Building a User-friendly semantic layer

A Practical Guide

Power BI Feszt 2024

Introduction

Mihaly Kavasi

Group Manager

Delivery Lead and Trainer

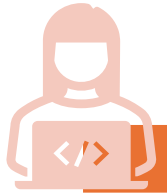
Avanade

- ✓ 8+ Years of Power BI Experience
- ✓ 7+ Year of Training Experience
- ✓ Microsoft Certified Solution Expert – Data Management and Analytics
- ✓ Microsoft Certified Trainer
- ✓ Azure Enterprise Data Analyst
- ✓ Fasttrack Recognized Solution Architect

Emergence of Self-Service

Business

- Agility
- Access
- Time to insight
- Ease of use



IT\BI

- Stability
- Security
- Avoid Rework
- Ease of Integration

There are conflicting interests between Business and IT.

This results in the emergence of shadow BI from Business and strict access rules from IT.

Self-Service BI models emerged to try to ease the collaboration.

How to split the responsibilities between Business and IT/BI?

IT/BI is responsible for:

Data quality

Data freshness

Security

Correctness of insights

Business is responsible for:

Validating concepts/prototypes

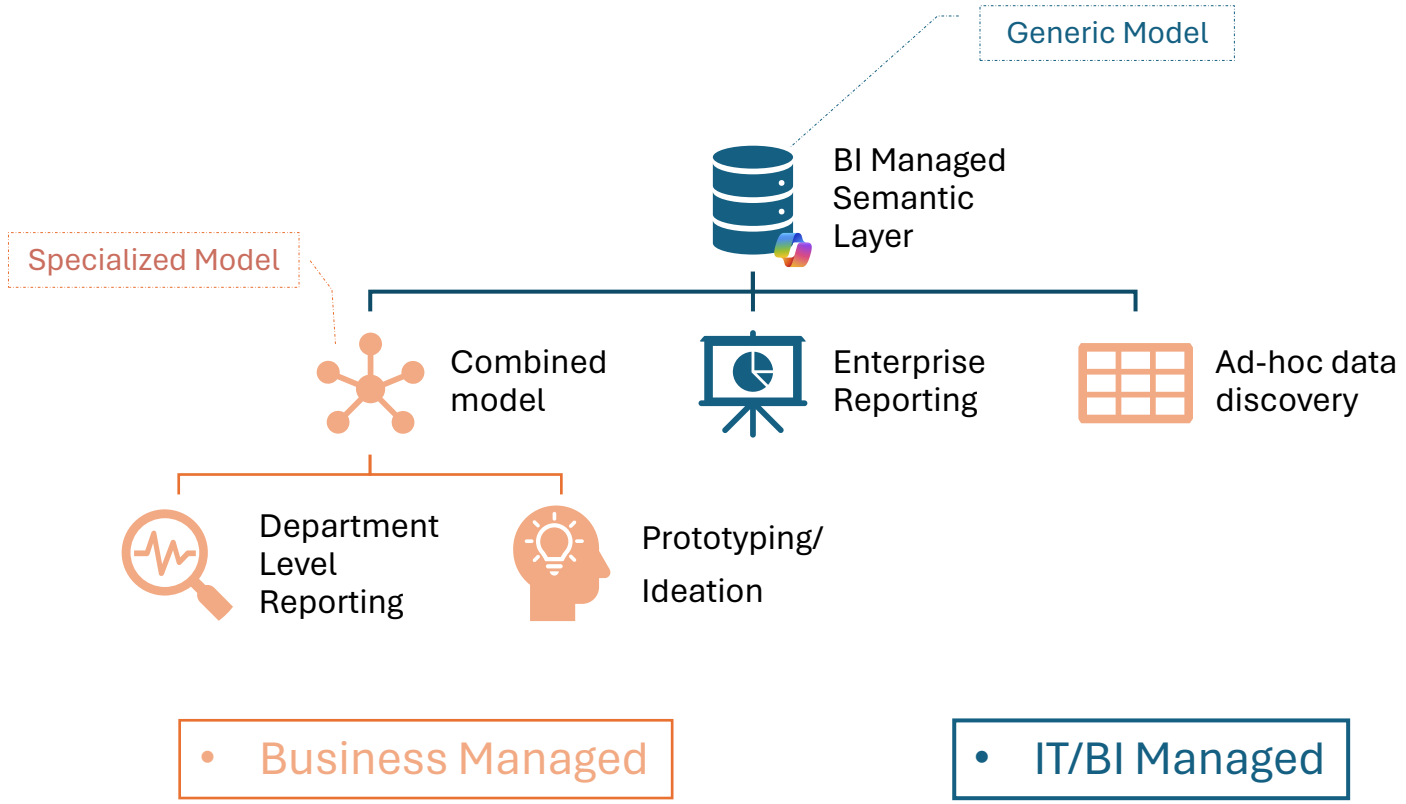
Creating reports

Design

Adoption support

Why should we create a user-friendly semantic layer?

- Datasets in Power BI contain a most important part of any analytics solution. The data model with the calculations.
- The ability to reuse datasets is one of the keyways to eliminate unnecessary duplications of effort and data. It also helps you get closer to achieve a single source of truth.
- One good dataset can be a source of 10s or even 100s of reports. If you think about maintenance and change management than it is obvious why having a smaller number of good quality, optimized and clean datasets is better.

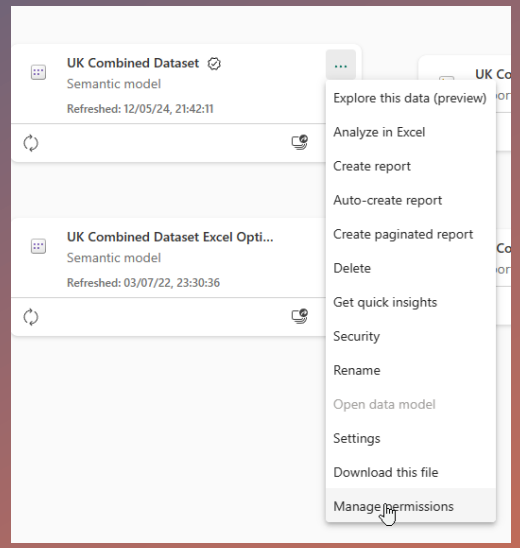


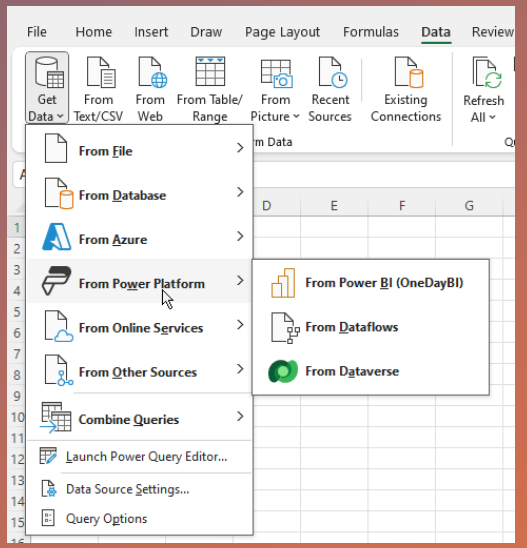
Difference between creating for yourself and others

