

Problem:

Creating a file share & sync solution using ownCloud and AWS

Objective:

The objective of this project is to deploy infrastructure to deploy Owncloud application support with MYSQL database leveraging AWS capabilities.

Implementation Objective:

- The ownCloud app should be installed in the public subnet and MUST be configured to access a new database called owncloud-db in the private subnet.
- Apache HTTP server should host ownCloud application in this subnet and must be configured with required PHP modules for ownCloud.
- The implementation will have two subnets (public and private) to separate web application server and database server.
- Custom VPC (owncloud-vpc) will have CIDR 10.0.0.0/16
- Public subnet will have CIDR 10.0.0.0/24 called owncloud-public-sn. Auto-assign IP address will be set as enabled.
- Private subnet will have CIDR 10.0.1.0/24 called owncloud-private-sn.
- Custom route tables (owncloud-public-rt) will be assigned to the Public subnet.
- Default route table (owncloud-private-rt) will be assigned to the Private subnet.
- owncloud-public-rt will have bi-directional internet route entry using Amazon internet gateway.

- owncloud-private-rt will have NAT gateway route entry to facilitate internet connectivity to private subnet.
- Two T2.micro EC2 instances will be used with Ubuntu 20.04.* LTS Amazon machine images.
- Two security groups will be created.
- . owncloud-private-sg for private security group with ports SSH: 22 & MYSQL: 3306.
- . owncloud-public-sg for public security group with ports SSH: 22 & HTTP: 80.

Proposed Solution:

ownCloud is an open source secure file sync and share solution which can help you gain control of this situation and enable you to create and deploy an enterprise scale file solution. ownCloud can run in our data centre or on a public cloud, with its servers, storage etc completely managed and controlled by your IT team and management in accordance with our company's governance and security requirements. We have decided to launch the ownCloud service from AWS.

PHASE 1: ARCHITECTURE

Architecture Diagram Description:

Internet:

This represents the external network, including the public internet.

Router or Gateway:

This is the entry point to your Virtual Private Cloud (VPC), connecting your VPC to the Internet.

VPC (Virtual Private Cloud):

The VPC encompasses the entire cloud network environment.

Public Subnet:

This subnet is part of the VPC and is intended to be accessible from the Internet.

It hosts the ownCloud application and the Apache HTTP server.

ownCloud Application:

This component represents the ownCloud application, which provides file sharing and syncing services.

It's hosted on an EC2 instance within the public subnet.

Apache HTTP Server:

The Apache HTTP server runs on the same EC2 instance as the ownCloud application.

It serves web requests for the ownCloud application.

Private Subnet:

This subnet is also part of the VPC but is not directly accessible from the Internet.

It hosts the MySQL database.

MySQL Database:

This component represents the MySQL database used by ownCloud to store user data and configurations.

It's hosted on an Amazon RDS (Relational Database Service) instance within the private subnet.

Security Groups:

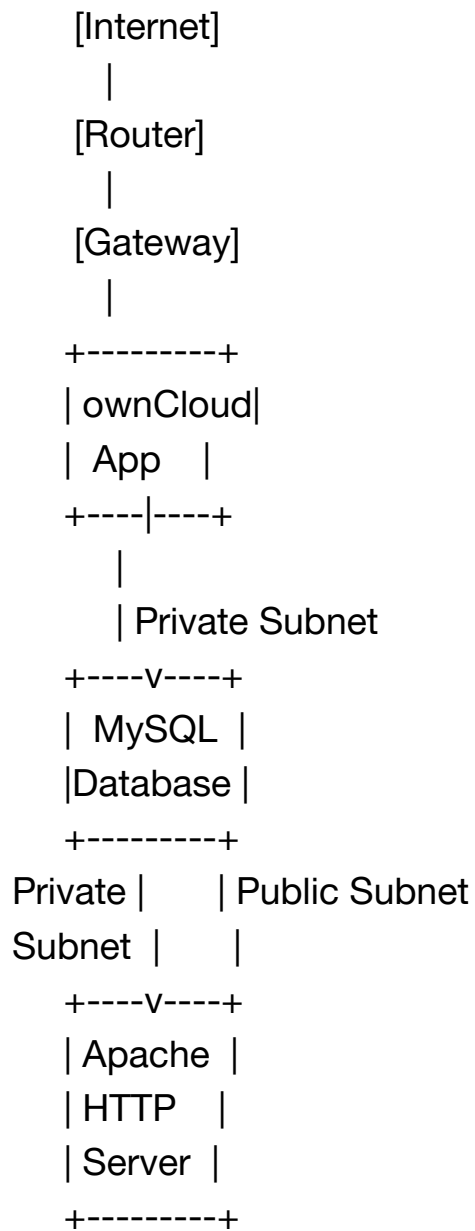
You would have security groups in place to control traffic flow between these components.

The security group for the MySQL database would only allow incoming traffic from the security group associated with the ownCloud application in the public subnet.

Communication Arrows:

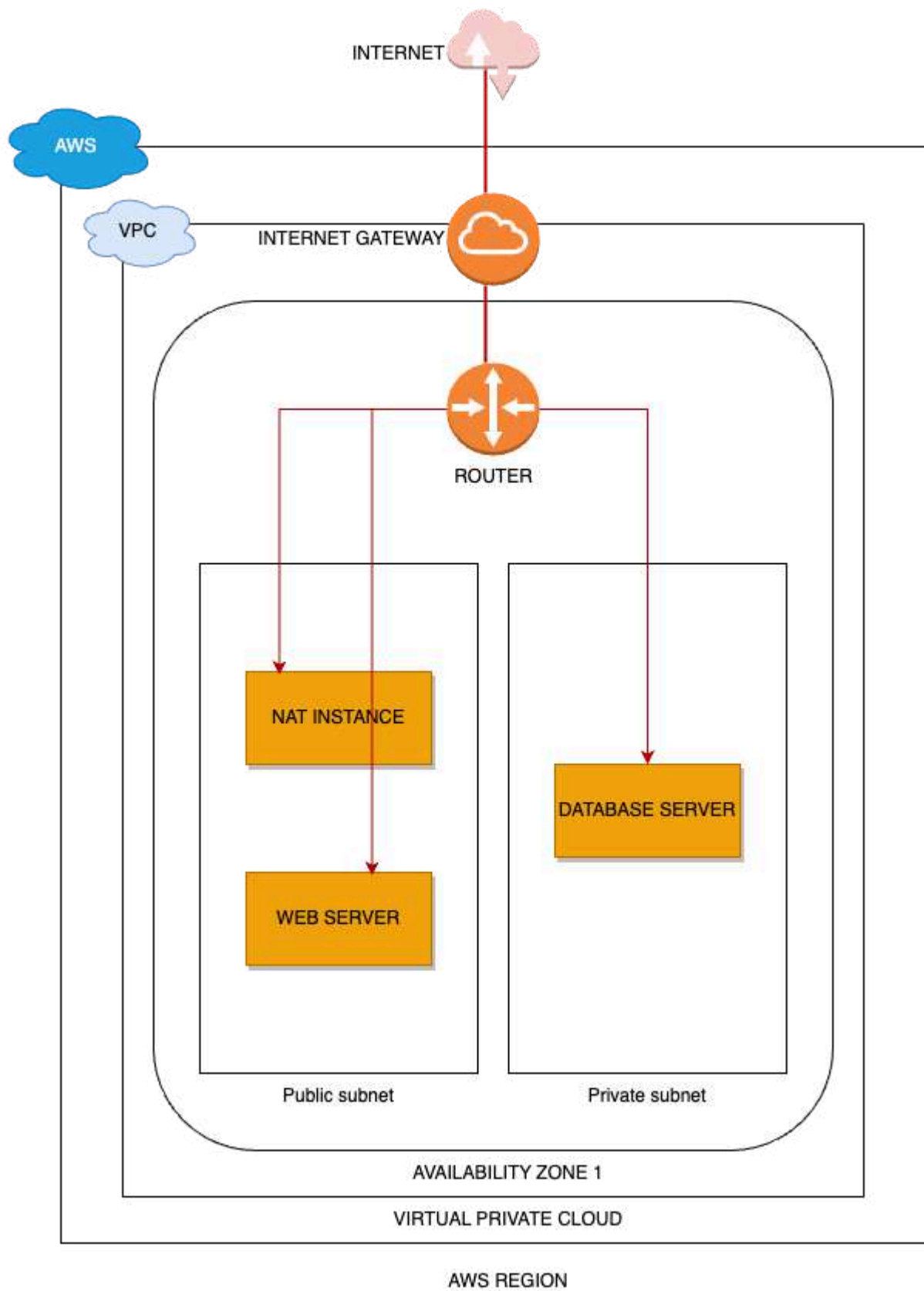
Arrows indicate the flow of traffic between components.

The flow of the process:



Network Planning and design considerations:

Basic plan:



MASTER PLAN:

High Level Deployment Architecture:

Our primary goal is to create a highly secure and resilient deployment architecture. We have achieved the same by deploying all the services/resources except the app service in a private subnet. Also, we have configured multiple rules in security groups to limit the access from the external world. As you can see below the MySQL instance in the private subnet can only be accessed via the public subnet and hence the external world does not have any access to it.

We have configured NAT Gateway in order to allow EC2 instances from private subnets to access the internet. Ideally, we shall temporarily allow this access until required packages are installed.

Here are the primary steps that I have followed.

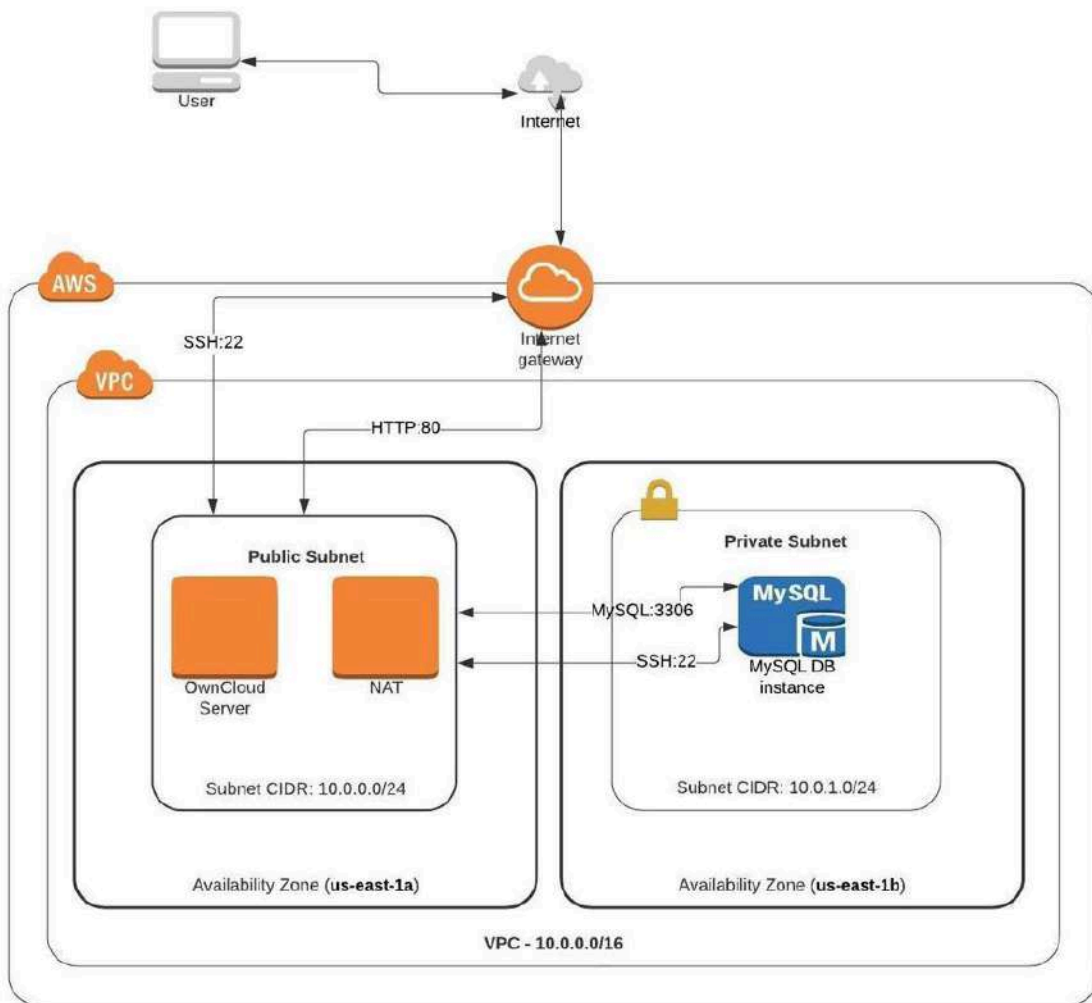
Keeping security in mind we have installed the MySQL server in EC2 instance in a private subnet.

In order to install the MySQL server the private EC2 instance needs outbound access to the internet. This is achieved by configuring NAT in the public subnet and then followed by adding it to the default route table.

Only two ports are open from My SQL server from the public subnet. Those ports are SSH: 22 and MySQL: 3306

OwnCloud app server is installed in an EC2 instance in the public subnet. The app server has two ports exposed; SSH: 22 & HTTP: 80 NAT gateway is configured in the public subnet.

I could have created a NAT instance, but I tried to save the resources by using a NAT gateway.



***note - for visual representation follow the photo gallery**

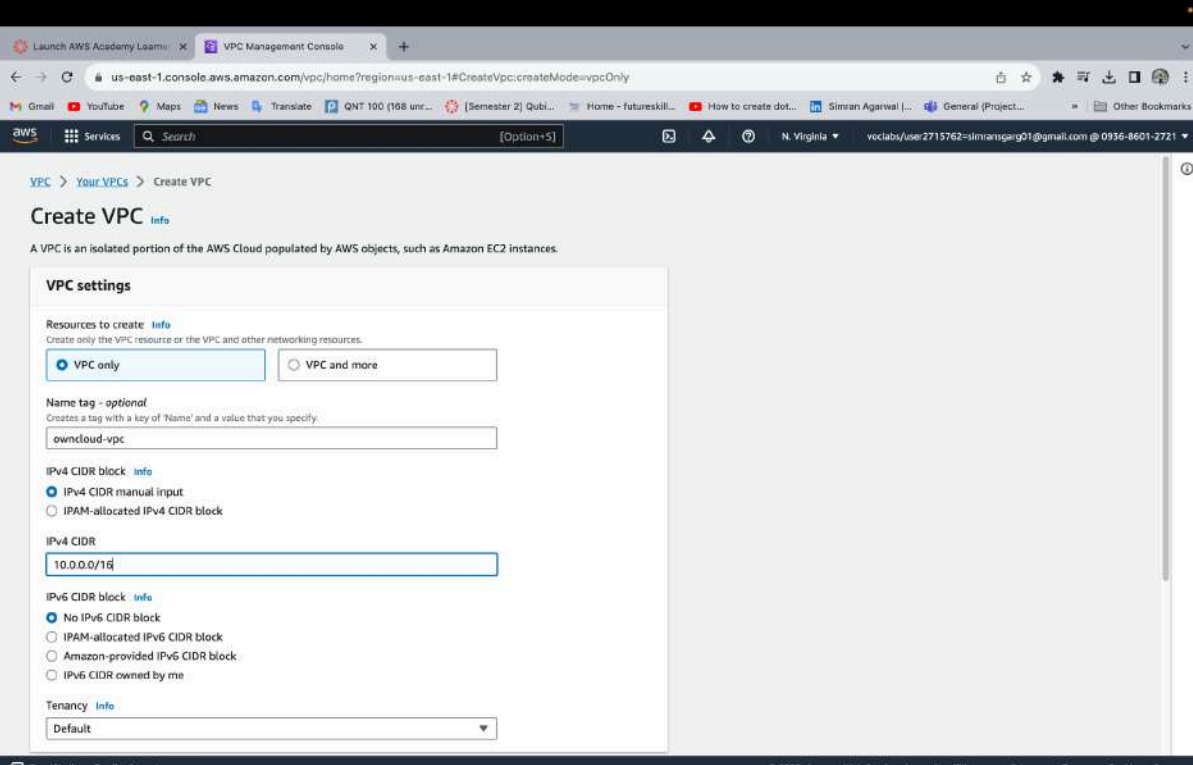
PHASE 2: IMPLEMENTATION

A. Create Custom VPC:

Create a custom VPC named "owncloud-vpc."

Implement two different subnets within this VPC: one public and one private. Define appropriate IP address ranges and routing tables for each subnet.

Create a custom VPC (owncloud-vpc) with CIDR 10.0.0.0/16



The screenshot shows the AWS Management Console 'Create VPC' page. The breadcrumb navigation is 'VPC > Your VPCs > Create VPC'. The page title is 'Create VPC' with an 'Info' link. A descriptive text states: 'A VPC is an isolated portion of the AWS Cloud populated by AWS objects, such as Amazon EC2 instances.' The 'VPC settings' section contains the following fields and options:

- Resources to create:** Two radio buttons: 'VPC only' (selected) and 'VPC and more'.
- Name tag - optional:** A text input field containing 'owncloud-vpc'. A note below states: 'Creates a tag with a key of 'Name' and a value that you specify.'
- IPv4 CIDR block:** Two radio buttons: 'IPv4 CIDR manual input' (selected) and 'IPAM-allocated IPv4 CIDR block'.
- IPv4 CIDR:** A text input field containing '10.0.0.0/16'.
- IPv6 CIDR block:** Four radio buttons: 'No IPv6 CIDR block' (selected), 'IPAM-allocated IPv6 CIDR block', 'Amazon-provided IPv6 CIDR block', and 'IPv6 CIDR owned by me'.
- Tenancy:** A dropdown menu with 'Default' selected.

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VPC Management Console

us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#VpcDetails:VpcId=vpc-027392ad23443bd06

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VPC dashboard

EC2 Global View

Filter by VPC:

Select a VPC

Virtual private cloud

Your VPCs

Subnets

Route tables

Internet gateways

Egress-only internet gateways

Carrier gateways

DHCP option sets

Elastic IPs

Managed prefix lists

Endpoints

Endpoint services

NAT gateways

Peering connections

Security

Network ACLs

Security groups

DNS firewall

You successfully created vpc-027392ad23443bd06 / owncloud-vpc

VPC > Your VPCs > vpc-027392ad23443bd06

vpc-027392ad23443bd06 / owncloud-vpc

Actions

Details

VPC ID	State	DNS hostnames	DNS resolution
vpc-027392ad23443bd06	Available	Disabled	Enabled
Tenancy	DHCP option set	Main route table	Main network ACL
Default	dopt-04ff69bc5fd237a9e	rtb-0894745e39244b01c	acl-0198654197184f254
Default VPC	IPv4 CIDR	IPv6 pool	IPv6 CIDR (Network border group)
No	10.0.0.0/16	-	-
Network Address Usage metrics	Route 53 Resolver DNS Firewall rule groups	Owner ID	
Disabled	Failed to load rule groups	093686012721	

Resource map

CIDRsFlow logsTags

Resource map

VPC

Your AWS virtual network

owncloud-vpc

Subnets (0)

Subnets within this VPC

Route tables (1)

Route network traffic to resources

rtb-0894745e39244b01c

CloudShellFeedbackLanguage

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B. Internet Gateway:

An Internet Gateway is a fundamental component in Amazon Web Services (AWS) that enables communication between resources within a Virtual Private Cloud (VPC) and the internet. It acts as a horizontally scaled, highly available VPC component that allows traffic to flow between the VPC and the public internet.

Create an internet gateway (owncloud-igw) and attach it to the VPC (owncloud-vpc).

The screenshot displays the AWS Management Console interface for an Internet Gateway. A green notification banner at the top states: "The following internet gateway was created: igw-00740ee0968c8be97 - owncloud-igw. You can now attach to a VPC to enable the VPC to communicate with the internet." Below this, the breadcrumb navigation shows "VPC > Internet gateways > igw-00740ee0968c8be97". The main heading is "igw-00740ee0968c8be97 / owncloud-igw".

The "Details" section shows the following information:

Internet gateway ID	State	VPC ID	Owner
igw-00740ee0968c8be97	Detached	-	093686012721

The "Tags" section shows a single tag:

Key	Value
Name	owncloud-igw

The left sidebar contains the navigation menu with categories: Virtual private cloud, Security, and DNS firewall. The bottom of the console shows the footer with "CloudShell", "Feedback", "Language", and copyright information for Amazon Web Services, Inc. or its affiliates.

C. Subnets:

The two subnets - one public and one private - within the VPC.

Public subnet will have CIDR 10.0.0.0/24 called owncloud-public-sn.

Auto-assign IP address will be set as enabled.

Private subnet will have CIDR 10.0.1.0/24 called owncloud-private-sn.

The screenshot shows the AWS Management Console interface for creating a new subnet. The browser address bar indicates the URL is `us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#CreateSubnet:`. The page title is "Subnet settings" with the instruction "Specify the CIDR blocks and Availability Zone for the subnet."

Subnet 1 of 1

Subnet name: Create a tag with a key of 'Name' and a value that you specify. The input field contains `owncloud-public-sn`. A note states: "The name can be up to 255 characters long."

Availability Zone: Choose the zone in which your subnet will reside, or let Amazon choose one for you. The dropdown menu is set to `US East (N. Virginia) / us-east-1a`.

IPv4 CIDR block: The input field contains `10.0.0.0/24`.

