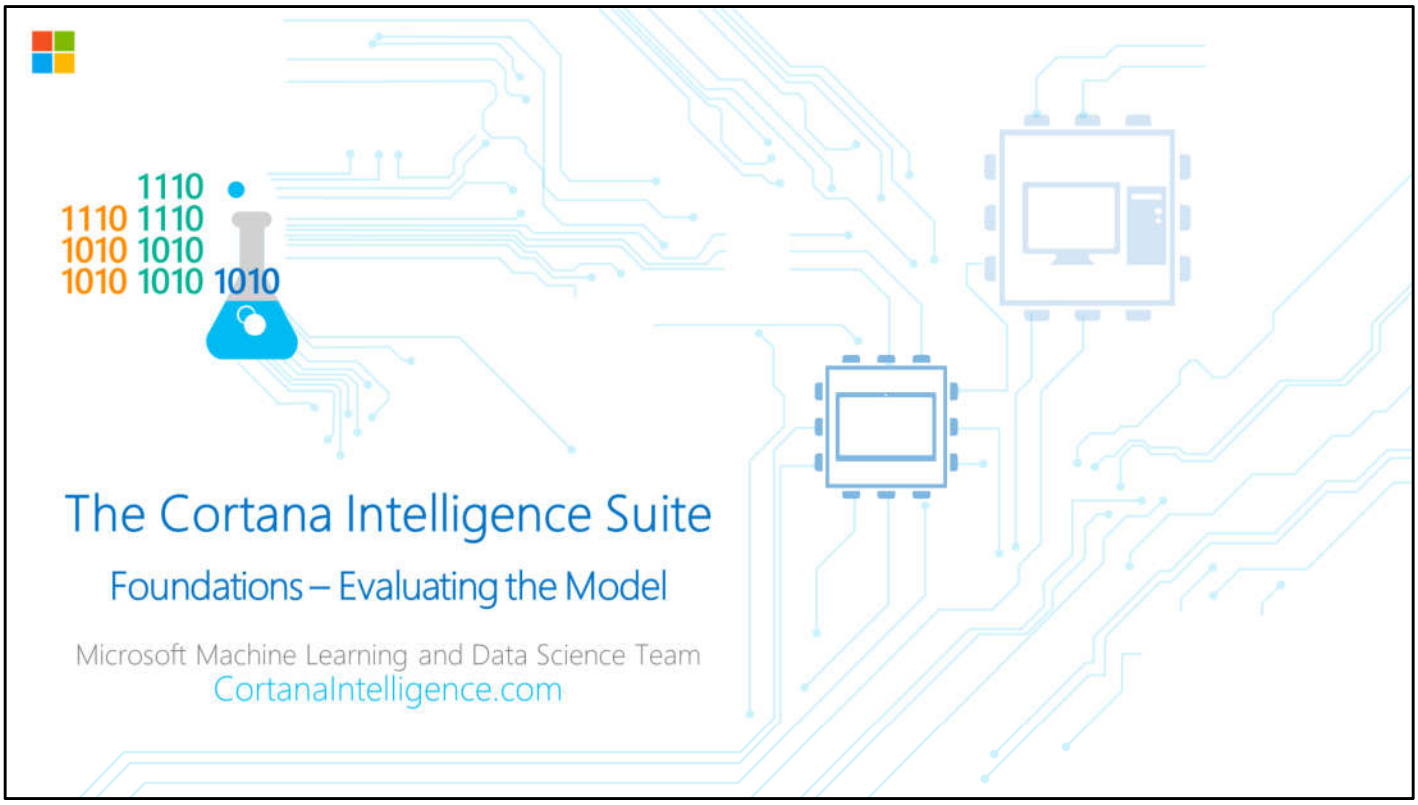


1. Main page: http://cortanaanalytics.com
2. To begin this module, you should have:
    1. Basic Math and Stats skills
    2. Business and Domain Awareness
    3. General Computing Background

