HBase Lab: Analyze real-time Twitter Sentiment with HBase in HDInsight

*This lab has been adapted and extended by Data Science Dojo from Microsoft's support documentation for HBase, originally contributed by Mumian. The original documentation can be here.

Contents

Lab 1: Preface

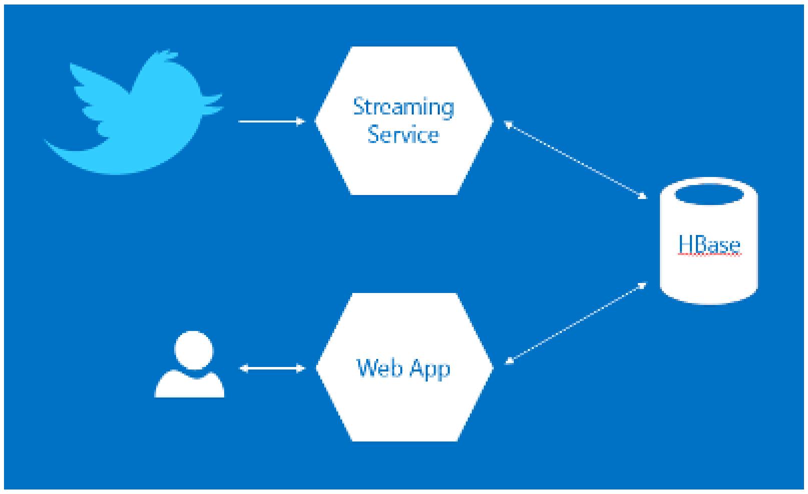
Exercise 1: Lab Prerequisites

1. Windows Operating System (or Windows Virtual Machine)
2. Visual Studio 2013 (Free Trial, or Community Edition also works)
3. A Twitter Account
4. An Azure Account (or free trial account)

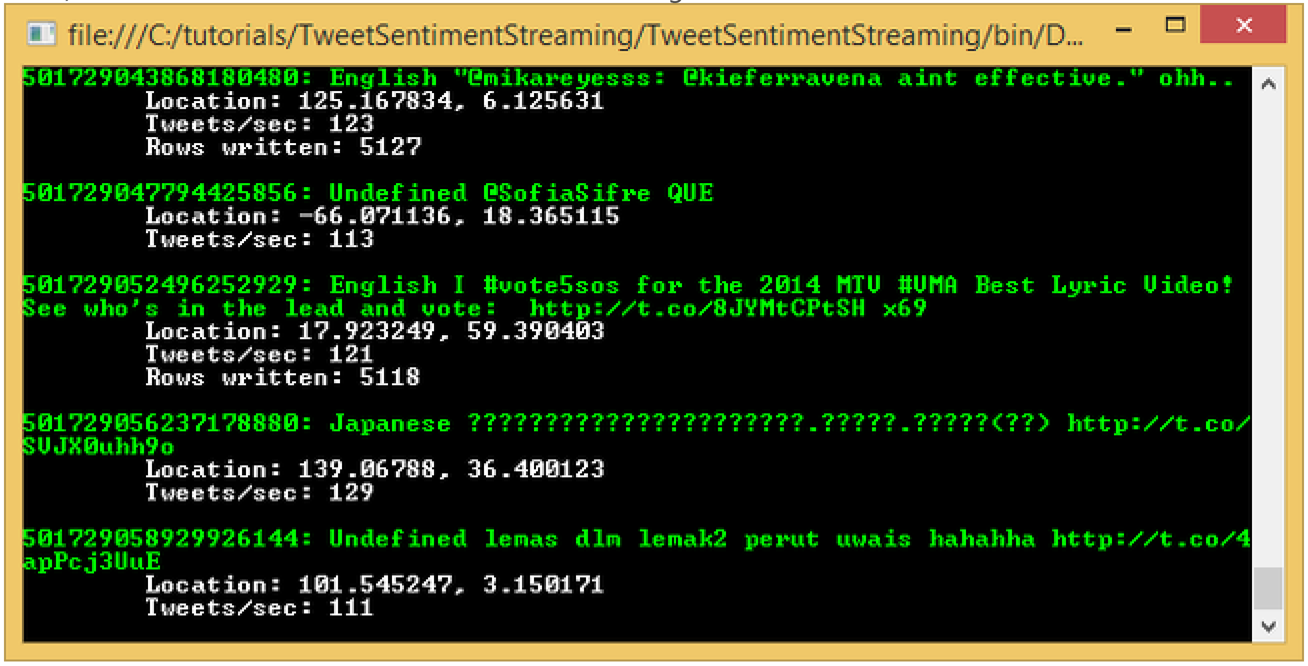
Exercise 2: Understanding the App

Learn how to do real-time sentiment analysis of big data using HBase in an HDInsight (Hadoop) cluster.

Social web sites are one of the major driving forces for Big Data adoption. Public APIs provided by sites like Twitter are a useful source of data for analyzing and understanding popular trends. In this tutorial, you will develop a console streaming service application and an ASP.NET Web application to perform the following:



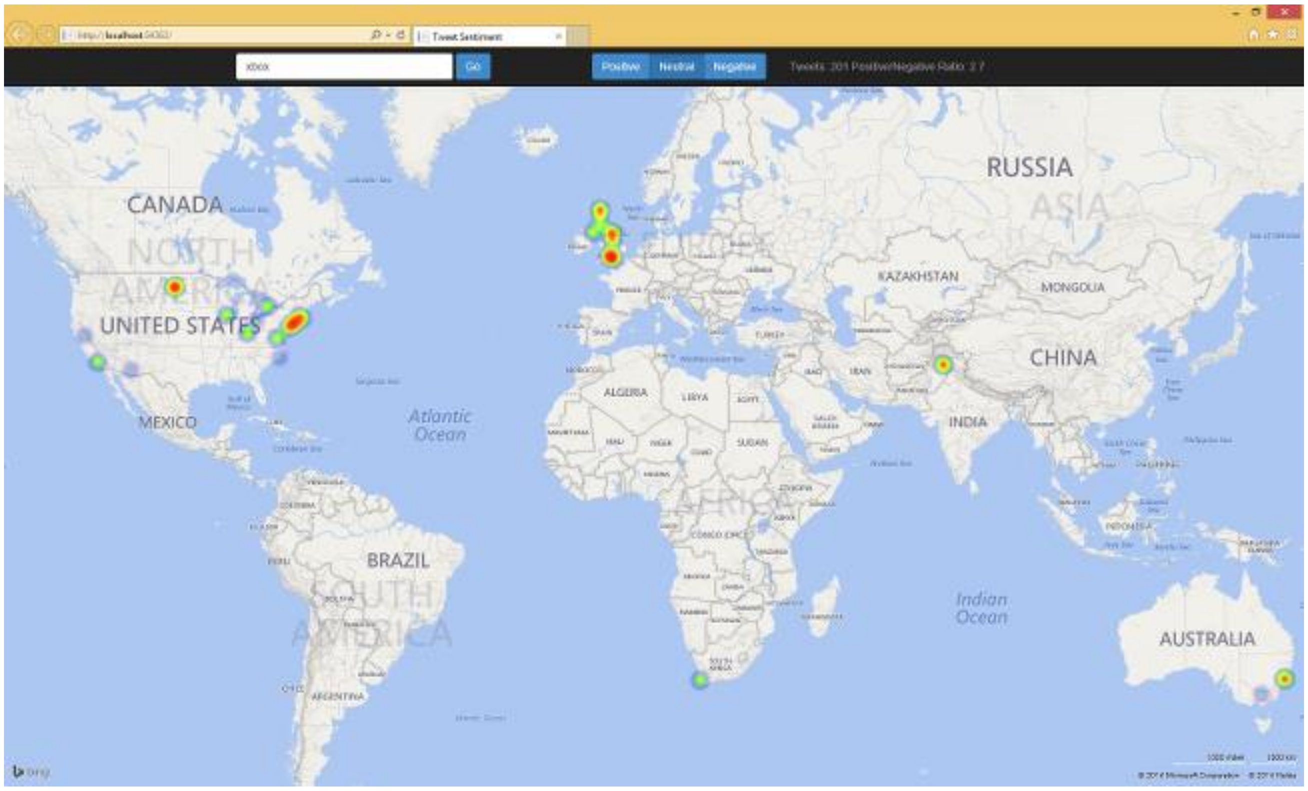
1) The streaming application
   a) Get geo-tagged Tweets in real-time using the Twitter streaming API.
   b) Evaluate the sentiment of these Tweets.
   c) Store the sentiment information in HBase using the Microsoft HBase SDK.


file:///C:/tutorials/TweetSentimentStreaming/TweetSentimentStreaming/bin/D...

```
501729043868180480: English "@mikareyesss: @kieferravena aint effective." ohh..
        Location: 125.167834, 6.125631
        Tweets/sec: 123
        Rows written: 5127

501729047794425856: Undefined @SofiaSifre QUE
        Location: -66.071136, 18.365115
        Tweets/sec: 113

501729052496252929: English I #vote5sos for the 2014 MTV #VMA Best Lyric Video!
See who's in the lead and vote:  http://t.co/8JYMtCPtSH x69
        Location: 17.923249, 59.390403
        Tweets/sec: 121
        Rows written: 5118

501729056237178880: Japanese ?????????????????????.?????.?????(??) http://t.co/
SVJX0uhh9o
        Location: 139.06788, 36.400123
        Tweets/sec: 129

501729058929926144: Undefined lemas dlm lemak2 perut uwais hahahha http://t.co/4
apPcj3UuE
        Location: 101.545247, 3.150171
        Tweets/sec: 111
```

2) The Azure Web application

   a) Plot the real-time statistical results on Bing maps using an ASP.NET Web application. A visualization of the tweets will look something like this:



You will be able to query tweets with certain keywords to get a sense of the expressed opinion in tweets is positive, negative, or neutral.

A complete Visual Studio solution sample can be found at https://github.com/maxluk/tweet-sentiment.

Lab 2: Configuring Twitter

Exercise 1: Getting a Twitter Account

We will be taking a conventional Twitter account and turning it into a Web App that will stream us live and incoming tweets from all over the world. To do this you must first have a Twitter account. You may use your personal Twitter account for this lab. **If you already have a Twitter account, go ahead and skip to Exercise 2 in this lab.**

1) Go to http://twitter.com and find the sign up box, or go directly to https://twitter.com/signup.
2) Enter your **full name**, **email address**, and a **password**.
3) Click **Sign up for Twitter**.
4) On the next page, you can select a **username** (usernames are unique identifiers on Twitter) — type your own or choose one we've suggested. We'll tell you if the username you want is available.
5) **Double-check** your name, email address, password, and username.
6) Click **Create my account.** You may be asked to complete a Captcha to let us know that you're human.
7) Twitter will send a **confirmation email** to the email address you entered. Click the link in that email to confirm your email address and account.

Exercise 2: Converting Twitter into a Streaming App

The Twitter Streaming APIs use OAuth to authorize requests. The first step to use OAuth is to create a new application on the Twitter Developer site.

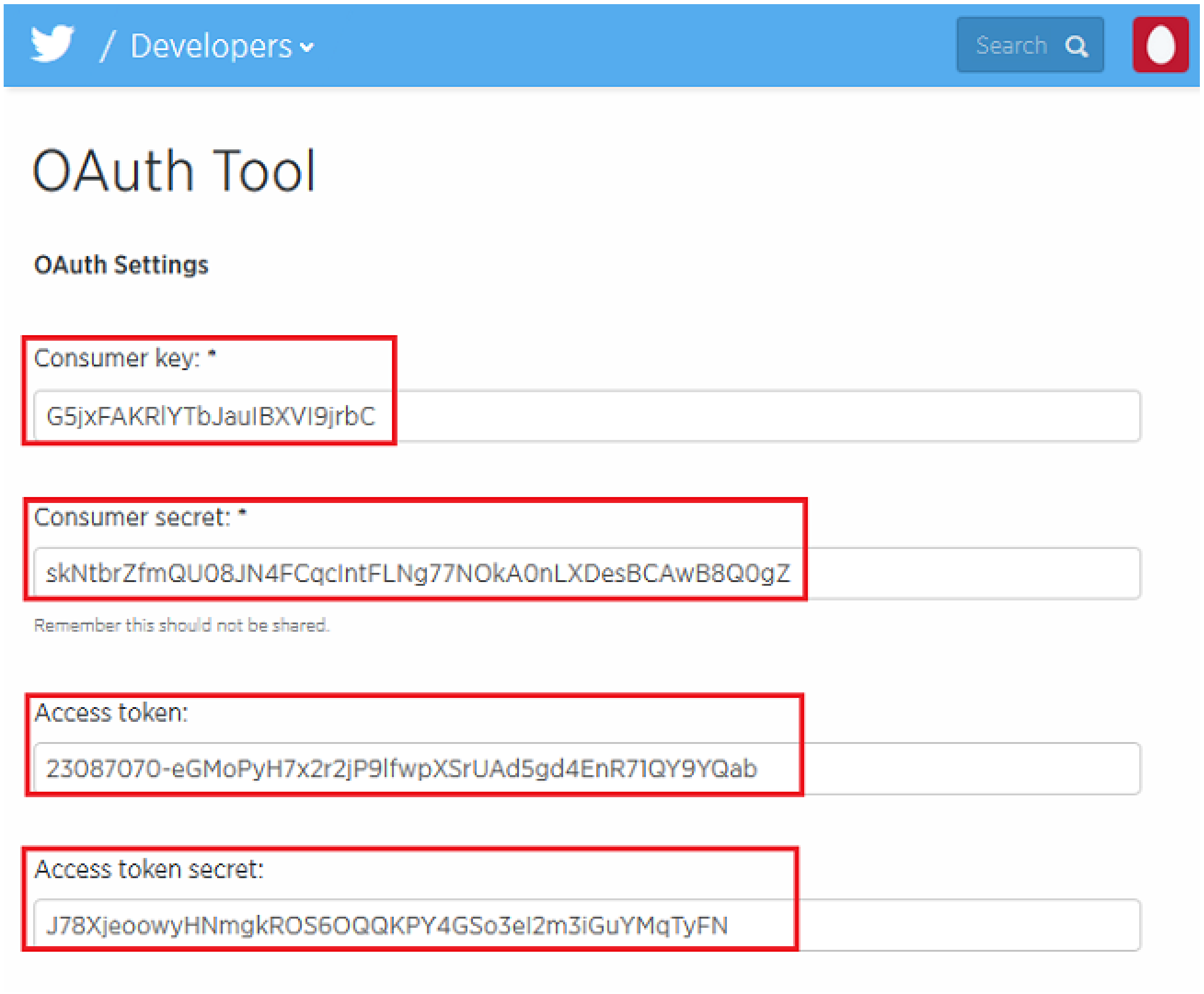
To create Twitter application ID and secrets:

1) Sign in to https://apps.twitter.com/.
2) Click **Create New App**.
3) Enter **Name**, **Description**, **Website**. The Website field is not really used. It **does not** have to be a valid URL. The following table shows some sample values to use:

FIELD	VALUE
Name	MyGloballyUniqueTwitterAppName
Description	<YourDescription>
Website	http://www.WhateverYouWant.com

NOTE: The name Twitter application name must be a unique name.

1) Check **Yes, I agree**, and then click **Create your Twitter application**.
2) Click the **Permissions** tab. The default permission is **Read only**. This is sufficient for this tutorial.
3) Click the **Keys and Access Tokens** tab.
4) Click **Create my access token**.
5) Click **Test OAuth** in the upper right corner of the page.
6) Write down (save to a notepad) **Consumer key**, **Consumer secret**, **Access token**, and **Access token secret**. You will need the values later in the tutorial.



OAuth Tool

OAuth Settings

Consumer key: *

G5jxFAKRlYTbJaulBXVI9jrbC

Consumer secret: *

skNtbrZfmQU08JN4FCqcIntFLNg77NOkA0nLXDesBCAwB8Q0gZ

Remember this should not be shared.

Access token:

23087070-eGMoPyH7x2r2jP9lfwpXSrUAd5gd4EnR71QY9YQab

Access token secret:

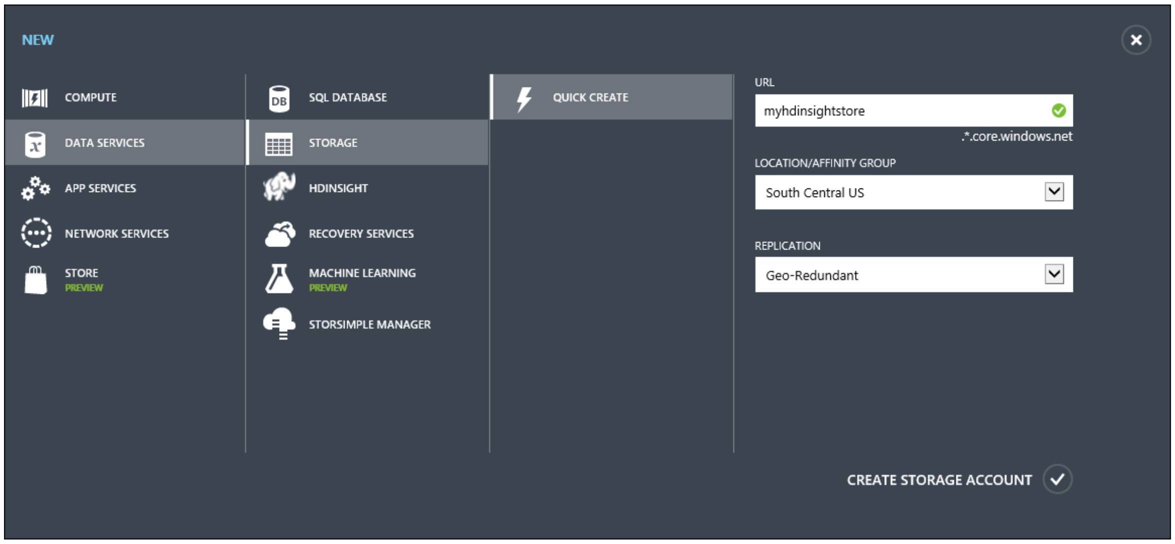
J78XjeoowyHNmgkROS6OQQKPY4GSo3eI2m3iGuYMqTyFN

Lab 3: Setting Up an HBase Cluster

Exercise 1: Create an Azure Storage Account

Since HBase runs on the Hadoop framework, it will require you to link it to an external data storage unit. In this case we will be using an Azure Blob storage.

1) Sign into your Azure account if you have one.
   a) If not, sign up for a free trial Azure account. http://azure.microsoft.com/en-us/pricing/free-trial/
2) Create an Azure Storage (sometimes called Azure Storage Vault). HDInsight and Hadoop do not deal with the storage or persistence of data and instead reference a data store.
   a) Once you are logged into your Azure portal (https://manage.windowsazure.com/), click **New>Data Services>Storage>Quick Create**
   b) URL: The URL will be the name of your storage and serve as a pseudo primary key for your storage name. Assign a unique name to it. It's called a URL because the storage account can be referenced directly via HTTP, ex: https://mystorageaccount.blob.core.windows.net/
   c) Location: Select a region that is closest to you, your users, or your Hadoop clusters.
   d) Replication: Geo-Redunant or Locally Redundant will suffice.



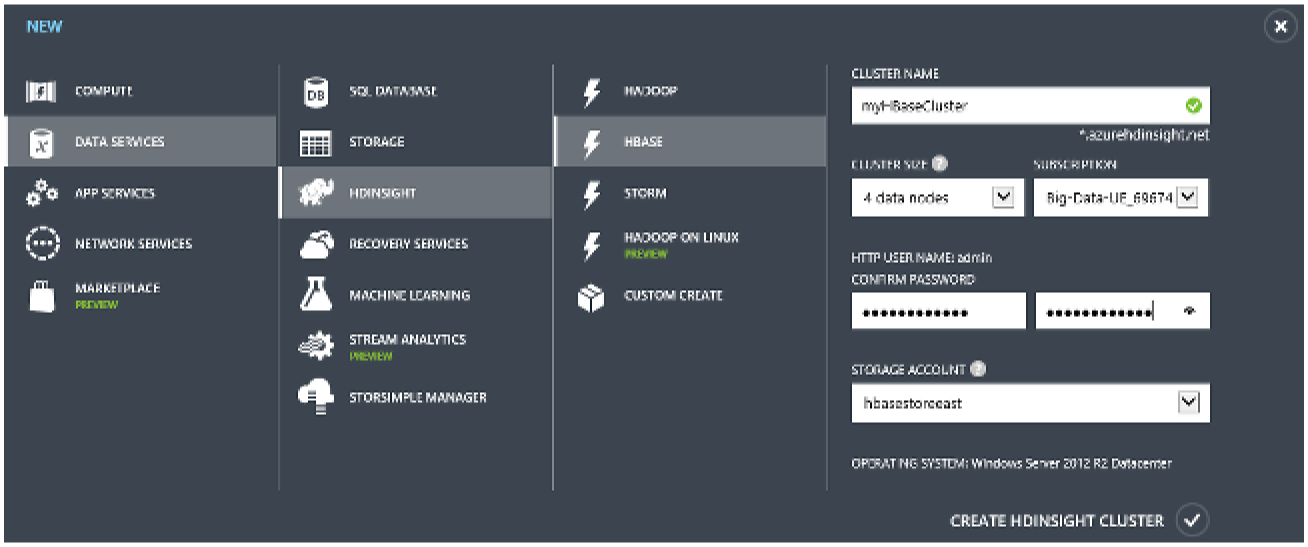
URL: myhdinsightstore .*.core.windows.net
LOCATION/AFFINITY GROUP: South Central US
REPLICATION: Geo-Redundant

   e) Provisioning a storage will take ~2 minutes after hitting the check mark button.

Exercise 2: Provisioning an HDInsight HBase Cluster

To provision an HBase cluster by using the Azure portal

1) Sign in to the Azure portal.
2) Click **NEW** in the lower left, and then click **DATA SERVICES** > **HDINSIGHT** > **HBASE**
3) Enter
   a) **CLUSTER NAME**: Set a globally unique name for your cluster. Imagine that you are picking a name for a website.
   b) **CLUSTER SIZE**: 1 data node.
   c) CLUSTER USER PASSWORD: <YourPassword>
   d) **STORAGE ACCOUNT**: Reference the storage account you created in the previous exercise.



