DEPARTMENT OF COMPUTER APPLICATIONS

T. JOHN COLLEGE

(Affiliated to Bangalore University & Approved to AICTE)
Gottigere, Bengaluru – 560 083

PROJECT REPORT ON

AWS Project using EBS Demonstration using EC2 Windows Server Instances.

A project report submitted to the Bangalore University in the partial fulfilment of the requirements for the award of the degree of

MASTERS OF COMPUTER APPLICATIONS

Submitted By

Chandan NL – P03ML22S1260

Under the Guidance of

Mr. R. SARAVANAN

(Assistant Professor, Department of Computer Applications)

DEPARTMENT OF COMPUTER APPLICATIONS

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PROJECT WORK

AWS Project using EBS Demonstration using EC2 Windows Server Instances.

Bonafide Work Done By

Chandan NL – P03ML22S126034

The project submitted in partial fulfilment of the requirements for the award of Master of Computer Applications, of Bangalore University, Bengaluru.

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GUIDE	**HEAD OF DEPARTMENT**

Submitted for the Viva-Voce Examination held on _____

DECLARATION

I, **Chandan NL [P03ML22S126034]** hereby declare that the project entitled "**AWS Project using EBS Demonstration using EC2 Windows Server Instances.**" is our project work carried out during the final year **3rd Sem** MCA at T. John College, Bengaluru, under the guidance of **Mr. R. SARAVANAN** Assistant Professor, Department of Computer Applications, T. John College and has not submitted previously for the award of any other degree or diploma by me to any institution or university according to the best of my knowledge.

Signature,

Chandan NL – P03ML22S126034

ACKNOWLEDGEMENT

EBS Demonstration using EC2 Windows Server Instances project is a unique project using the important AWS Services. Our tribute for the successful completion of the project goes to all those who helped through their constant guidance and encouragement. The satisfaction that accompanies the success would be incomplete without thanking the person who made it.

I am thankful to our beloved Principal **DR. Srinivasa H P**, who encourages us to come with new and innovative ideas and for providing the environment with all facilities for completing the project.

I am also grateful to our Head of the Department **DR. S DINAKARAN**, Department of Computer Applications for his valuable guidance and constant support during our project development.

I am also grateful to our project guide **Prof. SARAVANAN**, lecturer Department of Computer Applications for guidance and feedback in reviewing and refining this project. His insights have helped me improve the quality and clarity of my work.

I extend my thanks to all our teaching staffs of the Department of Computer Applications. Finally, we thank one and all who helped us directly and indirectly for the completion of our project.

ABSTRACT

Purpose of this project is to design, develop and demonstrate the usage of EBS Demonstration using EC2 Windows Server Instances using AWS having the following features:

- Creation of Custom VPC, Subnets, Route Tables, etc.
- Creation of EC2 Windows Server Instances in different Availability Zones and EBS Volume in the just created Custom VPC.
- Attach EBS volume to the EC2 Instance and Initialize the additional EBS volume in Disk Management.
- Create a text file in attached disk and verify the availability of the text file in another EC2 instance (Availability Zone “1b”).
- Demonstrating the EBS Demo

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INTRODUCTION

1) Project Goal:

To design, develop and demonstrate the usage of AWS EBS Demonstration using EC2 Windows Server Instances by Creating a Custom VPC, Subnets, Route Tables, etc.

and Creating EC2 Windows Server Instances and EBS Volume in the just created Custom VPC and Demonstrating the EBS Demo.

Key components include EC2 instances running Windows Server spread across different availability zones, enhancing redundancy and fault tolerance.

The project exemplifies efficient data storage management through the seamless integration of EBS volumes and snapshots. Additionally, remote desktop access facilitates the smooth administration and monitoring of Windows Server instances. This demonstration underscores the practical implementation of AWS services, showcasing their scalability, resilience, and ease of management.

It emphasizes the adaptability and strength of AWS cloud computing solutions in hosting Windows-based applications or services. So, the main motive of this project is to Integrate the EBS volume with the EC2 instance and initialize the additional EBS volume in Disk Management and create a text file in attached disk and verify the availability of the text file in another EC2 instance.

2) AWS Tools and Technologies Used:

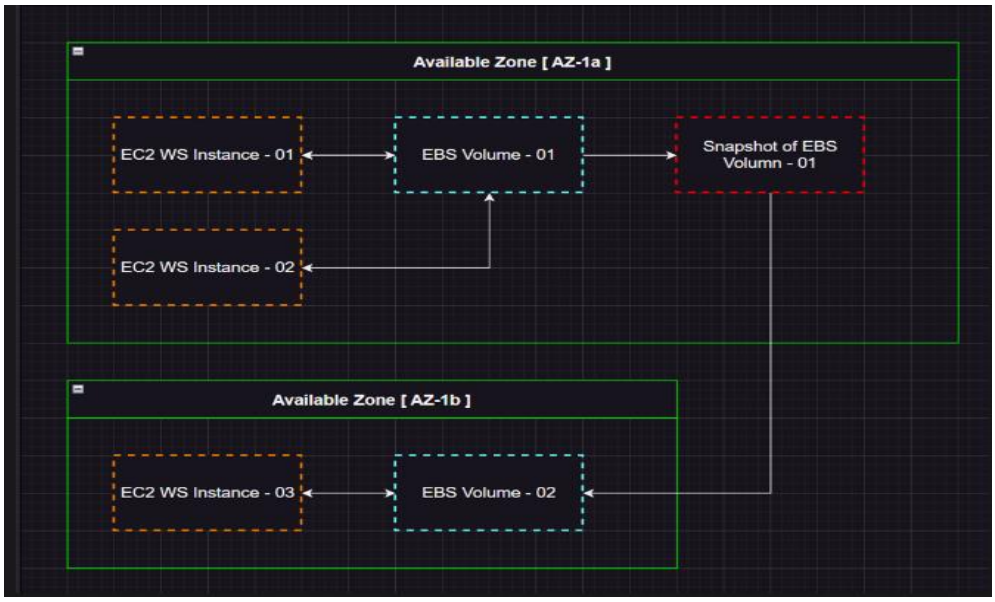
- Custom VPC, Subnets, Route Tables, Internet Gateway…etc.
- EC2 Instance Windows Server, In Different availability zones.
- EBS volume, Snapshots.
- Remote Desktop.

3) Hardware Specifications:

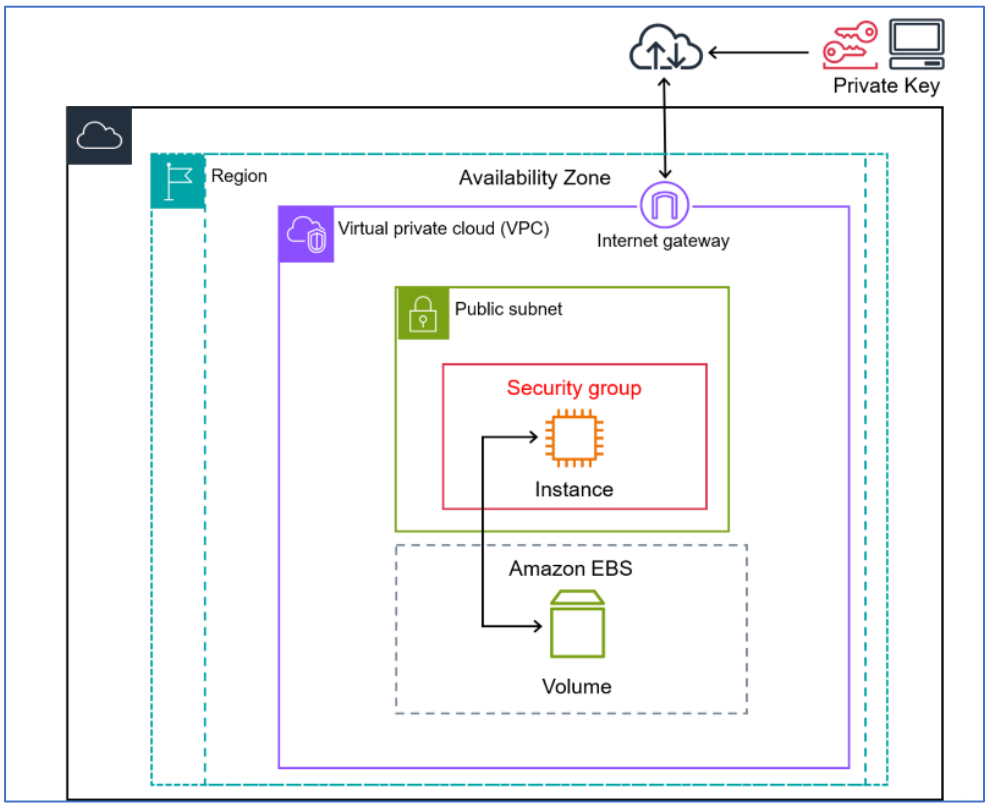
- **Operating System:** Windows 10 / 11.
- **RAM**: 8 GB
- **Processor**: Intel i3 12Gen Processor.
- **Storage**: 512GB SSD

4) System Design:

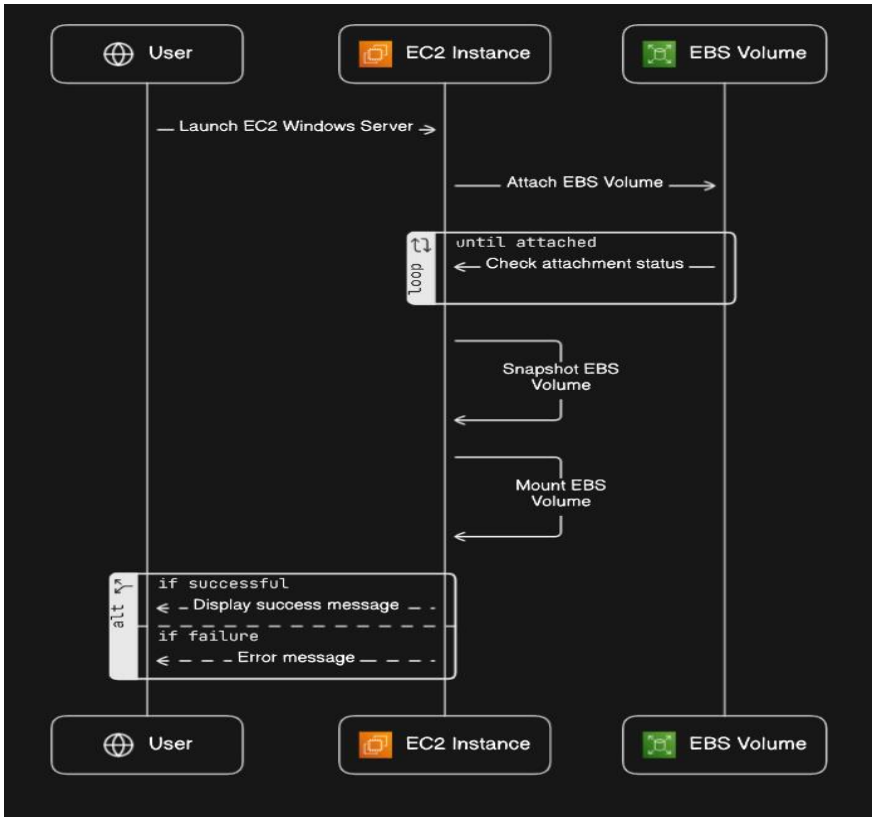
4.1) Solution Design



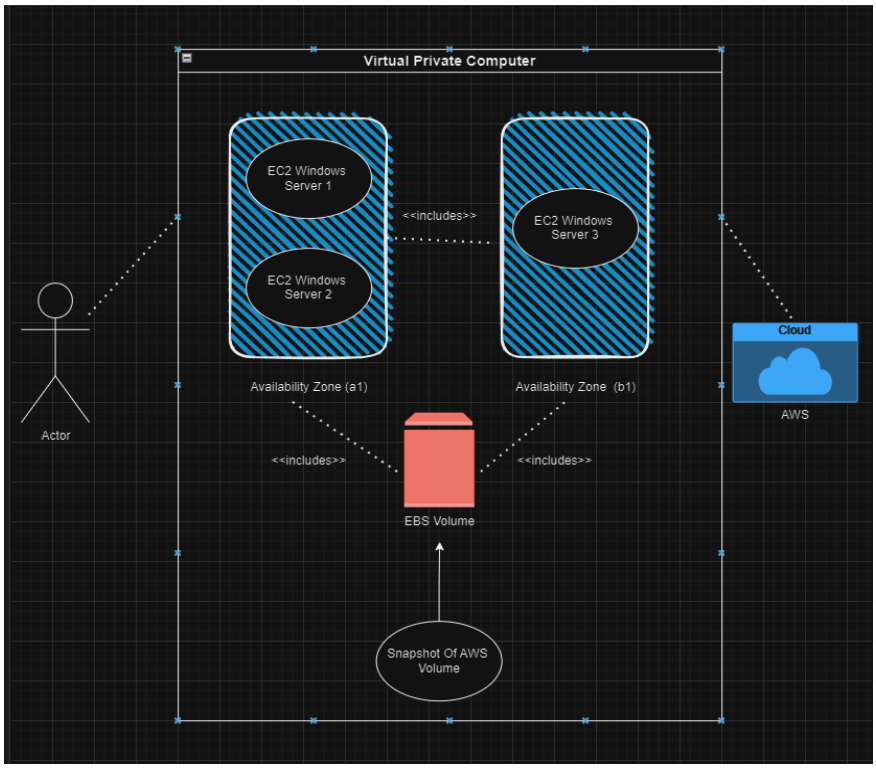
4.2) AWS Project Architecture



4.3) Sequence Diagram



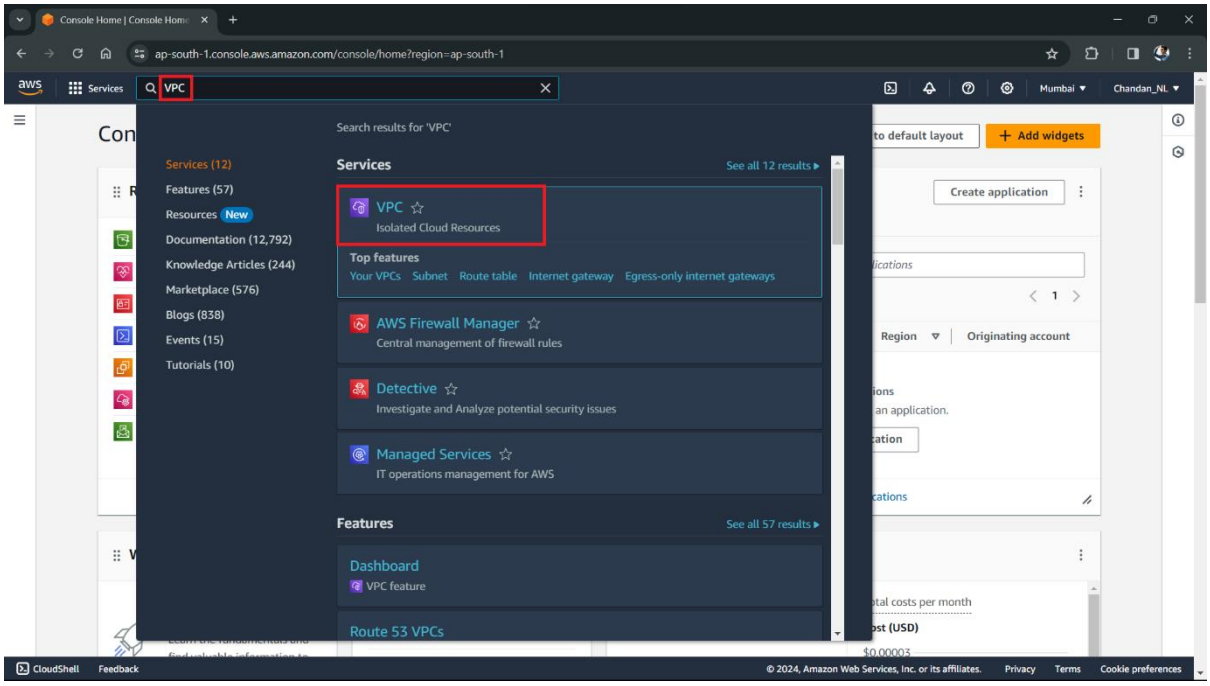
4.4) Use Case Diagram



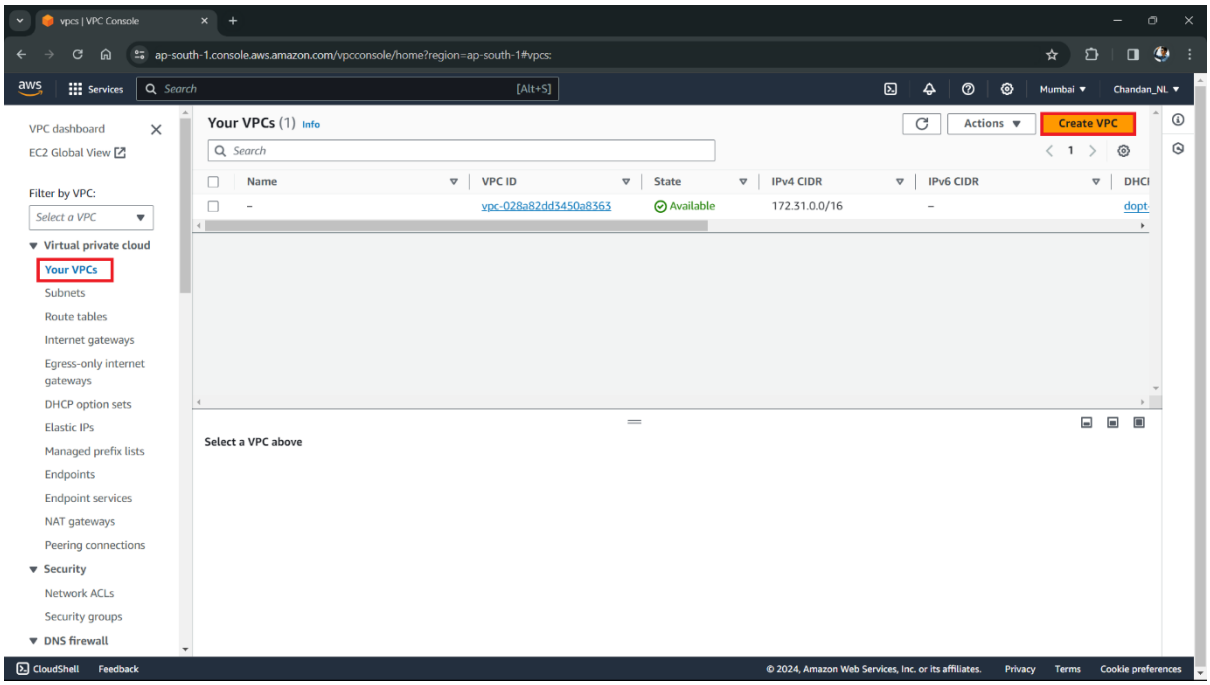
5) PVC -Project Set-Up and Executions

5.1) Creation of Custom VPC, Subnets, Route Tables, etc

Login to AWS Management Console, click on services, search for "VPC" and select "VPC".

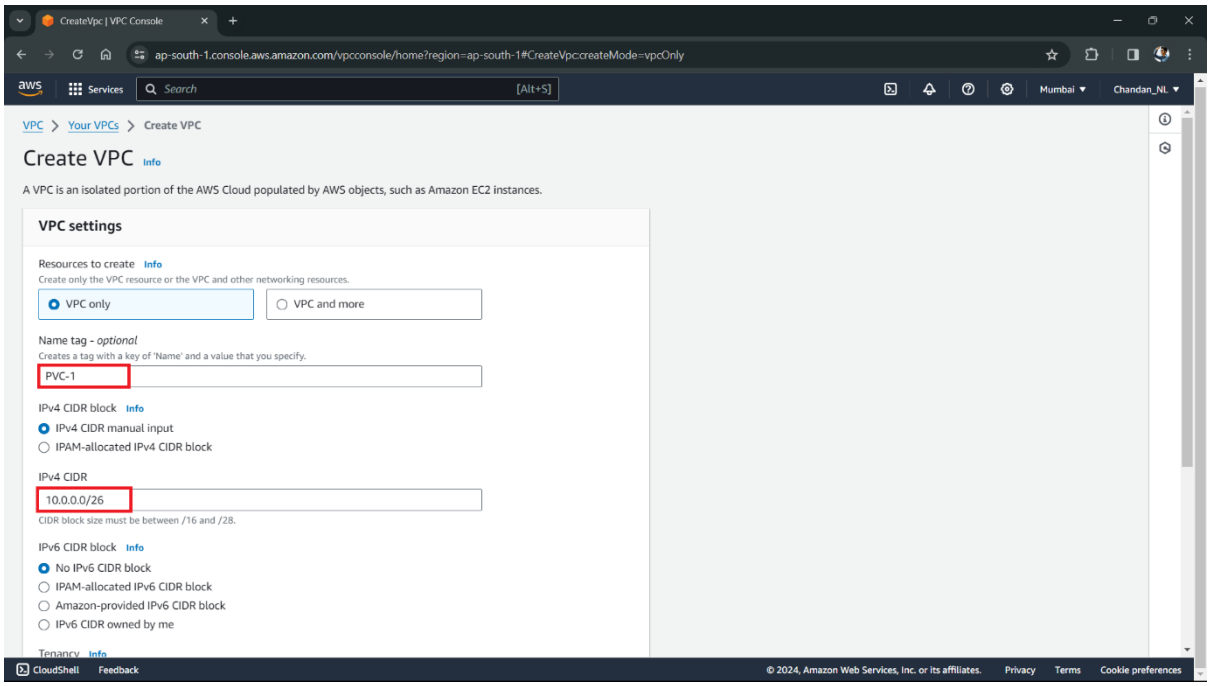


Select "Your VPCs" and click on "Create VPC"



Enter Name for your VPC

When you create a VPC, you must specify a range of IPv4 addresses for the VPC in the form of a Classless Inter-Domain Routing (CIDR) block; for example, 10.0. 0.0/16. This is the primary CIDR block for your VPC. ... After you create a VPC, you can add one or more subnets in each Availability Zone. **Enter "IPv4 CIDR" as "10.0.0.0/26"**



VPC IP Address Block:

IP Adress Range: 10.0.0.0/26

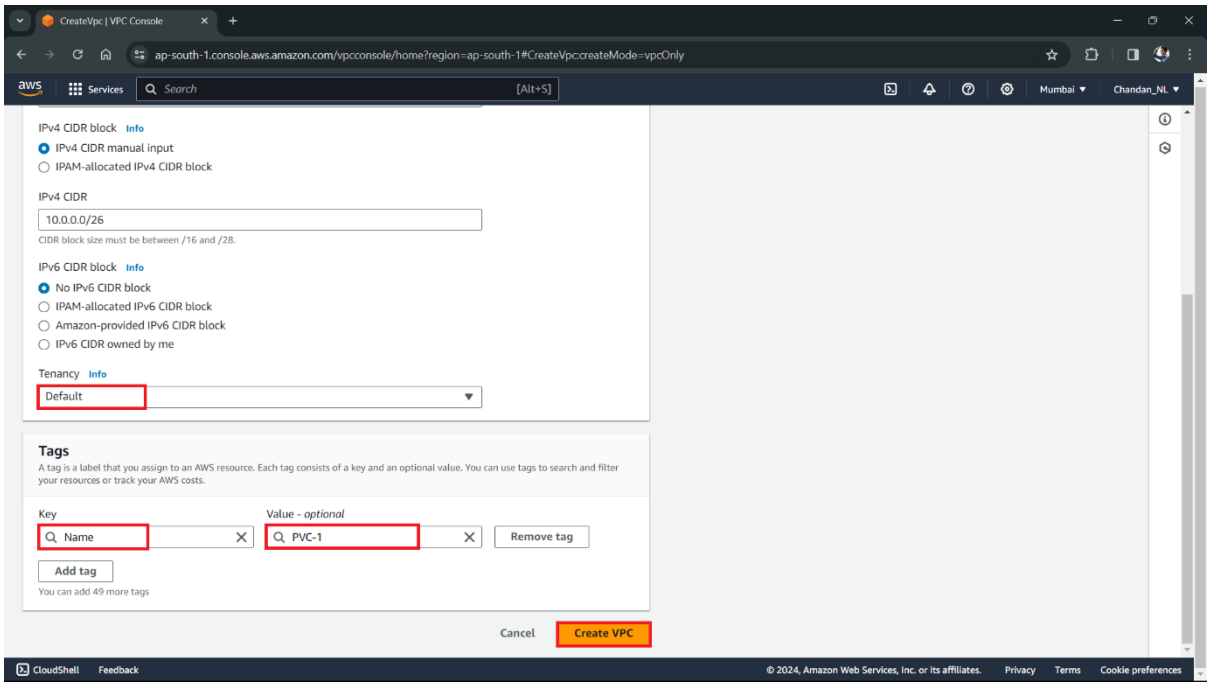
Total Number of IP Addresses:

2 ^ (30-26) = 2 ^ 6 = 64 (IP Addresses)

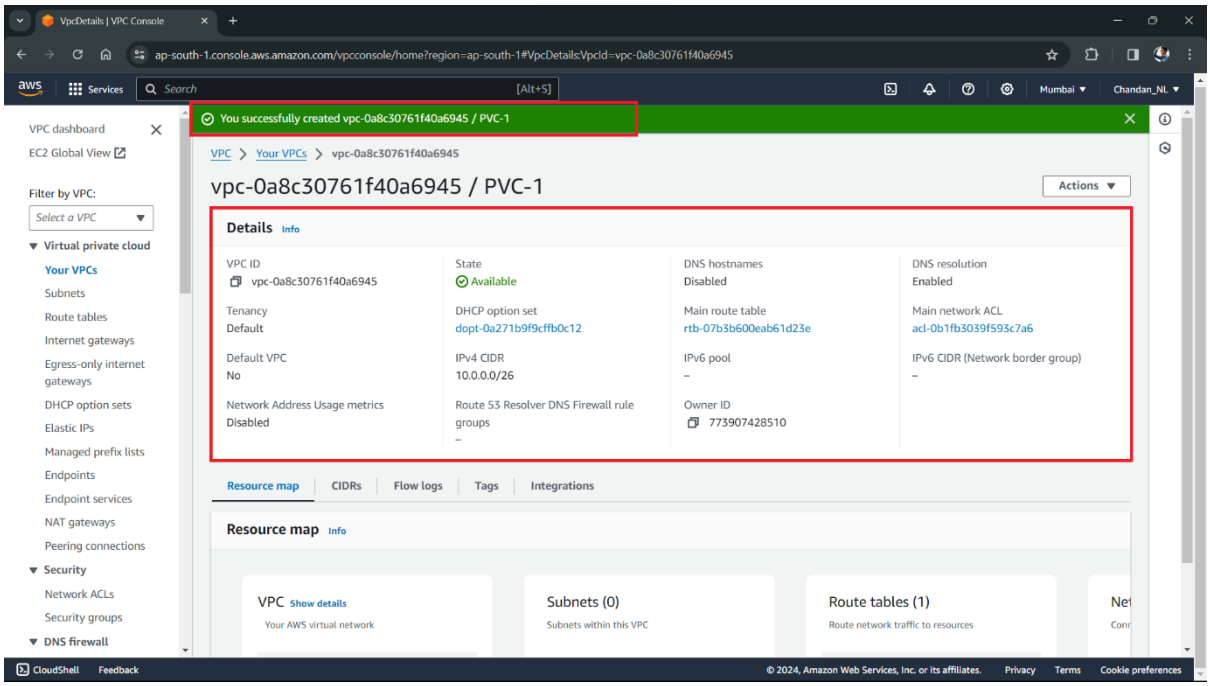
Starting IP Addresses: 10.0.0.0

Ending IP Addresses: 10.0.0.63

Enter the “Tags Info” and click on “Create VPC”

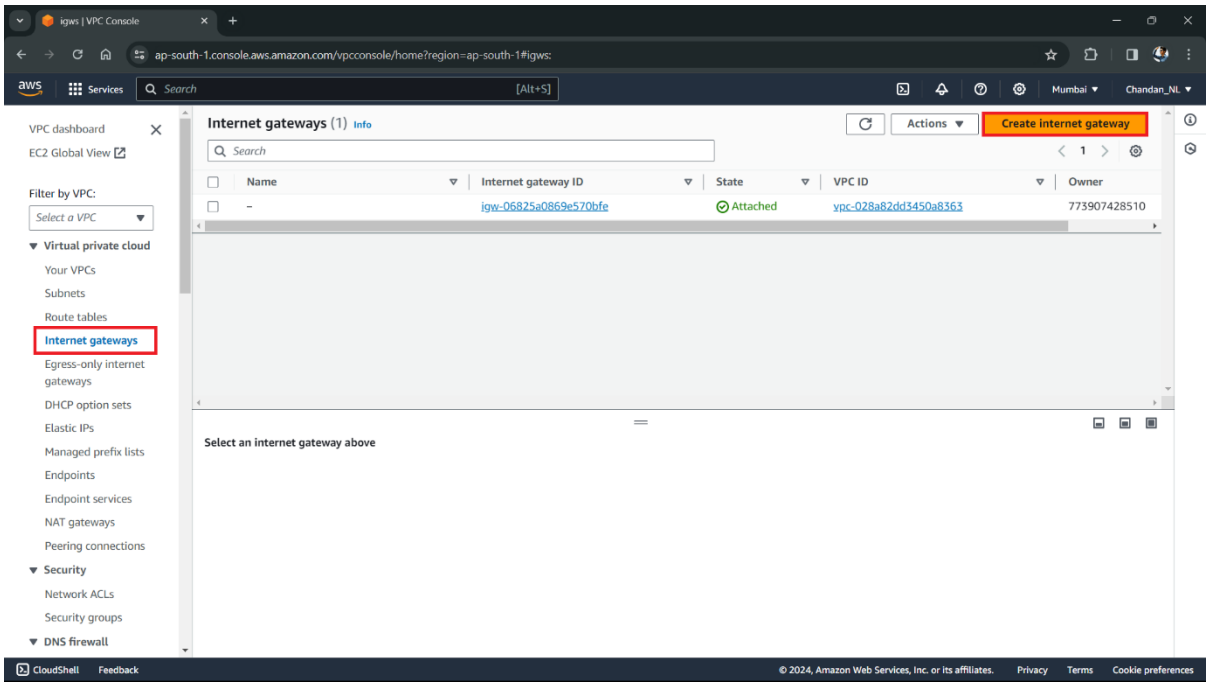


Verify the creation of your VPC

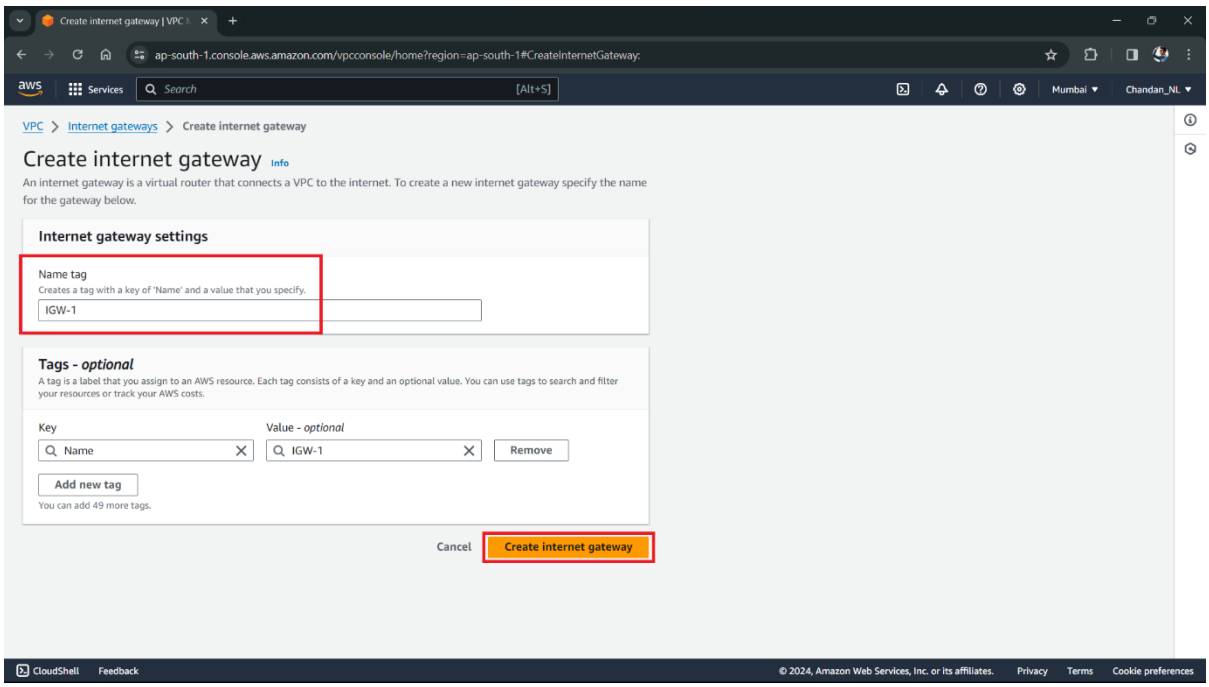


5.2) Creation of an Internet Gateway and attaching it to your created Custom VPC

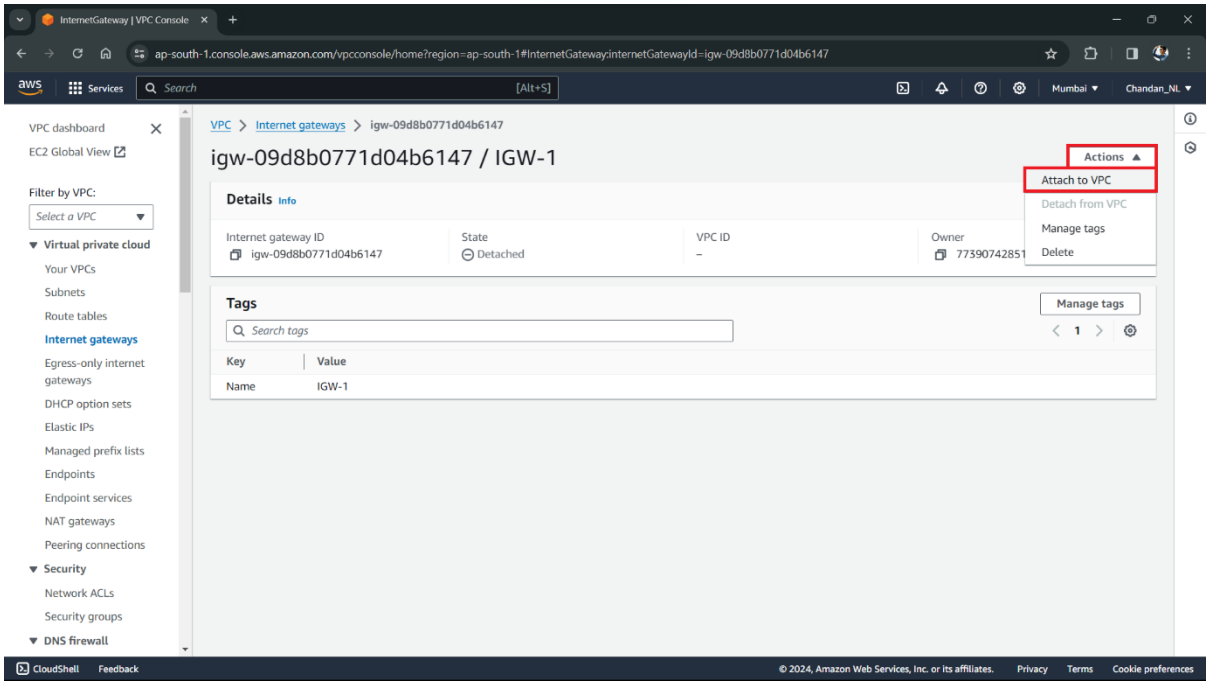
Select an Internet Gateway and click on Create Internet gateway



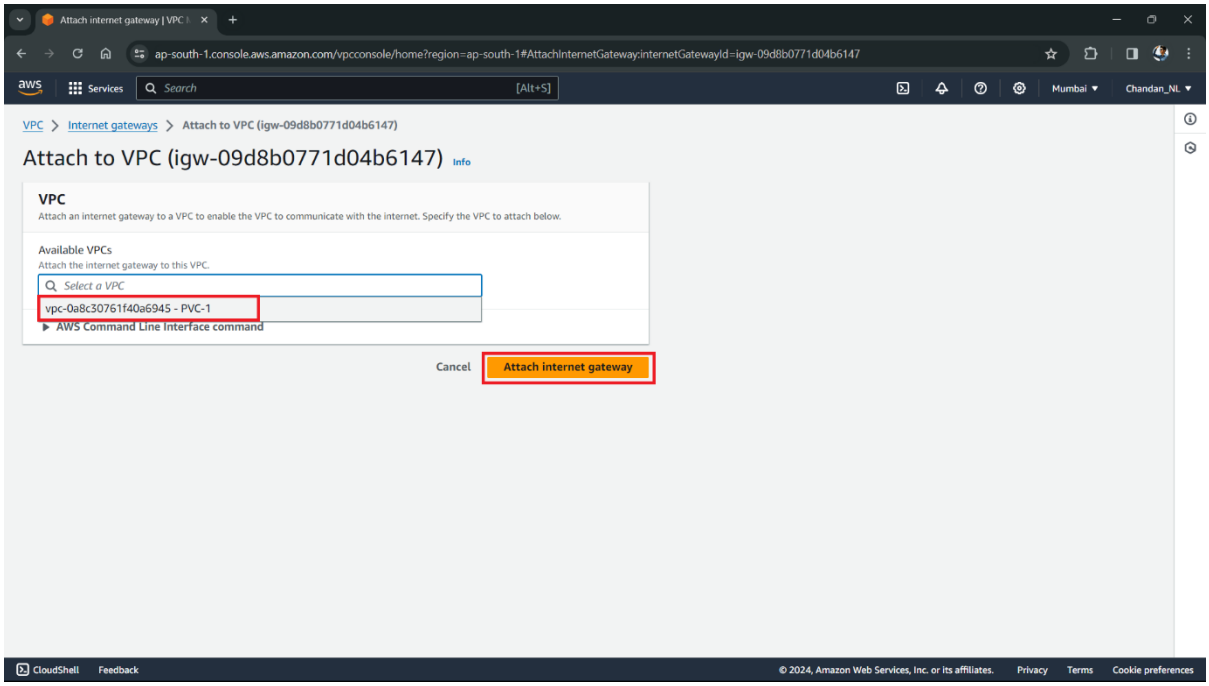
Enter Name to your Internet gateway and click on Create Internet gateway



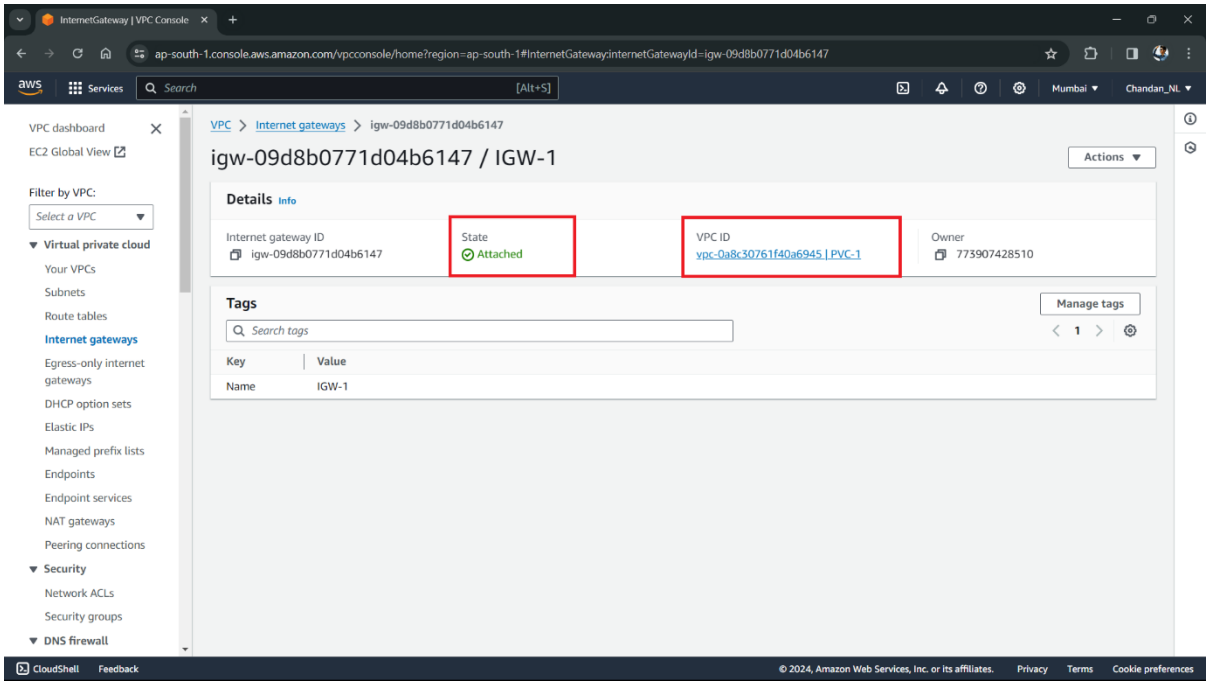
Click on “Attach to VPC” option



Select your created Custom VPC and click on “Attach Internet Gateway” option

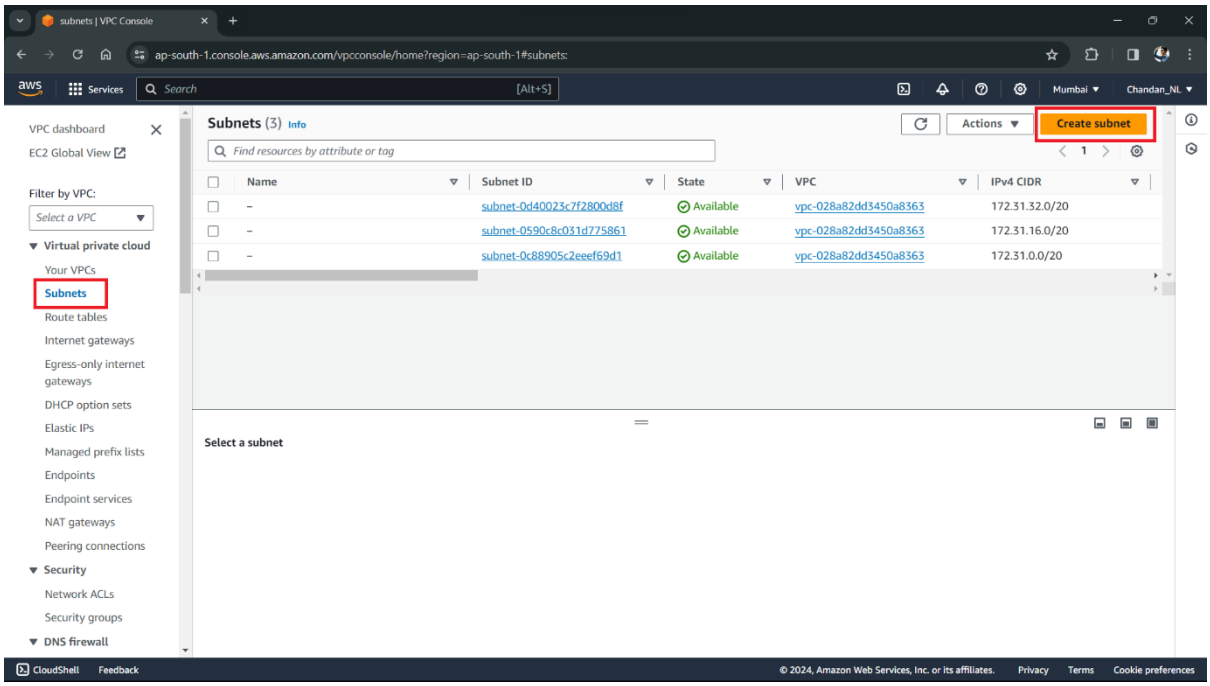


Verify the attachment

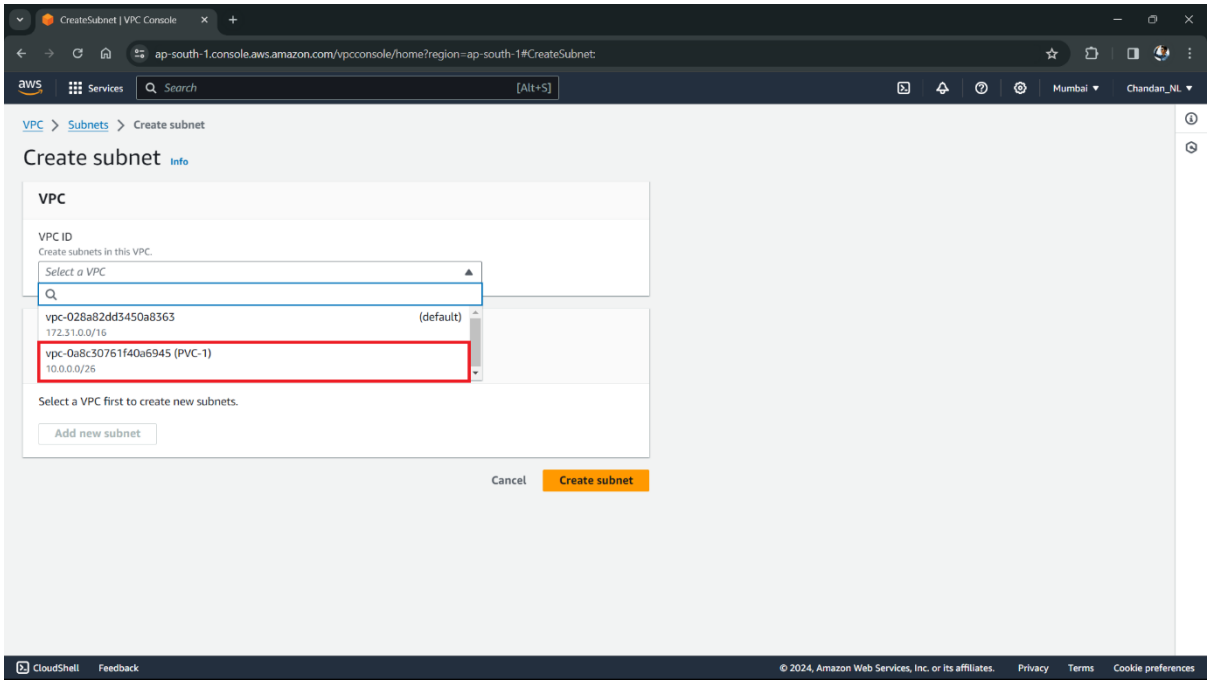


5.3) Create a Public Subnet and attach it to your VPC created

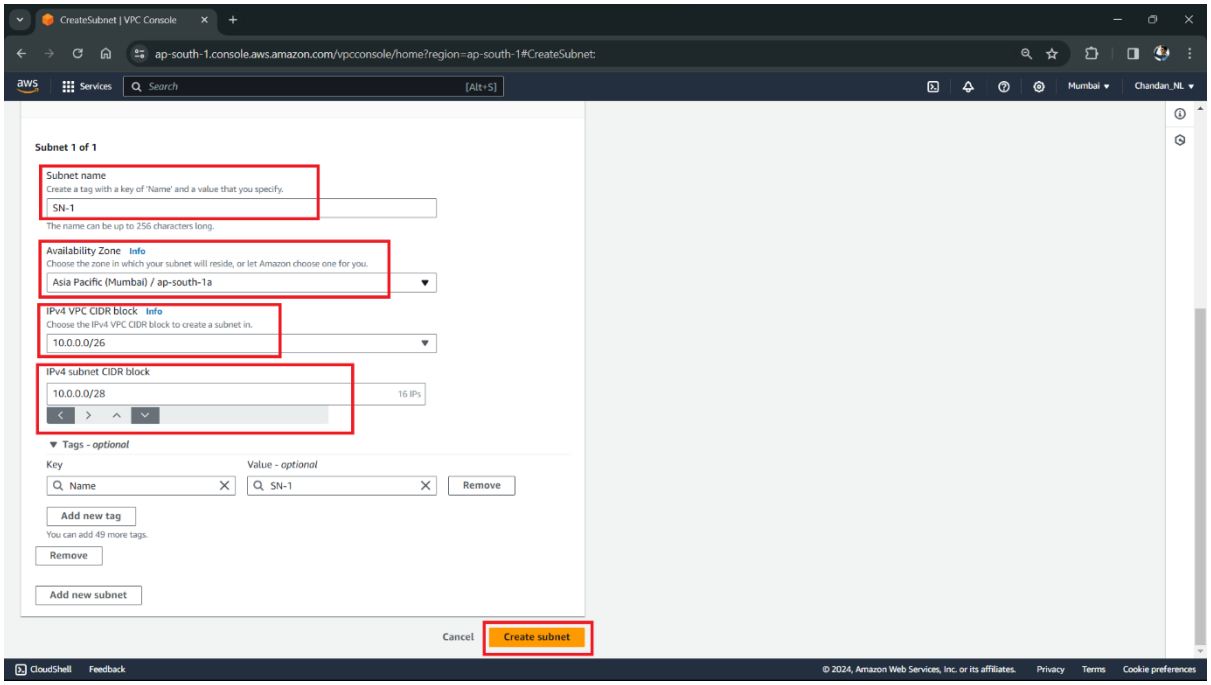
Select Subnets option and click on Create subnet



