Mentorness Article
Task -01
MIP :- Power BI -DA -08-Batch

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Power Bi Data Modeling: Relationship – Calculated Columns and Measures

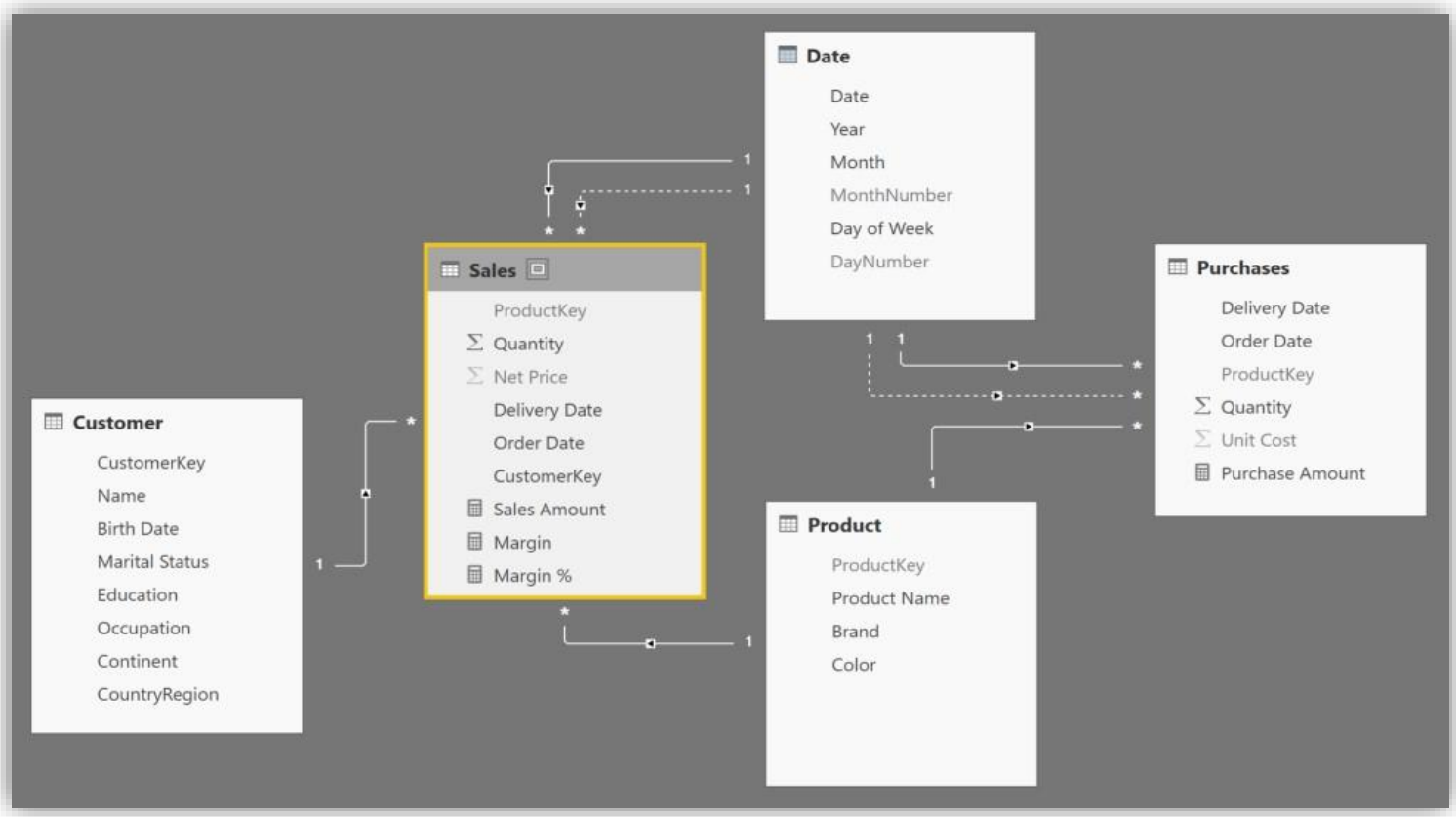
Introduction

A group of software services, applications, and connections called Power BI come

together to transform your disparate data sources into solid, interactive, and attractive insights.

