Power BI on a Diet - 5 TIPS to Slim Down Your Semantic Models

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Power BI & Fabric SUMMIT 2026

Special thanks to Fabric and Power BI Team at

Microsoft

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- ✓ Blogger, Speaker & Hiker
- ✓ Automation & Optimization

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Why Data Size Matters?

1 GB

VS.

2 GB

- Longer refresh times
- Slower query performance
- Longer waiting time while editing & publishing the model
- Higher memory requirements
- Higher data transfer costs
- Higher data storage cost
- More frequent failures = more retries
- Higher electricity consumption = more Carbon emissions

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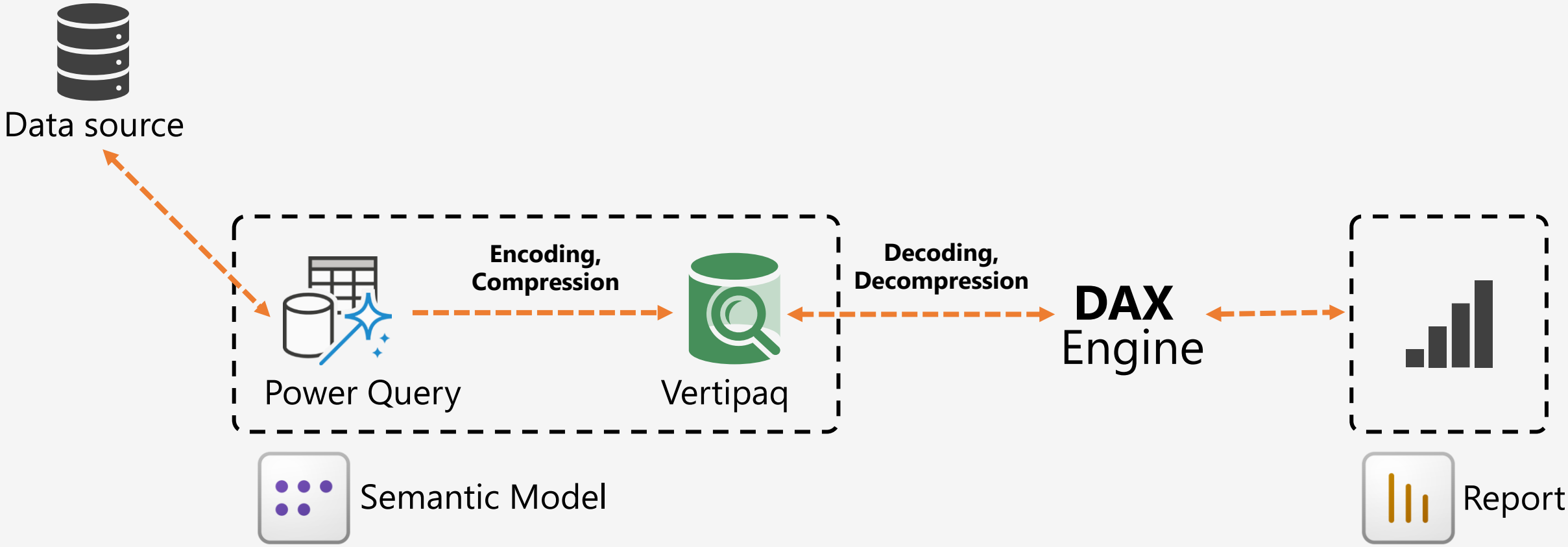
Typical Data Flow