Tags - optional:

Key	Value - optional	
<code>Name</code>	<code>owncloud-public-sn</code>	<button>Remove</button>

Add new tag

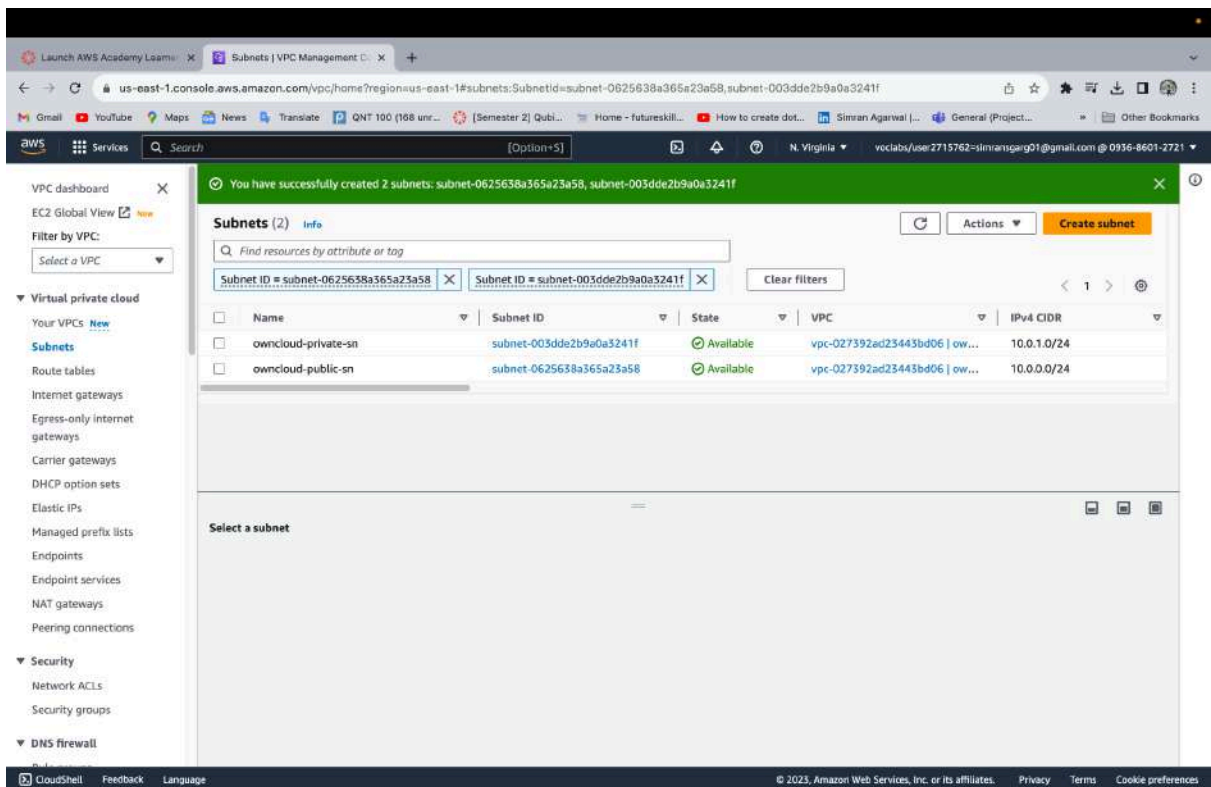
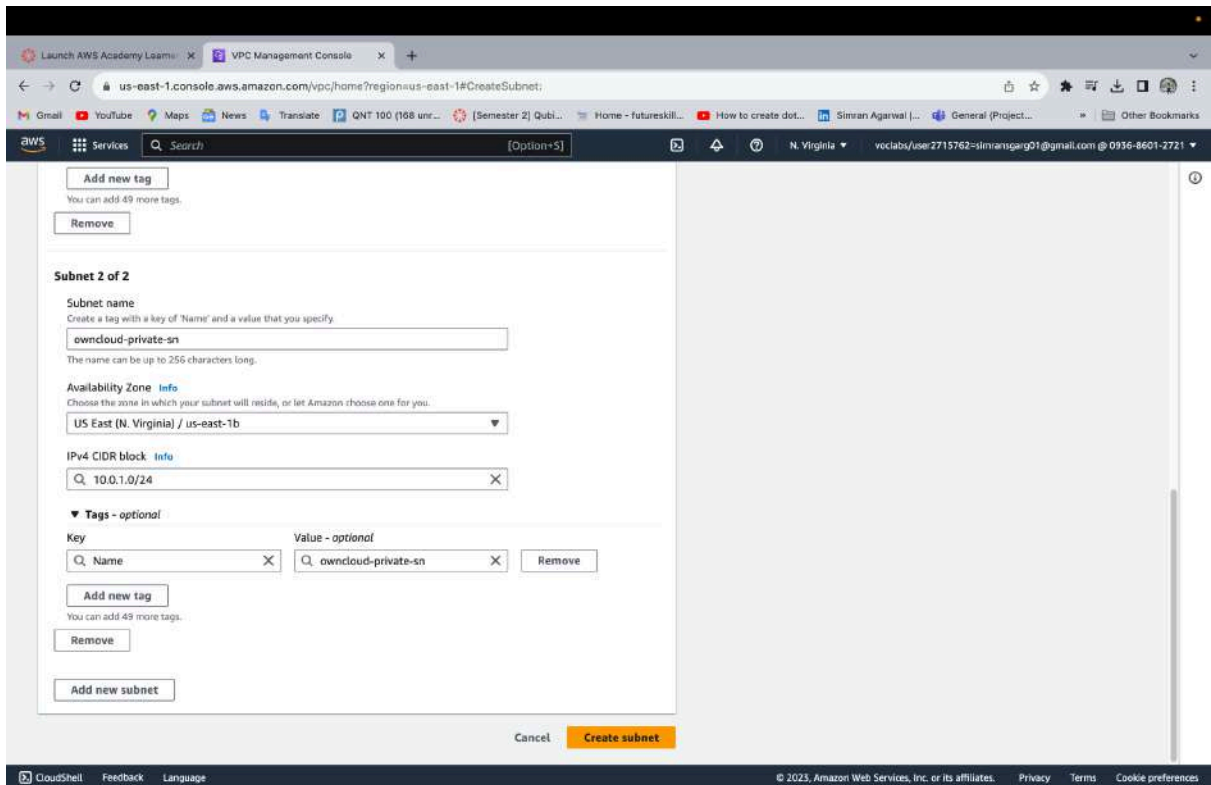
You can add 49 more tags.

Remove

Add new subnet

At the bottom right of the form are Cancel and Create subnet.

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D. ROUTE TABLES:

Route tables determine how traffic is directed within a VPC, and they are associated with one or more subnets.

Each subnet in a VPC must be associated with a specific route table. When you create a subnet, you can either choose the default VPC route table or create a custom route table and associate it with the subnet.

The screenshot shows the AWS Management Console interface for creating a new route table. The browser address bar indicates the URL is `us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#CreateRouteTable:`. The page title is "Create route table" with an "Info" link. Below the title, a brief description states: "A route table specifies how packets are forwarded between the subnets within your VPC, the internet, and your VPN connection."

The main form is divided into two sections:

- Route table settings:** This section contains two fields. The first is "Name - optional" with a subtext "Create a tag with a key of 'Name' and a value that you specify." The input field contains the text "owncloud-public-rt". The second field is "VPC" with a subtext "The VPC to use for this route table." It is a dropdown menu currently showing "vpc-027392ad23443bd06 (owncloud-vpc)".
- Tags:** This section explains that a tag is a label assigned to an AWS resource. It includes a table for adding tags:

Key	Value - optional	
Q Name	owncloud-public-rt	Remove

Below the table is an "Add new tag" button and a note: "You can add 49 more tags."

At the bottom of the form are two buttons: "Cancel" and "Create route table". The footer of the console shows "CloudShell", "Feedback", "Language", and copyright information for Amazon Web Services, Inc. or its affiliates, along with links for "Privacy", "Terms", and "Cookie preferences".

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us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#RouteTableDetails:RouteTableId=rtb-04abfcc8f583bcff

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VPC dashboard X
EC2 Global View
Filter by VPC:
Select a VPC

Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
Carrier gateways
DHCP option sets
Elastic IPs
Managed prefix lists
Endpoints
Endpoint services
NAT gateways
Peering connections

Security
Network ACLs
Security groups

DNS firewall

You have successfully updated subnet associations for rtb-04abfcc8f583bcff / owncloud-public-rt.

Details info

Route table ID
rtb-04abfcc8f583bcff

Main
No

Explicit subnet associations
subnet-0625638a365a23a58 / owncloud-public-sn

Edge associations
-

VPC
vpc-027392ad23443bd06 | owncloud-vpc

Owner ID
093686012721

Routes Subnet associations Edge associations Route propagation Tags

Explicit subnet associations (1)

Find subnet association

Name	Subnet ID	IPv4 CIDR	IPv6 CIDR
owncloud-public-sn	subnet-0625638a365a23a58	10.0.0.0/24	-

Subnets without explicit associations (1)

The following subnets have not been explicitly associated with any route tables and are therefore associated with the main route table:

Find subnet association

Name	Subnet ID	IPv4 CIDR	IPv6 CIDR
owncloud-private-sn	subnet-005dde2b9a0a3241f	10.0.1.0/24	-

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us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#EditRoutes:RouteTableId=rtb-04abfcc8f583bcff

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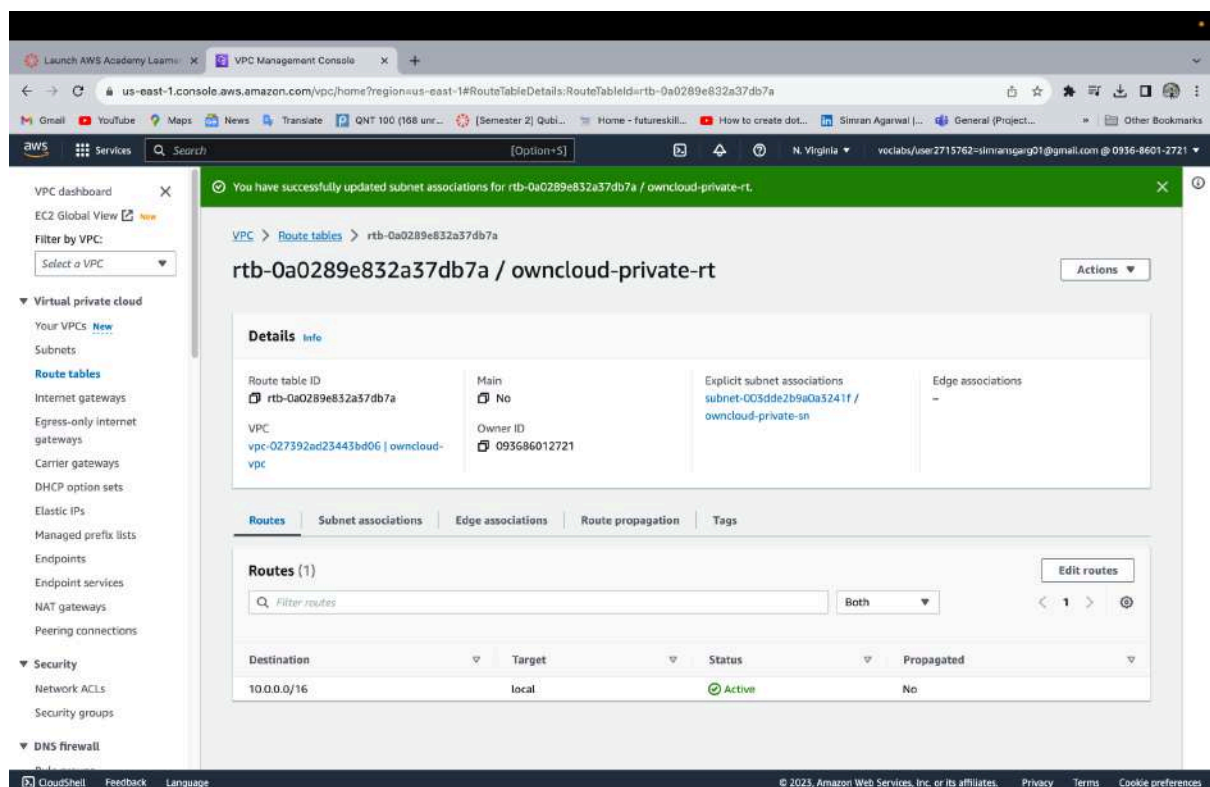
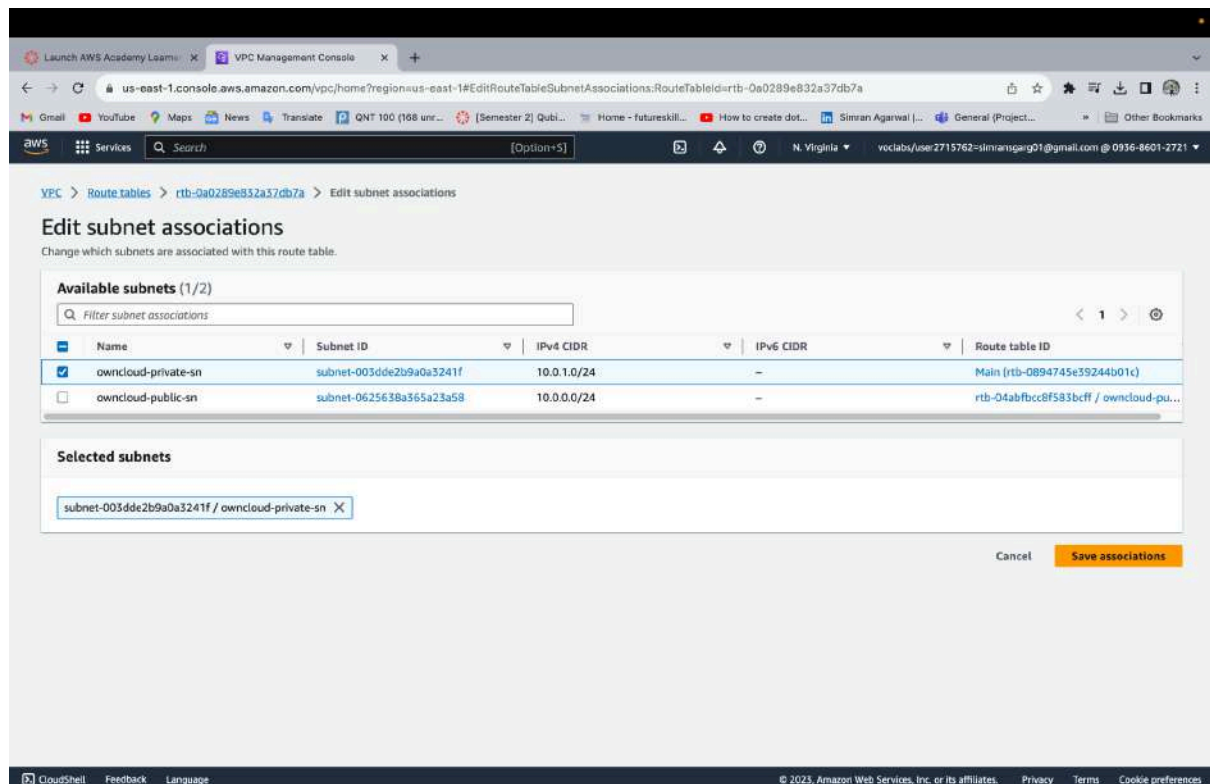
VPC > Route tables > rtb-04abfcc8f583bcff > Edit routes

Edit routes

Destination	Target	Status	Propagated
10.0.0.0/16	local	Active	No
0.0.0.0/0	igw-00740ee0968c8be97	-	No

Cancel Preview **Save changes**

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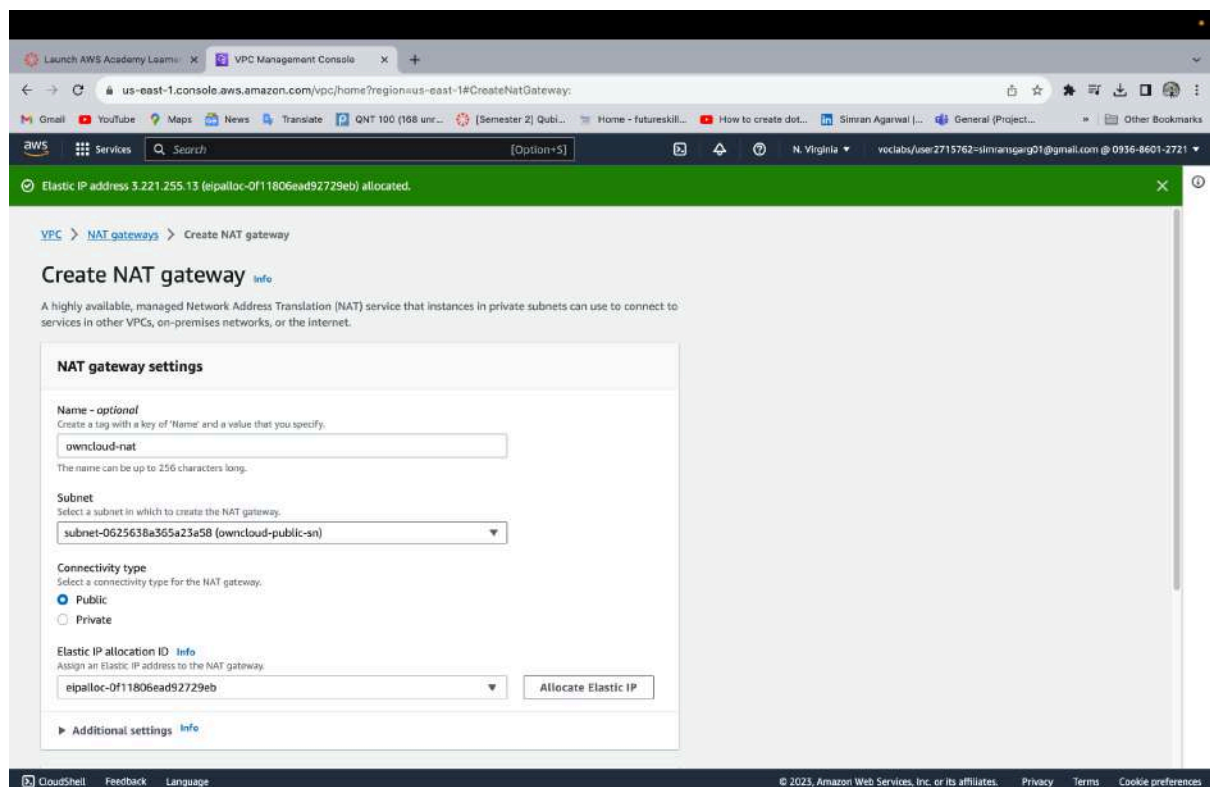
Private subnet needs to be connected to a public subnet in-order to establish a connection between the web application and the database. To establish this connection we will install the NAT Gateway on the Public Subnet and with the help of it we will route the connection to the

Private Subnet.

E. NAT GATEWAY:

NAT Gateways are primarily used for handling outbound traffic from private subnets within your VPC.

Resources like EC2 instances in private subnets can send requests to the internet via the NAT Gateway to access services, retrieve updates, or download software packages.



The screenshot shows the AWS Management Console interface for creating a NAT gateway. At the top, a green notification bar states: "Elastic IP address 3.221.255.13 (eipalloc-0f11806ead92729eb) allocated." The breadcrumb navigation shows "VPC > NAT gateways > Create NAT gateway". The main heading is "Create NAT gateway" with an "info" link. Below this is a descriptive paragraph: "A highly available, managed Network Address Translation (NAT) service that instances in private subnets can use to connect to services in other VPCs, on-premises networks, or the internet." The "NAT gateway settings" section contains the following fields and options:

- Name - optional:** A text input field containing "owncloud-nat". Below the field, it says: "Create a tag with a key of 'Name' and a value that you specify. The name can be up to 256 characters long."
- Subnet:** A dropdown menu showing "subnet-0625638a365a23e58 (owncloud-public-sn)".
- Connectivity type:** Two radio buttons: "Public" (selected) and "Private".
- Elastic IP allocation ID:** A dropdown menu showing "eipalloc-0f11806ead92729eb". To the right of the dropdown is a button labeled "Allocate Elastic IP".
- At the bottom of the settings section is a link: "Additional settings info".

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F. SECURITY GROUPS:

Security groups are rule-based, meaning you define rules that specify what traffic is allowed or denied. Each rule is associated with a specific security group.

Public sg:

The screenshot shows the 'Create security group' page in the AWS Management Console. The page is titled 'Create security group' and includes a sub-header 'Basic details'. The 'Security group name' field is 'owncloud-public-sg', the 'Description' is 'owncloud public sg', and the 'VPC' is 'vpc-027392ad23443bd06'. The 'Inbound rules' section shows two rules: SSH (TCP, port 22, source Anywhere) and HTTP (TCP, port 80, source Anywhere). Both rules have a source range of '0.0.0.0/0'.

Launch AWS Academy Learn... X Security groups | EC2 | us-east-1 X +

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateSecurityGroup:

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Create security group

A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.

Basic details

Security group name [Info](#)
owncloud-public-sg
Name cannot be edited after creation.

Description [Info](#)
owncloud public sg

VPC [Info](#)
vpc-027392ad23443bd06 X

Inbound rules [Info](#)

Type Info	Protocol Info	Port range Info	Source Info	Description - optional Info
SSH	TCP	22	Anywhere	
			0.0.0.0/0 X	
HTTP	TCP	80	Anywhere	
			0.0.0.0/0 X	

Add rule

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Private sg:

The screenshot shows the 'Create security group' page in the AWS Management Console. The page is titled 'Create security group' and includes a sub-header 'Basic details'. The 'Security group name' field is 'owncloud-private-sg', the 'Description' is 'owncloud private sg', and the 'VPC' is 'vpc-027392ad23443bd06'. The 'Inbound rules' section shows two rules: SSH (TCP, port 22, source Custom) and MySQL/Aurora (TCP, port 3306, source Custom). Both rules have a source range of '10.0.0.0/24'.

Launch AWS Academy Learn... X Security groups | EC2 | us-east-1 X +

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateSecurityGroup:

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EC2 > Security Groups > Create security group

Create security group

A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.

Basic details

Security group name [Info](#)
owncloud-private-sg
Name cannot be edited after creation.

