Sri Lanka Institute of Information Technology

Data Warehousing & Business Intelligence

Customer Credit Card Promotions

Assignment 2

Submitted By:

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Submitted To:

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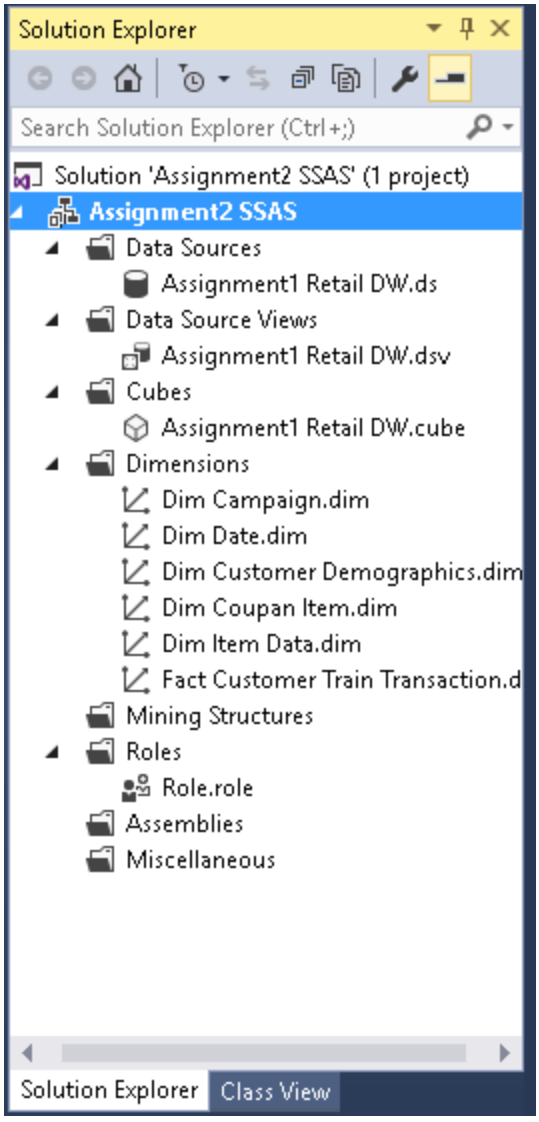
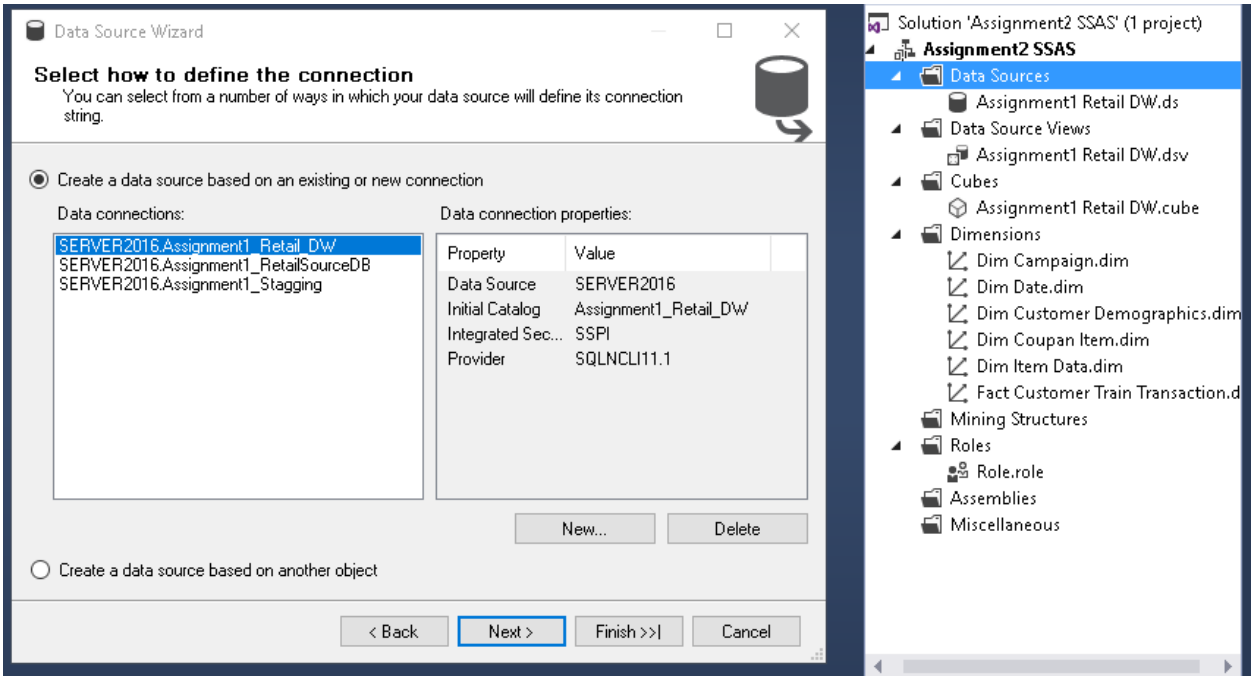
Step 1: Data Source Selection

In previous assignment, finally I have created my Data Warehouse by using transformation method. In this case, I had to use that warehouse database for my cube creation. In below, you can see my Cube structure.

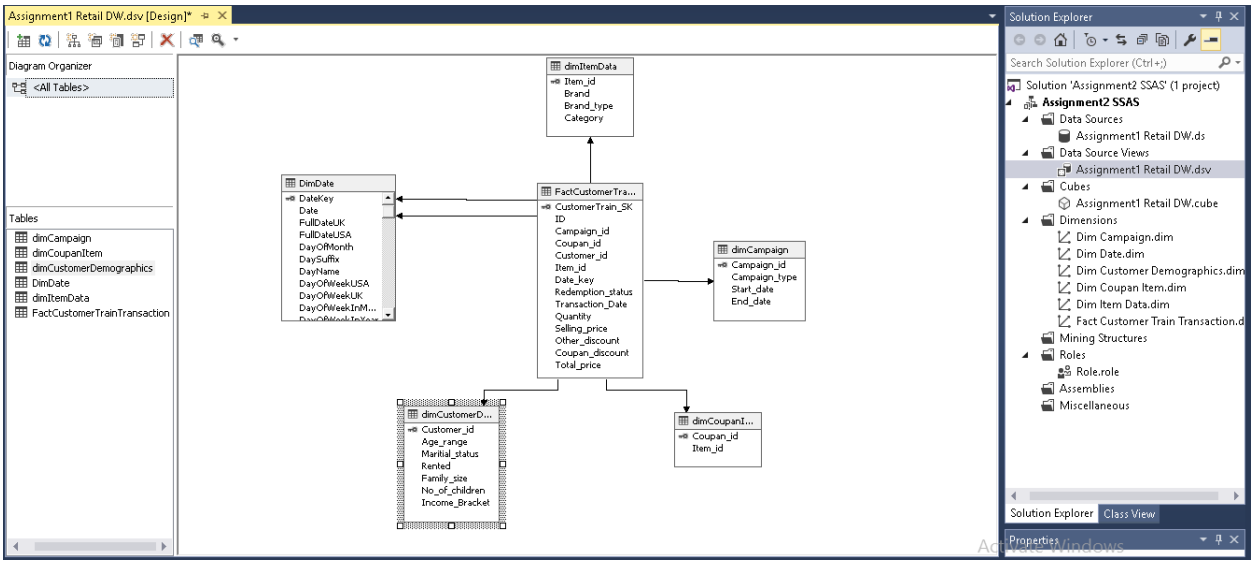


Step 2: SSAS Cube Implementation

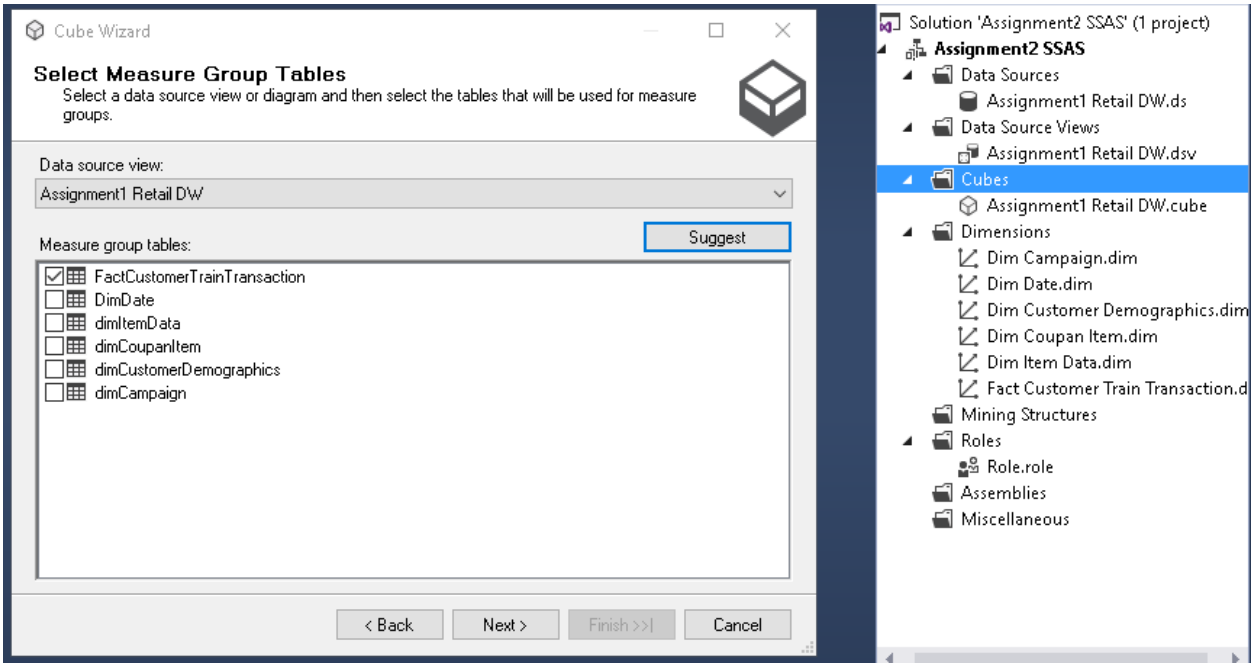
When Cube creation, first we have to configure our data source. For the data source, we will define our Data Warehouse database.



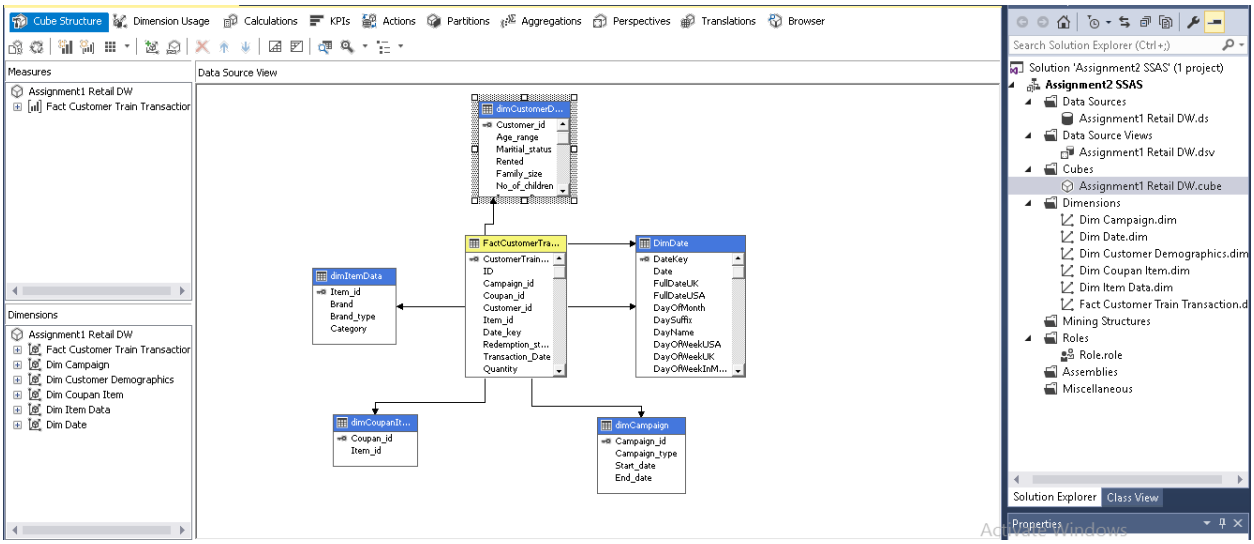
After that, I have created data source view. It represent diagram view of my star schema by showing connection of my tables.



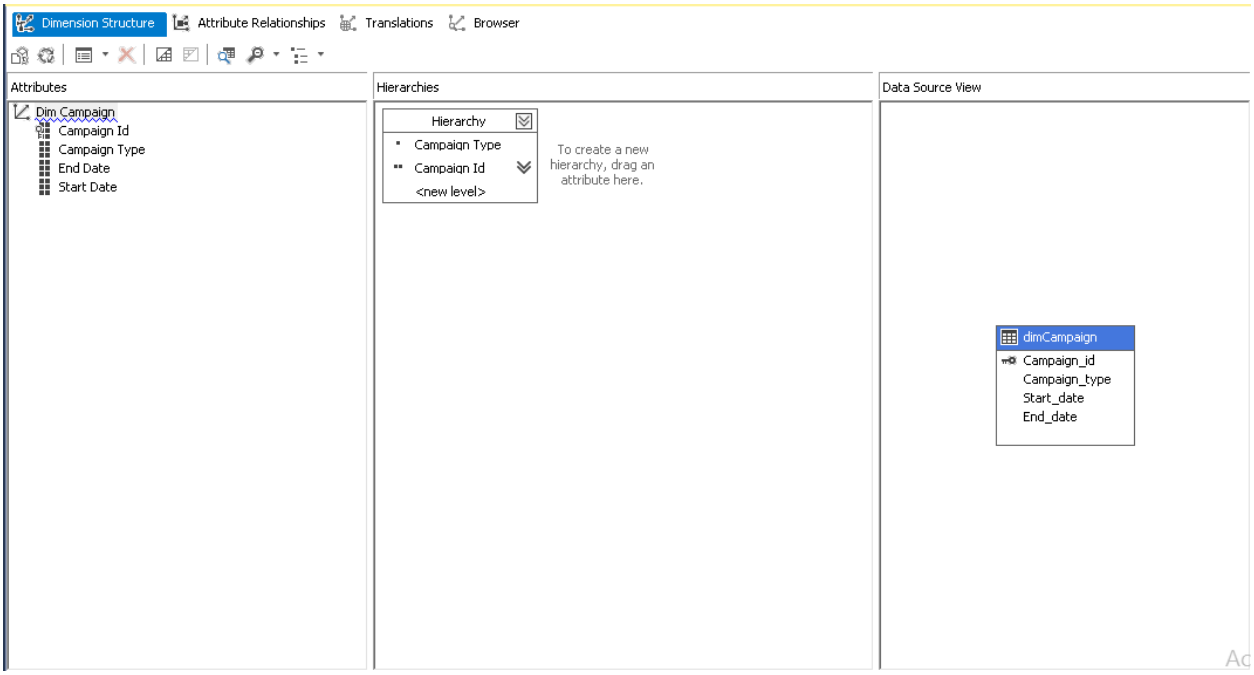
Next part is creating my cube. First, I had to run Cube wizard for configuration my tables. In this wizard, I had to choose only my fact table and rest of dim tables automatically connect with my fact table.



After apply correct configurations my cube is displaying like this.

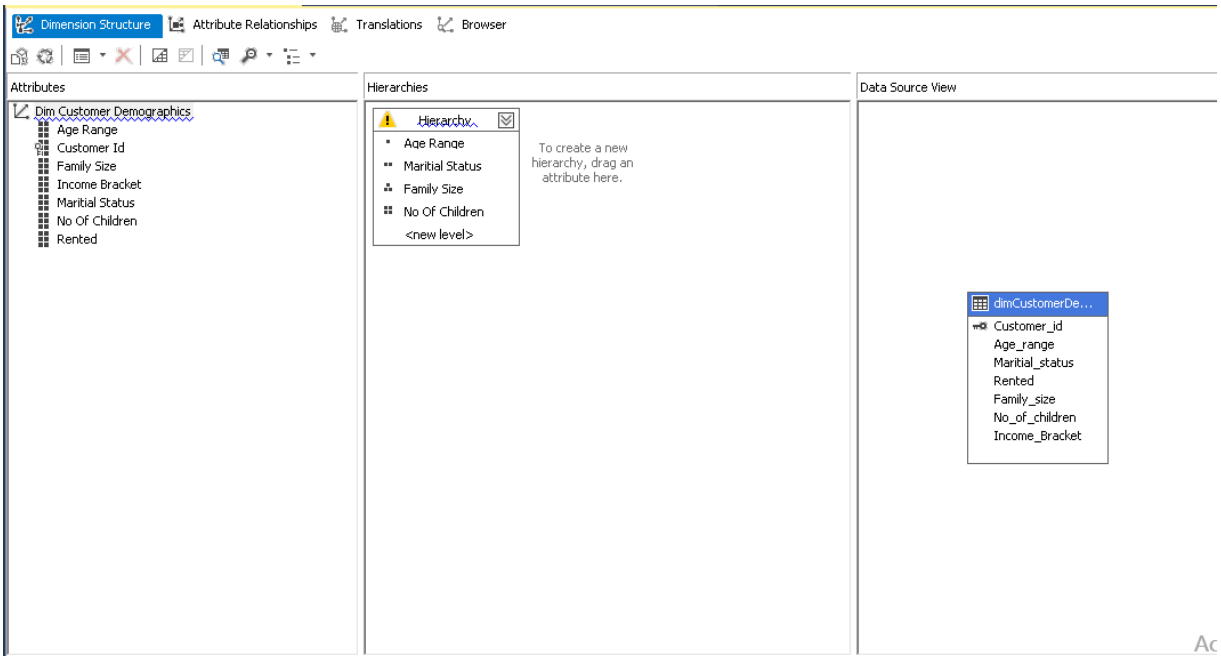


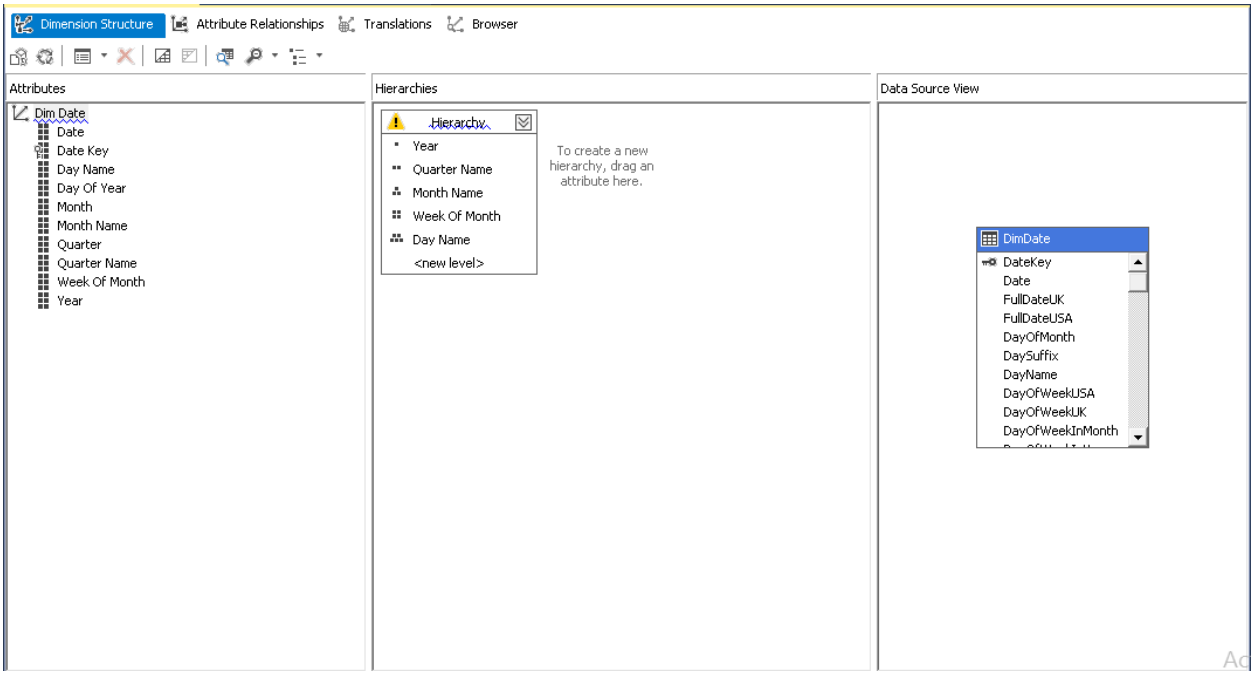
After creating cubes, there is one configuration missing. Mistake is, in attribute section all dim tables selected with their primary key and other columns not selected. There for we have to manually drag and drop those columns into attribute section.



