

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.

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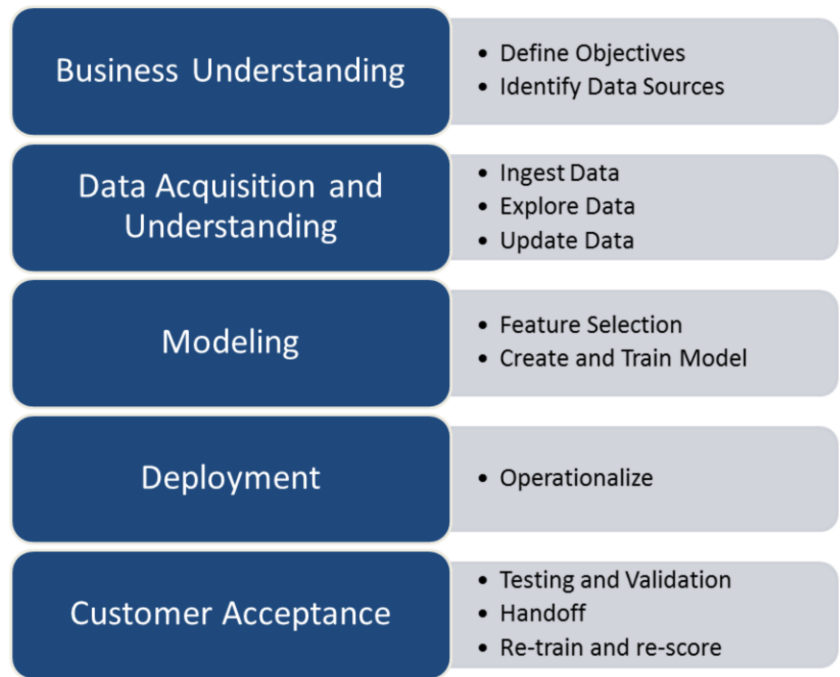
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The Data Science Process and Platform














The Team Data Science Process



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 to management and monitor

The Cortana Intelligence Platform

	Cortana, Cognitive Services, Bot Framework
	Power BI
	Stream Analytics
	HDInsight
	Azure Machine Learning (MRS)
	SQL Data Warehouse (SQL DB, Document DB)
	Data Lake
	Event Hubs
	Data Factory
	Data Catalog
	Microsoft Azure

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://caqs.azure.net/#gallery>

Module 1: Azure ML API



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1. List of API's: <https://azure.microsoft.com/en-us/services/cognitive-services/>

Azure ML - Publish as a Web Service

- Build the model
- Run the Experiment
- Create a Predictive Experiment
 - A. Click on Web Service set up button
 - B. Click on Create a Predictive Experiment
- Modify the predictive experiment
 - A. Connect the Web Service Input to Score
 - B. Add a Project Columns after Score and only allow Scored Labels and Probabilities
 - C. Move the Web Service Output to after Project Columns module
- Run, then deploy the Web Service
- Test the Web Service using the Test Dialogue
- Review Sample Code on the RRS Help Page

1. Publishing Steps: <https://azure.microsoft.com/en-us/documentation/articles/machine-learning-walkthrough-5-publish-web-service/>

Module 2: Accessing using Intelligent Processing



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1. Cognitive Services: <https://azure.microsoft.com/en-us/documentation/services/cognitive-services/>

Cortana



1. What Developers Need To Know About the Cortana API - <https://channel9.msdn.com/Blogs/Dev-Inspiration/What-Developers-Need-To-Know-About-the-Cortana-API>
2. Full Training Course: <https://mva.microsoft.com/en-US/training-courses/universal-windows-app-development-with-cortana-and-the-speech-sdk-8487>
3. Quickstart - <https://code.msdn.microsoft.com/Voice-Commands-Quickstart-64ce68ce>
(Note - will install Windows Phone emulator in your VS)
4. Training Series on Microsoft Virtual Academy: <https://mva.microsoft.com/en-US/training-courses/universal-windows-app-development-with-cortana-and-the-speech-sdk-8487>
5. <https://channel9.msdn.com/Shows/Visual-Studio-Toolbox/App-Development-with-Cortana>
6. <https://msdn.microsoft.com/en-us/library/windows/apps/xaml/dn974230.aspx?f=255&MSPPError=-2147217396>
7. <https://github.com/Microsoft/Windows-universal-samples/tree/master/Samples/SpeechRecognitionAndSynthesis>
8. <https://github.com/Microsoft/Windows-universal-samples/tree/master/Samples/CortanaVoiceCommand>
9. <http://www.slideshare.net/ActiveNick/building-windows-10-universal-apps-with-speech-and-Cortana>
10. https://mva.microsoft.com/en-US/training-courses/universal-windows-app-development-with-cortana-and-the-speech-sdk-8487?l=20D3s5Xz_5904984382

