Cloud Platform Development

[FINAL PROJECT - 40% of the overall grade]

Submission due: Final Submission by May 8th, 2020

Final Project Brief

Cloud computing is the delivery of on-demand computing services ranging from applications to storage and processing power over the internet and on a pay-as-you-go basis. Rather than owning their own computing infrastructure or data centers, companies can rent access to anything from applications to storage from a cloud service provider. Adoption of cloud computing has been influenced by the need to scale applications, data security and efficiency as well as cost reduction.

Amazon Web Services (AWS) is one of the most popular cloud service providers and is widely credited with the introduction of innovative concepts in cloud computing. AWS offers various services such as Amazon Simple Storage Service (S3) and Amazon Elastic Compute Cloud (EC2). For this project, you will work on instances provisioned on Amazon EC2 to host your application.

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The Goal of The Project

To combine the knowledge learnt in this class as well as in other classes to deploy a fully functional web application on a public cloud infrastructure Amazon Web Services (AWS).

To reduce the complexity of the project, you will use open source software for the hosting aspect instead of developing an application from scratch. You will learn how to utilize open source projects, provision and manage resources on AWS, configure and secure servers to offer cheap, reliable and scalable applications.

The Implementation

Note: You only have $10 credit to complete this project. You will not get more credits in case you finish yours by launching bigger or multiple instances among other services.

Get a Subdomain Name

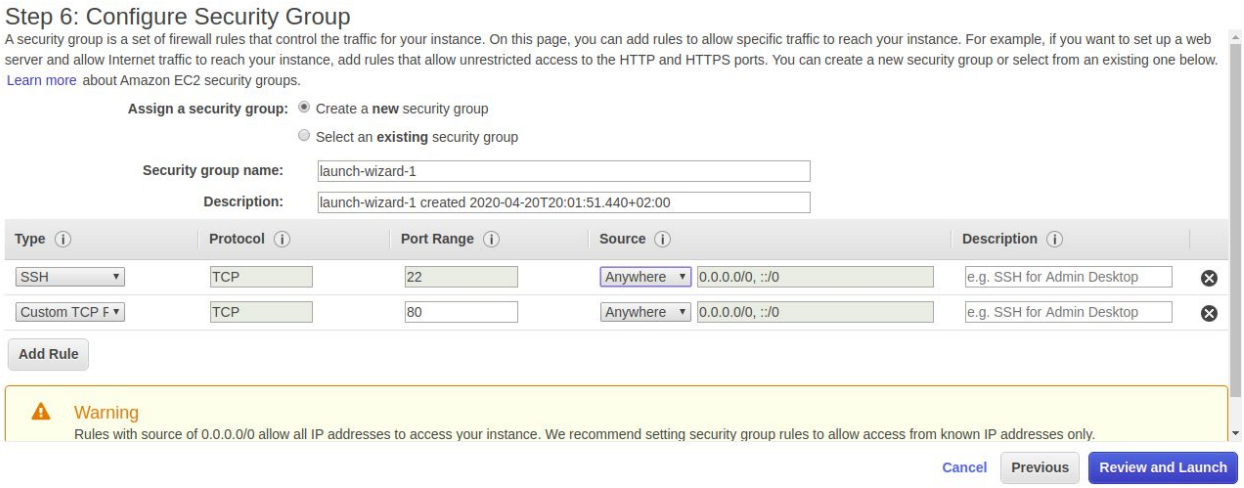
- I have created a domain name that you will use for this project *techdock.xyz*
- You will need to provide a **subdomain name** and the **public IP** address of the server you will create in the step below. These details should be added on the group excel sheet. For example subdomain name: *benson* public ip: *3.94.5.216* .This will give you a domain name to use in your project that will be *benson.techdock.xy*

Launching Your Instance

This section assumes you have already accepted the invitation to join AWS educate platform.