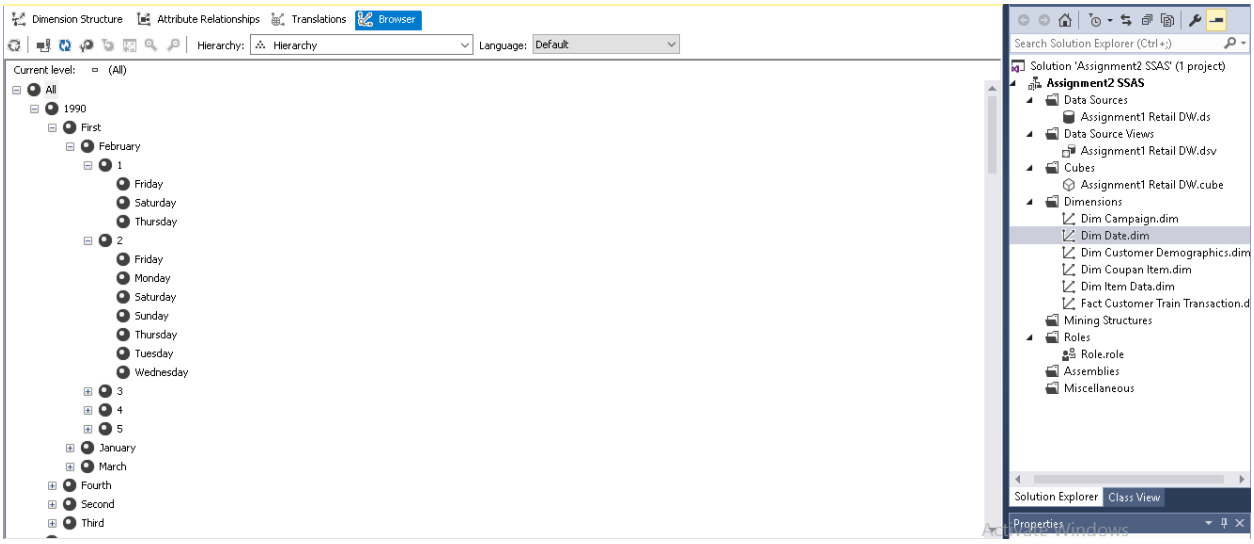
Creating Hierarchies

In above image, you can see one hierarchy, which I have created. In below I have inserted other tables with their hierarchies.

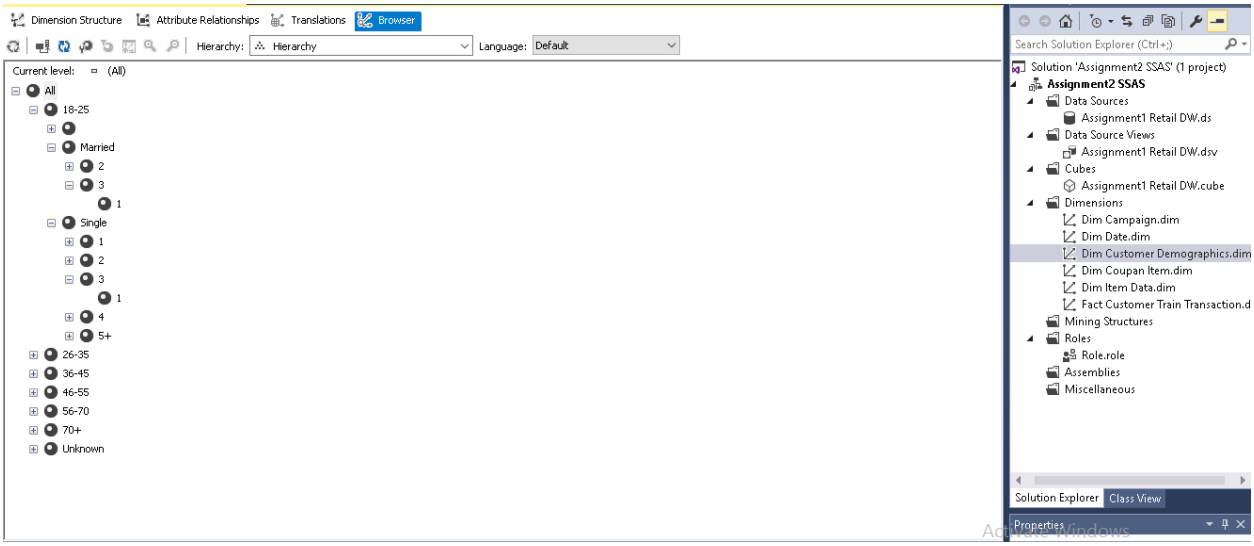



Dimension Structure
Attribute Relationships
Translations
Browser
Attributes
Dim Date
Date
Date Key
Day Name
Day Of Year
Month
Month Name
Quarter
Quarter Name
Week Of Month
Year
Hierarchies
Hierarchy
Year
Quarter Name
Month Name
Week Of Month
Day Name
<new level>
To create a new hierarchy, drag an attribute here.
Data Source View
DimDate
DateKey
Date
FullDateUK
FullDateUSA
DayOfMonth
DaySuffix
DayName
DayOfWeekUSA
DayOfWeekUK
DayOfWeekInMonth

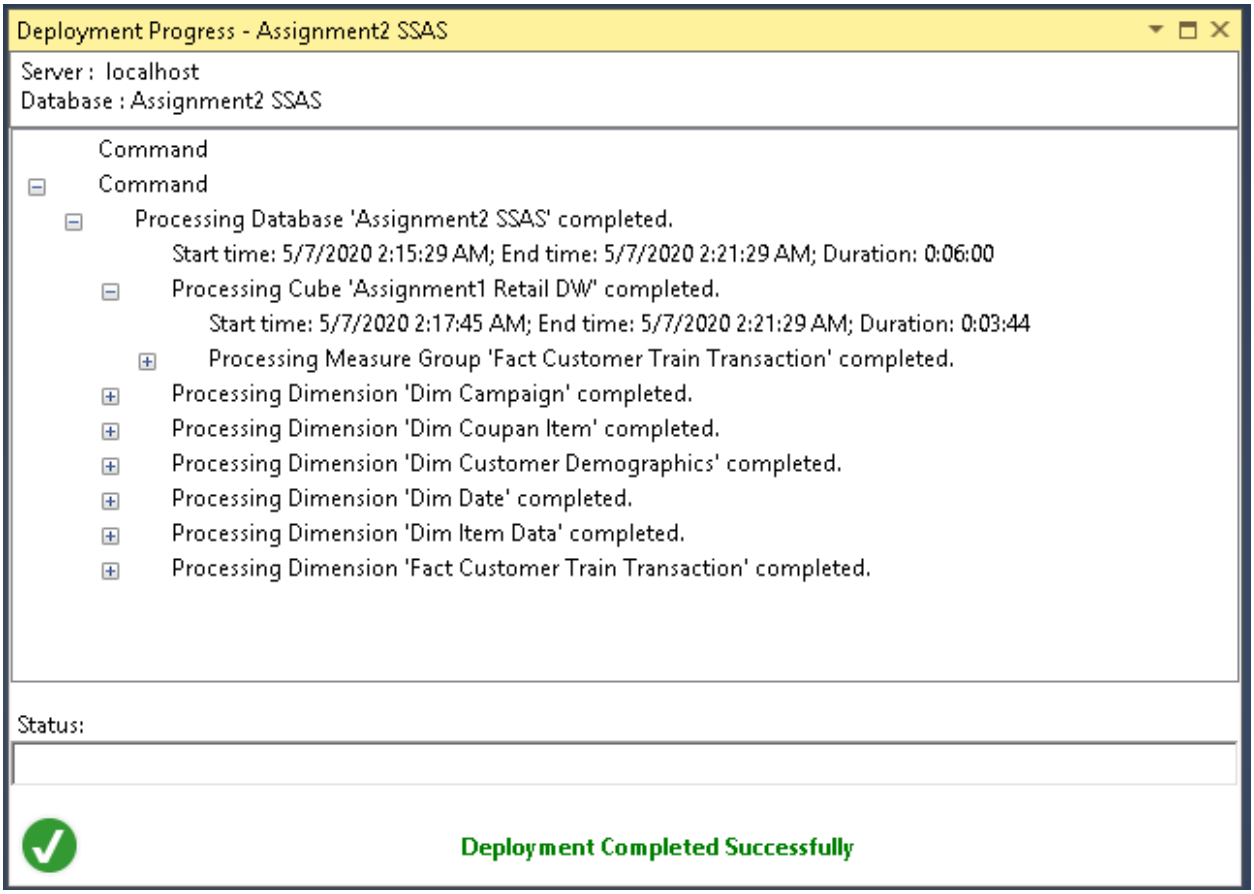
Date Wise


Dimension Structure
Attribute Relationships
Translations
Browser
Hierarchy:
Hierarchy
Language:
Default
Current level:
(All)
All
1990
First
February
1
Friday
Saturday
Thursday
2
Friday
Monday
Saturday
Sunday
Thursday
Tuesday
Wednesday
3
4
5
January
March
Fourth
Second
Third
Search Solution Explorer (Ctrl+;)
Solution 'Assignment2 SSAS' (1 project)
Assignment2 SSAS
Data Sources
Assignment1 Retail DW.ds
Data Source Views
Assignment1 Retail DW.dsv
Cubes
Assignment1 Retail DW.cube
Dimensions
Dim Campaign.dim
Dim Date.dim
Dim Customer Demographics.dim
Dim Coupan Item.dim
Dim Item Data.dim
Fact Customer Train Transaction.d
Mining Structures
Roles
Role.role
Assemblies
Miscellaneous
Solution Explorer
Class View
Properties

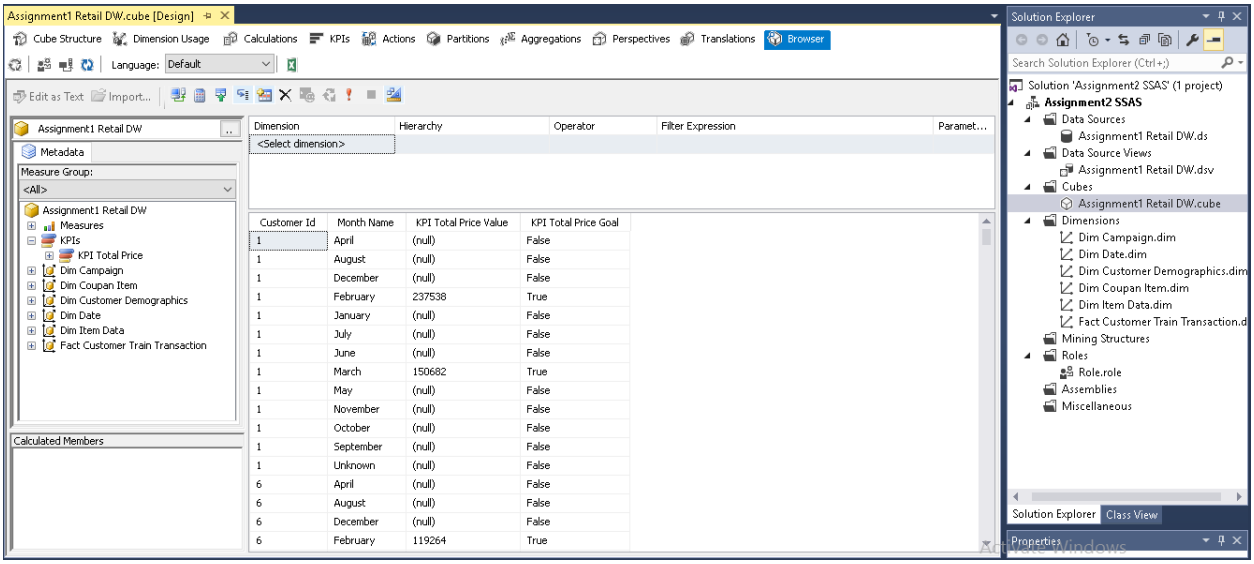
Personal detail wise



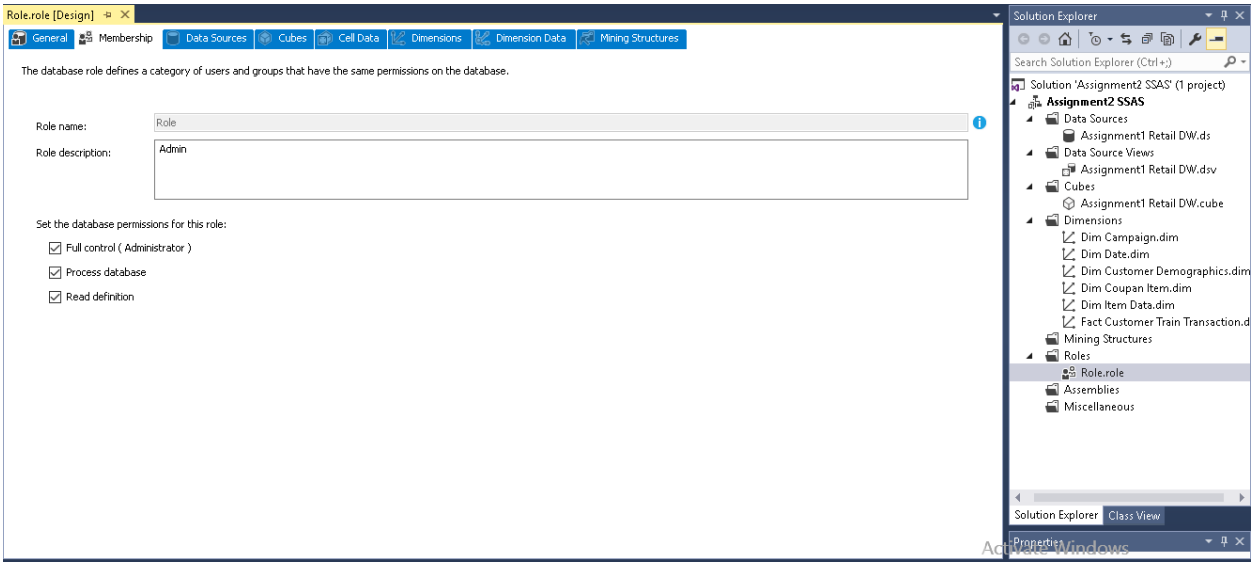
After these configurations, in first time I am going to deploy my Cube. After the deploying deployment result showed like this.



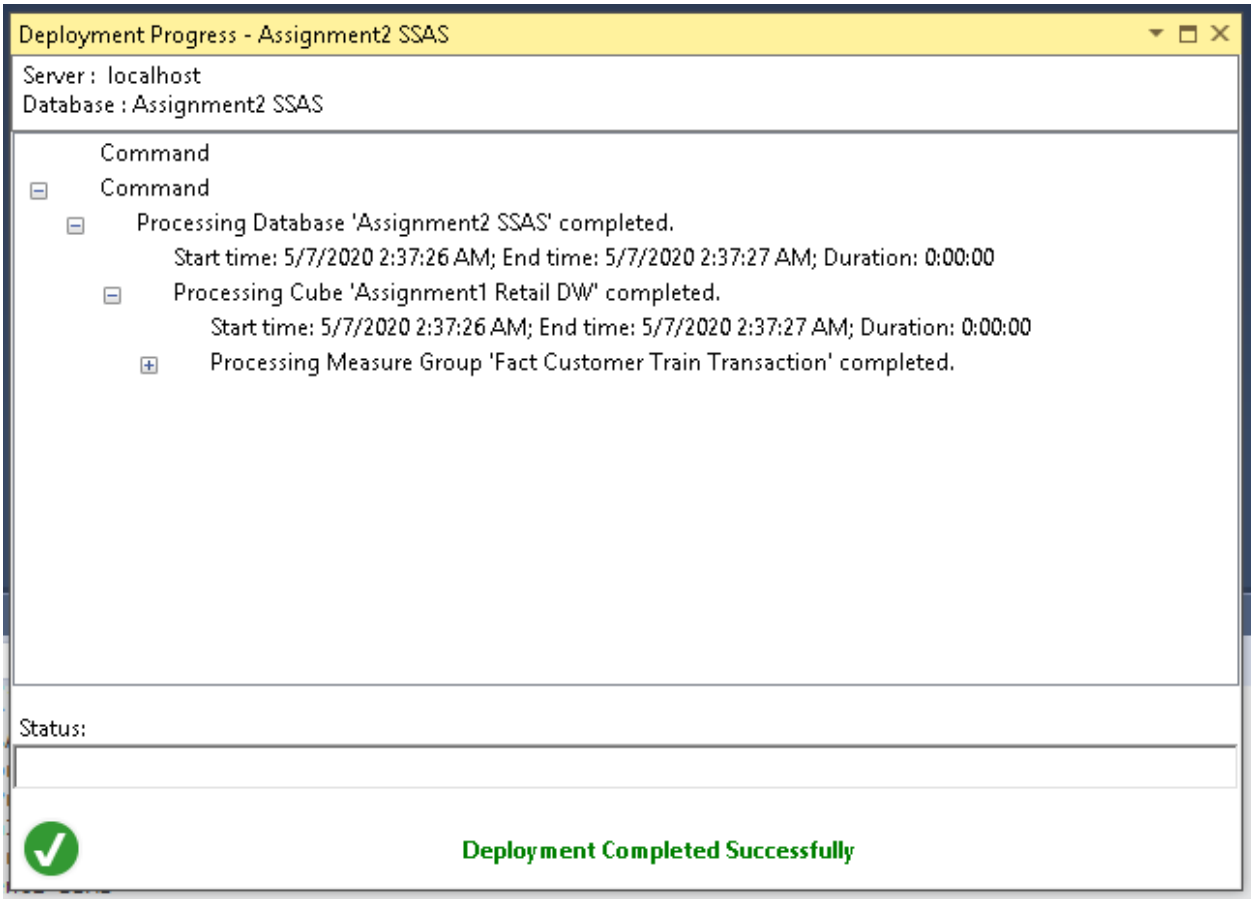
After deploying the cube, now you can customize your hierarchies with your measures.