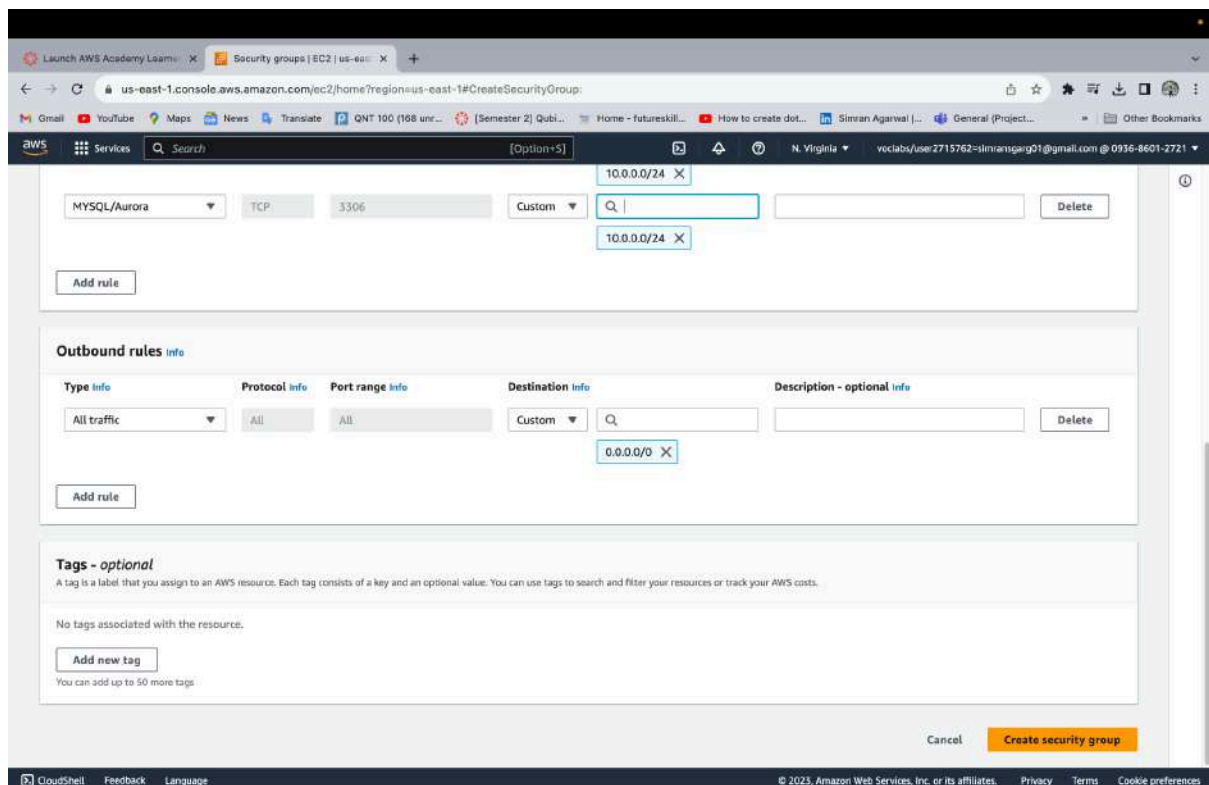
Description [Info](#)
owncloud private sg

VPC [Info](#)
vpc-027392ad23443bd06 X

Inbound rules [Info](#)

Type Info	Protocol Info	Port range Info	Source Info	Description - optional Info
SSH	TCP	22	Custom	
			10.0.0.0/24 X	
MySQL/Aurora	TCP	3306	Custom	
			10.0.0.0/24 X	

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G. EC2 INSTANCES:

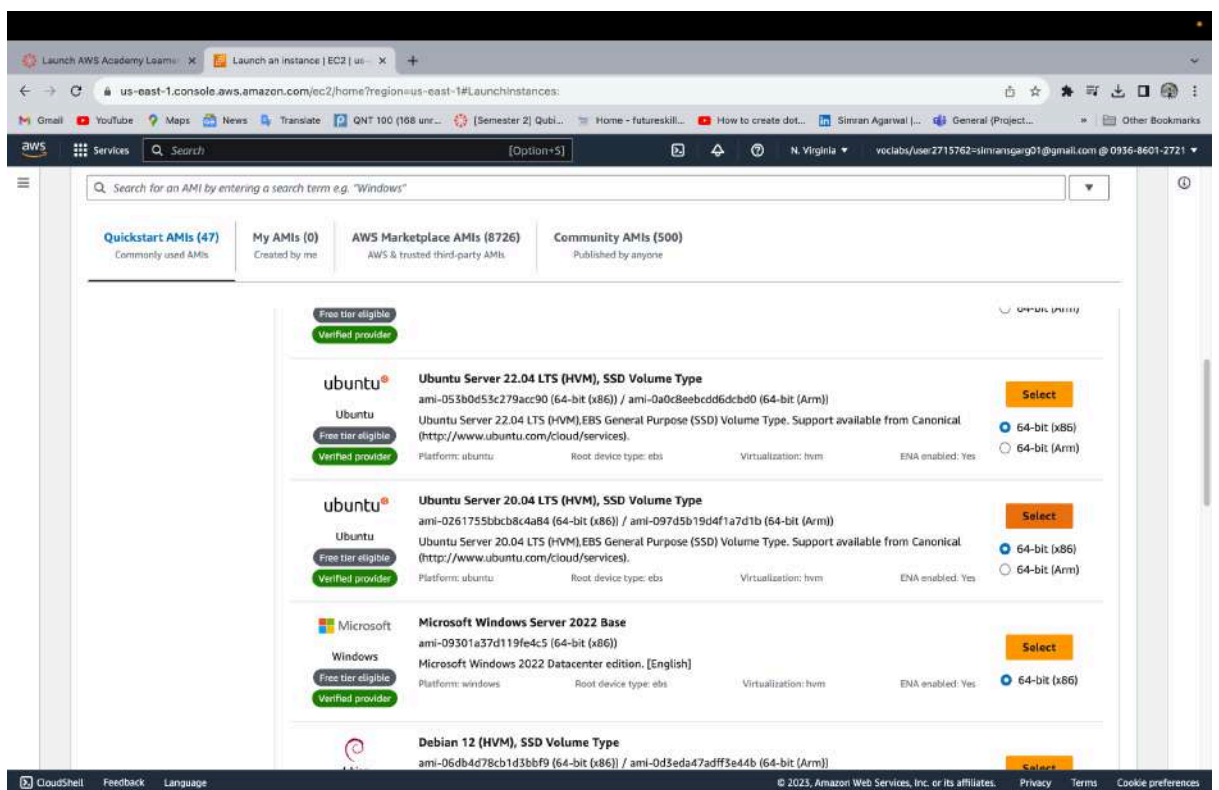
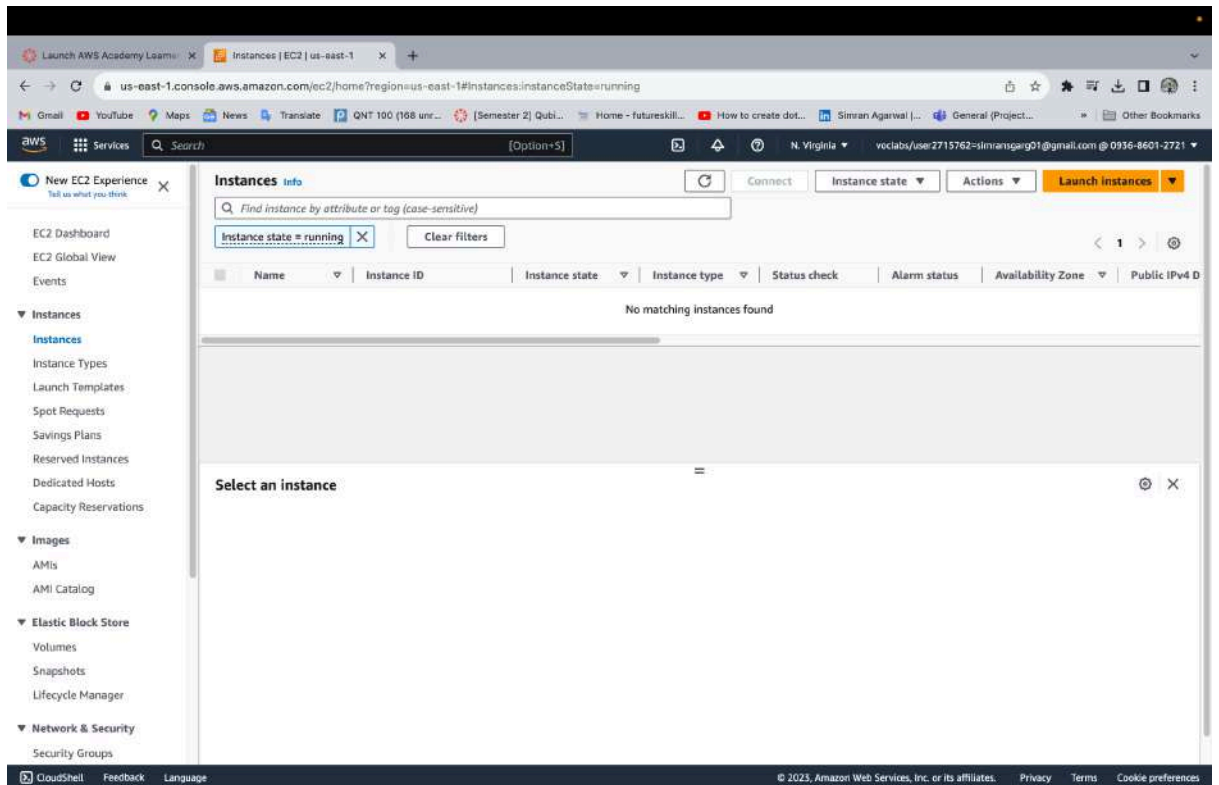
CONNECTION AND CONFIGURATION (OWNCLOUD):

We will follow the following procedure to install and configure owncloud on Public Subnet and MySQL on Private Subnet.

G1. PUBLIC INSTANCE:

1. Connect to the public instance using SSH
“sudo ssh -i keyx.pem ubuntu@3.81.73.98”
2. Now update and Upgrade the Ubuntu instance
“sudo apt update”
“sudo apt full-upgrade”
3. Install the Apache using the following command,
“sudo apt-get install apache2”

4. Change the directory to /var/www/
“cd /var/www/”
5. Download and extract the owncloud files.
“sudo wget
https://download.owncloud.com/server/stable/owncloud-comple
te-latest.tar.bz2 && \
sudo tar -xjf owncloud-complete-latest.tar.bz2 && \
sudo chown -R www-data. Owncloud”
6. Now run the following command to install the php and some of its
modules.
“sudo apt install php libapache2-mod-php php-mysql”
7. Make index.php as the default first load page by editing the
/etc/apache2/mods-enabled/dir.conf file and make the sequence
of index.php to be the first.
8. Now update the directory root path by editing edit
/etc/apache2/sites-enabled/000-default.conf file and change
/var/www/html to /var/www/owncloud.
9. Install the remaining modules of php
“sudo apt install php-bz2 php-curl php-gd php-imagick php-intl
php-mbstring php-xml php-zip”
10. Restart the apache server
“sudo systemctl reload apache2”
11. Now if you try opening the public ip of the public instance, it
will load up the owncloud admin account creation page.
But configuring the private instance is still pending, we need to
install and configure mysql inorder to use the web application.



Launch AWS Academy Learn... X Launch an Instance | EC2 | us-east-1 X

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

Launch an instance

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

Name and tags

Name: owncloud-public

Application and OS Images (Amazon Machine Image)

Search our full catalog including 1000s of application and OS images

AMI from catalog | Quick Start

Amazon Machine Image (AMI)
ubuntu/images/hvm-ssd/ubuntu-focal-20.04-amd64-server-20230517
ami-0261755bbcb8c4a84

Verified provider | Free tier eligible

Browse more AMIs

Summary

Number of instances: 1

Software Image (AMI)
Ubuntu Server 20.04 LTS (HVM),...read more
ami-0261755bbcb8c4a84

Virtual server type (instance type)
t2.micro

Firewall (security group)
New security group

Storage (volumes)
1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million I/Os, 1 GiB of snapshots, and 100 GB of bandwidth to the internet.

Cancel | Launch instance | Review commands

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Launch AWS Academy Learn... X Launch an Instance | EC2 | us-east-1 X

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

Create key pair

Key pair name
key1

Key pair type
☒ RSA
RSA encrypted private and public key pair

Private key file format
☒ .pem
For use with OpenSSH

When prompted, store the private key in a secure and accessible location on your computer. You will need it later to connect to your instance. Learn more

Cancel | Create key pair

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Launch AWS Academy Learn... Launch an Instance | EC2 | us-east-1

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

Key pair name - required
keyx Create new key pair

▼ Network settings Info

VPC - required Info
vpc-027592ad25443bd06 (owncloud-vpc)
10.0.0.0/16

Subnet Info
subnet-0625658a365a25a58 owncloud-public-sn
VPC: vpc-027592ad25443bd06 Owner: 093686012721
Availability Zone: us-east-1a IP addresses available: 250 CIDR: 10.0.0.0/24 Create new subnet

Auto-assign public IP Info
Enable

Firewall (security groups) Info
A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.
☐ Create security group ☒ Select existing security group

Common security groups Info
Select security groups
owncloud-public-sg sg-04cdc99edb56d3477 X
VPC: vpc-027592ad25443bd06 Compare security group rules

Security groups that you add or remove here will be added to or removed from all your network interfaces.

► Advanced network configuration

▼ Summary

Number of instances Info
1

Software image (AMI)
Ubuntu Server 20.04 LTS (HVM),...read more
ami-0261755bbcb8c4a84

Virtual server type (instance type)
t2.micro

Firewall (security group)
owncloud-public-sg

Storage (volumes)
1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million I/Os, 1 GiB of snapshots, and 100 GB of bandwidth to the internet.

Cancel Launch instance Review commands

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Launch AWS Academy Learn... Launch an Instance | EC2 | us-east-1

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

▼ Summary

Number of instances Info
1

Software image (AMI)
Ubuntu Server 20.04 LTS (HVM),...read more
ami-0261755bbcb8c4a84

Virtual server type (instance type)
t2.micro

Firewall (security group)
owncloud-public-sg

Storage (volumes)
1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million I/Os, 1 GiB of snapshots, and 100 GB of bandwidth to the internet.

Cancel Launch instance Review commands

▼ Configure storage Info Advanced

1x 8 GiB gp2 Root volume (Not encrypted)

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage

Add new volume

The selected AMI contains more instance store volumes than the instance allows. Only the first 0 instance store volumes from the AMI will be accessible from the instance.

0 x File systems Edit

► Advanced details Info

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Launch AWS Academy Learn... X Launch an Instance | EC2 | us-east-1 X

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

Success
Successfully initiated launch of Instance (i-0470854324c2dcf6a)

Launch log

Initializing requests ✓ Succeeded

Launch initiation ✓ Succeeded

Next Steps

What would you like to do next with this instance, for example "create alarm" or "create backup"

Create billing and free tier usage alerts
To manage costs and avoid surprise bills, set up email notifications for billing and free tier usage thresholds.
[Create billing alerts](#)

Connect to your instance
Once your instance is running, log into it from your local computer.
[Connect to instance](#)
[Learn more](#)

Connect an RDS database
Configure the connection between an EC2 instance and a database to allow traffic flow between them.
[Connect an RDS database](#)
[Create a new RDS database](#)
[Learn more](#)

Create EBS snapshot policy
Create a policy that automates the creation, retention, and deletion of EBS snapshots.
[Create EBS snapshot policy](#)

Manage detailed monitoring

Create Load Balancer

Create AWS budget

Manage CloudWatch alarms

CloudShell Feedback Language

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Launch AWS Academy Learn... X Instances | EC2 | us-east-1 X

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#Instances:

New EC2 Experience
Tell us what you think

EC2 Dashboard
EC2 Global View
Events

Instances

Instances

Instance Types

Launch Templates

Spot Requests

Savings Plans

Reserved Instances

Dedicated Hosts

Capacity Reservations

Images

AMIs

AMI Catalog

Elastic Block Store

Volumes

Snapshots

Lifecycle Manager

Network & Security

Security Groups

Instances (1) Info

Find instance by attribute or tag (case-sensitive)

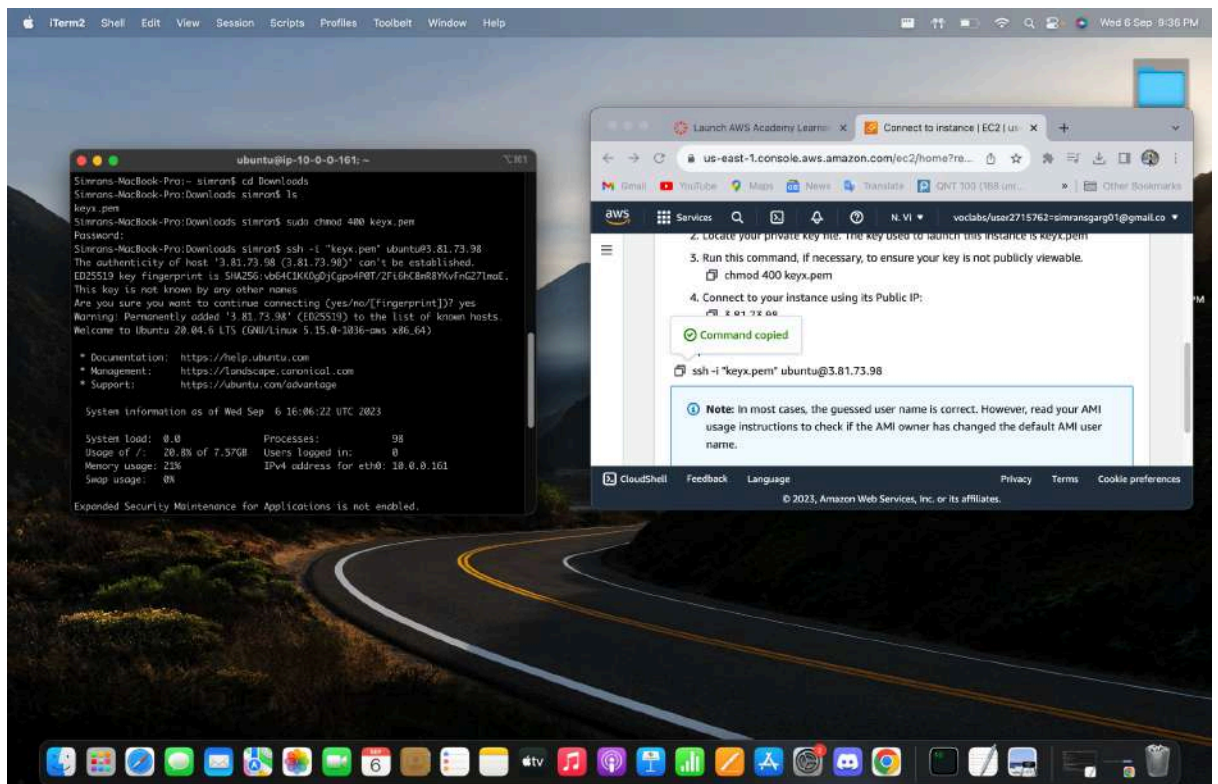
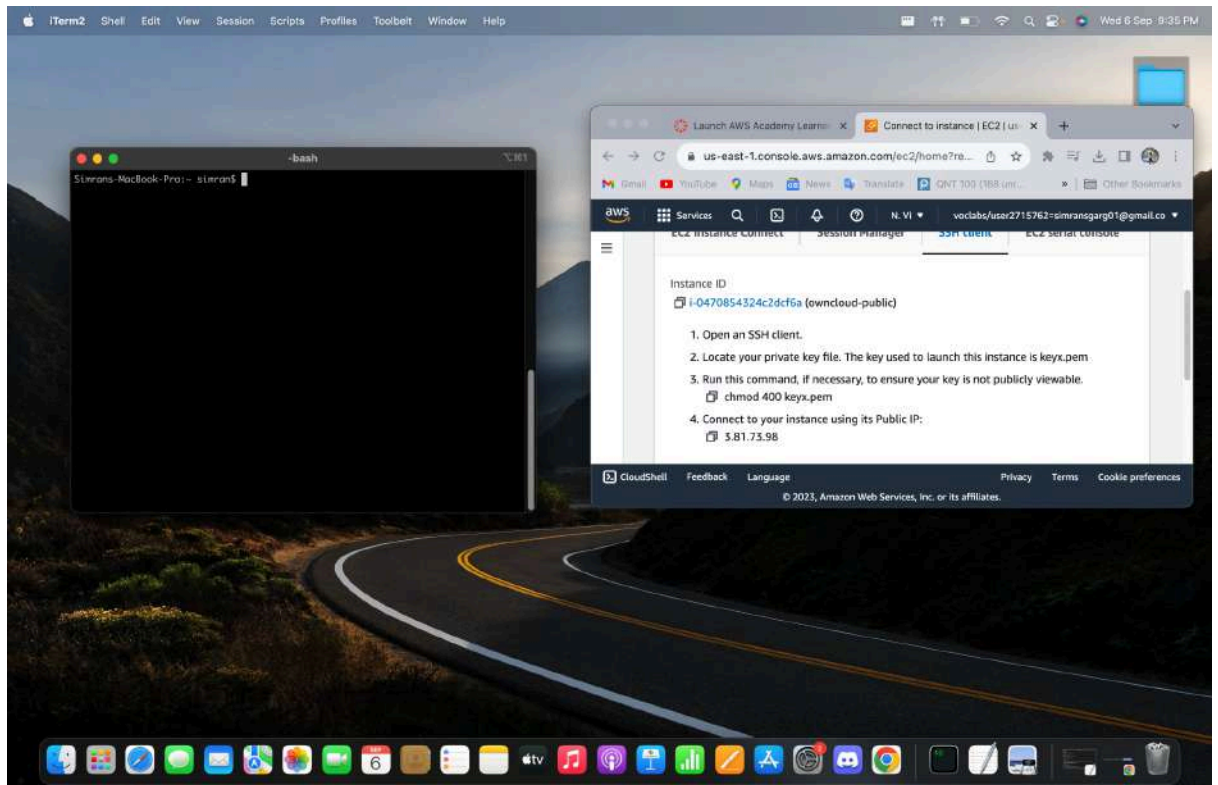
Connect Instance state Actions Launch Instances

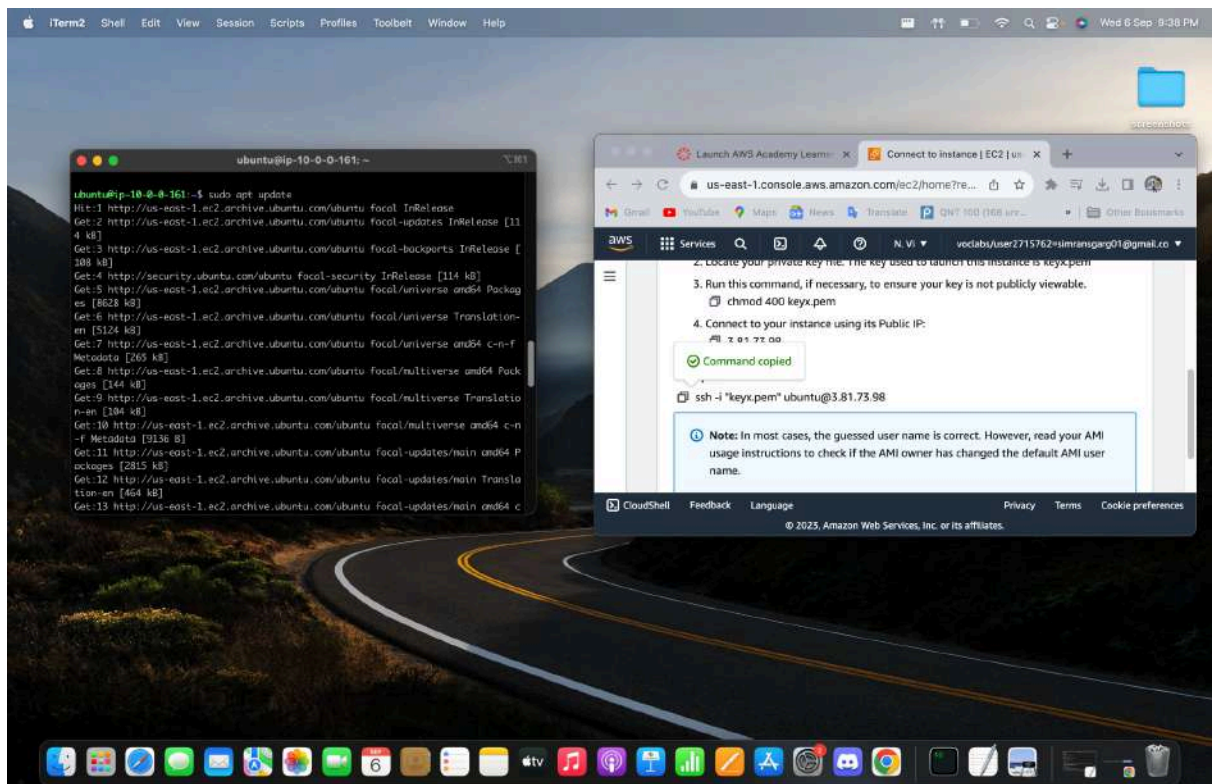
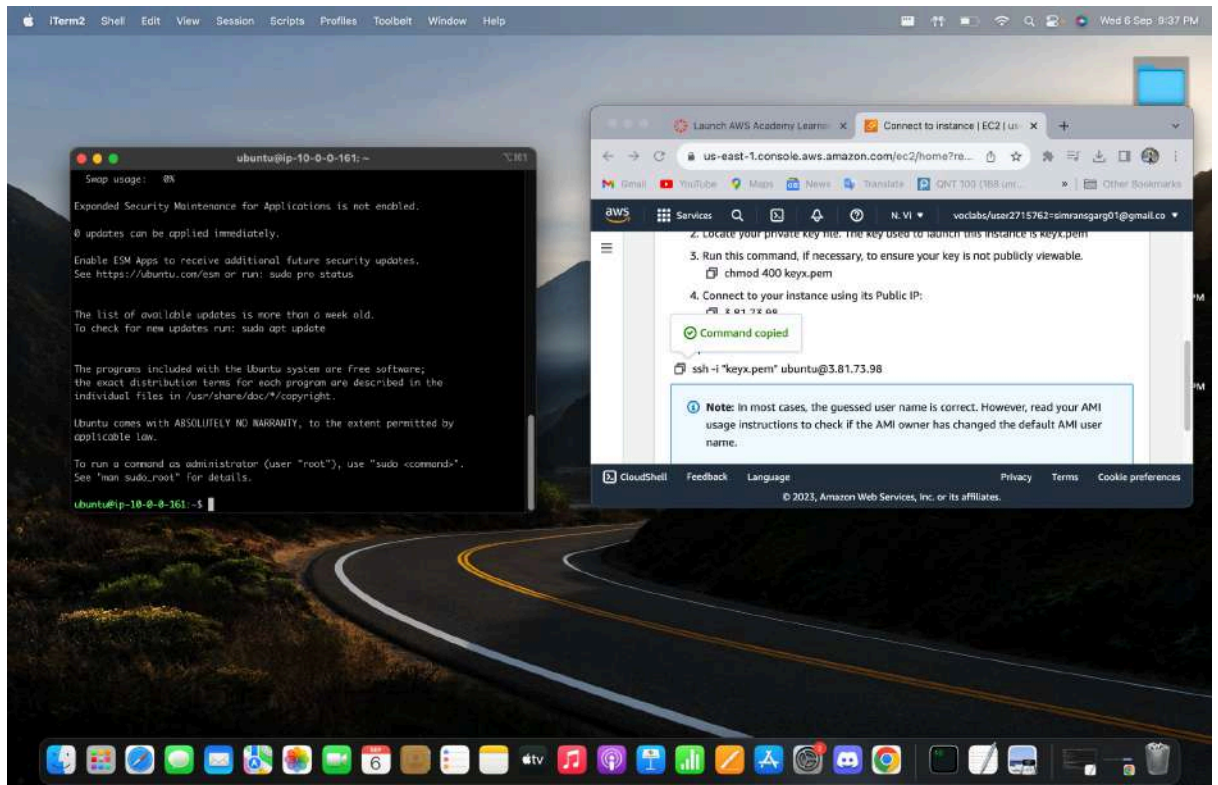
<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 D
<input type="checkbox"/>	owncloud-public	i-0470854324c2dcf6a	Pending	t2.micro	-	No alarms	us-east-1a	-

