



Power BI – External Tools

#PowerBler



DaxStudio - 2.5.0

File **Home** **Help**

Run **Cancel** **Clear Cache** **Output** **Edit** **DAX** **Format Query** **To Upper** **Comment** **Find** **Traces** **Scan** **Right Layout** **Query Plan** **Server Timings** **Cache** **Bottom Layout** **Internal** **Connect** **Refresh Metadata**

Query1.dax*

```

10 EVALUATE
11 ADDCOLUMNS (
12     SUMMARIZE (
13         Sales,
14         'Date'[Calendar Year],
15         'Product'[Category Name] ),
16         "sales", [Sales Amount],
17         "Margin", [Margin]
18 )

```

Total 550 ms SE CPU 0 ms Line Subclass Duration CPU Rows KB Query

1 SQL 301 0 SELECT TOP (1000001) [SELECT TOP (1000001) [TOP (1000001) [t0].[Calendar Year Name],SUM([t1].[Line Margin])]

2 SQL 231 0

FE SE

ALM Toolkit for Power BI

File Home Help

Compare Select Validate Update Generate Options Report Differences

Source: azure://southcentralus.azures.windows.net/chwade003.AdventureWorks2 Target: azure://southcentralus.azures.windows.net/chwade003.AdventureWorks3

Metadata Functions Ready

Model

Currency Date Product Promotion Sales Store

10 EVALUATE
11 ADDCOLUMNS (
12 SUMMARIZE (
13 Sales,
14 'Date'[Calendar Year],
15 'Product'[Category Name]),
16 "sales", [Sales Amount],
17 "Margin", [Margin]
18)

181 %

Model Data Sources Perspectives Relationships Roles Tables Date

[Reseller Current Quarter Sales] :=
TOTALQTD([Reseller Total Sales], 'Date'[Date])

Basic
Description Sales
Display Folder False
Hidden
Name Reseller Current Quarter Sales
Object Type Measure

Metadata
DAX identifier [Reseller Current Quarter Sales]
Format String \$#.00;(\$#.00);\\$#.00

Options

Other

Translations and Perspectives
Captions 0 empty, 0 translated, 0 default
Descriptions 0 empty, 0 translated, 0 default
Display Folders 0 empty, 0 translated, 0 default
Perspectives Shown in 1 out of 3 perspectives
Internet Operation False
Inventory False
Reseller Operation True

Metadata



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🌐 Data-Marc.com



Today's agenda

- External Tools, what is it?
- Analysis Services in memory
- Building External Tools
- Documentation of solutions
- Model Documenter external tool

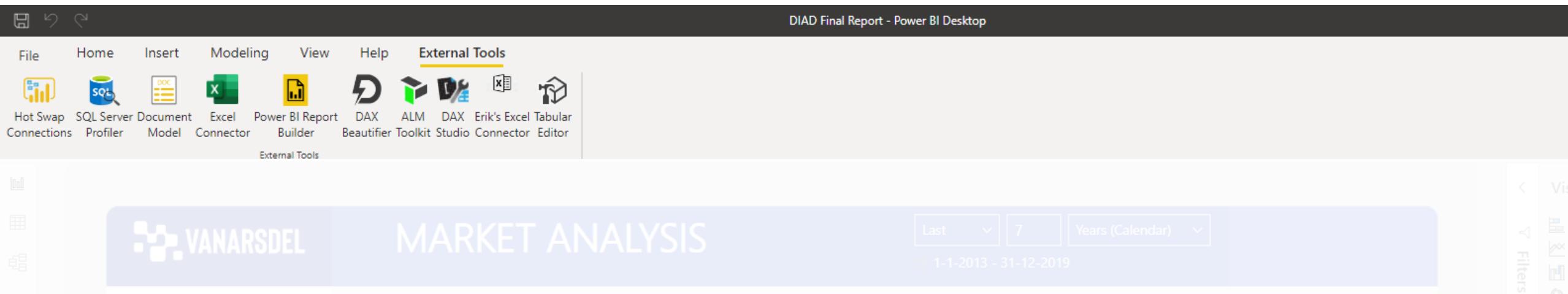




External Tools, what is it?

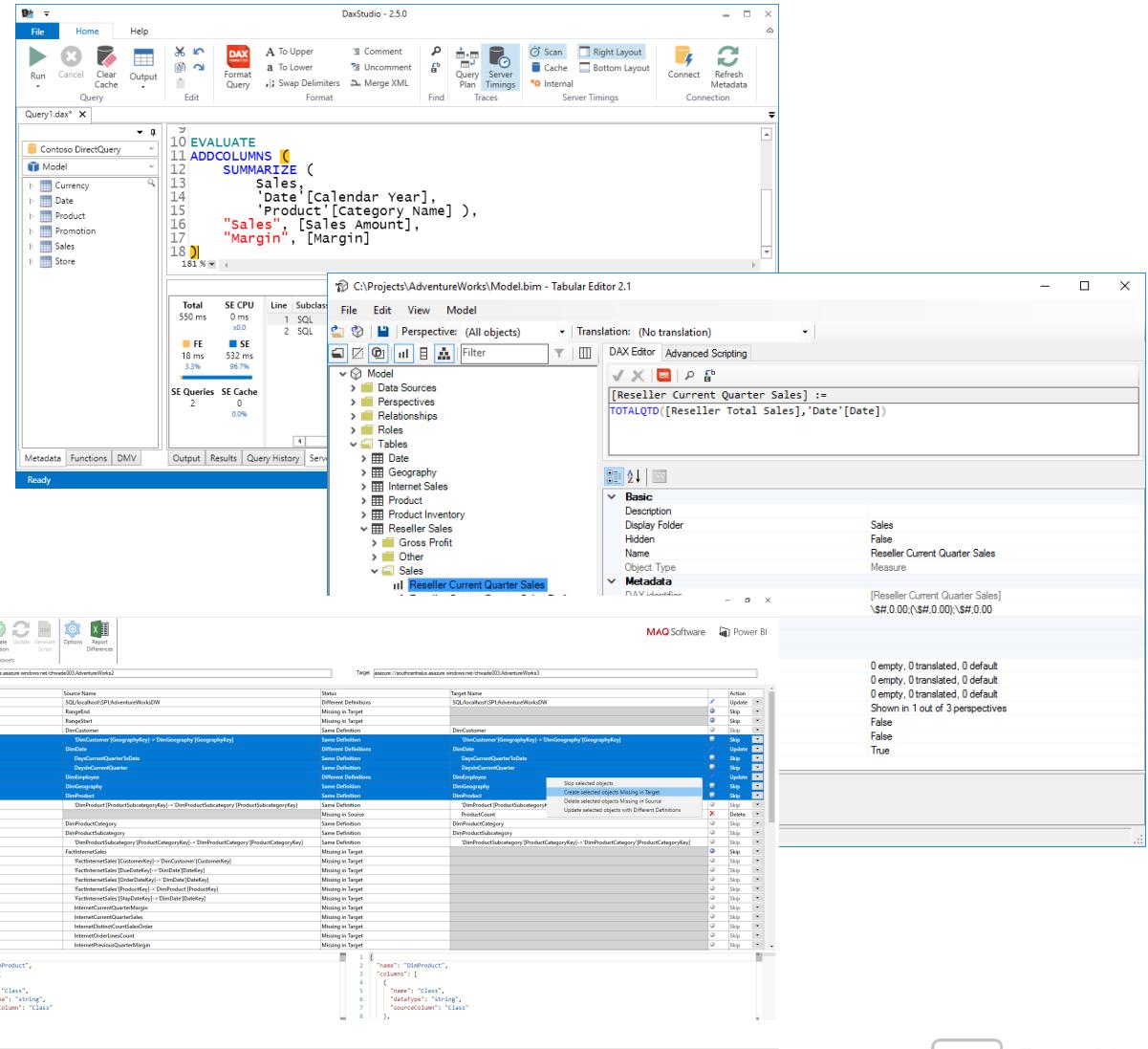
What are external tools in Power BI?

- Connect to the data model
- 3rd party tooling
- Depending on new metadata
- Read + Write to TOM



Connect with 3rd party tools

- DAX Studio
- Tabular Editor
- ALM Toolkit
- ...
- Your tool?



