

A hand is pouring clear water from a plastic bottle into a glass. The water is captured mid-pour, creating a dynamic stream. The background is a soft, out-of-focus white. In the bottom left corner, there are five teal-colored rounded rectangular shapes of varying heights, resembling a stylized fence or a bar chart.

# DYNAMIC M QUERY PARAMETERS IN POWER BI

DataGrillen 2024



***Samudra Bandaranayake***

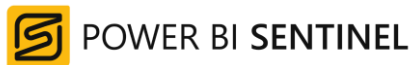
***Data Engineer @ oh22information services GmbH***

***Twitter : @\_samudrab***

***LinkedIn: /in/samudrabandaranayake/***

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# Content

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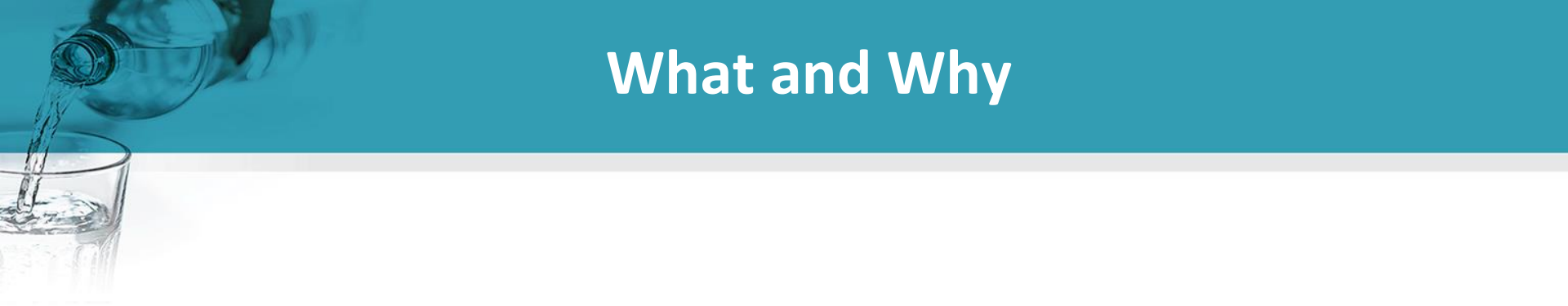
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# What and Why

- Allows users to change the values of query parameters within a report or dataset, and have the report or dataset update automatically
- Easily adjust the data being displayed without having to manually change the underlying query
- It gives users more control over the data
- Greater flexibility and interactivity in reports
- Dynamically set the value(s) using filters or slicers
- Especially useful for query performance optimizations without sacrificing report interactivity

