# Launching an EC2 instance using Apache webserver and creating a new virtual machine using AMI of your instance

## Amazon Elastic Compute Cloud (EC2)

It is a web service provided by Amazon Web Services (AWS) that allows users to rent virtual servers, known as **instances,** in the cloud.

EC2 provides scalable computing capacity, enabling businesses and individuals to quickly scale their applications and resources based on demand.

With EC2, users can launch instances with a wide range of computing capabilities, such as different **CPU, memory, storage, and networking** options.

These instances are billed on an hourly basis and can be easily configured, managed, and terminated as needed.


## Amazon Machine Image (AMI)

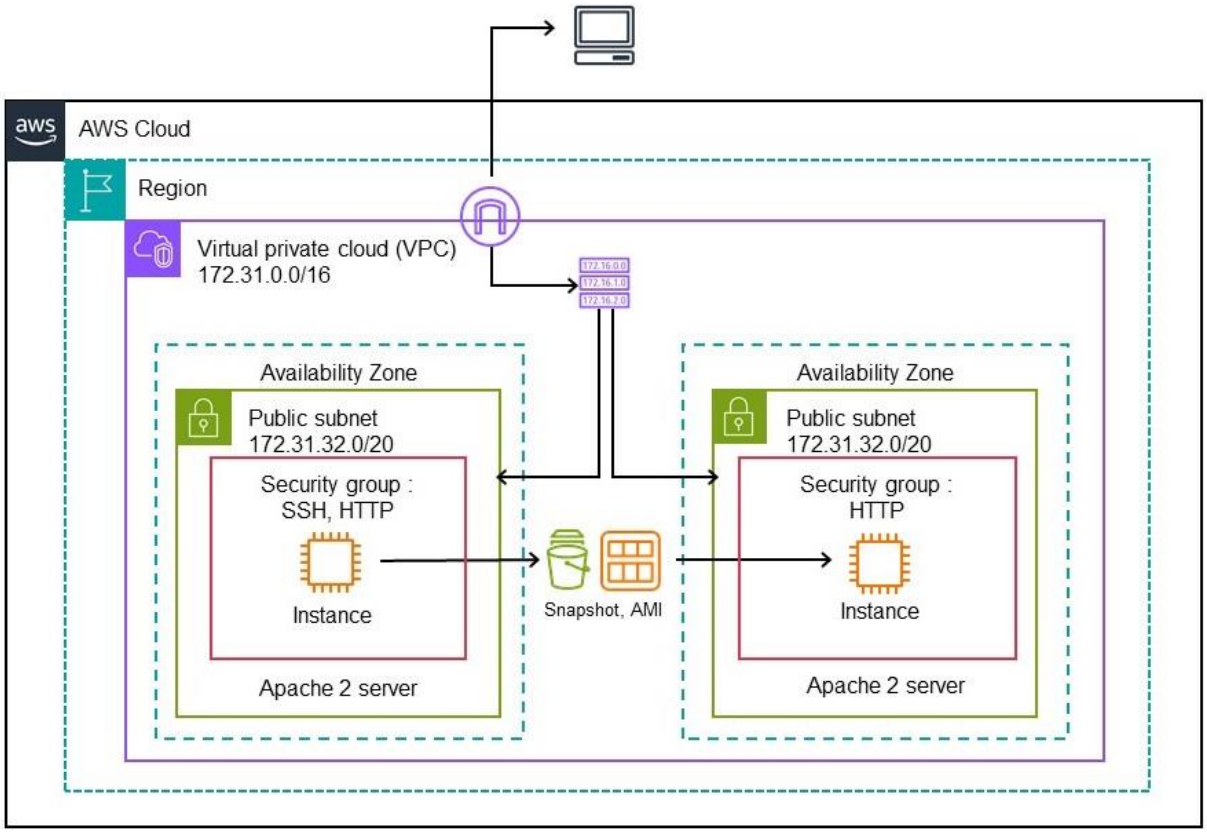
It is a **pre-configured template** that contains the necessary software, operating system, and configuration settings to launch an instance in Amazon Elastic Compute Cloud (EC2).

An AMI serves as a **virtual machine image** or a **snapshot** of a root file system.

AMIs are available for various **operating systems**, including different versions of Linux, Windows, and other specialized software configurations.

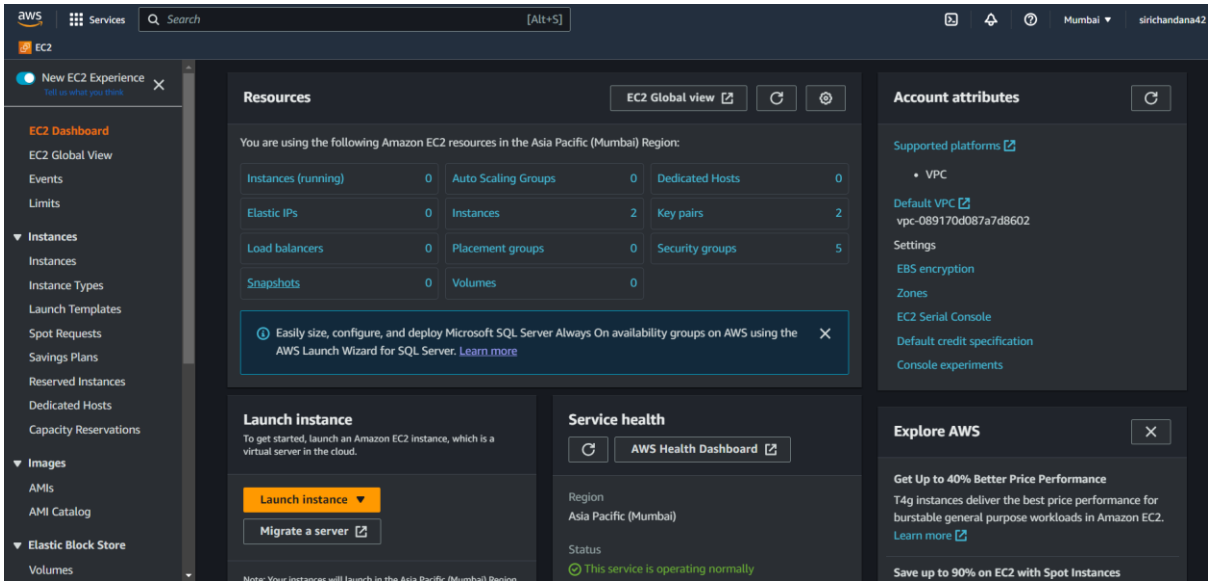
AMIs support **versioning**, allowing users to create new versions of an AMI as changes are made. AMIs can be copied between regions, shared with other AWS accounts, and made public or private.

## Architecture:



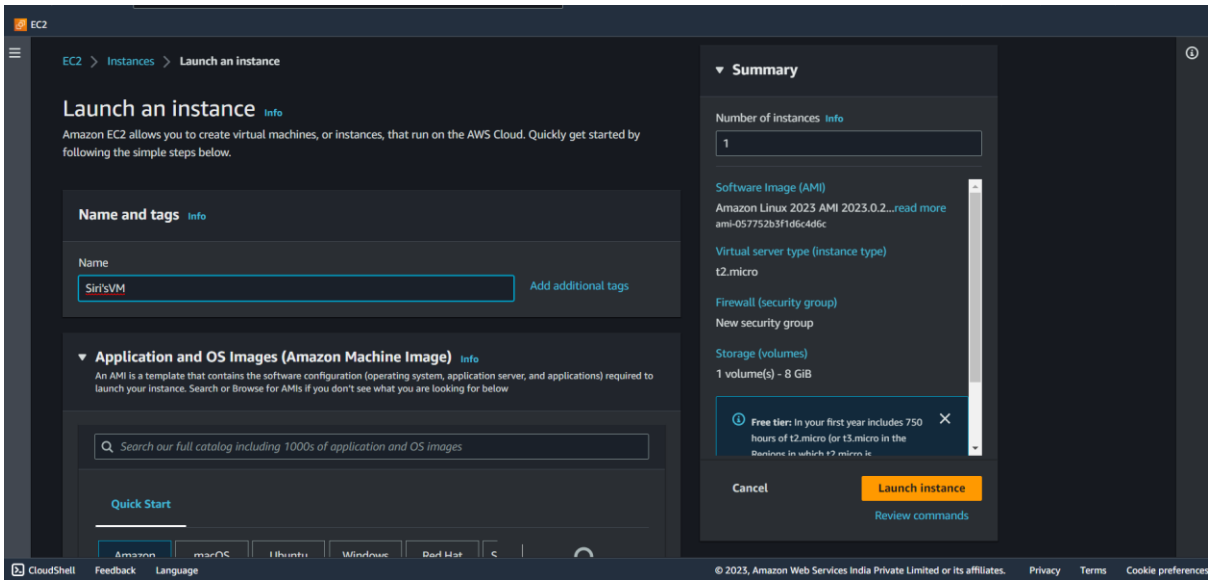
# Steps to Launch an Instance

1. First Log in to your AWS free tier account and open your AWS management console and click on services and select **compute** and
   Select **EC2**.