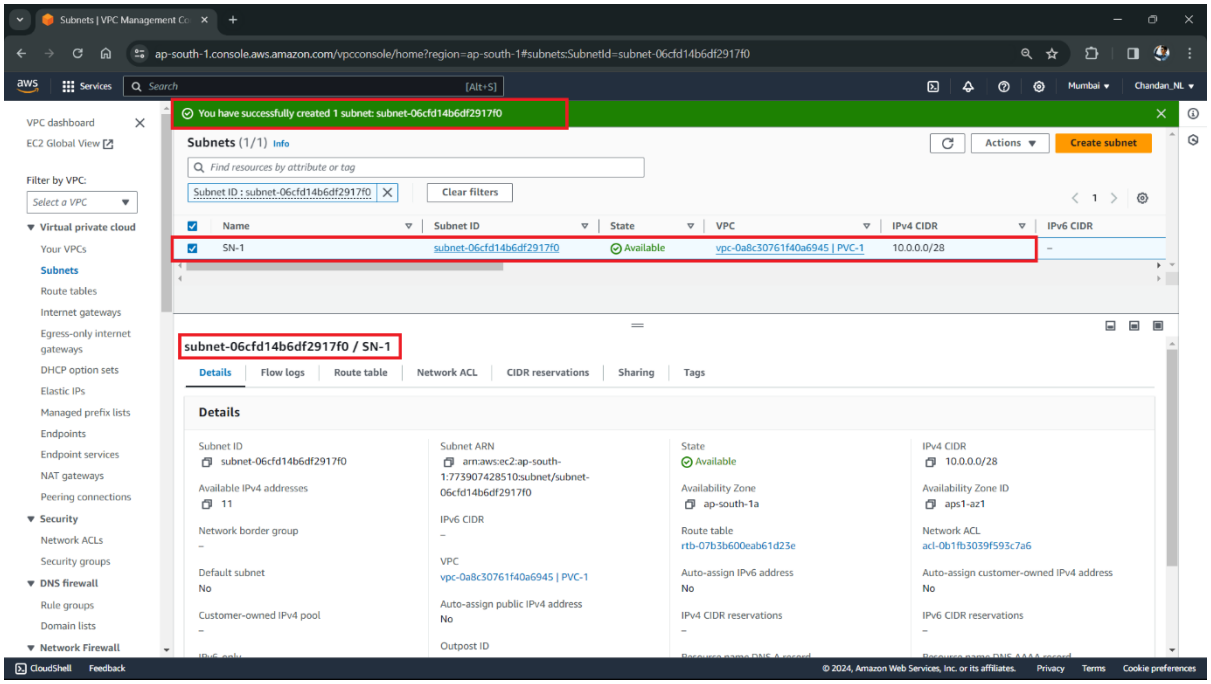
Select Your VPC created



Enter the relevant “Subnet Settings” values & click on “Create subnet” buttons

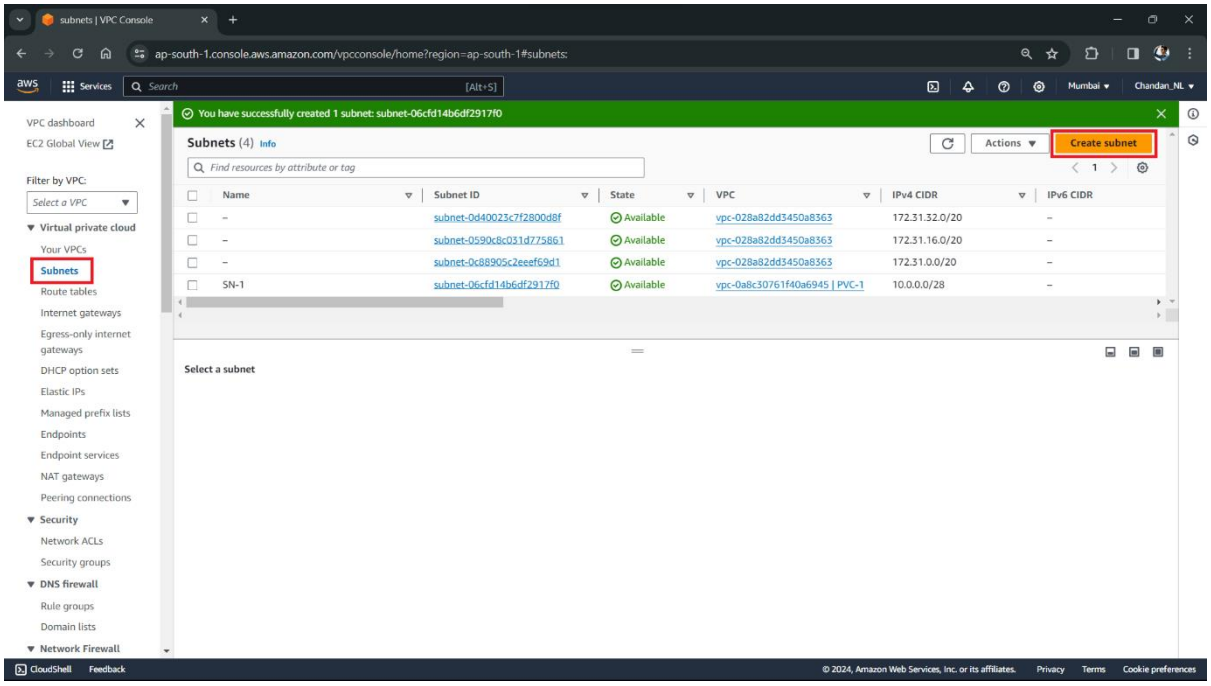


Verify the creation of the Public Subnet

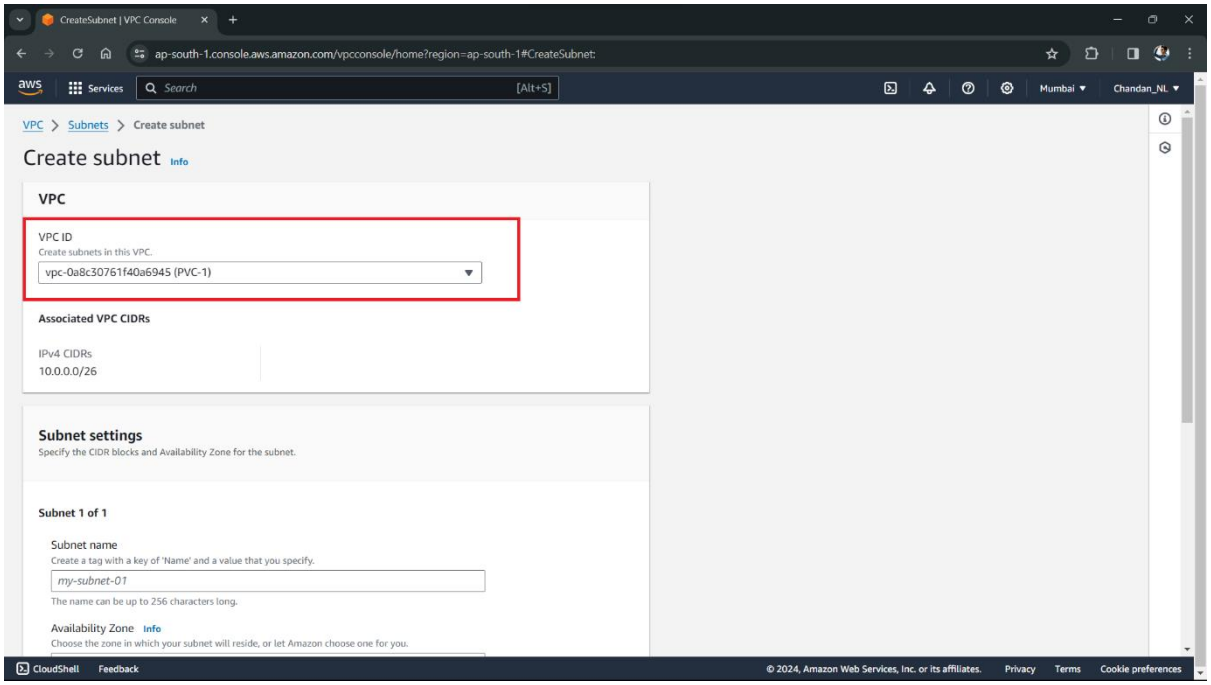


5.4) Create a Private Subnet and attach it to your VPC created

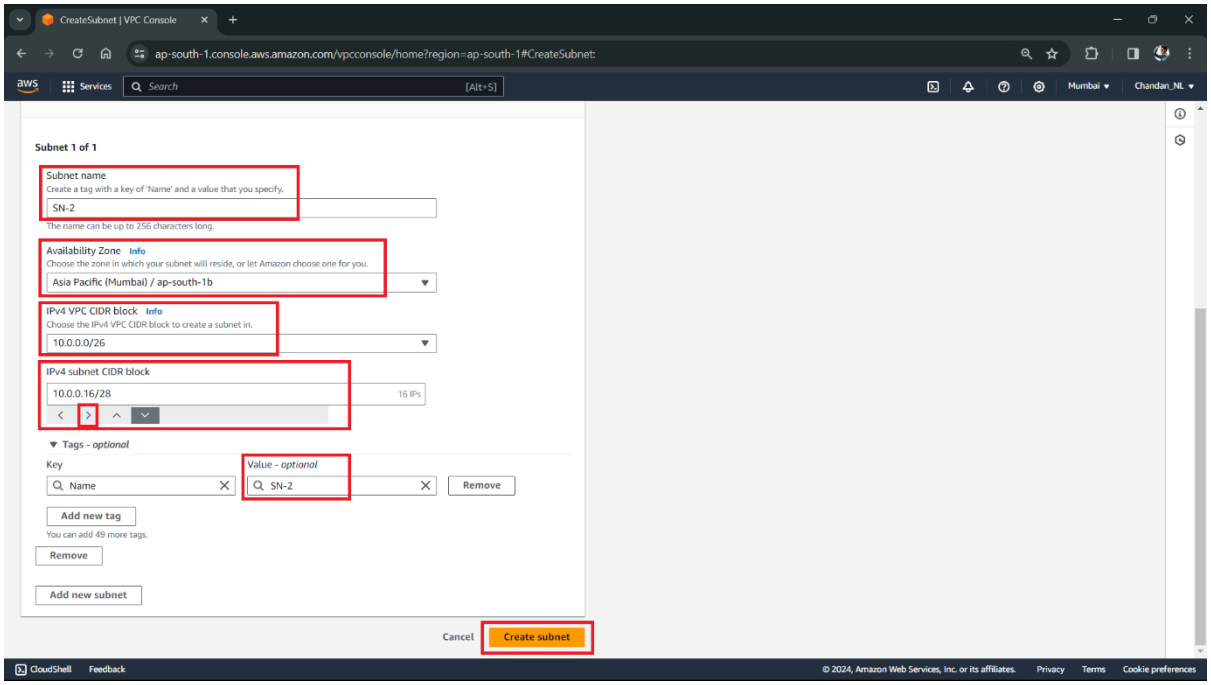
Select Subnets option and click on Create subnet



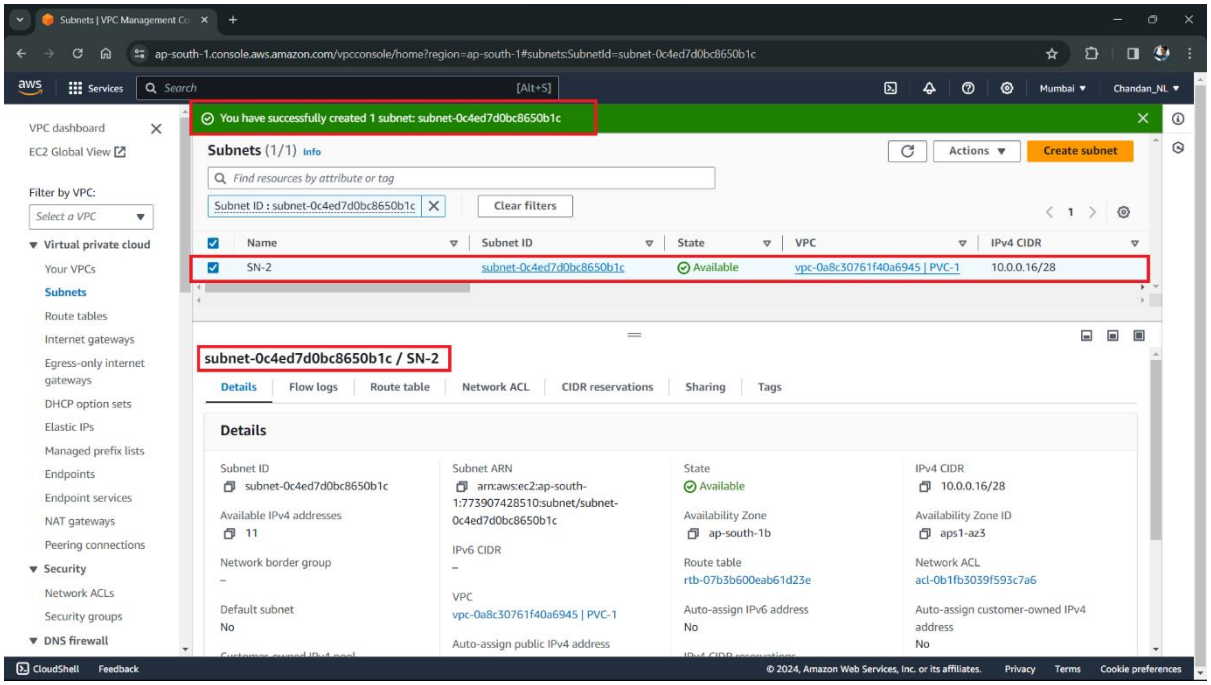
Select Your VPC created



Enter the relevant “Subnet Settings” values and click on “Create subnet” button



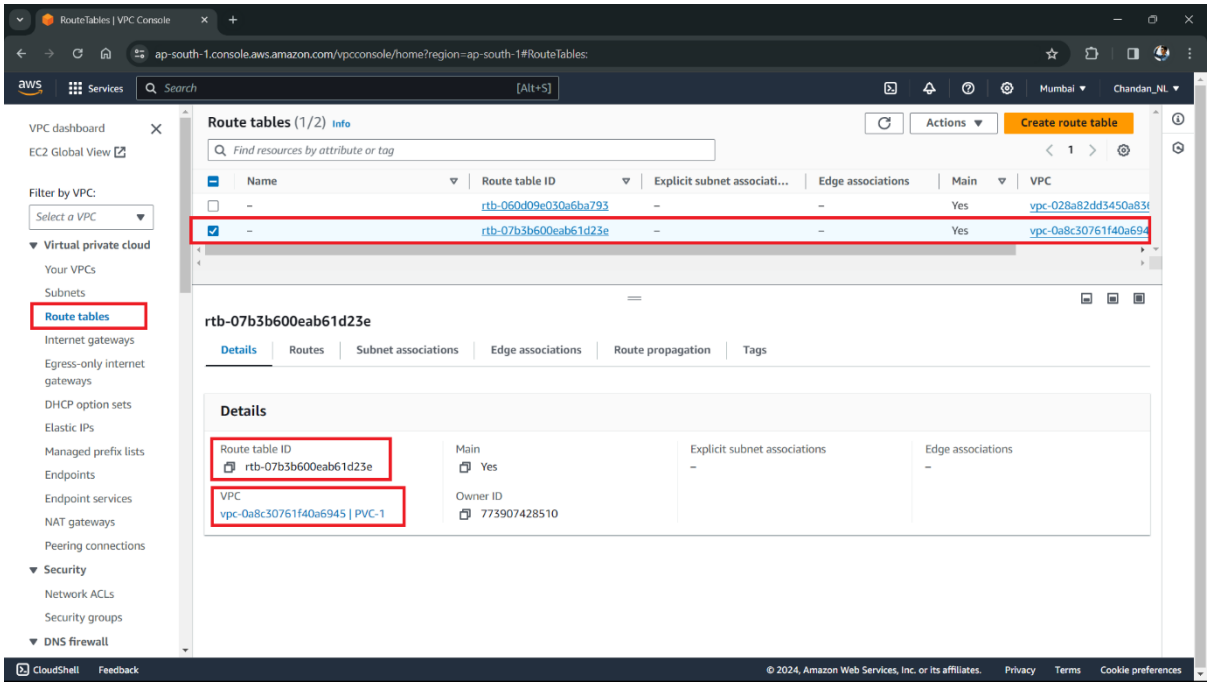
Verify the creation of the Public Subnet



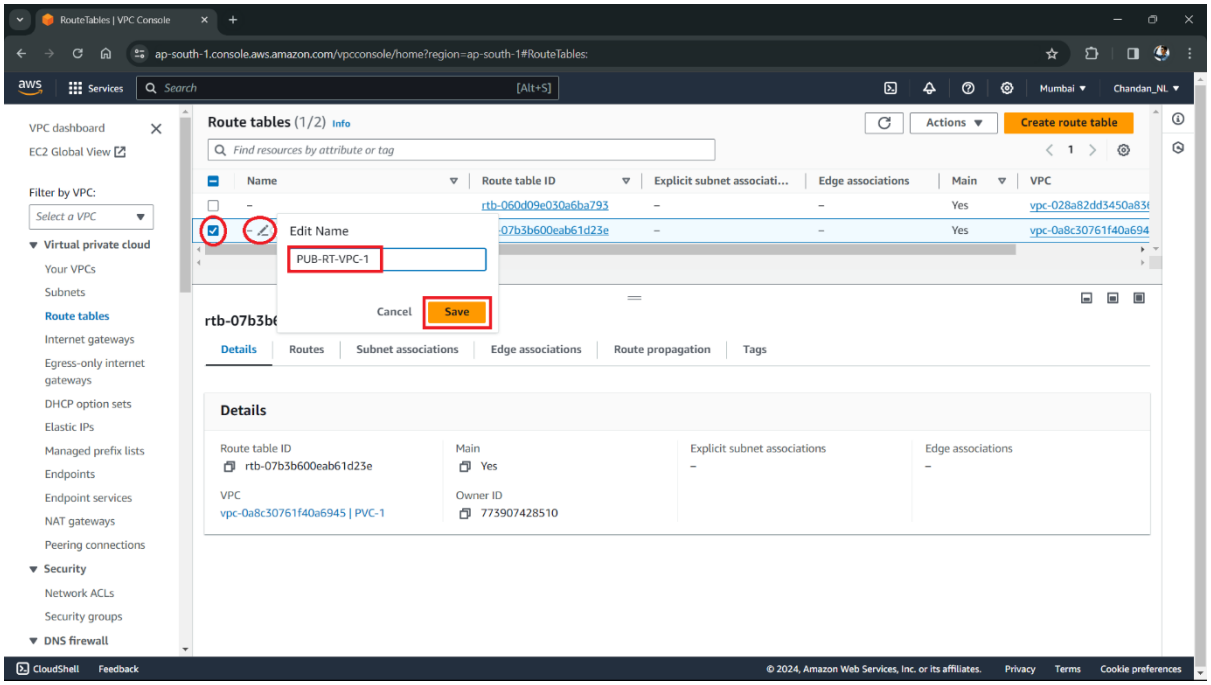
5.5) Route Tables Checking, Creation and association with the Subnets created

Check and associate the Main Route Table of your VPC with the Public-Subnet and verify the successful association.

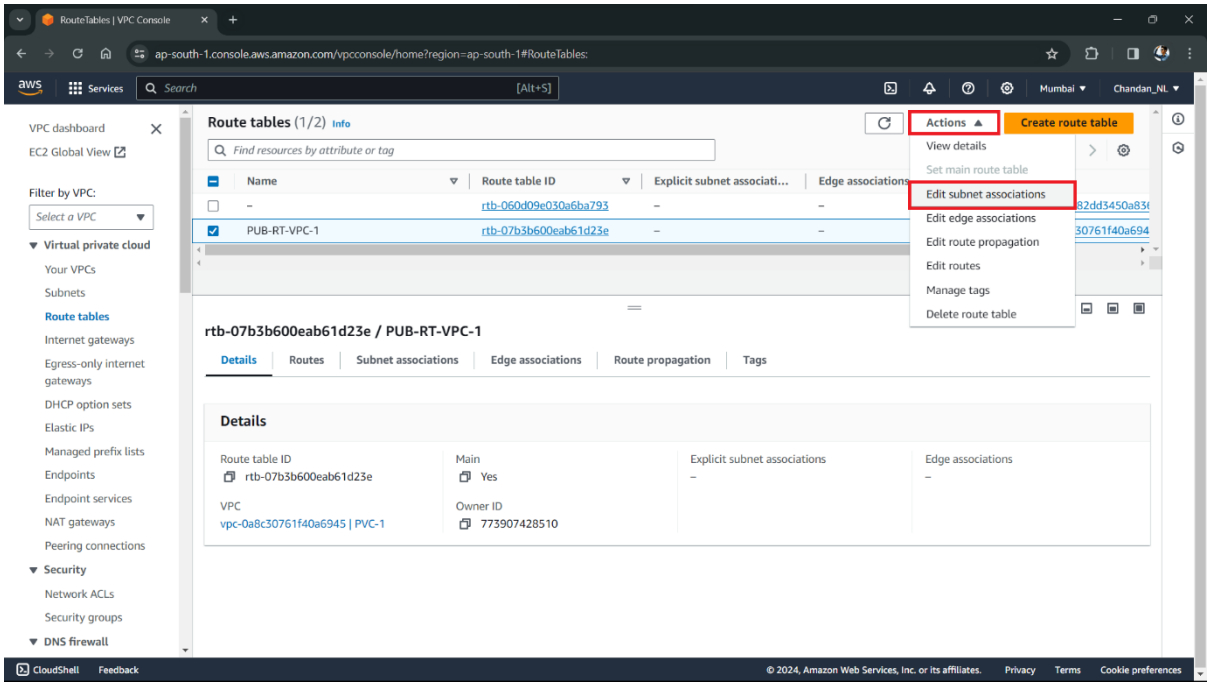
Click on the "Route Table" option and check for the "Main Route Table" created along with your VPC



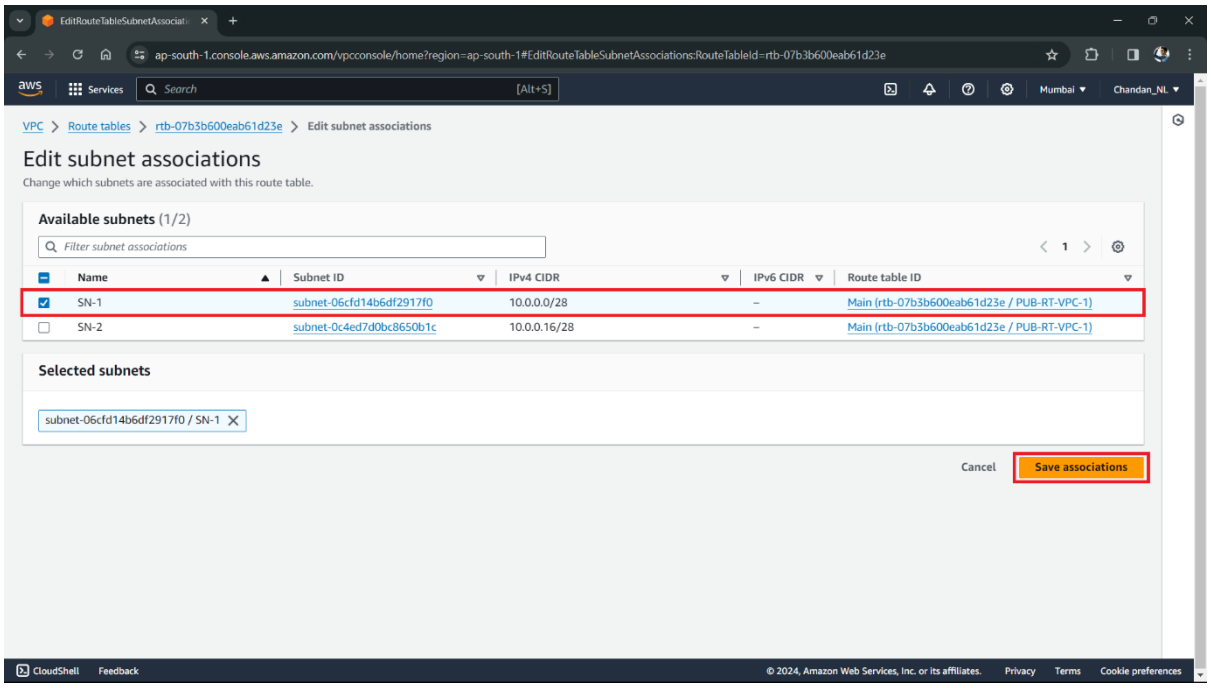
Name the “Main Route Table” as “PUBRTVPC1”



Click on “Edit subnet associations” option



Select the "Public-Subnet-(SN1)" subnet, click on "Save associations" button and verify the association



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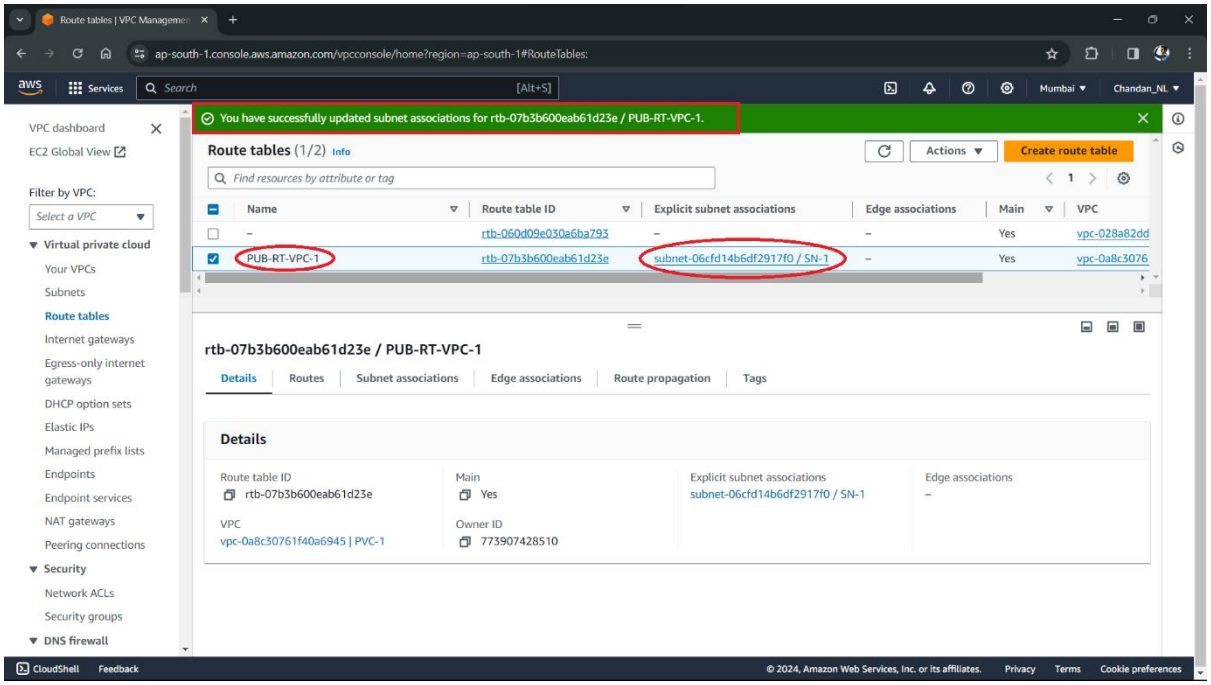
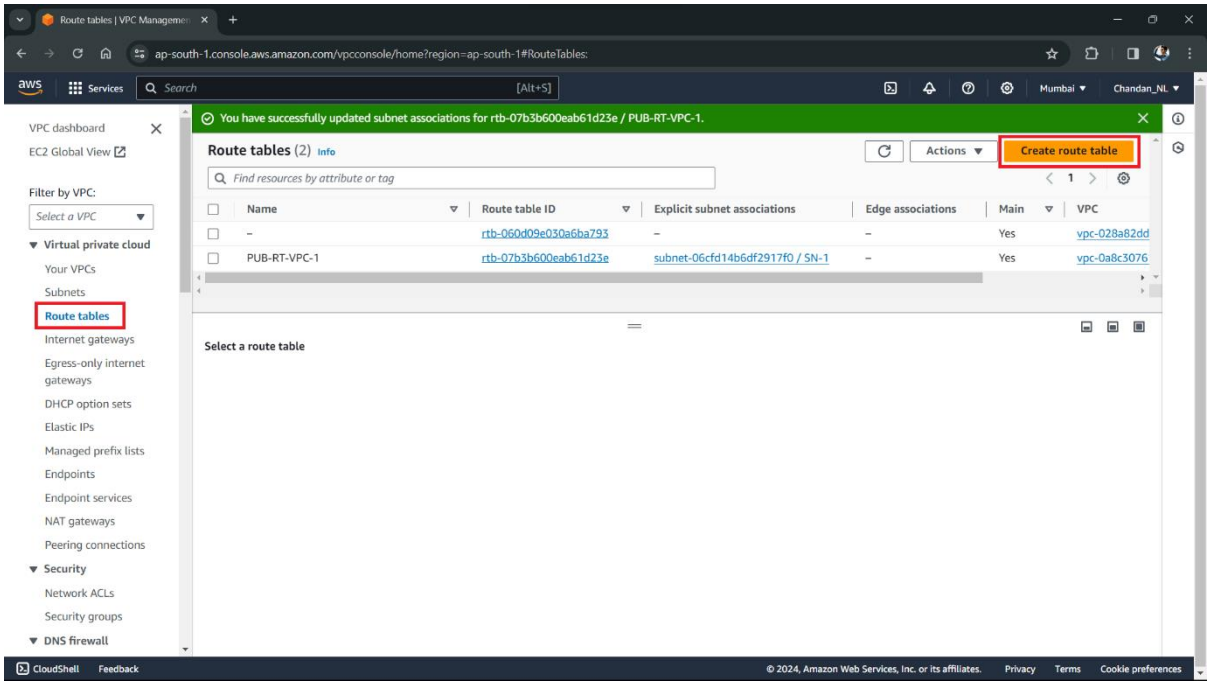
Create a new Route Table in your VPC and associate it with the Private-Subnet created and verify the successful association

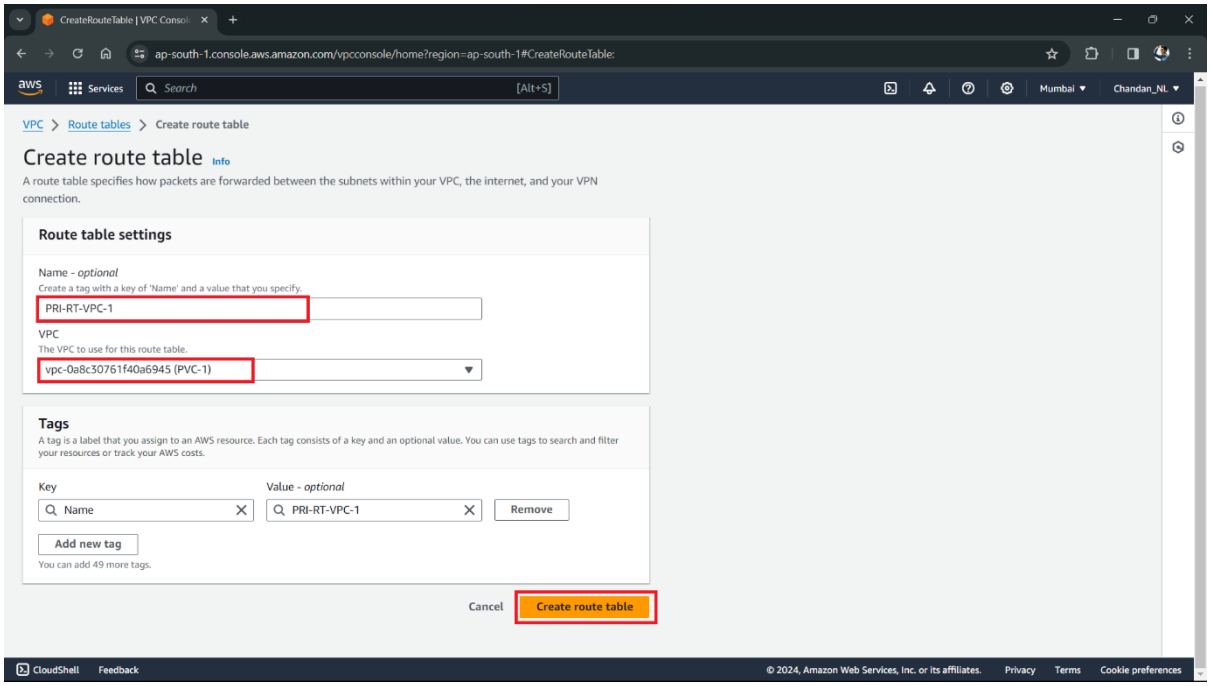
Click on "Create route table" button



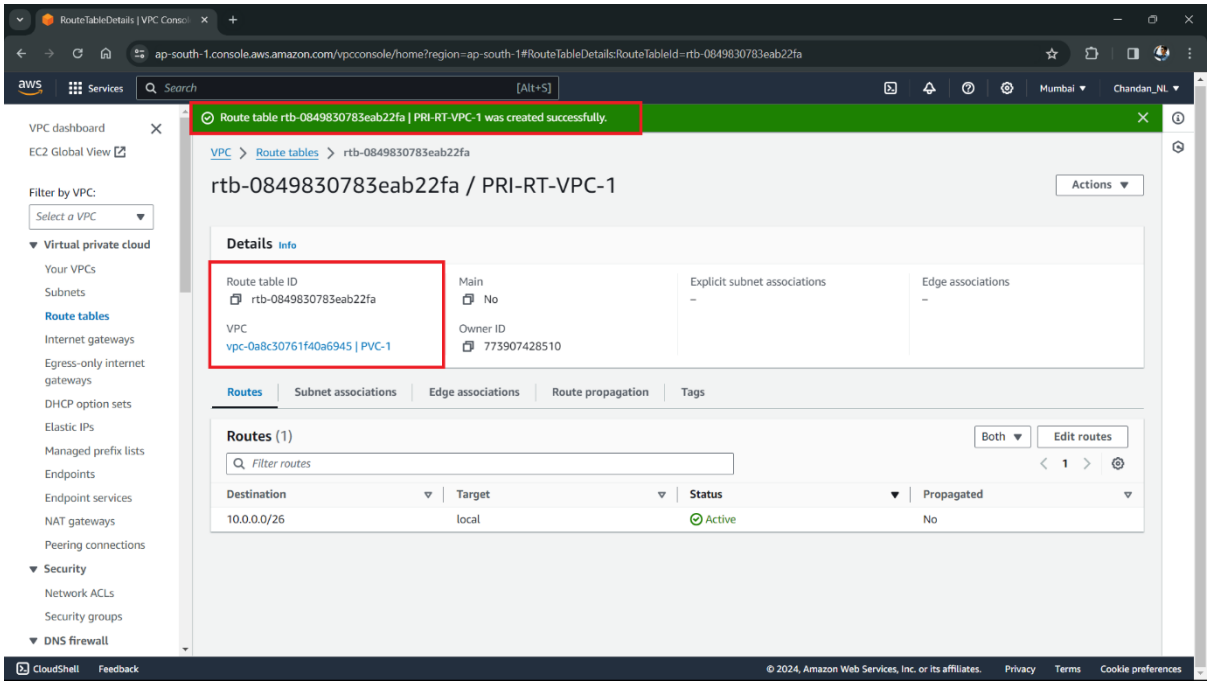
Enter the Route table Tag and select Your VPC created



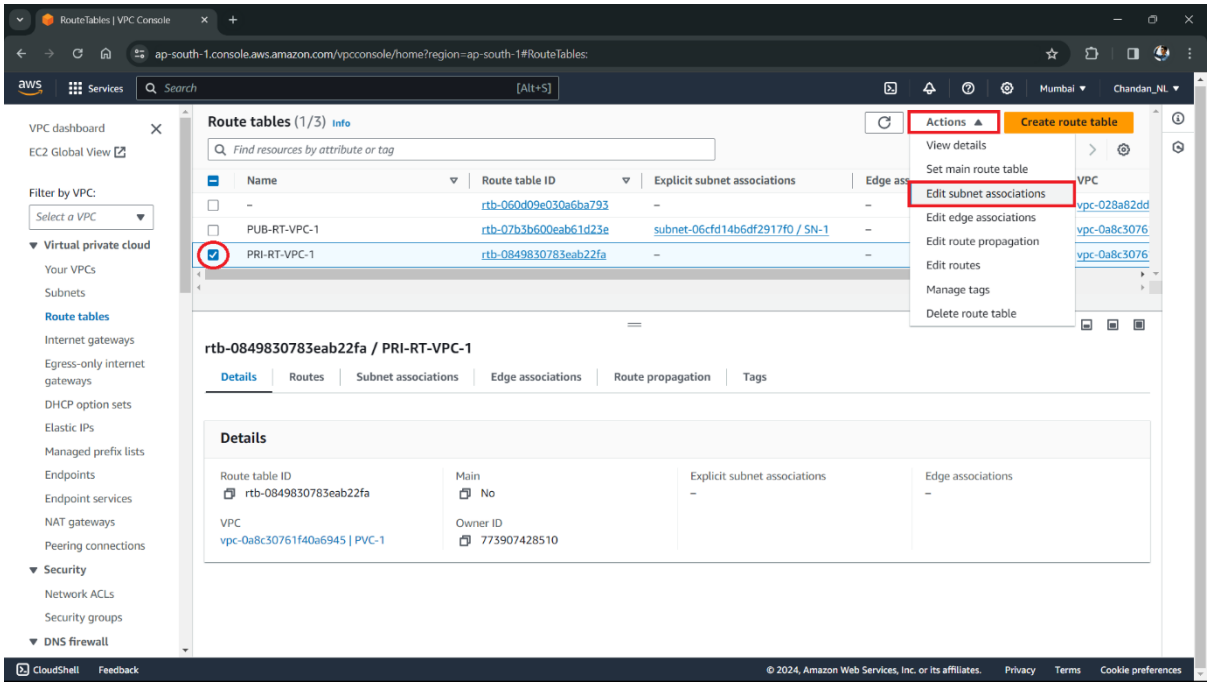
Click on the “Create route table” button



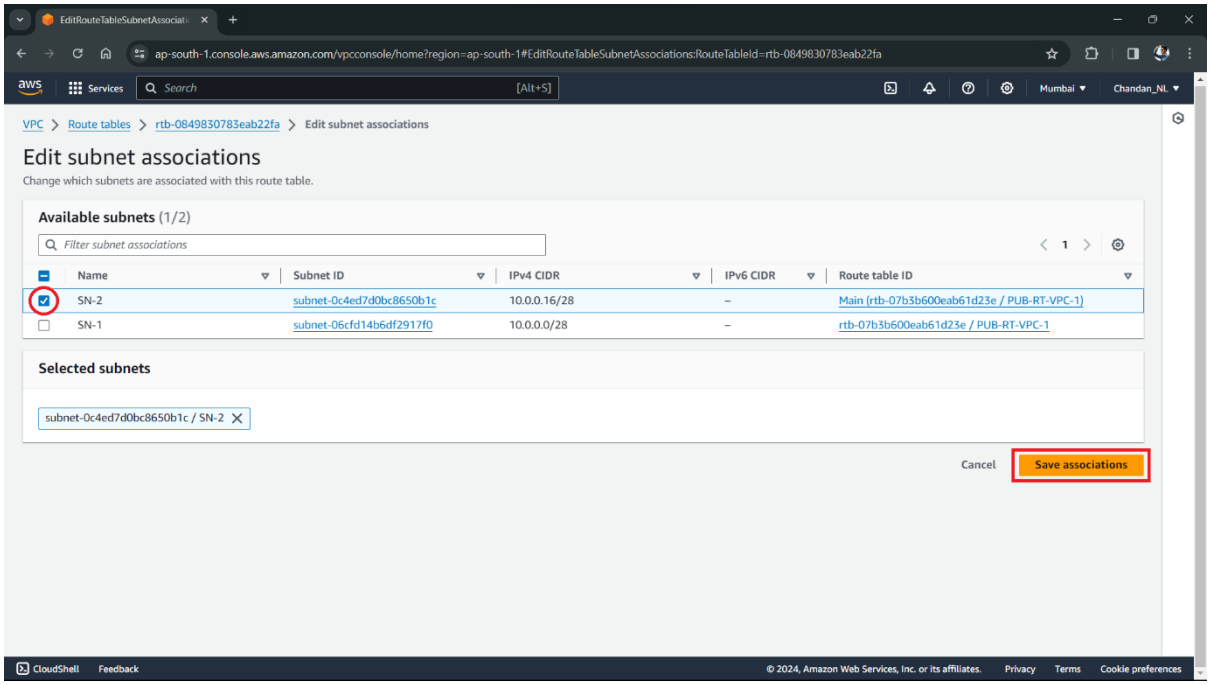
Verify its successful creation



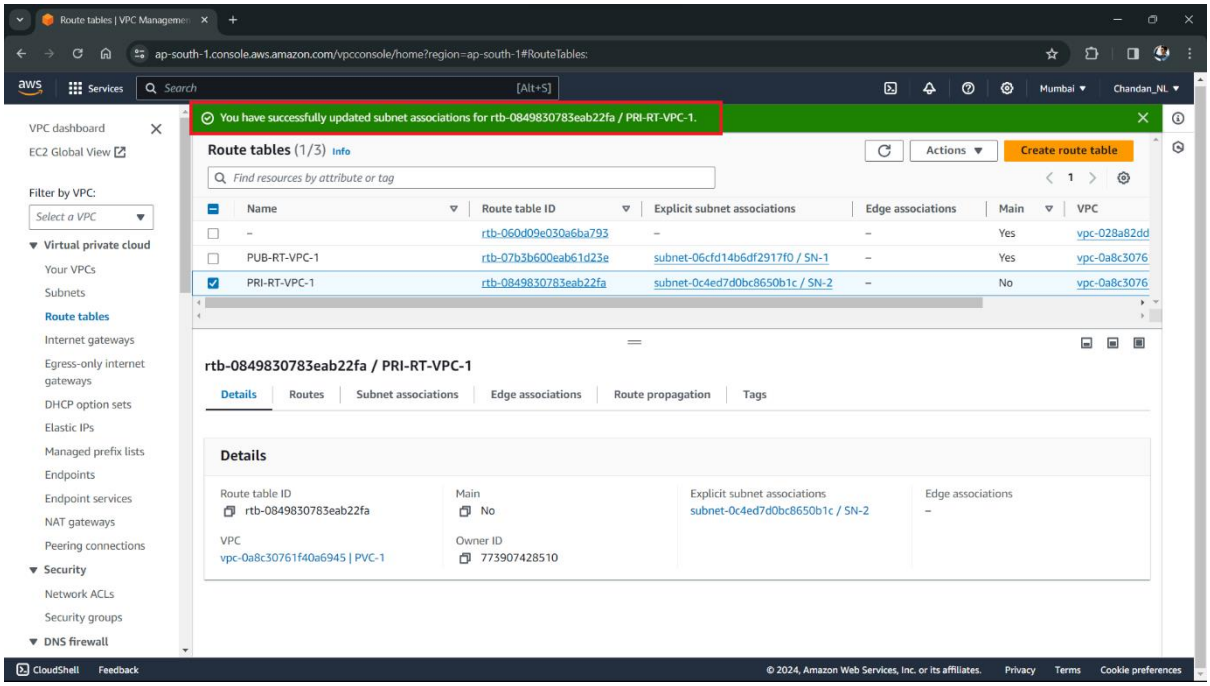
Associate the Route Table created with the Private-Subnet-(SN2)



Click on save association

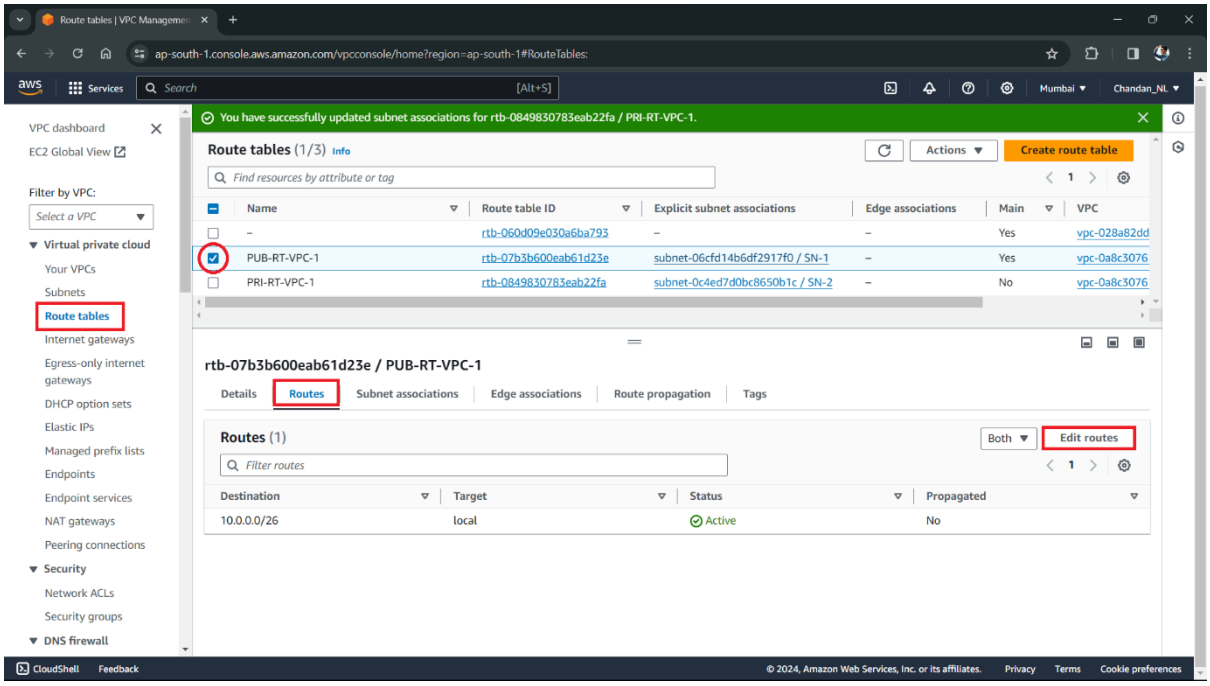


Verify the successful association

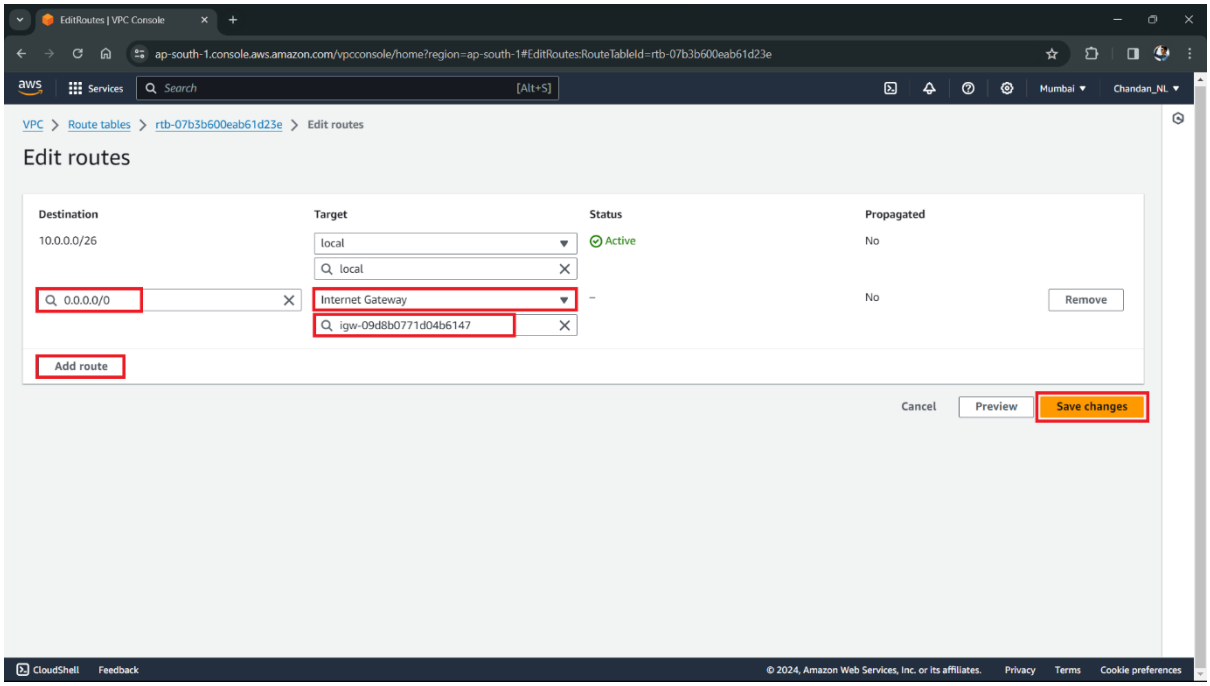


5.6) Associate the created Internet Gateway with the Public Subnet (SN1)

Select the Public Route Table and click on "Routes" option and click on "Edit routes"



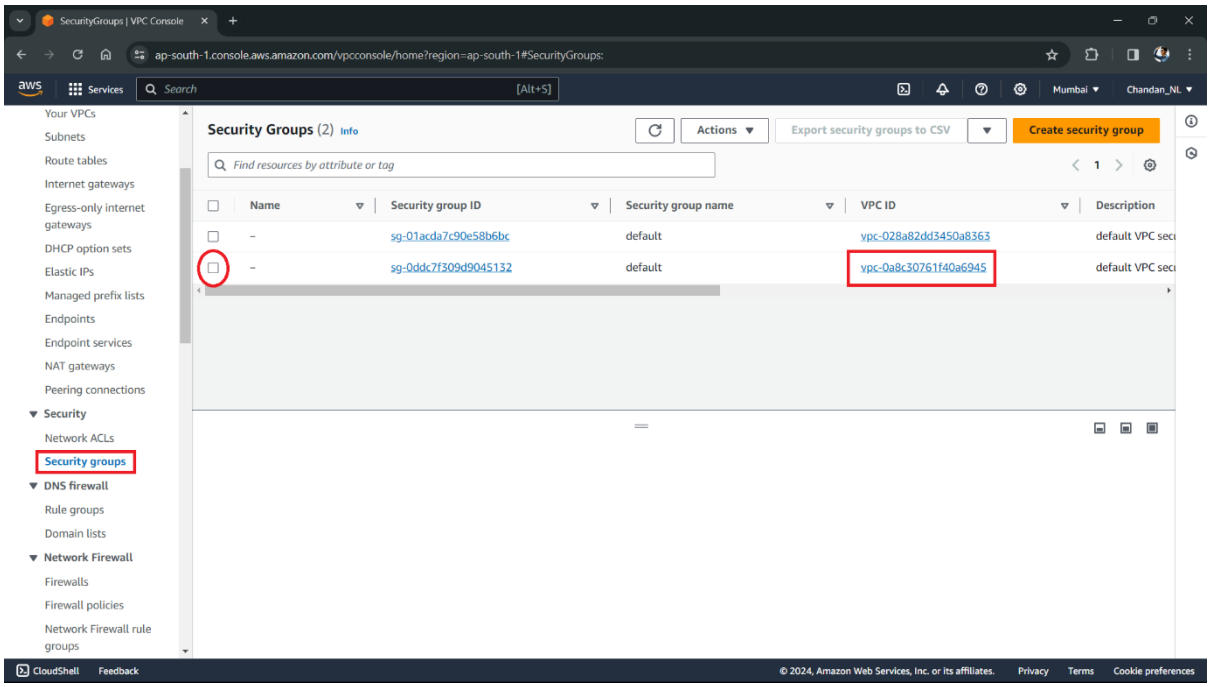
Click on "Add route" option and make entry for created Internet Gateway then save

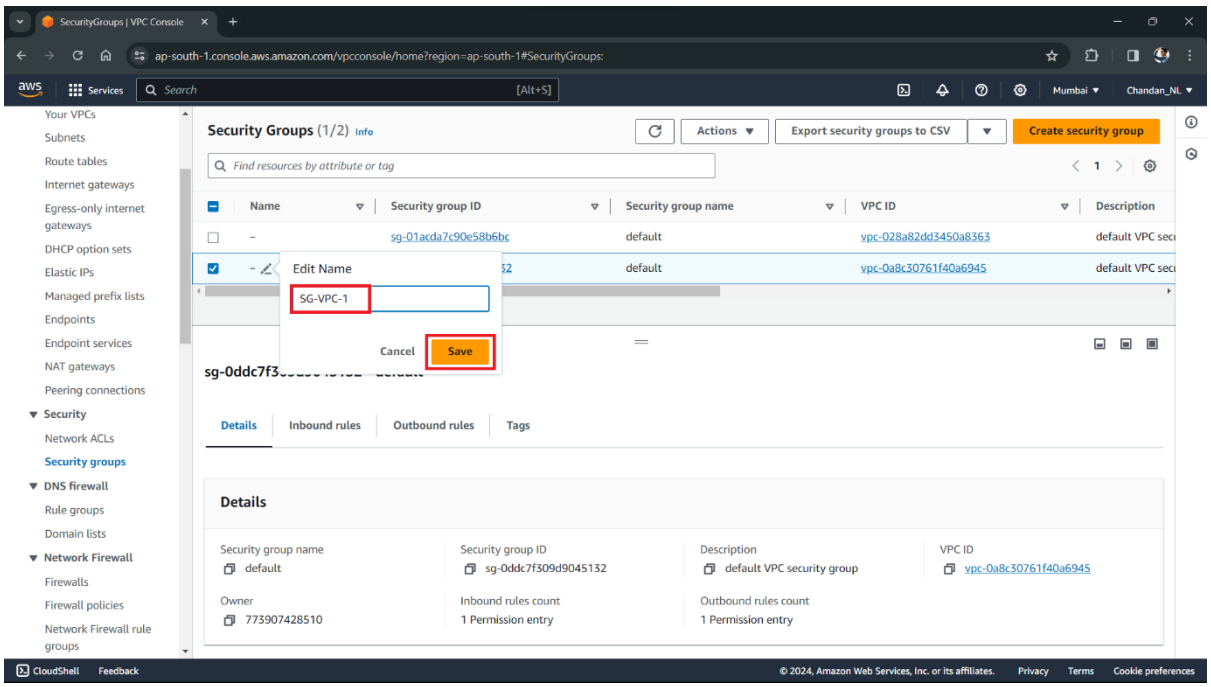


Click on save changes

5.7) Finding, Naming and Updating the default Security Group created along with VPC created with required info

