

# **Business Analytics with Power BI**

## **Module 3 – Predictive Analytics with Power BI and R**

*Student Lab Manual – Lab 3 – Using R with  
Power BI*

Version 1.0

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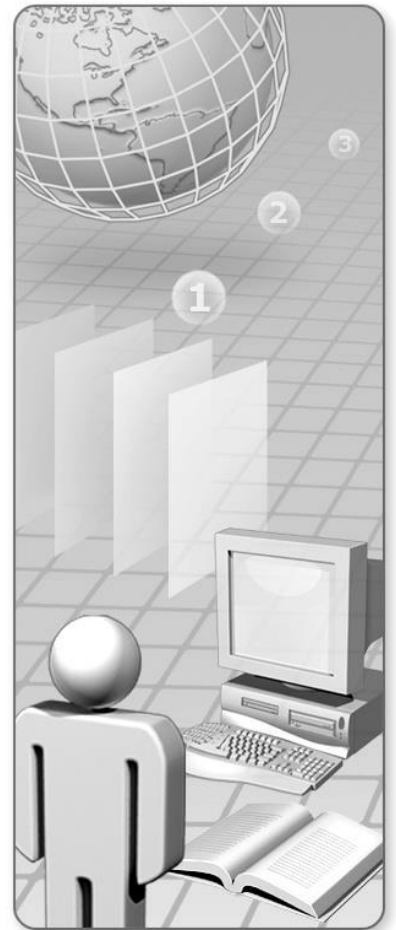
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## Module 3

### Predictive Analytics with Power BI and R

#### Lab 3 – Using R with Power BI



## Lab 3: Using R with Power BI

### Introduction

As seen in the lab 2, R language is very powerful. In this lab, you will use R as a data source for your analysis and also to create rich visualizations by using R libraries (**ggplot2** and **corrplot**).

### Objectives

After completing this lab, you will be able to:

- Create an analysis in Microsoft Power BI by using R data.
- Show R plots directly into a Power BI Desktop file.

### Estimated time to complete this lab

45 minutes (depends on experience)

### Resources

Virtual machine (VM) Name	<b>Business Analytics with Power BI - Module 1</b>
Domain	<b>POWERBI-WIN10</b>
User	<b>POWERBI-WIN10\LabUser</b>
Password	<b>P@ssw0rd1!</b>
Lab Files	<b>E:\Labs\</b>
Asset Files	<b>E:\Assets\</b>

# Exercise 1: Using R as a Data Source

## Introduction

In this exercise, you will create an analysis where the source is a script in R.

## Objectives

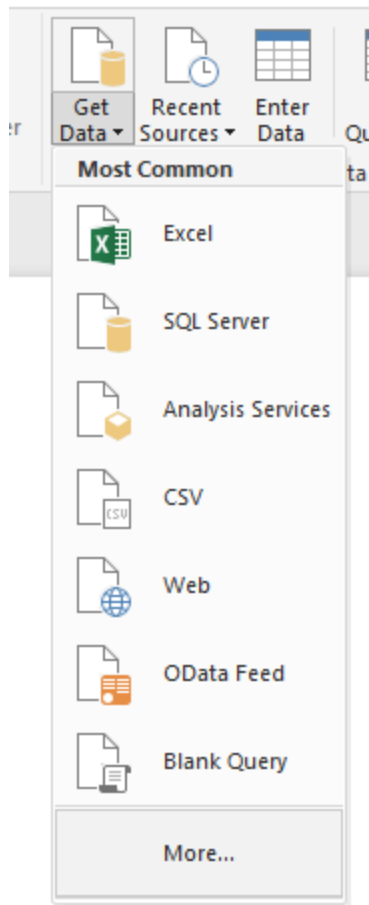
After completing this exercise, you will be able to:

- Create an analysis in Power BI using R data.

## Using R as a Data Source

In this task, you will create a Power BI Desktop report which data will come from a R script.

1. To open **Power BI Desktop**, in the taskbar, click the **Power BI Desktop** shortcut.
2. Click **Get Data** (ribbon menu), and then select **More**.



