

Cloud Architecting
COSC2930/ Semester 2, 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 17 September 2023, 23:59 pm
Marks	40

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 Architecting' 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 the learning outcomes of the course which are:

- CLO 2: Understand concepts around AWS-powered applications.
- CLO 3: Understand key concepts around architectural components.
- CLO 4: Create, manage and provision applications using AWS platform.

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 \[54357\]](#); upon logging in to the correct classroom you should see the following:

≡ ALLv1-54357

Home
Modules
Discussions

AWS Academy Learner Lab [54357]



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 [54357]' classroom created for you under your AWS 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 window (including your username, day & time of the screenshot).

These screenshots will be compared against your work in the 'AWS Academy Learner Lab [54357]' 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.

TASK A) Static website with S3 (4 marks)

Deploy the MomandPop Café static website using an S3 bucket with the following requirements:

1. 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> (1 mark)
2. The S3 bucket must retain all the deleted files. Whenever there is a file uploaded or deleted, an email notification is sent to your email. (1 mark)
3. When files are deleted, move them to Standard-IA storage class in 30 days, One Zone-IA in 90 days and Glacier Deep Archive in 365 days. (1 mark)
4. All the files in the bucket (current and future) are backed up to another bucket in a different region. (1 mark)

Show the website at the final step.

TASK B) Highly available Dynamic website (9 marks)

Deploy the MomandPop Café dynamic website (in our lab activities) with the following requirements:

1. The source code of the website is found in the Module 4 Challenge.
2. Prepare an appropriate environment ready to launch a web server: VPC, subnets, security groups, route table... (1 marks)
3. Run the website on an EC2 instance in Free Tier. (1 mark)
4. Make the website highly available using a Load Balancer, Auto Scaling Group and scaling policy... (2 mark)
5. Run the database on RDS. (1 mark)
6. Make the database highly available. (1 mark)
7. Store database connection information in the AWS Systems Manager Parameter Store. (1 mark)
8. Test the automatic scaling of the website under high load. (1 mark)
9. Draw a system architecture diagram to visualize all services/components you use in this task (including network with CIDR, subnets, IP addresses, route tables...) (1 mark)

Show the website at the final step.

TASK C) Route 53 Failover Routing (3 marks)

In this task, you will configure failover routing for the dynamic website in Task B with the following steps:

1. Register a domain for your website in task B. (1 marks)
2. Configure a Route 53 health check that sends emails when the health of your website in task B turns unhealthy. (1 mark)
3. Configure failover routing in Route 53 to switch to the static website in task A when the website in task B becomes unavailable. (1 marks)

TASK D) Caching with CloudFront (2 marks)

1. Create a cached version of the website in Task A. (1 mark)
2. Create a cached version of the website in Task B. (1 mark)

TASK E) Dynamic website with Elastic Beanstalk (3 marks)

Deploy the same website in Task B using Elastic Beanstalk.

TASK F) Breaking a Monolithic Application into Microservices (3 marks)

For this task, you will do the **(Optional) Module 13 - Guided Lab 1: Breaking a Monolithic Node.js Application into Microservices** in AWS Canvas.

TASK G) SNS, SQS and CloudWatch Alarm (3 marks)

Unless specified below, use the default configuration setting.

1. Create a standard SNS topic named **TopicAlarm**. Configure the SNS to send to your email. (0.5 mark)
2. Create a standard SQS named **LabQueue**. (0.5 mark)
3. Create a CloudWatch alarm named **AlarmSQS** to monitor all of the messages sent in the **LabQueue** SQS queue. The alarm should be triggered if the number of messages exceeds 1 over 1 minute. Associate the alarm with the **TopicAlarm** SNS topic. (1 mark)
4. Send and poll messages in the **LabQueue** SQS queue so that you'll receive an alarm email. (1 mark)

TASK H) Okami Restaurant (3 marks)

Okami (<https://www.okamirestaurant.com.au>) is a restaurant chain company which has over 41 branches in VIC, ACT, NSW and SA. Now the senior management of this company expressed their interest in migrating all their IT-related functions to AWS cloud. At the moment the company outsourced the online reservation and order functions to external providers. They plan to build their own reservation and order systems after the migration and host them in AWS cloud. They also prefer the cloud-based system to connect with each branch's local payment processing, inventory management, employee scheduling, payroll and accounting systems to form a virtual private network. Cost and security are their top concern.

Assume that you are working in a cloud consulting company and part of the team for generating a cloud migration feasibility report for Okami. You are now required to perform the following tasks.

Your task is to answer the following questions:

- a. With the role of an AWS Solution Architect, propose a complete solution for Okami cloud implementation using AWS services. Justify your answer by providing a supporting explanation. Be detailed and specific as much as possible when describing all the services needed (network, AWS services, security...) (2 marks)
- b. Draw a system architecture diagram to visualize all services/components you propose in task a (including network with CIDR, subnets, IP addresses, route tables...) (1 mark)

TASK I) Challenge Labs and Capstone Project documents (10 marks)

This task includes 8 weekly Challenge labs and the Capstone Project lab as announced on Canvas.

Place the Capstone Project diagram and the summary of your design decision here in this section.

6. Submission Instructions

You need to submit 2 files:

1. A pdf report file showing all the steps with screenshots for each task/sub-task such as A1, A2...(Task A, sub-task 1). Provide comments explaining all the screenshots.
2. A zipped archive file containing all the screenshot images with original quality. The screenshots are organized into sub folders for each task (\Task A, \Task B...).

You must submit these 2 files via Assignment submission link under Assignment 2 Canvas.

The files must be named as yourStudentNumber_a2.pdf or yourStudentNumber_a2.zip. For an example, if your student number is s1234567, the file must be named as s1234567_a2.pdf and 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>