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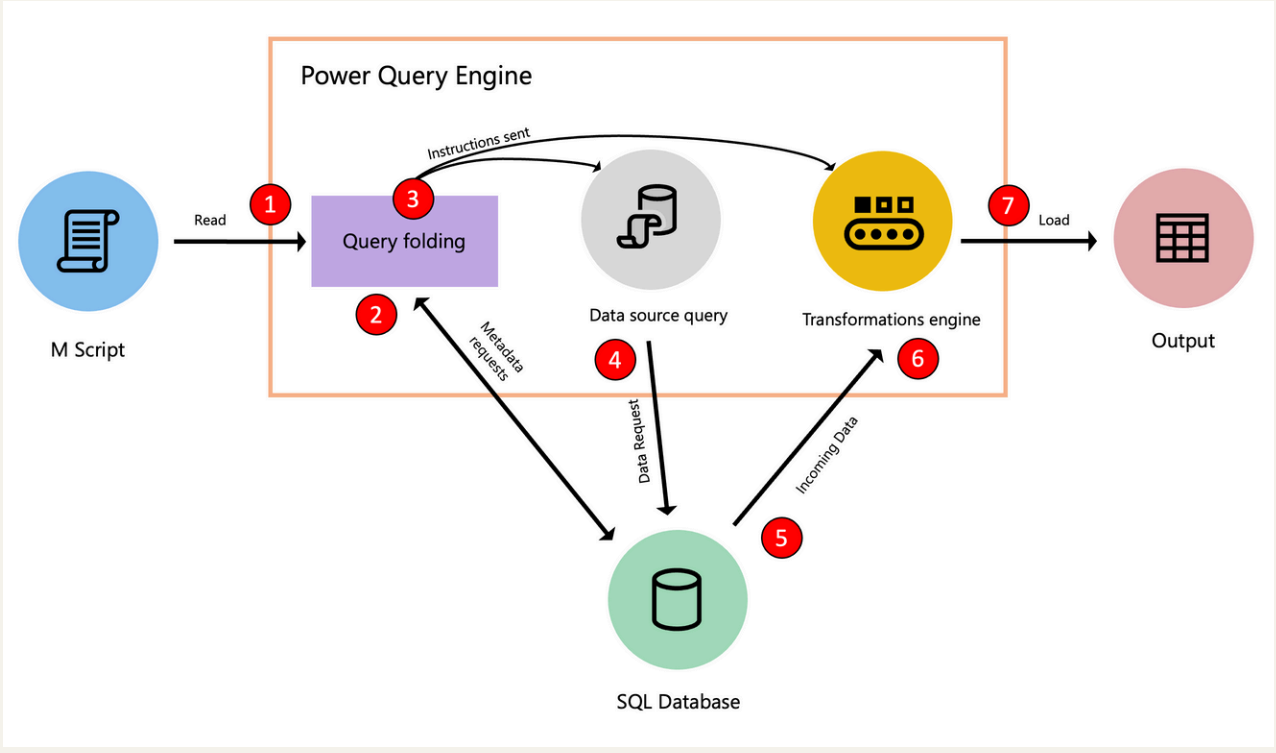
# Power BI Query Folding

TRANSFORM YOUR DATA INTO DECISIONS!

# Query Folding

**Query folding** is the process where Power Query translates your steps (transformations) into a single SQL query that runs on the data source, not on your machine. It improves overall performance and speeds up load time by reducing what's pulled into memory.

The most obvious beneficiary of query folding is **relational database** sources, such as **SQL Server**, **Oracle**, or **MySQL**. However, it`s not just that SQL databases take advantage of the query folding concept. Essentially, any data source that supports some kind of querying language, can possibly take advantage of query folding. Those other data sources are **OData**, **SSAS**, **Sharepoint lists**, **Exchange** and **AD**.


Power Query Engine
Instructions sent
Read
1
3
Query folding
2
Metadata requests
Data source query
4
Data Request
Transformations engine
6
Incoming Data
5
7
Load
M Script
Output
SQL Database

# Importance of Query Folding

- Ensures faster query execution.
- Reduced memory usage in Power BI.
- Allows efficient incremental refresh.
- Makes troubleshooting and optimization easier.

