

Sri Lanka Institute of Information Technology



Data Warehousing & Business Intelligence

Assignment 02

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Submitted to:

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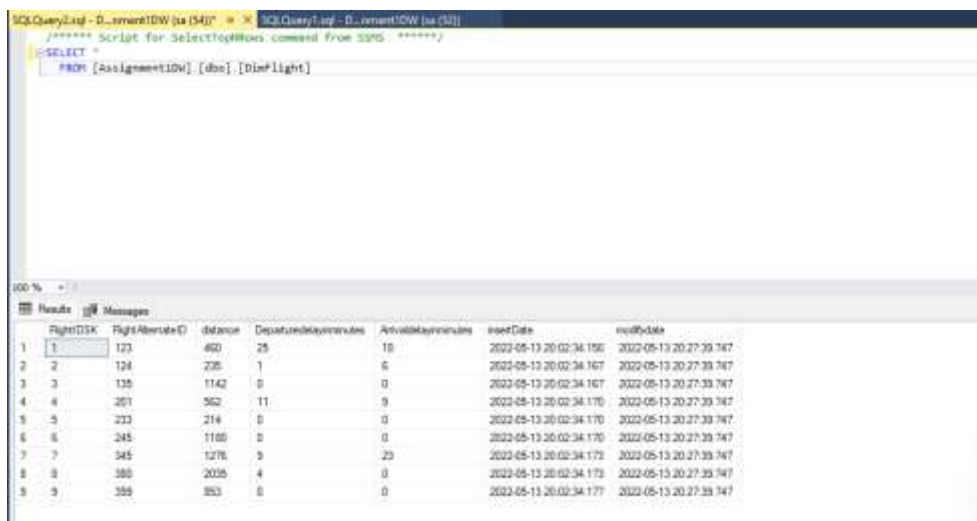
1. Data Source for the Assignment 02.

Data Source – Assignment1DW

Assignment1DW have following tables

- DimFlight
- DimFoodCategory
- DimFoodItem
- DimSatisfaction
- FactPassengers

DimFlight



```
SQLQuery1.sql - D:\Assignment1DW [sa (SAS)] * SQLQuery1.sql - D:\Assignment1DW [sa (SAS)]
/***** Script for SelectTopNRows command from SSAS *****/
SELECT *
FROM [Assignment1DW].[dbo].[DimFlight]
```

	FlightIDSK	FlightAlternateID	distance	Departuredelayinminutes	Arrivaldelayinminutes	insertDate	modifyDate
1	1	123	450	25	15	2022-05-13 20:02:34.156	2022-05-13 20:27:39.747
2	2	124	235	1	6	2022-05-13 20:02:34.167	2022-05-13 20:27:39.747
3	3	135	1142	0	0	2022-05-13 20:02:34.167	2022-05-13 20:27:39.747
4	4	257	562	11	9	2022-05-13 20:02:34.170	2022-05-13 20:27:39.747
5	5	233	214	0	0	2022-05-13 20:02:34.170	2022-05-13 20:27:39.747
6	6	245	1180	0	0	2022-05-13 20:02:34.170	2022-05-13 20:27:39.747
7	7	345	1276	9	23	2022-05-13 20:02:34.173	2022-05-13 20:27:39.747
8	8	380	2035	4	0	2022-05-13 20:02:34.173	2022-05-13 20:27:39.747
9	9	355	853	0	0	2022-05-13 20:02:34.177	2022-05-13 20:27:39.747

This Table have 9 rows .FlightIDSK, FlightAlternateID, distance, Departuredelayinminutes, Arrivaldelayinminutes ,insertdate,modifydate.

DimFoodCategory

SQLQuery3.sql - D...ment1DW (sa (58)) * SQLQuery2.sql - D...ment1DW (sa (54)) * SQLQuery1.sql - D...ment1DW (sa (52))

```

/***** Script for SelectTopRows command from SSRS *****/
SELECT *
FROM [Assignment1DW].[dbo].[DimFoodCategory]

```

CategoryIDSK	CategoryAlternateID	categoryname	insertDate	modifydate
1	1	economy meals	2022-05-10 17:11:45.977	2022-05-13 20:27:39.517
2	2	special meals	2022-05-10 17:11:45.983	2022-05-13 20:27:39.517
3	3	Business meals	2022-05-10 17:11:45.980	2022-05-13 20:27:39.517
4	10	vegetarian	2022-05-10 17:20:46.440	2022-05-13 20:27:39.520

Query executed successfully. DESKTOP-CN1TLO\SQLEXPRESS ... sa (58) Assignment1DW 00:00:00 4 rows

This table have 4 rows. CategoryIDSK, CategoryAlternateID, categoryname, insertdate, modifydate.

DimFoodItem

SQLQuery5.sql - D...ment1DW (sa (60)) * SQLQuery4.sql - D...ment1DW (sa (65)) * SQLQuery3.sql - D...ment1DW (sa (58)) * SQLQuery2.sql - D...ment1DW (sa (54)) *

```

/***** Script for SelectTopRows command from SSRS *****/
SELECT *
FROM [Assignment1DW].[dbo].[DimFoodItem]

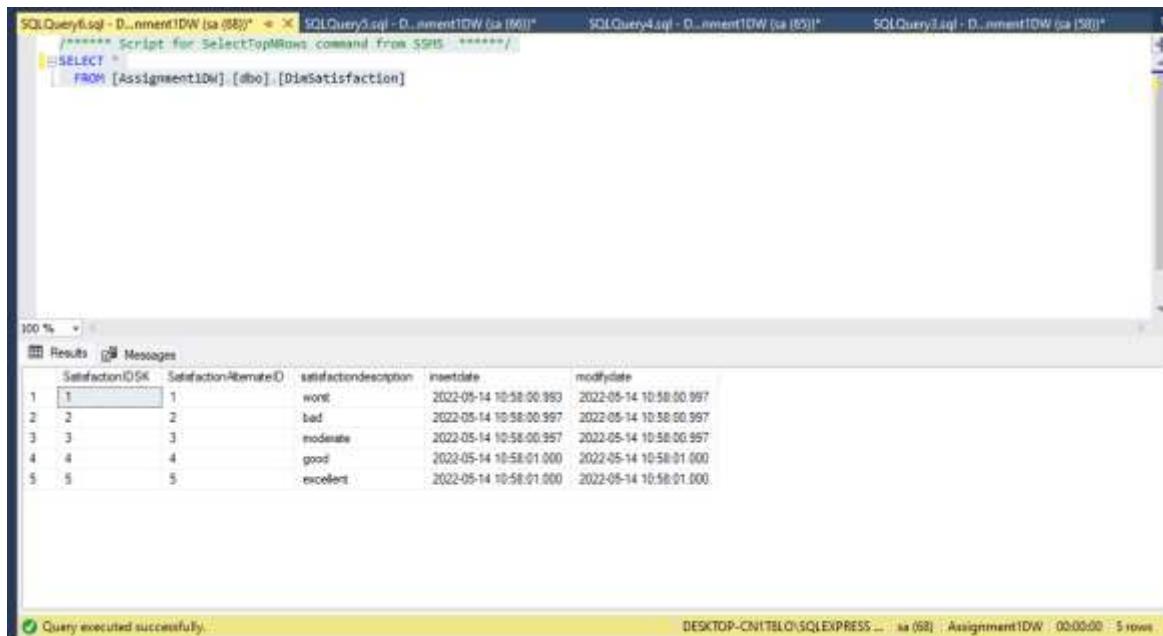
```

