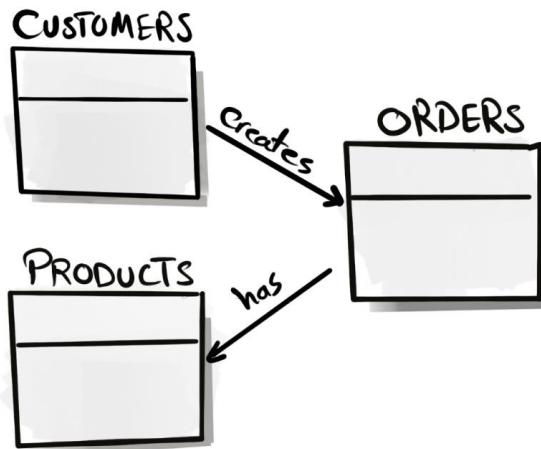
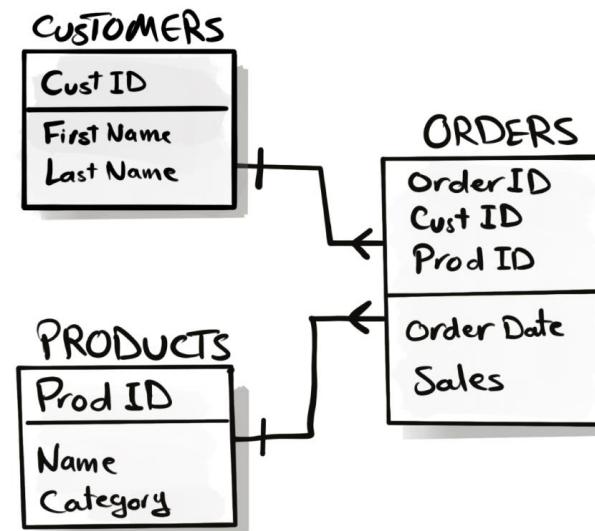




