



**Sri Lanka Institute of Information  
Technology**

**Data Warehousing & Business  
Intelligence Assignment 02 – Report**

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# Contents

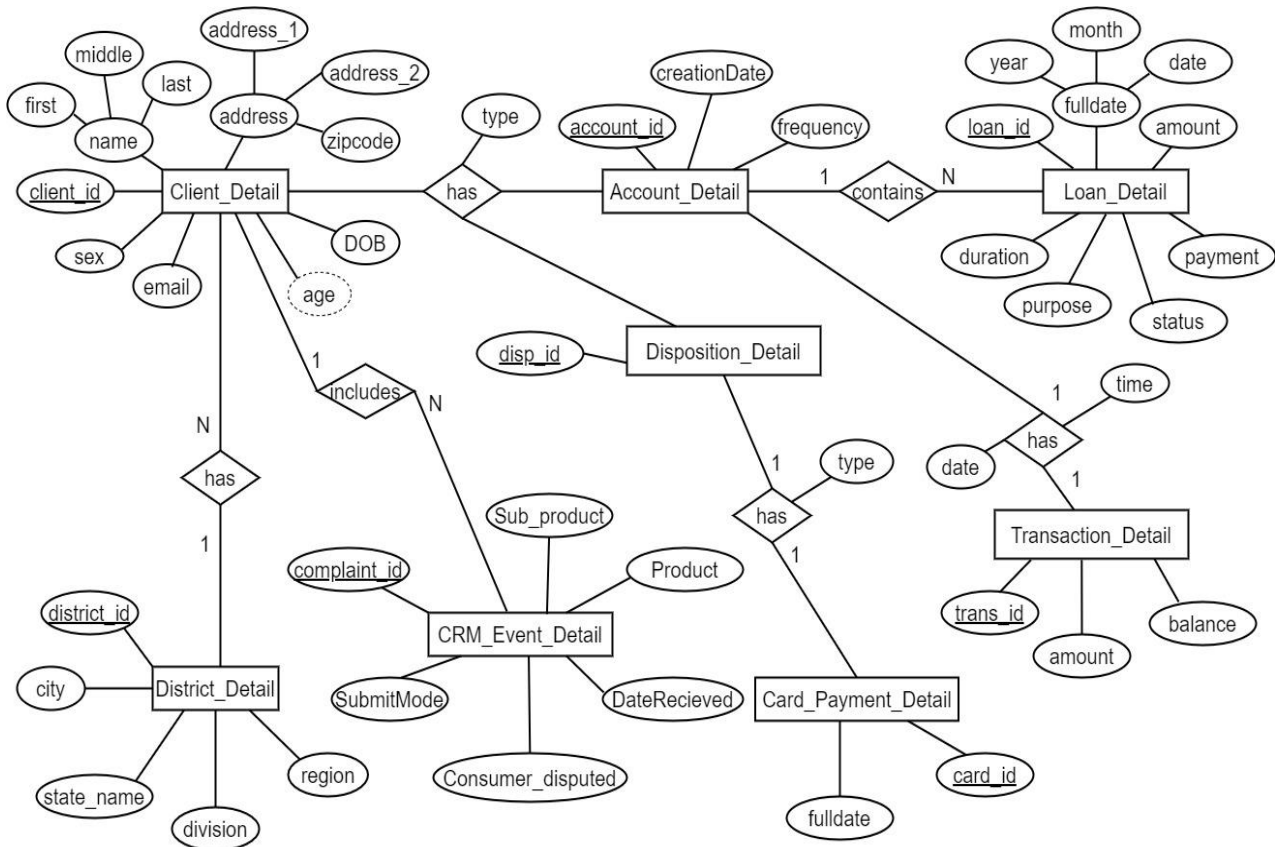
Data Source for the Assignment.....	3
SSAS Cube Implementation .....	4
Demonstration of OLAP Operations .....	9
SSRS Reports .....	14
Power BI Dashboard .....	18

## Data Source for the Assignment 2

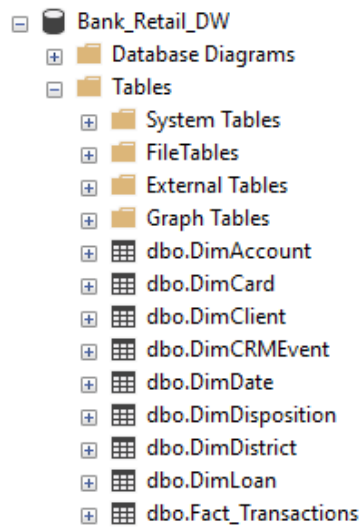
I have chosen a bank retail dataset from data world. This data set reflects combinations between retail banking of clients, related to credit card payments, loans and transactions. Client details, client transaction information, account details, loan details and credit card payment details are some of the key details included in the data set.

The link to the source data set is mentioned below:

<https://data.world/lpetrocelli/retail-banking-demo-data>



I used a snowflake schema for my data warehouse. There are 8 dimension tables and one fact table.



# SSAS Cube Implementation

Tools Used:

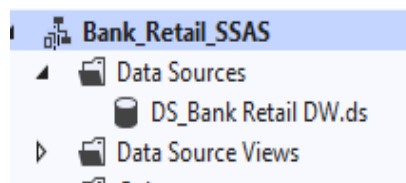
- SQL Server Data Tools
- SQL Server Management Studio

Steps:

1. Create the SSAS Project
2. Create a Data Source
3. Create a Data Source View
4. Create a Cube
5. Deploy the Cube

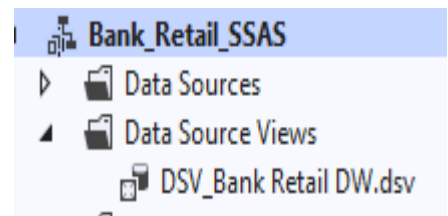
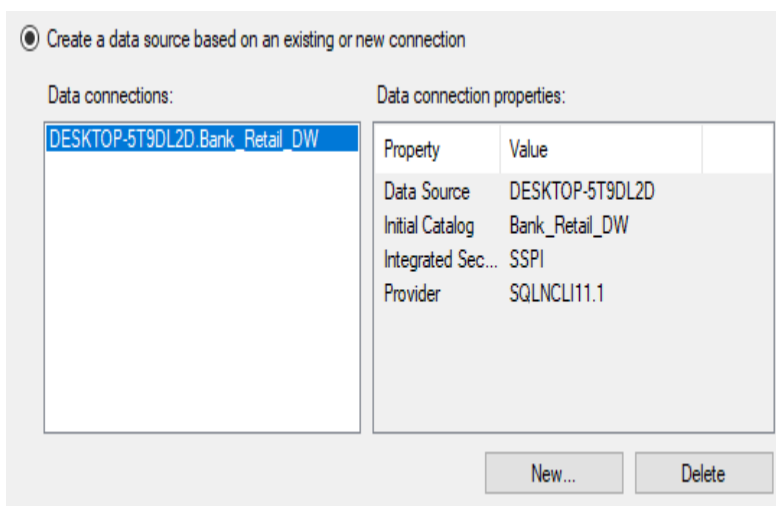
## Step 1: Creating the SSAS Project

