YOOBEE

COLLEGE OF CREATIVE INNOVATION

Programme

Diploma in Cloud Engineering
(120 Credits)

Course

DCE03: Open-source Integration
(Level 7, 30 Credits, Version 1.3)

Assessment Title

Research and Implement a Practical Demonstration (Amazon Linux)
DCE-03 | Assessment-3.1

Weighting within course

50%

Objective:

- The objective of Task 1 is to research and implement an open-source cloud-based Linux infrastructure for deploying a web server on Amazon Web Services (AWS). The implementation will focus on creating a cloud-ready environment using multiple Virtual Cloud Platform (VPC) peering connections. The aim is to ensure a high level of security while facilitating seamless communication between VPCs, thereby maintaining a secure, scalable, and efficient cloud infrastructure for the web server.
- The objective of Task 2 is to test and implement the cloud-based infrastructure set up in Task 1 before moving it into a production environment. This will involve maintaining the security and high availability of the website content using SAMBA Server-Client concepts on the Amazon Linux operating system platform. The task will ensure that the virtualized infrastructure is properly configured for file sharing, security, and optimal availability of website resources.
- These tasks aim to both design and verify the deployment of secure, scalable, and efficient infrastructure using AWS cloud services, ensuring the infrastructure is ready for production deployment with a focus on security and high availability.

Course Learning Outcomes (LOs) covered:

LO1: Implement and manage an open-source infrastructure to facilitate a cloud-ready environment.

LO2: Discuss and develop strategies to mitigate security risks of open source and cloud-based components.

Qualification Graduate Profile Outcomes (GPOs) covered:

GPO1: Demonstrate advanced knowledge of a range of technologies in a cloud-based environment that meet organisational needs for storage, compute, and networking.

GPO3: Critically assess risks for security and isolation in a cloud environment to meet organisational requirements and use specialised knowledge to implement and manage multi tenancy**.**

Assessment Tasks to Learning Outcome and GPOs Mapping:

LO	GPO	Task	Task Component	Weighting
LO1: Implement and manage an open-source infrastructure to facilitate a cloud-ready environment. **LO2:** Discuss and develop strategies to mitigate security risks of open source and cloud-based components.	GPO1 GPO3	Task 1:Understanding Open-Source Infrastructure.	**Task 1:** Research and Implement Scenario-Based Practical Demonstration-1.	50%
		Task 2: Discuss and develop strategies to mitigate the security risks of open source	**Task 2:** Discuss and Implement Scenario-Based Practical Demonstration-2.	50%
			Total	100%

Recommended Tasks Completion Timeline:

Week	Progress	Submission
Week 14	Assessment is to be released, and the student will start working (Task 1)	
Week 15	Assessment is to be released, and the student will start working (Task 2)	
Week 16	Recommend completing Assessment (Task 1, 2) by the end of the week	**Assessment Due**

Grading:

The final grade will be determined by the score achieved in this assessment based on the following table. Should a second or third attempt be required the maximum contribution toward the overall mark for the tasks that required a second or third assessment attempt is 50%. **A late submission is considered a second attempt, so the contribution will be capped at 50%.**

To pass this assessment, you must meet the requirements of each of the learning outcomes (irrespective of the numerical grade awarded).

Grade	Range
A +	Meet all course requirements, range (90—100%)
A	Meet all course requirements, range (85—89%)
A -	Meet all course requirements, range (80—84%)
B +	Meet all course requirements, range (75—79%)
B	Meet all course requirements, range (70—74%)
B -	Meet all course requirements, range (65—69%)
C +	Meet all course requirements, range (60—64%)
C	Meet all course requirements, range (55—59%)
C -	Meet all course requirements, range (50—54%)
D	Did not meet all course requirements, range (40—49%)
E	Did not meet all course requirements, mark range (0—39%)

Candidate's Assessment Instructions:

- This assessment is an open-book activity; you can use your course and review notes, and offline or online resources, such as textbooks or online journals.
- You can always ask your online tutor if you need further explanation if the instructions are unclear.
- Your work should not be plagiarised. Plagiarism includes copying material without acknowledging it, copying from another student, getting another person to help you with your assessment, using material from commercial essays or assignment services, or using AI to create the answers.
- The purpose of this assessment is to assess your knowledge. In the event Yoobee suspects collusion, this will be addressed. For more information on plagiarism, please refer to the Student Handbook.
- Submit your completed assessment online in the correct space provided.
- Marks and feedback will be returned within 15 days of the submission date.
- By completing and submitting an assessment, you are authenticating that the work is original and does not violate plagiarism or copyright law. Authenticity is checked where any breaches of academic integrity are suspected. Please refer to the Student Handbook for further information.

Submission Instructions:

Submit **one PDF report** document to the LMS by the specified due date.

Your report should:

- Include your name and ID number
- Include the AWS account login details, a cover page, and a report index for verification purposes in your report.
- Use a standard citation format if external sources are referenced
- Clearly label tasks and subtasks
- Include screenshots of each practical step in sequence, naming and numbering the screenshots. Screenshots must display the relevant settings or outputs for each step.
- Include your answers to the assessment questions for each task, describing choices, configurations, and learned insights with an appropriate practical and theoretical understanding.

Assessment Tasks

Task 1: Research and implement open-source infrastructure to facilitate a cloud-ready environment. Practical Demonstration-1.

Scenario:1

Yoobee School of Technology's IT department decided to deploy their web-based content using an open-source platform, using Amazon Linux provided by the Amazon cloud service's ready environment. You need to design your Virtual Private Cloud (VPC), Elastic Compute Cloud (EC2-Linux Instance), and require subcomponents of these services, including CIDR, IP address, Internet Gateway, Route Table, etc., to deploy a sample website.

1. Delete the default virtual private cloud (VPC) provided by Amazon and create two VPCs in different regions using your own AWS Management console account login and allocate different CIDR blocks in both VPCs to prepare a range of IP addresses. **(Take screenshots as Appendix-1 submission image 1.1 to 1.4)**

2. Deploy one EC2 Linux instance in VPC1 with public IP enabled and a second EC2 Linux instance in VPC2 with Private IP enabled in the Availability zone where subnets are associated. Also, attached required subcomponents, including Internet Gateway, Subnets, Route Table, etc., to access EC2 Linux instances outside of the Virtual Private Cloud. **(Take screenshots as Appendix-1 submission image 2.1 and 2.2)**

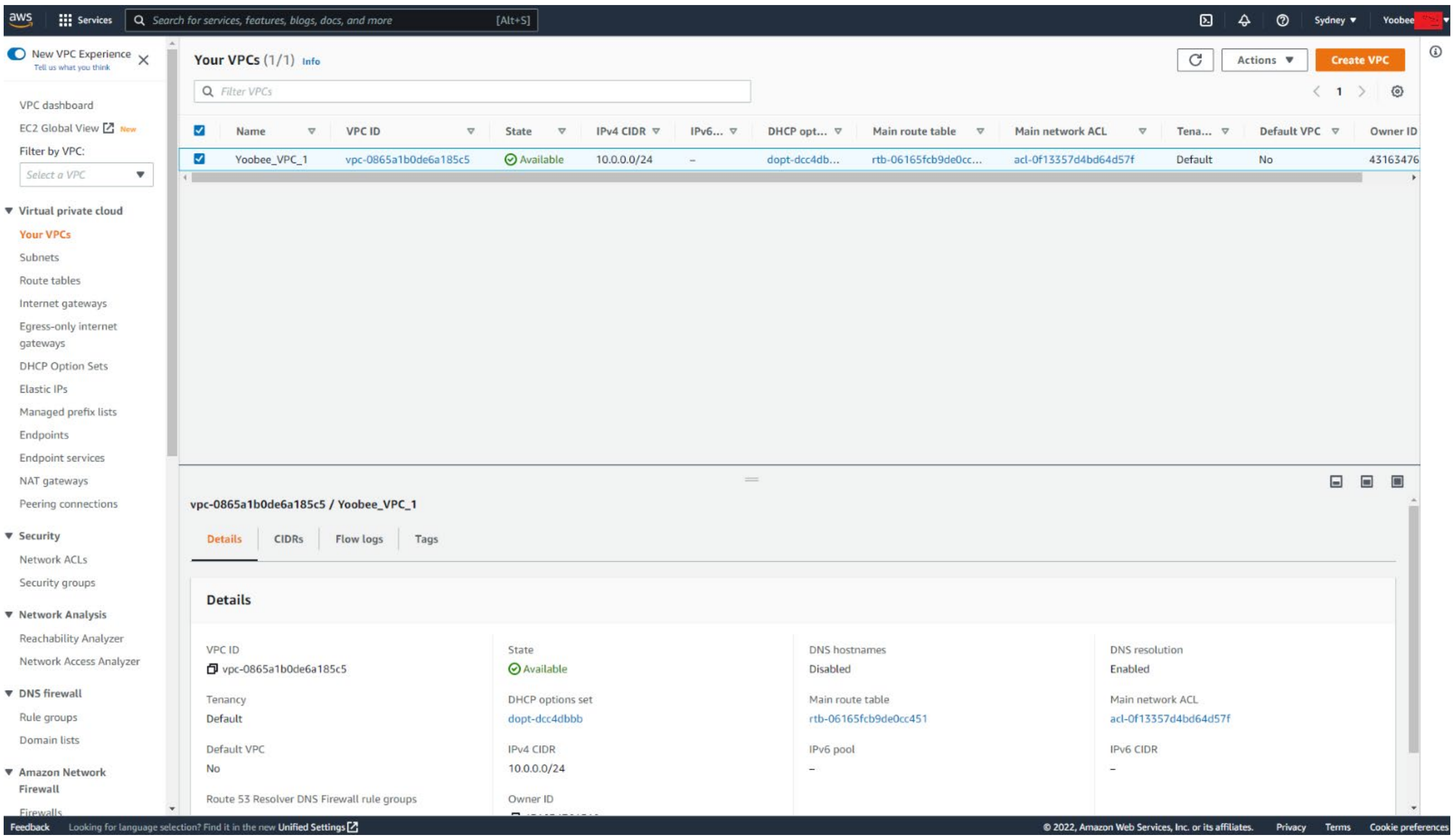
3. Connect VPC1 Linux instance using the SSH port from your local system or laptop while your VPC2 Linux instance is not accessible. Explain why? In your report. **(Take screenshots as Appendix-1 submission image 3.1 to 3.3)**

4. Create VPC peering by knowing the other VPC account ID using the acceptor/requester process. Edit the subnet in both VPC's vice versa, in the route table using the gateway as VPC peering. **(Take screenshots as Appendix-1 submission image 4.1 to 4.3)**

5. **Write a brief report in step-by-step practical implementation, including all images as shown in Appendix 1**.

Appendix-1

Submission Image-1.1: Yoobee_VPC_1 in Sydney Region



Your VPCs (1/1) Info

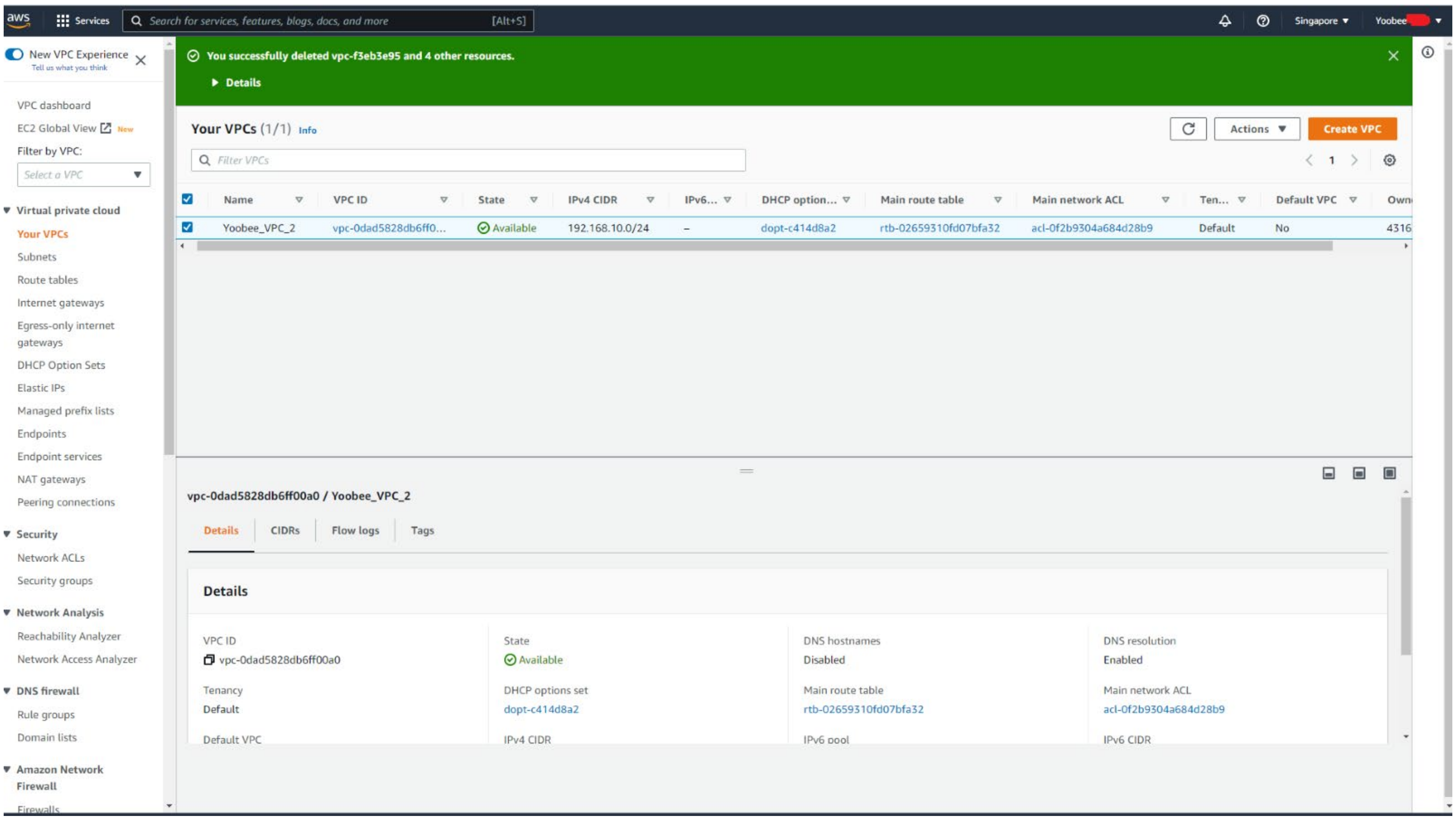
☑	Name	VPC ID	State	IPv4 CIDR	IPv6...	DHCP opt...	Main route table	Main network ACL	Tena...	Default VPC	Owner ID
☑	Yoobee_VPC_1	vpc-0865a1b0de6a185c5	Available	10.0.0.0/24	–	dopt-dcc4db...	rtb-06165fcb9de0cc...	acl-0f13357d4bd64d57f	Default	No	43163476

vpc-0865a1b0de6a185c5 / Yoobee_VPC_1

Details

VPC ID: vpc-0865a1b0de6a185c5
State: Available
DNS hostnames: Disabled
DNS resolution: Enabled
Tenancy: Default
DHCP options set: dopt-dcc4dbbb
Main route table: rtb-06165fcb9de0cc451
Main network ACL: acl-0f13357d4bd64d57f
Default VPC: No
IPv4 CIDR: 10.0.0.0/24
IPv6 pool: –
IPv6 CIDR: –
Route 53 Resolver DNS Firewall rule groups
Owner ID

Submission Image-1.2: Yoobee_VPC_2 in Singapore Region



You successfully deleted vpc-f3eb3e95 and 4 other resources.