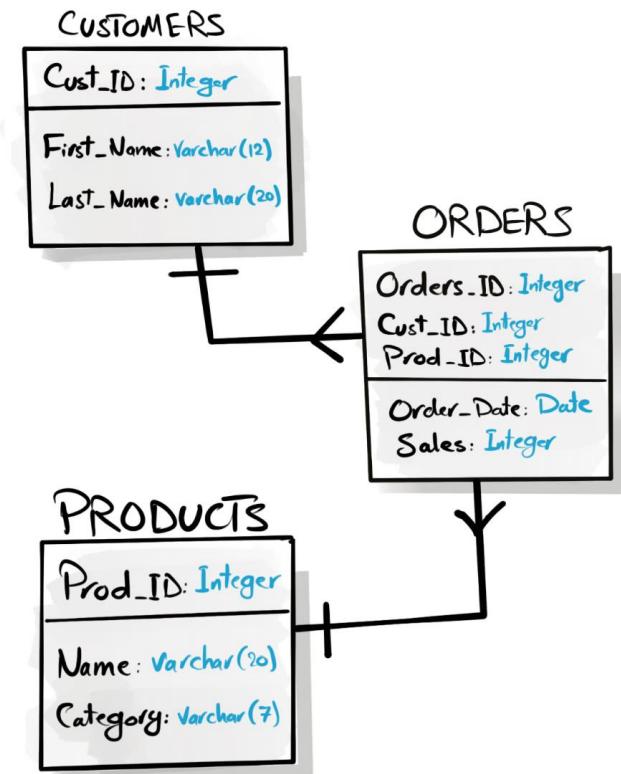
Conceptual Data Model



Logical Data Model

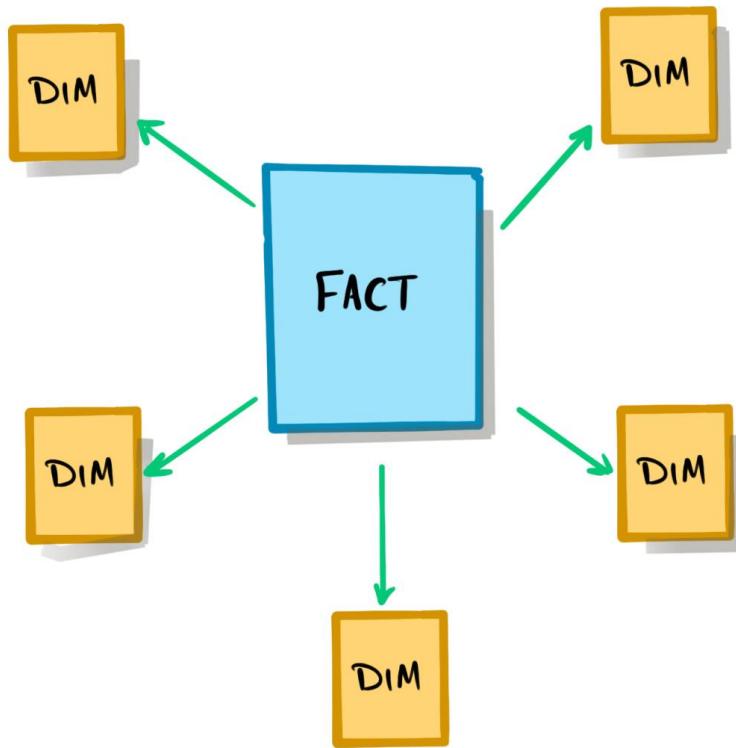


Physical Data Model

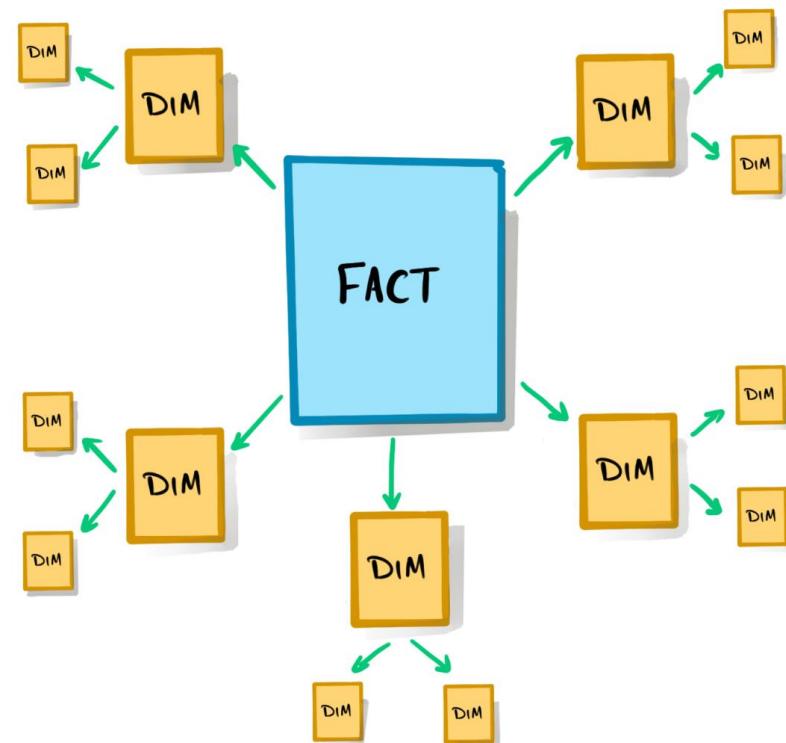




STAR SCHEMA