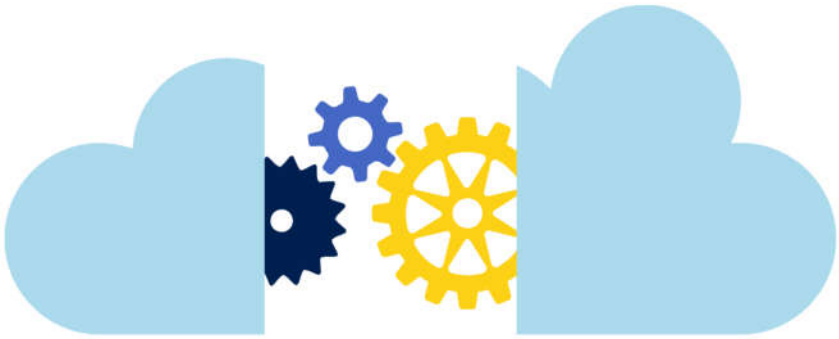
NOTE: These workbooks contain many resources to lead you through the course, and provide a rich set of references that you can use to learn much more about these topics. If the links do not resolve properly, type the link address in manually in your web browser. If the links have changed or been removed, simply enter the title of the link in a web search engine to find the new location or a corollary reference.

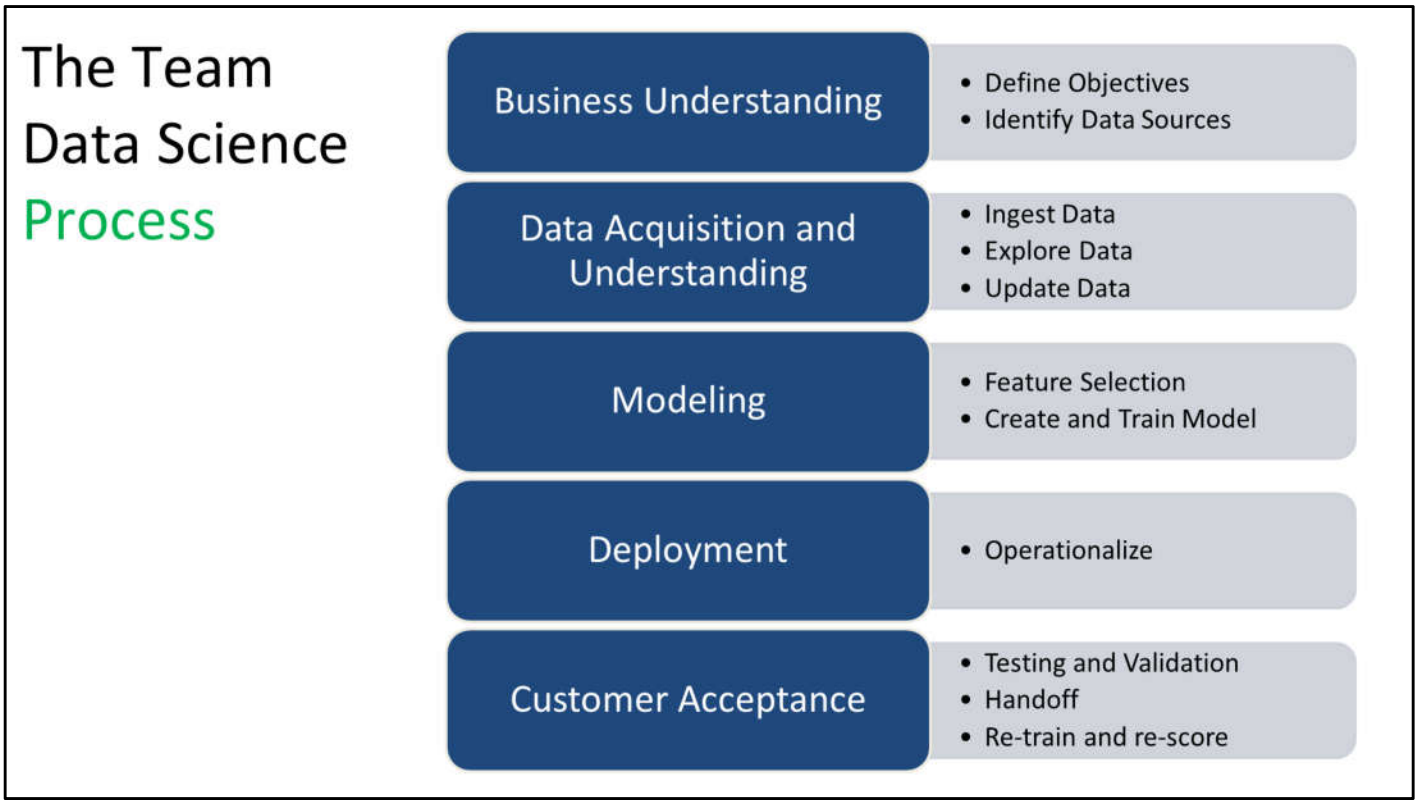
Section 5 Learning Objectives

1. Understand how to evaluate the efficacy and performance of an Azure ML experiment
2. Understand how to evaluate the efficacy and performance of an MSR ML experiment
3. Access and show data from Azure Storage
4. Access and Query Azure SQL DB

1. At the end of this Module, you will:
    1. Understand how to evaluate the efficacy and performance of an Azure ML experiment
    2. Understand how to evaluate the efficacy and performance of an MSR ML experiment
    3. Access and show data from Azure Storage
    4. Access and Query Azure SQL DB

