COS-20019/Cloud Computing Architecture.
Assignment-1b Report

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Date: 12/04/2025.
Lab - Monday 4:30 - 6:30, Room: BA411.

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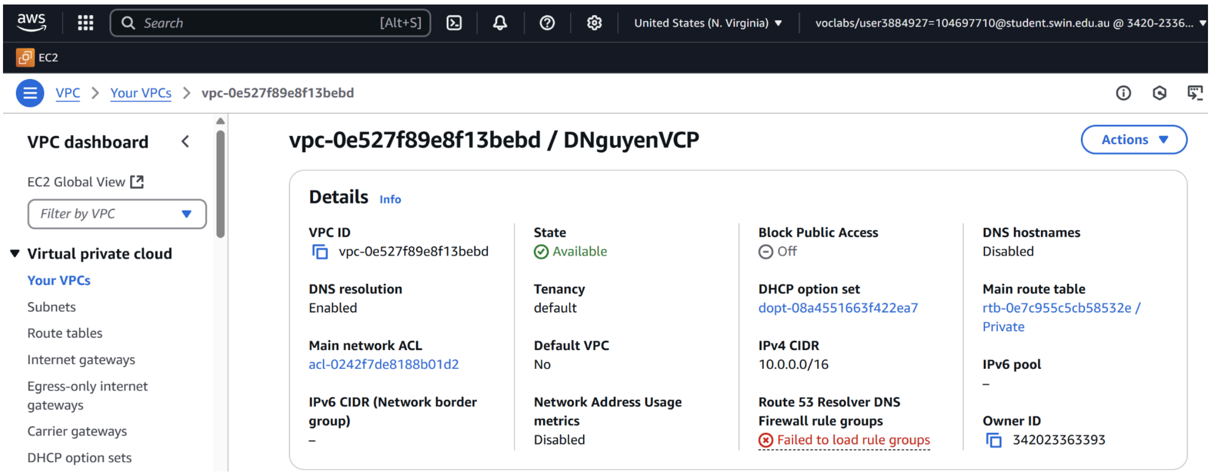
1. Overview:

In this assignment, we will build a secure Virtual Private Cloud (VPC) using subnets, routing tables, and security groups. In addition, we provide regulated access to and from this VPC via an internet gateway. We adapt the given PHP code to create a website that keeps metadata for photographs uploaded to Amazon S3 in a MySQL database served by Amazon RDS. We next deploy and test this website using an Apache web server running on an Amazon Elastic Compute Cloud (EC2) virtual machine instance. Finally, we improve security by creating a Network Access Control List (ACL) for the public subnet that houses our server. In this report, I explain the steps that I took, along with pointing out the problems during my work on Assignment 1b.

2. Infrastructure deployment:

For the first stage, we had to build a VPC with our initials and place it in the (us-east-1). The VPC serves as a container for the subnets and routing tables, which link to the main page.



