# SumProduct

**NEWSLETTER #130 - September 2023**
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## It's a BIG NEWSletter this month!

None is bigger than welcoming Microsoft's very own **Steve Kraynak** into the SumProduct madhouse. You can find out more about his past and his future below.

Excel Virtually Global gains momentum this month too. Scheduled for October, our website goes live and you can find out more about this year's Excel, financial modelling, Power BI, Fabric, Copilot and Python event within these very pages.

But good things come in threes for SumProduct – we are also pleased to announce we are a finalist for the Australian Institute of Training and Development (AITD) for Excellence in training. It's nice to be recognised, unless it's on Crimestoppers.

Microsoft has been busy too. Python comes to Excel, the Formula bar gets a facelift, stale values get formatted and we even see spreadsheets in space! That's on top of all the other new features coming to Excel this month.

There is still room for the usual suspects too. We've another Beat the Boredom Challenge, plus tips on Charts & Dashboards, Visual Basics, Power Pivot Principles, Power Query Pointers, Power BI Updates, Examine our A to Z of Keyboard Shortcuts and there is even time to **LOOKUP** this month's A to Z of Excel functions. Like buckets, other newsletters just pail in comparison. *(Enough! – Ed.)*

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

*Liam Bastick*, Managing Director, SumProduct

## SumProduct US and Steve Kraynak

Some exciting news to start off with this month! Dear readers one and all, please welcome **Steve Kraynak** to the SumProduct fold. Steve joins SumProduct after more than a decade as a Product Manager for the Excel team at Microsoft, where he directly impacted many features in Excel, including new worksheet functions like **IFS** and **TEXTJOIN**, Data from Picture, Excel for Mac, user experience improvements like Smooth Scrolling, and many others. Prior to this, he was instrumental in leading Customer Success at a start-up, Prodiance, who were acquired by Microsoft and their tools integrated into Excel. He brings a passion for listening to customers and helping them succeed by making the most of technology and their data, especially by using Excel and Power BI.

Steve is heading up our US team, so if you have any queries on consulting, training, financial modelling, model auditing, Power BI *etc.,* please feel free to drop Steve a line directly at steve.kraynak@sumproduct.com. He will be more than pleased to meet your acquaintance and assist you as required.

He also points out he is going to stop me stealing stuff from Microsoft websites and sticking it in this newsletter. Good luck with that Steve! 🙂

***Steve in his own words***

**How did I go from making vaccines to designing features for Excel?**

I always enjoyed working with computers, but never considered tech as a career choice, because I was interested in the life sciences. After getting a degree in biology, I joined a vaccine manufacturer and loved it. However, I always found myself setting up technology solutions and working on tech projects. This led to an opportunity at a small software company that sold an Excel add-in. This company, Prodiance, eventually was acquired by the Excel team, with me joining as a product manager.

At Microsoft, my initial focus was on the acquired products, but that soon expanded. I was able to work on a wide range of areas, including new worksheet functions (**TEXTJOIN**, **IFS** and some others), the early designs for rich data types, and even some work on SharePoint search (better understanding of Excel workbooks). In recent years, I've spent much of my time working to improve Excel for Mac, which has lagged behind Excel for Windows. I'm proud to say that we were able to close that gap significantly, and Excel for Mac now surprises a lot of people. I was also the product manager for an initiative we called "Customer Love", in which we aimed to improve old features. This initiative brought improvements such as the ability to unhide multiple sheets at one time, resizable conditional formatting dialogs, and "smooth scrolling" in Excel for Windows.

**What's the biggest surprise I learned at Microsoft?**

They don't have unlimited resources. Before I got to Microsoft, I assumed Microsoft had virtually unlimited resources and would surely fix any moderately impactful bugs that were found. A colleague and I found a significant bug in SharePoint that completely blocked what we were trying to do. Microsoft agreed that it was a bug, but it was not a high enough priority for them to fix it. This was a big surprise to me at the time. After joining the Excel team, I found out that even at the world's largest software company and for one of the flagship products, resources are limited. There's so much to work on – endless innovation, a huge amount of maintenance work to keep Excel working on the ever-changing platforms, new security threats, *etc*. You get the idea. Even with hundreds of engineers across the globe, they can't allocate time to everything that would be good to do.

*(That's me with the blue wig celebrating with some of my Excel teammates after an event on Microsoft's Redmond campus.)*

**My top 5 favourite features in Excel (in random order)**

Aside from the fundamentals, like the grid, automatic calculation, charts, number formatting, cell formatting and Tables, here are my top five favourite features. It's impossible to rank them and my tastes may change, but lately these are my go-to features.

1. **Power Query:** so often, I ask, "have you thought about using Power Query for this?" when discussing a problem with a spreadsheet solution. I think it really lives up to the name "power"
2. **Dynamic Array formulas:** Magical!
3. Value Preview ToolTips: I'm a little biased about this one, because it was one of the last features I worked on for the Excel team
4. **Slicers:** I love that they're so easy to use and they help guide the user about what they can do with the spreadsheet
5. **PivotTables:** simply can't function without them.

**Why did I join SumProduct?**

As part of the Excel product management team, I met many people from the incredible community of Excel users and professionals around the world, including Liam Bastick and Tim Heng, of SumProduct. The opportunity to work with them and expand SumProduct's footprint in the US is just not going to come around every day, so here I am. I'm excited to remain a member of the Excel community, but experience what it's like outside the gilded halls of Redmond (mostly concrete actually).

*Welcome aboard, Steve, we look forward to working alongside you too!*

## Excel Virtually Global 2023

At the time of writing, our latest Excel Virtually Global conference continues to gain momentum. It's looking like we may have *c.* 40 presenters this year! This conference, as always for charity, presents many Excel, Data Platform and PowerPoint MVPs, together with other acknowledged experts from Microsoft and / or around the globe to present, answer questions and demonstrate the future of Excel, Power BI, Fabric, ChatGPT, Copilot and possibly Python and how it will make your life easier, personally and professionally.

Each session (including Q&A) will last no more than an hour and topics will 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.

Sessions this year will both be live and recorded. You will be able to 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 it will last a few days, starting on Tuesday 10 October, 2023.

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 for charity – this year, there is no ticketing process: all we ask is an "honesty box" where you donate to your favourite charity.

For more details (*e.g.* times, speakers, sessions), please go to www.excelvirtuallyglobal.com. The links will go live nearer the time, so keep checking back as the program may change too.

Hopefully, we'll see you there!

## Australian Institute of Training and Development (AITD) Finalist

The Australian Institute of Training and Development (AITD) Excellence Awards recognise outstanding achievement in organisational learning and development. SumProduct has been recognised as a contributor to a project which achieved finalist status in the AITD 2023 Awards. We were lucky enough to be achieve finalist status last year, so who knows? Maybe this year, we may take our training program a step further.

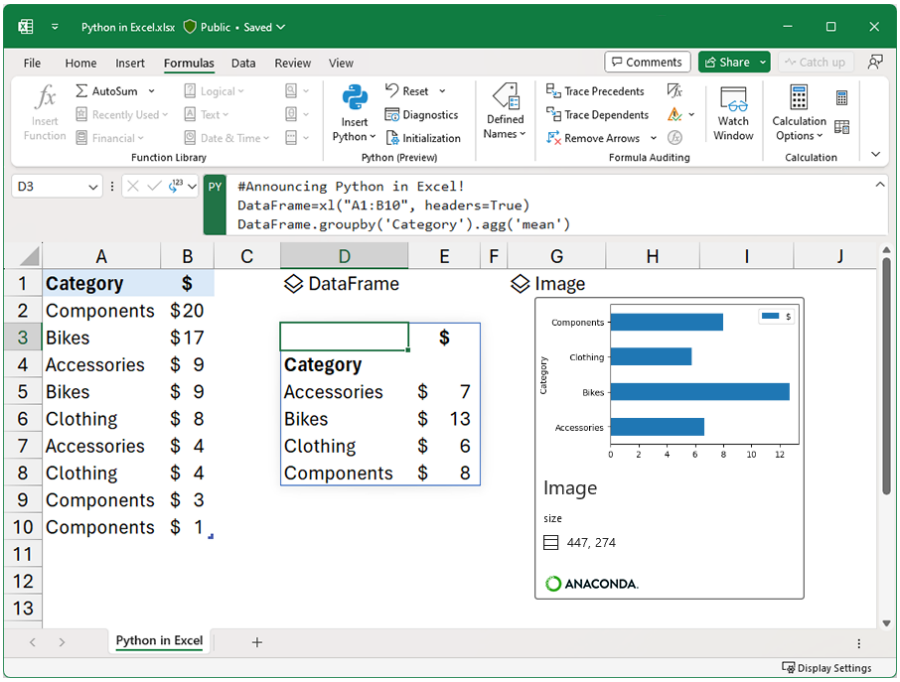
Projects entered in the AITD Excellence Awards are assessed against specific award criteria including business needs, strategic alignment, design, delivery and measurable impact by an independent judging panel. Entrants must provide evidence to demonstrate a high achievement against these criteria to be awarded finalist status. We are delighted to have been nominated and will find out later in the year if we are winners. Tim has his tux at the dry cleaners in preparation…

If you would like to find out how our standard or customised training programs can benefit you and your team, drop us a line at training@sumproduct.com.

# Python in Excel

*(Yes, we know it's a cobra, but it's a cool picture!)*

This month sees "a significant evolution" in the analytical capabilities available within Excel by releasing a Public Preview of Python in Excel. Python in Excel makes it possible to natively combine the programming language Python and Excel analytics within the same workbook - with no setup required. With Python in Excel, you can type Python directly into a cell, the Python calculations run in the Microsoft Cloud, and your results are returned to the worksheet, including plots and visualisations.



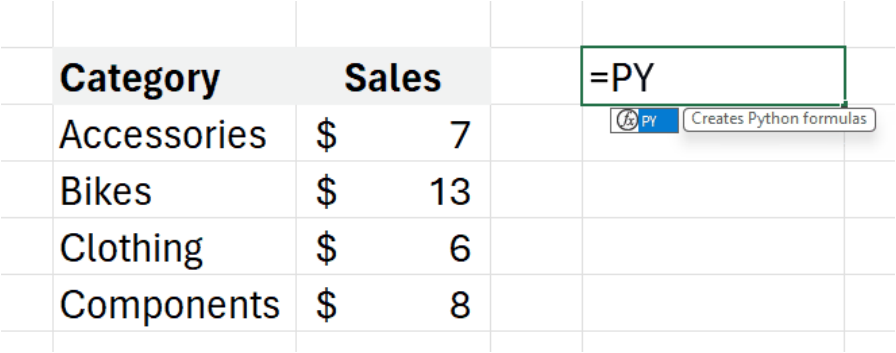

Python in Excel is rolling out to Public Preview for those in the Microsoft 365 Insiders program, using the Beta Channel in Excel for Windows.

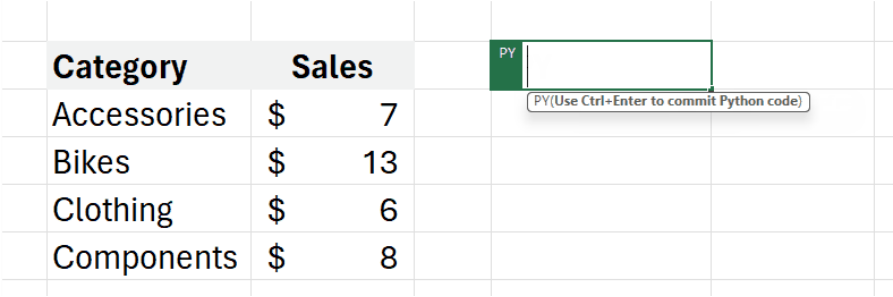
Given there are several languages out there that analysts use (*e.g.* R, SQL to name but two), it is not unreasonable to consider why is Python the first cab off the rank? There are several reasons mentioned by the Microsoft team. These are detailed below.

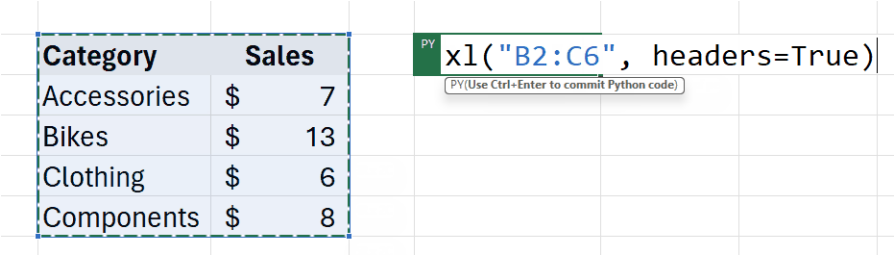
***Built for analysts***

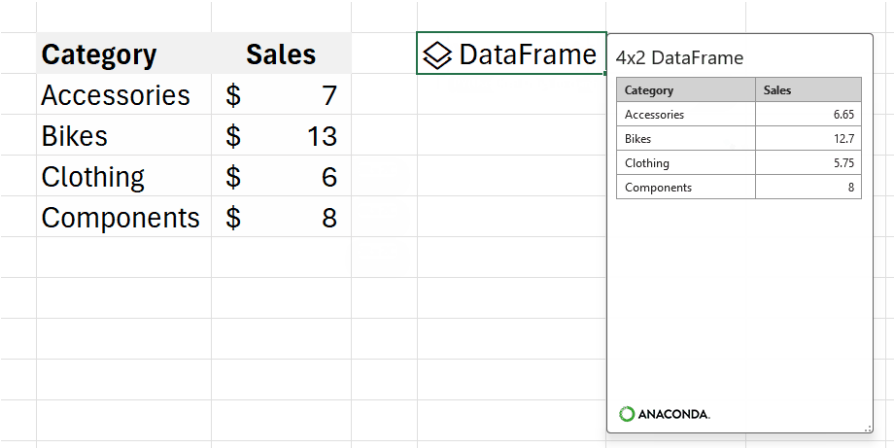
Every day, millions of users around the world rely on familiar Excel tools such as formulas, charts and PivotTables to analyse and understand their data. As of this update, Python in Excel will also be natively integrated directly into the Excel grid. To get started simply use the new **PY** function which allows you to input Python code directly into Excel cells.

For example, to create DataFrames with just a few simple clicks, it's no more difficult than this:



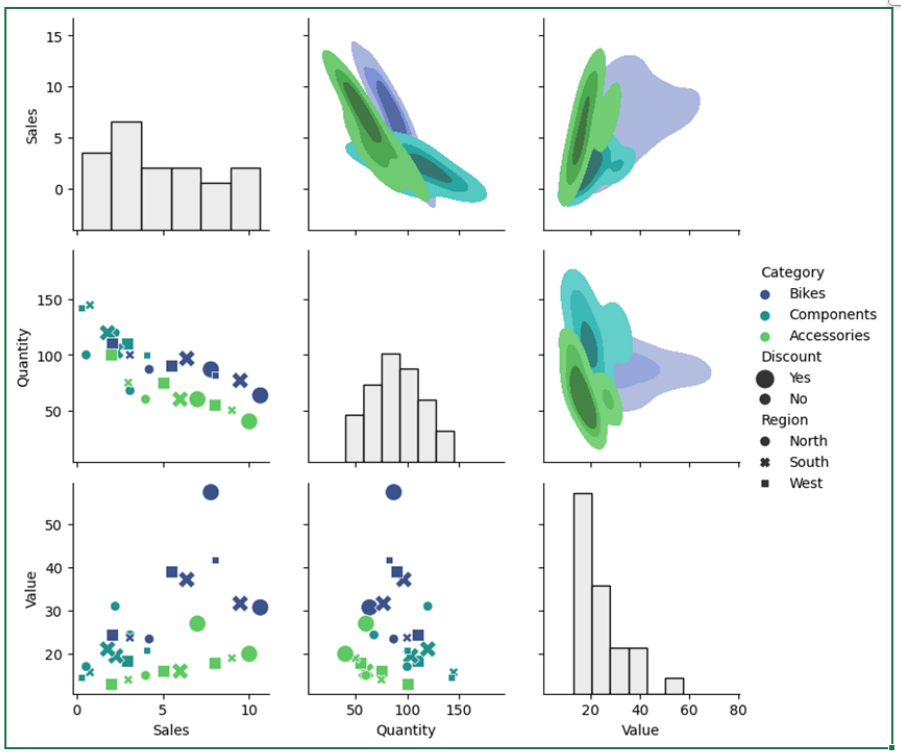




Excel users now have access to powerful analytics via Python for visualisations, cleaning data, machine learning, predictive analytics, and more. Users may now create end to end solutions that seamlessly combine Excel and Python all within Excel. Using Excel's built-in connectors and Power Query, users can easily bring external data into Python in Excel workflows. Python in Excel is compatible with the tools users know well, such as formulae, PivotTables and Excel charts.

An example of an advanced visualisation, for instance, might be the following. You can tap into the potential of well-known Python charting libraries like Matplotlib and seaborn to create a wide variety of charts, spanning from conventional bar graphs and line plots to specialised visualisations such as heatmaps, violin plots and swarm plots.

```
#Pair plot with seaborn pairplots to show relationships between variables.
g=sns.PairGrid(SalesData,diag_sharey=True, hue="Category", palette="viridis")
g.map_lower(sns.scatterplot, size=SalesData.Discount, sizes=(50, 150), style=SalesData.Region
g.map_diag(sns.histplot,hue=None, color=".9")
g.map_upper(sns.kdeplot, fill=True, levels=4, legend=False)
g.add_legend(title="", adjust_subtitles=True)
```



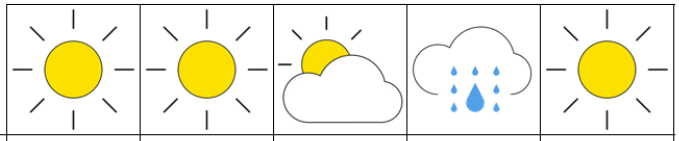

There is more though. You can consider the impact of machine learning, predictive analytics and forecasting. For examples, you may leverage the capabilities of Python libraries like scikit-learn and statsmodels to apply popular machine learning, predictive analytics, and forecasting techniques such as regression analysis, time series modelling, *etc*. You might even throw in a **LAMBDA** along the way!

```
#create and fit the model
model = DecisionTreeClassifier()
model.fit(historical_data, weather_labels)
```

# 5 Day Weather Forecast

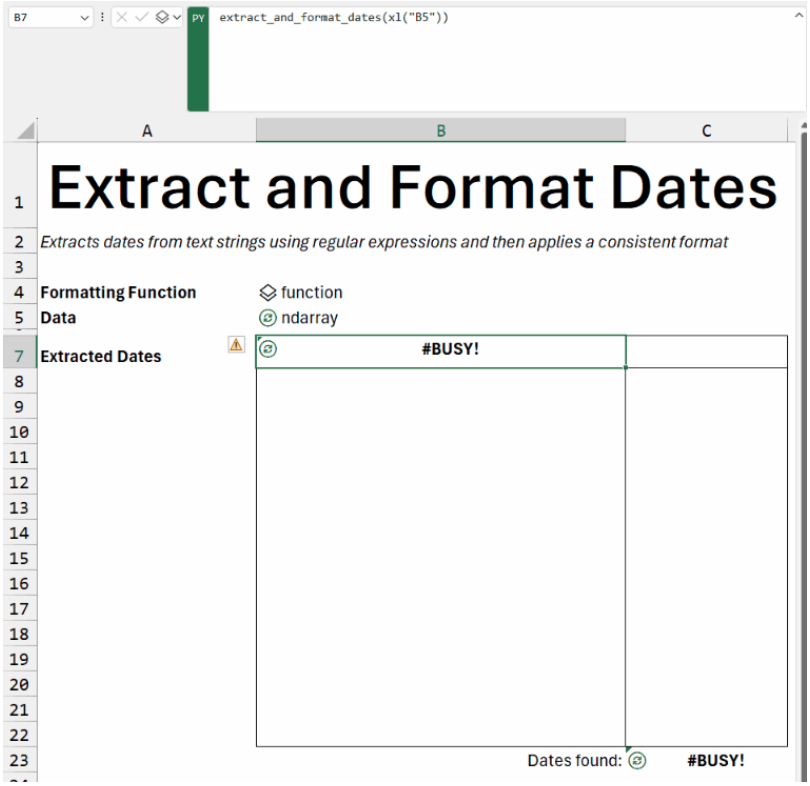
*Generates a forecast (sunny, rainy, cloudy), based on historical data for temperature, humidity and wind speed.*

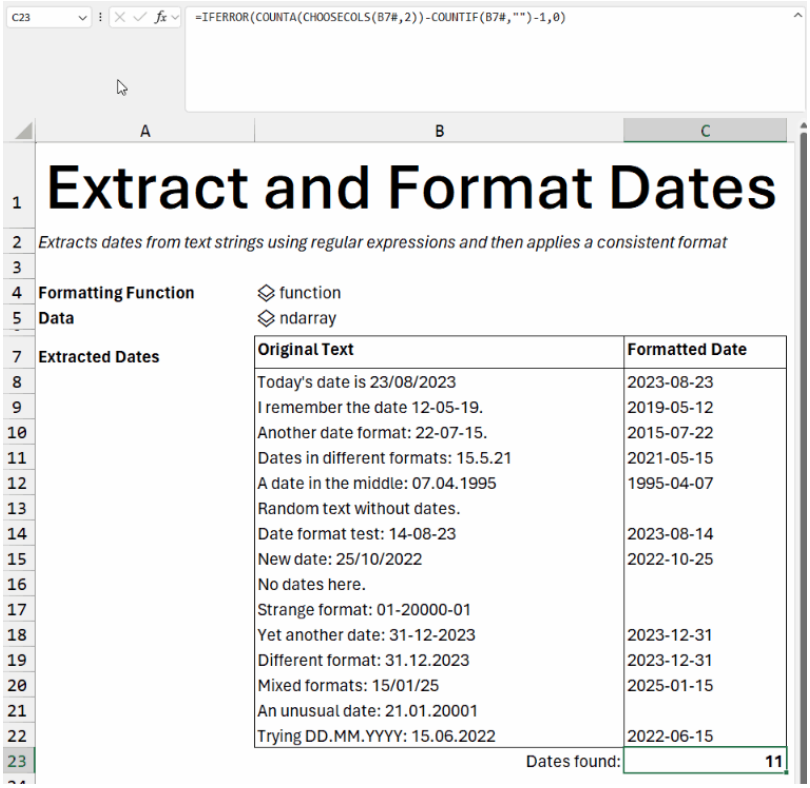
| | |
|---|---|
| **Historical Data** | DataFrame |
| **Weather Labels** | DataFrame |
| **Model** | DecisionTreeClassifier |
| **Full Forecast** | DataFrame |



| **Weekday** | Thursday | Friday | Saturday | Sunday | Monday |
|---|---|---|---|---|---|
| **Weather Forecast** | sunny | sunny | cloudy | rainy | sunny |
| **Temperature** | 67° | 65° | 77° | 60 | 74° |
| **Humidity** | 54% | 61% | 77% | 75 | 63% |
| **Wind Speed** | 9 MPH | 8 MPH | 2 MPH | 9 | 8 MPH |

You can consider data cleansing too. You may make efficient use of advanced data cleaning techniques such as locating missing values, standardising formats, removing duplicates and employing techniques like regular expressions for pattern-based transformations.




***Python analytics via Anaconda***

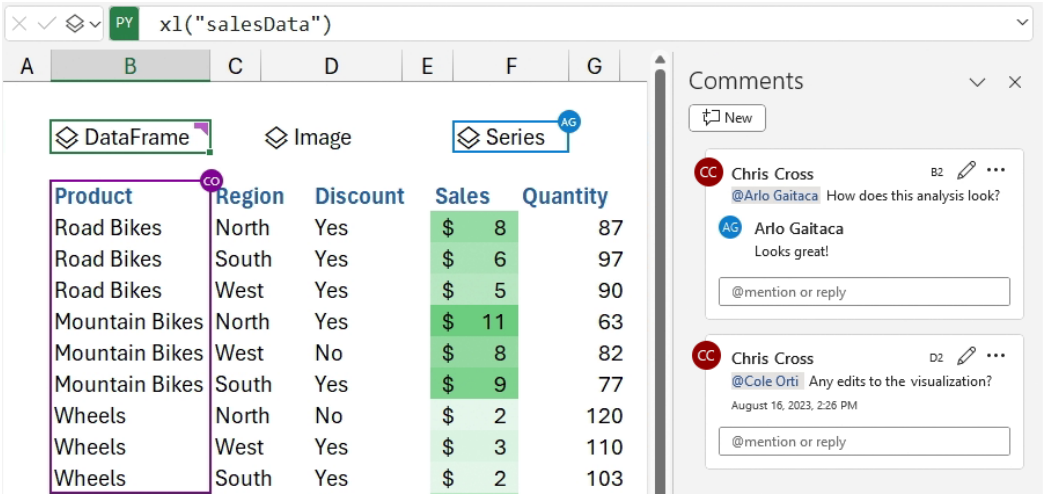
Anaconda is a leading enterprise Python repository used by tens of millions of data practitioners worldwide. Python in Excel leverages Anaconda Distribution for Python running in Azure, which includes the most popular Python libraries (*e.g.* pandas, Matplotlib, scikit-learn), and is securely built, tested and supported by Anaconda. Python provided by Anaconda supports a wide array of analytics with Python in Excel.

***Runs securely on the Microsoft Cloud, with no setup required***

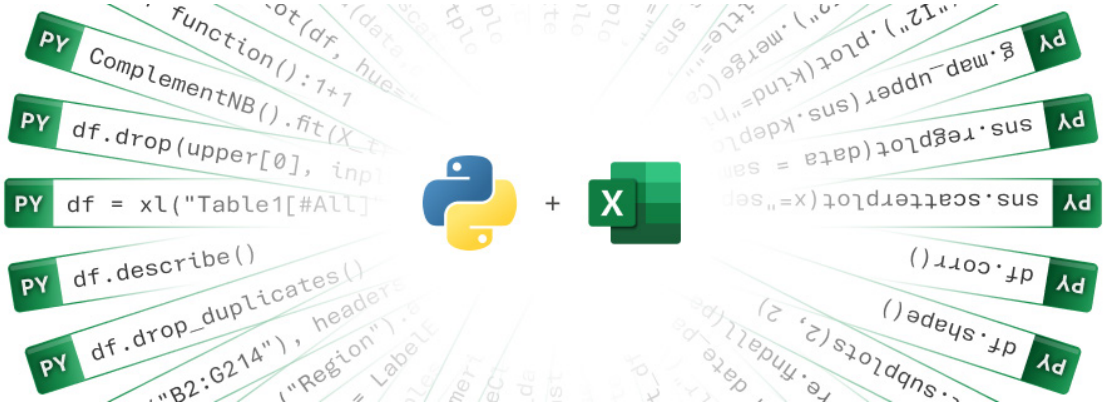
Python code used by Excel runs on the Microsoft Cloud with enterprise-level security as a compliant Microsoft 365 connected experience. The Python code runs in its own hypervisor isolated container using Azure Container Instances and secure, source-built packages from Anaconda through a secure software supply chain. Python in Excel keeps your data private by preventing the Python code from knowing who you are, and opening workbooks from the internet in further isolation within their own separate containers. Data from your workbooks can only be sent via the built-in **xl()** Python function, and the output of the Python code can only be returned as the result of the **=PY()** Excel function.

***Built for teams***

Users can share Python in Excel workbooks with confidence. Teammates can seamlessly interact with and refresh Python in Excel based analytics without needing to worry about installing additional tools, Python runtimes or managing libraries and dependencies. Users may share workbooks using collaboration tools such as Microsoft Teams and Microsoft Outlook and work together seamlessly via comments, **@** mentions, and co-authoring with colleagues as they normally would in Excel. Sensitivity labels applied to your workbooks containing Python will keep them compliant with your organisation's information protection policies too.