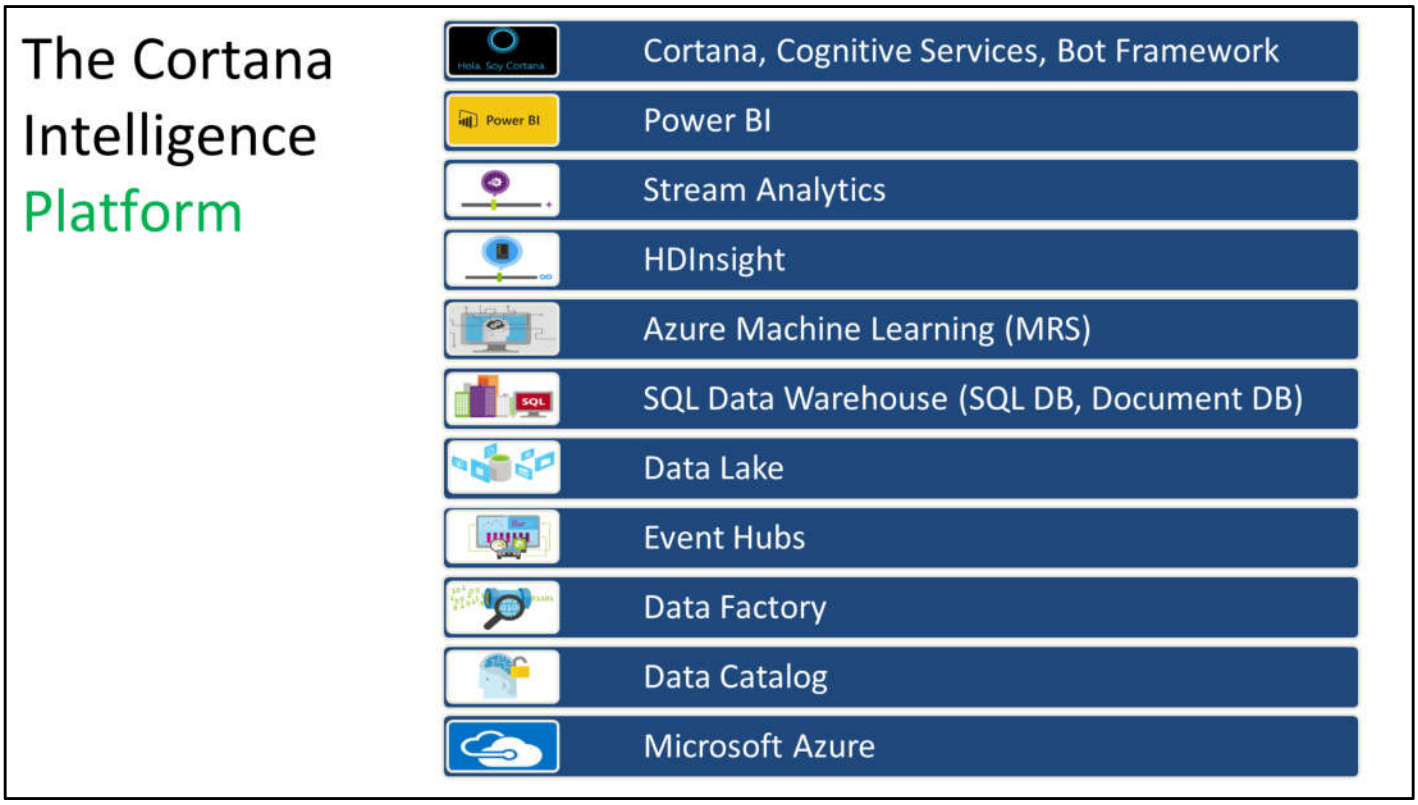
The Data Science Process and Platform





1. This process largely follows the CRISP-DM model: http://www.sv-europe.com/crisp-dm-methodology/
2. It also references the Cortana Intelligence process: https://azure.microsoft.com/en-us/documentation/articles/data-science-process-overview/
3. A complete process diagram is here: https://azure.microsoft.com/en-us/documentation/learning-paths/cortana-analytics-process/
4. Some walkthrough's of the various services: https://azure.microsoft.com/en-us/documentation/articles/data-science-process-walkthroughs/
5. An integrated process and toolset allows for a more close-to-intent deployment

6. Iterations are required to close in on the solution – but are harder tio management and monitor



1. Platform and Storage: Microsoft Azure – http://microsoftazure.com Storage: https://azure.microsoft.com/en-us/documentation/services/storage/ (Host It)
2. Azure Data Catalog: http://azure.microsoft.com/en-us/services/data-catalog (Doc It)
3. Azure Data Factory: http://azure.microsoft.com/en-us/services/data-factory/ (Move It)
4. Azure Event Hubs: http://azure.microsoft.com/en-us/services/event-hubs/ (Bring It)
