Benni De Jagere

PASS SQLSATURDAY SLOVENIA | 14 DEC 2019

Troubleshooting your Power BI Report Performance

Dragon source: https://www.flickr.com/photos/wili/2628869994/in/gallery-41926029@N05-72157622307278981/

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Benni De Jagere?

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Session Objectives

Leverage (external) options to pinpoint common causes

Techniques to avoid, or solve

Usable set of best practices

***Not*!** a DAX or PowerQuery Performance Deep Dive

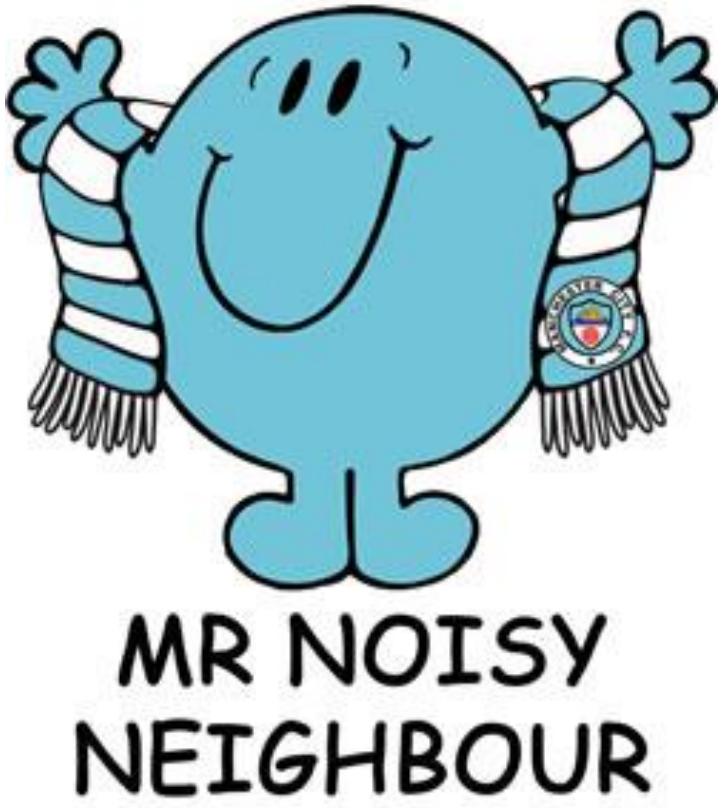
Why Troubleshoot Report Performance?

No one likes to wait
"Works on my machine" is not a valid reply
40% Science, 40% Art, 20% Luck
Context and Baseline are Key
Aim for quick wins on heavily used reports
Avoid long investigations on barely used reports (unless it's the CFO)

It depends!

Hold on ..

PowerBI.com



http://www.51mon.co.uk/photo/MrNoisyNeighboursMCFC.jpg

PowerBI.com

- Shared Resources, blessing and curse
- Premium Capacity does not automagically solve performance issues
- Beware of Cache mechanisms

The Report Case

Use Case

https://elidesc.com/wp-content/uploads/2012/07/Velo_Antwerpen.jpg

New York Citibikes

www.citibikenyc.com/system-data

Public Open Data

Starts June 2013

Information about every trip

- Longer than 60 seconds
- Starts at public station

Masterdata

https://i0.wp.com/thenypost.files.wordpress.com/2013/12/citibike1.jpg?quality=90&strip=all&ssl=1

The Report(s)

