Homework #8 Extra Credit Using Amazon Web Services

This semester we are for the first time allowing a small number of students the chance to earn some extra credit by exploring cloud computing as offered by Amazon's Web Services. If you are chosen to participate, the instructions below can be used to establish a website at AWS. Once established, you will be able to move your PHP program developed for Assignment #8 to your AWS website and have it execute there.

Instructions for how to qualify for the extra credit will be given in class. By completing the assignment you will be able to attach extra points to your score for Exam #1.

1. Sign up

To sign up for AWS you need a credit card. If you do not have one, buy a $25 American Express Gift card at Ralphs or other grocery store.

To sign up go to:

http://aws.amazon.com

and click on **Sign Up**. Follow the instructions to create your account using the "AWS Free Usage Tier".

Please note that many of the URLs listed from now on will only be available if you are signed up to AWS.

2. Apply the $100 credit

Once you are signed up, login to your AWS account. Go to the URL:

http://aws.amazon.com/awscredits/

Enter the code that we will provide to you and click on **Redeem**.

3. Set up the Default Elastic Beanstack Application

From the **My Account/Console** drop down in the top right select **AWS Management Console**. From the list of Amazon Web Services select **Elastic Beanstalk**. Select the **PHP 5.4** platform and click on **Start**. The default "My First Elastic Beanstalk Application will be created. You will need to wait for several minutes as your Linux + Apache + PHP- 5 instance is created and launched. You will see a *rotating wheel* next to **Default Environment**. Once creation and launch are completed, you will see the wheel turn

into a green square.

To test that the application and environment have been created properly, click on the **View Running Version** button. You should see the "*Congratulations*" page at an address like this one:

http://default-environment-fvusa3rsft.elasticbeanstalk.com

Go back to the Elastic Beanstack console. Open the Environment Details. You should see that the container is **64-bit Amazon Linux running PHP 5.4**.

4. Upload your PHP application

Develop your PHP server application, and make sure that you name the file **index.php**. Compress the file with ZIP so that the resulting file is named **index.php.zip**. On a Mac you can use zip or gzip. On Windows there are several free programs 7-Zip or FreeZip, etc. that you can use.

From the Elastic Beanstalk console click on the **Upload New Version** button.

The **Upload New Version** popup will display. Enter a **label** and a **description**. Click on the **Choose File** button and select the **index.php.zip** file. Under deployment select **Deploy to an existing environmen**t, and then click on **Upload and Deploy New Version**. Again wait several minutes for the *rotating wheel* to finish and the green square to appear. Click again on **View Running Version**. Check that your PHP app is running correctly. The URL that shows up in the address box (with http:// prepended) is the one to connect to from your Tomcat Java Servlet.

To browse how your web service and application has been set up, go to the **Services** console and select the **EC2** Service. You should see that you have 1 **Running Instance (**the 64-bit Linux service), 1 **Volume** (the 8GB disk hosting your instance), and 1 **Load Balancer** (managing port 80).

5. Set up Exploring Your Instance (Optional)

If you want to explore your Instance and create your own domain based URL with SSH control, you can add the following steps.

5.1 Create a Key Pair

From **Services**, select the **EC2** dashboard. Under **NETWORK AND SECURITY** select **Key Pairs**. Click on the button **Create Key Pair**. Enter a name like **phphosts** and click on **Create**. A download of your private key should start. Save the key, like **phphosts.pem**, in an appropriate location.

5.2 Create New Environment

Go back to the **Elastic Beanstalk** console, and click on **Launch New Environment**. Select a name and a "personal" URL. Use the **Check Availability** button to see if the URL is available.

Under **Version** you can either select the version uploaded in step 4 or a new one. As **Container Type** select **64-bit Amazon Linux running PHP 5.4**. Click **Continue**. In the Launch New Environment dialog leave all the entries untouched, but enter the name of you key under **Existing Key Pair**, like **phphosts** (do not add the .pen extension). Click **Continue**. In the next dialog, click **Finish**. Click **Close**. Again wait several minutes for the app to be deployed and launched. Verify that your app is running properly by selecting **View Running Version**. Notice that the URL now shows your "personal" sub-domain at elasticbeanstalk.com, as in:

http://**show-vars**.elasticbeanstalk.com

5.3 Get and Setup SSH

Once the PHP app with SSH-enabled environment is running, you can get access using SSH. You can use ssh on a Mac running OS X, or Putty when running on Windows.

