# Troubleshooting Power BI Reports

aka The 'It Depends Show'
aka Not a DAX/M Deep Dive

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Inetum-Realdolmen

**inetum.**
realdolmen
*Positive digital flow*

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# About me

dataMinds.be Co-Leader

@BenniDeJagere
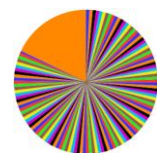
/bennidejagere

sessionize /bennidejagere

Microsoft Most Valuable Professional  Data Platform

#SayNoToPieCharts

https://github.com/BenniDeJagere/Presentations

# THE 10 SPONSORS

kapacity

ORANGEMAN

CatMan® Solution

BI
BUSINESS INNOVATION
BUSINESS INFORMATION
BUSINESS INTELLIGENCE

devscope

PROACTIVE

JDM

better results

M3 MIND YOUR BUSINESS

PART OF / FELLOWMIND
[stoltze][it] unit it

- Tabular Editor 3 Enterprise license (1 year)
- Scalextric C1413M ARC PRO Platinum GT racetrack
- Apple AirPods Pro
- Magnum Champagne
- LEGO® MINDSTORMS® Robot Inventor
- LEGO® NASA Space Shuttle Discovery
- Ticket to Power BI Administration and Governance course

# Session Objectives

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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 Reports?

# No one likes to wait

# But also ..

"Works on my machine" is not a valid reply

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)

40% Science, 40% Art, 20% Luck

***It depends!***

# Hold on ..

Noisy Neighbours

# PowerBI.com

Shared Resources, blessing and curse

Power BI Premium (Gen 1) does not automagically solve performance issues

Power BI Premium (Gen 2) shows great promise, but is not a one fix for all

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

# The Report(s)

Demo

# Inside Power BI Desktop

# Inside Power BI Desktop



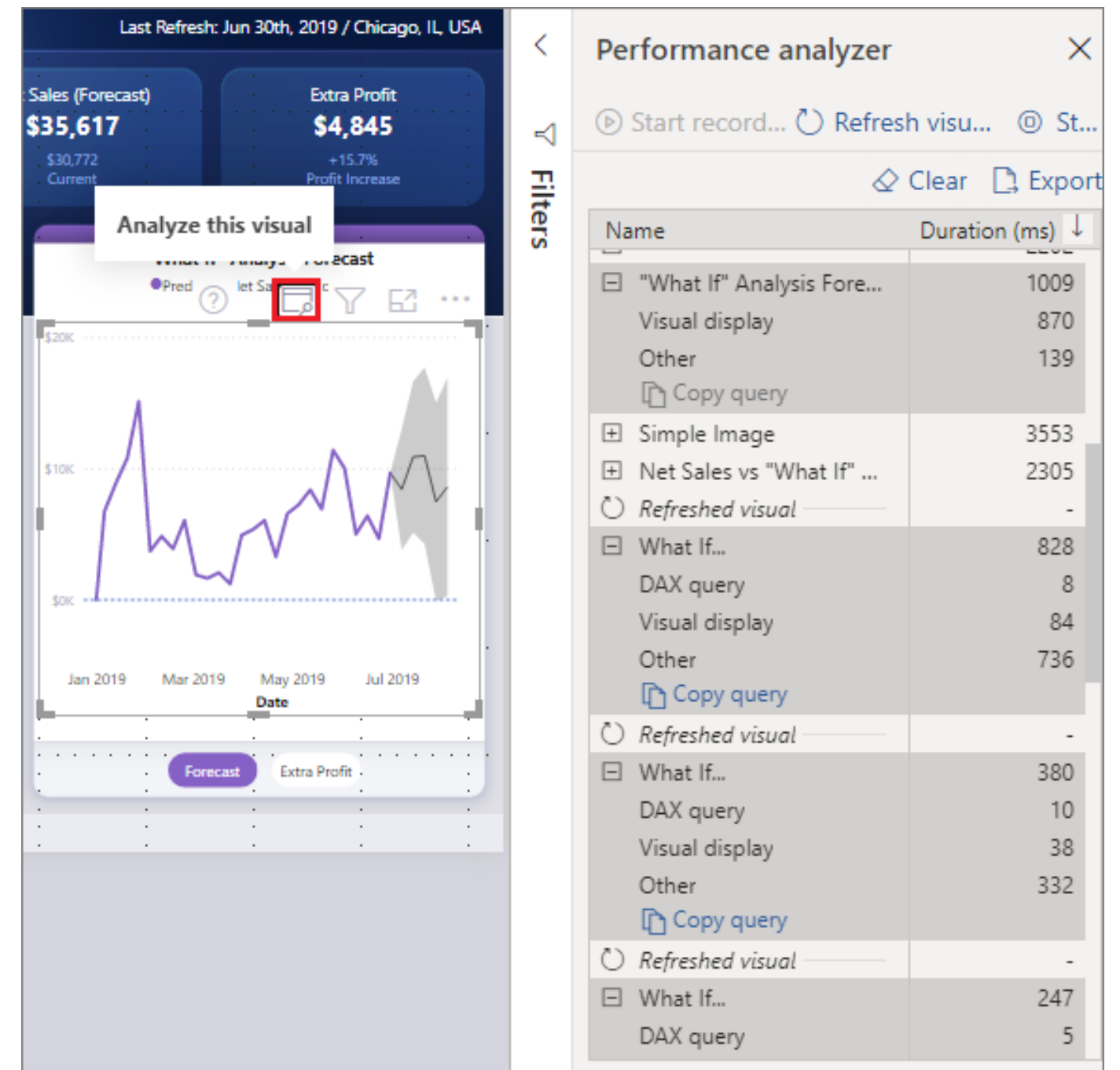| Name | Status | CPU | Memory | Disk | Network | GPU |
|------|--------|-----|--------|------|---------|-----|
| ✓ ⊞ Microsoft Power BI Desktop (12) | | 0,2% | 2 351,1 MB | 0 MB/s | 0 Mbps | 0% |
| ⊞ | | 0% | 894,0 MB | 0 MB/s | 0 Mbps | 0% |
| CefSharp.BrowserSubprocess | | 0,2% | 333,1 MB | 0 MB/s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