3. In the Search box, type **R Script**, and then click **Connect**.

## Get Data



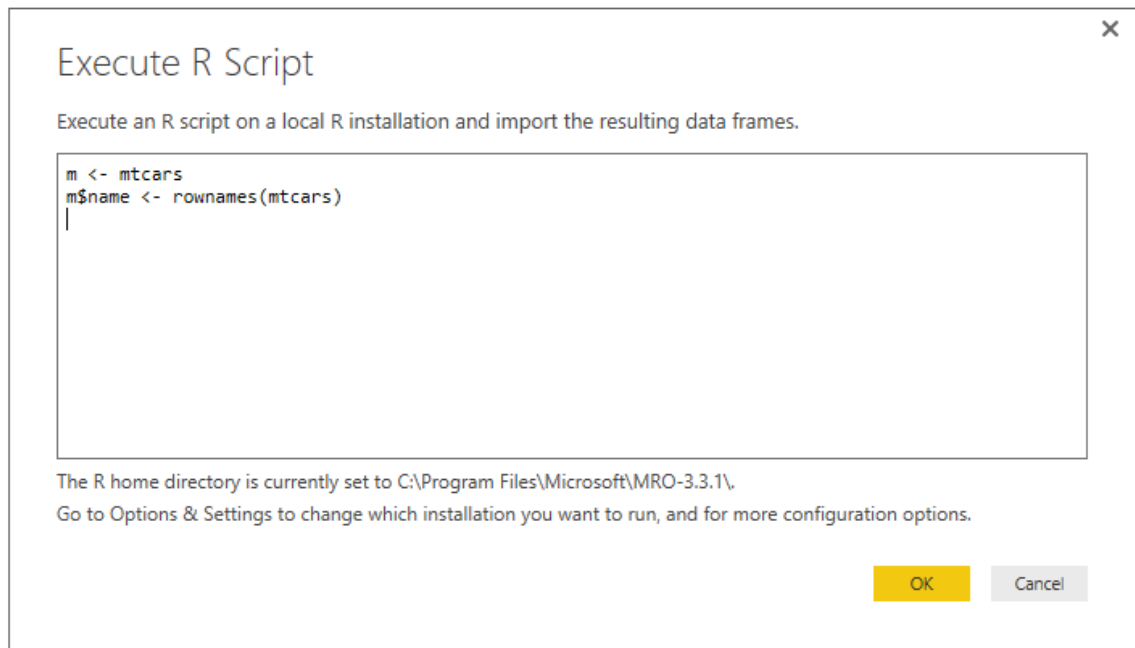
4. You should now see a window called **Execute R Script**. Input the following script to it.

```
m <- mtcars  
m$name <- rownames(mtcars)
```

*Note: You can input any R script here, as long you have R installed on your machine and the referenced libraries are installed.*

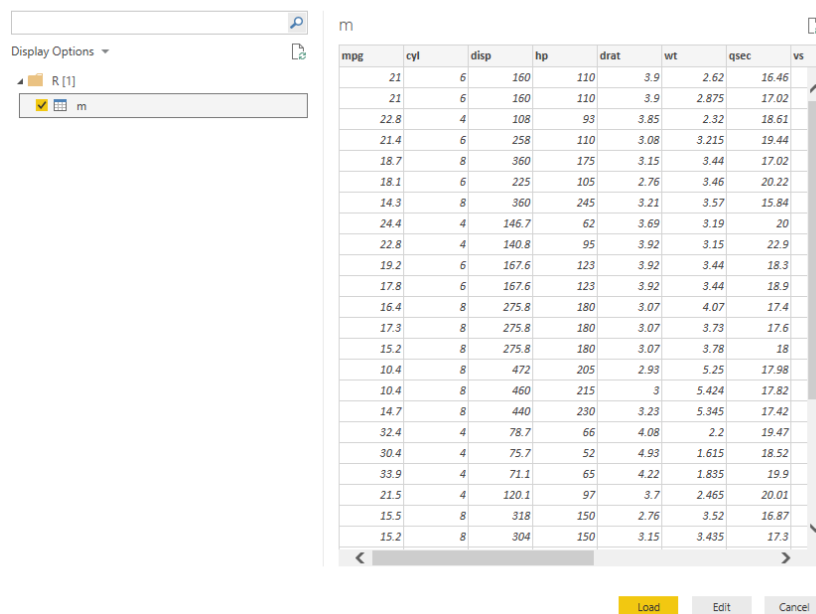


5. Your screen should be similar to the following screenshot. R is already installed on your virtual machine. Click **OK**.