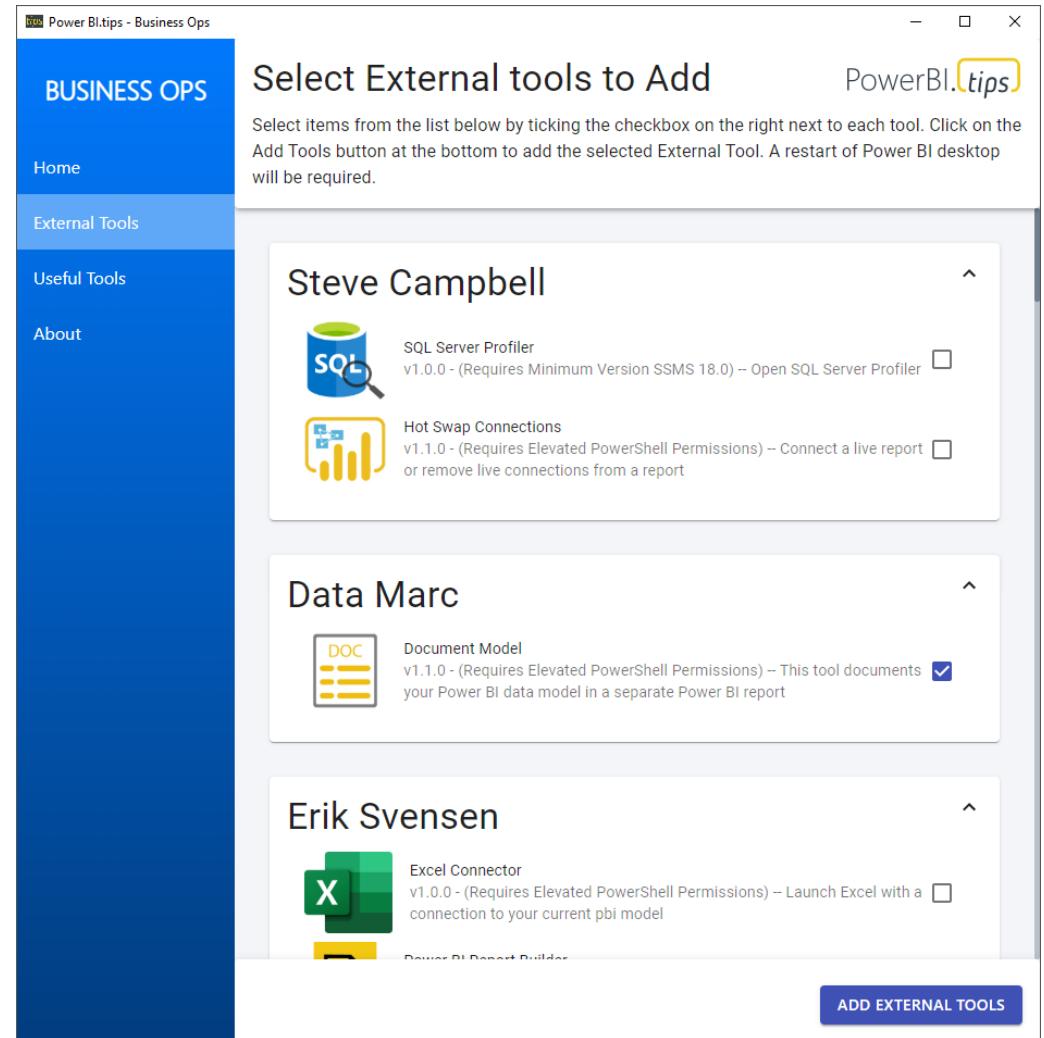
DEMO!

- Connect External Tool to Power BI
- Write new measure to Power BI with External Tools
- Push measure to PBI Service
- Publish content using XMLA and ALM Toolkit



Install additional External Tools?

- Requires Admin permissions
- Download them 1-by-1
- Use BusinessOps by PowerBI.tips



What is out there now?

Erik Svensen



Excel Connector
v1.0.0 - (Requires Elevated PowerShell Permissions) -- Launch Excel with a connection to your current pbi model



Power BI Report Builder
v1.0.0 - (Requires Install of Power BI Report Builder) -- Open a template report in Power BI Report Builder



Open In Tableau
v1.0.0 - Open In Tableau

PBI.tips - Themes Gallery



Themes Gallery
v1.0.0 - (Opens in Google Chrome) Pick colors from palettes



Themes Gallery
v1.0.0 - (Opens in Edge) Pick colors from thousands of color palettes

Davis Zhang



DAX Beautifier
v1.0.2 - (Requires install of AMO library) -- Use this tool to format all DAX code with one click!

David Eldersveld



Open Python
v1.0.0 - (Requires Python3 All Users Install) -- Opens a connection to a Python Script

Steve Campbell



SQL Server Profiler
v1.0.0 - (Requires Minimum Version SSMS 18.0) -- Open SQL Server Profiler



Hot Swap Connections
v1.1.0 - (Requires Elevated PowerShell Permissions) -- Connect a live report or remove live connections from a report

SQL BI



Analyze in Excel
v1.1.2 - Analyze in Excel for Power BI Desktop



Analysis Services in memory

Analysis services in memory

Power BI

=

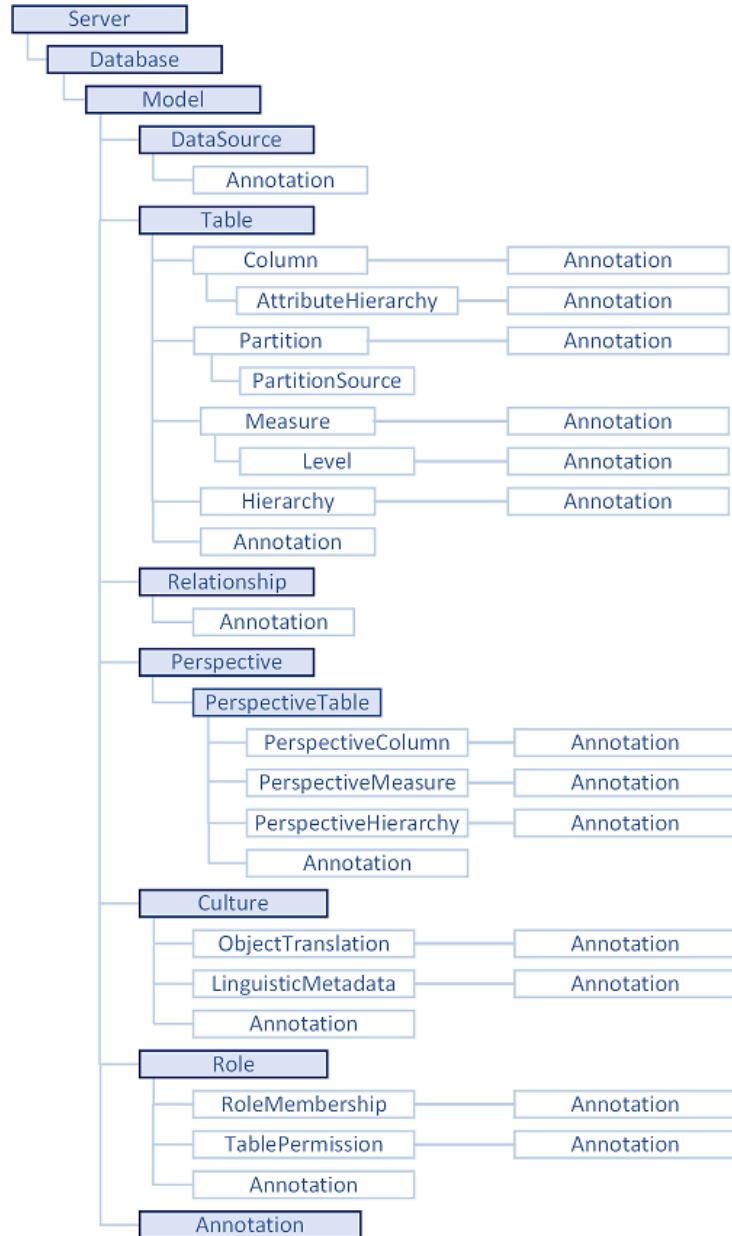
Analysis Services
under the hood



Name	Status	12% CPU	67% Memory	0% Disk	0% Network	4% GPU	GPU engine
> Microsoft Edge (38)		0%	1.501,2 MB	0 MB/s	0,1 Mbps	0%	GPU 0 - 3D
Microsoft Power BI Desktop (9)		0,1%	939,6 MB	0 MB/s	0 Mbps	0%	
CefSharp.BrowserSubprocess		0%	4,0 MB	0 MB/s	0 Mbps	0%	
CefSharp.BrowserSubprocess		0%	17,0 MB	0 MB/s	0 Mbps	0%	
CefSharp.BrowserSubprocess		0%	178,4 MB	0 MB/s	0 Mbps	0%	
CefSharp.BrowserSubprocess		0%	64,3 MB	0 MB/s	0 Mbps	0%	
CefSharp.BrowserSubprocess		0,1%	119,7 MB	0 MB/s	0 Mbps	0%	
CefSharp.BrowserSubprocess		0%	6,8 MB	0 MB/s	0 Mbps	0%	
Console Window Host		0%	5,8 MB	0 MB/s	0 Mbps	0%	
Microsoft SQL Server Analysis Services		0%	251,2 MB	0 MB/s	0 Mbps	0%	
Untitled - Power BI Desktop		0,1%	292,3 MB	0 MB/s	0 Mbps	0%	
> Spotify (32 bit) (3)		0,4%	134,3 MB	0,1 MB/s	0 Mbps	1,1%	GPU 0 - 3D
> Microsoft Teams (7)		2,1%	875,4 MB	0 MB/s	0,1 Mbps	2,2%	GPU 0 - 3D
> Notepad++ : a free (GNU) source code editor		0%	4,7 MB	0 MB/s	0 Mbps	0%	
> OneNote for Windows 10 (2)		0%	1,5 MB	0 MB/s	0 Mbps	0%	
> Task Manager		0,8%	26,3 MB	0 MB/s	0 Mbps	0%	
> Windows Explorer (2)		0,1%	85,2 MB	0 MB/s	0 Mbps	0%	
Background processes (80)							
> 1Password for Windows desktop (32 bit)		0%	2,6 MB	0 MB/s	0 Mbps	0%	
> Adobe Acrobat Update Service (32 bit)		0%	0,2 MB	0 MB/s	0 Mbps	0%	
> Antimalware Service Executable		0,1%	119,6 MB	0 MB/s	0 Mbps	0%	
> cav.exe (32 bit)		0%	2,1 MB	0 MB/s	0 Mbps	0%	

