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Practical No: 9

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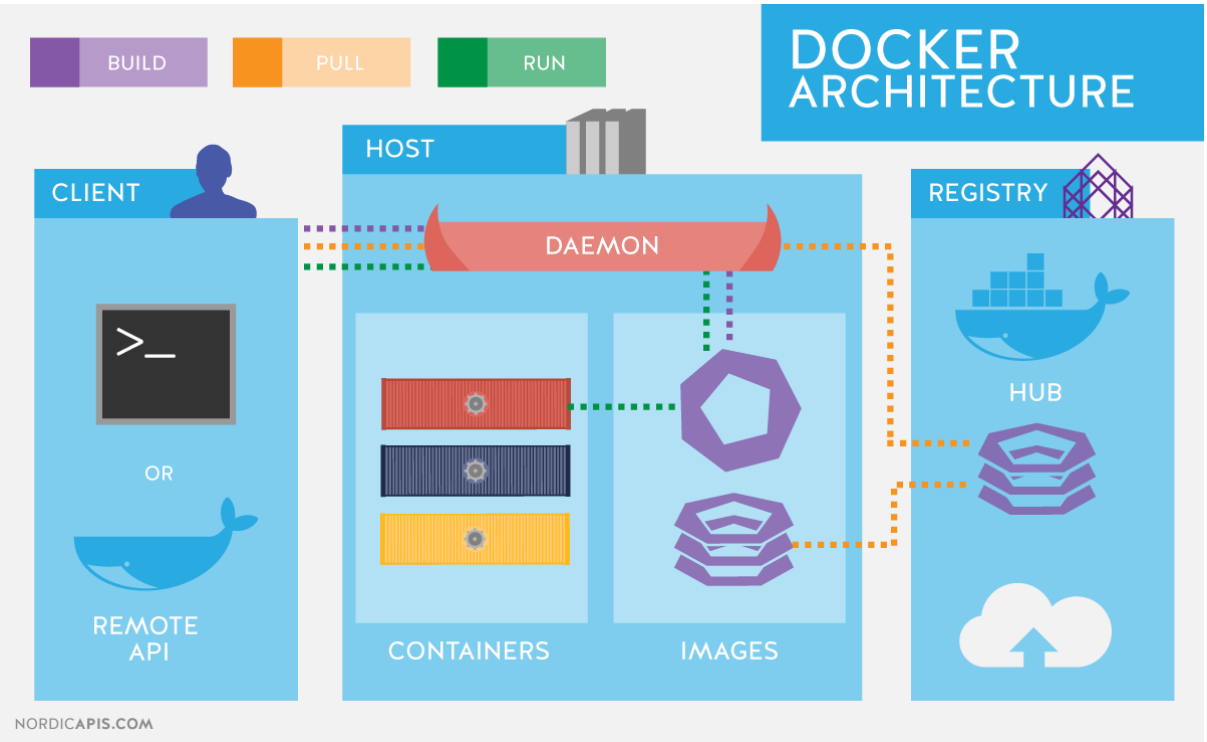
Aim: To understand containerization by deploying a lightweight Nginx web server using Docker on an EC2 instance, demonstrating the practical advantages of containers over traditional virtual machines.

1. What is Containerization / Docker? Explain Docker Architecture with the help of diagram
2. Compare Containers vs VMs
3. Why are Containers lightweight?
4. Deploy a containerized web Application on AWS EC2 Linux. [install Docker, pull nginx image and run it]. Pull python images and run the command to list all the locally stored docker images.

[Terminate the resources after performing the practical-terminate environment and application both]

ANS.1:

Containerization is a lightweight form of virtualization that packages an application and its dependencies (libraries, config files, etc.) into an isolated, portable unit called a **container**.
Docker is the most popular platform that enables developers to build, ship, and run containers consistently across different environments.