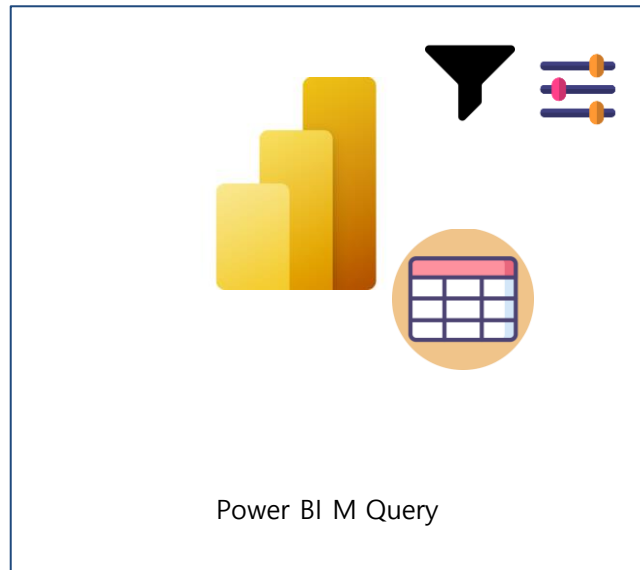
# What and Why



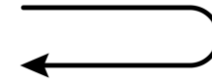
Request



Filtered data  
returned to  
user



Power BI M Query



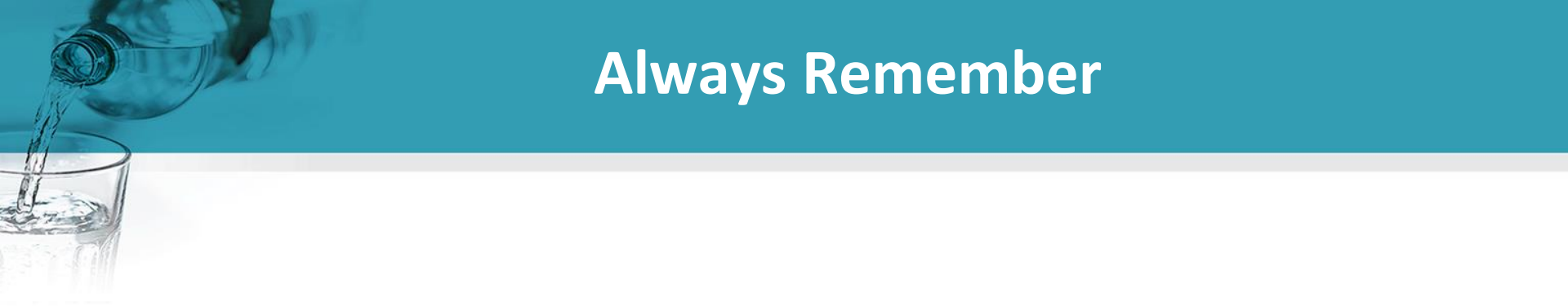
Transactional table  
with billions of rows



# History

- Went into public preview in October 2020, the feature supported M-based data sources (such as Azure Data Explorer, Databricks, BigQuery, Snowflake and more) but did not support other sources like SQL Server.
- It doesn't apply to Direct Query connection to most relational databases.
- In the February 2022 update they have enhanced this feature to support more DirectQuery data sources.
  - T-SQL based data sources: SQL Server, Azure SQL Database, Synapse SQL pools (such as Azure Synapse Analytics), and Synapse SQL OnDemand pools
  - Oracle
  - Teradata
  - Dataflows (enhanced compute engine enabled)
  - SAP Hana Relational

