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Cloud Foundations
COSC2757/ Semester 1, 2021
Milestone 2 (AWS cloud implementation)

Assessment Type	To be attempted individually. Submit online via Canvas→Assignments→Second Milestone Marks awarded for meeting requirements as closely as possible. Clarifications/updates may be made via announcements/relevant discussion forums.
Due Date	Week 11, Friday 21st May 2021, **5:00** pm AEST (*please note the time*)
Marks	45

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 Educate** accounts for this milestone. Email invites to use this account were sent earlier in the semester. Please accept the invite and start using this account. *If you have any account related issue, please email Course Coordinator:* Shekhar Kalra (shekhar.kalra@rmit.edu.au) 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 corresponding discussion board for assignment 2. 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.

All of us have been affected by the unfortunate COVID-19 scenario and its aftermath. It is often hard to concentrate and study online; but as a student enrolled in this course, it is your responsibility to regularly attend online session(s).

- Bring your questions to online discussion board, online facilitation 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. **Extension and late submissions**

- Email course coordinator: Shekhar Kalra (shekhar.kalra@rmit.edu.au) for any extension related queries.
- 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.
- **A**ccording to RMIT assessment policy as outlined here: https://www.rmit.edu.au/students/student-essentials/assessment-and-results/extensions-of-time-for-submission-of-assessable-work

  If you are seeking an extension of seven calendar days or less (from the original due date) you must apply at least one working day before the assessment deadline.
- After the due date, you will have 5 business days to submit your assignment as a late submission. Late submissions will incur a penalty of 10% per day. After these five days, Canvas will be closed, and you will lose ALL the assignment marks.

5. **Marking Guidelines**

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

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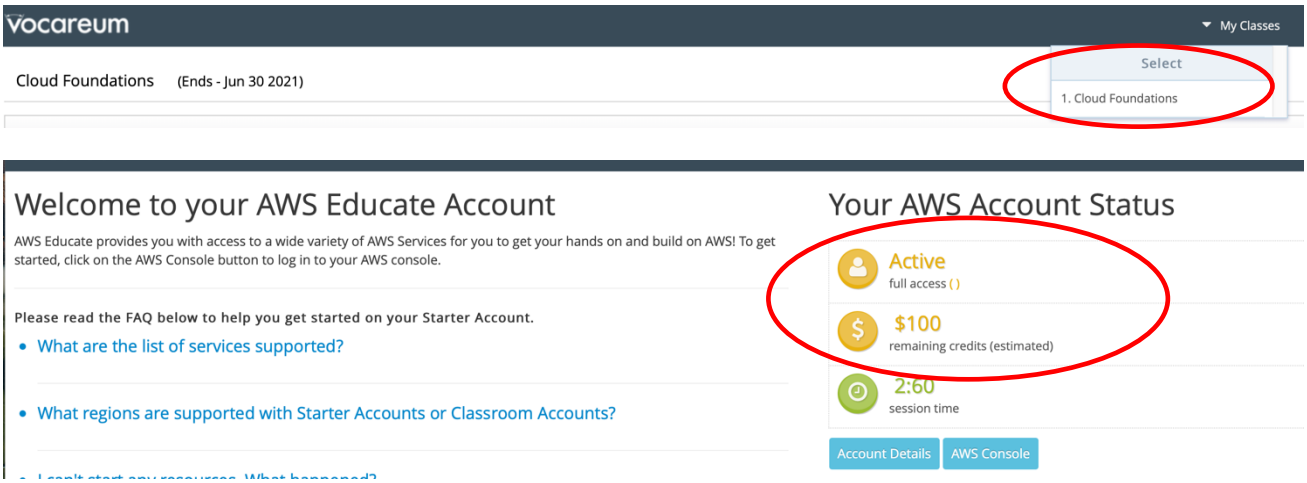
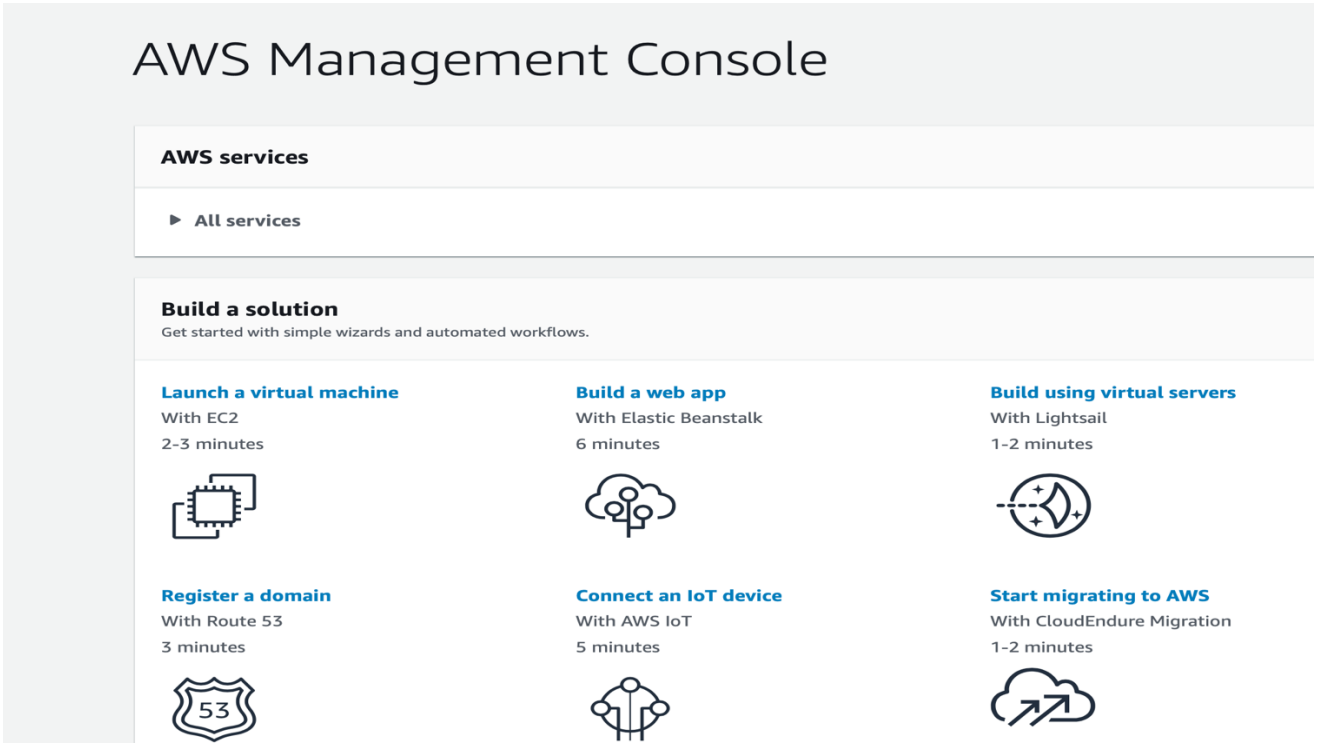
6. **Assignment 2 tasks**

