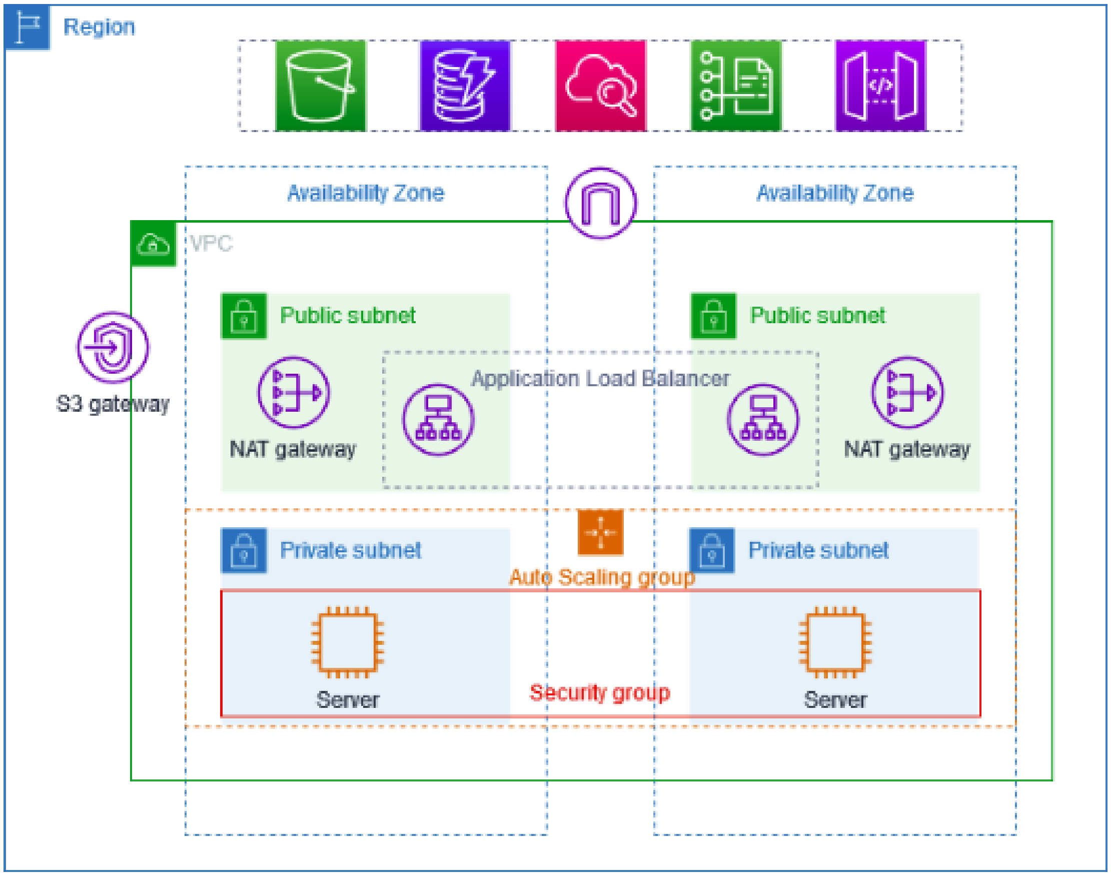
VPC with Public-Private Subnet in Production:

The project demonstrates how to create a VPC that you can use for servers in a production environment. To improve resiliency, you deploy the servers in two Availability Zones, by using an Auto Scaling group and an Application Load Balancer. For additional security, you deploy the servers in private subnets. The servers receive requests through the load balancer. The servers can connect to the internet by using a NAT gateway. To improve resiliency, you deploy the NAT gateway in both Availability Zones.