*Oversimplified for clarity

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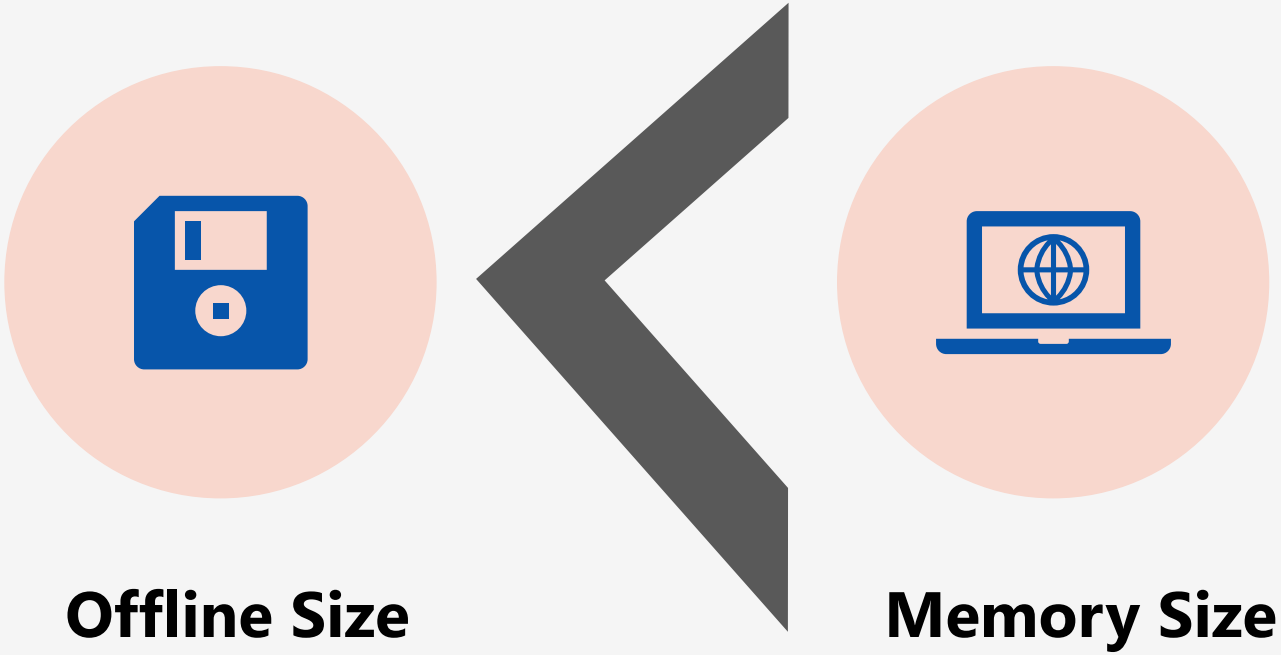
Semantic Model Size

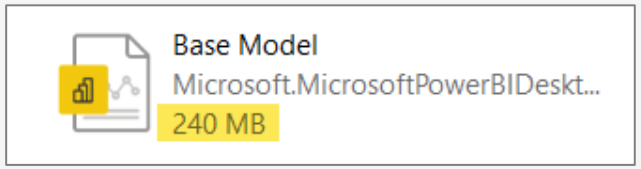


Memory size is always greater than the offline size

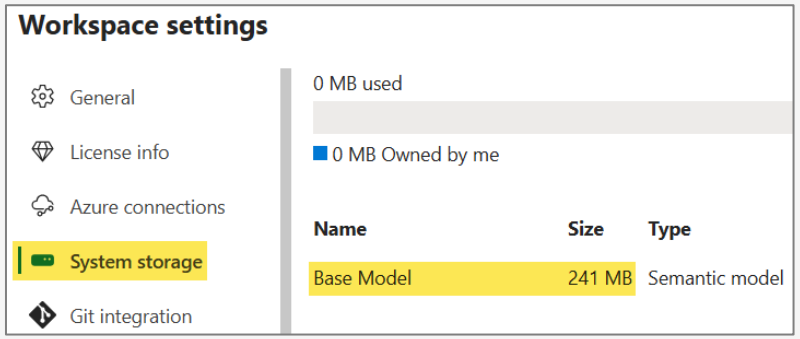
How can I find out the size of my model?