In SQL server Data tools, I created an Analysis Services Multidimensional and Data Mining Project and named it as **Bank\_Retail\_SSAS**.

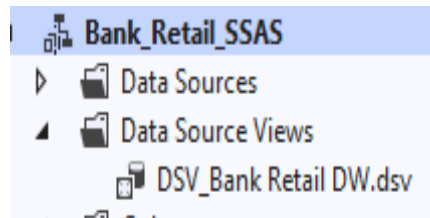


## Step 2: Creating a Data Source

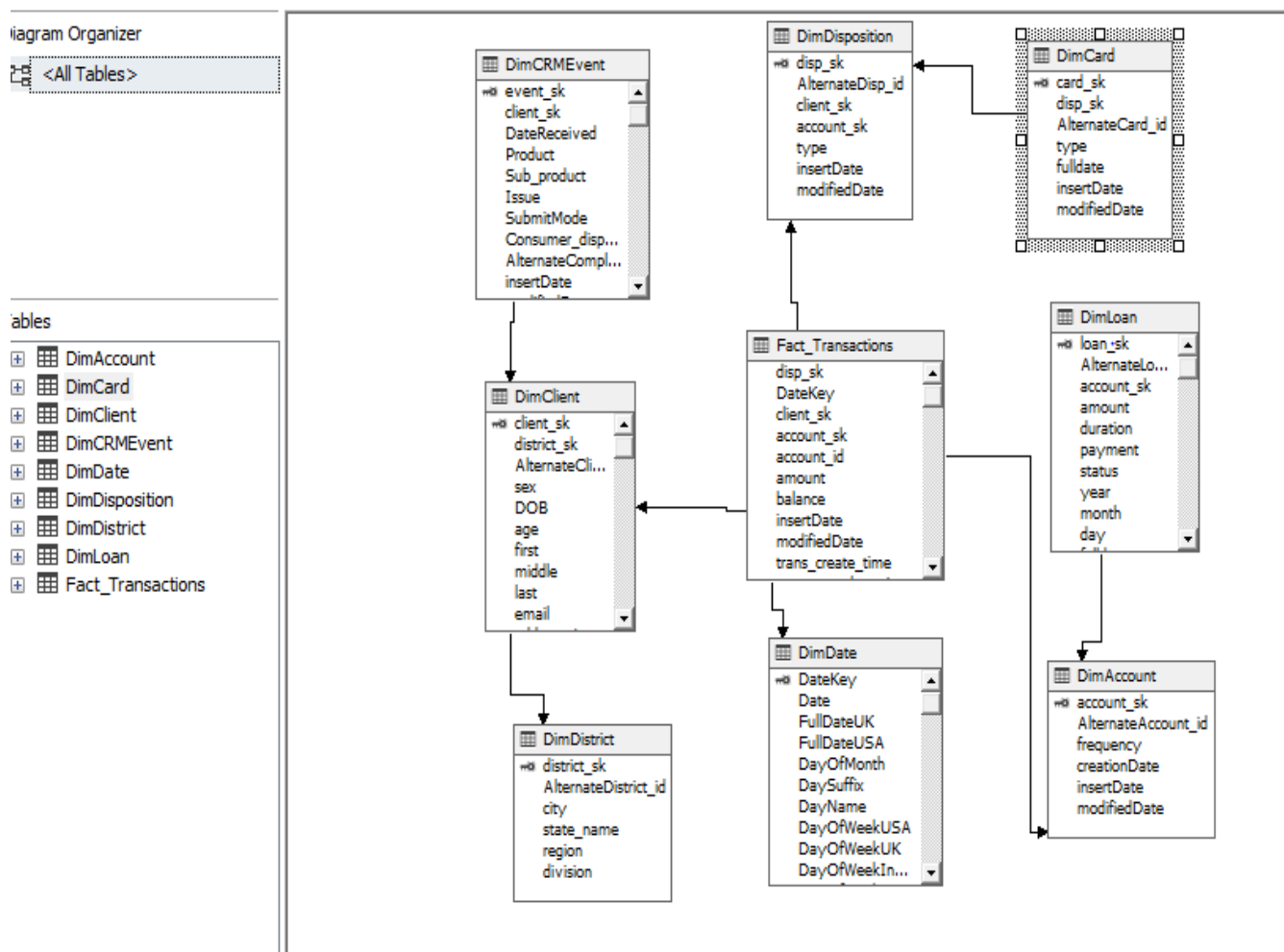
Data source defines from where, the cube is extracting data. At this step I created connection to the data warehouse.



