

Advanced EC2 Web App Project

Project Name: EC2 + Nginx + Node.js Web Application Deployment

1 Introduction

This project demonstrates deploying a Node.js application on an AWS EC2 (Ubuntu) instance and setting up Nginx as a reverse proxy. The goal is to host a Node.js app on EC2 and make it accessible via the EC2 Public IP.

2 EC2 Instance Launch

- Launched an EC2 t2.micro instance using Ubuntu 24.04 LTS AMI.
- Created a Key Pair for SSH access.
- Configured the Security Group with the following rules:
 - SSH (22) from My IP
 - HTTP (80) from Anywhere

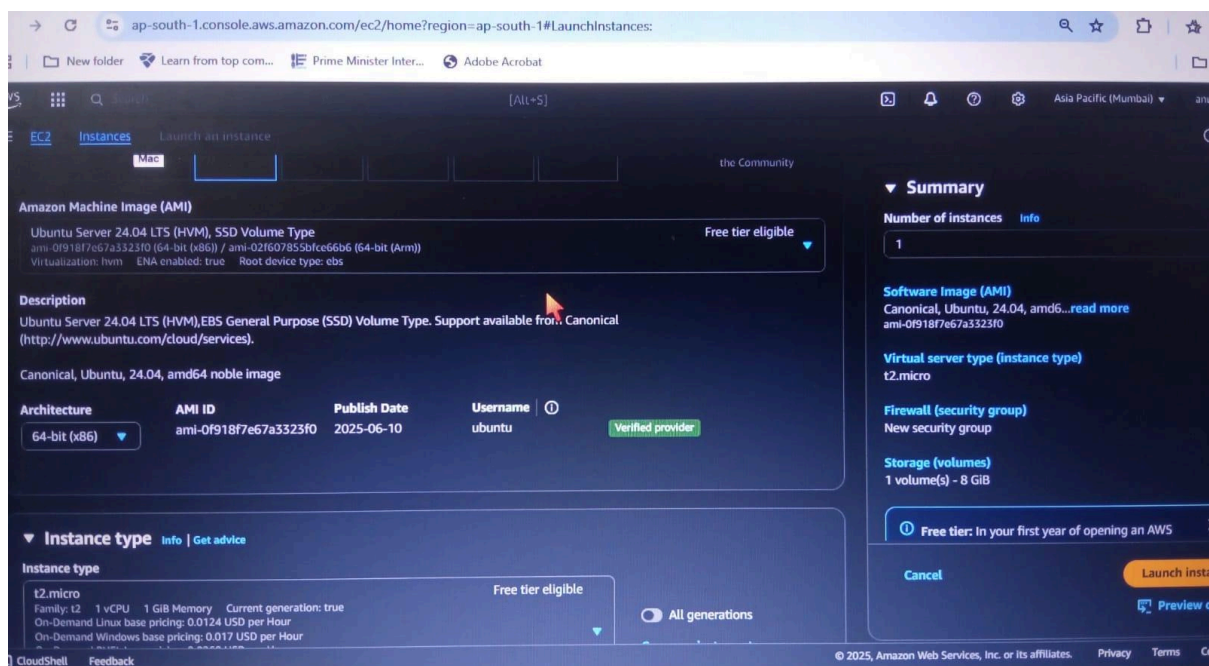


Figure 2.1: EC2 Instance Creation Page

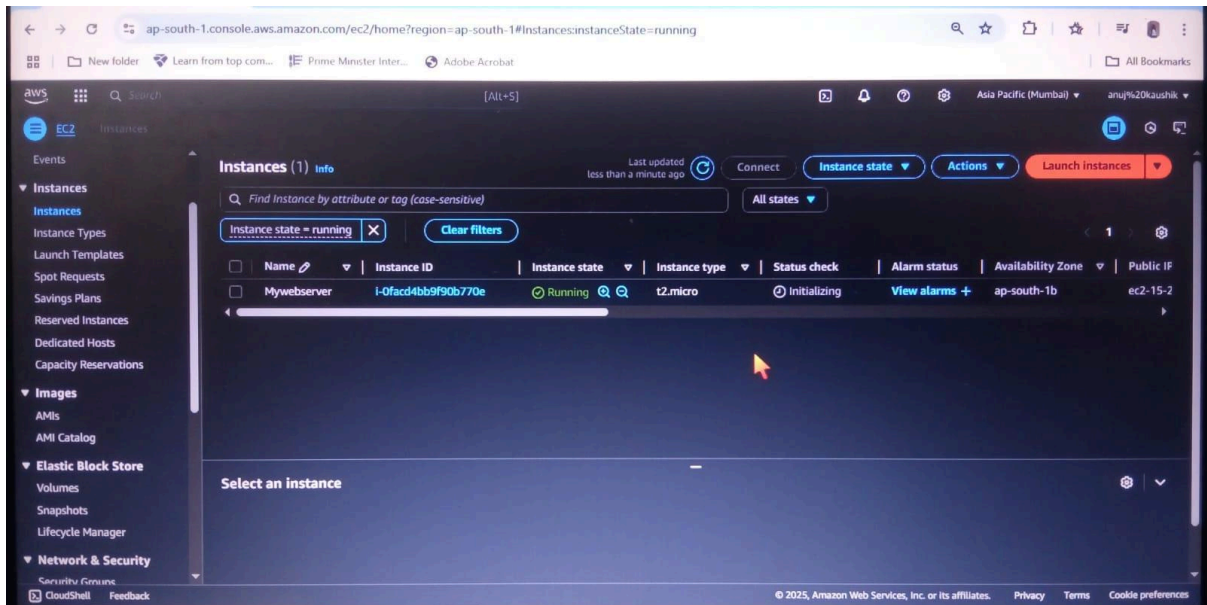


Figure 2.2: EC2 Instance Running Status

3 SSH Connection

Connect to EC2 using SSH:

`ssh -i "yourkey.pem" ubuntu@<EC2-Public-IP>`

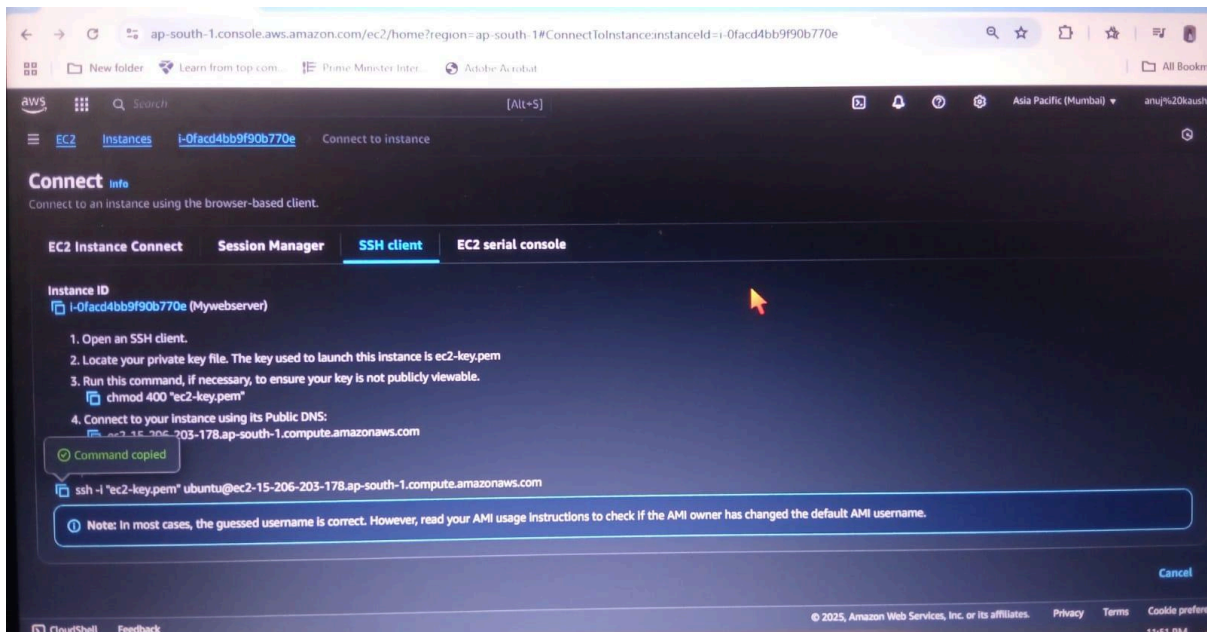


Figure 3.1: SSH Connection Terminal Page

```
ubuntu@ip-172-31-10-31:~$ ssh-keygen -f fingerprint is SHA256:r1RAJGRFZ3lqjp8pybamCkoa+/roz7gRbUDxtS2XIGH.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-15-206-203-178.ap-south-1.compute.amazonaws.com' (ED25519) to the list of known hosts.
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.8.0-1029-aws x86_64)

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

System information as of Sat Jun 21 18:20:59 UTC 2025

System load:          0.0
Usage of /:           25.4% of 6.71GB
Memory usage:        28%
Swap usage:          0%
Processes:           105
Users logged in:      0
IPv4 address for enx0: 172.31.10.31
IPv6 address for enx0: 2406:d81a:8ce:1660:32be:85df:e52f:1187

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-172-31-10-31:~$
```

Figure 3.2: SSH Connection Terminal Output

4 System Update

Updated the system packages:

`sudo apt update && sudo apt upgrade -y`

```
ubuntu@ip-172-31-10-31:~$ sudo apt update && sudo apt upgrade -y
Hit:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:4 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Packages [15.0 MB]
Get:5 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/universe Translation-en [5982 kB]
Get:6 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:7 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Components [3871 kB]
Get:8 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 c-n-f Metadata [301 kB]
Get:9 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 Packages [269 kB]
Get:10 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse Translation-en [118 kB]
Get:11 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 Components [35.0 kB]
Get:12 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 c-n-f Metadata [8328 B]
Get:13 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [1144 kB]