This assignment is split into two parts:

The tasks to be completed in the **AWS Educate** account which belongs to classroom titled **Cloud Foundations**; upon logging in to the correct AWS educate account you should see the following:





PLEASE NOTE- that each time you work in the 'Cloud Foundations' 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 <u>you will get a ZERO for the whole assignment 2</u>. No marks will be awarded for using a personal AWS account.

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NOTE: You will be required to submit a series of screenshots to show that you have completed the tasks. Please make sure that your screenshots show the entire window.

These screenshots will be compared against your work in the AWS educate 'Cloud Foundations' classroom environment. If no work exists in the classroom, you will get a ZERO.

PART 1 [Basic Cloud Implementation]

TASK A) VPC (5 marks)

~~1. Using the 'Launch VPC Wizard', create a new VPC and networking configuration.~~

~~o You will need to ensure you launch your VPC with a NAT instance.~~

~~2. Create an extra public and private subnet. Ensure these subnets are associated with the appropriate Route Tables.~~

~~3. Create a Security Group to allow HTTP Access inside the Assignment 2 VPC from the wider internet.~~

1. **Not using the Launch VPC Wizard**, create a new VPC, and name it Assignment 2 VPC.
   - You will make two public subnets, and two private subnets. Make four subnets and give them appropriate names.
   - Make sure you have one public and one private subnet in one availability zone, then the other public and private subnet in another availability zone.
   - Ensure your Public and Private subnets are associated with Route Tables that are relevantly configured.
   - For this exercise, resources in the private subnets will not need to access the Internet. This means we don't need a NAT Gateway, or NAT Instance.

2. Create a Security Group to allow HTTP Access inside the Assignment 2 VPC from the wider internet.

TASK B) EC2 (5 marks)