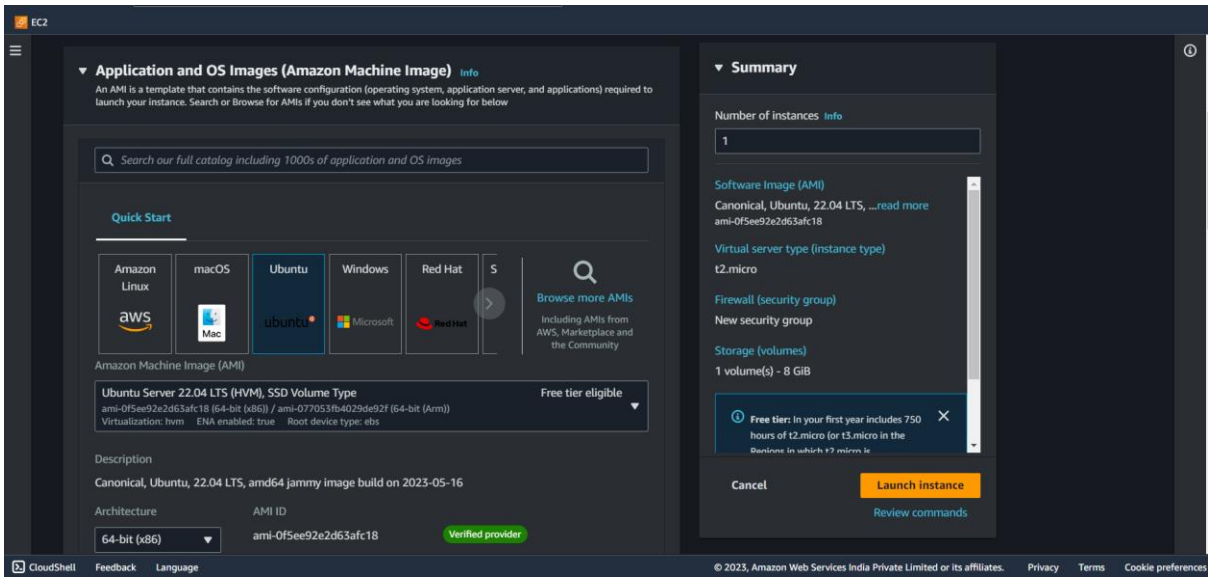



2. Click on Launch an Instance and open the EC2 launch pad

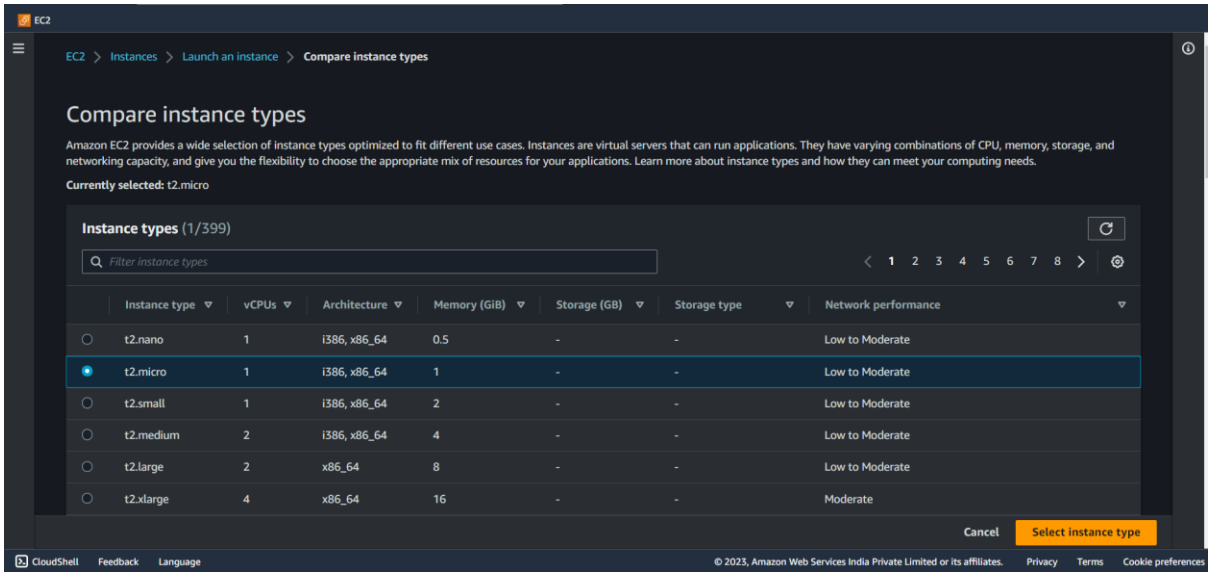
   Firstly **Name your Instance** and set respective **tags** if required.



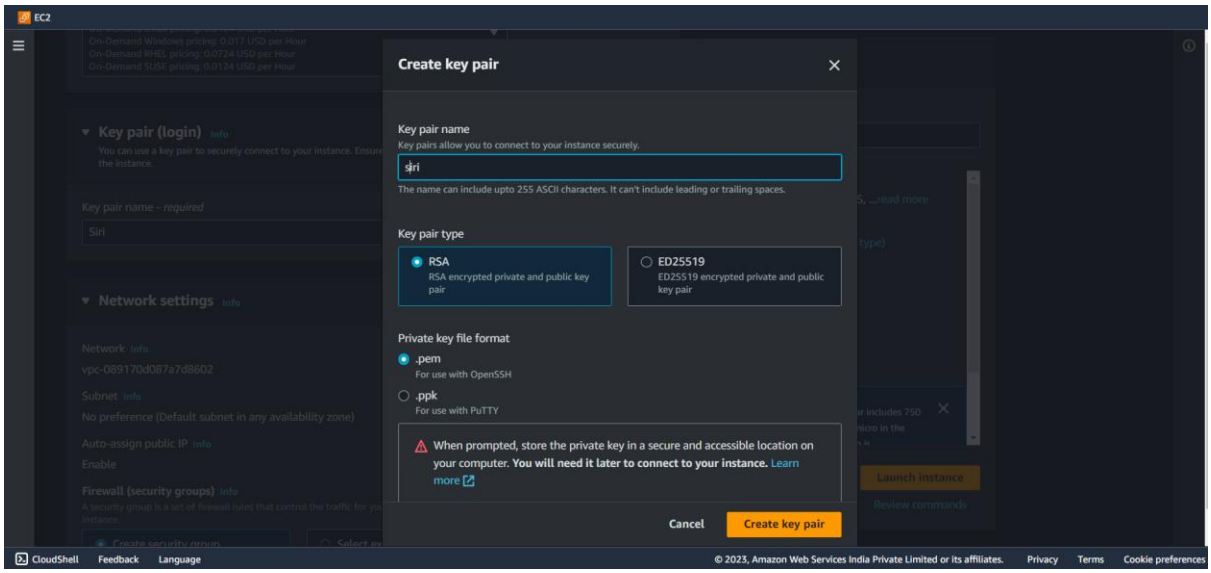
3. Select required **AMI** for your Virtual Machine here I chose **Ubuntu** you can also browse different AMIs in the browse more AMIs section make sure it is FREE TIER ELIGIBLE if you're using a free tier account



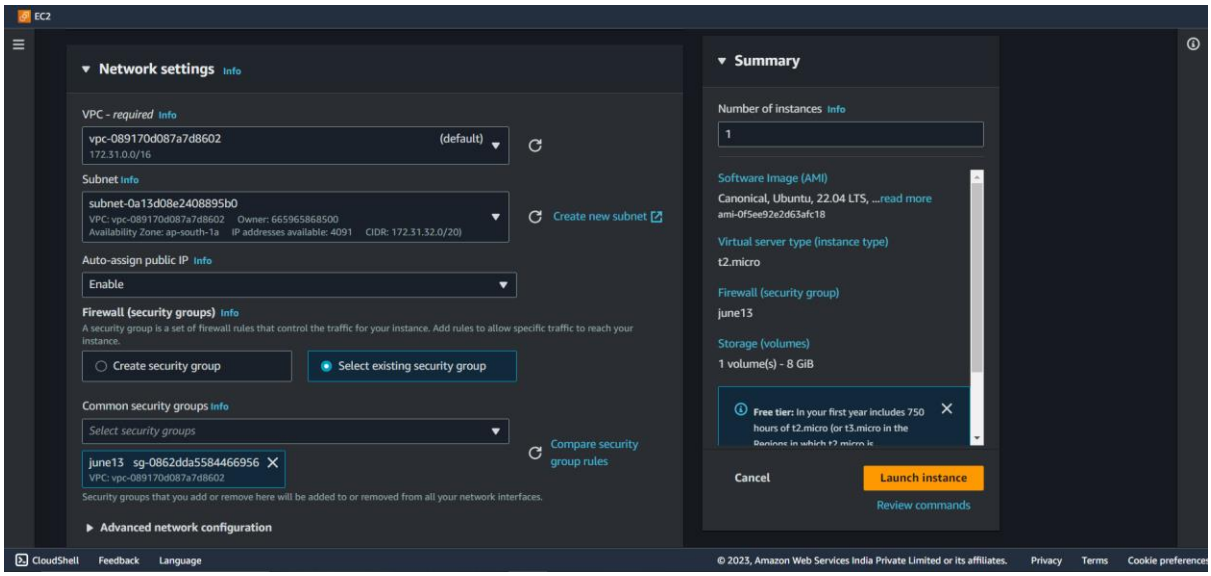

4. Select Required **Instance type** (Hardware configuration)
   **Instance types** refer to the various configurations of virtual machines available in AWS. Each instance type has specific combinations of CPU, memory, storage, and networking capacity to meet different workload requirements for your virtual machine AWS provides various instance types with different configuration as follows.