CLUSTER NAME: myHBaseCluster
*.azurehdinsight.net
CLUSTER SIZE: 4 data nodes
SUBSCRIPTION: Big-Data-UE_69674
HTTP USER NAME: admin
CONFIRM PASSWORD: ••••••••••••• •••••••••••••
STORAGE ACCOUNT: hbasestoreeast
OPERATING SYSTEM: Windows Server 2012 R2 Datacenter

The default HTTP USER NAME is admin.

Click the checkmark icon in the lower right to create the HBase cluster.

The cluster will; take ~17 minutes to provision. So please move onto the next lab if possible.

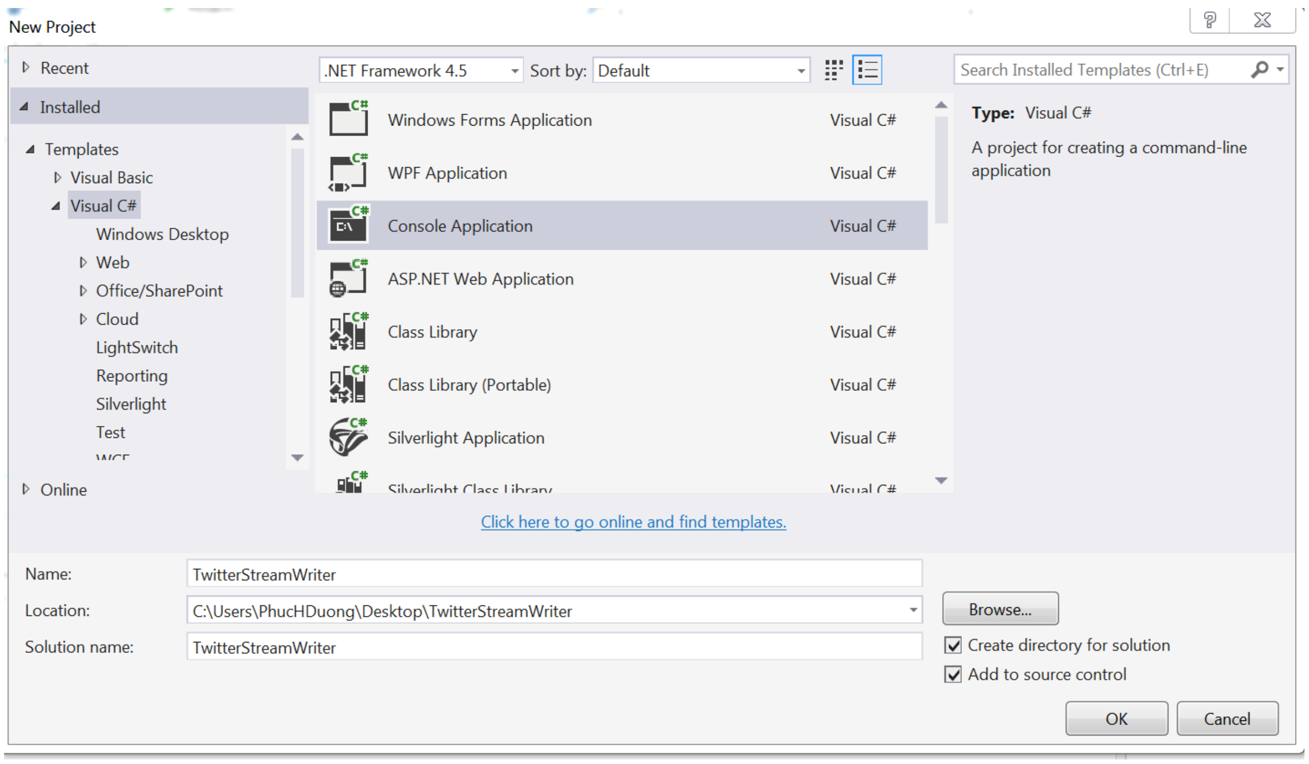
Lab 4: Creating a .Net Twitter Stream Service

We will now build a C# application that will intercept tweet streams from our Twitter account. The C# app will also take those tweets, parse them, and then write them to the HBase cluster. To do this we will be using Visual Studio.

If you do not have Visual Studio, please navigate to the following link (windows only) and download the 90 day free trial: https://www.visualstudio.com/en-us/downloads/download-visual-studio-vs.aspx

Exercise 1: Setting up the Solution File

1) **To create the Visual Studio solution:**
2) Open **Visual Studio**.
3) From the **File** menu, point to **New**, and then click **Project**.
4) Type or select the following values:
   a) Template: **Visual C# / Windows Desktop / Console Application**
   b) Name: **TwitterStreamWriter**
   c) Location: **C:\YourDesktop\TwitterStreamWriter**
   d) Solution name: **TwitterStreamWriter**


New Project

.NET Framework 4.5 — Sort by: Default

Installed > Templates > Visual C# > Windows Desktop

Console Application — Visual C#

Type: Visual C#

A project for creating a command-line application

Name: TwitterStreamWriter

Location: C:\Users\PhucHDuong\Desktop\TwitterStreamWriter

Solution name: TwitterStreamWriter

☑ Create directory for solution

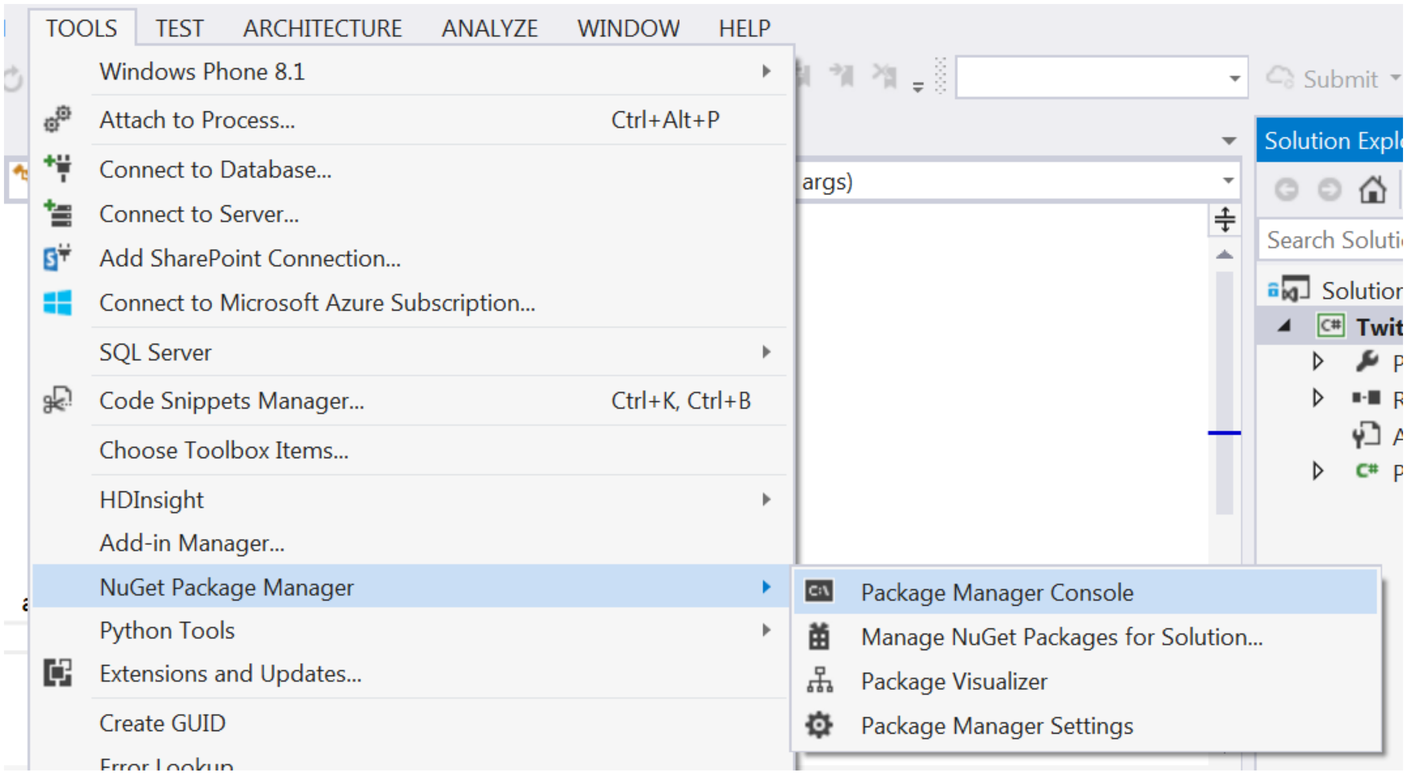
☑ Add to source control

5) Click **OK** to continue.

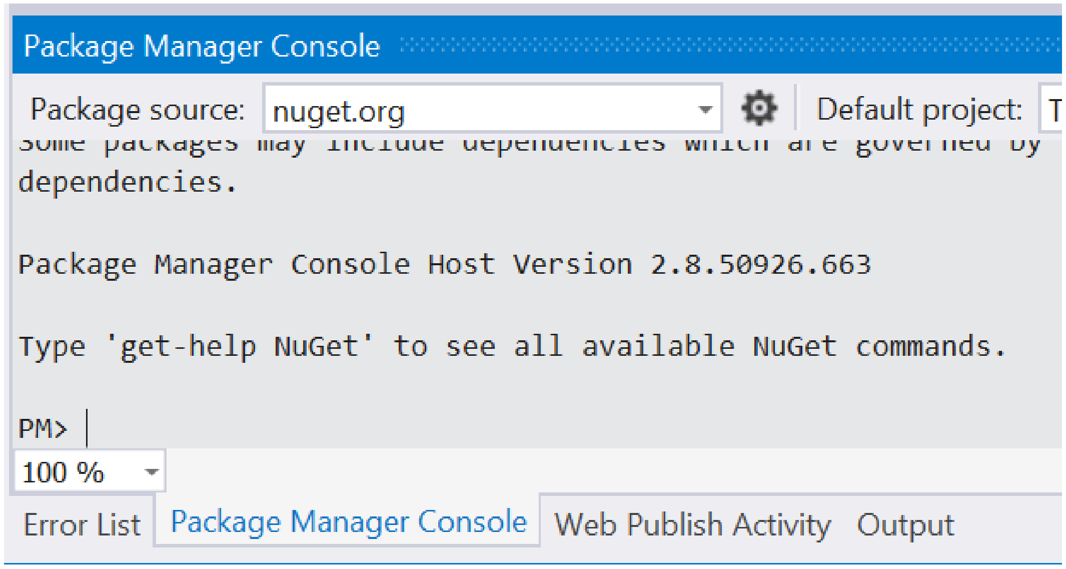
Exercise 2: Installing Dependencies & Packages

This lab will leverage from a massive amount of preexisting libraries written around the Twitter API. There also exists libraries associated with HBase connectivity. We will install and reference these libraries/packages using the **Nuget Package Manager.**

1) From the **Tools** menu, click **Nuget Package Manager**, and then click **Package Manager Console**. The console panel will open at the bottom of the page.



2) The Package Manager Console will open up somewhere your Visual Studio workspace. Wait for the Package Manager Console to initialize. You can tell that it is done when it says "PM>" at the very bottom.

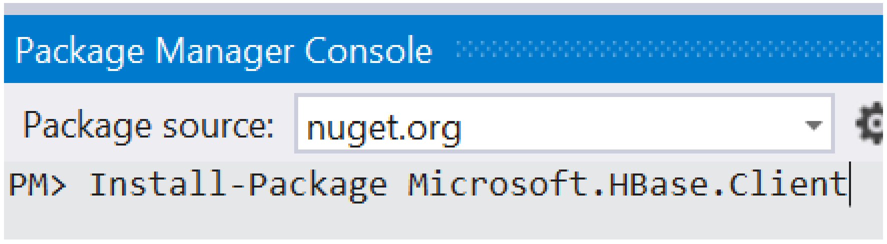


```
Some packages may include dependencies which are governed by
dependencies.

Package Manager Console Host Version 2.8.50926.663

Type 'get-help NuGet' to see all available NuGet commands.

PM>
```

3) Use the following commands to install the HBase .NET SDK package, which is client library used to access HBase clusters, and the Tweetinvi package, which is used to access the Twitter API.

   a) Install the HBase client: type in the following command into the Package Manager Console.

```
PM> Install-Package Microsoft.HBase.Client
```

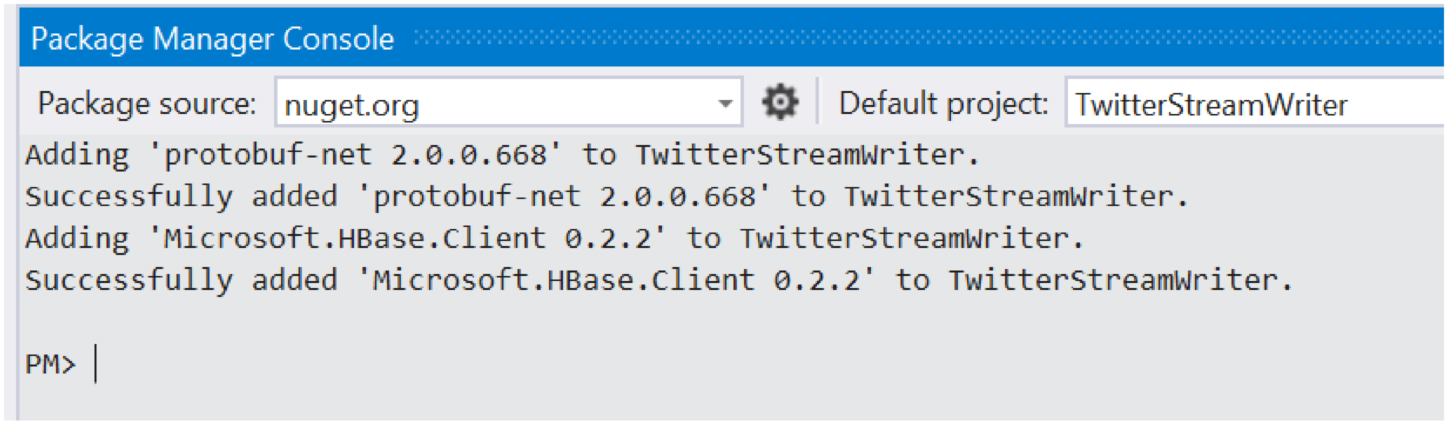


Package Manager Console

Package source: nuget.org

```
PM> Install-Package Microsoft.HBase.Client
```

Success Output:



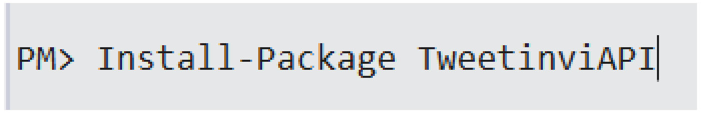
Package Manager Console

Package source: nuget.org Default project: TwitterStreamWriter

```
Adding 'protobuf-net 2.0.0.668' to TwitterStreamWriter.
Successfully added 'protobuf-net 2.0.0.668' to TwitterStreamWriter.
Adding 'Microsoft.HBase.Client 0.2.2' to TwitterStreamWriter.
Successfully added 'Microsoft.HBase.Client 0.2.2' to TwitterStreamWriter.

PM>
```

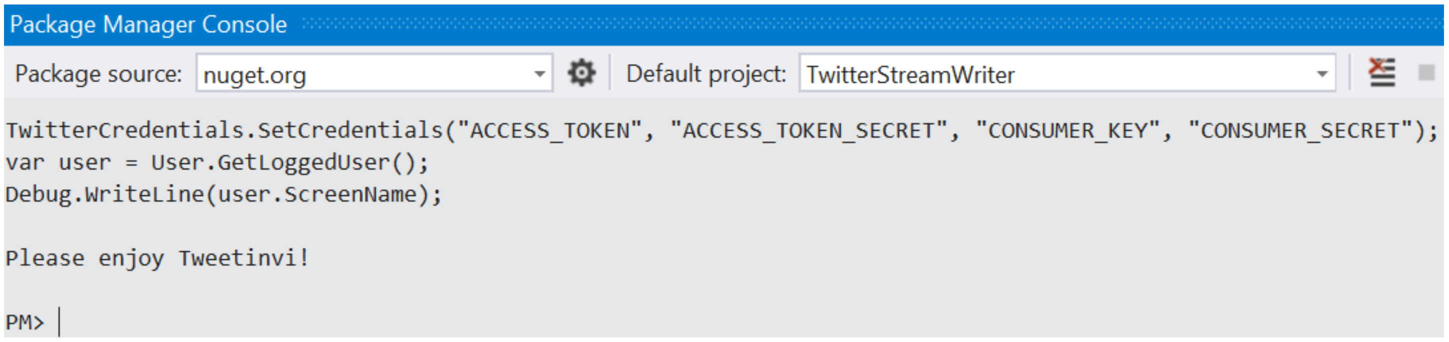
   b) Install the TwitterInvi package: type the following command into the Package Manager Console.

```
PM> Install-Package TweetinviAPI
```



```
PM> Install-Package TweetinviAPI
```

On success output:

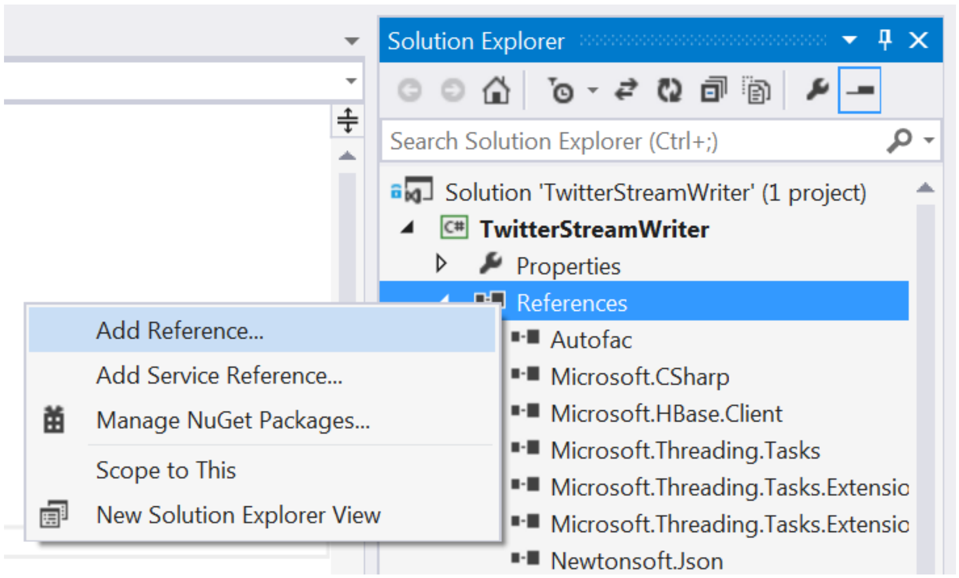


Package Manager Console

Package source: nuget.org Default project: TwitterStreamWriter

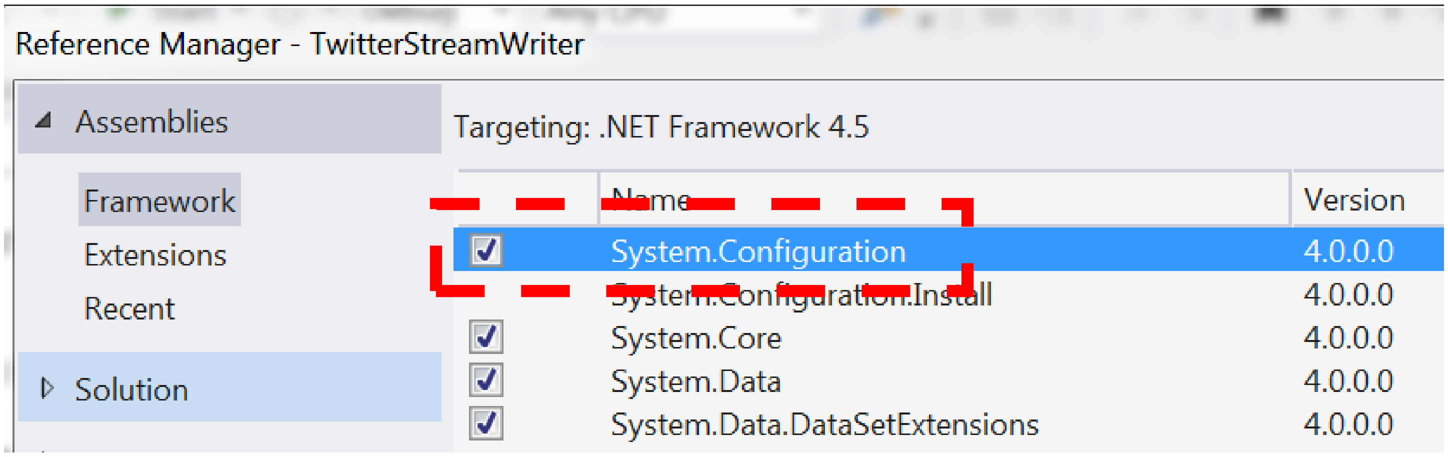
```
TwitterCredentials.SetCredentials("ACCESS_TOKEN", "ACCESS_TOKEN_SECRET", "CONSUMER_KEY", "CONSUMER_SECRET");
var user = User.GetLoggedUser();
Debug.WriteLine(user.ScreenName);

Please enjoy Tweetinvi!

PM>
```

4) **Installing System.Configuration.** From **Solution Explorer**, right-click **References**, and then click **Add Reference**.


Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'TwitterStreamWriter' (1 project)
TwitterStreamWriter
Properties
References
Autofac
Microsoft.CSharp
Microsoft.HBase.Client
Microsoft.Threading.Tasks
Microsoft.Threading.Tasks.Extensio
Microsoft.Threading.Tasks.Extensio
Newtonsoft.Json
Add Reference...
Add Service Reference...
Manage NuGet Packages...
Scope to This
New Solution Explorer View

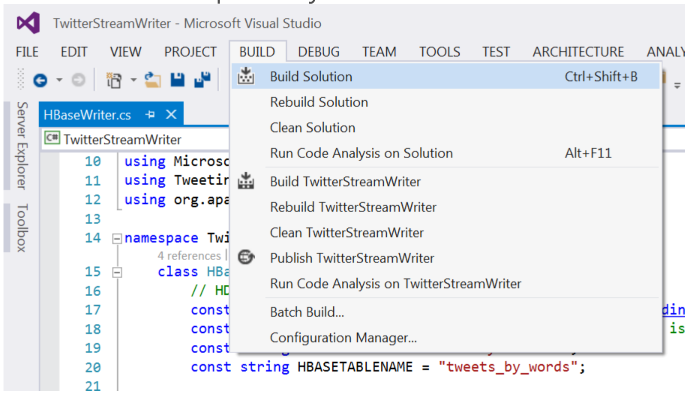
5) In the left pane, expand **Assemblies**, and then click **Framework**.