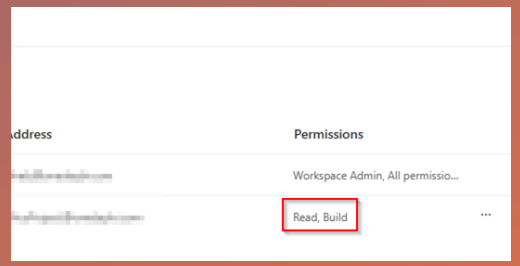
https://selfservicebi.co.uk/difference-between-creating-a-dataset-for-yourself-or-creating-for-others/

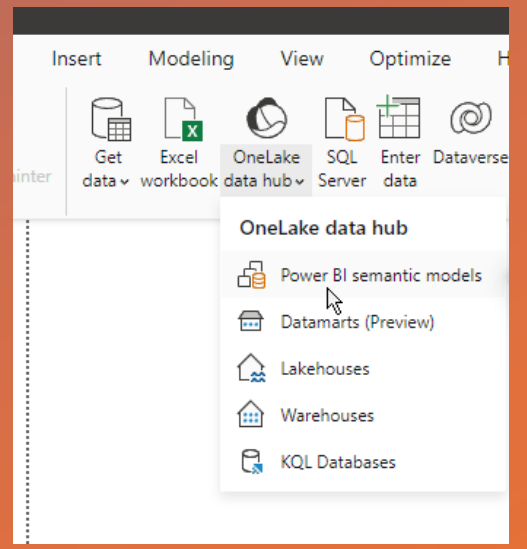
When you want to create a semantic layer....