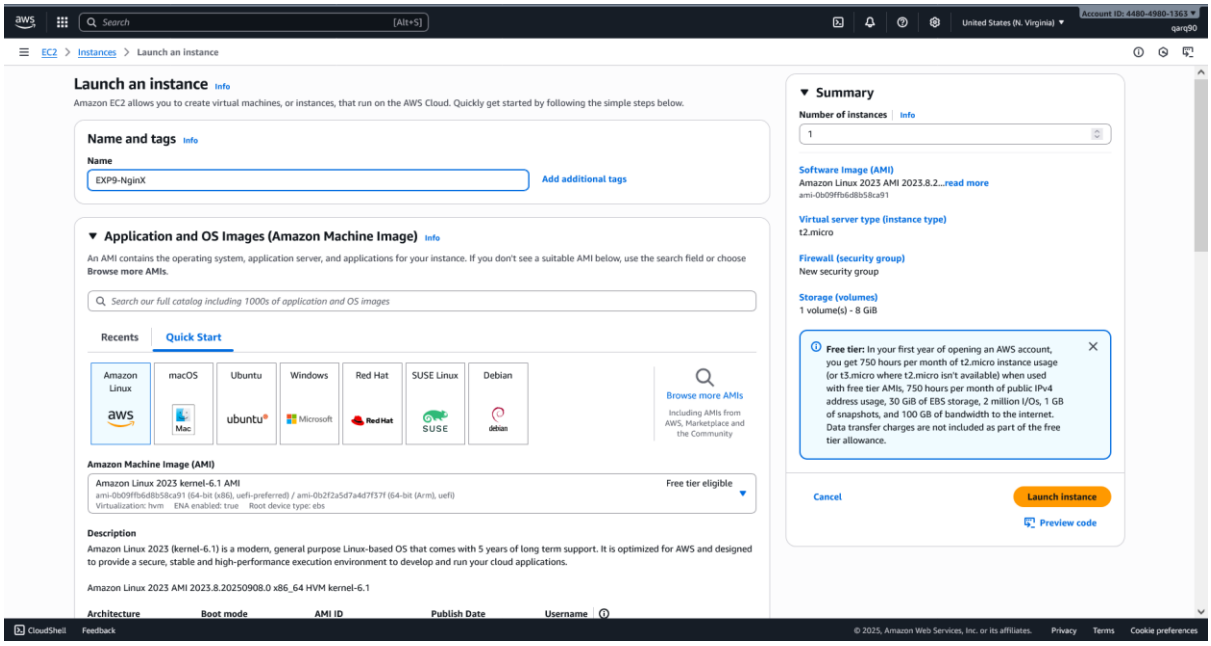
ANS.2:

Containers	Virtual Machines (VMs)
Share the host OS kernel	Each VM has its own full OS
Lightweight, fast boot-up	Heavy, slower boot-up
Less resource overhead	High resource overhead
Portable and consistent	Less portable due to size
Isolated at process level	Fully isolated hardware virtualization

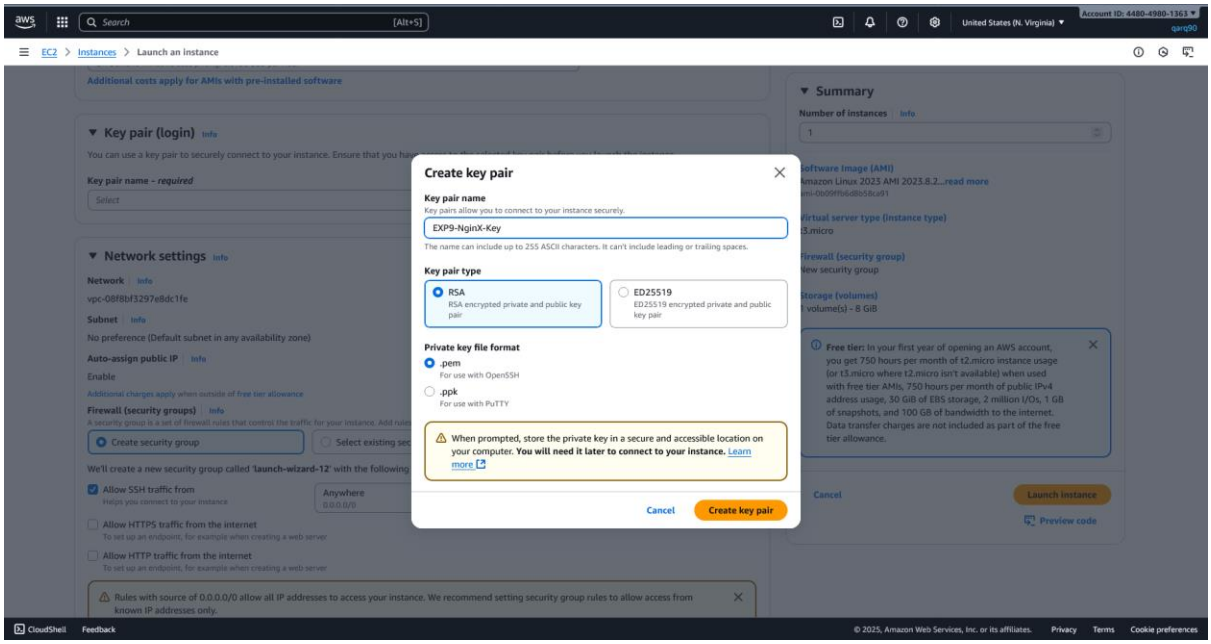
ANS.3:

Containers are lightweight because they **share the host operating system's kernel** and do not require a full operating system for each instance. Only the application, its dependencies, and a minimal runtime are packaged, eliminating the overhead of multiple guest OSes.

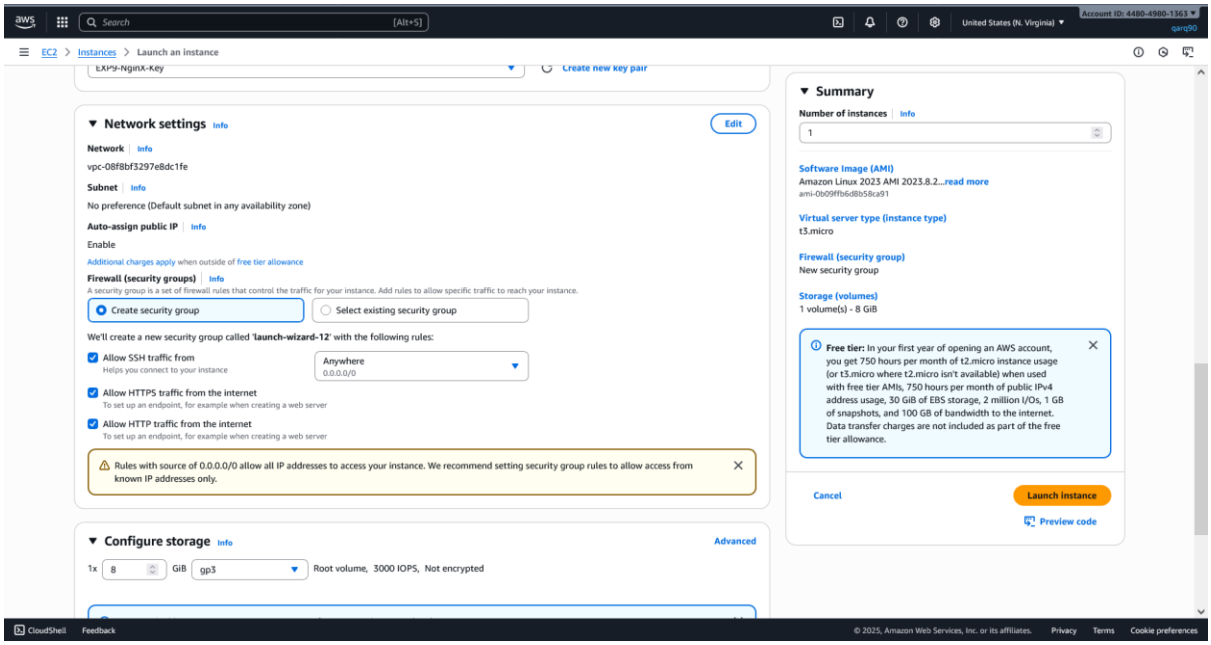
ANS.4:



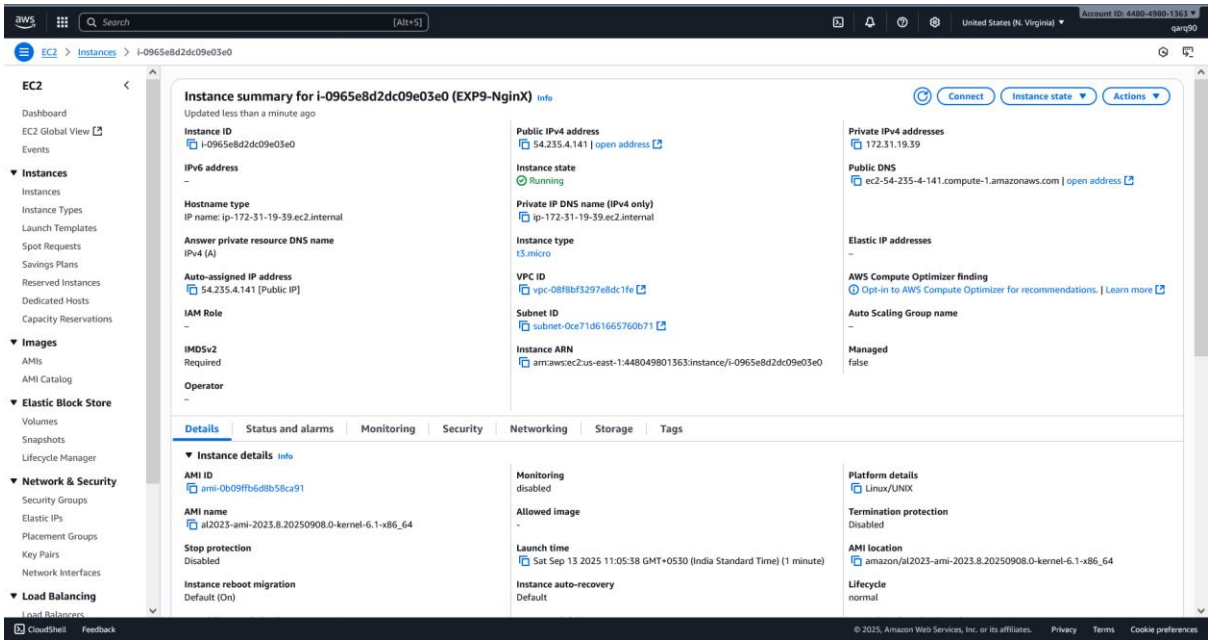
Creating a new Instance



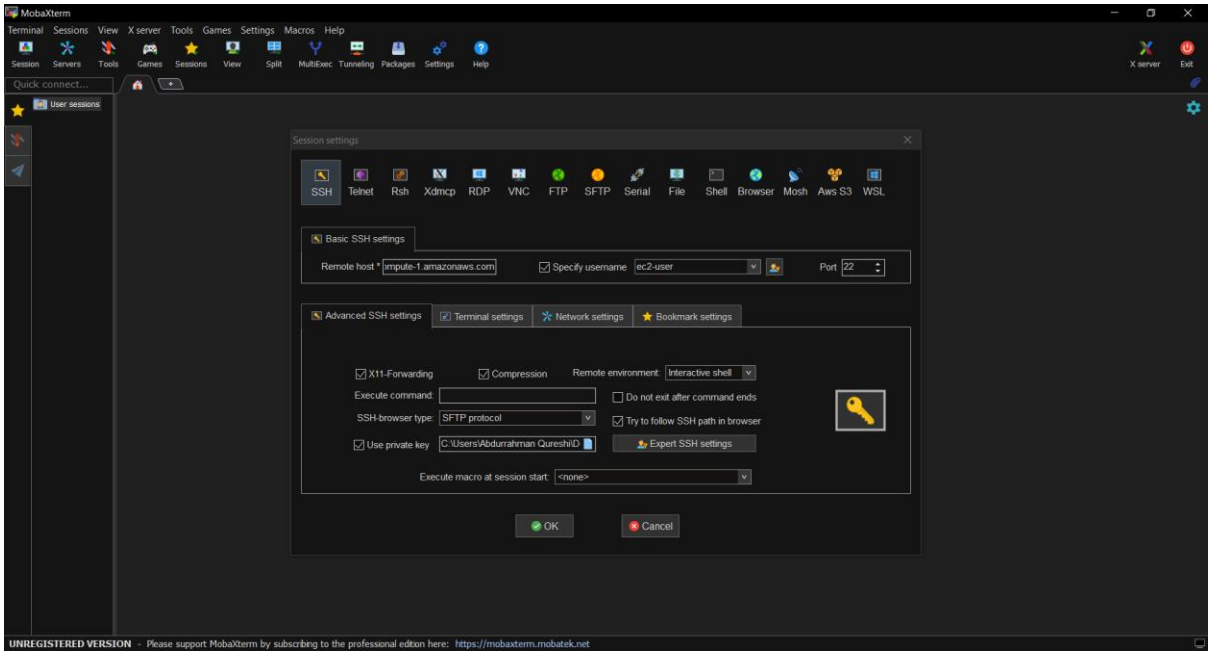
Creating Key Pair



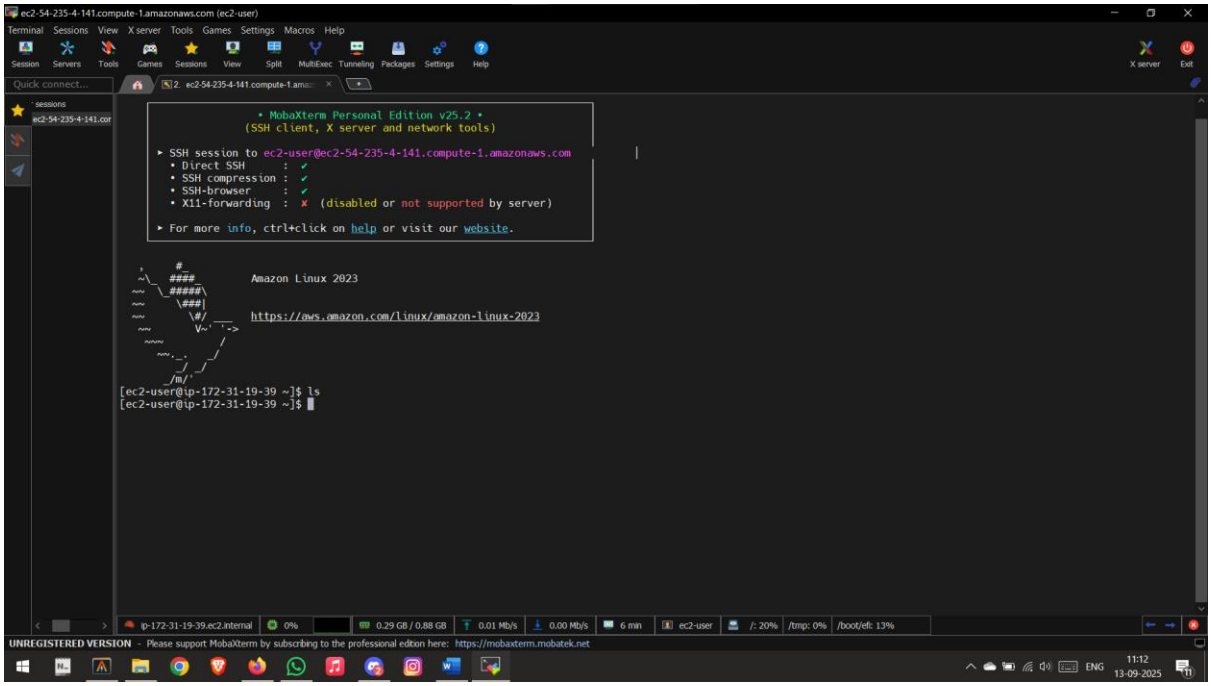
Configuring Network Settings