# Limitations of Query Folding

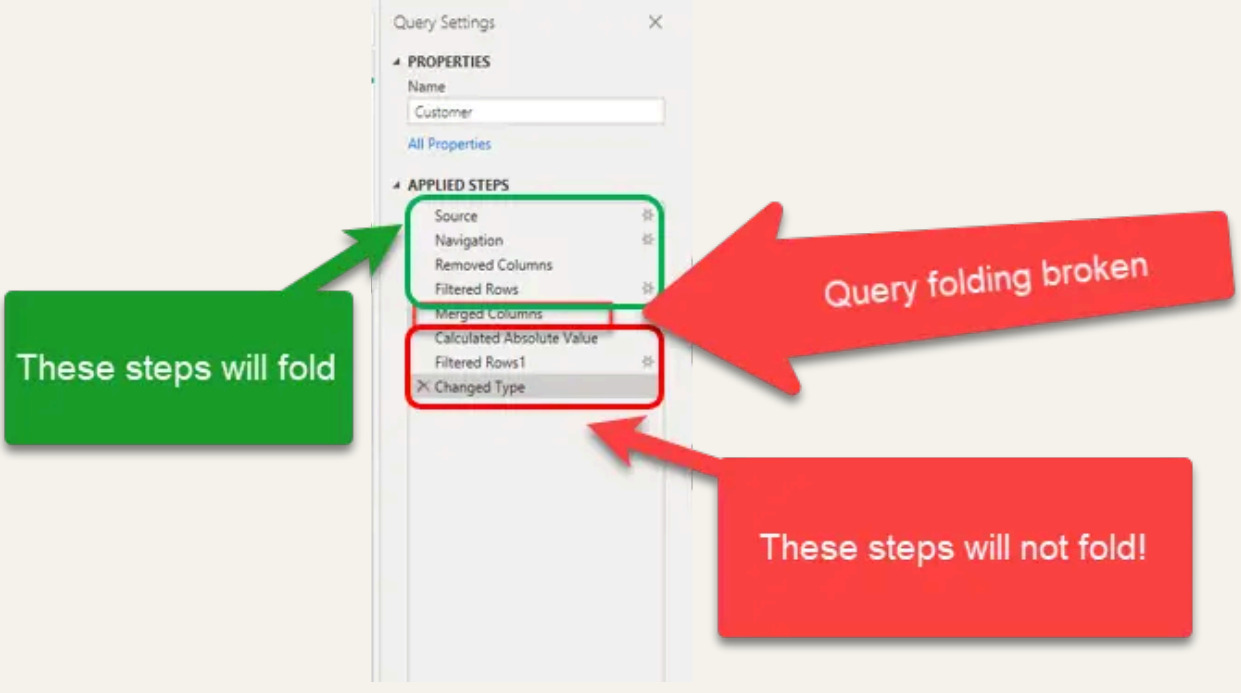
- Not all steps support query folding - some transformations (e.g., adding a custom column with a complex formula) break query folding.
- Query folding only works with data sources that support querying, such as relational databases.
- If one step breaks query folding, subsequent steps may not fold either.

# Actions Keep Folding Intact

Basic Transformations like:
✓ Removing columns
✓ Filtering rows
✓ Sorting
✓ Pivot/Unpivot
✓ Renaming fields
✓ Grouping data
✓ Merge/Join (in some cases)

# When Folding Breaks

Some transformations cause Power Query to stop folding:
❌ Complex logic in custom columns
❌ Manual value replacements
❌ Using Python or R scripts


Query Settings
PROPERTIES
Name
Customer
All Properties
APPLIED STEPS
Source
Navigation
Removed Columns
Filtered Rows
Merged Columns
Calculated Absolute Value
Filtered Rows1
Changed Type
These steps will fold
Query folding broken
These steps will not fold!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# Query Folding Indicators