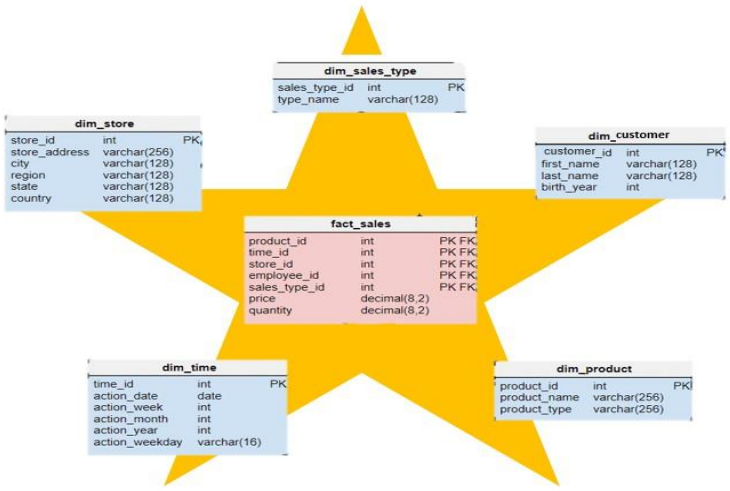
What Data Modelling?

The act of visualizing the relationships between data structures and the specific features that each data structure has is known as **data modeling**.



Star Schema

The Star Schema is the most common word used when discussing data modeling. It is advised to employ this strategy while creating data warehouses and associated databases since it is a commonly used method in Power bi.



Star Schema requires modelers to classify their model tables as either *dimensions or fact*

Therefore, the question is: What are the dimensions and fact table, and how do they differ from one another?

Fact-Table

Fact table is a comprehensive collection of attributes derived from dimension table.

It contains Quantitative data, can be sales orders, stock balances, exchange rates, temperatures and etc.

Comprising of two columns:

One column stores foreign keys and other column stores corresponding data or value.

Has fewer attributes but more records. Located in the middle of star schema.

Made after Dimension table.

Using for analysis and decision making.

Dimension - Table

Dimension table provide descriptive context and attributes for the data in the fact table.

Dimension tables should contain unique values for the features they are describing, and their columns will be responsible for filtering the data in the power bi report.

Has fewer records, but more attributes.