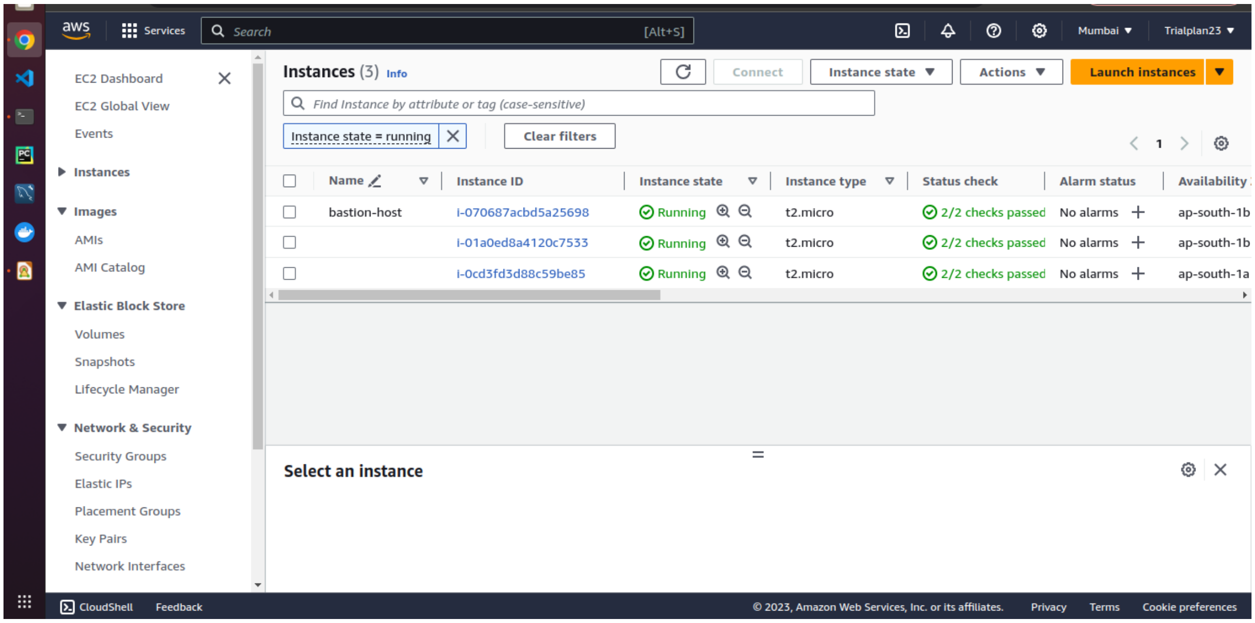
The following diagram provides an overview of the resources included in this example. The VPC has public subnets and private subnets in two Availability Zones. Each public subnet contains a NAT gateway and a load balancer node. The servers run in the private subnets, are launched and terminated by using an Auto Scaling group, and receive traffic from the load balancer. The servers can connect to the internet by using the NAT gateway.



Step1: I created a virtual private cloud with two availability zones which include one private and public cloud each and NAT gateway one per availability zone.

Step2 : Created EC2 instances with auto scaling groups in private subnets.Security groups are attached to the instances.EC2 instances are created in two availability zones.

Step3: Created a bastion host instance in the public subnet . As both the servers in private subnets do not have public IP address ,communicating with them is impossible. So, bastion host acts as a mediator between private subnet and public subnet.