Then finally, I have created role, which give user or user group to access to my database.



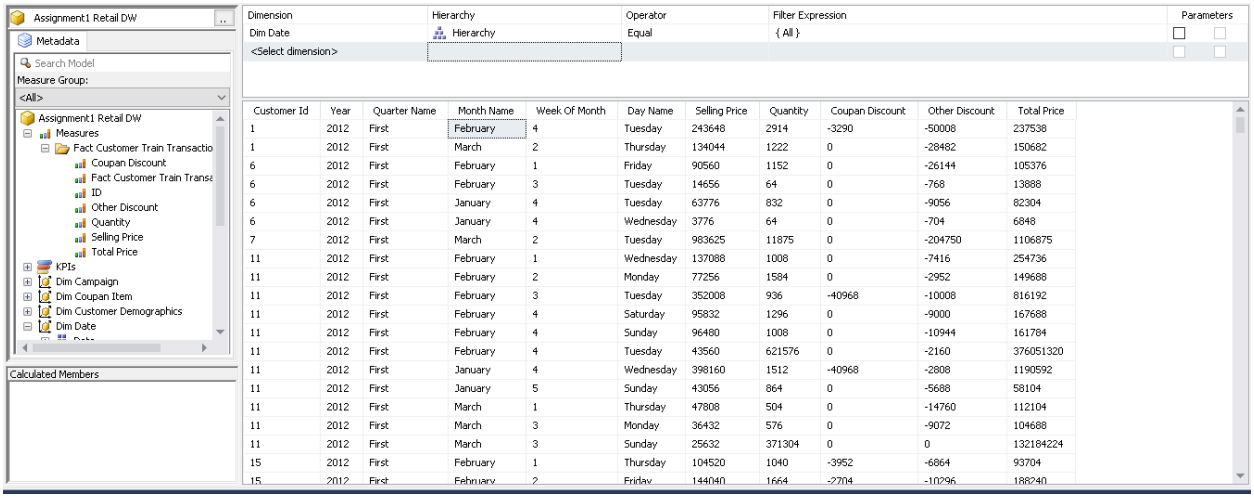
Then I have deploy again to apply my new creation which is role section.



Step 3: OLAP Operations using PowerPivot

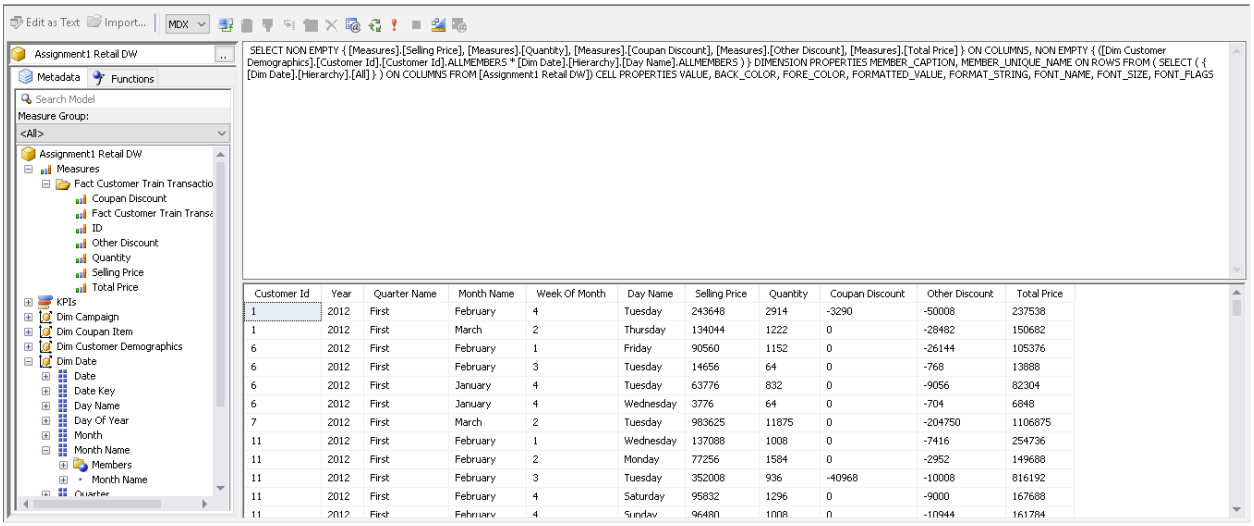
After the deployment, my deployed database send to SQL Server Management Studio. In there, again I have right clicked my cube and gone to brows section. In here, I have added again my hierarchies with measures.

Date hierarchy with measures



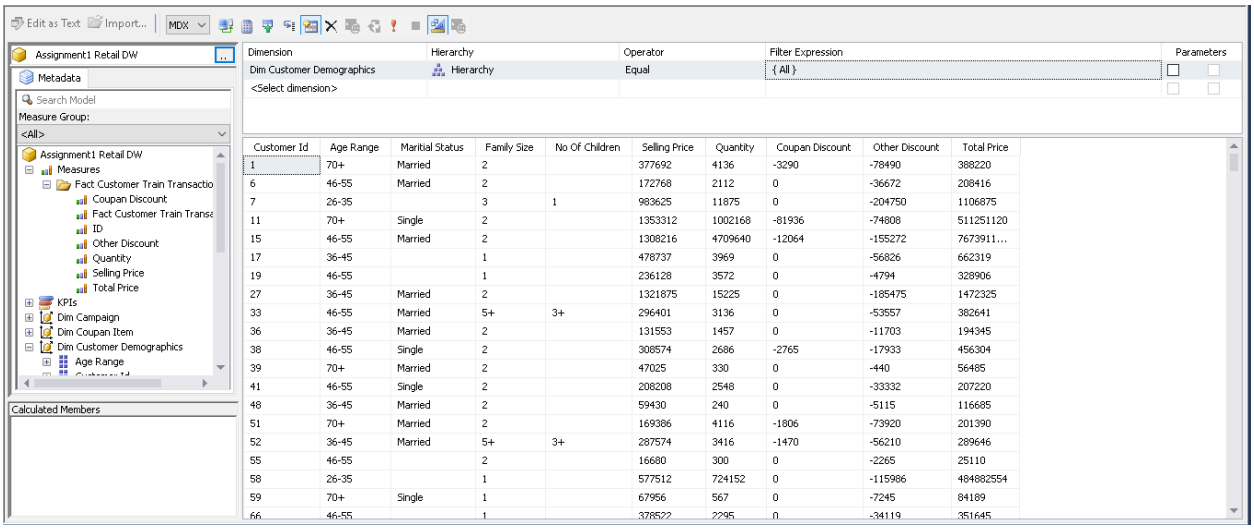
Customer Id	Year	Quarter Name	Month Name	Week Of Month	Day Name	Selling Price	Quantity	Coupan Discount	Other Discount	Total Price
1	2012	First	February	4	Tuesday	243648	2914	-3290	-50008	237538
1	2012	First	March	2	Thursday	134044	1222	0	-28482	150682
6	2012	First	February	1	Friday	90560	1152	0	-26144	105376
6	2012	First	February	3	Tuesday	14656	64	0	-768	13888
6	2012	First	January	4	Tuesday	63776	832	0	-9056	82304
6	2012	First	January	4	Wednesday	3776	64	0	-704	6848
7	2012	First	March	2	Tuesday	983625	11875	0	-204750	1106875
11	2012	First	February	1	Wednesday	137088	1008	0	-7416	254736
11	2012	First	February	2	Monday	77256	1584	0	-2952	149688
11	2012	First	February	3	Tuesday	352008	936	-40968	-10008	816192
11	2012	First	February	4	Saturday	95832	1296	0	-9000	167688
11	2012	First	February	4	Sunday	96480	1008	0	-10944	161784
11	2012	First	February	4	Tuesday	43560	621576	0	-2160	376051320
11	2012	First	January	4	Wednesday	398160	1512	-40968	-2808	1190592
11	2012	First	January	5	Sunday	43056	864	0	-5688	58104
11	2012	First	March	1	Thursday	47808	504	0	-14760	112104
11	2012	First	March	3	Monday	36432	576	0	-9072	104688
11	2012	First	March	3	Sunday	25632	371304	0	0	132184224
15	2012	First	February	1	Thursday	104520	1040	-3952	-6864	93704
15	2012	First	February	2	Friday	144040	1664	-2704	-10296	188240

Then I have execute this table for turn into SQL script. After converting, it looks like this.

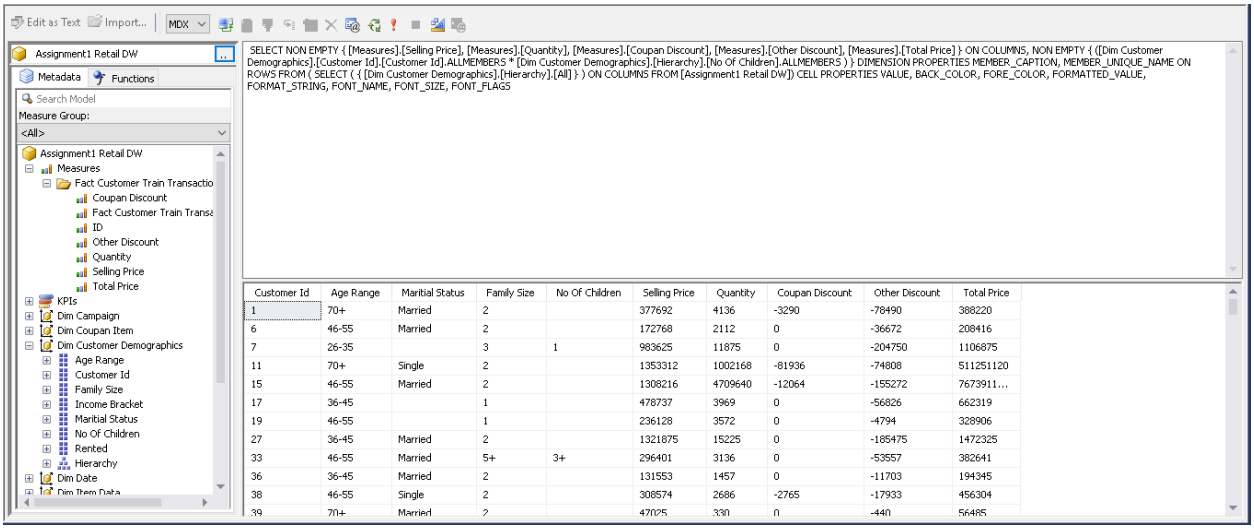


Customer Id	Year	Quarter Name	Month Name	Week Of Month	Day Name	Selling Price	Quantity	Coupan Discount	Other Discount	Total Price
1	2012	First	February	4	Tuesday	243648	2914	-3290	-50008	237538
1	2012	First	March	2	Thursday	134044	1222	0	-28482	150682
6	2012	First	February	1	Friday	90560	1152	0	-26144	105376
6	2012	First	February	3	Tuesday	14656	64	0	-768	13888
6	2012	First	January	4	Tuesday	63776	832	0	-9056	82304
6	2012	First	January	4	Wednesday	3776	64	0	-704	6848
7	2012	First	March	2	Tuesday	983625	11875	0	-204750	1106875
11	2012	First	February	1	Wednesday	137088	1008	0	-7416	254736
11	2012	First	February	2	Monday	77256	1584	0	-2952	149688
11	2012	First	February	3	Tuesday	352008	936	-40968	-10008	816192
11	2012	First	February	4	Saturday	95832	1296	0	-9000	167688
11	2012	First	February	4	Sunday	96480	1008	0	-10944	161784

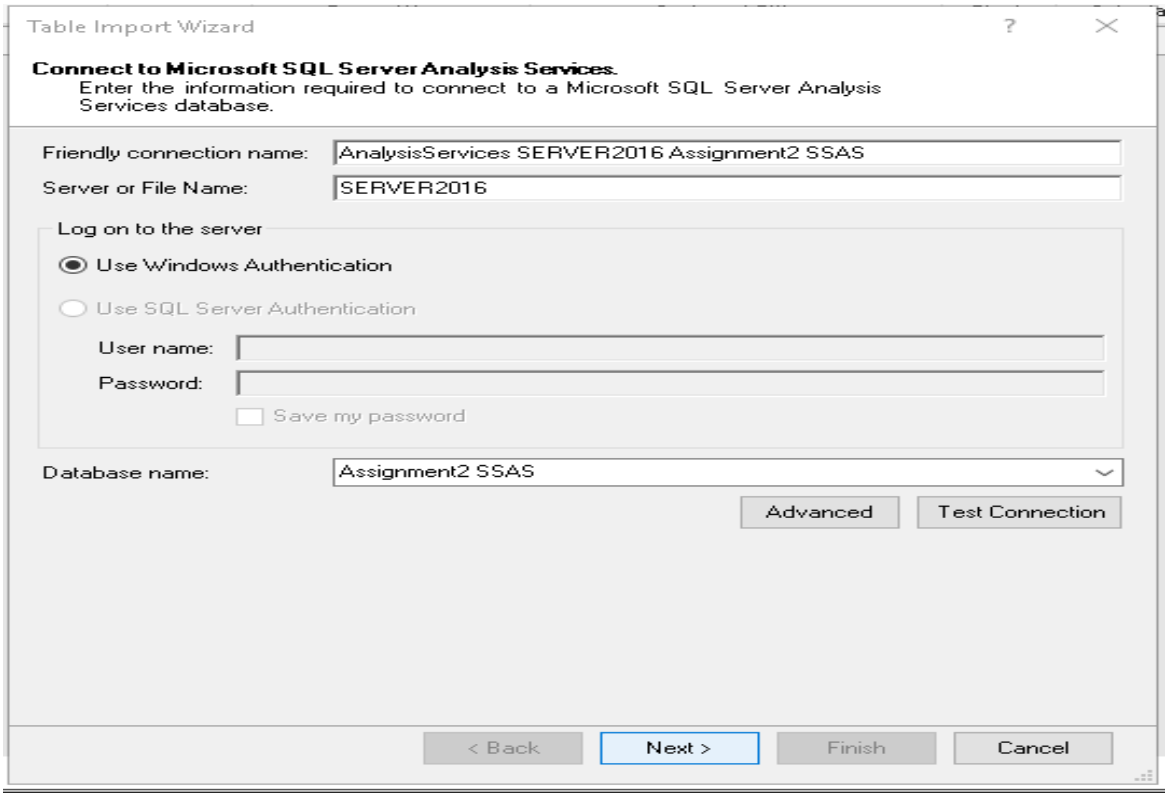
Age range hierarchy with measures



SQL script

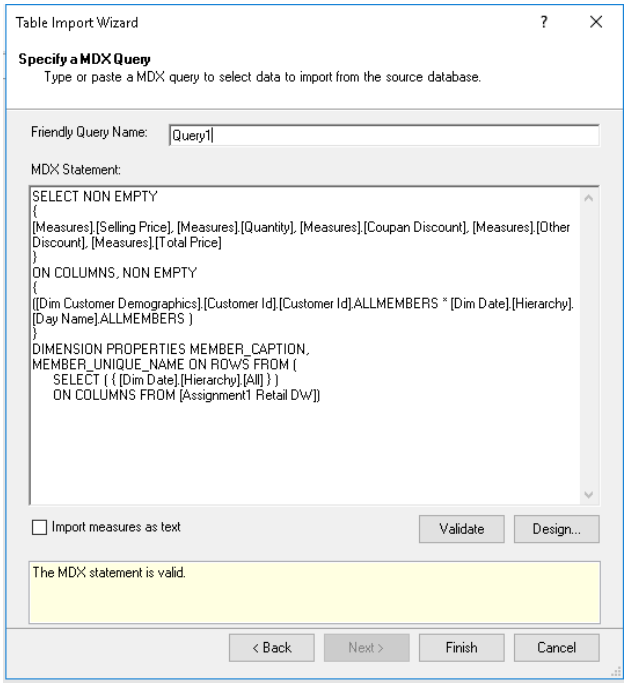


After those steps, now I can stablish connection with cube using PowerPivot option in Excel.

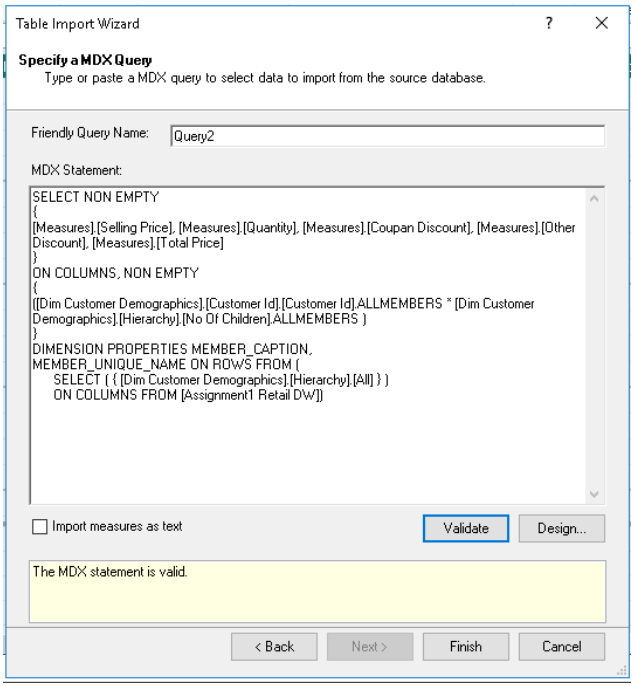


Then I have created two queries by including SQL scripts, which I have implemented in management studio.

