It's a soft CELL this month as we continue with our A to Z of Excel Functions series.

You might need a cup of **CHAR** afterwards...

Get & Transform updates take a back seat this month as all seems to be quiet on this front, but Microsoft has been busy in other areas. Power BI Desktop and Service have both been updated, and there's good news too for users of charts and Mac books too. There's the usual features (Power BI Desktop Updates and Keyboard Shortcuts) and more news about new efficiencies in Excel and our travel plans too.

Until next month.

Liam Bastick, Managing Director, SumProduct

#N/A No Longer a Waste of Space

Every now and then an improvement comes through in Excel that is truly newsworthy. Here's an item that many will be wanting! I am talking about *gaps in charts*.

The *#N/A* error is produced when a formula can't find what it's been asked to look for. It is also produced from the function **=NA()** which indicates no value is available. With the following dataset, *#N/A* is currently shown in a line chart as a connecting line. Microsoft has finally added the functionality for *#N/A* to be rendered as a blank:
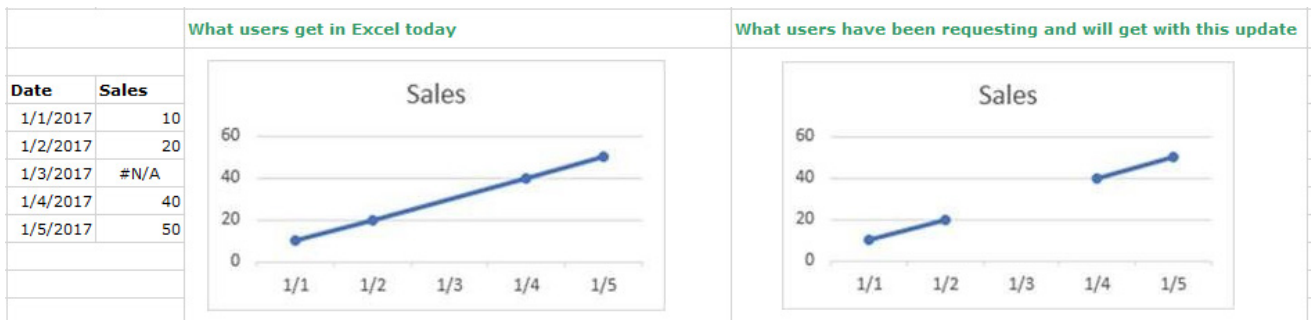

Let me back up a little. By default, data that is hidden in rows and columns in the worksheet is not displayed in a chart, and empty cells or null values are displayed as gaps. For most chart types, you can display the hidden data in a chart.

For line, scatter, and radar chart types, you can also change the way that empty cells and cells that display the *#N/A* error are displayed in the chart. Instead of displaying empty cells as gaps, you can display empty cells as zero values or you can span the gaps with a line. For *#N/A* values, you can choose to display those as an empty cell or connect data points with a line. The following examples show Excel's behaviour with each of these options.
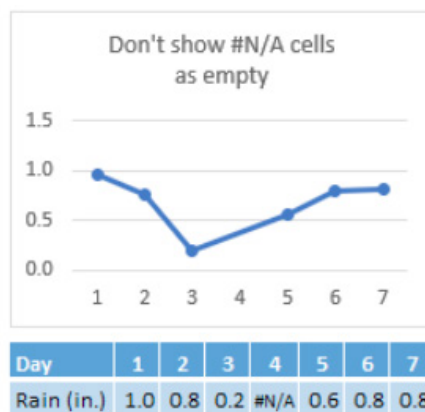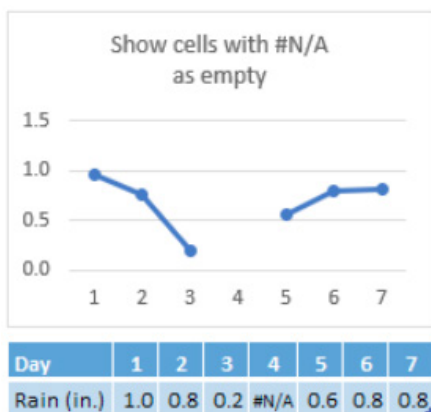
Options for showing empty cells

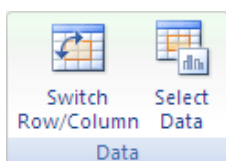OK, so this has been around for a while:
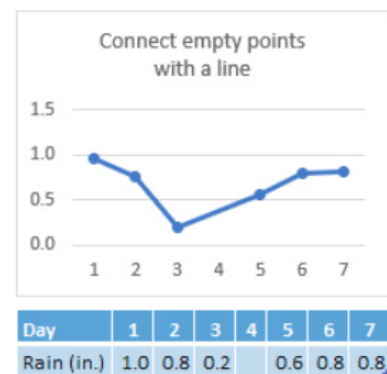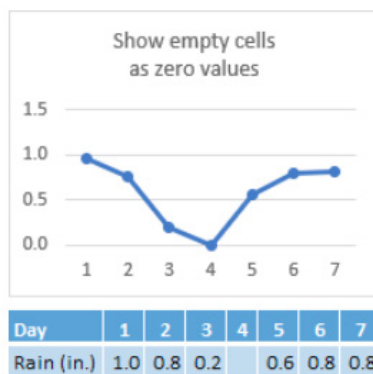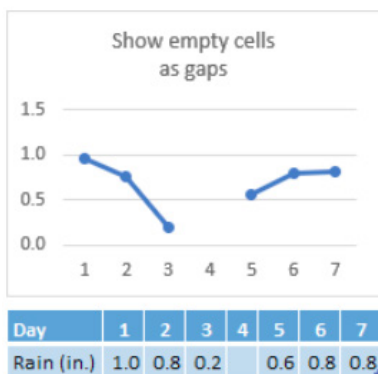
Options for cells with #N/A
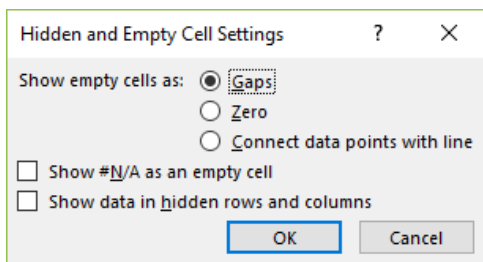
But this hasn't!

To change the way that empty cells, null *(#N/A)* values and hidden rows and columns are displayed in a chart:

- Click the chart you want to change
- Go to Chart Tools on the Ribbon, then on the 'Design' tab, in the 'Data' group, click 'Select Data':

- Click Hidden and Empty Cells:

- In the 'Show empty cells as:' options box, click 'Gaps', 'Zero', or 'Connect data points with line' as required
- It should be noted that on a scatter chart that displays only markers (without connecting lines), you can display empty cells as gaps or zero only — you cannot connect the data points with a line
- Click the Show #N/A as an empty cell' option if you don't want Excel to plot those points.

This feature is only available if you have an Office 365 subscription. If you are an Office 365 subscriber, make sure you have the latest version of Office. In order to maintain backwards compatibility with other versions of Excel, this feature is off by default.

Excel Office 365 Performance Improvements

You remember when you installed Office and the installation process asked you whether you wanted to submit telemetry back to Redmond? Well, some of you said "yes" and as a consequence, Microsoft has been identifying some specific examples of slow, high CPU or out of memory performance issues. These have included:

- Slow copying and pasting of one column, in a sheet comprising of lots of rows of data with many filtered
- Slow copying and pasting of many cells on a sheet with lots conditional formatting rules
- Slow performance or hanging when selecting cells after filtering or sorting rows from amongst lots of rows of data in a sheet
- High CPU opening a workbook with one or more sheets with lots of rows filtered, containing merged cells and / or grouping
- Slow when creating, deleting and / or editing sheet names in a workbook with lots of worksheets
- High CPU and / or out of memory errors opening a workbook with lots of formulae (with full column references (*e.g.* **VLOOKUP** over **A:A**) and / or multiple sheets
- Slow with deleting rows in a workbook with lots of formulae with full column references (*e.g.* **A:A**).

So, if you thought it was just you – it isn't. Microsoft has been busy fixing these issues. They have addressed each example above in the following ways:

- While copying and pasting, Excel is now more intelligent in detecting the need to trigger time-consuming object searches before initiating them
- While copying and pasting with conditional formatting (this is never a good thing!), the algorithm in Excel has now been "optimised" to consume time, proportional to the number of conditionally formatted cells involved
- While selecting cells in the visible sheet, after an operation, Excel re-renders (or at least evaluates) all rows top to bottom (including filtered rows) in the visible sheet. This may be expensive from a resource perspective, depending upon the number of rows and Excel's ability to calculate for animation related rendering (do consider turning this option off). This new optimisation caches prior rendered calculations for animation support and reduces time during each such calculation
- While opening a workbook and rendering lots of rows with merged cells, Excel is now more intelligent in detecting the need to perform time-consuming merged cell rendering calculations before actually calculating
- During sheet operations, the new fix ensures expensive sheet tab dimension calculations are performed optimally. Time savings here augment VBA to perform bulk sheet operations faster too
- While deleting rows that contain formulae with full column references, *e.g.* **A:A**, Excel optimises in bulk for all rows. This saves memory for such formulae and in turn reduces overhead for subsequent delete, edit and / or update operations involving them. However, we still strongly suggest never to have formulae reference an entire row or column.

These updates / optimisations / fixes apply to Excel O365 Version 16.0.8431.2058 or later updates, presently available to Office Insiders. Microsoft invites feedback – good or bad – on these modifications at for a such as www.excel.uservoice.com.

## Introducing Forms for Excel

Forms for Excel, powered by Microsoft Forms, has now replaced Excel Survey. This update, available for Office 365 Commercial and Education customers only presently, makes it simple and easy to collect information from users in the same organisation, to anyone in the world. Forms for Excel includes new features such as response time, responder name, images, videos, themes, and branching logic.

