

Department of Computer Engineering

Academic Term: JAN-MAY 2022

Class : **BE COMPUTER**

Subject Name: **CLOUD COMPUTING LABORATORY**

Subject Code: **CSL803**

Practical No:	02
Title:	To create EC2 instance on AWS and connecting the web server
Date of Performance:	28/01/2022
Date of Submission:	09/02/2022
Roll No:	8626
Name of the Student:	Divita Phadakale

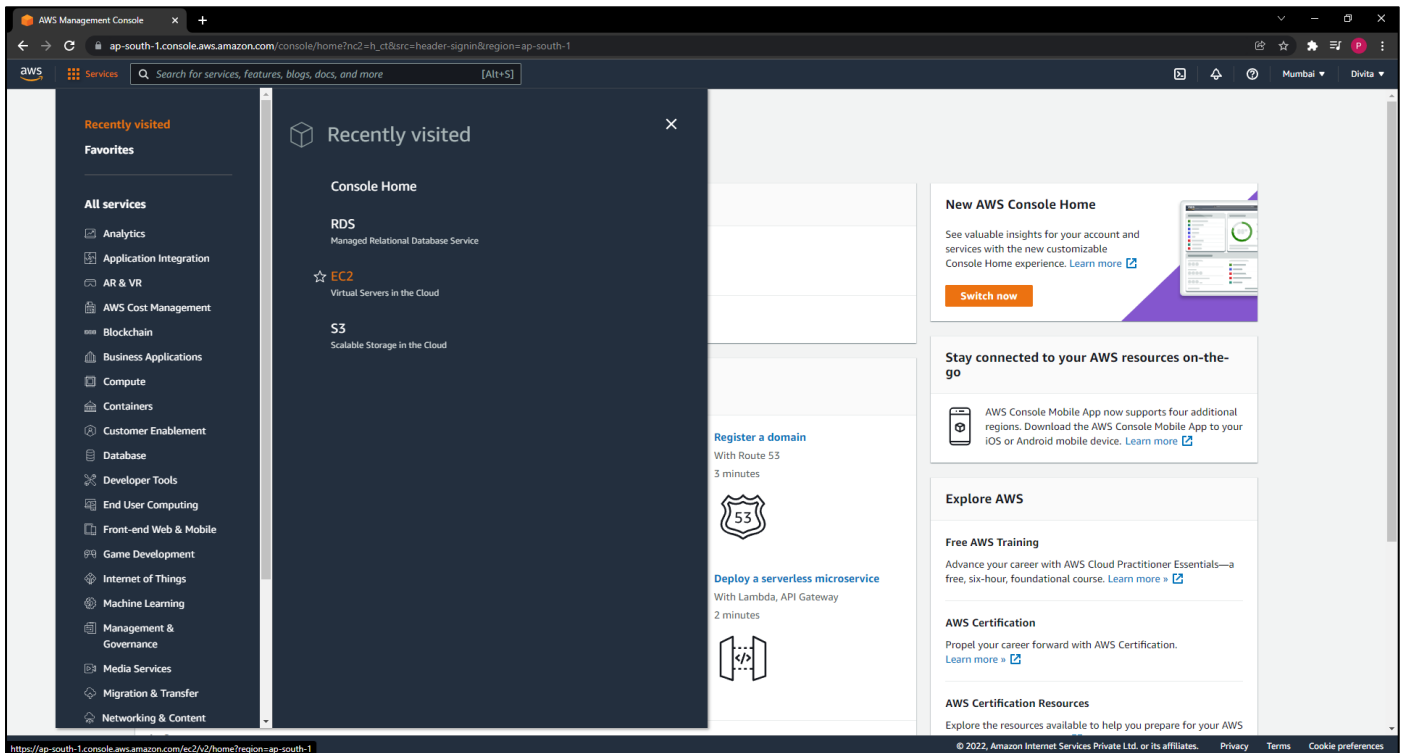
Evaluation:

Sr. No	Rubric	Grade
1	On time submission (2)	
2	Preparedness (2)	
3	Output (2)	
4	Post Lab Questions (4)	
	TOTAL	

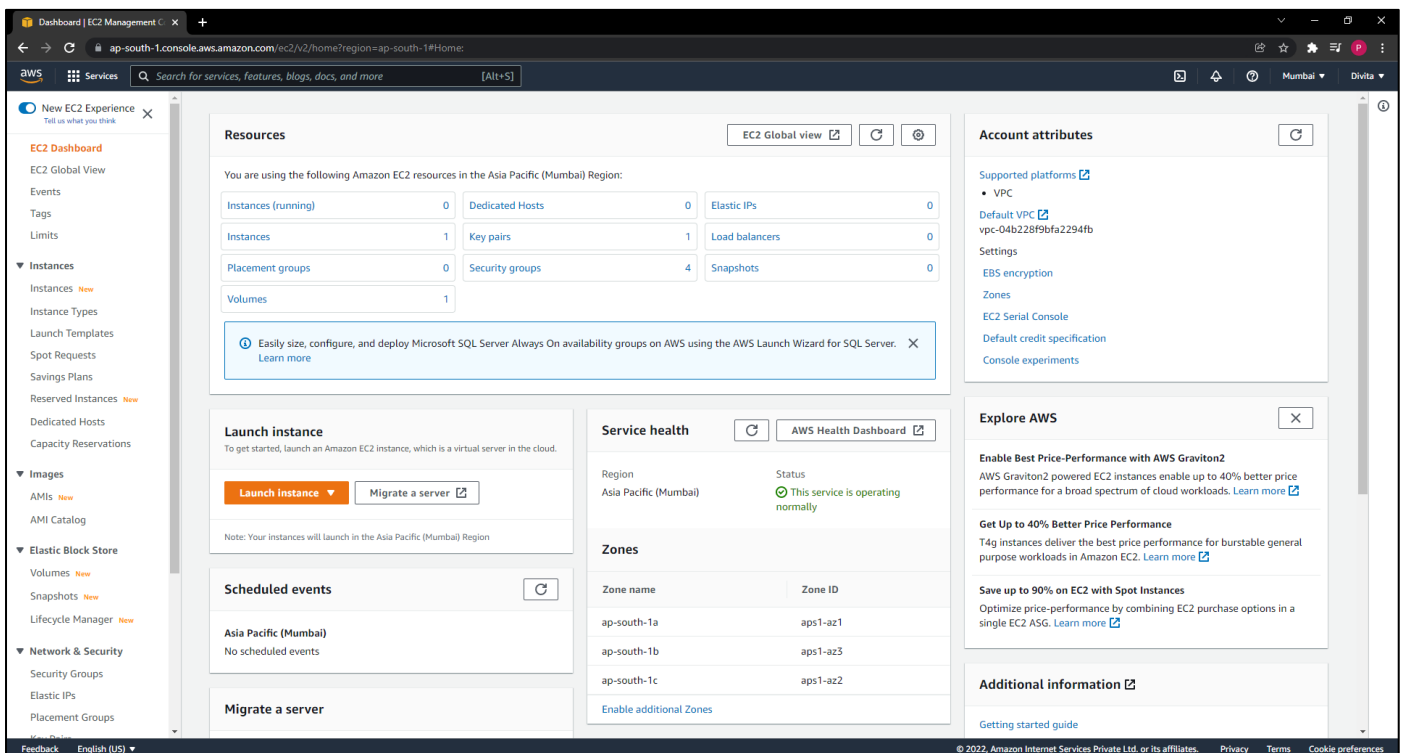
Signature of the Teacher:

Compiled by Prof. Mahendra Mehra & Sunil Chaudhari | Cloud Computing Laboratory
Manual
BE COMPUTERS(SEM:VIII)

- Create AWS account with proper credentials
- Go to the Services section in the left corner and select EC2



- The below page would appear which is called as the EC2 Dashboard
- We must click on “Launch Instance” to create the instance
- But before that lets create security groups for our instance



- Click on “Security Groups” in Network & Security and click on CREATE SECURITY GROUP in the right corner

- Give name and description(optional) to the security group and enter the following inbound and outbound rules
- Click on create

Inbound rules

Type	Protocol	Port range	Source	Description - optional
SSH	TCP	22	My IP	
HTTP	TCP	80	Anywhere-I...	
HTTPS	TCP	443	Anywhere-I...	
All ICMP - IPv4	ICMP	All	Anywhere-I...	

Outbound rules

Type	Protocol	Port range	Destination	Description - optional
All traffic	All	All	Custom	

Tags - optional
A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

- Once you click on the security group you created you will see all the rules that you added as shown in figure below

sg-087a1a412b5d36895 - myWebServer

Details

Property	Value
Security group name	myWebServer
Security group ID	sg-087a1a412b5d36895
Description	CC pracs web server
VPC ID	vpc-04b228f9bfa2294fb
Owner	782677963701
Inbound rules count	4 Permission entries
Outbound rules count	1 Permission entry

Inbound rules (4)

Name	Security group rule...	IP version	Type	Protocol	Port range	Source	Description
-	sgr-03662454a6d111...	IPv4	SSH	TCP	22	49.36.109.130/32	-
-	sgr-0a4a9dc4d63a78aed	IPv4	HTTPS	TCP	443	0.0.0.0/0	-
-	sgr-0e56cb77bf4c49531	IPv4	All ICMP - IPv4	ICMP	All	0.0.0.0/0	-
-	sgr-07c01105d9d6d9...	IPv4	HTTP	TCP	80	0.0.0.0/0	-

- Now coming back to creating the instance, once you clicked on Launch Instance you have to undergo 7 steps as shown here
- Step 1: Choose AMI

Launch instance wizard | EC2 M... X +

ap-south-1.console.aws.amazon.com/ec2/v2/home?region=ap-south-1#LaunchInstanceWizard

Search for services, features, blogs, docs, and more [Alt+S]

Mumbai Divita

You've been invited to try an early, beta iteration of the new launch instance wizard. We will continue to improve the experience over the next few months. We're asking customers for their feedback on this early release. To exit the new launch instance wizard at any time, choose the Cancel button. [Try it now!](#)

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 1: Choose an Amazon Machine Image (AMI)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

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

Search by Systems Manager parameter

1 to 45 of 45 AMIs

Quick Start

My AMIs

AWS Marketplace

Community AMIs

☐ Free tier only ⓘ

Amazon Linux 2 AMI (HVM) - Kernel 5.10, SSD Volume Type - ami-0c6615d1e95c98aca (64-bit x86) / ami-086be6d514a32d0f4 (64-bit Arm)

Amazon Linux 2 comes with five years support. It provides Linux kernel 5.10 tuned for optimal performance on Amazon EC2, systemd 219, GCC 7.3, Glibc 2.26, Binutils 2.29.1, and the latest software packages through extras. This AMI is the successor of the Amazon Linux AMI that is now under maintenance only mode and has been removed from this wizard.