**Query folding indicators** help you understand the steps that fold or don't fold. With query folding indicators, it becomes obvious when you make a change that breaks folding. This feature helps you to more easily resolve issues quickly, avoid performance issues in the first place, and have better insight into your queries.

| Indicator | Icon | Description |
|---|---|---|
| Folding |  | The folding indicator tells you that the data source evaluates the query up to this step. |
| Not folding |  | The not-folding indicator tells you that some part of the query up to this step is evaluated outside the data source. You can compare it with the last folding indicator, if there's one, to see if you can rearrange your query to be more performant. |
| Might fold |  | Might fold indicators are uncommon. They mean that a query "might" fold. They indicate either that folding or not folding is determined at runtime, when pulling results from the query, and that the query plan is dynamic. These indicators likely only appear with ODBC or OData connections. |
| Opaque |  | Opaque indicators tell you that the resulting query plan is inconclusive for some reason. It generally indicates that there's a true "constant" table, or that the indicators and query plan tool doesn't support that transform or connector. |
| Unknown |  | Unknown indicators represent an absence of a query plan, either due to an error or attempting to run the query plan evaluation on something other than a table (such as a record, list, or primitive). |

**Note:** The query folding indicators feature is available only for Power Query Online.

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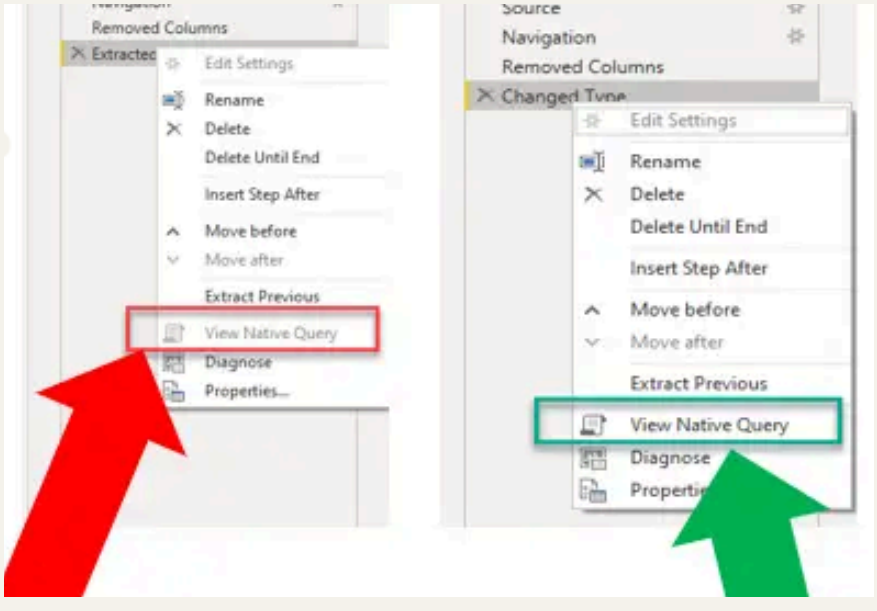
# Check For Query Folding