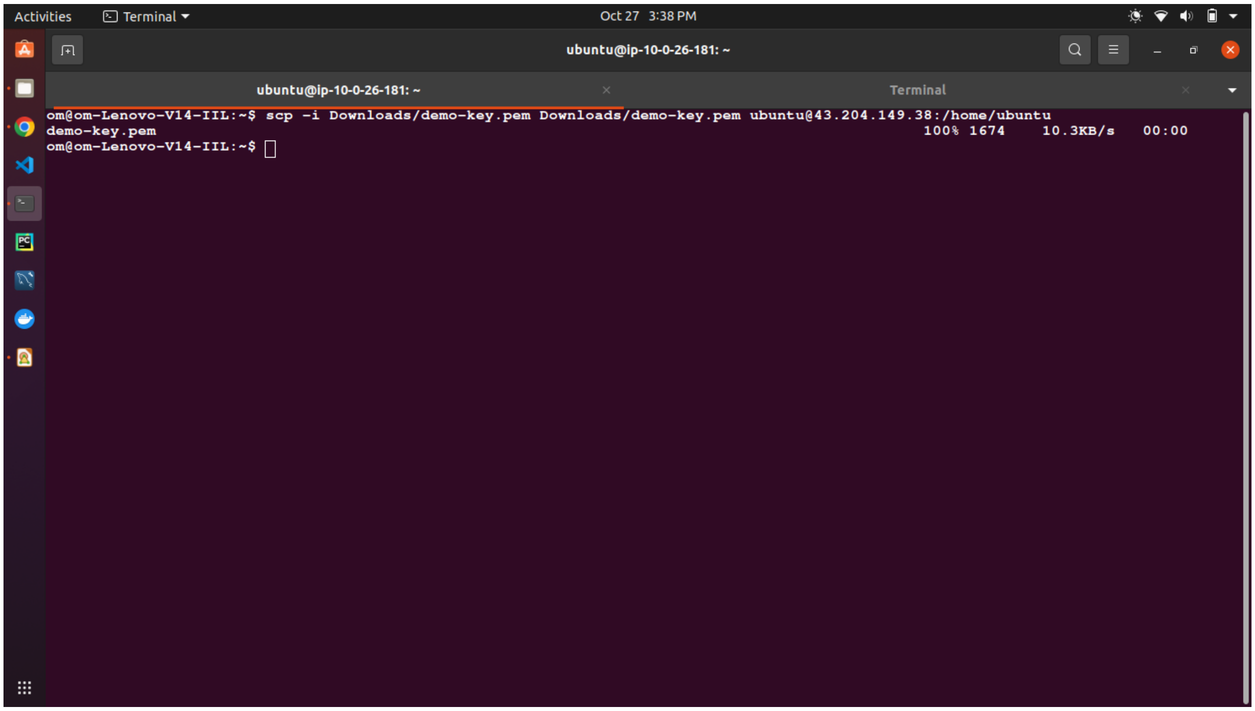


Instances (3) Info

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability
bastion-host	i-070687acbd5a25698	Running	t2.micro	2/2 checks passed	No alarms	ap-south-1b
	i-01a0ed8a4120c7533	Running	t2.micro	2/2 checks passed	No alarms	ap-south-1b
	i-0cd3fd3d88c59be85	Running	t2.micro	2/2 checks passed	No alarms	ap-south-1a

