Lab Week 3

Task 1. Loading a sample Data Warehouse

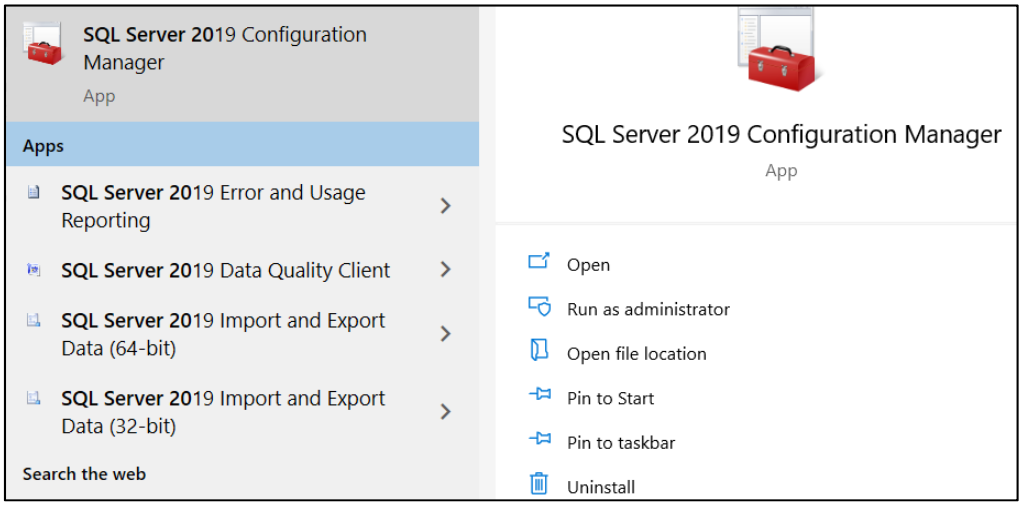
Task 2. Database diagram and Schemas

Task 3. PowerBI and visualization

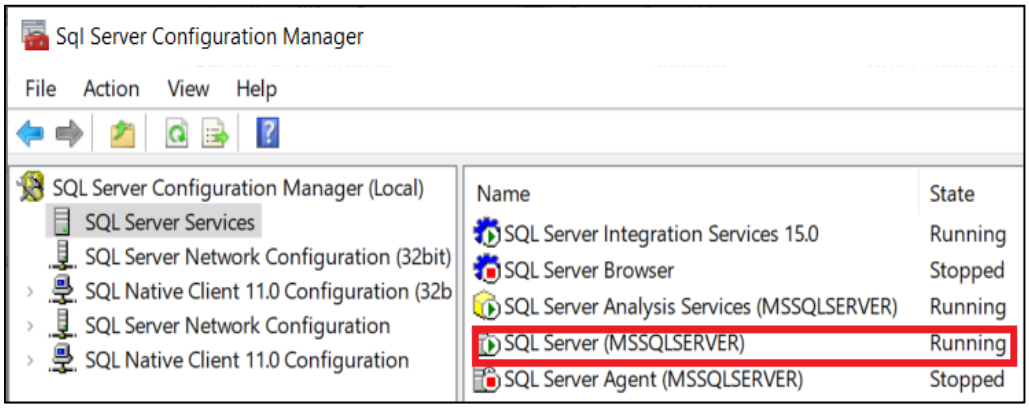
Task 1. Loading a sample Data Warehouse

The aim of Task 1 is to familiarize with the SQL Server Management Studio (SSMS). The SSMS toolbox is an integrated environment that manages the SQL infrastructure (e.g., Server, Databases, etc.). This toolbox is primary used to configure and administer instances of SQL Server and databases. In this lab, we will learn to query, design, and manage databases and data warehouses using sample data warehouse *AdventureWorksDW*.

1. First, check whether the local instance of SQL server 2019 is running or not.
   Search "**SQL server 2019 Configuration Manager**" application installed in local machine and open the application.



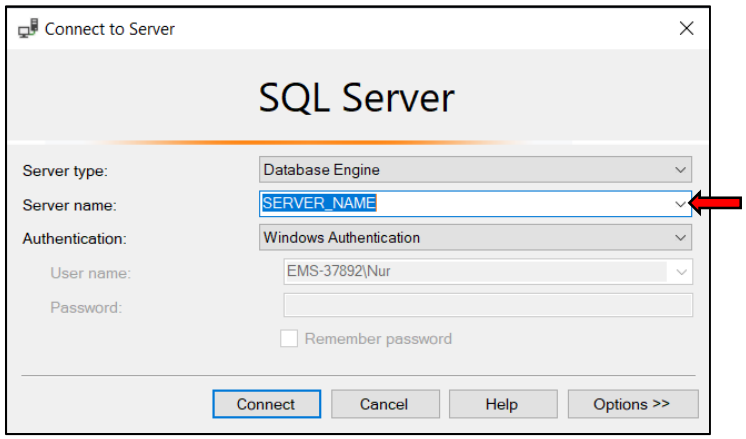
2. The SQL Server should be in *Running* state.



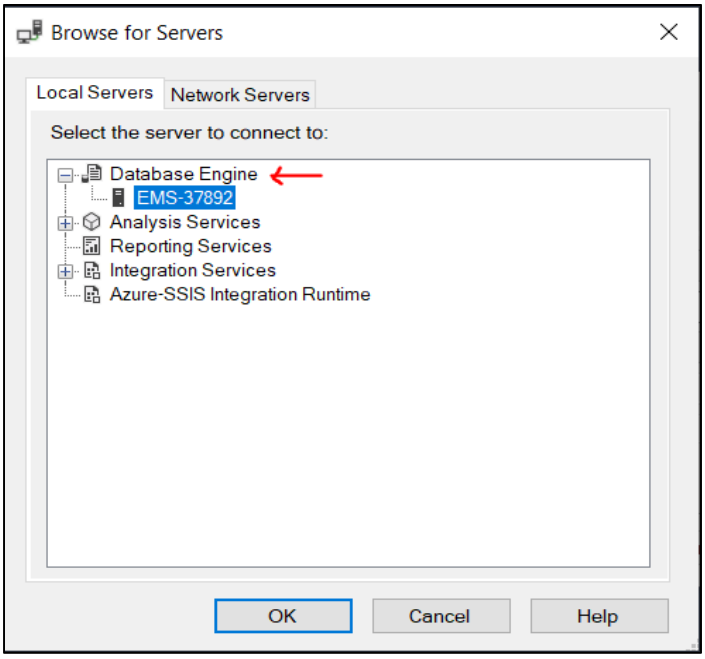
3. If the SQL Server is in *Stopped* state (i.e., not Running), right click on "SQL Server" and start the instance.