### Step 3: Creating a Data Source View

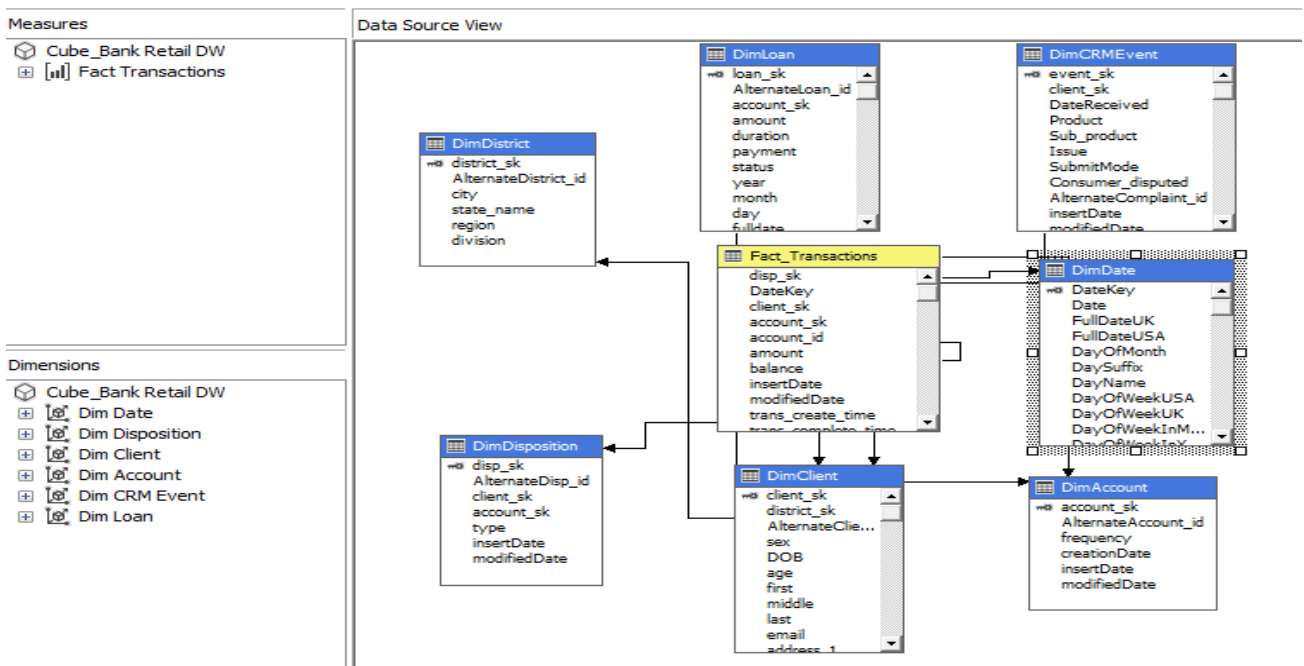


In this step I created a new data source view named DSV\_Bank Retail DW and after that I selected all dimension tables and fact table and created table links.

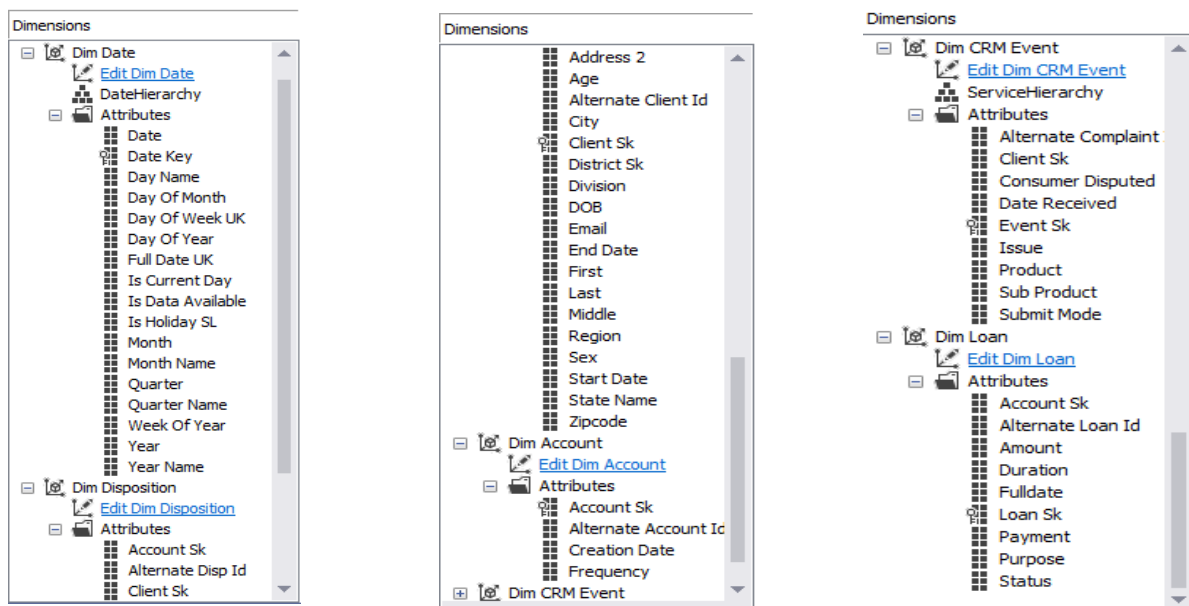


## Step 4: Creating a Cube

1. The data source view had created with the relevant tables in the previous section. We can use this existing data source to create the Cube.
2. From the "Cube wizard" select all the measures from the "Fact Transactions" fact table which is needed to include in the cube.
3. In the Select New Dimensions page, Selected the dimensions "Dim Disposition", "Dim client", "Dim Date", "Dim Account", "Dim CRM Event" and "Dim Loan"
4. The cube is named as Cube\_Bank\_Retail DW



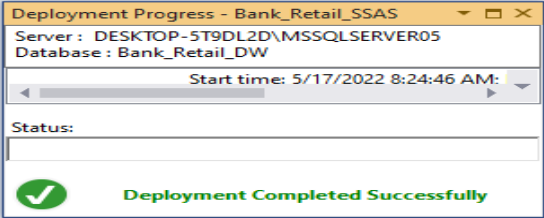
After that I added all the attributes to the dimension tables except SK. (it was already added).



## Step 5: Deploy the Cube

Provide connection credentials and deployed the cube.