▶ Details

Your VPCs (1/1) Info

☑	Name	VPC ID	State	IPv4 CIDR	IPv6...	DHCP option...	Main route table	Main network ACL	Ten...	Default VPC	Own
☑	Yoobee_VPC_2	vpc-0dad5828db6ff0...	✓ Available	192.168.10.0/24	–	dopt-c414d8a2	rtb-02659310fd07bfa32	acl-0f2b9304a684d28b9	Default	No	4316

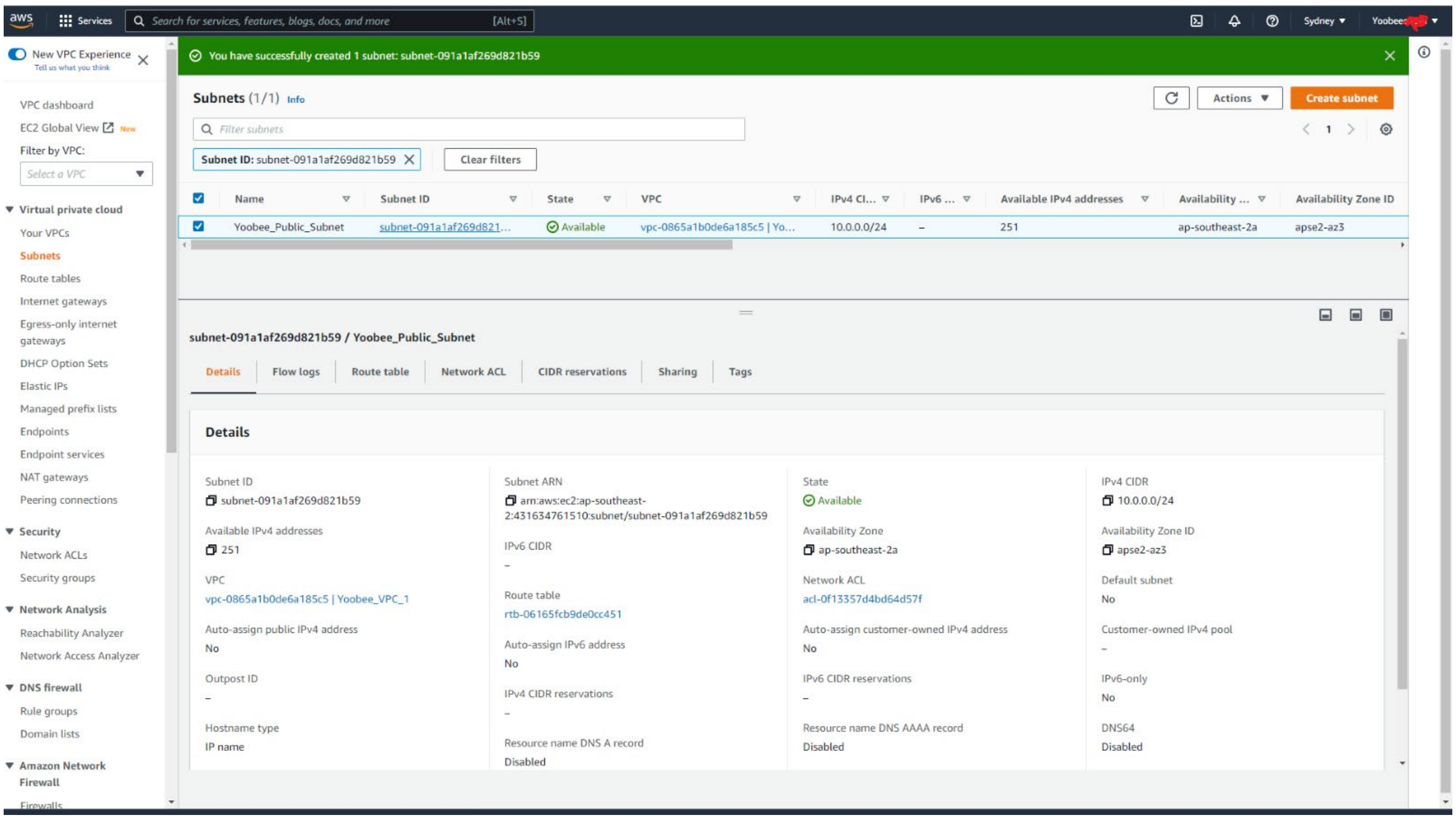
vpc-0dad5828db6ff00a0 / Yoobee_VPC_2

Details | CIDRs | Flow logs | Tags

Details

VPC ID vpc-0dad5828db6ff00a0	State ✓ Available	DNS hostnames Disabled	DNS resolution Enabled
Tenancy Default	DHCP options set dopt-c414d8a2	Main route table rtb-02659310fd07bfa32	Main network ACL acl-0f2b9304a684d28b9
Default VPC	IPv4 CIDR	IPv6 pool	IPv6 CIDR

Submission Image-1.3: Yoobee_VPC _Sydney Subnet



You have successfully created 1 subnet: subnet-091a1af269d821b59

Subnets (1/1) Info

Subnet ID: subnet-091a1af269d821b59

☑	Name	Subnet ID	State	VPC	IPv4 CI...	IPv6 ...	Available IPv4 addresses	Availability ...	Availability Zone ID
☑	Yoobee_Public_Subnet	subnet-091a1af269d821...	✓ Available	vpc-0865a1b0de6a185c5 | Yo...	10.0.0.0/24	–	251	ap-southeast-2a	apse2-az3

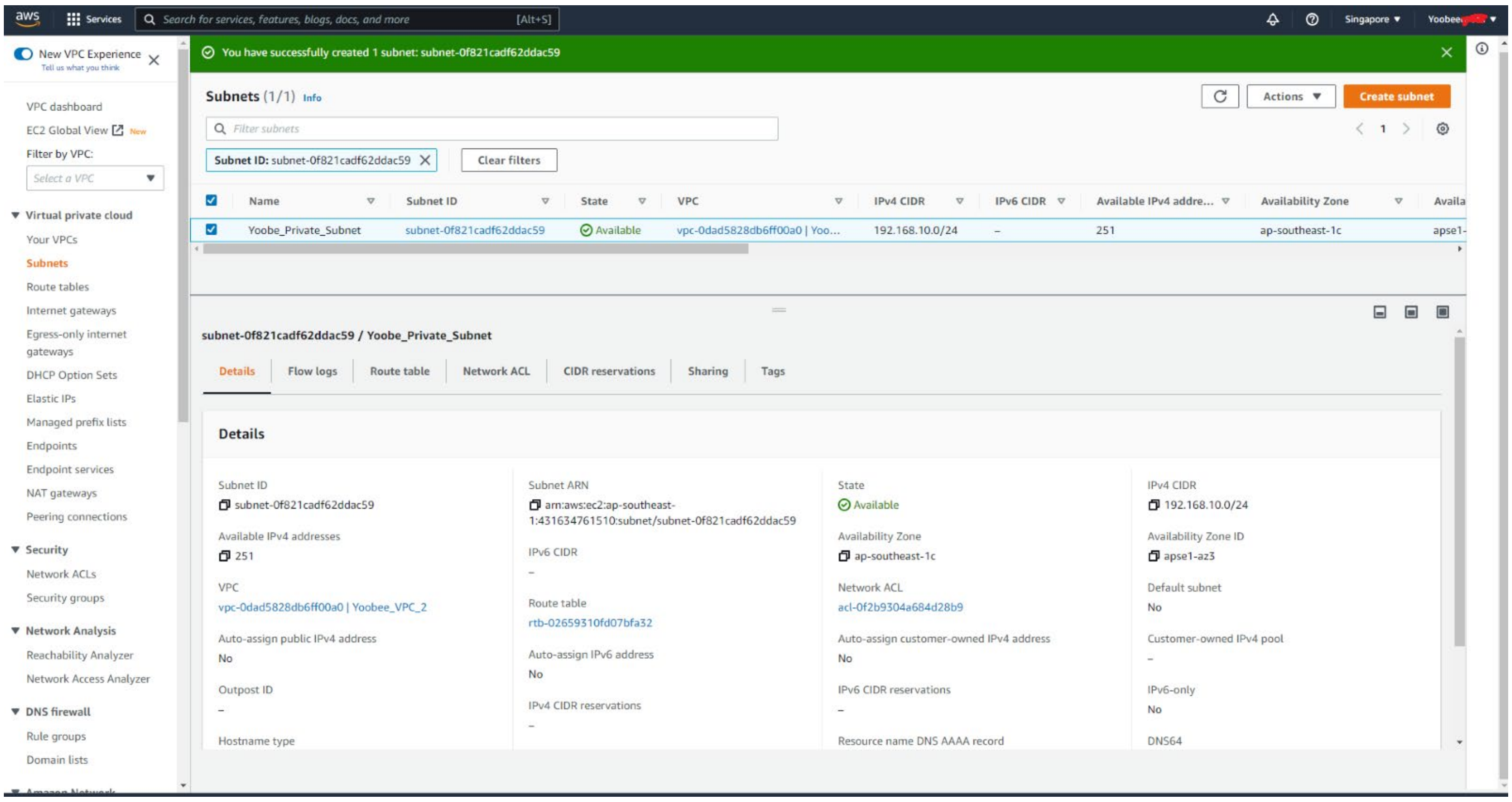
subnet-091a1af269d821b59 / Yoobee_Public_Subnet

Details | Flow logs | Route table | Network ACL | CIDR reservations | Sharing | Tags

Details

Subnet ID subnet-091a1af269d821b59	Subnet ARN arn:aws:ec2:ap-southeast-2:431634761510:subnet/subnet-091a1af269d821b59	State ✓ Available	IPv4 CIDR 10.0.0.0/24
Available IPv4 addresses 251	IPv6 CIDR –	Availability Zone ap-southeast-2a	Availability Zone ID apse2-az3
VPC vpc-0865a1b0de6a185c5 | Yoobee_VPC_1	Route table rtb-06165fcb9de0cc451	Network ACL acl-0f13357d4bd64d57f	Default subnet No
Auto-assign public IPv4 address No	Auto-assign IPv6 address No	Auto-assign customer-owned IPv4 address No	Customer-owned IPv4 pool –
Outpost ID –	IPv4 CIDR reservations –	IPv6 CIDR reservations –	IPv6-only No
Hostname type IP name	Resource name DNS A record Disabled	Resource name DNS AAAA record Disabled	DNS64 Disabled