5. Azure Data Lake: http://azure.microsoft.com/en-us/campaigns/data-lake/ (Store It)
6. Azure DocumentDB: https://azure.microsoft.com/en-us/services/documentdb/ , Azure SQL Data Warehouse: http://azure.microsoft.com/en-us/services/sql-data-warehouse/ (Relate It)
7. Azure Machine Learning: http://azure.microsoft.com/en-us/services/machine-learning/ (Learn It)
8. Azure HDInsight: http://azure.microsoft.com/en-us/services/hdinsight/ (Scale It)
9. Azure Stream Analytics: http://azure.microsoft.com/en-us/services/stream-analytics/ (Stream It)
10. Power BI: https://powerbi.microsoft.com/ (See It)
11. Cortana: http://blogs.windows.com/buildingapps/2014/09/23/cortana-integration-and-speech-recognition-new-code-samples/ and https://blogs.windows.com/buildingapps/2015/08/25/using-cortana-to-interact-with-your-customers-10-by-10/ and https://developer.microsoft.com/en-us/Cortana (Say It)
12. Cognitive Services: https://www.microsoft.com/cognitive-services
13. Bot Framework: https://dev.botframework.com/
14. All of the components within the suite: https://www.microsoft.com/en-us/server-cloud/cortana-intelligence-suite/what-is-cortana-intelligence.aspx
15. What can I do with it? https://gallery.cortanaintelligence.com/