6) In the right pane, select the checkbox in front of **System.Configuration**, and then click **OK**.


Reference Manager - TwitterStreamWriter
Assemblies
Framework
Extensions
Recent
Solution
Targeting: .NET Framework 4.5

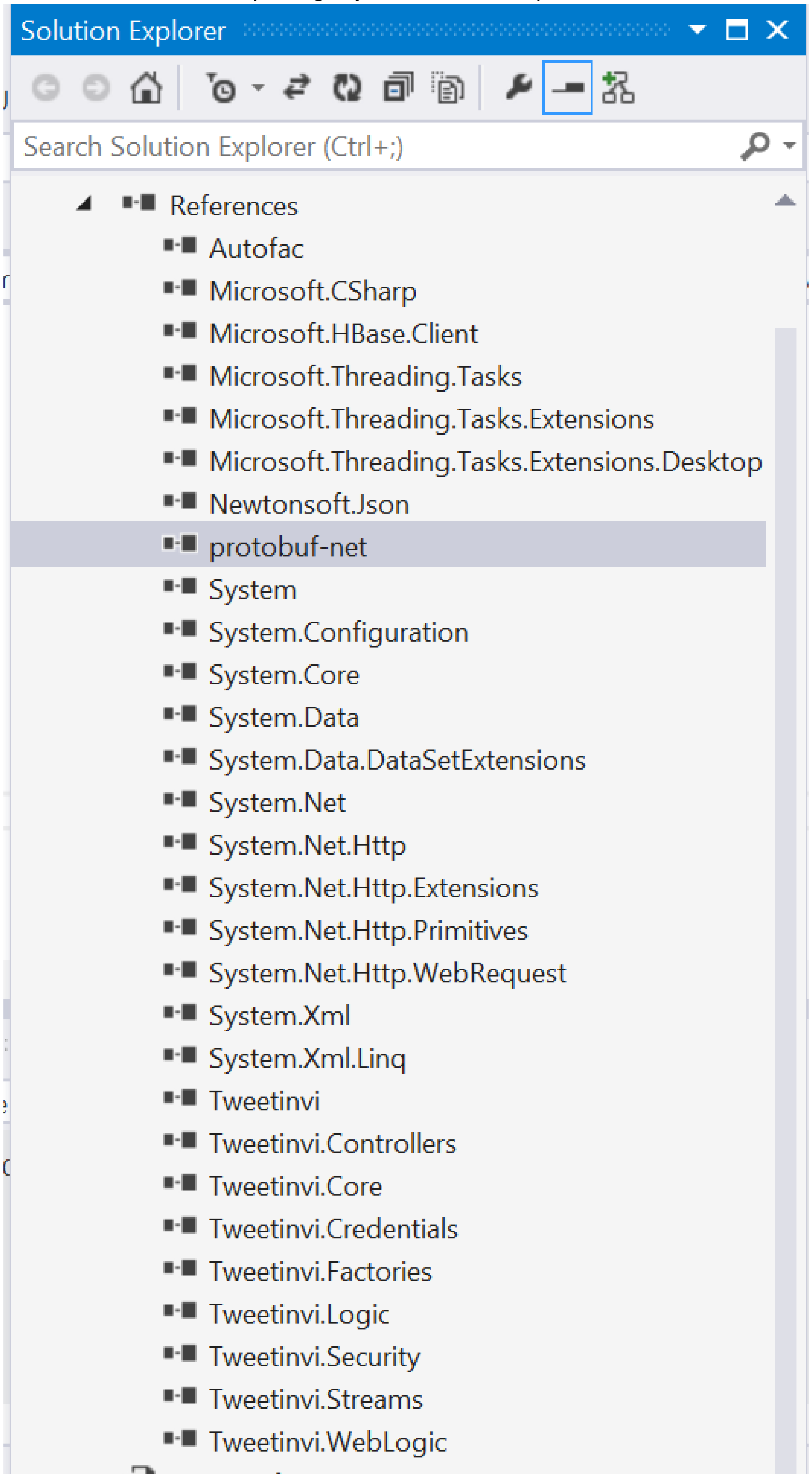
	Name	Version
✓	System.Configuration	4.0.0.0
	System.Configuration.Install	4.0.0.0
✓	System.Core	4.0.0.0
✓	System.Data	4.0.0.0
✓	System.Data.DataSetExtensions	4.0.0.0

7) Build your solution to ensure there are no errors. At the top navigation bar, there should be a build button. Select to "Build Solution", this will compile all your packages together into one neat packages and ensure that there are no compatibility issues.


TwitterStreamWriter - Microsoft Visual Studio
FILE
EDIT
VIEW
PROJECT
BUILD
DEBUG
TEAM
TOOLS
TEST
ARCHITECTURE
ANALY
HBaseWriter.cs
TwitterStreamWriter
Server Explorer
Toolbox
Build Solution Ctrl+Shift+B
Rebuild Solution
Clean Solution
Run Code Analysis on Solution Alt+F11
Build TwitterStreamWriter
Rebuild TwitterStreamWriter
Clean TwitterStreamWriter
Publish TwitterStreamWriter
Run Code Analysis on TwitterStreamWriter
Batch Build...
Configuration Manager...

```
using Microsc
using Tweetir
using org.apa

namespace Twi
    4 references |
    class HBa
        // HD
        const
        const
        const
        const string HBASETABLENAME = "tweets_by_words";
```

These are the reference packages you should end up with.

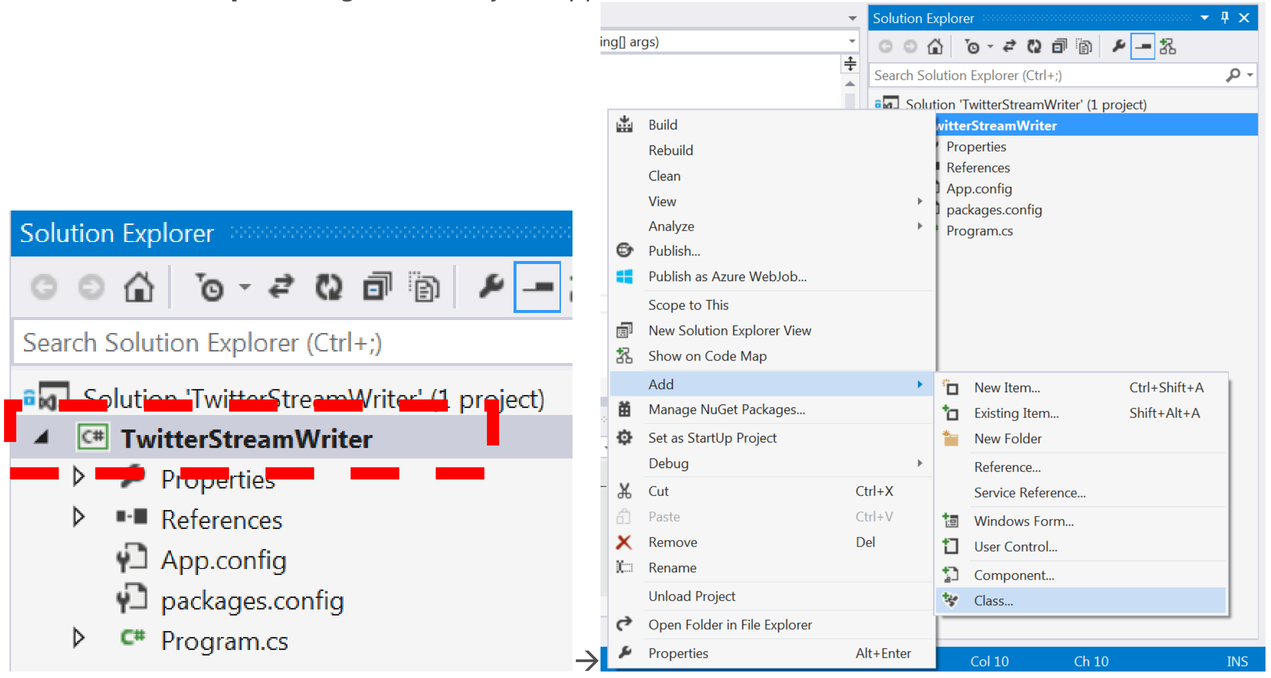


References
- Autofac
- Microsoft.CSharp
- Microsoft.HBase.Client
- Microsoft.Threading.Tasks
- Microsoft.Threading.Tasks.Extensions
- Microsoft.Threading.Tasks.Extensions.Desktop
- Newtonsoft.Json
- protobuf-net
- System
- System.Configuration
- System.Core
- System.Data
- System.Data.DataSetExtensions
- System.Net
- System.Net.Http
- System.Net.Http.Extensions
- System.Net.Http.Primitives
- System.Net.Http.WebRequest
- System.Xml
- System.Xml.Linq
- Tweetinvi
- Tweetinvi.Controllers
- Tweetinvi.Core
- Tweetinvi.Credentials
- Tweetinvi.Factories
- Tweetinvi.Logic
- Tweetinvi.Security
- Tweetinvi.Streams
- Tweetinvi.WebLogic

Exercise 3: Loading the HBase Writer Class

Now that the right packages are installed, we are good to begin the creation of an HBase writer that will take incoming tweet payloads and write them to the HBase cluster.

1) From **Solution explorer**, right click on your app (TwitterStreamWriter), click on **Add**, and then click **Class**.



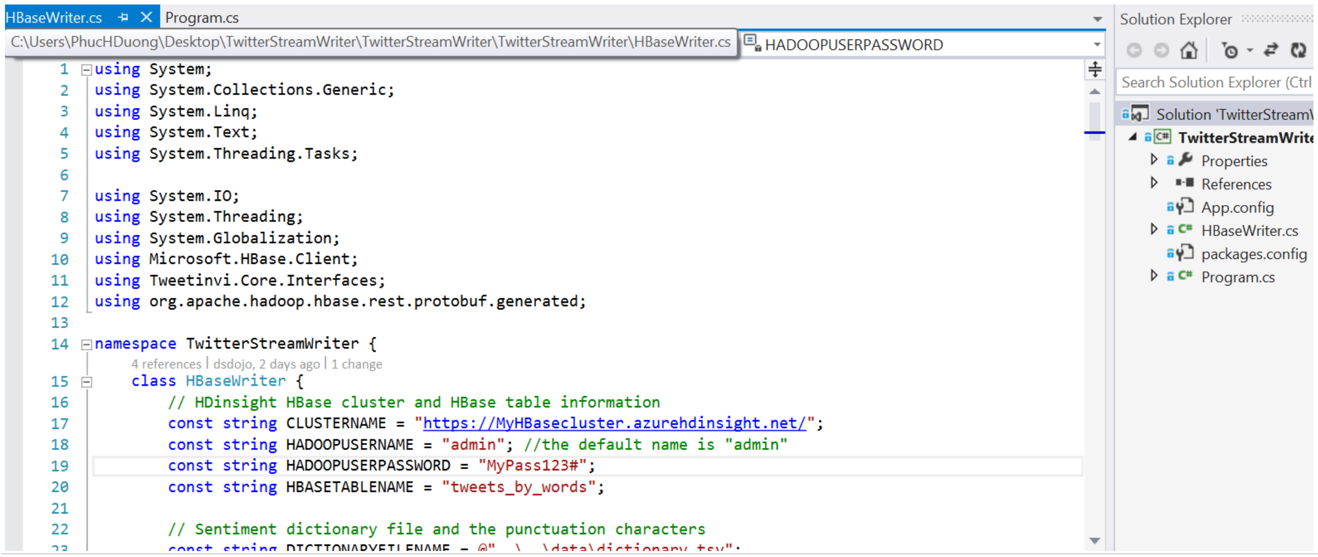
2) In **Name**: name the class **HBaseWriter**, and then click **Add**.

3) A new class called **HBaseWriter.cs** will have been added to the solution explorer on the side.

4) We have written a template HBase writer for you, please view the following link:

   a) https://github.com/datasciencedojo/TwitterHBaseStreamWriter/blob/master/TwitterStreamWriter/TwitterStreamWriter/HBaseWriter.cs

   b) Copy and paste the entirety of the file, then paste it into your own HBaseWriter.cs.


HBaseWriter.cs
Program.cs
C:\Users\PhucHDuong\Desktop\TwitterStreamWriter\TwitterStreamWriter\TwitterStreamWriter\HBaseWriter.cs
HADOOPUSERPASSWORD
4 references | dsdojo, 2 days ago | 1 change
Solution Explorer
Search Solution Explorer (Ctrl
Solution 'TwitterStream
TwitterStreamWrite
Properties
References
App.config
HBaseWriter.cs
packages.config
Program.cs

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

using System.IO;
using System.Threading;
using System.Globalization;
using Microsoft.HBase.Client;
using Tweetinvi.Core.Interfaces;
using org.apache.hadoop.hbase.rest.protobuf.generated;

namespace TwitterStreamWriter {
    class HBaseWriter {
        // HDinsight HBase cluster and HBase table information
        const string CLUSTERNAME = "https://MyHBasecluster.azurehdinsight.net/";
        const string HADOOPUSERNAME = "admin"; //the default name is "admin"
        const string HADOOPUSERPASSWORD = "MyPass123#";
        const string HBASETABLENAME = "tweets_by_words";

        // Sentiment dictionary file and the punctuation characters
        const string DICTIONARYFILENAME = @"..\..\data\dictionary.tsv";
```

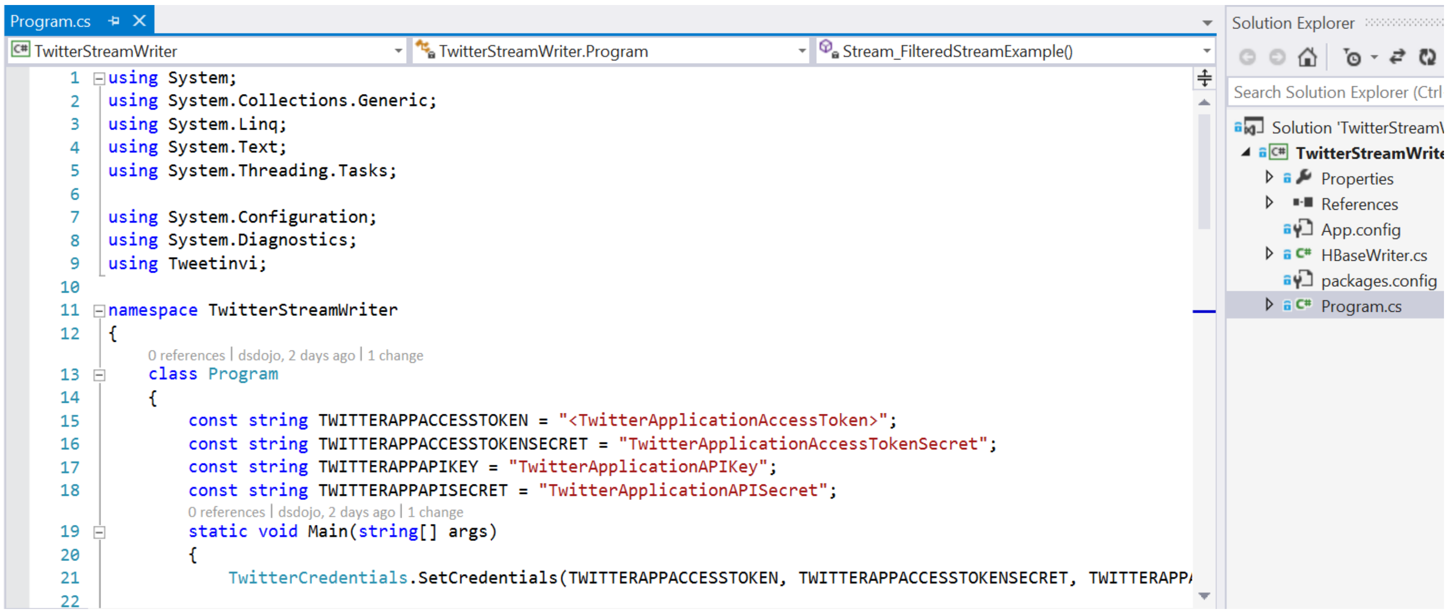
The HBaseWriter.cs provides the following functionality:

- **Connect to Hbase [HBaseWriter()]**: Use the HBase SDK to create a *ClusterCredentials* object with the cluster URL and the Hadoop user credential, and then create a *HBaseClient* object using the ClusterCredentials object.
- **Create HBase table [HBaseWriter()]**: The method call is *HBaseClient.CreateTable()*.
    - In this case it'll create table called "tweets_by_words" to store all of our incoming tweets.
- **Write to HBase table [WriterThreadFunction()]**: The method call is *HBaseClient.StoreCells()*.
- **Calculate the sentiment of the tweet**: CalcSentimentScore() will calculate whether the tweet is a negative, positive or neutral sentiment tweet based upon a dictionary that we will feed it later.

Exercise 4: Loading Program.cs

Now that the HBaseWriter class is defined, our app has been given the functionality to parse tweets, write Tweets to HBase, and calculate each tweet's sentiment. However we don't have a file that executes anything yet. Let's define our program.cs in order to use our newly defined functions.

1) Open your **program.cs** file within your solution explorer.
2) To save time we have pre-written a program.cs file for you:
   a) https://github.com/datasciencedojo/TwitterHBaseStreamWriter/blob/master/TwitterStreamWriter/TwitterStreamWriter/Program.cs
   b) Copy and paste the following GitHub code file above, and overwrite your program.cs file.



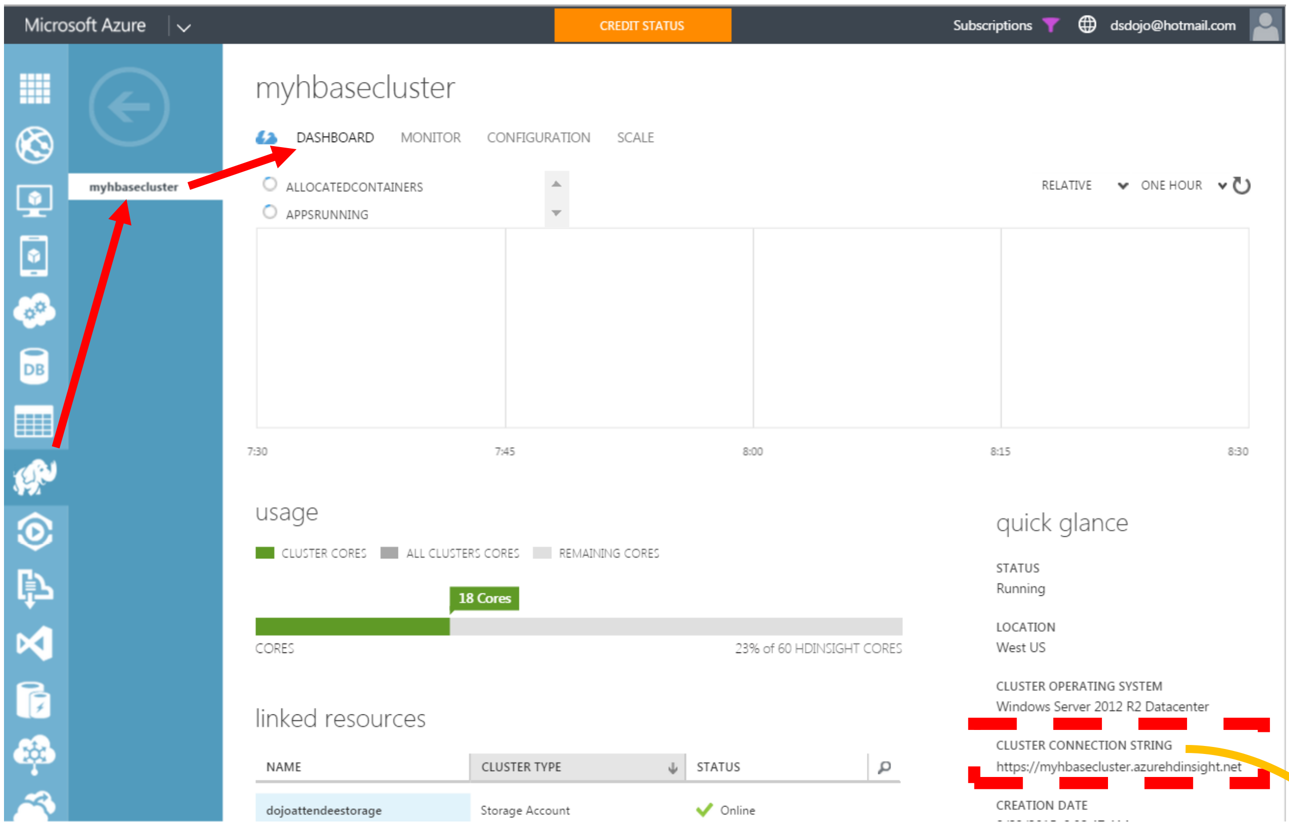
```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

using System.Configuration;
using System.Diagnostics;
using Tweetinvi;

namespace TwitterStreamWriter
{
    0 references | dsdojo, 2 days ago | 1 change
    class Program
    {
        const string TWITTERAPPACCESSTOKEN = "<TwitterApplicationAccessToken>";
        const string TWITTERAPPACCESSTOKENSECRET = "TwitterApplicationAccessTokenSecret";
        const string TWITTERAPPAPIKEY = "TwitterApplicationAPIKey";
        const string TWITTERAPPAPISECRET = "TwitterApplicationAPISecret";
        0 references | dsdojo, 2 days ago | 1 change
        static void Main(string[] args)
        {
            TwitterCredentials.SetCredentials(TWITTERAPPACCESSTOKEN, TWITTERAPPACCESSTOKENSECRET, TWITTERAPP
```

Program.cs will make the direct connection to your Twitter account, open up the live stream feed, then write incoming tweets to the HBase cluster using the HBaseWriter.cs class we defined earlier.

Exercise 5: Configuring your App

Now we must configure the App to use your own HBase cluster, as well as your own twitter account. To do this we will have to give it the correct credentials to access your HBase cluster and Twitter account.

1) **Referencing your HBase cluster:**
   a) There are 4 constants defined at the top of the HBaseWriter class within your HBaseWriter.cs file that will directly link to your HBase cluster, we just need to point them in the correct direction.
      i) "**CLUSTERNAME**" (line 17): This will be the direct URL connection string to your HBase cluster. Go to your Azure Management Portal (manage.windowsazure.com), click on **HDInsight > YourCluster -> DashBoard**.



STATUS
Running

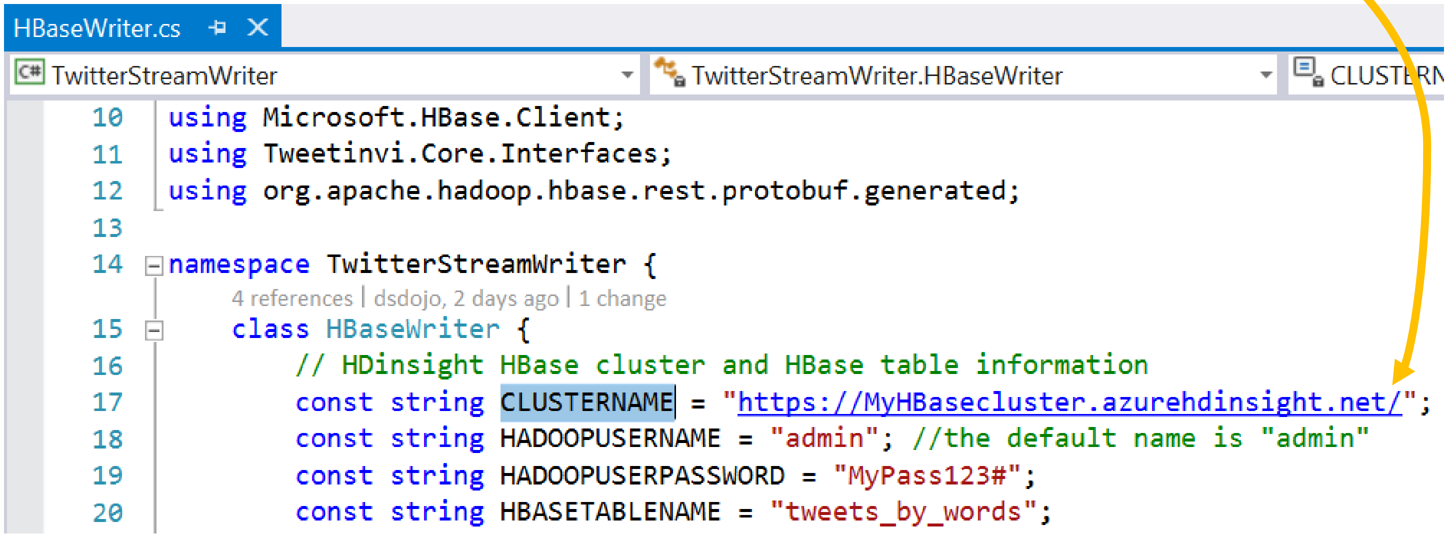
LOCATION
West US

CLUSTER OPERATING SYSTEM
Windows Server 2012 R2 Datacenter

CLUSTER CONNECTION STRING
https://myhbasecluster.azurehdinsight.net

CREATION DATE

NAME	CLUSTER TYPE	STATUS
dojoattendeestorage	Storage Account	✓ Online



