

Assumptions made:

- ABC Mobile Service provider can obtain the geographical location details of phone numbers called by the phone numbers registered with this service, even if the terminating phone number is subscribed to a different service provider.
- There can be multiple phone numbers associated to an account. If the account is of a company, the numbers are generally much larger than if the account is of an individual.
- A company does not have branches, i.e, it has only one geographic location.
- The attribute Account_id in Account_type dimension indicates whether the the account is of an individual or a company.
- Number of connections associated to an account is static.
- There can be multiple towers in one locality.
- Rate plans can be of three types: only talktime, only data or a hybrid of both.

Tables and attributes:

- Fact
 - Caller_phone_number varchar(10) FK
 - Called_phone_number varchar(10)
 - Caller_geography_key varchar(10) FK
 - Called_geography_key varchar(10) FK
 - Call_time_key varchar(10) FK
 - Account_type_key char(10)
 - Rate_plan_key
 - Call_duration time
- Account_phone
 - Phone_number varchar(50) PK
 - Account_id varchar(10) FK
- Account_type
 - Account_id varchar(2) PK
 - Name varchar(50)

--Number_of_connections int

--Start_date date

- Call_time

--Call_time_id varchar(10)

--Start_time time

--End_time time

- Geography

--Geography_id varchar(10)

--Tower_id int

--Country varchar(50)

--State varchar(50)

--City varchar(50)

--Locality varchar(50)

--Postal_code varchar(10)

- Rate_plan

--Rate_plan_id varchar(10)

--Rate_plan_type char(1)

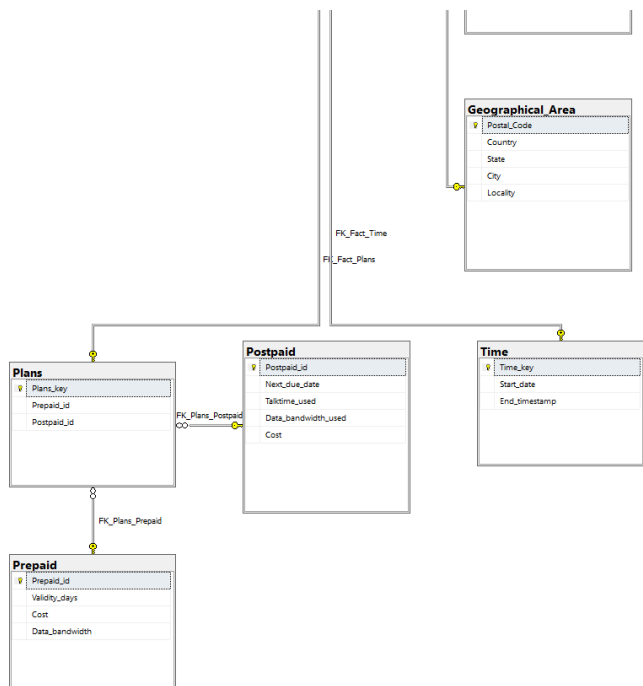
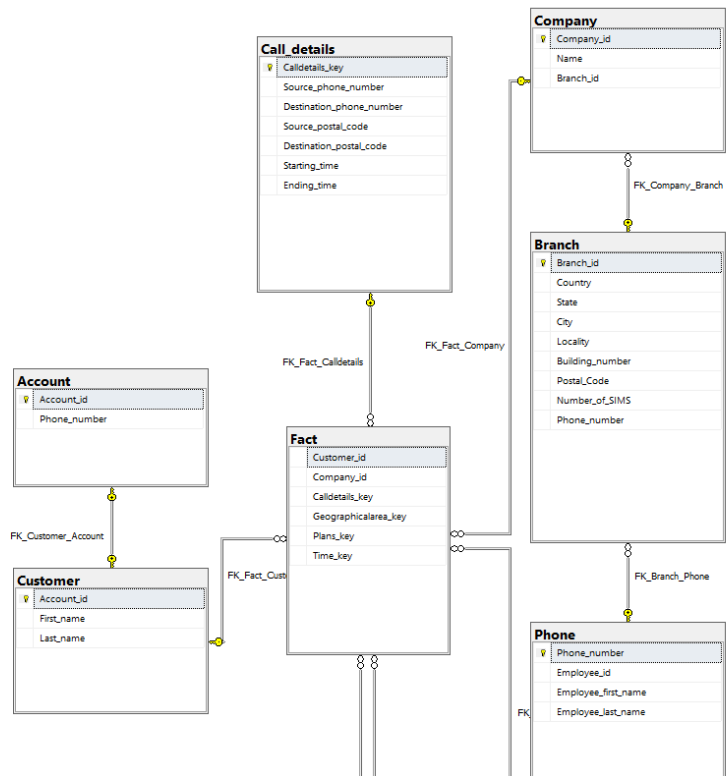
--Validity_days int