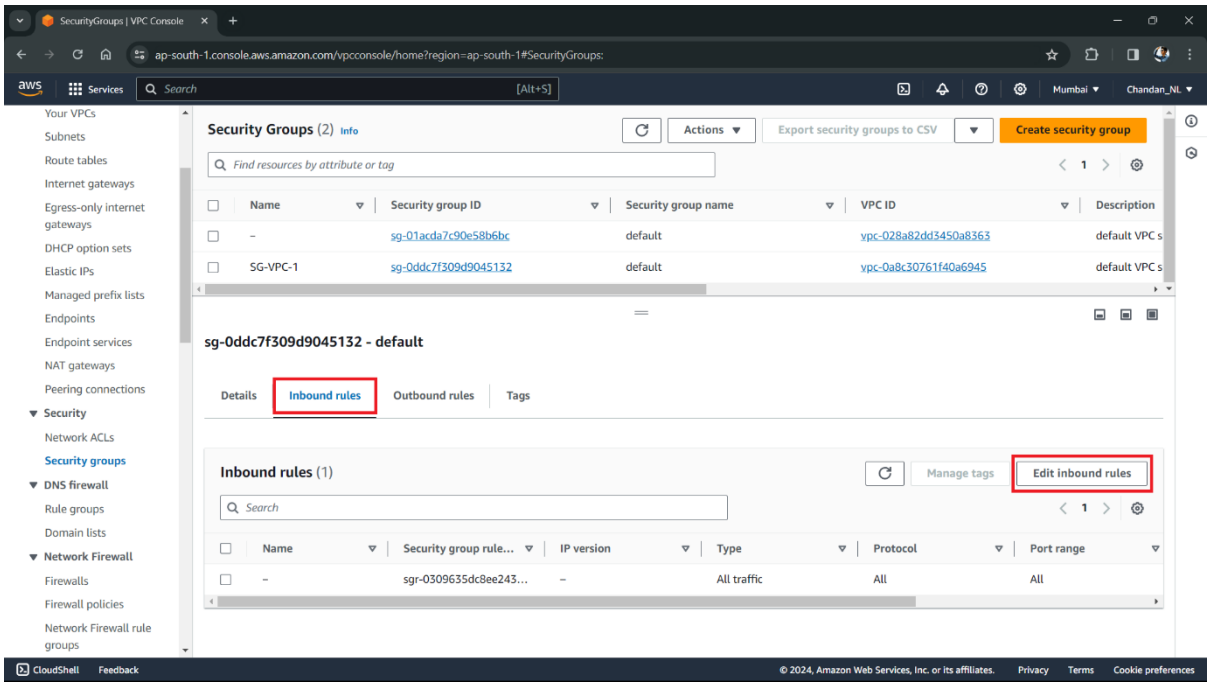
Click on "Security Groups", note down your VPC ID, select the default Security Group and name it as "SG-My-VPC-01"



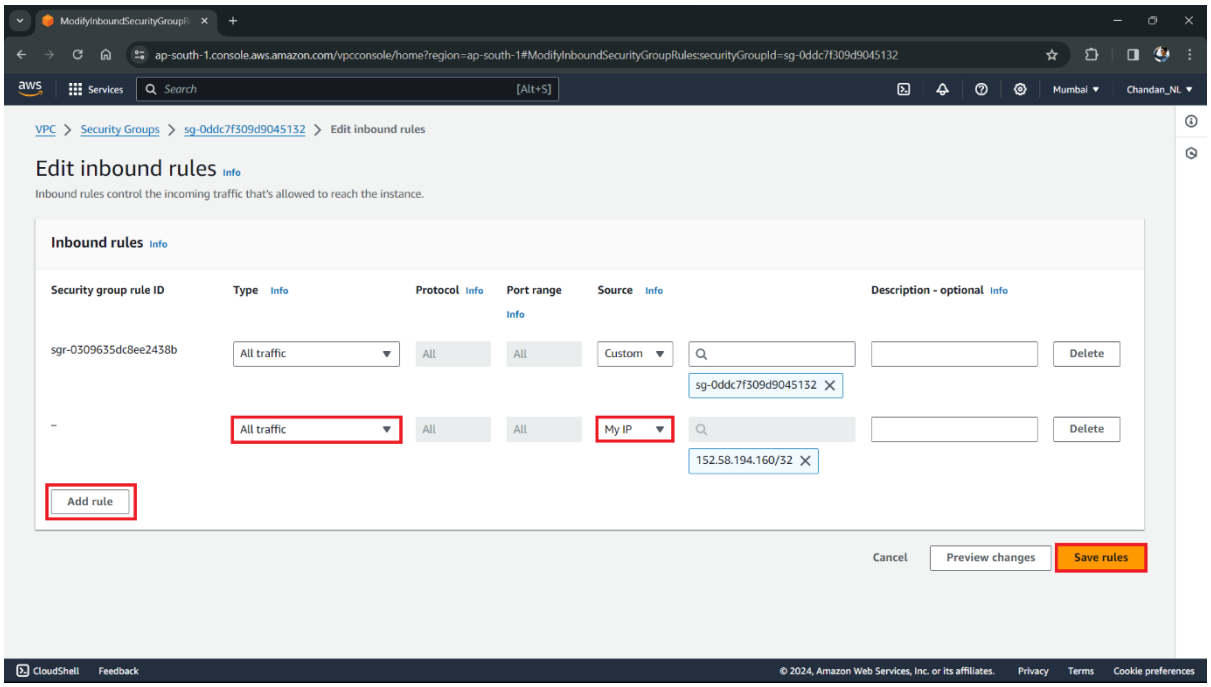


Click on “Inbound rules” tab and

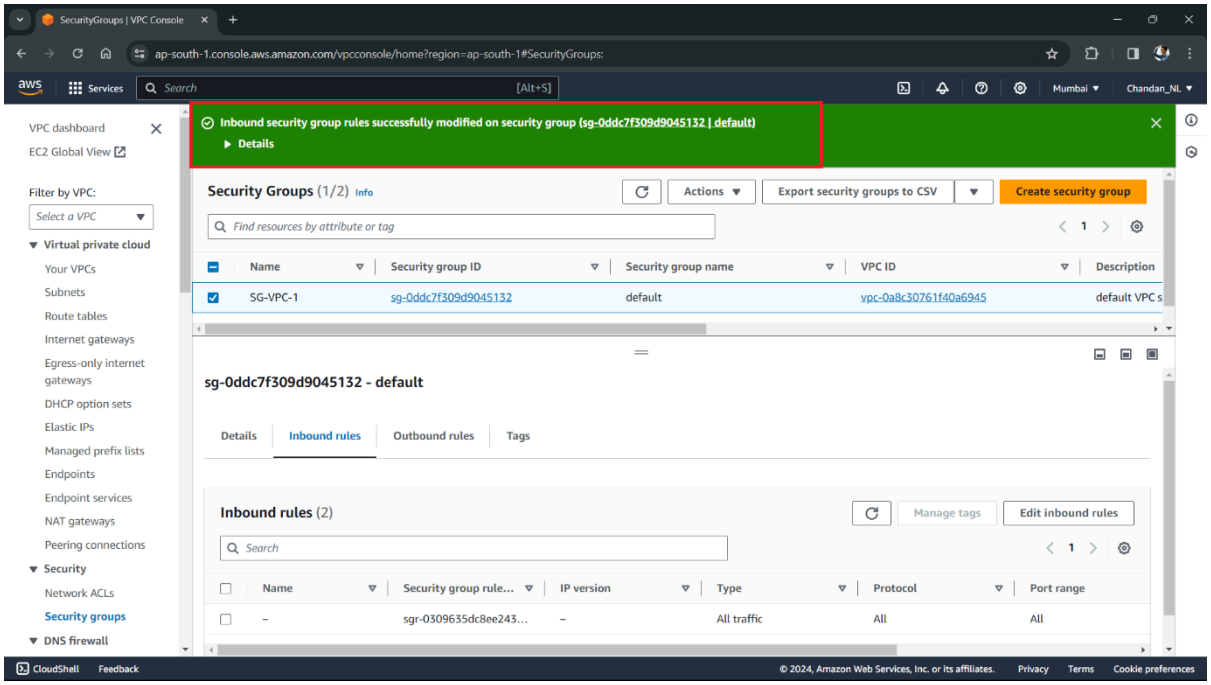
Click on “Edit Inbound rules” tab



Click on “Add rule” tab and add inbound rules and click on “Preview changes”

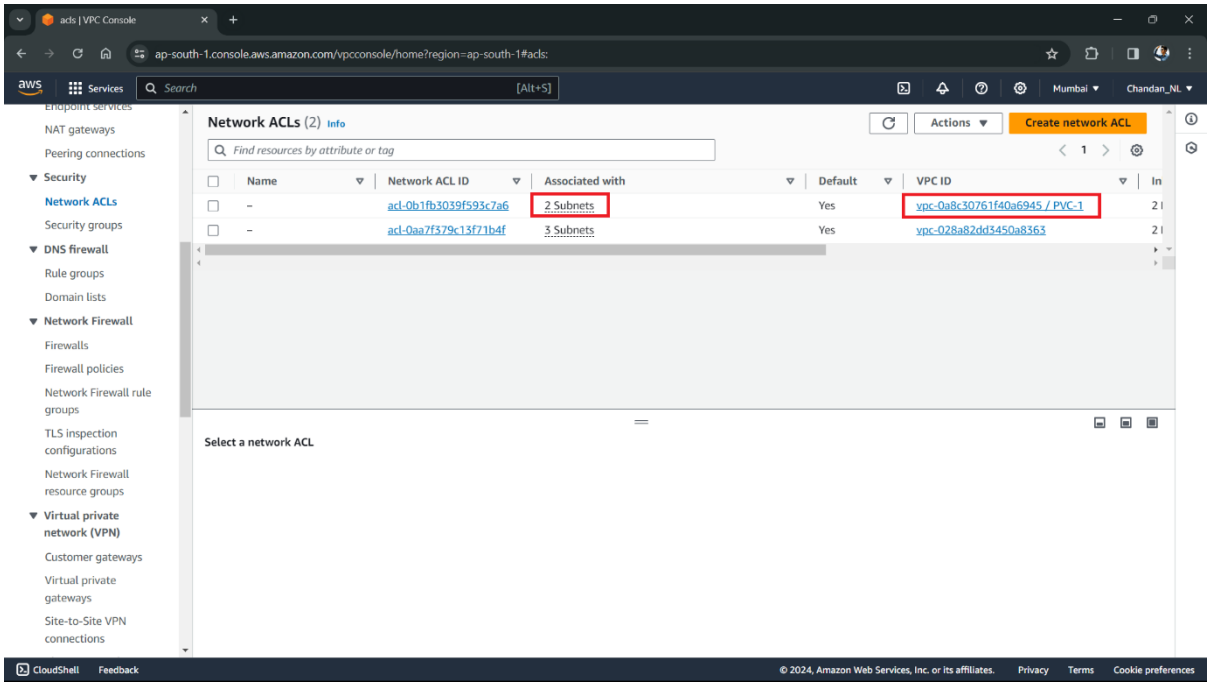


Verify and confirm

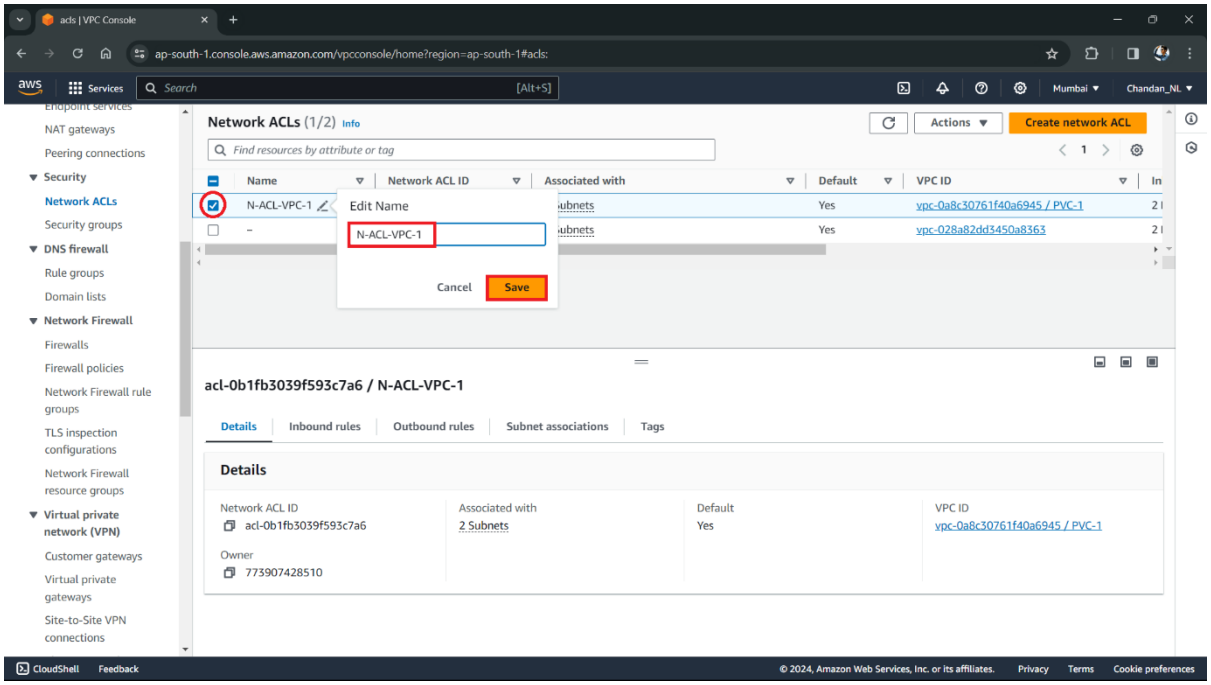


5.8) Update the default ACL that has got created along with VPC creation with required info

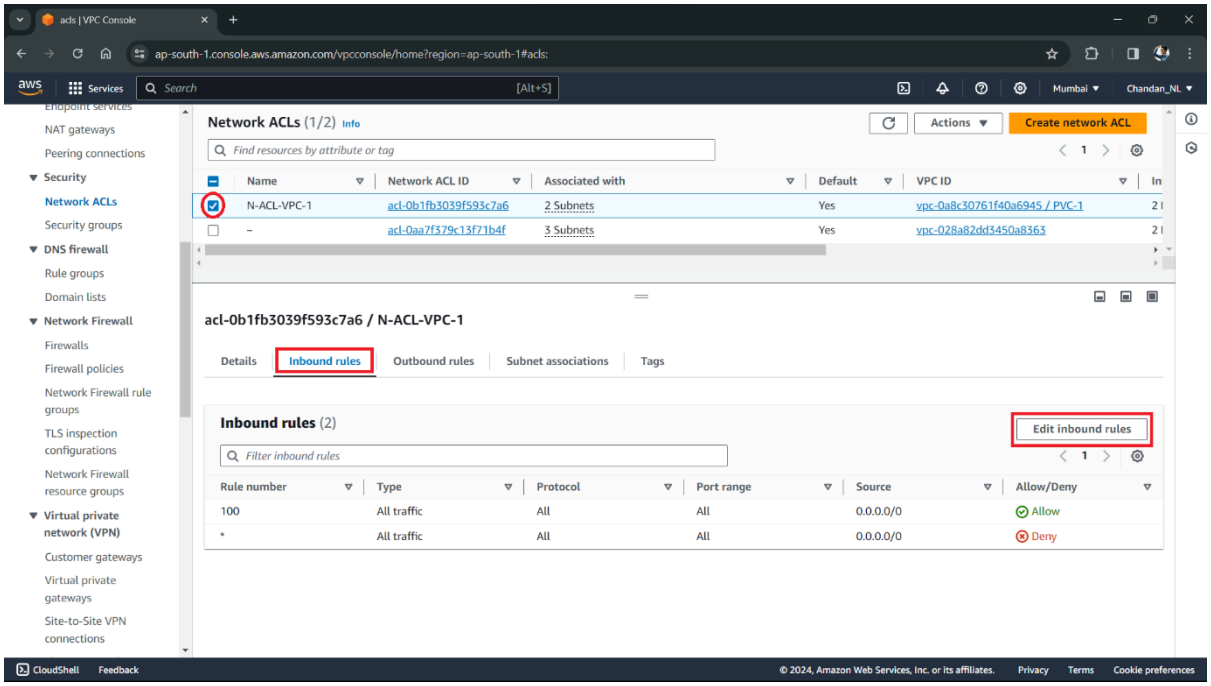
Click on "Network ACLs" and check that the relevant Networks ACL is displayed



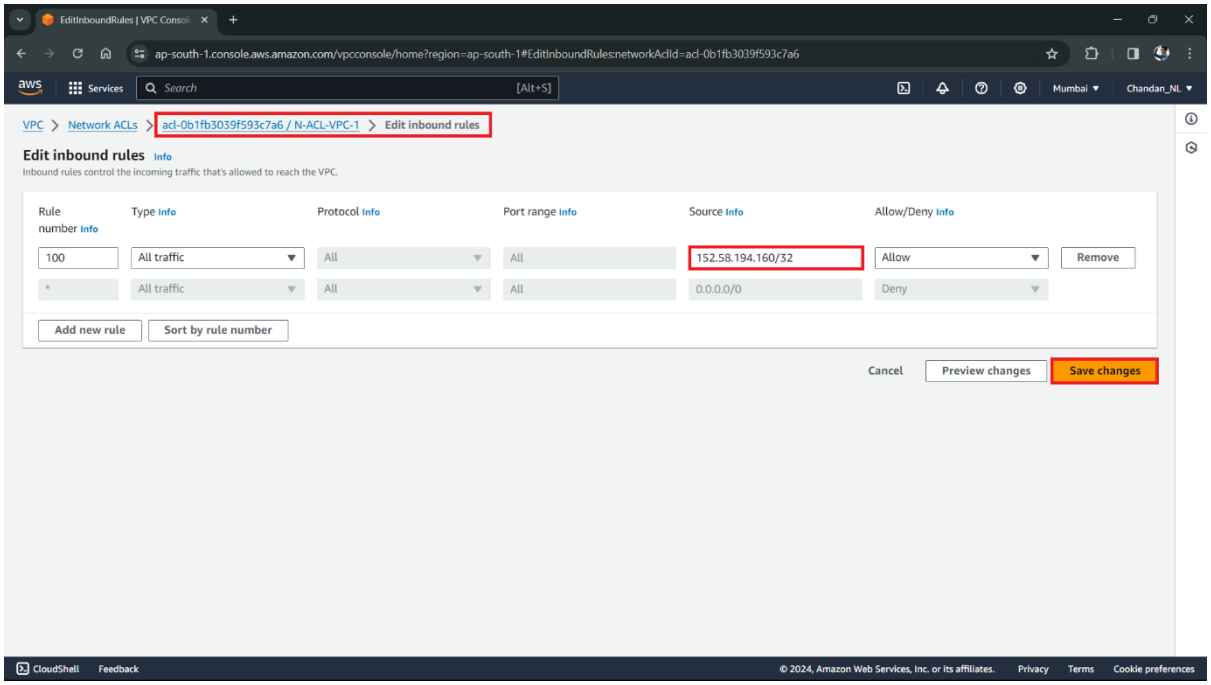
Name the “Network ACLs” and check



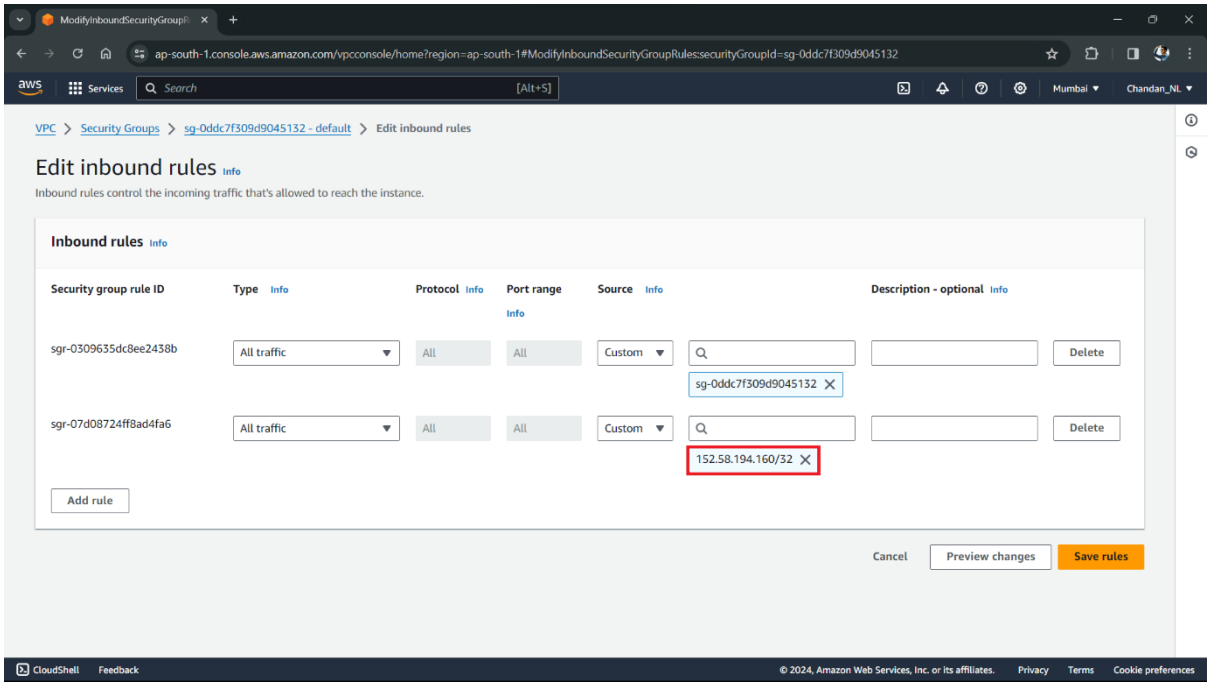
Click on “Inbound rules” and click on “Edit inbound rules”



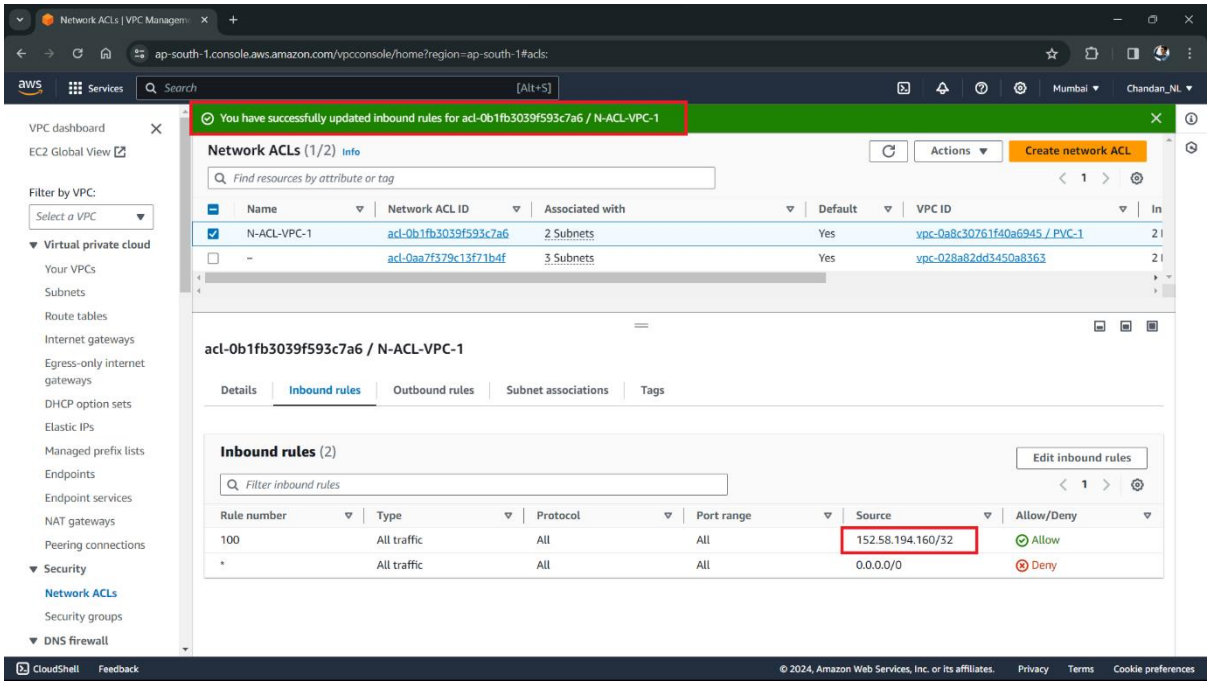
Copy your IP info from security groups



Paste your IP info under “Source Info” and click on “Save changes” button

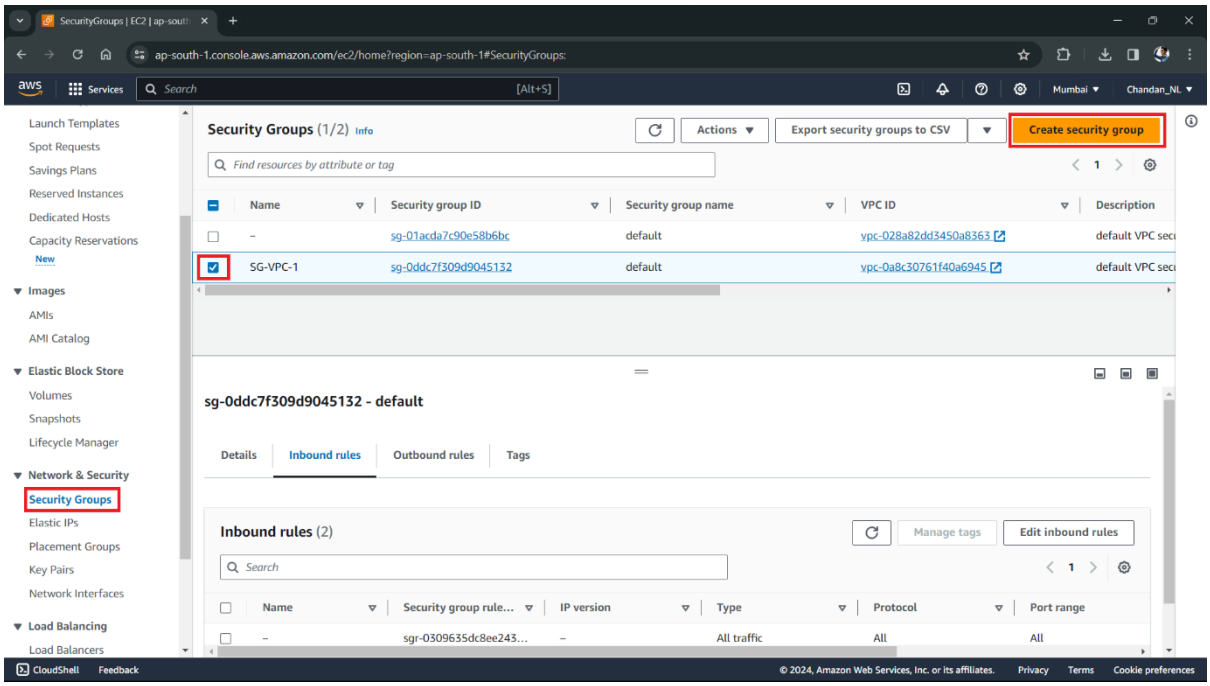


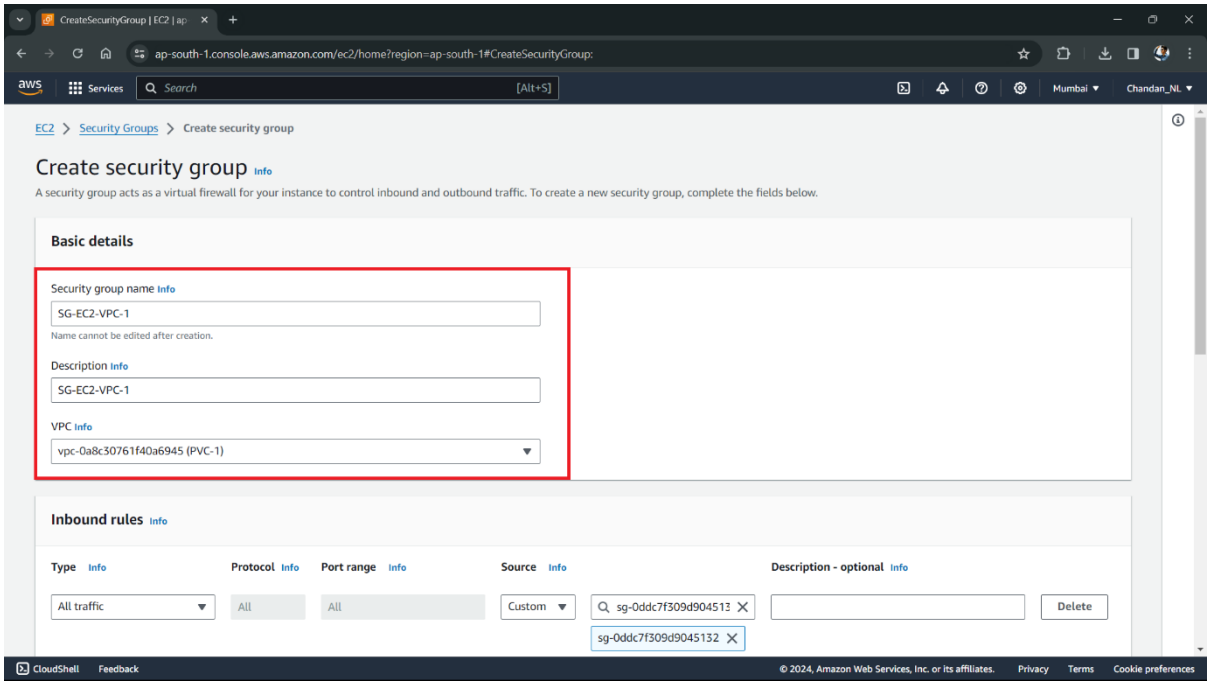
Verify the changes s



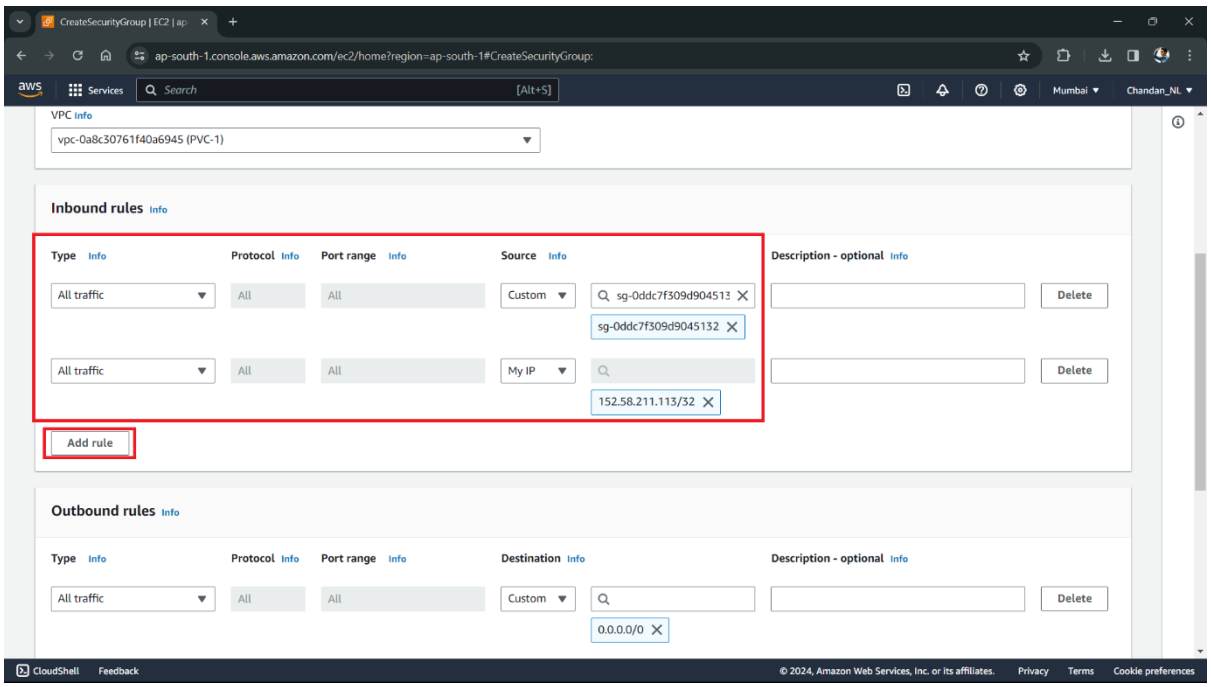
5.9) Create a Security Group for the EC2 Instances

Create a Security Group namely "SGEC2VPC1"

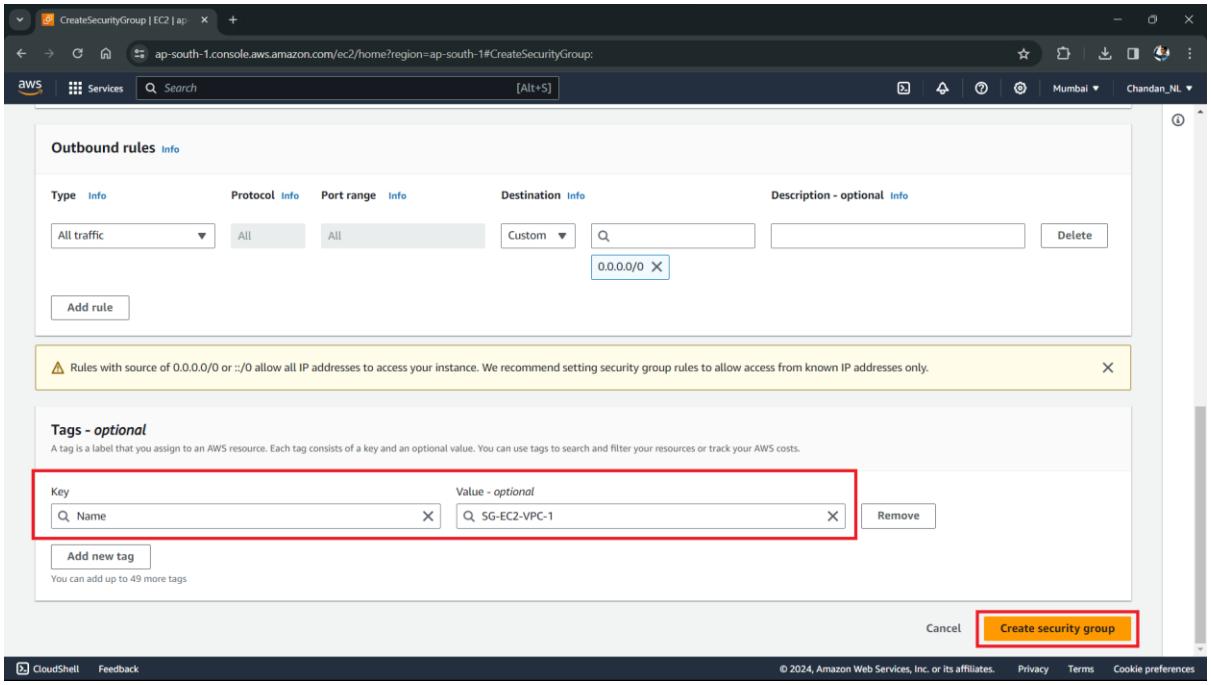




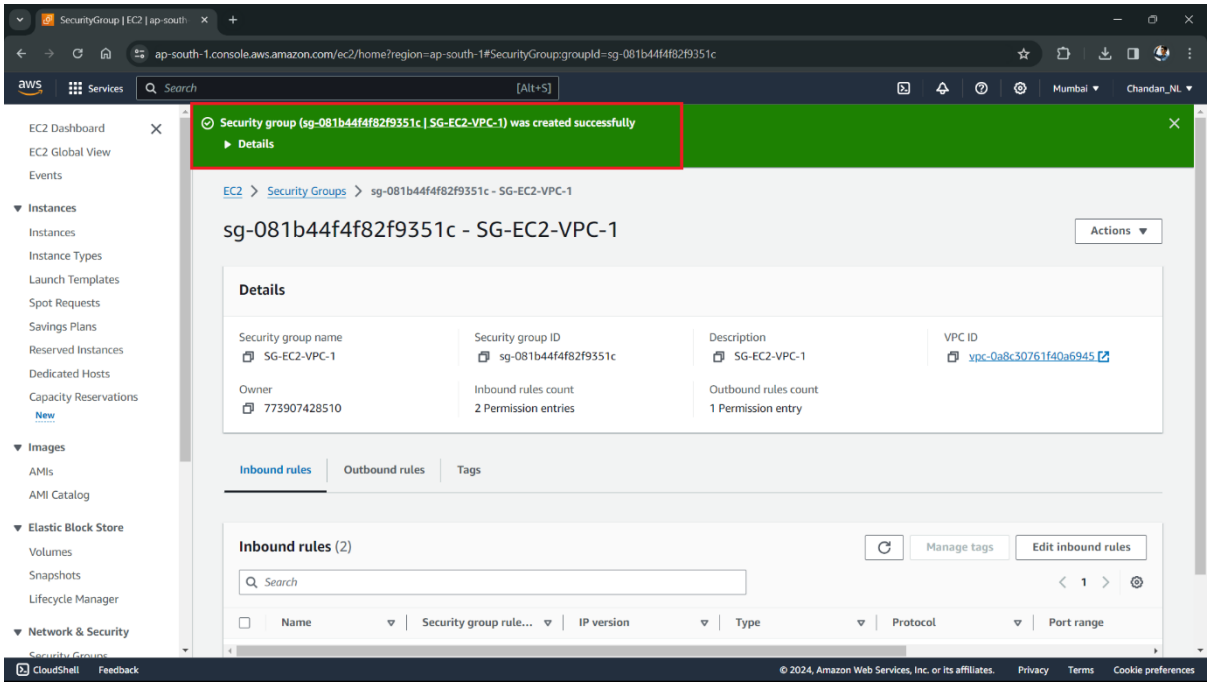
Click on “Add rule” button, select “All traffic” and select the Security Group created for the “MY-VPC-01”. Click on “Add rule” button again, select “All traffic” and select “My IP” option



Click “Save changes” button



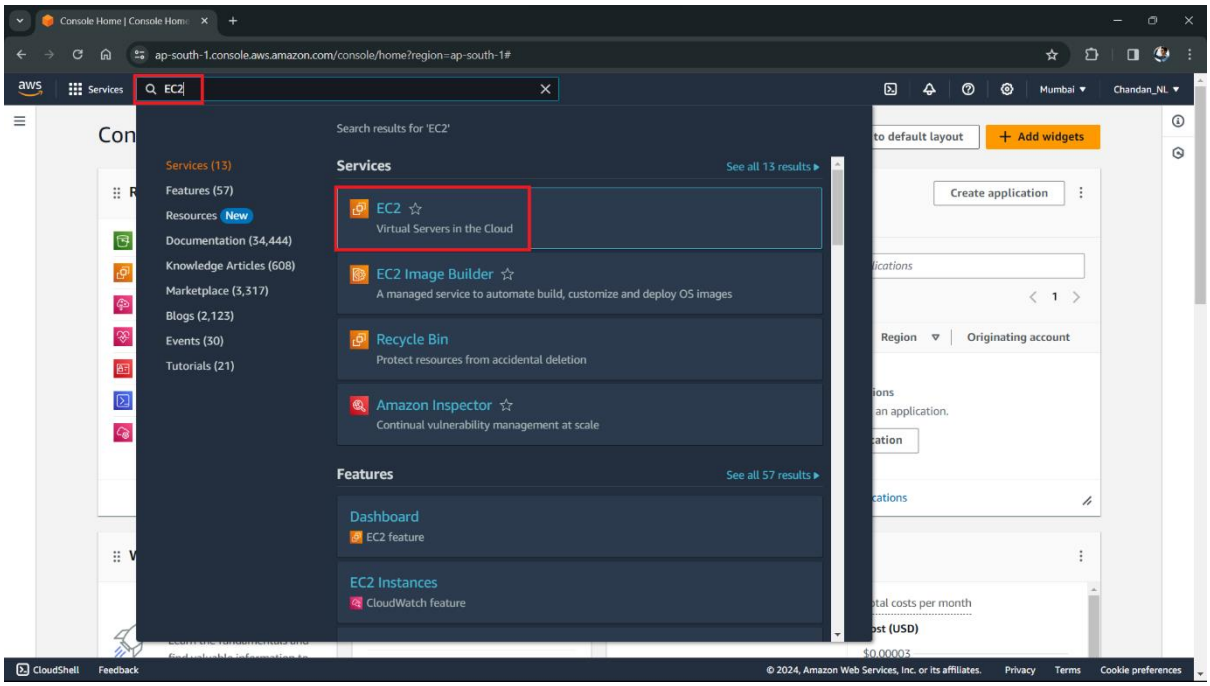
Verify the created Security Group



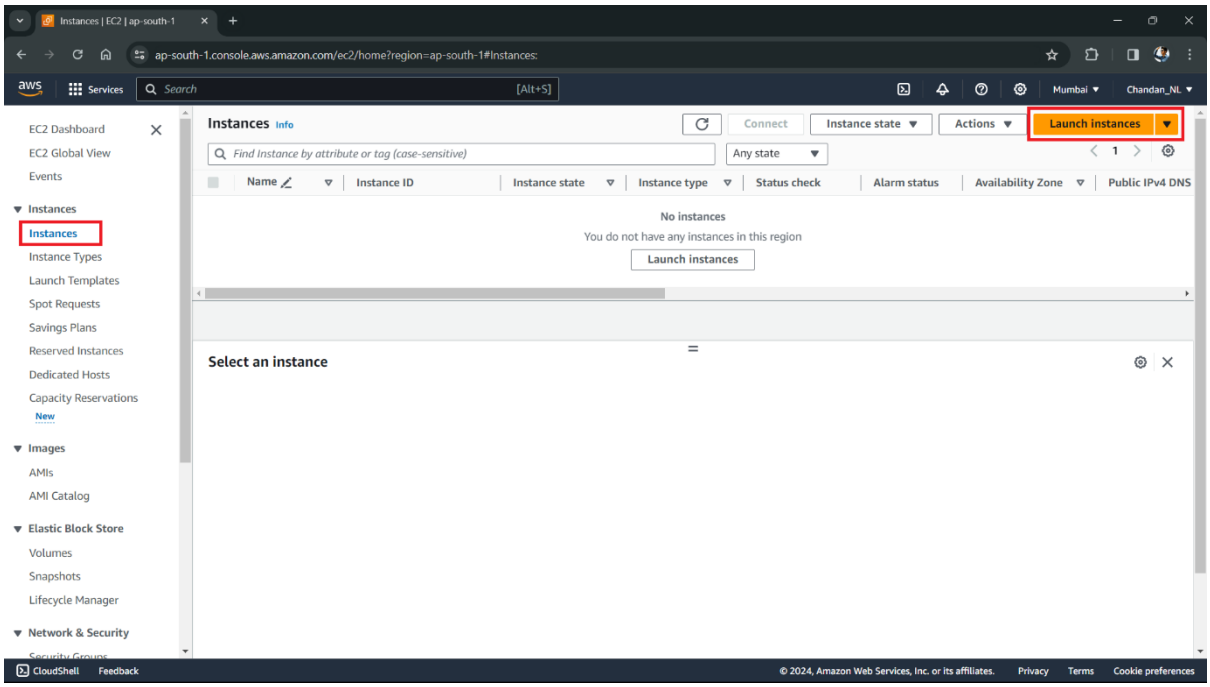
6) EC2 - Project Set-Up and Execution

6.1) Creation of EC2 Windows Server Instances and EBS Volume in the just created Custom VPC

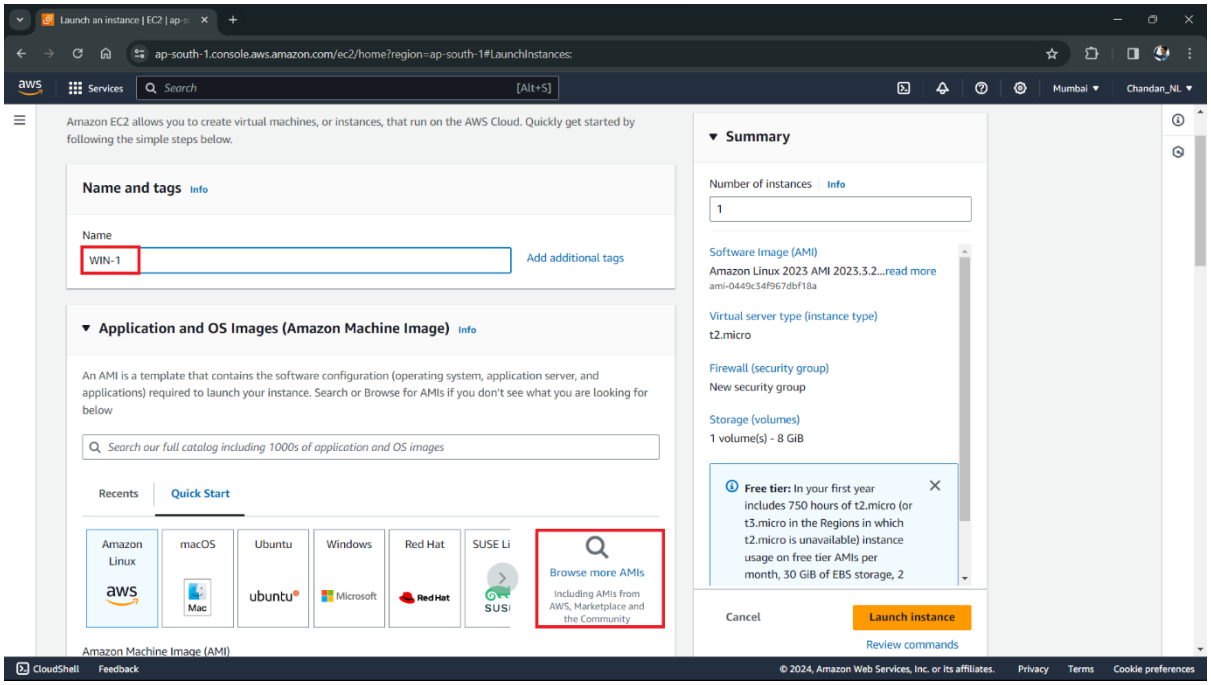
Launch three EC2 Instances using "Amazon Windows Server AMI".