```
10  using Microsoft.HBase.Client;
11  using Tweetinvi.Core.Interfaces;
12  using org.apache.hadoop.hbase.rest.protobuf.generated;
13
14  namespace TwitterStreamWriter {
        4 references | dsdojo, 2 days ago | 1 change
15      class HBaseWriter {
16          // HDinsight HBase cluster and HBase table information
17          const string CLUSTERNAME = "https://MyHBasecluster.azurehdinsight.net/";
18          const string HADOOPUSERNAME = "admin"; //the default name is "admin"
19          const string HADOOPUSERPASSWORD = "MyPass123#";
20          const string HBASETABLENAME = "tweets_by_words";
```

ii) **"HADOOPUSERNAME":** Leave the username as "admin".

iii) **"HADOOPUSERPASSWORD":** Insert the password that you set for the HBase cluster when you provisioned it.

iv) **"HBASETABLENAME":** Leave it as "tweets_by_words";

2) **Referencing your Twitter account:**

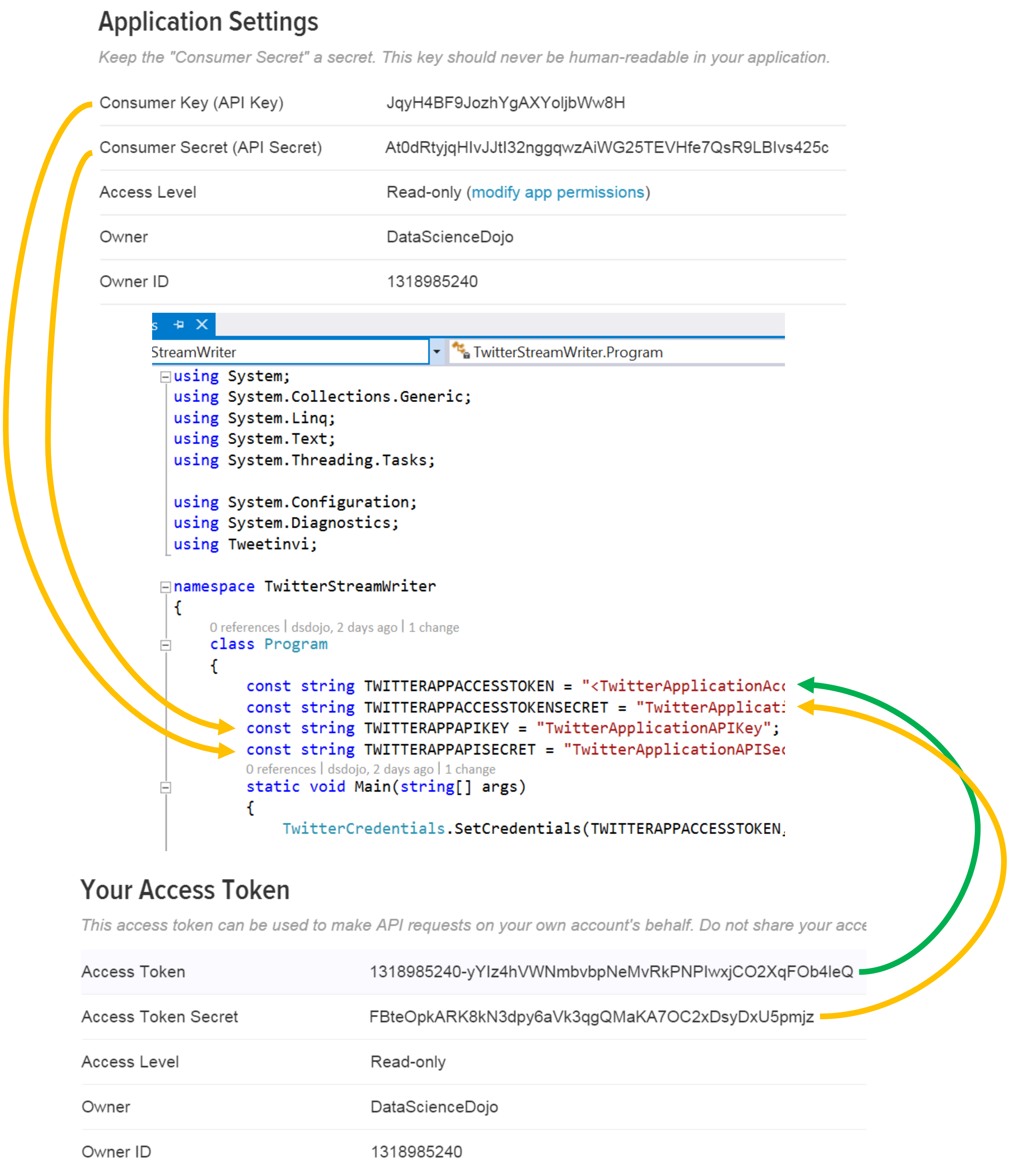
   a) We will now reference the Twitter app that we created from your own personal Twitter account in Lab 2, Exercise 2.

   b) Navigate to: https://apps.twitter.com/

      i) Click on your App.

      ii) Click on "Keys and Access Tokens"

iii) Under **Program.cs** has 4 constants defined at the top of the program class that defines your Twitter API keys and tokens. Please fill in the twitter key constants with your own twitter keys using the pictorial diagram below:



Application Settings

Keep the "Consumer Secret" a secret. This key should never be human-readable in your application.

Consumer Key (API Key)	JqyH4BF9JozhYgAXYoljbWw8H
Consumer Secret (API Secret)	At0dRtyjqHIvJJtI32nggqwzAiWG25TEVHfe7QsR9LBIvs425c
Access Level	Read-only (modify app permissions)
Owner	DataScienceDojo
Owner ID	1318985240

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

using System.Configuration;
using System.Diagnostics;
using Tweetinvi;

namespace TwitterStreamWriter
{
    0 references | dsdojo, 2 days ago | 1 change
    class Program
    {
        const string TWITTERAPPACCESSTOKEN = "<TwitterApplicationAc
        const string TWITTERAPPACCESSTOKENSECRET = "TwitterApplicati
        const string TWITTERAPPAPIKEY = "TwitterApplicationAPIKey";
        const string TWITTERAPPAPISECRET = "TwitterApplicationAPISe
        0 references | dsdojo, 2 days ago | 1 change
        static void Main(string[] args)
        {
            TwitterCredentials.SetCredentials(TWITTERAPPACCESSTOKEN,
```

Your Access Token

This access token can be used to make API requests on your own account's behalf. Do not share your acce

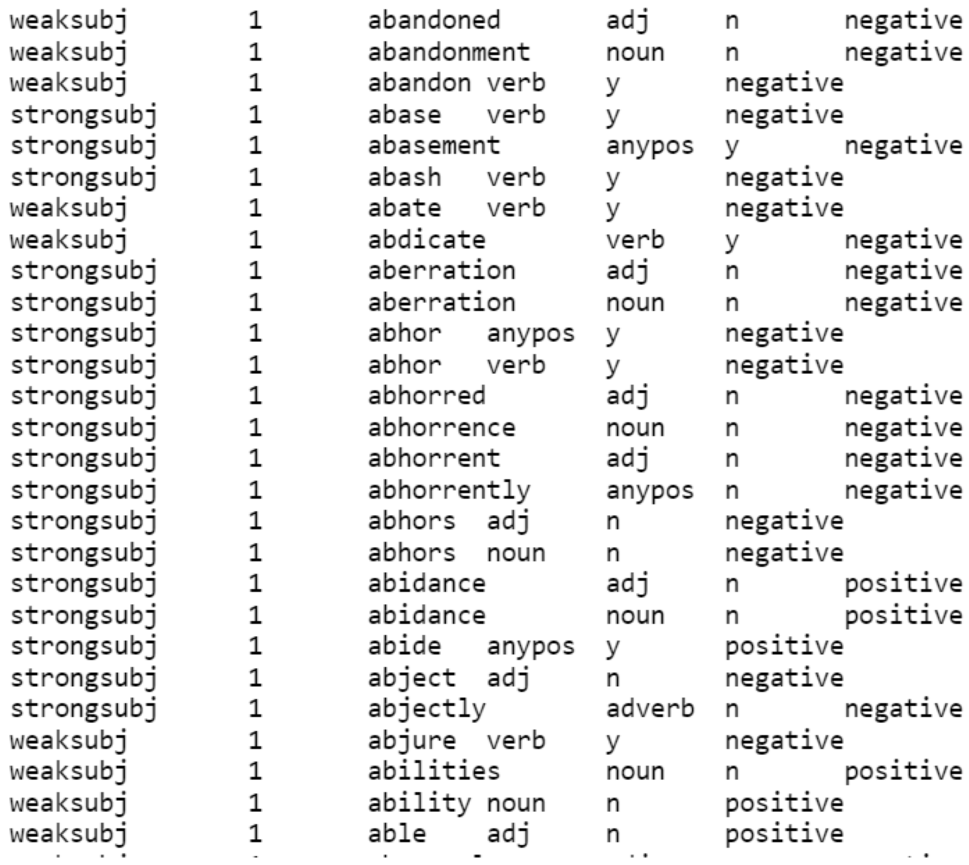
Access Token	1318985240-yYIz4hVWNmbvbpNeMvRkPNPIwxjCO2XqFOb4leQ
Access Token Secret	FBteOpkARK8kN3dpy6aVk3qgQMaKA7OC2xDsyDxU5pmjz
Access Level	Read-only
Owner	DataScienceDojo
Owner ID	1318985240

3) Configuring and loading the sentiment dictionary.

Our HBaseWriter class actually will try to quantify whether or not each incoming tweet is negative, positive, or neutral before writing it to the HBase cluster. It does this by reading from a sentiment dictionary, a predefined table that lists whether or not a word is positive or negative based upon its context usage within the English language.

a) Obtaining the dictionary:

i) Visit the following link, save the file as "dictionary.tsv". https://dojoattendeestorage.blob.core.windows.net/datasets/dictionary.tsv

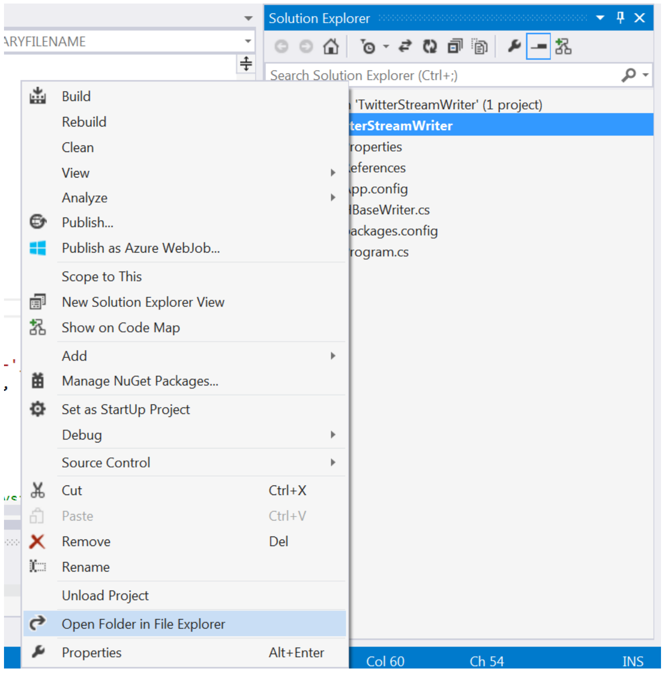


```
weaksubj        1       abandoned       adj     n       negative
weaksubj        1       abandonment     noun    n       negative
weaksubj        1       abandon verb    y       negative
strongsubj      1       abase   verb    y       negative
strongsubj      1       abasement       anypos  y       negative
strongsubj      1       abash   verb    y       negative
weaksubj        1       abate   verb    y       negative
weaksubj        1       abdicate        verb    y       negative
strongsubj      1       aberration      adj     n       negative
strongsubj      1       aberration      noun    n       negative
strongsubj      1       abhor   anypos  y       negative
strongsubj      1       abhor   verb    y       negative
strongsubj      1       abhorred        adj     n       negative
strongsubj      1       abhorrence      noun    n       negative
strongsubj      1       abhorrent       adj     n       negative
strongsubj      1       abhorrently     anypos  n       negative
strongsubj      1       abhors  adj     n       negative
strongsubj      1       abhors  noun    n       negative
strongsubj      1       abidance        adj     n       positive
strongsubj      1       abidance        noun    n       positive
strongsubj      1       abide   anypos  y       positive
strongsubj      1       abject  adj     n       negative
strongsubj      1       abjectly        adverb  n       negative
weaksubj        1       abjure  verb    y       negative
weaksubj        1       abilities       noun    n       positive
weaksubj        1       ability noun    n       positive
weaksubj        1       able    adj     n       positive
```

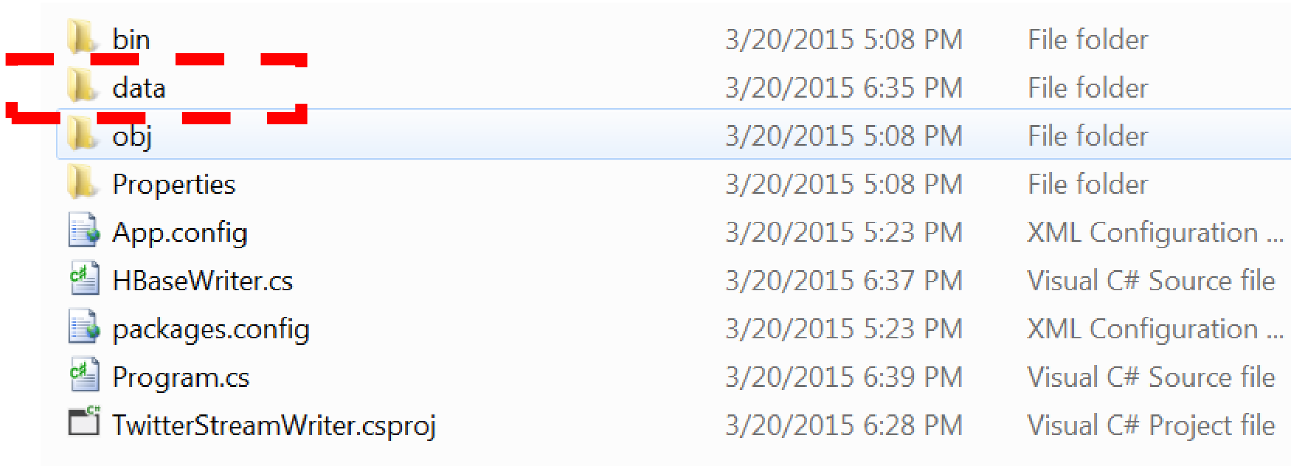
ii)

b) Moving your dictionary into your App folder:

i) Within your visual studio solution for the twitter streaming app, right click on your app (TwitterStreamWriter), go to “Open Folder in File Explorer”.



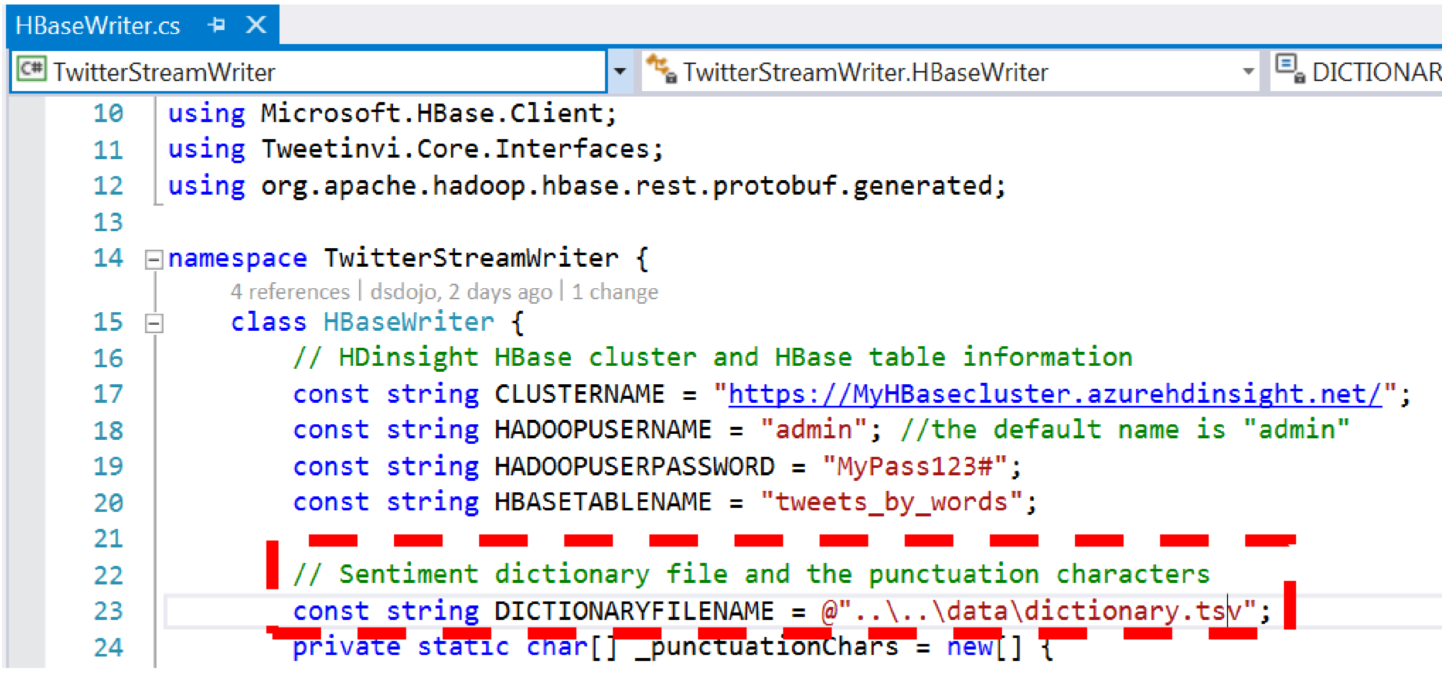
ii) Create a new folder called “data” and drag the dictionary.tsv into it.



bin	3/20/2015 5:08 PM	File folder
data	3/20/2015 6:35 PM	File folder
obj	3/20/2015 5:08 PM	File folder
Properties	3/20/2015 5:08 PM	File folder
App.config	3/20/2015 5:23 PM	XML Configuration ...
HBaseWriter.cs	3/20/2015 6:37 PM	Visual C# Source file
packages.config	3/20/2015 5:23 PM	XML Configuration ...
Program.cs	3/20/2015 6:39 PM	Visual C# Source file
TwitterStreamWriter.csproj	3/20/2015 6:28 PM	Visual C# Project file

c) Referencing your dictionary within your App:

i) Within your HBaseWriter.cs, there should be a constant defined as "DICTIONARYFILENAME", make sure it is referenced correctly to the correct folder, and it's named correctly. (it should already be referenced correctly named and referenced but just in case, check).



