

Getting Started

Introduction to Power BI & to This Course

What is Power BI?



Connect to and visualize any data using the unified, scalable platform for self-service and enterprise business intelligence (BI) that's easy to use and helps you gain deeper data insight.

What is Power BI?

1

Why?



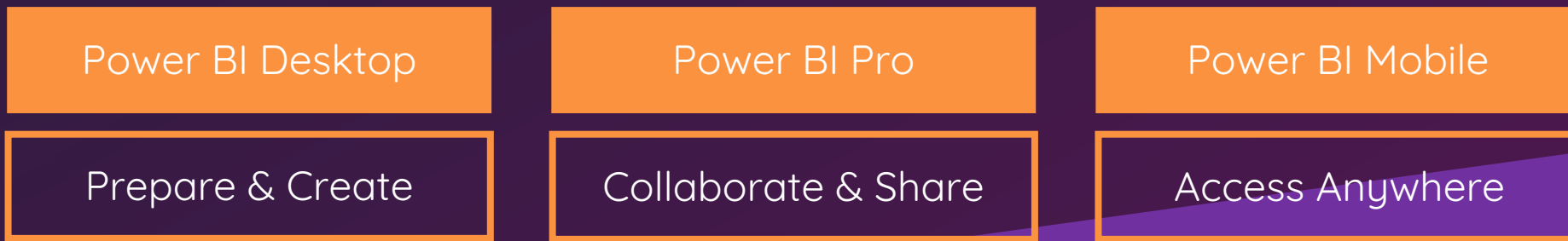
2

Who?



3

How?



Can't I Use Excel Instead?



Excel



Quick Calculations



Reports in Tabular Format



Single Tool Only



Power BI



Big Data



Interactive Visualizations



Collaboration

Course Outline



Single User (Power BI Desktop)



Share & Collaborate

Getting Started

Query Editor

Power BI Pro

Preparations

Data Preparation &
Transformation

Workspaces

Data Model

Gateways

Data Analysis
Expressions

Apps

Relationships

Power BI Mobile

Reports

How to Get the Most Out of This Course

Watch the Videos



Adjust the Playback Speed

Follow Along Actively



Learning by Doing

Fix Errors



Apply Your Knowledge

Be Part of the Community



Ask & Contribute

Be Creative



Explore Options & Create Own Projects

How to Use the Attached Project Files

Go to
github.com/academind/power-bi-course-resources

1 github.com/academind/power-bi-course-resources/tree/02-understanding-the-basics

2 Click to open drop-down

3 Select current course module

4 Select "Code"

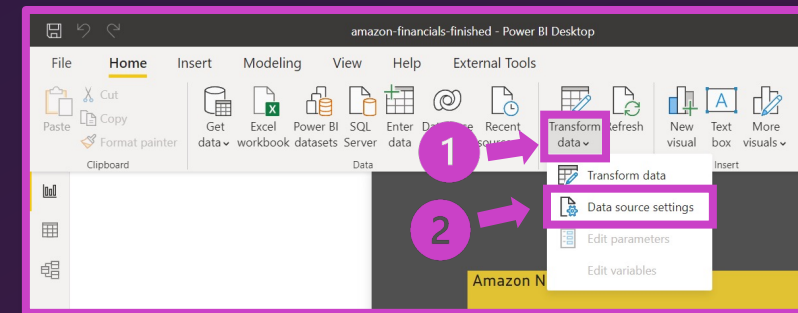
5 Download module files

How to Use the Attached Project Files

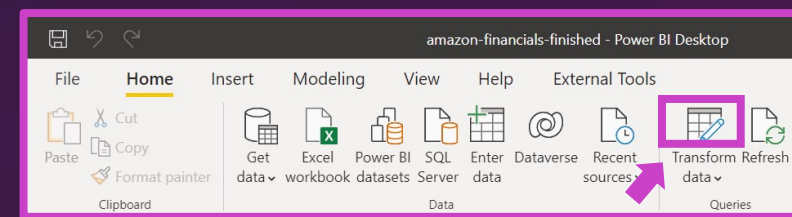
Unzip the downloaded file and copy the .pbix file you're interested in into a folder of your choice



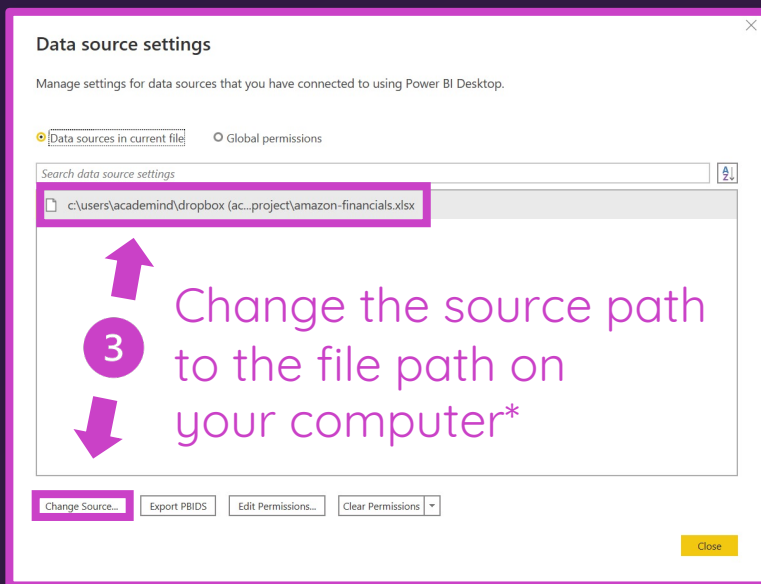
Open the .pbix file



Repeat **3** for all remaining files and close the “Data source settings” afterwards



Open the Query Editor if required for the lecture



* All source files can be found in the “main” branch in the “source-files” folder

Diving Into the Basics

Preparations to Follow Along Conveniently



Understanding the Power BI Desktop Workflow



A Closer Look at the Power BI Desktop Interface



Creating the Project File & Recommended Settings

The Power BI Desktop Workflow

Query Editor

Data Preparation

Clean &
Transform

Extract
Transform
Load

Query Editor



Data Model



The Power BI Desktop Workflow

Query Editor

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Transform

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Query Editor



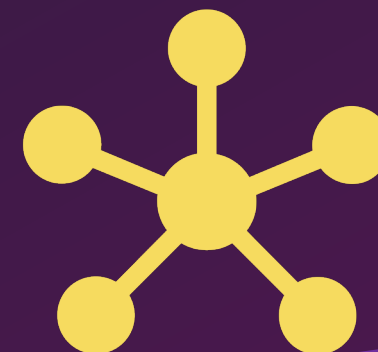
Data & Model View

Data Analysis

Inspect, Explore &
Understand Data

View & Edit
Relationships
between Tables

Data Model



Report View

Data Visualization

Create Reports with
Multiple Visuals

Working with Power BI Desktop

Understanding the Query Editor



What is the Query Editor?



Working with Queries & Editing Rows and Columns



Transformations, Formatting & Handling Errors

The Power BI Desktop Workflow

Query Editor

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Query Editor



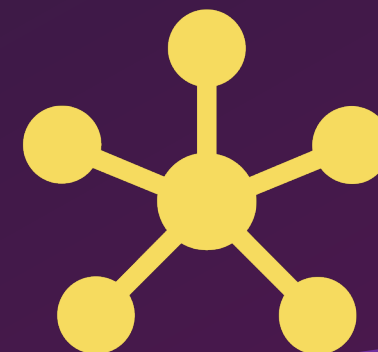
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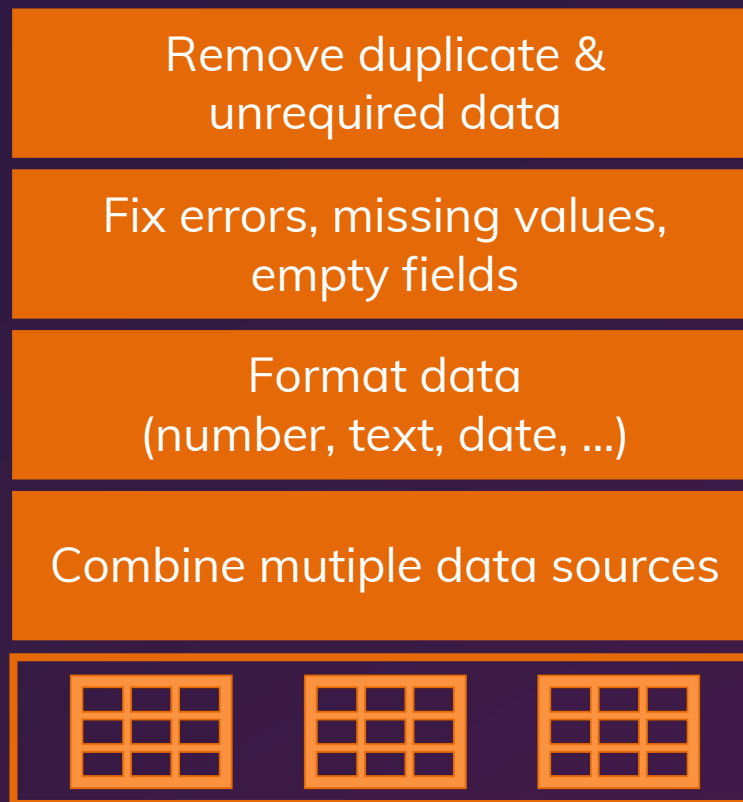
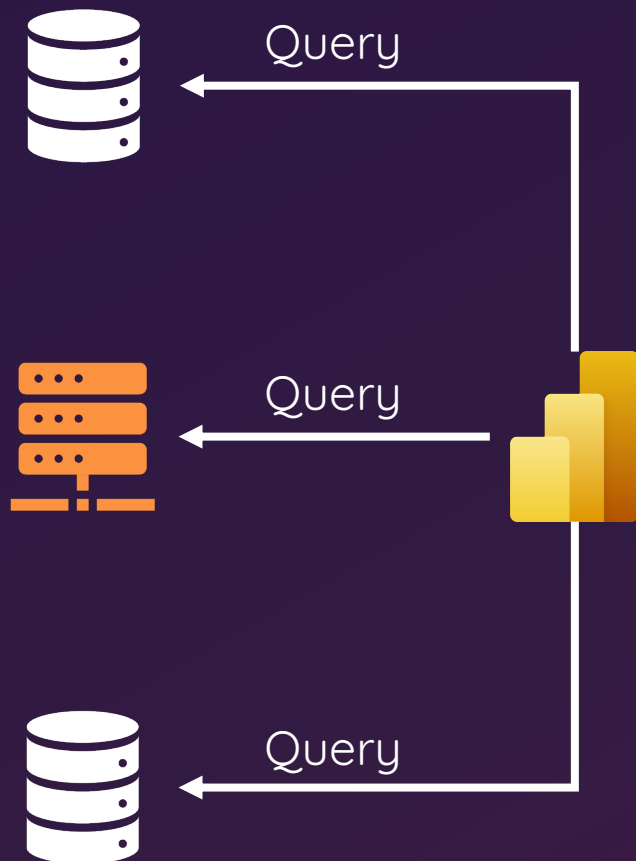


Report View

Data Visualization

Create Reports with
Multiple Visuals

What is “Data Cleansing” / “Data Cleaning”?



