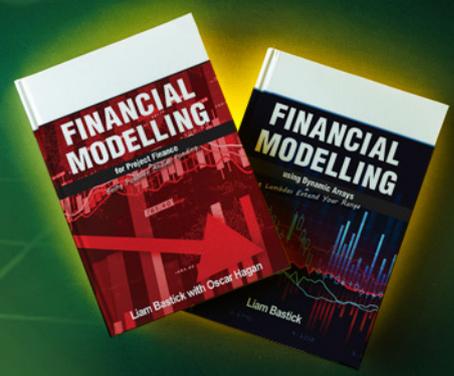


Sum Product

NEWSLETTER #147 - February 2025

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Books and events everywhere this month!

Here at SumProduct HQ, we are delighted to announce not one, but TWO new *Financial Modelling* books for the on-going series. They are more violent than *Game of Thrones* and easier to pick up than sodium lauryl sulphate (look it up). More details below.

Yours Truly is also presenting at not one, but TWO Excel events this month. We detail the upcoming Global Excel Summit in London and Excel Weekend in São Paulo. Check either or both out in person or online.

The February printing deadlines prevent us detailing copious amounts of Excel Updates this month (although there is one big one), but all our other regulars are back and ready to roll. There is the usual Beat the Boredom Challenge, Charts & Dashboards Tips, Over to AI, Excel for Mac, Visual Basics, Power Pivot Principles, Power Query Pointers, the latest Power BI Updates, plus we take the **P** out of the A to Z of Excel functions and **AL**ter the Keyboard Shortcuts too.

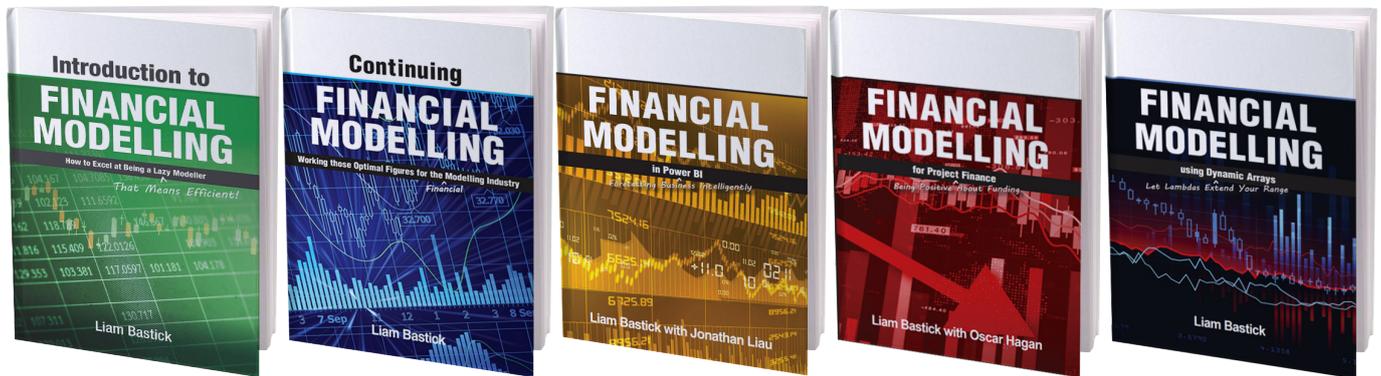
Happy reading and remember: stay safe, stay happy, stay healthy.

Liam Bastick, Managing Director, SumProduct



And Then There Were Five

Finally!



SumProduct is proud to announce two new books in the *Financial Modelling* series. Just like buses, you wait and wait, and then two turn up at once!

To add to *Introduction to Financial Modelling*, *Continuing Financial Modelling* and *Financial Modelling in Power BI*, please welcome two new upstarts to the series:

1. **Financial Modelling for Project Finance (Liam Bastick with Oscar Hagan):**

If you have a beginner's grasp in accounting, finance and Excel, you might be tempted to explore the quantitative, decision-centric world of Project Finance, ring-fencing funding for profitable projects.

This book seeks to demystify the area and show how the basic principles of financial modelling, first heralded in *Introduction to Financial Modelling*, may be applied and modified here.

The book explains "Project Finance" and how it differs from "project finance" at the outset. It then provides various Excel pointers on Excel's key functions and features, before crafting together the salient points of "Best Practice" modelling.

This book is practical: it provides numerous examples including a full case study showing how to model Project Finance, separating the concepts (and modelling) of construction and operations, including delivering a Cash Flow Waterfall, Sources and Uses of Funds, various valuation techniques, plus demonstrating how to create scenario, sensitivity and ratio analyses.

2. Financial Modelling using Dynamic Arrays (Liam Bastick):

Through numerous examples and case studies, it details the impact of the ecosystem introduced by dynamic arrays in Excel, injecting life into the jaded, stale world of financial modelling. From comparing the old methodologies to the new frontiers, this book considers how dynamic arrays have reshaped Excel and made it Turing complete, with its liberal use of **LET**, **LAMBDA**, *eta lambdas et al.*

LET invites complexity but reduces memory requirements, **LAMBDA** allows you to build anything, and dynamic arrays make it easy to quite literally extend your ideas and your way of thinking. See for yourself.

Through a dynamic array of Best Practice tips, tricks, functions and features, *Financial Modelling using Dynamic Arrays* shows you how to revamp and reinvent your financial models with Excel 365. Recreate your development kit in this brave new world. Erase the old and embrace the arrays!

For regular and *ad hoc* readers, each book is a standalone tome and does not require you to read earlier vignettes. There is a little repetition to set the scene, but we thought this was the better alternative than put it all in one 3,000-page book!

Watch out for Number Six, hopefully out later this year: it won't be a "Prisoner" for long as we introduce AI into the foray!

You can find these books both physically and electronically from all good bookshops, including Amazon. If it's not available at your bookshop, well...

Global Excel Summit 2025



Well, with our own **Liam Bastick** one of the hosts, we thought we should point out that the London-based Microsoft Excel conference for professionals and enthusiasts returns 4 to 6 February at the Soho Place Theatre in London. Apparently, the Wi-Fi is even reliable!

Whilst Liam will finally achieve the lifetime ambition of performing on stage to a paying audience in Soho (*we presume they're paying for him to*

stay clothed – Ed.), the speaker list sounds like a who's who in Excel, with fellow Excel MVP **Leila Gharani** headlining amongst many other notable bods.

The first two days are in person as well as online with Day 3 online only.

For full details, please see <https://globalexcelsummit.com/>.

Excel Weekend 10

And that's not all. Almost straight after the conclusion of the Global Excel Summit, the Brazilian event **Excel Weekend 10** comes at you too!



Not sure about the Excel blue (!), but it's a landmark event for Excel Weekend as it reaches its 10th edition. Congratulations!! It once again welcomes Excel enthusiasts from various corners of Brazil and worldwide to discuss innovative techniques and the latest trends in the tool and the market.

The hybrid event begins with an in-person day, which takes place on Friday, February 7, at the Microsoft Reactor São Paulo space. Participation is 100% free and the event is broadcast live on YouTube worldwide.

On February 8th and 9th, Excel Weekend 10 features online lectures with Microsoft MVPs (again including some of us here at SumProduct) from other countries, in different languages, and promotes technical discussions via Microsoft Teams between Excel communities from different regions. Feel free to join and learn the latest news from renowned professionals in Microsoft technologies!

For more details, go to <https://10.excelweekend.com/>

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...

We've talked at long length about Dynamic Arrays and how the value that they add to Excel and the solutions that we can build with them. Sometimes, as we keep pushing to solve ever increasingly difficult problems, we end up hitting some fairly hard limits.

In this instance, we have a list of employees where we know what division each person works in. We also have a list of capabilities that each employee brings to the team. If we select an employee, we'd like to know what their whole team brings to the table.

	A	B	C	D	E
1	Employee	Division		Employee	Capabilities
2	Amy	Sales		Amy	Excel
3	Billy	Sales		Amy	Client relations
4	Charlie	Marketing		Amy	PowerPoint
5	Debbie	Sales		Billy	Mathematics
6	Eric	Marketing		Billy	SQL
7				Billy	Analytics
8				Charlie	Drinking
9				Charlie	Wine connoisseur
10				Charlie	Former sommelier
11				Debbie	Management
12				Debbie	Change leadership
13				Debbie	Public speaking
14				Eric	Strategy
15				Eric	Python
16				Eric	Chess

So to do this, we naturally follow some basic steps – what's your employee's name, and what division are they from? So simple, so **INDEX(MATCH())**:

=INDEX(Table1[Division],MATCH(Employee_Selection,Table1[Employee],0))

Yes, of course, you can use **XLOOKUP** but we're deciding to use a formula that works in all versions of Excel.

Then, we might even be able to find a list of all the employees that work in that division. That's what **FILTER** is for, right?

=FILTER(Table1[Employee],Table1[Division]=Division_Selected)

Then, of course, we just need to filter our capability list on the list of employees. Simple, right?

=FILTER(Table2[Capabilities],Table2[Employee]=Division_Employees)

Name	Amy	<i>Employee_Selection</i>
Division	Sales	<i>Division_Selected</i>
All in division	Amy	<i>{Division_Employees}</i>
	Billy	
	Debbie	
All capabilities	#N/A	

Wait, what?

This month's challenge is very straightforward. Can you come up with a formula to give us a list of capabilities that each person in the team can provide?

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

Over to AI



Here at SumProduct we write many articles for many magazines and our authoring contracts have been revised recently to ensure Artificial Intelligence hasn't taken over our duties. We can assure everyone they have not.

But it did get us thinking: *what if we did let AI loose and write a regular article for the newsletter?*

This Month's Prompt: What are the anticipated improvements for AI in Excel in 2025?

As we look towards the future, it's clear that artificial intelligence (AI) will continue to revolutionise the way we interact with data. Microsoft Excel, one of the most widely used data analysis tools, is set to undergo significant advancements in AI capabilities by 2025. These improvements will not only enhance efficiency but also empower users to make better, data-driven decisions.

ENHANCED DATA ANALYSIS

In 2025, AI in Excel is expected to offer more advanced data analysis features. Machine Learning (ML) algorithms will be integrated more deeply into Excel, allowing users to perform complex analyses with ease. These algorithms will be capable of identifying patterns, trends and anomalies in large datasets, providing insights that were previously difficult to uncover.

This month, we decide to let AI loose on predicting what it will achieve in Excel. Now, given we have a few Excel MVPs in the team, we want to be clear: there is no "insider knowledge" here. This is AI's prediction about itself!

One of the key improvements will be the ability of AI to suggest relevant analyses based on the data at hand. For example, if a user inputs sales data, Excel's AI could automatically suggest performing a trend analysis, forecasting future sales or identifying key factors influencing sales performance. This feature will save users time and help them focus on interpreting the results rather than setting up the analyses.

AUTOMATED DATA CLEANING

Data cleaning is a crucial but time-consuming task in data analysis. By 2025, AI in Excel will significantly streamline this process. AI-powered tools will be able to automatically detect and rectify errors in datasets, such as missing values, duplicate entries and formatting inconsistencies. These tools will use advanced algorithms to ensure that the data is clean, accurate and ready for analysis.

Moreover, AI will be able to understand the context of the data and make intelligent suggestions for cleaning. For instance, if a column contains dates in different formats, AI can standardise them based on the most common format used. This automated approach to data cleaning will reduce the potential for human error and improve the overall quality of the data.

NATURAL LANGUAGE PROCESSING

Natural Language Processing (NLP) is another area where AI in Excel will see significant advancements. By 2025, users will be able to interact with Excel using natural language commands. This means that instead of using complex formulas and functions, users can simply type or speak their queries in plain language, and Excel will understand and execute the commands.

For example, a user could ask, "Show me the average sales for the last quarter" or "Highlight the top 10% of performers in this dataset" and Excel's AI will process the request and provide the desired output. This feature will make Excel more accessible to users who are not familiar with advanced functions and formulas, democratising data analysis capabilities.

PREDICTIVE ANALYTICS

Predictive analytics will be a cornerstone of AI improvements in Excel by 2025. Advanced ML models will be embedded within Excel, enabling users to perform predictive analyses without needing specialised knowledge in data science. These models will be able to predict future outcomes based upon historical data, helping users make informed decisions.

For instance, businesses can use predictive analytics to forecast sales, anticipate customer behaviour, and optimise inventory management. The AI models in Excel will continuously learn and improve over time, ensuring that predictions become more accurate and reliable. This capability will be particularly beneficial for small and medium-sized enterprises that may not have the resources to invest in dedicated data science teams.

PERSONALISED RECOMMENDATIONS

Personalisation will be a key focus of AI advancements in Excel by 2025. The AI will be able to learn from users' behaviour and preferences, offering personalised recommendations tailored to their specific needs. For example, if a user frequently performs a certain type of analysis, AI can suggest shortcuts, templates or additional features that align with their workflow.

Additionally, AI will be able to provide contextual recommendations based upon the content of the spreadsheets. If a user is working on a financial report, AI might suggest relevant financial metrics or visualisations that could enhance the report's clarity and impact. This level of personalisation will streamline workflows and improve overall productivity.

ADVANCED VISUALISATIONS

Data visualisation is a critical aspect of data analysis and AI in Excel will make significant strides in this area by 2025. Advanced AI algorithms will be able to create dynamic, interactive visualisations that adapt to the data being analysed. Users will have access to a wider range of visualisation options, including AI-generated charts and graphs that highlight key insights.

Furthermore, AI will be able to recommend the most appropriate visualisations for the data, making it easier for users to present their findings effectively. For example, if a dataset contains time-series data, AI might suggest a line chart or a heat map to illustrate trends over time. These advanced visualisations will help users communicate their insights more clearly and persuasively.

COLLABORATION AND INTEGRATION

AI improvements in Excel by 2025 will also enhance collaboration and integration with other tools and platforms. AI-powered features will facilitate real-time collaboration, allowing multiple users to work on the same spreadsheet simultaneously. AI will be able to track changes, resolve conflicts and provide suggestions for improving the collaborative workflow.

Integration with other Microsoft products, such as Power BI and Teams, will be more seamless, enabling users to leverage the full ecosystem of tools for their data analysis needs. AI will assist in integrating data from various sources, ensuring consistency and accuracy across different platforms. This interconnected approach will enhance the overall efficiency and effectiveness of data analysis processes.

CONCLUSION

The anticipated improvements in AI in Excel by 2025 will transform the way users interact with data, making advanced data analysis more accessible and efficient. Enhanced data analysis, automated data cleaning, natural language processing, predictive analytics, personalised recommendations, advanced visualisations and improved collaboration and integration are just some of the exciting developments on the horizon. As AI continues to evolve, Excel will remain at the forefront of innovation, empowering users to unlock the full potential of their data.

What do you think? Do you agree AI will get there this year? It will be interesting to see precisely what happens. Send us your comments and ideas for questions to contact@sumproduct.com.

Excel for Mac

With Steve Kraynak joining the team, we thought we would exploit his knowledge and recant all about Microsoft Excel for Mac. Each month, we'll cover a different topic to help you understand how Excel for Mac is different than Excel for Windows. This month, we discuss how the

destination folder is chosen when you save a copy of a file. This is also applicable to Word and PowerPoint. Be sure to pay attention to the folder destination when you do 'Save a Copy' or 'Save As' on a Mac.

Did you ever open a document and then create a copy by going to **File -> Save As...**? This is a very common task in all the office applications, including Excel, Word and PowerPoint. If you use a Mac, you may have been confused after you saved a copy of a file and then went to look for it and you couldn't find it where expected. When you save a copy of a file this way, you might expect that the copy would be created in the same folder where the original file is located, but this is not how it works on Mac.



Here are typical steps to make a copy of a file:

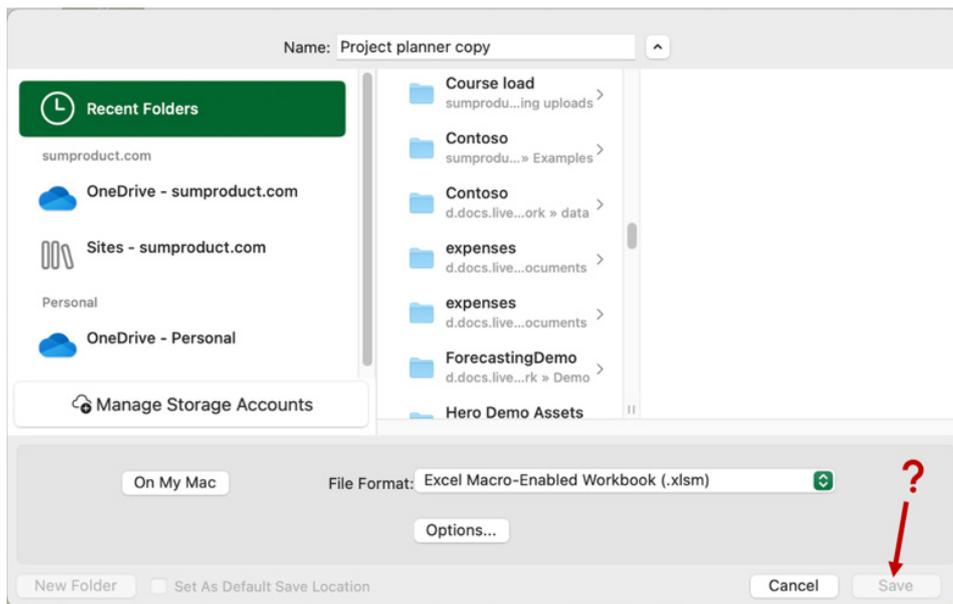
- open it, then go to **File -> Save a Copy...** (or **Save As...**)
- type a new name
- press Save.

You might expect the new file to be saved into the same folder as the original. On Windows, that's how it works. It seems intuitive. You simply saved a copy of the file with a new name, but didn't change the folder destination.

However, it doesn't work the same way on Mac. Instead of picking the folder of the original file that you opened, Excel for Mac picks the folder where you last saved or opened *any* file by going through the **File -> Open** or **File -> Save** dialog. If you open a few files, it will pick the folder of the last file that you opened, which may not be the same as the file you're trying to copy.

Also, if you open a file by going to the folder in Mac's Finder app and double-clicking the file, Excel won't pick that folder as the "last used" folder. It only uses the last folder where you opened or saved via the File menu in Excel (same for Word and PowerPoint).

Sometimes when the 'Save a Copy' dialog appears, it won't have any folder selected. You might see that the 'Recent Folders' pane appears, but the Save button is greyed out, because no folder has been selected, as shown below. At least when this happens, you won't be able to accidentally save the file into a folder you didn't pick.



Key Takeaway

Always take note of the destination folder when you do 'Save a Copy...' or 'Save As...' on Mac. Otherwise, you may need to go searching for your file later.

We'll continue 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 look at the interaction between charts and macros.

You may know that as part of our business, we provide model auditing services to clients, checking spreadsheets for errors. As part of that process, we often take two versions of a file and run software over it to identify changes in inputs and formulae.

