

## Lots to catch up on this month!

With shortened printing deadlines for December abbreviating our January newsletter and Microsoft issuing a raft of updates just before the turn of the year, our February newsletter sees us well and truly in catch-up mode with what's been going on – with numerous updates for Power BI and Power Query. Welcome to our biggest newsletter ever! Don't be put off if it's not all for you – with so much to report, there's sure to be something for everyone.

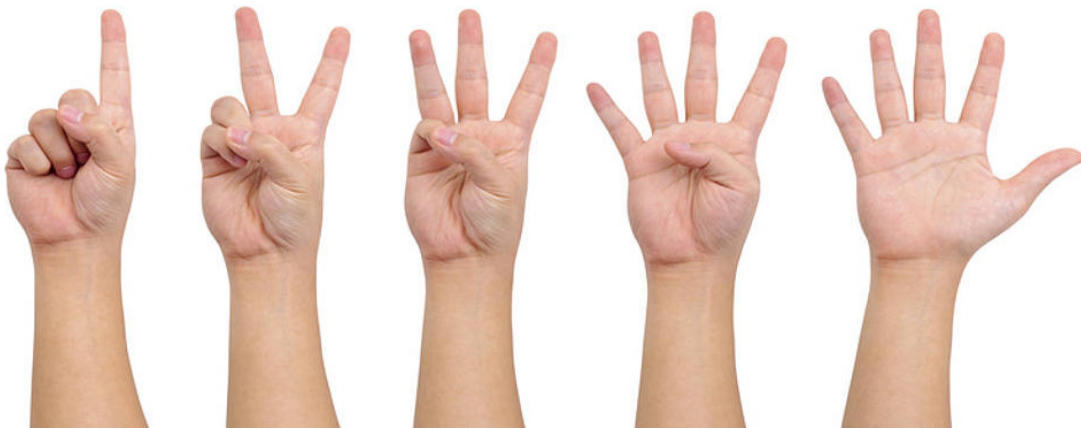
We've two big announcements this month too – there's more on Unlock Excel and our blog series goes daily (on a weekday anyway!). With the usual regular features such as Power Query Pointers, the A to Z of Excel Functions (this month **COLUMN** "rows" to the occasion!) and more Keyboard Shortcuts, there's plenty to delve into.

Until next month.

*Liam Bastick*, Managing Director, SumProduct



## Are You Getting it Five Times a Week..?



We've made a New Year's Resolution for 2018 we are hoping we can stick with... Our [Blog](#) page is going to have a new blog each day Monday to Friday starting from this week! If you're not already a regular reader, maybe you should be from now on.

Our standard schedule will be as follows:

- **Mondays:** [A to Z of Excel Functions](#) – start your week with a function. Do you know your **COUNTA** from your **COUNTBLANK**?
- **Tuesdays:** [Power Pivot Principles](#) – we're starting a new series dedicated to the Power Pivot COM add-in
- **Wednesdays:** [Power Query Pointers](#) – our regular series of ideas for the Extract, Transform and Load (ETL) tool will continue. Can you clean up your act and keep **TRIM**?
- **Thursdays:** [Power BI Tips](#) – another new series, coming soon to a theatre near you. If you haven't used Power BI yet, you really need to start
- **Fridays:** [VBA Blog](#) – our regular articles on VBA tips and tricks continues unabated.

With the [Final Friday Fix](#), [Monday Morning Mulling](#) and other *ad hoc* blogs appearing from time to time, hopefully there's something for everyone. This is all in addition to our [Excel Tip of the Day](#), and our [News](#) and [Thought](#) series which will continue to be updated on an (ir)regular basis too. And if you really do want more, do remember there's the monthly newsletter you can subscribe to at the foot of any [SumProduct](#) webpage too.

## Unlock Excel 2018 Update

CPA AUSTRALIA PROFESSIONAL DEVELOPMENT  
**INVEST IN YOURSELF**

**UNLOCK EXCEL**  
IMPROVE | DISCOVER | STREAMLINE

Advance your Excel knowledge with Microsoft's awarded MVPs – the world's leading Excel gurus – and learn how to improve your efficiency, discover new skills and streamline your processes.

APRIL 2018  
BRISBANE  
MELBOURNE  
SYDNEY  
WELLINGTON

EARLY BIRD PRICES AVAILABLE!  
View program and book now  
[cpaaustralia.com.au/unlockexcel](http://cpaaustralia.com.au/unlockexcel)

BE HEARD.  
BE RECOGNISED.

CPA AUSTRALIA

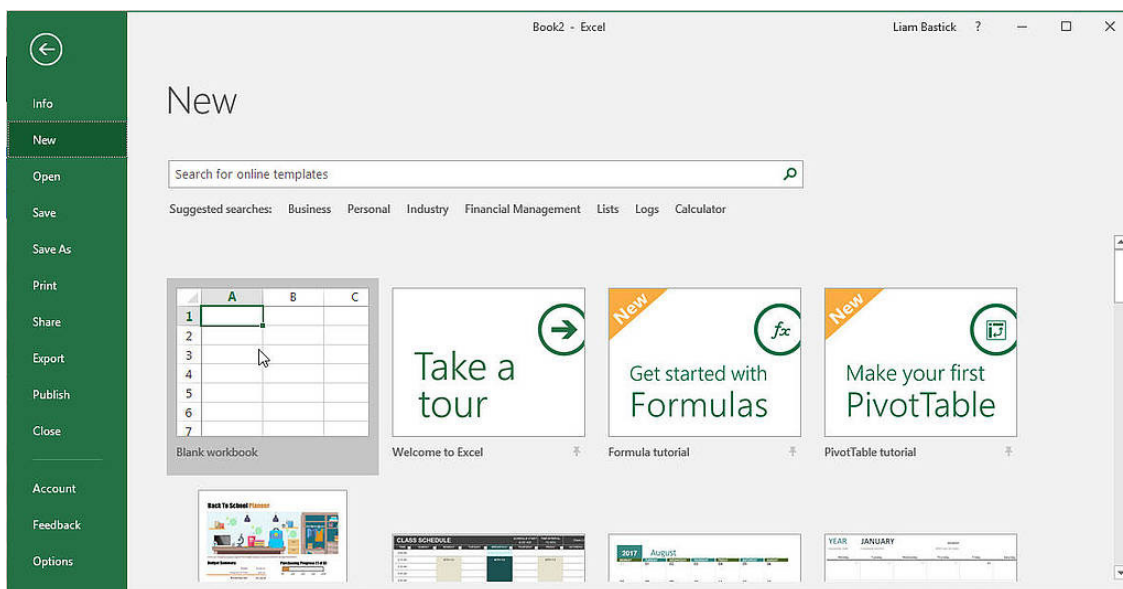
As mentioned last month, in conjunction with CPA Australia and Microsoft, SumProduct will be hosting the Excel MVP conference in 2018 for Australia and New Zealand.

The events are as follows:

- **MELBOURNE** 9-10 April
- **SYDNEY** 12-13 April
- **BRISBANE** 16-17 April
- **WELLINGTON** 19-20 April

We're pleased to inform you that the official website [www.cpaaustralia.com.au/training-and-events/conferences/unlock-excel](http://www.cpaaustralia.com.au/training-and-events/conferences/unlock-excel) is now fully up and running. Hope to see you there!

## Microsoft Tutorials for Excel 2016



Not sure we should be writing about this, but we are keen advocates of learning Excel, data management and financial modelling. Therefore, it seems churlish if we don't mention that Microsoft has added two Excel tutorials to Excel 2016 for those new to Excel:

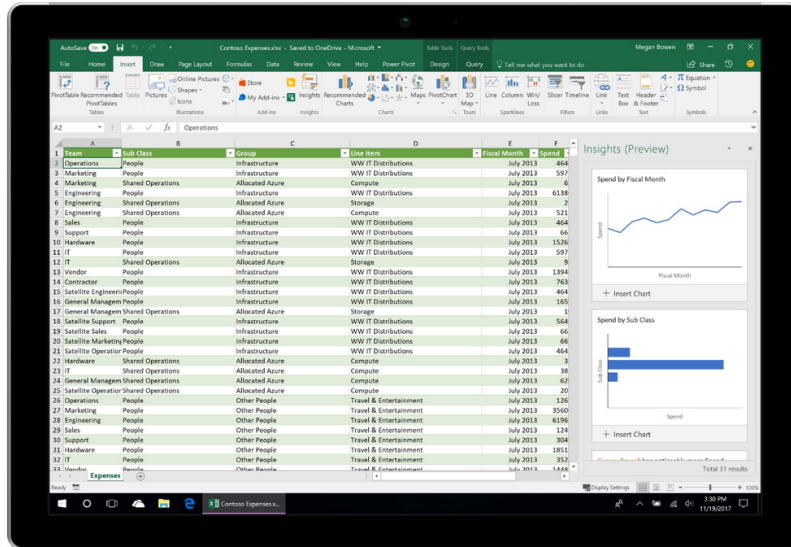
1. **Formula tutorial:** This session introduces the concept of a function and steps through some of the more common ones, including everyone's favourite (except us – we hate it), **VLOOKUP**. It's not a bad start though
2. **PivotTable tutorial:** This file provides a step-by-step guide to **PivotTables**. It's not bad, but doesn't mention Recommended PivotTables (highlight your data and use the keyboard shortcut **CTRL + Q**).

They're easy to access in Excel 2016, simply select 'File' from the Ribbon and then click on 'New' in the backstage area.

We look forward to more in due course and hope that Microsoft doesn't put us out of business!

# An Insight into Insights

Now here is some truly exciting news. Office 365 is looking to bring in Artificial Intelligence (AI) initiatives into three of its core products: Excel, Outlook and Word. Here at SumProduct, obviously we were most interested in the Excel initiative: **Insights**.



Insights is a new service that automatically highlights patterns detected in your data, helping you discover and analyse new insights such as trends, outliers and other useful analyses and visualisations. It will look for noteworthy trends in your data and provide quick summaries with PivotTables and charts. Because this feature is powered by machine

learning, it will provide increasingly advanced analysis as usage grows. It's just been announced that it has been rolled out in Preview to Office 365 commercial subscribers enrolled in Office Insiders in the United States this month. Let's hope it rolls out to the rest of us soon...

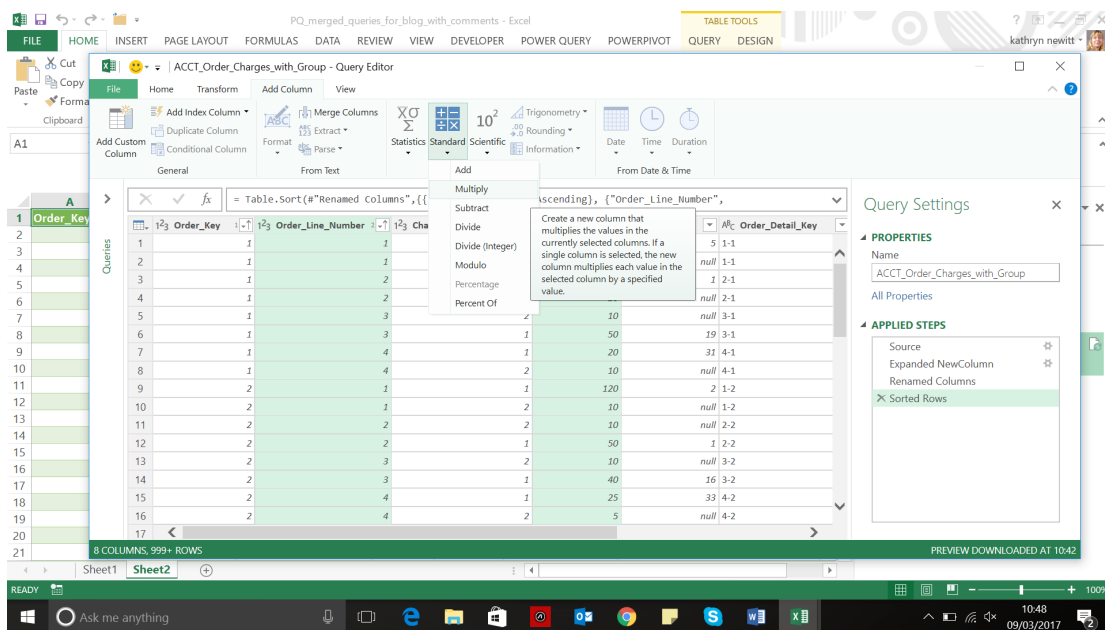
## Power Query Pointers

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](http://www.sumproduct.com/blog). If you wish to read more in the meantime, simply check out our Blog section each Wednesday. Last time we looked at M language syntax in a simple query. This month, we add some code to operate on each row in a table and show how bulky code can be simplified.

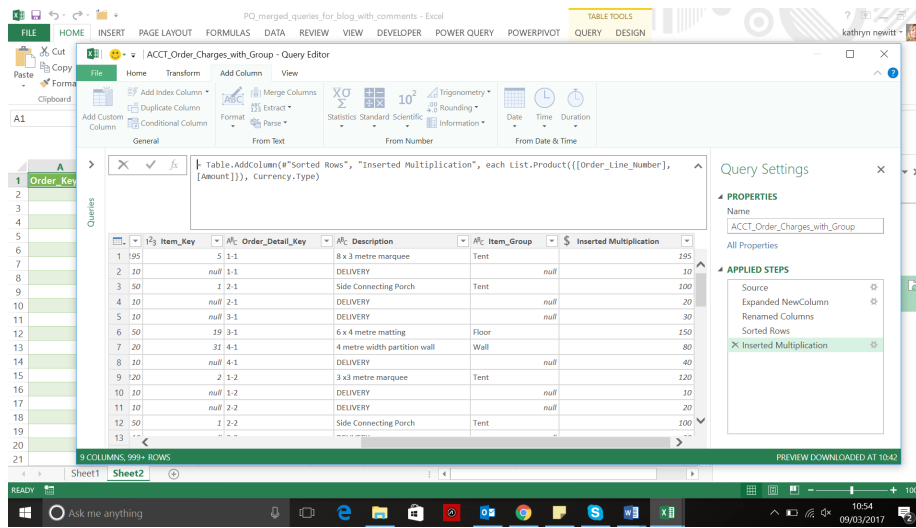
language can be configured to operate on each row in a table. To do this, let's add a column that is a product of two of my numerical columns, so we'll choose **Amount** and **Order\_Line\_Number**.

Using the **ACCT\_Order\_Charges\_with\_Group** query edited from last month's article, we will take this a step further and demonstrate how M

Having selected the two columns, in the 'Add Column' tab in the 'Standard' section, you can then choose to add a column that multiplies these chosen columns:



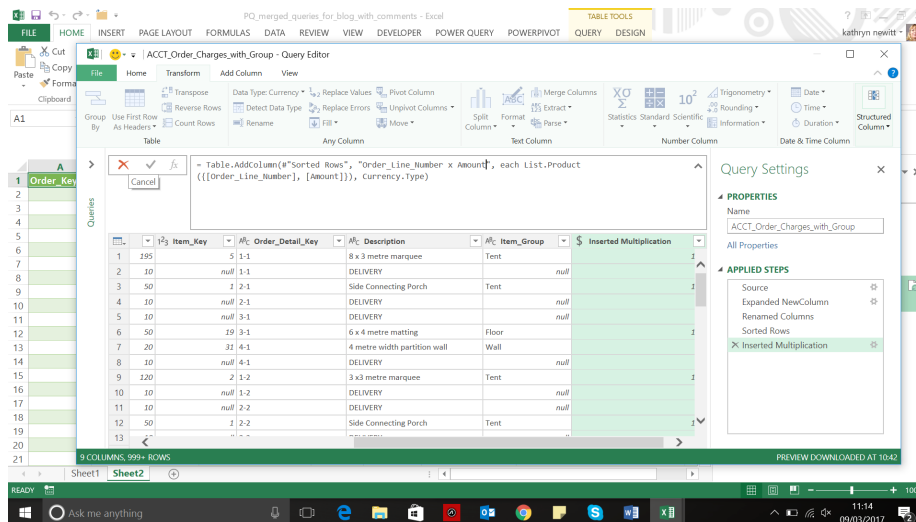
When you click on 'Multiply', a new column called 'Inserted Multiplication' is added to the table. The formula for this step appears in the window at the top of the editor:



**= Table.AddColumn("#Sorted Rows", "Inserted Multiplication", each List.Product({[Order\_Line\_Number], [Amount]}), Currency.Type)**

Regular readers will notice the '#' which tells Power Query to ignore the spaces in the column names. The other important part of this formula is 'each List.Product', which is what tells Power Query to apply the multiplication to each row in the table.

As already noted, the column name is not particularly user friendly. We could rename the column using the buttons, adding another step, but instead, to avoid adding another step, we'll edit the formula associated with adding the new column:

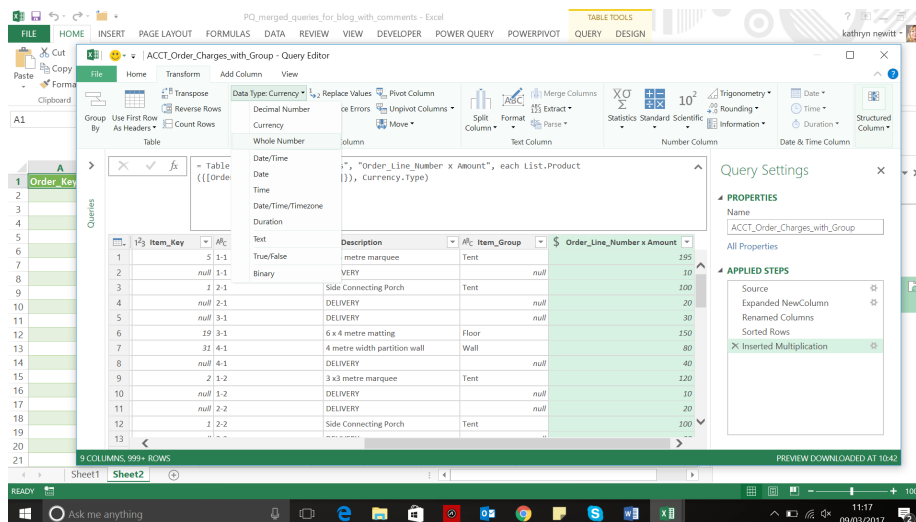


Clicking the tick icon executes the change (as will leaving the change in place and clicking anywhere in the table), and the column is added with the chosen name in one step.

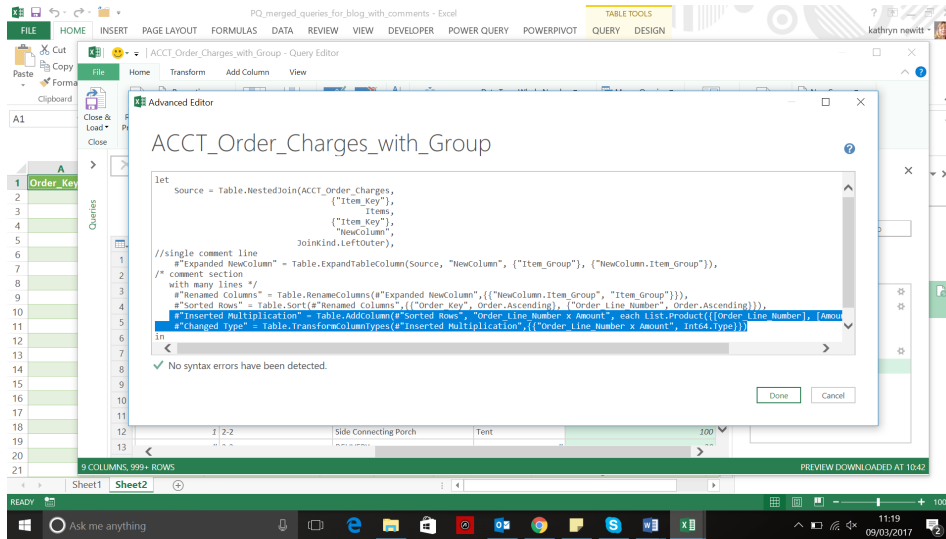
We can also add a step and then choose to combine it with another step by substituting the whole formula for that step into the next line. This works well if the step being inserted has a short amount of M language

associated with it; too much substitution can make code hard to follow and therefore of less value to share with other users.

Let's make a simple change by amending the data type on my newly renamed column **Order\_Line\_Number x Amount** from 'Currency' to 'Whole Number'. On the 'Transform' tab, select the column and then in the 'Data Type' section choose 'Whole Number' from the dropdown:



Having added this step, then open the 'Advanced Editor' from the 'Home' tab:

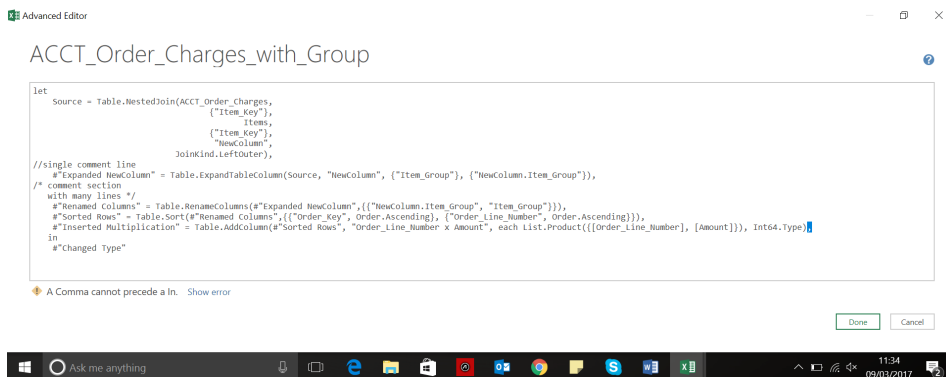


The two lines before the 'in' statement are:

```
#"Inserted Multiplication" = Table.AddColumn("#Sorted Rows", "Order_Line_Number x Amount", each List.Product({[Order_Line_Number], [Amount]}), Currency.Type),
#"Changed Type" = Table.TransformColumnTypes("#Inserted Multiplication",{{"Order_Line_Number x Amount", Int64.Type}})
```

At first glance, these may look complicated, but notice that the first line sets the added column to 'Currency.Type'. The second line changes this to 'Int64.Type'.

So, if we set the type to 'Int64' when the column is created, we don't need the second 'Changed Type' line. We can simply change the type and delete the step. This is not the end of the story though – last time out some of the syntax rules were outlined: one of them is that each step must refer to the previous step and another is that the last line before 'in' should not have a comma after it. Therefore, by removing a step manually in the editor we have broken the sequence: this needs to be remedied by removing the offending comma:



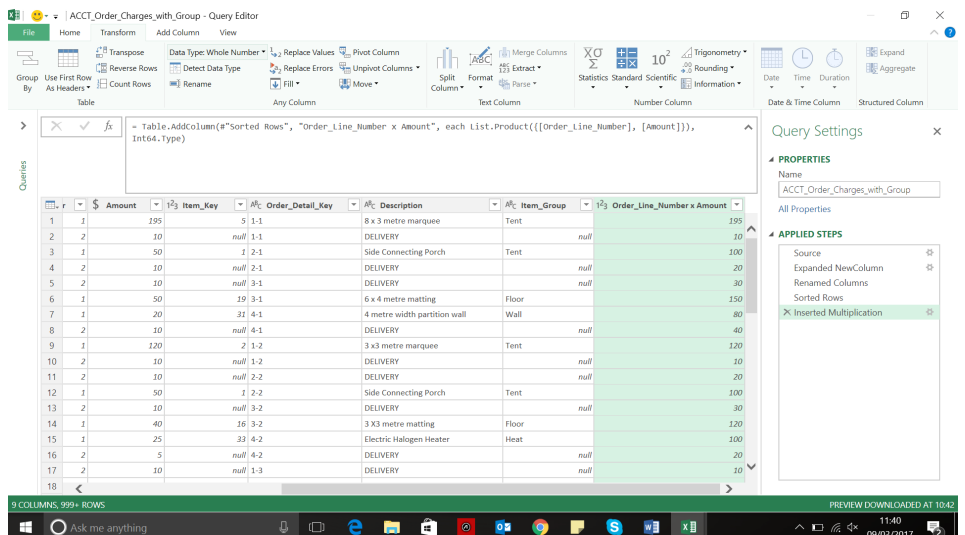
The 'in' statement currently refers to the line I have removed:

```
in
#"Changed Type"
```

We need to change this to refer to what is now the last line above it:

```
in
#"Inserted Multiplication"
```

Having done this and removed the comma before 'in', you can save the changes and look at the table: →



The step to change type has disappeared and the type on the column is now 'Whole Number', as shown next to the 'Data Type' section. We have successfully simplified the code behind the query.

