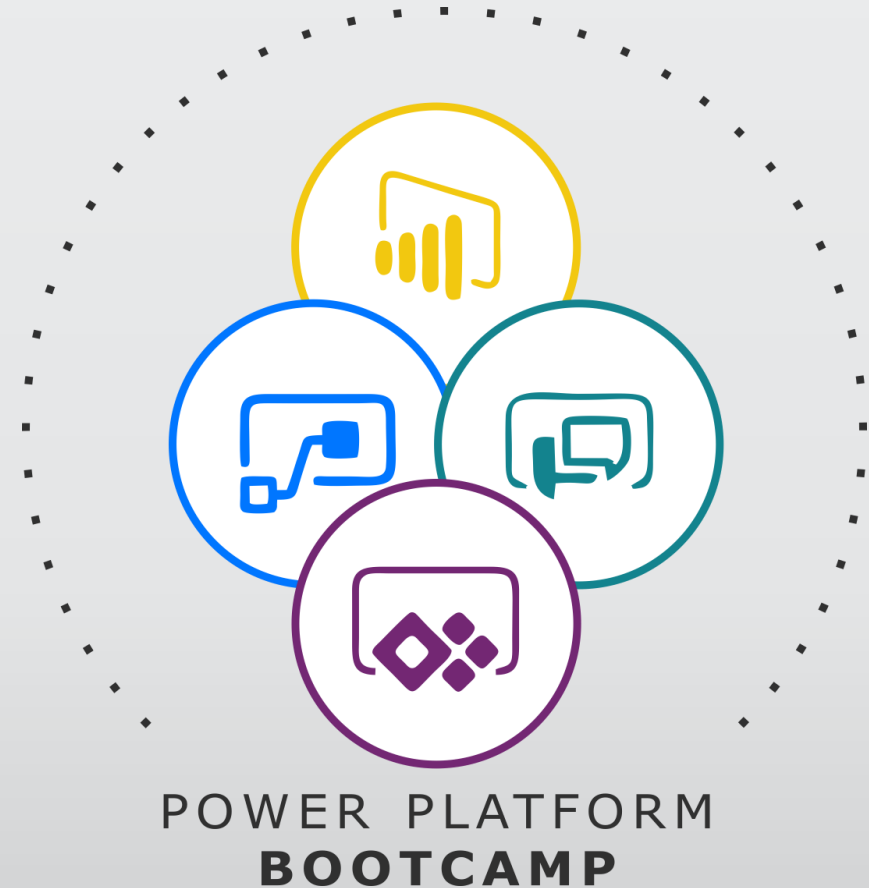


GLOBAL POWER PLATFORM BOOTCAMP

Organized Globally, Held Locally

Troubleshooting your Power BI
Report Performance

Benni De Jagere



Troubleshooting your Power BI Report Performance

Benni De Jagere



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Benni De Jagere?

- Senior Data Insights Consultant
- Realdolmen, a Gfi company
- **dataMinds**.be
-  @BenniDeJagere
-  /bennidejagere



