

# Sum Product

NEWSLETTER #118 - September 2022

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**Excel's not dead!** In fact, it's Live – Excel Live – and we detail how below. As Microsoft focuses more and more on collaboration, Excel moves 'next gen' on interactive access. And talking of interactive, we also reveal details on no less than TWO upcoming summits!

We also provide you with another Beat the Boredom Challenge to keep your Excel brain nimble, and complement this test with articles on Charts & Dashboards, Visual Basics, Power Pivot Principles, Power Query Pointers and Power BI Updates. We finally get to the end of our imaginary Excel functions series too, although our focus on **CTRL + SHIFT** keyboard shortcuts appears to continue unabated (how would you "function" without them..?)!

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

*Liam Bastick*, Managing Director, SumProduct



## Excel Virtually Global 2022



# EXCEL VIRTUALLY GLOBAL 2022

We don't have all the details yet – but it's time to make an announcement as we're doing this mid-October!!

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

How much would you be prepared to pay for the likes of Excel (and other) MVPs, Microsoft staff and other industry experts to present on a variety of Excel topics **in your house?**

Well, it's an option. For a third successive year, our usual **Excel Summit South** will not be held this year due to the current worldwide logistics. But again, we won't be beaten. We'll just go even bigger. And even better. And, er, even more global. And cheaper. And it's for charity.

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

Topics and presenters have not yet been agreed, but you know the drill! We'll round a few up and get them to entertain you. Dates will be in

the week commencing **Monday 17 October 2022**, with precise dates and times to be announced SOON.

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

Most sessions will be recorded so you may watch them later with downloads aplenty – there are no medals for staying up to watch the entire event live! That's just as well, as we plan to beat last year's marathon (no guarantees), which lasted a "mere" 60 hours. And it nearly killed us! 😊

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

More details will be available in the News section of our website soon: [www.sumproduct.com/news](http://www.sumproduct.com/news).

Hopefully, we'll see you there!



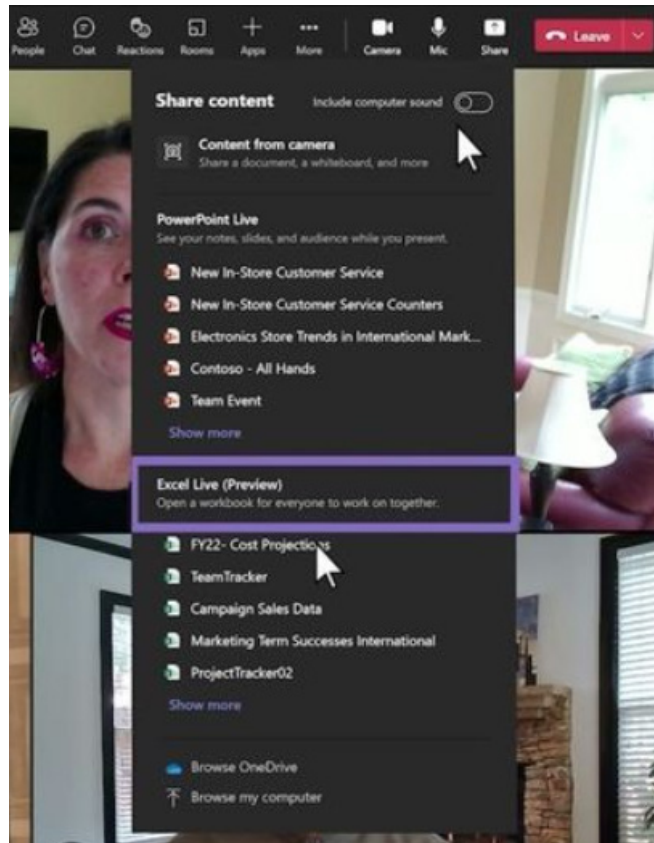
## Introducing Excel Live

Given how many of us work remotely some or all of the time, collaboration online is becoming more and more important. Last year, Microsoft introduced PowerPoint Live, which assisted presenting in Microsoft Teams. This year, at the recent Microsoft Build 2022, Live Share was introduced into Public Preview, which provides developers with the opportunity to take third-party apps beyond passive screen sharing and enables participants to jointly watch, edit and create in Teams.

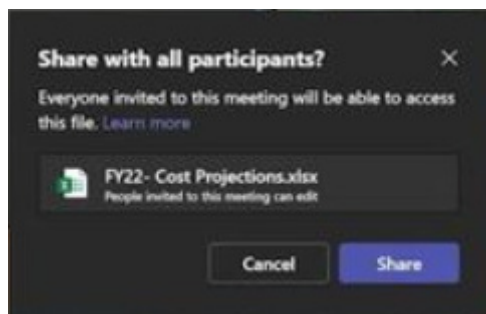
Until now, sharing spreadsheets within a Teams meeting has been a case of “one person presents, the rest watch”. Now, it’s possible

to collaborate. Microsoft has announced an enhanced collaboration solution for working on Microsoft Excel workbooks, called **Excel Live**, to allow your colleagues and you to collaborate in real time within your Teams meetings.

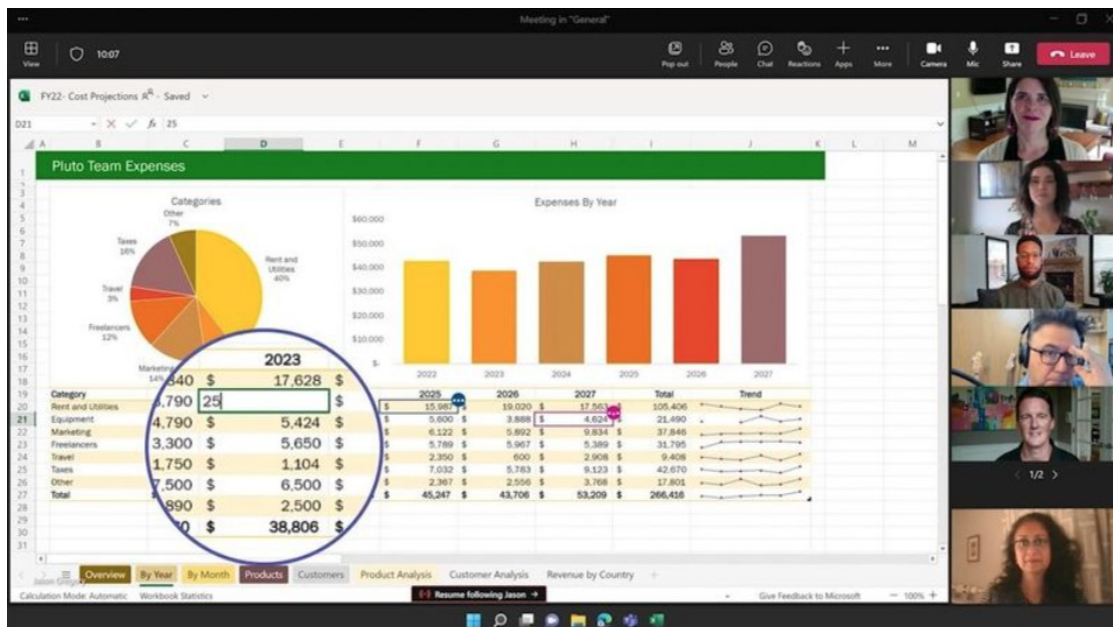
To use it, simply click the Share tray in Teams and scroll down to ‘Excel Live’, where you’ll see a list of your recent Excel workbooks.



Then, select the workbook you want to share. You’ll be asked to share access to the file with meeting participants. Choose Share.



After sharing access, everyone in the meeting can now edit the Excel file directly from the meeting screen in Teams.



The Teams meeting window now becomes a canvas for all participants to work together. Participants can follow the presenter, interact and edit the workbook, without ever leaving the meeting screen. You don't even need to have Excel running on their device.

This may also be accessed from within Excel for the web. For example, if you have a workbook open that you want to share in a Teams meeting, just click Share, then Work together in Teams.

You may want to look at the data your way, while working together, so Excel Live supports Sheet Views, which allows everyone co-editing the workbook to create customised views to sort or filter information however

needed (without disrupting anyone else's view). The workbook loads for each participant at the optimized zoom level with flexibility to adjust zoom based on their preferences. You'll be able to set permissions or use 'Show changes' to double-check the edits that were made during a call.

Excel Live will be available in Public Preview at the end of August.

If you are unsure of how to get such a Preview:

- IT administrators need to set an update policy that turns on Show preview features
- users then choose to join the Public Preview individually.

## My Data Summit

# My Data Summit

{ Every Data Has A Value }



On September 5, 8 and 9, SumProduct's **Liam Bastick** will be presenting at the next big Excel virtual event (<https://mydatasummit.com/>) on the topics of *Financial Modelling in Power BI* and *Best Practice Financial Modelling* (in Excel - not boring, we promise!!) with lots of cool tricks to make your life easier.

You can make sure you get your ticket for My Data Summit 2022 and use coupon code **LIAM-10** (if only that were my age!) at checkout [<https://lnkd.in/gZ4tDT98>] for 10% off the event ticket and masterclasses.

My Data Summit 2022 features keynote speakers from Microsoft, presentations by 33 experts and nine [9] masterclasses. The presentations

and classes will cover Microsoft Excel and Microsoft Power Platform topics. The sessions will be recorded so you can catch those you miss or want to watch again!

The Summit runs from September 5th through September 7th, and Masterclasses will take place on September 8th and 9th. Don't miss out on this opportunity to improve your skills in both Excel and Power Platform. Register today!

Check out the My Data Summit 2022 agenda here: <https://lnkd.in/gvZQ5u-t>.

# Beat the Boredom Challenge

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

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

This month’s challenge can be answered using the new function **TEXTSPLIT** (albeit not yet available in all versions of Excel), Power Query or by using Text to Columns in seconds. But that’s not what we want here. The aim is to find a formulaic solution that may be used in all versions of Excel. That’s a little trickier...

## The Challenge

They say sometimes the most complex problems are those that take only moments to communicate. If that’s true, then this month’s challenge might cause some fun and games!

“All” I want to do is take a text string and split it up so that each element of text is split into a separate column **formulaically**, e.g.

Data					
alpha,beta,gamma,delta		alpha	beta	gamma	delta
0; 1.2; 3.45; 6.789		0	1.2	3.45	6.789

Note I have used different separators (delimiters) in the two examples displayed. The fact I have used four elements each time is entirely coincidental. This month’s challenge is “simply” to come up with a formula that will produce the desired results.

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 look at data ranges and data tables for charts.

## Data Ranges

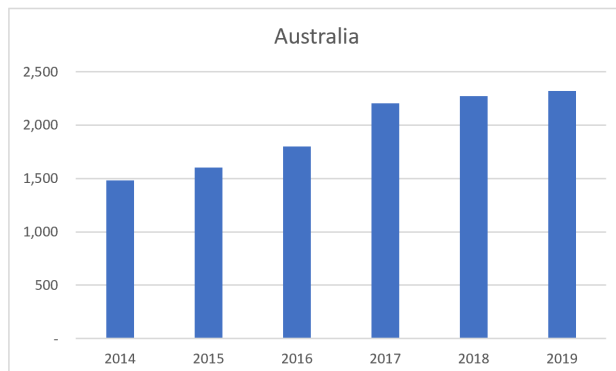
A data range is simply a set of data that has been organised in a certain way for it to be converted into a chart, viz.

	2014	2015	2016	2017	2018	2019
Australia	1,481	1,603	1,798	2,206	2,270	2,318
Canada	1,833	2,225	1,850	2,948	3,145	3,208
Denmark	792	830	733	905	721	900

In general, good chart data is data that is structured in such a way that is easy to construct the consequential chart. For instance, to create a Bar chart, data would be best organised in a continuous range of cells:

	2014	2015	2016	2017	2018	2019
Australia	1,481	1,603	1,798	2,206	2,270	2,318

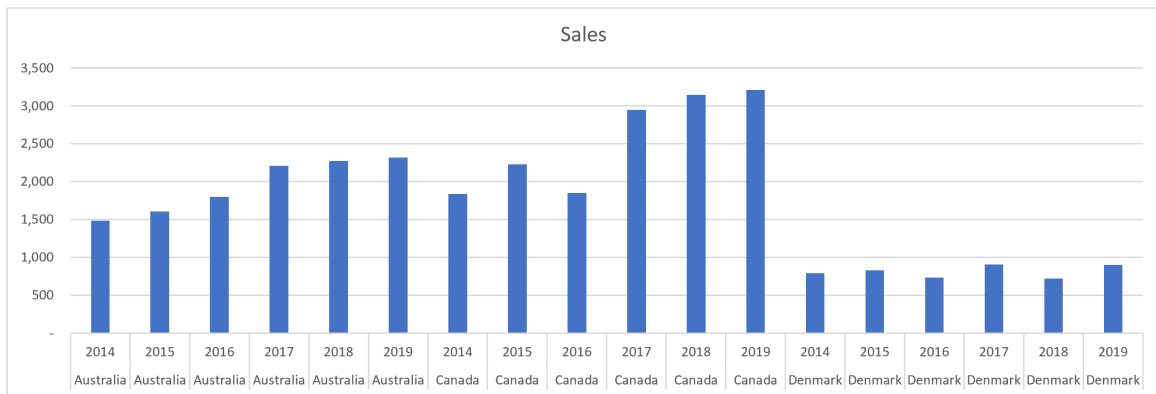
The table above will produce the following graph:



The following image is still considered a data range; it is just not formatted:

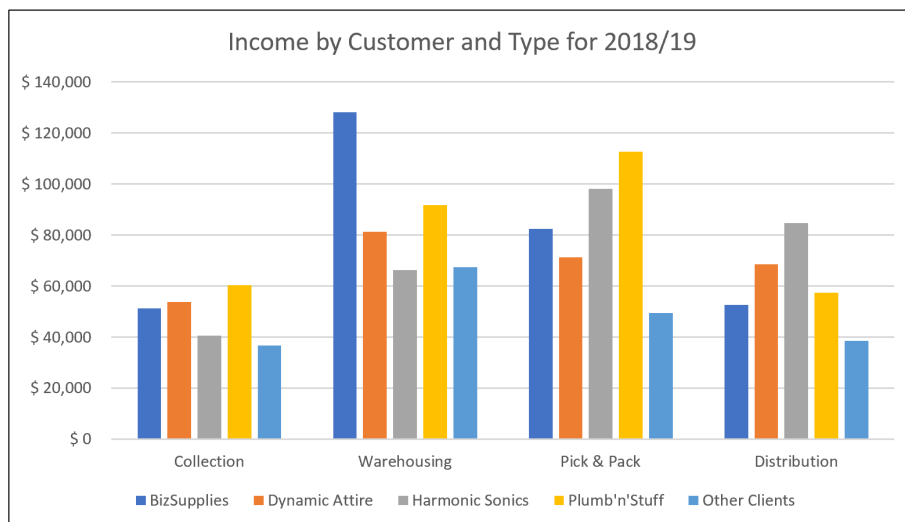
Country	Year	Sales
Australia	2014	1,481
Australia	2015	1,603
Australia	2016	1,798
Australia	2017	2,206
Australia	2018	2,270
Australia	2019	2,318
Canada	2014	1,833
Canada	2015	2,225
Canada	2016	1,850
Canada	2017	2,948
Canada	2018	3,145
Canada	2019	3,208
Denmark	2014	792
Denmark	2015	830
Denmark	2016	733
Denmark	2017	905
Denmark	2018	721
Denmark	2019	900

