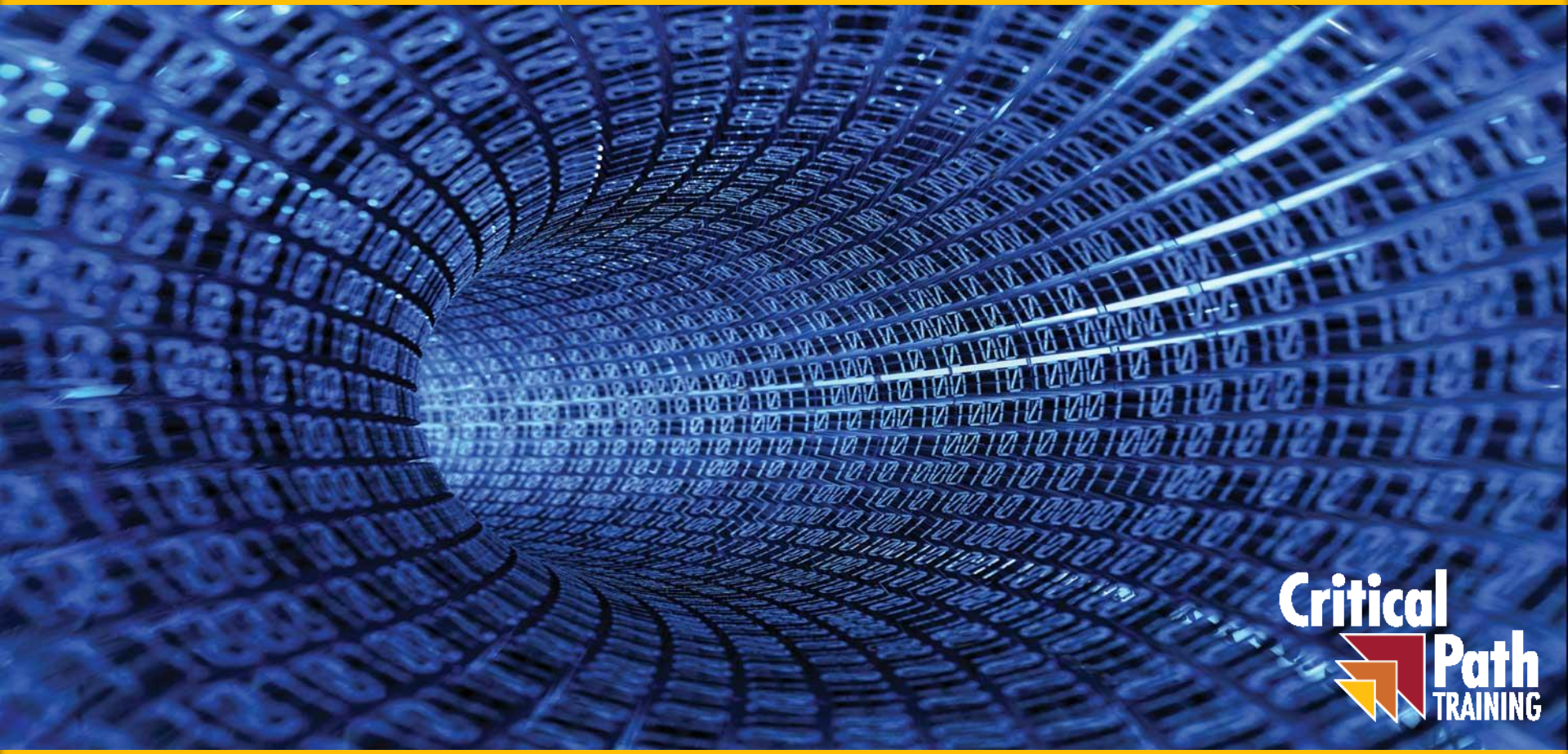
Introduction to Python with Power BI



Agenda

- Understanding Python as a Data Platform
- Installing Python Developer Tools
- Getting Started Writing Code in Python
- Integrating Python with Power BI Desktop

What is Python?

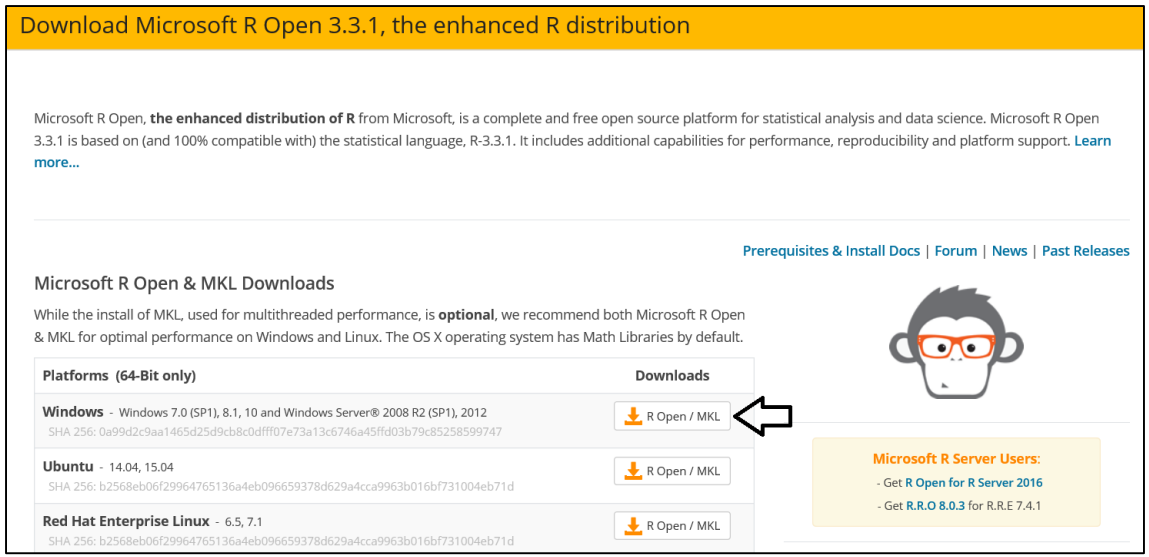
- What is Python?
  - Platform for data extraction and data preparation
  - Platform for statistics, data analysis and visualization
  - Free, cross-platform, open source software
  - Programming language + Runtime layer + Libraries
  - Flourishing ecosystem of Python package authors
- Why do you need it?
  - Analyzing data and generating statistics
  - Creating rich graphs and charts
  - Fitting statistical models for predictive analysis