   Note: The above three steps are to check the status of the SQL server. You should confirm that SQL server is in Running mode. The below steps will demonstrate to load a sample data warehouse using SQL Server Management Studio (SSMS) tool kit and will demonstrate the remaining tasks.

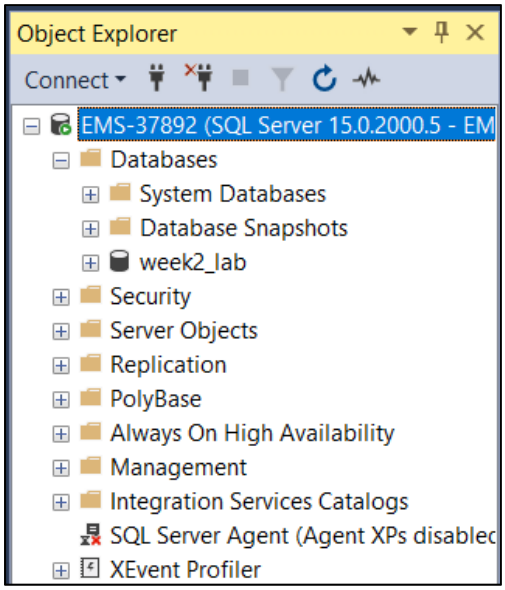
4. Start "SQL Server Management Studio", enter "Server name", and click "Connect".



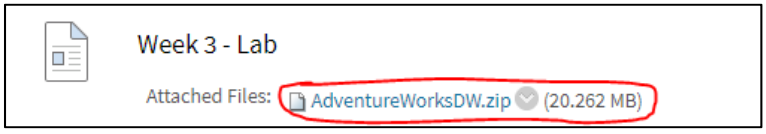
5. In case, you forget "SERVER_NAME", you can click the down arrow corresponding to the "Server name" and browse the available servers ("browse for more"). After that, select the preferred Server under "Database Engine" and proceed further.



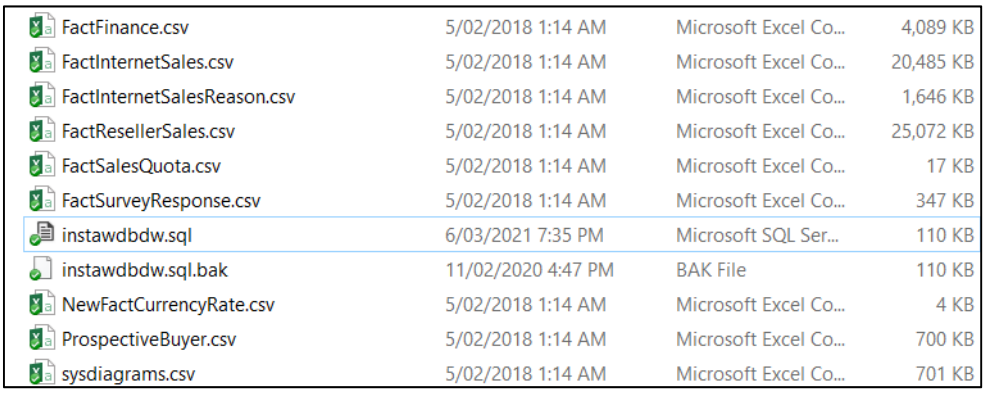
6. After connecting with the server, the object explorer of SSMS will look like below:



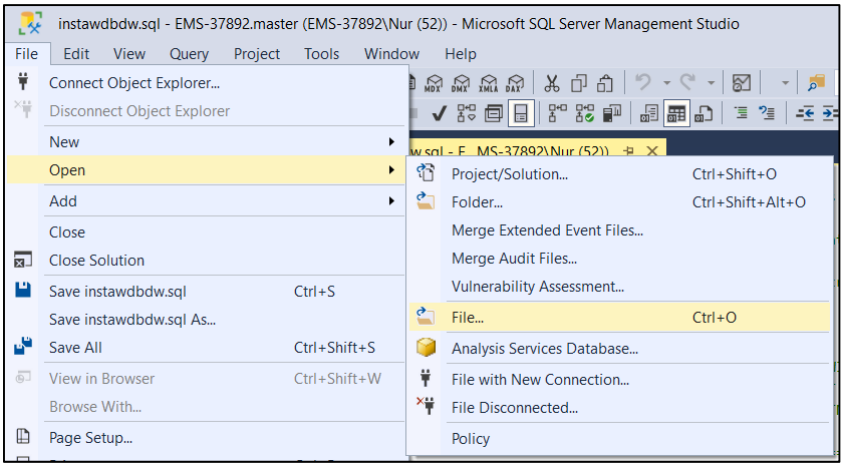
7. Now, download the *AdventureWorksDW.zip* from LMS *Week 3 - Lab* and extract the data into `C:\Samples\AdventureWorksDW\` (Please unzip the .zip file directly to the folder "C:\Samples"). The *AdventureWorksDW.zip* file contains a sample Data Warehouse.



8. Locate the file instawdbdw.sql in the extracted *AdventureWorksDW* folder.



9. Drag the "installdbdw.sql" file to SSMS main panel. Alternatively, you can browse the installdbdw.sql file to SSMS (File> Open> File…) to open (shown below):

