

Sum Product

NEWSLETTER #65 - April 2018

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We are Power-ing on this month...

It's all about Business Intelligence and Power BI in particular at the moment. Regular readers, please be patient – we'll put more in about financial modelling soon, but it's difficult keeping up with the pace of BI presently! There's updates aplenty this month (just for a change!). And there's more: our *Introduction to Financial Modelling* book is finally coming out this month!! There's details below. We take a look at Excel's Insights feature and also announce a new feature for Excel Online (just 27 years after its introduction to Desktop!): PivotTables. Remember them?

With the usual regular features such as Power Query Pointers, the A to Z of Excel Functions (this month, **CONCATENATE** is found not to be **COMPLEX!**) and more Keyboard Shortcuts, there's plenty to read.

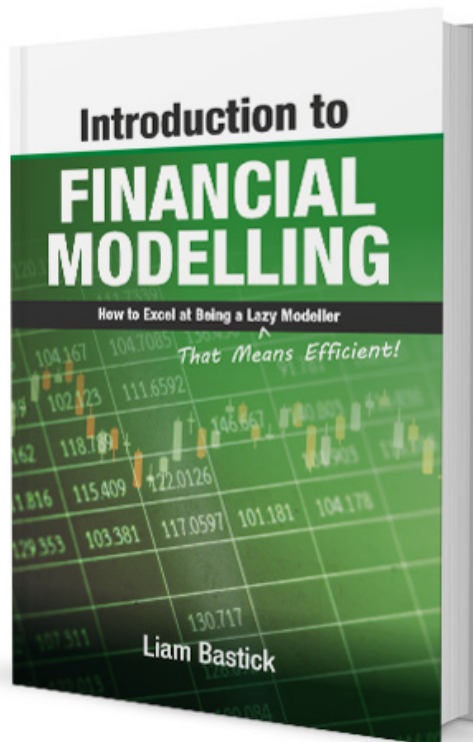
Until next month.

Liam Bastick, Managing Director, SumProduct



Book Him, Danno

Not mentioned since December 2016, it's been a long hard slog to get that book out – but we have an exciting announcement: whilst it's been available informally for a while now, it is out “properly” this month!



Due to circumstances beyond our control (and we won't bore you with), the book's delay has given us time to re-write certain areas and add new ideas. This c.320-page book was originally based on our hugely successful Financial Modelling training course and we can promise it will now be even more packed with useful tips and tricks, key layout ideas and stupid jokes.

Whilst we work out distribution and pricing, if you are interested in a copy, drop us a line at contact@sumproduct.com and we'll rustle you up a copy or two!

Unlock Excel Summit – Coming Very Soon



Picture: MVPs Jon Peltier (left) and Ken Puls are really looking forward to Unlock Excel...

It's not too late to sign up: it's coming this month. The CPA Australia / Microsoft / SumProduct Unlock Excel event for Australia starts Monday 9 April in Melbourne. Up to six MVPs presenting, plus guest speakers from Microsoft and CPA Australia, this event aims to provide applied Excel, Power Pivot, Power Query and Power BI tips for all users, from novice to advanced.

The events are as follows:

- **MELBOURNE** 9-10 April
- **SYDNEY** 12-13 April
- **BRISBANE** 16-17 April

Check out the official website at www.cpaustralia.com.au/training-and-events/conferences/unlock-excel. Hope to see you there!

MVP Summit Over and Out



Picture: courtesy of Wyn Hopkins

The beginning of March saw our very own Liam Bastick (hiding at the back) head to Redmond for the Excel Summit (our other MVP, Tim Heng was otherwise indisposed this year). It was a great networking event, and much was gleaned about the future of Excel, Power Pivot, Power Query and Power BI.

Whilst not at liberty to divulge details at this stage, Liam did concede there are some exciting features coming to Excel *et al.* later this year – which we will be able to tell you all about later in the year. And trust him, there are a few you most definitely will welcome! Keep your eyes on our News section and these newsletters for further details once Non-Disclosure embargos are lifted!

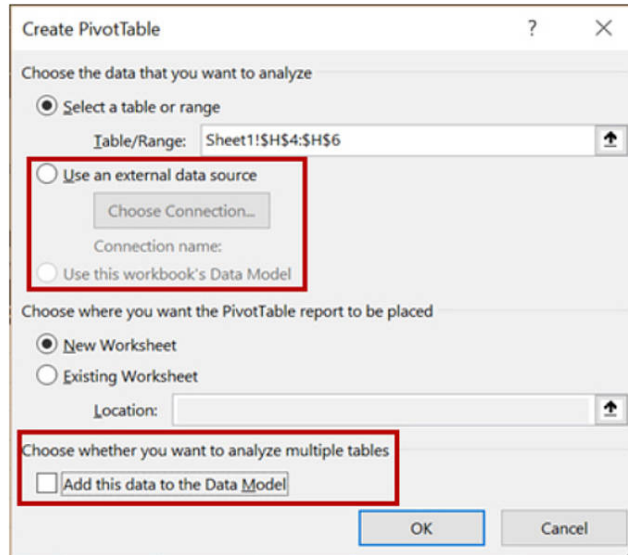
Inserting PivotTables Now Possible in Excel Online

It's probably fair to say that the take-up in authoring Excel workbooks using Excel Online has probably not exactly been immense. There are various reasons for this - most developers start building their files on the desktop, they don't know about Excel Online, they have no plans to share or some of the features required are not available in the Excel Online variant.

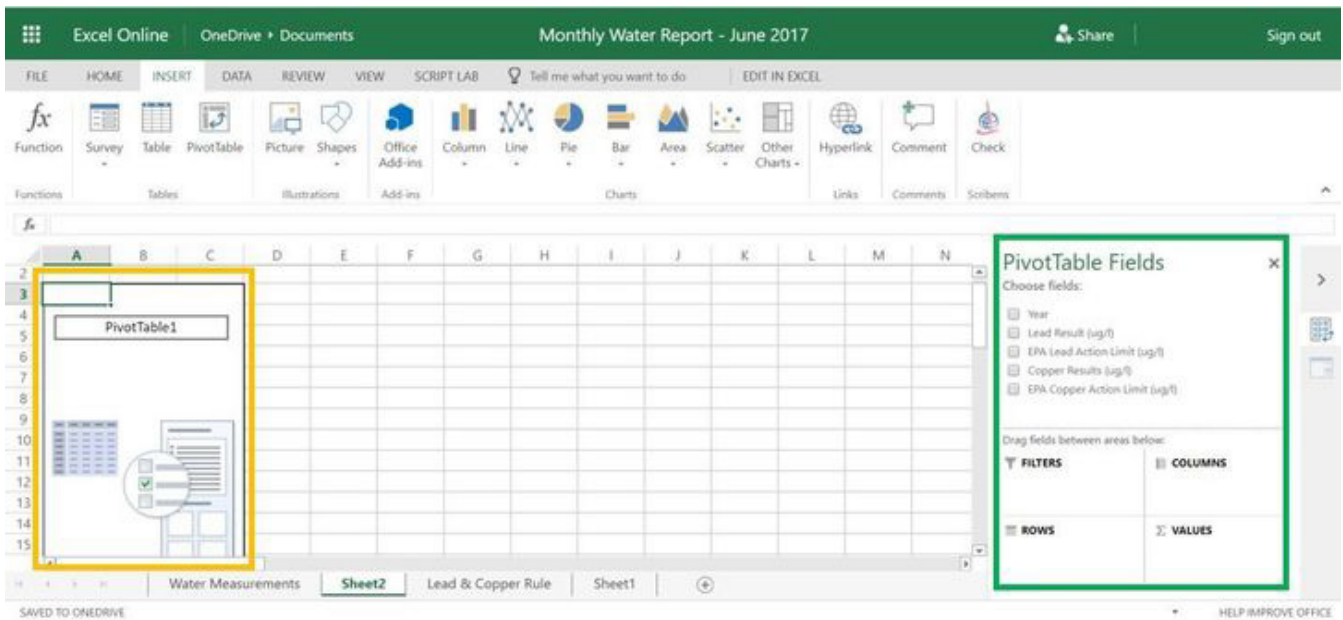
Well, Microsoft has removed one of the obstacles with that final reason. You can now insert a new PivotTable in Excel Online. Simply have your

data in tabular form, select it in the usual way and simply click on the 'PivotTable' icon in the 'Insert' tab of the Ribbon, then follow the usual instructions.

It's not all peaches and cream yet though. Excel Online wouldn't be Excel Online without a couple of quirks. As highlighted in our graphic (*below*), you cannot use data from external sources to populate your PivotTable, add to the Data Model or use data in the Data Model. But hey, it's a good start and better than not being able to do it at all!



The PivotTable interface created upon insertion is very similar to its desktop sibling:

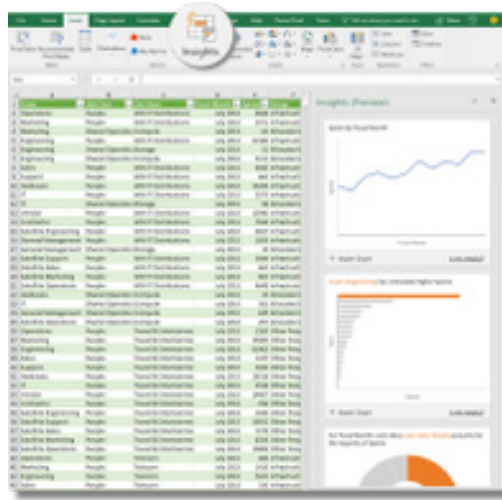


The yellow outline (*above*) is the placeholder for the new PivotTable – that's where you'll see your newly formed PivotTable, once you define it. The green outline (*also pictured*) is where you define your PivotTable, similar to the 'Field List' pane.

It's basically business as usual, subject to the limitations mentioned earlier. To define the look of your new Pivot Table, all you need to do is drag PivotTable Fields into the four quadrants of the PivotTable Fields box; to remove fields, just drag the field away.

Insights on Insights

The Microsoft Excel team has been working to provide data analysis at the touch of a button through a new Preview feature, Insights, which we have already announced previously. Insights analyses data and its structure in order to automatically generate a series of recommendations / observations, including high-level summaries, statistically significant findings and recommended visualisations.



It's not the finished article (hence the Preview mode), but this should be viewed as an early peek at a feature that will evolve and improve over time. Insights Preview in Excel is rolling out to Office 365 commercial subscribers, enrolled in Office Insiders, in the United States of America from mid-March. Other EN-US Insider Fast users should also be able to access this feature too.

Insights works best when run on clean, tabular data, such as an Excel Table. Do be careful though. Microsoft has noted the following so far:

- Data with five or more columns and 100 or more rows, as well as a mix of numbers and strings, tend to work best with Insights presently, but don't let that stop you trying other formats
- Insights only works on data in the grid today. Microsoft hopes to support multi-dimensional data (such as cubes and data models) in the future.
- Avoid blanks, duplicate names, or nesting in headers
- Merged cells, error values or badly typed data (e.g. numbers or dates stored as text) do not currently work with Insights
- Insights will not work in compatibility mode, so .xls files need to be upgraded for them to work with Insights.

Power Query Pointers

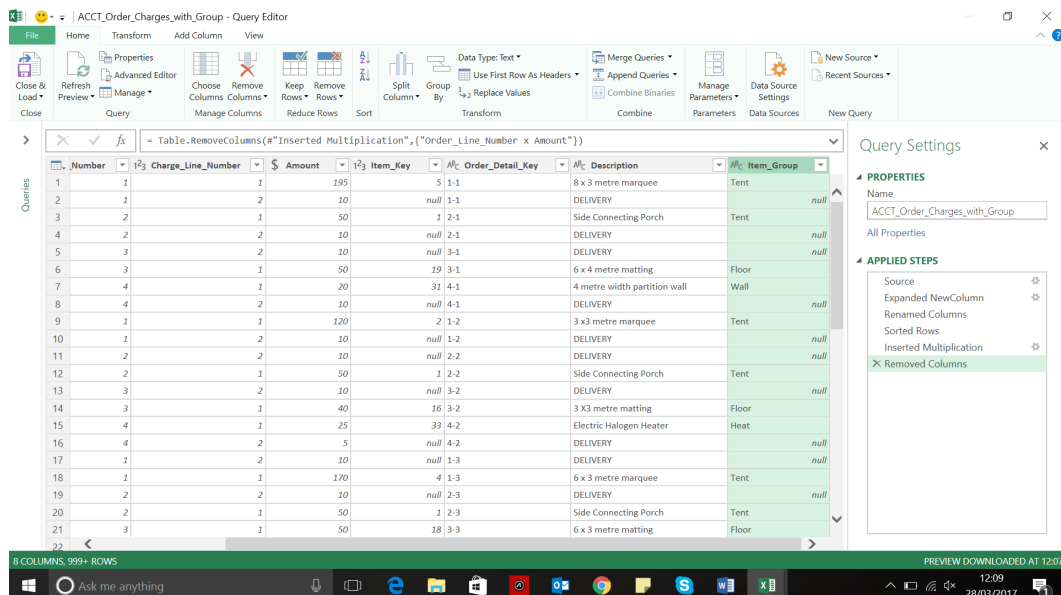
Each month we'll reproduce one of our articles on Power Query (Excel 2010 and 2013) / Get & Transform (Excel 2016) from www.sumproduct.com/blog. If you wish to read more in the meantime, simply check out our Blog section each Wednesday. Over the last few months, we have shown some of the tasks that can be achieved with M language and functions. This month, we build on this as we take a look at how to replicate some familiar Excel formulae.

As we have highlighted time and time again, Power Query functions are

not always the same as Excel formulae. Since most Power Query users will already have their favourite Excel formulae, it is useful to know how to replicate those that are most commonly used. **OR()** and **AND()** seem like a good place to start.