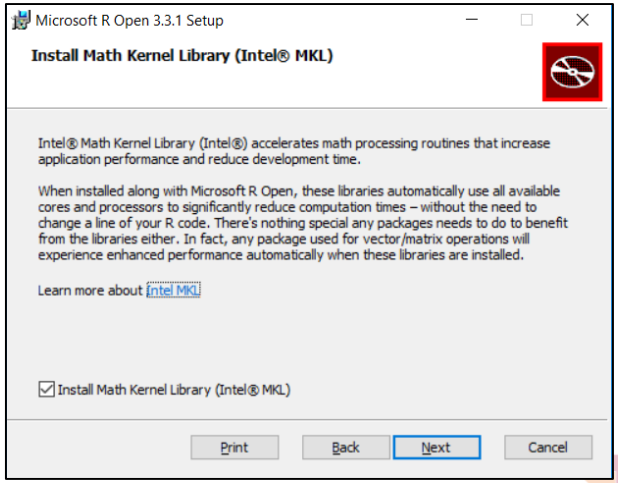
Agenda

- ✓ Understanding R as an Analytics Platform
- ➢ Installing Microsoft R Open and RStudio
- Writing R Code in RStudio
- Integrating R with Power BI Desktop

Install Microsoft R Open

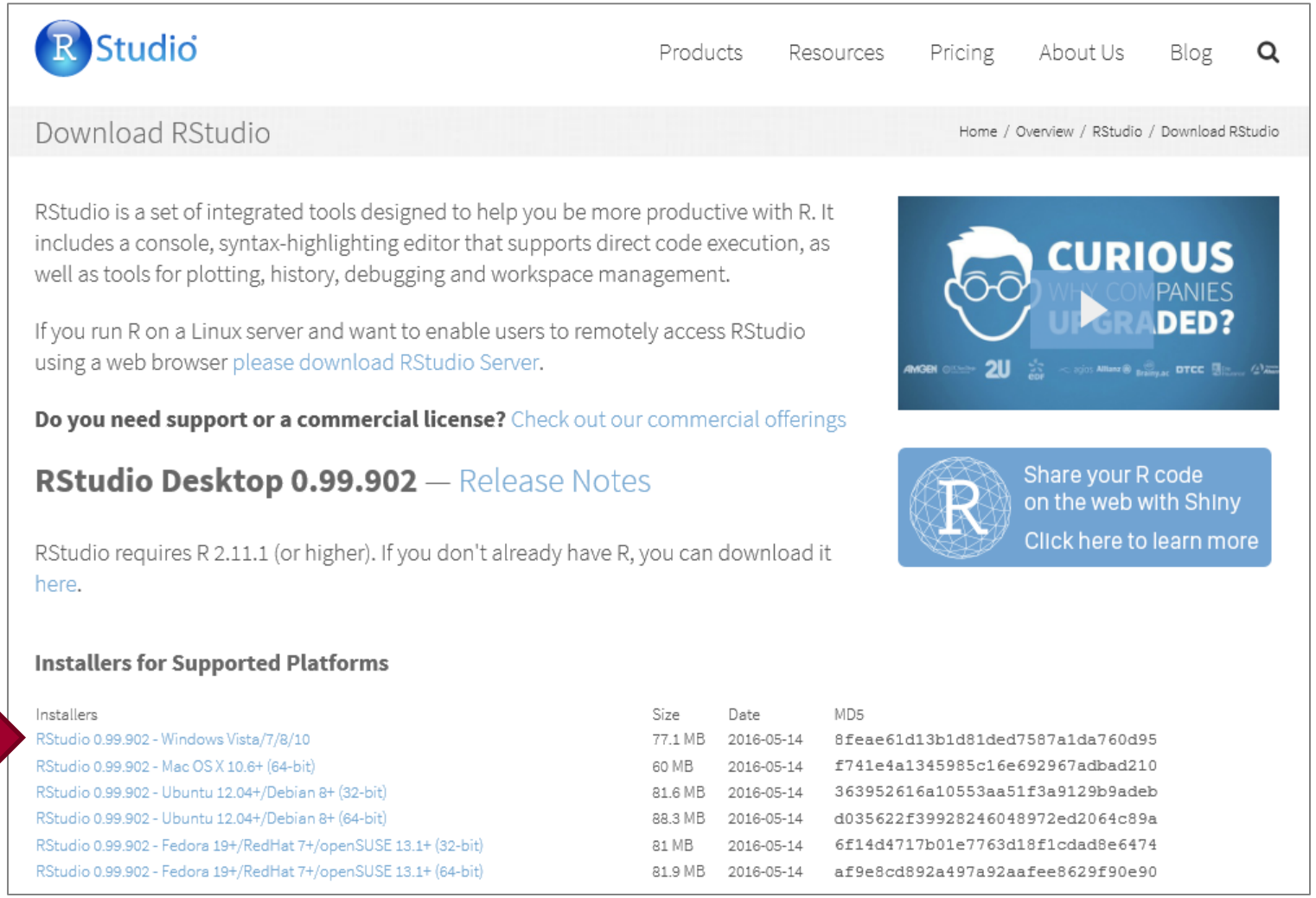
- https://mran.microsoft.com/download/



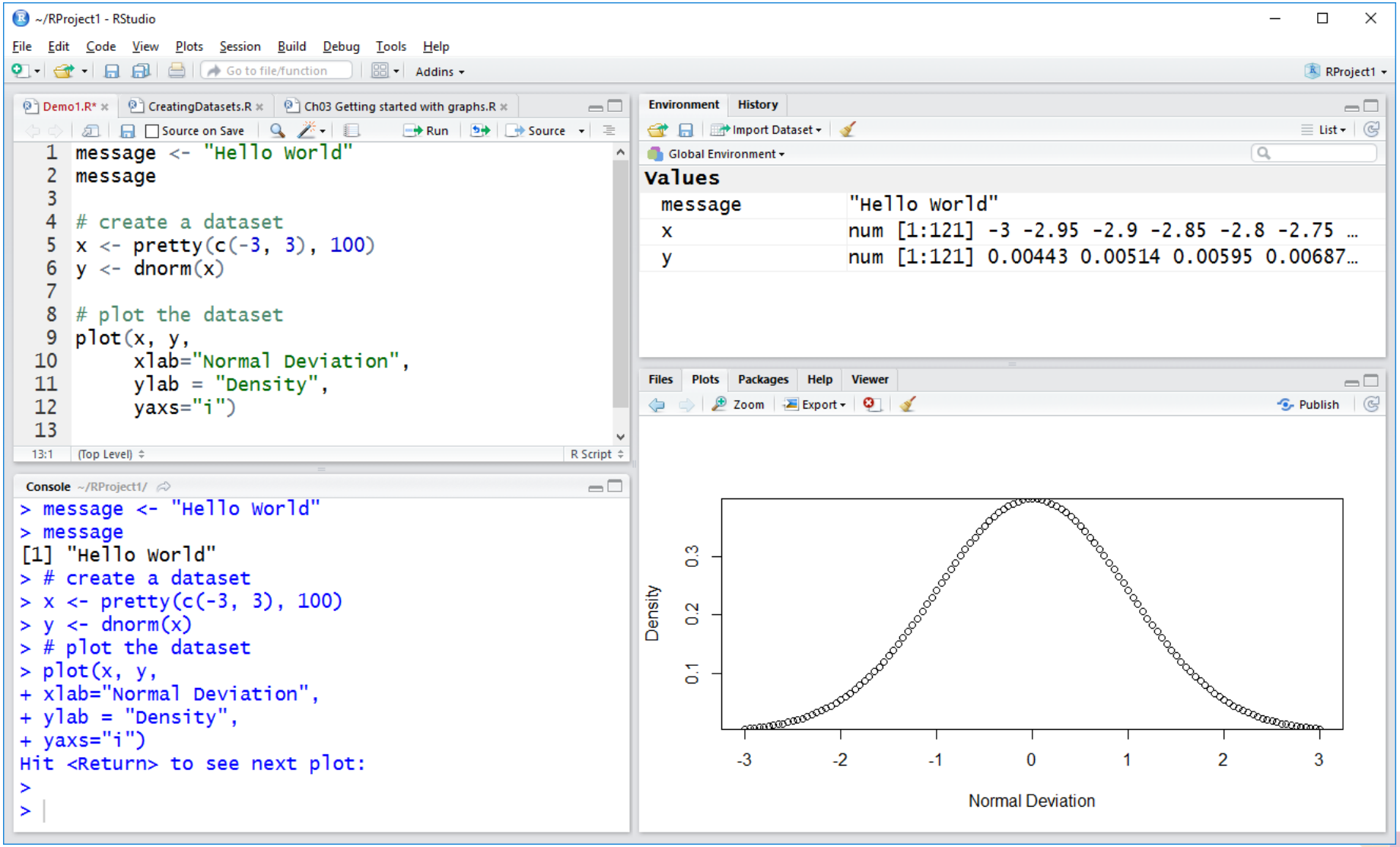


Installing R Studio

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



The RStudio IDE



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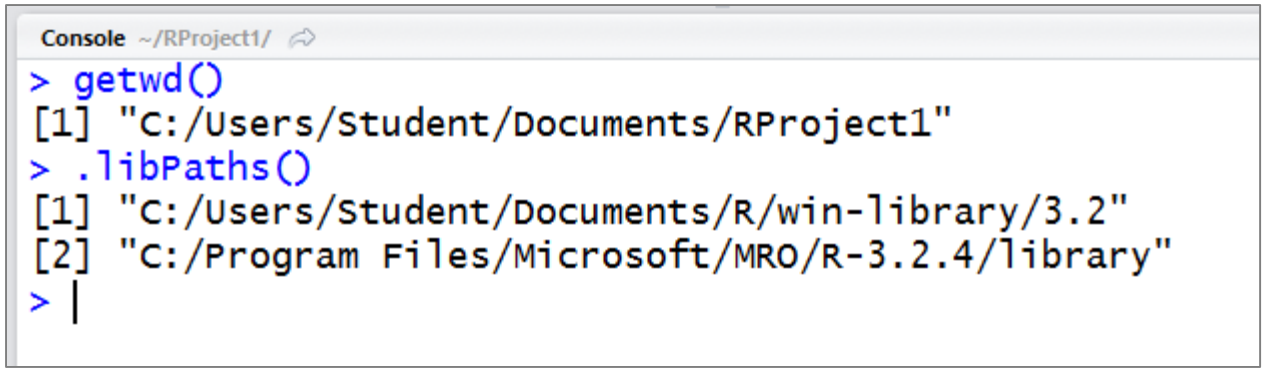
