

COS20019 – Assignment 1B

Janaka Pruthuvi Vimukthi Muthunayake

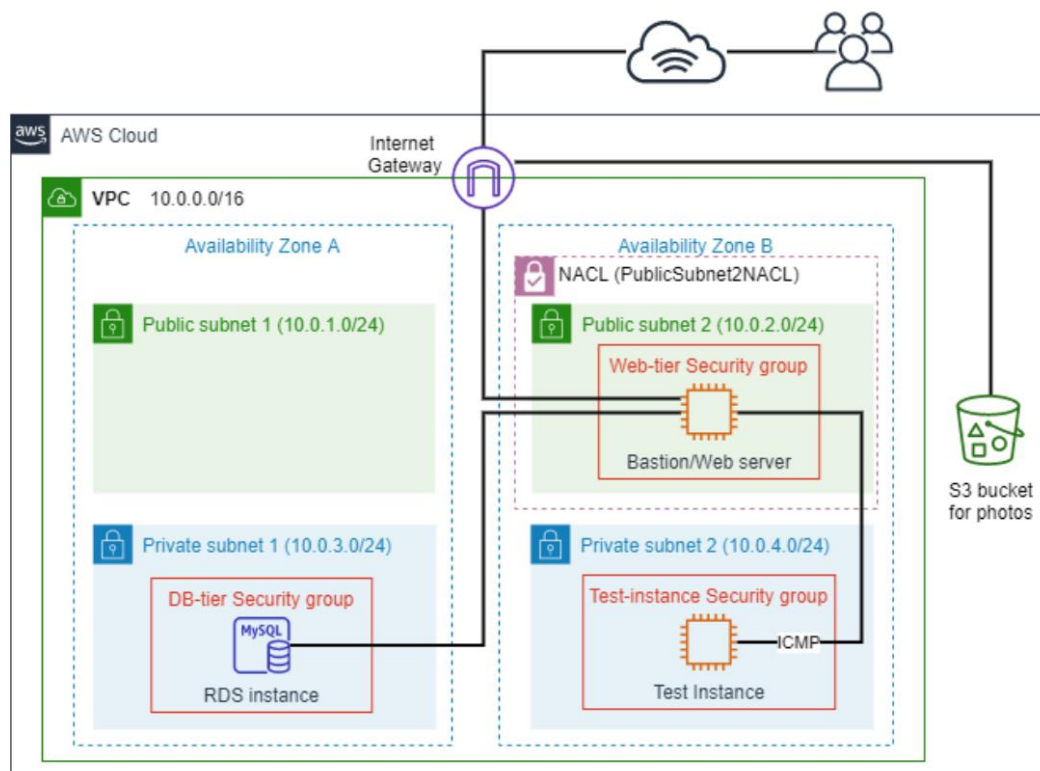
Student ID: 104315180

Tutorial: Wednesday 06:30pm

Objectives

1. Create a secure Virtual Private Cloud (VPC) with subnets, routing tables and security groups.
2. Control access to and from your VPC via an Internet Gateway.
3. Modify the provided PHP code to create a website that stores meta-data information about photos uploaded to S3 in a MySQL database managed by Amazon RDS. The website should enable the user to search for and display photos using meta-data.
4. Deploy and test your PHP web site on an Apache web server running on an EC2 virtual machine instance.
5. Add an additional layer of security by applying a Network ACL to the public subnet that hosts your web server.

1 Infrastructure



1.1 VPC (Virtual Private Cloud)

Created a secure VPC with subnets, security groups, internet gateway. created two availability zones each with a private and public subnet with suitable CIDR as specified in the infrastructure above and associated public subnets with a public route table that routes to the Internet gateway.

Created VPC

Name	VPC ID	State	IPv4 CIDR	IPv6 CIDR
JMuthunayakeVPC	vpc-02278419292a0355e	Available	10.0.0.0/16	-
-	vpc-067519668879ff636	Available	172.31.0.0/16	-

Details for JMuthunayakeVPC:

- VPC ID: vpc-02278419292a0355e
- State: Available
- DNS hostnames: Disabled
- DNS resolution: Enabled
- Tenancy: Default
- DHCP option set: dopt-0c2c34ce86b1e876
- Main route table: rtb-0cb2e4762397b3f02
- Main network ACL: acl-0d31bf45cae738f0
- Default VPC: No
- IPv4 CIDR: 10.0.0.0/16
- IPv6 pool: -
- IPv6 CIDR (Network border group): -
- Network Address Usage metrics: Disabled
- Route 53 Resolver DNS Firewall rule groups: Failed to load rule groups
- Owner ID: 187443111561

Public subnet 1

Name	Subnet ID	State	VPC
Public subnet 2	subnet-0b97054258650dbfc	Available	vpc-02278419292a0355e JM...
Public subnet 1	subnet-0ed07a38ca85614c	Available	vpc-02278419292a0355e JM...