OR()

Let's consider the data shown in the screen below:



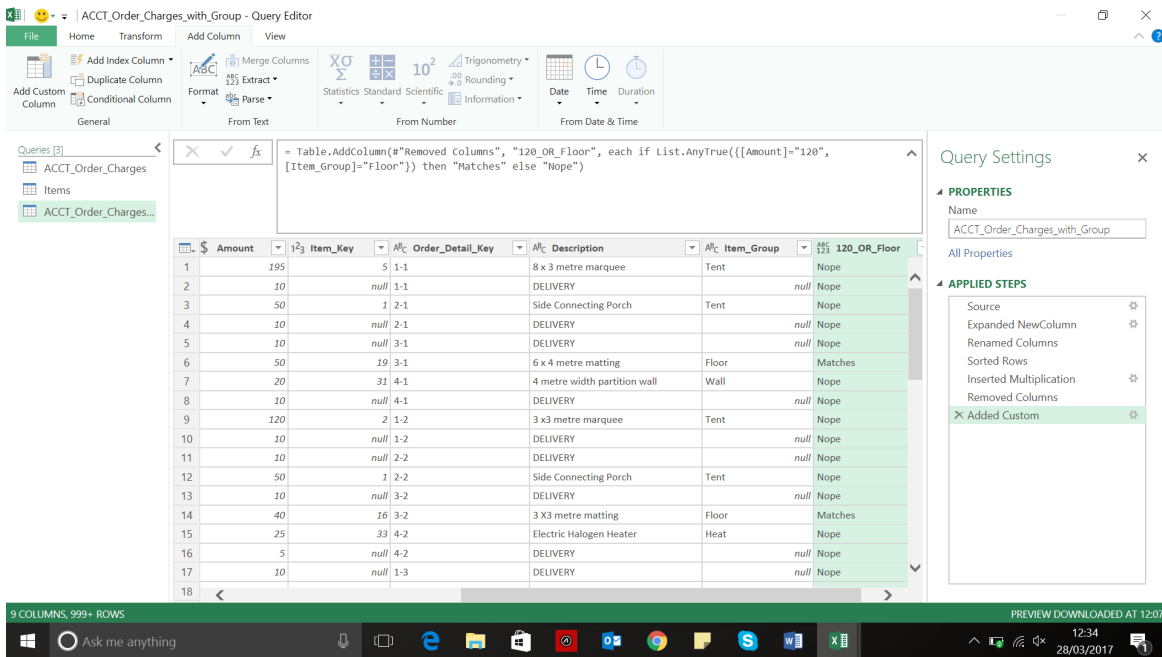
Imagine you wish to add a column to flag all data where the **Amount** is \$120 or the **Item_Group** is 'Floor'.

In Excel the formula for the new column would be

=OR([Amount] = "120", [Item_Group] = "Floor")

In the Query Editor, we could try filtering on **Amount** and then **Item_Group**, but this would give me those rows that meet both criteria, *i.e.* **AND()** instead (and there is a better way to do **AND()** too, as explained below).

Instead, let's create a new custom column, which we will call '**120_OR_Floor**', by going to the 'Add Column' section and choosing to 'Add Custom Column'.



As the screen above shows, the formula used is:

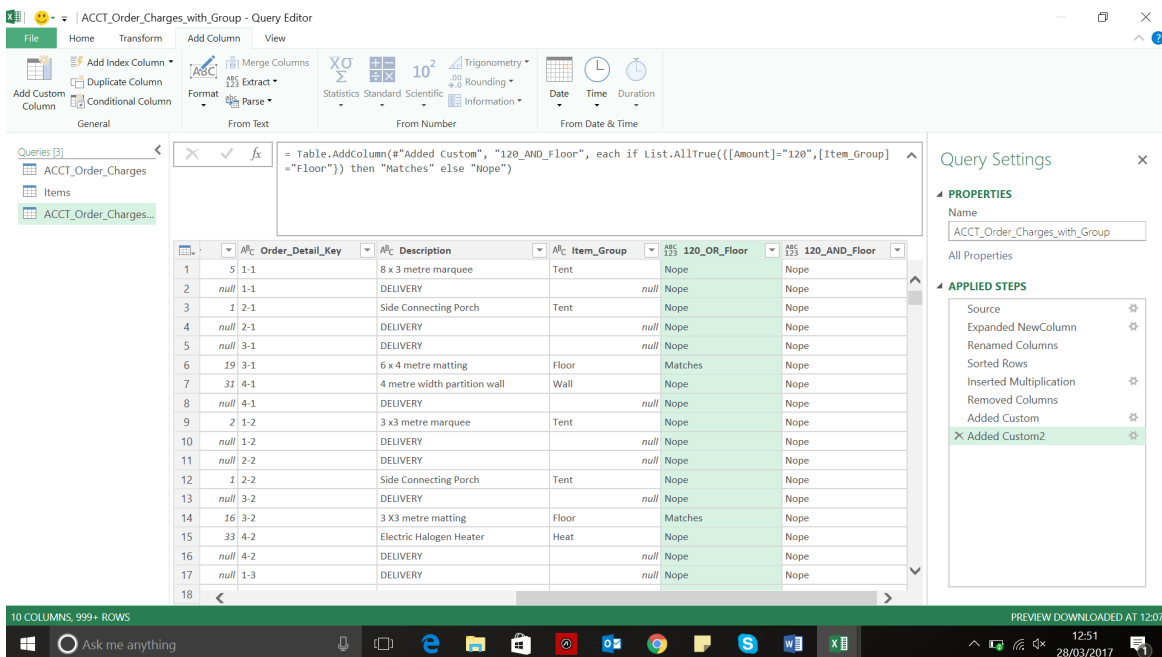
=if List.AnyTrue({[Amount]="120",[Item_Group]="Floor"}) then "Matches" else "Nope"

List.AnyTrue is Boolean (*i.e.* it can be TRUE or FALSE) which takes a list of statements and returns TRUE if any of the statements are true. So, you may easily extend this to add any conditions that you would like to test for.

AND()

As mentioned above, filtering can leave us with the rows that meet each criterion required, but it can be more useful to flag which rows meet the criteria (which means you can still see those that don't).

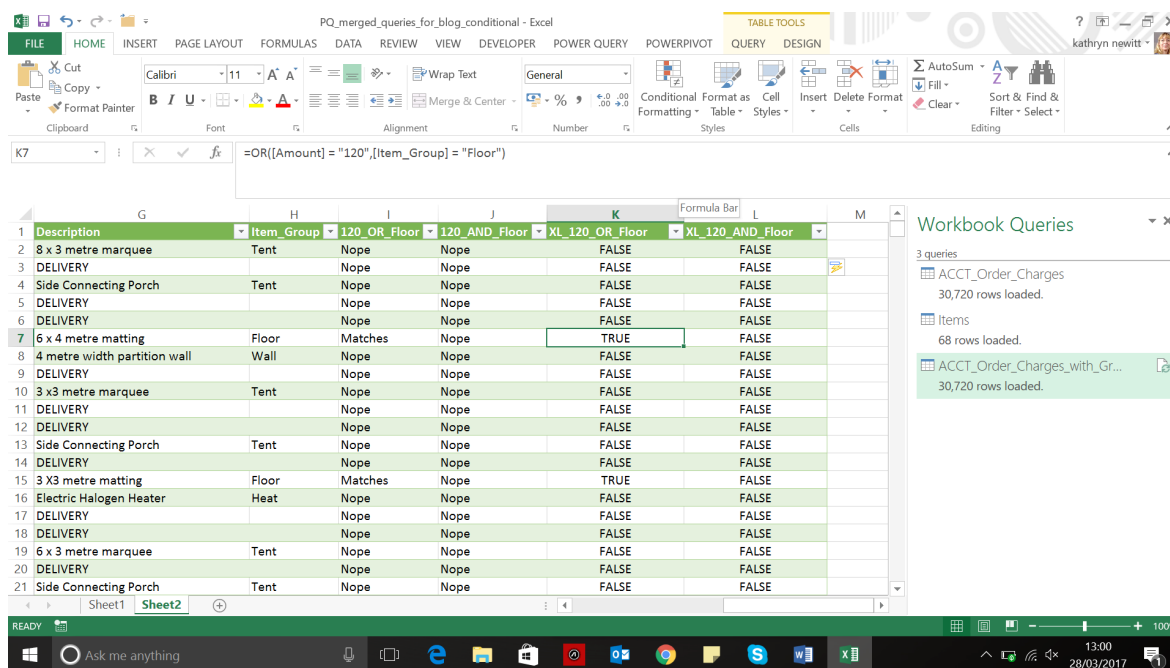
The function used here is in fact very similar to the one used for **OR()**, and we'll repeat the process to add another custom column to our existing query:



And this time, the function is clearly related to the last one used (and yes, we did copy and paste to speed things up!):

if List.AllTrue({[Amount]="120",[Item_Group]="Floor"}) then "Matches" else "Nope"

So, we have an equivalent to **OR()** and **AND()**, but just to prove it, below we have uploaded the data to a worksheet and added the Excel columns that would serve a similar purpose:



Not all formulas are so easy to replicate (yet!), so no doubt we will be visiting ways of reproducing other useful Excel formulae in future blogs. More next month.

March Updates for Power BI Desktop

Ahead of the MVP Summit, Microsoft added its usual monthly slew of improvements and new features to Power BI Desktop. There were no changes to Analytics this month, but there were still many new items. The full list of revisions are as follows:

Reporting

- Report page tooltips (Preview)
- Bookmarking is now Generally Available
- Display units and precision control for table and matrix columns
- Turn off the visual header in reading mode for a report
- Improved default visual placement

Custom visuals

- Mapbox
- User List by CloudScope
- Timeline by CloudScope
- KPI Chart by Akvelon
- R DataTable
- Outliers Detection
- Data Insights by MAQ Software
- Dumbbell Chart by MAQ Software
- Clustering using OPTICS by MAQ Software

Data connectivity

- SAP HANA connector enhancements:
 - DirectQuery multidimensional support is now Generally Available
 - SSL certificate validation support
- SAP BW DirectQuery is now Generally Available
- Azure Analysis Services connector is now Generally Available

Other

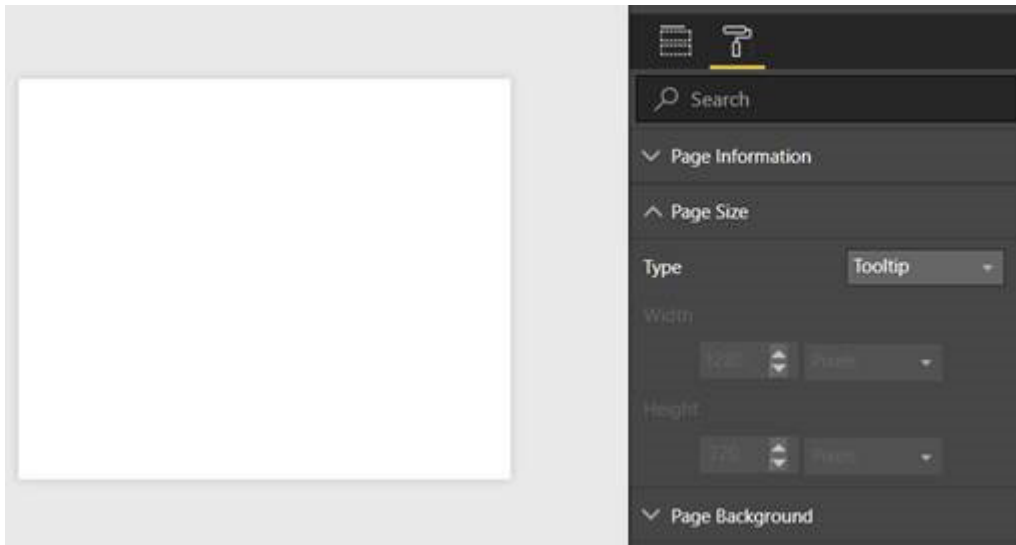
- Improved error reporting
- View previous errors you've encountered.

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

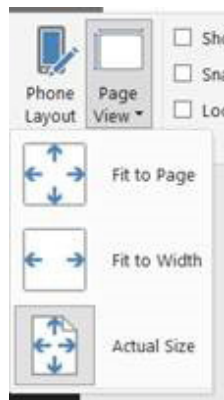
Report page tooltips (Preview)

This update sees the Preview of Microsoft's report page tooltips feature. This feature lets you design a report page to be used as a custom tooltip for other visuals in your report. This gives you full flexibility to design whatever kind of custom tooltips you want, from using cards, to showing detailed information or to miniature drillthrough pages shown when hovering.

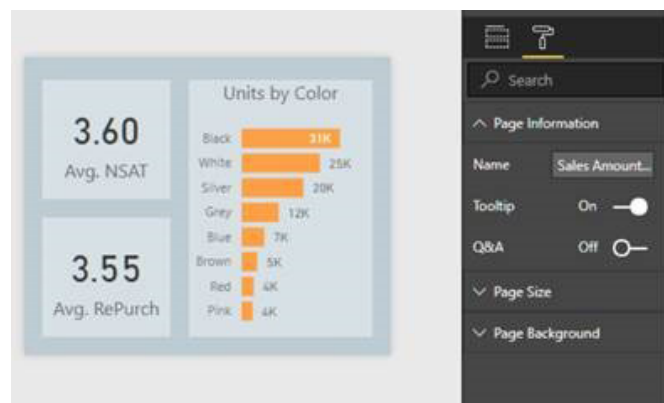
To start creating your custom report page tooltips, first you must design the tooltip you want to show. It's recommended you use a smaller page size, so you don't have to worry about the tooltip being too large to show on your normal report pages. With that in mind, Microsoft has added a new page size template called 'Tooltip' to use as a starting point, but you can use any page size you want.



While designing your tooltip, try viewing it in Actual size, so you know exactly what your tooltip will look like on hover:

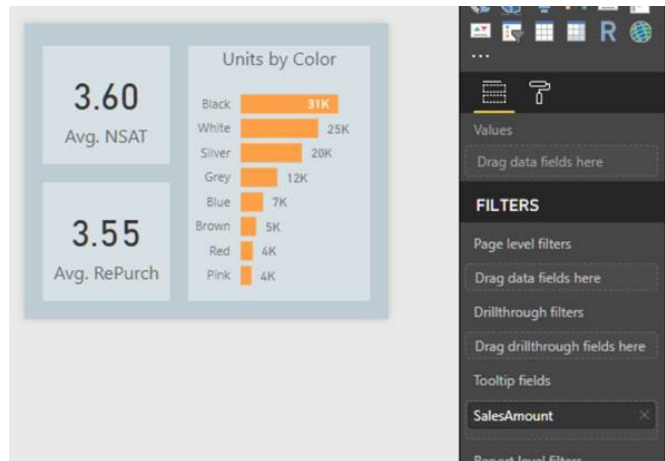


Once you've finished creating your tooltip report page, you'll need to mark the page as a tooltip so Power BI Desktop understands that you want to use it as such.