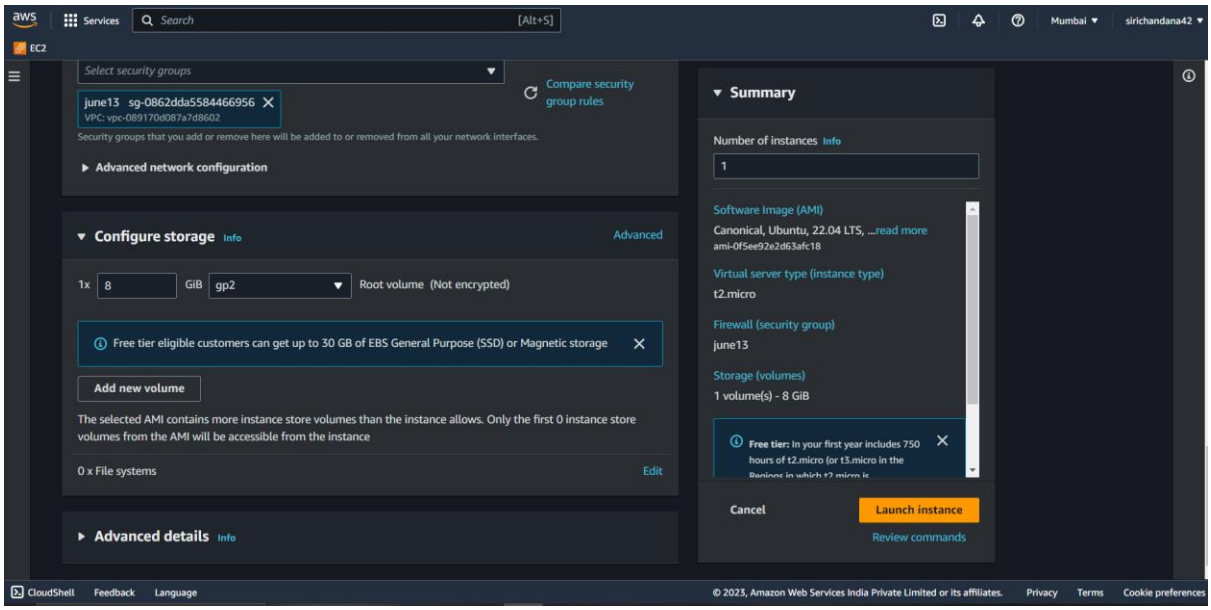
5. Create a **key pair** or use an existing key pair to encrypt and decrypt and authenticate your server. (Make sure you have respective **.pem file** when you use a key pair for accessing the instance it is called **Private Key** and AWS validates it with the **Public key** which they have)



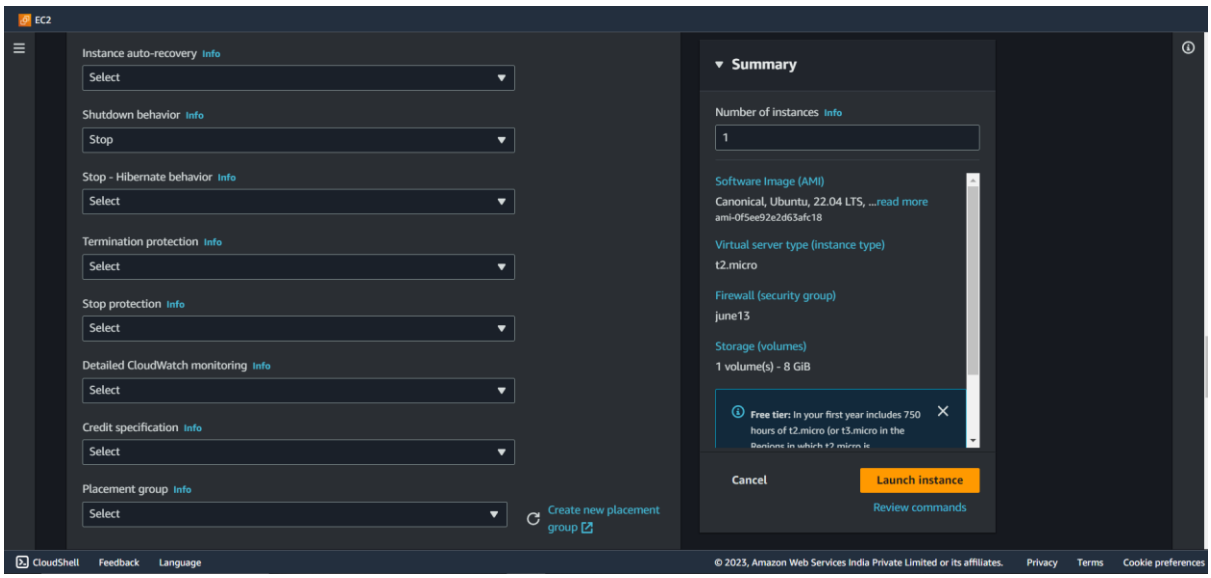

6. Set the required **network settings** regarding VPC and which availability zone you want to create your instance and also **firewalls** required to control the traffic and also **Security group rules** to allow specific traffic to reach your instance.



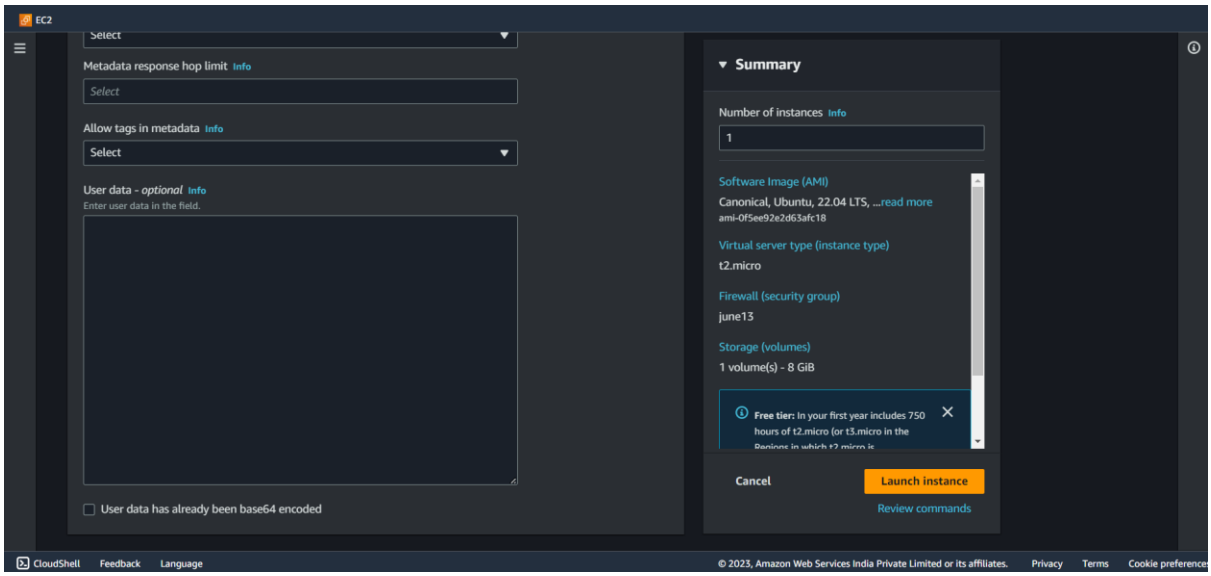
7. Select Required **Configurational storage** for you instance which will be your **root volume** where information of all your Packages, OS and etc., are stored.