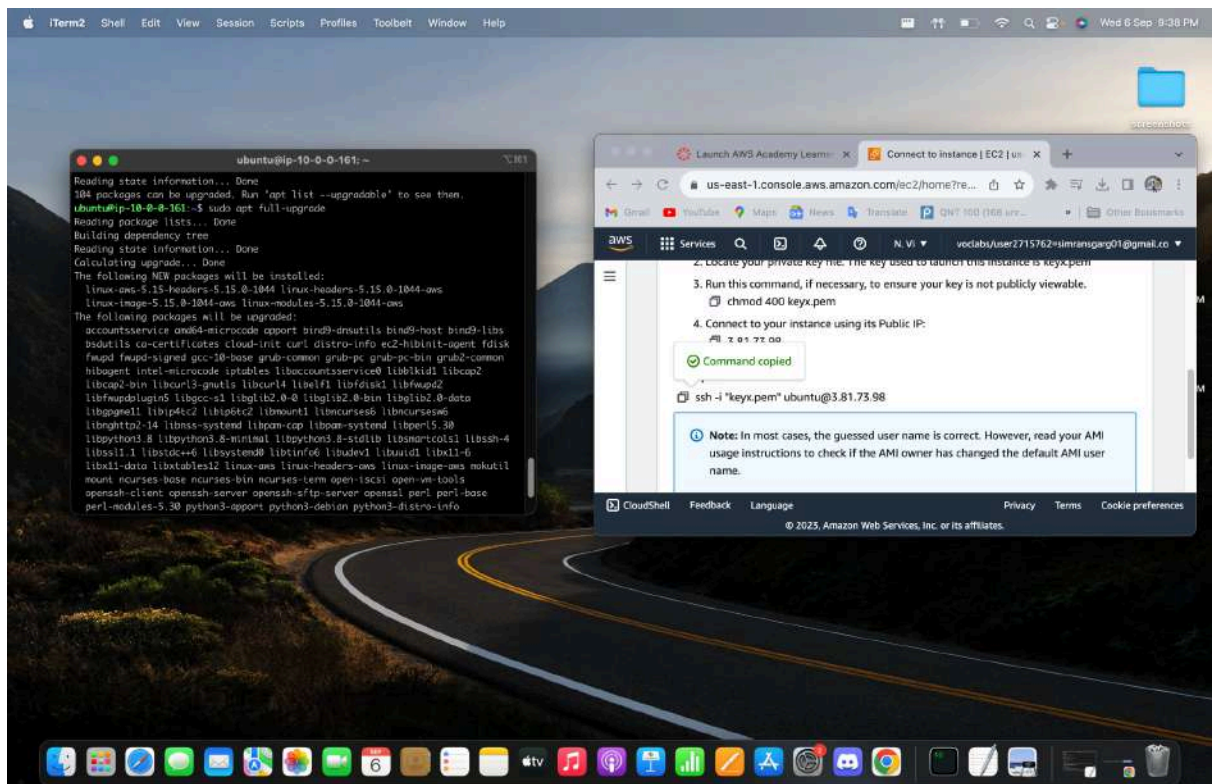
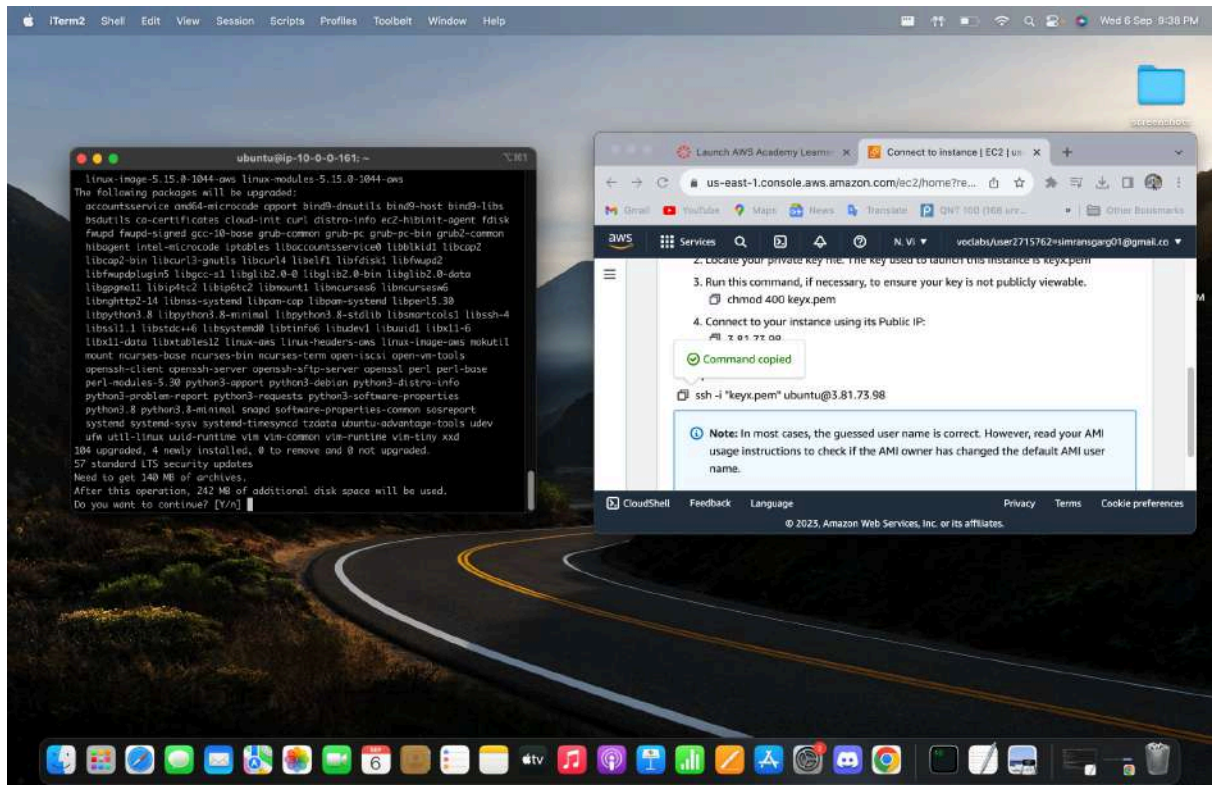
Select an instance

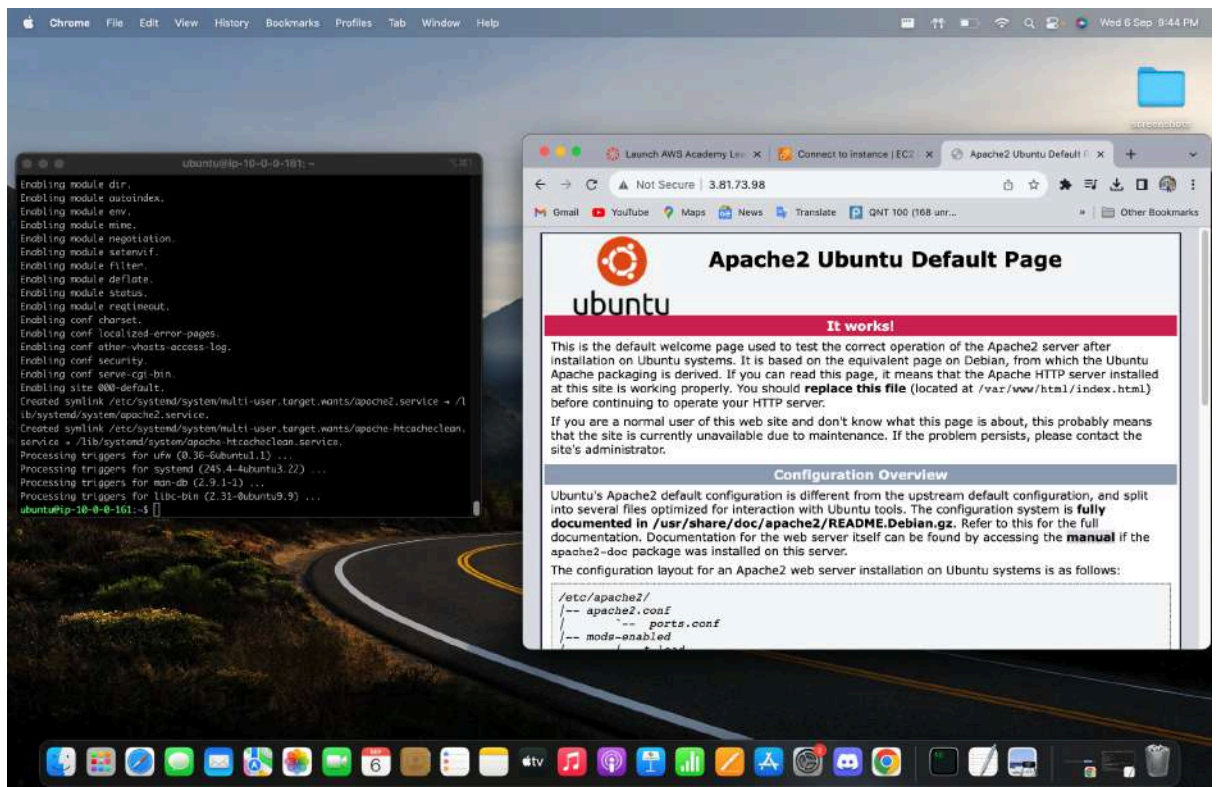
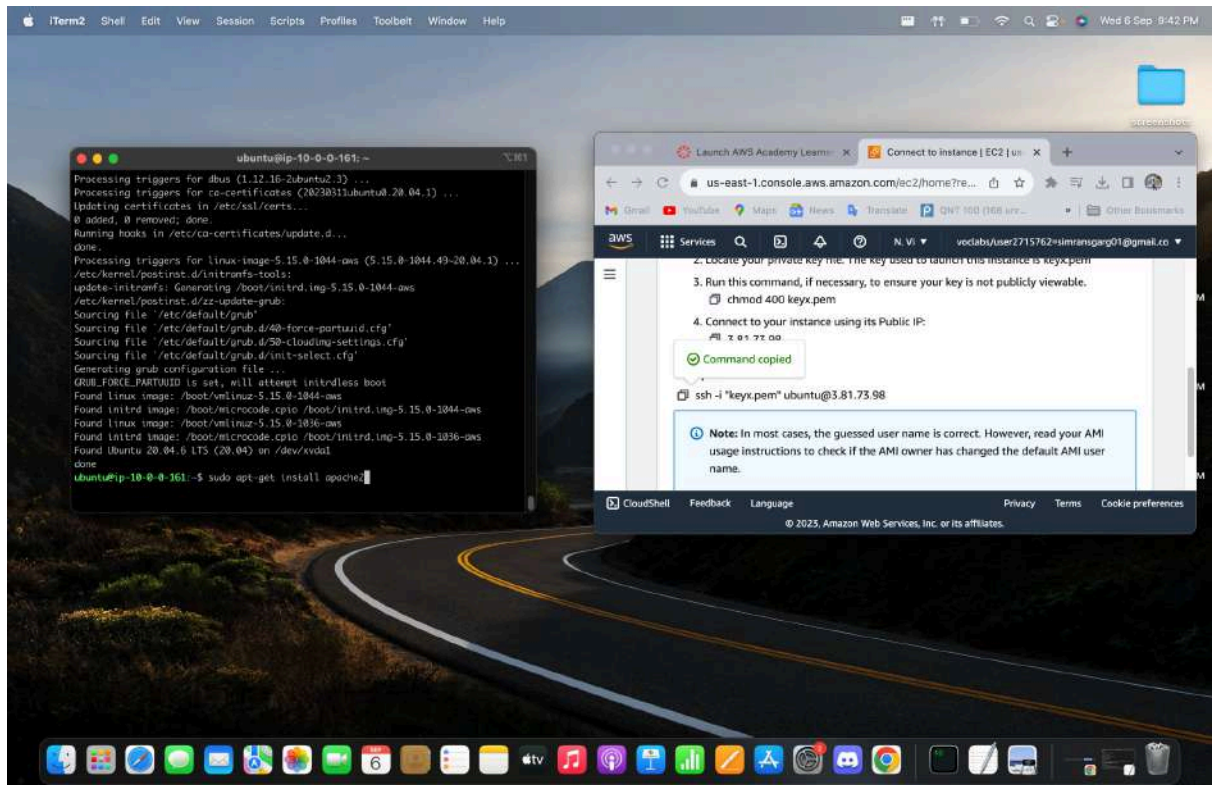
CloudShell Feedback Language

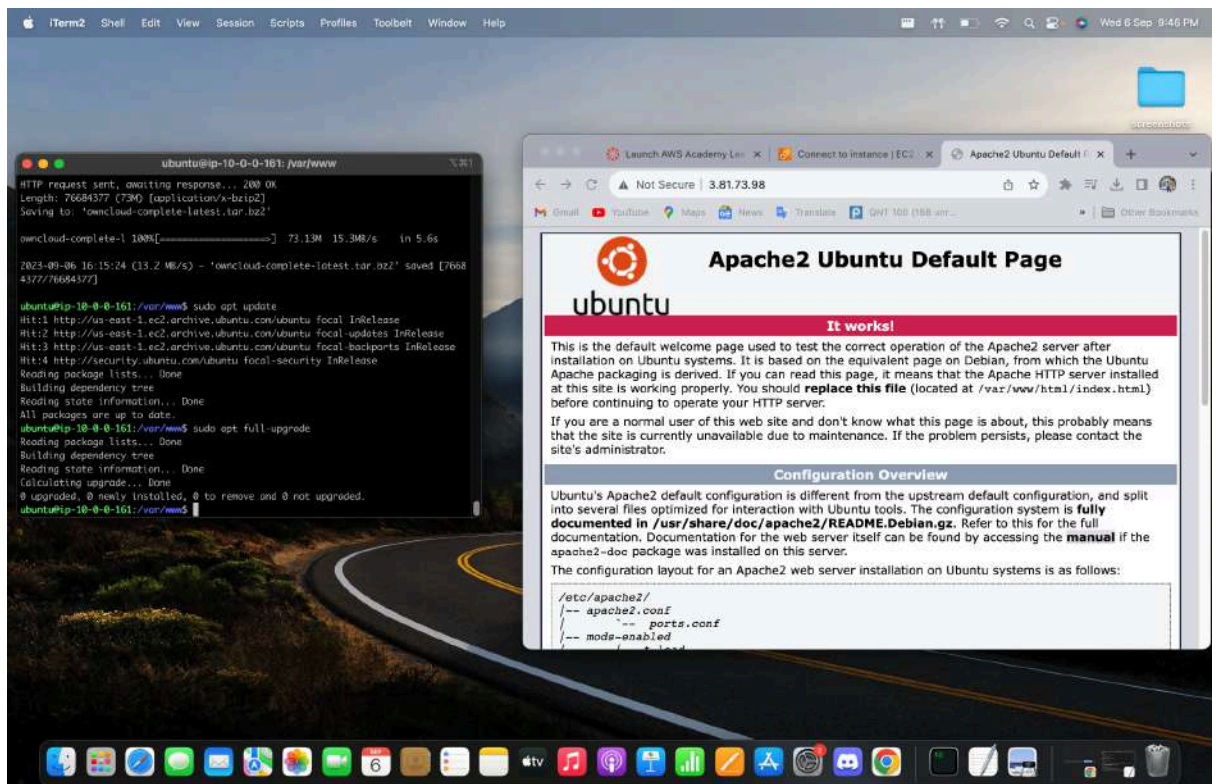
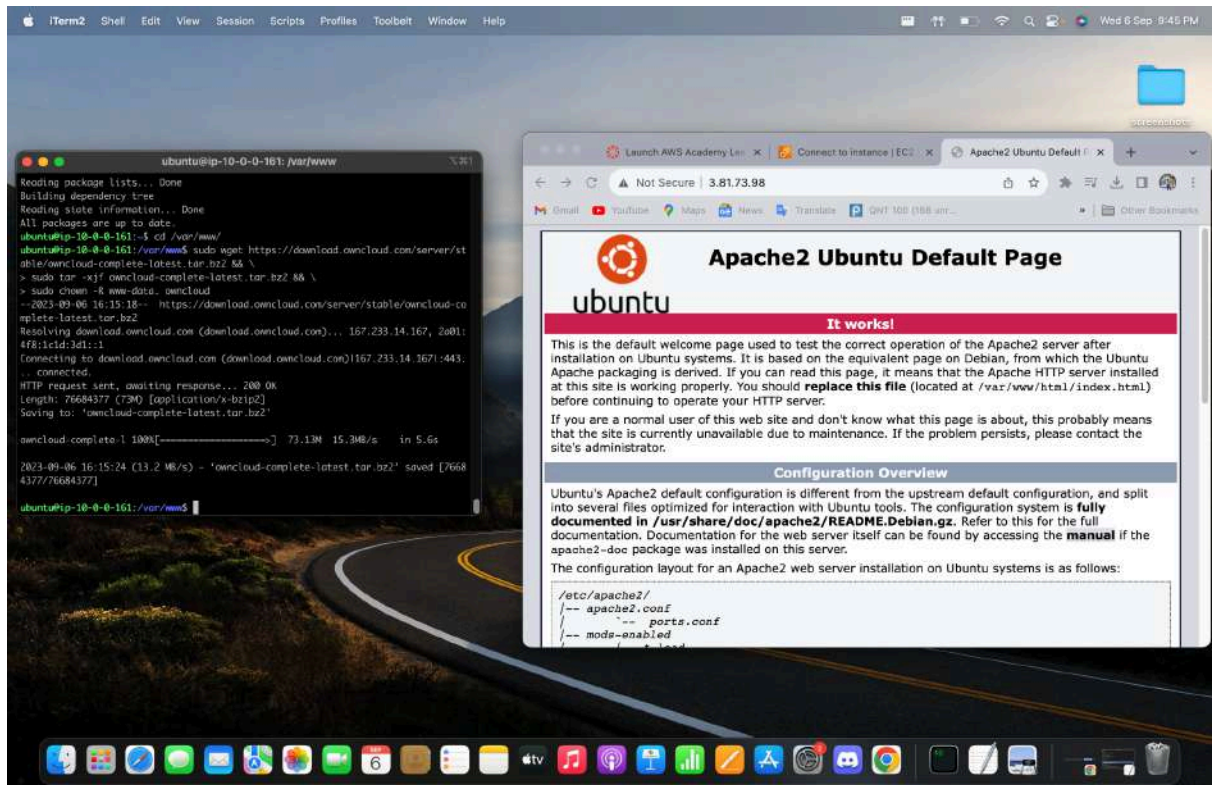
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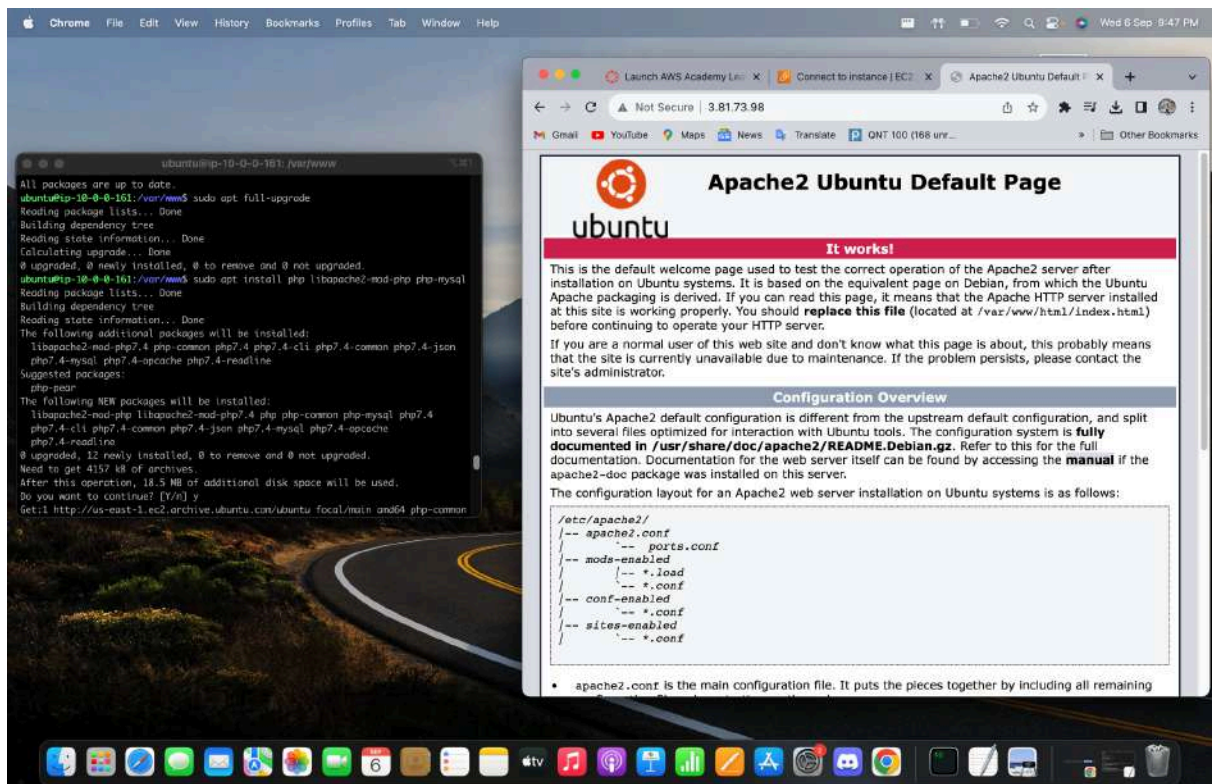
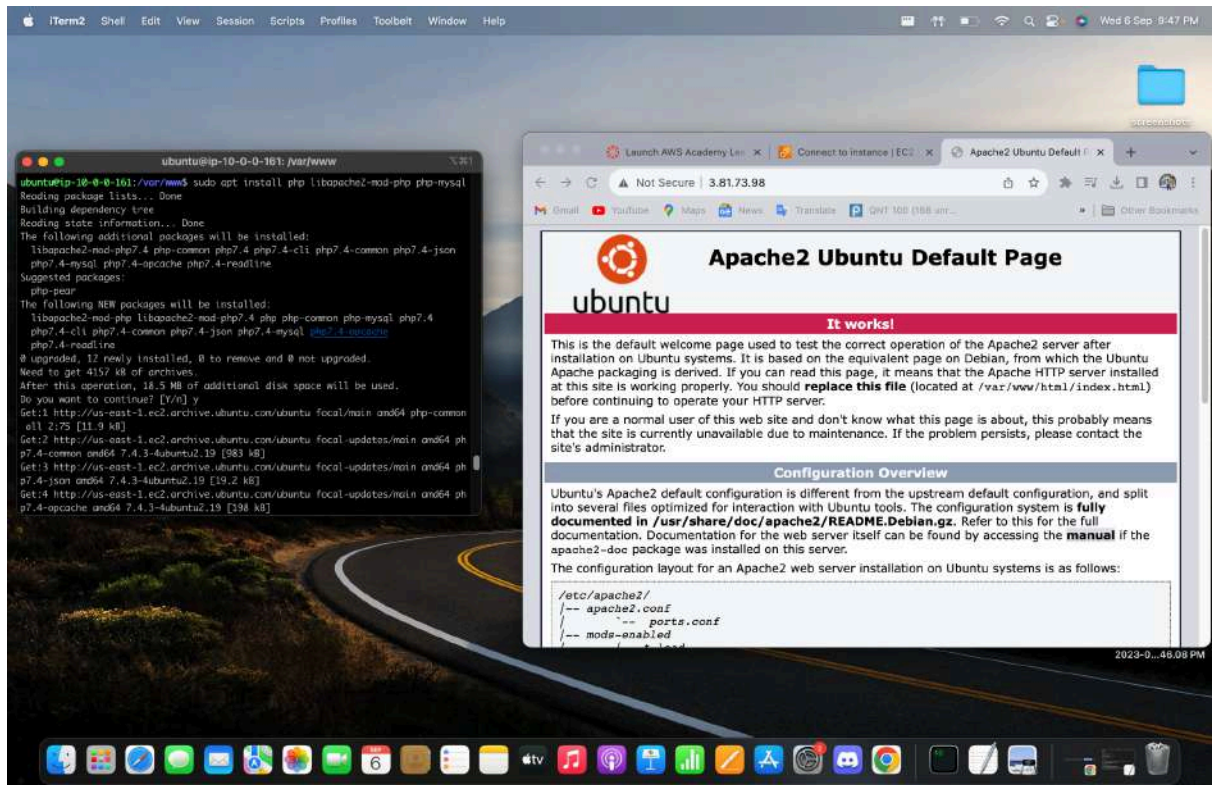