vpc-0e527f89e8f13bebd / DNguyenVCP

Details Info

VPC ID
vpc-0e527f89e8f13bebd

State
Available

Block Public Access
Off

DNS hostnames
Disabled

DNS resolution
Enabled

Tenancy
default

DHCP option set
dopt-08a4551663f422ea7

Main route table
rtb-0e7c955c5cb58532e / Private

Main network ACL
acl-0242f7de8188b01d2

Default VPC
No

IPv4 CIDR
10.0.0.0/16

IPv6 pool
–

IPv6 CIDR (Network border group)
–

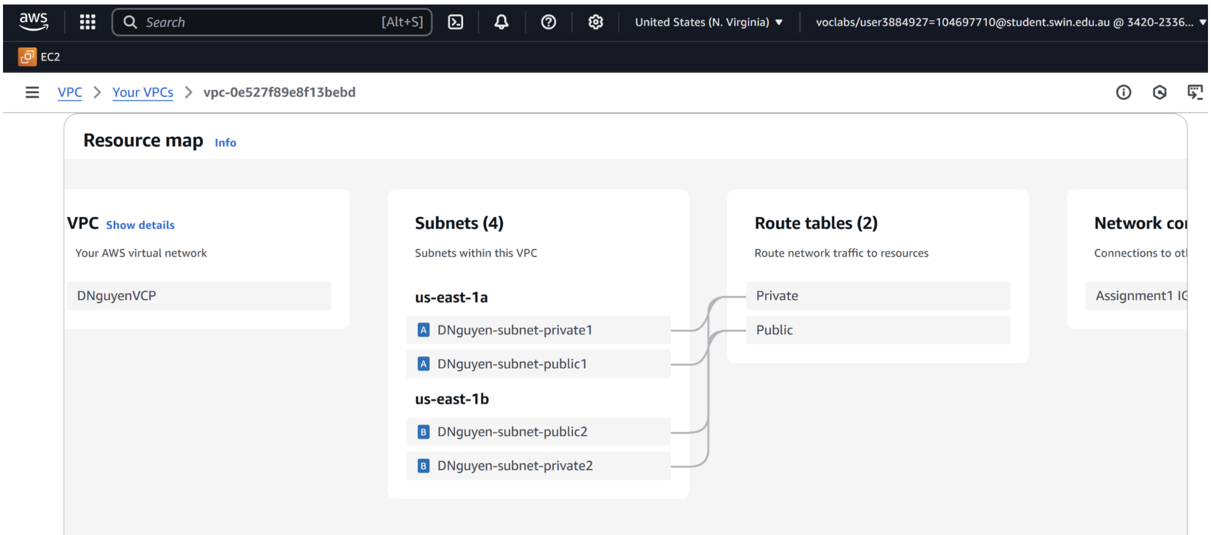
Network Address Usage metrics
Disabled

Route 53 Resolver DNS Firewall rule groups
Failed to load rule groups

Owner ID
342023363393

Fig.1: VCP creation details.

As illustrated in Figure 2, there are four subnets: Public and Private Subnet 1, which are created in the US-East-1a server, and Public and Private Subnet 2, which are created in the US-East-1b server. The private subnets in this VPC are used for testing and are only available via the Public 2 subnet, which is connected to Public 1 in the public route table and serves as the primary connection to the Internet. Furthermore, as seen in Figure 3, each subnet has been allocated the CIDR specified in the rubric.



aws
Search [Alt+S]
United States (N. Virginia) ▼
voclabs/user3884927=104697710@student.swin.edu.au @ 3420-2336... ▼
EC2
VPC > Your VPCs > vpc-0e527f89e8f13bebd
Resource map Info

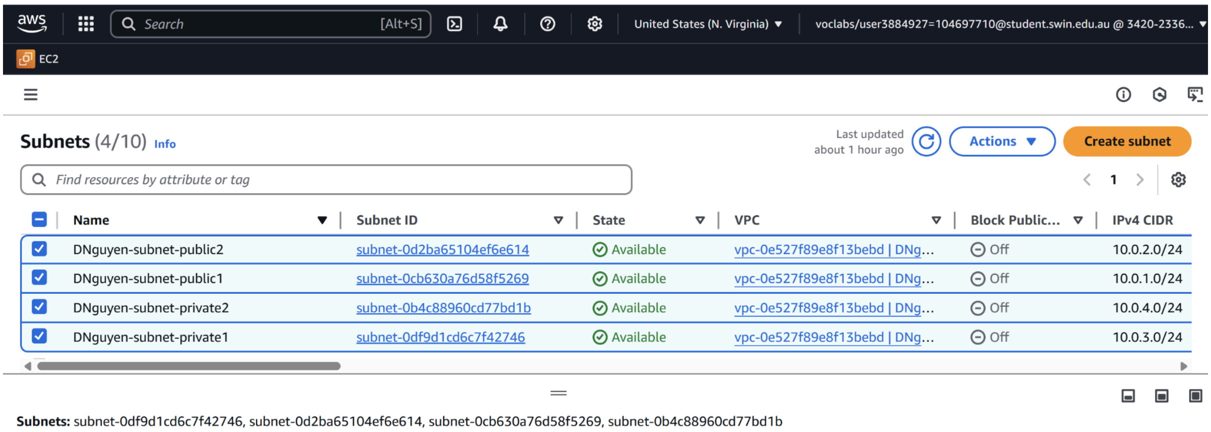
VPC Show details
Your AWS virtual network
DNguyenVCP

Subnets (4)
Subnets within this VPC
us-east-1a
A DNguyen-subnet-private1
A DNguyen-subnet-public1
us-east-1b
B DNguyen-subnet-public2
B DNguyen-subnet-private2

Route tables (2)
Route network traffic to resources
Private
Public

Network co
Connections to ot
Assignment1 IG

Fig.2: Resource Map of VCP.