On a Mac, SSH is built into OSX X and can be accessed through the **Terminal** app and there is no additional setup needed.

On a Windows PC, you will need to download the complete PuTTY distribution at:

http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html

You should download the file putty.zip that contains all the binaries, including **PuTTYgen** at:

http://tartarus.org/~simon/putty-snapshots/x86/putty.zip

PuTTY needs additional setup as it needs to use a converted version of the private key. The instructions on how to perform such conversion are available here:

http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/putty.html

5.4 Access your Linux Instance with SSH

To see how to launch your SSH client go to **Services** and select **EC2**. Select **Instances** in the navigation pane at left. Click on the **Actions** drop down and select **Connect**. Click

on **Connect with a standalone SSH client**.

5.4.1 Mac running OS X / ssh

On a Mac you will need to enter a command like this one:

```
ssh -i phphosts.pem ec2-user@ec2-54-235-60-138.compute-
1.amazonaws.com
```

type **yes**, when asked. Make sure that you are executing the ssh command in the same folder that contains the key. You should see output similar to this one:

```
$ ssh -i phphosts.pem ec2-user@ec2-54-235-60-138.compute-
1.amazonaws.com
The authenticity of host 'ec2-54-235-60-138.compute-
1.amazonaws.com (54.235.60.138)' can't be established.
RSA key fingerprint is
47:f7:b3:2f:88:b5:62:d9:6c:7c:60:19:53:cd:1a:0c.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ec2-54-235-60-138.compute-
1.amazonaws.com,54.235.60.138' (RSA) to the list of known hosts.

       __|  __|_  )
       _|  (     /   Amazon Linux AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-ami/2012.09-release-notes/
There are 15 security update(s) out of 56 total update(s)
available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-10-158-56-168 ~]$
```

You can find more info here:

http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/AccessingInstancesLinux.html - AccessingInstancesLinuxSSHClient

5.4.2 PC running Windows / PuTTY

In the windrow titled **Connect to an Instance**, click on **Connect from a Windows client using PuTTY**. You will be redirected to the URL:

http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/putty.html

6. Explore

You can now explore your Instance. When you login with SSH, your account home directory will be located at:

/home/ec2-user

That folder is empty, and is not where your apache / PHP files are. Run 'ps -ax', and you should see several instances of **httpd**:

```
 1940 ?          S        0:00 /usr/sbin/httpd -D FOREGROUND
 1941 ?          S        0:00 /usr/sbin/httpd -D FOREGROUND
 1942 ?          S        0:00 /usr/sbin/httpd -D FOREGROUND
 1944 ?          S        0:00 /usr/sbin/httpd -D FOREGROUND
 1945 ?          S        0:00 /usr/sbin/httpd -D FOREGROUND
```

To see your mounted volumes, run 'df -h':

```
[ec2-user@ip-10-158-56-168 sbin]$ df -h
Filesystem            Size  Used Avail Use% Mounted on
/dev/xvda1            7.9G  1.3G  6.6G  17% /
tmpfs                 298M     0  298M   0% /dev/shm
[ec2-user@ip-10-158-56-168 sbin]$
```

To see your document root, run 'ls /var/www/html/':

```
[ec2-user@ip-10-158-56-168 html]$ ls -l /var/www/html
lrwxrwxrwx 1 root root 16 Mar 22 20:38 /var/www/html ->
/var/app/current
[ec2-user@ip-10-158-56-168 html]$
```

To see your uploaded index.php file:

```
[ec2-user@ip-10-158-56-168 sbin]$ cd /var/www/html
[ec2-user@ip-10-158-56-168 html]$ ls -l
total 4
-rw-r--r-- 1 webapp webapp 3723 Feb  5 02:09 index.php
[ec2-user@ip-10-158-56-168 html]$
```

To see your php.ini file, 'ls -l /etc/php.ini':

```
[ec2-user@ip-10-158-56-168 html]$ ls -l /etc/php.ini
-rw-r--r-- 1 root root 65782 Mar 22 20:38 /etc/php.ini
[ec2-user@ip-10-158-56-168 html]$
```

Have fun exploring AWS!!