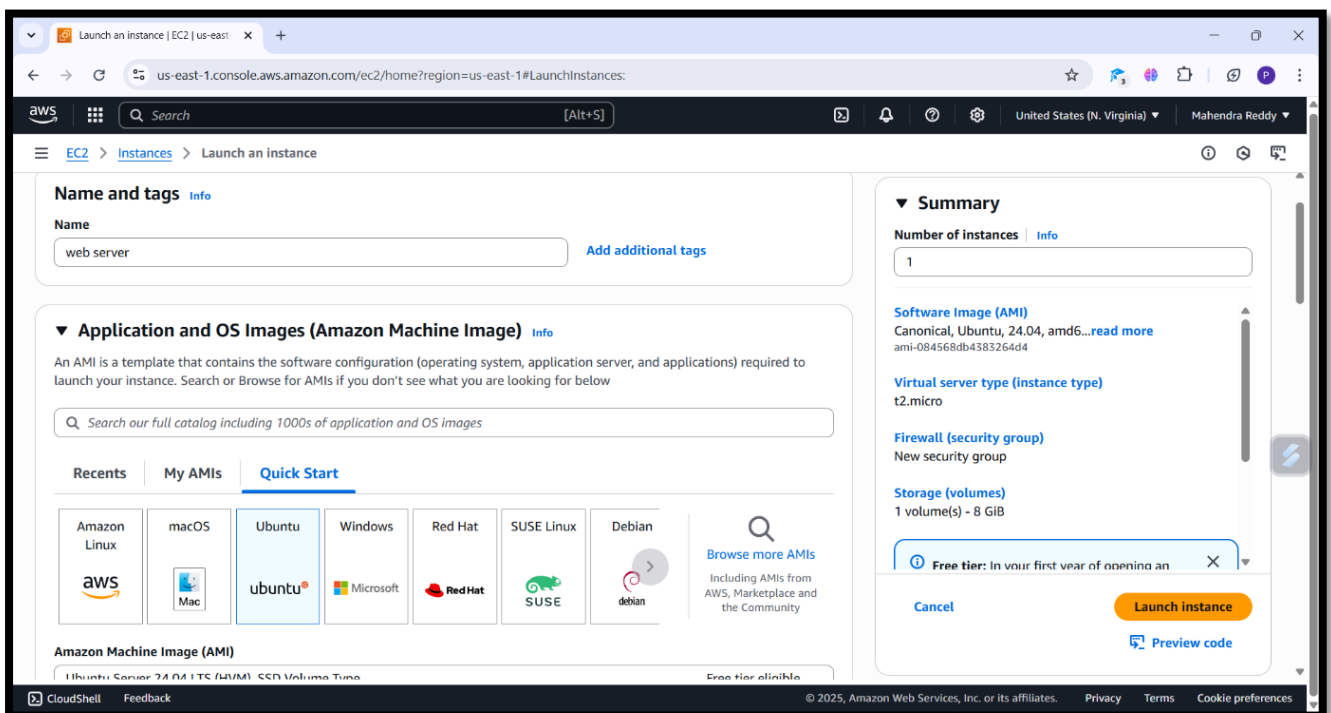


Secure and Scalable Static Website Architecture on AWS

1. Ubuntu:

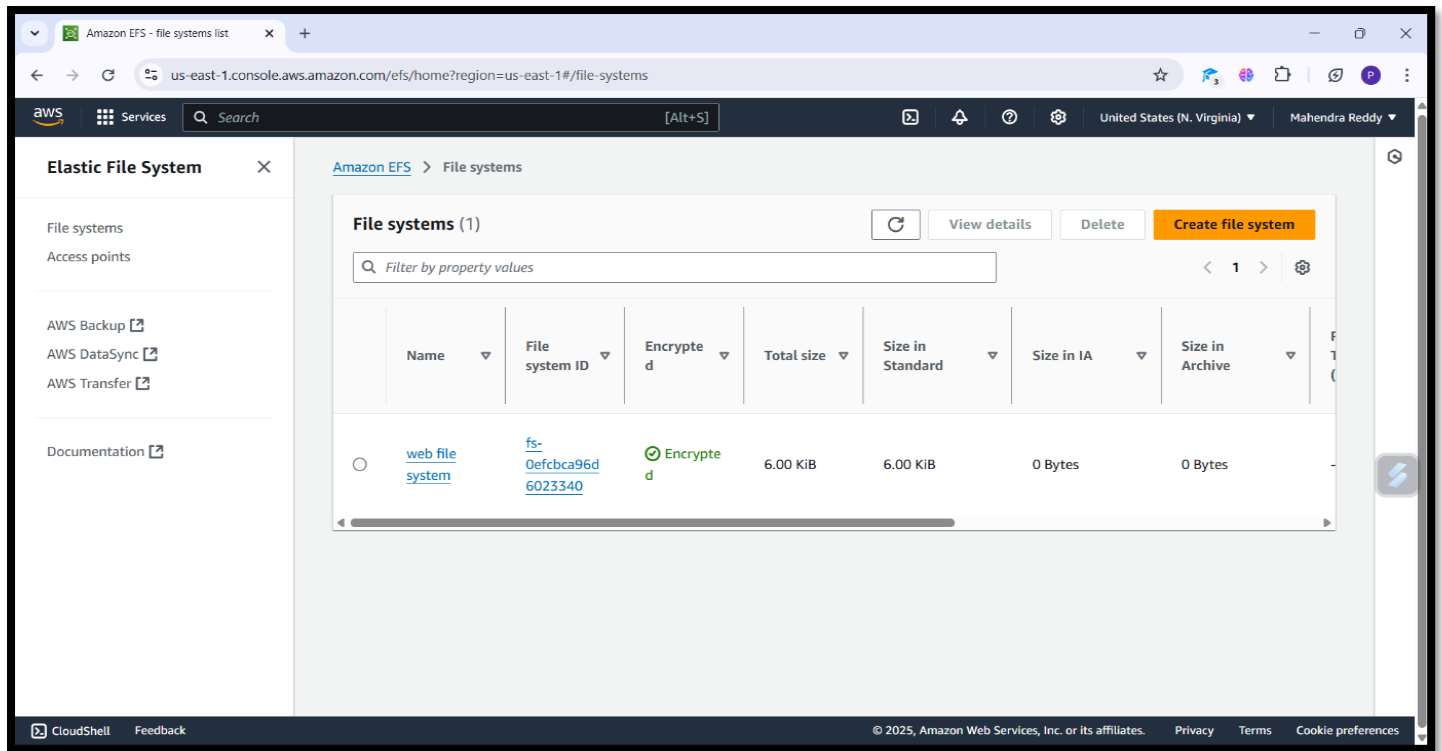
➤ Steps to create an EC2 instance (Ubuntu):

- Log in to AWS Console.
- Navigate to EC2 > Launch Instance.
- Select Ubuntu Server 20.04 LTS.
- Choose t2.micro .
- Configure network settings (VPC, Subnet).
- Add storage and tags as needed.
- Add security group with HTTP, HTTPS, and SSH open.
- Launch with a key pair.



➤ Creating the EFS File System:

- Go to EFS > Create File System.
- Choose the same VPC as the EC2 instance.
- Configure mount targets for availability zones.
- Finish creation.



➤ **Installing NFS utilities and mounting EFS:**

```
sudo apt update
```

```
sudo apt install -y nfs-common
```

```
sudo mkdir /var/www/html
```

```
sudo mount -t nfs4 -o nfsvers=4.1 <EFS-DNS>:/ /var/www/html(basic Syntax)
```

➤ **Attaching EFS via Console:**

- Select EC2 instance.
- Use the "Attach" command from EFS console.

➤ **Screenshot of EFS mount verification:**

- Use `df -Th` and take a screenshot showing `/var/www/html`.

```

root@ip-172-31-29-175: ~
Setting up keyutils (1.6.3-3build1) ...
Setting up nfs-common (1:2.6.4-3ubuntu5.1) ...

Creating config file /etc/idmapd.conf with new version

Creating config file /etc/nfs.conf with new version
info: Selecting UID from range 100 to 999 ...

info: Adding system user `statd' (UID 112) ...
info: Adding new user `statd' (UID 112) with group `nogroup' ...
info: Not creating home directory `/var/lib/nfs'.
Created symlink /etc/systemd/system/multi-user.target.wants/nfs-client.target → /usr/lib/systemd/system/nfs-client.target.