FoodIDSK	FoodAlternateID	name	ProductNumber	foodcountry	CategoryKey	insertDate	modifydate
1	1	ba rice with vegetables	AR-5381	Thailand	1	2022-05-10 21:59:27.310	2022-05-13 20:27:39.653
2	3	steamed rice served with salad	DR-5379	Japanese	1	2022-05-10 21:59:27.320	2022-05-13 20:27:39.653
3	5	Sri Lankan fish curry	SDE-5309	Sri Lankan	3	2022-05-10 21:59:27.320	2022-05-13 20:27:39.653
4	6	Gluten-Free Meal	AR-484	Sri Lankan	2	2022-05-10 21:59:27.320	2022-05-13 20:27:39.653
5	21	five-spice chicken curry with pests salad	DR-5385	China	1	2022-05-10 21:59:27.320	2022-05-13 20:27:39.653
6	32	Pan seared salmon steak	SDE-5386	Thailand	3	2022-05-10 21:59:27.320	2022-05-13 20:27:39.653
7	40	Low Fat Meal	DR-367	China	2	2022-05-10 21:59:27.320	2022-05-13 20:27:39.653
8	43	Sri Lankan special	SDE-5388	Sri Lankan	3	2022-05-10 21:59:27.320	2022-05-13 20:27:39.657
9	66	Kosher meal	AR-5389	Thailand	2	2022-05-10 21:59:27.320	2022-05-13 20:27:39.657

Query executed successfully. DESKTOP-CN1TLO\SQLEXPRESS ... sa (60) Assignment1DW 00:00:00 9 rows

This table have 9 rows. FoodIDSK, FoodAlternateID, name, ProductNumber, foodcountry, CategoryKey, insertdate, modifydate.

DimSatisfaction

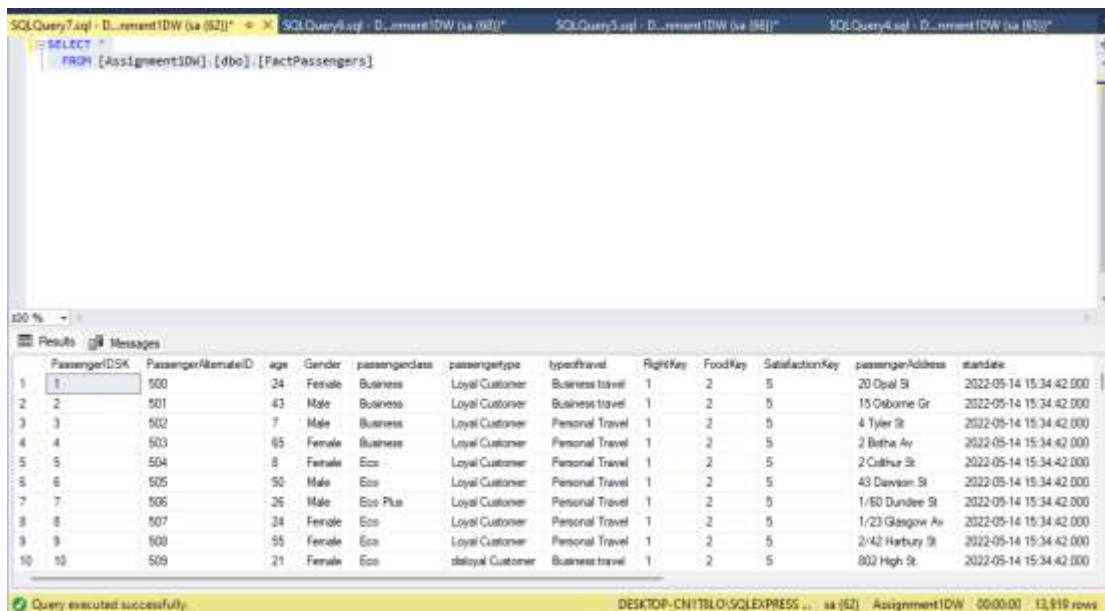


The screenshot shows a SQL Server Enterprise Manager window with a query executed against the 'Assignment1DW' database. The query is: `SELECT * FROM [Assignment1DW].[dbo].[DimSatisfaction]`. The results pane displays 5 rows of data from the DimSatisfaction table.

SatisfactionIDSK	SatisfactionAlternateID	satisfactiondescription	insertdate	modifydate
1	1	worst	2022-05-14 10:58:00.997	2022-05-14 10:58:00.997
2	2	bad	2022-05-14 10:58:00.997	2022-05-14 10:58:00.997
3	3	moderate	2022-05-14 10:58:00.997	2022-05-14 10:58:00.997
4	4	good	2022-05-14 10:58:01.000	2022-05-14 10:58:01.000
5	5	excellent	2022-05-14 10:58:01.000	2022-05-14 10:58:01.000

This table have 5 rows. SatisfactionIDSK ,SatisfactionAlternateID, satisfactiondescription, insertdate,modifydate.