Query Data

Clean Data

Analyse / Visualize Data

Understanding Append



Country	Revenue	Cost	Year
Germany	100	-20	2016
Germany	108	-22	2017
Germany	105	-25	2018



Country	Revenue	Cost	Year
Germany	110	-24	2019
Germany	116	-25	2020
Germany	122	-27	2021

Understanding Append

Country	Revenue	Cost	Year
Germany	100	-20	2016
Germany	108	-22	2017
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Country	Revenue	Cost	Year
Germany	110	-24	2019
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Germany	122	-27	2021

Country	Revenue	Cost	Year
Germany	100	-20	2016
Germany	108	-22	2017
Germany	105	-25	2018
Germany	110	-24	2019
Germany	116	-25	2020
Germany	122	-27	2021



Transpose

	Column1	Column2	Column3	→ Columns
Columns	First Name	Manu	Max	→ Rows
	Second Name	Lorenz	Schwarz	
	Age	34	32	

Transpose

Columns

Column1	Column2	Column3
First Name	Manu	Max
Second Name	Lorenz	Schwarz
Age	34	32

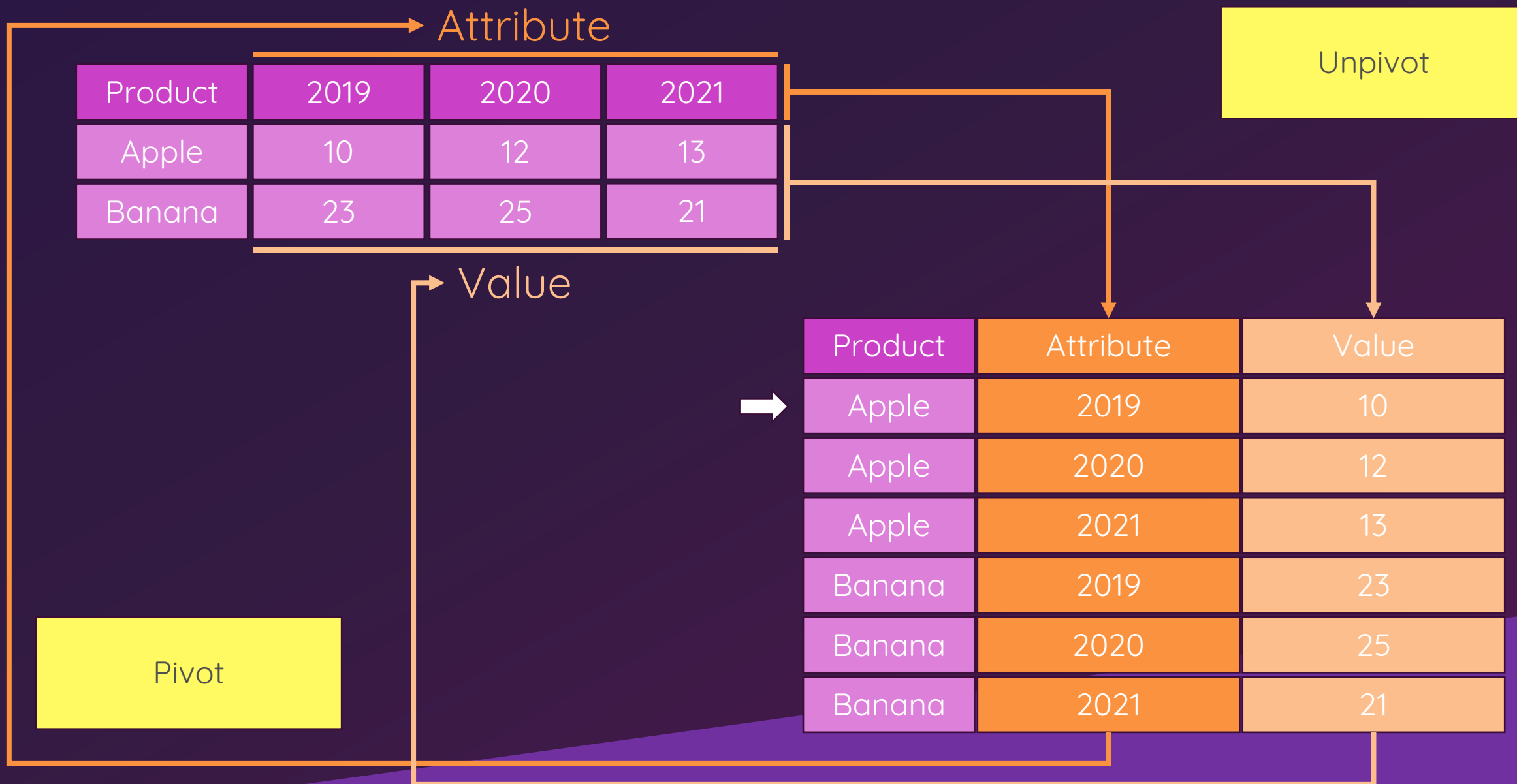
Rows

Columns

First Name	Second Name	Age
Manu	Lorenz	34
Max	Schwarz	32

Rows

Pivoting & Unpivoting



Query Editor Deep Dive

Understanding Data Modeling


Module Content



Data Modeling Theory

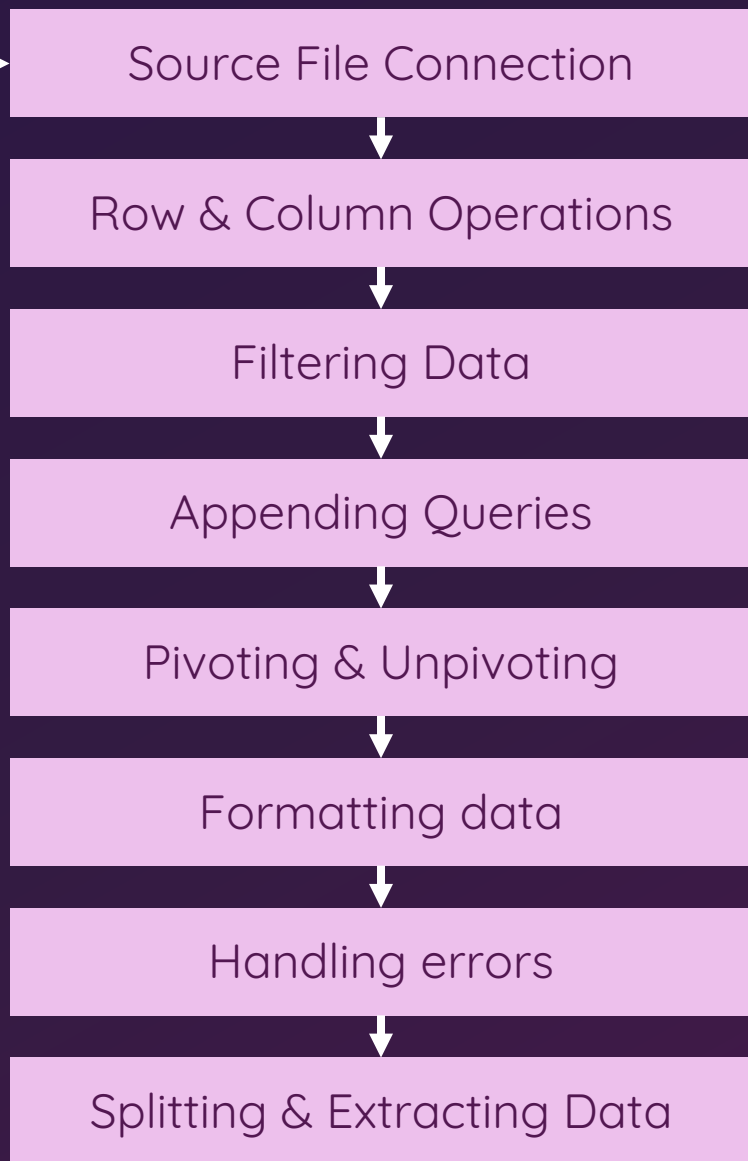


Understanding & Creating the Star Schema



Diving Deeper Into Selected Query Editor Features
& Understanding Basic Mathematical Calculations

The Current State & Next Steps



Country-id	country	...	population
36	australia	...	711.4
276	germany	...	1738.8
...

Basic Cleaning & Shaping



Develop &
Create Data Model

Data Models – What & Why?

Data Warehouse

Large store of data retrieved from various sources designed to enable BI activities

Data Model

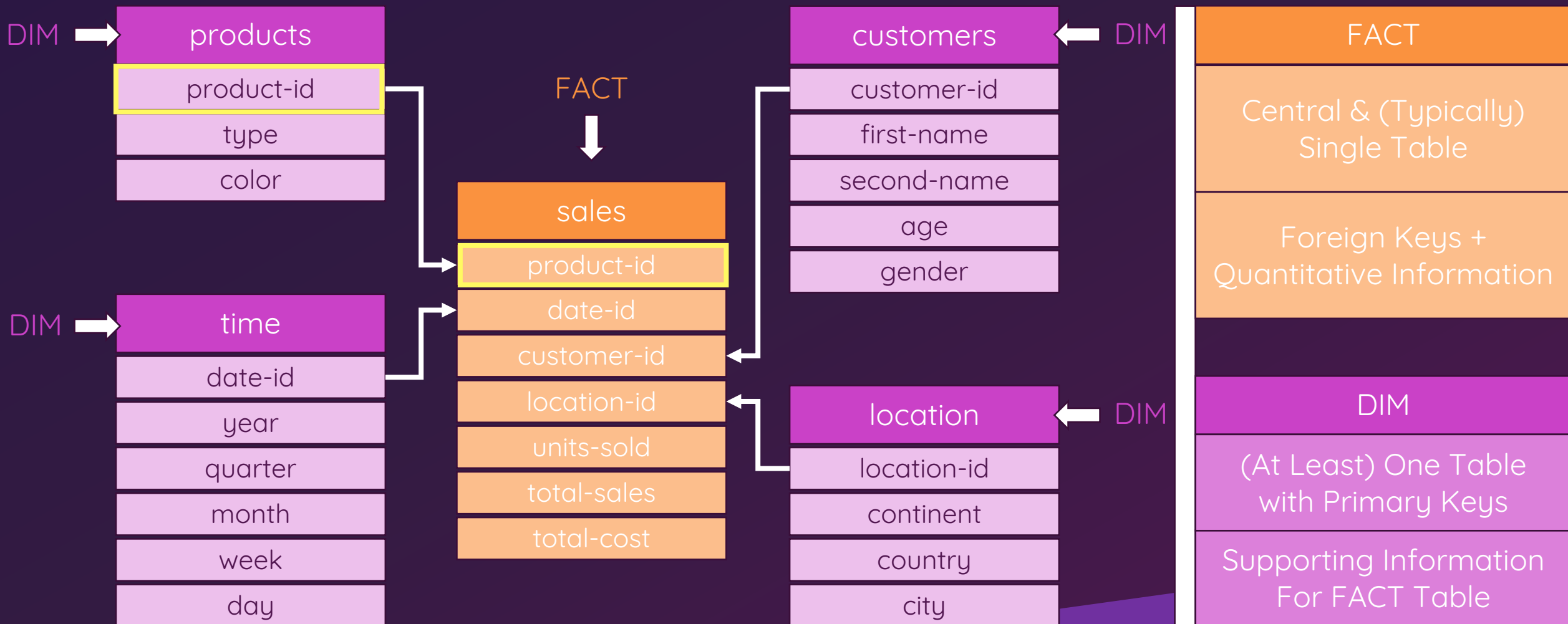
Structured & logical organization of data elements (e.g. tables) and the relationship between different data elements