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

[Select](#)

☒ 64-bit (x86) ☐ 64-bit (Arm)

Amazon Linux 2 AMI (HVM) - Kernel 4.14, SSD Volume Type - ami-0dafa01c8100180f8 (64-bit x86) / ami-01e8d65a0358f99c (64-bit Arm)

Amazon Linux 2 comes with five years support. It provides Linux kernel 4.14 tuned for optimal performance on Amazon EC2, systemd 219, GCC 7.3, Glibc 2.26, Binutils 2.29.1, and the latest software packages through extras. This AMI is the successor of the Amazon Linux AMI that is now under maintenance only mode and has been removed from this wizard.

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

[Select](#)

☒ 64-bit (x86) ☐ 64-bit (Arm)

macOS Monterey 12.1 - ami-01f13edade731d304

The macOS Monterey AMI is an EBS-backed, AWS-supported image. This AMI includes the AWS Command Line Interface, Command Line Tools for Xcode, Amazon SSM Agent, and Homebrew. The AWS Homebrew Tap includes the latest versions of multiple AWS packages included in the AMI.

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

[Select](#)

64-bit (Mac)

macOS Big Sur 11.6.2 - ami-03b0e4a0900e9a1d5

The macOS Big Sur AMI is an EBS-backed, AWS-supported image. This AMI includes the AWS Command Line Interface, Command Line Tools for Xcode, Amazon SSM Agent, and Homebrew. The AWS Homebrew Tap includes the latest versions of multiple AWS packages included in the AMI.

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

[Select](#)

64-bit (Mac)

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➤ Step 2: Instance Type -> Free Tier -> Next Configure Instance Details

Launch instance wizard | EC2 M... X +

ap-south-1.console.aws.amazon.com/ec2/v2/home?region=ap-south-1#LaunchInstanceWizard

Search for services, features, blogs, docs, and more [Alt+S]

Mumbai Divita

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 2: Choose an Instance Type

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. [Learn more](#) about instance types and how they can meet your computing needs.

Filter by: All instance families Current generation Show/Hide Columns

Currently selected: t2.micro (~ ECU's, 1 vCPUs, 2.5 GHz, -, 1 GiB memory, EBS only)

	Family	Type	vCPUs ⓘ	Memory (GiB)	Instance Storage (GB) ⓘ	EBS-Optimized Available ⓘ	Network Performance ⓘ	IPv6 Support ⓘ
<input type="checkbox"/>	t2	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
<input checked="" type="checkbox"/>	t2	t2.micro Free tier eligible	1	1	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	t2	t2.small	1	2	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	t2	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	t2	t2.large	2	8	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	t2	t2.xlarge	4	16	EBS only	-	Moderate	Yes
<input type="checkbox"/>	t2	t2.2xlarge	8	32	EBS only	-	Moderate	Yes
<input type="checkbox"/>	t3	t3.nano	2	0.5	EBS only	Yes	Up to 5 Gigabit	Yes
<input type="checkbox"/>	t3	t3.micro	2	1	EBS only	Yes	Up to 5 Gigabit	Yes
<input type="checkbox"/>	t3	t3.small	2	2	EBS only	Yes	Up to 5 Gigabit	Yes
<input type="checkbox"/>	t3	t3.medium	2	4	EBS only	Yes	Up to 5 Gigabit	Yes
<input type="checkbox"/>	t3	t3.large	2	8	EBS only	Yes	Up to 5 Gigabit	Yes
<input type="checkbox"/>	t3	t3.xlarge	4	16	EBS only	Yes	Up to 5 Gigabit	Yes

Cancel Previous **Review and Launch** Next: Configure Instance Details

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➤ Step 3: Instance Details, choose according to your requirements and then Next

Launch instance wizard | EC2 M5

ap-south-1.console.aws.amazon.com/ec2/v2/home?region=ap-south-1#LaunchInstanceWizard:

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 3: Configure Instance Details

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of instances: 1 [Launch into Auto Scaling Group](#)

Purchasing option: ☐ Request Spot instances

Network: vpc-04b228f9fa2294fb (default) [Create new VPC](#)

Subnet: No preference (default subnet in any Availability Zone) [Create new subnet](#)

Auto-assign Public IP: Use subnet setting (Enable)

Hostname type: Use subnet setting (IP name)

DNS Hostname: ☐ Enable IP name IPv4 (A record) DNS requests
☒ Enable resource-based IPv4 (A record) DNS requests
☐ Enable resource-based IPv6 (AAAA record) DNS requests

Placement group: ☐ Add instance to placement group

Capacity Reservation: Open

Domain join directory: No directory [Create new directory](#)

IAM role: None [Create new IAM role](#)

Shutdown behavior: Stop

Stop - Hibernate behavior: ☐ Enable hibernation as an additional stop behavior

Enable termination protection: ☐ Protect against accidental termination

Monitoring: ☐ Enable CloudWatch detailed monitoring
 Additional charges apply.

Tenancy: Shared - Run a shared hardware instance
 Additional charges will apply for dedicated tenancy.

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Add Storage](#)

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➤ Step 4: Add Storage -> according to requirements -> next

Launch instance wizard | EC2 M5

ap-south-1.console.aws.amazon.com/ec2/v2/home?region=ap-south-1#LaunchInstanceWizard:

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 4: Add Storage

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. [Learn more](#) about storage options in Amazon EC2.

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Throughput (MB/s)	Delete on Termination	Encryption
Root	/dev/xvda	snap-0d2b1848f14fd3cd	8	General Purpose SSD (gp2)	100 / 3000	N/A	<input checked="" type="checkbox"/>	Not Encrypted

[Add New Volume](#)

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. [Learn more](#) about free usage tier eligibility and usage restrictions.

Shared file systems

You currently don't have any file systems on this instance. Select "Add file system" button below to add a file system.

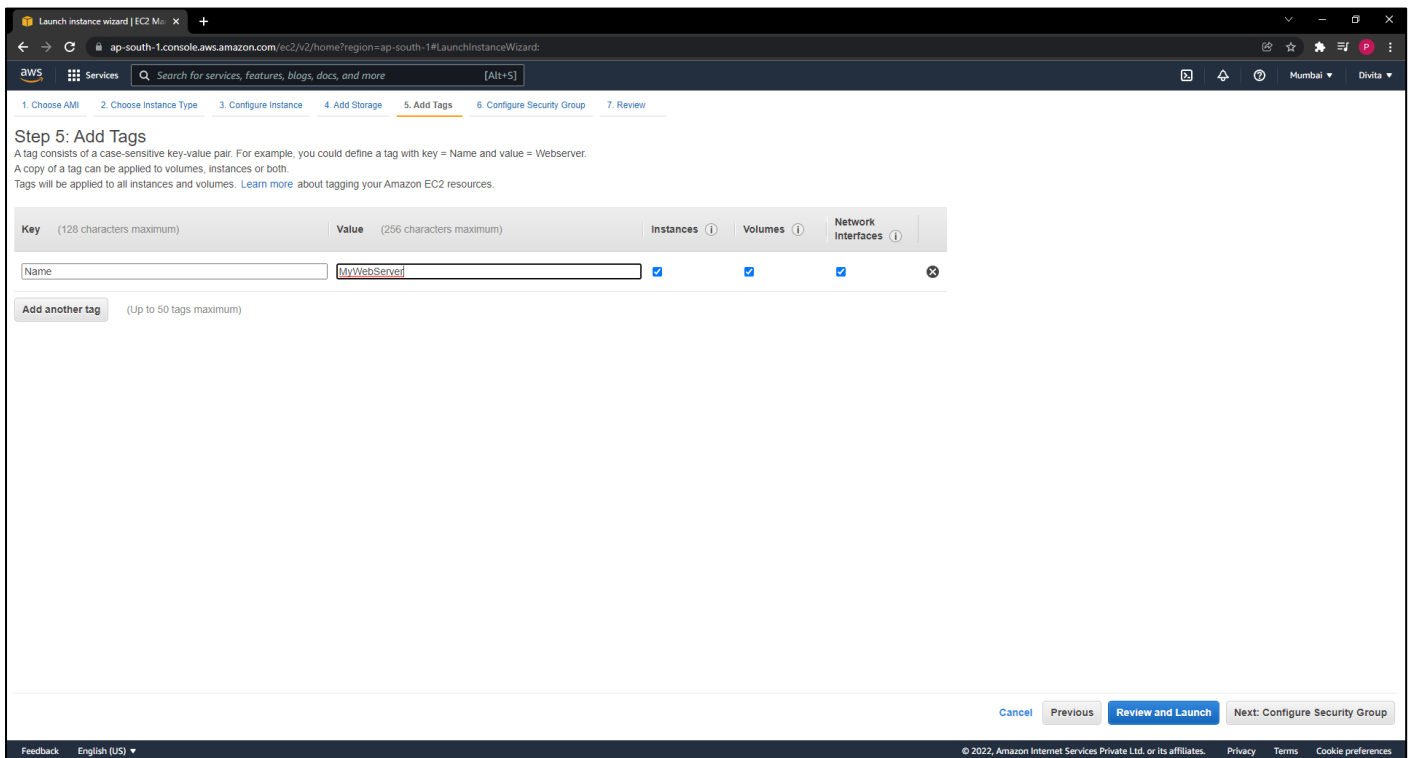
[Add file system](#)

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Add Tags](#)

