

CS 4740 Programming Assignment 1

Goals:

Gain hand-on experience on IaaS cloud -- specifically, get familiar with AWS EC2. Create a web server on EC2 instance with Amazon Linux, and create a MySQL Database. Connect the web server to the database and render contents in web page.

Please start this assignment when you have at least 2-3 hours available!

You may refer to the videos below for an introduction. Note that the steps in the videos may not be exactly the same as the steps in the following.

Amazon AWS RDS | How to create and connect RDS Database Instance

Part 1: <https://www.youtube.com/watch?v=LnAvUOmH1n0>

Part 2: <https://www.youtube.com/watch?v=vE2E7cYJ0IQ>

Introduction to Amazon RDS: <https://www.youtube.com/watch?v=yjH10T3Miaq>

Step 1: Create an AWS account

1. Create a free account on <https://aws.amazon.com/>.
2. Apply for AWS Educate here <https://aws.amazon.com/education/awseducate/apply/> -- free \$40 credit for students. Do NOT select the option "AWS Educate Starter Account". Note that YOU will be responsible for paying for AWS! \$40 should be enough with careful usage for all the programming assignments. However, please do not forget to close everything after you finish each programming assignment. Otherwise, you will receive a large bill.

Please apply ASAP! Normally, it will take more than one day for the application to get approved.

Step 2 Launch a database instance:

Before launching the DB instance, please read carefully and follow the tutorial in http://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP_Tutorials.WebServerDB.CreateVPC.html to create VPC, subnets, and security groups. The notes below show the changes to the tutorial in the website that you need to follow.

- a) In the top-right corner of the AWS Management Console, choose the region to create your VPC in. This example uses the ~~US West (Oregon)~~-region **select "US East (N. Virginia)" instead.**
- b) NAT Instance type for VPC: ~~t2.micro~~ **if It is not an option in AWS, use 't2.small' instead**

- c) When creating the second subnet, choose an Availability Zone different from the one that you chose for the first private subnet. For example, if you choose **us-east-1a** for the first subnet, then choose **us-east-1b** for the second subnet.
- d) Set the following values for your new inbound rule to allow Secure Shell (SSH) access to your EC2 instance. If you do this, you can connect to your EC2 instance to install the web server and other utilities, and to upload content for your web server.
 - Type: SSH (22)
 - Source: The IP address or range from the prior step, ~~for example: 203.0.113.25/32.~~ **Use 0.0.0.0/0 instead**, it means you enable all IP addresses to access your public instances. This approach is acceptable for a short time in a test environment, but it's unsafe for production environments. In production, you'll authorize only a specific IP address or range of addresses to access your instances.

Then we can start to create a database instance. Create a Relational Database Service instance in AWS. Please read and follow the tutorial on http://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP_Tutorials.WebServerDB.CreateDBInstance.html

Please adhere to notes listed below.

Notes: When creating DB instance, for the storage type: select "General purpose (SSD)".

Step 3 Create an EC2 Instance and Install a Web Server:

Create an EC2 Instance and Install a Web Server. Connect the web server to the RDS database. Please read and follow the tutorial on http://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP_Tutorials.WebServerDB.CreateWebServer.html

Notes:

1. You will have to create and download the key pair to login to your EC2 instance. Please save this key pair.
2. To connect the instance you create from Windows, you will need to use Putty or an SSH client. For Putty, you will need PUTTYgen to convert the .pem format key to private key (.ppk format) required by Putty. Tips: right click in PUTTY is paste. You can save the login session in
3. When you try to SSH the instance, the public DNS name can be found in by clicking the EC2 instance you just created.
4. `sudo yum update -y` **remove the -y option if it does not work**
5. You will need to search Google to be familiar with text editor in Linux.
6. The endpoint of the instance is the endpoint values from the created RDS instance.

7. In the SamplePage.php file, please replace the header tag (<h1>Sample page</h1>), with a header tag with your computing ID (e.g., <h1>vse7fd</h1>). Please add your name and address classroom (Olsson Hall 120) to the database.

Deliverables:

Each student needs to complete the assignment and submit report individually. In case you need to form a group following the procedures mentioned in the syllabus, mention the name of the group members in the report. As per report, in a word document, please include screenshots of the following:

1. The RDS Dashboard with a running MySQL instance
2. The initial "Amazon Linux AMI Test Page" (Apache test page)
3. The final SamplePage.php page in the application

Please submit one PDF of these screenshots and submit to Collab.

After finishing:

1. In <https://console.aws.amazon.com/rds/> for RDS, right click on the DB instance and select 'Take snapshot', name it as "pa1-done". When the snapshot has been created, delete your RDS instance.
2. In <https://console.aws.amazon.com/ec2/> for EC2, right click on your VM instances and select "instance state -> stop" (NOT "terminate!")