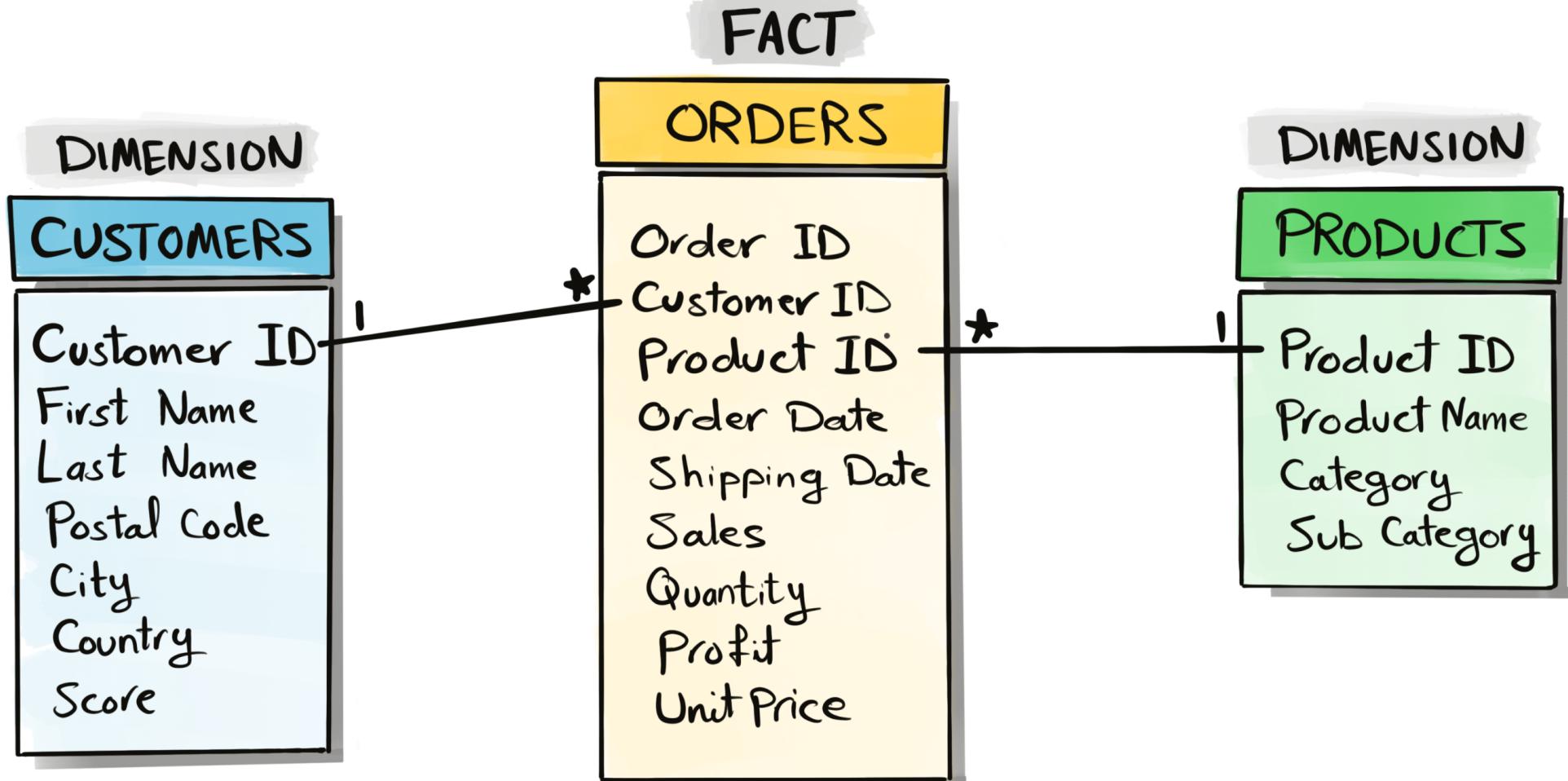


SNOWFLAKE SCHEMA





STAR SCHEMA

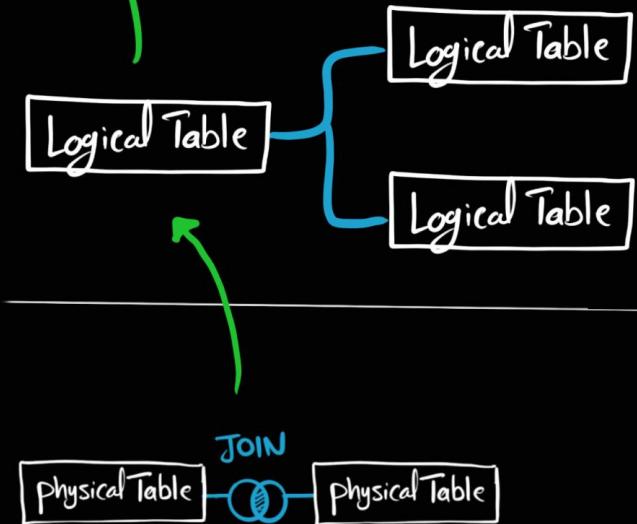
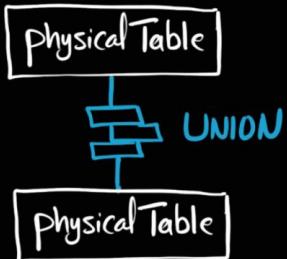
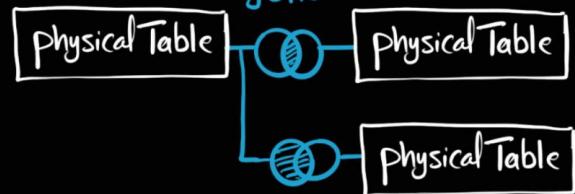