Now to be clear the data is neither dirty nor bad. The data is just in a format that is not in a favourable format when creating a chart, *e.g.*

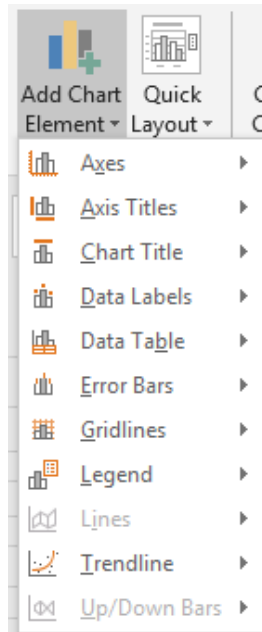


### Data Tables

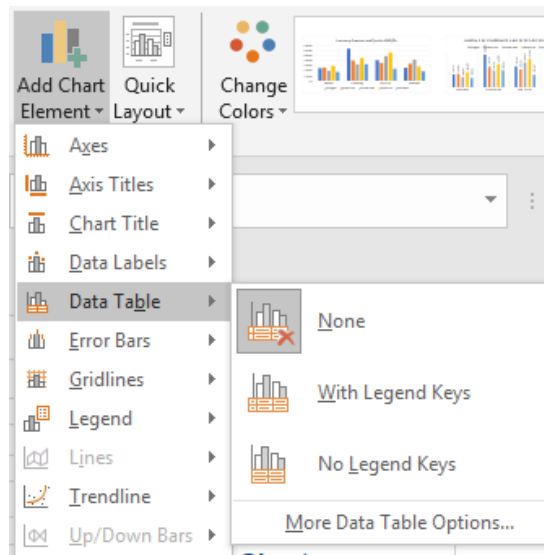
Charts may be built with a data table displayed within the chart. The 'Data Table' option may be enabled through selecting the chart:



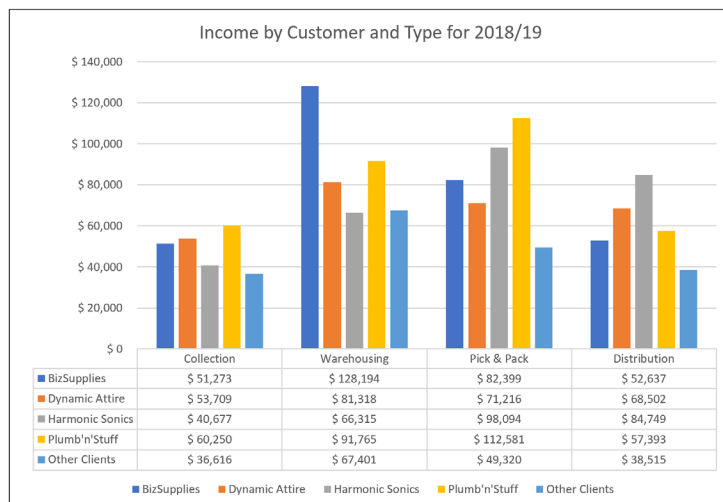
Navigate to the Design tab on the Ribbon and then select the 'Add Chart Element' option in the 'Chart Layouts' group:



This will bring down a dropdown menu where I can select the 'Data Table' option.



We may then opt to have a Data Table with or without legend keys. In the example below, we have opted to include legend keys so that it is easier for the end user to understand:



Data Tables are an important tool to have in your toolkit while producing dashboards. Data Tables represent another useful way to show how different scenarios will play out when flexing certain key inputs. When you have one input to flex you can simply use a one-dimensional table.

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. This month, we consider *While Wend* loops.



Last month, we looked at For Each...Next loops. Therefore, it makes sense to spend “awhile” with While Wend loops this time. The syntax is very simple:

```
While condition
    [statements]
```

```
Wend
```

The condition must result in a Boolean value of **True** or **False**.

**While** tests the condition and if it is **True** then it proceeds to execute the statements inside the loop. **While** loops are preferred over **For** loops when the number of iterations is unknown, *e.g.* modelling how many days it takes to reach sales a target or running through a worksheet column until it reaches an empty cell.

Let's consider an example: Jack and Jill go up a hill, but they might go tumbling down at any point. Assume the probability of falling down with any step is 30% and independent of any steps previously taken. Let's model how many steps it takes for them to fall down. What needs to be done?

- take a step
- assess the probability if they have fallen down or not
- repeat if they haven't.

```
(General)
Option Explicit

Sub JackAndJill()

    Dim CurrentStepsTaken As Integer
    CurrentStepsTaken = 0

    Dim FallenDown As Boolean
    FallenDown = False

    While FallenDown = False

        CurrentStepsTaken = CurrentStepsTaken + 1

        If Rnd() <= 0.3 Then
            FallenDown = True
        End If

    Wend

    Debug.Print CurrentStepsTaken & " step(s) up the hill were taken."
    Debug.Print "Jack fell down the hill!"
    Debug.Print "Jill came tumbling after..."

Immediate
4 step(s) up the hill were taken.
Jack fell down the hill!
Jill came tumbling after...
```

Notice how our condition is tested first. This means that the code will not run at all if the condition is not met. **FallenDown** is a Boolean value, whilst the **While** statement may be used as the condition.

```
While FallenDown
```

```
...
```

```
Wend
```

This is equivalent to saying:

```
While FallenDown = True
```

```
...
```

```
Wend
```

**FallenDown** was initially set to be **False**. Using **FallenDown** as the condition for the loop would mean that Jack and Jill would never set foot on the hill.

**While Wend** loops are a remnant from the BASIC programming language and remains as a form of backwards compatibility. Using a **Do...Loop** statement is usually preferred. Loop back next newsletter to explore why these are considered superior to **While Wend**.

More next time.

## Power Pivot Principles

We continue our series on the Excel COM add-in, Power Pivot. This month, we consider how to create lookups in Power Pivot.

The ability to create lookup columns in Excel is very useful, especially when we have a table that only contains an identifier of some sort but the data we need, such as the product name, is stored elsewhere. For example,

let's assume that we have the following table that contains shipment data for some arbitrary given date:

	Date	Order ID	CustomerID	ProductID	Volume
1	14-Dec-18	10031	3162	503	500
2	14-Dec-18	10032	3094	503	750
3	14-Dec-18	10033	3699	505	250
4	14-Dec-18	10034	3410	407	200
5	14-Dec-18	10035	3300	685	150
6	14-Dec-18	10036	3397	423	50

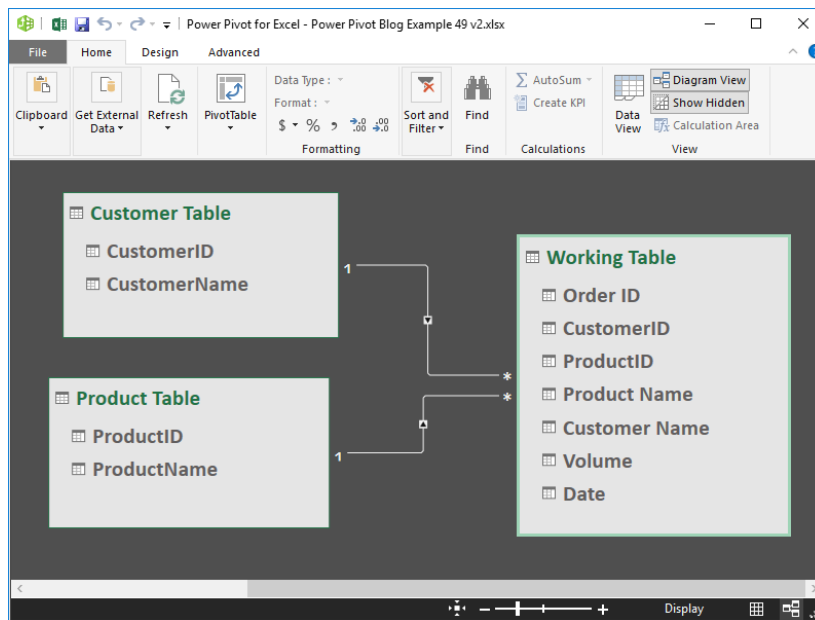
Yes, the table is useful however the table only contains the **Product ID** and **Customer ID**, making this particularly difficult to read for those of us who don't know product and customer IDs off the top of our heads. In this instance, the customer and product names are stored in other (related) tables, viz.

	Prod...	ProductName
1	503	Napkins
2	505	Paper Cups
3	407	Paper Plates
4	685	Pens
5	423	Office Table Type B

	Custo...	CustomerName
1	3162	SUSA
2	3094	Microhard
3	3699	Worthwools
4	3410	MWB
5	3300	Elux
6	3397	ATB

We can use the **RELATED** function to create two custom columns in the shipment table that will display the **Product Name** and **Customer Name**. You should note that before creating the custom columns, ensure that the three tables have been loaded to the data model and have established relationships between them.





To create our custom columns, navigate to the Power Pivot window and create a custom column on our **Shipping** table:

Date	Order ID	CustomerID	ProductID	Volume	Customer Name	Add Column
14-Dec-18	10031	3162	503	500		
14-Dec-18	10032	3094	503	750		
14-Dec-18	10033	3699	505	250		
14-Dec-18	10034	3410	407	200		
14-Dec-18	10035	3300	685	150		
14-Dec-18	10036	3397	423	50		

It's simple:

**=RELATED('Customer Table'[CustomerName]).**

We add another column for the **Product Name**:

Date	Order ID	CustomerID	ProductID	Volume	Customer Name	Product Name	Add Column
14-Dec-18	10031	3162	503	500	SUSA	Napkins	
14-Dec-18	10032	3094	503	750	Microhard	Napkins	
14-Dec-18	10033	3699	505	250	Worthwoods	Paper Cups	
14-Dec-18	10034	3410	407	200	MWB	Paper Plates	
14-Dec-18	10035	3300	685	150	Elux	Pens	
14-Dec-18	10036	3397	423	50	ATB	Office Table Type B	

**=RELATED('Product Table'[ProductName]).**

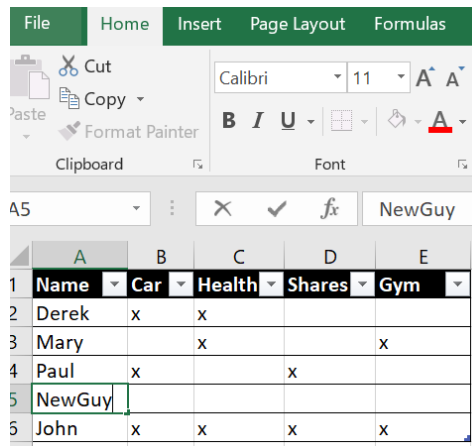
There we have it, using the **RELATED** function we have created a much more readable table.

More *Power Pivot* Principles next month.

# Power Query Pointers

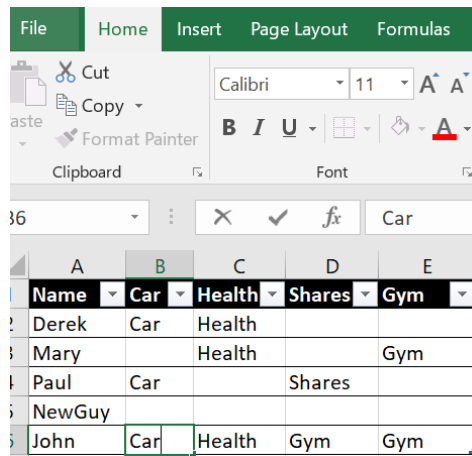
Each month we'll reproduce one of our articles on Power Query (Excel 2010 and 2013) / Get & Transform (Office 365, Excel 2016 and 2019) from [www.sumproduct.com/blog](http://www.sumproduct.com/blog). If you wish to read more in the meantime, simply check out our Blog section each Wednesday. This month, we look at a simple method to convert a check box into a name.

For this month's article, the easiest way to explain what we're trying to achieve is with a 'before and after' example. Let's start with this:



	A	B	C	D	E
1	Name	Car	Health	Shares	Gym
2	Derek	x	x		
3	Mary		x		x
4	Paul	x		x	
5	NewGuy				
6	John	x	x	x	x

Here, we have a simple table showing us our imaginary salespeople, and the benefits they have access to. However, instead of the x's, let's say we wish to put the name of the benefit into the table, so that we end up with this:



	A	B	C	D	E
1	Name	Car	Health	Shares	Gym
2	Derek	Car	Health		
3	Mary		Health		Gym
4	Paul	Car		Shares	
5	NewGuy				
6	John	Car	Health	Gym	Gym

This is then much easier to manipulate and merge with other tables. Therefore, we're going to look at a way to achieve this on a small scale, by adding new columns. Next month, we will look at a more complex version that will work for any number of columns.