However, our software doesn't work on charts – it only looks through the

cells in a workbook. Instead, we had to check the charts manually, which can take a very long time when we're working with multiple charts.

As with many other manual processes, that prompted us to ask – why can't we create a macro to do it?

```

Sub ChartIdentifier()

'Initialise values
Dim OutputWorkbook As Workbook
Dim TargetWorkbook As Workbook
Dim TargetFile As String
Dim sh As Worksheet
Dim ch As Object
Dim srs As Series

Dim SheetValue As String
Dim ChartValue As String
Dim SeriesValue As String
Dim FormulaValue As String

```

Here, we'll look at the thought process around creating a macro that would help us to identify a chart's details and present the results to a user. The Chart Identifier macro would need to report on the following characteristics of a chart:

- the sheet that the chart was located on
- the name of the chart object
- a list of the different data series that were being reported
- the formulae of each data series being reported on
- the axis formula for each item
- any *x / y / z* axis formulae that might apply for things like Bubble charts.

That's quite a lot! We need to step through this quagmire. We effectively need to go through the following steps:

- define the target / output file, save target details
- determine the series details and loop through to extract them
- extract out the relevant name / *y*-axis / *x*-axis / Bubble size from the formula and clean up.

Firstly, we need to define what file contains the charts, and where we want to store the results. For the macro to work properly, we don't want to modify the base file (which we can't do in a model audit), so we're going to create a new workbook to store the results.

We can use the command:

```

'Define our file which contains the charts
Set TargetWorkbook = ActiveWorkbook

Workbooks.Add

'Define our output workbook
Set OutputWorkbook = ActiveWorkbook

```

ActiveWorkbook refers to the Excel file that is currently active (*i.e.* the one that Excel is focused on and will be performing actions to). Presuming that we are running this macro when we are looking at the workbook we have sheets on, we can set the first variable, **TargetWorkbook** to be that file. Then, **Workbooks.Add** will create a new, blank Excel file that we can define as our **OutputWorkbook**.

Defining the Excel files will allow us to use **OutputWorkbook.Activate** and **TargetWorkbook.Activate** to switch between our files, as we will need to look at the Target to find chart information, and swap back to the Output to store the result.

Then, all we need is to identify the details that we want to store in the output and set up the headings we need to get the output file ready to take inputs.

```

'Save target file name
OutputWorkbook.Activate
Range("A1").Value = "File:"
Range("B1").Value = TargetWorkbook.Name

Range("A6").Value = "Sheet"
Range("B6").Value = "Chart"
Range("C6").Value = "Series"
Range("D6").Value = "Formula"
Range("E6").Value = "Name"
Range("F6").Value = "Y-axis"
Range("G6").Value = "X-axis"
Range("H6").Value = "Bubble Size"
Range("A6:H6").Font.Bold = True

```

We're then going to do one more thing: create named ranges that we can use to define where our outputs start and consider how many rows are included.

```
Names.Add "BubbleRange", "=OFFSET(BubbleStart,1,0,COUNTA(Sheet1!$A$6:$A$1048576)-1,1)", True
Names.Add "BubbleStart", "=Sheet1!$H$6", True
Names.Add "ChartNextItem", "=OFFSET(ChartStart,COUNTA(Sheet1!$B$6:$B$1048576),0)", True
Names.Add "ChartStart", "=Sheet1!$B$6", True
Names.Add "FormulaNextItem", "=OFFSET(FormulaStart,COUNTA(Sheet1!$D$6:$D$1048576),0)", True
Names.Add "FormulaStart", "=Sheet1!$D$6", True
Names.Add "NameRange", "=OFFSET(NameStart,1,0,COUNTA(Sheet1!$A$6:$A$1048576)-1,1)", True
Names.Add "NameStart", "=Sheet1!$E$6", True
Names.Add "SeriesNextItem", "=OFFSET(SeriesStart,COUNTA(Sheet1!$C$6:$C$1048576),0)", True
Names.Add "SeriesStart", "=Sheet1!$C$6", True
Names.Add "SheetNextItem", "=OFFSET(SheetStart,COUNTA(Sheet1!$A$6:$A$1048576),0)", True
Names.Add "SheetStart", "=Sheet1!$A$6", True
Names.Add "XAxisRange", "=OFFSET(XAxisStart,1,0,COUNTA(Sheet1!$A$6:$A$1048576)-1,1)", True
Names.Add "XAxisStart", "=Sheet1!$G$6", True
Names.Add "YAxisRange", "=OFFSET(YAxisStart,1,0,COUNTA(Sheet1!$A$6:$A$1048576)-1,1)", True
Names.Add "YAxisStart", "=Sheet1!$F$6", True
```

Thus, this first step has identified the workbooks, and has set up the output page to start taking details.

We will continue next month...

Charts and Dashboards

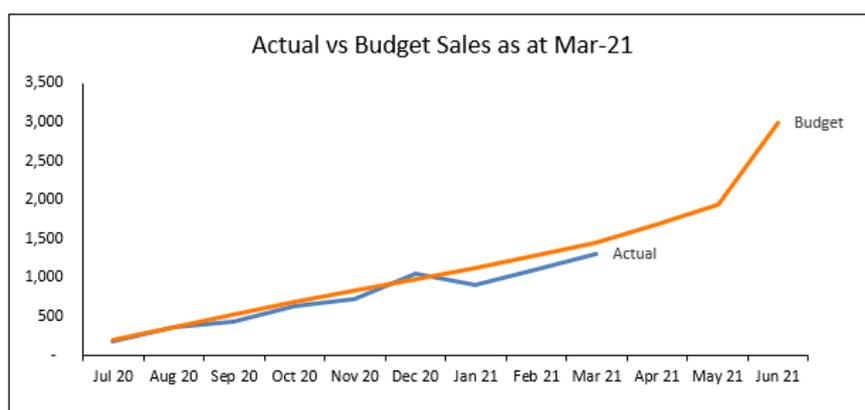
It's time to chart our progress with an introductory series into the world of creating charts and dashboards in Excel. This month, we consider creating a chart label that can move.

Chart labelling is an interesting topic. We have previously talked about the Dynamic Chart Labels and played around with the Dynamic Chart Labels for Stacked Column Charts. Now, we wish to discuss more tips concerning creating a chart label that can move along with its associated data series.

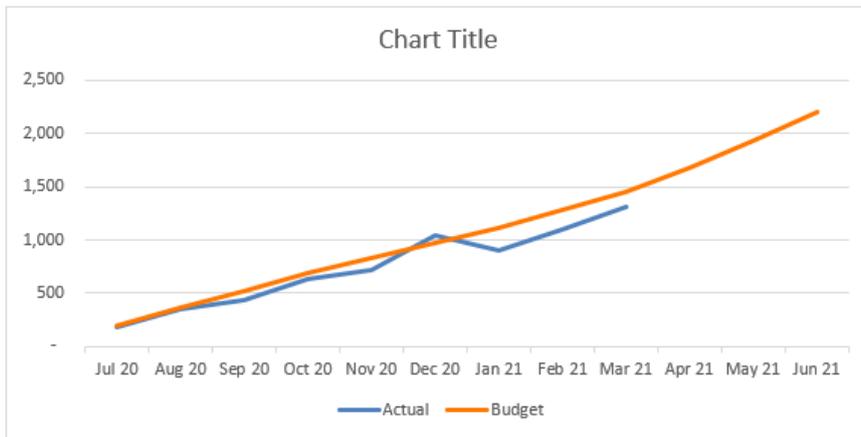
For example, imagine we have data for actual and budget sales for a given financial year. Actual data will be filled in at the close of each month, e.g.

	A	B	C	D	E	F	G	H	I	J	
7											
8			Data								
9											
10			Actual vs Budget Sales as at Mar-21					="Actual vs Budget Sales as at "&TEXT(INDEX(\$F\$13:\$F\$24,COUNTA(\$G\$13:\$G\$24)),"mmm-yy")			
11											
12											
13											
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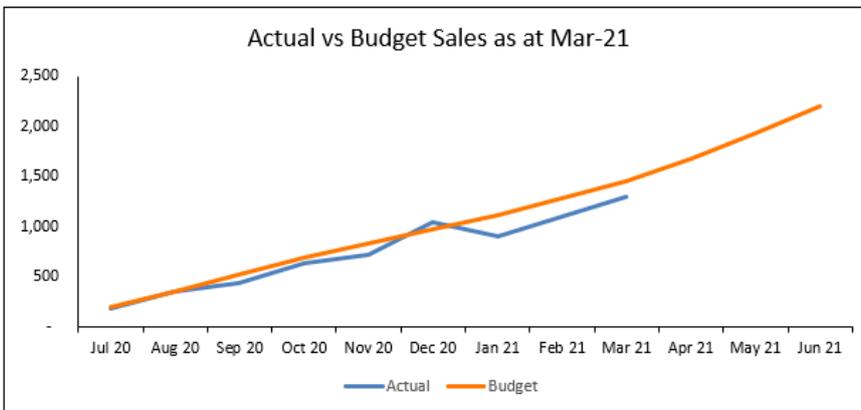
We want to create a line chart to illustrate the sales performance against the budget data. We will not need the legend for the chart, as we wish to place the labels next to the end point of each series, which move depending upon the data we input, as illustrated below:



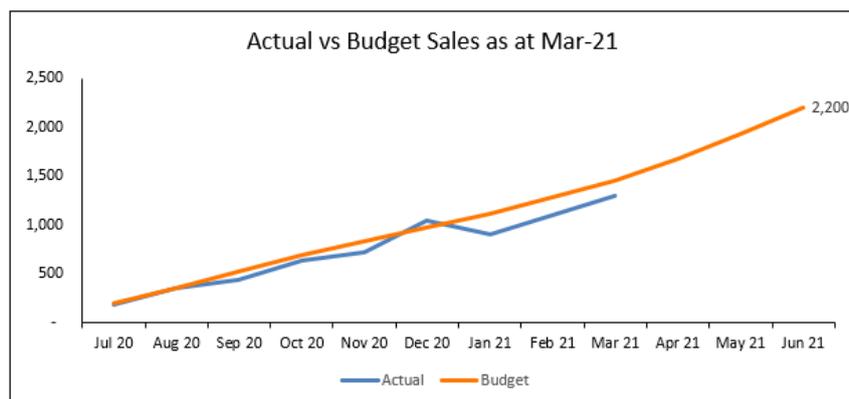
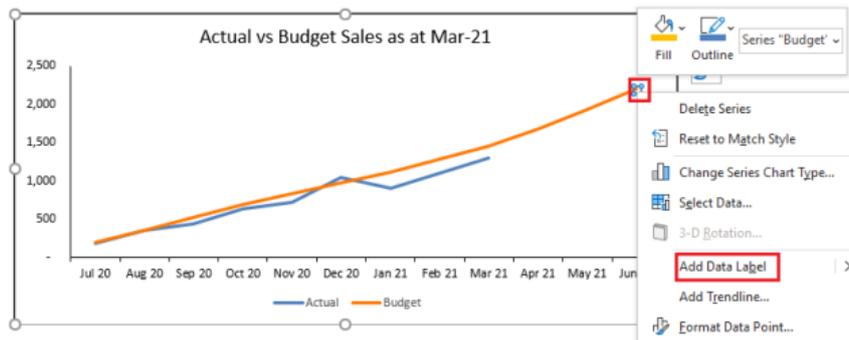
First, to create a chart, select the range **F12:H24** and navigate to the Insert tab on the Ribbon, and then select a line chart. The initial line chart will look like the one below:



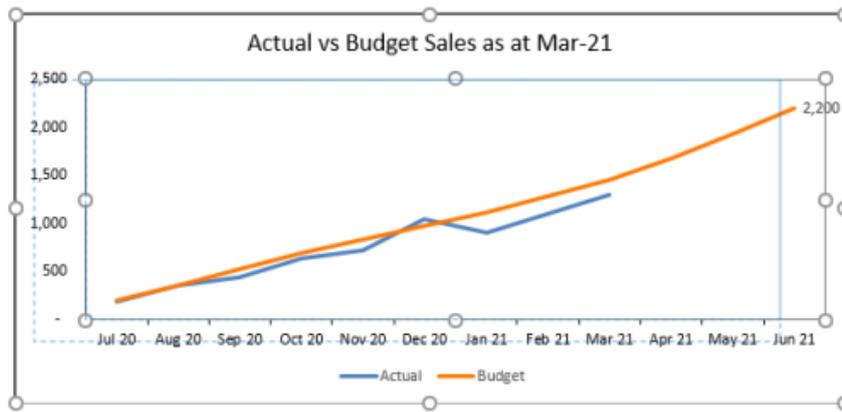
We will undertake some formatting at this point. First, we will extract the dynamic chart title by pointing it to cell **D10**. Then, we will remove the gridlines from the chart area and emphasise the border line for the two axes. The chart now appears like below:



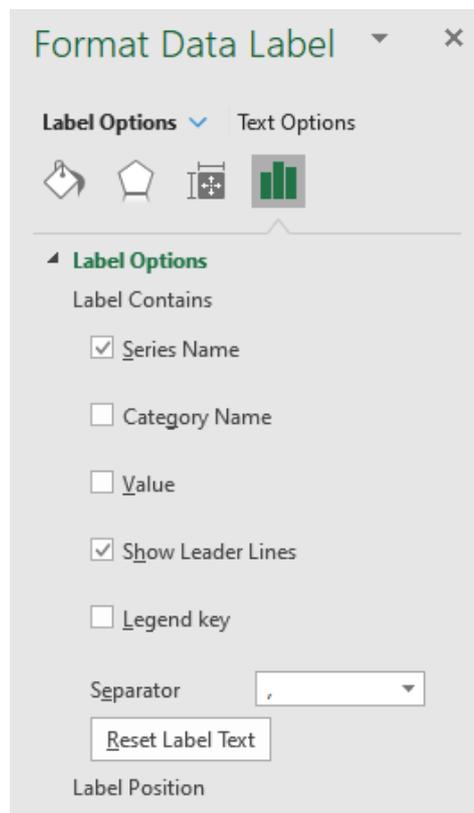
To get the series chart label for only the end point of a series, click on the series, then click once again on the data point we want to add the label on, right-click and choose 'Add Data Label'.



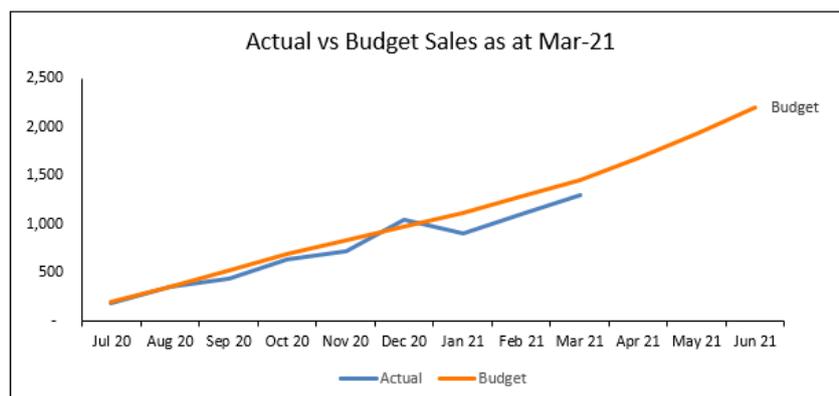
As the label stays too close to the chart border, we will resize the plot area.



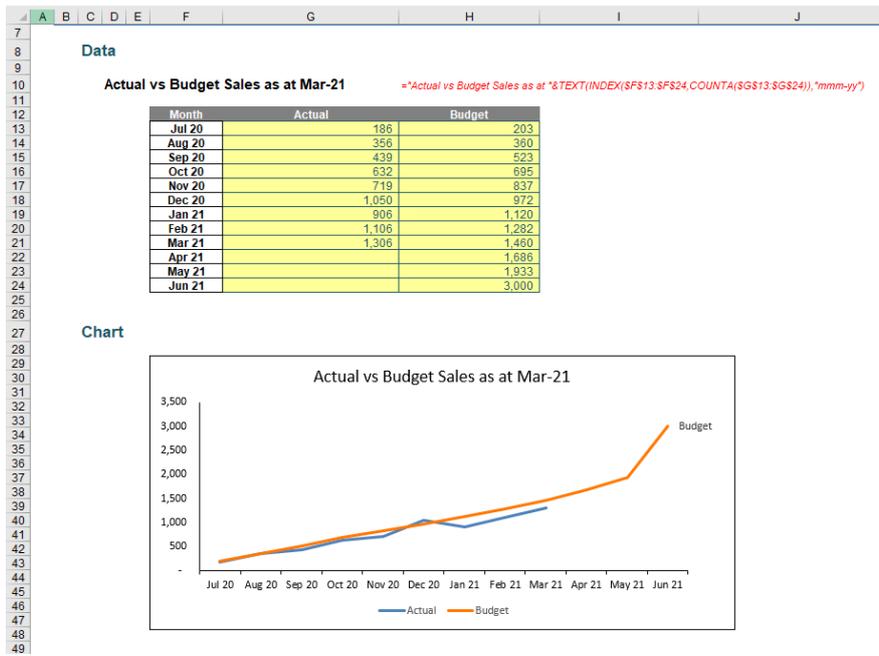
To change the chart label to the series name instead of the data value, right-click on the data point (**not** the label) and select 'Format Data Label'. In the 'Format Data Label' pane, under 'Label Options', tick 'Series Name'.



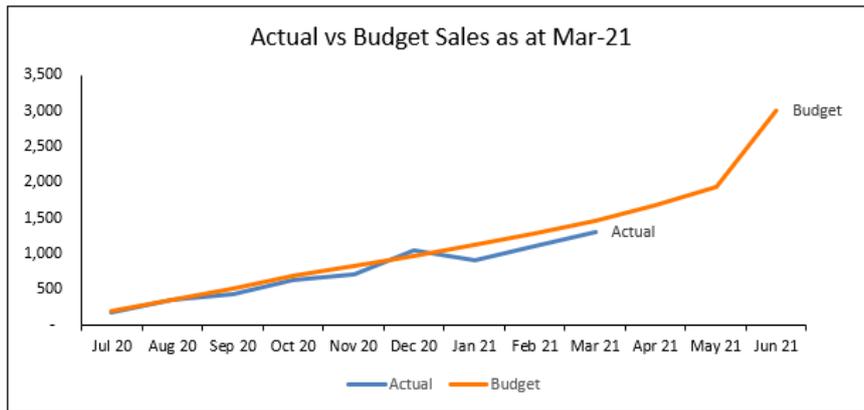
The chart will now look like the one below:



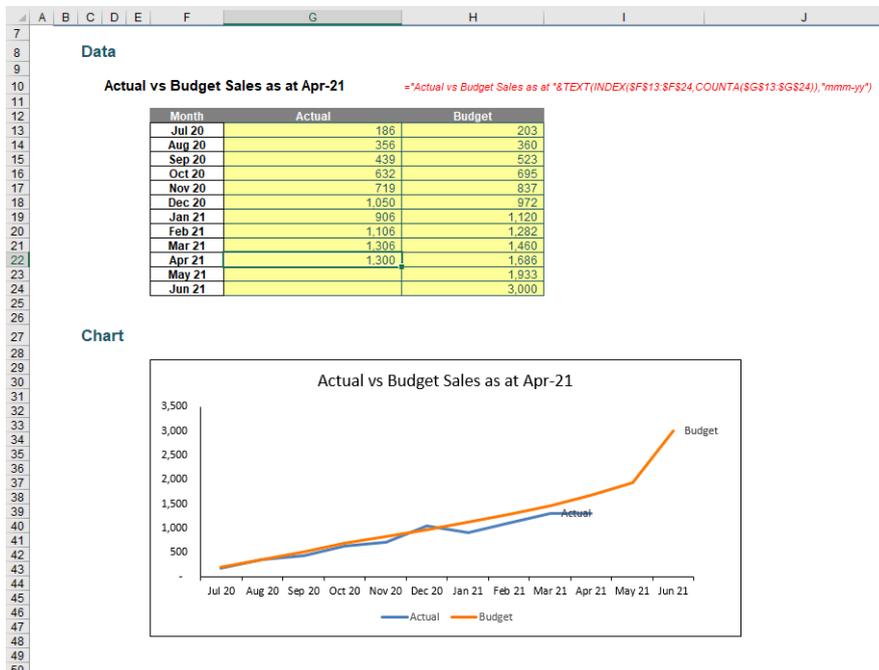
If we change the budget data, the label is moving with the chart series.