aws
Search [Alt+S]
United States (N. Virginia) ▼
voclabs/user3884927=104697710@student.swin.edu.au @ 3420-2336... ▼
EC2
Last updated about 1 hour ago
Actions ▼
Create subnet
Find resources by attribute or tag
1

Subnets (4/10) Info

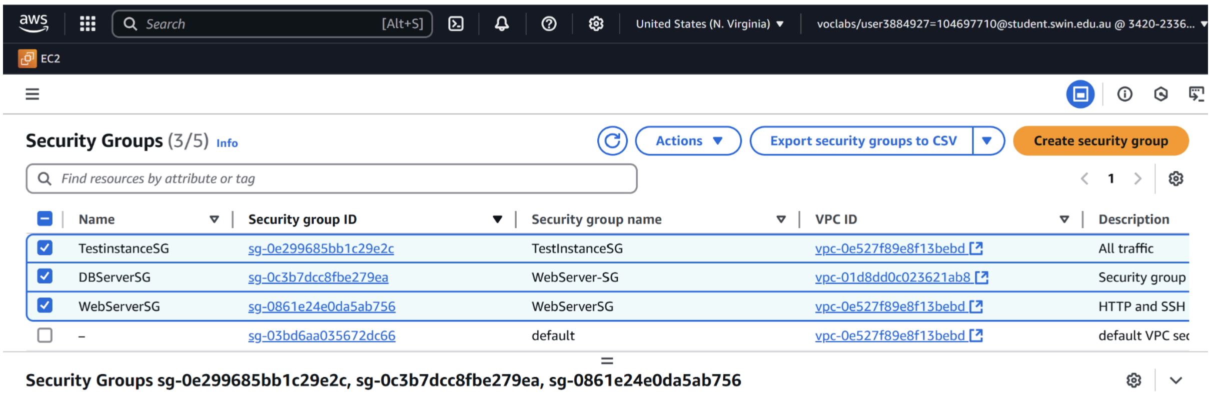
☐	Name	Subnet ID	State	VPC	Block Public...	IPv4 CIDR
☑	DNguyen-subnet-public2	subnet-0d2ba65104ef6e614	✓ Available	vpc-0e527f89e8f13bebd | DNg...	⊖ Off	10.0.2.0/24
☑	DNguyen-subnet-public1	subnet-0cb630a76d58f5269	✓ Available	vpc-0e527f89e8f13bebd | DNg...	⊖ Off	10.0.1.0/24
☑	DNguyen-subnet-private2	subnet-0b4c88960cd77bd1b	✓ Available	vpc-0e527f89e8f13bebd | DNg...	⊖ Off	10.0.4.0/24
☑	DNguyen-subnet-private1	subnet-0df9d1cd6c7f42746	✓ Available	vpc-0e527f89e8f13bebd | DNg...	⊖ Off	10.0.3.0/24

Subnets: subnet-0df9d1cd6c7f42746, subnet-0d2ba65104ef6e614, subnet-0cb630a76d58f5269, subnet-0b4c88960cd77bd1b

Fig.3: List of subnets and their allocated IPV4 CIDR.

3. Security Groups:

Figure 4 shows four security groups, each associated with a distinct subnet and serving a different function. The WebServerSg security group is assigned to the Web Server instance, and it only enables SSH and HTTP traffic, as well as all ICMP IPv4 traffic, as seen in Figure 5. Similarly, the TestInstanceSG allows all traffic and allocates it to the Test Instance for backend testing. Figure 4 demonstrates that the ICMP security only enables ICMP traffic from the TestServerSG, which serves as a link between the Web and Test server instances. The DBServerSG only enables MySQL traffic from WebServerSg, limiting access to the database via the Web server.