16. Getting Started Quickly: https://cags.azure.net/#gallery

Module 1:
Measuring Effectiveness and Efficiency in ML

6

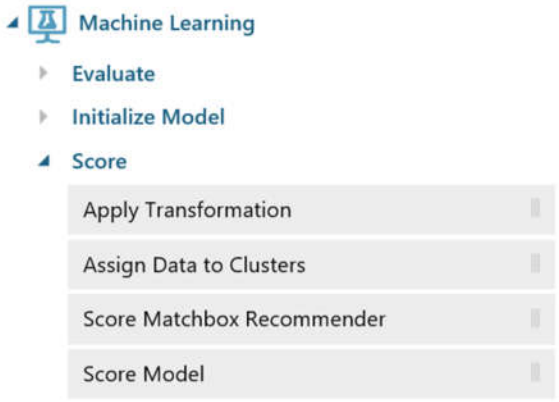
1. Train and Evaluate your Model: https://azure.microsoft.com/en-us/documentation/articles/machine-learning-walkthrough-4-train-and-evaluate-models/

Azure Machine Learning

Score

Apply a trained model to:

- A list of recommended items
- Forecasts for time series models
- Estimates of projected demand, volume, or other numeric quantity, for regression models
- Cluster assignments
- A predicted class or outcome, for classification models
- Probability scores associated with these outputs



1. https://azure.microsoft.com/en-us/documentation/articles/machine-learning-algorithm-choice/
2. https://msdn.microsoft.com/en-US/library/azure/dn906012.aspx
3. https://msdn.microsoft.com/en-us/library/azure/dn913055.aspx
4. https://msdn.microsoft.com/en-us/library/azure/dn913055.aspx
5. https://msdn.microsoft.com/en-us/library/azure/dn905970.aspx
6. https://msdn.microsoft.com/en-us/library/azure/dn905995.aspx

Azure Machine Learning

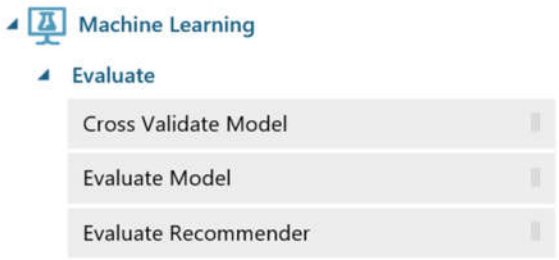
Evaluate

Metrics for Classification Models

- Accuracy, Recall, Precision, F1-Score
- AUC
- Average Log Loss
- Training Log Loss

Metrics for Regression Models

- Mean absolute error (MAE)
- Root mean squared error (RMSE)
- Relative absolute error (RAE)
- Relative squared error (RSE)
- Coefficient of determination



1. Simple explanation of the ROC Curve: http://blog.revolutionanalytics.com/2016/08/roc-curves-in-two-lines-of-code.html
2. https://msdn.microsoft.com/en-us/library/azure/dn906026.aspx
3. https://azure.microsoft.com/en-us/documentation/articles/machine-learning-evaluate-model-performance/
4. https://msdn.microsoft.com/library/azure/75fb875d-6b86-4d46-8bcc-74261ade5826
5. https://msdn.microsoft.com/library/azure/927d65ac-3b50-4694-9903-20f6c1672089
6. https://msdn.microsoft.com/library/azure/e9ad68a7-e91b-4ae6-800e-b5ee7e22cd17