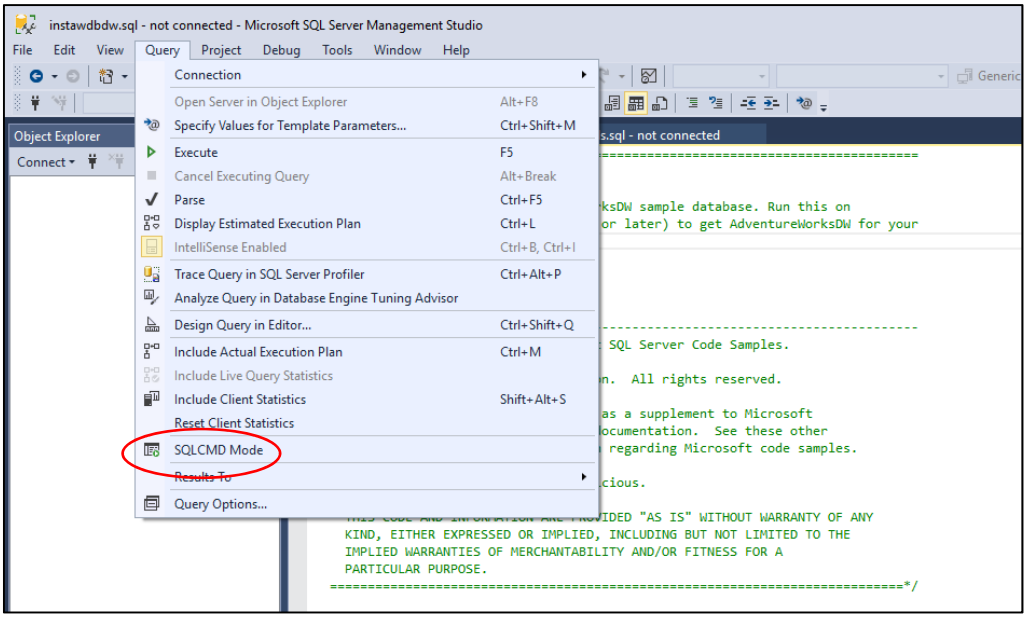


Finally, the contents of installdbdw.sql will be visible in the central pane of SSMS.

```
    This source code is intended only as a supplement to Microsoft
    Development Tools and/or on-line documentation.  See these other
    materials for detailed information regarding Microsoft code samples.

    All data in this database is ficticious.

    THIS CODE AND INFORMATION ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
    KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
    IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A
    PARTICULAR PURPOSE.
  ============================================================================*/

  /*
   * HOW TO RUN THIS SCRIPT:
   *
   * 1. Enable full-text search on your SQL Server instance.
   *
   * 2. Open the script inside SQL Server Management Studio and enable SQLCMD mode.
   *    This option is in the Query menu.
   *
   * 3. Copy this script and the install files to C:\Samples\AdventureWorksDW, or
   *    set the following environment variable to your own data path.
   */
   :setvar SqlSamplesSourceDataPath "C:\Samples\AdventureWorksDW\"
```

Note: The *:setvar* path is the folder where the AdventureWorksDW.zip was extracted. If the extracted folder path is different, please put the exact folder path under *:setvar* variable.

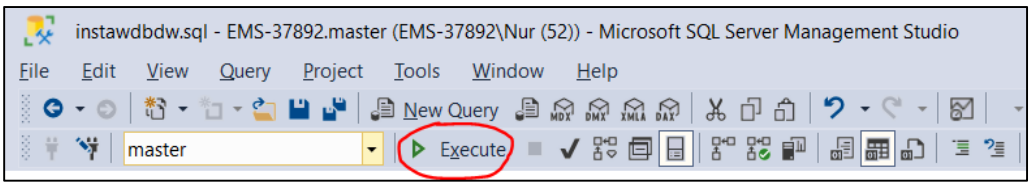
10. Enable the SQLCMD Mode before you execute the SQL script (i.e. installdbdw.sql) in SSMS.



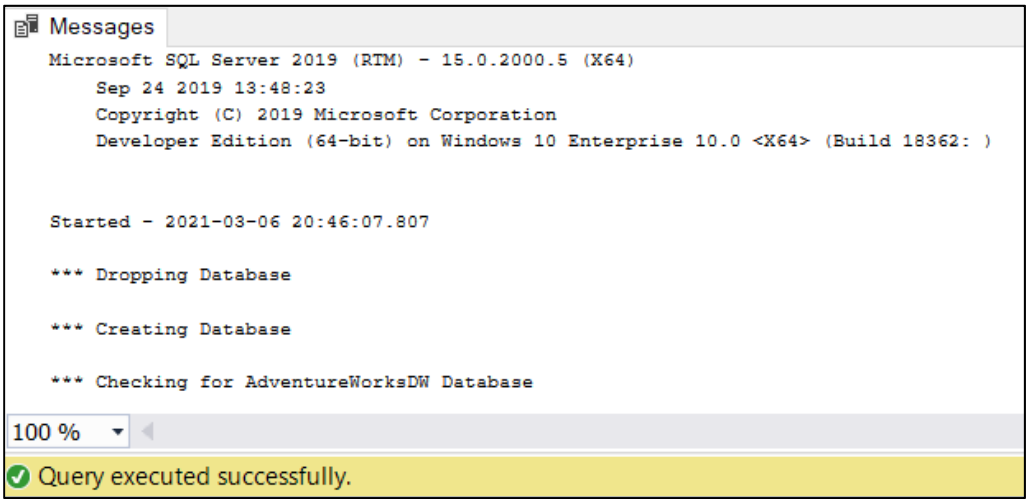
Important: The above installdbdw.sql script is important to understand the database operations. Go through the script carefully, and try to understand which section is for the table schema creation, which section is for bulk loading data and which section is for creating primary keys and setting primary and foreign key constraints.

Question: Can you please answer, how many tables the "installdbdw.sql" script will create and what will be the database name?

11. Run the SQL script by clicking "Execute".

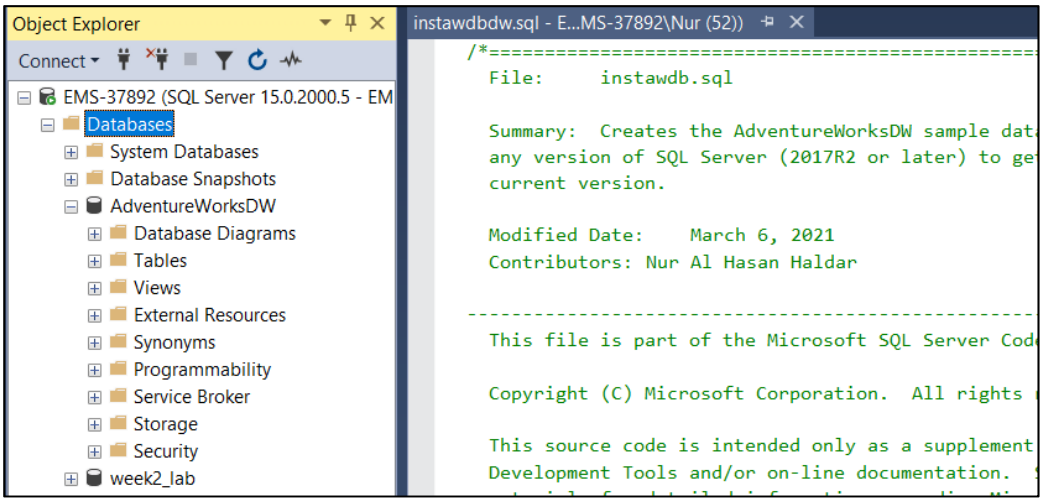


12. You can see the "Message" pane at the bottom of SSMS editor as below. Please check the contents of the messages to understand the query.