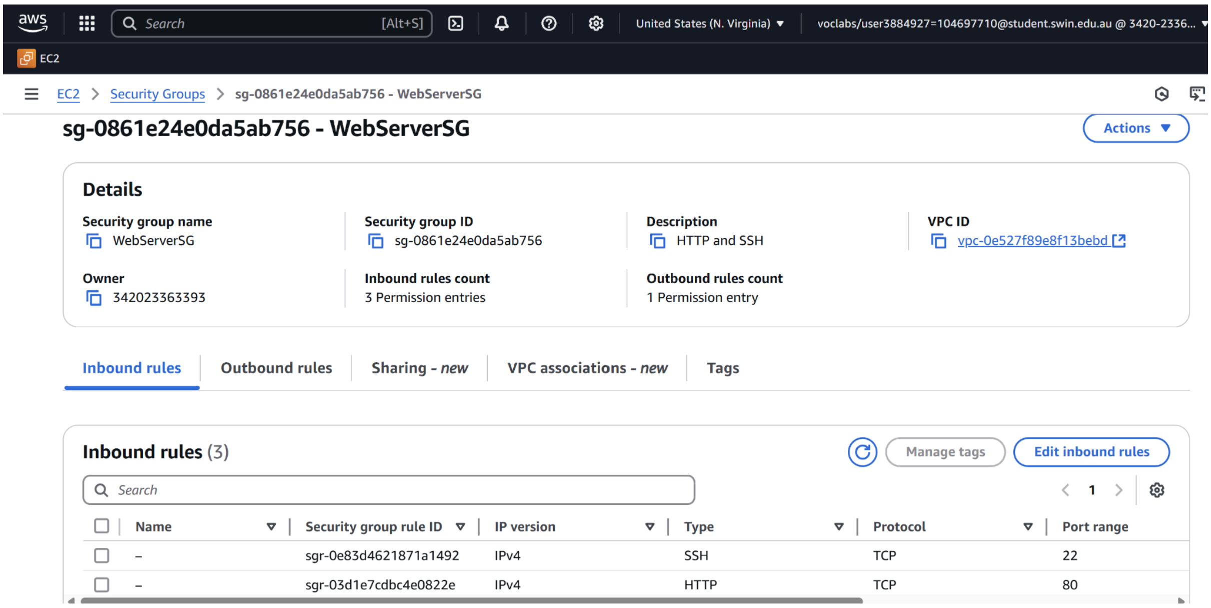

aws
Search [Alt+S]
United States (N. Virginia) ▼
voclabs/user3884927=104697710@student.swin.edu.au @ 3420-2336...
EC2
Actions ▼
Export security groups to CSV
Create security group
Find resources by attribute or tag

Security Groups (3/5) Info

	Name	Security group ID	Security group name	VPC ID	Description
☑	TestinstanceSG	sg-0e299685bb1c29e2c	TestInstanceSG	vpc-0e527f89e8f13bebd	All traffic
☑	DBServerSG	sg-0c3b7dcc8fbe279ea	WebServer-SG	vpc-01d8dd0c023621ab8	Security group
☑	WebServerSG	sg-0861e24e0da5ab756	WebServerSG	vpc-0e527f89e8f13bebd	HTTP and SSH
□	–	sg-03bd6aa035672dc66	default	vpc-0e527f89e8f13bebd	default VPC sec

Security Groups sg-0e299685bb1c29e2c, sg-0c3b7dcc8fbe279ea, sg-0861e24e0da5ab756

Fig.4: Security groups with their corresponding subnets.


aws
Search [Alt+S]
United States (N. Virginia) ▼
voclabs/user3884927=104697710@student.swin.edu.au @ 3420-2336...
EC2
EC2 > Security Groups > sg-0861e24e0da5ab756 - WebServerSG
Actions ▼
Inbound rules
Outbound rules
Sharing - new
VPC associations - new
Tags
Manage tags
Edit inbound rules
Search