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 CxO)
- *It depends!*

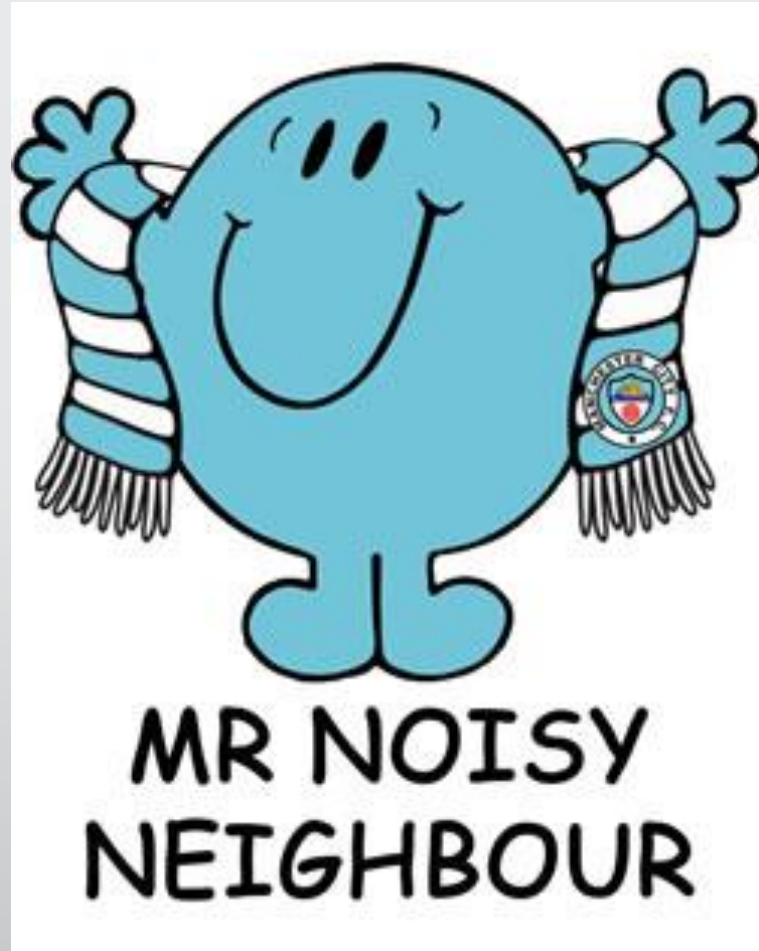


Hold on ..



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PowerBI.com



<http://www.51mon.co.uk/photo/MrNoisyNeighboursMCFC.jp>

PowerBI.com

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



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The Report Case



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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)



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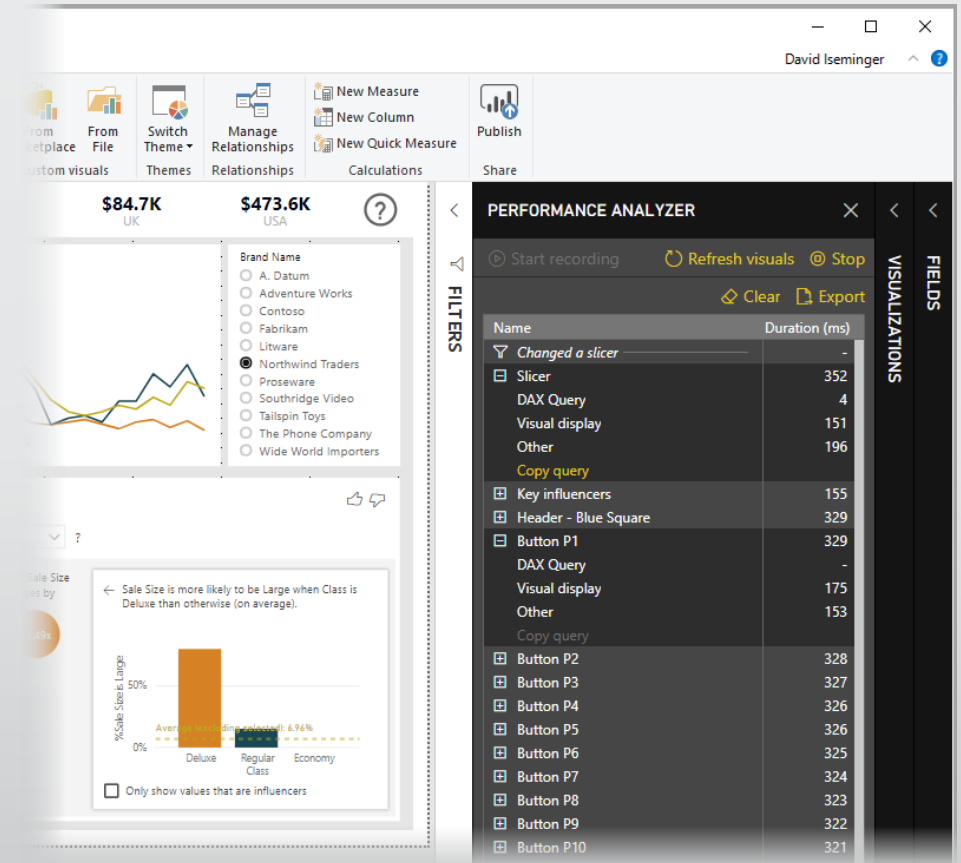
Inside Power BI Desktop



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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.pptx>

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
CefSharp.BrowserSubprocess		0%	894,0 MB	0 MB/s	0 Mbps	0%		Very low	Very low
Microsoft Mashup Evaluation ...		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



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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 (€€€)
- And more ..