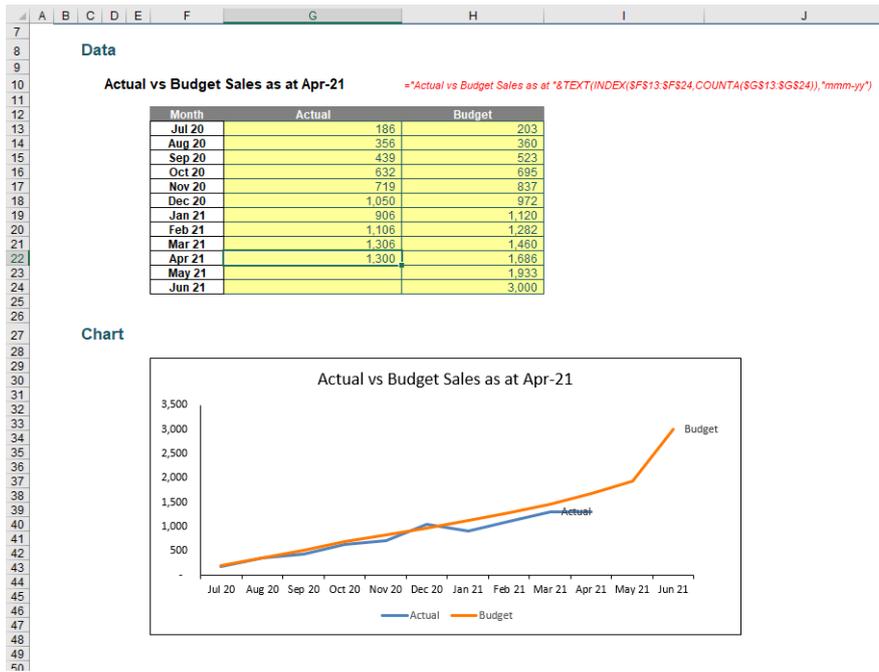
We will repeat the same process to get the label for the Actual series.



However, when we add more data to the chart, the label is not moving and is overwritten by the series line.



However, when we add more data to the chart, these labels are not moving and would be overwritten by their respective series lines, because we had been adding data labels for a single point in each series. In summary, the data labels were not dynamic yet.

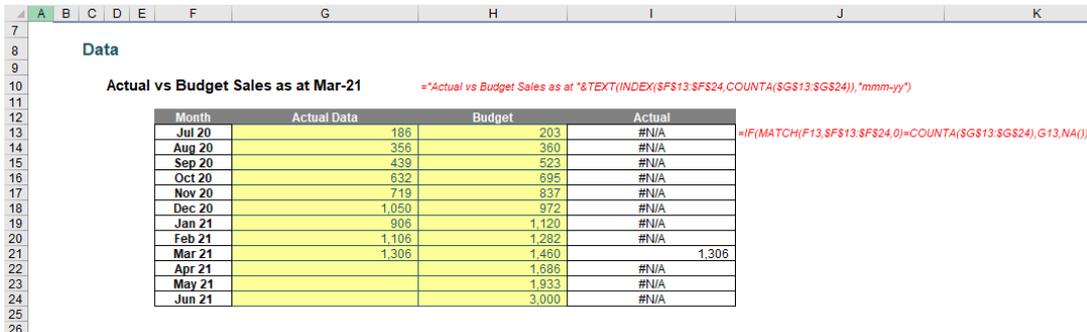


Guess what we are going to do now!

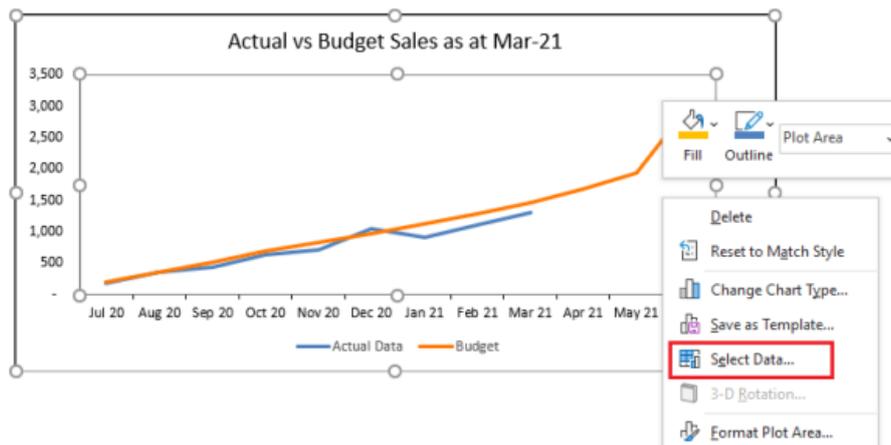
To fix this, we will need a helper series which plots only the last actual data point. In cells **I13:I24**, we will add a series call 'Actual' – which will be used as the label later – and use the formula as shown below to get only the last actual data point. We will also need to rename the existing 'Actual' series to 'Actual Data' to distinguish with the new series. All other data point with #N/A errors will be hidden. The #N/A errors are deliberate, as they prevent the points being plotted on a line chart.

We have used the formula

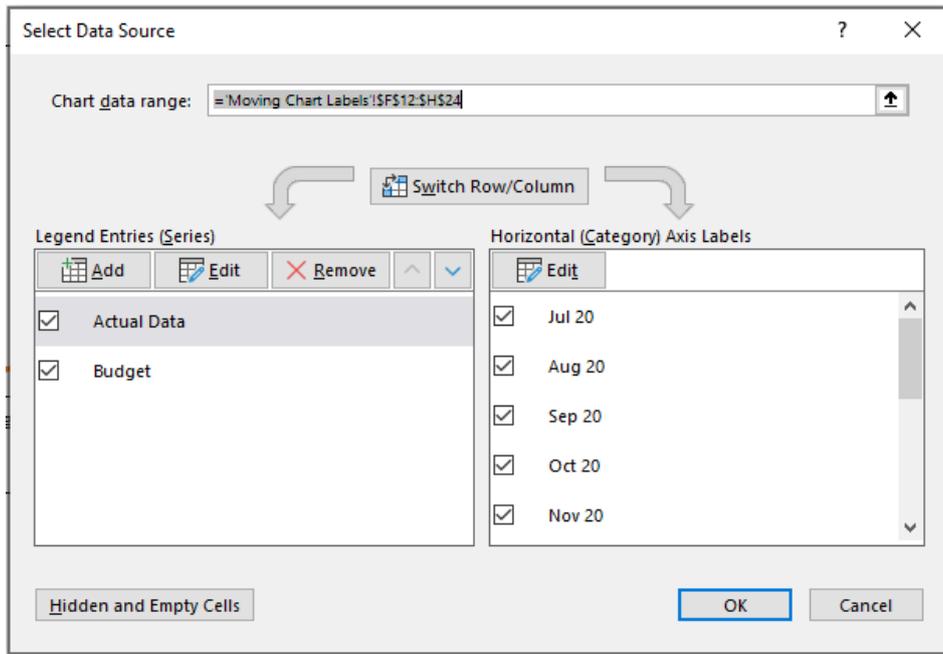
=IF(MATCH(F13,\$F\$13:\$F\$24,0)=COUNTA(\$G\$13:\$G\$24),G13,NA())



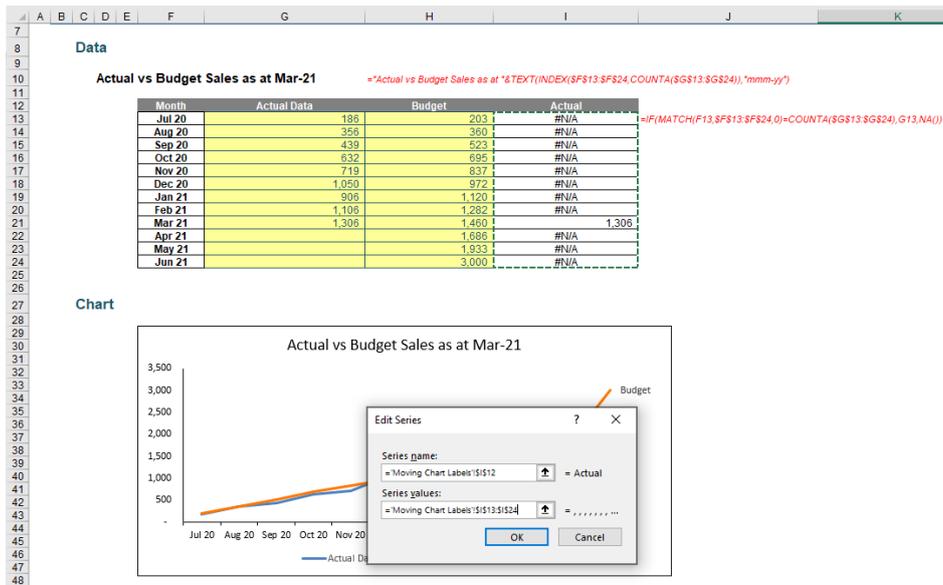
Next, let's remove the 'Actual' data label, and then right-click on the chart area and choose 'Select Data...':



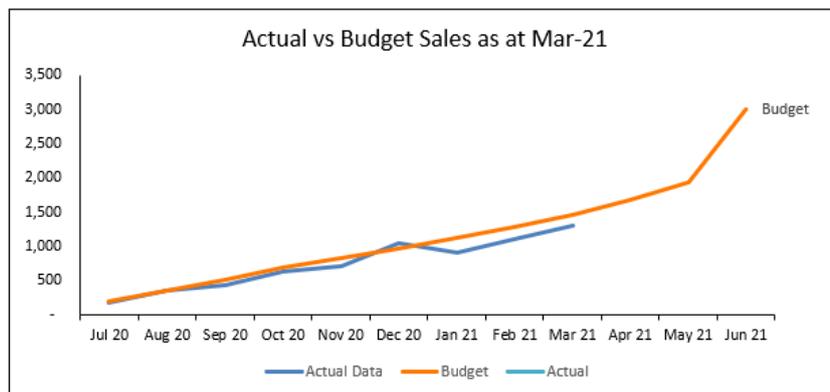
In the 'Select Data Source' dialog, under 'Legend Entries (Series)', click Add.



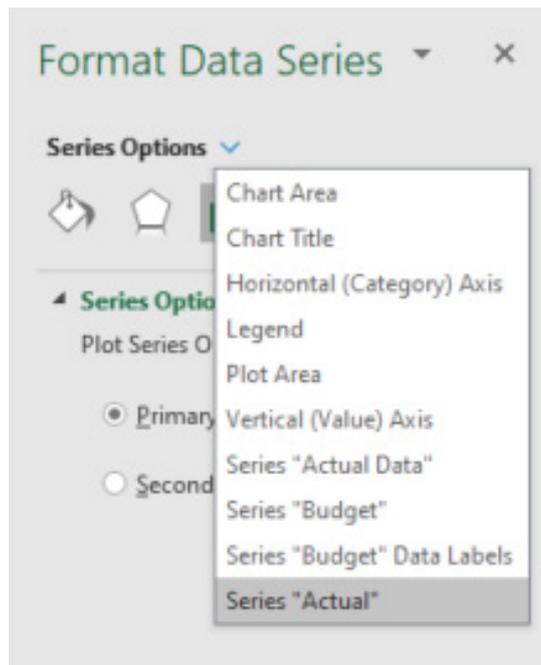
Select cell I12 to be the Series name and cells I13:I24 to be the Series values and click OK.



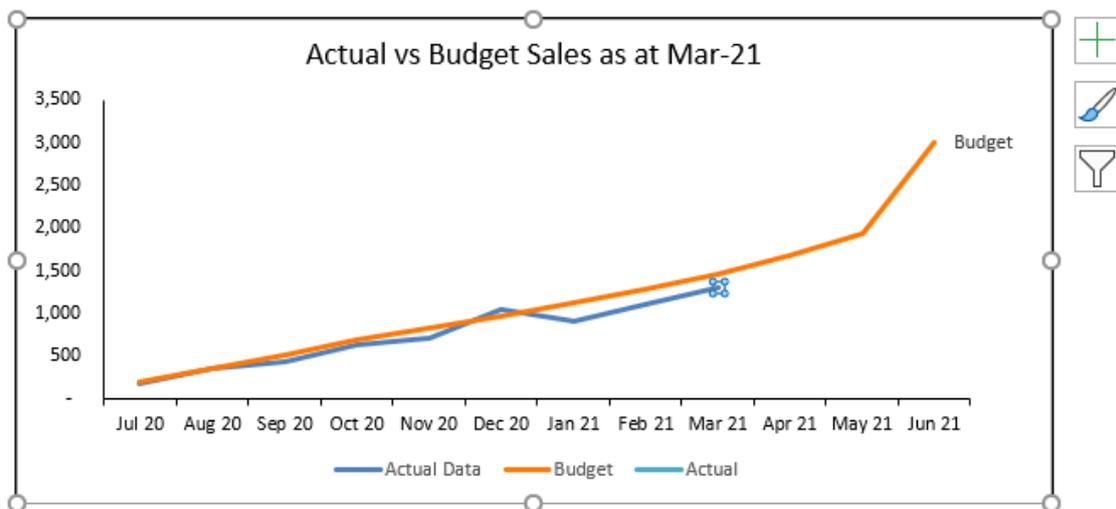
The chart now looks like the one below. A new 'Actual' series is added, with only one data point overlapped by the 'Actual Data' series (making it difficult, if not impossible, to see).



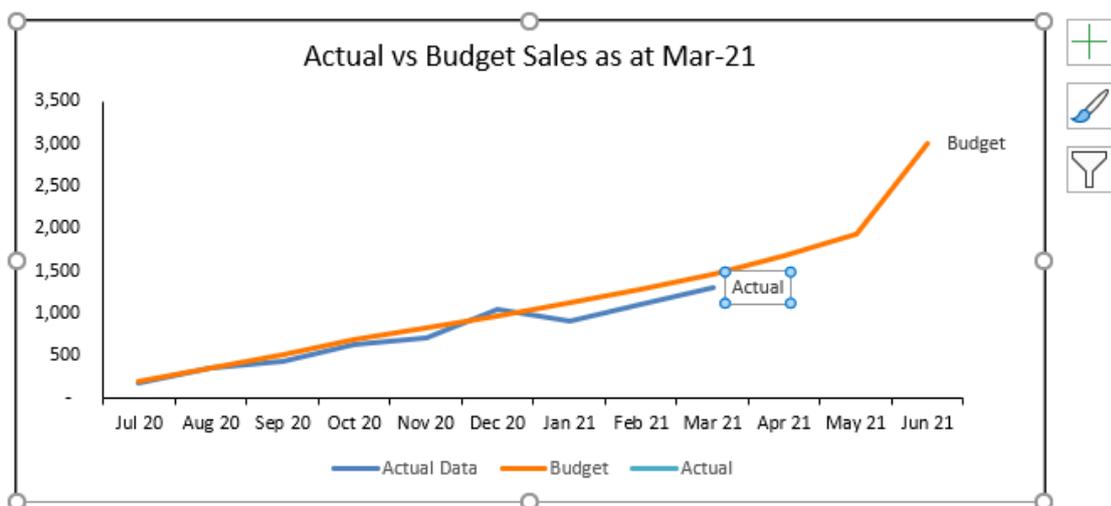
To format the Actual series only, right-click on the chart and select 'Format Data Series'. In the 'Format Data Series' panel, under 'Series Options', choose 'Series "Actual"'.



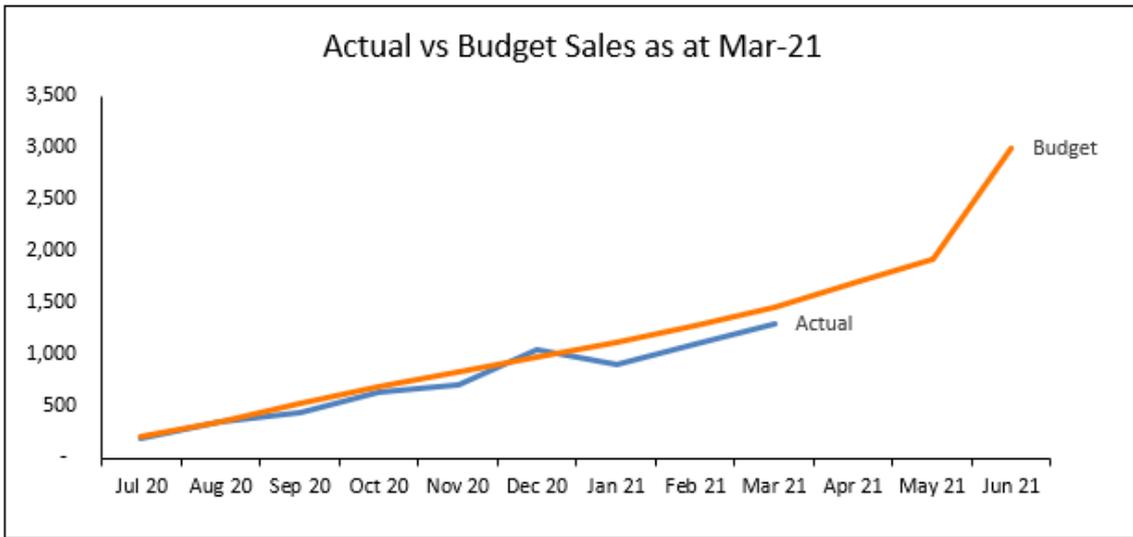
The data point is highlighted, right-click on it and choose 'Add Data Label'.



Again, right-click on the label, select 'Format Data Label' and tick 'Series Name'.