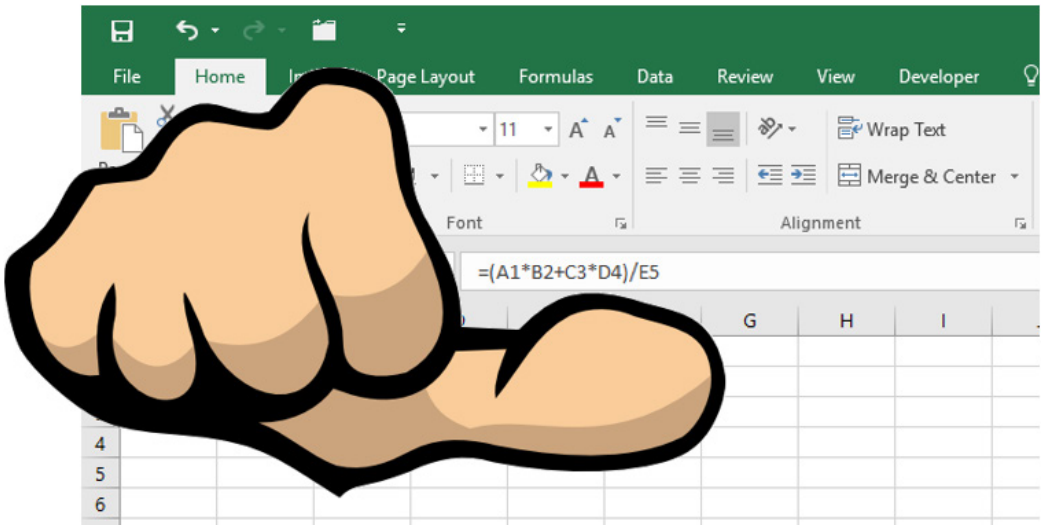



Python in Excel is currently available to users running Beta Channel on Windows. This feature will roll out to Excel for Windows first, starting with build 16.0.16818.20000, and then to the other platforms at a later date. To use Python in Excel, join the Microsoft 365 Insider Program. Then, choose the Beta Channel Insider level to get the latest builds of the Excel application.




## Formula Bar Reverting to Type

If you're like us, you probably have a lot of your working life with your head immersed in formulae. These pesky little critters are the backbone of any spreadsheet, and they allow you to perform calculations, analyse data, build financial models, forecast key variables and create dynamic reports. However, no matter how experienced you (think you) are, writing and editing formulae can sometimes be challenging, especially if you have complex or nested expressions – which you shouldn't because you should follow the "Rule of Thumb", *viz.*



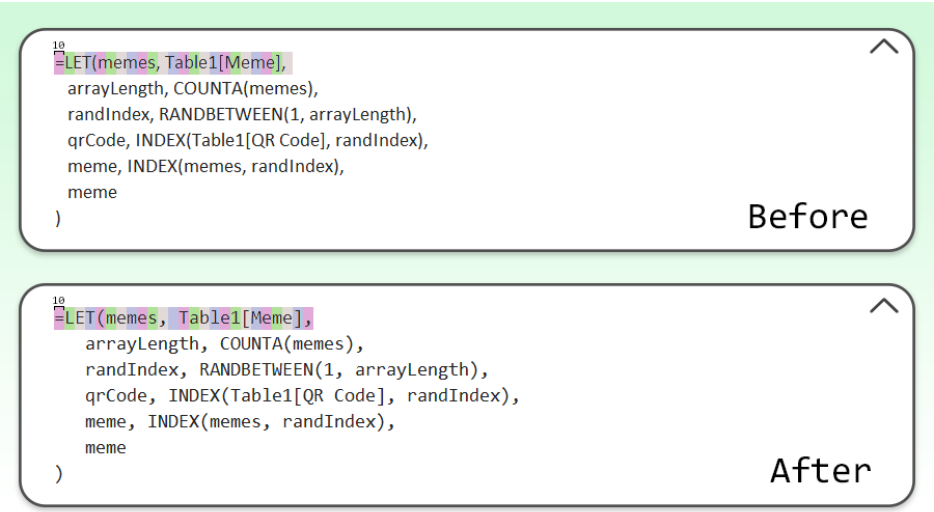

No formula should be longer than your thumb!

To this end, Microsoft has announced a change that should make your formula editing experience easier and more straightforward: the use of the Monospaced font in the Formula bar. The Monospaced font is a type of font where each character has the same width, regardless of its shape or style. This means that your formulae will align and space evenly, making them easier to read and debug.

Monospaced font, also known as fixed-width or typewriter font, has several advantages over a proportional font. Here are some of the benefits of using monospaced font in the Formula bar:

- **Alignment and Readability:** Monospaced fonts significantly improve the readability of code by ensuring consistent and clear alignment. Each character occupies the same amount of space horizontally, which makes it easier to maintain an organised, structured and consistent layout. This is particularly helpful for indentation and presenting a clean image
- **Error Detection and Visual Parsing:** Monospaced fonts offer consistent alignment, making it easier to quickly spot errors, typos and discrepancies in code. This uniform spacing enhances visual parsing of complex structures, aiding in identifying patterns, nested levels and relationships within the logic. This is particularly valuable for understanding intricate nested or conditional statements and catching mistakes early in the authoring process
- **Cross-Platform Consistency:** Monospaced fonts offer streamlined copy-pasting of code from different sources while maintaining formatting. They also ensure a uniform appearance across various platforms and editors, ensuring consistent readability and structure.

To use the Monospaced font in the Formula bar, simply edit or author a formula in the Formula bar. You should notice a different rendering of your formula text. Here is an example of a before and after of some formula text:




You can see how by the time we get to the first “m” in the formula, the letters are not consistently centred in 10px width boxes in the “Before” image.

Monospaced Font is currently available to users running Beta Channel on Windows. This feature will roll out to Excel for Windows first and come to the other platforms later.

# Stale Value Formatting

Microsoft has just announced a significant improvement to one of spreadsheeting's oldest features: Manual calculation mode. 44 years ago, Manual calculation mode debuted in VisiCalc in 1979, six [6] years before the first release of Excel. Since its release, the user experience has remained largely the same, until now…

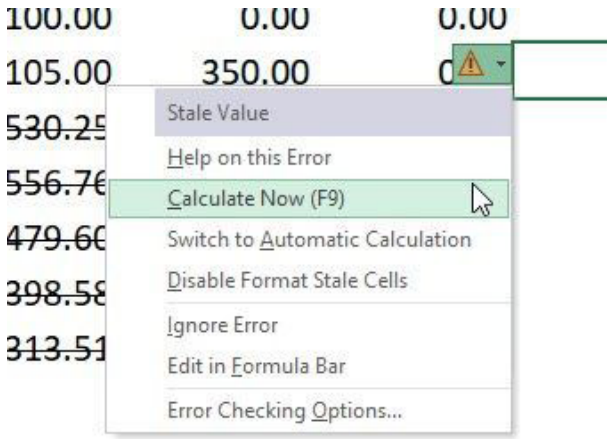
Manual calculation mode suspends calculations, which means that the values in cells can become out of date. Microsoft refers to these as being **stale**. When you edit a cell in a spreadsheet, not all cells become stale, just the ones that depend on your change. Excel tracks stale cells internally. Unfortunately, there has been no way to see which cells were pending calculation.

However, with this update, Excel can show these stale cells by ~~striking them out~~. That way, you know not to rely on them until they are calculated.

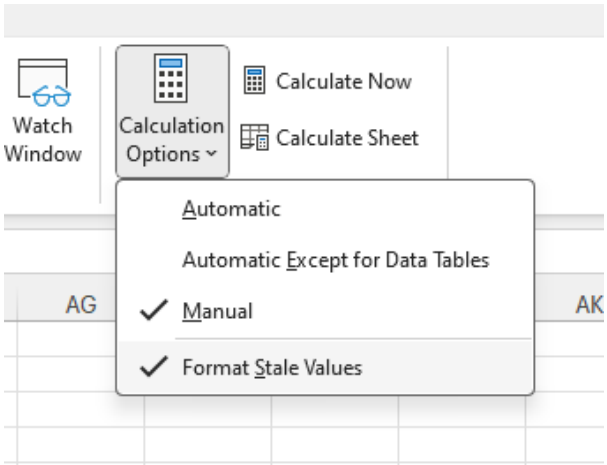
| | A | B | C | D |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | Updated: | 10 | |
| 3 | | Stale: | ~~20~~ | |
| 4 | | | | |

Whilst stale formatting will most often be seen in Manual calculation mode, it is not limited to it. For example, you may get stale cells in Automatic calculation mode if you abort a long-running calculation by pressing **ESC**. Once the calculation resumes and completes, the stale formatting will be lifted.

When a cell containing a stale value is selected, Excel will show a warning icon. If you click on the icon, you will be provided with a menu with contextual actions, such as triggering calculation or switching to Automatic calculation mode.




'Stale Value Formatting' is an application setting that is on by default. If you prefer, you can turn it off via the 'Format Stale Values' checkbox located under the 'Calculation Options' menu on the Formulas tab.

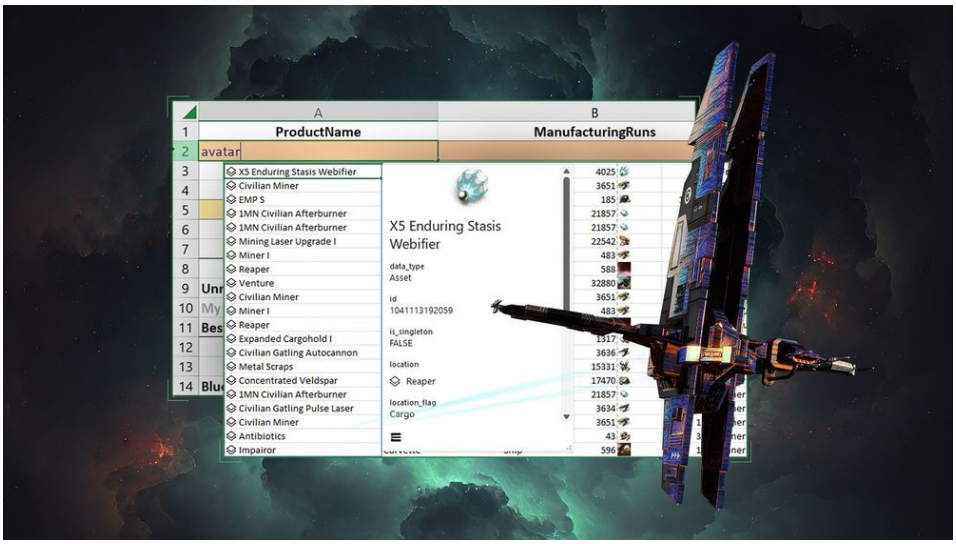



Stale Formatting is currently available to users running Beta Channel on Windows. This feature will roll out to Excel for Windows first and come to the other platforms at a later date.

# Spreadsheets in Space!?

Well, this is something different!

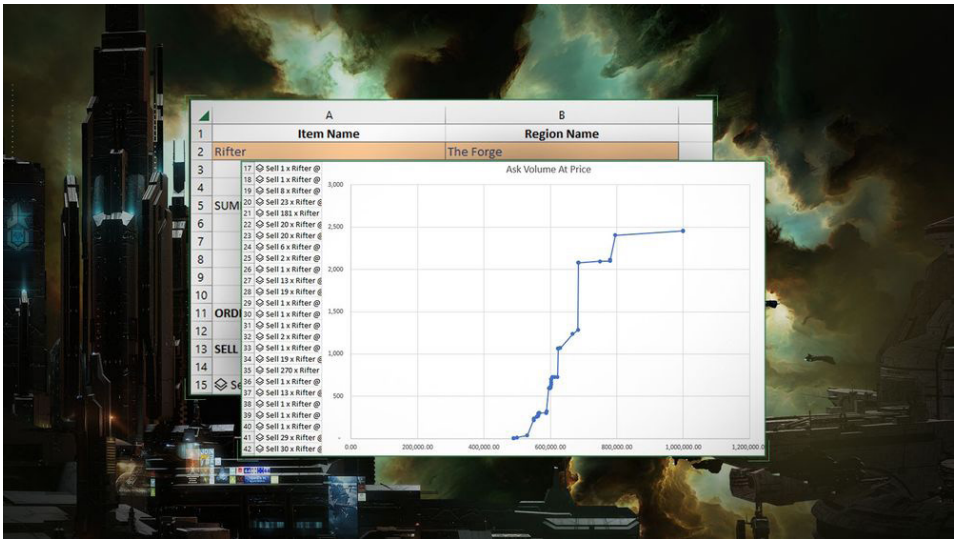
The Excel team must be looking for things to do. Recently, they collaborated with CCP Games as they developed a new Excel add-in that will "supercharge" the EVE Online game experience by making data analytics accessible to all players, with no programming knowledge required. This tool enables players of all skill levels to access and analyse data to optimise gameplay as they strive for galactic domination. Who needs infrastructure, project finance and valuation models anymore..?




EVE Online is a massively multiplayer sci-fi game in which hundreds of thousands of players carve out interstellar empires through fleet battles and economic warfare. Set tens of thousands of years in the future, EVE is an immersive, community-driven experience featuring a vast player-run economy and offers professions ranging from commodities trader to mercenary, industrial entrepreneur to pirate, mining engineer to fleet commander and much more. From brokering business deals to waging war, EVE's players all have access to a diverse array of tools and interfaces to forge their own destiny in New Eden. EVE Online is renowned for its scale, complexity and its gigantic, world record-breaking in-game battles where thousands of players come head-to-head in a single star system.

In reality, Microsoft 365's add-in framework allows developers to create custom solutions for Microsoft 365 applications using JavaScript. In Excel, developers can leverage the to create their own custom data types containing images, entities, arrays and formatted number values, backed by their own custom data sources. Custom functions are fully supported for both inputs and outputs of data types for functions.

EVE Online is the first video game to have developed an Excel add-in using this type of data integration. You may import your data to unlock the full potential of Excel's robust analysis and visualisation tools. You can create custom reports, graphs and charts to gain insights into your in-game activities, track your progress, and strategise your next steps. Or you could just get a job. All the information you need for advancement and eventual domination will now be at your fingertips.




You may get started by downloading the Excel add-in. In an Excel workbook, click on the EVE Online add-in now appearing in the top right. This will open a pane on the right where you select 'add character'. Once authorised, you can begin pulling in-game data and using the available functions to inform your gameplay.

Now – get back to work!

# 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 have a table called **Data** that contains details of some new items and their suppliers in a clean horizontal structure, as below. We need to import this data into an inventory management system.

| ItemCode | ItemName | Supplier | Note | ItemCost | ItemMPQ |
|---|---|---|---|---|---|
| SP001 | Orange juice | Sunshine Farm | Promotion only | 12 | 6 |
| SP001 | Orange juice | West Farmer | | 9 | 3 |
| SP001 | Orange juice | Rural Farm | | 24 | 6 |
| SP002 | Milk | Milk Land | Prioritised | 2 | 1 |
| SP002 | Milk | Morning East | | 12 | 4 |
| SP002 | Milk | Rural Farm | Promotion only | 3 | 1 |
| SP002 | Milk | Dairy West | Once a month | 4 | 1 |
| SP003 | Cereal | Nice Breakfast | | 4 | 1 |
| SP003 | Cereal | Rural Farm | Fortnightly | 5 | 1 |

| Repeated Columns |
|---|
| Supplier |
| ItemCost |
| ItemMPQ |
| Note |

However, the system requires a template that only allows one row per item. Therefore, the data needs to be laid out as follows.

| ItemCode | ItemName | Supplier1 | ItemCost1 | ItemMPQ1 | Note1 | Supplier2 | ItemCost2 | ItemMPQ2 | Note2 | Supplier3 | ItemCost3 | ItemMPQ3 | Note3 | Supplier4 | ItemCost4 | ItemMPQ4 | Note4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP001 | Orange juice | Sunshine Farm | 12 | 6 | Promotion only | West Farmer | 9 | 3 | | Rural Farm | 24 | 6 | | | | | |
| SP002 | Milk | Milk Land | 2 | 1 | Prioritised | Morning East | 12 | 4 | | Rural Farm | 3 | 1 | Promotion only | Dairy West | 4 | 1 | Once a month |
| SP003 | Cereal | Nice Breakfast | 4 | 1 | | Rural Farm | 5 | 1 | Fortnightly | | | | | | | | |

In this challenge, the objective is to use Power Query to transform structure of the data from vertical format to horizontal as shown in the pictures above.

As always, there are some requirements:

- repeated columns are listed in the second table of Question Data. They have to be in that specific order (*i.e.* 'Note' is the last column of every repeated group)
- all column headers need to be dynamic. If they are changed, the queries still need to work
- the number of suppliers for each item may be varied.

Sounds 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 ans introductory series into the world of creating charts and dashboards in Excel. This month, we continue our discussion on dashboard design.*

In last month's newsletter, we talked about the five criteria to consider when designing a dashboard, being:

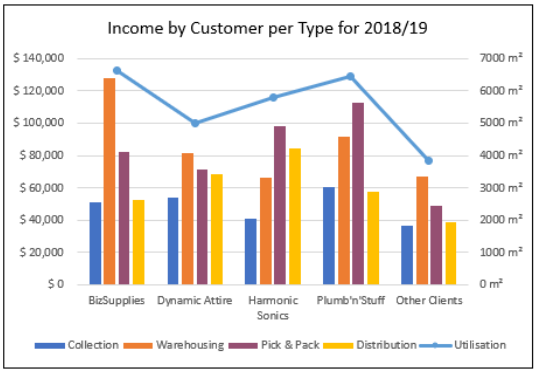
1. the granularity
2. level of information required
3. timescales
4. leading and lagging metrics
5. decision making required.

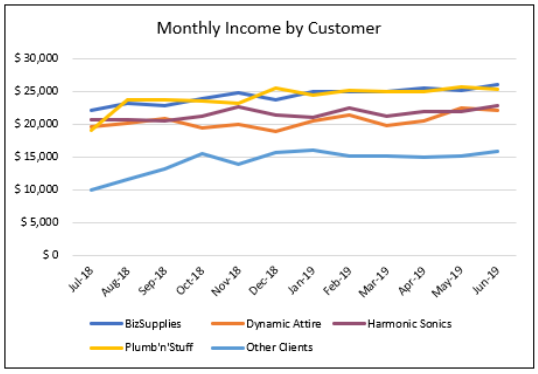
We also looked at two dashboard examples, one was bad, one was better. A good dashboard should be able to answer the frequently asked business questions at a glance. This essentially means that the end user should be able to pick out the information they need from the dashboard within a few seconds, or at least know where to look for the information they need within that time frame. If the end user is spending minutes scanning for that information, there is a problem with the dashboard design.

Thus, when designing a dashboard, we should endeavour to follow the ***five-second rule***. Five seconds is roughly how much time the end user should need to find the information they are looking for when examining the dashboard. Of course, deeper analysis or investigation is expected to take longer than five seconds, but the most important metrics should stand out to the user.

For example, we have a sales manager who needs to send the sales performances to the senior management:

- the income by customer by type and the utilisation
- the monthly income by customer.




All of the requested metrics are displayed neatly in one dashboard. Most of the information they requested can be easily found within five seconds.

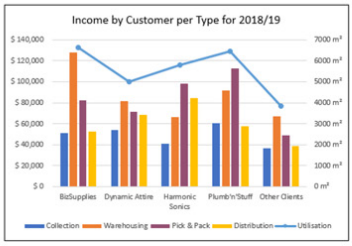
The best way to explain this is through a scenario.

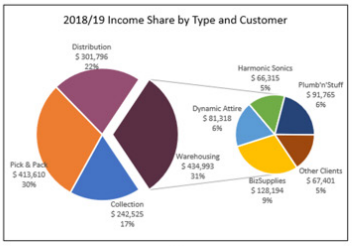
In our example, sales data is categorised into five customer groups, namely BizSupplies, Dynamic Attire, Harmonic Sonics, Plumb'n'Stuff and Other Clients, and into four types, being Collection, Warehousing, Pick&Pack and Distribution. The sales staff should have a collection of 60-70 well maintained and updated charts / chart data that measure various possible metrics, operation indicators and business unit indices. This is akin to ***cockpit reporting***, where in an aeroplane, various instruments keep track of all key outputs, although some are irrelevant at particular times (*e.g.* de-icer settings are possibly not essential information for landing).

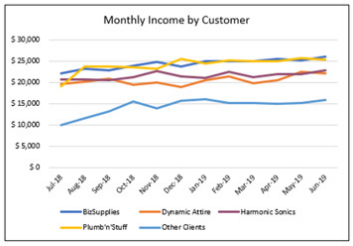
For each division, each reporting period, they will create a ***report***, probably referred to as a dashboard. This report may contain charts that highlight potential issues now or in the future, as well as multitudes of other charts that reflect that the business is doing just fine. When compiling reports for the board, be it monthly, quarterly or yearly, the analysts will sift through the cockpit reporting data. They would look for any charts that highlight any areas of concern now, or in the near future; ignoring charts that do not show any issues. These charts are compiled and put into a reporting dashboard.

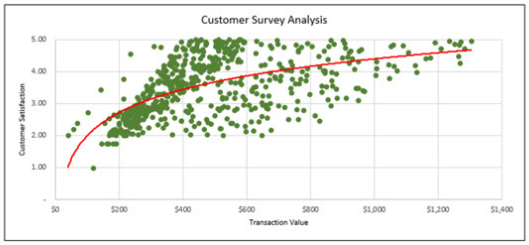
The report(ing dashboard) will then be comprised of, says, six [6] to nine [9] charts that will highlight to the board any issues within the company that they have to address. Hence, the analogy to the cockpit dashboard, where it is a collection of all the potential charts that an analyst has to look over. The analyst focuses on the charts that raises concern into a reporting dashboard for senior management to address.

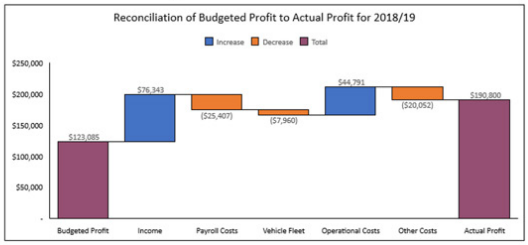
At a business level, they key points from each division will be reported. This is referred to in different software as the (overall) **dashboard**. Data may come from many sources and not pertain to one particular product, service, business unit or division.




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 go back to basics and look at how to record a macro.*

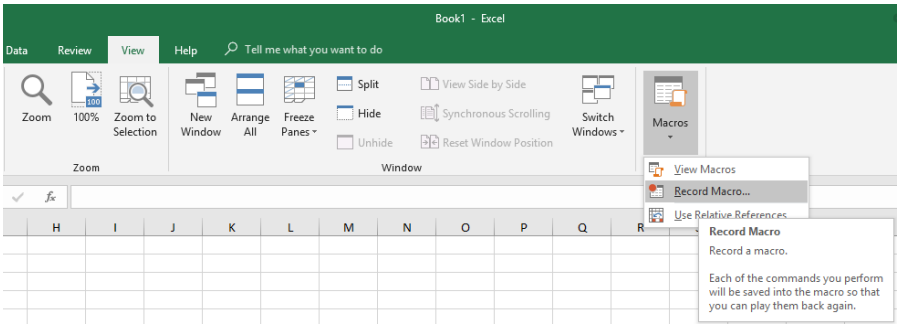
Recording a macro is pretty straightforward and is the typical well users get their feet under the table with VBA. There are several ways you can do this:

1. From the 'View' tab on the Ribbon
2. From the 'Developer' tab on the Ribbon
3. From the Status Bar
4. Keyboard shortcut.

Let's take a brief look at each in turn.

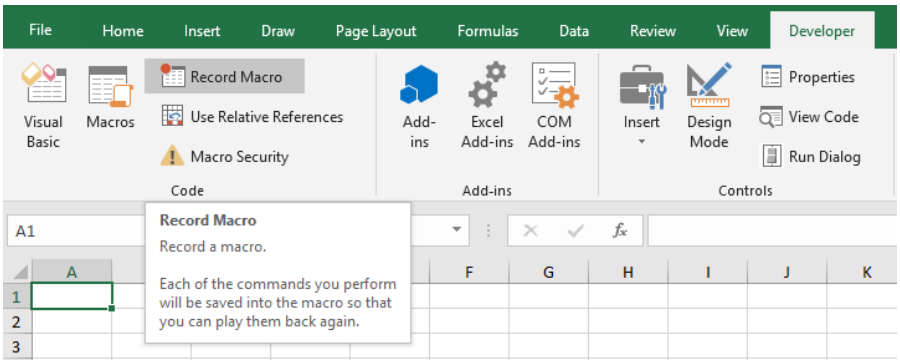
**1. From the 'View' tab on the Ribbon**

In the 'View' tab of the Ribbon, there is a category called 'Macros' with a 'Macros' button, funnily enough. Click on the button and a drop-down menu will appear. Select 'Record Macro…'.



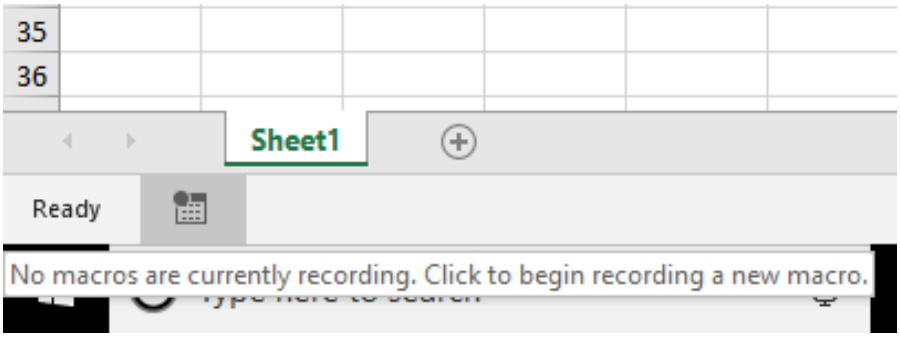

**2. From the 'Developer' tab on the Ribbon**

Similarly, in the 'Code' grouping on the 'Developer' tab and then select 'Record Macro', *viz.*




**3. From the Status Bar**

We can find a small button next to the word 'Ready' in the status bar at the bottom of Excel




After pressing a "Record Macro" the Record Macro dialog box will appear.

**4. Keyboard shortcut**

Perhaps not the easiest keyboard shortcut in the world to remember, **ALT + W + M + R** activates the first method ('View' tab on the Ribbon). It also stops the macro recording. This keyboard shortcut isn't pretty, but it's robust. The 'Developer' tab isn't always on the Ribbon (see last month's newsletter for details) and the status bar has no readily accessible shortcut.

More next month.

## Power Pivot Principles

Before we get into what the **MEDIAN** function does, let's answer the question: what does median mean? The median is the middle value in a sorted list of numbers. For example, if we have the following set of values:

6, 1, 2, 9, 3

We have to arrange these values in ascending order:

1, 2, 3, 6, 9

Then we can then determine that the median is three [3].

If we have an even number of values, *e.g.*

4, 5, 8, 10

We would take the average of the middle two numbers ((5 + 8) / 2). Therefore, the median would be 6.5 in this case.

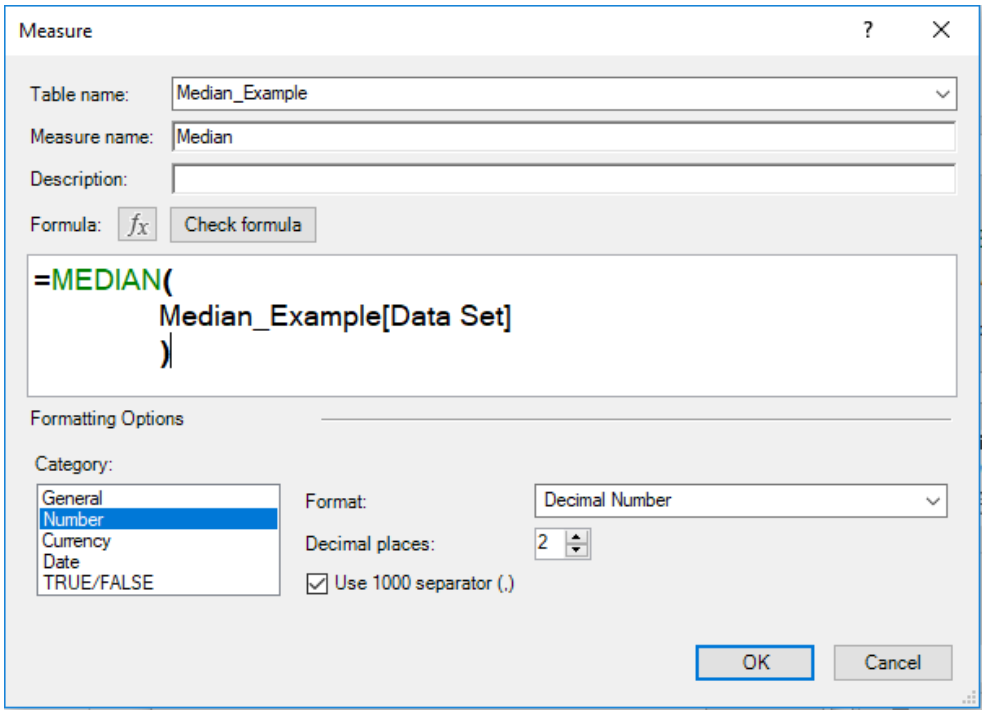
OK, so what does the **MEDIAN** *function* do?