New metadata

- New standard since September 2020 release!
- Power BI = Meta data v3
- Matches Analysis Services metadata
- Model.bim
- Tabular Object Model (TOM)
- Open format (json)



```
1
2
3
4
5 -{
6   "version": "1.1.0",
7   "name": "Document Model",
8   "description": "This tool documents your Power BI data model in a separate Power BI report",
9   "path": "C:\\Windows\\System32\\WindowsPowerShell\\v1.0\\powershell.exe",
10  "arguments": "C:\\temp\\Data-Marc_WriteConnectionDetailsToFile.ps1 \"%server%\" \"%database%\" \"%connectionString%\" \"%outputFile%\"",
11  "iconData": "data:image/png;base64,iVBORw0KGgoAAAANSUhEUgAAANUAAAD7CAMAAADKOCH3AAAAAXNSR0IAAJ",
12 }
13
14
15
16
```

Building External Tools

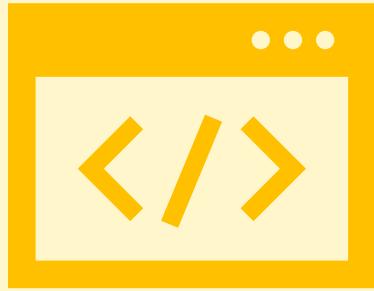
Where to get started?



- Have a good idea for a tool?
- Does it interact in some way with the data model?
- Then go for it!

designed by  freepik.com

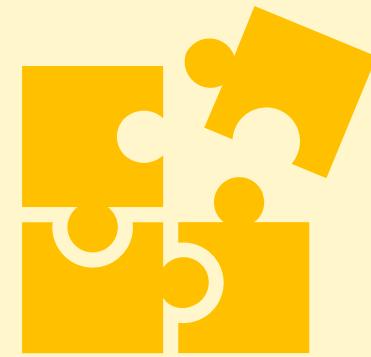
How to setup your own External Tool?



**Build your
application**

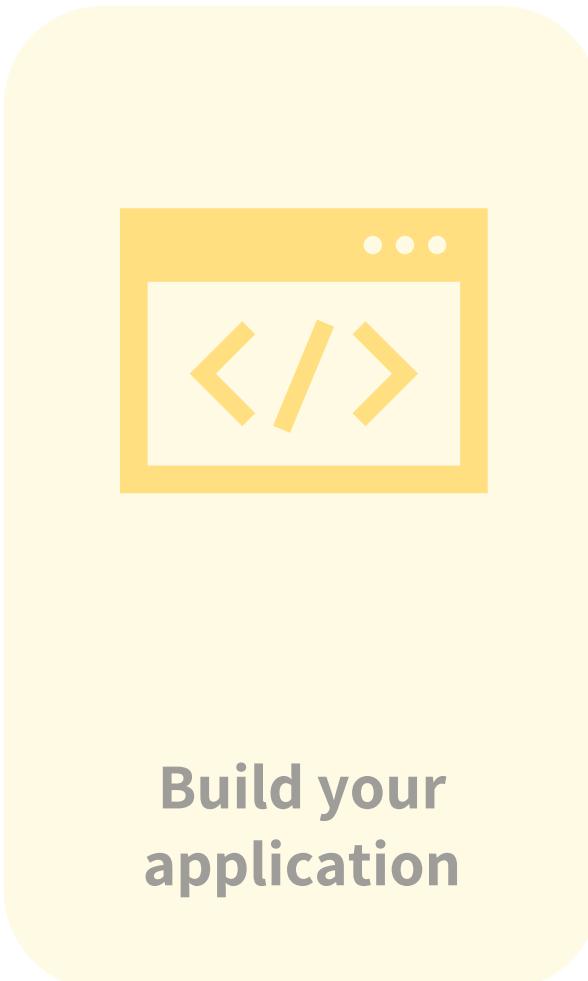


Create your icon



**Integrate in
Power BI Desktop**

How to setup your own External Tool?



Windows PowerShell ISE

```
File Edit View Tools Debug Add-ons Help
Data-Marc_WriteConnectionDetailsToFile.ps1
10
11 # Below you can define your personal preference for file saving and reading.
12 # The default location can be changed and will be leverages throughout the entire script.
13 # InstallerLocation only applies to installation via PowerBI.tips Business Ops.
14 $InstallerLocation = "$TOOL_INSTALL_DIR\"
15 $DefaultLocation = 'C:\BusinessOpsTemp'
16 $finalLocation = if($InstallerLocation -like "*TOOL_INSTALL_DIR*")
17 {$DefaultLocation} else {$InstallerLocation}
18
19 # Write out file locations
20 Write-Host 'installer location ' + $InstallerLocation
21 Write-Host 'default location ' + $DefaultLocation
22 Write-Host 'final location ' + $finalLocation
23
24 #This part starts tracing to catch unfortunate errors and defines where to write the file.
25 $LogFile = $finalLocation + 'PBI_DocumentModel_Logfile.txt'
26 Start-Transcript -Path $LogFile
27
28 # Function to automatically download the pbit file if it cannot be found on the defined location.
29 # Function based on https://gist.github.com/chrisbrownie/f20cb4508975fb5da145d3d38024a
30 function DownloadfilesFromRepo {
31     Param(
32         $Owner = 'marcelijieveld',
33         $Repository = 'External-Tools-Model-Documentation',
34         $Path = 'ModelDocumentationTemplate.pbit',
35         $DestinationPath = 'C:\BusinessOpsTemp'
36     )
37
38     $baseUri = "https://api.github.com/"
39     $uriPath = "repos/$Owner/$Repository/contents/$Path"
40     $wr = Invoke-WebRequest -Uri $($baseUri+$uriPath)
41     $objects = $wr.Content | ConvertFrom-Json
42     $files = $objects | Where-Object {$_.type -eq "file"} | Select-Object -exp download_url
43     $directories = $objects | Where-Object {$_.type -eq "dir"}
44
45     $directories | ForEach-Object {
46         DownloadFilesFromRepo -Owner $Owner -Repository $Repository -Path $_.path -DestinationPath $($DestinationPath)
47     }
48
49     if (-not (Test-Path $DestinationPath)) {
50         # Create the destination directory
51     }
}
PS D:\OneDrive Macaw\OneDrive - Macaw\External Tools - Model Documentation>
```

Commands X

Modules: All Refresh

Name:

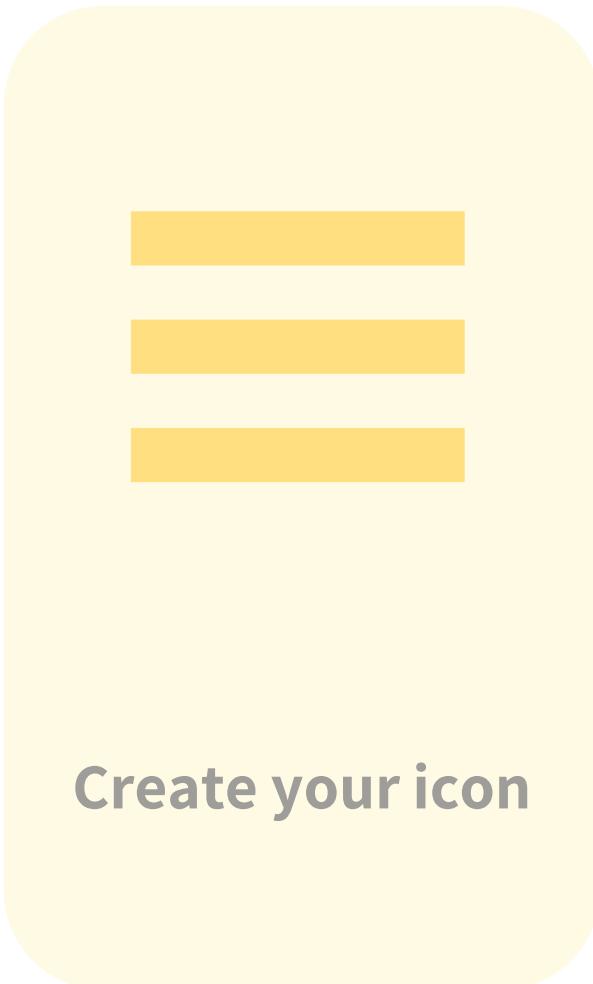
A:

- Add-AppClientConnectionGroup
- Add-AppClientPackage
- Add-AppPublishingServer
- Add-AppxPackage
- Add-AppxProvisionedPackage
- Add-AppxVolume
- Add-AzDGroupMember
- Add-AzAnalysisServicesAccount
- Add-AzApplianceManagementApplianceToProduct
- Add-AzApplianceManagementProductToGroup
- Add-AzApplianceManagementRegion
- Add-AzApplianceManagementUserToGroup
- Add-AzApplicationGatewayAuthenticationCertificate
- Add-AzApplicationGatewayBackendAddressPool
- Add-AzApplicationGatewayBackendHttpSetting
- Add-AzApplicationGatewayCustomError
- Add-AzApplicationGatewayFrontendEndpointConfig
- Add-AzApplicationGatewayFrontendPort
- Add-AzApplicationGatewayHttpListener
- Add-AzApplicationGatewayHttpListenerCustomError
- Add-AzApplicationGatewayPipConfiguration
- Add-AzApplicationGatewayProbeConfig
- Add-AzApplicationGatewayRedirectConfiguration
- Add-AzApplicationGatewayRequestRoutingRule
- Add-AzApplicationGatewayRewriteRuleSet
- Add-AzApplicationGatewaySslCertificate
- Add-AzApplicationGatewayTrustedRootCertificate
- Add-AzApplicationGatewayUrlPathMapConfig
- Add-AzAutoscaleSetting
- Add-AzCognitiveServicesAccountNetworkRule
- Add-AzContainerServiceAgentPoolProfile
- Add-AzDataFactoryV2DataFlowDebugSessionPackage
- Add-AzDataFactoryV2TriggerSubscription
- Add-AzDataLakeAnalyticsDataSource
- Add-AzDataLakeAnalyticsFirewallRule

Run Insert Copy

Ln 20 Col 54 115%

How to setup your own External Tool?