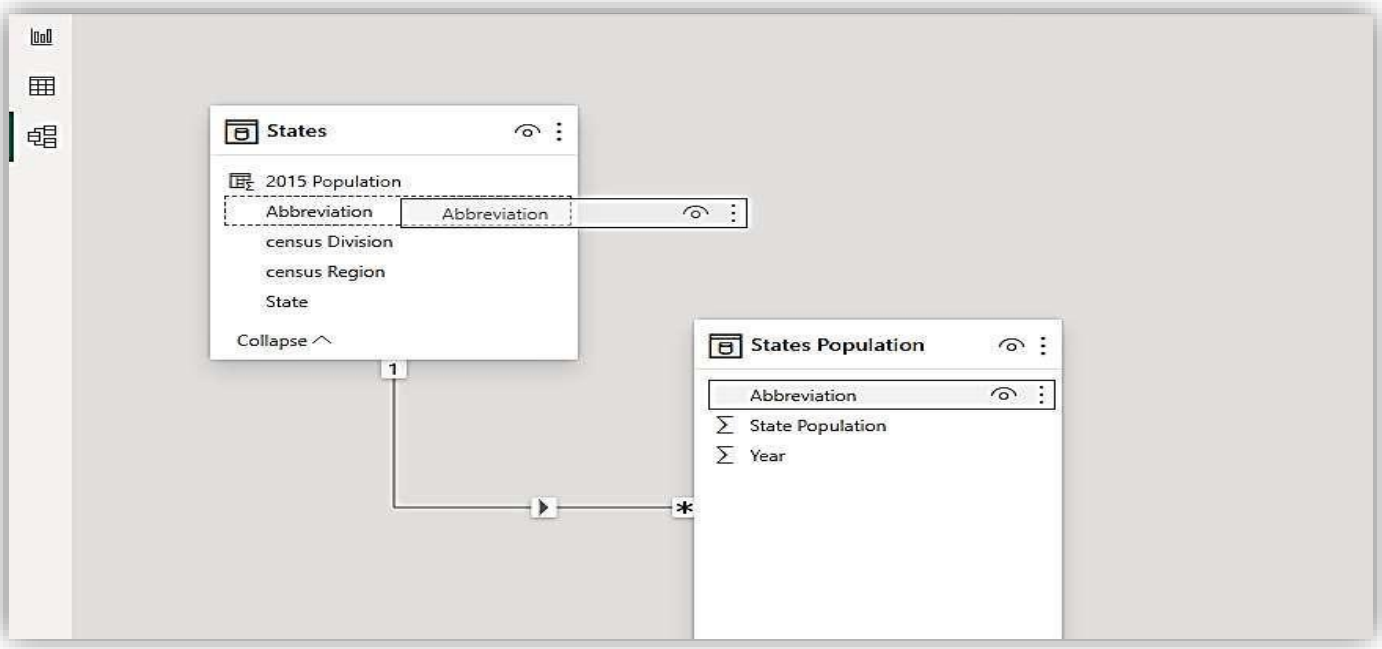
Located in the Edges in star schema.

Using for Data and process storage.

Relationships in power Bi- How to create Relationships?

There are two ways to create relationship:

1. To create a relationship, select a field in one table and drag it onto the field in the other table. as shown in the following images.



2. To add a relationship, choose "New" after choosing "manage relationships" from the ribbon.

Let's move into another important part which is called “Cardinality”.

Cardinality

Each Model relationship is defined by **a *cardinality type***, there are *Four Types:*

- One-to-many (1:*)
- Many-to-one (*:1)
- One-to-one (1:1)
- Many-to-many (*:*)

O One-to-many (Many-to-one) cardinality

The one-to-many and many-to-on cardinality are the same, and they are also the most common cardinality types.

- **One-to-one cardinality (1:1)**

  A one-to-one relationship means that both columns contain unique values, this type of cardinality is not common.

- **Many-to-many cardinality** (*:*)

  When there are duplicate entries in both columns of a many-to-many connection, it is deemed a "Weak Relationship" and is not commonly employed as this cardinality type is the most troublesome.

Cross-Filter Direction

Every model connection has a cross-filter direction defined for it. Depending on the type of cardinality, there are two potential cross-filter directions.

- Single direction
- Both directions which is described as “Bi-directional”