There are various ways you can create a form:

- OneDrive for Business: **CLICK + New**
- Document library of modern SharePoint team sites (O365 group backed): **CLICK + New**
- Excel Online: Click **Forms > + New Form**. The workbook is stored on OneDrive for Business or modern SharePoint team sites.
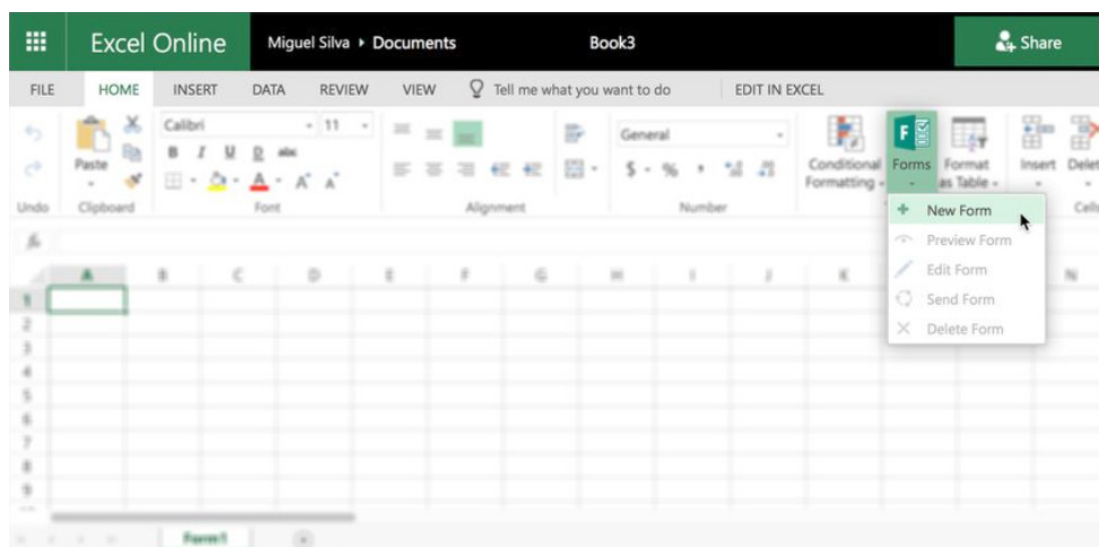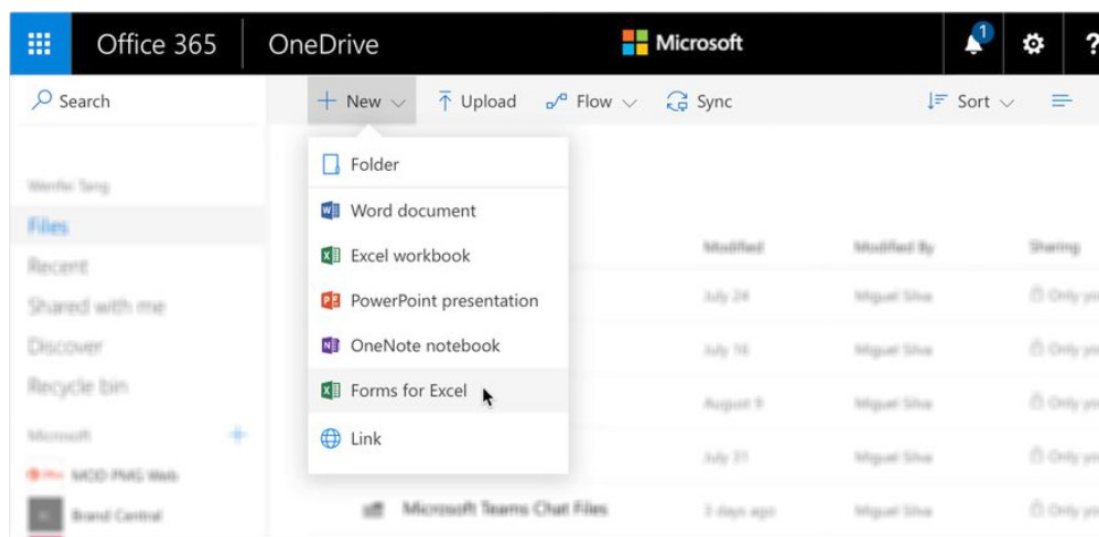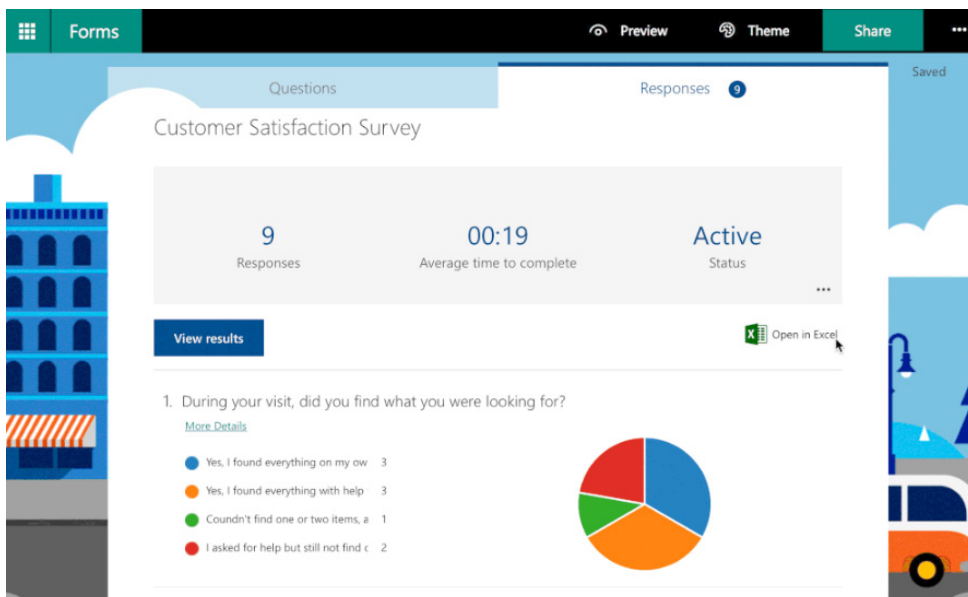
You can build a form in your Excel workbook from Excel Online, OneDrive for Business, or SharePoint Online.
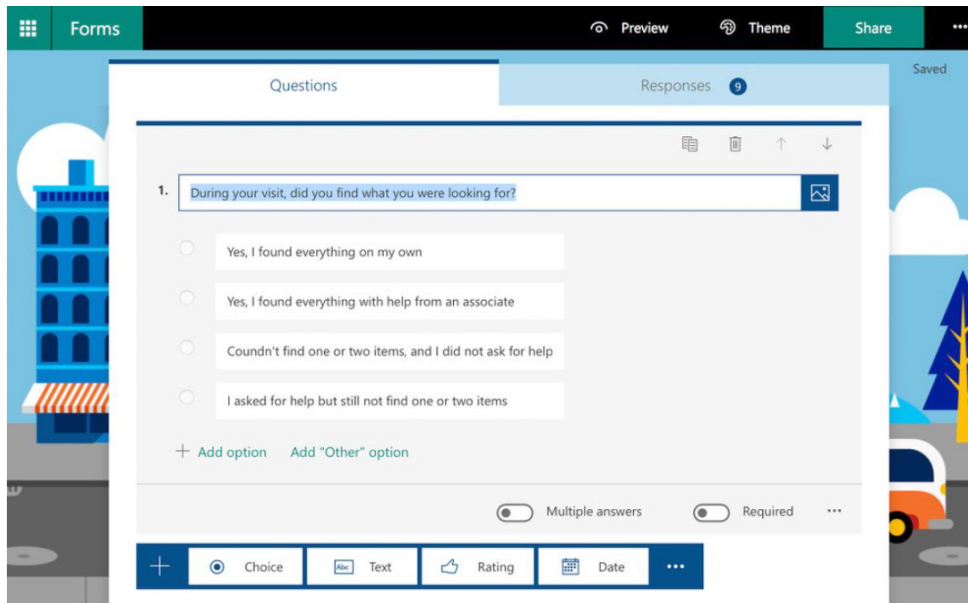
Whilst access to the forms may be limited, the forms themselves may be sent to anyone with the response data retained on OneDrive.
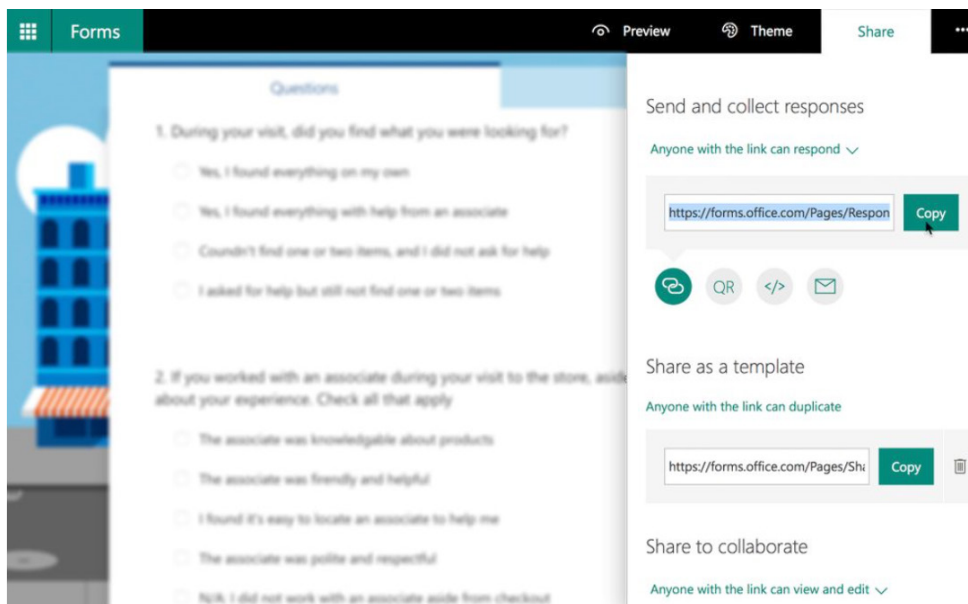
The results are available in real time, with charts available in Microsoft Forms and real-time response data readily available in your corresponding Excel workbook.

As stated above, this is presently available for Office 365 Commercial and Education customers only. It should also be noted that all existing Excel surveys you may have created will continue to work. Further, you can still use Excel survey if "external sharing" is enabled for your classic SharePoint team sites.

As always, the main concerns users have with these sorts of features concerns privacy and security of data. All data is primarily stored on servers of Microsoft Forms and all response data is automatically stored in your Excel workbook. You can find out more about Security and Compliance for Microsoft Forms at support.office.com/en-us/article/Set-up-Microsoft-Forms-cc52287a-4550-464d-9a1b-457bf9df2240?ui=en-US&rs=en-US&ad=US#ID0EAACAAA=Security_&_Compliance.

Excel for Mac gets a Makeover

There's a major version update for Excel for Mac just been released (in Preview right now). So far, it's just released to Insider Fast participants, but you can try it out by going to **Help menu > Check for Updates** and then opt into the Insiders program and choose 'Insiders Fast'.
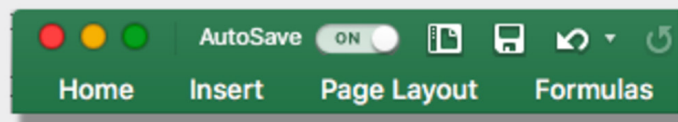
Whilst there are finally some long-awaited improvements and features, Microsoft has been busy under the hood and has been updating the architecture of the product. By the software company's own press release, it states that "...these early builds may be a little rough around the edges"!!

For those with an Office 365 subscription in Excel, co-authoring and the dreaded AutoSave for OneDrive and SharePoint files are now available. Changes are automatically saved as you work, and when you co-author with others, you can see their changes as they work in real-time. There's also the charts which have been available for some time to PC users - namely the Waterfall, Funnel, Histogram, Pareto, Box & Whisker, TreeMap and Sunburst visualisations.

