

Sum Product

NEWSLETTER #101 - April 2021

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I thought it was time for a new photo! After 100 newsletters, it's time to acknowledge the savage ravages of time. But energy levels remain intact! A new page has been turned in our history – it's time to make a new mark (well, Liam, in this case...). Yup, the jokes remain (sorry). No refunds – but then you didn't pay for this newsletter, you cheapskate!

Indeed, it's a MASSIVE to start our next century of newsletters. The Power BI updates return in anger (over 50 new updates!), and we have news items to divulge including conditional formatting improvements in Excel, the ability to 'Show Changes', the propagation of Power Fx and an ability to convert Word documents to PowerPoint presentation. Aside from new photos, it's even time to start a new series on charts and dashboards to add to the plethora of articles.

All of the other regulars are here too: we have another Beat the Boredom Challenge, Visual Basics, Power Pivot Principles, Power Query Pointers, and we even find a **FLOOR** in on this month's A to Z of Excel Function(s).

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

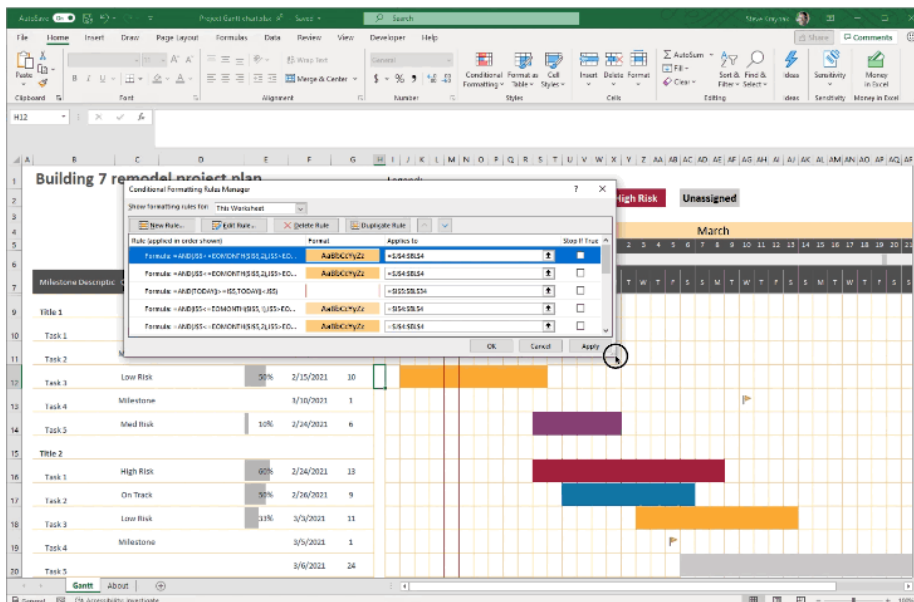
Liam Bastick, Managing Director, SumProduct



Conditional Formatting Improvements in Excel

Conditional formatting has just got better in Excel for Windows. If you're a Microsoft 365 subscriber, the dialog boxes are now resizable, so that you may view more rules at one time. Furthermore, it's also easier to see the

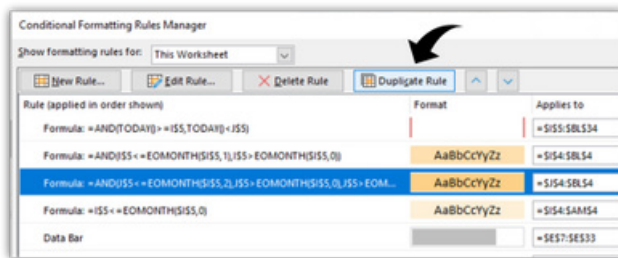
formula and range that the rules apply to. This includes the Conditional Formatting Rules Manager and the New / Edit Rule dialogs.



That's not all. If you're a Microsoft 365 subscriber, in Excel for Windows (and coming soon to Excel for Mac), there's a new button so you can finally duplicate a selected conditional formatting rule rather than have to keep writing the flaming thing out.

Simply select the rule, and click 'Duplicate Rule' to create the copy. This should be really useful when you want to create a few rules that are similar, but with some slight modifications. You can create one rule, then duplicate it and make the necessary tweaks to the new rule. You don't need to start from scratch for each one.



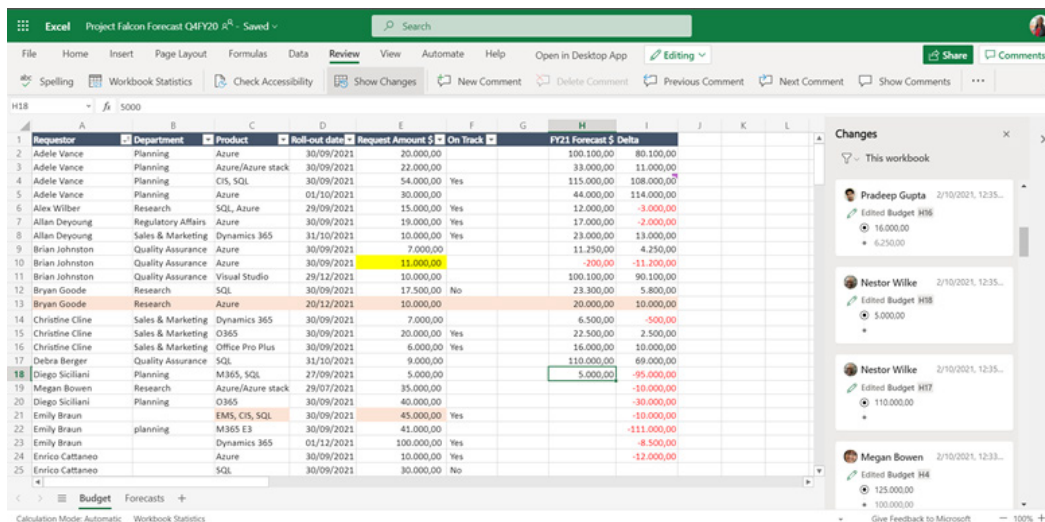


To get these improvements, you must be a Microsoft 365 subscriber, and you need to install the latest updates. For Windows, this is version 16.0.13530 or greater. For Mac this will be version 16.47 or later.

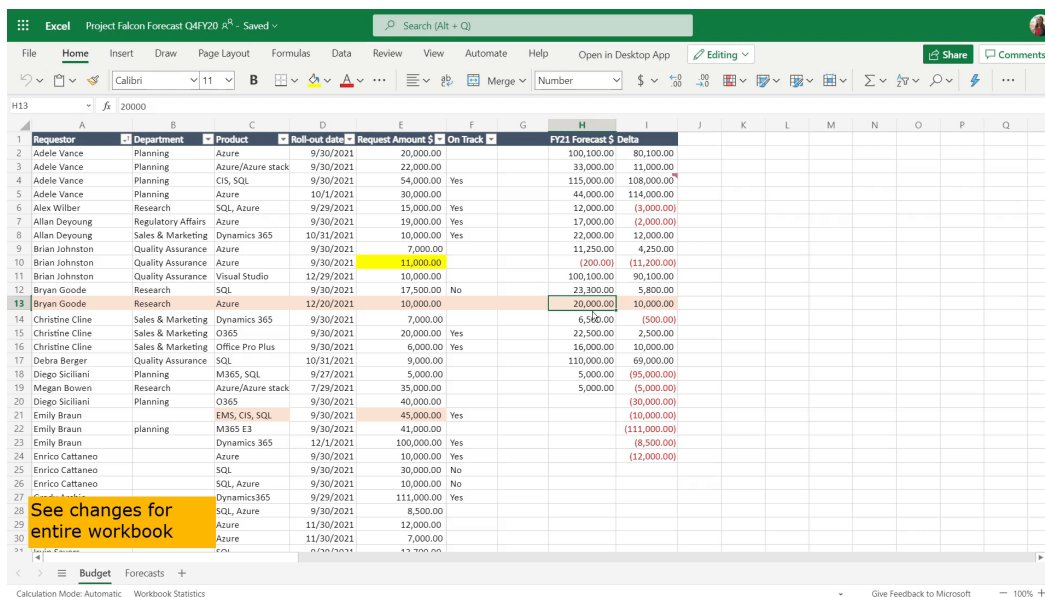
Show Changes Shows its Hand

If you have grown up with Excel, you may have become mentally scarred over the years with Excel's past (in)ability to share workbooks. Recently, Microsoft has revamped this in line with its priorities to emphasise accessibility and collaboration. As users try this feature once more, it's become important to understand what others are changing. Therefore, Microsoft has been working on a new feature, 'Show Changes', that will provide an overview of all changes made to the workbook, down to individual cells.

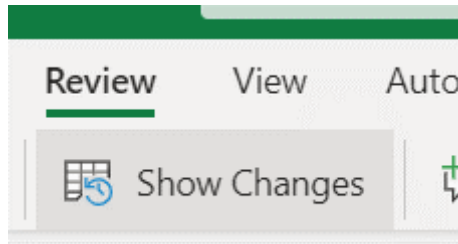
In a nutshell, this feature enables you to collaborate by highlighting what edits were made to your workbook(s) in the past 60 days. You can see details about who changed what, where, and when, along with the previous value of the cell for quick reversion, if needed. You can narrow down the list of changes by selecting any sheet, range or cell, to check all the changes that were made, including bulk edits. 'Show Changes' tracks changes made across any Microsoft 365 endpoint, i.e. Windows, Mac, iPads / iPhones and Android phones / tablets.



Here is how you can view changes for the entire workbook:

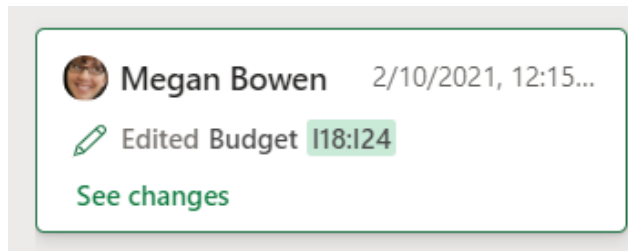


To initiate this feature, go to the Review tab, select 'Show Changes':

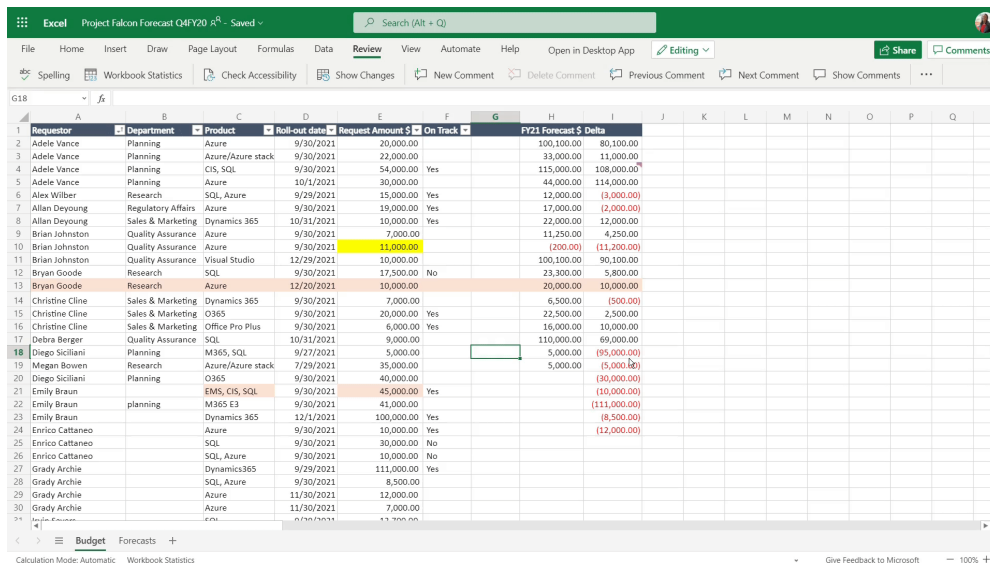
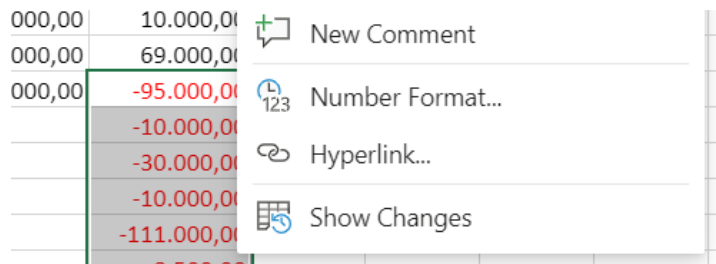


It should be noted that:

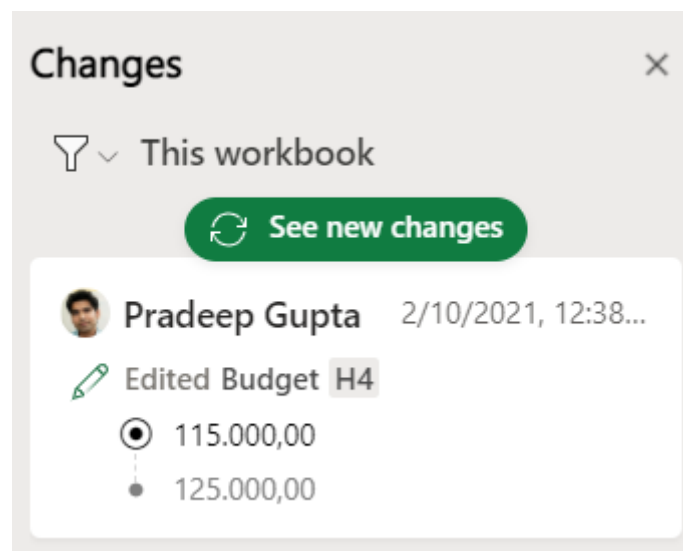
- edits are shown in the Changes pane, with the most recent first
- you can see who made the changes, where, and when, as well as what the edits were
- in cards (see below), which are tracking a similar change to multiple cells, you can see all the changes made at once by selecting 'See changes' for the past 60 days:



- you may filter and see changes at a more granular level by selecting the sheet, range or cell you want, right-clicking it, and then selecting 'Show Changes'



- if someone edits the workbook while the Changes pane is open, you can update the workbook with the latest changes by selecting the 'See new changes' button (i.e. they are not displayed automatically in real time).



Images above from Microsoft Insider team.

Microsoft acknowledges that there are a few known limitations while using 'Show Changes'. You are supposed to be able to see changes for up to 60 days, but if you have a high number of edits you may see changes over a shorter duration.

So what's the catch? You have to store the workbook stored in OneDrive or SharePoint to be able to track changes. You will also need editing permissions to the Excel file. Furthermore, this feature will be rolled out in Excel for the web, for users running "Targeted" release builds, to begin with. Still, it's a start!

Power Fx

Microsoft Power Fx has been announced as "...the newest member of the Microsoft Power Platform family...". It is the low code language for expressing logic across the Microsoft Power Platform. It is the same language that is at the heart of the so-called Microsoft Power Apps canvas apps today and is inspired by Microsoft Excel. It enables the full spectrum of development from "no code" to "pro code".

Microsoft views this announcement as a statement of direction. There are no adverse implications for Power BI's existing M and DAX languages. Power Fx is complementary to them: M and DAX focus on reading, shaping, joining and summarising large amounts of data, whilst Power Fx focuses on reading and writing smaller sets of relational data.

In particular:

- **Power Fx is open source.** Microsoft has learned from the public's adoption of languages like C# and Typescript. With Power Fx, we're now bringing that same open approach to the low code world. Microsoft will open-source Power Fx, making the language available for open contribution by the broader community on GitHub
- **Power Fx is based on Microsoft Excel.** Using formulae that are already familiar to hundreds of millions of users, Power Fx allows a broad range of people to bring skills they already know to low code solutionsz
- **Power Fx is built for "low code".** Already the foundation of the Microsoft Power Apps canvas, Power Fx will soon be extended for use across Power Platform to Microsoft Dataverse, Microsoft Power Automate, Microsoft Power Virtual Agents, and beyond.

This table shows all of Power Fx's pure functions, the ones marked in green are identical or very close to Excel's version:

Abs	Color	DateValue	GUID	Left	Param	Sequence	Time
Acos	ColorFade	Day	HashTags	Len	Pi	ShowColumns	TimeValue
Acot	ColorValue	Defaults	Hour	Ln	PlainText	Shuffle	TimeZoneOffset
AddColumns	Concat	Degrees	If	LookUp	Power	Sin	Today
And	Concatenate	Distiinct	IfError	Lower	Proper	Sort	Trim
Asin	Count	DropColumns	isBlank	Match	Radians	SortByColumns	TrimEnds
AsType	Cos	EncodeUrl	IsEmpty	MatchAll	Rand	Split	Ungroup
Atan	Cot	EndsWith	IsError	Max	RenameColumns	Sqrt	Upper
Atan2	CountA	Errors	IsMatch	Mid	Replace	StartsWith	User
Average	CountIf	Exp	IsNumeric	Min	RGBA	StdevP	Validate
Blank	CountRows	Filter	IsToday	Minute	Right	Substitute	Value
Calendar	DataSourceInfo	Find	IsType	Mod	Round	Sum	VarP
Char	Date	First	JSON	Month	RoundDown	Switch	Weekday
Choices	DateAdd	FirstN	Language	Not	RoundUp	Table	With
Clock	DateDiff	ForAll	Last	Now	Search	Tan	Year
Coalesce	DateTimeValue	GroupBy	LastN	Or	Second	Text	

Excel has many more functions than this and Microsoft will be adding more all the time to Power Fx.

Low Code

Power Fx describes business logic in concise, yet powerful, formulae, in a way that would make sense to your average Excel user.

In particular, there are many attributes worth noting for Power Fx:

- **Asynchronous.** All data operations in Power Fx are asynchronous. The maker doesn't need to specify this, nor does the maker need to synchronize after the call is over. Most importantly, the maker doesn't need to be aware of this concept at all, they don't need to know what a promise or lambda function is, which is just as well, as I have no idea what Microsoft is talking about!
- **Local and remote.** Power Fx uses the same syntax and functions for data that is local in-memory and remote in a database or service. The user need not think about this distinction. Power Fx automatically delegates what it can to the server to process filters and sorts there more efficiently
- **Relational data.** Database keys are another concept the maker doesn't need to know about. The maker can use simple dot notation to access the entire graph of relationships from a record
- **Projection.** When writing a query, many developers will naively write "select * from ..." that brings back all the columns of data. Power Fx performs analysis of all the columns that are used through the entire app, even across formula dependencies. Projection is automatically optimised and again the maker need not even know what that word means
- **Retrieve only what is needed.** The LookUp function implies that only one record should be retrieved and that is all that is brought back. If more records are requested by using the Filter function, for which thousands of records may qualify, only a single page of data is brought back at a time, on the order of a hundred records. The user must gesture through a gallery or data table to see the additional data, and it is automatically brought in for them. The maker can reason about large sets of data without needing to think about limiting data requests to reasonable amounts
- **Runs only when it is needed.** Calculations may be deferred until required
- **Excel syntax translation.** Excel is used by hundreds of millions of users. Microsoft wants to leveraging the knowledge users already have
- **Display names and localisation.** In Dataverse and SharePoint, there is a display name for fields and tables as well as a unique logical name. The display names are often much more user friendly, as in this case, but they have another important quality: they can be localised. If you have a multi-lingual team, each team member can see table and field names in their own language. In all cases, Power Fx makes sure that the correct logical name is sent to the database automatically.

Always Live

Excel has no edit mode, compile step or run state. You simply open your spreadsheet, you edit formulae and values freely and work with the results. The spreadsheet is always live while in Excel and there is no distinction made between editing and running. Changes in any value or formula are immediately propagated throughout the spreadsheet and the maker can quickly check for the right answer. Any errors that Excel

detects are surfaced immediately and don't interfere with the rest of the spreadsheet.

Power Fx strives for this same live experience. It incorporates an incremental compiler to update formulas while the app is running and without disturbing state.

No Code

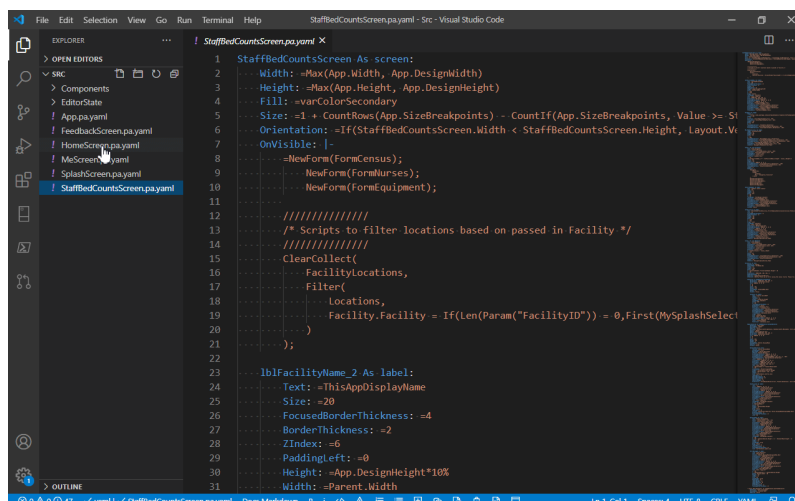
You don't need to read and write Power Fx to start expressing logic. There are lots of customisations and logic that can be expressed through simple switches and UI builders. Microsoft has built these "no code"

tools to read and write Power Fx to ensure there is plenty of headroom for someone to take it further, acknowledging that "no code" tools will never offer all the expressiveness of the full language.

Pro Code

Low code makers build things that sometimes require the help of an expert or are taken over by a professional to maintain and enhance. Professionals also appreciate that low code development can be easier, faster and less costly than building in a professional tool. Not every situation requires the full power of Visual Studio.