Thus, to commence we'll create a query using 'From Table' on the 'Get and Transform' section of the 'Data' tab:

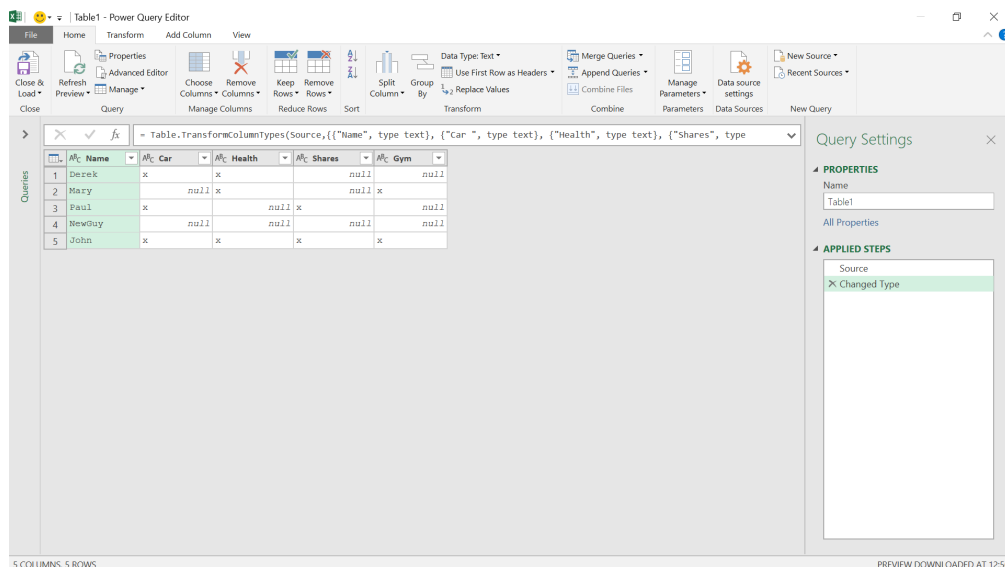


Table1 - Power Query Editor

Table.TransformColumnTypes(Source,{{"Name", type text}, {"Car ", type text}, {"Health", type text}, {"Shares", type text}, {"Gym ", type text}}

	Name	Car	Health	Shares	Gym
1	Derek	x	x	null	null
2	Mary		x	null	x
3	Paul	x		x	null
4	NewGuy			null	null
5	John	x	x	x	x

Query Settings

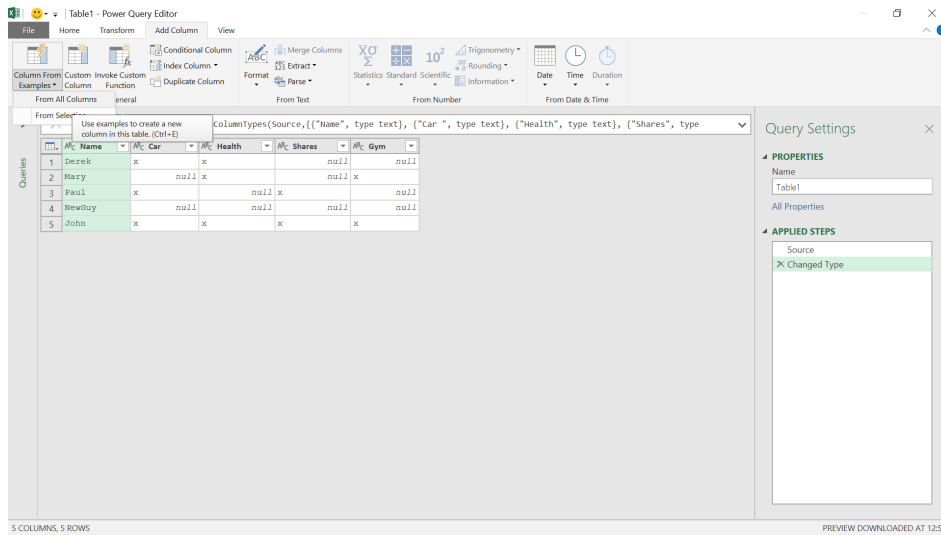
PROPERTIES

Name: Table1

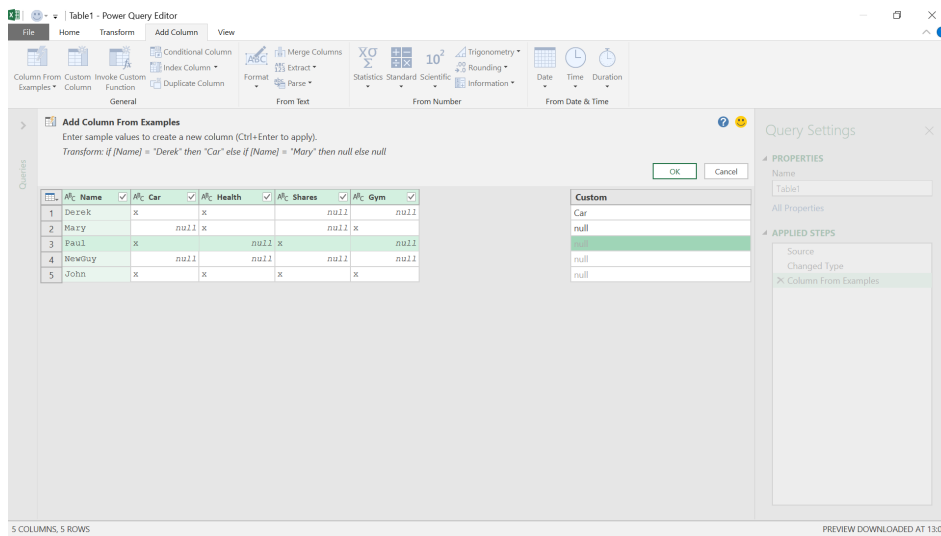
APPLIED STEPS

- Source
- Changed Type

We will use the 'Add Column from Examples' on the 'Add Column' tab.



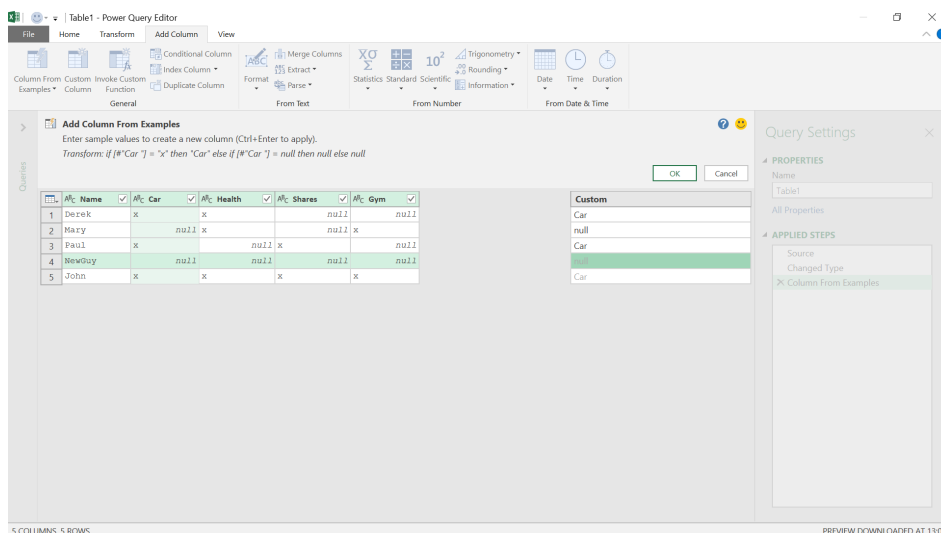
Let's provide ourselves with the option of using any column, and we'll start typing what we would like to see in a new version of the Car column, viz.



It's important to keep an eye on the formula at the top of the screen:

**Transform if [Name] = 'Derek' then 'Car' else if [Name] = 'Mary' then null else null**

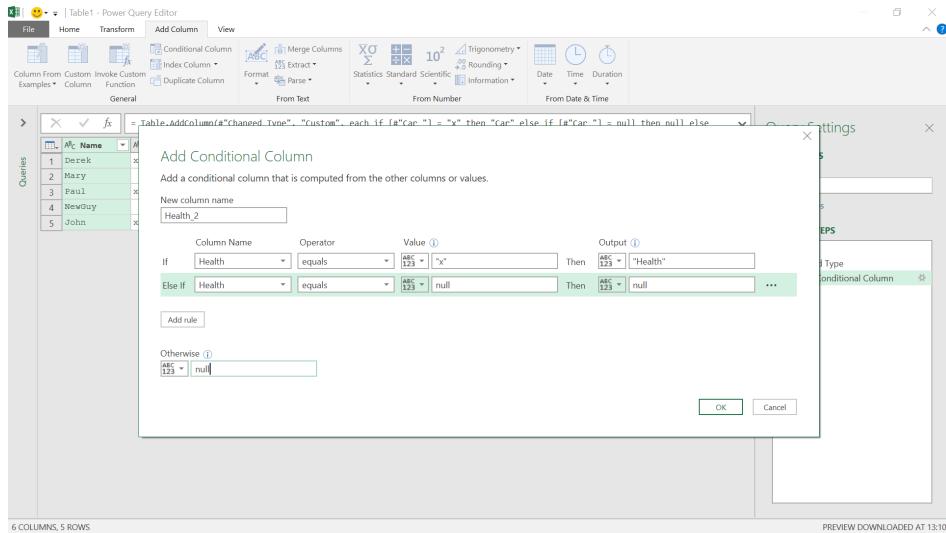
This is clearly not what we want so let's enter another example:



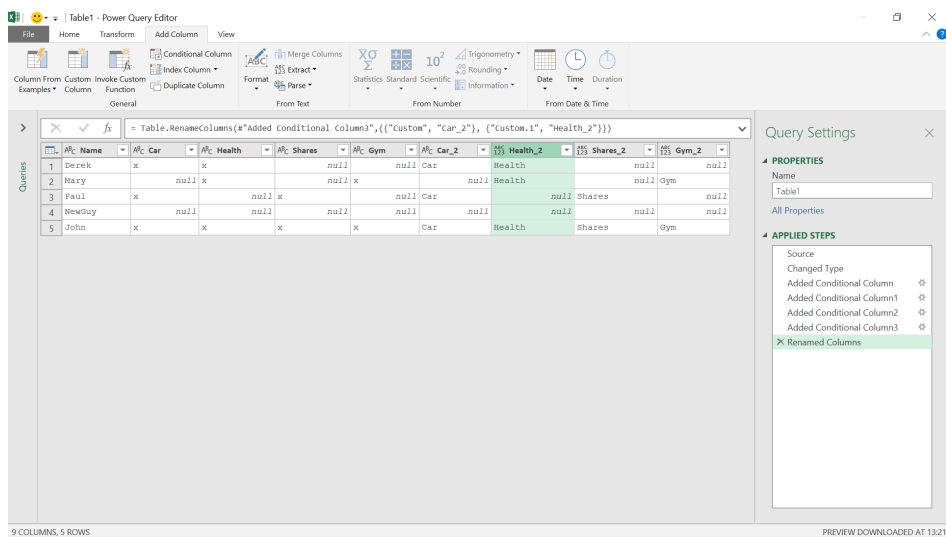
This is what we're looking for:

**Transform if [#"Car"] = "x" then "Car" else if [#"Car"] = null then null else null**

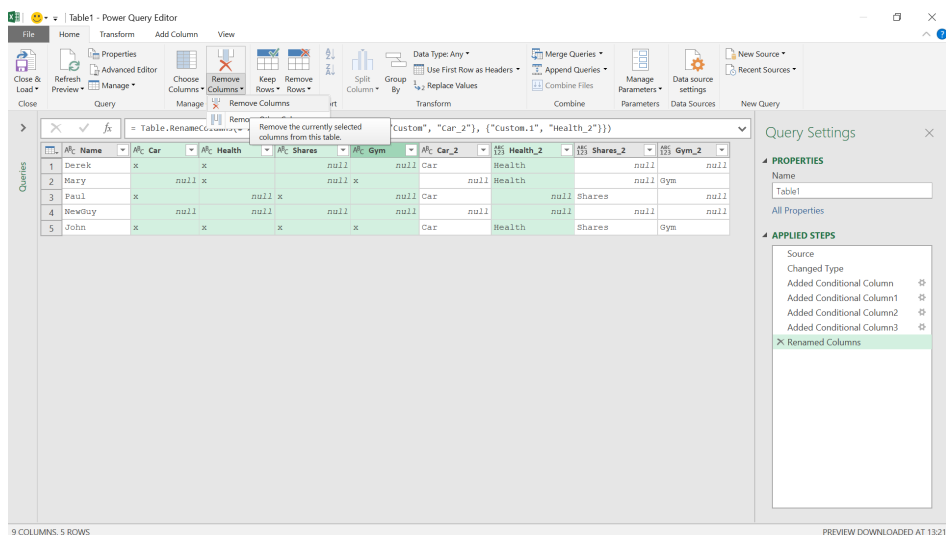
This is replacing our x's with 'Car'. We may then either add all our columns in this way or else use 'Conditional Column' and use the same idea for our other columns. An example of this alternative approach is shown below:



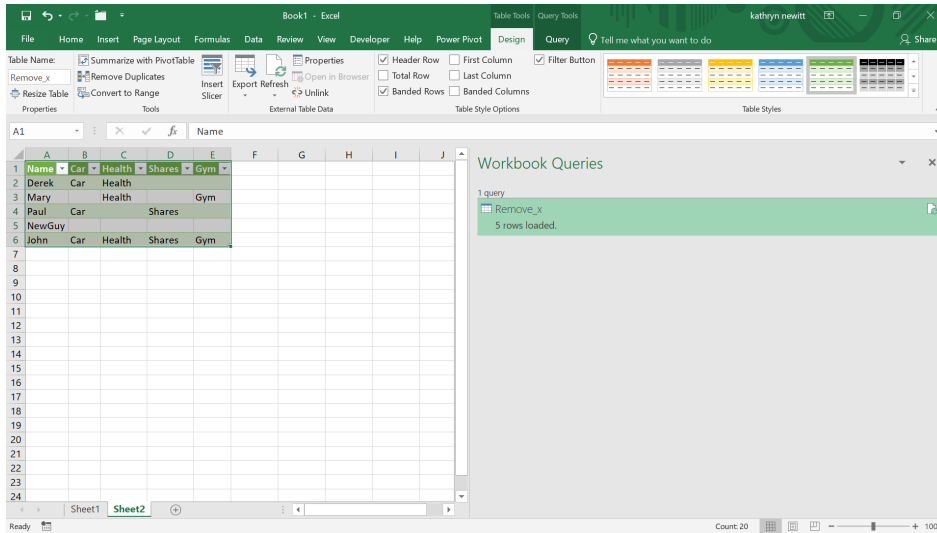
Having added all four new columns, we have the desired format:



We may then delete our original columns from the Home tab using the 'Remove Columns' option.



We then rename the columns and 'Close & Load' the data to the Excel worksheet.



This is fine if we have four columns, but what if there are hundreds? Also, whilst this query may be refreshed if new employees join the company, what if new benefits were introduced? Next month, we'll show a different method which will work for any number of columns...

So as we say, more next month!

