Sri Lanka Institute of Information Technology

Assignment II

Data Warehouse & Business Intelligence

2021

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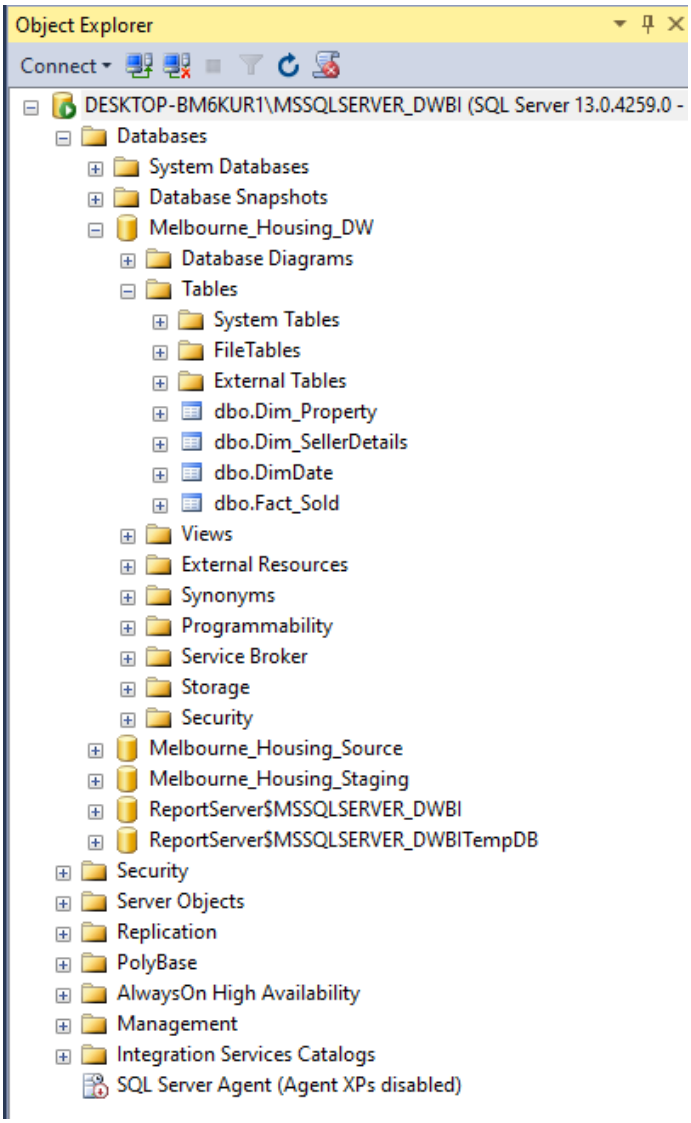
Y3S1.04 (DS)

Contents

Step 1: Data source for the assignment 2

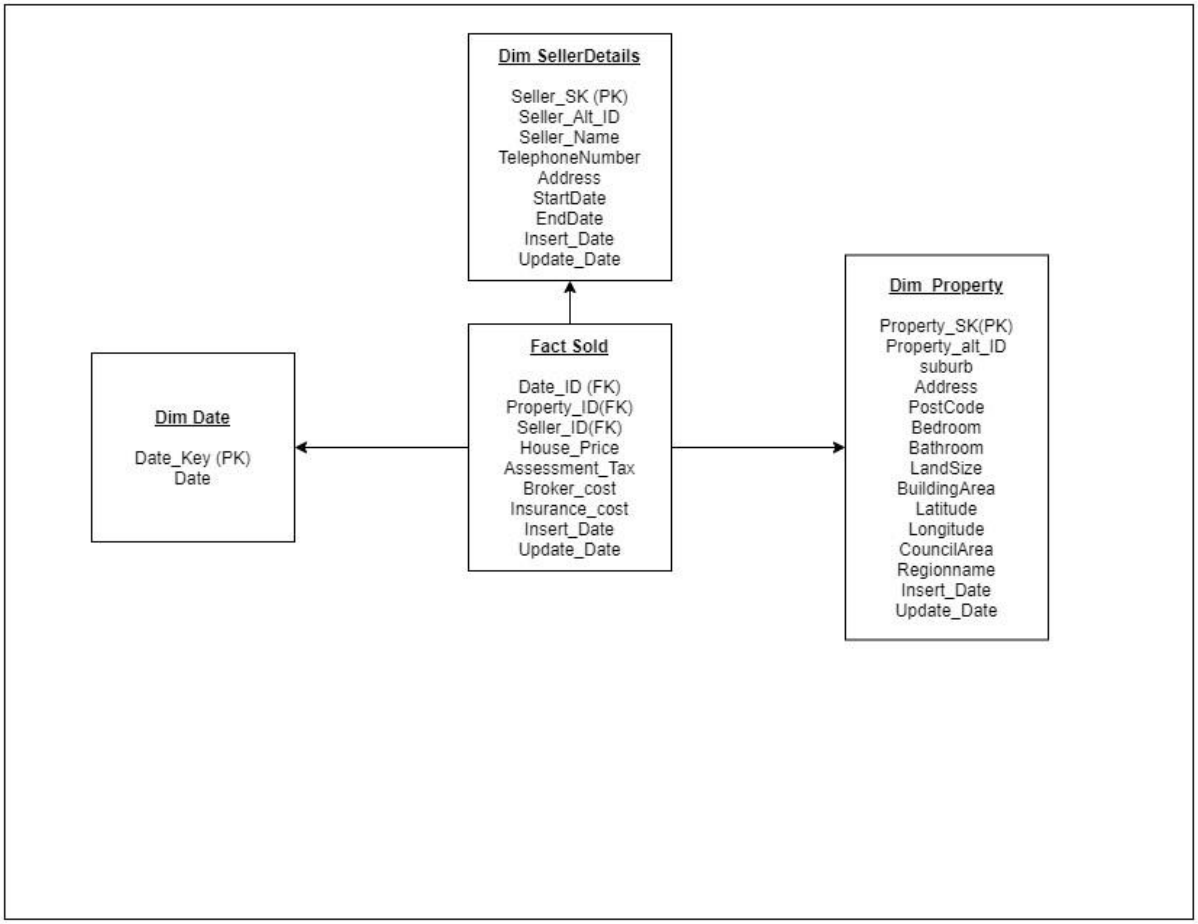
Previously created Melbourne_Housing data warehouse is used as data source for building reports.There are three dimension tables and one fact table in that data warehouse.

- Fact_Sold
- Dim_Property
- Dim_SellerDetails
- Dim_Date



Data warehouse design

Data warehouse tables are arranged according to star dimensional model.

