

## Exercise 2: Data Modeling

### Part 1: Import new data and update existing data

Continue in the same Power BI you used for Exercise 1 or use the sample solution provided on Github.

In the next steps you will import the necessary SQL tables into Power BI to add more data to our model. Import all tables and adjust the data model.

The data is stored on an SQL server. The access data are as follows:

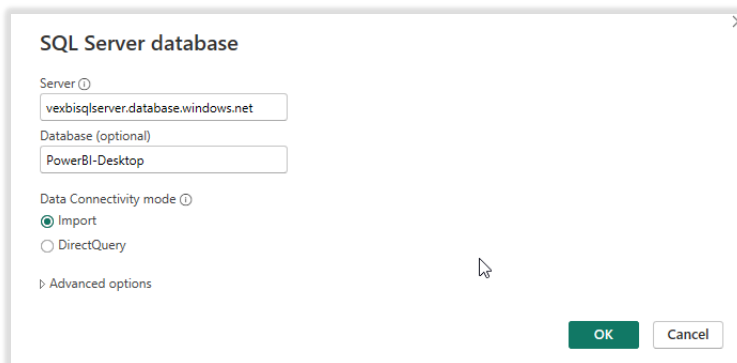
**Server:** vexbisqlserver.database.windows.net

**Database:** PowerBI-Desktop

**User:** ventum

**Password:** Blrocks4ever

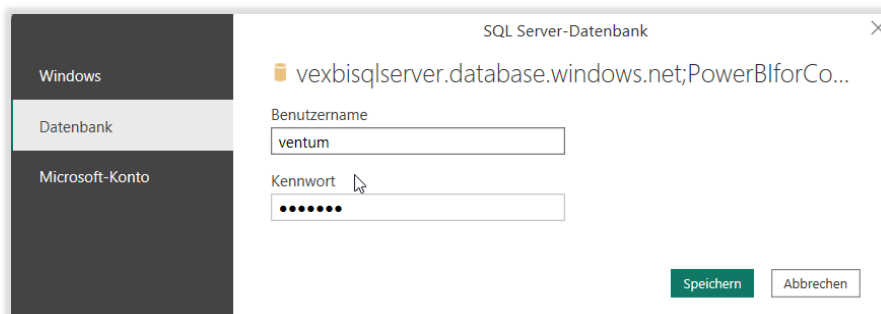
1. Select the field "SQL Server" in the tab "Start" under "Get data"
2. Enter the server address and database



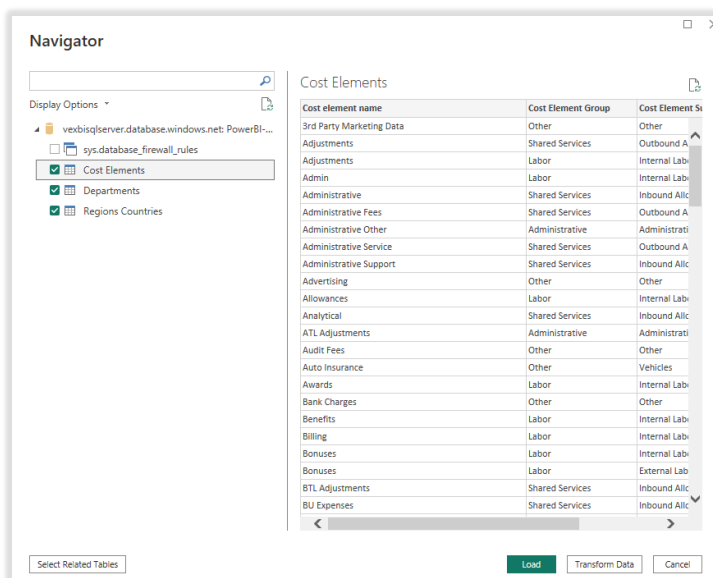
### Hint

Under Data Connectivity Mode you have the options "Import" and "DirectQuery". In almost all simple use cases, "Import" should be selected. In this case, Power BI uploads the data into the model instead of querying it anew with each call as in "DirectQuery" mode.