Module 2:
Accessing result data from Azure Storage

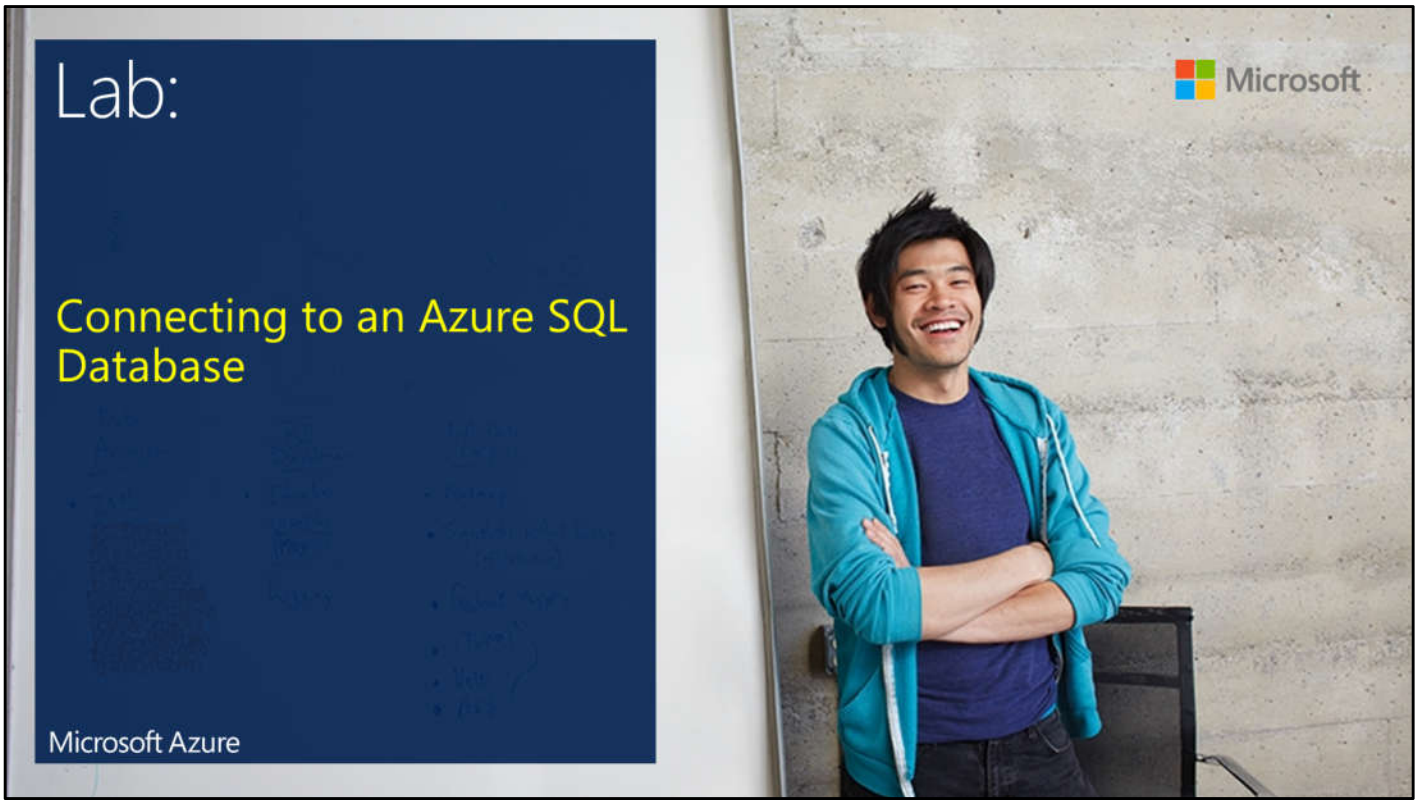
9

1. Working with Azure Storage: https://azure.microsoft.com/en-us/documentation/services/storage/

Options for Data Access

- Power BI / Excel
- Query Tools
- Code
- 3rd Party

1. Access and read through this page: https://support.office.com/en-us/article/Connect-to-Microsoft-Azure-Blob-Storage-Power-Query-f8165faa-4589-47b1-86b6-7015b330d13e?ui=en-US&rs=en-US&ad=US&fromAR=1
2. Access and read through this page: http://social.technet.microsoft.com/wiki/contents/articles/2128.azure-and-sql-database-tutorials-tutorial-1-using-azure-web-role-and-azure-table-service.aspx