Options for Data Sourcing

- API Sources
- Storage Sources
- Coding access (REST)

1. Azure Storage Services REST API Reference - <https://msdn.microsoft.com/en-us/library/azure/dd179355.aspx>

Module 3: Querying with HIVE

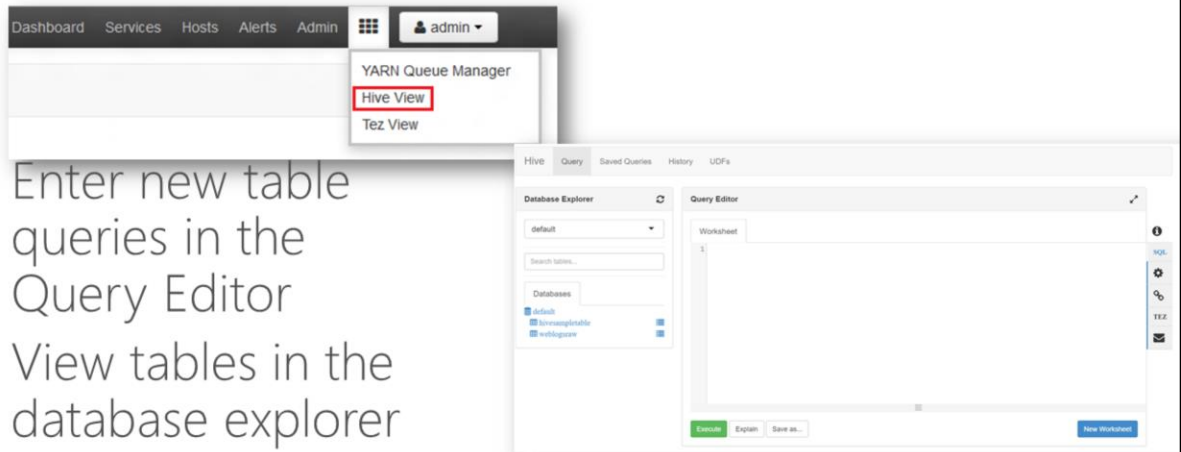


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1. Understanding HIVE: <http://hive.apache.org/>

Hive Query in Ambari

- Navigate to Ambari Views from Azure Portal.
- Select Hive view from list of views:



- Enter new table queries in the Query Editor
- View tables in the database explorer

1. More about Ambari Views: <https://azure.microsoft.com/en-us/blog/using-ambari-views-to-author-hive-and-pig-queries/>

Module 4: Querying with Power BI

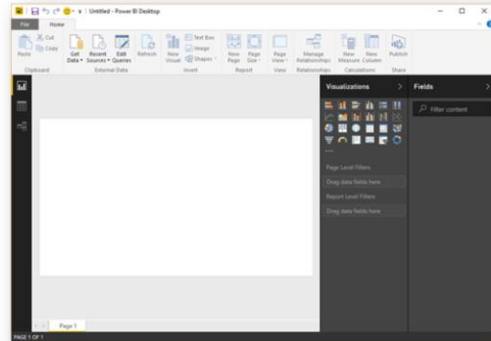


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1. Data Sources for Power BI:
<https://powerbi.microsoft.com/en-us/documentation/powerbi-service-get-data/>