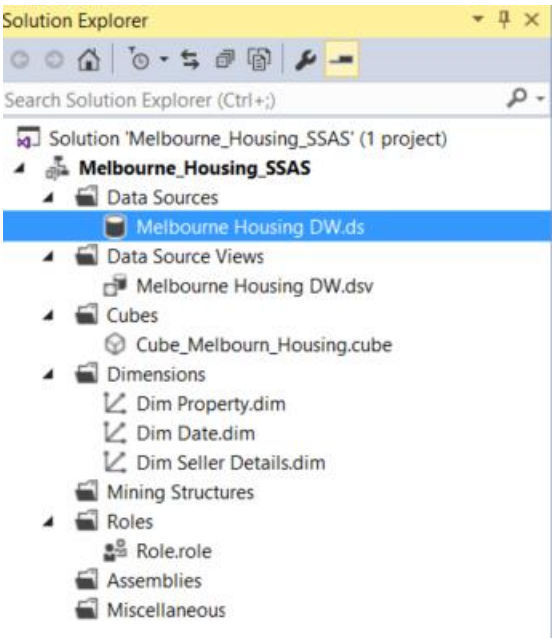


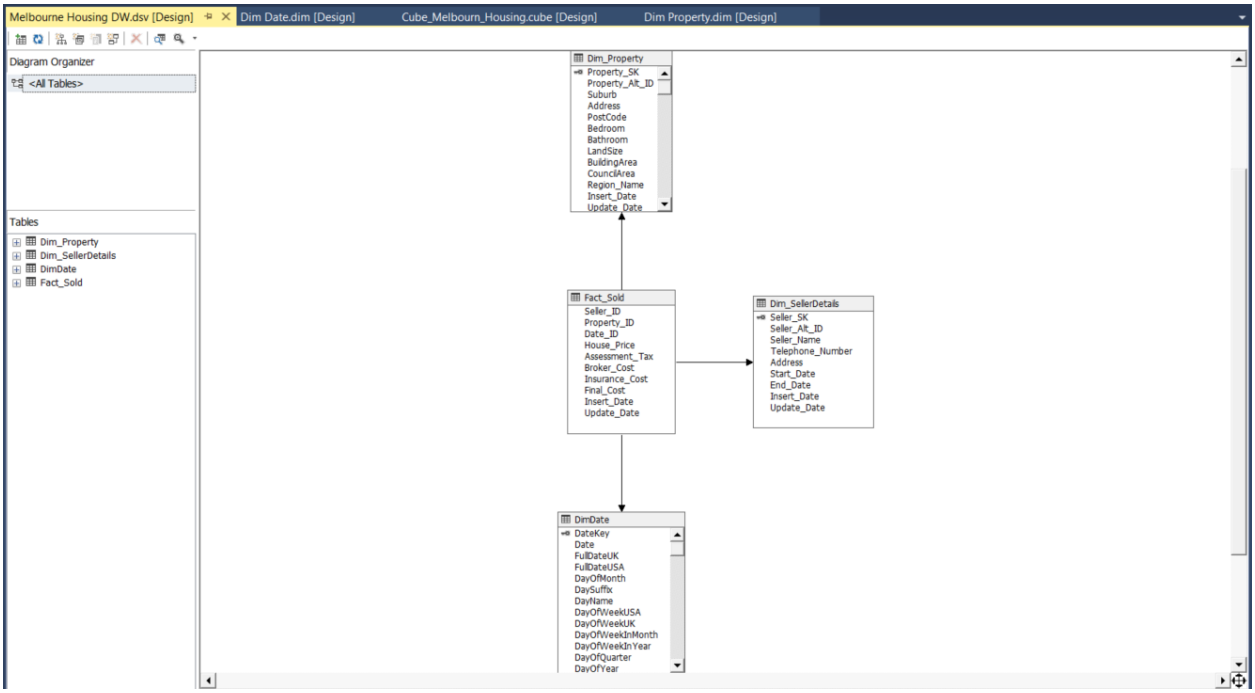
Dimention Name	Dimention Attributes	Derived Attribute	Data Type	Key column	Derived Logic	Description
Dim_Property	Property_SK	no	int	Primary key	Auto increment	
	Property_Alt_ID	no	int			
	Suburb	no	nvarchar(255)			
	Address	no	nvarchar(255)			
	PostCode	no	int			
	Bedroom	no	int			
	Bathroom	no	int			
	LandSize	no	float			
	BuildingArea	no	float			
	CouncilArea	no	nvarchar(255)			
	Region_Name	no	nvarchar(255)			
	Insert_Date	yes	datetime		System Datetime	
	Update_Date	yes	datetime		System Datetime	
Dim_SellerDetails	Seller_SK	no	int			
	Seller_Alt_ID	no	nvarchar(255)			
	Seller_Name	no	nvarchar(255)			
	Telephone_Number	no	nvarchar(255)			
	Address	no	nvarchar(255)			
	Start_Date	yes	datetime		System Datetime (Historical)	
	End_Date	yes	datetime		System Datetime (Historical)	
	Insert_Date	yes	datetime		System Datetime	
	Update_Date	yes	datetime		System Datetime	
DimDate	DateKey		int	Primary key		static table
	Date		datetime			static table
	FullDateUK		char(10)			static table
	FullDateUSA		char(10)			static table
	DayOfMonth		varchar(4)			static table
	DaySuffix		varchar(9)			static table
	DayName		varchar(9)			static table
	More...					
Fact_Sold	Seller_ID	no	int	foreign key		
	Property_ID	no	int	foreign key		
	Date_ID	no	int	foreign key		
	House_Price	no	float			
	Assessment_Tax	no	float			
	Broker_Cost	no	float			
	Insurance_Cost	no	float			
	Final_Cost	yes	float		House_Price+Assessment_Tax+Broker_Cost+Insuarence_Cost	
	Insert_Date	yes	datetime		System Datetime	
	Update_Date	yes	datetime		System Datetime	

Step 2: SSAS Cube implementation

First, created a new Analysis Services Multidimensional and Data Mining project in SSAS.

And then created a Data Source and a Data Source View as show below, using previously created data warehouse. (Melbourne Housing DW)

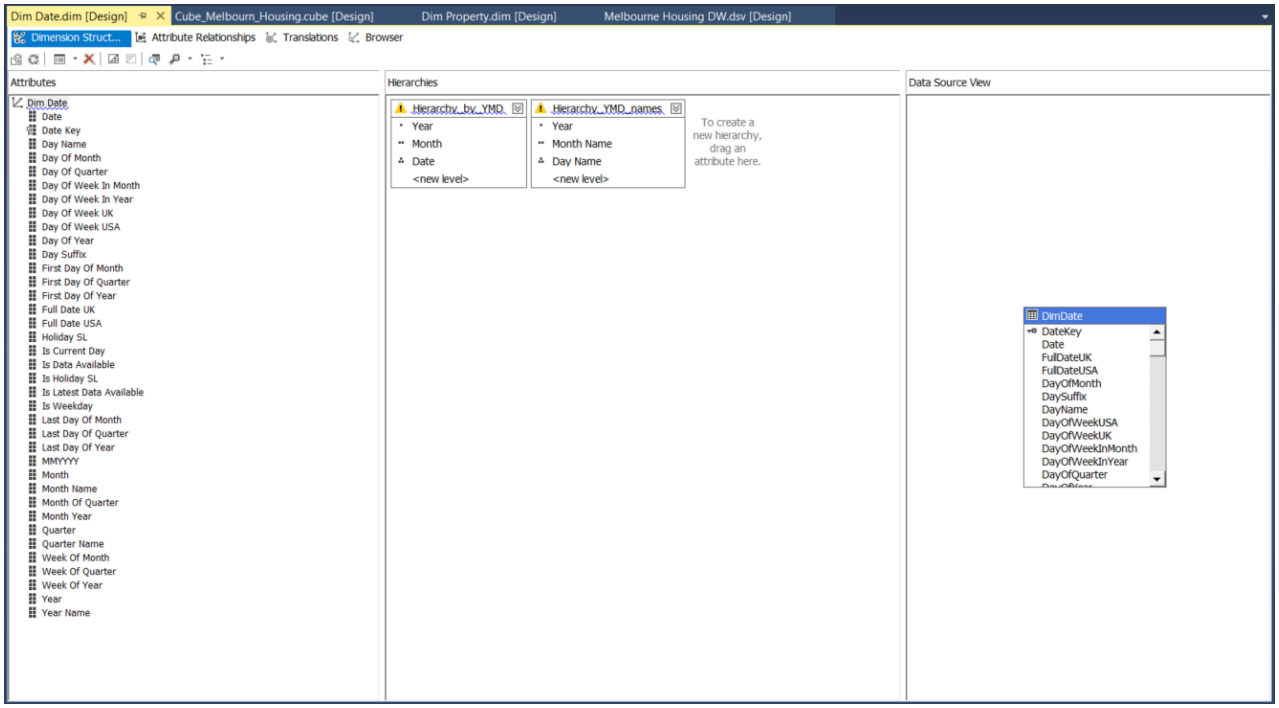


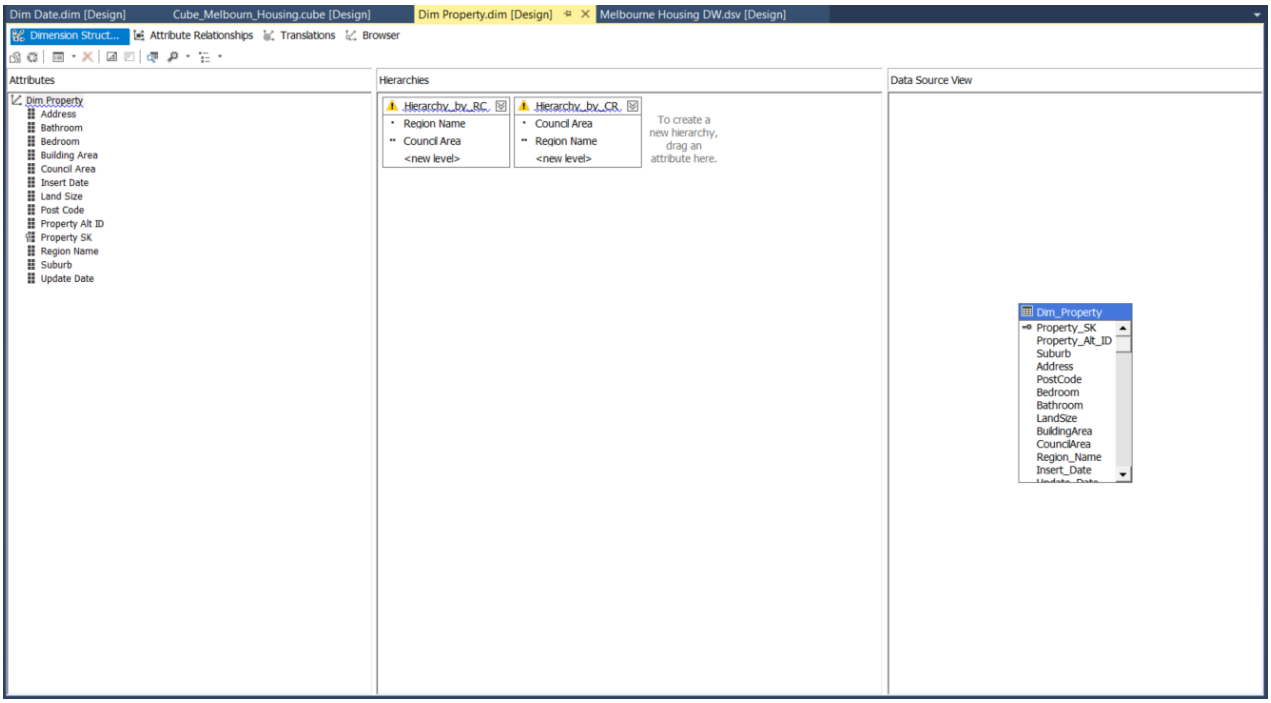


In next step SSAS cube is designed using necessary measures in the Fact_Sold. Also include hierarchies for dimensions.

