

Cloud Foundations
COSC2766/ Semester 1, 2023
Assignment 2 (AWS cloud implementation)

Assessment Type	<p>To be attempted individually.</p> <p>Submit online via Canvas→Assignments→ Assignment 2</p> <p>Marks awarded for meeting requirements as closely as possible. Clarifications/updates may be made via announcements/relevant discussion forums.</p>
Due Date	Week 11, Sunday 21 May 2023, 23:59 pm
Marks	30

1. Overview (you must read this first)

You are to attempt this assignment individually, no group work is allowed. You will use material and knowledge gained from reading AWS Academy 'Cloud Foundations' course.

- You will need your **AWS academy** accounts for this milestone. Email invites to use this account were sent earlier. Please accept the invite and start using this account. *If you have any account related issue, please email Course Coordinator: Long Nguyen (long.nguyenminh@rmit.edu.vn) at your earliest.* Most of the times these queries will be directed to AWS and may take few days to resolve.

If you find a specification open to interpretation, post a query identifying the specification in the Discussion board on Canvas. Software development and deployment in real life does not come with a definitive roadmap and flowcharts complete with instructions. More often than not, it is the job of the developer/analyst to clarify requirements from the client.

- Bring your questions to online discussion board, online lecture sessions
- Watch the online recordings on a regular basis if you cannot attend the live sessions.
- Do NOT start the work on assignment at the last minute.
- Do NOT ask for last minute extensions, these are often rejected. Extensions can only be granted for personal and medical reasons, provided you can supply some evidence.

2. Learning Outcomes

This assessment relates to all of the learning outcomes of the course which are:

- CLO 2: Create a virtual private cloud (VPC) and demonstrate Amazon Elastic Compute cloud (Amazon EC2)
- CLO 3: Comprehend AWS storage services
- CLO 4: Comprehend AWS database services
- CLO 6: Communicate using the proper language of the field including reports written with a professional approach

3. Academic integrity and plagiarism (standard warning)

Academic integrity is about honest presentation of your academic work. It means acknowledging the work of others while developing your own insights, knowledge and ideas. You should take extreme care that you have:

- Acknowledged words, data, diagrams, models, frameworks and/or ideas of others you have quoted (i.e. directly copied), summarised, paraphrased, discussed or mentioned in your assessment through the appropriate referencing methods,
- Provided a reference list of the publication details so your reader can locate the source if necessary. This includes material taken from Internet sites.

If you do not acknowledge the sources of your material, you may be accused of plagiarism because you have passed off the work and ideas of another person without appropriate referencing, as if they were your own.

RMIT University treats plagiarism as a very serious offence constituting misconduct. Plagiarism covers a variety of inappropriate behaviours, including:

- Contract cheating- paying/asking someone to do your work
- Failure to properly document a source involving none, insufficient or incorrect referencing
- Copyright material from the internet or databases
- Collusion between students

4. Marking Guidelines

The marks allocated have been added to each of the tasks. Please read rubrics for details.

5. Assignment 2 tasks

The tasks to be completed in the classroom titled [AWS Academy Learner Lab \[45333\]](#); upon logging in to the correct classroom you should see the following:

≡


ALLv1-45333

Home

Modules

Discussions

AWS Academy Learner Lab [45333]



AWS Academy Learner Lab provides a long-running sandbox environment for ad hoc exploration of AWS services. Within this class, students will have access to **a restricted set of AWS services**. Not all AWS documentation walk-through or sample labs that operate in an AWS Production account will work in the Learner Lab environment. You will retain access to the AWS resources set up in this environment for the duration of this course. We limit your budget (\$100USD), so you should exercise caution to prevent charges that will deplete your budget too quickly. If you exceed your budget, you will lose access to your environment and lose all of your work.

View Course Stream

View Course Calendar

View Course Notifications

To Do

Nothing for now

PLEASE NOTE- that each time you work in the 'AWS Academy Learner Lab [45333]' classroom created for you under your AWS Academy account, your entry times are logged. If you work under an incorrect or personal account, these log entries will not exist and you will get a ZERO for the whole assignment 2. No marks will be awarded for using a personal AWS account.

NOTE: You will be required to submit a series of screenshots together with a report file to show that you have completed the tasks. Please make sure that your screenshots show the entire screen (including the time and date of the screenshot).

These screenshots will be compared against your work in the 'AWS Academy Learner Lab [45333]' classroom environment. If no work exists in the classroom, you will get a ZERO.