From here, there are two ways you can start using this tooltip in your report. The first is to tie it to a specific field using the 'Tooltip fields' bucket in the Filters pane. This behaves similarly to the drillthrough fields bucket. Any fields you put into the tooltip fields bucket will be tied to this tooltip. If you use this field in charts throughout your report, this tooltip will be used instead of the default Power BI tooltip. You can put both categorical and numerical fields in this bucket, including measures.

For example, let's put 'SalesAmount' in the 'Tooltip fields' bucket:

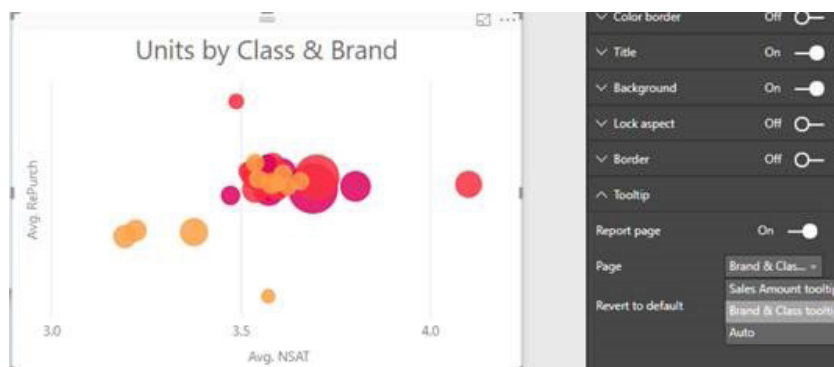


That page will be used as a tooltip in other charts using the 'SalesAmount' field, viz.



The other way you can tie a custom tooltip page to your charts is to manually set it. Visuals that support report page tooltips now has a Tooltip card in the formatting pane. In the card, you can set any page

that's marked as a Tooltip page, even if it doesn't have anything in the Tooltip field bucket, to be the tooltip for this visual. This is useful if you want to design a tooltip to be used for a specific visual.



Another use case is to manually override the automatically selected tooltip if you have accidentally picked the wrong one to use. For example, in the chart above, if we had one tooltip tied to the 'Units' field and one tied to the 'Category' field (the two fields used to create the

chart), we'd pick one of these tooltips to use automatically. If you didn't like the tooltip picked, you can use this manual override to pick the other one instead.

If you manually override the tooltip in this card, you can always go back to the default “automatic” selection by selecting ‘Auto’ in the dropdown list. You can also completely turn the report page tooltips off for a chart using the toggle in the Tooltip card. This will force a chart to use Power BI Desktop’s default tooltip, even if there are matching report page tooltips in the report.

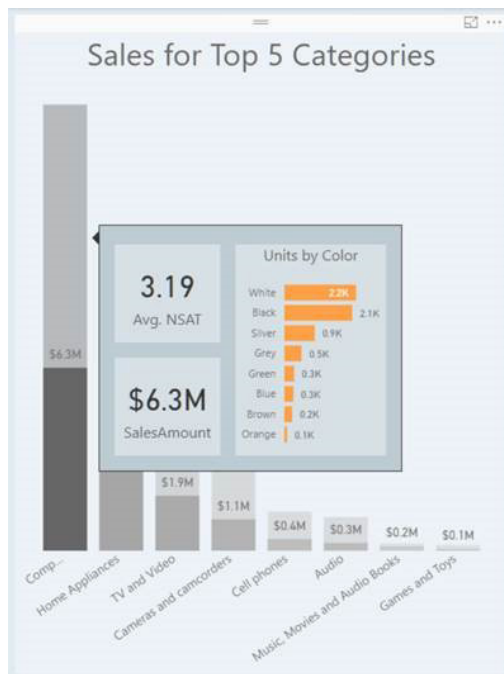


There are a couple of other things to consider when building report page tooltips. First, when using these custom tooltips for line charts, you will only get one tooltip for all lines in the chart, as you do today. The field in

the legend does not get passed through as a filter on the tooltip. In the example below, the tooltip is showing all units sold on that day across all three classes: Deluxe, Economy, and Regular:



Second, when a chart is being cross-highlighted, the report page tooltips will always show the cross-highlighted data, even if you are hovering over the “faded out” section of the data point. To see the unfiltered data in the tooltip, you will need to clear the highlighting:



This feature is in preview, so you will need to turn it on in the ‘Options’ dialog (**File > Options and settings > Options > Preview features**). Currently, report page tooltips are not supported when viewing reports

in mobile apps or in embedded environments, including Publish to web. In these cases, everything will fall back to Power BI’s default tooltip. Report page tooltips are also not supported yet for custom visuals.

Bookmarking is now Generally Available

Back in October, Microsoft released a preview of bookmarking, a powerful feature that can be used for anything from storytelling to app-like navigation. Since then, Microsoft has updated the feature to add more flexibility. This update makes bookmarking Generally Available. This means you will no longer need to turn bookmarking on through the 'Preview feature' tab in the 'Options' dialog, and you can

now create bookmarks in the Power BI Service without needing to first create a bookmark in Power BI Desktop. This also means that all the custom visuals that are published by Microsoft on AppSource support bookmarking. Other visuals in the marketplace are in the process of adding support to bookmarking too.

Display units and precision control for table and matrix columns

There's been an improvement for table and matrix field formatting. For numerical values, you can now control both the display units and decimal places per column similar to what you can already do for data labels on charts. This setting will override any model-level formatting set for that field.

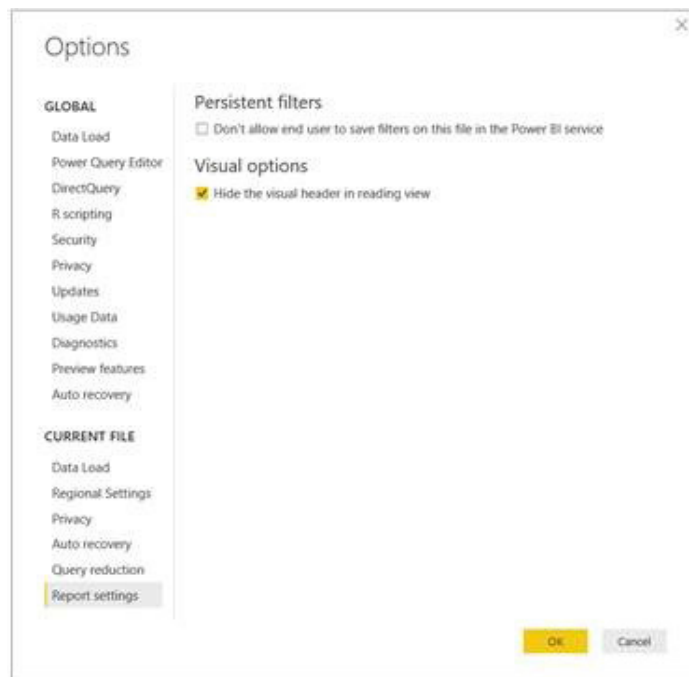


Turn off the visual header in reading mode for a report

Frequently, if you are embedding your published report, especially if it is in a webpage, you don't want or expect your users to undertake many of the actions that currently show in the visual header, such as opening the visual in focus mode or drilling down. If this is the case, you now have a way to completely disable the visual header for your entire report when it's viewed by consumers.

To turn off the visual header, you can check the 'Hide the visual header in reading view box' in the 'Report settings' section in the 'Options' dialog.

Once you've done this and published, you will no longer see the header for any visuals in your report when it's being consumed. This includes Reading mode in the Power BI Service, Publish to web reports, and any other embedding experience. Note that you will still see the header in Power BI Desktop (since it's always in edit mode) and when editing the report in the Power BI Service.



Improved default visual placement

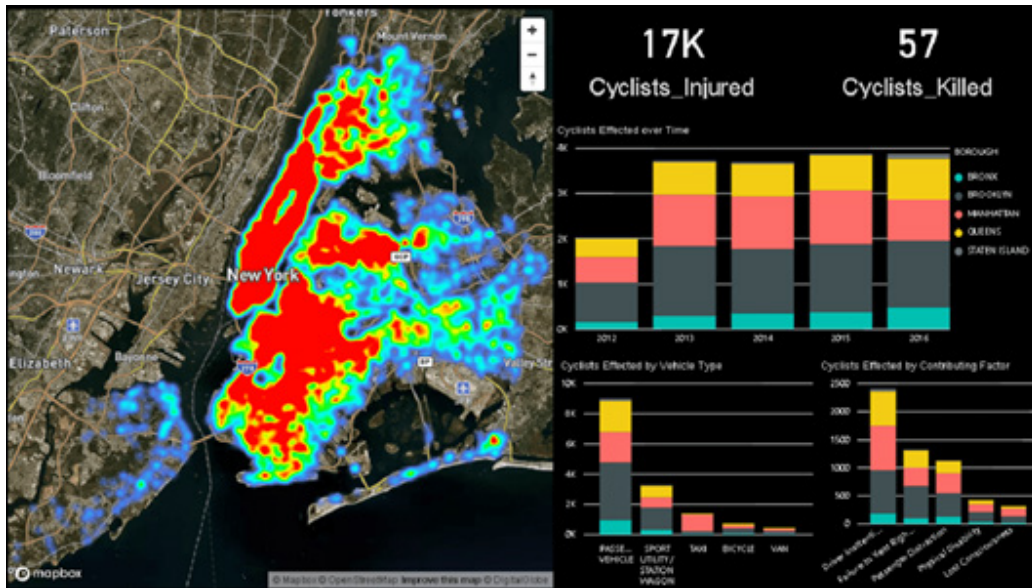
Microsoft has made some improvements to where visuals are placed by default when you create them. You should notice that the automatic placement is now more logical and does a better job of filling in gaps that are available around already existing visuals. Well, that's the theory anyway...

Mapbox

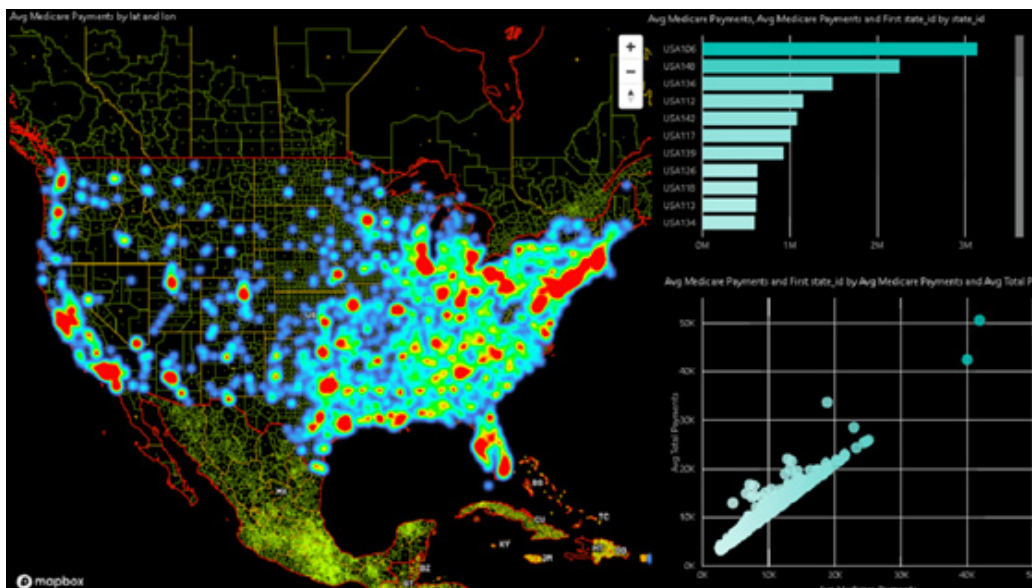
Mapbox provides mapping and location tools for Business Intelligence (BI). Their maps, search and navigation APIs and SDKs seamlessly integrate into data visualisation platforms like Power BI or can be extended to create custom dashboards or analytics tools.