Details for Public subnet 1:

- Subnet ID: subnet-0ed07a38ca85614c
- Subnet ARN: arn:aws:ec2:us-east-1:187443111561:subnet/subnet-0ed07a38ca85614c
- State: Available
- Availability Zone: us-east-1a
- IPv4 CIDR: 10.0.3.0/24
- Available IPv4 addresses: 250
- Network border group: us-east-1
- Route table: rtb-0cb2e4762397b3f02
- Network ACL: acl-0d31bf45cae738f0
- VPC: vpc-02278419292a0355e | JMuthunayakeVPC
- Auto-assign IPv6 address: No
- Auto-assign customer-owned IPv4 address: No
- Customer-owned IPv4 pool: -
- Auto-assign public IPv4 address: -
- IPv4 CIDR reservations: -
- IPv6 CIDR reservations: -

Public subnet 2

Name	Subnet ID	State	VPC
Public subnet 2	subnet-0b97054258650dbfc	Available	vpc-02278419292a0355e JM...
Public subnet 1	subnet-0ed07a38ca85614c	Available	vpc-02278419292a0355e JM...

Details for Public subnet 2:

- Subnet ID: subnet-0b97054258650dbfc
- Subnet ARN: arn:aws:ec2:us-east-1:187443111561:subnet/subnet-0b97054258650dbfc
- State: Available
- Availability Zone: us-east-1b
- IPv4 CIDR: 10.0.4.0/24
- Available IPv4 addresses: 250
- Network border group: us-east-1
- Route table: rtb-0cb2e4762397b3f02
- Network ACL: acl-0d31bf45cae738f0
- VPC: vpc-02278419292a0355e | JMuthunayakeVPC
- Auto-assign IPv6 address: No
- Auto-assign customer-owned IPv4 address: No
- Customer-owned IPv4 pool: -
- Auto-assign public IPv4 address: -
- IPv4 CIDR reservations: -
- IPv6 CIDR reservations: -

Private subnet 1

Name	Subnet ID	State	VPC
Private subnet 1	subnet-004c14f67131ff06	Available	vpc-02278419292a0355e JM...
-	subnet-09020a5567579119	Available	vpc-067519668879ff636

Details for Private subnet 1:

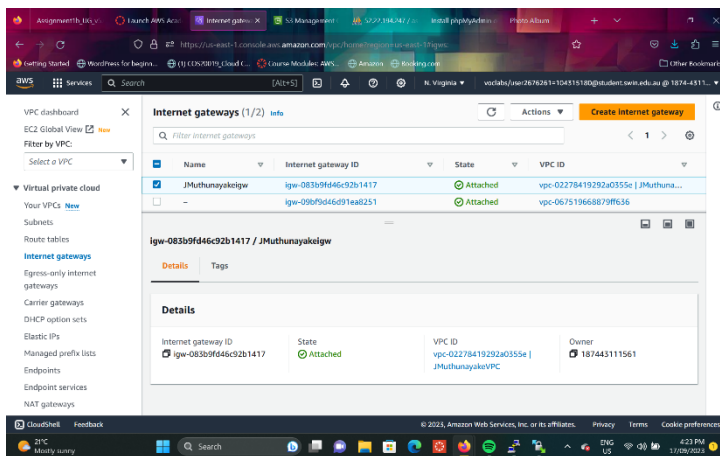
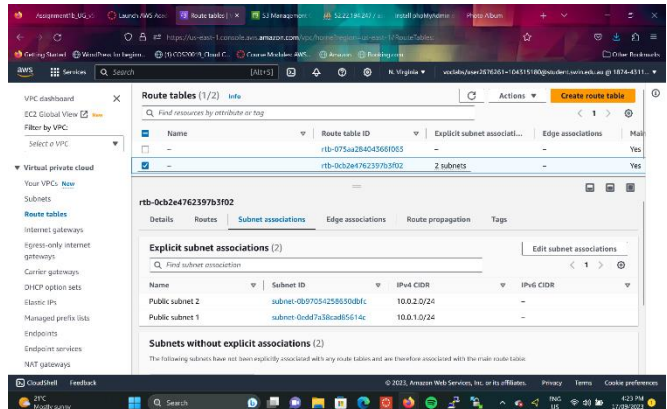
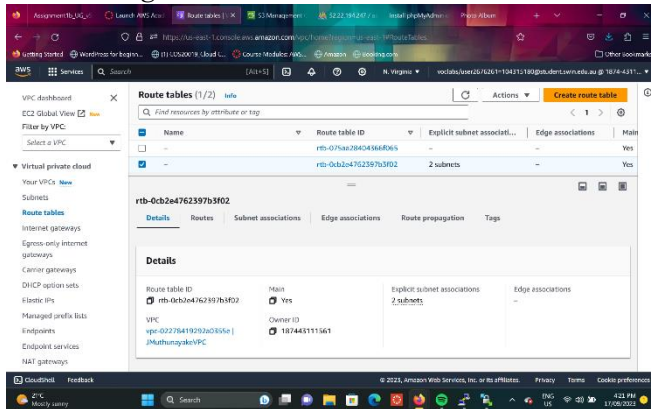
- Subnet ID: subnet-004c14f67131ff06
- Subnet ARN: arn:aws:ec2:us-east-1:187443111561:subnet/subnet-004c14f67131ff06
- State: Available
- Availability Zone: us-east-1a
- IPv4 CIDR: 10.0.3.0/24
- Available IPv4 addresses: 251
- Network border group: us-east-1
- Route table: rtb-0cb2e4762397b3f02
- Network ACL: acl-0d31bf45cae738f0
- VPC: vpc-02278419292a0355e | JMuthunayakeVPC
- Auto-assign IPv6 address: No
- Auto-assign customer-owned IPv4 address: No
- Customer-owned IPv4 pool: -
- Auto-assign public IPv4 address: -
- IPv4 CIDR reservations: -
- IPv6 CIDR reservations: -

