Power BI With R Integration

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Power BI with R

- This course is intended to show how to leverage R to extend Power BI capabilities and visualize outputs from R.
- This is not a Tutorial on R.

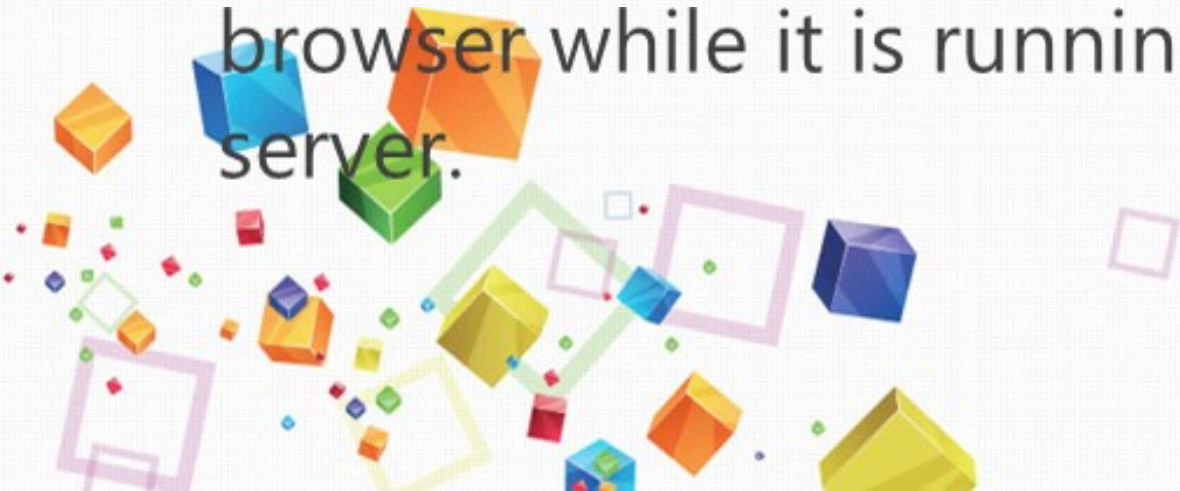
What is R

- R is an open source programming language and software environment for statistical computing and graphics
- The R language is widely used among statisticians and data miners for developing statistical software and data analysis.

What is R Studio

- RStudio is a free and open-source **Integrated Development Environment (IDE)** for R .

- RStudio is available in two editions: RStudio Desktop, where the program is run locally as a regular desktop application; and RStudio Server, which allows accessing RStudio using a web browser while it is running on a remote Linux server.



Installing R & R Studio

Install “R” and “R Studio”

- Download R from the Link :