Professionals want to use professional tools to be the most productive. This is why language tooling has been introduced that unpacks a canvas app into constituent parts that can be edited with Visual Studio Code or Visual Studio:



```
StaffBedCountsScreen As screen:
  Width: =Max(App.Width, App.DesignWidth)
  Height: =Max(App.Height, App.DesignHeight)
  Fill: =varColorSecondary
  Size: =1 + CountRows(App.SizeBreakpoints) - CountIf(App.SizeBreakpoints, Value >= S
  Orientation: =If(StaffBedCountsScreen.Width < StaffBedCountsScreen.Height, Layout.V
  OnVisible: |-
    -NewForm(FormCensus);
    -NewForm(FormNurses);
    -NewForm(FormEquipment);
    ///////////////////////////////////////////////////
    /* Scripts to filter locations based on passed in Facility */
    ///////////////////////////////////////////////////
    ClearCollect(
      FacilityLocations,
      Filter(
        Locations,
        Facility.Facility = If(Len(Param("FacilityID")) = 0, First(MySplashSelect
      );
  lblFacilityName_2 As label:
    Text: =ThisApp.DisplayName
    Size: =20
    FocusedBorderThickness: =4
    BorderThickness: =2
    ZIndex: =6
    PaddingLeft: =0
    Height: =App.DesignHeight*10%
    Width: =Parent.Width
```

In Summary

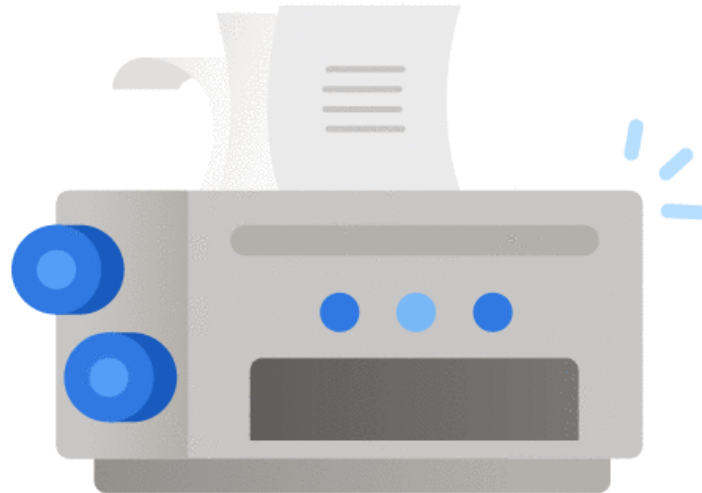
Power Fx is the new language for expressing logic across the Microsoft Power Platform. It's not so much a new programming language as the "announced new name" for the formula language for the canvas apps.

It is intended to be a general purpose, strong-typed, declarative and functional programming language, sharing many of the same syntax and functions as Excel.

Convert Word Documents to PowerPoint Presentations

What!? Not Excel or Power BI!? I have to mention this piece of news, because this – if it works (caveat, caveat) – will be brilliant. With Office Insiders, you can now transform Word documents into PowerPoint presentations. I cannot tell you how much of my life I have wasted on this transformation!

When you use the Transform command, it creates a presentation based on all the summarised sections of the document (yes, I am not quite sure what that means either...). It also adds imagery, icons, videos, themes and fonts using Artificial Intelligence.



To convert your Word document into a PowerPoint presentation:

- open any document you want to convert into a presentation in Word for the web
- click **File -> Transform -> Transform to PowerPoint presentation**
- when prompted, choose a design theme for your presentation
- click 'Open presentation' to review the results in PowerPoint for the web
- the presentation will be created in your OneDrive root folder.

Transform your document to PowerPoint presentation is available in Word for the web to the First Release audience, and will be rolled out to all web users slowly but surely. It should also be noted that this feature is currently only available in English and is not available for Internet Explorer (isn't that a Microsoft product?) and Safari browsers. Presently, this

feature only supports text content for the transformation to presentation; other media content support is not currently available. However, you may also add your own media to the presentation after you have transformed your Word document.

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...*

For this newsletter's challenge, we are again pulling inspiration from a recent consulting problem. We were presented with data similar to the following:

Name	2018 Budget	2019 Budget	2020 Budget	2018 Forecast	2019 Forecast	2020 Forecast
Item 1	10	20	30	40	50	60
Item 2	70	80	90	100	110	120
Item 3	130	140	150	160	170	180

However, our client wants it presented as follows:

Name	Year	Budget	Forecast
Item 1	2018	10	40
Item 1	2019	20	50
Item 1	2020	30	60
Item 2	2018	70	100
Item 2	2019	80	110
Item 2	2020	90	120
Item 3	2018	130	160
Item 3	2019	140	170
Item 3	2020	150	180

It's neither a pivot nor an unpivot, but something in between... Maybe Power Query is the solution to his one (*hint, hint*)..? This is the challenge this month: can you find a solution that will allow you to automatically transform the first table into the second one?

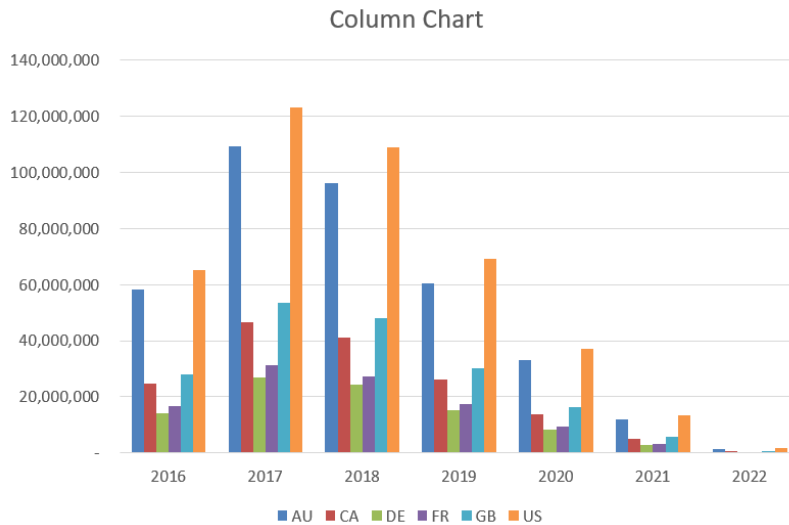
Sound easy? Try it. One solution just might be found later in this newsletter – but no reading ahead!

Charts and Dashboards – a New Series

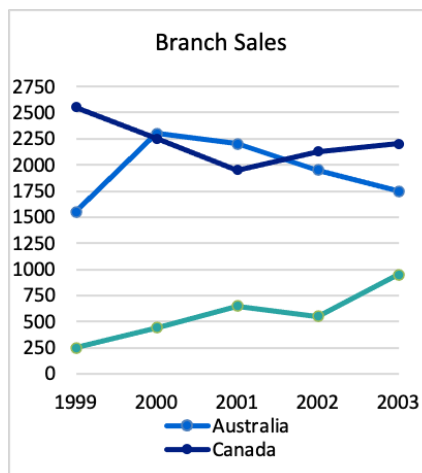
It's time to chart our progress with an introductory series into the world of creating charts and dashboards in Excel. We'll start off basic, and knowing us, probably remain there forever more...

Charts are visual representations of data organised into a graphical format. Data is usually represented by symbols like bars in a bar chart, lines in a line chart or areas in an area chart.

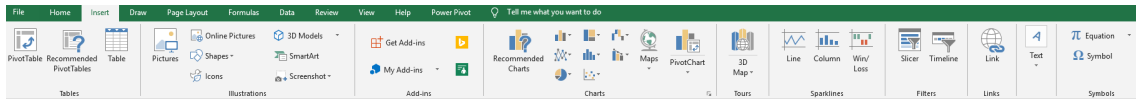
For those using their eyes for the first time ever, here is an example of a column chart:



and here is one of a line chart:



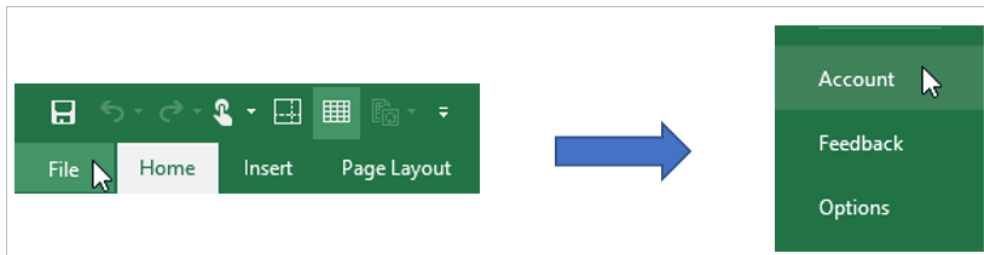
We can simply create charts using Excel. All Excel versions offer chart creation tools. To insert a chart, this varies slightly between versions of Excel, but typically, it goes something like this. Just go to the Insert tab:



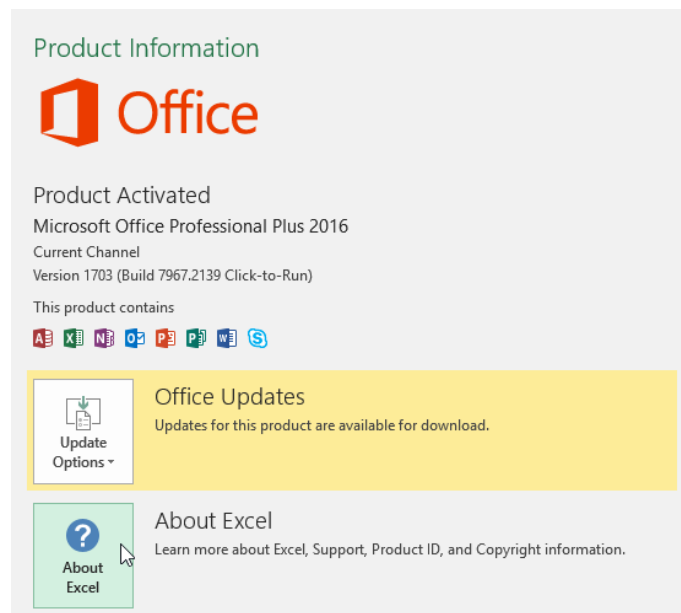
However, on the Insert tab, there are several new chart types available only in Excel 2016 / Office 365 onwards, such as Box & Whisker, Funnel, Histogram – Pareto, Sunburst, Treemap, Waterfall, and in Excel 2019, Filled map.

There, a key question is: how do you know which version of Excel you are using?

- In the File tab on the Ribbon, choose Account:



- Then, select the 'About Excel' option. The version of Excel will be displayed at the top of the pop-up window:



About Microsoft® Excel® 2016

Microsoft® Excel® 2016 MSO (16.0.7927.1020) 64-bit

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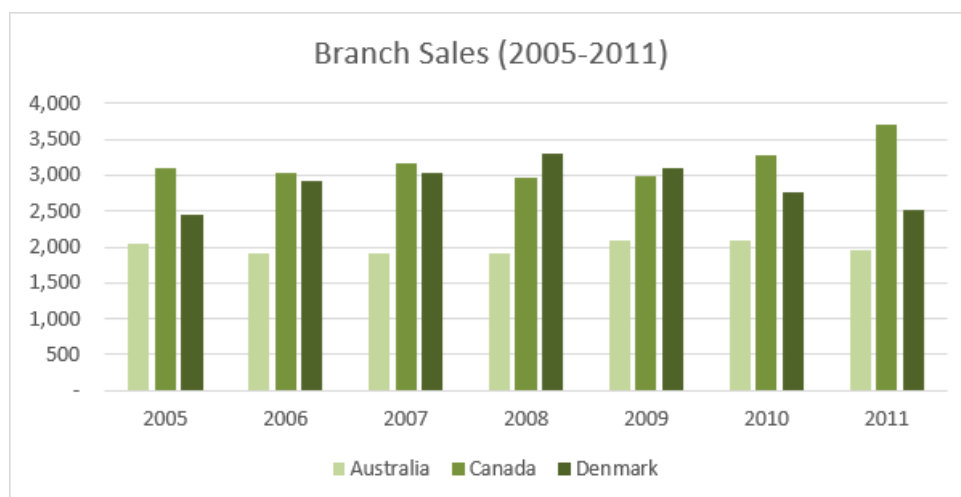
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OK

We use charts to turn data into information. For example, we are not able to determine patterns in the data just by looking at raw numbers:

	2005	2006	2007	2008	2009	2010	2011
Australia	2,054	1,916	1,916	1,916	2,082	2,082	1,950
Canada	3,101	3,042	3,172	2,964	2,984	3,285	3,712
Denmark	2,456	2,928	3,043	3,296	3,096	2,758	2,513

However, with a chart, life is much easier:



We'll continue next month...

Visual Basics

We thought we'd run an elementary series going through the rudiments of Visual Basic for Applications (VBA) as a springboard for newer users. This month, we thought we'd look at some of the ways you can apply range modifiers to change what set of cells exactly you're referring to.

Consider the following table:

VBA code	
Range("A1").Offset(r,c)	Refers to a range r rows down and c columns to the right of the initial range
Range("A1").End(xlDown)	Similar to Ctrl-arrow keys, refers to a range that is at the end of set of contiguous cells (or at the next populated cell if the immediate next cell is empty). Can also use xlUp, xlLeft and xlRight
Range("A1").EntireColumn	Refers to the entire column of the original range. If multiple cells are selected, it will refer to multiple columns
Range("A1").EntireRow	Refers to the entire row of the original range. If multiple cells are selected, it will refer to multiple rows
Range("A1").DirectDependents	The equivalent of Ctrl-]: refers to any cells that are direct dependents of the target cell (i.e. include the target cell in a formula). Returns an error if there are no dependent cells available on the worksheet.
Range("A1").DirectPrecedents	The equivalent of Ctrl-[: refers to any cells that are precedents of the target cell (i.e. are referred to in the target cell's formula). Returns an error if there are no precedent cells available on the worksheet.
Range("A1").Dependents	The equivalent of Ctrl-Shift-]: refers to all cells that are dependents of the target cell (including any that are dependents of dependent cells, and so on). Returns an error if there are no dependent cells available on the worksheet.
Range("A1").Precedents	The equivalent of Ctrl-Shift-[: refers to all cells that are precedents of the target cell (including any that are precedents of precedent cells, and so on). Returns an error if there are no precedent cells available on the worksheet.
Range("A1","C1")	Refers to all of the cells between A1 and C1 (i.e. the range A1:C1)

The first two are probably the most common ones that we tend to see in code. The **Offset** property is a simple way of choosing cells with reference to a single base cell. This can be used to start in a single row, and loop through code a number of times, referring to a new row with each loop. The loop variable that is increasing in size (e.g. in a For loop) can be set as the 'r' value in the **Offset** property, for example.

The second property is useful when you know where your data starts at the top of a column, but you don't know where it ends. **Range("A1").End(xlDown)** will go to the bottom of your dataset, so you can determine where your last data point is.

You can actually combine these properties together as well. To select the next new row at the bottom of your data, you can use **Range("A1").End(xlDown).Offset(1,0)** to firstly go to **A1**, go down to the bottom of your data, then offset the result by one row down, to pick the next blank row.

These are really useful tools that you can use to adjust the ranges that you refer to, helping you run loops or work with uncertain sizes of data.

More next time.

Power Pivot Principles

We continue our series on the Excel COM add-in, Power Pivot. This month, we consider further why disconnected tables may be useful in Power Pivot.

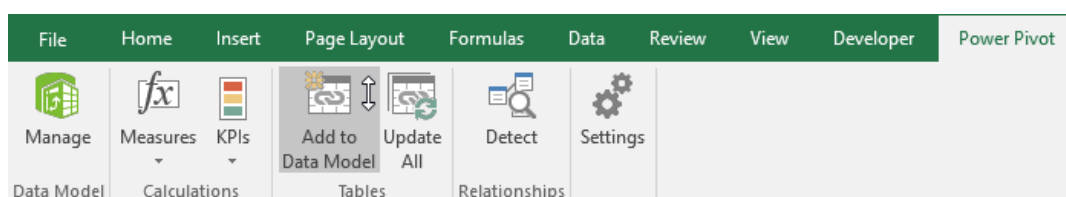
In last month's newsletter, we highlighted how useful connected tables can be when creating measures. This time, we will cover a useful application of disconnected tables, using them to help calculate values in different currencies.

I'll begin with creating the following table in Excel; note that the values in column **B** have to be derived through this formula:

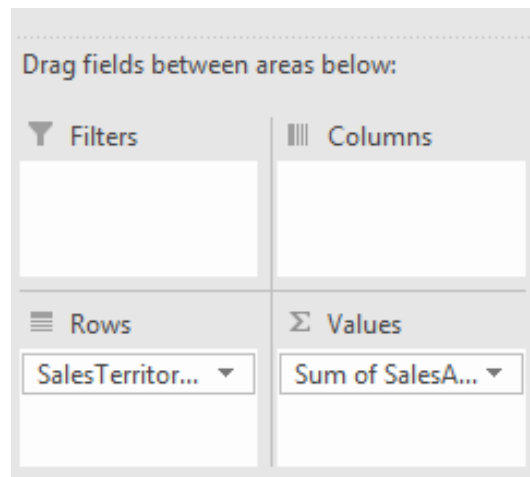
=TEXT(A2,"0.00")

A	B
A\$ Per Euro	AUD Per Euro
1.01	1.01
1.02	1.02
1.03	1.03
1.04	1.04
1.05	1.05
1.06	1.06
1.07	1.07
1.08	1.08
1.09	1.09
1.1	1.10
1.11	1.11
1.12	1.12
1.13	1.13
1.14	1.14
1.15	1.15
1.16	1.16
1.17	1.17
1.18	1.18
1.19	1.19
1.2	1.20

Once this table has been created, highlight it and convert the range into a Table (**CTRL + T**). The next step is to highlight the entire Table and copy it into Power Pivot. I have named this Table **Exchange_Rate**. We can do this by going to the 'Power Pivot' tab on the Ribbon and selecting the 'Add to Data Model' option, viz.

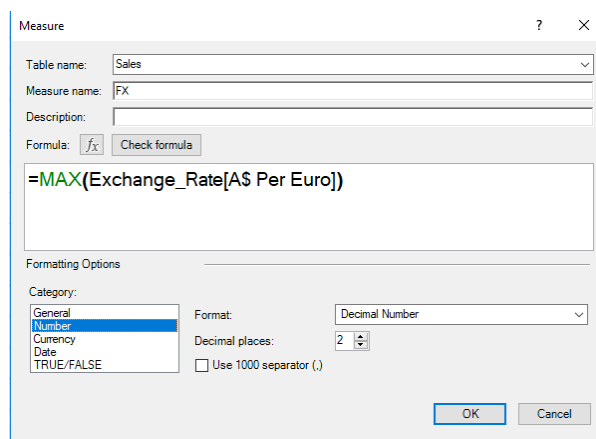


After adding the table to the Data Model, we can create a new PivotTable through Power Pivot with [Sales] by SalesTerritory:

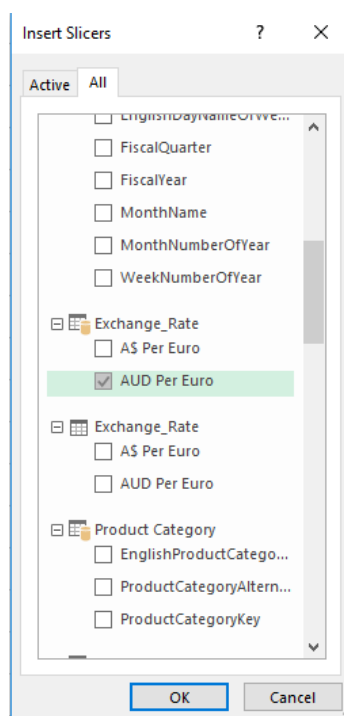


Create a measure called **FX**:

=MAX(Exchange_Rate[A\$ Per Euro])



Add a slicer on the **Exchange_Rate** Table, on the 'AUD Per Euro' column.

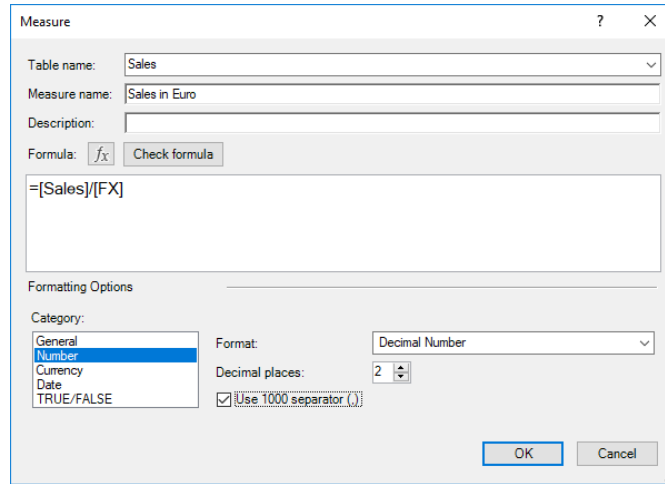


Note the fact there are two “tables” called **Exchange_Rate** – one referring to the Table itself and one to the table loaded into Power Pivot. We have selected the Power Pivot one in the image (above).

This slicer does not manipulate the PivotTable, as the slicer updates the Table but not the PivotTable – this is because they are not connected!

What’s next? Well, let’s create a new measure:

=[Sales]/[FX]



Now remove the other fields from the PivotTable’s ‘Values’ area so we just have the ‘Sum of SalesAmount’ and ‘Sales in Euros’.

Row Labels	Sum of SalesAmount	Sales in Euro	AUD Per Euro			
Australia	402,474.75	376,144.63	1.01	1.02	1.03	1.04
Canada	231,539.60	216,392.15	1.05	1.06	1.07	1.08
China	1,423.85	1,330.70	1.09	1.1	1.11	1.12
France	167,266.10	156,323.46	1.13	1.14	1.15	1.16
Germany	169,588.10	158,493.55	1.17	1.18	1.19	1.2
Italy	763.75	713.79				
New Zealand	720.70	673.55				
Thailand	365,864.60	341,929.53				
United Kingdom	207,991.25	194,384.35				
United States	272,965.85	255,108.27				
Grand Total	1,820,598.55	1,701,493.97				

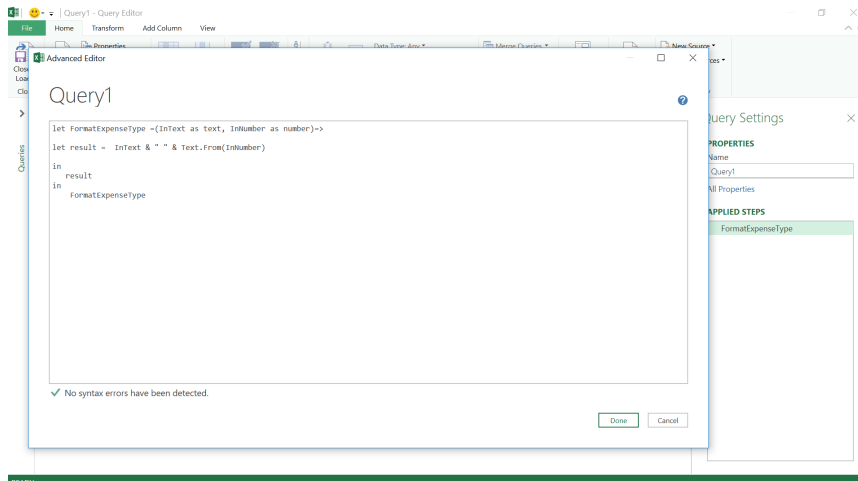
Now remove the other fields from the PivotTable’s ‘Values’ area so we just have the ‘Sum of SalesAmount’ and ‘Sales in Euros’.