sg-0861e24e0da5ab756 - WebServerSG

Details

Security group name: WebServerSG

Security group ID: sg-0861e24e0da5ab756

Description: HTTP and SSH

VPC ID: vpc-0e527f89e8f13bebd

Owner: 342023363393

Inbound rules count: 3 Permission entries

Outbound rules count: 1 Permission entry

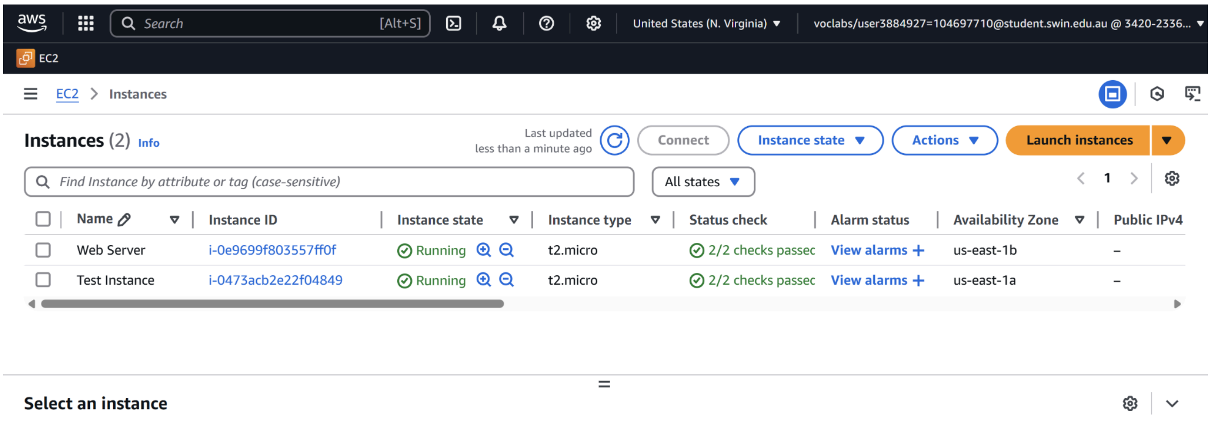
Inbound rules (3)

	Name	Security group rule ID	IP version	Type	Protocol	Port range
□	–	sgr-0e83d4621871a1492	IPv4	SSH	TCP	22
□	–	sgr-03d1e7cdbc4e0822e	IPv4	HTTP	TCP	80

Fig.5: WebServerSG inbound rules.

4. EC2 Instances:

This instance will host the "Photo Album" web application and serve as a bastion host for SSH into the Test instance, which is located on a private subnet. Furthermore, the public IP addresses in AWS are constantly changing.

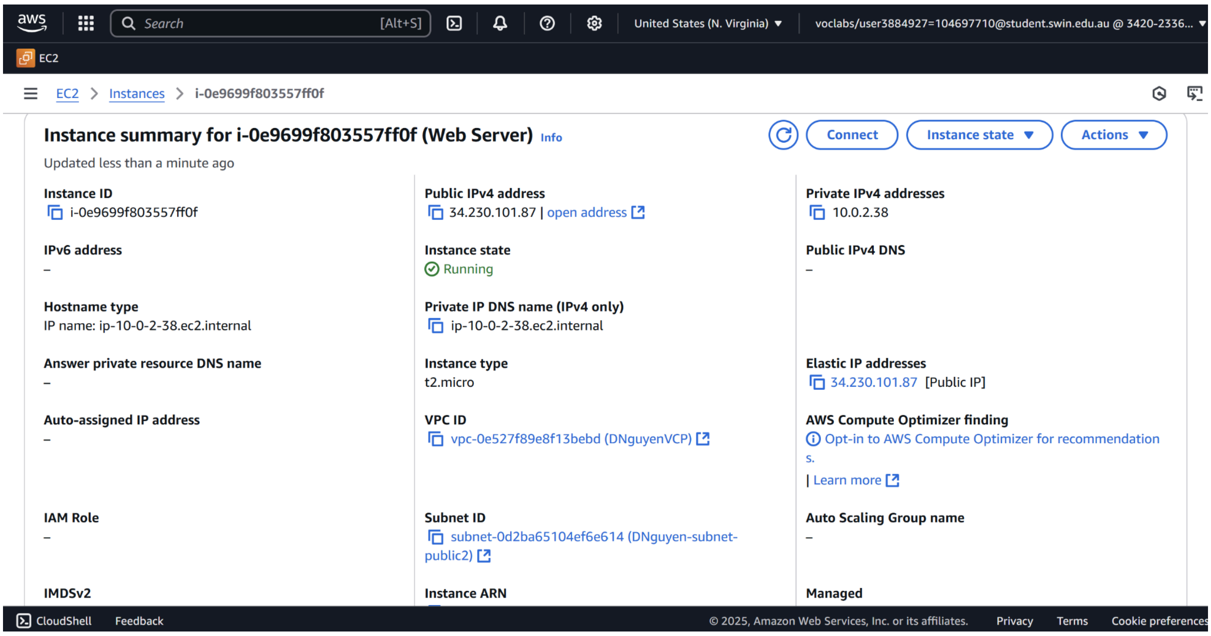


aws
Search [Alt+S]
United States (N. Virginia) ▼
voclabs/user3884927=104697710@student.swin.edu.au @ 3420-2336... ▼
EC2
EC2 > Instances
Last updated less than a minute ago
Connect
Instance state ▼
Actions ▼
Launch instances ▼
Find Instance by attribute or tag (case-sensitive)
All states ▼
1
Select an instance