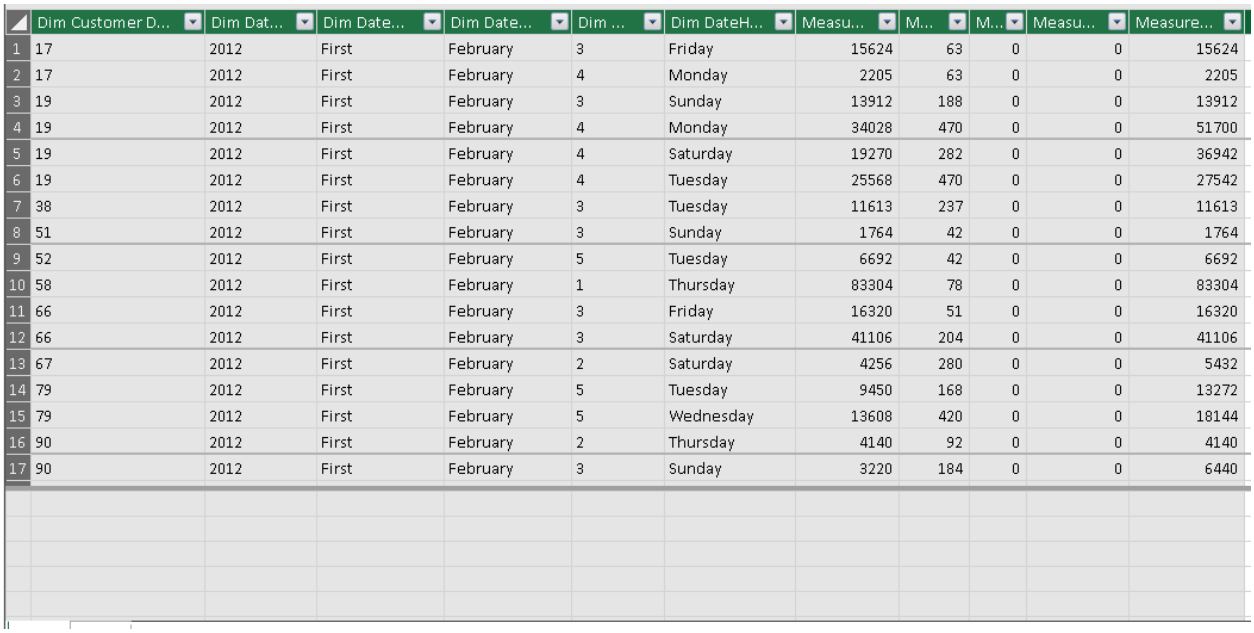
Query 1



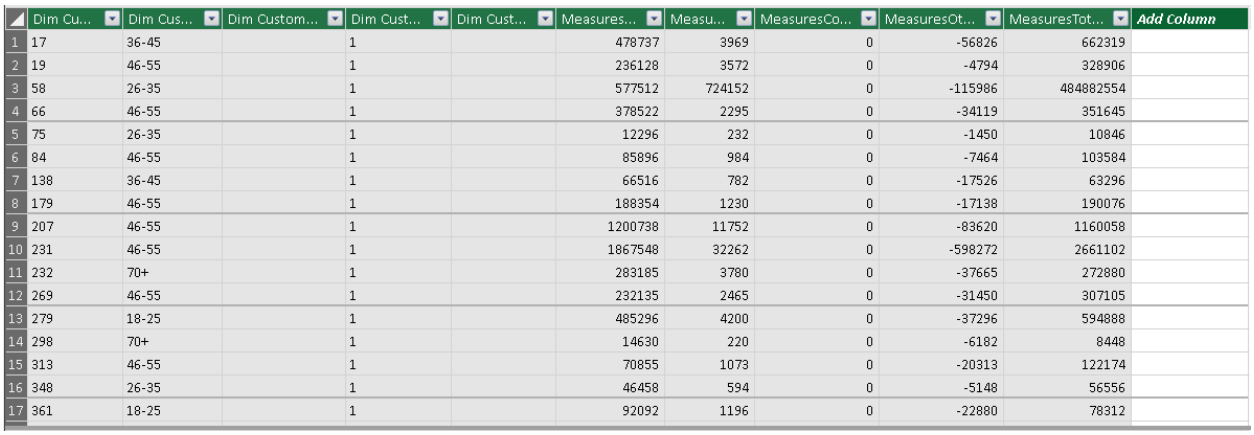
Query 2



After running that two queries, I have got those two tables in excel which is same as management studio tables.



	Dim Customer D...	Dim Dat...	Dim Date...	Dim Date...	Dim ...	Dim DateH...	Measu...	M...	M...	Measu...	Measure...
1	17	2012	First	February	3	Friday	15624	63	0	0	15624
2	17	2012	First	February	4	Monday	2205	63	0	0	2205
3	19	2012	First	February	3	Sunday	13912	188	0	0	13912
4	19	2012	First	February	4	Monday	34028	470	0	0	51700
5	19	2012	First	February	4	Saturday	19270	282	0	0	36942
6	19	2012	First	February	4	Tuesday	25568	470	0	0	27542
7	38	2012	First	February	3	Tuesday	11613	237	0	0	11613
8	51	2012	First	February	3	Sunday	1764	42	0	0	1764
9	52	2012	First	February	5	Tuesday	6692	42	0	0	6692
10	58	2012	First	February	1	Thursday	83304	78	0	0	83304
11	66	2012	First	February	3	Friday	16320	51	0	0	16320
12	66	2012	First	February	3	Saturday	41106	204	0	0	41106
13	67	2012	First	February	2	Saturday	4256	280	0	0	5432
14	79	2012	First	February	5	Tuesday	9450	168	0	0	13272
15	79	2012	First	February	5	Wednesday	13608	420	0	0	18144
16	90	2012	First	February	2	Thursday	4140	92	0	0	4140
17	90	2012	First	February	3	Sunday	3220	184	0	0	6440



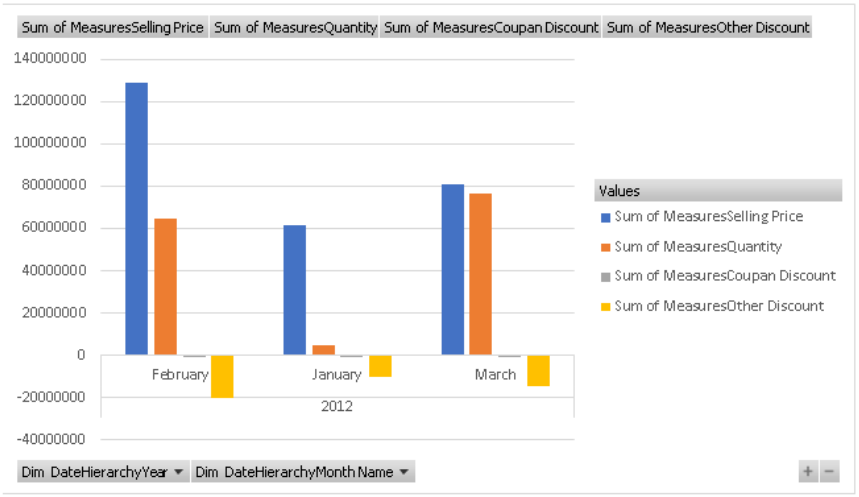
	Dim Cu...	Dim Cus...	Dim Custom...	Dim Cust...	Dim Cust...	Measures...	Measu...	MeasuresCo...	MeasuresOt...	MeasuresTot...	Add Column
1	17	36-45	1		478737	3969	0	-56826	662319		
2	19	46-55	1		236128	3572	0	-4794	328906		
3	58	26-35	1		577512	724152	0	-115986	484882554		
4	66	46-55	1		378522	2295	0	-34119	351645		
5	75	26-35	1		12296	232	0	-1450	10846		
6	84	46-55	1		85896	984	0	-7464	103584		
7	138	36-45	1		66516	782	0	-17526	63296		
8	179	46-55	1		188354	1230	0	-17138	190076		
9	207	46-55	1		1200738	11752	0	-83620	1160058		
10	231	46-55	1		1867548	32262	0	-598272	2661102		
11	232	70+	1		283185	3780	0	-37665	272880		
12	269	46-55	1		232135	2465	0	-31450	307105		
13	279	18-25	1		485296	4200	0	-37296	594888		
14	298	70+	1		14630	220	0	-6182	8448		
15	313	46-55	1		70855	1073	0	-20313	122174		
16	348	26-35	1		46458	594	0	-5148	56556		
17	361	18-25	1		92092	1196	0	-22880	78312		

OLAP Operations

Drill Down

For the hierarchy, I have selected (Year -> Month -> week of the month -> day). I have drilled down this hierarchy and added selling price, quantity, coupon discount and other discount as measures.

Row Labels	Sum of MeasuresSelling Price	Sum of MeasuresQuantity	Sum of MeasuresCoupan Discount	Sum of MeasuresOther Discount
⊟2012				
⊞**February**	**128968933**	**64936310**	**-554750**	**-20136589**
⊟**January**				
⊟1				
Friday	727489	8682	0	-121356
Monday	1513056	22699	-55575	-386872
Saturday	1066336	11779	-632	-277222
Thursday	1450838	19886	0	-186767
Tuesday	698613	8187	-2850	-86493
Wednesday	743788	7493	0	-155092
⊞2	13147500	432884	-14966	-2390947
⊞3	15362743	1589773	-151173	-2476832
⊞4	18439703	1331780	-84602	-2903129
⊞5	8405355	1606404	-26698	-1311434
⊞**March**	**80763198**	**76412686**	**-350490**	**-14453759**
Grand Total	**271287552**	**146388563**	**-1241736**	**-44886492**



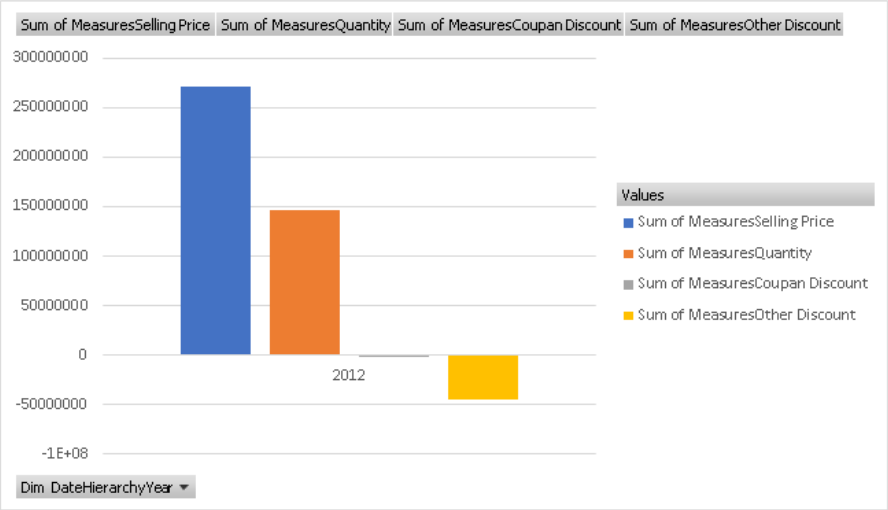
In the other hand, I have selected (Age range -> marital status -> family size) and I have drilled down this hierarchy and added selling price, quantity, coupon discount and other discount as measures.

Row Labels	Sum of MeasuresSelling Price	Sum of MeasuresQuantity	Sum of MeasuresCoupan Discount	Sum of MeasuresOther Discount
18-25				
1	1915086	25301	0	-313709
2	2870900	1975724	-4192	-367984
Married				
3	5633031	63813	0	-402702
Single				
1	2020355	1027159	0	-335208
2	2676876	1018428	-7881	-633141
5+	176958	1566	0	-35032
26-35	**53472106**	**32675187**	**-203518**	**-8782707**
36-45	**80161775**	**51482348**	**-263792**	**-12999197**
46-55	**89382233**	**48880337**	**-577907**	**-15215539**
56-70	**15861306**	**3811464**	**-78478**	**-3333587**
70+	**17116926**	**5427236**	**-105968**	**-2467686**
Grand Total	**271287552**	**146388563**	**-1241736**	**-44886492**

Roll up

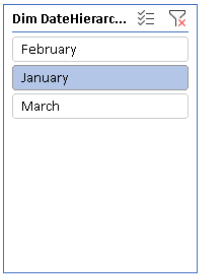
This OLAP operation is complete opposite of drill down operation. This use hierarchy with less drop downs. For the hierarchy, I have selected (Year -> Month). I have drilled down this hierarchy and added selling price, quantity, coupon discount and other discount as measures.

Row Labels	Sum of MeasuresSelling Price	Sum of MeasuresQuantity	Sum of MeasuresCoupan Discount	Sum of MeasuresOther Discount
⊟2012				
⊞February	128968933	64936310	-554750	-20136589
⊞January	61555421	5039567	-336496	-10296144
⊞March	80763198	76412686	-350490	-14453759
Grand Total	271287552	146388563	-1241736	-44886492

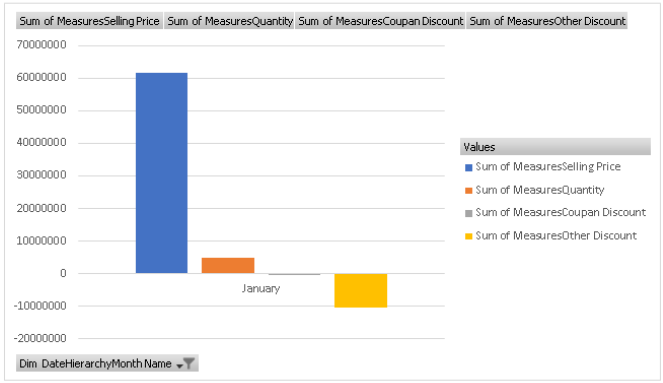


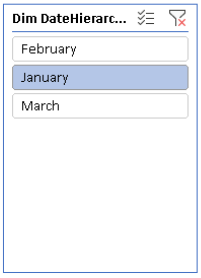
Slicing

For the slicing, first we need to create one slice for graph and one slice for table. By using slice, we select one dim with column to get report. It will give result only for our specified selection.

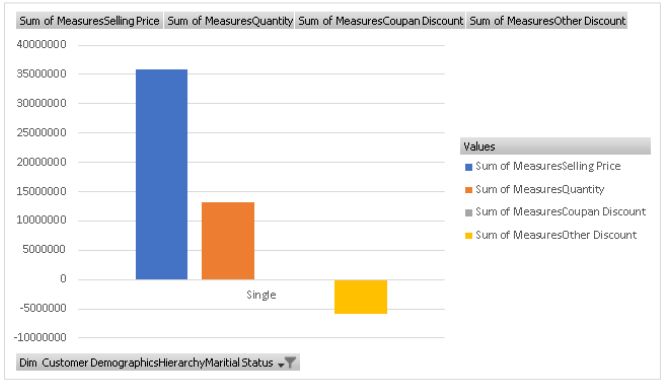


Row Labels	Sum of MeasuresSelling Price	Sum of MeasuresQuantity	Sum of MeasuresCoupan Discount	Sum of MeasuresOther Discount
January	61555421	5039567	-336496	-10296144
Grand Total	61555421	5039567	-336496	-10296144





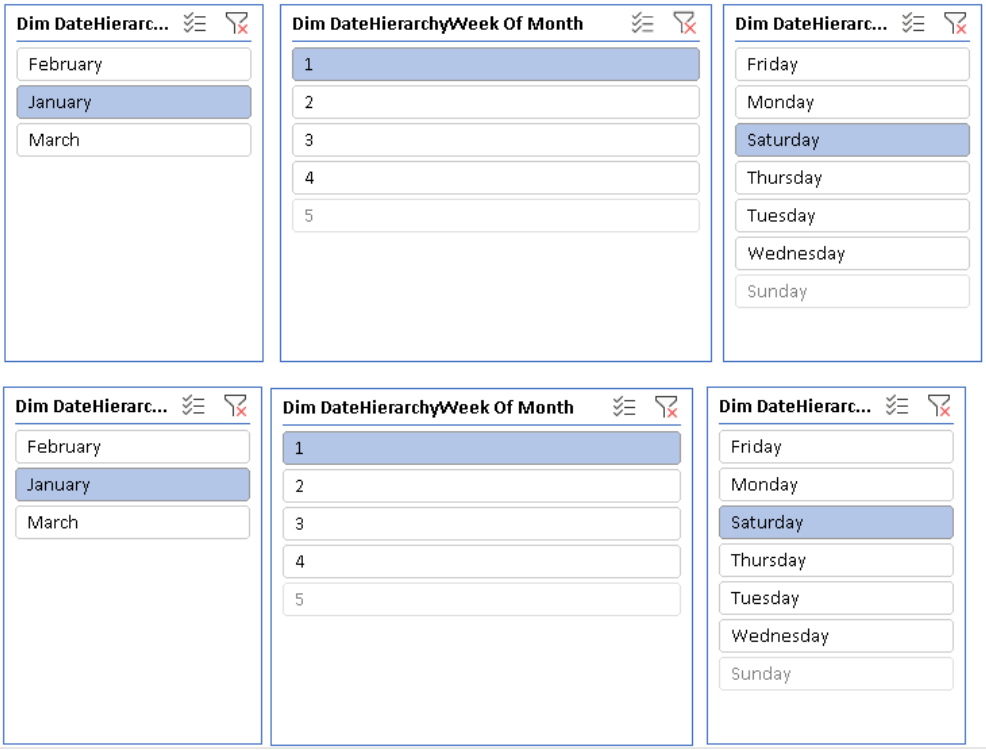
Row Labels	Sum of MeasuresSelling Price	Sum of MeasuresQuantity	Sum of MeasuresCoupan Discount	Sum of MeasuresOther Discount
Single	35882992	13176072	-208541	-5784378
Grand Total	**35882992**	**13176072**	**-208541**	**-5784378**

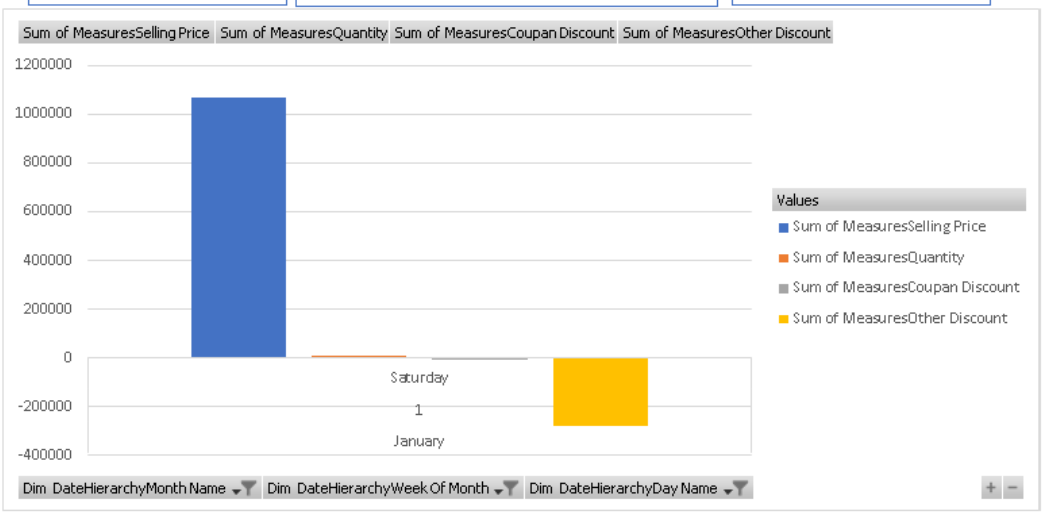


Dicing

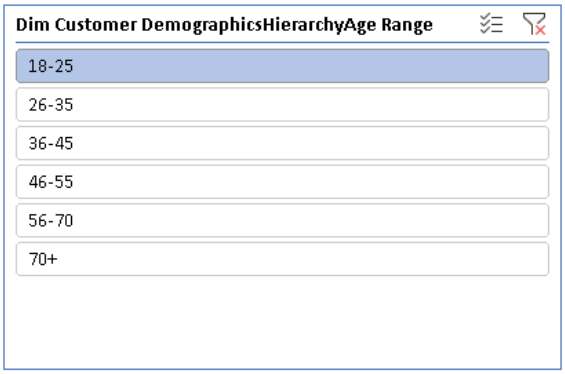
This is improvement of slicing. In here, we need to select more than one dimensions with columns. It will give exact specified value by searching deep.