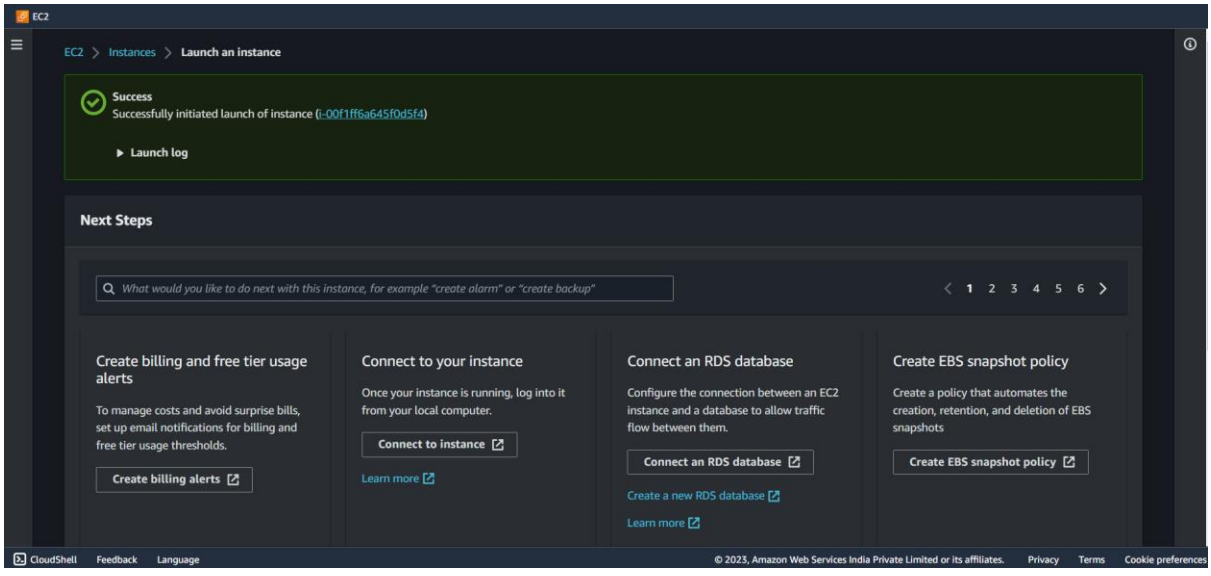

8. You can set advanced settings if you need like
   DOT (**Delete on Termination** on/off) which will delete/wont delete the root volume when you terminate the instance.
   **Termination Protection** which helps prevent accidental termination of critical resources.
   **AWS Cloud watch** is a monitoring and observability service. It enables you to collect and track metrics, collect and monitor log files, and set alarms on specific metrics or log events



9. You can add any **user data** if required to pre boot any program on your ec2 instance

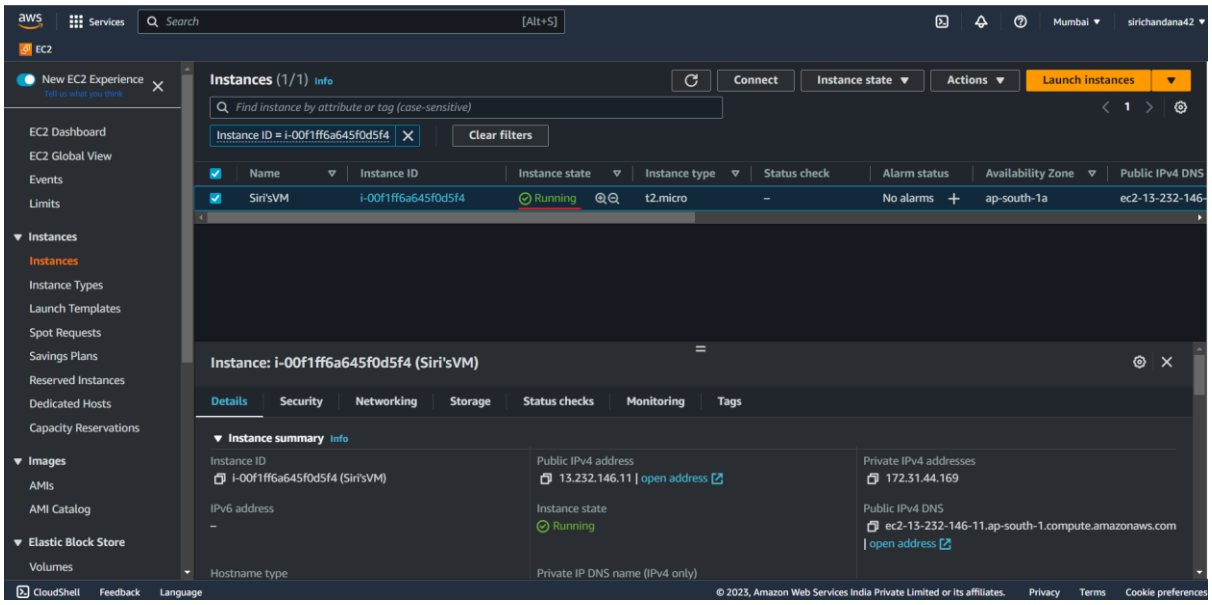



10. Click on **Launch Instance** to launch your EC2 instance and you must be able to few a successfully launched sign with the Instance ID. Then click on the Instance ID to view your instance.



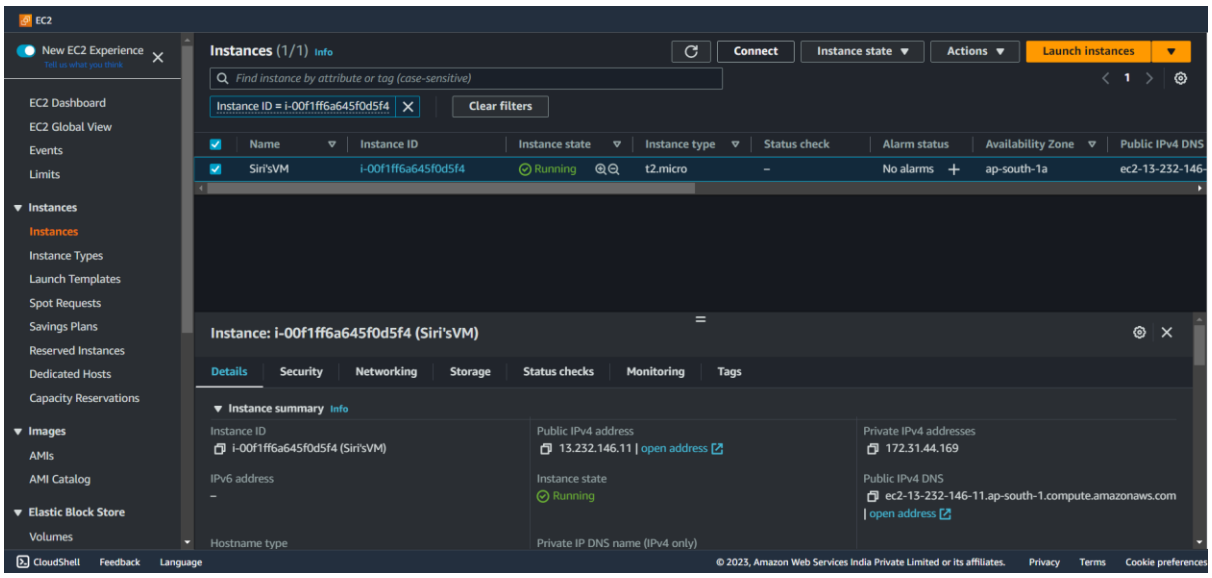

Wait until the Pending state of your instance turns into running state….

11. Now that your instance is in running state you will have a public IP from **AWS Pool** of addresses and a private IP




12. To access your Virtual Machine you must **Connect to your instance** by selecting the instance and clicking on connect you will be navigated to Connect to an instance page

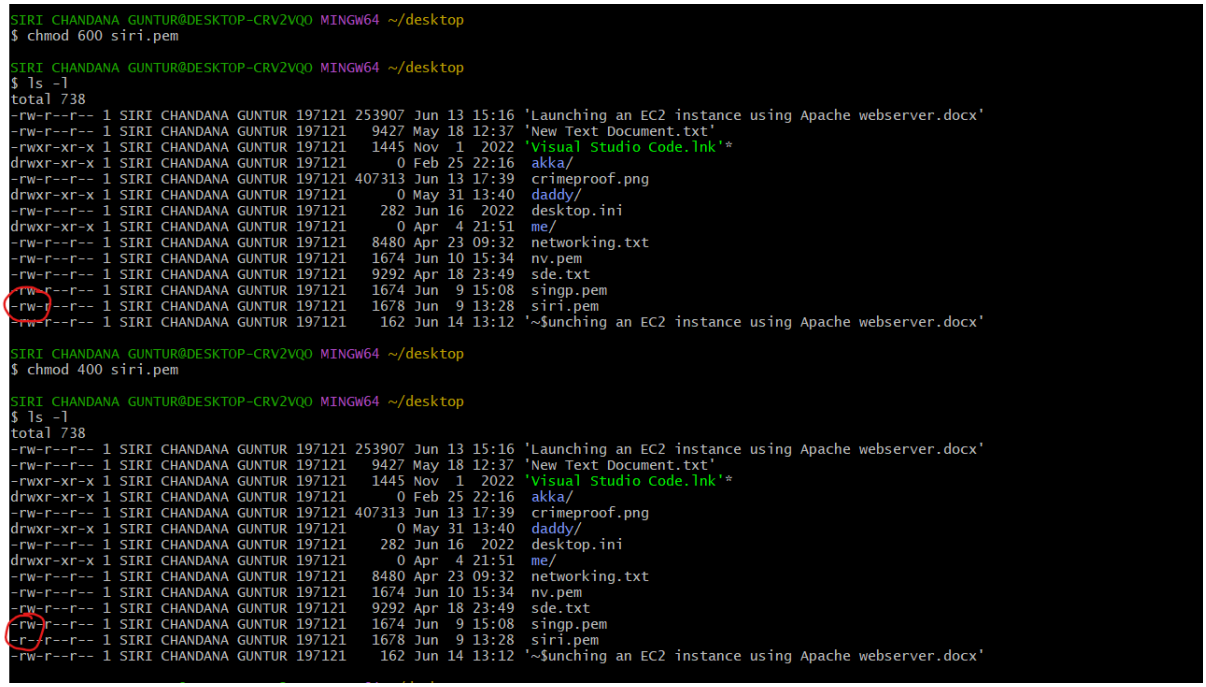
    For Ubuntu, I used **GIT Bash** to connect to the instance by SSH client.
    For Amazon Linux, You can use **Instance Connect.**