Power BI

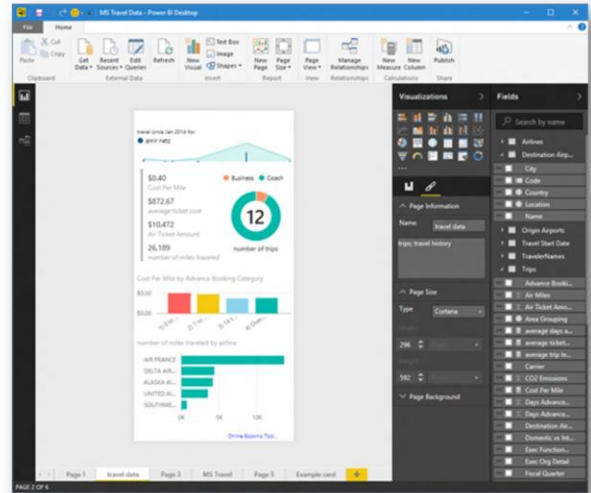
- A Reporting System for Multiple Data Sources
- Available in:
 - Web Portal
 - Power BI Desktop
 - Microsoft Excel
 - Mobile apps (iOS, Android, Windows)
- Author
 - Connect to Data
 - Shape the Data
 - Model the Data
 - Report on the Data
- Publish
 - Local
 - To Service



1. Guided Learning: <https://powerbi.microsoft.com/en-us/guided-learning/>
2. 4-part online course for Power BI in Excel 2013: https://mva.microsoft.com/en-US/training-courses/data-visualizations-with-power-bi-in-excel-2013-8889?l=kBrIM2A3_104984382

Power BI - Accessing

- Microsoft Excel
- Web Portal
- Power BI Desktop
- Mobile apps (iOS, Android, Windows)



1. Web Portal – <http://powerbi.com>
2. Power BI Desktop - <https://powerbi.microsoft.com/en-us/documentation/powerbi-desktop-latest-update/>
3. Excel - <https://support.office.com/en-us/article/Get-Transform-in-Excel-2016-881c63c6-37c5-4ca2-b616-59e18d75b4de?ui=en-US&rs=en-US&ad=US>
4. Mobile Apps - <https://powerbi.microsoft.com/en-us/Mobile>
5. Use this link to see what you are able to do:
<https://app.powerbi.com/view?r=eyJrljoiYWU2ZWQyNzYtOWNlZi00YmU2LWlyYjYtMjk1MWY5YjlyZGlyliwidCI6ImY1NDViZDY2LTdjM2YtNDcyOS04NTFhLWI3Y2EzYWY5ZWY5ZmI2ZSIsImMiOiJh9>

Power BI – Authoring Reports



Components:

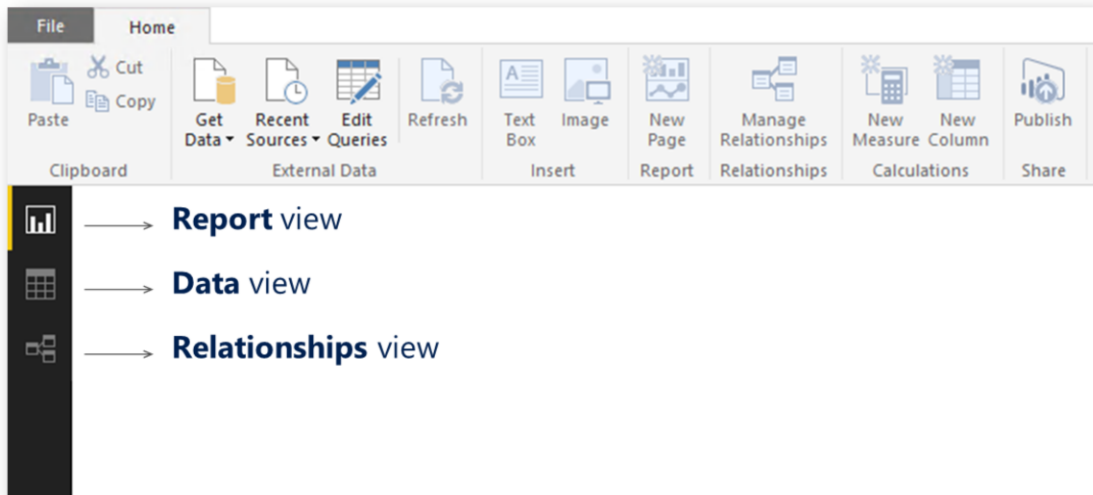
- Data
- Reports
- Dashboards

Process:

1. Connect to Data
2. Shape the Data
3. Model the Data
4. Report on the Data

1. Getting Started: <https://powerbi.microsoft.com/en-us/documentation/powerbi-desktop-getting-started/>

Power BI Desktop Views



1. Data View: <https://powerbi.microsoft.com/en-us/documentation/powerbi-desktop-data-view/>
2. Relationship View: <https://powerbi.microsoft.com/en-us/documentation/powerbi-desktop-relationship-view/>
3. Report View: <https://powerbi.microsoft.com/en-us/documentation/powerbi-desktop-report-view/>



1. Option 1: First-time, comprehensive example:
<https://powerbi.microsoft.com/en-us/documentation/powerbi-desktop-getting-started/>
2. Option 2: EMEA soccer data example :
<http://tinyurl.com/buckwoodypbi1>
3. Option 3: US retirement example:
<http://tinyurl.com/buckwoodypbi2>
4. Option 4: Open Power BI or Excel, and use this data source:
<http://services.odata.org/V4/Northwind/Northwind.svc/>
 1. Define Relationships
 2. Change the data types to be appropriate for location, summation, etc.
 3. Create linked graphics based on those relationships and data elements



Creating Impactful Reports

1. On Demand Webinar: <http://bit.ly/29q32l1>
2. Interesting Example of Good Visualization: <http://www.datapointed.net/2010/01/crayola-crayon-color-chart/>
3. Another one: <http://community.powerbi.com/t5/Data-Stories-Gallery/Vizion-Solutions-MLB-Analysis/m-p/60504>
4. Great book on data visualization: **The Wall Street Journal Guide to Information Graphics: The Dos and Don'ts of Presenting Data, Facts, and Figures Paperback** – December 16, 2013
5. Article on Data Storytelling: <http://www.forbes.com/sites/brentdykes/2016/03/31/data-storytelling-the-essential-data-science-skill-everyone-needs/#47248463f0c8>

Creating a Useful Report



- **Find and Verify your Source Data**
 - Locate the most authoritative data
 - Get permission where required
- **Shape and Model the Data**
 - Find the main message
 - Remove extraneous data
 - Change the types to be more effective in interactive layouts
- **Select the right Graphic**
 - Scale, increments, axes
 - Simple is better
 - Tell a story

1. From the book The Wall Street Journal Guide to Information Graphics: <http://www.amazon.com/Street-Journal-Guide-Information-Graphics/dp/0393347281>
2. Finding the right visualization: http://blogs.msdn.com/b/microsoft_business_intelligence1/archive/2012/10/08/best-practices-in-data-visualization.aspx

Creating Useful Dashboards



- Consider the audience
 - Make sure you account for culture
- Single Screens where possible
 - Use all your whitespace
 - Fonts and readability
- Make the most important data the biggest
 - Top right is the most valuable space
 - Use cards with linked charts
- Show information once
 - No data overlap

1. Full article: <https://powerbi.microsoft.com/en-us/documentation/powerbi-service-tips-for-designing-a-great-dashboard/>

Interaction and Integration



- **Linking Charts**
 - Find out what the audience needs to see
- **Add Slicers where needed**
 - Allows for one visualization to be many
- **Integrate with Cortana**
 - Link your accounts

1. Power BI Q and A: <https://powerbi.microsoft.com/en-us/documentation/powerbi-service-q-and-a/>
2. R Visualizations: http://community.powerbi.com/t5/R-Script-Showcase/bd-p/RVisuals?utm_content=buffer78b5e&utm_medium=social&utm_source=facebook.com&utm_campaign=buffer



1. Understand how to publish an Azure ML API
2. Understand the access methods of Azure Storage and Intelligent processing systems
3. Understand the options to send a HIVE query to an HDI system
4. Use Power BI to Access Data

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Questions?