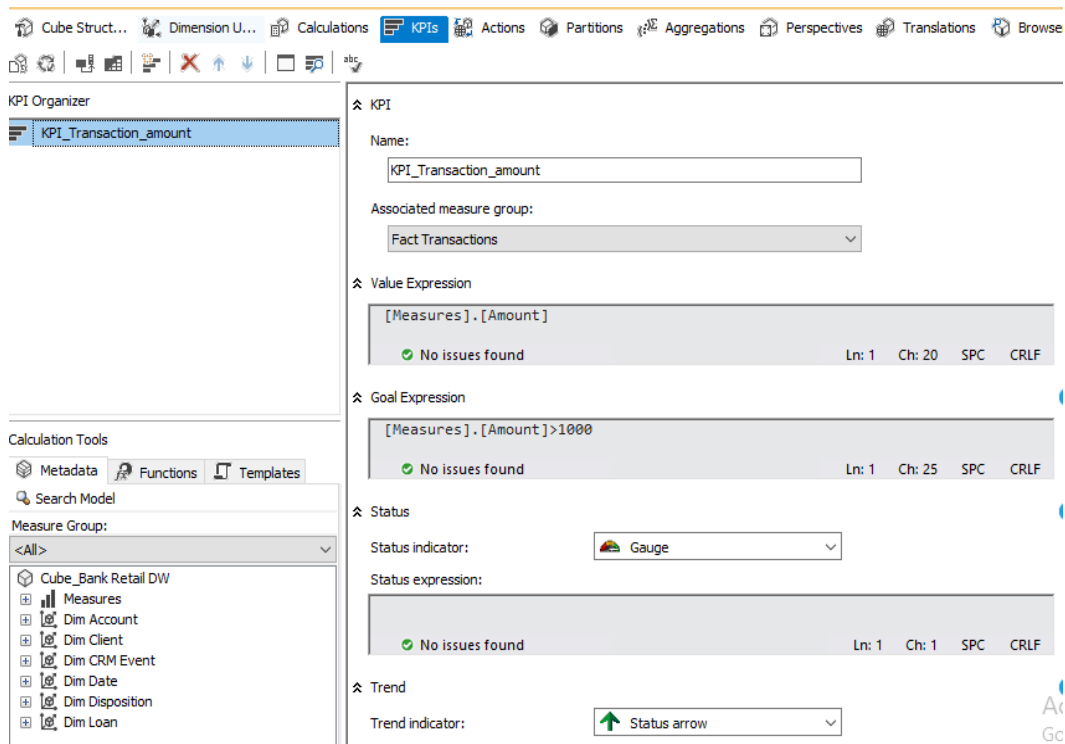
```
Build started...
----- Build started: Project: Bank_Retail_SSAS, Configuration: Development -----
Started Building Analysis Services project: Incremental ....
Hierarchy [Dim Date].[DateHierarchy] : Attribute relationships do not exist between
Dimension [Dim Date] : Avoid visible attribute hierarchies for attributes used as le
Dimension [Dim Disposition] : Create hierarchies in non-parent child dimensions.
Hierarchy [Dim Client].[LocationHierarchy] : Attribute relationships do not exist be
Dimension [Dim Client] : Avoid visible attribute hierarchies for attributes used as
Dimension [Dim Account] : Create hierarchies in non-parent child dimensions.
Hierarchy [Dim CRM Event].[ServiceHierarchy] : Attribute relationships do not exist
Dimension [Dim CRM Event] : Avoid visible attribute hierarchies for attributes used
Dimension [Dim Loan] : Create hierarchies in non-parent child dimensions.
Database [Bank_Retail_DW] : The database has no Time dimension. Consider creating on
Build complete -- 0 errors, 10 warnings
----- Deploy started: Project: Bank_Retail_SSAS, Configuration: Development -----
Performing an incremental deployment of the 'Bank_Retail_DW' database to the 'DESKTO
Generating deployment script...
Add Cube Cube_Bank Retail DW
Process Database Bank_Retail_DW
Done
Sending deployment script to the server...
Done
Deploy complete -- 0 errors, 0 warnings
===== Build: 1 succeeded or up-to-date, 0 failed, 0 skipped =====
===== Deploy: 1 succeeded, 0 failed, 0 skipped =====
```



## Creating a KPI

A Key Performance Indicator is the measurable value that demonstrates how effectively the company is achieving its key business objectives.

Here, I created a KPI to check transaction amount greater than 1000.



## Creating Hierarchy

Created hierarchy in District Dimension.

The screenshot shows the 'Dimension Structure' tool interface. The 'Attributes' pane on the left lists attributes for 'Dim Client', including 'District Sk'. The 'Hierarchies' pane in the center shows a new hierarchy named 'LocationHierarchy' being created, with levels for 'Division', 'State Name', 'Region', 'City', and 'Zipcode'. A tooltip indicates: 'To create a new hierarchy, drag an attribute here.' The 'Data Source View' pane on the right shows two data sources: 'DimDistrict' and 'DimClient'. 'DimDistrict' contains attributes: 'district\_sk', 'AlternateDistrict\_id', 'city', 'state\_name', 'region', and 'division'. 'DimClient' contains attributes: 'client\_sk', 'district\_sk', 'AlternateClien...', 'sex', 'DOB', 'age', 'first', 'middle', 'last', and 'email'. An arrow points from 'DimClient' to 'DimDistrict'.

## Creating Role

I created a role named cubereader with permission read definition

The screenshot shows the 'General' tab of a role configuration tool. The tabs at the top are: General, Membership, Data Sources, Cubes, Cell Data, Dimensions, Dimension Data, and Mining Structures. The 'General' tab is selected.

The database role defines a category of users and groups that have the same permissions on the database.

Role name:

Role description:

Set the database permissions for this role:

- ☐ Full control ( Administrator )
- ☐ Process database
- ☒ Read definition



## Demonstration of OLAP Operations

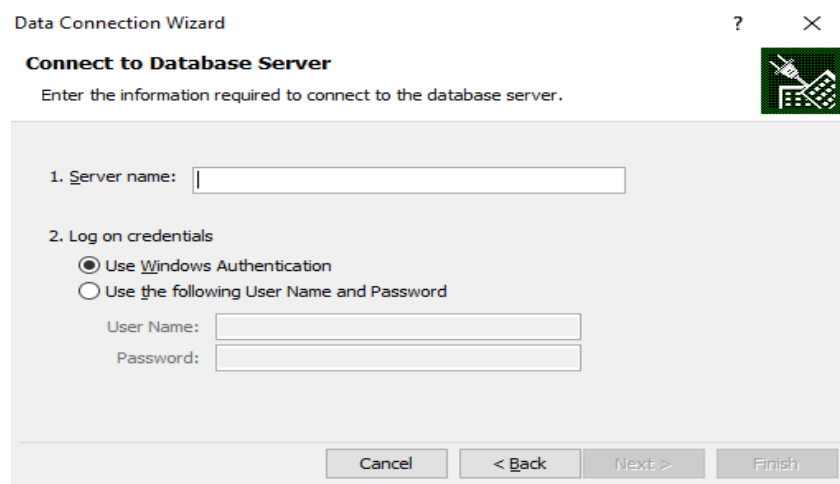
Tools used:

- Microsoft Excel
- SQL Server Management Studio

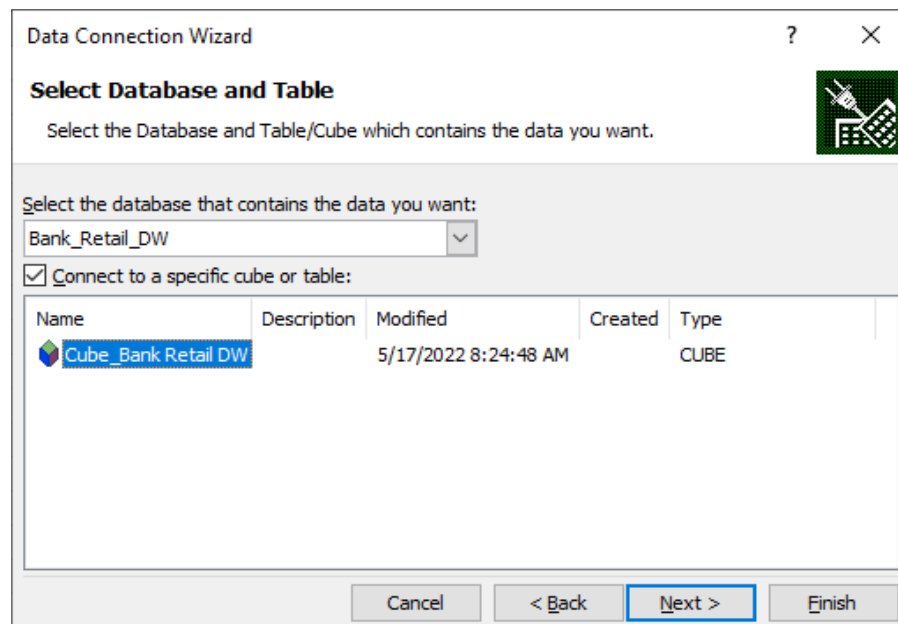
### Connecting cube excel

Connecting Excel to SSAS Cube without MDX.

- In the Excel sheet Data tab, select From Other Sources Then from Analysis Service.



The screenshot shows the 'Data Connection Wizard' window, specifically the 'Connect to Database Server' step. The window title is 'Data Connection Wizard'. The main heading is 'Connect to Database Server'. Below the heading, it says 'Enter the information required to connect to the database server.' There are two steps: 1. Server name: with a text input field. 2. Log on credentials: with two radio buttons. The first radio button is selected and labeled 'Use Windows Authentication'. The second radio button is labeled 'Use the following User Name and Password'. Below the second radio button are two text input fields: 'User Name:' and 'Password:'. At the bottom right, there are four buttons: 'Cancel', '< Back', 'Next >', and 'Finish'.



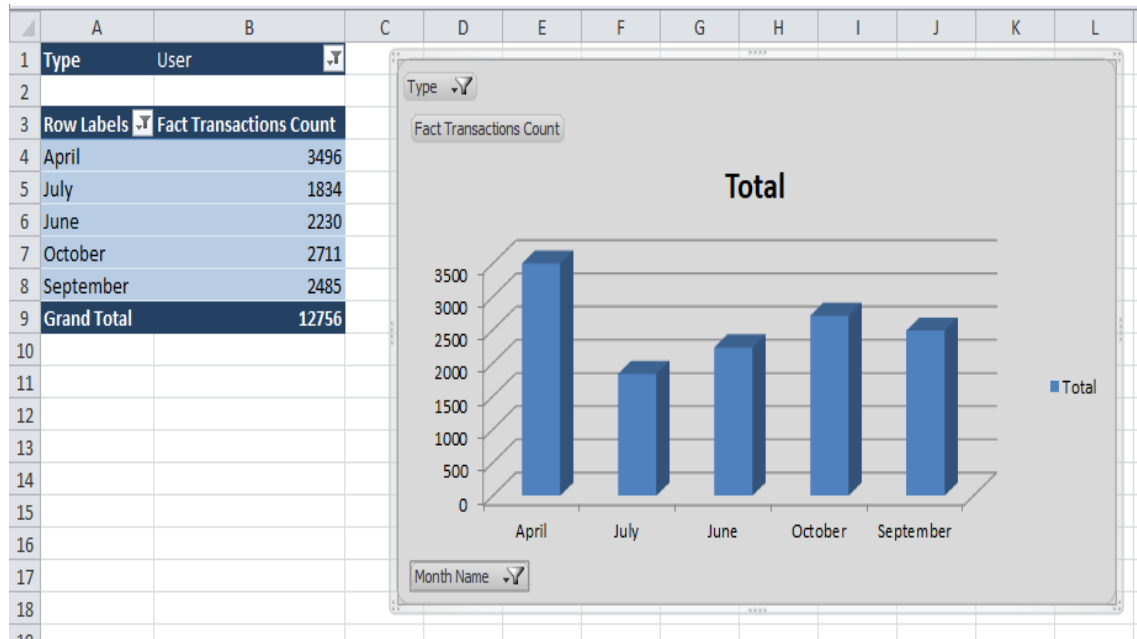
The screenshot shows the 'Data Connection Wizard' window, specifically the 'Select Database and Table' step. The window title is 'Data Connection Wizard'. The main heading is 'Select Database and Table'. Below the heading, it says 'Select the Database and Table/Cube which contains the data you want.' There is a text input field for 'Select the database that contains the data you want:' with the value 'Bank\_Retail\_DW' and a dropdown arrow. Below this is a checkbox labeled 'Connect to a specific cube or table:' which is checked. Below the checkbox is a table with the following columns: Name, Description, Modified, Created, and Type. The table contains one row with the following data: Name: 'Cube\_Bank Retail DW', Description: (empty), Modified: '5/17/2022 8:24:48 AM', Created: (empty), and Type: 'CUBE'. At the bottom right, there are four buttons: 'Cancel', '< Back', 'Next >', and 'Finish'. The 'Next >' button is highlighted with a blue border.