FactPassengers

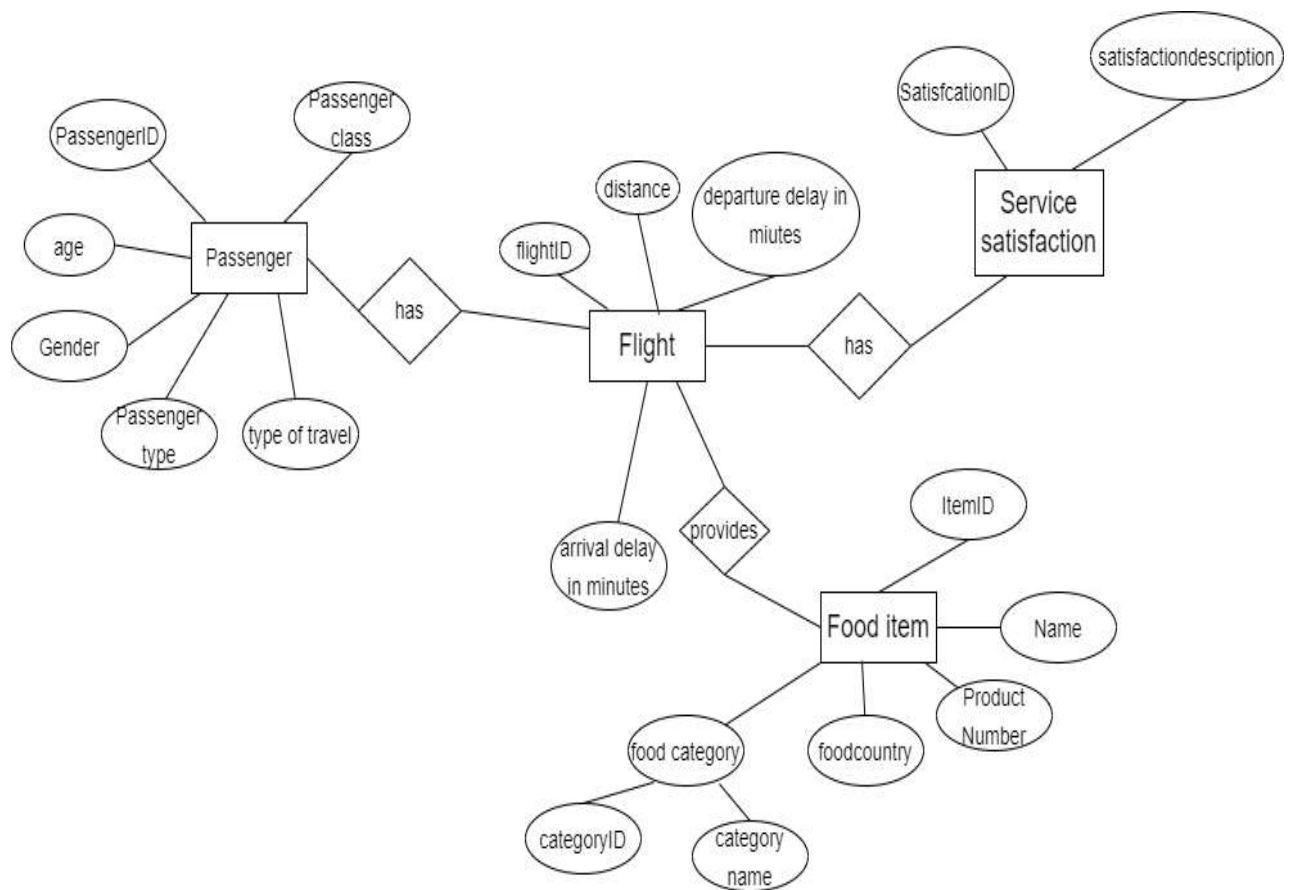


The screenshot shows a SQL Server Enterprise Manager window with a query executed against the 'Assignment1DW' database. The query is: `SELECT * FROM [Assignment1DW].[dbo].[FactPassengers]`. The results pane displays 10 rows of data from the FactPassengers table.

PassengerIDSK	PassengerAlternateID	age	Gender	passengerclass	passengertype	typetravel	RightKey	FoodKey	SatisfactionKey	passengerAddress	startdate
1	500	24	Female	Business	Loyal Customer	Business travel	1	2	5	20 Opal St	2022-05-14 15:34:42.000
2	501	43	Male	Business	Loyal Customer	Business travel	1	2	5	15 Osborne Gr	2022-05-14 15:34:42.000
3	502	7	Male	Business	Loyal Customer	Personal Travel	1	2	5	4 Tyler St	2022-05-14 15:34:42.000
4	503	65	Female	Business	Loyal Customer	Personal Travel	1	2	5	2 Betha Av	2022-05-14 15:34:42.000
5	504	8	Female	Eco	Loyal Customer	Personal Travel	1	2	5	2 Cultha St	2022-05-14 15:34:42.000
6	505	50	Male	Eco	Loyal Customer	Personal Travel	1	2	5	43 Davison St	2022-05-14 15:34:42.000
7	506	26	Male	Eco Plus	Loyal Customer	Personal Travel	1	2	5	1/60 Dundee St	2022-05-14 15:34:42.000
8	507	34	Female	Eco	Loyal Customer	Personal Travel	1	2	5	1/23 Glasgow Av	2022-05-14 15:34:42.000
9	508	55	Female	Eco	Loyal Customer	Personal Travel	1	2	5	2/42 Harbury St	2022-05-14 15:34:42.000
10	509	21	Female	Eco	disloyal Customer	Business travel	1	2	5	802 High St	2022-05-14 15:34:42.000