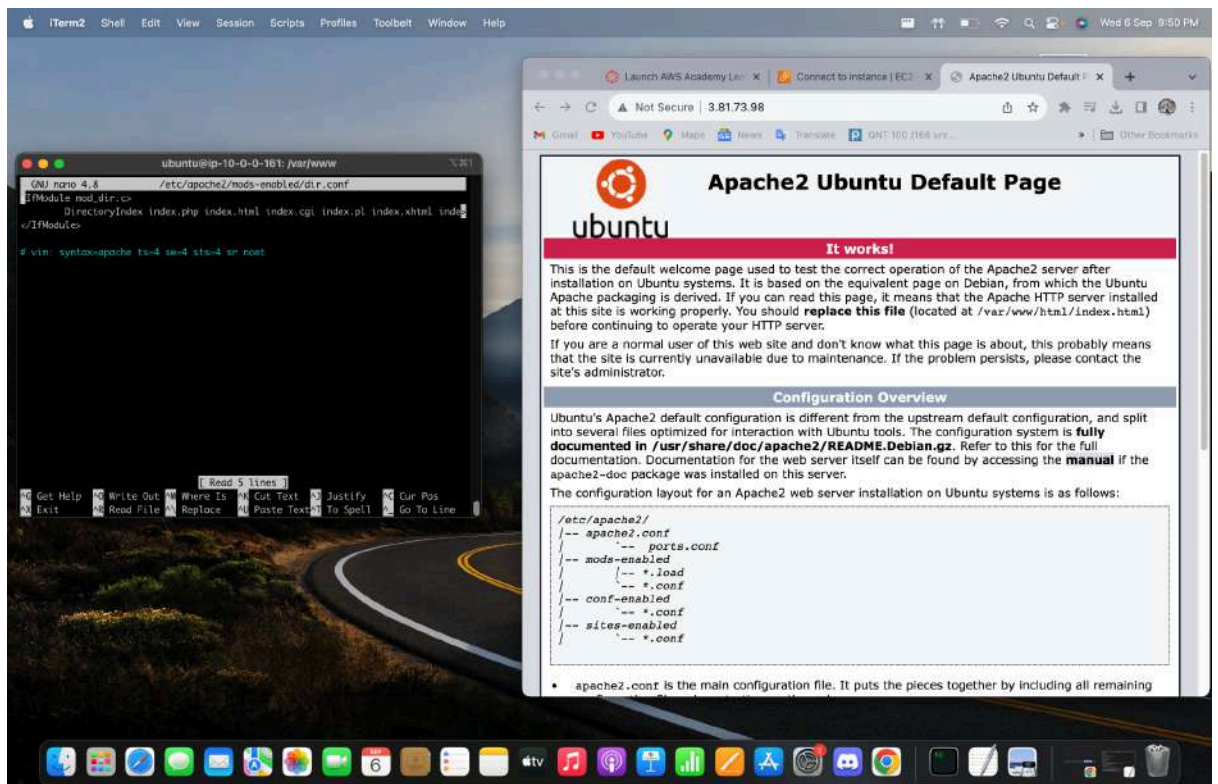
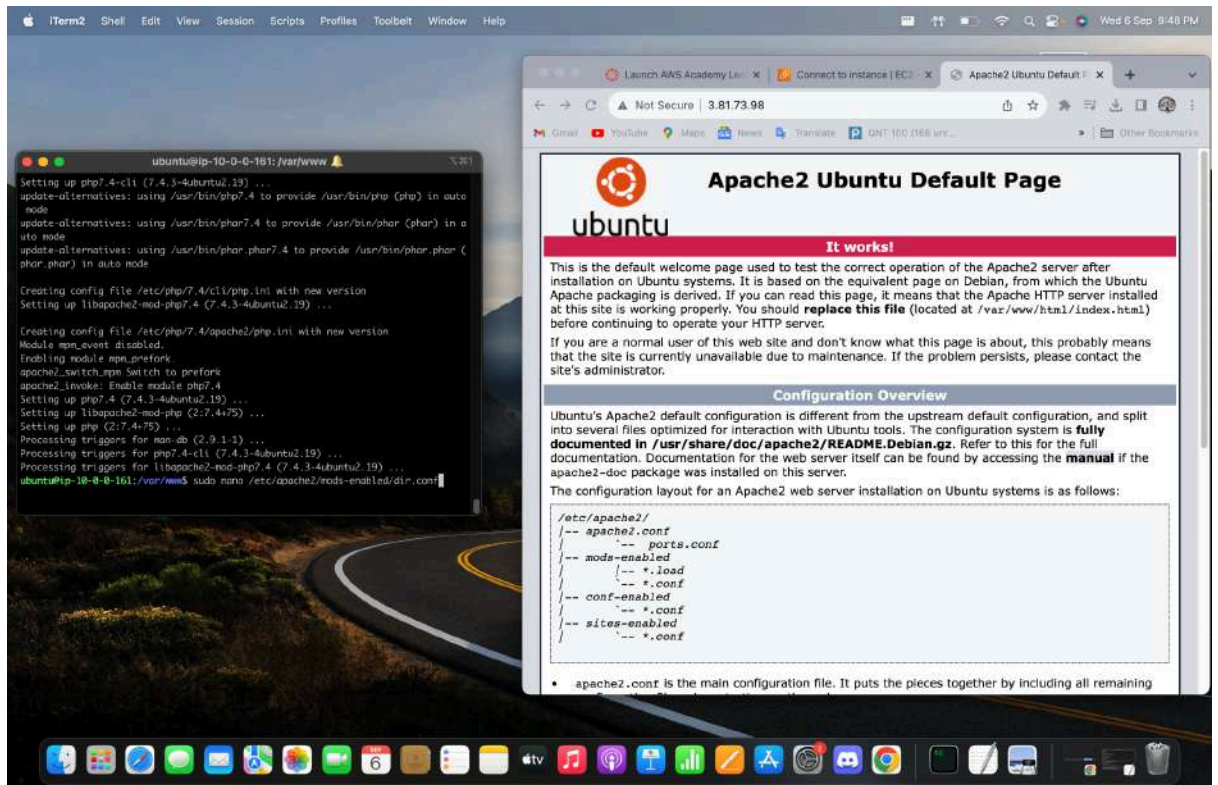


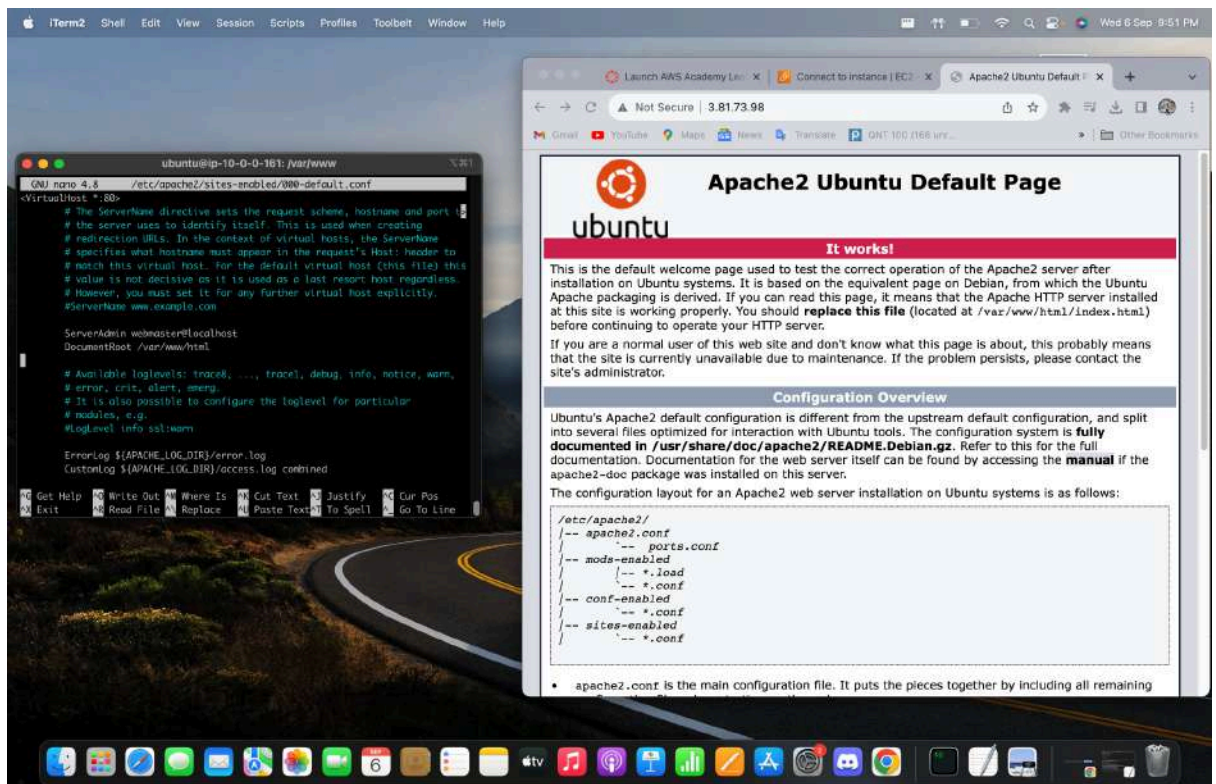
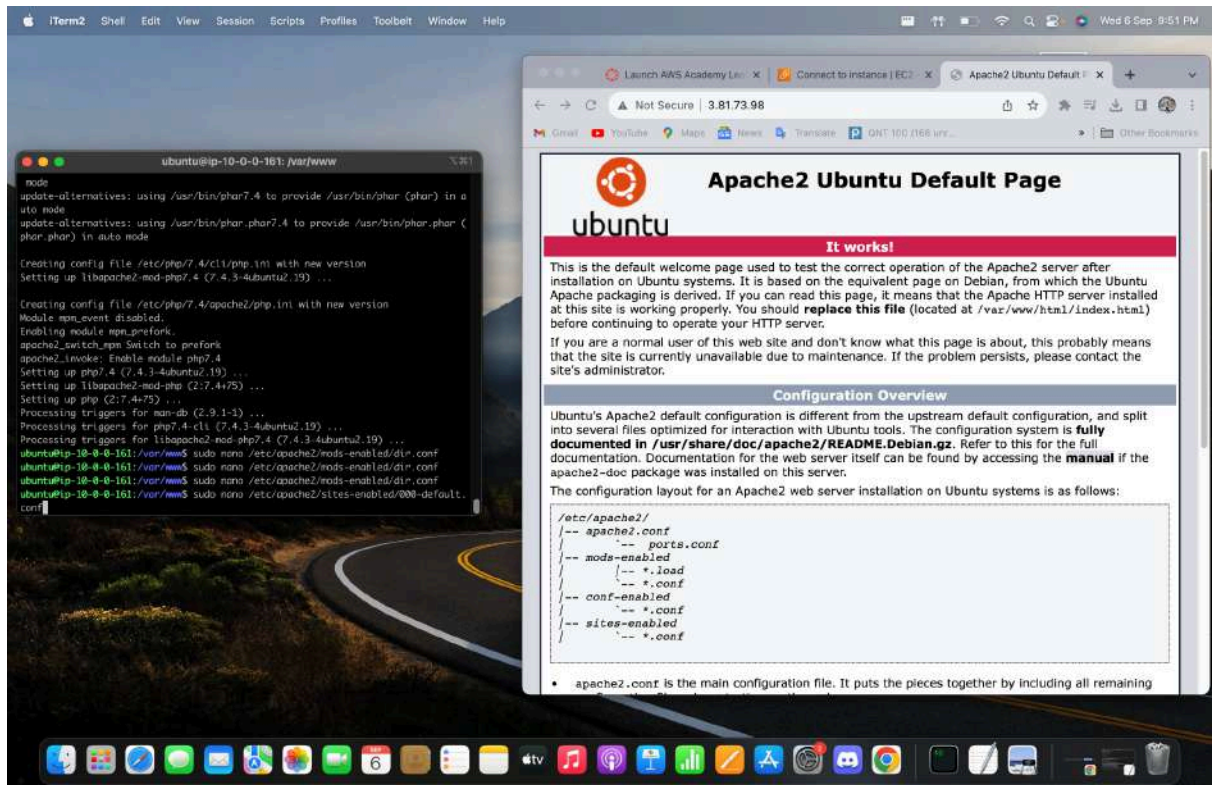


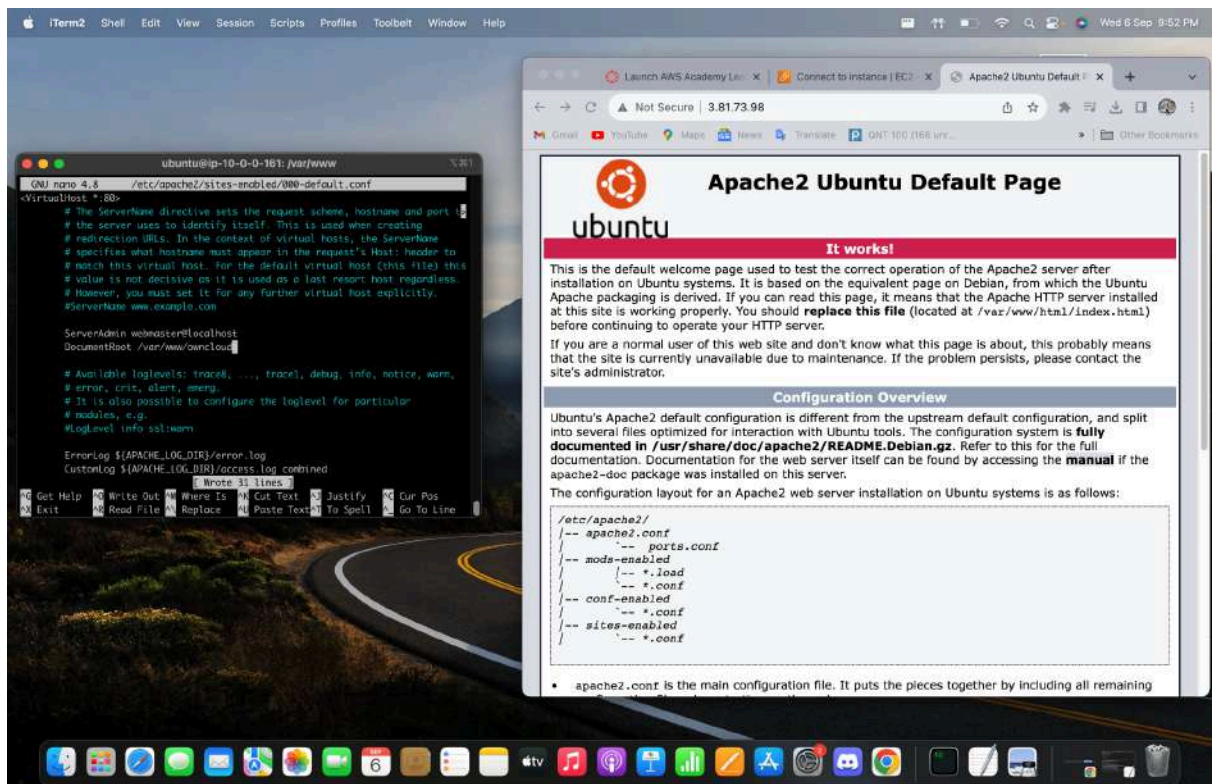
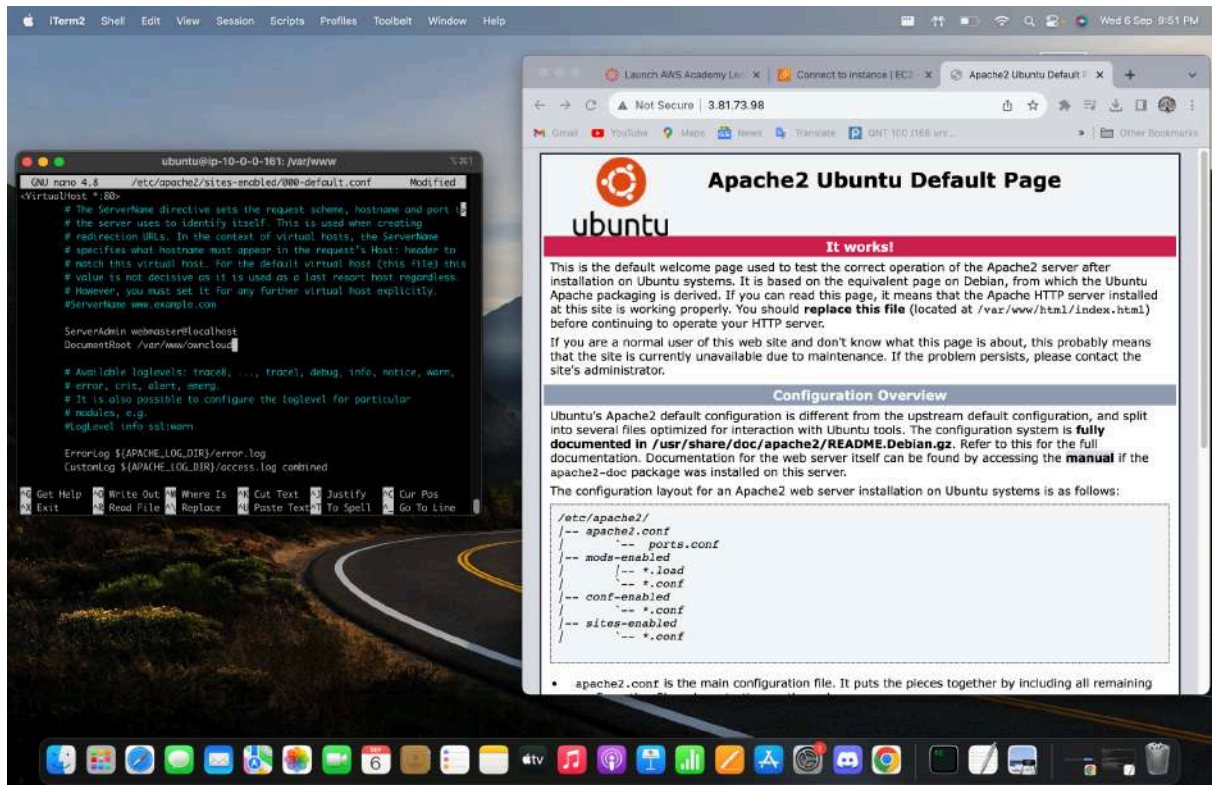