Offline Size

- **Local machine:** Windows explorer

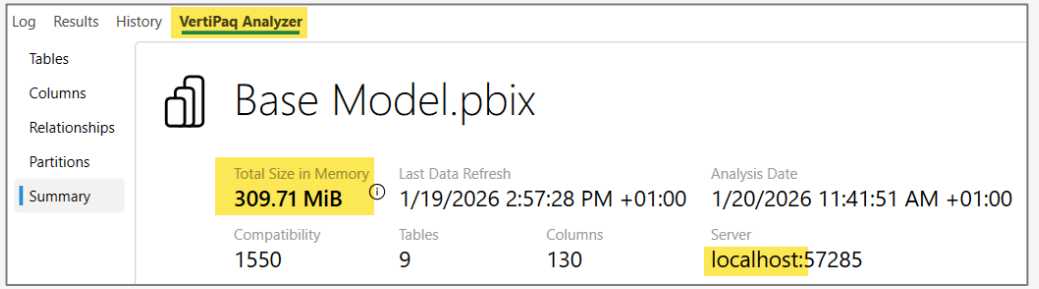


- **Workspace:** Workspace settings > System storage

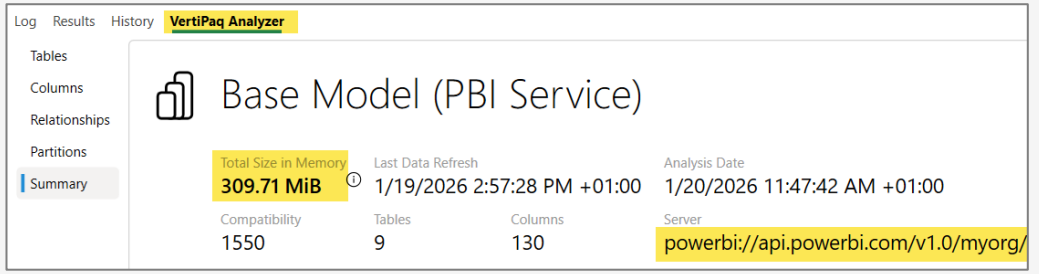


Memory Size

- **Local machine:** Vertipaq Analyzer



- **Workspace:** Vertipaq Analyzer



TIP 1: Disable auto date/time

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Auto date/time

- When the auto date/time is enabled, Power BI Desktop creates a hidden auto date/time table for **each date column** in the model.
- These tables are **permanently hidden**. They don't appear in the Fields pane or the Model view diagram, or in the Table view.
- The table and its column **can't** be directly referenced by DAX expressions.
- They don't work when using **Analyze in Excel**.
- What's the point of auto date/time tables?
  - To support convenient time intelligence reporting based on date columns loaded into a model

Best practice: **Disable auto date/time and add a date table in your semantic models**

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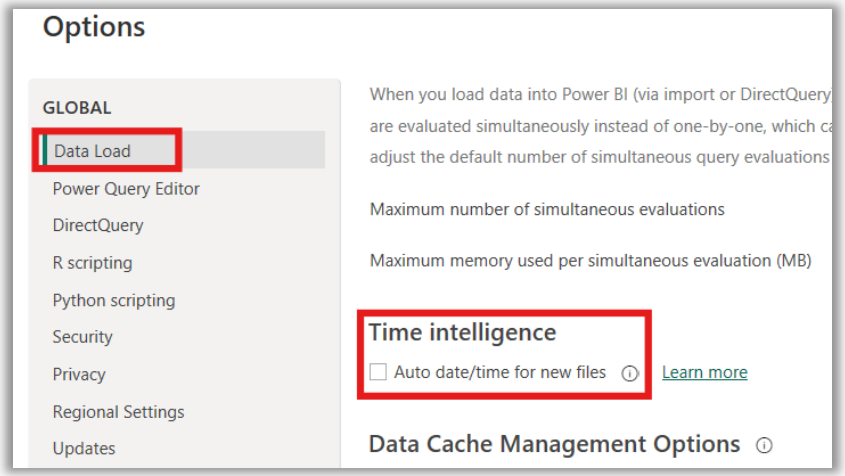
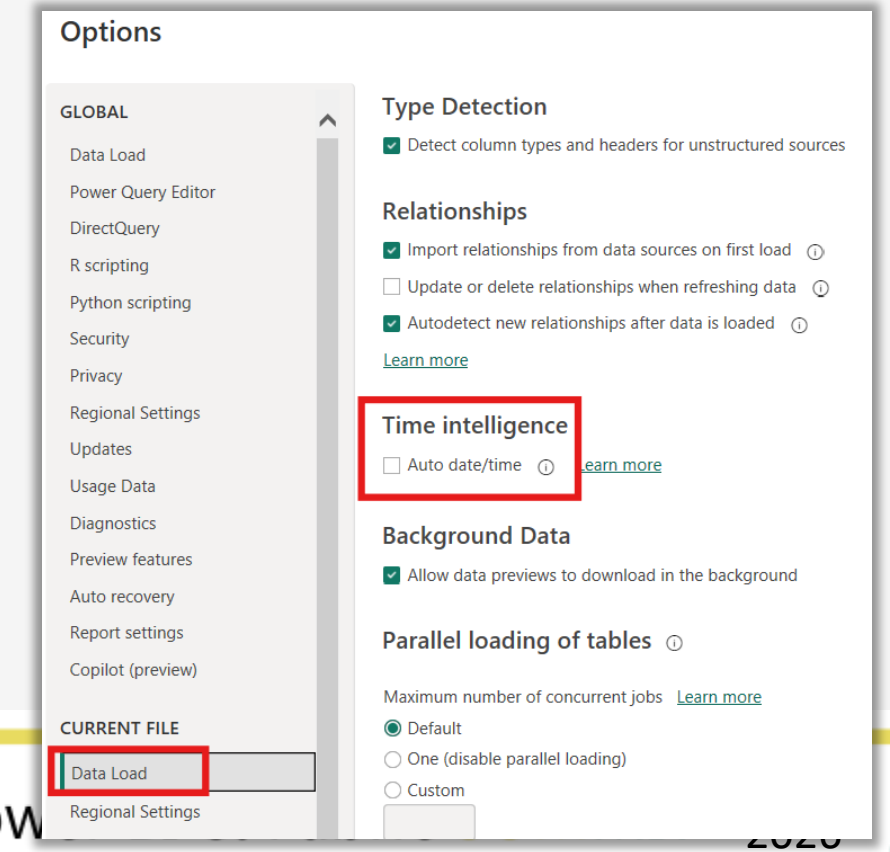
Disable auto date/time