## Power BI Updates

This month's updates see the announcement of a variety of new features such as the conditional formatting for data labels, the new 'Select sensitivity label' dialog, a data loss prevention policy update and DAX Editor improvements. The full list is as follows:

### Reporting

- Conditional formatting for data labels
- New 'Select sensitivity label' dialog
- Data loss prevention policy update
- Metric visual
- Mobile formatting now supports text box visuals

### Modelling

- DAX Editor improvements

### Data connectivity and preparation

- MariaDB (Connector Update)
- Google Sheets (Connector Update)
- Certified connectors availability in Power BI dataflows and datamarts

### Mobile applications

- Follow metrics from your mobile application

### Developers

- Introducing a new way to manage, enforce and transact licences for Power BI visuals

### Visualisations

- New visuals in AppSource
- Drill Down Combo Bar PRO by ZoomCharts
- Inforiver charts

### Other

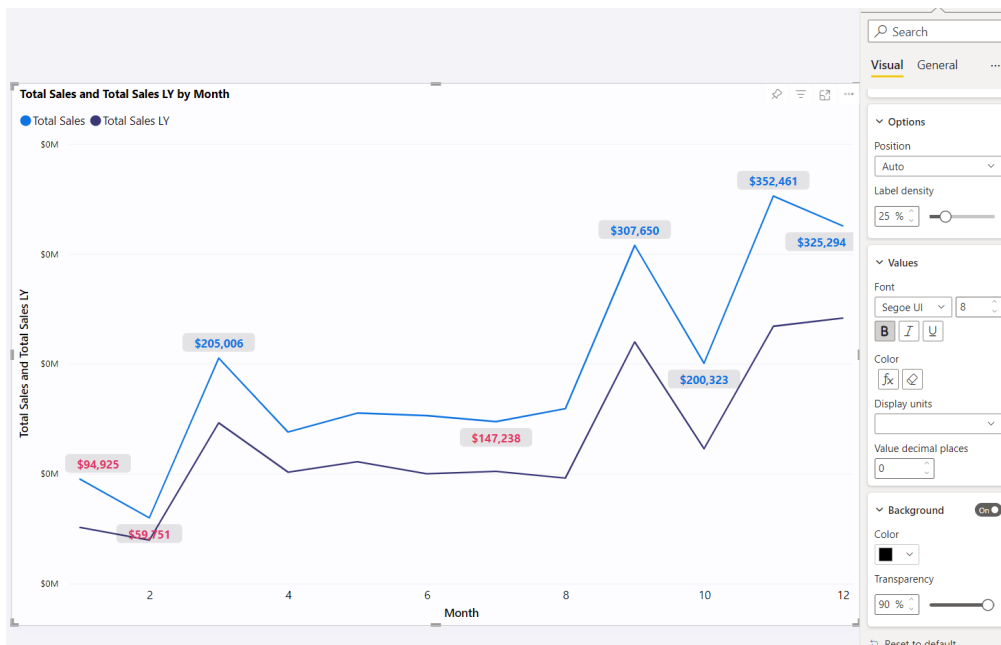
- Visualising views in Dynamics 365 with Power BI General Availability
- More ways to optimise Power BI performance.

Let's now go through each in turn.

### Conditional formatting for data labels

When conditional formatting for data labels was first introduced to Power BI Desktop last year, the scope at which Power BI evaluated your conditional formatting rules was based upon the full aggregate of the field across the whole visual, rather than at each data point. This caused all data labels in the visual to come out to the same colour. This was not exactly a crowd favourite, and it has been amended with this update.

With this update, conditional formatting on data labels for visuals with one or more measures and no field in the Legend field well will now evaluate for data points. The example (below) shows data labels for sales from this year coloured blue if sales grew above a certain threshold over last year, else red if they did not:



You can find the conditional formatting options for these labels in the Formatting pane, under **Data labels** -> **Values** -> **Color**. You may set conditional formatting rules for all measures or for individual measures. Formatting set on individual measures takes precedence. Therefore, if you've explicitly set a colour for data labels on all measures and add a conditional formatting rule for just one, the conditional formatting rule will apply to that measure.

It should be noted that conditional formatting rules for data labels that you've set on current reports already will be unaffected. This is good for preserving backward compatibility, but not so good necessarily for getting the per-datapoint "correct" behaviour out to authors. You can get this new behaviour simply by editing your report on this version of Power BI and reapplying the colour conditional formatting rule onto your relevant data labels.

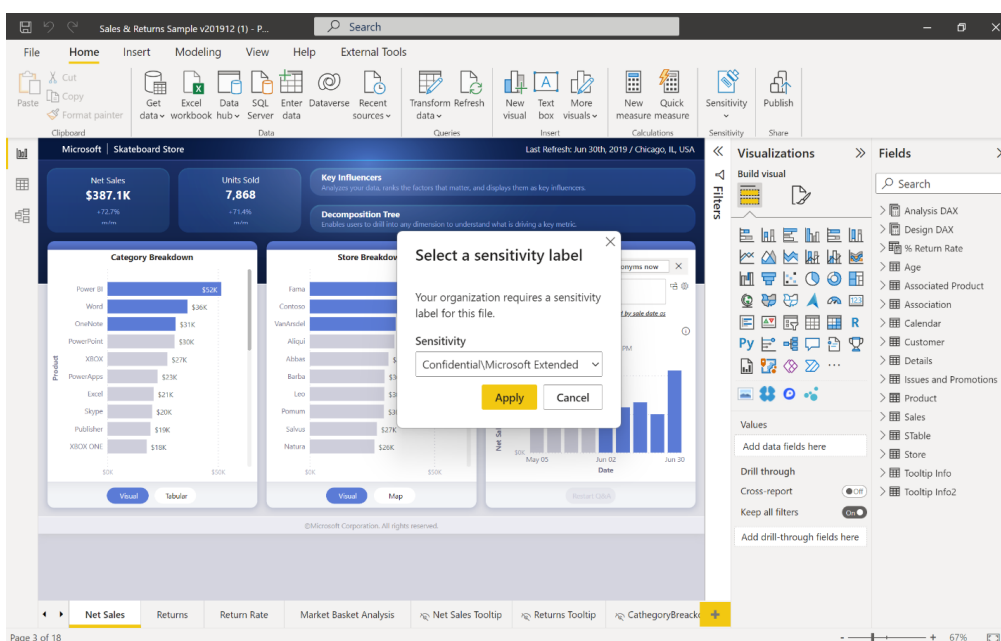
In an upcoming release, Microsoft has stated that they will bring this same behaviour to visuals where you also have a field in the Legend field well. The company has admitted they have discovered a critical bug preventing them from shipping the whole feature this month, so they decided to compromise in order to get one half of it out early. In anticipation of the rest of this update, Power BI has removed conditional formatting button from the Formatting pane for data labels in cases where you have a measure grouped by a legend field. This has been modified to prevent more users from setting up the "wrong" conditional formatting rules.

More very soon.

### New 'Select sensitivity label' dialog

For tenants requiring sensitivity labels on their reports, Power BI now allows creators to set the sensitivity label directly from the save flow. Previously, the dialog would produce a message re-directing the user to

find and use the Ribbon dropdown instead. This new dialog helps save creators time searching for the sensitivity labels settings in the Ribbon to complete their save.



### Data loss prevention policy update

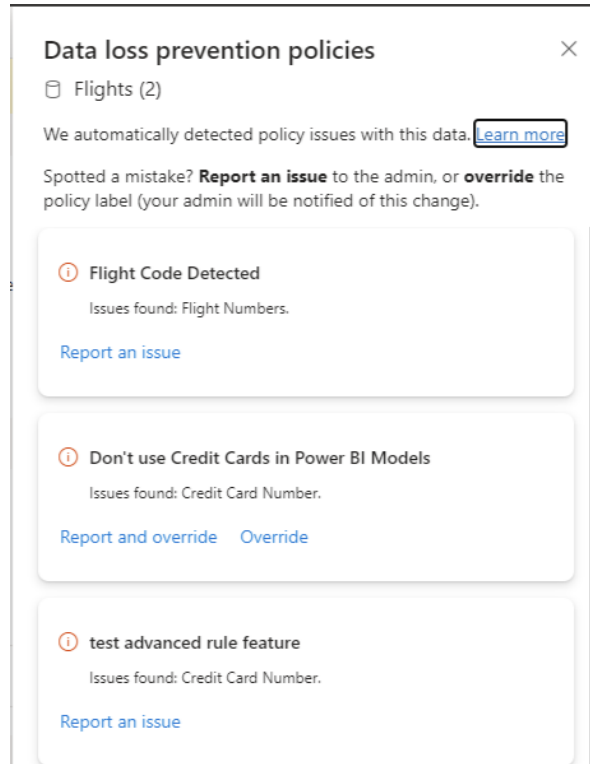
Earlier this year, Microsoft Purview DLP policies were released for Power BI into public Preview. These DLP policies enable you to better control the sensitive information managed in your Power BI tenant, as well as comply with governmental or industry regulations, such as GDPR (the European Union's General Data Protection Regulation).

This month, the ability for Power BI users to provide feedback on the policy rules evaluating their datasets has been introduced. In the dataset's Detail page, you will now be able to see all the policy rules that have been detected for this dataset. A side panel will appear with a card representing each and every rule. On top of viewing all the matched rules, data owners will be able to take action if they believe the data was falsely identified.

Based upon how the policy rule was configured, you will be able to see one or a combination of these actions:

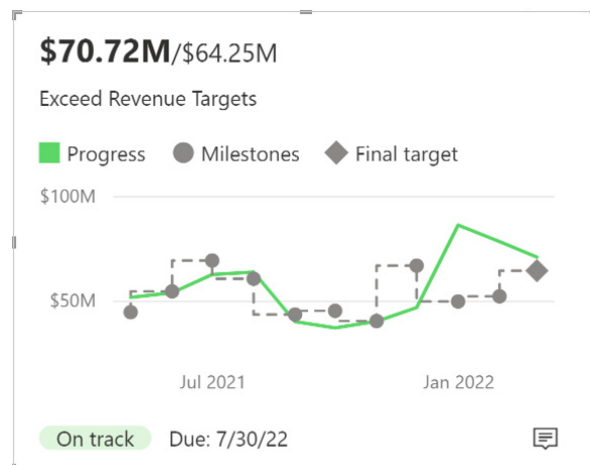
- **Report an issue:** report the issue as a false positive (meaning that the policy has mistakenly identified non-sensitive data as sensitive, for example)
- **Override:** override the policy. Overriding a policy means that this policy will no longer evaluate this particular dataset. Depending upon the policy configuration, you may be required to provide a justification for the override
- **Report and override:** report the issue as a false positive and override the policy.

These tools have been provided to Power BI users so that they may provide insight on the datasets met with rules defined by the Security Admins in Microsoft Purview Compliance Portal and help create a built-in line of communication to ensure smooth operation on both teams.

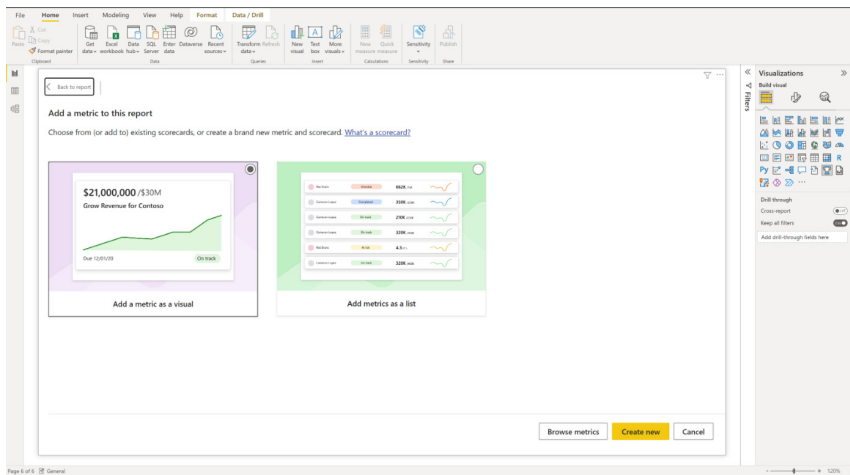


### Metric visual

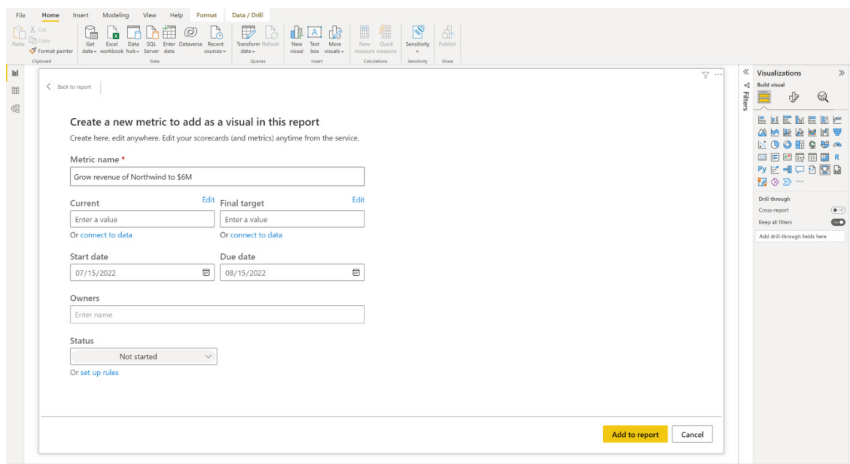
The Metric visual is now available in Power BI Desktop. This visual provides a considerable level of flexibility in integrating metrics into your Power BI reporting solutions. You may now include individual metrics instead of the entire scorecard and create report pages showcasing metrics alongside other visuals, in the context of the rest of the report data.



You may either create a new metric or add a metric from an existing scorecard as a visual in the report.



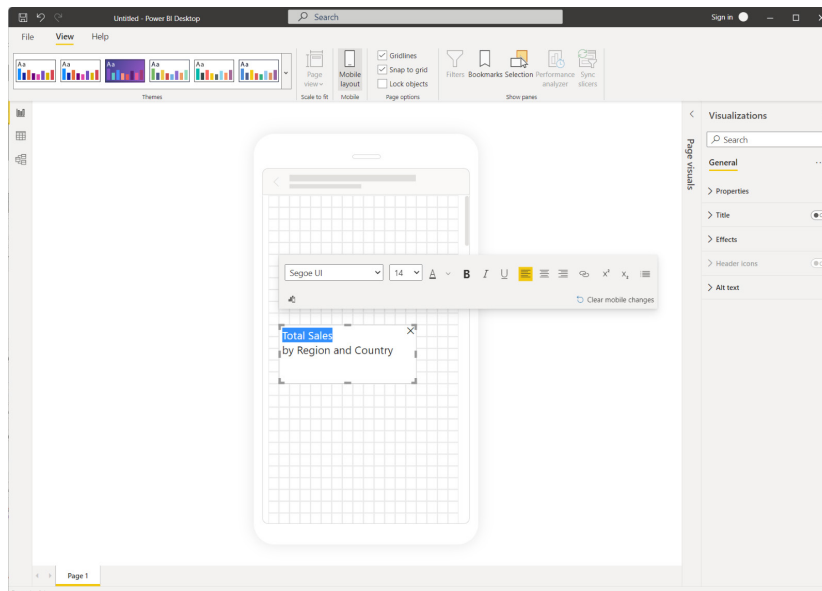
You can create a metric by either entering values or connecting to data in reports you have access to.



You can view notes, perform check-ins and set up rules on this metric similar to the methodologies required on a regular scorecard. Furthermore, you may also format the metric visual to the look and feel of the rest of the report and it is configurable with options to turn the individual metric elements (such as targets, owner etc.) on / off.

### Mobile formatting now supports text box visuals

In this release, mobile formatting has been extended to support text box visuals. Now, when you add a text box to the mobile canvas, you can change its Format settings to best suit the mobile-optimised view you're creating.





## DAX Editor improvements

In this update, Microsoft has commented that they “...have been working hard on improving the DAX editing experience after [they] changed some core components at the end of last year”. With this update, they have announced that they have now fixed the most common issues and welcome any feedback – positive and / or negative.

## MariaDB (Connector Update)

The MariaDB connector has been updated to resolve customer-reported bugs.