Note: The message “Query executed successfully” should be seen at bottom. Please check the message logs in case some “Error” occurs.

13. Now refresh the Object Explorer in the left pane and check a new database named “AdventureWorksDW” under Databases field. On exploring “Tables”, one can see that 30 tables have been created.



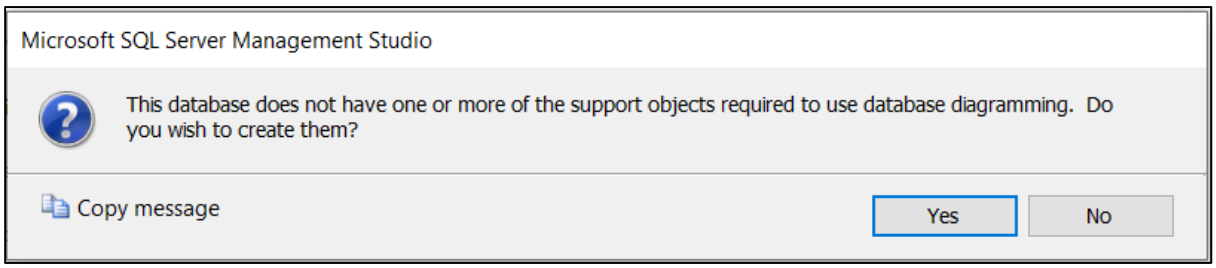
Question: Can you display few records under “DimEmployee” table?
Hint: (Right click on DimEmployee and select records) Few records are as below:

Results Messages

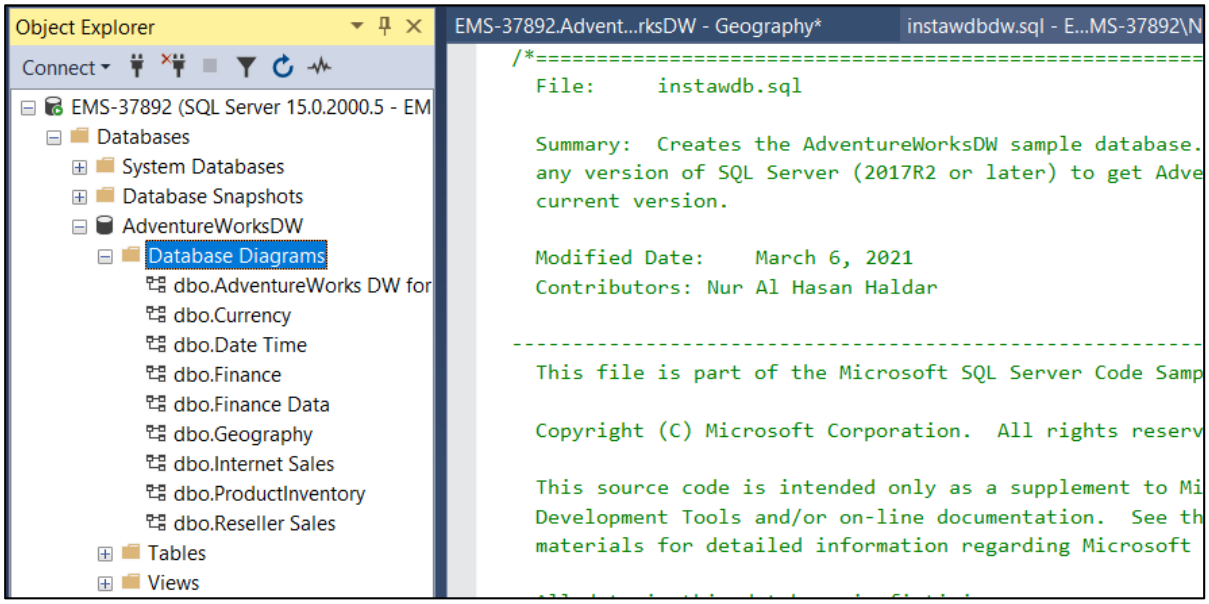
	EmployeeKey	ParentEmployeeKey	EmployeeNationalIDAlternateKey	ParentEmployeeNationalIDAlternateKey	SalesTerritoryKey	FirstName	LastName	MiddleName
1	1	18	14417807	NULL	11	Guy	Gilbert	R
2	2	7	253022876	NULL	11	Kevin	Brown	F
3	3	14	509647174	NULL	11	Roberto	Tamburello	NULL
4	4	3	112457891	NULL	11	Rob	Walters	NULL
5	5	3	112457891	NULL	11	Rob	Walters	NULL
6	6	267	480168528	NULL	11	Thierry	D'Hers	B
7	7	112	24756624	NULL	11	David	Bradley	M
8	8	112	24756624	NULL	11	David	Bradley	M
9	9	23	309738752	NULL	11	JoLynn	Dobney	M
10	10	189	690627818	NULL	11	Ruth	Ellerbrock	Ann

