

# Implementing Predictive Analytics with Spark in Azure HDInsight

Lab 1 – Exploring Data with Spark

## Overview

In this lab, you will use Spark to explore data and prepare it for predictive analysis.

## What You'll Need

To complete the labs, you will need the following:

- A web browser
- A Microsoft account
- A Microsoft Azure subscription
- A Windows, Linux, or Mac OS X computer
- Azure Storage Explorer
- The lab files for this course

**Note:** To set up the required environment for the lab, follow the instructions in the [Setup](#) document for this course. Specifically, you must have signed up for an Azure subscription.

## Provisioning an HDInsight Spark Cluster

The first task you must perform is to provision an HDInsight Spark cluster.

**Note:** The Microsoft Azure portal is continually improved in response to customer feedback. The steps in this exercise reflect the user interface of the Microsoft Azure portal at the time of writing, but may not match the latest design of the portal exactly.

### Provision an HDInsight Cluster

**Note:** If you already have a Spark 2.0 HDInsight cluster running, you can skip this procedure.

1. In a web browser, navigate to <http://portal.azure.com>, and if prompted, sign in using the Microsoft account that is associated with your Azure subscription.
2. In the Microsoft Azure portal, in the Hub Menu, click **New**. Then create a new HDInsight cluster with the following settings:
  - **Cluster Name:** *Enter a unique name (and make a note of it!)*
  - **Subscription:** *Select your Azure subscription*

- **Cluster Configuration**
    - **Cluster Type:** Spark
    - **Cluster Operating System:** Linux
    - **HDInsight Version:** Spark 2.0.1 (HDI 3.5)
    - **Cluster Tier:** Standard
  - **Applications:** None
  - **Credentials:**
    - **Cluster Login Username:** *Enter a user name of your choice (and make a note of it!)*
    - **Cluster Login Password:** *Enter and confirm a strong password (and make a note of it!)*
    - **SSH Username:** *Enter a user name of your choice for SSH access (and make a note of it!)*
    - **SSH Authentication Type:** PASSWORD
    - **SSH Password:** *Enter and confirm a strong password (and make a note of it!)*
  - **Data Source:**
    - **Primary storage type:** Azure Storage
    - **Selection Method:** From all subscriptions
    - **Create a new storage account:** *Enter a unique name for your storage account (and make a note of it!)*
    - **Choose Default Container:** *The name of your cluster*
    - **Location:** *Select any available region.*
    - **Cluster AAD Identity:** Not Configured
  - **Pricing**
    - **Number of Worker nodes:** 1
    - **Worker node size:** *View all and choose the smallest available size*
    - **Head node size:** *View all and choose the smallest available size*
  - **Advanced Configurations:** *Leave the default configuration*
  - **Resource Group:**
    - **Create New:** *Enter a unique name for your resource group (and make a note of it!)*
  - **Pin to dashboard:** Not selected
3. In the Azure portal, view **Notifications** to verify that deployment has started. Then wait for the cluster to be deployed (this can take a long time – often 30 minutes or more. Feel free to catch up on your social media networks while you wait!)

**Note:** As soon as an HDInsight cluster is running, the credit in your Azure subscription will start to be charged. The free-trial subscription includes a credit limit of approximately \$170 (or local equivalent) that you can spend over a period of 30 days, which is enough to complete the labs in this course as long as clusters are deleted when not in use. If you decide not to complete this lab, follow the instructions in the *Clean Up* procedure at the end of the lab to delete your cluster to avoid using your Azure credit unnecessarily.

### View the HDInsight Cluster in the Azure Portal

1. In the Azure portal, browse to the Spark cluster you just created.
2. In the blade for your cluster, under **Quick Links**, click **Cluster Dashboards**.
3. In the **Cluster Dashboards** blade, note the dashboards that are available. These include a Jupyter Notebook dashboard that you will use later in this course.

## Exploring Data

Now that you have provisioned a Spark cluster, you can use it to explore data.

## Upload Source Data to Azure Storage

In this lab, you will explore data that contains records of flights. Before you can do this, you must store the flight data files in the shared storage used by your cluster. The instructions here assume you will use Azure Storage Explorer to do this, but you can use any Azure Storage tool you prefer.

1. In the folder where you extracted the lab files for this course on your local computer, in the **data** folder, verify that the **raw-flight-data.csv** and **airports.csv** files exist. These files contain the flight data you will explore
2. Start Azure Storage Explorer, and if you are not already signed in, sign into your Azure subscription.
3. Expand your storage account and the **Blob Containers** folder, and then double-click the blob container for your HDInsight cluster.
4. In the **Upload** drop-down list, click **Upload Files**. Then upload **raw-flight-data.csv** and **airports.csv** as block blobs to a new folder named **data** in root of the container.

## Upload a Jupyter Notebook

You will use a Jupyter Notebook to explore the data. You can choose to work with Python or Scala.

1. In the Azure portal, in the blade for your HDInsight cluster, under **Quick Links**, click **Cluster Dashboards**.
2. Click **Jupyter Notebook**, and if prompted, log in using the cluster login name you specified when provisioning your cluster (be sure you use login name for HTTP connections and not the SSH user name.)
3. Click **Upload**, and browse to the **Lab01** folder in the folder where you extracted the lab files. Then select either **Python Data Exploration.ipynb** or **Scala Data Exploration.ipynb**, depending on your preferred choice of language, and upload it.

## Use Code to Explore Data

Now that you have uploaded the notebook, you can use the code it contains to explore your data.

1. Open the notebook you uploaded and then read the notes and run the code it contains to explore the flight data.

## Clean Up

**Note:** If you intend to proceed straight to the next lab, skip this section. Otherwise, follow the steps below to delete your cluster and avoid being charged for cluster resources when you are not using them.

### Delete the Resource Group

1. Close the browser tab containing the Jupyter Notebooks dashboard if it is open.
2. In the Azure portal, view your **Resource groups** and select the resource group you created for your cluster. This resource group contains your cluster and the associated storage account.
3. In the blade for your resource group, click **Delete**. When prompted to confirm the deletion, enter the resource group name and click **Delete**.
4. Wait for a notification that your resource group has been deleted.
5. Close the browser.