3. Authenticate yourself as a **database** user (not using Anonymous, Windows or Microsoft!)



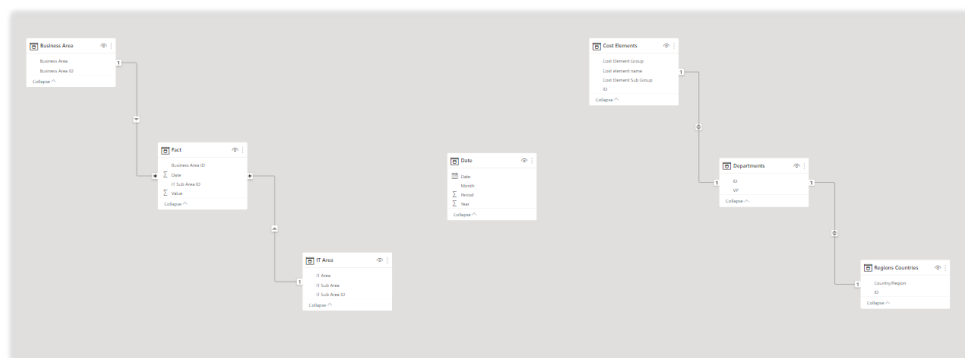
4. Import all tables from the SQL server and check the the data types in the “Transform” view before loading.
  1. Cost Elements
  2. Departments
  3. Regions Countries



The screenshot shows the 'Navigator' window in SQL Server Enterprise Manager. The 'Display Options' pane on the left shows the 'Cost Elements' table selected. The main pane displays the 'Cost Elements' table structure with the following columns:

Cost element name	Cost Element Group	Cost Element Si
3rd Party Marketing Data	Other	Other
Adjustments	Shared Services	Outbound A
Adjustments	Labor	Internal Lab
Admin	Labor	Internal Lab
Administrative	Shared Services	Inbound Alic
Administrative Fees	Shared Services	Outbound A
Administrative Other	Administrative	Administrati
Administrative Service	Shared Services	Outbound A
Administrative Support	Shared Services	Inbound Alic
Advertising	Other	Other
Allowances	Labor	Internal Lab
Analytical	Shared Services	Inbound Alic
ATL Adjustments	Administrative	Administrati
Audit Fees	Other	Other
Auto Insurance	Other	Vehicles
Awards	Labor	Internal Lab
Bank Charges	Other	Other
Benefits	Labor	Internal Lab
Billing	Labor	Internal Lab
Bonuses	Labor	Internal Lab
Bonuses	Labor	External Lab
BTL Adjustments	Shared Services	Inbound Alic
BU Expenses	Shared Services	Inbound Alic

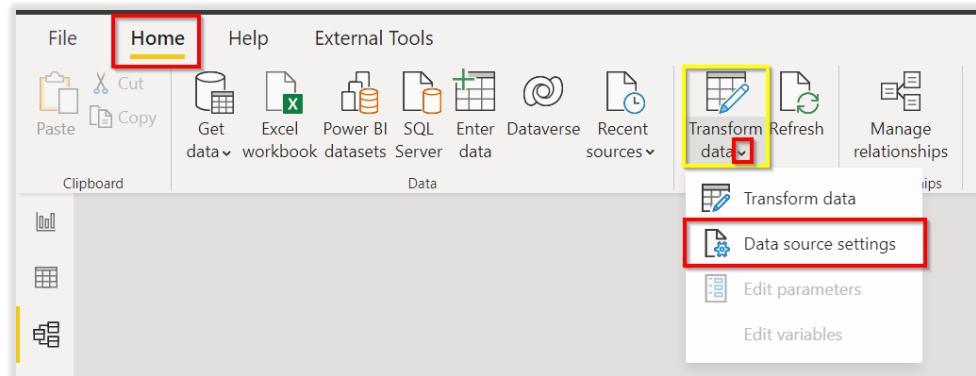
5.  In model view: Take a look at the data model.