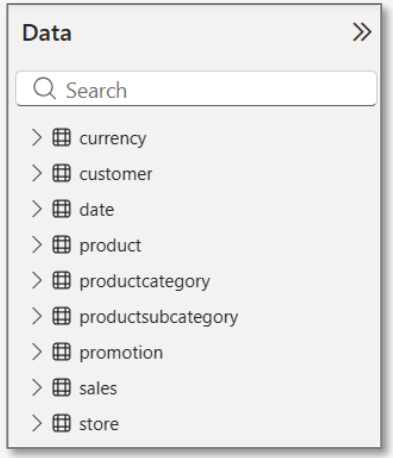
- Auto date/time can be configured *globally* or for the *current file*
  - *Global* option applies to new Power BI Desktop files
  - *Current file* option applies to the current file
- They can be turned on or off at any time.
- **Recommendation**: Disable auto date/time for both global and current file
  - File > Options and settings > Options > GLOBAL > Time intelligence
  - File > Options and settings > Options > CURRENT FILE > Time intelligence

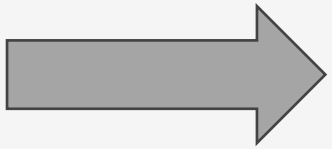


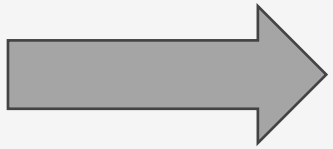


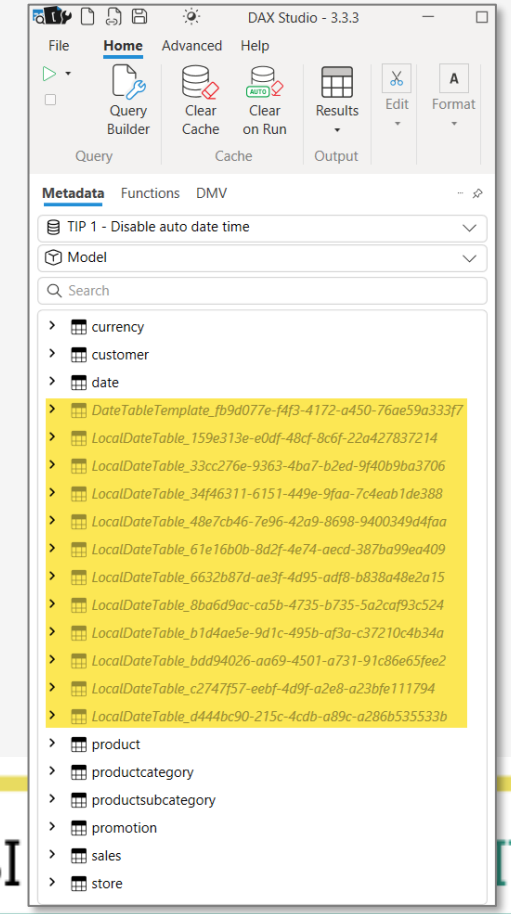
Tool: DAX Studio

- Is there a way to view the auto date/time tables when they are hidden from the model?
- How can we find out how much space the auto date/time tables use?