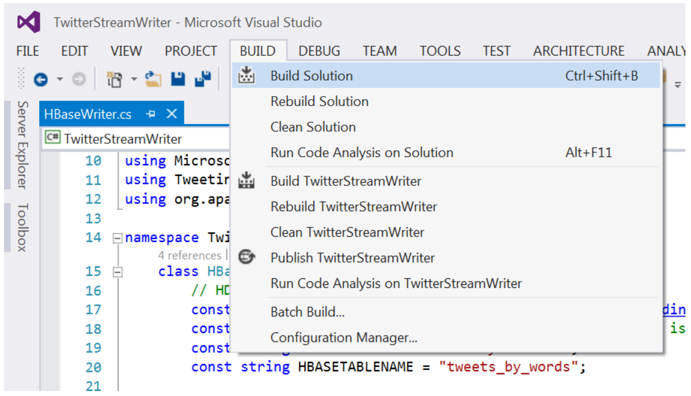
HBaseWriter.cs

TwitterStreamWriter | TwitterStreamWriter.HBaseWriter | DICTIONAR

```
using Microsoft.HBase.Client;
using Tweetinvi.Core.Interfaces;
using org.apache.hadoop.hbase.rest.protobuf.generated;

namespace TwitterStreamWriter {
    4 references | dsdojo, 2 days ago | 1 change
    class HBaseWriter {
        // HDinsight HBase cluster and HBase table information
        const string CLUSTERNAME = "https://MyHBasecluster.azurehdinsight.net/";
        const string HADOOPUSERNAME = "admin"; //the default name is "admin"
        const string HADOOPUSERPASSWORD = "MyPass123#";
        const string HBASETABLENAME = "tweets_by_words";

        // Sentiment dictionary file and the punctuation characters
        const string DICTIONARYFILENAME = @"..\..\data\dictionary.tsv";
        private static char[] _punctuationChars = new[] {
```

Exercise 6: Running your App to Collect Data

1. Build your solution to ensure there are no errors. At the top navigation bar, there should be a build button. Select to "Build Solution". If there are no errors move on, if not, then please troubleshoot.


TwitterStreamWriter - Microsoft Visual Studio
FILE EDIT VIEW PROJECT BUILD DEBUG TEAM TOOLS TEST ARCHITECTURE ANALY
Build Solution Ctrl+Shift+B
Rebuild Solution
Clean Solution
Run Code Analysis on Solution Alt+F11
Build TwitterStreamWriter
Rebuild TwitterStreamWriter
Clean TwitterStreamWriter
Publish TwitterStreamWriter
Run Code Analysis on TwitterStreamWriter
Batch Build...
Configuration Manager...
HBaseWriter.cs
TwitterStreamWriter
Server Explorer
Toolbox

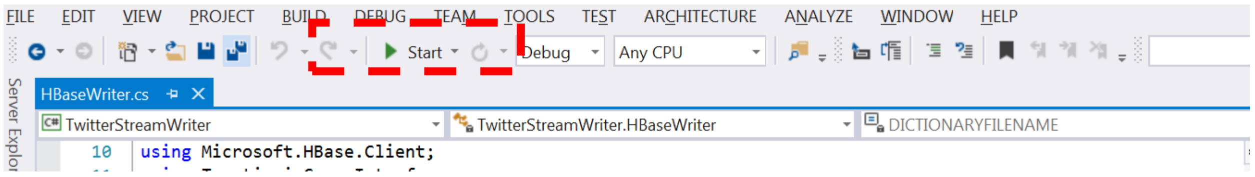
```
using Microsc
using Tweetir
using org.apa

namespace Twi
    4 references
    class HBa
        // HD
        const                          din
        const                          is
        const
        const string HBASETABLENAME = "tweets_by_words";
```

2. Run your program for the first time:

   a. AFTER you successfully build your solution, let's run our app for the first time.

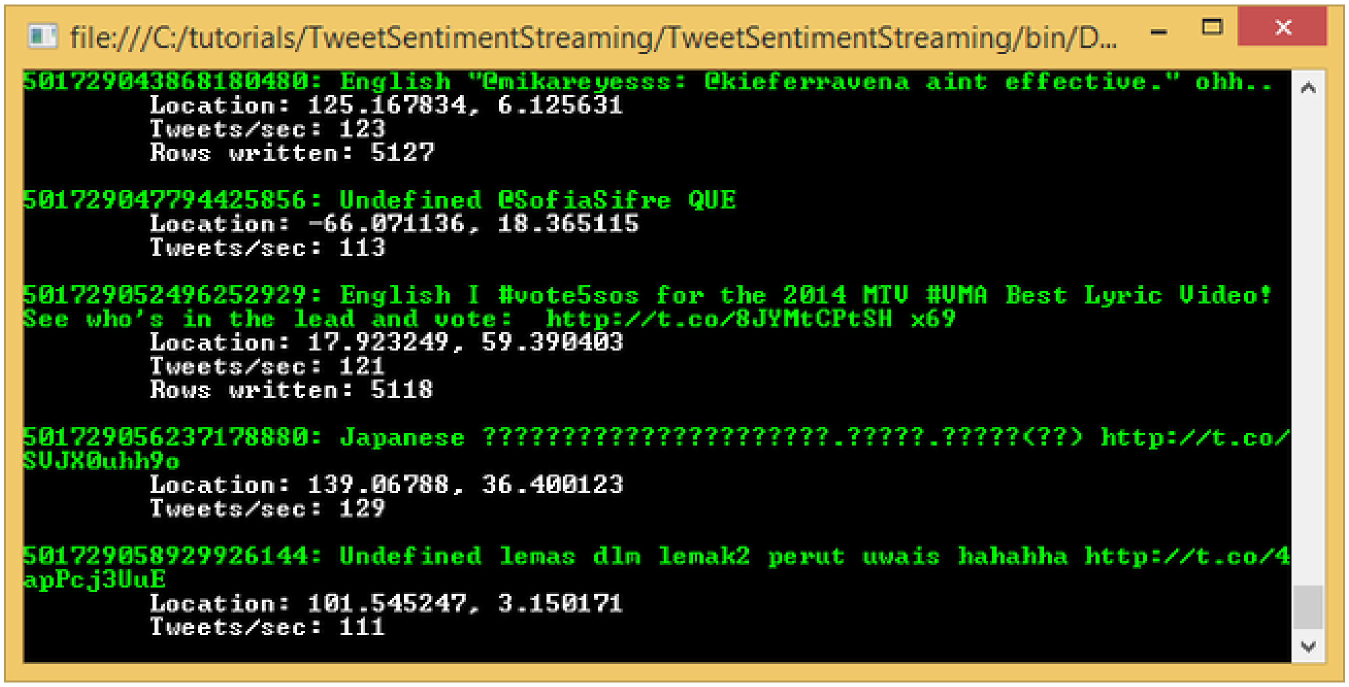
   b. Click the "Start" button.

   c.


FILE EDIT VIEW PROJECT BUILD DEBUG TEAM TOOLS TEST ARCHITECTURE ANALYZE WINDOW HELP
Start
Debug
Any CPU
Server Explor
HBaseWriter.cs
TwitterStreamWriter
TwitterStreamWriter.HBaseWriter
DICTIONARYFILENAME

```
using Microsoft.HBase.Client;
```

   d. Your app will now open up. It'll try to create a table. After which, it'll start streaming tweets over the console. Please make sure your output looks like the output below before moving on to the next step.

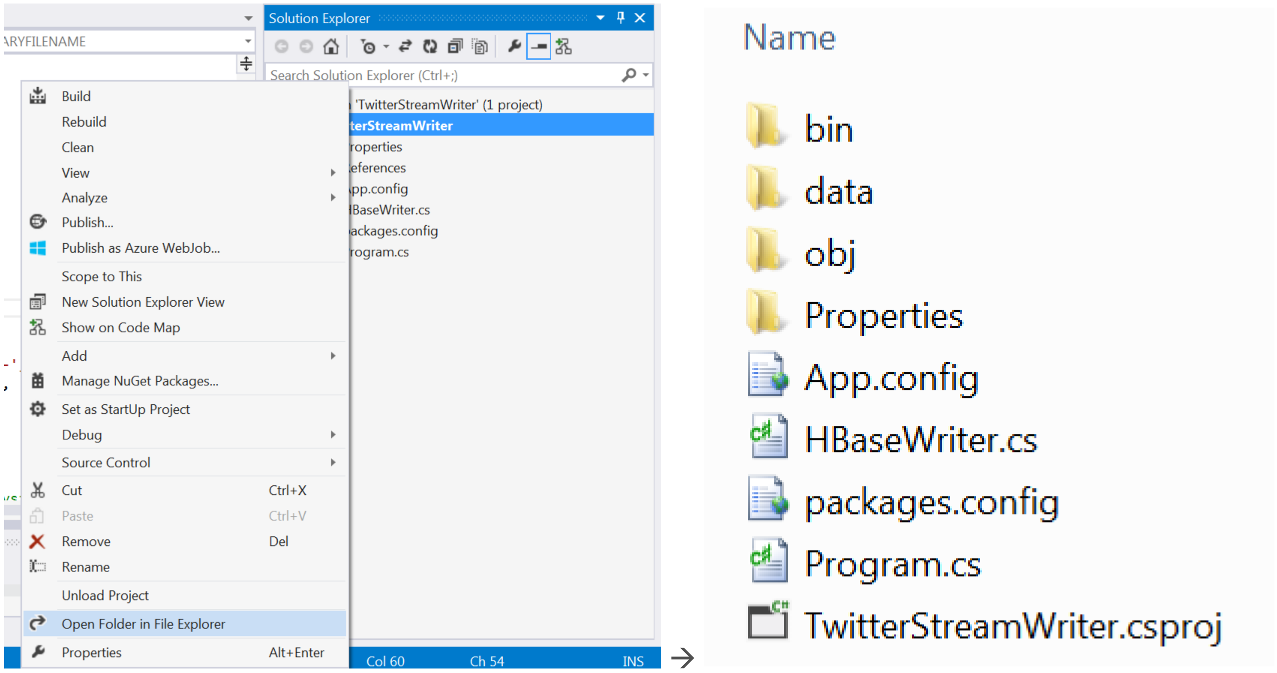

file:///C:/tutorials/TweetSentimentStreaming/TweetSentimentStreaming/bin/D...

```
501729043868180480: English "@mikareyesss: @kieferravena aint effective." ohh..
        Location: 125.167834, 6.125631
        Tweets/sec: 123
        Rows written: 5127

501729047794425856: Undefined @SofiaSifre QUE
        Location: -66.071136, 18.365115
        Tweets/sec: 113

501729052496252929: English I #vote5sos for the 2014 MTV #VMA Best Lyric Video!
See who's in the lead and vote:  http://t.co/8JYMtCPtSH x69
        Location: 17.923249, 59.390403
        Tweets/sec: 121
        Rows written: 5118

501729056237178880: Japanese ?????????????????????.?????.?????(??) http://t.co/
SUJX0uhh9o
        Location: 139.06788, 36.400123
        Tweets/sec: 129

501729058929926144: Undefined lemas dlm lemak2 perut uwais hahahha http://t.co/4
apPcj3UuE
        Location: 101.545247, 3.150171
        Tweets/sec: 111
```

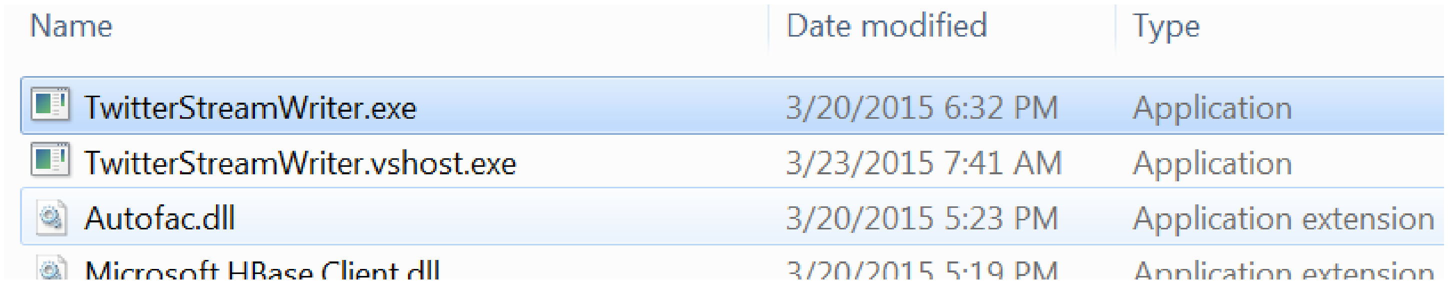
3. Run your app outside of visual studio.

   a. We want to keep this app on so that it can collect tweets for us. Ideally we'd be running this on commodity hardware such as Rasberry Pi. In all cases, we want to run this outside of visual studio to reduce ram usage.

   b. Make sure you've run you've built and successfully ran the app within visual studio before moving onto this step. Within your solution explorer, right click on your App, then go to "Open folder in File Explorer". This will open up your app folder.



   c. Navigate: **bin** > **Debug** > **YourAppName.exe**



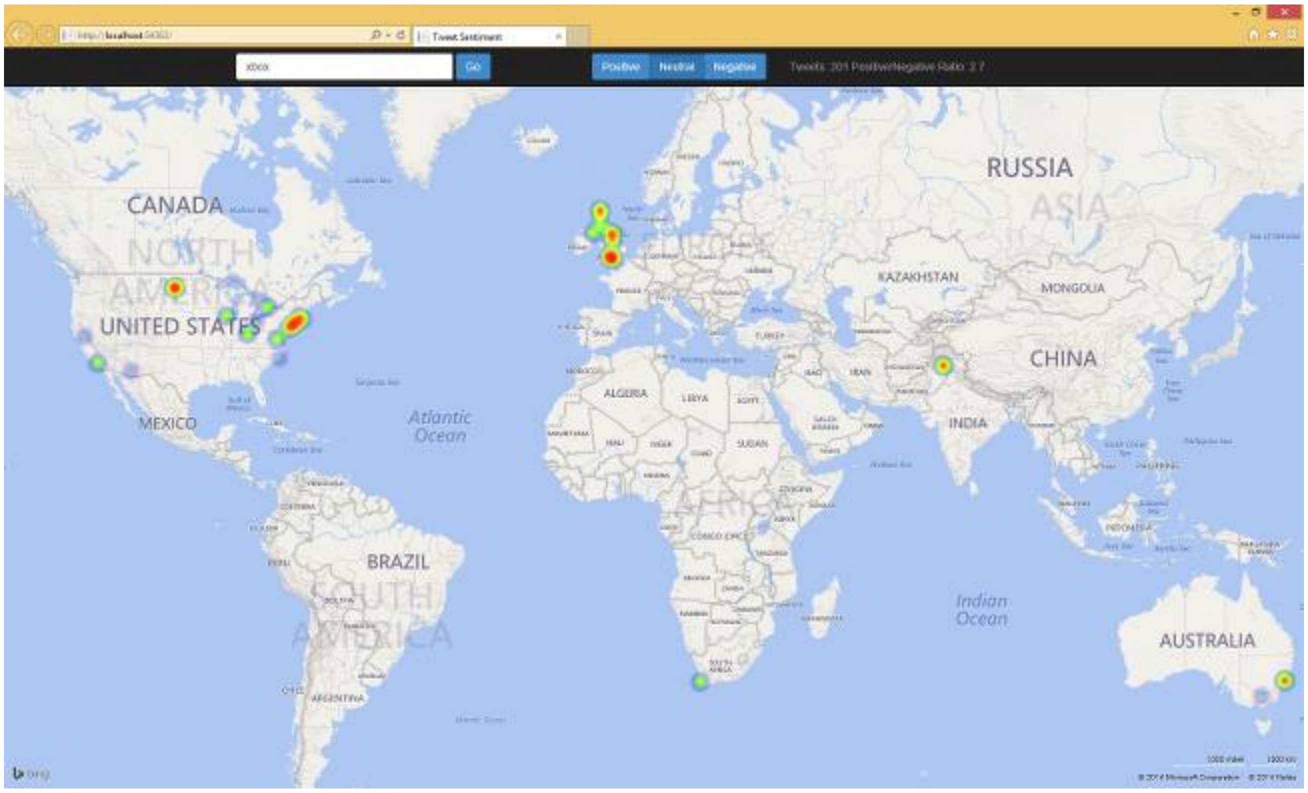
Name	Date modified	Type
TwitterStreamWriter.exe	3/20/2015 6:32 PM	Application
TwitterStreamWriter.vshost.exe	3/23/2015 7:41 AM	Application
Autofac.dll	3/20/2015 5:23 PM	Application extension
Microsoft.HBase.Client.dll	3/20/2015 5:19 PM	Application extension

   d. Click on it to execute it. You may create desktop shortcut of this file so you won't have to navigate through your folder directories again.

   e. Leave this app running in the background to accumulate twitter data.

Lab 5: Create an Azure Website to visualize Twitter sentiment

In this section, you will create an ASP.NET MVC Web application to read the real-time sentiment data from HBase and plot the data on Bing maps. We will also upload the website to an opened domain where you can show others. We will also be using a JavaScript heat map library to plot our tweets on a world map.

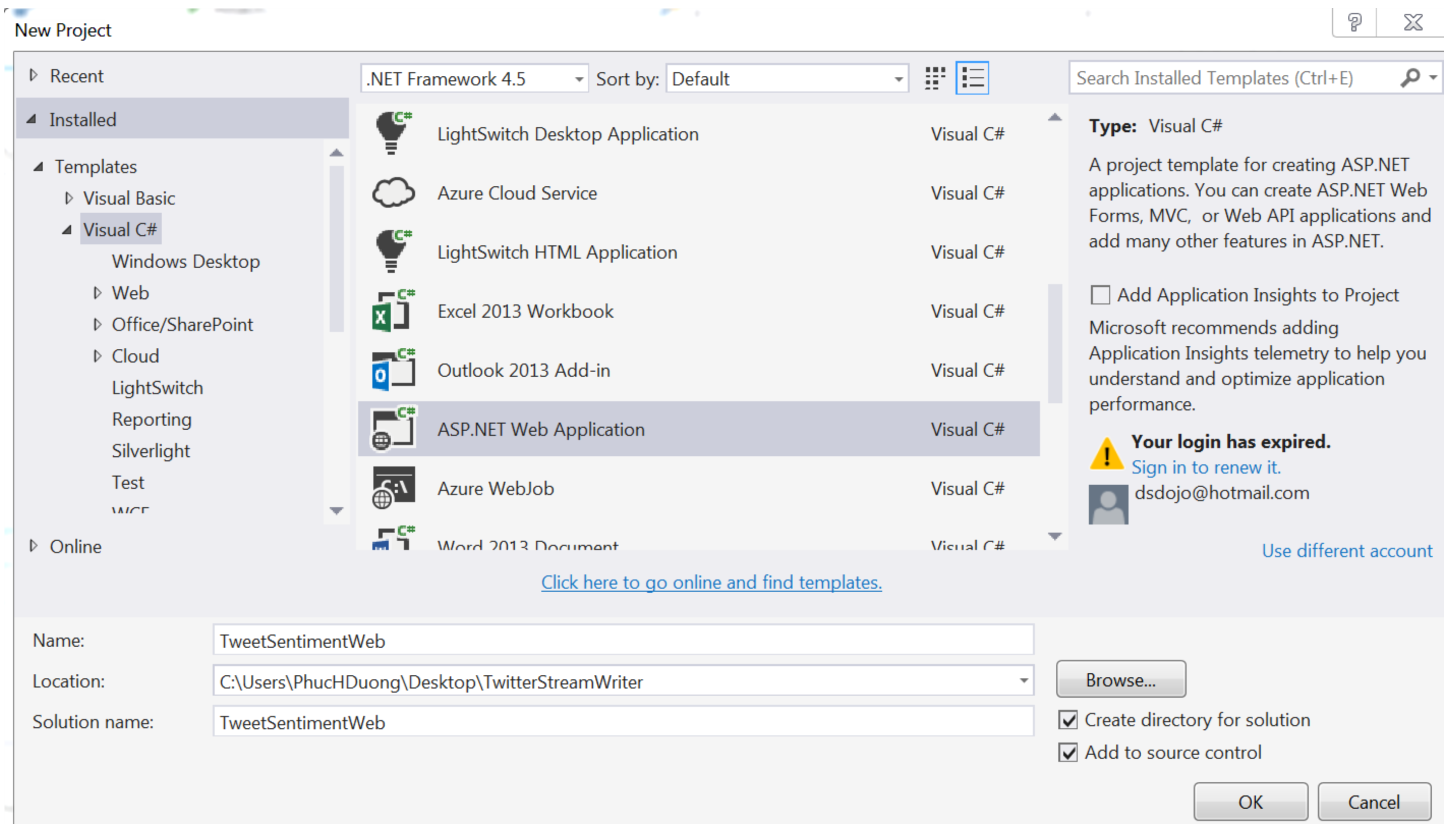


Exercise 1: Setting up the Solution File

We will be creating a new solution file for our new project. It is recommended that you create folder first manually to house this project file. For this example we created a Desktop folder that would house both apps, the twitter stream writer and the twitter heat map web app. Then created a separate folder within for each of the two apps.

To create an ASP.NET MVC Web application:

1) Open Visual Studio.
2) Click **File**, click **New**, and then click **Project**.
3) Type or enter the following:
   a) Template category: **Visual C#/Web**
   b) Template: **ASP.NET Web Application**
   c) Name: **TweetSentimentWeb**
   d) Location: **C:\Users\MyUserName\Desktop\TwitterStreamWriter**


New Project
Recent
Installed
Templates
Visual Basic
Visual C#
Windows Desktop
Web
Office/SharePoint
Cloud
LightSwitch
Reporting
Silverlight
Test
Online
.NET Framework 4.5
Sort by: Default
Search Installed Templates (Ctrl+E)
LightSwitch Desktop Application — Visual C#
Azure Cloud Service — Visual C#
LightSwitch HTML Application — Visual C#
Excel 2013 Workbook — Visual C#
Outlook 2013 Add-in — Visual C#
ASP.NET Web Application — Visual C#
Azure WebJob — Visual C#
Word 2013 Document — Visual C#
Click here to go online and find templates.
Use different account
Browse...
OK
Cancel

Type: Visual C#

A project template for creating ASP.NET applications. You can create ASP.NET Web Forms, MVC, or Web API applications and add many other features in ASP.NET.

☐ Add Application Insights to Project

Microsoft recommends adding Application Insights telemetry to help you understand and optimize application performance.