The Tips & Best Practices



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The Golden Rule(s)

- Transform early
- Transform once
- Transform smart



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Data Types



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Auto Date/Time



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Column/Row Usage



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Modelling



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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



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



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



PowerQuery



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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)
- Use PowerQuery Diagnostics to troubleshoot bottlenecks (December 2019)



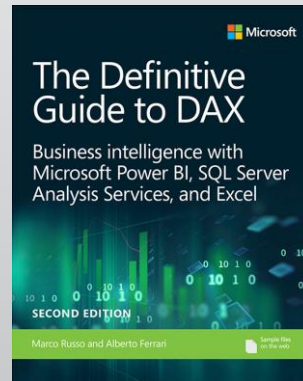
DAX



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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



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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, ..)



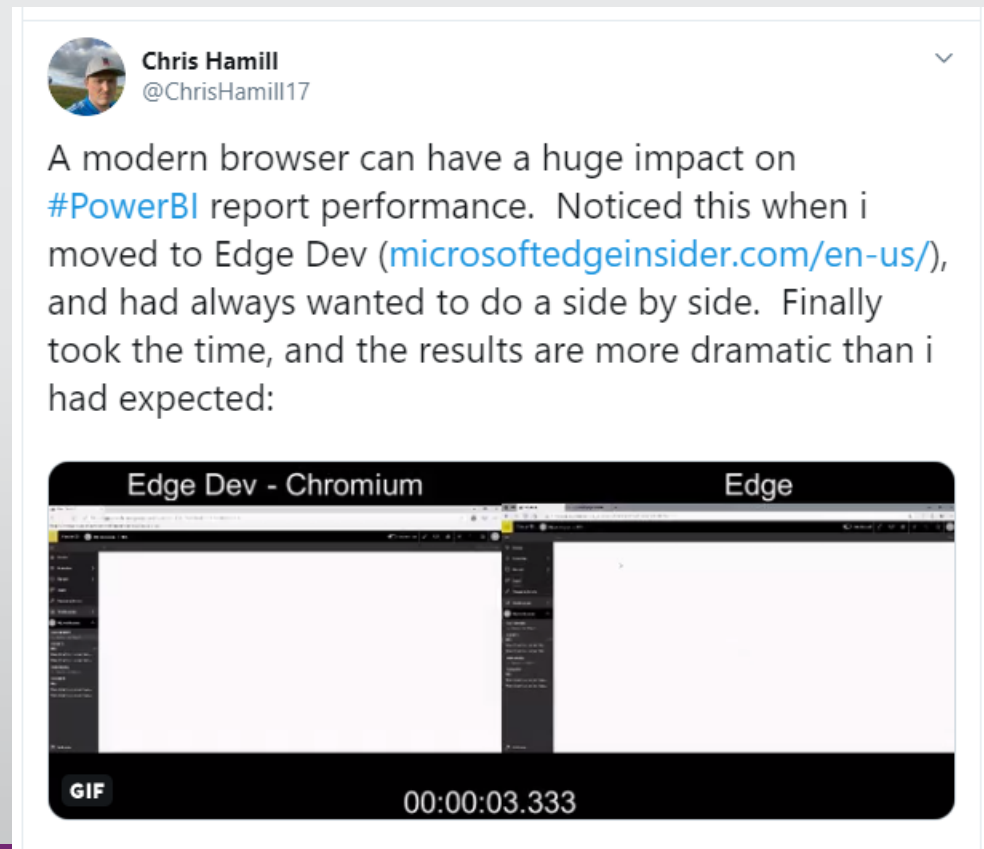
Bonus Round



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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://powerbi.tips/2019/12/more-visuals-mo-problems/>
- <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://blog.crossjoin.co.uk/2019/12/16/testing-performance-of-power-bi-reports-in-the-browser-part-3/>



Any Questions?



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**Please fill
out the
survey!
& Win
Swags!!**



<https://www.powerplatformbootcamp.com/survey>



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Thank You For Attending



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