VIZ

DATA SOURCE

Physical Layer

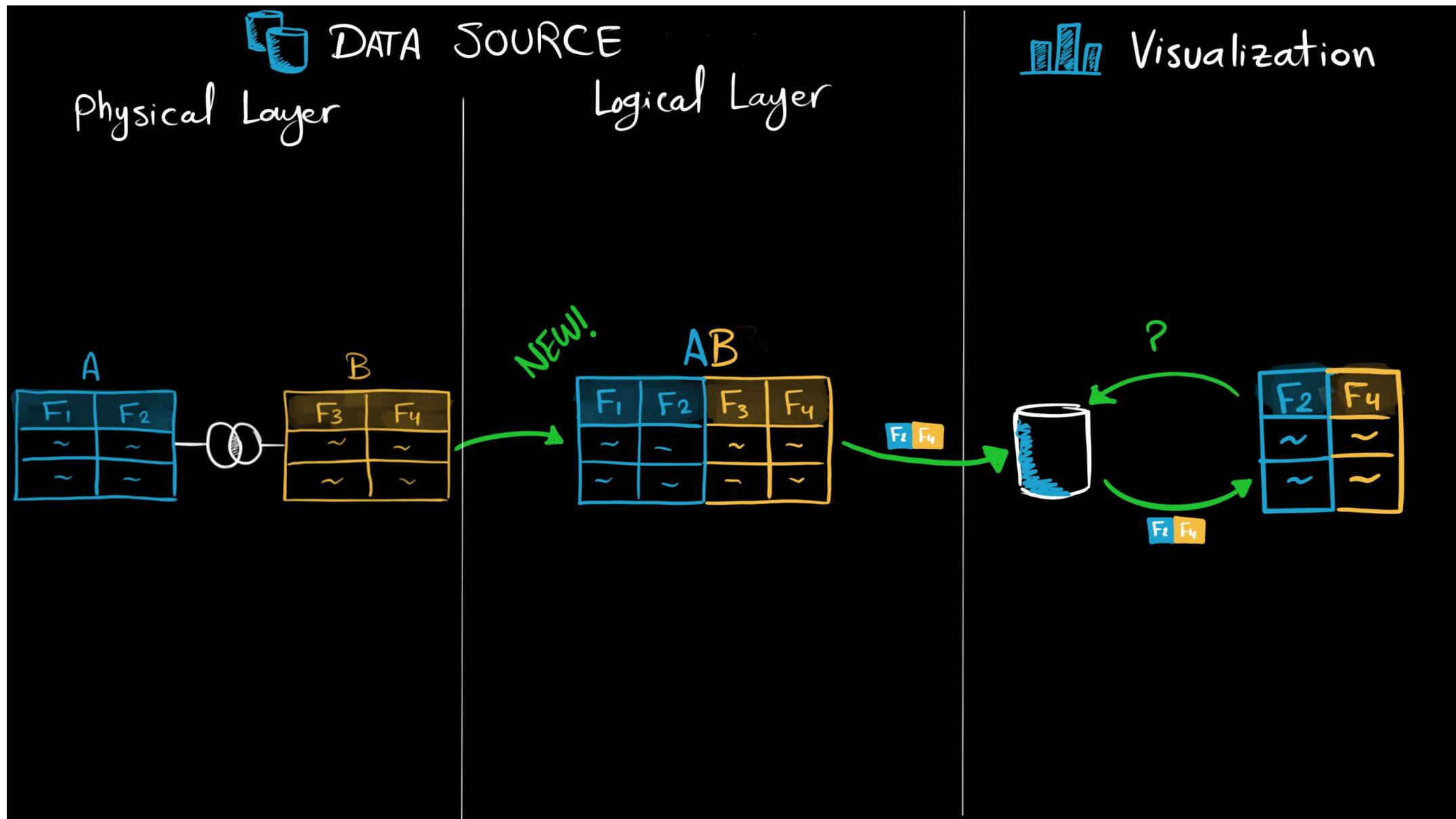


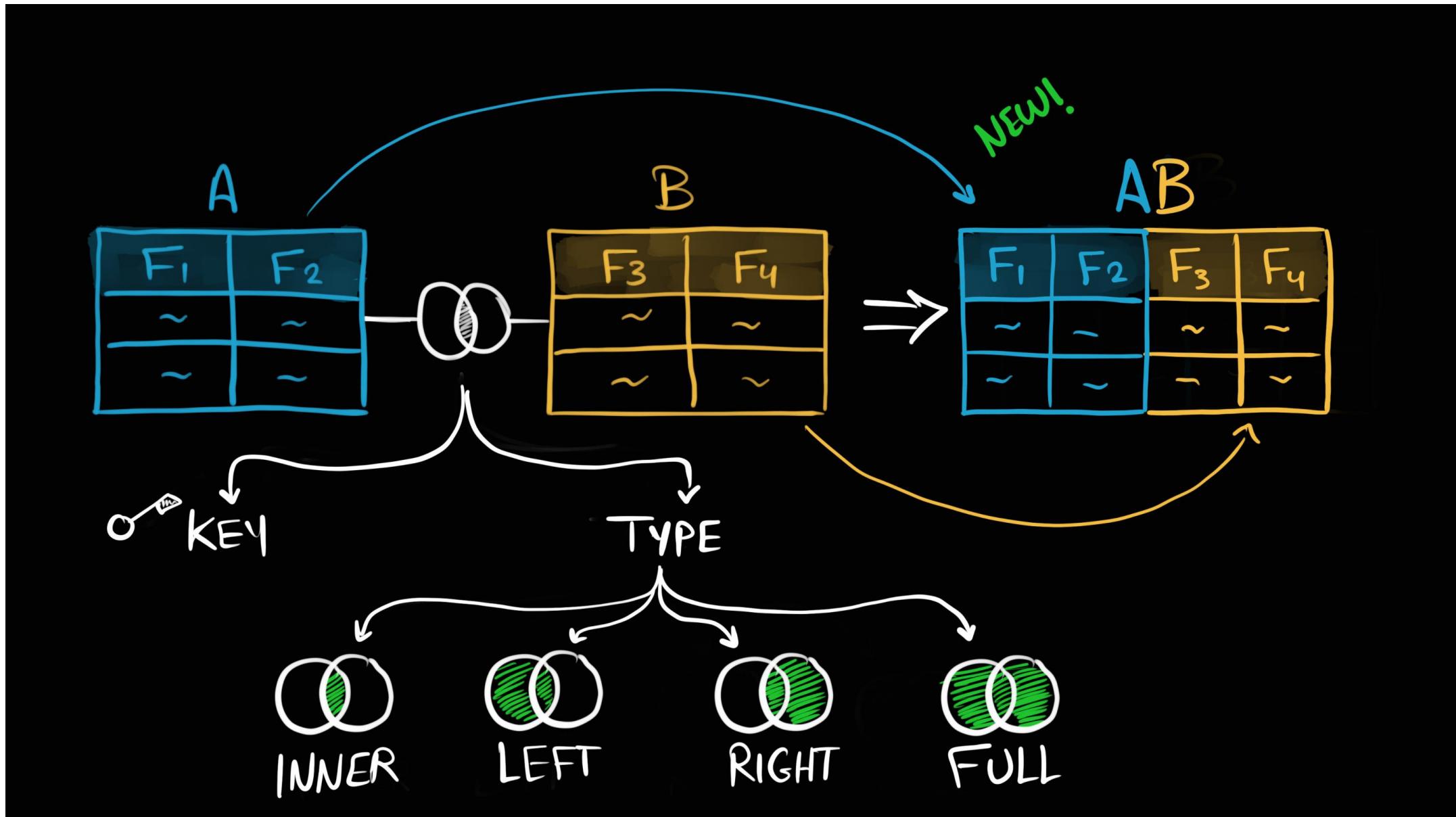
Blending