## Power Query Extra: Getting Multi-Page Data from a Web Site with a Single URL

At the risk of it looking like all we do is Power Query (we don't!), we thought we would share with you our solution to a rather awkward – yet common – problem. We recently got a question from one of our readers that highlights the issue quite well. Consider the data from the website [www.quanthockey.com/khl/seasons/2017-18-khl-players-stats.html](http://www.quanthockey.com/khl/seasons/2017-18-khl-players-stats.html):



Rk	Name	Age	Pos	GP	G	A	P	PIM	+/-	PPG	SHG	GWG	G/GP	A/GP	P/GP
1	Nigel Dawes	32	F	19	20	5	25	6	4	9	0	5	1.053	0.263	1.316
2	Ilya Kovalchuk	34	F	24	17	11	28	12	2	10	0	5	0.708	0.458	1.167
3	Nikita Gusev	25	F	24	13	19	32	2	12	3	0	2	0.542	0.792	1.333
4	Sergei Mozyakin	36	F	23	12	14	26	2	-1	6	0	2	0.522	0.609	1.130
5	Justin Azevedo	29	F	19	12	6	18	10	3	4	0	3	0.632	0.316	0.947
6	Sergei Shirokov	31	F	24	11	14	25	12	17	4	1	1	0.458	0.583	1.042
7	Vladimir Tkachyov	24	F	20	11	6	17	16	4	2	0	2	0.550	0.300	0.850
8	Eeli Tolvanen	18	F	19	11	10	21	8	7	4	0	3	0.579	0.526	1.105
9	Kirill Kaprizov	20	F	18	11	10	21	0	11	2	0	4	0.611	0.556	1.167
10	Quinton Howden	25	F	23	10	6	16	16	-1	6	0	0	0.435	0.261	0.696

The webpage is nicely set out and contains a table of hockey player statistics. The thing is, the embedded table actually has 17 pages of data and let's say we wish to extract all of this data for analysis elsewhere.

There's a problem though. When you click on the second or subsequent page of data, the URL for the website does not change. This seemingly

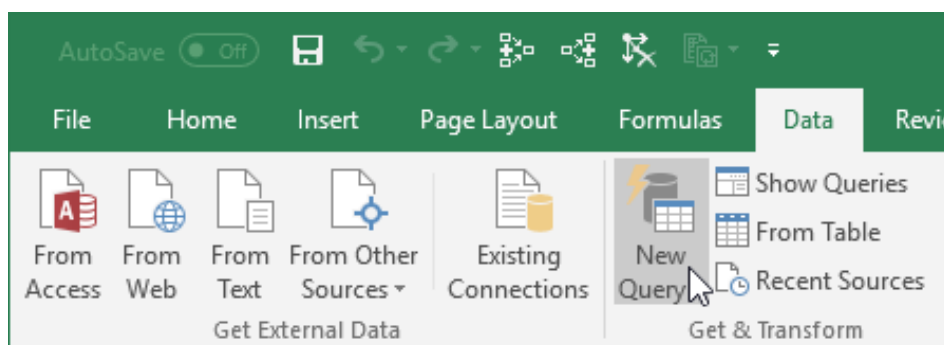
defeats Power Query (or Power BI) as URLs for each page of table data are required.

So how may we extract all of the data? To answer this, let's get there in five steps.

### Step 1: Manual Retrieval of Data

Before we move on to our proposed solution, we should first cover how to manually import data from the hockey statistics site. You should note that this method does not yield the complete list; this will be detailed later on. First, let's focus on manual extraction.

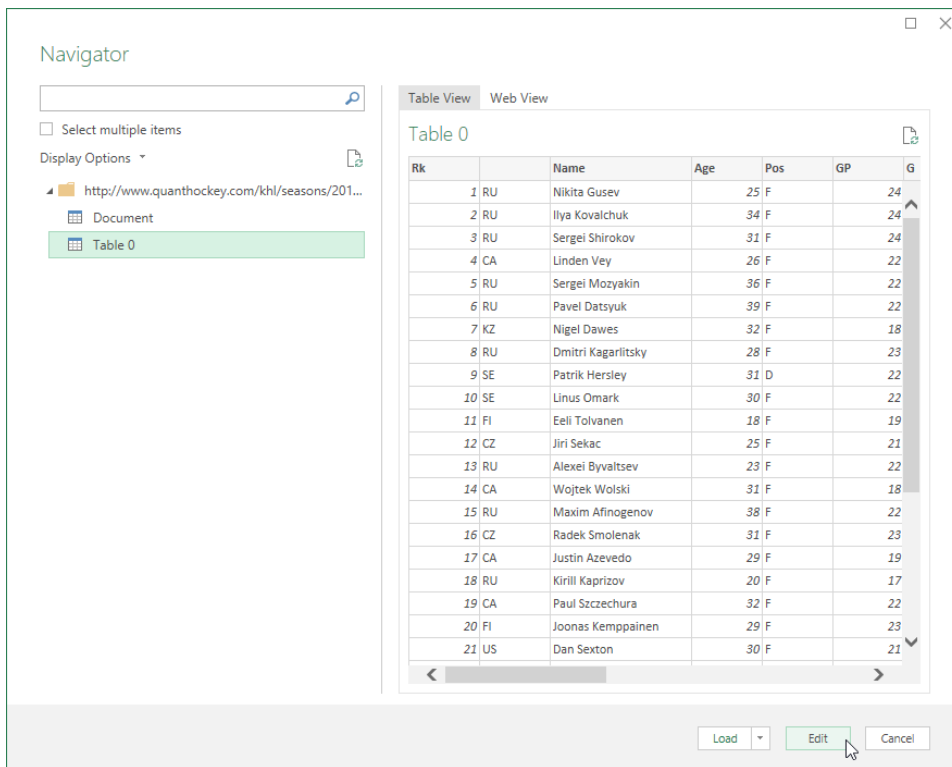
To manually import the data from this hockey statistics site [www.quanthockey.com/khl/seasons/2017-18-khl-players-stats.html](http://www.quanthockey.com/khl/seasons/2017-18-khl-players-stats.html) using Power Query, first open Excel then navigate to the 'Data' tab and click on the 'New Query' option, then select the 'Other Sources' option followed by 'Web'.



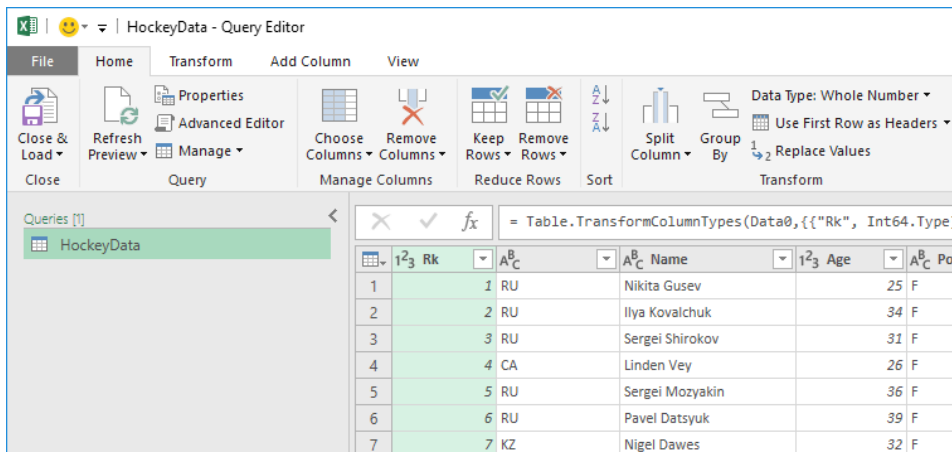
A dialog box will appear, allowing us to insert the URL. Next click 'OK'.



The 'Navigator' dialog box will appear, allowing us to select exactly which table to pull data from. At this point all looks good, however we should name the table, so let's click on 'Edit'.



In the 'Query Editor' dialog box, we should give our Query a friendly name, say 'Hockey Data', then select 'Close & Load'.



All seems to have worked well, however upon closer inspection, we can see that Power Query was only able to retrieve the first 50 entries, i.e. page 1 of the table data.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	
43	42	RU	Ilya Mikheyev	23	F	20	6	9	15	4	8	1	0	0	0.3	0.45	0.75
44	43	US	Casey Wellman	30	F	22	5	10	15	2	1	0	1	0	0.227	0.455	0.682
45	44	UA	Pavel Padakin	23	F	20	5	10	15	12	11	0	0	1	0.25	0.5	0.75
46	45	RU	Alexander Khokhlachev	24	F	18	5	10	15	6	4	2	0	2	0.278	0.556	0.833
47	46	RU	Pavel Chernov	27	F	22	6	8	14	24	7	1	0	0	0.273	0.364	0.636
48	47	RU	Dmitri Kugryshev	27	F	22	6	8	14	2	1	3	0	1	0.273	0.364	0.636
49	48	CA	Gilbert Brule	30	F	21	6	8	14	24	-1	3	0	1	0.286	0.381	0.667
50	49	CA	Eric O'Dell	27	F	18	6	8	14	12	12	1	0	0	0.333	0.444	0.778
51	50	CZ	Andrej Nestrasil	26	F	22	4	10	14	2	-6	0	0	2	0.182	0.455	0.636

All seems to have worked well, however upon closer inspection, we can see that Power Query was only able to retrieve the first 50 entries, i.e. page 1 of the table data.

In summary, we have three issues:

1. We are unable to manually pull all of the data from the website
2. We do not know how many pages of data the website has
3. The webpage does not change its URL when a new page of data is displayed.

Let's deal with one issue at a time.

## Step 2: Custom Functions

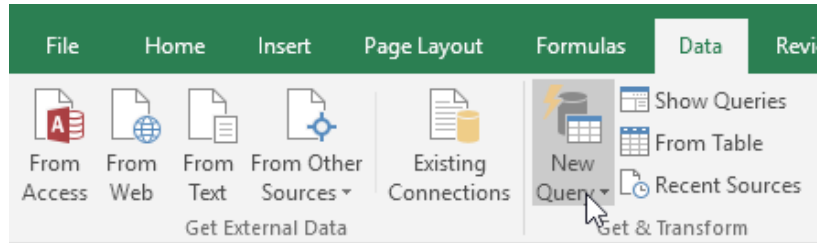
Let's address the first issue, then, *i.e.* the inability to manually retrieve all of the data just by importing it using Power Query.

One proposed solution, proposed by MVP Reza Rad, is to utilise Custom Functions in Power Query. A custom function is a query that is run by other queries, for those of you who know Java from coffee beans, and is similar to what is known as an Object Method. The benefit of having a custom function is that we can repeat the same steps to a refreshed dataset if need be.

Let's work through a simple example to illustrate Custom Function's utility. For example, we wish to retrieve the gross earnings of all of the movies released in a particular year, along with their current rank and their studio. It does not matter which year we wish to begin with; for this example, we shall begin with 2017 (it's a little too early in the year for 2018!):

[www.boxofficemojo.com/yearly/chart/?yr=2017&p=.htm](http://www.boxofficemojo.com/yearly/chart/?yr=2017&p=.htm)

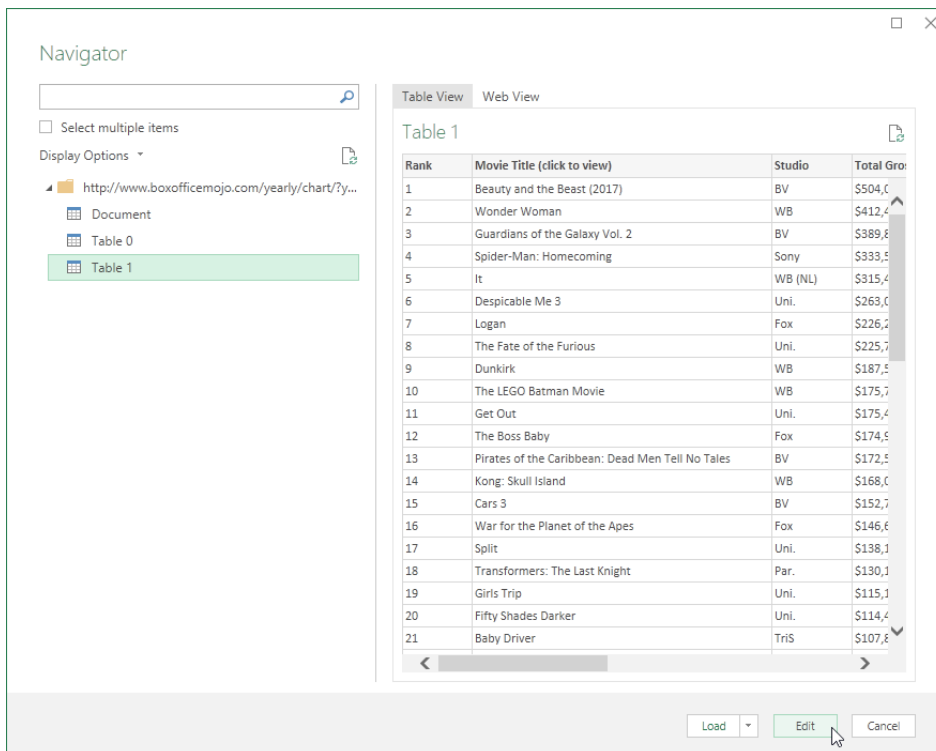
To launch Power Query, we'll use Excel 2016 and select 'New Query' from the 'Data' tab:



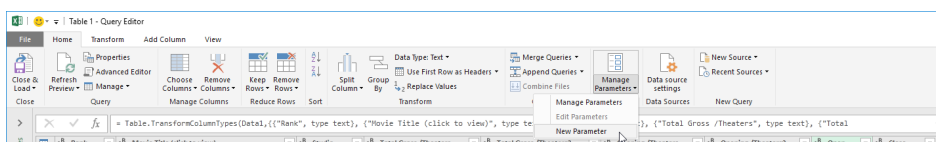
Then, we'll adopt the default options and click 'OK'.



A dialog box will appear, prompting the selection of the table. We select 'Table 1' then click on 'Edit'.

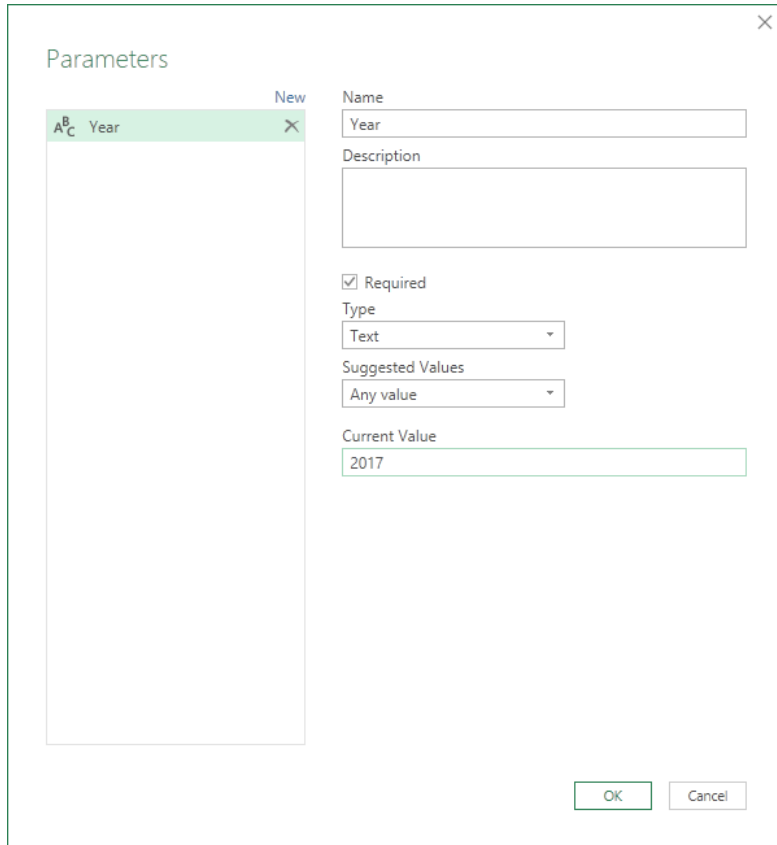


Now that we have the Query Editor window open we can define our parameter. Parameters are needed for custom functions to work.

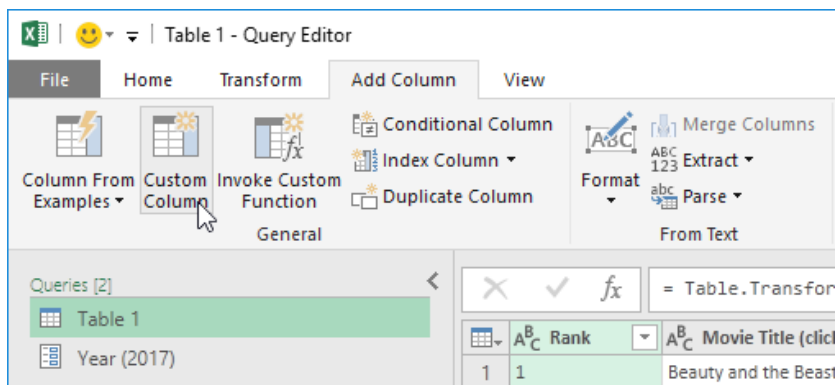




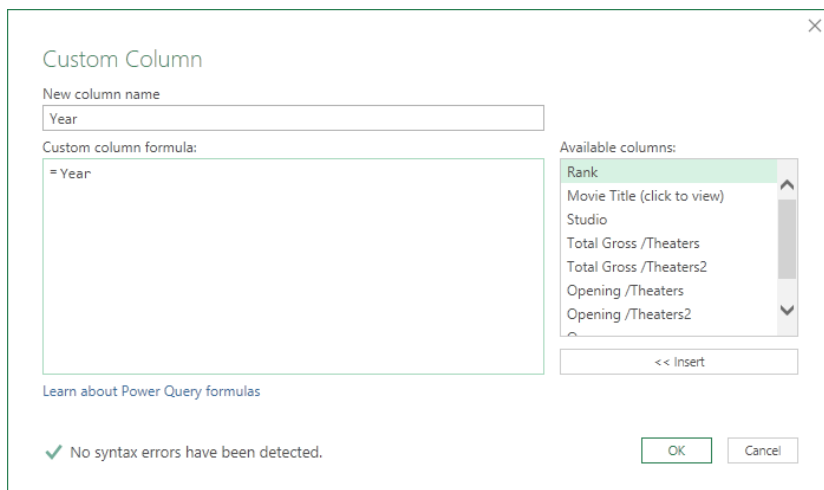
We create a simple parameter, set the name to 'Year' type to 'text' and the initial value to 2017.



We can now add a custom column to 'Table 1', click on 'Table 1', then on the 'Add Column' tab, then 'Custom Column'.



We give the custom column a name 'Year' and make it equal to the parameter 'Year'.

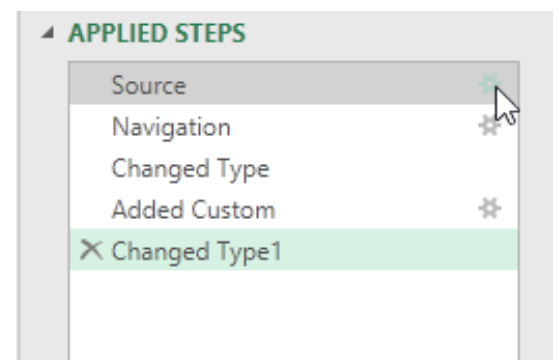


Be sure to change the custom column's data type to 'Text'.

A <sup>B</sup> <sub>C</sub> Open	A <sup>B</sup> <sub>C</sub> Close	A <sup>B</sup> <sub>C</sub> Year
3/17	7/13	2017
6/2	-	2017
5/5	9/21	2017
7/7	-	2017
9/8	-	2017
6/30	-	2017
3/3	7/13	2017
4/14	7/13	2017
7/21	-	2017
2/10	6/8	2017
2/24	6/11	2017
3/31	-	2017
5/26	9/21	2017
3/10	6/15	2017
6/16	-	2017
7/14	-	2017
1/20	5/4	2017
6/21	8/24	2017
7/21	10/12	2017
2/10	3/30	2017
6/28	-	2017
8/11	-	2017
2/10	4/27	2017
9/22	-	2017
7/28	-	2017
3/24	6/1	2017
6/9	8/17	2017
8/18	-	2017
5/19	8/31	2017
6/2	-	2017
1/27	5/11	2017

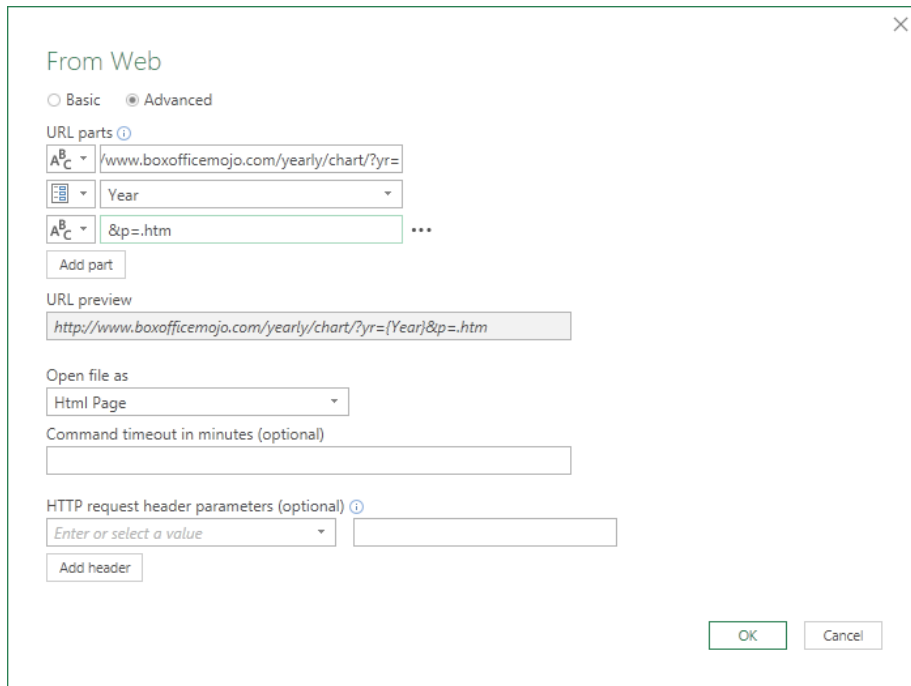
Next, we need to integrate our Parameter into the URL. If we achieve this, we'll be able to dynamically change the URL, ultimately altering the source of the database by the desired year.

With 'Table 1' selected, we can click on the setting icon for the 'Source' in 'Applied Steps', viz.

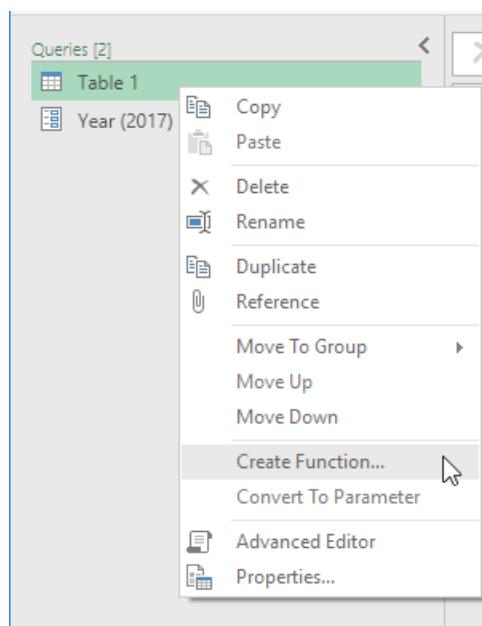


Selecting the 'Advanced' option, we can identify the part of the URL that has the date, and enter the parameter in its place instead. We should also include the last bit of the URL after the Year parameter. We do this by 'Adding Parts' to the URL.

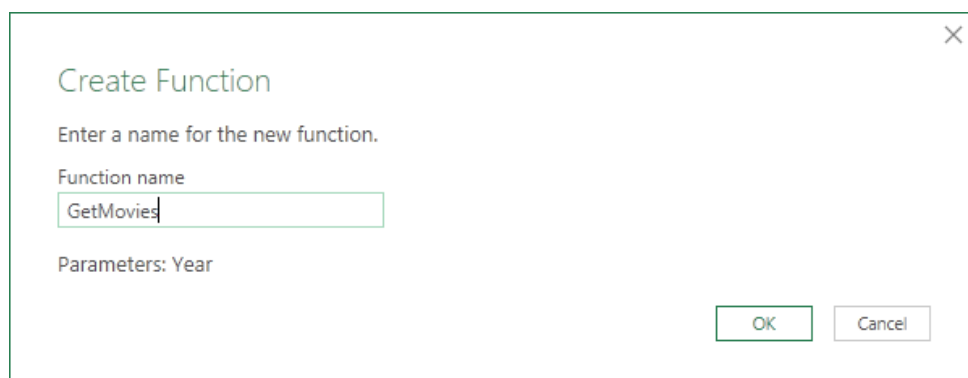
Once that is done click 'OK'.



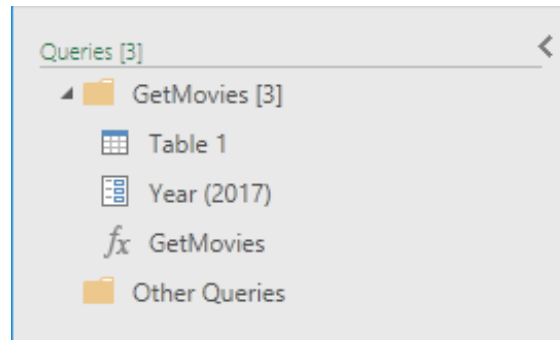
We now have to convert the query into a function. To do this, we right click on the 'Table 1' query and then select 'Create Function...'.



Here, we'll name the function 'GetMovies' then click 'OK'.