Name	Description	Modified	Created	Type
Cube_Bank Retail DW		5/17/2022 8:24:48 AM		CUBE

## OLAP Operations

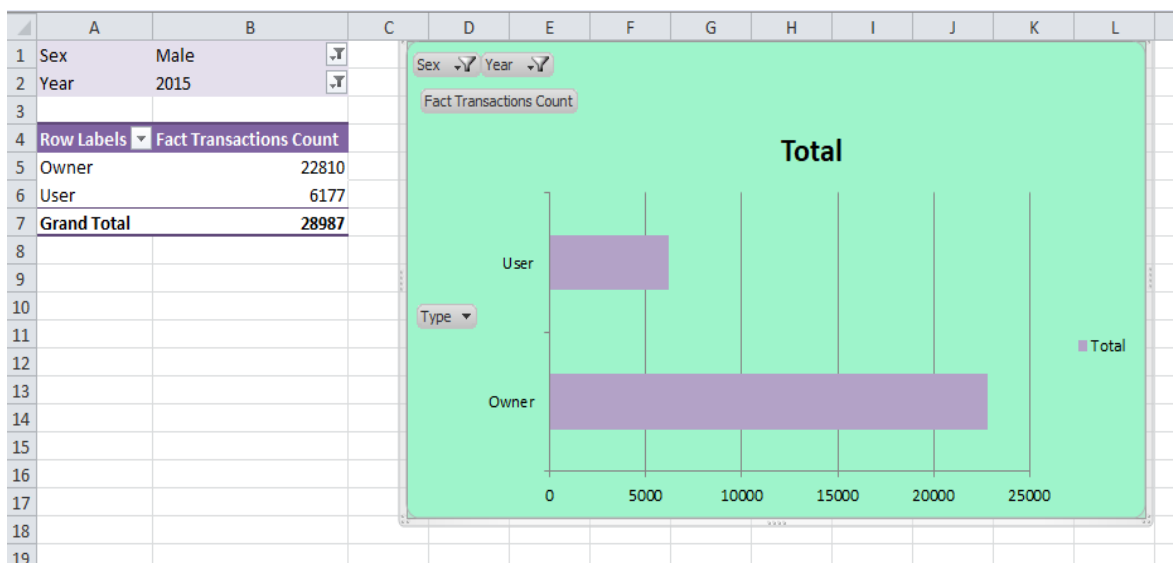
### Slice

- A new sub cube is created using one dimension.



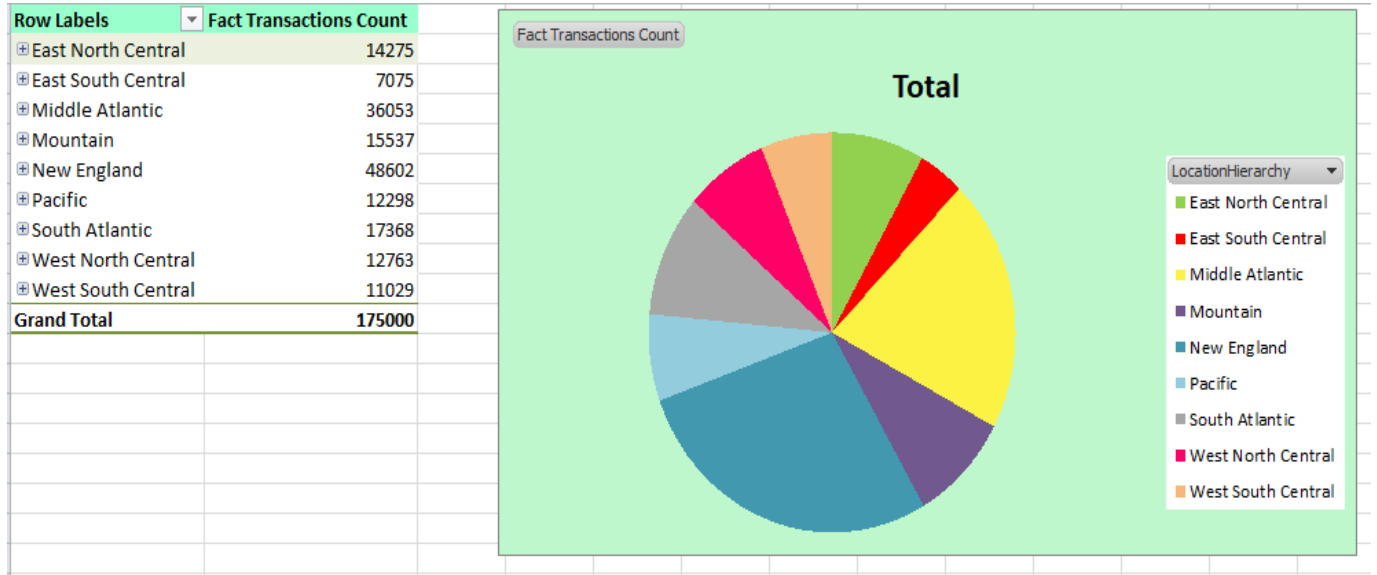
### Dice

- Dice is similar to slice.
- But here two or more dimensions are resulted in the creation of a sub cube.
- Here the dimensions DimDate(Year), DimDisposition(type), Fact\_Transactions and DimClient(sex) results in creation of the subcube.