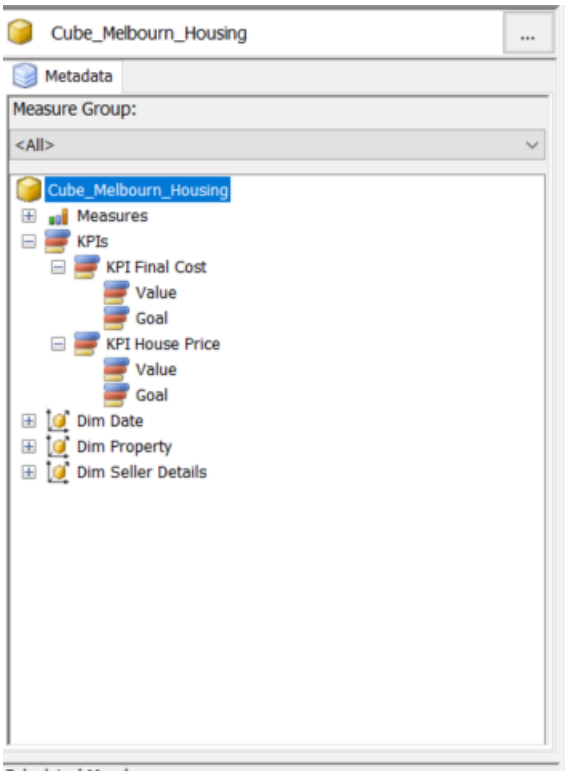
Hierarchies are created for Dim_Date and Dim_Property.

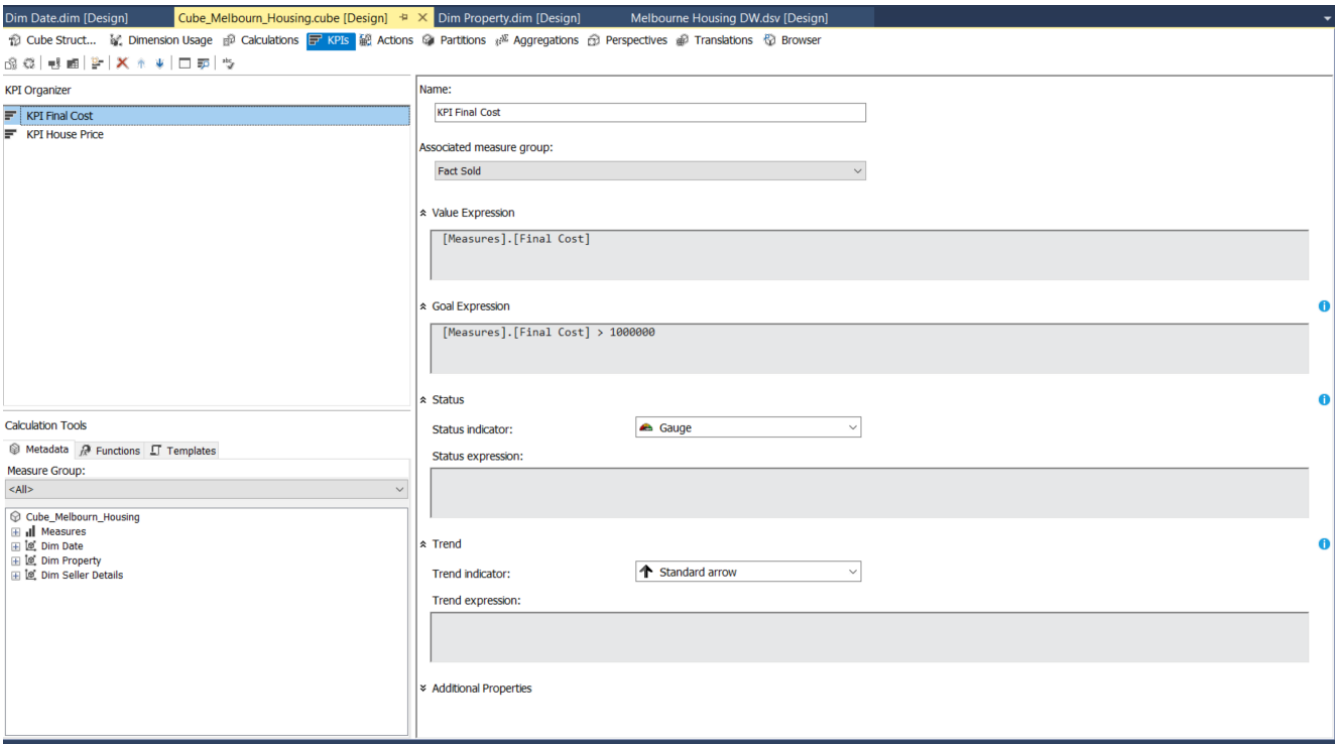
- Year -> Month -> Day
- Year -> Month Name -> Day Name
- Region Name -> Council Area

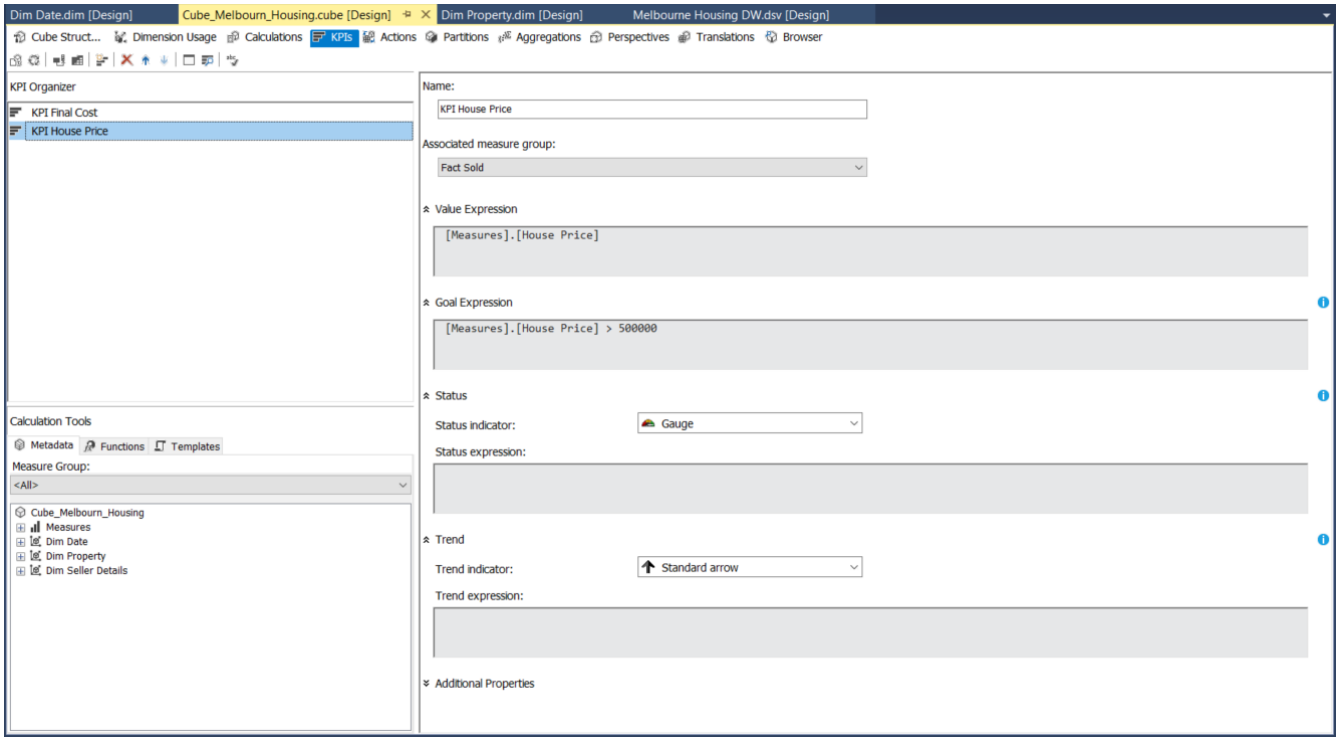




And then KPIs are created using the measures in SSAS Cube.