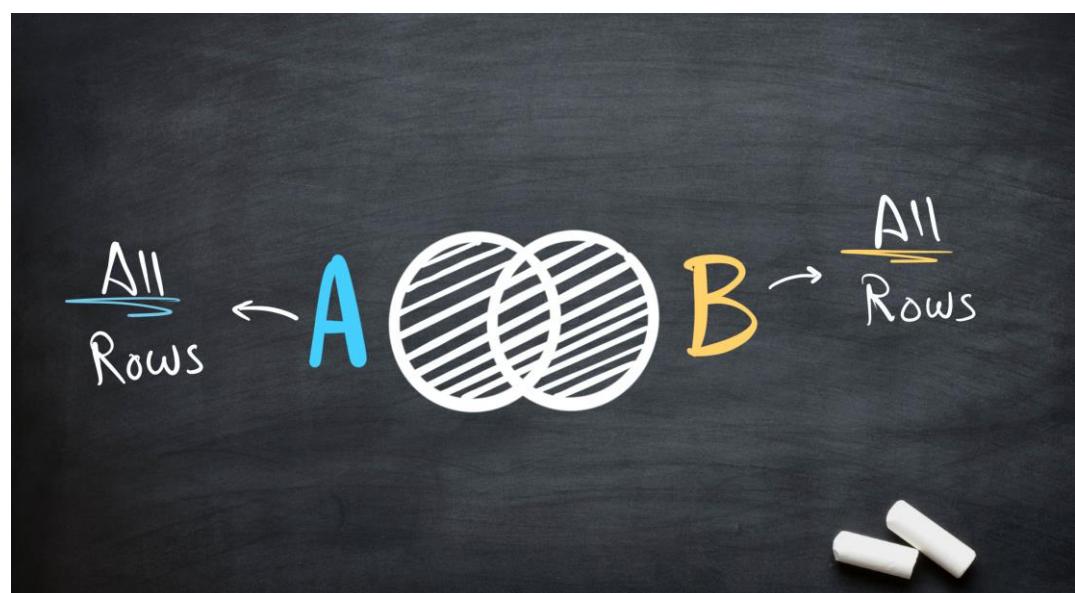
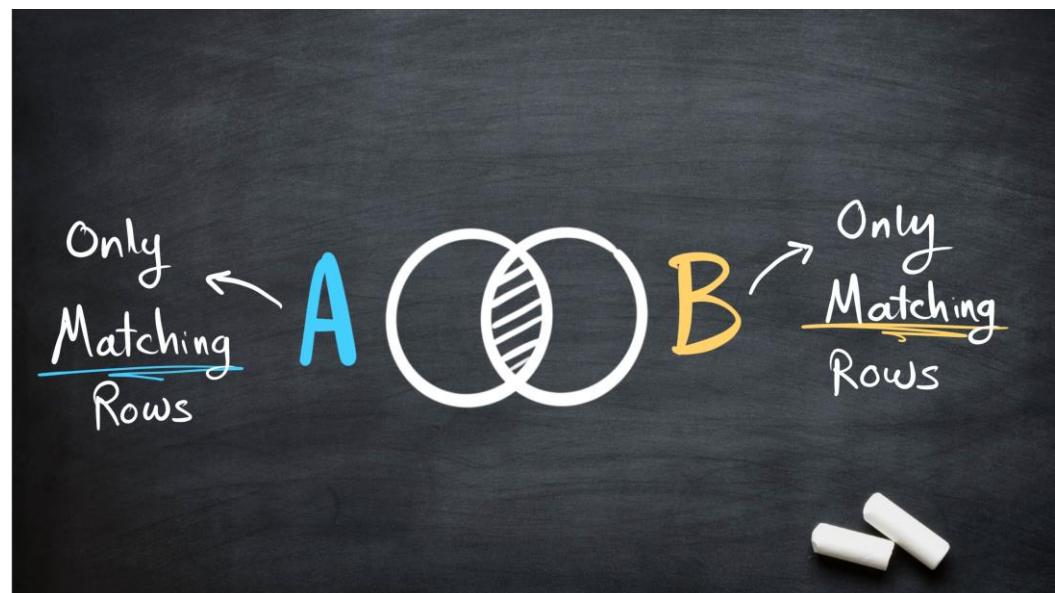
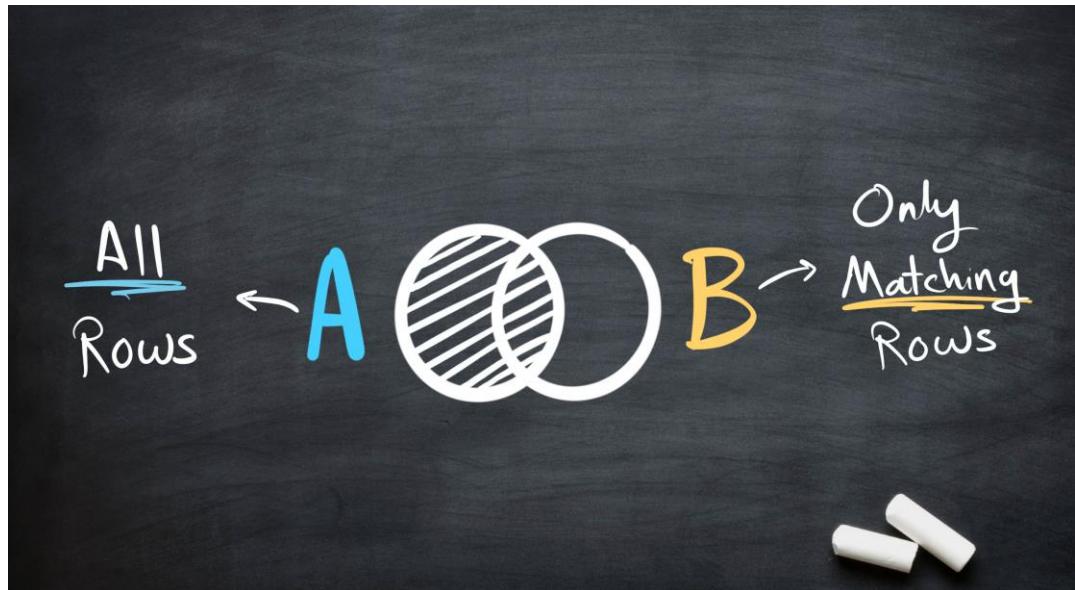
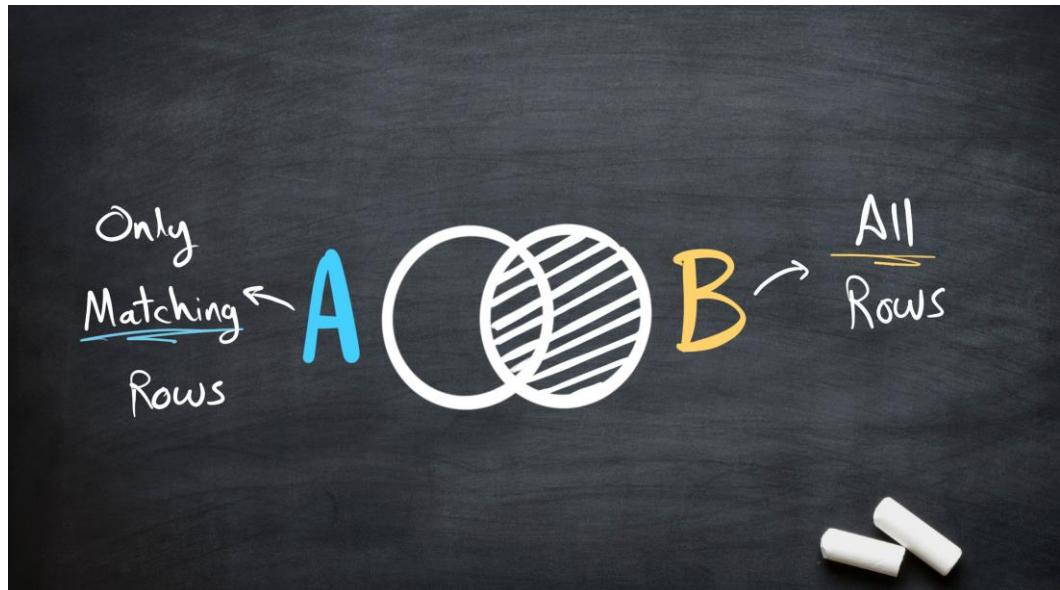