Create your icon

The screenshot shows a web application for converting images to Base64. At the top right, the text "CONVERT YOUR IMAGES TO BASE64" is displayed above a dashed box containing "DRAG & DROP IMAGES ANYWHERE" and "OR CLICK HERE". In the center, there is a cartoon character named "MR. BASE" wearing a white shirt and tie, holding a briefcase. Below the character are three sections: "File Formats", "Image optimization", and "Browser Support".

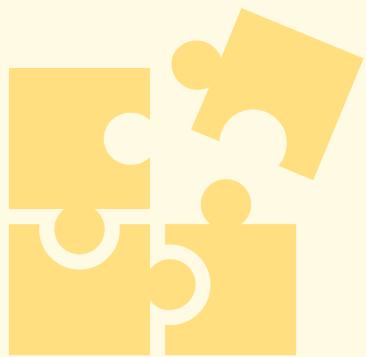
File Formats
You can upload up to 20 images (max. 1.00 MB each) as JPG, PNG, GIF, WebP, SVG or BMP.
Please note that Internet Explorer 8 has a limit of 32 KB for [data URI](#). Versions below have no support.

Image optimization
We can optimize your JPEG & PNG images, using [jpegoptim](#) and [optipng](#). This will reduce the file without any visible impact (in most cases).
Optimization status:

Browser Support
The [encoded results](#) are [compatible](#) with all of the following browsers and versions. Please send me a note if there are issues.

Chrome 4+	Safari 3.1+
Firefox 2+	Opera 9+
Edge	IE 8+

How to setup your own External Tool?



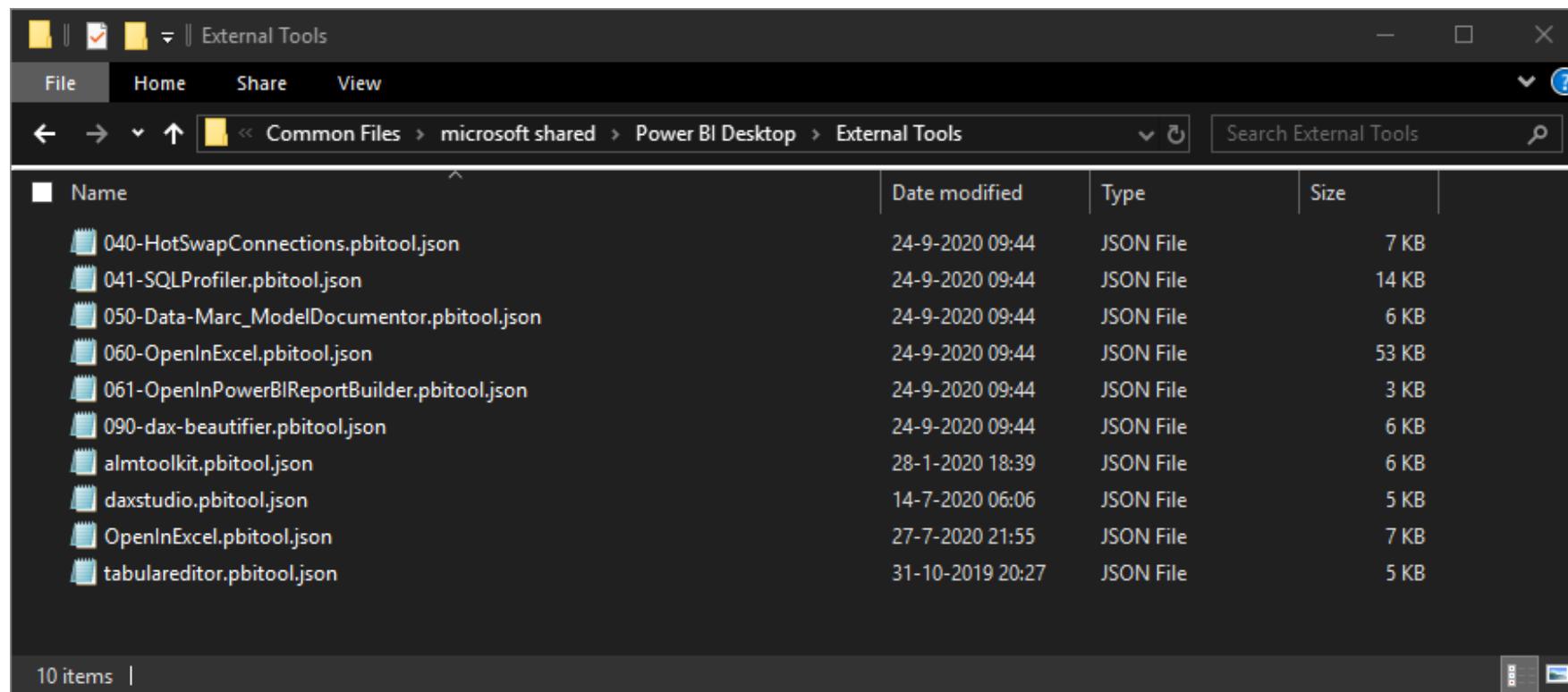
Integrate in
Power BI Desktop

- *.pbitool.json file
- \%\server%\
- \%\database%\

```
{  
  "version": "1.1.0",  
  "name": "Document Model",  
  "description": "This tool documents your Power BI data model in a separate Power BI report.",  
  "path": "C:\\Windows\\\\System32\\\\WindowsPowerShell\\\\v1.0\\\\powershell.exe",  
  "arguments": "C:\\\\temp\\\\Data-Marc_WriteConnectionDetailsToFile.ps1 \\"%server%\" \\"%database%\"",  
  "iconData": "data:image/png;base64,iVBORw0KGgoAAAANSUhEUgAAANUAAAD7CMAAADKOCH3AAAAAXNSR0B  
}
```

Drop the file in the right location

C:\Program Files (x86)\Common Files\Microsoft Shared\Power BI Desktop\External Tools