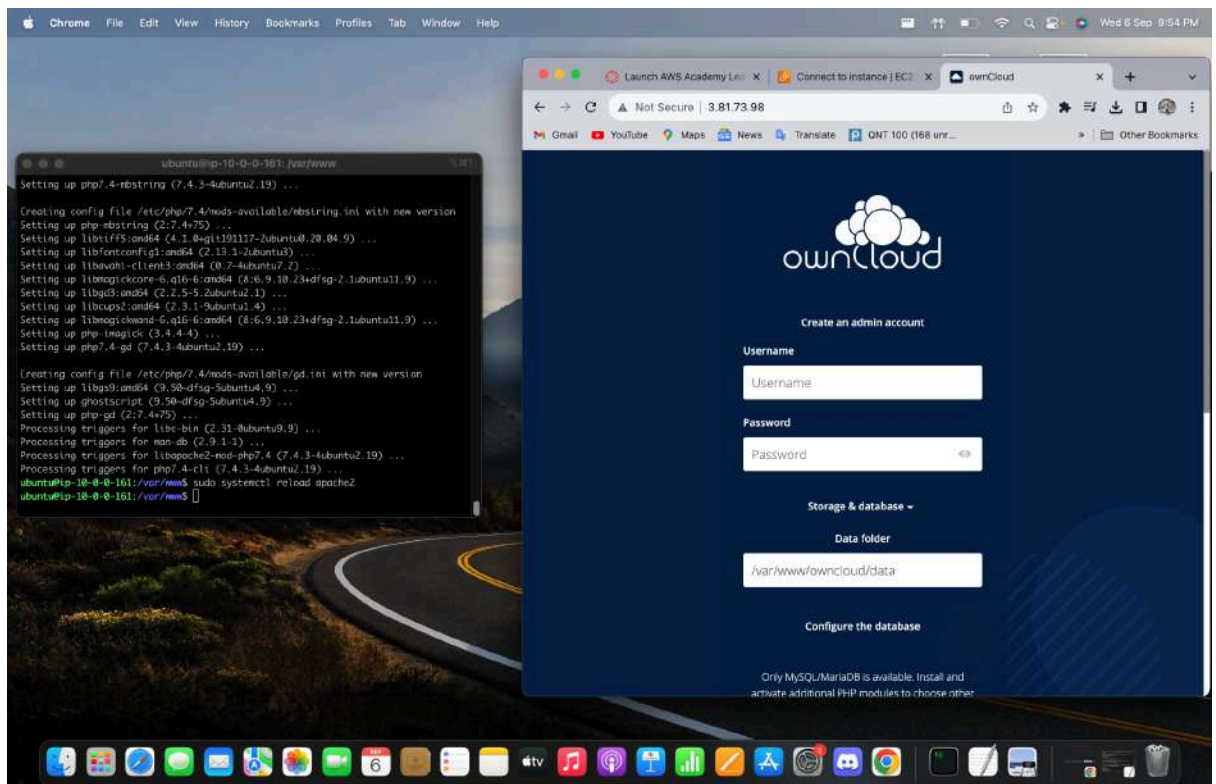
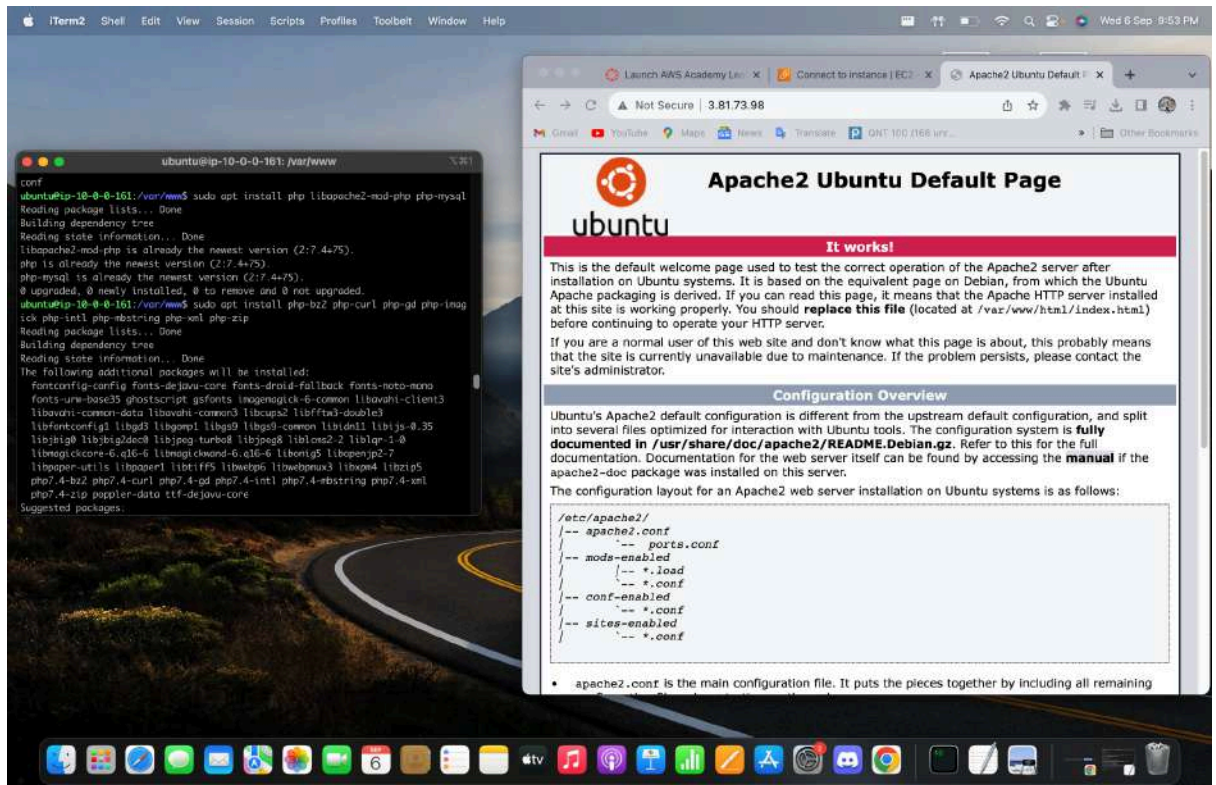












G2. PRIVATE INSTANCE:

12. Now to access the private instance, we cannot do it directly like we did for the public instance, this is because the private instance can only access the internet via the public instance with the help of NAT Gateway.

So we already are logged into the public instance, we will try connecting to the private instance through the public instance using the following steps.

- a. First, we will copy the key of the private instance into the public instance.
- b. We will change the permission of that key to 400 (read-only).
“sudo chmod 400 keyx.pem”
- c. Now we will try to connect to the private instance using the following command
“sudo ssh -i keyx.pem ubuntu@10.0.1.200”

13. After successfully connecting to the private instance, we will update and upgrade the system first.

“sudo apt update”

“sudo apt full-upgrade”

14. Now that we have updated and upgraded our private instance, we will install the mysql server with the following command

“sudo apt install mysql-server”

15. Now for creating the database and the users and granting them the privileges we need to follow the below steps.

“sudo mysql”

“CREATE DATABASE owncloud;”

“CREATE USER 'owncloud'@'localhost' IDENTIFIED BY 'password';”

“CREATE USER 'owncloud'@'%' IDENTIFIED BY 'password';”

```
"GRANT ALL PRIVILEGES ON *.* TO 'owncloud'@'localhost' with
GRANT OPTION;"
"GRANT ALL PRIVILEGES ON *.* TO 'owncloud'@'%' with
GRANT OPTION;"
"FLUSH PRIVILEGES;"
"EXIT"
```

16. We have successfully created the database (owncloud) and the user (owncloud) with the password (password).
17. In-order for the public instance to connect and access the database in the private instance we have to configure the bind address in the sql configuration. To do that type the following command

```
"sudo nano /etc/mysql/mysql.conf.d/mysqld.cnf"
```

Change the bind address from 127.0.0.1 to 0.0.0.0

18. Now, restart the mysql service using the following commands.
"sudo systemctl restart mysql.service"

19. Sometimes, the firewall blocks the connection from public instance to private, to allow the good flow of data and requests from public instance to private instance, try running the following command.

```
"sudo iptables -A INPUT -p tcp --destination-port 3306 -j
ACCEPT"
```


Launch AWS Academy Learn... X EC2 | us-east-1 X +

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

Search for an AMI by entering a search term e.g. "Windows"

Quickstart AMIs (47) Commonly used AMIs

My AMIs (0) Created by me

AWS Marketplace AMIs (8726) AWS & trusted third-party AMIs

Community AMIs (500) Published by anyone

SUSE

SUSE Linux Enterprise Server 15 Service Pack 5 (HVM), EBS General Purpose (SSD) Volume Type. Amazon EC2 AMI Tools preinstalled; Apache, MySQL, PHP, and Ruby available.

Platform: suse Root device type: ebs Virtualization: hvm ENA enabled: Yes

Free tier eligible Verified provider

ubuntu

Ubuntu Server 22.04 LTS (HVM), SSD Volume Type

ami-053b0d53c279acc90 (64-bit (x86)) / ami-0a0c8eebcd6dc00 (64-bit (Arm))

Ubuntu Server 22.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical (http://www.ubuntu.com/cloud/services).

Platform: ubuntu Root device type: ebs Virtualization: hvm ENA enabled: Yes

Free tier eligible Verified provider

ubuntu

Ubuntu Server 20.04 LTS (HVM), SSD Volume Type

ami-0261755bbcb8c4a84 (64-bit (x86)) / ami-097d5b19d4f1a7d1b (64-bit (Arm))

Ubuntu Server 20.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical (http://www.ubuntu.com/cloud/services).

Platform: ubuntu Root device type: ebs Virtualization: hvm ENA enabled: Yes

Free tier eligible Verified provider

Microsoft

Windows

Microsoft Windows Server 2022 Base

ami-09301a37d119fe4c5 (64-bit (x86))

Microsoft Windows 2022 Datacenter edition, [English]

Platform: windows Root device type: ebs Virtualization: hvm ENA enabled: Yes

Free tier eligible Verified provider

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Launch AWS Academy Learn... X EC2 | us-east-1 X +

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

Name and tags info

Name

owncloud-db Add additional tags

Application and OS Images (Amazon Machine Image) info

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

Search our full catalog including 1000s of application and OS images

AMI from catalog Recents Quick Start

Amazon Machine Image (AMI)

ubuntu/images/hvm-ssd/ubuntu-focal-20.04-amd64-server-20230517

ami-0261755bbcb8c4a84

Verified provider Free tier eligible

Browse more AMIs

Including AMIs from AWS, Marketplace and the Community

Catalog Published Architecture Virtualization Root device type ENA Enabled

Quickstart AMIs 2023-05-17T23:59:47.00Z x86_64 hvm ebs Yes

Summary

Number of instances info

1

Software image (AMI)

Ubuntu Server 20.04 LTS (HVM),...read more

ami-0261755bbcb8c4a84

Virtual server type (instance type)

t2.micro

Firewall (security group)

New security group

Storage (volumes)

1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Cancel Launch instance Review commands

CloudShell Feedback Language

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Launch AWS Academy Learn... X EC2 | us-east-1 X +

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

Services Search [Option+S]

Compare instance types

Additional costs apply for AMIs with pre-installed software

▼ Key pair (login) info

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - required

keyx [Create new key pair](#)

▼ Network settings info

VPC - required info

vpc-027392ad25443bd06 (owncloud-vpc) [Create new VPC](#)

Subnet info

subnet-003dde2b9a0a3241f owncloud-private-sn [Create new subnet](#)

Auto-assign public IP info

Disable

Firewall (security groups) info

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

▼ Summary

Number of instances info

1

Software image (AMI)

Ubuntu Server 20.04 LTS (HVM),...read more
ami-0261755bbcb8c4a94

Virtual server type (instance type)

t2.micro

Firewall (security group)

owncloud-private-sg

Storage (volumes)

1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million I/Os, 1 GiB of snapshots, and 100 GB of bandwidth to the internet.

Cancel [Launch instance](#) [Review commands](#)

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Launch AWS Academy Learn... X EC2 | us-east-1 X +

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

Services Search [Option+S]

▼ Network settings info

VPC - required info

vpc-027392ad25443bd06 (owncloud-vpc) [Create new VPC](#)

Subnet info

subnet-003dde2b9a0a3241f owncloud-private-sn [Create new subnet](#)

Auto-assign public IP info

Disable

Firewall (security groups) info

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

☐ Create security group ☒ Select existing security group

Common security groups info

Select security groups

owncloud-private-sg sg-014204c1a4f7130c2 [Compare security group rules](#)

Security groups that you add or remove here will be added to or removed from all your network interfaces.

► Advanced network configuration

▼ Configure storage info [Advanced](#)

1x 8 GiB gp2 Root volume (Not encrypted)

▼ Summary

Number of instances info

1

Software image (AMI)

Ubuntu Server 20.04 LTS (HVM),...read more
ami-0261755bbcb8c4a94

Virtual server type (instance type)

t2.micro

Firewall (security group)

owncloud-private-sg

Storage (volumes)

1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million I/Os, 1 GiB of snapshots, and 100 GB of bandwidth to the internet.

Cancel [Launch instance](#) [Review commands](#)

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Launch AWS Academy Learn... X EC2 | us-east-1 X +

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

Success
Successfully initiated launch of Instance (i-0450523e31990e431)

Launch log

Initializing requests ✓ Succeeded

Launch initiation ✓ Succeeded

Next Steps

What would you like to do next with this instance, for example "create alarm" or "create backup"

Create billing and free tier usage alerts
To manage costs and avoid surprise bills, set up email notifications for billing and free tier usage thresholds.
[Create billing alerts](#)

Connect to your instance
Once your instance is running, log into it from your local computer.
[Connect to instance](#)
[Learn more](#)

Connect an RDS database
Configure the connection between an EC2 instance and a database to allow traffic flow between them.
[Connect an RDS database](#)
[Create a new RDS database](#)
[Learn more](#)

Create EBS snapshot policy
Create a policy that automates the creation, retention, and deletion of EBS snapshots.
[Create EBS snapshot policy](#)

Manage detailed monitoring

Create Load Balancer

Create AWS budget

Manage CloudWatch alarms

CloudShell Feedback Language

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Launch AWS Academy Learn... X Instances | EC2 | us-east-1 X +

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#Instances:v=3,\$case=tags:true%5C,client:false,\$regex=tags:false%5C,client:false

New EC2 Experience
Tell us what you think

EC2 Dashboard

EC2 Global View

Events

Instances

Instances

Instance Types

Launch Templates

Spot Requests

Savings Plans

Reserved Instances

Dedicated Hosts

Capacity Reservations

Images

AMIs

AMI Catalog

Elastic Block Store

Volumes

Snapshots

Lifecycle Manager

Network & Security

Security Groups

Instances (2) Info

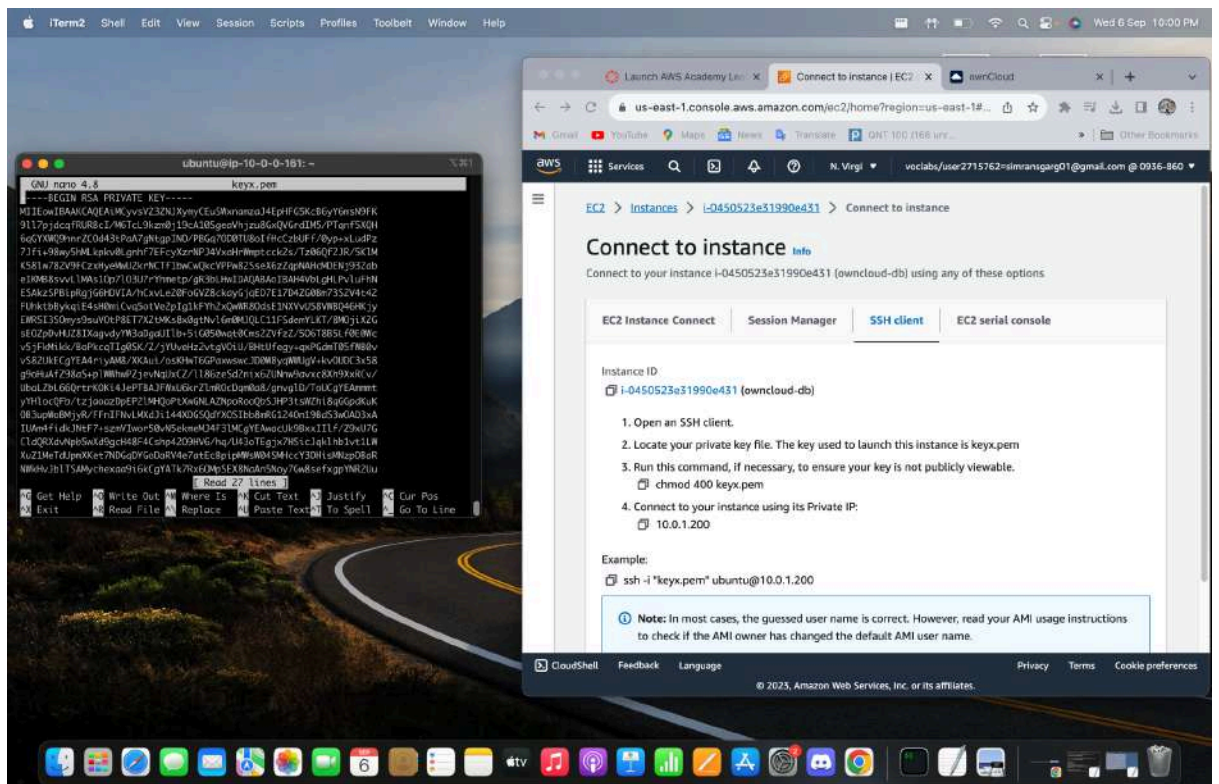
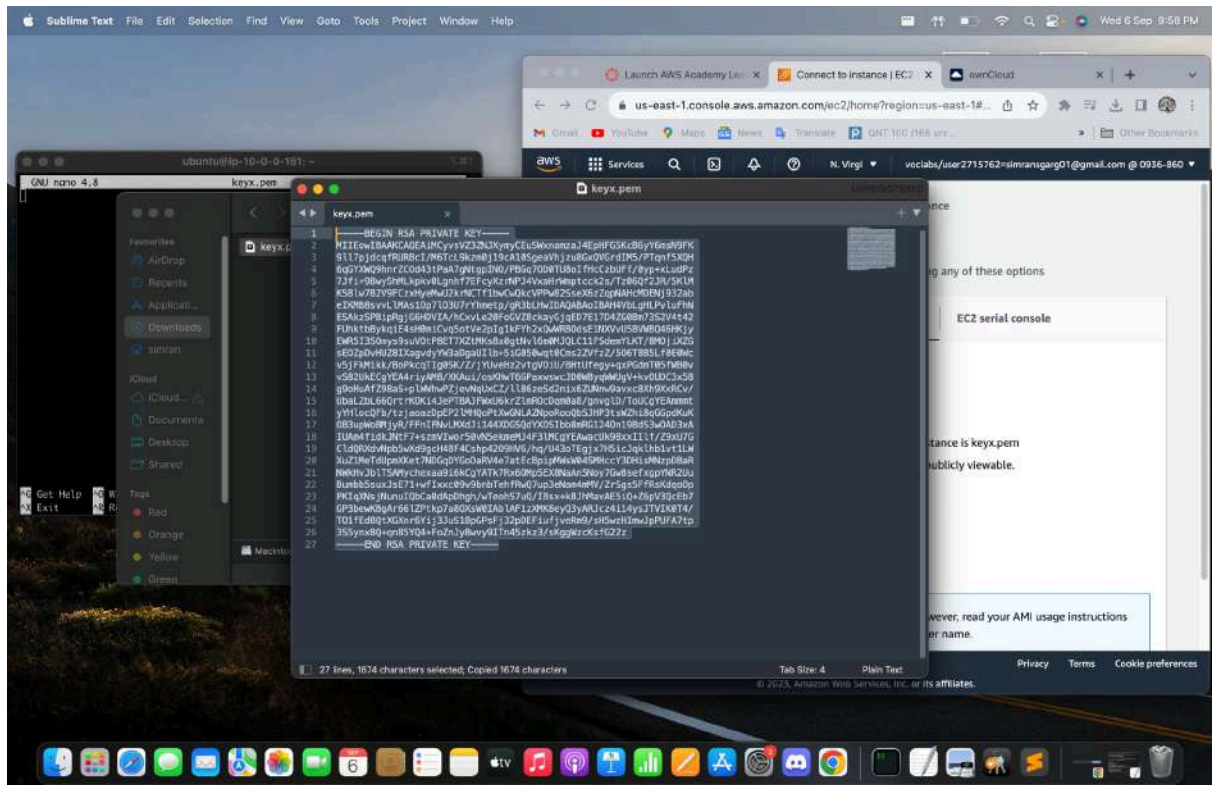
Find instance by attribute or tag (case-sensitive)

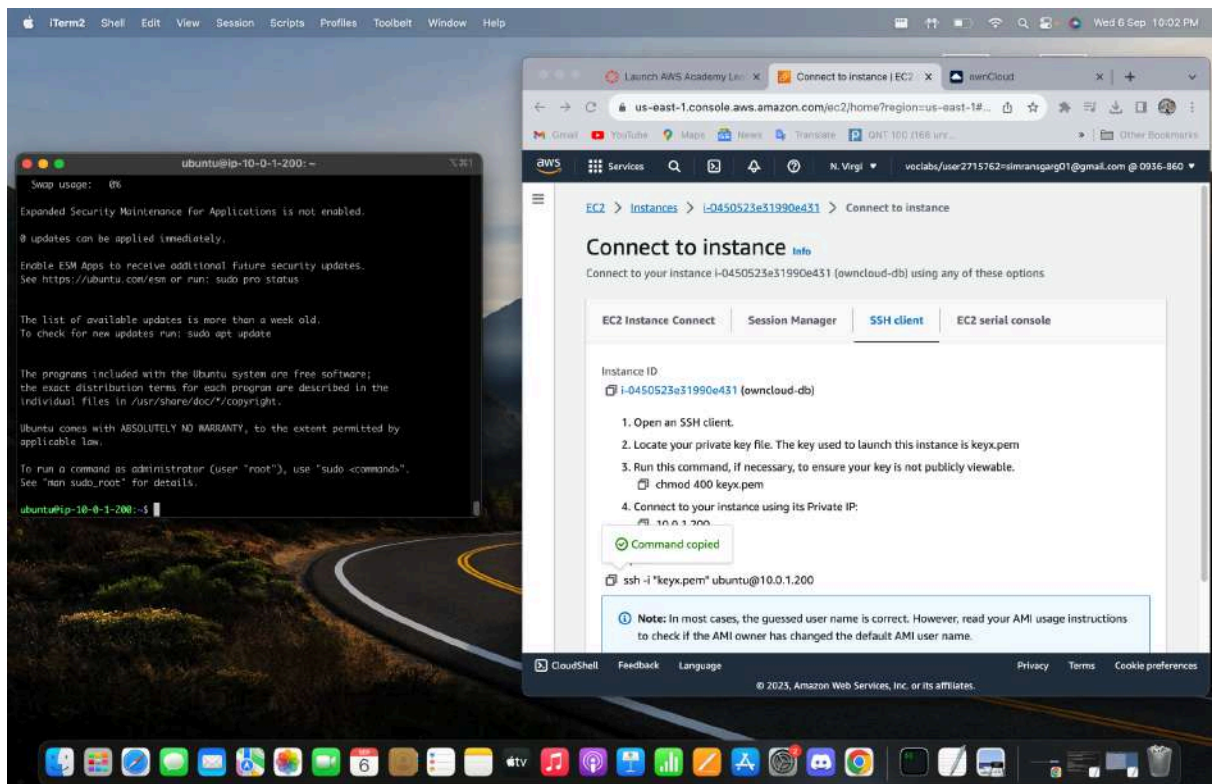
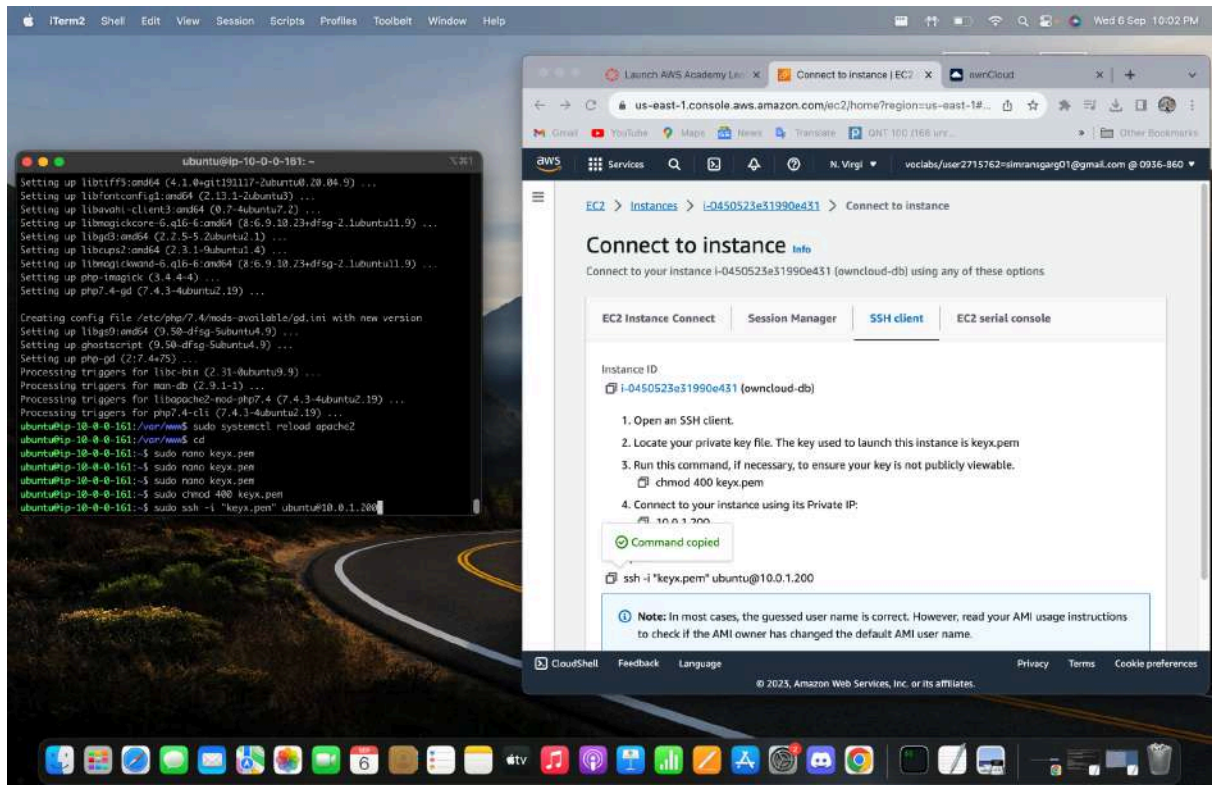
	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DN
<input type="checkbox"/>	owncloud-db	i-0450523e31990e431	Running	t2.micro	Initializing	No alarms	us-east-1b	-
<input type="checkbox"/>	owncloud-public	i-0470854324c2dcf6a	Running	t2.micro	Initializing	No alarms	us-east-1a	-