# Always Remember

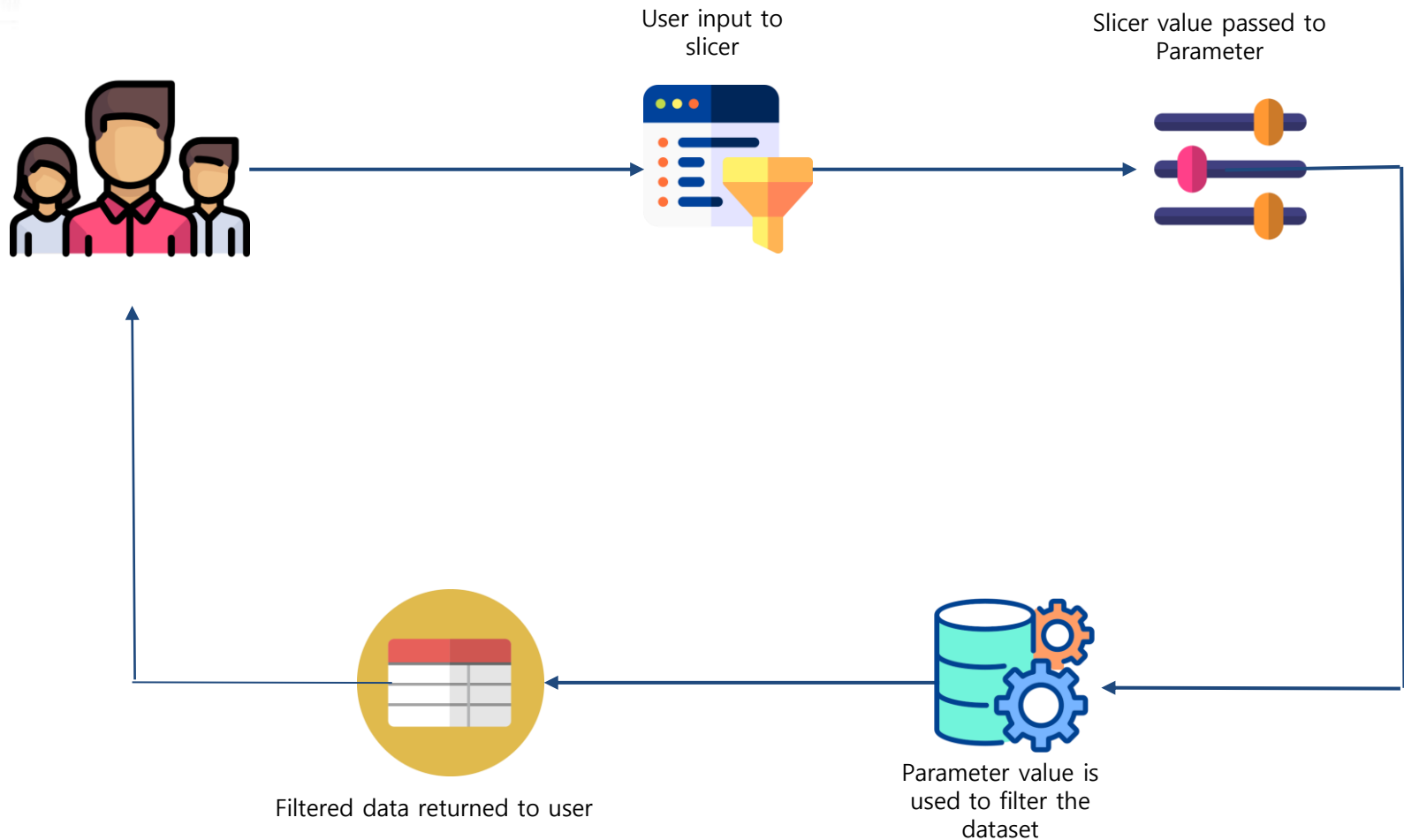


**This only works with Direct Query**

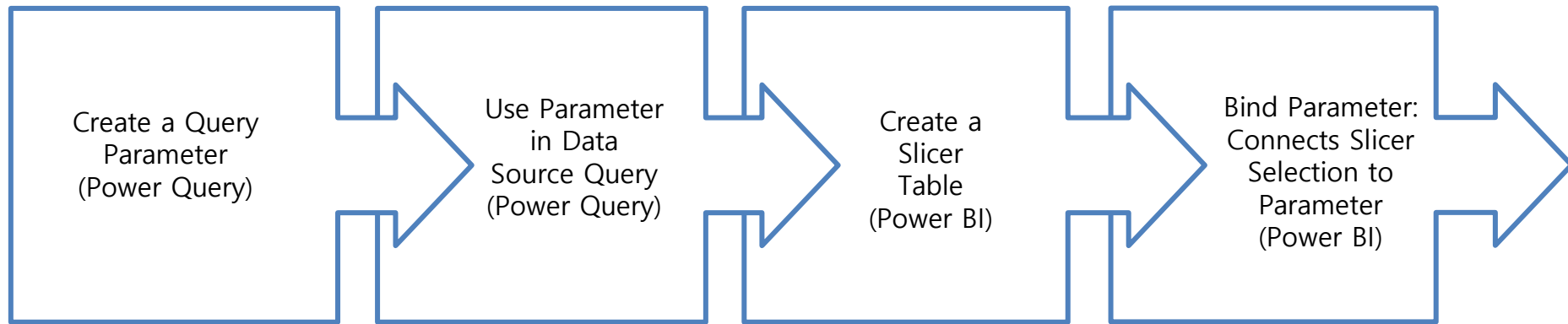


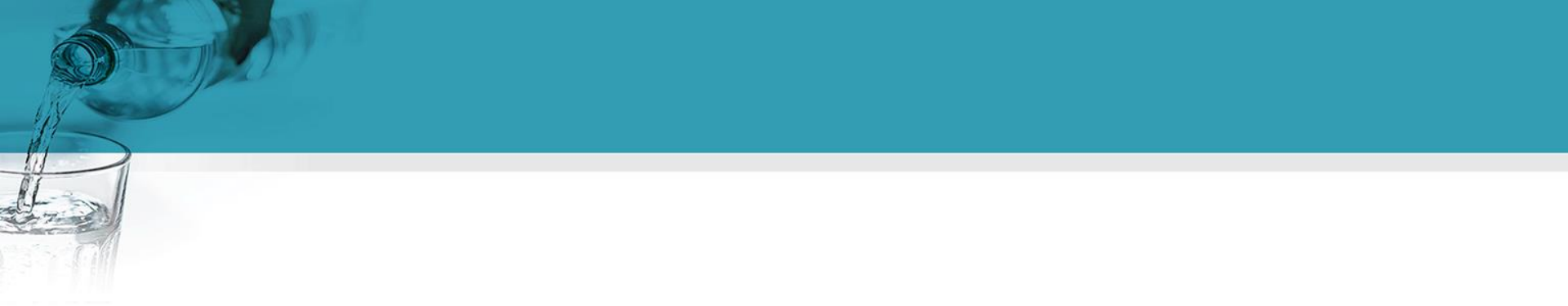


# How M Query Works



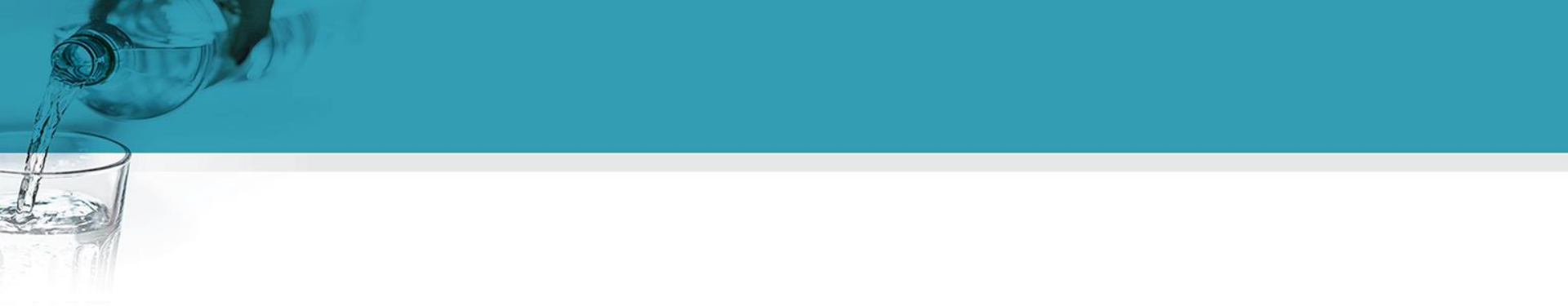
# How to Setup Dynamic M Query Parameter?





# DEMO I

## Single Select M Query Filter



# DEMO II

## Multi-select M Query Filter



# When to Use?


- Dynamic M parameters serve as an excellent choice when seeking to **replicate the behavior of a dynamic calculated column.**
  - Dynamic Calculated Column
  - Execute Stored Procedure/UDFs
  - Dynamic Column Switch

# Dynamic Calculated Column



- Have a calculated column based on user inputting a factor like a Currency Conversion ( EUR to USD) or Unit conversion (Meter to Feet).

```
let  
Source = Sql.Database("localhost\TestingDB", "Testing", [Query="SELECT PRODUCT, PROFIT * "&  
Text.From(Currency_Conv_Factor) & " FROM financials"]]  
in  
Source
```



# Execute Stored Procedure/UDFs (User Defined Functions)

- M query parameters can be passed to SQL parameters in stored procs/UDFs.

```
let  
Source = Sql.Database("localhost\TestingDB", "Testing", [Query="Exec SalesSummary " & Text.From(Product) & ""])  
in  
Source
```