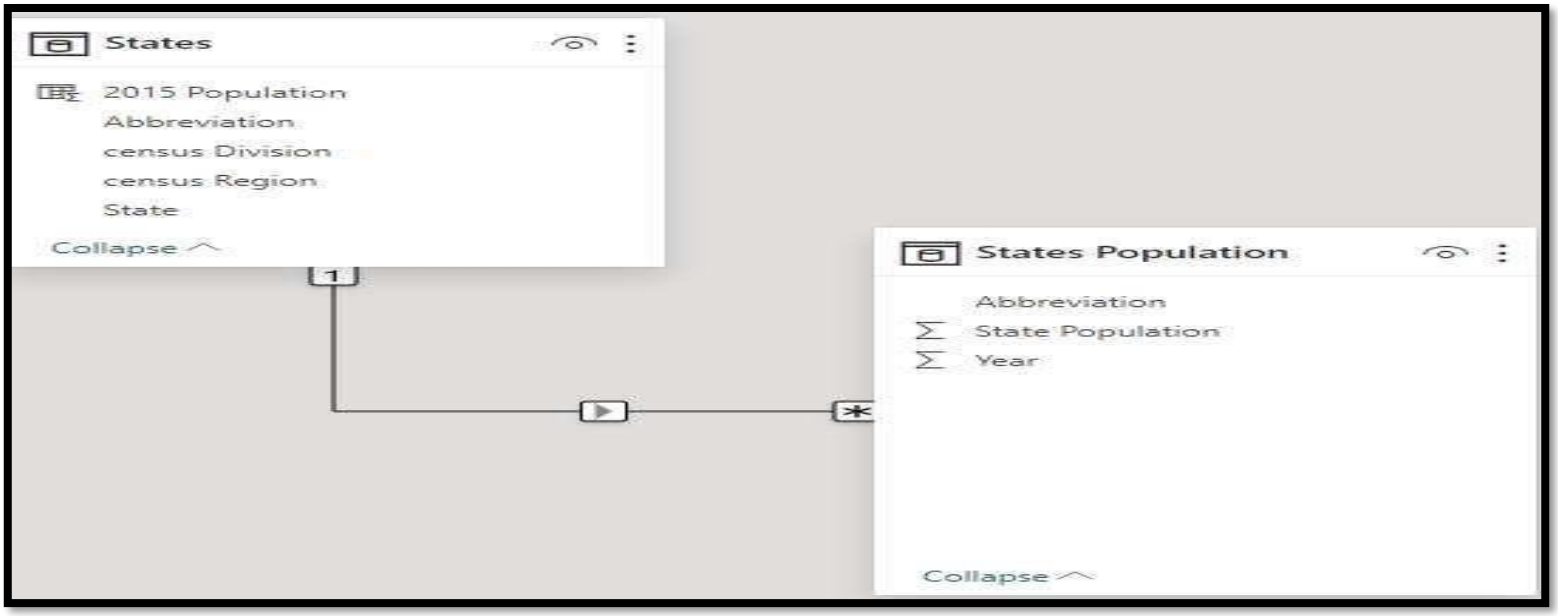
Single direction is default for one-to-many and many-to- one.

Bi-directional is automatically applied on one-to-one and many-tomany.

Be aware that bi-directional can have a detrimental effect on performance as it slows down and causes problems with Dax computations, but it has no effect on power query.

Therefore, we advise use bi-directional filters sparingly.

Note: The arrowhead(s) along the relationship line in the Power Bi Model View may be used to identify the direction of a cross-filter; a single arrowhead indicates a single direction filter, while a double arrowhead indicates a bidirectional connection.



Now, after knowing the cardinality and cross-filter direction we are able to know:

The relationship between Fact and Dimension table

- One-to-many
- From Dimension to Fact
- Single directional
- Star Schema

Calculated Columns and Measures

There is a great deal of disagreement between computed columns and measurements since many people believe them to be interchangeable. However, there are significant distinctions between the two, which we will discuss below.

Calculated columns:

Calculated columns evaluated in the context of each row in a table.

- **Let's take an example:**

  Ex: We need to calculate the total sales from price per unit and units sold

```
1 Total sales =
2 (
3     'Table 1 (Data Sales Adidas)'[Price per Unit]*'Table 1 (Data Sales Adidas)'[Units Sold]
4 )
```

Price per Unit	Units Sold	Total sales
50	1200	60000
50	1000	50000
50	1000	50000
50	1250	62500
50	900	45000
50	1000	50000
50	1220	61000

As above it showed *total*-sales is created for every row and this correct for the calculated columns.

IZI Note: calculated columns consume a large amount of memory and slow down the performance of data model.