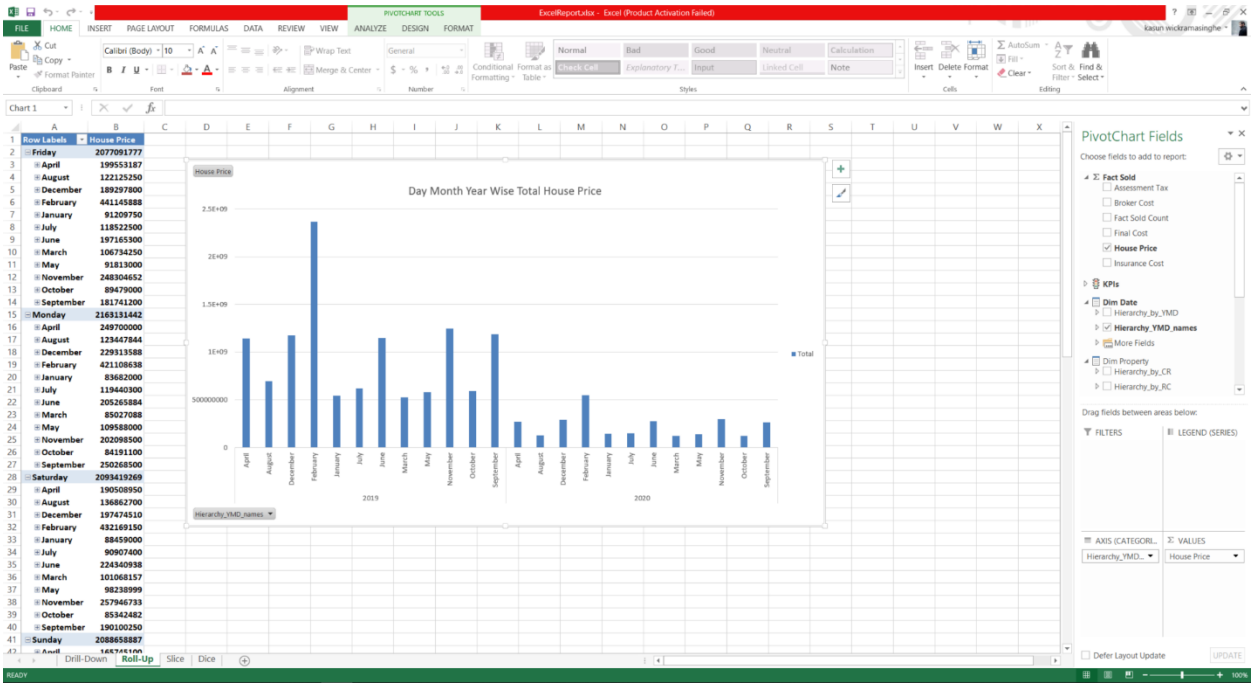

Dim Date.dim [Design]
Cube_Melbourn_Housing.cube [Design]
Dim Property.dim [Design]
Melbourne Housing DW.dsv [Design]
Cube Struct...
Dimension Usage
Calculations
KPIs
Actions
Partitions
Aggregations
Perspectives
Translations
Browser
KPI Organizer
KPI Final Cost
KPI House Price
Name:
KPI House Price
Associated measure group:
Fact Sold
Value Expression
[Measures].[House Price]
Goal Expression
[Measures].[House Price] > 500000
Status
Status indicator:
Gauge
Status expression:
Trend
Trend indicator:
Standard arrow
Trend expression:
Additional Properties
Calculation Tools
Metadata
Functions
Templates
Measure Group:
<All>
Cube_Melbourn_Housing
Measures
Dim Date
Dim Property
Dim Seller Details

Step 3: Demonstration of OLAP operations

The Analysis Service is connected as a data source to excel workbook without using MDX Queries, the excel workbook is connected to the SSAS database and to the cube.

1. Roll-up

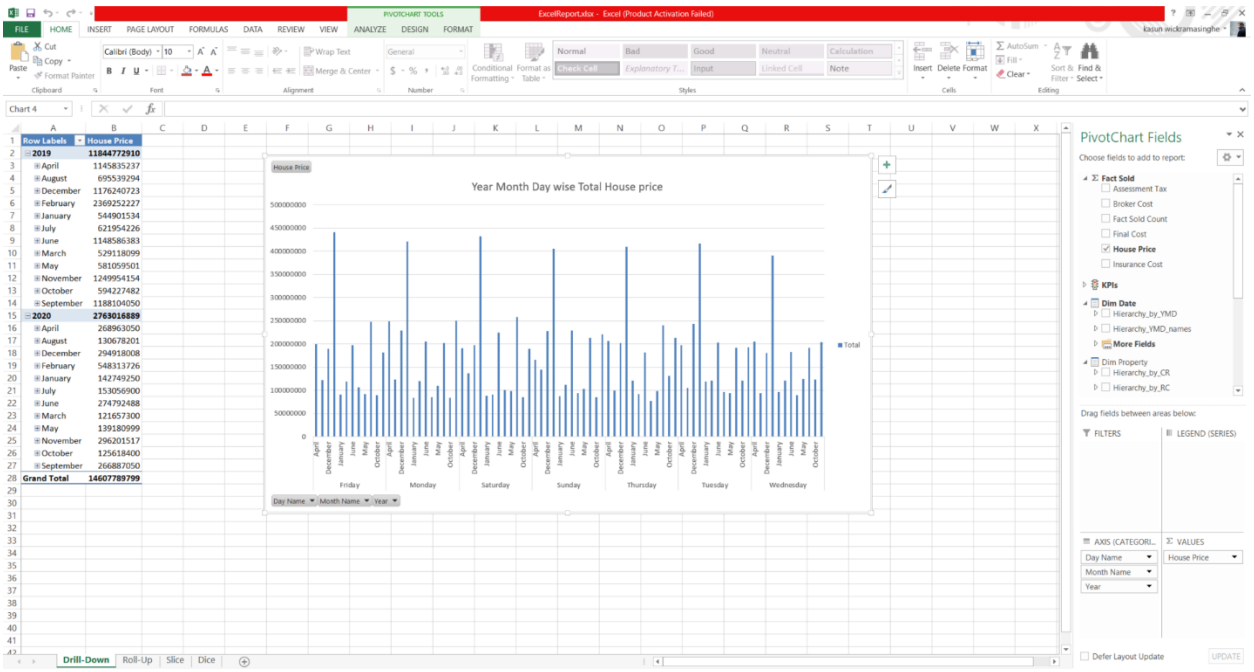
Climbing up a hierarchy of a dimension to aggregate data means the Rollup.



In above report, it shows total of all the house prices according to day name, month name, and year. Day is the top level of the hierarchy. This report shows day wise total house prices, and it can be rolled up to display month and year wise total house prices.

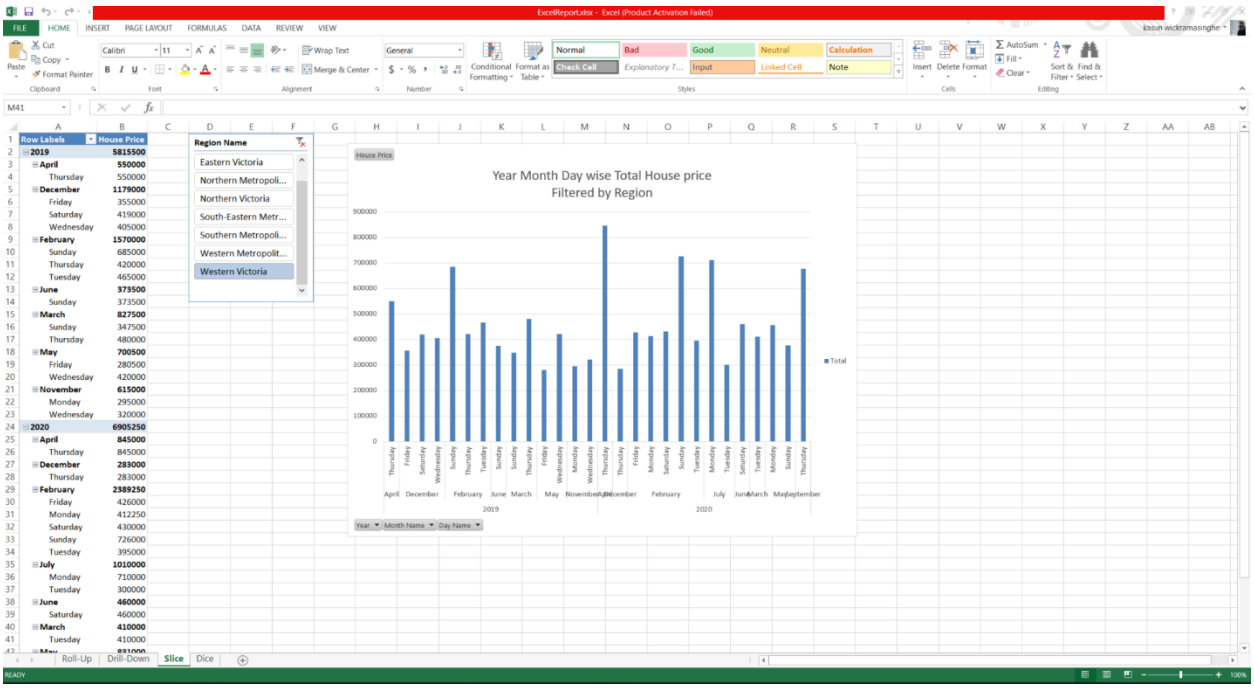
2. Drill-down

Stepping down a hierarchy of a dimension allowing navigation through details means the Drill-down.