Instances (2) Info

□	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4
□	Web Server	i-0e9699f803557ff0f	✓ Running	t2.micro	✓ 2/2 checks passec	View alarms +	us-east-1b	–
□	Test Instance	i-0473acb2e22f04849	✓ Running	t2.micro	✓ 2/2 checks passec	View alarms +	us-east-1a	–

Fig.6: 2 Main EC2 instances (WebServer and Test instance).



aws
Search [Alt+S]
United States (N. Virginia) ▼
voclabs/user3884927=104697710@student.swin.edu.au @ 3420-2336... ▼
EC2
EC2 > Instances > i-0e9699f803557ff0f
Connect
Instance state ▼
Actions ▼
CloudShell
Feedback
© 2025, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences

Instance summary for i-0e9699f803557ff0f (Web Server) Info

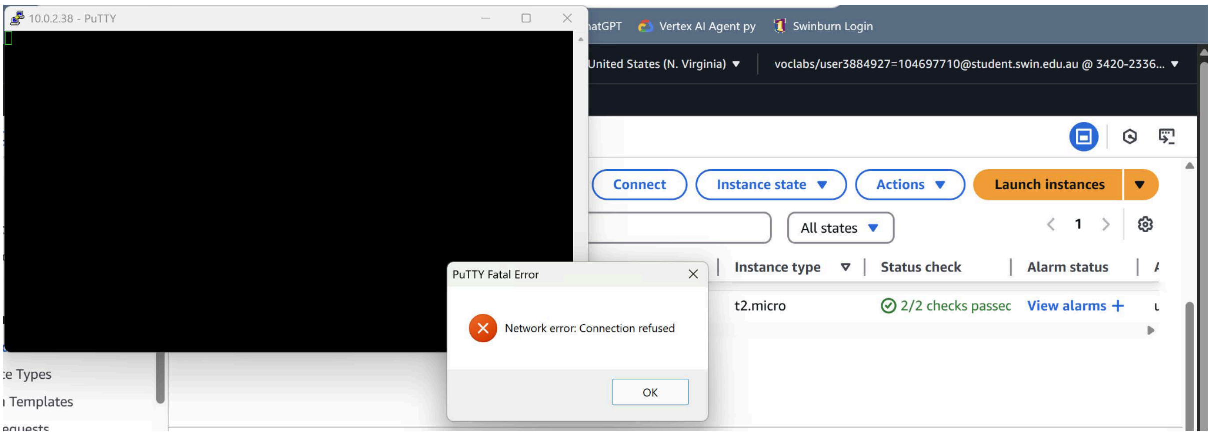
Updated less than a minute ago

Instance ID i-0e9699f803557ff0f	Public IPv4 address 34.230.101.87 | open address	Private IPv4 addresses 10.0.2.38
IPv6 address –	Instance state Running	Public IPv4 DNS –
Hostname type IP name: ip-10-0-2-38.ec2.internal	Private IP DNS name (IPv4 only) ip-10-0-2-38.ec2.internal	
Answer private resource DNS name –	Instance type t2.micro	Elastic IP addresses 34.230.101.87 [Public IP]
Auto-assigned IP address –	VPC ID vpc-0e527f89e8f13bebd (DNguyenVCP)	AWS Compute Optimizer finding Opt-in to AWS Compute Optimizer for recommendations. | Learn more
IAM Role –	Subnet ID subnet-0d2ba65104ef6e614 (DNguyen-subnet-public2)	Auto Scaling Group name –
IMDSv2	Instance ARN	Managed

Fig.7: WebServer instance.

5. The Problem:

For the next part of assignment 1b, I need to connect my EC2 to Putty, WinSCP and Apache. However, I wasn't able to connect to Putty for some reason. I have followed the same guideline of "Connect to your Linux EC2 instance using Putty" from assignment 1a. Yet, as you can see in the figure below, Putty shows an error of "Connection refused". I have checked over my work 3 times, along with terminating instances a couple of times and launching new ones just to make sure that the problem is in the instances, but even launching new instances correctly and perfectly, Putty still shows the error. Since I couldn't connect to Putty means I couldn't connect to WinSCP or Apache. So I have to stop my work as I didn't know where the problem lies. I will consult with my tutor on my next lab to see if he and I can figure out the problem.



PuTTY Fatal Error

Network error: Connection refused

OK

Fig.8: Putty issue.