Share the dataset but not the workspace to provide access but maintain security



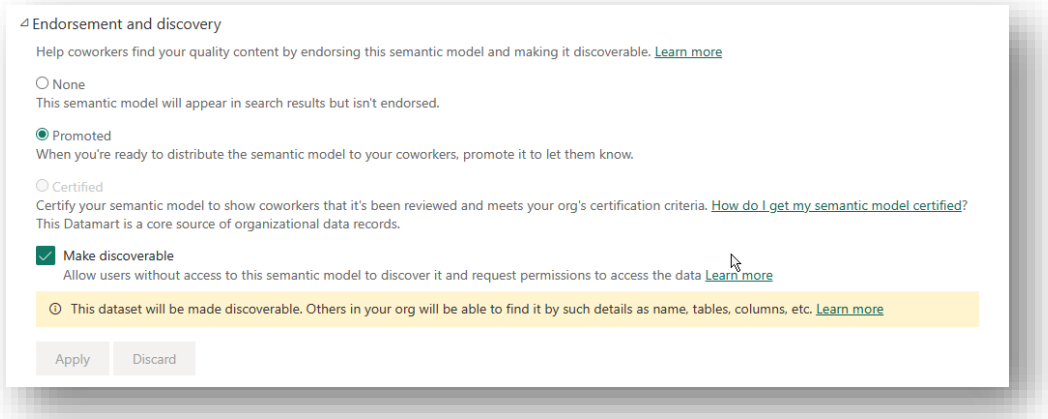


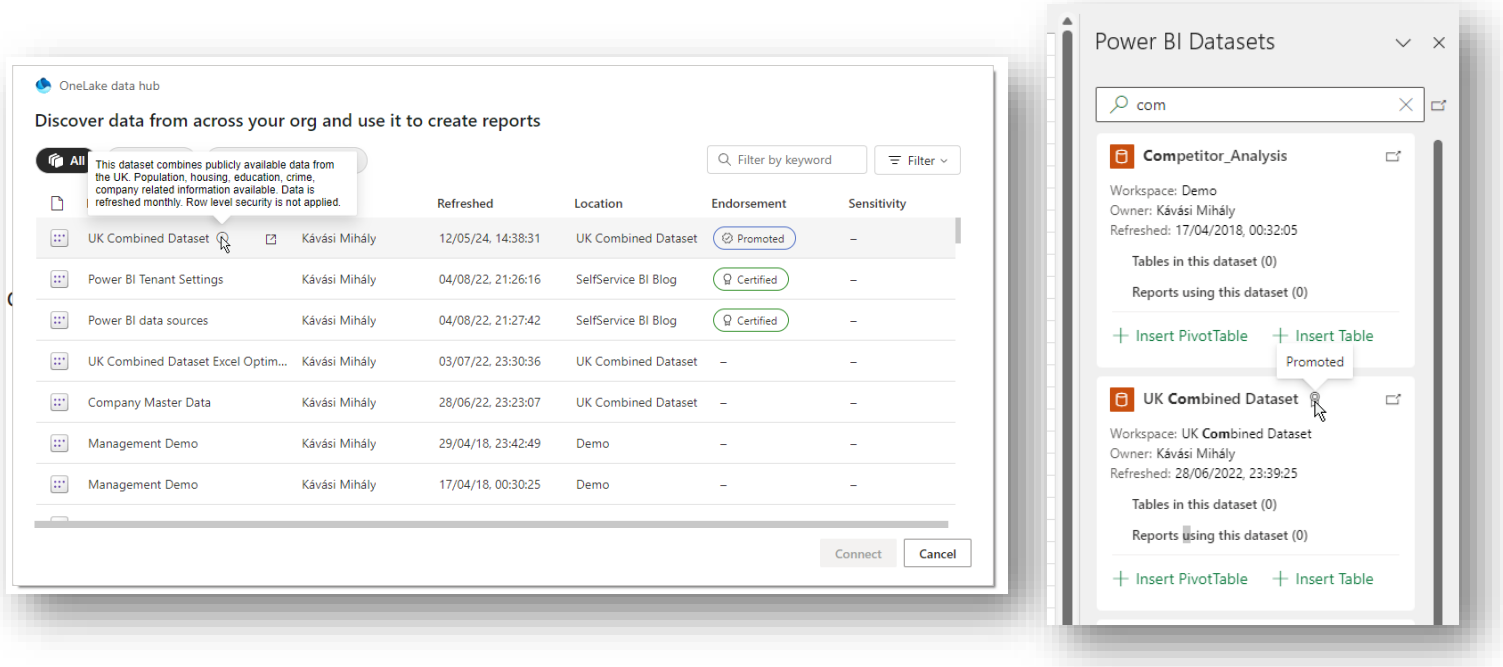




… make sure your audience knows which one is the best for their data needs

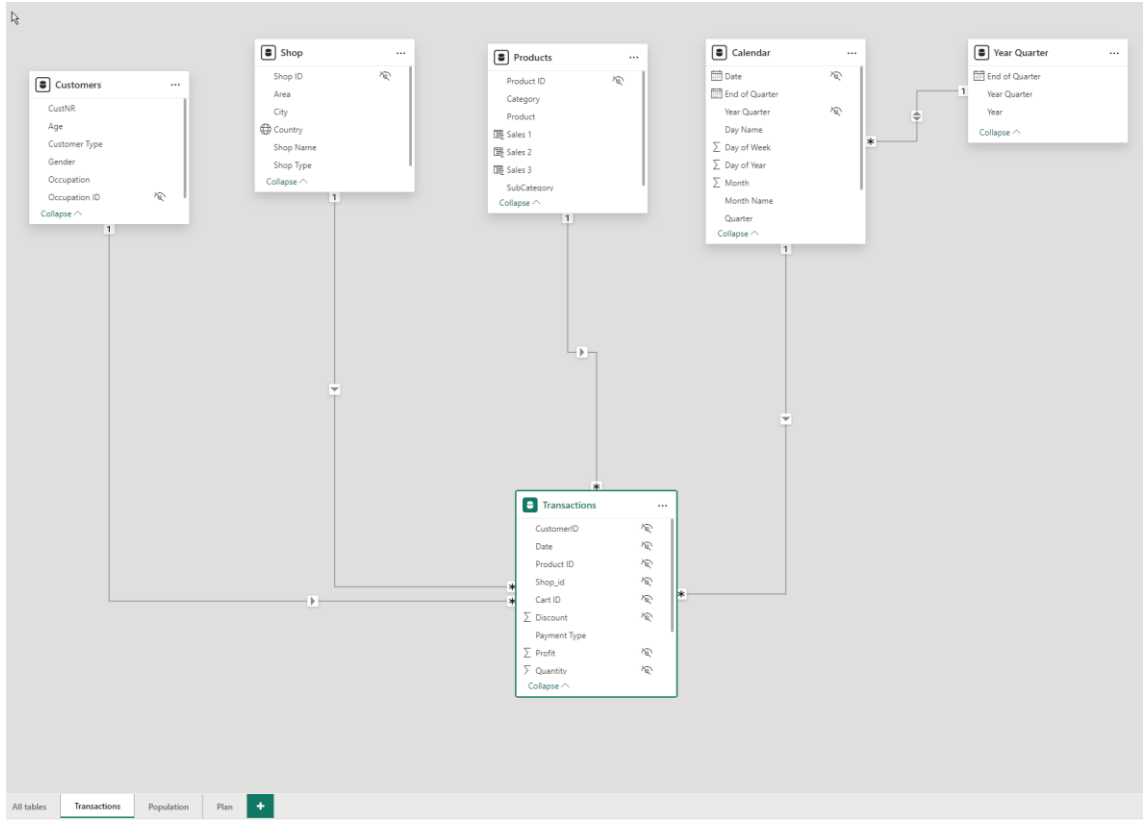
- Use the certification system
- Set Discoverability
- Add Semantic Layer Descriptions





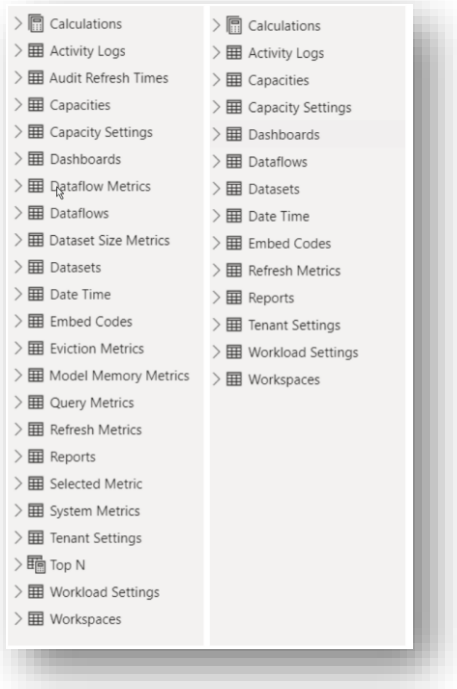
Naming Conventions and Standard

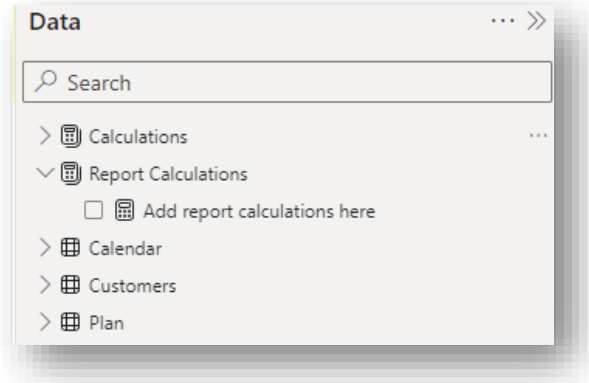
- Unambiguous and business specific naming standards for tables, columns, measures, hierarchies and relationships
- Ensure that each calculation is only can be create by one measure
- Check if measures work with all necessary dimensions
- Remove unnecessary columns
- Make sure that additional filters are not needed to display the right values using the measure. For example, the need to filter out returned sales in the visual filter to give you the proper sales volume, have a measure that already provides that.
- Create Layouts for each Fact table in the Model view

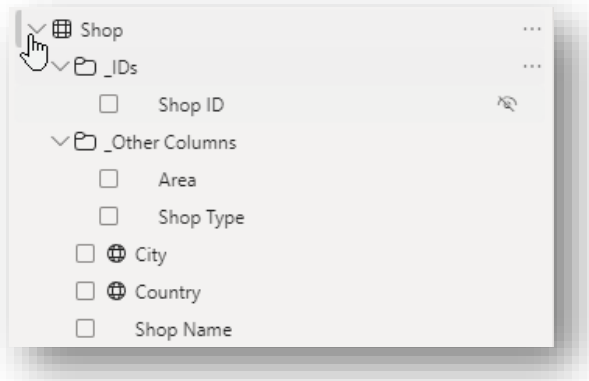


Useful content visible and organized

- Follow Analytical Data Modelling best practices (Star schema)
- Hide all the Fact tables (they should only contain facts and id columns)
- Hide all the id columns
- Do not create measures in data tables
- Create a Calculations table for model metrics
- Create a Report calculations table for report metrics
- Organize your measures into logical folders
- Surface your most important dimension attributes by create folders for the rest