If you don't have an Office 365 subscription, all is not lost. Visual Basic for Applications (VBA) has been updated for everybody. Some additional methods, properties and objects available to Windows Office users will now work on Mac as well. It's not perfect though. There are still differences between the Mac and Windows Object Model, so you will still see "not supported on this platform" for some elements.

Welcome to the 20th century Mac users. No doubt they'll put Excel in iTunes soon...

Power Query Pointers

Each month we'll reproduce one of our articles on Power Query (Excel 2010 and 2013) / Get & Transform (Excel 2016) 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 thought it was time for refreshments…

The ability to refresh data easily is a useful feature of Power Query. To begin with users are happy to carry this out manually by right clicking on an existing query.
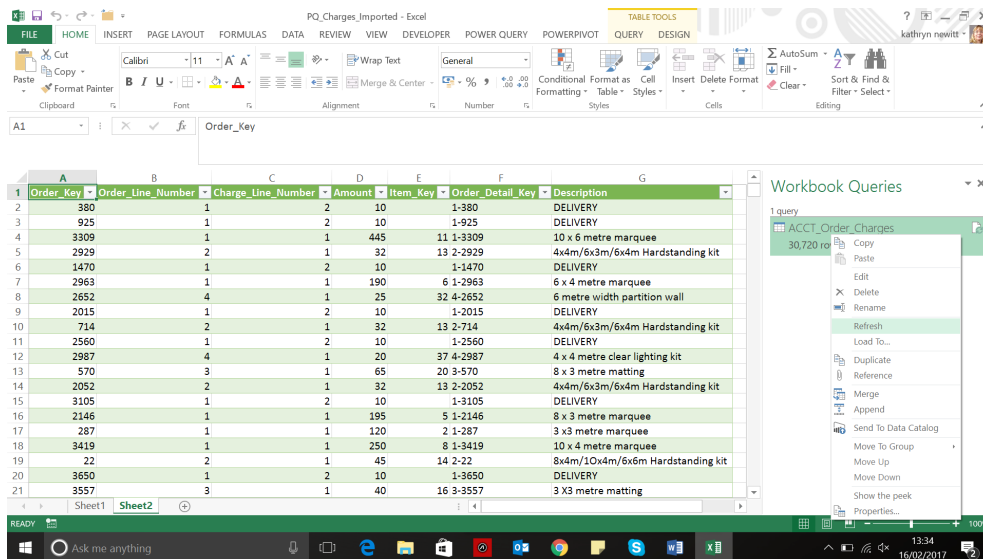
As queries are added to and the Excel model becomes more complex, automated refreshing seems an attractive option. There are several trigger points for refreshes, which require different methods to instigate them. A query can be set to refresh when a workbook is opened or at a specified time interval, from the Excel menus. These triggers can be extended to refresh Power Pivot too, since the refresh controls are held within the main Excel menus rather than as part of the Power Query (or Power Pivot) add-in.

The refresh options for queries created in Power Query are found on the 'Data' tab in Excel – there is a 'Connections' section which features a 'Connections' icon, clicking this brings up the 'Workbook Connections' screen. The screen below shows the connections for the merged query created in September's newsletter:
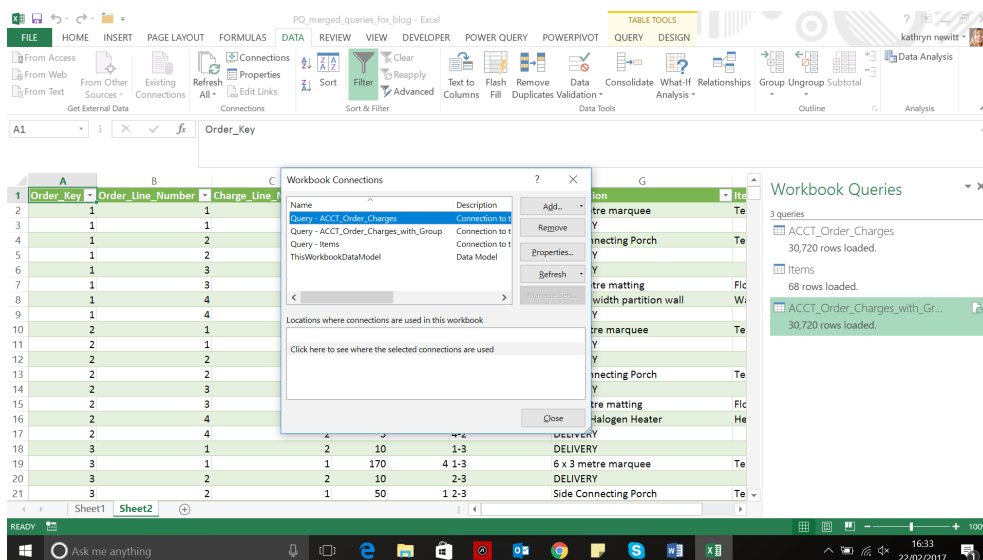
Having selected a query, you can look at the 'Properties' box, which includes a 'Refresh Control' section:
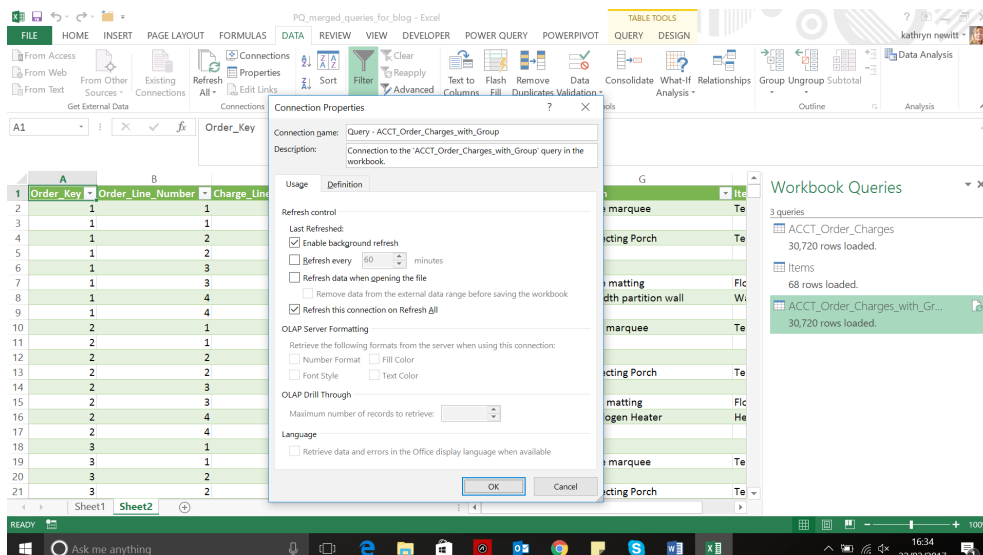
There are several checkboxes:

- Background refresh takes longer, but allow you to work whilst it's in progress. That's why it is the default, and should only be taken off for specific reasons as it will lock out users until complete
- Refreshing every **n** minutes only works while the workbook is open. It can be good for data that is frequently changing at source and can be used in conjunction with the background refresh setting
- Refreshing when opening the file does exactly what it suggests and can also be used in conjunction with the background refresh setting. This comes with an extra option to remove data from the external data range before saving the workbook; this option can be taken in order to save the workbook with the query definition but without the external data
- Refresh this connection on 'Refresh All' ought to be checked as a general principle otherwise end users may believer data is up to date when it is not.

If these options are not enough, then there are some VBA options, but only use these if the queries are not going to be ported to Power BI. A single connection or all connections can be refreshed on demand using VBA. To refresh all connections some specific VBA code, so let's look at simpler options here instead.