6. In the navigator window, you should see **m** as an available dataset to use. Click the check box (left side of “m”) to select it. After that, you will be able to see a preview of your data.

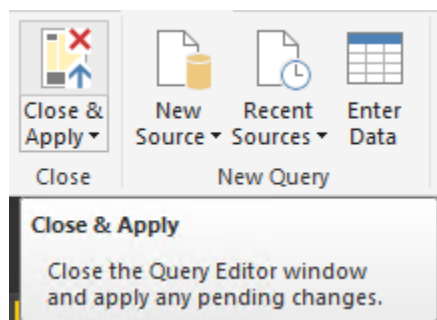
#### Navigator



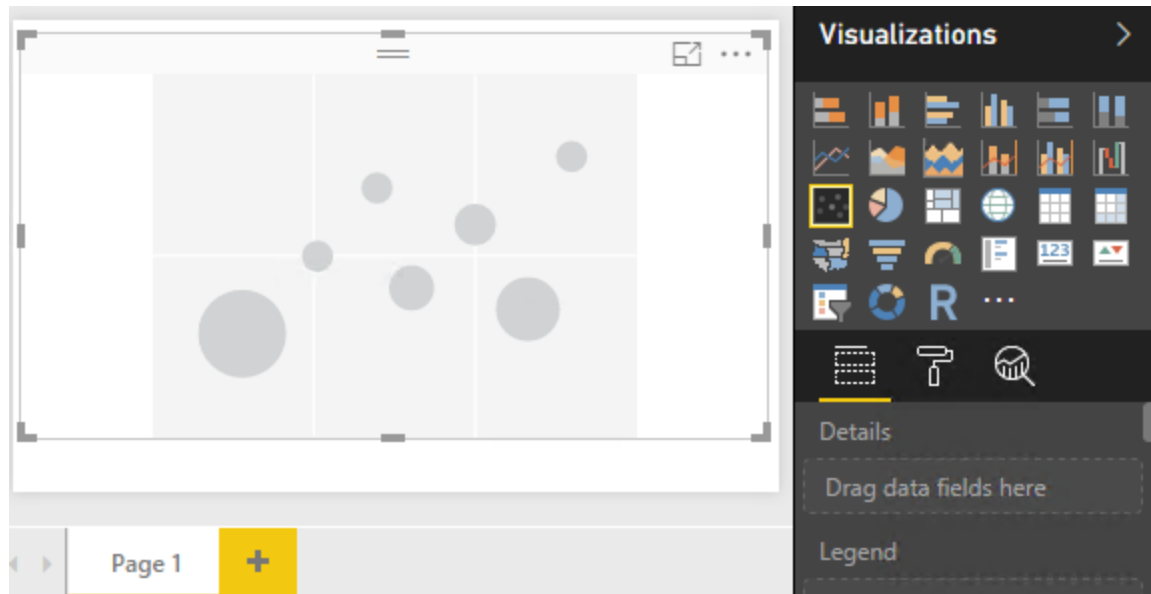
7. Click **Edit**.
8. In the **Query Settings** pane, change the name from **m** to **Cars**.
9. Remove the following columns from your query:  
**cyl, disp, drat, qsec, vs, am, gear, and carb**
10. Your screen should be similar to the following screenshot:

	1.2 mpg	1.2 hp	1.2 wt	name
1	21	110	2.62	Mazda RX4
2	21	110	2.875	Mazda RX4 Wag
3	22.8	93	2.32	Datsun 710
4	21.4	110	3.215	Hornet 4 Drive
5	18.7	175	3.44	Hornet Sportabout
6	18.1	105	3.46	Valiant
7	14.3	245	3.57	Duster 360
8	24.4	62	3.19	Merc 240D
9	22.8	95	3.15	Merc 230
10	19.2	123	3.44	Merc 280
11	17.8	123	3.44	Merc 280C
12	16.4	180	4.07	Merc 450SE
13	17.3	180	3.73	Merc 450SL