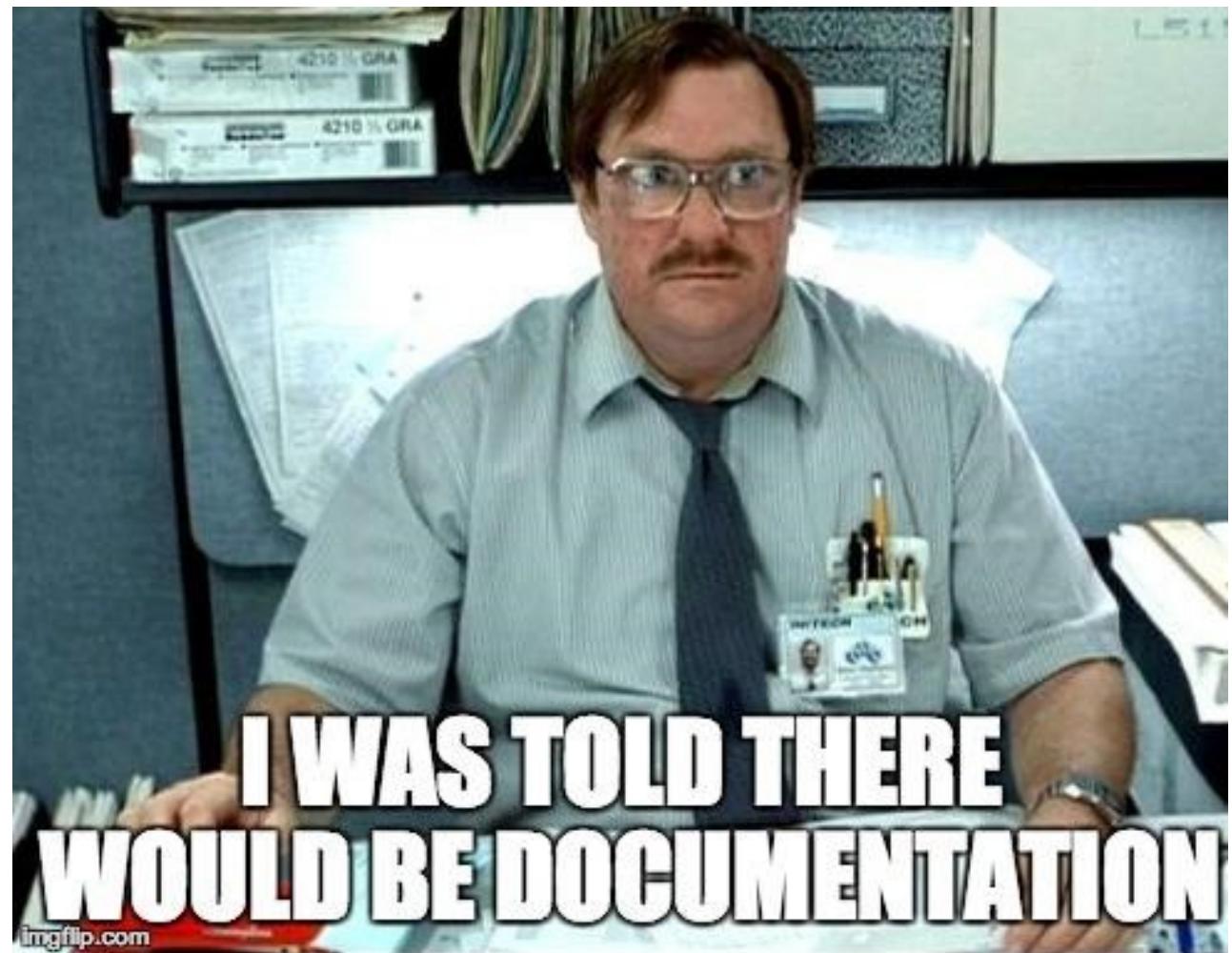


Documentation

Documentation is overrated?

▲ Yes!

◆ No



Documentation?



Marc Lelijveld
@MarcLelijveld

If you deliver or use a #PowerBI solution which uses a shared dataset. Does it come with proper documentation?

Yes, nicely shared in PBI

18.3%

Yes, but too much text!

5%

If I've time left

30%

No, what is documentation

46.7%



Ásgeir Gunnarsson
@bidgeir

...

Als antwoord op [@MarcLelijveld](#)

You're missing an option. If it's prioritised. I always ask for it to be part of the task but too often it's not prioritised. Even though clients pay me for advice, documentation is sadly one of those they most often ignore

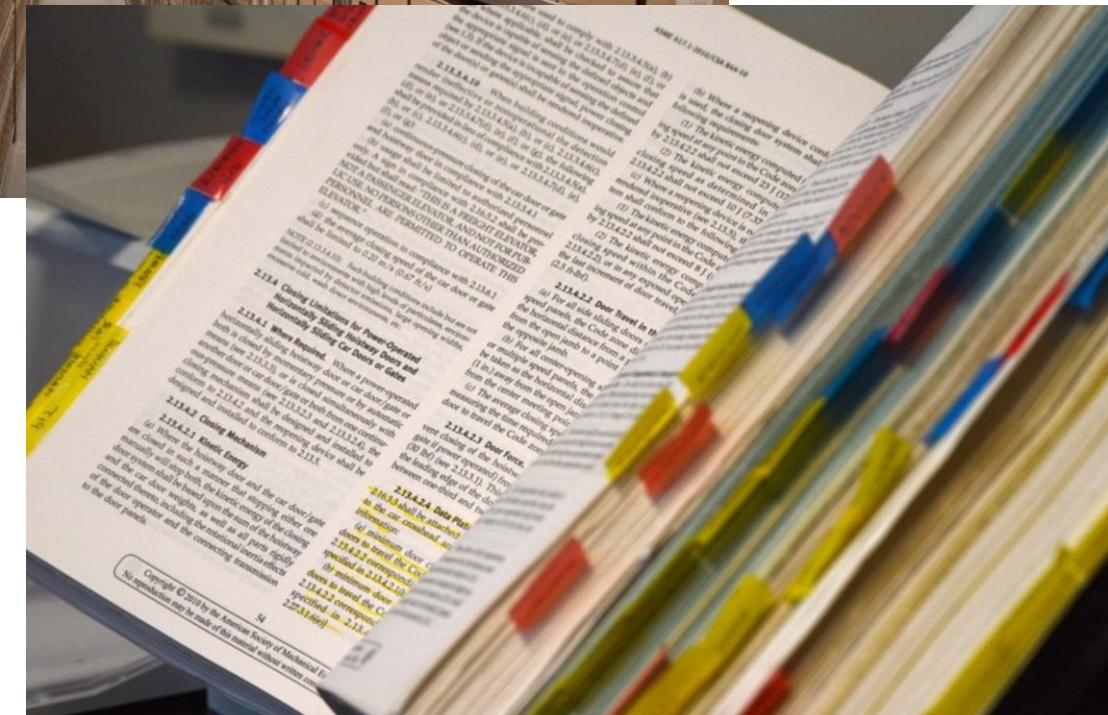
Do you currently document your Power BI solutions?

▲ Always! I describe every detail!

● I manually put something together

◆ I generate something and that's it

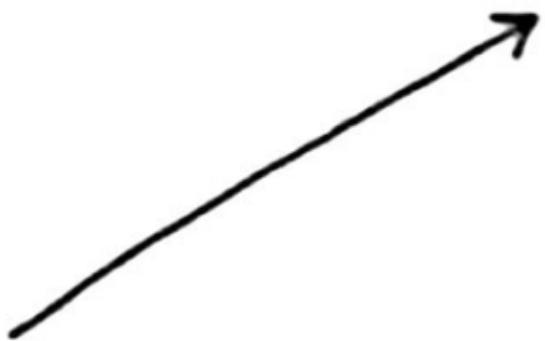
■ Documentation? What's that?



Handover projects

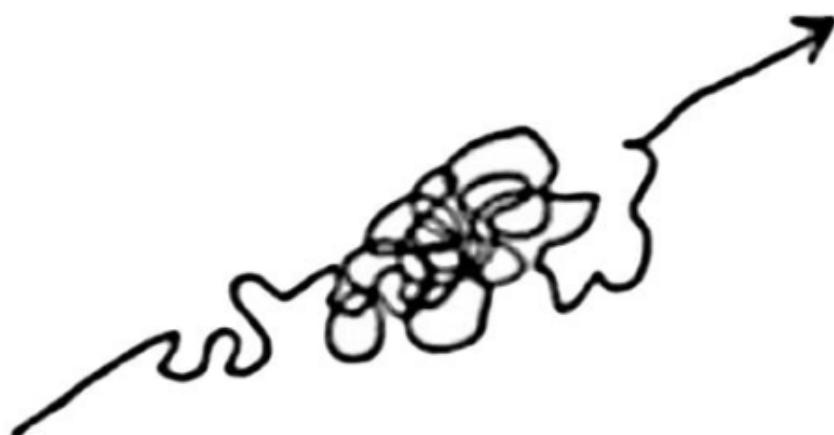


Success



what people think
it looks like

Success



what it really
looks like



Data-Marc.com

What do you want to document?

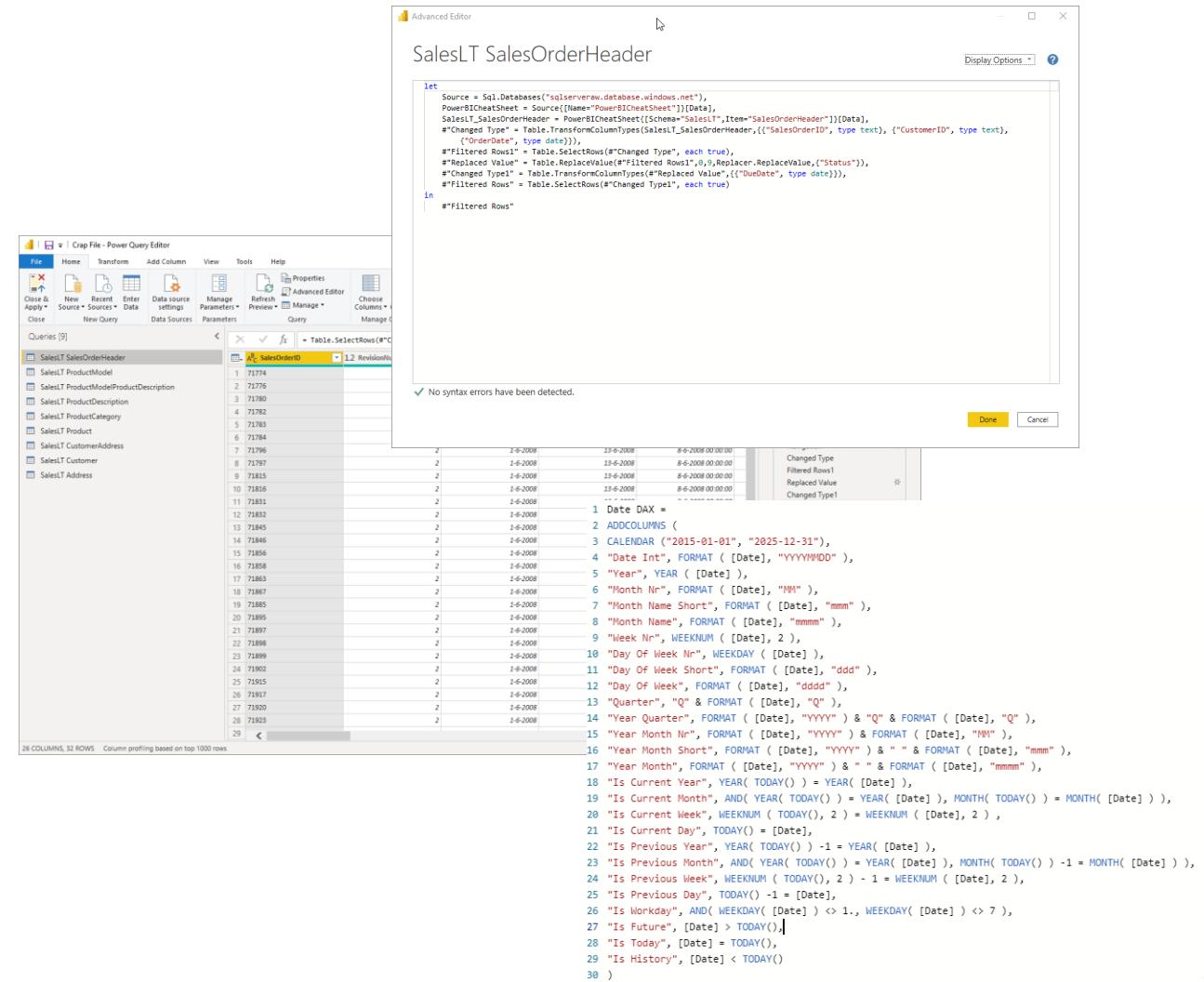
I want to document the following items:

▲ Power Query

● Relationships and model

◆ DAX expressions

■ Column and table properties



The screenshot shows the Advanced Editor window for a query named "SalesLT SalesOrderHeader". The code is as follows:

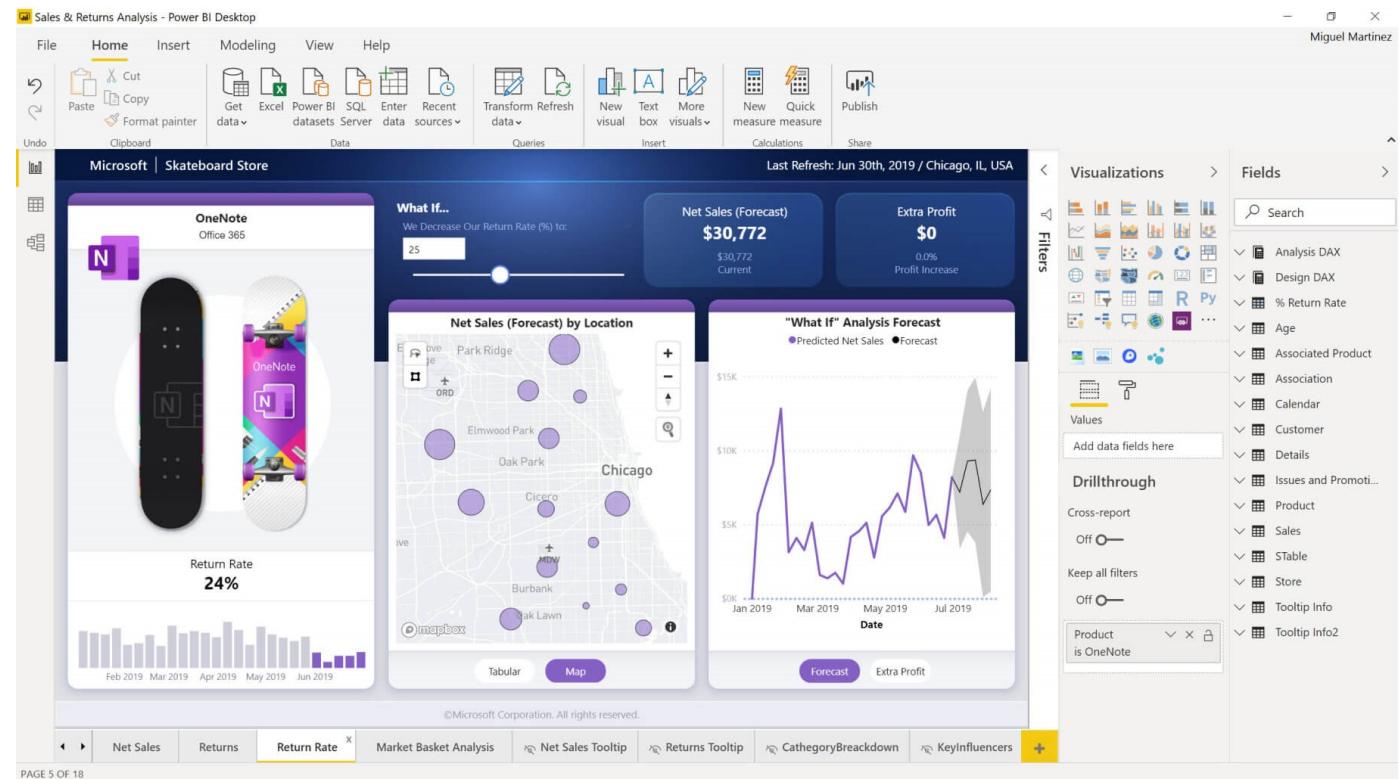
```
let
    Source = Sql.Databases("sqlserver-new.database.windows.net"),
    PowerBIcheatSheet = Source[[Name="PowerBIcheatSheet"]][Data],
    SalesLT_SalesOrderHeader = PowerBIcheatSheet[[Schema="SalesLT",Item="SalesOrderHeader"]][Data],
    #"Changed Type" = Table.TransformColumnTypes(SalesLT_SalesOrderHeader,{{"SalesOrderID", type text}, {"CustomerID", type text}, {"OrderDate", type date}}),
    #"Filtered Rows1" = Table.SelectRows(#"Changed Type", each true),
    #"Replaced Value" = Table.ReplaceValue(#"Filtered Rows1",0,9,Replacer.ReplaceValue,{"Status"}),
    #"Changed Type1" = Table.TransformColumnTypes(#"Replaced Value",{{"DueDate", type date}}),
    #"Filtered Rows" = Table.SelectRows(#"Changed Type1", each true)
in
    #"Filtered Rows"
```

Below the code, the Power Query Editor interface is visible, showing the "SalesLT SalesOrderHeader" query with its columns and data preview.

But what about the rest?

- Visuals
- Bookmarks
- Page navigation

The report in general...



Documentation

DOC Model Documentation

26
Tables
16
Tables to be deleted
253
Columns
138
Columns Hidden
96
DAX Calculated

Table Type	Table Name	Table Type	Column Name	Encoding
All	SalesLT SalesOrderHeader	PQ	AccountNumber	HASH
			BillToAddressID	HASH
			Comment	HASH
			CreditCardApprovalCode	HASH
			CustomerID	HASH
			DueDate	HASH
			Freight	VALUE
			ModifiedDate	HASH
			OnlineOrderFlag	HASH
			OrderDate	HASH
			PurchaseOrderNumber	HASH
			RevisionNumber	HASH
			rowguid	HASH
			RowNumber-26629798-1795-4f74-8f37-6a1ba059b61	VALUE
			SalesOrderID	HASH
			SalesOrderNumber	HASH
			ShipDate	HASH
			ShipMethod	HASH
			ShipToAddressID	HASH
			Status	HASH
			SubTotal	VALUE
			TaxAmt	VALUE
			TotalDue	VALUE
	SalesLT ProductModelProductDescription	PQ	Culture	HASH
			ModifiedDate	HASH

Selected Source Expression

```
let
Source = Sql.Databases("sqlserveraw.database.windows.net"),
PowerBIcheatSheet = Source[[Name="PowerBIcheatSheet"]][Data],
SalesLT_SalesOrderHeader =
PowerBIcheatSheet[[Schema="SalesLT",Item="SalesOrderHeader"]][Data],
#"Changed Type" = Table.TransformColumnTypes(SalesLT_SalesOrderHeader,
{("SalesOrderID", type text), ("CustomerID", type text), ("OrderDate", type date)}),
#"Filtered Rows1" = Table.SelectRows(#"Changed Type", each true),
#"Replaced Value" = Table.ReplaceValue(#"Filtered Rows1",0.9,Replacer.ReplaceValue,{"Status"}),
#"Changed Type1" = Table.TransformColumnTypes(#"Replaced Value",{"(DueDate", type date)}),
#"Filtered Rows" = Table.SelectRows(#"Changed Type1", each true)
in
#"Filtered Rows"
```