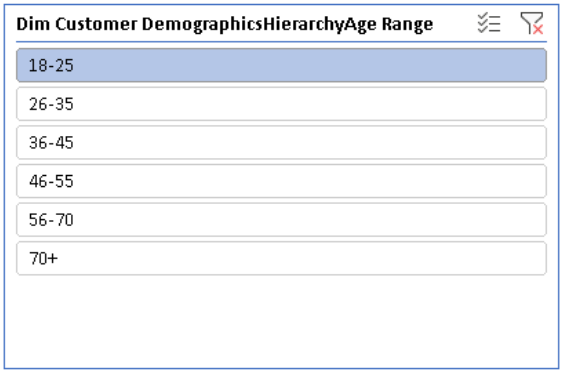
Row Labels	Sum of MeasuresSelling Price	Sum of MeasuresQuantity	Sum of MeasuresCoupan Discount	Sum of MeasuresOther Discount
January				
1				
Saturday	1066336	11779	-632	-277222
Grand Total	**1066336**	**11779**	**-632**	**-277222**

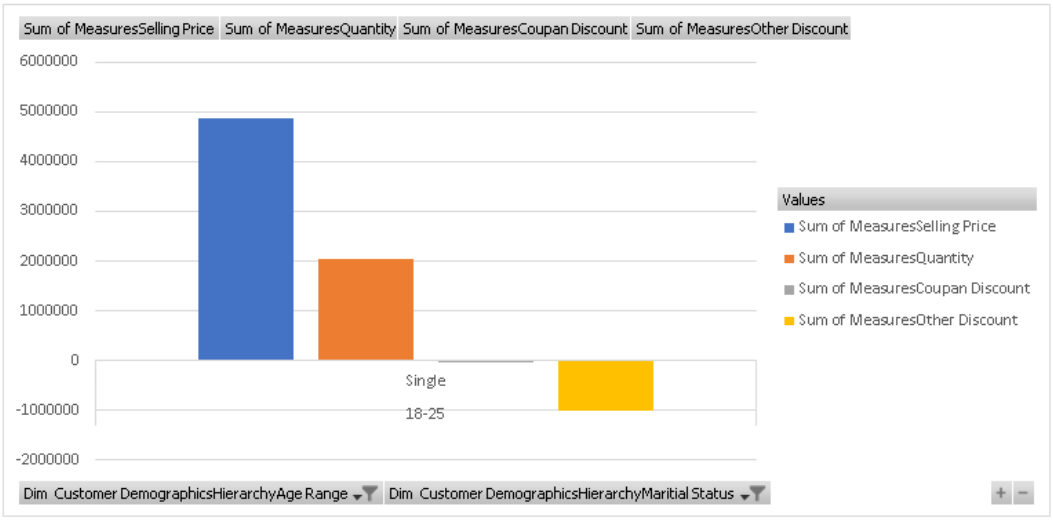




Row Labels	Sum of MeasuresSelling Price	Sum of MeasuresQuantity	Sum of MeasuresCoupan Discount	Sum of MeasuresOther Discount
18-25				
Single	4874189	2047153	-7881	-1003381
Grand Total	**4874189**	**2047153**	**-7881**	**-1003381**





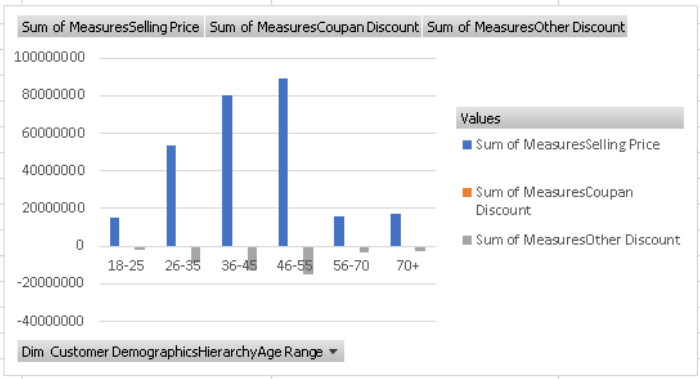


Pivot

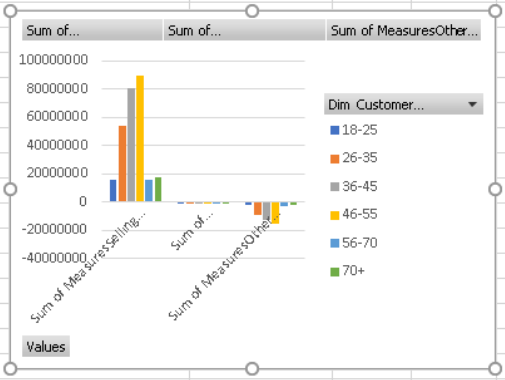
This is 2D representation of our table. You have define 2 sides only in here. And also, this can generate by slice operation. Then you can pivot this table.

Age range wise

Row Labels	Sum of MeasuresSelling Price	Sum of MeasuresCoupan Discount	Sum of MeasuresOther Discount
18-25	15293206	-12073	-2087776
26-35	53472106	-203518	-8782707
36-45	80161775	-263792	-12999197
46-55	89382233	-577907	-15215539
56-70	15861306	-78478	-3333587
70+	17116926	-105968	-2467686
Grand Total	**271287552**	**-1241736**	**-44886492**

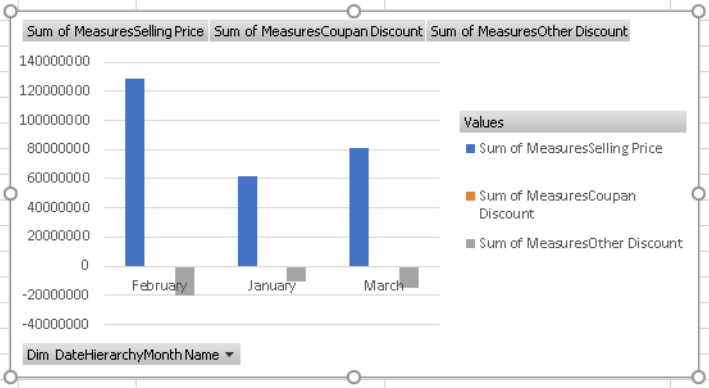


	Column Labels						
Values	**18-25**	**26-35**	**36-45**	**46-55**	**56-70**	**70+**	**Grand Total**
Sum of MeasuresSelling Price	15293206	53472106	80161775	89382233	15861306	17116926	271287552
Sum of MeasuresCoupan Discount	-12073	-203518	-263792	-577907	-78478	-105968	-1241736
Sum of MeasuresOther Discount	-2087776	-8782707	-12999197	-15215539	-3333587	-2467686	-44886492

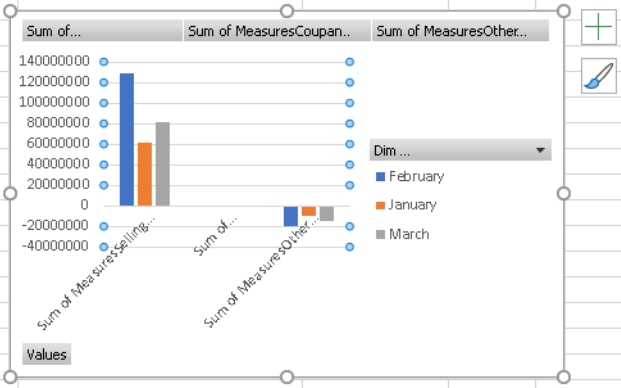


Date wise

Row Labels	Sum of MeasuresSelling Price	Sum of MeasuresCoupan Discount	Sum of MeasuresOther Discount
February	128968933	-554750	-20136589
January	61555421	-336496	-10296144
March	80763198	-350490	-14453759
Grand Total	**271287552**	**-1241736**	**-44886492**

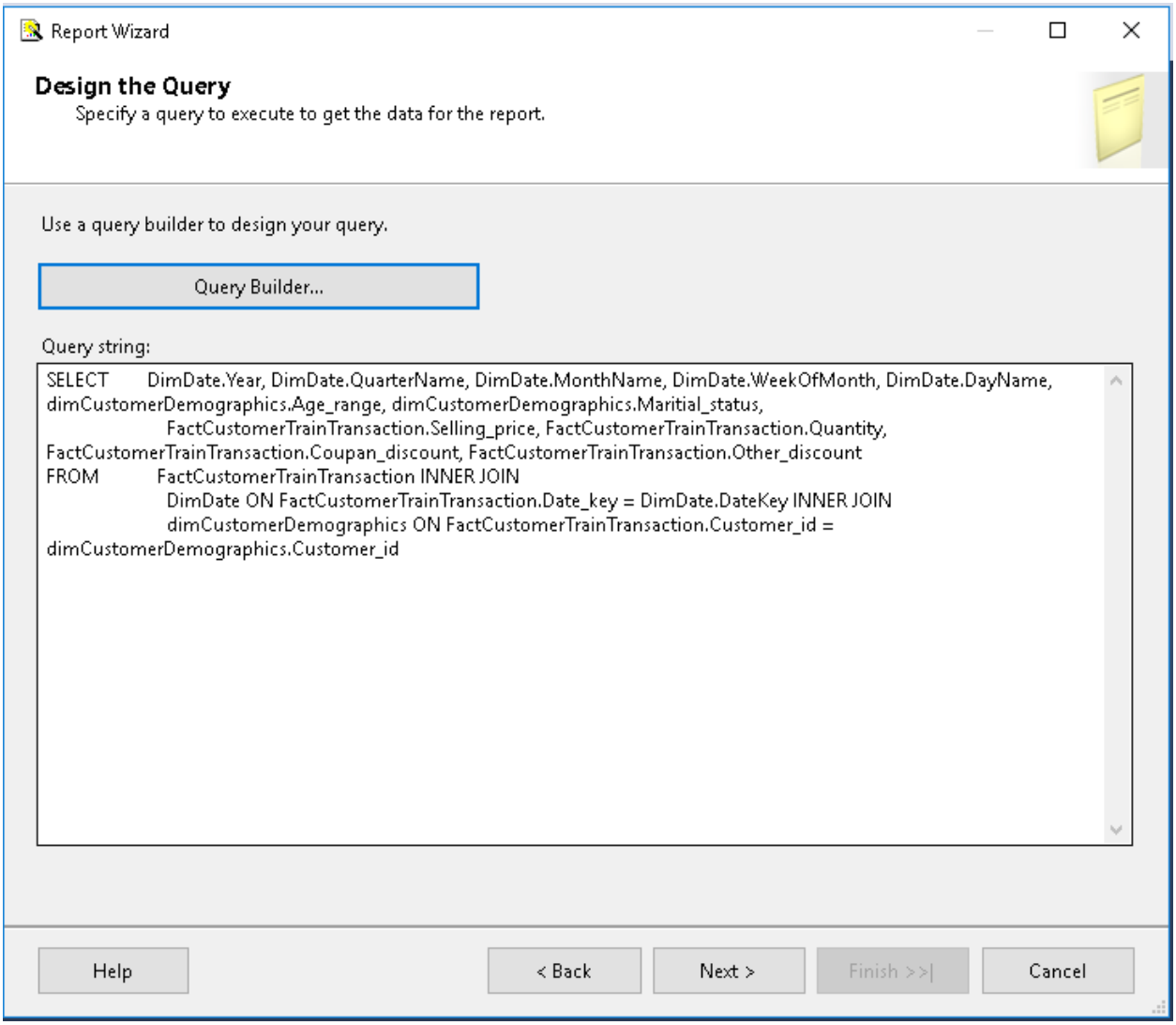


	Column Labels			
Values	**February**	**January**	**March**	**Grand Total**
Sum of MeasuresSelling Price	128968933	61555421	80763198	271287552
Sum of MeasuresCoupan Discount	-554750	-336496	-350490	-1241736
Sum of MeasuresOther Discount	-20136589	-10296144	-14453759	-44886492

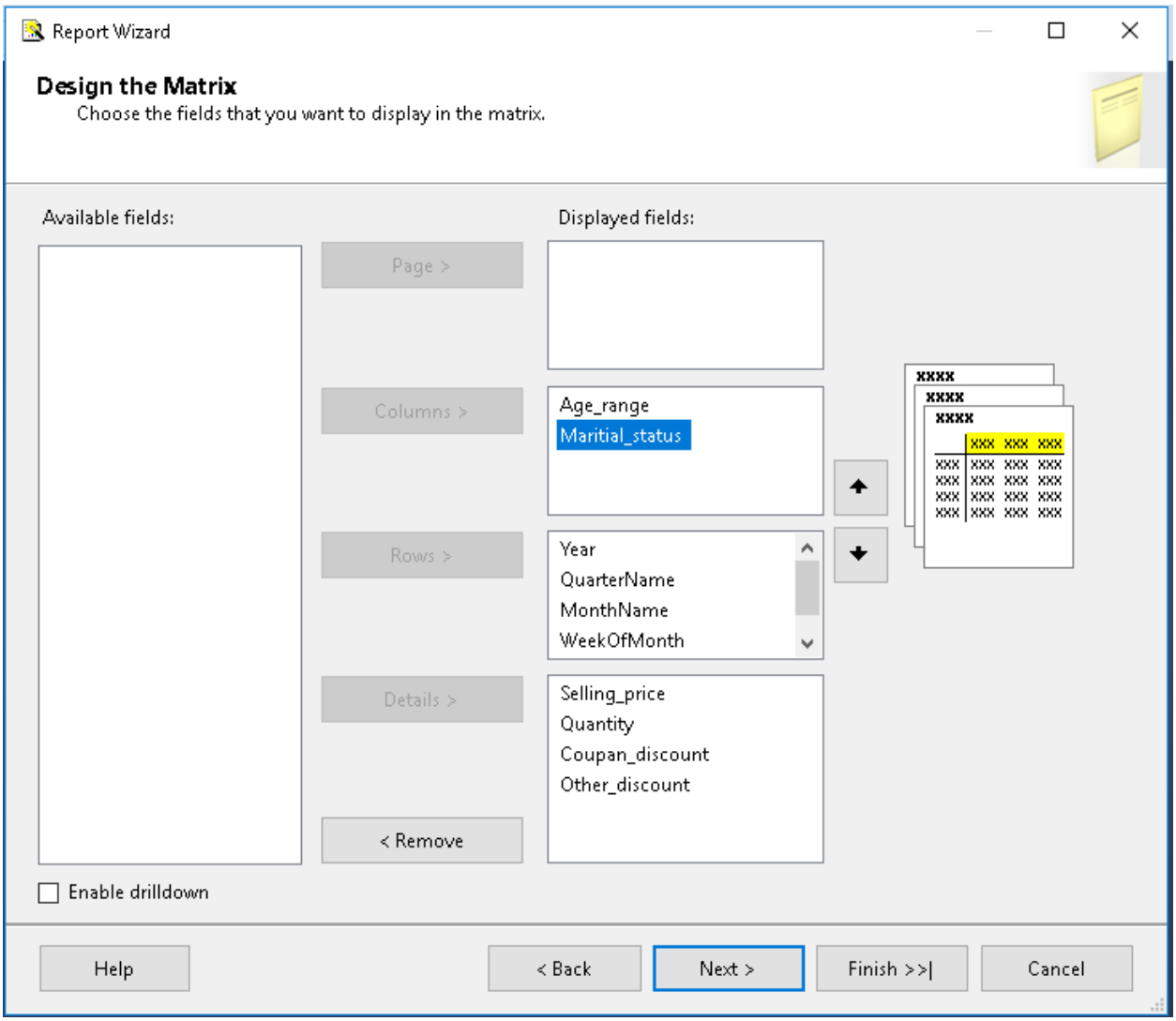


Step 4: SSRS Report

Before creating SSRS reports, we have to create report analysis project in visual studio and then we have to define our analysis database when creating report. Then we have to go to query builder and then create table in there by using hierarchy and measurements and build SQL script of it.