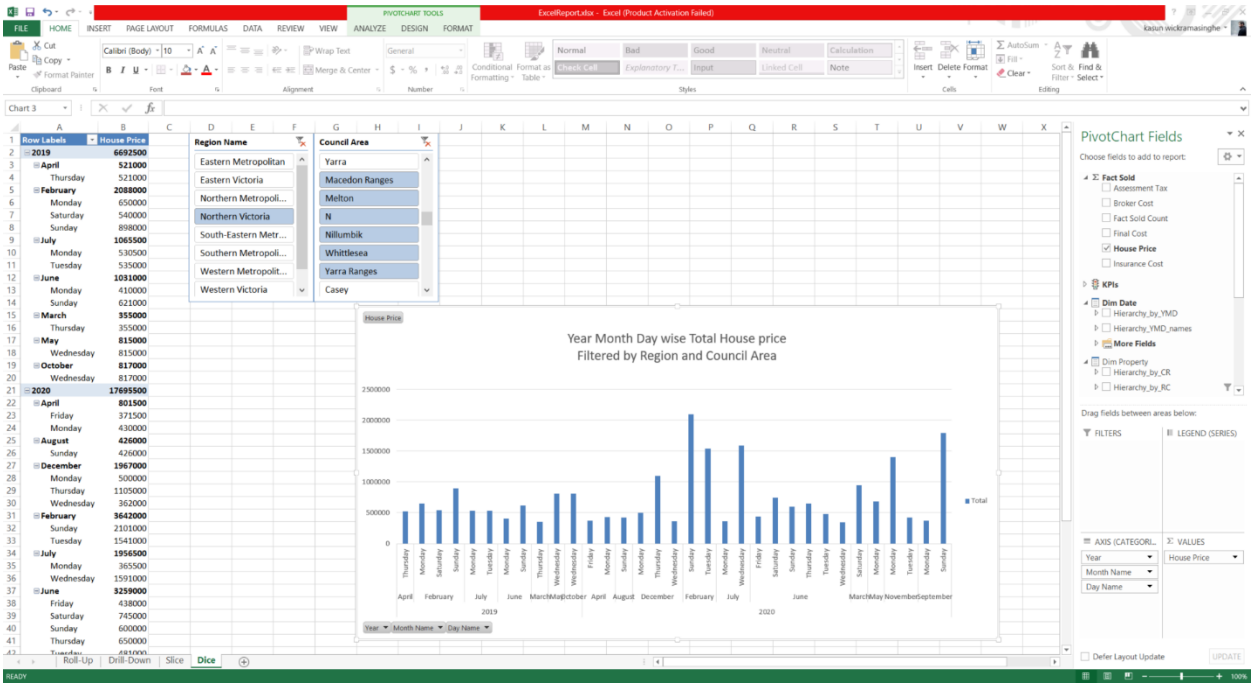
In above report, it shows total of all the house prices according to year, month name, day name. Year is the top level of the hierarchy. This report shows Year wise total house prices, and it can be drilled down to display month and day wise total house prices.

3. Slice



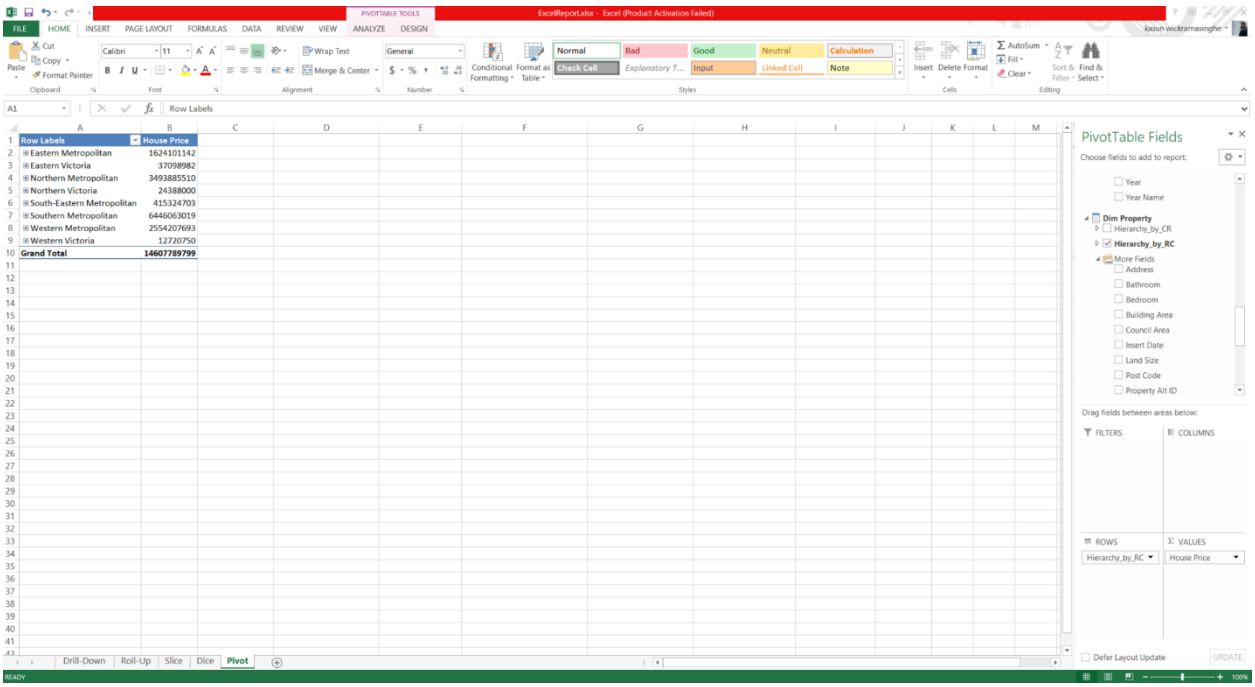
In above report, it shows total of all the house prices according to year, month name, day name. A slicer is created using region names. One or more regions can be selected from the slicer, then report will display the region wise total house prices.

4. Dice

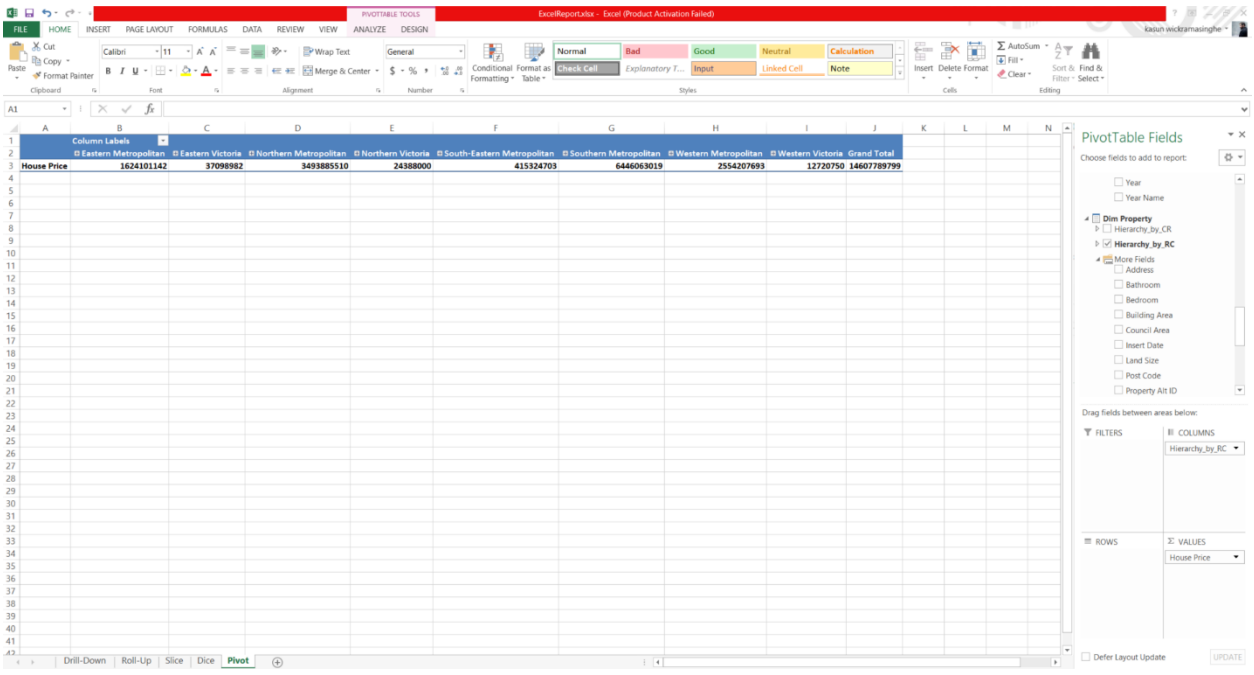


In above report, it shows total of all the house prices according to year, month name, day name. Two slicers are created using region names and council area. One or more regions and council areas can be selected from two slicers, then report will display the region and council area wise total house prices.