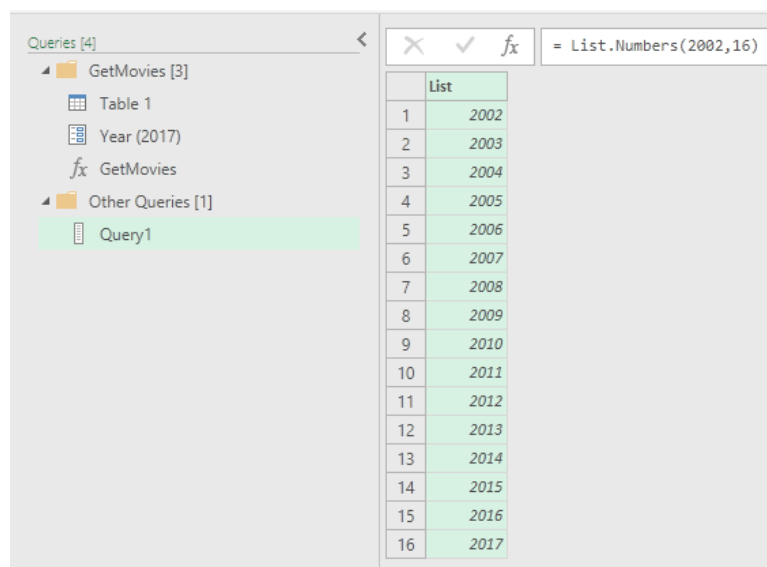
There is now a group folder containing the original 'Table 1' query, the Year 2017 parameter and the **GetMovies** function.



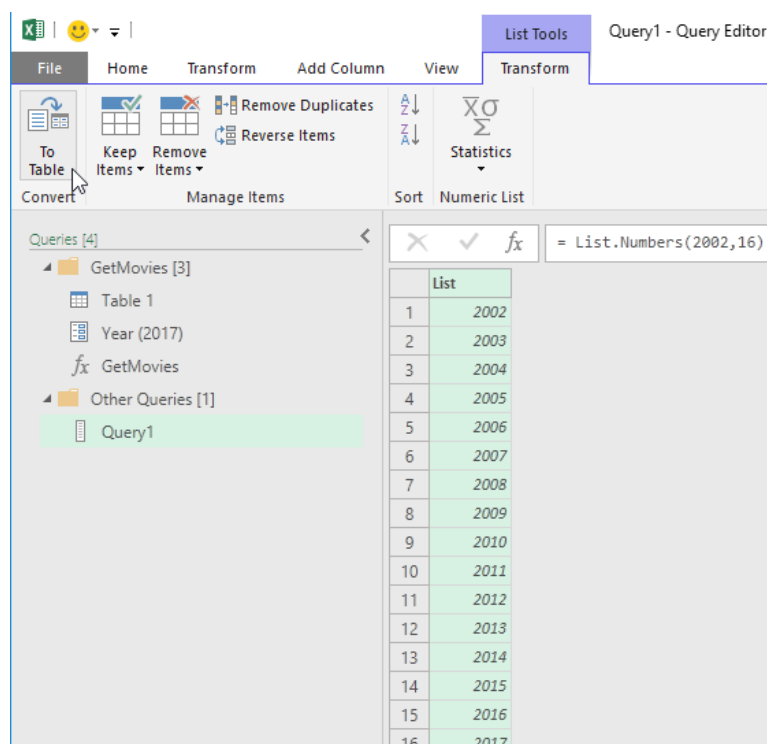
We have created a copy of the 'Table 1' query and called it '**GetMovies**', from now on every time we call on **GetMovies**, Power Query will perform the same tasks in that order.

For simplicity then, we will create a simple generator and use the **List.Numbers** function to create our generator. To do this, you can create a new query by navigating to the 'Home' tab in the Query Editor, then 'New Source', 'Other Sources' and choosing Blank Query. Then, enter the following formula in the formula bar:

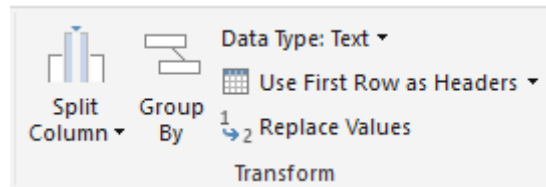
**=List.Numbers(2002,16)**



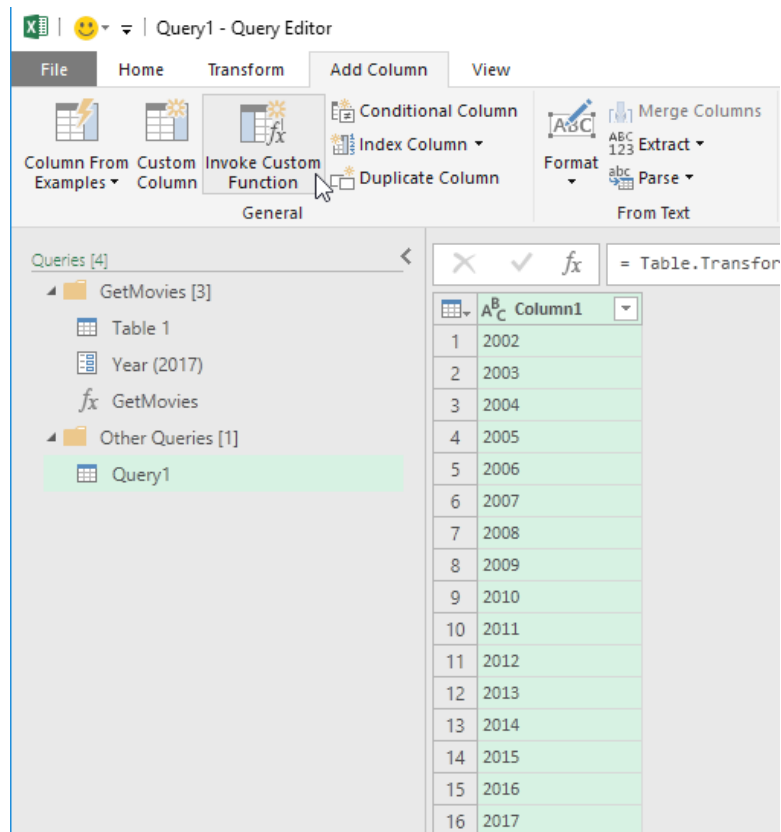
The list may then be converted into a table using the 'To Table' option located in the 'Convert' group.



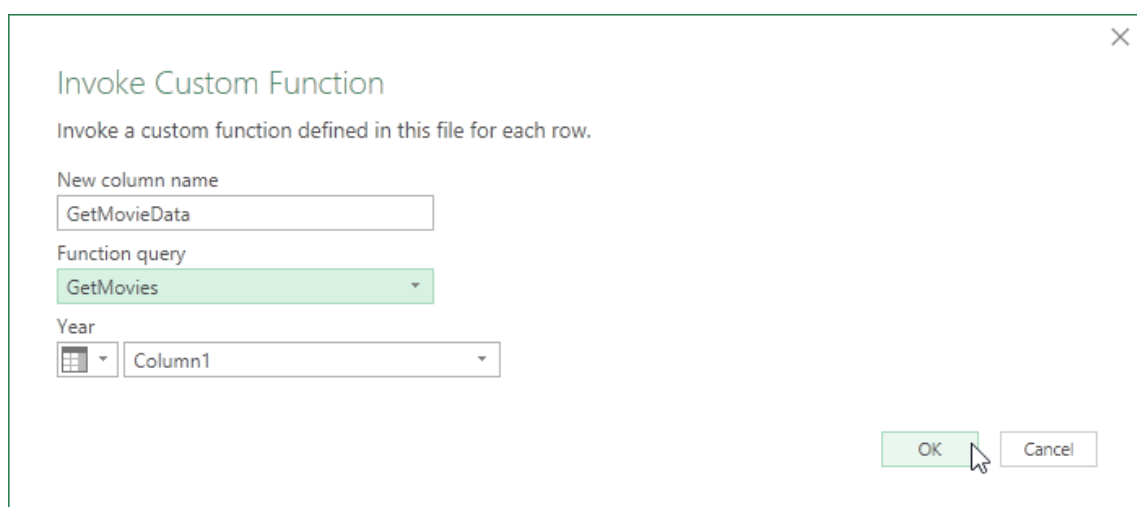
The default conversion settings will suffice. Lastly, change the data type to 'Text'.



With the 'Query1' query selected, we can invoke a custom function by going to the 'Add Column' tab and select the 'Invoke Custom Function' in the 'General' group.



We will name the new column to 'GetMovieData', select the 'GetMovies' function and click 'OK'.



A new column will be added.

	A <sup>B</sup> <sub>C</sub> Column1	ABC 123 GetMovieData
1	2002	Table
2	2003	Table
3	2004	Table
4	2005	Table
5	2006	Table
6	2007	Table
7	2008	Table
8	2009	Table
9	2010	Table
10	2011	Table
11	2012	Table
12	2013	Table
13	2014	Table
14	2015	Table
15	2016	Table
16	2017	Table

Clicking on each individual Table will reveal the movie data for its corresponding year. For example, here's the 2006 data:

A <sup>B</sup> <sub>C</sub> Rank	A <sup>B</sup> <sub>C</sub> Movie Title (click to view)	A <sup>B</sup> <sub>C</sub> Studio	A <sup>B</sup> <sub>C</sub> Total Gross /Theaters	A <sup>B</sup> <sub>C</sub> Total Gross /Theaters2	A <sup>B</sup> <sub>C</sub> Opening /Theaters	A <sup>B</sup> <sub>C</sub> Opening /Theaters2
1	Pirates of the Caribbean: Dead Man's Chest	BV	\$423,315,812	4,133	\$135,634,554	4,133
2	Night at the Museum	Fox	\$250,863,268	3,768	\$30,433,781	3,685
3	Cars	BV	\$244,082,982	3,988	\$60,119,509	3,985
4	X-Men: The Last Stand	Fox	\$234,362,462	3,714	\$102,750,665	3,690
5	The Da Vinci Code	Sony	\$217,536,138	3,757	\$77,073,388	3,735

There are some limitations however:

- Editing the **M** script of the function will cause the function and query to fail
- Custom functions cannot be scheduled to update in Power BI.

It's still better than nothing.

If we expand our dataset,

	A <sup>B</sup> <sub>C</sub> Column1	ABC 123 GetMovieData
1	2002	Table
2	2003	Table
3	2004	Table
4	2005	Table
5	2006	Table
6	2007	Table
7	2008	Table
8	2009	Table
9	2010	Table
10	2011	Table
11	2012	Table
12	2013	Table
13	2014	Table
14	2015	Table
15	2016	Table
16	2017	Table

this reveals this compiled table with the top 100 movies for each year:

Rank	Movie Title	Studio	Total Gross	Theaters
88	Bad Company	BV	\$30,160,161	2,944
89	Ghost Ship	WB	\$30,113,491	2,787
90	The New Guy	SonR	\$29,760,152	2,687
91	SwimFan	Fox	\$28,564,995	2,860
92	The Crocodile Hunter: Collision Course	MGM	\$28,442,574	2,535
93	Brown Sugar	FoxS	\$27,363,891	1,378
94	Blood Work	WB	\$26,235,081	2,525
95	All About the Benjamins	NL	\$25,916,319	1,519
96	Frida	Mira.	\$25,885,000	794
97	Jonah: A VeggieTales Movie	Art.	\$25,581,229	1,625
98	Beauty and the Beast (IMAX)	BV	\$25,487,190	68
99	The Transporter	Fox	\$25,296,447	2,610
100	The Sweetest Thing	Sony	\$24,718,164	2,670
101	Summary of 480 Movies on C...	Summary of 480 Movies on Ch...	Summary of 480 Movies on Ch...	Summary of 480 Movies on Char
102	Totals:	Totals:	\$9,206,344,777	-
103	Averages:	Averages:	\$19,179,885	-
104	1 The Lord of the Rings: The Return of the King	NL	\$377,027,325	3,703
105	2 Finding Nemo	BV	\$339,714,978	3,425
106	3 Pirates of the Caribbean: The Curse of the Black Pearl	BV	\$305,413,918	3,416
107	4 The Matrix Reloaded	WB	\$281,576,461	3,603
108	5 Bruce Almighty	Unl.	\$242,829,261	3,549
109	6 X2: X-Men United	Fox	\$214,949,694	3,749
110	7 Elf	NL	\$173,398,518	3,381

The data still needs some cleaning up however, you can learn how to do that by keeping up with our Power Query Pointers series!

The above deals with manual importation of the data, but what about the page number issue?

### Step 3: Unknown Number of Pages

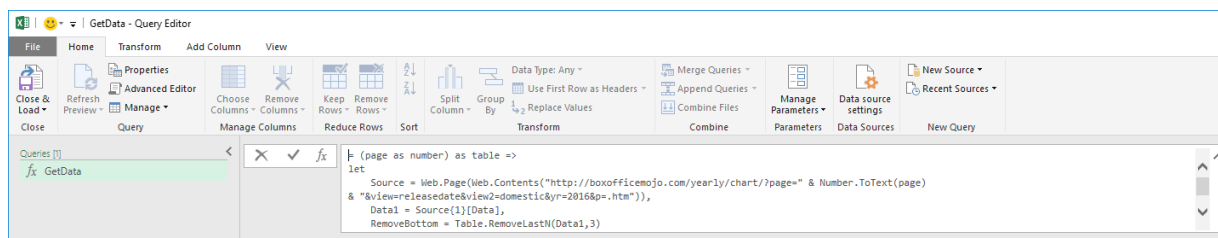
The solution to this problem was produced by a combined effort of Matt Mason, his blog post can be found [here](#) and Miguel Escobar, whose video explains his method well.

Matt Mason's method adopts a brute force method where it instructs Power Query to run through pages 1 to 10,000 and stop when Power Query runs into an error or a 'null' value. He points out that if this method is used together with third party software such as Fiddler (more on Fiddler later), Power Query will be found trying to evaluate all 10,000 pages. Furthermore, if you try Matt's method now with the newest

version of Power Query, you may receive an error claiming that you do not have access to the database.

This is where Miguel comes in and adjusts the code a little so that it does not adopt the brute force method anymore as well as fix the permissions bug that has developed in Power Query. Building off Matt Mason's ideal, we will only use his 'GetData' function and build off that.

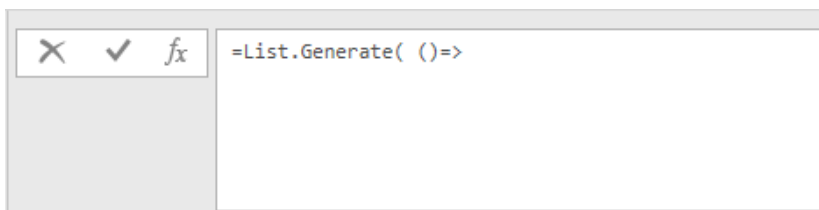
To begin with, let's open Power Query from Excel and convert Matt's 'GetData' query into a function:



Now we create a whole new query: go to 'New Source' then 'Other Sources' and 'Blank Query'. The first line of code to be entered uses the List.Generate Function:

**=List.Generate ( )=>**

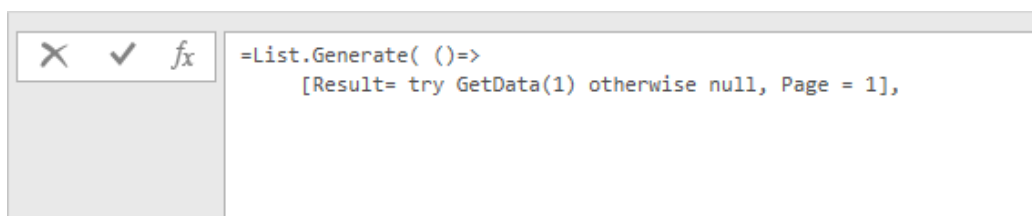
The ()=> function nomenclature essentially says that we will find a function with no parameter.



The next line is:

**[Result= try GetData(1) otherwise null, Page = 1],**

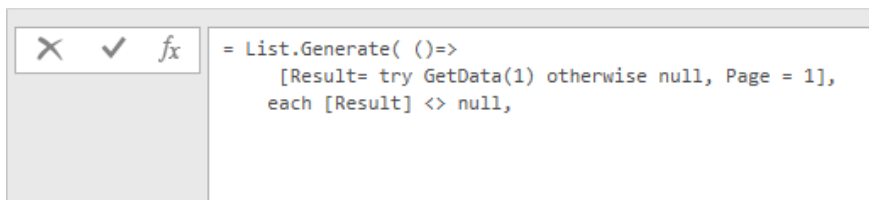
This line uses Matt's original function; however, it throws in an error check. Essentially, it states 'try' to GetData, if it returns with an error, return with 'Null' in Page 1:



The next line:

```
each [Result] <> null,
```

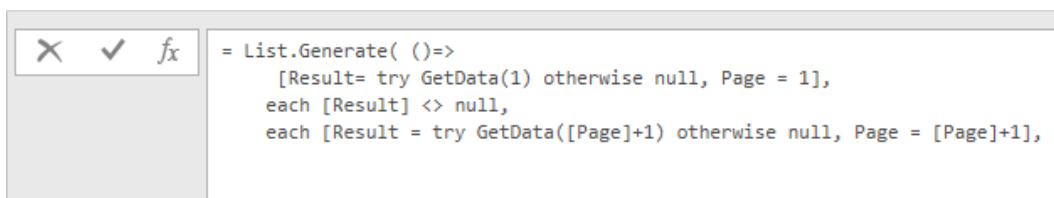
specifics a condition, where the result cannot be null. Or perform this function as long as the Result does not equal to null.



```
= List.Generate( ()=>  
    [Result= try GetData(1) otherwise null, Page = 1],  
    each [Result] <> null,
```

The next line increments the Page to page 2:

```
each [Result = try GetData([Page]+1) otherwise null, Page = [Page]+1],
```

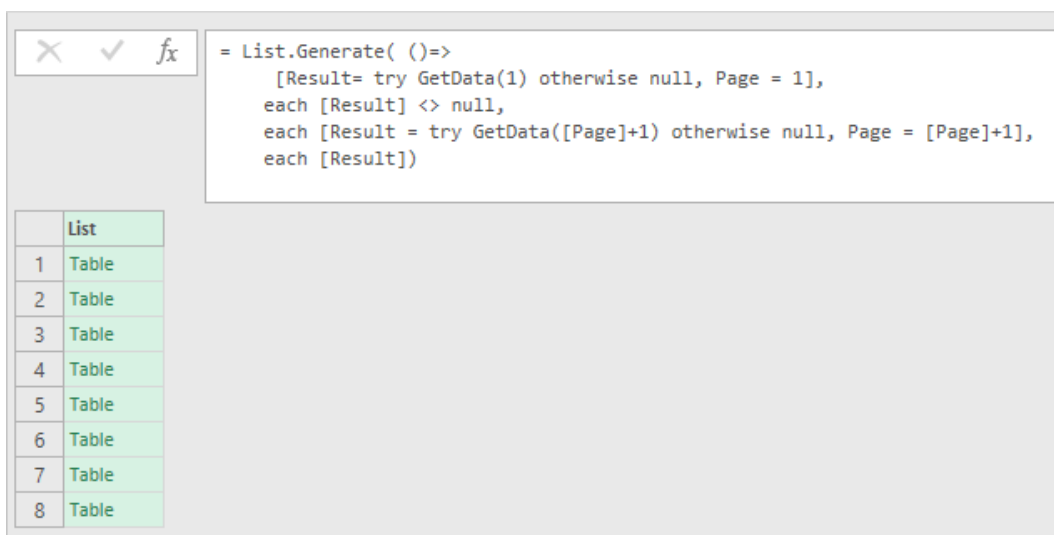


```
= List.Generate( ()=>  
    [Result= try GetData(1) otherwise null, Page = 1],  
    each [Result] <> null,  
    each [Result = try GetData([Page]+1) otherwise null, Page = [Page]+1],
```

The last line in this function instructs Power Query to display the Result field:

```
each [Result])
```

Once we hit **ENTER** we will see the list of tables:

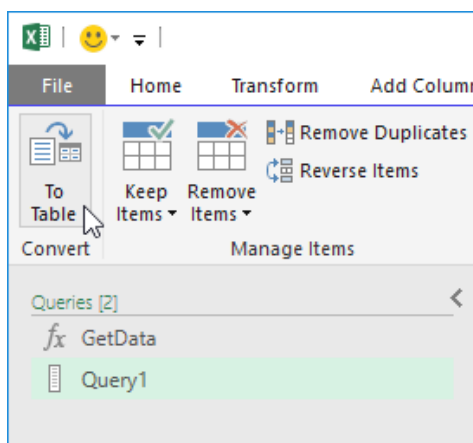


```
= List.Generate( ()=>  
    [Result= try GetData(1) otherwise null, Page = 1],  
    each [Result] <> null,  
    each [Result = try GetData([Page]+1) otherwise null, Page = [Page]+1],  
    each [Result])
```

	List
1	Table
2	Table
3	Table
4	Table
5	Table
6	Table
7	Table
8	Table

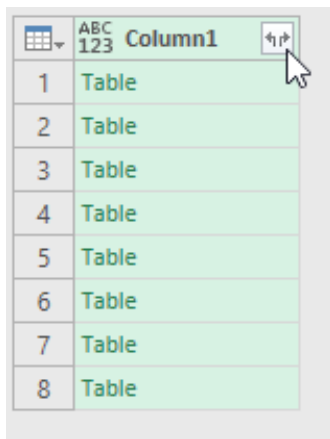
This is all of the different pages pulled of the domestic gross of 2016 from the Box Office Mojo website. Notice that Power Query does not try to evaluate 10,000 pages.

Now we go through the table and define each column's data type. While this is still a list we can transform this into a table and expand the data:

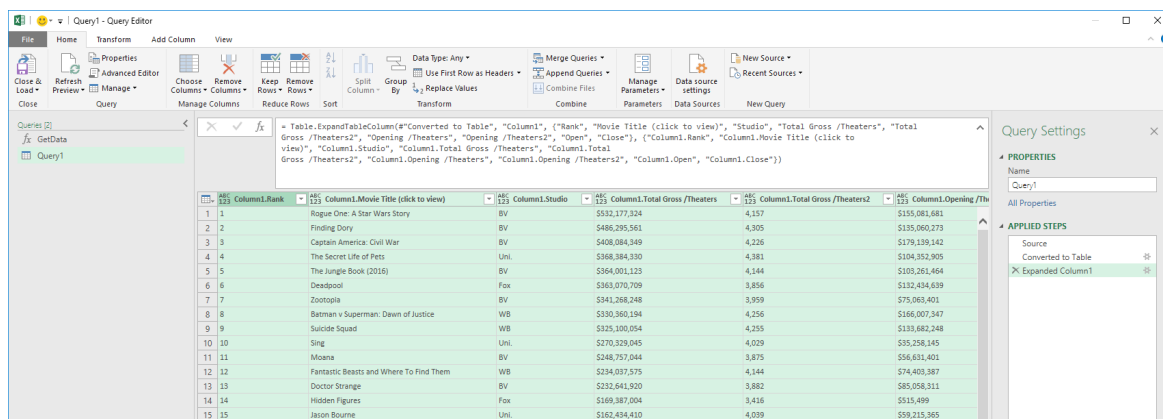




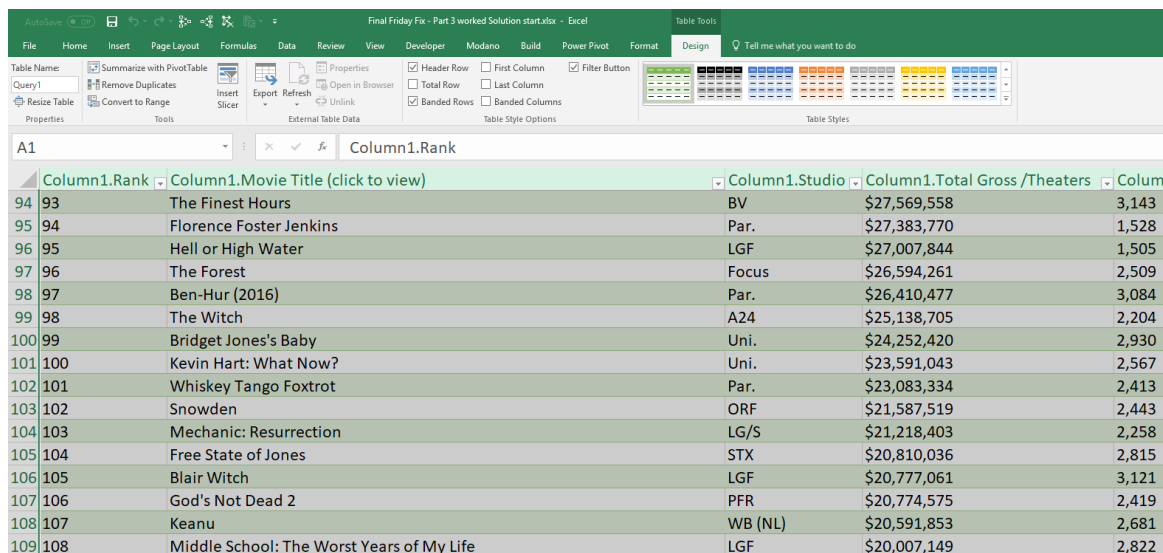
Once the table has been transformed we can expand the table.