Multidimensional Schema

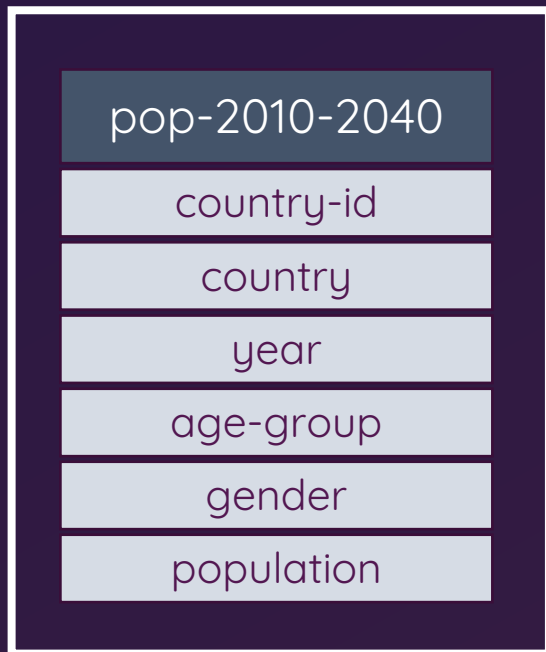
Model different dimensions to keep track of entities / actions concerning the warehouse's activities



The Star Schema – An Example

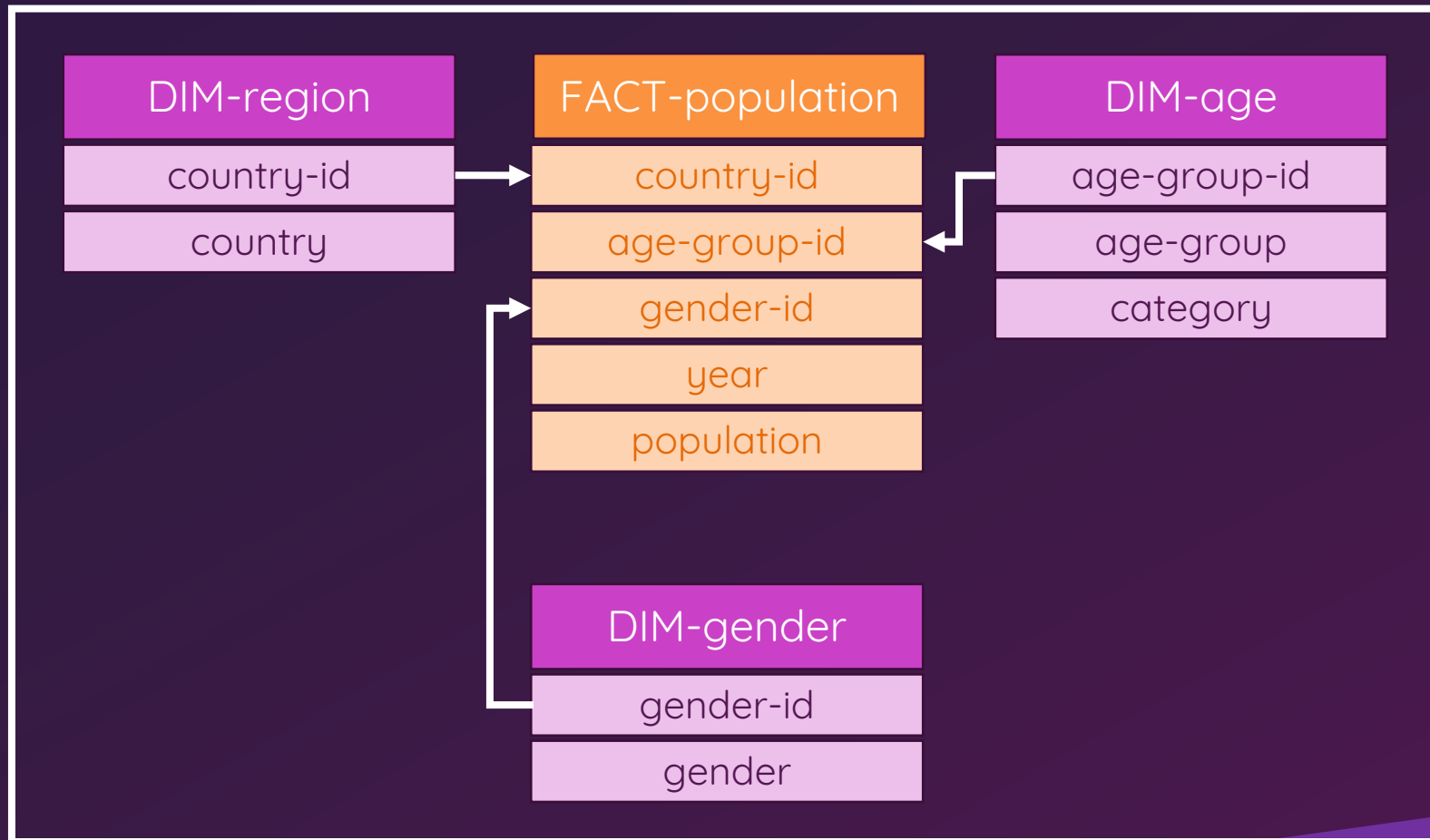


Applying the Star Schema to the Course Project



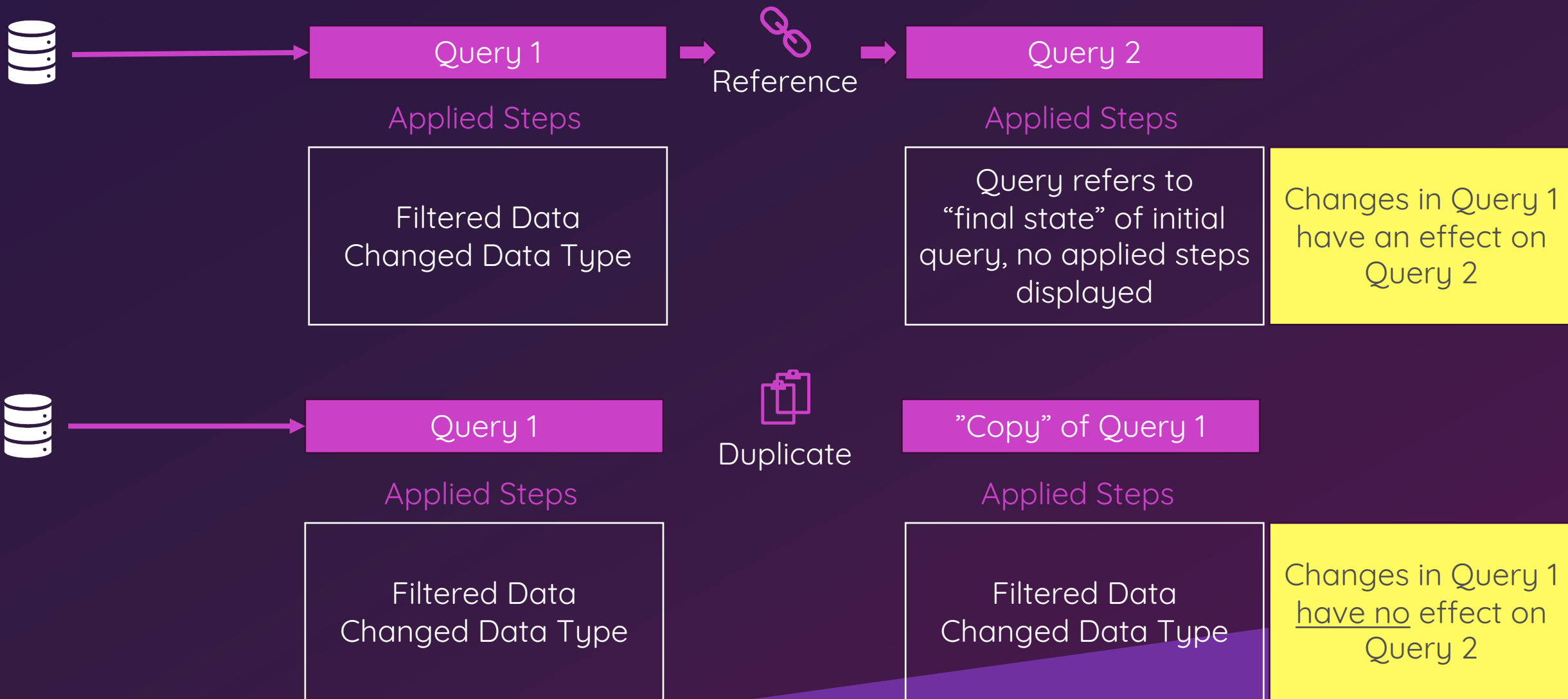
Single Table

VS

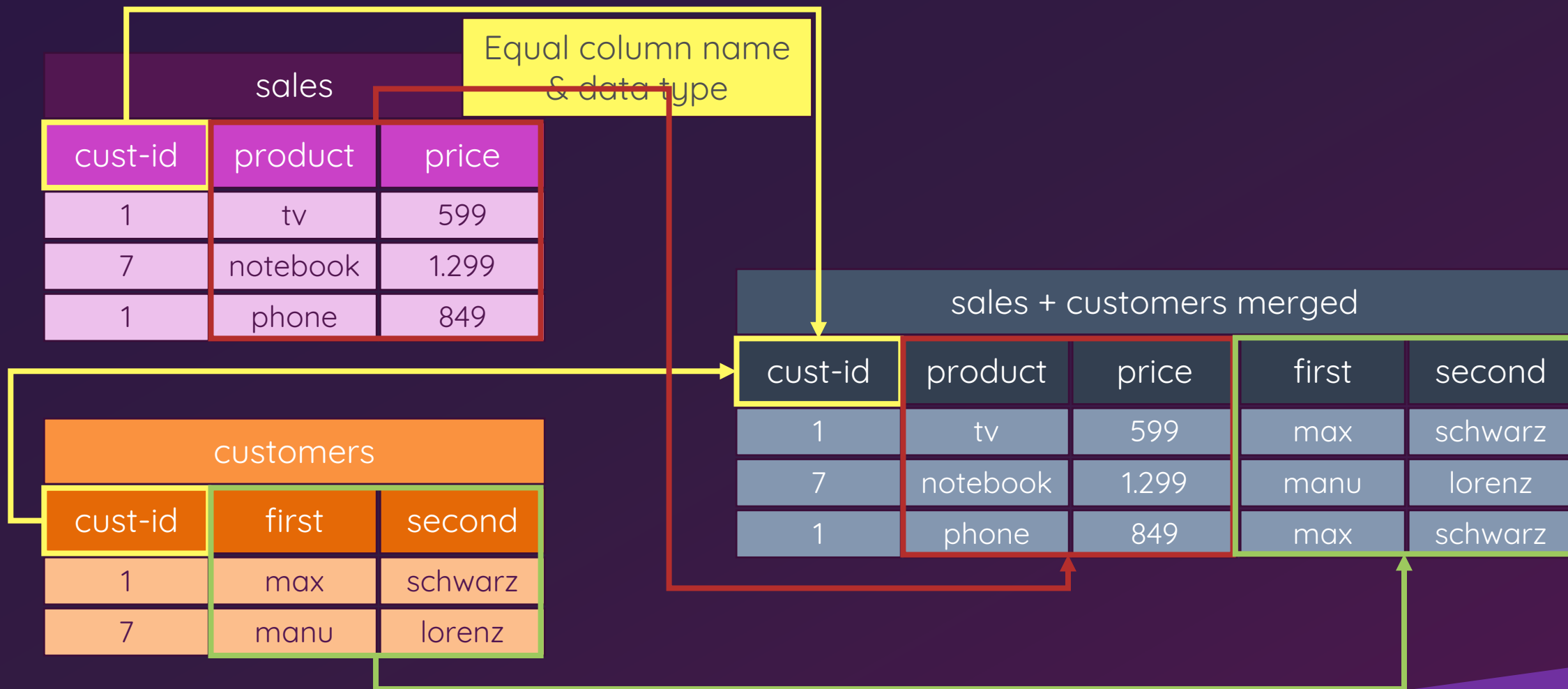


Multidimensional (Star) Schema

Reference vs Duplicate



Merging Queries - Theory




Understanding "Join Kind"