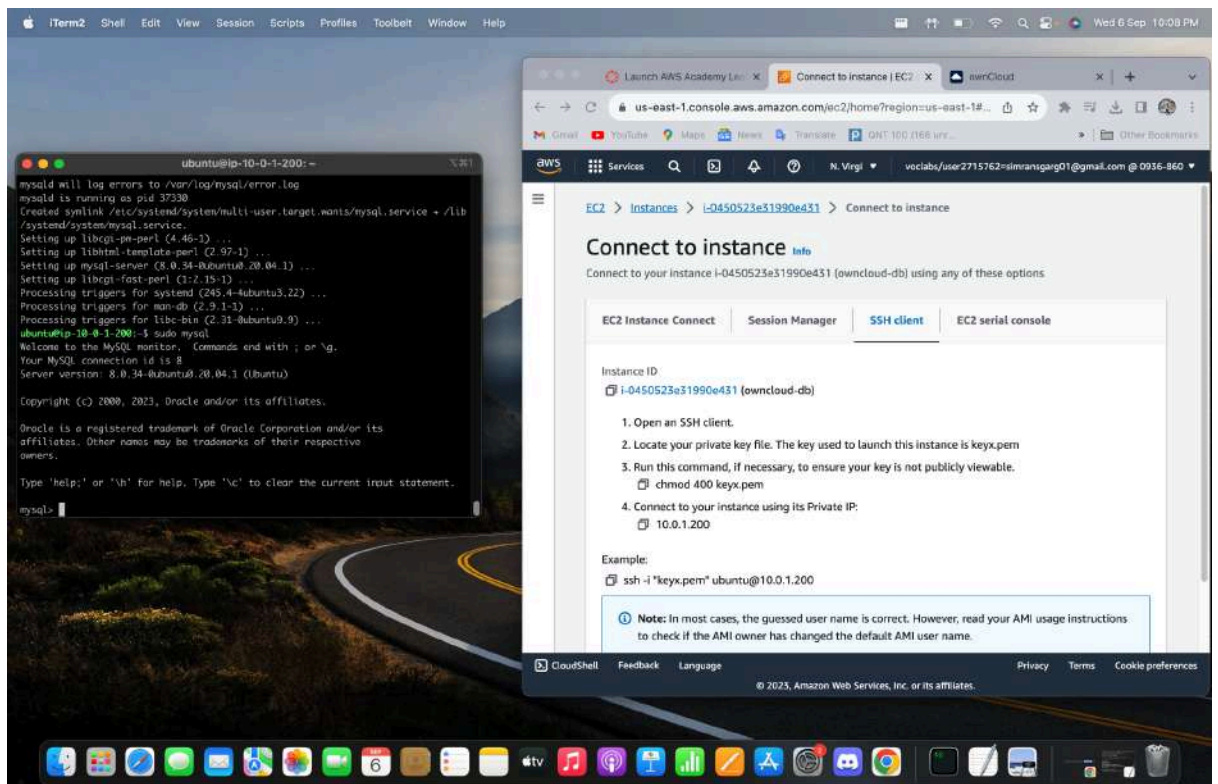
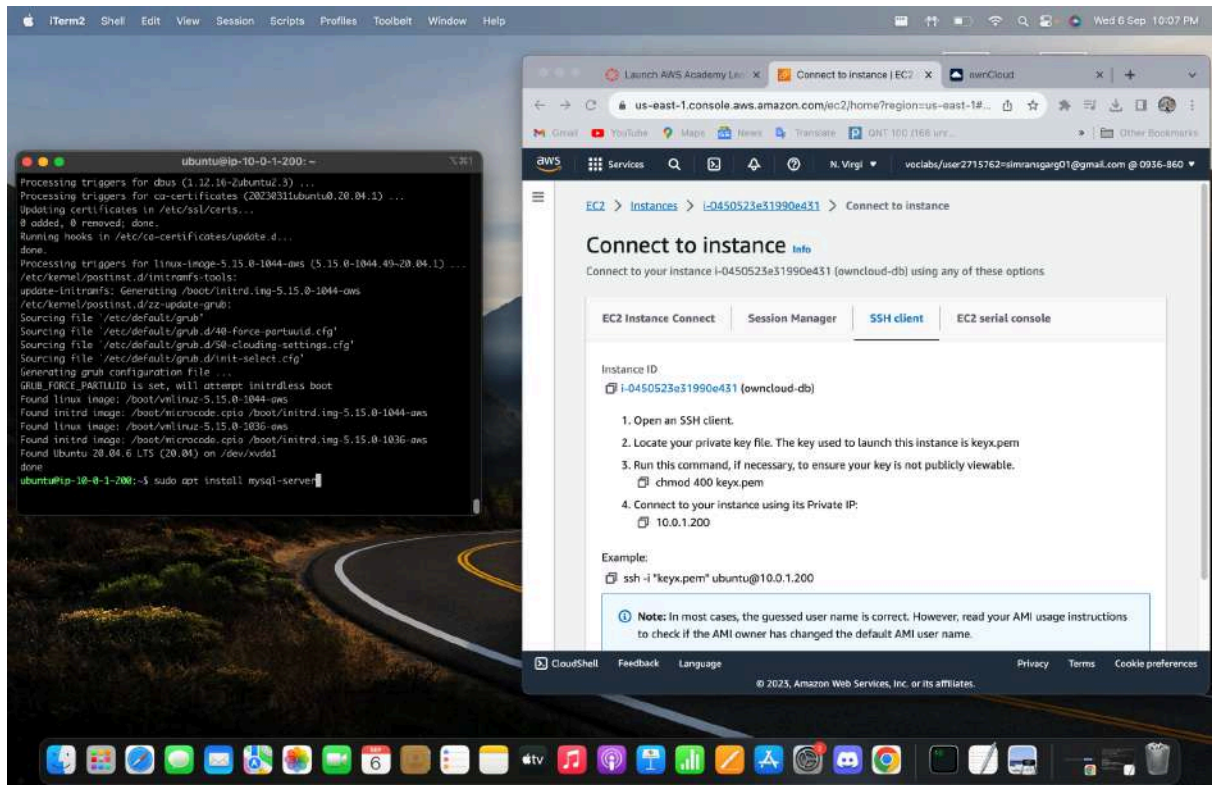
Select an instance

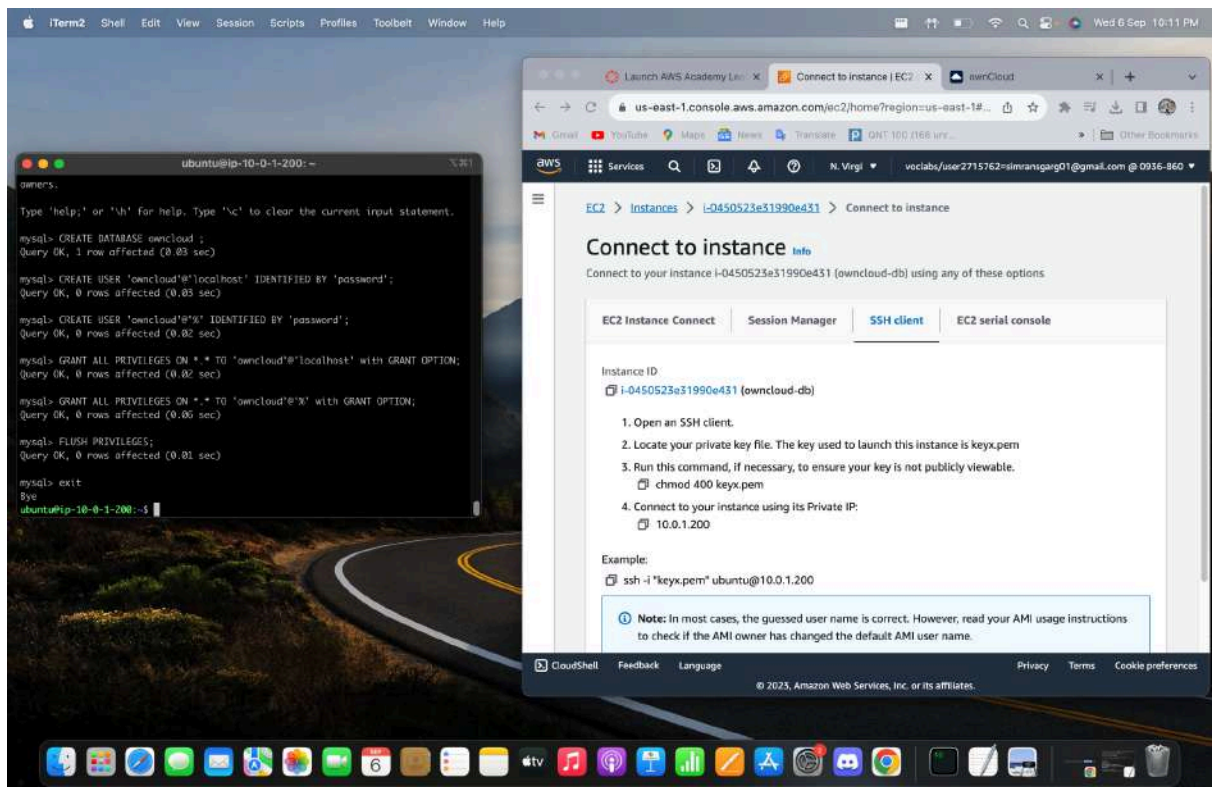
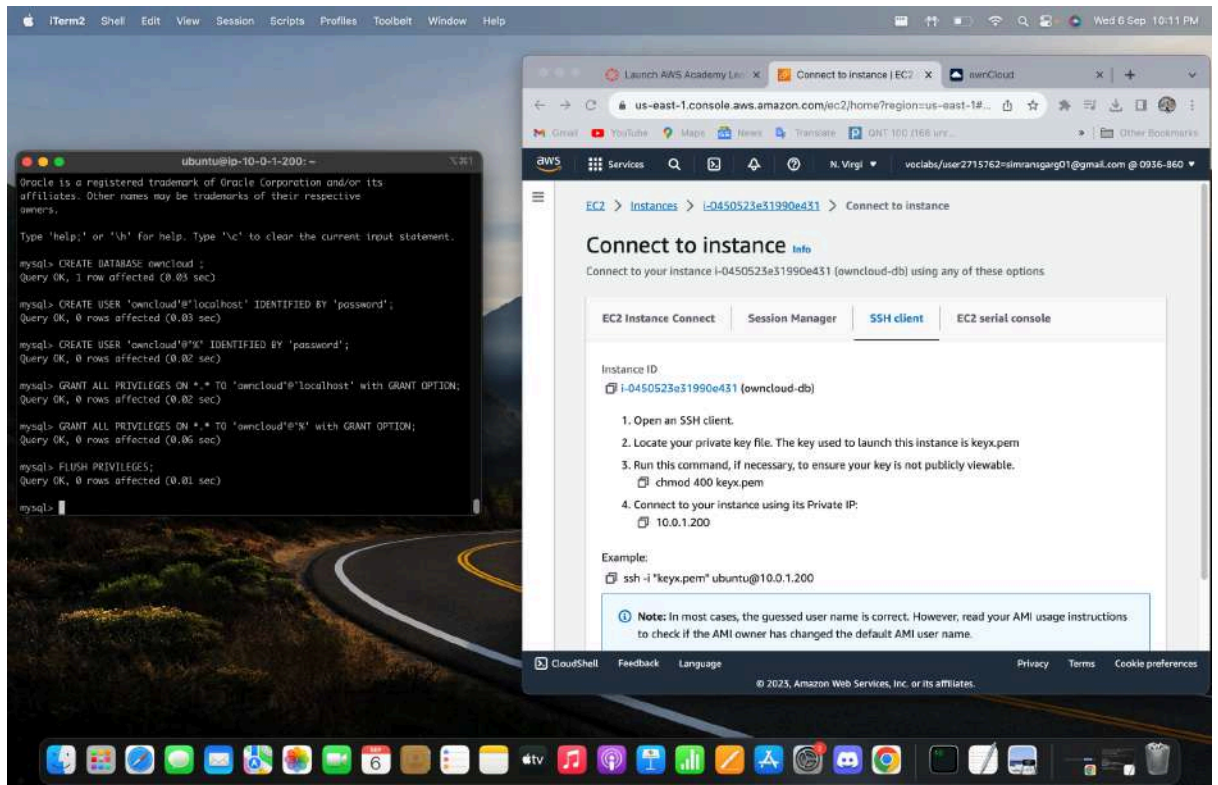
CloudShell Feedback Language

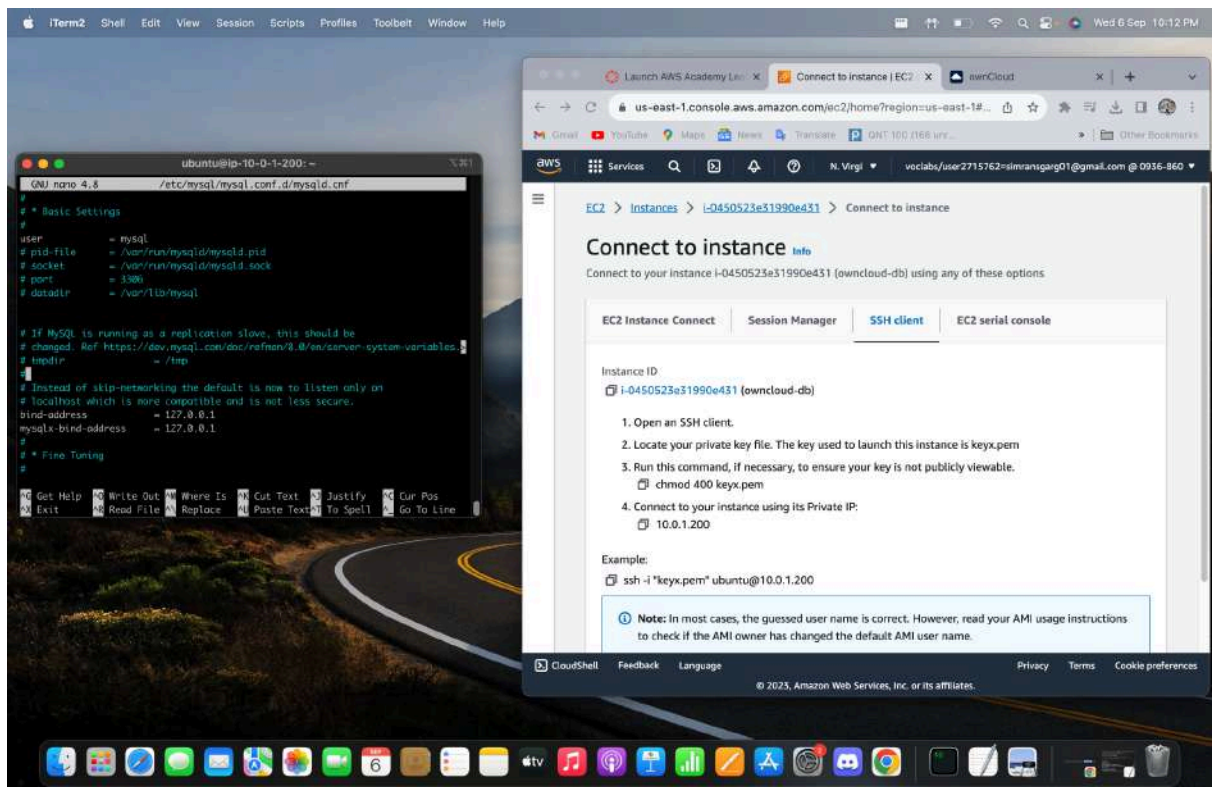
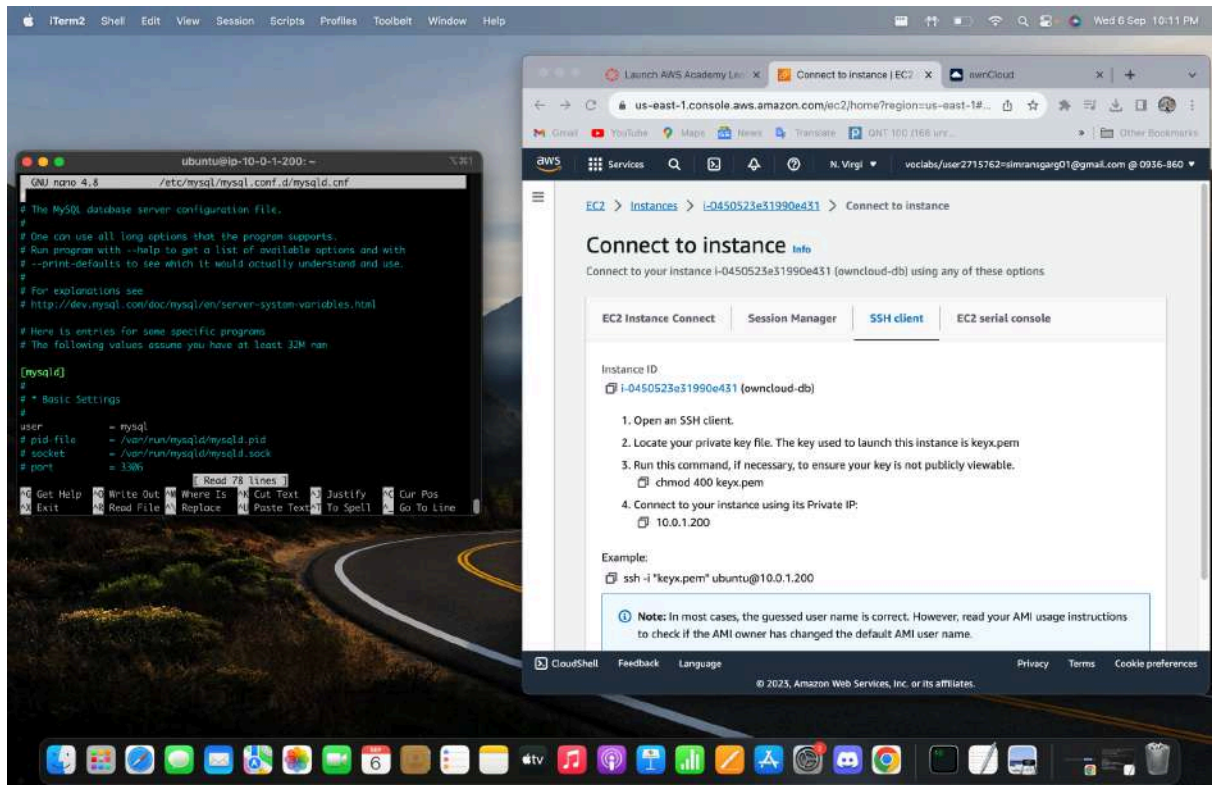
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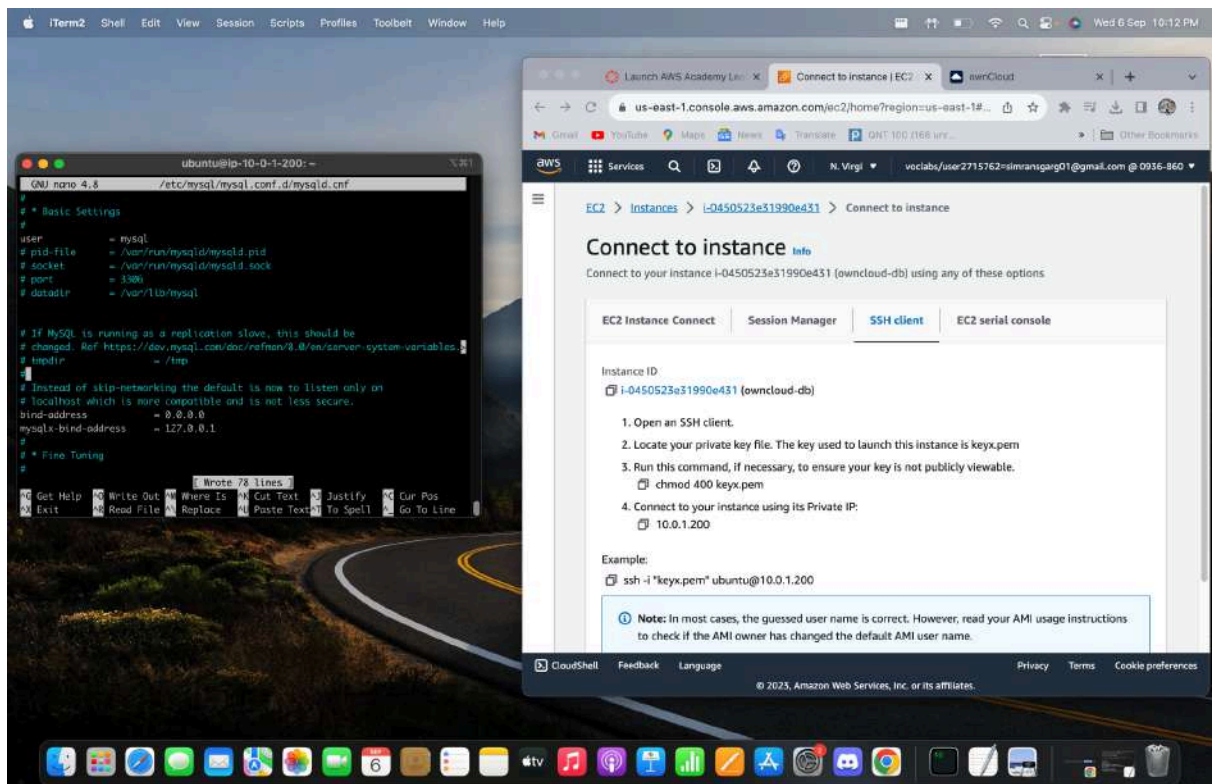
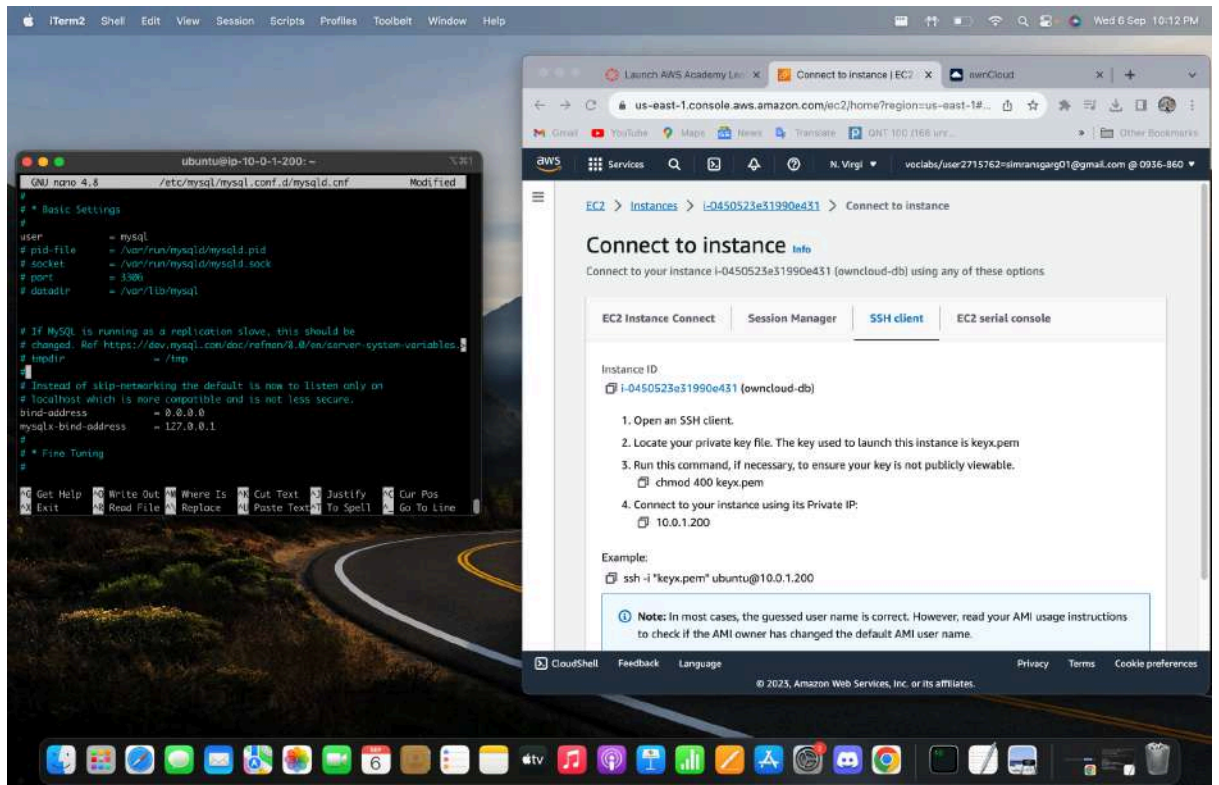