With the Mapbox Power BI custom visual, Mapbox brings five powerful features for visualizing data with maps to Power BI:

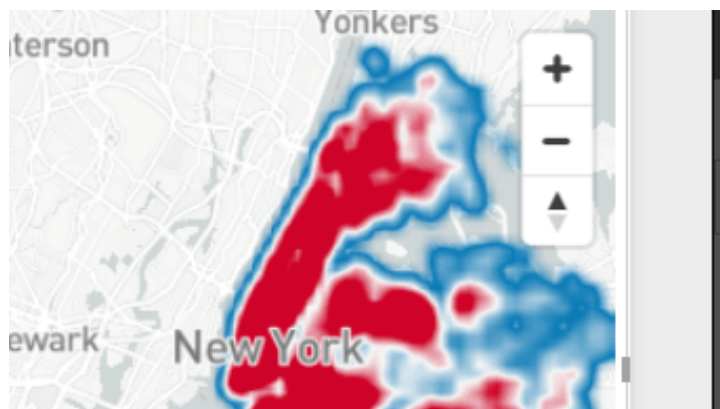
1. **Multiple visual types** that allow you to choose from heatmaps, graduated circle maps, and cluster aggregation maps all within one visual



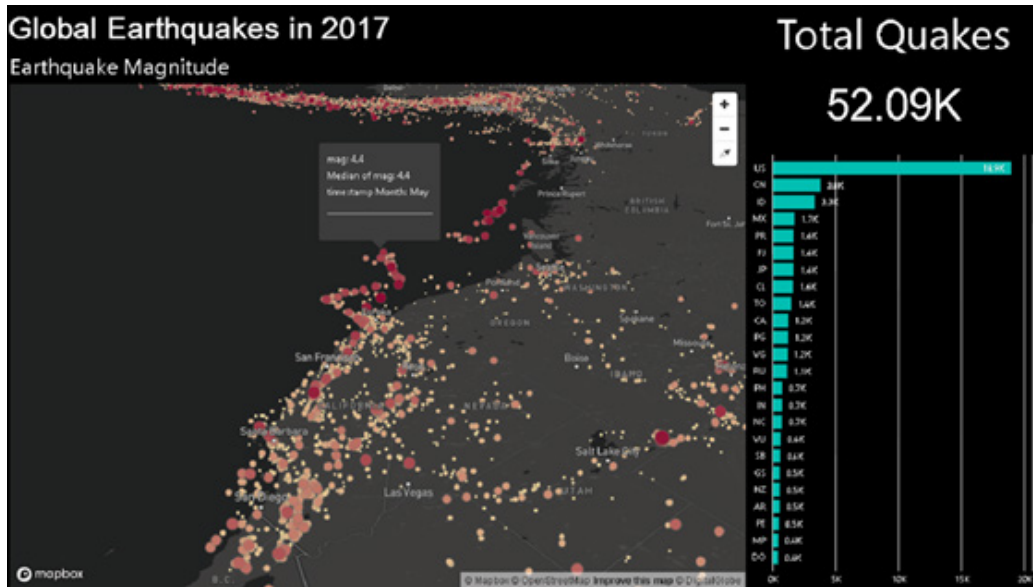
2. **Vector maps** that help you filter and understand big, dynamic data with tens of thousands of data points rendering at 60 frames-per-second



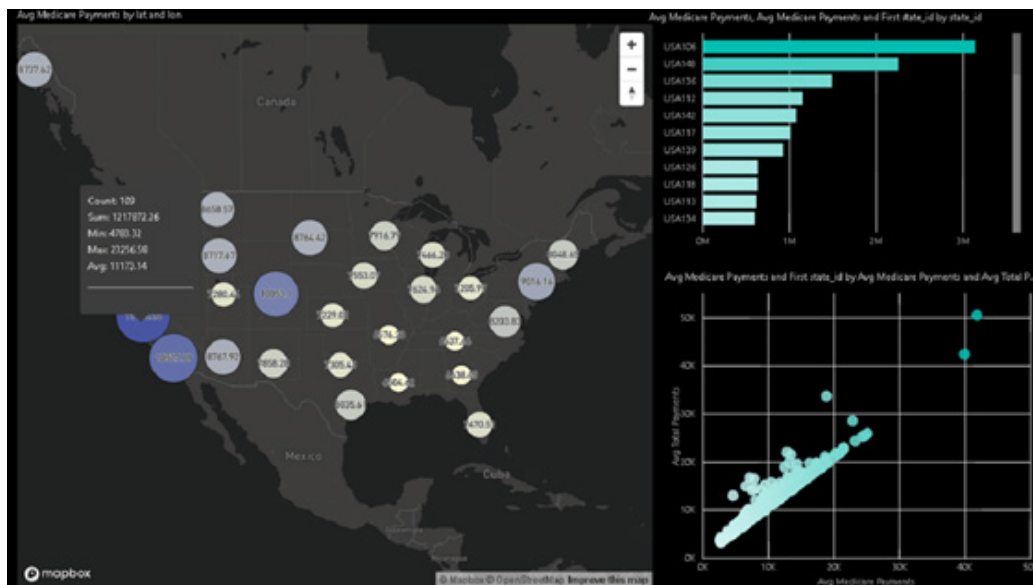
3. **Custom map design tools** that allow you to control every element of your visualisation, from color, to size, to minimum and maximum zoom



4. Upload most types of custom map data from shapefiles, KMLs, to imagery GeoTiffs and drop them in your dashboard as a custom map style



5. Use cluster aggregations to understand spatial trends way beyond density by styling clusters based on a measure sum, minimum, maximum or average value



These features enable you to arrange and visualise data in new ways to help you understand your data better, all while leveraging Power BI's infrastructure to uncover new insights.

To create this visual, you will need a free Mapbox account. As of now, you'll get 50,000 map views free per month, then you'll be billed for overages at US\$0.50 per 1,000 map views. You can download this custom visual on 'AppSource' where you will also find the relevant documentation.

User List by CloudScope

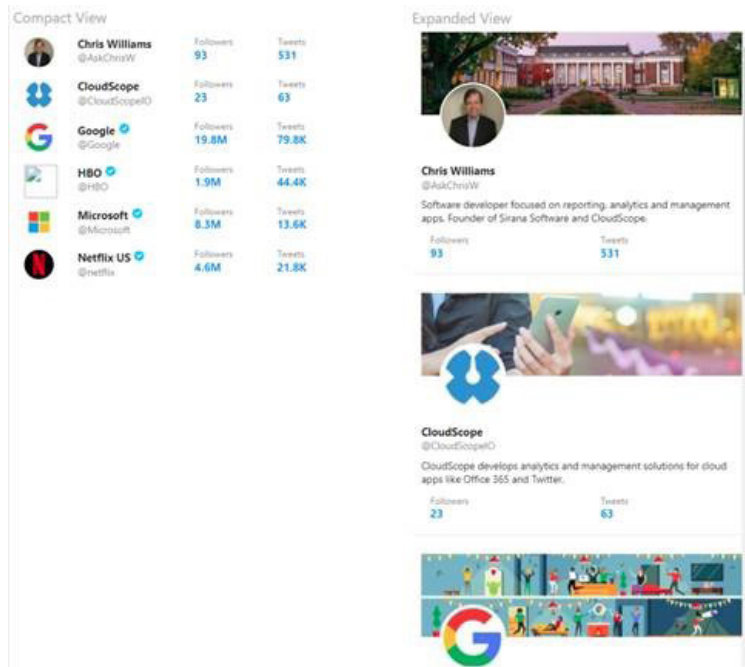
User List by CloudScope is a specialised grid-style visual that allows you to display data about users, organisations or other data elements. You can view this list in either a compact or expanded format depending on your presentation needs. You can also cross-highlight other visuals when selecting on an item in the list.

The compact version of the visual can display:

- Photo
- Name
- ScreenName
- Verified status
- and any number of generic data fields

The expanded list adds:

- Background photo
- Description.



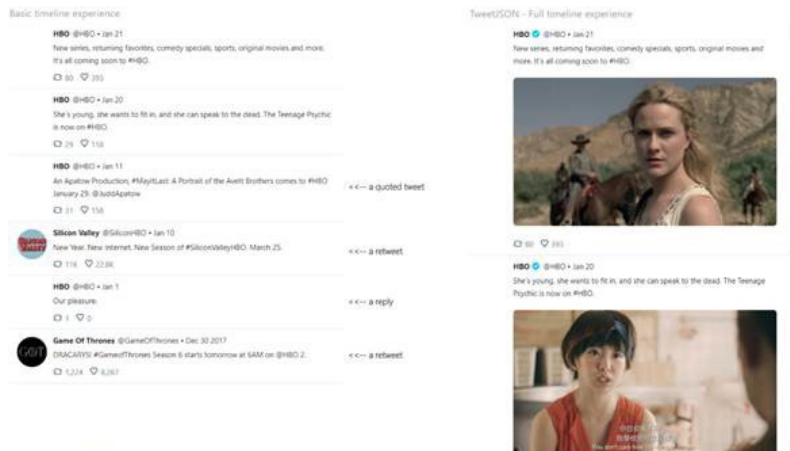
Timeline by CloudScope

The Timeline by CloudScope visual displays a list of social data information in a format similar to a Twitter timeline. You can create this visual by providing up to seven fields from your data model:

- User picture
- User name
- User screen name
- Created date
- Text
- Likes
- Retweets.

This will create a timeline visual you can use to integrate social media information into your report. Each status item in the timeline can be used to cross-highlight other visuals on your report page.

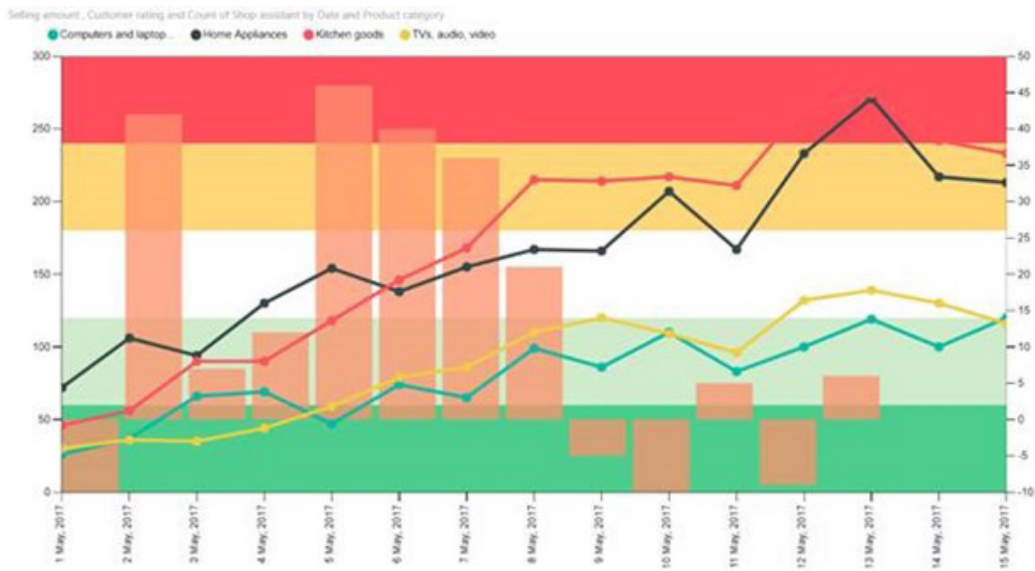
There is also an enhanced version of this that you can create by providing a property collection called TweetJson, which will allow you to display embedded tweet media, author verified status and distinguish between different tweet types (tweets, retweets, replies and quoted tweets). You can learn more about TweetJson on CloudScope's website, www.cloudscope.io/support/tweetjson.



KPI Chart by Akvelon

KPI Chart by Akvelon is a single visual for visualising / analysing the correlation between two measures. It combines a line chart and a column chart with the same X axis to show a representation of the distribution of numerical data. Additionally, KPI Chart by Akvelon allows you to show static and dynamic background KPI regions that can characterise, for

example, the level of success before reaching the target. This chart is a simplified version of the standard 'Line and Clustered' column chart with the added ability to create multiple lines and add horizontal regions to assess progress.



R DataTable

The R DataTable by David Eldersveld is an interactive R-powered table that helps you easily explore and filter data. Some of the benefits of the R DataTable include:

- **Search:** global search field to filter data across all columns
- **Pagination:** use 'Show # of entries' to choose between 5, 10, 25, 50, 100, or 1000 records to display per page
- **Column-level filters:** conveniently filter column values using the option below each column header.

Some of the format options include:

- **Initial Entries:** choose the default number of entries / records per page
- **Filters:** choose where to position the column filters (Top, Bottom, None).

Show 50 entries

Species	Waterbody	Method	Bait	Category	Weight (lbs)	Length (in)	Year	County
PUMPKINSEED	Houghton Lake	Driftfishing	Arrow	Catch and Keep	1.12		2013	Roscommon
ROCK BASS	Houghton Lake	Driftfishing	Artificial Bait	Catch and Keep	1.42	11.75	2013	Roscommon
SMALLMOUTH BASS	Hubbard Lake	Driftfishing	Artificial Crayfish	Catch and Keep	5.77	22	2013	Alcona
SMALLMOUTH BASS	Pine River	Stillfishing	Artificial Decoy	Catch and Keep	6.06	20.08	2013	Charlevoix
SMALLMOUTH BASS	Boardman River	Driftfishing	Artificial Grub	Catch and Keep	6.06	21.31	2013	Grand Traverse
CHANNEL CATFISH	Kalamazoo River	Stillfishing	Leech	Catch and Release		30	2013	Allegan
CHANNEL CATFISH	Kalamazoo River	Stillfishing	Leech	Catch and Release		31	2013	Allegan

Showing 1 to 19 of 19 entries (filtered from 1,190 total entries)

Outliers Detection

Use the Outliers Detection to find outliers, a data point a significant distance from most other points, in your data using the most appropriate method. This can help you find measurement errors or indicators of important occurrences or events. One such example is fraud detection, where outliers may indicate fraudulent activity.

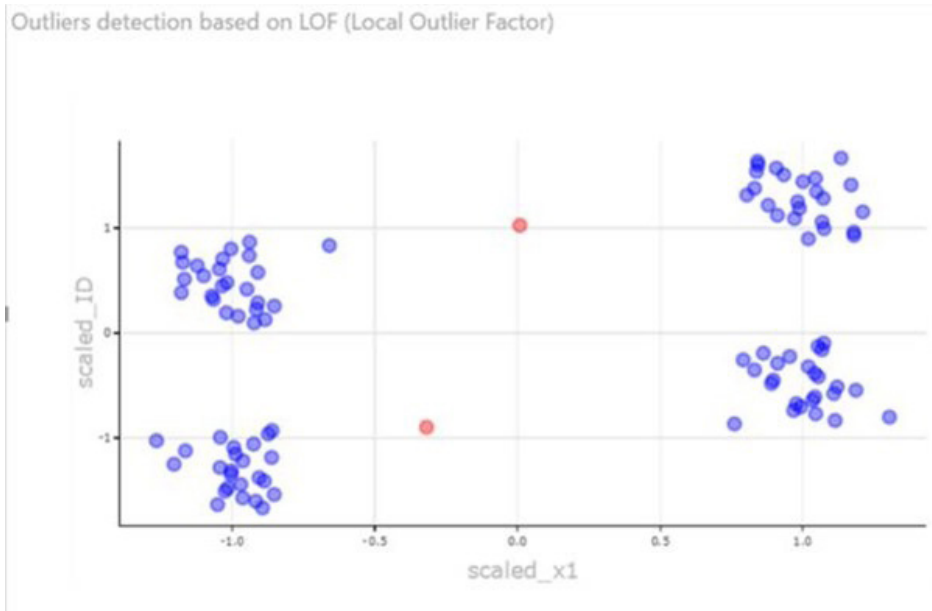
There are many different methods to detect outliers, and in this custom visual you can use five of the most popular detection methods:

1. **Zscore:** a standard deviation approach
2. **Tukey's method:** an interquartile range (IQR) approach
3. **LOF (Local Outlier Factor) method:** computes the local density deviation of a given data point with respect to its neighbours. It considers samples that have a substantially lower density than their neighbours as outliers
4. **Cook's distance:** shows the influence of each observation on the fitted response values. An observation with Cook's distance larger than three times the mean Cook's distance might be an outlier
5. **Manual method:** allows you to define your own upper and lower thresholds for the original data.