--Data_bandwidth float

--Cost float

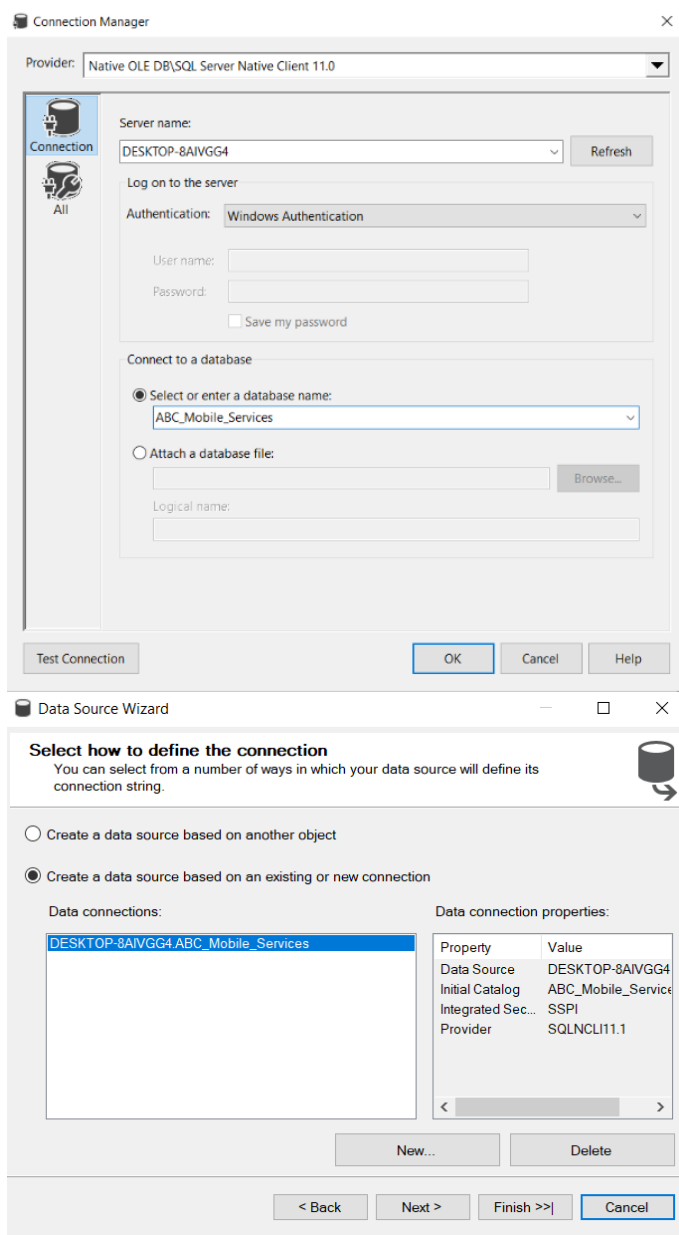
Process:

Create the tables in MSSQL



Having created the tables, some values are inserted into the dimension tables.