Private subnet 2

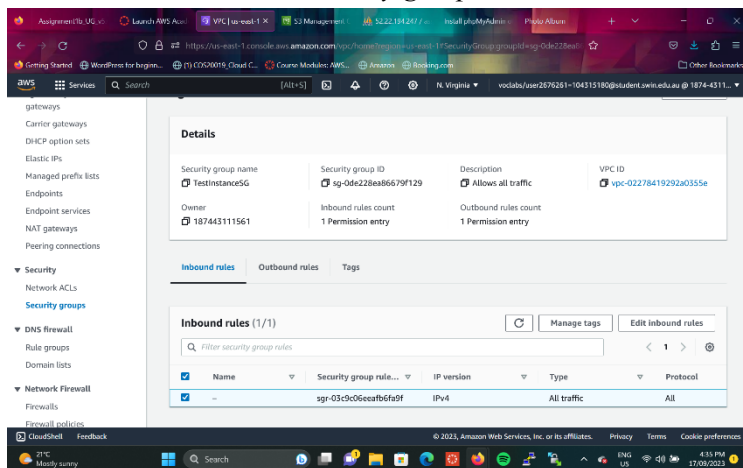
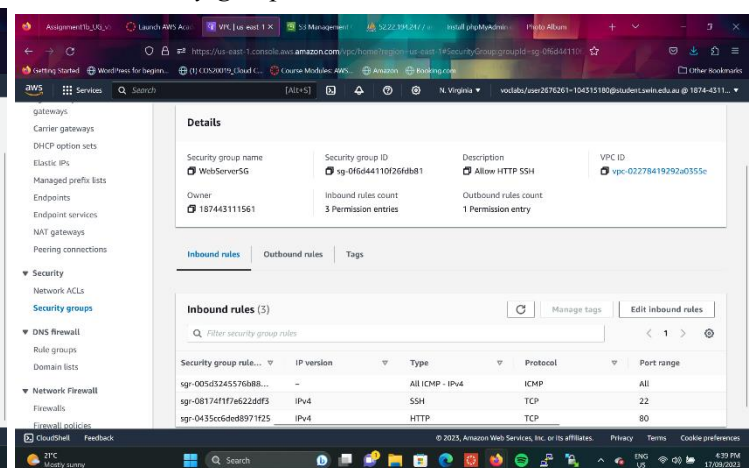
Name	Subnet ID	State	VPC
Private subnet 2	subnet-025f0a796547ab	Available	vpc-067519668879ff636
-	subnet-029db263a0a652a0	Available	vpc-02278419292a0355e JM...

Details for Private subnet 2:

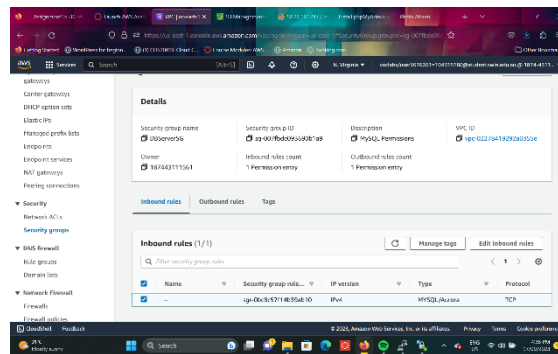
- Subnet ID: subnet-025f0a796547ab
- Subnet ARN: arn:aws:ec2:us-east-1:187443111561:subnet/subnet-025f0a796547ab
- State: Available
- Availability Zone: us-east-1b
- IPv4 CIDR: 10.0.4.0/24
- Available IPv4 addresses: 250
- Network border group: us-east-1
- Route table: rtb-0cb2e4762397b3f02
- Network ACL: acl-0d31bf45cae738f0
- VPC: vpc-02278419292a0355e | JMuthunayakeVPC
- Auto-assign IPv6 address: No
- Auto-assign customer-owned IPv4 address: No
- Customer-owned IPv4 pool: -
- Auto-assign public IPv4 address: -
- IPv4 CIDR reservations: -
- IPv6 CIDR reservations: -