In addition to the different detection method, the visual also supports three ways to visualize outliers:

- Scatter plot
- Box plot
- Density plot.

For each plot type, you can decide to visualise the original data or outlier scores.



Data Insights by MAQ Software

Data Insights by MAQ Software allows you to view data in multiple formats. You can switch between a horizontal bar, a vertical bar, a brick or a tabular format. With Data Insights by MAQ Software, you can explore, select and view selected data in the format that best fits your individual business needs.

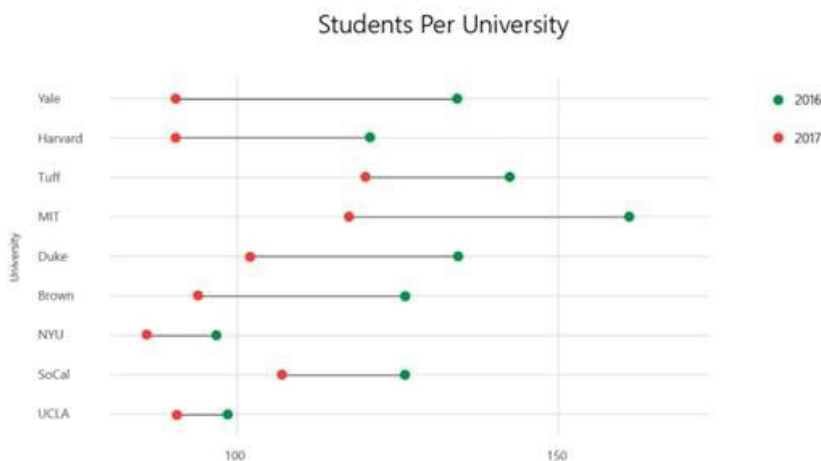


Dumbbell Chart by MAQ Software

The Dumbbell Chart by MAQ Software displays critical measures and shows changes over a duration or across categories. The Dumbbell Chart helps you analyse changes in critical data. This visual allows you to illustrate the change between two data points and comparing the distances between them. The visual consists of a dual-axis combination chart, where one axis is marked by a circle and the other is marked by a line that spans data points you provide.

Key features include:

- The ability to display the performance of multiple indicators.
- The ability to compare the growth or loss of indicators across various categories.
- Easy interaction with many data points using the zoom functionality.
- Quick downloading of an image of the chart with the capture image widget.

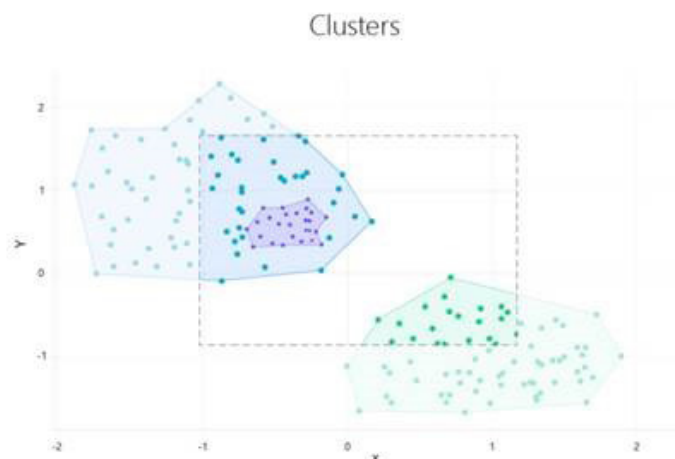


Clustering using OPTICS by MAQ Software

The Clustering using OPTICS by MAQ Software visual uses the OPTICS based clustering algorithm to analyse groups and hierarchies within a group. The algorithm works on density-based clustering, so you can also identify individual points that don't belong to any of the groups. You can perform hierarchical clustering on your data to identify more closely-knit groups within larger groups. This visual also allows you to adjust the clustering parameters to control hierarchy depth and cluster sizes.

Key features include:

- Ability to identify outliers based on convex hull plots
- Data is scaled and pre-processed automatically so no need to do so externally
- Add your own dataset for tooltips
- Ability to identify sub clusters / hierarchal clusters in your data
- Ability of hover tooltips and zoom effects
- Capability to manually adjust the parameters of the clustering model
- No need to define the number of clusters.



SAP HANA connector enhancements

This update also sees a couple of enhancements to the SAP HANA connector.

DIRECTQUERY MULTIDIMENSIONAL SUPPORT IS NOW GENERALLY AVAILABLE

Last month's update released a preview of the new SAP HANA DirectQuery multidimensional connector. A few weeks ago, Power BI Service enabled support for the connector (via the On-premises data gateway February update). Now, Microsoft has announced that the new DirectQuery multidimensional connector has hit General Availability. Note that you may still opt into using the DirectQuery relational connector by enabling the option under 'File -> Options and Settings -> Options -> DirectQuery -> Treat SAP HANA as a relational source'.

SSL CERTIFICATE VALIDATION SUPPORT

In this release, Microsoft has enhanced support for connecting to SAP HANA servers with SSL encryption by surfacing the 'SSL Certificate Validation' options in the 'Power BI Desktop Credentials' prompt. Note that you may need to remove or edit already stored credentials for a given SAP HANA server that you connected to before in order to leverage these new options. Support for these new options will become available in the Power BI Service (via On-premises data gateway) in one of the next few Gateway updates. Coming soon!

SAP BW DirectQuery is now Generally Available

This update heralds the General Availability of the DirectQuery mode for SAP BW, which was introduced as a Beta feature a few months ago. For this connector, it is important to discard existing preview DirectQuery

reports. Do watch out: errors will occur on old reports when you try to refresh the report.

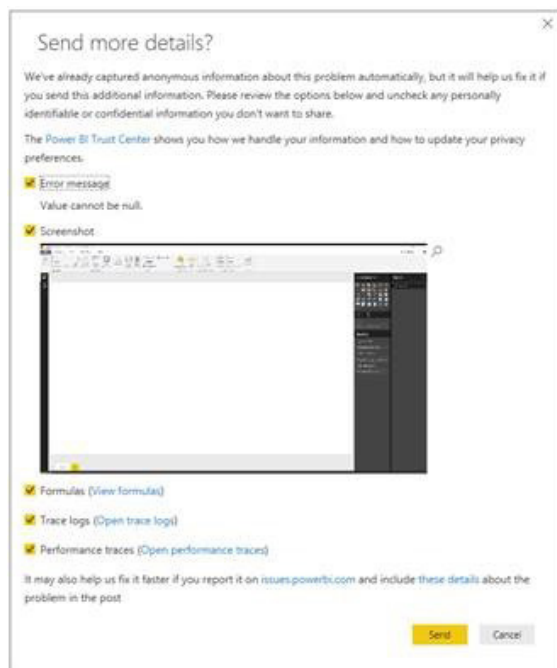
Azure Analysis Services connector is now Generally Available

Another connector becoming Generally Available in this update is the Azure Analysis Services connector.

Improved error reporting

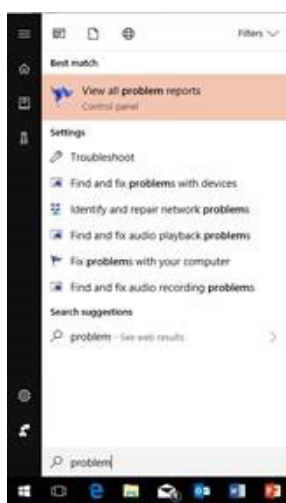
If you ever get an error while using Power BI Desktop (!), you'll no longer see the old send-a-frown experience where you email Microsoft the information. Microsoft has now upgraded this error reporting experience to use Windows Error Reporting. Now whenever you hit an error, you'll be able to send Microsoft the information directly through this new error

dialog. In addition to being able to submit errors in Power BI Desktop directly, another benefit of the move to Windows Error Reporting is that you now have a centralised place to see and search all your Windows diagnostic data that you've reported to Microsoft. Big Sister can now watch Big Brother!



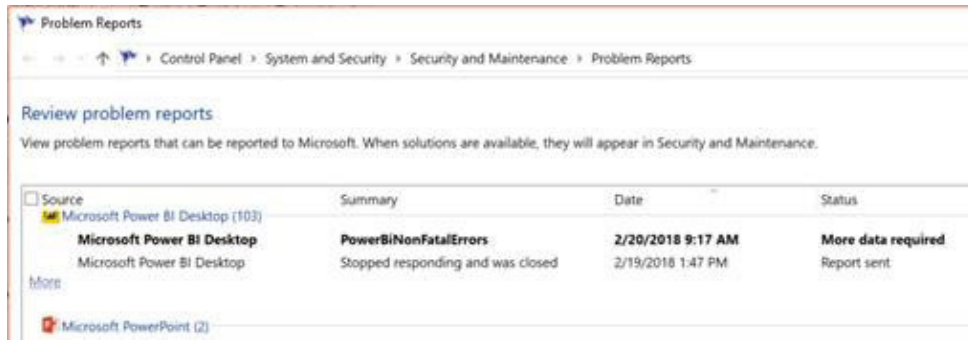
View previous errors you've encountered

Now that Windows Error Reporting has arrived (see above), you can also view any errors you've previously encountered while using Power BI Desktop. To do this, search for 'problem reports' in your start menu:

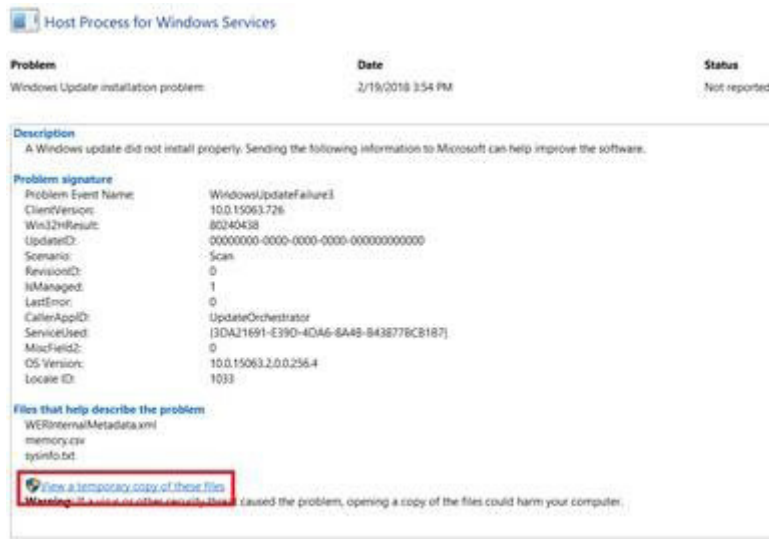


If you select 'View all problem' reports, you'll get a dialog showing all your errors and you can double click any issue in the list to view the details that were sent to Microsoft, including any screenshots:

If you select 'View all problem' reports, you'll get a dialog showing all your errors and you can double click any issue in the list to view the details that were sent to Microsoft, including any screenshots:



If you chose to not submit a report initially, you can always get all the information from here to send to the Microsoft support team later, if needed. Just click 'View a temporary copy of these files' and save anything you need to send to the support team:



More next month, no doubt...

Latest Updates for Power BI Service and Mobile

A little more sporadic than its Desktop counterpart, there's been new features added to Power BI Service and Mobile. Here's the summary of what has been released recently:

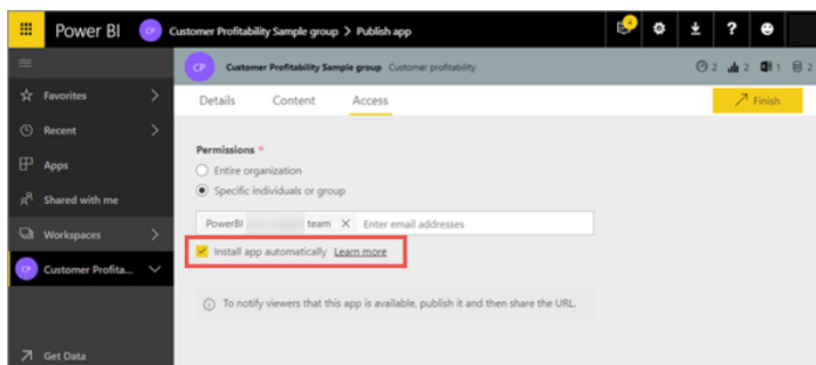
- Automatically install apps
- P4 and P5 capacities on Premium
- Organisational custom visuals (Preview)
- February update for On-premises data gateway
- Share reports and improved hyperlinks on Mobile.

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

Automatically install apps

It's been made easier to distribute Power BI apps within your organisation as you may now push apps to end users. App consumers no longer need to dig through the Microsoft AppSource or follow installation instructions to get their content; pushed apps will automatically be installed in their Apps content list for easy access. This option can be

found in the app publishing workflow. Assuming your administrator has granted you rights to push apps, you will see a new option called install the app automatically under the 'Access' tab. When the box is checked, all the users under the permissions section will have the app installed.



P4 and P5 capacities on Premium

When Power BI Premium was first launched, Microsoft provided users with a choice of four different SKUs (EM3, P1, P2, P3), each which contained different numbers of virtual cores and memory sizes. This month, two more capacities have been added, P4 and P5, that give users the flexibility of having up to 64 and 128 v-cores, respectively, in

deployment. Capacities may still be allocated to suit your business needs and instantly scale up or down. Interestingly, these capacity sizes are currently available for Power BI customers in the West US and Southeast Australia only (yay, Microsoft remembered Australia for once!). Support for additional regions is coming soon.

Organisational custom visuals (Preview)

The latest release sees a new way for organisations to develop, share and maintain custom visuals. Organisational custom visuals, now in Preview mode, allow Power BI administrators to manage and even deploy proprietary custom visuals for report authors to import into their reports on Desktop.