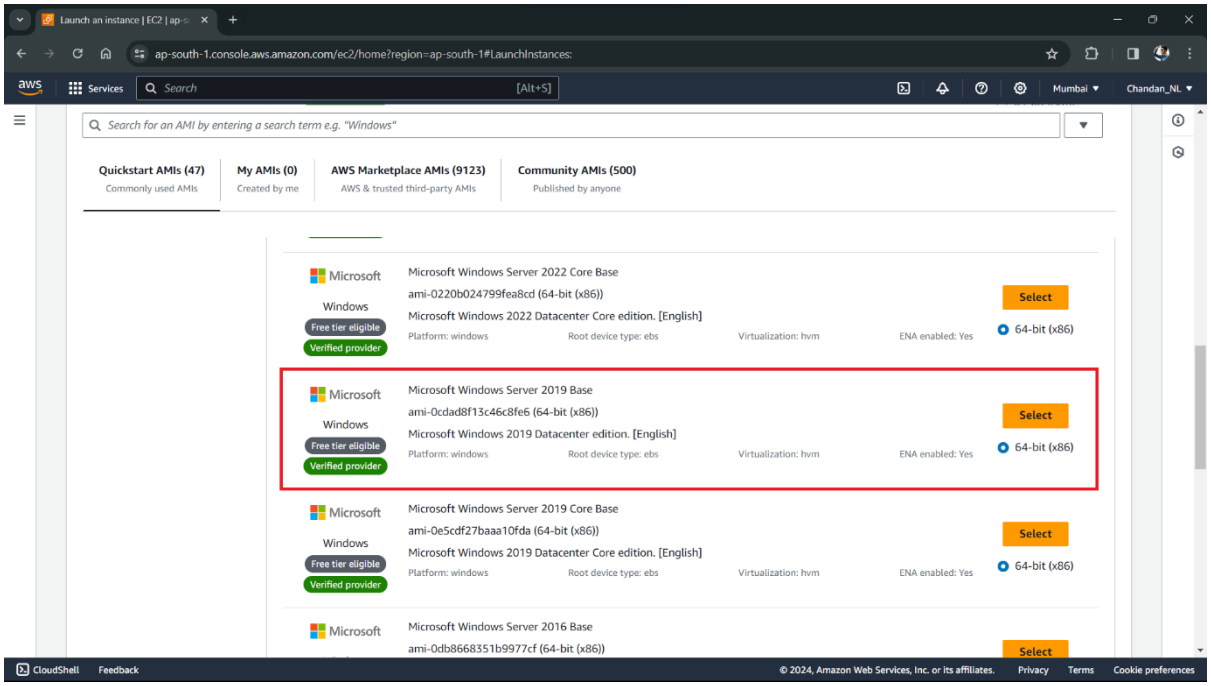
Two EC2 Instances (WIN1 and WIN2) in the Mumbai AZ "1a"



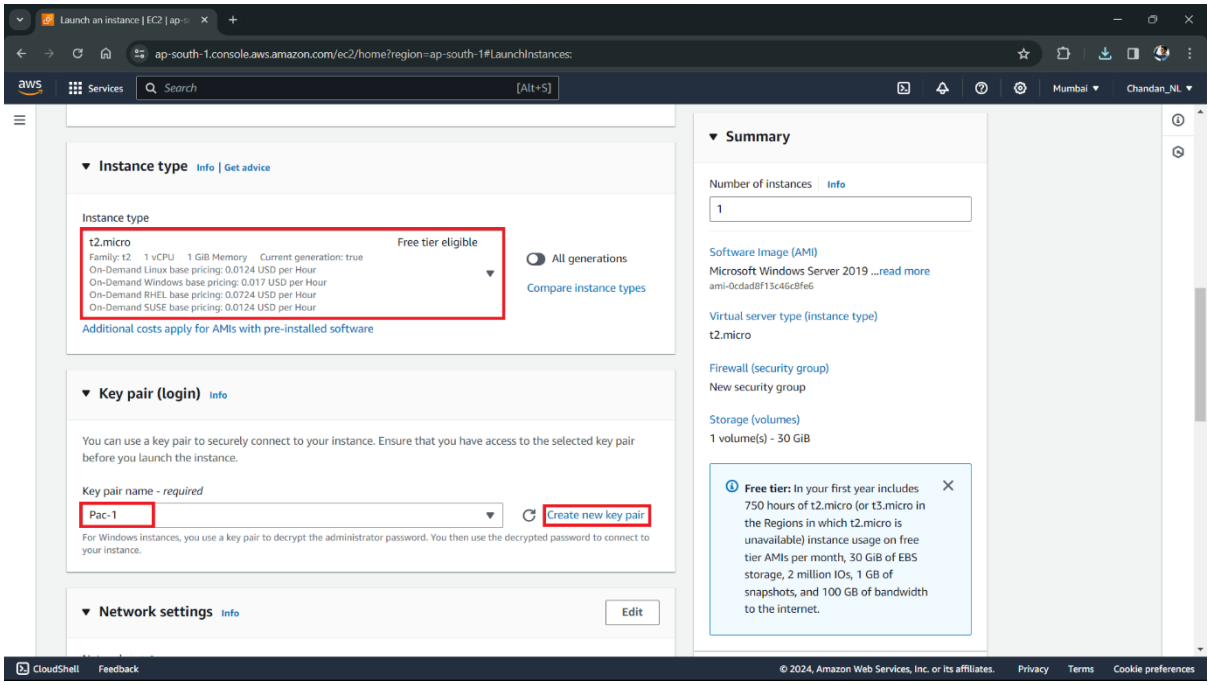
Give instance name and click on Browse more AMI's



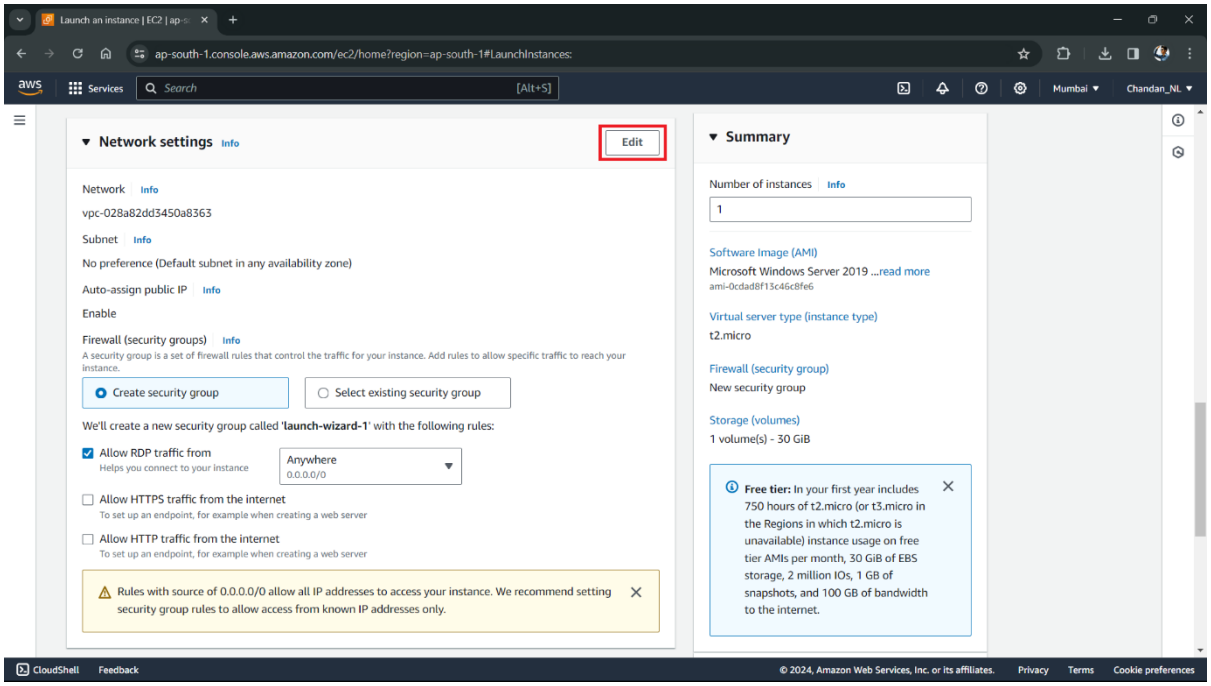
Select Microsoft Windows Server 2019 Base



Select instance type “t2.micro” and select existing “key pair”

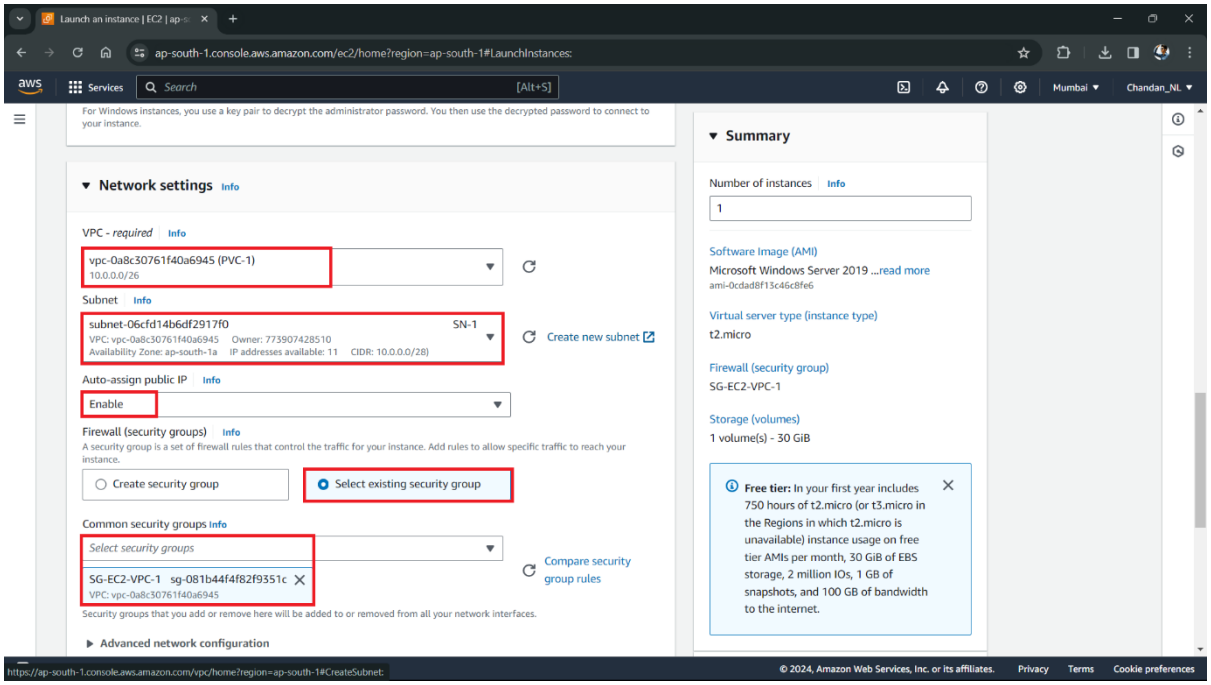


Click on edit in network settings panel

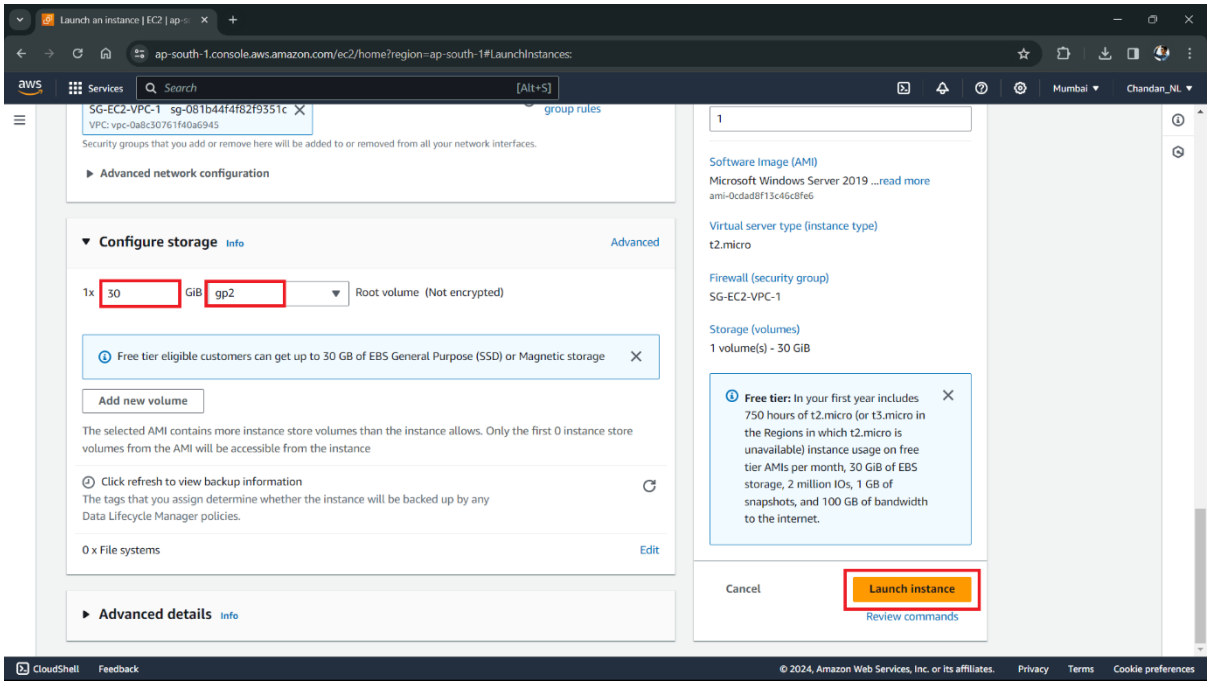


Select a custom VPC created

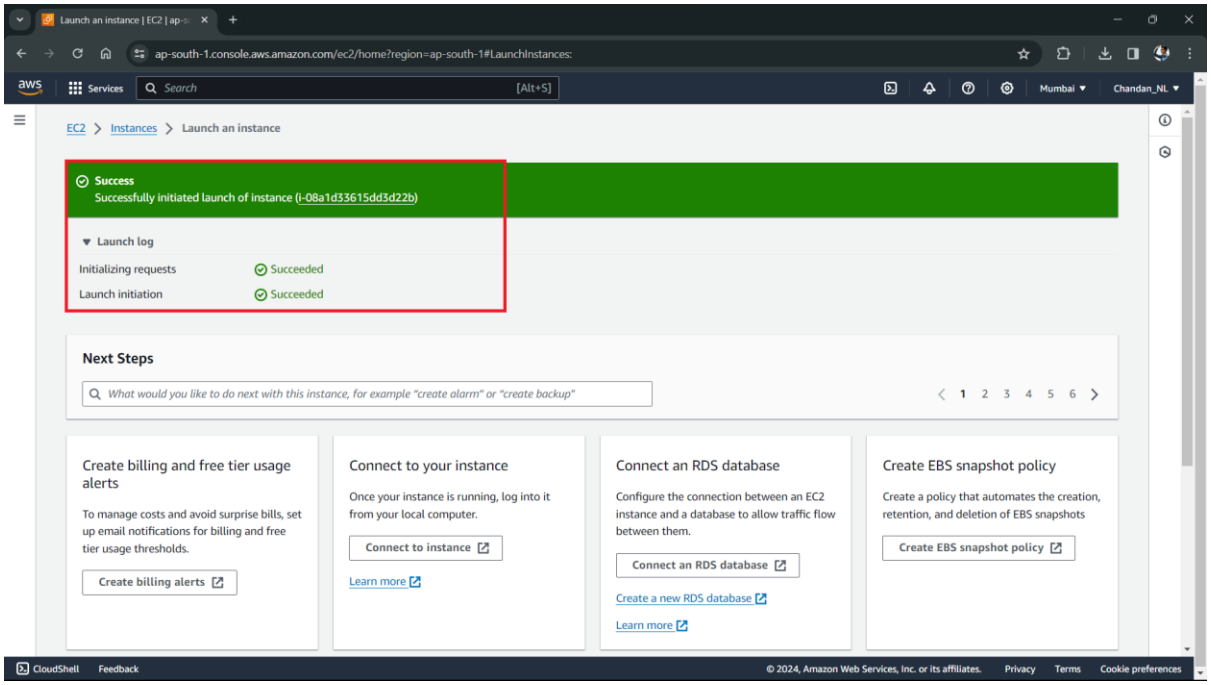
Select a Subnet Public (SN1) availability zone in 1a and select an existing security group created in VPC



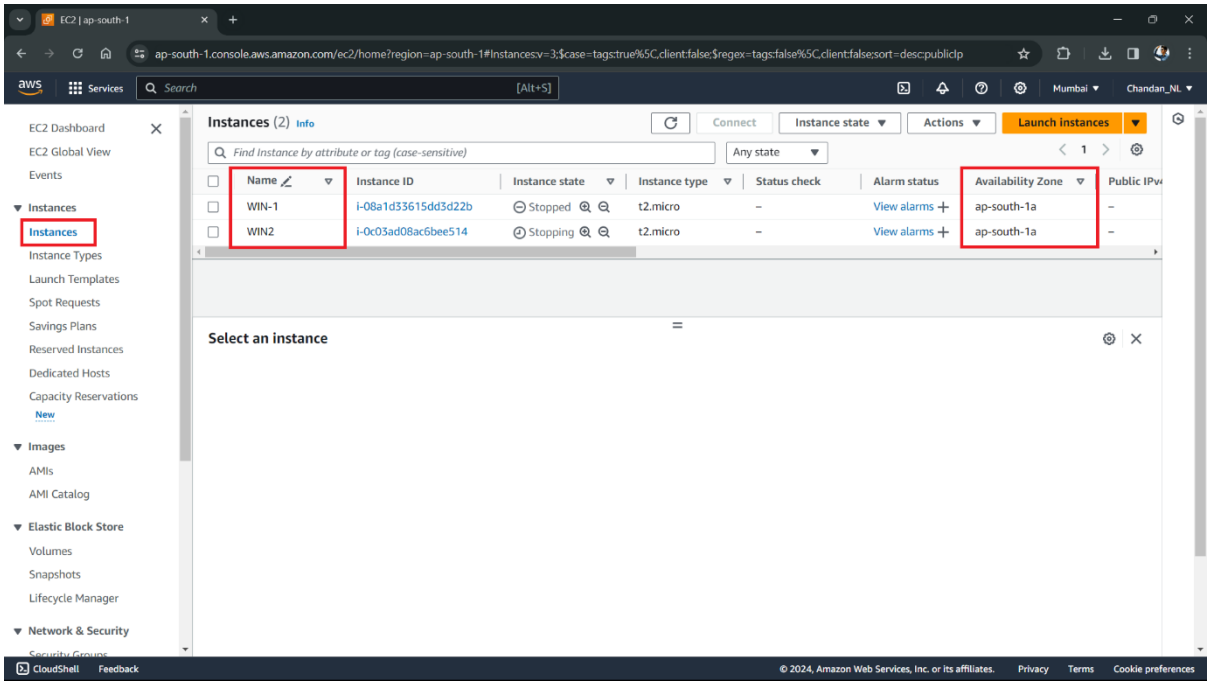
Click on Launch instance



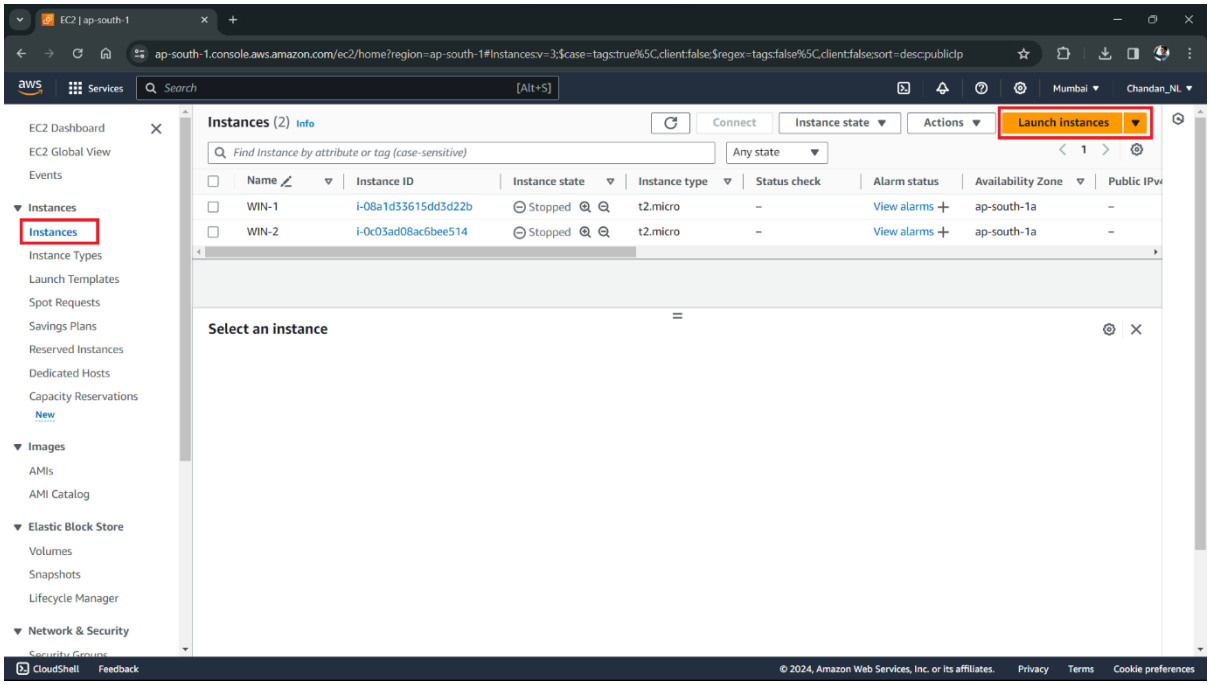
Click on view all instances



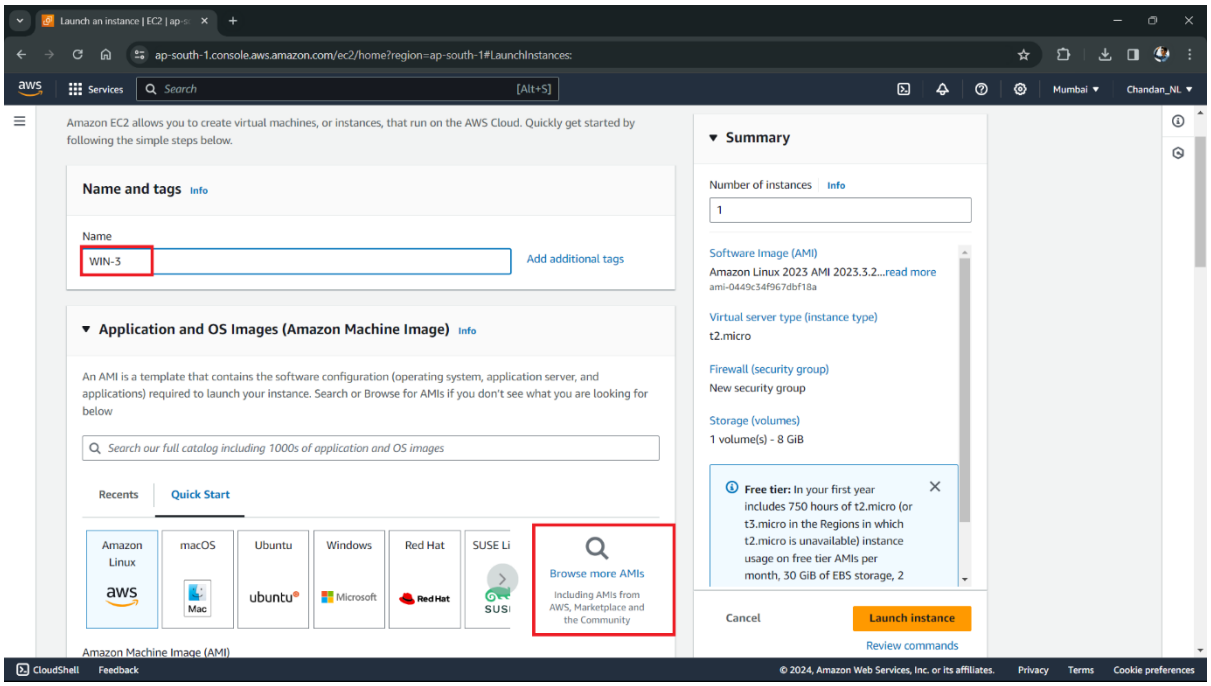
Create another EC2 instance using same steps. Two EC2 Instances (WIN1 and WIN2) in the Mumbai AZ "1a".



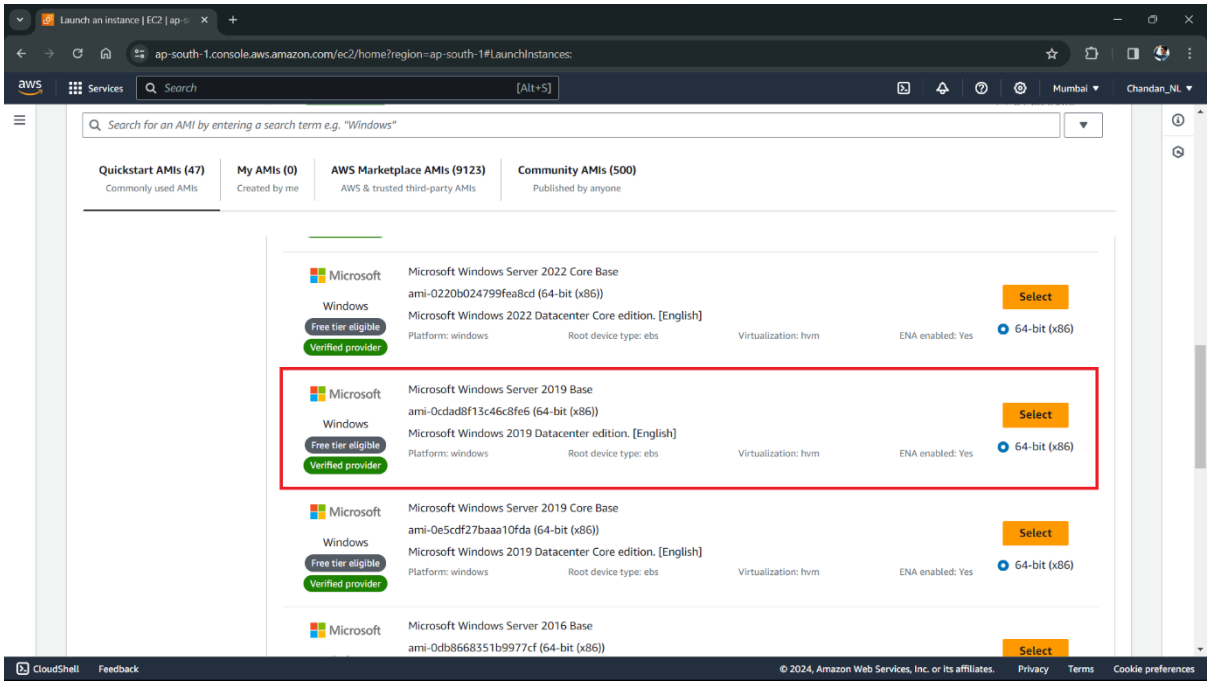
Create one EC2 Instance (WIN3) in the Mumbai AZ “1b”.



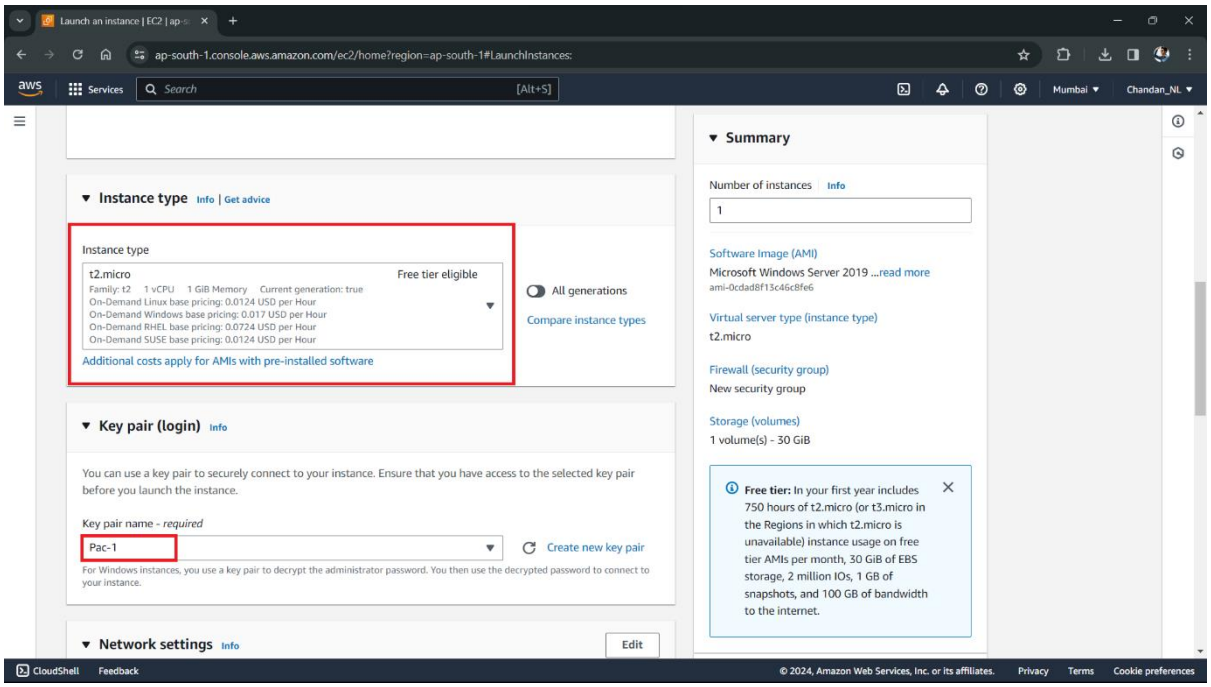
Give instance name and click on Browse more AMI’s



Select Microsoft Windows Server 2019 Base



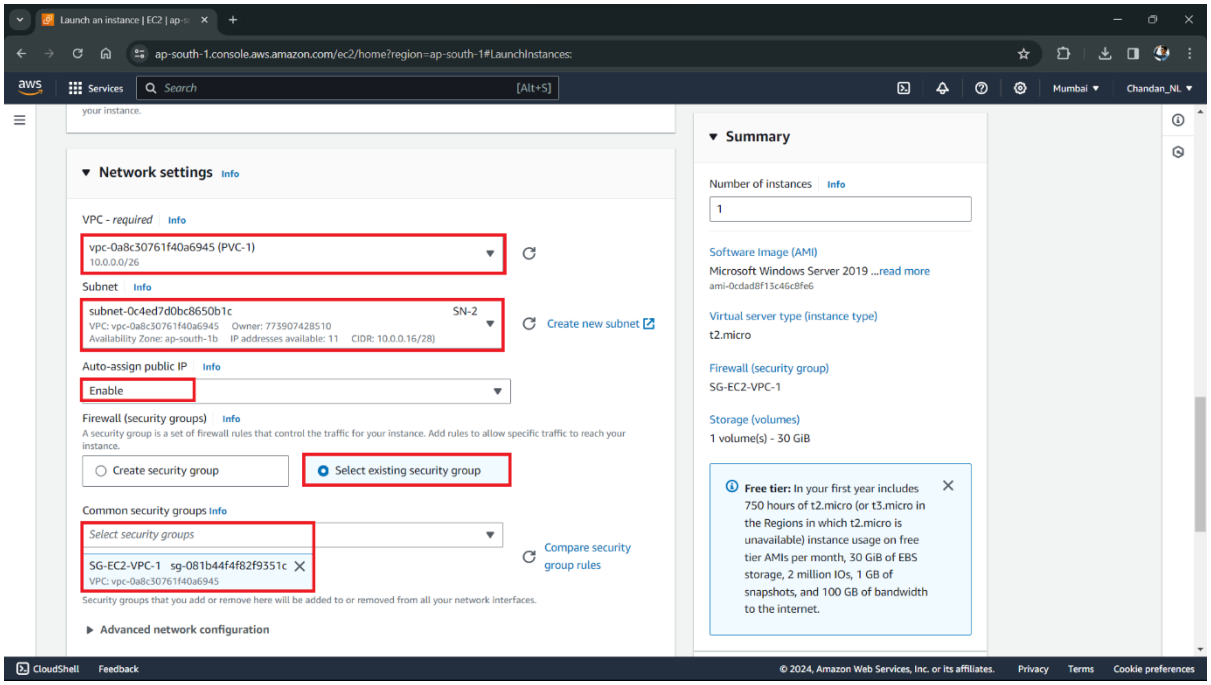
Select instance type “t2.micro” and select existing “key pair”



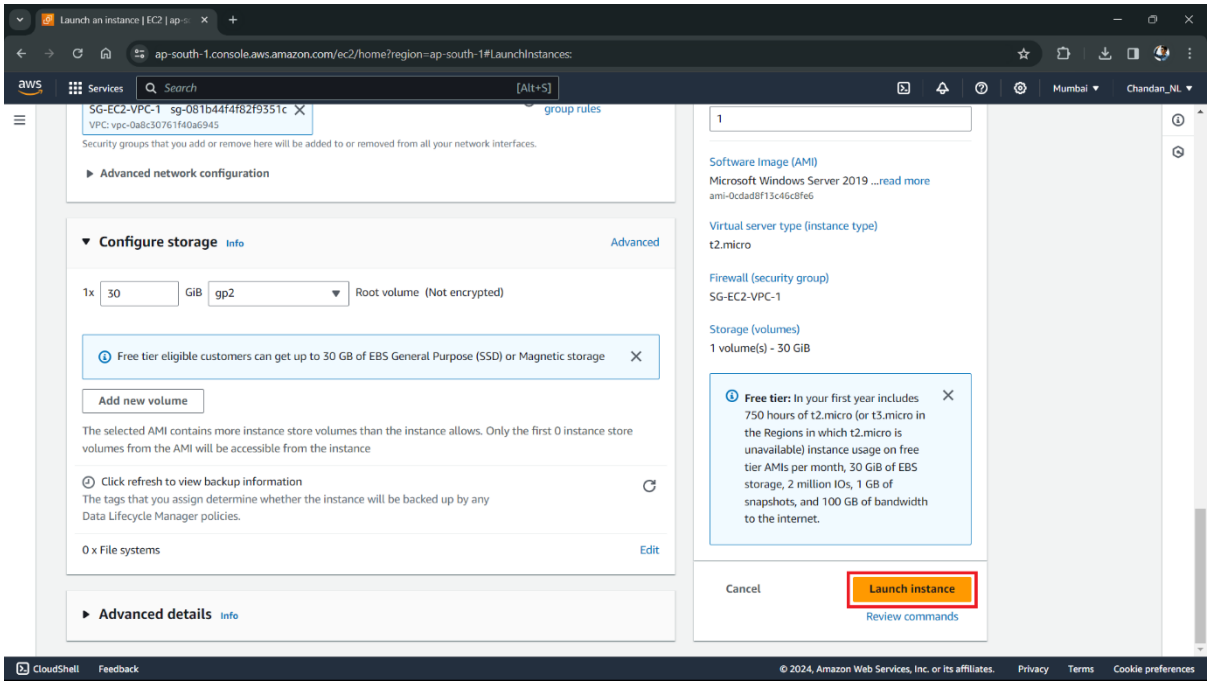
Click on edit in network settings panel

Select a custom VPC created

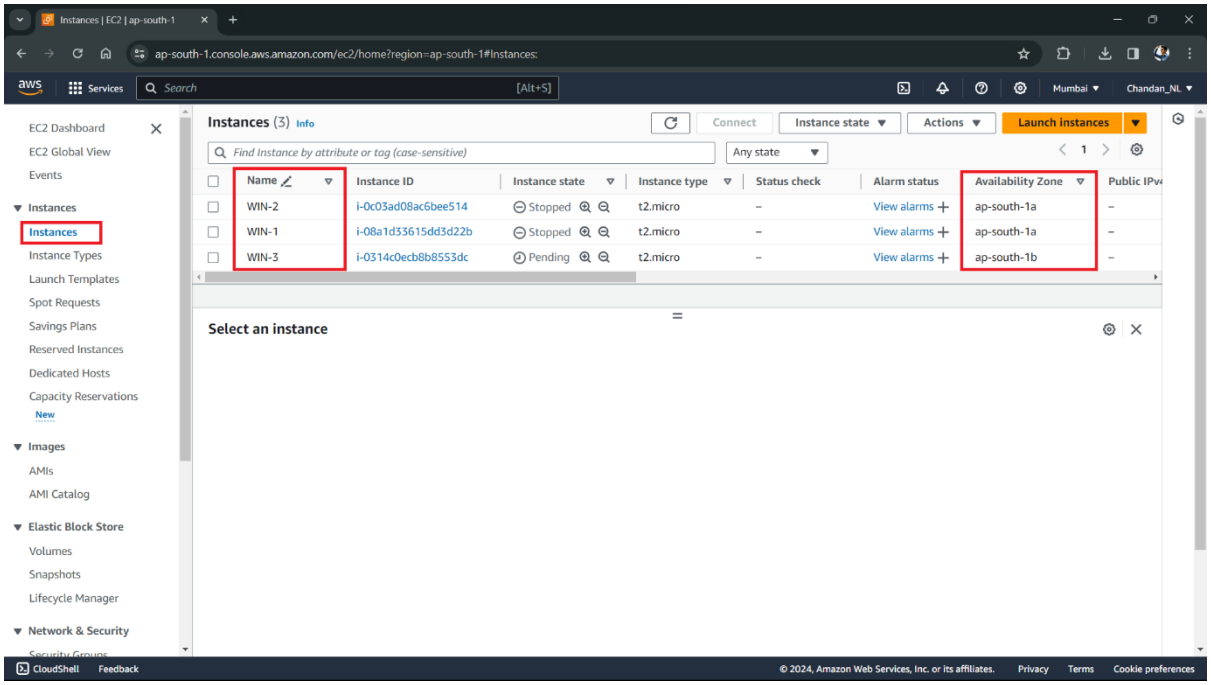
Select a Subnet Private (SN2) availability zone in 1b and select an existing security group created in VPC



Click on Launch instance

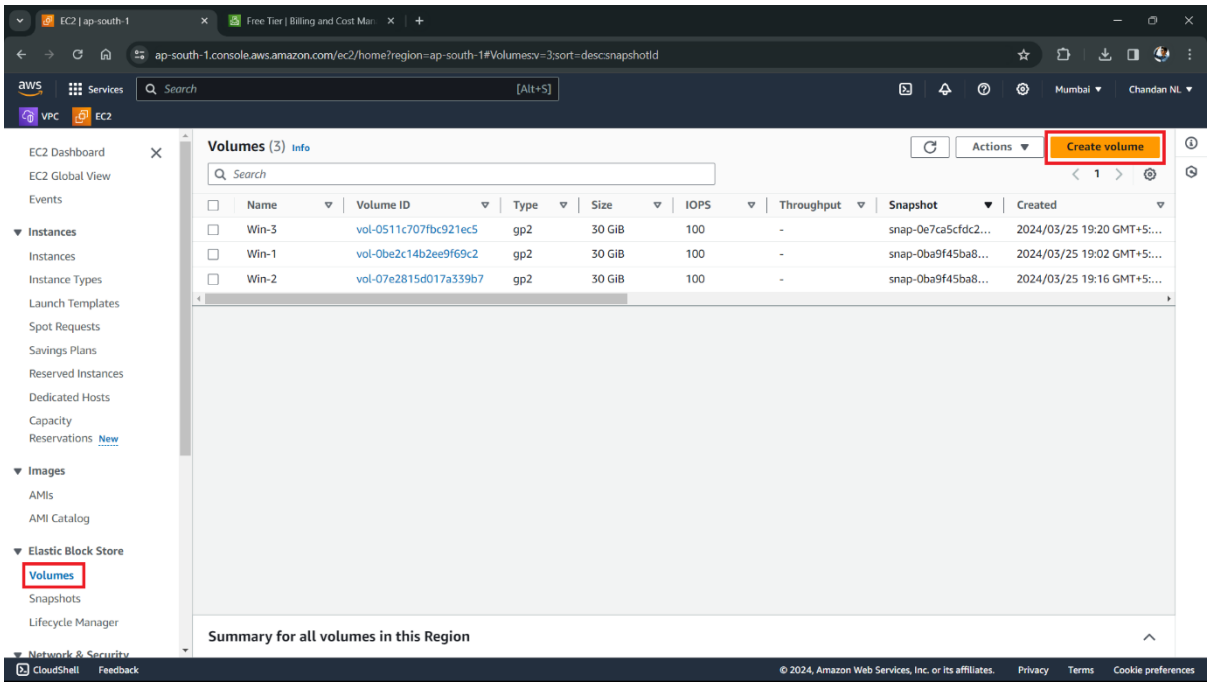


Click on view all instances

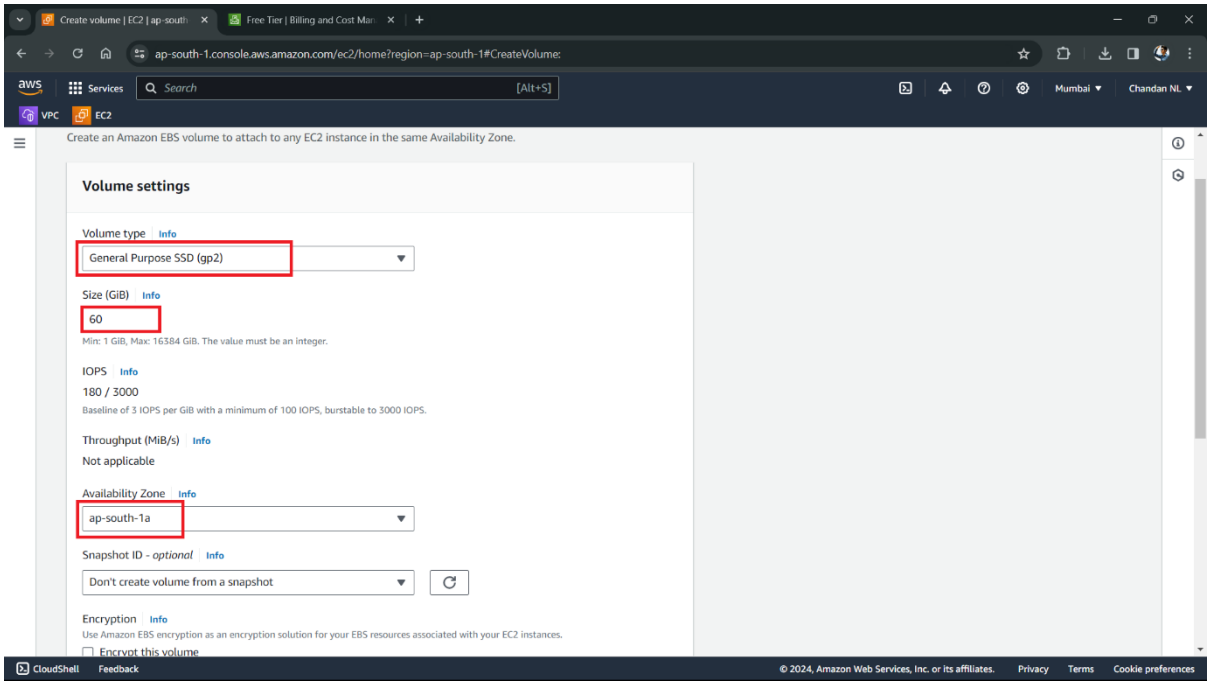


6.2) Create an EBS Volume (Addl-EBS-01-Demo) in Mumbai AZ "1a" and attach it to the Instance (EC2-WIN-01-EBS-DEMO)

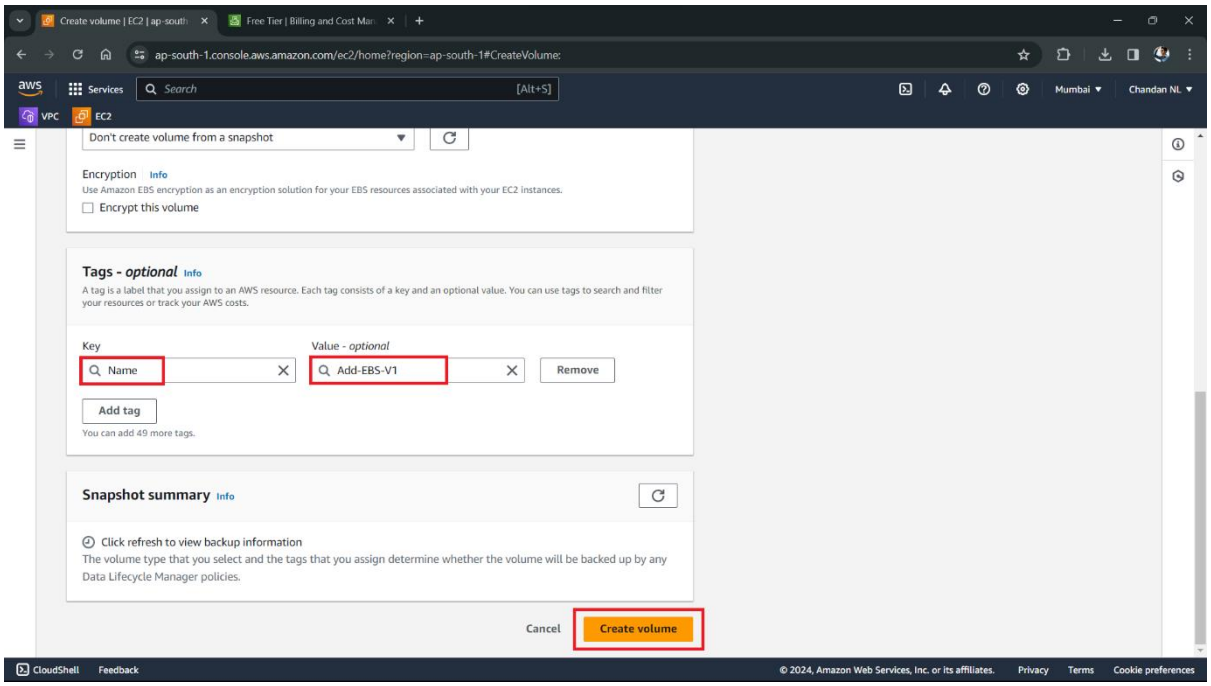
Create a new EBS volume



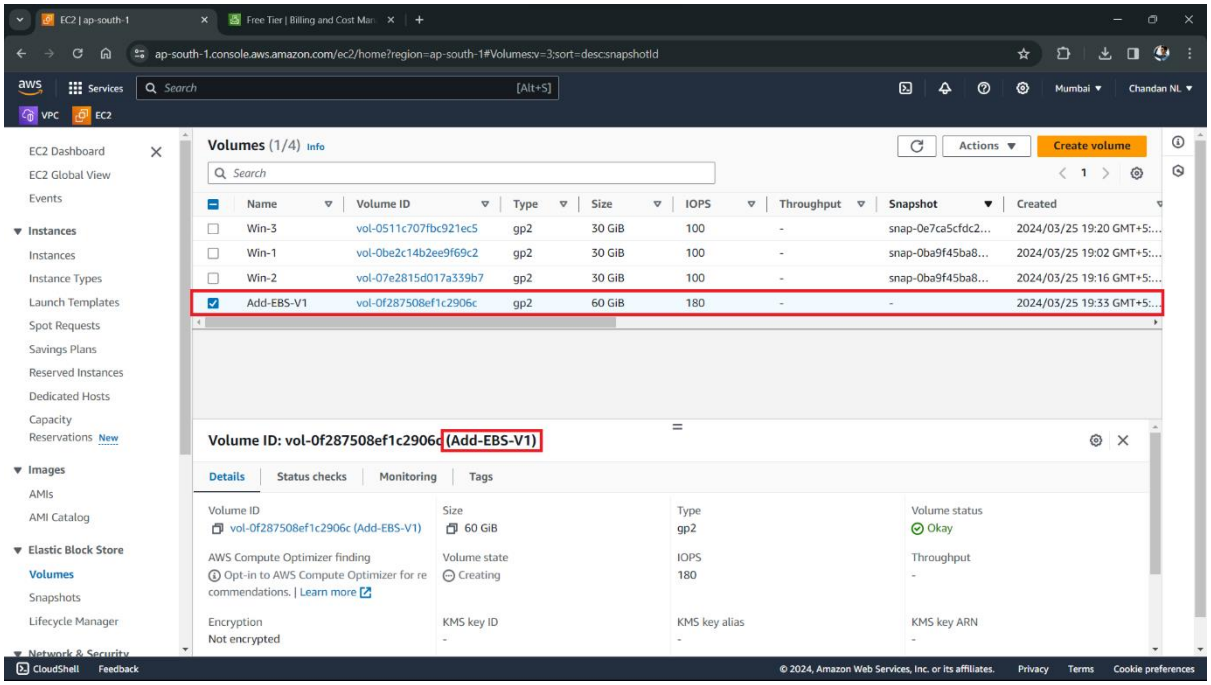
Set volume size to 60 GB and Availability Zone as "1a"



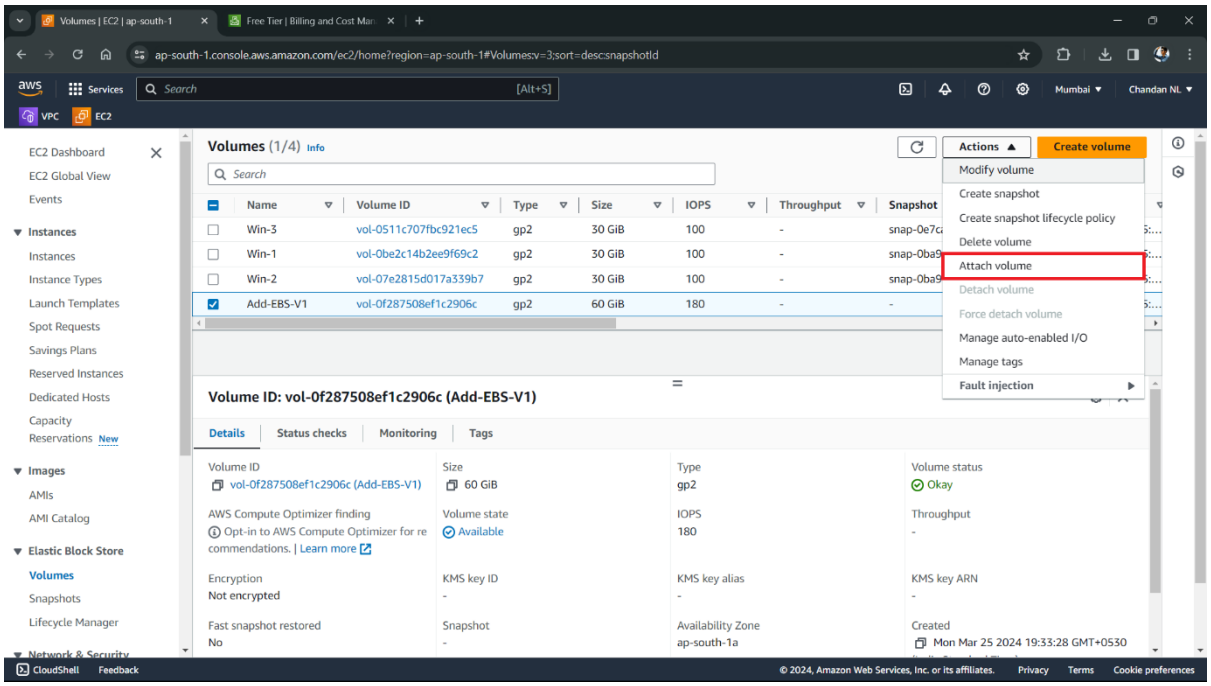
Give name to your Volume and click on Create volume



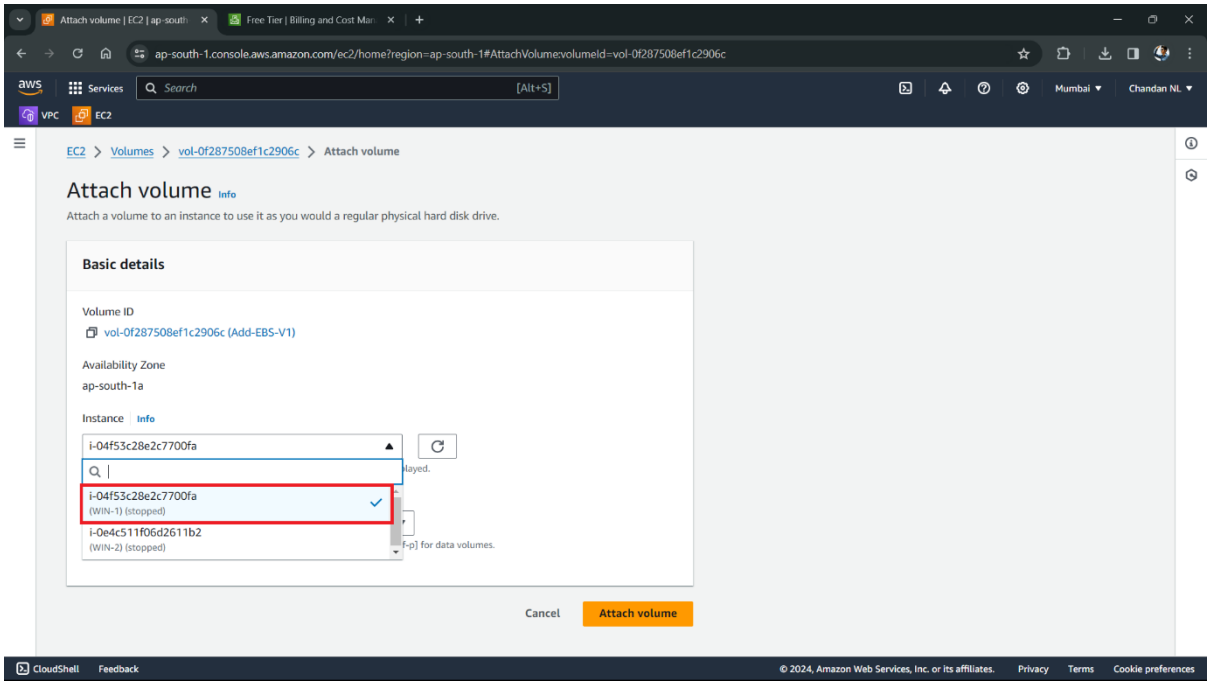
Verify your created volume



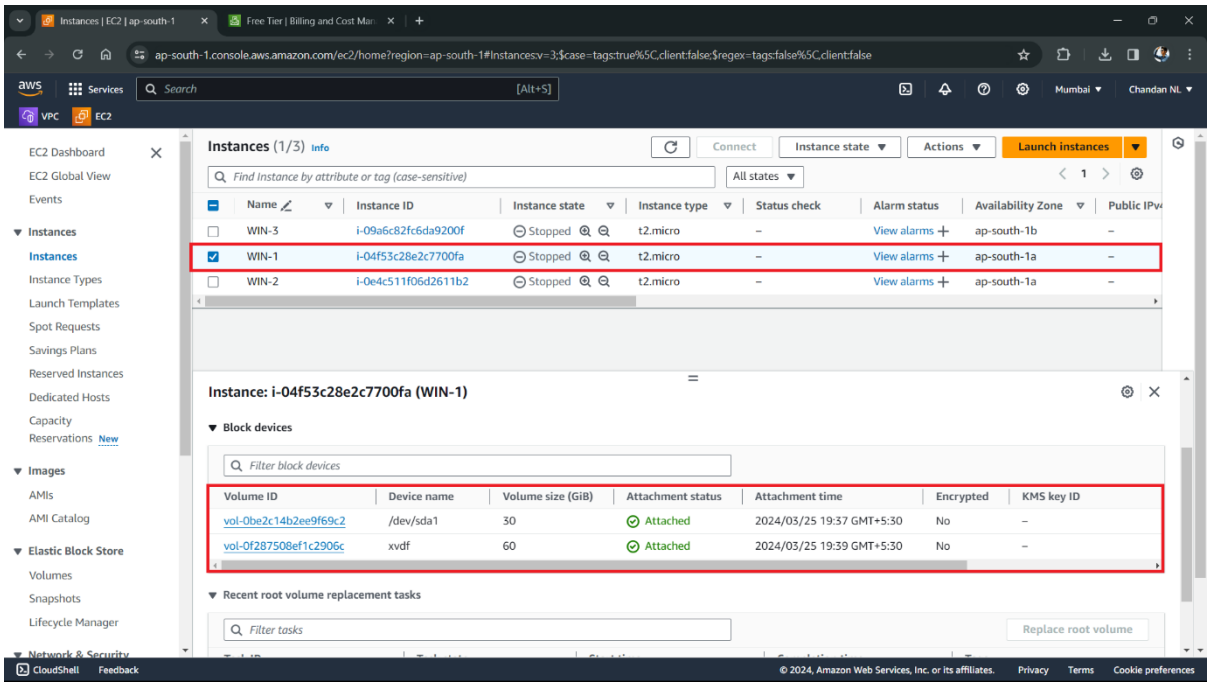
Attach the created volume to the EC2 Instance



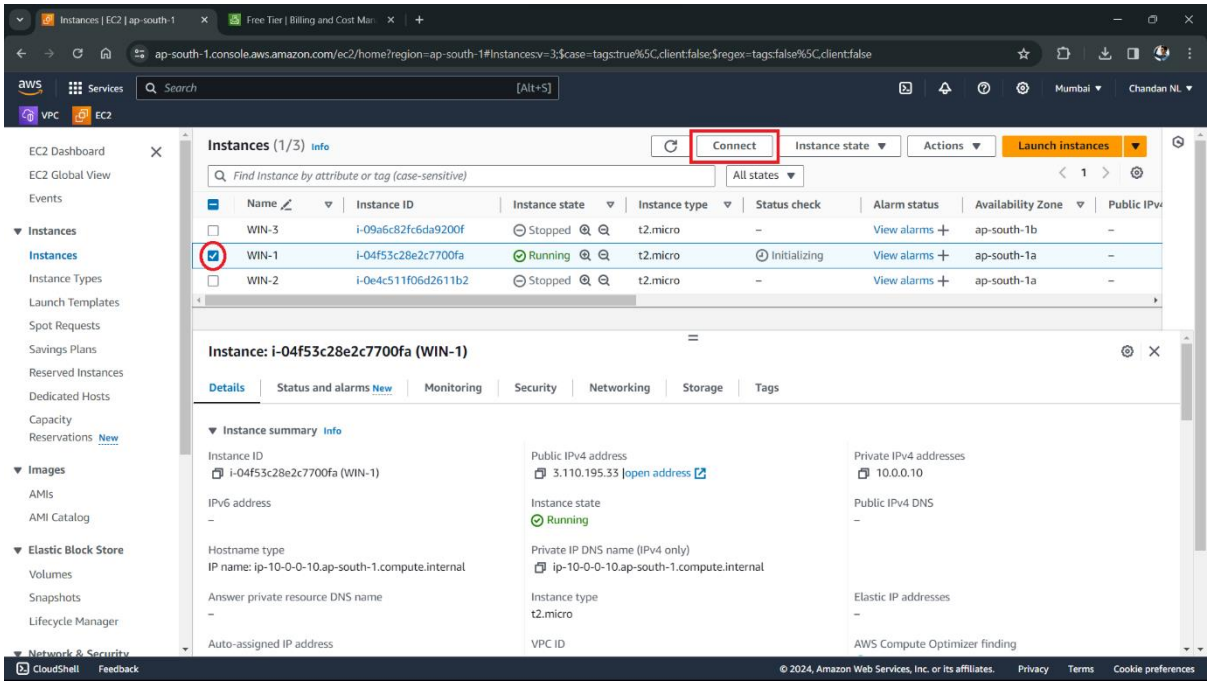
Select instance “WIN1” and click on Attach volume



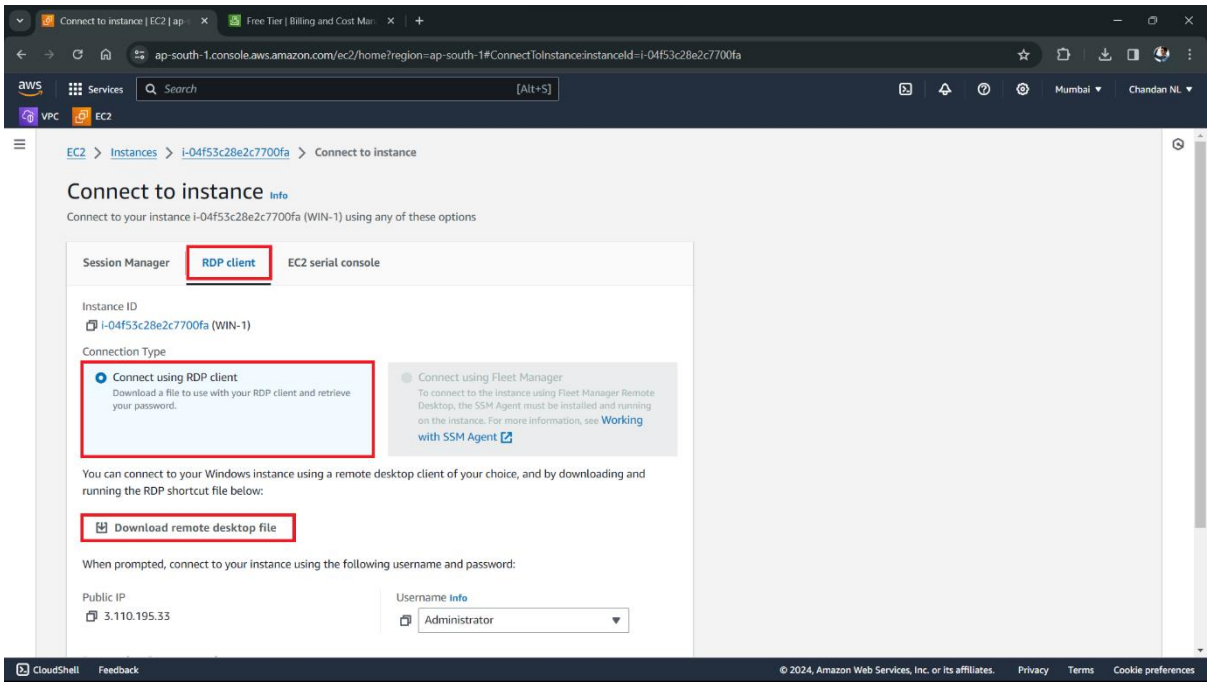
Verify your attached volume



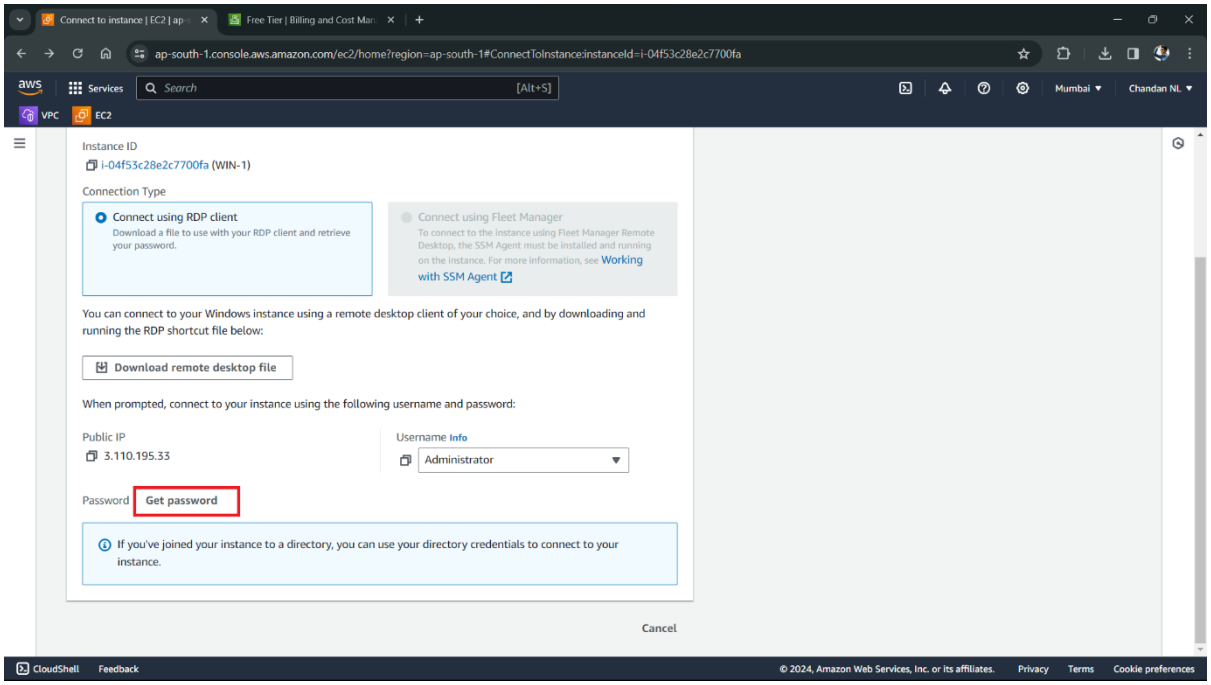
6.3 Connect to the Instance (WIN1) through RDP.