The expanded table should look something like this:



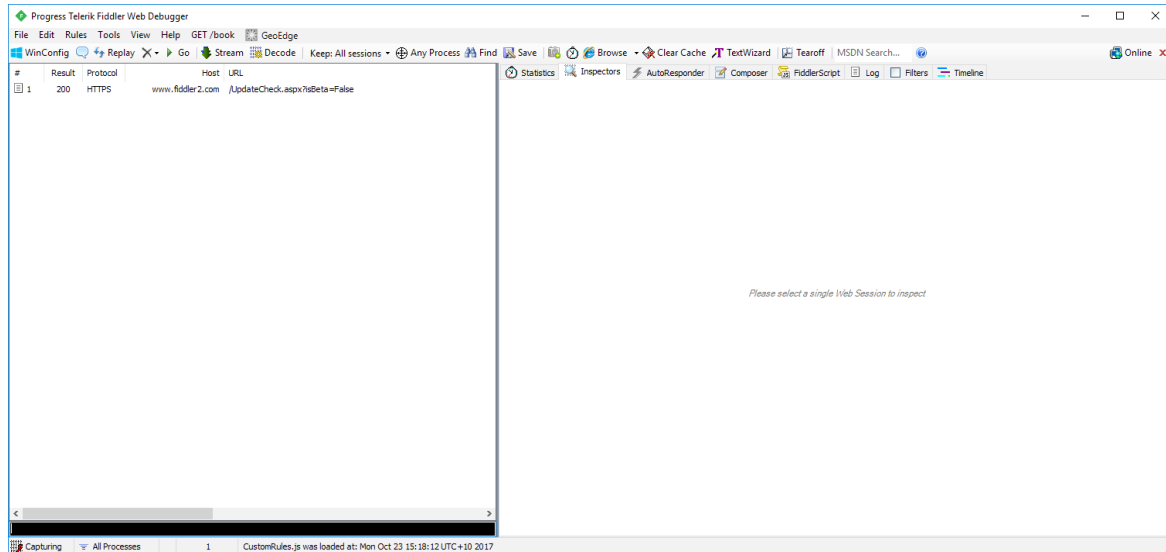
Closing and loading will not result an error but instead all of the movie data from the year of 2016 from Box Office Mojo.



Now that we have dealt with the page number issue, we can now move on to the final bit...

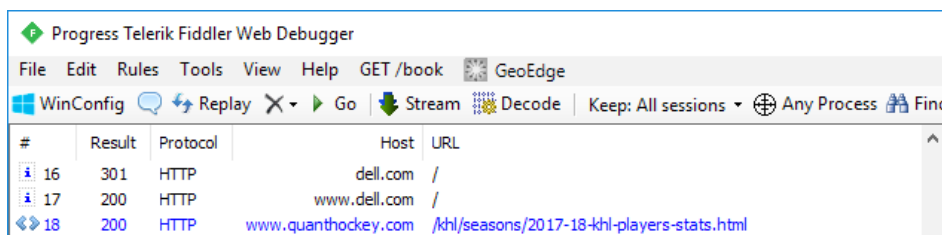
#### Step 4: Fiddling with the URL, Fiddle(r) with the URL

Power Query needs some assistance: a software program called **Fiddler** is one such assistant. To download this software, please go to Telerik's software [page](#) to download Fiddler. When your PC has finished installing Fiddler, open it and the page should look something like this:

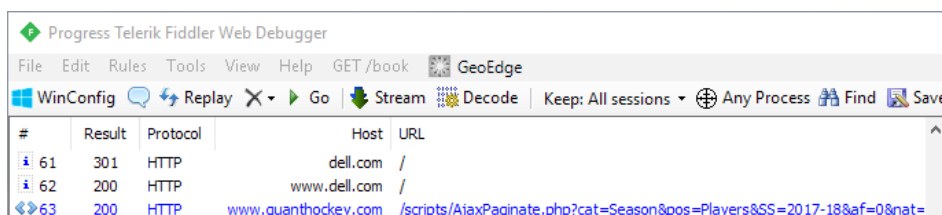


As the prompt "Please select a single Web Session to impact" will require a web browser; we have used Chrome for this example, just because that was what we felt like when we took the screenshots.

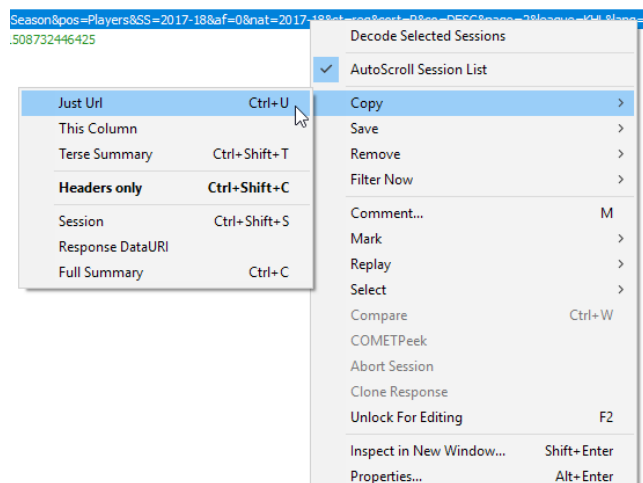
So we go back to where we started and navigate to the Hockey statistics website again (URL: [www.quanthockey.com/khl/seasons/2017-18-khl-players-stats.html](http://www.quanthockey.com/khl/seasons/2017-18-khl-players-stats.html)) and we will start to see some interesting things appearing on Fiddler:



Fiddler takes the source of the URL and displays it here, so let's see what happens when we try page 2 of the Hockey Stats. Fiddler now returns with an alternate URL:



It seems to have been broken down into Seasons, and potentially pages too. Let's copy it and save it on to an Excel spread sheet to aid us in discovering any patterns. Right click the line of URL and select 'Copy just URL'.



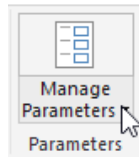
After repeating the process, a couple of times, we spot a pattern. Fiddler is able to retrieve the URL and break it down into pages. This is great news, we can finally use this to work with Power Query.

```
http://www.quanthockey.com/scripts/AjaxPaginate.php?cat=Season&pos=Players&SS=2017-18&af=0&nat=2017-18&st=reg&sort=P&so=DESC&page=2&league=KHL&lang=en&rnd=167379793&dt=1
http://www.quanthockey.com/scripts/AjaxPaginate.php?cat=Season&pos=Players&SS=2017-18&af=0&nat=2017-18&st=reg&sort=P&so=DESC&page=3&league=KHL&lang=en&rnd=55482417&dt=1
http://www.quanthockey.com/scripts/AjaxPaginate.php?cat=Season&pos=Players&SS=2017-18&af=0&nat=2017-18&st=reg&sort=P&so=DESC&page=4&league=KHL&lang=en&rnd=45013485&dt=1
```

### Step 5: A Solution

Now for the final part where we combine everything together.

The first step is to create a new Query in Power Query and create a new parameter:



Name the parameter 'PageNumber', set it to a Decimal Number type, and give it a current value of 1.

Parameters

New

1<sup>2</sup> PageNumber X

Name: PageNumber

Description:

Required

Type: Decimal Number

Suggested Values: Any value

Current Value: 1

OK Cancel

Now create a new Blank Query and paste the original code from Matt Mason into the formula bar:

```
Source =
Web.Page(Web.Contents("http://boxofficemojo.com/yearly/chart/?page="
& Number.ToText(page) &
"&view=releasedate&view2=domestic&yr=2013&p=.htm")),
```

Then modify it using the new URL provided from Fiddler:

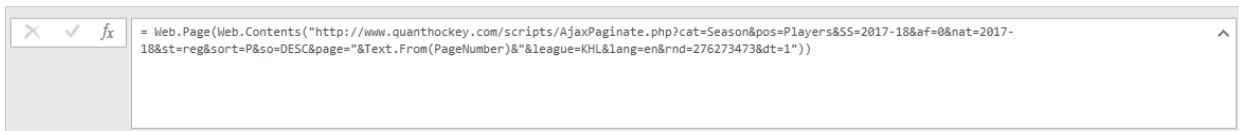
```
=Web.Page(Web.Contents("http://www.quanthockey.com/scripts/AjaxPaginate.php?cat=Season&pos=Pla
yers&SS=2017-18&af=0&nat=2017-18&st=reg&sort=P&so=DESC&page=2&league=KHL&lang=en&rnd=167379793
&dt=1"))
```

We also have to include the **PageNumber** parameter and the **Text.From** Power Query function to ensure that it is inserted into the URL as a text format. The following code should replace the page number (in case you were wondering, the ampersand symbols mean concatenate):

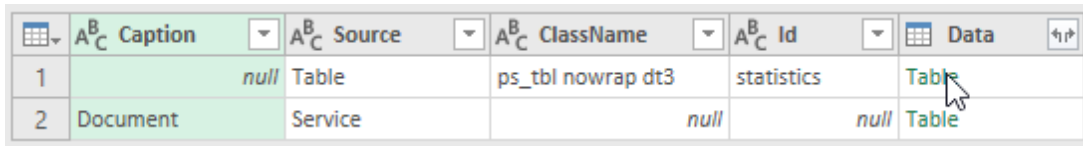
```
="&Text.From(PageNumber) &"
```

yielding this:

```
=Web.Page(Web.Contents("http://www.quanthockey.com/scripts/AjaxPaginate.php?cat=Season&pos=Pla
yers&SS=2017-18&af=0&nat=2017-18&st=reg&sort=P&so=DESC&page="&Text.From(PageNumber) &"&league=K
HL&lang=en&rnd=276273473&dt=1"))
```



As you can see, the **PageNumber** parameter has been linked into the URL. Power Query will return with a condensed table. The next step is to select the top right 'Table' option:



This will expand the table resulting in a table that only imports data from the first page, or the first 50 records.

44	44	RU	Alexander Khok...	24	F	18	5	10	15	6	4	2
45	45	RU	Pavel Chernov	27	F	22	6	8	14	24	7	1
46	46	RU	Dmitri Kugryshev	27	F	22	6	8	14	2	1	3
47	47	CA	Gilbert Brule	30	F	21	6	8	14	24	-1	3
48	48	CA	Eric O'Dell	27	F	18	6	8	14	12	12	1
49	49	CZ	Andrej Nestrail	26	F	22	4	10	14	2	-6	0
50	50	RU	Andrei Markov	39	D	21	4	10	14	8	-2	4

Now, create a new blank query and copy this code in, it is a modified version of Matt's GetData function for our purpose:

**= (PageNumber as number) => let**

**Source = Web.Page(Web.Contents("http://www.quanthockey.com/scripts/AjaxPaginate.php?cat=Season&pos=Players&SS=2017-18&af=0&nat=2017-18&st=reg&sort=P&so=DESC&page=" & Text.From(PageNumber) & "&league=KHL&lang=en&rnd=276273473&dt=1"))**,

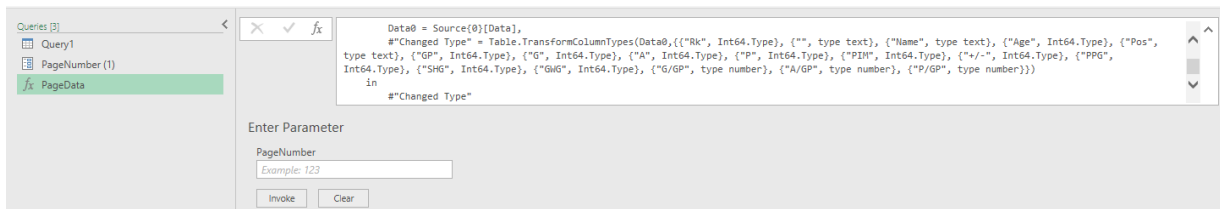
**Data0 = Source{0}[Data],**

**#"Changed Type" = Table.TransformColumnTypes(Data0,{{"Rk", Int64.Type}, {"", type text}, {"Name", type text}, {"Age", Int64.Type}, {"Pos", type text}, {"GP", Int64.Type}, {"G", Int64.Type}, {"A", Int64.Type}, {"P", Int64.Type}, {"PIM", Int64.Type}, {"+/-", Int64.Type}, {"PPG", Int64.Type}, {"SHG", Int64.Type}, {"GWG", Int64.Type}, {"G/GP", type number}, {"A/GP", type number}, {"P/GP", type number}})**

**in**

**#"Changed Type"**

The second section of code simply changes the data types accordingly for each column so that you don't have to do it! Once entered, rename the function to **'PageData'**.



Now to incorporate Miguel's method, create another blank query and copy this code in:

**= List.Generate( ()=>**

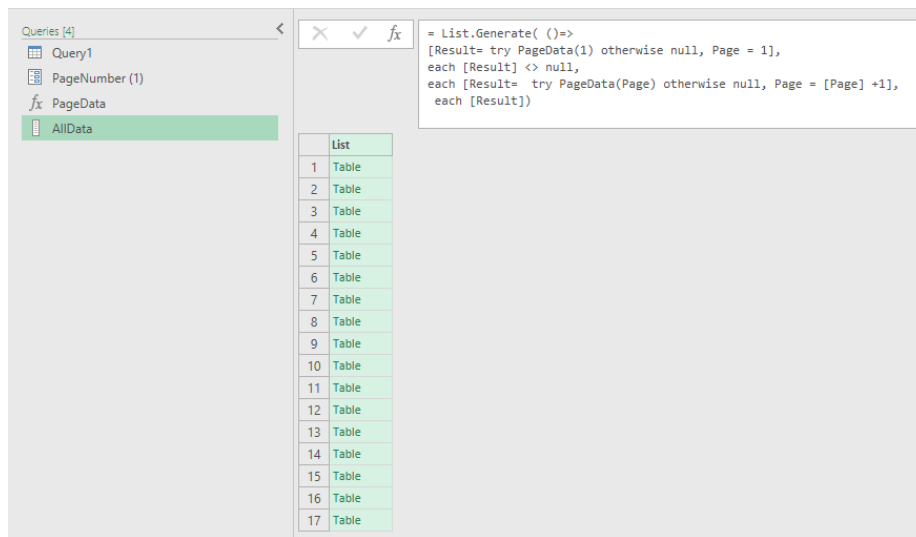
**[Result= try PageData(1) otherwise null, Page = 1],**

**each [Result] <> null,**

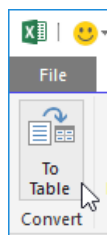
**each [Result= try PageData(Page) otherwise null, Page = [Page] +1],**

**each [Result])**

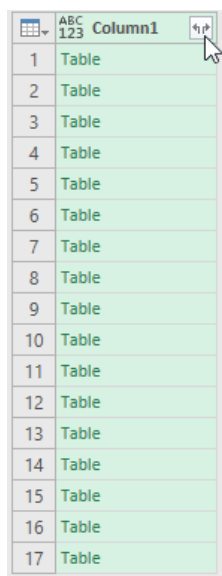
Once entered, change the name of the query to **'AllData'**.



This time there are no modifications needed in the code, other than to convert this list into a table.



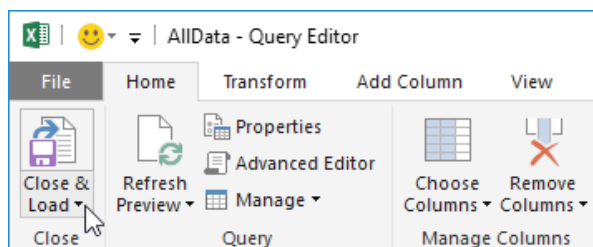
Once Power Query has converted it into a table, we can expand the table:



Expanding the table should yield this result, where Power Query is able to compile the entire list of Hockey players, way beyond 50:

Column1.Rk	Column1.	Column1.Name	Column1.Age	Column1.Pos	Column1.GP	Column1.G	Column1.LA	Column1.P
45	RU	Pavel Chernov	27	F	22	6	8	14
46	RU	Dmitri Kugryshev	27	F	22	6	8	14
47	CA	Gilbert Brule	30	F	21	6	8	14
48	CA	Eric O'Dell	27	F	18	6	8	14
49	CZ	Andrej Neustrasil	26	F	22	4	10	14
50	RU	Andrei Markov	39	D	21	4	10	14
51	CZ	Robin Hanzl	28	F	19	4	10	14
52	SE	Anton Lander	26	F	21	2	12	14
53	KZ	Kevin Dallman	36	D	20	2	12	14
54	LV	Miks Indrasis	27	F	23	8	5	13
55	RU	Sergei Kalinin	26	F	22	8	5	13
56	DK	Nicklas Jensen	24	F	18	7	6	13
57	KZ	Dustin Boyd	31	F	24	6	7	13
58	FI	Petri Kontiola	33	F	22	6	7	13
59	SE	Alexander Bergstrom	31	F	20	6	7	13
60	RU	Andrei Alexeyev	22	F	24	5	8	13
61	RU	Denis Parshin	31	F	23	5	8	13
62	CA	Colby Genoway	34	F	23	4	9	13
63	RU	Evgeny Lapevko	33	F	22	4	9	13
64	CZ	Jakub Nekladal	30	D	22	4	9	13
65	RU	Valeri Nichushkin	22	F	18	8	4	12
66	RU	Daniil Vovchenko	21	F	23	7	5	12

We can now proceed to 'Close & Load'.



There you have it, all 829 Hockey Player statistics (as at the time of writing) in one worksheet!

Column1.Rk	Column1.	Column1.Name	Column1.Age	Column1.Pos	Column1.GP	Column1.G	Column1.A	Column1.P	Column1.PIM	Column1.+/-
807	806 RU	Alexander Sharychenkov	26 G		1	0	0	0	0	
808	807 RU	Evgeny Ivannikov	26 G		1	0	0	0	0	
809	808 RU	Daniil Stalnov	23 D		1	0	0	0	4	-1
810	809 RU	Vladimir Sokhatsky	28 G		1	0	0	0	0	
811	810 RU	Alexander Trushkov	21 G		1	0	0	0	0	
812	811 RU	Sergei Magarilov	32 G		1	0	0	0	0	
813	812 RU	Ivan Fischenko	22 F		1	0	0	0	0	0
814	813 RU	Ivan Fedotov	21 G		1	0	0	0	0	
815	814 RU	Maxim Tretiak	21 G		1	0	0	0	0	
816	815 RU	Nikolai Molkov	22 G		1	0	0	0	0	
817	816 RU	Sergei Alexeyev	23 D		1	0	0	0	0	0
818	817 RU	Timur Besharov	21 F		1	0	0	0	0	0
819	818 RU	Ramil Suleimanov	21 F		1	0	0	0	0	0
820	819 RU	Kirill Belyayev	20 F		1	0	0	0	0	0
821	820 RU	Daniil Yurtaikin	20 F		1	0	0	0	0	0
822	821 RU	Anton Todykov	25 G		1	0	0	0	0	
823	822 RU	Artyom Ikamatskikh	20 D		1	0	0	0	2	0
824	823 RU	Mikhail Yepishin	20 D		1	0	0	0	0	1
825	824 RU	Mikhail Zholobov	20 F		1	0	0	0	0	-1
826	825 RU	Mikhail Bitsadze	18 F		1	0	0	0	0	0
827	826 RU	Alexei Melnichuk	19 G		1	0	0	0	0	
828	827 RU	Maxim Afanasyev	19 D		1	0	0	0	0	0
829	828 RU	Artur Karmashkov	19 D		1	0	0	0	0	0
830	829 RU	Dmitry Yushkevich	20 D		1	0	0	0	0	0

Until Microsoft introduces a new built in feature to circumvent all this nasty coding, there does appear to be little alternative to this common issue. If you have a better solution please do let us know at [contact@sumproduct.com](mailto:contact@sumproduct.com).

We would like to thank [Reza Rad](#), [Miguel Escobar](#), [Matt Mason](#) and [Simon Sabin](#) for all contributing to this solution.

## December 2017 Updates for Power BI Desktop

Apologies for the delay in reporting these updates, but Microsoft took a while to announce the updates and therefore we missed our newsletter production deadlines. No matter – they have been busy behind the scenes with more updates for Power BI Desktop. And it's been worth the wait – Q&A finally comes to the party, albeit in Preview mode.

In summary, here's the latest additions:

### Reporting

- Q&A for report creation (Preview)
- Cross-highlighting for bookmarks
- More bookmark flexibility
- Field properties pane and field descriptions
- Scatter visual from x- & y-axis groupings
- High density sampling for maps based on latitude and longitude
- Responsive slicers
- New custom visuals:
  - o Card Browser
  - o Table Heatmap
  - o Data Image by CloudScope
  - o Power KPI Matrix
  - o Text Filter
  - o ChartAccent – LineChart
  - o ChartAccent – BarChart

## Analytics

- Drill filters other visuals

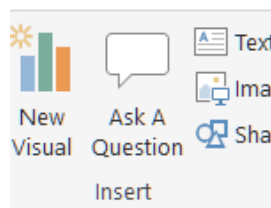
## Data Connectivity

- Adobe Analytics connector (Preview)
- HDInsight Interactive Query connector
- Data.World connector
- SAP BW connector improvements:
  - o Support for connecting to an SAP BW Message Server
  - o Support for Windows Authentication
- IBM Netezza connector now generally available.

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

## Q&A for report creation (Preview)

Now this is a good one. One of the great features of the Power BI Service (*more later*) is the Q&A feature that lets end users ask questions about the data using natural language on bespoke dashboards and get a visual back that answers that question. Then you could pin those answers to the dashboard. Well now it comes to Desktop, albeit in Preview model. Double clicking on a blank area of your report page or clicking the 'Ask a question' button on the Ribbon produces a question box to type your burning question.



As you type, a visual is created in real-time answering the question and updates as you modify or add to your question.

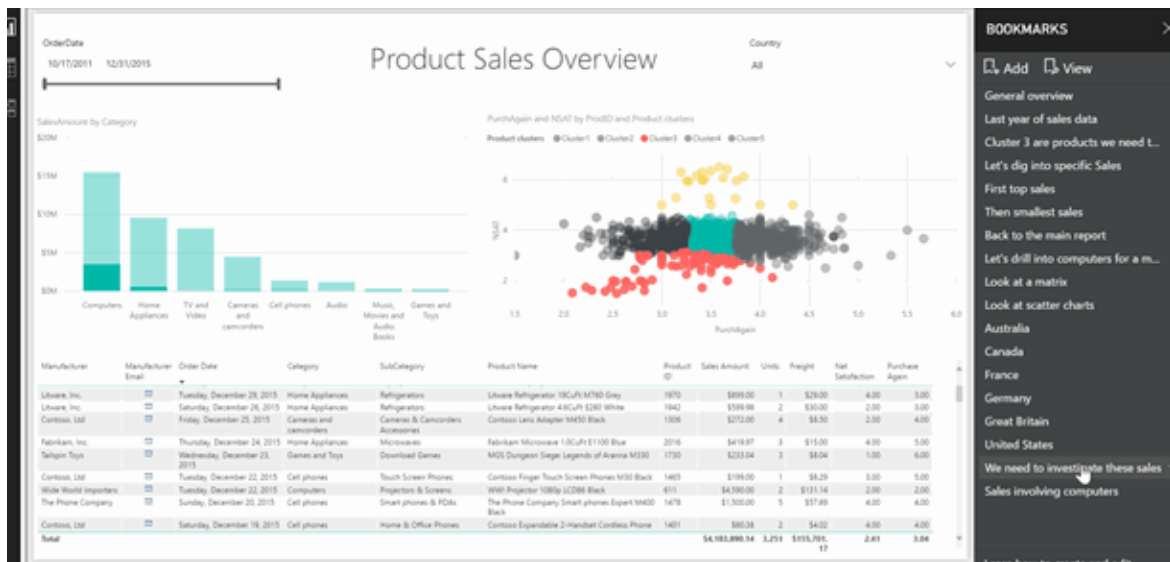


Once your visual is made, you can use it the exact same way as a normal Power BI visual, changing fields around and formatting it to match your report's style. With Q&A now built into the report experience in this way, you can get answers to your questions *just by typing them*. That's worth the price of the software alone (it's free). It also lets you quickly create an entire report without needing to use the field well or list.

Do note that Q&A is currently a preview feature, so to access this highlight you will need to enable it through the 'Options' dialog the first time you wish to incorporate the feature. Trust us, this is a cool feature!

## Cross-highlighting for bookmarks

There's two updates for the bookmarking preview this month, the first of which is the ability to bookmark the cross-highlighted state in addition to any filters, slicers and other bookmarkable features. Now that you can bookmark cross-highlighting, these may be accessed easily and the insights shared with everyone who uses the reports.