Created symlink /etc/systemd/system/remote-fs.target.wants/nfs-client.target → /usr/lib/systemd/system/nfs-client.target.
auth-rpcgss-module.service is a disabled or a static unit, not starting it.
nfs-idmapd.service is a disabled or a static unit, not starting it.
nfs-utils.service is a disabled or a static unit, not starting it.
proc-fs-nfsd.mount is a disabled or a static unit, not starting it.
rpc-gssd.service is a disabled or a static unit, not starting it.
rpc-statd-notify.service is a disabled or a static unit, not starting it.
rpc-statd.service is a disabled or a static unit, not starting it.
rpc-svcgssd.service is a disabled or a static unit, not starting it.
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for libc-bin (2.39-0ubuntu8.4) ...
Scanning processes...
Scanning candidates...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

User sessions running outdated binaries:
ubuntu @ session #8: sshd[1341]

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@ip-172-31-29-175:~# sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsz=1048576,hard,timeo=600,retrans=2,noresvport 172.31.82.196:/ /var/www/html
root@ip-172-31-29-175:~# df -Th
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/root        ext4      19G   2.0G   17G   11% /
tmpfs            tmpfs     479M    0 479M    0% /dev/shm
tmpfs            tmpfs     192M   908K  191M    1% /run
tmpfs            tmpfs      5.0M    0   5.0M    0% /run/lock
/dev/xvda16      ext4     881M    79M  741M   10% /boot
/dev/xvda15      vfat     105M    6.1M   99M    6% /boot/efi
tmpfs            tmpfs      96M   12K   96M    1% /run/user/1000
172.31.82.196:/  nfs4      8.0E    0 8.0E    0% /var/www/html
root@ip-172-31-29-175:~#