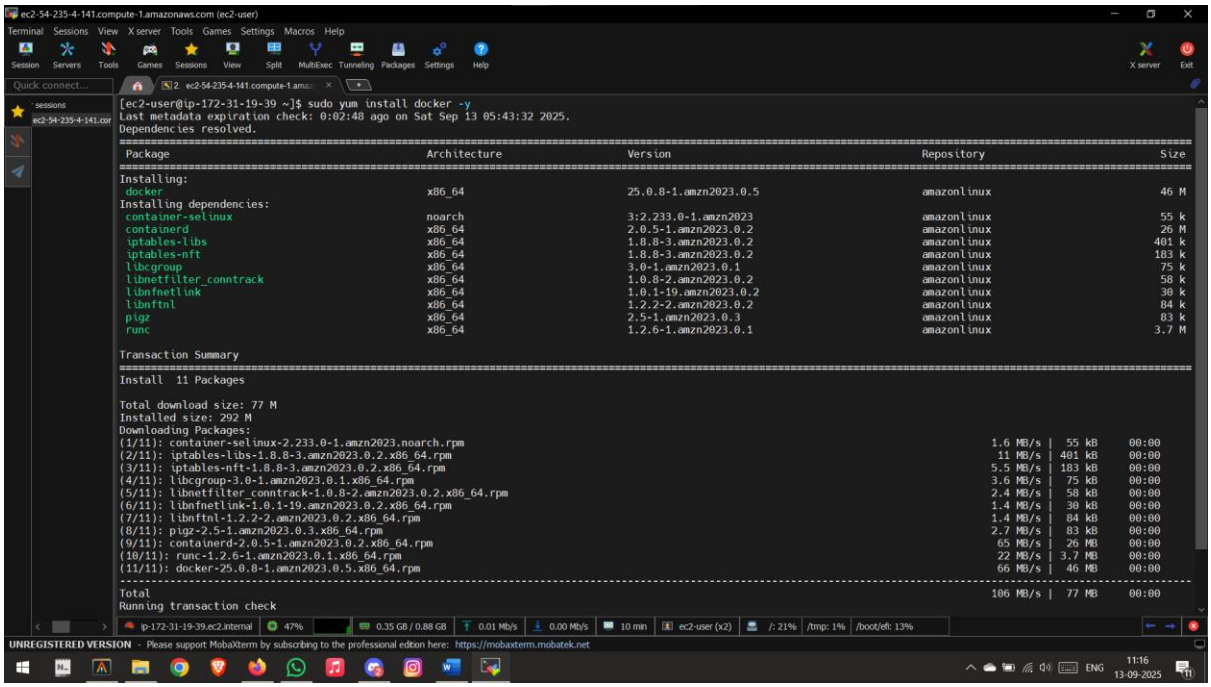
Instance Details



Connecting to Instance on MobaXterm



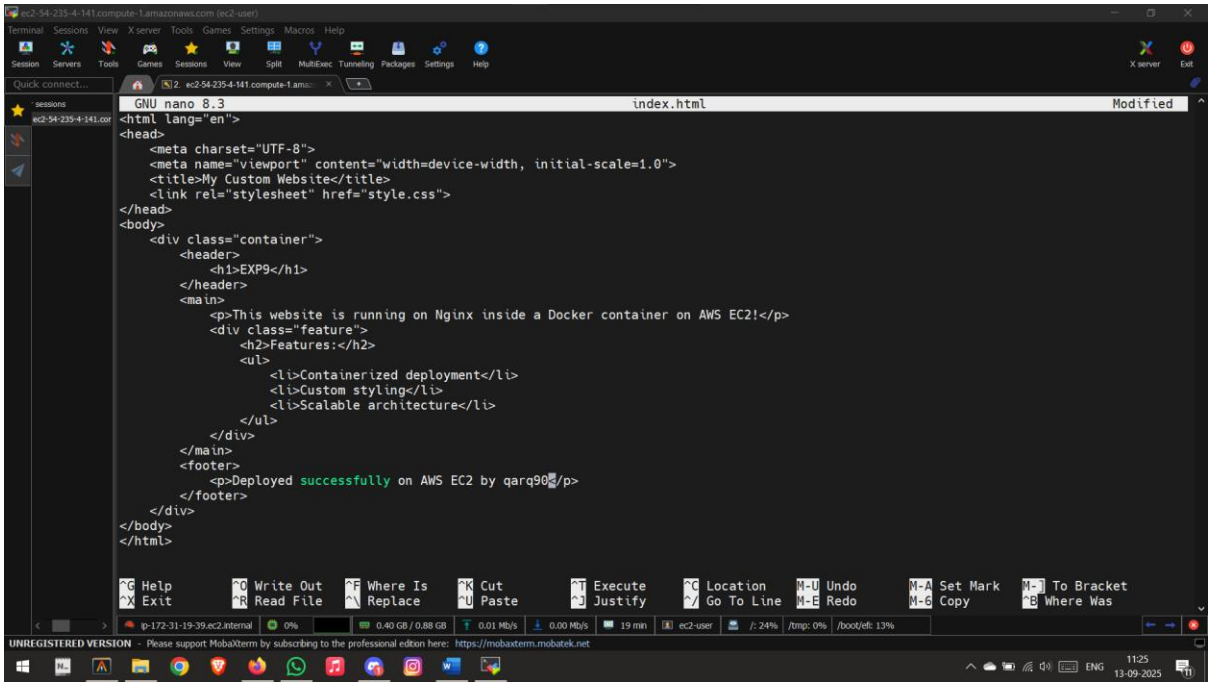
Connected to Instance

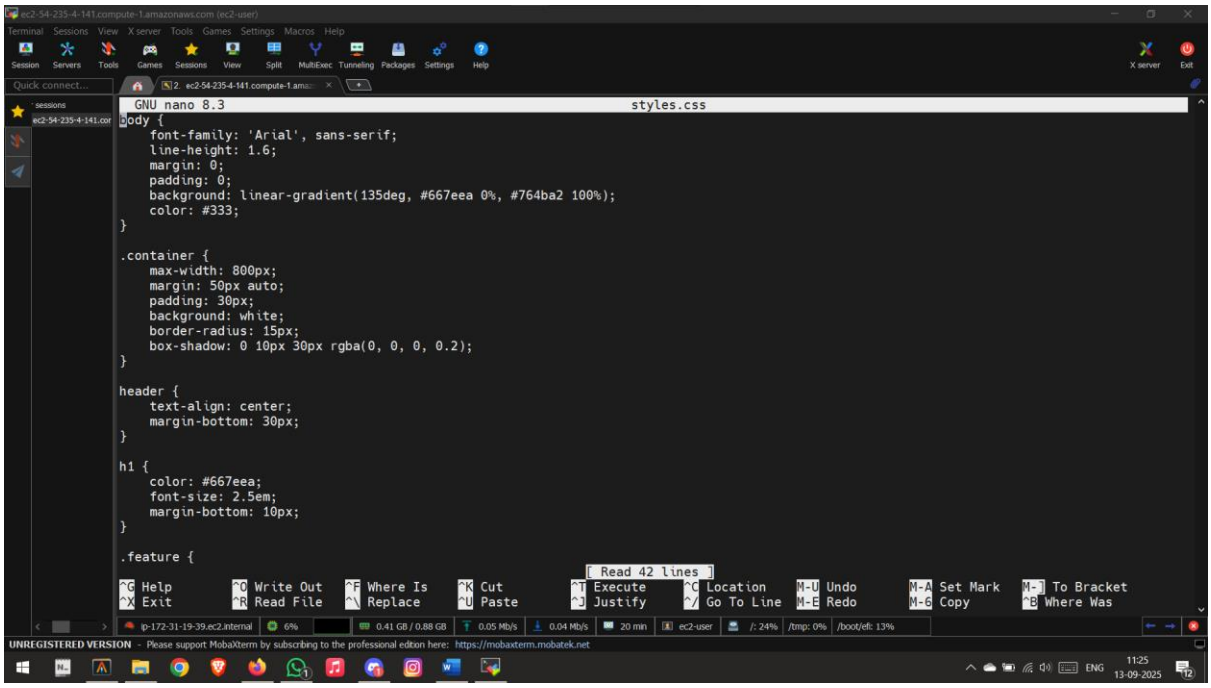


Installing Docker