Submission Image-1.4: Yoobee_VPC _Singapore Subnet



You have successfully created 1 subnet: subnet-0f821cadf62ddac59

Subnets (1/1) Info

Subnet ID: subnet-0f821cadf62ddac59

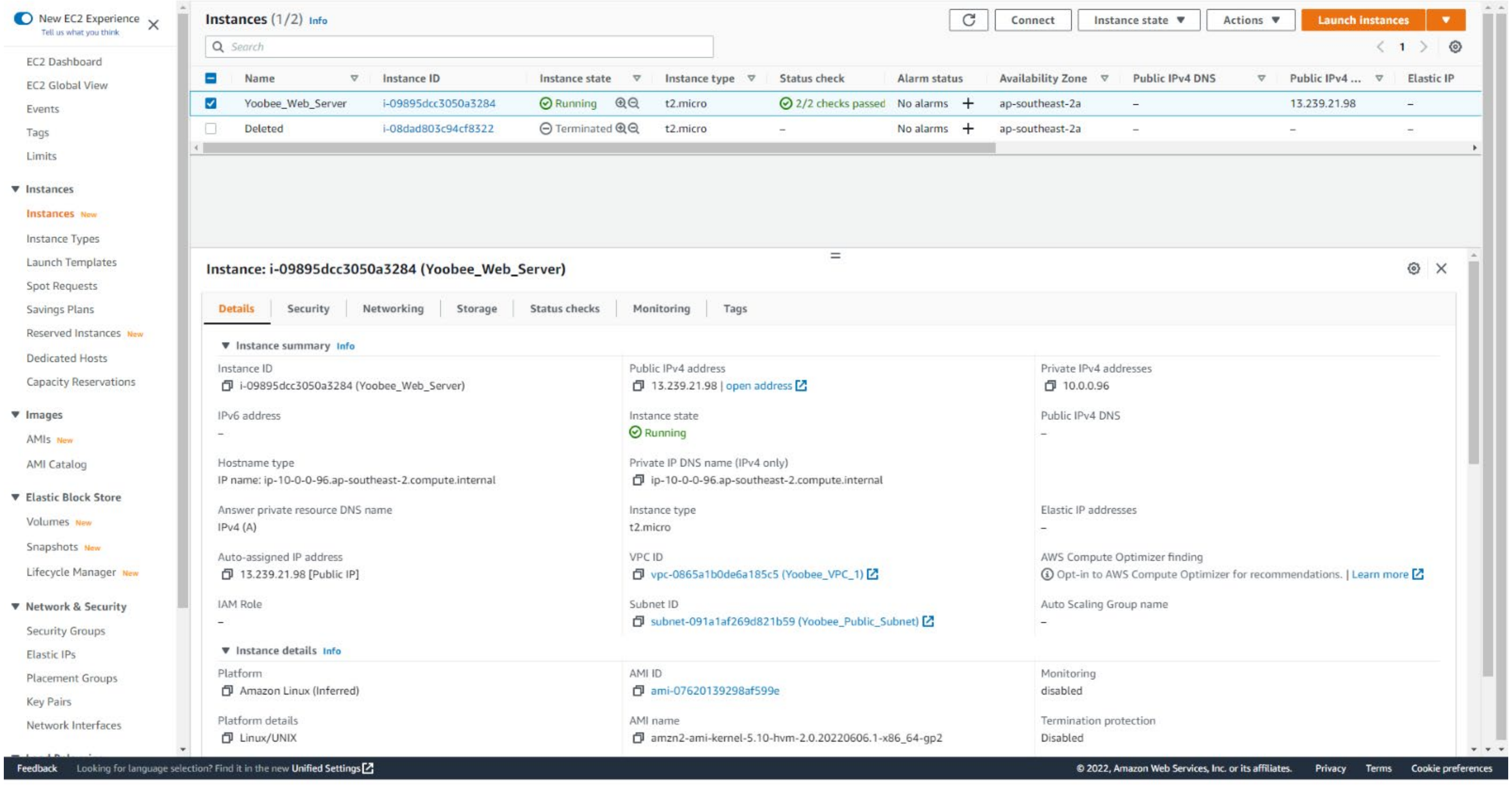
☑	Name	Subnet ID	State	VPC	IPv4 CIDR	IPv6 CIDR	Available IPv4 addre...	Availability Zone	Availa
☑	Yoobe_Private_Subnet	subnet-0f821cadf62ddac59	✓ Available	vpc-0dad5828db6ff00a0 | Yoo...	192.168.10.0/24	–	251	ap-southeast-1c	apse1-

subnet-0f821cadf62ddac59 / Yoobe_Private_Subnet

Details

Subnet ID subnet-0f821cadf62ddac59	Subnet ARN arn:aws:ec2:ap-southeast-1:431634761510:subnet/subnet-0f821cadf62ddac59	State ✓ Available	IPv4 CIDR 192.168.10.0/24
Available IPv4 addresses 251	IPv6 CIDR –	Availability Zone ap-southeast-1c	Availability Zone ID apse1-az3
VPC vpc-0dad5828db6ff00a0 | Yoobee_VPC_2	Route table rtb-02659310fd07bfa32	Network ACL acl-0f2b9304a684d28b9	Default subnet No
Auto-assign public IPv4 address No	Auto-assign IPv6 address No	Auto-assign customer-owned IPv4 address No	Customer-owned IPv4 pool –
Outpost ID –	IPv4 CIDR reservations –	IPv6 CIDR reservations –	IPv6-only No
Hostname type		Resource name DNS AAAA record	DNS64

Submission Image-2.1: Yoobee_Web_Server EC2 Linux instance at the Sydney region



Instances (1/2) Info

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
☑	Yoobee_Web_Server	i-09895dcc3050a3284	✓ Running	t2.micro	✓ 2/2 checks passed	No alarms +	ap-southeast-2a	–	13.239.21.98	–
□	Deleted	i-08dad803c94cf8322	⊖ Terminated	t2.micro	–	No alarms +	ap-southeast-2a	–	–	–

Instance: i-09895dcc3050a3284 (Yoobee_Web_Server)

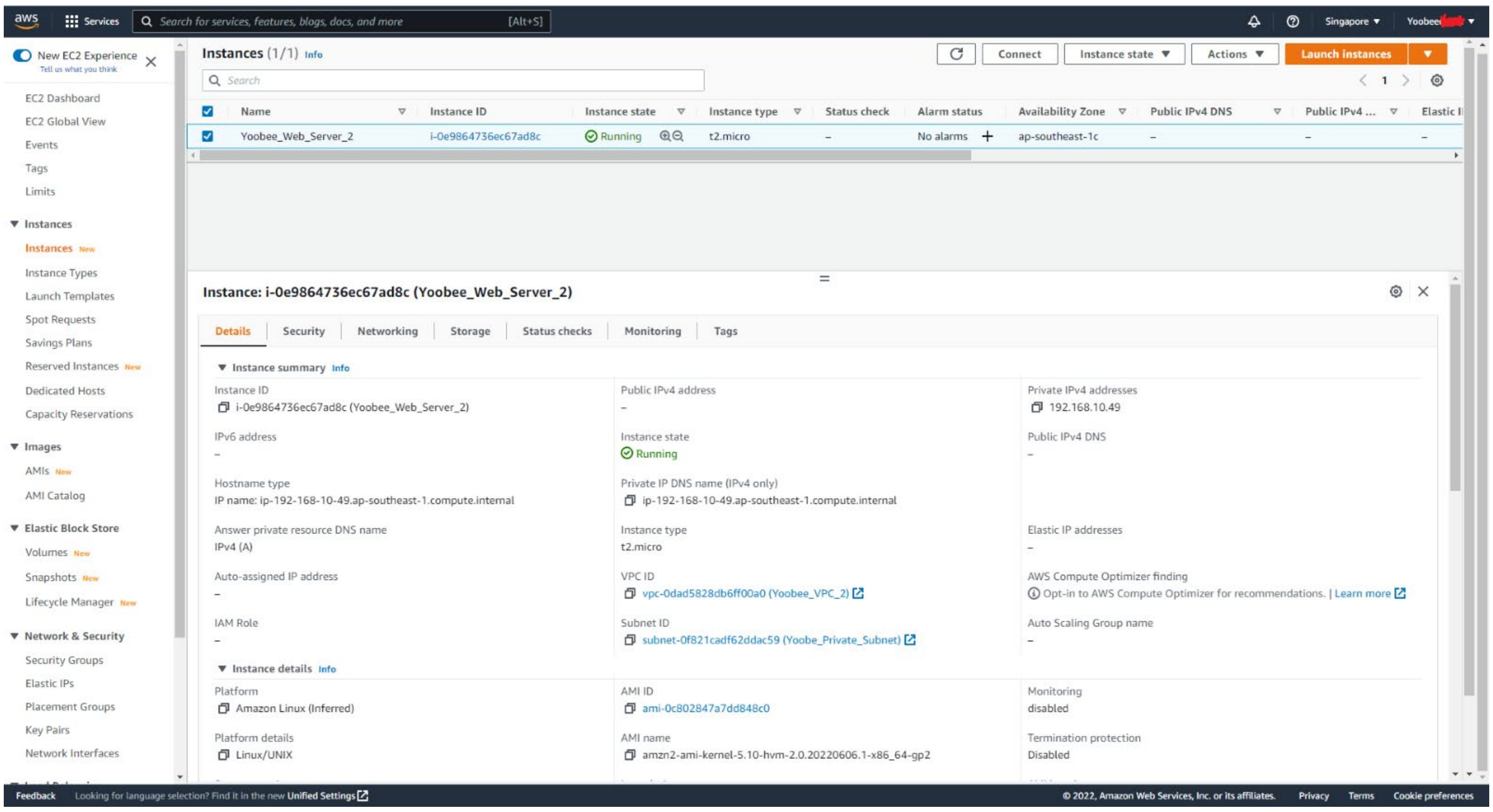
▼ Instance summary Info

Instance ID i-09895dcc3050a3284 (Yoobee_Web_Server)	Public IPv4 address 13.239.21.98 | open address	Private IPv4 addresses 10.0.0.96
IPv6 address –	Instance state ✓ Running	Public IPv4 DNS –
Hostname type IP name: ip-10-0-0-96.ap-southeast-2.compute.internal	Private IP DNS name (IPv4 only) ip-10-0-0-96.ap-southeast-2.compute.internal	
Answer private resource DNS name IPv4 (A)	Instance type t2.micro	Elastic IP addresses –
Auto-assigned IP address 13.239.21.98 [Public IP]	VPC ID vpc-0865a1b0de6a185c5 (Yoobee_VPC_1)	AWS Compute Optimizer finding Opt-in to AWS Compute Optimizer for recommendations. | Learn more
IAM Role –	Subnet ID subnet-091a1af269d821b59 (Yoobee_Public_Subnet)	Auto Scaling Group name –

▼ Instance details Info

Platform Amazon Linux (Inferred)	AMI ID ami-07620139298af599e	Monitoring disabled
Platform details Linux/UNIX	AMI name amzn2-ami-kernel-5.10-hvm-2.0.20220606.1-x86_64-gp2	Termination protection Disabled

Submission Image-2.2: Yoobee_Web_Server_2 EC2 Linux instance at the Singapore region



Instances (1/1) Info

☑	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic I
☑	Yoobee_Web_Server_2	i-0e9864736ec67ad8c	Running	t2.micro	–	No alarms +	ap-southeast-1c	–	–	–

Instance: i-0e9864736ec67ad8c (Yoobee_Web_Server_2)

▼ Instance summary Info

Instance ID: i-0e9864736ec67ad8c (Yoobee_Web_Server_2)

Public IPv4 address: –

Private IPv4 addresses: 192.168.10.49

IPv6 address: –

Instance state: Running

Public IPv4 DNS: –

Hostname type: IP name: ip-192-168-10-49.ap-southeast-1.compute.internal

Private IP DNS name (IPv4 only): ip-192-168-10-49.ap-southeast-1.compute.internal

Answer private resource DNS name: IPv4 (A)

Instance type: t2.micro

Elastic IP addresses: –

Auto-assigned IP address: –

VPC ID: vpc-0dad5828db6ff00a0 (Yoobee_VPC_2)

AWS Compute Optimizer finding: Opt-in to AWS Compute Optimizer for recommendations. | Learn more

IAM Role: –

Subnet ID: subnet-0f821cadf62ddac59 (Yoobe_Private_Subnet)

Auto Scaling Group name: –

▼ Instance details Info

Platform: Amazon Linux (Inferred)

AMI ID: ami-0c802847a7dd848c0

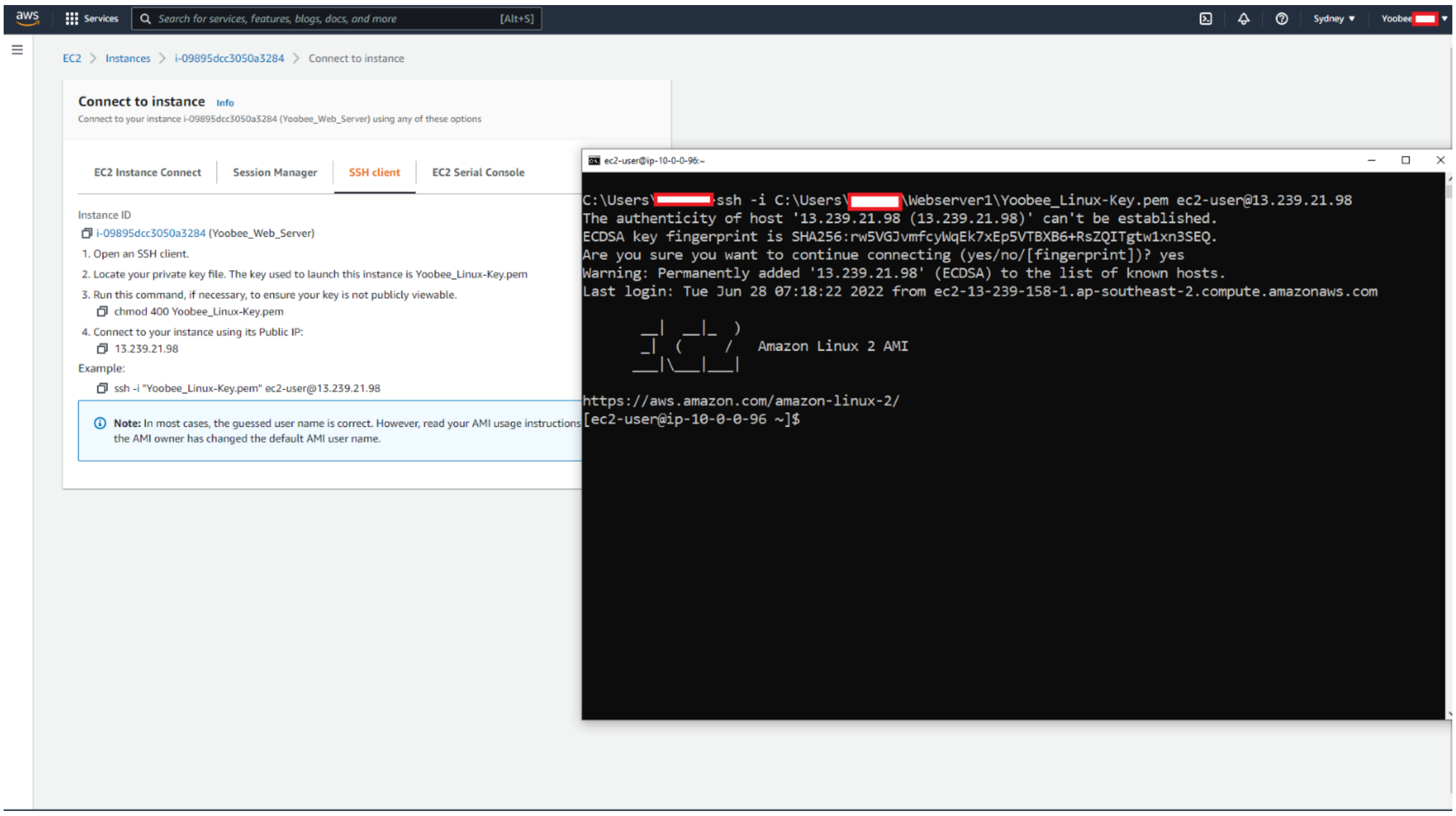
Monitoring: disabled

Platform details: Linux/UNIX

AMI name: amzn2-ami-kernel-5.10-hvm-2.0.20220606.1-x86_64-gp2

Termination protection: Disabled

Submission Image-3.1: Yoobee_Web_Server EC2 Linux instance accessible using SSH port.