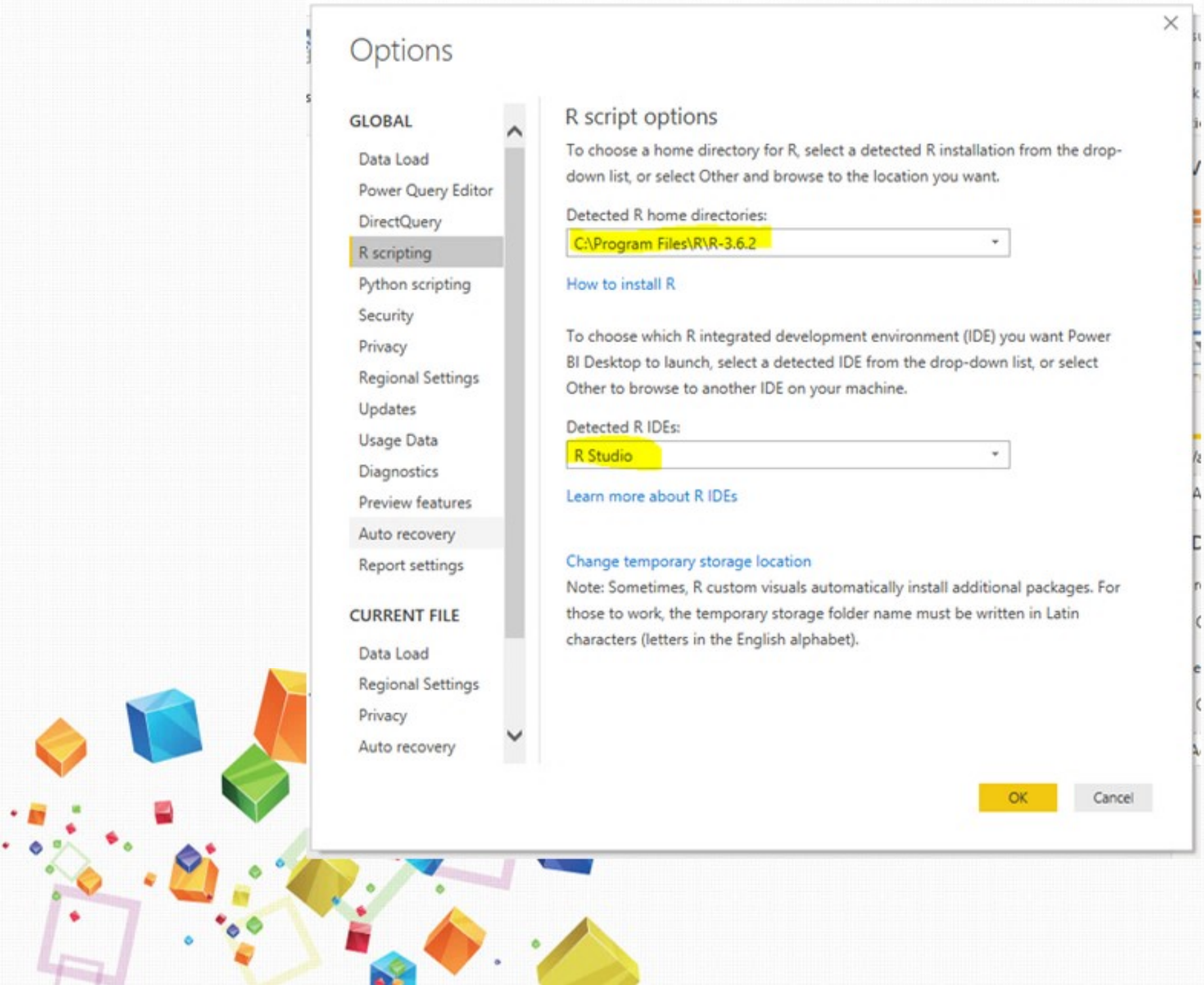
http://cran.us.r-project.org/

- Download R Studio from the Link:

https://www.rstudio.com/products/rstudio/download/

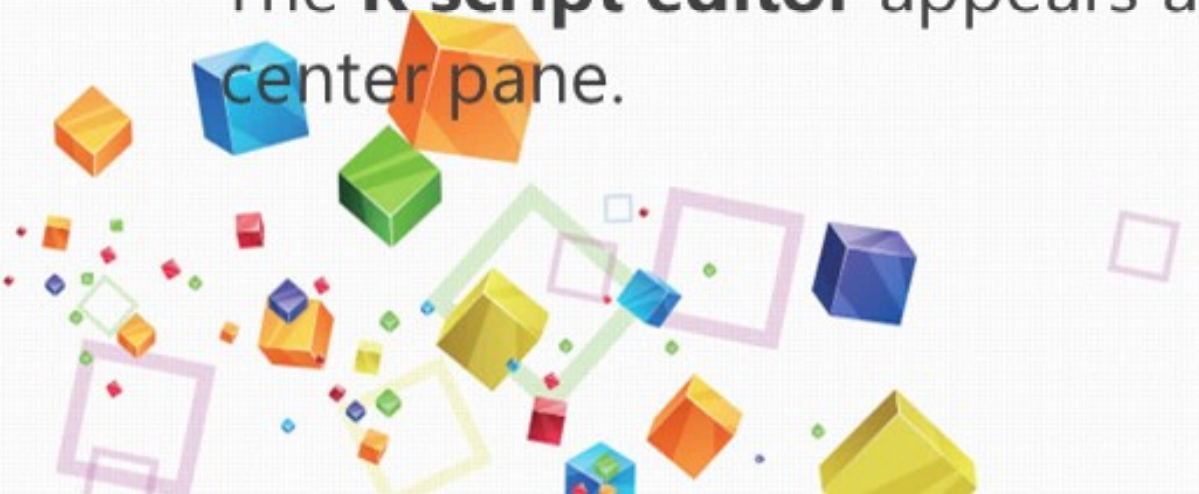
Enable R visuals in Power BI Desktop

- From the Power BI Desktop menu, select **File** > **Options and settings** > **Options**.
- On the left side of the **Options** page, under **Global**, select **R scripting**.
- Under **R script options**, verify that your local R installation is specified in **Detected R home directories** and that it properly reflects the local R installation you want Power BI Desktop to use.