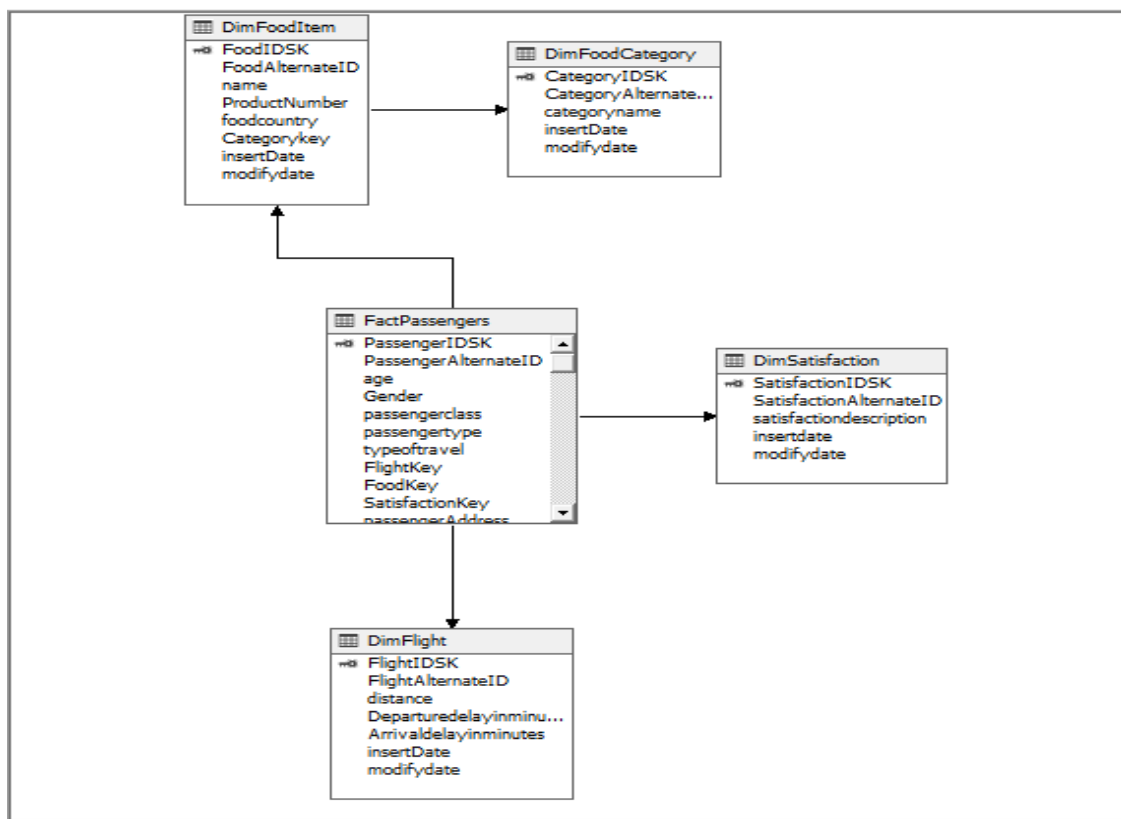
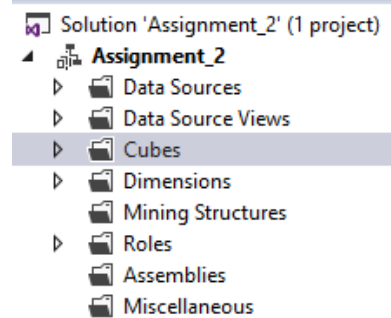
This Table have 13,919 rows .PassengerIDSK, PassengerAlternatID, age, Gender,passengerclass,passengertype,typeoftravel,FlightKey,FoodKey,SatisfactionKey,passengerAddress , startdate,enddate,insertdate,modifydate,accm_txn_create_time, accm_txn_complete_time, txn_process_time_hours.

ER Diagram.

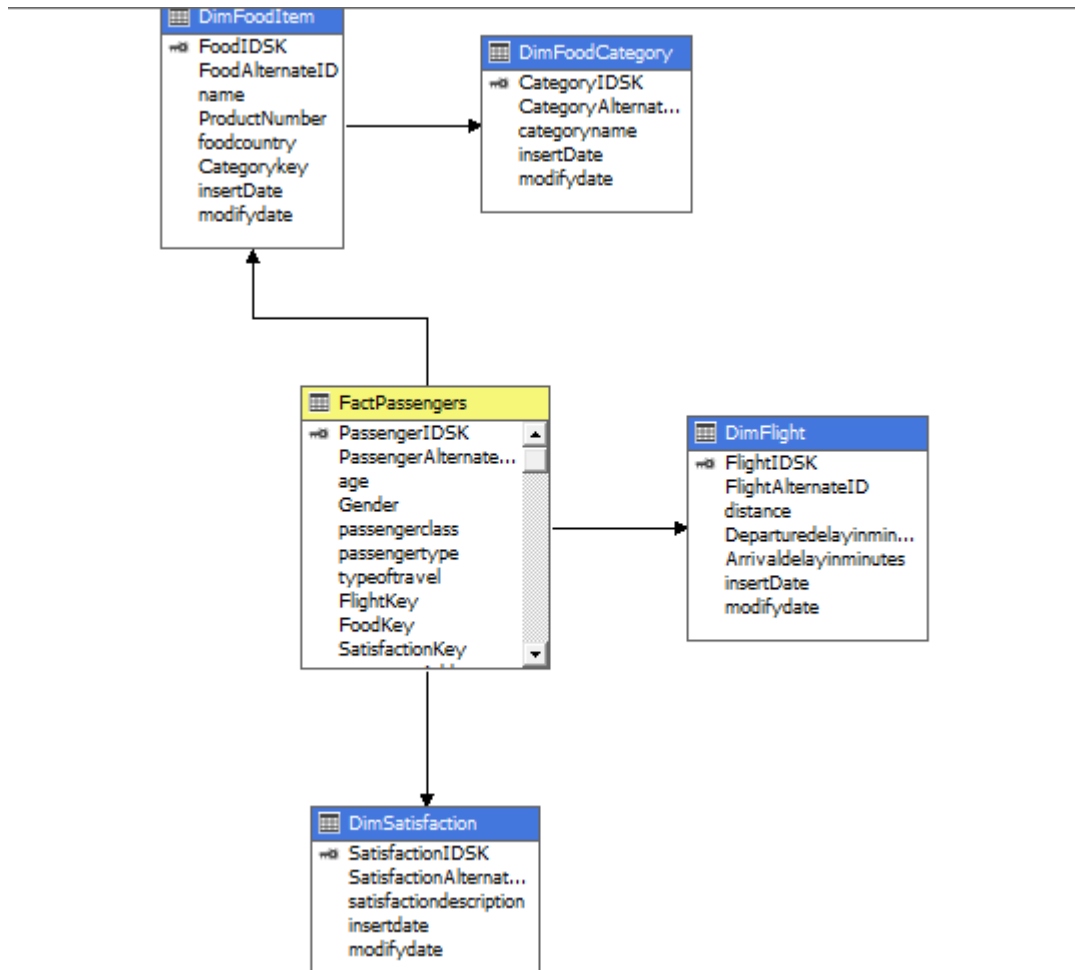


2)SSAS Cube Implementation.