Connect to instance Info

Connect to your instance i-09895dcc3050a3284 (Yoobee_Web_Server) using any of these options

Instance ID

i-09895dcc3050a3284 (Yoobee_Web_Server)

1. Open an SSH client.
2. Locate your private key file. The key used to launch this instance is Yoobee_Linux-Key.pem
3. Run this command, if necessary, to ensure your key is not publicly viewable.
   chmod 400 Yoobee_Linux-Key.pem
4. Connect to your instance using its Public IP:
   13.239.21.98

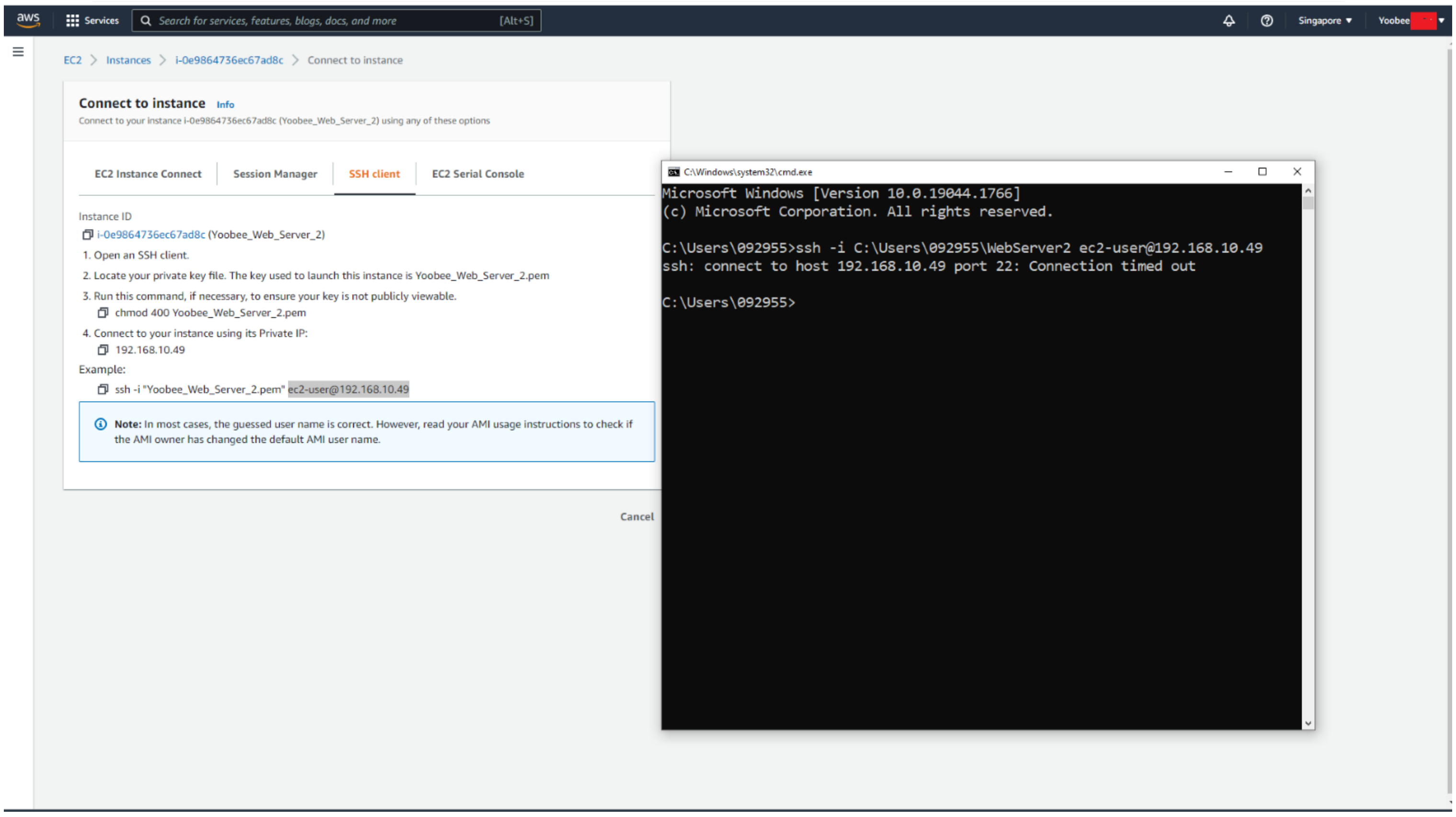
Example:

ssh -i "Yoobee_Linux-Key.pem" ec2-user@13.239.21.98

Note: In most cases, the guessed user name is correct. However, read your AMI usage instructions the AMI owner has changed the default AMI user name.

```
C:\Users\[redacted]ssh -i C:\Users\[redacted]\Webserver1\Yoobee_Linux-Key.pem ec2-user@13.239.21.98
The authenticity of host '13.239.21.98 (13.239.21.98)' can't be established.
ECDSA key fingerprint is SHA256:rw5VGJvmfcyWqEk7xEp5VTBXB6+RsZQITgtw1xn3SEQ.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '13.239.21.98' (ECDSA) to the list of known hosts.
Last login: Tue Jun 28 07:18:22 2022 from ec2-13-239-158-1.ap-southeast-2.compute.amazonaws.com

       __|  __|_  )
       _|  (     /   Amazon Linux 2 AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-10-0-0-96 ~]$
```

Submission Image-3.2: Yoobee_Web_Server_2 EC2 Linux instance not accessible using SSH port.


aws
Services
Search for services, features, blogs, docs, and more
[Alt+S]
Singapore ▼
Yoobee [redacted] ▼
EC2 > Instances > i-0e9864736ec67ad8c > Connect to instance
EC2 Instance Connect
Session Manager
SSH client
EC2 Serial Console
Cancel
C:\Windows\system32\cmd.exe

Connect to instance Info

Connect to your instance i-0e9864736ec67ad8c (Yoobee_Web_Server_2) using any of these options

Instance ID

i-0e9864736ec67ad8c (Yoobee_Web_Server_2)

1. Open an SSH client.
2. Locate your private key file. The key used to launch this instance is Yoobee_Web_Server_2.pem
3. Run this command, if necessary, to ensure your key is not publicly viewable.
   chmod 400 Yoobee_Web_Server_2.pem
4. Connect to your instance using its Private IP:
   192.168.10.49

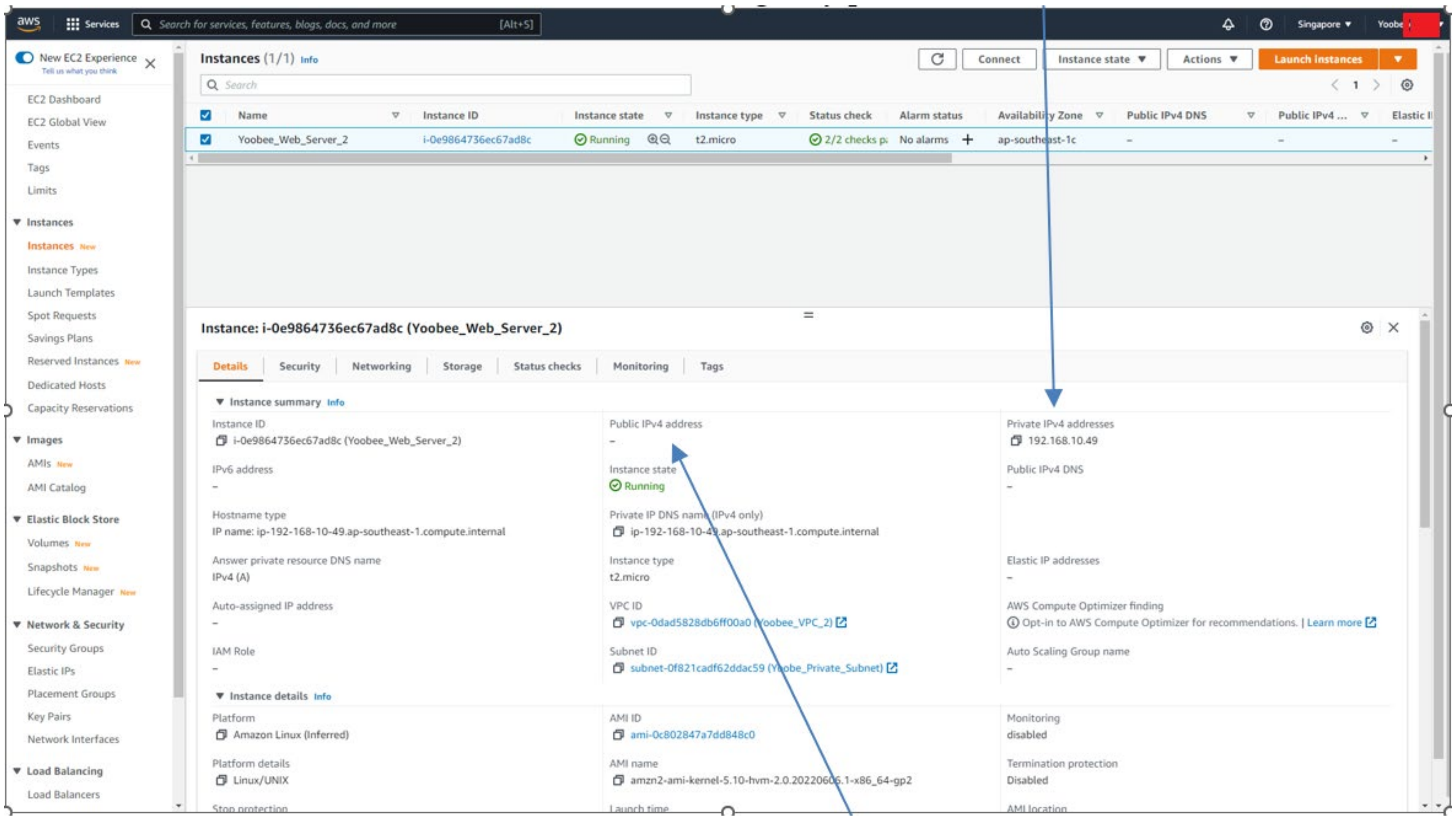
Example:

ssh -i "Yoobee_Web_Server_2.pem" ec2-user@192.168.10.49

Note: In most cases, the guessed user name is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

```
Microsoft Windows [Version 10.0.19044.1766]
(c) Microsoft Corporation. All rights reserved.

C:\Users\092955>ssh -i C:\Users\092955\WebServer2 ec2-user@192.168.10.49
ssh: connect to host 192.168.10.49 port 22: Connection timed out

C:\Users\092955>
```

Submission Image-3.3: Sample Explanation: The VPC2 Linux instance is not accessible. Explain why?



Instances (1/1) Info

☑	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic I
☑	Yoobee_Web_Server_2	i-0e9864736ec67ad8c	Running	t2.micro	2/2 checks p	No alarms +	ap-southeast-1c	–	–	–

Instance: i-0e9864736ec67ad8c (Yoobee_Web_Server_2)

Instance summary Info

Instance ID
i-0e9864736ec67ad8c (Yoobee_Web_Server_2)

Public IPv4 address
–

Private IPv4 addresses
192.168.10.49

IPv6 address
–

Instance state
Running

Public IPv4 DNS
–

Hostname type
IP name: ip-192-168-10-49.ap-southeast-1.compute.internal

Private IP DNS name (IPv4 only)
ip-192-168-10-49.ap-southeast-1.compute.internal

Answer private resource DNS name
IPv4 (A)

Instance type
t2.micro

Elastic IP addresses
–

Auto-assigned IP address
–

VPC ID
vpc-0dad5828db6ff00a0 (Yoobee_VPC_2)

AWS Compute Optimizer finding
Opt-in to AWS Compute Optimizer for recommendations. | Learn more

IAM Role
–

Subnet ID
subnet-0f821cadf62ddac59 (Yoobe_Private_Subnet)

Auto Scaling Group name
–

Instance details Info

Platform
Amazon Linux (Inferred)