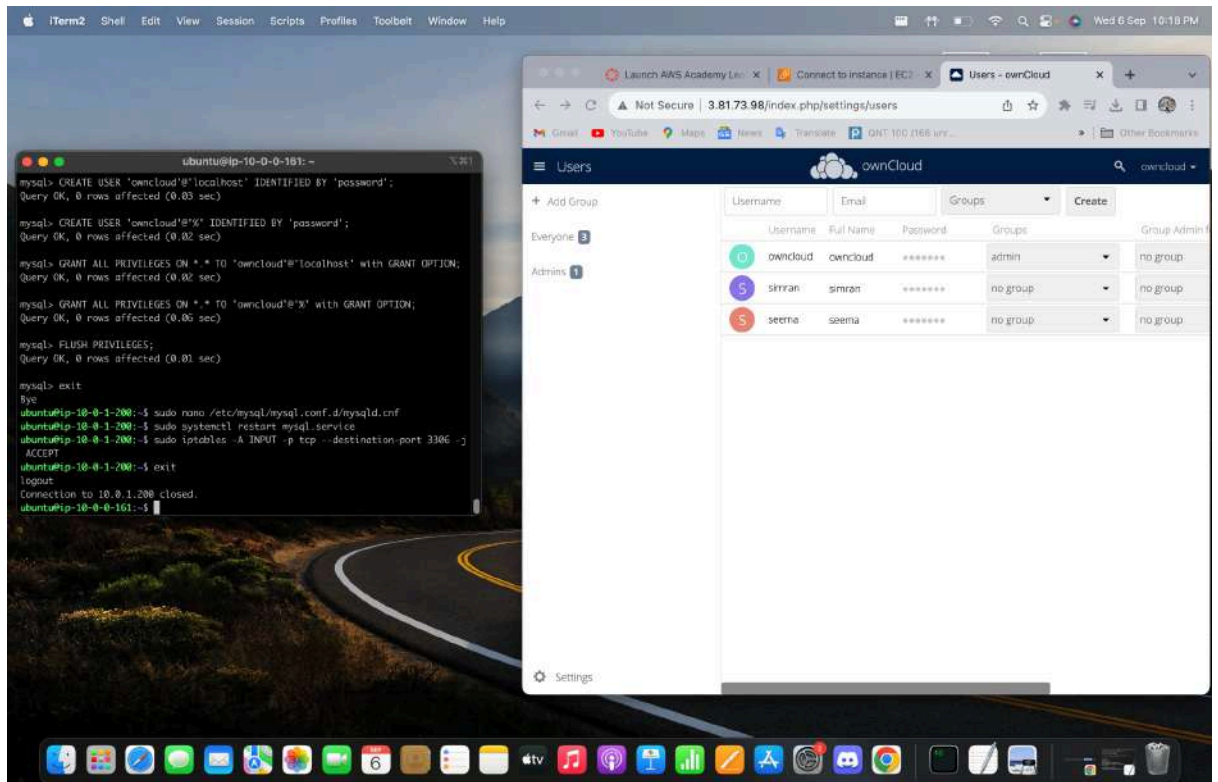
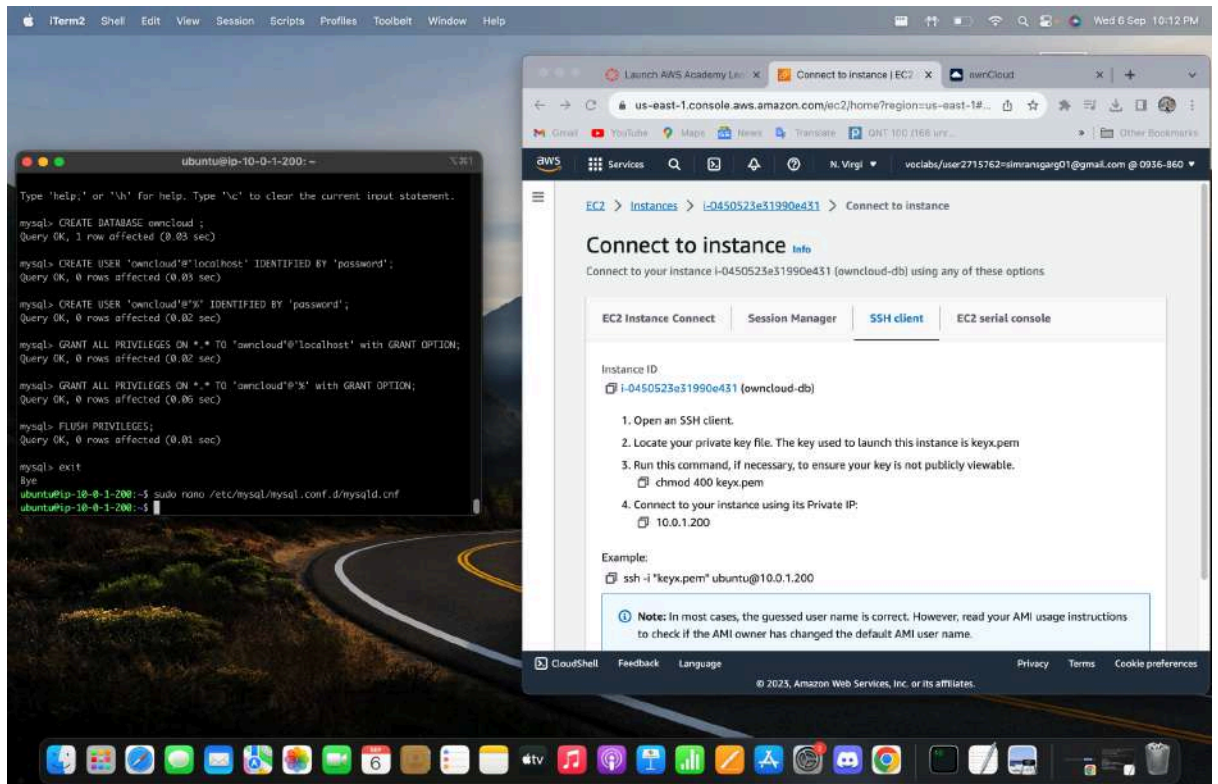












H. OWNCLOUD ADMIN REGISTRATION:

20. Now, type the Public IP address of the public instance in the URL bar and hit enter.

“Owncloud Admin Registration Page” (index.php), will open up.

21. Enter the following parameters:

Username: owncloud

Password : owncloud

Data Folder : /var/www/owncloud/data

Database Username : owncloud

Database Password : password

Database Name : owncloud

Database Host : 10.0.1.200:3306

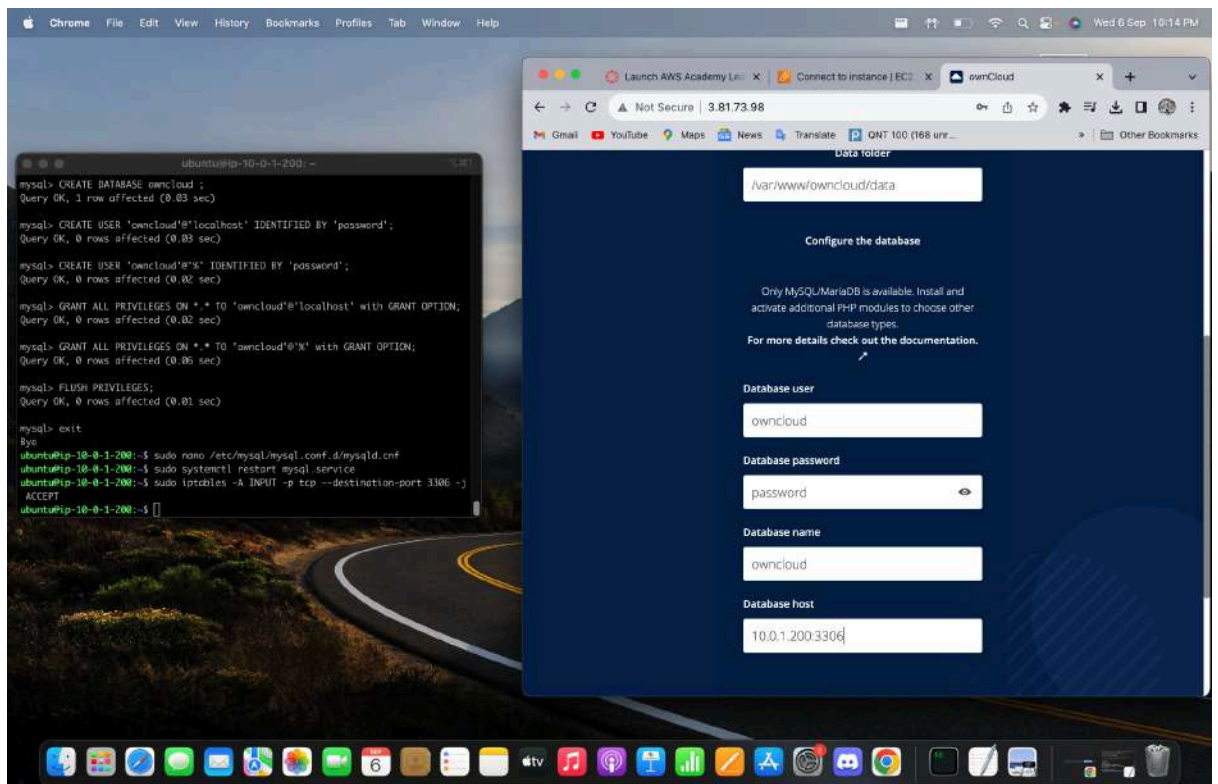
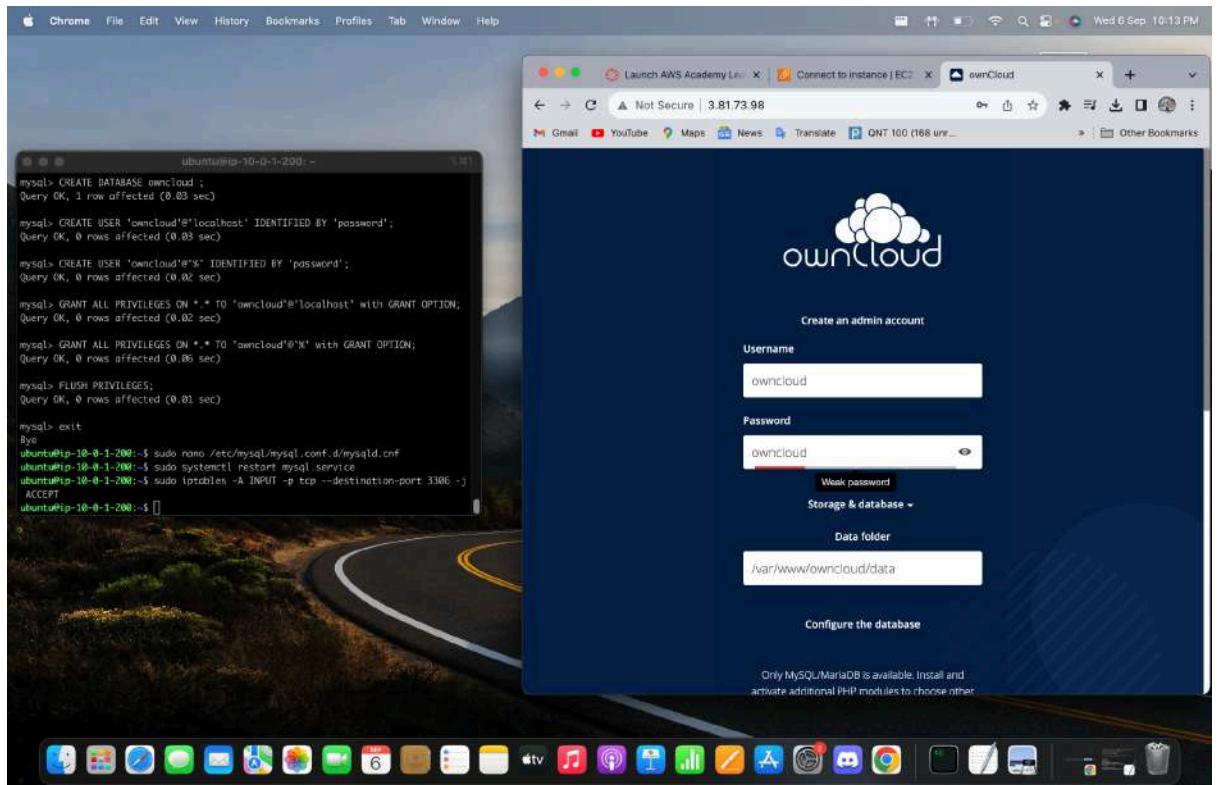
22. Now, click on Finish Setup.

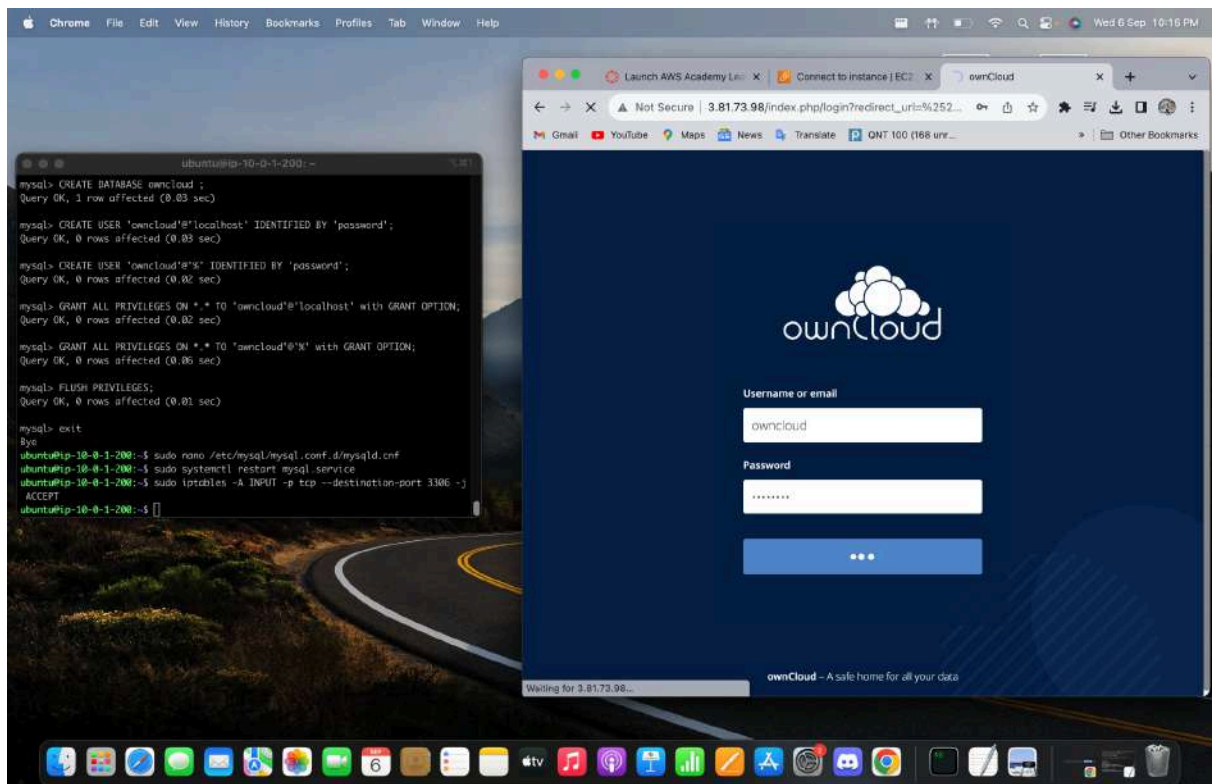
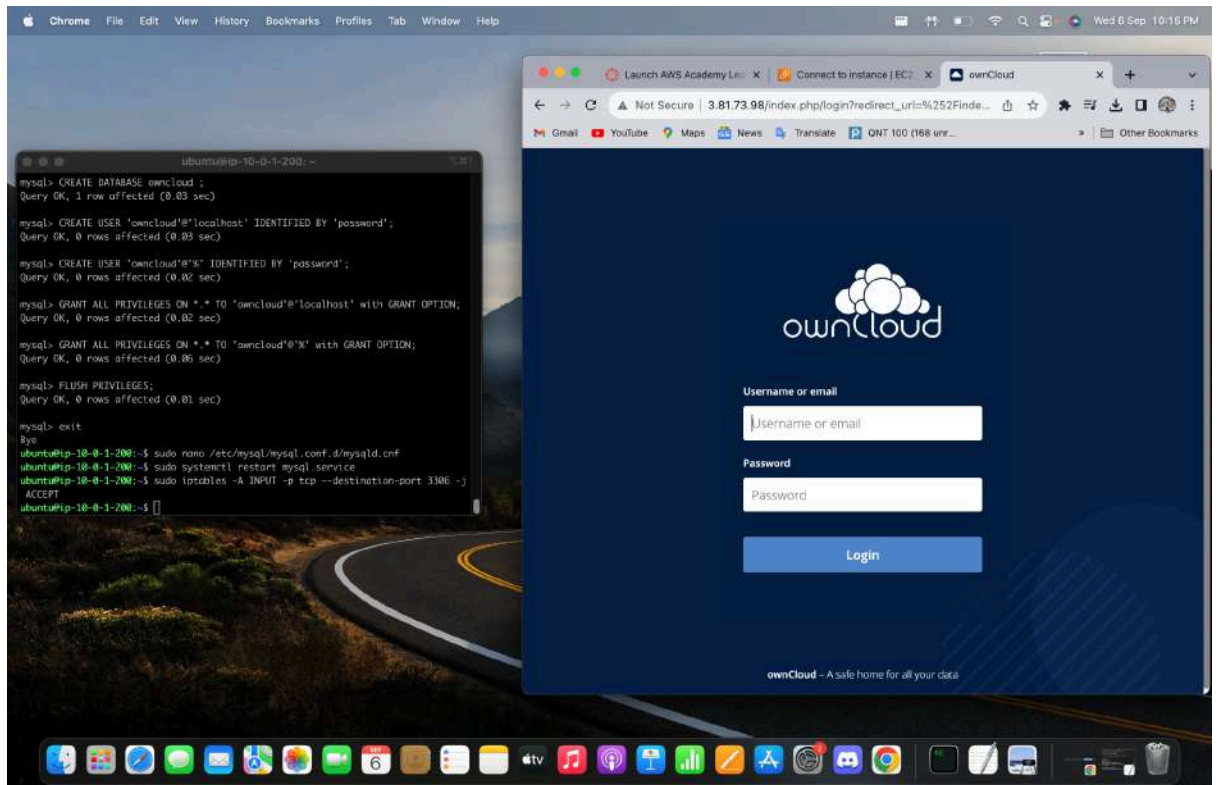
23. If all the steps are followed correctly so far then you must see a login window.

Try logging in to owncloud platform using the following credentials.

Username: owncloud

Password : owncloud





Launch AWS Academy Learn... X

Connect to instance | EC2 | X

Files - ownCloud X

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Not Secure | 3.81.73.98/index.php/apps/files/?dir=/&fileid=3

Press (fn) F to exit full screen

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Files ownCloud

owncloud

All files

Favourites

Shared with you

Shared with others

Shared by link

Tags

Deleted files

Settings

All files +

NAME

Size

Modified

Documents 35 KB seconds ago

Learn more about ownCloud 3.5 MB seconds ago

Photos 988 KB seconds ago

3 folders 4.5 MB

Launch AWS Academy Learn... X | Connect to instance | EC2 | ui... X | Users - ownCloud X | +

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+ Add Group

Everyone 1

Admins 1

Username	Email	Groups	Create			
Username	Full Name	Password	Groups	Group Admin for	Quota	
 owncloud	owncloud	owncloud	*****	admin ▾	no group ▾	Default ▾

⚙ Settings

Launch AWS Academy Learn... X | Connect to instance | EC2 | ui... X | Users - ownCloud X | +

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≡ Users ownCloud 🔍 owncloud ▾

+ Add Group

Everyone 3

Admins 1

Username	Email	Groups	Create			
Username	Full Name	Password	Groups	Group Admin for	Quota	
 owncloud	owncloud	owncloud	*****	admin ▾	no group ▾	Default ▾
 simran	simran	simran	*****	no group ▾	no group ▾	Default ▾
 seema	seema	seema	*****	no group ▾	no group ▾	Default ▾

⚙ Settings