DATA WITH BARAA











CustomerNames

ID	Name
1	Maria
2	John



CustomerAges

ID	Age
1	20
3	35



Inner

ID	Name	ID	Age
1	Maria	1	20



Left

ID	Name	ID	Age
1	Maria	1	20
2	John	NULL	NULL



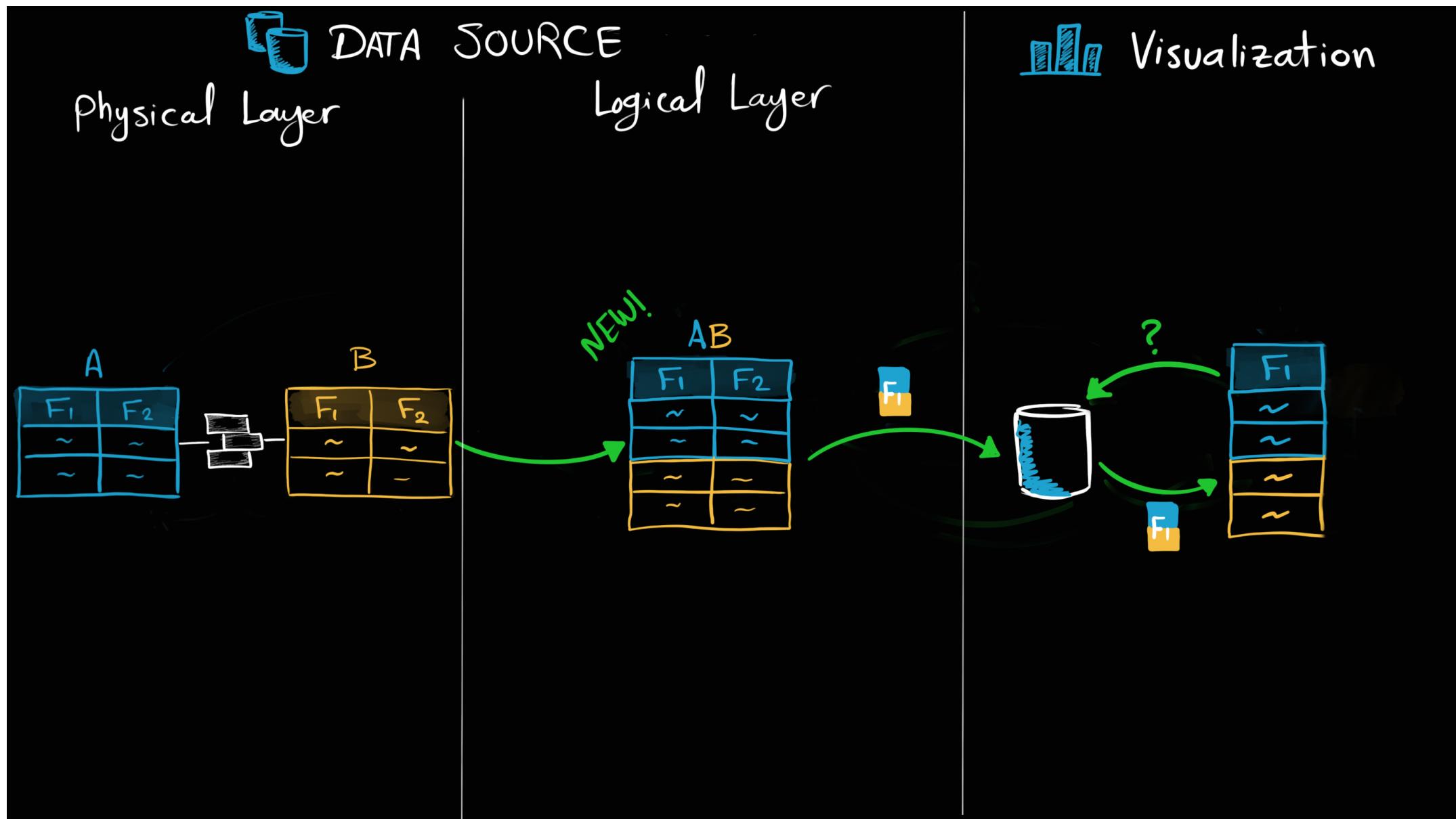
Right

ID	Name	ID	Age
1	Maria	1	20
NULL	NULL	3	35



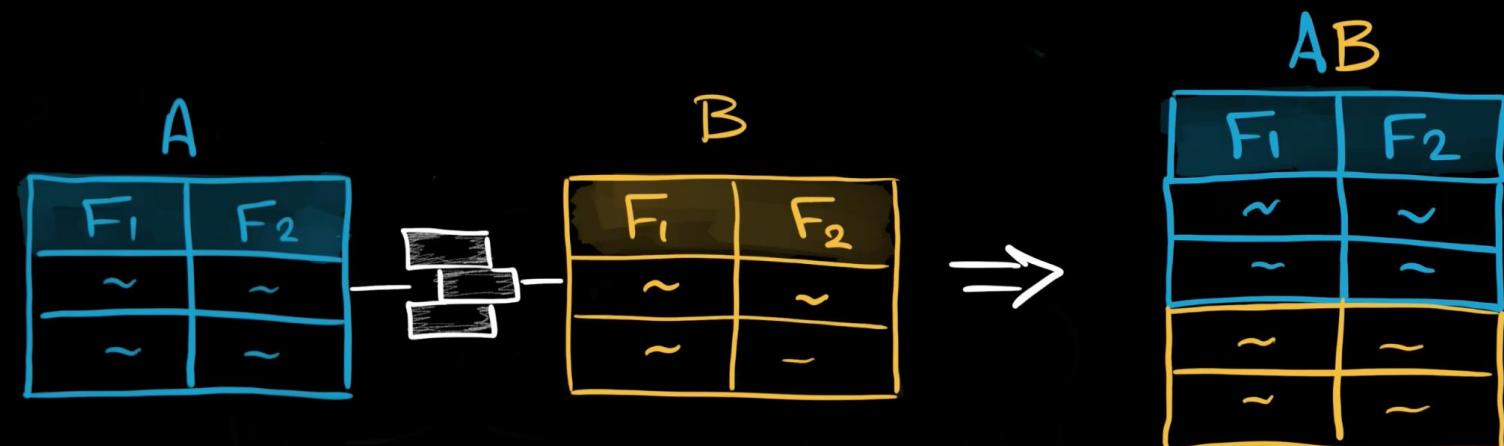
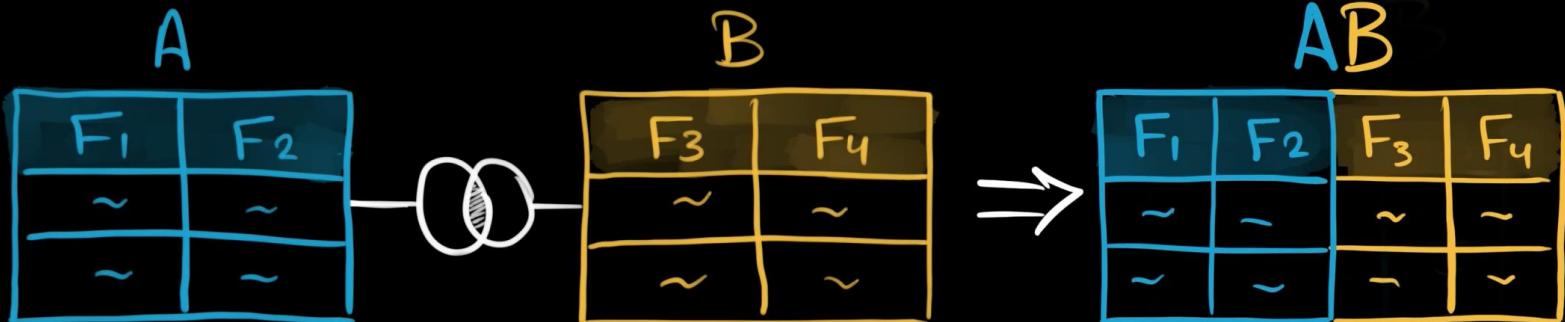
Full