A macro can be constructed to refresh a single connection on the 'Developer' tab when the workbook is open. On the 'Developer' tab in the Excel Ribbon, there is an option to 'Record Macro'. Let's call it 'refresh' and provide a description which states what is being refreshed:
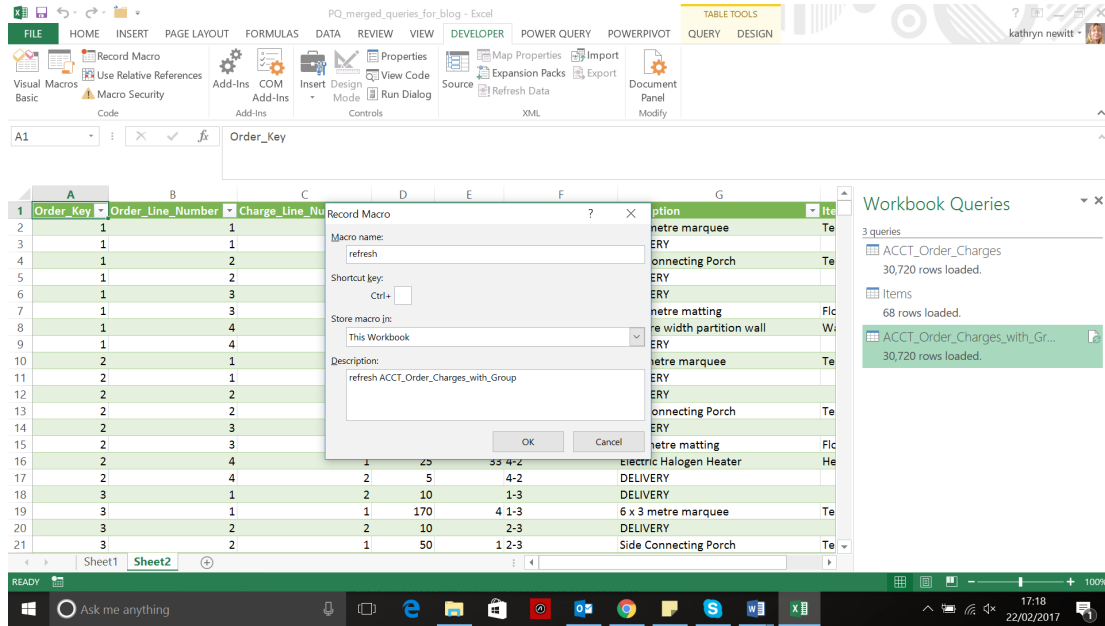
Having set up the macro, you then perform the action you want to record, by refreshing the *ACCT_Order_Charges_with_Group* query from the 'Connections' option on the 'Data' tab (say):
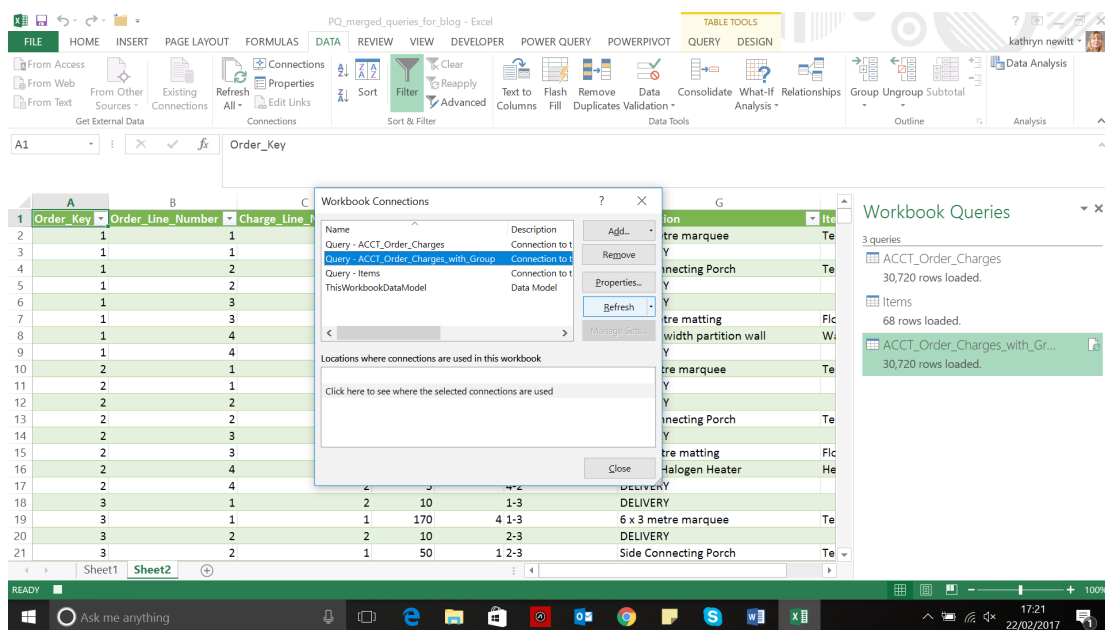
Then, you may stop recording by going back to the 'Developer' tab and choosing to 'Stop Recording':
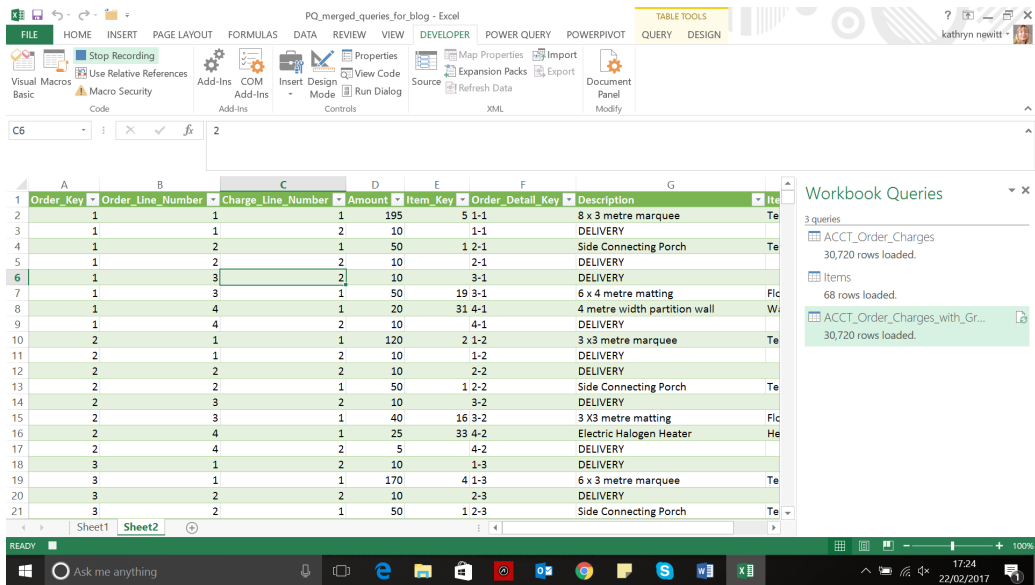
The macro may then be inspected. From the Developer tab under Macros, editing shows the VBA behind it:
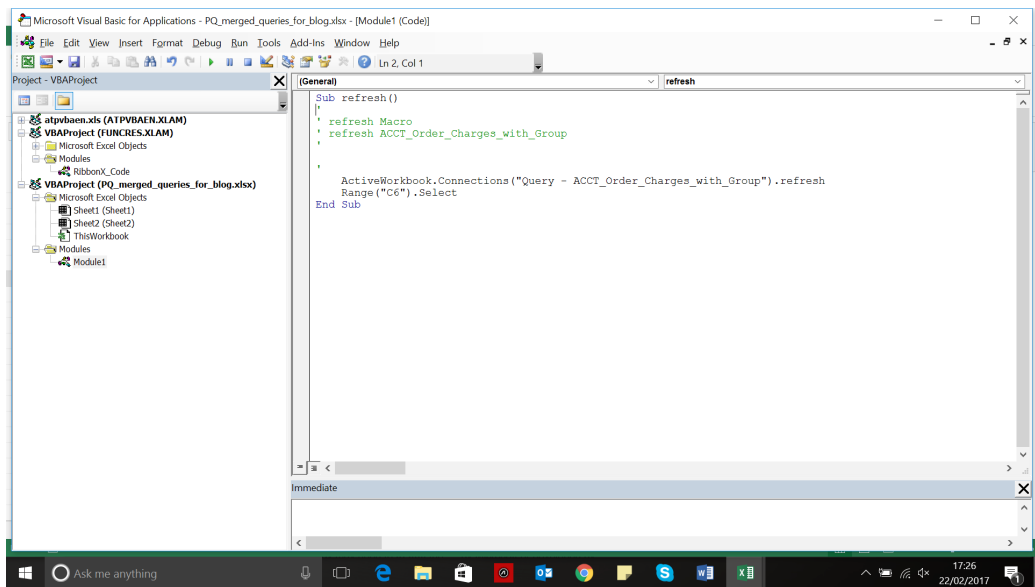
Whilst the refresh may be run from the macros section, it would be better to have a button. Still on the 'Developer' tab, in the 'Control' section, select 'Insert' 'Form Controls' – hovering over the icons tells us what they are, and in this case, you can choose the button icon. Once selected, the cursor turns into a '+' so that the button may be positioned. Having selected a location, you are then prompted for the macro that the button will run:
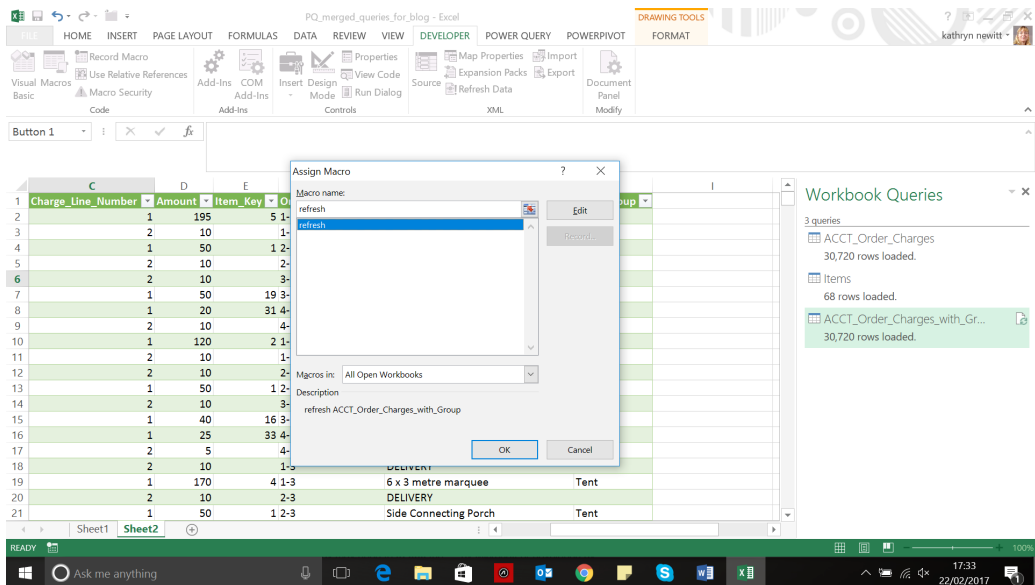
Give it an appropriate name. As long as you remember to save my workbook in .xlsm or .xlsb format (you will be warned if you try to save to .xlsx format), the button will be saved with the workbook, allowing you to refresh my connection without using the menus.
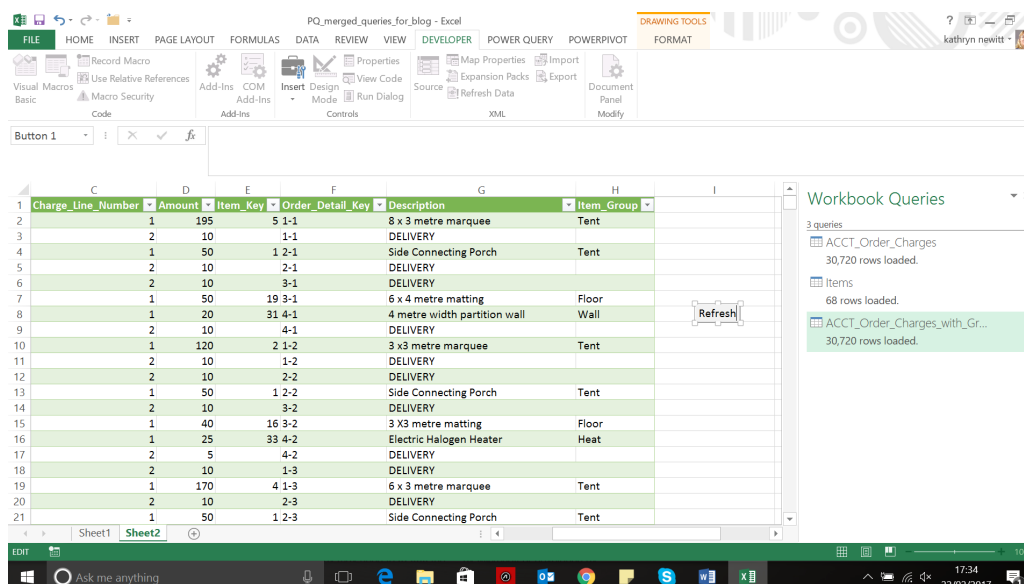
These options will be enough to get started with managing how connections are refreshed, but for the adventurous, more can be achieved by using third party add-ins, which can allow solutions to be ported to the web.

What's in Store for Power BI?

Aside from being able to download Power BI Desktop for free from Power BI's website, you can now get it from the Microsoft Store too. Now, that *should* be a good thing - or so it would seem. But you can get *too much* of a good thing. If you simply browse casually for Power BI **be careful**. The Store "helpfully" only makes it third choice presently, as our graphic shows. Many users are reporting that they are downloading the wrong application as a result.