The **MEDIAN** function returns the median value from a column of values in a data table. The **MEDIAN** function ignores blanks when calculating the median value in a column and returns with a decimal number as a result. Let's take a look at an example. We will create a simple measure using the **MEDIAN** function using the data from this Table:

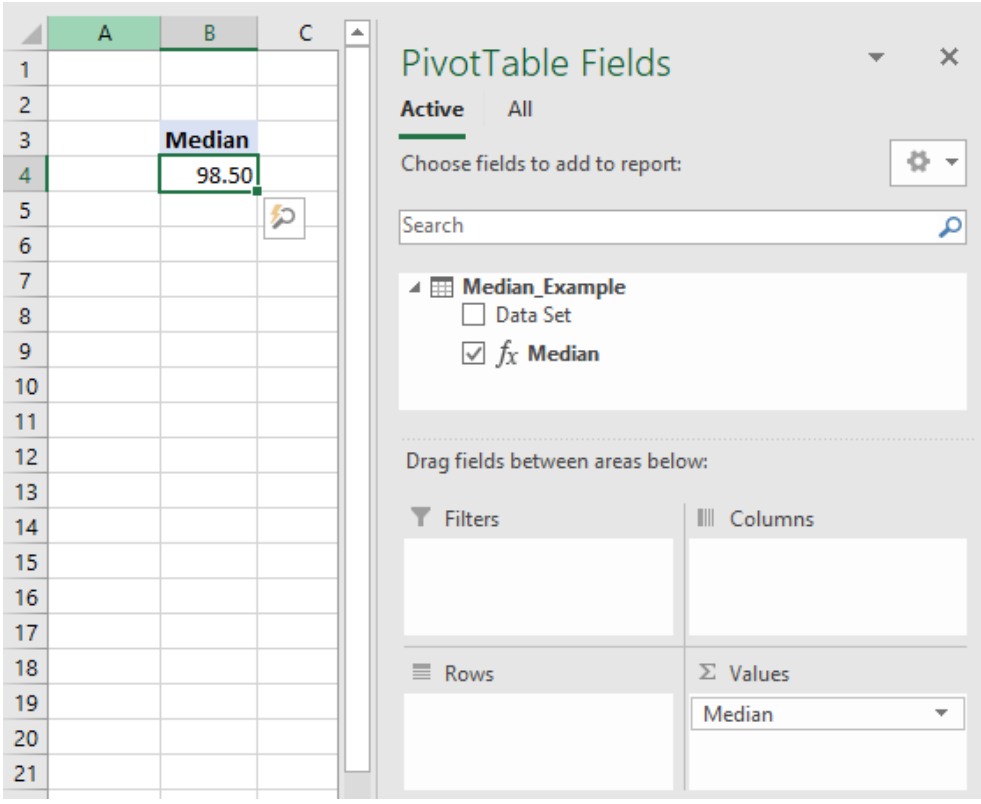
| | A | B |
|---|---|---|
| 1 | | |
| 2 | | Data Set |
| 3 | | 155 |
| 4 | | 46 |
| 5 | | 35 |
| 6 | | 105 |
| 7 | | 177 |
| 8 | | 33 |
| 9 | | 197 |
| 10 | | 199 |
| 11 | | 127 |
| 12 | | 42 |
| 13 | | 147 |
| 14 | | 57 |
| 15 | | 101 |
| 16 | | 19 |
| 17 | | 181 |
| 18 | | 191 |
| 19 | | 90 |
| 20 | | 70 |
| 21 | | 96 |
| 22 | | 8 |
| 23 | | 179 |
| 24 | | 168 |
| 25 | | 25 |
| 26 | | 172 |
| 27 | | 82 |
| 28 | | 52 |
| 29 | | |

After adding this table to our Data Model, we can create the following measure:

```
=MEDIAN(
        Median_Example[Data Set]
        )
```




Exporting this measure to a PivotTable, we get:

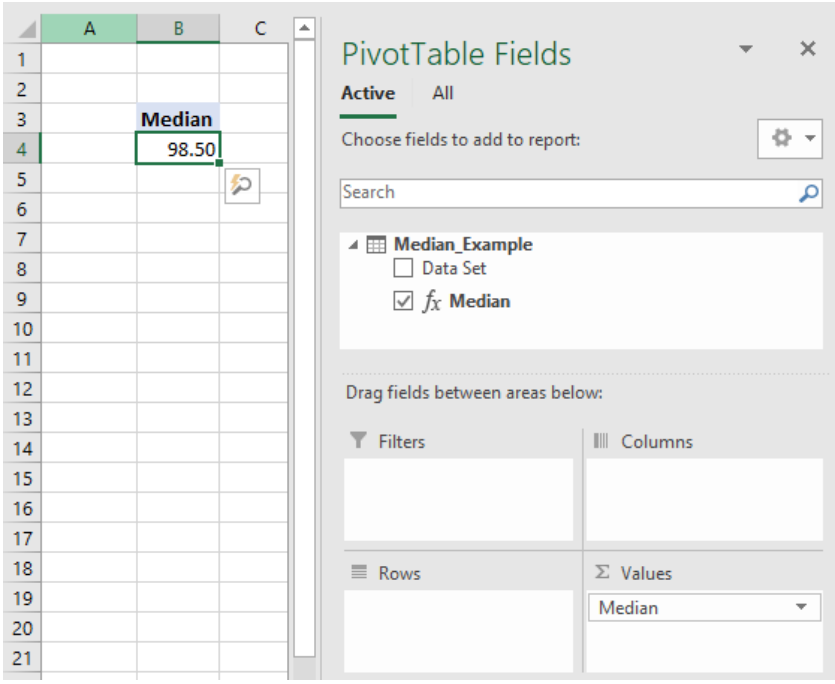


Power Pivot has automatically arranged our dataset in ascending order and calculated the Median value. Neat! This means that the **MEDIAN** function in Power Pivot will not be affected by the way we order the values in our columns and will calculate the median independently.

Let's try adding some blank cells into our data set:

| | A | B |
|---|---|---|
| 1 | | |
| 2 | | Data Set |
| 3 | | 155 |
| 4 | | 46 |
| 5 | | 35 |
| 6 | | |
| 7 | | 105 |
| 8 | | 177 |
| 9 | | 33 |
| 10 | | 197 |
| 11 | | 199 |
| 12 | | 127 |
| 13 | | |
| 14 | | |
| 15 | | |
| 16 | | |
| 17 | | 42 |
| 18 | | 147 |
| 19 | | 57 |
| 20 | | 101 |
| 21 | | 19 |
| 22 | | 181 |
| 23 | | 191 |
| 24 | | 90 |
| 25 | | 70 |
| 26 | | |
| 27 | | 96 |
| 28 | | 8 |
| 29 | | 179 |
| 30 | | 168 |
| 31 | | 25 |
| 32 | | 172 |
| 33 | | 82 |
| 34 | | 52 |
| 35 | | |

Refreshing our PivotTable yields… the same value:



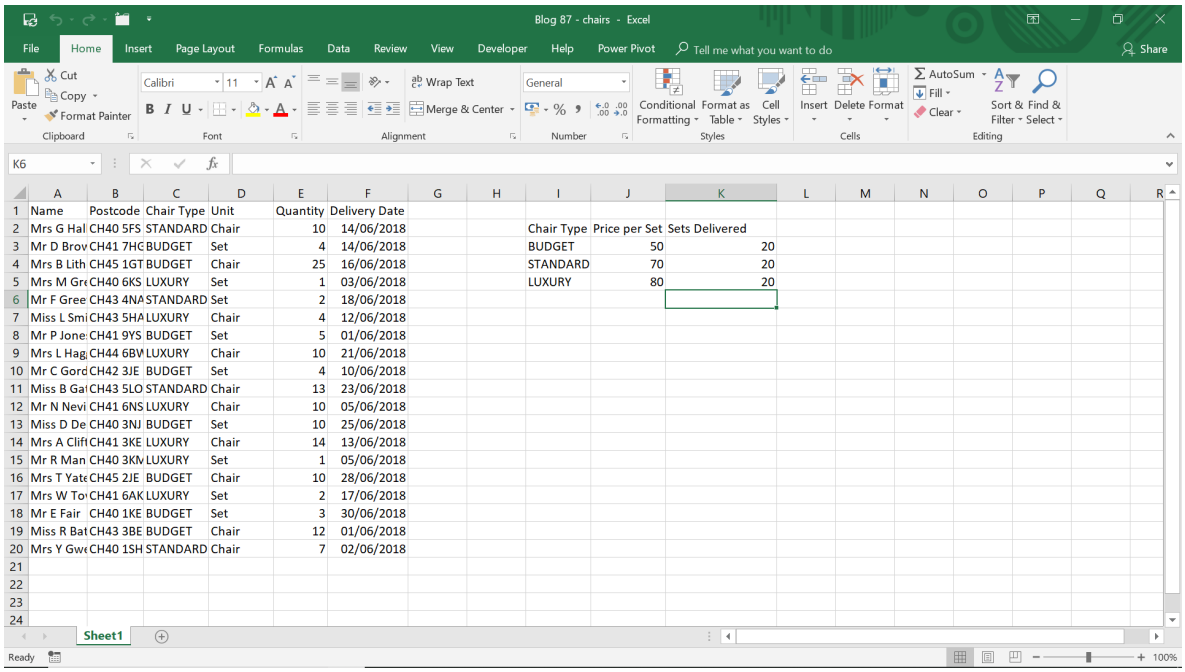

We can see that the **MEDIAN** function ignores blank cells in our data set, similar to its equivalent function in Excel.

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 review an example where we need to calculate the stock needed from a supplier.*

The example for this month's newsletter combines some Power Query functionality in order to find the solution to a supply problem. Let's start by looking at the data below, which shows the chairs hired in the last month and the amount that the supplier who maintains the chairs, delivered to our fictitious hire company.

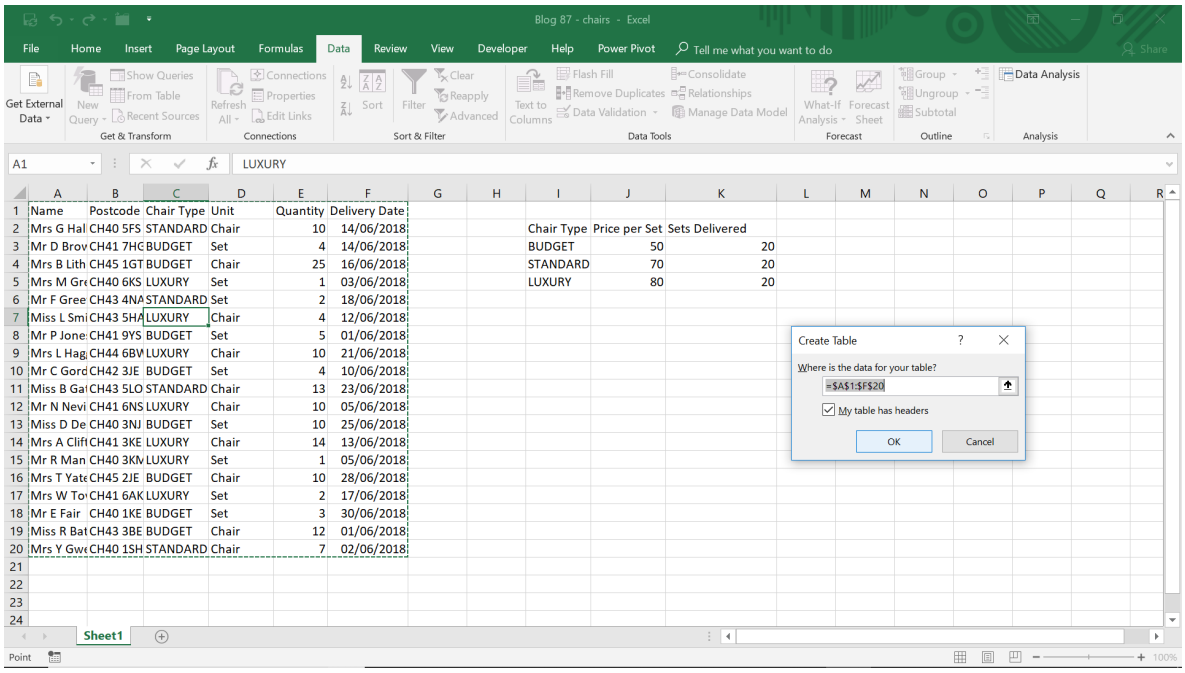


| Name | Postcode | Chair Type | Unit | Quantity | Delivery Date |
|---|---|---|---|---|---|
| Mrs G Hal | CH40 5FS | STANDARD | Chair | 10 | 14/06/2018 |
| Mr D Brov | CH41 7HC | BUDGET | Set | 4 | 14/06/2018 |
| Mrs B Lith | CH45 1GT | BUDGET | Chair | 25 | 16/06/2018 |
| Mrs M Gre | CH40 6KS | LUXURY | Set | 1 | 03/06/2018 |
| Mr F Gree | CH43 4NA | STANDARD | Set | 2 | 18/06/2018 |
| Miss L Smi | CH43 5HA | LUXURY | Chair | 4 | 12/06/2018 |
| Mr P Jone | CH41 9YS | BUDGET | Set | 5 | 01/06/2018 |
| Mrs L Hag | CH44 6BV | LUXURY | Chair | 10 | 21/06/2018 |
| Mr C Gord | CH42 3JE | BUDGET | Set | 4 | 10/06/2018 |
| Miss B Gal | CH43 5LO | STANDARD | Chair | 13 | 23/06/2018 |
| Mr N Nevi | CH41 6NS | LUXURY | Chair | 10 | 05/06/2018 |
| Miss D De | CH40 3NJ | BUDGET | Set | 10 | 25/06/2018 |
| Mrs A Clifi | CH41 3KE | LUXURY | Chair | 14 | 13/06/2018 |
| Mr R Man | CH40 3KN | LUXURY | Set | 1 | 05/06/2018 |
| Mrs T Yate | CH45 2JE | BUDGET | Chair | 10 | 28/06/2018 |
| Mrs W To | CH41 6AK | LUXURY | Set | 2 | 17/06/2018 |
| Mr E Fair | CH40 1KE | BUDGET | Set | 3 | 30/06/2018 |
| Miss R Bat | CH43 3BE | BUDGET | Chair | 12 | 01/06/2018 |
| Mrs Y Gw | CH40 1SH | STANDARD | Chair | 7 | 02/06/2018 |

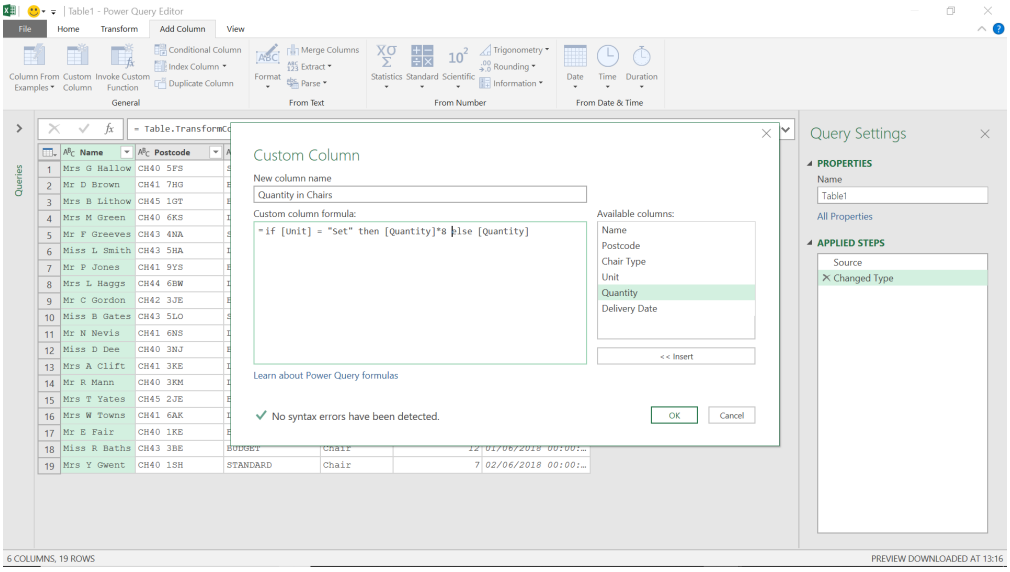
| Chair Type | Price per Set | Sets Delivered |
|---|---|---|
| BUDGET | 50 | 20 |
| STANDARD | 70 | 20 |
| LUXURY | 80 | 20 |

The question is: did we have the correct number of chairs supplied? We know that each set has eight chairs in it, but we can't tell if we have the right number by looking at this data.

Let's start by creating a query for my order data, by choosing 'From Table' in the 'Get & Transform' section on the 'Data' tab.

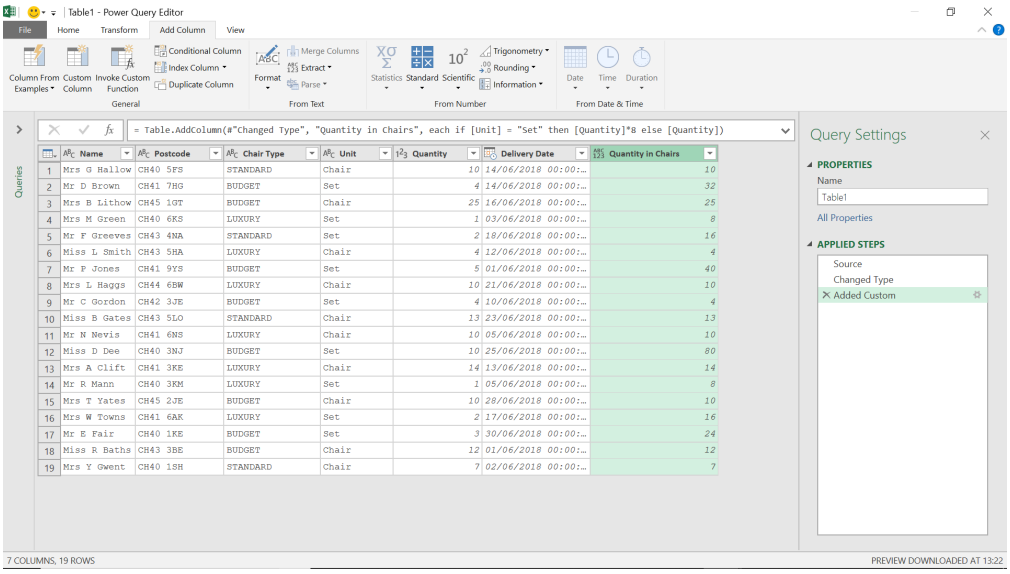



We'll start by to creating a new column in the query which will show all the quantities in chairs: we will use a 'Custom Column' for this on the 'Add Column' tab.

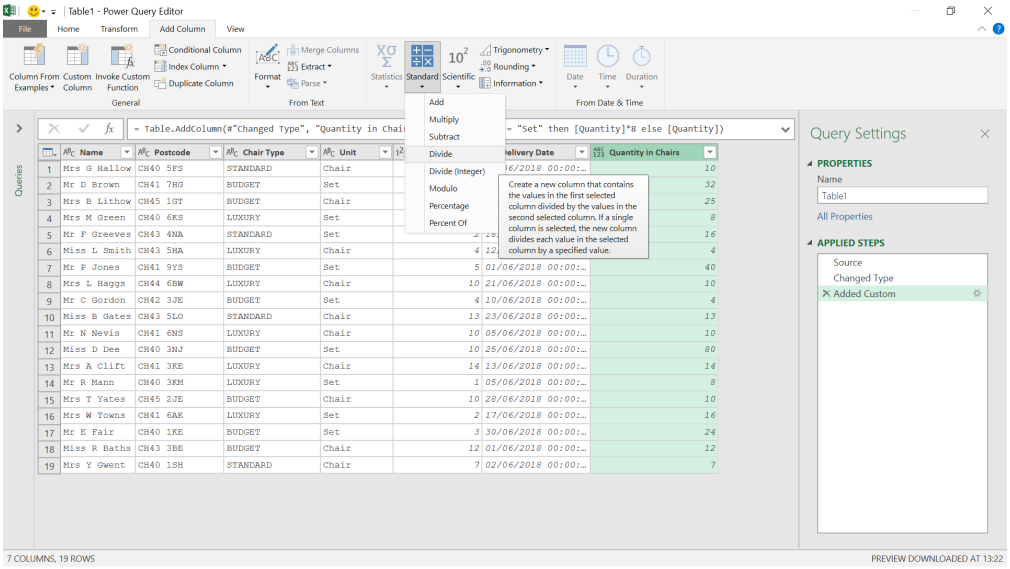



The **M** formula used here is

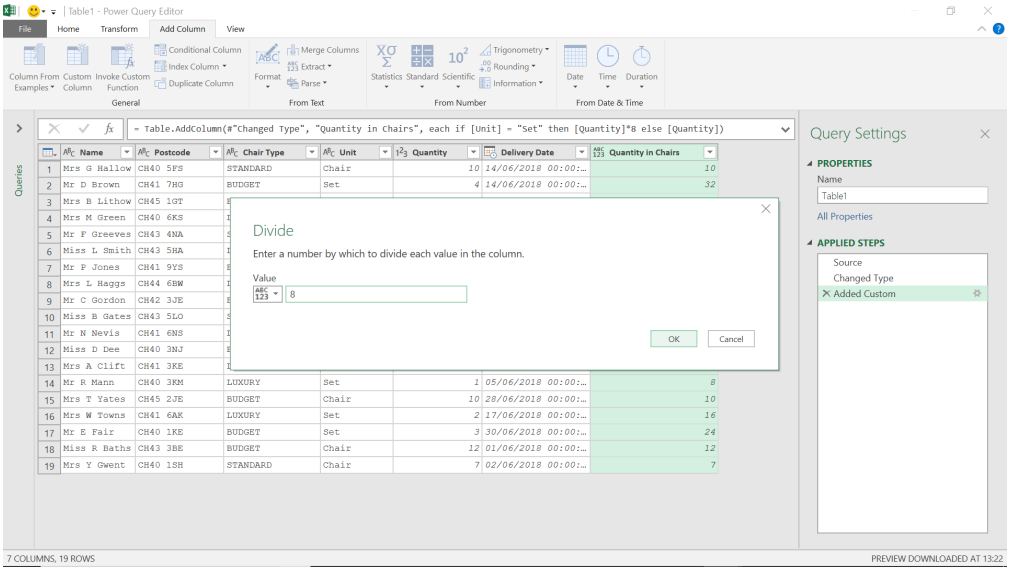
**= if [Unit] = "Set" then [Quantity]*8 else [Quantity]**



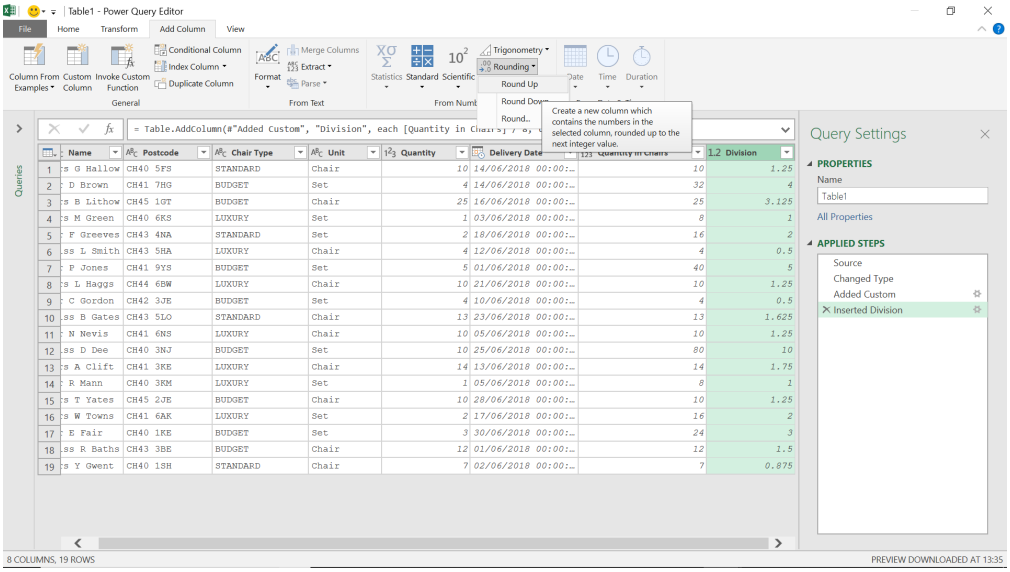

We now have all our quantities in chairs, but the supplier only deals in sets, so we need to know how many sets we need of each type. We need to divide the chair quantity by eight [8] and then round up to the next integer. We could do this in another custom column, but this time we will use the options in the 'Standard' dropdown on the 'From Number' section of the menus instead. We can't use the 'Divide (Integer)' option because this will round down, and we need to round up. Instead, we'll use two steps, starting with 'Divide'.



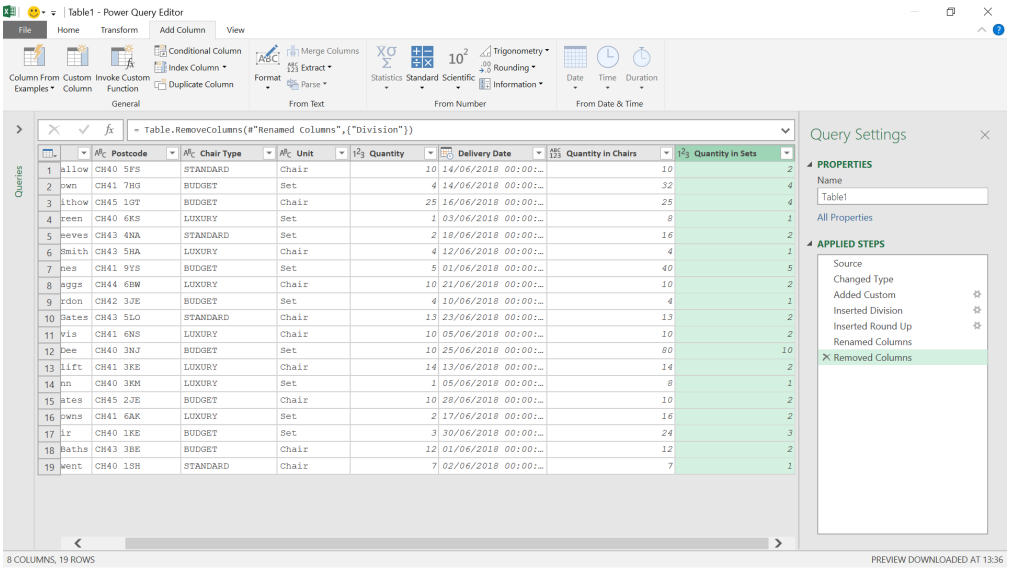
We choose to divide by eight [8].



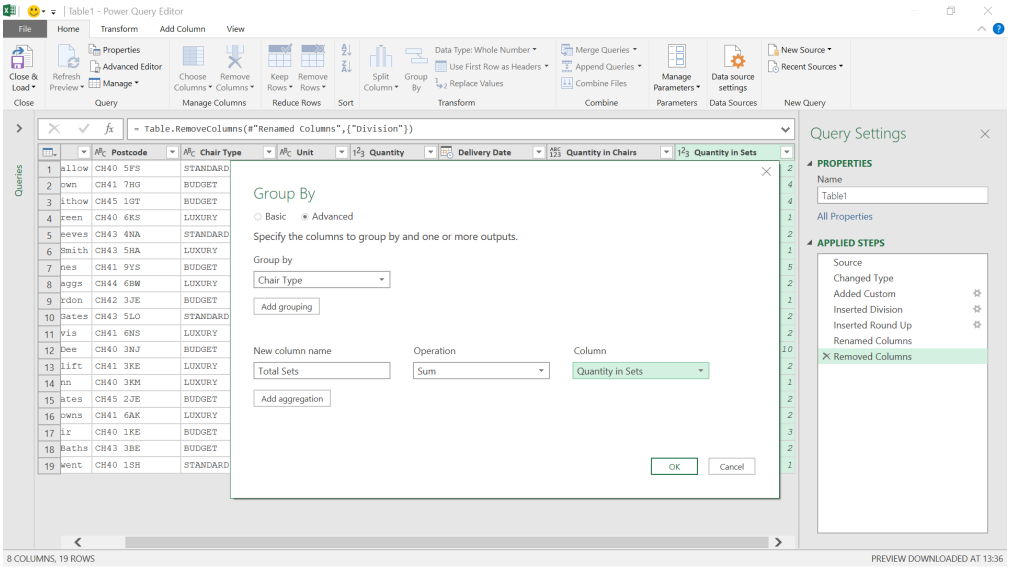

We then use the 'Rounding' dropdown to choose to 'Round Up'.