Options
GLOBAL
Data Load
Power Query Editor
DirectQuery
R scripting
Python scripting
Security
Privacy
Regional Settings
Updates
Usage Data
Diagnostics
Preview features
Auto recovery
Report settings
CURRENT FILE
Data Load
Regional Settings
Privacy
Auto recovery
R script options
To choose a home directory for R, select a detected R installation from the drop-down list, or select Other and browse to the location you want.
Detected R home directories:
C:\Program Files\R\R-3.6.2
How to install R
To choose which R integrated development environment (IDE) you want Power BI Desktop to launch, select a detected IDE from the drop-down list, or select Other to browse to another IDE on your machine.
Detected R IDEs:
R Studio
Learn more about R IDEs
Change temporary storage location
Note: Sometimes, R custom visuals automatically install additional packages. For those to work, the temporary storage folder name must be written in Latin characters (letters in the English alphabet).
OK
Cancel

Create R visuals in Power BI Desktop

- Select the **R Visual** icon in the **Visualization** pane to add an R visual.
- In the **Enable script visuals** window that appears, select **Enable**.
- When you add an R visual to a report, Power BI Desktop makes the following changes:
- A placeholder R visual image appears on the report canvas.
- The **R script editor** appears along the bottom of the center pane.



Create R visuals in Power BI Desktop (continued..)

- In the **Values** section of the **Visualization** pane, drag fields from the **Fields** pane that you want to consume in your R script, just as you would with any other Power BI Desktop visual. Alternatively, you can also select the fields directly in the **Fields** pane.

Add & Remove Fields

- Only fields that you've added to the **Values** section are available to your R script.
- You can add new fields or remove unneeded fields from the **Values** section while working on your R script in the **R script editor**.
- Power BI Desktop automatically detects which fields you've added or removed.

Generation of R code with Field Selection

- As you select fields, the **R script editor** generates supporting R script binding code for those fields in the gray section along the top of the editor pane.
- If you remove a field, the **R script editor** automatically removes the supporting code for that field.

The first few Auto Generated R Scripts:

- Create a dataframe called **dataset**, which is comprised of the different fields selected by the user.
- The default aggregation is: *do not summarize*.

- Similar to table visuals, fields are grouped and duplicate rows appear only once.

Points to Remember

- Its always easier to work on R Studio than R
- Both R & Power Bi should be installed on the same machine.
- You need packages to create visualizations in R. Make sure all the packages are installed in R.
- The library for R Studio should also be up & running.

- Access the field by adding *dataset$*_____to your R script.
- For fields with spaces or special characters, use single quotes.
- You can create a script and Run it to see the visualization

Limitations of R Visuals

- Data sizes: Data used by an R visual for plotting is limited to 150,000 rows. If more than 150,000 rows are selected, only the top 150,000 rows are used and a message is displayed on the image.

- Resolution: All R visuals are displayed at a specific resolution (72 DPI).
- Calculation times: If an R visual calculation exceeds five minutes, it causes a time-out error.

- Relationships: As with other Power BI Desktop visuals, if data fields from different tables with no defined relationship between them are selected, an error occurs.

- Refreshes: R visuals are refreshed upon data updates, filtering, and highlighting. However, the image itself isn't interactive and can't be the source of cross-filtering.

- Highlights: R visuals respond if you highlight other visuals, but you can't select elements in the R visual to cross filter other elements.

- Each visualization in R has to be plotted in R script of Power BI. If the plots of x axis & y axis is not identified by R, you will not get the visualization.