Your login has expired.
Sign in to renew it.
dsdojo@hotmail.com

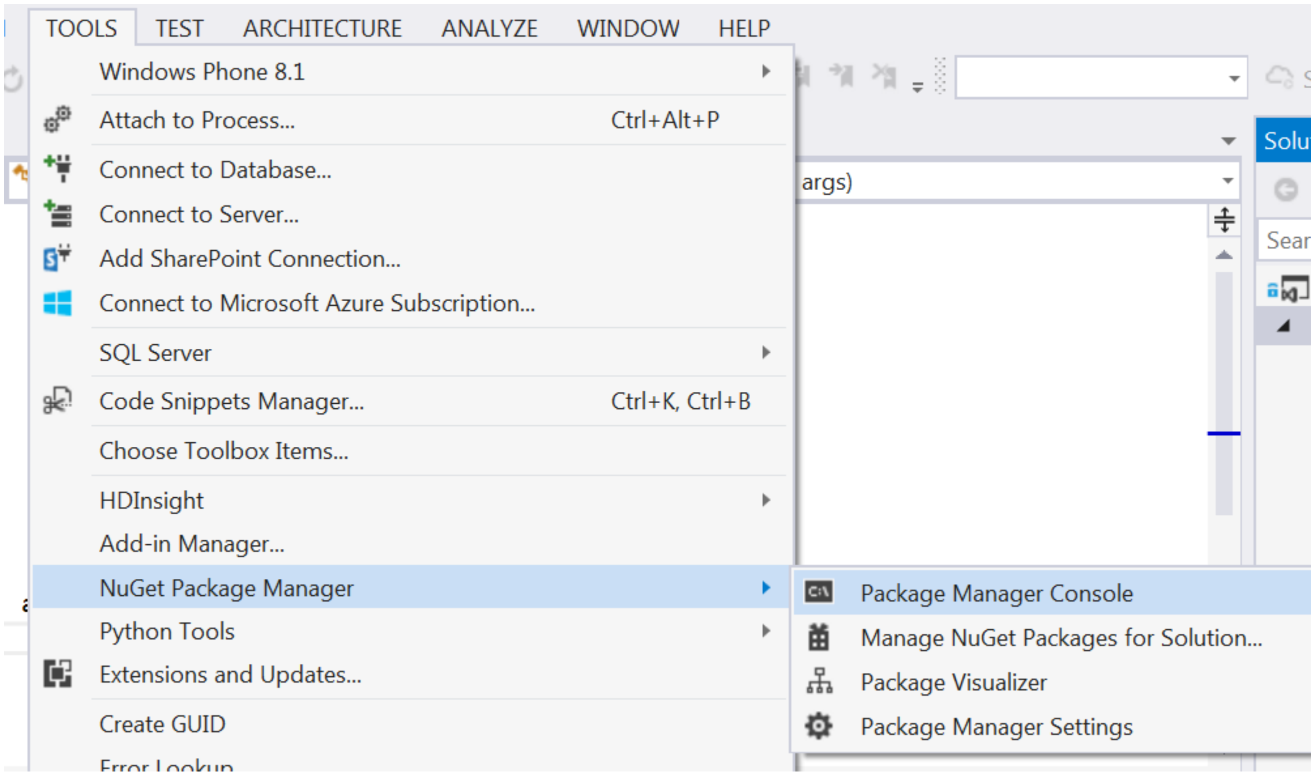
Name: TweetSentimentWeb
Location: C:\Users\PhucHDuong\Desktop\TwitterStreamWriter
Solution name: TweetSentimentWeb
☑ Create directory for solution
☑ Add to source control

4) Click **OK**.
5) In **Select a template**, click **MVC**.

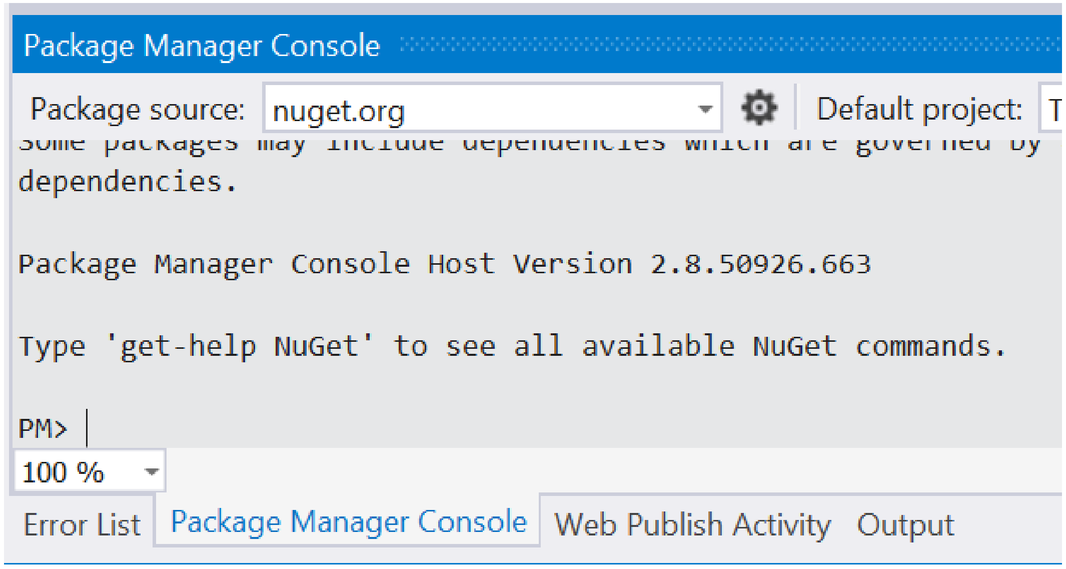
Exercise 2: Installing Dependencies & Packages

This lab will leverage from preexisting libraries associated with HBase connectivity. We will install and reference these libraries/packages using the **Nuget Package Manager.**

1) From the **Tools** menu, click **Nuget Package Manager**, and then click **Package Manager Console**. The console panel will open at the bottom of the page.



2) The Package Manager Console will open up somewhere your Visual Studio workspace. Wait for the Package Manager Console to initialize. You can tell that it is done when it says "PM>" at the very bottom.

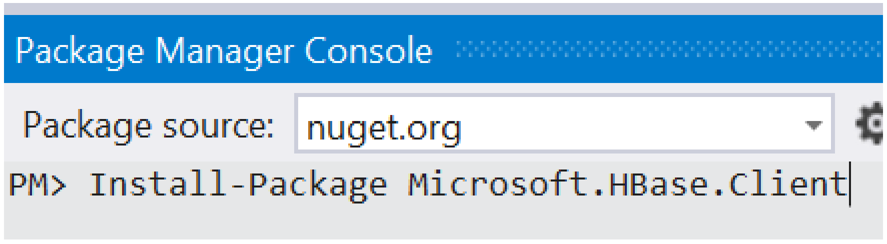


```
Some packages may include dependencies which are governed by
dependencies.

Package Manager Console Host Version 2.8.50926.663

Type 'get-help NuGet' to see all available NuGet commands.

PM>
```

3) Use the following commands to install the HBase .NET SDK package, which is client library used to access HBase clusters, and the Tweetinvi package, which is used to access the Twitter API.

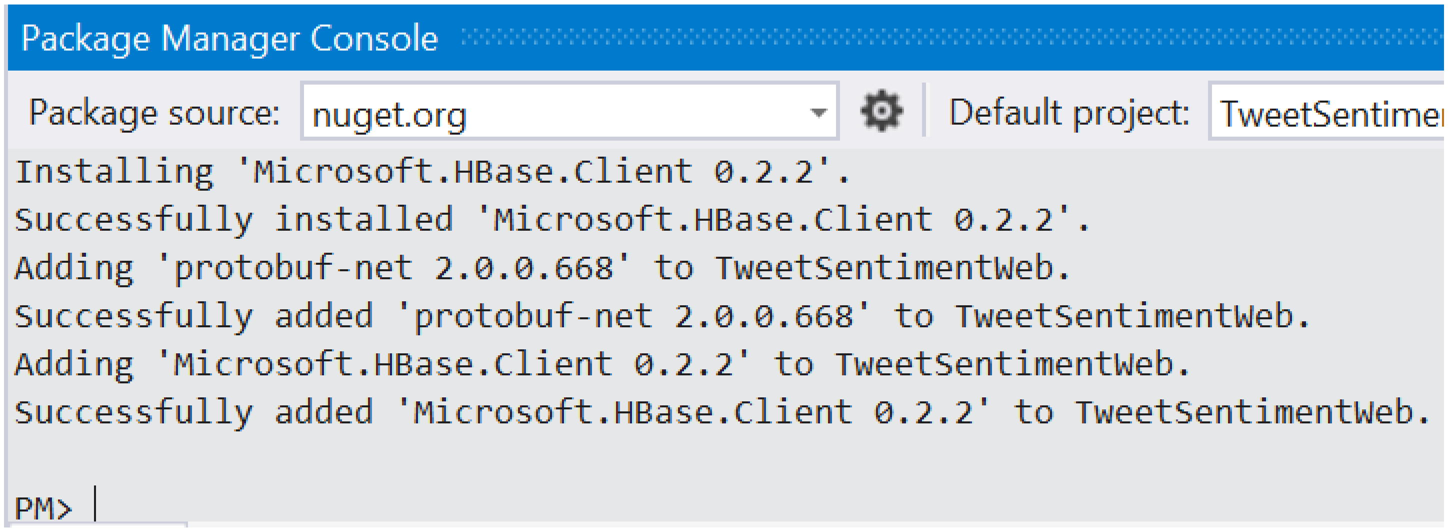
a) Install the HBase client: type in the following command into the Package Manager Console.

```
PM> Install-Package Microsoft.HBase.Client
```



```
PM> Install-Package Microsoft.HBase.Client
```

Success Output:



```
Installing 'Microsoft.HBase.Client 0.2.2'.
Successfully installed 'Microsoft.HBase.Client 0.2.2'.
Adding 'protobuf-net 2.0.0.668' to TweetSentimentWeb.
Successfully added 'protobuf-net 2.0.0.668' to TweetSentimentWeb.
Adding 'Microsoft.HBase.Client 0.2.2' to TweetSentimentWeb.
Successfully added 'Microsoft.HBase.Client 0.2.2' to TweetSentimentWeb.

PM>
```

Exercise 3: HBase Reader Class

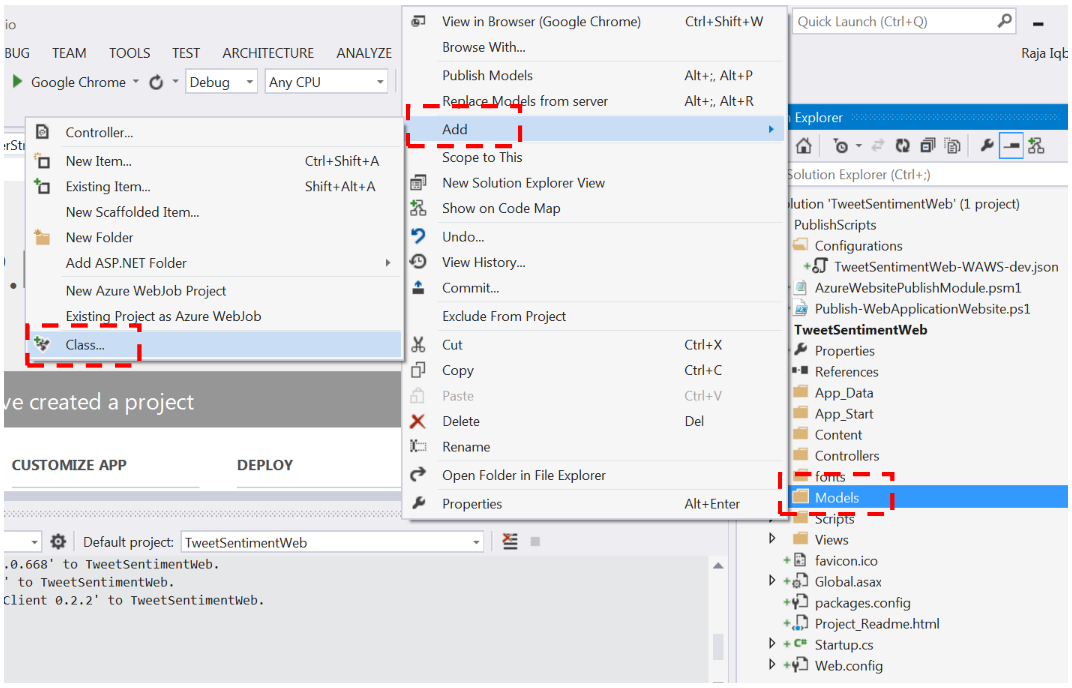
Since we are not reading from a traditional database, we can't connect to a database like we normally would and specify an ODATA or ODBC driver to connect automatically. Instead we must specify our own HBase writer much like we did in the HBase Twitter Stream Writer app.

1) Adding an HBase Reader class:

a) From **Solution Explorer**, expand **TweetSentiment**.

b) Right-click **Models**, click **Add**, and then click **Class**.

c) In Name, enter **HBaseReader.cs**, and then click **Add**.



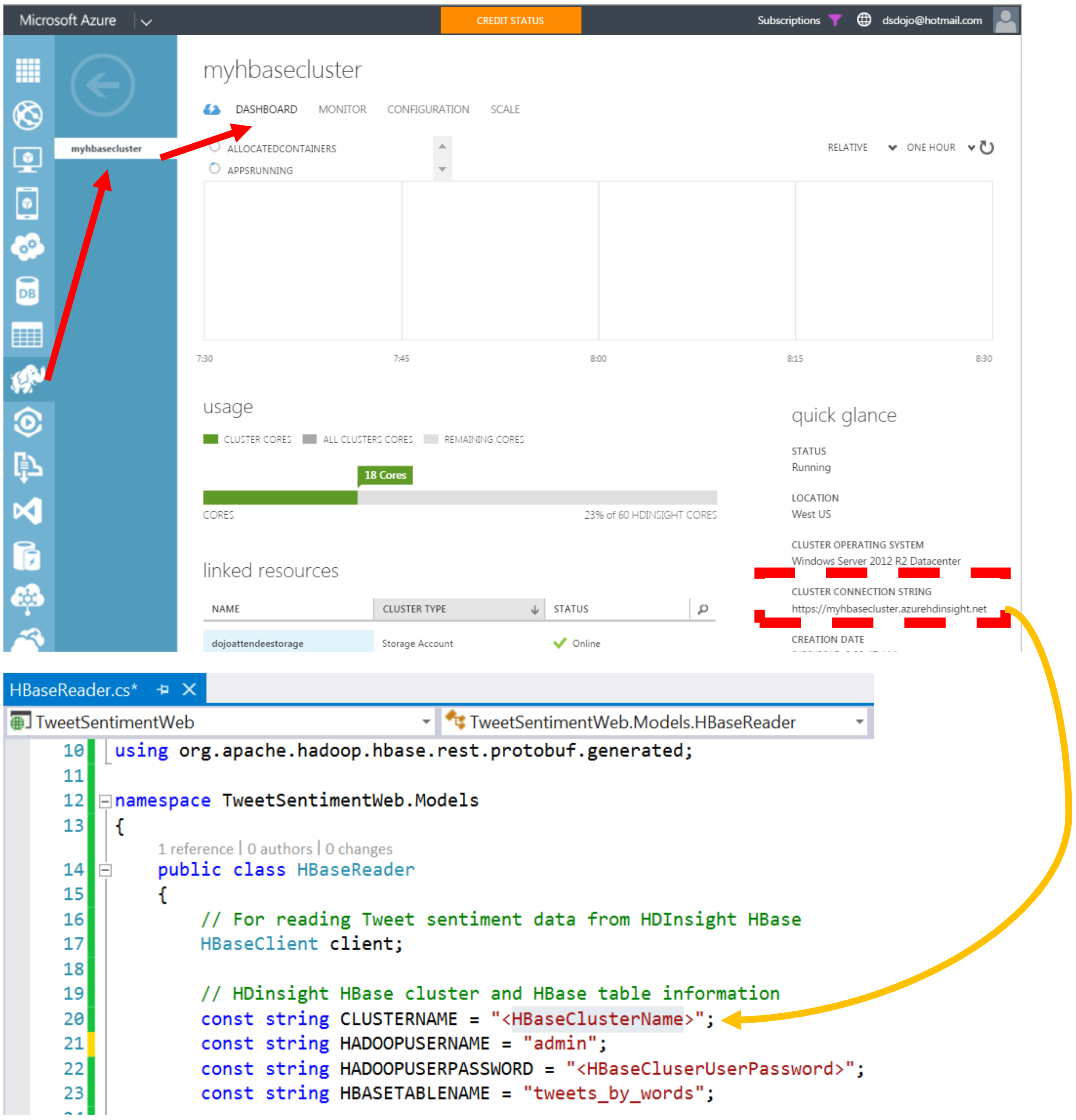
```
.0.668' to TweetSentimentWeb.
' to TweetSentimentWeb.
Client 0.2.2' to TweetSentimentWeb.
```

d) To save time, we have written an HBase reader for you. Visit the following link and copy and paste the code over to your own HBaseReader.cs.
https://raw.githubusercontent.com/datasciencedojo/TwitterHBaseLab/master/TwitterSentimentWeb/TweetSentimentWeb/Models/HBaseReader.cs

Referencing your HBase cluster:

a) There are 4 constants defined at the top of the HBaseWriter class within your HBaseWriter.cs file that will directly link to your HBase cluster, we just need to point them in the correct direction.

i) "**CLUSTERNAME**" (line 17): This will be the direct URL connection string to your HBase cluster. Go to your Azure Management Portal (manage.windowsazure.com), click on **HDInsight > YourCluster -> DashBoard**.



STATUS
Running

LOCATION
West US

CLUSTER OPERATING SYSTEM
Windows Server 2012 R2 Datacenter

CLUSTER CONNECTION STRING
https://myhbasecluster.azurehdinsight.net

CREATION DATE

NAME	CLUSTER TYPE	STATUS
dojoattendeestorage	Storage Account	✓ Online

```
10  using org.apache.hadoop.hbase.rest.protobuf.generated;
11
12  namespace TweetSentimentWeb.Models
13  {
        1 reference | 0 authors | 0 changes
14      public class HBaseReader
15      {
16          // For reading Tweet sentiment data from HDInsight HBase
17          HBaseClient client;
18
19          // HDinsight HBase cluster and HBase table information
20          const string CLUSTERNAME = "<HBaseClusterName>";
21          const string HADOOPUSERNAME = "admin";
22          const string HADOOPUSERPASSWORD = "<HBaseCluserUserPassword>";
23          const string HBASETABLENAME = "tweets_by_words";
```

ii) **"HADOOPUSERNAME":** Leave the username as "admin".

iii) **"HADOOPUSERPASSWORD":** Insert the password that you set for the HBase cluster when you provisioned it.

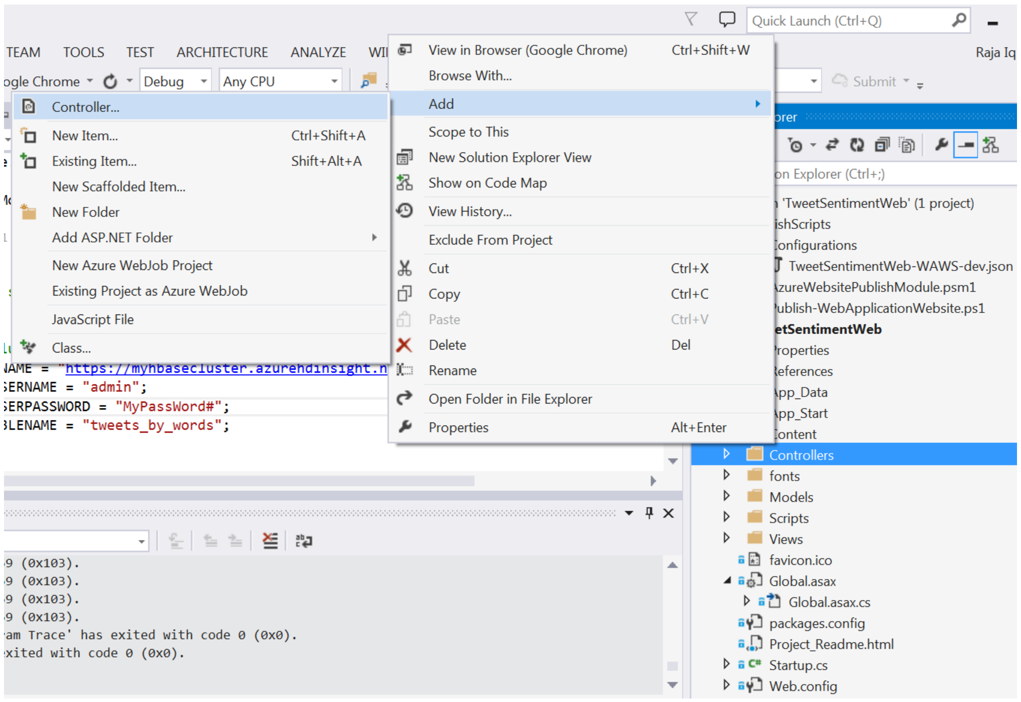
iv) **"HBASETABLENAME":** Leave it as "tweets_by_words";

Exercise 4: Tweets Controller

We will now add application logic to our website by adding a TweetsController to the webpage. This controller will deal specifically with opening an HBase cluster connection, and sending queries by utilizing our HBase reader class. Upon a successful query, the results will be sent back to our frontend JavaScript code via AJAX.

1) From **Solution Explorer**, expand **TweetSentimentWeb**.