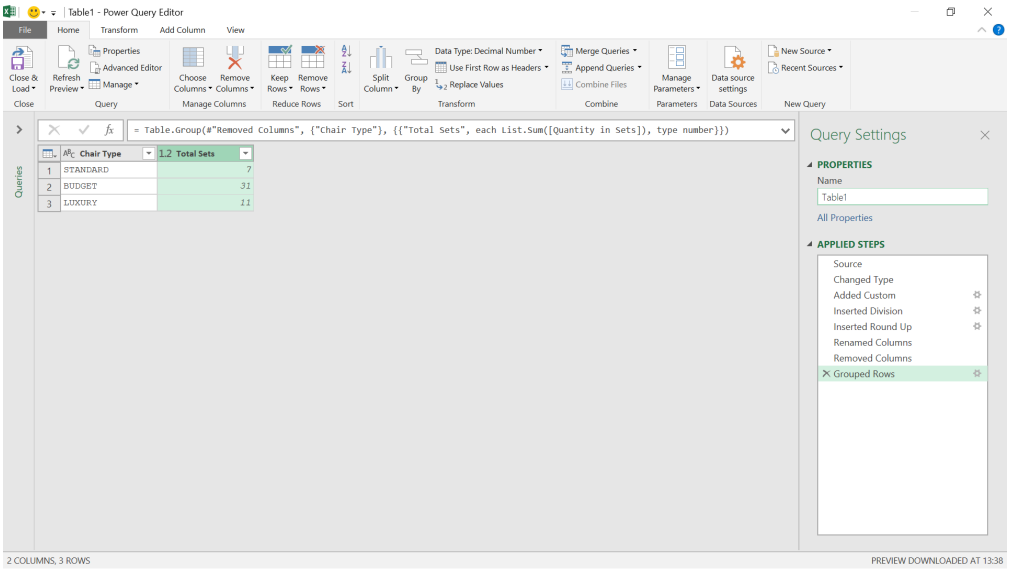

We can then rename our new column and remove **Division**.



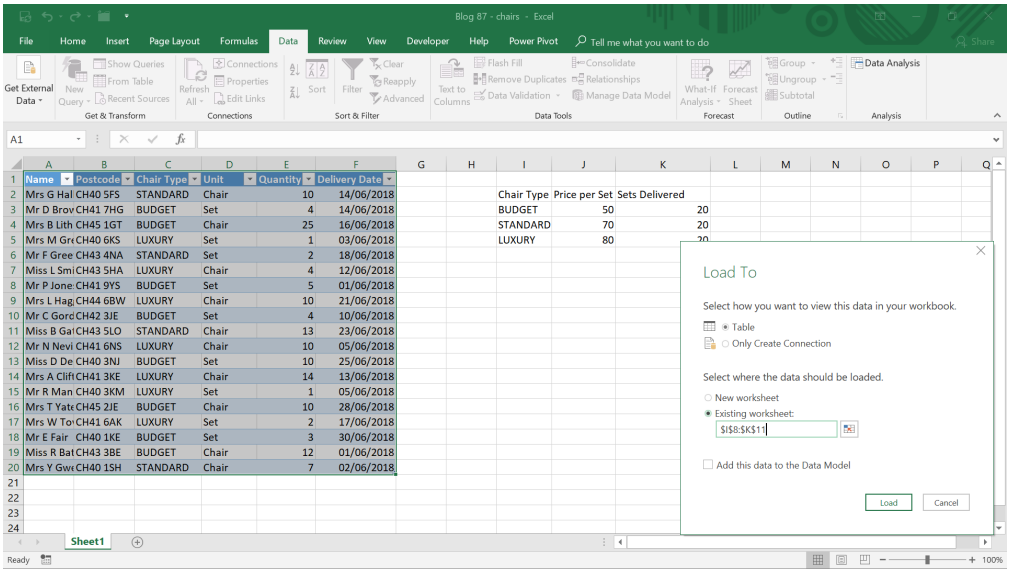
Now we have the quantity in sets, we may group our data.



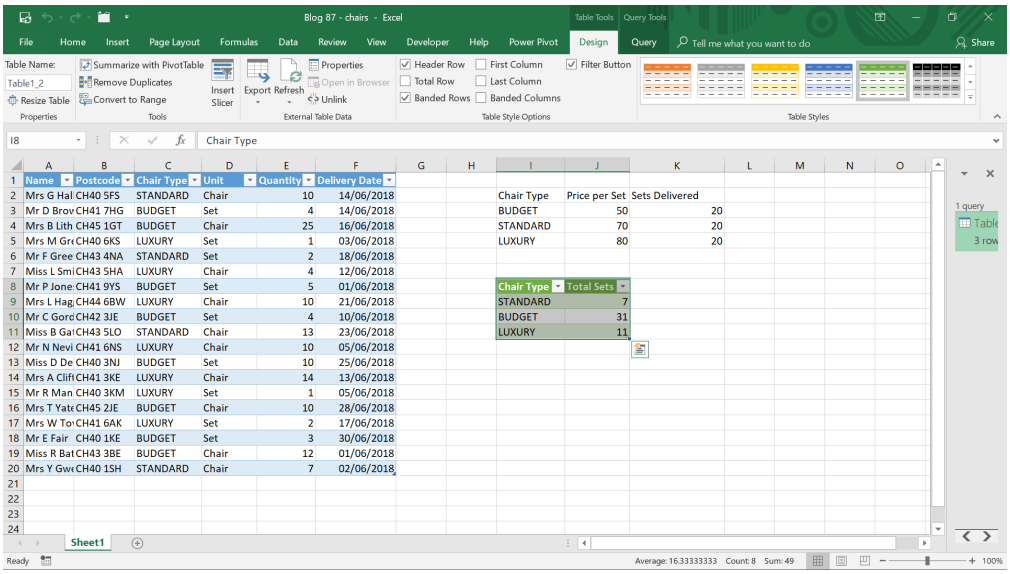

We need to group by chair type, and for each chair type, we need to sum the number of sets.




We have the total number of sets for each type, so now we may 'Close & Load To' from the 'Home' or 'File' tab to compare this with the number delivered.



We specify where we would like the data to appear on our worksheet.



| Name | Postcode | Chair Type | Unit | Quantity | Delivery Date |
|---|---|---|---|---|---|
| Mrs G Hal | CH40 5FS | STANDARD | Chair | 10 | 14/06/2018 |
| Mr D Brov | CH41 7HG | BUDGET | Set | 4 | 14/06/2018 |
| Mrs B Lith | CH45 1GT | BUDGET | Chair | 25 | 16/06/2018 |
| Mrs M Gre | CH40 6KS | LUXURY | Set | 1 | 03/06/2018 |
| Mr F Gree | CH43 4NA | STANDARD | Set | 2 | 18/06/2018 |
| Miss L Smi | CH43 5HA | LUXURY | Chair | 4 | 12/06/2018 |
| Mr P Jone | CH41 9YS | BUDGET | Set | 5 | 01/06/2018 |
| Mrs L Hag | CH44 6BW | LUXURY | Chair | 10 | 21/06/2018 |
| Mr C Gord | CH42 3JE | BUDGET | Set | 4 | 10/06/2018 |
| Miss B Ga | CH43 5LO | STANDARD | Chair | 13 | 23/06/2018 |
| Mr N Nevi | CH41 6NS | LUXURY | Chair | 10 | 05/06/2018 |
| Miss D De | CH40 3NJ | BUDGET | Set | 10 | 25/06/2018 |
| Mrs A Clif | CH41 3KE | LUXURY | Chair | 14 | 13/06/2018 |
| Mr R Man | CH40 3KM | LUXURY | Set | 1 | 05/06/2018 |
| Mrs T Yate | CH45 2JE | BUDGET | Chair | 10 | 28/06/2018 |
| Mrs W To | CH41 6AK | LUXURY | Set | 2 | 17/06/2018 |
| Mr E Fair | CH40 1KE | BUDGET | Set | 3 | 30/06/2018 |
| Miss R Bat | CH43 3BE | BUDGET | Chair | 12 | 01/06/2018 |
| Mrs Y Gw | CH40 1SH | STANDARD | Chair | 7 | 02/06/2018 |

| Chair Type | Price per Set | Sets Delivered |
|---|---|---|
| BUDGET | 50 | 20 |
| STANDARD | 70 | 20 |
| LUXURY | 80 | 20 |

| Chair Type | Total Sets |
|---|---|
| STANDARD | 7 |
| BUDGET | 31 |
| LUXURY | 11 |

Clearly, we haven't had enough budget chairs, so we've been paying extra as 11 sets must have come from the standard or luxury chairs! We may now alter our future orders to allow for this.

More next time.

## Power BI Updates

This month's updates see a new layout switcher, an update to On-Object Interaction (in Preview), and updates to the **ORDERBY** function, amongst other items and features. The full list is as follows:

***Reporting***

- New layout switcher
- New bubble range scaling setting
- On-Object Interaction – updates in Preview:
- Resizing and positioning to the On-Object menus
- On-Object format sub-selections now supported in Spotlight and Focus modes

***Modelling***

- Updates to the **ORDERBY** function

***Data connectivity***

- New modern data connectivity and discovery experience in Dataflows
- Lakehouses (connector update)

***Service***

- XMLA Write support for Direct Lake datasets
- Automatic replica synchronisation for Dataset Scale-Out in Preview

***Mobile***

- Choose your start-up content

***Developers***

- Published AppSource visuals now generate leads in Partner Center and CRM

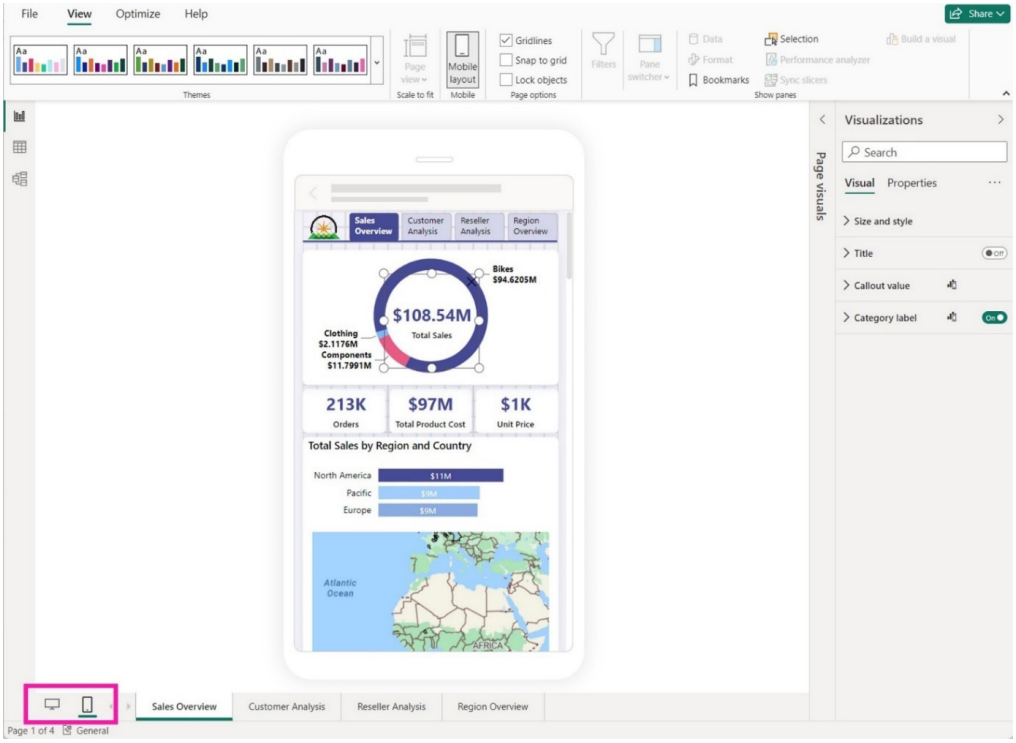
***Visualisations***

- New visuals in AppSource
- Drill Down Combo Bar PRO by ZoomCharts
- Sunburst Chart by Powerviz
- xViz Performance Flow by Lumel.

Let's look at each in turn.

***New layout switcher***

New buttons have been added to make it easy to quickly switch between web and mobile layouts whilst you're developing your reports. You'll find the new switcher buttons down at the bottom of the screen, right next to the page navigator.



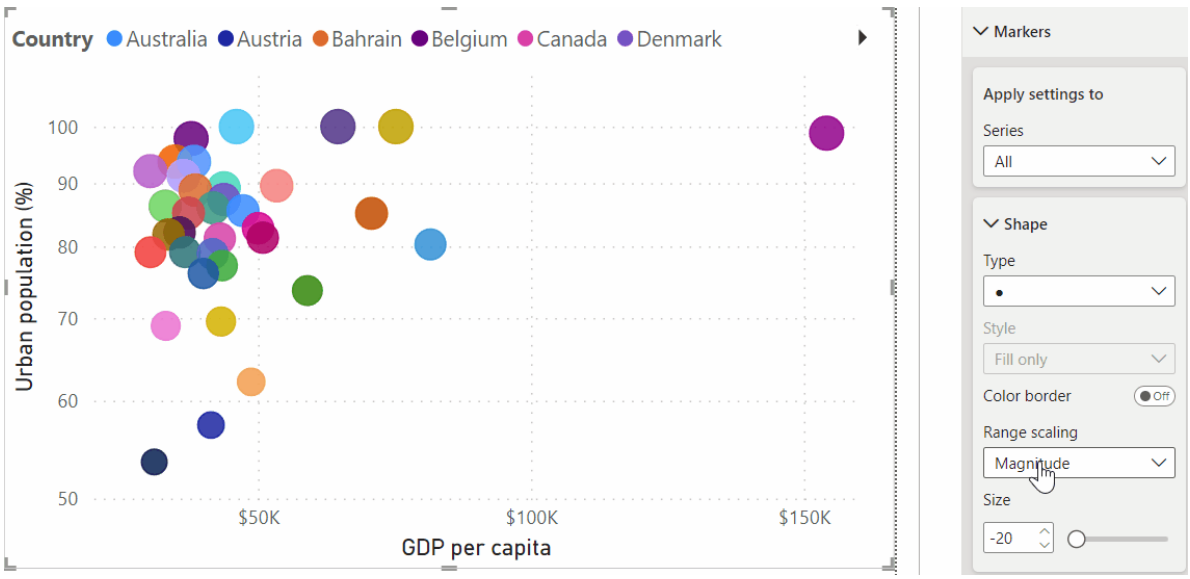

***New bubble range scaling setting***

The new bubble range scaling setting for scatter chart and map visuals has now been introduced. This setting gives report creators more control over how the bubble (marker) sizes respond to the data, making it more accurate or distinctive based on preference.

With the magnitude option, the bubble areas closely follow the data proportions. With the data-range option, the bubble size limits are mapped to data minimum and maximum. The auto option, which is the default setting for new reports, selects the appropriate option based on data characteristics.

This setting may be adjusted in the Formatting panel, **Markers -> Shape -> Range scaling** for Scatter charts or **Bubbles >- Size -> Range scaling** for Maps. For reports authored in earlier Power BI versions, these settings default to (Deprecated) for Scatter charts (which differs in handling negative values), and Data range for Map charts.

Azure Maps charts will also include this feature in a coming product update.



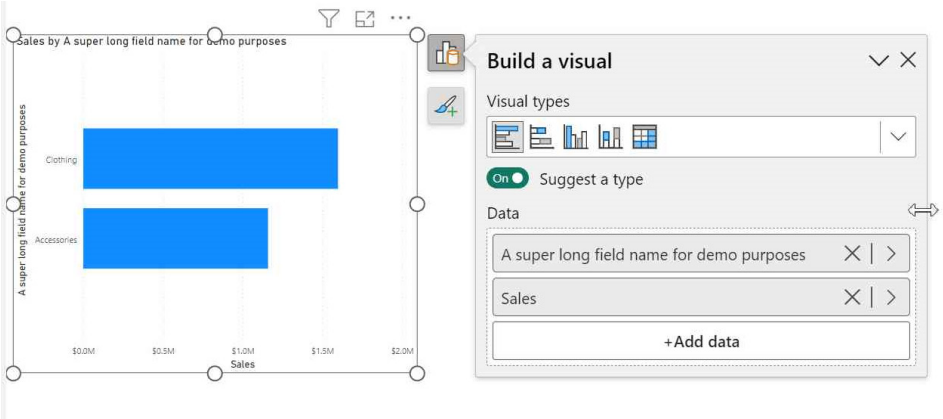

In the figure above, the size of each country represents 'Urban Population', which is also shown on the **y**-axis.

***On-Object Interaction – updates in Preview***

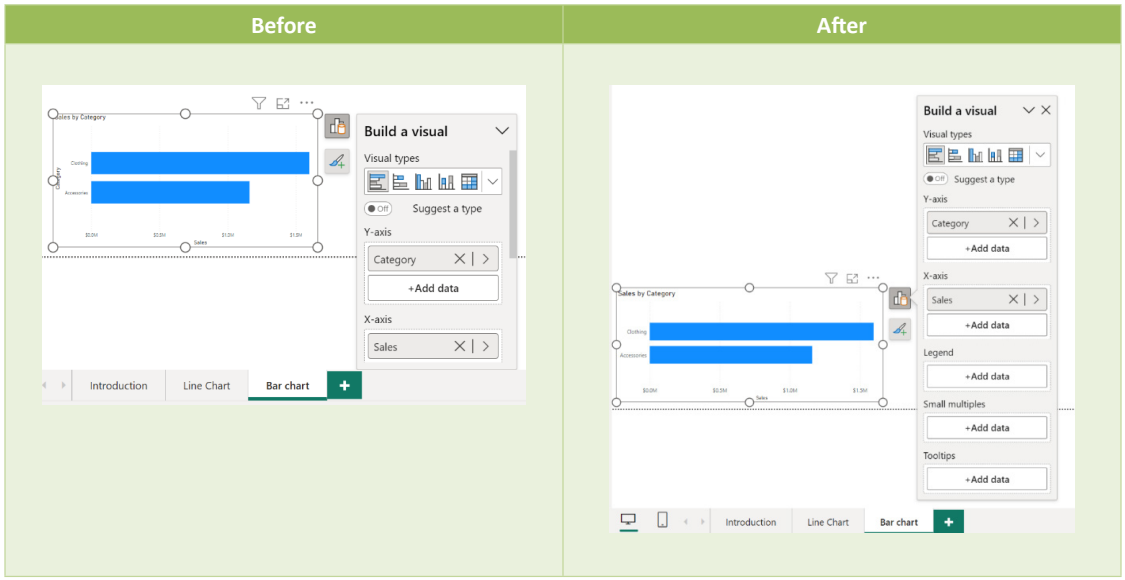
The new On-Object Interaction feature was released to Preview back in March. The improvements keep coming, however, and two are detailed below.

**RESIZING AND POSITIONING TO THE ON-OBJECT MENUS**

The ability to resize the On-Object menus horizontally has now been added. This is especially helpful when you're working with long field names.

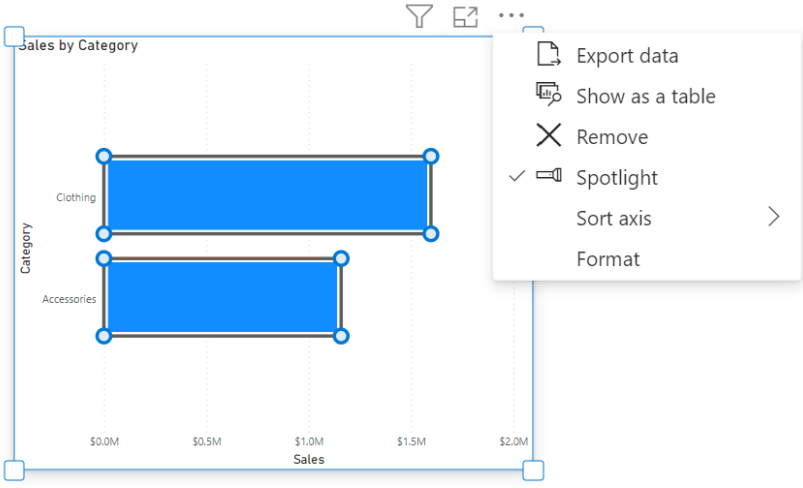



The positioning of the On-Object menus has also been improved to make better use of the canvas space. Previously, when a visual was near the bottom of the canvas, the On-Object menu was very small and required scrolling to be able to see and use the field wells. Now, the On-Object menu moves up and stretches into the canvas to bring the field wells into view without needing to scroll.

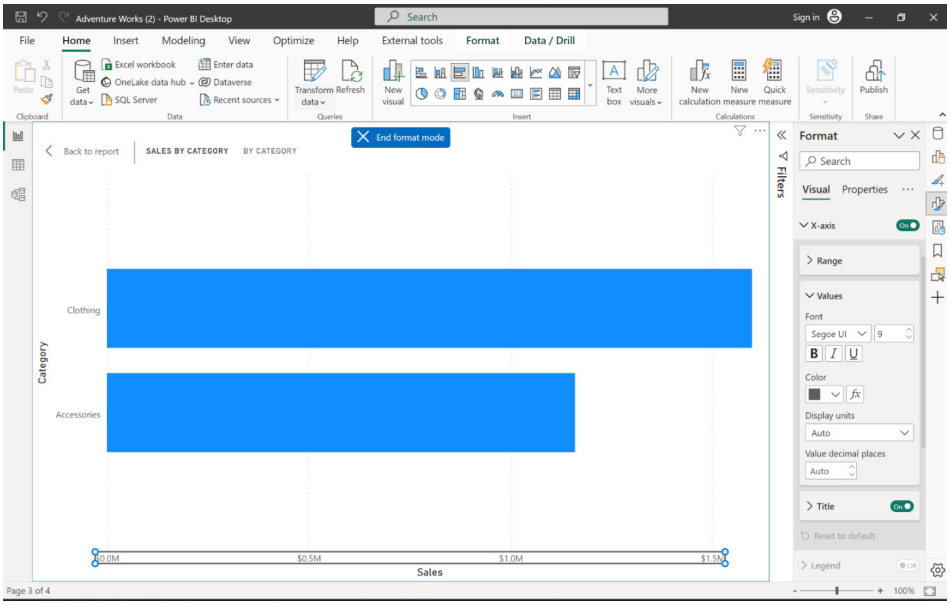



**ON-OBJECT FORMAT SUB-SELECTIONS NOW SUPPORTED IN SPOTLIGHT AND FOCUS MODES**

When spotlighting a visual or expanding the visual in Focus mode, you can now use On-Object formatting to sub-select and format styles.



In Focus mode, it can be hard to tell when you've entered Format mode with just the subtle border. To address this, Power BI has added a button to the header to better indicate when you're in Format mode and how to exit Format mode while staying in Focus mode.




***Updates to the ORDERBY function***

If there are blanks in the data, you can specify where to order them by adding 'BLANKS LAST' or 'BLANKS FIRST'. For example, this is a perfectly valid expression:

```
BiggestSpender =
SELECTCOLUMNS (
INDEX (
1,
ALLSELECTED ( 'DimCustomer' ),
ORDERBY ( SUM ( 'FactInternetSales'[SalesAmount] ), DESC BLANKS LAST)
),
'DimCustomer'[FullName]
)
```

Specifying how blanks are handled is optional and can be combined with specifying the order direction (DESC/ASC). Valid values include:

- **BLANKS DEFAULT.** This is the default value. The behaviour for numerical values is blank values are ordered between zero and negative values. The behaviour for strings is blank values are ordered before all strings, including empty strings
- **BLANKS FIRST.** Blanks are always ordered on the beginning, regardless of ascending or descending sorting order
- **BLANKS LAST.** Blanks are always ordered on the end, regardless of ascending or descending sorting order.

***New modern data connectivity and discovery experience in Dataflows***

The new data connectivity and discovery experience in Dataflow, Dataflow Gen2 and Datamart has also been introduced this month. Users spend a lot of time finding the right data, the right connection information and credentials. With the new 'Get Data' experience, Power BI has made it easier to browse different Fabric artifacts through the OneLake data hub. This improved experience aims to expedite this process and get you closer to the data that you're looking for in the quickest way possible.

***Lakehouses (connector update)***

This update includes significant performance improvements to the Lakehouses connector. They haven't told us what they are though…

### *XMLA Write support for Direct Lake datasets*

Direct Lake datasets now support XMLA-Write operations. Now you may utilise the Business Intelligence (BI) Pro tools and scripts to create and manage Direct Lake datasets.

Whether you prefer SQL Server Management Studio (SSMS), Tabular Editor, DAX Studio or something else, you can connect to your Direct Lake datasets using XMLA endpoints and perform operations such as deploying, customising, merging, scripting, debugging and testing. You may use tools like Azure DevOps or GitHub to implement source control, versioning and continuous integration for your data models. You can automate and streamline your development and deployment processes. You can also use PowerShell or REST APIs to automate tasks such as refreshing or applying changes to your Direct Lake datasets.

### *Automatic replica synchronisation for Dataset Scale-Out in Preview*

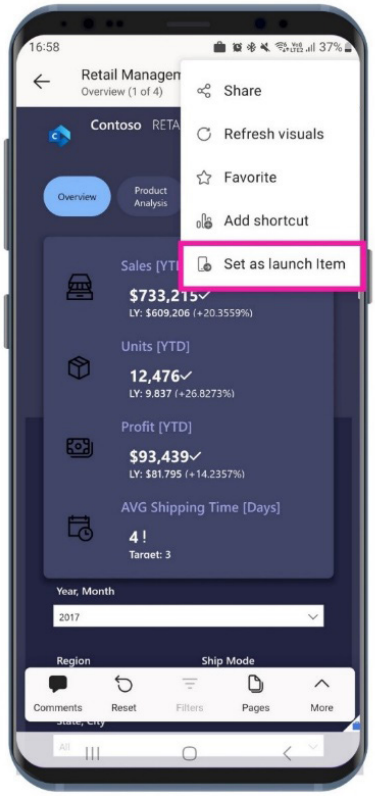
The Power BI team has now finalised Dataset Scale-Out configuration APIs and completed the replica synchronisation feature. Specifically, you no longer need to enable Scale-Out at the workspace level by using a burdensome XMLA request. The XMLA command is deprecated and will no longer work. You can now enable Scale-Out on a dataset-by-dataset basis using the Power BI REST API for datasets. You also no longer need to synchronise read replicas manually if you want to take advantage of automatic replica synchronisation. Automatic replica synchronisation is enabled by default. However, it is also possible to disable automatic synchronisation to synchronise the read / write and read replicas of a dataset manually for controlled refresh isolation.

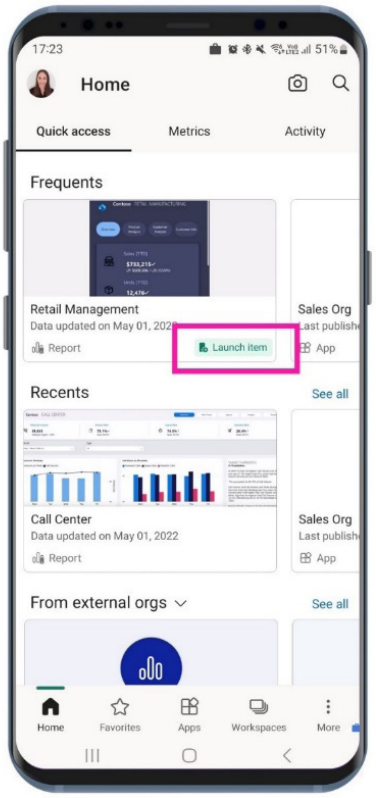
### *Choose your start-up content*

Power BI mobile application users may now choose which item they want to have open automatically whenever they launch the Power BI Mobile app. This feature saves time for users who mostly view a specific item on their mobile app, and don't want to waste time navigating from the app's home page every time they open it.