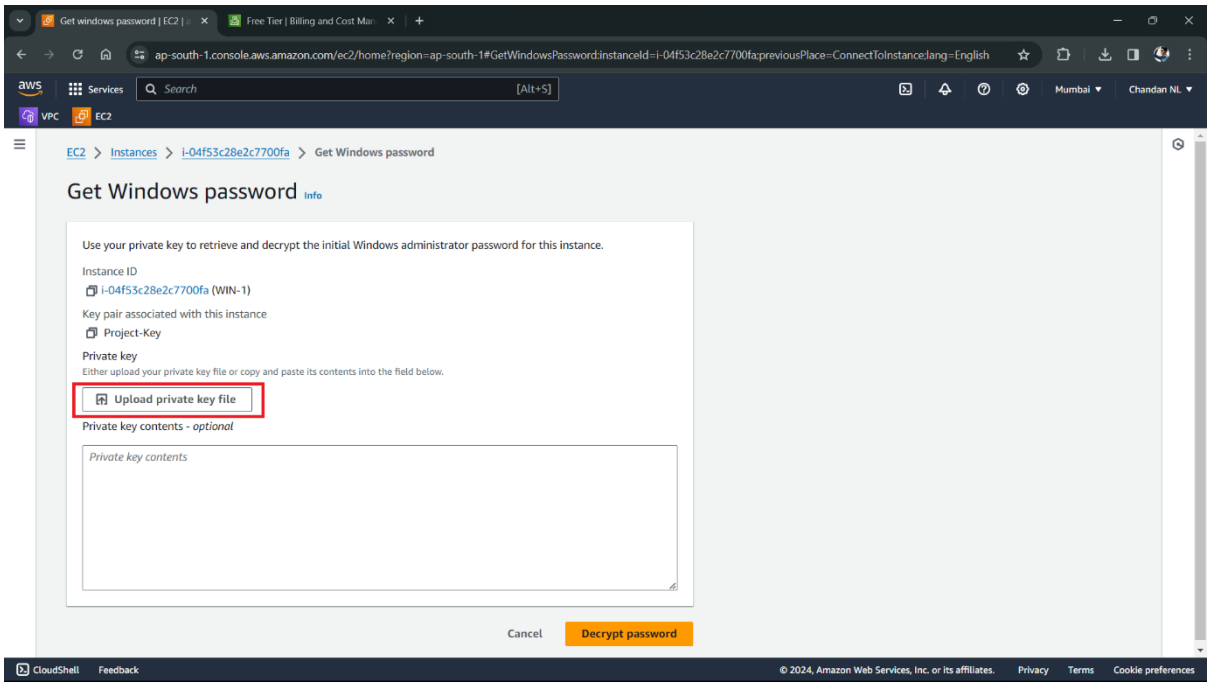
Select RDP Client and download remote desktop file



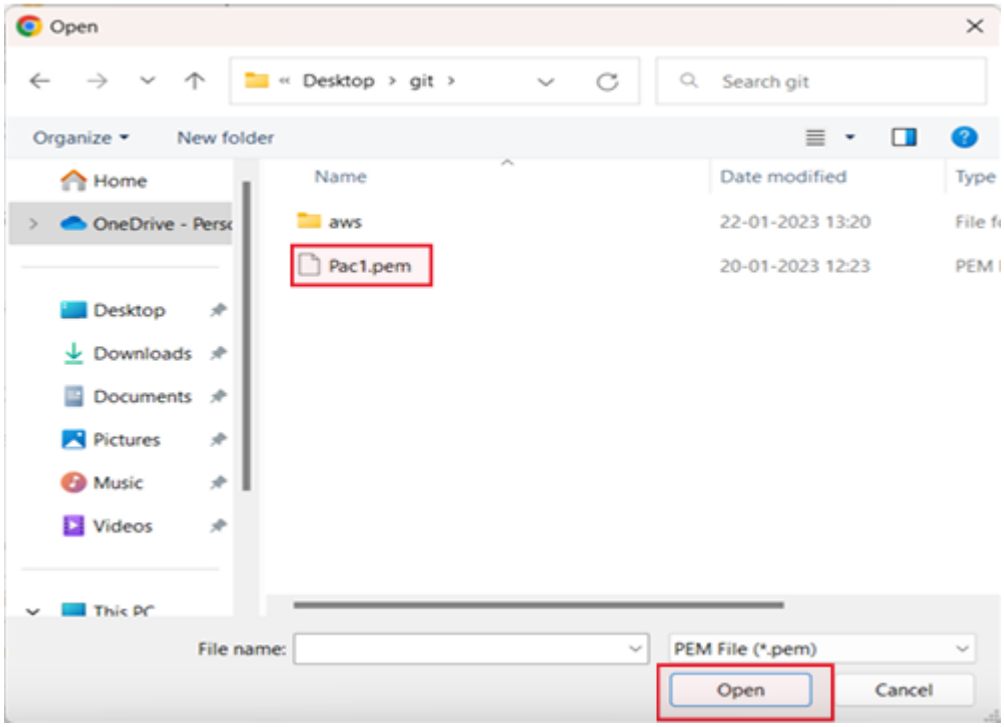
Click on Get password



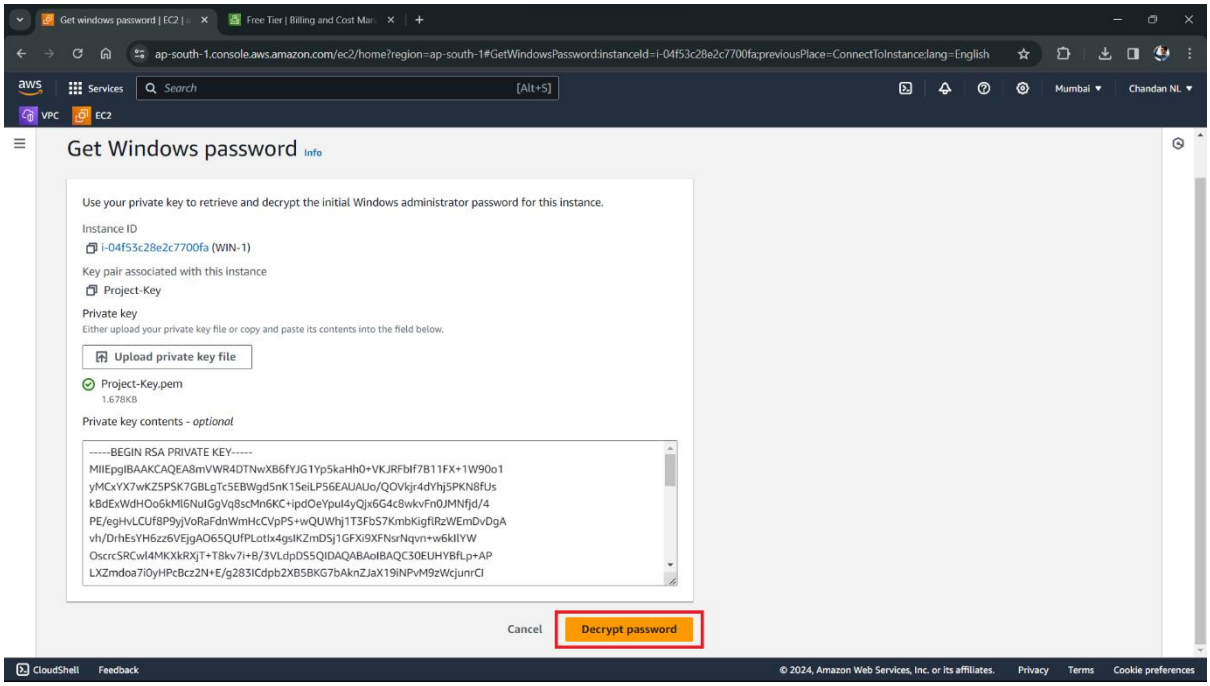
Click on upload private key file to decrypt password



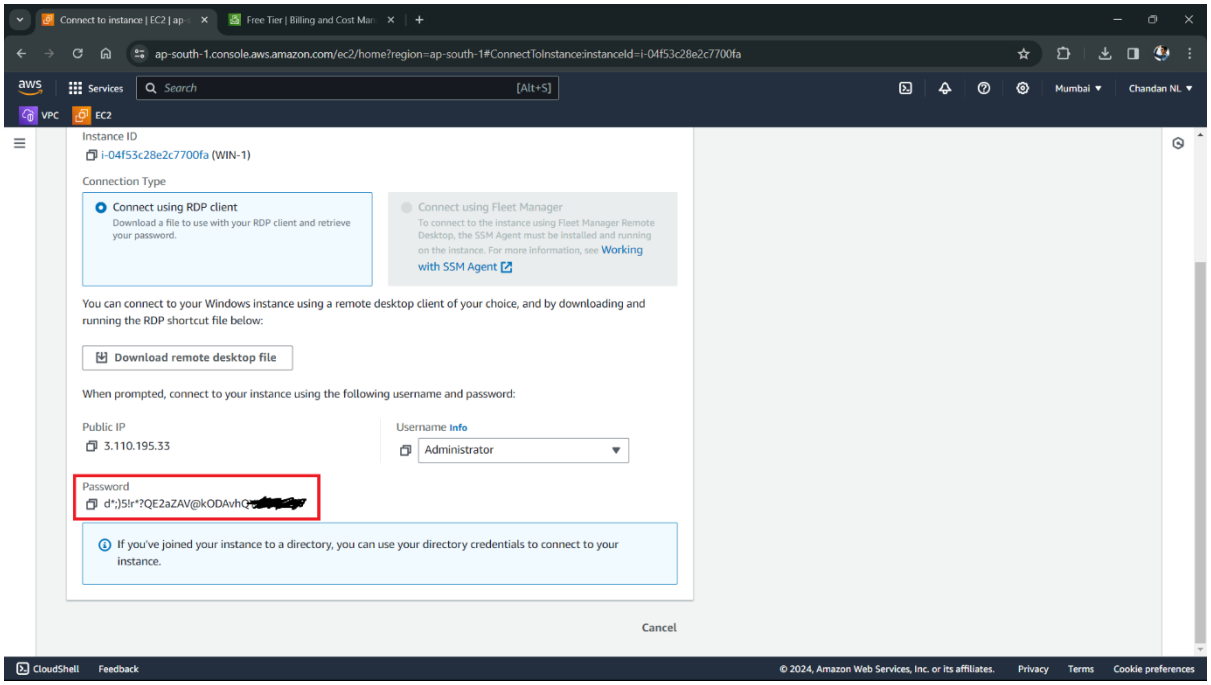
Select your key pair .pem file



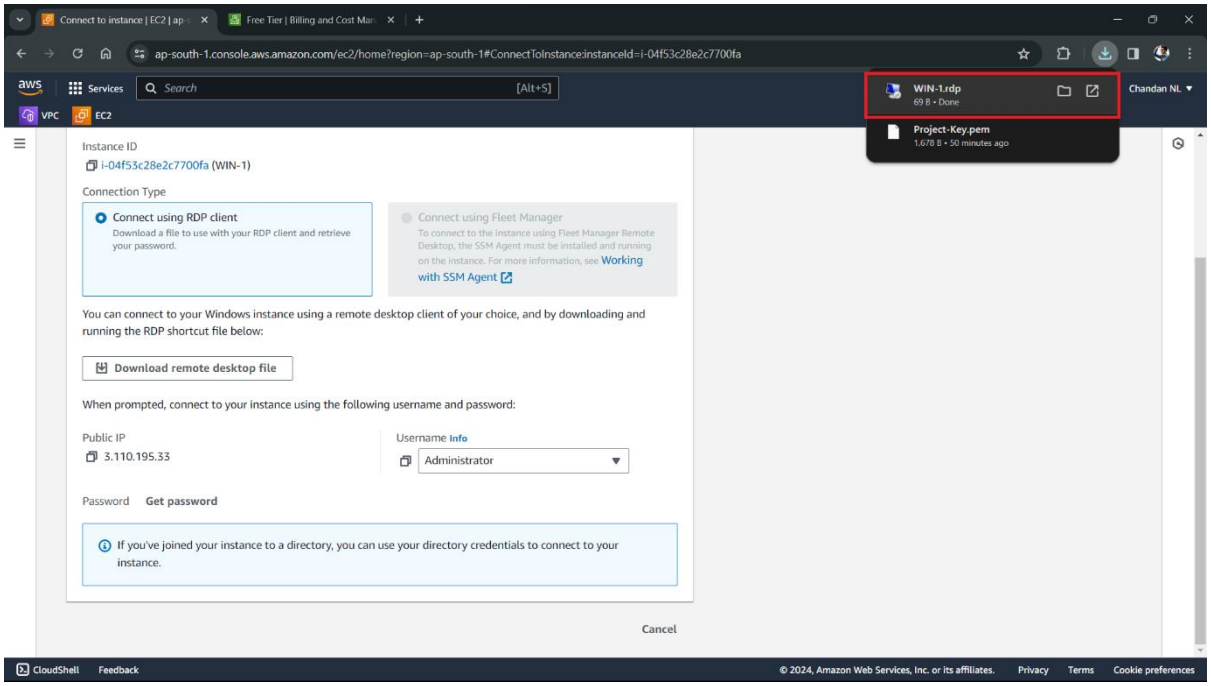
Click on decrypt password



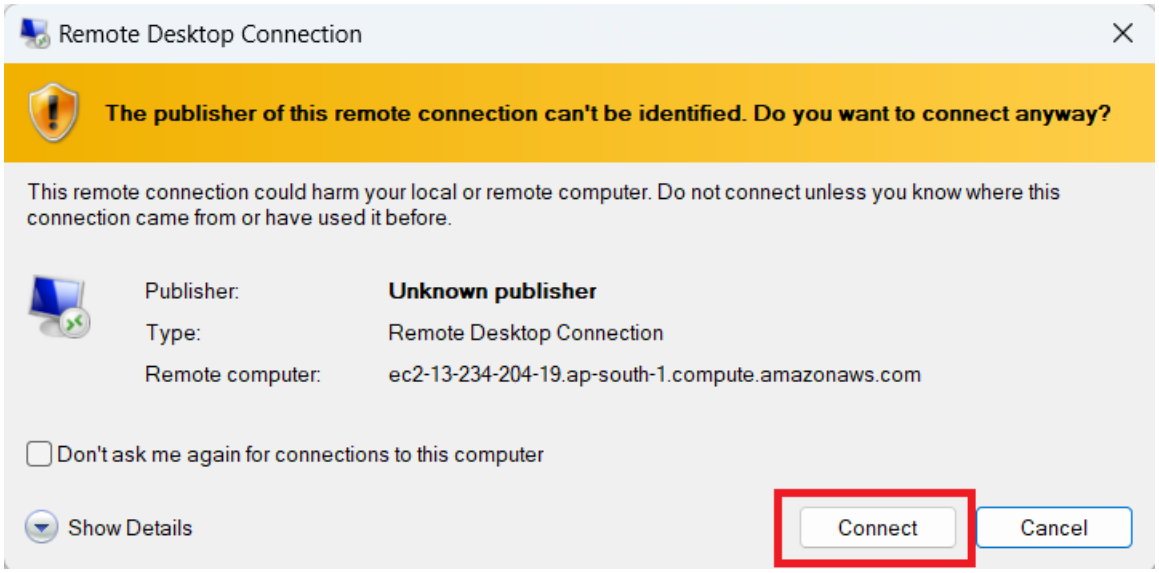
Copy the password



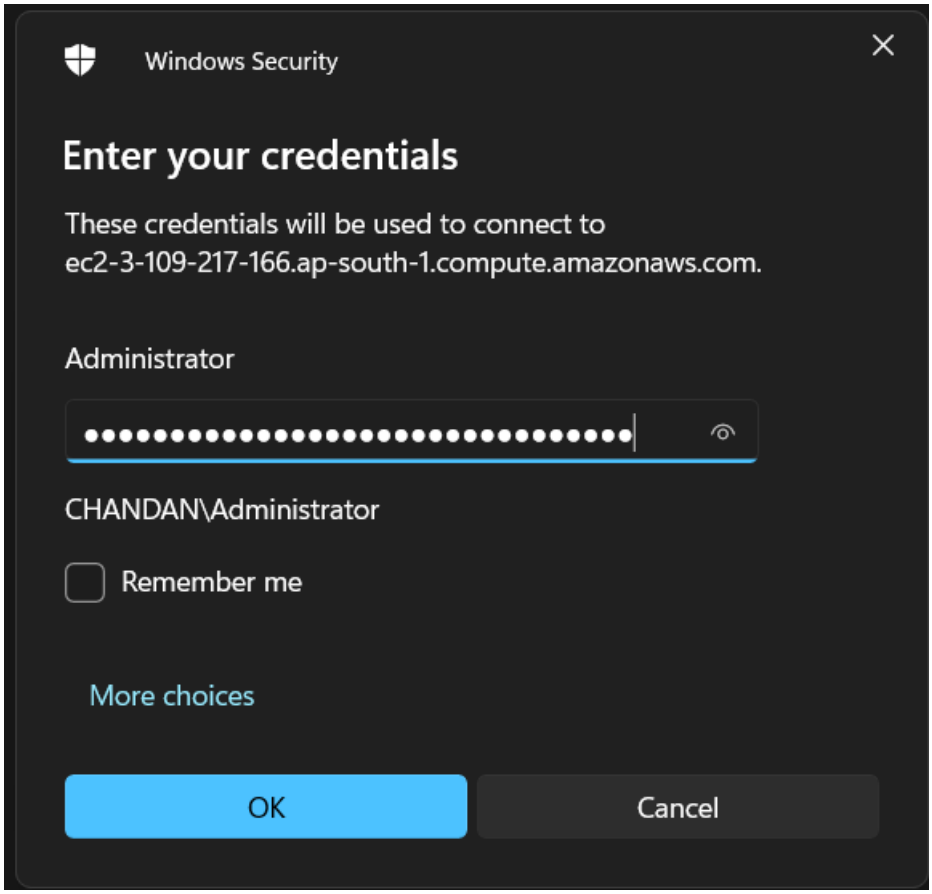
Open your downloaded remote desktop file



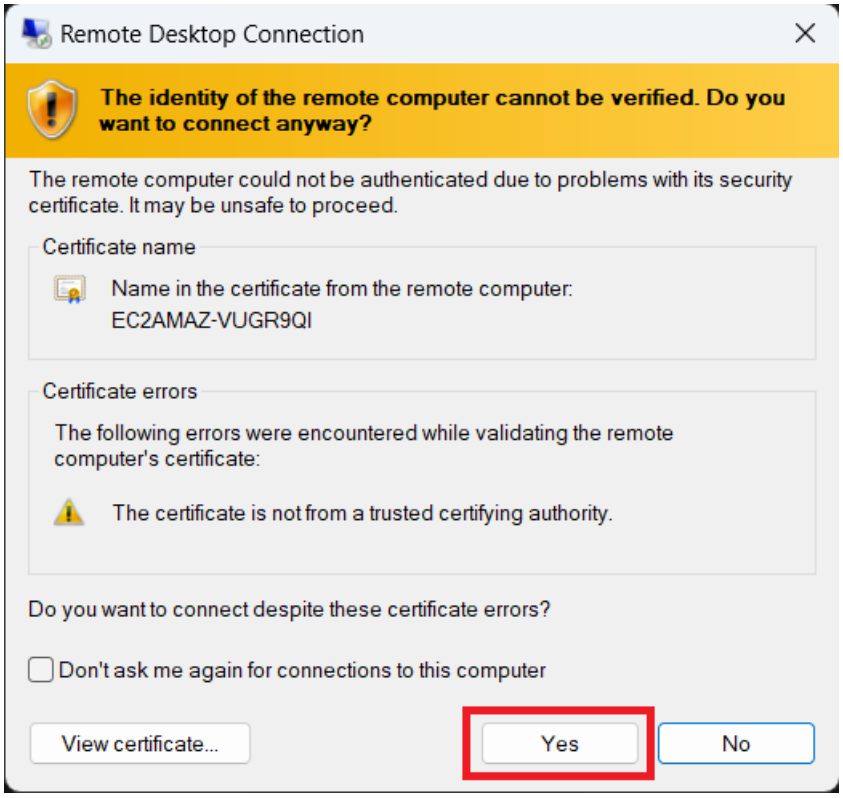
Click on connect



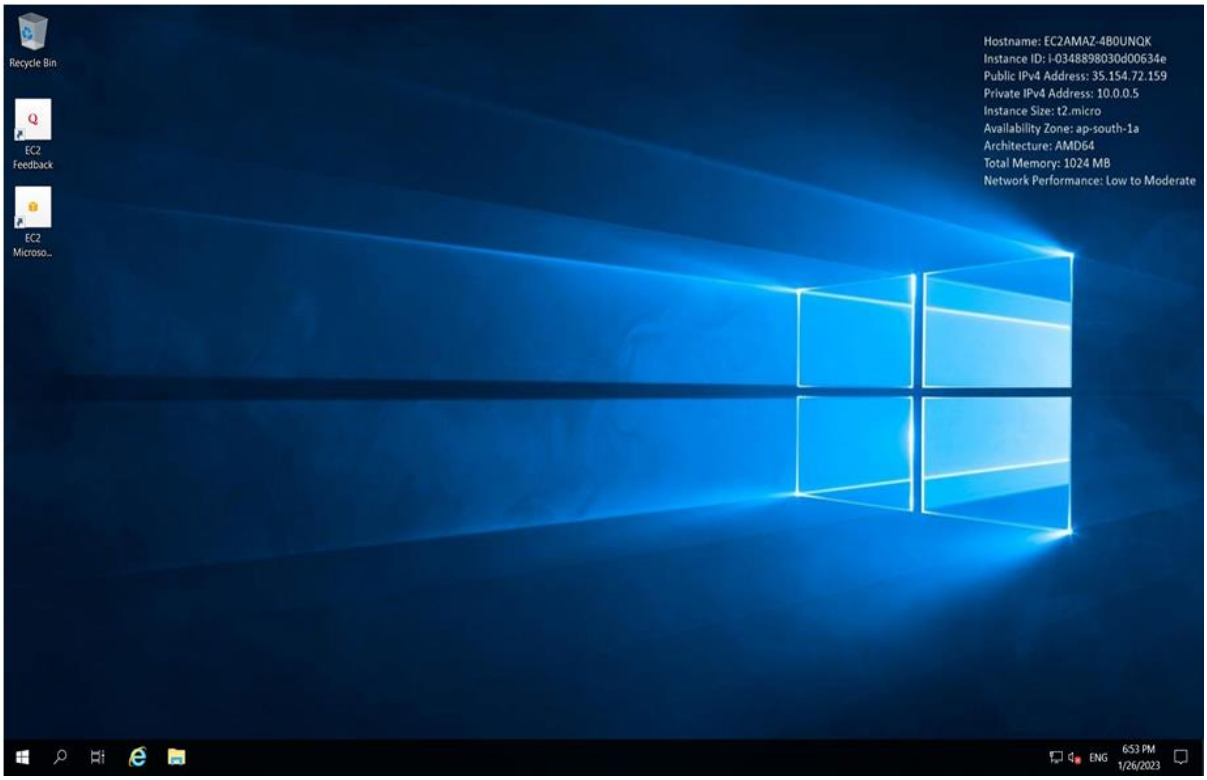
Paste your password and click on ok



Click on yes to launch your windows EC2 instance

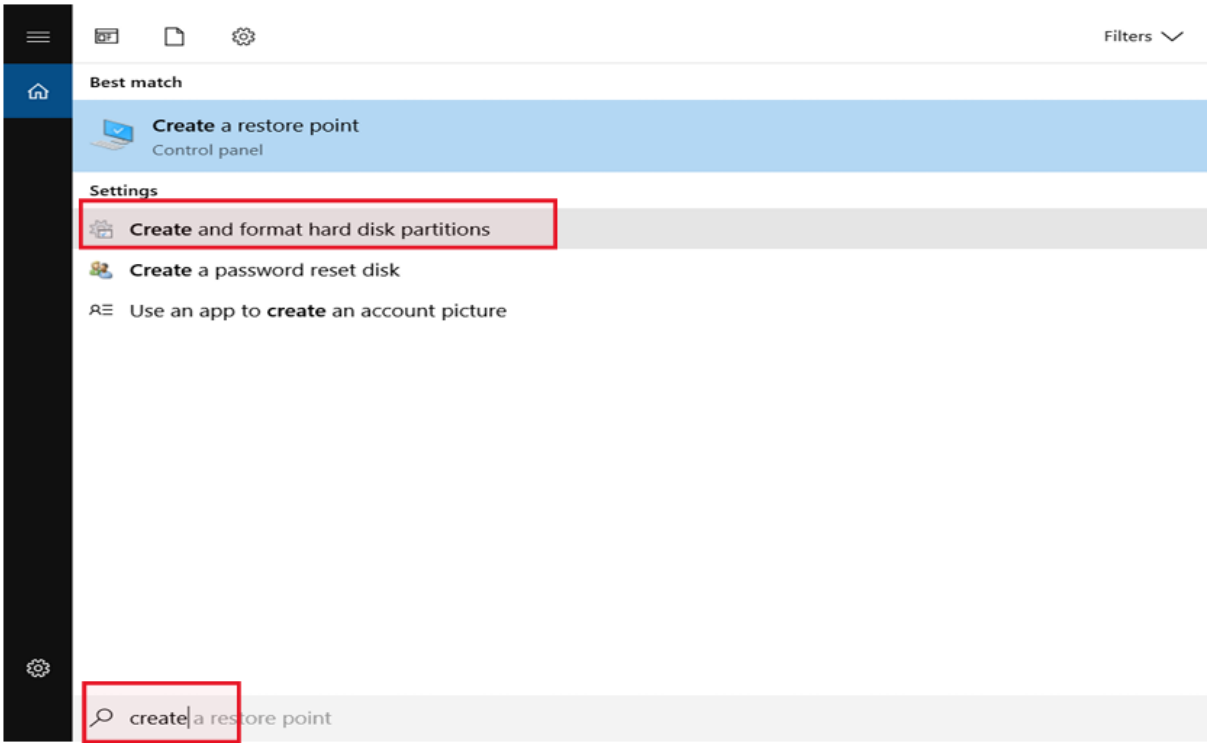


Windows EC2 instance launched

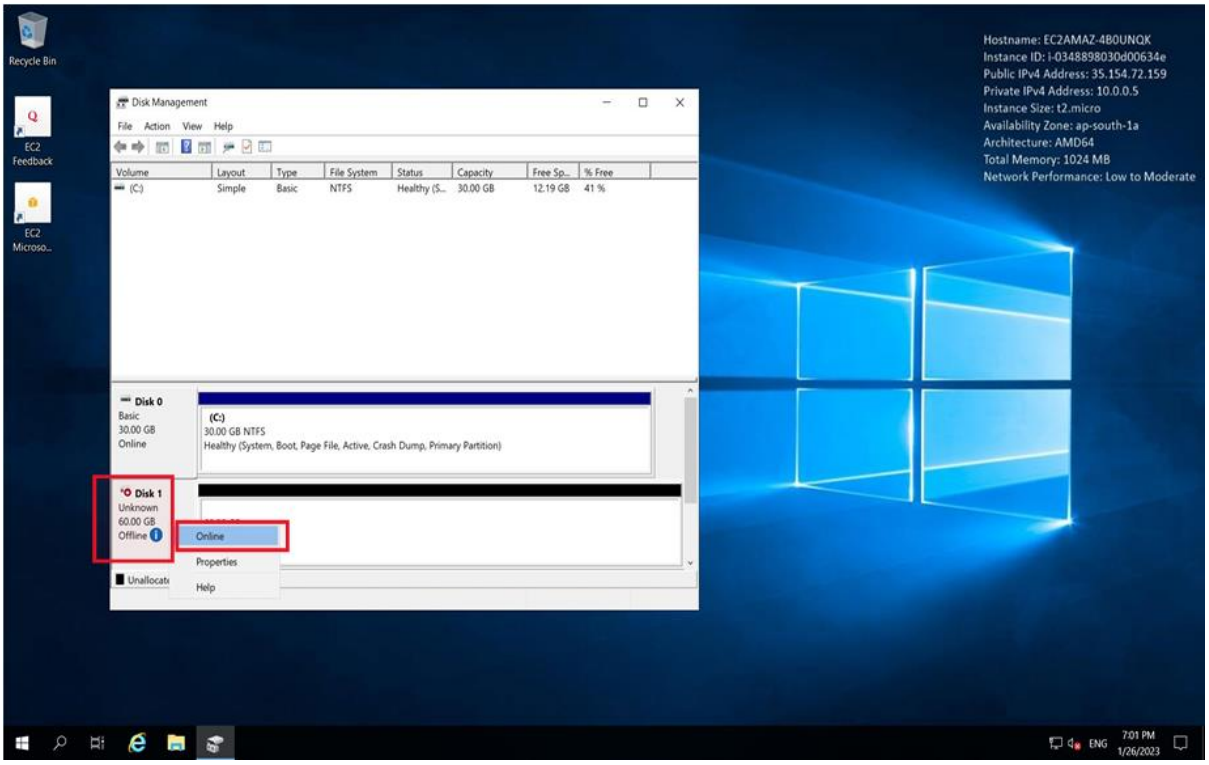


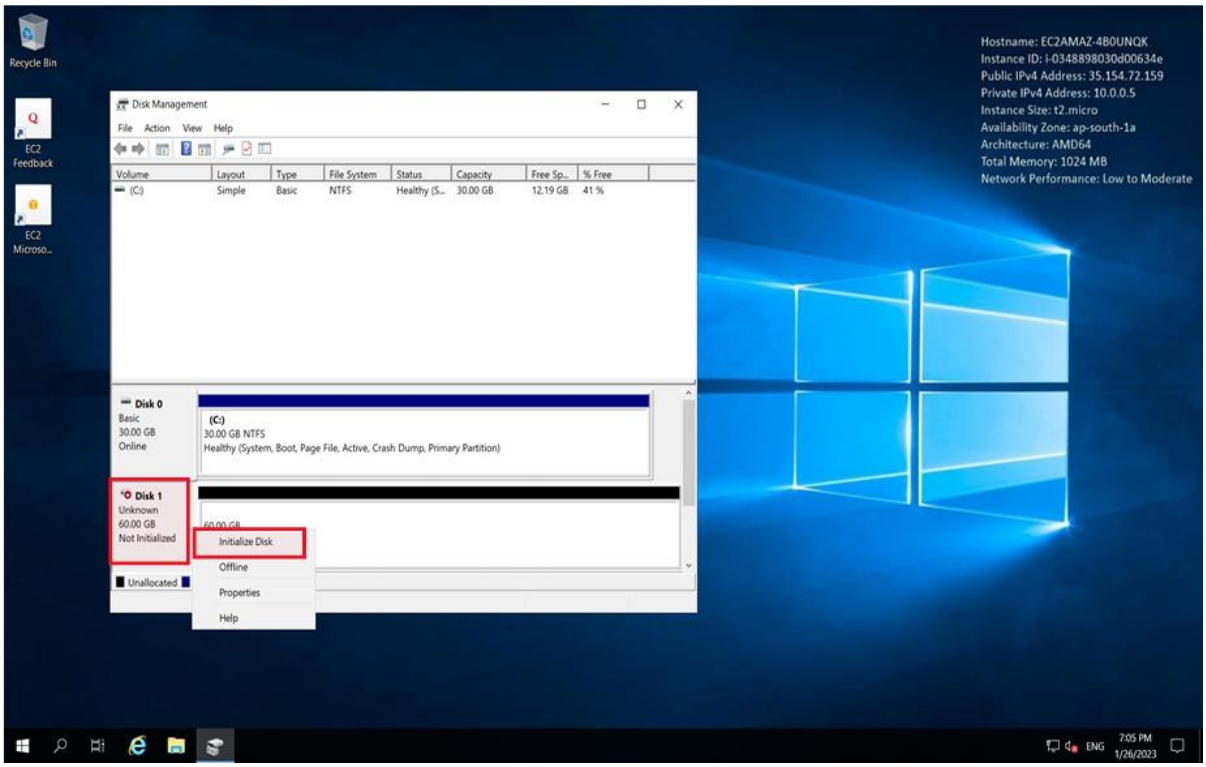
6.4) Create a file system in the additional volume

Type “Create and format hard disk partitions” in the Search box and verify that “Disk Management” screen is getting displayed

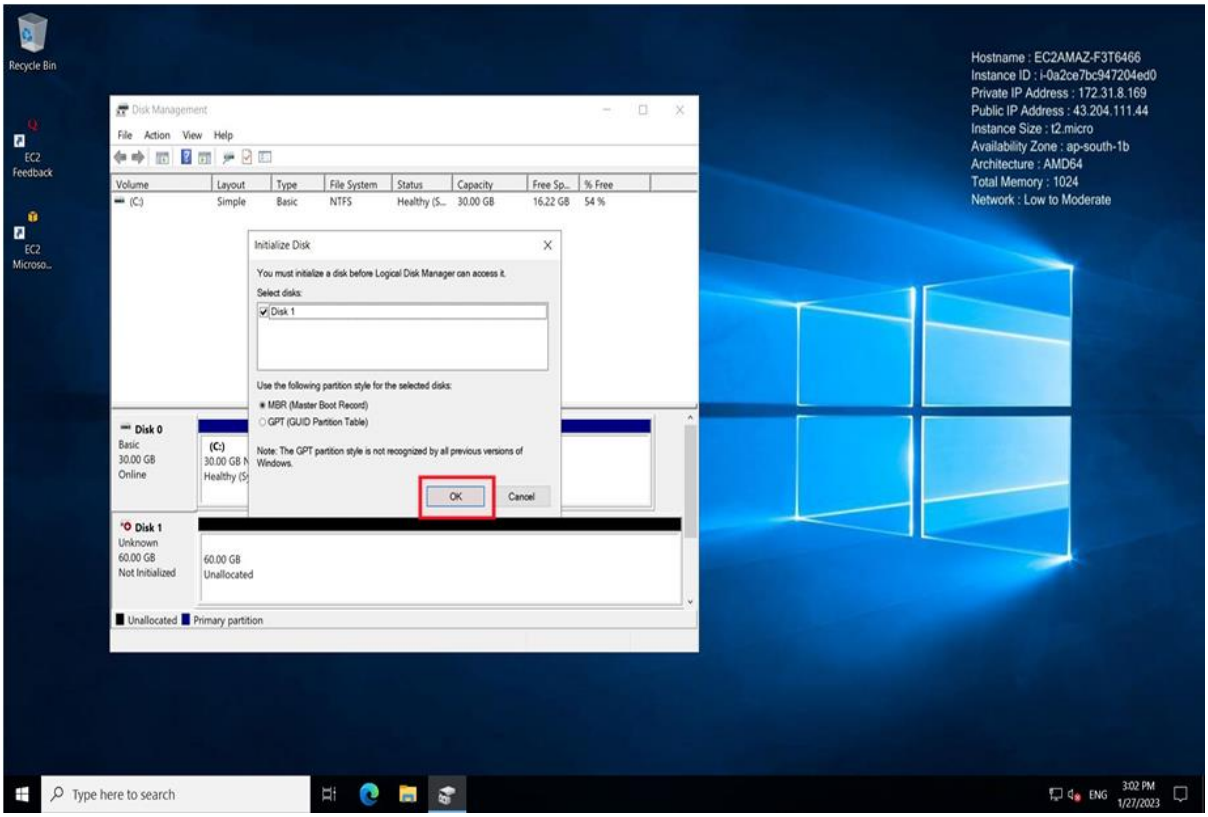


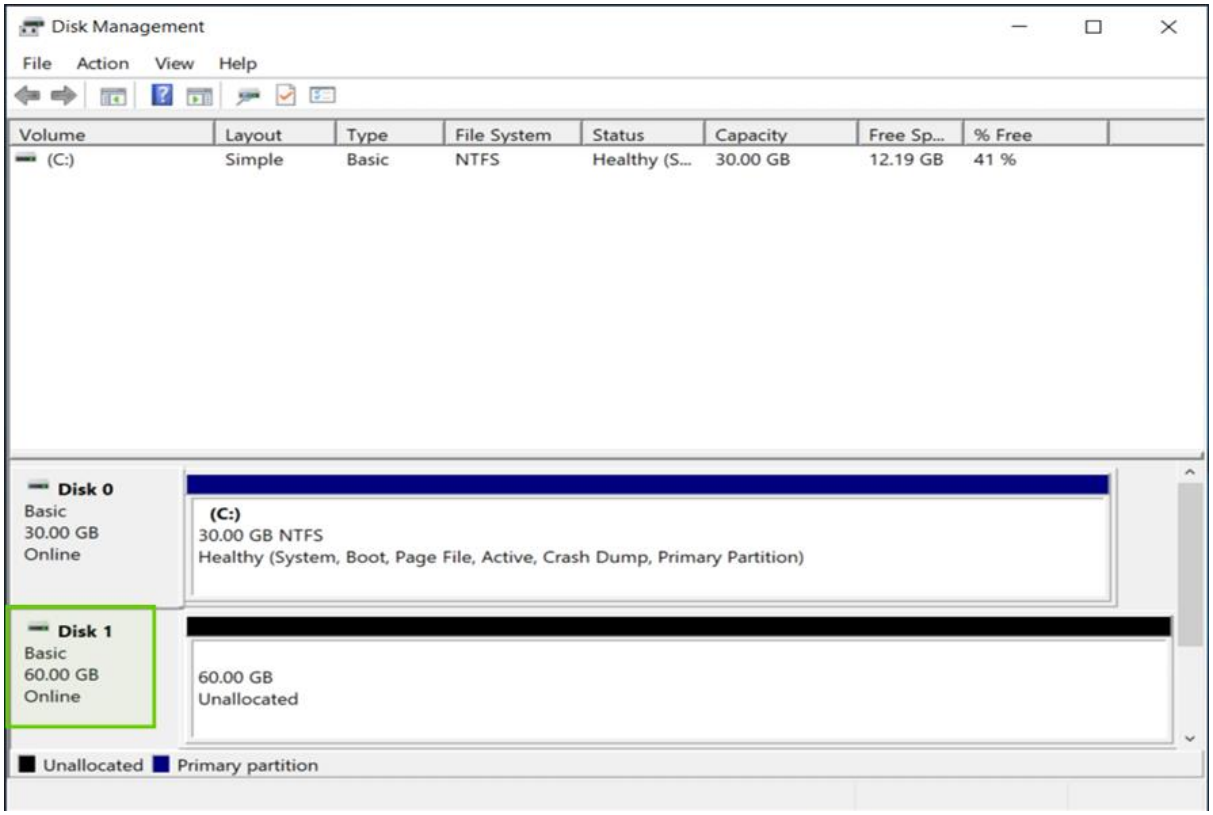
Bring the additional EBS volume “Online” and then “Initialize” it



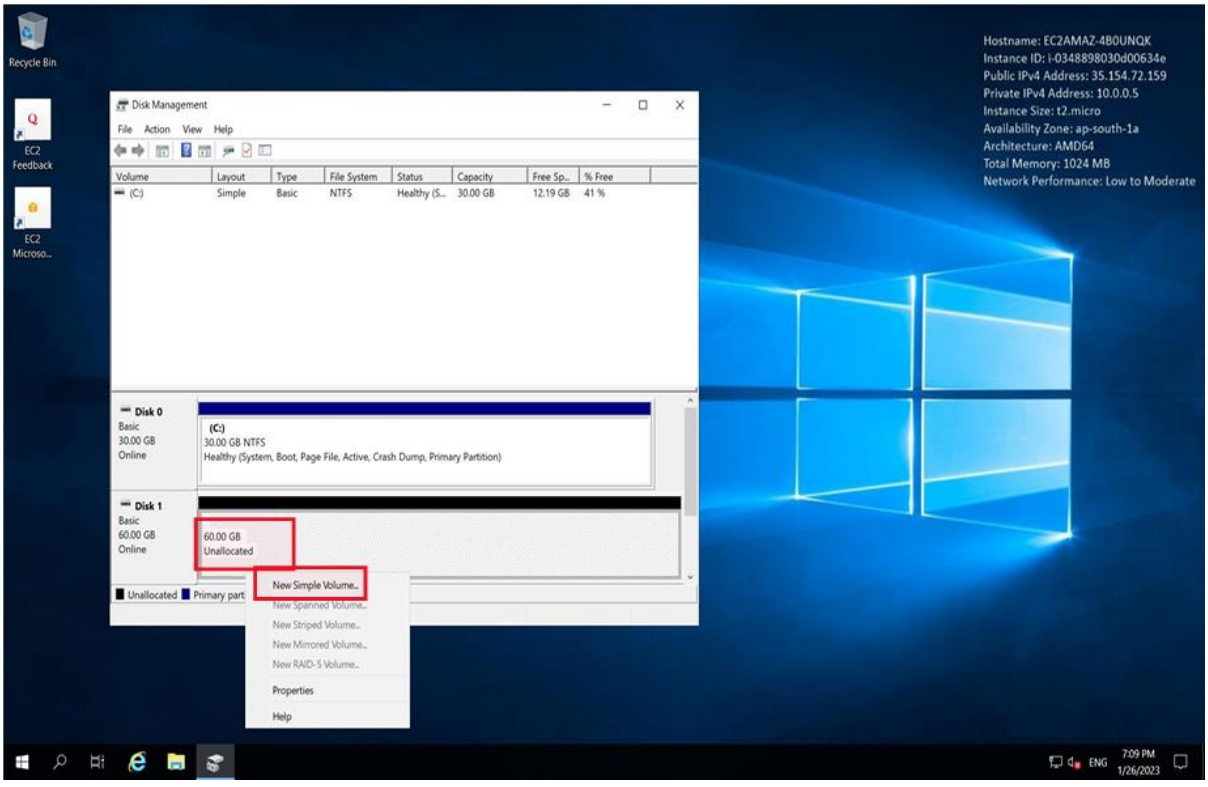


Click ok to Initialize Disk

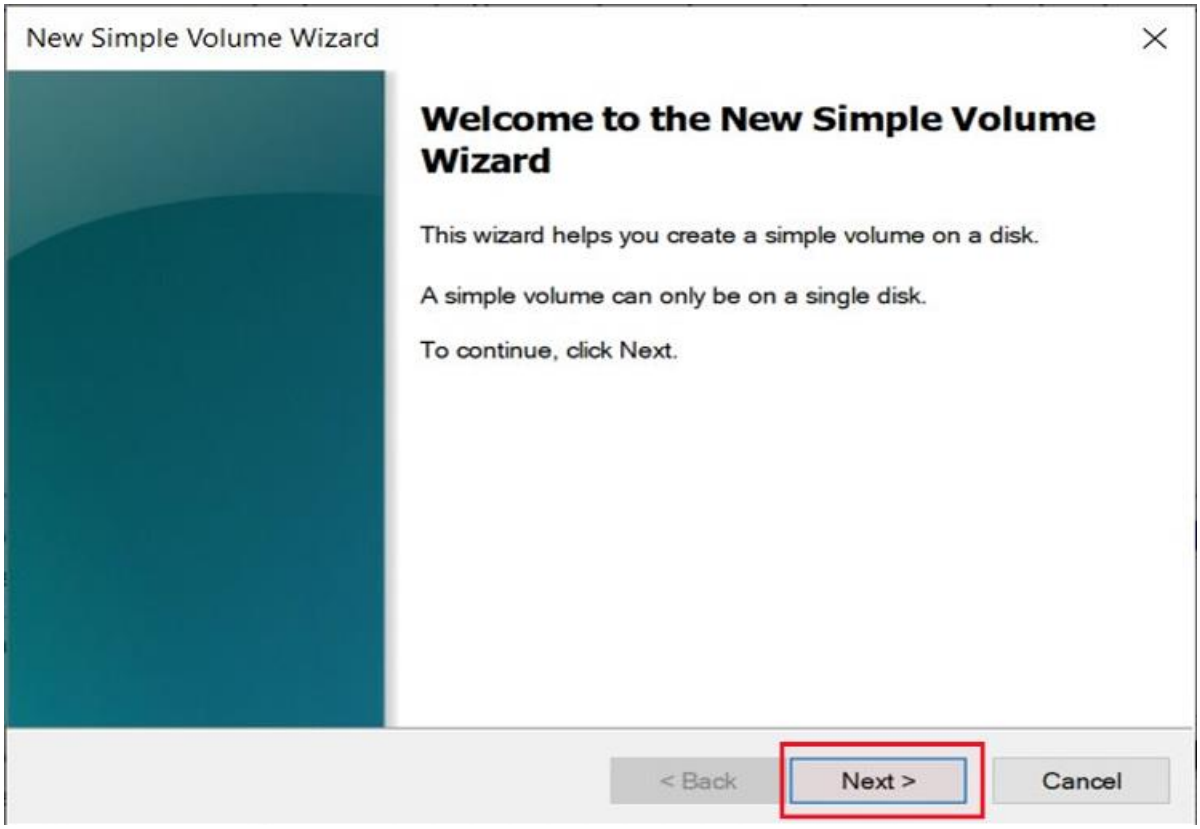


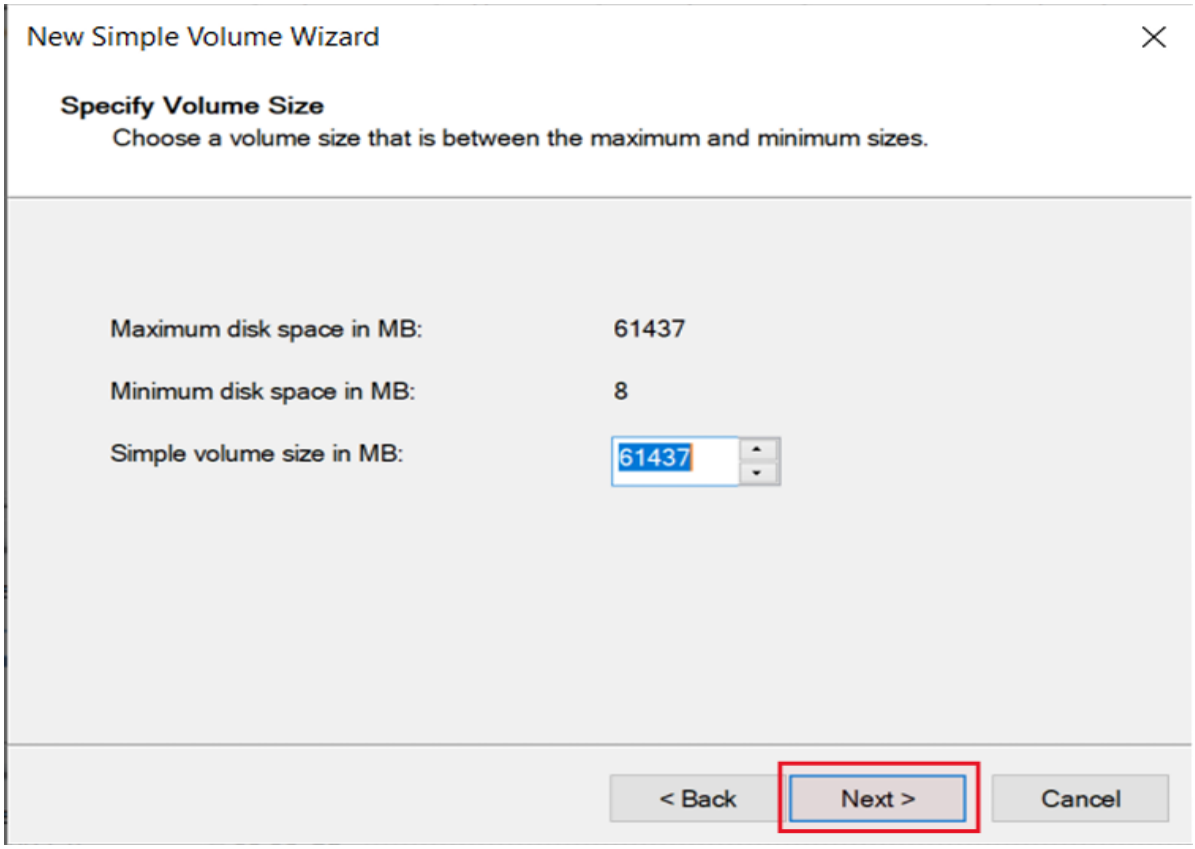


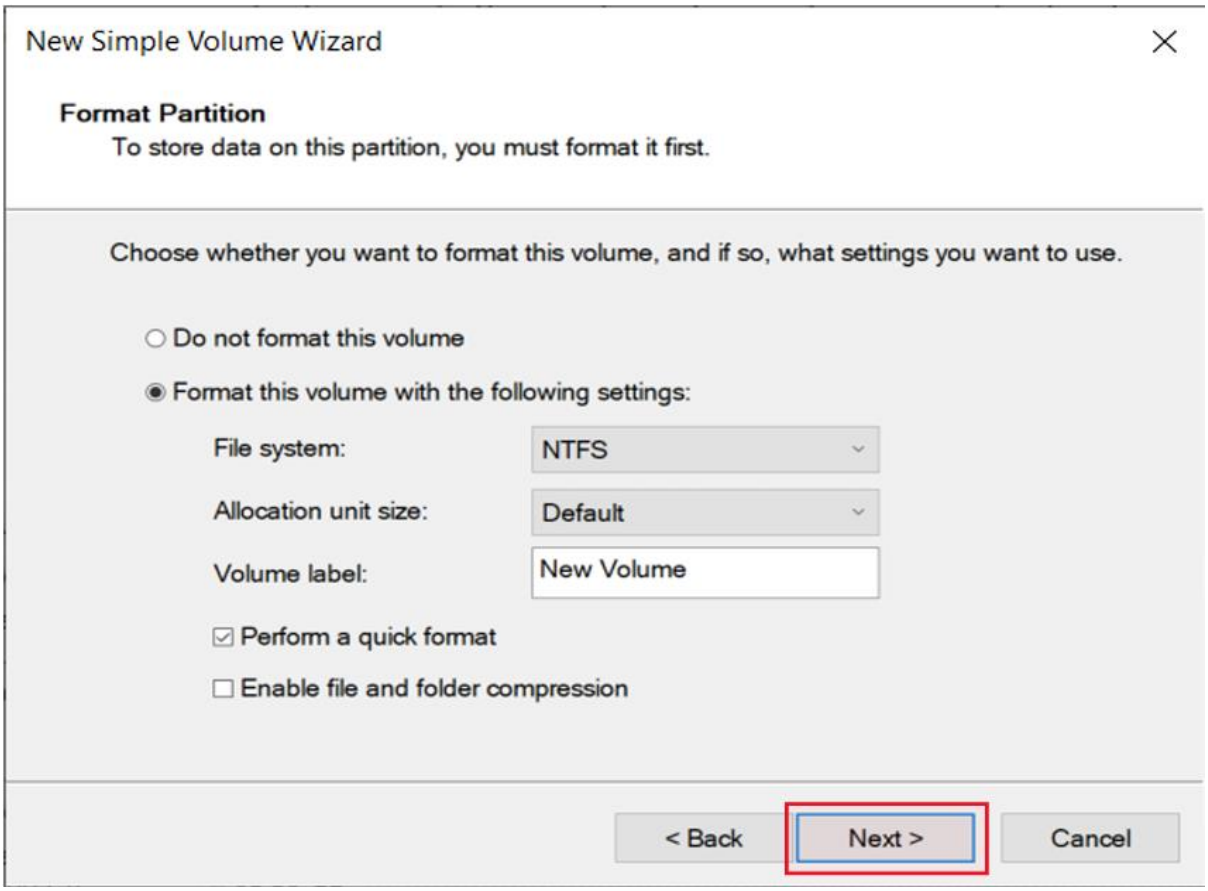
Then select “Simple New Volume” option and create a file system in the additional volume