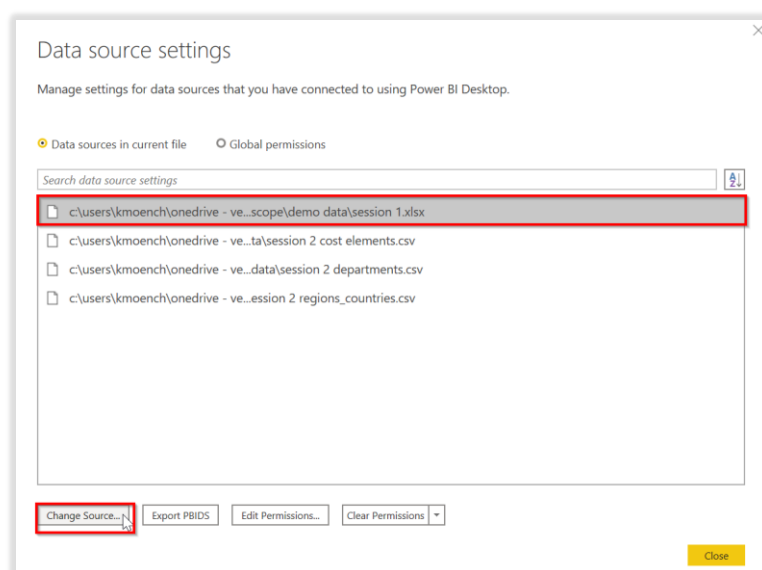
### Hint

*There is a lot that can be improved. However, first we need to update our fact table to accommodate our new dimension in step 3.*

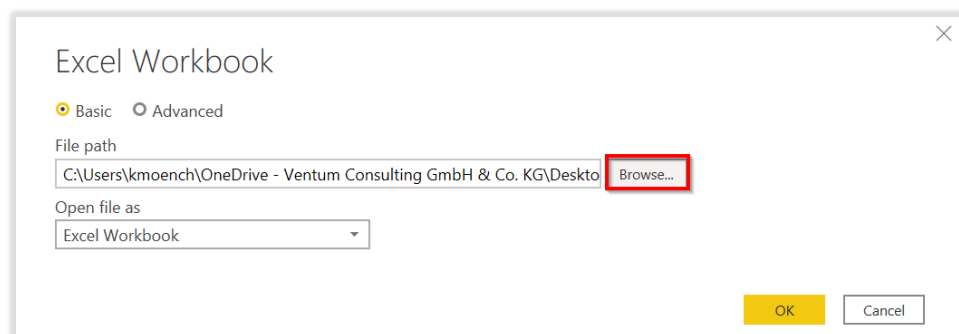
6. Replace the source of the fact table “Exercise 1.xlsx” with “Exercise 2.xlsx”:
  - a) In the home menu, click on the arrow under “Transform data” and select “Data source settings”:



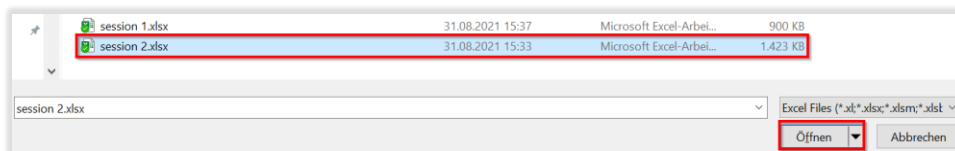
b) Select the data source “Exercise 1.xlsx” and click on the button “Change Source”:



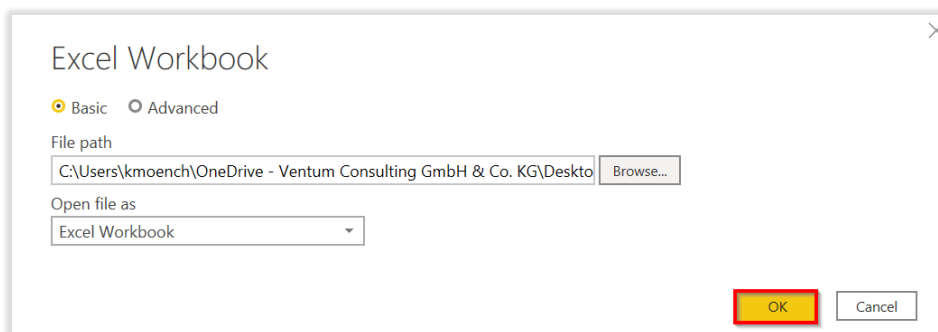
c) Click on “Browse”



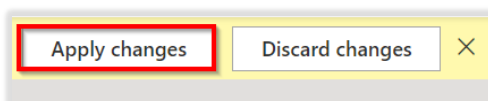
d) Select “Exercise 2.xlsx” and click on “Open” :



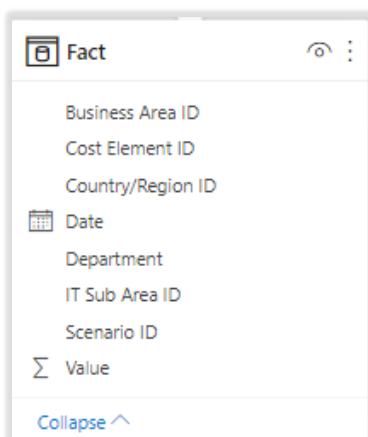
e) Confirm with “ok”:



f) Close the editor and click on “Apply changes” in the top right corner of your screen:



g) Your fact table should now look like this:



## Part 2: Build relationships between imported tables

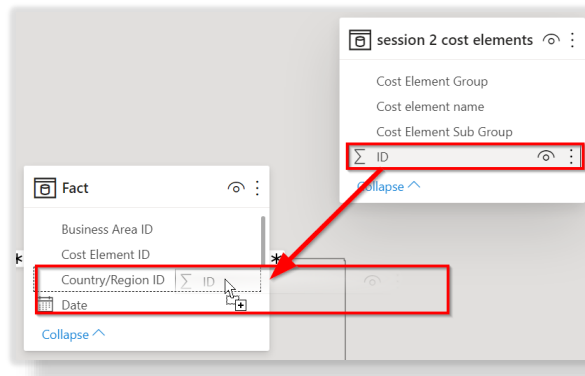
h) Connect your dimension tables to the fact tables and delete all wrong relationships.

The correct mapping of columns is:

'Fact'[Cost Element ID]	↔	'Exercise 2 cost elements'[ID]
'Fact'[Department]	↔	'Exercise 2 departments'[ID]
'Fact'[Country/Region ID]	↔	'Exercise 2 Country/Region'[ID]

## Hint

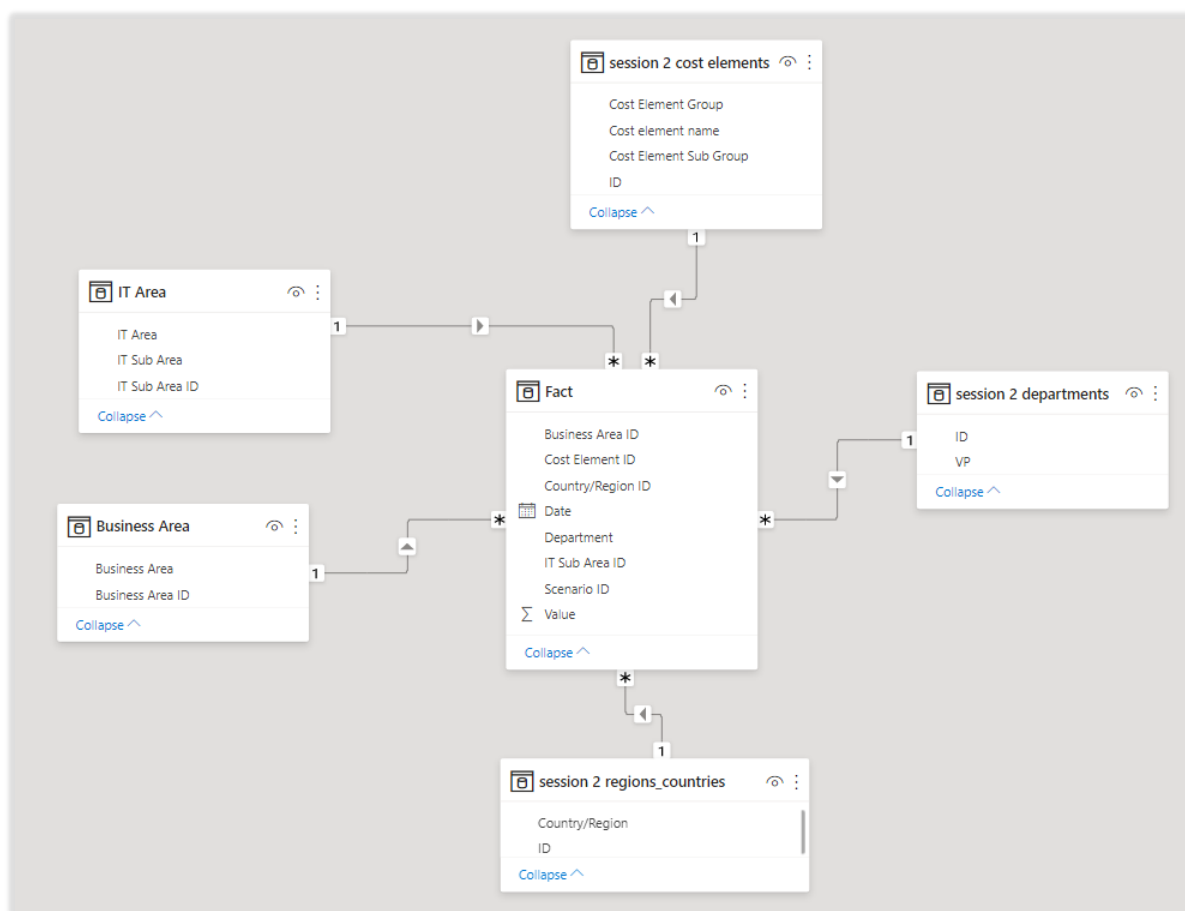
A relationship can be made by clicking on the column name that represents either the primary key or foreign key of interest in one table and dragging and dropping it onto the column name in the other table that contains the corresponding key.