More *Power Pivot* Principles next month.

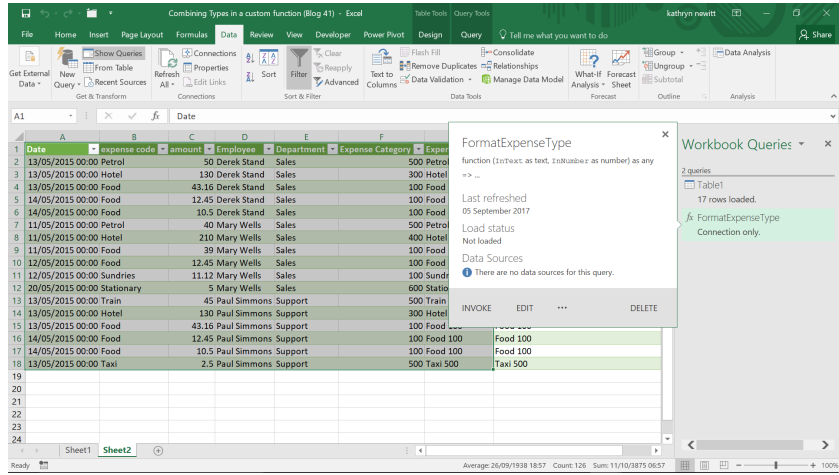
Power Query Pointers

Each month we’ll reproduce one of our articles on *Power Query (Excel 2010 and 2013) / Get & Transform (Office 365, Excel 2016 and 2019)* from www.sumproduct.com/blog. If you wish to read more in the meantime, simply check out our *Blog* section each Wednesday. This month, we look at how to customise function descriptions by using the *M* function meta-data.

Previously, we have created a function called **FormatExpenseType** which combined a text and a number field to give us our expense type:



In the workbook, the function is shown in the query pane:



We would like to provide a potential user of this function with more information to help them use it. In M language, there are a collection of functions under the heading 'Documentation'. Since this is a part of how M language is constructed, these functions are not easy to find. They are

all in the Power Query M Language specification, which can be found at <https://msdn.microsoft.com/library/mt807488.aspx>, which is a good read if you are having trouble sleeping. These are the functions that we are interested in:

Documentation.Examples list

List of record objects with example usage of the function. Only displayed as part of the function information. Each record should contain the following optional text fields: Description, Code, Result

Documentation.LongDescription text

Full description of what the function does, displayed in the function information

Documentation.Name text

Text to display across the top of the function invocation dialog

Documentation.AllowedValues list

List of valid values for this parameter. Providing this field will change the input from a textbox to a drop-down list. Note: this does not prevent a user from manually editing the query to supply alternate values

Documentation.FieldCaption text

Friendly display name to use for the parameter

Documentation.FieldDescription text

Description to show next to the display name

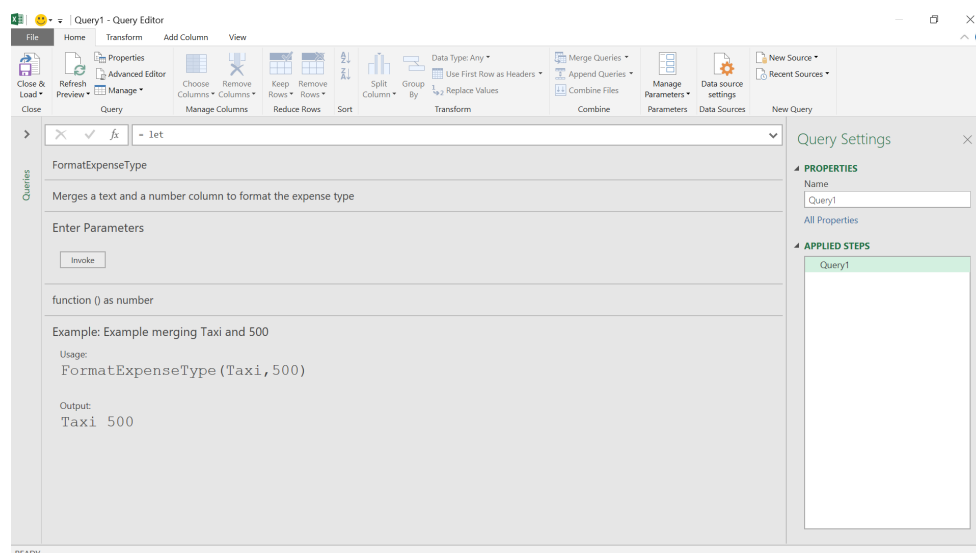
Documentation.SampleValues list

List of sample values to be displayed (as faded text) inside of the text box.

We may use some of these functions in a blank query, as shown below, so that it is clear which functions are controlling the descriptions and examples.



When you click 'OK' (the function is displayed in the way we have determined), note the deliberate mistake: we have called the function a number instead of text (**func()** as **number**).



This shows how the descriptions and examples are definitely controlled by us – even down to calling it a numerical function when it isn't! We can control the metadata in any custom function that we create.

More next month!

Power BI Updates

Sorry these didn't make last month, but our publishing deadline forced us to abandon these changes. Nevertheless, welcome back Power BI updates! There were the usual Previews, as well as a new colo(u)r selector, new filter operations, a search bar and an easier way was introduced to configure email subscription attachments.

But there were more.

The full list reads as follows:

Reporting

- DirectQuery for PBI datasets and Azure Analysis Services and updates (Preview)
- Search bar
- Model view updates (Preview)
- New Field List and updates to new Field List (Preview)
- Small Multiple (Preview): gridlines and background colours
- Word-wrap in Small Multiples titles (Preview)
- Updates to background settings on Small Multiples (Preview)
- Color picker and updates
- Smart guides for aligning objects are now available in the Mobile layout view
- New filter operations: "is empty" and "is not empty"
- More granular control over certificate revocation check for web connections
- Advanced Data Selection in Azure Maps Visual

Analytics

- Anomaly detection now in the Ribbon
- X axis constant line for line charts

In a second set of updates, Microsoft has also continued its work on the ongoing Previews of DirectQuery for Power BI datasets and Azure Analysis Services, Small Multiples, and the Model View User Interface (UI). Also, it has been made easier to specify filters in the DAX **CALCULATE** function. On the Power BI Service side, when you click on a dataset in the workspace list view, you will be taken to the new dataset details page, which includes information about when the report was last refreshed, as well as actions such as creating a new report.

Data connectivity

- Snowflake: Support for custom roles
- Parquet files: connector available in Power BI Desktop
- Hive LLAP: support for Windows authentication
- Salesforce: API update
- SAP HANA and BW: new documentation
- Kerberos-based SSO for Denodo
- Certified Connectors

Service

- Email subscription attachment
- Featured content on Home updates
- View dataset details from workspace List view
- Filter apps gallery to view only endorsed apps

Mobile

- Easily find your organisation's endorsed content using the Mobile app
- Power BI Free license users can now navigate to workspaces in the Mobile apps

Modelling

- Model View UI (Preview)
- **IF.EAGER**
- **CALCULATE** filters now easier to use

Visualisations

- New visuals
- Shielded HTML Viewer by Nova Silva
- Zebra BI Tables (version 4.5)
- Zebra BI Charts (version 4.5)
- ValQ 2.0 released with connected and collaborative planning features
- Drill Down Combo PRO by ZoomCharts
- SMART KPI List by Nova Silva
- Comparison chart
- Combo Bar PRO visual

Template apps

- Microsoft partners: installing a preconfigured template app
- Sales analytics AI for Microsoft Business Central
- Download PBIX files for installed template apps
- Analyse popular stocks with Power BI
- Facebook Ads Overview Report – by Windsor.ai

Developers

- Visual container fix
- EnumObjectInst with no datarole support

Embedded

- The new Power BI embedded analytics playground
- Power BI Embedded Generation 2 (Preview)
- Power BI embedded analytics new Contoso demo
- New Client API documentation

Other

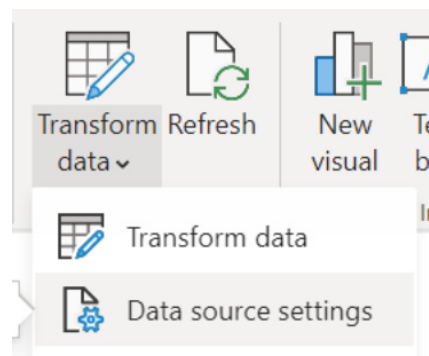
- New icon update
- Advanced notice: Microsoft 365, including Power BI, ending support for Internet Explorer 11 and legacy version of Microsoft Edge
- Paginated reports export API is now Generally Available
- Windows 7 deprecation
- Certificate revocation check controls now available in Desktop interface
- External Tools integration in Desktop Generally Available
- Desktop change log.

You know the drill by now. Let's go through each in turn.

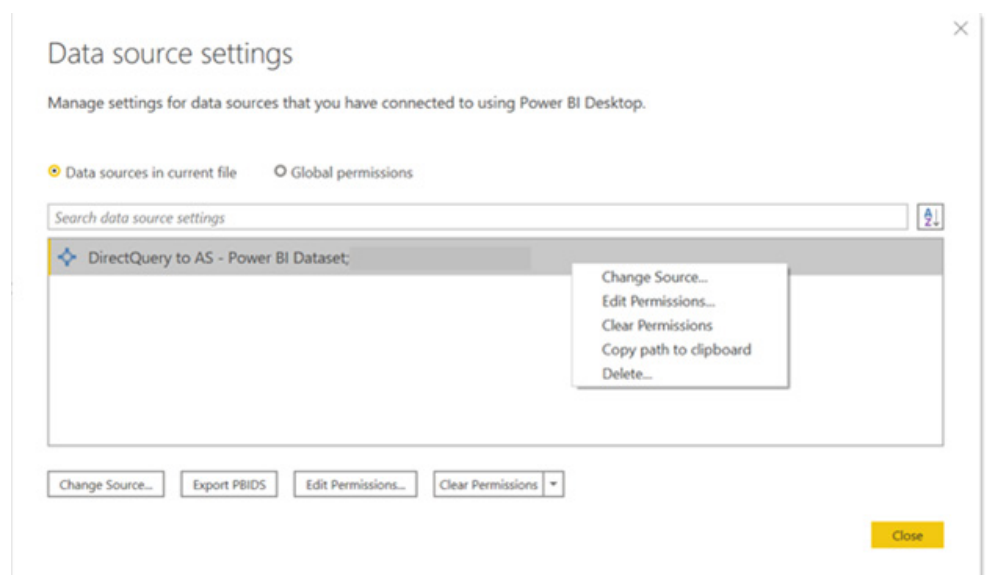
DirectQuery for PBI datasets and Azure Analysis Services and updates (Preview)

DELETING DIRECTQUERY CONNECTIONS

You can now delete DirectQuery connections to Power BI datasets and Azure Analysis Services. To do so, go to the Data Source Settings dialog, which you can find in the dropdown for 'Transform data'



In the 'Data source settings' dialog, right-click on the DirectQuery connection you'd like to delete:



You should note that this does not reverse the action of adding a local model: this action deletes the DirectQuery connection and all the tables and fields associated with that connection.

CALCULATED TABLES

Microsoft has also announced that they have added support for calculated tables.

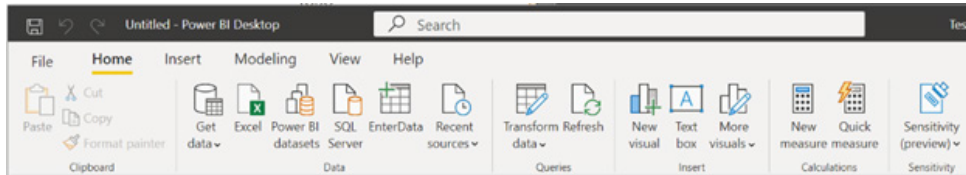
DISPLAY FOLDERS AND 'SORT BY COLUMN'

Now, display folders and 'Sort by column' properties set in a remote source will be synchronised with your local Power BI Desktop model.

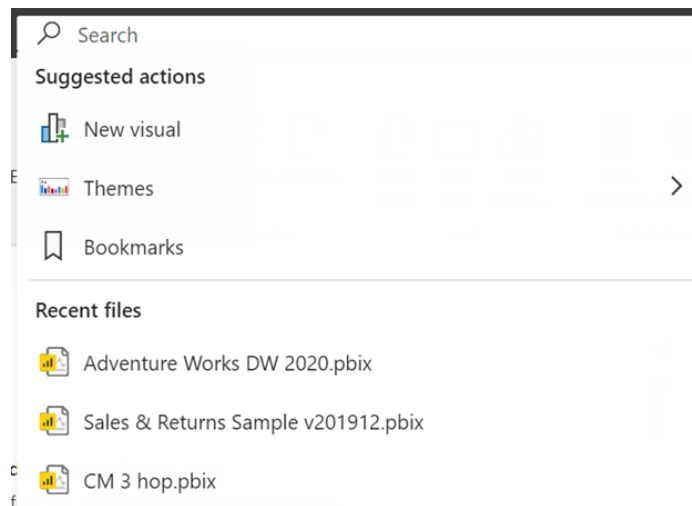
Search bar

This update sees an amendment to the Power BI Desktop Ribbon. Microsoft has stated that they have received feedback that sometimes it can be difficult to find the commands, files or other options you are

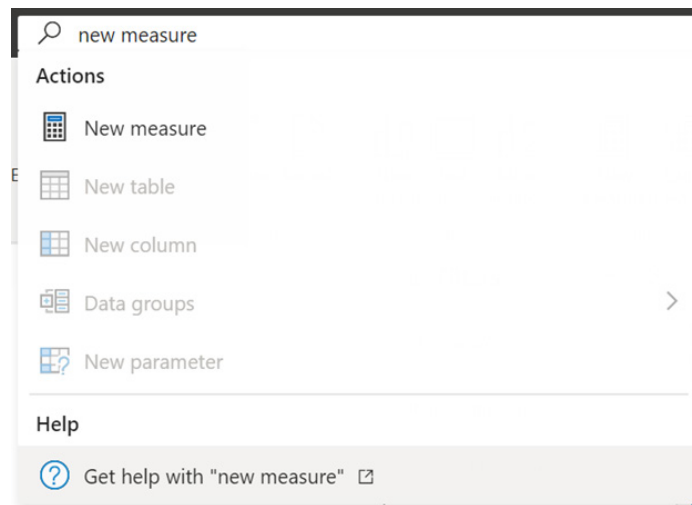
looking for. Therefore, in Power BI Desktop you can now see a Search bar, just like you can in other Office applications.



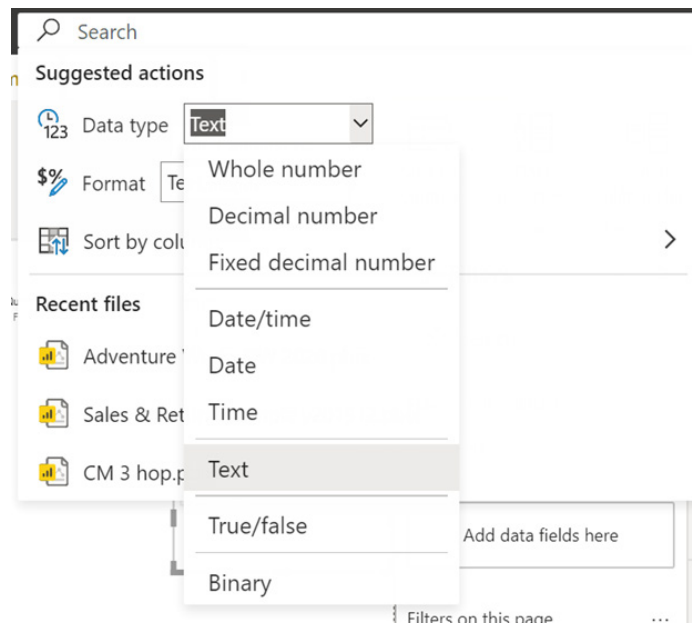
When you click on the Search bar, Power BI will suggest some actions for you to take based on the current state of your report, e.g.



As you type in a keyword, the search results will update to show you buttons that are related to your search. You can also click 'Get help' and be directed to the official Microsoft documentation (let's hope it's not **M** you are querying!).



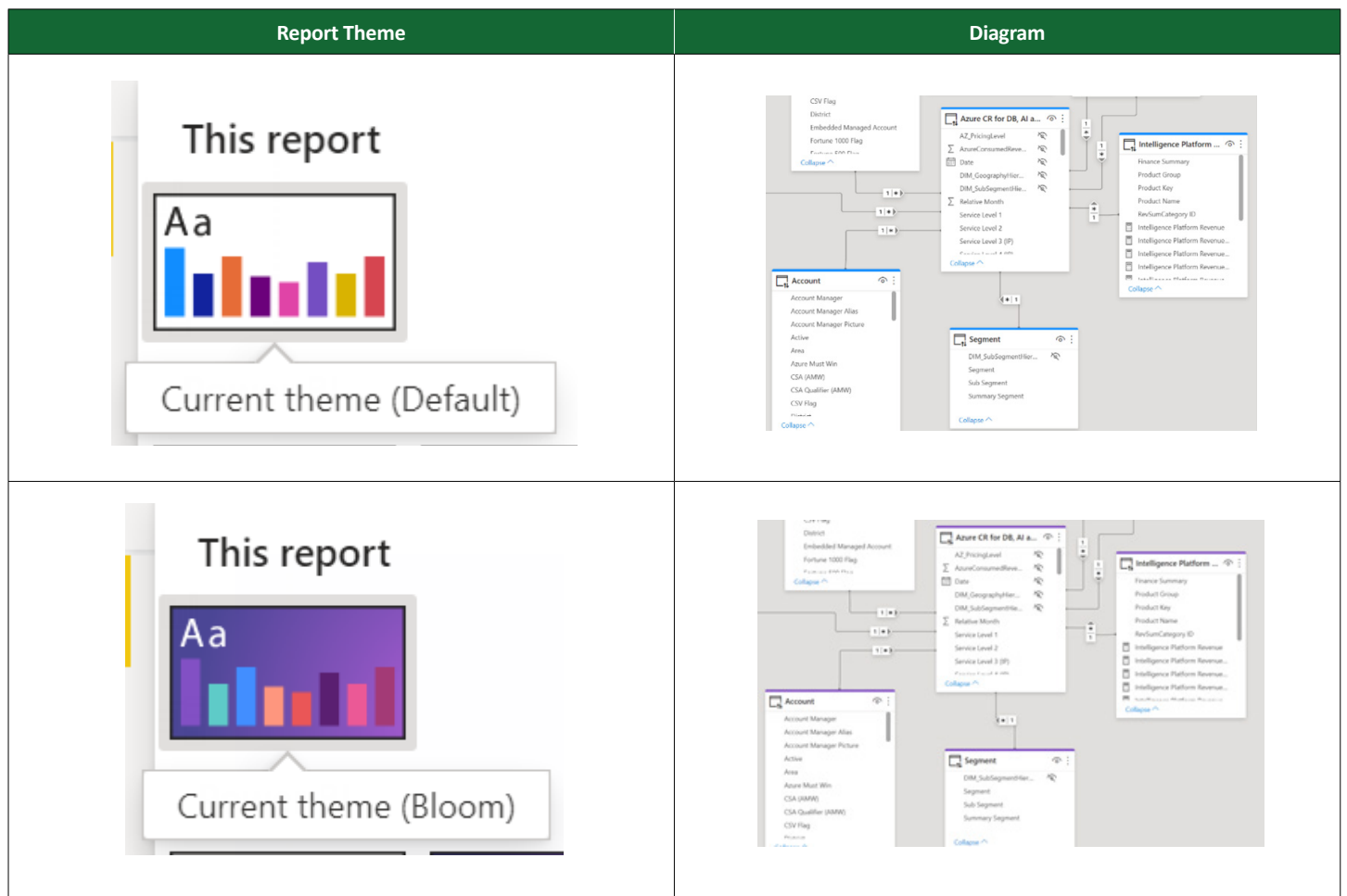
If you have a visual or field selected, special tabs show up on the Ribbon, with context specific buttons. If you select a visual or field, those special Ribbon buttons will be included in your Ribbon search results as well. For example, the following image shows when a field has been selected, so the 'Data type' option shows up in the Search box:



Just before all our foreign readers get too excited, please note that for the time being, this is only available in **English (United States)** presently. Good luck getting help with colours then... 😊

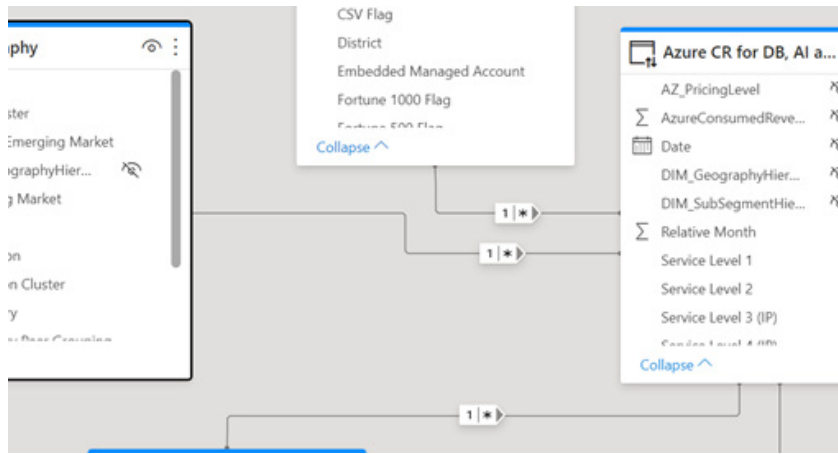
Model view updates (Preview)

This update sees the colours in the table card headers will match the colours in the report theme you are using.