Routing Table -> Subnet associates*Internet Gateway***1.2 Security Groups**

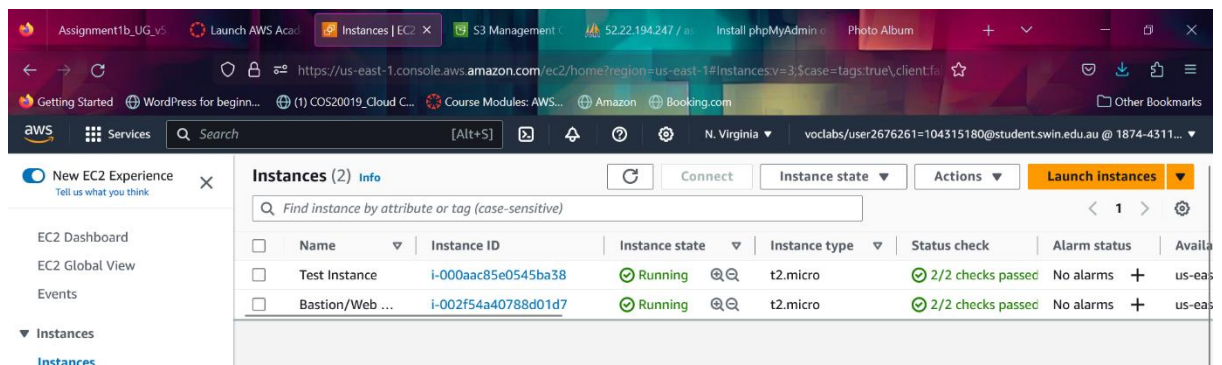
Crated the security groups according to the diagram.