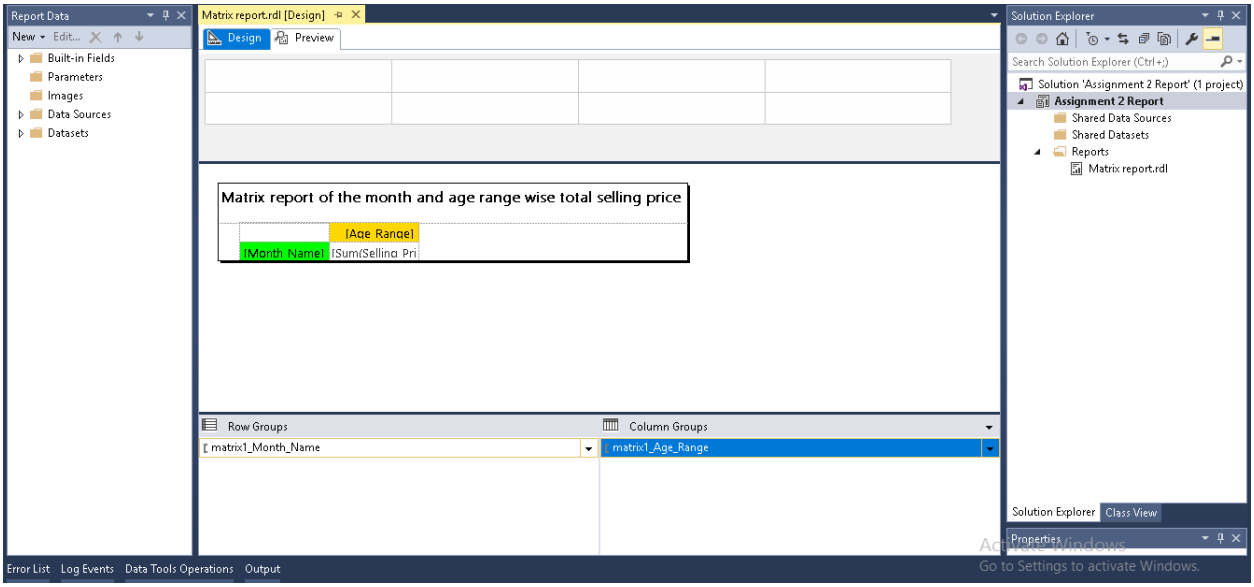
Then you have to build matrix by selecting matrix option. And you have to add column names into suitable fields.



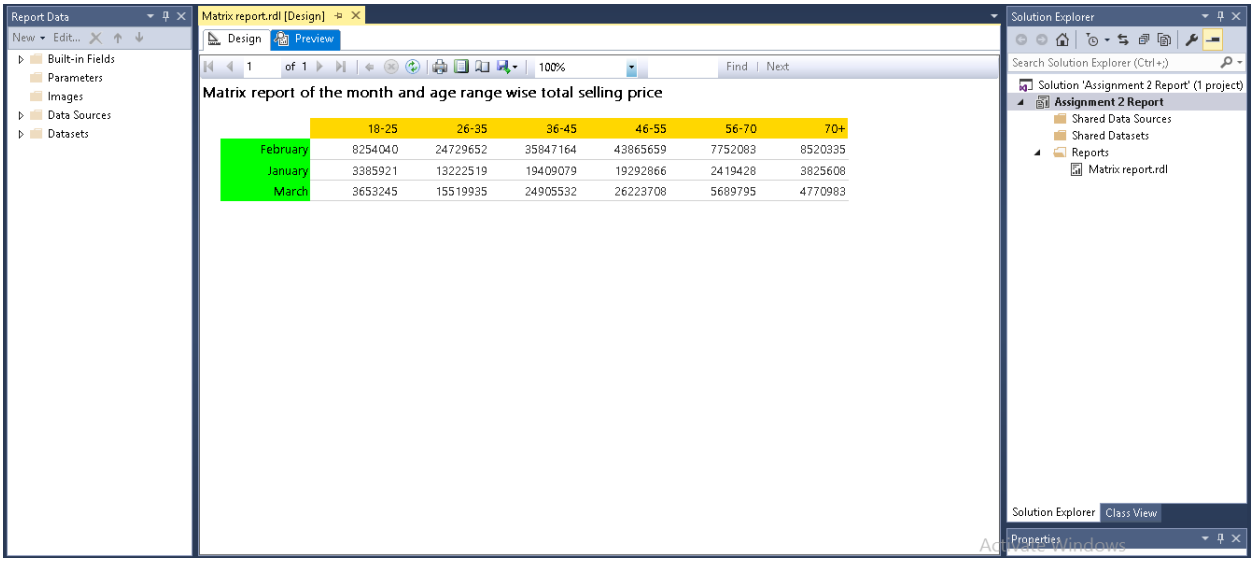
Finally, you can give report name for your report and finish it.

Report 1 -: Matrix report

Design of matrix reports

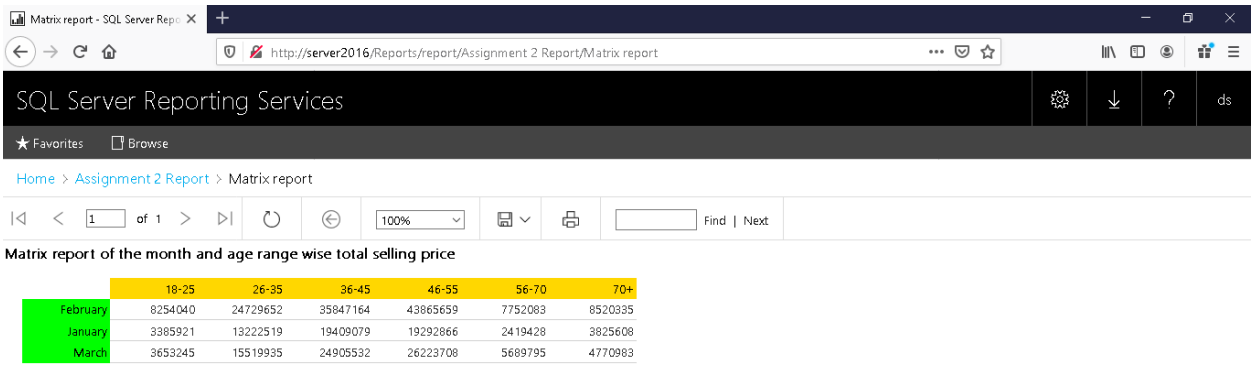


Preview of those matrix reports



	18-25	26-35	36-45	46-55	56-70	70+
February	8254040	24729652	35847164	43865659	7752083	8520335
January	3385921	13222519	19409079	19292866	2419428	3825608
March	3653245	15519935	24905532	26223708	5689795	4770983

Matrix reports on web portal



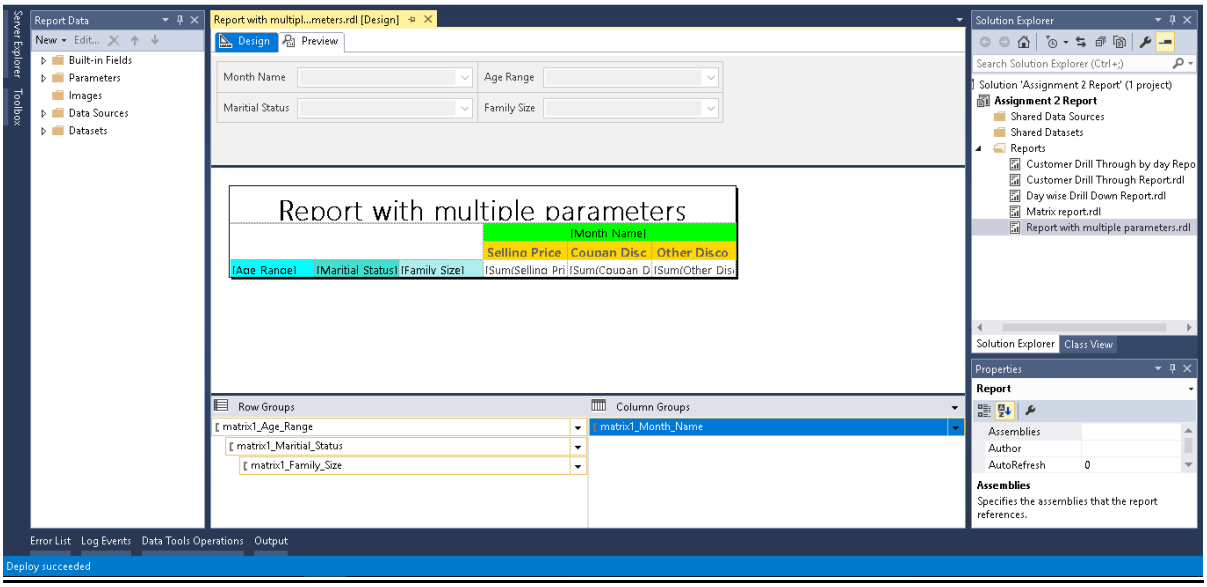
Matrix report of the month and age range wise total selling price

	18-25	26-35	36-45	46-55	56-70	70+
February	8254040	24729652	35847164	43865659	7752083	8520335
January	3385921	13222519	19409079	19292866	2419428	3825608
March	3653245	15519935	24905532	26223708	5689795	4770983

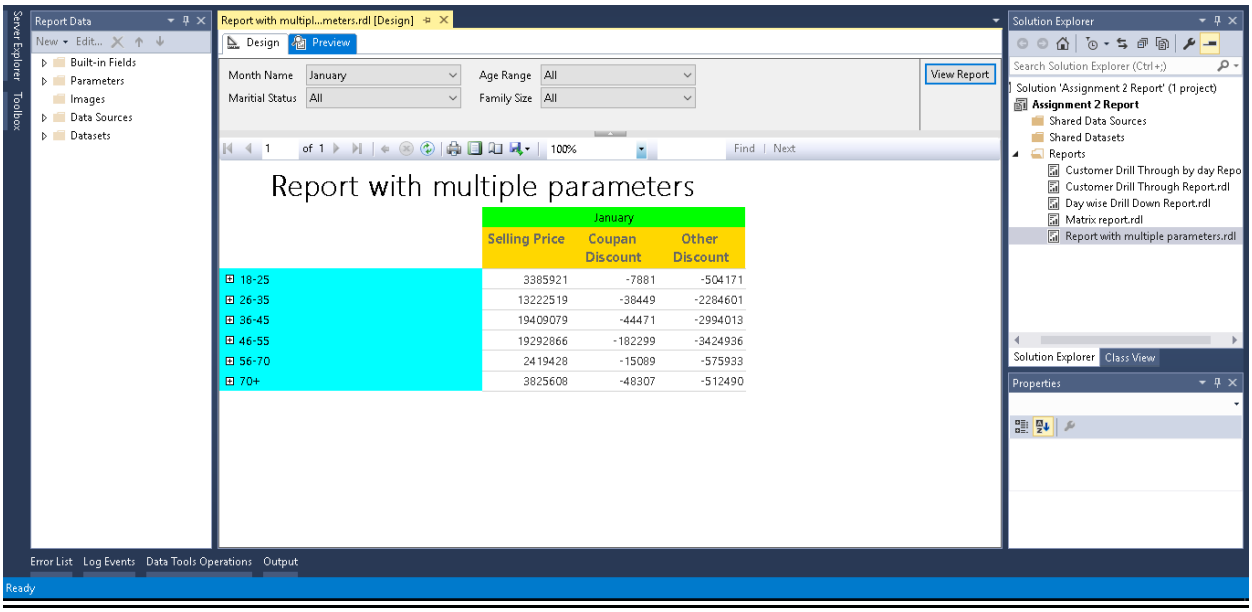
Report 2: Reports with Multiple Parameters

Before create report we have to define parameters. In upper line, you can see my parameters.

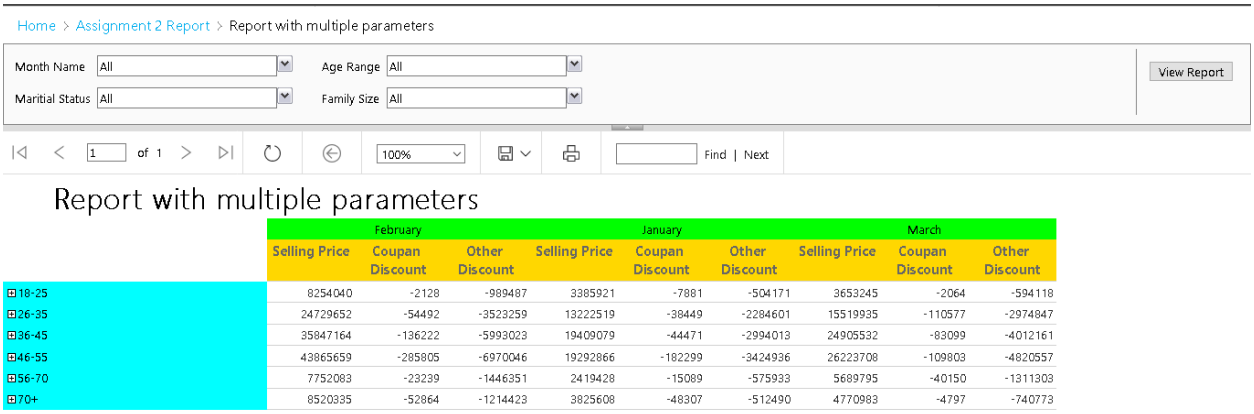
Design



Preview



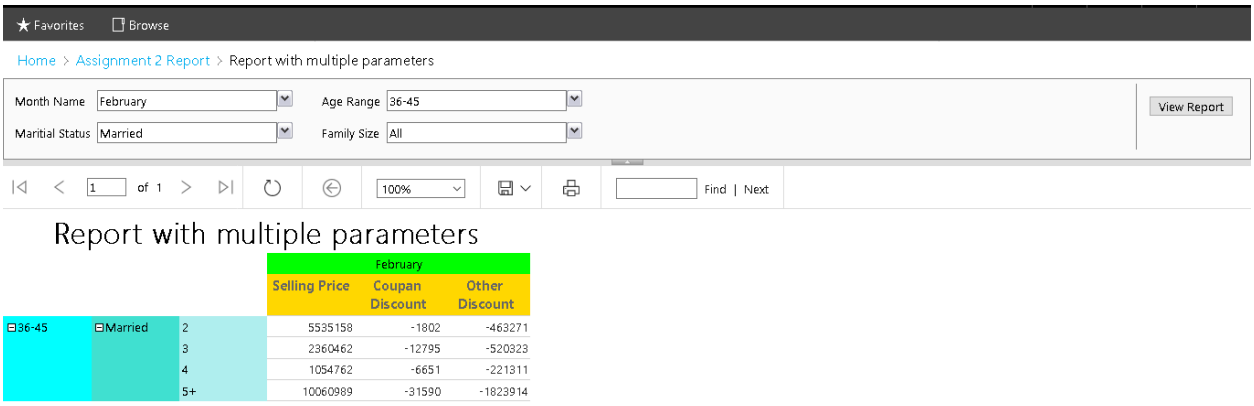
Web portal view



Report with multiple parameters

	February			January			March		
	Selling Price	Coupan Discount	Other Discount	Selling Price	Coupan Discount	Other Discount	Selling Price	Coupan Discount	Other Discount
⊞18-25	8254040	-2128	-989487	3385921	-7881	-504171	3653245	-2064	-594118
⊞26-35	24729652	-54492	-3523259	13222519	-38449	-2284601	15519935	-110577	-2974847
⊞36-45	35847164	-136222	-5993023	19409079	-44471	-2994013	24905532	-83099	-4012161
⊞46-55	43865659	-285805	-6970046	19292866	-182299	-3424936	26223708	-109803	-4820557
⊞56-70	7752083	-23239	-1446351	2419428	-15089	-575933	5689795	-40150	-1311303
⊞70+	8520335	-52864	-1214423	3825608	-48307	-512490	4770983	-4797	-740773

After applying some parameter values



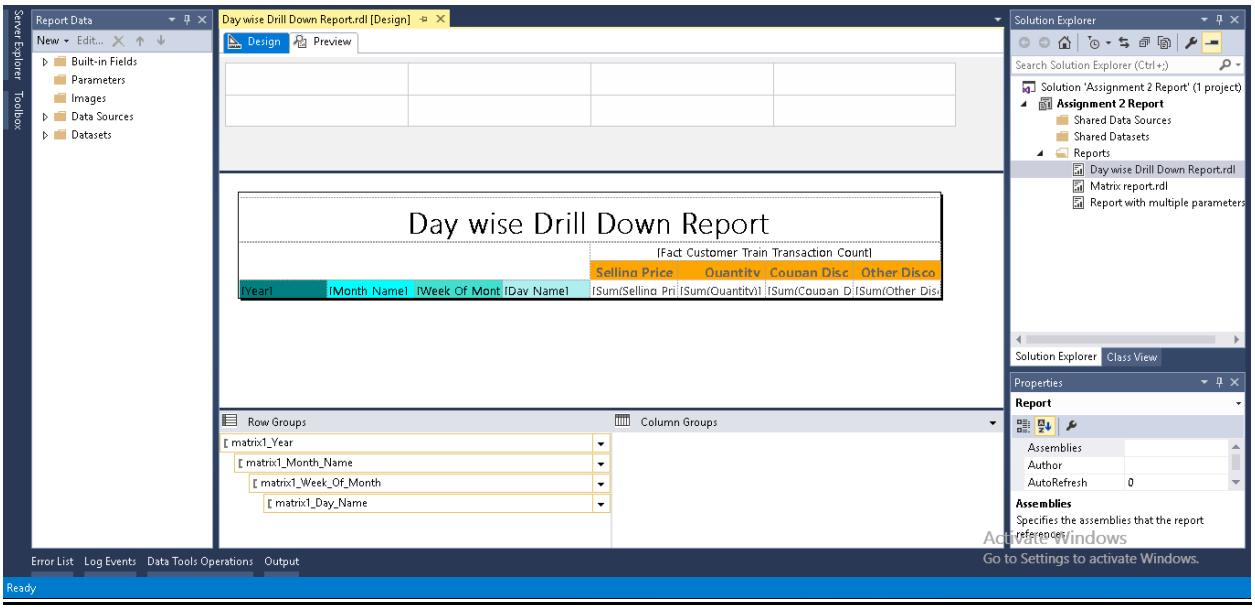
Report with multiple parameters

			February		
			Selling Price	Coupan Discount	Other Discount
⊟36-45	⊟Married	2	5535158	-1802	-463271
		3	2360462	-12795	-520323
		4	1054762	-6651	-221311
		5+	10060989	-31590	-1823914

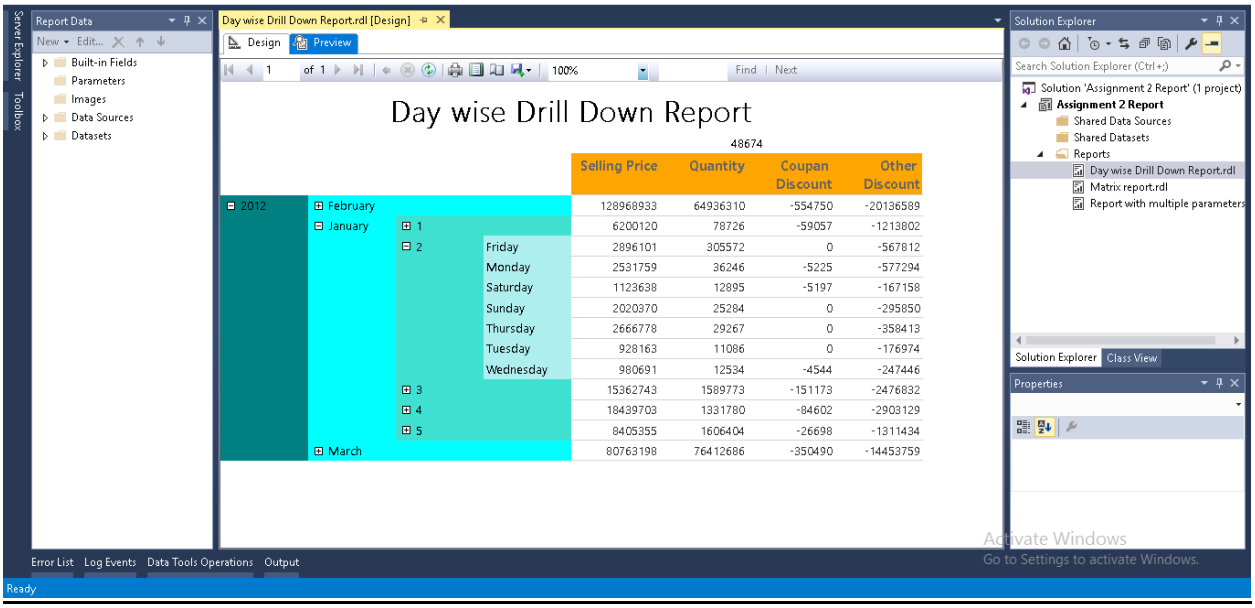
Report 3: Drill-Down Report

Using drill down hierarchies (month -> week of month -> day) we will create these reports.