Task 2. Generate Database Diagram and Schema using SSMS

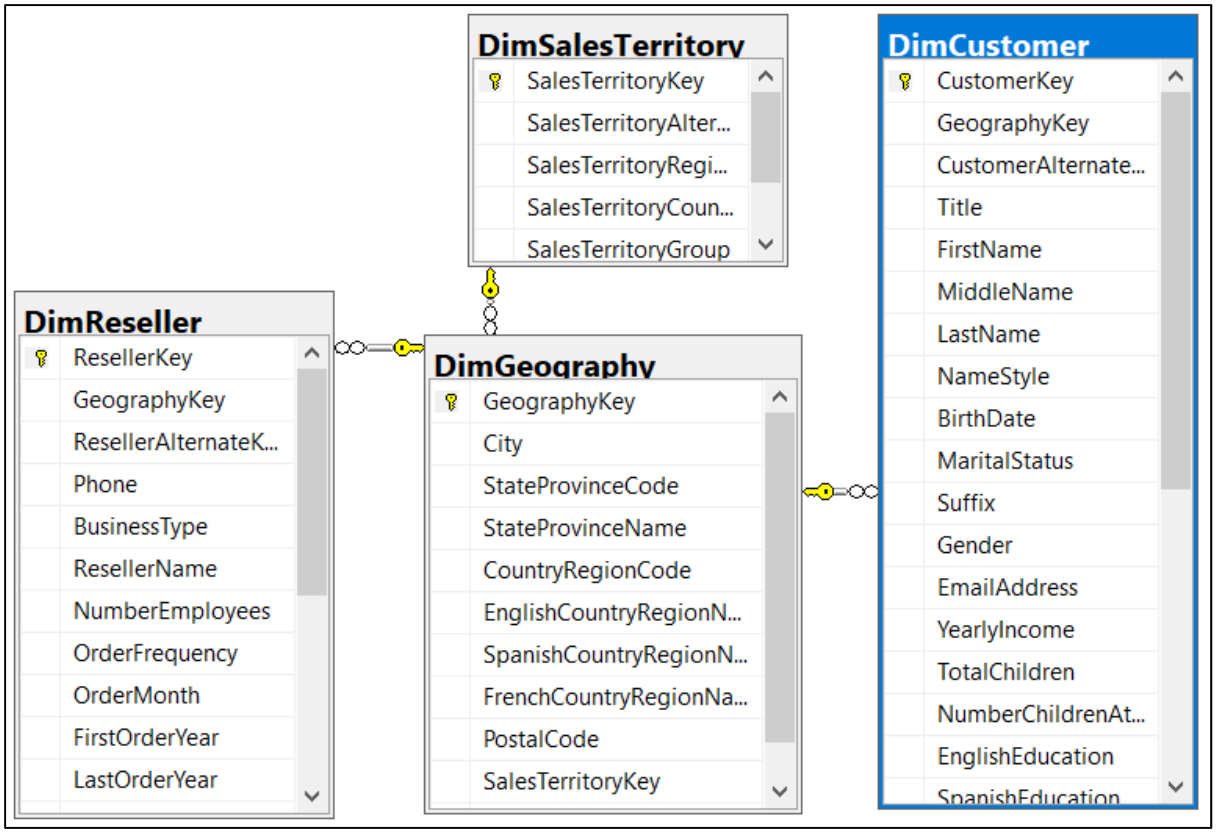
The “Object Explorer” pane of SSMS contains the “Database Diagrams” of the tables available in AdventureWorksDW database. Click the “Database Diagrams” and the below message will be popped. Click “Yes” to create them automatically for the first time.



The default database diagrams are populated in the Object Explorer pane.



You can visualize the relationships of the tables by clicking the corresponding diagrams. For example, click “dbo.Geography” under Database Diagrams and the below Entity-Relationship diagram can be generated automatically.



Question: Can you explore the four tables shown in above diagram and identify the Primary keys and Foreign Keys of the table?

In this task, we can learn the relationships between the tables.

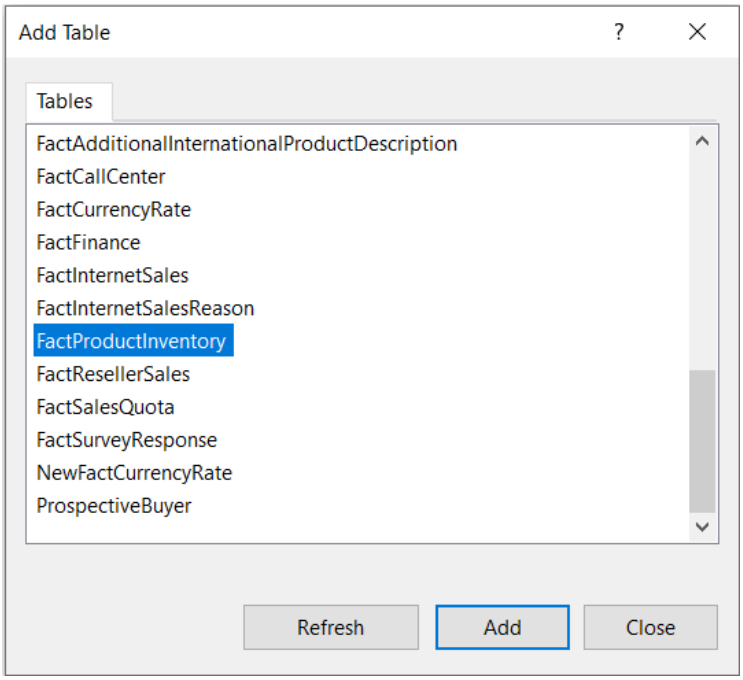
Additional Questions: Based on the *AdventureWorksDW*,

- Which tables are fact tables? Which tables are dimension tables? How are they connected? Is this a star schema, a snowflake schema or a fact constellation?
- How would your DW look like? Draw an ER diagram on a piece of paper and discuss with your lab facilitator.

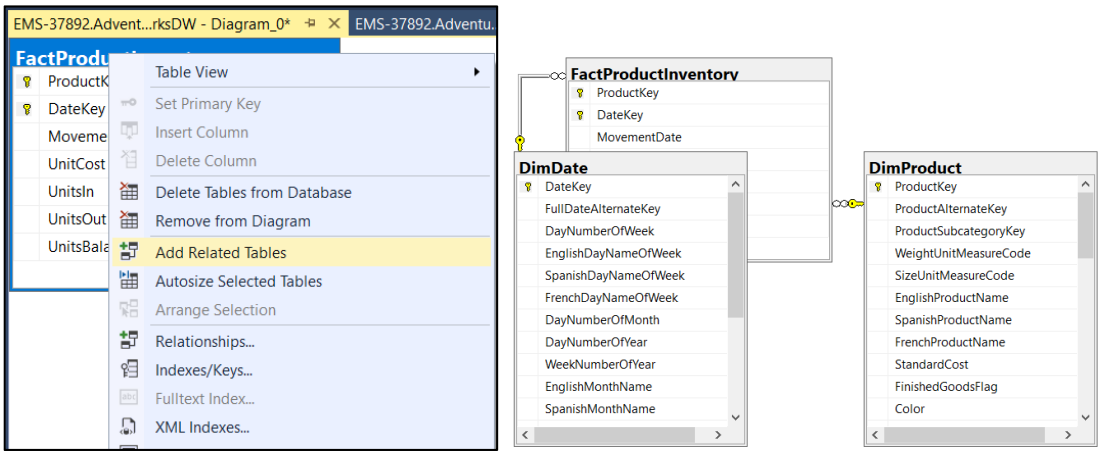
New Database Diagram using SQL Server Management Studio

We also can create new diagram using SSMS toolkit. Below, one sample example is demonstrated. Here, we will generate the database diagram using the tables related to Product Inventory. In general, a product inventory contains all the information related to a product (e.g., Cost, Selling date, Price, etc.)