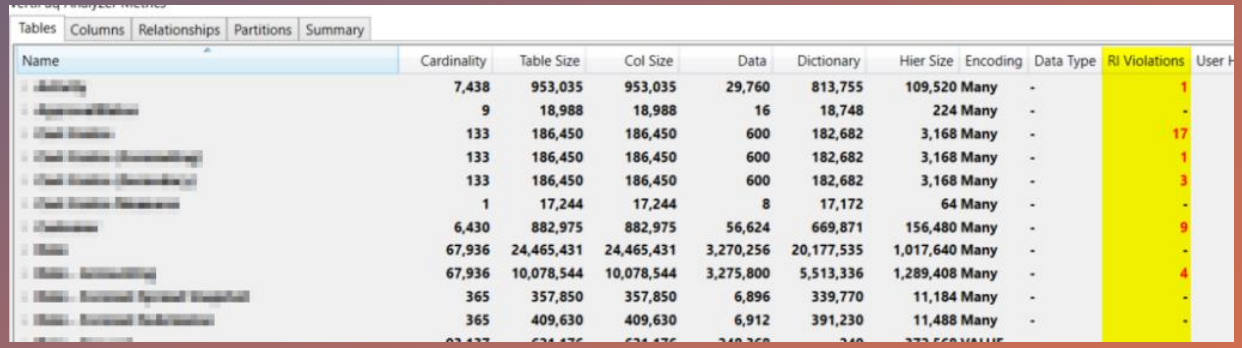






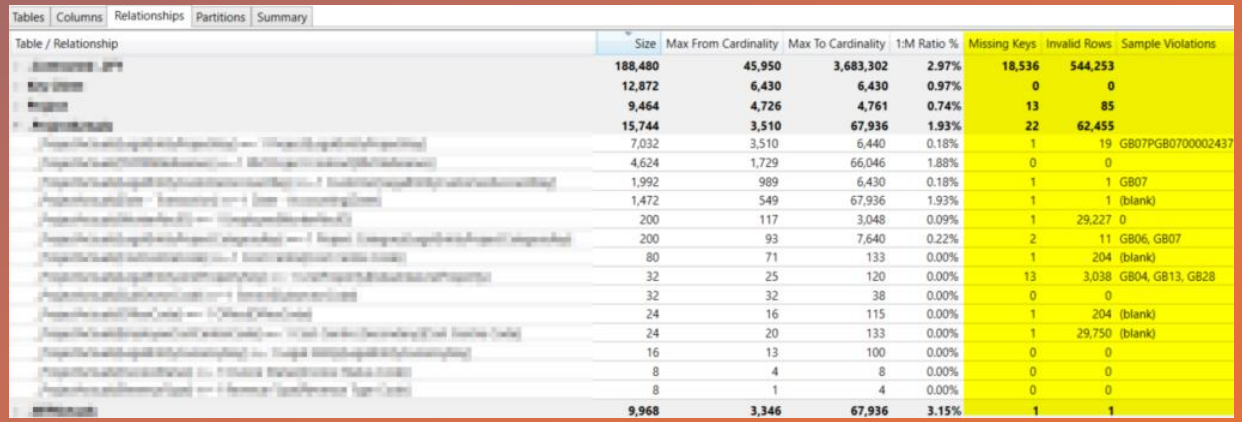
Data should be clean and aligned

Make sure you do not have referential integrity violations



Tables | Columns | Relationships | Partitions | Summary

Name	Cardinality	Table Size	Col Size	Data	Dictionary	Hier Size	Encoding	Data Type	RI Violations	User H
[redacted]	7,438	953,035	953,035	29,760	813,755	109,520	Many	-	1	
[redacted]	9	18,988	18,988	16	18,748	224	Many	-	-	
[redacted]	133	186,450	186,450	600	182,682	3,168	Many	-	17	
[redacted]	133	186,450	186,450	600	182,682	3,168	Many	-	1	
[redacted]	133	186,450	186,450	600	182,682	3,168	Many	-	3	
[redacted]	1	17,244	17,244	8	17,172	64	Many	-	-	
[redacted]	6,430	882,975	882,975	56,624	669,871	156,480	Many	-	9	
[redacted]	67,936	24,465,431	24,465,431	3,270,256	20,177,535	1,017,640	Many	-	-	
[redacted]	67,936	10,078,544	10,078,544	3,275,800	5,513,336	1,289,408	Many	-	4	
[redacted]	365	357,850	357,850	6,896	339,770	11,184	Many	-	-	
[redacted]	365	409,630	409,630	6,912	391,230	11,488	Many	-	-	



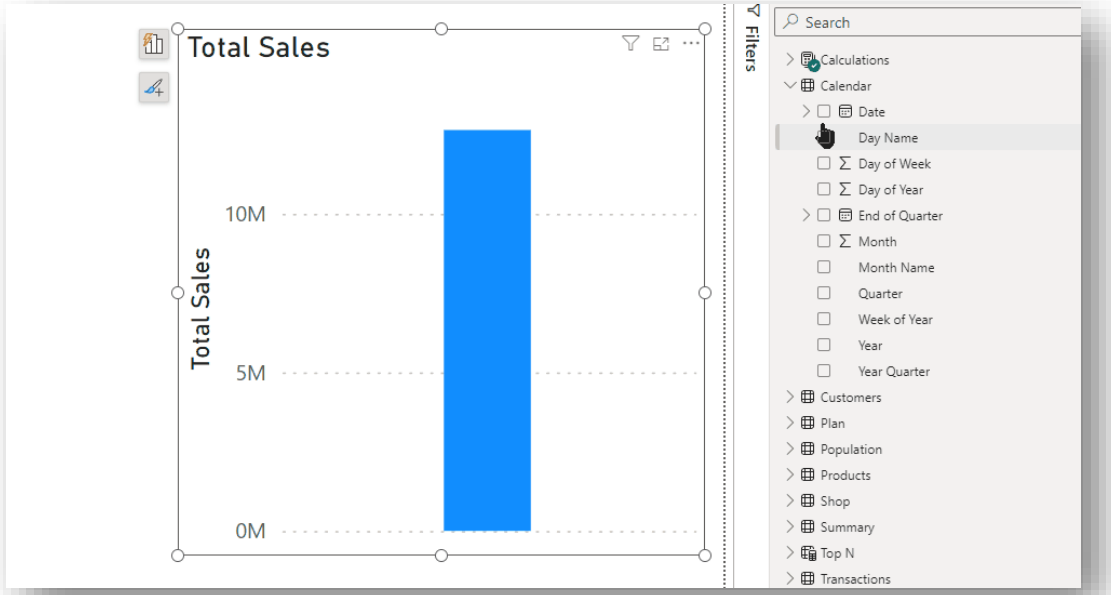
Tables | Columns | Relationships | Partitions | Summary

Table / Relationship	Size	Max From Cardinality	Max To Cardinality	1:M Ratio %	Missing Keys	Invalid Rows	Sample Violations
[redacted]	188,480	45,950	3,683,302	2.97%	18,536	544,253	
[redacted]	12,872	6,430	6,430	0.97%	0	0	
[redacted]	9,464	4,726	4,761	0.74%	13	85	
[redacted]	15,744	3,510	67,936	1.93%	22	62,455	
[redacted]	7,032	3,510	6,440	0.18%	1	19	GB07PGB0700002437
[redacted]	4,624	1,729	66,046	1.88%	0	0	
[redacted]	1,992	989	6,430	0.18%	1	1	GB07
[redacted]	1,472	549	67,936	1.93%	1	1	(blank)
[redacted]	200	117	3,048	0.09%	1	29,227	0
[redacted]	200	93	7,640	0.22%	2	11	GB06, GB07
[redacted]	80	71	133	0.00%	1	204	(blank)
[redacted]	32	25	120	0.00%	13	3,038	GB04, GB13, GB28
[redacted]	32	32	38	0.00%	0	0	
[redacted]	24	16	115	0.00%	1	204	(blank)
[redacted]	24	20	133	0.00%	1	29,750	(blank)
[redacted]	16	13	100	0.00%	0	0	
[redacted]	8	4	8	0.00%	0	0	
[redacted]	8	1	4	0.00%	0	0	
[redacted]	9,968	3,346	67,936	3.15%	1	1	

