Microsoft Azure - Starter Kits for Partners

Hands son Lab

Intelligent Apps Scenario

With Event Hub,Stream Analytics,Machine Learning, Cognitive Services,and Power BI

Last Update: August 2016





**MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS DOCUMENT.**

The information contained in this document represents the current view of Microsoft Corporation on the issues discussed as of the date of publication. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information presented after the date of publication.

Complying with all applicable copyright laws is the responsibility of the user. Without limiting the rights under copyright, no part of this document may be reproduced, stored in or introduced into a retrieval system, or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise), or for any purpose, without the express written permission of Microsoft Corporation.

Microsoft may have patents, patent applications, trademarks, copyrights, or other intellectual property rights covering subject matter in this document. Except as expressly provided in any written license agreement from Microsoft, the furnishing of this document does not give you any license to these patents, trademarks, copyrights, or other intellectual property.

The descriptions of other companies’ products in this document, if any, are provided only as a convenience to you. Any such references should not be considered an endorsement or support by Microsoft. Microsoft cannot guarantee their accuracy, and the products may change over time. Also, the descriptions are intended as brief highlights to aid understanding, rather than as thorough coverage. For authoritative descriptions of these products, please consult their respective manufacturers.

© 2015 Microsoft Corporation. All rights reserved. Any use or distribution of these materials without express authorization of Microsoft Corp. is strictly prohibited.

Microsoft and Windows are either registered trademarks of Microsoft Corporation in the United States and/or other countries.

The names of actual companies and products mentioned herein may be the trademarks of their respective owners.

Contents

[Overview 5](#_Toc459639282)

[Prerequisites 5](#_Toc459639283)

[Exercises 5](#_Toc459639284)

[Exercise 1: Develop Azure Event Hubs with SDKs 5](#_Toc459639285)

[Exercise 2: Real-Time Analytics with Azure Event Hub, Stream Analytics and PowerBI 6](#_Toc459639286)

[Exercise 3: Build predictive analytics pipelines using Azure Machine Learning & SQL Data Warehouse 7](#_Toc459639287)

## Overview

Using Microsoft Azure, as your Platform as a Service (PaaS) platform, will enable you to build the cloud application quickly, provisioning and accessing any host ubiquitously. By using the Big data and predictive analysis services that Azure provides, you can build an intelligent application quickly.

In this hands-on Lab, you will learn how to ingress data from Azure Event Hubs, analyze the stream data in real-time with Azure Stream analytics, send data to Machine Learning for predictive analytics, visualize the result data with PowerBI.

**Estimated time** to complete this lab: **180 minutes**.

**Audience**: IT Pro, Architect, Application Owners and Developers

### Prerequisites

The following is required to complete this hands-on lab:

* A Microsoft Azure subscription - [sign up for a free trial](http://aka.ms/WATK-FreeTrial)
* [Azure PowerShell 0.7.4](http://go.microsoft.com/fwlink/p/?linkid=320376)  or higher
* [Windows PowerShell 3.0](http://go.microsoft.com/fwlink/p/?LinkId=393708) or higher
* Visual Studio 2015

## Exercises

### Exercise 1: Develop Azure Event Hubs with SDKs

Follow the following article to complete the Azure Event Hubs development in C# step by step, you will get familiar with the Azure Event Hubs provisioning, the Azure Event Hubs SDKs.

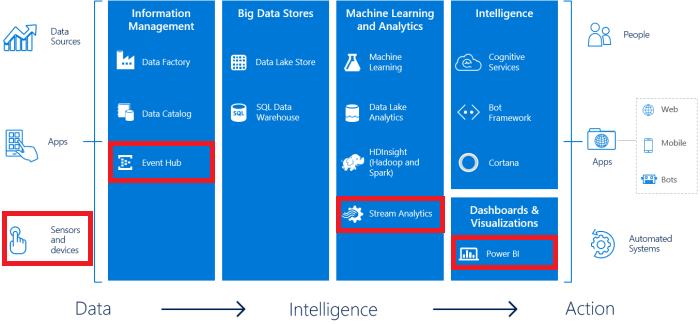
The purpose of this article is to explore and illustrate how to provision an Event Hub in Azure classic portal, how to collect messages into an Event hub using a console application in C#, and retrieve them in parallel using the C# Event Processor Host library.

Note: NA

**Scenario Guide**: <https://azure.microsoft.com/en-us/documentation/articles/event-hubs-csharp-ephcs-getstarted/>

### Exercise 2: Real-Time Analytics with Azure Event Hub, Stream Analytics and PowerBI

This lab provides an introduction to Azure Event Hubs and processing streaming data in real-time with Azure Stream Analytics. You will configure an Event Hub and use PowerShell to send streaming sample data to it. You will create a Stream Analytics job, use the Event Hub as input, and configure Power BI as an output. Finally, you will visualize an aggregated view of your sample data stream in Power BI.

* 1. 
  2. **Scenario**:

This is a tutorial for analyzing stream data in real time and creating a live dashboard using Power BI. We will be using a bluetooth sensor (TI sensor) for sending data to Eventhub, Azure Stream Analytics will analyze it real time and send the output directly to Power BI.