Organisational custom visuals (Preview)

This latest update also sees an enhanced version of the on-premises data gateway. New features in this release include:

- ability to refresh queries combining data from on-premises and cloud data sources
- improvements to the gateway support for DirectQuery over SAP HANA (Preview)
- an updated mashup engine.

Share reports and improved hyperlinks on Mobile

Finally, Microsoft has extended the capability of report sharing to mobile. You can now share reports directly from your mobile app on any platform. At the same time, a new and enhanced tooltip interface has been added where you can drag your finger across the visual to explore details about each data point.

March Update for Power BI Report Server

The Power BI updates don't end there this month. March also saw the release of a new version of Power BI Report Server that contains several new features, including bookmarking, synchronising slicers and quick measures. This release is supported for production workloads, so you should feel free to upgrade your production environment to take advantage of all of these new capabilities.

In summary, the updates / new features are as follows:

Visuals

- Table and matrix
- Cartesian charts and maps
- Slicers

Reporting

- Storytelling and apps
- Interactivity
- Ease of authoring

Analytics

Query editing

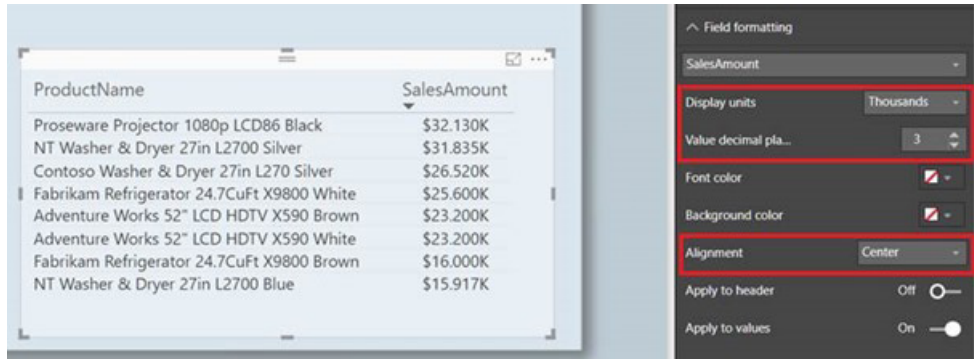
Performance improvements

Other improvements

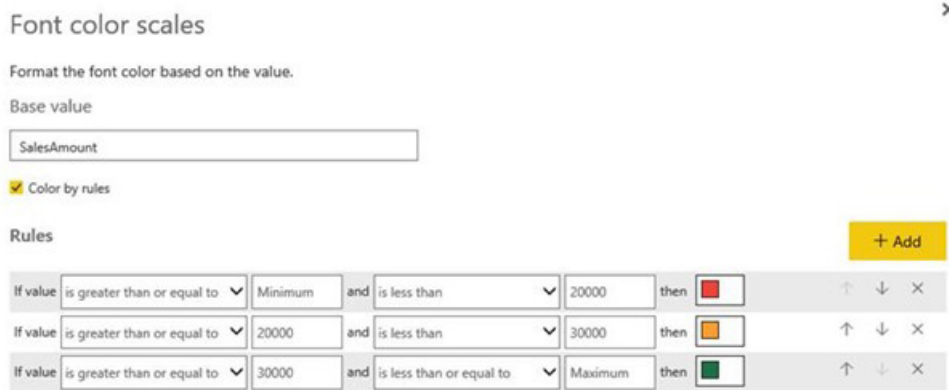
Let's take a look at each of these in turn.

Table and matrix

For table and matrix visuals, there have been additions: cell alignment, display units and precision control for individual fields.



Conditional formatting has also been extended to include rule-based conditional formatting.

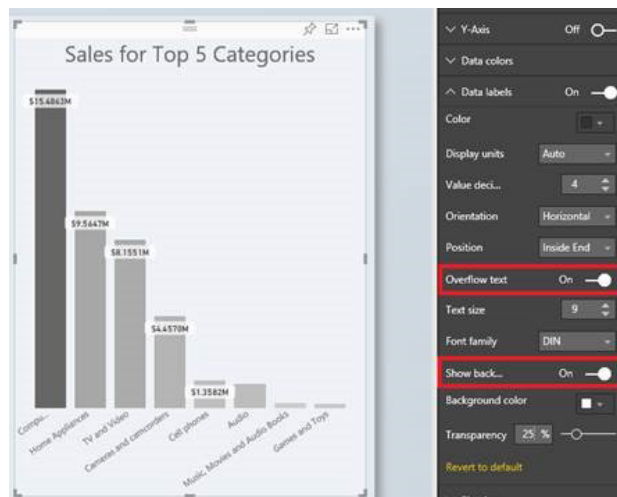


Now, if you have specific business logic to reflect in your table or matrix, you may create rules to conditionally colour the background or font colour of a column.

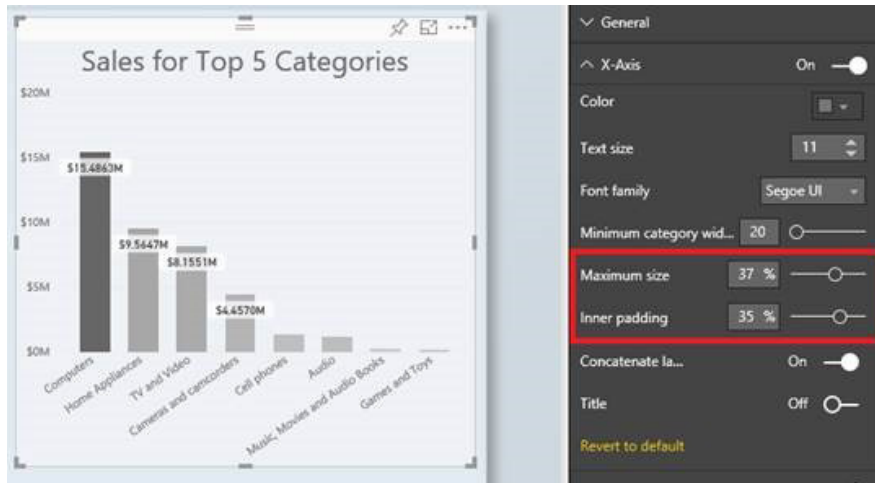
ProductName	SalesAmount
Proseware Projector 1080p LCD86 Black	\$32.1K
NT Washer & Dryer 27in L2700 Silver	\$31.8K
Contoso Washer & Dryer 27in L270 Silver	\$26.5K
Fabrikam Refrigerator 24.7CuFt X9800 White	\$25.6K
Adventure Works 52" LCD HDTV X590 Brown	\$23.2K
Adventure Works 52" LCD HDTV X590 White	\$23.2K
Fabrikam Refrigerator 24.7CuFt X9800 Brown	\$16.0K
NT Washer & Dryer 27in L2700 Blue	\$15.9K

Cartesian charts and maps

For data labels on bar and column charts, you may now overflow your data labels past the bar's boundary. Additionally, for Cartesian charts and maps, you can also control the background colour and transparency.



There are new formatting options for the axis of bar and column charts as well. You can control the padding between categories and increase the percentage of the chart used for axis labels.



For scatter charts, this update has added a way to plot your data without having to group it on a category through the details bucket.

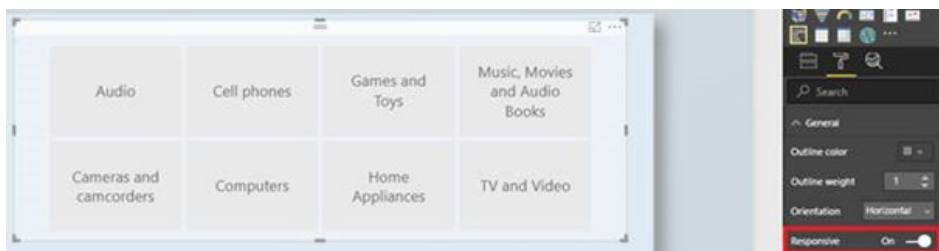


If you are using Bing maps with latitude / longitude data, high density sampling is now enabled that better preserves the shape of your data while also highlighting outliers.

Slicers

Two new features have been added to the slicer visual. The first is known as “responsive slicers”, which lets you resize slicers to a variety of different sizes and shapes, from horizontal to square to vertical, and the

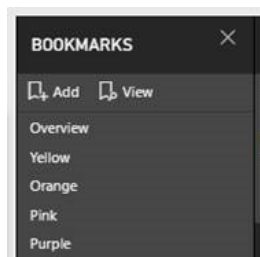
values in the slicer responsively rearrange themselves as you do. For the second, “relative date slicers”, Microsoft has provided a feature to let you set a specific anchor date instead of it always being relative to today.



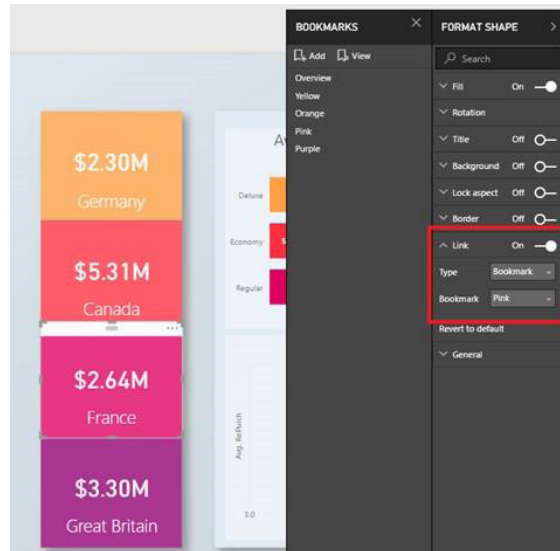
Storytelling and apps

The new bookmarking feature lets you save specific states of your report. This state can include filters, slicers, cross-highlighting, what charts are visible or not (set through the selection pane) and everything else that

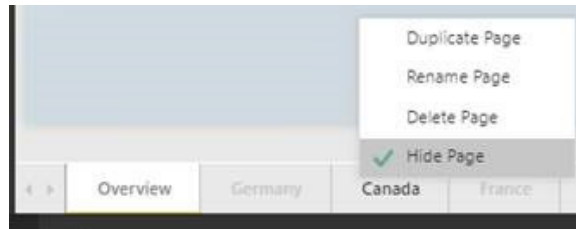
makes up your current view. You also have the flexibility to control what part of the report’s state is included in a bookmark.



Once you have several bookmarks, you can then play through those states in a specific order to tell a story. Also, you may tie a specific state of your report to images or shapes, and when someone clicks on that image, it will load that specific state. This lets you set up custom navigation and create an interactive app-like report that changes as users click around.



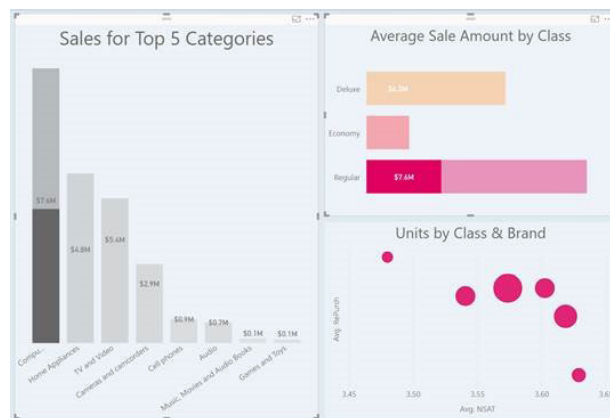
To make your report more app like, you can also hide pages in your report. In addition to letting you hide work in progress, this also lets you hide pages you don't want users to navigate to directly and force them to reach that page through bookmark links or drillthrough.



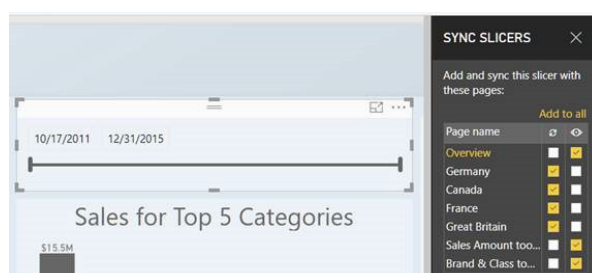
You can also disable the visual header in reading mode which can give your reports a much cleaner and app-like look.

Interactivity

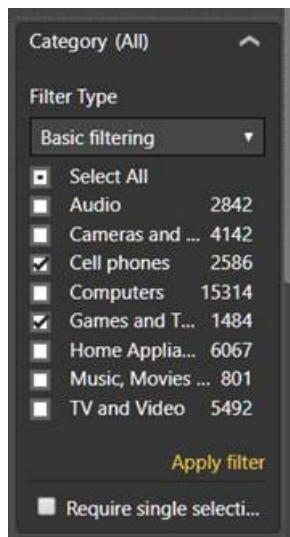
Several reporting features have been added to improve interactivity. You can now cross-highlight across multiple charts on a page.



As a report creator, you can also sync slicers across multiple pages of your report. If you set this up, if a user selects a specific slicer value on one page of their report, it will apply to any report pages that are synchronised with it.



If you have a report connected to a slow dataset, there are also report options to help reduce the number of queries being sent. From one place, you may add an 'Apply' button to all slicers and filters in your report. This means users can make as many modifications to their slicer or filter as they want and then once ready apply it. From here, you can also easily turn off cross-highlighting for your report.



Ease of authoring

In addition to these new reporting features, improvements have been incorporated that make it easier for authors to create reports. Power BI Report Server has improved the default placement of visuals when they are added to a report page, so you don't have to resize and move the visuals as much. When you do need to select and rearrange objects on your report, you can easily select and change the z-order of visuals (visual ordering) through the selection pane.

Microsoft has noted that once you have your layout set and all you need to do is format and test your report, it can be easy to accidentally move visuals while clicking on them. To help with this accidental issue, you can now lock visuals in your report, so they can't be moved or resized.