5.Pivot



Row Labels	House Price
Eastern Metropolitan	1624101142
Eastern Victoria	37098982
Northern Metropolitan	3493885510
Northern Victoria	24388000
South-Eastern Metropolitan	415324703
Southern Metropolitan	6446063019
Western Metropolitan	2554207693
Western Victoria	12720750
Grand Total	14607789799

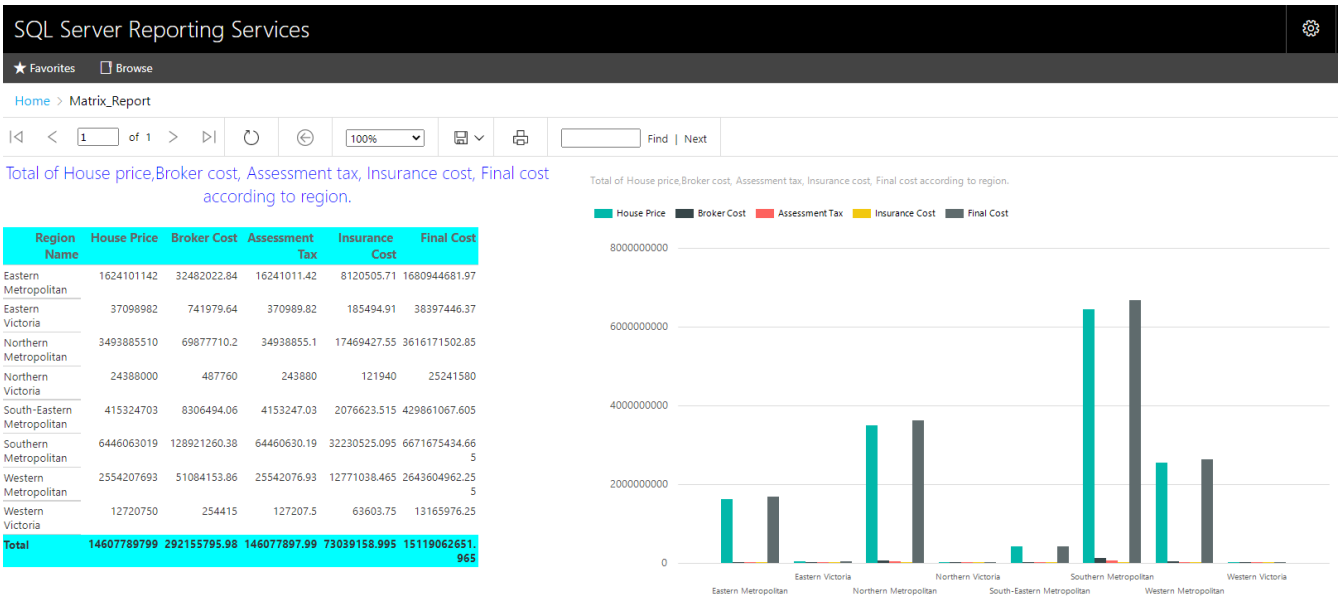


Column Labels	Eastern Metropolitan	Eastern Victoria	Northern Metropolitan	Northern Victoria	South-Eastern Metropolitan	Southern Metropolitan	Western Metropolitan	Western Victoria	Grand Total
House Price	1624101142	37098982	3493885510	24388000	415324703	6446063019	2554207693	12720750	14607789799

Since column fields are not categorized to subfields. The data axes can be rotated to provide a substitute presentation of data.

Step 4: SSRS Reports

Report 1: Report with a matrix

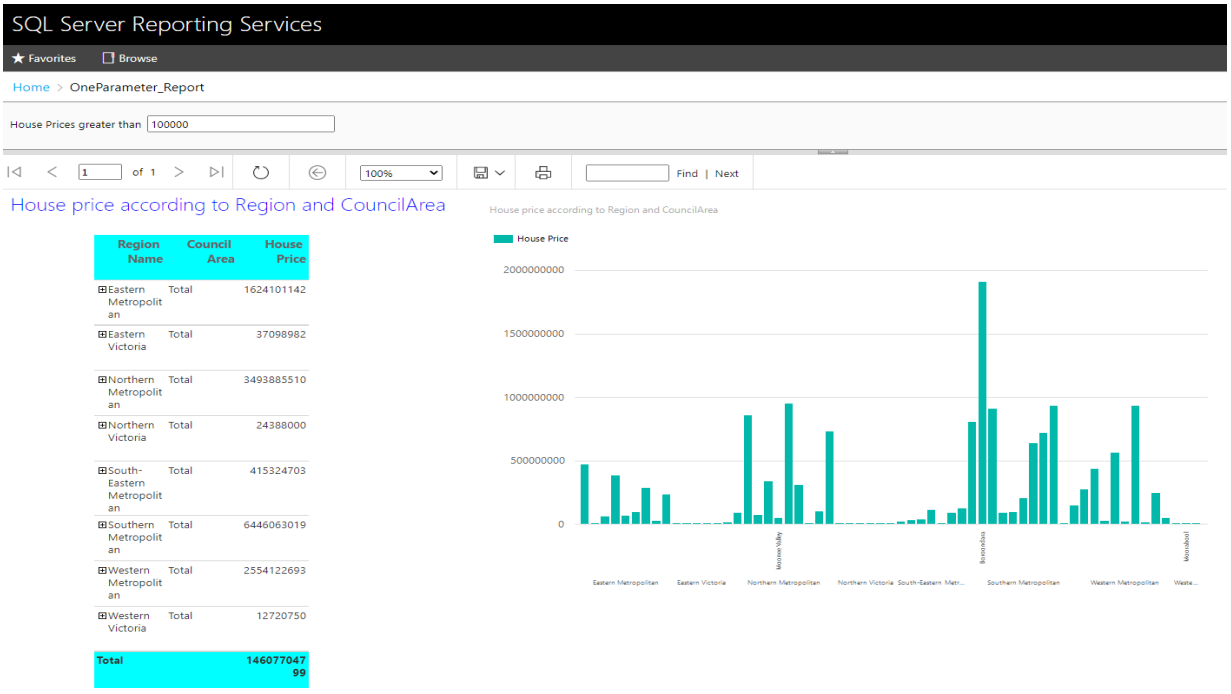


Region Name	House Price	Broker Cost	Assessment Tax	Insurance Cost	Final Cost
Eastern Metropolitan	1624101142	32482022.84	16241011.42	8120505.71	1680944681.97
Eastern Victoria	37098982	741979.64	370989.82	185494.91	38397446.37
Northern Metropolitan	3493885510	69877710.2	34938855.1	17469427.55	3616171502.85
Northern Victoria	24388000	487760	243880	121940	25241580
South-Eastern Metropolitan	415324703	8306494.06	4153247.03	2076623.515	429861067.605
Southern Metropolitan	6446063019	128921260.38	64460630.19	32230525.095	6671675434.665
Western Metropolitan	2554207693	51084153.86	25542076.93	12771038.465	2643604962.255
Western Victoria	12720750	254415	127207.5	63603.75	13165976.25
Total	**14607789799**	**292155795.98**	**146077897.99**	**73039158.995**	**15119062651.965**

The above report display house price, broker cost, assessment tax, insurance cost and final cost according to region name.