AMI ID
ami-0c802847a7dd848c0

Monitoring
disabled

Platform details
Linux/UNIX

AMI name
amzn2-ami-kernel-5.10-hvm-2.0.20220606.1-x86_64-gp2

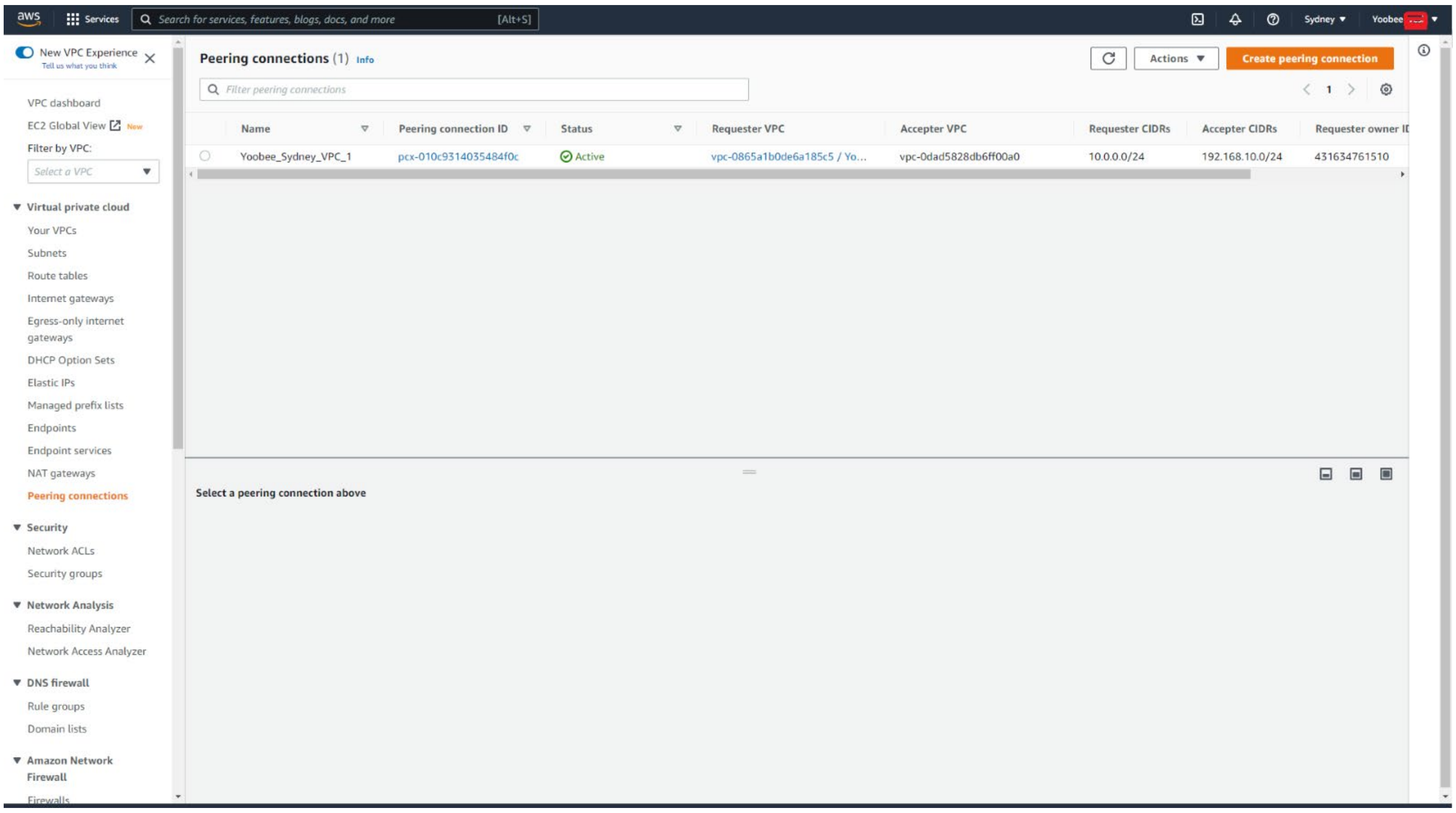
Termination protection
Disabled

Stop protection

Launch time

AMI location

Submission Image-4.1: Sydney Peering active

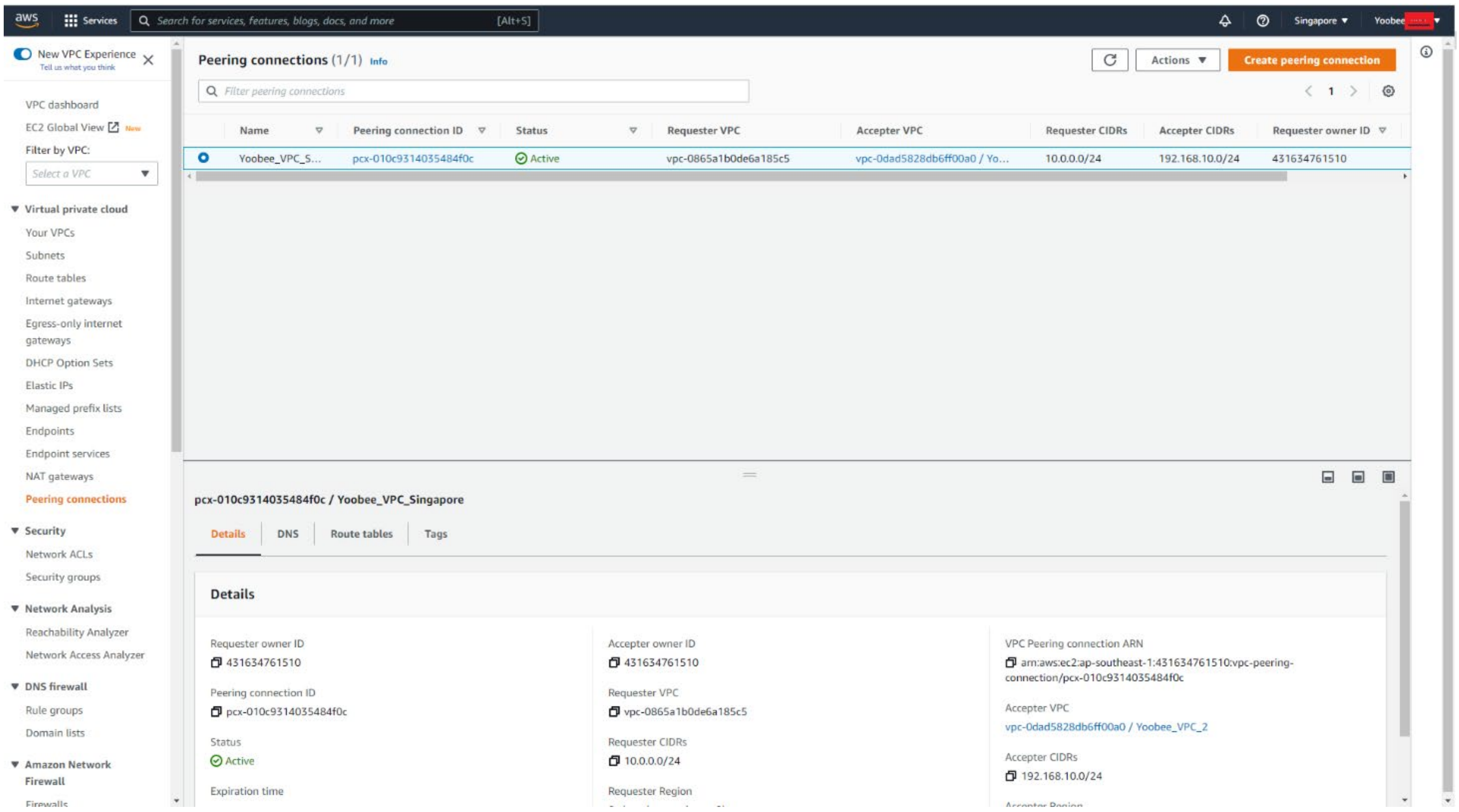


Peering connections (1) Info

	Name	Peering connection ID	Status	Requester VPC	Accepter VPC	Requester CIDRs	Accepter CIDRs	Requester owner ID
○	Yoobee_Sydney_VPC_1	pcx-010c9314035484f0c	✓ Active	vpc-0865a1b0de6a185c5 / Yo...	vpc-0dad5828db6ff00a0	10.0.0.0/24	192.168.10.0/24	431634761510

Select a peering connection above

Submission Image-4.2: Singapore Peering active



Peering connections (1/1) Info

	Name	Peering connection ID	Status	Requester VPC	Accepter VPC	Requester CIDRs	Accepter CIDRs	Requester owner ID
●	Yoobee_VPC_S...	pcx-010c9314035484f0c	✓ Active	vpc-0865a1b0de6a185c5	vpc-0dad5828db6ff00a0 / Yo...	10.0.0.0/24	192.168.10.0/24	431634761510

pcx-010c9314035484f0c / Yoobee_VPC_Singapore

Details

Requester owner ID
431634761510

Peering connection ID
pcx-010c9314035484f0c

Status
✓ Active

Expiration time

Accepter owner ID
431634761510

Requester VPC
vpc-0865a1b0de6a185c5

Requester CIDRs
10.0.0.0/24

Requester Region

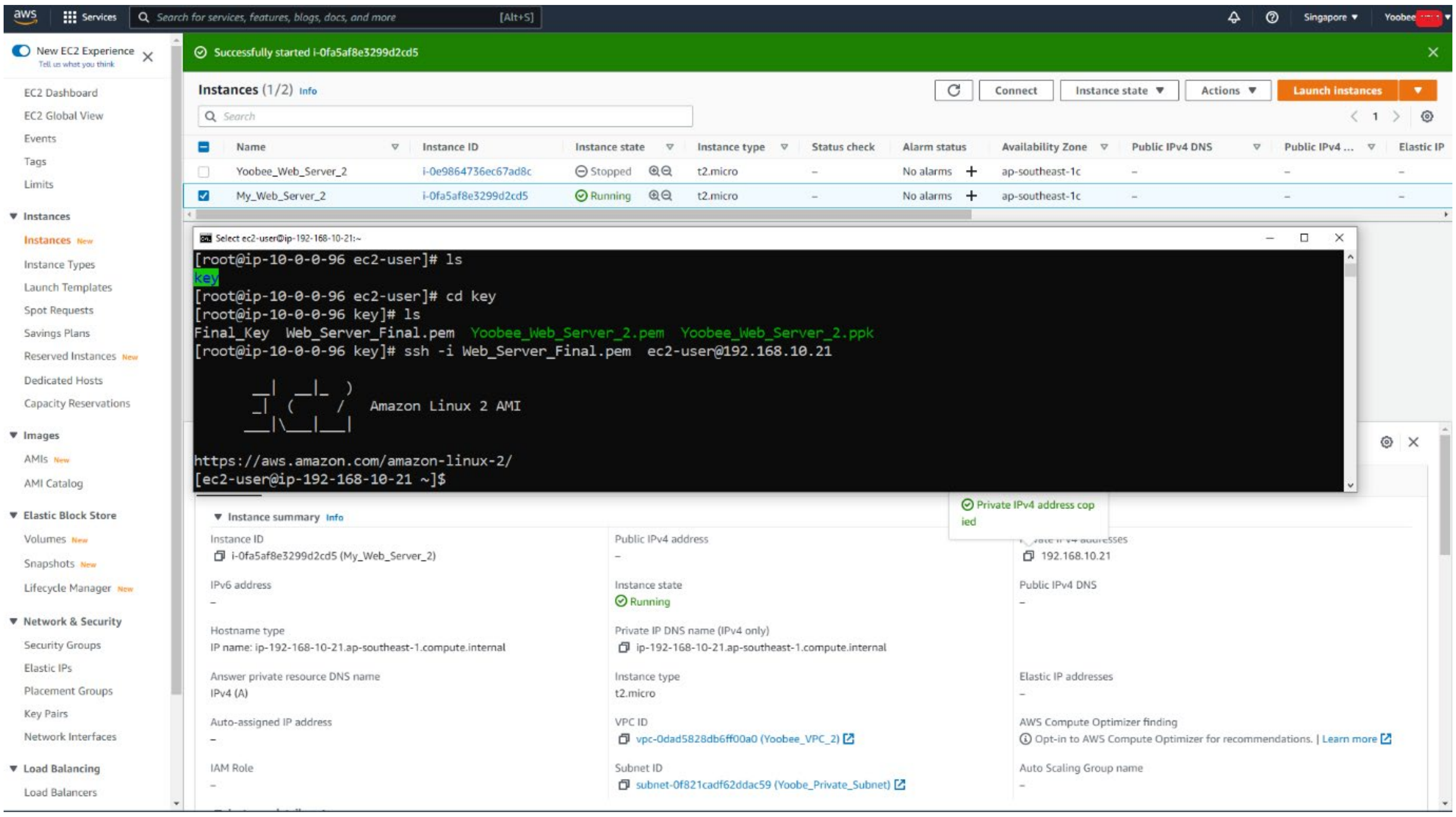
VPC Peering connection ARN
arn:aws:ec2:ap-southeast-1:431634761510:vpc-peering-connection/pcx-010c9314035484f0c

Accepter VPC
vpc-0dad5828db6ff00a0 / Yoobee_VPC_2

Accepter CIDRs
192.168.10.0/24

Accepter Region

Submission Image-4.3: Yoobee_Web_Server_2 EC2 Linux instance accessible using SSH port from EC2 Linux Yoobee_Web_Server located in Sydney VPC.



Successfully started i-0fa5af8e3299d2cd5

Instances (1/2) Info

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
☐ Yoobee_Web_Server_2	i-0e9864736ec67ad8c	Stopped	t2.micro	–	No alarms	ap-southeast-1c	–	–	–
☑ My_Web_Server_2	i-0fa5af8e3299d2cd5	Running	t2.micro	–	No alarms	ap-southeast-1c	–	–	–

Select ec2-user@ip-192-168-10-21:~

```
[root@ip-10-0-0-96 ec2-user]# ls
key
[root@ip-10-0-0-96 ec2-user]# cd key
[root@ip-10-0-0-96 key]# ls
Final_Key  Web_Server_Final.pem  Yoobee_Web_Server_2.pem  Yoobee_Web_Server_2.ppk
[root@ip-10-0-0-96 key]# ssh -i Web_Server_Final.pem  ec2-user@192.168.10.21

       __|  __|_  )
       _|  (     /   Amazon Linux 2 AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-192-168-10-21 ~]$
```

Private IPv4 address copied

Instance summary Info

Instance ID: i-0fa5af8e3299d2cd5 (My_Web_Server_2)

Public IPv4 address: –

Private IPv4 addresses: 192.168.10.21

IPv6 address: –

Instance state: Running

Public IPv4 DNS: –

Hostname type: IP name: ip-192-168-10-21.ap-southeast-1.compute.internal

Private IP DNS name (IPv4 only): ip-192-168-10-21.ap-southeast-1.compute.internal

Answer private resource DNS name: IPv4 (A)

Instance type: t2.micro

Elastic IP addresses: –

Auto-assigned IP address: –

VPC ID: vpc-0dad5828db6ff00a0 (Yoobee_VPC_2)

AWS Compute Optimizer finding: Opt-in to AWS Compute Optimizer for recommendations. | Learn more

IAM Role: –

Subnet ID: subnet-0f821cadf62ddac59 (Yoobe_Private_Subnet)

Auto Scaling Group name: –

Task 2: Discuss and develop strategies to mitigate security risks of open source and cloud-based components. Practical Demonstration-2

Scenario 2: Implement a SAMBA server in one of the Linux instances to access data from a Microsoft-based operating system using Elastic IP as cross-platform data migration. Similarly, exchange your data from Linux to Microsoft using Public IP, which requires proof of concept to mitigate the security risks of the open-source Linux platform.