- First, I create Analysis Service Project renamed as “Assignment_2”.
- Then we should configure components starting from data sources to dimensions.
- Then I create my Data Source Which is Assignment1DW.
- Created Date source View.



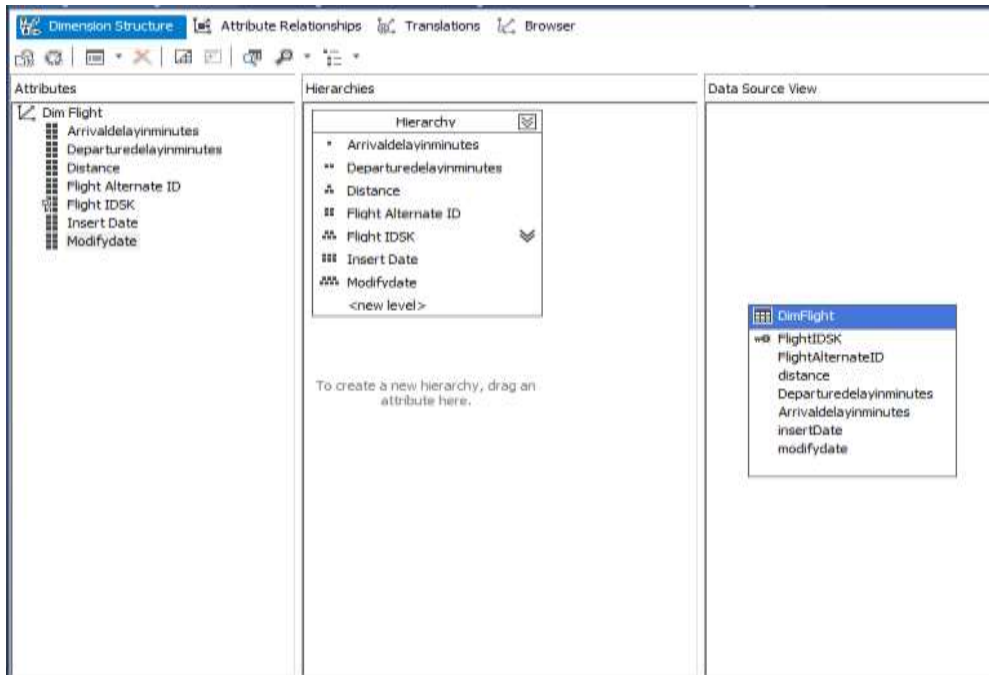
- Then create the cube named Cube_Assignment1DW. This is the snowflake schema.



➤ Then Add the Dimensions Attributes.

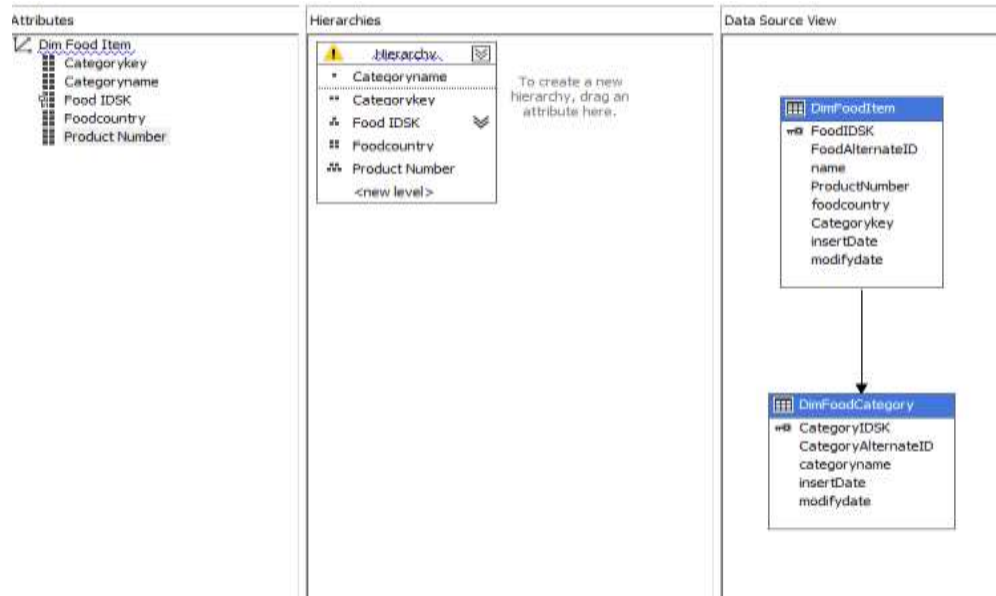
- DimFlight

Create a hierarchy For Flight.



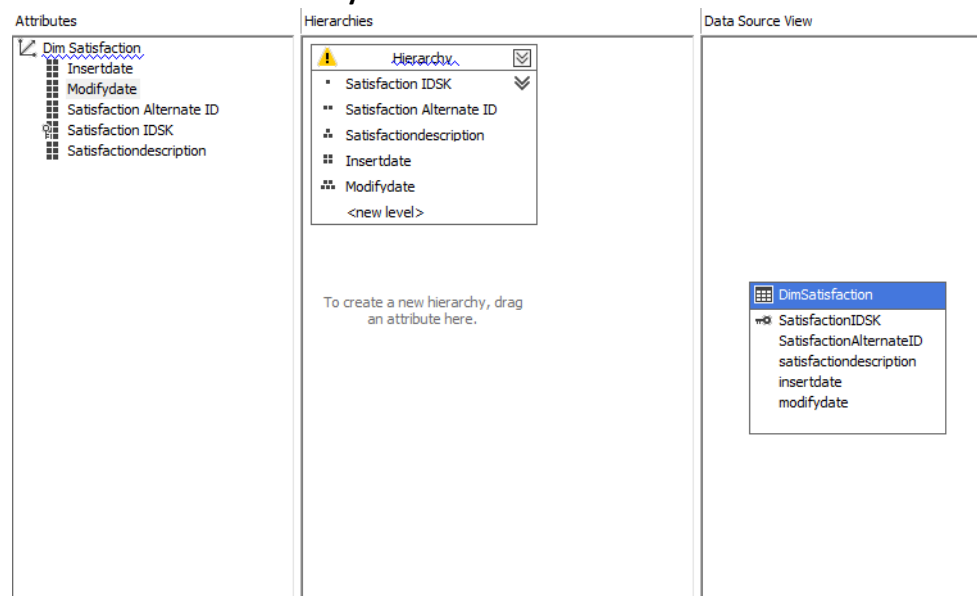
- DimFoodItem

Create a hierarchy For FoodItem.