TIP 2: Only load the rows and columns that are necessary

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Only load the rows that are necessary

- Do you really need all that data in your fact tables?
- If you're making a report only for actuals, then why load data for forecasts?
- Filter out the data whenever you can and load only the rows necessary for your report
- You can always load the additional data later when required
- Following dimensions can be a good starting point:
  - Years
  - Scenarios
  - Geography

Remove the columns that are not required

Types of columns in a table

- **Primary or alternate key:** column contains unique value for each row - *keep only if used for relationships*
- **Qualitative attributes:** column can be text or number, used to group or filter rows - *keep*
- **Quantitative attributes:** column is a number and used for calculations or filtering - *keep*
- **Descriptive attributes:** column contains text providing additional information about a row but never used in filters or calculations - *keep only if required for drill-through operations*
- **Technical attributes:** Information recorded for technical reason without a business value - *keep only if required for drill-through operations*

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TIP 3: Set the correct data type for columns

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Set the correct data type for columns

- Different data types consume different amounts of storage space
- Data type affects the encoding method used by the VertiPaq Engine
- The encoding method affects the final storage acquired by the column
- **Look out for data type impostors:**
  - integers stored as decimals or text
  - decimals stored as text

TIP 4: Optimize datetime columns

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Concept: Column Cardinality

- The number of unique values in a column.
- This number is important for reducing column size and directly affects VertiPaq performance.
- DAX operations, including iterations and filters, depend directly on this number.
- **Column cardinality is more significant than the total number of rows in the table.**

What is the minimum level of granularity at which the data should be presented in the report?

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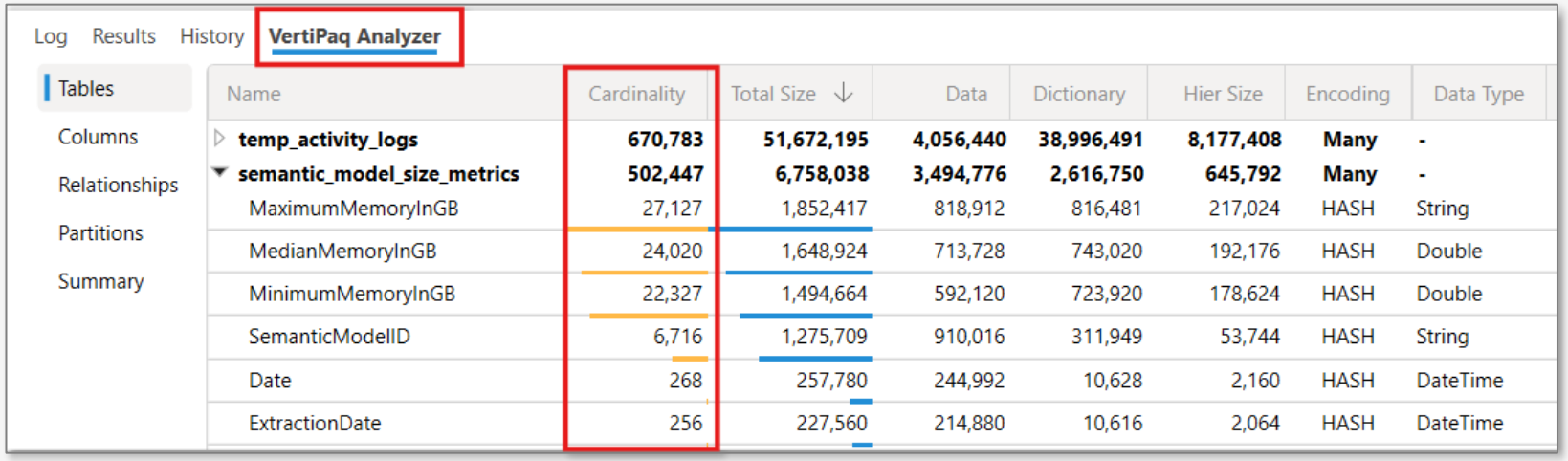
Tool: Vertipaq Analyzer

- How can you check the cardinality of a column?
- Tool to analyze VertiPaq storage structures and data model details in Power BI.
- Available with DAX Studio: **Advanced > View Metrics**