To configure a launch item for yourself, open the item you want to see when you launch the app. This can be a specific report page, dashboard, scorecard, report in an app or an entire app. When the item is open, open the More options (…) menu from the header and select 'Set as launch item'. This will mark the item as the launch item. Only one item at a time may be marked as the launch item.

Administrators may also use Mobile Device Management (MDM) tools to remotely configure a launch item for a group of users (front-line workers, for example) to simplify their experience with the app.




### *Published AppSource visuals now generate leads in Partner Center and CRM*

Until recently, your customer leads may have come solely from customers downloading them from AppSource.com. However, now you have access to even more leads through Power BI, both the Desktop and web embed AppSource.

To access these new leads, simply navigate to the Referrals workspace in Partner Center *(sic)*. Here, you can see all the leads you receive from Power BI, as well as those from AppSource.com. Furthermore, if you've connected your CRM, you'll see them there too.

By utilising these new leads from Power BI, you can potentially reach more customers and increase your business's growth.

***New visuals in AppSource***

The following are new visuals this update:

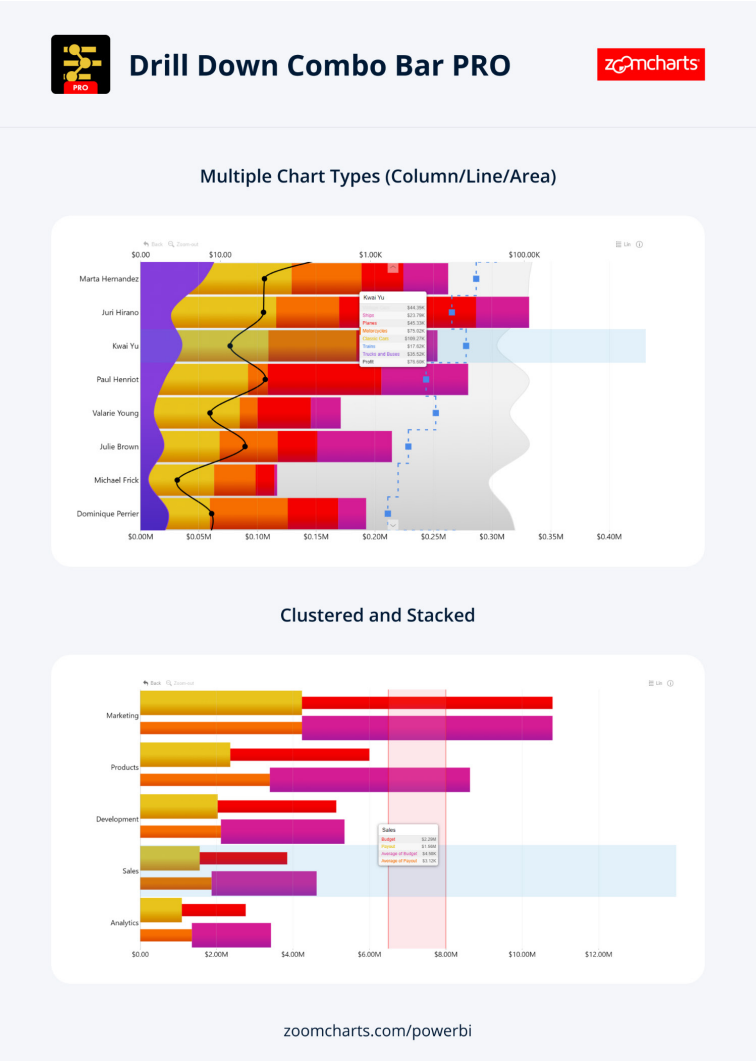
- Composed Line Area Bar Chart by Devlup Funnels
- Galigeo For Power BI
- Performance Flow – xViz
- Radial chart by Devlup Funnels
- Time-lines by BI-Champ.

***Drill Down Combo Bar PRO by ZoomCharts***

Drill Down Combo Bar PRO by ZoomCharts offers a wide selection of customisation options, letting creators build everything from regular Bar charts to Box and Whisker plots. This visual also offers cross-chart filtering capabilities combined with on-chart interactions.

The main features include:

- **multiple chart types:** choose between Column, Line and Area charts
- **full customisation:** customise **x** and **y** axes, legend, outline and fill settings
- **stacking and clustering:** choose normal, 100% proportional or zero-based stacking
- **static and dynamic thresholds:** set up to four [4] thresholds
- **multi-touch device friendly:** get the same experience on mouse and touch input devices.




Popular use cases include:

- **Sales and marketing:** sales strategies, sales results and campaign-by-campaign marketing metrics
- **Human resources:** hiring, overtimes and efficiency ratios by department
- **Accounting and finance:** financial performance by region, office or business line
- **Manufacturing:** production efficiencies and quality metrics by product line.

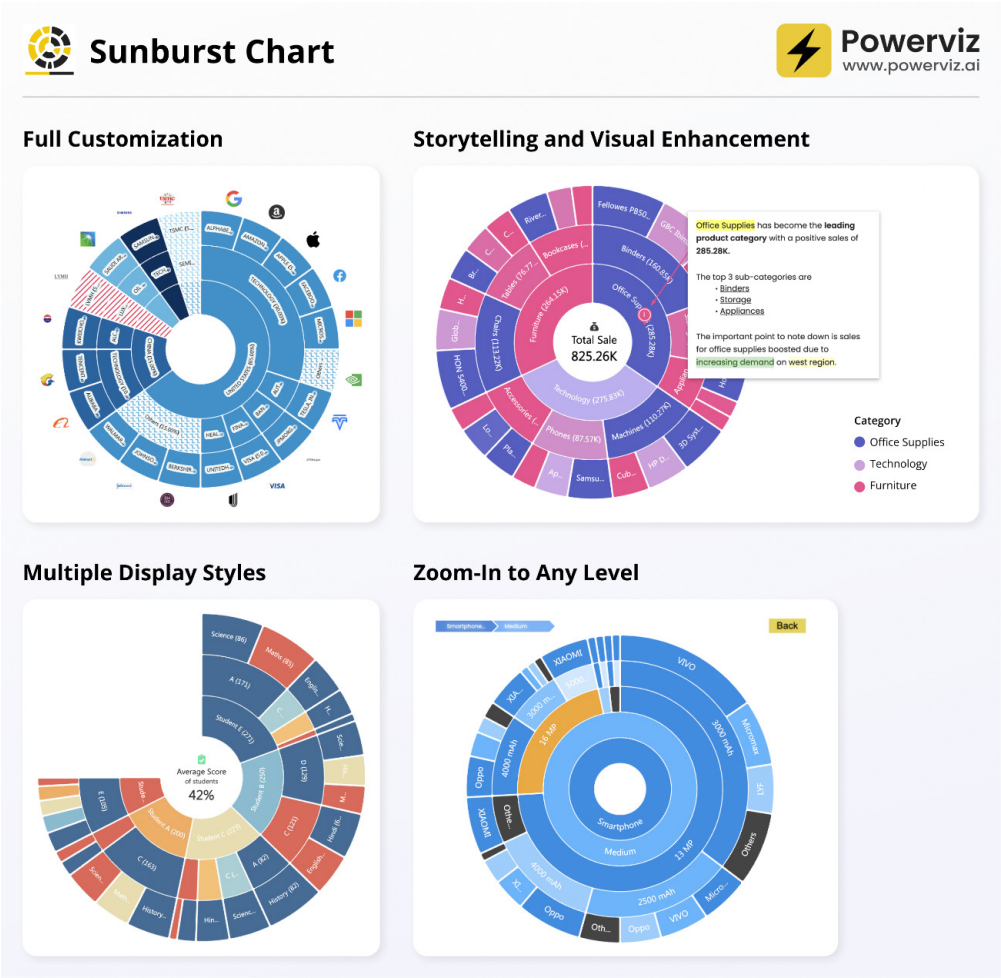
***Sunburst Chart by Powerviz***

There is a new Sunburst chart by Powerviz, designed to display hierarchical data in a user-friendly and intuitive format. With its concentric circle design, you can easily display part-to-whole relationships and gain valuable insights from your data.

Key features include:

- **customisation:** control display style, labels, centre circle, fill patterns and dynamic images
- **colour options:** choose from 30+ colour palettes, including colour-blind safe options
- **ranking:** easily filter the Top / Bottom **N** by each level and show the remaining categories as 'Others'
- **conditional formatting**: identify outliers based on value or category rules
- **interactive features:** enjoy full interactivity with zoom, drill down and cross-filtering for detailed exploration.

Many other features included annotations, grid view, show condition and accessibility support.

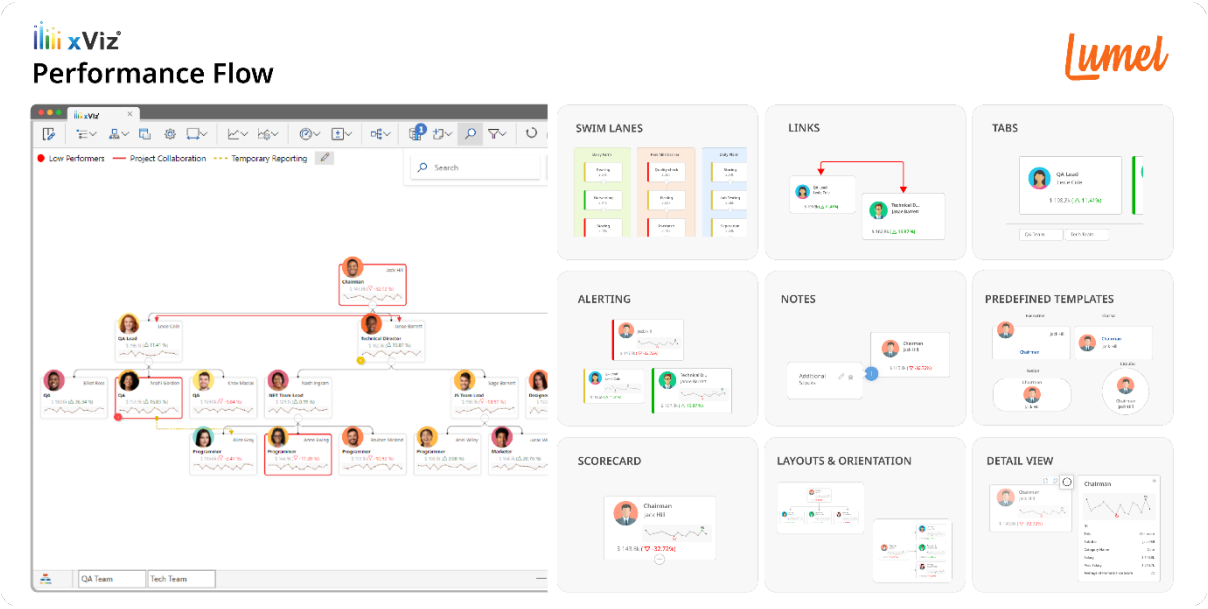



Business use cases might include:

- **Sales and marketing:** market share analysis and customer segmentation
- **Finance:** departmental budgets and expenditure distribution
- **Operations:** supply chain management, identify inefficiencies in manufacturing process
- **Education:** course structure, curriculum creation
- **Human resources:** organisation structure, employee demographics.

***xViz Performance Flow by Lumel***

xViz Performance Flow by Lumel is an integrated business flow monitoring visual with an interactive KPI tree visualisation for organisational performance management use cases. It offers insights into people, places, processes and entities with Performance Indicators, trendlines and advanced Alerting on goals, metrics and their variances.




Performance Flow is suitable for a wide range of use cases:

- **organisational performance:** discover HR / employee performance insights through an interactive pictorial Organisational Tree chart with performance attributes and trends
- **process flow:** visualise business flows in various stages using Swim Lanes with connector lines, icons, KPI metrics and trends in one single integrated view
- **financial performance:** cost centre analysis with Scorecards or KPI Trees
- **sales performance:** dive deep into sales performance at regional, departmental and salesperson levels with Decomposition Trees.

The visual is packed with analytical and interactive features such as:

- interactive hierarchy navigation including quick search, zooming, subtree analysis, *etc.*
- streamline processes using Swim Lanes like in Visio
- uncover hidden / dotted connections using Links
- data-driven conditional formatting rules
- custom tabs for end-users.

More next month!

## New Features for Excel

This month sees the release of 'Insert Pictures into Cells' and 'Set Default Theme' for Windows and Mac Insider users. Mac Insider users may also 'Automatically Crop Pictures', plus Excel for web users can now 'Format Individual Data Points in your Charts'.

You can check out the full list here:

***Excel for the web***

- Format Individual Data Points in your Chart via Home Ribbon Controls

***Excel for Windows***

- Share a Section of a Workbook (Current Channel)
- Copy Values Quickly from the Status Bar (Monthly Enterprise Channel)
- Insert Pictures in Cells (Insiders)
- Default Theme for Office (Insiders)

***Excel for Mac***

- Automatically Crop Pictures (Insiders)
- Insert Pictures in Cells (Insiders)
- New Default Theme for Office (Insiders)

***Android***

- Insert Photos from Android Phone (Insiders)
- New Default Theme for Office (Insiders)

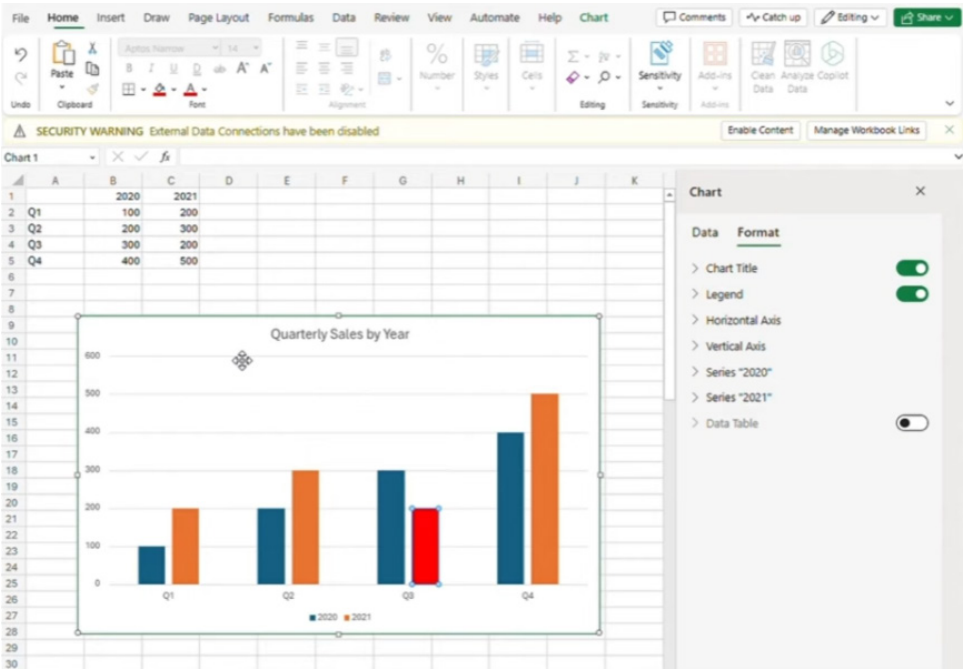
***Enterprise users in the Semi-Annual Channel***

- Various feature updates *(see below)*.

Let's get started.

***Format Individual Data Points in your Chart via Home Ribbon Controls***

In Excel for the web, you may now format data points in your chart using the Home Ribbon Controls. With this update, you can choose the fill colour for each individual point in the data series. This can be a helpful way to highlight particular data points and illustrate trends in your data.




***Share a Section of a Workbook (Current Channel)***

In Excel for Windows (Current Channel, and already available in Excel for the web), whether collaborating through Teams or on the web, you might wish to share information from a workbook. Of course, you can share the entire workbook, but often it's safer, faster and more efficient to share just a section of the workbook for viewing or editing. You can easily share with others a link to a specific sheet, range, table or chart. First, you create a link to the shared section of a workbook. Then, you send or make available the link to recipients. Finally, recipients may simultaneously view or edit the workbook section.

***Copy Values Quickly from the Status Bar (Monthly Enterprise Channel)***

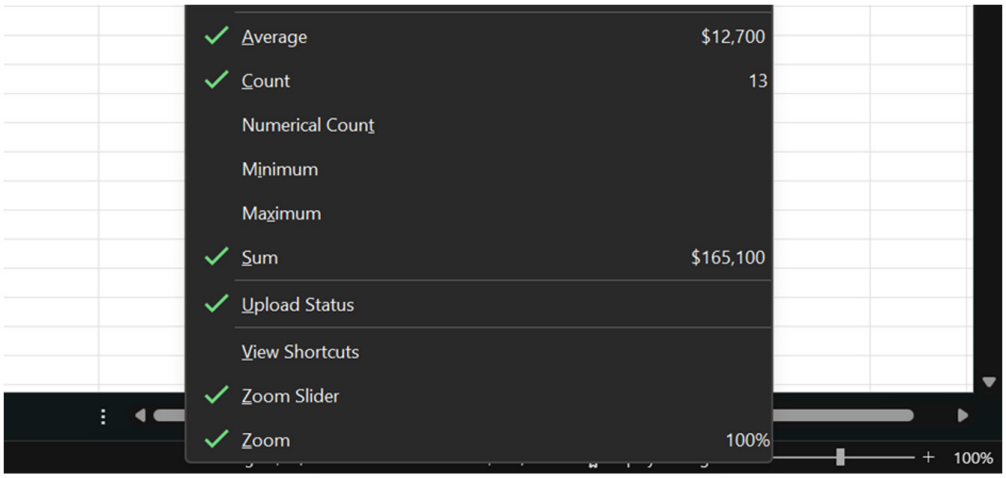
You can now select the value that you want to copy and move it to the clipboard. Then, you can simply paste the information wherever you need in your workbook.

Excel has long been able to provide quick facts about your data, such as sum, average, maximum and count, on the Status bar when you highlight cells. However, this then begs the question: how do you get that information from the status bar back into the workbook?

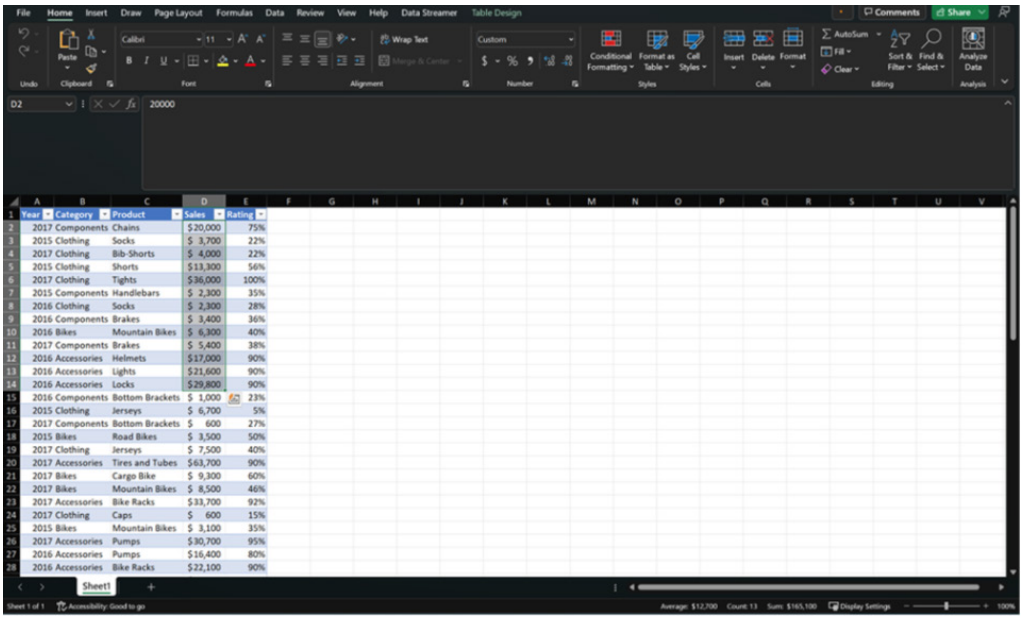
Well, as of this update in the Monthly Enterprise Channel for Excel for Windows, you may now select the value that you want to copy and move it to the clipboard. Then, you can simply paste the information wherever you need in your workbook.

To do this:

- open an existing Excel workbook that contains the data to be analysed
- right-click the Status bar to ensure that values are turned on




- select the cells that contain the data you want to use, and then review the aggregated information in the Status bar (*i.e.* average, count, numerical count, minimum, maximum or sum)



- select the value in the Status bar to save it temporarily on your clipboard and then click the cell in which you want to.

This feature is available to Office Insiders running Version 2104 (Build 14023.10000) or later on Windows.

***Insert Pictures in Cells (Insiders)***

In both Excel for Windows and Excel for Mac, Microsoft has now enabled the ability for a picture to become the actual cell value.

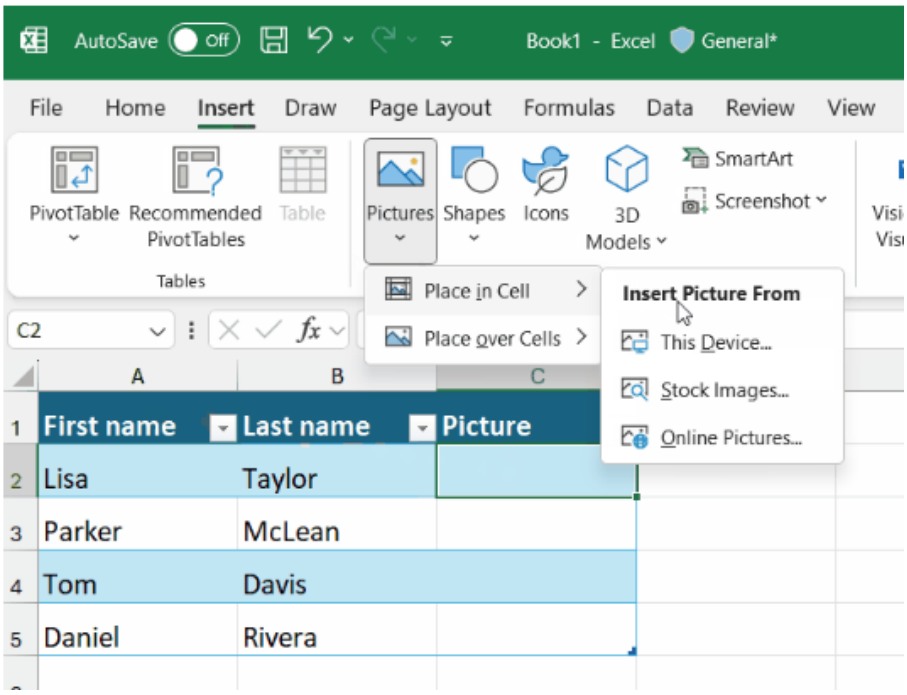
Pictures add a splash of colour to your worksheets and provide a visual representation of your content. They also make it easier to understand your data and draw insights. Let's be honest a picture tells a 1,000-word story.

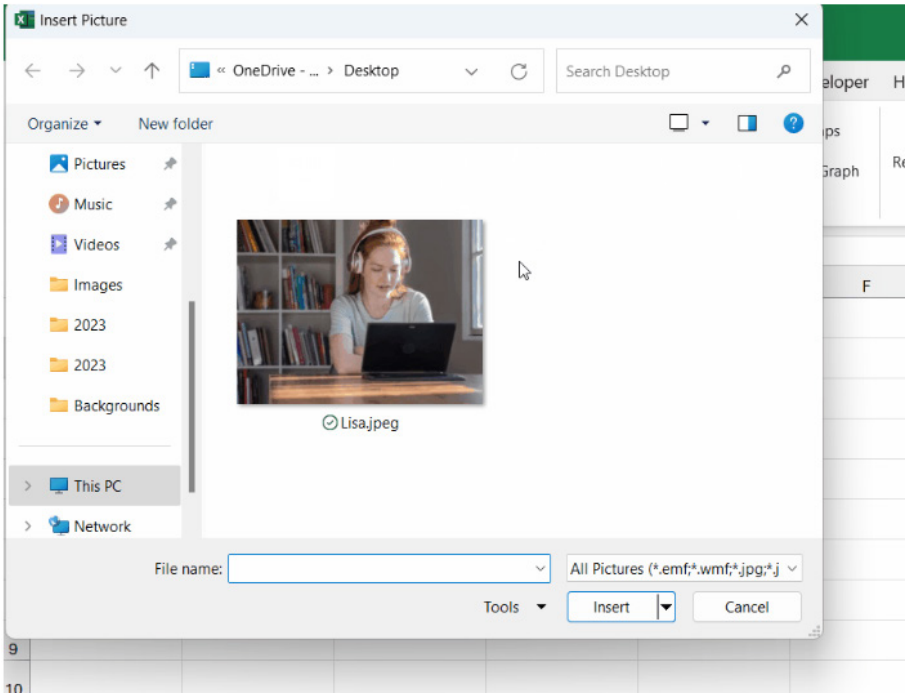
Whilst you have been able to use pictures in Excel for many years, Excel has only recently enabled the ability for a picture to become the actual cell value. It remains attached to the data even when the sheet's layout is modified. You can use it in tables / Tables, sort, filter, and include it in formulae too.

In the last year the Excel team has introduced the new **IMAGE** function, which allows you to place a web picture in cell using a URL. Now the idea is extended. You now have the ability to insert local pictures, directly into cells, from your device or from the stock image libraries.

To utilise the feature:

- select the cell where you want to place the picture
- select **Insert -> Pictures -> Place in Cell**, and then select one of the available sources:
    - This Device
    - Stock Images
    - Online Pictures



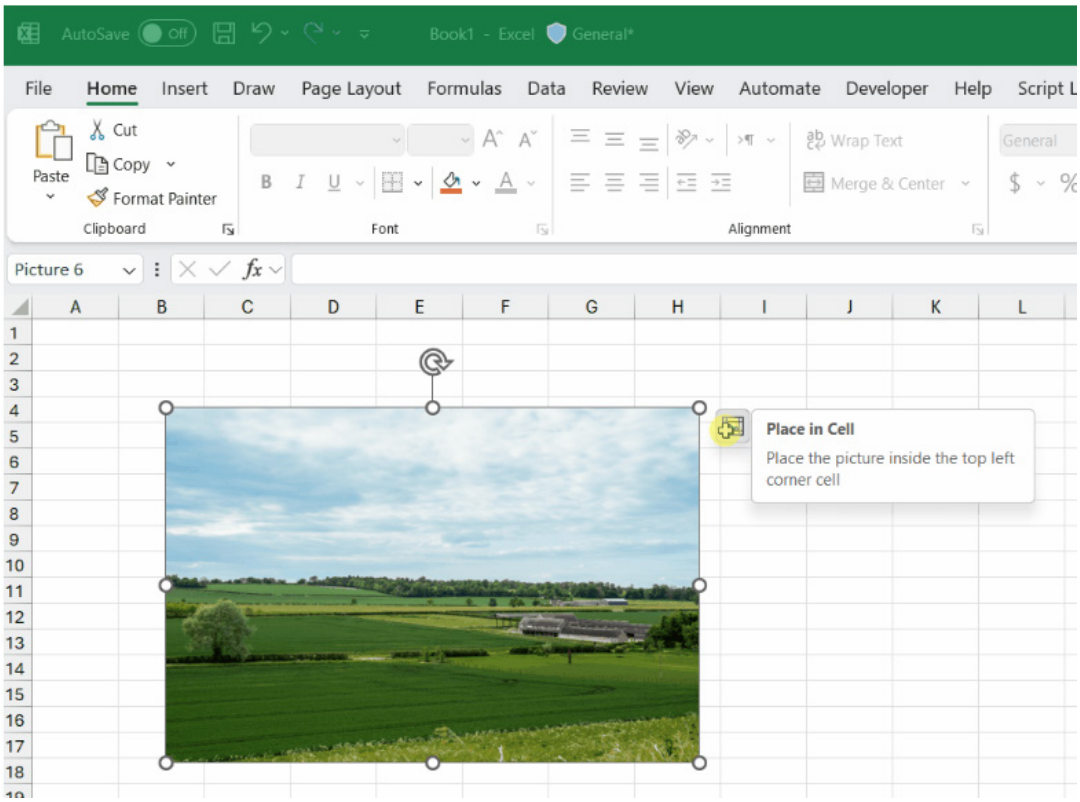




- Animation.