ID	Name	ID	Age
1	Maria	1	20
2	John	NULL	NULL
NULL	NULL	3	35





JOIN Combine the FIELDS of two Tables



UNION Combine the ROWS of two Tables



DATA SOURCE
Logical Layer

A

F ₁	F ₂
~	~
~	~

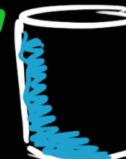


B

F ₃	F ₄
~	~
~	~

F₄

?



Visualization

F ₁	F ₄
~	~
~	~

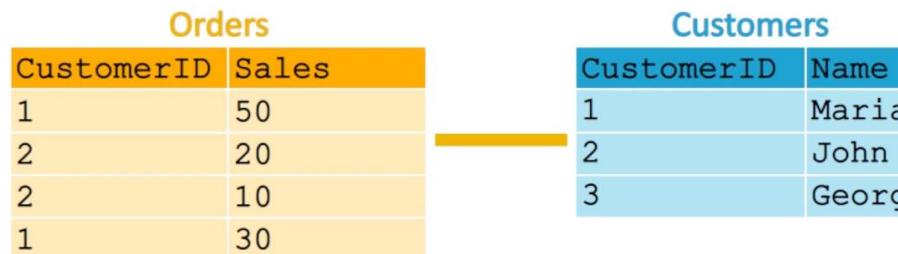
F₁ F₄



LEFT TABLE	RIGHT TABLE	JOIN TYPES
Some Record Match	Some Record Match	
All Record Match	Some Record Match	
Some Record Match	All Record Match	
All Record Match	All Record Match	