To be fair, the apps are presented on a ranking system and Power BI Desktop is new so it won't be Number 1 in the search - yet. The problem is, the current leader is the mobile app. That's fair enough - IF this actually made it clearer it was the mobile variant. You have been warned!
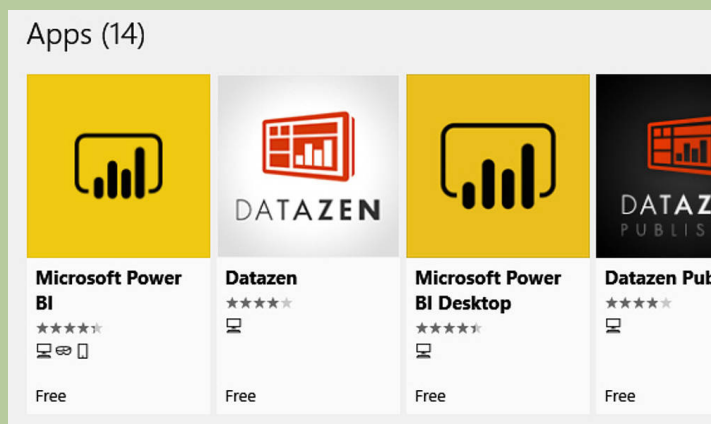
October 2017 Updates for Power BI Desktop

October sees another key feature from the Microsoft Data Insights Summit make its first appearance: bookmarking, albeit in Preview. Combined with September's drillthrough feature, bookmarking provides powerful storytelling capabilities and highly interactive reporting. There's also the usual visual improvements and a significant update for the quick measures feature.

In summary, here's the complete list of October updates:

Reporting

- Bookmarking (preview)
- Selection pane and visual display controls
- Bookmark links for shapes and images (preview)

- Spotlight
- Scatter & bubble markers
- Increase the number of data points shown in scatter charts

Analytics

- Quick measures for SSAS live connections
- Sales from new customers quick measure
- Cell-level formatting for multidimensional AS models

Data connectivity

- Vertica connector (beta)
- SAP BW connector: support for additional member properties

Other

- Power BI Desktop in the Windows Store
- Improved access to help content.

Let's take a look at each of these in turn.

Bookmarking (preview)

And so, bookmarking finally arrives! This was one of the features demonstrated at the recent Data Insights Summit as a very powerful way to save and share out insights with others. Bookmarking lets you save interesting states as part of your report. Once you have a list of bookmarks, you can use those in several ways, including a quick way to pick up where you left off in your analysis, for organising presentations of your report, creating report navigation, *etc*.

When you add a bookmark to your report, it will include the following:

- the current page
- filters
- slicers
- sort order
- drill location
- Visibility (more on this later)
- any of the "focus" modes.

Microsoft even notes that although bookmark cross highlighting is not yet supported, this is on the radar and "…something we definitely plan to implement soon". That will be very cool.

Once you turn on the preview feature switch, you can add bookmarks by opening the bookmarks pane, which can be found under the 'View' tab:

You can set up your report to look how you want, with all the filters properly set, and click the 'Add' button under 'Bookmarks':
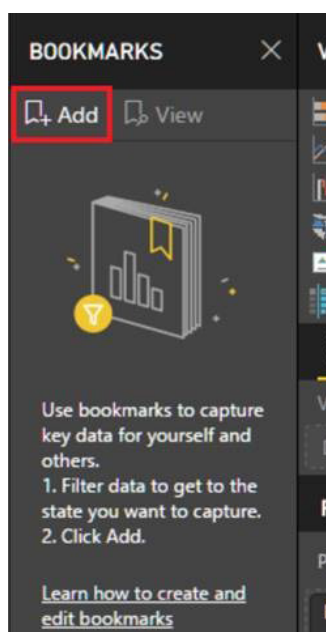
This will add a bookmark to pane, which you can rename and go back to whenever you want. You can continue adding as many bookmarks as you want.
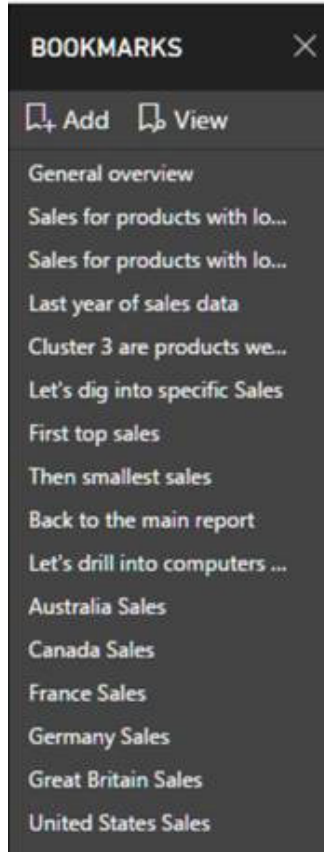
If you want to use your bookmarks as a story or in a presentation, you can use the 'View' option to enter into a view mode for bookmarks *viz*.
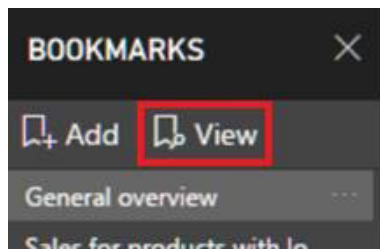
When in this mode, there is a title bar for each bookmark that includes the bookmark name and navigation arrows. At this point, you can close the bookmarking pane if you want to.

This mode is a good way to preview your bookmarks in the Power BI Desktop. It's also a great way to navigate bookmarks in the Power BI service *(see below)*, where you can also enter into full screen mode to hide all the navigation menus.

While bookmarking is in preview, you will need to add your initial bookmarks to your report in the Power BI Desktop. After you publish your reports to the service, you'll see the bookmarks pane option in the 'View' dropdown and can then edit and view your bookmarks as you see fit.

Since this feature is in preview, you'll need to enable it the first time through **File>Options** and **Settings>Options**. In the dialog, open the 'Preview features' tab and select 'Bookmarking':
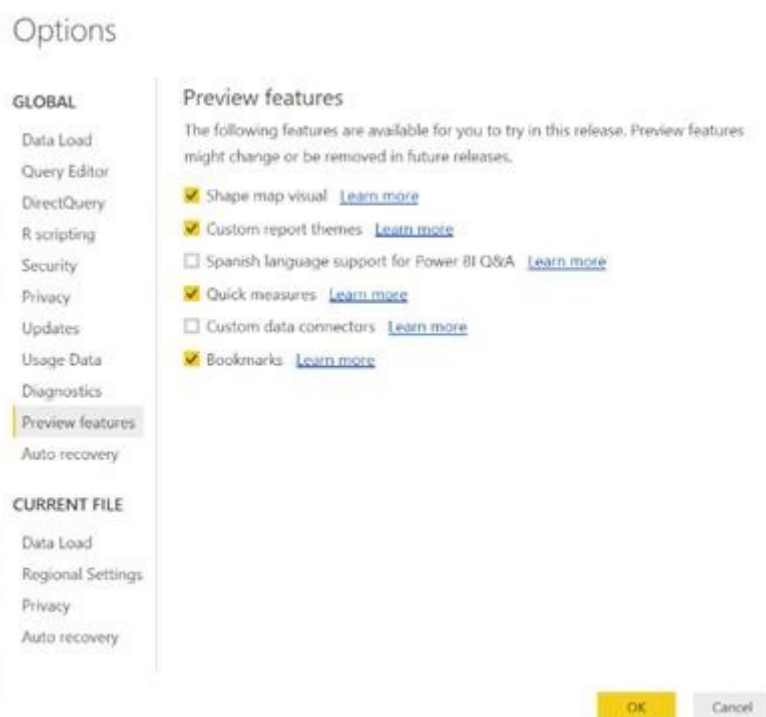
Selection pane and visual display controls

As part of the aforementioned bookmarking, Microsoft has also added a new selection pane. This pane lists out all objects on the report page you are currently viewing and allows you to select the visual from here. This can be very useful when you are authoring complex repor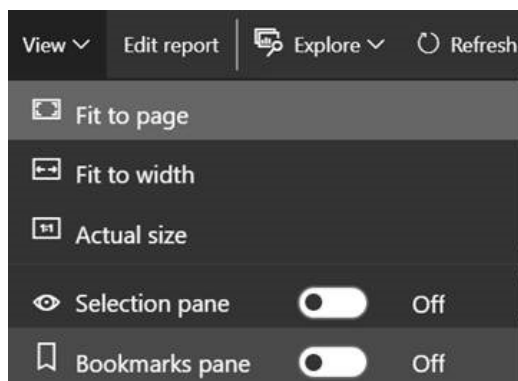ts with many overlapping charts. You can also hide visuals on your report through this pane. By combining this feature with bookmarking, you can create reports with visuals changing out depending on the current bookmark selection.

You can open the selection pane through the View' tab:
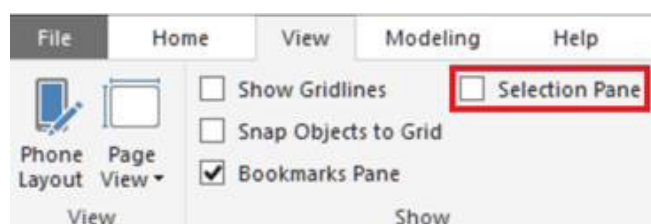
In the selection pane, for each item on the current page, you'll see either an eye or line icon letting you know if it is visible or not. Clicking on the eye icon will let you toggle the visual between hidden and visible.
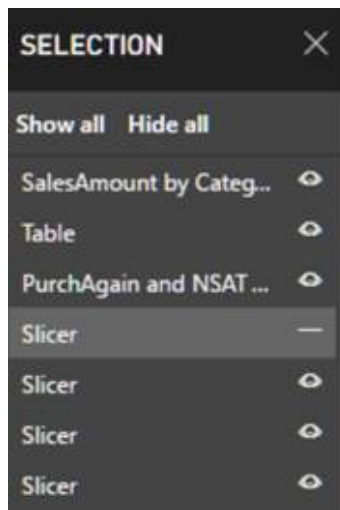
As mentioned earlier, visibility state can also be bookmarked, so it is useful for storytelling purposes. While hidden, slicers will continue to filter the report page, so you can continue to create reports using this feature.

Bookmark links for shapes and images (preview)

Another feature released in coordination with bookmarking is links for shapes and images. Last month, as part of drillthrough, Microsoft added the ability to link shapes and images to the previous page to create back buttons. This linking feature has now been extended to also allow you to link shapes and images to bookmarks as well. This allows you to create custom navigation in your reports or creating buttons that perform different actions across your report.

You'll find the option in the formatting pane under the 'Link' card. You can pick either 'Back' or 'Bookmark' as your link type. If you pick 'Bookmark', you'll have a dropdown to pick one of the bookmarks you currently have in your report.

Just as with the back button, you can activate bookmark buttons by pressing **CTRL + CLICK** while in editing mode or simply by just clicking in reading mode.