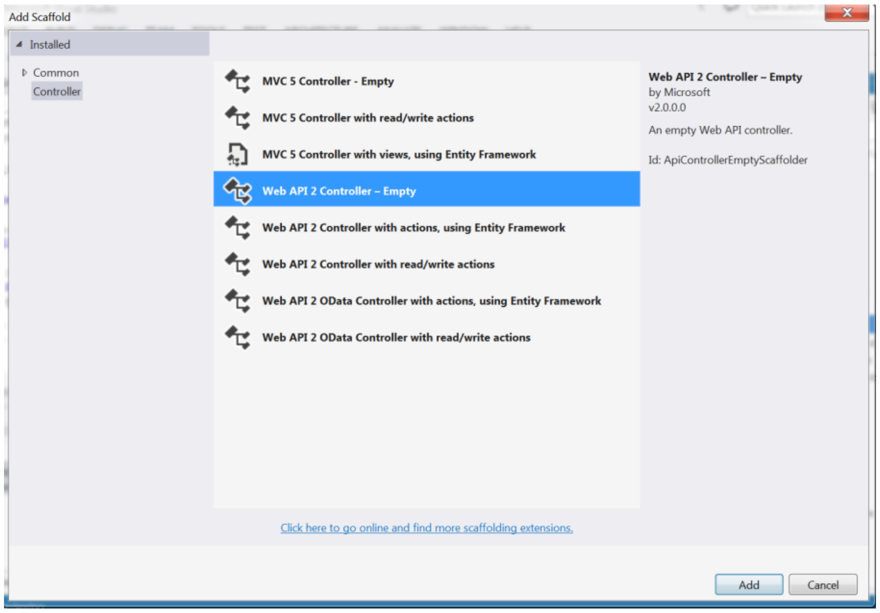
2) Right-click **Controllers**, click **Add**, and then click **Controller**.



```
NAME = "https://myhbasecluster.azurehdinsight.n
SERNAME = "admin";
SERPASSWORD = "MyPassWord#";
BLENAME = "tweets_by_words";
```

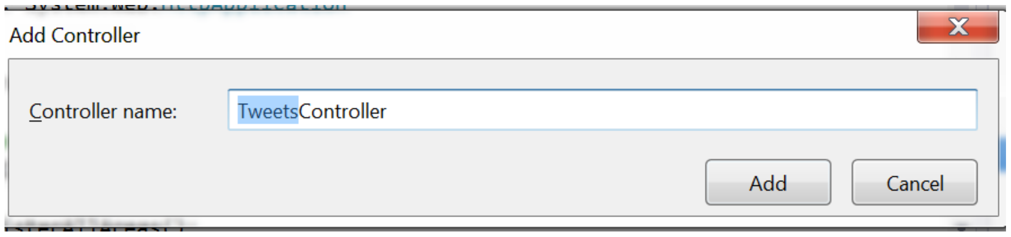
```
9 (0x103).
9 (0x103).
9 (0x103).
9 (0x103).
am Trace' has exited with code 0 (0x0).
xited with code 0 (0x0).
```

3) Click **Web API 2 Controller - Empty**, and then click **Add**.


Add Scaffold
Installed
Common
Controller
MVC 5 Controller - Empty
MVC 5 Controller with read/write actions
MVC 5 Controller with views, using Entity Framework
Web API 2 Controller – Empty
Web API 2 Controller with actions, using Entity Framework
Web API 2 Controller with read/write actions
Web API 2 OData Controller with actions, using Entity Framework
Web API 2 OData Controller with read/write actions
Click here to go online and find more scaffolding extensions.
Add
Cancel

Web API 2 Controller – Empty
by Microsoft
v2.0.0.0
An empty Web API controller.
Id: ApiControllerEmptyScaffolder

4) In Controller name, type **TweetsController**, and then click **Add**.


Add Controller

Controller name: TweetsController

5) From **Solution Explorer**, double-click TweetsController.cs to open the file.

6) Modify the file, so it looks like the following:

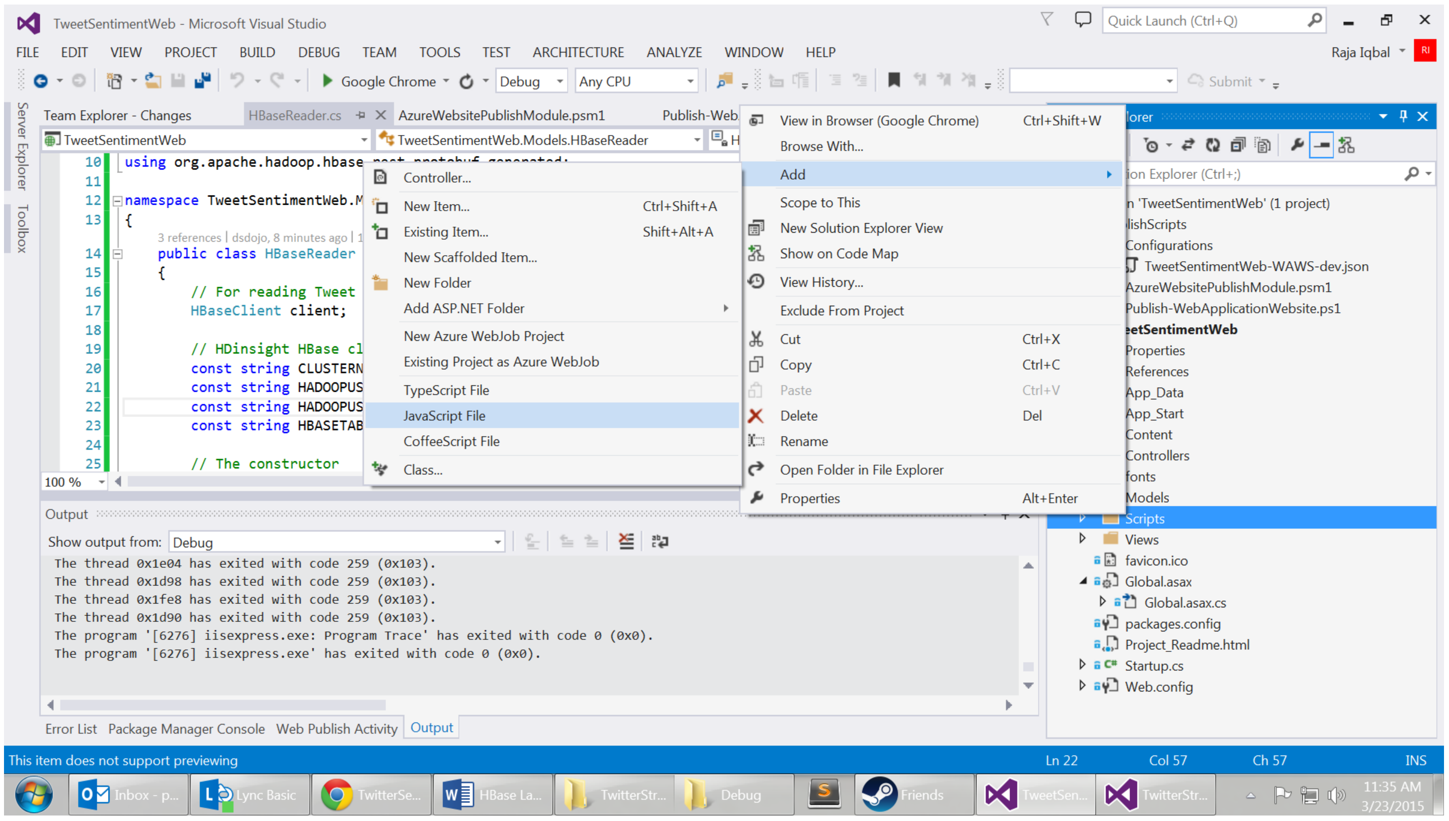
```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Net;
using System.Net.Http;
using System.Web.Http;

using System.Threading.Tasks;
using TweetSentimentWeb.Models;

namespace TweetSentimentWeb.Controllers
{
    public class TweetsController : ApiController
    {
        HBaseReader hbase = new HBaseReader();

        public async Task<IEnumerable<Tweet>> GetTweetsByQuery(string query)
        {
            return await hbase.QueryTweetsByKeywordAsync(query);
        }
    }
}
```

Exercise 5: Heat Map Library

To get Heat Map functionally, we will leverage a JavaScript library written by Alastair Aitchison. The library will use a Bing world map and can plot tweets by longitude/latitude coordinates then color code them by frequencies and magnitude. The library is pretty versatile and can be adapted to other projects such as mapping crime in cities. For information about this library visit the following link: https://alastaira.wordpress.com/2011/04/15/bing-maps-ajax-v7-heatmap-library/

1) From **Solution Explorer**, expand **TweetSentimentWeb**.

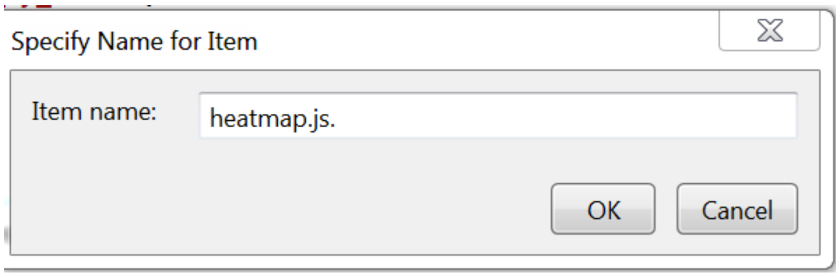
2) Right-click **Scripts**, click **Add**, click **JavaScript File**.



```
using org.apache.hadoop.hbase

namespace TweetSentimentWeb.M
{
    3 references | dsdojo, 8 minutes ago | 1
    public class HBaseReader
    {
        // For reading Tweet
        HBaseClient client;

        // HDinsight HBase cl
        const string CLUSTERN
        const string HADOOPUS
        const string HADOOPUS
        const string HBASETAB

        // The constructor
```

```
The thread 0x1e04 has exited with code 259 (0x103).
The thread 0x1d98 has exited with code 259 (0x103).
The thread 0x1fe8 has exited with code 259 (0x103).
The thread 0x1d90 has exited with code 259 (0x103).
The program '[6276] iisexpress.exe: Program Trace' has exited with code 0 (0x0).
The program '[6276] iisexpress.exe' has exited with code 0 (0x0).
```

3) In Item name, enter **heatmap.js**.


Specify Name for Item

Item name: heatmap.js.

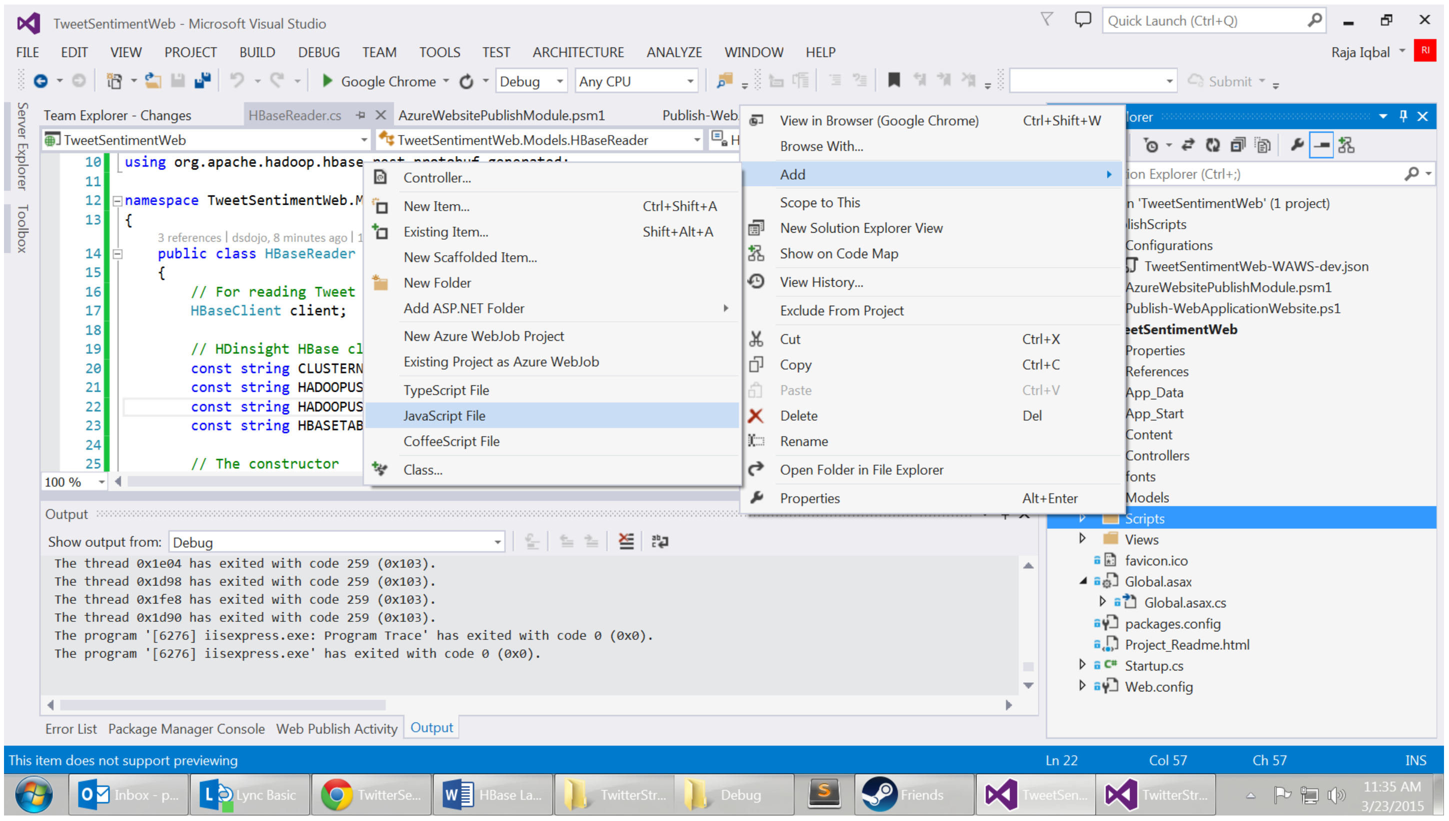
4) Visit the following link, copy and paste over this heatmap.js into your heatmap.js https://raw.githubusercontent.com/datasciencedojo/TwitterHBaseLab/master/TwitterSentimentWeb/TweetSentimentWeb/Scripts/heatmap.js

Exercise 6: Website Core Functionalities

We will now setup a file called, “tweetStream.js”, which will be the core of our website’s functionality. First it’ll initialize the prewritten Microsoft Bing world map. It also submits the queries from the front end via AJAX to our controller to send off to our HBase cluster. Once the results from the query are received, tweetStream.js will plot all the tweets by longitude/latitude, then color code data points by tweet counts and sentiment. It does this by using the heatmap.js library that we created in the previous exercise.

1) From **Solution Explorer**, expand **TweetSentimentWeb**.

2) Right-click **Scripts**, click **Add**, click **JavaScript File**.

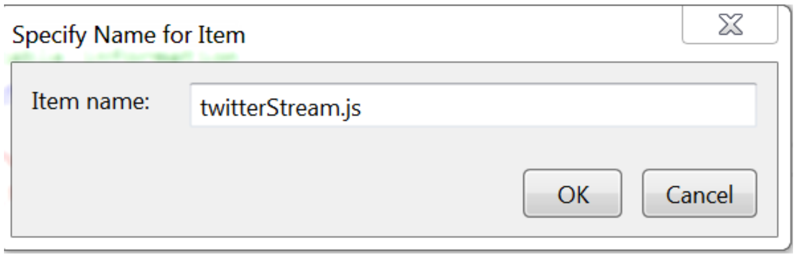


```
using org.apache.hadoop.hbase.rest.protobuf.generated;

namespace TweetSentimentWeb.M
{
    public class HBaseReader
    {
        // For reading Tweet
        HBaseClient client;

        // HDinsight HBase cl
        const string CLUSTERN
        const string HADOOPUS
        const string HADOOPUS
        const string HBASETAB

        // The constructor
```

Show output from: Debug

```
The thread 0x1e04 has exited with code 259 (0x103).
The thread 0x1d98 has exited with code 259 (0x103).
The thread 0x1fe8 has exited with code 259 (0x103).
The thread 0x1d90 has exited with code 259 (0x103).
The program '[6276] iisexpress.exe: Program Trace' has exited with code 0 (0x0).
The program '[6276] iisexpress.exe' has exited with code 0 (0x0).
```

3) In Item name, enter **twitterStream.js**.


Specify Name for Item

Item name: twitterStream.js

OK Cancel

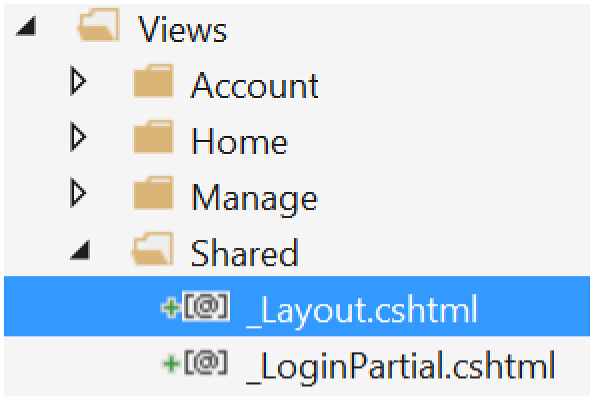
4) Visit the following link, paste this twitterStream.js into your twitterStream.js:
https://raw.githubusercontent.com/datasciencedojo/TwitterHBaseLab/master/TwitterSentimentWeb/TweetSentimentWeb/Scripts/twitterStream.js

Exercise 7: HTML & CSS

Time to build our homepage using .Net template language. First we must build our HTML page. By default Azure website homepages will have a prepopulated “template” page (Index.html). We must overwrite this page, also we will take advantage of the .Net template language.

1) **_Layout.cshtml:**
   This will be our base page without the map. Though we will specify for the template, a special place to insert the map.

   a) From **Solution Explorer**, expand **TweetSentimentWeb**, expand **Views**, expand **Shared**, and then double-click **_Layout.cshtml**.

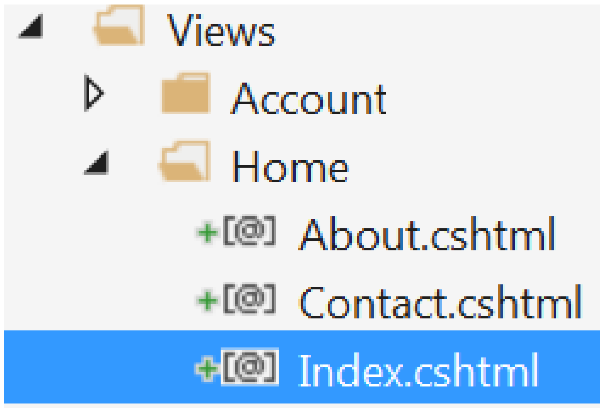


   b) Visit the following link for the _Layout.cshtml file, copy over the code in this file and overwrite your _Layout.cshtml file:
   https://raw.githubusercontent.com/datasciencedojo/TwitterHBaseLab/master/TwitterSentimentWeb/TweetSentimentWeb/Views/Shared/_Layout.cshtml

2) **Index.cshtml**

This is where our heatmap will go. It'll automatically be inserted into the layout.cshtml.

a) From **Solution Explorer**, expand **TweetSentimentWeb**, expand **Views**, expand **Home**, and then double-click **Index.cshtml**.



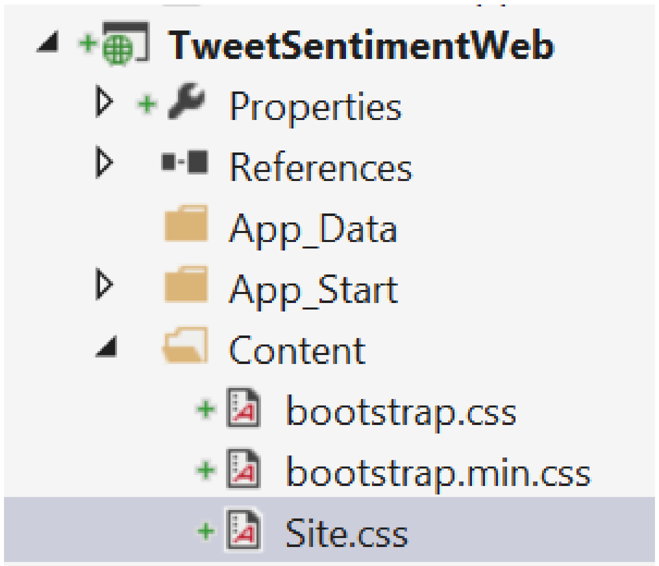
b) Replace the content with the following:

```
@{
    ViewBag.Title = "Tweet Sentiment";
}

<div class="map_container">
    <div id="map_canvas"/>
</div>
```

3) **Site.css**

Let's add minimal CSS styling for our website to look nicer. Specifically to make the map full screen.

a) From **Solution Explorer**, expand **TweetSentimentWeb**, expand **Content**, and then double-click **Site.css**.

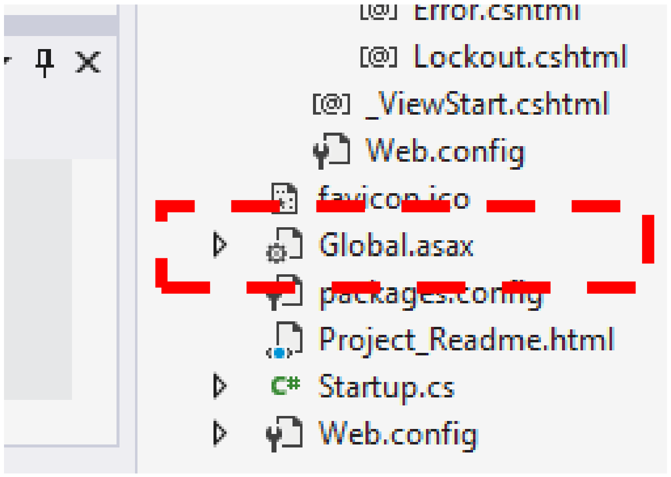


b) Append site.css with the following code:

```
/* make container, and thus map, 100% width */
.map_container {
    width: 100%;
    height: 100%;
}

#map_canvas{
  height:100%;
}

#tweets{
  position: absolute;
  top: 60px;
  left: 75px;
  z-index:1000;
  font-size: 30px;
}
```

4) **Global.asax.cs**

Overwrite the global.asax file with the following code:



```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Web;
using System.Web.Mvc;
using System.Web.Optimization;
using System.Web.Routing;

using System.Web.Http;

namespace TweetSentimentWeb
{
    public class MvcApplication : System.Web.HttpApplication
    {
        protected void Application_Start()
        {
            // Register API routes
            GlobalConfiguration.Configure(WebApiConfig.Register);

            AreaRegistration.RegisterAllAreas();
            FilterConfig.RegisterGlobalFilters(GlobalFilters.Filters);
            RouteConfig.RegisterRoutes(RouteTable.Routes);
            BundleConfig.RegisterBundles(BundleTable.Bundles);

        }
    }
}
```

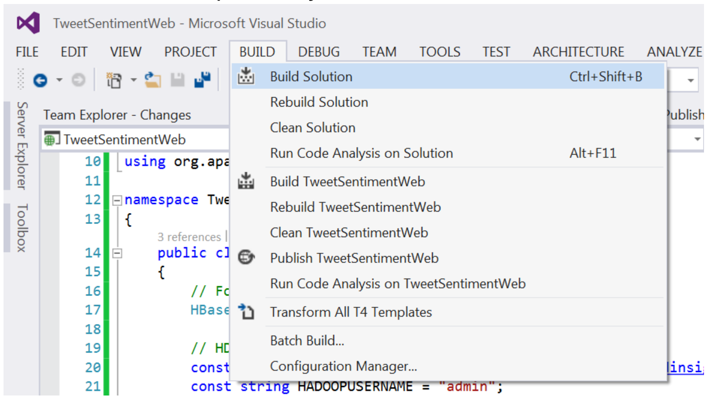
The code is also located here for copy and paste:
https://raw.githubusercontent.com/datasciencedojo/TwitterHBaseLab/master/TwitterSentimentWeb/TweetSentimentWeb/Global.asax.cs

Lab 6: Web Deployment

We are now able to deploy our website.