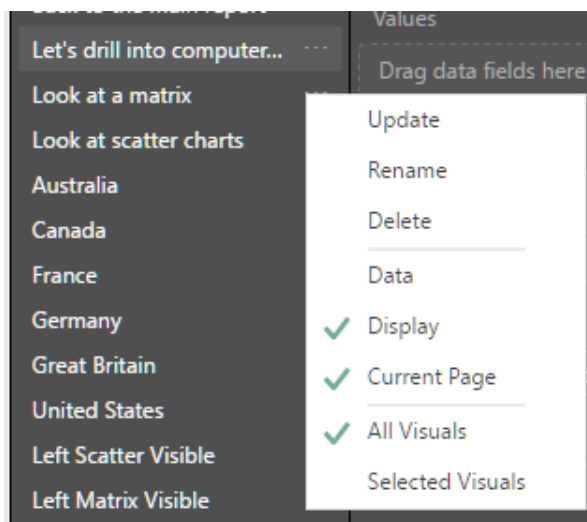
### More bookmark flexibility

Given bookmarking is still in its infancy, Microsoft is particularly listening to feedback on the bookmark preview released earlier this year. Some of the early feedback received for bookmarking was that end users wanted more flexibility in what could be bookmarked. In particular, there were suggestions received about the ability to control the types of properties that were bookmarked and what visuals on a page were affected by the bookmark. Consequently, this update has been developed in response to these comments, with two new sets of controls added.

The first control allows you to pick whether the bookmark will apply the “data” properties such as:

- filters and slicers
- “visual” properties such as spotlight
- visibility and / or the page change that moves users to the page that was visible when the bookmark was added.

These group of properties may be combined to bookmark just what you need.



The second control lets you pick which visuals the bookmark is applied to. By default, bookmarks apply to the entire page. However, if you want the bookmark to apply to only part of the page, e.g. because you divided your page in half to do a side by side comparison, you can now do just that.

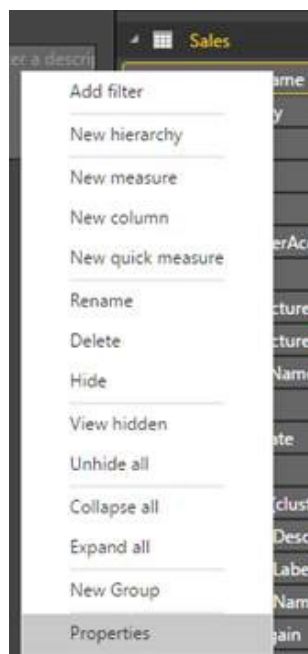
First, simply set up the bookmark how you want it to look and then second, multi-select the visuals you want included in the bookmark. Third, you can create or update your bookmark while the visuals are still selected. Then, you “simply” change the bookmark through the bookmark’s menu to **Selected visuals** instead of **All visuals** and it will only apply the bookmark to those visuals you selected.



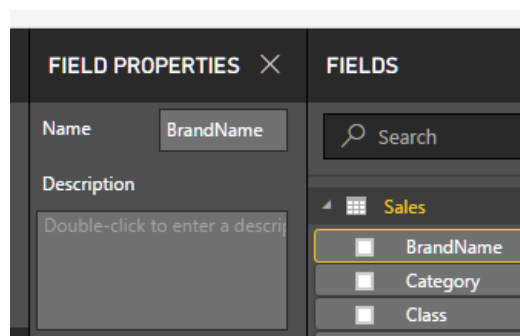


### Field properties pane and field descriptions

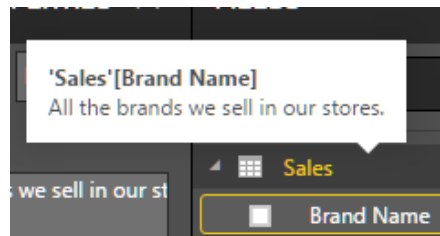
The field properties pane allows users to change the name and description of a field from the fields list. This may be accessed by selecting 'Properties' from the field menu:



In the pane, the field may be renamed and a description attributed.



This works like a screen tip or Data Validation Input Message in Excel: once you give a field a description, you can see it anytime by hovering over the field in the list:

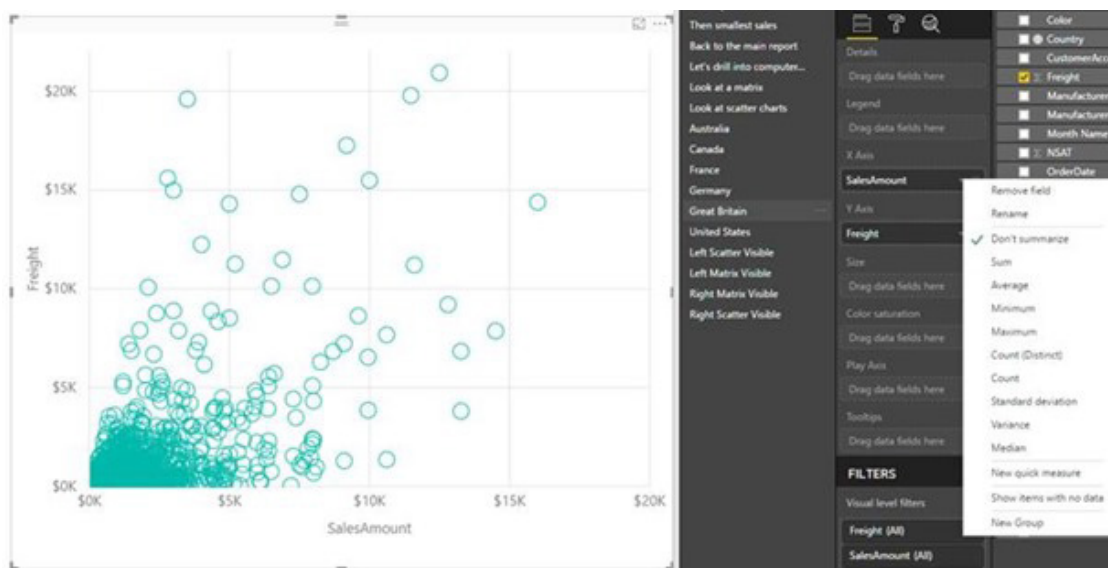


If there are multiple users editing reports, this is a great way for everyone to understand what fields they should use and how measures are being calculated.

The description is also shown if you're using a connection to an external Analysis Services model. This means you can see this information from centralised IT-developed models if the developer set the description there as well.

### Scatter visual from x- & y-axis groupings

Until now, the way to create a scatter visual was to use two measures, one for each axis, and a categorical value in the details bucket to group on. With this update, you don't need to add a category to the details bucket. Power BI Desktop will instead plot all the x- and y- pairs that you have in your model. To create your scatter visual this way, just pick 'Don't summarize' as the aggregation type. This is only an option for numeric columns and won't work for measures.

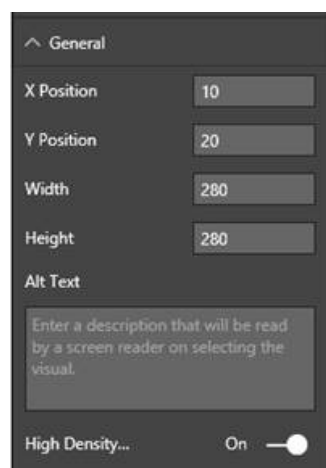


### High density sampling for maps based on latitude and longitude

This update sees Microsoft extend the high-density sampling algorithm, which is already supported in scatter and line visuals, to maps using latitude and longitude. This new algorithm will better preserve the shape of your data while also surfacing outliers. To do this, Power BI Desktop prioritises showing points that aren't going to be hidden by neighbouring points. With this change, end users should see a noticeably improved experience with any map visuals using latitude and longitude that exceed

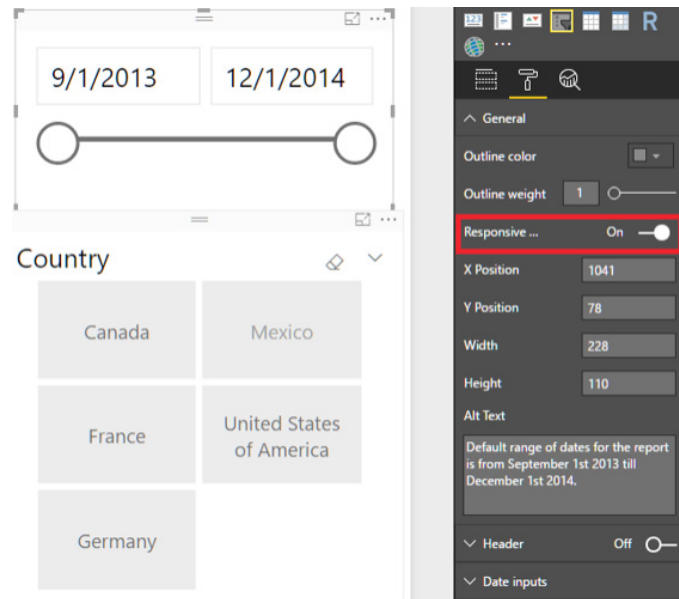
the data point limit. Microsoft claim that this sampling algorithm allows you to represent a large number of data points without sacrificing performance and load time. We will see!

It's not mandatory though. If you would prefer to use the previous sampling algorithm or test out the improvements, simply turn off 'High Density Sampling' in the 'General' card of the 'Formatting' pane.



## Responsive slicers

With the new responsive slicers, Power BI Desktop allows you to resize them to a variety of different sizes and shapes, from horizontal to square to vertical, and the values in the slicer rearrange themselves as you do. You can make both horizontal slicers and date and range slicers responsive. Both the date and range slicers also have the added benefit of improved touch areas so it's easier to change them with a fingertip (assuming you have a touchscreen!). These have been designed with mobile app solutions in mind.

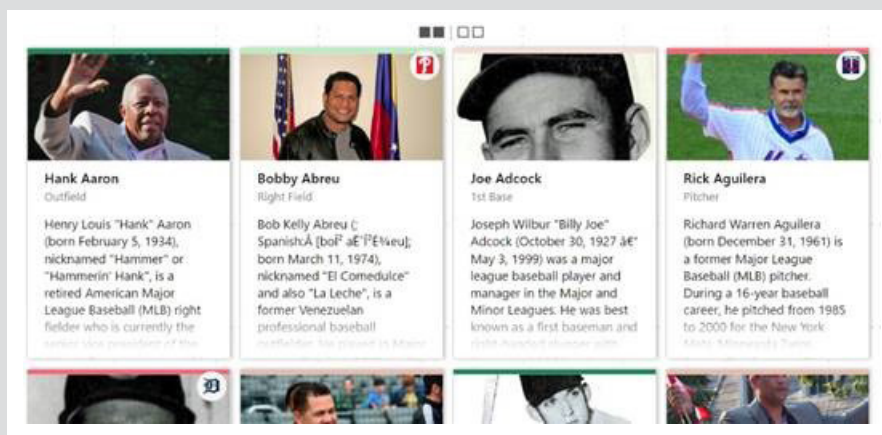


## New custom visuals

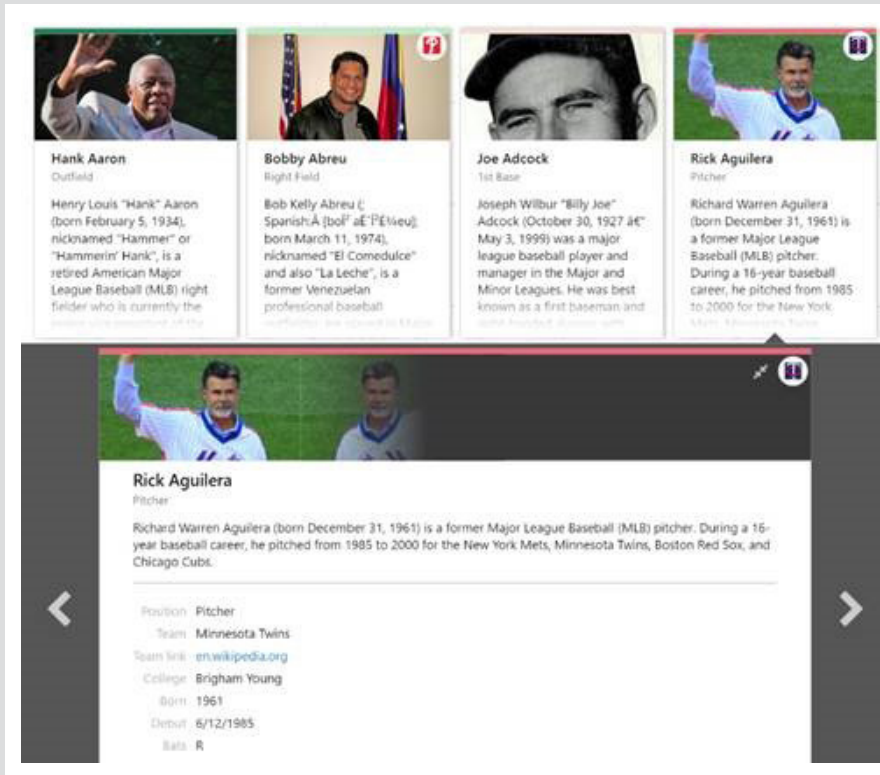
There's quite a few in this update, so here's a brief summary of each...

### CARD BROWSER

The Card Browser visual is a document set viewer featuring 'flippable' (Microsoft believe this is a word!), double-sided thumbnails for natural navigation of media collections. The Preview face of each card renders the headline image, title, and origin of the story with a text sample, enabling rapid discovery of documents of interest, e.g.



Flipping the cards reveals the MetaData face, which lists document properties. Clicking a card expands it in place for detailed reading:



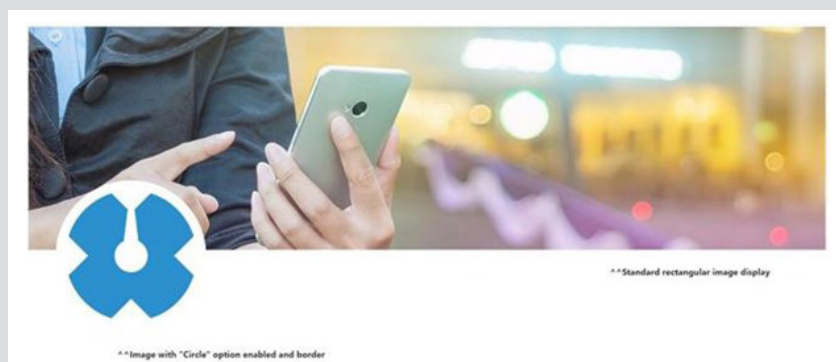
### TABLE HEATMAP

The Table Heatmap visual allows you to compare data values in an easy and intuitive way, a bit like heat map conditional formatting in Excel. You may give it a category and all the measures you want to compare. The visual will then colour the matrix in a stepped color gradient, which may be customised if required.



### DATA IMAGE BY CLOUDSCOPE

The Data Image visual by CloudScope displays dynamic web images. You can pick to crop the image into a circle and to add a border:



## POWER KPI MATRIX

Apparently, this isn't the fourth instalment of the Keanu Reeves sci-fi franchise. The Power KPI Matrix visual enables balanced scorecards in Power BI and displays an unlimited number of metrics and KPIs in a single, customised list. Power KPI Matrix is similar to the Power KPI custom visual in supporting the creation and display of KPI indicator symbols and values along with current and historical trends of actual and target values, but it has the added benefit of the tabular format that allows for an unlimited number of metrics and KPIs in a single matrix.

Category	Sub-Category	Metric Name	Current Value	KPI Status	Last 18 Months
Non-Financial	Usage	Active Customers	18,193	↓ -4 %	
		Transactions	431.9K	↓ -54 %	
		Satisfaction	50.5%	↑ 12 %	
Financial	Volume	Total Units	1.15M	↑ 23 %	
		Premium Units	30.76K	↓ -27 %	
		Top Line	Gross Revenue	\$7.97M	↓ -1 %
		Avg Price	\$12.55	↓ -19 %	
		Returns	1,572	↑ 7 %	

## TEXT FILTER

The Text Filter visual is a search box that can be used to filter all the visual on your report page to any categories in a given field that contains the text you specify.

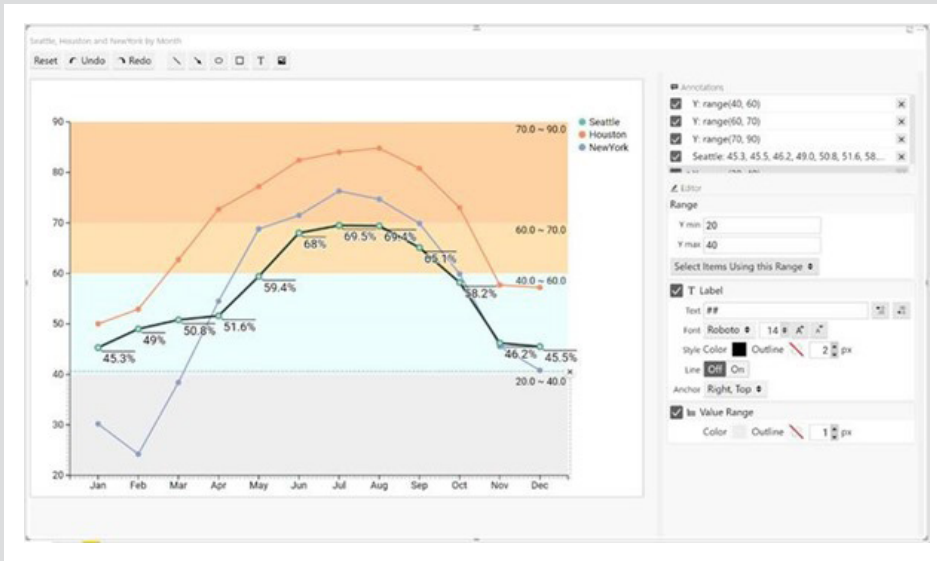
Name

🔍

Gender	Name	Year	Rank
F	Willow	2016	96
M	Willis	1880	86
M	Willis	1881	93
M	Willie	1880	34
M	Willie	1881	30
F	Willie	1881	94
M	Willie	1882	31
F	Willie	1882	89
M	Willie	1883	34
F	Willie	1883	96
M	Willie	1884	31
F	Willie	1884	93
M	Willie	1885	29
F	Willie	1885	95
M	Willie	1886	28
F	Willie	1886	88
M	Willie	1887	27
F	Willie	1887	88
M	Willie	1888	24
F	Willie	1888	79
M	Willie	1889	26
F	Willie	1889	85
M	Willie	1890	23
F	Willie	1890	77
M	Willie	1891	21
F	Willie	1891	78
M	Willie	1892	19
F	Willie	1892	78

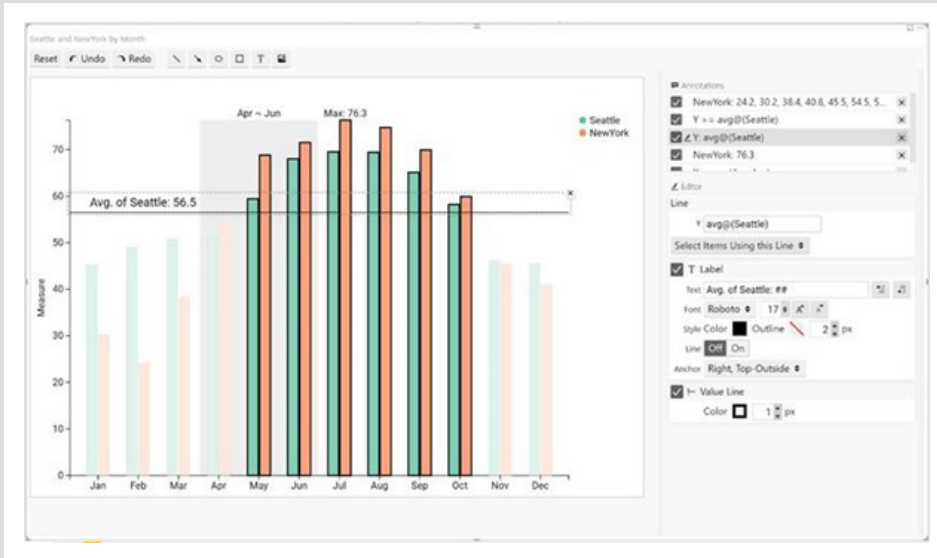
## CHARTACCENT – LINECHART

The ChartAccent visual’s line chart allows you to highlight individual data points, data series, points within a range or even points above the average value. You have fine-grained control over the data label formatting, the ability to define ranges on the axis and the ability to annotate the chart with shapes, text, and images. Each annotation is listed on the top right section of the pane, so you can see the actions taken and easily make edits or remove annotations.



## CHARTACCENT – BARCHART

Similar to the LineChart!



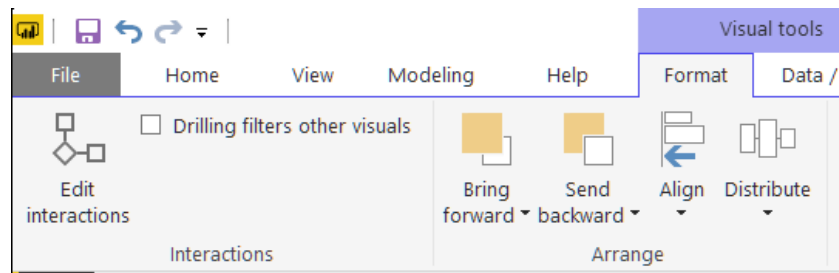
Right, that’s custom visuals sorted (phew!). What’s next?

### Drill filters other visuals

This update adds one of the most popular drill features, the ability for other visuals on reports to be filtered as users drill down into a visual. Now, as you drill down in a given category, you may also filter all visuals on your page by that same category. This new option is on by default for all new reports, but you can turn it off (or turn it on for older reports), through the option in the 'Format' tab.

## Drill filters other visuals

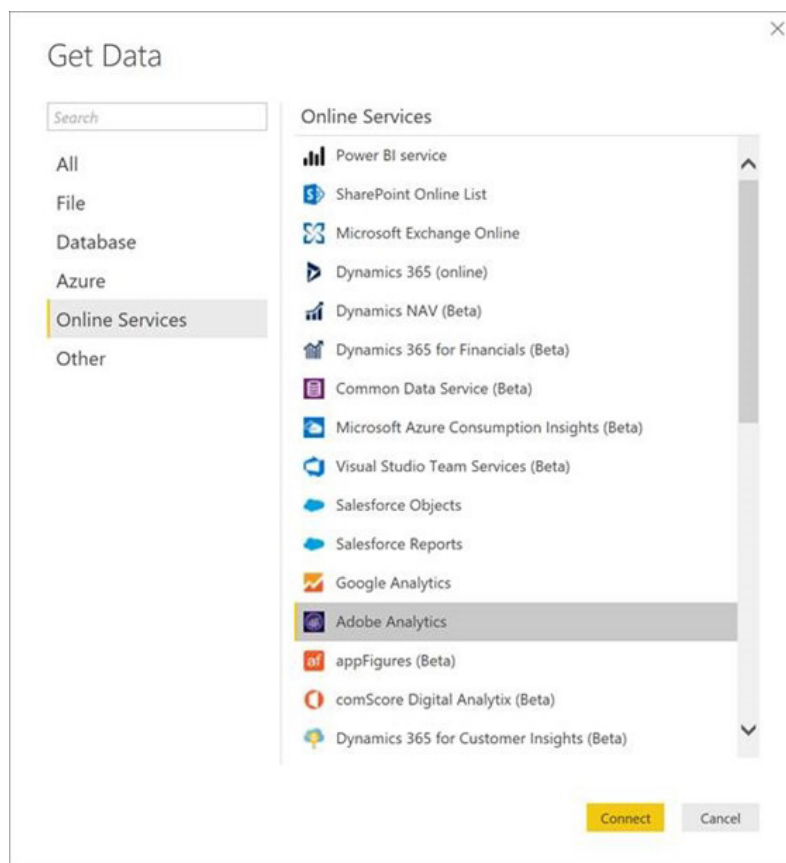
This update adds one of the most popular drill features, the ability for other visuals on reports to be filtered as users drill down into a visual. Now, as you drill down in a given category, you may also filter all visuals on your page by that same category. This new option is on by default for all new reports, but you can turn it off (or turn it on for older reports), through the option in the **Format** tab.