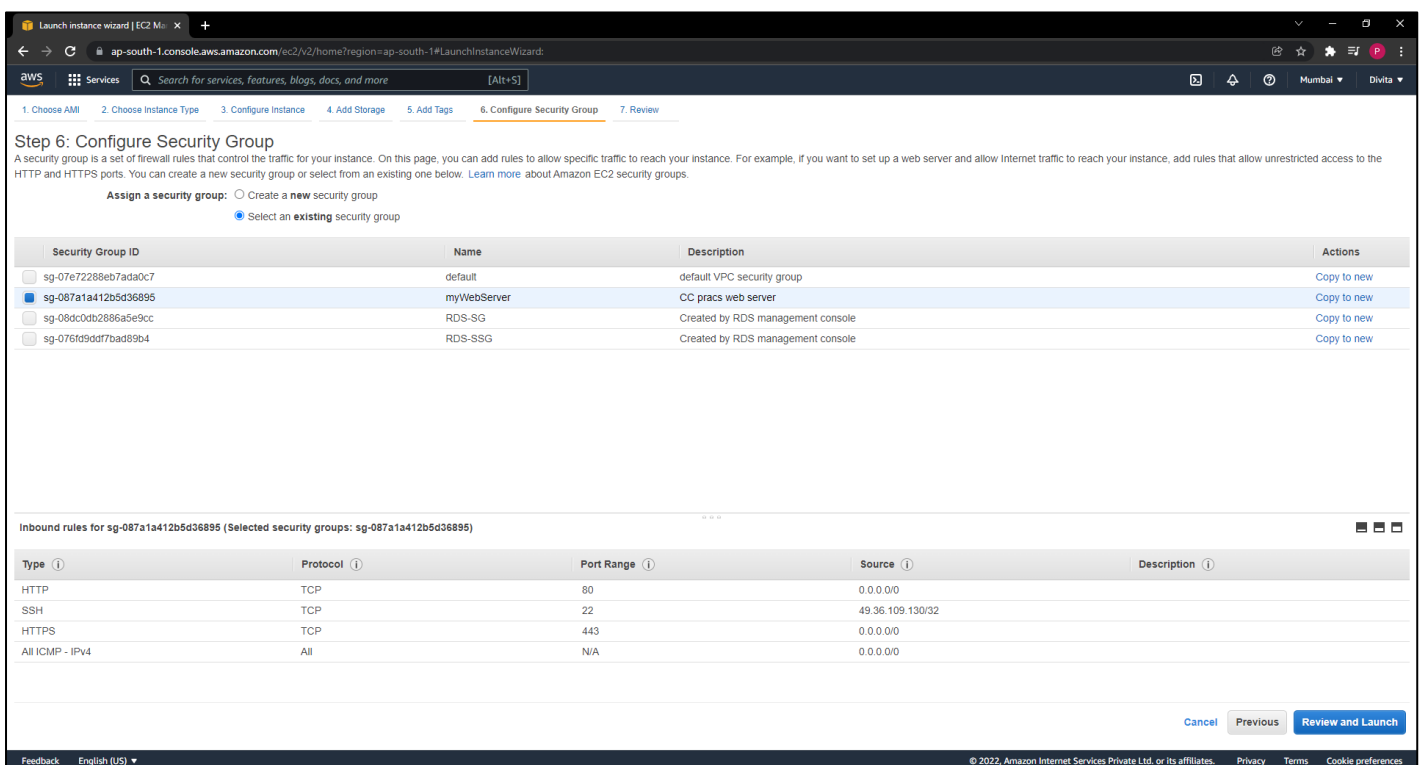
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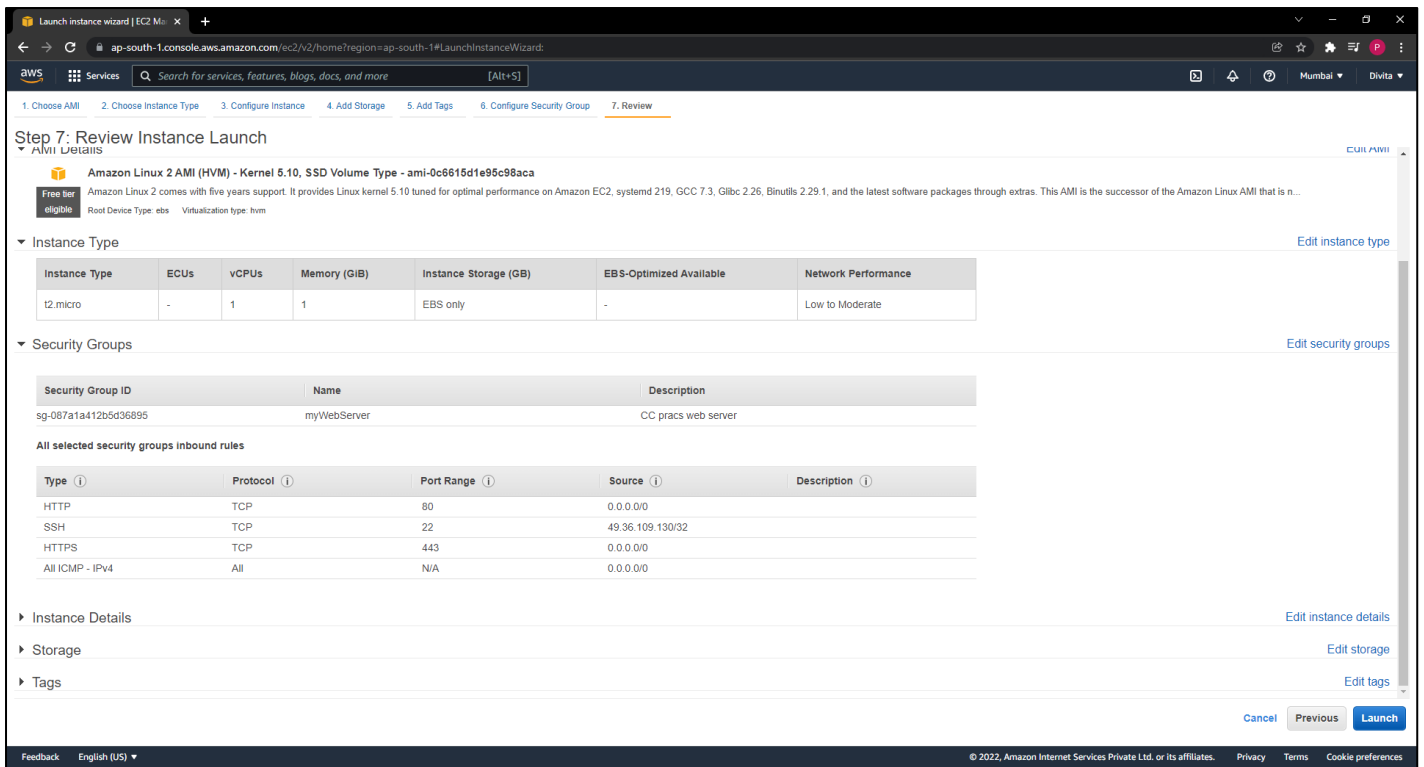
➤ Step 5: Add tags -> Enter Key-value pair as Name and xyz -> Next



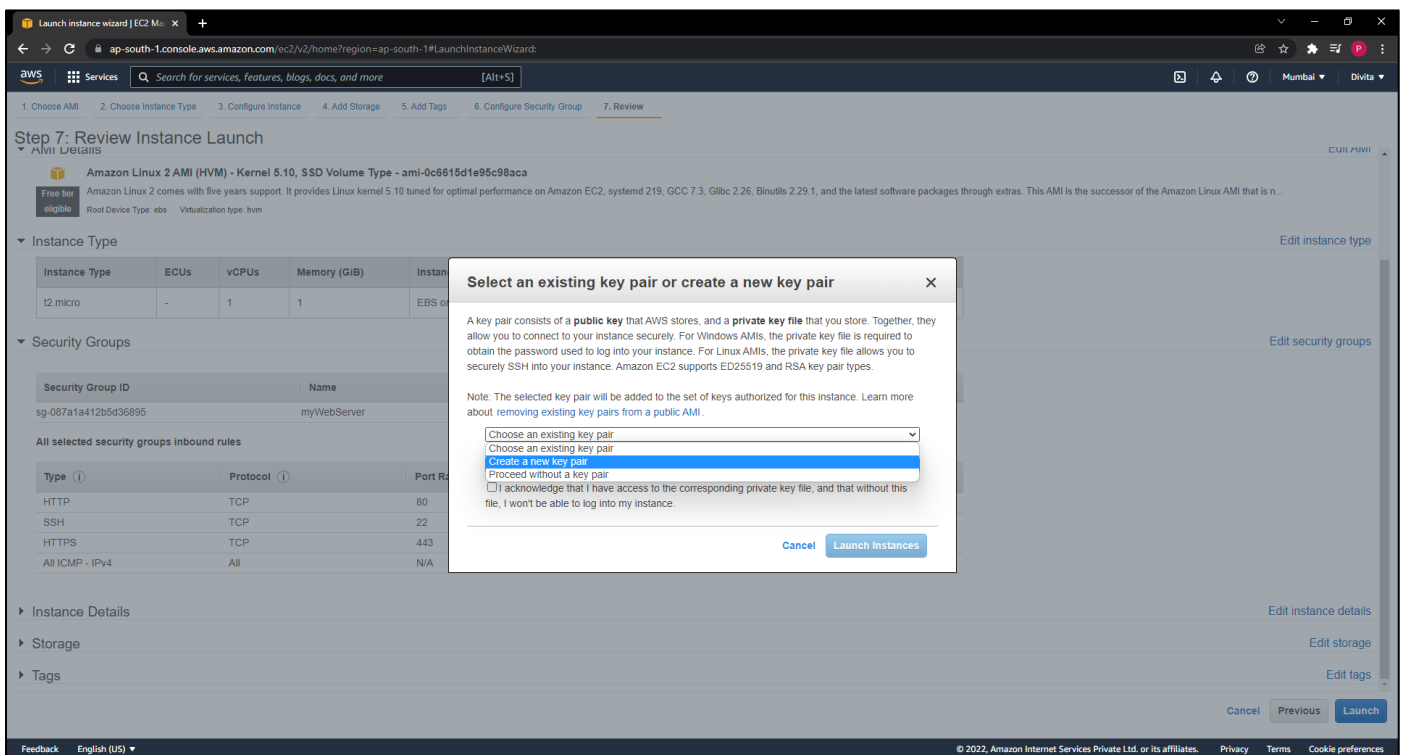
- Step 6: Configure Security Group (this is where we'll select the security group that was created previously)
- Tick the Select an existing security group
- Select the desired security group
- You can see the rules below