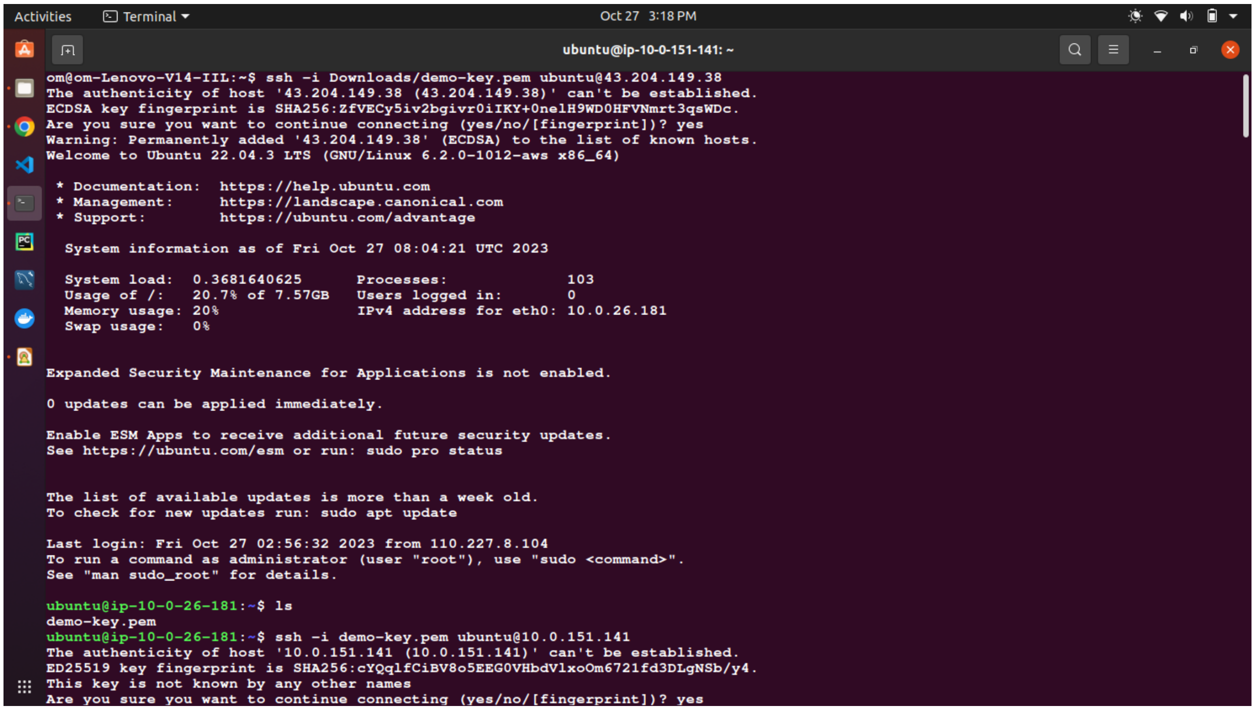
Select an instance

Step4: Copied the pem file from local server to the bastion host server using scp command.

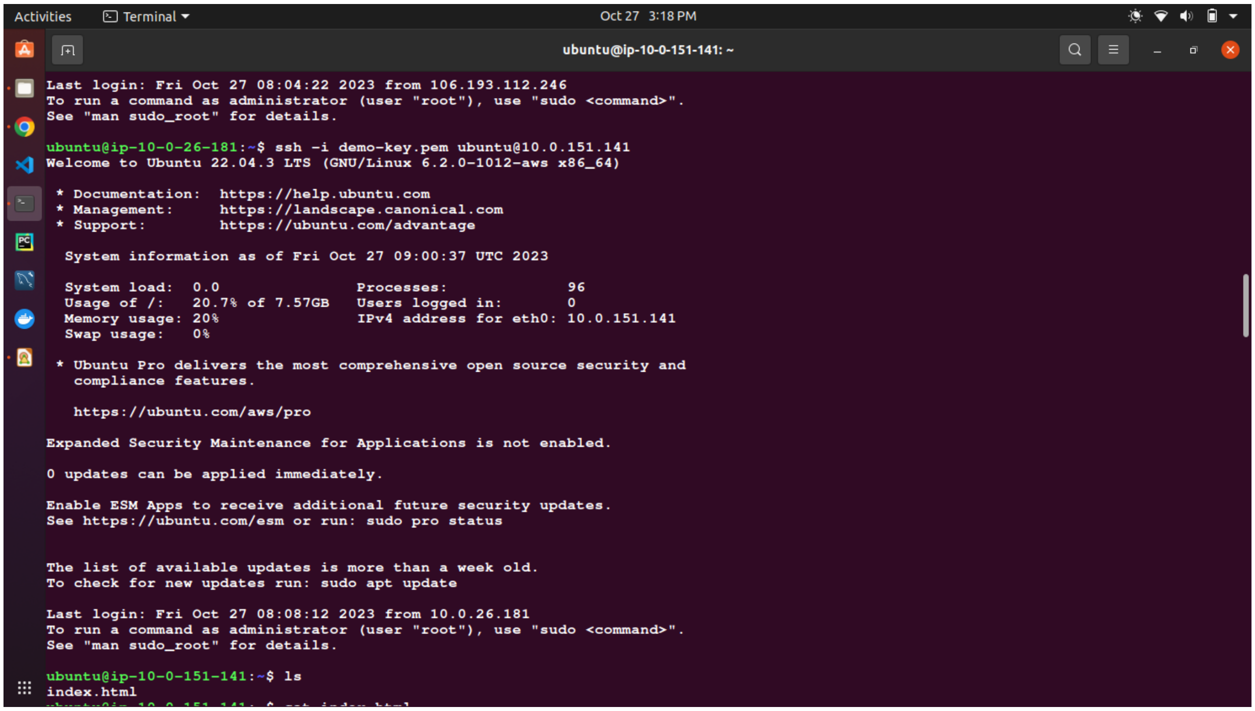


```
om@om-Lenovo-V14-IIL:~$ scp -i Downloads/demo-key.pem Downloads/demo-key.pem ubuntu@43.204.149.38:/home/ubuntu
demo-key.pem                                                                  100% 1674    10.3KB/s   00:00
om@om-Lenovo-V14-IIL:~$ 
```