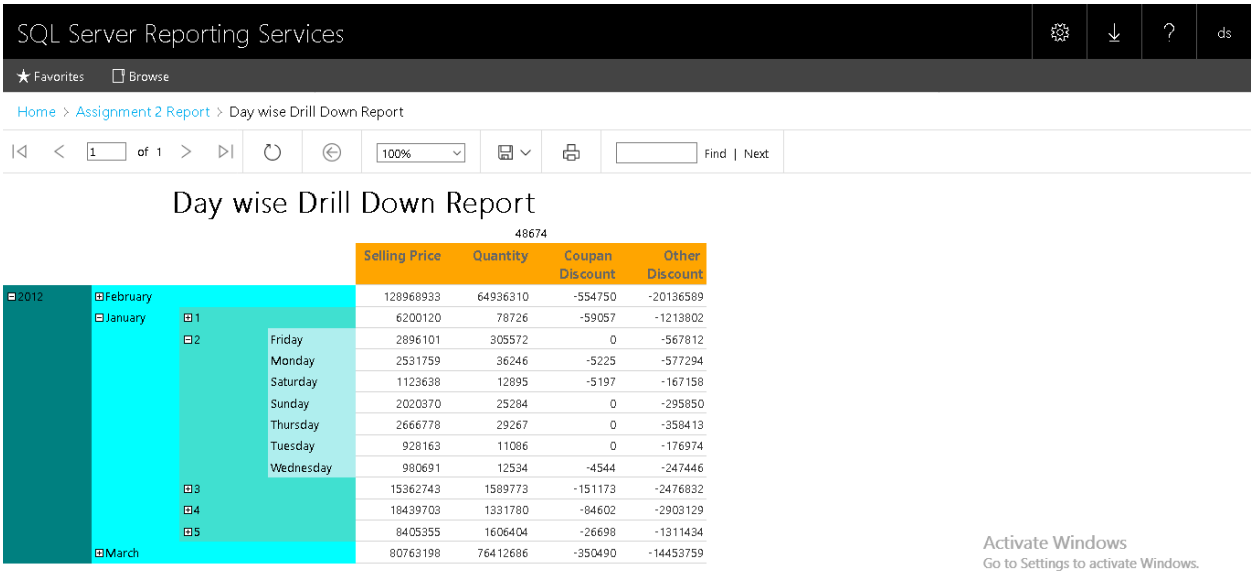
Design



Preview



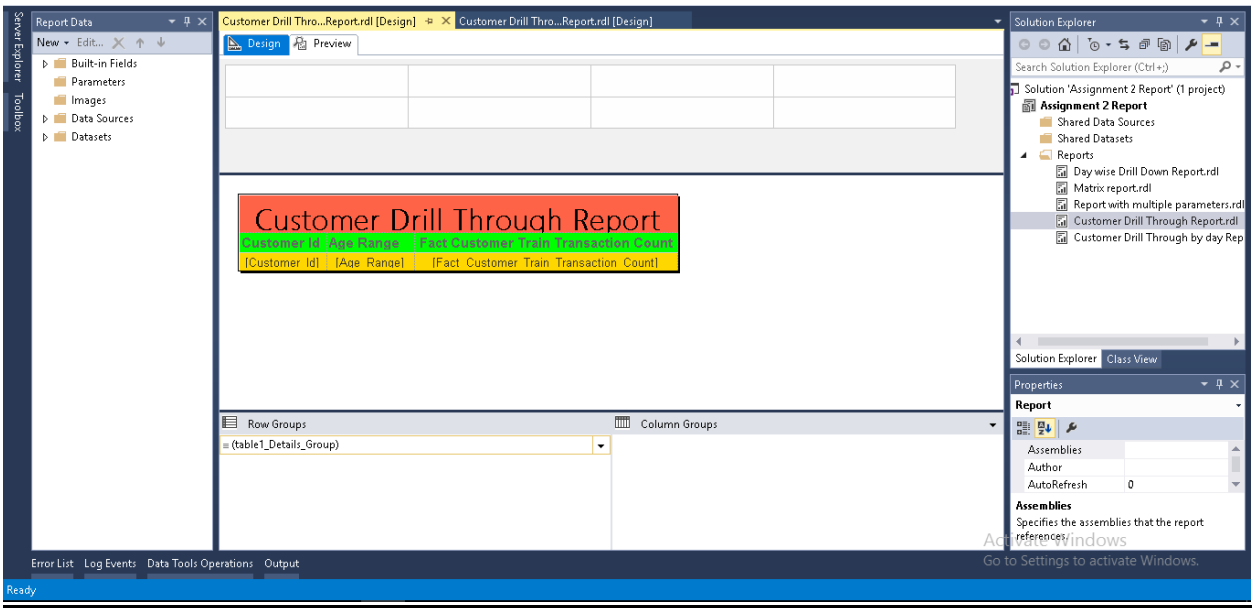
Web portal view



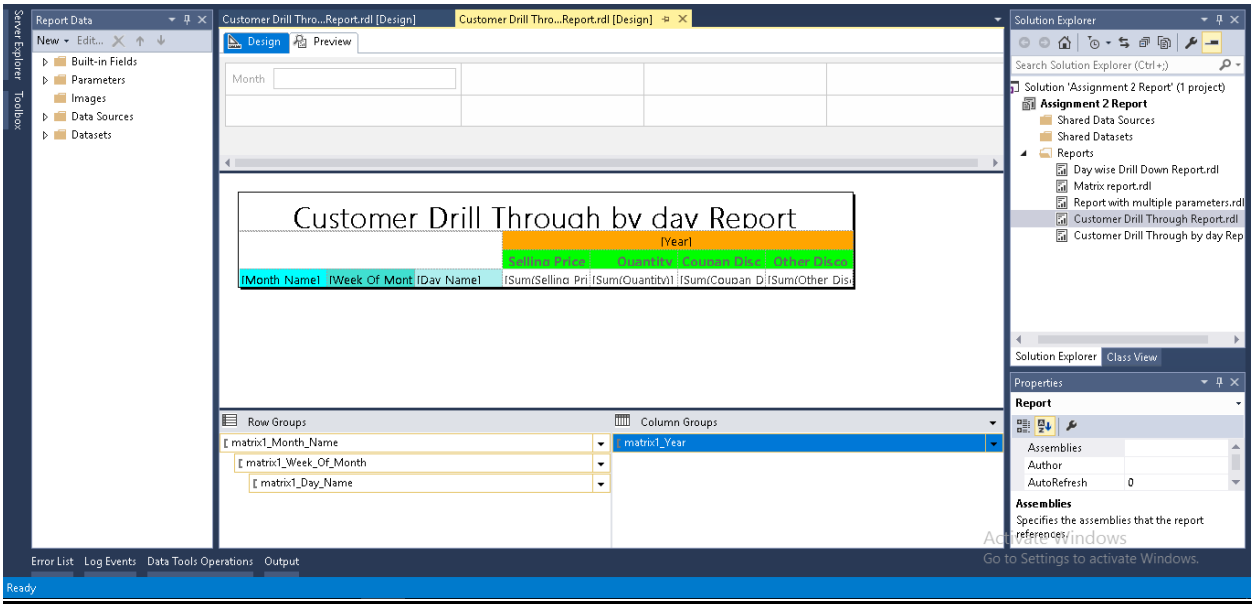
Report 4: Drill Through

In these types when we click one report it should take us into another report. There is parent report and child report.