Exercise 1: Testing Your Webpage

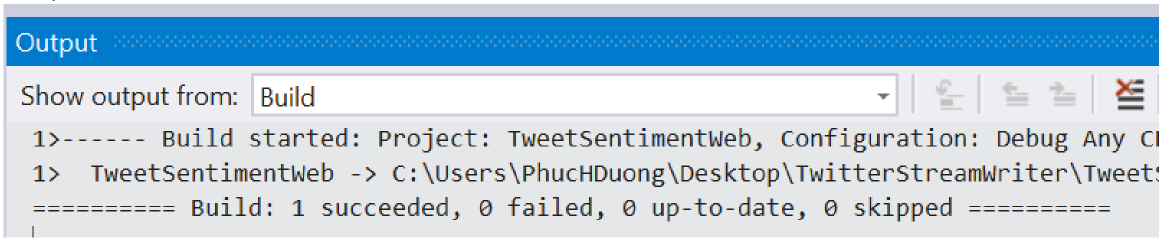
1) **Build your solution** to ensure there are no errors. At the top navigation bar, there should be a build button. Select to "Build Solution", this will compile all your packages together into one neat packages and ensure that there are no compatibility issues.



TweetSentimentWeb - Microsoft Visual Studio
FILE EDIT VIEW PROJECT BUILD DEBUG TEAM TOOLS TEST ARCHITECTURE ANALYZE
Build Solution Ctrl+Shift+B
Rebuild Solution
Clean Solution
Run Code Analysis on Solution Alt+F11
Build TweetSentimentWeb
Rebuild TweetSentimentWeb
Clean TweetSentimentWeb
Publish TweetSentimentWeb
Run Code Analysis on TweetSentimentWeb
Transform All T4 Templates
Batch Build...
Configuration Manager...
Team Explorer - Changes
TweetSentimentWeb
Server Explorer
Toolbox

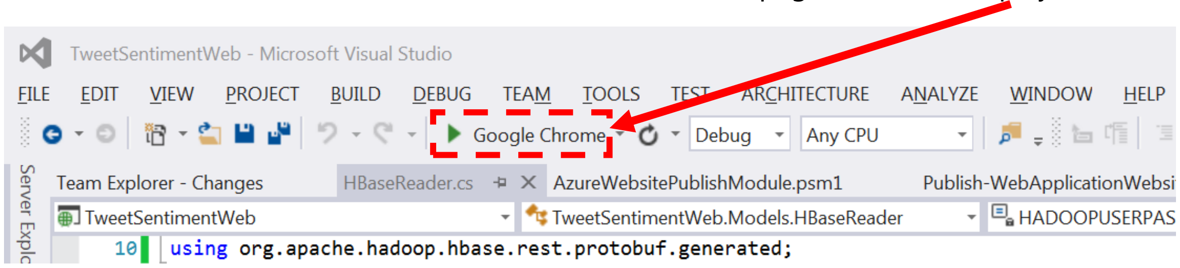
```
using org.apa
namespace Twe
{
    public cl
    {
        // Fo
        HBase

        // HD
        const
        const string HADOOPUSERNAME = "admin";
```

Output:



```
1>------ Build started: Project: TweetSentimentWeb, Configuration: Debug Any CI
1>  TweetSentimentWeb -> C:\Users\PhucHDuong\Desktop\TwitterStreamWriter\Tweet
========== Build: 1 succeeded, 0 failed, 0 up-to-date, 0 skipped ==========
```

2) **Run Your Webserver**
We will now launch a local webserver and test our webpage. Click on the play button.

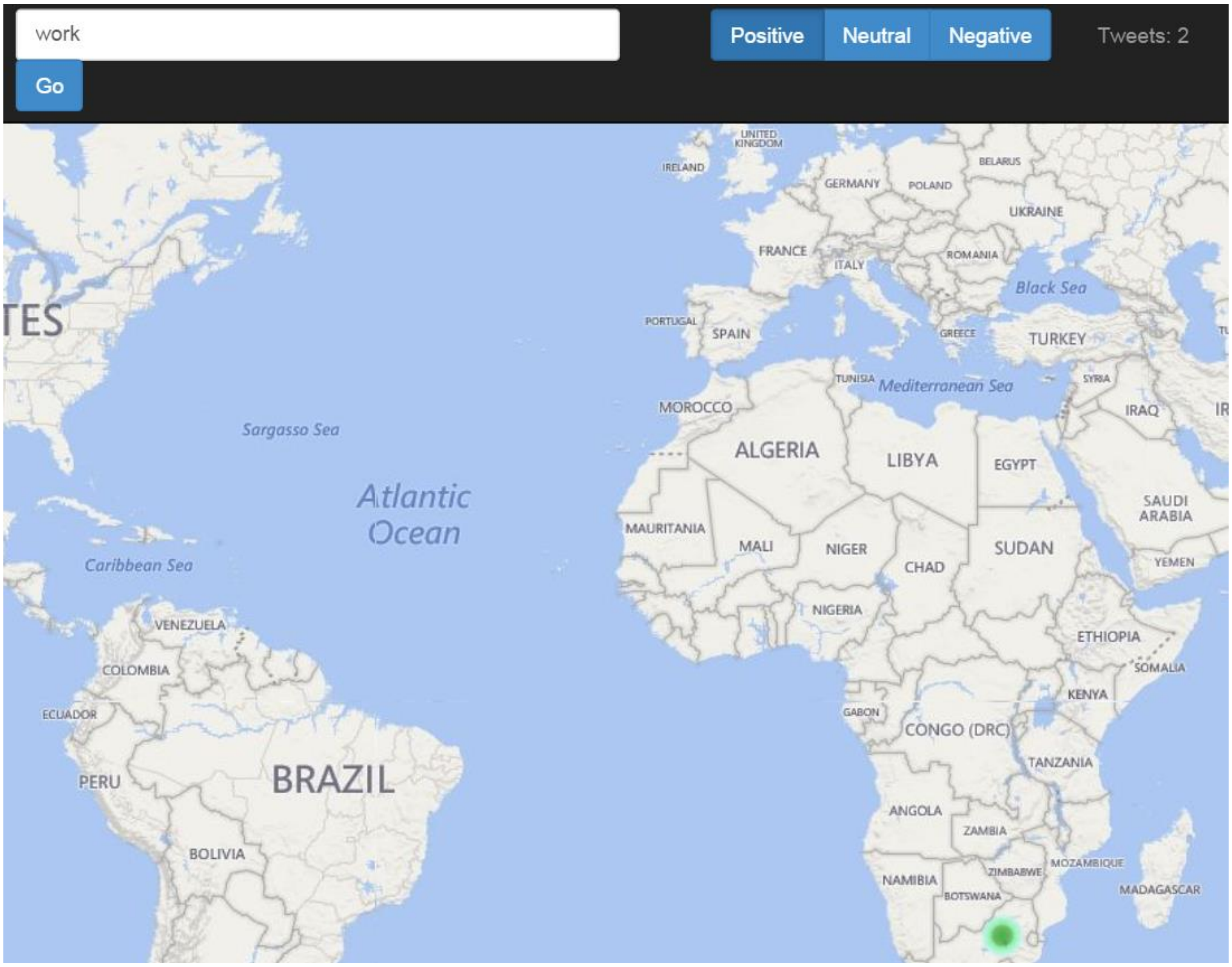


TweetSentimentWeb - Microsoft Visual Studio
FILE EDIT VIEW PROJECT BUILD DEBUG TEAM TOOLS TEST ARCHITECTURE ANALYZE WINDOW HELP
Google Chrome
Debug
Any CPU
Team Explorer - Changes
HBaseReader.cs
AzureWebsitePublishModule.psm1
Publish-WebApplicationWebsi
TweetSentimentWeb
TweetSentimentWeb.Models.HBaseReader
HADOOPUSERPAS
Server Explo

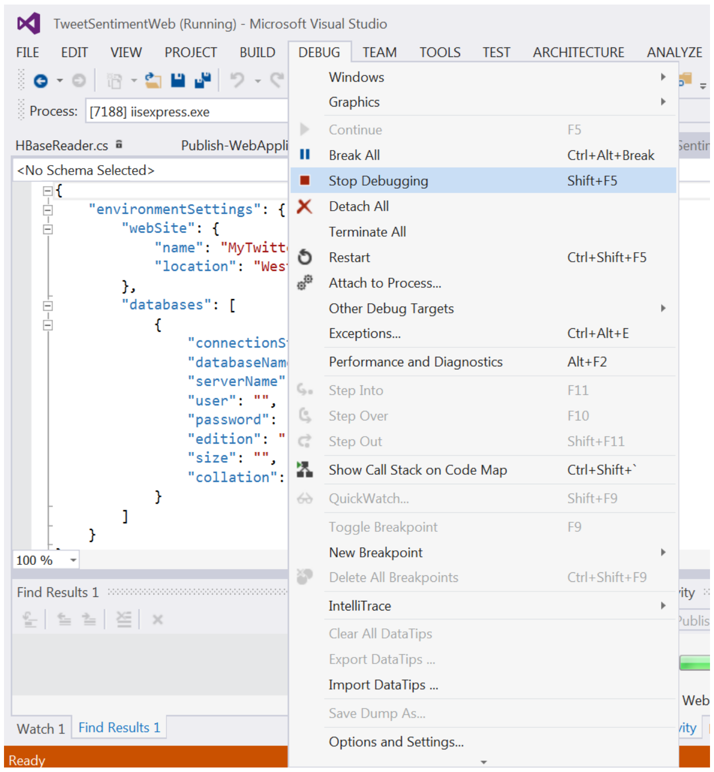
```
using org.apache.hadoop.hbase.rest.protobuf.generated;
```

3) **Test Queries**

Assuming you've left your HBase Twitter Stream app on to collect data, you should very easily be able to query and see the results. In the below example, the word "work" was queried against the tweets repository in the HBase cluster under "positive" sentiments, and two tweets came back and were plotted in South Africa. Popular words on twitter include "cheese", "iPhone", or "work".



4) **Stop Debug and Turn Off Webserver**

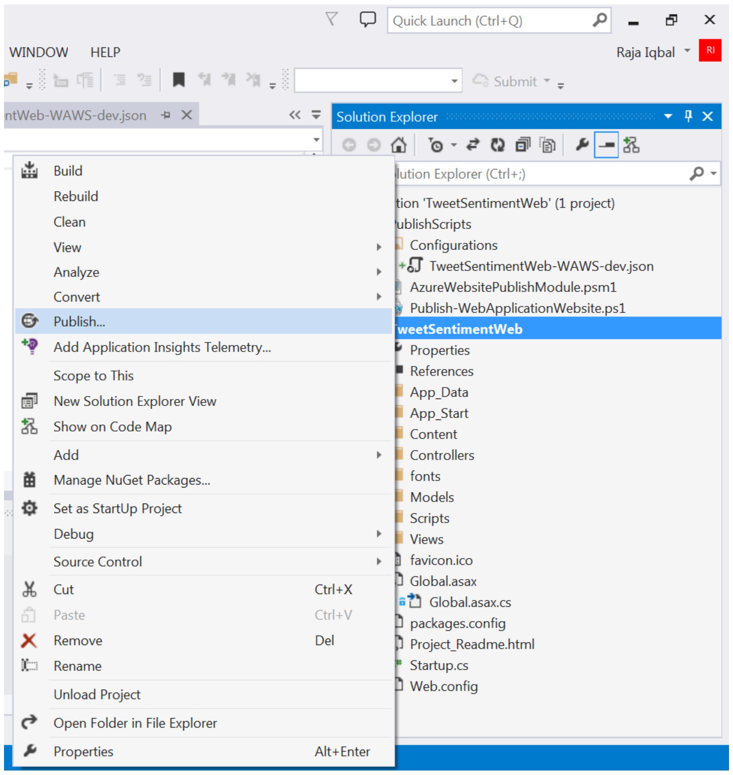


```
{
    "environmentSettings": {
        "webSite": {
            "name": "MyTwitt
            "location": "Wes
        },
        "databases": [
            {
                "connectionS
                "databaseNam
                "serverName"
                "user": "",
                "password":
                "edition": "
                "size": "",
                "collation":
            }
        ]
    }
```

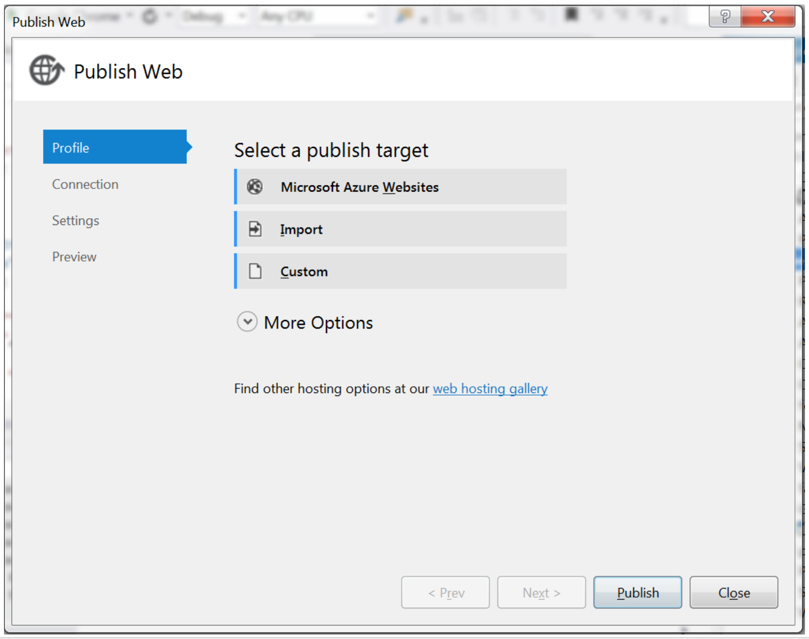
Exercise 2: Publishing Your Webpage

Now that we've confirmed that our website works, we can now publish it to a live web domain and share it with the world. The following exercise will show you how to publish to an Azure website, but if you know how to send via FTTP connection, you may send it to whatever webhost you want. Just make sure that the webhost supports .NET web servers.

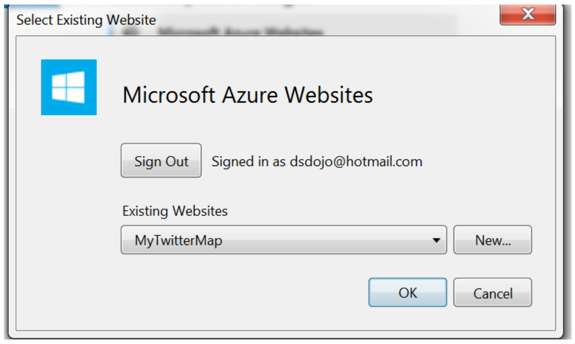
1) Right click on your WebApp within your Solution Explorer, in the example below the WebApp is named "TweetSentimentWeb". Click on Publish



2) Select Microsoft Azure Websites



3) Sign into your Azure account. Select your website domain. Make a new domain if you do not have one. It should populate your publish credentials. Click publish.

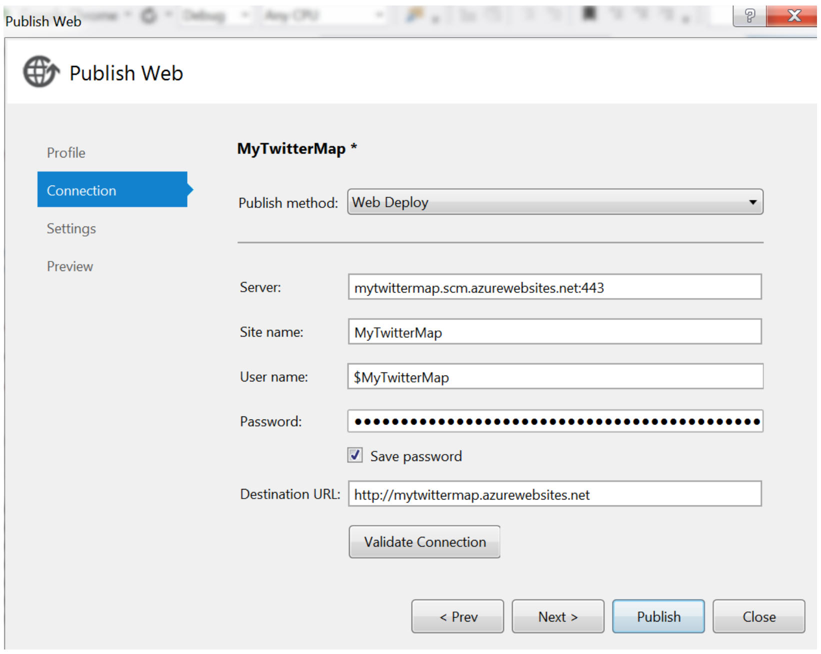


Select Existing Website

Microsoft Azure Websites

Signed in as dsdojo@hotmail.com

Existing Websites: MyTwitterMap



Publish Web

MyTwitterMap *

Publish method: Web Deploy

Server: mytwittermap.scm.azurewebsites.net:443

Site name: MyTwitterMap

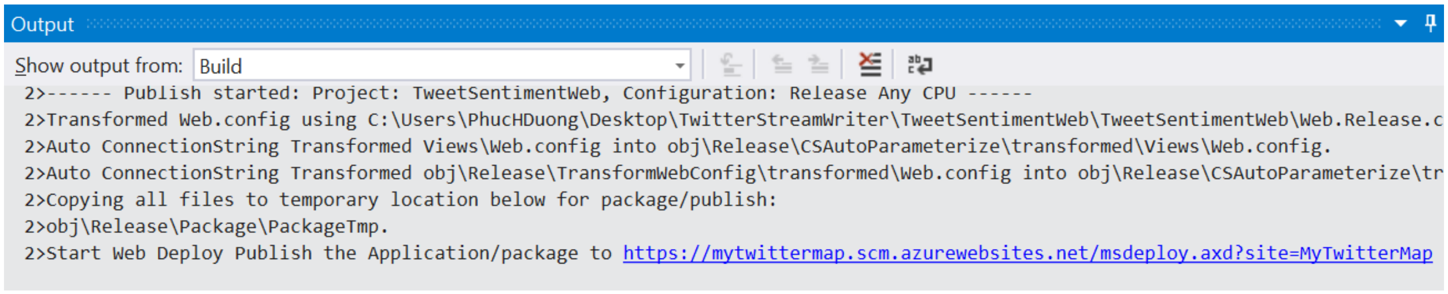
User name: $MyTwitterMap

Password: ••

[✓] Save password

Destination URL: http://mytwittermap.azurewebsites.net

Output (start of upload):

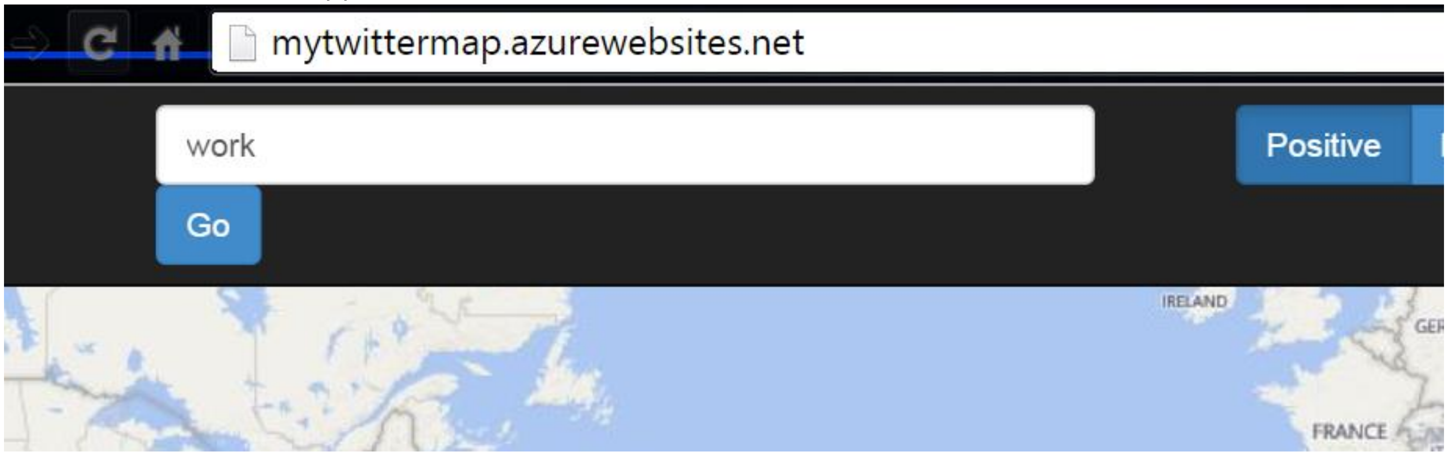


Output

Show output from: Build

```
2>------ Publish started: Project: TweetSentimentWeb, Configuration: Release Any CPU ------
2>Transformed Web.config using C:\Users\PhucHDuong\Desktop\TwitterStreamWriter\TweetSentimentWeb\TweetSentimentWeb\Web.Release.c
2>Auto ConnectionString Transformed Views\Web.config into obj\Release\CSAutoParameterize\transformed\Views\Web.config.
2>Auto ConnectionString Transformed obj\Release\TransformWebConfig\transformed\Web.config into obj\Release\CSAutoParameterize\tr
2>Copying all files to temporary location below for package/publish:
2>obj\Release\Package\PackageTmp.
2>Start Web Deploy Publish the Application/package to https://mytwittermap.scm.azurewebsites.net/msdeploy.axd?site=MyTwitterMap
```

4) You can now share this app with others:



5) Source Control: If you're happy with your touches, it is recommended that you submit your webpage to GitHub. Be careful not to submit with your passwords to a public Git repository.

Warning: Please do not leave your HBase cluster own. Turn it off when you're done with it or else you will eat away all of your free subscription funds.