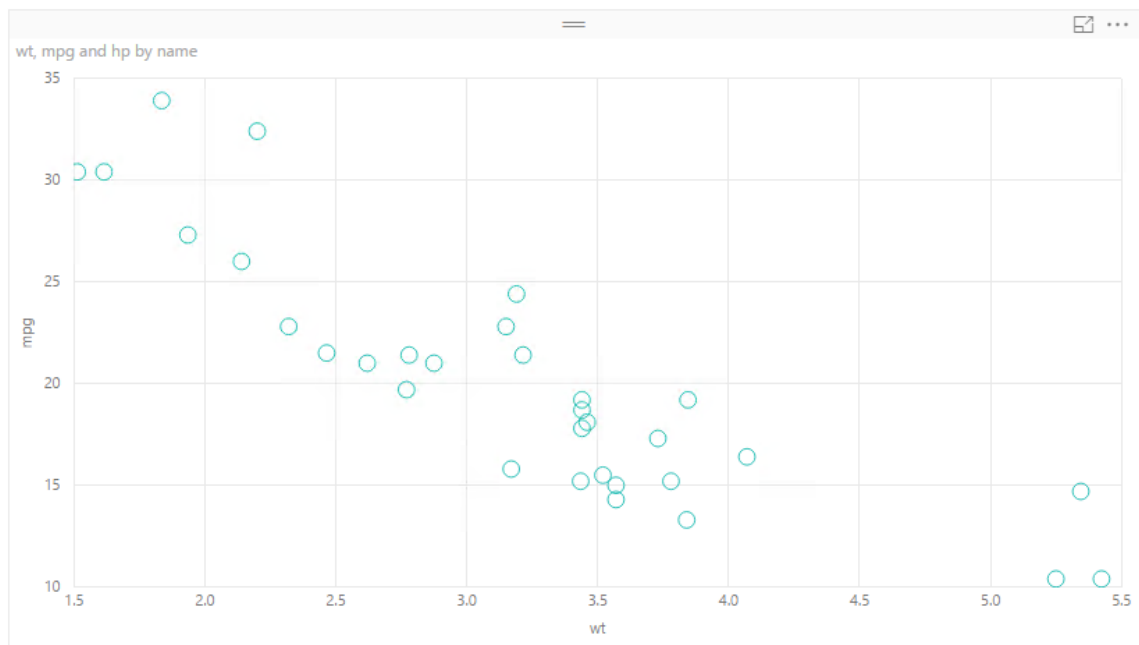
11. Click **Close & Apply**.



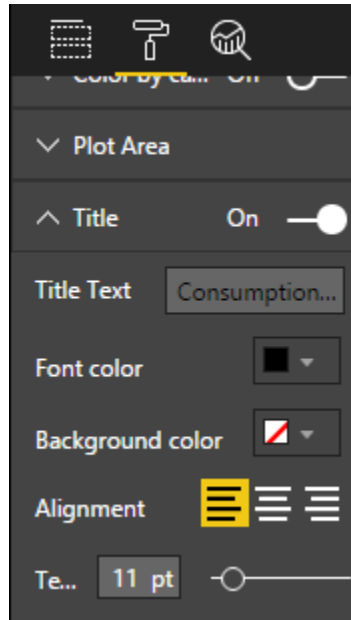
12. Add a **Scatter Chart** visual, and resize it to a bigger size (to occupy all the area of report).



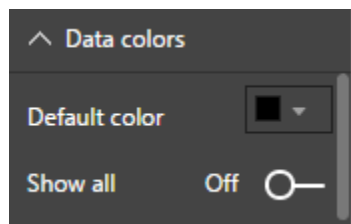
13. Add the field **name** to **Details**.
14. Add the field **wt** to **X Axis**.
15. Add the field **mpg** to **Y Axis**.
16. Add the field **hp** to **Tooltips**.
17. You should now have the following chart:



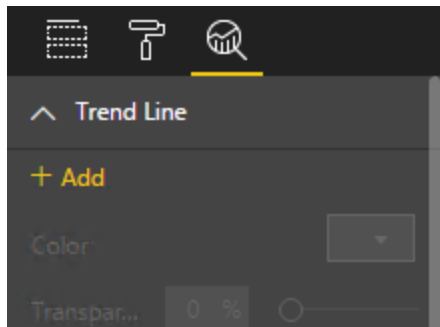
18. With the scatter chart selected, go to **Format** tab, expand **Title**, and change the **Title Text** property to **Consumption by weight**.
19. Change the **Font color** to **black**.
20. Change the **Text size** property to **11 pt**.