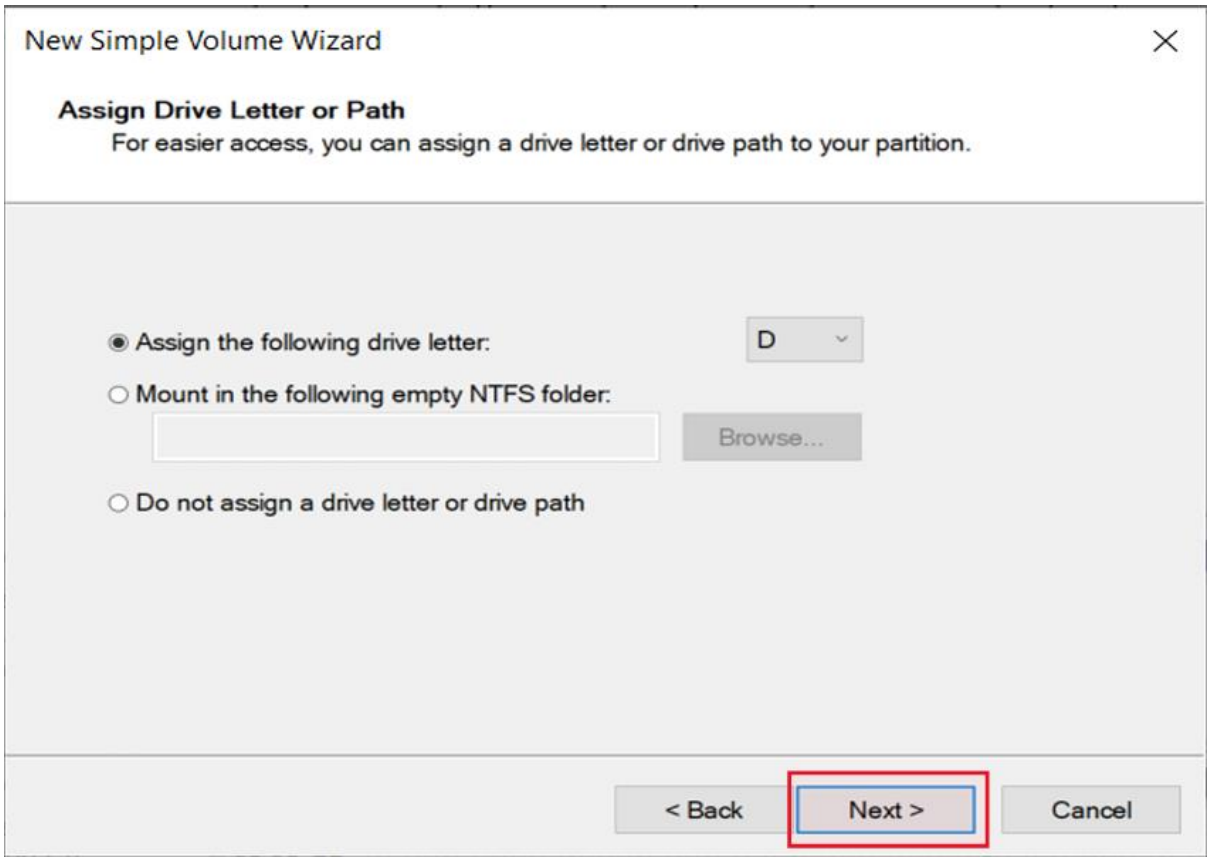


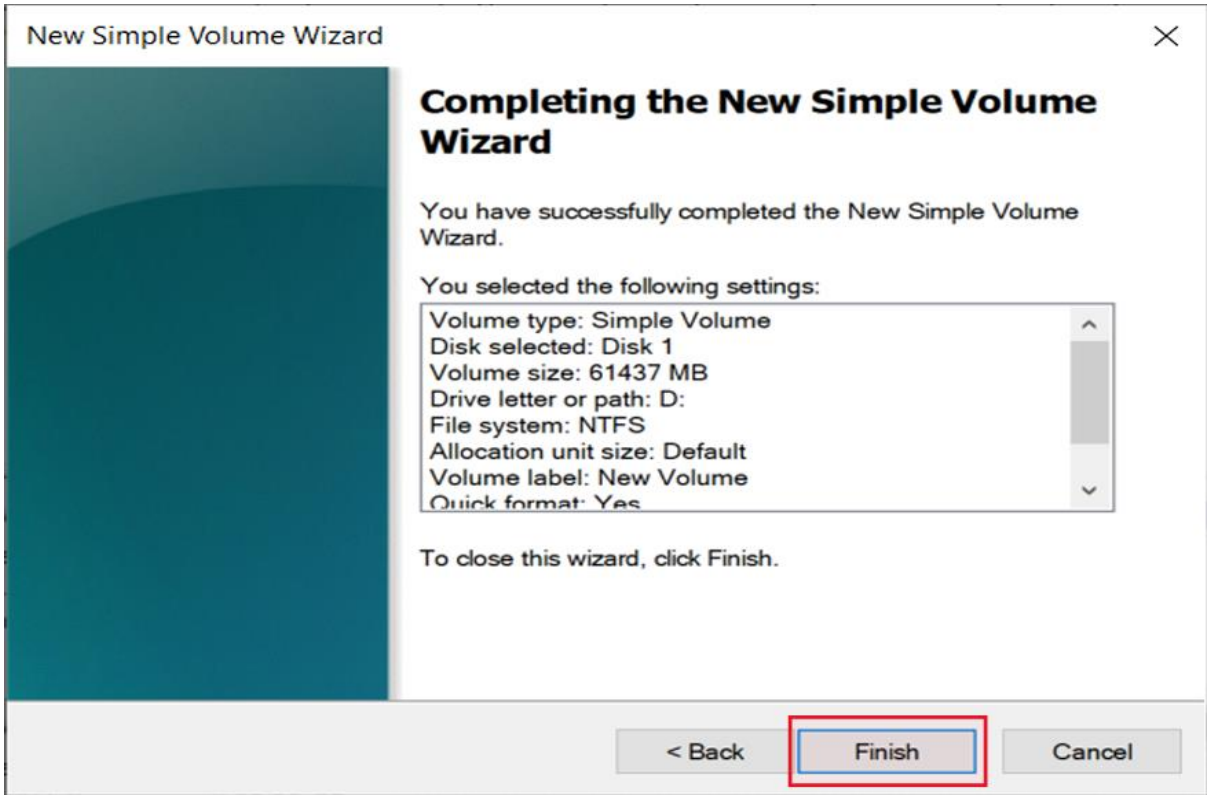
By clicking next create a file system in the additional volume



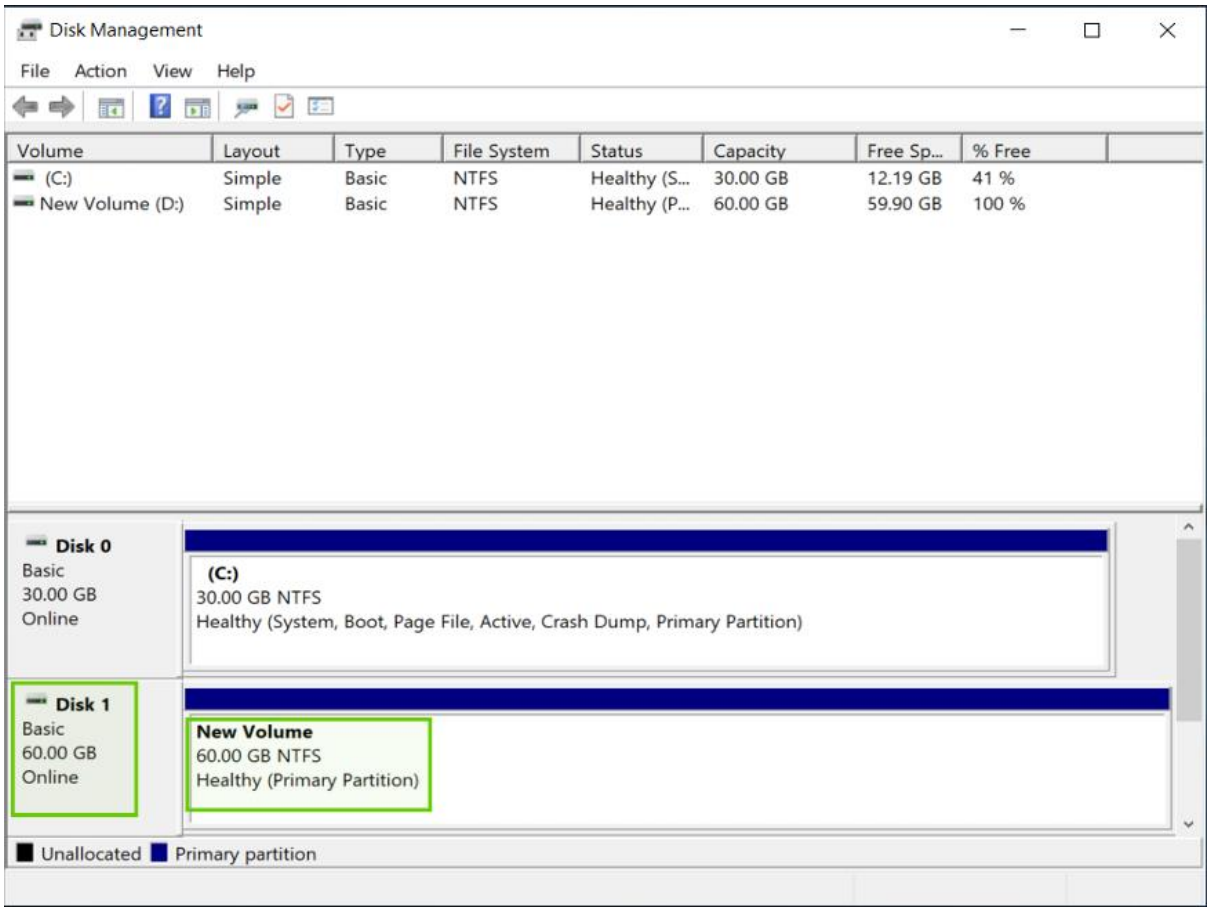



New Simple Volume Wizard
Format Partition
To store data on this partition, you must format it first.
Choose whether you want to format this volume, and if so, what settings you want to use.
Do not format this volume
Format this volume with the following settings:
File system:
NTFS
Allocation unit size:
Default
Volume label:
New Volume
Perform a quick format
Enable file and folder compression
< Back
Next >
Cancel

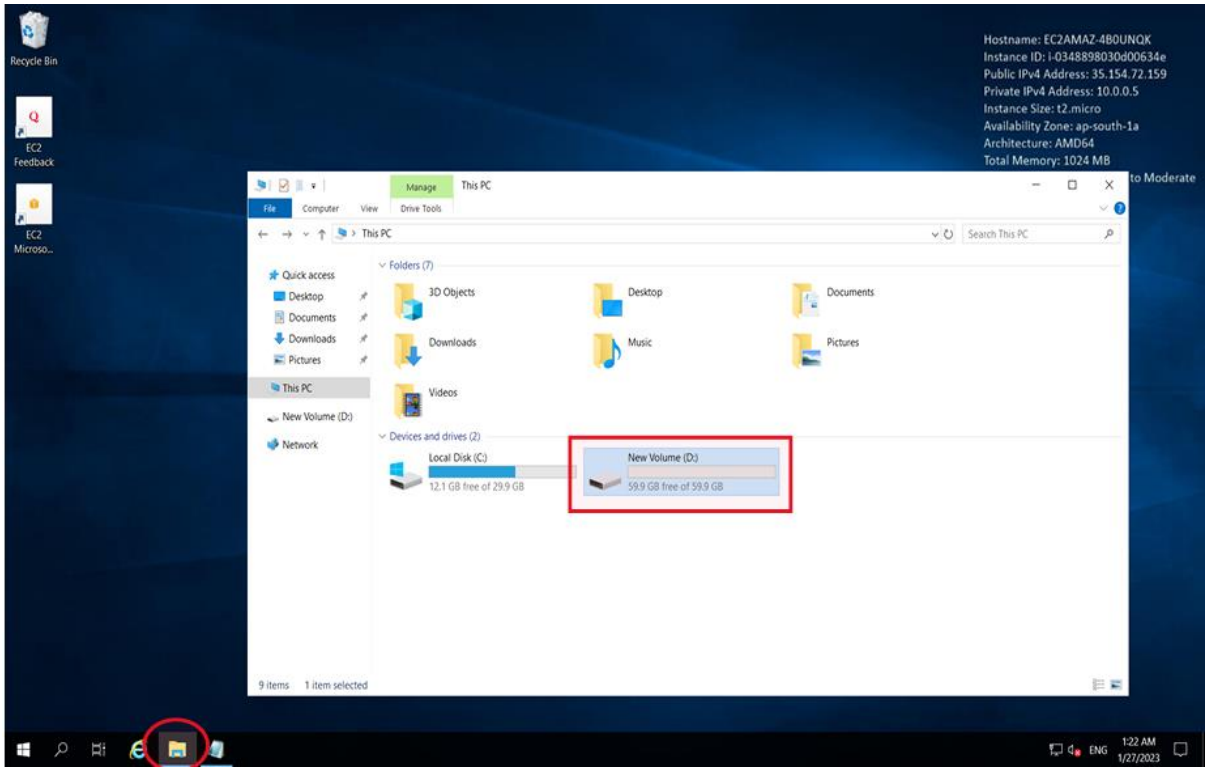

New Simple Volume Wizard
Assign Drive Letter or Path
For easier access, you can assign a drive letter or drive path to your partition.
Assign the following drive letter:
D
Mount in the following empty NTFS folder:
Browse...
Do not assign a drive letter or drive path
< Back
Next >
Cancel



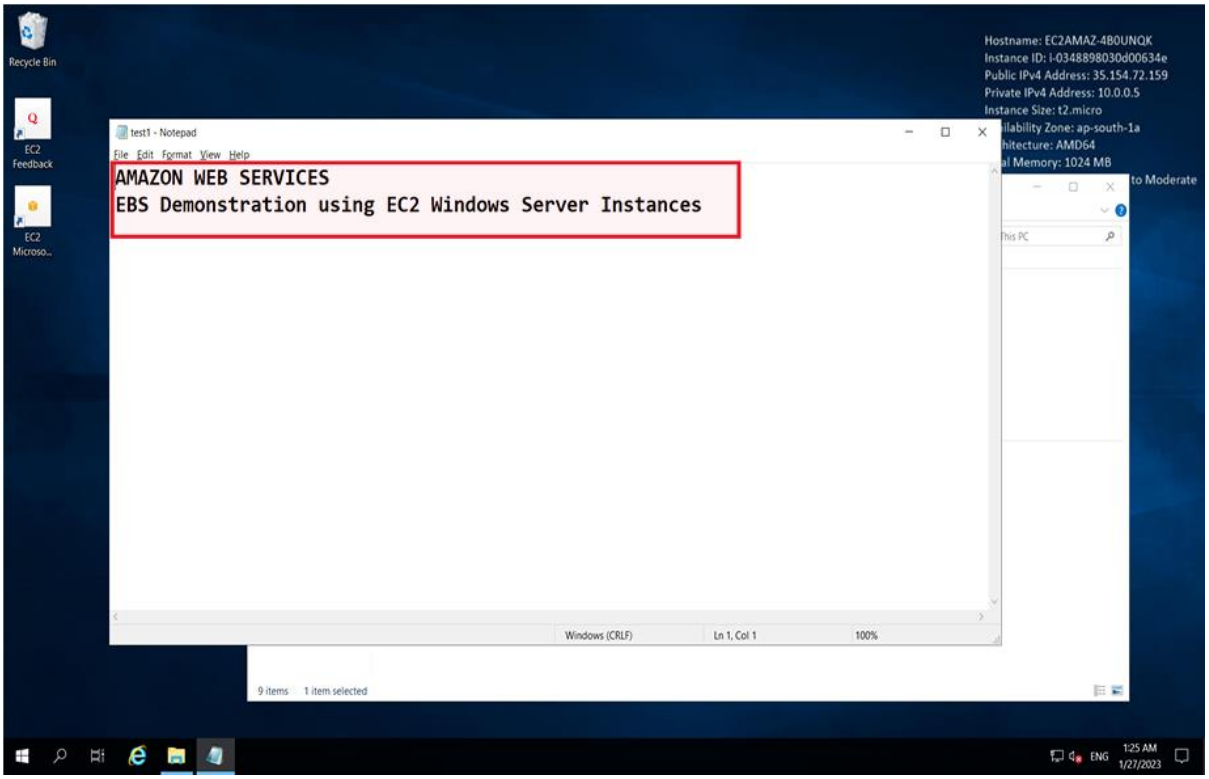
Verify the created a file system in the additional volume



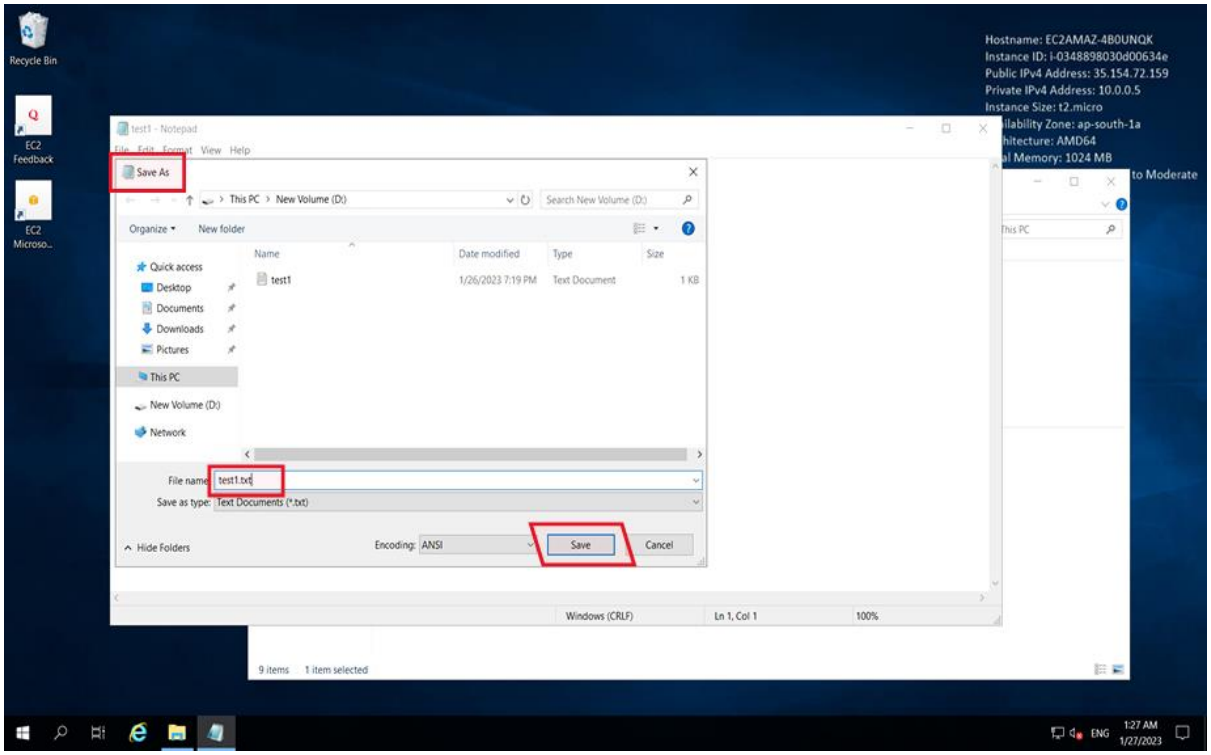
Select “File Explorer” option, select the additional disk attached



Create a text file “test1.txt” with some content in additional disk and save it

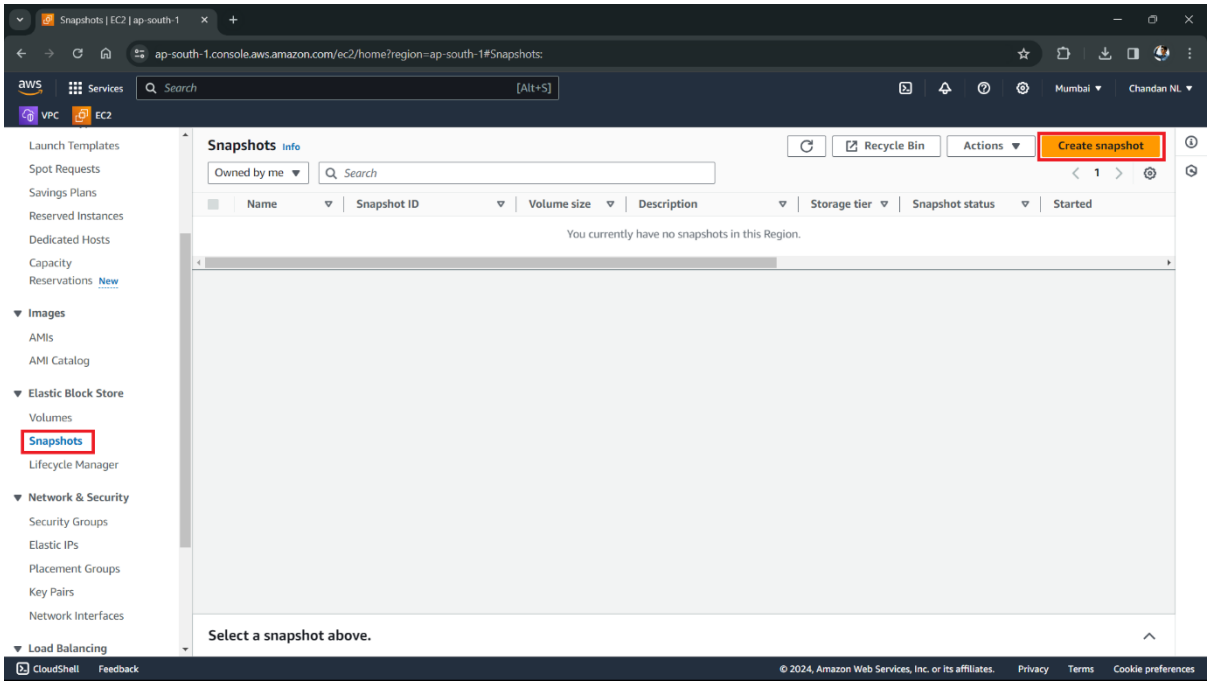


Save the file as test1.txt

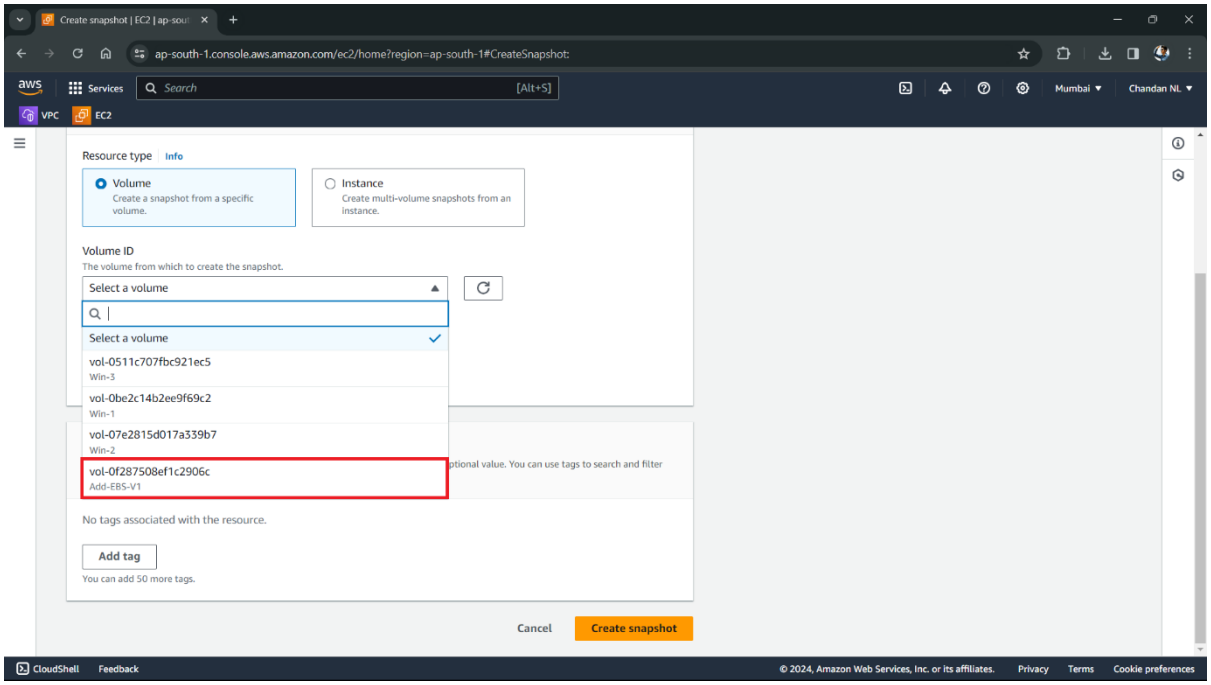


6.5) Create a Snapshot "AddSS1" from the Additional Volume

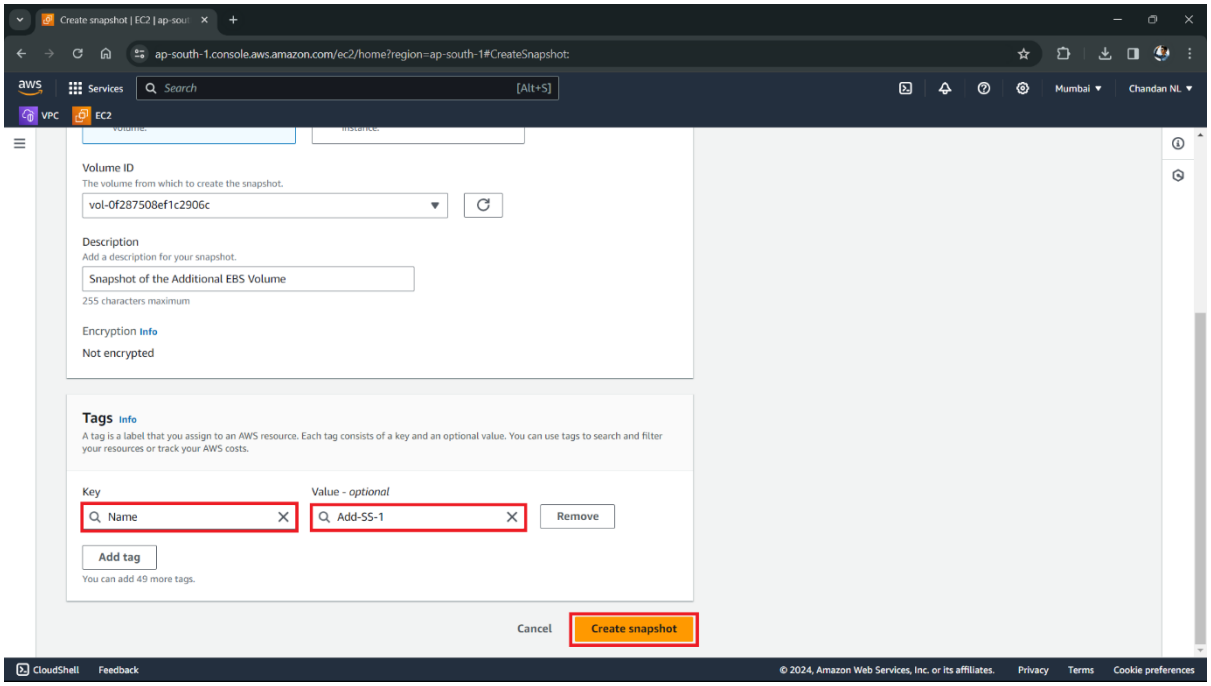
Create a snapshot of the EBS Volume



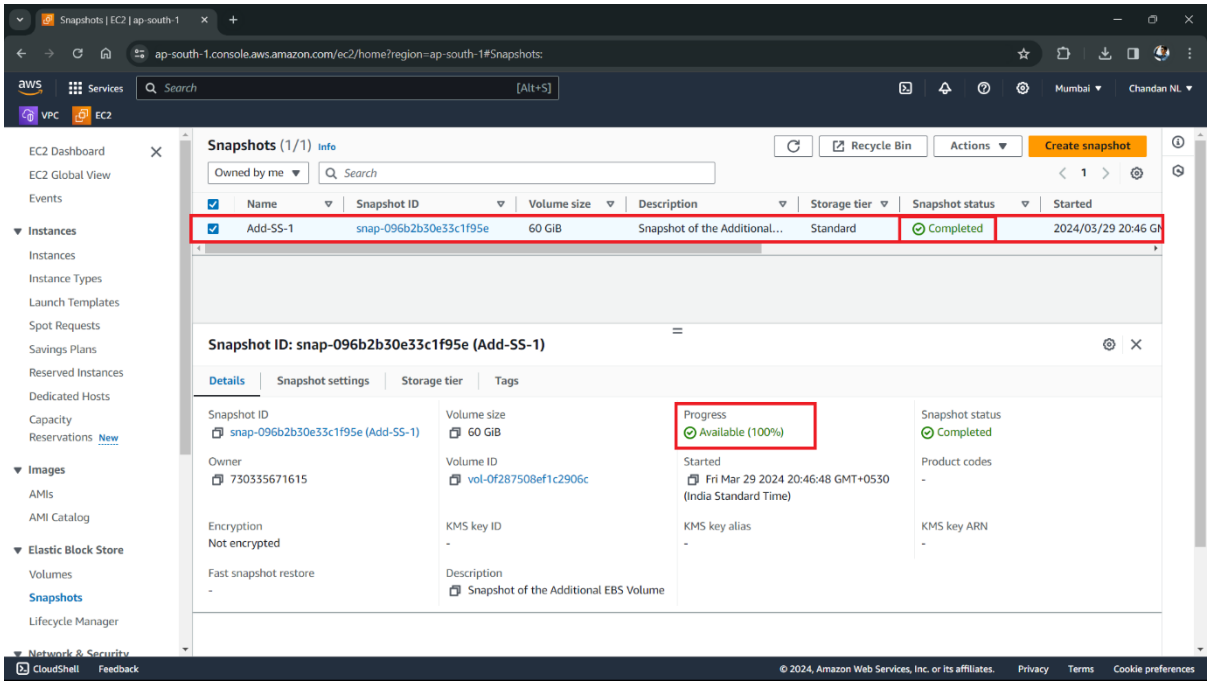
Select your created volume ”AddEBSV1”



Give name to your Snapshot and click on Create snapshot

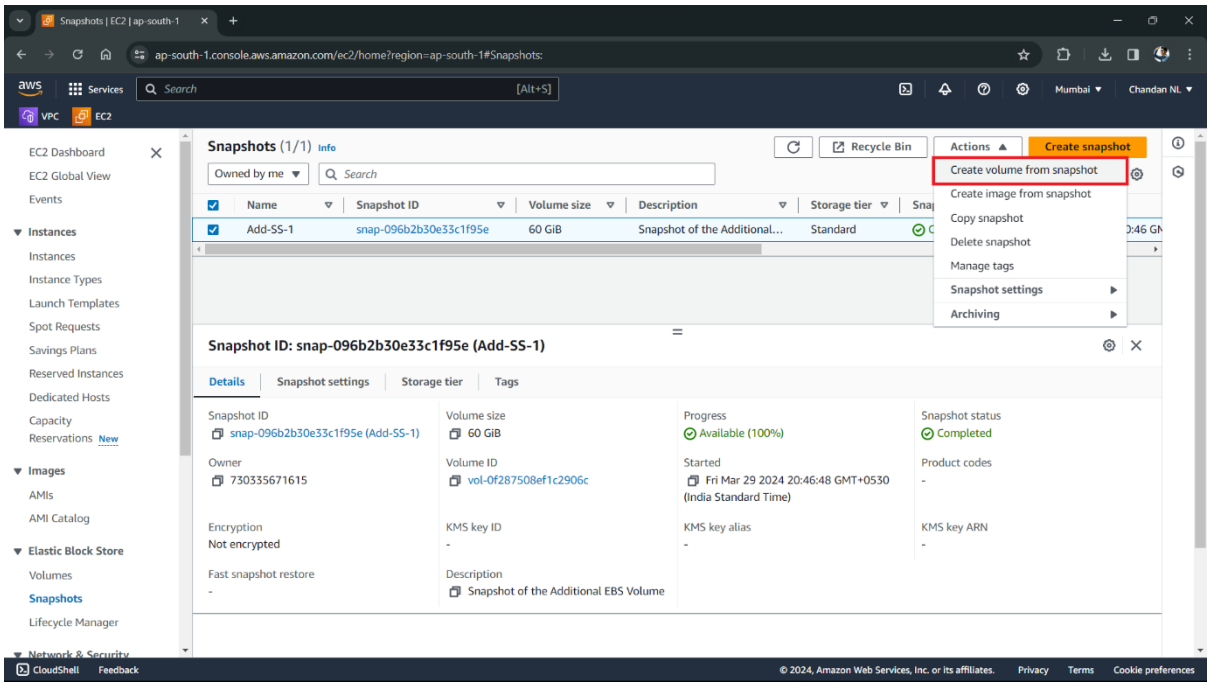


Verify the snapshot created

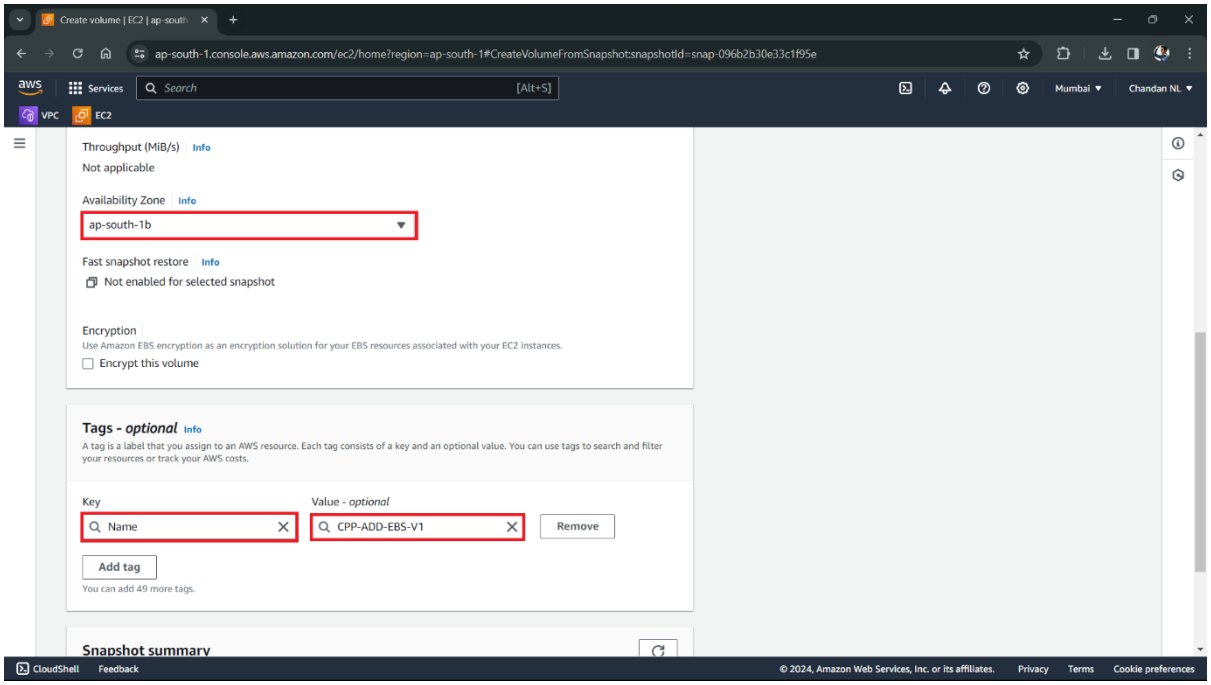


6.6) Create a Volume namely “Copy-Addl-Vol-01” in the Availability Zone “1b” from the Snapshot

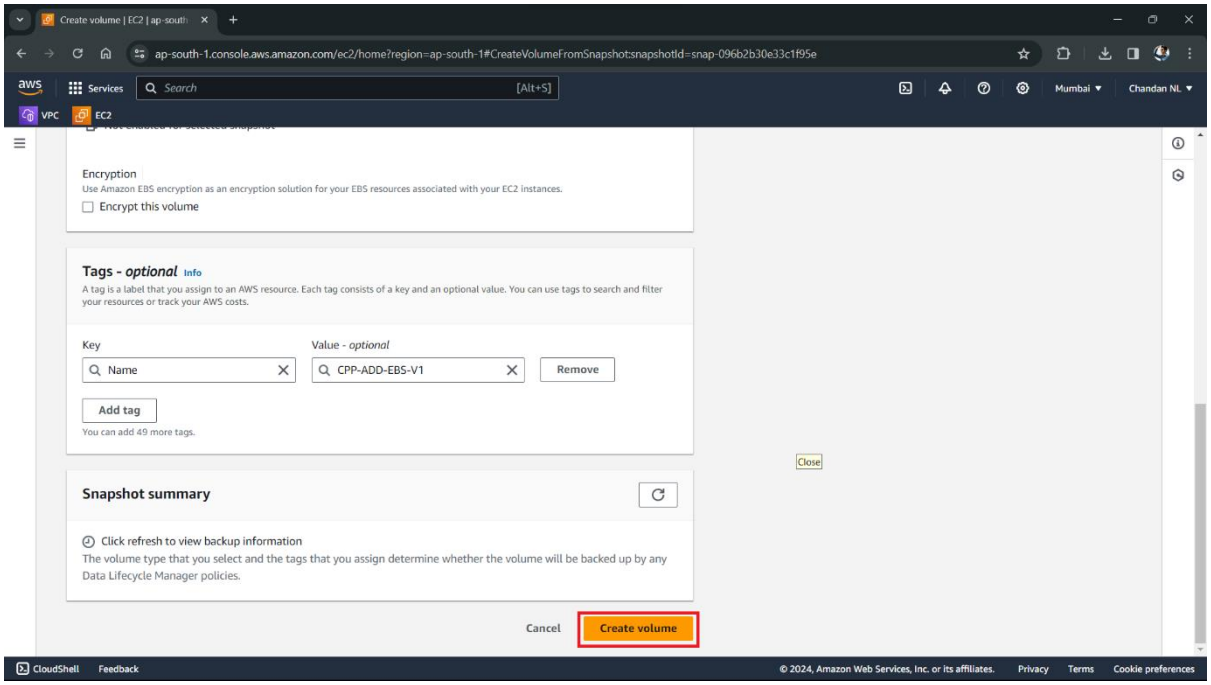
Create a new volume from snapshot in AZ “1b”



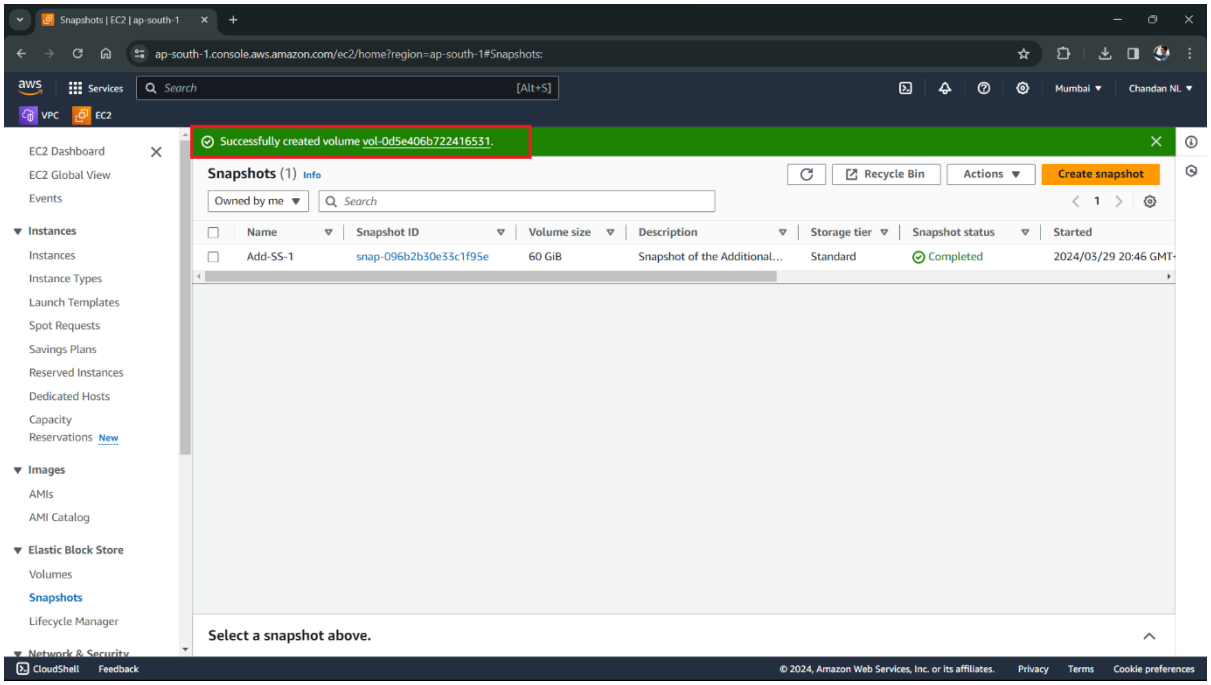
Select Availability Zone “1b”



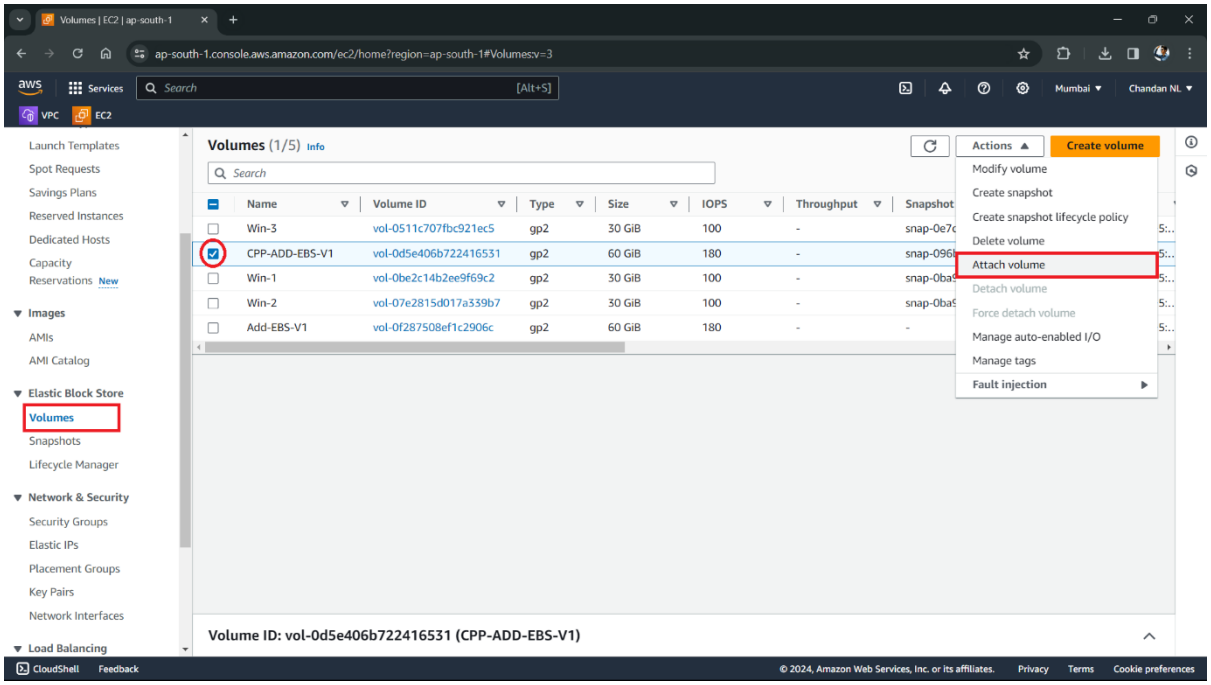
Give name to your Volume and click on Create volume