# GIT BASH

1. First to access the pem file make sure your PWD (Present Working Directory) is in same as the location where you saved your .pem file in your local machine


2. Change the permissions of your pem file to **read only** to avoid any unnecessary changes in the private key



3. Now connect to the ssh client using the command so that you will be connected to your virtual machine

   **ssh –i  nv.pem ubuntu@public IP address**

```
SIRI CHANDANA GUNTUR@DESKTOP-CRV2VQO MINGW64 ~/desktop
$ ssh -i siri.pem ubuntu@13.232.146.11
The authenticity of host '13.232.146.11 (13.232.146.11)' can't be established.
ED25519 key fingerprint is SHA256:lJpUC4IxEPKsAlUS4u64WhO5DJ7U5UMOkmHJgDoBUgc.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '13.232.146.11' (ED25519) to the list of known hosts.
Welcome to Ubuntu 22.04.2 LTS (GNU/Linux 5.19.0-1025-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

  System information as of Wed Jun 14 11:44:59 UTC 2023

  System load:  0.0               Processes:             95
  Usage of /:   20.6% of 7.57GB   Users logged in:       0
  Memory usage: 24%               IPv4 address for eth0: 172.31.44.169
  Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status


The list of available updates is more than a week old.
To check for new updates run: sudo apt update


The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-44-169:~$
```

4. Update your kernel to latest version using **sudo apt-get update** command.

```
ubuntu@ip-172-31-44-169:/$ sudo apt-get update
Hit:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:3 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Get:4 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [108 kB]
Get:5 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [14.1 MB]
Get:6 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [457 kB]
Get:7 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe Translation-en [5652 kB]
Get:8 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 c-n-f Metadata [286 kB]
Get:9 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [217 kB]
Get:10 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse Translation-en [112 kB]
Get:11 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 c-n-f Metadata [8372 B]
Get:12 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [676 kB]
Get:13 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [183 kB]
Get:14 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [15.1 kB]
Get:15 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [350 kB]
Get:16 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [52.8 kB]
Get:17 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [921 kB]
Get:18 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [194 kB]
Get:19 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [20.0 kB]
Get:20 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [35.3 kB]
Get:21 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse Translation-en [8452 B]
Get:22 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 c-n-f Metadata [468 B]
Get:23 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [40.9 kB]
Get:24 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main Translation-en [10.2 kB]
Get:25 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 c-n-f Metadata [388 B]
Get:26 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/restricted amd64 c-n-f Metadata [116 B]
Get:27 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [23.4 kB]
Get:28 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [15.0 kB]
Get:29 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 c-n-f Metadata [548 B]
Get:30 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/multiverse amd64 c-n-f Metadata [116 B]
Get:31 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [123 kB]
Get:32 http://security.ubuntu.com/ubuntu jammy-security/main amd64 c-n-f Metadata [10.2 kB]
Get:33 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [349 kB]
Get:34 http://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [52.6 kB]
Get:35 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [735 kB]
Get:36 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [130 kB]
Get:37 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [15.6 kB]
Get:38 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [30.2 kB]
Get:39 http://security.ubuntu.com/ubuntu jammy-security/multiverse Translation-en [5828 B]
Get:40 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [252 B]
Fetched 25.2 MB in 5s (4929 kB/s)
Reading package lists... Done
ubuntu@ip-172-31-44-169:/$
```

5. Now install Apache webserver into your virtual machine to host your desired webpage using **sudo apt-get install apache** command

```
ubuntu@ip-172-31-44-169:/$ sudo apt-get install apache2
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils bzip2 libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.3-0 mailcap mime-support ssl-cert
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom www-browser bzip2-doc
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils bzip2 libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.3-0 mailcap mime-support ssl-cert
0 upgraded, 13 newly installed, 0 to remove and 58 not upgraded.
Need to get 2137 kB of archives.
After this operation, 8505 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libapr1 amd64 1.7.0-8ubuntu0.22.04.1 [108 kB]
Get:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libaprutil1 amd64 1.6.1-5ubuntu4.22.04.1 [92.6 kB]
Get:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libaprutil1-dbd-sqlite3 amd64 1.6.1-5ubuntu4.22.04.1 [11.3 kB]
Get:4 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libaprutil1-ldap amd64 1.6.1-5ubuntu4.22.04.1 [9168 B]
Get:5 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 liblua5.3-0 amd64 5.3.6-1build1 [140 kB]
Get:6 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 apache2-bin amd64 2.4.52-1ubuntu4.5 [1345 kB]
Get:7 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 apache2-data all 2.4.52-1ubuntu4.5 [165 kB]
73% [7 apache2-data 0 B/165 kB 0%]
```

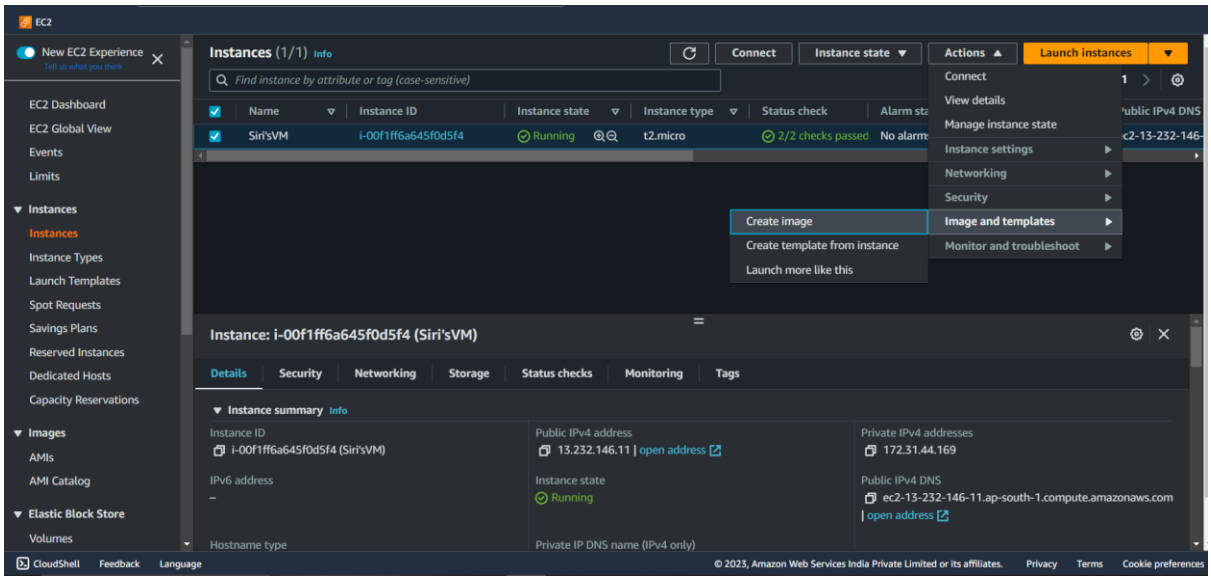
6. The temporary file in /var/www/html
   index.html file is displayed when you access using your instance public IP you can also change the display page by overriding the existing file with new source code html file.

```
ubuntu@ip-172-31-44-169:/$ cd /
ubuntu@ip-172-31-44-169:/$ ls
bin  boot  dev  etc  home  lib  lib32  lib64  libx32  lost+found  media  mnt  opt  proc  root  run  sbin  snap  srv  sys  tmp  usr  var
ubuntu@ip-172-31-44-169:/$ cd var
ubuntu@ip-172-31-44-169:/var$ ls
backups  cache  crash  lib  local  lock  log  mail  opt  run  snap  spool  tmp  www
ubuntu@ip-172-31-44-169:/var$ cd www
ubuntu@ip-172-31-44-169:/var/www$ ls
html
ubuntu@ip-172-31-44-169:/var/www$ cd html
ubuntu@ip-172-31-44-169:/var/www/html$ ls
index.html
ubuntu@ip-172-31-44-169:/var/www/html$
```