Report 2: Report with more than one parameter

One parameter



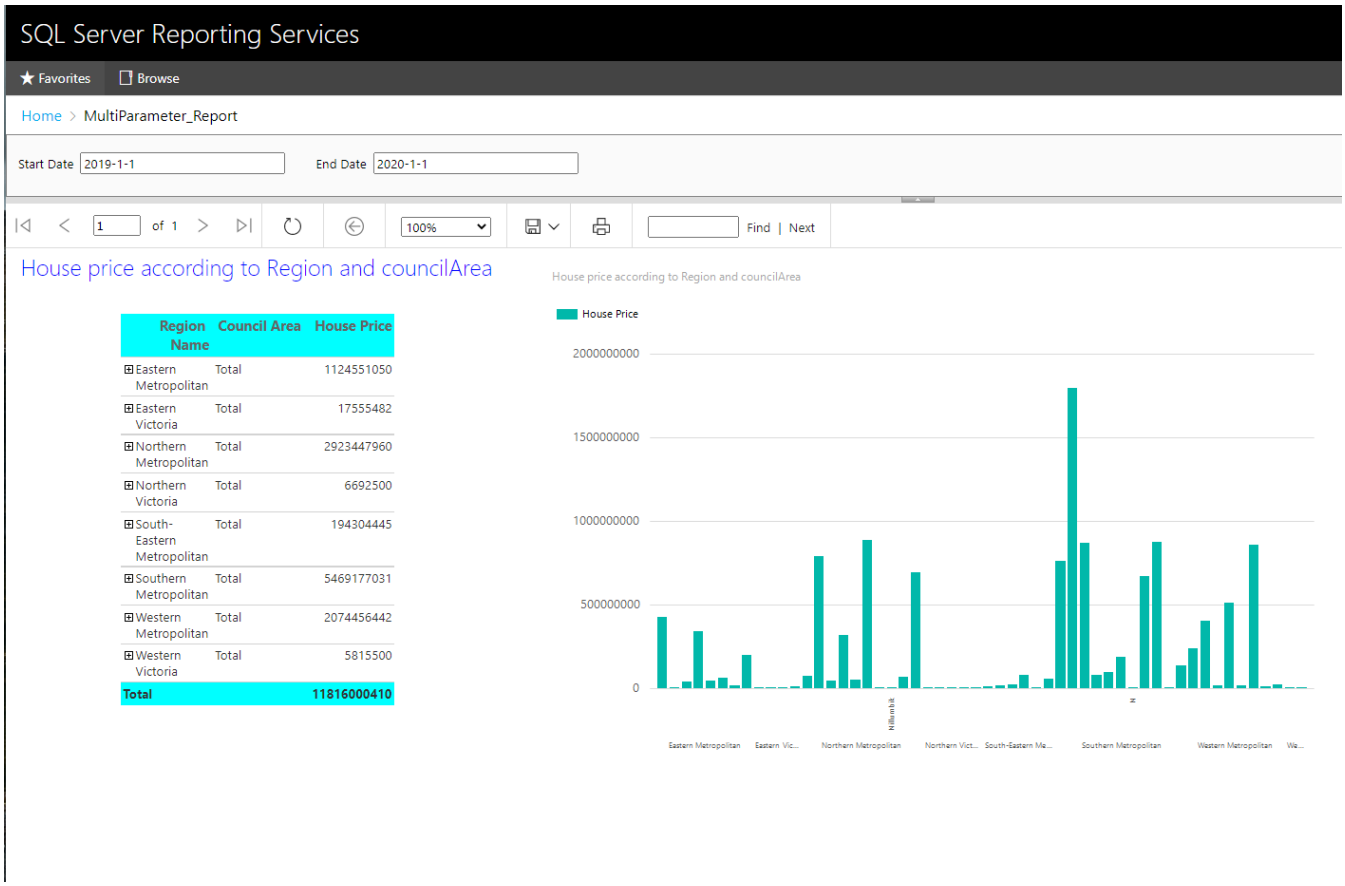
Region Name	Council Area	House Price
⊞Eastern Metropolitan	Total	1624101142
⊞Eastern Victoria	Total	37098982
⊞Northern Metropolitan	Total	3493885510
⊞Northern Victoria	Total	24388000
⊞South-Eastern Metropolitan	Total	415324703
⊞Southern Metropolitan	Total	6446063019
⊞Western Metropolitan	Total	2554122693
⊞Western Victoria	Total	12720750
Total		**14607704799**

In order to filter report using one parameter, use below SQL command.

where fs.House_Price > @value

A parameter will be used to filter the region wise total of house prices which are greater than a particular value. Users will be able to give any value and filter the report.

Multi parameter



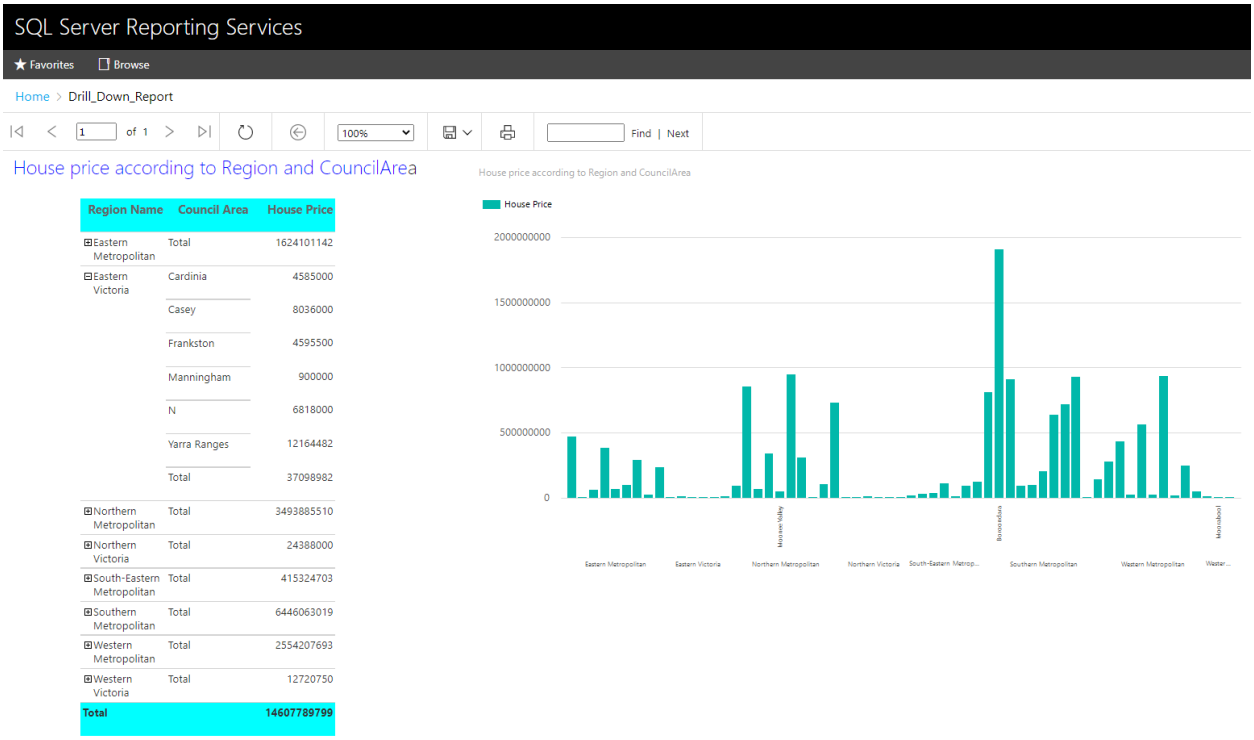
Region Name	Council Area	House Price
Eastern Metropolitan	Total	1124551050
Eastern Victoria	Total	17555482
Northern Metropolitan	Total	2923447960
Northern Victoria	Total	6692500
South-Eastern Metropolitan	Total	194304445
Southern Metropolitan	Total	5469177031
Western Metropolitan	Total	2074456442
Western Victoria	Total	5815500
Total		**11816000410**

In order to filter report using two parameter, use below SQL command.

where dd.Date > @date1 and dd.Date < @date2

These two parameters will be used to filter the region wise total of house prices which are between two particular dates. Users will be able to give any date for those two text boxes and filter the report.

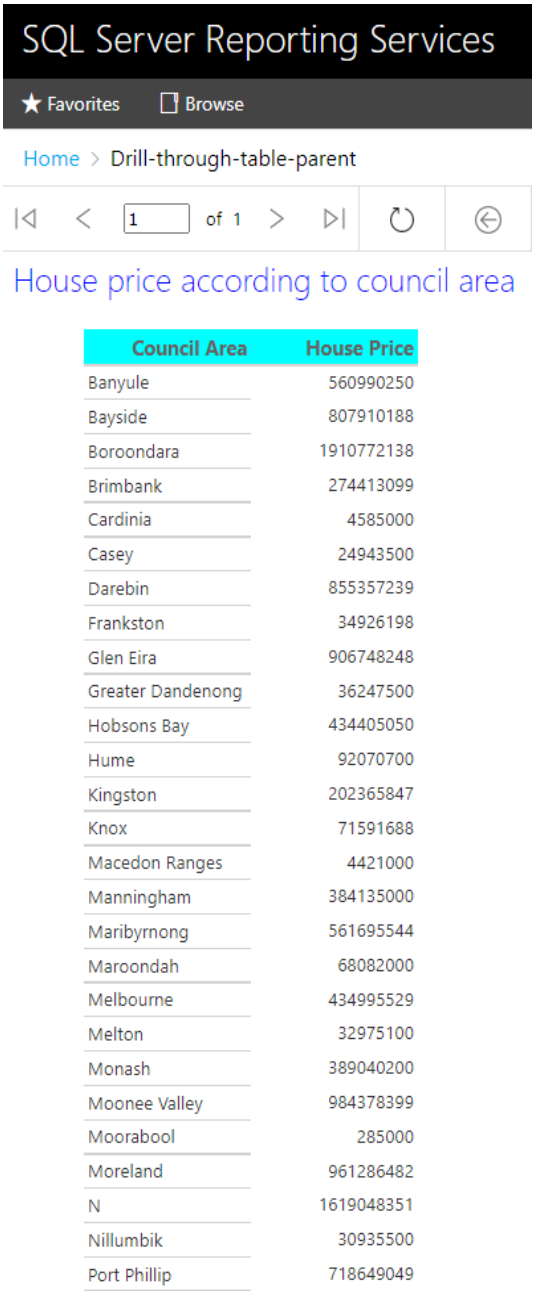
Report 3: Create an SSRS drill-down report



Region Name	Council Area	House Price
⊞Eastern Metropolitan	Total	1624101142
⊟Eastern Victoria	Cardinia	4585000
	Casey	8036000
	Frankston	4595500
	Manningham	900000
	N	6818000
	Yarra Ranges	12164482
	Total	37098982
⊞Northern Metropolitan	Total	3493885510
⊞Northern Victoria	Total	24388000
⊞South-Eastern Metropolitan	Total	415324703
⊞Southern Metropolitan	Total	6446063019
⊞Western Metropolitan	Total	2554207693
⊞Western Victoria	Total	12720750
Total		**14607789799**

In above report, it shows total of all the house prices according to region name and council area. Region name is the top level of the hierarchy. This report shows region wise total house prices, and it can be drilled down to display council area wise total house prices.