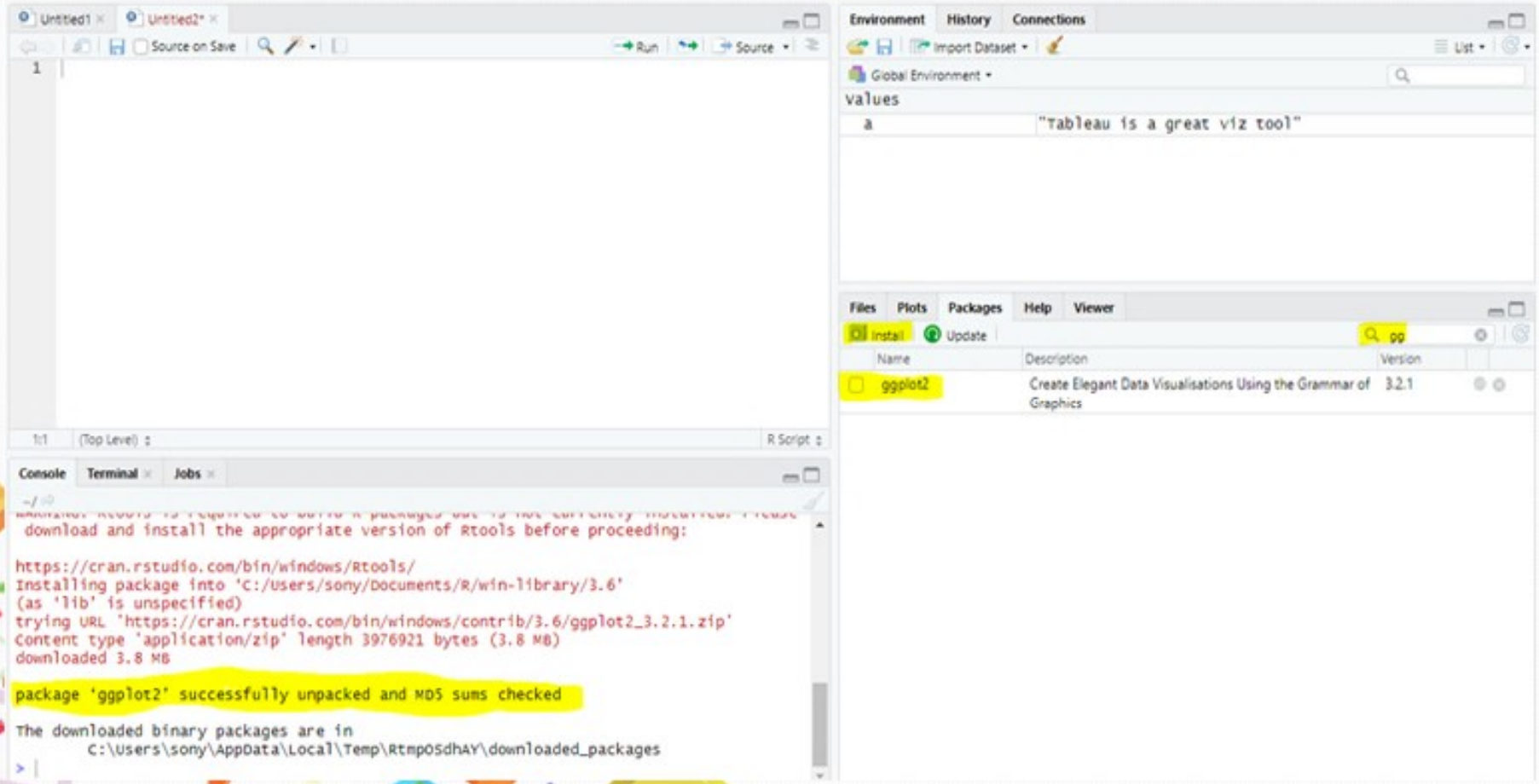
- RRO installations: In this release, the 32-bit version of Power BI Desktop doesn't automatically identify RRO installations; you must manually provide the path to the R installation directory in **Options and settings** > **Options** > **R Scripting**.