Now we create a project in Visual Studio and establish a connection to the server as follows-



Adding the data source-

Data Source Wizard

Impersonation Information
You can define what Windows credentials Analysis Services will use to connect to the data source.

☒ Use a specific Windows user name and password

User name: KR

Password: ****

☐ Use the service account

☐ Use the credentials of the current user

☐ Inherit

< Back **Next >** Finish >> Cancel

Data Source Wizard

Completing the Wizard
Provide a name and then click Finish to create the new data source.

Data source name: ABC Mobile Services

Preview:

Connection string:
Provider=SQLNCLI11.1;Data Source=DESKTOP-8AIVGG4;Integrated Security=SSPI;Initial Catalog=ABC_Mobile_Services

< Back Next > **Finish** Cancel

Creating the data source view-

Data Source View Wizard

Select a Data Source
Select an existing relational data source or create a new one.

Relational data sources:
ABC Mobile Services

Data source properties:

Property	Value
Data Source	DESKTOP-8AIVGG4
Initial Catal...	ABC_Mobile_Servi...
Integrated ...	SSPI
Provider	SQLNCLI11.1

New Data Source... Advanced...

< Back Next > Finish >>| Cancel

Select all available objects to be included-

Data Source View Wizard

Select Tables and Views
Select objects from the relational database to be included in the data source view.

Available objects:

Name	Type
Account_phone (dbo)	Table
Account_type (dbo)	Table
Call_time (dbo)	Table
Fact (dbo)	Table
Geography (dbo)	Table
Rate_Plan (dbo)	Table
sysdiagrams (dbo)	Table

Included objects:

Name	Type
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Filter:

☐ Show system objects

Add Related Tables

< Back Next > Finish >>| Cancel

Data Source View Wizard

Completing the Wizard
Provide a name, and then click Finish to create the new data source view.

Name:
ABC Mobile Services

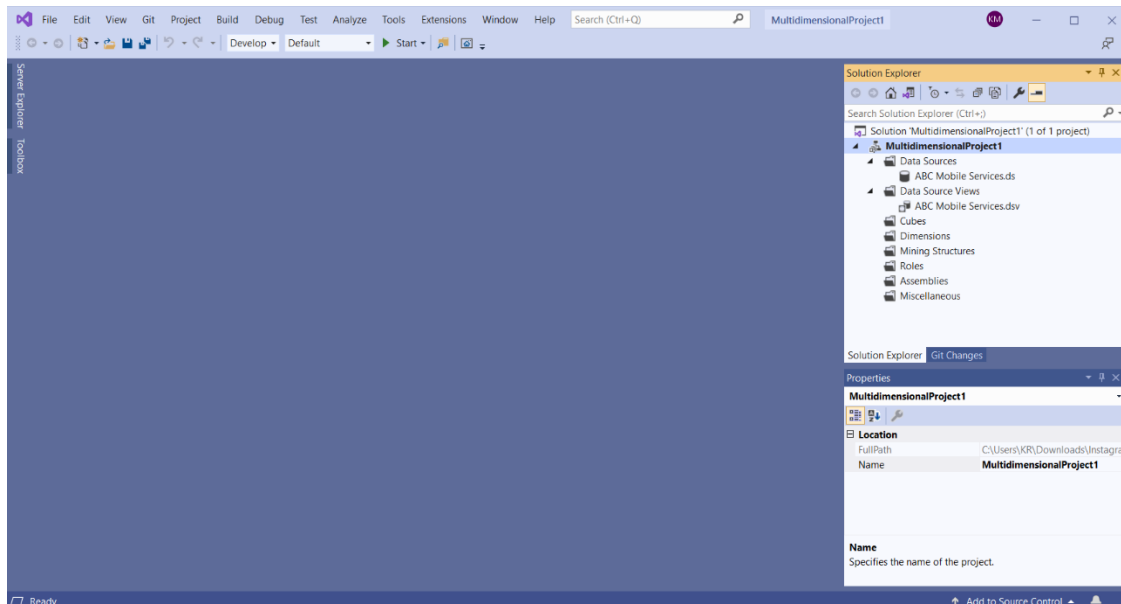
Preview:

ABC Mobile Services

< Back Next > Finish Cancel

Completes the wizard

Notice ABC Mobile Services added to the Data Sources and Data Source Views in the Solution Explorer



Add the dimensions and making the cube-

Dimension Wizard

Select Creation Method
You can base the dimension on an existing table or generate a new table as the source.

How would you like to create the dimension?

☒ Use an existing table

☐ Generate a time table in the data source

☐ Generate a time table on the server

☐ Generate a non-time table in the data source

Template:
(None)

Description:
Create a dimension based on one or more tables in a data source. The attributes that are available for the dimension will depend on the structure of the data in the table.

< Back Next > Finish >> Cancel

Cube Wizard

Select Measure Group Tables

Select a data source view or diagram and then select the tables that will be used for measure groups.

Data source view:
ABC Mobile Services

Measure group tables:

☐ Account_phone
☐ Account_type
☐ Call_time
☒ Fact
☐ Geography
☒ Rate_Plan
☒ sysdiagrams

Cube Wizard

Select Measures

Select measures that you want to include in the cube.

☒ Measure

☒ Fact
☒ Fact Count
☒ Rate Plan
☒ Validity Days
☒ Data Bandwidth
☒ Cost
☒ Rate Plan Count
☒ Sysdiagrams
☒ Principal Id
☒ Version
☒ Sysdiagrams Count

Cube Wizard

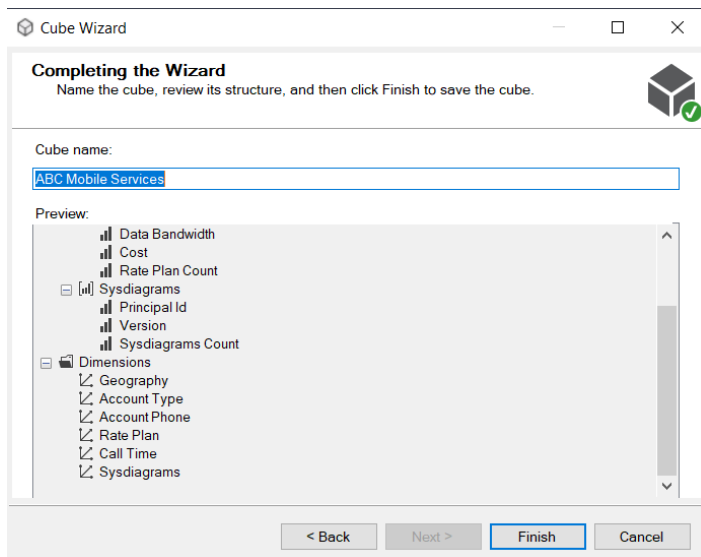
Completing the Wizard

Name the cube, review its structure, and then click Finish to save the cube.