LEFT QUERY	ID	Sales
	A	10
	B	50
	C	20

RIGHT QUERY	ID	Region
	A	USA
	BB	Europe
	C	Asia


OUTER


LEFT 		
ID	Sales	Region
A	10	USA
B	50	n/a
C	20	Asia


FULL 		
ID	Sales	Region
A	10	USA
B	50	n/a
C	20	Asia
BB	n/a	Europe

RIGHT 		
ID	Region	Sales
A	USA	10
BB	Europe	n/a
C	Asia	20

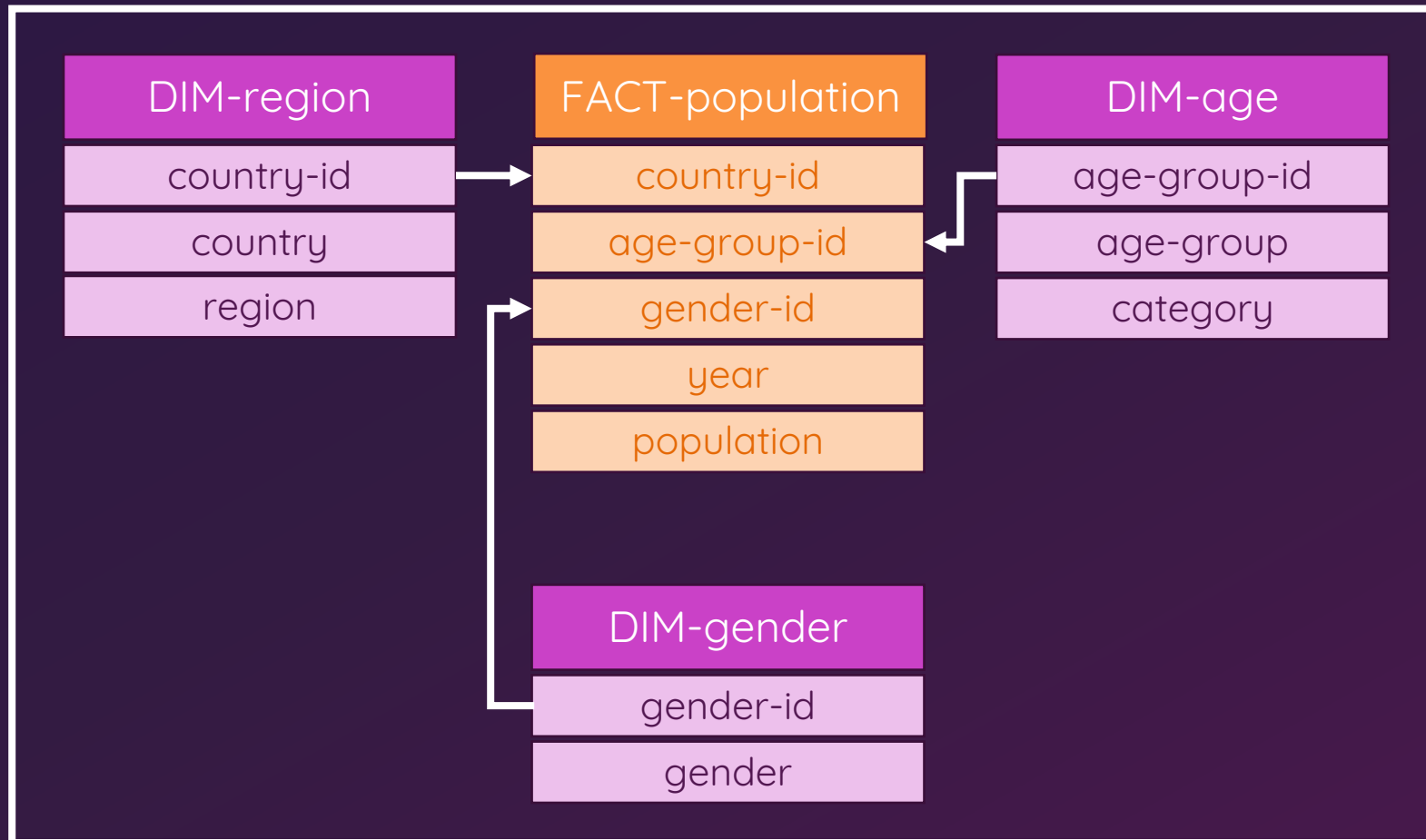
ANTI

LEFT 		
ID	Sales	Region
B	50	n/a

RIGHT 		
ID	Region	Sales
BB	Europe	n/a

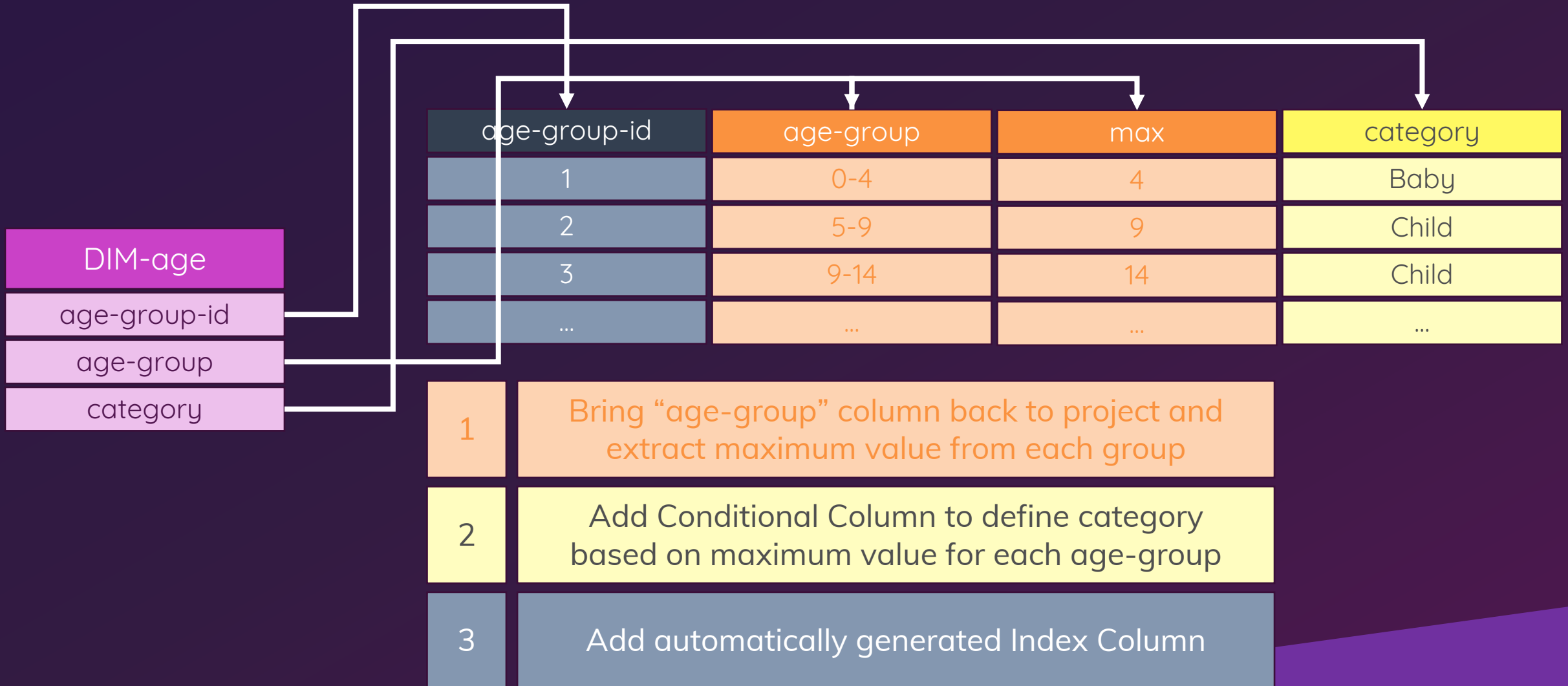
INNER 		
ID	Sales	Region
A	10	USA
C	20	Asia