- DimSatisfaction

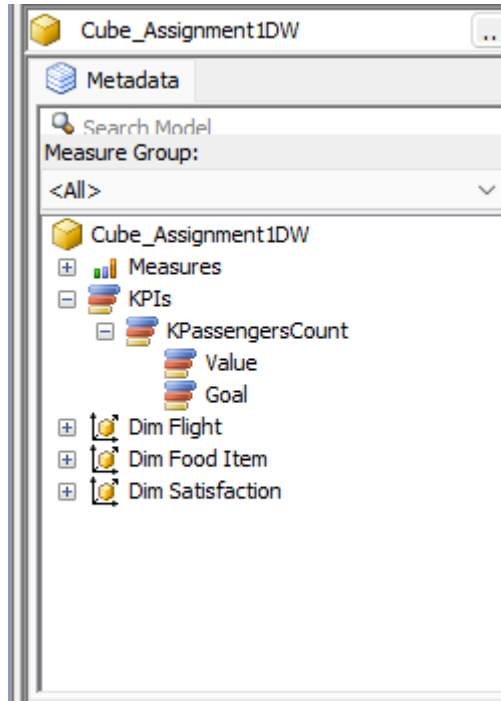
Create a hierarchy For satisfaction.



- Create the KPI. Name the KPI as “**KPassengersCounts**” .
- Then select “Fact Passengers” as the Associated Measure Group. In the Measure Group on the lower left side panel, expand Measures and then expand “Fact Passengers”. Drag and drop ‘Fact Passengers Count’ attribute to Global Expression area and modify the expression as follows:

[Measures].[Fact Passengers Count] >10

- Then I save all the changes. After processing the cube we can see like this.



Dimension	Hierarchy	Operator	Filter Expression
<Select dimension>			
Categorykey	Foodcountry	KPassengersCounts Value	KPassengersCounts Goal
1	China	5990	True
1	Japanese	1082	True
1	Thailand	395	True
2	China	1	False
2	Sri Lanka	6319	True
2	Thailand	(null)	False
3	Sri Lanka	107	True
3	Thailand	25	True
Unknown	Unknown	(null)	False

Categorykey	Foodcountry	Satisfactiondescription	KPassengersCounts Value	KPassengersCounts Goal	
1	China	bad	(null)	False	
1	China	excellent	2672	True	
1	China	good	271	True	
1	China	moderate	3047	True	
1	China	worst	(null)	False	
1	China	Unknown	(null)	False	
1	Japanese	bad	1	False	
1	Japanese	excellent	1081	True	
1	Japanese	good	(null)	False	
1	Japanese	moderate	(null)	False	
1	Japanese	worst	(null)	False	
1	Japanese	Unknown	(null)	False	
1	Thailand	bad	(null)	False	
1	Thailand	excellent	70	True	
1	Thailand	good	23	True	
1	Thailand	moderate	301	True	
1	Thailand	worst	1	False	
1	Thailand	Unknown	(null)	False	

Dimension 1	Measure	Operator	Filter Expression		
<Select dimension>					
Categorykey	Foodcountry	Satisfactiondescription	Distance	KPassengersCounts Value	KPassengersCounts Goal
1	China	bad	1142	(null)	False
1	China	bad	1180	(null)	False
1	China	bad	1276	(null)	False
1	China	bad	2035	(null)	False
1	China	bad	214	(null)	False
1	China	bad	235	(null)	False
1	China	bad	460	(null)	False
1	China	bad	562	(null)	False
1	China	bad	853	(null)	False
1	China	bad	Unknown	(null)	False
1	China	excellent	1142	(null)	False
1	China	excellent	1180	(null)	False
1	China	excellent	1276	1122	True
1	China	excellent	2035	1550	True
1	China	excellent	214	(null)	False
1	China	excellent	235	(null)	False
1	China	excellent	460	(null)	False
1	China	excellent	562	(null)	False
1	China	excellent	853	(null)	False
1	China	excellent	Unknown	(null)	False
1	China	good	1142	(null)	False