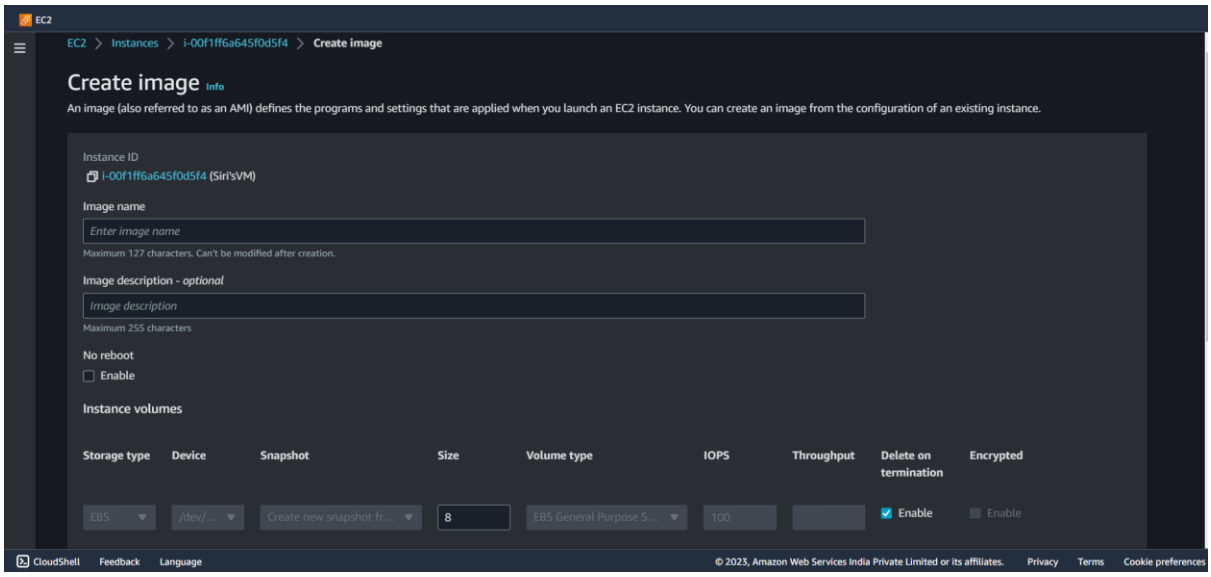
7. This is the index.html file which will be displayed

# New Virtual Machine from existing instance AMI

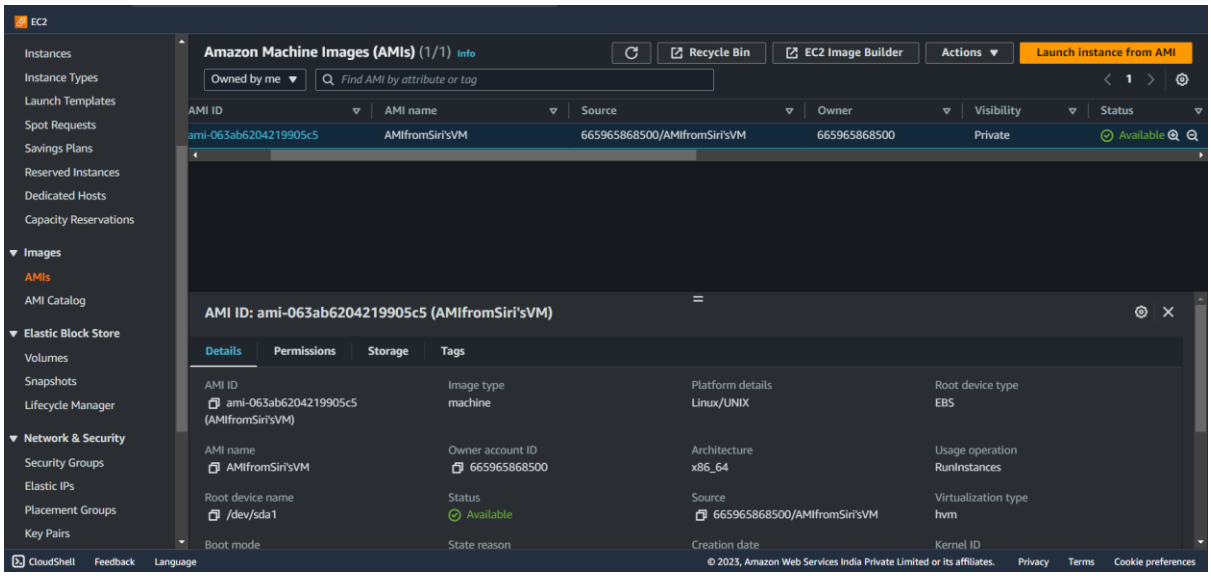
1. Select the instance and go to Actions and select **Images and templates** and select **create image**.



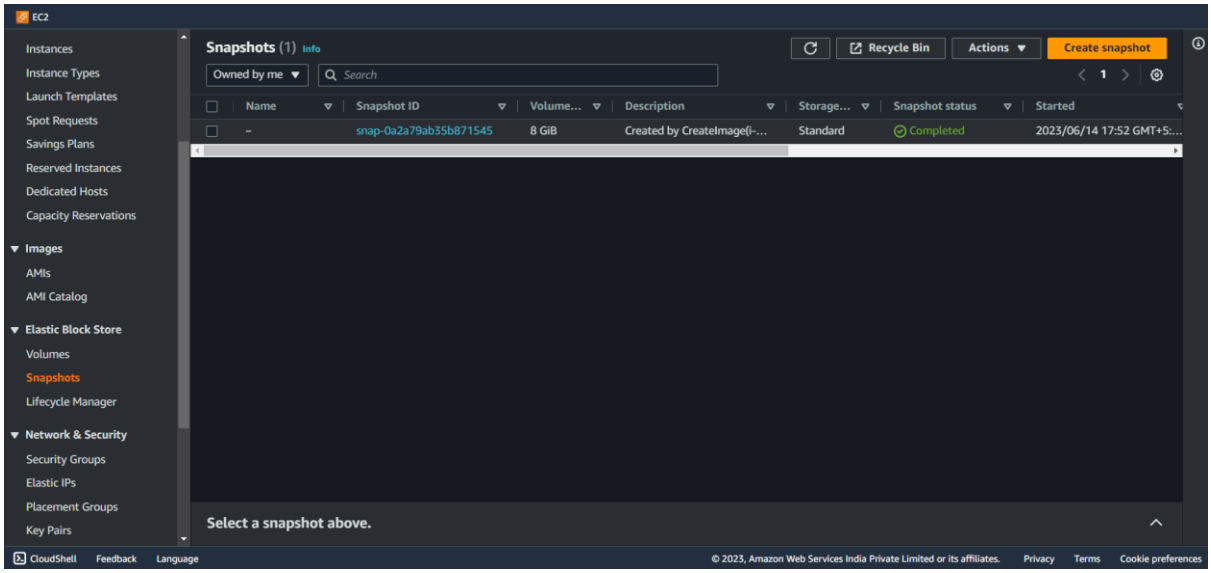

2. **Name** your AMI and add relevant **tags** if needed



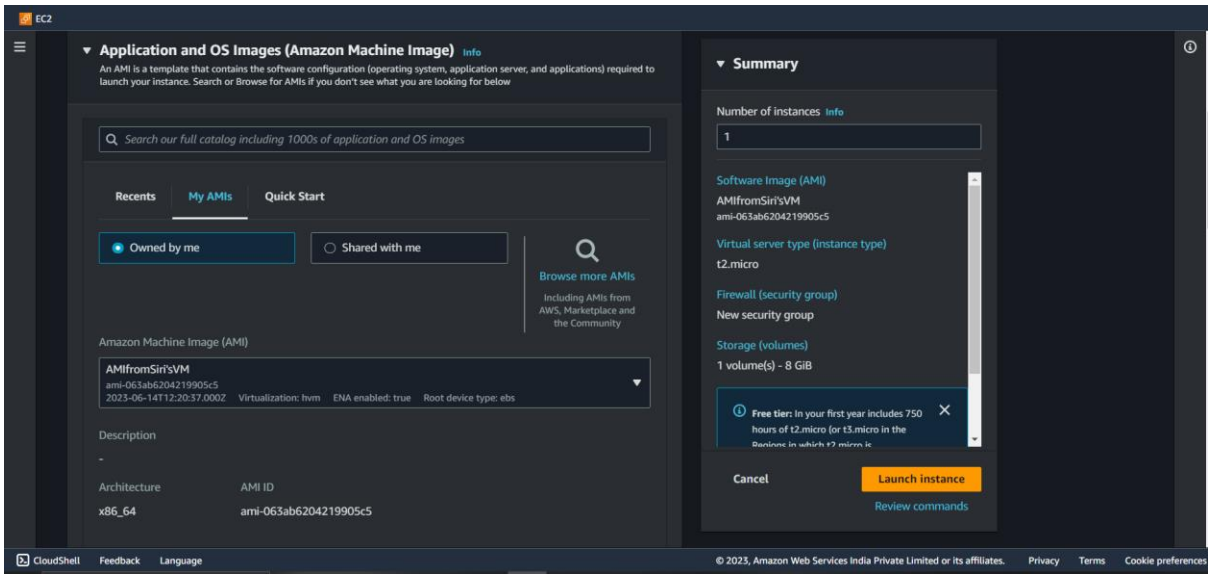
3. Wait until your AMI turns into available state and create a new instance from the AMI.




You automatically capture a snapshot whenever an AMI is generated snapshot refers to a point-in-time copy of an Amazon Elastic Block Store (EBS) volume.