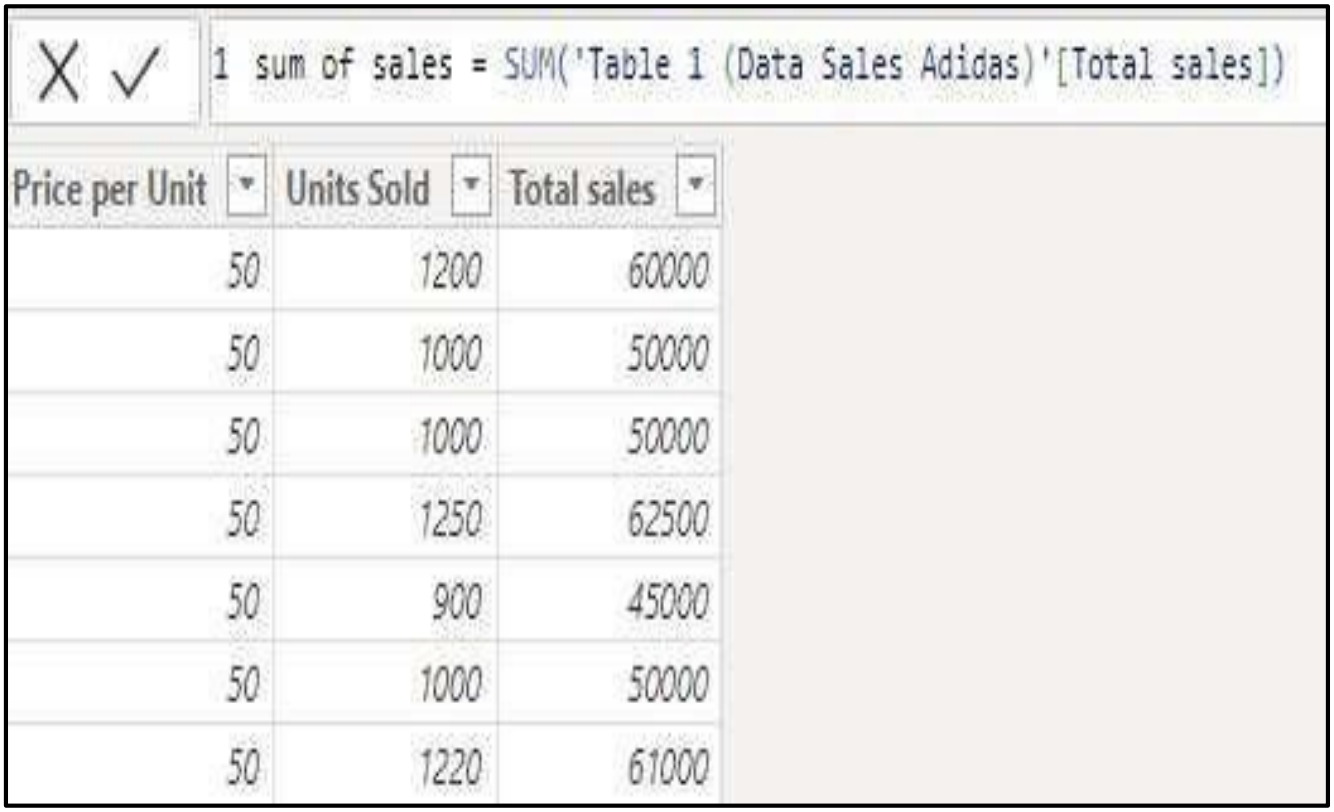
Measures:

Measures are applied to aggregates like sum or average (simply numeric data).

Measures are assessed in any context in which they are employed.

Since measures must be applied to aggregated variables while unit price and unit sold are at the row level, we are unable to apply the same method with measures as we did in the previous example.

@ Let's take an example to know what measures used for:



```
1 sum of sales = SUM('Table 1 (Data Sales Adidas)'[Total sales])
```

Price per Unit	Units Sold	Total sales
50	1200	60000
50	1000	50000
50	1000	50000
50	1250	62500
50	900	45000
50	1000	50000
50	1220	61000

Ex: We need to calculate the sum of total sales

The sum aggregates the total sales and allows this item to be available to the Dax Query.

Overview

- Data modeling: What is it?
- What is the Star Schema model?
- What the Fact and Dimension tables vary from one another.
- How can one build connections in a power bi?
- Power Bi cross filter direction types.
- Power Bi cardinality types.
- An explanation of computed measurements and columns.