3. Demonstration of OLAP operations.

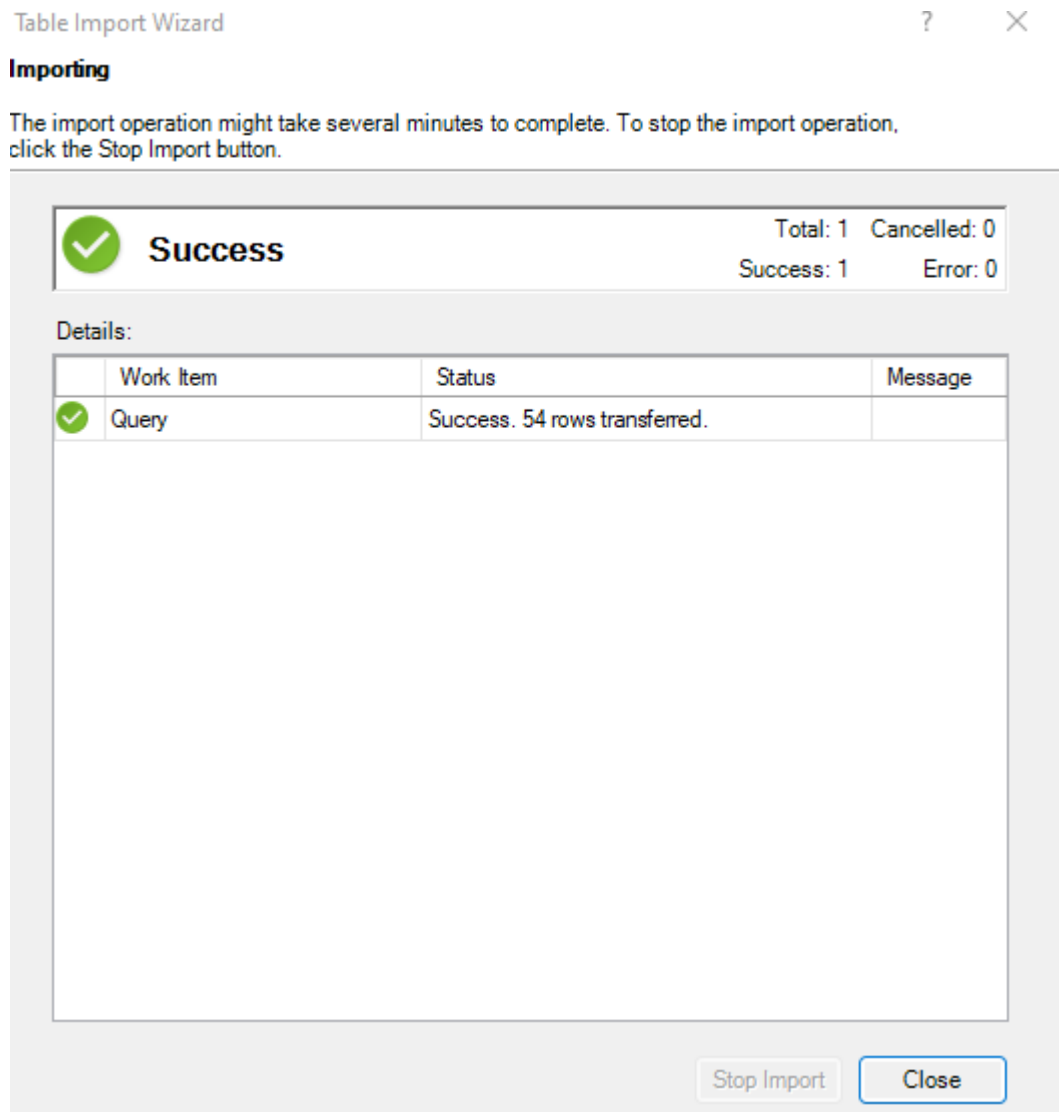
- First ,I generate the MDX query using the cube's browser.

<Select dimension>					
Categorykey	Foodcountry	Categoryname	Satisfactiondescription	KPassengersCounts Value	KPassengersCounts Goal
1	China	economy meals	bad	(null)	False
1	China	economy meals	excellent	2672	True
1	China	economy meals	good	271	True
1	China	economy meals	moderate	3047	True
1	China	economy meals	worst	(null)	False
1	China	economy meals	Unknown	(null)	False
1	Japanese	economy meals	bad	1	False
1	Japanese	economy meals	excellent	1081	True
1	Japanese	economy meals	good	(null)	False
1	Japanese	economy meals	moderate	(null)	False
1	Japanese	economy meals	worst	(null)	False
1	Japanese	economy meals	Unknown	(null)	False
1	Thailand	economy meals	bad	(null)	False
1	Thailand	economy meals	excellent	70	True
1	Thailand	economy meals	good	23	True
1	Thailand	economy meals	moderate	301	True
1	Thailand	economy meals	worst	1	False
1	Thailand	economy meals	Unknown	(null)	False
2	China	special meals	bad	(null)	False
2	China	special meals	excellent	1	False
2	China	special meals	good	(null)	False

- Then I click on execute button.In order to get MDX query I click on Design Mode button.

```
SELECT NON EMPTY { KPIValue("KPassengersCounts"), KPIGoal("KPassengersCounts") } ON COLUMNS, NON EMPTY { ([Dim Food Item].[Categorykey].[Categorykey].ALLMEMBERS * [Dim Food Item].[Foodcountry].[Foodcountry].ALLMEMBERS * [Dim Food Item].[Categoryname].[Categoryname].ALLMEMBERS * [Dim Satisfaction].[Satisfactiondescription].[Satisfactiondescription].ALLMEMBERS ) } DIMENSION PROPERTIES MEMBER_CAPTION, MEMBER_UNIQUE_NAME ON
ROWS FROM [Cube_Assignment1DW] CELL PROPERTIES VALUE, BACK_COLOR, FORE_COLOR, FORMATTED_VALUE, FORMAT_STRING, FONT_NAME, FONT_SIZE, FONT_FLAGS
```

- Then I connect to the Excel using Assignment_2 Using the above MDX Query.
In the next window,past the MDX query I copied,and click on validate button to ensure there are no erros, and click finish.



In the Excel, I can see all the fields I selected via the MDX Query.

In order to create **Drill Down and Roll Up**.

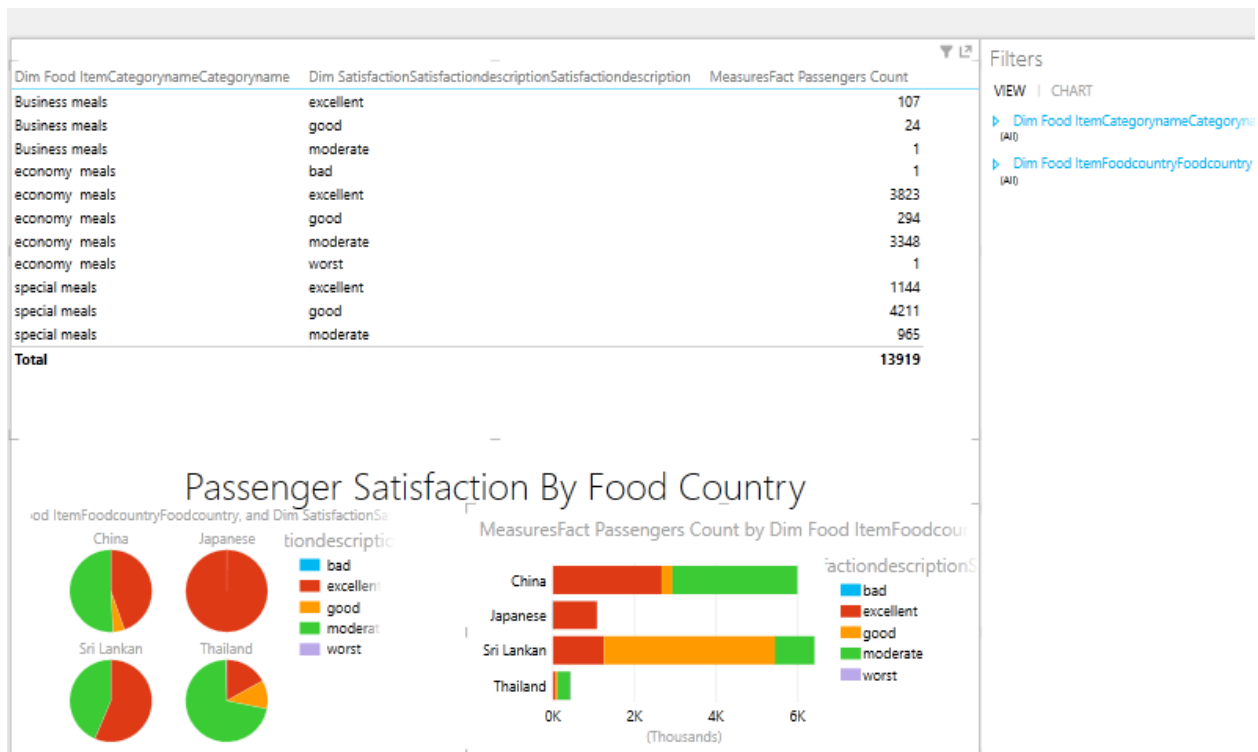
- I gather the summation of Passenger Count on satisfaction description under Food country and FoodCategory.