Important Link for R Manual

- R Script Showcase - https://community.powerbi.com/t5/R-Script-Showcase/bd-p/RVisuals

Hands On- Create Bars

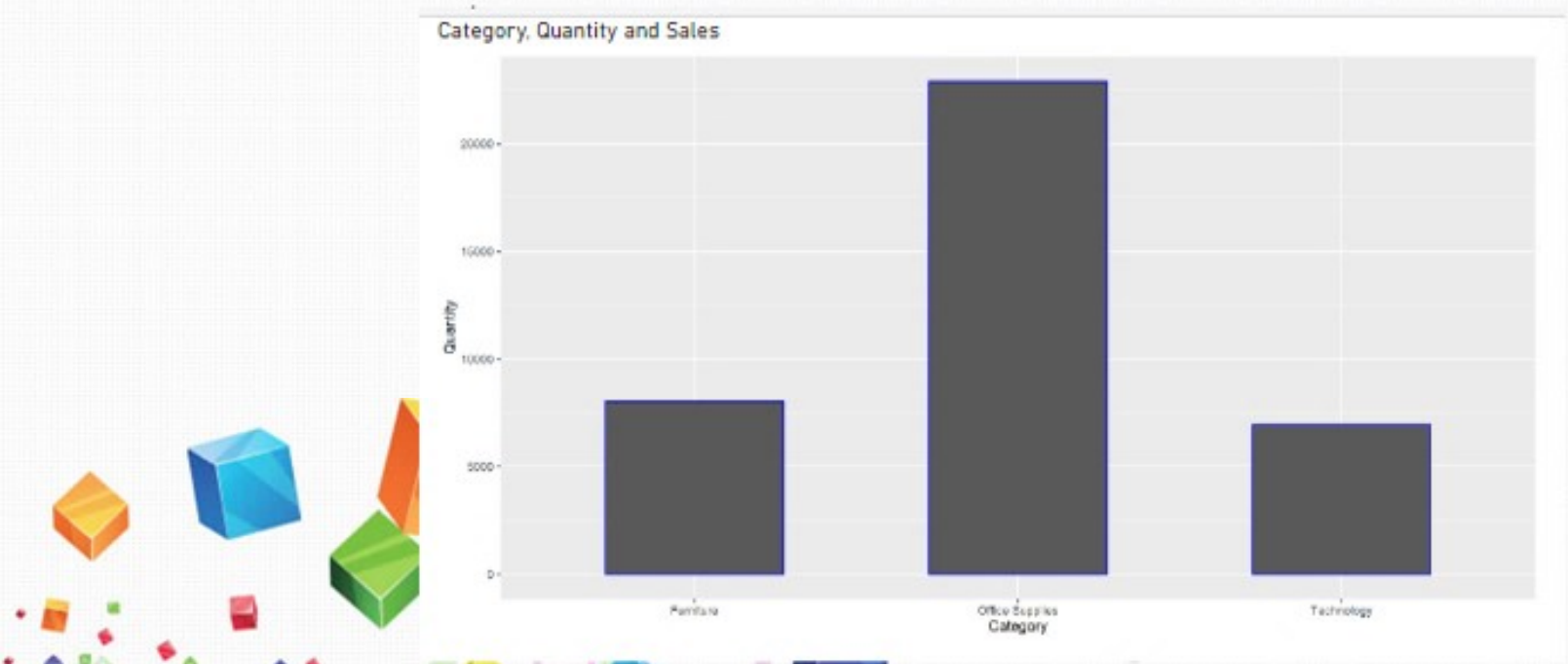
- Go to R Studio and from the Packages side download ggplot 2 .
- Click on install and wait for successful install message in console.



Now go to Power BI & bring the R visual to the sheet & drop Category & Quantity to the viz and write the below Script:

- library(ggplot2)
- ggplot(dataset, aes(x= Category,y= Quantity)) + geom_bar(width=0.55,stat="identity")