Step5: Logged into bastion host and checked the pem file. Then again logged into one of the server in private subnet.



```
om@om-Lenovo-V14-IIL:~$ ssh -i Downloads/demo-key.pem ubuntu@43.204.149.38
The authenticity of host '43.204.149.38 (43.204.149.38)' can't be established.
ECDSA key fingerprint is SHA256:ZfVECy5iv2bgivr0iIKY+0nelH9WD0HFVNmrt3qsWDc.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '43.204.149.38' (ECDSA) to the list of known hosts.
Welcome to Ubuntu 22.04.3 LTS (GNU/Linux 6.2.0-1012-aws x86_64)

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

  System information as of Fri Oct 27 08:04:21 UTC 2023

  System load:  0.3681640625      Processes:             103
  Usage of /:   20.7% of 7.57GB   Users logged in:       0
  Memory usage: 20%               IPv4 address for eth0: 10.0.26.181
  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

Last login: Fri Oct 27 02:56:32 2023 from 110.227.8.104
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-10-0-26-181:~$ ls
demo-key.pem
ubuntu@ip-10-0-26-181:~$ ssh -i demo-key.pem ubuntu@10.0.151.141
The authenticity of host '10.0.151.141 (10.0.151.141)' can't be established.
ED25519 key fingerprint is SHA256:cYQqlfCiBV8o5EEG0VHbdVlxoOm6721fd3DLgNSb/y4.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
```



```
Last login: Fri Oct 27 08:04:22 2023 from 106.193.112.246
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-10-0-26-181:~$ ssh -i demo-key.pem ubuntu@10.0.151.141
Welcome to Ubuntu 22.04.3 LTS (GNU/Linux 6.2.0-1012-aws x86_64)

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

  System information as of Fri Oct 27 09:00:37 UTC 2023

  System load:  0.0               Processes:             96
  Usage of /:   20.7% of 7.57GB   Users logged in:       0
  Memory usage: 20%               IPv4 address for eth0: 10.0.151.141
  Swap usage:   0%

 * Ubuntu Pro delivers the most comprehensive open source security and
   compliance features.

   https://ubuntu.com/aws/pro

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See https://ubuntu.com/esm or run: sudo pro status


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Last login: Fri Oct 27 08:08:12 2023 from 10.0.26.181
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-10-0-151-141:~$ ls
index.html
```
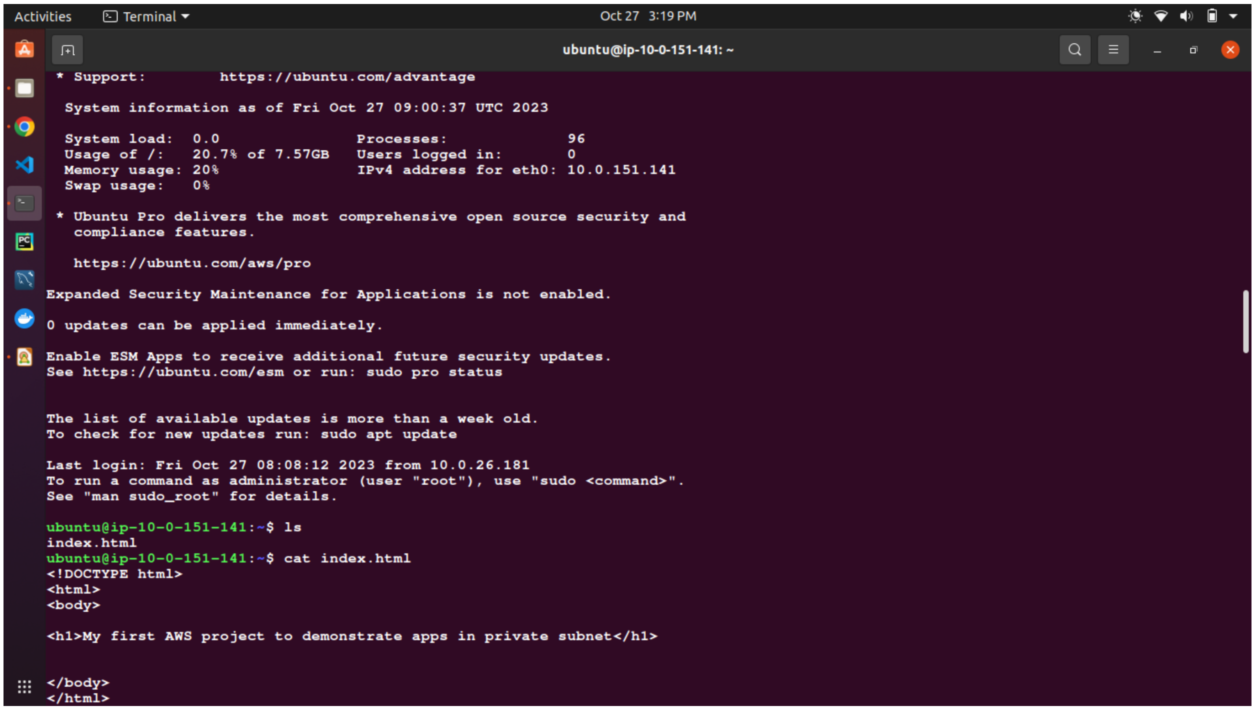