We won't need the legend, hence, click on it and hit Delete. We may also need to resize the plot area. The chart now looks like this:



Now, if we add more actual data, the chart title changes and the label moves along with the series!

Month	Actual Data	Budget	Actual
Jul 20	186	203	#N/A
Aug 20	356	360	#N/A
Sep 20	439	523	#N/A
Oct 20	632	695	#N/A
Nov 20	719	837	#N/A
Dec 20	1,050	972	#N/A
Jan 21	906	1,120	#N/A
Feb 21	1,106	1,282	#N/A
Mar 21	1,306	1,460	#N/A
Apr 21	1,500	1,686	1,500
May 21		1,933	#N/A
Jun 21		3,000	#N/A

Chart

More next time.

Power Pivot Principles

We continue our series on the Excel COM add-in, Power Pivot. This month, we continue considering **EARLIER**...

Last month's newsletter explained how the **EARLIER** function worked and we showed how to use the **EARLIER** function to create a calculated column that ranks products based on total sale amounts. This month, we're going to cover another application for the **EARLIER** function: how to create a cumulative total column in Power Pivot.

In this example, we will be using the following dataset (this image is not exhaustive):

Product ID	Product Category	Price	Amount Sold
10022	Hats	184.00	28
10023	Shoes	307.00	79
10024	Hats	96.00	75
10025	Shoes	215.00	37
10026	Hats	20.00	41
10027	Shirts	462.00	40
10028	Pants	391.00	21
10029	Shoes	360.00	38
10030	Pants	220.00	47
10031	Pants	496.00	56
10032	Shoes	206.00	92
10033	Pants	164.00	47
10034	Hats	211.00	26
10035	Shirts	111.00	93
10036	Shirts	285.00	23
10037	Shirts	336.00	49
10038	Hats	116.00	68
10039	Shoes	94.00	17
10040	Pants	188.00	90
10041	Pants	170.00	6
10042	Shoes	280.00	86
10043	Shirts	221.00	3
10044	Shoes	63.00	49

After loading the data to our data model, we may use the **EARLIER** function to create a cumulative total column. For example, say we wish to write a **DAX** formula that can calculate the cumulative amount sold for each product, ascending with the price. The formula would look like this:

```
=CALCULATE(
    SUM([Amount Sold]),
    FILTER('SaleTbl',
    SaleTbl[Price] <= EARLIER(SaleTbl[Price])
    )
)
```

Product ID	Product Category	Price	Amount Sold	Cumulative Amount Sold	
1	10060	Pants	\$0.00	43	43
2	10026	Hats	\$20.00	41	84
3	10050	Shoes	\$29.00	40	124
4	10044	Shoes	\$63.00	49	173
5	10061	Shirts	\$65.00	17	190
6	10039	Shoes	\$94.00	17	207
7	10024	Hats	\$96.00	75	282
8	10035	Shirts	\$111.00	93	375
9	10067	Shirts	\$112.00	5	380
10	10038	Hats	\$116.00	68	448
11	10046	Pants	\$117.00	33	481
12	10063	Shirts	\$132.00	93	574
13	10057	Shirts	\$153.00	44	618

This formula uses the same logic that we covered previously regarding the inner and outer row context. To avoid repeating ourselves, we will only go over it briefly here:

1. The **FILTER** function is evaluating the **Price** for each row for the entire table, inner row context
2. The function then has to evaluate '**EARLIER**(SaleTbl[Price])'. The **EARLIER** function instructs the function to evaluate the outer row context which is just 'SaleTbl[Price]'. On the first row, this evaluates to '\$0.00', which is the price of the first row
3. The **FILTER** function then returns with a table with all of the rows that have a price that is greater than or equal to '\$0.00'
4. The **CALCULATE** function then sums the **Amount Sold** for all of these rows which is incidentally 43 (in the first row)
5. Steps 1 to 4 are repeated for the rest of the rows in the table.

If you are still confused as to how this works, we'd recommend reading last month's article over how the **EARLIER** function works in greater detail. Let's see if the **EARLIER** function works with dates too.

We will be using the following dataset:

Date	Total Sales
1/08/2019	490.00
2/08/2019	475.30
3/08/2019	451.54
4/08/2019	465.08
5/08/2019	483.68
6/08/2019	498.19
7/08/2019	518.12
8/08/2019	492.22
9/08/2019	477.45
10/08/2019	472.68
11/08/2019	491.58
12/08/2019	506.33
13/08/2019	521.52
14/08/2019	537.17
15/08/2019	521.05
16/08/2019	531.47
17/08/2019	504.90
18/08/2019	515.00
19/08/2019	494.40
20/08/2019	504.28
21/08/2019	509.33

We can use the following **DAX** code to create a calculated column:

```
=CALCULATE(
    SUM(SaleDataDates[Total Sales]),
    FILTER('SaleDataDates',
        SaleDataDates[Date] <= EARLIER(SaleDataDates[Date])
    )
)
```

	Date	Total Sales	Cumulative Sales
1	1/07/2018	\$490.00	\$490.00
2	2/07/2018	\$475.30	\$965.30
3	3/07/2018	\$451.54	\$1,416.84
4	4/07/2018	\$465.08	\$1,881.92
5	5/07/2018	\$483.68	\$2,365.60
6	6/07/2018	\$498.19	\$2,863.80
7	7/07/2018	\$518.12	\$3,381.92
8	8/07/2018	\$492.22	\$3,874.13

The **EARLIER** function works with dates too!

That's it for this month; more next time.

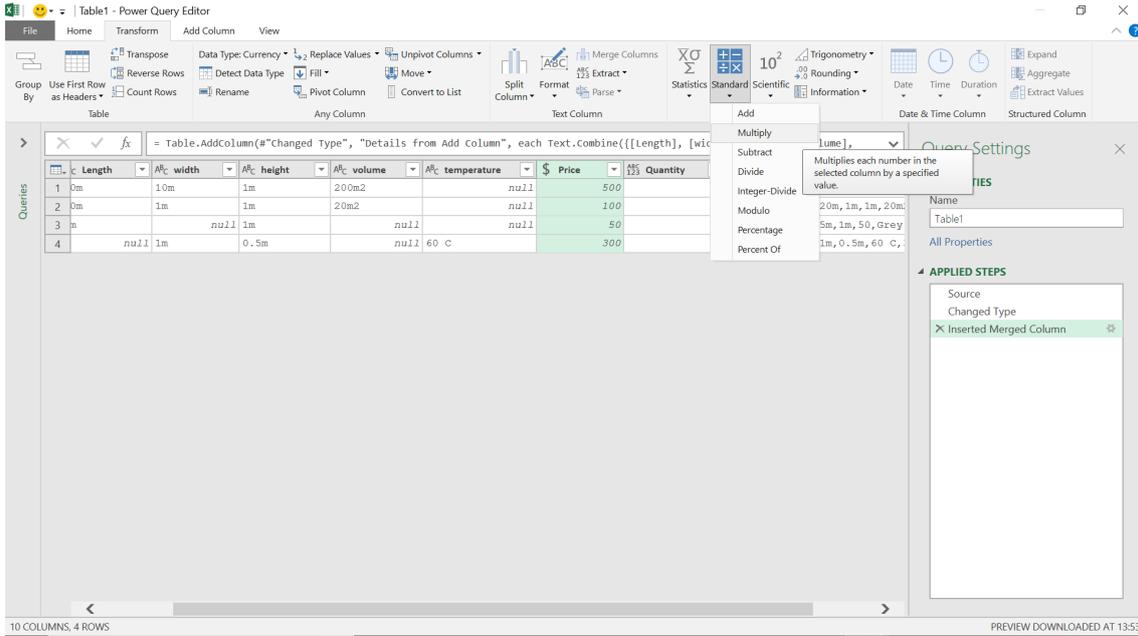
Power Query Pointers

Each month we'll reproduce one of our articles on Power Query (Excel 2010 and 2013) / Get & Transform (Office 365, Excel 2016 and 2019) from www.sumproduct.com/blog. If you wish to read more in the meantime, simply check out our Blog section each Wednesday. This month, we look at the differences in the way that the 'Standard' button works on the 'Transform' and 'Add Column' tabs.

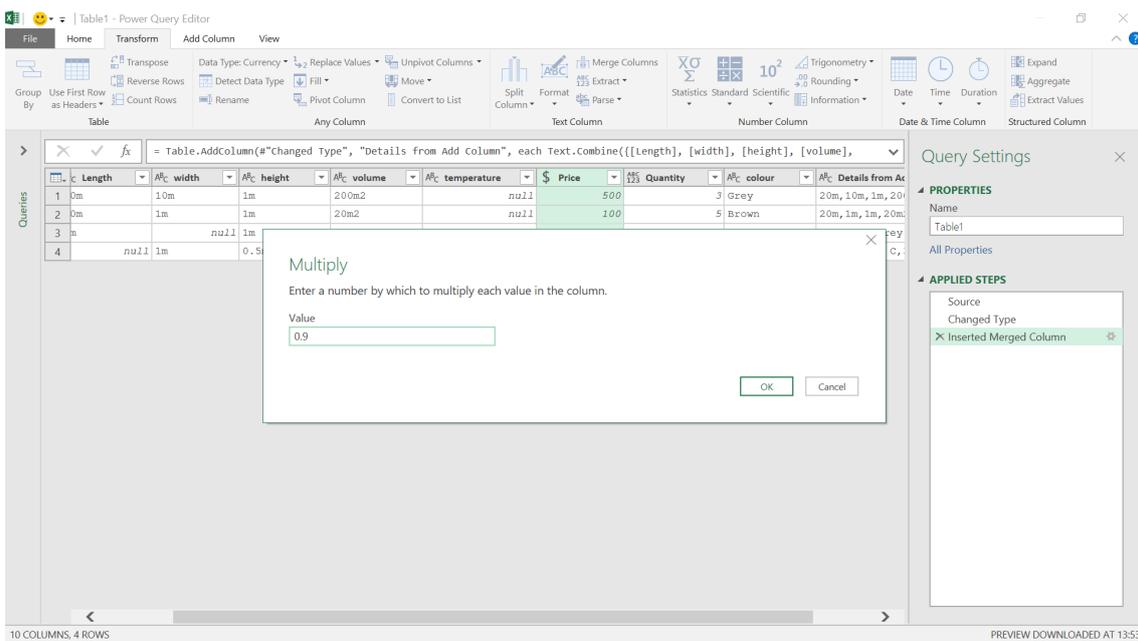
Last time, we looked at the 'Merge Column' functionality and the current differences between the way it works on the 'Transform' and 'Add Column' tabs. This time, we will look at the 'Standard' option available on these tabs for numeric columns. In this case, there are reasons why the standard

option behaves differently for each tab.

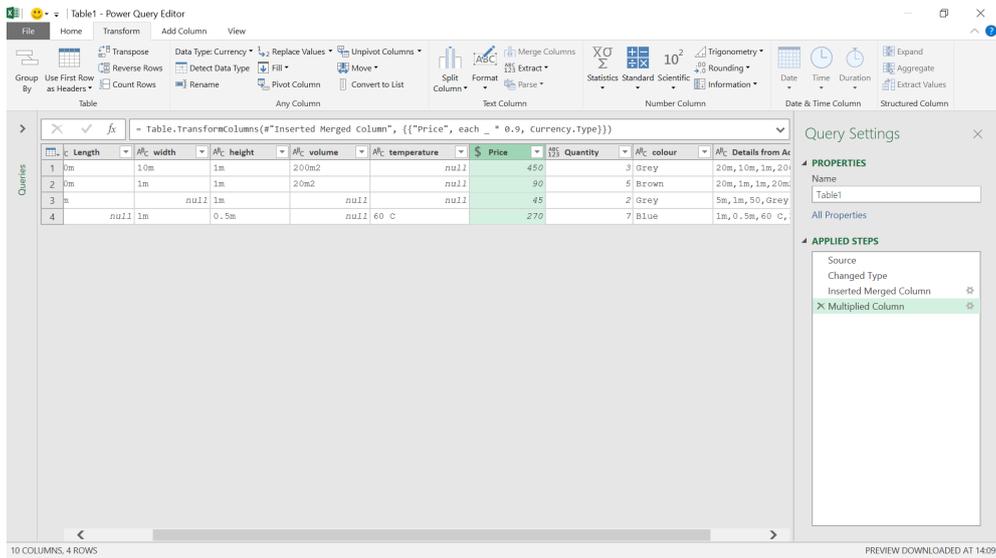
Let's start with some simple data, where we will focus on the price. In the 'Transform' tab, we may modify our price column using 'Standard' options:



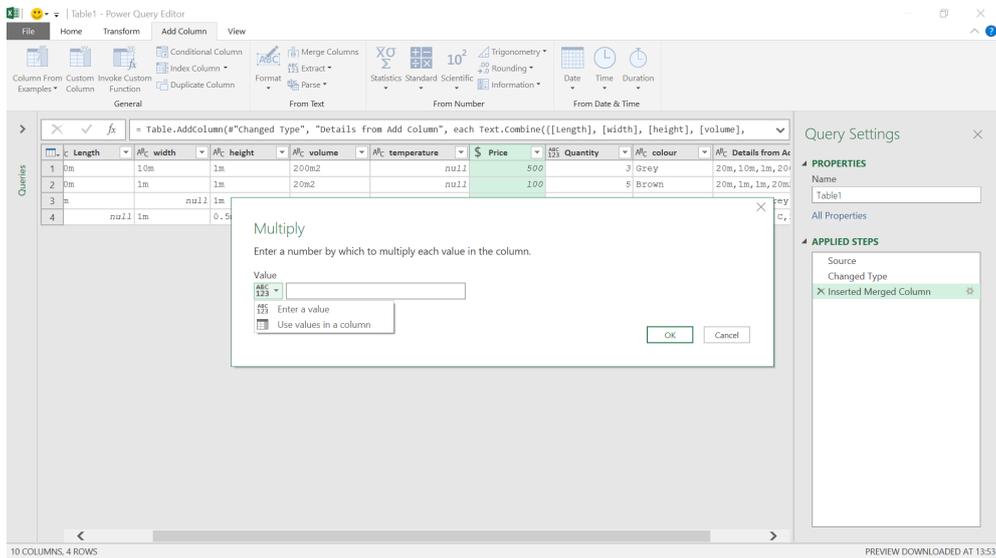
We can choose to apply a 'Standard' reduction by multiplying my prices by 0.9, viz.



This will change the existing column.

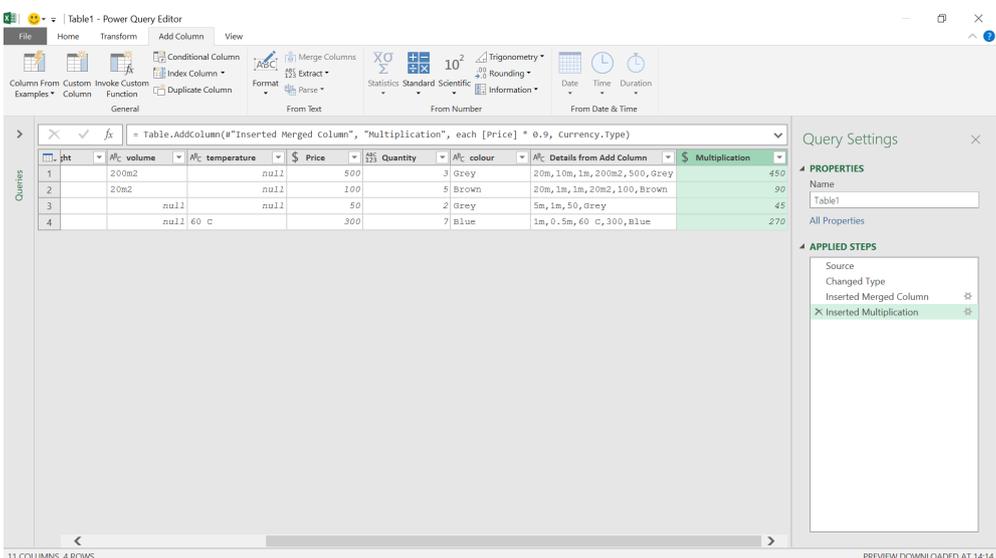


However, imagine we have decided we wish to keep our existing column and see discounted prices in a new column. In this case, we should use the 'Add Column' tab instead:

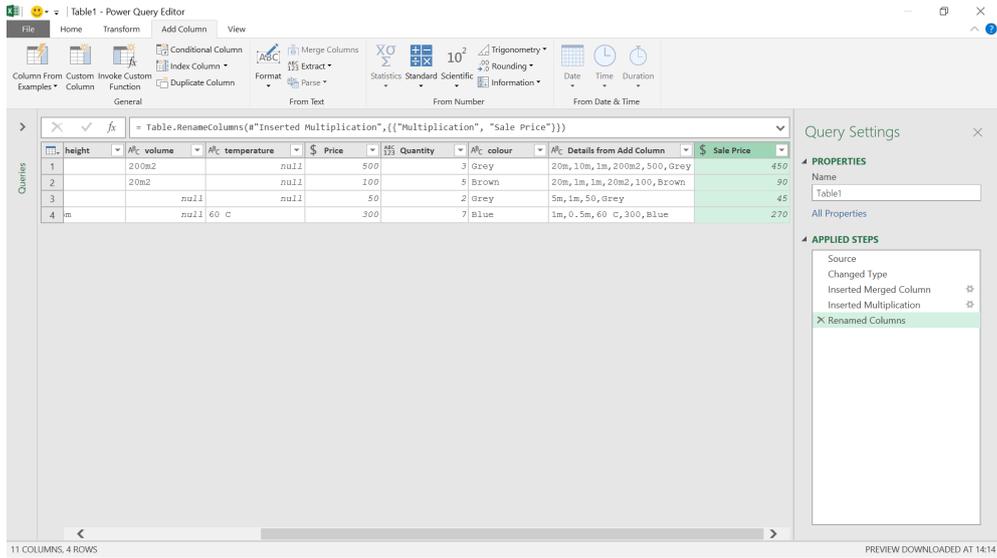


The process looks the same as for the 'Transform' tab, until we come to enter the value used for multiplication. We then see we have the option to use values from a column as an alternative to using a fixed value. This

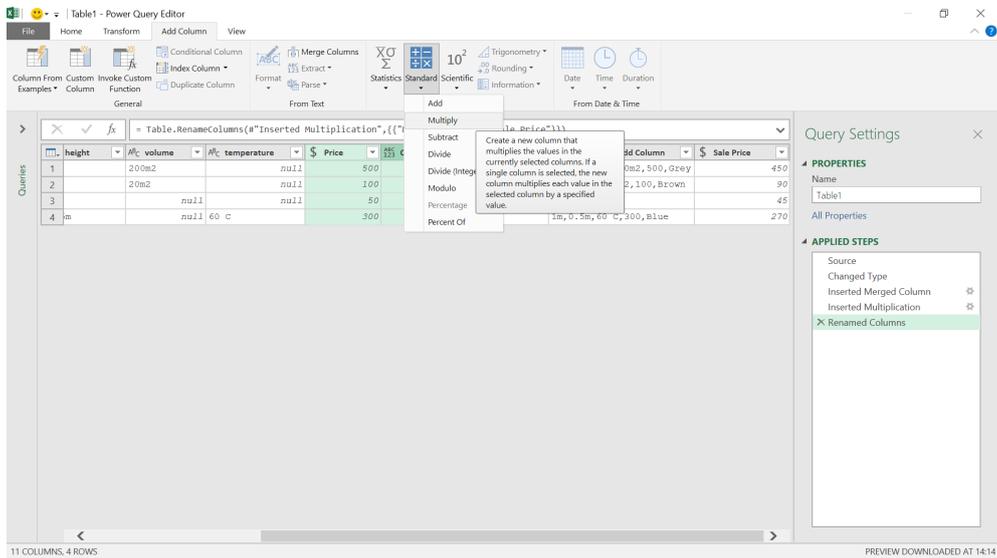
was not available in the 'Transform' tab. We will use a fixed value for now and complete our action. We would have liked the option to name our new column, but we can change this later.