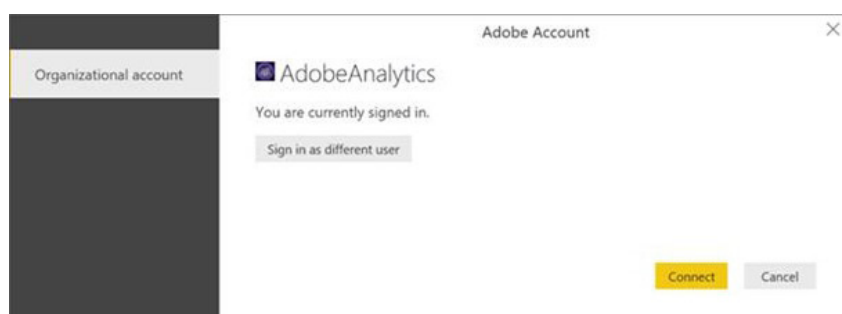
## Adobe Analytics connector (Preview)

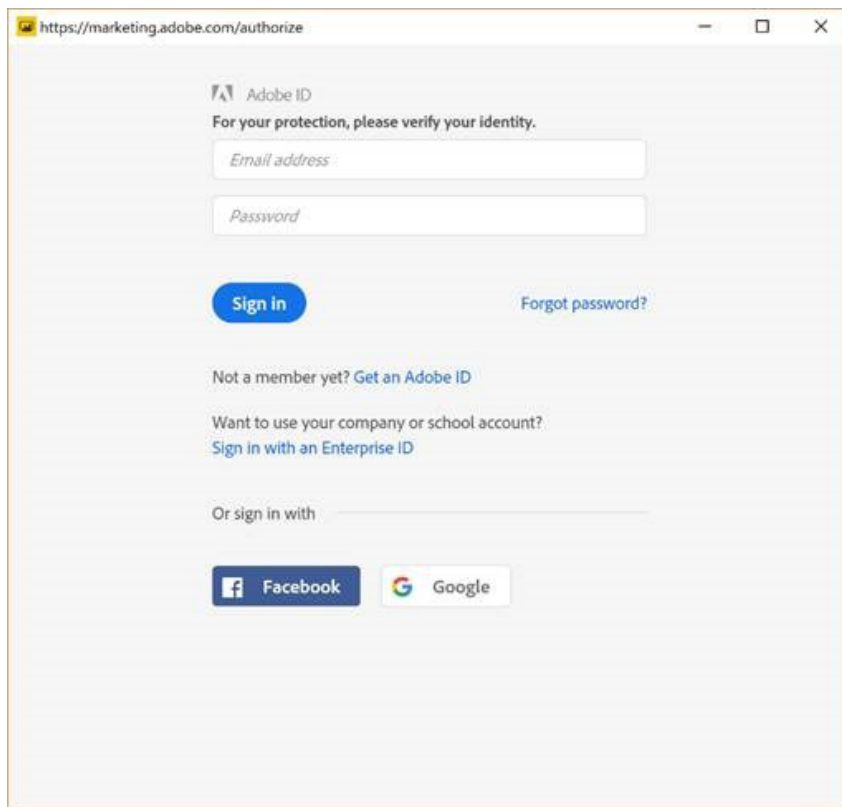
This update also sees a new connector for Adobe Analytics. This connector allows users to easily import and analyse Adobe Analytics data within Power BI. The connector is currently available as a Beta connector in Power BI Desktop. End-to-end support for this connector in the Power BI Service will become available in a few months.

The new Adobe Analytics connector can be found in the 'Get Data' dialog, under the 'Online Services' category.



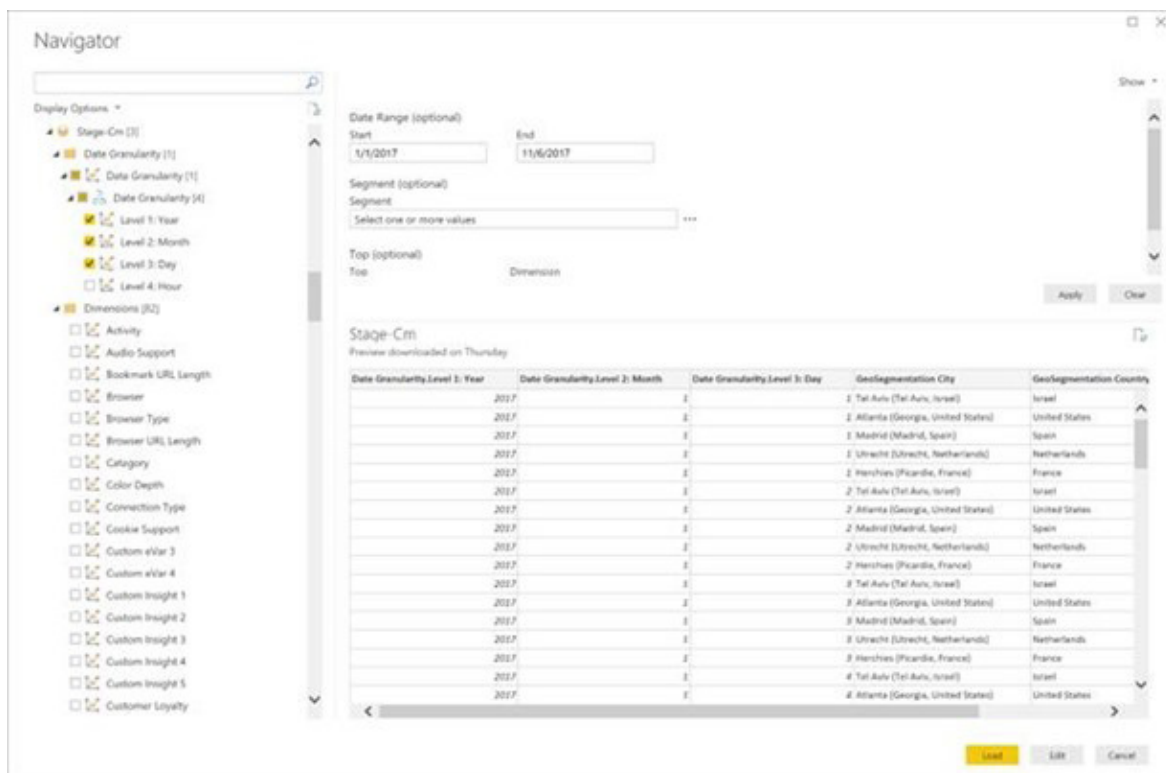
After selecting the Adobe Analytics connector, authentication is straightforward, viz.





Once the connection has been successfully established, users may preview and select multiple dimensions and measures within the 'Navigator' dialog to create a single tabular output. As part of this selection, there is also the option to provide any necessary input parameters for the selected items.

After selecting the desired information, users may decide to directly load the query into Power BI Desktop or perform any additional data transformations and filters within the Query Editor UX upfront, via the 'Edit' option in this dialog.



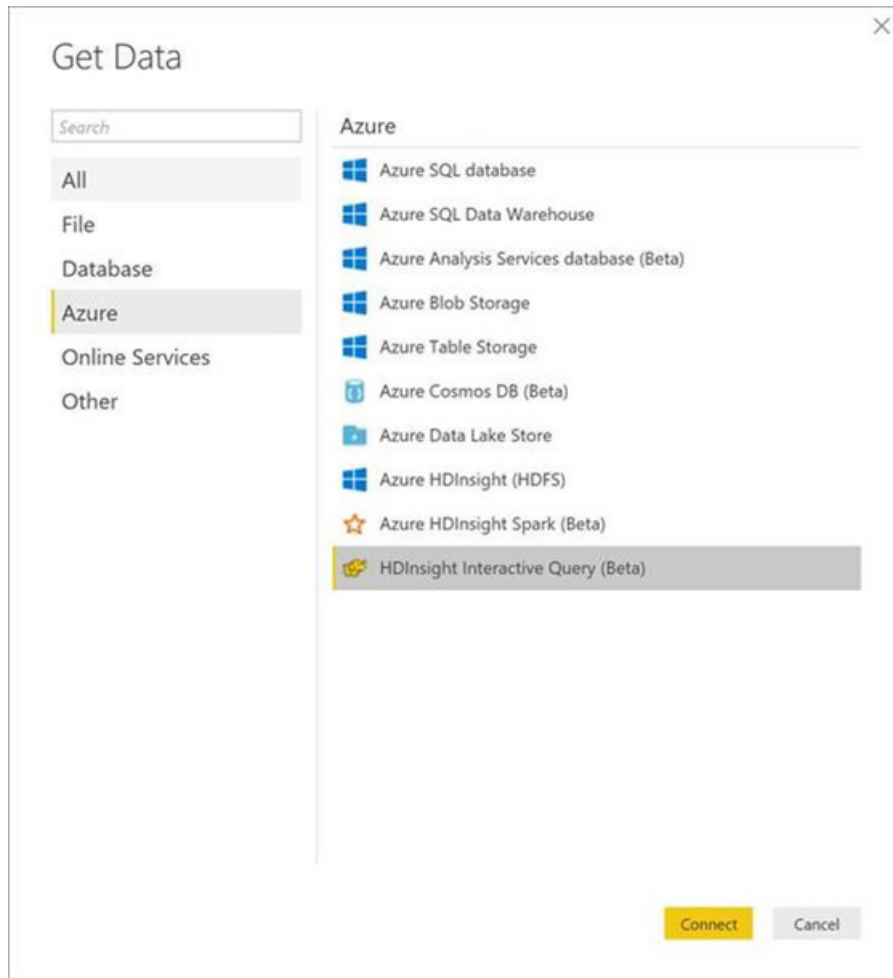
This connector is in preview, so you will need to enable it through the 'Options' dialog the first time you wish to try it.



### HDInsight Interactive Query connector

Another new connector in this Power BI Desktop release is a new connector for HDInsight Interactive Query. Interactive Query leverages Hive on LLAP in Apache Hive 2.1, bringing the interactivity to your complex data warehouse style queries on large datasets stored on commodity cloud storage.

The new HDInsight Interactive Query connector can be found under the Azure tab in the 'Get Data' dialog:



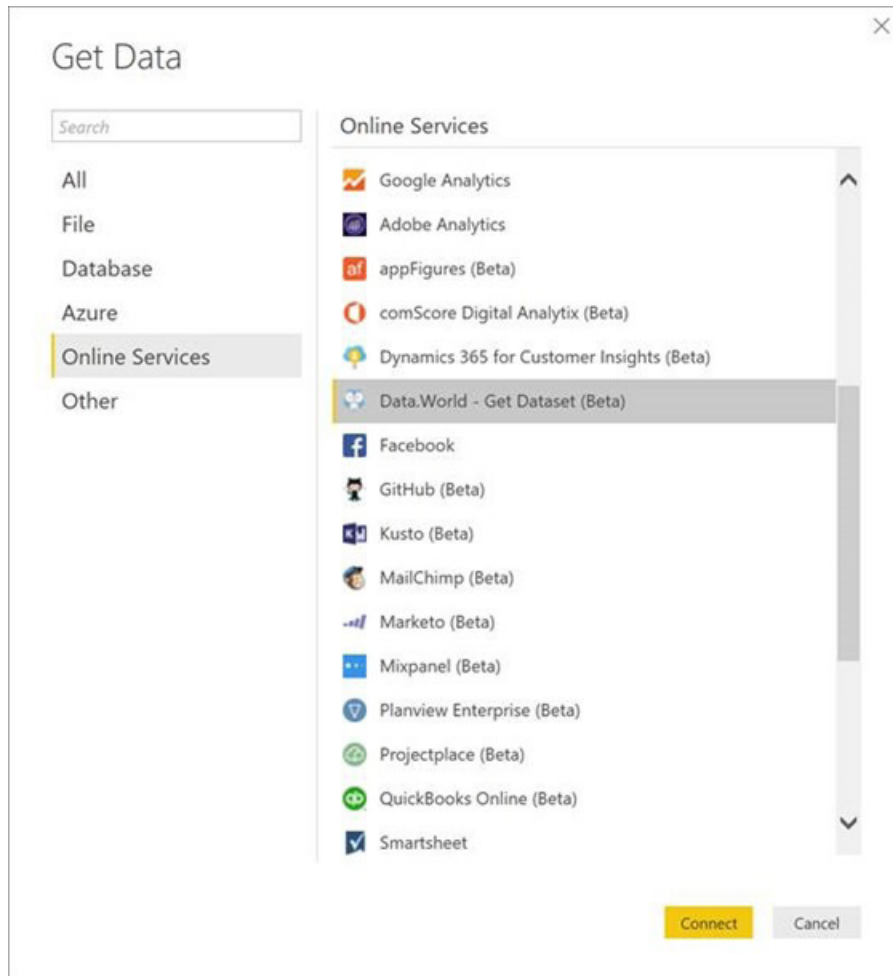
Upon selecting this connector, users may specify which HDInsight Interactive Server and Database to connect to, as well as the connectivity mode. This connector supports both Import and DirectQuery modes.



Once connection details have been provided, users may authenticate using user name / password, then navigate, preview and select one or multiple tables from the connected database.

## Data.World connector

In partnership with Data.World, Microsoft has shipped a new connector in Power BI Desktop that allows users to import Data.World datasets into Power BI. The new Data.World connector can be found under the Online Services category in the 'Get Data' dialog:



This connector requires users to provide an Owner and Dataset ID and, optionally, a query to run.



After specifying these fields, users will be able to preview the dataset and load it directly into Power BI Desktop or leverage the Query Editor to apply data transformations and filters before the data is loaded.

## SAP BW connector improvements

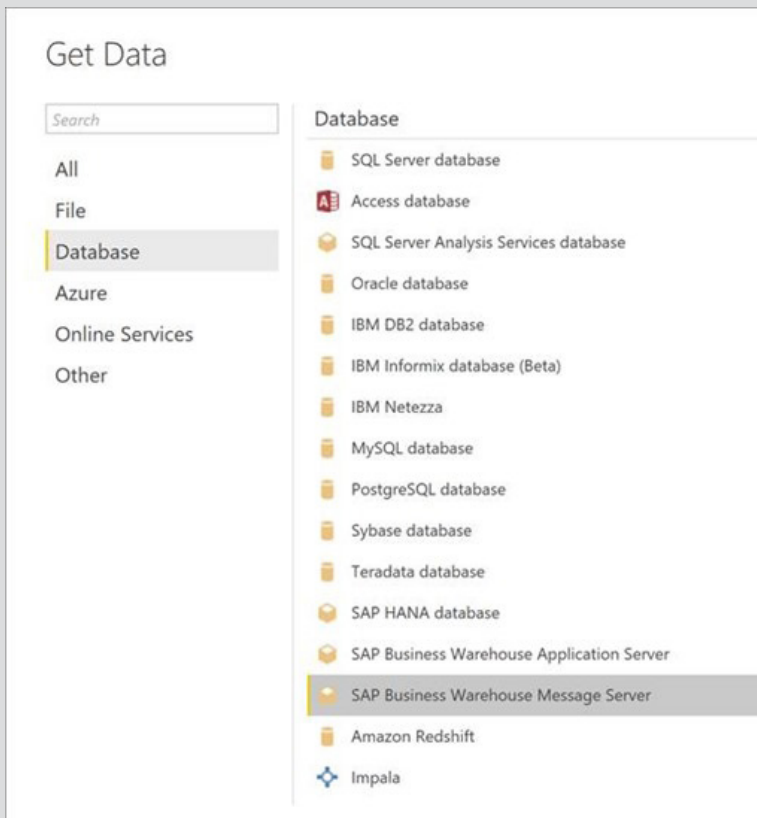
There have been a couple of significant improvements to the SAP BW connector in this release, too:

- Support for connecting to an SAP BW Message Server
- Support for Windows Authentication.

Brief details are provided below.

### SUPPORT FOR CONNECTING TO AN SAP BW MESSAGE SERVER

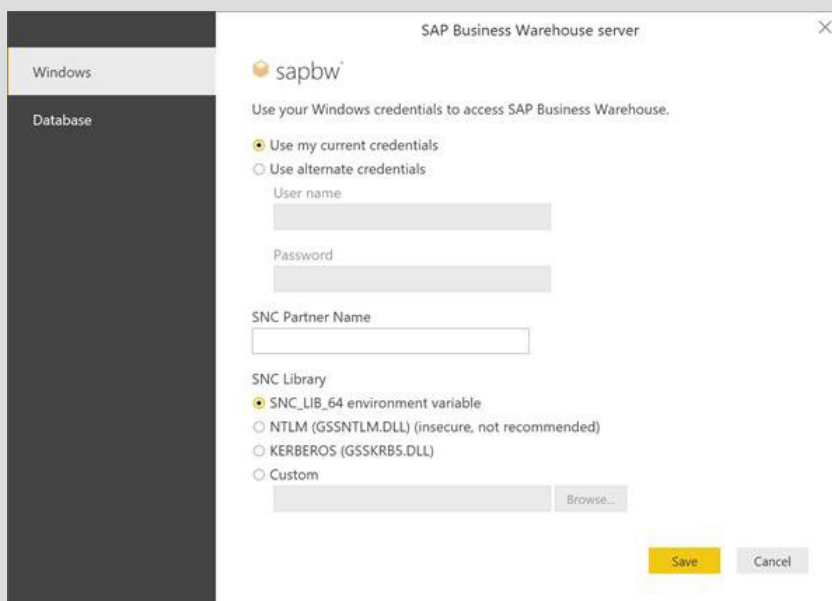
One common request from SAP BW connector users was being able to specify a Message Server rather than an Application Server when setting up the connection from Power BI. Microsoft has responded by adding a new SAP BW Application Server connector under the Database category in the 'Get Data' dialog:



This new connector allows users to specify a Server, System ID, Client ID and Logon group for the Message Server to connect to. Both Import and DirectQuery connectivity modes are supported.

### SUPPORT FOR WINDOWS AUTHENTICATION

Windows credentials are now supported when connecting to either SAP BW Application or Message Servers. The extra Windows Authentication option may be found in the 'Credentials' dialog after specifying a server to connect to. This new authentication type allows users to connect using the "current user" or specifying "alternate credentials," as well as their SNC partner name. The SNC library to use may also be specified.



Please note that these two new features for SAP BW are only available in Power BI Desktop at the time of writing. Microsoft has promised support for them in the Power BI service, via the On-premises data gateway, will be added in the future, but has not specified a timeline yet.

## **IBM Netezza connector now generally available**

Finally (we're glad you made it to here), this update makes the IBM Netezza connector now "GA" (Generally Available). This connector has been available as a Beta connector in Power BI Desktop since June last year and is supported end-to-end in the Power BI service (via the On-premises data gateway) since August.

The IBM Netezza connector can be found within the 'Get Data' dialog, under the 'Database' category. The connector allows you to import data or create DirectQuery-based reports on top of IBM Netezza databases.

## **January Updates for Power BI Desktop**

It didn't stop in December. January's are out too. So sorry to those who have no interest in this, but we know many of you do like to keep up to date! Here's the January additions:

### **Reporting**

- Show and hide pages
- Control data label background color for Cartesian and maps visuals
- Increase area used for axis labels in charts
- Bar / column padding control
- Show dates as a hierarchy (Preview)
- Add an anchor date for relative date slicer
- Top N selection in Q&A

### **Analytics**

- Correlation coefficient quick measure

### **Custom visuals**

- PowerApps
- TreeViz
- Funnel with Source by MAQ Software
- Box and Whisker chart by MAQ Software
- Agility Planning Matrix Light
- Image Grid
- Gantt Chart by MAQ Software

### **Data connectivity**

- Support for Azure Active Directory authentication for Azure SQL Database & Data Warehouse connectors

### **Other**

- Advanced language settings for the Windows store app.

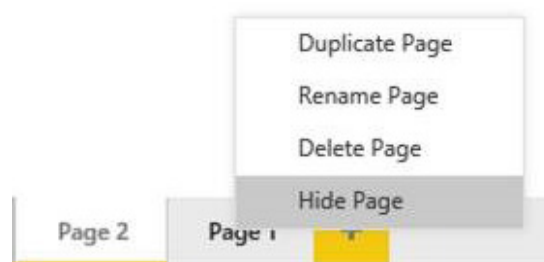
Let's take a look at each of these in turn.

### **Show and hide pages**

While creating your reports, you may have needed to hide a page or two perhaps because of in-progress work. You still wanted users to have access to other parts of the report. Hiding pages is also useful when you start using drillthrough or creating your own navigation through

bookmarking, and you don't want you users to access a page through the normal page navigation.

Starting from this update, you can now hide any number of pages you want through right clicking the page name and selecting hide.

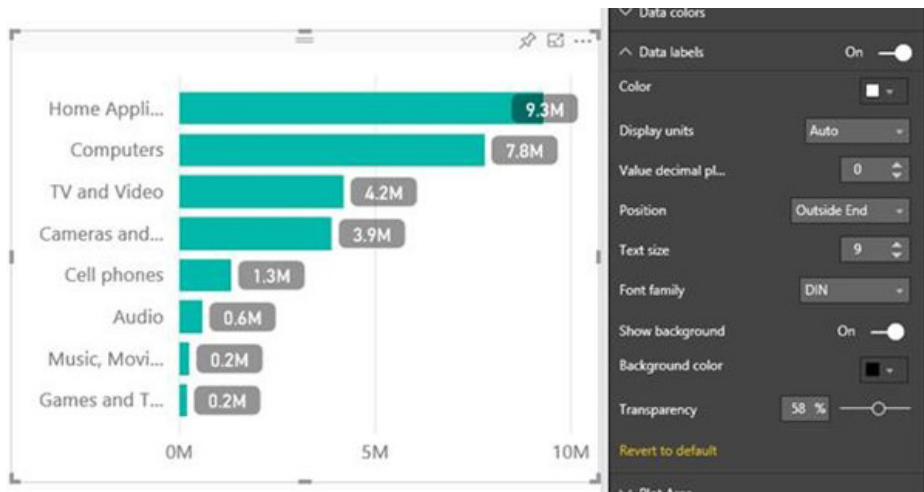


While you are editing the report, you'll still see the pages, but they will look different to indicate they are hidden. You won't be able to see the pages at all when you move to reading mode.



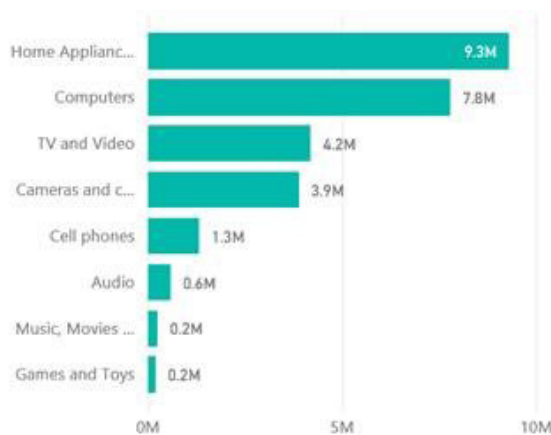
### Control data label background color for Cartesian and maps visuals

You can now control the background colour for data labels in Cartesian and map visuals. This is useful for stylistic changes and readability, especially when you have a situation where the data label is midway over a data point. You can find the option under the 'Data labels' card in the 'Formatting' pane:

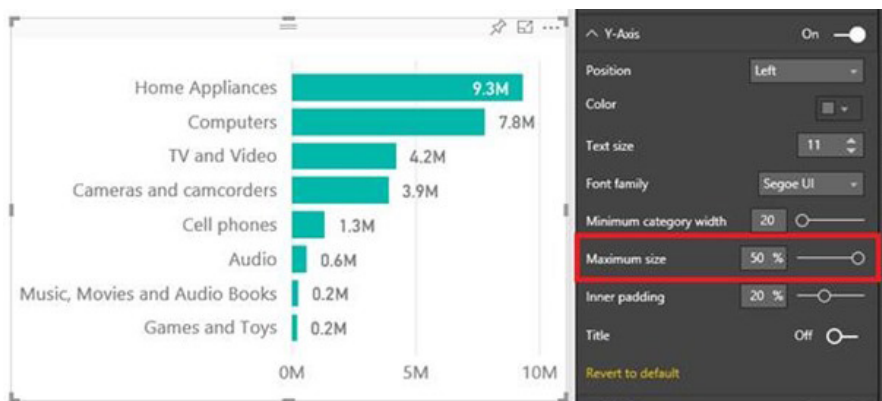


### Increase area used for axis labels in charts

If you have a chart where the axis labels are being cut off, previously your only option would be to increase the size of your chart.

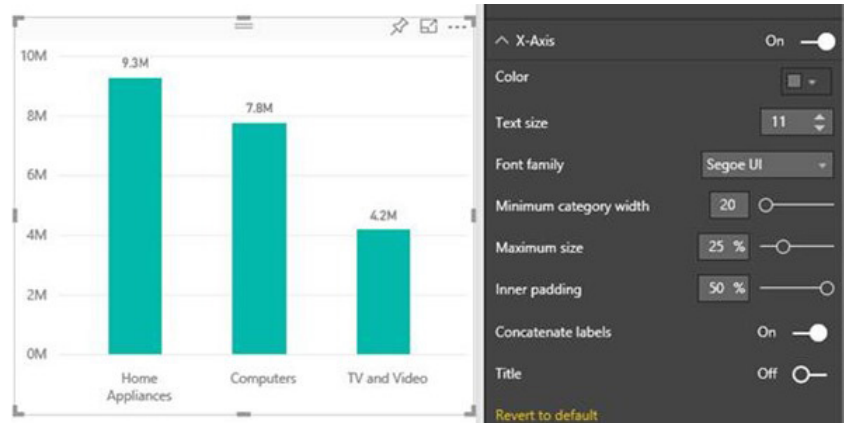


That's not a great option as the report page space is limited, therefore this update adds a maximum size control for the axis to the 'Formatting' pane. This new slider can be used to increase the percentage of the chart used by the axis labels.