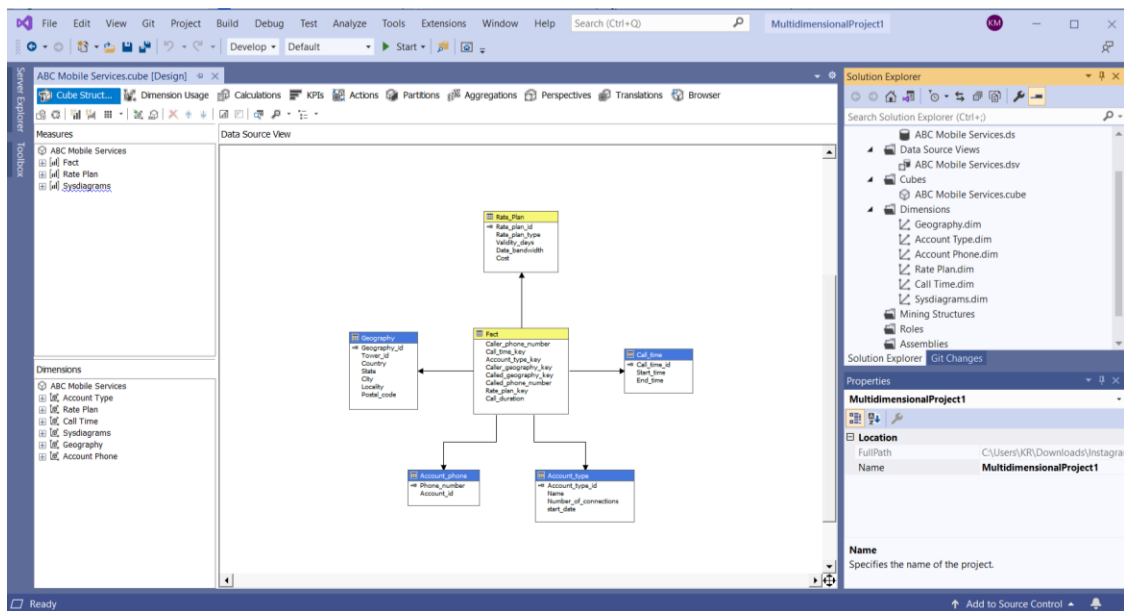
Cube name:
ABC Mobile Services

Preview:

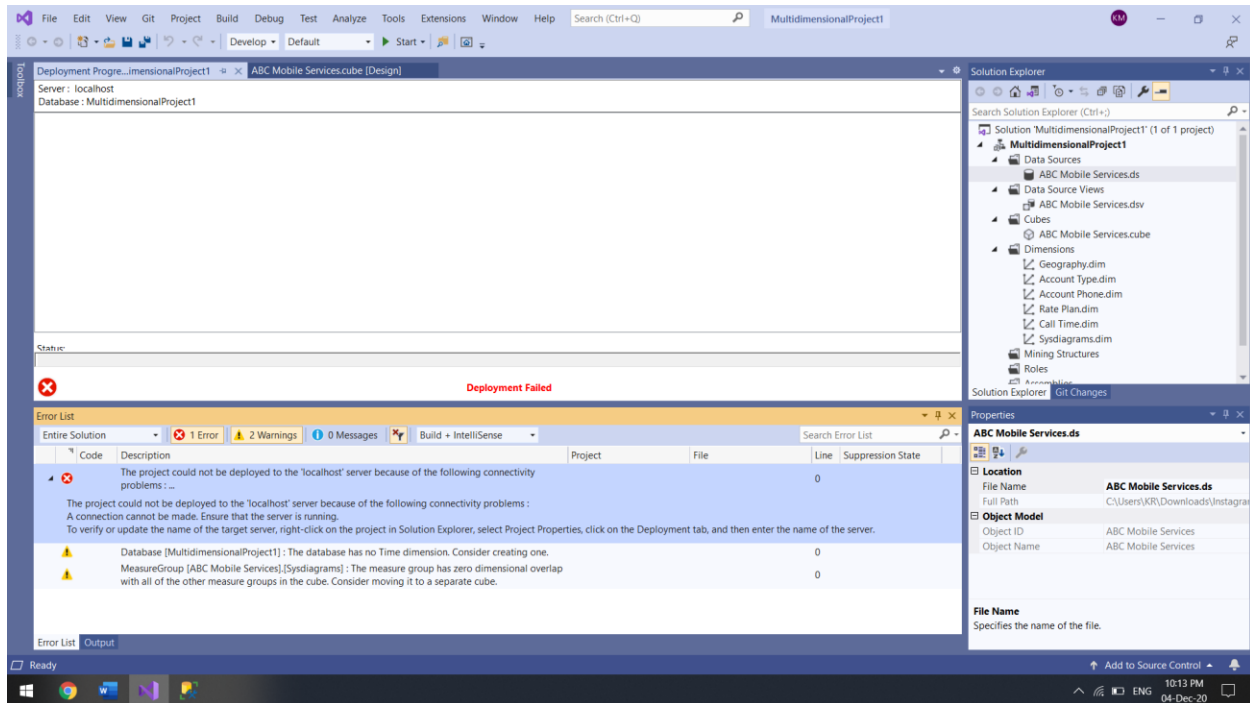
- Measure groups
 - Fact
 - Fact Count
 - Rate Plan
 - Validity Days
 - Data Bandwidth
 - Cost
 - Rate Plan Count
 - Sysdiagrams
 - Principal Id
 - Version
 - Sysdiagrams Count
- Dimensions
 - Geography
 - Account Type