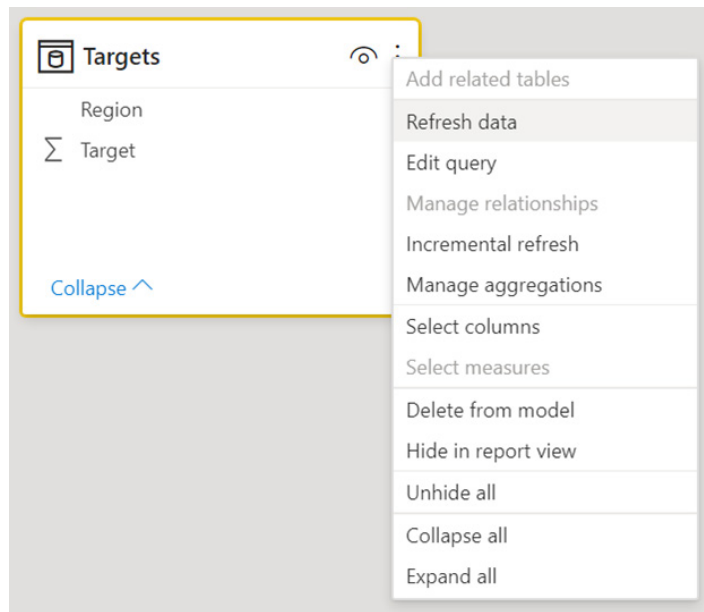
If your theme uses a colour that is almost white, it won't be used in the table headers. This is to mitigate situations where it can be hard to differentiate tables in dual mode.

Further, the relationships have a new look where the direction and cardinality has been centralised rather than being spread out across the relationship line.

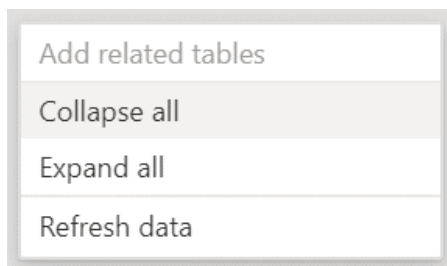


This doesn't appear to be to everyone's taste, but it should be noted that this is a Preview.

Microsoft has also added options to expand and collapse all the table cards in the model diagram at once. This may be performed in several ways. You may right-click on a table card in the diagram or click on the more options button to get the 'Collapse all' and 'Expand all' options.

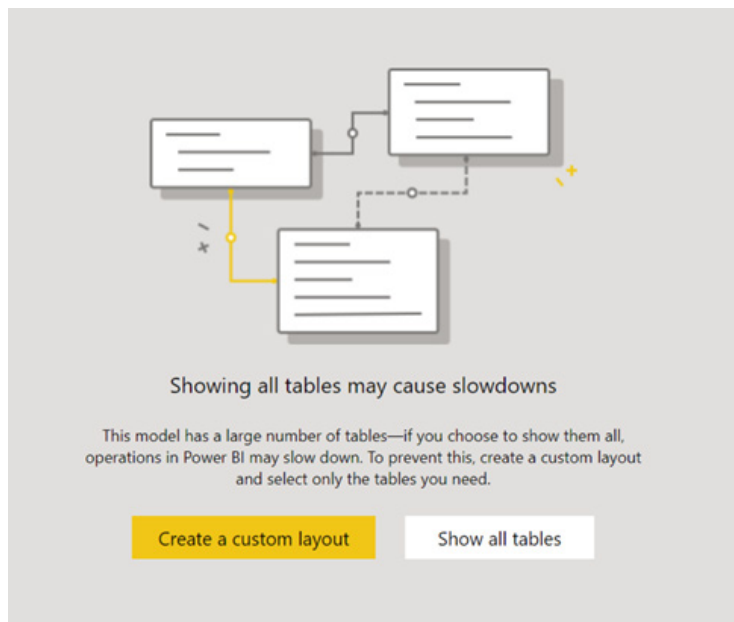


Another approach is to right-click anywhere on the grey background behind the model diagram and the following menu options with expand and collapse will appear:



There are also two performance improvements:

1. The table threshold for the 'All tables' view has been increased to 75 tables. If your model has less than 75 tables, the 'All tables' view will be shown. If you have more than 75 tables in your model, instead of the 'All tables' view, you'll see the following image:



If you'd like to bypass the threshold, you can press 'Show all tables'. However, Microsoft "strongly recommends" you don't do this as it may cause Power BI to consume extreme amounts of memory, CPU cycles, and slow down significantly. Instead, if you want to make modifications to your diagram, it is suggested you create custom layouts and working with a smaller number of tables at a time

2. The responsiveness of relationships drawn between tables and of moving tables in the diagram around should now be faster.

New Field List and updates to New Field List (Preview)

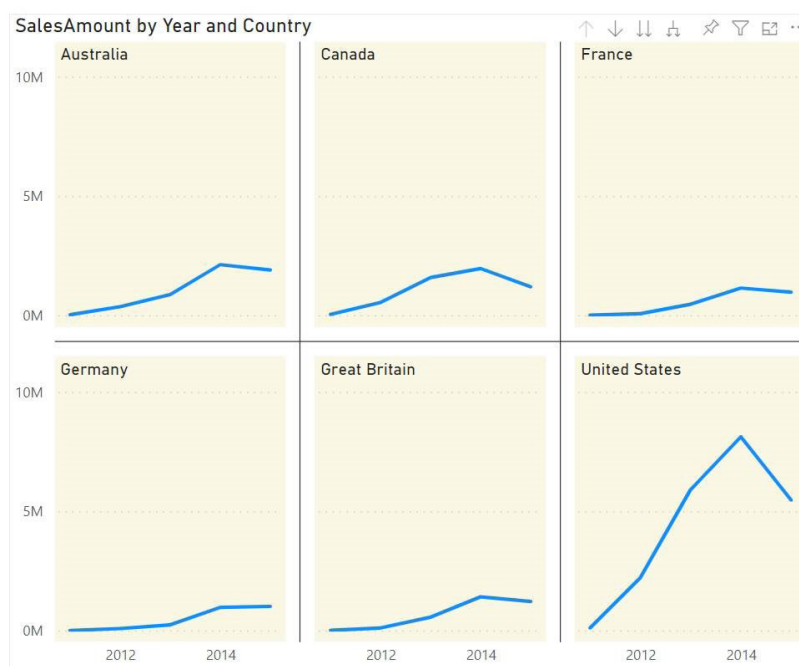
Back in November of last year, the new Field List was released to the Model view only. This has now been propagated to *all* views: Model, Report and Data. This change will create consistency for functionality and User Interfaces across views (where applicable). To activate, find the Preview feature switch in the preview options: **File > Options and settings > Options > Preview features > New Field list.**

Further, Microsoft has now tightened the padding, added the context menu back when all the tables are hidden, brought back the yellow indicator when reordering fields in the field wells, and fixed icon discrepancies amongst other changes.

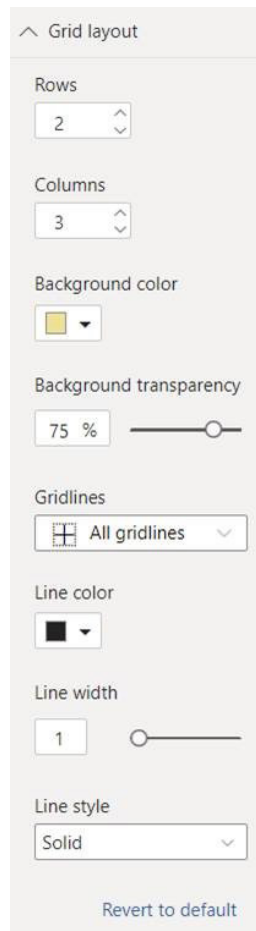
Small Multiples (Preview): gridlines and background colours

Continuing the updates already made on the Small Multiples Preview feature, Microsoft has now added gridline and background colour

controls to the grid layout Formatting card. These provide new options to clearly separate the Small Multiples plot areas.



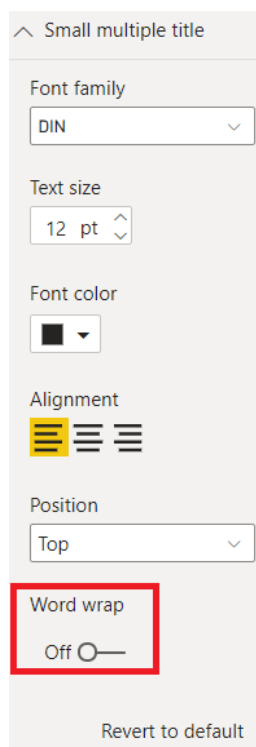
You can find the formatting controls in the 'Grid layout' card in the Formatting pane:



Here, you can now set background colour and transparency, add an assortment of different gridline patterns, and style those gridlines.

Word-wrap in Small Multiples titles (Preview)

Microsoft has continued their work on the small multiples Preview feature. This update sees word wrap added to small multiple titles, so you may ensure your longer titles aren't truncated if they run beyond the width of the small multiple column.



Keep in mind that Power BI Desktop will allocate space for the longest category name in all of your small multiples to ensure the plot areas align properly. As a result, if some of your small multiple titles are much

longer than others, turning on word wrap may leave extra whitespace under the shorter titles. Therefore, do consider the trade-off between the space reserved for plot areas and titles when considering word wrap.

Updates to background settings on Small Multiples (Preview)

Furthermore, the small multiples background colour and background transparency formatting settings have been updated to include new default values. While the previous default value for background colour was automatically inherited from page background and the default

transparency was 100% (totally transparent), the new defaults will instead be 'no fill' and 0% (totally opaque), respectively. This change will allow you to see immediate changes in your small multiples background colours without your having to change the transparency setting.

The problem is, this change in defaults will also affect existing reports, so:

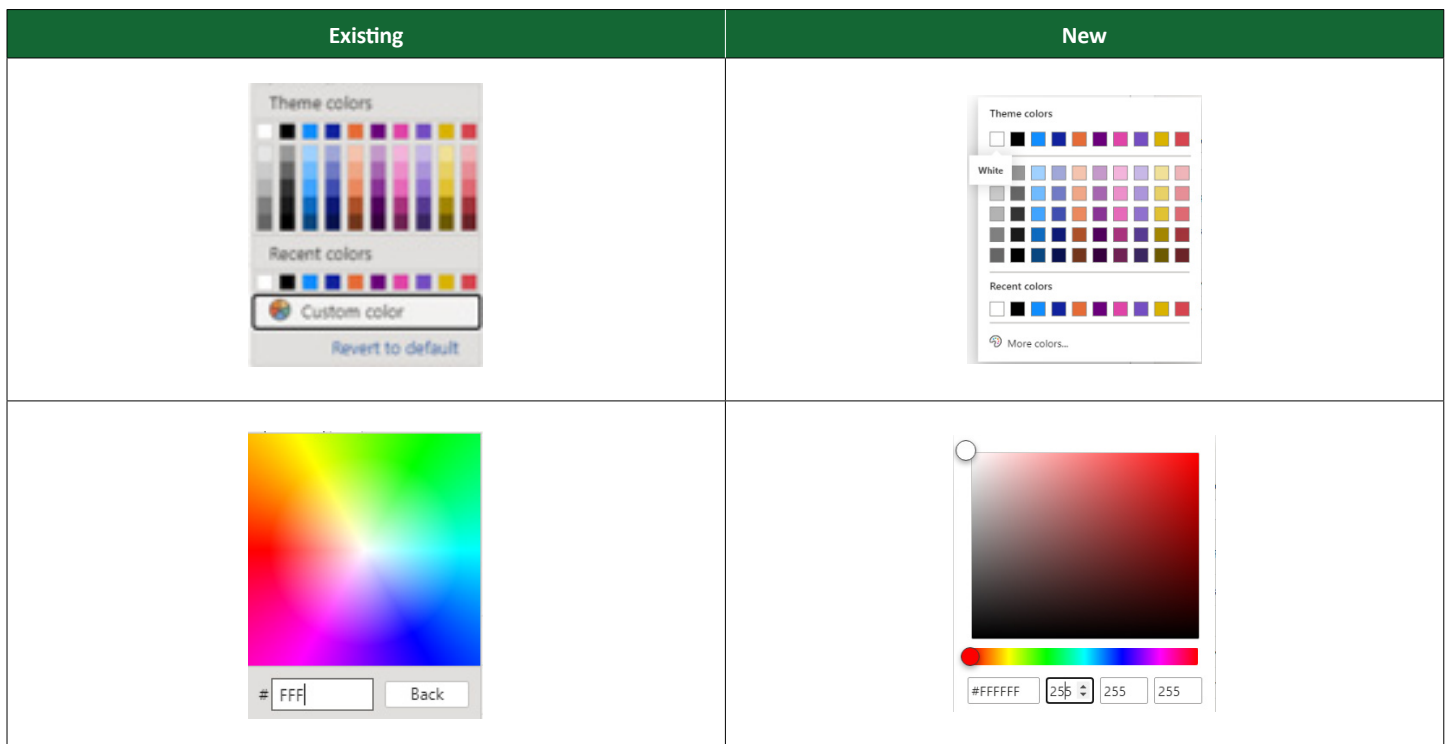
- if you have previously adjusted transparency without changing the small multiples background colour, the previous (default) colour will have become 'no fill', meaning you will no longer see a background colour on your small multiples grid
- if you have previously changed the small multiples background colour without changing transparency, the previous transparency (100%) will now become 0%, meaning you will now see your background colour applied to the small multiples grid.

Changing your colour and transparency settings away from the new defaults will avoid this behaviour. You have been warned!

Color picker and updates

Microsoft has updated the color picker to make it easier to work with. The colour swatches are better separated, so it is easier to find the colour you need. In the 'More colors' screen, you can now enter an RGB value in addition to a HEX value.

Here is a side-by-side comparison of the existing and updated experience:

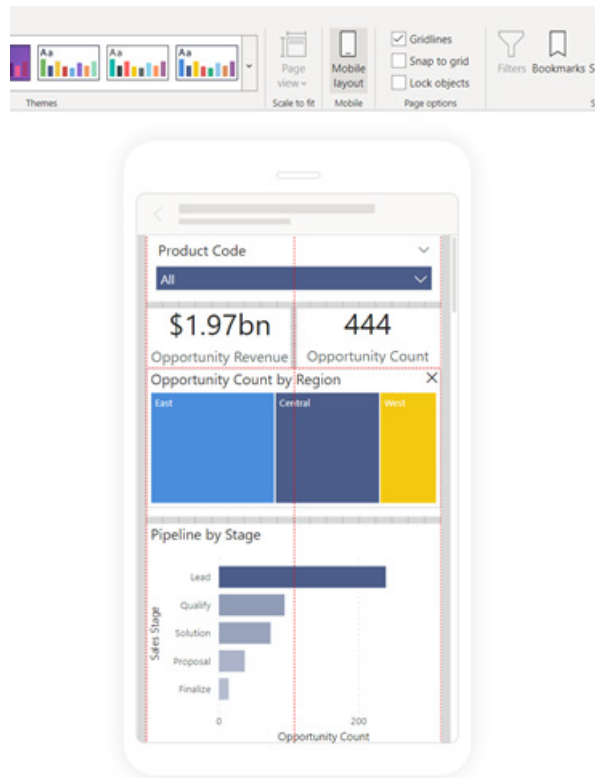


The latest update also sees the color picker being prioritised to pop up on the right side, so that less of it overlaps with the report canvas. This update also provides a bug fix for users who could not use **ESC** to close the color picker.

Smart guides for aligning objects are now available in the Mobile layout view

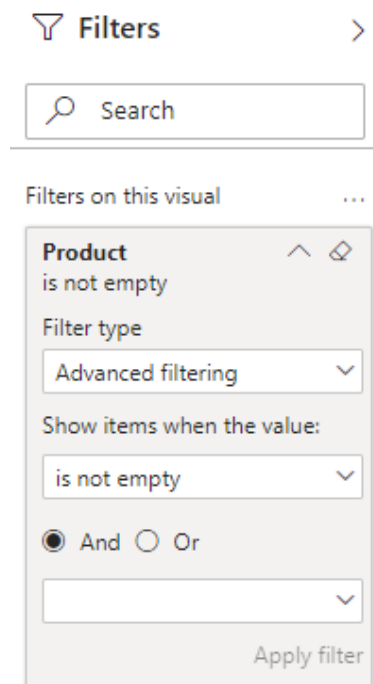
Smart guides are now available in the Mobile layout view, just like in the regular Web layout view. In case you've been living under a rock for the past 100 years of software development, smart guides help you align objects, and this is no different on the Mobile report page. Any time you

drag or resize objects, you'll see these smart guides. In addition, when you move an object close to another one, it will snap into alignment with the other object.



New filter operations: “is empty” and “is not empty”

Two new filter operations have been added for Text datatypes: **is empty** and **is not empty**. These new operations are located in the Filter pane in the ‘Advanced filtering’ type:



The operation **is empty** shows items when the value is an empty string (“”), whereas the **operation is not empty** shows items when the value is not an empty string (“”).

It should be noted that:

- if you have text values that have only spaces (“ ”), these values are automatically converted to empty strings (“”).
- if you’re wanting to filter out or filter to null values (no value), you’ll need to use one of the **is not blank** or **is blank** operations.

More granular control over certificate revocation check for web connections

Towards the end of last year, Microsoft introduced certificate revocation checks for web connections in Power BI Desktop. The feature could be enabled (or disabled) by checking (or unchecking) the 'Enable certificate revocation check' in the Security pane in the Options dialog in Power BI Desktop.

This has now been modified to give users better control by introducing a "basic" check. The "basic" check will accept certificates whose revocation status is unknown, for example, because the certificate does not specify it. This is important for some organisations that use corporate proxy servers. For instance. You may still disable the revocation check or enable it in comprehensive mode, which will not accept certificates with unknown revocation status.

Certificate revocation info status	Comprehensive Check	Basic Check	None
Revoked	✗	✗	✓
Unknown	✗	✓	✓
Not revoked	✓	✓	✓

Presently, the original checkbox interface will still be shown in Power BI Desktop, although this will be modified shortly. To use the more fine-grained control today without having to wait for the user interface change, please set the following DWORD registry value: DisableCertificateRevocationCheck. You will need to set this in Power

BI Desktop's registry key, which is HKEY_LOCAL_MACHINE\SOFTWARE\WOW6432Node\Microsoft\Microsoft Power BI Desktop or HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Microsoft Power BI Desktop depending on your systems configuration. Please consult an expert if unsure!

You can set the registry value to one of the following values:

Value	Mode	Configuration
0	Basic	Certificates that have an unknown revocation status will be accepted. Equivalent to enabling the checkbox in Power BI Desktop)
1	Disabled	Ignore all revocation checks. Equivalent to disabling the checkbox in Power BI Desktop)
2	Comprehensive	Require certificates to not be revoked.

You may configure this registry setting now to take advantage of the more fine-grained control today; these options will soon be available in any case in Power BI Desktop.

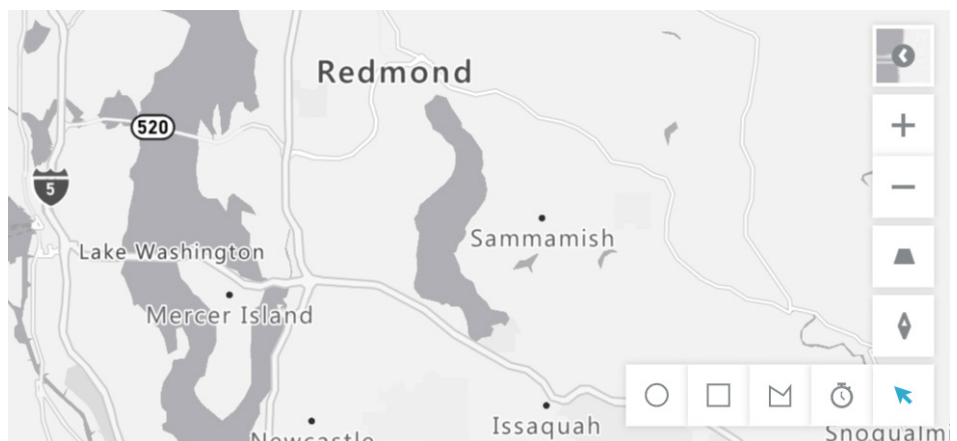
Advanced Data Selection in Azure Maps Visual

The Azure Maps Visual in Power BI provides multiple visualisation types (such as bubbles, 3D bar chart, real-time traffic etc.) that make it easy to envision your business data on a map and observe how different

parameters change across locations. In particular, there are new selection features that make it even easier to explore location data in Power BI.

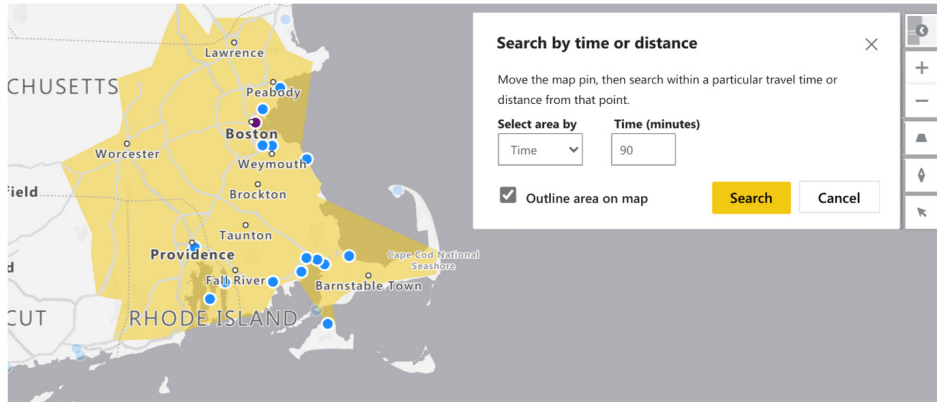
SELECTION CONTROL

This is a new selection control option, available in the toolbar, located on top right of the Azure Map Visual. You will now have no less than four new methods to select and interact with data on the map.



RANGE SELECTION

You may use this range selection method to select all data that is within a specified driving distance or driving time from a specified location. This method is especially useful to visualise the catchment area of a retail store, for example.



RADIAL SELECTION

If you click on the 'Circle' icon in the selection control bar, this will activate the radial selection mode. Then, click at a desired point on the map canvas and drag the mouse to the desired radius. A circular region centred on the

selection point highlights all locations within this given radial. Simply click again to complete the selection. Only selected points remain active on the map canvas. To cancel the selection, click anywhere on the map.