Step3: Now I deployed a python application in the server and created a basic html file .Run the application at port 8000.



```
 * Support:        https://ubuntu.com/advantage

  System information as of Fri Oct 27 09:00:37 UTC 2023

  System load:  0.0               Processes:             96
  Usage of /:   20.7% of 7.57GB   Users logged in:       0
  Memory usage: 20%               IPv4 address for eth0: 10.0.151.141
  Swap usage:   0%

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To check for new updates run: sudo apt update

Last login: Fri Oct 27 08:08:12 2023 from 10.0.26.181
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-10-0-151-141:~$ ls
index.html
ubuntu@ip-10-0-151-141:~$ cat index.html
<!DOCTYPE html>
<html>
<body>

<h1>My first AWS project to demonstrate apps in private subnet</h1>


</body>
</html>
```
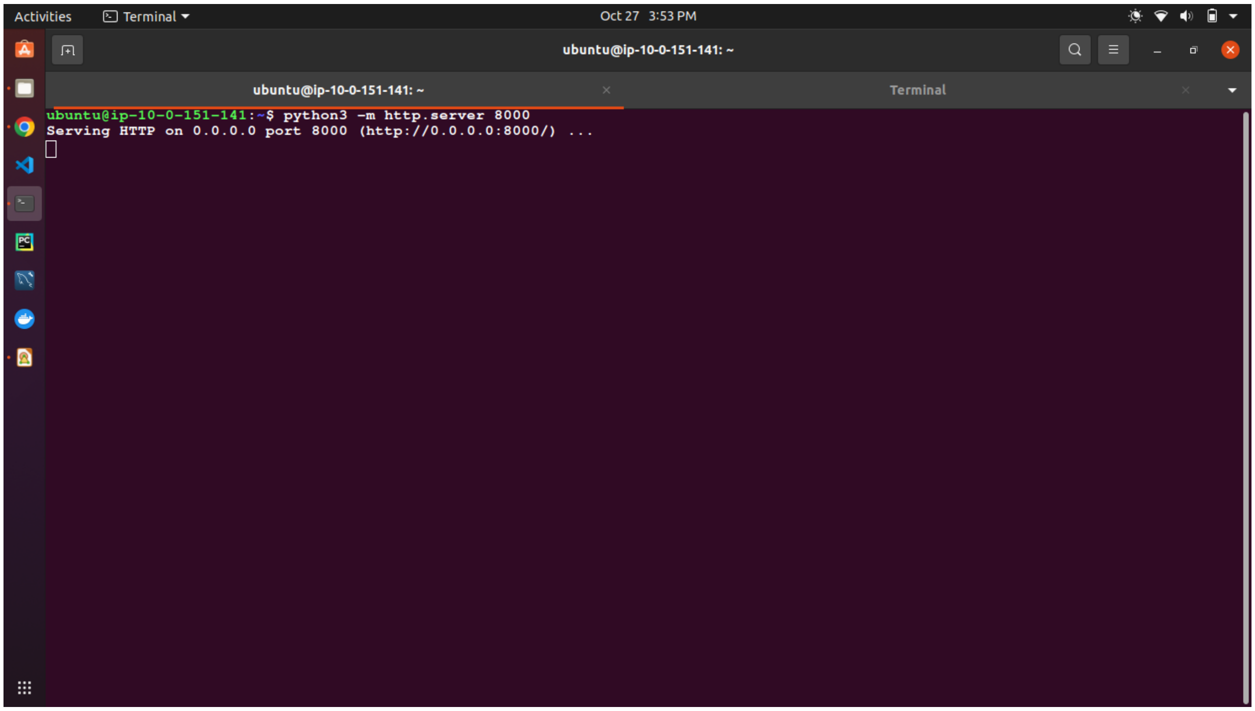
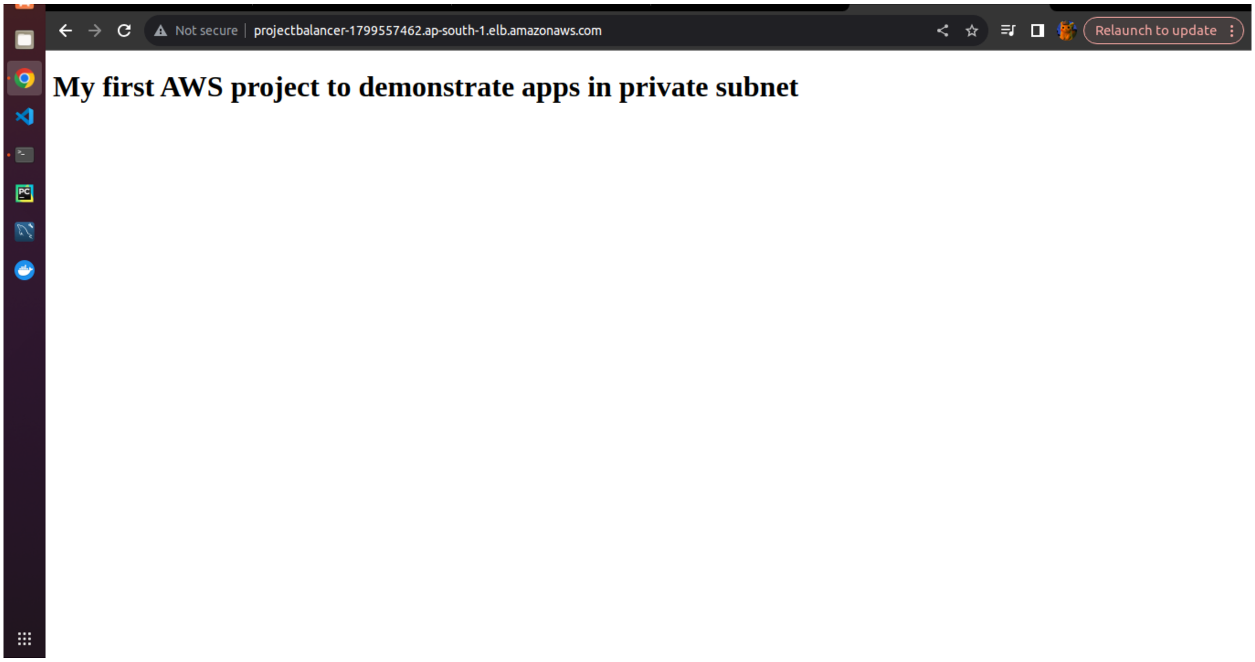



```
ubuntu@ip-10-0-151-141:~$ python3 -m http.server 8000
Serving HTTP on 0.0.0.0 port 8000 (http://0.0.0.0:8000/) ...
```

Step7: Now create a load balancer in public subnet which balances the traffic and attach instances as target groups.

Step8: The http is up and running and the text is displayed. Here target group actively monitors the healthy part . The load is always going to the healthy EC2 instance.



My first AWS project to demonstrate apps in private subnet