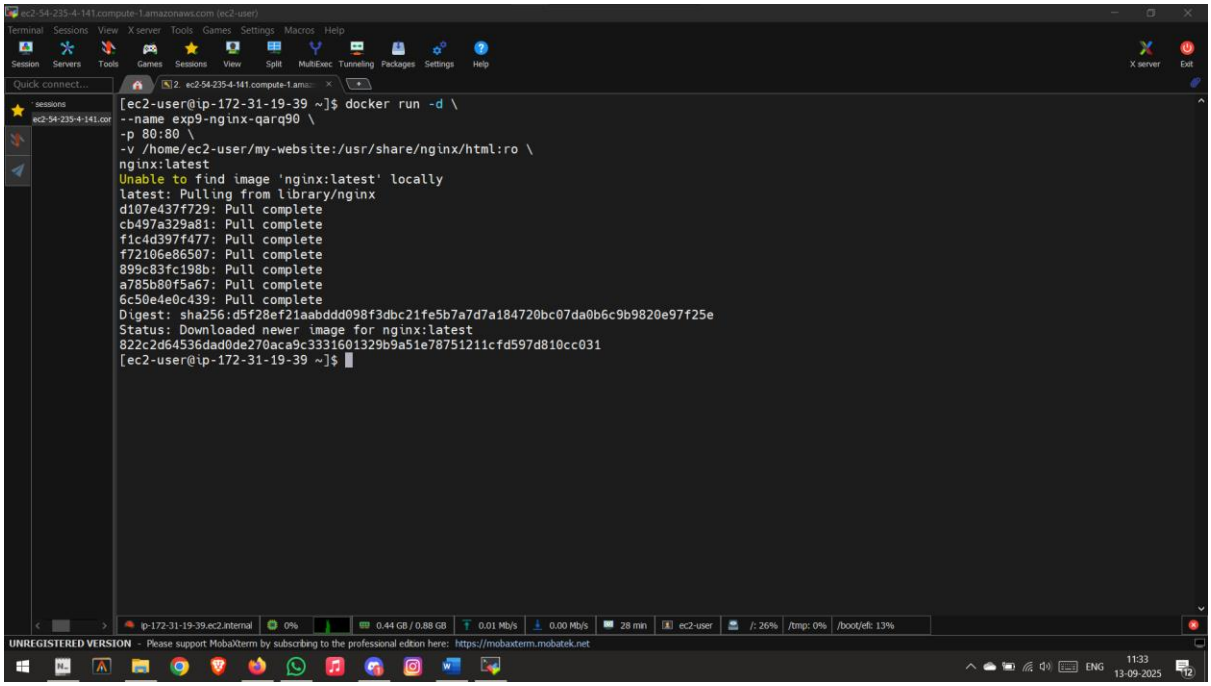
```
[ec2-user@ip-172-31-19-39 ~]$ sudo systemctl start docker
[ec2-user@ip-172-31-19-39 ~]$ sudo systemctl enable docker
Created symlink /etc/systemd/system/multi-user.target.wants/docker.service → /usr/lib/systemd/system/docker.service.
[ec2-user@ip-172-31-19-39 ~]$ sudo usermod -a -G docker ec2-user
[ec2-user@ip-172-31-19-39 ~]$ docker --version
Docker version 25.0.8, build 0bab007
```