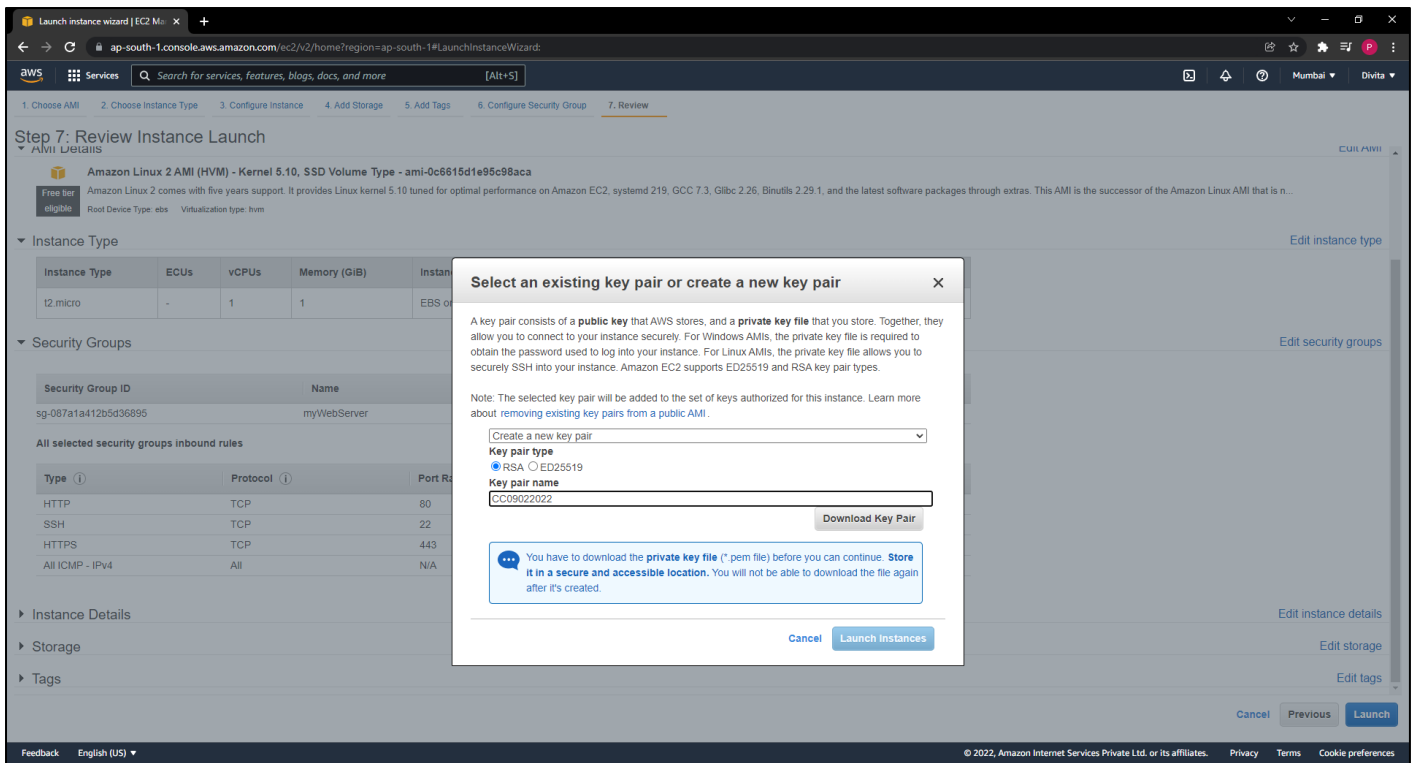
- Step 7: Review and LAUNCH



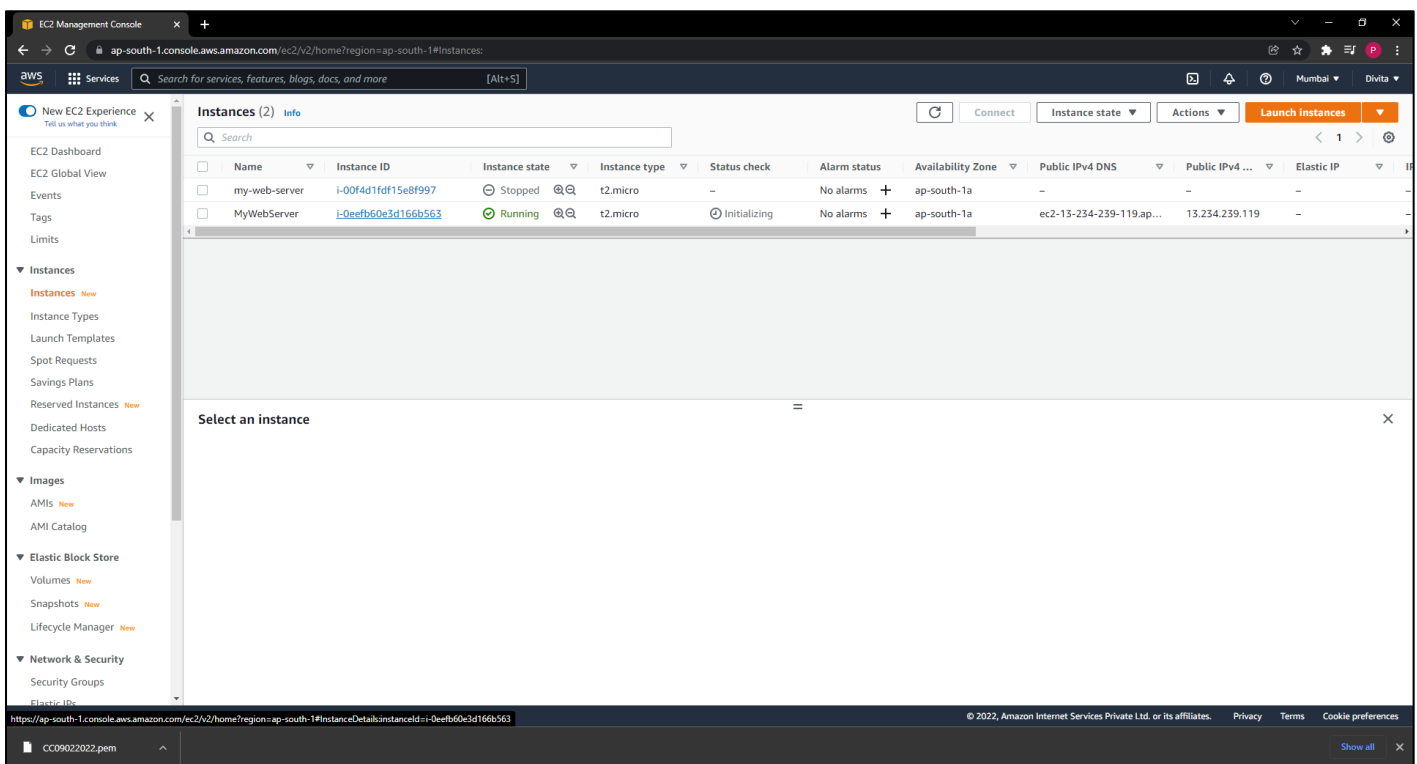
- After you launch, you will see a pop-up like this
- We must select a key value pair or create a new one if its not existing



- Select RSA -> give name to the key pair and download it
- The downloaded file will be in .pem format



➤ You can view your instance in the “Instances” and check the status



- You can see this after the instance is launched successfully
- This consists of Public and Private IP addresses along with their DNS address

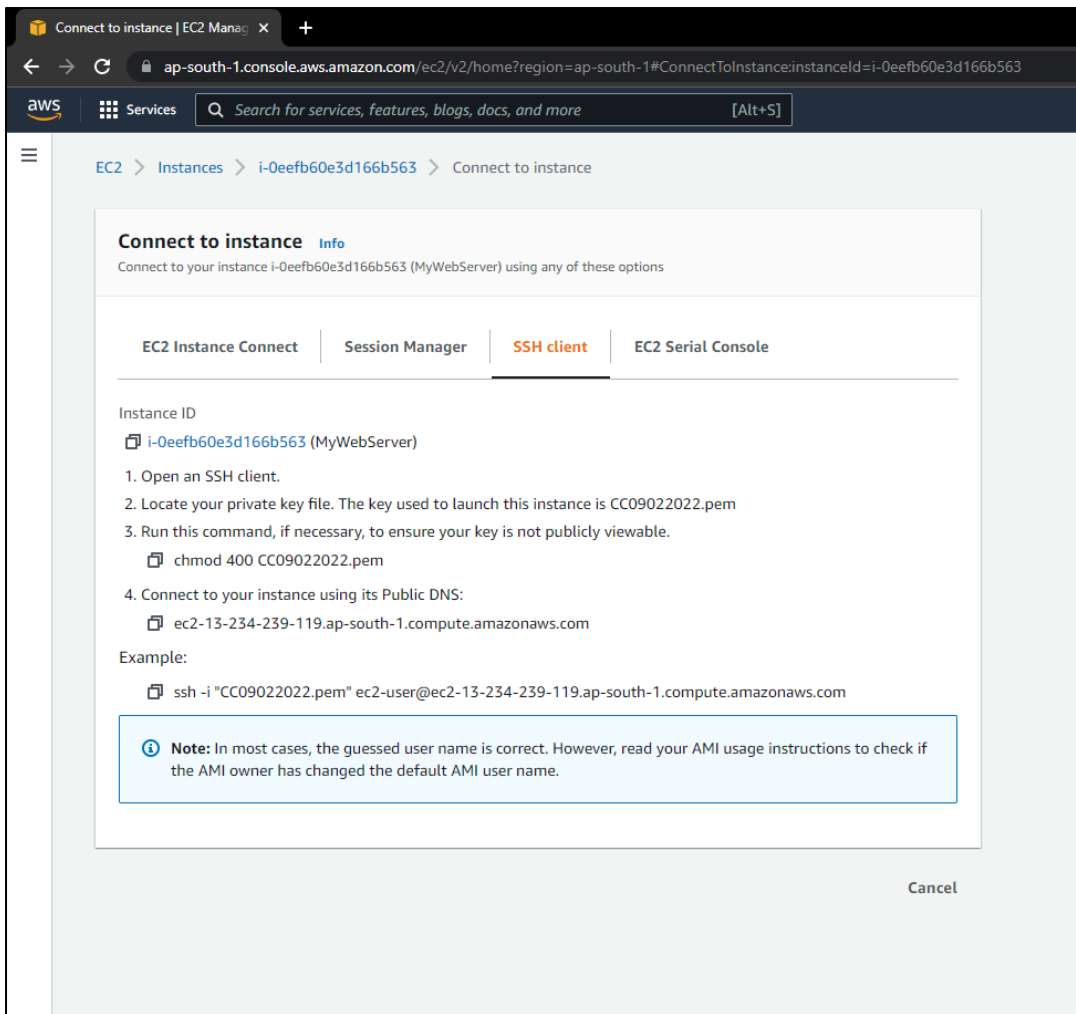
The screenshot displays the AWS Management Console interface for an EC2 instance. The left sidebar contains navigation options like EC2 Dashboard, Events, Tags, Limits, and various instance types. The main content area shows the 'Instance summary for i-0ee6b60e3d166b563 (MyWebServer)'. The instance is in a 'Running' state. Key details include:

- Instance ID:** i-0ee6b60e3d166b563
- Public IPv4 address:** 13.234.239.119
- Private IPv4 addresses:** 172.31.46.182
- Instance state:** Running
- Host ID:** -
- Host resource group name:** -
- Virtualization type:** hvm
- Reservation:** r-03623acb33c19e03f

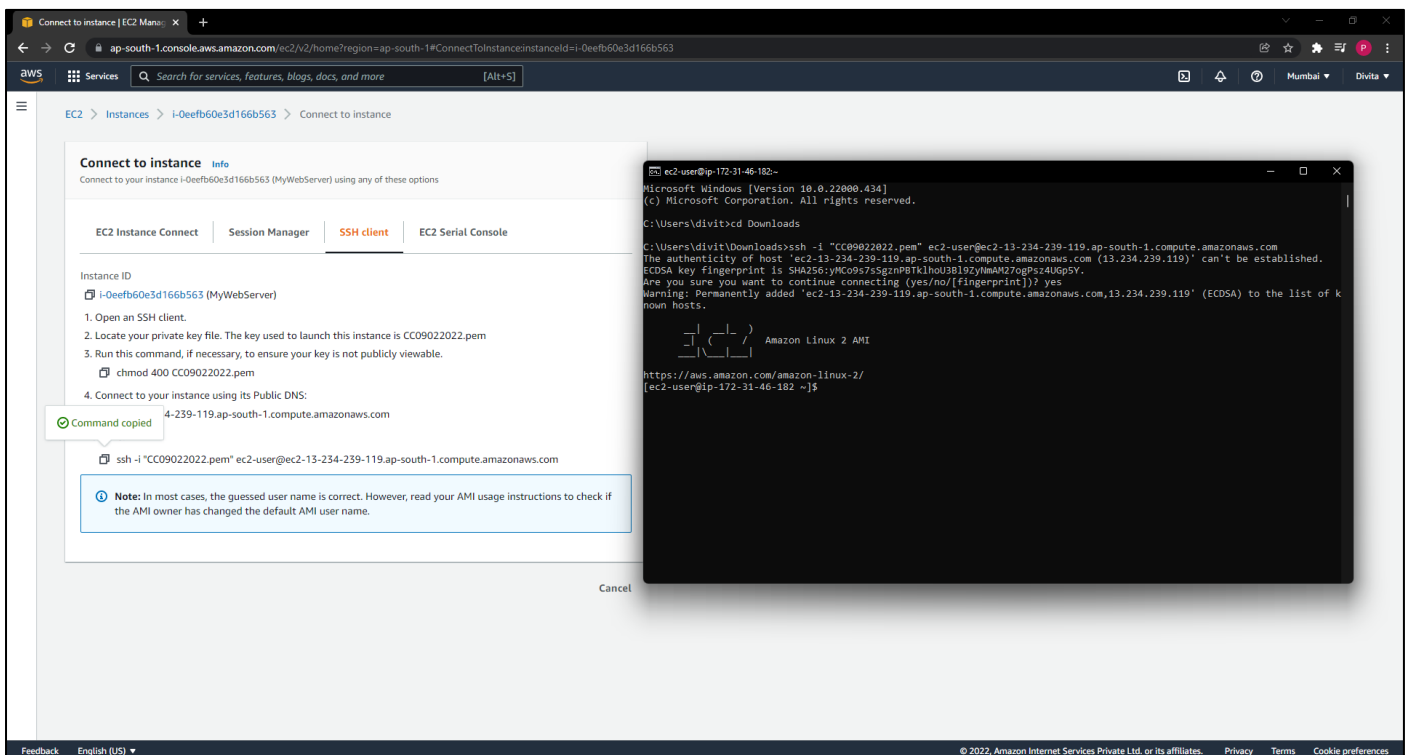
 Below the summary, there are tabs for Details, Security, Networking, Storage, Status checks, Monitoring, and Tags. The 'Details' tab is active, showing 'Host and placement group' information.