Adding More DIM Tables

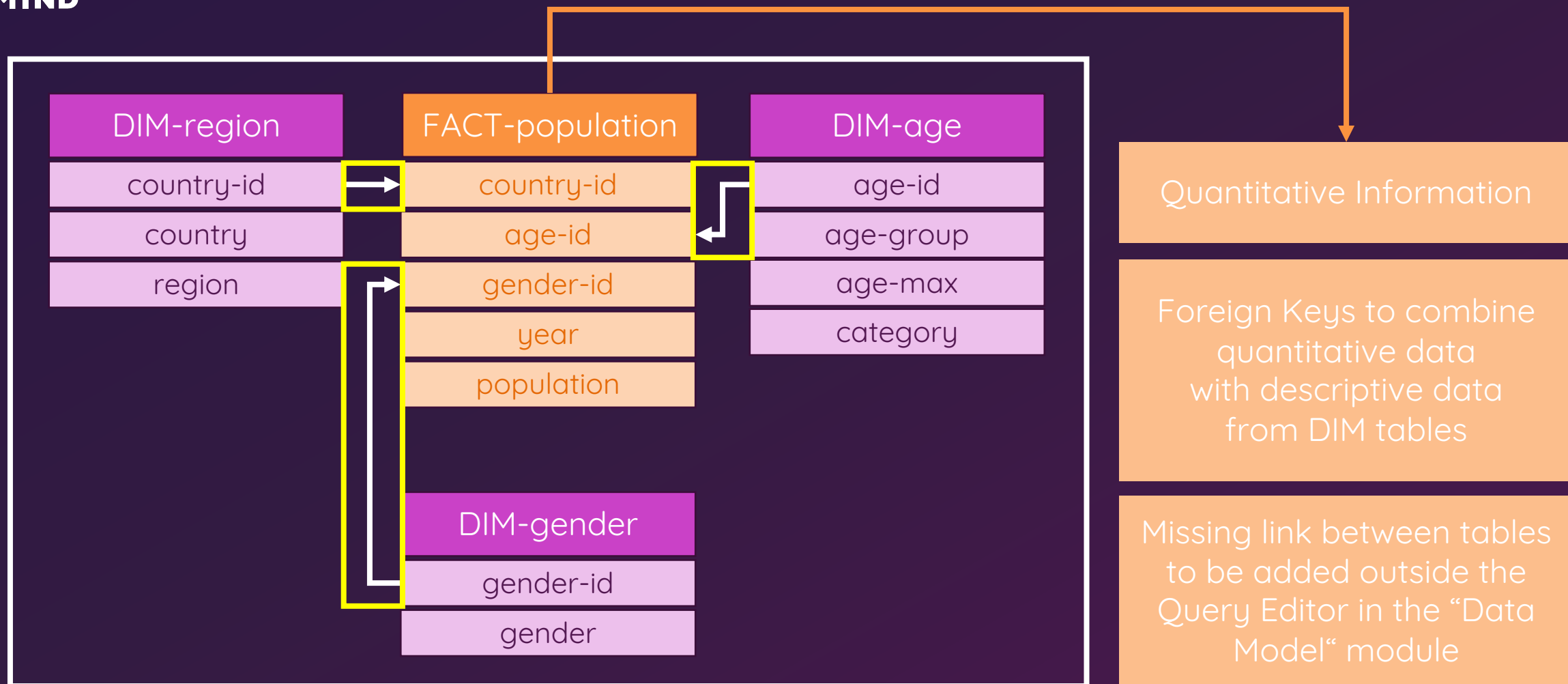


Multidimensional (Star) Schema

The DIM-age Table

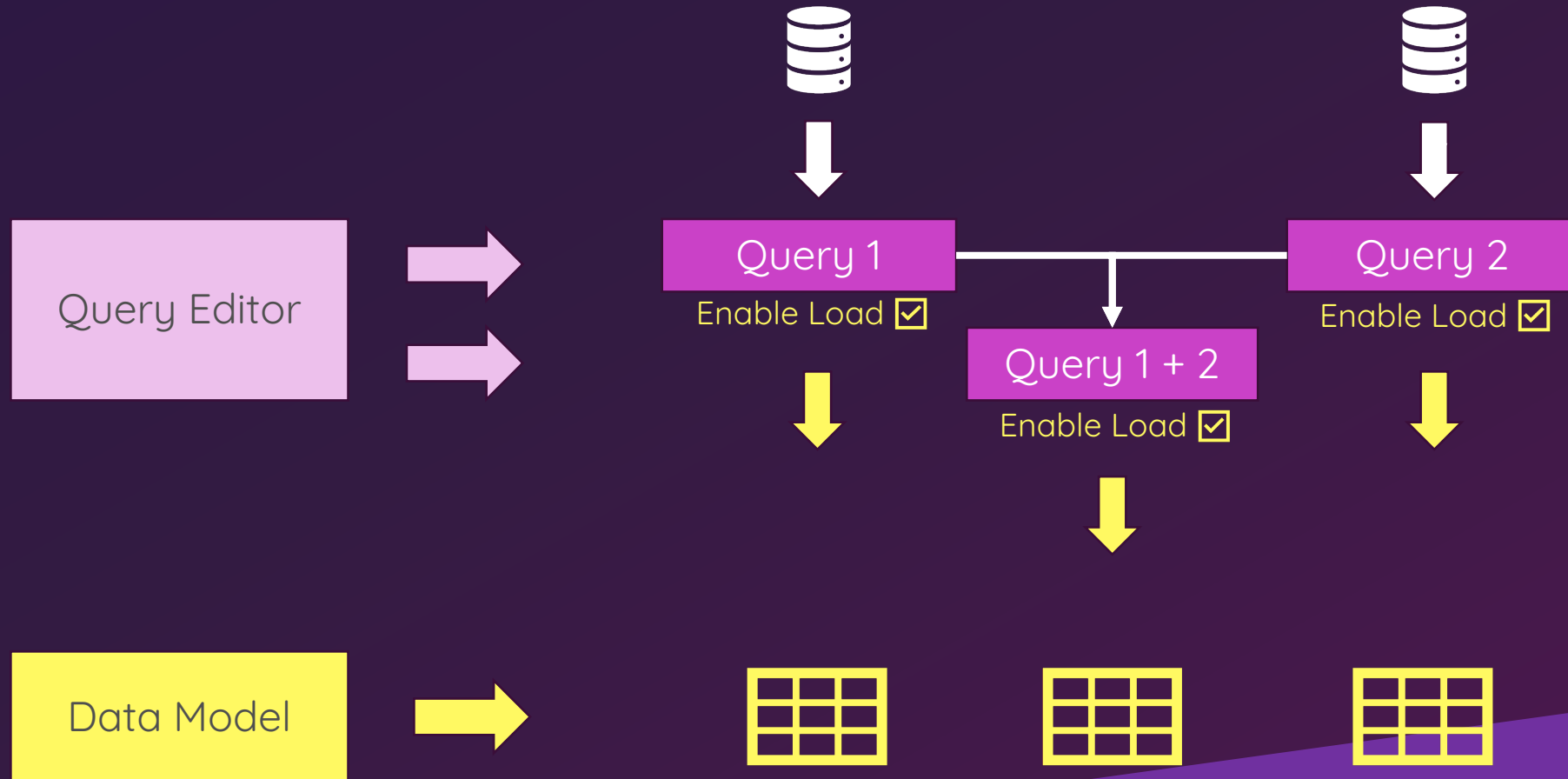


The FACT Table



Multidimensional (Star) Schema

Understanding “Enable Load”



Data View & Relationships

Leaving the Query Editor



Understanding Relationships



M-Language vs DAX & DAX Introduction



Working with Calculated Columns & Measures

The Power BI Desktop Workflow

Query Editor

Data Preparation

Clean &
Transform

Extract
Transform
Load

Query Editor



Data Model



The Power BI Desktop Workflow

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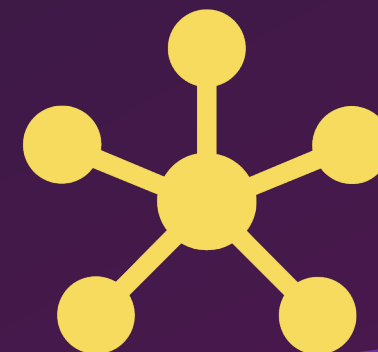
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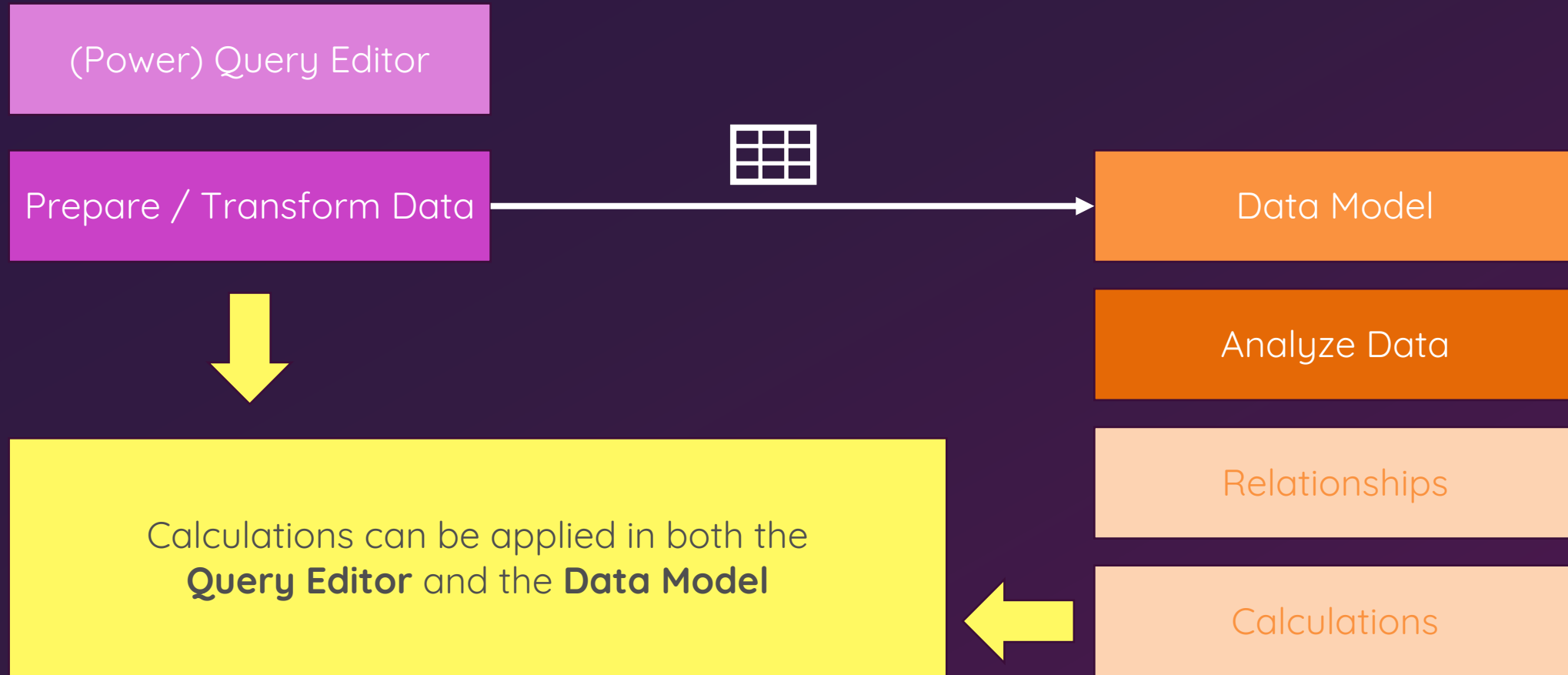