## Hint

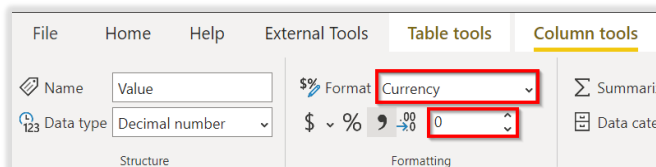
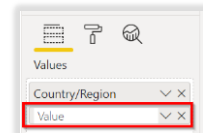
A connection can be deleted by right clicking onto it and selecting “Delete”.

- i) Your model should look like in below screenshot. Make sure that all relationships are active, i.e., there are only solid and no dotted lines between the tables. To change the status of a relationship, double click on the relationship and activate button “Make this relationship active”.

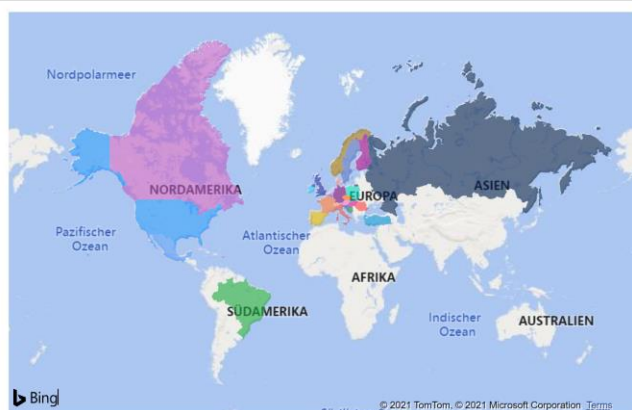


## Bonus Exercise

1.  In report view:
    - a) Add a new page to your report and rename it “Exercise 2” (right click on page name, click on “Rename Page”)
    - b) Add a filled map  with [Country/region] as location and [Expenditures] as Tooltip. Add [Country/region] as legend.
    - c) Add a table with countries and their expenditures in 2014. Filter that table so that only countries with 10 million Dollars Expenditure in 2014 are being displayed
    - d) Rename column “Value” into “Expenditure”. To do so, double click onto “Value” in Fields section of the visual.
  - e) Add a clustered column chart  with Expenditures by Country/Region
  - f) Add a slicer  with ‘IT Areas’
  - g) Add a slicer with ‘Business Areas’
  - h) Play with the slicers and observe how they affect the other visuals. Why do they affect the displayed countries within the column chart?
2.  In model view:
    - a) Change the relationship between ‘Fact’ table and ‘Business Area’ table: set cross filter direction to “Both”
    - b) Change relationship between ‘Fact’ and ‘IT Area’: set cross filter direction to “Both”
  3.  In report view:
    - a) Verify that selections in ‘IT Area’ slicer affect ‘Business Area’ slicer and vice versa
  4.  In data view:
    - a) Select Fact table and click on “Value” column. In the above menu “Column tools” change the field “Format” to “Currency” and the number of decimal places shown to 0:



Your final report should look like this (next page):



**Countries with more than Million Expenditure in 2014**

Country/Region	Expenditures
USA	\$714.428.450
United Kingdom	\$44.371.209
France	\$19.004.286
Germany	\$12.259.767
Puerto Rico	\$10.030.891
<b>Total</b>	<b>\$800.094.602</b>

#### IT Area

- ☐ BU Support
- ☐ Enablement
- ☐ Functional
- ☐ Governance
- ☐ Infrastructure

#### Business Area

- ☐ BU
- ☐ Distribution
- ☐ Infrastructure
- ☐ Manufacturing
- ☐ Office & Administrative
- ☐ R&D
- ☐ Services

Total Expenditure by Country/Region