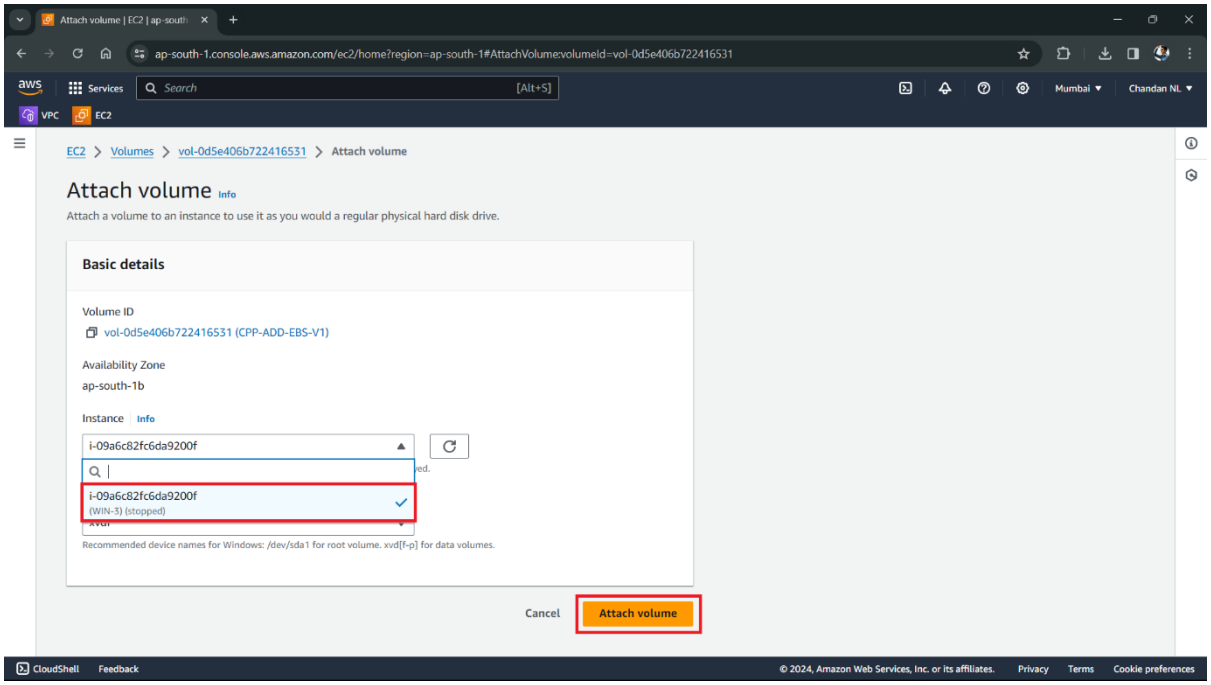
Verify the volume created



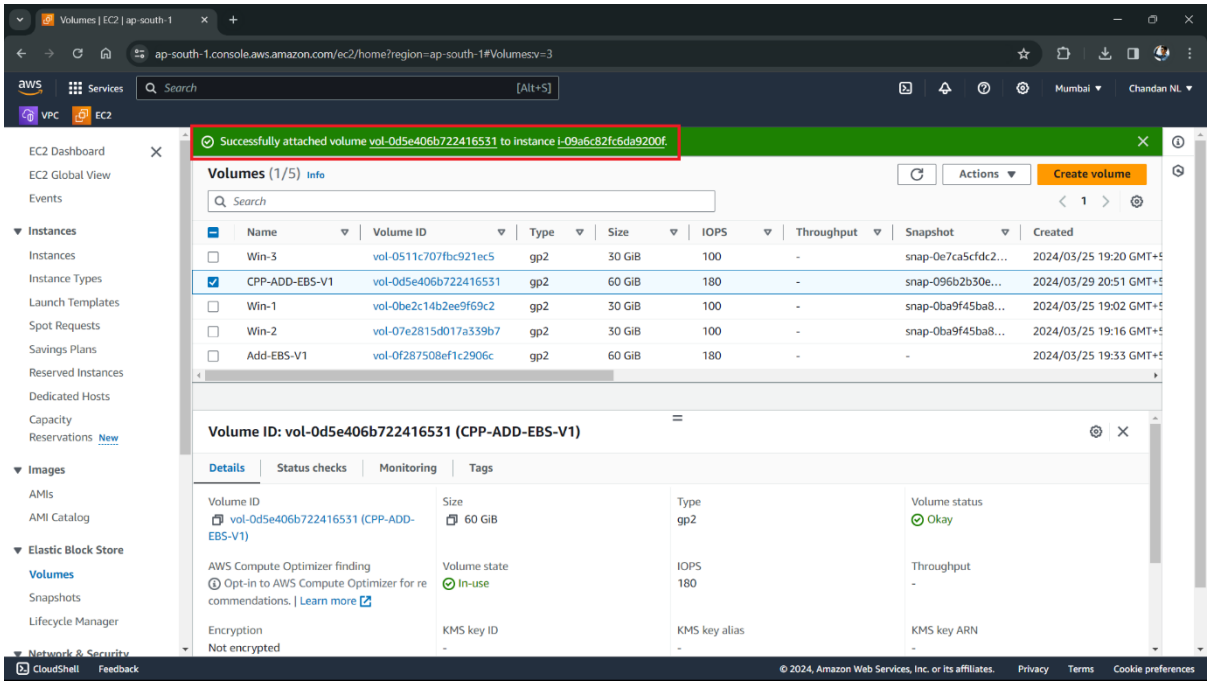
Attach this volume with the EC2 Instance (WIN3) which is in AZ “1b”



Select EC2 Instance (WIN3) which is in AZ "1b" and Attach volume



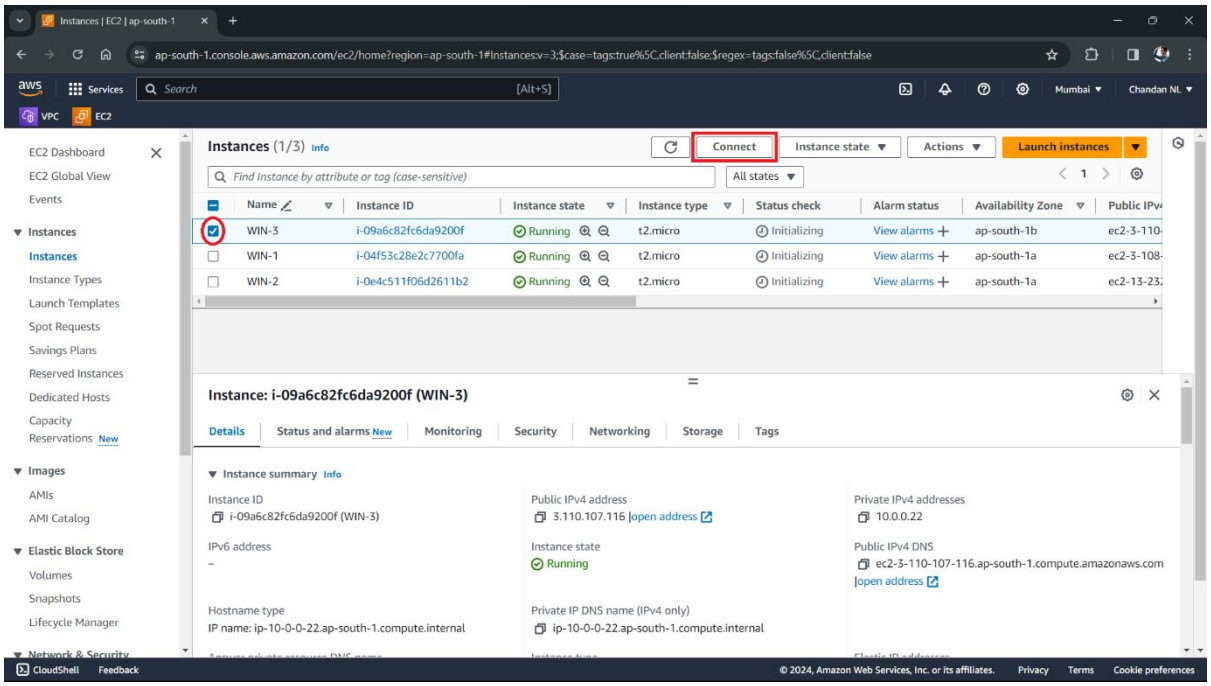
Verify the attachment



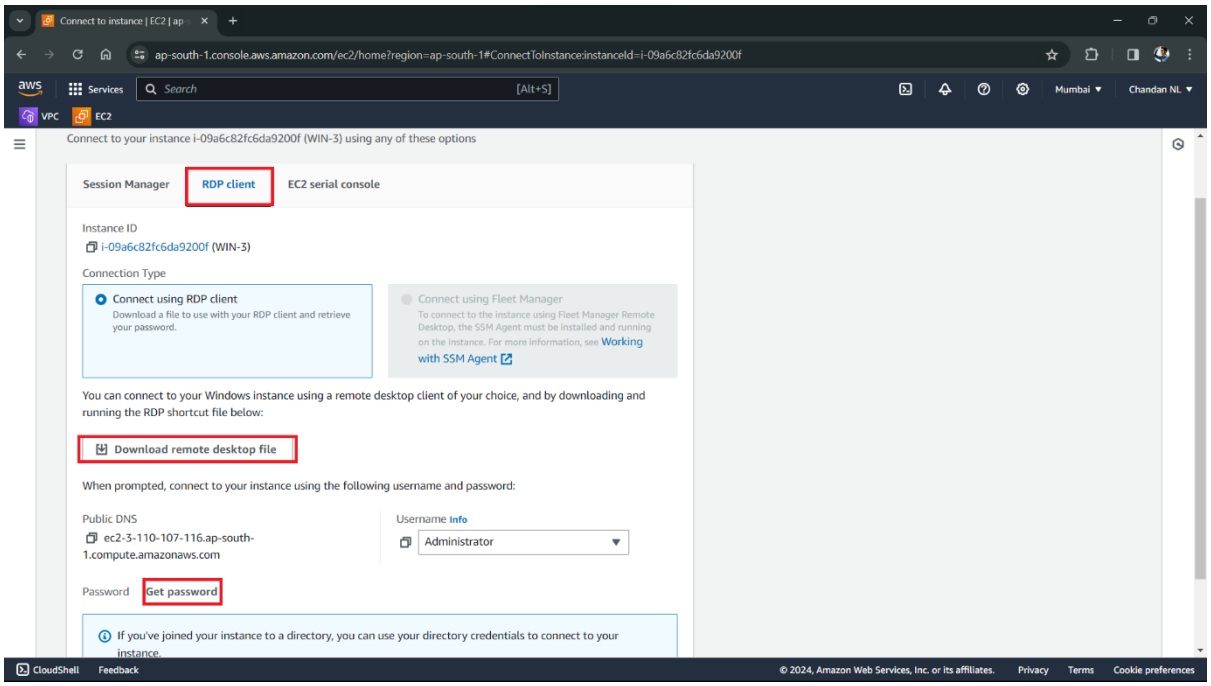
7) EBS Project Set-Up and Demonstration

7.1) Demonstrating the EBS Demo

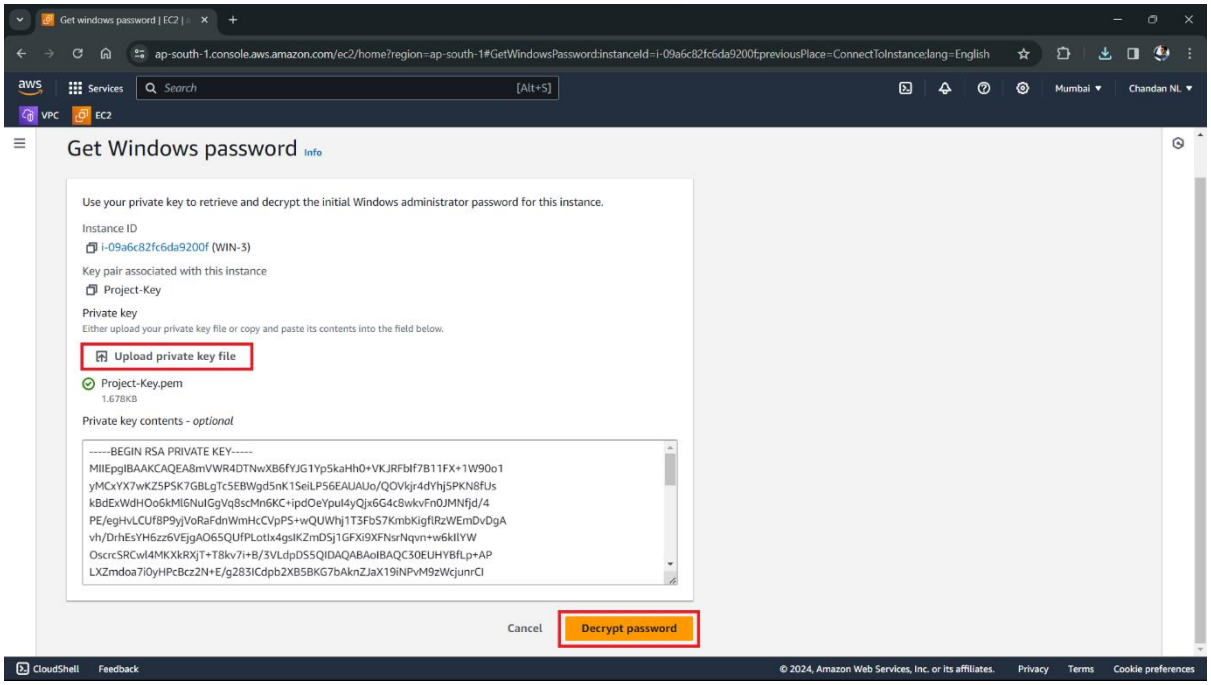
Connect to the Instance (WIN3) through RDP.



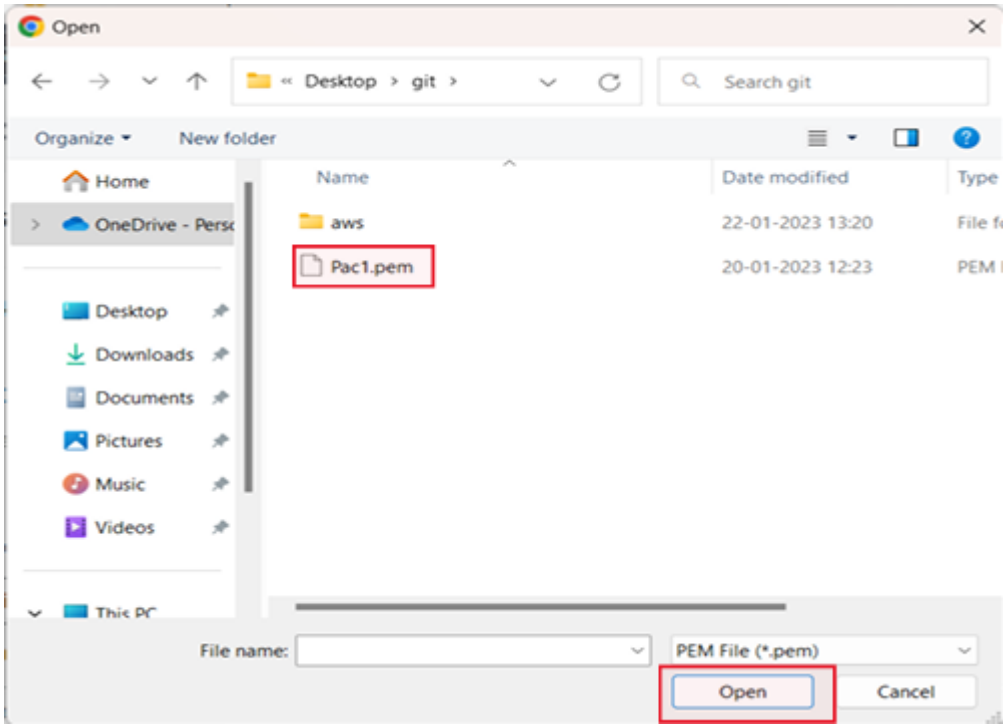
Select RDP Client and download remote desktop file and click on Get password



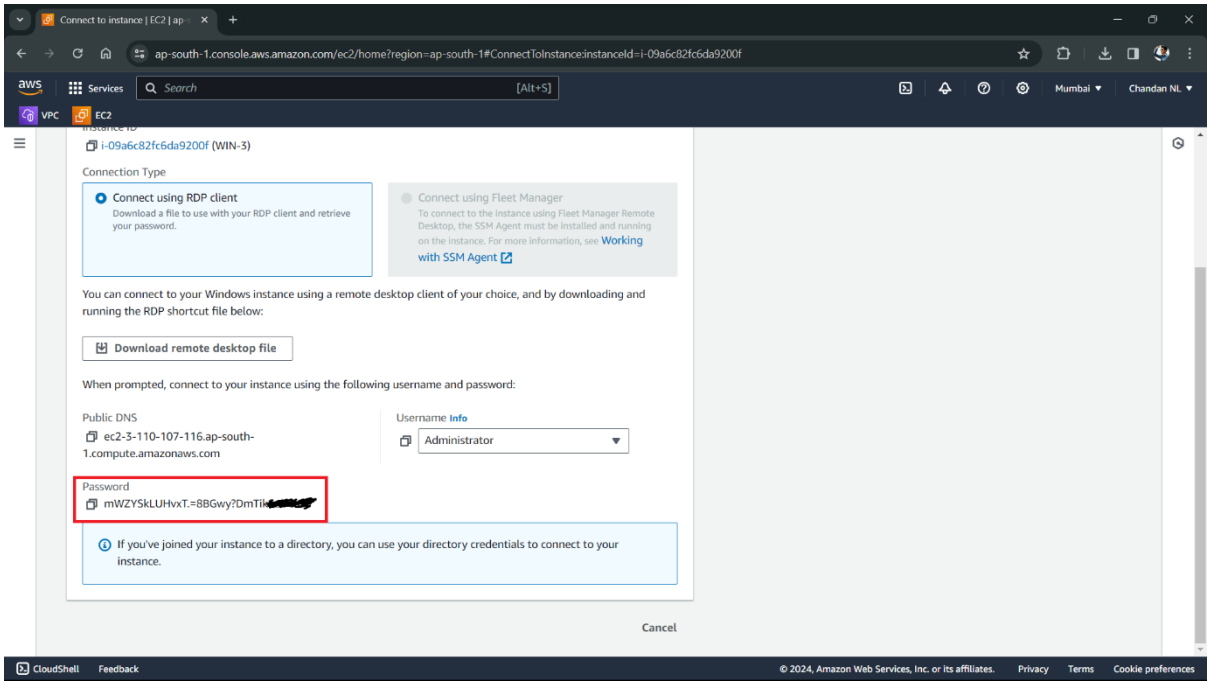
Click on upload private key file to decrypt password and click on decrypt password



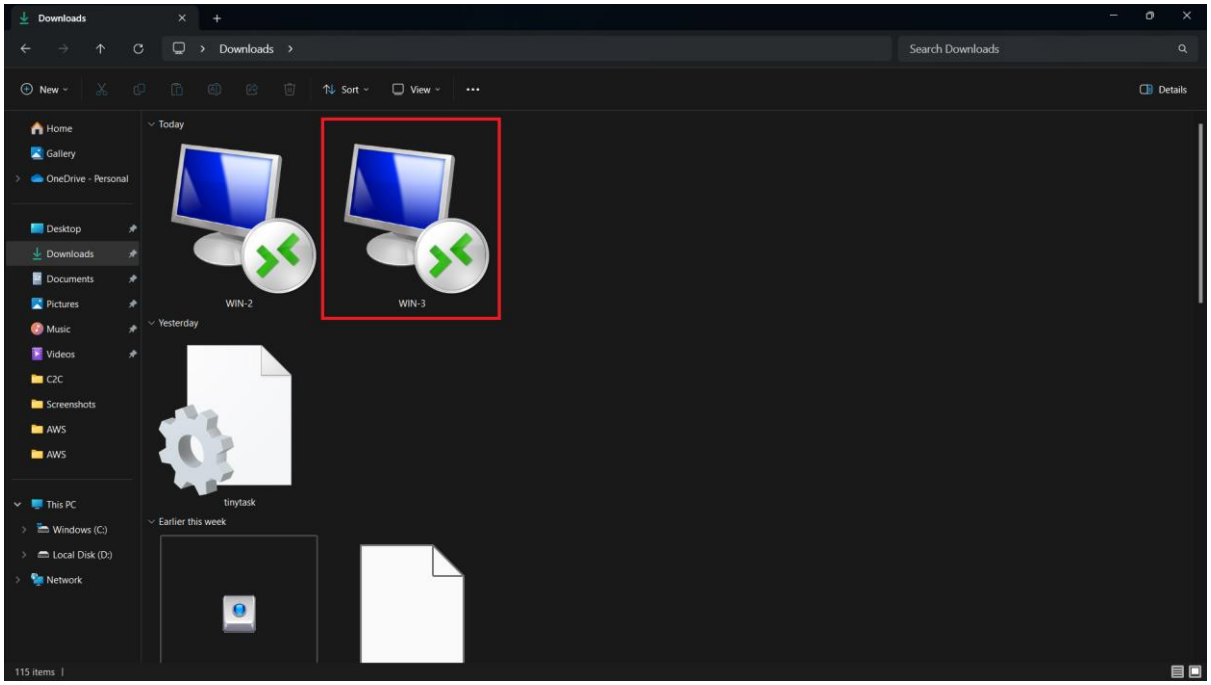
Select your key pair .pem file



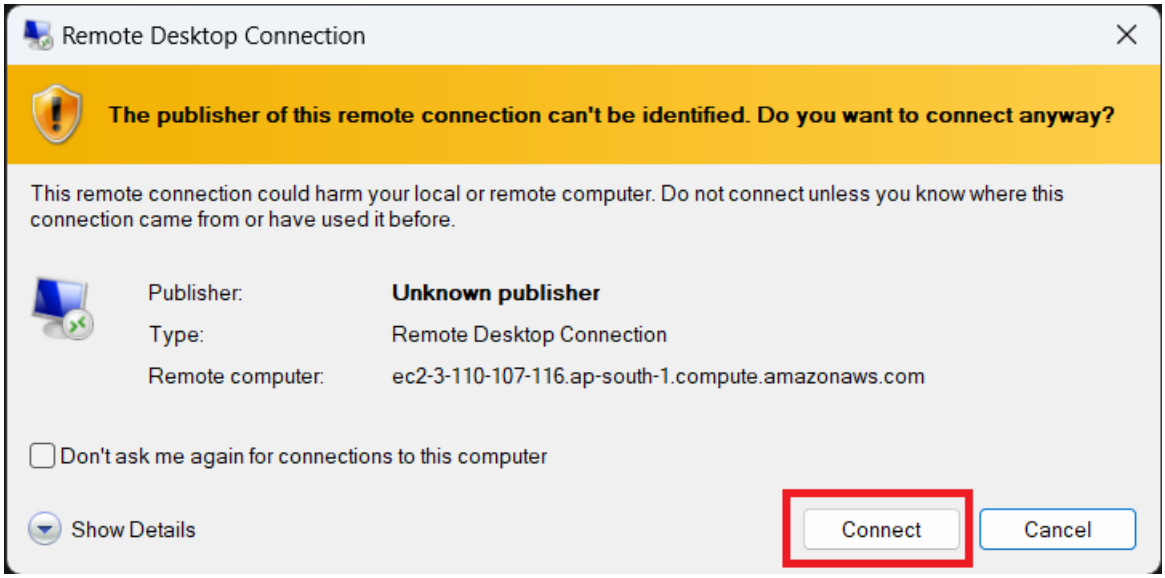
Copy the password



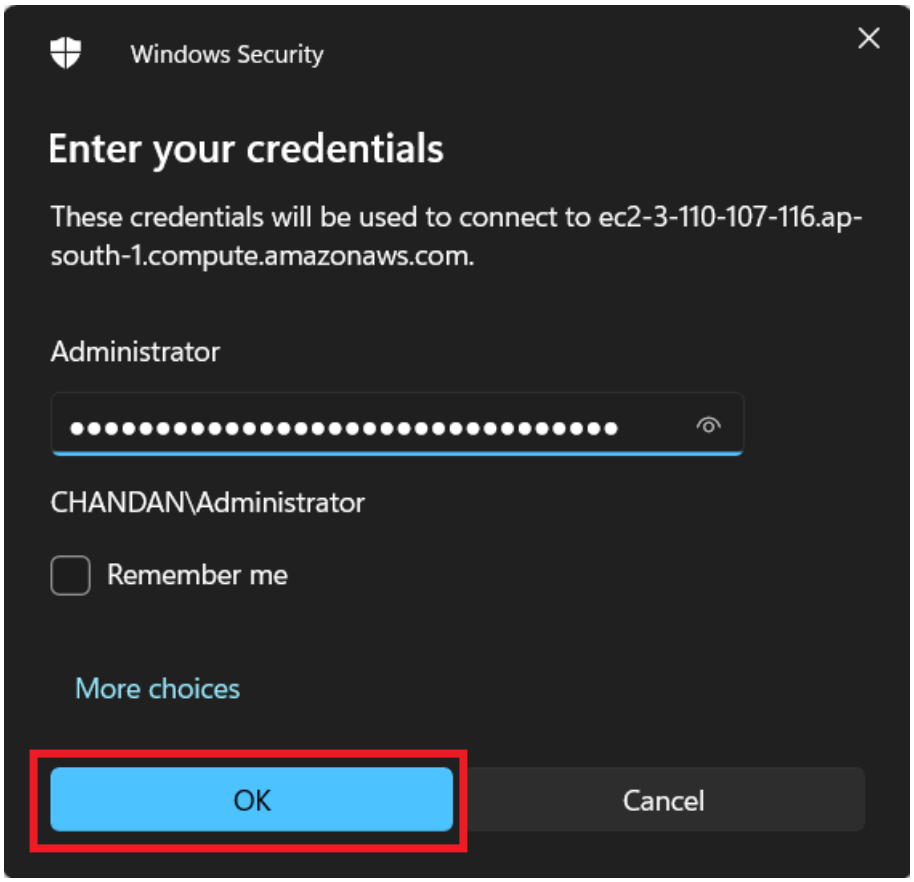
Open your downloaded remote desktop file



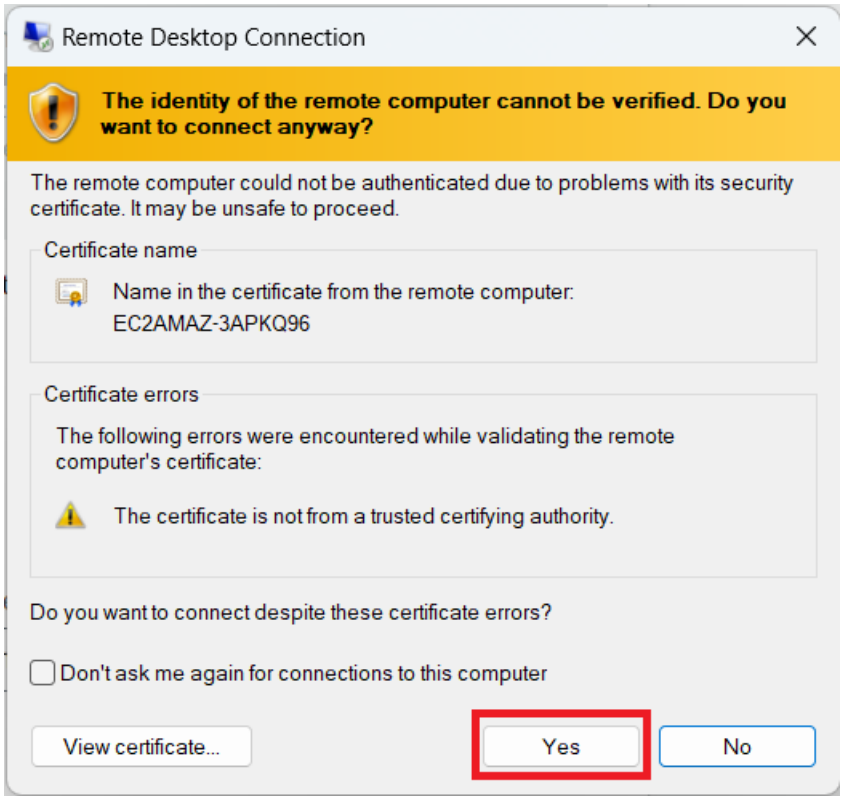
Click on connect



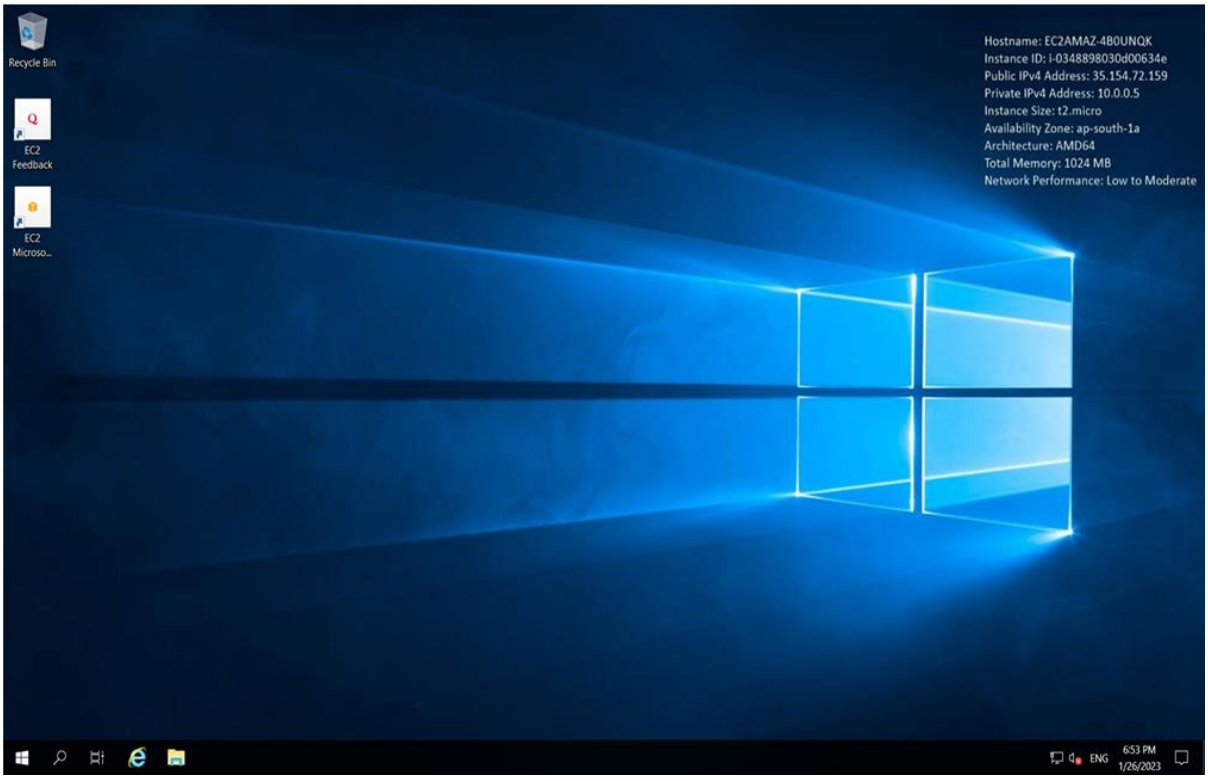
Paste your password and click on ok



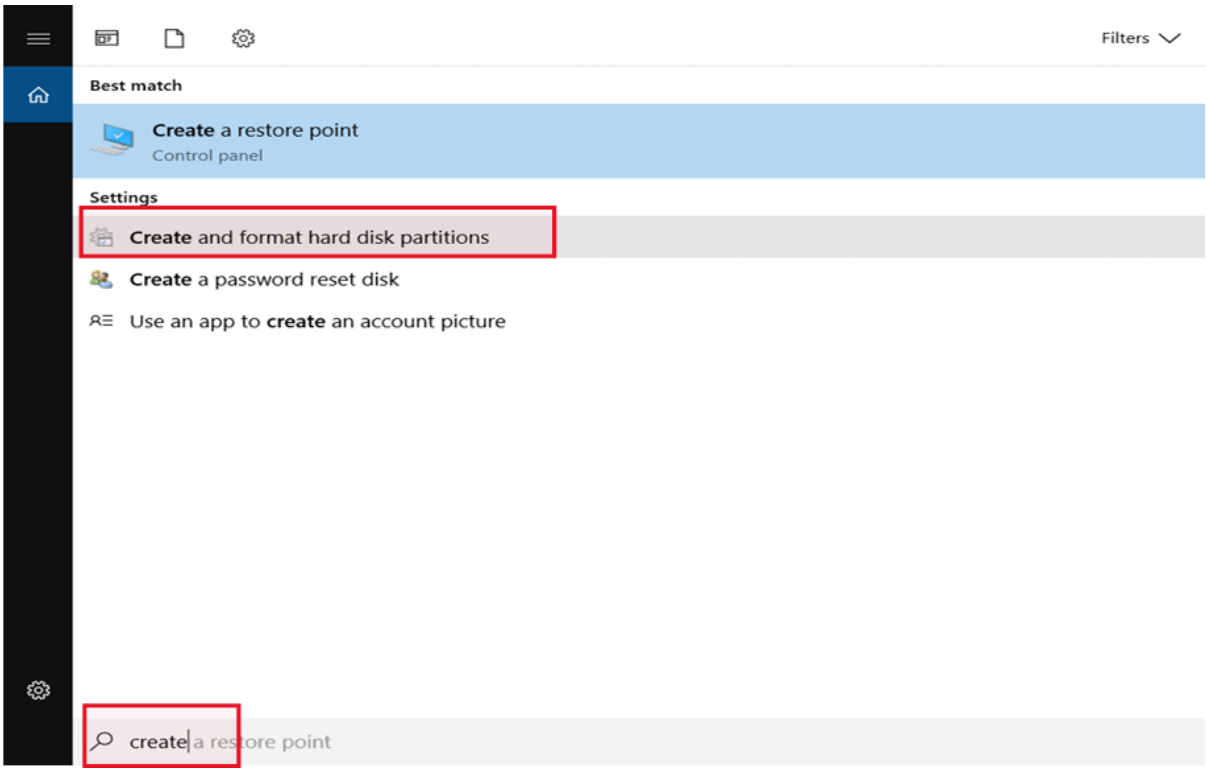
Click on yes to launch your windows EC2 instance



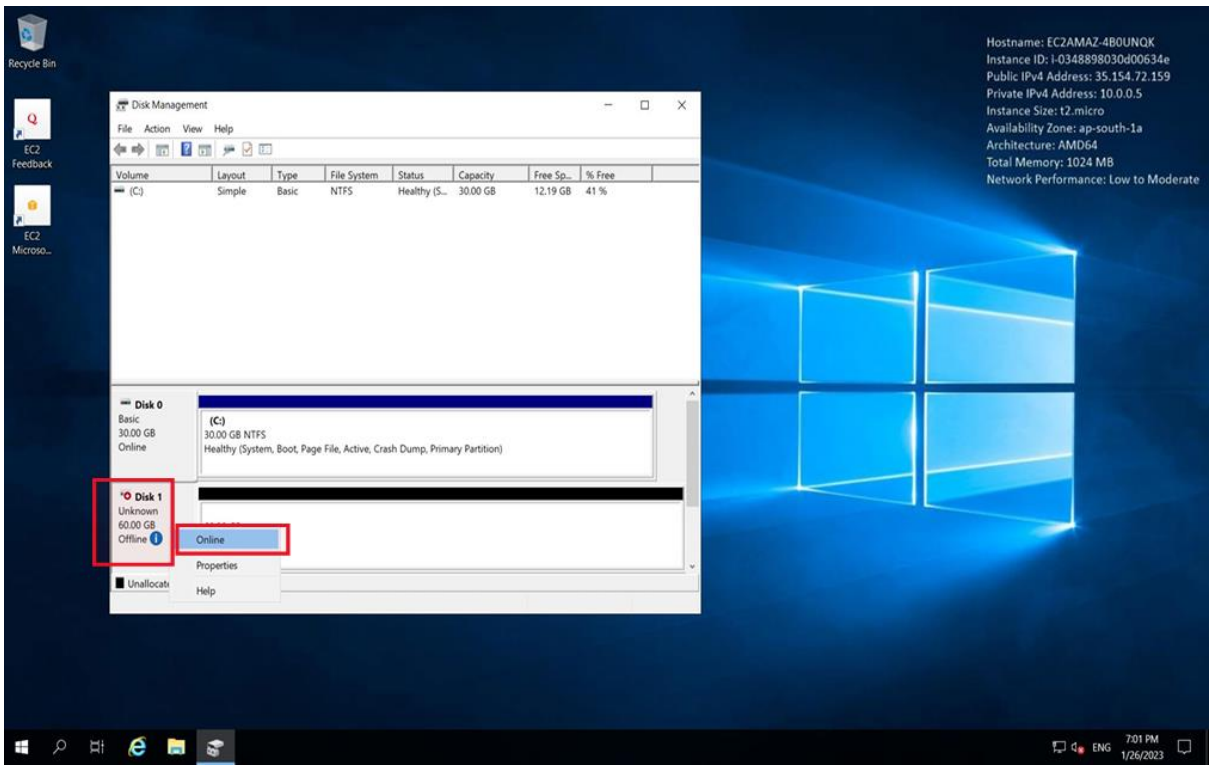
Windows EC2 instance launched



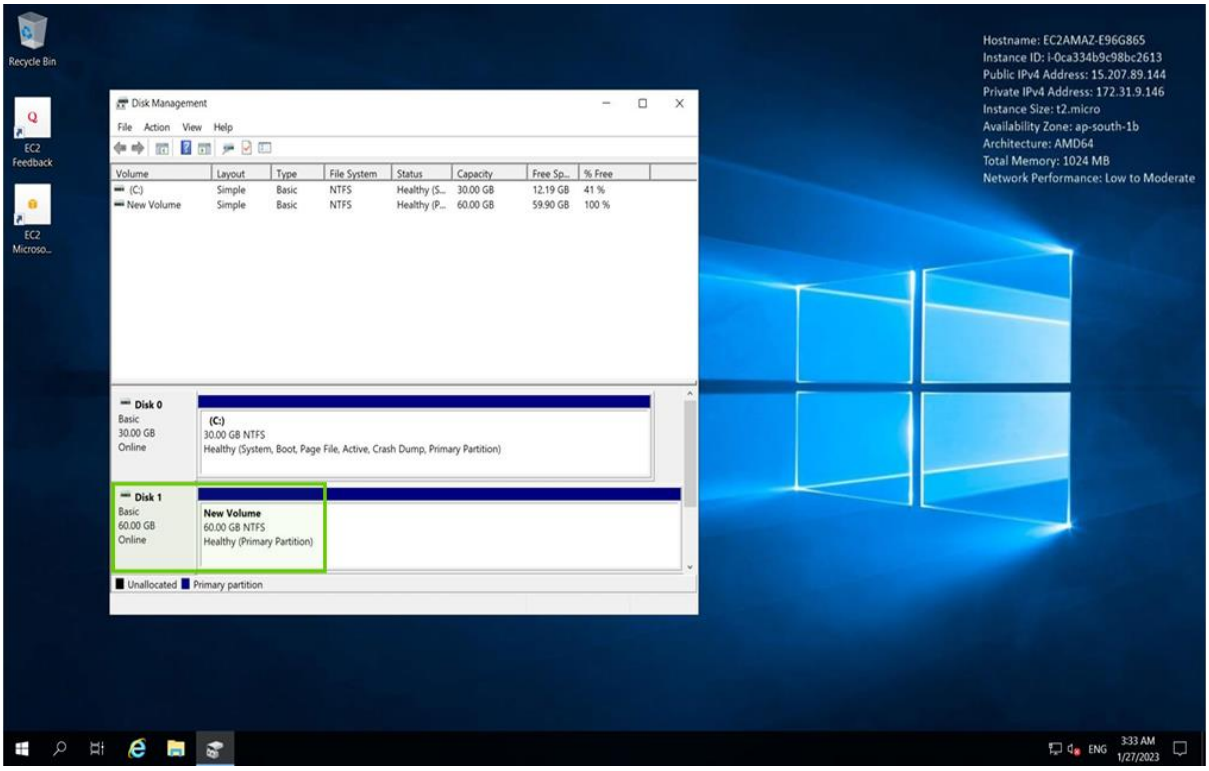
Type “Create and format hard disk partitions” in the Search box and verify that “Disk Management” screen is getting displayed



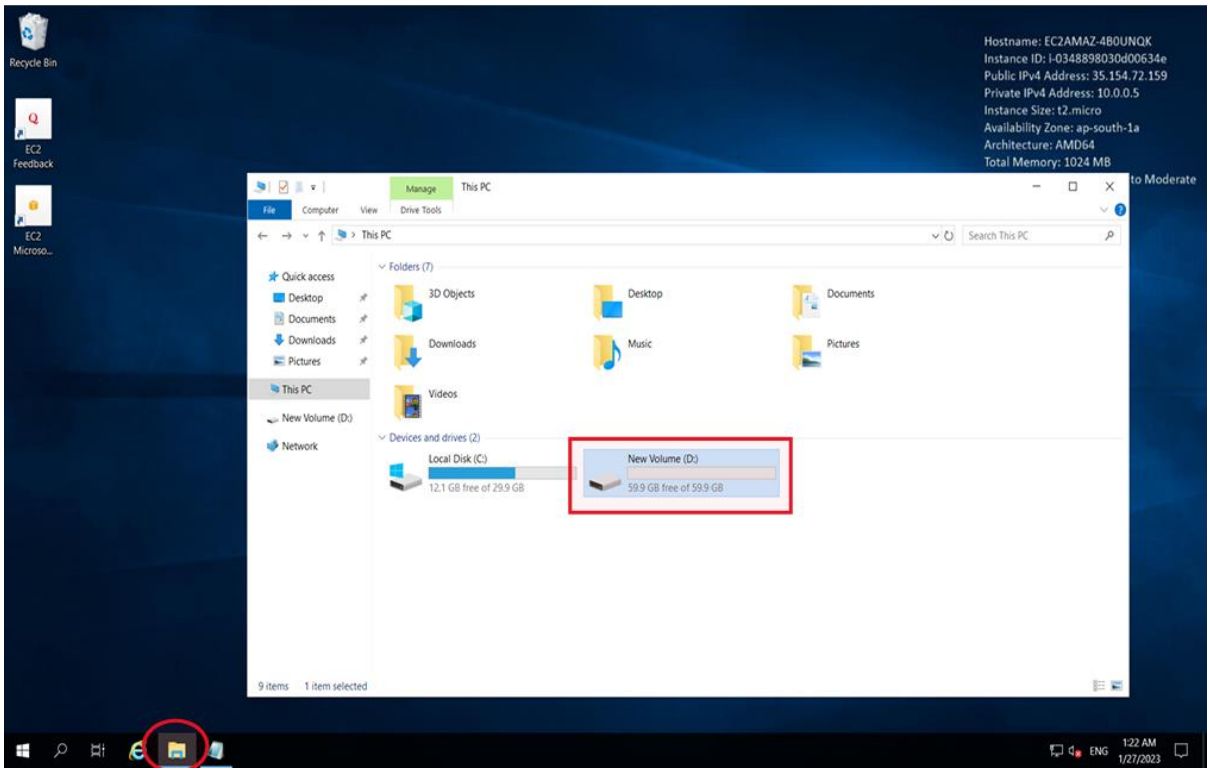
Bring the additional EBS volume “Online”



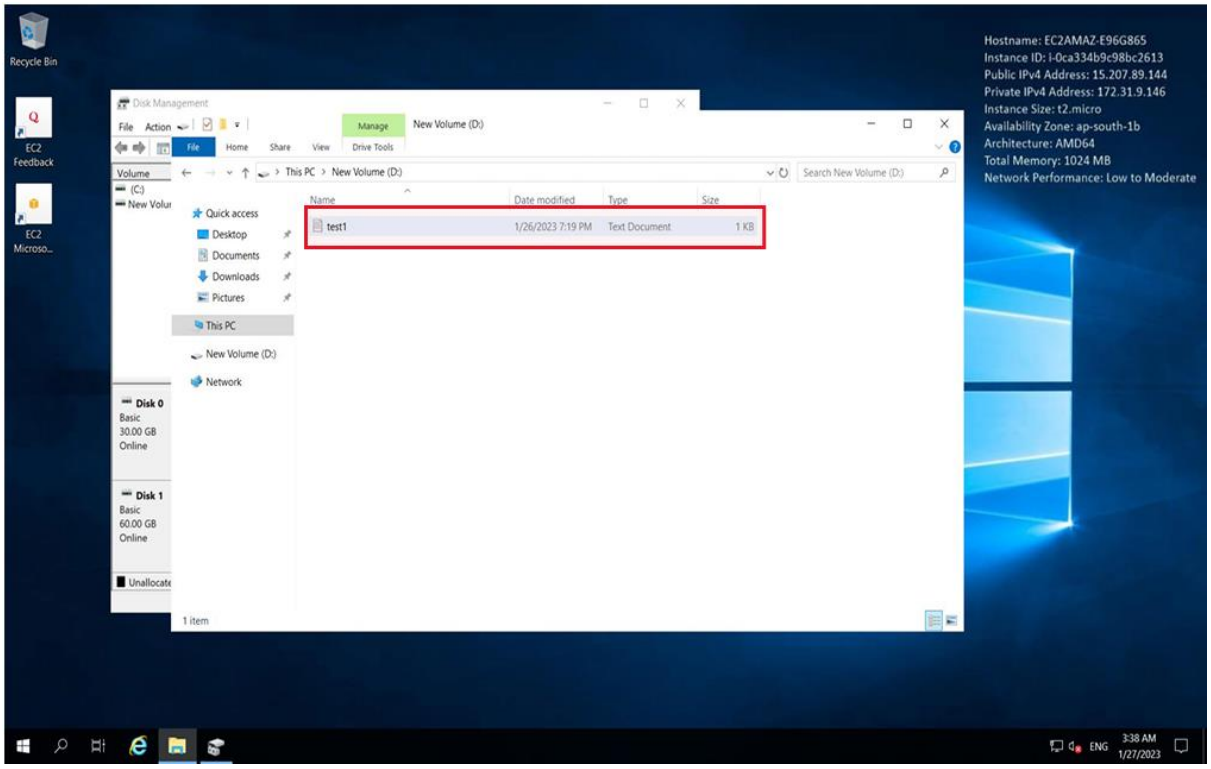
Verify the Disk is online

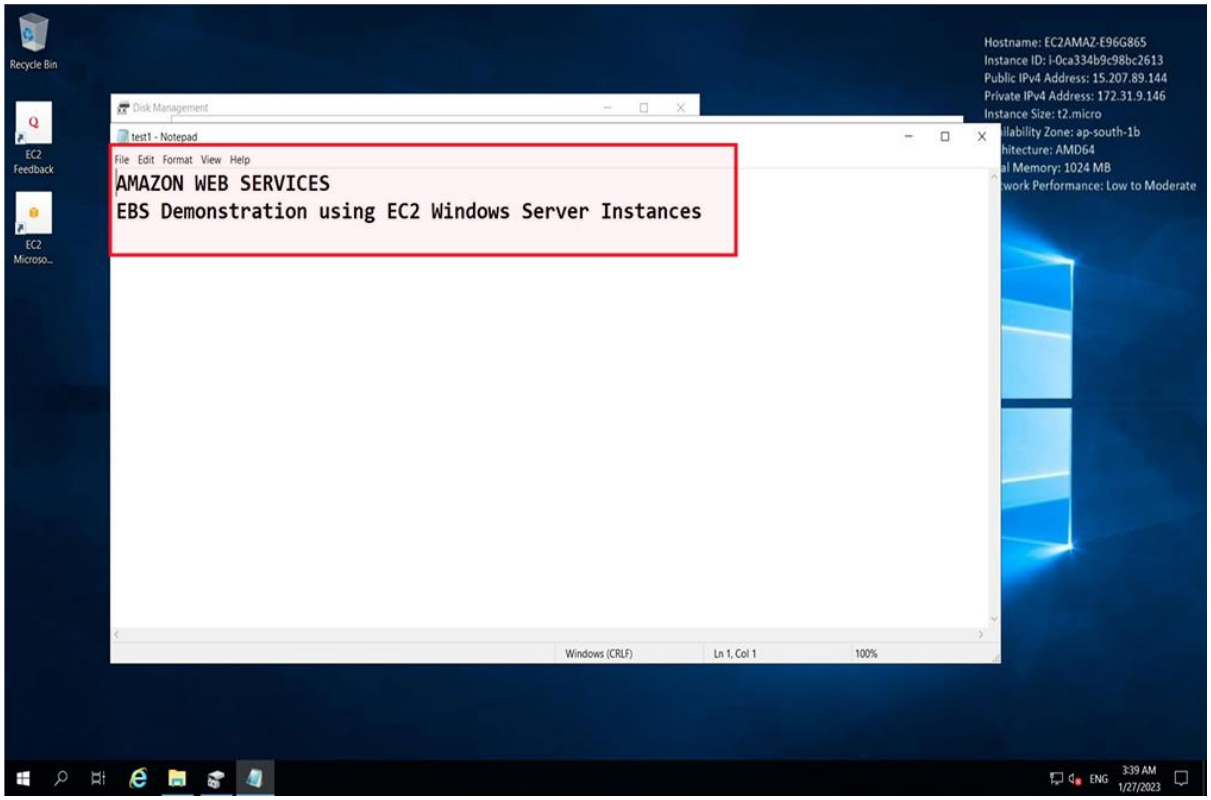


Select "File Explorer" option, select the additional disk attached

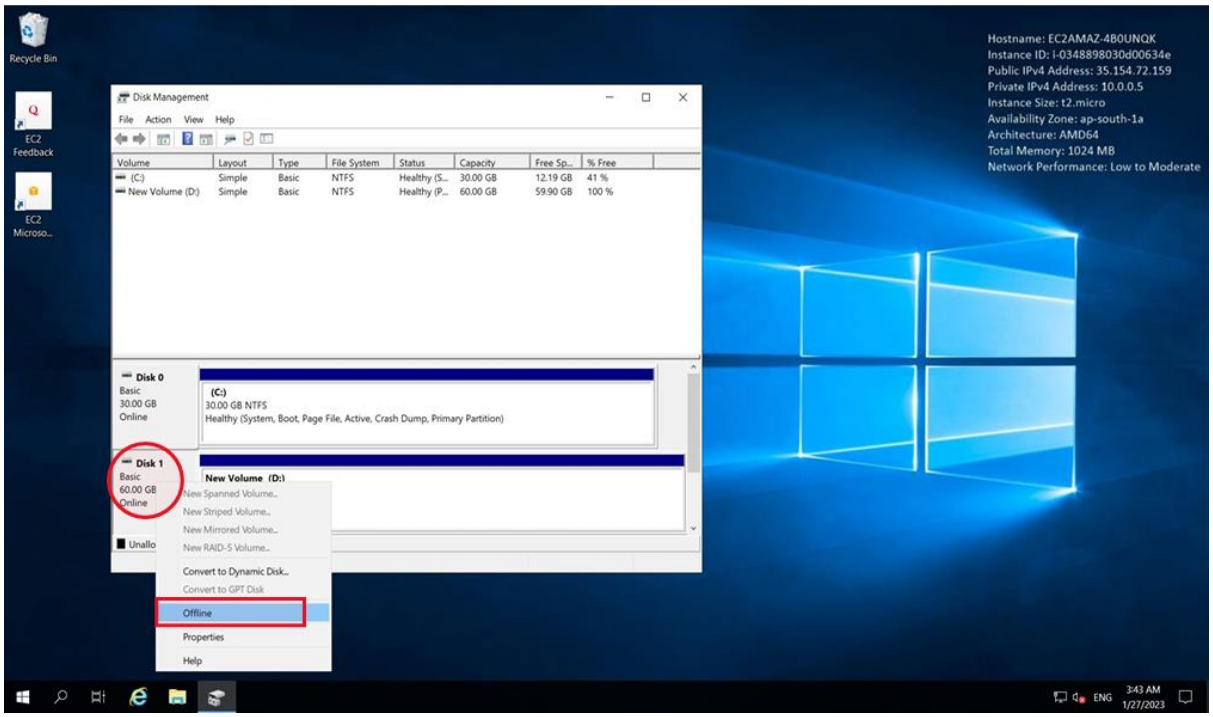


Verify the availability of the text file “test1.txt” and its content

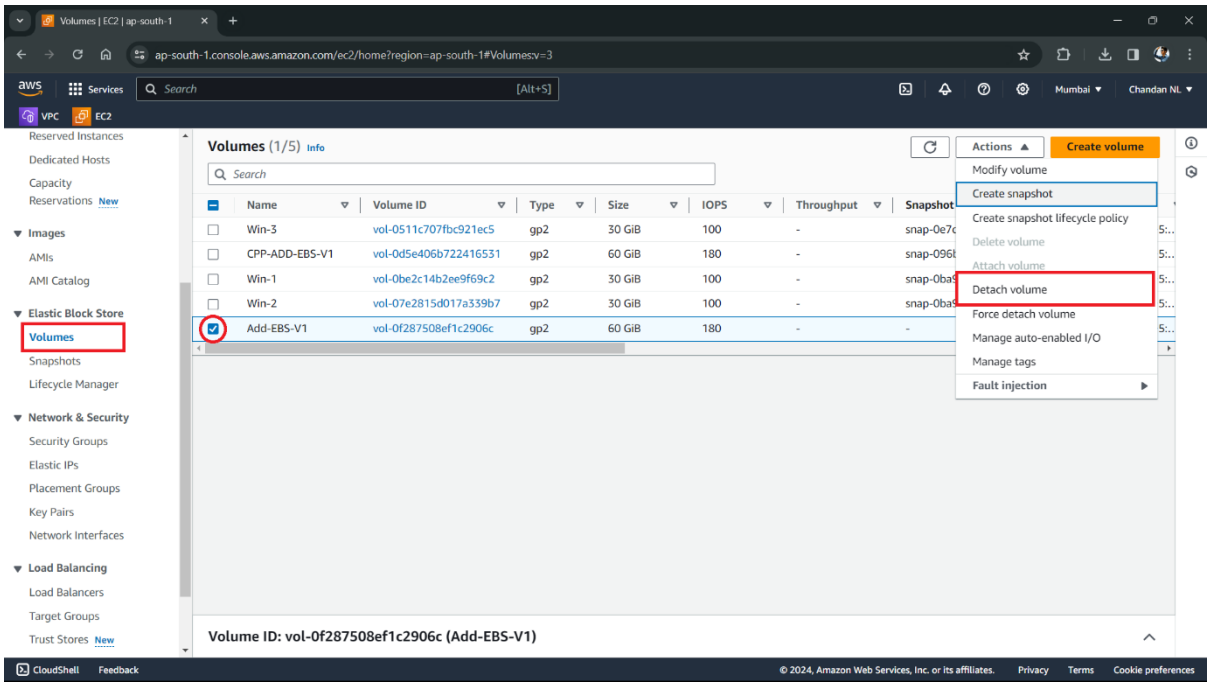




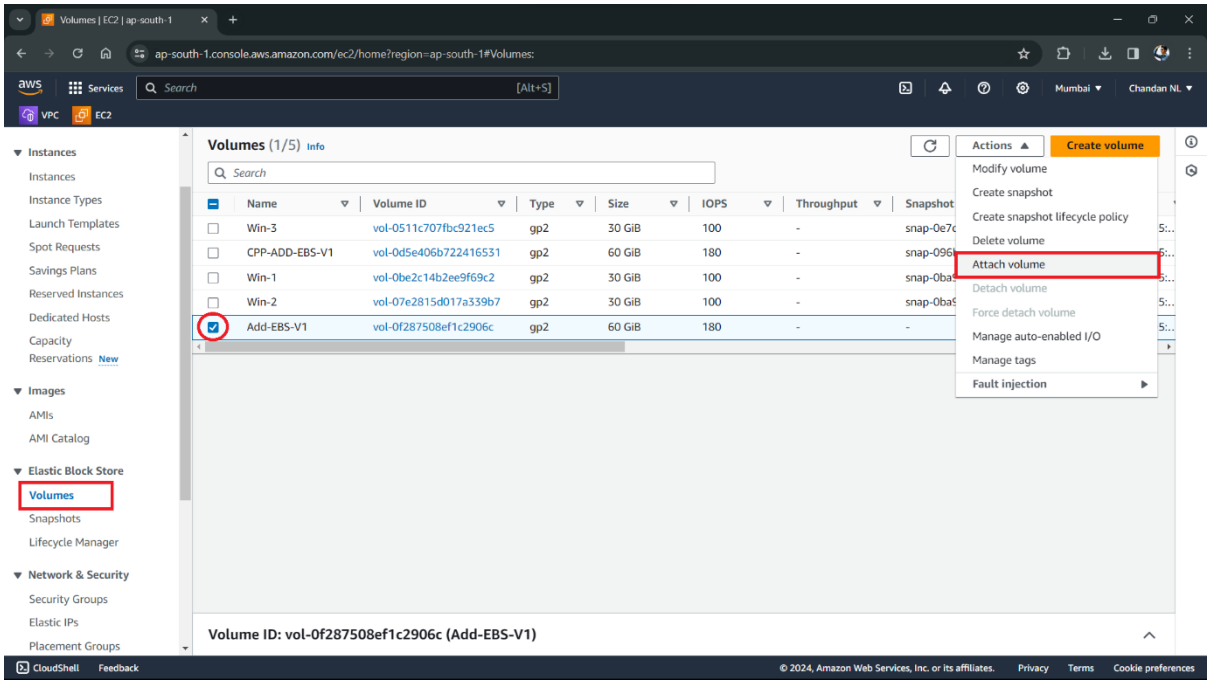
Make the additional disk in the EC2 Instance (WIN1) “offline”