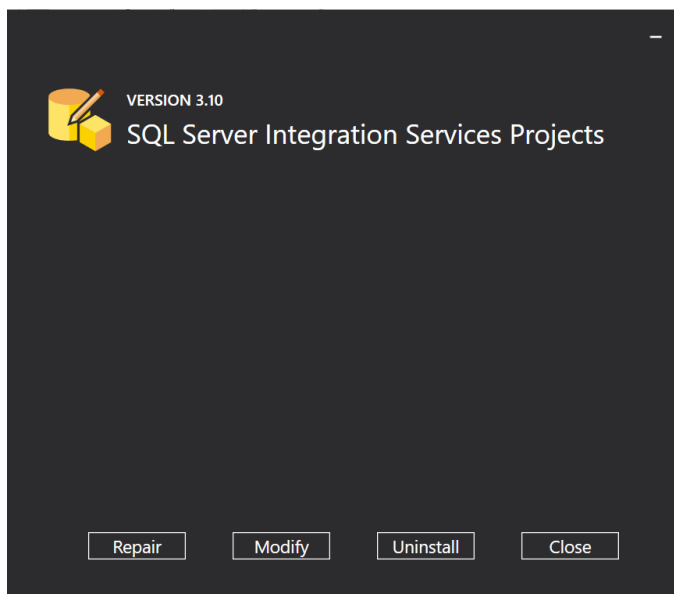
And after building the model, we get this data source view-



Deploying the model gave me some errors-



I tried to install SQL Server Analysis Services with SQL Server Data Tools (following [this link](#)), but I got an error in doing that despite trying several times. I clicked on Repair several times but it gave me errors.