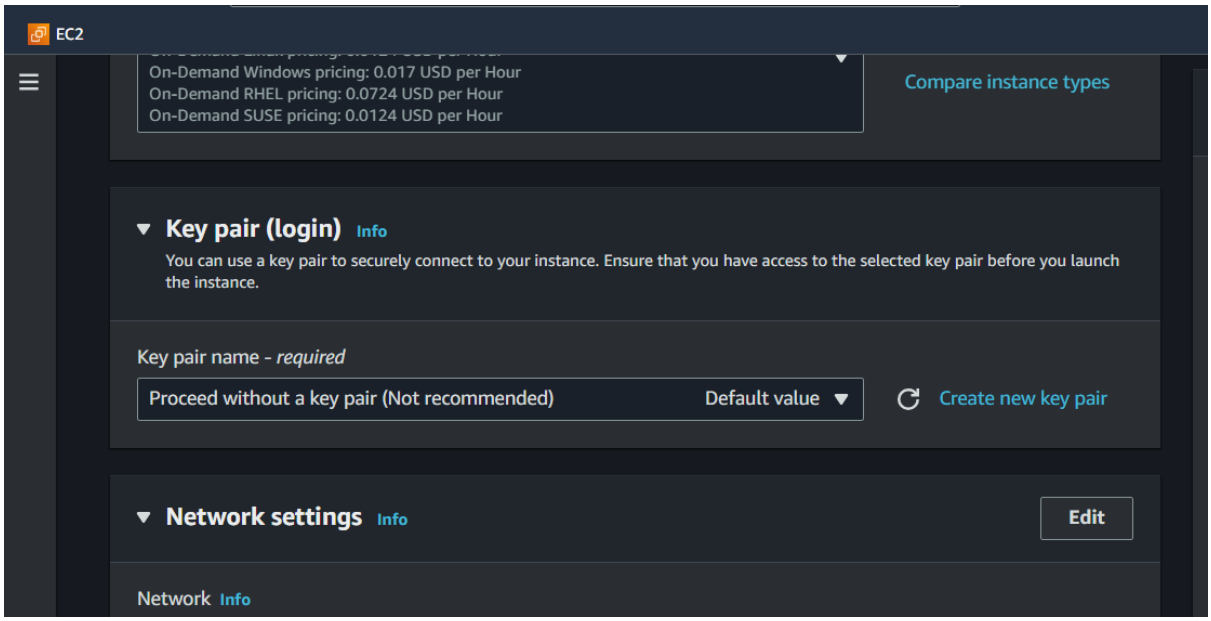


4. Now launch a new instance using created AMI in My AMIs

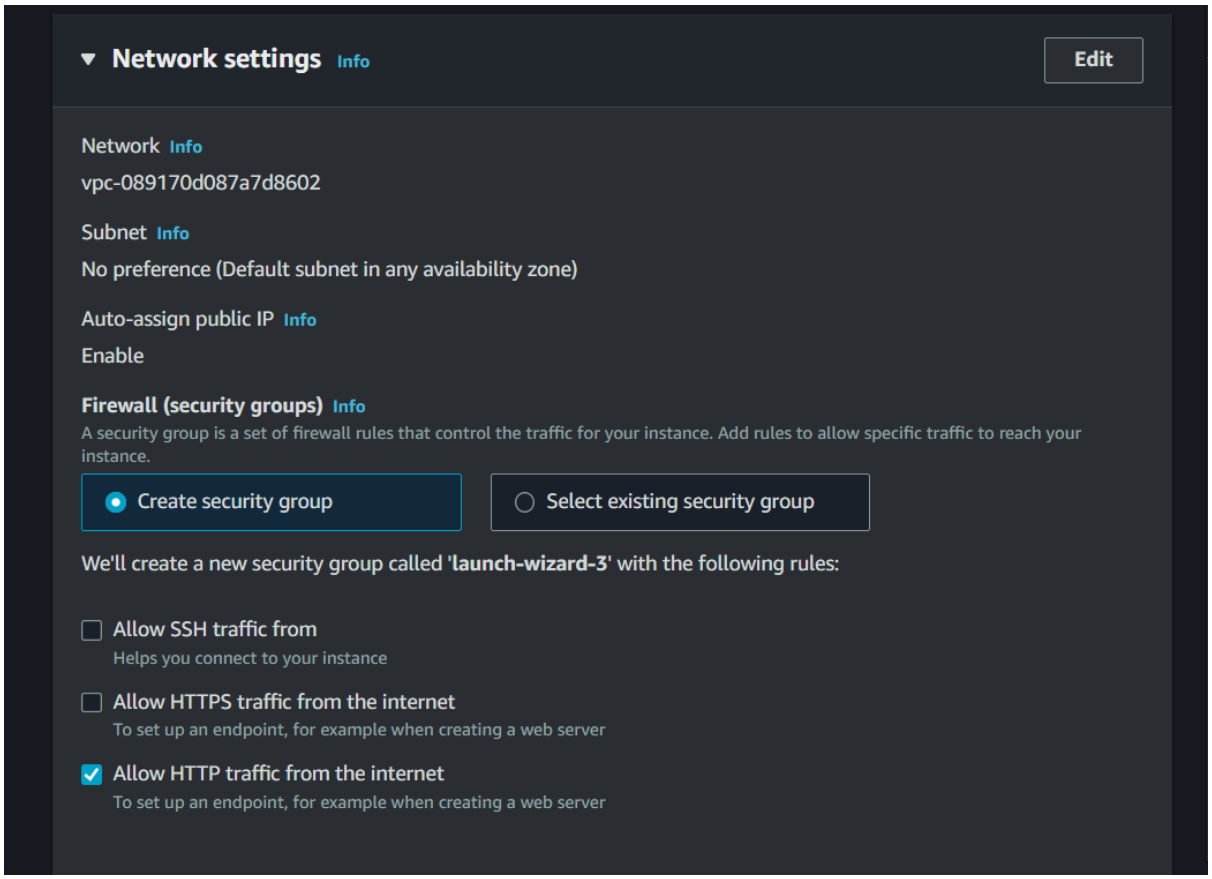



5. There is no need of key pair because we don't connect as all the packages are installed in the instance with which we created AMI

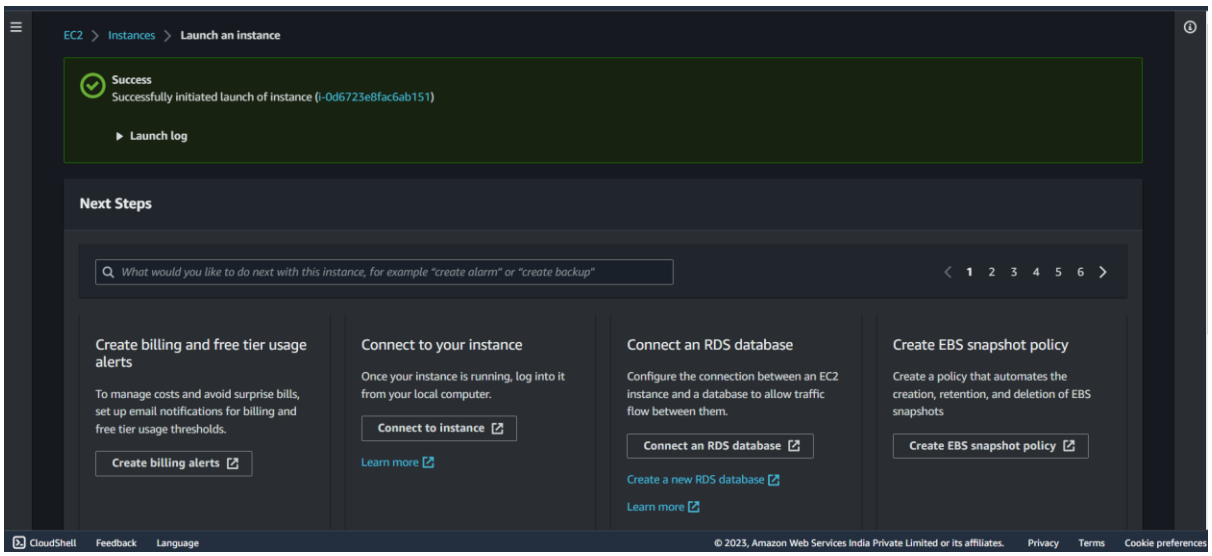
   Hence select proceed without a key pair.