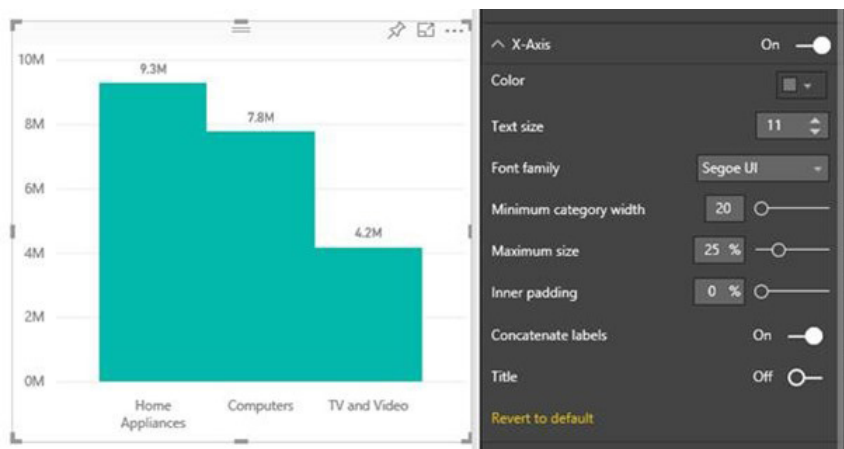


## Bar / column padding control

Another new axis formatting option added is the ability to control the inner padding between bars. You can make the inner padding up to 50% of the bar's width:

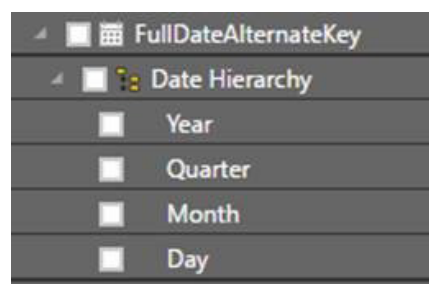


or all the way down to zero to get a histogram effect:



## Show dates as a hierarchy (Preview)

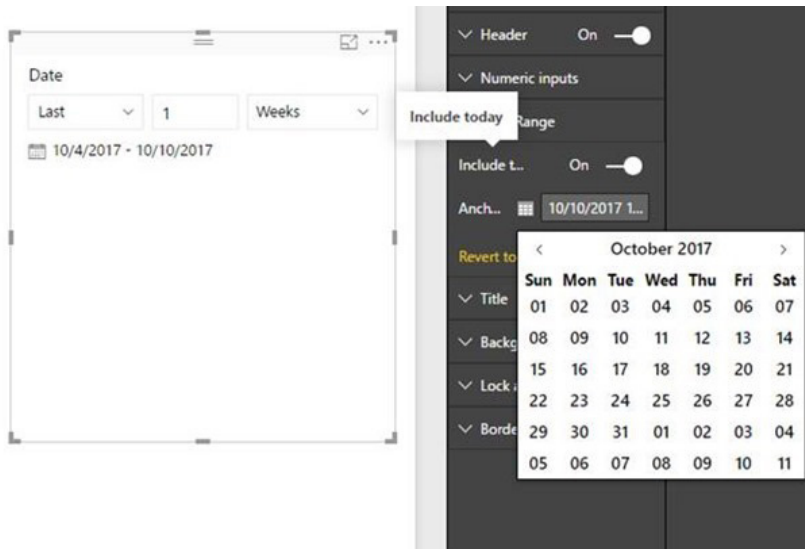
For a long time now, Power BI has automatically created a date hierarchy whenever you are using the internal date table. The problem was that you couldn't see the said hierarchy in the field list. Instead, this update has created it automatically for you when you drag your data column into a visual. Now, you can see the entire hierarchy in the field list. You'll need to turn on the preview feature switch under **File > Options and Settings > Options > Preview** features.



This is useful not only because there's now more transparency about automatically generating this hierarchy, but also because you can now use individual fields from the hierarchy in your visuals just by dragging or checking the specific level you are interested in. Previously, to do this you would have needed to put the entire hierarchy into the visual and then remove the levels you didn't want.

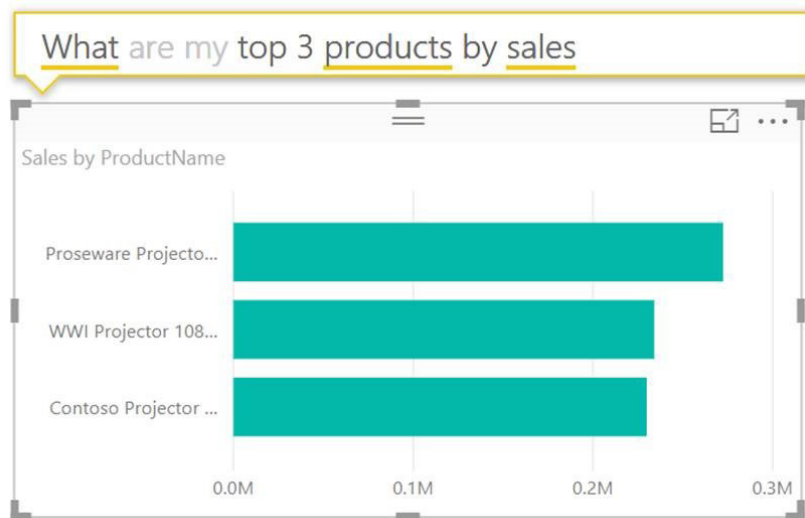
## Add an anchor date for relative date slicer

When using the relative date slicer, you may want to start further back in time than the current date (*i.e.* today). This is very common whenever your data is not complete until a few days later when all sales are finalised and reported into your systems. You can now do this with the relative date slicer by setting an anchor date. Once you have an anchor date set, the slicer will be evaluated relative to that specific date. You can set it in the date range options in the 'Formatting' pane.



### Top N selection in Q&A

After bringing Q&A to Power BI Desktop in December, Microsoft has continued to improve the natural language engine itself. You may now ask **top-n** type questions such as "What are my top 3 products by sales?".



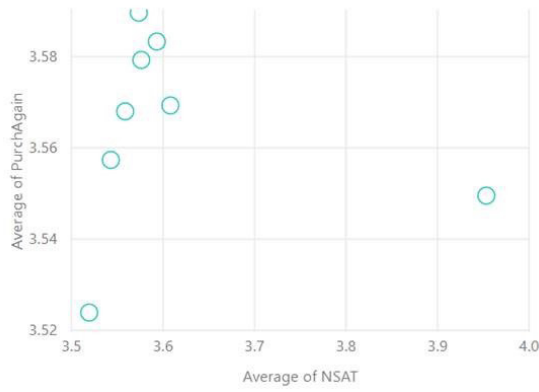
or "top manufacturer by NSAT"



### Correlation coefficient quick measure

This quick measure is now in the 'quick measures' gallery. It calculates the Pearson correlation coefficient between two measures within a certain category, which is a really common statistical measure of how closely related two values are.

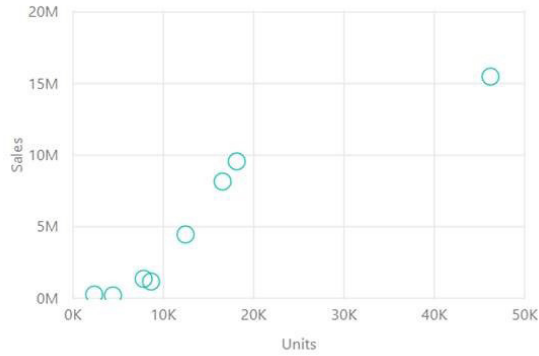
Average of NSAT, Average of PurchAgain and Average of NSAT and Av...



**-0.14**

NSAT and PurchAgain correlation for Category

Units and Sales by Category



**0.94**

Units and Sales correlation over Category

### Custom visuals

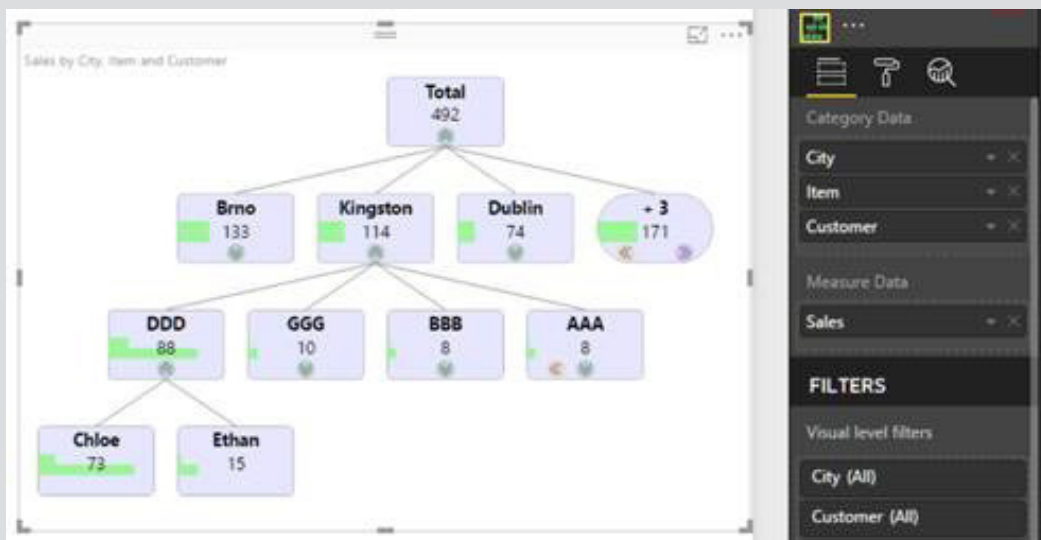
There's another raft of visuals in the January update too!

#### POWERAPPS

With the new PowerApps custom visual, aside from quickly finding insights in your data, you can take action on it as well. They allow you to build automated workflows. With the new custom visual, that experience can be embedded in your report.

#### TREEVIZ

The TreeViz custom visual by AutoCont CZ a.s. allows you to display your hierarchical data in a tree-like structure. You may expand and collapse each level and decide how many children data points to show before grouping the smaller ones into a single child group:





### FUNNEL WITH SOURCE BY MAQ SOFTWARE

The Funnel with Source custom visual lets you track any metric of interest over various stages along with the source of entry of the data point to the funnel. For example, in the case of sales journey data, this visual displays the channel through which

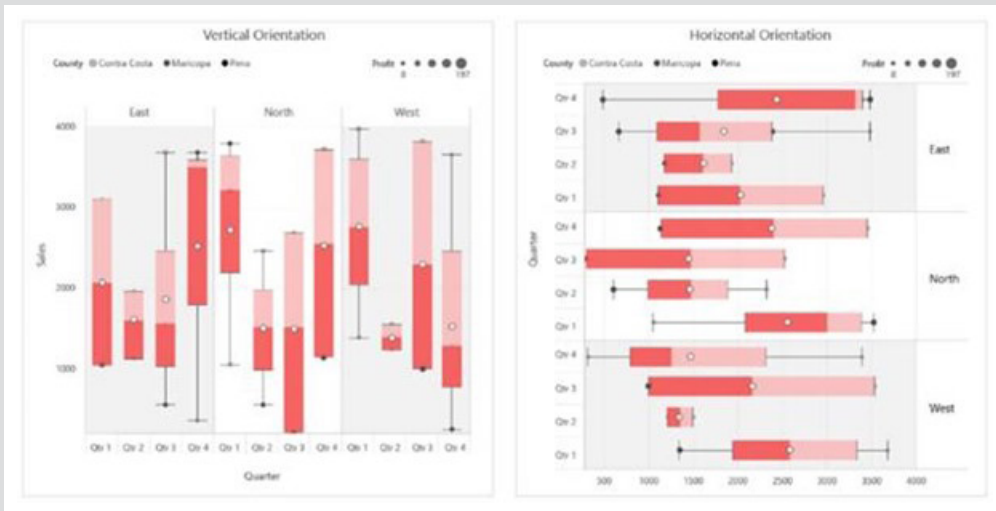
any lead enters the funnel and then the corresponding journey through the various stages of the sales cycle. You can also filter data based on the selection of channel and on the selection of any stage of the sales journey.



### BOX AND WHISKER CHART BY MAQ SOFTWARE

Box and whisker charts are most commonly used in statistical analysis to see the spread of your data. They consist of two parts: the main body called the box and the thin vertical lines coming out of the box called *whiskers*. The first quartile forms the bottom and the third quartile forms the top of the box. The

whiskers connect the minimum and the maximum values to the box. In addition to showing median, first and third quartile, and maximum and minimum values, the Box and Whisker chart by MAQ Software is also used to depict mean, standard deviation and quartile deviation.



### AGILITY PLANNING MATRIX LIGHT

The Agility Planning Matrix Light by Managility is a matrix visual for planning and budgeting. Some benefits of this matrix visual are the ability to selectively drilldown on specific rows and to display currently applied filters on the visual itself.

Calendar Year: 2017		Finance Data Org Name: Demo Company (UK)											
		Calendar Year/Month: 201701				201702				201703			
Statement/Item Header	Chart/Icon	Actuals	Budget	% Sales	% ACT-BUD	Actuals	Budget	% Sales	% ACT-BUD	Actuals	Budget	% Sales	% ACT-BUD
> 001 Revenue		\$4,350.00	\$5,000.00	100.00 %	-13.00 %	\$14,088.00	\$5,000.00	100.00 %	181.72 %	\$13,995.00	\$5,000.00	100.00 %	179.90 %
> 002 Direct Costs		\$0.00	(\$763.64)	0.00 %	-100.00 %	\$0.00	(\$763.64)	0.00 %	-100.00 %	\$0.00	(\$763.64)	0.00 %	-100.00 %
> 003 Gross Profit		\$4,350.00	\$5,000.00	100.00 %	-13.00 %	\$14,088.00	\$5,000.00	100.00 %	181.72 %	\$13,995.00	\$5,000.00	100.00 %	179.90 %
	Purchases	\$0.00	(\$763.64)	0.00 %	-100.00 %	\$0.00	(\$763.64)	0.00 %	-100.00 %	\$0.00	(\$763.64)	0.00 %	-100.00 %
	Sales	\$4,350.00	\$5,000.00	100.00 %	-13.00 %	\$14,088.00	\$5,000.00	100.00 %	181.72 %	\$13,995.00	\$5,000.00	100.00 %	179.90 %
003 Gross Profit Total		\$4,350.00	\$4,236.36	100.00 %	-13.00 %	\$14,088.00	\$4,236.36	100.00 %	81.72 %	\$13,995.00	\$4,236.36	100.00 %	79.90 %
> 004 Expense		(\$2,029.72)	(\$48,787.31)	0.00 %	-1940.79 %	(\$18,551.06)	(\$48,787.31)	0.00 %	-1185.37 %	(\$17,307.99)	(\$48,787.31)	0.00 %	-1587.62 %
> 005 Operating Profit		\$2,320.28	(\$44,550.95)	53.34 %	-1862.79 %	(\$4,465.06)	(\$44,550.95)	-31.70 %	-1183.65 %	(\$3,312.99)	(\$44,550.95)	-23.87 %	-1817.72 %
> 006 Other Income		\$0.00	\$97.05	0.00 %	-100.00 %	\$0.00	\$97.05	0.00 %	-100.00 %	\$0.00	\$97.05	0.00 %	-100.00 %
> 007 Net Profit		\$2,320.28	(\$44,453.90)	53.34 %	-1862.79 %	(\$4,465.06)	(\$44,453.90)	-31.70 %	-1183.65 %	(\$3,312.99)	(\$44,453.90)	-23.87 %	-1817.72 %
> 008 EBIT		\$2,320.28	(\$44,453.90)	53.34 %	-1862.79 %	(\$4,465.06)	(\$44,453.90)	-31.70 %	-1183.65 %	(\$3,312.99)	(\$44,453.90)	-23.87 %	-1817.72 %
> 009 EBITDA		\$2,320.28	(\$44,453.90)	53.34 %	-1862.79 %	(\$4,465.06)	(\$44,453.90)	-31.70 %	-1183.65 %	(\$3,312.99)	(\$44,453.90)	-23.87 %	-1817.72 %

### IMAGE GRID

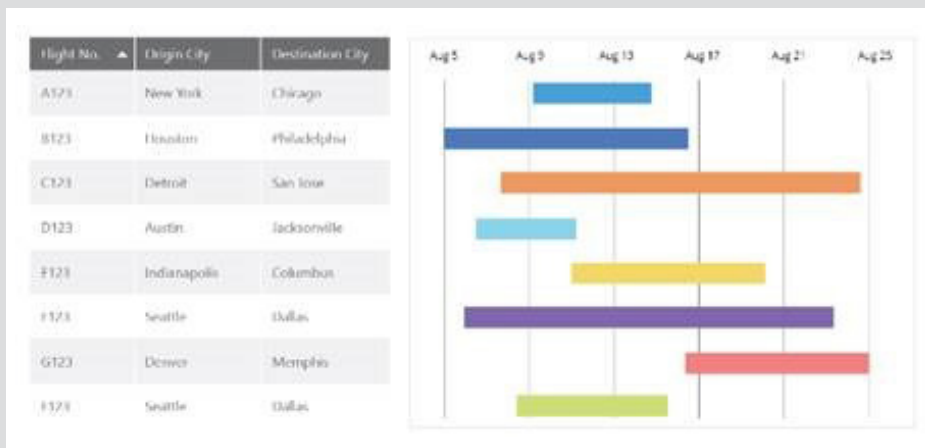
The Image Grid custom visual by Fredrik Hedenström is analogous to a word cloud for images. You may display many images and choose for the size to be based on the sort order or the value of a measure. You can also decide to show them in a grid view instead with the top visual to be based on the sort order.



The jury is out on this one...

### GANTT CHART BY MAQ SOFTWARE

This type of chart is well known and is commonly used for scheduling and management of tasks. This visual shows additional details of the task by providing a grid where one can view more data related to the task and can display the hierarchy of data category. Also, it may be sorted based on any data point of the task.

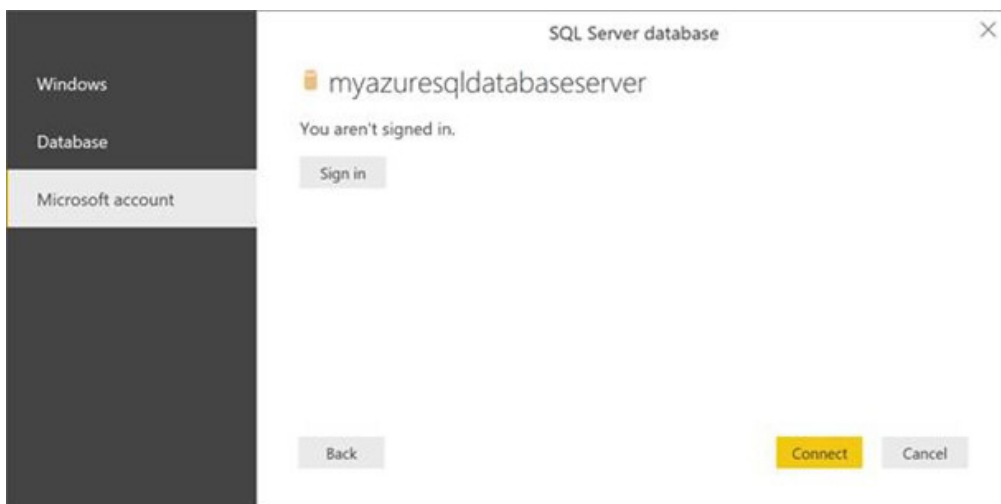


### Support for Azure Active Directory authentication for Azure SQL Database & Data Warehouse connectors

For those using the Azure SQL Database and Data Warehouse connectors, there have been many requests to Microsoft to be able to leverage the Azure Active Directory authentication in order to connect to these Azure services within Power BI.

With January's update for Power BI Desktop, Microsoft has introduced a new "Microsoft Account" option within the Credentials dialog for the Azure SQL Database and Data Warehouse connectors, allowing users to authenticate using their AAD accounts.

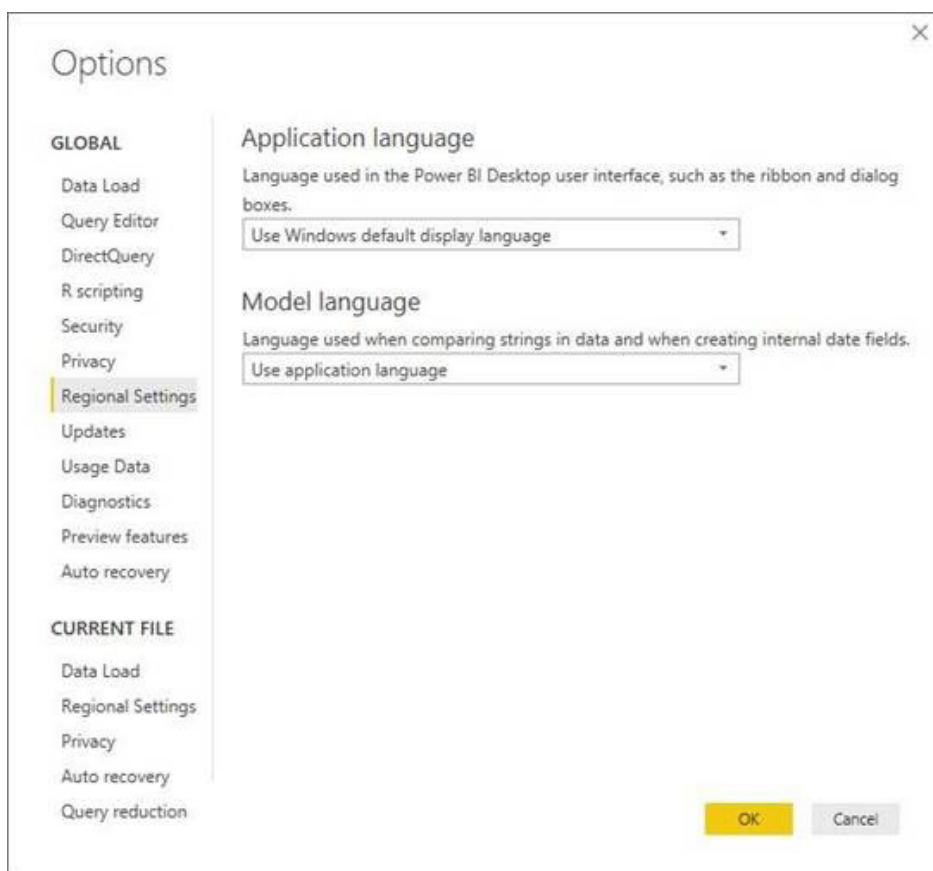
It should be further noted that support for this new authentication type in the Power BI Service will soon be available too. Watch this space!



### Advanced language settings for the Windows store app

If you're using the Windows store app, you can now specify the display language. You can also specify the model language separate from the display language. This is useful if you are working for a global company and there are people from all over the world consuming and creating reports in languages other than the default language the report was created in.

You'll see these new options under the 'Regional Settings' tab in the 'Options' dialog. Changing the application language will ignore the Windows default display language and switch to the chosen language. Changing the model language will decouple the model language from the application language for any newly created reports. (Note that this won't affect the model language for existing reports.) Changing either of these settings requires a restart.



Phew! Lots of updates there. But we're far from finished...

# December 2017 Updates for Power BI Service

Yup, same excuse here as for Power BI Desktop December Updates (above). In summary, here's the latest additions:

- Selective publish(ing) for Power BI apps
- External user distribution with Azure Active Directory B2B
- Improved workspace management with Premium
- AI-powered app recommendations
- Dashboard on-tile updates
- E-mail subscriptions for apps
- Single-sign on for SQL Server, Teradata and SAP HANA
- High availability for gateways and more in the recent on-premises update
- Granular control for Publish to Web.

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

## Selective publish(ing) for Power BI apps

Power BI apps allow organisations to distribute a collection of purpose-built dashboards and reports to a large number of business users and empower them to make data-driven decisions. Since May, when Power BI apps were first launched, thousands of apps have been created in Power BI. Microsoft estimates that hundreds of thousands of users have used these apps, showing that the snowball is truly rolling (*it is very weird writing this when it's 40 degrees Celsius outside!*).

This update takes things a step further by releasing one of the most requested features: selective publish of content. Apart from the fact that this doesn't appear to make grammatical sense, what does this mean?

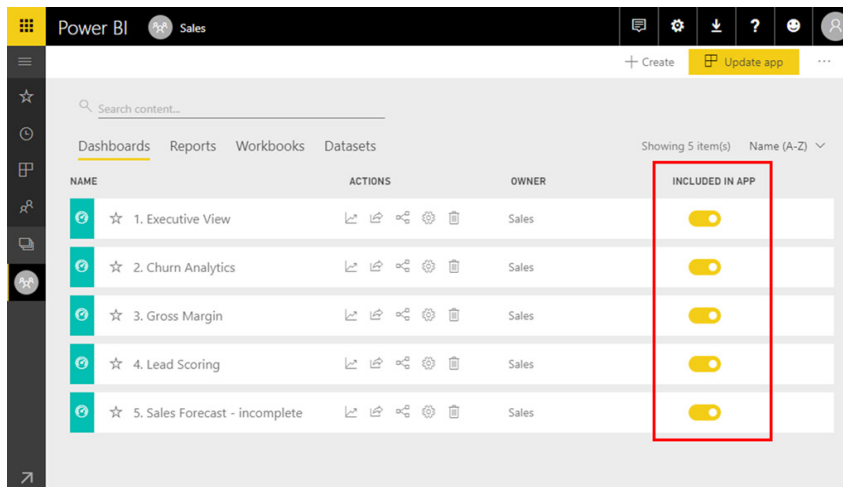
It's probably best to explain using a hypothetical situation. Imagine you have created a Power BI app that your entire organisation uses to get a 360-degree view of the sales pipeline and you are working on adding a new dashboard to the app that focuses on sales forecasts. Your end

users request a minor improvement to an existing dashboard in the app. You would like to make that improvement and update the app without publishing the incomplete sales forecast dashboard.

This was not possible until this update. Previously, with every update of a Power BI app, all the content in the underlying app workspaces would get published. However, with this release, you can choose not to publish certain dashboards and reports in the app workspace.