```

➤ Apache2 server page:

`sudo apt install apache2 -y`

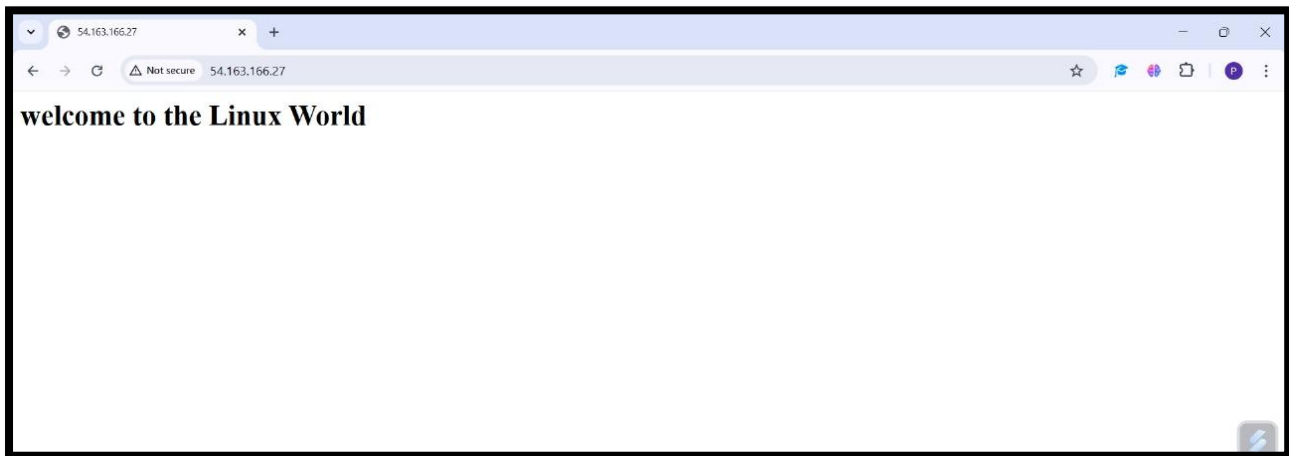
`sudo systemctl start apache2`

`sudo systemctl enable apache2`

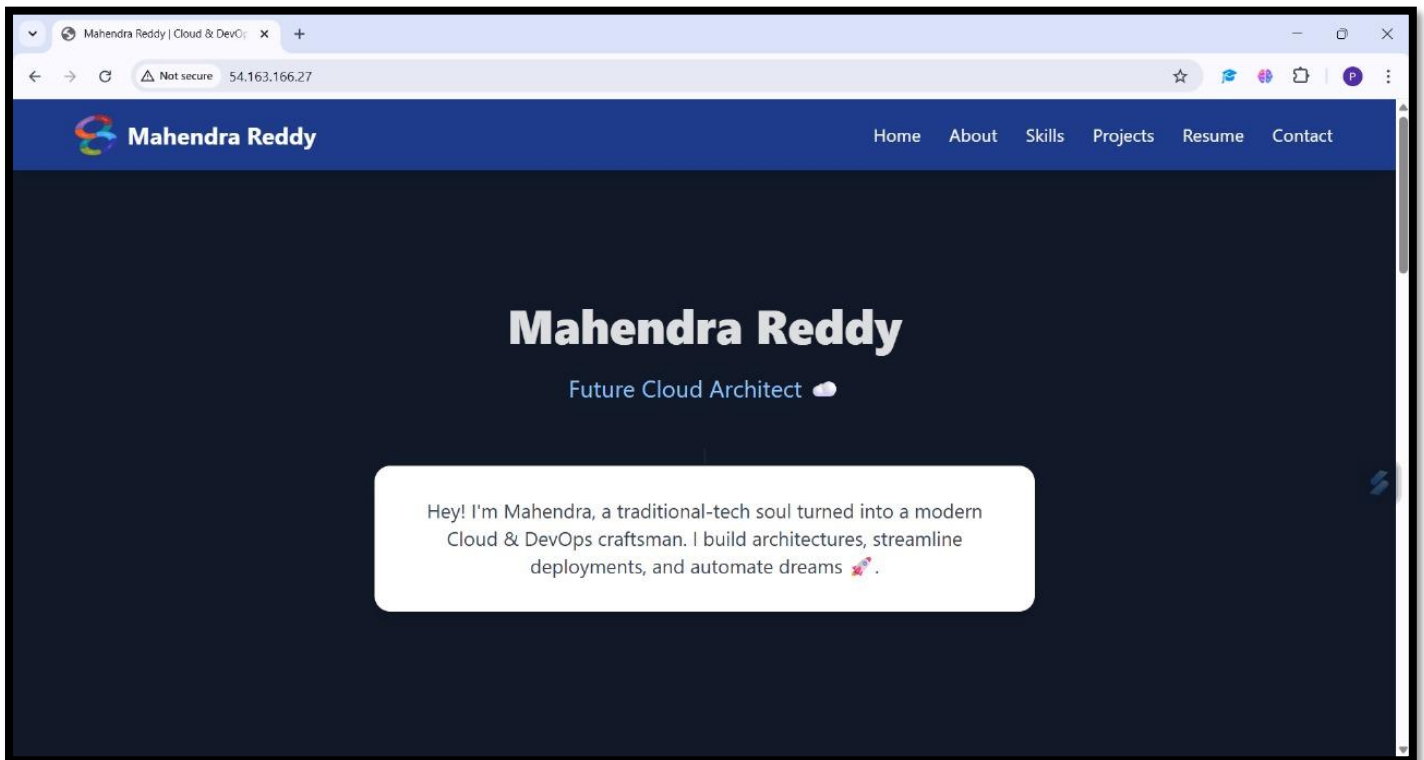


➤ Sample Web Page:

```
echo "<h1>Welcome to the linux world </h1>" | sudo tee /var/www/html/index.html
```



- Main website hosted:
- Access via EC2 Public IP.