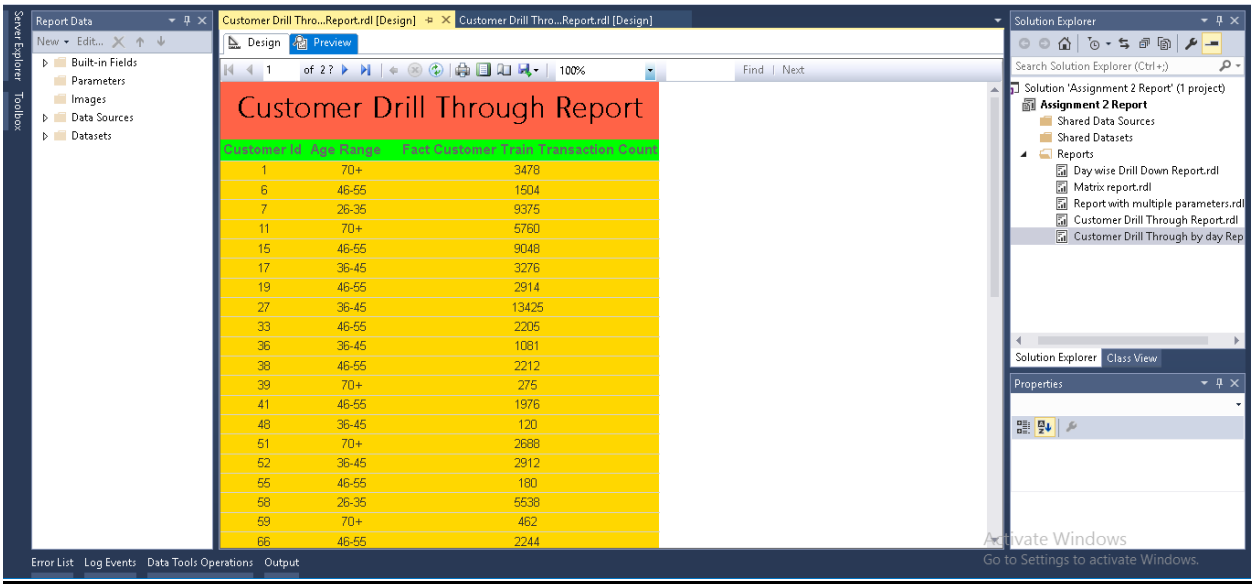
Design – Parent



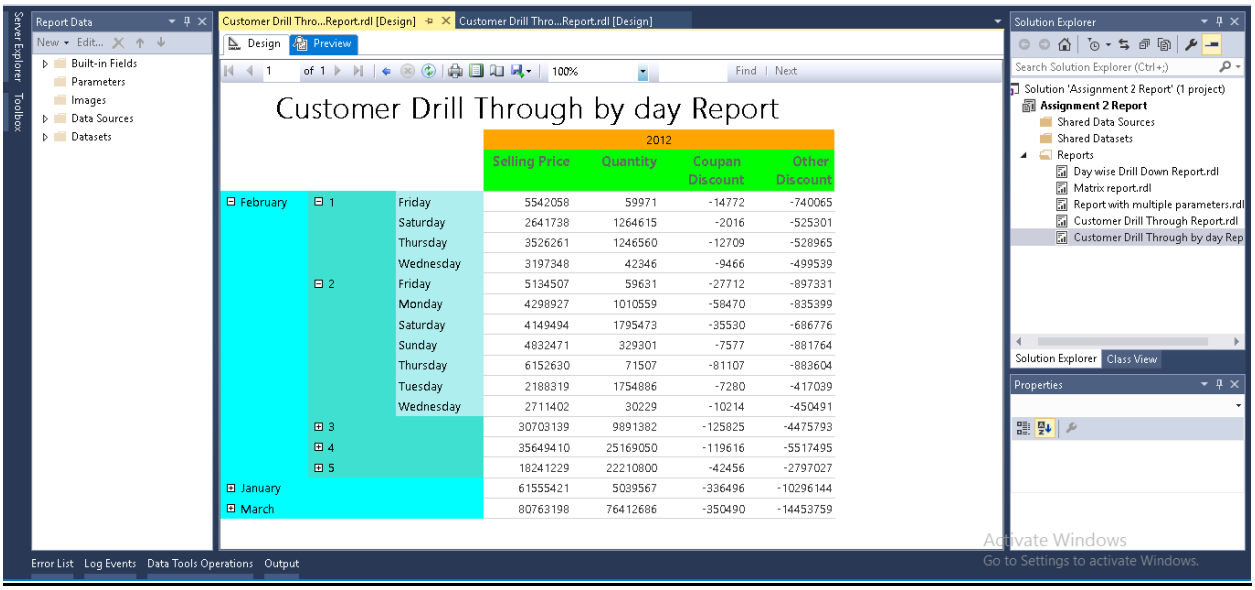
Design – child



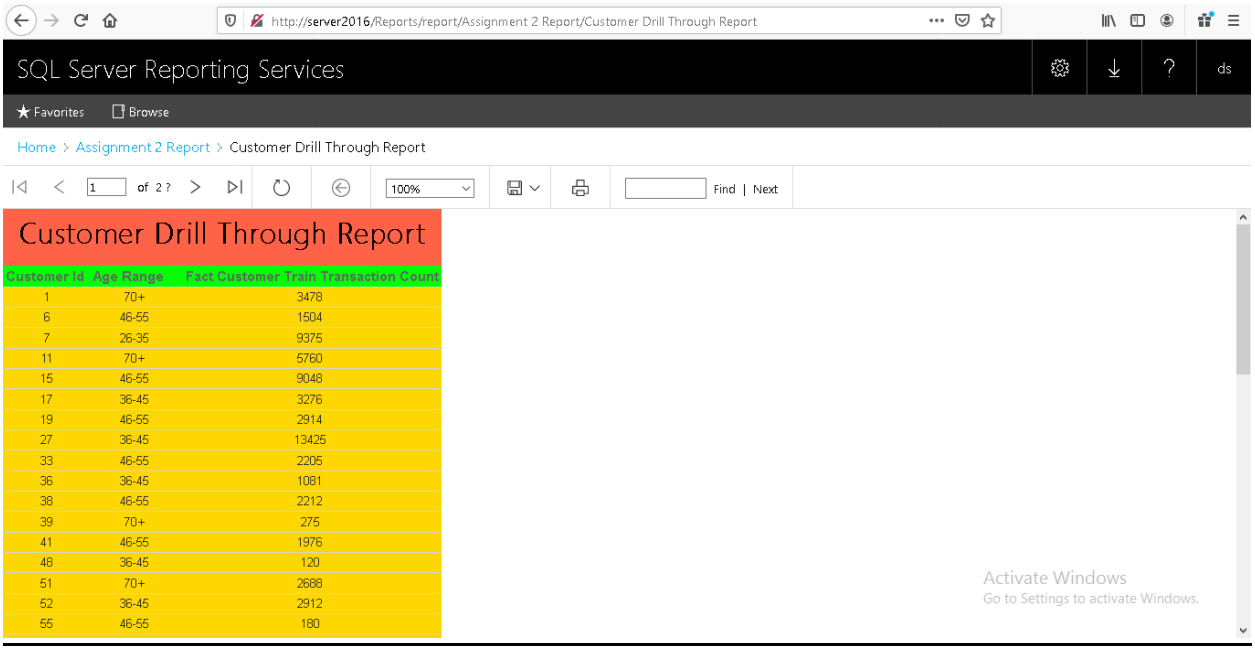
Preview – Parent



Preview – child

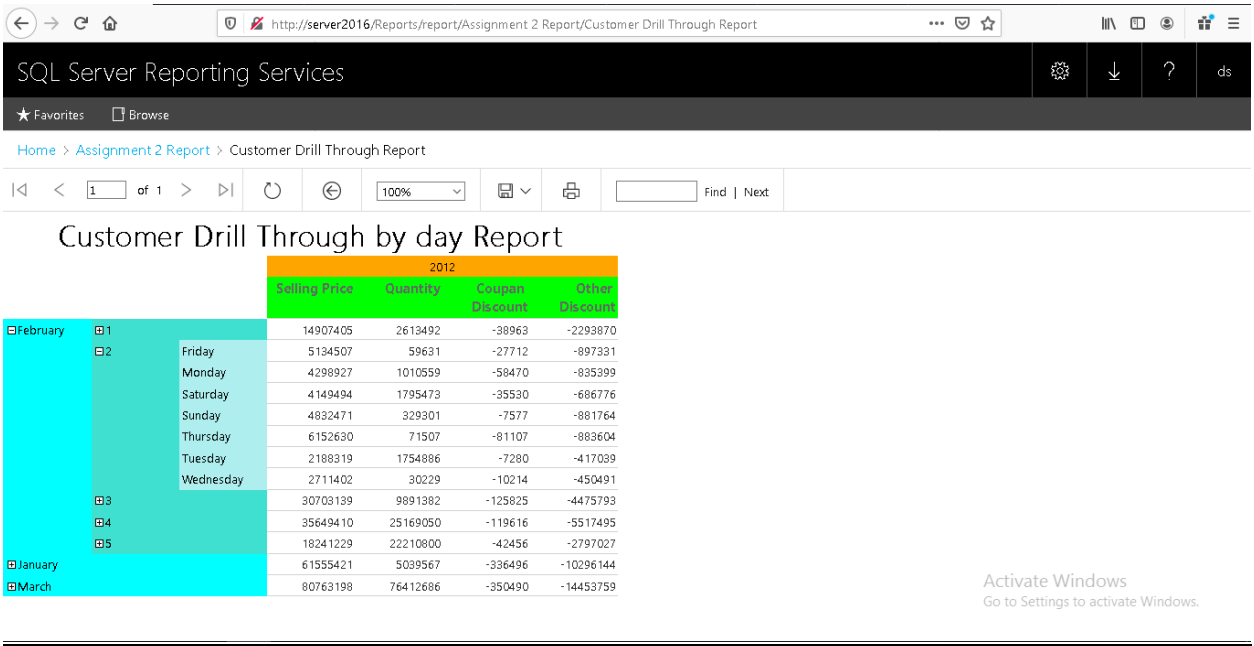


Web portal view – Parent

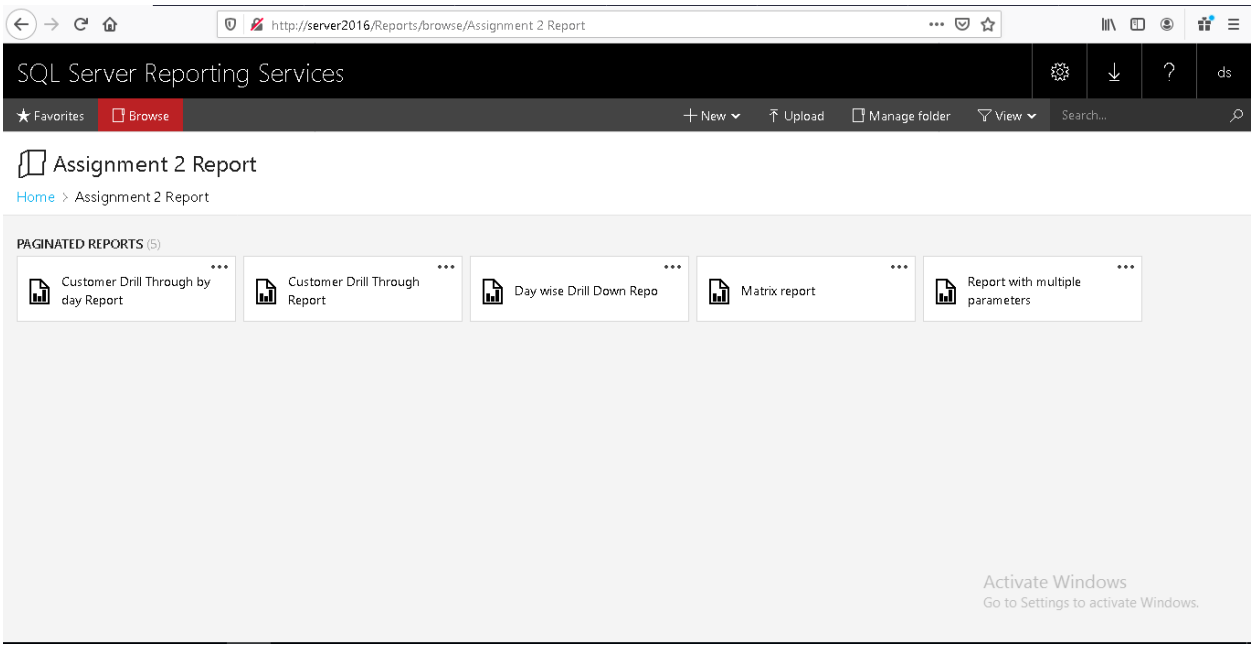


After clicking on the customer ID, it will take us to all transaction report

Web portal view – child



After applying all reports my SQL server Reporting Service is looks like this



Part 2 – Power BI

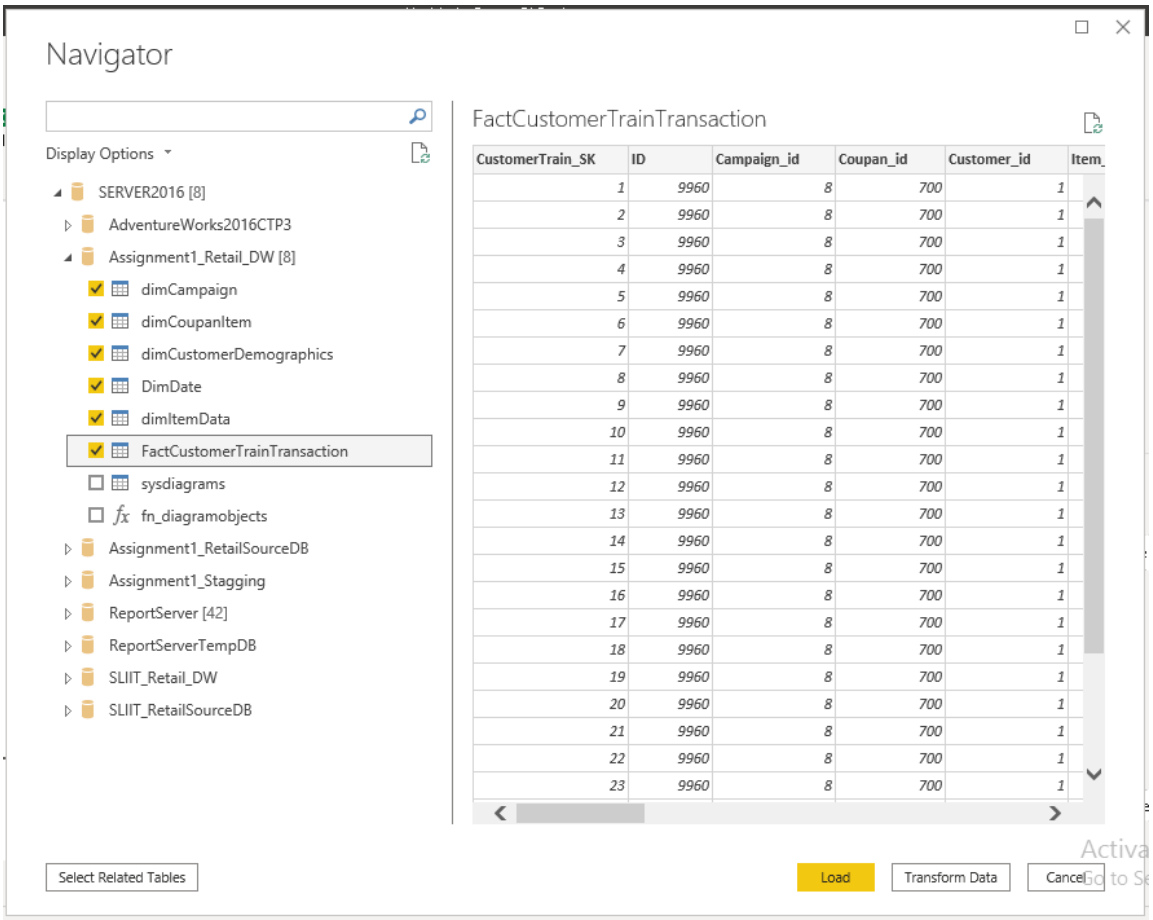
Audience

This all thing based on customer credit card transaction. People who are age is more than or equal to 18 can have credit card and do transaction. Above 18 years, olds will be my audience. In addition, people who do not have our credit card service also our audience.

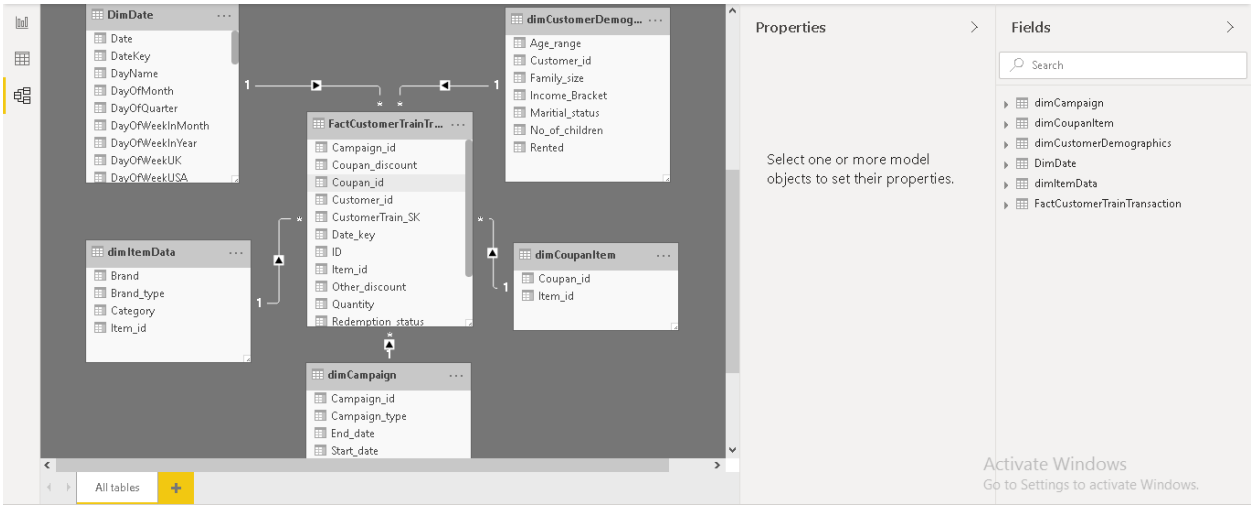
The story, which is going to tell to audience

I am going prove that we are the one who give more discounts when customer purchase items from sales using our credit card. In addition, our credit card is the most used credit card in every month. I am going to prove those by using graphs.

Before prove that we need to import out data warehouse database into our Power BI. After importing database, we have select suitable tables for this experiment.

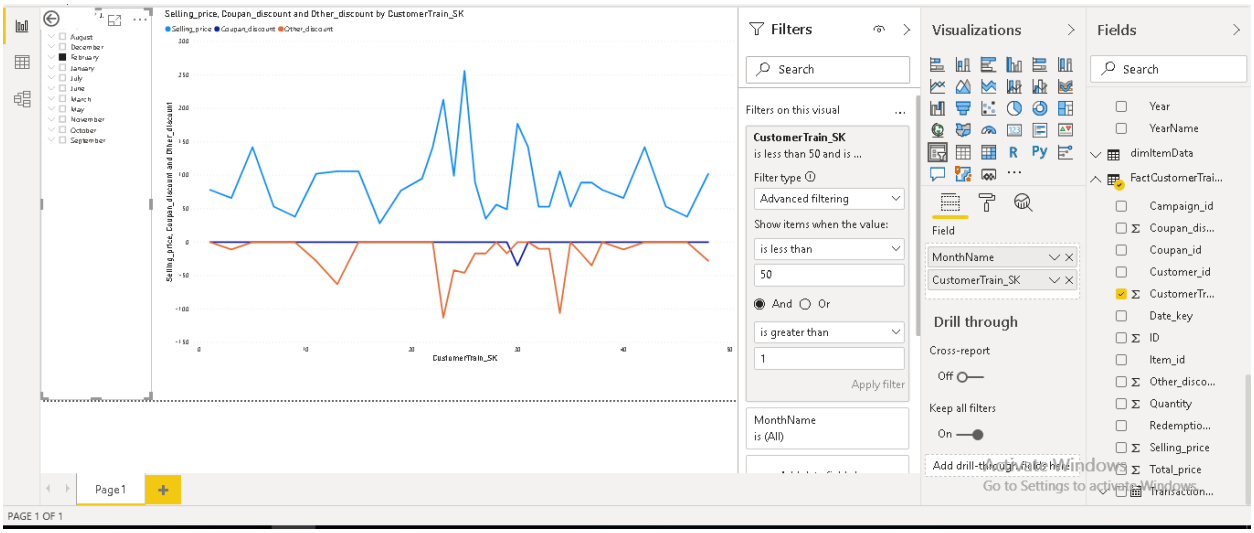


Then we can show our table connectivity by selecting table connect icon.

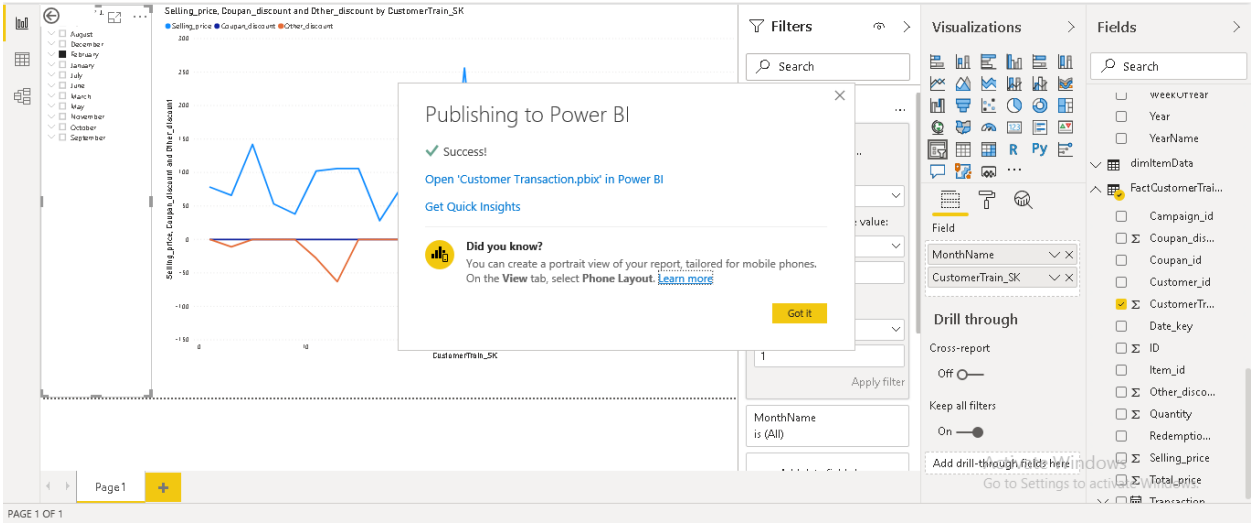


KPI creation and reason of selecting it

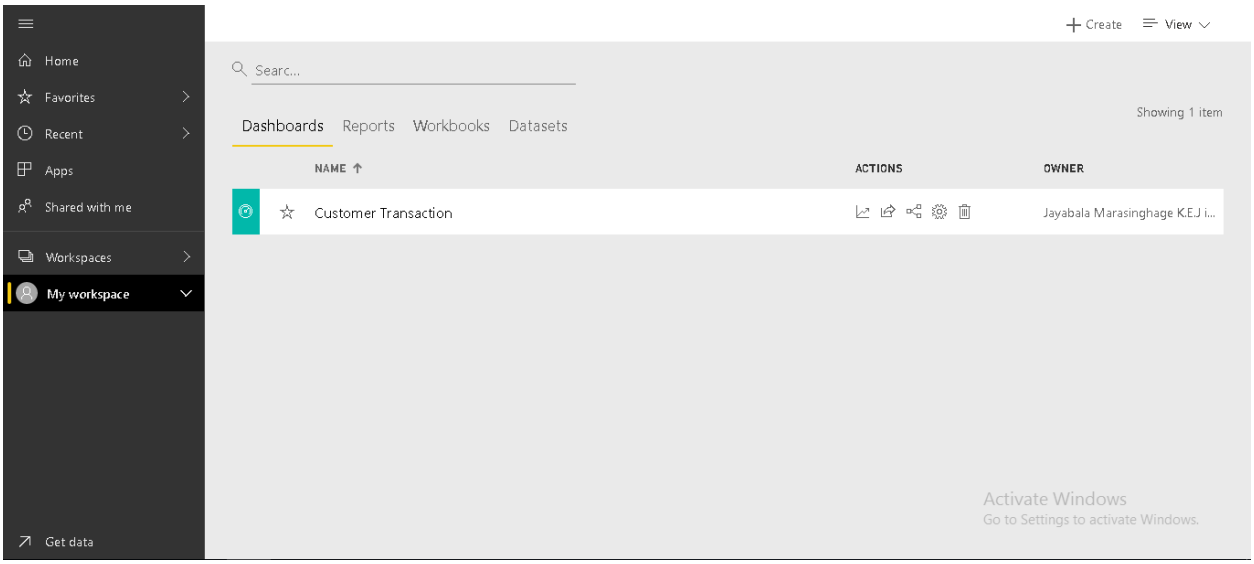
In KPI creation, I have select sample of all customers. There are huge number of customers do transaction using our credit cards. There for I created KPI, which is customer, ID must between 50 and 1. For each ID we can see price, customer had to pay and amount of discounts, which they have.



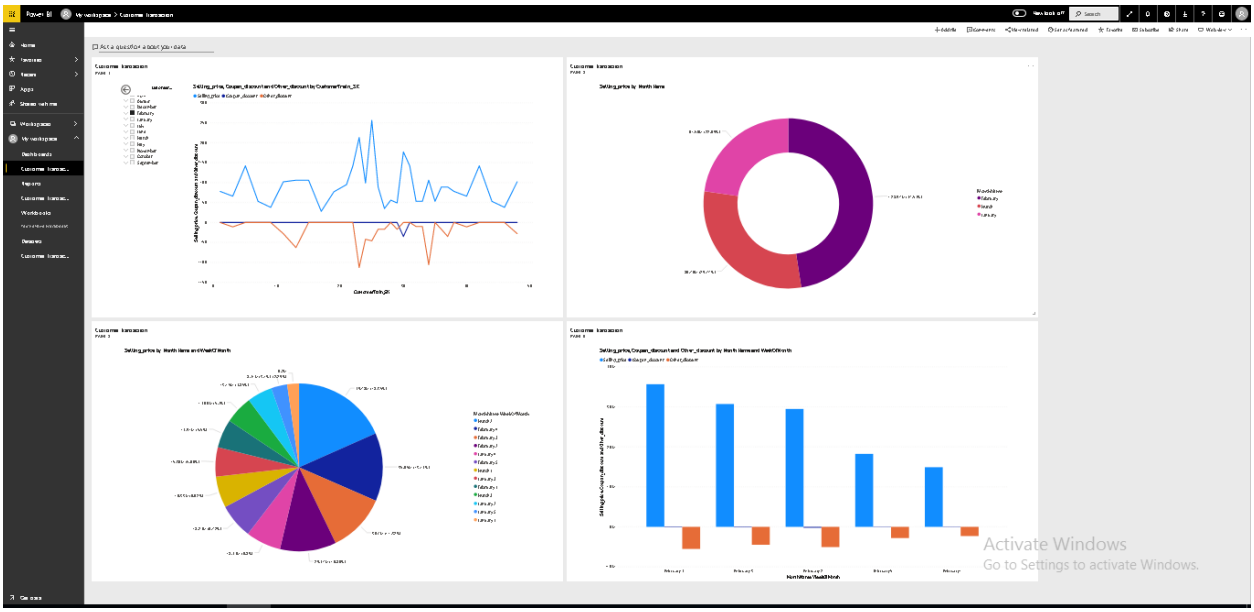
After that I have add that graph into my workspace and in workspace, I have created another 3 charts for understanding total customer transaction for given time period and total of discounts given in particular times.



Dashboard



Inside of my dashboard with all charts



End.