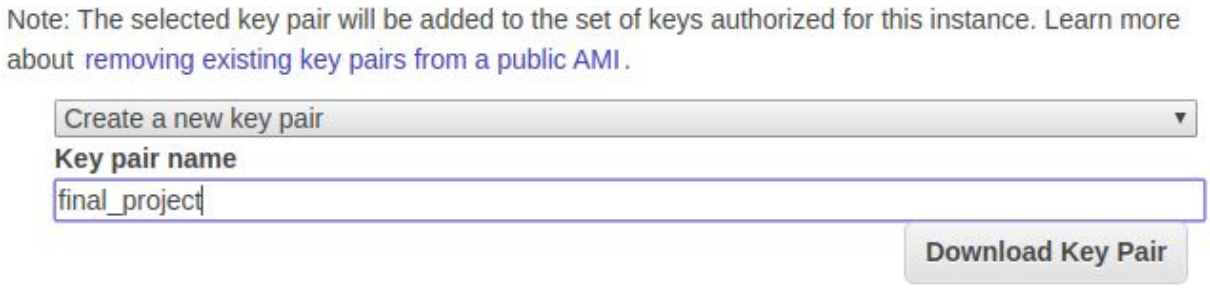
- Go to AWS educate platform, navigate to **AWS Account** on the menu select **AWS Educate Starter Account** and that will open a new tab on the link https://labs.vocareum.com/
- Click on AWS Console button to open the AWS Management Console where you can provision and manage resources.
- Select on EC2 >> running instances>> Launch instance
- Select Ubuntu Server 18.04 base image

- Select on the **t2.micro** instance. Notice that a bigger instance will be more expensive and will likely finish your credits before you are done with the project.
- Continue clicking on the next button so you do not skip some critical configuration. Leave the settings as they are and when you get to Step **6: Configure Security Group,** you will open ssh port 22, 80 and server port 443 to be accessible from anywhere as shown below (missing port 443 but you should allow it too).



- When you get to the launch page, create a new key pair, by providing a name and then downloading it as shown below. Note that by default,

AWS does not allow login to servers with username and password but rather uses ssh keys.



- Proceed and launch the instance and log in to the instance using the ssh key you downloaded earlier and the IP of the server as seen on AWS EC2 console. Eg: *ssh -i {key pair location}/{key-pair name} ubuntu@{your ip address}*

Configure Your Instance

- Install Apache web server (highly recommended) but you can also use nginx or any other web server of your choice.
- Follow my blog which is detailed with a step by step guide on deploying your first website. You can ignore the Digital Ocean domain configuration section and start from *Setting Up Apache2* section.
- Once you have the dummy site running, it's now time to deploy your application.

Deploy Your Application

- We will use https://www.opencart.com/ open source e-commerce application. The GitHub repository can be found here.
- Clone and follow the instructions on the documentation to make it work on the server.
  Note: You can start by deploying the application on your local machine so you can get familiar with the setup and that way it will be easier to set it up on the server.
- Customize your application by branding it with the products you want to display.

Secure Your Application

- You will secure your application with a free SSL certificate.
- I recommend using LetsEncrypt but you can use any other providers. Using the Certbot application will automate the configuration for your set up. You can follow my guide or directly use guide by certbot
- After configuring the SSL certificate, you can use SSL Labs to check your rating (grade B is acceptable for this project but it would be great if you could challenge yourself to get an A).

Activities and Deliverables

1. **Setup and Deployment**
   a. Provision a server on AWS through your AWS educate account (You only need 1 account per group).
   b. Set-Up the server with all required software and libraries.
   c. Deploy Opencart E-commerce web application.
   d. Configure and secure application to be accessible online
   e. Create SSH access account for me (name and credentials to be shared separately)
2. **Project documentation**
   a. Documentation of current implementation stage/step of the group
   b. Final deliverable of the project including project domain url, ssh access and key takeaways from the project

Resources You'll Need in This Project

- Internet Access
- Access to AWS Educate Account and AWS console
- SSH client like putty for Windows & terminal for Linux/Unix

Groups and Submission Criteria:

- I will assign groups of two students for this project.

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- Project should be submitted by 8th of May
- File naming: The final submission document should be named as shown below. This will be shared on google docs to myself with at least comment permissions granted.

  Student1_names_Student2_names_final_project (Google docs)