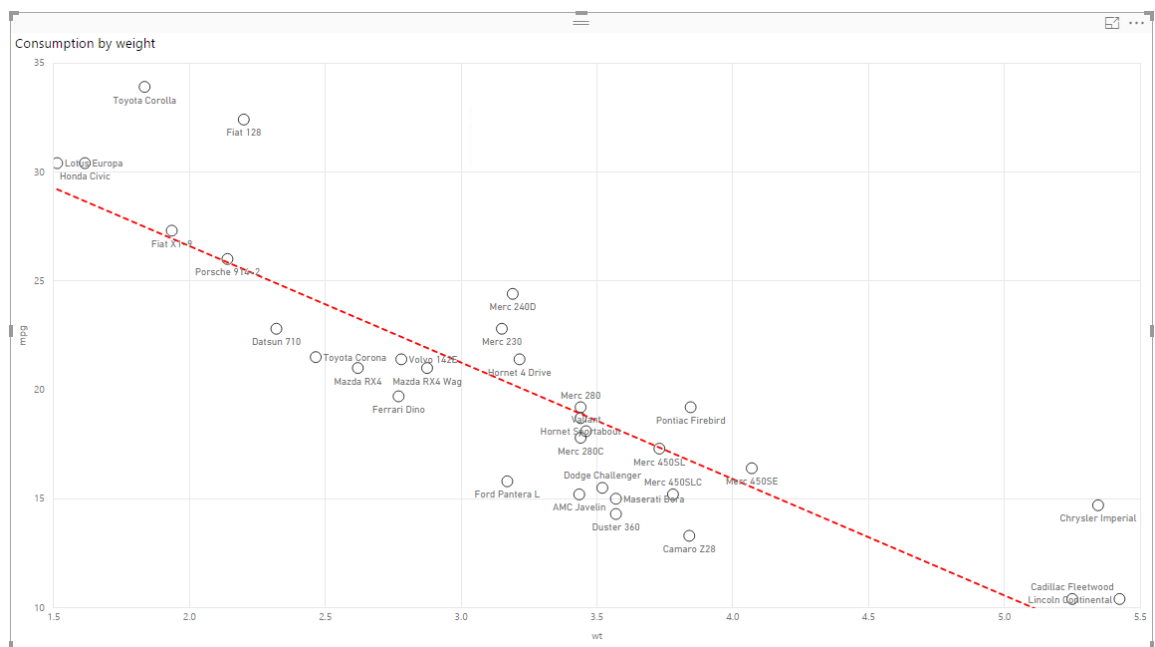
21. Still on **Format**, go to **Data colors**, and change the **Default color** to **black**,



22. Locate **Category labels** and change it to **On**.
23. Select the **Analytics** pane (you must have the scatter chart selected). Search for **Trend Line** and click **+ Add**.



24. Change the color to **Red**.
25. Now you have a scatter chart that uses R to generate data, and is plotting a trend line (similar to a linear regression).



26. You can save the report. Create and use the **E:\Labs\M3Lab3\** folder. Name the report as **RDataSource.pbix** and close **Power BI Desktop**.

## Exercise 2: Using R Visuals

### Introduction

In this exercise, you will use R Visual to show two charts generated by R code.

### Objectives

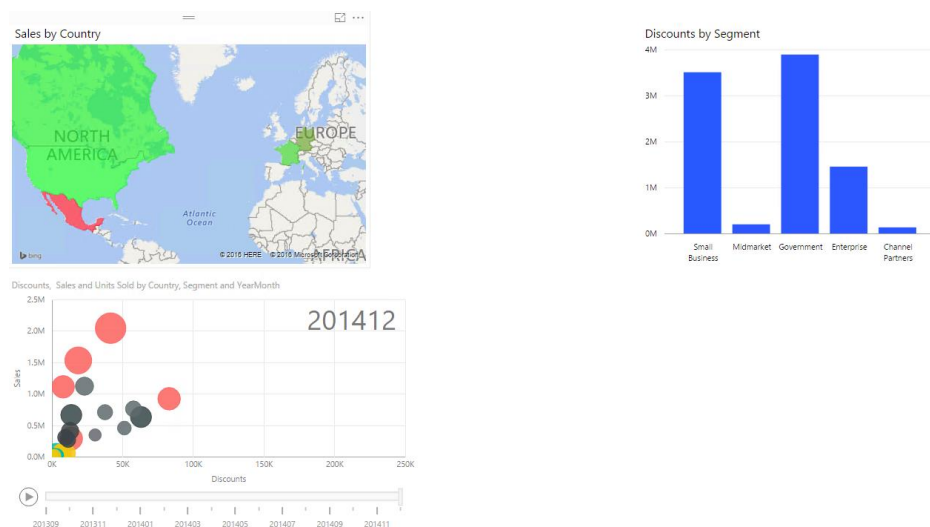
After completing this exercise, you will be able to:

- Show R plots directly into a Power BI Desktop file.

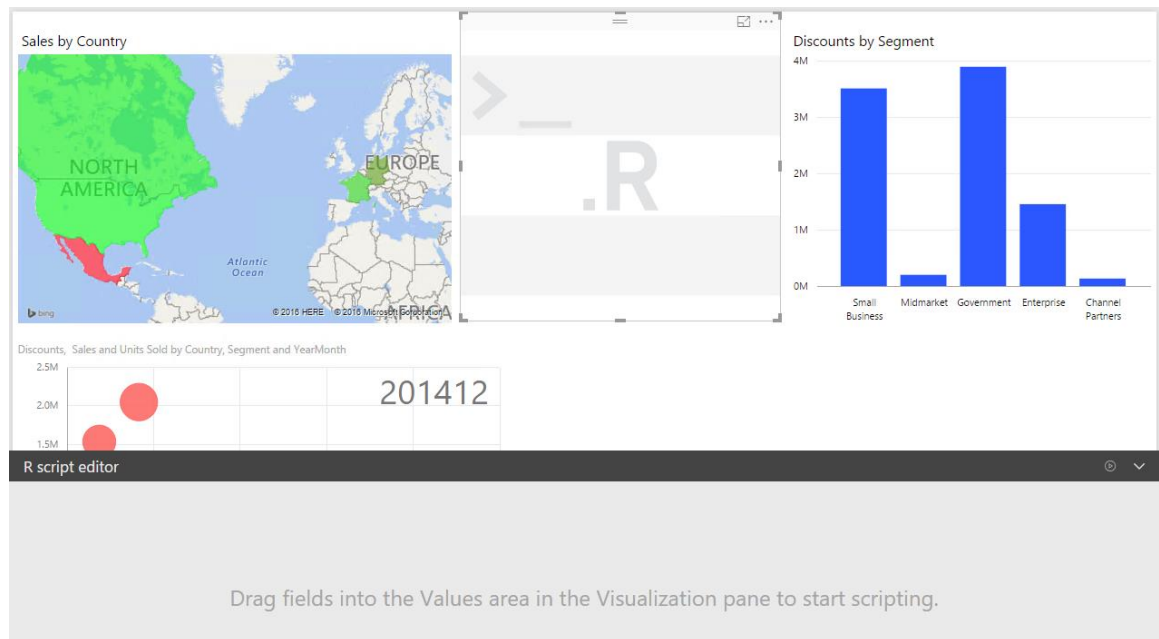
### Using R Visuals

In this task, you will edit an existing Power BI Desktop file to add two new visualizations created by using R code.

1. Go to **E:\Assets\M3 – Lab 3**. Create a copy from **Lab3\_RVisuals\_Initial.pbix** in **E:\Labs\M3Lab3**.
2. Open the file you just copied. You should see the following report:



3. Locate the R visual in the **Visualizations** pane. Add it to your report. Position it between the map and bar chart.



4. Drag the following fields to the **Values** property of the R visual. These values will compose the data frame available (called dataset) to you in the R script window:

**Profit, Discounts and Units Sold.**

5. Add the following R script to the **R script editor** window.

```
library(corrplot)           # R library "corrplot"
M <- cor(dataset)           # Computes a correlation matrix
corrplot(M)
```

```
R script editor

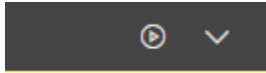
⚠ Duplicate rows were removed from the data.

# Create dataframe
# dataset <- data.frame(Profit, Discounts, Units Sold)

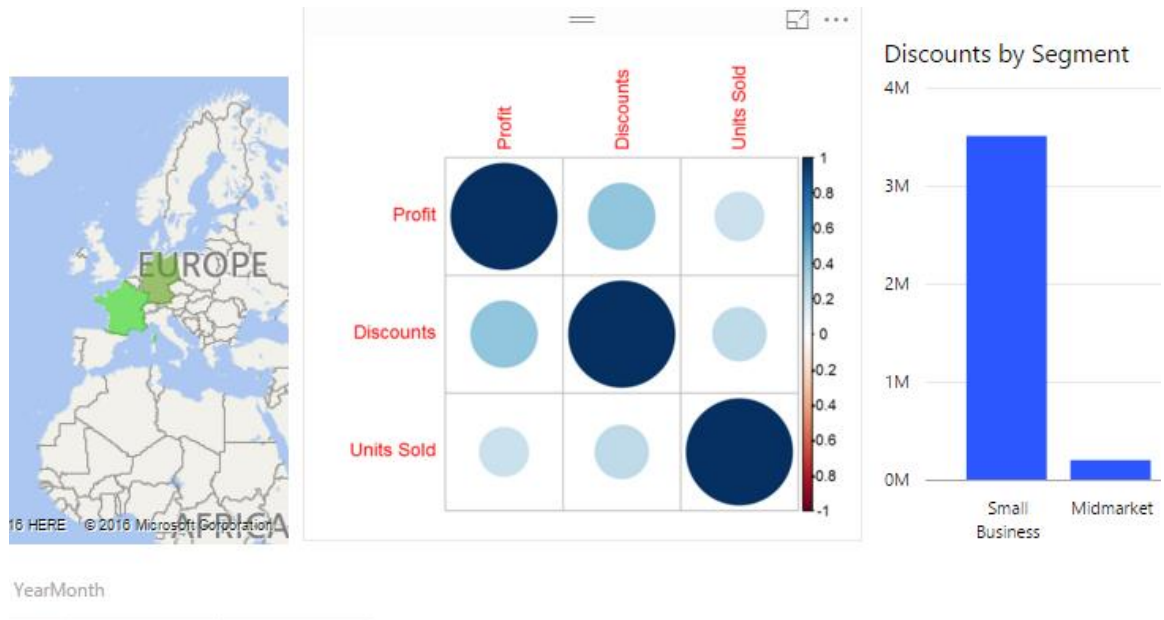
# Remove duplicated rows
# dataset <- unique(dataset)

library(corrplot)           # R library "corrplot"
M <- cor(dataset)           # Computes a correlation matrix
corrplot(M)
```

6. Click the play icon.



7. You should see the following result:



8. Add another R visual to the region below the existing R visual and bar chart.
9. Drag the following fields to the **Values** property from the R visual you just added:

**Sales and Segment**

10. Add the following code to the **R script editor** window.

```
library(ggplot2)

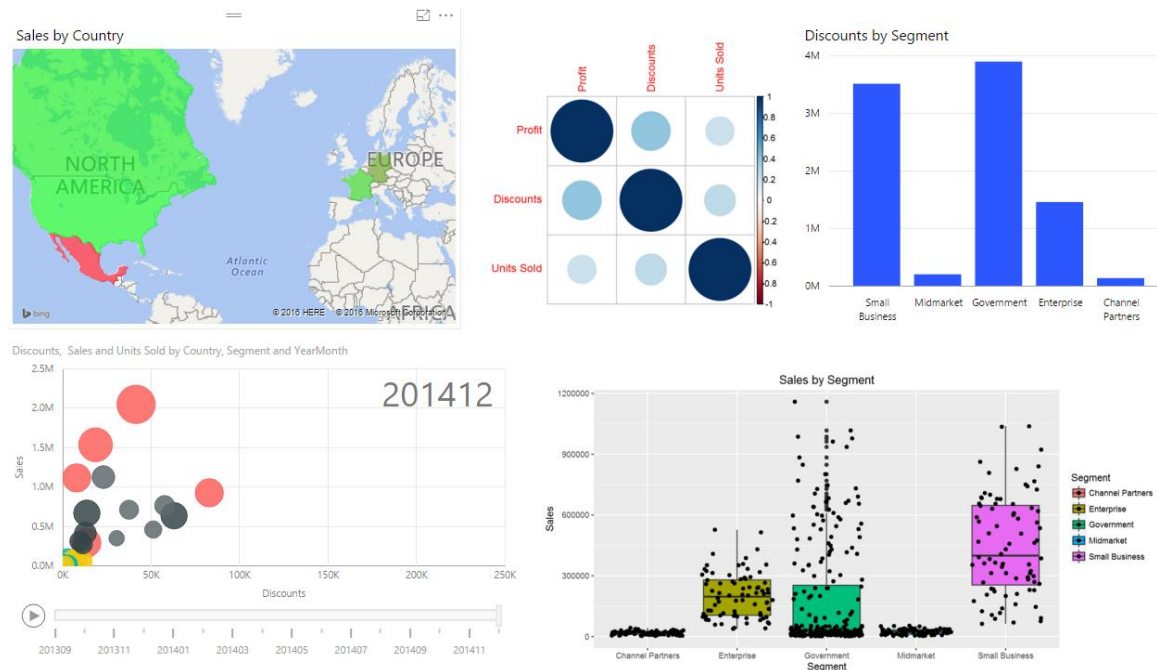
qplot(Segment, Sales, data=dataset, geom=c("boxplot", "jitter"),
fill=Segment, main="Sales by Segment", xlab="Segment",
ylab="Sales")
```