VertiPaq Analyzer



Name	Cardinality	Total Size	Data	Dictionary	Hier Size	Encoding	Data Type
temp_activity_logs	**670,783**	**51,672,195**	**4,056,440**	**38,996,491**	**8,177,408**	**Many**	**-**
semantic_model_size_metrics	**502,447**	**6,758,038**	**3,494,776**	**2,616,750**	**645,792**	**Many**	**-**
MaximumMemoryInGB	27,127	1,852,417	818,912	816,481	217,024	HASH	String
MedianMemoryInGB	24,020	1,648,924	713,728	743,020	192,176	HASH	Double
MinimumMemoryInGB	22,327	1,494,664	592,120	723,920	178,624	HASH	Double
SemanticModelID	6,716	1,275,709	910,016	311,949	53,744	HASH	String
Date	268	257,780	244,992	10,628	2,160	HASH	DateTime
ExtractionDate	256	227,560	214,880	10,616	2,064	HASH	DateTime

Cardinality of datetime columns

- Do our users prefer the report in milliseconds or in seconds?
- Do you **really** need the datetime to the lowest detail?
  - **Date:** 10 years of date = 3,700 unique values
  - **Time:** 1 day = unique value based on the precision

Unit	Cardinality
Hour	24
15 Minutes	96
5 Minutes	288
Minute	1,440
Second	86,400
Milisecond	86,400,000

The higher the cardinality of the column, the higher the storage required for the column – reduce cardinality to reduce size

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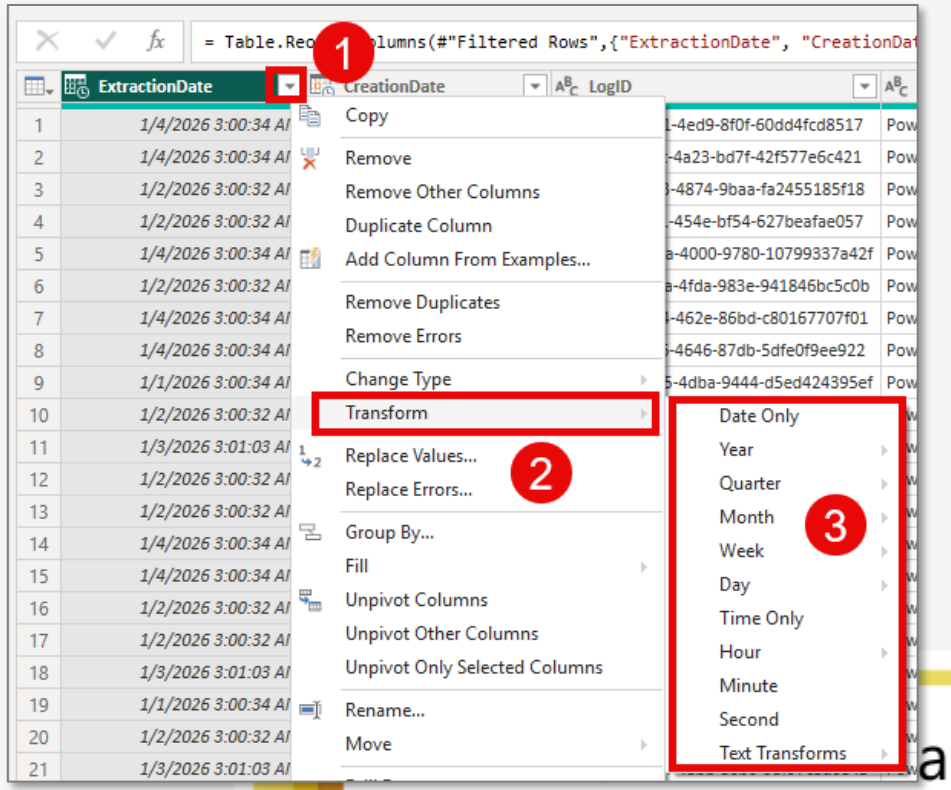
Optimize datetime columns

- Remove the time part if not required
- Round the time to acceptable granularity, e.g., 5 second interval, 30 minutes interval, etc.
- Split the date and time into two different columns