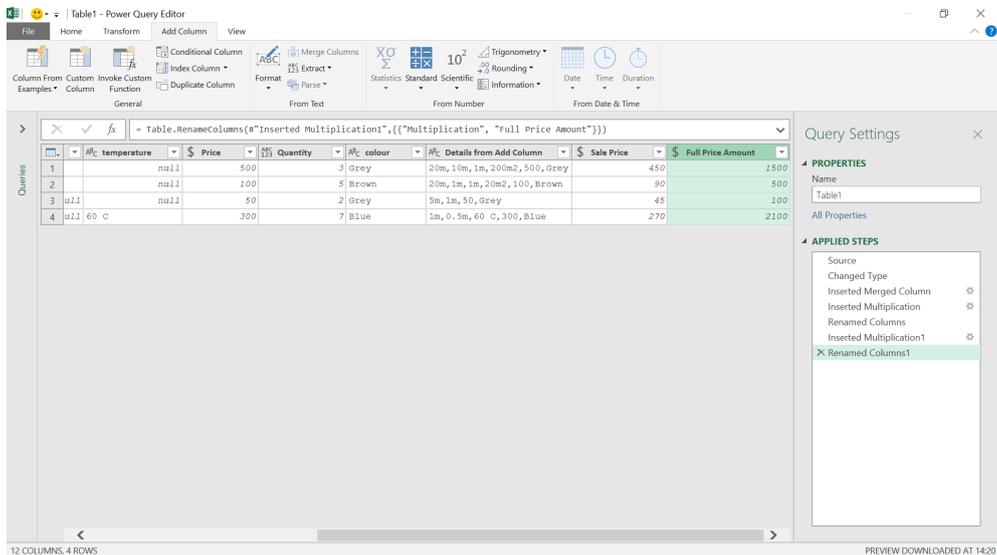
A new column Multiplication has appeared. If we rename this to 'Sale Price', we can see both of our prices:



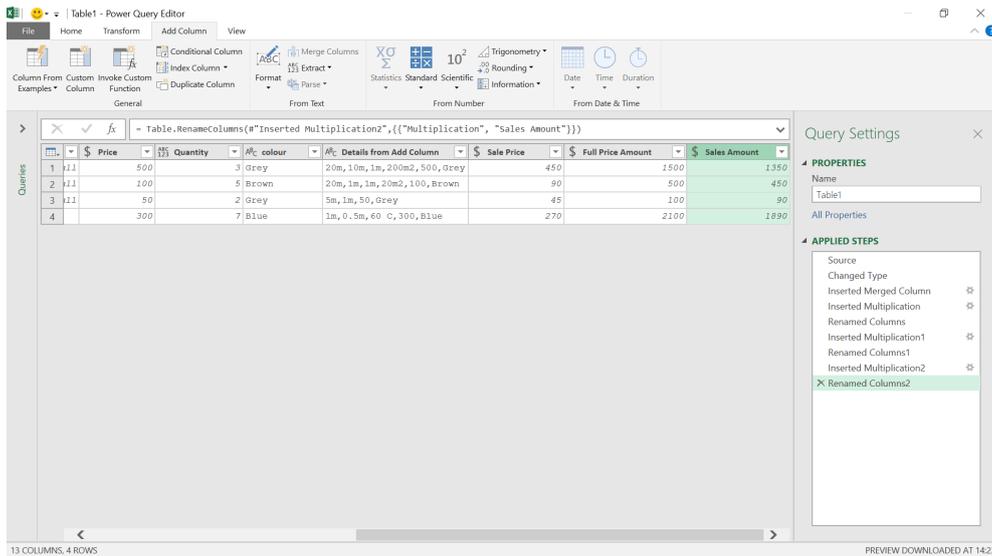
Since we were given the option to select values from a column as part of the 'Standard' multiplication functionality, let's try selecting two numeric columns to see what options are available on 'Standard'.



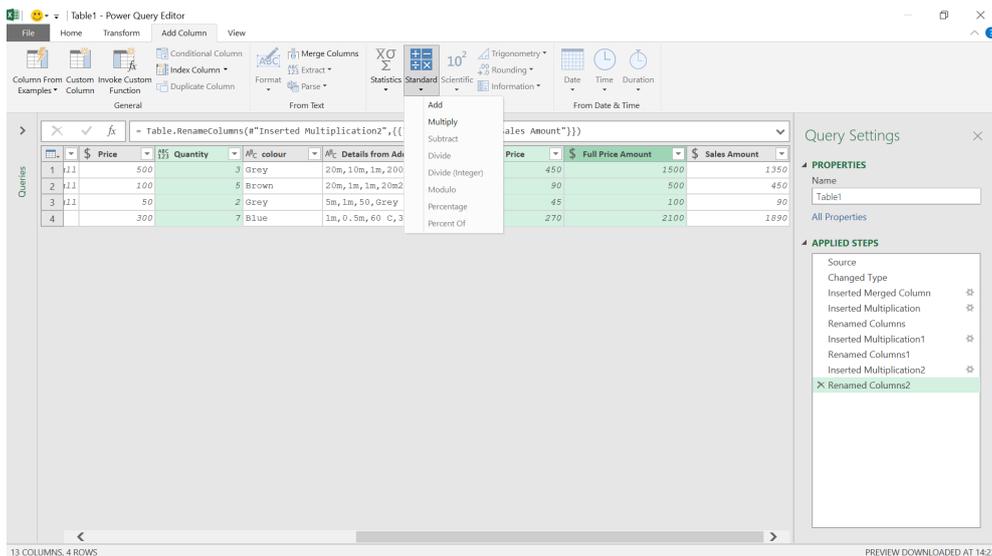
Having selected Price and Quantity, we have the option of creating a new column by combining the values in the selected columns. We can perform all the 'Standard' operations with the exception of 'Percentage':



Let's opt to multiply our columns and create a new column which we will rename to show the potential returns if we sell all our stock at pre-sales prices. We may create another column from the Sale Price and Quantity to show the effects of the proposed sale.



Whereas the 'Standard' option from the 'Transform' column enables us to perform simple operations on a numeric column, the 'Standard' option from the 'Add Column' tab may be used to combine data from more than one column and present our results whilst still showing the original data. Some 'Standard' options are even available for more than two [2] columns.



This can be a quick way to create a new column via addition or multiplication without creating a custom query.

Until next month.

Power BI Updates

After last month's hiatus, the Power BI updates return this month. There is a new 'Explore this data' option in the visual options menu, plus the Treemap visual now boasts three [3] Tiling methods for enhanced visualisation. Other highlights include the Preview of the Tabular Model Definition Language (TMDL) scripting experience and the ability to track your semantic model version history.

The full list of updates is as follows:

Copilot and AI

- Unlock suggested questions from standard prompts in Copilot

Reporting

- Explore this data: new entry point from a visual
- Storytelling in PowerPoint: new Reset behaviour
- Storytelling in PowerPoint: supporting Page Up and Page Down
- Save to OneDrive and SharePoint: updated file picker (Preview)
- Enhancement to Text slicer (Preview)
- Enhancements to Treemap visual

Modelling

- Semantic model version history (Preview)
- Edit your data model in the Power BI Service: updates (Preview)
- Live edit of semantic models in Direct Lake mode with Power BI Desktop: updates (Preview)
- TMDL scripting experience (Preview)

Data Connectivity

- New Snowflake connector implementation (Preview)

Visualisations

- Drill Down Scatter PRO by ZoomCharts: the All-in-One Scatter visual
- Lollipop Chart by Powerviz
- Inforiver Super Filter
- Inforiver Analytics+ 4.2

Other

- Now in Power BI Desktop: OneLake catalogue.

Let's look at each in turn.

Unlock suggested questions from standard prompts in Copilot

Whilst in Preview mode, when selecting from standard prompts after launching Copilot or using the prompt guide, a new prompt 'Answer a question about the data' has now become available. Selecting this prompt will unlock three [3] suggested questions to help you explore your data.

The screenshot displays the Power BI Desktop interface. The main report area shows an 'Executive Summary - Sales Report' with three visualizations: a line chart for 'Sales Amount by Order Date / Due Date', a map for 'Order Quantity by Reseller Country', and a table of sales data. The Copilot sidebar on the right is in 'Preview' mode and displays a list of suggested questions. Three questions are highlighted in a red box:

- What is the sales amount by due date by customer city
- Top reseller state-provinces by sales amount by due date
- What is the sales amount by due date by sales order order

You can continue to click the prompt by scrolling up or from the prompt guide (book icon) to generate three more suggested questions if none of the first set are interesting to you. Furthermore, authors may also

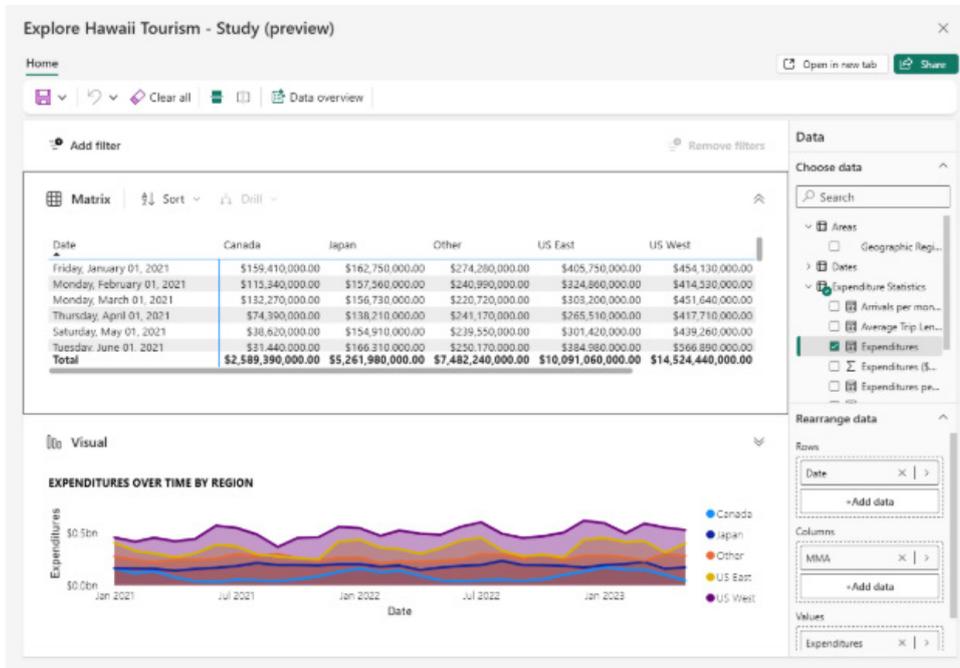
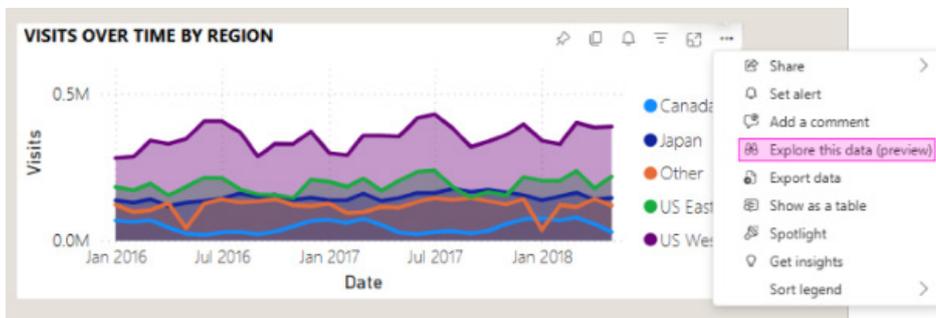
personalise these suggested questions using Q&A setup in Desktop for a particular semantic model. With this feature, suggested questions will now show up in both Copilot and the Q&A visual.

Explore this data: new entry point from a visual

Exploring your data has become simpler with the recently added 'Explore this data' option to the visual options menu. This lightweight and focused experience allows users to launch Explore and easily tweak their visual (change chart type, add new data, filter and more) and see

the underlying data, making it easy to get the answers they need without all the distractions and extra complexity of reports.

You simply select 'Explore this data' in the 'More options' menu and start exploring the visual.



Storytelling in PowerPoint: new Reset behaviour

When integrating a report into your presentation, it is important to ensure that it remains stable and unaltered. This add-in refreshes data from Power BI without modifying the report definition.

However, since Power BI reports are dynamic, sometimes you may want PowerPoint to get the latest changes done in the report in Power

BI Service. Previously, you had to remove and re-embed the report to achieve this. Now, with the improved 'Reset' command, you can choose either to reset the add-in to its original state as initially added to the presentation or to reset and update it with the current view from Power BI.

Reset all changes? ✕

Choose how you'd like to start over:

- Sync with the Power BI view
The view that's currently in Power BI.
- Restore the initial PowerPoint view
The view as it was originally added to this slide.

This will reset the view only. Your data is always in sync with Power BI.

Reset changes
Keep as is

Storytelling in PowerPoint: supporting Page Up and Page Down

You can now use the Page Down / Up keys on your keyboard to quickly navigate between slides when using the Power BI add-in. This is especially useful when the add-in captures the entire slide, and you want to advance the slide rather than trigger a Power BI event.

Save to OneDrive and SharePoint: updated file picker (Preview)

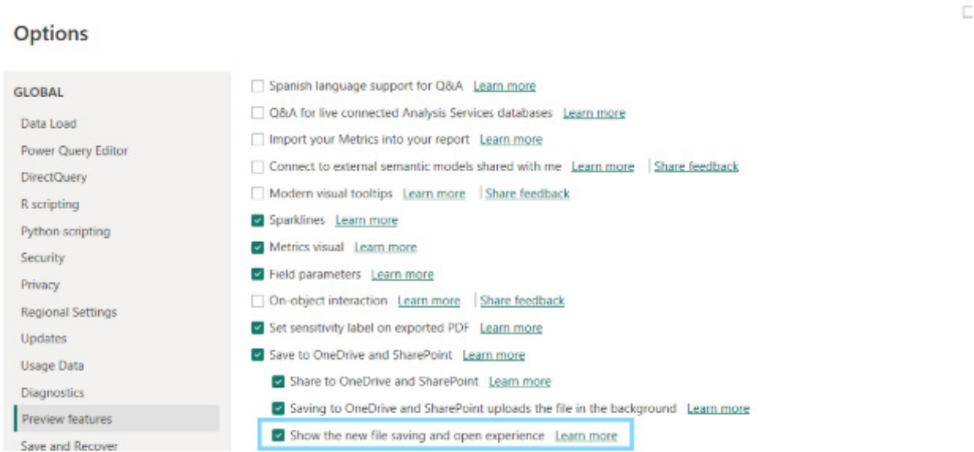
Updates have been made to the Power BI file picker to simplify navigation and file-saving processes. Microsoft has considered the feedback received regarding the current file picker and has decided to make significant improvements in response. In this update, the Power BI file picker now aligns more closely with the Office experiences you are familiar with.

New updates include:

- improved experience when opening and saving files in One Drive and SharePoint
- easy access to reports in OneDrive and SharePoint
- navigating between folders in various workspaces
- adding new folders to existing workspaces
- pinning folders and files in the file picker.

It is noted that these updates may disrupt your workflow. Therefore, they are not enabled by default. To access the updates, open the Desktop application, go to **'Options and settings' (under the File Menu) -> Options -> Preview features**, select the checkbox to enable 'Show the new file saving and open experience' then select 'OK' to accept the setting.

Soon, these settings will be on by default and will no longer require an opt-in.



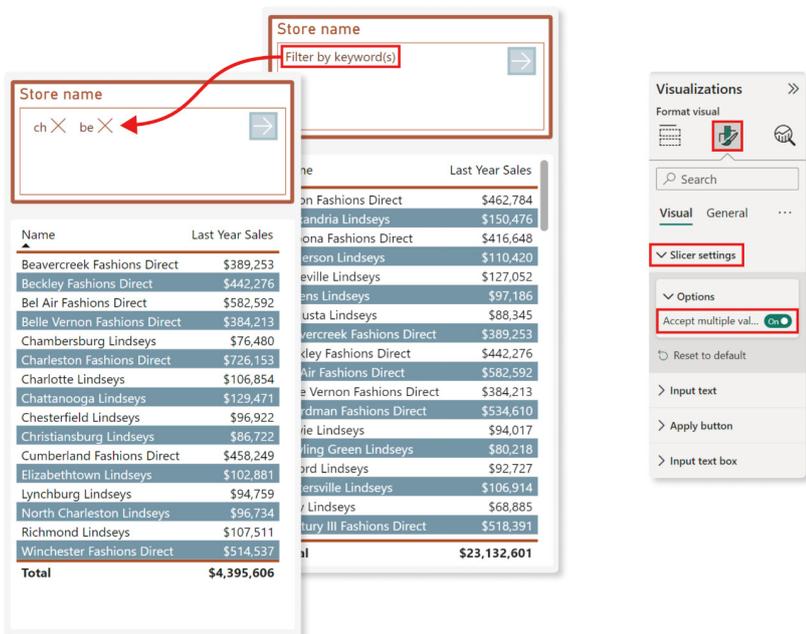
Enhancement to Text slicer (Preview)

Following the November 2024 Text slicer release, this update enhances functionality and user experience by allowing multiple text selections. This Text slicer is currently in Preview. To enable the Text slicer, go to **Options and settings -> Options -> Preview features -> Text slicer visual** to make sure it is selected, and then simply restart Power BI.

This month's enhancement adds a new Slicer settings control with an on / off toggle allowing the slicer to 'Accept multiple values'. All other existing formatting options for the Input text, 'Apply' button and 'Input' text box from the November update remain the same in the Format pane.

After creating a Text slicer visual and adding a text field from the data model, users may filter the dataset based on user input. Simply click the slicer input box, type your text and apply the filter either by clicking the apply icon, pressing **ENTER** or else clicking outside the visual. The slicer immediately filters and displays the results, and you can repeat these steps to add more text selections.

When the 'Accept multiple values option' is enabled, additional text may be added to the slicer by repeating these steps, thereby allowing multiple selections for filtering the dataset. Keep in mind that switching the toggle on or off will clear any previous text selections.