Create an EFS (Elastic) file system for your organisation. The organisation is currently having issues with data breaches in its file systems. The CTO (Chief Technology Officer) realized that the security groups of the EC2 instances and EFS file system are not working as desired, while the data inflow and outflow.

As the Cloud support team member, you will now ensure that the EFS only connects to the data travelling from the EC2 instances and not from else within your VPC. This will help in mitigating your current issue of not allowing data from other resources.

Draw the topology and create the process of connecting your EC2 instances to your EFS file system. Minimum two instances are required to show the connectivity and the change. Also, in your report, explain how the SG modification helped your organisation to mitigate the risk.

1. Create two Linux EC2 instances using a common security group and deploy both instances as Web servers.

Configure shared storage using EFS service with security group outbound any and inbound NFS TCP 2049 only rule to share website content between multiple Linux instances to implement web server security.

(Do not use the default web page design sample website using any convenient scripting language.)

(Take screenshots as Appendix-2, including Design Topology and submission image 2.1 to 2.3)

2. Implement an NFS server in one instance and configure shared storage between multiple Linux.

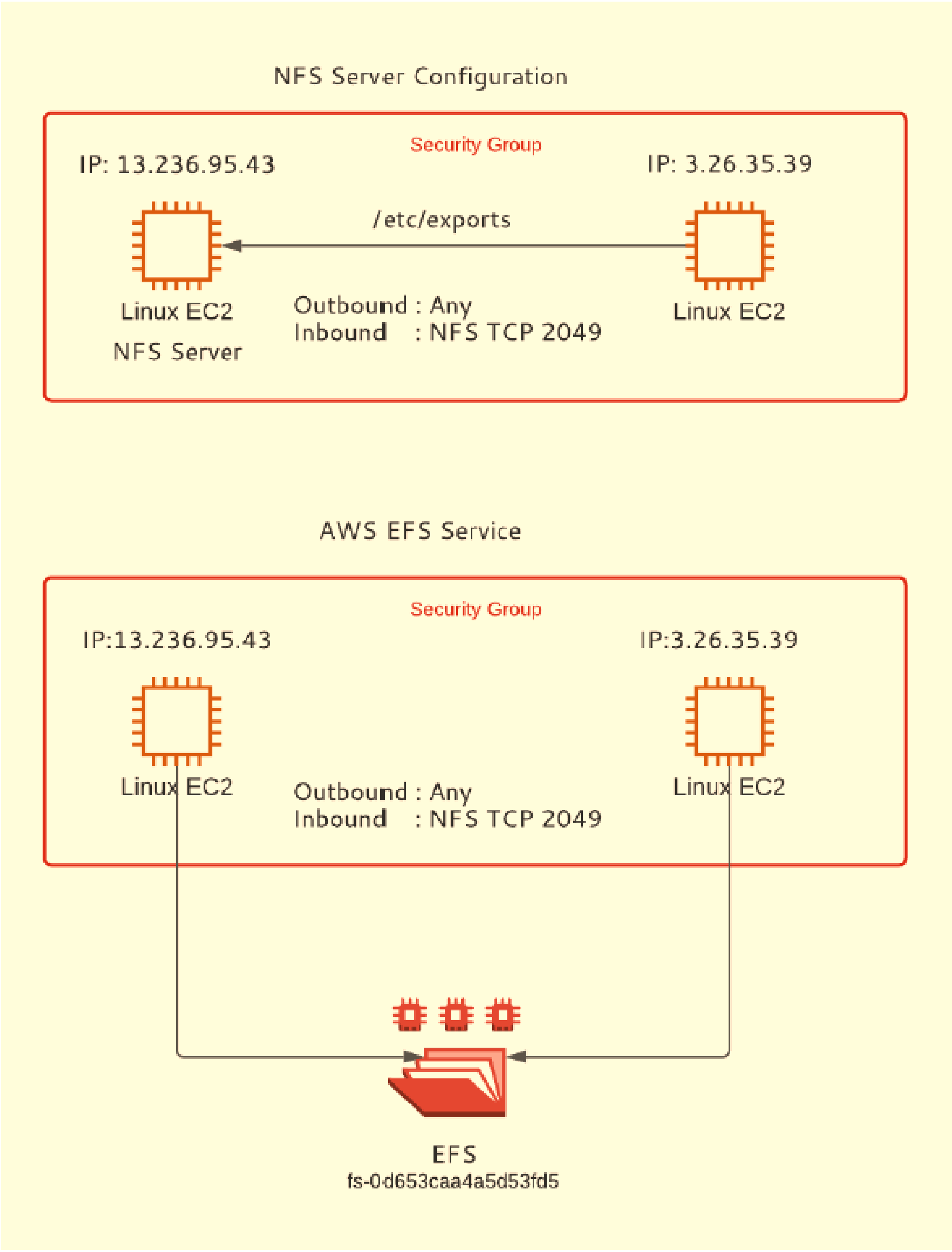
(Take screenshots as Appendix-2, including Design Topology and submission image 2.4)

3. Discuss the difference between the AWS EFS service and NFS Server configuration, in brief, and explain in your report with required referencing.
4. Make a Samba server and share a folder to access from a Microsoft Windows EC2 instance using an Elastic IP. You can use existing Linux instances or create new ones, depending on your troubleshooting skills, to mitigate the security risk of open-source and cloud-based components. **(Take screenshots as Appendix-2, including Design Topology and submission images 4.1 and 4.2)**

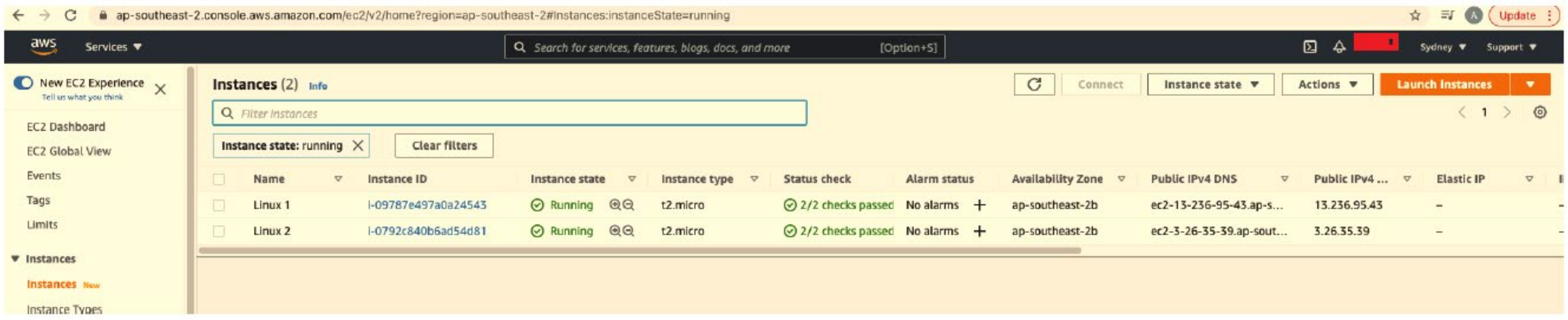
5. Assessment submitted with detailed research and step-by-step practical explanation. **Submission 5.1:** Report Writing and Submission

Appendix-2

Design Topology

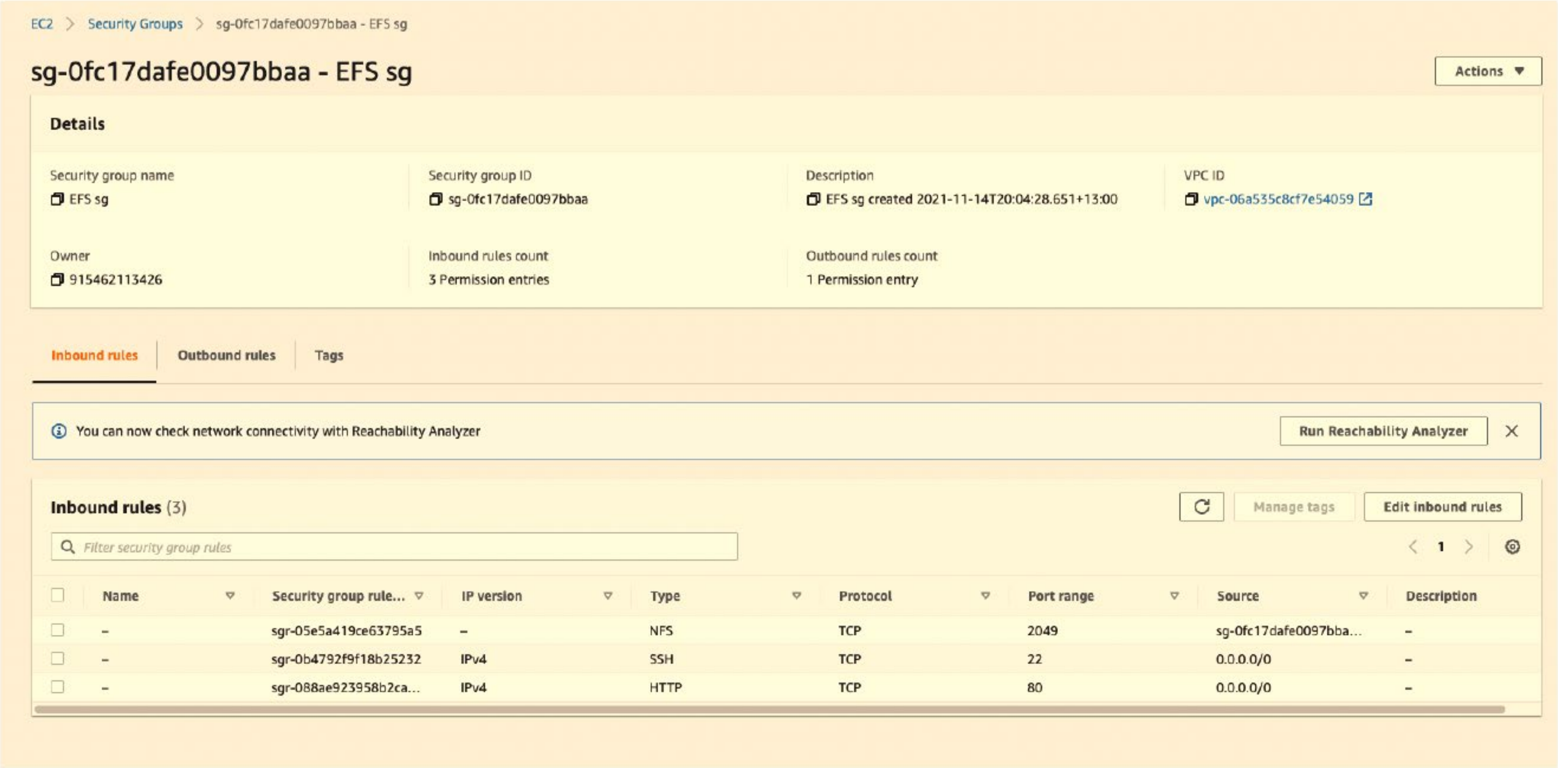


Submission Image: 2.1 EC2 Linux instances in common security group



Instances (2) Info

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
□	Linux 1	i-09787e497a0a24543	Running	t2.micro	2/2 checks passed	No alarms +	ap-southeast-2b	ec2-13-236-95-43.ap-s...	13.236.95.43	–
□	Linux 2	i-0792c840b6ad54d81	Running	t2.micro	2/2 checks passed	No alarms +	ap-southeast-2b	ec2-3-26-35-39.ap-sout...	3.26.35.39	–


EC2 > Security Groups > sg-0fc17dafe0097bbaa - EFS sg
Actions ▼
Inbound rules
Outbound rules
Tags
Run Reachability Analyzer
Manage tags
Edit inbound rules
Filter security group rules