# Dynamic Column Switch

- When you are required to let user change the columns of a chart dynamically.

let

```
Source = Sql.Database("localhost\TestingDB", "Testing", [Query="SELECT "& Xaxis & ", " & Yaxis & " FROM financials"])
```

in

Source





# When Not to Use

## ➤ When using measures

**Test case:**

**Dataset: ContosoRetailDW**

**No of rows in FactSales table : 3,406,089 records**

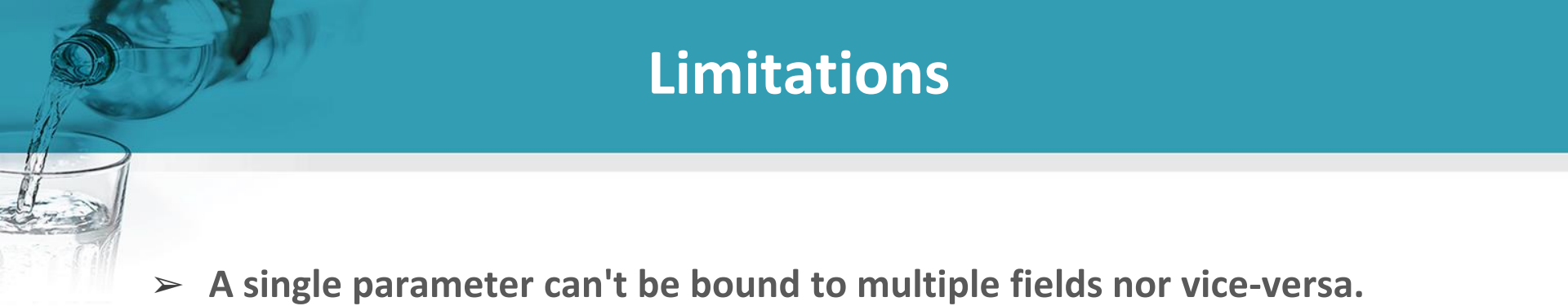
**Measures : 1 (Total Sales)**



# When not to use

- After doing a few speed tests, I found that using dynamic M parameters is average slower than not using them.

Test Name	Average Time (ms)
No M Parameter	965
With M Parameter	1019



# Limitations

- A single parameter can't be bound to multiple fields nor vice-versa.
- When increasing number of requests on the database end then users may also face slowness.
- Since we are letting the user directly query the dataset, it is crucial to know what parameter we are passing and its implications on the database side.
- Don't support Row-Level Security (RLS).
- Dynamic M query parameters don't support aggregations.
- If you use SQL sources, you might get a confirmation dialog every time the parameter value changes. This dialog is due to a security setting: Require user approval for new native database queries.



# Mitigate Security Risk

## Potential security risk

When you allow report readers to dynamically set the values for the M query parameters, they may be able to access additional data or trigger modifications to the source system, depending how the parameters are set up.

[Learn more](#)

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- **Avoid string concatenation**
- **Consume parameter values in M operations that fold to the source query**
- **Then the M engine and connector construct the final query**



# References

- <https://learn.microsoft.com/en-us/power-bi/connect-data/desktop-dynamic-m-query-parameters>
- <https://blog.crossjoin.co.uk/2020/10/25/why-im-excited-about-dynamic-m-parameters-in-power-bi/>
- <https://blog.crossjoin.co.uk/2020/10/25/why-im-excited-about-dynamic-m-parameters-in-power-bi/>



# Recap

- 01** What & Why?
- 02** How to Setup Dynamic M Query Parameter?
- 03** When to use
- 04** When not to use
- 05** Limitations

A close-up photograph of a hand holding a clear plastic bottle, tilted to pour water into a clear glass. The water is captured mid-pour, creating a dynamic stream and ripples in the glass. The background is a soft, out-of-focus light blue and white. A solid teal horizontal band spans the lower portion of the image, serving as a background for the text.

THANK YOU ☺