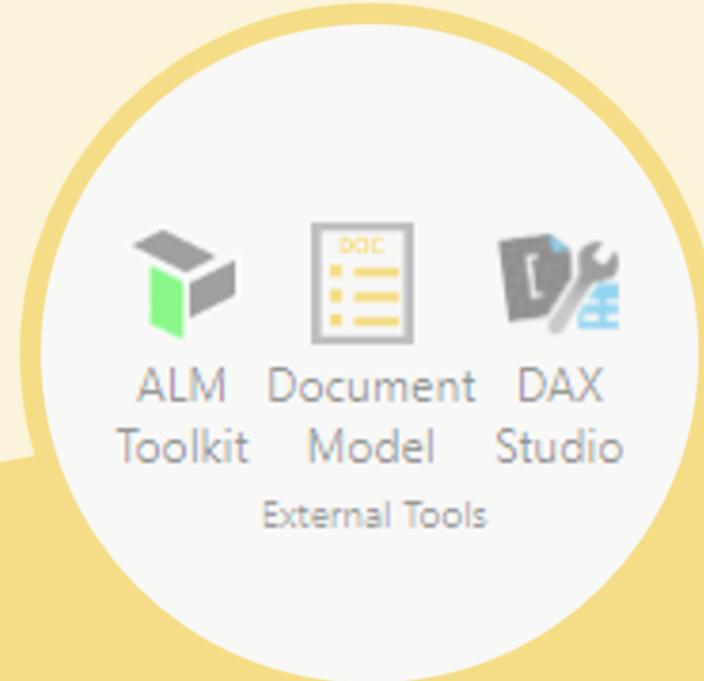
25
Relationships
22
Active
3
Inactive
6
Bi-Directional
2
Need attention

To Table

Relationship	Cardinality	Relation To	
9788-	One > Many	SalesLT Product - SalesLT Product	
5077-	One > Many	SalesLT Product - SalesLT Product	
e31a8-	One <> Many	SalesLT Product - SalesLT Product	
alesLT	One > Many	SalesLT Product - SalesLT Product	
Category	One > Many	SalesLT Product - SalesLT Product	
Model	One > Many	SalesLT Product - SalesLT Product	
83b8-	One > Many	SalesLT ProductDescription - SalesLT ProductDescription	
676d-	One > Many	SalesLT ProductDescription - SalesLT ProductDescription	
2244e-	One > One	SalesLT ProductDescription - SalesLT ProductDescription	
omer	One <> One	SalesLT ProductDescription - SalesLT ProductDescription	
a74e-	One > Many	SalesLT ProductModel - SalesLT ProductModel	
23d1-	One > Many	SalesLT ProductModel - SalesLT ProductModel	
88e8-4066-a74e-30976a78e82b	One > Many	SalesLT ProductModelProductDescription - SalesLT ProductModelProductDescription	
True	LocalDateTable_5f6068d5-8854-4772-b45f-7eedee302ec - LocalDateTable_5f6068d5-8854-4772-b45f-7eedee302ec	One > Many	SalesLT ProductModelProductDescription - SalesLT ProductModelProductDescription
True	SalesLT ProductDescription - SalesLT ProductDescription	One <> One	SalesLT ProductModelProductDescription - SalesLT ProductModelProductDescription
True	SalesLT ProductModel - SalesLT ProductModel	Many > Many	SalesLT ProductModelProductDescription - SalesLT ProductModelProductDescription
True	LocalDateTable_1f72160e-4147-4e47-8a96-23a31f53f17e - LocalDateTable_1f72160e-4147-4e47-8a96-23a31f53f17e	One > Many	SalesLT SalesOrderHeader - SalesLT SalesOrderHeader

Powered by Data-Marc.com

Powered by Data-Marc.com



Document your
model

Power BI Model Documenter

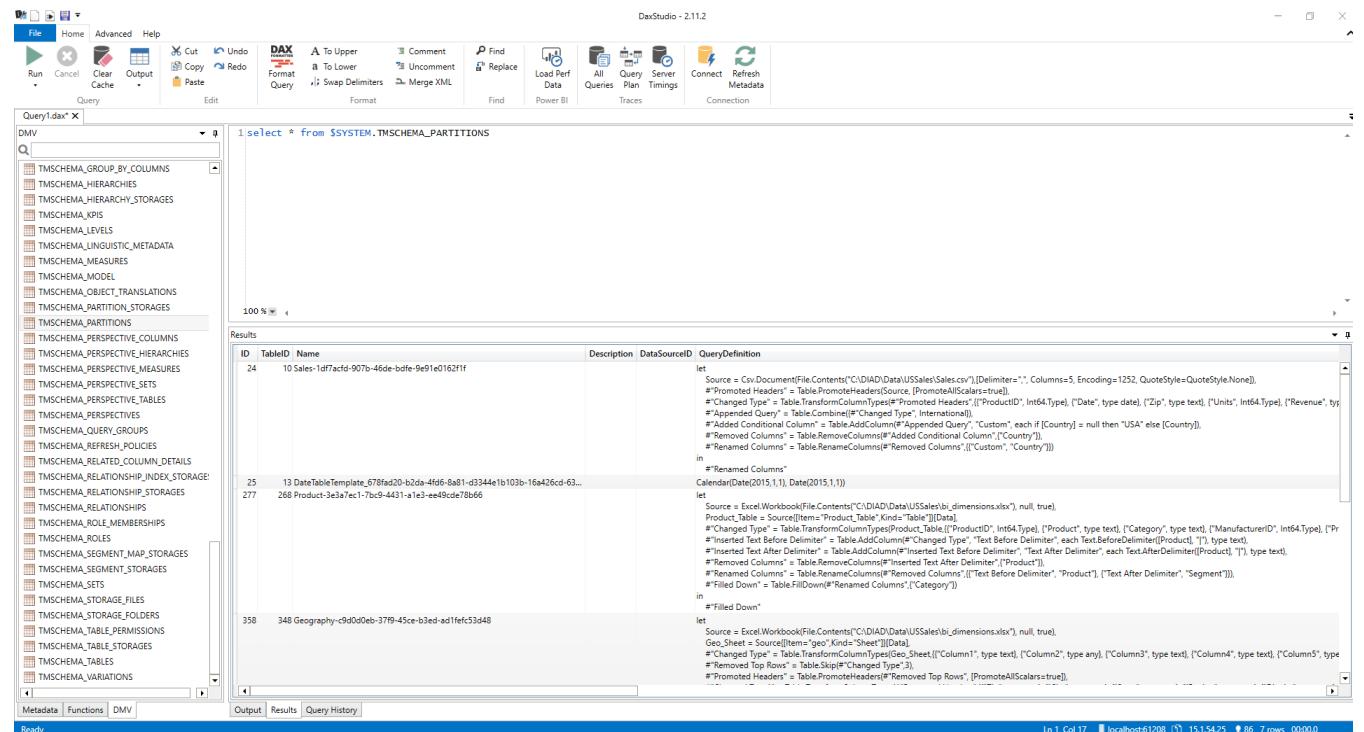
Dynamic Management Views

Analysis Services Dynamic Management Views (DMVs) are queries that return information about model objects, server operations, and server health.

- DB Schema = Database model
- DISCOVER = Operations & Sessions
- TM Schema = Tabular = Power BI / AAS
- MD Schema = MDX = Multidimensional

Dynamic Management Views

- Analysis Services metadata
 - Tables
 - Columns
 - Measures
 - Perspectives
 - Partitions
 - ...
- Query via DAX Studio



The screenshot shows the DAX Studio interface version 2.11.2. On the left, there is a sidebar titled "DMV" containing a tree view of Analysis Services metadata categories such as TMSchema_Group_By_Columns, TMSchema_Hierarchies, etc. The main area is titled "Query1.dax" and contains a query:

```
1 select * from $SYSTEM.TMSchema_Partitions
```

The results grid shows four rows of partition data:

ID	TableID	Name	Description	DataSourceID	QueryDefinition
24	10	Sales-1d7acf0-907b-46d8-bdfe-9e91e0162f1f	let		Source = Csv.Document(File.Contents("C:\DAX\Data\USales\Sales.csv"),[Delimiter=","], Columns=5, Encoding=1252, QuoteStyle=QuoteStyle.None);#Append Headers? = Table.PromoteHeaders(Source,[PromoteAllScalars=true]);#Changed Type? = Table.TransformColumnTypes(#"Promoted Headers",{{"ProductID", Int64.Type}, {"Date", type date}, {"Zip", type text}, {"Units", Int64.Type}, {"Revenue", ty... in #Renamed Columns#CalendarDate(2015,1,1), Date(2015,1,1))
25	13	DateTableTemplate_678fad20-b2da-4fd8-8a81-d3344e1b103b-16a426cd-63...	let		Product = Source[[{"Product": "Product", "Table": "Table1"}]]#Changed Type? = Table.TransformColumnTypes(Product,Table[{"ProductID": Int64.Type}, {"Product": type text}, {"Category": type text}, {"ManufacturerID": Int64.Type}, {"Pr... in #Filled Down#
277	268	Product-3e3a7ec1-7bc9-4431-a1e3-eee49cde78b66	let		#Inserted Text Before Delimiter? = Table.AddColumn(#"Changed Type", "Text Before Delimiter", each Text.BeforeDelimited([Product], ""), type text);#Inserted Text After Delimiter? = Table.AddColumn(#"Inserted Text Before Delimiter", "Text After Delimiter", each Text.AfterDelimited([Product], ""), type text);#Removed Columns? = Table.RemoveColumns(#"Inserted Text After Delimiter", [{"Product"}]);#Renamed Columns? = Table.RenameColumns(#"Removed Columns", [{"Text Before Delimiter", "Product"}, {"Text After Delimiter", "Segment"}]);#Filled Down = Table.FillDown(#"Renamed Columns", {"Category"})
358	348	Geography-9d0d0eb-37f9-45ce-b3ed-ad1fefc53d48	let		Source = Excel.Workbook(File.Contents("C:\DAX\Data\USales\bi_dimensions.xlsx"), null, true);Geo_Sheet = Source[[Item="geo", Kind="Sheet"]][Data];#Changed Type? = Table.TransformColumnTypes(Geo_Sheet,{{"Column1", type text}, {"Column2", type any}, {"Column3", type text}, {"Column4", type text}, {"Column5", type... in #Filled Down#

DEMO!

- Show all tables in model
 - Table Expressions
- Show all measures
- Show Perspectives
 - Measures in perspectives
 - Columns in perspectives
- Show columns
- Roles
 - Role expressions



Automation of documentation

- Need for something to execute tasks automatically.
- Something that runs on every computer

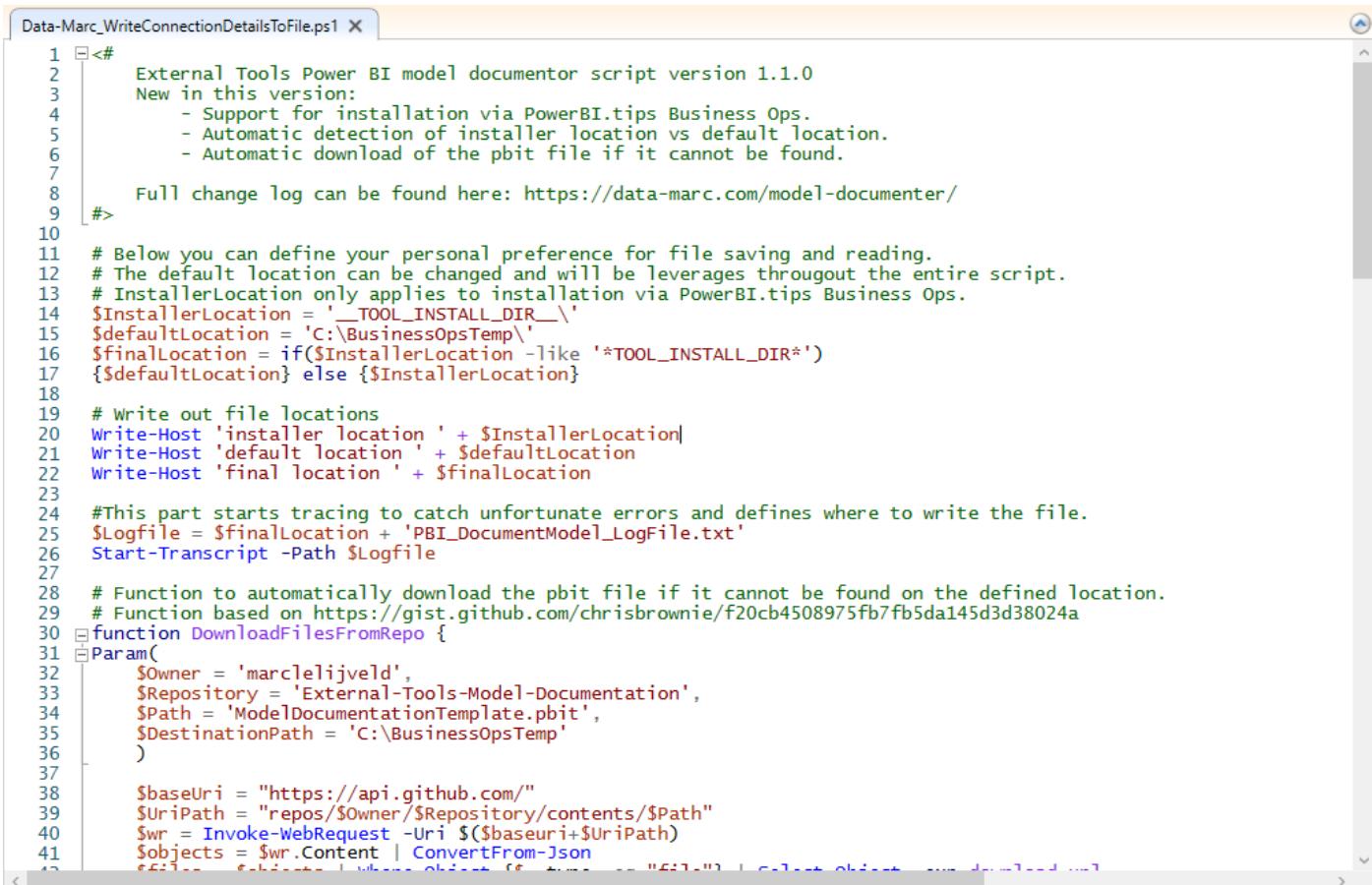
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PowerShell

- Retrieve Server and Database information
- Dump connection file in json format
- Download template from GitHub
- Opens Power BI template



The screenshot shows a code editor window with the title "Data-Marc_WriteConnectionDetailsToFile.ps1". The script is a PowerShell function designed to write connection details to a file. It includes comments explaining its purpose and how it handles different installation paths. The function uses the `Invoke-WebRequest` cmdlet to download a template file from GitHub if it's not found locally.

```
1 #<#
2     External Tools Power BI model documentor script version 1.1.0
3     New in this version:
4         - Support for installation via PowerBI.tips Business Ops.
5         - Automatic detection of installer location vs default location.
6         - Automatic download of the pbit file if it cannot be found.
7
8     Full change log can be found here: https://data-marc.com/model-documenter/
9 #>
10
11 # Below you can define your personal preference for file saving and reading.
12 # The default location can be changed and will be leverages throughout the entire script.
13 # InstallerLocation only applies to installation via PowerBI.tips Business Ops.
14 $InstallerLocation = '__TOOL_INSTALL_DIR__'
15 $defaultLocation = 'C:\BusinessOpsTemp\'
16 $finalLocation = if($InstallerLocation -like '*TOOL_INSTALL_DIR*') { $defaultLocation } else { $InstallerLocation }
17
18 # Write out file locations
19 Write-Host 'installer location ' + $InstallerLocation
20 Write-Host 'default location ' + $defaultLocation
21 Write-Host 'final location ' + $finalLocation
22
23 #This part starts tracing to catch unfortunate errors and defines where to write the file.
24 $LogFile = $finalLocation + 'PBI_DocumentModel_LogFile.txt'
25 Start-Transcript -Path $LogFile
26
27 # Function to automatically download the pbit file if it cannot be found on the defined location.
28 # Function based on https://gist.github.com/chrisbrownie/f20cb4508975fb7fb5da145d3d38024a
29
30 function DownloadfilesFromRepo {
31     Param(
32         $Owner = 'marcelijeveld',
33         $Repository = 'External-Tools-Model-Documentation',
34         $Path = 'ModelDocumentationTemplate.pbit',
35         $DestinationPath = 'C:\BusinessOpsTemp'
36     )
37
38     $baseUri = "https://api.github.com/"
39     $uriPath = "repos/$Owner/$Repository/contents/$Path"
40     $wr = Invoke-WebRequest -Uri $($baseUri+$uriPath)
41     $objects = $wr.Content | ConvertFrom-Json
42 }
```

Learnings

- Capturing server and database parameters
- Double \\ in path took a while to figure out
- PowerShell in general + debugging
- On-demand editing *.pbit file not possible
- Dump connection json file as “workaround”

Learn from others!

Known limitations (or irritations)

- PowerShell Execution Policies
- Power BI Privacy levels might block loading
- Native database queries
- Requires admin approval for installation
- Requires MSOLAP.8 Provider to be installed
- Excel template requires manual download
- No support for live connections
- Next-next-finish installer

```
PS C:\Users\Marcl> Get-ExecutionPolicy -List
```

scope	ExecutionPolicy
MachinePolicy	Undefined
UserPolicy	Undefined
Process	Undefined
CurrentUser	Undefined
LocalMachine	Unrestricted

Privacy Levels

- Always combine data according to your Privacy Level settings for each source
- Combine data according to each file's Privacy Level settings
- Always ignore Privacy Level settings ⓘ

Native Database Queries

- Require user approval for new native database queries

Two versions

Initial release (up to v1.2.1)

- External tools were new
- I had little to minor knowledge about it
- Never build an actual application

... was a great start!

Model Documenter v2 (and up)

- Fixes a lot of bugs / limitations
- First “application” I ever build

Model Documenter v2

- C# application
- Build based on input from the community
- Completely open sourced!
Feel free to contribute!
- Build from scratch to overcome previous issues



So, from now on...



You Get Documentation, You
Get Documentation

You All Get Documentation!

Wrap up

External Tools...

...are depending on Analysis Service **metadata** format.

...allow you to develop with **3rd party tools**.

...opens tons op **opportunities to contribute** to Power BI.

Model Documenter...

... allows me to be lazy (or efficient) by **generating** documentation.

... opens new opportunities to **hand-over** your solutions.

... is super powerful for **self-service purposes** and end-users.

LET'S
RECAP...

For resources

[Https://data-marc.com/model-documenter/](https://data-marc.com/model-documenter/)



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