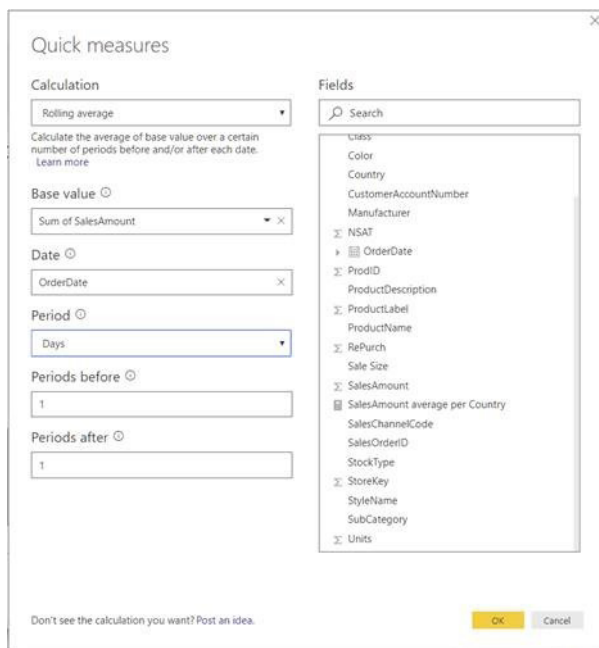
Analytics

In order to help create new DAX measures, Quick Measures now comes to the Power BI Report Server. This is a relatively new feature that lets you quickly create new measures based on other fields in your table.

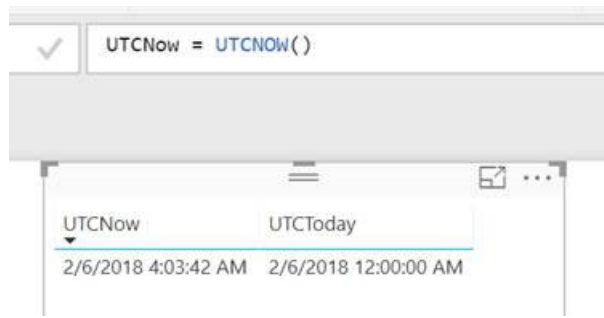
With this borne in mind, when formatting your visuals, there are so many formatting options now for visuals that it can be hard to find what you are looking for, so a search box has now been added to the formatting and analytics panes.

Also, if you have multiple people editing your reports, you can add descriptions to the fields of your model. This is a useful way for everyone to understand what fields they should use and how measures are being calculated.

These new measures become part of your model and can be used in any of your charts, just like manually created DAX calculations. You can also see the underlying DAX and edit it if you need to tweak the results.

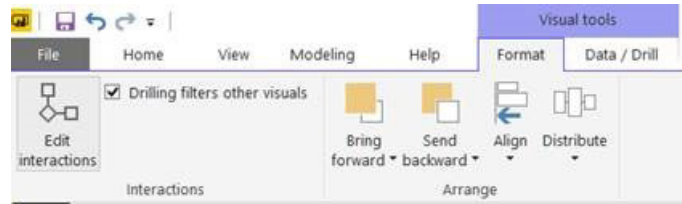


Another DAX improvement is the addition of two new DAX functions that help if you're working with date-time data across time zones. **UTCNOW()** and **UTCTODAY()** will always return the current time or date in UTC so you can guarantee consistent results wherever you are.



If you have your own date table, you can now mark them as a date table in Power BI Report Server too. This means Microsoft can remove their built-in date tables, and you can start using this date table in your datetime quick measures.

When analysing your data, drilling down can help you find interesting insights. With this update, it's now possible for other visuals on your report to be filtered as you drill down in a visual, which will help you find even more insights in your data.

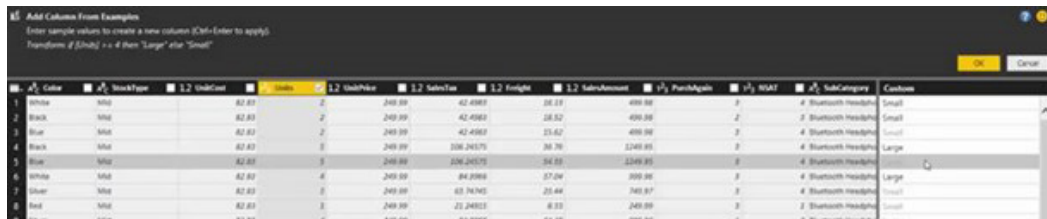


The last analytics feature for this release is extending the cell-level formatting support to multi-row cards. This means that for table, matrix, single value cards and multi-row cards, cell-level formatting defined in the multi-dimensional Analysis Services (AS) model will automatically flow through and be applied.

Query editing

For this update, the Query Editor has also been improved. There's now support for generating 'Conditional Columns' transformations as part of the 'Add Column From Examples' experience. This addition opens up a lot of additional scenarios for 'Add Column From Examples' including:

- Basic conditional columns
- Conditional column ranges
- Null fallback
- Bucketing (uniform ranges).

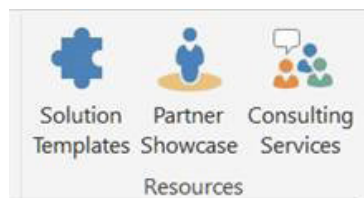


Performance improvements

This new version of Power BI Report Server also has several major performance improvements. This include updates in our filtering implementation, which improves performance for certain scenarios, such as when using strings. There's also many improvements to the performance of reports using DirectQuery. You should expect some improvement to many queries and substantial improvement in particular cases. The key performance improvements are:

- combining additive and non-additive aggregates into single query
- improved handling of queries with a large number of literals
- use of a single SQL query rather than multiple for some visuals and calculations
- optimised queries to reduce post-aggregation
- optimised use of **TREATAS** in calculations.

You'll also see improvements when opening and saving large files and when using the 'Show items with no data' feature in visuals.



Even though this update is all about Server, one update affects the Power BI Desktop error reporting experience. If you encounter an exception while using Power BI, you'll be shown a dialog where you can optionally send Microsoft information to help them investigate the issue and improve the Desktop. You'll be able to do this completely inside

Power BI Desktop. This new experience is also hooked into Windows Error reporting, so you can view your previous error information in the same place as errors from other Windows applications. More next time, no doubt.

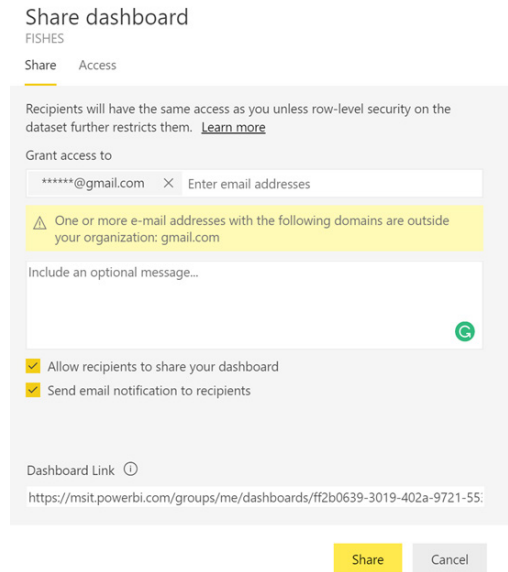
Sharing Power BI Content with Anyone by Email

In other news, Microsoft has just announced the ability to share content with users using their personal email accounts, making it easier to share data with people outside of your organisation. Previously, you could only share content to other users with work email addresses.

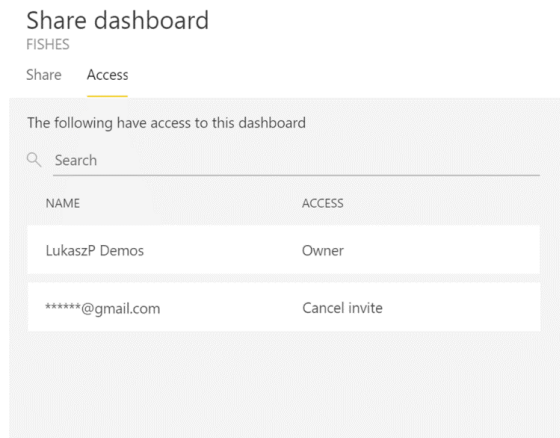
This is great news for SumProduct – as we often undertake consulting assignments that have required us setting up dummy email accounts.

This can be useful in many situations. For example, if you're a service provider such as a financial planner, you often need to securely provide your clients reports and dashboards. Sometimes your clients prefer to use personal email addresses, like Outlook.com or Gmail, and now you can share to those people with Power BI.

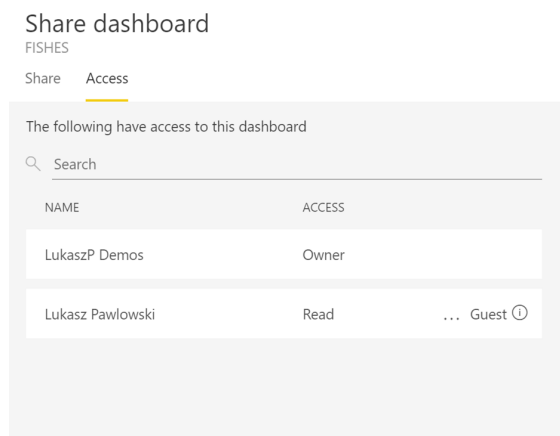
To share content through email, simply enter their email address in the Share pane:



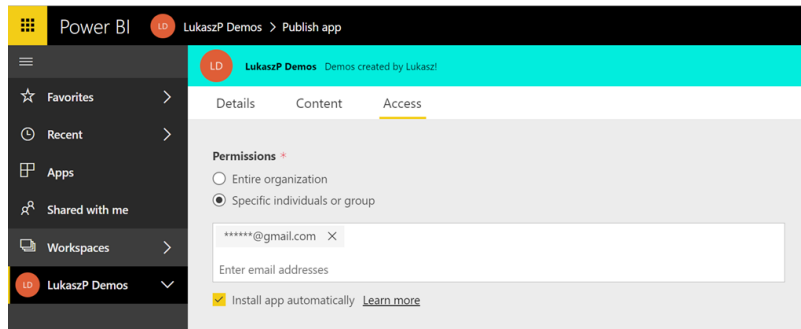
When you select 'Share', they'll get an invite to join your organisation as a guest user. On the 'Access' tab, you'll see them listed:



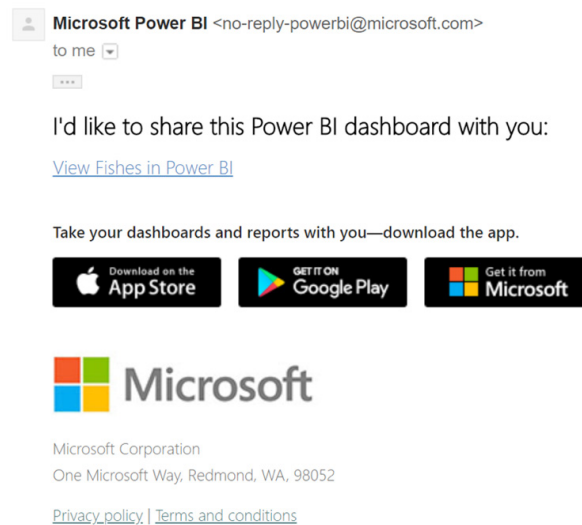
After the user accepts the invite, you will see them marked as a guest in the access list.



For apps, you add the personal email account into the 'Permissions' list on the 'Access' tab:



So how does it work? Well, an invitational email is sent to the provided email address. The recipient needs to be in your organisation's Azure Active Directory (AAD). If the recipient isn't in AAD, they'll be prompted to create an AAD account.



Sharing with personal email works just like external sharing with Azure B2B to organisations. You'll either need to put the content in a Premium capacity or assign a Power BI Pro license so the user can consume the content.

Do note though that you still cannot sign-up for Power BI with a personal email address. This hasn't changed. Microsoft still requires a business account by signing up for a free trial of Office 365. It's a start though!

STOP PRESS: Coming soon to Power BI – Common Data Service for Analytics

Just as this newsletter was about to head for desktop publishing, this landed on our desk.

In light of International Data Corporation's (IDC's) recent global data creation estimate, that there will be more than 160 zettabytes of data by

2025, Microsoft has estimated that greater than 60% of this data will be created by businesses. With this as background, a common data service is going to be a technological imperative.

What is the Common Data Model?

1. The Common Data Model is an easy to provision scalable data store that provides security, storage and behavior via an entity model.
2. The Common Data Model can serve as an operational data store (ODS) and a transaction processing (TP) store*.
 - a. Data can be copied into standard and custom entities from multiple systems of record. The data can be cleansed, made non redundant and processed for integrity. This data is read-only. (ODS)
 - b. Data can be represented by updatable standard and custom entities which support atomic reads and writes. (TP)
 - c. Analytics on the totality of data in the CDM drives insights**.
3. The Common Data Model provides a standard schema through a set of standard entities

With these capabilities the CDM empowers the power user to **measure, act** and **automate** on a consolidated set of data sourced from across the enterprise.

* An operational data store pulls data from other systems and enables work on the consolidated data. A transaction processing store is designed to process the day-to-day transactions of an organization.
** The CDM is not a data warehouse, we are currently investigating in memory analytics and PowerBI for this purpose. A data warehouse accumulates data from other systems for historical analysis.

Pictured above: Microsoft's summary of their Common Data Model (CDM).

Therefore, Microsoft has announced a new capability coming to Power BI soon: the Common Data Service (CDS) for Analytics. CDS for Analytics capability will reduce the complexity of driving business analytics across data from business apps and other sources:

- **Common data schema.** Built on the common data model, CDS for Analytics will expand Power BI with the introduction of an extensible business application schema on which organisations can integrate data from multiple sources. Pre-built connectors for common data sources, including Dynamics 365, Salesforce and others from Power BI's extensive catalogue, will be available to help organisations access data from Microsoft and third parties. But that's not all – you'll also be able to add your own data
- **Accelerated access to insights.** Equally, once the data is aggregated, the next step is transforming it into relevant insights and making those insights immediately available to help users take intelligent action. In addition to the data being accessible for self-service analytics in Power BI, customers will have the opportunity to purchase apps from Microsoft and our partners built on Power BI with the new CDS for Analytics capability:
 - o Microsoft's first-party Power BI Insights apps will deliver out-of-the-box insights tailored to specific line of business scenarios, across marketing, sales, service, finance, operations and talent. For example, Power BI for Sales Insights might address how to maximise sales productivity by providing insights into which opportunities are at risk and where salespeople could be spending their time more efficiently

o Partners can also build Power BI apps to deliver added value to their customers. Insurance and investment solution provider CUNA Mutual Group is developing a new offering for the credit union industry built on Power BI and Dynamics 365. AdvantEdge Analytics will extend Microsoft's common data model, leveraging standard connectors to populate the data model from the line of business apps used by credit unions. AdvantEdge will expose deep insights through Power BI, and users will have the ability to translate these insights into action with Dynamics 365. Partners and AdvantEdge customers will also be able to extend the model even further, accelerating the possibilities for digital transformation for credit unions.