## Google Sheets (Connector Update)

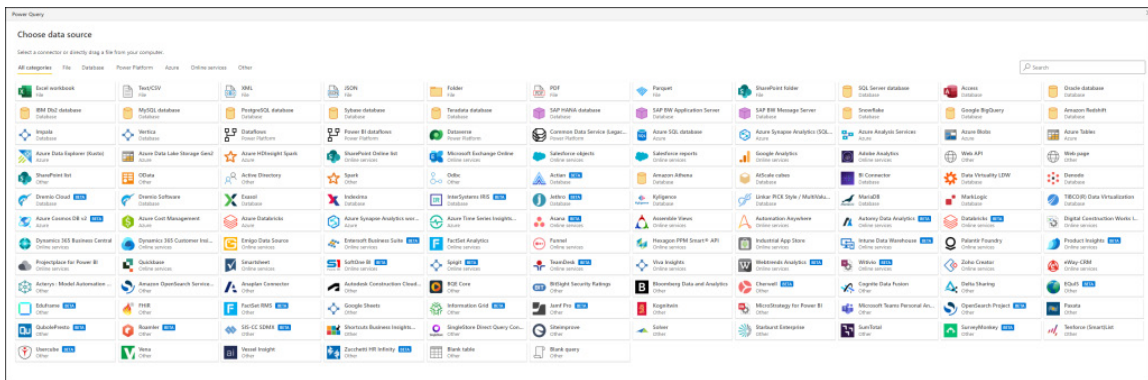
The Google Sheets connector has been updated to include a direct link to Google Sheets documentation.

## Certified connectors availability in Power BI dataflows and datamarts

80+ additional data sources (all certified connectors) are now available in the Power Query Online experience for use in Power BI dataflows and datamarts. This means that Power BI dataflows and datamarts creators have the option to connect to many more data sources in Power Query Online experiences, similar to Power BI Desktop today.

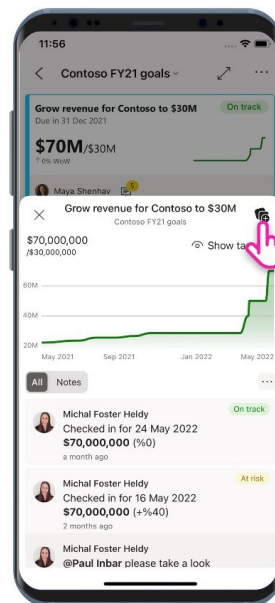
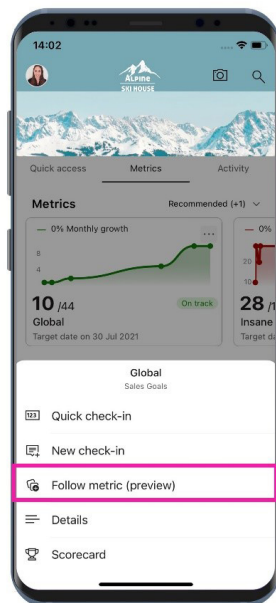
Notable additions include:

- Anaplan
- Asana
- Azure Databricks and Databricks
- Denodo
- Dremio
- Google Sheets
- HexagonSmartAPI
- MariaDB
- Palantir Foundry
- Planview Projectplace
- Starburst Enterprise
- SurveyMonkey.



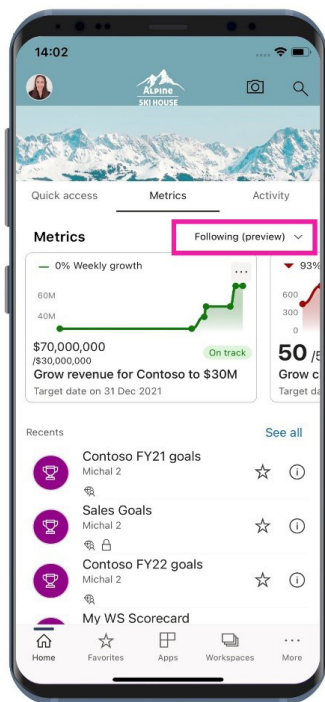
## Follow metrics from your mobile application

Now you can follow metrics directly from the mobile application and keep up to date with the activity on those metrics. To start following a metric, just tap 'More options' (...) on a metric's card in the Metrics hub or in the metric's Details pane and choose 'Follow metric'.



To view all the metrics you're following, select 'Following' in the Metrics display list, accessible from the Metrics hub. It makes no difference whether the metric was marked for 'Following' in the Power BI Service

or in the mobile application; you will see them all. Likewise, in the Power BI Service you'll also be able to see all your followed metrics, including those that you started following from the mobile app.



### Introducing a new way to manage, enforce and transact licences for Power BI visuals

Microsoft recently announced a key feature for AppSource visuals: it is now possible to sell, manage and enforce licences directly through the commercial marketplace. Developers may use the new licencing API,

available with API version 4.7 and July release of Power BI Desktop, to enforce the licence and provide a unique standardised licencing experience for end users.

### New visuals in AppSource

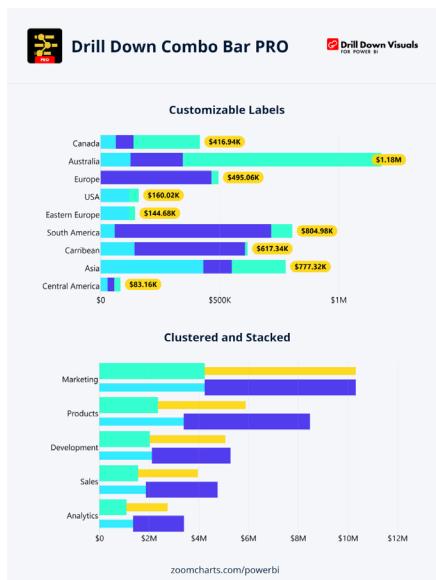
The following are new visuals this update:

- Video by CloudScope
- Collage Pro by CloudScope;
- Inforiver Charts by Inforiver.
- Collage NextGen by CloudScope

### Drill Down Combo Bar PRO by ZoomCharts

Drill Down Combo Bar PRO offers a wide selection of customisation options, letting creators build a large selection of charts from a single custom visual. You can build everything from regular Bar charts to Box

and Whisker plots. This visual also offers powerful cross-chart filtering capabilities combined with intuitive on-chart interactions.



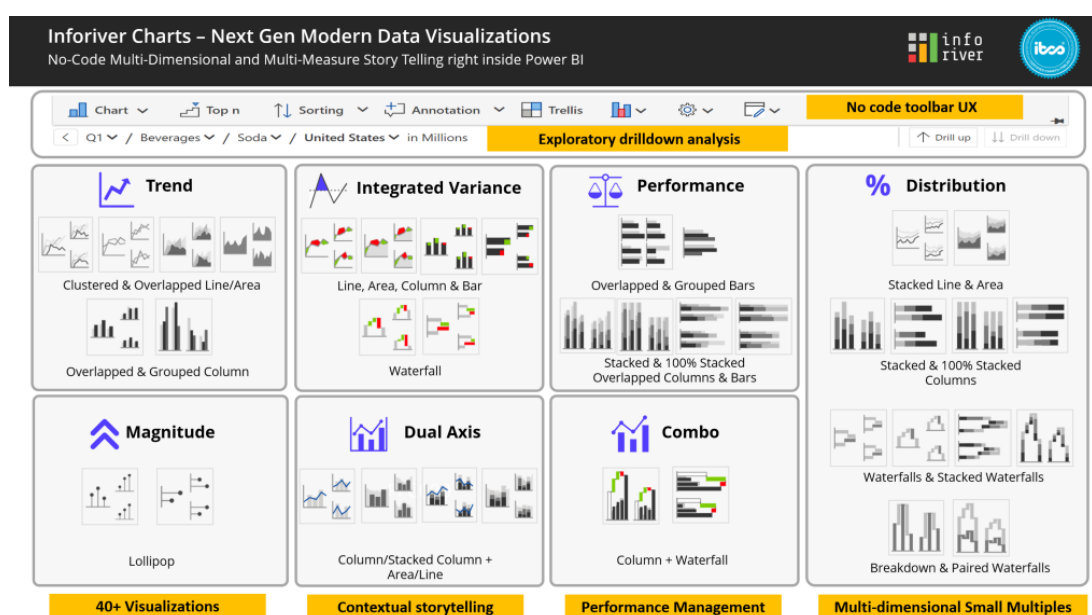
Main features include:

- **multiple chart types:** choose between Column, Line and Area charts
- **full customisation:** customise x and y axes, the legend, stacks, clusters, ToolTips, outline and fill settings
- **stacking and clustering:** choose normal, 100% proportional or zero-based stacking
- **customise series:** up to 25 may be customised
- **static and dynamic thresholds:** set up to four [4] thresholds to demonstrate targets or benchmarks
- **conditional formatting:** take customisation to the next level
- **use series defaults and value labels defaults:** to customise multiple series simultaneously
- **ToolTip field support:** now available
- **multi-touch device friendly:** get the same experience on mouse and touch input devices.

You may try Drill Down Combo Bar PRO now by downloading the visual from AppSource.

## Inforiver charts

Inforiver charts is a quick way to explore, visualise and share performance management insights in Power BI. Using 40+ advanced visualisation options, users may build data stories in minutes and share actionable performance insights through an intuitive no-code user experience (UX).



Key highlights:

- **performance management visualisations** for both comparative and non-comparative measures with integrated variances in a single click. Variances for the prior year, budget and forecast data are calculated automatically
- **exploratory analysis** with contextual drill-down, drill-up and drill-across navigation across multiple dimensions
- **storytelling and data-point annotations** to tell compelling stories using dynamic data-level annotations. This supports small-multiples and flexible text orientation
- **advanced small multiples / Trellis** to analyse across various data categories in a single click with highly responsive layouts, context-based titles, analytics and comments
- **integrated KPI Cards** with multiple conditional formatted KPI Metrics, benchmarks and variances
- **rich feature set** which includes mostly frequently requested capabilities in Power BI Idea place and Power BI user community, such as:
  - o measure-driven data labels
  - o Stacked Waterfall chart
  - o Gradient Line chart.

Inforiver is certified by International Business Communication Standards (IBCS) and is available in AppSource to try and buy.

## Visualising views in Dynamics 365 with Power BI General Availability

This update includes the announcement that the Power BI integration in Dynamics 365 and model driven Power Apps, which shipped as a Preview last December, is now Generally Available. Dynamics 365 and model driven Power Apps give organisations the ability to quickly build essential line-of-business apps in a low-code environment, increasing agility and modernizing processes.

Since these apps are all built on top of Dataverse, they're backed by your core business data. With this integration directly on views, information workers are now able to tap into this data and explore it using Power BI's powerful data analytics capabilities without ever needing to leave their app. All you have to do is click the 'Visualize this view' button and let Power BI automatically create a report on top of the exact data you were looking at.

## More ways to optimise Power BI performance.

Recently, settings were introduced in Power BI Desktop that allowed optimisation of Power Query query execution performance. This month, new settings have been added to influence the Power BI engine query execution further. Together, these settings enable you to optimise the

performance of Power BI whilst data is being imported or DirectQuery queries are being executed. For example, in case data import is taking too long or DirectQuery queries are slow or slowing down source systems, these settings can help you optimise performance.

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

## New Features for Excel

Aside from Excel Live (please see earlier in this newsletter), there are other additions / improvements to Excel this month too. These updates are as follows:

### Excel for the web

- Search for fields in the PivotTable Field List
- Power Query Group operations are now available

### Excel for Windows

- Control automatic data conversions (Insiders Beta)
- Natural Language Query improvements (Current Channel and Monthly Enterprise Channel)

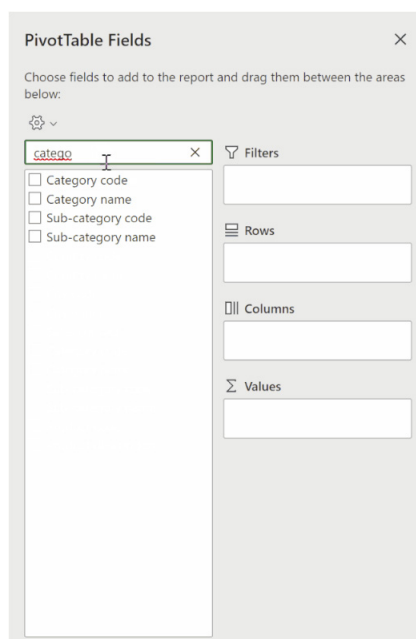
### Excel for Mac

- Natural Language Query improvements
- Resizable Conditional Formatting dialog (Insiders Beta).

Let's plough through.

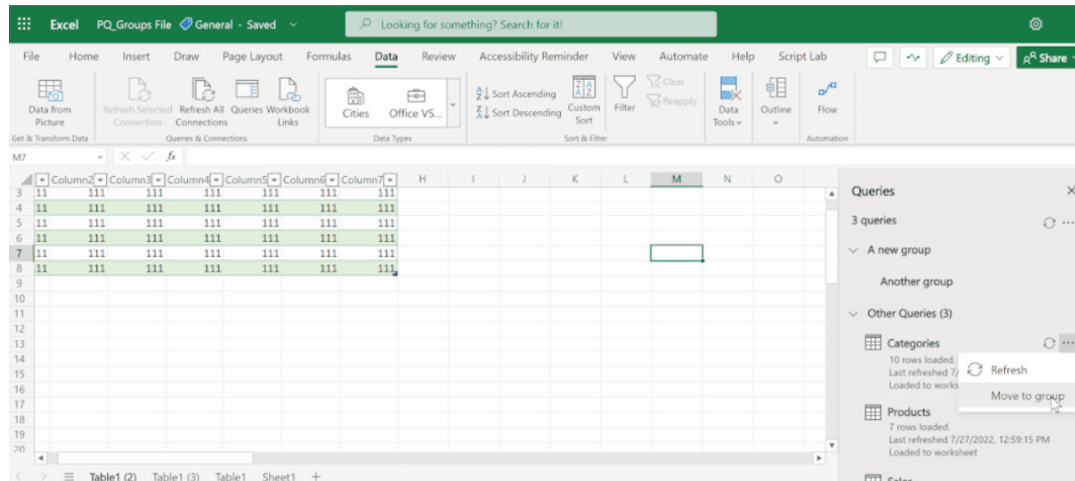
### Search for fields in the PivotTable Field List

Microsoft is rolling out an update to the PivotTable Field List in Excel for the web to enable users to easily search for fields in their PivotTables. If you don't see this feature yet, don't worry, it's on its way!



## Power Query Group operations are now available

Power Query has been further enabled in Excel for the web this month, with the advent of Group operations to the Queries pane. This will allow you to better sort your queries and perform various operations on query groups.

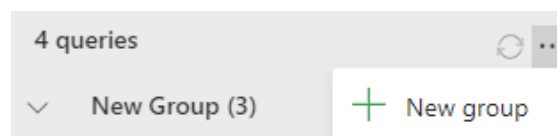


This new functionality is available to all Office 365 Subscribers on Excel for the Web.