Adding filtering with multiple values brings more control to data slicing. Future enhancements are still planned as Power BI is modified to improve its visualisation capabilities with the Text slicer.

Enhancements to Treemap visual

This month's update includes significant enhancements to the Treemap visual, with three [3] new Tiling methods that improve layout options, plus new spacing controls to enhance the visual's appearance and usability. These features are aimed at offering better control and customisation, resulting in more precise Treemaps in Power BI.

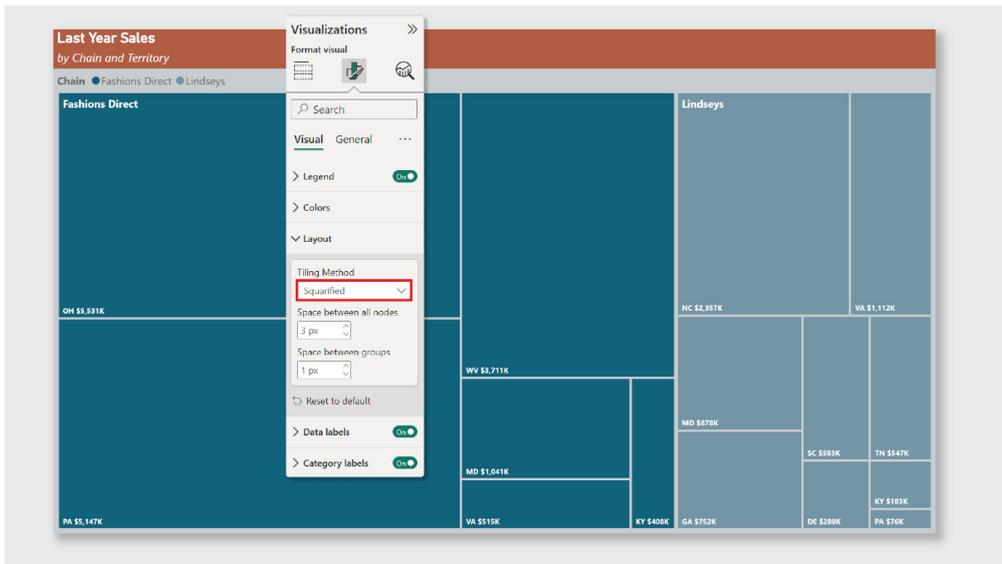
Treemap visuals are powerful tools for data visualisation that allow users to represent hierarchical data through nested rectangles. Each branch

of the hierarchy is represented by a rectangle, which is then tiled with smaller rectangles representing sub-branches. This structure allows for quick comparison of different category proportions.

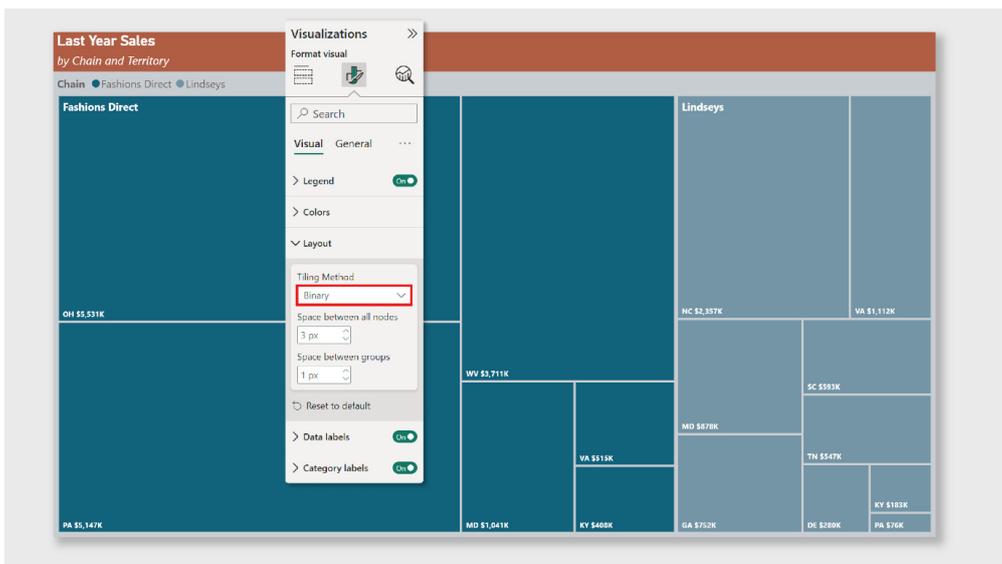
To generate two-level Treemap visuals, ensure that both the Category and Details fields are enabled. This allows you to visualise the hierarchical relationships between various categories and their subcategories in a clear and organised manner.

There are three [3] new Tiling methods:

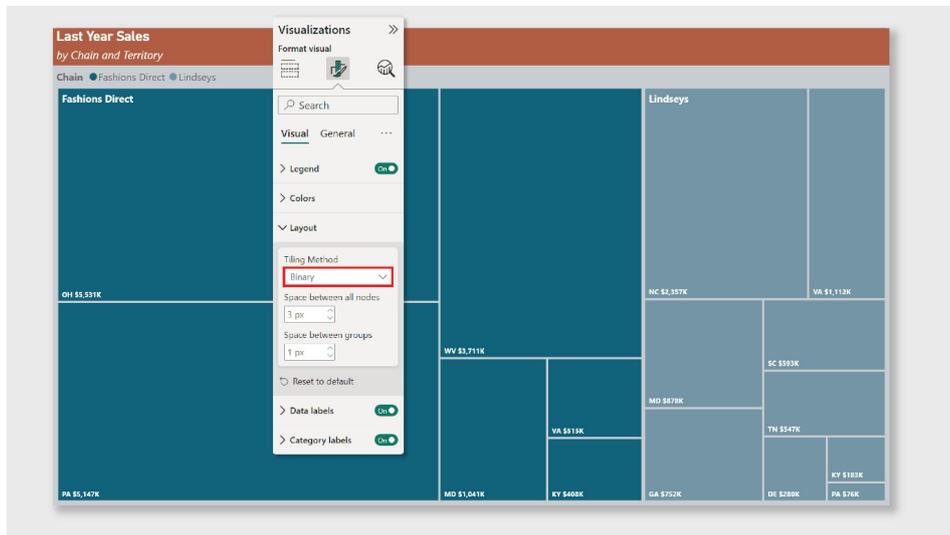
1. **Squarified:** this method uses a squarified Treemap algorithm to prevent elongated rectangles, creating a balanced layout. It arranges rectangles so their aspect ratios are close to squares, making size comparisons potentially easier



2. **Binary:** this method continuously divides the chart area into two [2] sections whilst incrementally adding new rectangles / nodes creating a balanced and visually appealing Treemap. Each hierarchy level further splits the space, resulting in an organised Treemap that adapts to the dataset's structure. It may produce different visual characteristics compared to squarified algorithm depending on the dataset

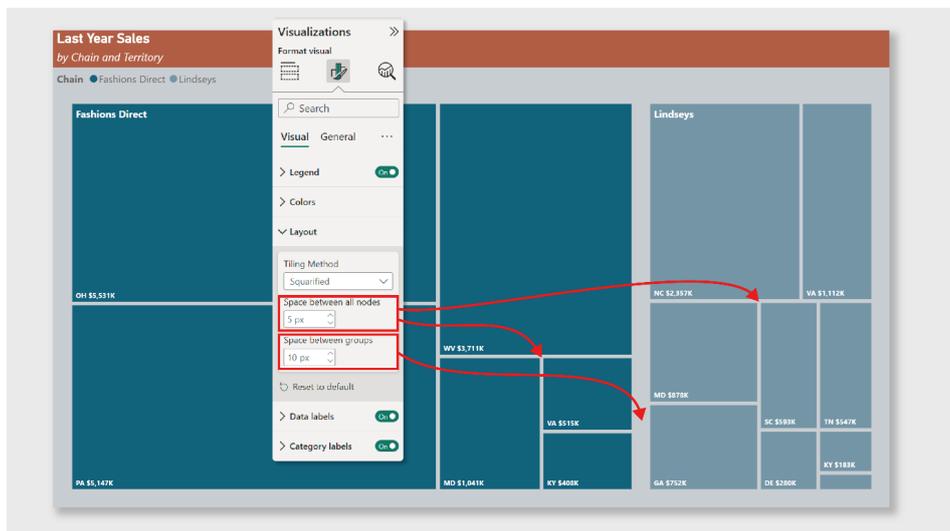


3. **Alternating (Columns, Rows):** the alternating method clearly distinguishes categories by first splitting them by columns and then within each column by rows. This method effectively organises datasets with numerous hierarchical levels.



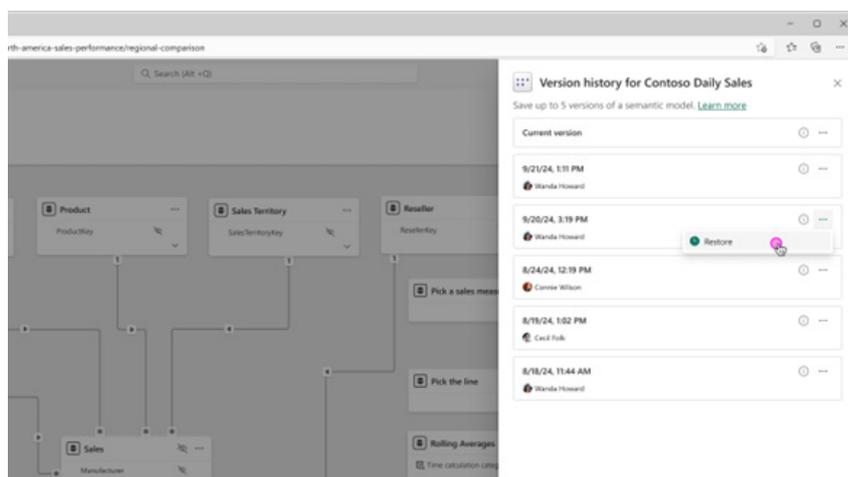
This month's update also introduces new spacing options to enhance the readability and appearance of the Treemap visual:

- **Space between all nodes:** this setting introduces gaps between adjacent nodes at all hierarchy levels, reducing clutter and improving clarity
- **Space between groups:** by adding extra space around each node group, this option visually separates different hierarchical groups, which helps to visually distinguish categories within the hierarchy.

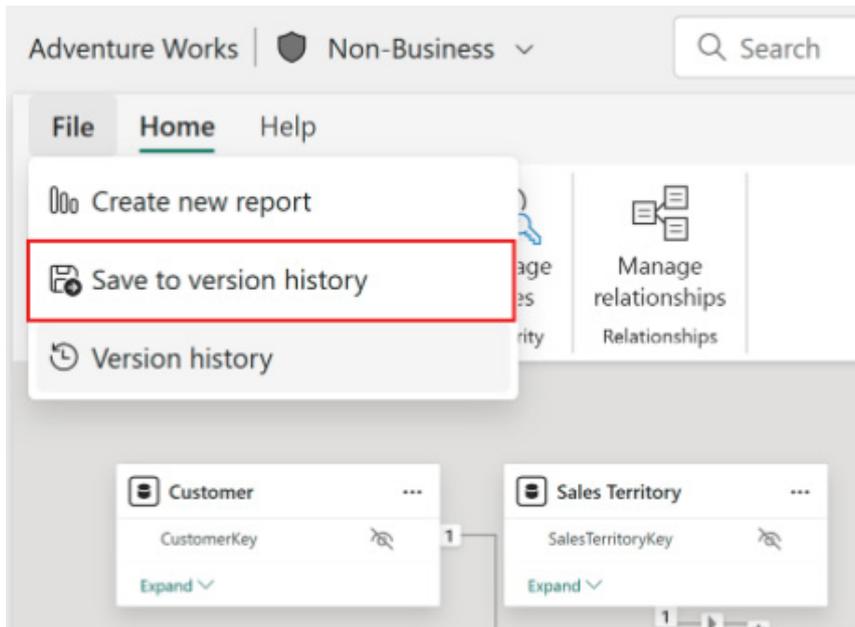


Semantic model version history (Preview)

This update also announces the public Preview of semantic model version history. This feature aims to empower self-service users by providing confidence to recover from critical mistakes when editing semantic models on the web. In this Preview, versions will be automatically captured in an Office-like history pane for your web-edited Premium semantic models. You can easily select and restore any of these previous versions of your semantic model.



Additionally, you have the option to manually save versions to the version history for your semantic model.



Edit your data model in the Power BI Service: updates (Preview)

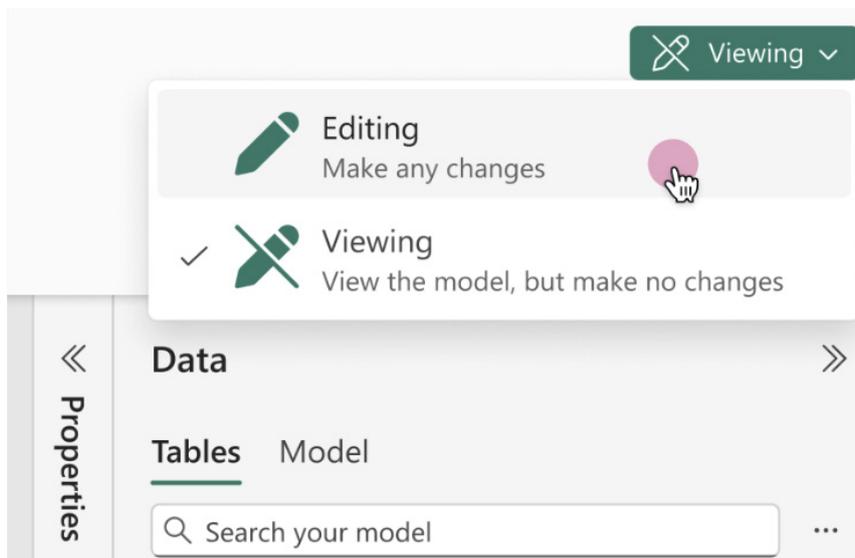
The following improvements to the data model editing in Power BI Service Preview have been introduced in this update.

ON BY DEFAULT PREVIEW FOR PREMIUM WORKSPACES

With the release of semantic model version history, Microsoft will start enabling the workspace-level Preview feature for editing data models in Power BI Service. Users may edit the data models workspace setting, which will be turned on by default for Premium workspaces. If you prefer, you can still disable the workspace Preview for your workspace. Power BI administrators will still have the ability to enable or disable data model editing in Power BI Service for the entire organisation or specific security groups through the admin portal.

VIEWING MODE

Now, when you open your semantic models on the web, it will default to Viewing mode. This allows you to easily view the model in a safe environment, preventing any accidental edits. When you're ready to make changes, simply toggle to Editing mode to make your modifications directly on the web.



Live edit of semantic models in Direct Lake mode with Power BI Desktop: updates (Preview)

Live editing semantic models in Direct Lake mode with Power BI Desktop is now enabled by default, allowing you to use this feature immediately without needing to turn on the Preview feature. If you prefer, you can still disable this feature by turning off the live edit of Power BI semantic models in Direct Lake mode Preview in **Options and Settings -> Options -> Preview features**.

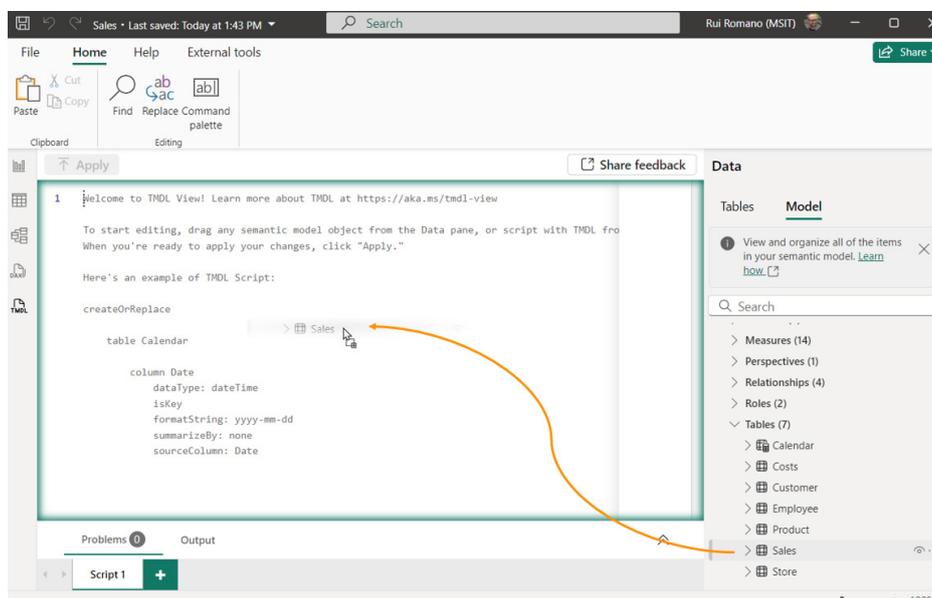
TMDL scripting experience (Preview)

TMDL view is a new view in Power BI Desktop that lets you script, modify and apply changes to the semantic model being edited in Desktop with a modern code editor using Tabular Model Definition Language (TMDL – hence the name!), improving development efficiency and providing complete visibility over the semantic model metadata. TMDL view offers an alternative experience to semantic modelling using code instead of a graphical user interface like Model view.

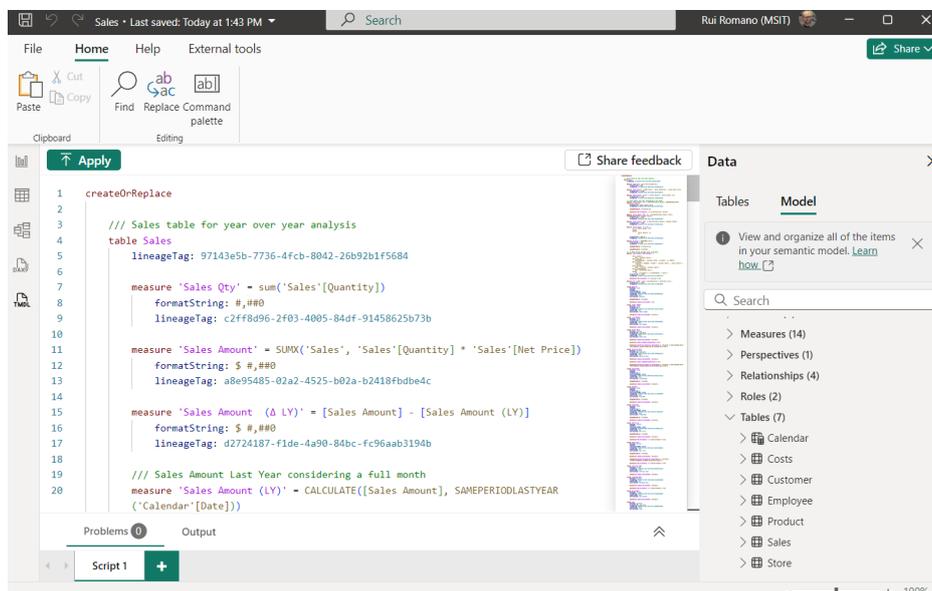
Benefits include:

- **enhance development efficiency** with a rich code editor that includes search-and-replace, keyboard shortcuts, multi-line edits and more
- **increase reusability** by easily script, share and reuse TMDL scripts among semantic model developers. For example, use a centralised SharePoint site to easily share reusable semantic model objects such as calendar tables or time intelligence calculation groups
- **get more control and transparency**, showing all semantic model objects and properties, and allowing changes to items not available in Desktop GUI, such as `IsAvailableInMDX` or `DetailRowsDefinition`.