R Projects and Workspaces

- R projects based on folder structure
  - Data and scripts added to current working directory

- Each R project defines a workspace
  - Workspace tracks set of user-defined objects
  - Workspace defines set of loaded packages
  - Workspace data saved/loaded using .RData files



Writing and Testing R Code in Scripts

01_GettingStarted.R

Source on Save

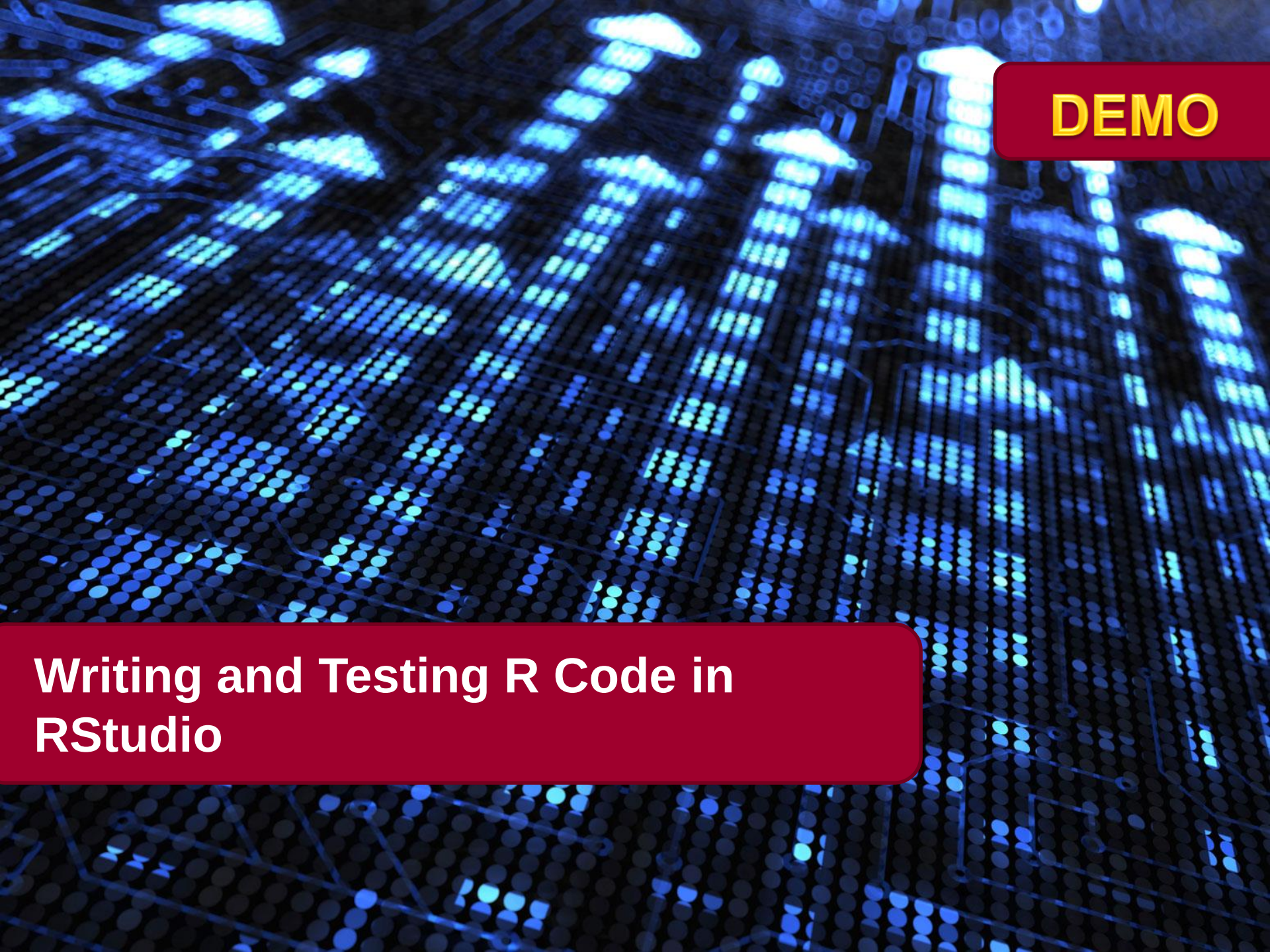
```r
# use <- for variable assignment
message <- "Hello World"

print(message)

# create vector using the c function
vector1 <- c(2, 4, 6,  8)

# create vectors using sequence
vector2 <- 1:10
vector3 = letters[1:5]
vector4 = LETTERS[24:26]
vector6 = 2^(1:8)

# create vector with electin years
election.years <- seq(from = 1996, to = 2016, by = 4)

# enumerate through election years using for loop
for (year in election.years){
    print(paste(year, "is an election year"))
}

# remove all objects from workspace
rm(list=objects())
```