2. Securing Instance Using Bastion Host

- Creating a bastion host in a public subnet.
- The private instance in a private subnet.
- SSH agent forwarding or jump host SSH config (~/.ssh/config).
- Security group configurations.
- Example SSH command:
ssh -i key.pem -A ubuntu@<private-ip> and then to private instance.

```
ubuntu@ip-10-0-141-109: ~
root@ip-10-0-1-135:~# ssh -i "key.pem" ubuntu@10.0.141.109
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.8.0-1024-aws x86_64)

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

System information as of Thu May 15 07:04:05 UTC 2025

System load:  0.0          Processes:      104
Usage of /:   9.1% of 18.33GB    Users logged in: 0
Memory usage: 20%          IPv4 address for enx0: 10.0.141.109
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.

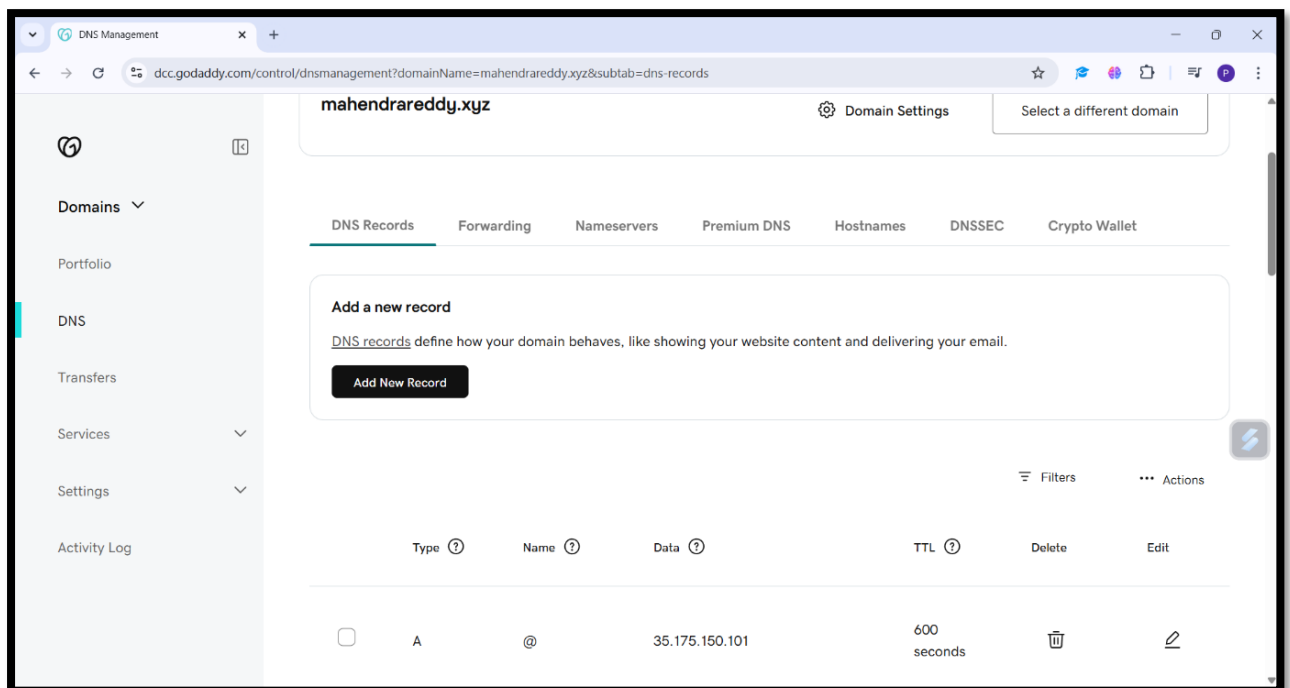
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

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

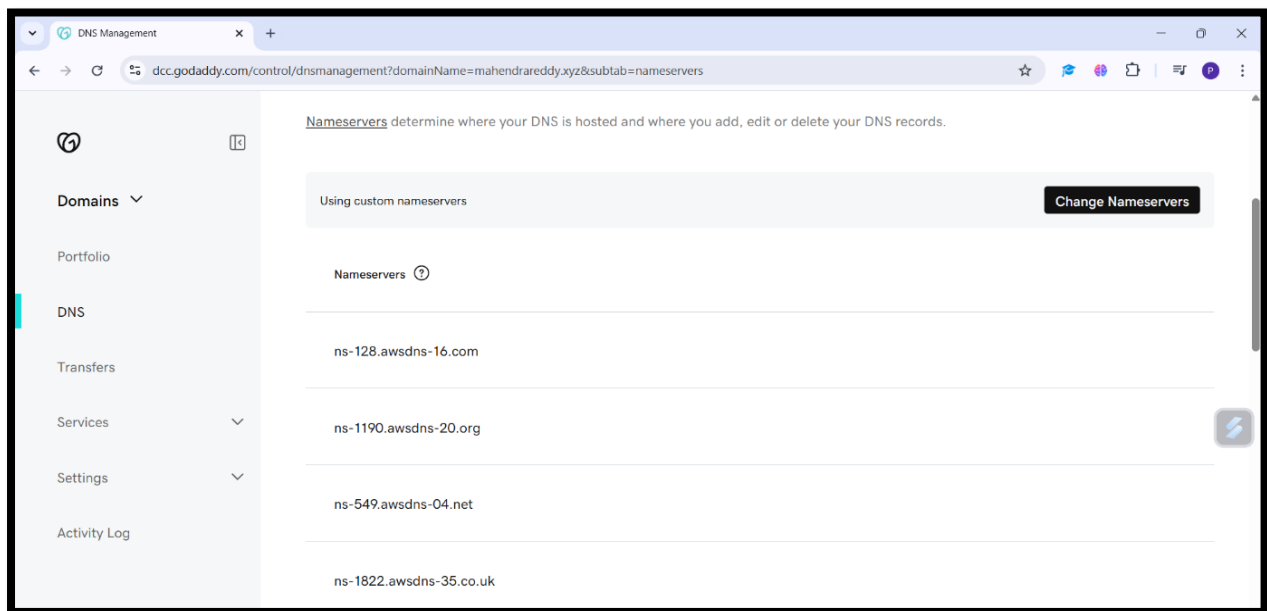
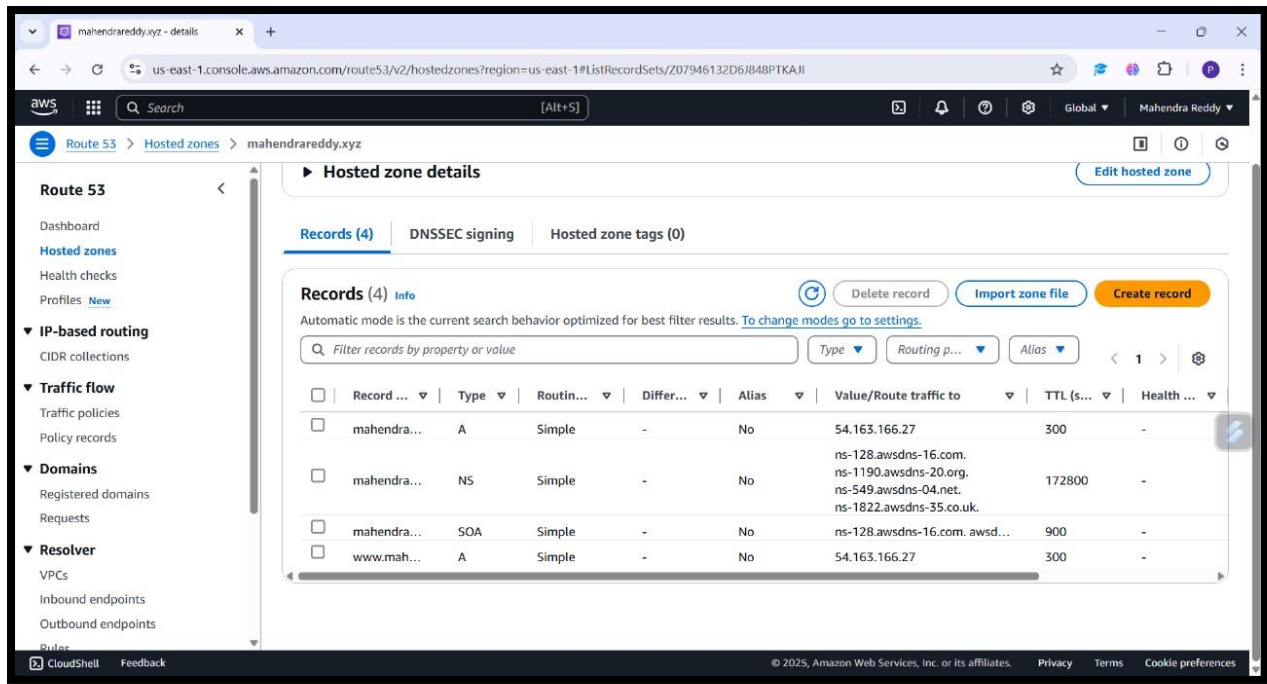
ubuntu@ip-10-0-141-109:~$ ls
ubuntu@ip-10-0-141-109:~$ su -
Password:
su: Authentication failure
ubuntu@ip-10-0-141-109:~$
```