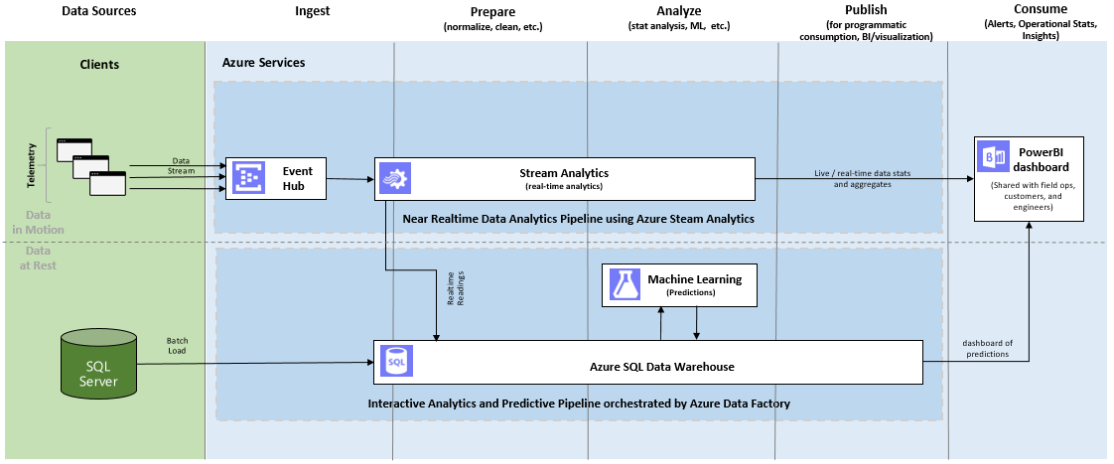
* 1. **Learning Objectives:**

Upon completing this lab, you will have hands-on experience with the following functions and concepts related to Azure Event Hubs, Stream Analytics and Cortana Intelligence:

* Creating an Event Hub and Stream Analytics job using the Azure Management Portal
* Configuring input/query/output for a Stream Analytics job
* Sending data to an Event Hub and Visualizing real-time data in Power BI
  1. **Scenario Guide:** <https://gallery.cortanaintelligence.com/Tutorial/Sensor-Data-Analytics-with-ASA-and-Power-BI-2>

### Exercise 3: Build predictive analytics pipelines using Azure Machine Learning & SQL Data Warehouse

This tutorial will demostrate how to build a cloud application with the real time and predictive analytics features. For real-time pipeline, Stream Analytics read data from an EventHub and send the data to PowerBI for visualization. For the predictive pipeline, Stream Analytics also send the data to Azure SQL Data Warehouse where Azure Data Factory will call Azure Machine Learning to read the data from the warehouse and send the aggregated results back to the warehouse for visualization in PowerBI.

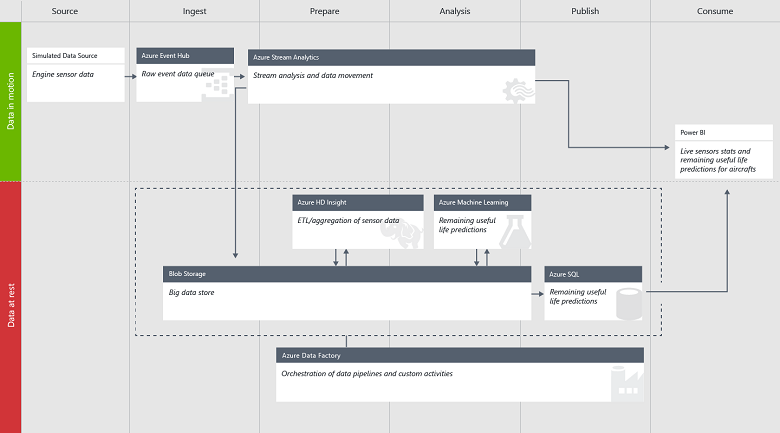


**Scenario**: This scenario is a rating system that allows users to rate an event and visualize the results in real-time. Ratings are also stored in a data warehouse and sent to machine learning for near real-time predictions.

**Scenario Guide:** <https://github.com/Azure/Cortana-Intelligence-Gallery-Content/tree/master/Tutorials/SQL-Data-Warehouse>

### Exercise 4: Predictive Maintenance solution with Azure Machine Learning & HDInsight

This solution shows a predictive maintenance solution that leverage Event Hubs for ingesting aircraft sensor readings into Azure. Stream Analytics provides real-time insights on engine health and stores that data in long-term storage for more complex, compute-intensive batch analytics. HDInsight transforms the sensor data at scale which is then consumed by Machine Learning to predict the remaining useful life of aircraft engines and components after each flight. Data Factory handles orchestration, scheduling, and monitoring of the batch processing pipeline. Finally, Power BI allows technicians to monitor the real-time sensor data using visualizations to schedule maintenance on devices.



**Scenario**: The Cortana Intelligence Predictive Maintenance for Aerospace Solution Template monitors aircraft and predicts the remaining useful life of aircraft engine components.

**Scenario Guide:** <https://gallery.cortanaintelligence.com/SolutionTemplate/Predictive-Maintenance-for-Aerospace-1>

### Exercise 5: Intelligent Kiosk with Cognitive Services

* 1. The Intelligent Kiosk is a collection of demos showcasing workflows and experiences built on top of the Microsoft Cognitive Services. Most of the experiences are hands-free and autonomous, using the human faces in front of a web camera as the main form of input.
  2. **Scenario Guide:** <https://github.com/Microsoft/Cognitive-Samples-IntelligentKiosk/>