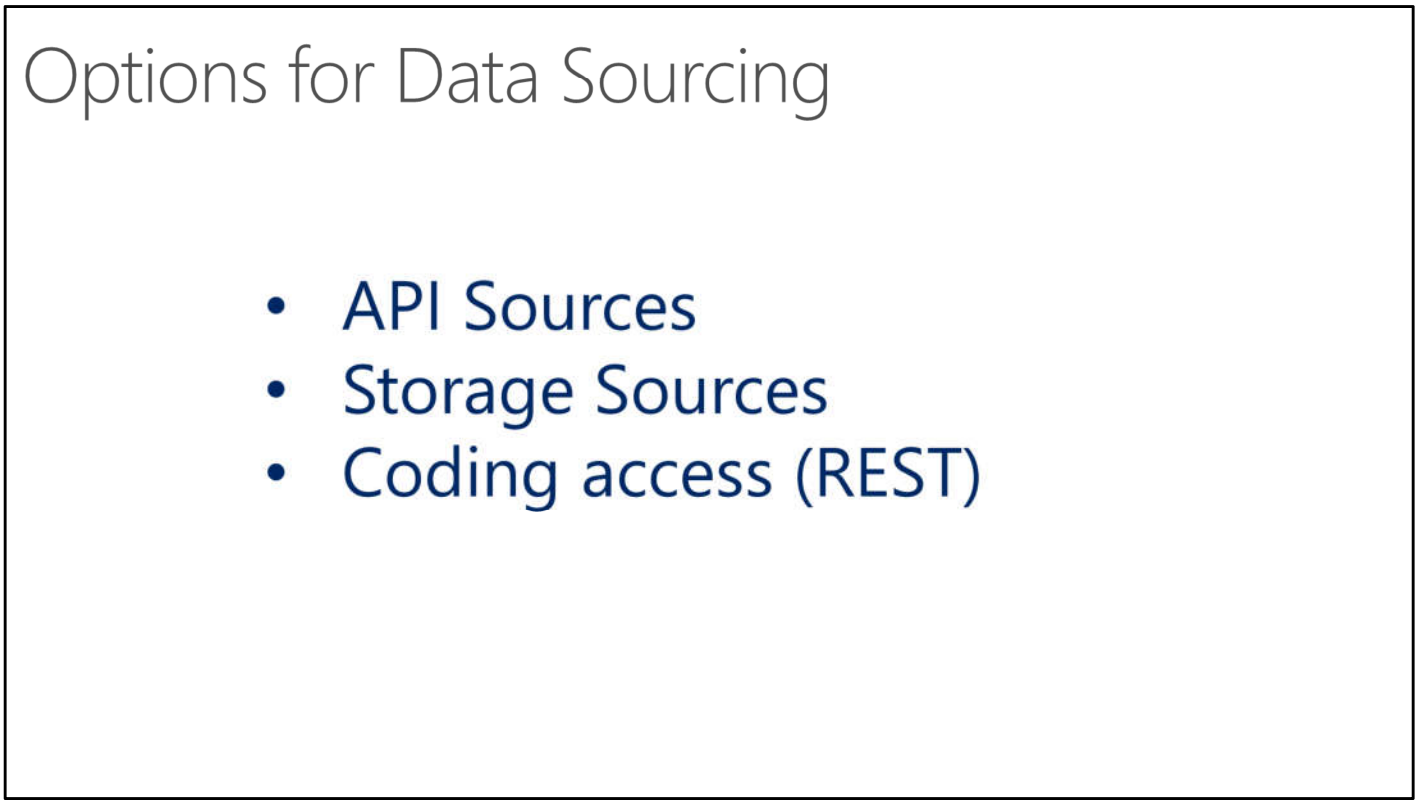


1. Optional: On your DVSM, you can connect to Azure SQL DB after you open the firewall.
    1. Read this for creating a database server and database: https://azure.microsoft.com/en-us/documentation/articles/sql-database-get-started/
    2. In the portal, find and record your connection strings: http://www.connectionstrings.com/sql-azure/
    3. Read this to connect and browse to a database: https://msdn.microsoft.com/en-us/library/hh272693%28v=vs.103%29.aspx