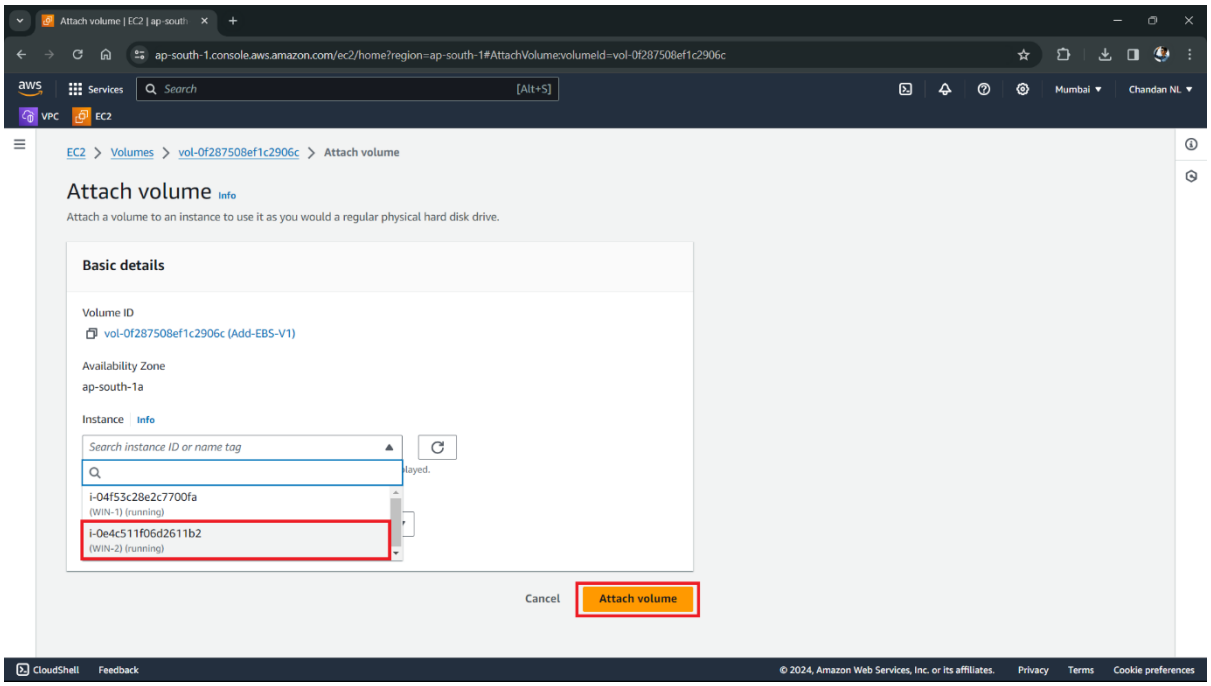
Then detach this volume “AddEBSV1” from the EC2 Instance (WIN01)



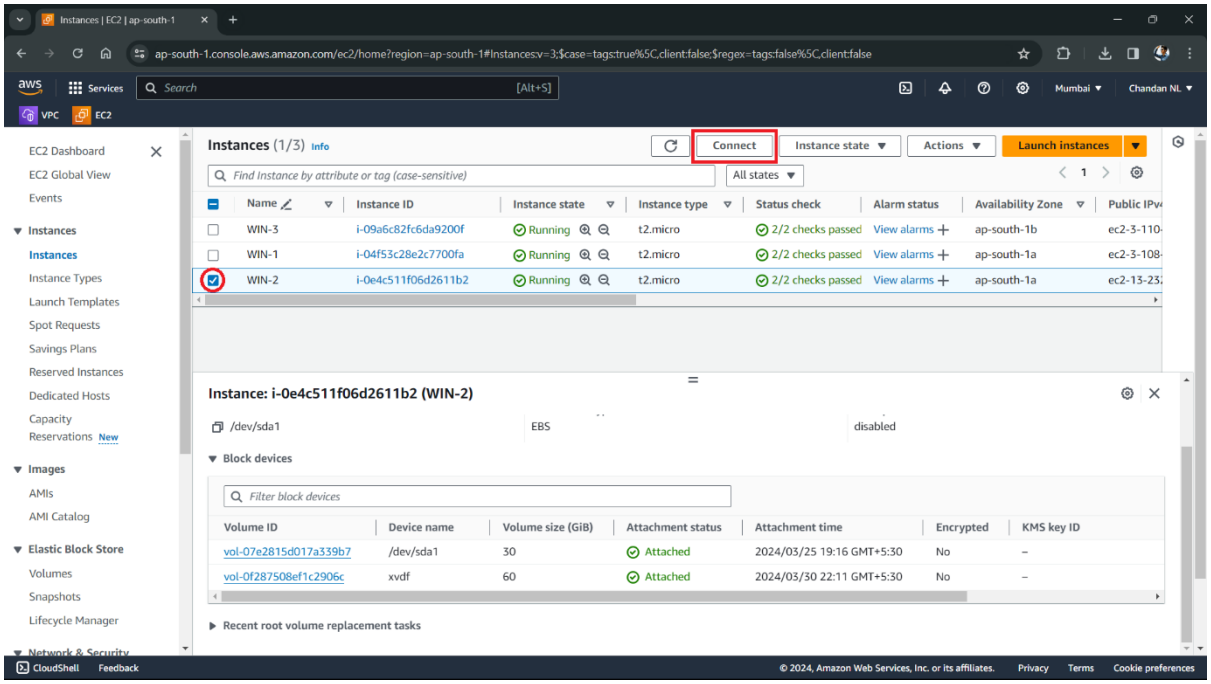
7.2) Now, attach this volume “AddEBSV1” to the EC2 Instance (WIN2) which is in AZ “1a”



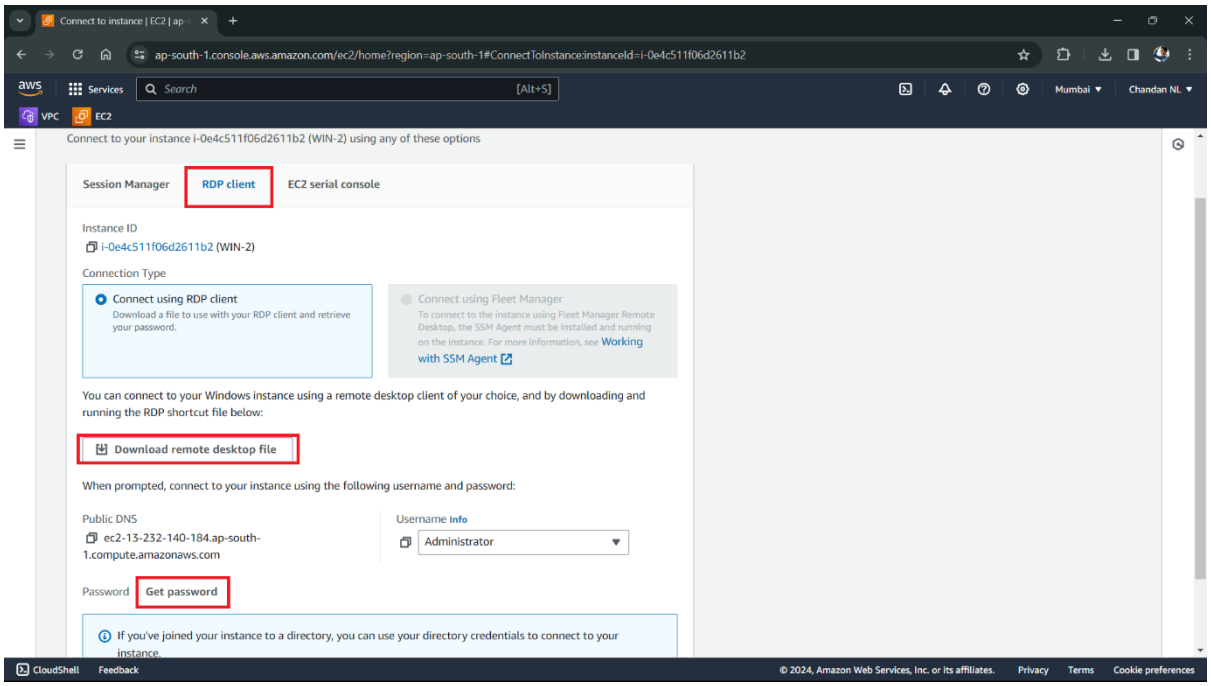
Select EC2 instance “WIN2” in Availability zone “1a” and attach volume



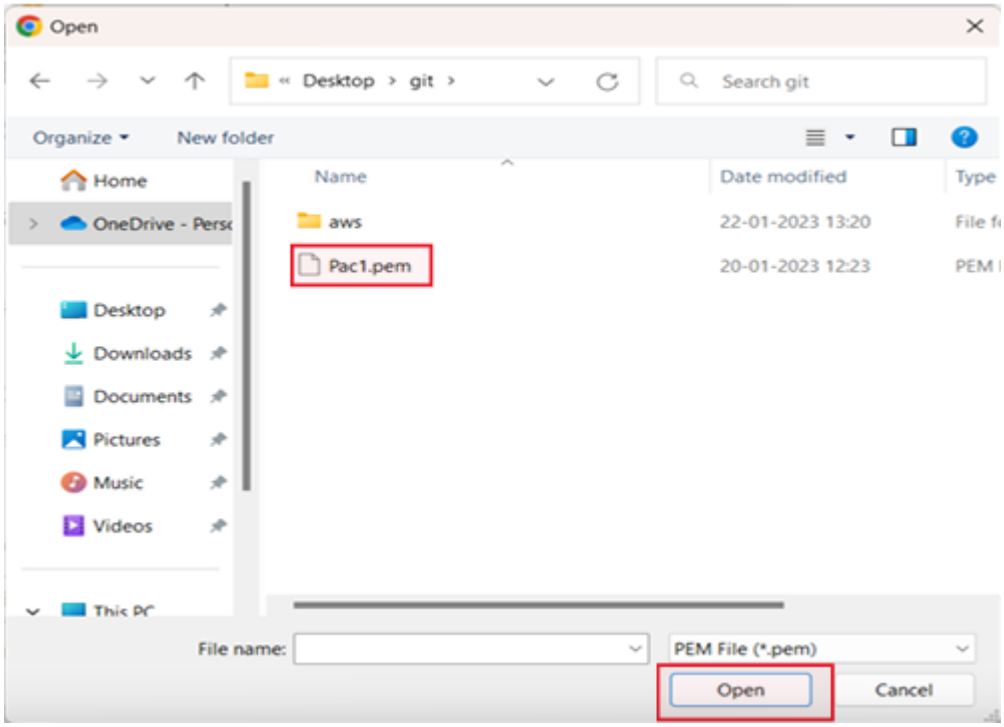
7.3) Connect to the Instance (WIN2) through RDP



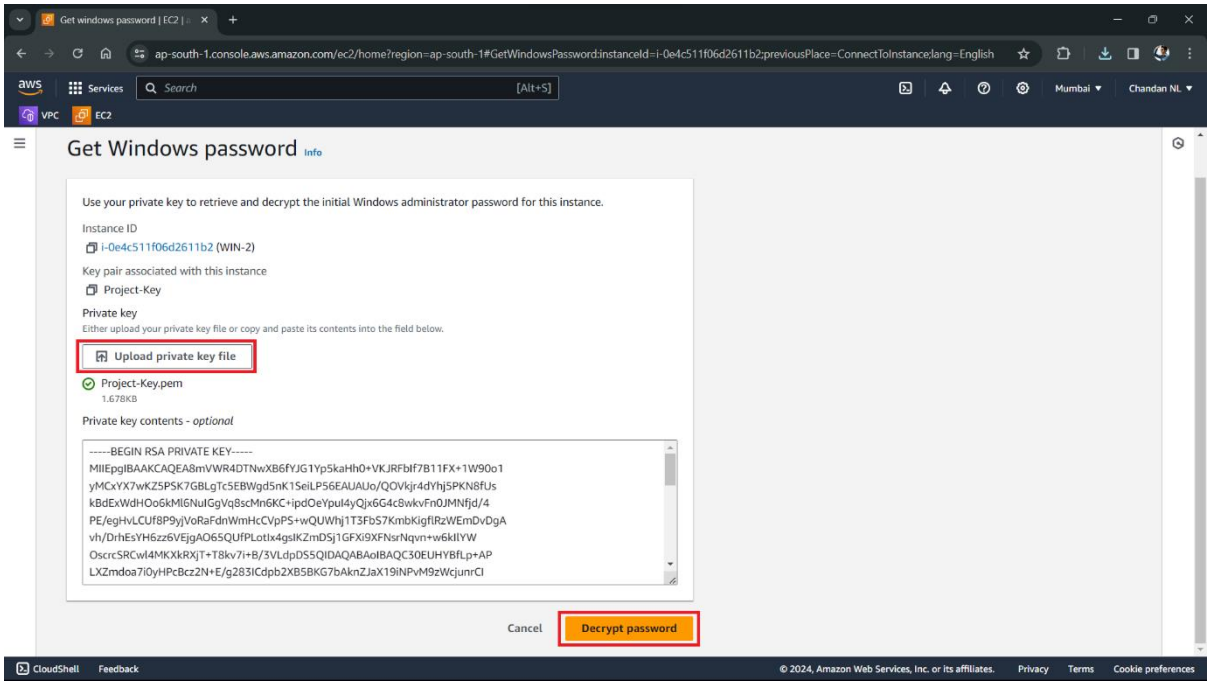
Select RDP Client and download remote desktop file and click on Get password



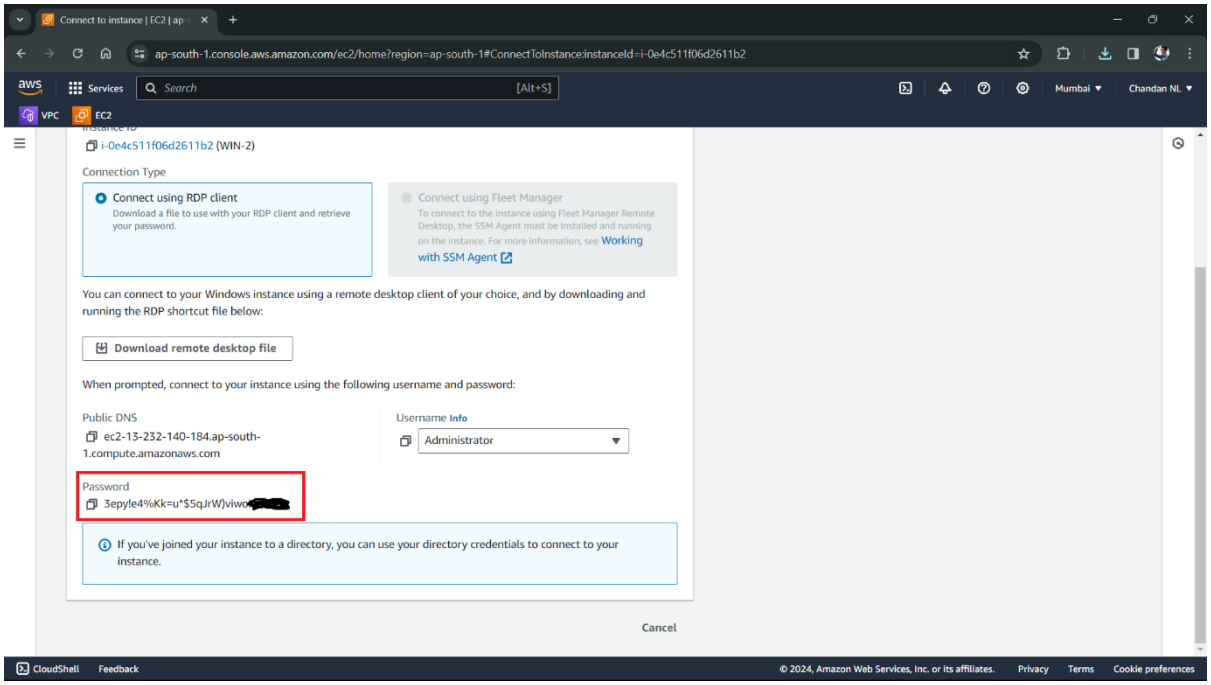
Select your key pair .pem file



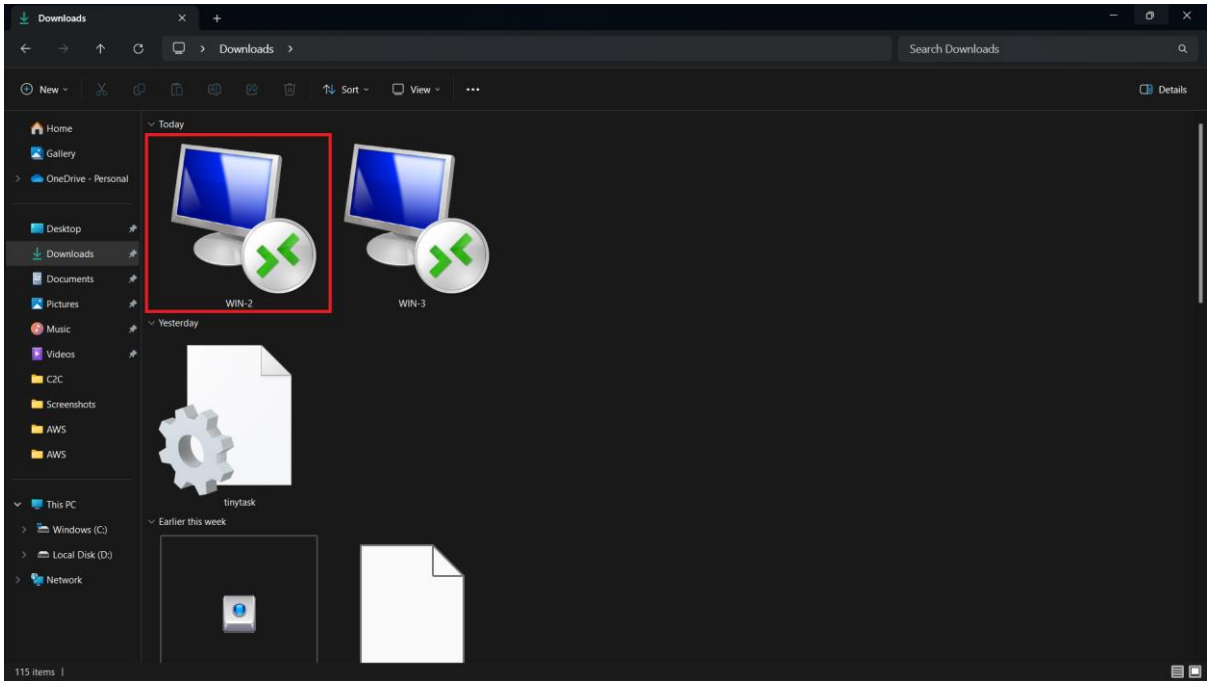
Click on upload private key file to decrypt password



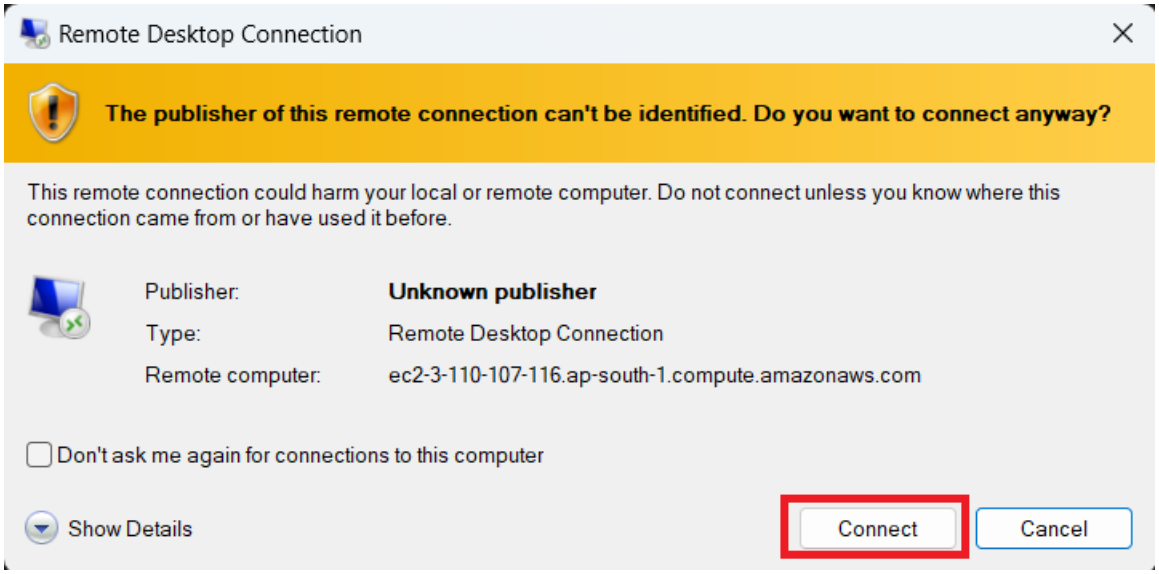
Copy the password



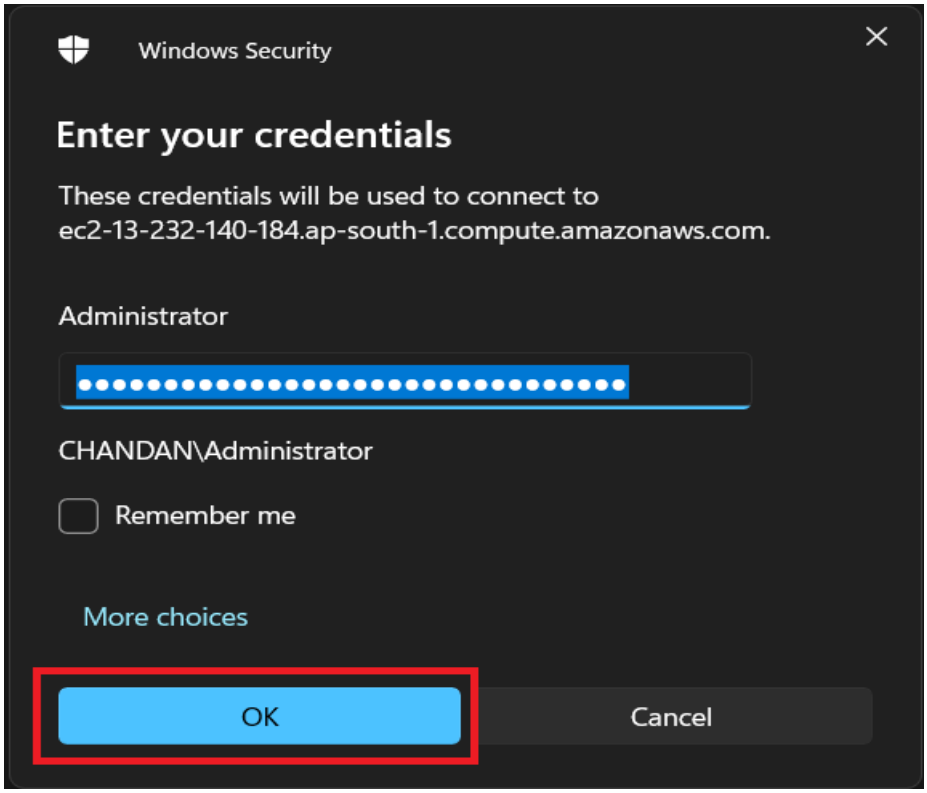
Open your downloaded remote desktop file



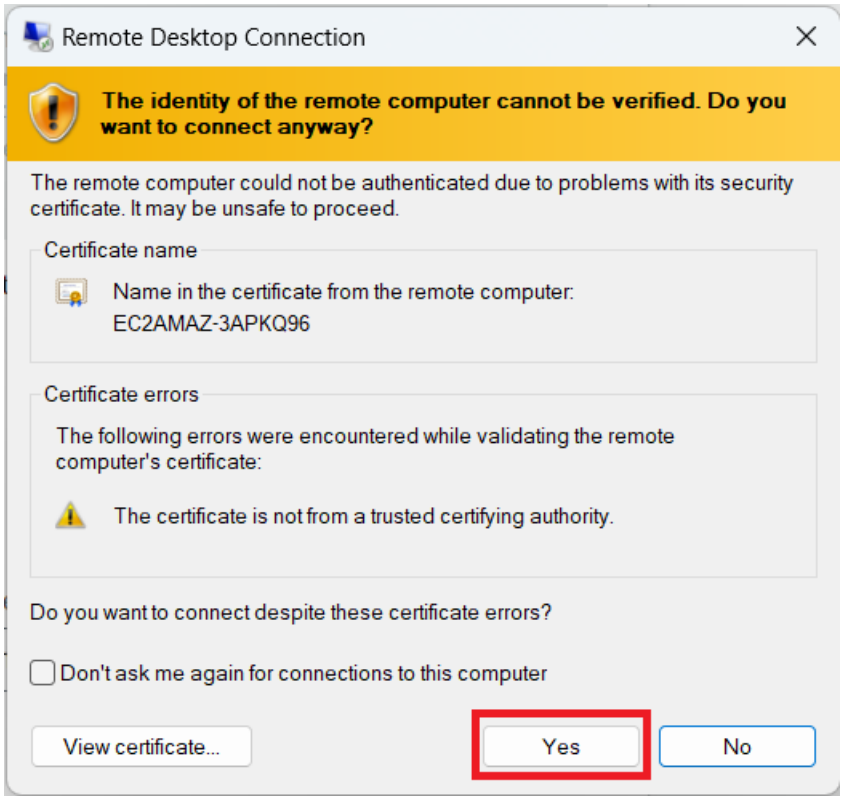
Click on connect



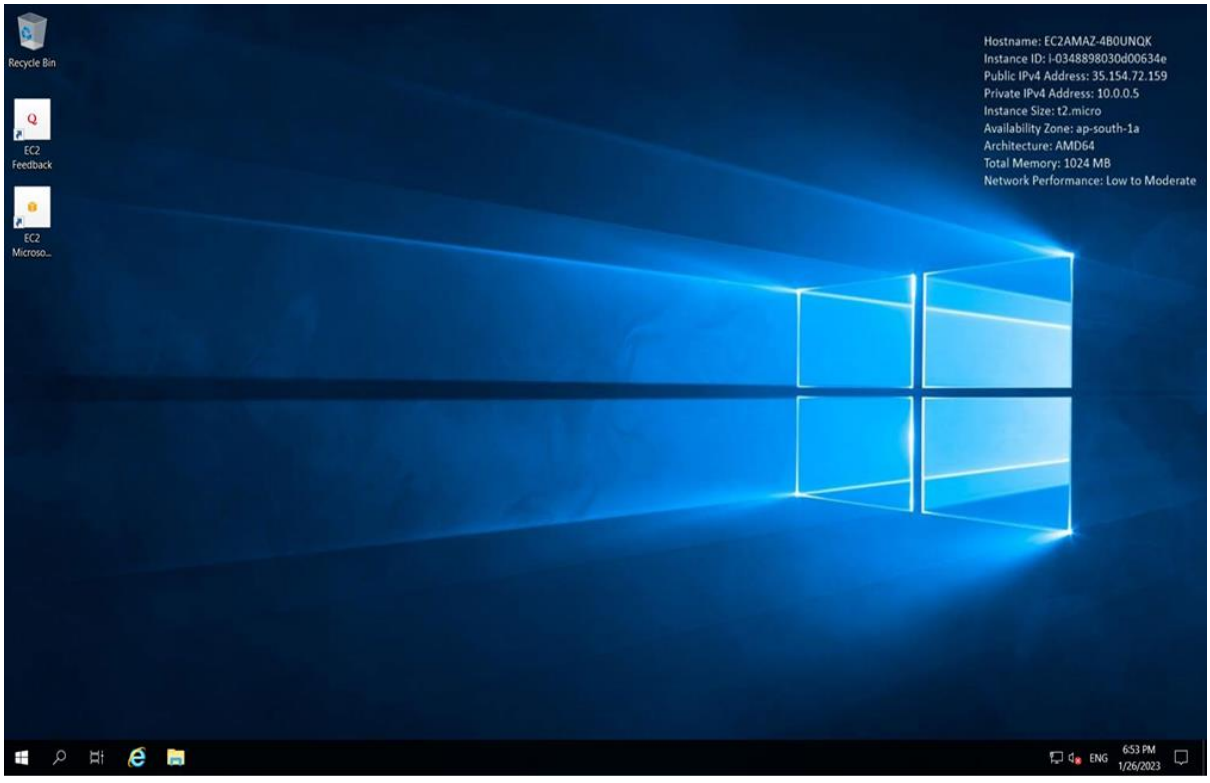
Paste your password and click on ok



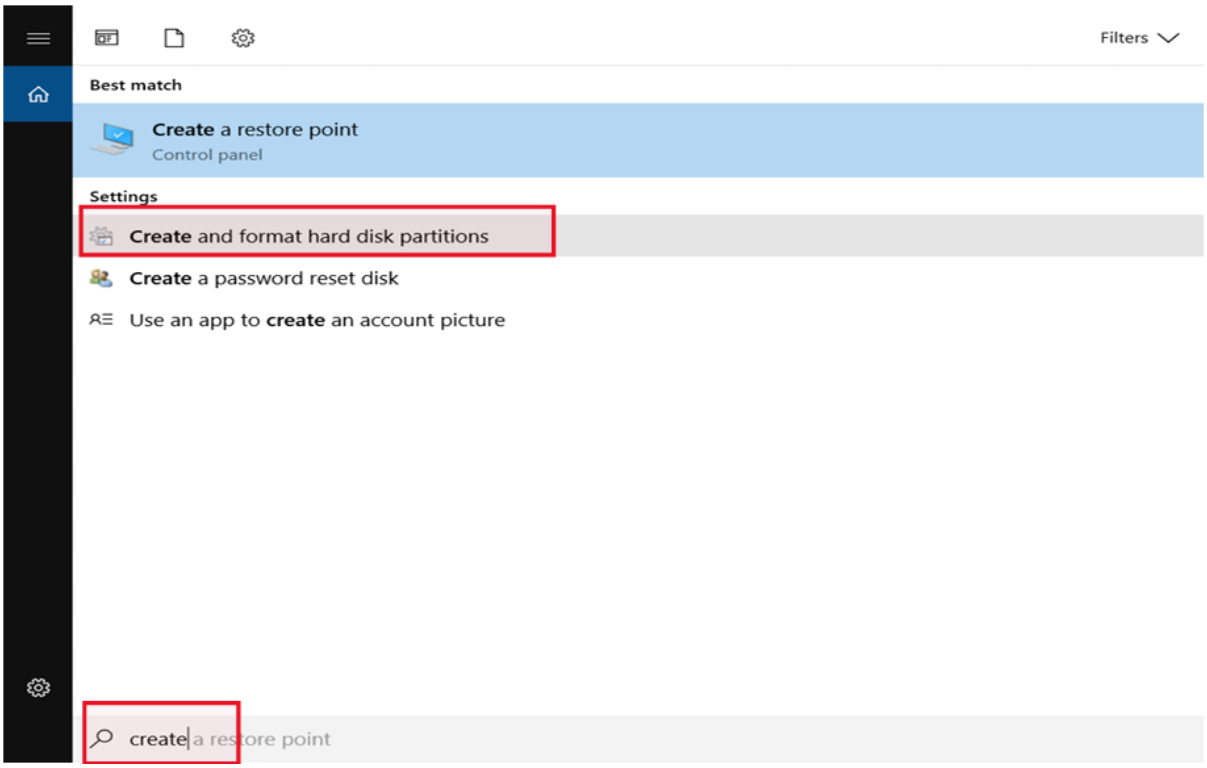
Click on yes to launch your windows EC2 instance



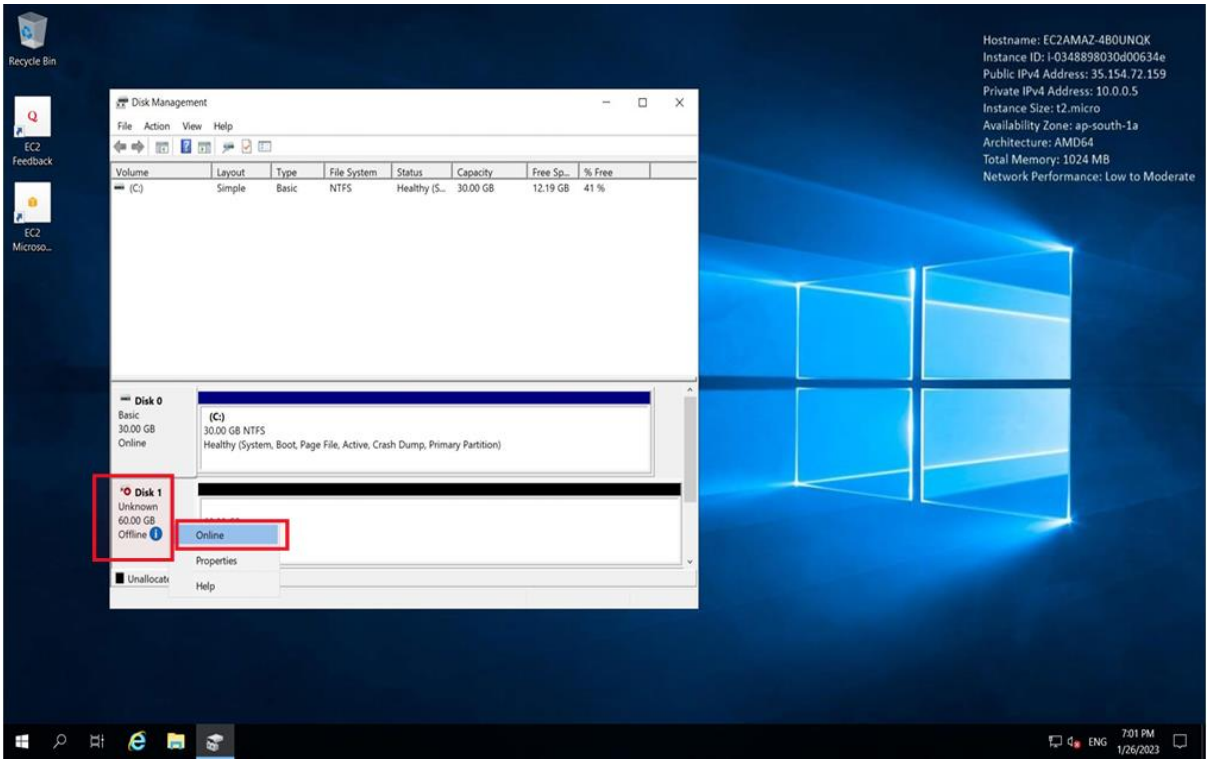
Windows EC2 instance launched



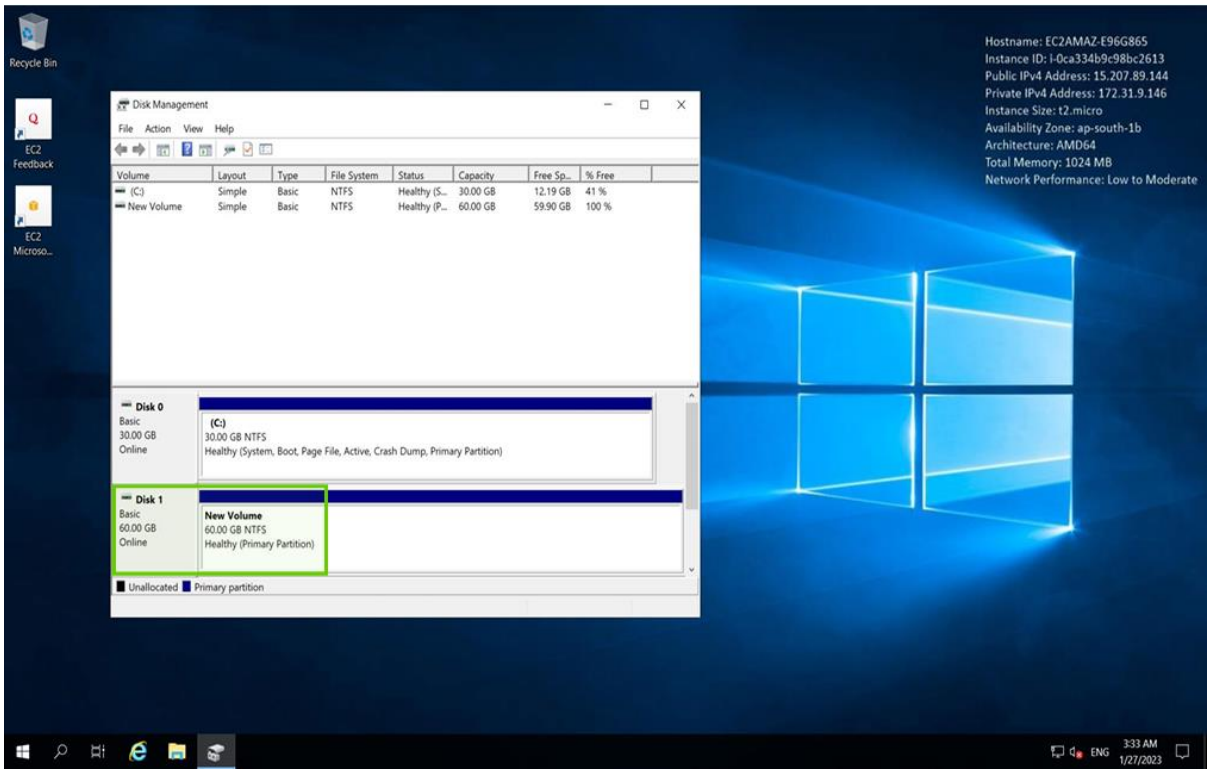
7.4) Type “Create and format hard disk partitions” in the Search box and bring the additional EBS volume “Online”



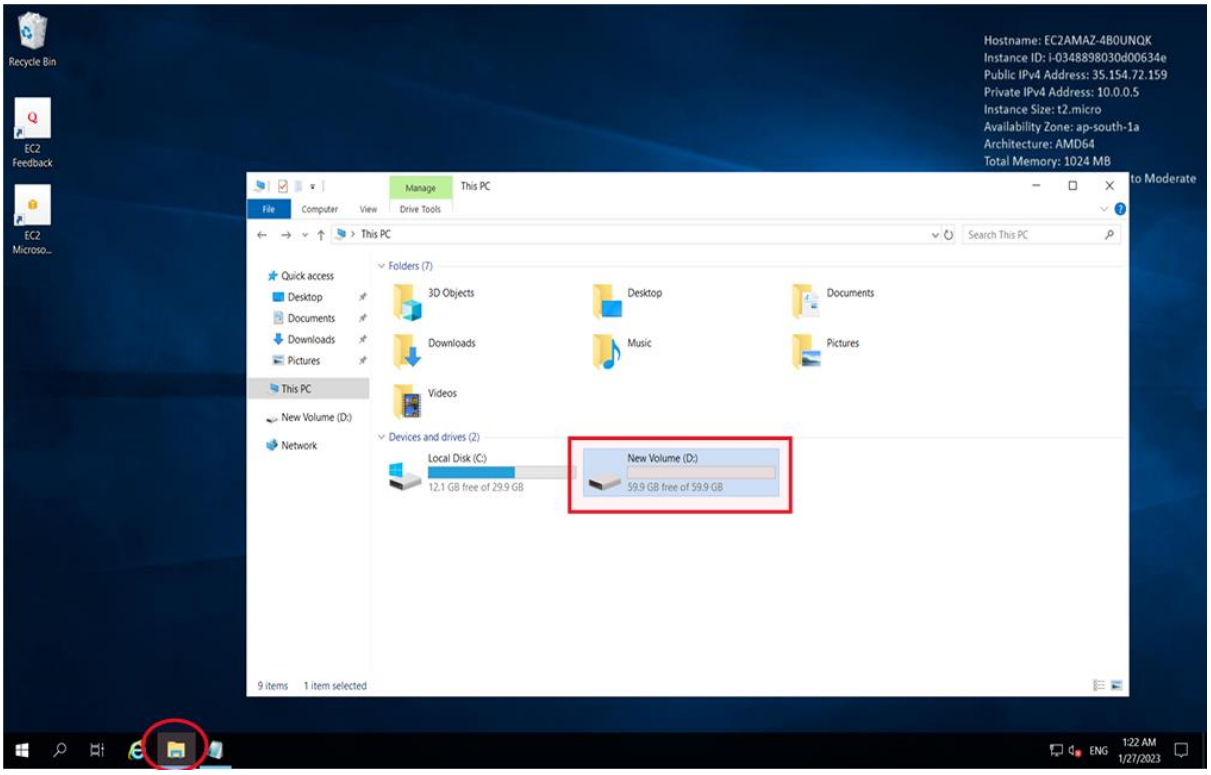
Bring the additional EBS volume “Online”



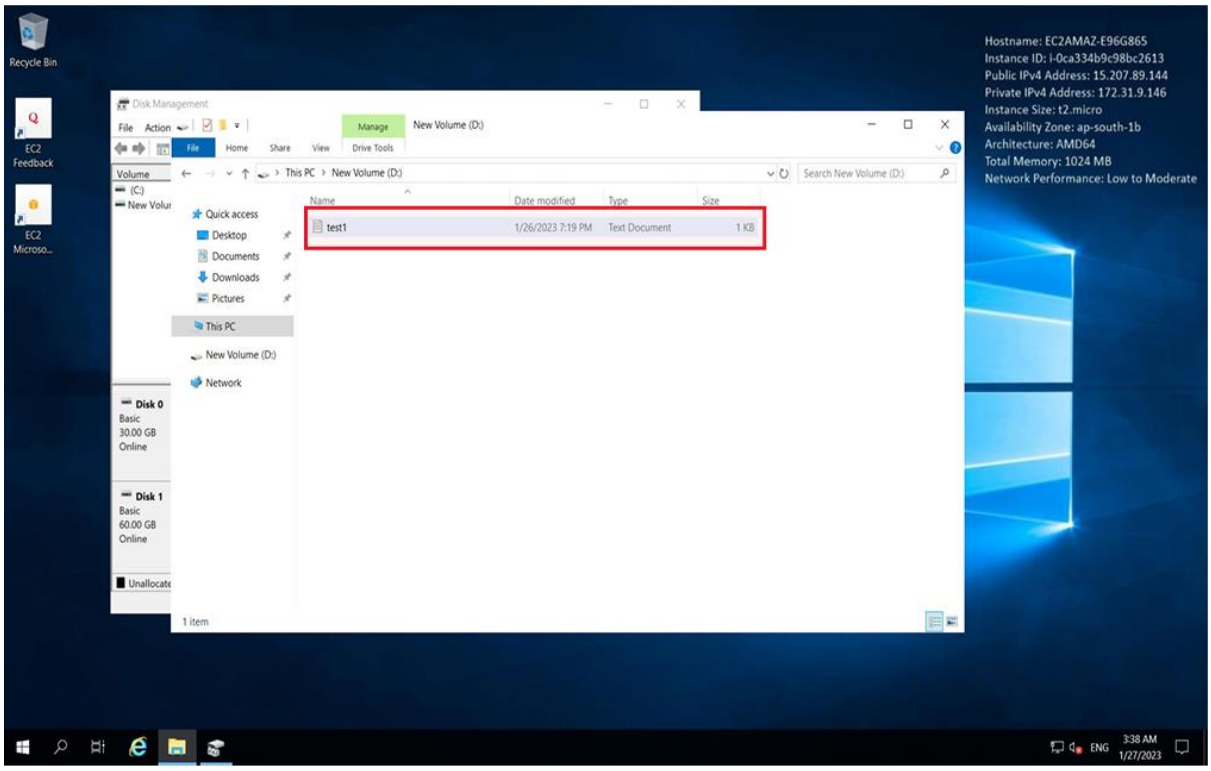
Verify the Disk is online

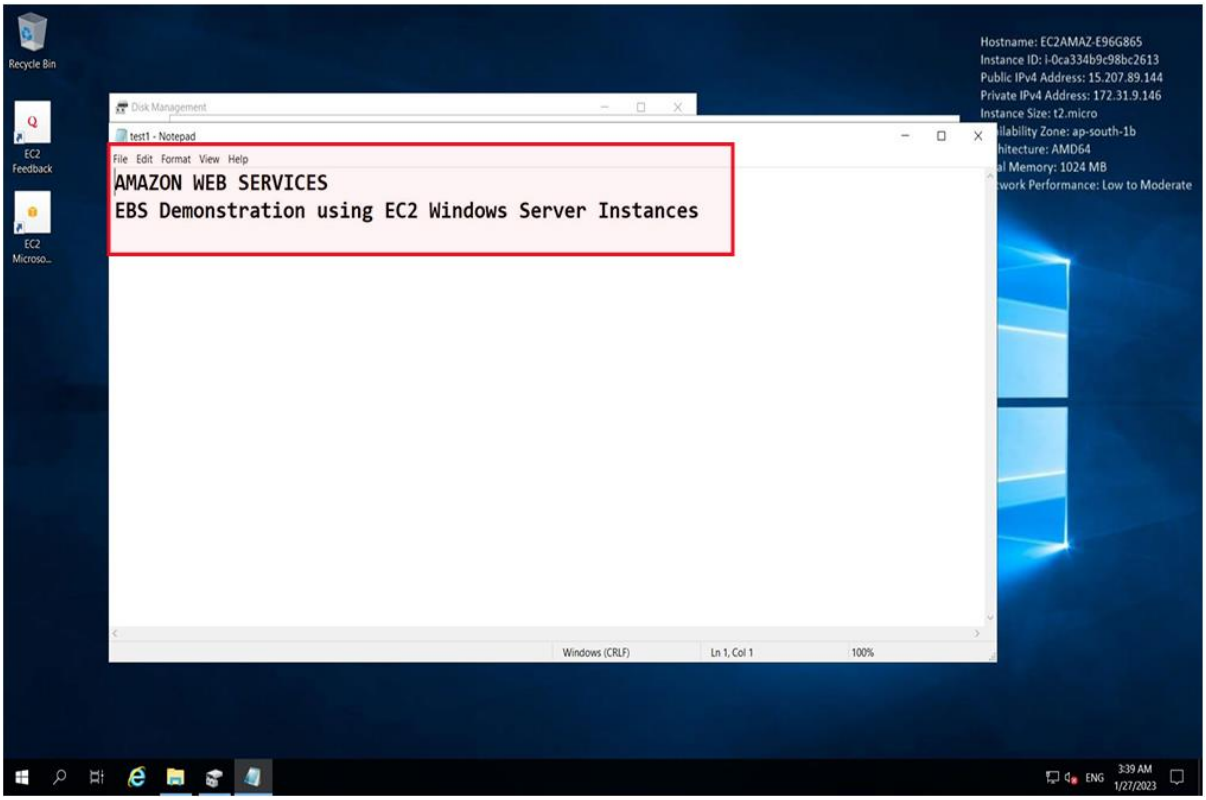


Select "File Explorer" option, select the additional disk attached



Verify the availability of the text file “test1.txt” and its content





8) Test Cases

Test case ID	Action	Expected Output	Actual Output	Result	Comments
01	Login in to AWS	AWS console	AWS Console	PASS	Login was successful
02	Enter an invalid email and password	Wrong user ID or Password	Wrong user ID or Password	PASS	Login Attempt failed
03	Start the Instances	Started	Started	PASS	All the EC2 instances Started
04	Connect instance through RDP	Connection Established	Connection Established	PASS	Windows instance is ready to use
05	Attach the EBS volume to the EC2 instances	Attached Successfully	Attached Successfully	PASS	The EBS volume is attached Successfully to the EC2 instances
06	Disk Initialization and Verification	Running Correctly	Running Correctly	PASS	Disk partition is successful
07	Creating text file in the Disk	Created	Created	PASS	Text file created successfully
08	User attach the EBS volume to unknown EC2 instance	Instances not Created	Instances not Created	PASS	Does not attach to unknown instances
09	Creating Private Key for the instances	Private Key created	Private Key Created	PASS	Creation of private key was successful
10	Upload private key for password decryption	Successfully Decrypted	Successfully Decrypted	PASS	The password was Decrypted
11	Upload different private key for decryption	Can not decrypt the password	Can not decrypt the password	PASS	Unsuccessful Decryption
12	Sign out	Sign out successful	Sign out successful	PASS	AWS console Sign out was done successfully

9) Project Summary

This project has given us practical exposure to design, develop and demonstrate the usage of EBS (Elastic Block Store) using EC2 Windows Server Instances in AWS.

It shows us how to Create Custom VPC, Subnets, Route Tables, etc and Create EC2 Windows Server Instances and EBS Volume in the Custom VPC.

This project has also provided details about how to attach EBS volume to the EC2 Instance and Initialize the additional EBS volume in Disk Management and create a text file in attached disk and verify the availability of the text file in another EC2 instance(Availability Zone “1b”)

10) Conclusion

This project has given us a valuable exposure to the Cloud Computing (Amazon Web Service) services such as Compute, Storage, Database, Networking and Content Delivery.

This project also provides a block storage solution designed for the EC2 instance. EBS is built for high durability as well as high availability, which is ensured by the replication of data in various Availability Zones (AZs). EBS offers multiple volume types in order to fulfil various workload needs, from log processing to high-performance applications.

Further, we have learned about usage of VPC’s, Subnets, Route Tables, Internet gateways, EBS Volumes, Snapshots etc. in Amazon Web Service.