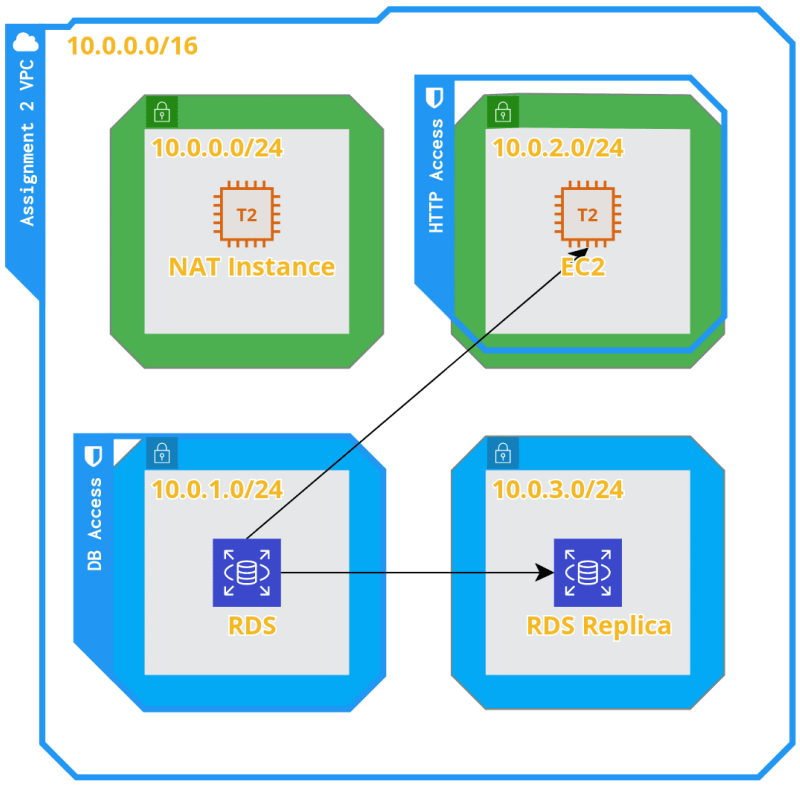
1. Inside EC2, launch with:
   - Amazon Linux 2 AMI
   - t2.micro Instance Type
   - Inside the Assignment 2 VPC, inside Public Subnet 2, and enable 'Auto-assign Public IP'
   - Leave the Storage settings as Default, but add a Name Tag of 'Assignment 2 EC2' and assign the Security Group you created earlier.
   - Choose 'Proceed without a key pair' when you launch the instance.

TASK C) RDS (15 marks)

1. Create a security group for the Assignment 2 VPC called DB Access.
    a. This security group should allow inbound connections on the port used for MySQL connections from instances that have the HTTP Access security group you created in part A.

2. Create Subnet Group for Database
3. Create Database
    a. Go to Create Database under RDS, and select Amazon Aurora.
    b. Leave the 'Settings' as default, but set the password to 'Assignment2'
    c. Set the DB instance type to db.t2.small.
    d. The deployment must be a Multi-AZ deployment.
    e. Ensure it is launched in the Assignment 2 VPC, using the subnet group you created previously.
    f. Ensure you attach the DB Security Group.
    g. Disable Enhanced monitoring.

This is a map of the architecture outlined in Tasks A, B, and C.



TASK D) S3 & IAM (5 marks)

Create an S3 storage bucket and create an IAM Role with the 'AmazonS3FullAccess' policy. Attach this role to your previously launched EC2 instance.

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PART 2 [Advanced Cloud Implementation]

NOTE: You will not be able to use your AWS educate environment for these tasks- you must the sandbox environment. The Sandbox has a timer of four hours, after which the created resources will be terminated. Due to the time limited nature of the sandbox, it is recommended that you thoroughly review the relevant course material and plan your actions first.

The following tasks will require you to be more familiar with the relevant modules and require some self-research. **No help will be provided for these tasks.**

Complete tasks E-G in AWS Academy Sandbox:

TASK E) Auto Scaling Group (5 marks)

Create an Auto Scaling Group that launches instances of the same type and configuration of the previously launched instance across your public subnets.

TASK F) Elastic Load Balancer (5 marks)

Create a Target Group and attach it to the Auto Scaling Group. Use an Elastic Load Balancer to load balance requests to your Auto Scaling Group.

TASK G) Route 53 (5 marks)

Create a Hosted Zone (you do not have to purchase a domain or use a domain you own) and create subdomain DNS records for your Load Balancer and S3 Bucket.

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7. **Submission Instructions**

You need to create single zipped archive containing the following:

Tasks		**Screenshots required**	**Name of screenshot files**
Task A	VPC	VPC - Your VPCs VPC – Subnets VPC - Route Table configuration	Name all screenshots with **TaskA_** *For eg. Task A_VPCs, etc.*
Task B	EC2	EC2 - Instances (with instance selected to show details)	Name all screenshots with **TaskB_**
TASK C	RDS	RDS – Create Database Process (all steps) RDS - Subnet Groups RDS- Databases	Name all screenshots with **TaskC_**
TASK D	S3 & IAM	IAM – Roles EC2 – Show attached Role S3 – Bucket creation process (all steps)	Name all screenshots with **TaskD_**
TASKS E-G	Auto Scaling Group, Elastic Load Balancer, Route 53	Take screenshots of your process Take screenshots of your resources and their details once you have created them.	Name screenshots with relevant task names such as: **TaskE_** **TaskF_** **TaskG_**

You must submit this single zipped archive via Assignment submission link under Milestone 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

8. **Facilitator led sessions**

Please attend Monday and Thursday (630-730pm) sessions to query doubts concerning this assignment.