POLYGON SELECTION

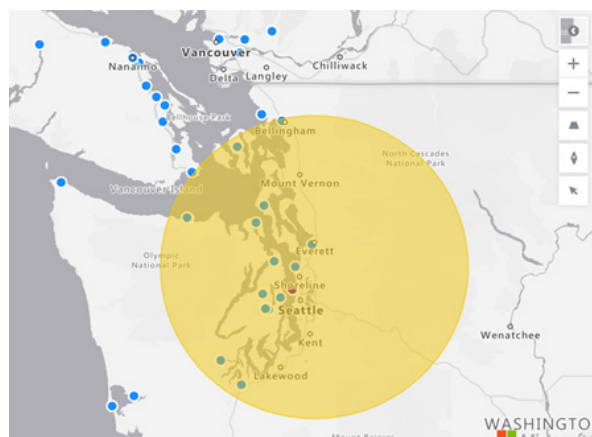
For fine grain control of what data to select, use this polygon selection. With the mouse-key pressed down, drag and draw any freeform shape to select data lying within the shape. To close the shape, just double click

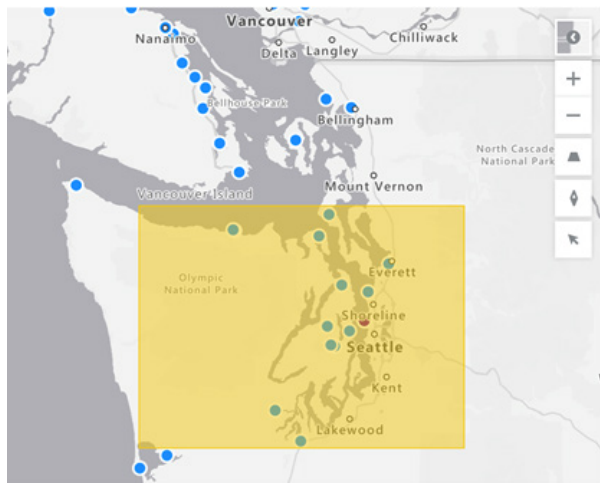
on the map. Without keeping the mouse-key pressed down, you can click anywhere on the Map to specify vertices of a polygon boundary and select data within the boundary.



RADIAL AND BOX SELECTION

The radial and box selection method provides the ability to make a selection on the map using a circle or rectangle drawn on the map canvas.



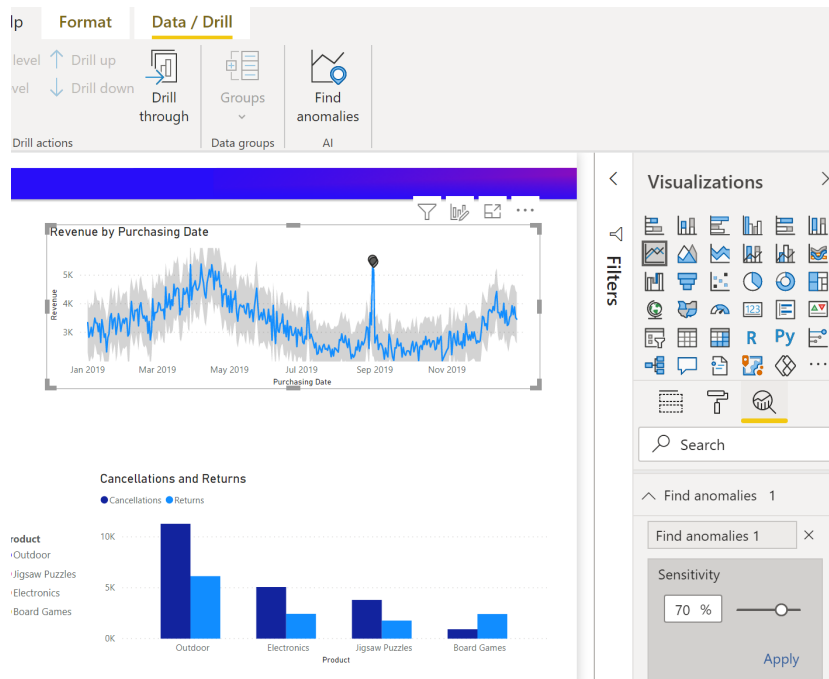


The new selection control is enabled by default. To turn on / off this selection control, edit the Azure Map Visual and go to the Format tab in the control panel. Locate the section titled 'Map Settings', expand it and make sure the 'Selection Control' toggle option is set to true (slide the control to the right).

Anomaly detection now in the Ribbon

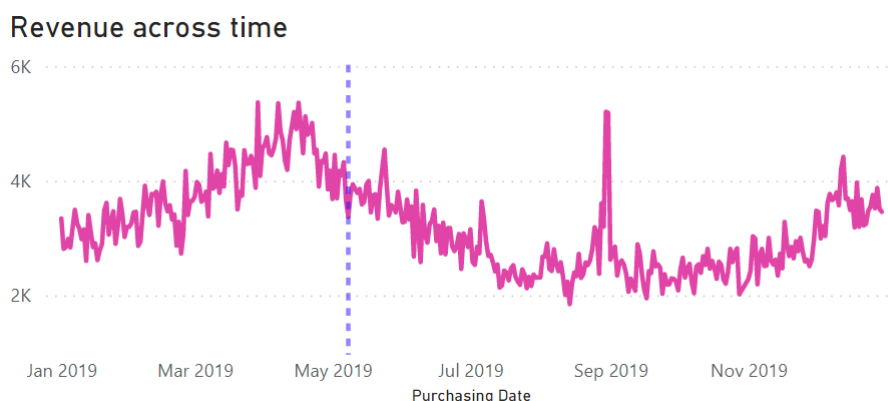
Again, late last year, Anomaly detection was available in Preview. Now, a new entry point has been added for the feature in the Ribbon under the

AI section of the Data / Drill tab. Further, Microsoft has also decreased the minimum number of data points required for the analysis to four [4].



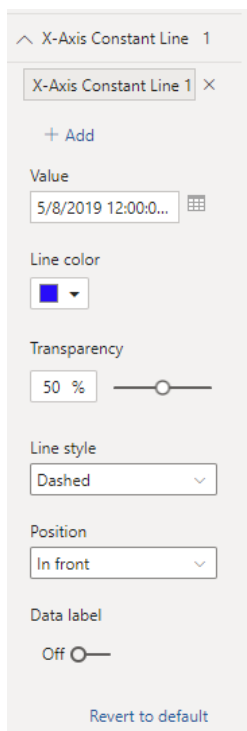
X axis constant line for line charts

Power BI now supports adding a x axis constant line in line charts for continuous type data.

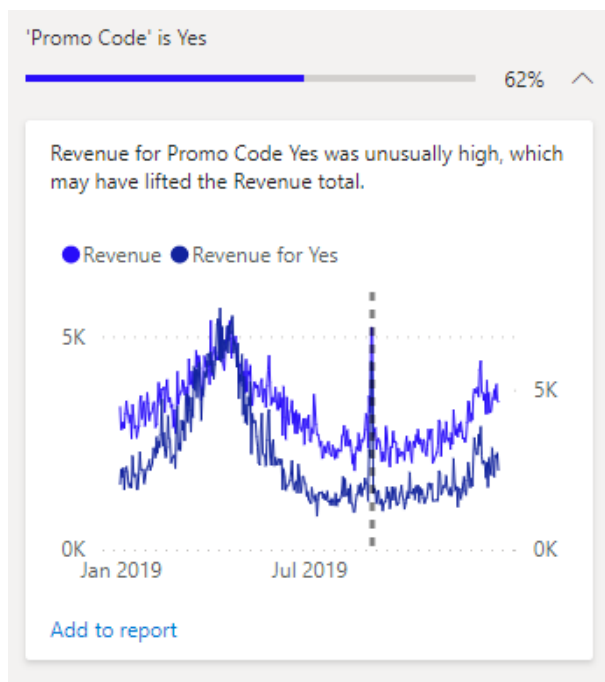


You can create this line by selecting 'Add' on the 'X axis constant line' from the Analytics icon in the Visualizations section. The value can be a date time or numerical value, depending upon your data. You may configure

all sorts of options for your line, from its Color, Transparency percentage, Line style, Position, Data Label, similar to the existing y axis constant line.



This constant line is used in visuals in the Anomalies pane to indicate the date time of the anomalies in the series.



Snowflake: Support for custom roles

Custom role support has now been added to the Snowflake connector. Specification of a role provides query-level granularity, as the role becomes part of the 'Source' step in each of the generated M queries,

providing more flexibility to users. In the connection experience, a new option under 'Advanced Options' of the Snowflake connector will allow users to specify a text value to use as the Role name.

Kerberos-based SSO for Denodo

This update provides you with an easier way to publish Power BI reports to the Service, that connect to Denodo, using DirectQuery leveraging Kerberos-based single sign-on, via the on-premises data gateway.

Certified Connectors

There is a new certified connector to add to the fold, Kognitwin, which allows users to connect to Kognitwin Energy (by Kongsberg), for advanced digitalisation and analytics.

There are also updates to the following nine certified connectors:

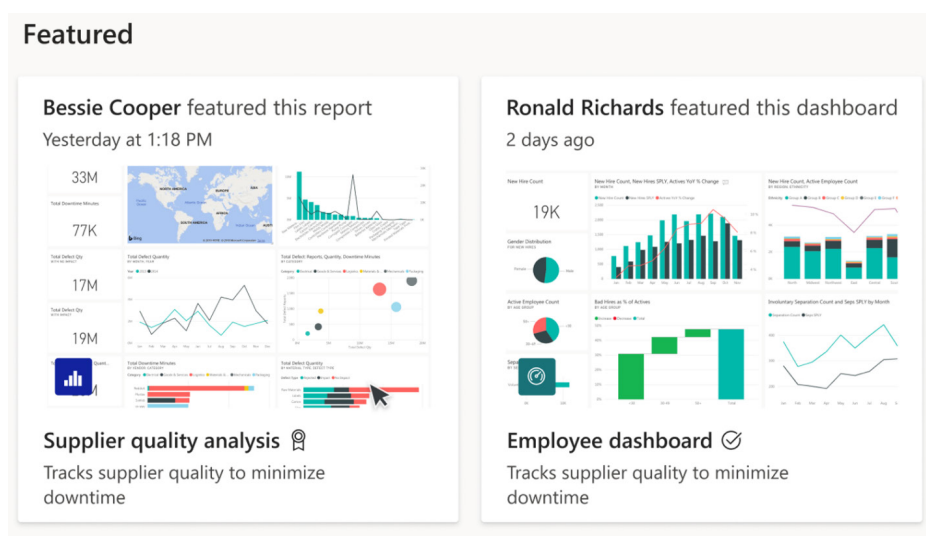
- Automation Anywhere
- Data Virtuality
- e-Way CRM
- Exasol
- FactSet
- IntelligentPlant
- MariaDB
- Vena
- Zoho Creator.

Email subscription attachment

In Power BI Service, you can now create a subscription from a premium upgraded workspace or with PPU for yourself and others and include a copy of all pages in your reports. This eliminates the need to subscribe separately to each section. It is similar to generating an export of the report. Attachments may be generated in either PDF or PPT.

Featured content on Home updates

The featured content on your Home page now includes metadata as to who featured the artifact. Additionally, endorsed content may also be featured in the same workflow.

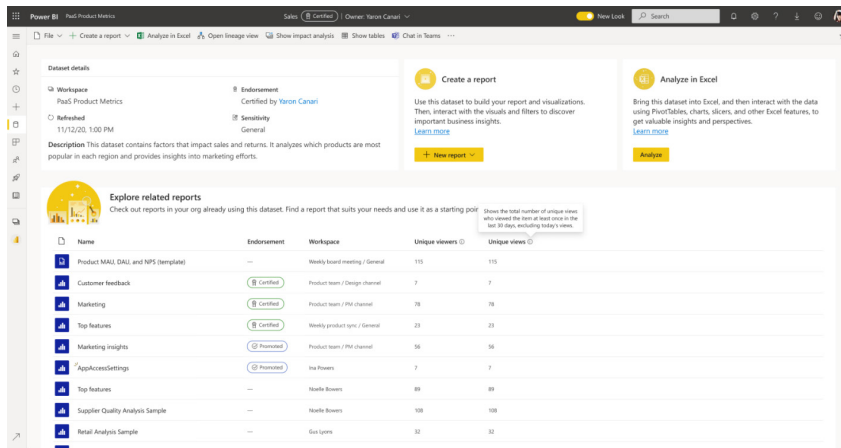


View dataset details from workspace List view

You can now open the dataset details page from the 'Workspace content list' view. When clicking on a dataset in the 'Workspace content list' view, the dataset details page is opened to provide meaningful information and quick actions, including:

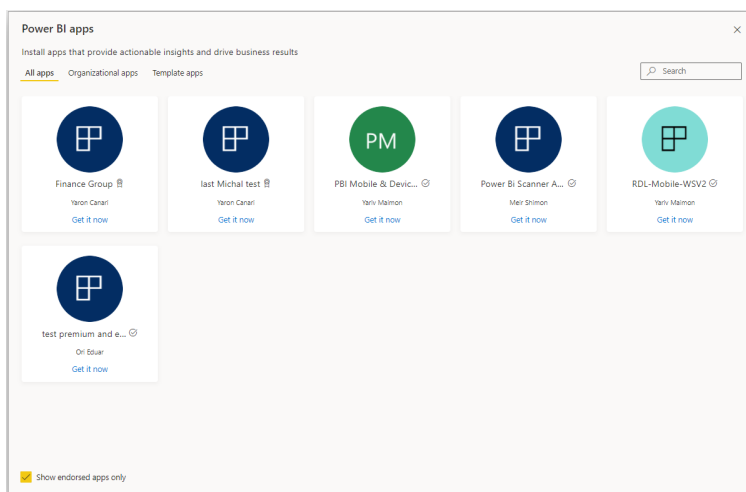
- information about the dataset including last refresh time
- list of reports that are built on top of the dataset (just reports that you have access to will be shown here)
- usage metrics for the past 30 days, including how many users and report opens were there for the last 30 days, not including today
- quick actions: view lineage, create a report and 'Analyze in Excel'
- create from template: if there is a template report defined for this dataset, you can quickly create a report from this template.

Please note that this feature is only available in the New workspaces.

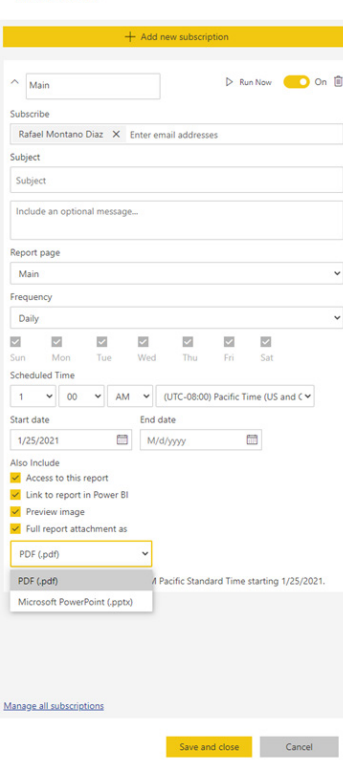


Filter apps gallery to view only endorsed apps

When getting a new app from the apps gallery you can choose to filter the gallery to view only certified and promoted apps. These apps were set by their owner as trusted.



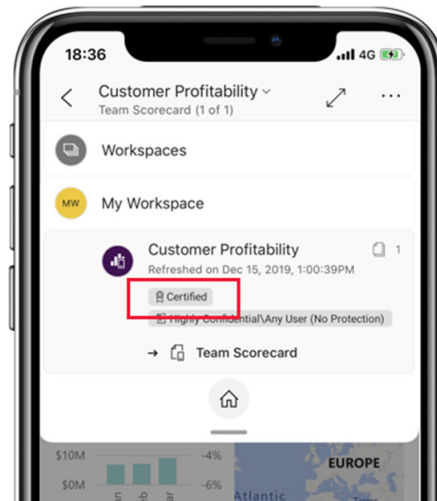
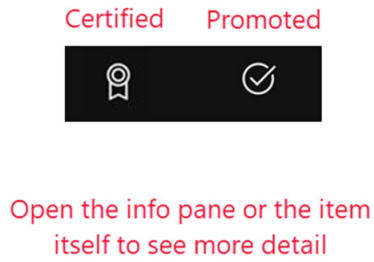
Subscribe to emails



Easily find your organisation's endorsed content using the Mobile app

In Power BI Mobile, content that has been promoted or certified in the Power BI Service is now tagged in the app with a badge. Report creators may promote their content to show that it is ready for you to use

(promoted) or certify their content to show that it has been approved by their organisation (certified).



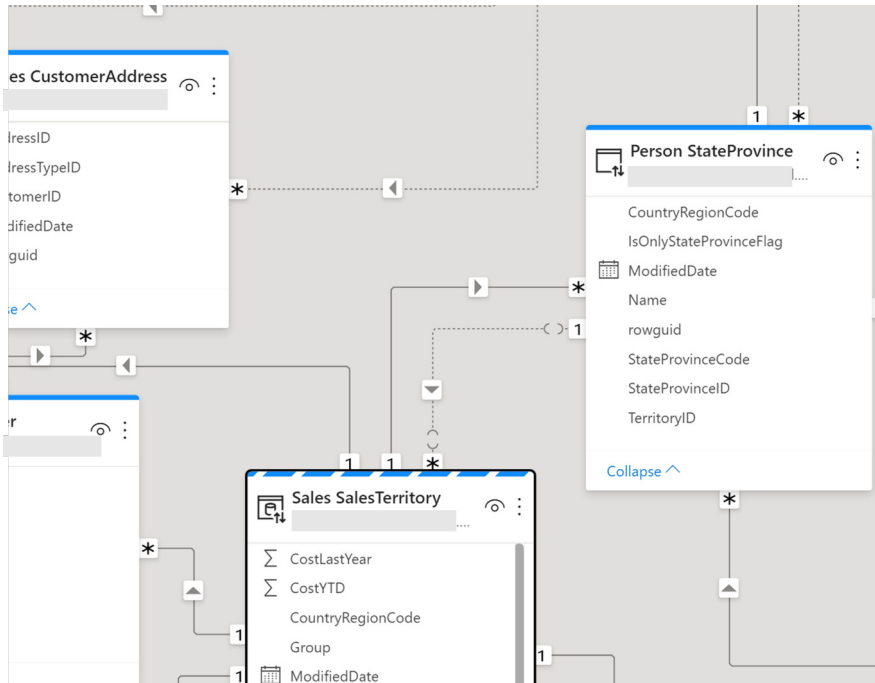
Power BI Free license users can now navigate to workspaces in the Mobile apps

Until now, Power BI Free license users could only access workspace content through the 'Shared with me' page. With this release, Power BI Free license users can view and access workspaces for which they have been added as viewers directly from the workspaces list.

However, there is a catch: this change is applicable only for content that is hosted on a Power BI Premium capacity.

Model View UI (Preview)

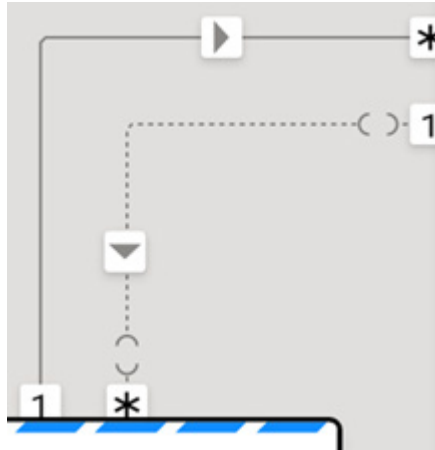
Microsoft has made some changes to how relationships look in your model diagram, viz.



The cardinalities are now shown at the end points of a relationship and the direction of the relationship is shown at the centre. These icons have also been increased in size to be more legible.

LIMITED RELATIONSHIPS UI

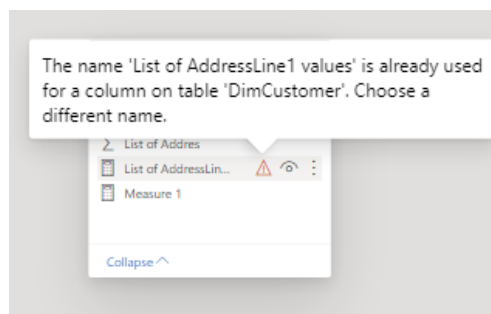
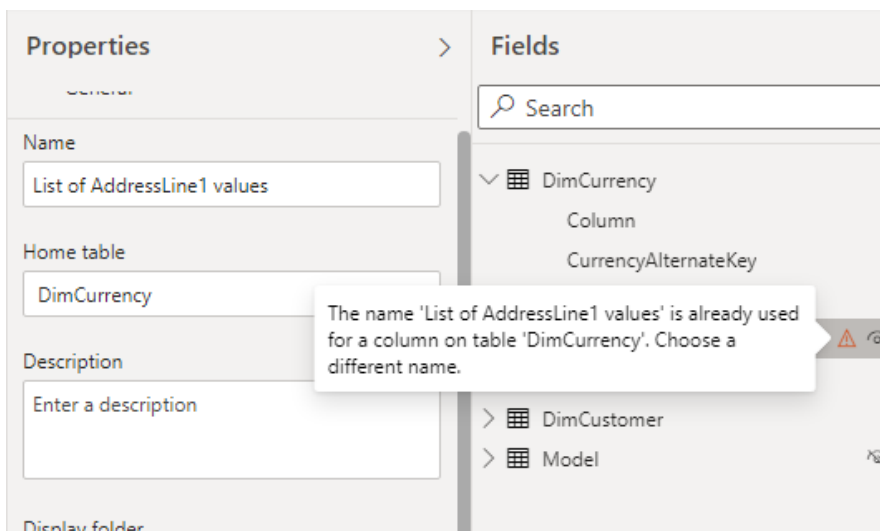
In the image of the new relationships look, you may have also noticed that an icon has been added:



This icon indicates a limited relationship and easily allows you to identify them in your model. In case you don't know, limited relationships are relationships between different source groups.

ERROR ICONS TOOLTIPS

When you are in live connect mode, errors on measures will display an error icon in the fields list and in the model diagram. When you hover over the icon, a ToolTip will display more information about the error on that measure:



IF.EAGER

A new function has been introduced to DAX. Ladies and gentlemen, please welcome **IF.EAGER**! This function has the same behaviour as the existing **IF** function, but the performance may differ due to differences in how the function is evaluated by the engine. **IF.EAGER** uses what is known as an “eager evaluation”, whereby the two branch expressions

(second and third parameter) are evaluated regardless of the condition (first parameter) being true or false. In contrast, **IF** uses strict evaluation, meaning it only executes one of the two branch expressions, depending upon the condition being true or false.

Using **IF.EAGER** (and thus eager evaluation) has performance benefits, specifically when the same calculation needs to be evaluated for both the branch and condition expressions. Consider the following example:

SalesEager := IF([Total Sales] > [Last Month Sales], [Total Sales], [Last Month Sales]-[Total Sales])

In the example above, the **Total Sales** measure is evaluated in the condition expression, as well as the branch expressions. Additionally, the **Last Month Sales** measure is evaluated both in the condition expression as well as in the second branch expression. This means that Power BI will evaluate **Total Sales** three times when using the **IF** function, because it

is included in both branch expressions and when the expression is false, Last Month Sales will get evaluated twice.