Get:14 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main Translation-en [242 kB]
Get:15 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [161 kB]
Get:16 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [1086 kB]
Get:17 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe Translation-en [276 kB]
Get:18 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [376 kB]
Get:19 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 c-n-f Metadata [26.0 kB]
Get:20 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Packages [1224 kB]
Get:21 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/restricted Translation-en [256 kB]
Get:22 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Components [212 B]
Get:23 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Packages [21.7 kB]
Get:24 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/multiverse Translation-en [4788 B]
Get:25 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Components [940 B]
Get:26 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 c-n-f Metadata [592 B]
Get:27 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-backports/main amd64 Packages [39.2 kB]
Get:28 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-backports/main Translation-en [8676 B]
Get:29 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-backports/main amd64 c-n-f Metadata [272 B]
Get:30 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-backports/universe amd64 Packages [27.1 kB]
Get:31 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-backports/universe Translation-en [16.5 kB]
Get:32 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-backports/universe amd64 Components [16.4 kB]
```

Figure 4: System Update Output

5 Nginx Install & Configuration

Installed Nginx:

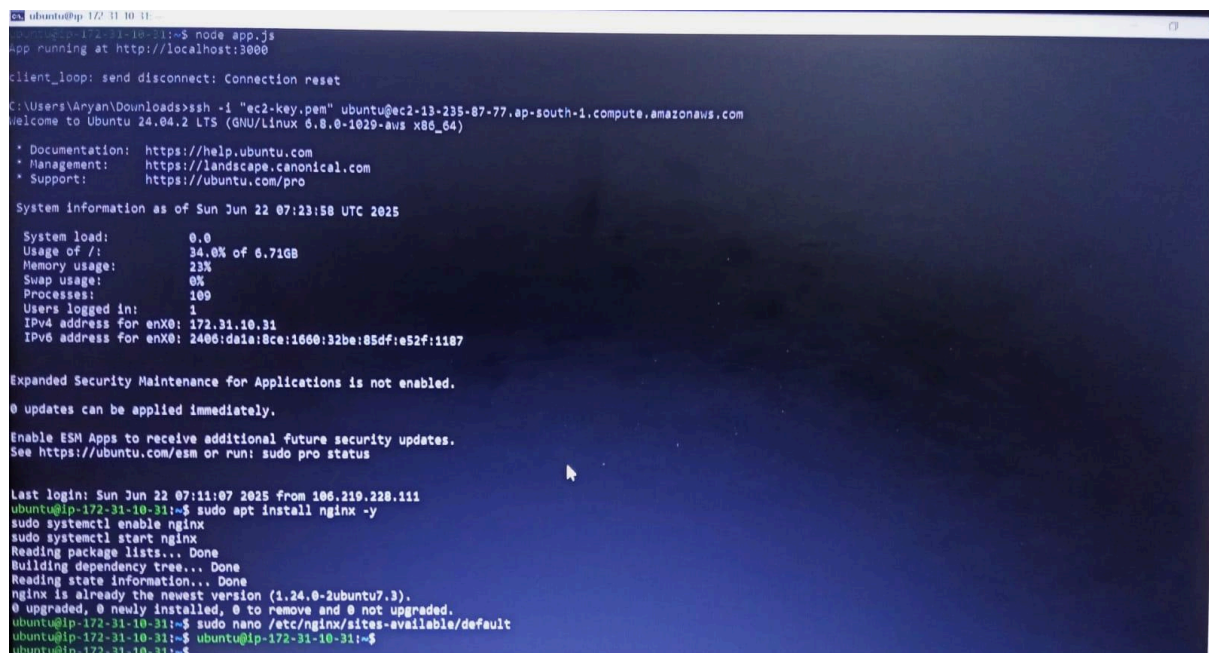
```
sudo apt install nginx -y
sudo systemctl enable nginx
sudo systemctl start nginx
```