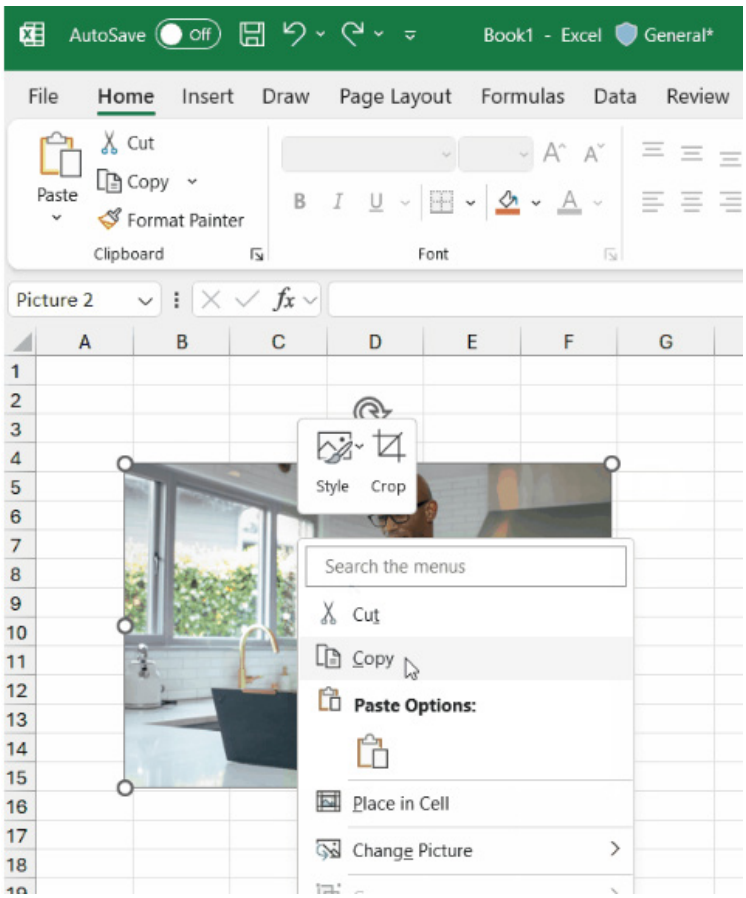
It should be noted that in order to insert pictures and have them "float" on top of your worksheet, like you used to do before, select **Insert -> Pictures -> Place over Cells** instead.

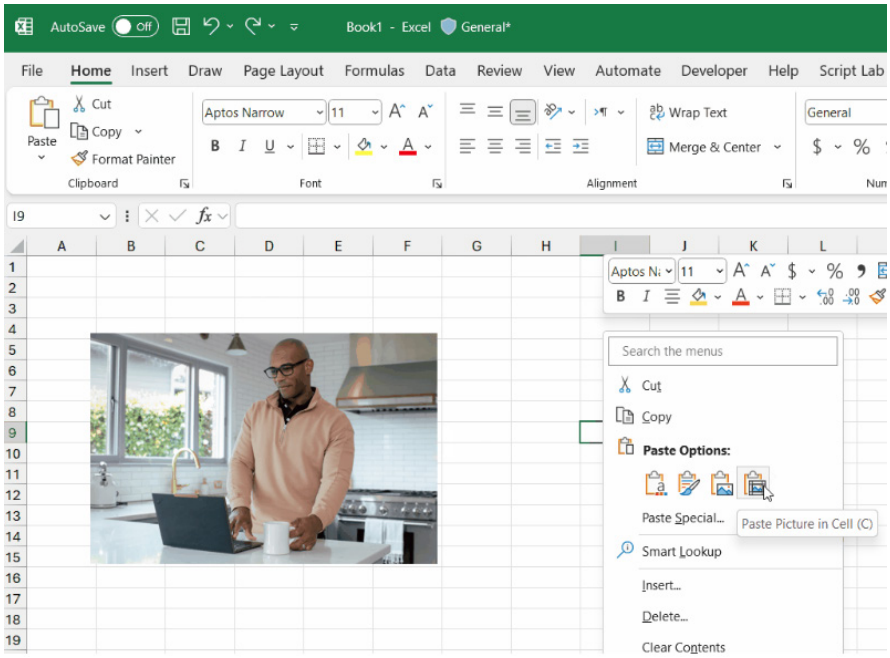
If you have an existing worksheet that contains a picture that was inserted using the 'Place over Cells' command, and you want it to become part a cell, select the picture and click the 'Place in Cell' button that appears next to the picture.

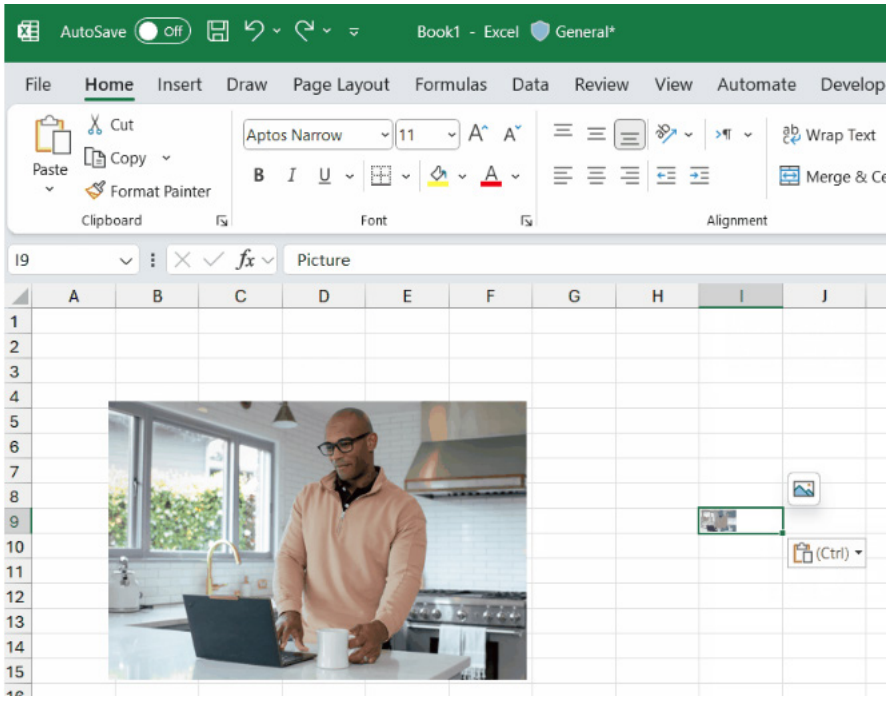
You can also find the 'Place in Cell' command in the right-click context menu or in the 'Picture Format' contextual tab.




To directly paste a picture from the clipboard into a cell, select **Paste -> Paste Picture in Cell** on the Home tab or in the right-click context menu. Do note though that when you use the default Paste command on the Home tab or the context menu, or press **CTRL + V** to paste a picture, it will pasted over cells for now not pasted into the cell.






These capabilities are now available to Insiders running:

- Windows: Version 2306 (Build 16529.20000)
- Mac: Version 16.75 (Build 23070901).

These capabilities will become available soon in Excel for the web as well as on Excel for iOS and Excel for Android.

***(New) Default Theme for Office (Insiders)***

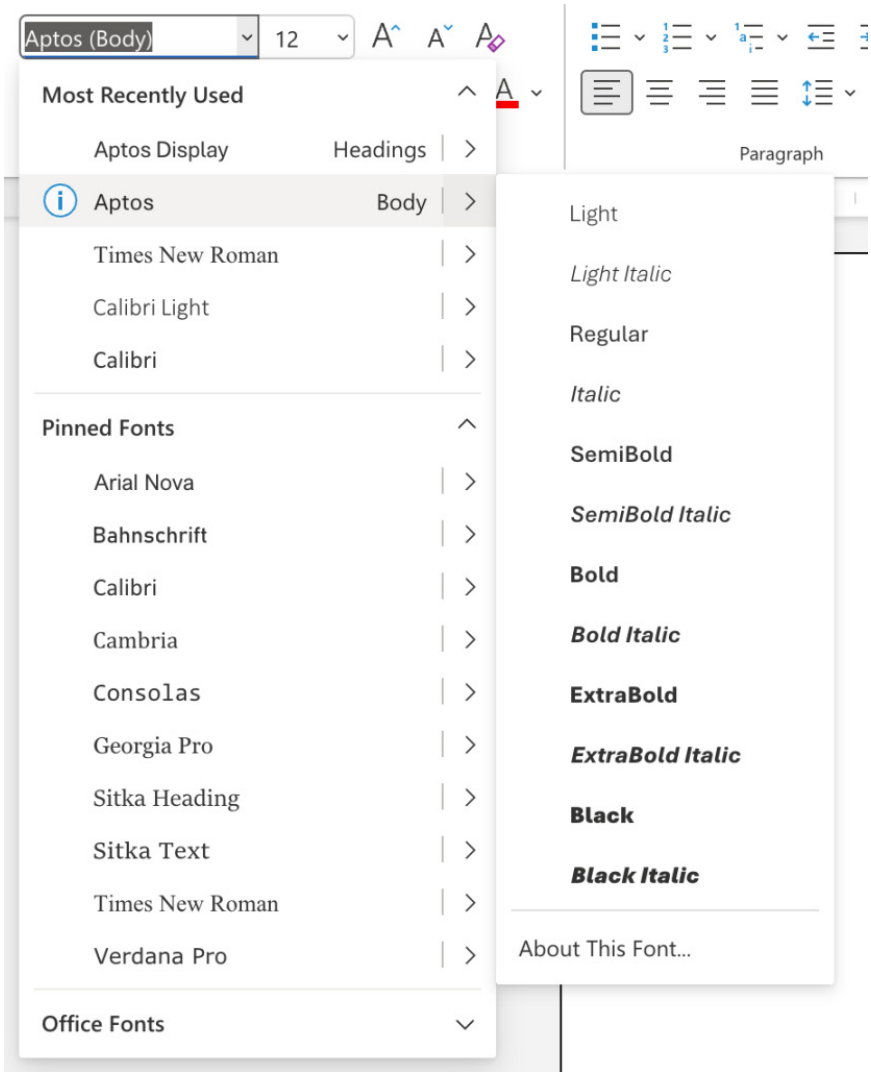
In the Insiders channel of both Excel for Windows and Excel for Mac, Microsoft has refreshed the Office theme with a new default font, colour palette, style, and line weights that help you make your documents more modern and accessible.

Microsoft released five [5] Calibri replacement candidate fonts out into the wild for feedback. These were:

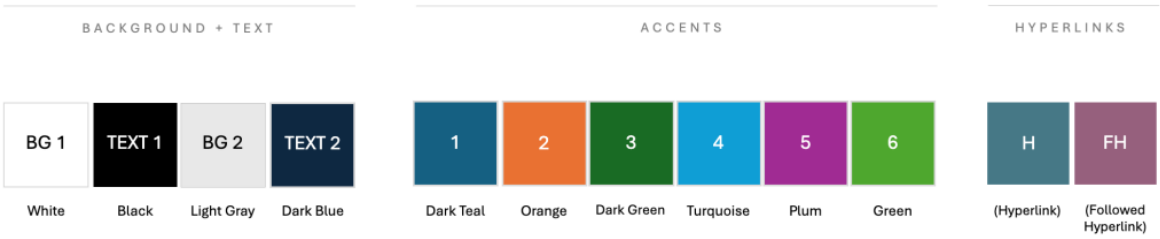
- Bierstadt
- Grandview
- Seaford
- Skeena
- Tenorite.

Users chose Bierstadt as the preferred font, and so it was adopted and given a new name / identity **Aptos**. (Witness protection anyone..?)

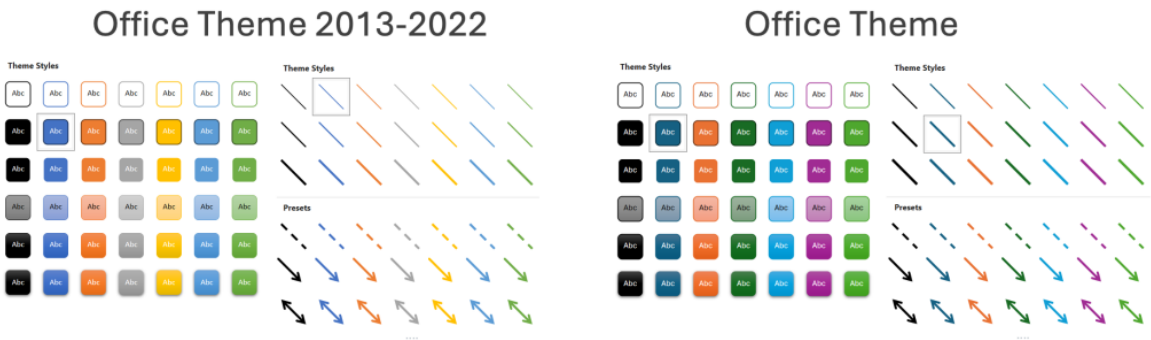
This new font supports a variety of weights and includes variants such as narrow, serif and monospace.




The Excel team also researched popular colour palettes and design trends, and created a set of default colours that works well in all Office apps. You may use these new colours to style content such as charts, lists and shapes.




The default outline weights have also been increased, improving the consistency between shapes and lines, and adding better contrast.



But it doesn't end there (sadly). Microsoft is also refreshing the default style of its Word documents and Outlook emails to make them apparently easier to read, look more professional and easier to navigate.

As the theme rolls out, all new documents, presentations, worksheets and emails you create in Word, PowerPoint, Excel and Outlook will use the new theme. That will be nice – especially if you liked the old theme. Do note, however, that your existing documents won't change. They will continue to use the original theme that was applied when they were created.

If you prefer Calibri and would still like to use the previous Office theme, don't fret. It's been renamed **Office Theme 2013 – 2022**.

If neither Aptos nor Calibri are the right fonts for you, there are hundreds of other choices built into Microsoft 365. Simply choose a typeface that matches your needs and set it as your default.

Even in Word, if you want to revert to the older style formatting, you still can. Simply use Word 2013 formatting from the 'Document Formatting' menu.

This feature is available to Beta Channel users who are running:

- Win32: Version 2307 (Build 16626.20076) or later
- Mac: Version 16.75 (Build 23071400) or later
- Android: Version 16.0.16626.20076 or later.

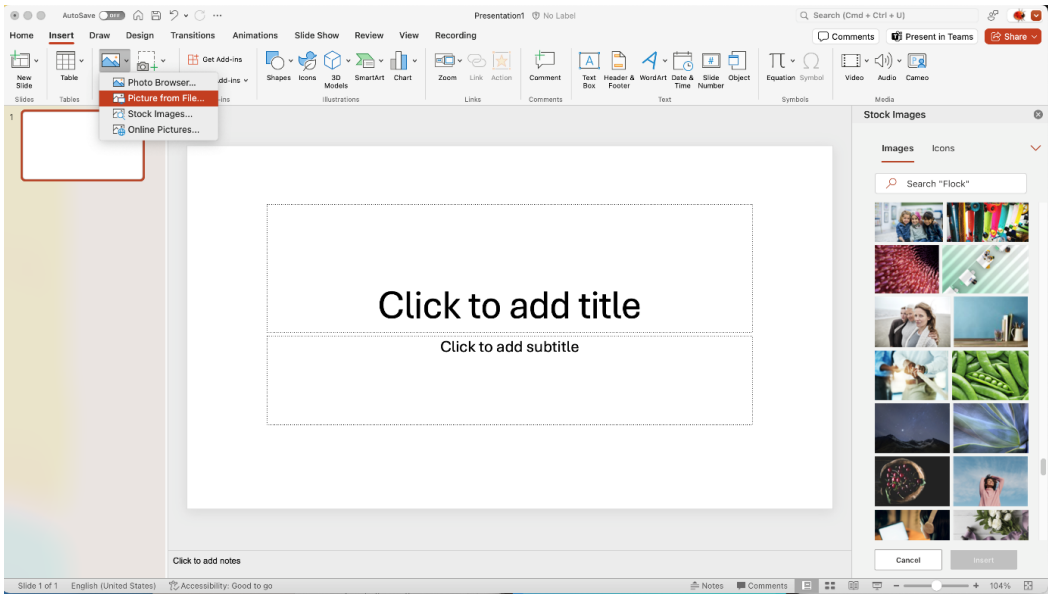
It will be coming later to iOS.

***Automatically Crop Pictures (Insiders)***

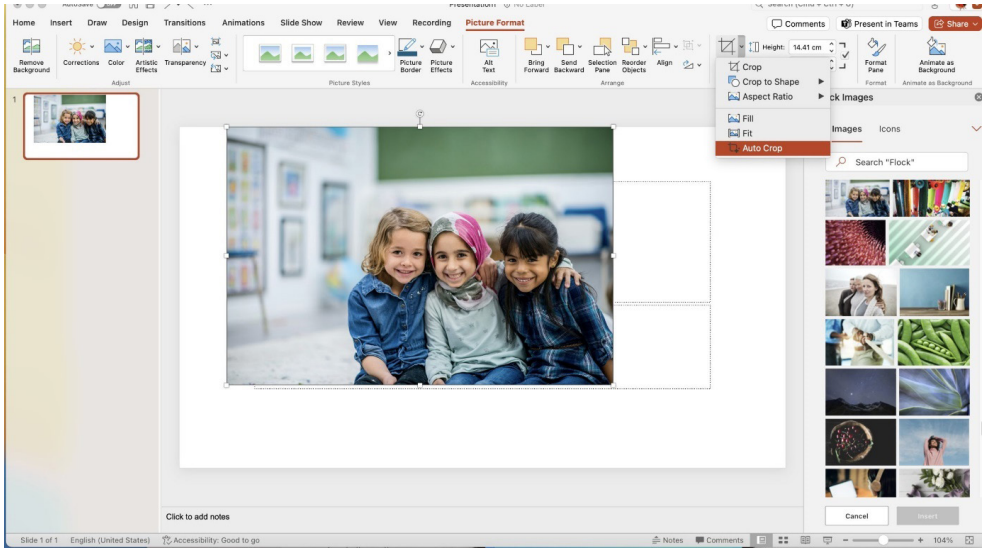
There is another feature now out for Excel for Mac. If you've ever taken a digital picture, you've probably used the Crop command. It's one of the most used features when working with pictures. Now, with a single click, the 'Auto Crop' command helps you identify the most important parts of your picture and crops out the rest.

In Excel, Word and PowerPoint for Mac:

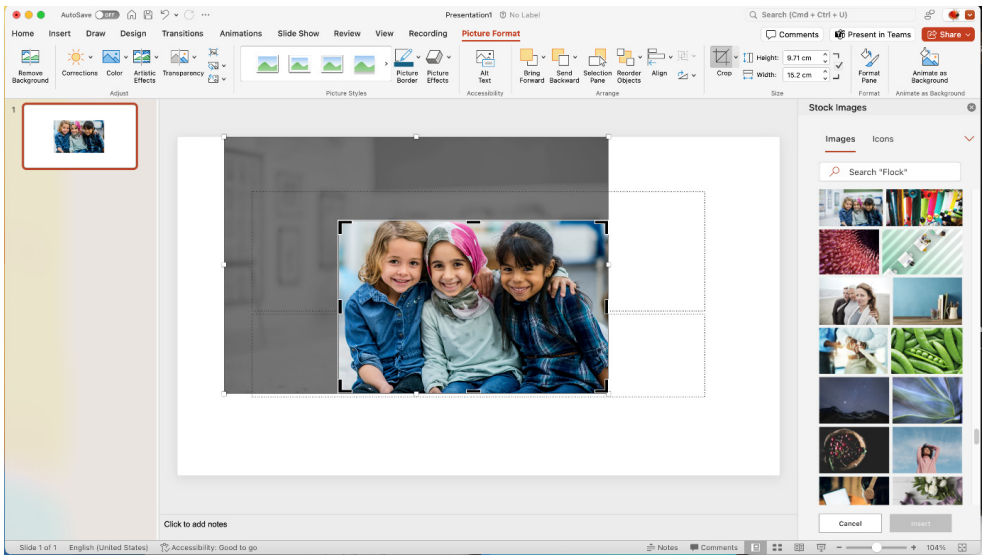
- create or open an existing document, worksheet or presentation
- to insert a picture, click the Insert tab and select a picture by using one of the available options



- select a picture, and then click **Picture Format -> Auto Crop**.

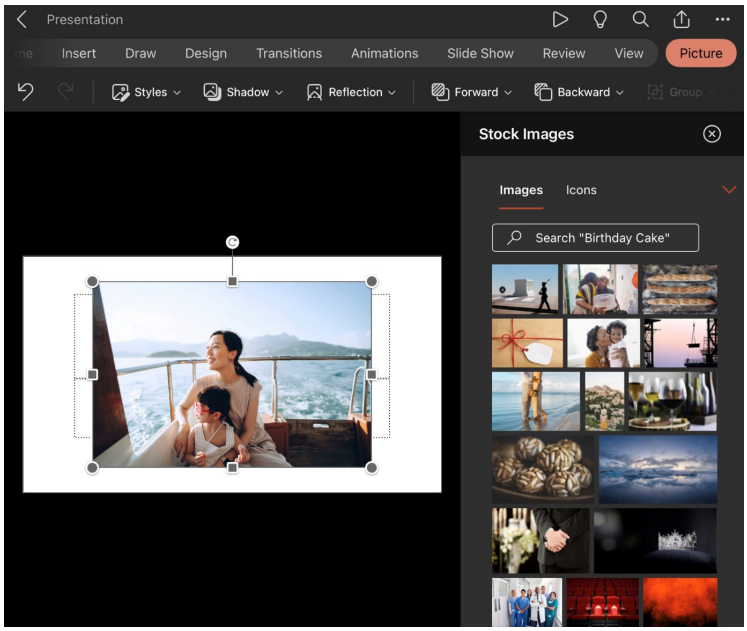



Notice that your picture is now cropped to focus on its most important parts:

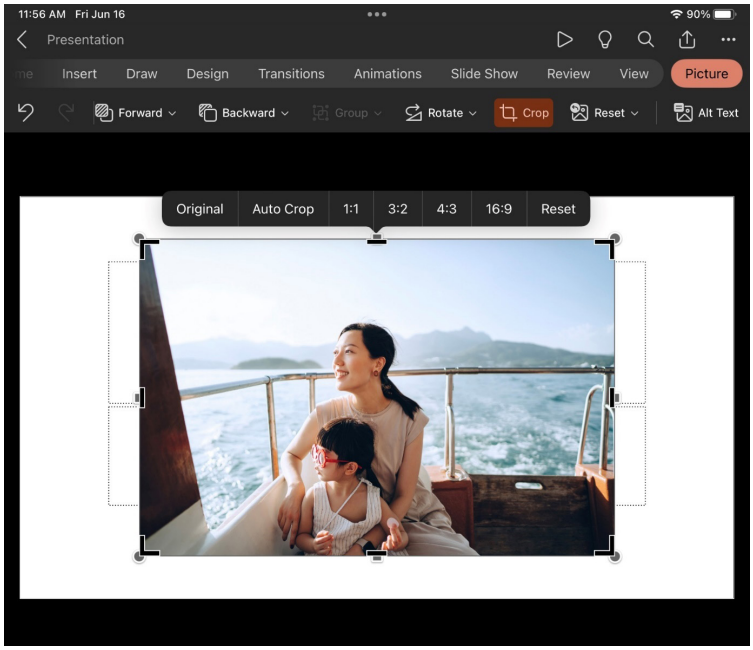



In Excel, Word and PowerPoint for iOS (iPhone and iPad):

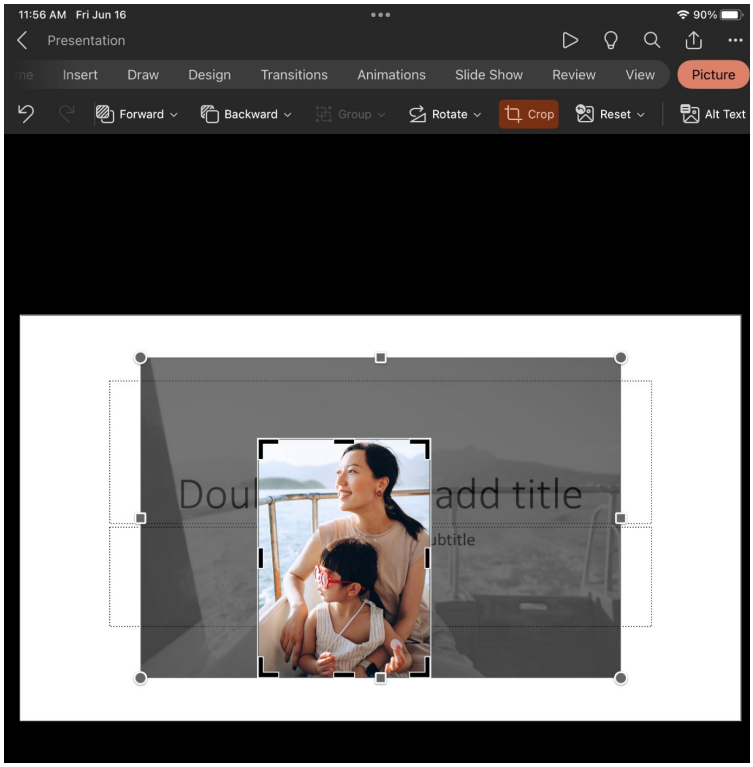
- create or open an existing document, worksheet or presentation, and insert a picture



- tap **Picture -> Crop -> Auto Crop**.




Notice that your picture is now cropped to focus on its most important parts:




There are known issues for this new feature:

- it is not yet supported for SVGs or PDFs
- you may only apply auto crop to one image at a time.

This feature is available to Microsoft 365 Insiders running:

- iOS: Version 2.76 (Build 23062804) or later
- Mac: Version 16.76 (Build 23062703) or later.

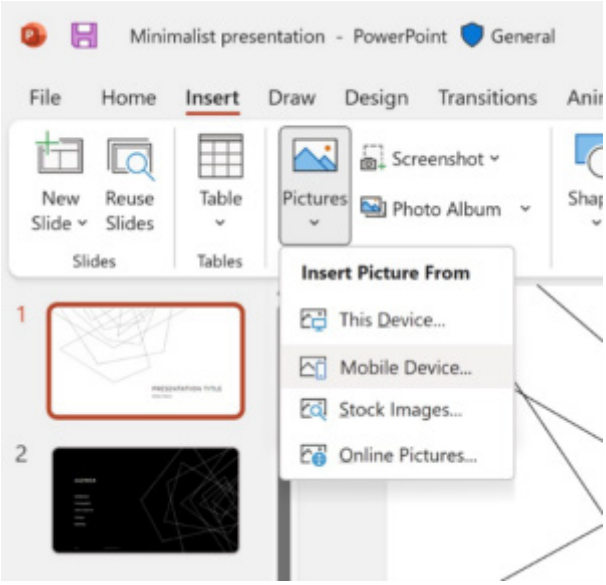
***Insert Photos from Android Phone (Insiders)***

You may now insert photos from your Android phone into Excel, Word and PowerPoint for Windows files.

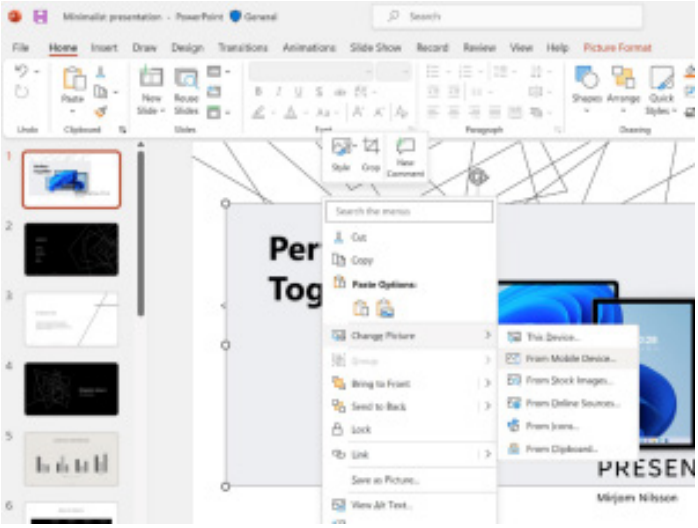
In the past, transferring images from your Android phone to an Excel, Word or PowerPoint file required multiple steps. That's no longer the case: you may now do so by using a wireless connection.