However, switching to **IF.EAGER** would mean that the branch expressions get evaluated regardless so the Power BI engine will evaluate **Total Sales** and **Last Month Sales** only once as it can reuse the evaluations for the condition expression. Note that this does **not** mean that you should always be using **IF.EAGER** instead of **IF** going forward. Indeed, Microsoft recommends using **IF**, unless you have this specific situation or have other performance issues.

CALCULATE filters now easier to use

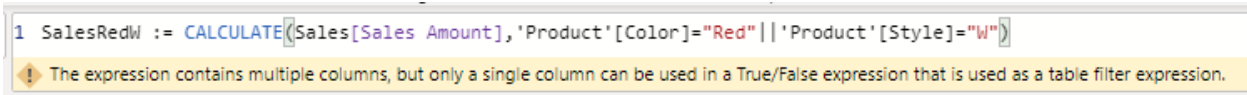
Power BI has now added extra flexibility in specifying multiple filters when working with the **CALCULATE** function. As an example, let's say you needed to calculate the sales amount for products that are either red or are part of a product line for women (style indicator 'W'). You already have a measure, **Sales Amount**, which is defined as:

Sales Amount := SUM(Sales[SalesAmount])

You might be tempted to try the following "old" Power BI DAX:

SalesRedW := CALCULATE(Sales[Sales Amount], Product[Color] = "Red" || Product[Style] = "W")

Unfortunately, this would not work:



In order to make this work, you had to add an explicit table filter, like in the following example:

SalesRedW := CALCULATE(Sales[Sales Amount], FILTER(ALL('Product'[Color], 'Product'[Style]), 'Product'[Color]='Red' || 'Product'[Style]='W'))

However, starting with this release, the first syntax you tried works. This is now perfectly valid DAX and will work without error messages:

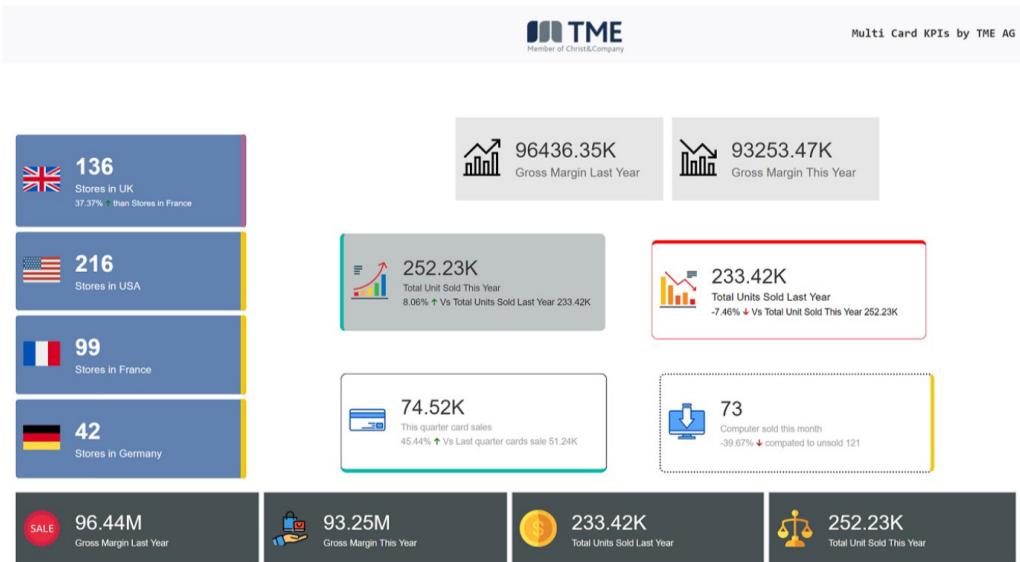
SalesRedW := CALCULATE(Sales[Sales Amount], Product[Color] = "Red" || Product[Style] = "W")

This makes it easier to build calculations that require multiple filters and complex combinations of conditions, such as **OR (||)** and **(&&)**.

New visuals

There are some new visuals for you to explore:

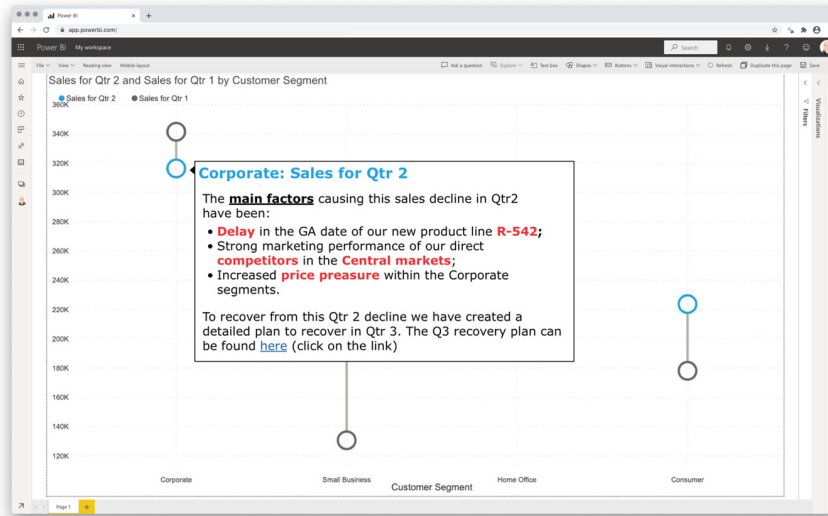
- Graphomate matrix
- ParaTaskCard
- SMART KPI List
- Lipstick Column Chart
- Lipstick Bar Chart
- Control Chart XmR
- ParaHTMLViewer
- Merged Bar Chart
- Animated Image and Bubble Chart
- Animated Bar Race Chart
- Dynamic Radial Bar Chart by JTA
- Text Highlighter
- Multi Card KPIs, by TME AG.



Shielded HTML Viewer by Nova Silva

Context is paramount when preparing data visualisation reports (charts and dashboards, to you and me). Power BI visuals that allow users to add HTML formatted content to their reports and dashboards are proving popular.

Whilst showing HTML formatted content can add value to your reports, it may also form a potential security risk. Shielded HTML Viewer is an HTML Viewer for Power BI certified by Microsoft that “shields” these risks.



The Shielded HTML Viewer (in the image above, it has been used in the ToolTip of a Dumbbell chart) is based on a so called “allow-list”: only those HTML tags and attributes mentioned in this list will be interpreted and formatted accordingly. Anything else will be ignored, so that there is no risk of running harmful HTML codes. Furthermore, all functionality

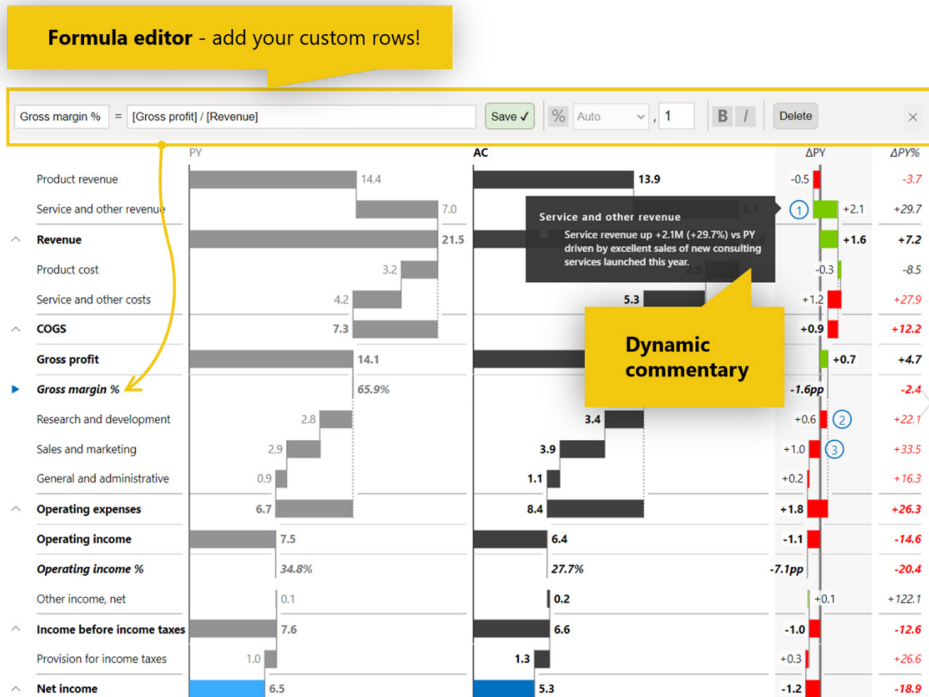
is available through the standard Power BI interface, so there is no need to learn a new interface.

This may be downloaded from the AppSource. All features are available for free to evaluate the Shielded HTML Viewer within Power BI Desktop.

Zebra BI Tables (version 4.5)

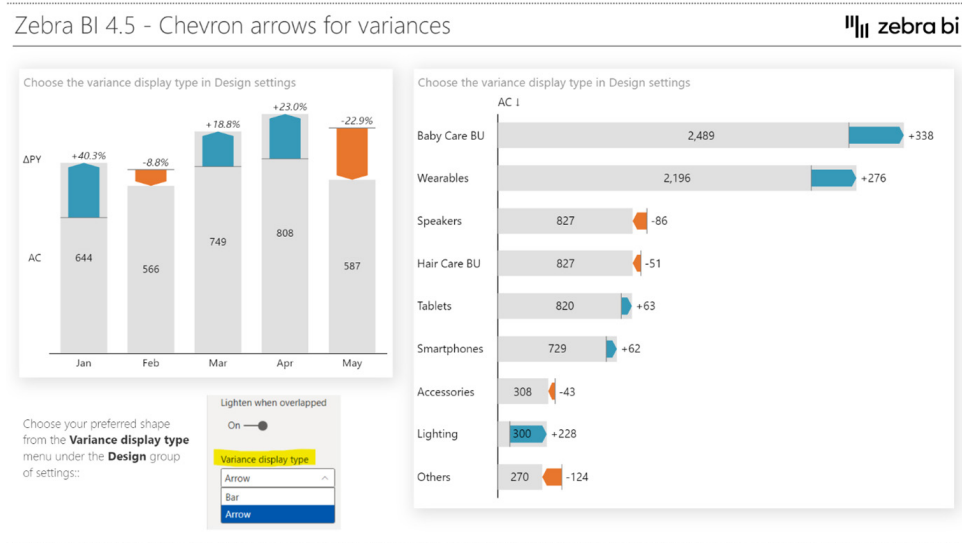
This Zebra BI Tables visual introduces a brand new formula editor so you can add custom-calculated rows directly in the visual. It also supports

dynamic commentary and has the ability to invert and rename groups in tables, amongst other new features.



Zebra BI Charts (version 4.5)

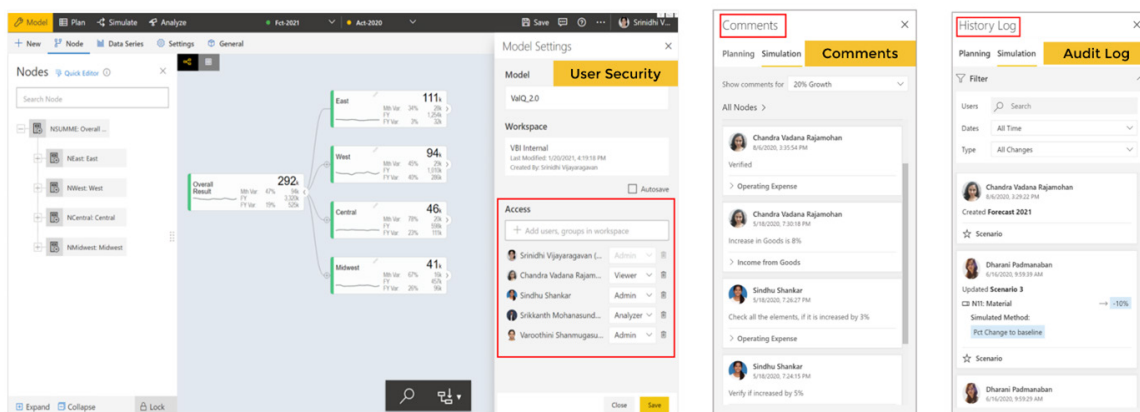
The latest version of Zebra BI Charts also contains several design improvements as well as the dynamic comments, similar to Zebra BI Tables. For example, you may now display variances with arrows pointing up / down or left / right to better distinguish between positive and negative variances:



This feature should be useful for people with colour vision deficiencies, since the variances are distinguished by shape as well as colour. Further, similar to Zebra BI Tables, the Zebra BI Charts visual also supports adding comment markers, comment ToolTips and dynamic linked comments.

ValQ 2.0 released with connected and collaborative planning features

ValQ 2.0 release for modern visual planning has several exciting new features. It's now completely free on Power BI Desktop.



New features include:

- **enterprise user security:** the software now allows / restricts user access to models, nodes, scenarios and planning series by user and groups
- **connected planning:** with the 'Model Merge' feature, it is now possible for users to merge and link multiple planning models
- **rolling forecasts:** YTD actual, budget and forecast data may be easily combined for the rest of the year
- **advanced analysis:** there is now an ability to perform attribution, variance and sensitivity analysis, which provides deeper insights across various business drivers
- **digital board room experience:** with touch support that makes interacting with models easier on TVs and mobile devices
- **collaborative planning:** share scenarios and models across business users with audit and commenting capabilities
- **data access options:** ValQ now offers enhanced export to XLS/CSV, Write Back API, Web URL for exporting the planning scenarios, analysis, model etc.

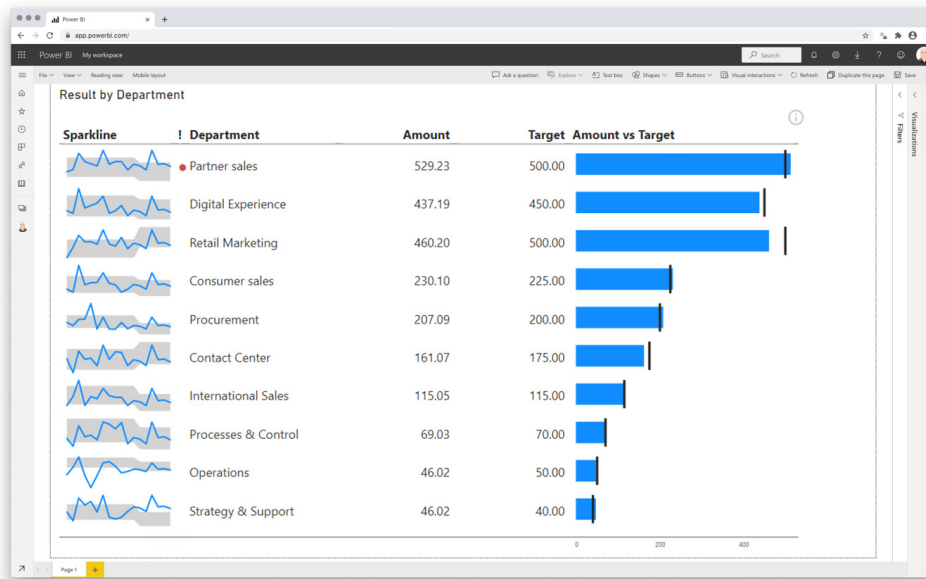
Drill Down Combo PRO by ZoomCharts

Combo PRO Visual by ZoomCharts lets you combine columns, lines and areas in one visual in any combination. Among the main features for the Combo PRO Visual by ZoomCharts, you will find:

- **on-chart interactions:** click, pan, zoom-in / out to explore multiple drill-down levels
- **multiple chart types:** choose between column, line and area chart for each series
- **stacking and clustering:** stack or cluster series, chose between series specific or cumulative (total) values
- **static and dynamic thresholds:** set up to three thresholds to demonstrate targets or benchmarks
- **full customisation:** customise x and y axes, legends, stacks, ToolTips, fill settings, outlines
- **multi-touch device friendly:** get equal experience on any device and many more.

SMART KPI List by Nova Silva

One important goal of any well-designed dashboard is to inform its readers by creating one overview of all KPI's. One suggestion might be to consider the SMART KPI List, which has been created specifically for this purpose.



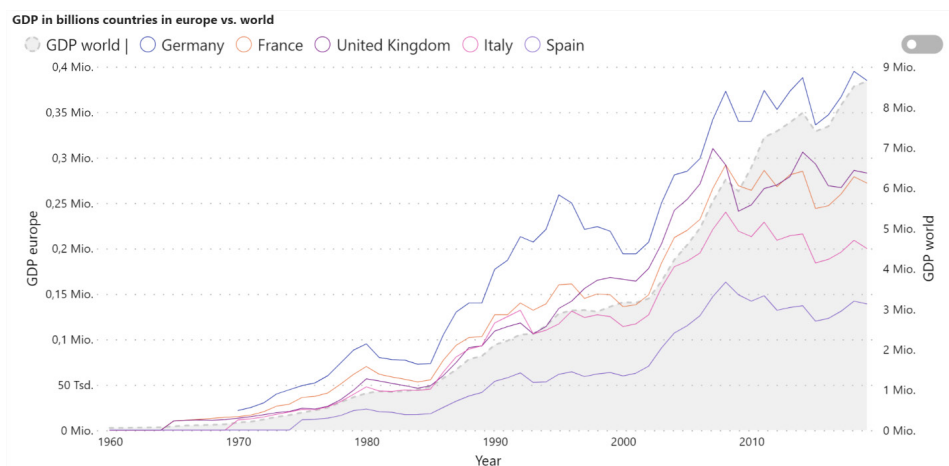
Just for clarification (in case you have been living in Uranus for the past few year...), **SMART** refers to:

- **Specific:** the red-dot highlights the KPIs that need immediate attention
- **Measurable:** a value alone is a weak indicator of performance; a sparkline shows the trend to determine if you are moving towards your goal
- **Achievable:** by comparing each result with a target, you can determine if your KPI has met expectations
- **Relevant:** within the sparkline, you may add a range of acceptable results which help you to identify “normal” and “abnormal” results from the past
- **Time-bound:** the sparkline adds the required historic context to each indicator to provide further information on each of the indicators’ signals.

You can download this visual from the AppSource. All features are available for free to evaluate within Power BI Desktop.

Comparison chart

If you have ever had the need to visually compare the development of figures, like “sales” or “order volume” with an index, then the Comparison Chart may help you. For example, you could create a chart that demonstrates the development of the gross domestic product of the top five countries in Europe compared to the world. As long as you have access to market data you can compare the development of your sales with the sales in the market.

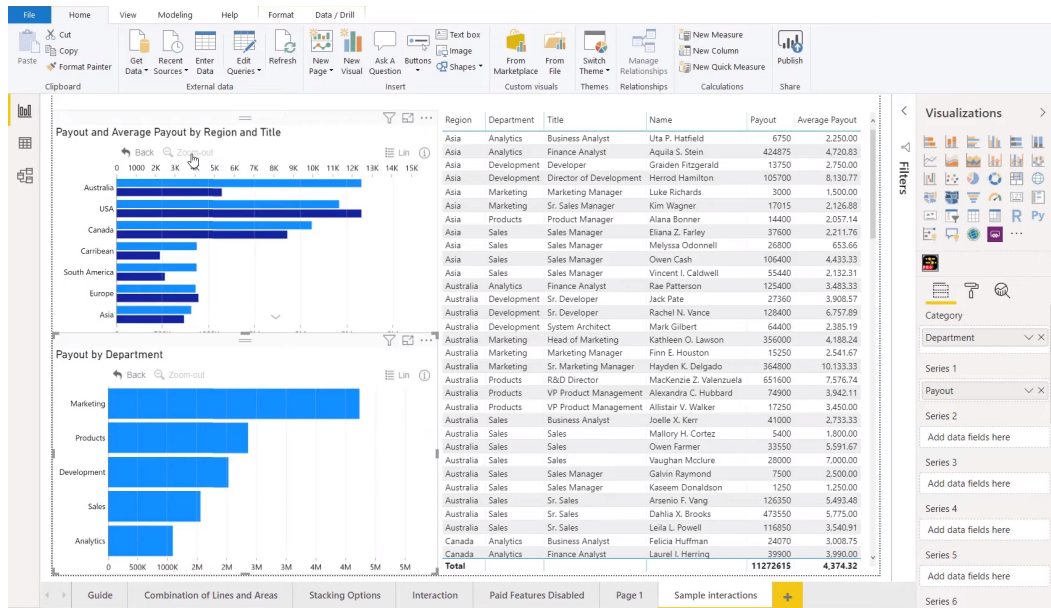


When using Power BI's default line chart you have to decide beforehand which products you want to visualise (via the "legend" or via measures for each product). The Comparison Chart offers you the ability to select

your top five products dynamically and visualise the index information on a second axis with numerous formatting options.

Again, this is located in the AppSource.

Combo Bar PRO visual



Combo Bar PRO Visual by ZoomCharts allows you to combine bars, vertical lines and vertical areas in one visual in any combination. It has been developed for efficient data exploration, with single touch / click drill down and drill up functionality.

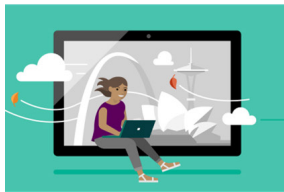
Main features include:

- **on-chart interactions:** click, pan, zoom in / out to explore multiple drill-down levels
- **multiple chart types:** choose between bar, line and area chart for each series
- **stacking and clustering:** stack or cluster series, choose between series specific or cumulative (total) values
- **static and dynamic thresholds:** set up to three thresholds to demonstrate targets or benchmarks
- **full customisation:** customise x and y axes, legends, stacks, ToolTips, fill settings, outlines
- **multi-touch device friendly:** the intentions is to get an equal experience on any device.

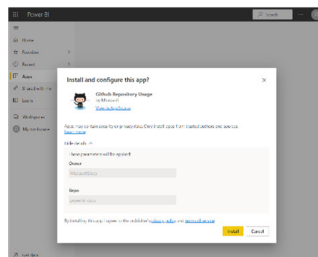
Microsoft partners: installing a preconfigured template app

Last December saw Microsoft announce a new capability that enables template application (app) publishers to provide preconfigured template app installation for their customers. When installing a template app, users had to configure parameters to connect the template app to their data. Users often found this step confusing and were unsure about

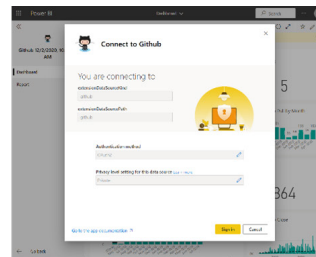
what information to provide, leading to many failed installations. Now, as a template app publisher you can preconfigure the template app installation, making life easier for users and eliminating a frequently encountered source of frustration.