Test Instance Security group*Web Server Security group*

DB Server Security group



1.3 EC2 Virtual Machine



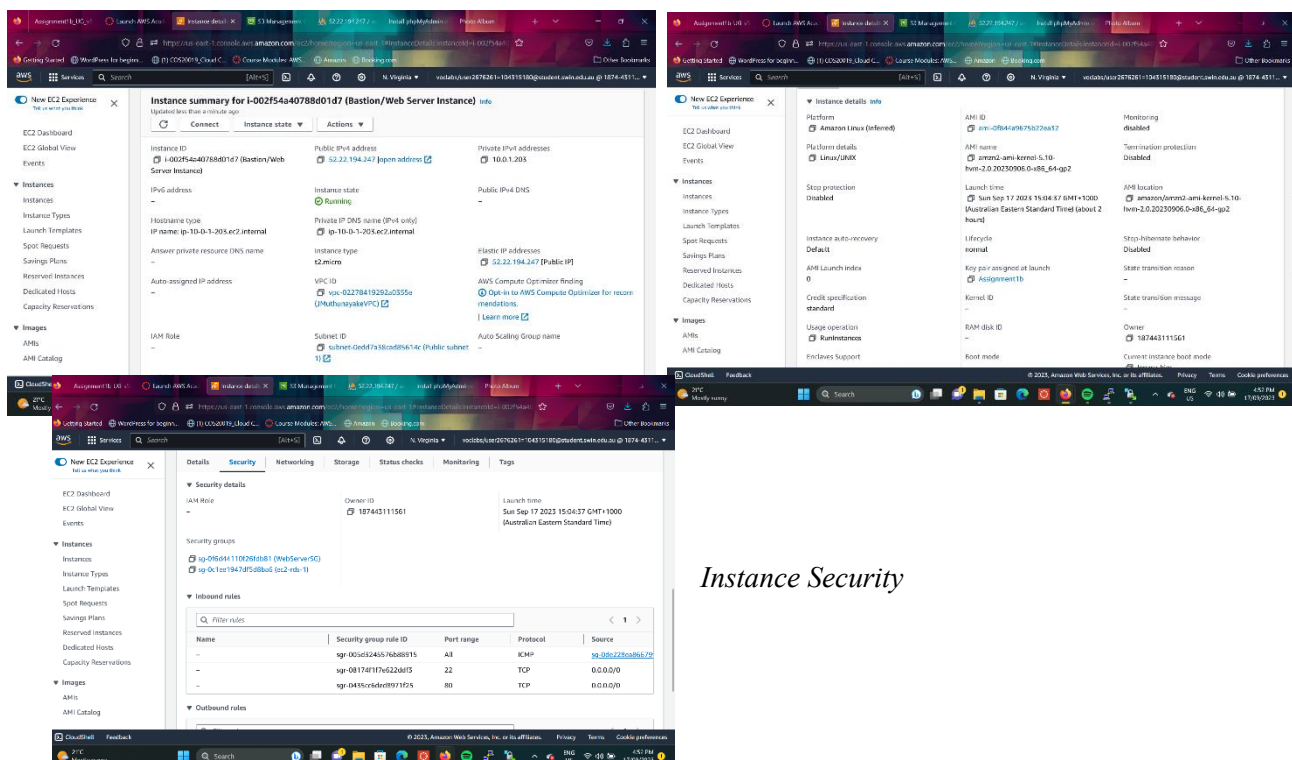
Deployed EC2 Instances

1.3.1 Bastion/Web Server instance

Deployed an EC2 Virtual Machine and configured it. To keep the IP address static, Elastic IP address is used.

Bastion/Web Server Instance summary

Instance details

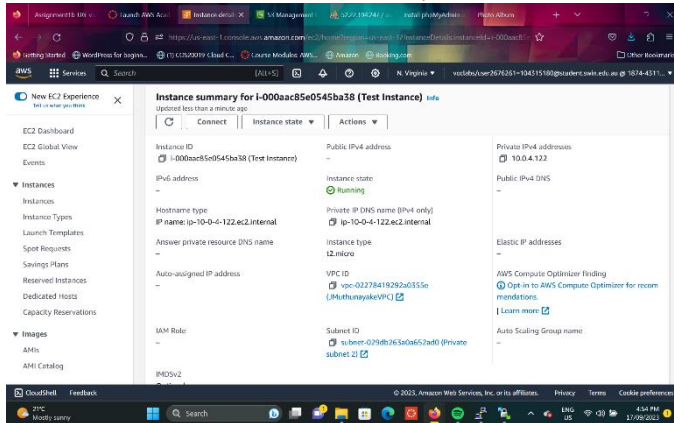


Instance Security

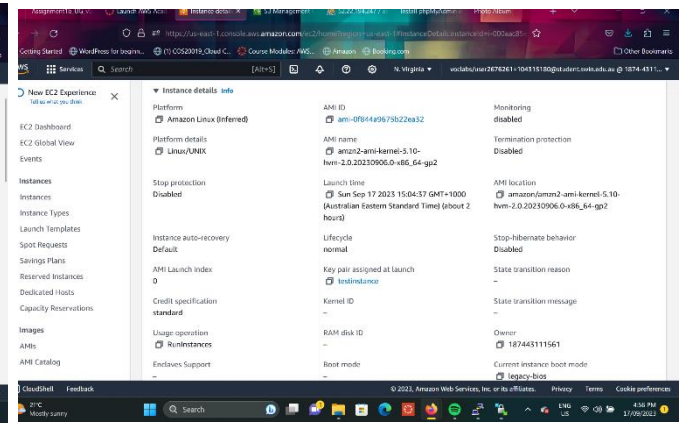
1.3.2 Test Instance

This instance is for demonstration purpose only. I was able to establish a connection (ICMP ping) between test instance and bastion/web server instance.