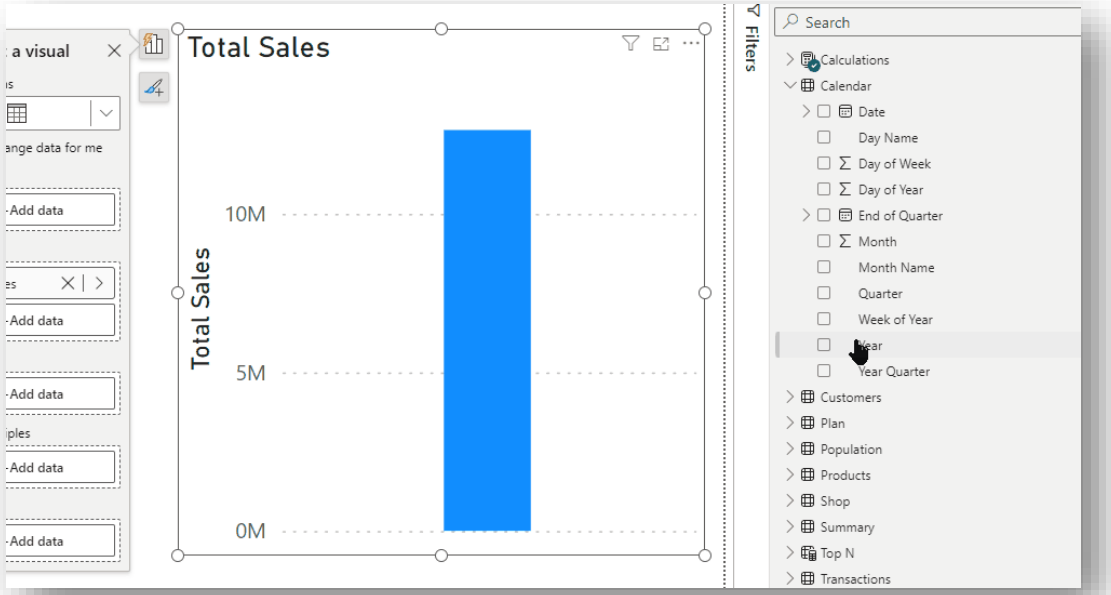
https://selfservicebi.co.uk/referential-integrity-violations-in-a-data-model-what-are-those/

Make sure the data behaves as expected - Sorting

Sorting not set:

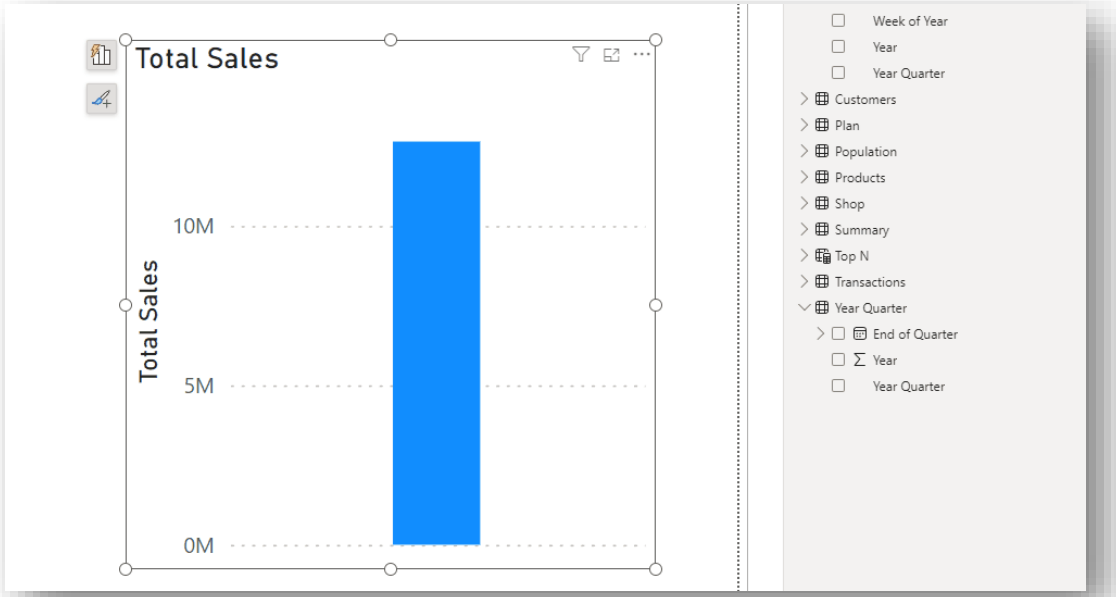


Sorting set:

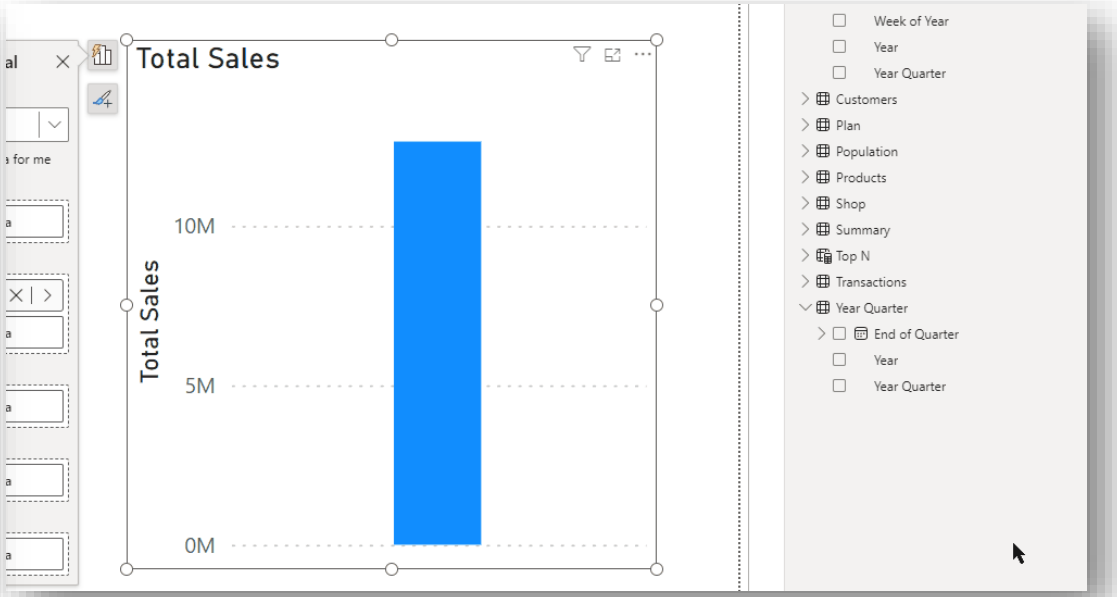


Make sure the data behaves as expected - Summarization

Summarization not set correctly:

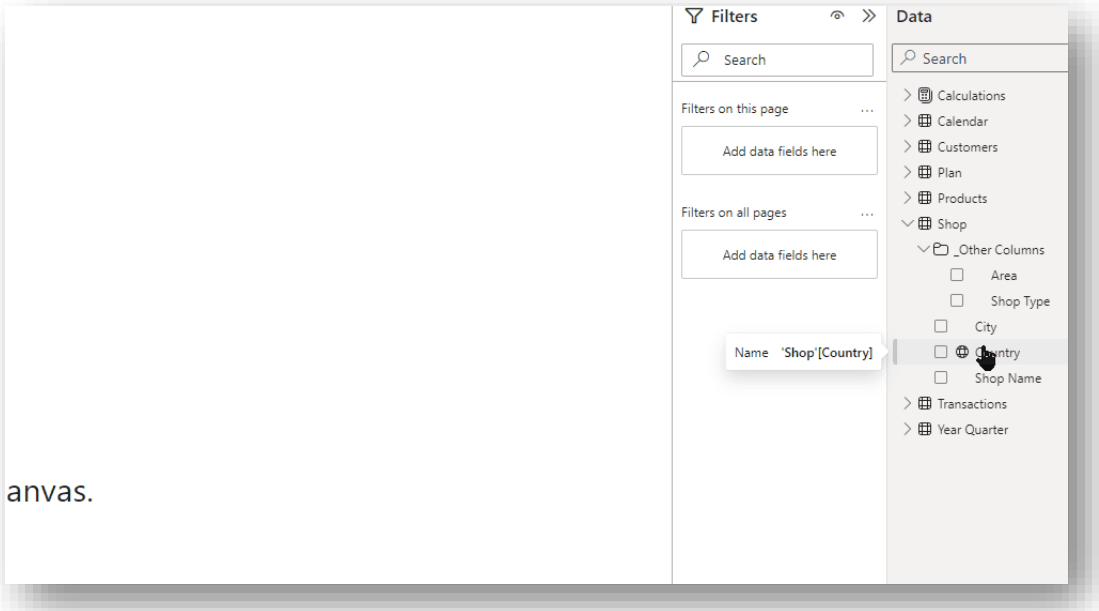


Summarization set correctly:

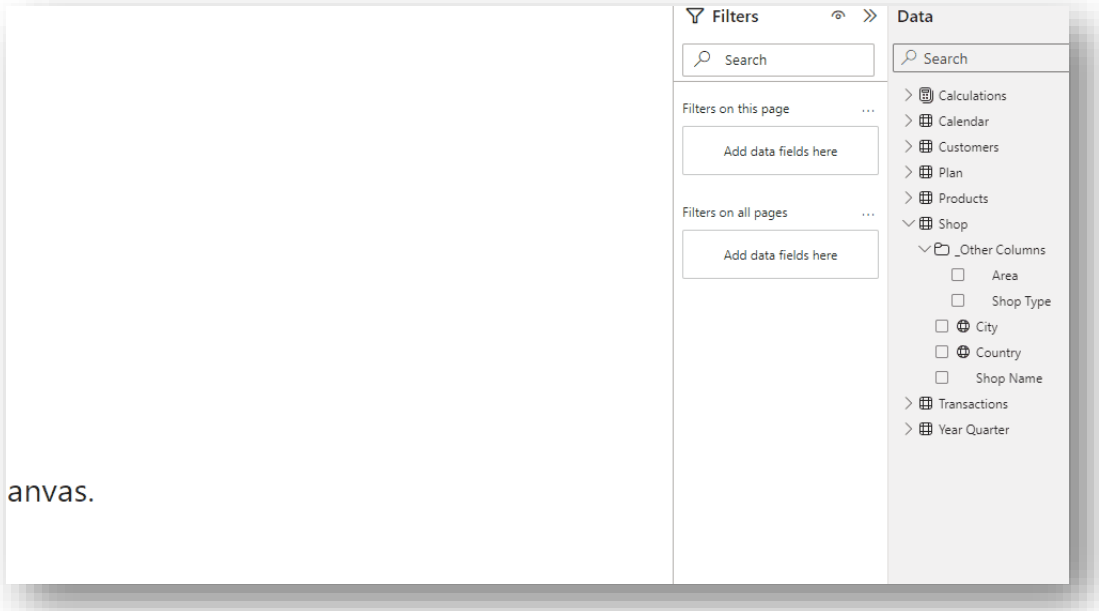


Make sure the data behaves as expected – Data Category

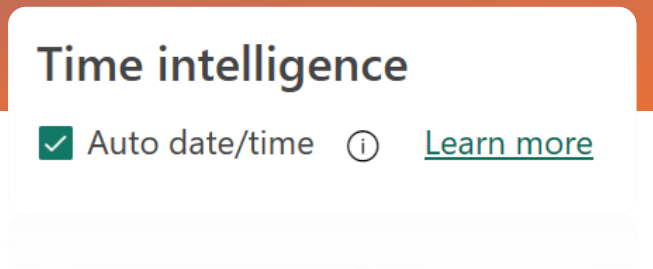
Data category not set correctly:



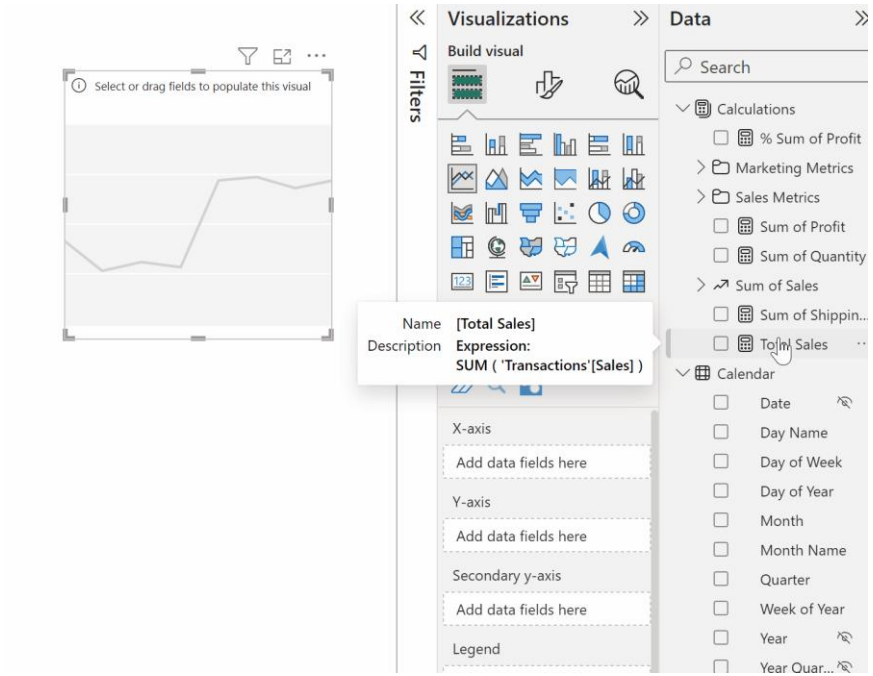
Data Category set correctly:



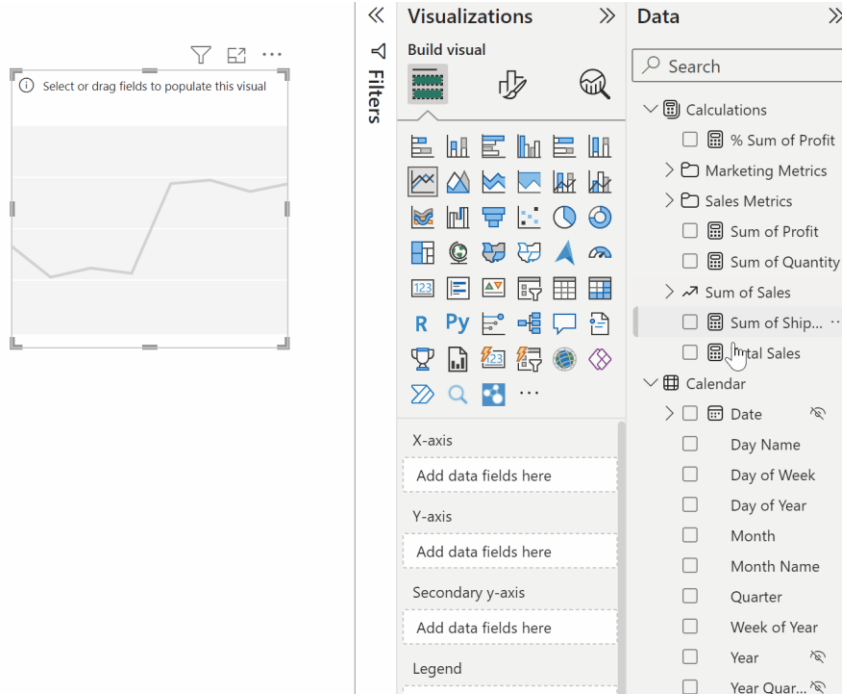
Make sure the data behaves as expected – Auto Date Time