3. Configure Route 53 with Custom Domain

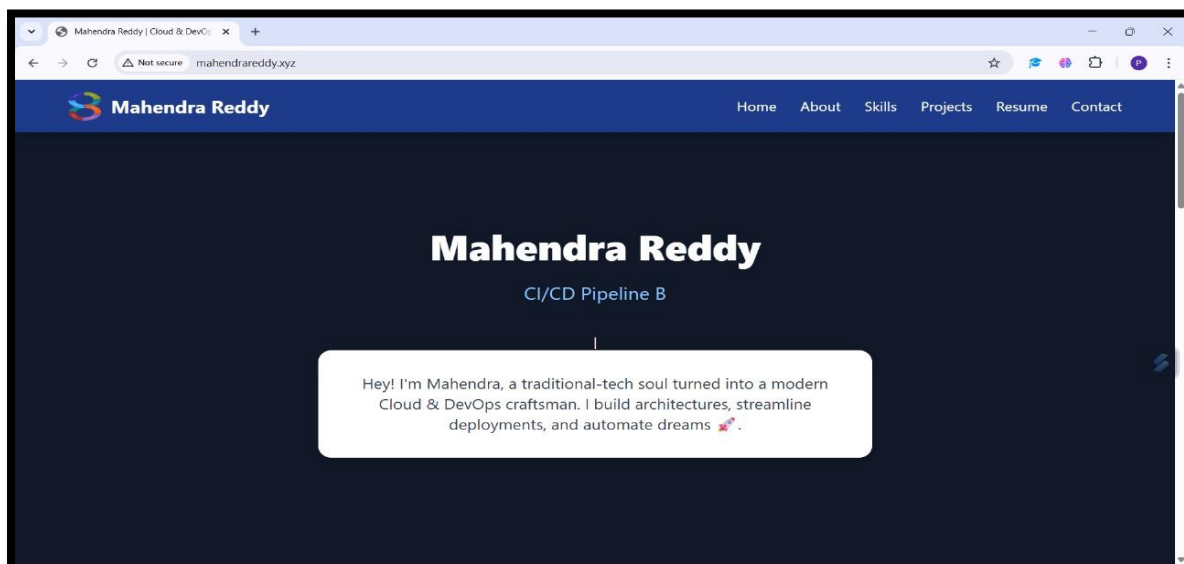
- Domain registration.



- Hosted zone creation in Route 53.
- Record Set (A) pointing to EC2.
- Screenshot of DNS settings.



- Hosted website using Domain Name:



4. Install SSL/TLS Certificate:-

➤ Install SSL on Apache Manually (if no Load Balancer is used):