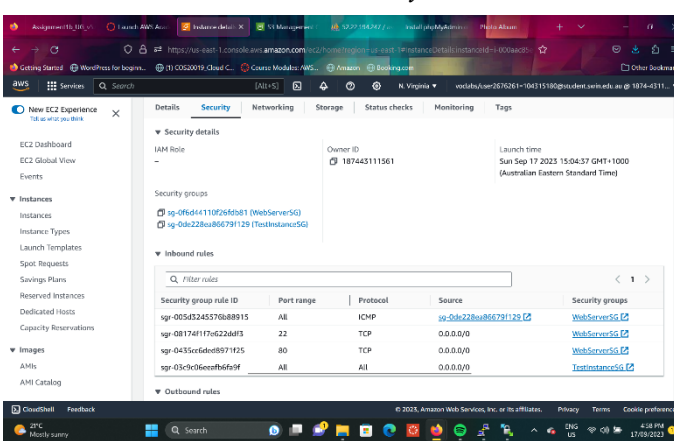
Test Instance Summary



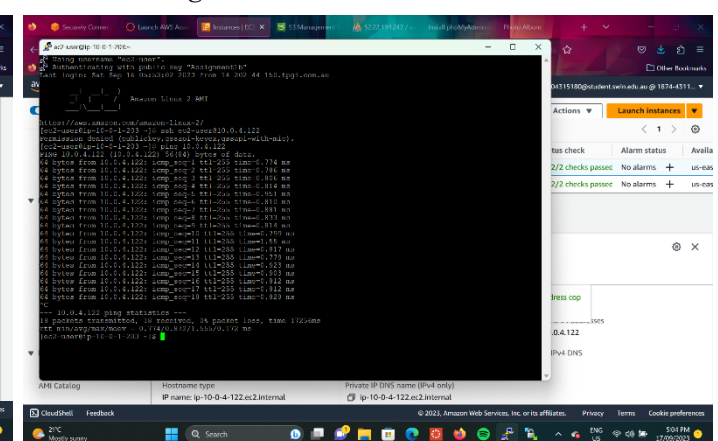
Test Instance Details



Test Instance Security



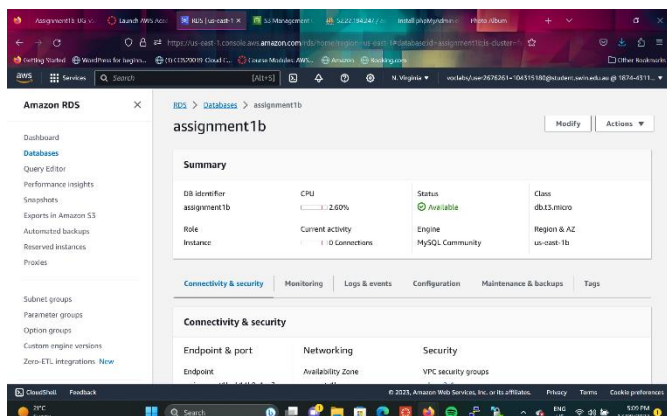
ICMP Ping



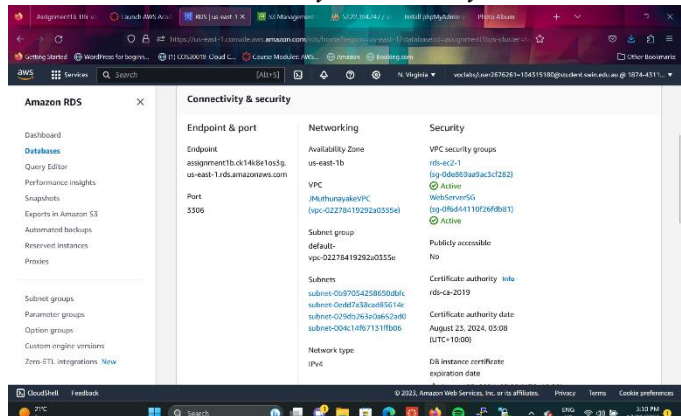
1.4 RDS database instance

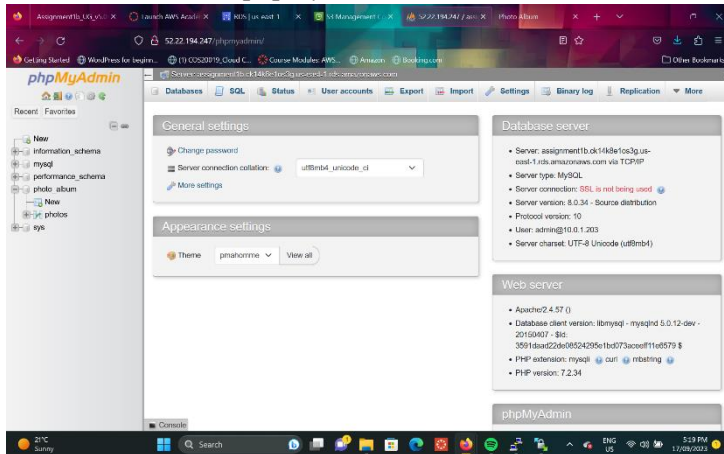
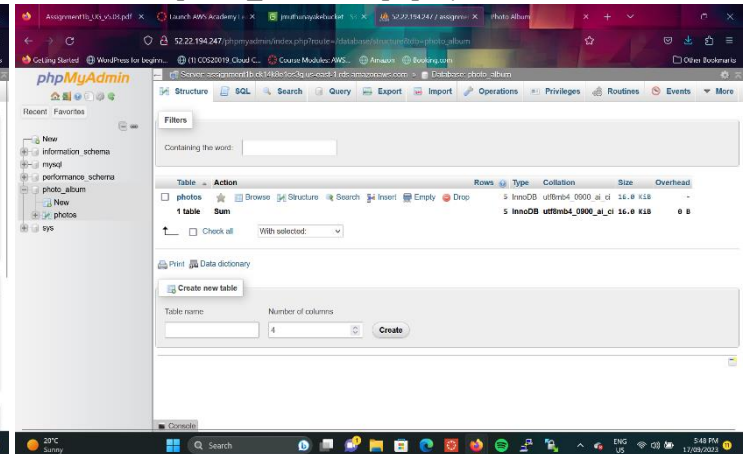
Created “assignment1b” RDS Database reside in private subnet 1 and install phpMyAdmin on EC2. Can access to phpMyAdmin from <http://52.22.194.247/phpmyadmin/> by giving username and password which created while configuring RDS Database.