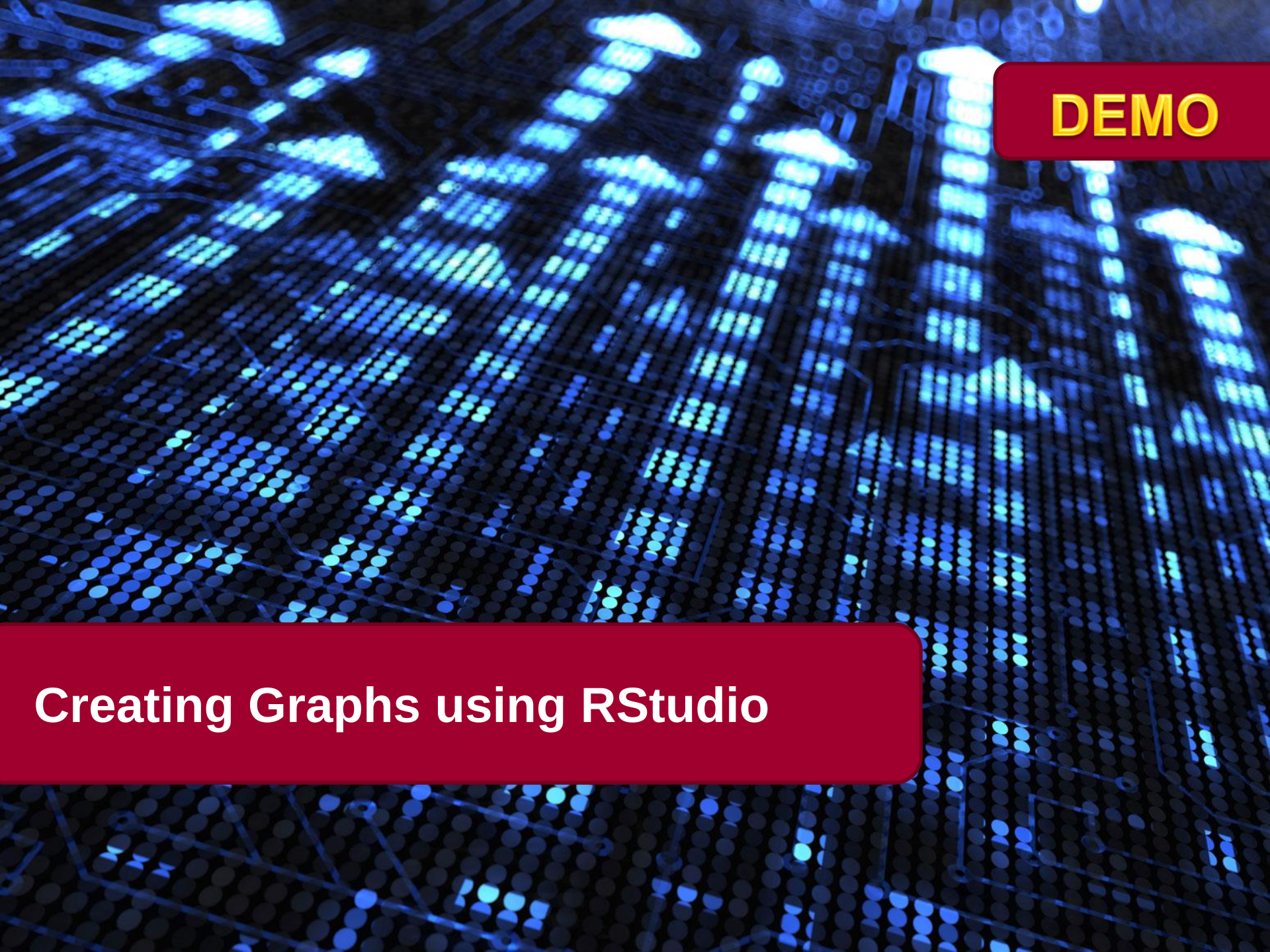
R Objects

- In R, variables represent named objects
- Object names can contain
  - Letters
  - Numbers
  - Underscores (_)
  - Dots (.)

Essential Data Structures in R

- Vector
  - One-dimensional, single-mode array
- Matrix
  - Two-dimensional, single-mode array
- Array
  - N-dimensional, single-mode array
- List
  - Ordered collection of multi-mode objects
- Data frame
  - Two-dimensional, multi-mode array
- Factor
  - Integer-backed list of categorical values