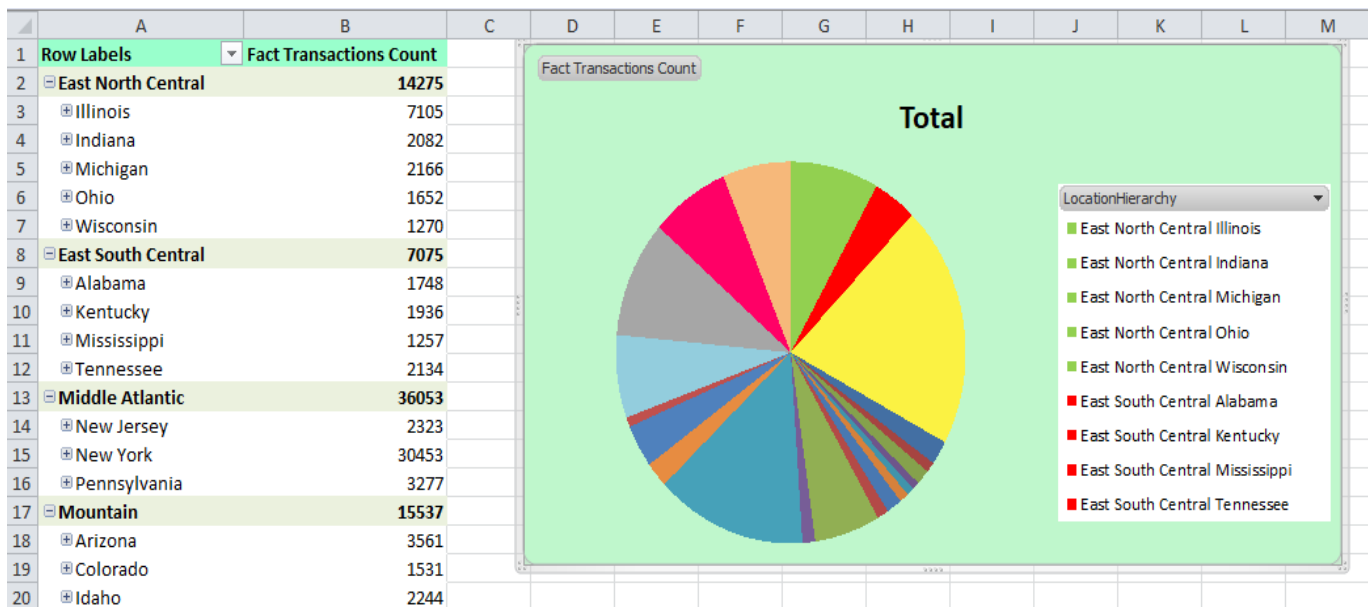
## Roll Up

- Roll up is known as “consolidation” or “aggregation”.
- Here roll up operation is performed climbing up the location concept hierarchy of DimDistrict.



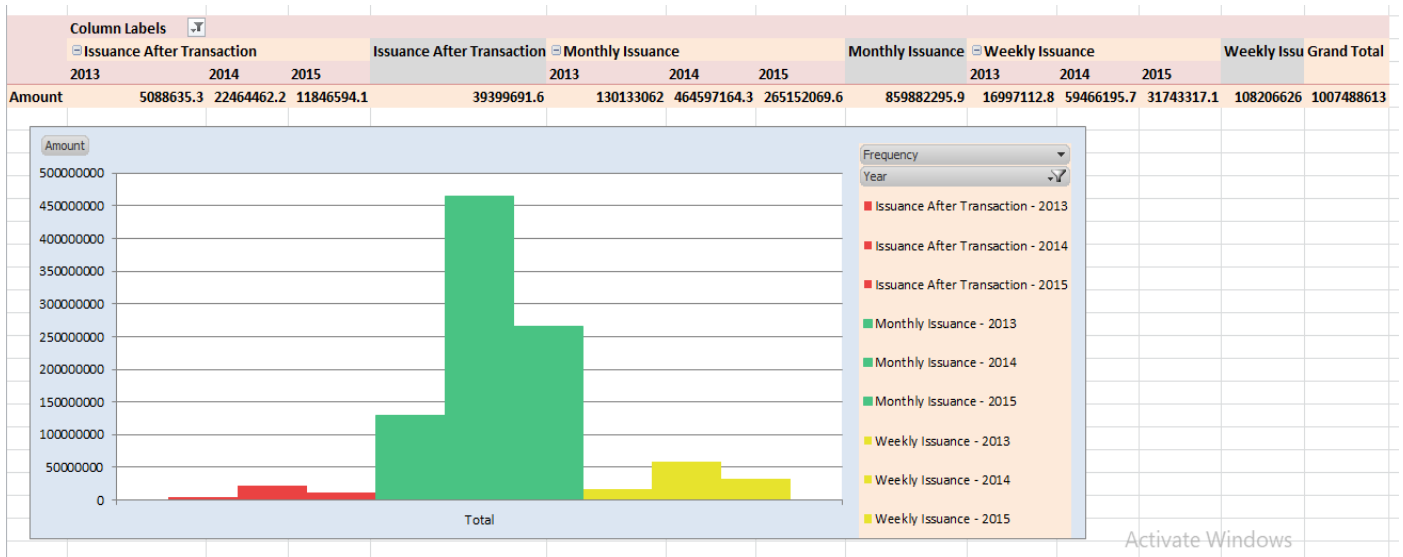
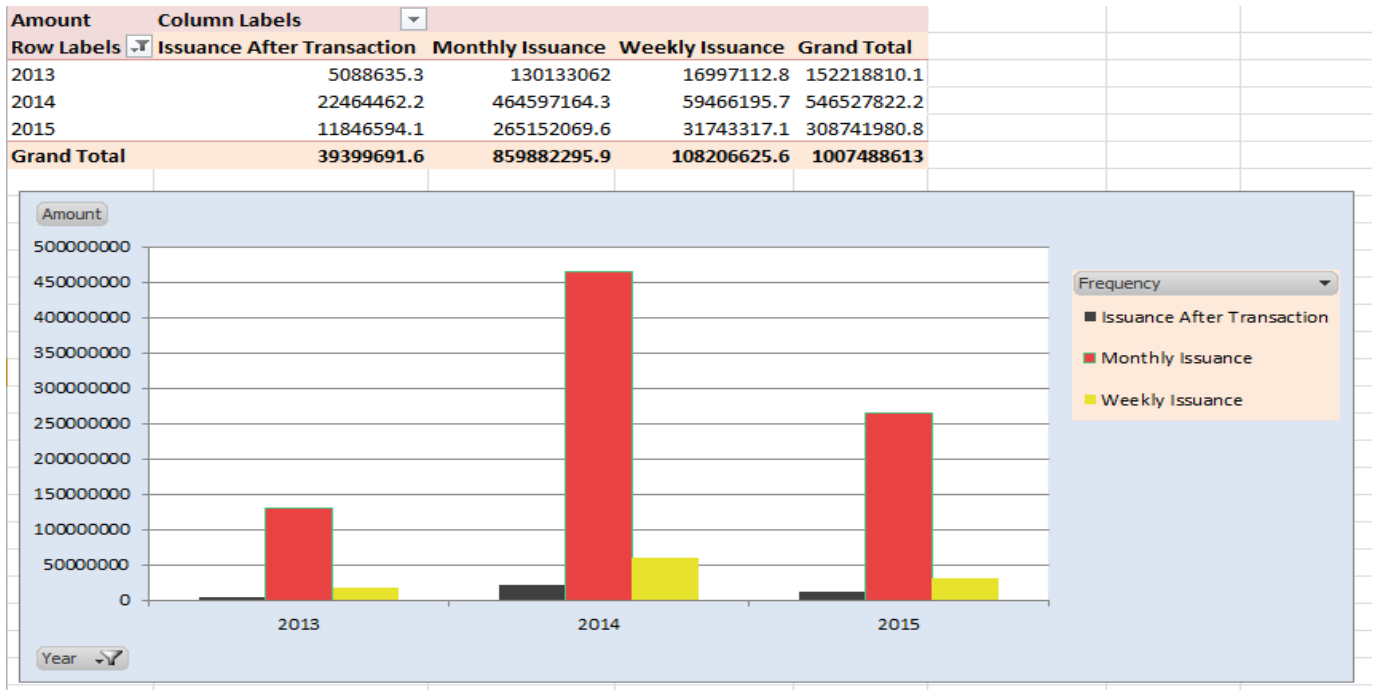
## Drill Down

- In drill down data is fragmented into smaller parts.
- It can be done via moving down the concept hierarchy increasing the dimension.
- Here data hierarchy of DimDistrict is drilled down.