sg-0fc17dafe0097bbaa - EFS sg

Details

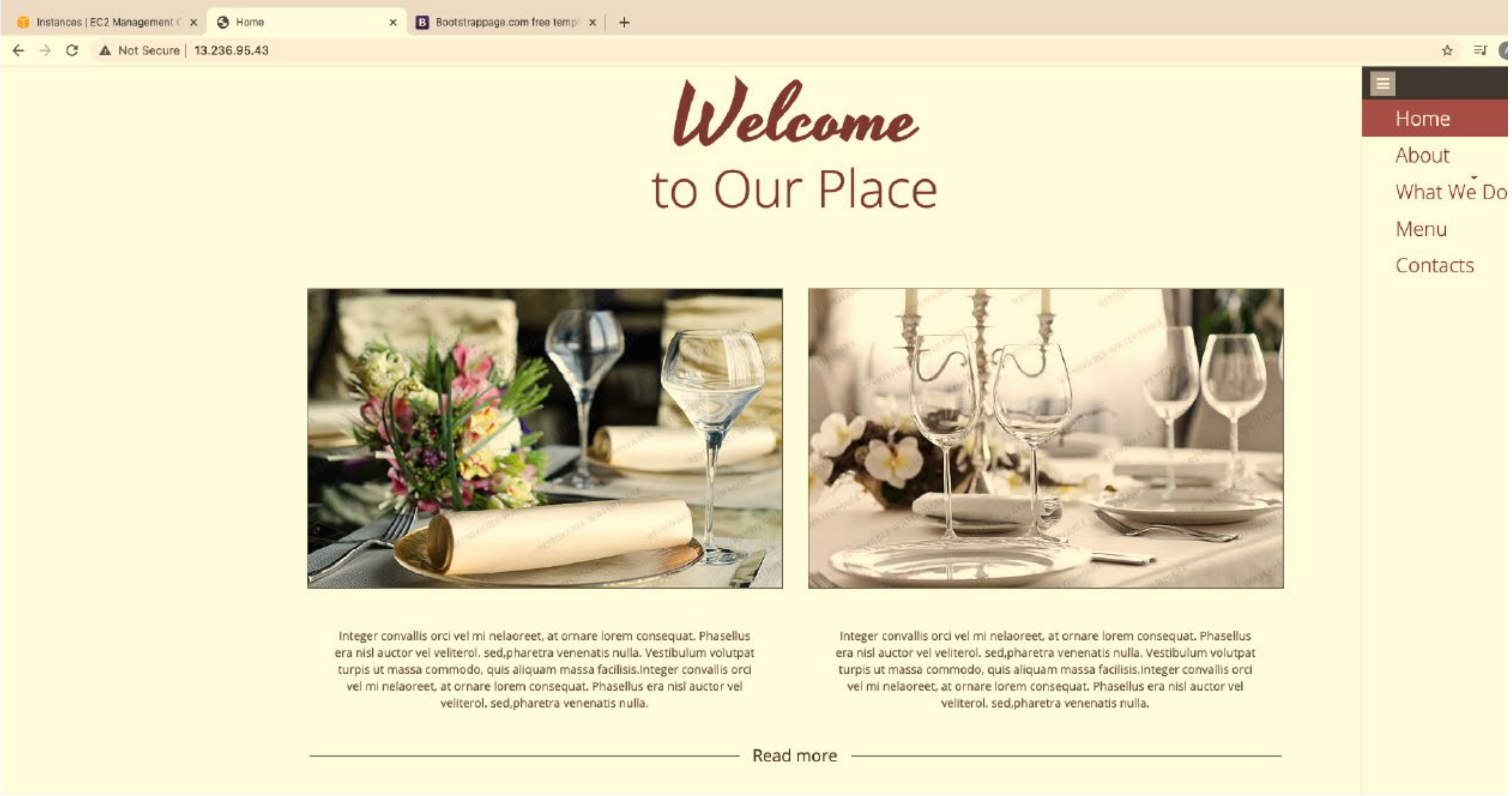
Security group name EFS sg	Security group ID sg-0fc17dafe0097bbaa	Description EFS sg created 2021-11-14T20:04:28.651+13:00	VPC ID vpc-06a535c8cf7e54059
Owner 915462113426	Inbound rules count 3 Permission entries	Outbound rules count 1 Permission entry	

You can now check network connectivity with Reachability Analyzer

Inbound rules (3)

□	Name	Security group rule...	IP version	Type	Protocol	Port range	Source	Description
□	–	sgr-05e5a419ce63795a5	–	NFS	TCP	2049	sg-0fc17dafe0097bba...	–
□	–	sgr-0b4792f9f18b25232	IPv4	SSH	TCP	22	0.0.0.0/0	–
□	–	sgr-088ae923958b2ca...	IPv4	HTTP	TCP	80	0.0.0.0/0	–

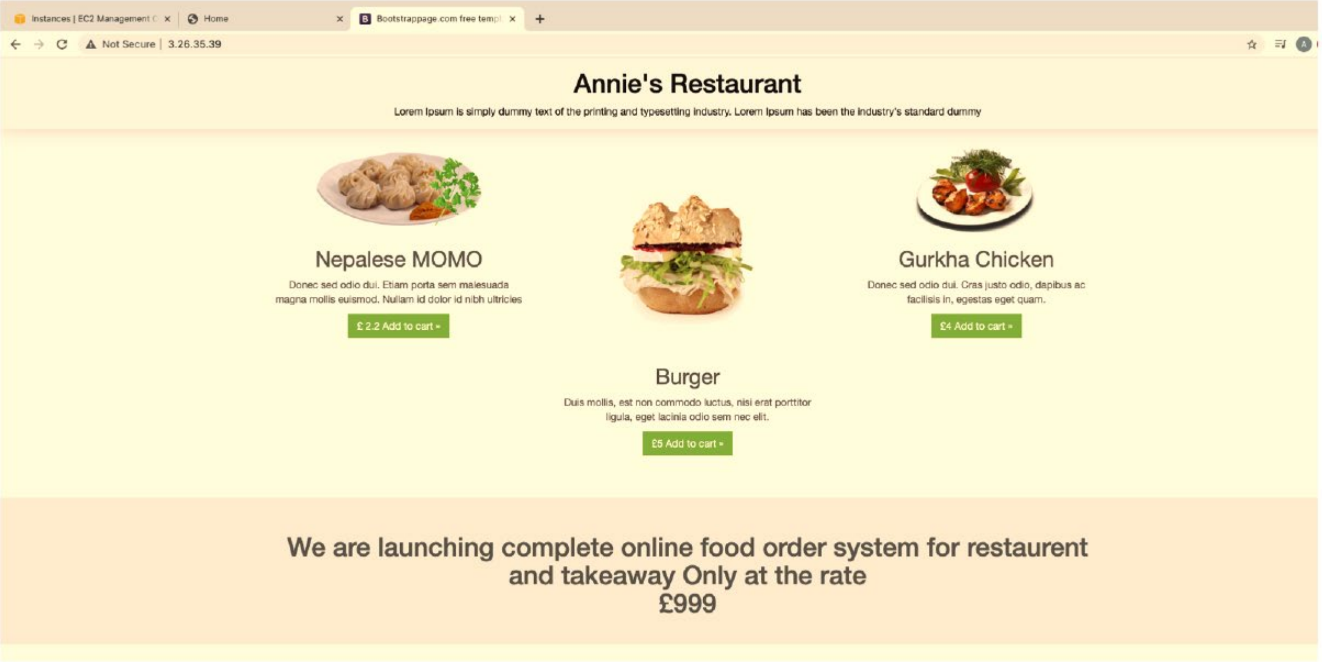
Submission Image:2.2 EC2 Linux Web Server-1


Instances | EC2 Management C
Home
Bootstrappage.com free temp
Not Secure | 13.236.95.43
Welcome
to Our Place
Home
About
What We Do
Menu
Contacts
Read more

Integer convallis orci vel mi nelaoreet, at ornare lorem consequat. Phasellus era nisl auctor vel veliterol. sed,pharetra venenatis nulla. Vestibulum volutpat turpis ut massa commodo, quis aliquam massa facilisis.Integer convallis orci vel mi nelaoreet, at ornare lorem consequat. Phasellus era nisl auctor vel veliterol. sed,pharetra venenatis nulla.

Integer convallis orci vel mi nelaoreet, at ornare lorem consequat. Phasellus era nisl auctor vel veliterol. sed,pharetra venenatis nulla. Vestibulum volutpat turpis ut massa commodo, quis aliquam massa facilisis.Integer convallis orci vel mi nelaoreet, at ornare lorem consequat. Phasellus era nisl auctor vel veliterol. sed,pharetra venenatis nulla.

Submission Image:2.3 EC2 Linux Web Server-2



Annie's Restaurant

Lorem Ipsum is simply dummy text of the printing and typesetting industry. Lorem Ipsum has been the industry's standard dummy

Nepalese MOMO

Donec sed odio dui. Etiam porta sem malesuada magna mollis euismod. Nullam id dolor id nibh ultricies

£ 2.2 Add to cart »

Gurkha Chicken

Donec sed odio dui. Cras justo odio, dapibus ac facilisis in, egestas eget quam.

£4 Add to cart »

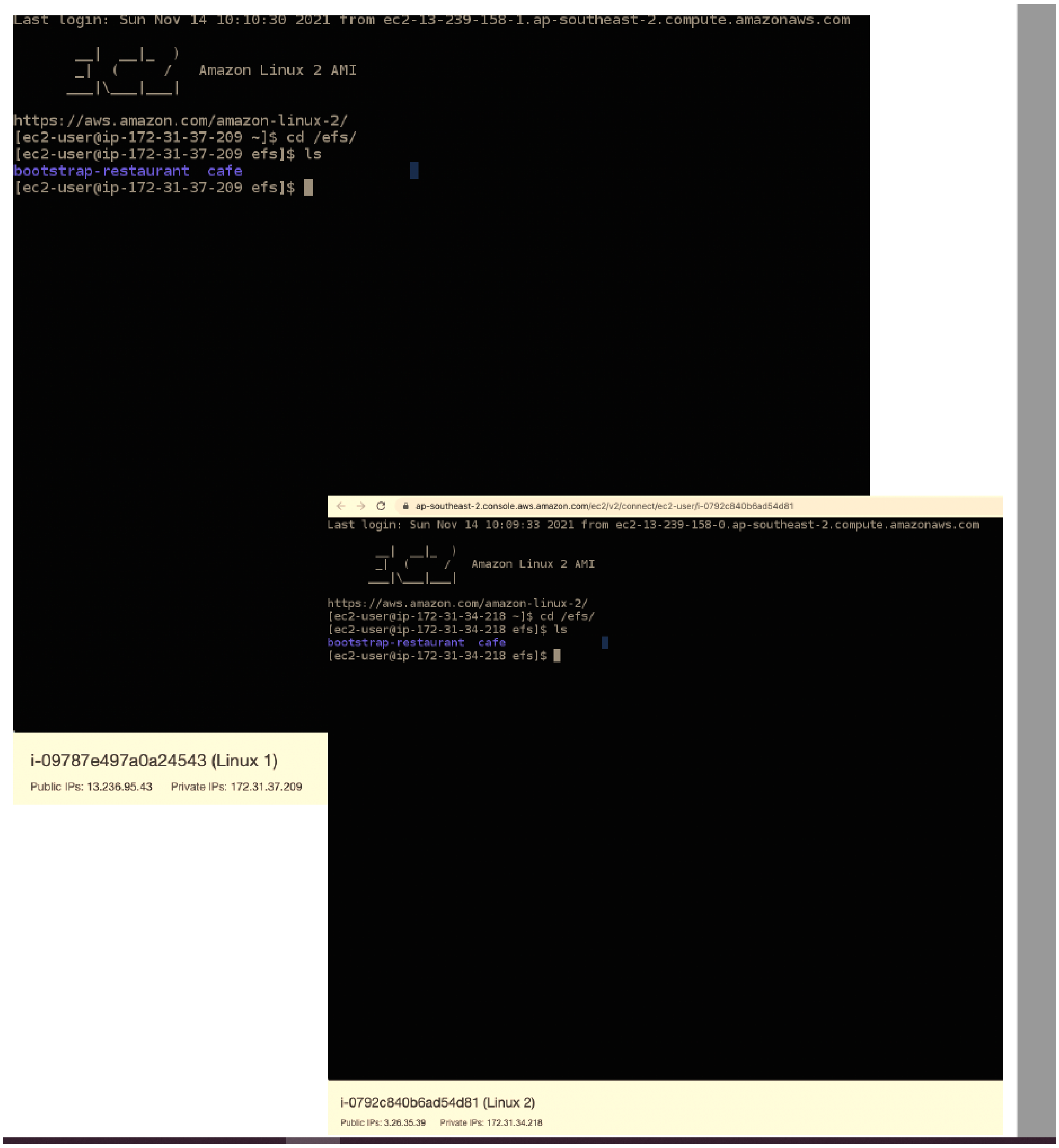
Burger

Duis mollis, est non commodo luctus, nisi erat porttitor ligula, eget lacinia odio sem nec elit.

£5 Add to cart »

We are launching complete online food order system for restaurent and takeaway Only at the rate £999

Submission Image: 2.4 Sample file access in shared storage.


ap-southeast-2.console.aws.amazon.com/ec2/v2/connect/ec2-user/i-0792c840b6ad54d81

```
Last login: Sun Nov 14 10:10:30 2021 from ec2-13-239-158-1.ap-southeast-2.compute.amazonaws.com

       __|  __|_  )
       _|  (     /   Amazon Linux 2 AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-172-31-37-209 ~]$ cd /efs/
[ec2-user@ip-172-31-37-209 efs]$ ls
bootstrap-restaurant  cafe
[ec2-user@ip-172-31-37-209 efs]$
```

i-09787e497a0a24543 (Linux 1)

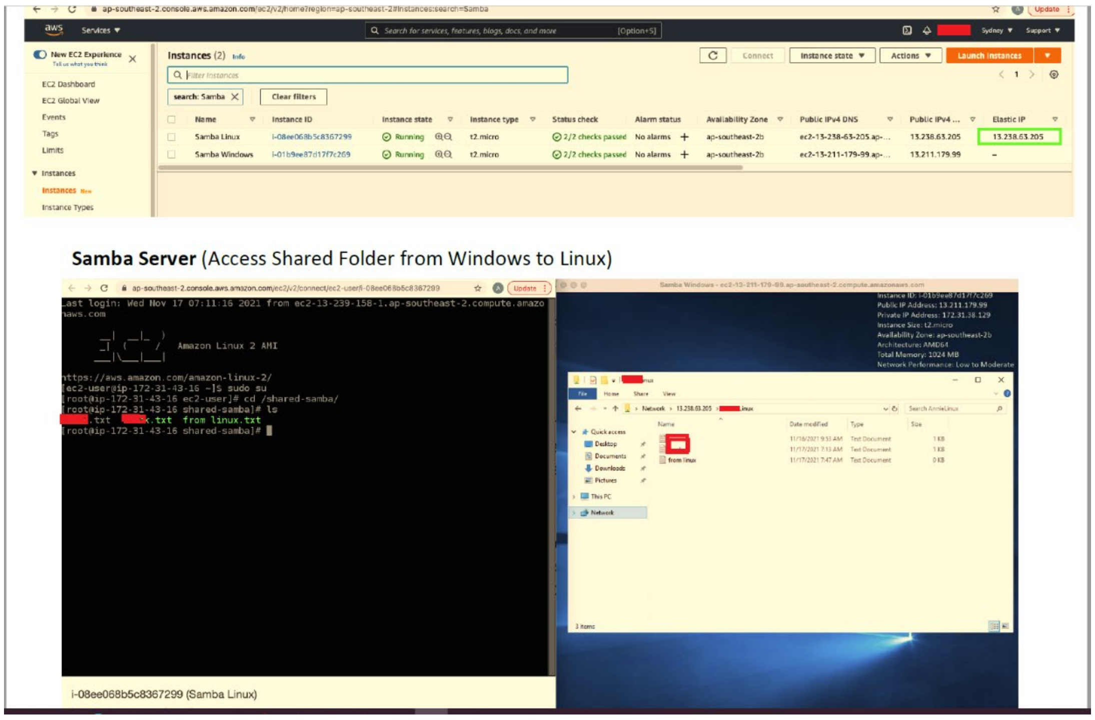
Public IPs: 13.236.95.43   Private IPs: 172.31.37.209

```
Last login: Sun Nov 14 10:09:33 2021 from ec2-13-239-158-0.ap-southeast-2.compute.amazonaws.com

       __|  __|_  )
       _|  (     /   Amazon Linux 2 AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-172-31-34-218 ~]$ cd /efs/
[ec2-user@ip-172-31-34-218 efs]$ ls
bootstrap-restaurant  cafe
[ec2-user@ip-172-31-34-218 efs]$
```

i-0792c840b6ad54d81 (Linux 2)