- Install Certbot:
`sudo apt update`
`sudo apt install certbot python3-certbot-apache -y`
- Run Certbot to get and install a certificate:
`sudo certbot --apache`
- Follow prompts to:
 - Choose the domain
 - Redirect HTTP to HTTPS
 - Install certificate
- Verify the certificate with:
`sudo certbot certificates`
- Set up auto-renewal (already included via systemd timer):
`sudo systemctl status certbot.timer`

```
root@ip-172-31-81-223: ~
drareddy.xyz
Saving debug log to /var/log/letsencrypt/letsencrypt.log
Enter email address (used for urgent renewal and security notices)
(Enter 'c' to cancel): pallampartimahendra456@gmail.com

-----
Please read the Terms of Service at
https://letsencrypt.org/documents/LE-SA-v1.5-February-24-2025.pdf. You must
agree in order to register with the ACME server. Do you agree?
-----
(Y)es/(N)o: y

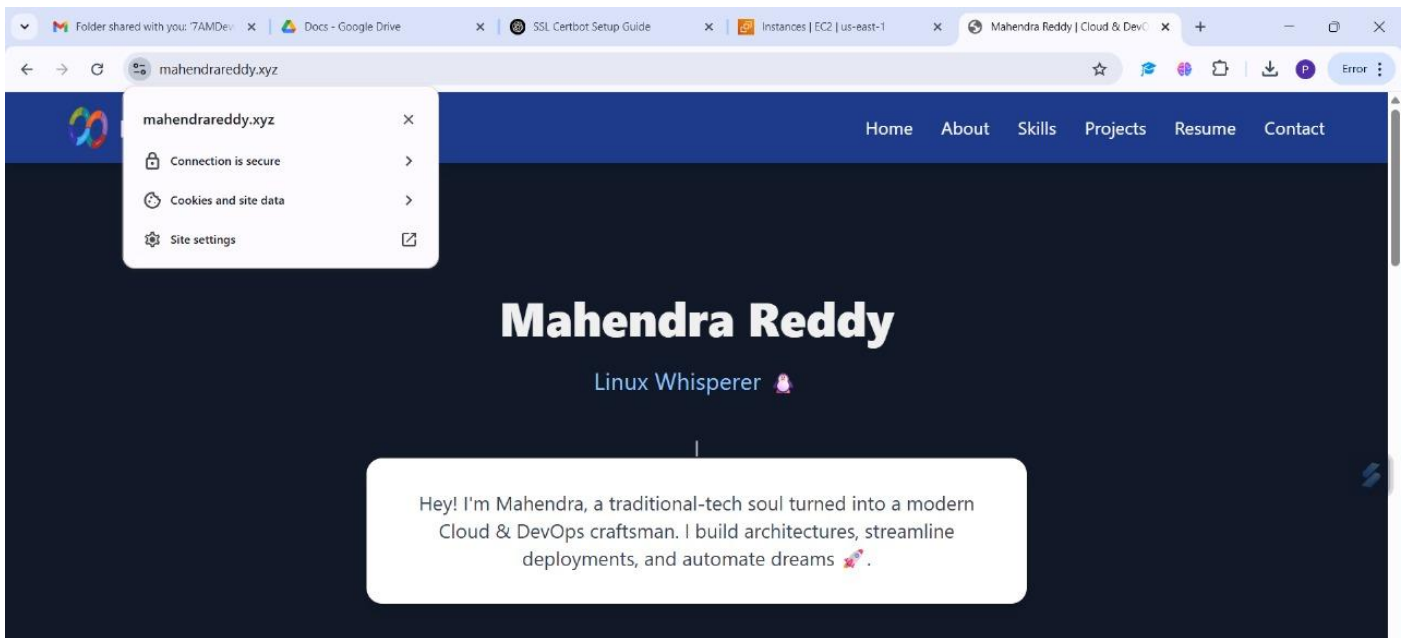
-----
Would you be willing, once your first certificate is successfully issued, to
share your email address with the Electronic Frontier Foundation, a founding
partner of the Let's Encrypt project and the non-profit organization that
develops Certbot? We'd like to send you email about our work encrypting the web,
EFF news, campaigns, and ways to support digital freedom.
-----
(Y)es/(N)o: y
Account registered.
Requesting a certificate for mahendrareddy.xyz and www.mahendrareddy.xyz

Successfully received certificate.
Certificate is saved at: /etc/letsencrypt/live/mahendrareddy.xyz/fullchain.pem
Key is saved at: /etc/letsencrypt/live/mahendrareddy.xyz/privkey.pem
This certificate expires on 2025-08-15.
These files will be updated when the certificate renews.
Certbot has set up a scheduled task to automatically renew this certificate in the background.

Deploying certificate
Successfully deployed certificate for mahendrareddy.xyz to /etc/apache2/sites-available/000-default-le-ssl.conf

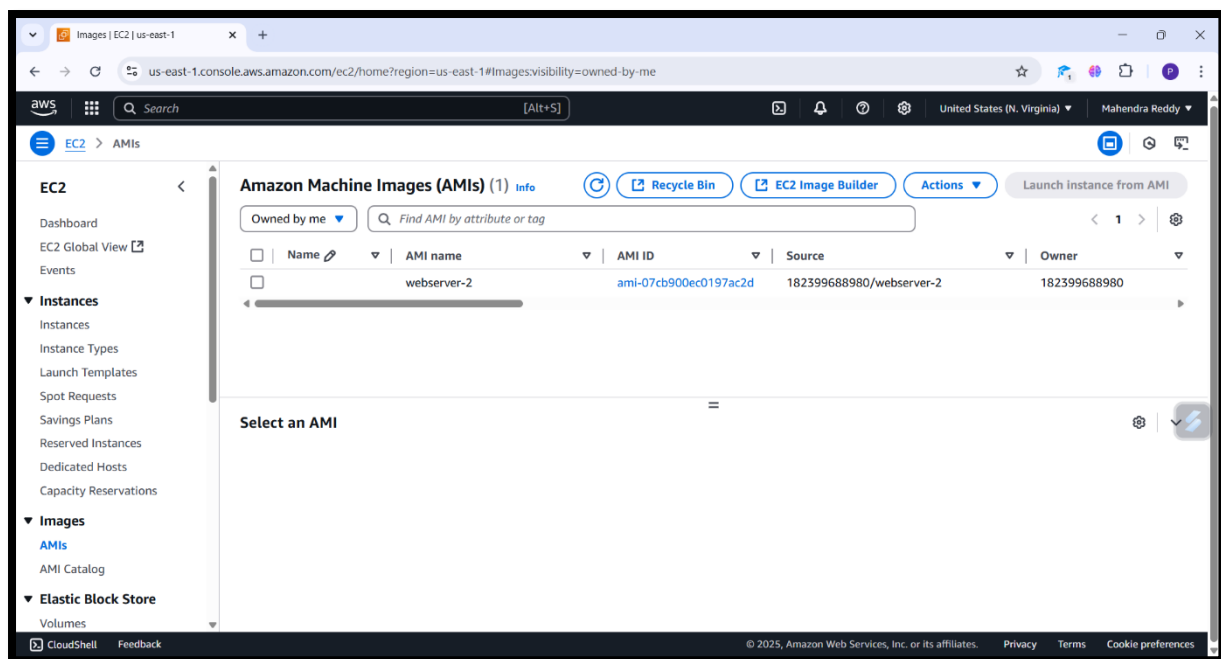
We were unable to find a vhost with a ServerName or Address of www.mahendrareddy.xyz.
Which virtual host would you like to choose?
-----
1: 000-default.conf | | Enabled
2: 000-default-le-ssl.conf | mahendrareddy.xyz | HTTPS | Enabled
-----
Select the appropriate number [1-2] then [enter] (press 'c' to cancel): 2
Successfully deployed certificate for www.mahendrareddy.xyz to /etc/apache2/sites-available/000-default-le-ssl.conf
Congratulations! You have successfully enabled HTTPS on https://mahendrareddy.xyz and https://www.mahendrareddy.xyz

-----
If you like Certbot, please consider supporting our work by:
* Donating to ISRG / Let's Encrypt: https://letsencrypt.org/donate
* Donating to EFF: https://eff.org/donate-le
-----
root@ip-172-31-81-223:~#
```