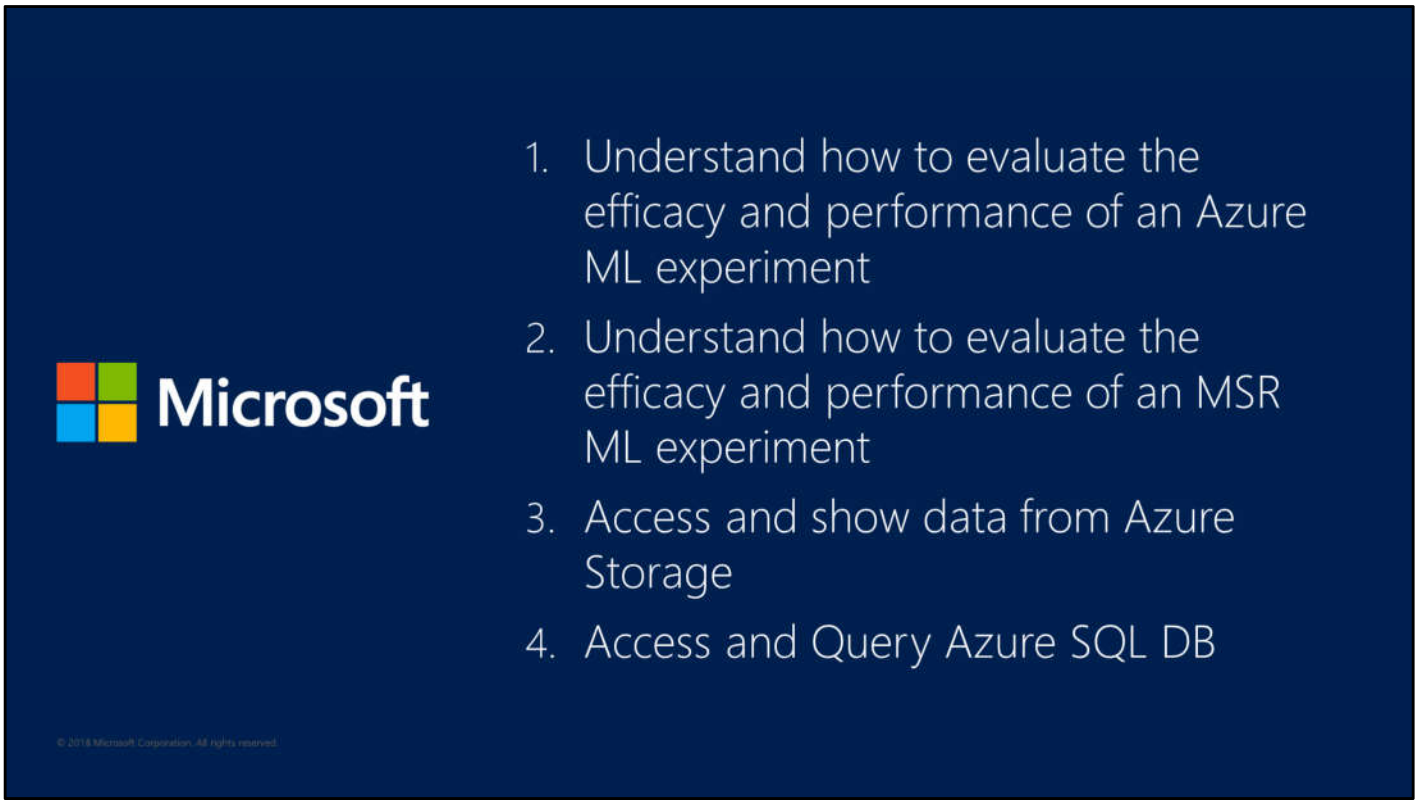
Module 3:
Accessing Data from API-based Sources

12

1. Accessing storage using Code: https://azure.microsoft.com/en-us/documentation/articles/storage-dotnet-how-to-use-blobs/ - other SDKs are listed for various tasks on Azure (including Azure Storage: https://azure.github.io/projects/sdks/



1. REST Documentation: https://msdn.microsoft.com/en-us/library/azure/dd179355.aspx


Microsoft
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Questions?