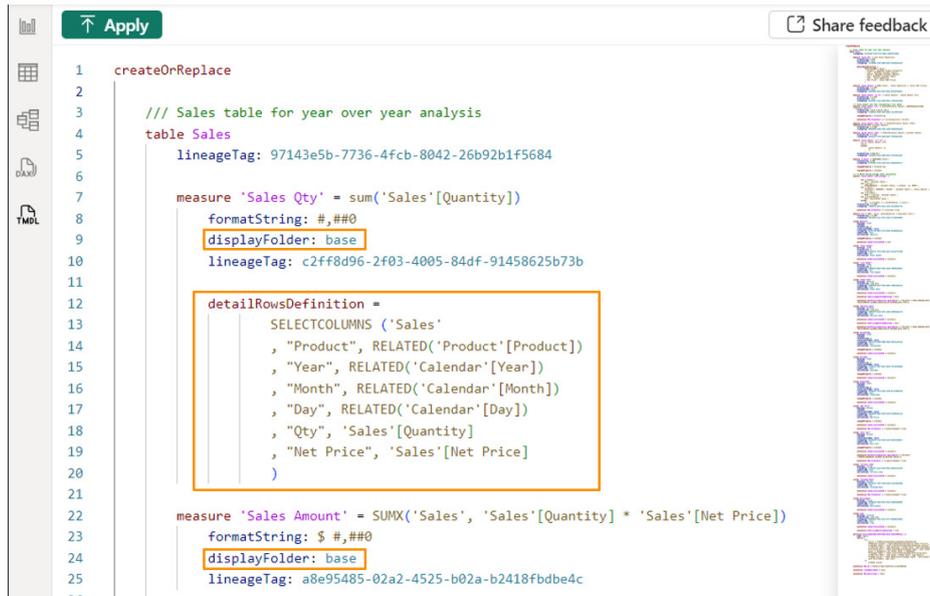
You may script any semantic model object such as a table, measure, column or perspective by selecting the objects from Data pane and dragging them into the code editor:



TMDL view will script the selected objects as a TMDL script and just like TMDL in VS Code you get an enriched code experience with features such as semantic highlighting, error diagnostics and AutoComplete.

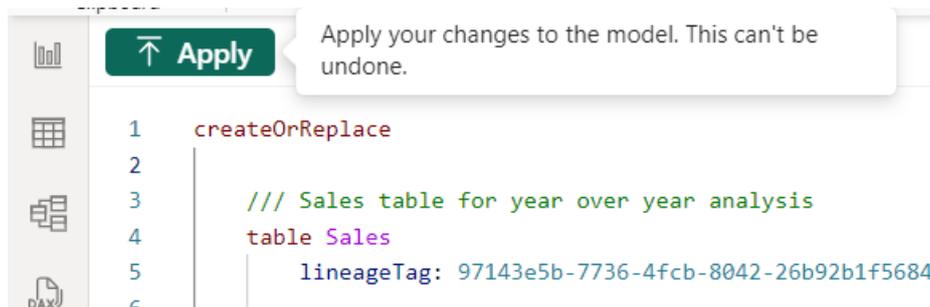


You may change any valid property or object within the semantic model. For instance, the example below demonstrates how to modify the **displayFolder** property and detail rows definition of multiple measures:



```
1 createOrReplace
2
3
4 /// Sales table for year over year analysis
5 table Sales
6     lineageTag: 97143e5b-7736-4fcb-8042-26b92b1f5684
7
8     measure 'Sales Qty' = sum('Sales'[Quantity])
9         formatString: #,##0
10        displayFolder: base
11        lineageTag: c2ff8d96-2f03-4005-84df-91458625b73b
12
13        detailRowsDefinition =
14            SELECTCOLUMNS ('Sales'
15                , "Product", RELATED('Product'[Product])
16                , "Year", RELATED('Calendar'[Year])
17                , "Month", RELATED('Calendar'[Month])
18                , "Day", RELATED('Calendar'[Day])
19                , "Qty", 'Sales'[Quantity]
20                , "Net Price", 'Sales'[Net Price]
21            )
22
23     measure 'Sales Amount' = SUMX('Sales', 'Sales'[Quantity] * 'Sales'[Net Price])
24         formatString: $ #,##0
25        displayFolder: base
26        lineageTag: a8e95485-02a2-4525-b02a-b2418fbdbe4c
```

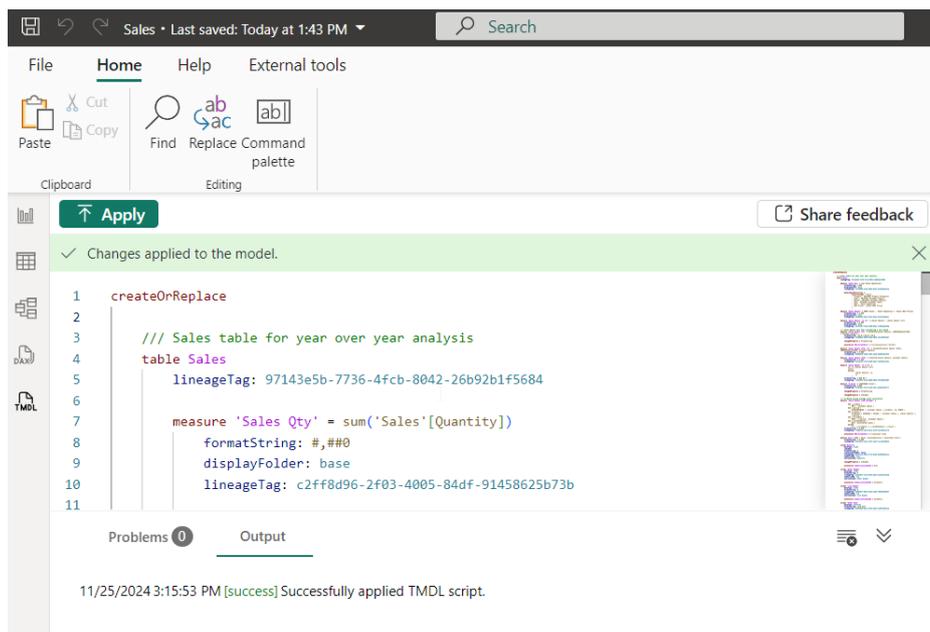
When ready, you can hit the 'Apply' button to execute the TMDL script against the semantic model to get your changes applied.



Apply your changes to the model. This can't be undone.

```
1 createOrReplace
2
3
4 /// Sales table for year over year analysis
5 table Sales
6     lineageTag: 97143e5b-7736-4fcb-8042-26b92b1f5684
```

When successful, an instant notification will be displayed, and your modelling change will be applied to the semantic model.



Changes applied to the model.

```
1 createOrReplace
2
3
4 /// Sales table for year over year analysis
5 table Sales
6     lineageTag: 97143e5b-7736-4fcb-8042-26b92b1f5684
7
8     measure 'Sales Qty' = sum('Sales'[Quantity])
9         formatString: #,##0
10        displayFolder: base
11        lineageTag: c2ff8d96-2f03-4005-84df-91458625b73b
```

11/25/2024 3:15:53 PM [success] Successfully applied TMDL script.

In the event of a failure, your modelling changes will not be applied to the semantic model, and you can view more information about the error by clicking on show details, which expands the Output pane with the error details.



To get started with this feature, go to **File -> Options and settings -> Options -> Preview features** and check the box next to 'TMDL View'.

New Snowflake connector implementation (Preview)

The integration with Snowflake continues. This month, Microsoft has introduced a new implementation for Snowflake connector, currently available in Preview. To access this feature, in Power BI Desktop, navigate to **Options and settings (under the File Menu) -> Options -> Preview features**, click the checkbox to enable the 'Use new Snowflake connector implementation' option. Once the option is on, all the newly created

connections will automatically use the new connector implementation.

Your existing connections will remain unchanged. You can also test the new feature by editing the queries.

If you're using On-prem Data Gateway to refresh your semantic model, make sure you have the latest version to use this feature.

Drill Down Scatter PRO by ZoomCharts: the All-in-One Scatter visual

The latest ZoomCharts visual, Drill Down Scatter PRO, is now available on AppSource. It is designed for fully interactive Power BI reports that deliver quick insights and help you make decisions graphically.

Scatter PRO makes data exploration straightforward with user interactions like panning, zoom-in and rectangular or lasso selection. You can also create a multi-level hierarchy, which will allow users to drill down by simply clicking on a data point marker.

Main features:

- **Drill Down:** create a multi-level category hierarchy and drill down with just a click
- **Customisation:** configure marker colours, shapes, outlines, labels, threshold lines / areas, x and y axes, and more
- **Data-Driven Formatting:** apply marker colours, shapes, and even images directly from data
- **Area Shading:** highlight areas that need attention with up to eight [8] shapes at custom coordinates
- **Dynamic Regression Line:** show a linear or polynomial regression line. It will automatically recalculate upon any changes in the chart.

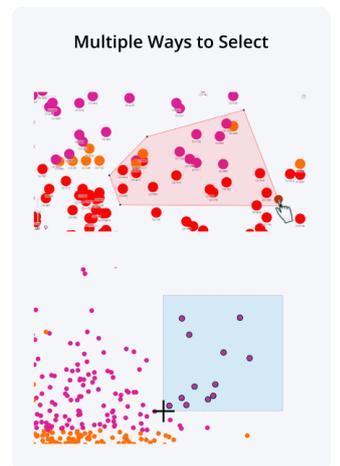
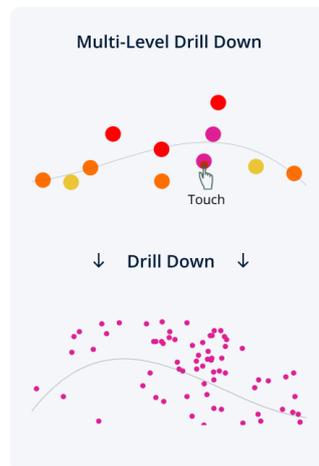


Drill Down Scatter PRO



BUILT FOR BIG DATA AND BIG DECISIONS

Scatter PRO combines powerful features and intuitive user experience. Freely move the chart around, zoom in, select data and drill down easily to quickly find the insights you're looking for!





CUSTOMIZE EVERY DETAIL

Create the perfect chart for your report with 200+ formatting settings, and highlight what's important using area shading and thresholds.



Lollipop Chart by Powerviz

The Powerviz Lollipop chart is a variation of a Bar chart that uses lines and dots to represent data points. It is useful for highlighting specific trends to help stakeholders make informed decisions.



Key features:

- **Chart Options:** switch easily between vertical / horizontal chart
- **Marker Style:** choose from Shapes, Charts, Icons, Images or Upload custom image(s)
- **Small Multiples:** split your visual into multiple smaller visuals
- **Error Bars:** add error bars to show data variability, improving analysis accuracy
- **Race Chart:** enhance the chart by adding animations to show data changes over time
- **Cut / Clip Axis:** trim / adjust the axis to accommodate the outliers
- **Dynamic Deviation:** analyse the deviation between two [2] bars at a glance
- **Preview Slider:** explore various sections of a chart in large datasets using a slider
- **Conditional Formatting:** find outliers by using rules for measures or categories based upon rules
- **Other features** included are Templates, Import / Export themes, Data Colours, Ranking and more.

Business Use Cases include sales analyses, financial reporting and market research.

Inforiver Super Filter

Lumel's Inforiver Super Filter has been introduced in this latest update, powered by Lumel's patented Time-Period Selector and alert Induced Selections. This visual is free with community support. They claim it is a single visual for all your filter / slicer needs, including date periods, categories, hierarchies, search, alerting, bulk copy / paste, and more.

Features include:

- **Facet Filtering:** group multiple slicers into one with a cascading effect
- **Date Filtering:**
 - Slider / Calendar Date-picker / Relative Date options
 - Different Calendar Viewing modes:
 - **Multi-Year:** select months across multiple years for year-on-year / seasonal analysis
 - **Year:** select months / quarters for month-over-month / quarterly analysis
 - **Month:** select specific dates for detailed analysis
 - **Date Range Selection** in month mode for custom timeframes
 - **Week Mode:** track weekly trends and milestones within specific months
 - **Day Mode:** granular filtering for time-sensitive analysis
 - Auto-updating Dynamic Date Presets like Year To Date / Last Month for date range
 - **Fiscal Year Support:** configure with no code
 - **Calendar Heatmap:** track trends over time
- **Bulk Filtering:** copy-paste values from Excel for mass filtering
- **Save Filters:** quickly apply frequent selections
- **Advanced Search:** pattern-based search, alphanumeric, focused text filtering
- **Analytical Features:** rank performers, apply conditional formatting, and add subtitles for context
- **Flexible Layouts:** vertical, horizontal, list, dropdown, tile, and more options.

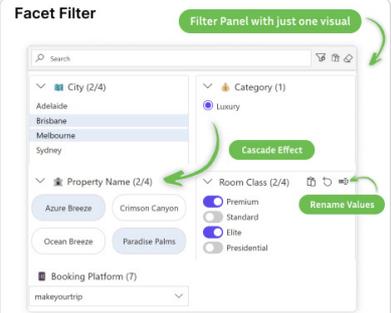


Super Filter

Free Forever
Community Support

Facet Filter

Filter Panel with just one visual



Cascade Effect

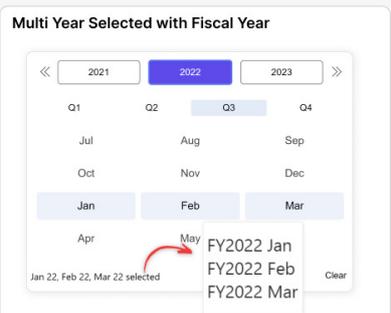
Rename Values

Calendar Heatmap



Display Selected Values

Multi Year Selected with Fiscal Year

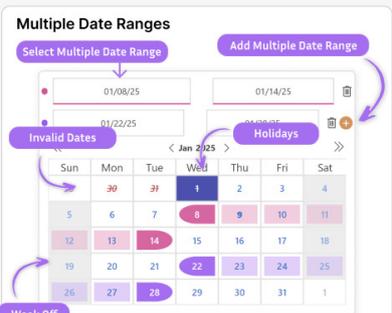


FY2022 Jan
FY2022 Feb
FY2022 Mar

Multiple Date Ranges

Select Multiple Date Range

Add Multiple Date Range



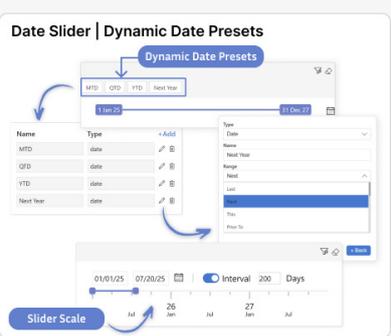
Invalid Dates

Holidays

Week Off

Date Slider | Dynamic Date Presets

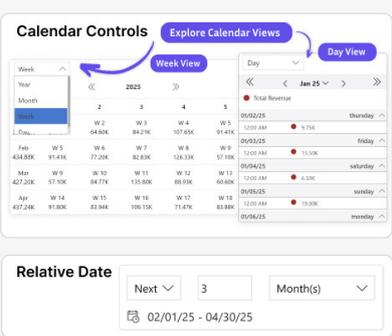
Dynamic Date Presets



Slider Scale

Calendar Controls

Explore Calendar Views



Week View

Day View

Relative Date

Next 3 Month(s)

02/01/25 - 04/30/25

Saved Filter | Conditional Formatting | Dynamic Preset

Display Presets

Name	Type
Revenue > 2M	filter
Revenue < 1M	alert

Conditional Formatting Preset

Type: Alert
Name: Revenue < 1M
Range: Background

Type: Filter
Name: Revenue > 2M

Conditional Formatting

Icon Color: [fr]
Background Color: [fr]
Font Color: [fr]

Saved Filter Presets

Default: Revenue > 2M ✓
+ Saved the Filter

Wildcard Search | Operator Search

Search: property_name

Operator Search: >2.2M

Alphanumeric Search

Hotel code: 13.73K - 18.00K

Business: A17835, B14562, M18923, S11167, A12482, B13967, M11889, S15692

Bulk Copy & Paste

Property Name	Value
Azure Breeze	2.03M
Crimson Canyon	2.05M
Harmony Haven	2.16M
Midnight Mirage	2.35M
Ocean Breeze	1.66M
Paradise Palms	2.72M
Serenity Springs	546.92K

Popup Mode

[Popup Mode Input]

Ranking | Images

Country (6/9)

USA	63.21M
India	28.56M
Brazil	18.51M
Canada	16.36M
Japan	14.72M
Italy	12.45M
Spain	11.73M
Australia	10.66M
Others (4/12)	74.21M

Inforiver Analytics+ 4.2

Inforiver Analytics+ (100+ Charts + Cards + Tables) by Lumel is rearchitected and redesigned so that enterprise customers may migrate their legacy BI platform reports and dashboards from Tableau, Spotfire, Qlik, Cognos, OBIEE, SAC, or their static PowerPoint dashboards from Think-cell or Mekko Graphics and consolidate them with Microsoft Power BI.