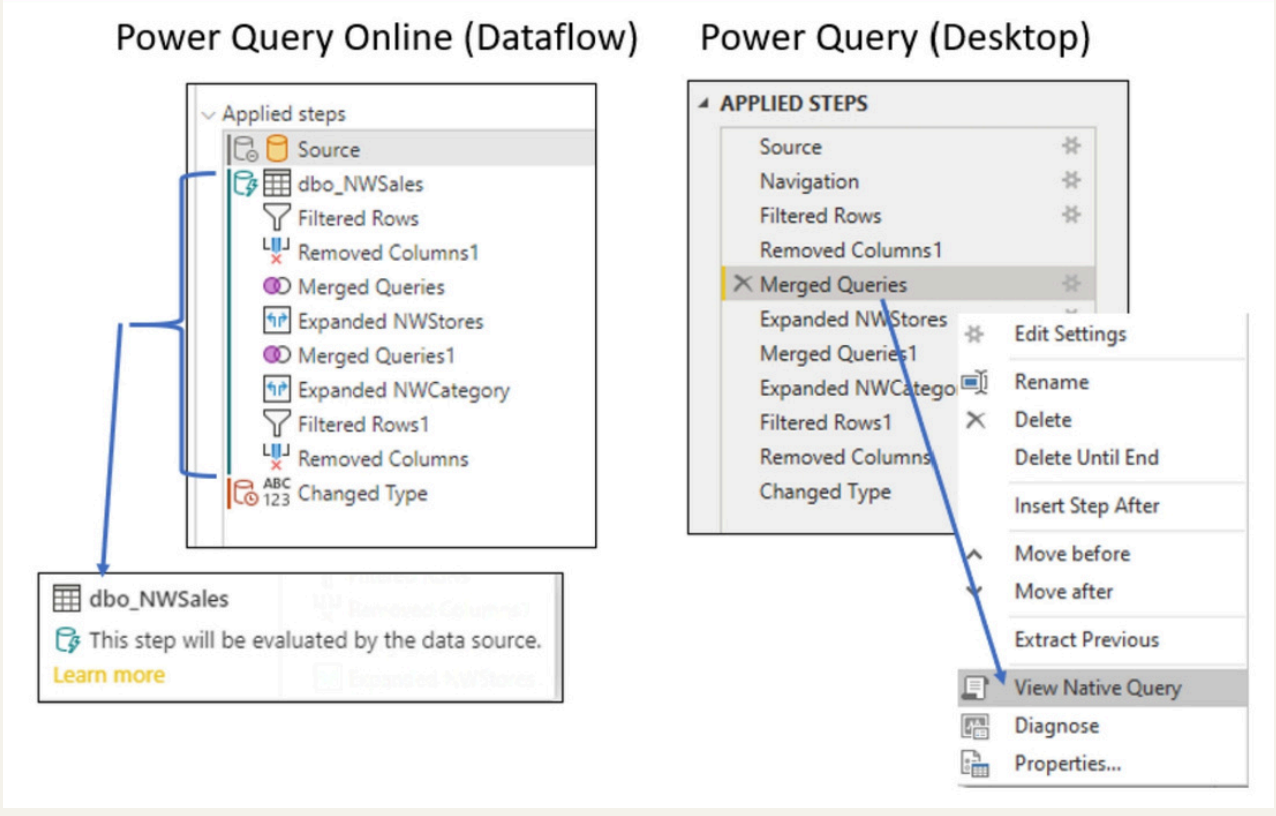
1. Open **Power Query Editor** Go to Power BI.
2. Right-Click on a Step in the **APPLIED STEPS** pane.
3. Choose '**View Native Query**' Option

If it's available ✅: Folding is happening
If it's greyed out ❌: Folding has been interrupted




Not Happening

Happening


Power Query Online (Dataflow)
Power Query (Desktop)
Applied steps
Source
dbo_NWSales
Filtered Rows
Removed Columns1
Merged Queries
Expanded NWStores
Merged Queries1
Expanded NWCategory
Filtered Rows1
Removed Columns
Changed Type
dbo_NWSales
This step will be evaluated by the data source.
Learn more
APPLIED STEPS
Source
Navigation
Filtered Rows
Removed Columns1
Merged Queries
Expanded NWStores
Merged Queries1
Expanded NWCatego
Filtered Rows1
Removed Columns
Changed Type
Edit Settings
Rename
Delete
Delete Until End
Insert Step After
Move before
Move after
Extract Previous
View Native Query
Diagnose
Properties...

# Example

## Example 1: Basic Query Folding

You connect to a SQL Server table –> apply a filter in Power Query, such as: "Only show rows where Sales > 1000".
This query is executed on the SQL Server, and only the filtered data is loaded into Power BI.

## Example 2: Aggregation

Applying an aggregation like summing up sales data by region and the transformation gets pushed to the source.

# Best Practices

**Push Transformations Early:** Apply filters and transformations that can fold as early as possible.

**Combine Steps Wisely:** Avoid transformations that break query folding, such as adding complex custom columns.

**Leverage Native Queries:** For complex transformations, consider writing custom SQL queries in Power Query to maintain folding.

# THANK YOU!!!

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