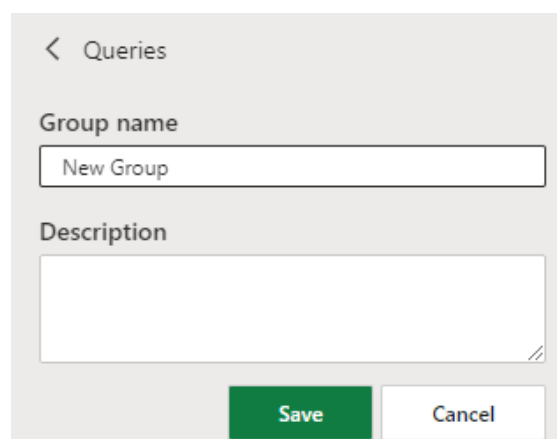
You can now perform various operations on Power Query groups to better organise your queries and easily consume the data on the Queries pane. To begin, open the Queries pane, select the Data tab and then choose Queries.

### Create a new group

- Select the top-level button and then choose 'New group'



- Give the new group a name; you can also enter a description should you wish
- When you are done, choose Save



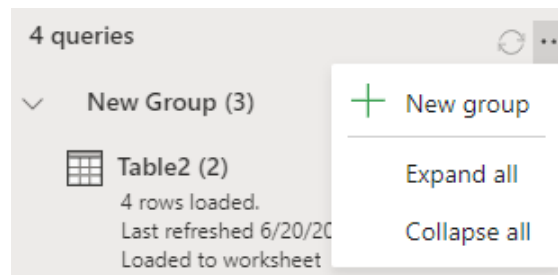
- You will see the new group was created:



You should note that until you move queries into groups, all queries will be listed under the 'Other queries' group.

## Expand / collapse all groups

- Select the top-level button and then choose 'Expand all' / 'Collapse all' as required

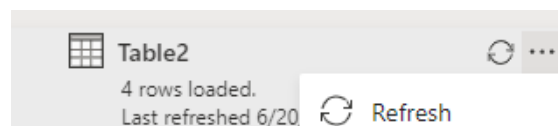


- You will see the result of the respective action in the Queries pane.

Again, you should note that you can Expand or Collapse any group by using the arrow next to the group name.

## Refresh a group

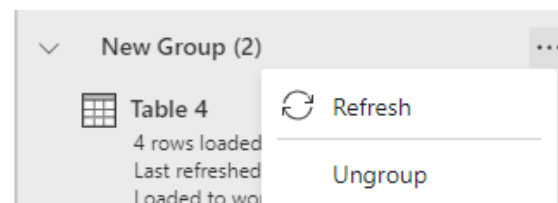
- If the group contains queries, you can refresh all of them at once, the same way you can refresh individual queries
- To do this, select the action menu button and then choose Refresh.



Obviously, Refresh will work for supported data sources only.

## Ungroup the queries within a group

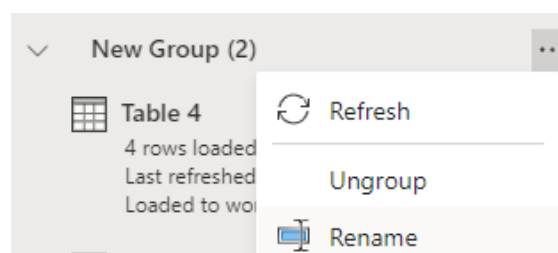
- If you want to reorganise your queries and take them out of the group, you can use this operation
- To do this, select the action menu button and then choose Ungroup



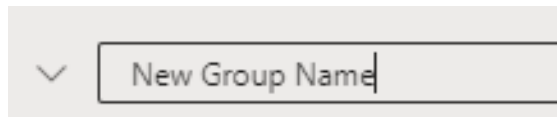
You should note that this action will only delete the group, not the queries in this group.

## To rename a group

- To do this, select the action menu button and then choose Rename

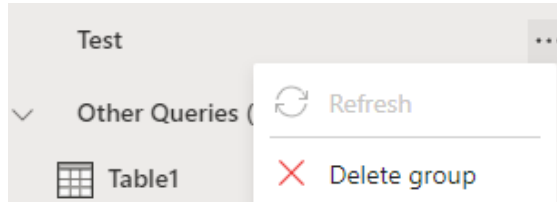


- Enter the new name, then press anywhere to save changes.



### To delete a group

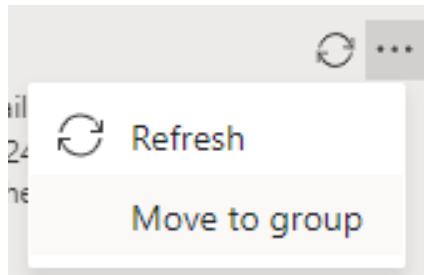
- To do this, select the action menu button and then choose 'Delete group'.



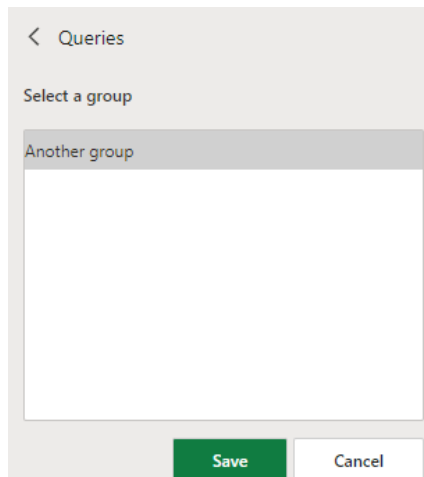
At this stage, delete is supported for empty groups only. Microsoft has stated it is working on adding support for deleting groups that include queries.

### Move a query or group into another group

- To do this, select the action menu button and then choose 'Move to group...'

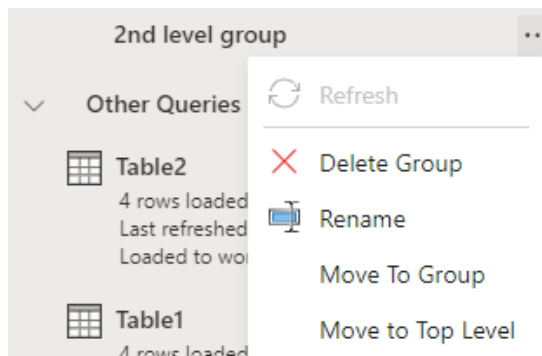


- Select the item you want to move it to and then select Save.



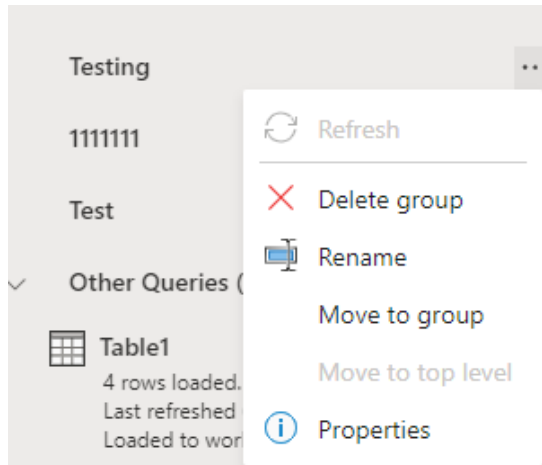
### Move a group to the top level

- If a group is nested within one or more groups, you can quickly move it to the top level
- To do this, select the action menu button and then choose 'Move to top level'.

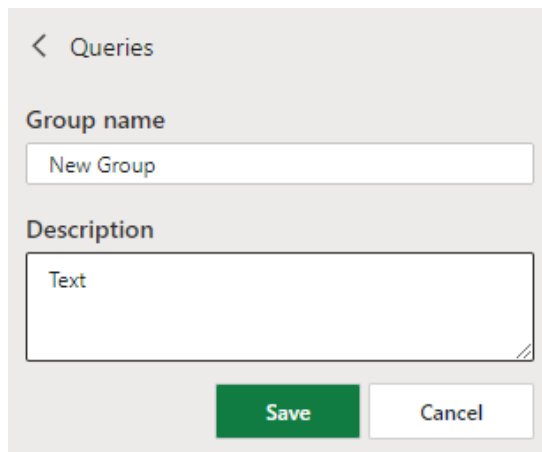


### Edit a group's properties

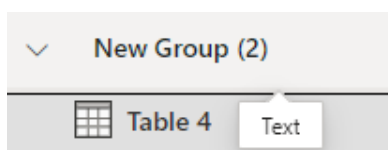
- To do this, select the action menu button and then choose Properties



- You can use this to rename the group or change its description
- When you are done, select Save



- You will be able to see the group description by hovering over it.



Apparently, Microsoft's future plans include Query operations, amongst other ideas. The end goal is to release the full Power Query Editor experience to Excel for the Web *eventually*.



## Control automatic data conversions (Insiders Beta)

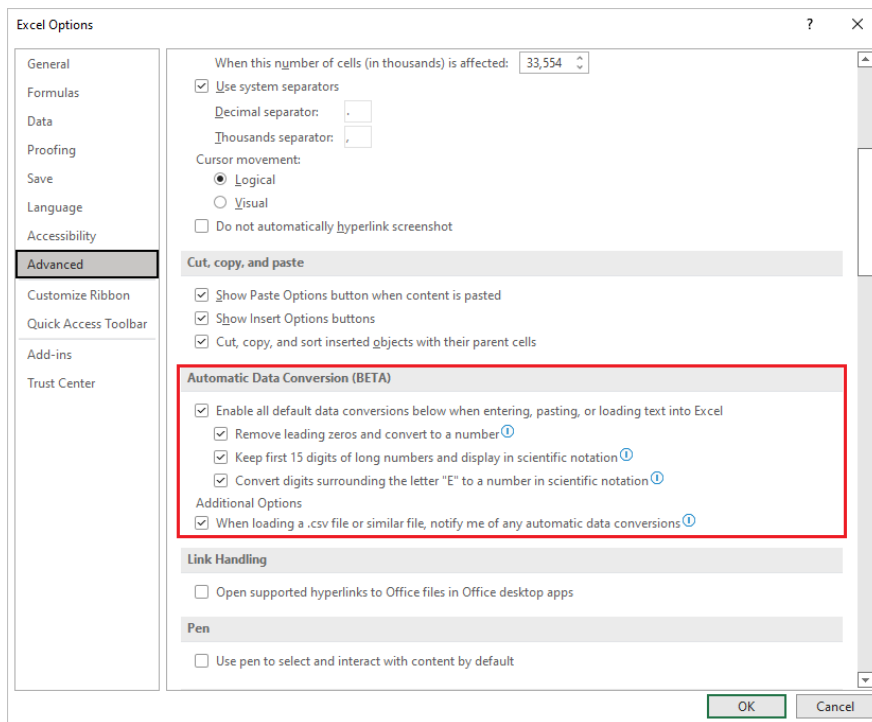
This improvement to Excel for Windows will give you more control over data conversions. Specifically, you may now control how and whether the data you enter is automatically converted to specific formats.

It's no secret that many have been frustrated by the fact that Excel automatically converts data to specific formats. End users have continually expressed a desire for more control over data conversions.

Whilst Microsoft has emphasised that they will not change the Excel defaults, Excel will now provide the ability to disable specific types of

automatic data conversions as needed. This way, you won't need to worry about your data being converted to a format that you didn't want and weren't expecting.

To disable specific automatic data conversions, select **File -> Options -> Advanced -> Automatic Data Conversion**. Then choose the conversion(s) that you'd like to disable.



Currently, you may enable or disable the following options:

- remove leading zeros from numerical text and convert to a number
- truncate numerical data to 15 digits of precision and convert to a number that may be displayed in scientific notation, if needed
- convert numerical data surrounding the letter "E" to a number displayed in scientific notation.

You should also note that you may select the 'When loading a .csv file or similar file, notify me of any automatic number conversions' check box. By doing so, Excel will display a warning message when it detects that

at least one of the optional automatic data conversions is enabled and about to occur when opening a .csv or .txt file. The message gives the ability to do a "one-time load" of the file without converting the data.

Presently, there are a couple of known issues:

- support for disabling these conversions during macro execution is planned but is not yet available
- support for automatic conversion to dates is planned but, again, is not yet available.

This feature is available to Office Insiders running Version 2207 (Build 15427.20000) or later on Windows. The same options should come to Excel for Mac soon.

## Natural Language Query improvements (Current Channel and Monthly Enterprise Channel)

The latest natural language processing innovations have now been released to Excel for Windows. You can now ask questions about specific patterns or insights that might be in your data like "Show me insights for Southeast Asia". This will include receiving more options when there are multiple answers to your question.

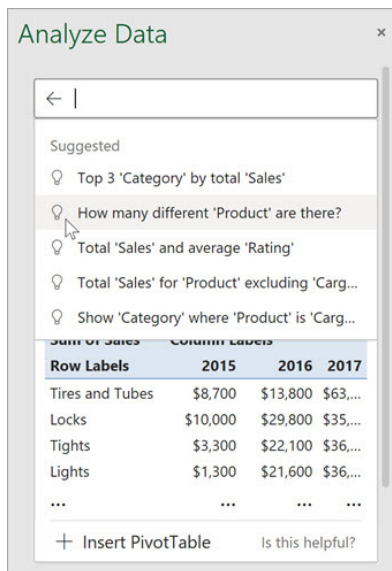
This is all part of 'Analyze Data' in Excel which empowers you to understand your data through natural language queries that allow you to ask questions about your data without having to write complicated formulae. In addition, 'Analyze Data' provides high-level visual summaries, trends and patterns.

All you have to do is select a cell in a data range and select the 'Analyze Data' button on the Home tab of the Ribbon. 'Analyze Data' in Excel

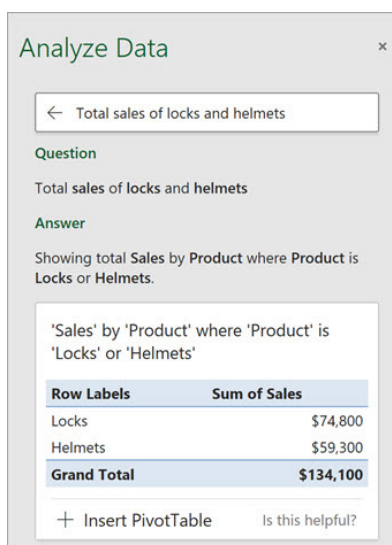
will analyse your data, and return interesting visuals about it in the associated task pane.

If you're interested in more specific information, you can enter a question in the query box at the top of the pane, and press **ENTER**. 'Analyze Data' will provide answers with visuals such as tables, charts or PivotTables that can then be inserted into the workbook.