RDS Database



Database connectivity and security

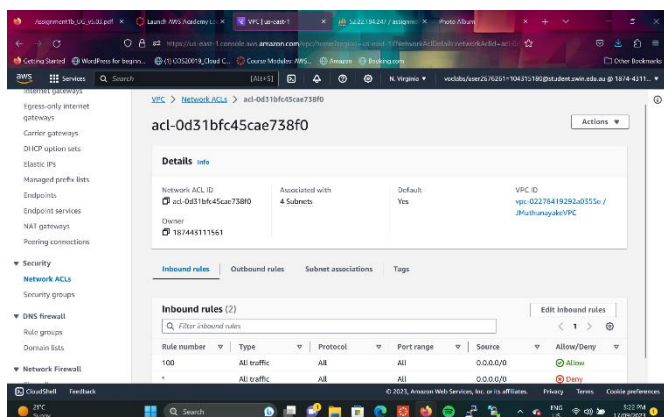
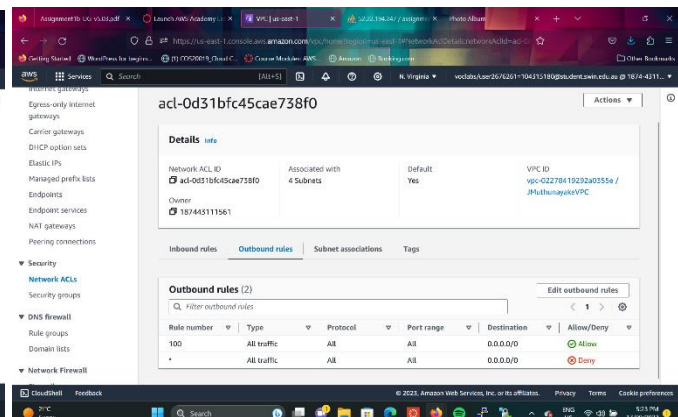


Access phpMyAdmin*Create Database 'photo_album' on phpMyAdmin***1.5 Network ACL**

I tried to configure a Network ACL with inbound rules and outbound rules;

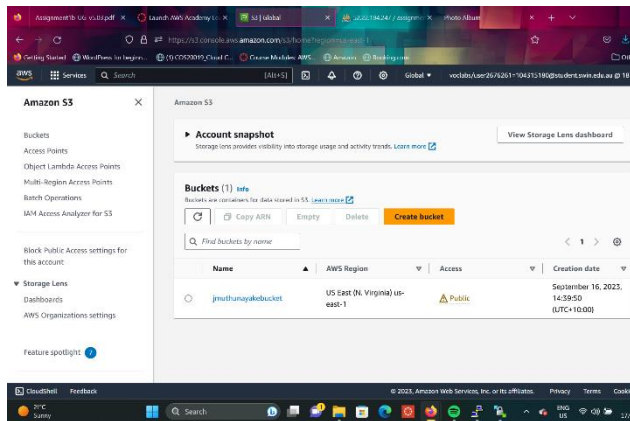
- Rule number 100
 - Type: SSH (22)
 - Source: 0.0.0.0/0 (anywhere)
- Rule number 110
 - Type: ICMP (Echo request)
 - Source: Private subnet 2 (10.0.4.0/24)
- Rule number 120
 - Type: HTTP (80)
 - Source: 0.0.0.0/0 (anywhere)

But after configured these rules I couldn't access to phpMyAdmin or my website. Then I allow All traffic in Network ACL.

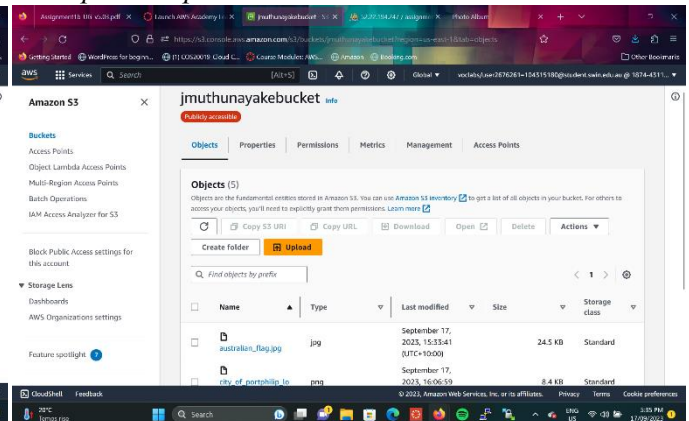
Network ACL Inbound Rules*Network ACL Outbound Rules***2. Functional Requirement of Website****2.1 Photo storage**

Created an S3 photo storage bucket and make it publicly accessible by unblocking public access and editing bucket policy. I have uploaded some photos manually and verified public access by URL.