Docker Installed

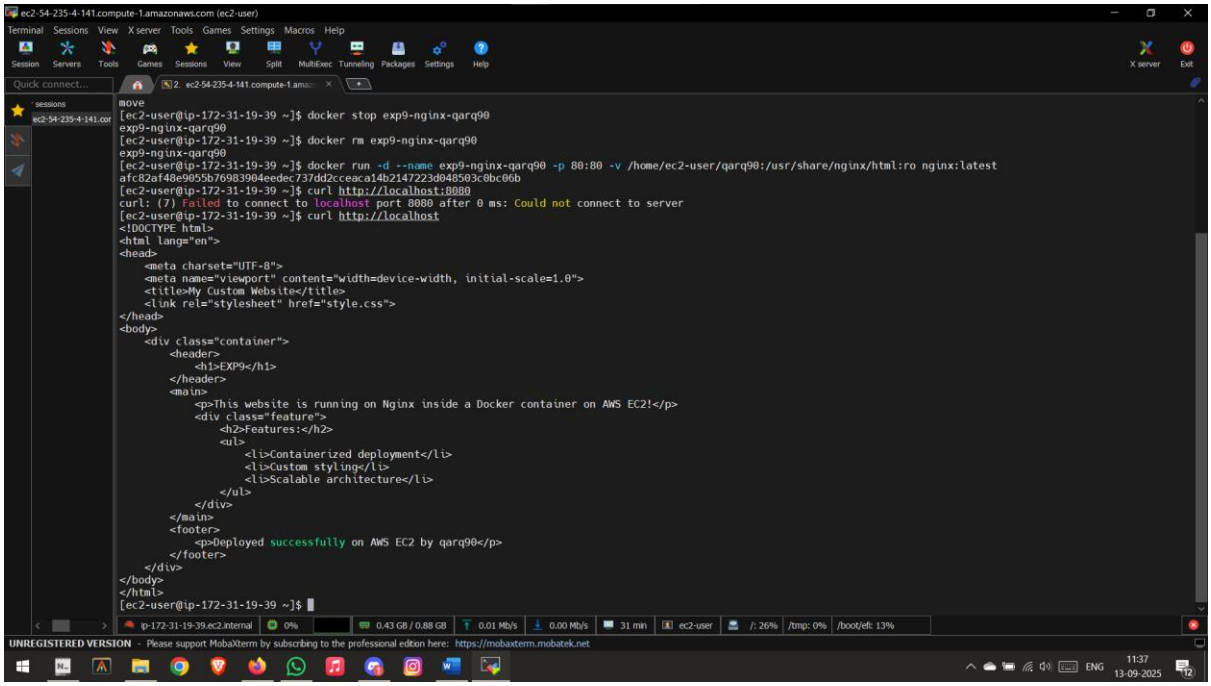




Created Sample html and CSS file to deploy



Deploying Container



Output of Deployed Container