Report View

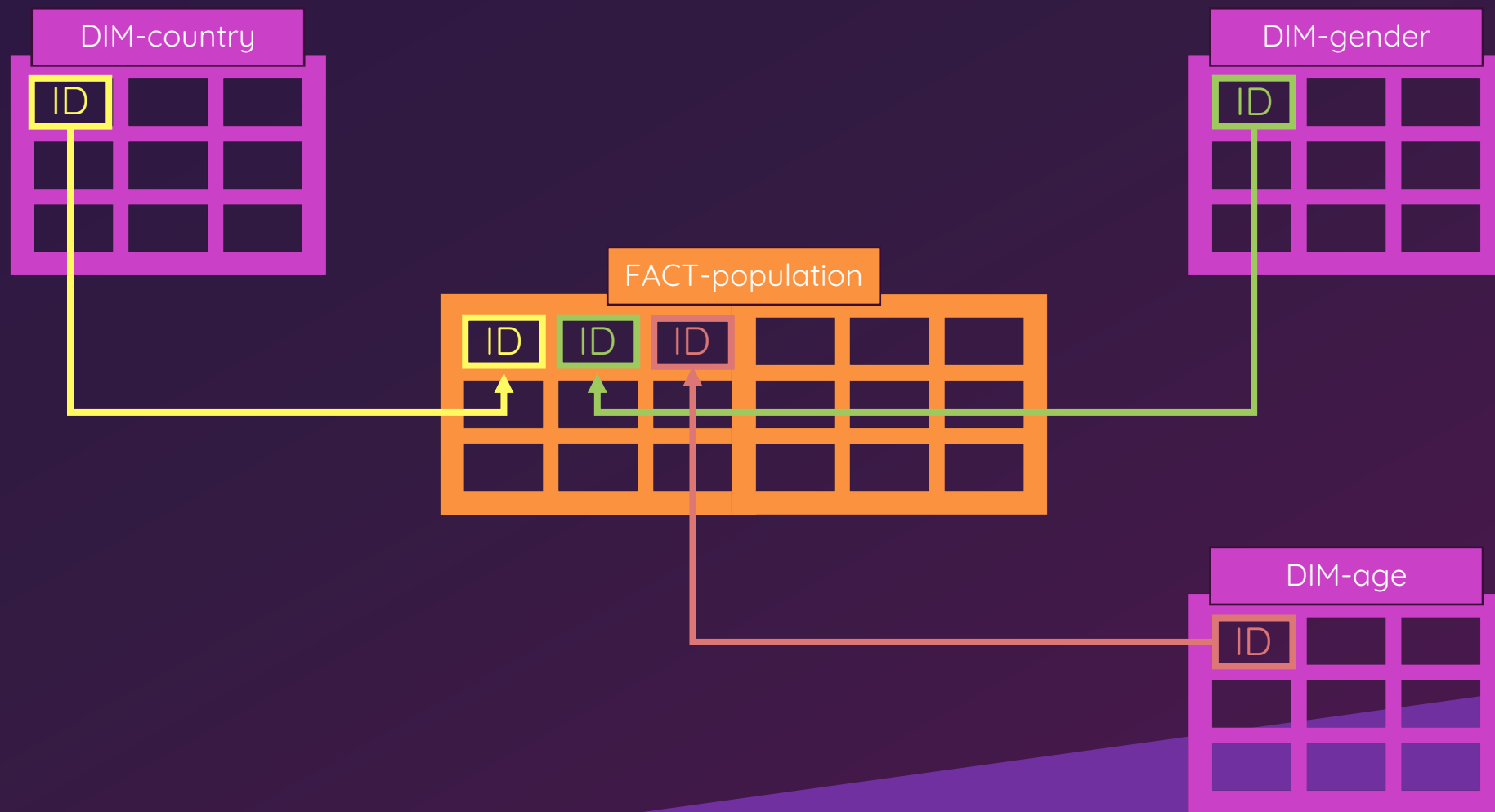
Data Visualization

Create Reports with
Multiple Visuals

Query Editor vs Data Model



Relationships to the Rescue!



Understanding Relationships

Cardinality

Cross Filter Direction

Active Properties

Relationship Type

Different Kinds Of Data Relationships



One-to-Many (1:n)

One record in table A has one or many related records in table B

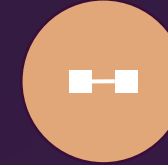
e.g. an employee belongs to one company but a company has many employees



Many-to-Many (n:n)

One record in table A has one or many related tables in table B – and vice versa

e.g. an employee is part of multiple projects and every project has multiple employees assigned to it

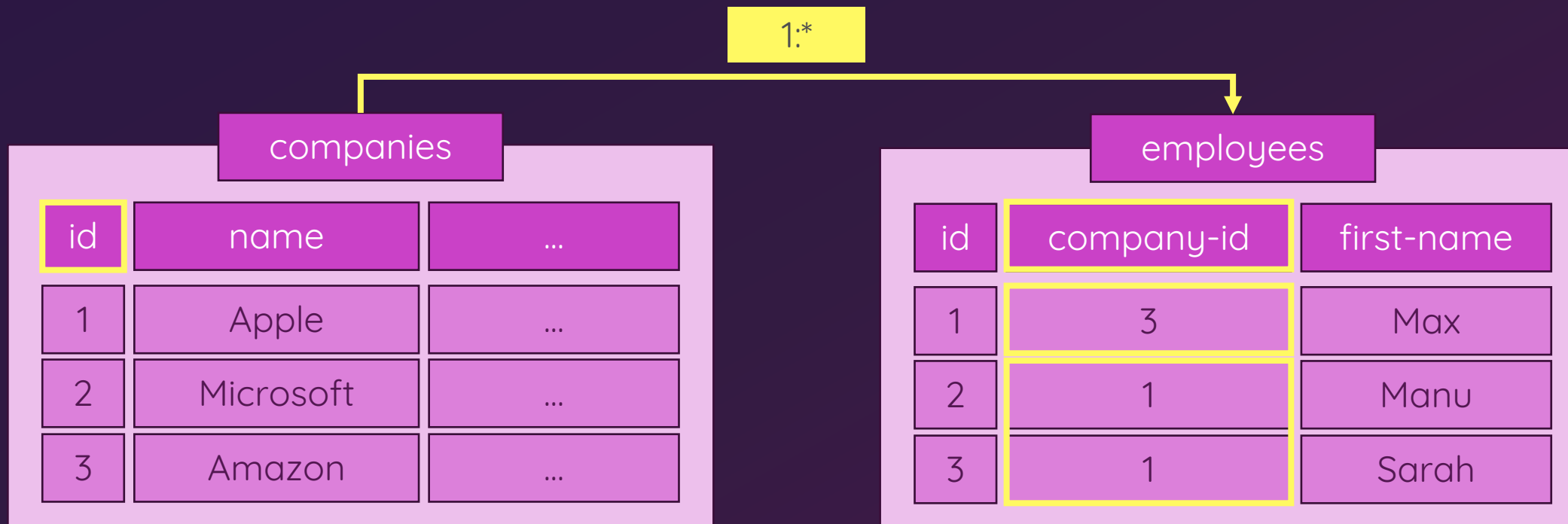


One-to-One (1:1)

One record in table A belongs to exactly one record in table B – and vice versa

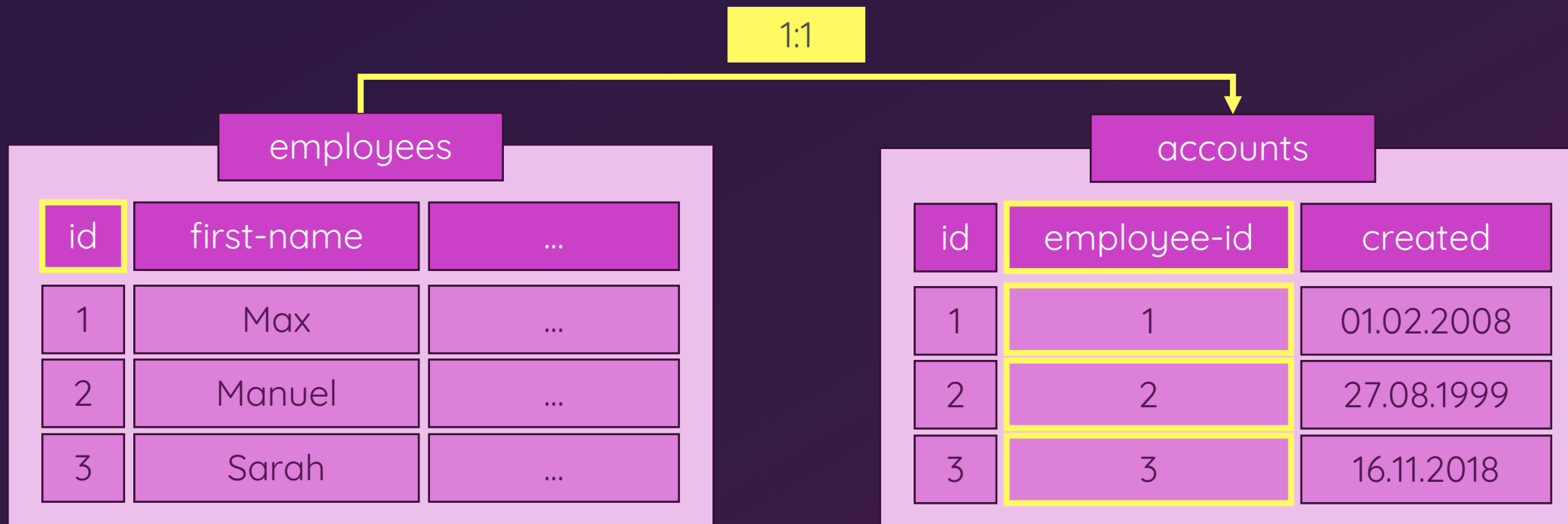
e.g. an employee has exactly one intranet account and every intranet account belongs to exactly one employee

One to Many (1:*)



“One”: **Unique** entry for **primary key**
”Many”: **One or multiple** entries for **foreign key**

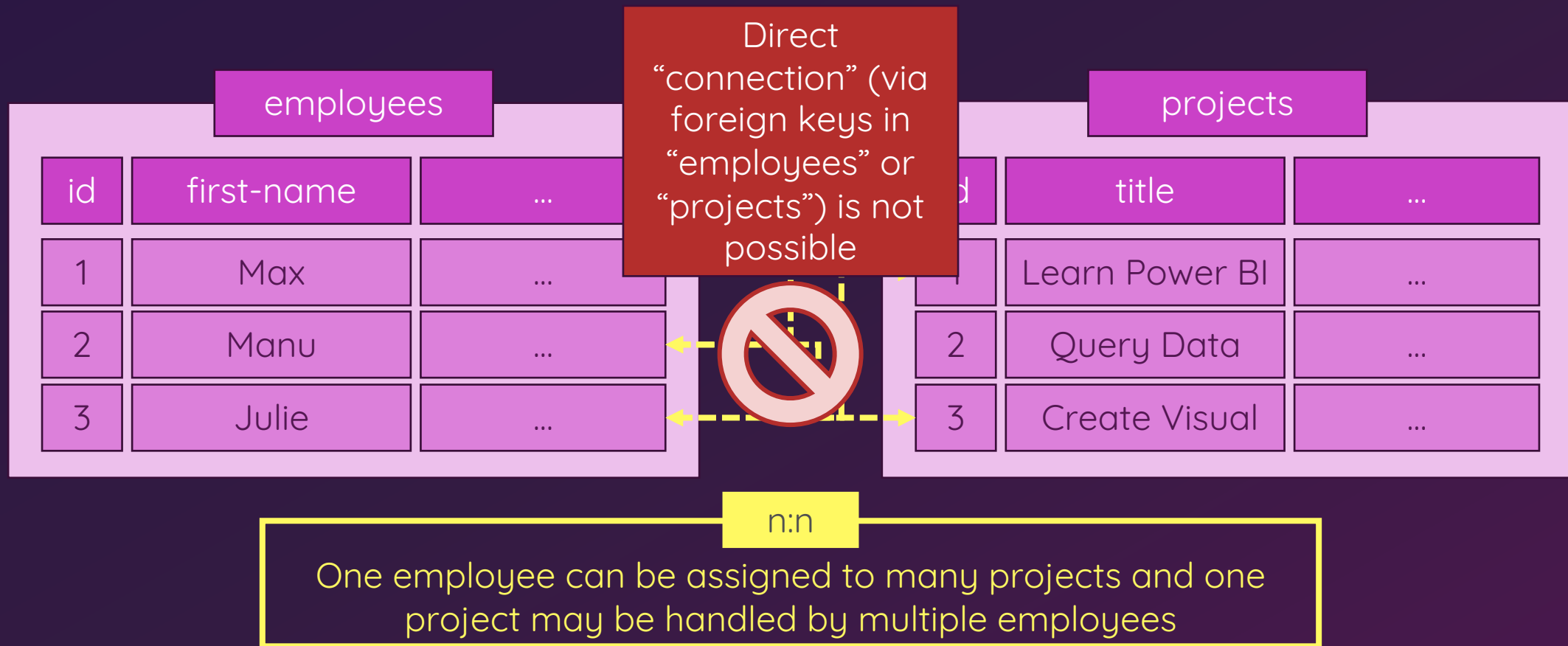
One to One (1:1)