1. In SSMS under the database *AdventureWorksDW*, right click "Database Diagrams" and select "New Database Diagram".
2. From the Database Diagrams tool dialog scroll and select FactProductInventory table. Press Add and then Close.



3. Right click FactProductInventory table and select "**Add Related Tables**". This automatically adds tables linked to the Product Inventory by Foreign Keys of which the FactProductInventory table is a foreign key.

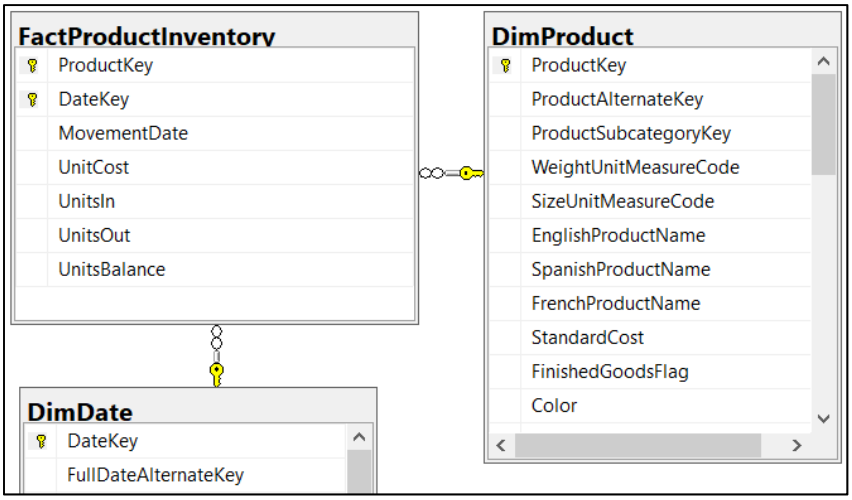


4. Eliminate Unwanted Tables from the Diagram

   Right click on any table that you feel is not important and select "**Remove From Diagram**".

5. Auto Arrange Tables

   Right click the blank space in the SSMS central pane and select "**Arrange Tables**". This organizes the tables without overlapping.

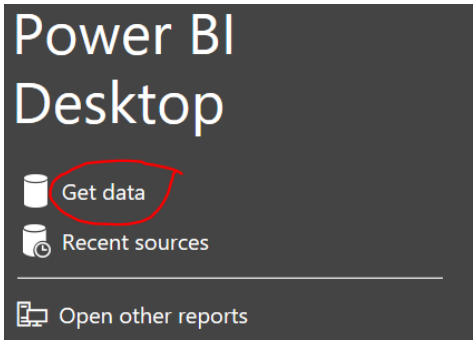


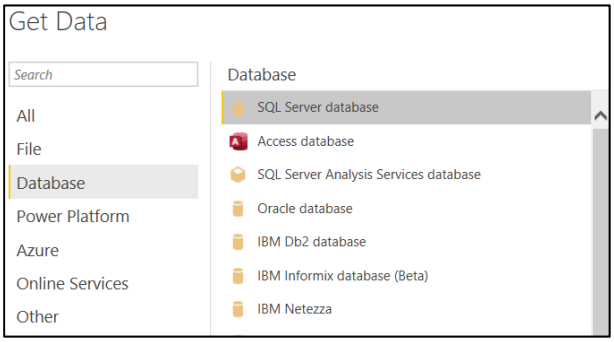
6. Copy Diagram to save in MS Word

   Right click on the blank space of the diagram and click “Copy diagram to clipboard”. Further, paste it to MS word.

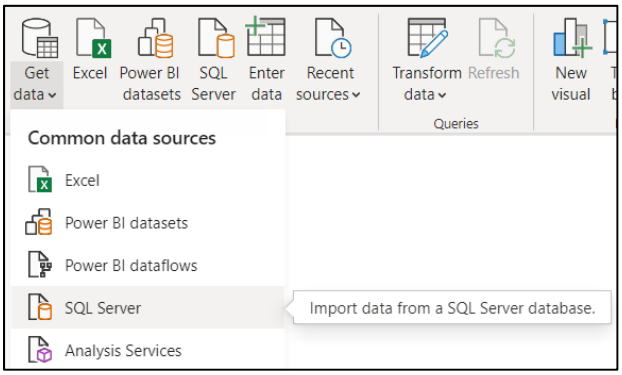
Task 3. Connecting Power BI Desktop

Step 1: After we launch Power BI Desktop, we can use the “Get Data” feature to navigate to the SQL Data Warehouse option, as shown in the following figure.

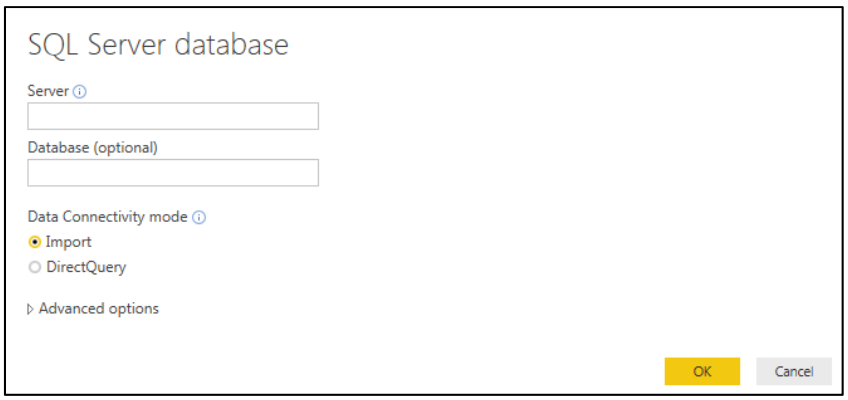




Or, one can get the below screen to load data.