CONNECTING INSTANCE:

- Click on “CONNECT” present on the right side
- Go to the SSH Client tab and copy the line after Example



- Open command prompt on your desktop and paste the command copied there
- It will ask for confirmation to which say yes
- Now you are ready to run commands on your EC2 instance.
- Let's move to the installation part in next step



- Enter the following commands: (Go to the location where the keypair is downloaded)
 - `sudo su` (to get root privilege)
 - `yum install -y httpd.x86_64` (install apache web server)
 - `systemctl start httpd.service` (start the server)
 - `systemctl enable httpd.service`
 - `systemctl status httpd.service`

```
root@ip-172-31-46-182:/home/ec2-user#
Microsoft Windows [Version 10.0.22000.434]
(c) Microsoft Corporation. All rights reserved.

C:\Users\divit>cd Downloads

C:\Users\divit\Downloads>ssh -i "CC09022022.pem" ec2-user@ec2-13-234-239-119.ap-south-1.compute.amazonaws.com
The authenticity of host 'ec2-13-234-239-119.ap-south-1.compute.amazonaws.com (13.234.239.119)' can't be established.
ECDSA key fingerprint is SHA256:yMC09s7sSgznpBTk1hoU3B19ZyNmAM27ogPsz4UGp5Y.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-13-234-239-119.ap-south-1.compute.amazonaws.com,13.234.239.119' (ECDSA) to the list of known hosts.

 _ _ _ _ _
| | | | |
|_|_|_|_|_| Amazon Linux 2 AMI

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-172-31-46-182 ~]$ sudo su
[root@ip-172-31-46-182 ec2-user]# yum install -y httpd.x86_64
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
amzn2-core
Resolving Dependencies
--> Running transaction check
--> Package httpd.x86_64 0:2.4.52-1.amzn2 will be installed
--> Processing Dependency: httpd-tools = 2.4.52-1.amzn2 for package: httpd-2.4.52-1.amzn2.x86_64
--> Processing Dependency: httpd filesystem = 2.4.52-1.amzn2 for package: httpd-2.4.52-1.amzn2.x86_64
--> Processing Dependency: system-logos-httpd for package: httpd-2.4.52-1.amzn2.x86_64
--> Processing Dependency: mod_http2 for package: httpd-2.4.52-1.amzn2.x86_64
--> Processing Dependency: httpd filesystem for package: httpd-2.4.52-1.amzn2.x86_64
--> Processing Dependency: /etc/mime.types for package: httpd-2.4.52-1.amzn2.x86_64
--> Processing Dependency: libaprutil-1.so.0()(64bit) for package: httpd-2.4.52-1.amzn2.x86_64
--> Processing Dependency: libapr-1.so.0()(64bit) for package: httpd-2.4.52-1.amzn2.x86_64
--> Running transaction check
--> Package apr.x86_64 0:1.7.0-9.amzn2 will be installed
--> Package apr-util.x86_64 0:1.6.1-5.amzn2.0.2 will be installed
--> Processing Dependency: apr-util-bdb(x86-64) = 1.6.1-5.amzn2.0.2 for package: apr-util-1.6.1-5.amzn2.0.2.x86_64
--> Package generic-logos-httpd.noarch 0:18.0.0-4.amzn2 will be installed
--> Package httpd filesystem.noarch 0:2.4.52-1.amzn2 will be installed
```

```

root@ip-172-31-46-182/home/ec2-user
Verifying : httpd-filesystem-2.4.52-1.amzn2.noarch
Verifying : httpd-2.4.52-1.amzn2.x86_64
Verifying : mailcap-2.1.41-2.amzn2.noarch
Verifying : generic-logos-httpd-18.0.0-4.amzn2.noarch
Verifying : mod_http2-1.15.19-1.amzn2.0.1.x86_64
Verifying : apr-1.7.0-9.amzn2.x86_64

Installed:
  httpd.x86_64 0:2.4.52-1.amzn2

Dependency Installed:
  apr.x86_64 0:1.7.0-9.amzn2      apr-util.x86_64 0:1.6.1-5.amzn2.0.2      apr-util-bdb.x86_64 0:1.6.1-5.amzn2.0.2      generic-logos-httpd.noarch 0:18.0
  mailcap.noarch 0:2.1.41-2.amzn2  mod_http2.x86_64 0:1.15.19-1.amzn2.0.1

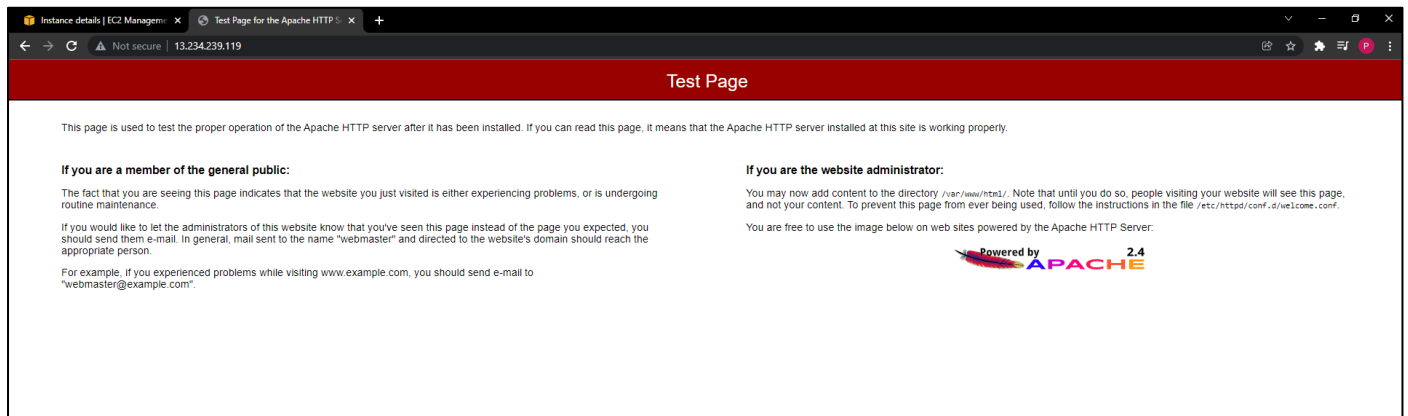
Complete!
[root@ip-172-31-46-182 ec2-user]# systemctl start httpd.service
[root@ip-172-31-46-182 ec2-user]# systemctl enable httpd.service
Created symlink from /etc/systemd/system/multi-user.target.wants/httpd.service to /usr/lib/systemd/system/httpd.service.
[root@ip-172-31-46-182 ec2-user]# systemctl status httpd.service
● httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; vendor preset: disabled)
   Active: active (running) since Wed 2022-02-09 13:58:46 UTC; 44s ago
     Docs: man:httpd.service(8)
 Main PID: 3433 (httpd)
   Status: "Total requests: 0; Idle/Busy workers 100/0;Requests/sec: 0; Bytes served/sec:  0 B/sec"
 CGroup: /system.slice/httpd.service
├─3433 /usr/sbin/httpd -DFOREGROUND
├─3434 /usr/sbin/httpd -DFOREGROUND
├─3435 /usr/sbin/httpd -DFOREGROUND
├─3436 /usr/sbin/httpd -DFOREGROUND
├─3437 /usr/sbin/httpd -DFOREGROUND
└─3438 /usr/sbin/httpd -DFOREGROUND

Feb 09 13:58:46 ip-172-31-46-182.ap-south-1.compute.internal systemd[1]: Starting The Apache HTTP Server...
Feb 09 13:58:46 ip-172-31-46-182.ap-south-1.compute.internal systemd[1]: Started The Apache HTTP Server.
[root@ip-172-31-46-182 ec2-user]#
```

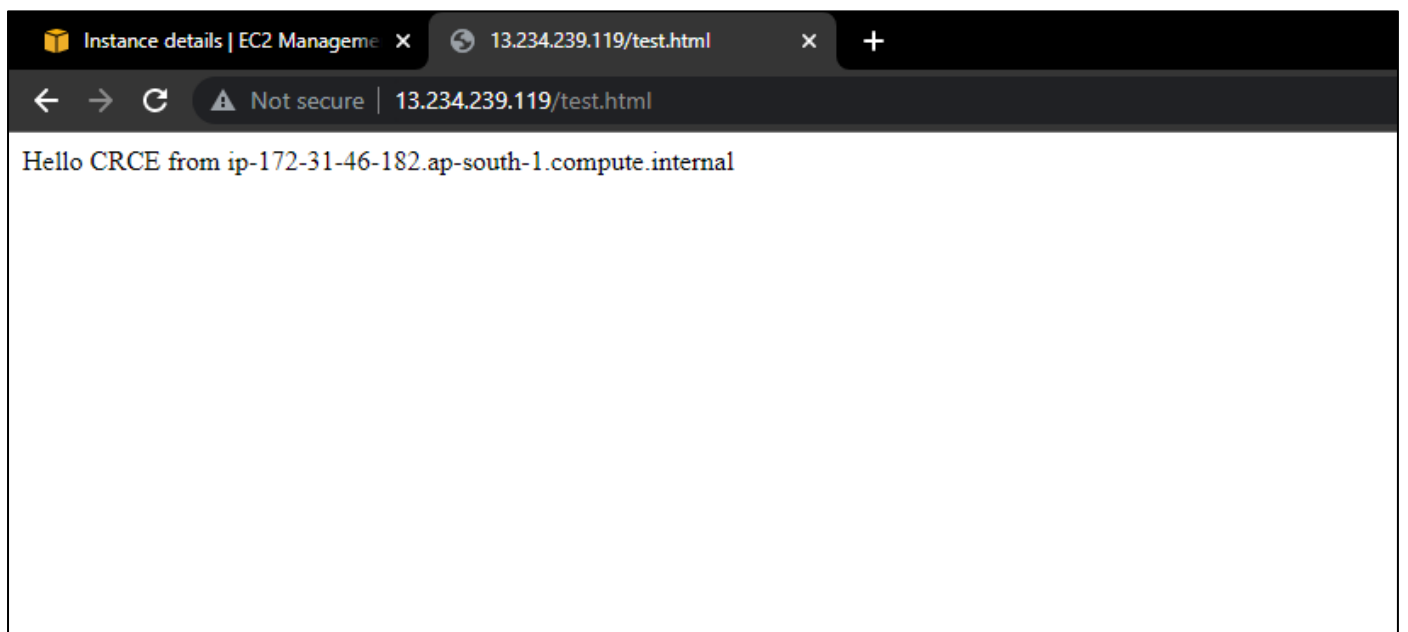
- To check our server connection, customize the web page with:
echo "Hello CRCE from \$(hostname -f)" > /var/www/html/test.html

```
root@ip-172-31-46-182/home/ec2-user
[root@ip-172-31-46-182 ec2-user]# clear
[root@ip-172-31-46-182 ec2-user]# [root@ip-172-31-46-182 ec2-user]#
[root@ip-172-31-46-182 ec2-user]# echo "Hello CRCE from $(hostname -f)" > /var/www/html/test.html
[root@ip-172-31-46-182 ec2-user]#
```