Relationships | How it Works



MANY-MANY

CustomerID	Sum(Sales)	Name
1	80	Maria
2	30	John

MANY-ONE

CustomerID	Sum(Sales)	Name
1	80	Maria
2	30	John

ONE-MANY

CustomerID	Sum(Sales)	Name
1	50	Maria
2	20	John

ONE-ONE

CustomerID	Sum(Sales)	Name
1	50	Maria
2	20	John

Correctness Performance

OK	NOK
----	-----

Cardinality

MANY	MANY
------	------

OK	OK
----	----

MANY	ONE
------	-----

NOK	NOK
-----	-----

ONE	MANY
-----	------

NOK	OK
-----	----

ONE	ONE
-----	-----



DATA SOURCE Logical Layer

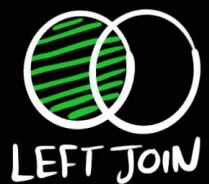
A

F ₁	F ₂
~	~
~	~
~	~

B

F ₃	F ₄
~	~
~	~
~	~

Visualization



F ₁	F ₄
~	~
~	~

Primary

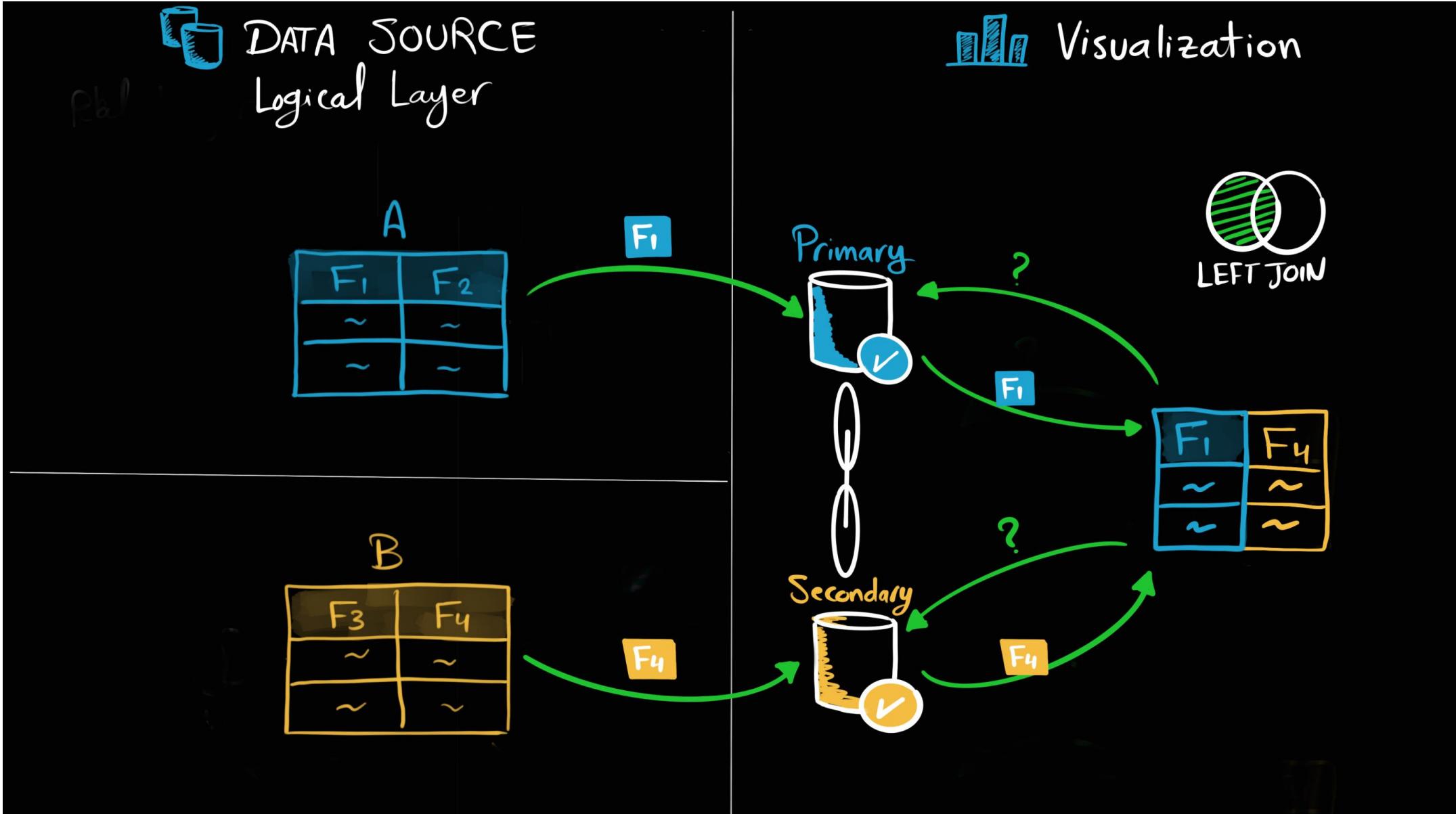
Secondary

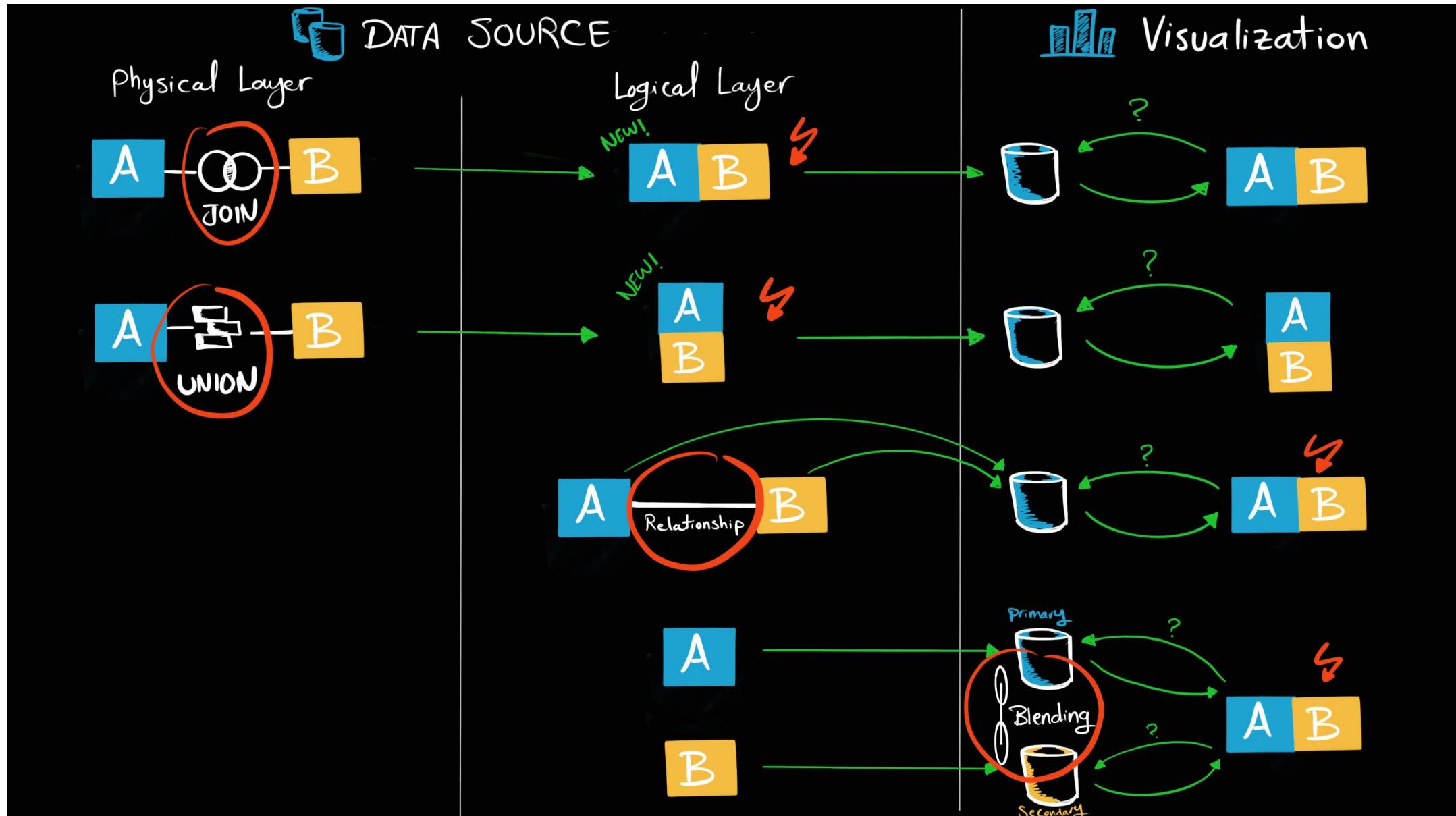
F₁

F₁

F₄

F₄







Layer

Physical Layer



Physical Layer



Logical Layer



Visualization Level

	Physical Layer	Physical Layer	Logical Layer	Visualization Level
Layer				
Multi-Data Sources	✗	✗	✗	✓
Merge Tables?	✓	✓	✗	✗
Flexibility	Static	Static	Flexible	Very Flexible (Page by Page)
Join Types	n/a	Inner, Left, Right, Full	All	Left
Rank	n/a	3	1 (Default)	2