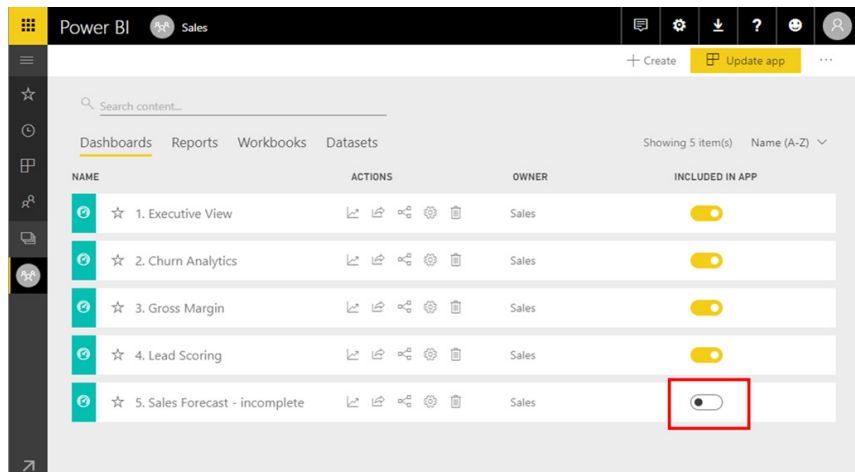
To show how this works, in the graphic below, we have an app workspace for Sales. We would like to make a small change to the Executive View dashboard and update the app. The problem is, we do not want my incomplete Sales Forecast dashboard to be published to my end users yet.

This update adds new functionality to the content list to do precisely that.



The "Included in app" toggle for this example Sales Forecast dashboard may simply be turned off: →

The app may then be updated, with the Sales Forecast dashboard not be included. Hence, you can make incremental updates to apps without publishing any incomplete dashboards or reports.



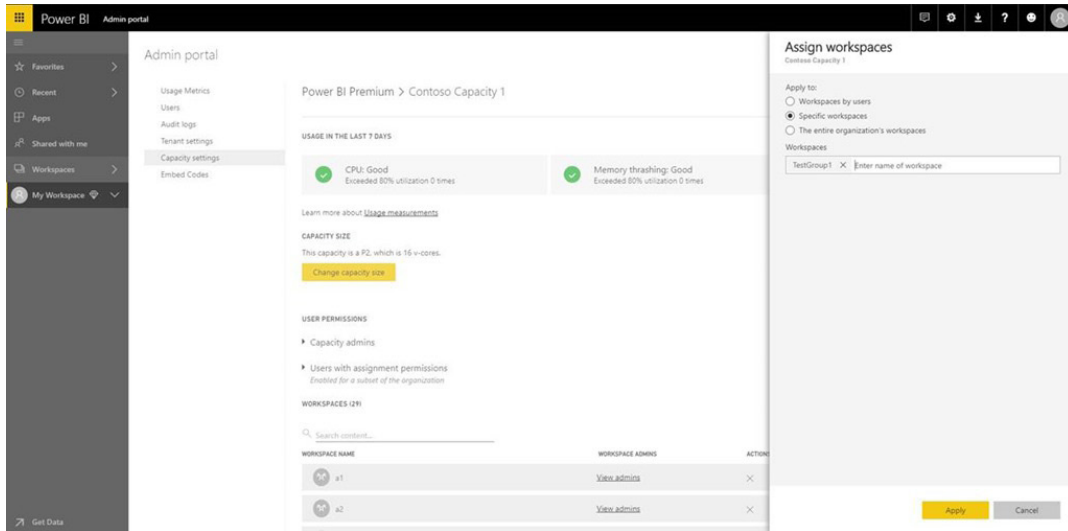
## External user distribution with Azure Active Directory B2B

Continuing with the example above, there might come a situation where you want to share the sales app that you created to external users outside of your organisation. Remembering Power BI's integration with Azure Active Directory (AD) business-to-business (B2B) which we reported

on in December's newsletter, you can seamlessly distribute Power BI apps and dashboards to guest users while maintaining control over the internal data. Recipients will be able to access your content with their own organisational identity.

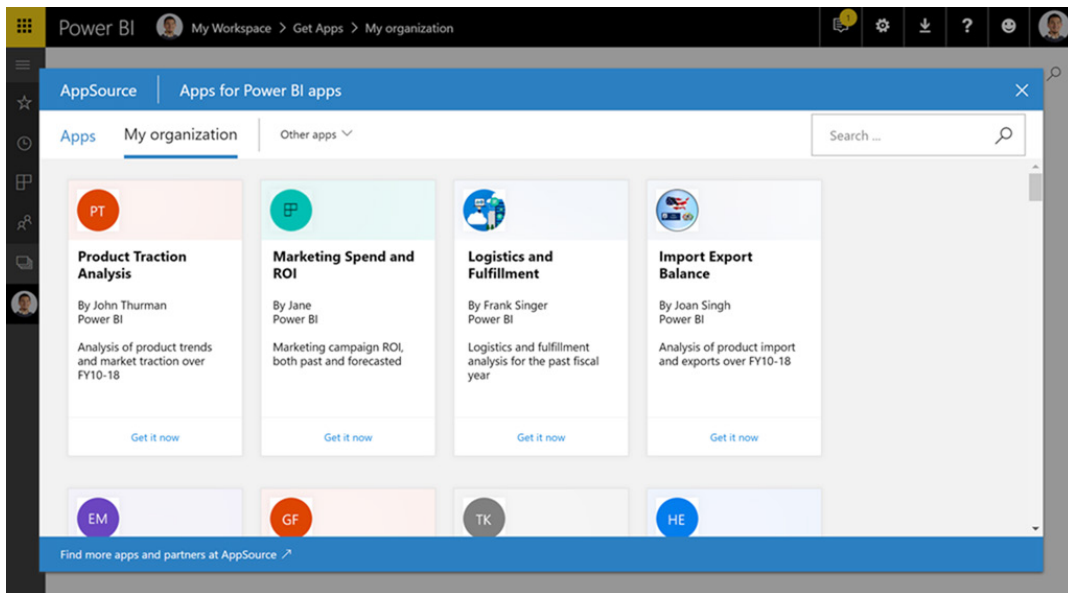
## Improved workspace management with Premium

For those of an IT persuasion amongst you, it's now easier for capacity administrators (Power BI and O365 inclusive) to assign specific workspaces to Power BI Premium. Instead of bulk assigning workspaces for the entire organisation, there's more granularity in the control settings.



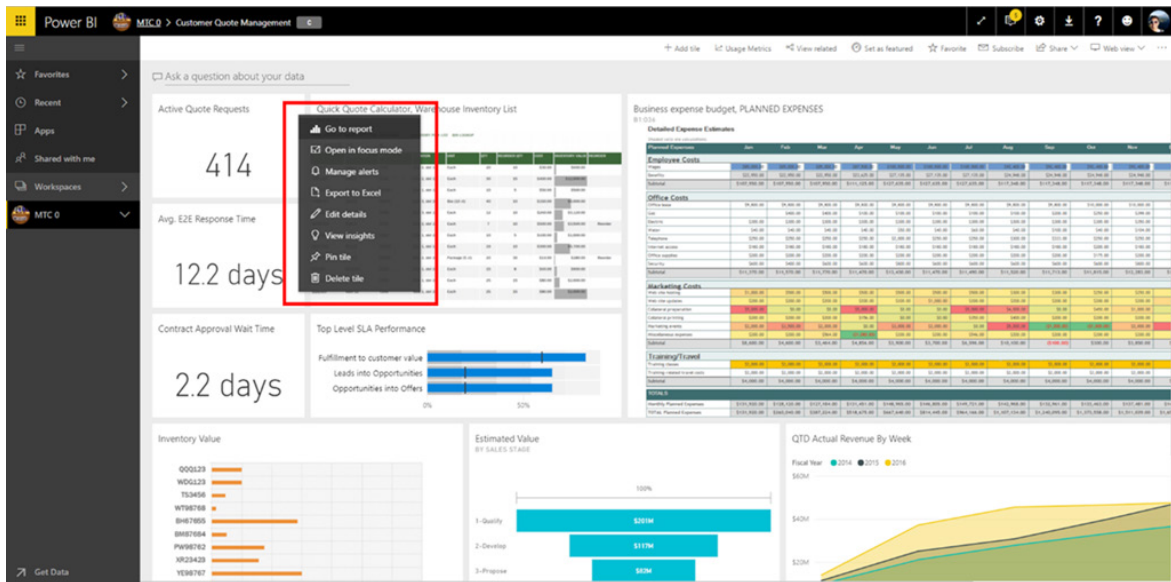
## AI-powered app recommendations

The Power BI AppSource is now combined with AI, which is therefore offering more relevant apps to end users. Apparently, these suggestions are powered by a sophisticated model that takes into account a variety of factors, including the overall popularity of the app, the actions of other users in your organisation, and your relationship with those users. You'd better get on with them then, we suppose.



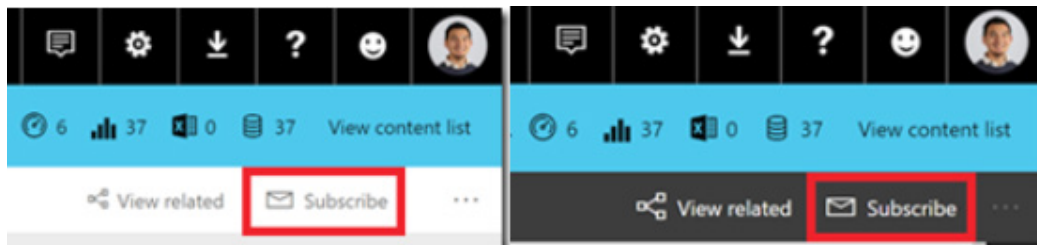
## Dashboard on-tile updates

The latest update does away with the need to experiment with the different icons on the on-tile actions for dashboard tiles. Microsoft has updated the "on-hover" experience to just contain the ellipses and now when they are clicked on, users should benefit from a more intuitive dropdown that describes the various actions that can be performed on that tile.



### ***E-mail subscriptions for apps***

Back in October, support was added for e-mail subscriptions within Power BI Apps. This update allows you to install any Power BI app, and then subscribe for email updates on any dashboard or report page contained within the app. You will then be notified of any changes to the data in real time, enhancing the impact of your Power BI solutions.



### ***Single-sign on for SQL Server, Teradata and SAP HANA***

Power BI now leverages Kerberos to support single sign-on (SSO) when connecting to certain data sources such as SQL Server, Teradata and SAP HANA via DirectQuery. With SSO configured for these data sources, queries will be executed under the identity of the user interacting with

the service or mobile app. This means there's no longer a necessity to have shared data caching across different users – each user will be able to precisely query the data which they have permission to in the underlying data source.

### ***High availability for gateways and more in the recent on-premises update***

The on-premises data gateway has also been updated. Now, you may group multiple gateway instances together with High availability support, trace Mashup engine logs under "Additional logging", connect to IBM

Netezza via the gateway, automatically fall back to communicating through Azure Service Bus using HTTPS if direct TCP fails and there's even an updated version of the Mashup engine to utilise too.

### ***Granular control for Publish to Web***

Administrators now have more control over Publish to Web in their organisations with two new capabilities:

1. Administrators may now restrict Publishing to Web to specific security groups. This is useful if some groups, like PR or Marketing, should be able to Publish to Web, but this is not allowed for everyone
2. Administrators can now see all Publish to Web embed codes in their organisation and remove codes as necessary / required.

More next time, no doubt.

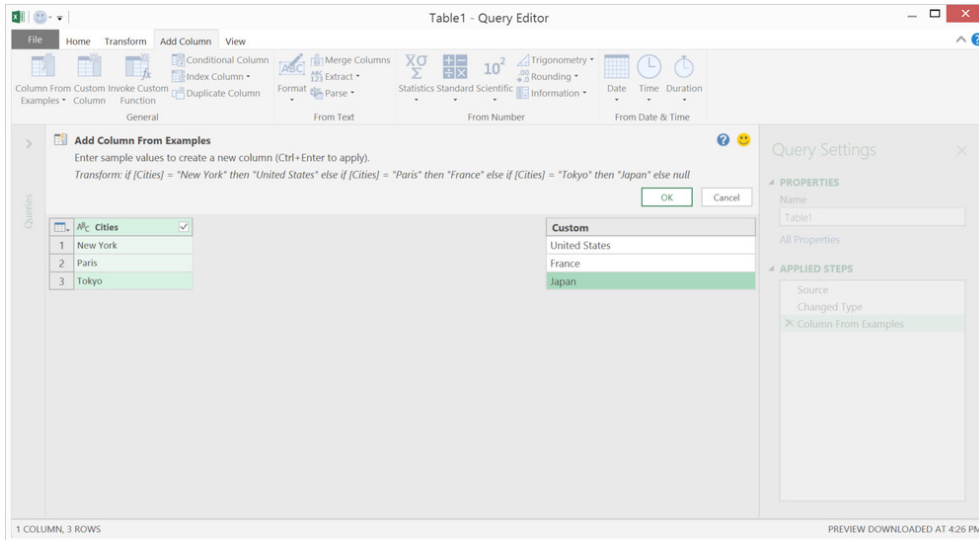
## **January Updates for Get & Transform (Excel 2016) / Power Query (Excel 2010 and 2013)**

Mid-January saw the release of another set of updates for Get & Transform, the versatile features based on the Power Query technology, providing fast, easy data gathering and shaping capabilities.

This update adds support for generating 'Conditional Columns' transformations as a part of the really useful 'Add Column From Examples' feature, which can be accessed via 'Add Column' tab on the 'Query Editor' Ribbon. By supporting 'Conditional Columns' transformations, the following scenarios are now unlocked:

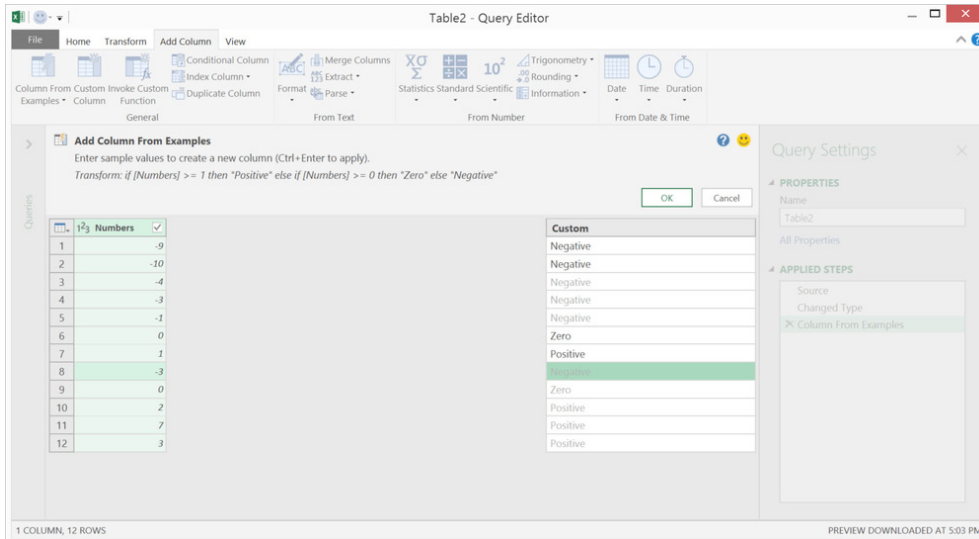
## Basic Conditional Column

It is now possible to define a mapping between values in an input column and the desired output by providing a set of examples.



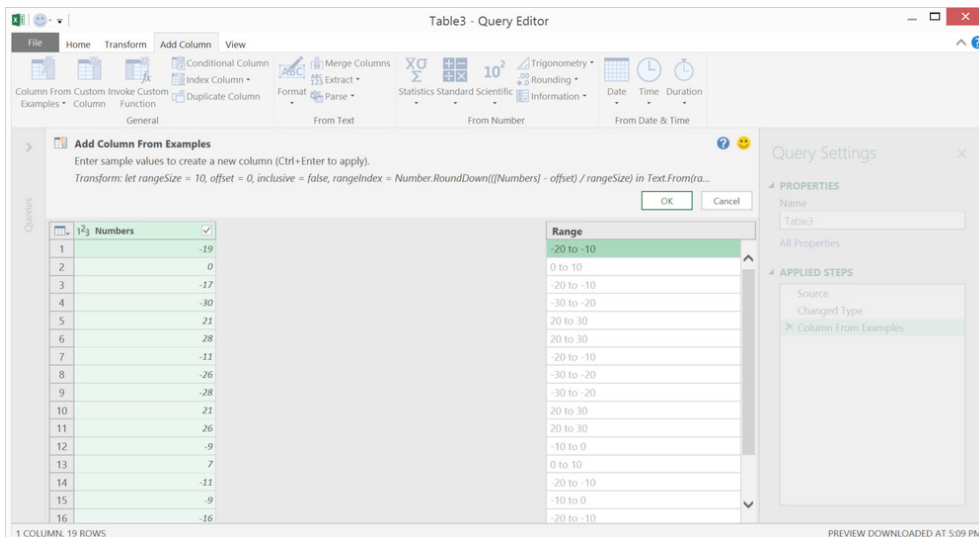
## Conditional Column Ranges

With this update, you can define a new column with non-uniform ranges based on an input column. This new capability is supported for columns where the output values do not encode the range boundaries.



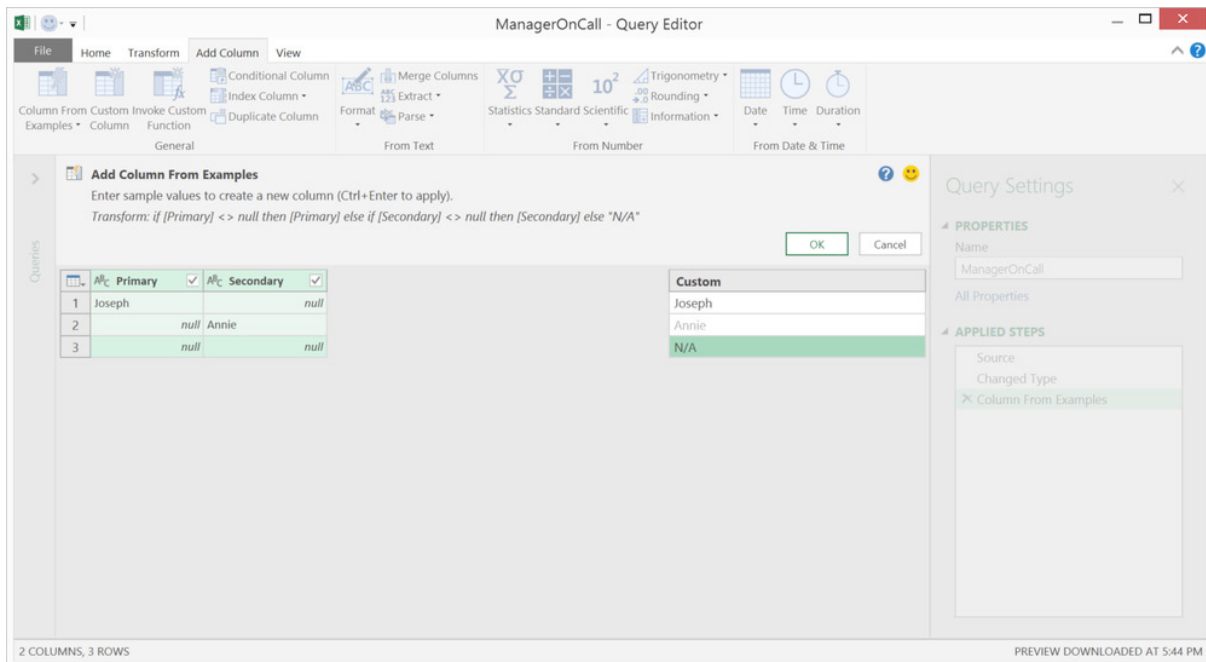
## Bucketing

Starting with this January release, 'Add Column From Examples' also supports what's known as "bucketing". Users may specify the upper / lower boundaries of a range for a certain row and Excel will automatically extrapolate to all other rows by using uniform ranges.



## Null Fallback

A very common scenario for 'Conditional Column' is using a value from a given column, or the value from a fallback column when the first column value is missing. The 'Add Column From Examples' feature now supports this kind of transformation.



## The A to Z of Excel Functions: COLUMN

Ah, it's time for my Lord of the Rings impersonation. What do I mean? "**COLUMN**" (try saying it out loud if you don't understand – this joke is *precious*). This function returns the column number of the given cell reference. For example, the formula **=COLUMN(D10)** returns the value 4, because column **D** represents the fourth column.

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

**COLUMN([reference])**

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

- **reference**: believe it or not, this is optional and represents the cell or range of cells for which you want to return the column number
  - o if the **reference** argument is omitted or refers to a range of cells, and if the **COLUMN** function is entered as a horizontal array formula, the **COLUMN** function returns the column numbers of **reference** as an horizontal array
  - o to enter a formula as an array formula: starting with the formula cell, select the range that you want to contain the array formula. Press the **F2** function key and then press **CTRL+SHIFT+ENTER**.
    - **N.B.** in Excel Online you cannot create array formulae
  - o if the **reference** argument is a range of cells, and if the **COLUMN** function is not entered as a horizontal array formula, the **COLUMN** function returns the number of the leftmost column
  - o If the **reference** argument is omitted, it is assumed to be the reference of the cell in which the **COLUMN** function appears
  - o The **reference** argument cannot refer to multiple areas.

Please see our example below:

	A	B	C
1	Formula	Description	Result
2	<b>=COLUMN()</b>	Column in which the formula appears (C)	<b>3</b>
3	<b>=COLUMN(DD17)</b>	Column number of the cell reference (DD17)	<b>108</b>
4			



## The A to Z of Excel Functions: COLUMNS

This is one of the pillars of Excel's features. Yes, the jokes get no better. This function returns the number of columns in an array or reference and should not be confused with the **COLUMN** function (*above*).

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

**COLUMNS(array)**

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

- **array**: this is required and represents an array or array formula, or a reference to a range of cells for which you want the number of columns
- this is a useful function to employ when you need to keep track of the relative number of columns in an array. For example, **VLOOKUP(lookup\_value, table\_array, COLUMNS(given\_range), [range\_lookup])** allows you to add or remove columns in the range without the relevant column to be returned being affected.

Please see our final examples for this month below:

	A	B	C
1	Formula	Description	Result
2	<b>=COLUMNS(E5:R20)</b>	Number of columns in the reference E5:R20	14
3	<b>=COLUMNS({1,2,3;4,5,6})</b>	Number of columns in the array constant {1,2,3;4,5,6}. There are two three-column rows, containing the numbers 1,2 and 3 in the first row, with 4, 5 and 6 in the second row	3
4			

### Upcoming SumProduct Training Courses

Location	Course	Date	Duration
Brisbane	Excel Tips & Tricks	12 Feb 2018	1 day
Melbourne	Excel Tips & Tricks	20 Feb 2018	1 day
Melbourne	Financial Modelling	21 - 22 Feb 2018	2 days
Perth	Financial Modelling	26 - 27 Feb 2018	2 days
Sydney	Visual Basic for Applications	12 Mar 2018	1 day
Sydney	Power Pivot, Power Query and Power BI	19 - 21 Mar 2018	3 days
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

## Key Strokes

Each newsletter, we'd like to introduce you to useful keystrokes you may or may not be aware of. This month we focus on the Left Arrow key (it's better not Left!!):

Keystroke	What it does
Left Arrow	Move left one cell
ALT + Left Arrow	Back (hyperlink navigation)
CTRL + Left Arrow	Select the last cell in the area left
SHIFT + Left Arrow	Extend selection left one cell
CTRL + ALT + Left Arrow	Intel Chipset: Turn screen +90 degrees; else: move active cell to previous non-adjacent area within selection
CTRL + SHIFT + Left Arrow	Extend selection down to last cell in area left
SHIFT + ALT + Left Arrow	Ungroup

There are over 540 keyboard shortcuts in Excel. For a comprehensive list, please download our Excel file a [www.sumproduct.com/thought/keyboard-shortcuts](http://www.sumproduct.com/thought/keyboard-shortcuts). Also, check out our new daily **Excel Tip of the Day** feature on the [www.sumproduct.com](http://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](mailto: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](http://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](mailto: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](mailto:training@sumproduct.com) for a copy of the brochure or download it directly from <http://www.sumproduct.com/training>.

**Sydney Address:** SumProduct Pty Ltd, Suite 52, Level 10, 88 Pitt Street, Sydney, NSW 2000  
**New York Address:** SumProduct Pty Ltd, 48 Wall Street, New York, NY, USA 10005  
**London Address:** SumProduct Pty Ltd, Office 7, 3537 Ludgate Hill, London, EC4M 7JN, UK  
**Melbourne Address:** SumProduct Pty Ltd, Level 9, 440 Collins Street, Melbourne, VIC 3000  
**Registered Address:** SumProduct Pty Ltd, Level 6, 468 St Kilda Road, Melbourne, VIC 3004

[contact@sumproduct.com](mailto:contact@sumproduct.com)  
[www.sumproduct.com](http://www.sumproduct.com)  
**+61 3 9020 2071**