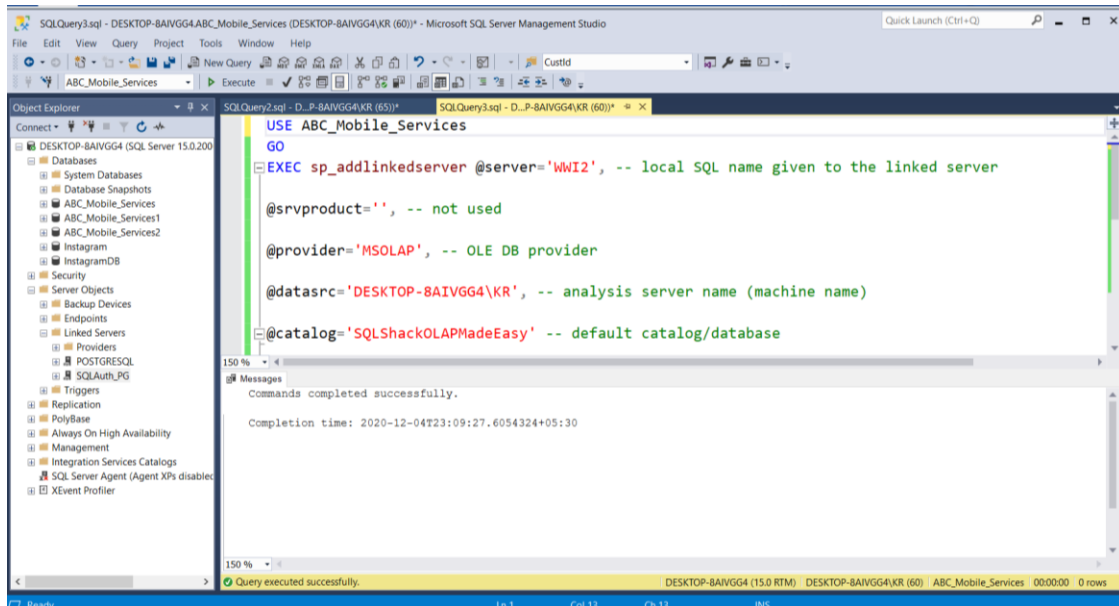


As an alternative, I tried to make a linked server like demonstrated in [this website article](#) and use OPENQUERY. As the website mentions, with a Linked Server configured, the Database Engine can act as a proxy to SSAS by using the T-SQL OPENQUERY function in SQL. The OPENQUERY function takes as arguments the Linked Server name and an MDX query (as a string), and returns a table object that can

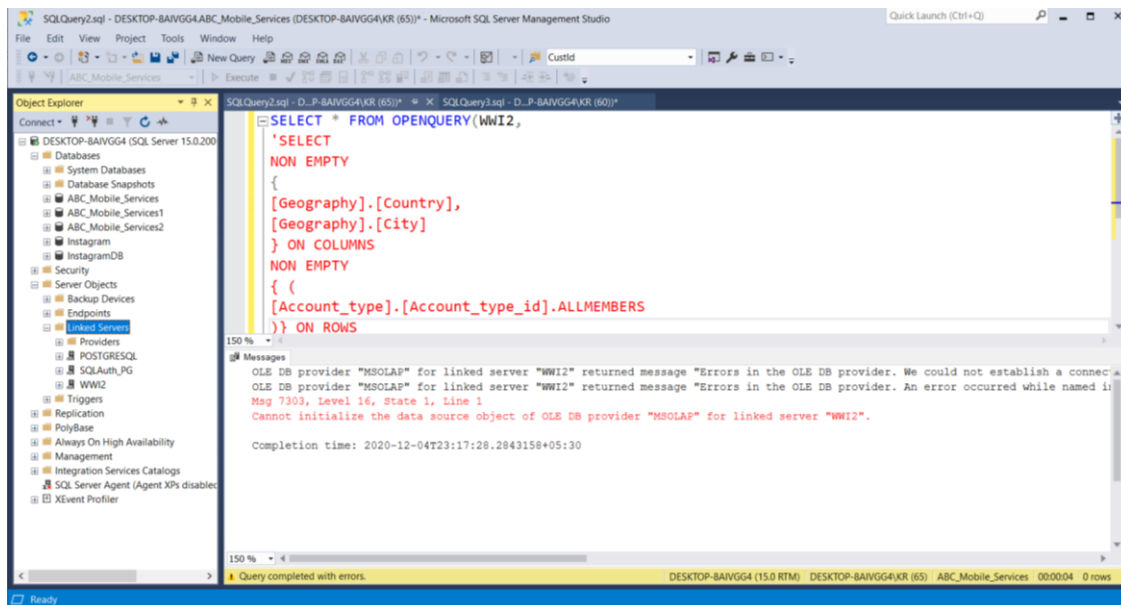
be manipulated in a SQL SELECT statement like a traditional table. Note that the query string is limited to 8000 characters in length.

However, this didn't work for me.

Creating the linked server-



I got the following error message.



To run MDX queries, since a cube has many dimensions, we need to represent certain attributes on columns and certain on rows and then the corresponding measures.

Excel can also be used for analysis.