If you are interested in exploring your data, or just want to know what is possible, 'Analyze Data' also provides personalised suggested questions which you can access by selecting on the query box. You simply select the text box at the top of the 'Analyze Data' pane and you will see suggestions:



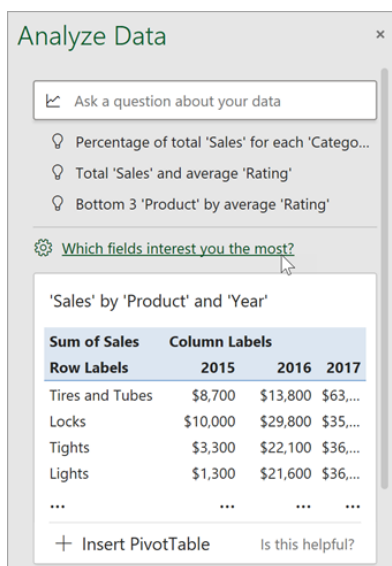
Alternatively, you may just ask a question:



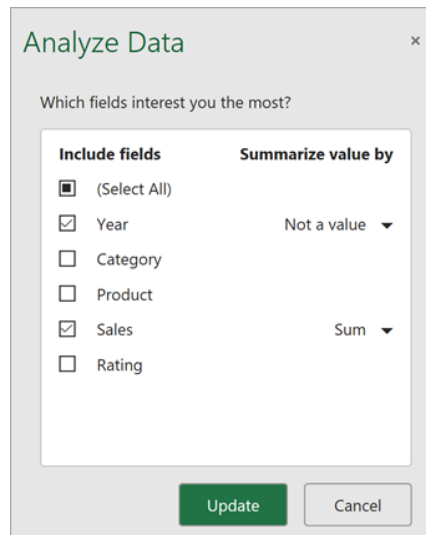
If you do not have a question in mind, in addition to Natural Language, 'Analyze Data' analyses and provides high-level visual summaries, trends and patterns. You can save time and get a more focused analysis by selecting only the fields you want to see. When you choose fields and how to summarise them, 'Analyze Data' excludes other available

data - speeding up the process and presenting fewer, more targeted suggestions. For example, you might only want to see the sum of sales by year or you could ask 'Analyze Data' to display average sales by year.

- Select 'Which fields interest you the most?'



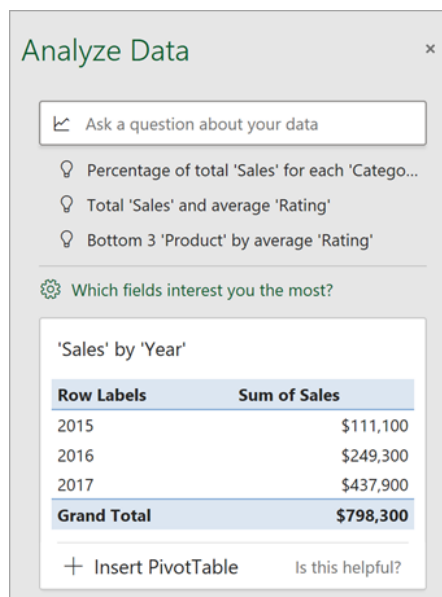
- Select the fields and how their data should be summarised



You should note that the 'Not a value' option in the field list refers to fields that are not normally summed or averaged. For example, you wouldn't sum the years displayed, but you might sum the values of

the years displayed. If used with another field that is summed or averaged, 'Not a value' works like a row label, but if used by itself, 'Not a value' counts unique values of the selected field

- 'Analyze Data' will offer fewer, better targeted suggestions.



To make the most of 'Analyze Data', it's best to work with clean, tabular data, viz.

Year	Category	Product	Sales	Rating
2017	Components	Chains	\$ 200	75%
2015	Clothing	Socks	\$ 37	22%
2017	Clothing	Bib-Shorts	\$ 40	22%
2015	Clothing	Shorts	\$ 133	56%
2017	Clothing	Tights	\$ 360	100%
2015	Components	Handlebars	\$ 23	35%
2016	Clothing	Socks	\$ 23	28%
2016	Components	Brakes	\$ 34	36%
2016	Bikes	Mountain Bikes	\$ 63	40%
2017	Components	Brakes	\$ 54	38%
2016	Accessories	Helmets	\$ 170	90%
2016	Accessories	Lights	\$ 216	90%
2016	Accessories	Locks	\$ 298	90%
2016	Components	Bottom Brackets	\$ 10	23%
2015	Clothing	Jerseys	\$ 67	5%
2017	Components	Bottom Brackets	\$ 6	27%
2015	Bikes	Road Bikes	\$ 35	50%
2017	Clothing	Jerseys	\$ 75	40%
2017	Accessories	Tires and Tubes	\$ 637	90%

Here are some tips for getting the most out of 'Analyze Data':

- 'Analyze Data' works best with data that is formatted as an Excel table. To create an Excel table, click anywhere in your data and then go to **Insert -> Table (CTRL + T)**
- make sure you have good headers for the columns. Headers should be a single row of unique, non-blank labels for each column. Avoid double rows of headers, merged cells, etc.
- if you have complicated, or nested data, you can use Power Query to convert tables with cross-tabs or multiple rows of headers.

### Natural Language Query improvements (Excel for Mac)

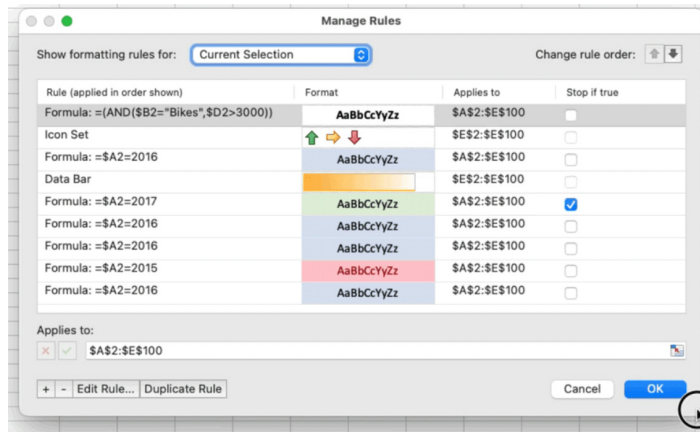
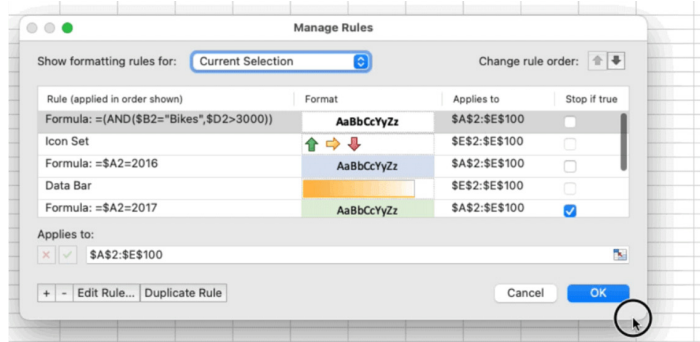
As above!!

### Resizable Conditional Formatting dialog (Insiders Beta)

Previously, the size of the 'Manage Rules' dialog in Excel for Mac limited you to viewing just five [5] conditional formatting rules at a time. You may also not be able to see the entire formula or the range used in your rules. Now, you can make the dialog wider and / or taller, allowing you

to see more of the rules all at once and giving you more space to view longer formulas if needed.

In addition, this update improves accessibility by making it easier to use your keyboard to manage your conditional formatting rules.



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

### Excel Features Availability

Feature	Insider		Production					Web
	Windows <a href="#">Click the link that connects to the website</a>	Mac <a href="#">Click the link that connects to the website</a>	Windows/CC <a href="#">Click the link that connects to the website</a>	Windows/MC <a href="#">Click the link that connects to the website</a>	Windows/CA <a href="#">Click the link that connects to the website</a>	Mac <a href="#">Click the link that connects to the website</a>		
Search within PivotTable Field List								July 2022
Set manual data connections	Version 2207 (Build 12427.20000) or later							
Natural Language Query improvements			Version 2209 (Build 13128.20200) or later	Version 2209 (Build 13128.20200) or later		Version 16.83 (Build 12297.19012) or later		
Enable Conditional Formatting ribbon tab		Version 16.84 (Build 12270.19000) or later						
Hide Data Tables	Version 2205 (Build 12516.20000) or later							
Sheet protection for data connections								June 2022
Add "PivotTable Connections to Clear settings pane"								June 2022
Report from local text, CSV, and XML files								June 2022
Provide automatic on-board suggestions for charts and PivotCharts			Version 2209 (Build 13128.20200) or later	Version 2209 (Build 13128.20200) or later		Version 16.83 (Build 12297.19012) or later		
Force users to click the refresh button								May 2022
Changing access file for workbook links								May 2022
Improve Recommendations dialog box	Version 2209 (Build 13128.20000) or later							
Faster results and response connected devices		Version 16.82 (Build 12010.19000) or later	Version 2209 (Build 13128.20200) or later	Version 2208 (Build 13128.20200) or later				
Faster AutoFilter				Version 2209 (Build 13128.20200) or later		Version 16.83 (Build 12297.19012) or later		
Dataflow connector				Version 2209 (Build 13128.20200) or later				
Database connector				Version 2209 (Build 13128.20200) or later				
Disable data with Power Query filter		Version 16.81 (Build 12081.19112) or later						
Improve font, style, and font size						Version 16.84 (Build 12270.19000) or later		

You can find the updated version of this grid with the interactive links at [aka.ms/ExcelFeaturesFlyer](https://aka.ms/ExcelFeaturesFlyer).

# The A to Z of Excel Functions: IMSQRT

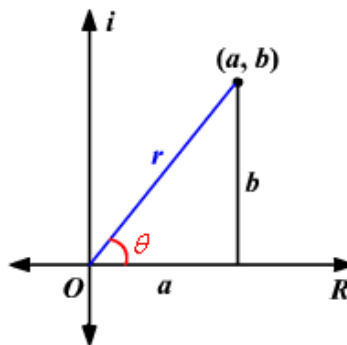


An imaginary number is a complex number that can be written as a real number multiplied by the imaginary unit  $i$  (sometimes denoted  $j$ ) which is defined by its property  $i^2 = -1$ . In general, the square of an imaginary number  $bi$  is  $-b^2$ . For example,  $9i$  is an imaginary number, and its square is  $-81$ . Zero is considered to be both real and imaginary.

An **imaginary number**  $bi$  can be added to a **real number**  $a$  to form a **complex number** of the form  $a + bi$ , where the real numbers  $a$  and  $b$  are

called, respectively, the **real part** and the **imaginary part** of the **complex number**.

The **polar form** of a complex number is another way to represent the number. The form  $z = a + bi$  is called the **rectangular form** of a complex number.



The horizontal axis is the real axis and the vertical axis is the imaginary axis. You can find the real and imaginary components in terms of  $r$  and  $\theta$ , where  $r$  is the length of the vector and  $\theta$  is the angle made with the real axis.

From the Pythagorean Theorem,

$$r^2 = a^2 + b^2$$

By using the basic trigonometric ratios,

$$\cos \theta = a / r \text{ and } \sin \theta = b / r$$

Therefore, multiplying each side by  $r$ :

$$r \cos \theta = a \text{ and } r \sin \theta = b$$

Therefore,

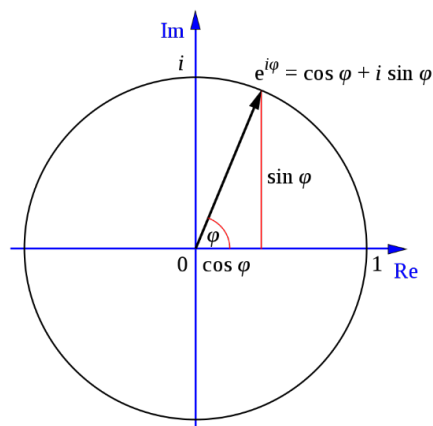
$$z = a + bi$$

$$\Leftrightarrow z = r \cos \theta + (r \sin \theta)i$$

$$\Leftrightarrow z = r(\cos \theta + i \sin \theta)$$

In the case of a complex number,  $r$  represents the **absolute value**, or **modulus** (where  $r = |z| = \sqrt{a^2 + b^2}$ ), and the angle  $\theta$  is called the **argument** of the complex number ( $\theta = \tan^{-1}(\frac{b}{a})$  for  $a > 0$  and  $\theta = \tan^{-1}(\frac{b}{a}) + \pi$  for  $a < 0$ ).

Using **Euler's Formula**,



$$e^{i\theta} = \cos \theta + i \sin \theta$$

It is using this approach that the square root of the complex number  $x + yi$  may be determined:

$$\sqrt{x + yi} = \sqrt{r} \cos\left(\frac{\theta}{2}\right) + i\sqrt{r} \sin\left(\frac{\theta}{2}\right)$$

where:

$$r = \sqrt{x^2 + y^2}$$

$$\theta = \tan^{-1}\left(\frac{y}{x}\right) \text{ and}$$

$$\theta \in (-\pi; \pi]$$

The **IMSQRT** function returns the square root of a complex number in  $x + yi$  or  $x + yj$  text format. It employs the following syntax to operate:

**IMSQRT(inumber)**

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

- **inumber**: this is required and represents the complex number for which you want to calculate the square root.

It should be further noted that:

- you should use **COMPLEX** to convert real and imaginary coefficients into a complex number
- **IMSQRT** recognises either the **i** or **j** notation
- if **inumber** is a value that is not in the  $x + yi$  or  $x + yj$  text format, **IMSQRT** returns the **#NUM!** error value
- if **inumber** is a logical value, **IMSQRT** returns the **#VALUE!** error value
- if the complex number ends in **+i** or **-i** (or **j**), i.e. there is no coefficient between the operator and the imaginary unit, there must be no space, otherwise **IMSQRT** will return an **#NUM!** error.

Please see our first example below:

	A	B	C
1	Formula	Description	Result
2	<b>=IMSQRT("3 + 4i")</b>	Square root of the complex number 3 + 4i	<b>2+i</b>
3			

## The A to Z of Excel Functions: IMSUB

### Subtracting Complex Numbers

$$\begin{aligned}
 & \text{Like Terms} \quad (7+9i) - (3+4i) \quad \text{Like Terms} \\
 & = 7 + 9i - 3 - 4i \\
 & = 7 - 3 + 9i - 4i \\
 & = \boxed{4 + 5i} \quad \begin{array}{l} i = \sqrt{-1} \\ 9x - 4x = 5x \end{array}
 \end{aligned}$$

Sometimes you might wish to subtract one complex number from another. **IMSUB** returns the difference of two complex numbers in the **x + yi** or **x + yj** text format.

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

**IMSUB(inumber1, inumber2)**

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

- **inumber1**: the first argument and represents the number from which to subtract **number2**
- **inumber2**: this is also required. This is the complex number to subtract from **inumber1**.