DEMO
Writing and Testing R Code in RStudio


DEMO
Creating Graphs using RStudio

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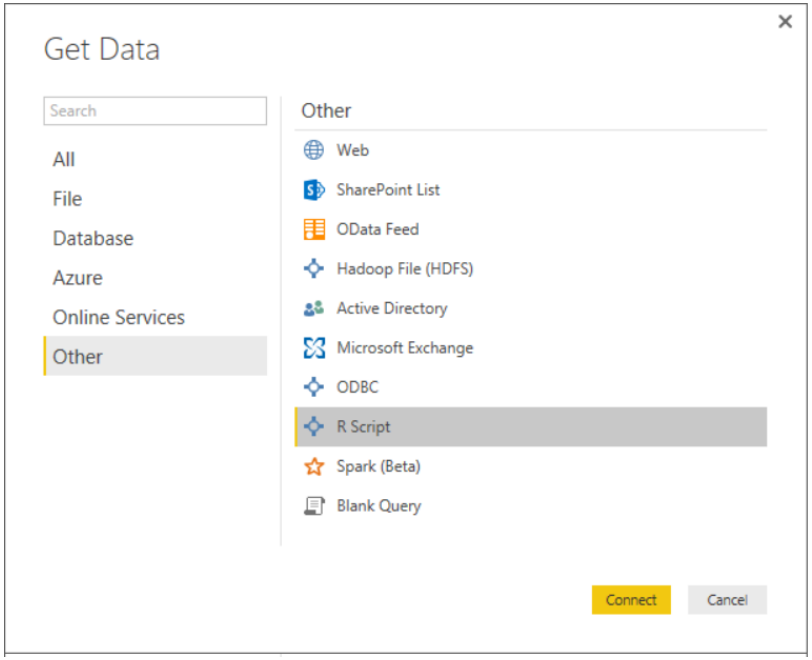
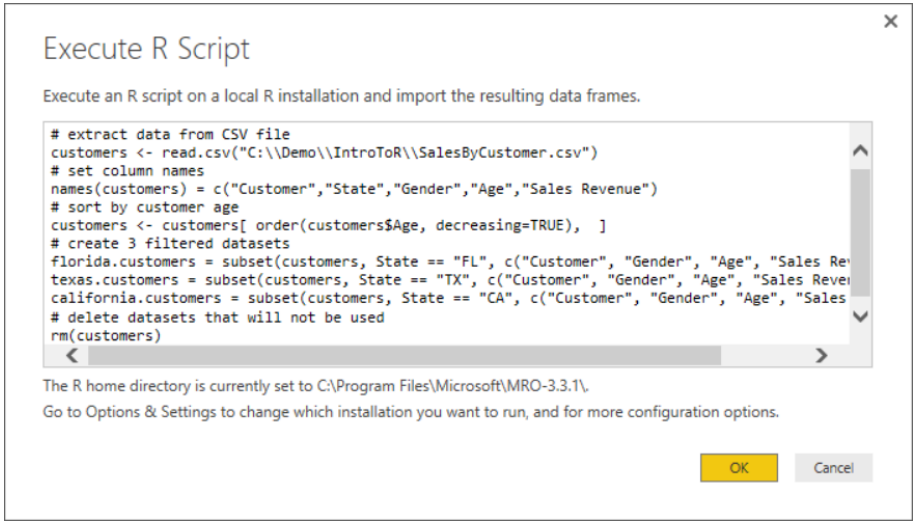
Where Can You Use R Code in PBIDT?

- As a data source to a query
  - You can use R code to import and reshape data
- Within a Query Applied Step
  - You can use R code to add transforms to a query
- Inside an R Visual in a Power BI Report
  - You can use R code to creates charts from your data

Using R Code as a Query Data Source

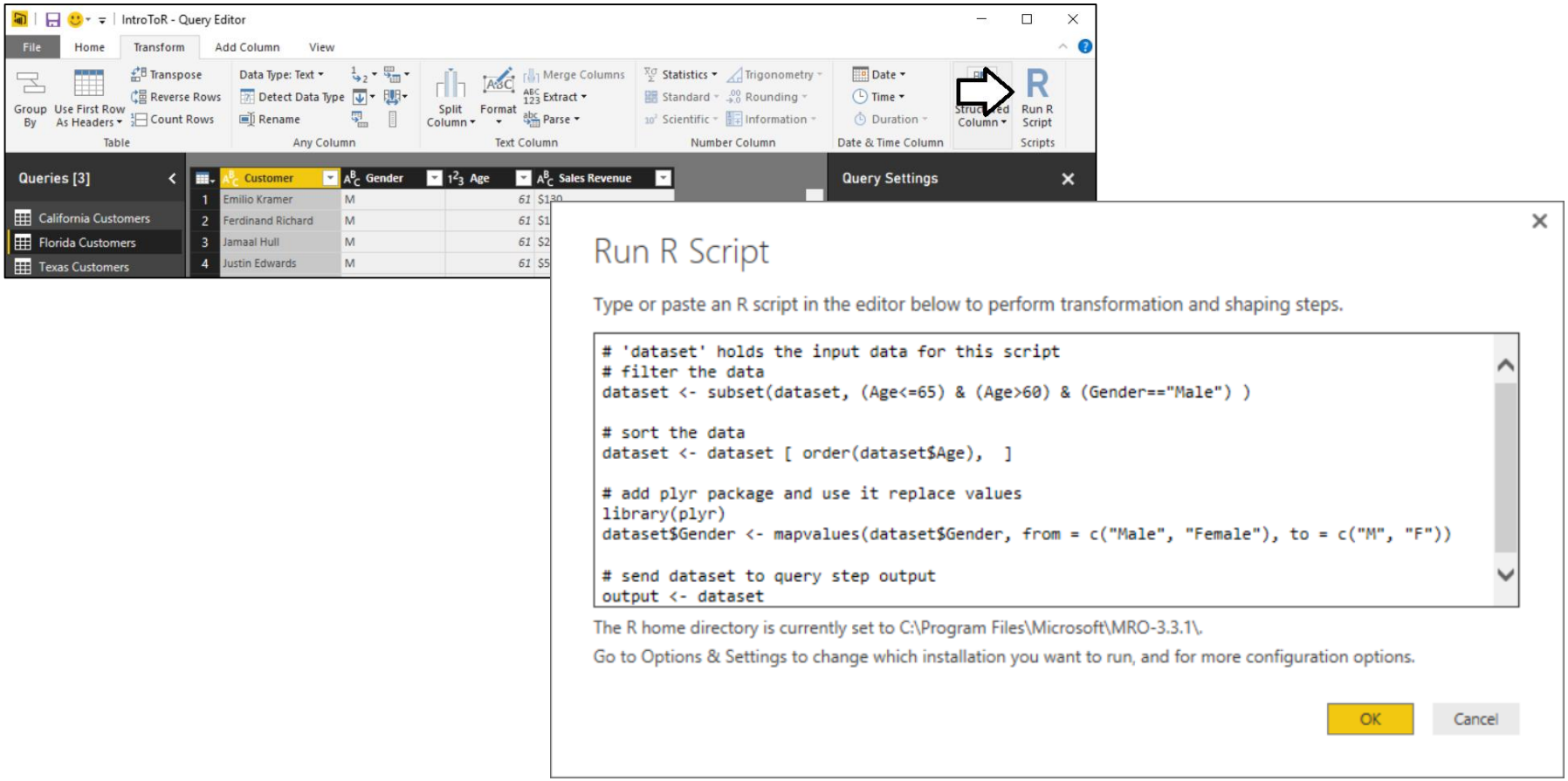
- Create new query based on R script
  - Copy and paste code from RStudio into PBIDT