## Pivot

- Pivot is a visualization operation which rotates the data axes in view to provide an alternative presentation of the data.



## **SSRS Reports**

[Report 01 - Report with matrix](#)

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Account frequency type wise monthly transaction report

Month	Type	Type	Total
February	Monthly Issuance	Monthly Issuance	21139781.3000
April	Monthly Issuance	Monthly Issuance	69022718.1000
March	Monthly Issuance	Monthly Issuance	652945286.0000
October	Monthly Issuance	Monthly Issuance	66998065.5000
<b>Total</b>	<b>342823481.8000</b>	<b>467282369.1000</b>	<b>810105850.9000</b>

## Report 02 - Report with more than one parameter

Issue  Consumer disputed

☐ (Select All)  
☐ Bankruptcy  
☒ Balance transfer fee  
☒ Delinquent account  
☒ Using a debit or ATM card  
☒ Sale of account  
☐ Transaction issue

Issue  Consumer disputed

☐ (Select All)  
☒ Yes  
☐ No

Issue  Balance transfer fee, Delinquent ac Consumer disputed  Yes

1 of 2 ? 100%

Issue and consumer disputed wise CRM event report

Product	Sub product	Submit Mode	Date Received
Bank account or service	Other bank product/service	Web	11/9/2016 12:00:00 AM
Bank account or service	Other bank product/service	Web	11/9/2016 12:00:00 AM
Bank account or service	Other bank product/service	Web	11/9/2016 12:00:00 AM
Bank account or service	Other bank product/service	Web	11/9/2016 12:00:00 AM
Bank account or service	Other bank product/service	Web	11/9/2016 12:00:00 AM

[Report 3: Create an SSRS drill-down report.](#)

Year and month wise loan amount obtained by clients

.....

Datewise loan amount obtained

Year	Month	loan Amount
2011	April	
		65184.0000
		65184.0000
		65184.0000
		41904.0000
		41904.0000
	August	
		105804.0000



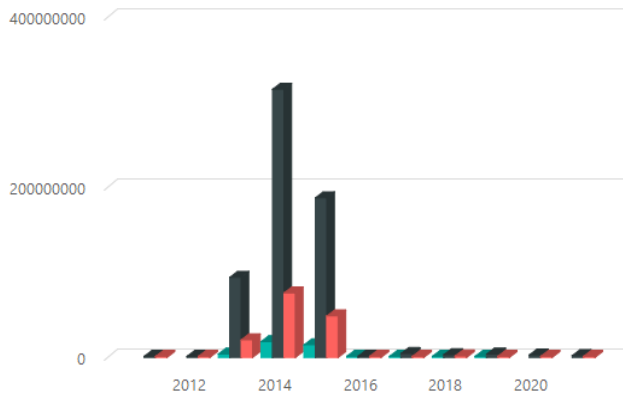
## Report 4: Create an SSRS drill-through report.

This chart shows amount of transactions done in years and we can view number of transactions done during each month by clicking an



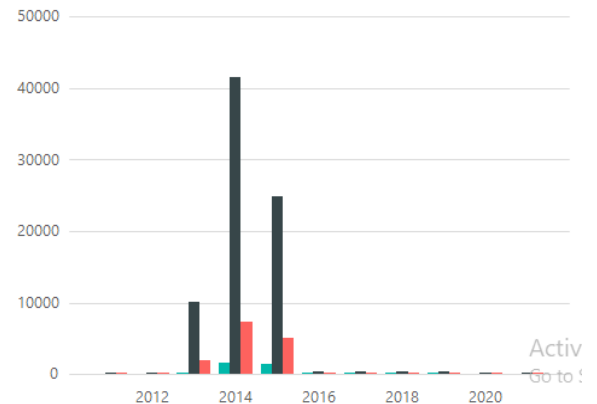
Yearly transaction amount

■ Issuance After Transaction ■ Monthly Issuance ■ Weekly Issuance



Month wise number of transactions

■ Issuance After Transaction ■ Monthly Issuance ■ Weekly Issuance



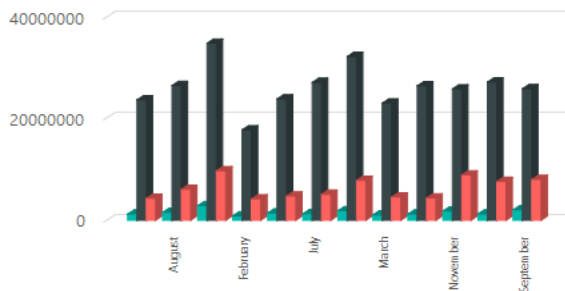
Jackton-5f9dl7d/Reports/favorites

Activ  
Go to !



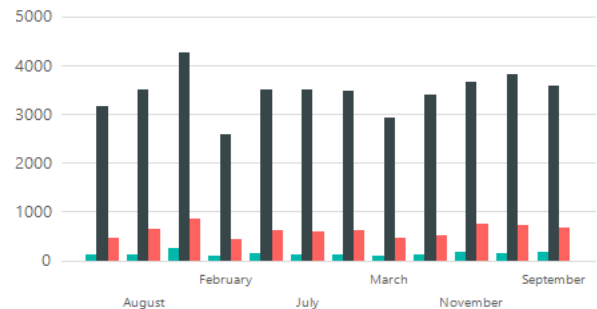
Yearly transaction amount

■ Issuance After Transaction ■ Monthly Issuance ■ Weekly Issuance



Month wise number of transactions

■ Issuance After Transaction ■ Monthly Issuance ■ Weekly Issuance



# Power BI Dashboard