# Tools for the Trade

# PowerBI.com

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/create-reports/media/desktop-performance-analyzer/performance-analyzer-07.png

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# Tools for the Trade

Performance Analyzer Pane

DAX Studio

VertiPaq Analyzer (SQLBI.com)

Tabular Editor

Power BI Helper

ALM Toolkit

Power BI Field Finder

Power BI Sentinel (€)

Power Query Diagnostics Tool

Power BI Sidetools

Power BI Cleaner

And more ..

# Tabular Editor

Demo

# DAX Studio

Demo

# Vertipaq Analyzer

Demo

# The Tips & Best Practices

# The Golden Rule(s)

Transform early

Transform once

Transform smart

# Data Types

# Data Types

Don't underestimate the impact

Do you really need date and time combined?

Think about precision and scale

# Auto Date/Time

# Column/Row Usage

# Data Modelling

# Data Modelling



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, Precision, and Scale

# 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

# Reports

# Modelling Tips (Continued)

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, ..)

# Power Query

# Power Query 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 (by Date or Entity)

# DAX

# DAX Tips

- Use 'repeater' functions (SumX, AverageX, ..) when needed
- Avoid calculated columns
- Keep measures simple initially, add complexity later
- Use variables
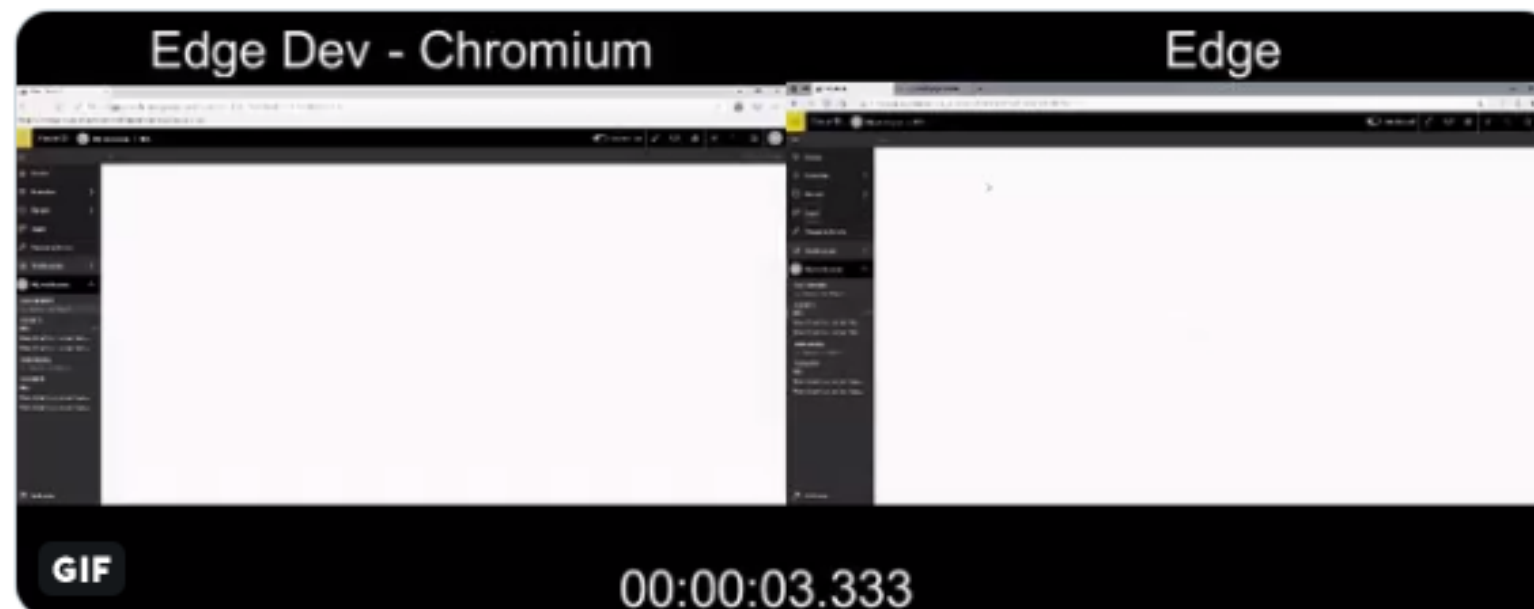- Solve the model, then solve DAX
- Read the Bible ☺
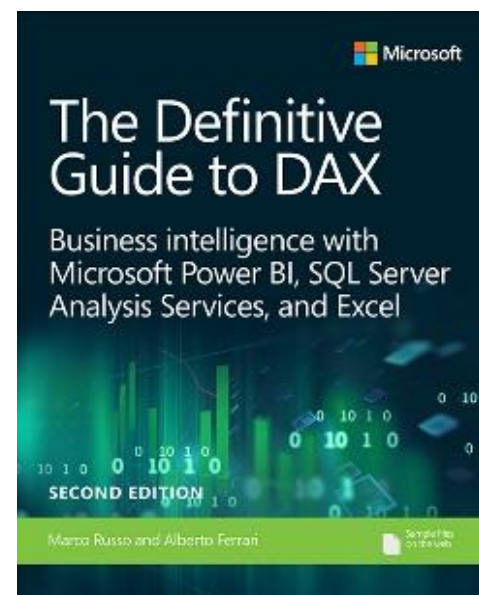
# Battle of the Browsers

# Wrap Up

# 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

# 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/

# Resources

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://powerbi.tips/2020/04/tabular-editor-rocks/

https://www.youtube.com/playlist?list=PLn1m_aBmgsbGDZb7ydd8_LS1AfosdRndQ

https://alluringbi.com/2020/08/06/consolidating-report-elements-for-improved-performance/

https://powerbi.microsoft.com/en-gb/blog/best-practice-rules-to-improve-your-models-performance/

# Resources

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

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

https://www.sqlbi.com/tv/my-power-bi-report-is-slow-what-should-i-do-2/

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

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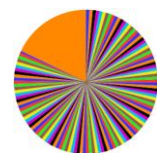
# About me

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Data Platform

#SayNoToPieCharts