It works as follows:

- open the document, worksheet or presentation in which you want to insert a photo from your Android phone
- select **Insert -> Picture -> Mobile Device**




- right-click the photo you want, and then select **Change Picture -> From Mobile Device**.



After you complete these steps, you can transfer your photos from your Android phone.

There are known limitations:

- you may see a repeated 'Login' dialog box when you log in for the first time
- the 'Login' dialog box may take 10 seconds or more to load.

To use this feature:

- you must have a Microsoft Enterprise account
- your Android device must be nearby.

This feature is rolling out to Insiders running Version 2307 (Build 16621.10000) or later.

***Enterprise users in the Semi-Annual Channel***

There are new features and non-security updates that are included in Semi-Annual Enterprise Channel updates for Microsoft 365 Apps for enterprise, Microsoft 365 Apps for Business, and the subscription versions of the desktop apps for Project and Visio. New or updated, features are released in Semi-Annual Enterprise Channel twice a year, on the second Tuesday in January and July each year. It just takes us time due to printing deadlines to report them!

For Excel, the following feature updates are now available:

- **Touch Improvements to Ribbon:** Microsoft has improved the spacing of buttons in the Ribbon when the device is being used in Tablet posture
- **Apply sensitivity labels to PDFs created with Office apps:** This update allows you to use these labels to protect PDFs created using Excel, Word or PowerPoint for Windows
- **Speed-up filtering when workbook contains lots of conditional formatting rules:** when your workbook contains lots of conditional formatting rules, it can slow down applying a filter such as a colour filter. This is no longer the case. By optimising the underlying data structure filtering has been accelerated
- **Improvements to Power BI Request Access:** Microsoft has upgraded the experience for users who create PivotTables connected to Power BI datasets. Prior to the improved experience, when a user tried to refresh a PivotTable connected to a dataset that they do not have access to, they would see a generic error message. Now, a specific error dialog appears that informs the user that they do not have access to the dataset and allows them to click a link to request access from the owner. Once access is granted, the user can go back to the PivotTable and refresh to continue their analysis
- **PivotTable overlap improvements:** the experience has been improved when PivotTables overlap other content in your workbook
- **Smooth Scrolling:** scrolling in your sheet is now much smoother. There is no longer any snapping to rows and columns
- **Reducing unwanted fragmenting of conditional formatting rules:** you can check out the improved performance and faster calculations when applying conditional formatting rules to cells. This has been achieved by reducing fragmentation of data when pasting copied cells into that a cell range
- **Speeding up Formula Entry:** Excel has sped up entering a formula in a cell noticeably by reducing memory usage, making more efficient use of allocated memory and optimising redrawing. These optimisations are more noticeable on devices with slower Memory or slower CPU-Memory throughput as well as for larger cell ranges
- **Copy Paste is more efficient:** copy / paste now uses an index-based search, rather than a linear scan, for more optimal merging. The optimisations are especially noticeable on low-end devices with constrained hardware
- **New Text and Array Functions:** 14 new text and array functions have been added: **CHOOSECOLS**, **CHOOSEROWS**, **DROP**, **EXPAND**, **HSTACK**, **TAKE**, **TEXTAFTER**, **TEXTBEFORE**, **TEXTSPLIT**, **TOCOL**, **TOROW**, **VSTACK**, **WRAPCOLS** and **WRAPROWS**.

The updated version of the grid with all the new features is fast becoming too complicated to show clearly here. Nonetheless, you can find the interactive links at aka.ms/ExcelFeaturesFlyer.

## Excel Features Availability

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| | Insider | | Production | | | | |
|---|---|---|---|---|---|---|---|
| Feature | Windows Find the latest Excel version for this platform | Mac Find the latest Excel version for this platform | Windows/CC Find the latest Excel version for this platform | Windows/MEC Find the latest Excel version for this platform | Windows/SA Find the latest Excel version for this platform | Mac Find the latest Excel version for this platform | Web |
| Block XLL Add-Ins | Version 2302 (Build 16130.20128) or later | | | | | | |
| PivotTables: Manual Sort of Rows & Columns | | | Already Supported | Already Supported | Already Supported | Already Supported | February 2023 |
| Automatic Recalculation Optimization | Version 2208 (Build 15529.10000) or later | Version 16.64 (Build 22081401) or later | | | | | |
| Import Data from SQL Server Database | | Version 16.68 (Build 22110801) or later | | | | | |
| Import Data from Additional Sources | | | | | | Version 16.69 (Build 23010700) or later | |
| Power Query Editor | | | | | | Version 16.69 (Build 23010700) or later | |
| IMAGE function | | | Version 2211 (Build 15831.20190) or later | Version 2211 (Build 15831.20252) or later | | Version 16.67 (Build 22102900) or later | December 2022 |
| Check Formula with Value Preview Tooltips | Version 2302 (Build 16116.20000) or later | Version 16.70 (Build 230116) or later | | | | | |
| Office Scripts | Version 2212 (Build 15922.20000) or later | Version 16.68 (Build 22120101) or later | | | | | |
| Automate Tasks with Power Automate tab | | | Version 2301 (Build 15703.10000) or later | | | Version 16.66 (Build 22092500) or later | |
| PivotTable Show Details to XLO | | | | | | | January 2023 |
| Excel Live in Teams | | | | | | | December 2022 |
| Formula Suggestions | | | | | | | December 2022* |
| Formula by Example | | | | | | | December 2022* |
| Suggested Links | | | | | | | December 2022 |
| Add search bar in queries pane | | | | | | | December 2022 |

*Starting to roll out

Features Flyer: aka.ms/ExcelFeaturesFlyer

CC: Current Channel, MEC: Monthly Enterprise Channel, SA: Semi Annual Enterprise Channel
All information is subject to change

## Excel Features Availability

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| | Insider | | Production | | | | |
|---|---|---|---|---|---|---|---|
| Feature | Windows Find the latest Excel version for this platform | Mac Find the latest Excel version for this platform | Windows/CC Find the latest Excel version for this platform | Windows/MEC Find the latest Excel version for this platform | Windows/SA Find the latest Excel version for this platform | Mac Find the latest Excel version for this platform | Web |
| Add keyboard shortcut to open PQ editor | | | Version 2211 (Build 15730.31883) or later | | | | |
| Create nested PQ data types | Version 2211 (Build 15928.10000) or later | | | | | | |
| Add Get Data from Dynamic Arrays | Version 2105 (Build 14014.20002) or later | | | | | | |
| Data from picture | | | Version 2210 (Build 15723) or later | Version 2210 (Build 15726.20262) or later | | Version 16.38 or later | December 2022 |
| Chart Data Foils | | | | | | | November 2022 |
| Show Changes | | | Version 2209 (Build 15703.10000) or later | | | Version 16.66 (Build 22092500) or later | Already Supported |
| New Paste Options | Version 2210 (Build 15726.20000) or later | | | | | | |
| Quickly Find the Command you need | | | Version 2206 (Build 15331.20010) or later | | | | October 2022 |
| New DAX Functions | Version 2208 (Build 15504.10000) or later | | | | | | |
| Navigation Pane | | | Version 2209 (Build 15629.10000) or later | | | | |
| Smooth Scrolling | | | Version 2205 (Build 15225.20092) or later | Version 2208 (Build 15601.20230) | Version 2208 (Build 15601.20456) or later | Already Supported | Already Supported |
| Check Performance | | | | | | | September 2022 |
| Share Section of Excel Workbook | | | | | | | September 2022 |
| Dynamic Array Support in Charts | Version 2209 (Build 15617.10000) or later | | | Version 2210 (Build 15726.20262) or later | | | September 2022 |
| Modern Comments | | | Version 2209 (Build 15427.20000) or later | | | | |
| Manage Your Storage Accounts from Mac | | Version 16.64 (Build 22082100) or later | | | | | |

Features Flyer: aka.ms/ExcelFeaturesFlyer

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## Excel Features Availability

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| Feature | Insider | | Production | | | | |
|---|---|---|---|---|---|---|---|
| | Windows Find the latest Excel version for this platform | Mac Find the latest Excel version for this platform | Windows/CC Find the latest Excel version for this platform | Windows/MEC Find the latest Excel version for this platform | Windows/SA Find the latest Excel version for this platform | Mac Find the latest Excel version for this platform | Web |
| New Excel functions | | | Version 2208 (Build 15427.20194) or later | Version 2208 (Build 15601.20230) or later | | Version 16.64 (Build 22081401) or later | August 2022 |
| Power Query Group operations | | | | | | | August 2022 |
| Improvements to the connected Power BI experience | Version 2208 (Build 15601.20028) or later | | | | | | August 2022 |
| Add and edit rich text formatting | | | Already Supported | Already Supported | Already Supported | Already Supported | August 2022 |
| Sort by color or icon from auto filter menu | | | Already Supported | Already Supported | Already Supported | Already Supported | August 2022 |
| Edit files with legacy data connections | | | Already Supported | Already Supported | Already Supported | Already Supported | August 2022 |
| Edit files with legacy Shared Workbook feature | | | Already Supported | Already Supported | Already Supported | Already Supported | August 2022 |
| Delete chart elements | | | | | | | August 2022 |
| Multiline formula bar | | | | | | | August 2022 |
| Search within PivotTable Field List | | | Already Supported | Already Supported | Already Supported | Already Supported | July 2022 |
| Set automatic data conversions | Version 2207 (Build 15427.20000) or later | | | | | | |
| Natural Language Query Improvements | | | Version 2206 (Build 15330.20230) or later | Version 2205 (Build 15225.20356) or later | | Version 16.63 (Build 22070801) or later | |
| Resize Conditional Formatting dialog box | | Version 16.64 (Build 22070600) or later | | | | | |
| Sheet protection | | | Already Supported | Already Supported | Already Supported | Already Supported | June 2022 |

Features Flyer: aka.ms/ExcelFeaturesFlyer

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

## Excel Features Availability

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| Feature | Insider | | Production | | | | |
|---|---|---|---|---|---|---|---|
| | Windows Find the latest Excel version for this platform | Mac Find the latest Excel version for this platform | Windows/CC Find the latest Excel version for this platform | Windows/MEC Find the latest Excel version for this platform | Windows/SA Find the latest Excel version for this platform | Mac Find the latest Excel version for this platform | Web |
| Semi-select for links creation | | | Already Supported | Already Supported | Already Supported | Already Supported | June 2022 |
| Add "PivotTable Connections to Slicer settings pane | | | Already Supported | Already Supported | Already Supported | Already Supported | June 2022 |
| Import from local text, CSV, and XLSX files | | | | | | Version 16.57 (22011100) or later | |
| Provide automatic alt-text suggestions on charts and PivotCharts | | | Version 2205 (Build 15225.20288) or later | Version 2204 (Build 15128.20280) or later | | Version 16.62 (22061100) or later | |
| Power Query refresh for selected data sources | | | Already Supported | Already Supported | Already Supported | Already Supported | May 2022 |
| Changing source file for workbook links | | | Already Supported | Already Supported | Already Supported | Already Supported | May 2022 |
| Improved Recommended PivotTable experience | Version 2204 (Build 15128.10000) or later | | | | | | |
| Faster recalc on resource constrained devices | | Version 16.62 (Build 22050804) or later | Version 2204 (Build 15128.20248) or later | Version 2204 (Build 15128.20280) or later | | | |
| Faster AutoFilter | | | | Version 2204 (Build 15128.20248) or later | Version 2208 (Build 15601.20456) or later | Version 16.61 (22050700) or later | |
| Dataflow connector | | | | Version 2203 (Build 15028.20248) or later | | | |
| Dataverse connector | | | Version 2204 (Build 15128.20178) or later | | | | |
| Improved Find dialog and Find All | | | | | | Version 16.60 (220410) or later | |
| LAMBDA: Helper Functions | | | Version 2202 (Build 14931.20120) or later | Version 2202 (Build 14931.20274) or later | Version 2208 (Build 15601.20456) or later | Version 16.56 (Build 211211) or later | Already Supported |

Features Flyer: aka.ms/ExcelFeaturesFlyer

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

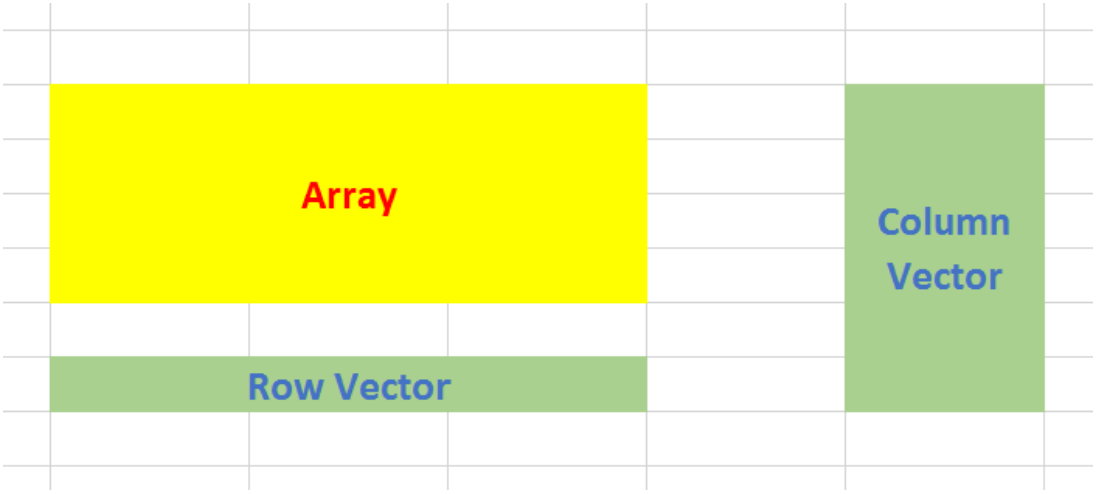
More next month, we're sure.

# The A to Z of Excel Functions: LOOKUP

**LOOKUP** has two forms: an array form and a vector form. As a reminder:

- An **array** is a collection of cells consisting of at least two rows and at least two columns
- A **vector** is a collection of cells across just one row (row vector) or down just one column (column vector).

The diagram should be self-explanatory:




The array form of **LOOKUP** looks in the first row or column of an array for the specified value and returns a value from the same position in the last row or column of the same array:

**LOOKUP(lookup_value, array)**

where:

- **lookup_value** is the value that **LOOKUP** searches for in an array. The **lookup_value** argument can be a number, text, a logical value or a name or reference that refers to a value
- **array** is the range of cells that contains text, numbers, or logical values that you want to compare with **lookup_value**.

If **array** covers an area that is wider than it is tall (*i.e.* it has more columns than rows), **LOOKUP** searches for the value of **lookup_value** in the first row and returns the result from the last row. Otherwise, **LOOKUP** searches for the value of **lookup_value** in the first column and returns the result from the last column instead.

The alternative form is the vector form:

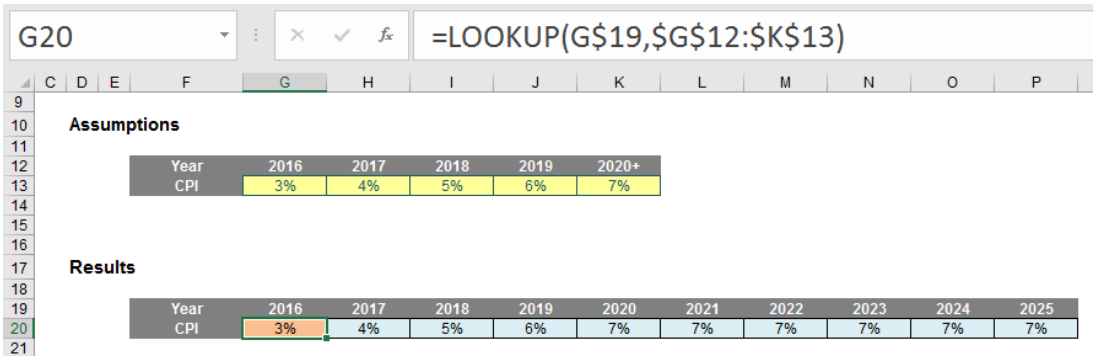
**LOOKUP(lookup_value, lookup_vector, [result_vector])**

The **LOOKUP** function vector form syntax has the following arguments:

- **lookup_value** is the value that **LOOKUP** searches for in the first vector
- **lookup_vector** is the range that contains only one row or one column
- **result_vector** is optional – if ignored, **lookup_vector** is used – this is the where the result will come from and must contain the same number of cells as the **lookup_vector**.

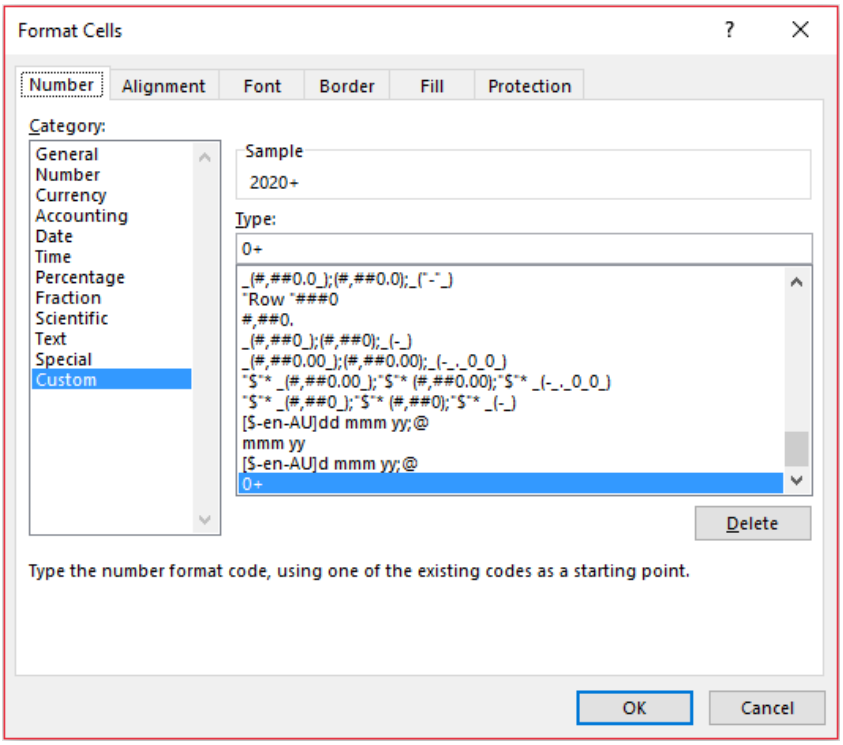
The **lookup_value** must be located in a range of strictly ascending values, *i.e.* where each value is larger than the one before and there are no duplicates.

**LOOKUP** is simple to use, doesn't rely on row or index column numbers and allows modellers to create inputs that do not need to be specified for all periods modelled. Let me demonstrate with the following example:




Imagine you have an annual model forecasting for many years into the future. Creating inputs will be time consuming if data has to be entered on a period by period basis. But there is a shortcut.

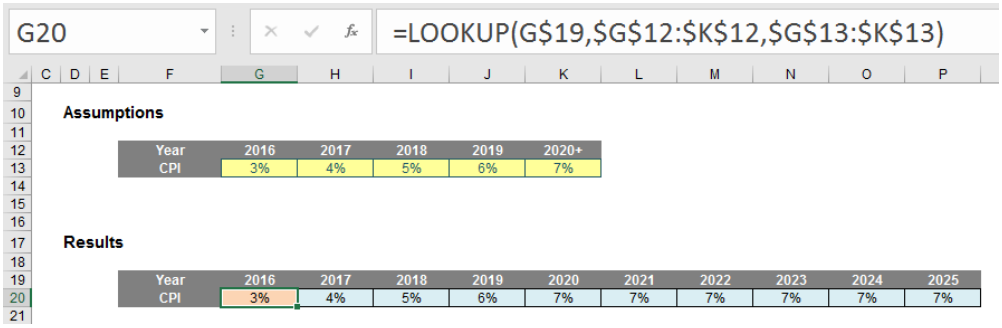
Do you see the data table in cells **F12:K13** above? The value in the final cell of the first row is actually "2020" not "2020+". It appears that way due to custom number formatting (**CTRL + 1**):




The syntax "0+" adds a plus sign to the number although Excel still reads the value as 2020.

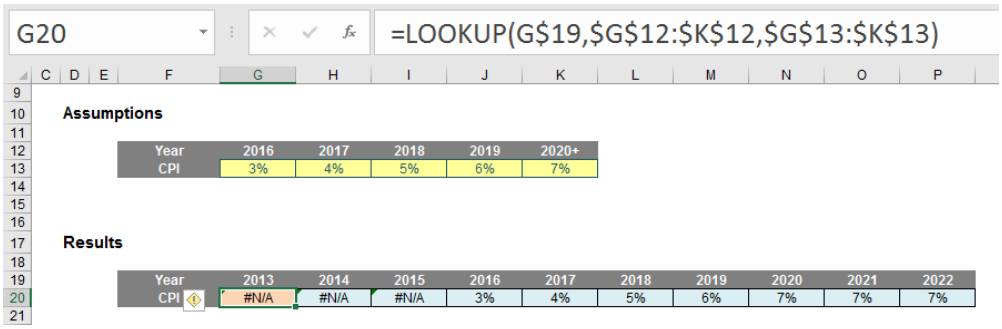
The formula uses the array version of **LOOKUP**, looking up the year in the first row of the data table and returning the corresponding value from the final row. When a year is selected which is greater than 2020, the 2020 value is used as **LOOKUP** seeks out the largest value less than or equal to the value sought. Therefore, we don't need to have lengthy data tables – once we assume inputs will be constant thereafter, we can just curtail the input section.

Using the array form of **LOOKUP** is dangerous though. What if someone accidentally inserts rows? The lookup will "flip" to look the first and last columns instead, which is not what is required. Using the vector form is safer:




Whilst the formula contains one more argument, the formula is more stable. Further, the **lookup_vector** and the **result_vector** do not need to be in the same worksheet or even the same workbook. In fact, as long as there are the same number of elements in each, one can be a row vector and the other a column vector.

**LOOKUP** is very useful when the **lookup_vector** contains data in strict ascending order. Where do we find this? Dates in time series – **LOOKUP** is very useful for financial modelling / forecasting. Just be careful though; consider the following scenario:



Here, the same formula generates an #N/A error. This is because the date is smaller than the smallest value in the data range. **LOOKUP** is not quite clever enough to use the first value unprompted, but a simple tweak of the formula will suffice:

G20 =IF(G$19<$G$12,$G$13,LOOKUP(G$19,$G$12:$K$12,$G$13:$K$13))

**Assumptions**

| Year | 2016 | 2017 | 2018 | 2019 | 2020+ |
|---|---|---|---|---|---|
| CPI | 3% | 4% | 5% | 6% | 7% |

**Results**

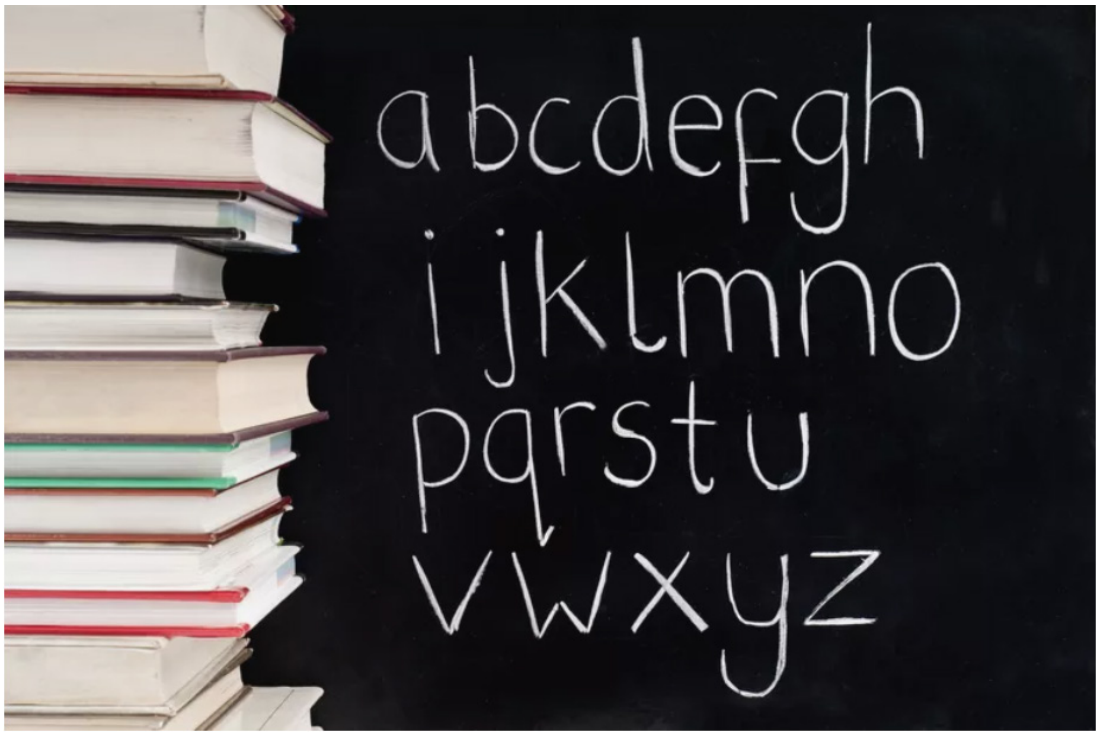
| Year | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|
| CPI | 3% | 3% | 3% | 3% | 4% | 5% | 6% | 7% | 7% | 7% |

Here, the formula has been modified to:

**=IF(G$19<$G$12,$G$13,LOOKUP(G$19,$G$12:$K$12,$G$13:$K$13))**

The added **IF** statement checks to see if the year is smaller than the first year in the data table and if so, returns the first result. Simple. It is with this final modification – in its vector form – that I usually use **LOOKUP** to return values for certain time periods where I do not want to have an input for each period modelled. Very useful!

## The A to Z of Excel Functions: LOWER




This function converts all uppercase letters in a text string to lowercase.

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

**LOWER(text)**

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

- **text:** this is required and represents the **text** you wish to convert to lowercase.

It should be noted that:

- **LOWER** does not change characters in text that are not letters.

Please see our final example for this month below:

| | A | B | C |
|---|---|---|---|
| 1 | Data | | |
| 2 | SumProduct | | |
| 3 | Liam Bastick | | |
| 4 | | | |
| 5 | | | |
| 6 | Formula | Description | Result |
| 7 | =LOWER(A2) | Lower case of text in cell A2 | sumproduct |
| 8 | =LOWER(A3) | Lower case of text in cell A3 | liam bastick |
| 9 | | | |

More Excel Functions next month.

## Beat the Boredom Suggested Solution

To recap, we had a table called **Data** that contained details of some new items and their suppliers in a clean horizontal structure, as below. We needed to import this data into an inventory management system.

| ItemCode | ItemName | Supplier | Note | ItemCost | ItemMPQ |
|---|---|---|---|---|---|
| SP001 | Orange juice | Sunshine Farm | Promotion only | 12 | 6 |
| SP001 | Orange juice | West Farmer | | 9 | 3 |
| SP001 | Orange juice | Rural Farm | | 24 | 6 |
| SP002 | Milk | Milk Land | Prioritised | 2 | 1 |
| SP002 | Milk | Morning East | | 12 | 4 |
| SP002 | Milk | Rural Farm | Promotion only | 3 | 1 |
| SP002 | Milk | Dairy West | Once a month | 4 | 1 |
| SP003 | Cereal | Nice Breakfast | | 4 | 1 |
| SP003 | Cereal | Rural Farm | Fortnightly | 5 | 1 |

| Repeated Columns |
|---|
| Supplier |
| ItemCost |
| ItemMPQ |
| Note |

However, the system required a template that only allowed one row per item. Therefore, the data needed to be laid out as follows.

| ItemCode | ItemName | Supplier1 | ItemCost1 | ItemMPQ1 | Note1 | Supplier2 | ItemCost2 | ItemMPQ2 | Note2 | Supplier3 | ItemCost3 | ItemMPQ3 | Note3 | Supplier4 | ItemCost4 | ItemMPQ4 | Note4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP001 | Orange juice | Sunshine Farm | 12 | 6 | Promotion only | West Farmer | 9 | 3 | | Rural Farm | 24 | 6 | | | | | |
| SP002 | Milk | Milk Land | 2 | 1 | Prioritised | Morning East | 12 | 4 | | Rural Farm | 3 | 1 | Promotion only | Dairy West | 4 | 1 | Once a month |
| SP003 | Cereal | Nice Breakfast | 4 | 1 | | Rural Farm | 5 | 1 | Fortnightly | | | | | | | | |

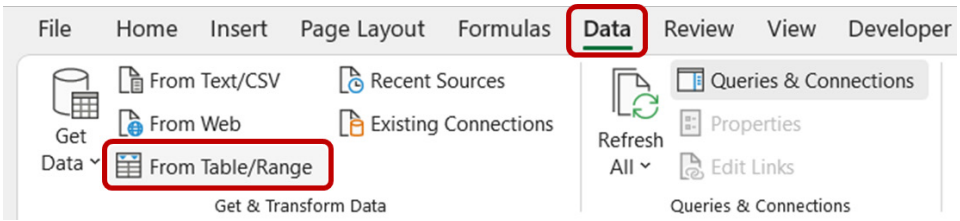
In this challenge, the objective was to use Power Query to transform structure of the data from vertical format to horizontal as shown in the pictures above.