S3 Bucket



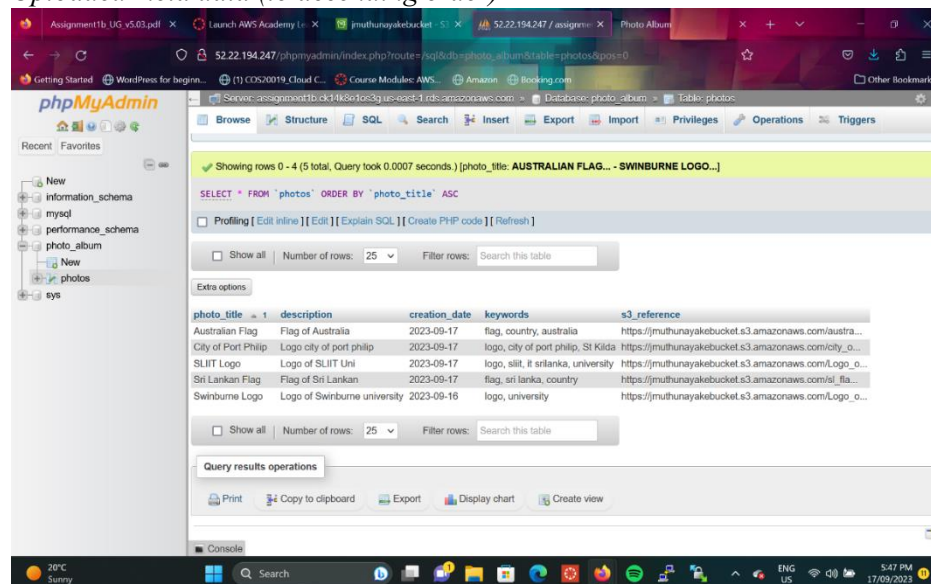
Uploaded photos to bucket



2.2 Photo meta data

Uploaded meta data of photos to phpMyAdmin photos table using SQL queries.

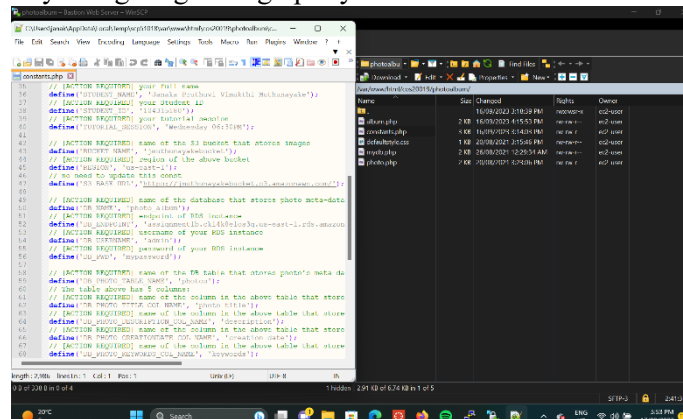
Uploaded meta data (to ascending order)



2.3 Photo album website functionality

I have uploaded the PHP Source codes to server and modified the *constants.php* file. Created a directory on server and verify it by navigating through putty.

Modified constant.php file



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The website can be accessed by <http://52.22.194.247/cos20019/photoalbum/album.php> successfully.





Successfully Implemented Web Page

Student name: Janaka Pruthuvi Vimukthi Muthunayake

Student ID: 104315180

Tutorial session: Wednesday 06:30PM

Uploaded photos:

Photo	Name	Description	Creation date	Keywords
	Swinburne Logo	Logo of Swinburne university	2023-09-16	logo, university
	SLIIT Logo	Logo of SLIIT Uni	2023-09-17	logo, sliit, it srilanka, university
	Australian Flag	Flag of Australia	2023-09-17	flag, country, australia
	Sri Lankan Flag	Flag of Sri Lankan	2023-09-17	flag, sri lanka, country

Assignment 1B Checklist

Submission Checklist

Student Name: Janaka Pruthuvi Vimukthi Muthunayake

Student Id: 104315180

Tutorial time: Wednesday 06:30 PM

Date of submission: 17/09/2023

Submit to Canvas:

☒ A PDF document file as specified in the Submission section of the assignment specification.

Marking Scheme

Infrastructure Requirements

- ☒ VPC with 2 public and 2 private subnets
- ☒ Correct Public and Private Routing tables with correct subnet associations
- ☒ Security groups properly configured and attached.
- ☒ Network ACL properly configured and attached.
- ☒ Correct Web server and Test instances running in correct subnets.
- ☒ Database schema as specified.
- ☒ Database running in correct subnets.
- ☒ S3 objects publicly accessible, using proper access policy.

Functional Requirements

- ☒ Album.php page displayed from EC2 Web server
- ☒ Provided URL is persistent (Elastic IP Association)
- ☒ Photos loaded from S3 with matching metadata from RDS
- ☒ Web server instance reachable from Test instance via ICMP

Comments

- Tried to configure Network ACL using inbound and outbound rules, but unfortunately couldn't configure.