Spotlight

There's more to bookmarking. Microsoft has also added a new way to call attention to a specific chart during presentations. You can already use the focus mode to temporarily increase the size of a chart to fill the whole page. However, if you would prefer, you can now call attention to a chart without losing the context of the report instead. You can spotlight a visual to fade out all the other charts on the page *viz*.
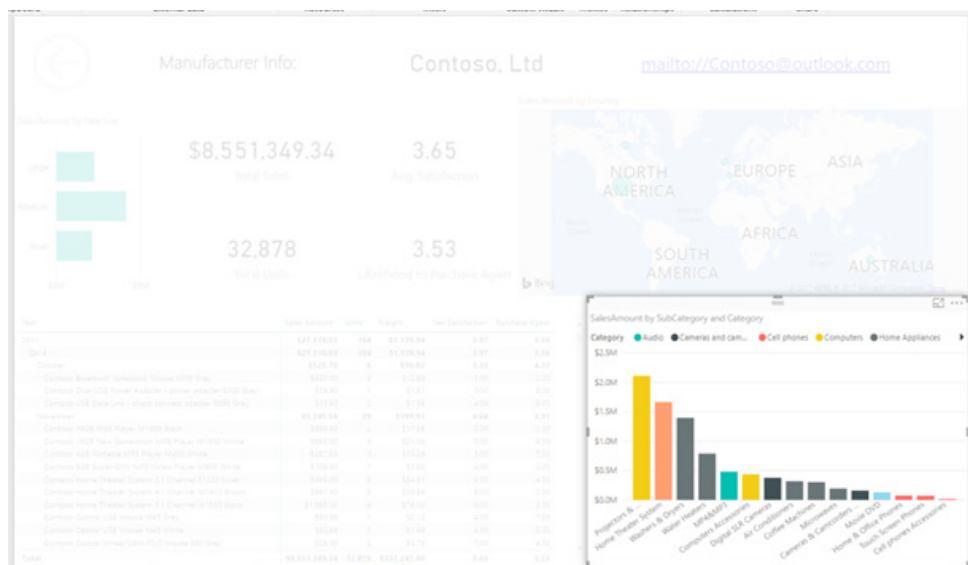
Clicking anywhere else on the report will remove the spotlight. You can find this option under the "…" section of any chart.
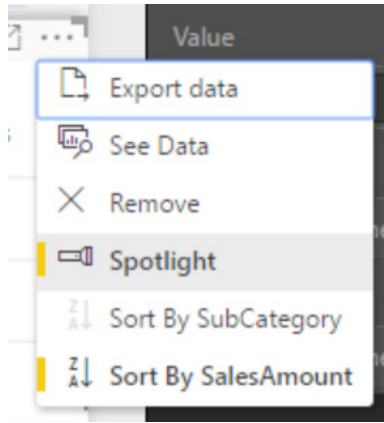
This spotlight feature can also be included as part of a bookmark.

Scatter & bubble markers

Another feature released in coordination with bookmarking is links for shapes and images. Last month, as part of drillthrough, Microsoft added the ability to link shapes and images to the previous page to create back buttons. This linking feature has now been extended to also allow you to link shapes and images to bookmarks as well. This allows you to create custom navigation in your reports or creating buttons that perform different actions across your report.

You'll find the option in the formatting pane under the 'Link' card. You can pick either 'Back' or 'Bookmark' as your link type. If you pick 'Bookmark', you'll have a dropdown to pick one of the bookmarks you currently have in your report.


You can also customise it per series to make your reports more accessible:
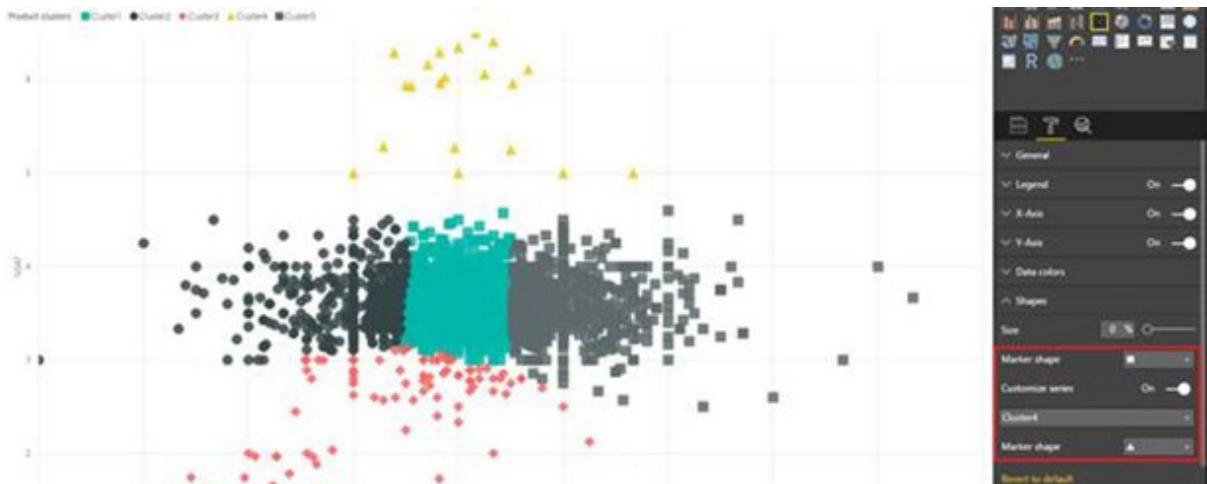
Increase the number of data points shown in scatter charts

September's update introduced a new sampling algorithm for scatter charts designed with high density data in mind. This is now built upon: Microsoft now allows you a way to increase the number of data points shown in your scatter chart. Using the new Data volume slider in the 'General' card of the formatting pane, you can set the maximum data volume to any number between 3,500 and 10,000:

ust a friendly warning here. Since more data points can mean a longer loading time, if you do choose to publish reports with limits at the higher end of the scale, make sure to test out your reports across the web and mobile as well make sure performance matches your users' expectations.

Quick measures for SSAS live connections

Now you can use quick measures for reporting that use a live connection mode against SQL Server Analysis Services (AS) models. You can turn on this preview feature switch and start using them right away in your models. One thing to be aware of though is since different quick measures require support for different DAX functions and operators, some quick measures won't be available on certain AS server versions.

Microsoft has also extended quick measure support to work with custom date tables. Previously, the time intelligent quick measures (period-to-date, period-over-period, rolling average) could only be used with the Power BI-provided hierarchies. Now, if your model has a custom Date table (for example, the **DimDate** table in the **AdventureWorks** model), you can use the primary date column in that table for time intelligent quick measures. This will only work though if you ensure that the person who built the model has marked it as a 'Date table'. That's a significant improvement.

Sales from new customers quick measure

There's another new quick measure: totals from new categories. You'll find this new quick measure under the 'Filters' category:

This quick measure lets you find things like the sales data for first time customers or the number of first time helpdesk callers.
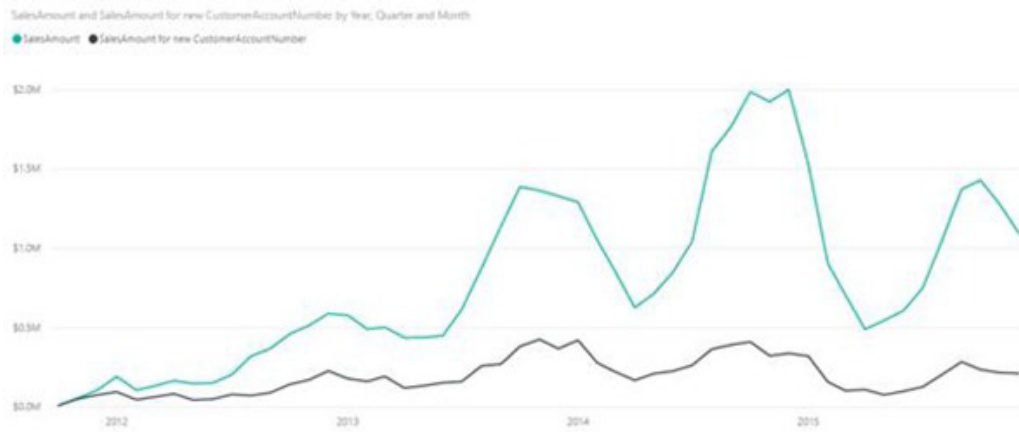
Cell-level formatting for multidimensional AS models

If you have cell-level formatting set up in your on-premises SQL Server Analysis Services models, this will now be respected in your Power BI reports too. You'll see the formatting for your values in our table, matrix and single value card visuals, with no additional setup required. Here's an example Microsoft has provided from the AdventureWorks cube:

Vertica connector (beta)

With October's update, a new data connector has also been added to Power BI Desktop for Vertica. The Vertica Analytics platform is designed for use in data warehouses and other big data workloads where speed, scalability, simplicity and openness are crucial to the success of analytics. The new Vertica connector allows you to build reports by importing or creating a DirectQuery connection to your databases in the Vertica Analytics Platform.

The new Vertica connector is available as a beta connector and can be found under the "Other" category within the Get Data dialog:
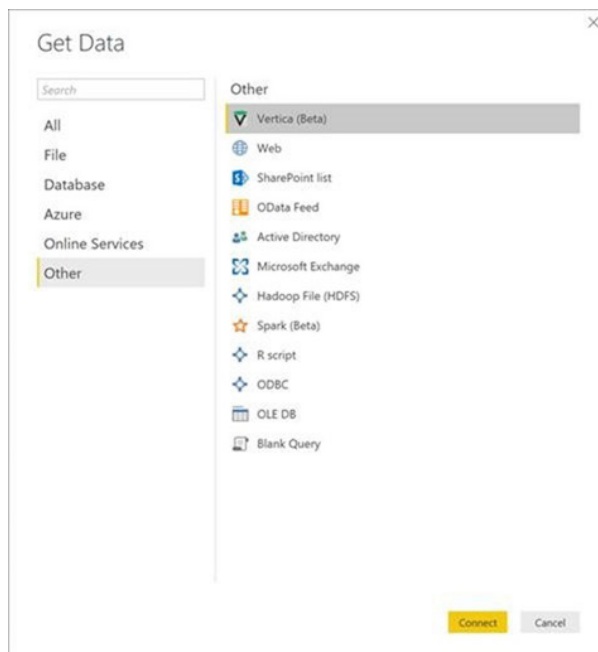
When selecting this connector, you will be prompted to specify your Vertica server / database details and will be able to specify which Data Connectivity mode to use.

The first time you connect, you will be asked to specify credentials for Vertica.

Once the connection has been established with your credentials, you'll be able to browse and select one or multiple tables within the Navigator dialog and then decide to load or edit your data.

SAP BW connector: support for additional member properties

One of the most requested features for the SAP BW connector has been the ability to import additional member properties, besides Medium Name. With this release of Power BI Desktop, other properties will now be available in the SAP BW connector so that you can select them within the Navigator dialog.