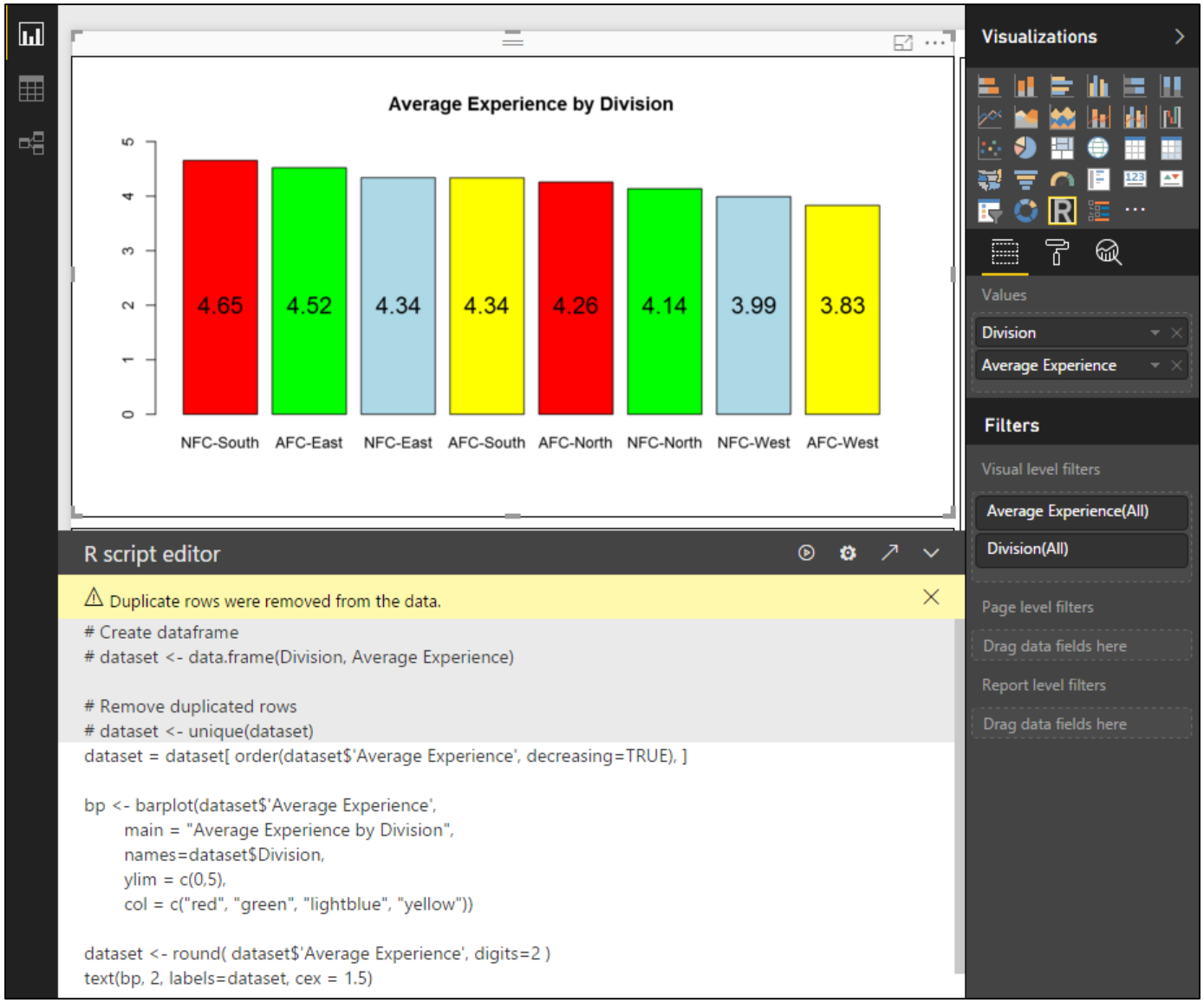


Using R Code as an Applied Query Step

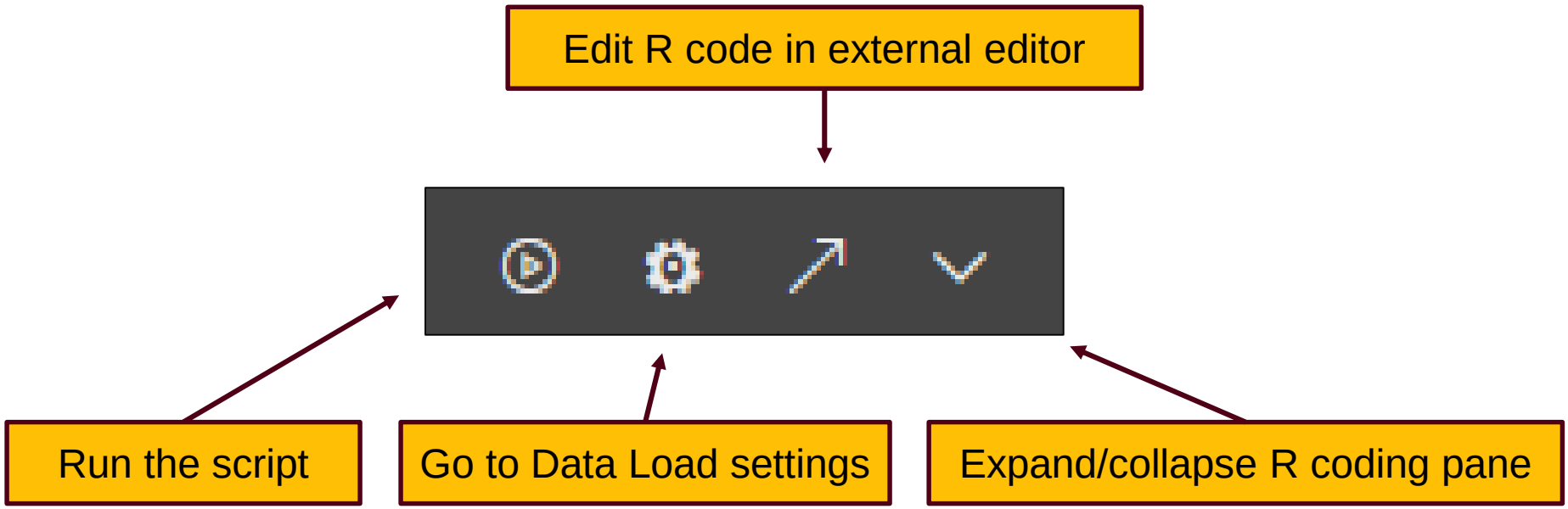
- Add new Run R Script step to query
  - Use R code and R packages to transform data

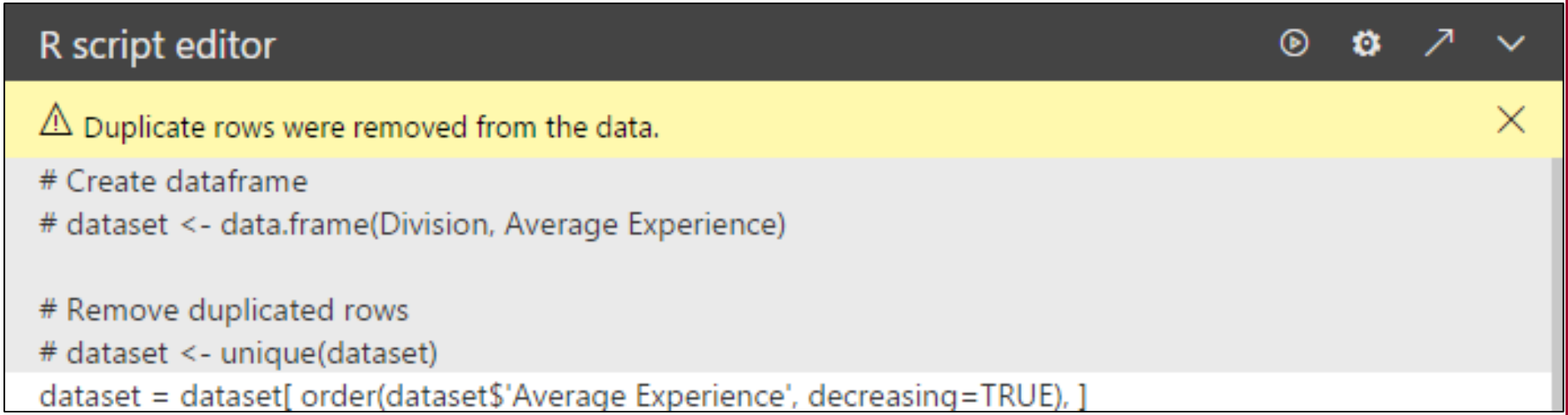


R Visuals in Power BI



New R Features in September Release





R Integration Limitations with Power BI

- Power BI Desktop R Limitations
  - Only data frames are imported
  - Complex columns and Vector columns are not imported
  - Values that are N/A are translated to NULL values
  - Prompting for user input halts script
  - R visual data for plotting is limited to 150,000 rows
  - R visual calculation times out with error after 5 minutes
  - R visual is not interactive – no highlighting support
  - Plots can only be displayed to R default display device

Summary

- ✓ Understanding R as an Analytics Platform
- ✓ Installing Microsoft R Open and RStudio
- ✓ Writing R Code in RStudio
- ✓ Integrating R with Power BI Desktop