As always, there were some requirements:

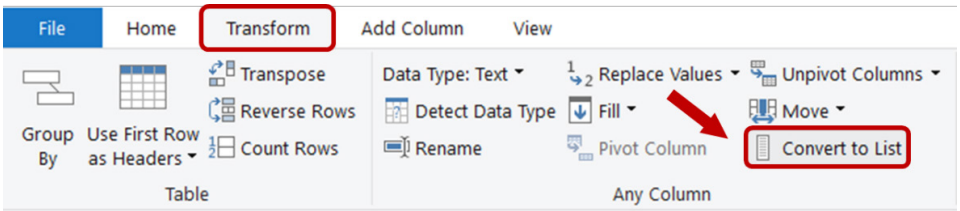
- repeated columns were listed in the second table of Question Data. They had to be in that specific order (*i.e.* 'Note' is the last column of every repeated group)
- all column headers needed to be dynamic. If they were changed, the queries still needed to work
- the number of suppliers for each item may be varied.

***Suggested Solution***

Firstly, we should bring two question tables into Power Query, one by one, by selecting each table and then navigating to the Data tab, and click 'From Table/Range' under the 'Get & Transform Data' grouping, *viz*.

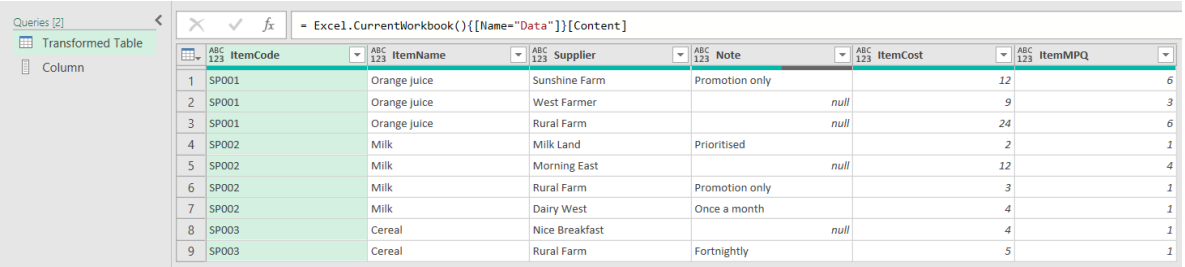


Secondly, we need to convert the 'Column' query into a list by going to Transform tab and then selecting 'Convert to List'.




| | List |
|---|---|
| 1 | Supplier |
| 2 | ItemCost |
| 3 | ItemMPQ |
| 4 | Note |

Thirdly, we come to the Data table. We rename this query 'Transformed Table'.




| | ItemCode | ItemName | Supplier | Note | ItemCost | ItemMPQ |
|---|---|---|---|---|---|---|
| 1 | SP001 | Orange juice | Sunshine Farm | Promotion only | 12 | 6 |
| 2 | SP001 | Orange juice | West Farmer | null | 9 | 3 |
| 3 | SP001 | Orange juice | Rural Farm | null | 24 | 6 |
| 4 | SP002 | Milk | Milk Land | Prioritised | 2 | 1 |
| 5 | SP002 | Milk | Morning East | null | 12 | 4 |
| 6 | SP002 | Milk | Rural Farm | Promotion only | 3 | 1 |
| 7 | SP002 | Milk | Dairy West | Once a month | 4 | 1 |
| 8 | SP003 | Cereal | Nice Breakfast | null | 4 | 1 |
| 9 | SP003 | Cereal | Rural Farm | Fortnightly | 5 | 1 |

We need Power Query to identify a list of grouped columns (*i.e.* **ItemCode** and **ItemName**). To do this, we add a new step by clicking '**fx**' next to the Formula bar. Then, the **List.RemoveItems** and **Table.ColumnNames** functions are used to remove all repeated columns listed in the Column list (which we created earlier) from the Source step. We add the formula below to the Formula bar and name this step as GroupCols.

**=List.RemoveItems(Table.ColumnNames(Source),Column)**

| | List |
|---|---|
| 1 | ItemCode |
| 2 | ItemName |

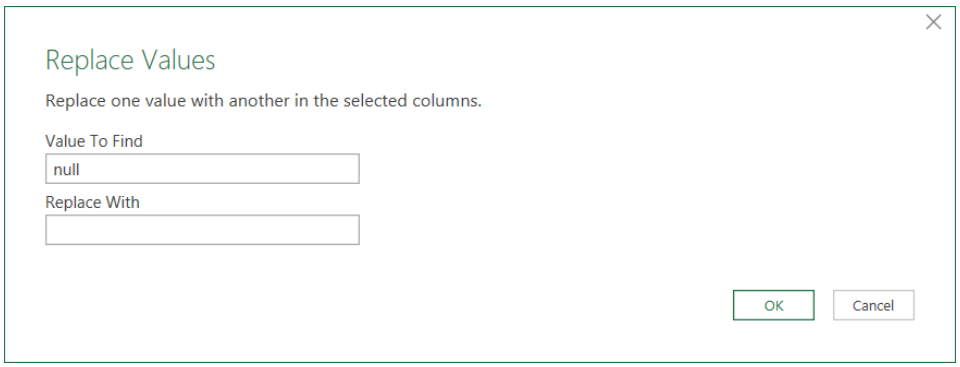
Then, we re-order the columns with the following formula. **List.Combine** helps combine grouped columns above with the Column list, which has a correct column order for repeated columns.

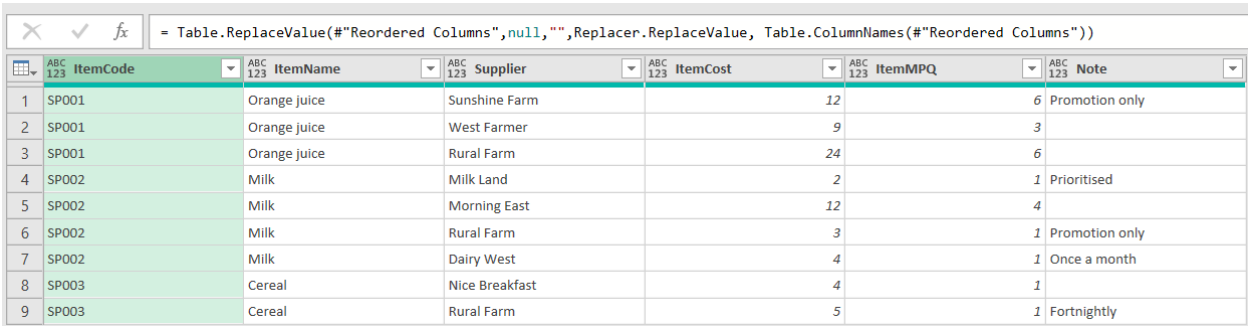
**=Table.ReorderColumns(#"Replaced Value", List.Combine({GroupCols, Column})**

As you can see from the picture below, **Note** is now the last column:

| | ItemCode | ItemName | Supplier | ItemCost | ItemMPQ | Note |
|---|---|---|---|---|---|---|
| 1 | SP001 | Orange juice | Sunshine Farm | 12 | 6 | Promotion only |
| 2 | SP001 | Orange juice | West Farmer | 9 | 3 | null |
| 3 | SP001 | Orange juice | Rural Farm | 24 | 6 | null |
| 4 | SP002 | Milk | Milk Land | 2 | 1 | Prioritised |
| 5 | SP002 | Milk | Morning East | 12 | 4 | null |
| 6 | SP002 | Milk | Rural Farm | 3 | 1 | Promotion only |
| 7 | SP002 | Milk | Dairy West | 4 | 1 | Once a month |
| 8 | SP003 | Cereal | Nice Breakfast | 4 | 1 | null |
| 9 | SP003 | Cereal | Rural Farm | 5 | 1 | Fortnightly |

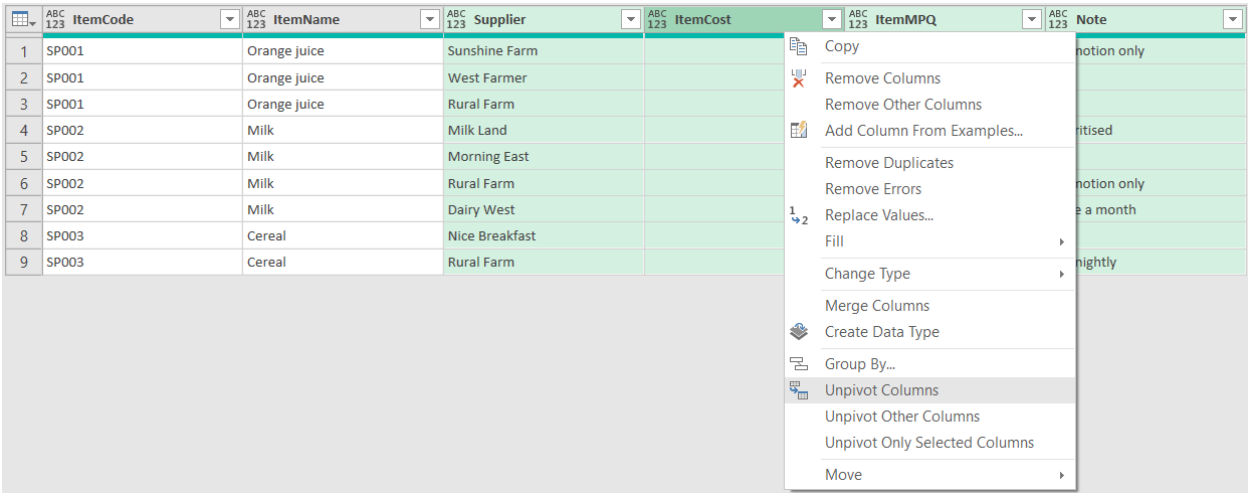
We will next remove all the *null* values in the table by replacing values *null* with **“”**. This ensures that all values are kept after unpivoting later.




| | ItemCode | ItemName | Supplier | ItemCost | ItemMPQ | Note |
|---|---|---|---|---|---|---|
| 1 | SP001 | Orange juice | Sunshine Farm | 12 | 6 | Promotion only |
| 2 | SP001 | Orange juice | West Farmer | 9 | 3 | |
| 3 | SP001 | Orange juice | Rural Farm | 24 | 6 | |
| 4 | SP002 | Milk | Milk Land | 2 | 1 | Prioritised |
| 5 | SP002 | Milk | Morning East | 12 | 4 | |
| 6 | SP002 | Milk | Rural Farm | 3 | 1 | Promotion only |
| 7 | SP002 | Milk | Dairy West | 4 | 1 | Once a month |
| 8 | SP003 | Cereal | Nice Breakfast | 4 | 1 | |
| 9 | SP003 | Cereal | Rural Farm | 5 | 1 | Fortnightly |

After that, we need to unpivot the columns, specifically the four repeated columns in our ‘Column’ list. We simply select the four columns, right-click and select ‘Unpivot Columns’.



To keep the query dynamic, we need to replace the grouped columns with our variable 'GroupCols' from:

**= Table.UnpivotOtherColumns(#"Replaced Value", {"ItemCode", "ItemName"}, "Attribute", "Value")**

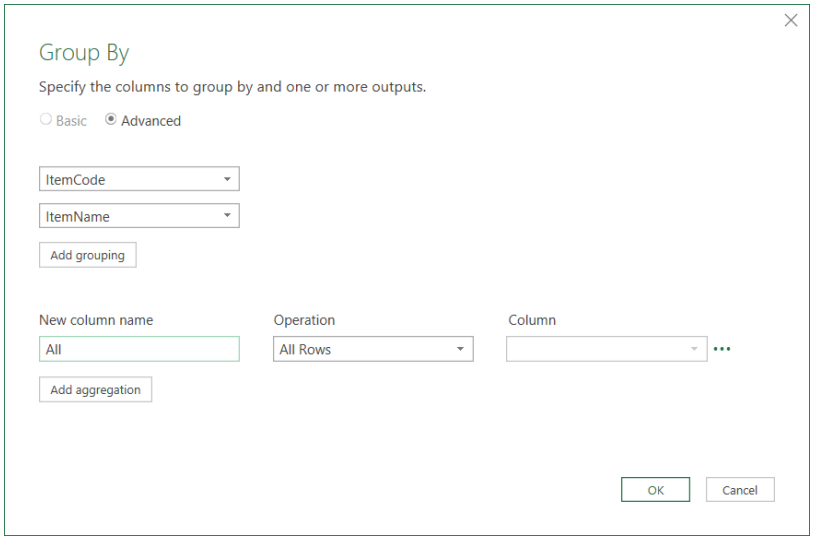
into:

**= Table.UnpivotOtherColumns(#"Replaced Value", GroupCols, "Attribute", "Value")**

```
= Table.UnpivotOtherColumns(#"Replaced Value", GroupCols, "Attribute", "Value")
```

| | ItemCode | ItemName | Attribute | Value |
|---|---|---|---|---|
| 1 | SP001 | Orange juice | Supplier | Sunshine Farm |
| 2 | SP001 | Orange juice | ItemCost | 12 |
| 3 | SP001 | Orange juice | ItemMPQ | 6 |
| 4 | SP001 | Orange juice | Note | Promotion only |
| 5 | SP001 | Orange juice | Supplier | West Farmer |
| 6 | SP001 | Orange juice | ItemCost | 9 |
| 7 | SP001 | Orange juice | ItemMPQ | 3 |
| 8 | SP001 | Orange juice | Note | |
| 9 | SP001 | Orange juice | Supplier | Rural Farm |
| 10 | SP001 | Orange juice | ItemCost | 24 |
| 11 | SP001 | Orange juice | ItemMPQ | 6 |
| 12 | SP001 | Orange juice | Note | |
| 13 | SP002 | Milk | Supplier | Milk Land |
| 14 | SP002 | Milk | ItemCost | 2 |
| 15 | SP002 | Milk | ItemMPQ | 1 |
| 16 | SP002 | Milk | Note | Prioritised |

We will next group all repeated columns into their respective **ItemCode** and **ItemName**. To do this, we select both **ItemCode** and **ItemName** columns and go to the Transform Tab, where we select 'Group By'. We name the new column 'All' and choose the operation 'All Rows' from dropdown list.




Once again, to keep the query dynamic we will replace the values {"**ItemCode**", "**ItemName**"} in the formula with GroupCols.

```
= Table.Group(#"Unpivoted Columns", GroupCols, {{"All", each _, type table}})
```

| | ItemCode | ItemName | All |
|---|---|---|---|
| 1 | SP001 | Orange juice | Table |
| 2 | SP002 | Milk | Table |
| 3 | SP003 | Cereal | Table |

We are then going to add an index column in each table within the **All** column, such that when it reaches a row with new **ItemCode** and **ItemName** values, the index resets to one [1]. We then create a new blank step called Indexed and apply the following formula.

**= Table.TransformColumns(#"Grouped Rows", {{"All", each Table.AddIndexColumn(_,"GroupIndex", 1, 1)}})**

```
= Table.TransformColumns(#"Grouped Rows", {{"All", each Table.AddIndexColumn(_,"GroupIndex", 1, 1)}})
```

| | ItemCode | ItemName | All |
|---|---|---|---|
| 1 | SP001 | Orange juice | Table |
| 2 | SP002 | Milk | Table |
| 3 | SP003 | Cereal | Table |

| ItemCode | ItemName | Attribute | Value | GroupIndex |
|---|---|---|---|---|
| SP001 | Orange juice | Supplier | Sunshine Farm | 1 |
| SP001 | Orange juice | ItemCost | 12 | 2 |
| SP001 | Orange juice | ItemMPQ | 6 | 3 |
| SP001 | Orange juice | Note | Promotion only | 4 |
| SP001 | Orange juice | Supplier | West Farmer | 5 |
| SP001 | Orange juice | ItemCost | 9 | 6 |
| SP001 | Orange juice | ItemMPQ | 3 | 7 |
| SP001 | Orange juice | Note | | 8 |
| SP001 | Orange juice | Supplier | Rural Farm | 9 |
| SP001 | Orange juice | ItemCost | 24 | 10 |
| SP001 | Orange juice | ItemMPQ | 6 | 11 |
| SP001 | Orange juice | Note | | 12 |

The above formula indexes the **All** column and is named **GroupIndex**, with the index starting at one [1] and increases in increments of one [1]. Next, we expand the **All** column which should then look like the following:

| | ItemCode | ItemName | Attribute | Value | GroupIndex |
|---|---|---|---|---|---|
| 1 | SP001 | Orange juice | Supplier | Sunshine Farm | |
| 2 | SP001 | Orange juice | ItemCost | 12 | |
| 3 | SP001 | Orange juice | ItemMPQ | 6 | |
| 4 | SP001 | Orange juice | Note | Promotion only | |
| 5 | SP001 | Orange juice | Supplier | West Farmer | |
| 6 | SP001 | Orange juice | ItemCost | 9 | |
| 7 | SP001 | Orange juice | ItemMPQ | 3 | |
| 8 | SP001 | Orange juice | Note | | |
| 9 | SP001 | Orange juice | Supplier | Rural Farm | |
| 10 | SP001 | Orange juice | ItemCost | 24 | |
| 11 | SP001 | Orange juice | ItemMPQ | 6 | |
| 12 | SP001 | Orange juice | Note | | |
| 13 | SP002 | Milk | Supplier | Milk Land | |
| 14 | SP002 | Milk | ItemCost | 2 | |
| 15 | SP002 | Milk | ItemMPQ | 1 | |
| 16 | SP002 | Milk | Note | Prioritised | |
| 17 | SP002 | Milk | Supplier | Morning East | |
| 18 | SP002 | Milk | ItemCost | 12 | |
| 19 | SP002 | Milk | ItemMPQ | 4 | |
| 20 | SP002 | Milk | Note | | |

While the above indexing would allow us to separate the data based on each item code and name, we would like to further index and separate the data by suppliers as well. First, we need to establish the number of repeated columns or the number of rows per unique supplier which is four. To do this we use **List.Count** function as below:

**=List.Count(Column)**

We will rename this step as RepeatedCols, and next we use the following formula for a new blank step:

**= Table.TransformColumns(#"Expanded All", {{"GroupIndex", each Number.RoundUp(_ / RepeatedCols), type number}})**

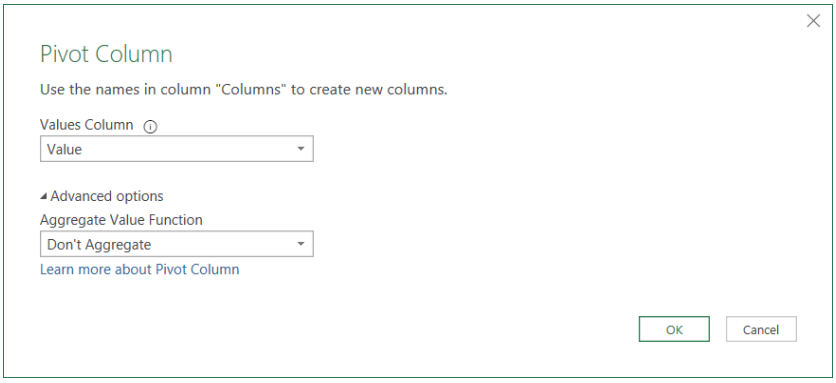
The above formula rounds up the index column to the closest division of four, *e.g.* 1/4 = 0.25 rounded up is one [1], 2/4 = 0.5 rounded up is still one [1] *etc*. Thus, the query will now look like this:

| | ItemCode | ItemName | Attribute | Value | GroupIndex |
|---|---|---|---|---|---|
| 1 | SP001 | Orange juice | Supplier | Sunshine Farm | 1 |
| 2 | SP001 | Orange juice | ItemCost | 12 | 1 |
| 3 | SP001 | Orange juice | ItemMPQ | 6 | 1 |
| 4 | SP001 | Orange juice | Note | Promotion only | 1 |
| 5 | SP001 | Orange juice | Supplier | West Farmer | 2 |
| 6 | SP001 | Orange juice | ItemCost | 9 | 2 |
| 7 | SP001 | Orange juice | ItemMPQ | 3 | 2 |
| 8 | SP001 | Orange juice | Note | | 2 |
| 9 | SP001 | Orange juice | Supplier | Rural Farm | 3 |
| 10 | SP001 | Orange juice | ItemCost | 24 | 3 |
| 11 | SP001 | Orange juice | ItemMPQ | 6 | 3 |
| 12 | SP001 | Orange juice | Note | | 3 |
| 13 | SP002 | Milk | Supplier | Milk Land | 1 |
| 14 | SP002 | Milk | ItemCost | 2 | 1 |
| 15 | SP002 | Milk | ItemMPQ | 1 | 1 |
| 16 | SP002 | Milk | Note | Prioritised | 1 |
| 17 | SP002 | Milk | Supplier | Morning East | 2 |
| 18 | SP002 | Milk | ItemCost | 12 | 2 |
| 19 | SP002 | Milk | ItemMPQ | 4 | 2 |
| 20 | SP002 | Milk | Note | | 2 |

We next merge the **Attribute** and **GroupIndex** columns to give each supplier an index identifier using 'Merge Columns' under the Transform tab. We name the merged column as **Columns**.

| | ItemCode | ItemName | Value | Columns |
|---|---|---|---|---|
| 1 | SP001 | Orange juice | Sunshine Farm | Supplier1 |
| 2 | SP001 | Orange juice | 12 | ItemCost1 |
| 3 | SP001 | Orange juice | 6 | ItemMPQ1 |
| 4 | SP001 | Orange juice | Promotion only | Note1 |
| 5 | SP001 | Orange juice | West Farmer | Supplier2 |
| 6 | SP001 | Orange juice | 9 | ItemCost2 |
| 7 | SP001 | Orange juice | 3 | ItemMPQ2 |
| 8 | SP001 | Orange juice | | Note2 |
| 9 | SP001 | Orange juice | Rural Farm | Supplier3 |
| 10 | SP001 | Orange juice | 24 | ItemCost3 |
| 11 | SP001 | Orange juice | 6 | ItemMPQ3 |
| 12 | SP001 | Orange juice | | Note3 |
| 13 | SP002 | Milk | Milk Land | Supplier1 |
| 14 | SP002 | Milk | 2 | ItemCost1 |
| 15 | SP002 | Milk | 1 | ItemMPQ1 |
| 16 | SP002 | Milk | Prioritised | Note1 |
| 17 | SP002 | Milk | Morning East | Supplier2 |
| 18 | SP002 | Milk | 12 | ItemCost2 |
| 19 | SP002 | Milk | 4 | ItemMPQ2 |
| 20 | SP002 | Milk | | Note2 |

Then, we select the column **Columns** and click 'Pivot Column' under the Transform tab. We then choose the column **Value** as the 'Values Column' and click 'Advanced options' to select 'Don't Aggregate' for the 'Aggregate Value Function'.




Lastly, we convert **""** back to *null* values using 'Replace Values', and finally, 'Close & Load'. We should have the end result as follows:

| ItemCode | ItemName | Supplier1 | ItemCost1 | ItemMPQ1 | Note1 | Supplier2 | ItemCost2 | ItemMPQ2 | Note2 | Supplier3 | ItemCost3 | ItemMPQ3 | Note3 | Supplier4 | ItemCost4 | ItemMPQ4 | Note4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP001 | Orange juice | Sunshine Farm | 12 | 6 | Promotion only | West Farmer | 9 | 3 | | Rural Farm | 24 | 6 | | | | | |
| SP002 | Milk | Milk Land | 2 | 1 | Prioritised | Morning East | 12 | 4 | | Rural Farm | 3 | 1 | Promotion only | Dairy West | 4 | 1 | Once a month |
| SP003 | Cereal | Nice Breakfast | 4 | 1 | | Rural Farm | 5 | 1 | Fortnightly | | | | | | | | |

It only takes two minutes if you can type at 500 miles per hour!

Until next month.


## Upcoming SumProduct Training Courses - COVID-19 update

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

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

| Location | Course | Date | Date | Duration | Duration |
|---|---|---|---|---|---|
| Online (Australia) | Excel Tips and Tricks | 11 Sep 2023 | 09:00-17:00 AEST | (-1 day) 23:00-17:00 GMT | 1 Day |
| Online (Australia) | Financial Modelling | 12 - 13 Sep 2023 | 09:00-17:00 AEST | (-1 day) 23:00-17:00 GMT | 2 Days |
| Online (Australia) | Power Pivot, Power Query and Power BI | 22 - 24 Nov 2023 | 09:00-17:00 AEDT | (-1 day) 22:00-17:00 GMT | 3 Days |
| Online (Australia) | Excel Tips and Tricks | 5 Dec 2023 | 09:00-17:00 AEDT | (-1 day) 22:00-17:00 GMT | 1 Day |
| Online (Australia) | Financial Modelling | 6 - 7 Dec 2023 | 09:00-17:00 AEDT | (-1 day) 22:00-17:00 GMT | 2 Days |

## Key Strokes

Each newsletter, we'd like to introduce you to useful keystrokes you may or may not be aware of. We've started going through the alphabet actions. It's pretty **E**-fficient this month…

| Keystroke | What it does |
|---|---|
| END | Toggle End mode |
| CTRL + END | Selects the last cell in the sheet |
| CTRL + SHIFT + END | Extends the selection to the last cell in the sheet |
| SHIFT + END | Toggle End mode (and extend when you press **SHIFT + Arrow key(s)**) |
| ENTER | Enter value (and move down, depending upon Excel Options) |
| ALT + ENTER | Redo; in Edit (F2) mode: insert line break |
| CTRL + ENTER | Fill value in edited cell into all cells and do not move |
| CTRL + SHIFT + ENTER | Fill value in edited cell into all cells and do not move |
| SHIFT + ENTER | Enter value (and move up, depending upon Excel Options) |
| ESC | Cancel (edit, copy, cut, dialog, *etc.*) |
| CTRL + ESC | Bring up Start menu (overriding an Excel command) |
| CTRL + SHIFT + ESC | Task Manager (Windows, overriding an Excel command) |
| SHIFT + ESC | Cancel (edit, copy, cut, dialog, *etc.*) |
| Execute | Enter value (and move down, depending upon Excel Options) |
| ALT + Execute | Redo |
| CTRL + Execute | Fill value in edited cell into all cells and do not move |
| CTRL + SHIFT + Execute | Fill value in edited cell into all cells and do not move |
| SHIFT + Execute | Enter value (and move up, depending upon Excel Options) |

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

## Our Services

We have undertaken a vast array of assignments over the years, including:

- **Business planning**
- **Building three-way integrated financial statement projections**
- **Independent expert reviews**
- **Key driver analysis**
- **Model reviews / audits for internal and external purposes**
- **M&A work**
- **Model scoping**
- **Power BI, Power Query & Power Pivot**
- **Project finance**
- **Real options analysis**
- **Refinancing / restructuring**
- **Strategic modelling**
- **Valuations**
- **Working capital management**

If you require modelling assistance of any kind, please do not hesitate to contact us at contact@sumproduct.com.

## Link to Others

These newsletters are not intended to be closely guarded secrets. Please feel free to forward this newsletter to anyone you think might be interested in converting to "the SumProduct way".

If you have received a forwarded newsletter and would like to receive future editions automatically, please subscribe by completing our newsletter registration process found at the foot of any www.sumproduct.com web page.

## Any Questions?

If you have any tips, comments or queries for future newsletters, we'd be delighted to hear from you. Please drop us a line at newsletter@sumproduct.com.

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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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