It should be further noted that:

- you should use **COMPLEX** to convert real and imaginary coefficients into a complex number
- **IMSUB** recognises either the **i** or **j** notation
- if any of **inumber1** or **inumber2** is a value that is not in the **x + yi** or **x + yj** text format, **IMSUB** returns the **#NUM!** error value
- if any of **inumber1** or **inumber2** is a logical value, **IMSUB** returns the **#VALUE!** error value
- if any of **inumber1** or **inumber2** is non-numeric, **IMSUB** returns the **#VALUE!** error value
- if any complex number ends in **+i** or **-i** (or **j**), *i.e.* there is no coefficient between the operator and the imaginary unit, there must be no space, otherwise **IMSUB** will return an **#NUM!** error
- the difference of two complex numbers is given by:

$$(a + bi) - (c + di) = (a - c) + (b - d)i$$

Please see an example below:

	A	B	C
1	Formula	Description	Result
2	<b>=IMSUB("3 + 4i", "1 + 5i")</b>	Difference between the two complex numbers in the formula	<b>2-i</b>

## The A to Z of Excel Functions: IMSUM

### Adding Complex Numbers

$$\begin{aligned}
 & \text{Like Terms} \quad (8+7i) + (4+3i) \quad \text{Like Terms} \\
 & = (8 + 4) + (7i + 3i) \\
 & = \boxed{12 + 10i}
 \end{aligned}$$

$$i = \sqrt{-1}$$

$$7x + 3x = 10x$$

Feeling contrary having read about **IMSUB**, you might wish to add one complex number to one or more other complex numbers. **IMSUM** returns the sum of two or more complex numbers in the **x + yi** or **x + yj** text format.

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

**IMSUM(inumber1, [inumber2], ...)**

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

- **inumber1, [inumber2], ...: inumber1** is required; other arguments are optional. Between 1 and 255 complex numbers may be added together.

It should be further noted that:

- you should use **COMPLEX** to convert real and imaginary coefficients into a complex number
- **IMSUM** recognises either the **i** or **j** notation
- if any of **inumber1**, [**inumber2**], ... is a value that is not in the **x + yi** or **x + yj** text format, **IMSUM** returns the **#NUM!** error value
- if any of **inumber1**, [**inumber2**], ... is a logical value, **IMSUM** returns the **#VALUE!** error value
- if any of **inumber1**, [**inumber2**], ... is non-numeric, **IMSUM** returns the **#VALUE!** error value
- if any complex number ends in **+i** or **-i** (or **j**), *i.e.* there is no coefficient between the operator and the imaginary unit, there must be no space, otherwise **IMSUM** will return an **#NUM!** error
- the addition of two complex numbers is given by:

$$(a + bi) + (c + di) = (a + c) + (b + d)i$$

Please see an illustration below:

	A	B	C
1	Formula	Description	Result
2	<b>=IMSUM("3 + 4i", "1 + 5i")</b>	Addition of the two complex numbers in the formula	<b>4+9i</b>
3			

## The A to Z of Excel Functions: IMTAN

Similar to real trigonometric identities,  $\tan z = \frac{\sin z}{\cos z}$ , where  $z = a + bi$ .

The **IMTAN** function returns the tangent of a complex number in **x + yi** or **x + yj** text format.

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

**IMTAN(inumber)**

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

- **inumber**: this is required and represents the complex number for which you want to calculate the tangent.

It should be further noted that:

- you should use **COMPLEX** to convert real and imaginary coefficients into a complex number
- **IMTAN** recognises either the **i** or **j** notation
- if **inumber** is a value that is not in the **x + yi** or **x + yj** text format, **IMTAN** returns the **#NUM!** error value
- if **inumber** is a logical value, **IMTAN** returns the **#VALUE!** error value
- if the complex number ends in **+i** or **-i** (or **j**), *i.e.* there is no coefficient between the operator and the imaginary unit, there must be no space, otherwise **IMTAN** will return an **#NUM!** error.

Please see our final example for this month below:

	A	B	C
1	Formula	Description	Result
2	<b>=IMSIN("3 + 4i")</b>	Sine of the complex number 3 + 4i	<b>3.85373803791938-27.0168132580039i</b>
3	<b>=IMCOS("3 + 4i")</b>	Cosine of the complex number 3 + 4i	<b>-27.0349456030742-3.85115333481178i</b>
4	<b>=IMDIV(C2,C3)</b>	Division of sine by cosine of the complex number 3 + 4i	<b>-0.000187346204629539+0.999355987381473i</b>
5	<b>=IMTAN("3 + 4i")</b>	Tangent of the complex number 3 + 4i	<b>-0.000187346204629478+0.999355987381473i</b>
6			

More Excel Functions next month.



# Beat the Boredom Suggested Solution

Our solution to this newsletter's challenge uses a function most of you may never even have considered, or perhaps didn't even *know* existed...

## The Challenge

"All" I wanted to do was be able to take a text string and split it up so that each element of text was split into a separate column *formulaically*, e.g.

Data				
alpha,beta,gamma,delta	alpha	beta	gamma	delta
0; 1.2; 3.45; 6.789	0	1.2	3.45	6.789

Note I have used different separators (delimiters) in the two examples displayed. The fact I have used four elements each time is entirely coincidental.

## Suggested Solution

It's not impossible to come up with some monstrous calculation using a combination of *text functions*. Some of you may have worked out some horrendous formula that appears to work. I applaud you if you have.

But I am going to go another way; what about this little beauty?

The screenshot shows an Excel spreadsheet with a table and formulas. The table has two rows of data. The first row contains 'alpha,beta,gamma,delta' and the second row contains '0; 1.2; 3.45; 6.789'. The columns are labeled 'alpha', 'beta', 'gamma', and 'delta'. To the right of the table, there are two formulas in column G: '=TRANSPOSE(FILTERXML("<x><y>"&SUBSTITUTE(E13,"","</y><y>")&"</y></x>","//y"))' and '=TRANSPOSE(FILTERXML("<x><y>"&SUBSTITUTE(E14,"","</y><y>")&"</y></x>","//y"))'. The formulas are highlighted in red.

For the formula in cell **G13**:

**=TRANSPOSE(FILTERXML("<x><y>"&SUBSTITUTE(E13,"","</y><y>")&"</y></x>","//y"))**

Er, what the..?

*Maybe* (!) this needs some explanation. Let's start with the highly popular and frequently used **FILTERXML** function. Hands up all those who use this function regularly...

## The FILTERXML function

Until Excel 2013, Excel was mostly an offline application, although you could use VBA, Power Query / Get & Transform or Power Pivot in Excel to gain access to internet and online datasets. However, Excel 2013 changed all that and introduced two new functions to the world:

1. **WEBSERVICE**, which provides immediate and easy access to any REST WebAPI assuming you have an internet connection by downloading the HTTP response of the provided URL; and
2. **FILTERXML**, which **parses** an XML string (*i.e.* a text string that contains an XML document) and returns a single element (known as a node or attribute) provided by an XPath. In case you are wondering, XPath is a query language for selecting XML elements such as nodes and attributes and works with both XML and HTML.

Therefore, **FILTERXML** tends to work in tandem with **WEBSERVICE** insofar that it makes sense of the long text string delivered by the former function and finds what you are looking for in that text string.

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

**FILTERXML(xml, xpath)**

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

- **xml**: this is required and represents a string in a valid XML format
- **xpath**: this is also required. This represents a string in a standard XPath format.

It should be noted that:

- if **xml** is not valid, **FILTERXML** returns the **#VALUE!** error value
- if **xml** contains a namespace with a prefix that is not valid, **FILTERXML** returns the **#VALUE!** error
- the **FILTERXML** function is not available in Excel Online
- the **FILTERXML** function is not available in Excel (2016) for Mac
- Further, this function may appear in the function gallery in Excel for Mac, but it relies on features of the Windows operating system, so it will not return results on a Mac.

Here are some examples:

	A	B	C
1		Address	
2		<a href="https://themes.trac.wordpress.org/log/i-design?limit=100&amp;mode=stop_on_copy&amp;format=rss">https://themes.trac.wordpress.org/log/i-design?limit=100&amp;mode=stop_on_copy&amp;format=rss</a>	
3			
4			
5	Formula	Description	Result
6	=WEBSERVICE(A2)	Downloads the HTTP response of the provided URL (truncated).	<?xml version="1.0"?><rss xmlns:dc="http://purl.org/dc/elements
7	=FILTERXML(\$C\$6,\$B7)	//item/link	http://themes.trac.wordpress.org/changeset/98555/i-design
8	=FILTERXML(\$C\$6,\$B8)	//item/title	Revision 98555: New version of i-design - 1.3.0
9	=FILTERXML(\$C\$6,\$B9)	//item/pubDate	Sat, 25 Aug 2018 14:17:35 GMT
10			
11		This example uses the FILTERXML function on XML data returned in cell C6, which is provided by the results of the WEBSERVICE function on the web query in cell A2. The information summarises the link, the title and publishing date in this instance.	
12			
13			

OK, so far so good. But there is another function used...

### The SUBSTITUTE function

The **SUBSTITUTE** function, like the **REPLACE** function, replaces existing text with new text in text strings. It uses the following syntax to operate:

**SUBSTITUTE(text, old\_text, new\_text, instance\_number)**

where:

- the **text** parameter is the string of text that contains the characters that we want to substitute
- the **old\_text** parameter is the string of text that we want the function to look for in the **text** parameter
- the **new\_text** parameter is the text string that is going to replace the **old\_text**
- the **instance\_number** is the instance which we want the **old\_text** to be replaced by the **new\_text** parameter if there are multiple **old\_text** strings found. If excluded, all occurrences are replaced.

It is a simple to understand function.

### Returning to Our Suggested Solution

Revisiting our example:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	
1	<b>Splitting up Text</b>																		
2	SP Splitting Text Example.xlsxm																		
3	Navigator																		
4																			
5																			
6	<b>1. Splitting up Text</b>																		
7																			
8	<b>Examples</b>																		
9																			
10	<b>Using FILTERXML</b>																		
11																			
12	Data																		
13	alpha	beta	gamma	delta		alpha	beta	gamma	delta										
14	alpha	beta	gamma	delta		alpha	beta	gamma	delta										
15	0	1.2	3.45	6.789		0	1.2	3.45	6.789										
16																			

For the formula in cell G13:

=TRANSPOSE(FILTERXML("<x><y>"&SUBSTITUTE(E13,"","</y><y>")&"</y></x>","//y"))

Let's review the first argument of FILTERXML for cell G13:

"<x><y>"&SUBSTITUTE(E13,"","</y><y>")&"</y></x>"

If we calculated this, we would get

`<x><y>alpha</y><y>beta</y><y>gamma</y><y>delta</y></x>`

Oh now, it's completely clear (!).

Do you see that the text **alpha,beta,gamma,delta** has had the comma substituted for `</y><y>`, and then this has been "wrapped" inside

`<x><y>...</y></x>`

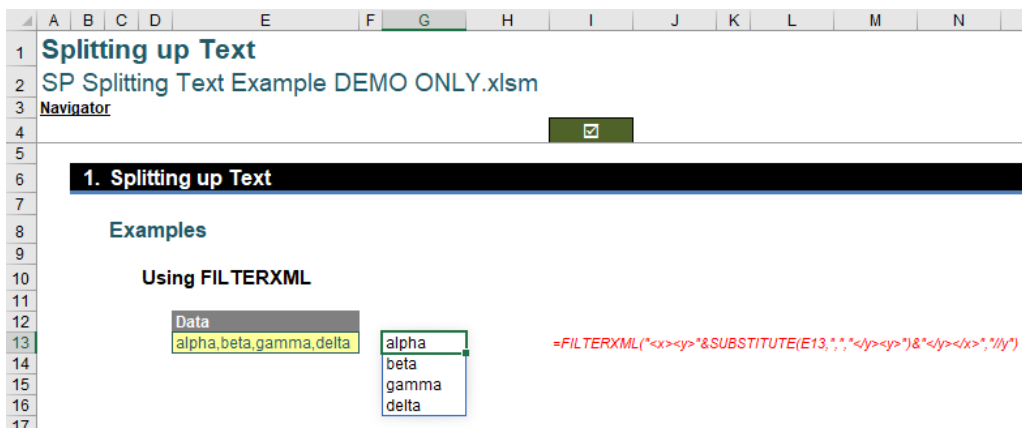
If you are familiar with XML or even HTML, you might be starting to see where this is all going. Consider these angular bracket elements:

- `<x>` and `</x>` denote the start and end of the data **x** (you can replace **x** with pretty much any text string)
- `<y>` and `</y>` denote the start and end of a **y** "node", *i.e.* a building block of XML. Again, you can change **y** to an alternative annotation. The overarching idea is that an entire document is a document node; every element in a document is an element node; text in an element is a text node, *etc.* We have **y** nodes!

Therefore, we have broken the text string up into its text nodes. Therefore,

`=FILTERXML(expression, "//y")`

means parse (split up) each **y** node. This will provide a list of the **y** nodes. If you are using a version of Excel that supports dynamic arrays, you would get the following:



Wrapping this function in **TRANSPOSE** swaps rows to columns and *vice versa*. However, also this could be performed using "legacy" Excel where dynamic arrays are not recognised by selecting several cells once you have created the formula and pressing **CTRL + SHIFT + ENTER**.

It's a little different, but this month shows you how sometimes you can use functions meant for something else completely and use them in an entirely different environment. We doubt anyone at Redmond envisaged this trick back when this function was coded!

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](mailto: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	28 -30 Sep 2022	09:00-17:00 AEST	(-1 day) 23:00-07:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	5 Oct 2022	09:00-17:00 AEDT	(-1 day) 22:00-06:00 GMT	1 Day
Online (Australia)	Financial Modelling	6 - 7 Oct 2022	09:00-17:00 AEDT	(-1 day) 22:00-06:00 GMT	2 Days

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) 22:00-06:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	16 Nov 2022	09:00-17:00 AEDT	(-1 day) 22:00-06:00 GMT	1 Day
Online (Australia)	Financial Modelling	17 - 18 Nov 2022	09:00-17:00 AEDT	(-1 day) 22:00-06:00 GMT	2 Days
Online (Australia)	Power Pivot, Power Query and Power BI	7 - 9 Dec 2022	09:00-17:00 AEDT	(-1 day) 22:00-06:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	14 Dec 2022	09:00-17:00 AEDT	(-1 day) 22:00-06:00 GMT	1 Day
Online (Australia)	Financial Modelling	15 - 16 Dec 2022	09:00-17:00 AEDT	(-1 day) 22:00-06:00 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 the function keys that Excel uses:

Keystroke	What it does
CTRL + SHIFT + F1	Show / hide Ribbon and Quick Access Toolbar altogether
CTRL + SHIFT + F3	Create names
CTRL + SHIFT + F4	Find previous (from most recent search)
CTRL + SHIFT + F6	Previous window / workbook
CTRL + SHIFT + F12	Print

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

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- **Model reviews / audits for internal and external purposes**
- **M&A work**
- **Model scoping**
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- **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](mailto: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](http://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](mailto:newsletter@sumproduct.com).

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