Public IPs: 3.26.35.39   Private IPs: 172.31.34.218

Submission Image:4.1 Sample file access with SAMBA Server



ap-southeast-2.console.aws.amazon.com/ec2/v2/home?region=ap-southeast-2#Instances:search=Samba

Instances (2) Info

search: Samba

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
□	Samba Linux	i-08ee068b5c8367299	Running	t2.micro	2/2 checks passed	No alarms	ap-southeast-2b	ec2-13-238-63-205.ap-...	13.238.63.205	13.238.63.205
□	Samba Windows	i-01b9ee87d17f7c269	Running	t2.micro	2/2 checks passed	No alarms	ap-southeast-2b	ec2-13-211-179-99.ap-...	13.211.179.99	–

Samba Server (Access Shared Folder from Windows to Linux)

ap-southeast-2.console.aws.amazon.com/ec2/v2/connect/ec2-user/i-08ee068b5c8367299

```
Last login: Wed Nov 17 07:11:16 2021 from ec2-13-239-158-1.ap-southeast-2.compute.amazo
naws.com

       __|  __|_  )
       _|  (     /   Amazon Linux 2 AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-172-31-43-16 ~]$ sudo su
[root@ip-172-31-43-16 ec2-user]# cd /shared-samba/
[root@ip-172-31-43-16 shared-samba]# ls
[redacted].txt  [redacted]x.txt  from linux.txt
[root@ip-172-31-43-16 shared-samba]# 
```

i-08ee068b5c8367299 (Samba Linux)

Samba Windows - ec2-13-211-179-99.ap-southeast-2.compute.amazonaws.com

Instance ID: i-01b9ee87d17f7c269
Public IP Address: 13.211.179.99
Private IP Address: 172.31.38.129
Instance Size: t2.micro
Availability Zone: ap-southeast-2b
Architecture: AMD64
Total Memory: 1024 MB
Network Performance: Low to Moderate

[redacted]inux

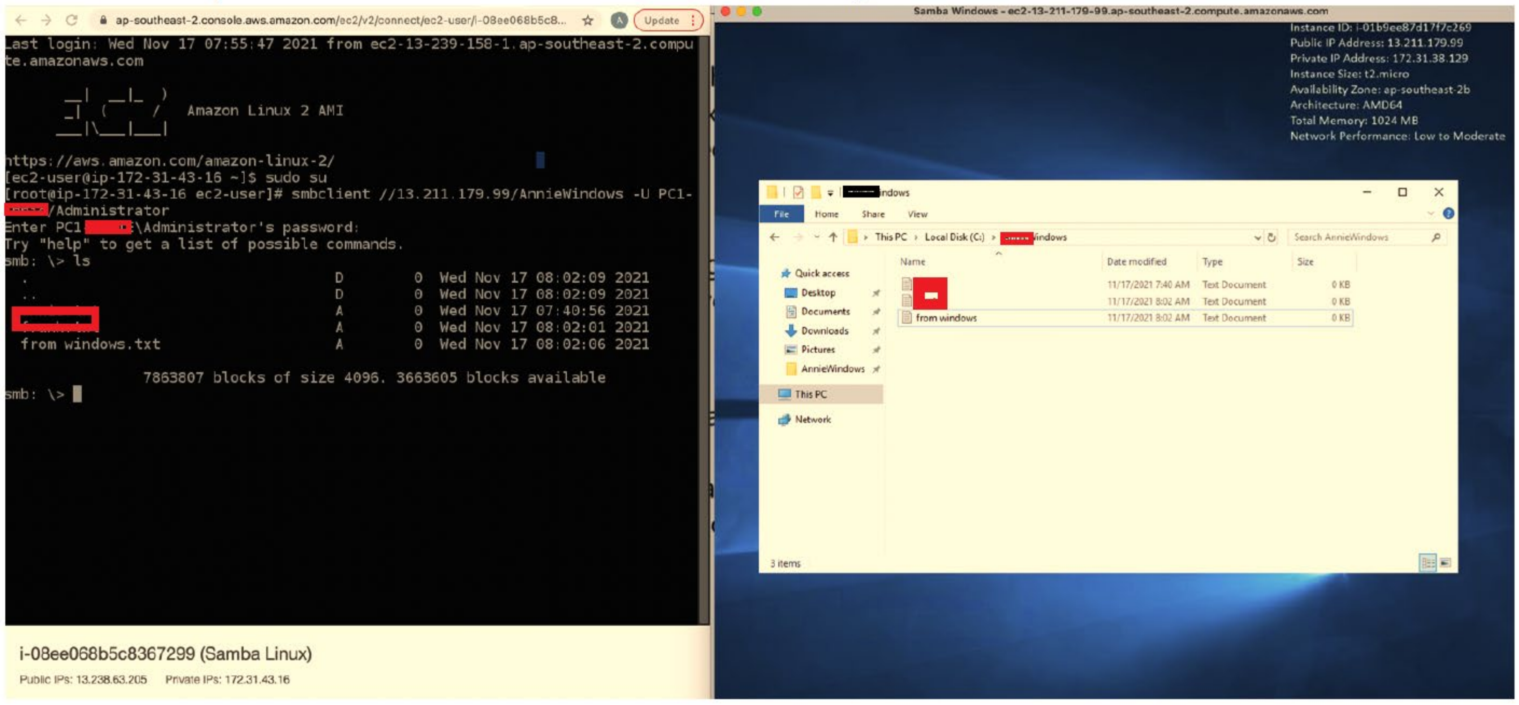
Network › 13.238.63.205 › [redacted]Linux

Name	Date modified	Type	Size
[redacted]	11/16/2021 9:53 AM	Text Document	1 KB
[redacted]	11/17/2021 7:13 AM	Text Document	1 KB
from linux	11/17/2021 7:47 AM	Text Document	0 KB

3 items

Submission Image: 4.2 Sample file access in Windows

Samba Client (Access Shared Folder from Linux to Windows)



ap-southeast-2.console.aws.amazon.com/ec2/v2/connect/ec2-user/i-08ee068b5c8...

```
Last login: Wed Nov 17 07:55:47 2021 from ec2-13-239-158-1.ap-southeast-2.compu
te.amazonaws.com

       __|  __|_  )
       _|  (     /   Amazon Linux 2 AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-172-31-43-16 ~]$ sudo su
[root@ip-172-31-43-16 ec2-user]# smbclient //13.211.179.99/AnnieWindows -U PC1-
[redacted]/Administrator
Enter PC1[redacted]\Administrator's password:
Try "help" to get a list of possible commands.
smb: \> ls
  .                                   D        0  Wed Nov 17 08:02:09 2021
  ..                                  D        0  Wed Nov 17 08:02:09 2021
  [redacted]                          A        0  Wed Nov 17 07:40:56 2021
                                      A        0  Wed Nov 17 08:02:01 2021
  from windows.txt                    A        0  Wed Nov 17 08:02:06 2021

                7863807 blocks of size 4096. 3663605 blocks available
smb: \> 
```

i-08ee068b5c8367299 (Samba Linux)

Public IPs: 13.238.63.205   Private IPs: 172.31.43.16

Samba Windows - ec2-13-211-179-99.ap-southeast-2.compute.amazonaws.com

Instance ID: i-01b9ee87d17f7c269
Public IP Address: 13.211.179.99
Private IP Address: 172.31.38.129
Instance Size: t2.micro
Availability Zone: ap-southeast-2b
Architecture: AMD64
Total Memory: 1024 MB
Network Performance: Low to Moderate

[redacted]indows

This PC › Local Disk (C:) › [redacted]Windows

Name	Date modified	Type	Size
[redacted]	11/17/2021 7:40 AM	Text Document	0 KB
	11/17/2021 8:02 AM	Text Document	0 KB
from windows	11/17/2021 8:02 AM	Text Document	0 KB

3 items

Marking Rubric

To pass this assessment, you must meet the requirements of each of the learning outcomes (irrespective of the numerical grade awarded).

Criterion		**Evidence**				
Task and Weightage		**A-, A, A+ (80-100%)**	**B-, B, B+ (65-79%)**	**C-, C, C+ (50-64%)**	**D (40-49%)**	**E (0-39%**
Task 1: Research and Implement Scenario-Based Practical Demonstration-1. (LO1) (50%)	**1. VPC Creation and Configuration**	VPCs created with correct CIDR, subnets, and route tables, documented with clear and correct screenshots.	VPCs are created with the correct CIDR, but minor issues in subnetting or route table configuration. Screenshots provided.	VPC creation is done but, missing some subcomponents or incorrect CIDR allocation. Screenshots are partially clear.	VPC created, but major issues in configuration, CIDR allocation, or route tables. Screenshots are unclear or missing.	VPC creation is incomplete or incorrect. No screenshots or poor-quality screenshots provided.
	2. EC2 Instance Deployment	EC2 instances deployed with correct settings (Public/Private IP) and associated subcomponents. Fully documented with screenshots.	EC2 instances are deployed correctly with minor misconfigurations. Screenshots provided.	EC2 instances deployed with some missing subcomponents. Screenshots are clear, but some configurations are incomplete.	EC2 instances deployed with significant misconfigurations or missing subcomponents. Screenshots are unclear or incomplete.	EC2 instances are not deployed correctly or with significant missing components. No screenshots or poor-quality screenshots.
	3. VPC Connectivity and SSH Access	Successful SSH connection to VPC1 EC2, with a thorough explanation of why VPC2 is inaccessible. Well documented.	SSH connection successful for VPC1 EC2 with a basic explanation for VPC2.	SSH connection to VPC1 works, but an explanation for VPC2 is vague or missing.	SSH connection to VPC1 is not working or the explanation for VPC2 is incomplete.	No SSH connection or unclear explanation for VPC2.
	4. VPC Peering Setup	VPC peering is established and documented accurately, including subnet routing changes. Screenshots included	VPC peering setup with minor issues, but overall functionality documented. Screenshots provided.	VPC peering setup, but incomplete or partially incorrect subnet routing configuration. Screenshots unclear.	The VPC peering setup is incomplete or incorrect with significant configuration issues. Screenshots are missing or unclear.	No VPC peering set up or major errors in the configuration. No screenshots provided.
	5. Report Writing and Submission	Report well-structured, clear, and comprehensive. Step-by-step practical implementation and solutions are well documented.	The report is clear and structured, with a few minor gaps in explanation. Some practical steps are documented.	The report is satisfactory but lacks clarity or has incomplete documentation of steps.	Report disorganized or incomplete, lacking important practical steps.	Report missing or extremely incomplete, with little to no practical documentation.

Criterion		Evidence				
Task and Weightage		A-, A, A+ (80-100%)	B-, B, B+ (65-79%)	C-, C, C+ (50-64%)	D (40-49%)	E (0-39%)
Task 2: **Discuss and Implement Scenario-Based Practical Demonstration-2. (LO2)** **(50%)**	- **EFS and EC2 Instance Configuration**	EFS is correctly set up with EC2 instances in a shared security group, website content served, with clear step-by-step explanation and screenshots.	EFS setup with EC2 instances in a shared security group, minor issues in the configuration. Clear screenshots and explanations.	EFS setup is partially correct but with some issues in configuration or security groups. Screenshots provided.	EFS setup with significant configuration issues or missing security group rules. Screenshots unclear.	No EFS setup or major errors in configuration. Screenshots not provided or unclear.
	- **NFS Server Configuration**	NFS server implemented correctly, with shared storage working as expected across multiple instances. Screenshots provided.	NFS server set up with minor issues, but shared storage works. Screenshots are clear.	The NFS server is set up with partial functionality or missing configurations. Screenshots are somewhat clear.	NFS server set up with significant issues or functionality not working as expected. Screenshots are unclear or incomplete.	No NFS server set up or major issues in functionality. Screenshots not provided.
	- **EFS vs NFS Discussion**	Clear and detailed discussion on the differences between AWS EFS and NFS server configurations. Well-referenced.	Good discussion with minor gaps in detail or referencing.	Satisfactory discussion, missing some details or unclear explanation of differences.	Basic discussion with major gaps in explanation or missing references.	No discussion or major gaps in understanding of EFS vs NFS.
	- **SAMBA Server Configuration**	SAMBA server fully configured, with shared folder accessible from a Windows instance via Elastic IP. Security risks mitigated. Detailed screenshots provided.	SAMBA server set up with minor issues or missing configurations. Clear screenshots and basic risk mitigation explanation.	SAMBA server is set up with some issues in its configuration. Screenshots are partially clear.	SAMBA server is set up with significant configuration issues or incomplete security measures. Screenshots are unclear or incomplete.	No SAMBA server set up or significant errors. No screenshots or poor-quality screenshots provided.
	- **Report Writing and Submission**	Report well-structured, clear, and comprehensive. Step-by-step practical implementation and solutions well documented.	The report is clear and structured, with a few minor gaps in explanation. Some practical steps are documented.	The report is satisfactory but lacks clarity or has incomplete documentation of steps.	Report disorganized or incomplete, lacking important practical steps.	Report missing or extremely incomplete, with little to no practical documentation.