- **Customise and extend your apps.** Power BI apps built with the new capability will also be extensible to meet unique business requirements. Regardless of skillset – from self-service customizations in low code / no code experiences in Power BI, to the depth of the Azure platform with data services like Azure Machine Learning and Azure Databricks – users will be able to custom tailor reports or build new ones uniquely relevant to their needs.

Watch this space.

The A to Z of Excel Functions: COMPLEX

Imagine this complex function. This function converts real and imaginary coefficients into a complex number of the form $x + yi$ or $x + yj$, where i or j denotes the square root of -1.

The COMPLEX function employs the following syntax to operate:

COMPLEX(real_num, i_num, [suffix])

The COMPLEX function has the following arguments:

- **real_num:** this is required and represents the real coefficient of the complex number
- **i_num:** this is also required. This denotes the imaginary coefficient of the complex number
- **suffix:** this argument is optional. The **suffix** for the imaginary component of the complex number. If omitted, suffix is assumed to be "i".

NOTE: All complex number functions accept "i" and "j" for **suffix**, but neither "I" nor "J". Using uppercase results in the #VALUE! error value, given the possible confusion with cell references etc. All functions that accept two or more complex numbers require that all suffixes match.

It should be further noted that:

- if **real_num** is non-numeric, **COMPLEX** returns the #VALUE! error value
- if **i_num** is non-numeric, **COMPLEX** returns the #VALUE! error value
- if **suffix** is neither "i" nor "j", **COMPLEX** returns the #VALUE! error value
- arithmetic operations involving imaginary numbers require specific functions such as **IMSUB** (subtract), **IMSUM** (add), **IMPRODUCT** (multiply) and **IMDIV** (divide). If these are not used, the calculations will return the #VALUE! error value.

Please see our example below:

	A	B	C
1	Formula	Description	Result
2	=COMPLEX(3,4)	Complex number with 3 as the real coefficient, 4 as the imaginary coefficient; i is the default suffix	3+4i
3	=COMPLEX(2,5,"i")	Complex number with 2 as the real coefficient, 5 as the imaginary coefficient; i is the specified suffix	2+5i
4	=COMPLEX(2,5,"j")	Complex number with 2 as the real coefficient, 5 as the imaginary coefficient; j is the specified suffix	2+5j
5	=C2+C3	Demonstrates complex numbers may not simply be added	#VALUE!
6	=IMSUM(C2,C3)	Complex summation of the complex numbers in cells C2 and C3	5+9i
7	=IMSUM(C2,C4)	Demonstrates complex summation only works if the same suffixes are used	#VALUE!
8	=IMSUB(C2,C3)	Complex subtraction of the complex numbers in cells C2 and C3	1-i
9	=IMPRODUCT(C2,C3)	Complex multiplication (product) of the complex numbers in cells C2 and C3	-14+23i
10	=IMDIV(C2,C3)	Complex division of the complex numbers in cells C2 and C3. Note the general formatting	0.896551724137931-0.241379310344828i
11			

The A to Z of Excel Functions: CONCAT

More and more users are migrating to the Office 365 subscription model and with that comes great power, well Excel 2016 anyway. And *some* versions of Office 365 Excel 2016 are getting six new functions to play with. The roll-out started in late February 2016 and continues to this very day.

Do note we said some Excel users are getting these new features. To have access to these functions, you have to meet one of the following requirements:

- You are an Office 365 subscriber and have the latest version of Office installed on your PC
- You are using Excel Online
- You are using Excel Mobile
- You are using Excel for Android phones and tablets.

Just having standalone Office 2016 is insufficient: Microsoft's push to get everyone onto the subscription model continues! Even then, the roll-out will be in stages. Office 365, Home, Personal or University subscriptions will update before other types and businesses may find new features have been restricted by their IT departments. Further, recent discussions on Excel for a suggest PCs may be getting new features ahead of those with Mac's etc.

CONCAT is one of the new functions available in this new-age Excel 2016.

This function replaces the **CONCATENATE** function (see our next functions blog). The **CONCAT** function combines the text from multiple ranges and / or text strings:

CONCAT(text1, [text2],...)

where:

- **text1** is the text item to be joined
- **text2** (onwards) are the additional items to be joined.

For example, consider the following illustration:

	C	D	E	F	G	H	I	J	K	L	M	N	O	P
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														

Upon first glance, **CONCAT** does the same thing as the legacy **CONCATENATE** function or **&** (ampersand) operator, but is just easier to spell. However, it is a little more than that: **CONCATENATE** will not cope with highlighting a contiguous range (it will just return the **#VALUE!** error); **CONCAT** will concatenate them all.

The A to Z of Excel Functions: CONCATENATE

As mentioned above, in Excel 2016, Excel Mobile, and Excel Online, this function has been replaced with the **IMPORTANT:** In Excel 2016, Excel Mobile, and Excel Online, this function has been replaced with the **CONCAT** function (*see the last function, above*). Although the **CONCATENATE** function is still available for backward compatibility, you should consider using **CONCAT** from now on. This is because

CONCATENATE may not be available in future versions of Excel. You have been warned!

CONCATENATE may be used to join two or more text strings into one string. This will link text with the values in cells and / or the results of various formulae. For example, consider the following:

	C	D	E	F	G	H	I	J	K	L	M	N
10												
11												
12												
13												
14												

This shows how simple concatenation is. Using the **CONCATENATE** function, the above example is no more difficult than:

=CONCATENATE("You have picked the colour ",G11)

Note that the text has to be in inverted commas and if you require spacing this needs to be built into the text component too.

This formula could be simplified using the ampersand (&) operator instead:

= "You have picked the colour "&G11

This alternative formula would do exactly the same thing and does not require you to learn how to spell **CONCATENATE**. Seriously, the operator is preferred in any case since it is slightly more efficient and allows for more items to be joined together.

For the more pedantic amongst you, the text above does not form a sentence. Indeed, it also treats "Orange" as a proper noun as it capitalises the "O". Also, there is no full stop. Therefore, we might wish to refine the above example as follows:

	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
10															
11		Rainbow colour			Orange										
12															
15		More sophisticated			You have picked the colour orange.										
16															

In this example, I have generated the more elaborate formula, viz.

= "You have "&IF(G11="", "not yet picked.", "picked the colour "&LOWER(G11)&".")

Working our way through this formula, this version allows for what happens if cell G11 is unpopulated (i.e. the expression **G11=""** means **G11** is blank / empty), inserts the full stop and turns "Orange" into "orange" using Excel's **LOWER** function (this makes everything lower case).

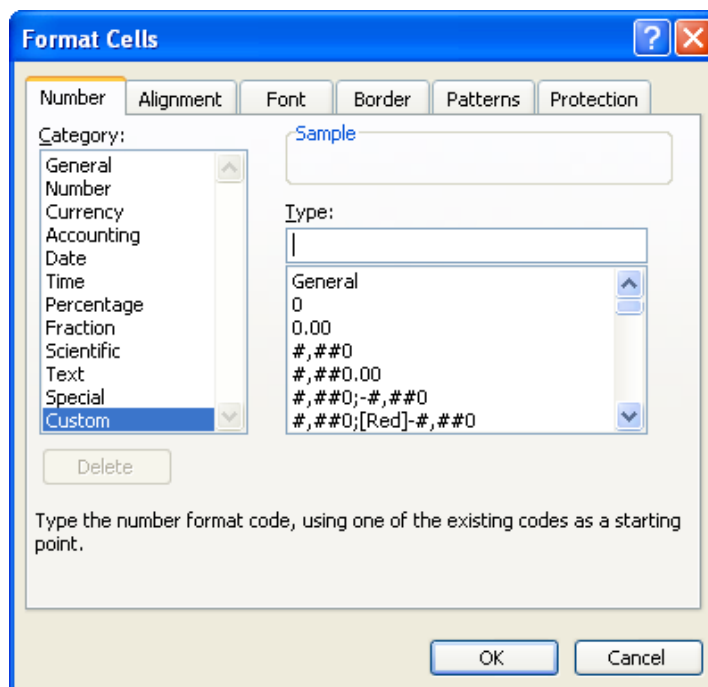
Concatenation often means manipulating the appearance of text: as well as the **LOWER** function, **UPPER** (upper case) and **PROPER** (pseudo-title case: capitalises the first letter of each and every word) can be useful partners in crime.

Concatenation is often referred to as "mixed text", in that it is a mixture of text and other arguments such as cell references and / or formulae results. Typically, mixed text will often contain numbers too, and these can be a little more awkward to format. You cannot simply Format Cells (**CTRL + 1**) as this formats cells containing numerical data only.

In this case, we have to fall back on the useful **TEXT** function which formats, er, numbers. The syntax of **TEXT** is as follows:

=TEXT(Reference,"Mask")

The reference is the cell or formula that needs to be formatted and the **Mask** is the syntax you would enter for Custom number formatting in the Format Cells (**CTRL + 1**) dialog box:



To see how this works in practice, consider the following:

	C	D	E	F	G	H	I	J	K	L	M	N
22												
23		TEXT Function										
24												
25		Number			1,234,567,890.0							
26												
27		Example			The number is \$1,234.6m							
28												

Again, the eagle-eyed will spot no full stop, but that is not the point here. The formula

=`"The number is "&TEXT(G25,"$#,##0.0,,\m")`

takes the value in cell **G25** and displays it to the nearest \$0.1m.

Speaking from experience, with practice much mundane monthly reporting commenting on numbers can be automated using this technique; the key is to identify all the scenarios that may occur and allow for them. The formulae may get slightly complex, e.g.

	C	D	E	F	G	H	I	J	K	L	
29											
30		Possible Commentaries									
31											
32		Revenue Summary									
33											
34					Prior Period		Current				
35		Revenue			80.0		80.0				
36											
37		Example			Revenue remains constant at \$80 for the month.					<i>More complex!</i>	
38											

This example commentary considers how revenue has changed from one month to the next:

```
=IF(Prior_Period_Revenue=0,"Revenue is "&TEXT(Current_Period_Revenue,"$#,##0")&" this month.",
IF(OR(Prior_Period_Revenue<0,Current_Period_Revenue<=0),"Revenue inputs need to be reviewed.",
IF(Prior_Period_Revenue=Current_Period_Revenue,"Revenue remains constant at "&TEXT(Current_Period_Revenue,"$#,##0")&" for the
month.",
"Revenue has "&
IF(Current_Period_Revenue>Prior_Period_Revenue,"increased","decreased")&
" by "&TEXT(ABS(Current_Period_Revenue/Prior_Period_Revenue-1),
"#,##0.0%")&" this month."))
```

Good luck working that final formula through!

SumProduct Still Out and About

It's been a busy last few weeks – and it continues to be. We've been globetrotting big time! Presently, we're in the midst of a chaotic itinerary taking in Amsterdam, Brisbane, Bundaberg (Queensland), Kuala Lumpur, London, Los Angeles, Melbourne, Newcastle (NSW), Perth (Western Australia), Redmond (Washington State), Solomon Islands, Sydney and Wollongong (NSW).



Picture: SumProduct opens up its new office in Seattle...

If you live / work anywhere near any of these locations and would like to catch up, do drop us a line at contact@sumproduct.com – we'd love to hear from you.

Upcoming SumProduct Training Courses

Location	Course	Date	Duration
Adelaide	Financial Modelling	5 - 6 Apr 2018	2 days
Sydney	Excel Tips & Tricks	23 Apr 2018	1 day
Sydney	Financial Modelling	26 - 27 Apr 2018	2 days

Melbourne	Excel Tips & Tricks	30 Apr 2018	1 day
Melbourne	Financial Modelling	1 - 2 May 2018	2 days
Melbourne	Power Pivot, Power Query and Power BI	7 - 9 May 2018	3 days
Auckland	Financial Modelling	21 - 22 May 2018	2 days
Wellington	Financial Modelling	24 - 25 May 2018	2 days
Darwin	Financial Modelling	4 - 5 Jun 2018	2 days
Sydney	Power Pivot, Power Query and Power BI	18 - 20 Jun 2018	3 days
Sydney	Financial Modelling	25 - 26 Jun 2018	2 days
Melbourne	Excel Tips & Tricks	2 Jul 2018	1 day
Melbourne	Financial Modelling	3 - 4 Jul 2018	2 days
Melbourne	Power Pivot, Power Query and Power BI	17 - 19 Jul 2018	3 days
Sydney	Excel Tips & Tricks	13 Aug 2018	1 day
Sydney	Financial Modelling	15 - 16 Aug 2018	2 days
Brisbane	Excel Tips & Tricks	27 Aug 2018	1 day
Brisbane	Financial Modelling	28 - 29 Aug 2018	2 days
Sydney	Power Pivot, Power Query and Power BI	10 - 12 Sep 2018	3 days
Perth	Financial Modelling	17 - 18 Sep 2018	2 days
Perth	Power Pivot, Power Query and Power BI	19 - 21 Sep 2018	3 days

Key Strokes

Each newsletter, we'd like to introduce you to useful keystrokes you may or may not be aware of. This month we are on the up and up as we focus on the Up Arrow key:

Keystroke	What it does
Up Arrow	Move up one cell
ALT + Up Arrow	Close drop-down (auto-complete, filter or validation)
CTRL + Up Arrow	Select the cell at the top of the region
SHIFT + Up Arrow	Extend selection up one cell
CTRL + ALT + Up Arrow	Intel Chipset: Display screen normally (0 degrees orientation)
CTRL + SHIFT + Up Arrow	Extend selection up to the end of the region

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.

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 <http://www.sumproduct.com/training>.

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