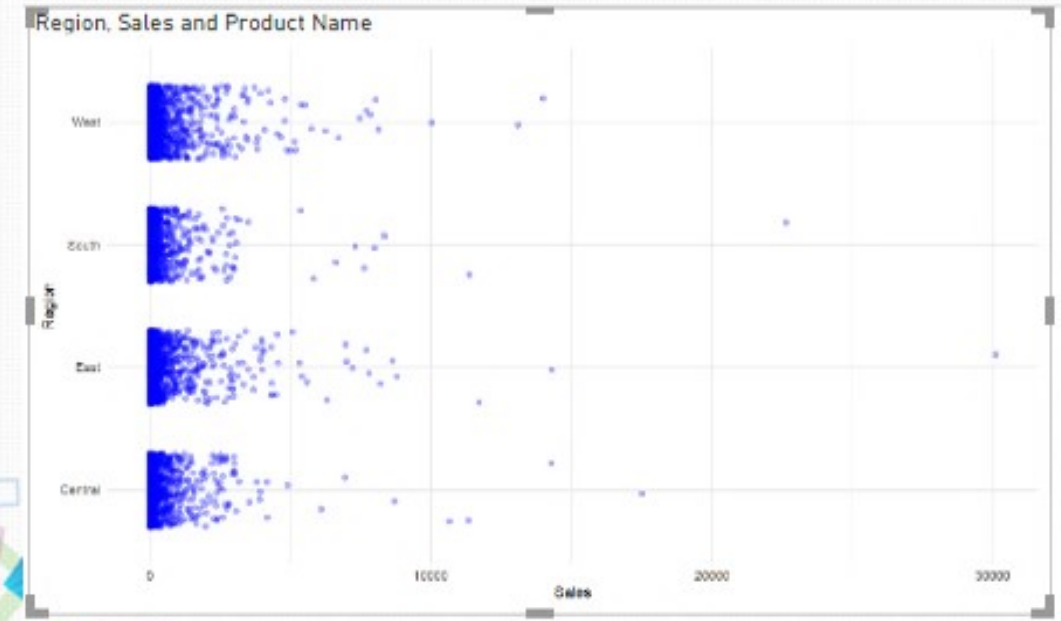
Now you will be able to see the below viz :



Hands On- Create a Jitter plot

- The Script for Jitter plot is as follows:

```
library(ggplot2)
ggplot(dataset, aes(x=Sales,y=Region))  +
geom_jitter(width  = 0.00,height=0.30,color="blue",alpha=0.30)  +
theme_minimal()
```

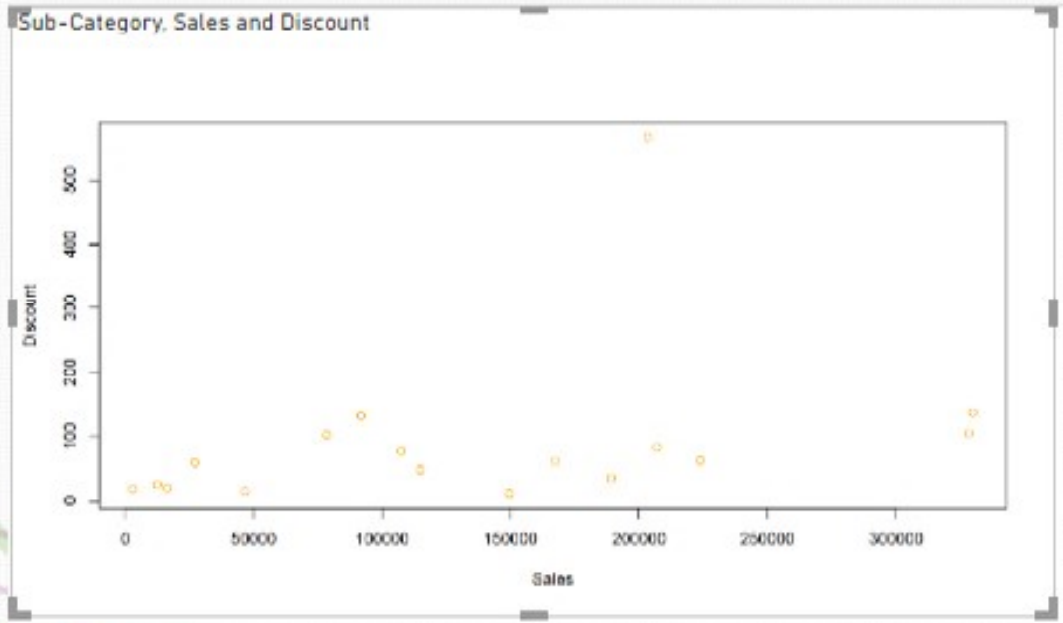


Hands On – Create a Scatterplot

- The Script for Scatterplot is as below:

```
x <- dataset$Sales
y <- dataset$Discount

plot(x,y, col="orange",xlab="Sales",ylab="Discount")
```



The End