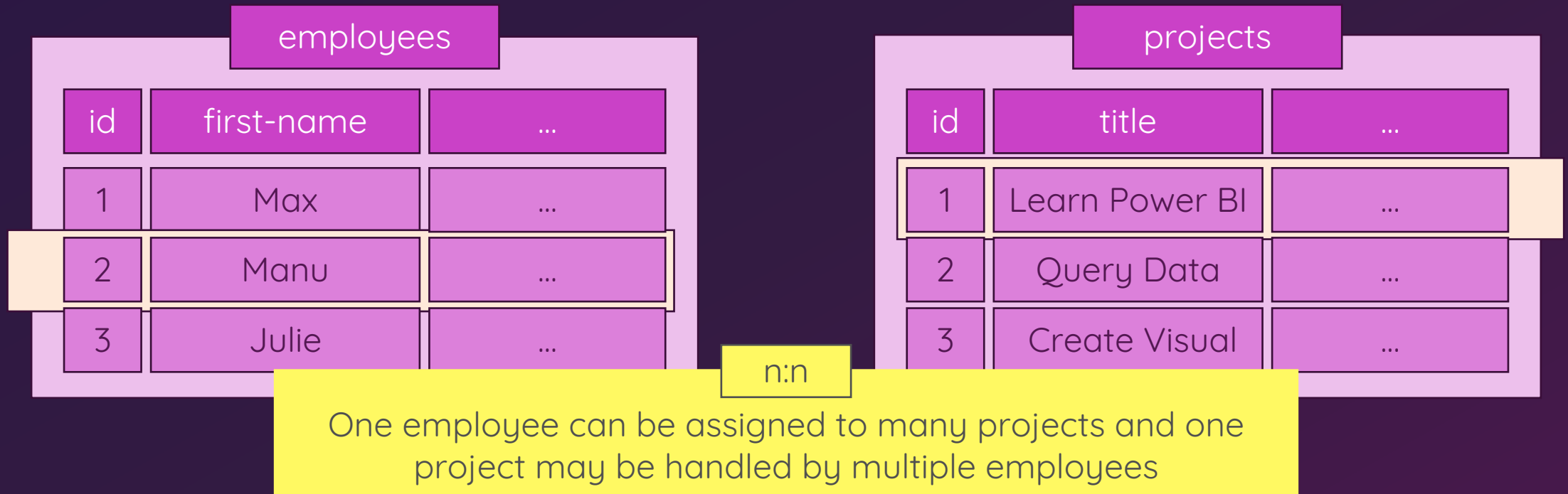
“One”: **Unique** entry for **primary key**

”One”: **Unique** entry for **foreign key**

Many-To-Many Relations Need Intermediate Tables



Many-To-Many Relations Need Intermediate Tables



An “intermediate table” is created and used to store the relations between “employees” and “projects”

projects-employees		
id	employee-id	project-id
1	2	1
2	3	1

One row per relation between the two “main tables”

Understanding Relationships

Cardinality

Cross Filter Direction

Active Properties

Relationship Type

Table “Communication”

Understanding Relationships

Cardinality

Cross Filter Direction

Active Properties

Relationship Type

Table “Communication”

Activate / Deactivate
Relationship

M vs DAX (Data Analysis Expressions)

	Description	Application
M	Power Query Formula Language	Data Preparation
	Data Transformation	Before Data Model
DAX	Data Analysis Expression Language	Create Insights
	Analytical Data Calculations	In Data Model
	Comparable to Excel Functions	

DAX Basics

DAX Reference

<https://docs.microsoft.com/en-us/dax/>

Syntax

Formula = ...

Data Types

String

Number

...

Operators

+

-

...

Functions

CONCATENATE()

Basics



Advanced

DAX Statements

DEFINE

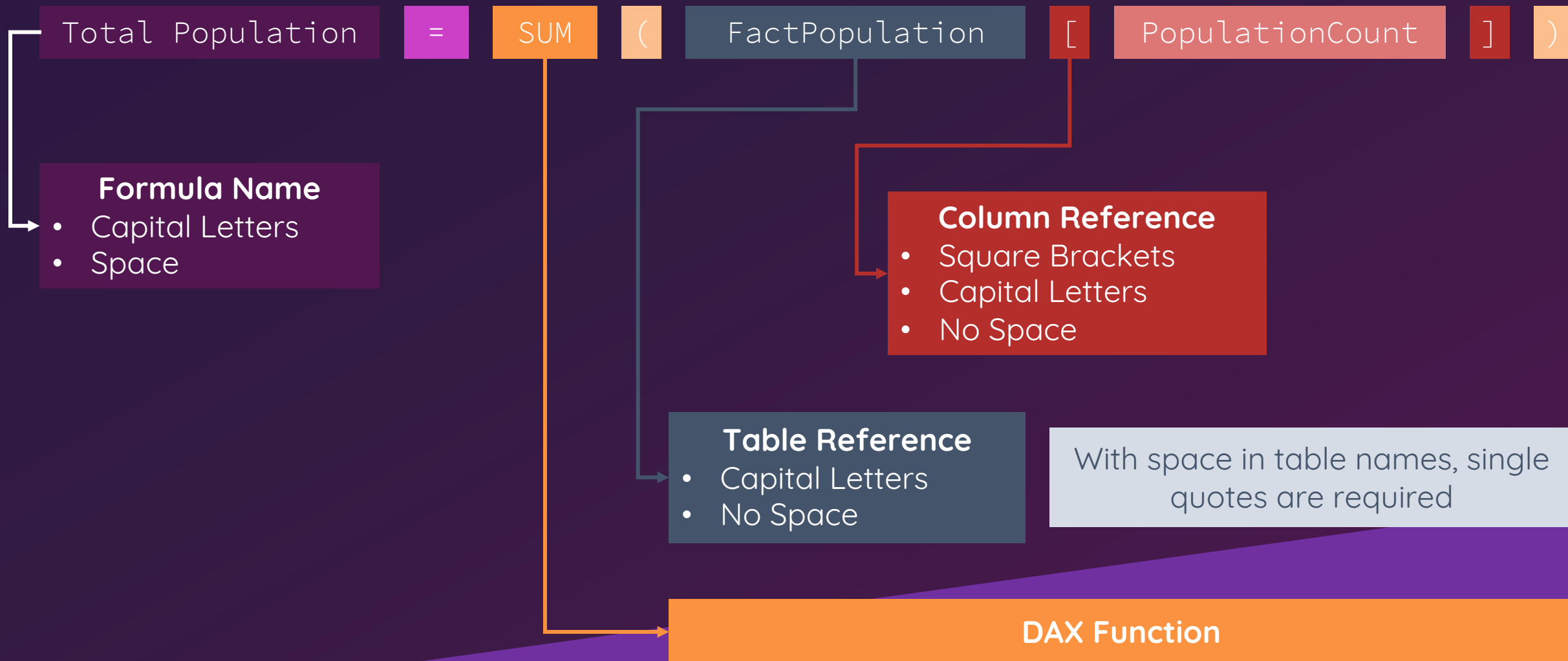
EVALUATE

ORDER BY

VAR

DAX Queries

The Core DAX Syntax



DAX Data Types

String (Text)	“The DAX Basics”	
Whole & Decimal Numbers	564	949.59
Boolean	TRUE	FALSE
Date/Time	January 1st 2020	
Currency		
Blank (NA)		

DAX Operators

Arithmetic	Comparison	Logical	Text concat.
+	=	&&	&
-	==		
*	>	IN	
/	>=		
^	<>		

Type	Function	Output
Text	CONCATENATE("I Love Power", "BI")	I Love PowerBI
Information	ISNUMBER(2020)	TRUE
Logical	IF([Population]>100000, "Big", "Small")	Big Small
Math	ROUND(352.867, 2)	352.87
Statistical	AVERAGE(Fact-Pop[Population])	
Filter	FILTER(Fact-Pop[Year]=2020)	
Date & Time	CALENDAR(DATE(2000,01,01), DATE(2020,12,31))	

Calculated Column or Measure?

Calculated
Column

“Perform an operation that generates
results for each row of your table”



Measure

“Return a single result of a calculation or
an aggregated value (e.g. Averages)”

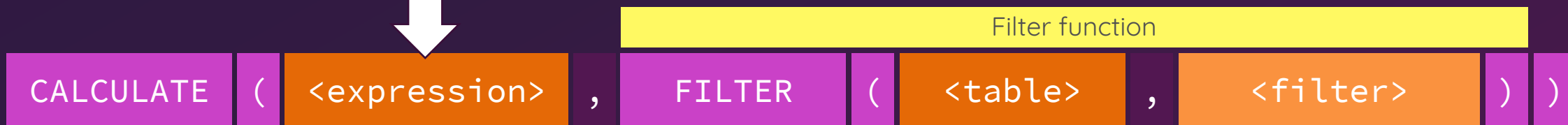




)

The "FILTER" & "CALCULATE" Functions

SUM('FACT-population'[population])



'FACT-population'[gender]="Female"