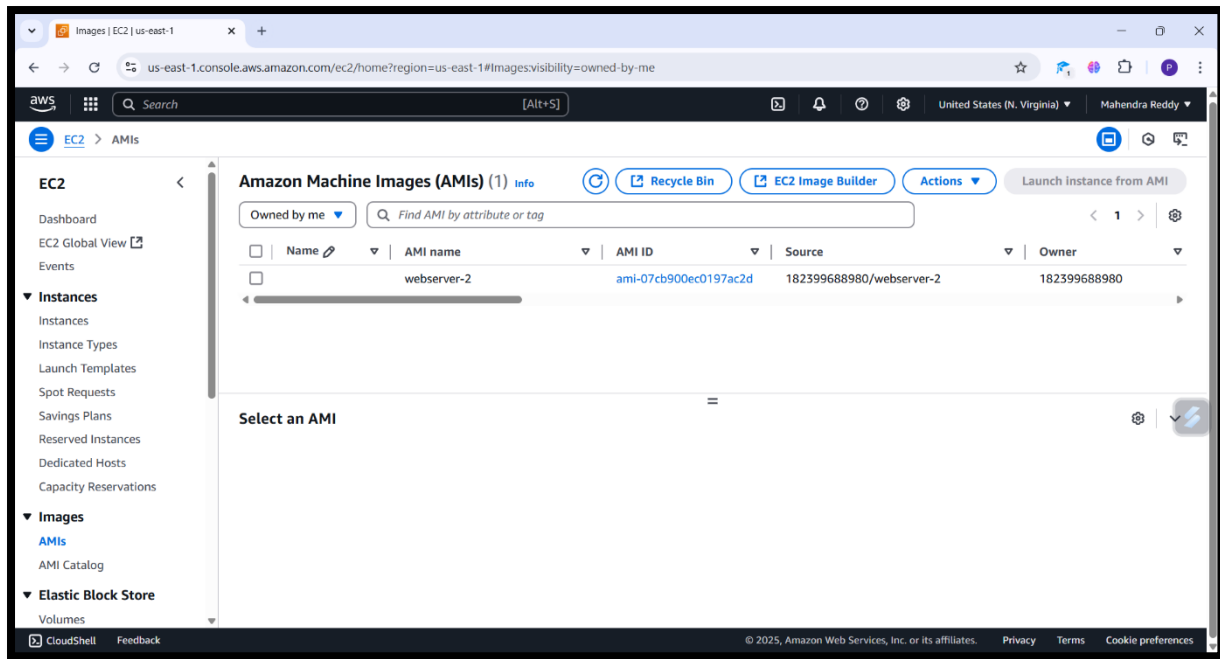
5. Prepare a Custom AMI for Reuse

- create AMI.
- Screenshot of the AMI created under EC2 > AMIs.



6. Prepare a Reusable Launch Template

- Launch template creation with custom AMI.
- Setting instance type, key pair, SGs, user data).
- Screenshots of the template configuration.



- Launch the website from the Template:

