



EUROPEAN **MiCROSOFT FABRiC**

Community Conference

STOCKHOLM 24-27 SEPTEMBER 2024

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#FABCONEUROPE



THE MAGIC OF MERGING: GETTING FRIENDLY WITH POWER QUERY JOINS IN DATAFLOWS

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ABOUT ME

- **Project Manager** (PMP, PMI-ACP)
- **Microsoft Certified Professional**
(DP-600, PL-300, MCT, MCSA, MCSE, MOS Master)
- **Romania PBI and Modern Excel UG Founder**
<https://www.meetup.com/romaniapug>
- **Microsoft MVP** M365 (Excel) & Data Platform (Power BI)

SESSION PLAN

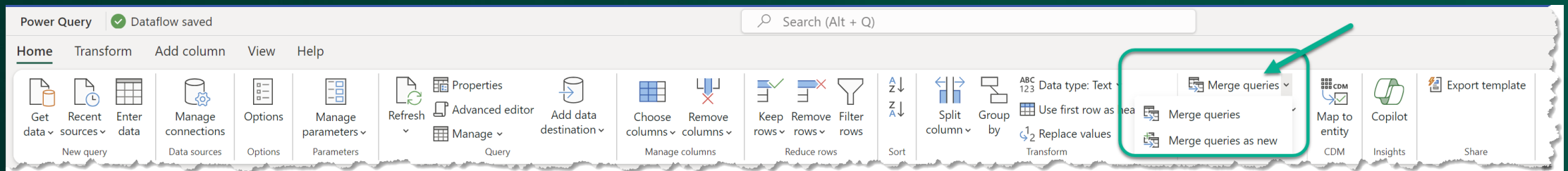
- Overview
- JOIN KINDS
 - Standard JOINS
 - “New” Joins (Semi)
- “EXTRA” JOINS
 - Full Anti and
 - Cross Join
- Demo
 - all joins
 - Fuzzy Match
 - some use-cases
- Q & A

WHAT ARE JOINS?

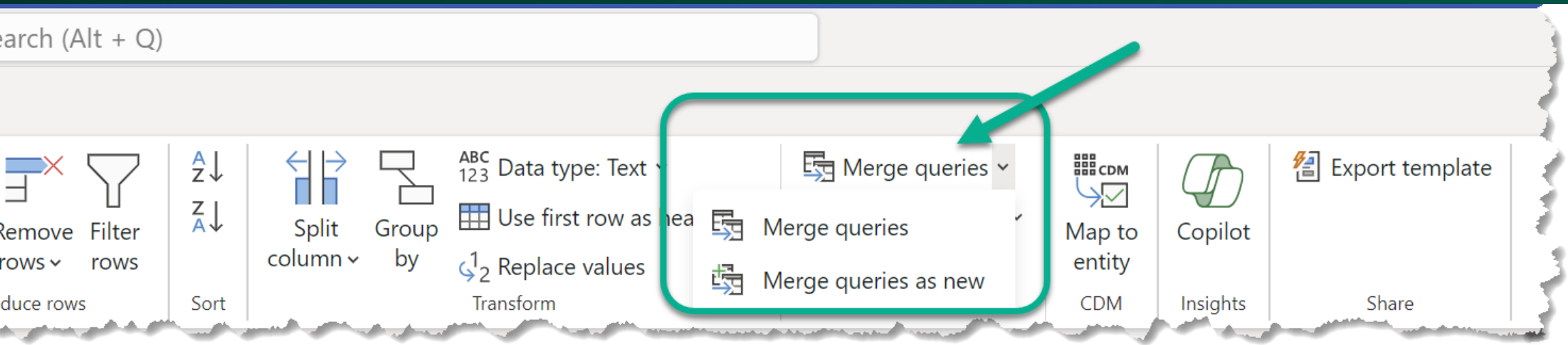


- JOINS are the process of combining two queries using MERGE in PQ
- Enrich data, Increase or Reduce number of rows
- 6 standard JOIN Types in UI + 2 using M Language

MERGE USING UI



MERGE USING UI



MERGE USING UI



Merge ?

Select a table and matching columns to create a merged table.

Orders

1 ² 3 OrderID	1 ² 3 CustomerID	1 ² 3 OrderDate	1 ² 3 Amount
101	1	1/15/2023	100
102	2	2/20/2023	150
103	3	3/5/2023	200
104	1	4/10/2023	120
105	4	5/22/2023	180

Primary Table
Top Table


Right table for merge *


Customers


1 ² 3 CustomerID	A ^B C FirstName	A ^B C LastName	A ^B C Email
1	John	Doe	john@example...
2	Jane	Smith	jane@example...
3	Bob	Johnson	bob@example.d
4	Alice	Brown	alice@example


Related Table
Bottom Table


Join kind


Left outer

Right outer

Full outer


Inner

Left anti

Right anti

☐ Use fuzzy matching to perform the merge

> Fuzzy matching options

 The selection matches 5 of 5 rows from the first table

OK

Cancel

MERGE USING UI



Merge ?

Select a table and matching columns to create a merged table.

LEFT

Orders

OrderID	CustomerID	OrderDate	Amount
101	1	1/15/2023	100
102	2	2/20/2023	150
103	3	3/5/2023	200
104	1	4/10/2023	120
105	4	5/22/2023	180

Primary Table
Top Table

RIGHT

Right table for merge *

Customers

CustomerID	FirstName	LastName	Email
1	John	Doe	john@example...
2	Jane	Smith	jane@example...
3	Bob	Johnson	bob@example.d
4	Alice	Brown	alice@example

Related Table
Bottom Table

Join kind

☒ Left outer ☐ Right outer ☐ Full outer ☐ Inner ☐ Left anti ☐ Right anti

☐ Use fuzzy matching to perform the merge

> Fuzzy matching options

☒ The selection matches 5 of 5 rows from the first table

OK Cancel

MERGE USING UI

LEFT

RIGHT



Merge ?

Select a table and matching columns to create a merged table.

Orders ↻

1 ² 3	OrderID	1 ² 3	CustomerID	OrderDate	1 ² 3	Amount
	101		1	1/15/2023		100
	102		2	2/20/2023		150
	103		3	3/5/2023		200
	104		1	4/10/2023		120
	105		4	5/22/2023		180

Primary Table
Top Table


Right table for merge *


Customers ▼


1 ² 3	CustomerID	A ^B C	FirstName	A ^B C	LastName	A ^B C	Email
	1		John		Doe		john@example...
	2		Jane		Smith		jane@example...
	3		Bob		Johnson		bob@example.d
	4		Alice		Brown		alice@example


Related Table
Bottom Table


Join kind


Left outer

Right outer

Full outer

Inner

Left anti

Right anti

☐ Use fuzzy matching to perform the merge

> Fuzzy matching options

✓ The selection matches 5 of 5 rows from the first table

OK

Cancel

MERGE USING UI – DFG2 Specific



Merge ?

Select a table and matching columns to create a merged table.

Orders

1 ² 3 OrderID	1 ² 3 CustomerID	OrderDate	1 ² 3 Amount
101	1	1/15/2023	100
102	2	2/20/2023	150
103	3	3/5/2023	200
104	1	4/10/2023	120
105	4	5/22/2023	180

Right table for merge *

Customers

1 ² 3 CustomerID	A ^B C FirstName	A ^B C LastName	A ^B C Email
1	John	Doe	john@example....
2	Jane	Smith	jane@example...

Suggestions

Select any of the suggested column-pair mappings for the selected tables. [Learn more](#)

Orders
1²3 CustomerID → Customers
1²3 CustomerID

- **Column pair suggestion**
Only the column-pair-mapping is suggested.
- **Expand or aggregate the new merged table column**
The option to aggregate will be added later this year.
- **Query Step Icons and Dependency View**

JOIN KINDS

6 JOINS using UI



Left Outer Join



Right Outer Join



Full Outer Join



Inner Join



Left Anti Join



Right Anti Join

2 JOINS NOT in UI



Left Semi Join



Right Semi Join

“EXTRA” JOINS

Full Anti Join

Cross Join

Self Join



Demo

JOIN KINDS

6 JOINS using UI

• 2 JOINS **NOT** in UI



Left outer



Right outer



Full outer



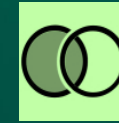
Inner



Left anti



Right anti



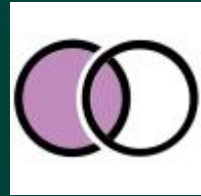
Left Semi



Right Semi

JOIN KINDS

Left Outer Join



Keeps all the rows from the primary table and brings in any matching rows from the related table.

⚠ Default Join Type for `Table.NestedJoin ()`

6 JOINS using UI



Right outer



Full outer



Inner

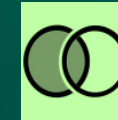


Left anti

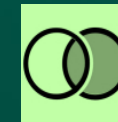


Right anti

• 2 JOINS **NOT** in UI



Left Semi



Right Semi

JOIN KINDS

6 JOINS using UI

• 2 JOINS **NOT** in UI

Right Outer join



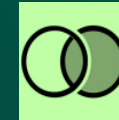
Keeps all the rows from the related table and brings in any matching rows from the primary table.



Left Outer Join



Left Semi



Right Semi



Full outer



Inner



Left anti



Right anti

JOIN KINDS

Full Outer Join



Brings in all the rows from both the primary and related tables.

6 JOINS using UI

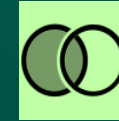
• 2 JOINS **NOT** in UI



Left Outer Join



Right Outer join



Left Semi



Right Semi



Inner



Left anti



Right anti

JOIN KINDS

Inner Join



Brings in all the rows from both the primary and related tables.

⚠ Default Join Type for `Table.Join ()`

6 JOINS using UI

• 2 JOINS **NOT** in UI



Left Outer Join



Right Outer join



Full Outer Join



Left Semi



Right Semi



Left anti



Right anti

JOIN KINDS

Left Anti Join



Brings in only rows from the primary table that don't have any matching rows from the related table.

6 JOINS using UI

• 2 JOINS **NOT** in UI



Left Outer Join



Right Outer join



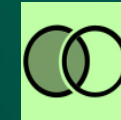
Full Outer Join



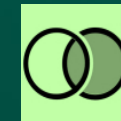
Inner Join



Right anti



Left Semi



Right Semi

JOIN KINDS

6 JOINS using UI

• 2 JOINS **NOT** in UI

Right Anti Join



Brings in only rows from the related table that don't have any matching rows from the primary table.



Left Outer Join



Right Outer join



Full Outer Join



Inner Join



Left Anti Join



Left Semi



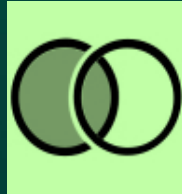
Right Semi

JOIN KINDS

6 JOINS using UI

• 2 JOINS **NOT** in UI

Left Semi Join



Only rows from the left table with a matching row in the right table are returned.

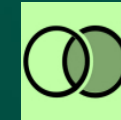
⚠ NOT available in UI



Left Outer Join



Right Outer join



Right Semi



Full Outer Join



Inner Join



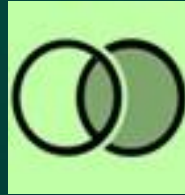
Left Anti Join



Right Anti Join

JOIN KINDS

Right Semi Join



Only rows from the right table with a matching row in the left table are returned.

⚠ NOT available in UI

6 JOINS using UI

• 2 JOINS **NOT** in UI



Left Outer Join



Left Semi Join



Right Outer join



Full Outer Join



Inner Join



Left Anti Join



Right Anti Join

JOIN KINDS

6 JOINS using UI

• 2 JOINS **NOT** in UI



Left Outer Join



Left Semi Join



Right Outer join



Right Semi Join



Full Outer Join



Inner Join



Left Anti Join




Right Anti Join

SESSION Summary

- OVERVIEW
- JOIN KINDS
- “EXTRA” JOINS
- FUZZY MATCH
- DEMO

Join Types - Cheat Sheet

Left Outer Join



Key	T1
B	#
C	@
D	=
E	\$


Left Table

Key	T1	T2
B	#	15
C	@	20
D	=	
E	\$	

Right Table

All rows from Left + **matching** rows from Right

Right Outer Join



Key	T1
B	#
C	@
D	=
E	\$


Left Table

Key	T1	T2
A		10
B	#	15
C	@	20
F		60

Right Table

All rows from Right + **matching** rows from Left

Left Semi Join



Key1	T1
B	#
C	@
D	=
E	\$


Left Table

Key	T1	T2
B	#	
C	@	

Right Table

Matching from Left

Right Semi Join



Key1	T1
B	#
C	@
D	=
E	\$


Left Table

Key	T1	T2
B		15
C		20

Right Table

Matching from Right

Left Anti Join



Key	T1
B	#
C	@
D	=
E	\$


Left Table

Key	T1	T2
D	=	
E	\$	

Right Table

Rows from Left **not matching** with Right

Right Anti Join



Key	T1
B	#
C	@
D	=
E	\$


Left Table

Key	T1	T2
A		10
F		60

Right Table

Rows from Right **not matching** with Left

Full Anti Join



Key	T1
B	#
C	@
D	=
E	\$


Left Table

Key	T1	T2
A		10
D	=	
E	\$	
F		60

Right Table

Rows **not matching** between both

Inner Join



Key	T1
B	#
C	@
D	=
E	\$


Left Table

Key	T1	T2
B	#	15
C	@	20

Right Table

Matching rows between Left and Right

Full Outer Join



Key	T1
B	#
C	@
D	=
E	\$


Left Table

Key	T1	T2
A		10
B	#	15
C	@	20
D	=	
E	\$	
F		60

Right Table

All rows from both

Union / Append



Key	T1
B	#
C	@


Left Table

Key	T1	T2
A		10
B		15

Right Table

Combine all rows from Left and Right

Cross Join



Key1	T1
B	#
C	@

Left Table

Key1	T1	Key2	T2
B	#	A	10
B	#	B	15
C	@	A	10
C	@	B	15

Right Table

All row combinations from both

Read the full article at:
<https://gorilla.bi/power-query/join-types/>

Crafted by
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<https://gorilla.bi/>

POTENTIAL PROBLEMS:

- Data Duplication and Inaccurate Results
- Data Loss
- Performance Degradation
- Mismatched Data Types and Join Keys
- Increased Complexity and Maintenance Challenges
- Schema Drift and Dataflow Failures
- Security and Compliance Risks
- Unintended Cross Joins
- Misalignment with Business Logic

MITIGATION STRATEGIES

- Understand Join Types
- Validate Join Conditions
- Data Profiling
- Use Unique Identifiers
- Test Joins with Sample Data
- Monitor Performance
- Documentation

WHAT TO REMEMBER

- Same type Matching Columns
- Same number of columns in primary and related table
- Merge on multiple columns - ***selection ORDER matters***
- Duplicates in the Lookup/Right table will get multiple matches
 - Intentional – OK
 - Not intentional – can cause problems
- Fuzzy matching
 - breaks folding
 - only supported for merge operations over text columns
 - ALWAYS check results
- Power Query is Case Sensitive
- Merge vs Merge Query as New
- Adding Index column breaks folding

RESOURCES

- <https://learn.microsoft.com/en-us/power-query/merge-queries-overview>
- <https://learn.microsoft.com/en-us/power-query/fuzzy-matching>
- <https://gorilla.bi/power-query/join-types>
- <https://powerquery.how/table-nestedjoin/>
- <https://powerquery.how/table-join/>
- <https://ssbi-blog.de/blog/technical-topics-english/join-types-in-power-query-see-how-it-works/>
- <https://gorilla.bi/power-query/join-types/#cheat-sheet>
- <https://radacad.com/choose-the-right-merge-join-type-in-power-bi>
- https://github.com/cristiangyal/Europe_Fabcon_2024_JOINS



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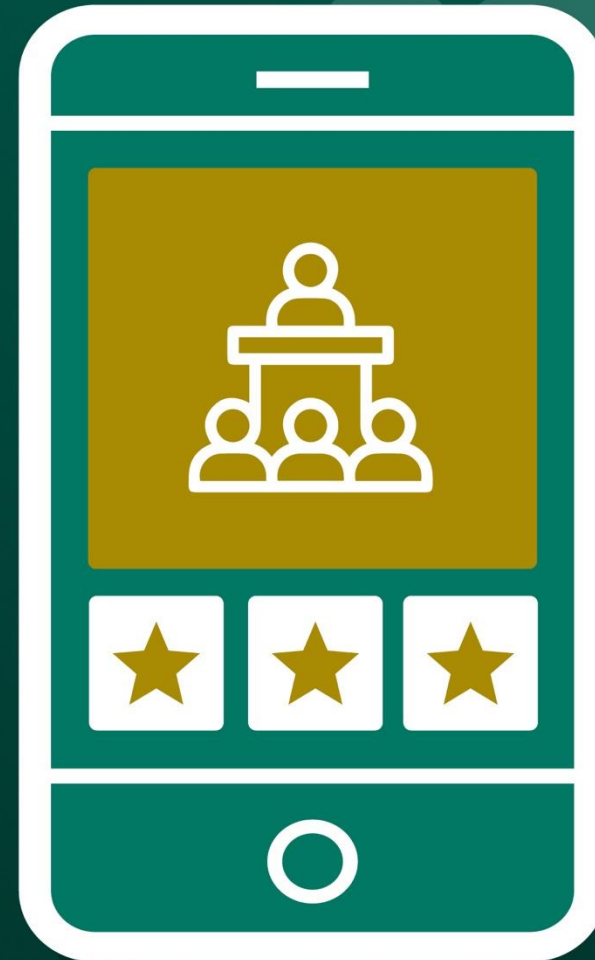
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