100+ Charts
122 KPI cards
Tables
Storyboard

Bar/Column

- Overlapped bar/column
- Stacked bar/column
- Cluster/Grouped - bar/column
- 100% stacked bar/column
- Integrated variance bar/column
- Win and loss bar/column
- Split bars
- Tornado chart
- Ribbon chart

Pie/Donut

- Pie chart
- Donut chart

Gauge

- Angular gauge
- Linear gauge

Hierarchy

- Treemap
- Sunburst chart

Waterfall

- Waterfall
- Stacked waterfall
- Stacked breakdown
- Stacked variance waterfall
- Breakdown waterfall
- Measure breakdown
- Waterfall - column/bar
- Variance waterfall
- Side by side waterfall

Bullet

- Conditional bar/column
- Comparative bullet bar/column
- IBCS bullet bar/column
- Qualitative bullet bar/column

Line

- Line
- Stacked Line
- 100% Stacked Line
- Grouped/Clustered Line
- Base line
- Variance line
- Spline
- Stacked spline
- Stepped
- Stacked stepped
- 100% stacked stepped Line
- Grouped/Clustered stepped
- Base line stepped
- Line stepped variance
- 100% stacked stepped Line
- Grouped/Clustered spline

Area

- Area
- Stacked area
- 100% stacked area
- Cluster area
- Base area
- Variance area
- Area spline
- Stacked spline
- 100% stacked spline area
- Cluster spline
- Area stepped
- 100% stacked stepped area
- Stacked stepped
- Cluster stepped
- Base area stepped
- Variance area stepped

Combo

- Column + line
- Column + area
- Column + column
- Stacked Column + line
- Stacked Column + area

Funnel

- Executive/Horizontal executive funnel
- Funnel

Bubble/Scatter

- Scatter chart
- Quadrant chart
- Bubble chart
- Swarm plot vertical/horizontal
- Packed Bubble

Marimekko

- Marimekko
- % marimekko
- Stacked marimekko
- % stacked marimekko

Radar/Polar

- Radar/Polar chart

Statistical

- Box plot
- Histogram chart

Special charts

- Lollipop
- Slope graph
- Parallel coordinates
- Dumbbell bar/column
- Dot plot bar/column
- Range plot bar/column
- Arrow plot bar/column

Coming Soon

- Multi axes chart
- Gantt
- Sanku

Roadmap

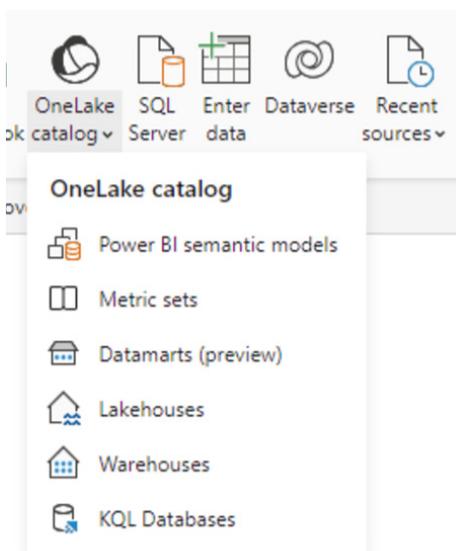
- SPC charts
- Decomposition Tree
- Network graph
- Progress Bar
- Cluster Lollipop
- Proportional plot
- Stream
- Map chart

Benefits include:

- single visual with 100+ chart types, including numerous advanced and special chart types missing in Power BI
- support for use cases where you need a large number of data points
- annotations and data point storytelling like Think-cell
- visual calculated formulae for rows and columns with quick editing
- multi-dimensional visualisation (hierarchy support for all three [3] axes) for visual pivot table-like exploratory experience
- multi-measure visualisations (integrated variances)
- small multiple / Trellis for all chart types, KPI cards, and elegant Excel-like tables for Tableau and Spotfire
- split and group measures into Trellis panels like Tableau
- no code and ease of use with on-canvas formatting
- reading view interactivity like in Tableau or Qlik-sense
- flexible KPI cards with Sparkline charts and presets
- storyboarding: rapidly build dashboards in minutes with templates and smart layouts.

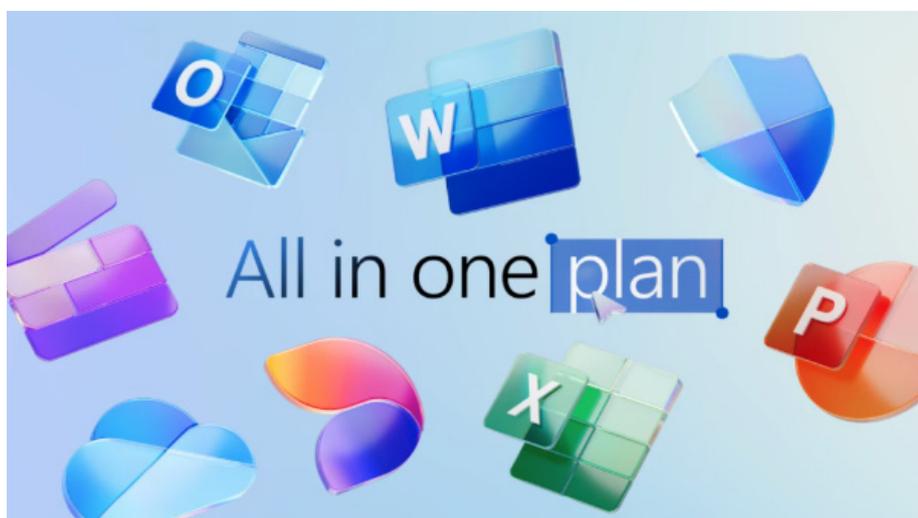
Now in Power BI Desktop: OneLake catalogue

The OneLake catalogue (catalog for our US readers) is now part of the Power BI Desktop experience, providing a consistent and seamless way to discover and explore data. This update ensures alignment with the broader Fabric ecosystem, offering users a unified and familiar experience across tools.



More next month.

Power Query Pointers



It's a quiet month for Excel – relatively.

However, the one piece of news to report here is BIG news. Since the software giant launched Microsoft 365 (formerly Office 365) to consumers in 2013, Microsoft has steadily delivered new applications (apps), features and benefits to subscribers. These include advanced security with Microsoft Defender, creative tools like Microsoft Clipchamp, and various enhancements to Word, Excel, PowerPoint, OneNote and Outlook.

Now, Microsoft has announced that they are bringing Microsoft Copilot and Microsoft Designer to Microsoft 365 Personal and Family subscribers in most markets worldwide. Their availability will vary by device / language, with features varying by platform. Minimum age limits may apply to use some of the AI features, which will only be available to the subscription owner and cannot be shared. Indeed, Copilot features in Outlook apply to accounts with @outlook.com, @hotmail.com, @live.com, or @msn.com email addresses and are available in Outlook.com, Outlook built into Windows, Outlook on Mac, and iOS and Android apps, but usage limits will apply.

Nonetheless, these changes bring the transformative power of AI to the personal productivity tools that millions of people use every day.

Most readers here will be familiar with Copilot and what it brings to the melting pot, but Microsoft Designer is announced in this mix too. This provides subscribers with the opportunity to undertake more image creation and editing than free users may. In addition to accessing Designer within apps like Word and PowerPoint, you can also use the

standalone Designer app on the web and mobile. You may use Designer to create eye-catching images by simply describing what you're looking for or choosing from pre-populated ideas.

Microsoft 365 Personal and Family subscribers will receive a monthly allotment of AI credits to use Copilot in Word, Excel, PowerPoint, Outlook and OneNote. The credits can also be used for AI image generation and editing in Designer and in other AI-powered apps like Paint, Photos and Notepad on a device running Windows. The monthly allotment should be enough for most subscribers. For Microsoft 365 Family subscribers, Copilot will be available to the subscription owner and cannot be shared with others. Those who frequently use Copilot can upgrade to Copilot Pro, without worrying about usage limits.

For those who are concerned, Microsoft is committed to giving their customers control over their experience and know there are times when AI assistance isn't desired (like in some academic scenarios), so they have added settings in apps like Word, Excel and PowerPoint that allow you to disable or enable Copilot as needed.

There is a cost though: Microsoft 365 Personal and Family will increase in the US for the first time since its release by US\$3 USD (visit your local store to see regional pricing), although it should be noted that existing subscribers won't experience the price increase until their next renewal.

Copilot for all!

Until next month.

The A to Z of Excel Functions: PDURATION



Well, maybe that's not what the **PDURATION** function measures... In fact, this function actually returns the number of periods required by an investment to reach a specified value. Its syntax is straightforward:

=PDURATION(rate, pv, fv)

where:

- **rate** is the interest rate per period
- **pv** is the present value of the investment
- **fv** is the desired future value of the investment.

All three arguments are required.

PDURATION uses the following equation:

$$PDURATION = \frac{LN(fv) - LN(pv)}{LN(1 + rate)} = \frac{LN\left(\frac{fv}{pv}\right)}{LN(1 + rate)}$$

It should be noted that:

- **PDURATION** requires that all arguments are positive values; this breaches the sign convention of other financial functions
- if argument values are not valid, **PDURATION** returns the #NUM! error value
- if arguments are not using valid data types, **PDURATION** returns the #VALUE! error value
- it does not cater for regular payments.

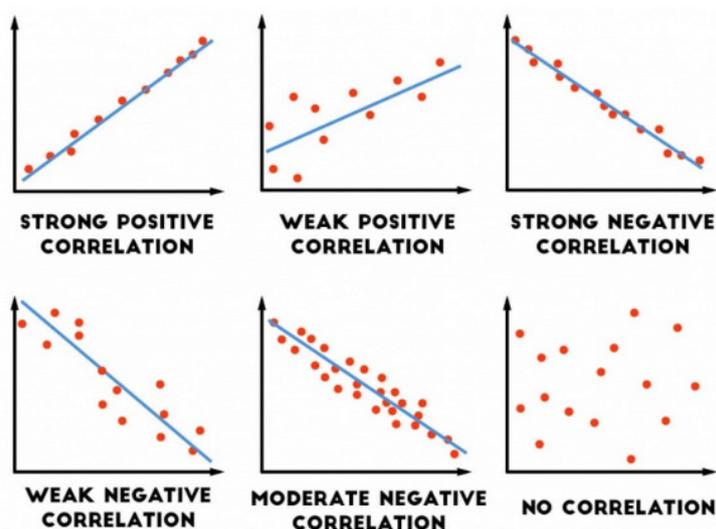
Please see our example below:

	A	B	C
1	Formula	Description	Result
2	<code>=PDURATION(2.5%, 2000, 2200)</code>	The number of years required for an investment of \$2,000, earning 2.5% annually, to reach \$2,200 (3.86 years).	3.86
3	<code>=PDURATION(0.025/12, 1000, 1200)</code>	The number of months required for an investment of \$1,000, earning 2.5% annually, to reach \$1,200 (87.6 months).	87.6

The A to Z of Excel Functions: PEARSON



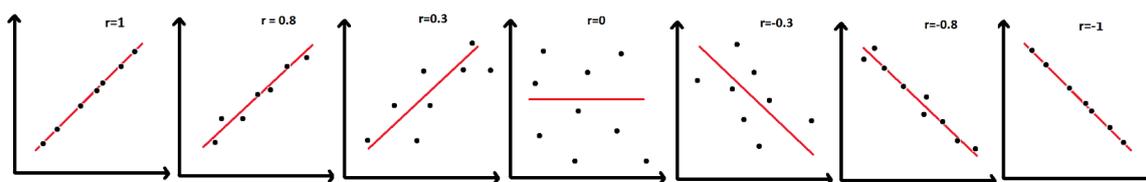
Imagine you are attempting to understand the relationship between two variables, which are assumed to exhibit a linear relationship:



The closer the data points are to the line of best fit on a Scatter graph, the stronger the correlation. This fit may be measured numerically by a correlation coefficient. There are several coefficients that may be used, but the one we shall consider here is the Pearson's Product Moment Correlation Coefficient (bizarrely denoted r), which measures the strength of the linear correlation between two variables.

Pearson's product moment correlation coefficient (sometimes known as PPMCC or PCC) is a measure of the linear relationship between two variables that have been measured on interval or ratio scales. It can only be used to measure the relationship between two variables which are both normally distributed. It is usually denoted by r , and it can only take values between -1 and +1. Its value may be interpreted as follows:

r value	Interpretation
$r = 1$	Perfect positive linear correlation
$0.8 \leq r < 1$	Strong positive linear correlation
$0.4 \leq r < 0.8$	Moderate positive linear correlation
$0 < r < 0.4$	Weak positive linear correlation
$r = 0$	No correlation
$-0.4 \leq r < 0$	Weak negative linear correlation
$0.8 \leq r < -0.4$	Moderate negative linear correlation
$-1 < r < -0.8$	Strong negative linear correlation
$r = -1$	Perfect negative linear correlation



To calculate Pearson's Product Moment Correlation Coefficient, r :

- Plot the scatter diagram for your data; you have to do this first to detect any outliers. If you do not exclude these outliers in your calculation, the correlation coefficient will be misleading
- By being able to see the distribution of your data, you will get a good idea of the strength of correlation of your data before you calculate the correlation coefficient
- Next, check that your data meets all the calculation criteria. The variables need to be:
 - **measured on an interval / ratio scale** (like weight in kilograms or distance in kilometres)
 - **Normally distributed**: you can check this by looking at a boxplot of your data. If the boxplot is approximately symmetric, it is likely that the data will be Normally distributed
 - **linearly correlated**: look at a significance test of the null and alternative hypotheses.
- Finally, calculate the correlation coefficient using the following formula:

$$r = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y_i - \bar{y})^2}}$$

where x_i and y_i are the i th pair of array points and \bar{x} and \bar{y} are the means of the two arrays.

Alternatively, you can calculate this metric using the **PEARSON** function in Excel. It returns the Pearson product moment correlation coefficient, r , a dimensionless index that ranges from -1.0 to 1.0 inclusive and reflects the extent of a linear relationship between two data sets, as explained above.

The **PEARSON** function has the following syntax:

=PEARSON(array1, array2)

It contains two [2] arguments:

- **array1** which is required and represents a set of independent values
- **array2** which is also required and represents a set of dependent values.

It should be noted that:

- the arguments must be either numbers or names, array constants 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 [0] are included
- if **array1** and **array2** are empty or have a different number of data points, **PEARSON** returns the #N/A error value.

Please see our final example for this month below:

	A	B	C
1	Independent values	Dependent values	
2	9	10	
3	7	6	
4	5	1	
5	3	5	
6	1	3	
7			
8			
9	Formula	Description	Result
10	=PEARSON(A2:A6,B2:B6)	Pearson product moment correlation coefficient for the data sets above (0.699379).	0.6994
11			

More Excel Functions next month.

Beat the Boredom Suggested Solution

Earlier in this newsletter, we set a fairly straightforward challenge. Can you come up with a formula to give us a list of capabilities that each person in a team can provide?

In this instance, we have a list of employees where we know what division each person works in. We also have a list of capabilities that each employee brings to the team. If we select an employee, we'd like to know what their whole team brings to the table.

	A	B	C	D	E
1	Employee	Division		Employee	Capabilities
2	Amy	Sales		Amy	Excel
3	Billy	Sales		Amy	Client relations
4	Charlie	Marketing		Amy	PowerPoint
5	Debbie	Sales		Billy	Mathematics
6	Eric	Marketing		Billy	SQL
7				Billy	Analytics
8				Charlie	Drinking
9				Charlie	Wine connoisseur
10				Charlie	Former sommelier
11				Debbie	Management
12				Debbie	Change leadership
13				Debbie	Public speaking
14				Eric	Strategy
15				Eric	Python
16				Eric	Chess

So to do this, we naturally follow some basic steps: what's your employee's name and what division are they from?

=INDEX(Table1[Division],MATCH(Employee_Selection,Table1[Employee],0))

Then, we might even be able to find a list of all the employees that work in that division.

=FILTER(Table1[Employee],Table1[Division]=Division_Selected)

Then, of course, we just need to filter our capability list on the list of employees.

=FILTER(Table2[Capabilities],Table2[Employee]=Division_Employees)

Name	Amy	<i>Employee_Selection</i>
Division	Sales	<i>Division_Selected</i>
All in division	Amy	<i>{Division_Employees}</i>
	Billy	
	Debbie	
All capabilities	#N/A	

Suggested Solution

This problem suffers from a problem that has plagued arrays, not just in Excel. The system is simply not equipped to let us calculate "an array of arrays", *i.e.* we can't feed in a variable number of employees into our capability filter and expect it to know how to combine the results.

The trick to working around this problem is to define the filter relationship more directly. Instead of creating a criterion to see if the Employee column matches the **Division_Employees**, we can instead try to create a series of {1,0} results that correspond to that check.

MATCH(Table2[Employee],Division_Employees,0)

This will give us positive numbers (reflecting the employee's position in our selected list) or #N/A if it can't find the employee in the list. Recognising this, we need to wrap it in an error check:

IFNA(MATCH(Table2[Employee],Division_Employees,0),0)

This will yield only positive numbers and zeroes in our list.

Step 1	Step 2
1	1
1	1
1	1
2	2
2	2
2	2
#N/A	0
#N/A	0
#N/A	0
3	3
3	3
3	3
#N/A	0
#N/A	0
#N/A	0

Because positive numbers can be used as substitute for TRUE when a formula is expecting a Boolean TRUE / FALSE input, this is all we need to fill in our **FILTER** result.

=FILTER(Table2[Capabilities],IFNA(MATCH(Table2[Employee],Division_Employees,0),0))

G	H	I	J	K
	Name	Amy	<i>Employee_Selection</i>	
	Division	Sales	<i>Division_Selected</i>	
	All in division	Amy	<i>{Division_Employees}</i>	
		Billy		
		Debbie		
	All capabilities	Excel		
		Client relations		
		PowerPoint		
		Mathematics		
		SQL		
		Analytics		
		Management		
		Change leadership		
		Public speaking		

=FILTER(Table2[Capabilities],IFNA(MATCH(Table2[Employee],Division_Employees,0),0))

There we go! By switching the filter direction of the “array of arrays”, we can get an array result that lines up with our filter table, allowing us to get the result that we’re looking for.

Did you have a better solution? Let us know, we’d be glad to hear if there are better ways to work around this problem!

Upcoming SumProduct Training Courses

Location	Course	Course Date	Local Time	UTC	Duration
London UK	Financial Modelling	17 February 2025 - 18 February 2025	09:00 - 17:00 BST	17 February 2025 09:00 UTC - 18 February 2025 16:00 UTC	2 Days
Melbourne Australia	Power Pivot, Power Query and Power BI	18 February 2025 - 19 February 2025	09:00 - 17:00 AEDT	17 February 2025 22:00 UTC - 19 February 2025 06:00 UTC	2 Days
Melbourne Australia	ChatGPT	19 February 2025 - 20 February 2025	09:00 - 17:00 AEDT	18 February 2025 22:00 UTC - 20 February 2025 06:00 UTC	2 Days

Key Strokes

Each newsletter, we'd like to introduce you to useful keystrokes you may or may not be aware of. This time, we thought we would regain **ALTER** the alphabet, but be warned – it's a bit of a blast from the past:

Keystroke	What it does
ALT + D	Activate Data menu (Excel 2003 and earlier)
ALT + E	Activate Edit menu (Excel 2003 and earlier)
ALT + F	Excel 2007: Activate Office button; Excel 2003: Activate File menu
ALT + H	Activate Help menu (Excel 2003 and earlier)
ALT + I	Activate Insert menu (Excel 2003 and earlier)
ALT + K	Check Names (only when emailing, not as attachment)
ALT + O	Activate Format menu (Excel 2003 and earlier)
ALT + Q	Tell Me
ALT + S	Send Now (only when emailing, not as attachment)
ALT + T	Activate Tools menu (Excel 2003 and earlier)
ALT + V	Activate View menu (Excel 2003 and earlier)
ALT + W	Activate Windows menu (Excel 2003 and earlier)

There are c.550 keyboard shortcuts in Excel. For a comprehensive list, please download our Excel file at <http://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".

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Any Questions?

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SumProduct offers a wide range of training courses, aimed at finance professionals and budding Excel experts. Courses include Excel Tricks & Tips, Financial Modelling 101, Introduction to Forecasting and M&A Modelling.

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