The Report View

Creating Beautiful Visuals & Reports



Creating Visuals & Reports



Formatting Visuals / Charts & Understanding Report Themes



Working with Filters, Hierarchies & Interactions

A (Final) Look at the Power BI Desktop Workflow

Query Editor

Data Preparation

Clean &
Transform

Extract
Transform
Load

Query Editor



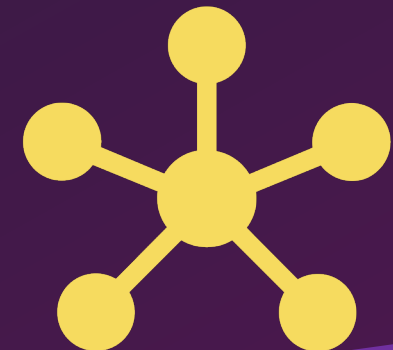
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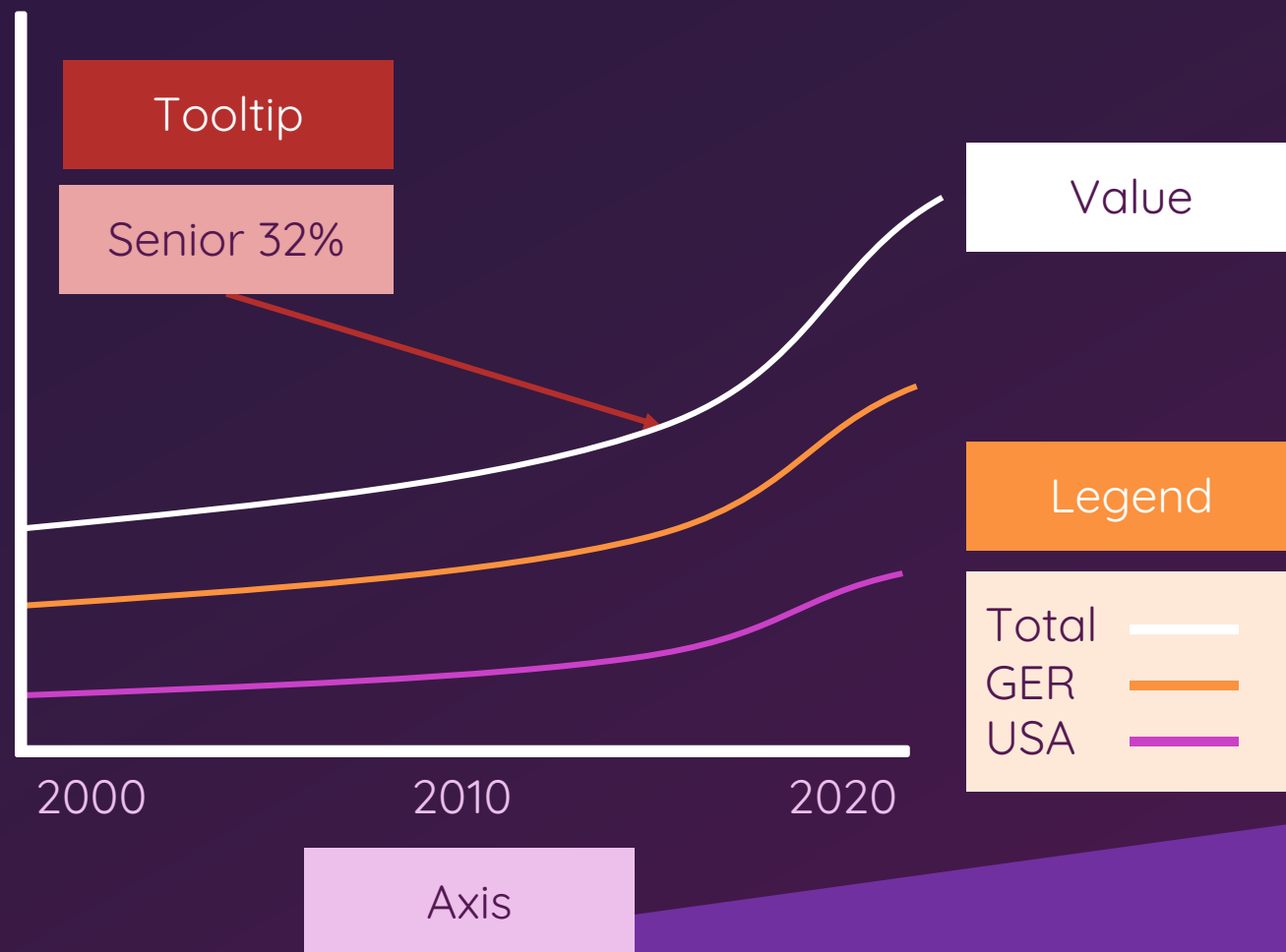


Report View

Data Visualization

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Multiple Visuals

Basic Visual Elements



Power BI Pro & Mobile

Sharing & Collaborating

Module Content



Understanding the Relationship between Power BI Desktop & Power BI Pro



Diving Into Workspaces to Collaborate on Projects



Sharing Data between Power BI Desktop, Power BI Pro & Power BI Mobile

The Next Steps

Single User



Power BI Desktop



STOP



Publish

Power BI Pro



Access

Power BI Mobile

Organization



Power BI Desktop



Publish



IT

Power BI Pro



Share

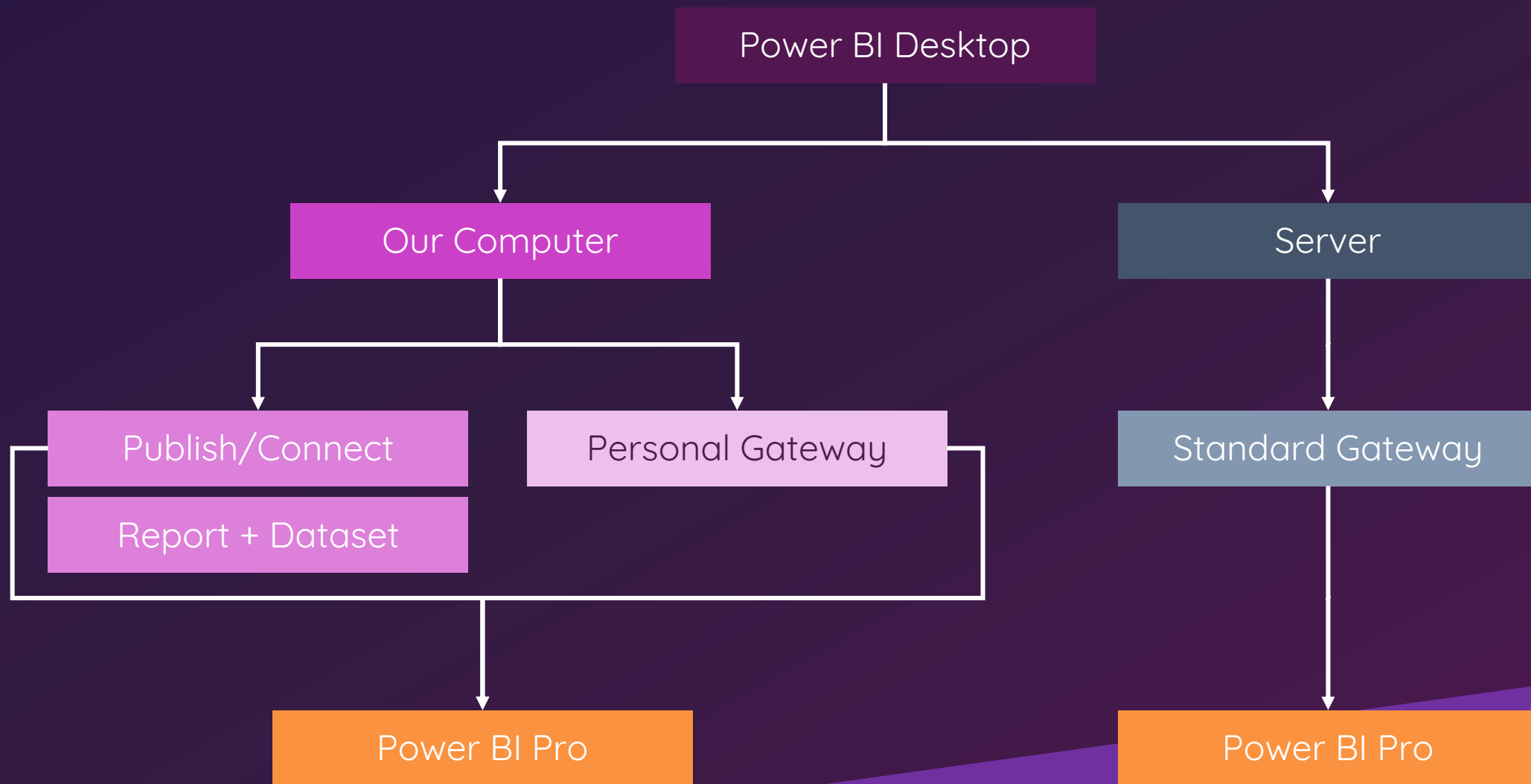


Marketing

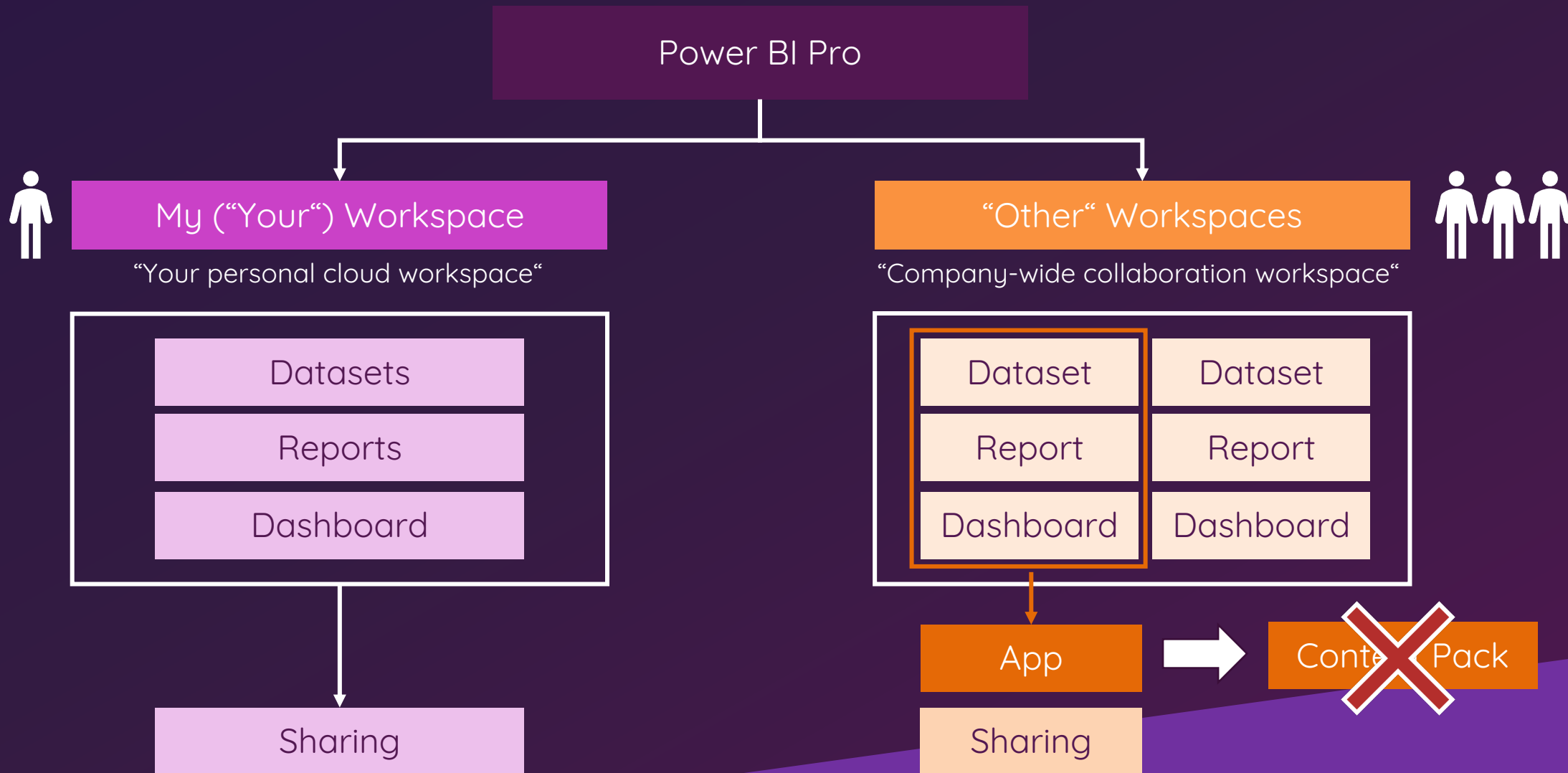
Power BI Pro

Power BI Mobile

Publishing From PBI Desktop to PBI Pro



Workspaces, Apps & Content Packs



Sharing Data: Workspace or App?