Updated Nginx configuration (`/etc/nginx/sites-available/default`):

```
server {
    listen 80;
    location / {
        proxy_pass http://localhost:3000;
    }
}
```

Restarted Nginx:

```
sudo systemctl restart nginx
```



```
ubuntu@ip-172-31-10-31:~$ node app.js
app running at http://localhost:3000

client_loop: send disconnect: Connection reset

C:\Users\Aryan\Downloads>ssh -i "ec2-key.pem" ubuntu@ec2-13-235-87-77.ap-south-1.compute.amazonaws.com
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.8.0-1029-aws x86_64)

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

System information as of Sun Jun 22 07:23:58 UTC 2025

System load:          0.0
Usage of /:            34.0% of 6.71GB
Memory usage:         23%
Swap usage:           0%
Processes:            109
Users logged in:      1
IPv4 address for enX0: 172.31.10.31
IPv6 address for enX0: 2406:da1a:8ce:1660:32be:85df:e52f:1187

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

Last login: Sun Jun 22 07:11:07 2025 from 106.219.220.111
ubuntu@ip-172-31-10-31:~$ sudo apt install nginx -y
sudo systemctl enable nginx
sudo systemctl start nginx
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
nginx is already the newest version (1.24.0-2ubuntu7.3).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
ubuntu@ip-172-31-10-31:~$ sudo nano /etc/nginx/sites-available/default
ubuntu@ip-172-31-10-31:~$
```

Figure 5.1: Terminal Output for `sudo apt install nginx`

```
ubuntu@ip-172-31-10-31:~$ node app.js
app running at http://localhost:3000

client_loop: send disconnect: Connection reset

C:\Users\Aryan\Downloads>ssh -i "ec2-key.pem" ubuntu@ec2-13-235-87-77.ap-south-1.compute.amazonaws.com
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.8.0-1029-aws x86_64)

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

System information as of Sun Jun 22 07:23:58 UTC 2025

System load:          0.0
Usage of /:            34.0% of 6.71GB
Memory usage:         23%
Swap usage:           0%
Processes:            109
Users logged in:      1
IPv4 address for enx0: 172.31.10.31
IPv6 address for enx0: 2406:dada:8ce:1660:32be:85df:e52f:1187

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

Last login: Sun Jun 22 07:11:07 2025 from 106.219.228.111
ubuntu@ip-172-31-10-31:~$ sudo apt install nginx -y
sudo systemctl enable nginx
sudo systemctl start nginx
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
nginx is already the newest version (1.24.0-2ubuntu7.3).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
ubuntu@ip-172-31-10-31:~$ sudo nano /etc/nginx/sites-available/default
ubuntu@ip-172-31-10-31:~$
ubuntu@ip-172-31-10-31:~$
```