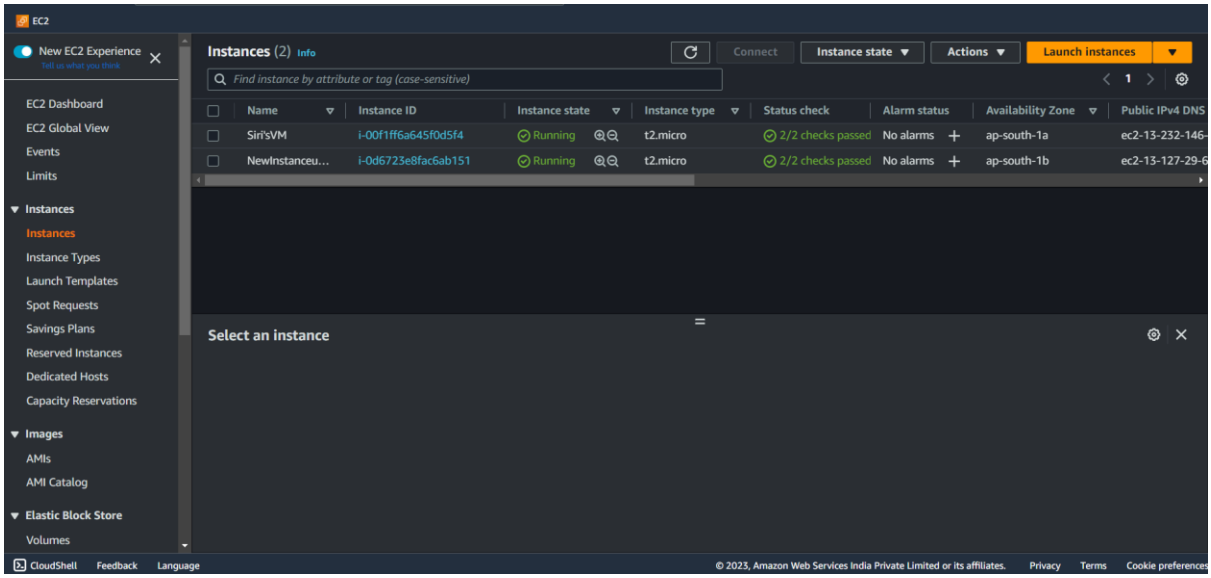
6. Select only **HTTP protocol** to display the webpage




7. Now Launch the instance you'll be getting a a successfully initiated popup box with instance id



8. Click on view all instances so that you can see both actual instance and AMI replicated instance at a time

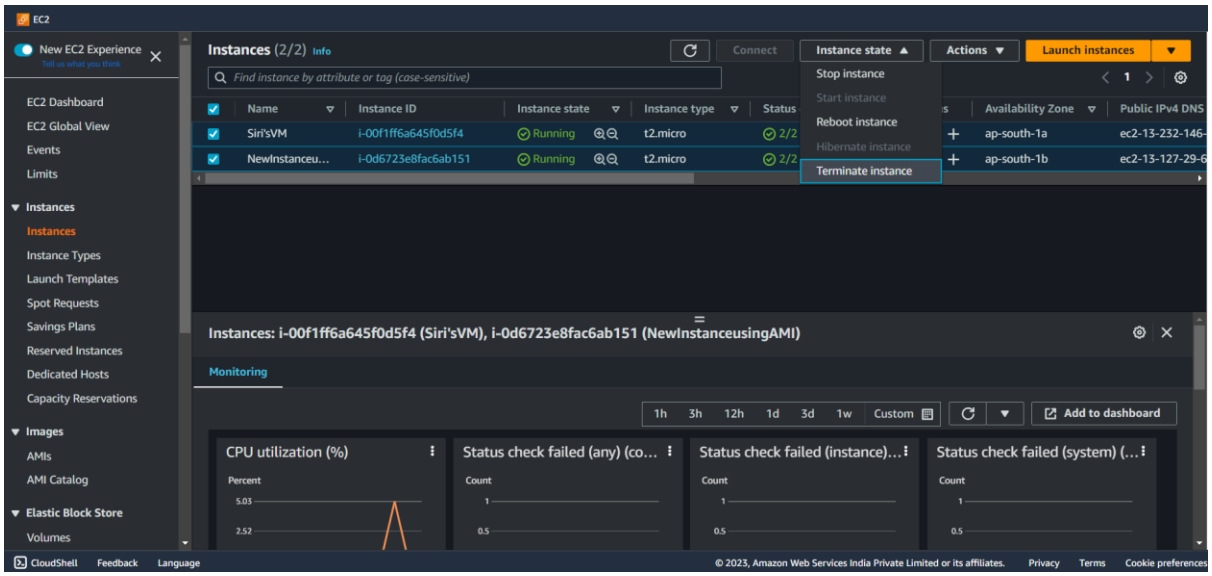



9. Since AMI replicated Instance will already have all the installed packages from the Instance 1 i.e., (Siri'sVM)
   We don't have to connect it to git bash and install again
   So now access the web page using new instance Public IP

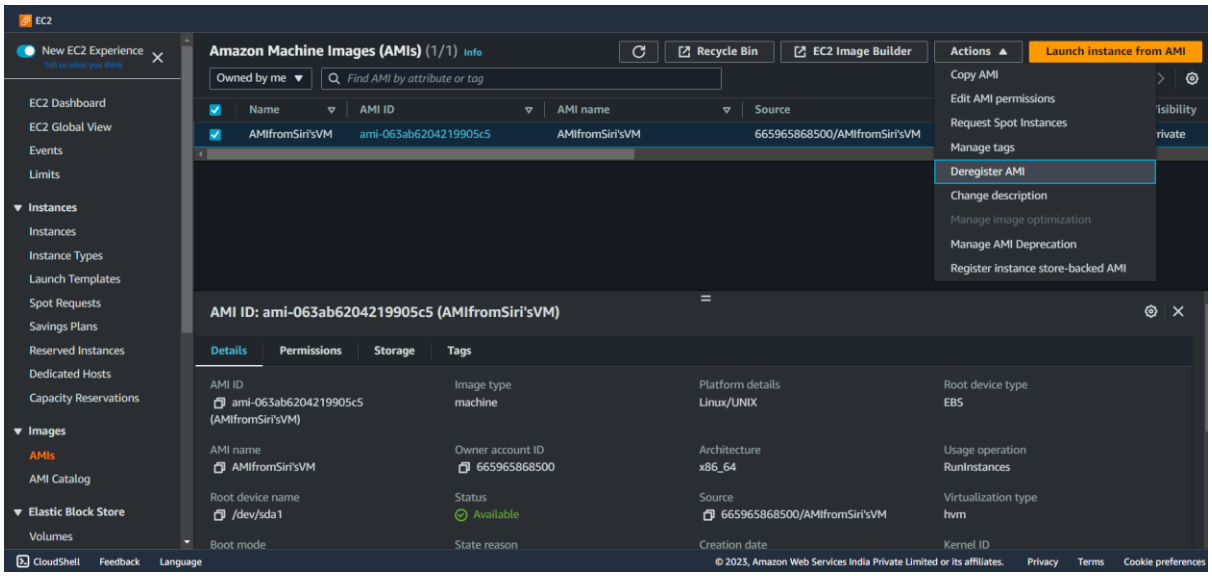

Siri'sVM IP – 13.232.146.11
NewInstancefromAMI IP – 13.127.29.64

# Cleaning Up Workspace

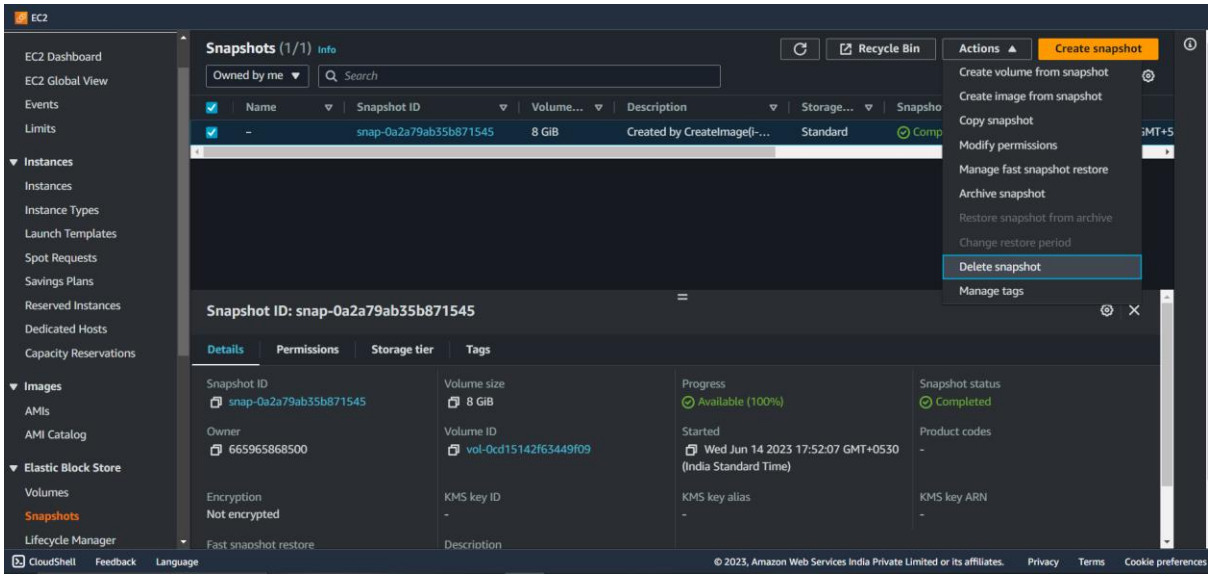
1. When you no longer need an **instance** you can **terminate the instance** by selecting the instances and click on instance state and then click terminate instance




2. You must also **deregister the AMI** by selecting the AMI and in actions select deregister



3. Since a Snapshot is automatically generated when u take an AMI you must also **delete the snapshot** or else charges will be applied after 24hrs




Make sure your dashboard is clear with no running resources