Auto date time disabled:

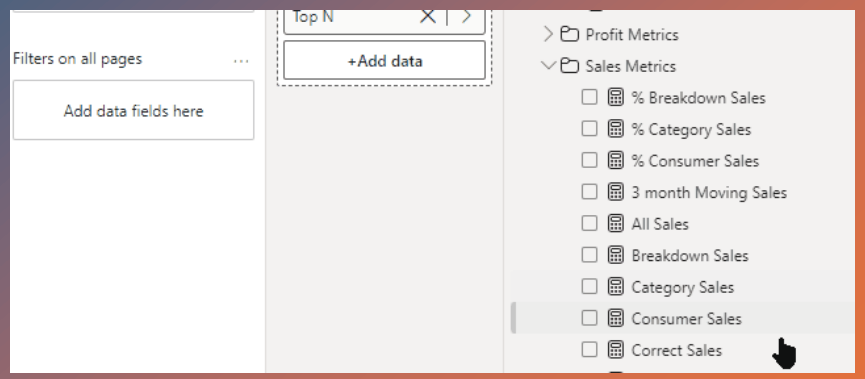


Auto date time enabled:



Warning this is controversial suggestion!

```
3 month Moving Sales =
IF([Total Sales],
CALCULATE (
    [Total Sales],
    DATESBETWEEN (
        'Calendar'[Date],
        CALCULATE ( MAX ( 'Calendar'[Date] ), DATEADD ( 'Calendar'[Date], -3, MONTH ) ) + 1,
        MAX ( 'Calendar'[Date] )
    )
)
)
```



Make your measures understandable

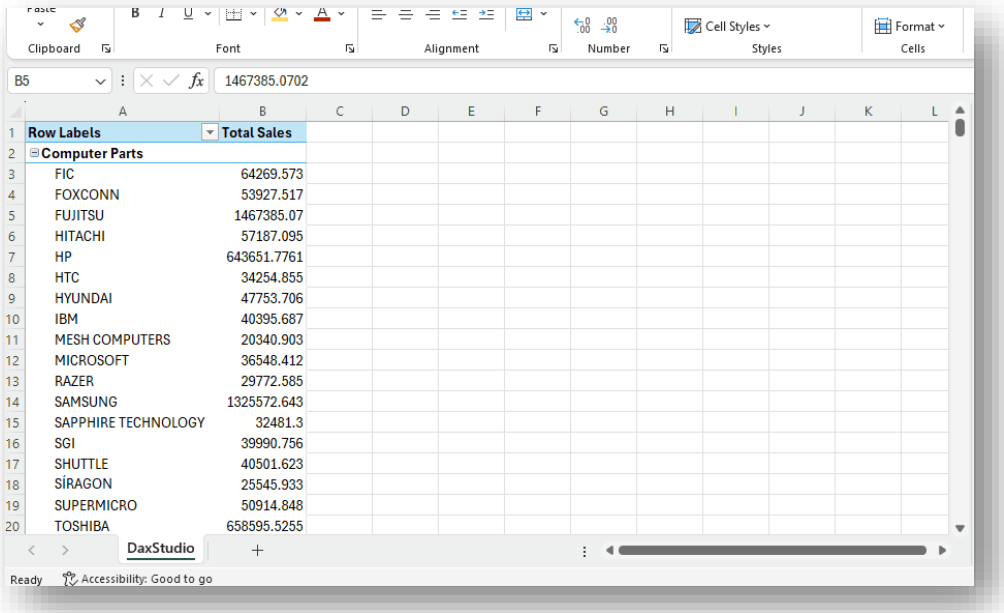
- Give meaningful names
- Only keep visible the reusable measures (hide any intermediary or report specific measures)
- Format your measures
- Add the measure definition to the description
- Semantic Layer measures should not contain design related logic (like +0)

Think about all your potential users

- Do not only think about Power BI report creators
- Analyze in Excel in many cases are more likely used for quick data discovery
- Also, you can improve your reach even further by setting up Organizational Data Types

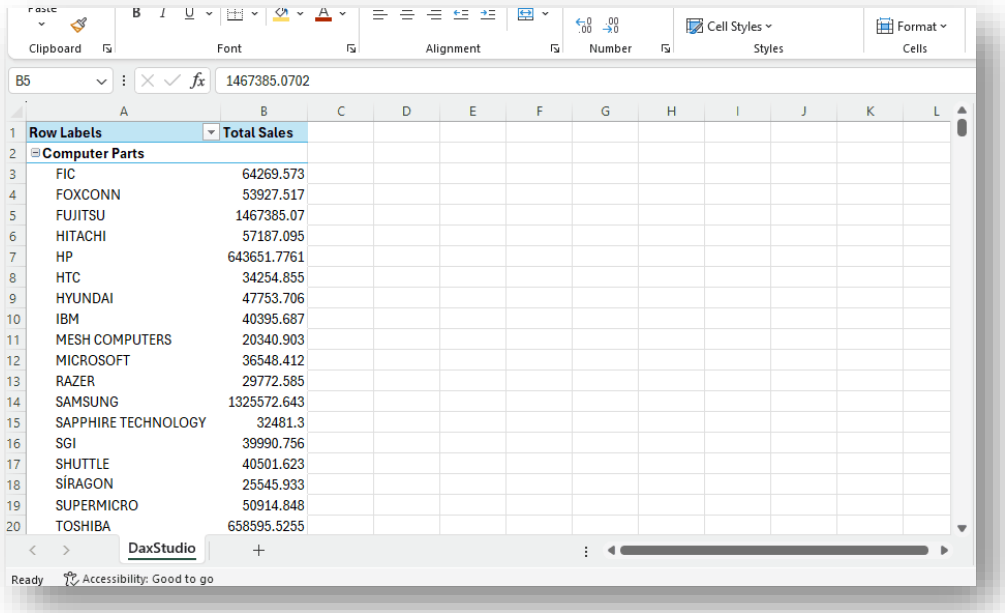
Accommodate Excel Features – Show Details

Detailed Rows Expression not set:



Row Labels	Total Sales
Computer Parts	
FIC	64269.573
FOXCONN	53927.517
FUJITSU	1467385.07
HITACHI	57187.095
HP	643651.7761
HTC	34254.855
HYUNDAI	47753.706
IBM	40395.687
MESH COMPUTERS	20340.903
MICROSOFT	36548.412
RAZER	29772.585
SAMSUNG	1325572.643
SAPPHIRE TECHNOLOGY	32481.3
SGI	39990.756
SHUTTLE	40501.623
SÍRAGON	25545.933
SUPERMICRO	50914.848
TOSHIBA	658595.5255

Detailed Rows expression set correctly:



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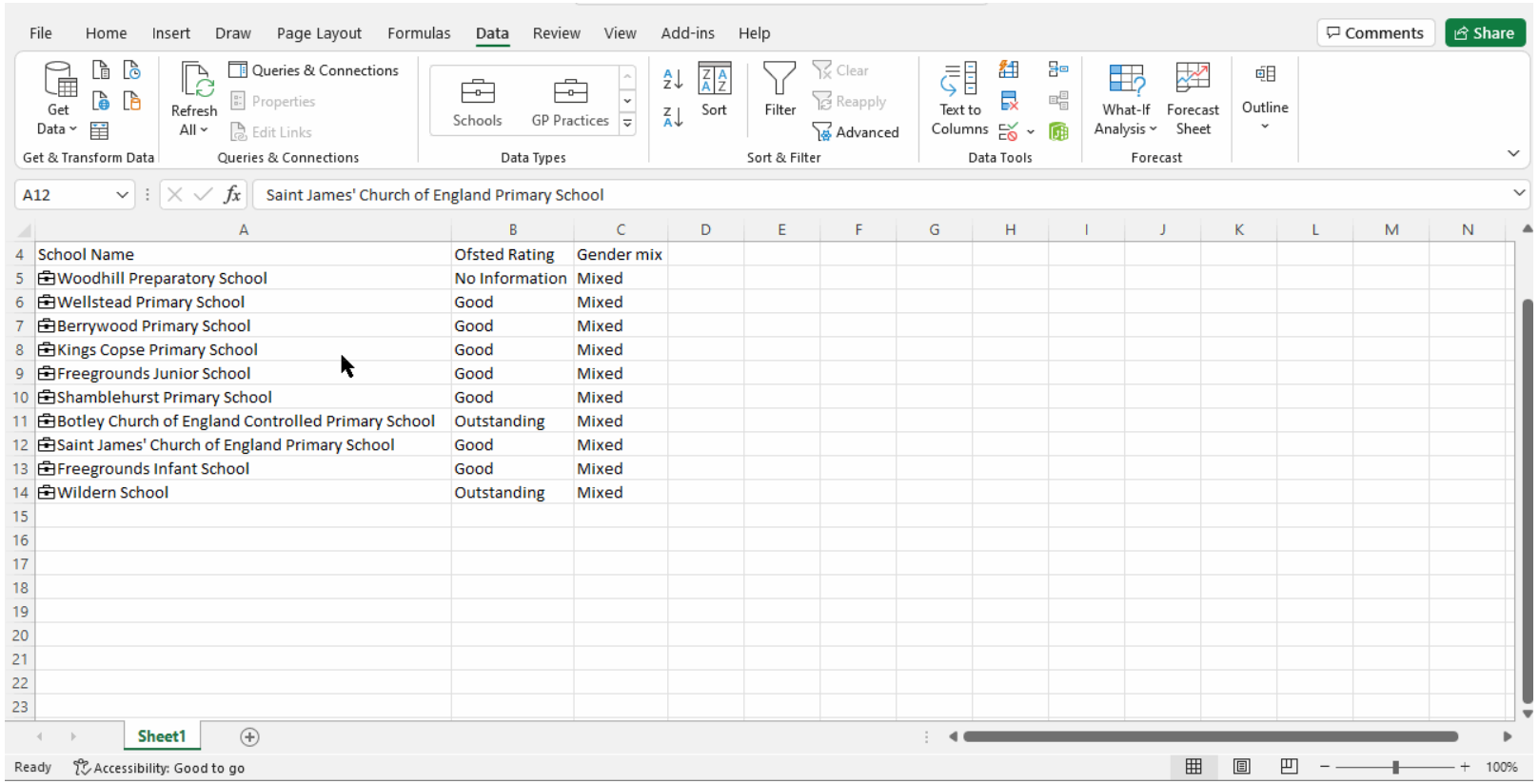
https://selfservicebi.co.uk/hidden-features-of-analyze-in-excel-part-1-show-me-the-details/

Accommodate Excel Features – Data Types



https://selfservicebi.co.uk/organizational-data-types-supercharge-your-excel-users-productivity

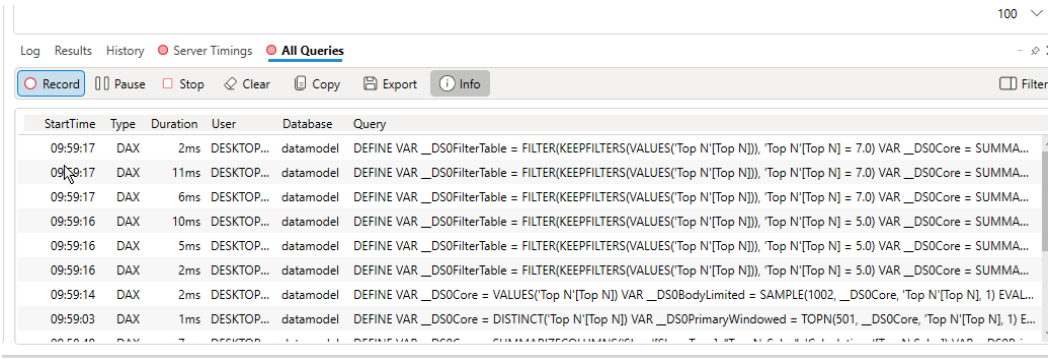
Continuously Optimize Performance

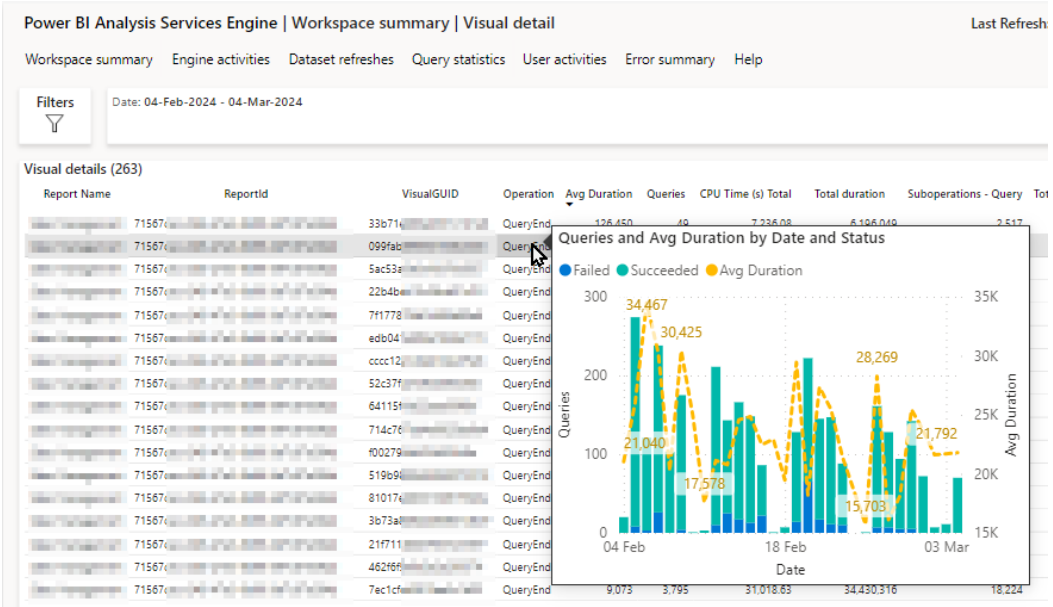
During Development:

- Use tools like Performance Analyzer and DAX Studio to test and optimize the performance.

During Production:

- Use Log Analytics to continuously monitor performance and proactively optimize based on utilization patterns





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These same principles will make our semantic layer Copilot Ready!