TIP 5: Optimize high precision (decimal) columns

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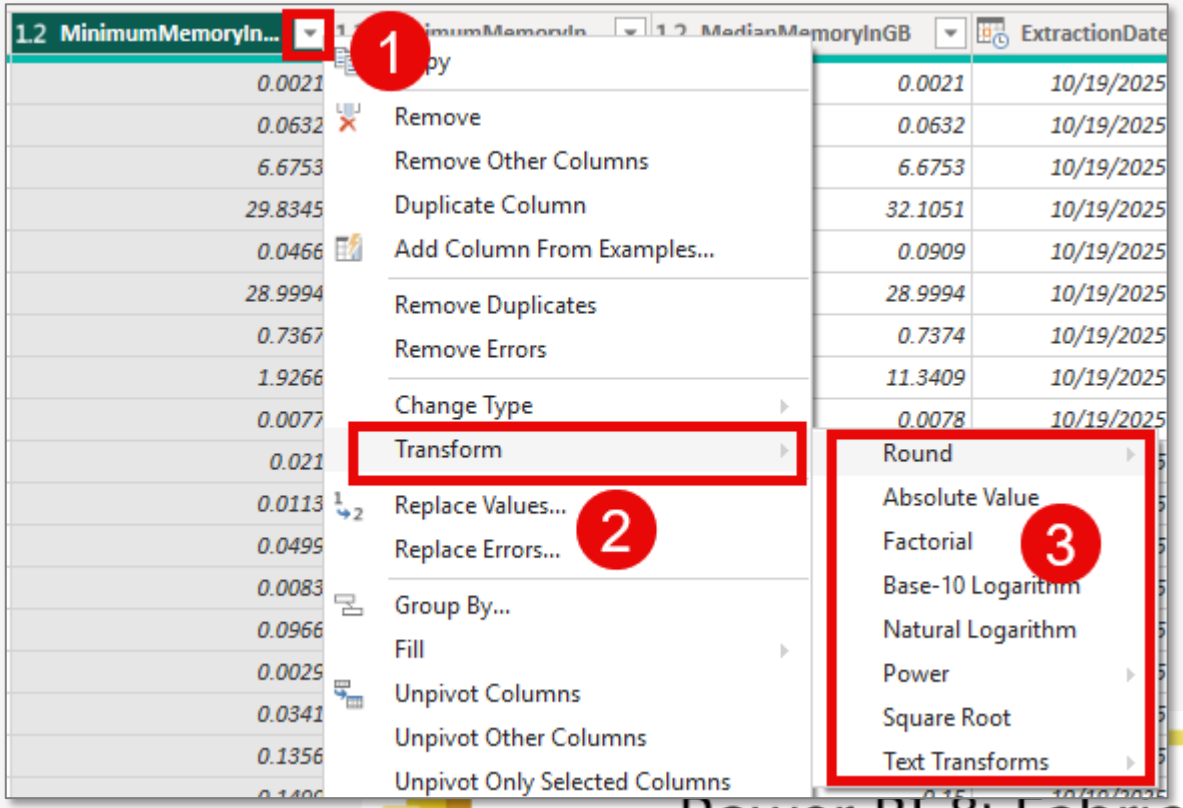
Cardinality of high precision columns

- Do our users like to see a value like 123.45678 in the report?
- Do we really need to keep the floating columns to 5 digits after the decimal?
- In most cases, it's acceptable to show 123.5 or 123.46

Each digit increases the cardinality of the column

Optimize high precision columns

- Round the column to acceptable granularity, e.g., 2 digits after the decimal
- Split the integer and decimal parts into two different columns



Concept: Roche's Maxim of Data Transformation

Data should be transformed as far "upstream" as possible, and as far "downstream" as necessary

"upstream" means closer to where the data is originally produced
"downstream" means closer to where the data is consumed

Have the data already available in the format you need it to be in

Ask the data source team to do the transformations in the source if possible

Summary

- **TIP 1:** Disable auto date/time
- **TIP 2:** Only load the rows and columns that are necessary
- **TIP 3:** Set the correct data type for columns
- **Column Cardinality:** Reduce the number of unique values in a column
  - **TIP 4:** Datetime columns: Only keep the lowest level of time detail required for your report
  - **TIP 5:** Decimal columns: Round to a decimal digit sufficient for your report
- Use Vertipaq Analyzer to analyze the storage distribution of your model
- **Roche's Maxim:** Move the data transformations closer to the data source

Get the slides…

https://github.com/DhyanRathore/Presentations/tree/main/2026/20260224_PowerBI&FabricSummit2026

Thank You!!

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