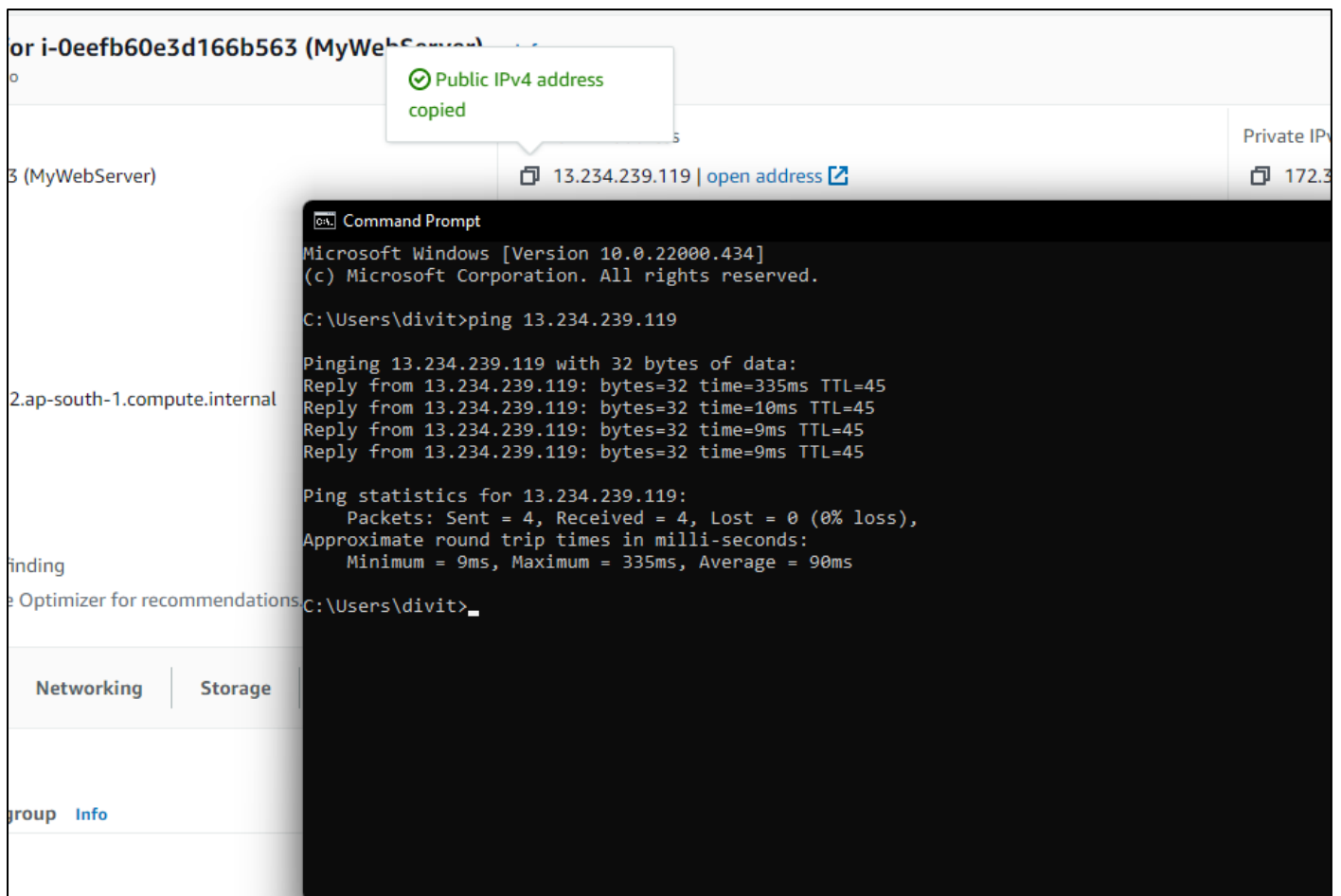
- Now open browser and copy your Public IPv4 address and hit enter (make sure you are opening it in http and not https)



- You can see your customized page with /test.html

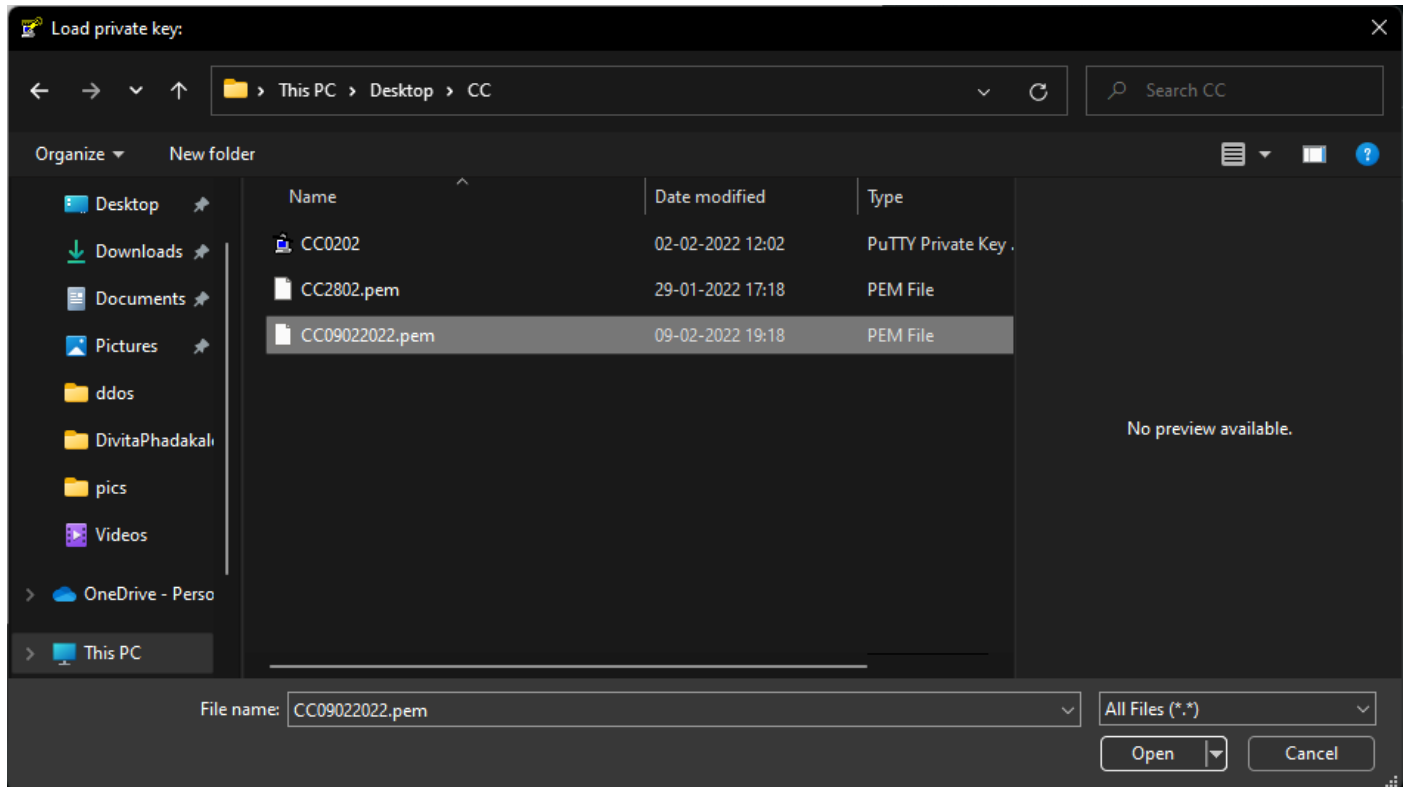
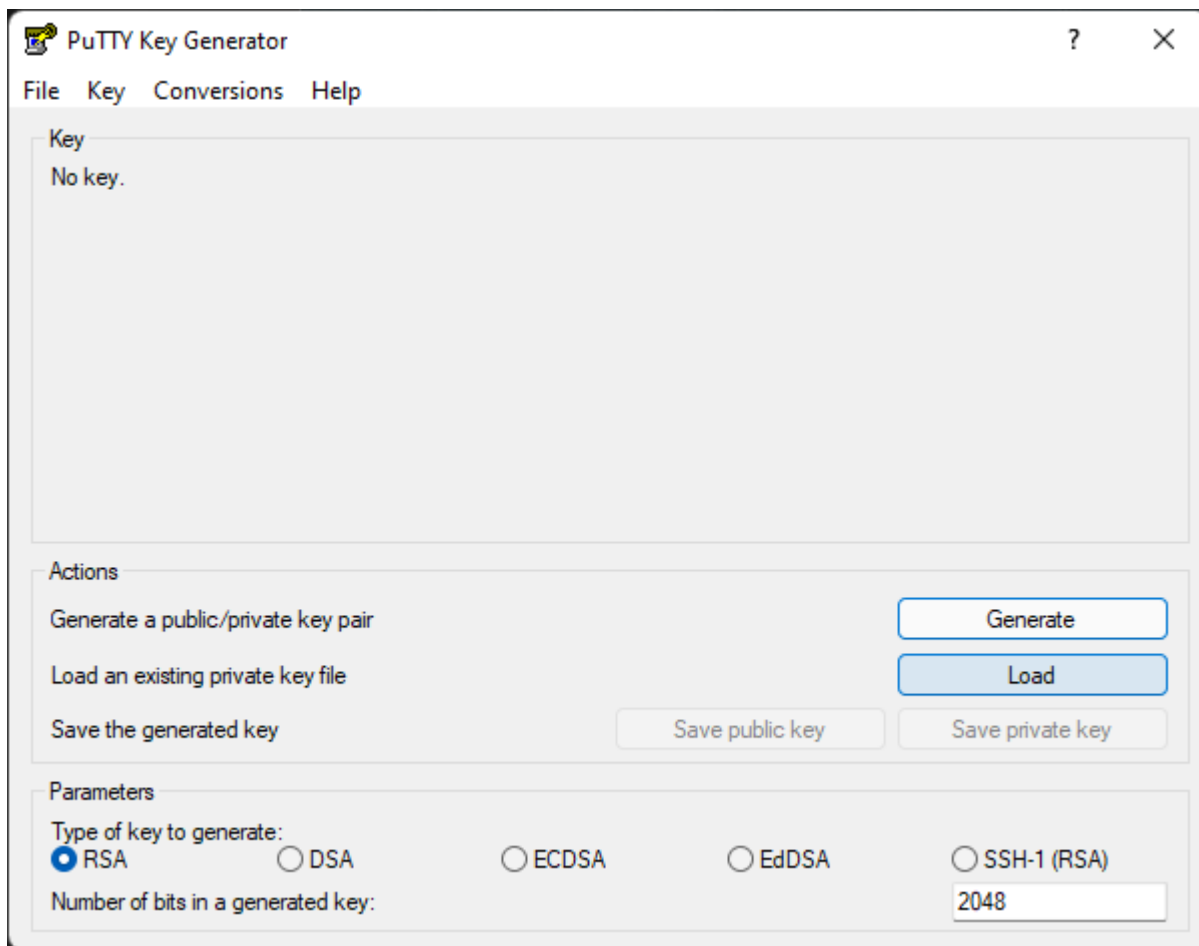