Figure 5.2: Terminal Output for `sudo apt install nginx`

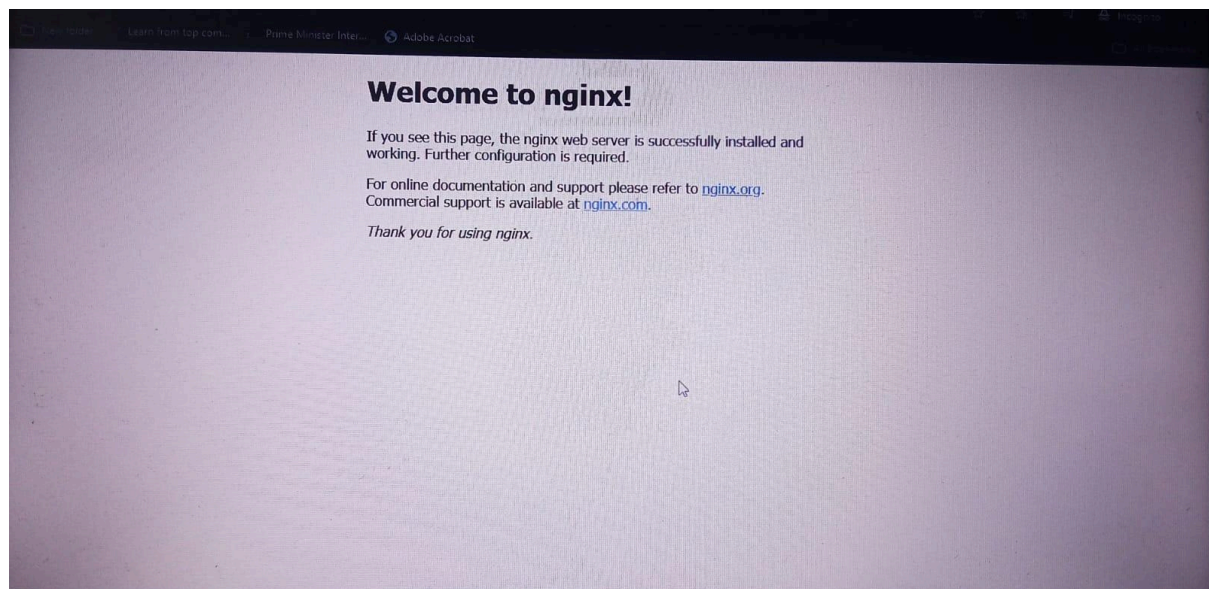


Figure 5.3: nginx output in Browser

6 Node.js Install

Installed Node.js:

```
curl -fsSL https://deb.nodesource.com/setup_18.x | sudo -E bash -
sudo apt install -y nodejs
node -v
npm -v
```

```
ubuntu@ip-172-31-10-31:~$ sudo apt-get install nodejs
Hit:1 http://ep-south-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:2 http://deb.nodesource.com/node_18.x nodistro InRelease
Hit:3 http://security.ubuntu.com/ubuntu noble-security InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
apt-transport-https is already the newest version (2.8.3).
ca-certificates is already the newest version (20240203).
curl is already the newest version (8.5.0-2ubuntu10.6).
gnupg is already the newest version (2.4.4-2ubuntu17.2).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Hit:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:4 http://deb.nodesource.com/node_18.x nodistro InRelease
Hit:5 http://security.ubuntu.com/ubuntu noble-security InRelease
Reading package lists... Done
2025-06-21 18:44:03 - Repository configured successfully.
2025-06-21 18:44:03 - To install Node.js, run: apt-get install nodejs -y
2025-06-21 18:44:03 - You can use N|solid Runtime as a node.js alternative
2025-06-21 18:44:03 - To install N|solid Runtime, run: apt-get install nsolid -y
ubuntu@ip-172-31-10-31:~$ sudo apt-get install -y nodejs
node -v
v18.20.8
npm -v
10.8.2
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
nodejs is already the newest version (18.20.8-1nodesource1).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
ubuntu@ip-172-31-10-31:~$
```

Figure 6: Terminal Output for Node.js (node -v & npm -v)