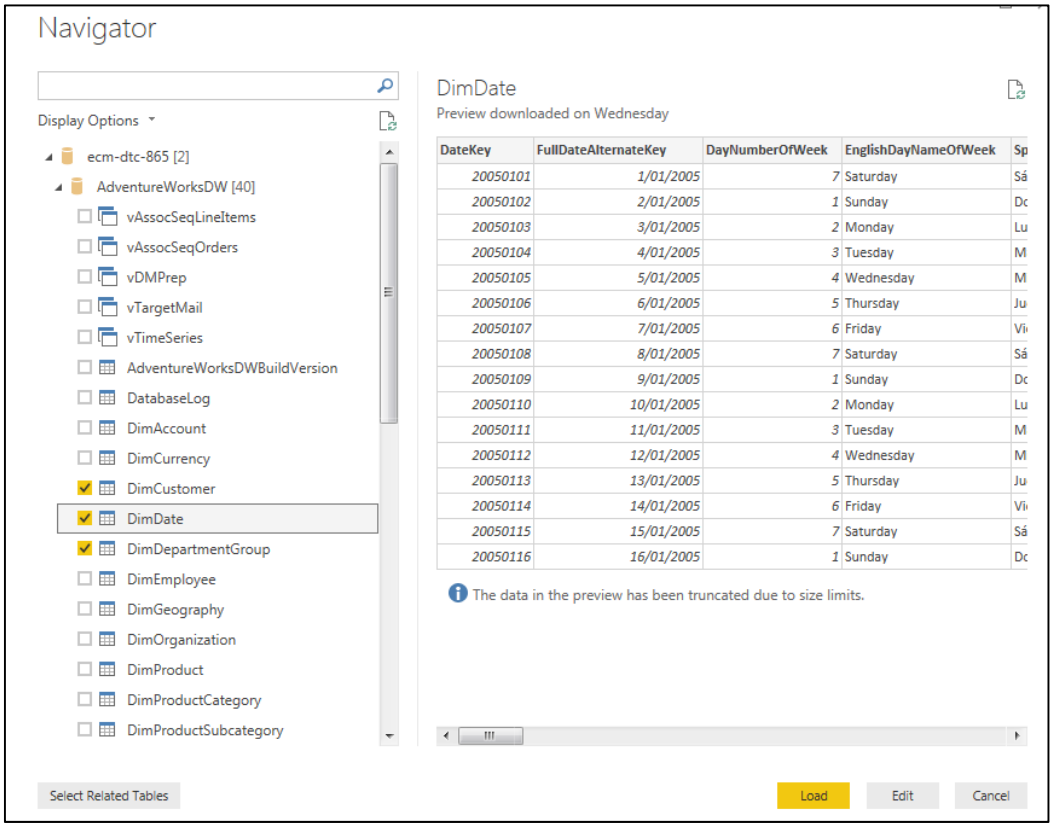


Step 2: Fill the Server information to connect the SQL Server through Power BI.

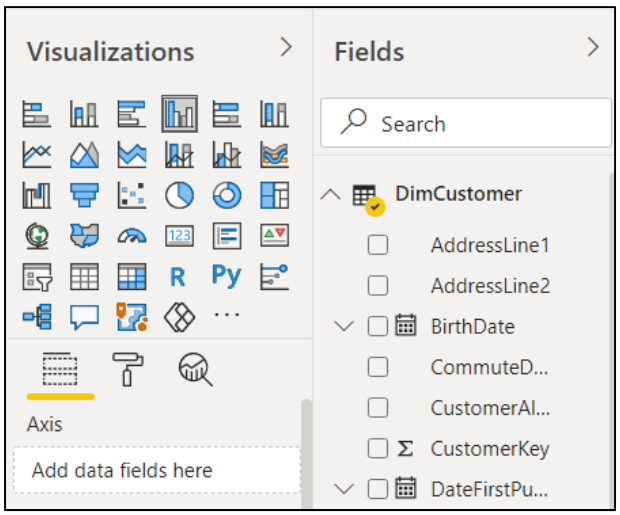


Note - If you selected the “Import” option in the “Data Connectivity mode”, the data is loaded into your local Power BI store when you click “OK”. You can then work with the data at any time. The data at this point is static and separate from the original source. If you selected the “DirectQuery” option, the database must be running and you must be able to connect to SQL Data Warehouse whenever you work with the data.

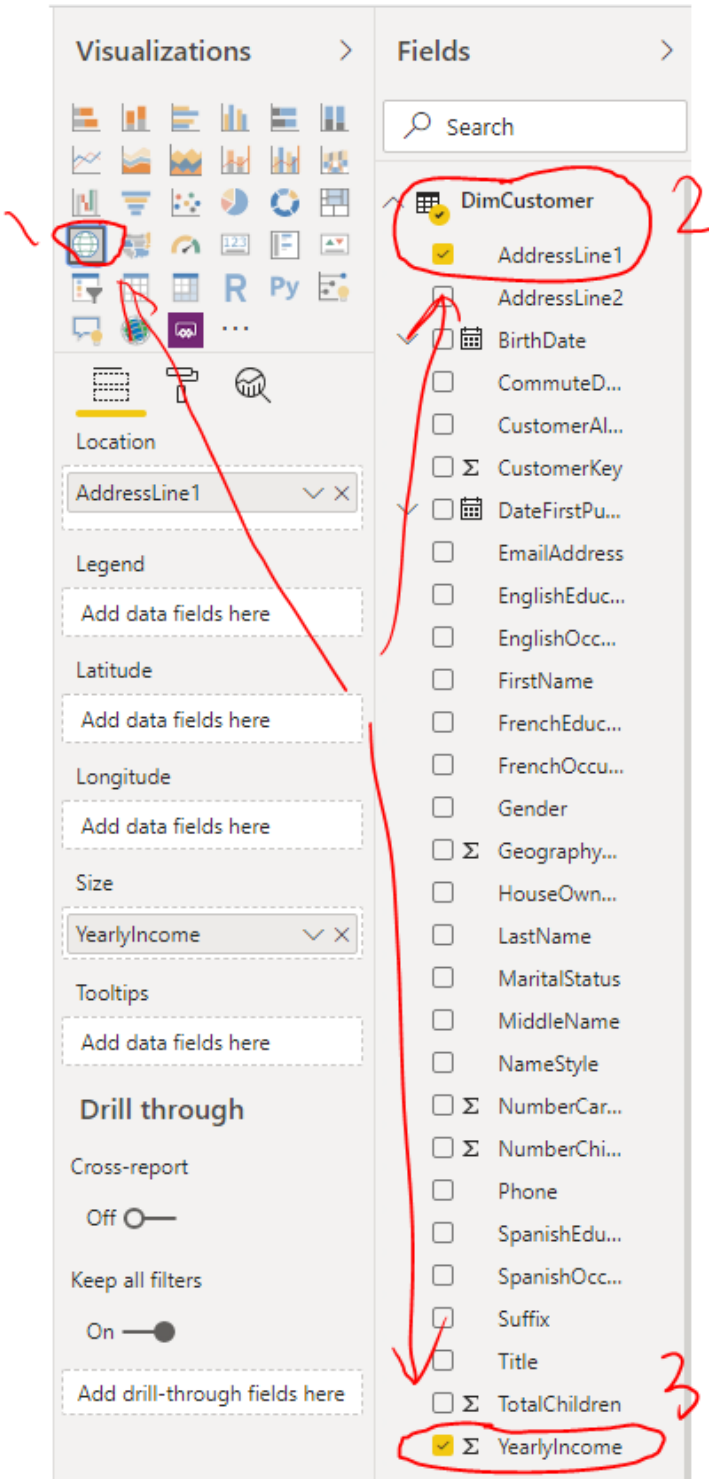
Step 3: The navigator will be like the below screen. Select some tables and see their contents.