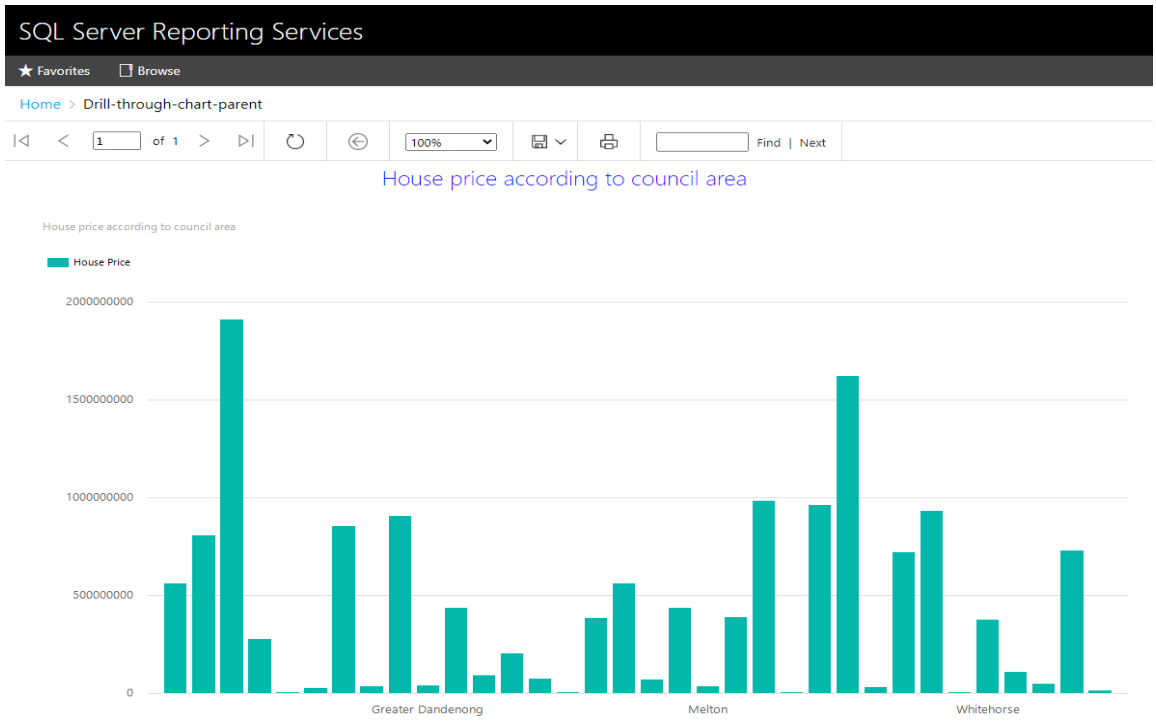
Report 4: Create an SSRS drill-through report

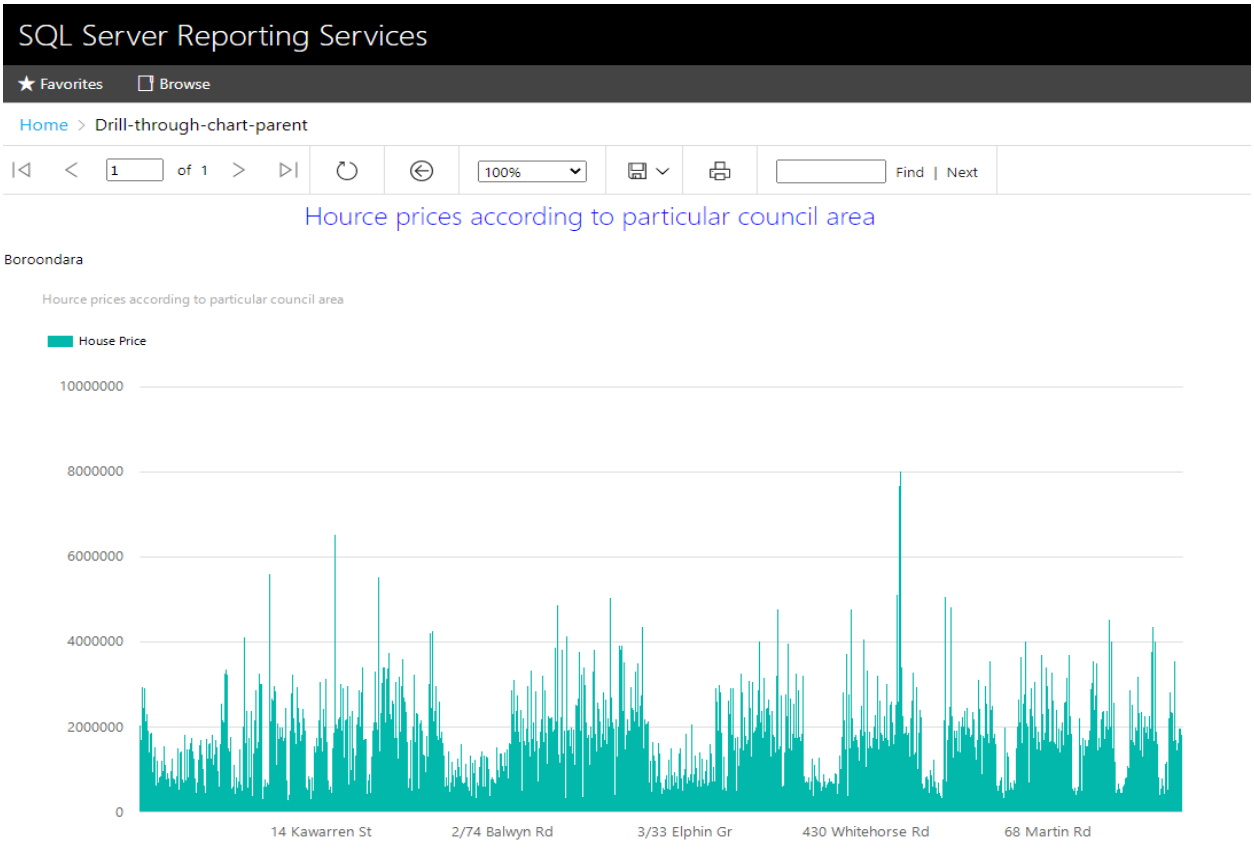


Council Area	House Price
Banyule	560990250
Bayside	807910188
Boroondara	1910772138
Brimbank	274413099
Cardinia	4585000
Casey	24943500
Darebin	855357239
Frankston	34926198
Glen Eira	906748248
Greater Dandenong	36247500
Hobsons Bay	434405050
Hume	92070700
Kingston	202365847
Knox	71591688
Macedon Ranges	4421000
Manningham	384135000
Maribyrnong	561695544
Maroondah	68082000
Melbourne	434995529
Melton	32975100
Monash	389040200
Moonee Valley	984378399
Moorabool	285000
Moreland	961286482
N	1619048351
Nillumbik	30935500
Port Phillip	718649049

Banyule	
Address	House Price
1 Bardia St	726500
1 Ebony Pde	710000
1 Elder St	632000
1 Goodenough Ct	830000
1 Hillside Rd	2530000
1 Meagher St	741000
1 Normanby Ct	810000
1 Papua St	662000
1 Rocke St	1300000
1 Shelley St	706000
1/10 Oriel Rd	700000
1/100 St Elmo Rd	450000
1/111 Nepean St	585000
1/12 Thoresby Gr	1300000
1/14 Edgar St	850000
1/16 Cape St	525000
1/169 Lower Heidelberg Rd	1050000
1/171 Waiora Rd	630000
1/18 Leafield St	537000
1/241 Lower Plenty Rd	725000
1/249 Lower Plenty Rd	720000
1/29 Main Rd	420000
1/3 Campbell Rd	637000

The above first report display council area wise total house prices, by clicking on one row which has specific council area name, it will redirect to another report, which will display one by one house prices which are belongs to previously selected council are.


SQL Server Reporting Services
Favorites
Browse
Home > Drill-through-chart-parent
1
of 1
100%
Find | Next
House price according to council area
House price according to council area
House Price
2000000000
1500000000
1000000000
500000000
0
Greater Dandenong
Melton
Whitehorse


SQL Server Reporting Services
Favorites
Browse
Home > Drill-through-chart-parent
1
of 1
100%
Find | Next
Hource prices according to particular council area
Boroondara
Hource prices according to particular council area
House Price
10000000
8000000
6000000
4000000
2000000
0
14 Kawarren St
2/74 Balwyn Rd
3/33 Elphin Gr
430 Whitehorse Rd
68 Martin Rd