You can select one or multiple properties for each selected object, which will be represented as new columns in the output results of your queries.
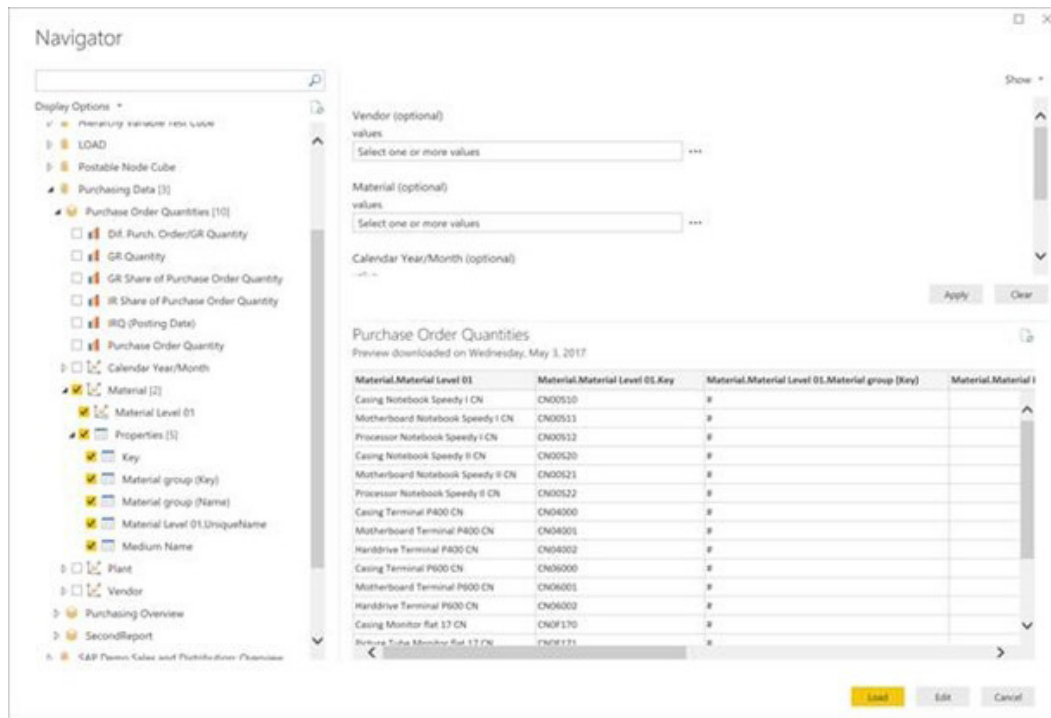
Power BI Desktop in the Windows Store

As stated above, Power BI Desktop is now available from the Windows Store. Until now, you could get Power BI Desktop by downloading it manually (from within the Power BI service, or from our download location) and install it directly – often referred to as an MSI installation. With the new option of installing it from the Windows Store, you can take advantage of:

- Automatic monthly updates installed in the background as soon as it's available
- No longer needing admin privileges to install
- Smaller download size since the Windows Store makes sure that only the components that have changed in each update are downloaded to your machine
- Easier IT deployments for everyone in your organization, including making Power BI Desktop available through the Microsoft Store for Business
- Automatic language detection each time Power BI Desktop is launched

It's just a shame it's not the first thing you find in the Store when you search for it *(see above)*!

Improved access to help content

In order to make Power BI easier to follow (and to aid current users get access to community sites), this update sees a Help tab added. This tab is all about giving you quick and easy access to all these resources.

October 2017 Updates for Power BI Service

It's not just Power BI Desktop that's had a spruce up this month. Microsoft has been busy and has also released additional features across Power BI Service and Mobile too. In summary, here's the latest additions:

- Share dashboards to free users with Premium
- Allocate capacities to suit your business needs with v-core pooling
- Instantly scale-up or scale-down capacities with one click
- PubNub block to easily push data into REST APIs
- Update for On-premises data gateway
- Filter reports on the go on Power BI Mobile
- Cross platform Visio support
- Improved load performance for usage metrics.

I suppose we should go through each of these items too…

Share dashboards to free users with Premium

It goes without saying that Microsoft wants to make it as easy as possible for customers to adopt Premium for their existing Power BI deployments and start benefiting from unlimited distribution to all users, consistent performance, and increased scale.   While Power BI apps are the recommended approach for large scale distribution, some users want to utilise their existing dashboard sharing approach so they could adopt Premium more quickly. As a result, the Service now allows dashboard sharing by Pro users of content in Premium workspaces to <u>all</u> users.

Apps continue to be the recommended way to distribute BI content to large groups of users and Microsoft encourages its customers to consider apps in their deployments. Apps include features that make content distribution easy to manage including staging of changes, managing permissions for all reporting assets in one place, and a streamlined consumption experience for users.

Allocate capacities to suit your business needs with v-core pooling

When Power BI Premium was first announced in June, it was required users had to choose between four different SKUs (EM3, P1, P2, P3), each which contained different numbers of virtual cores and memory sizes. This latest update sees released a set of features that give you much more flexibility on how you can allocate capacities and deploy Premium within your organisation.

The first feature is *v-core pooling*. When users purchase a Premium SKU, they gain access to the corresponding number of v-cores. For example,

if you bought a P3, you will have access to 32 v-cores. By leveraging v-core pooling, you will have the flexibility to provision the v-cores into one or more nodes of Premium capacity. With the same example, you can use your 32 v-cores to provision four P1s (4 nodes * 8 cores/node), two P2s (2 nodes * 16 cores/node), or just one P3. You are also free to move between the different node configurations as long as you have the v-cores available. And you thought it was all just hard core or soft core.

Instantly scale-up or scale-down capacities with one click

As part of the v-core pooling release, Microsoft is also making it easier to scale-up or scale-down your premium capacities with just one click. For example, if you have a P1 node you can now scale that up to a P2 or P3 though the capacity admin portal, provided that you have purchased the required number of v-cores. Conversely, you can scale down a capacity to a lower SKU to free up your already purchased v-cores for another node:
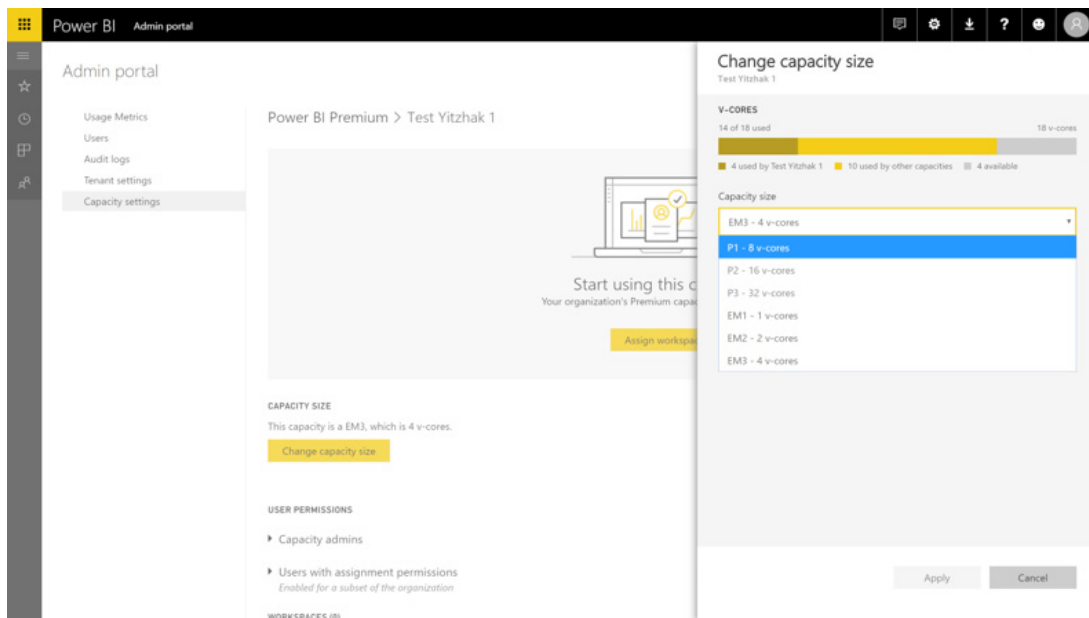
PubNub block to easily push data into REST APIs

In partnership with PubNub, Microsoft has announced availability of a PubNub Block for easily pushing data into the Power BI REST APIs. PubNub Blocks provide serverless functions which can be easily set up at a moment's notice. With the Power BI push dataset block, users can easily push data from PubNub streams to the Power BI REST APIs. From there, the data can be visualised in real-time as a Power BI streaming dataset.

Update for On-premises data gateway

There's further enhancements in the new update for the Power BI On-premises data gateway. The update includes Personal Mode support for national clouds, improved data gateway configuration experience when running Personal Mode and a new version of the Mashup Engine.

Filter reports on the go on Power BI Mobile

At the beginning of this year, Microsoft introduced support for reports on mobile, which allowed authors to seamlessly create report views optimised for a phone's form factor. Starting from now, filters are now available on phone reports.

You can now gain full access to all the filtering capabilities available to you in the service on your phone with no further configuration needed. All the various levels including: report level, page level or visual level filters on the original report will automatically appear on your phone's report in a touch optimised interface.

Just like on the Power BI Service, you can choose to use basic or advanced filtering, while having the default filtering set saved by the report author propagate to your mobile app.
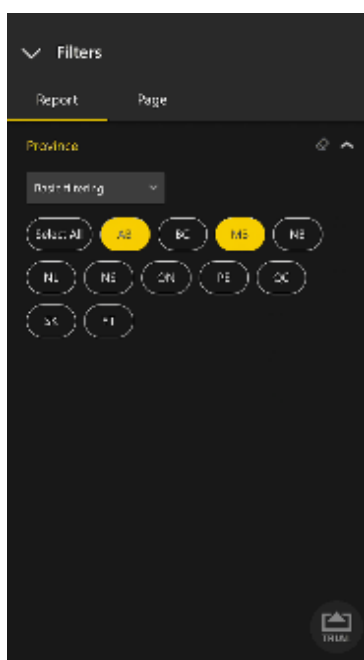
Cross platform Visio support

The Power BI team recently announced support for a new type of visualisations: Visio visualizations. This new feature allows you to create tailored charts without the need to code. Once created and added to your report, all report viewers will be able to view and cross filter it across all platforms, including all mobile platforms.

Improved load performance for usage metrics

Also rolled out, there's many performance enhancements and optimisations to usage metrics for reports and dashboards. With this newest update, usage metrics reports now load more quickly, allowing dashboard and report authors to get even quicker insights into their impact.

Out and About in November

We show off our new premises in Hong Kong…

The road (air?) trip continues… November sees us again all over Australia as well as in Hong Kong and Kuala Lumpur. Drop us a line at contact@sumproduct.com if you'd like to meet up. We'd be happy to discuss your modelling / training requirements.

We're still not finished for 2017 though. More to follow in our December issue.