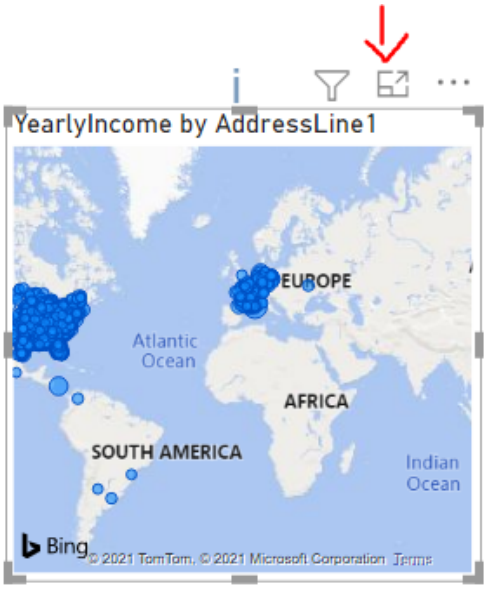
Step 4: The Visualisation and Fields pane are available in the right of the Power BI Desktop. The Fields pane show the tables imported from the database.



Step 5: Choose “Map” for visualisation, and choose the “AddressLine1” and “∑YearlyIncome” attributes from the DimCustomer table.

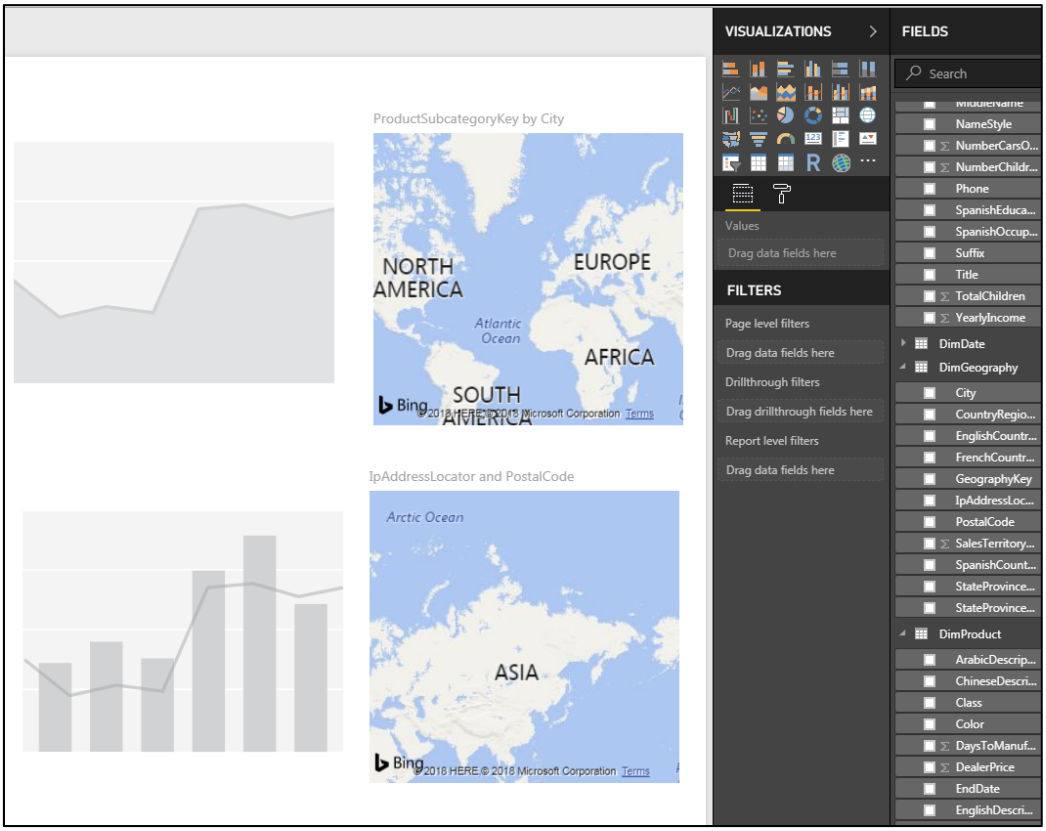


Step 6: You should see a map similar to the following.



Click on Focus Mode and the follow screen of YearlyIncome by Addressline1 will be visible.

Step 7: You can choose some attributes from any table and can visualise them also. The more visualisation and analytics will be carried out in the following labs.


ProductSubcategoryKey by City
NORTH AMERICA
EUROPE
Atlantic Ocean
AFRICA
SOUTH AMERICA
Bing
© 2018 HERE © 2018 Microsoft Corporation Terms
IpAddressLocator and PostalCode
Arctic Ocean
ASIA
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FILTERS
Page level filters
Drag data fields here
Drillthrough filters
Drag drillthrough fields here
Report level filters
Drag data fields here
FIELDS
Search
NameStyle
NumberCarsO...
NumberChildr...
Phone
SpanishEduca...
SpanishOccup...
Suffix
Title
TotalChildren
YearlyIncome
DimDate
DimGeography
City
CountryRegio...
EnglishCountr...
FrenchCountr...
GeographyKey
IpAddressLoc...
PostalCode
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SpanishCount...
StateProvince...
StateProvince...
DimProduct
ArabicDescrip...
ChineseDescri...
Class
Color
DaysToManuf...
DealerPrice
EndDate
EnglishDescri...