11. Click the play icon.

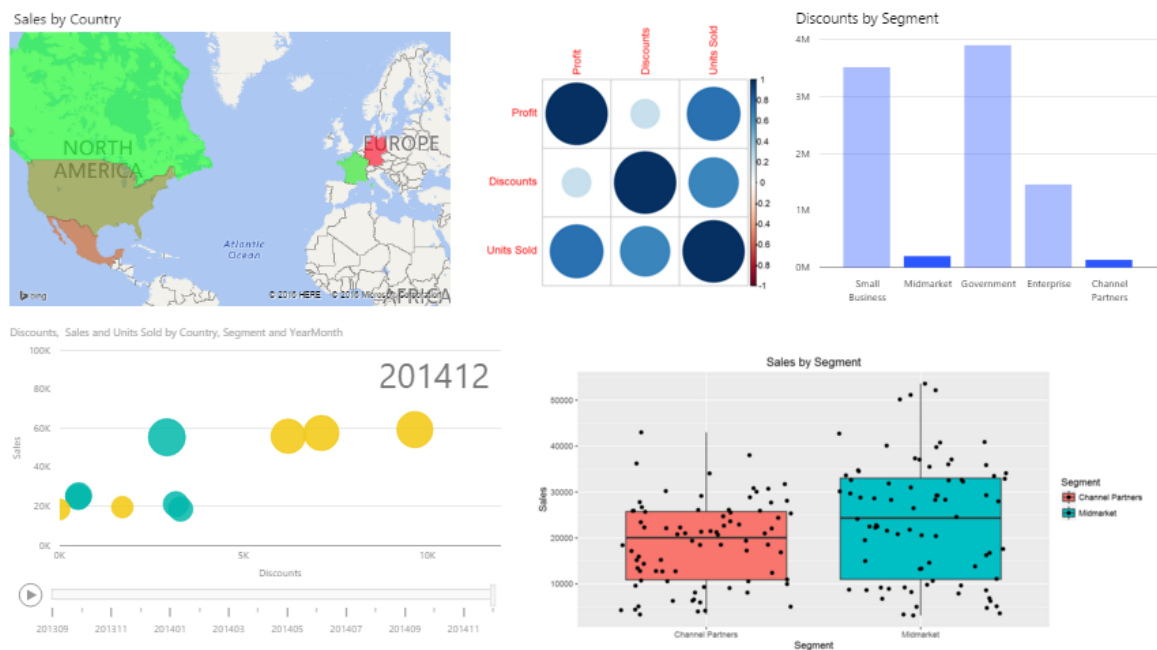


12. You should now have the following report, which uses regular Power BI charts with charts created by using R code.





13. Click the map and/or the others Power BI visuals to see that the R source is filtered and the visuals are updated to reflect the applied filter.



14. Save your report as **Lab3\_R\_Visuals\_Final.pbix** in the **E:\Labs\M3Lab3** directory.

15. Close **Power BI Desktop**.