Add "Install in Power BI" call to action to your website and pass parameters via API



User is redirected to Power BI and installs the template with the parameters

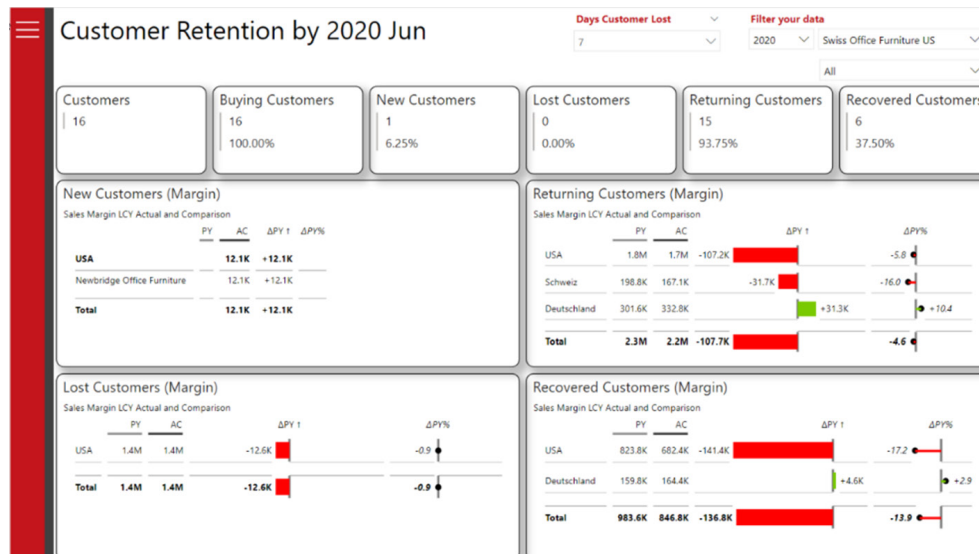


User opens the app and is prompted for credentials

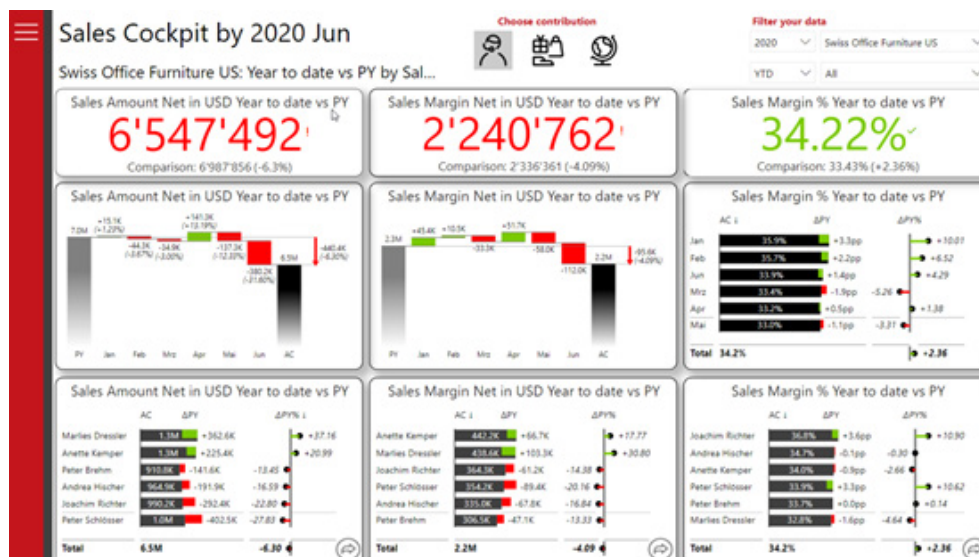
Sales analytics AI for Microsoft Business Central

With the Sales Analytics for Microsoft Business Central template app, you leverage your investment in Business Central. There are various benefits:

- here, you may drill-down to see the details of your salespeople, customers and items
- to understand customer behaviour and customer loyalty, you can use the customer retention report page. It shows which customers per country are new, returning, lost or recovered, and what the sales margin is compared to the previous year
- the dynamics segmentation creates price range, customer and item segmentations based on lifetime values
- the cross-analytics report page is the place to proactively explore your data and find deviations to address your actions.

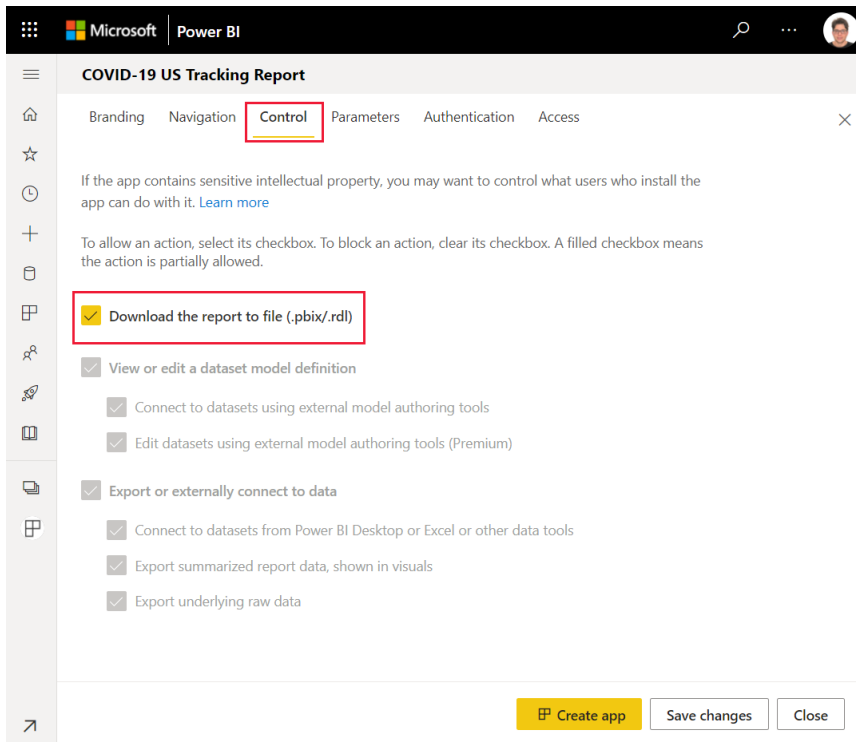


It may be worth downloading and installing the free Business Central Extension.

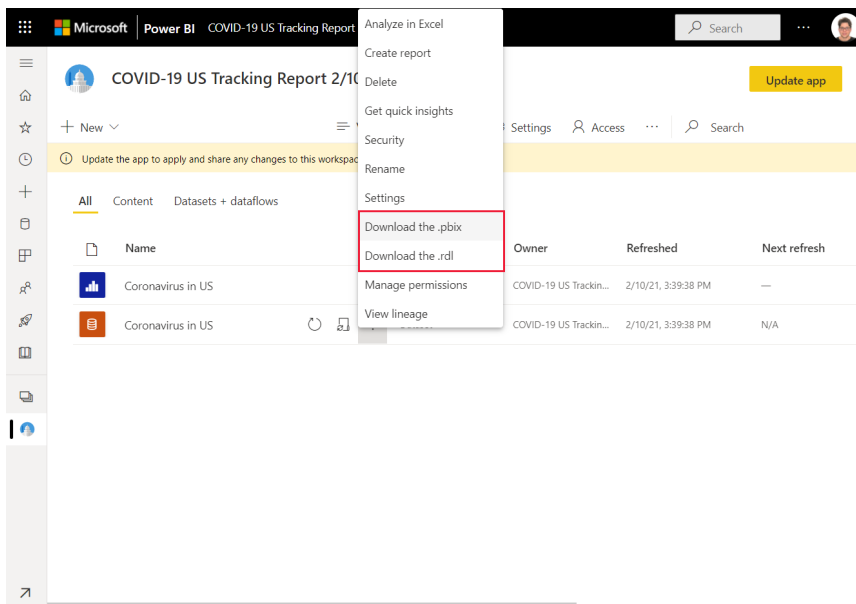


Download PBIX files for installed template apps

Starting with this update, if you are a template app publisher, you can now allow Power BI Pro users to download a PBIX file directly from your template app once they've installed it. All you have to do is turn on the download PBIX feature on the Control tab when you're creating your template app.



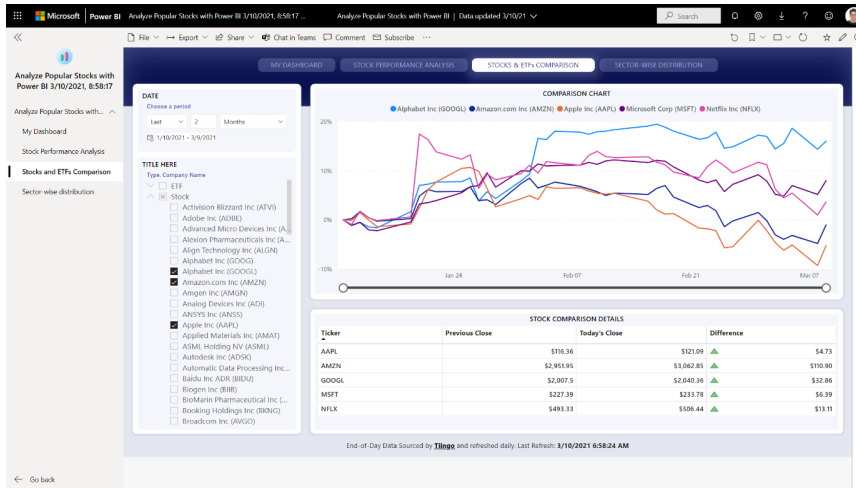
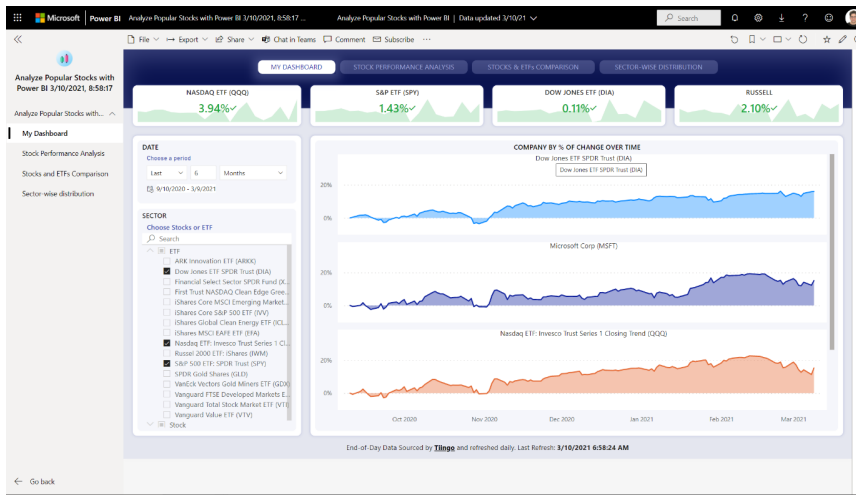
When PBIX download has been enabled for a template app, Power BI Pro users will be able to download the PBIX file from the report or template app workspace, viz.



Analyse popular stocks with Power BI

The 'Analyze Popular Stocks with Power BI' app (catchy name...) shows you multiple KPIs for imminent analysis. You may use it to track end-of-day quotes as well as weekly, monthly or annual trends for popular

stocks. Features include being able to track stock highs and lows, analyse moving averages, sector-wise distribution and Bollinger bands, plus construct performance comparisons for popular stocks over time.

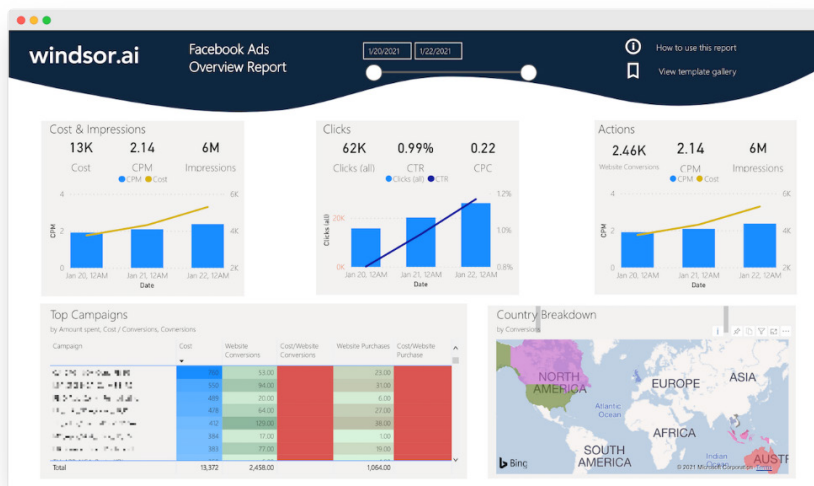


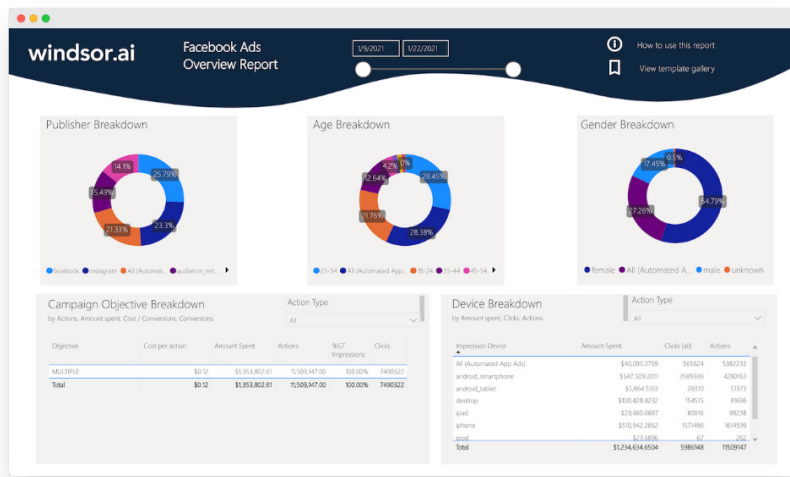
This is available on AppSource. The app may pull refreshed, end-of-day stock data without any additional subscriptions, although getting stock data requires a Power BI Pro license.

Facebook Ads Overview Report – by Windsor.ai

The first Facebook Ads template app has arrived for Power BI. This application helps advertisers and marketers connect Power BI to the Facebook Ads Insights API. It contains a connector, so that all you need to get started is access to a Facebook Ads account. As with other templates, this template app offers automatic data refresh, and you can set a date range to get historical data.

The app has two report pages which allow you to gain insights about Campaigns and Ad Sets:





A variety of breakdowns is available and includes breakdowns by country, age, gender, objective, device, publisher, etc. You can also find metrics about cost, CPM, impressions and clicks.

To get started:

- connect your Facebook Ads Data
- take note of the API key provided
- select at least one Facebook Ads account from the dropdown

- install the Facebook Ads Overview Report Power BI Template App
- enter the API key provided

- on the next screen click Sign In.

Your data will then load. This may take a while, depending upon the size of your data.

Visual container fix

Custom visuals didn't fully support the customise series. However, the fix is now available for both Power BI Service and Desktop.

EnumObjectInst with no datarole support

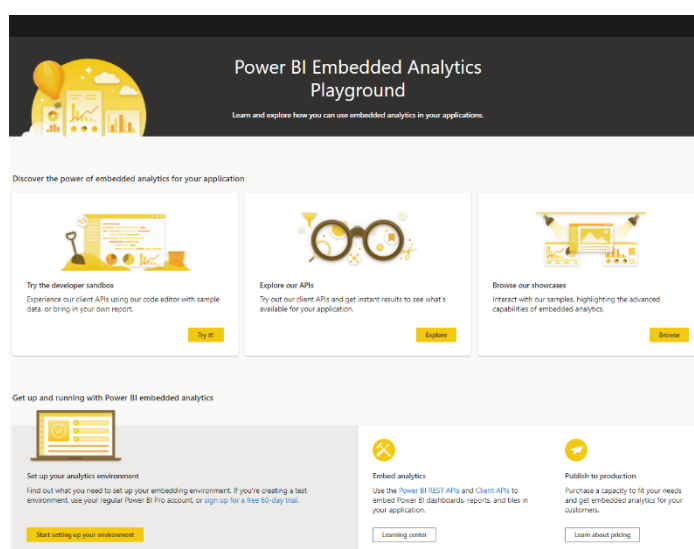
With the 3.6 API release, a Power BI visual can now receive updates from Power BI without the need to bind any data. In order to use this feature, a visual needs to:

- use the 'powerbi-visuals-api' 3.6.0 version
- have these capabilities:
 - 'supportsLandingPage' set to true
 - 'supportsEmptyDataView' set to true.

The new Power BI embedded analytics playground

The new Power BI Embedded Analytics playground was also announced in this update. It allows developers to get hands-on coding experience in Microsoft's developer sandbox, using samples or their own reports. Developers can discover and interact with client APIs and see instant

results. Additionally, you can check out the interactive feature showcases to get inspiration on how to apply the latest features to your applications.



Power BI Embedded Generation 2 (Preview)

The second generation of Power BI Embedded, referred to as Embedded Gen 2, became available recently for Azure subscribers to use during the Preview period. Embedded Gen 2 offers enhanced performance, greater scale, lower entry level for paginated report and AI workloads,

instant scaling and without downtime and improved metrics, that allow developers to auto-scale up and down, by scripting or using Azure Alerts rules.

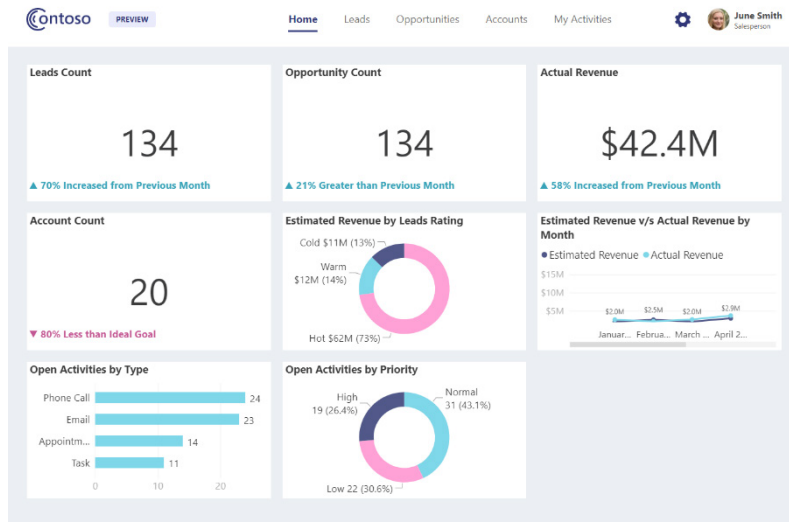
Power BI embedded analytics new Contoso demo

The new Power BI embedded analytics Contoso sales demo was recently introduced to users and Microsoft partners, allowing you to explore a data-driven application with customised dashboard views, built upon Power BI embedded analytics. Here, you may learn how a Microsoft Dataverse database with Row Level Security (RLS) ensures each user sees only the

data they have access to, see APIs in action including exporting, custom action buttons, writeback and Service Principal-based authentication. Most importantly, users may now browse the open-source code behind the demo via GitHub and customise with their own data.

To get started, simply:

- open the Contoso Sales Demo application
- select Salesperson
- select Enter in demo mode.

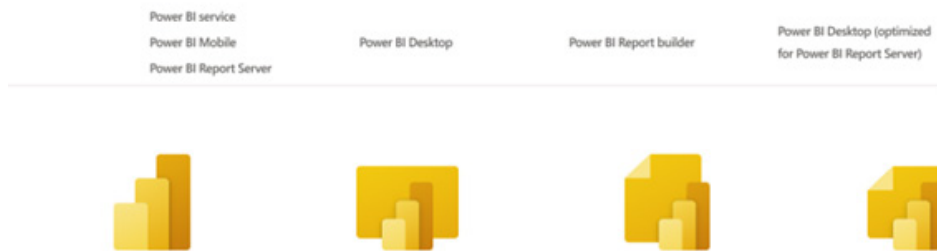


New Client API documentation

The new Client API documentation is now available. This has been a real added-value paragraph.

New icon update

Across the Power Platform Microsoft has updated their product icons to the new Fluent design system. Their intention apparently is "...to create brand consistency and bring a modern, full color (sic) experience...".



Advanced notice: Microsoft 365, including Power BI, ending support for Internet Explorer 11 and legacy version of Microsoft Edge

It's time to make a change. Any users still using Edge Legacy or Internet Explorer 11 will find products like Power BI will no longer support IE11 as of 17 August 2021. Microsoft Edge Legacy end of life is even earlier (9 March 2021 – which is before this newsletter comes out).



Paginated reports export API is now Generally Available

The export API for paginated reports only is now Generally Available. Users can take advantage of the export API in all A SKU's, P SKU's and Premium per user.

Windows 7 deprecation

If you're a Windows 7 user, it's important to note that Power BI Desktop stopped supporting Windows 7 back in January. Power BI Desktop is now only supported on Windows 8.1 or newer versions of Windows, and as always, for only the newest release of Power BI Desktop.

Certificate revocation check controls now available in Desktop interface

Last month, Microsoft introduced changes to the certificate revocation check to give you more fine-grained control over what is accepted as a valid certificate. This update sees further controls added in the Power BI Desktop Options. You can find these options in **Options -> Global -> Security**:

Check if your certificates have been revoked

Certificates ensure the security of your connections to online data sources. To be safe, you can check if a certificate has been revoked before connecting.

[Learn more](#)

- Comprehensive check | Reject certificates that have been revoked and certificates without revocation info.
- Basic check | Only reject certificates that have been revoked. Certificates without revocation information will be allowed through (which is important for some organizations with corporate proxy servers).
- None | We won't check revocation info. All valid certificates will be allowed through.

External Tools integration in Desktop Generally Available

With this release of Power BI Desktop, external tools integration has been made Generally Available. You can leverage a wide range of additional semantic modelling features, DAX query / expression optimisation and authoring utilities and application lifecycle management (ALM) capabilities in Power BI Desktop by using ALM Toolkit, Tabular Editor, DAX Studio, Metadata Translator, and many more open-source tools.

Along with GA, following additional enhancements have also been provided:

- support for dynamic format strings
- metadata translation
- object-level security (OLS).

Desktop change log

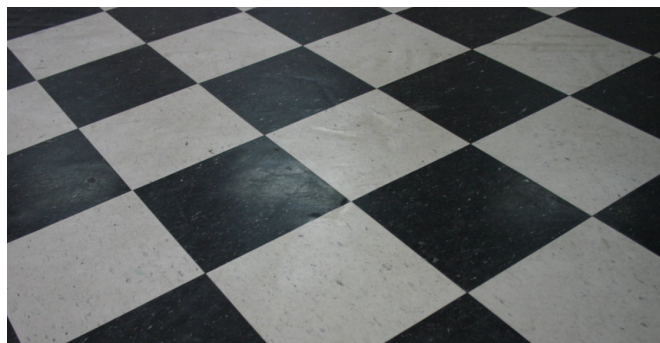
Many users have noticed frequent updates to Power BI Desktop being published outside of the regular monthly cycle. These updates mostly provide fixes to issues found with that month's release, which will be carried forward into the next month's release. However, Microsoft concedes they have not been very clear as to what fixes are included in each ad hoc update. Therefore, they have announced the Power BI Desktop change log so now you can see exactly what fixes are part

of what update. You can find it at <https://docs.microsoft.com/en-us/power-bi/fundamentals/desktop-change-log>.

If you download the installer from Microsoft.com you'll have to download each update manually. If you get Power BI Desktop through the Store – which is where Microsoft wishes to push you – you'll be delivered these updates automatically.

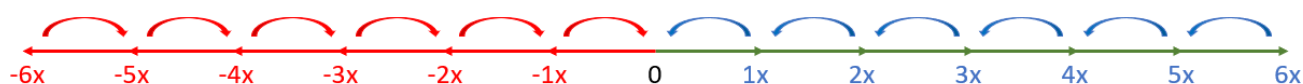
More next month, we're sure!

The A to Z of Excel Functions: FLOOR



After a night on the tiles, we found this image...

Have you found the **FLOOR** in this function? This function returns number rounded down, towards zero, to the nearest multiple of significance:



For example, if you are an American (which, let's be honest is all Microsoft really cares about) and you want to avoid using cents in your prices (that makes no cents) and your product is priced at \$4.44, use the formula **=FLOOR(4.44, 0.05)** to round prices down to the nearest nickel.

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

FLOOR(number, significance)

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

- **number**: this is required and represents the value you wish to round
- **significance**: this is also required. This is the multiple used for rounding.

It should be further noted that:

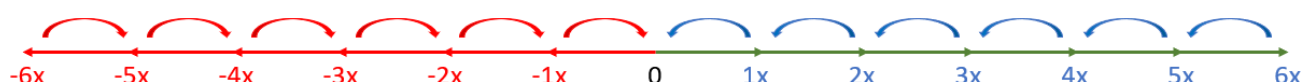
- if either argument is nonnumeric, **FLOOR** returns the **#VALUE!** error value
- regardless of the sign of **number**, a value is rounded down when adjusted towards zero. If **number** is an exact multiple of significance, no rounding occurs
- it is noted if **number** is positive, **significance** should be too
- if **number** is negative, positive **significance** will round **number** away from zero (that's right, a flaw in **FLOOR!**).

Please see our example below:

	A	B	C
1	Formula	Description	Result
2	=FLOOR(3.999,2)	Rounds 3.999 down to the nearest multiple of 2.	2
3	=FLOOR(-3.999,-2)	Rounds -3.999 up to the nearest multiple of -2.	-2
4	=FLOOR(-3.999,2)	Rounds -3.999 down to the nearest multiple of -2.	-4
5	=FLOOR(3.999,-2)	Produces an error as a positive number must have a positive significance.	#NUM!
6	=FLOOR(0.239,0.01)	Rounds 0.239 down to the last multiple of 0.01.	0.23
7			

The A to Z of Excel Functions: FLOOR.MATH

Not to be confused with a floor mat... This function actually rounds a number down to the nearest integer or to the nearest multiple of significance (see below).



The **FLOOR.MATH** function employs the following syntax to operate:

FLOOR.MATH(number, [significance], [mode])

The **FLOOR.MATH** function is slightly more sophisticated than **FLOOR** and has the following arguments:

- **number**: this is required. This **number** is what is to be rounded (down for positive numbers)
- **significance**: this is optional. This represents the multiple to which **number** is to be rounded
- **mode**: also optional. For negative numbers, this controls whether **number** is rounded toward or away from zero.

It should be further noted that:

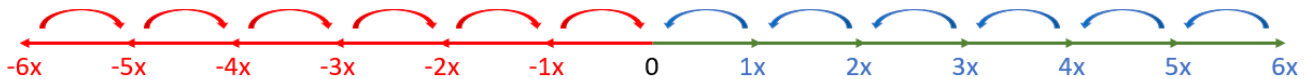
- by default, positive numbers with decimal portions are rounded down to the nearest integer, e.g. 6.3 is rounded down to 6, using the default **significance** (1)
- by default, negative numbers with decimal portions are rounded away from 0 to the nearest integer, e.g. -6.7 is rounded to -7
- by using 0 or a negative **number** as the **mode** argument, you can change the direction of the rounding for negative numbers. For example, rounding the **number** -6.3 with a **significance** of 1 and a **mode** of -1 rounds toward zero (0), to -6
- the **significance** argument rounds the **number** down to the nearest integer that is a multiple of the **significance** specified. The exception is where the number to be rounded is an integer. For example, for a **significance** of 3, the **number** is rounded down to the last integer that is a multiple of 3
- if **number** divided by a **significance** of 2 or greater results in a remainder, the result is rounded down.

Please see our next example below:

	A	B	C
1	Formula	Description	Result
2	<code>=FLOOR.MATH(24.3,5)</code>	Rounds 24.3 down to the nearest integer that is a multiple of 5.	20
3	<code>=FLOOR.MATH(6.7)</code>	Rounds 6.7 down to the nearest integer.	6
4	<code>=FLOOR.MATH(-8.1,2)</code>	Rounds -8.1 down (away from zero) to the nearest integer that is a multiple of 2 (-10).	-10
5	<code>=FLOOR.MATH(-5.5,2,-1)</code>	Rounds -5.5 up (towards zero) to the nearest integer that is a multiple of 2, with a mode of -1, which means it actually reverses the specified rounding direction for negative numbers.	-4

The A to Z of Excel Functions: FLOOR.PRECISE

Last of the three! This function returns a number that is rounded down to the nearest integer or to the nearest multiple of significance. Regardless of the sign of the number, the number is rounded down. However, if the number or the significance is zero, zero is returned.



The **FLOOR.PRECISE** function employs the following syntax to operate:

FLOOR.PRECISE(number, [significance])

The **FLOOR.PRECISE** function has the following arguments:

- **number**: this is required and represents the value to be rounded
- **significance**: this is optional. This is the multiple to which number is to be rounded
- if **significance** is omitted, its default value is 1.

It should be further noted that:

- the absolute value of the multiple is used, so that the **FLOOR.PRECISE** function returns the mathematical **FLOOR** irrespective of the signs of **number** and **significance**
- like **CEILING.PRECISE**, Excel's intellisense (*i.e.* the AutoComplete) does not appear to recognise this function – but it still works.

Please see our final example below:

	A	B	C
1	Formula	Description	Result
2	<code>=FLOOR.PRECISE(-4.3,-1)</code>	Rounds -4.3 down to the nearest multiple of -1.	-5
3	<code>=FLOOR.PRECISE(-4.3,1)</code>	Rounds -4.3 down to the nearest multiple of 1.	-5
4	<code>=FLOOR.PRECISE(4.3,1)</code>	Rounds 4.3 down to the nearest multiple of 1.	4
5	<code>=FLOOR.PRECISE(4.3,-1)</code>	Rounds 4.3 down to the nearest multiple of -1.	4
6	<code>=FLOOR.PRECISE(4.3)</code>	Rounds 4.3 down to the nearest multiple of 1 (the default value).	4
7	<code>=FLOOR.PRECISE(4.3,0)</code>	Returns zero if the number or the significance is zero.	0
8			

More Excel Functions next month.

Beat the Boredom Suggested Solution

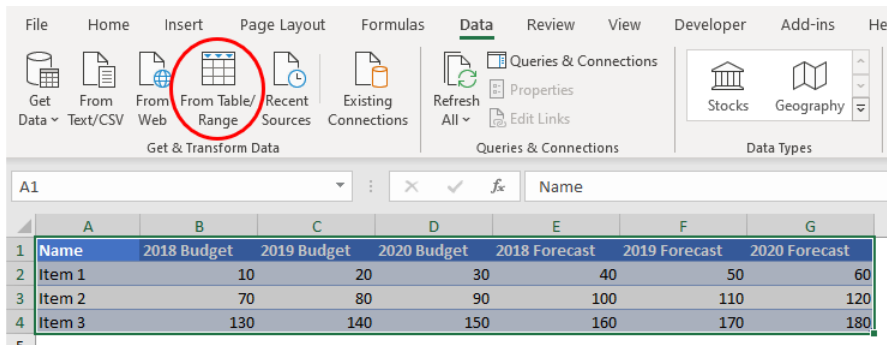
As a recap, earlier in this month's newsletter, we presented you with the following data:

Name	2018 Budget	2019 Budget	2020 Budget	2018 Forecast	2019 Forecast	2020 Forecast
Item 1	10	20	30	40	50	60
Item 2	70	80	90	100	110	120
Item 3	130	140	150	160	170	180

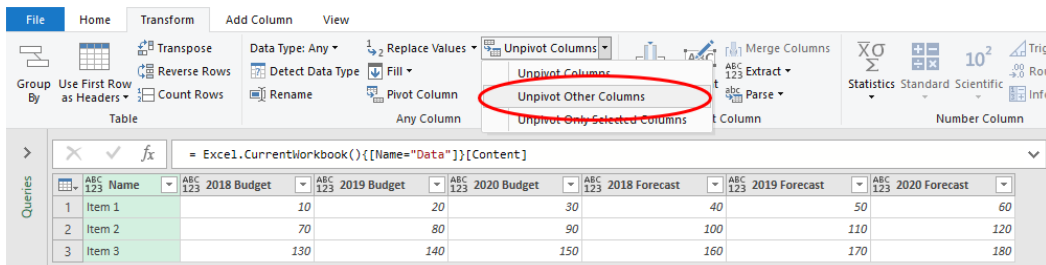
However, we want to present it as follows *automatically*:

Name	Year	Budget	Forecast
Item 1	2018	10	40
Item 1	2019	20	50
Item 1	2020	30	60
Item 2	2018	70	100
Item 2	2019	80	110
Item 2	2020	90	120
Item 3	2018	130	160
Item 3	2019	140	170
Item 3	2020	150	180

This sounds like a job for Power Query, which is our recommended approach. Therefore, the first thing we'll do is load the Table into the Power Query Editor, viz.



It was hinted earlier that this transformation fell in between an unpivot and a pivot. Well, I sort of lied – it's actually *one of each*. First, we need to unpivot. Therefore, once in the Power Query Editor, we select the **Name** column only and then choose 'Unpivot other columns' from the 'Unpivot columns' dropdown in the Transform tab, as pictured:

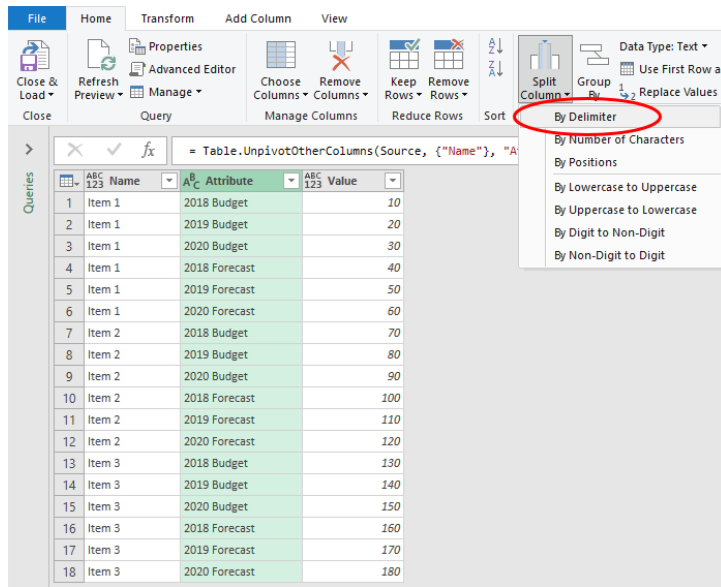


Note you don't select the **Budget** and **Forecast** columns and unpivot them. If you do that, if the number of years were to be added, these columns wouldn't be unpivoted. It's safer to unpivot everything except for the Name field, viz.

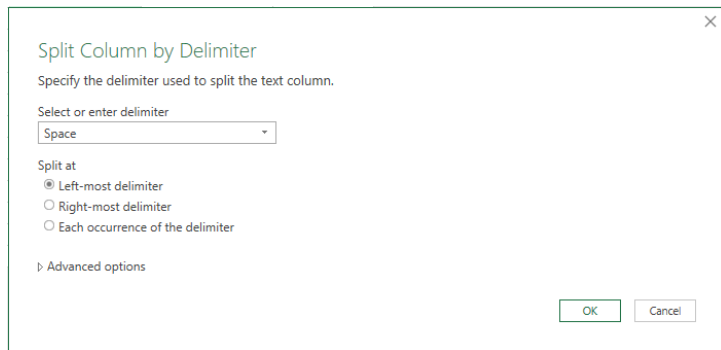
	Name	Attribute	Value
1	Item 1	2018 Budget	10
2	Item 1	2019 Budget	20
3	Item 1	2020 Budget	30
4	Item 1	2018 Forecast	40
5	Item 1	2019 Forecast	50
6	Item 1	2020 Forecast	60
7	Item 2	2018 Budget	70
8	Item 2	2019 Budget	80
9	Item 2	2020 Budget	90
10	Item 2	2018 Forecast	100
11	Item 2	2019 Forecast	110
12	Item 2	2020 Forecast	120
13	Item 3	2018 Budget	130
14	Item 3	2019 Budget	140
15	Item 3	2020 Budget	150
16	Item 3	2018 Forecast	160
17	Item 3	2019 Forecast	170
18	Item 3	2020 Forecast	180

If more fields appear (e.g. **2021 Budget**, **2021 Forecast**, **2021 Variance**), these would automatically unpivot too.

Next, we want to split the **Attribute** column up into year and whether it is Budget or Forecast (in this instance). To do this, we should split the column at the space in each text string. This space is known as a *delimiter*, so it makes sense to select the **Attribute** column and then choose to split the column by delimiter as follows:



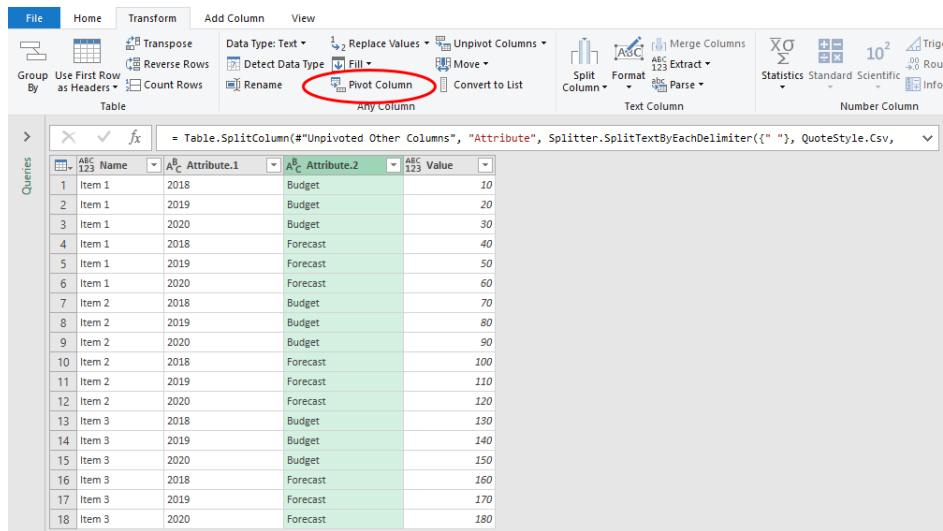
Bizarrely, this transformation is on the Home tab, not the Transform tab! Select the 'By Delimiter' option from the 'Split column' dropdown. This will generate the 'Split Column by Delimiter' dialog, where we will split on the first, left-most occurrence of the space delimiter.



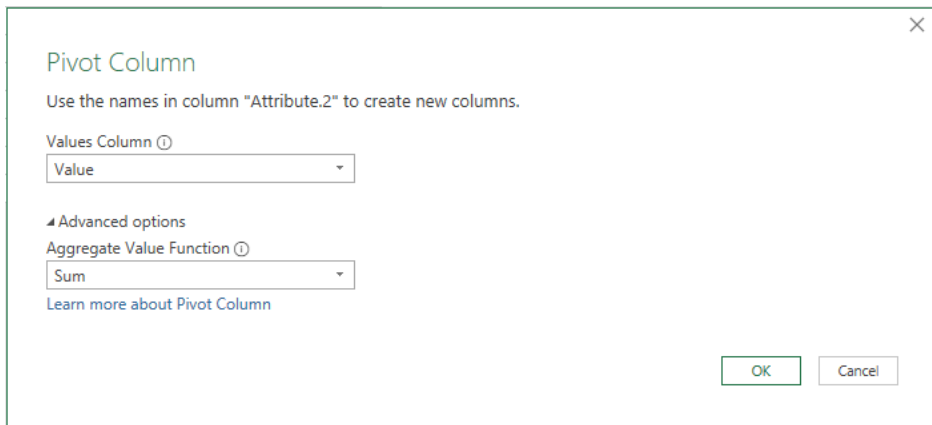
This results in the **Attribute** column effectively being split in two:

ID	Name	Attribute.1	Attribute.2	Value
1	Item 1	2018	Budget	10
2	Item 1	2019	Budget	20
3	Item 1	2020	Budget	30
4	Item 1	2018	Forecast	40
5	Item 1	2019	Forecast	50
6	Item 1	2020	Forecast	60
7	Item 2	2018	Budget	70
8	Item 2	2019	Budget	80
9	Item 2	2020	Budget	90
10	Item 2	2018	Forecast	100
11	Item 2	2019	Forecast	110
12	Item 2	2020	Forecast	120
13	Item 3	2018	Budget	130
14	Item 3	2019	Budget	140
15	Item 3	2020	Budget	150
16	Item 3	2018	Forecast	160
17	Item 3	2019	Forecast	170
18	Item 3	2020	Forecast	180

We are nearly there. We've decomposed (so to speak!), now we need to "re-compose". It's time to select the **Attribute.2** column and use it for a pivot:



Having selected the **Attribute.2** column, select 'Pivot column' from the Transform tab. This gives rise to the 'Pivot Column' dialog:



Ensure that it is the **Attribute.2** column that is used to create new columns. Then, select the **Value** field as the 'Values Column' and choose 'Sum' as the 'Aggregate Value Function' in the 'Advanced options', all as

pictured (above). This will then pivot the **Attribute.2** column, creating two columns, **Budget** and **Forecast**, summing the values which relate to each context:

ABC 123	Name	ABC Attribute.1	ABC 123 Budget	ABC 123 Forecast
1	Item 1	2018	10	40
2	Item 1	2019	20	50
3	Item 1	2020	30	60
4	Item 2	2018	70	100
5	Item 2	2019	80	110
6	Item 2	2020	90	120
7	Item 3	2018	130	160
8	Item 3	2019	140	170
9	Item 3	2020	150	180

All that's left to do now is rename the **Attribute.1** column to **Year** and load it back into Excel:

Name	Year	Budget	Forecast
Item 1	2018	10	40
Item 1	2019	20	50
Item 1	2020	30	60
Item 2	2018	70	100
Item 2	2019	80	110
Item 2	2020	90	120
Item 3	2018	130	160
Item 3	2019	140	170
Item 3	2020	150	180

Until next time.

Upcoming SumProduct Training Courses - COVID-19 update

Due to the COVID-19 pandemic that is currently spreading around the globe, we are suspending our in-person courses until further notice. However, to accommodate the new working-from-home dynamic, we are switching our public and in-house courses to an online delivery stream, presented via Microsoft Teams, with a live presenter running through the same course material, downloadable workbooks to complete the hands-on exercises during the training session, and a recording of the sessions for

your use within 1 month for you to refer back to in the event of technical difficulties. To assist with the pacing and flow of the course, we will also have a moderator who will help answer questions during the course.

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

Location	Course	Date	Date	Duration	Duration
Online (Australia)	Power Pivot, Power Query and Power BI	7 - 9 Apr 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	14 Apr 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	1 Day
Online (Australia)	Financial Modelling	15 - 16 Apr 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	2 Days
Online (Australia)	Power Pivot, Power Query and Power BI	10 - 12 May 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	17 May 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	1 Day
Online (Australia)	Financial Modelling	18 - 19 May 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	2 Days
Online (Australia)	Power Pivot, Power Query and Power BI	15 - 17 Jun 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	22 Jun 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	1 Day
Online (Australia)	Financial Modelling	23 - 24 Jun 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	2 Days
Online (Australia)	Power Pivot, Power Query and Power BI	19 - 21 Jul 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	26 Jul 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	1 Day
Online (Australia)	Financial Modelling	27 - 28 Jul 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	2 Days
Online (Australia)	Power Pivot, Power Query and Power BI	23 - 25 Aug 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	30 Aug 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	1 Day
Online (Australia)	Financial Modelling	31 Aug - 1 Sep 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	2 Days
Online (Australia)	Power Pivot, Power Query and Power BI	29 Sep - 1 Oct 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	6 Oct 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	1 Day

Location	Course	Date	Date	Duration	Duration
Online (Australia)	Financial Modelling	7 - 8 Oct 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	2 Days
Online (Australia)	Power Pivot, Power Query and Power BI	3 - 5 Nov 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	10 Nov 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	1 Day
Online (Australia)	Financial Modelling	11 - 12 Nov 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	2 Days
Online (Australia)	Power Pivot, Power Query and Power BI	8 - 10 Dec 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	15 Dec 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	1 Day
Online (Australia)	Financial Modelling	16 - 17 Dec 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	2 Days

Key Strokes

Each newsletter, we'd like to introduce you to useful keystrokes you may or may not be aware of. This year, we thought we'd revisit each function key in depth (there are 12 – one for each month of the year!). Given it's now April, let's look at the **F4** tips:

Keystroke	What it does
F4	In Excel: redo In Edit mode / Formula bar: toggle \$ references
ALT + F4	Close application
CTRL + F4	Close window
SHIFT + F4	Find Next (from most recent search)
ALT + SHIFT + F4	Close application
CTRL + ALT + F4	Close application
CTRL + SHIFT + F4	Find Previous (from most recent search)
CTRL + ALT + SHIFT + F4	Close application

Hey, it's not our fault so many do the same thing this month!

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

Our Services

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

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

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

Link to Others

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

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

Any Questions?

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

Training

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

Check out our more popular courses in our training brochure:



Drop us a line at training@sumproduct.com for a copy of the brochure or download it directly from www.sumproduct.com/training.

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