Make sure you DON'T terminate your instances otherwise your work cannot be traced.

Scenario: You have a small business with 2 websites. One is a static website that shows your business information and the other one is a dynamic website that stores product data on a backend database server which you want to keep private. You want to use Amazon VPC to set up a VPC that meets the following requirements:

TASK A) VPC (3 marks)

Not using the Launch VPC Wizard (option VPC and more), create a new VPC with the following description:

- The name of the VPC is your s-number (i.e. s1234567).
- The VPC has 2 Availability Zones.
- Each AZ has 1 public subnet and 1 private subnet with maximum 251 IP addresses each.
- Ensure your public and private subnets are associated with route tables that are relevantly configured.

TASK B) Static website with EC2 (6 marks)

By launching an EC2 instance, host a static website with the following requirements:

- The instance uses a security group named Web_SG that allows HTTP and SSH access from the wider internet.
- The source code of the website can be downloaded from this link: <https://aws-tc-largeobjects.s3-us-west-2.amazonaws.com/ILT-TF-200-ACACAD-20-EN/Module-3-Challenge-Lab/static-website.zip>.
- The instance uses the *vockey* key pair created by the Learner Lab environment.
- Assign a permanent public IP address to the EC2 (i.e. the IP address will not change when the instance is restarted).

Screenshot each configuration step and show the website at the end.

TASK C) Static website with S3 (3 marks)

Deploy the same website in Task B using an S3 bucket. Screenshot each configuration step and show the website at the end.

TASK D) Static website with Elastic Beanstalk (3 marks)

Deploy the same website in Task B using Elastic Beanstalk. Screenshot each configuration step and show the website at the end.



TASK E) Auto Scaling and Load Balancer (6 marks)

Make the website in Task B highly available by deploying the EC2 instance in a second Availability Zone using a Load Balancer, Auto Scaling Group and Scaling policy.

TASK F) Dynamic website (6 marks)

Beside the static website, the business has a dynamic website that store data in a database server. The system includes an EC2 instance that hosts the website and an RDS instance to store data in a private subnet.

Deploy the dynamic website with the following requirements:

- The website runs on an EC2 instance in a public subnet with the following information:

- Name: Dynamic website
- AMI: Amazon Linux 2
- Instance type: t2.micro
- Key pair: vockey
- Security group: Web_SG
- User data

```
#!/bin/bash
# Install Apache Web Server and PHP
yum install -y httpd mysql
amazon-linux-extras install -y php7.2
# Download Lab files
wget https://aws-tc-largeobjects.s3-us-west-2.amazonaws.com/ILT-TF-200-ACACAD-20-EN/mod6-guided/scripts/inventory-app.zip
unzip inventory-app.zip -d /var/www/html/
# Download and install the AWS SDK for PHP
wget https://github.com/aws/aws-sdk-php/releases/download/3.62.3/aws.zip
unzip aws -d /var/www/html
# Turn on web server
chkconfig httpd on
service httpd start
```

- IAM instance profile: LabInstanceProfile

- The database runs on an RDS DB instance in a private subnet.
- Ensure that a security group and a DB subnet group are created and associated with the RDS instance.
- Also, the database is initialized and relevantly configured with setting from the dynamic website.

Screenshot each configuration step and show the website at the end.

TASK G) System Architecture (3 marks)

Draw a system architecture to visualize all your previously created components in the VPC (including CIDRs, IP addresses, route tables, etc.).

6. Submission Instructions

You need to create single zipped archive containing the following:

- A pdf report file containing all the screenshots with comment explaining each screenshot.
- For each task, create a folder named **TaskA, TaskB...** Put all the screenshots with original image quality in each folder. Name the screenshot images **Step 1, Step 2...**corresponding to the steps in the report.

You must submit this single zipped archive via Assignment submission link under Assignment 2 Canvas.

The zipped file must be named as yourStudentNumber_a2.zip, as an example if your student number is s1234567 the file must be named as

s1234567_a2.zip

INCORRECT file name will attract a penalty of 5 marks from the total score.

Assessment declaration: When you submit work electronically, you agree to the assessment declaration:

<https://www.rmit.edu.au/students/student-essentials/assessment-and-exams/assessment/assessment-declaration>

For further information on our policies and procedures, please refer to:

<https://www.rmit.edu.au/students/student-essentials/rights-and-responsibilities/academic-integrity>