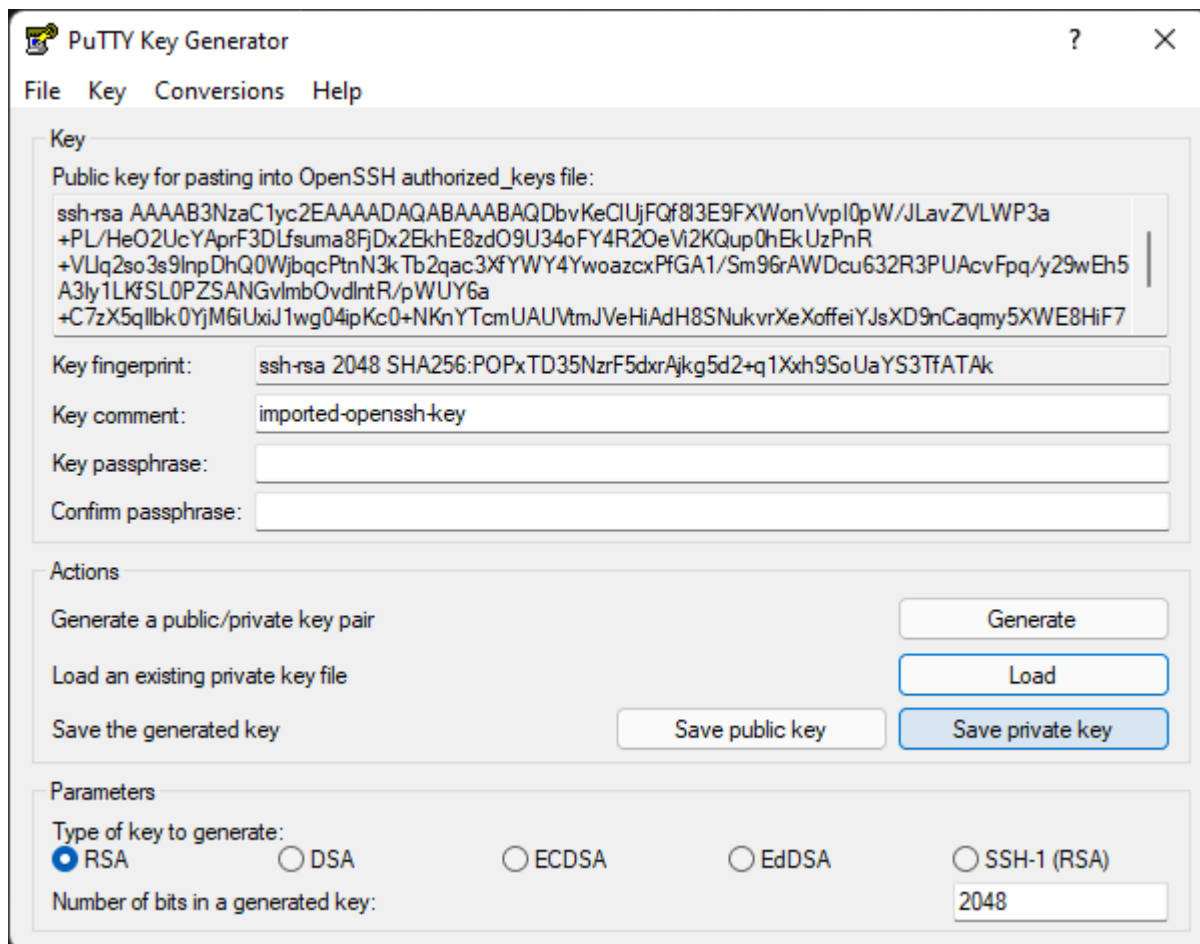
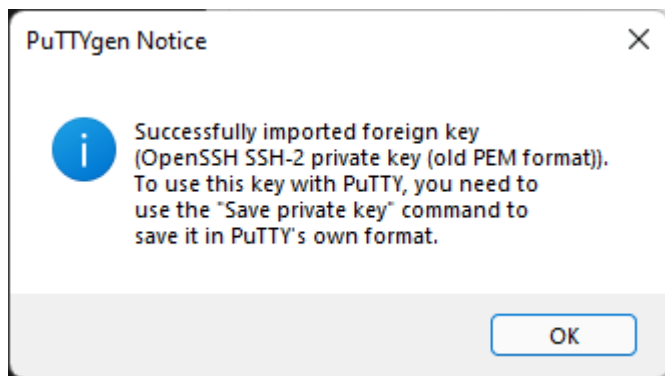
- To check the security group effectiveness, we can ping the public ip address from our normal command prompt since we added ICMP to inbound rules
- If its successful it means we have set it correctly

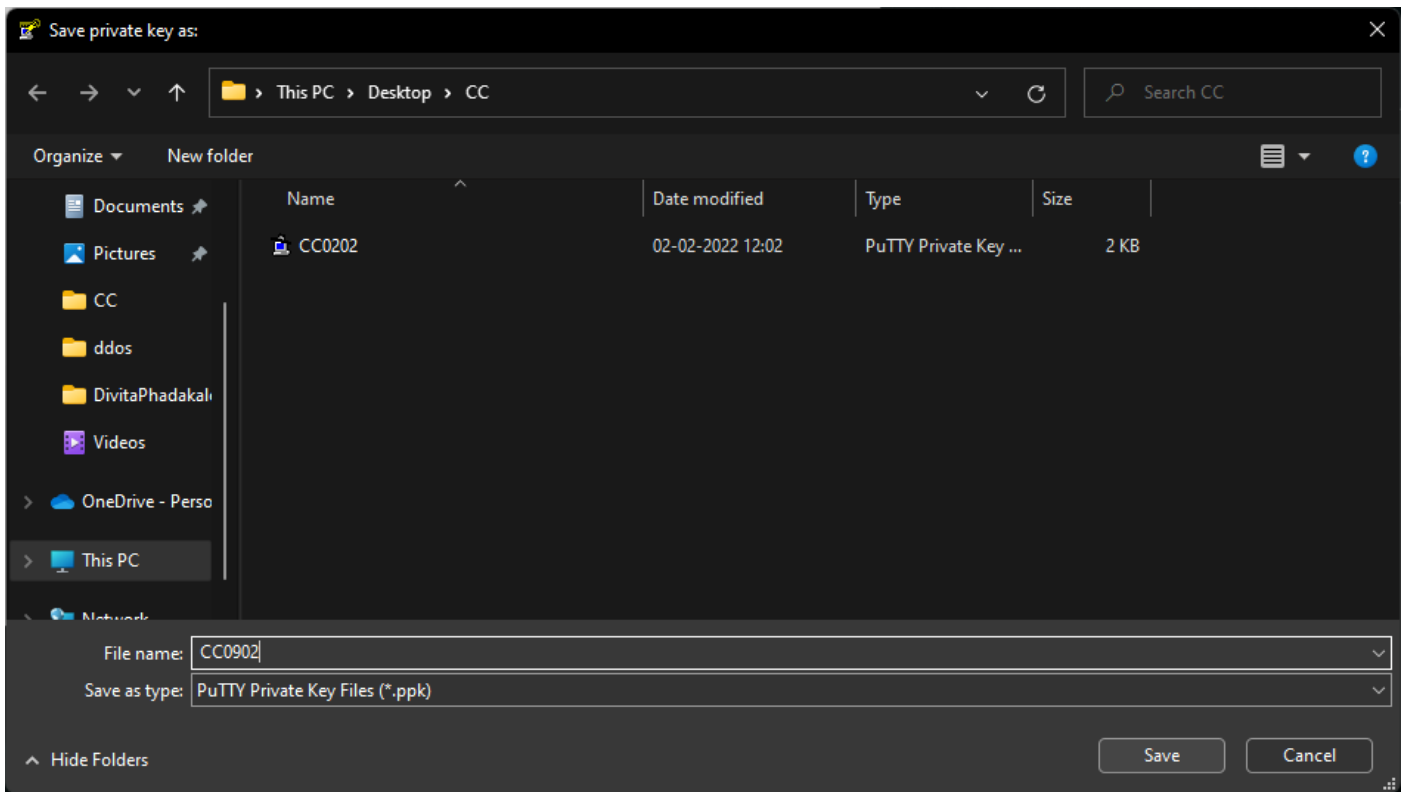


CONNECTION WITHOUT SSH:

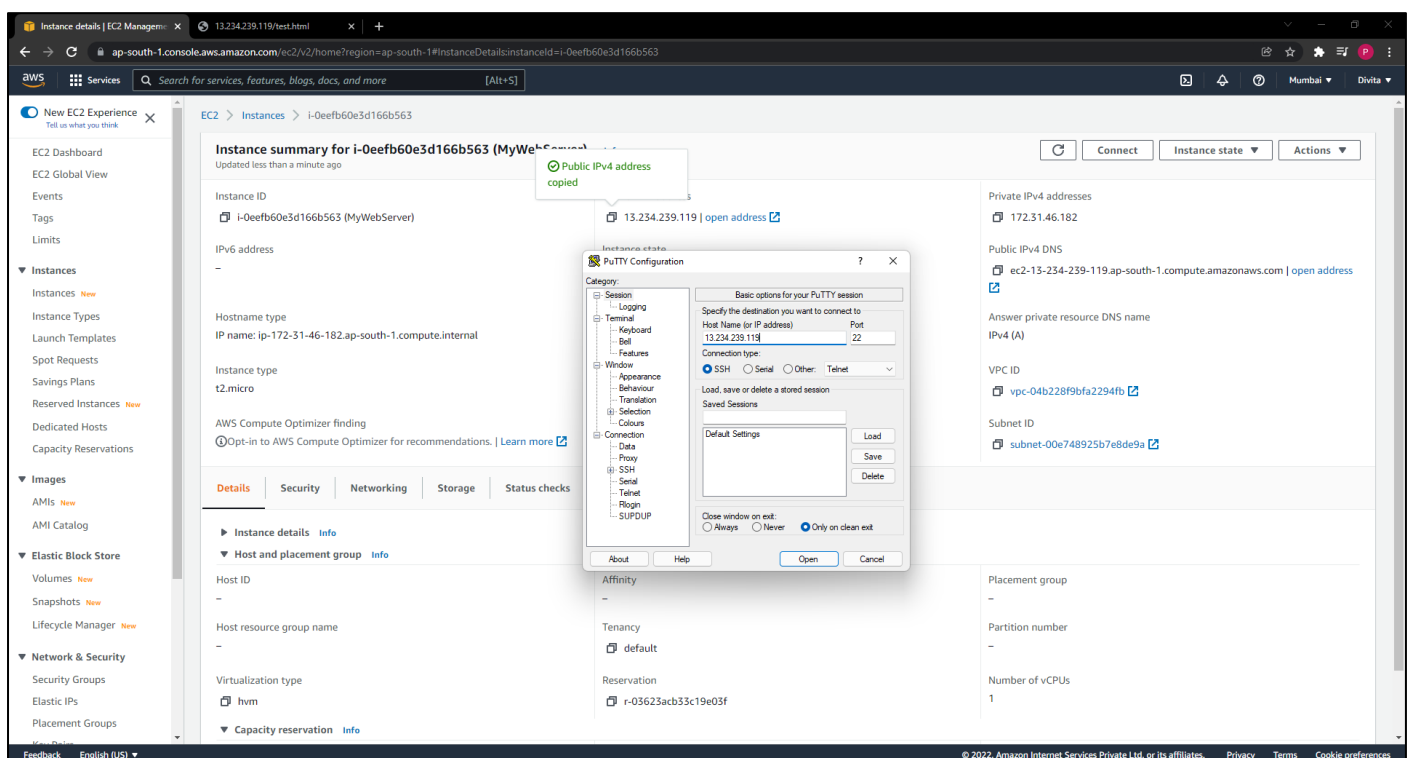
- Download putty and puttygen
([https://www.puttygen.com/download-putty#PuTTY for windows](https://www.puttygen.com/download-putty#PuTTY%20for%20windows)
[https://www.puttygen.com/download-putty#Download PuTTY for Mac and Installation Guide](https://www.puttygen.com/download-putty#Download%20PuTTY%20for%20Mac%20and%20Installation%20Guide))
- Open Putty key Generator
- Click on Load
- It will ask for existing private key
- We must select the .pem file that we downloaded previously
- To do that select All files instead of .ppk in the right
- Click "OK"
- Save Private Key
- Name the file, this will be in .ppk format

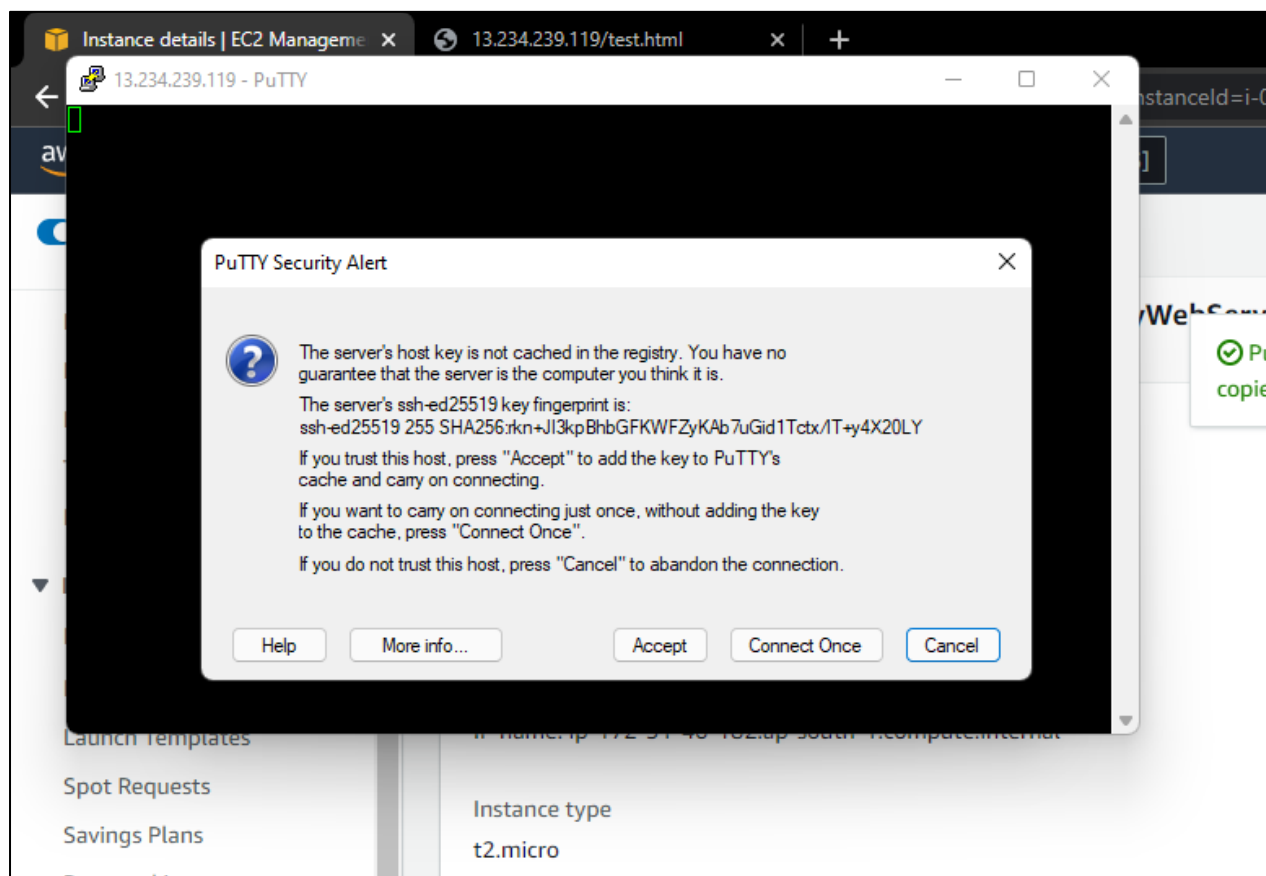
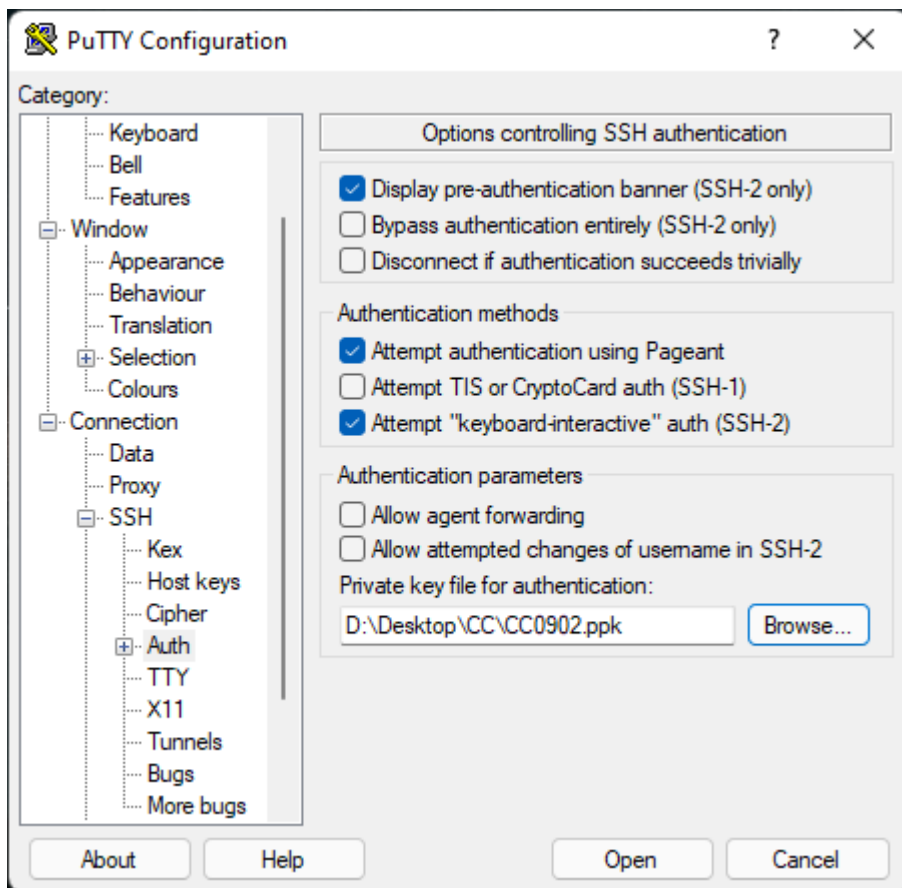






- Now open Putty and go to the “Session” section -> enter public ip address in Host Name
- Go to “Connection” -> “SSH” and browse the .ppk file that you just created
- Click on Accept





- Login as ec2-user
- Repeat the same commands as above to connect the server

```
ec2-user@ip-172-31-46-182:~  
login as: ec2-user  
Authenticating with public key "imported-openssh-key"  
Last login: Wed Feb  9 13:53:41 2022 from 49.36.109.130  
  
  _|  _|_ )  
  _| (  _ /  Amazon Linux 2 AMI  
  __| \__|__|  
  
https://aws.amazon.com/amazon-linux-2/  
[ec2-user@ip-172-31-46-182 ~]$
```

```
root@ip-172-31-46-182:/home/ec2-user  
login as: ec2-user  
Authenticating with public key "imported-openssh-key"  
Last login: Wed Feb  9 13:53:41 2022 from 49.36.109.130  
  
  _|  _|_ )  
  _| (  _ /  Amazon Linux 2 AMI  
  __| \__|__|  
  
https://aws.amazon.com/amazon-linux-2/  
[ec2-user@ip-172-31-46-182 ~]$ sudo su  
[root@ip-172-31-46-182 ec2-user]# yum install -y httpd.x86_64  
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd  
amzn2-core | 3.7 kB 00:00  
Package httpd-2.4.52-1.amzn2.x86_64 already installed and latest version  
Nothing to do  
[root@ip-172-31-46-182 ec2-user]# systemctl status httpd.service  
● httpd.service - The Apache HTTP Server  
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; vendor preset: disabled)  
   Active: active (running) since Wed 2022-02-09 13:58:46 UTC; 18min ago  
     Docs: man:httpd.service(8)  
  Main PID: 3433 (httpd)  
    Status: "Total requests: 5; Idle/Busy workers 100/0; Requests/sec: 0.0045; Bytes served/sec: 13 B/sec"
```