The A to Z of Excel Functions: CELL

With our A to Z of Excel Functions series, you could argue we have been trying to make a soft **CELL** (get it?). We are well and truly in the high C's now and the puns do not get any better. Ah well…

The CELL function returns information about the formatting, location, or contents of a cell. For example, if you want to verify that a cell contains a numeric value instead of text before you perform a calculation on it, you can use the following formula:

=IF(CELL("type"**, A1)** = "v"**, A1 * 2, 0)**

This formula calculates **A1***2 only if cell **A1** contains a numeric value, and returns 0 if **A1** contains text or is blank. The **CELL** function employs the following syntax to operate:

CELL(info_type, [reference])

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

- **info_type:** this is required. This is a text value that specifies what type of cell information you want to return. The following list shows the possible values of the **info_type** argument and the corresponding results:

Info_Type	Returns
"address"	Reference of the first cell in reference, as text
"col"	Column number of the cell in reference
"color"	1 if the cell is formatted in colour for negative values; otherwise returns 0 (zero)
"contents"	Value of the upper-left cell in reference; not a formula

"filename"	Filename (including full path) of the file that contains reference, as text. Returns empty text ("") if the worksheet that contains reference has not yet been saved
"format"	Text value corresponding to the number format of the cell. The text values for the various formats are shown in the following table. Returns "-" at the end of the text value if the cell is formatted in colour for negative values. Returns "()" at the end of the text value if the cell is formatted with parentheses for positive or all values
"parentheses"	1 if the cell is formatted with parentheses for positive or all values; otherwise returns 0
"prefix"	Text value corresponding to the "label prefix" of the cell. Returns single quotation mark (') if the cell contains left-aligned text, double quotation mark (") if the cell contains right-aligned text, caret (^) if the cell contains centred text, backslash (\) if the cell contains fill-aligned text, and empty text ("") if the cell contains anything else - simple!
"protect"	0 if the cell is not locked, and 1 if the cell is locked
"row"	Row number of the cell in reference
"type"	Text value corresponding to the type of data in the cell. Returns "b" for blank if the cell is empty, "l" for label if the cell contains a text constant, and "v" for value if the cell contains anything else
"width"	Column width of the cell rounded off to an integer. Each unit of column width is equal to the width of one character in the default font size.

- **reference:** this is optional. This is the cell that you want information about. If this argument is omitted, the information specified in the **info_type** argument is returned for the last cell that was changed. If the reference argument is a range of cells, the **CELL** function returns the information for only the upper left cell of the range.

CELL Format Codes

The following list describes the text values that the **CELL** function returns when the **Info_type** argument is "format" and the reference argument is a cell that is formatted with a built-in number format.

If the Excel format is	The CELL function returns
General	G
0	F0
#,##0	,0
0	F2
#,##0.00	,2
$#,##0_);($#,##0)	C0
$#,##0_);[Red]($#,##0)	C0-
$#,##0.00_);($#,##0.00)	C2
$#,##0.00_);[Red]($#,##0.00)	C2-
0%	P0
0.00%	P2
0.00E+00	S2
# ?/? or # ??/??	G
m/d/yy or m/d/yy h:mm or mm/dd/yy	D4
d-mmm-yy or dd-mmm-yy	D1
d-mmm or dd-mmm	D2
mmm-yy	D3
mm/dd	D5
h:mm AM/PM	D7
h:mm:ss AM/PM	D6
h:mm	D9
h:mm:ss	D8

Please see the example below:

	A	B	C
1	**Data**		
2	69		
3	SumProduct		
4			
5			
6	**Formula**	**Description**	**Result**
7	*=CELL("row",IV65536)*	The row number of cell IV65336	**65536**
8	*=CELL("contents",A3)*	The contents of cell A3	**SumProduct**
9	*=CELL("type",A2)*	The data type of cell A2. In this case, the data type of "v" indicates value	**v**

There's lots you can do with **CELL**. You may recall in one of our Thought articles we used it to automate the file name using the formula

=IF(ISERROR(OR(FIND("[",CELL("filename",A1)),FIND("]",CELL("filename",A1)))),"",MID(CELL("filename",A1),FIND("[",CELL("filename",A1))+1,FIND("]",CELL("filename",A1))-FIND("[",CELL("filename",A1))-1))

So how does this work?

Let's step back and consider the formula **=CELL("filename",A1)**. This returns the filename (any cell may be used). An example of a returned filename might be:

C:\Documents and Settings\Liam\My Documents\Spreadsheet Doctor\Doctor 30 - Automated Filename\[Example Workbook.xls]Sheet1

This is not what is required, there's 'padding'. All we want is the actual filename, in this case 'Example Workbook.xls'. Therefore, we need to extract the filename from this worksheet directory path.

This will require a three-step process.

Step 1: FINDing the Beginning and the End

The directory path will vary for each file, so we need to spot a foolproof method of finding the beginning and the end of the workbook name. Fortunately, Excel assists us here. '[' and ']' are reserved characters in Excel's syntax and denote the beginning and the end of the workbook name.

The example returned filename above is 122 characters long. If we can find the position of the '[' and ']' we will be on our way.

FIND(find_text,within_text,start_num) is the function we need, where:

- **find_text i**s the text you want to find;
- **within_text** is the text containing the text you want to find; and
- **start_num** (which is optional) specifies the character at which to start the search. The first character in within_text is character number 1. If you omit **start_num**, it is assumed to be 1.

So, in our example, **=FIND("[",CELL("filename",A1))** returns the value 95 and the formula **=FIND("]",CELL("filename",A1))** returns the value 116. In other words, for our illustration, if we can get Excel to return the character string in positions 96 to 115 inclusive (*i.e.* between the square brackets) we will have our workbook name.

Step 2: LEFT a bit, RIGHT a bit, Aim for the MID Section

There are various functions in Excel that will return part of a character string:

- **LEFT(text,num_characters)** returns the first few characters of a string depending upon the number specified (**num_characters**). This is not useful here as we do not want the first few characters of our text string;
- **RIGHT(text,num_characters)** returns the last few characters of a string depending upon the number specified (**num_characters**). This is not useful here either as we do not want the last few characters of our text string; and
- **MID(text,start_num,num_characters)** returns a specific number of characters from a text string, starting at the position specified, based on the number of characters chosen.

Therefore, we should use the **MID** function here. In hard code form, our formula would be:

=MID(CELL("filename",A1),96,20)

where:

- 96 = position one character to the right of '[' (95 + 1); and
- 20 which is the length of the filename string, being the position of ']' less the position of '[' less 1, *i.e.* 116 – 95 – 1 = 20.

This gives us our filename 'Example Workbook.xls'.

The problem is we don't want hard code: a flexible formula is required. Using the concepts explained above, we derive:

=MID(CELL("filename",A1),FIND("[",CELL("filename",A1))+1,FIND("]",CELL("filename",A1))-FIND("[",CELL("filename",A1))-1)

And so we are done. Except we aren't.

Step 3: Error Trapping

A good modeller will always ensure that a formula will work in all foreseeable circumstances. The above formula will only work if the file has been named and saved. Otherwise, **CELL("filename",A1)** will return empty text (""), which will cause the embedded **FIND** formulae to return *#VALUE!* errors, and hence the overall formula will also return the *#VALUE!* error.

We therefore need an error trap, *i.e.* a check that ensures if the file has not yet been saved we just get empty text ("") returned. To do this, we can use the following formula:

=IF(ISERROR(OR(FIND("[",CELL("filename",A1)),FIND("]",CELL("filename",A1)))),"",1)

ISERROR(expression) gives a value of TRUE if the **expression** is evaluated as an error, otherwise it is FALSE. In our equation above, if the file has not been saved, this formula will return the empty text (""), otherwise it will return our 'dummy' value of 1. Substituting our derived formula above for the 1 gives us the final formula:

=IF(ISERROR(OR(FIND("[",CELL("filename",A1)),FIND("]",CELL("filename",A1)))),"",MID(CELL("filename",A1),FIND("[",CELL("filename",A1))+1,FIND("]",CELL("filename",A1))-FIND("[",CELL("filename",A1))-1))

It isn't pretty, it's not short, it's not transparent, but it's flexible and robust.

The A to Z of Excel Functions: CHAR

Cup of tea? Well a cup of **CHAR** won't help you…

This function returns the character specified by a number. You can use **CHAR** to translate code page numbers you might get from files on other types of computers into characters. Yup, that exciting.

Operating Environment	Character Set
Macintosh	Macintosh character set
Windows	ANSI

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

CHAR(number)

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

- **number:** this is required. This is a number between 1 and 255 specifying which character you want. The character is from the character set used by your computer.

Again, please see the example below:

Formula	Description	Result
=CHAR(65)	Displays the character represented by the number 65 in the computer's character set	A
=CHAR(33)	Displays the character represented by the number 33 in the computer's character set	!

More next month.

Upcoming SumProduct Training Courses

Location	Course	Date	Duration
Sydney	Visual Basic for Applications	6th Nov 2017	1 day
Sydney	Excel Tips & Tricks	13th Nov 2017	1 day
Sydney	Financial Modelling	14th - 15th Nov 2017	2 days
Melbourne	Power Pivot, Power Query and Power BI	4th - 6th Dec 2017	3 days
Melbourne	Excel Tips & Tricks	11th Dec 2017	1 day
Melbourne	Financial Modelling	12th - 13th Dec 2017	2 days
Sydney	Excel Tips & Tricks	15th Jan 2018	1 day
Sydney	Financial Modelling	16th - 17th Jan 2018	2 days
Sydney	Power Pivot, Power Query and Power BI	22nd - 24th Jan 2018	3 days
Melbourne	Power Pivot, Power Query and Power BI	29th - 31st Jan 2018	3 days
Hobart	Financial Modelling	5th - 6th Feb 2018	2 days
Melbourne	Power Pivot, Power Query and Power BI	4th - 6th Dec 2017	3 days
Brisbane	Excel Tips & Tricks	12th Feb 2018	1 days
Brisbane	Financial Modelling	13th - 14th Feb 2018	2 days

Melbourne	Excel Tips & Tricks	19th Feb 2018	1 day
Melbourne	Financial Modelling	20th - 21st Feb 2018	2 days
Perth	Financial Modelling	26th - 27th Feb 2018	2 days
Sydney	Visual Basic for Applications	12th Mar 2018	1 day
Sydney	Power Pivot, Power Query and Power BI	19th - 21st Mar 2018	3 days
Adelaide	Financial Modelling	5th - 6th Apr 2018	2 days
Sydney	Excel Tips & Tricks	23rd Apr 2018	1 day
Sydney	Financial Modelling	26th - 27th Apr 2018	2 days
Melbourne	Excel Tips & Tricks	30th Apr 2018	1 day
Melbourne	Financial Modelling	1st - 2nd May 2018	2 day
Melbourne	Power Pivot, Power Query and Power BI	14th - 16th May 2018	2 day
Auckland	Financial Modelling	21st - 22nd May 2018	2 days
Wellington	Financial Modelling	24th - 25th May 2018	2 days
Darwin	Financial Modelling	4th - 5th Jun 2018	2 days
Sydney	Power Pivot, Power Query and Power BI	18th - 20th Jun 2018	1 day
Sydney	Financial Modelling	25th - 26th Jun 2018	2 days

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Key Strokes

Each newsletter, we'd like to introduce you to useful keystrokes you may or may not be aware of. This month we're amidst the numbers 7, 8 and 9:

Keystroke	What it does
CTRL + 7	Sort of defunct now, toggled Standard toolbar in Excel 2003 and earlier
CTRL + SHIFT + 7	Outline border
CTRL + 8	Show outline symbols (toggle)
CTRL + SHIFT + 8	Select current region (this may not work on keyboards with a number pad)
CTRL + 9	Hide row
CTRL + SHIFT + 9	Unhide row

There are over 540 keyboard shortcuts in Excel. For a comprehensive list, please download our Excel file a www.sumproduct.com/thought/keyboard-shortcuts. Also, check out our new daily **Excel Tip of the Day** feature on the www.sumproduct.com homepage.

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