7 Created Node.js App

App (`app.js`) code:

```
const http = require("http");
const port = 3000;
const requestHandler = (req, res) => {
  res.end("Hello Aryan! Node.js App is running on EC2!");
};
const server = http.createServer(requestHandler);
server.listen(port, () => {
  console.log(`App running at http://localhost:${port}`);
});
```

Run the app:

node [app.js](#)


```

ubuntu@ip-172-31-10-31:~$ sudo apt-get install -y nodejs
node -v
npm -v
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
nodejs is already the newest version (18.20.8-1nodesource1).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
ubuntu@ip-172-31-10-31:~$ mkdir myapp && cd myapp
mkdir: cannot create directory 'myapp': File exists
ubuntu@ip-172-31-10-31:~/myapp$ nano app.js
ubuntu@ip-172-31-10-31:~/myapp$ cat app.js
const http = require('http');
const port = 3000;

const requestHandler = (req, res) => {
  res.end('Hello Aryan! Node.js app is running on EC2 with Nginx!');
};

const server = http.createServer(requestHandler);
server.listen(port, () => {
  console.log(`App running at http://localhost:${port}`);
});

ubuntu@ip-172-31-10-31:~/myapp$ node app.js
App running at http://localhost:3000
=

```

Figure 7: Terminal Output (App running at http://localhost:3000)

8 Final Output

App is now available at:

http://<EC2-Public-IP>

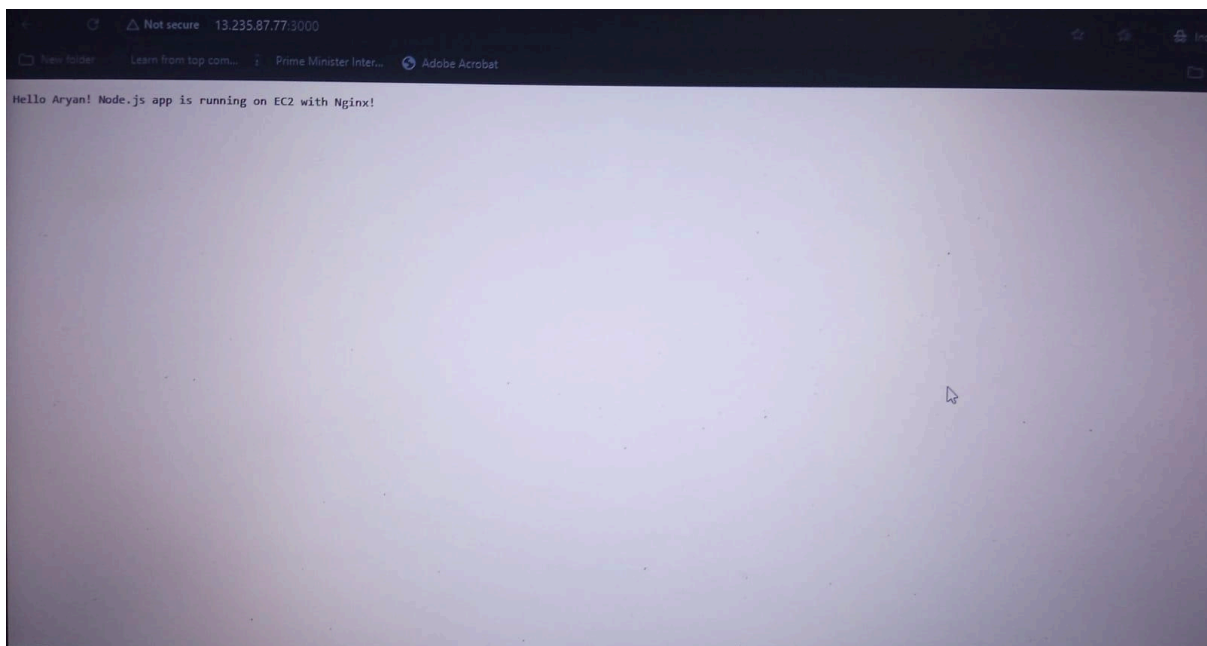


Figure 8: Final Output in Browser (Hello Aryan! Node.js App is running on EC2!)

Conclusion

- Deployed a Node.js app on EC2
- Configured Nginx as a reverse proxy
- Created a fully working environment for a Node.js app on AWS EC2