Inside Power BI Desktop

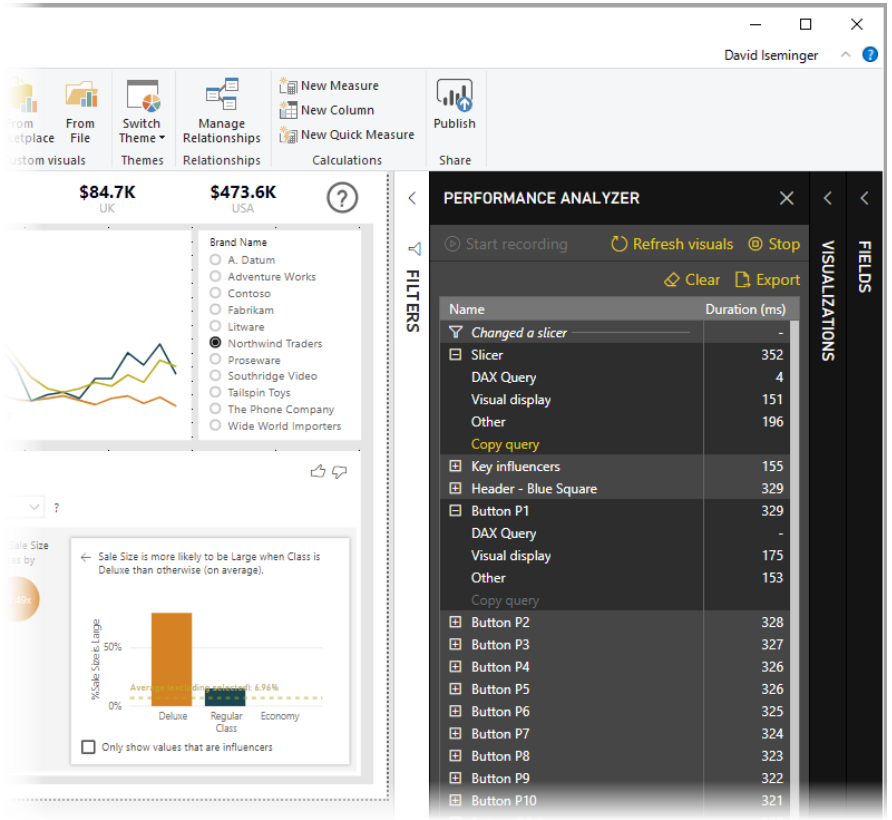
Performance Analyzer Pane

Public Release in May 2019

Flight Recorder for all operations

Breaks down execution times

Export results with ease



https://docs.microsoft.com/en-us/power-bi/media/desktop-performance-analyzer/performance-analyzer-01.png

Inside Power BI Desktop

Name	Status	CPU	Memory	Disk	Network	GPU	GPU engine	Power usage	Power usage tr...
Microsoft Power BI Desktop (12)		0,2%	2 351,1 MB	0 MB/s	0 Mbps	0%	GPU 0 - 3D	Very low	Very low
		0%	894,0 MB	0 MB/s	0 Mbps	0%		Very low	Very low
CefSharp.BrowserSubprocess		0,2%	333,1 MB	0 MB/s	0 Mbps	0%		Very low	Very low
Microsoft Mashup Evaluation ...		0%	244,2 MB	0 MB/s	0 Mbps	0%		Very low	Very low
Microsoft Mashup Evaluation ...		0%	184,4 MB	0 MB/s	0 Mbps	0%		Very low	Very low
Microsoft Mashup Evaluation ...		0%	181,1 MB	0 MB/s	0 Mbps	0%		Very low	Very low
CefSharp.BrowserSubprocess		0%	125,4 MB	0 MB/s	0 Mbps	0%		Very low	Very low
Microsoft SQL Server Analysis ...		0%	123,7 MB	0 MB/s	0 Mbps	0%		Very low	Very low
CefSharp.BrowserSubprocess		0%	94,1 MB	0 MB/s	0 Mbps	0%		Very low	Very low
CefSharp.BrowserSubprocess		0%	93,8 MB	0 MB/s	0 Mbps	0%		Very low	Very low
CefSharp.BrowserSubprocess		0%	67,7 MB	0 MB/s	0 Mbps	0%		Very low	Very low
Console Window Host		0%	5,9 MB	0 MB/s	0 Mbps	0%		Very low	Very low
CefSharp.BrowserSubprocess		0%	3,8 MB	0 MB/s	0 Mbps	0%		Very low	Very low

Tools for the Trade

Tools for the Trade

Performance Analyzer Pane

DAX Studio (SQLBI.com)

VertiPaq Analyzer (SQLBI.com)

Tabular Editor

Power BI Helper

Power BI Field Finder

Power BI Sentinel (€€€)

BISM Normalizer

And more ..

The Tips & Best Practices

The Golden Rule(s)

Transform early

Transform once

Transform smart

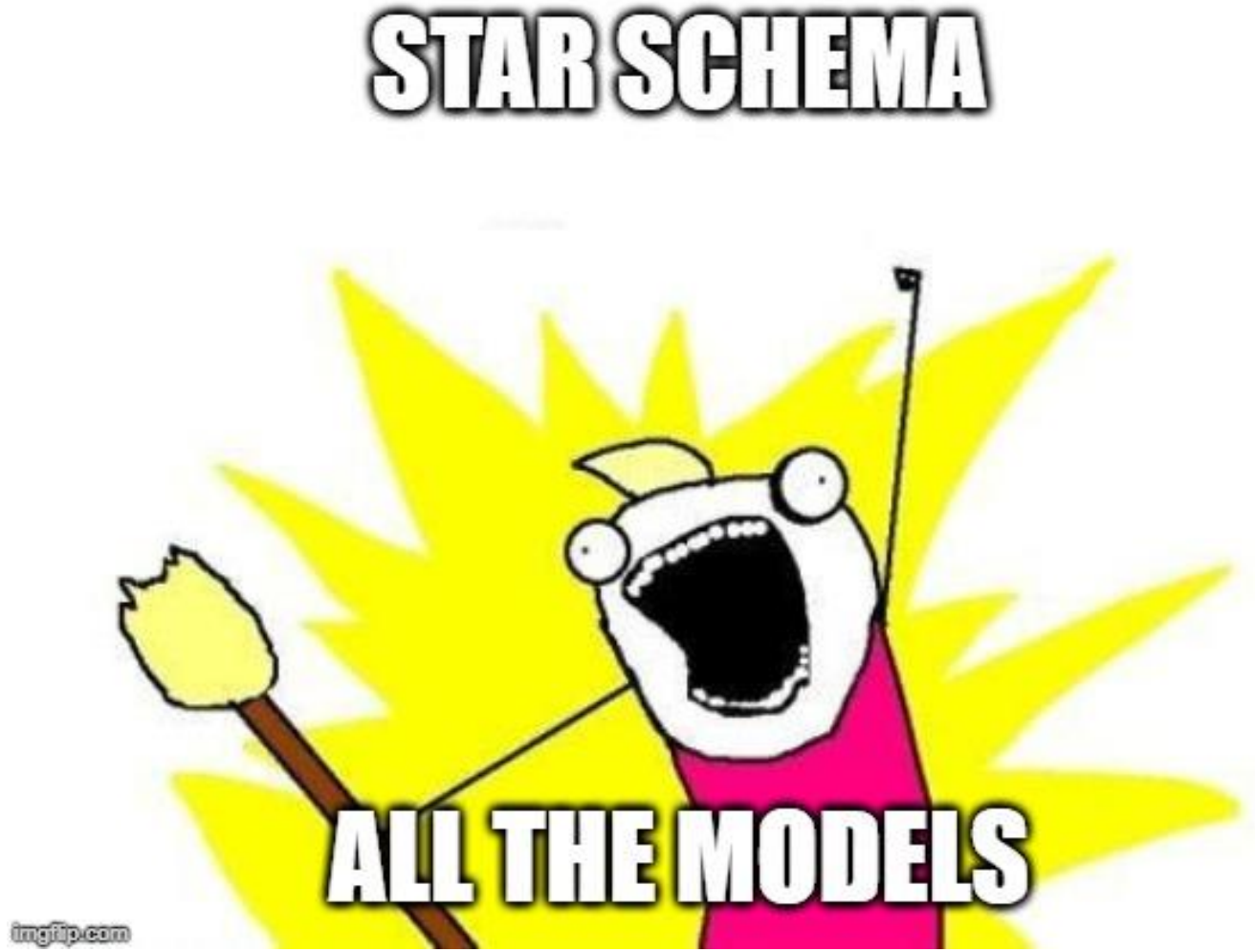
Data Types

Auto Date/Time

Column & Row Usage

Modelling

Modelling Tips



Thanks, @KoVer ☺

Modelling Tips

Star Schema (all the things!)

Use persisted surrogate keys for relationships

Avoid Bi-Directional filtering (rather DAX Crossfilter)

Disable auto date/time, rather 'Mark as Date Table'

Debate Role-playing dimensions

Optimize Data Types

Try setting "Assume Referential Integrity" on relationships – in many cases, this setting significantly improves query performance.

Modelling Tips (continued)

Avoid wide tables

Remove unused columns **and** rows

Only load queries that are used

Reduce inappropriate summarization

Think about your data granularity

Hide (or remove) Key fields from the model view

Consider your source and refresh schedule

PowerQuery

PowerQuery Tips

Query Folding, when possible

Don’t repeat tables & fields

Only load tables that are used in the model

Specify correct Data Types

Parameterize ‘fact’ queries (Date or Entity)

DAX

DAX Tips

Avoid ‘repeater’ functions (SumX, AverageX, ..)

Avoid calculated columns

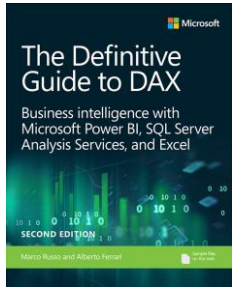
Keep measures simple initially, and add complexity incrementally.

Use variables

Solve the model, then solve DAX

Use Data Categories

Read the Bible ☺



Reports

Report Page Tips

Limit visuals on a single pane

Filtering and slicing before rendering is a valid option (ie. Landing page, Report Filters, ..)

Avoid having 5+ report tabs on a single report

Avoid interaction between visuals when they're not needed

Avoid overly detailed visuals

Be aware of render intensive visuals (ie. Maps, Custom visuals, ..)

Bonus Round

Composite Models & Aggregations

Composite models (and DirectQuery) require proper usage of DAX

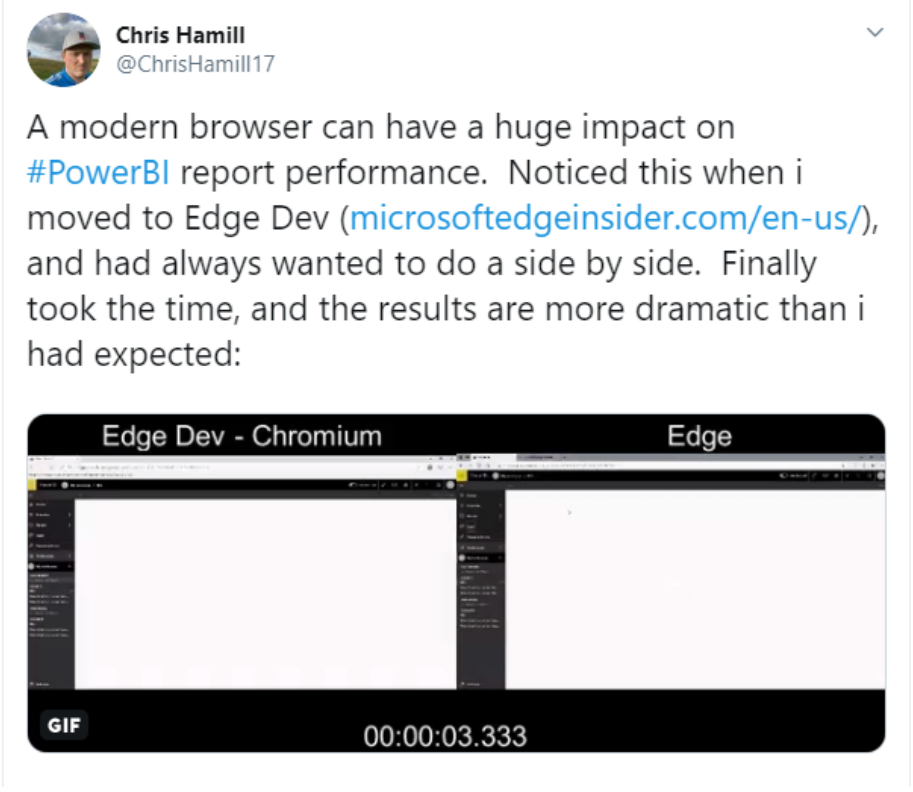
- Use these wisely

Aggregations cost memory, data refresh time

- Solve specific performance issues

Battle of the Browsers

https://twitter.com/ChrisHamill17/status/1160242636369694720



Takeaways

Report performance should be thought of at design time

Think about your transforms

Modelling is key

Choice of browser and hardware matters

Create a personal set of best practices for Tabular Editor

Read public (online) resources

Resources

https://docs.microsoft.com/en-us/power-bi/power-bi-reports-performance
https://docs.microsoft.com/en-us/power-bi/guidance/import-modeling-data-reduction
https://docs.microsoft.com/en-us/power-bi/guidance/star-schema
https://sqlserverbi.blog/2019/08/24/power-bi-project-good-and-best-practices/
https://docs.microsoft.com/en-us/power-bi/desktop-performance-analyzer
https://docs.microsoft.com/en-us/power-bi/visuals/power-bi-visualization-best-practices
https://www.sqlbi.com/books/the-definitive-guide-to-dax-2nd-edition/

Resources

https://www.sqlbi.com/tools/

https://github.com/otykier/TabularEditor

https://powerbihelper.org/

https://github.com/stephbruno/Power-BI-Field-Finder

https://www.sqlbi.com/articles/comparing-dax-calculated-columns-with-power-query-computed-columns/

https://www.biinsight.com/four-different-ways-to-find-your-power-bi-desktop-local-port-number/

Resources

https://blog.crossjoin.co.uk/2019/12/02/testing-performance-of-power-bi-reports-in-the-browser-part-1/

https://blog.crossjoin.co.uk/2019/12/09/testing-performance-of-power-bi-reports-in-the-browser-part-2/

https://www.sqlbi.com/tv/my-power-bi-report-is-slow-what-should-i-do/

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