Sum of MeasuresFact Passengers Count					
Row Labels	bad	excellent	good	moderate	worst
China		2673	271	3047	
economy meals		2672	271	3047	
special meals			1		
Japanese	1	1081			
economy meals	1	1081			
Sri Lankan		1249	4211		966
Business meals		106			1
special meals		1143	4211		965
Thailand		71	47	301	1
Business meals		1	24		
economy meals		70	23	301	1
Grand Total	1	5074	4529	4314	1

- I gather the summation of Passenger Count on satisfaction description under FlightID and FoodCategory.

Fact Passengers Count					
Row Labels	bad	excellent	good	moderate	worst
123		368	16	301	1
economy meals		368	15	301	1
special meals			1		
124	1	2,025	2,936	965	
Business meals		105			105
economy meals	1	777			778
special meals		1,143	2,936	965	5,044
135		1,264			1,264
special meals		1,264			1,264
201		91		80	171
233			107		107
245			1,524		1,524
345		1,122		1,336	2,458
economy meals		1,122		1,336	2,458
380		1,559	214		1,773
Unknown			8	1	9
Grand Total	1	5,074	4,529	4,314	1

- In order to create **Slice and Dice**,
I create a PowerView dashboard to demonstrate the Passenger Satisfaction food country
Wise. Like this,



4.SSRS Reports.

I use Report Builder to create my reports.

- First step to create Data Source.In order to create the data source,I add the my data source as “Assignment1DW”.
- Next I create the data set.In order to create the data set right click on DataSet and open up DataSet properties window.In the query section ,provide the dataset name as “Dataset1” and select use the data set embedded in my dataset.

SELECT

DimFoodItem.foodcountry
,FactPassengers.PassengerAlternateID
,FactPassengers.passengerclass
,DimSatisfaction.satisfactiondescription

FROM

FactPassengers

INNER JOIN DimFoodItem

ON FactPassengers.FoodKey = DimFoodItem.FoodIDSK

INNER JOIN DimSatisfaction

ON FactPassengers.SatisfactionKey = DimSatisfaction.SatisfactionIDSK

Exceute the above query that I have create using SQL server .Then I click ok button to create the dataset.

1.Create the Materix report.

At the point of selecting fields for Row groups and Column groups, I drag and drop ‘foodcountry’, ‘passengerclass’ to Row groups section and ‘satisfactiondescription’ to Column groups section and

‘PassengerAlternateID’ to Values section and click Next . In Choose the layout page, select all the option and click Next . These options are to have totals for different levels/groups and to enable or disable the expand/collapse feature (essentially drill-down/roll-up) Click Finish . Now, you should be able to see a matrix inserted in to the report body. I provide a suitable report title such ‘Passenger Class wise Food Satisfaction Details’ and design the look of the report accordingly.

Then I click on save button and save the prepared matrix report to the my report server.

Then it display like this.

Passenger Class wise Food Satisfaction Details						
passengerclass	foodcountry	bad	excellent	good	moderate	worst
SS						
Business		1	2469	2176	2056	0
Eco		0	2263	2028	1938	0
Eco Plus		0	342	325	320	1

when I click on expand particular Passenger class.I can see like this.

Passenger Class wise Food Satisfaction Details						
passengerclass	foodcountry	bad	excellent	good	moderate	worst
SS						
Business	China	0	1309	124	1439	0
	Japanese	1	511	0	0	0
	Sri Lankan	0	612	2034	466	0
	Thailand	0	37	18	151	0
Eco	China	0	1181	127	1401	0
	Japanese	0	493	0	0	0
	Sri Lankan	0	558	1874	409	0
	Thailand	0	31	27	128	0
Eco Plus		0	342	325	320	1

2.Create the Parameterized Report.

I have added two parameters and List of values to parameters like this.

SELECT

DimFoodItem.foodcountry

,FactPassengers.PassengerAlternateID

,FactPassengers.passengerclass

,DimSatisfaction.satisfactiondescription

FROM

FactPassengers

INNER JOIN DimFoodItem

ON FactPassengers.FoodKey = DimFoodItem.FoodIDSK

INNER JOIN DimSatisfaction

ON FactPassengers.SatisfactionKey = DimSatisfaction.SatisfactionIDSK

WHERE

DimFoodItem.foodcountry = @foodcountry

AND FactPassengers.passengerclass LIKE @passengerclass

Then I save the report to report server.Then I can see the report can get the output like this.

enter distance: 500		Gender: male							View Report	
Gender satisfaction description		123	124	135	233	245	345	360		
Male	bad	0	1	0	0	0	0	0		
	excellent	194	965	0	0	0	548	809		
	good	3	1464	621	0	0	0	116		
	moderate	144	463	0	52	741	626	0		
	worst	1	0	0	0	0	0	0		

