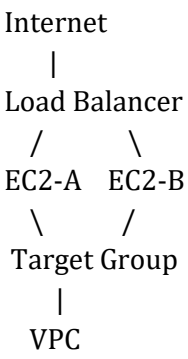
Highly Available Web Application Deployment Using AWS

Objective:

To deploy a simple web application on two EC2 instances located in different Availability Zones, fronted by an Application Load Balancer (ALB), ensuring high availability — if one EC2 instance fails, the other serves traffic seamlessly.

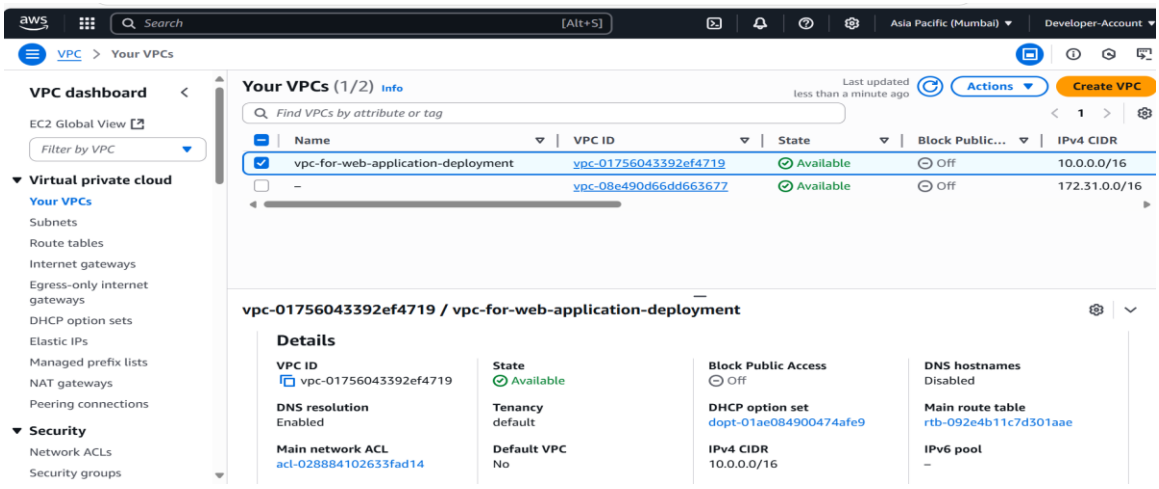
Architecture Diagram:



Step-by-Step Implementation:

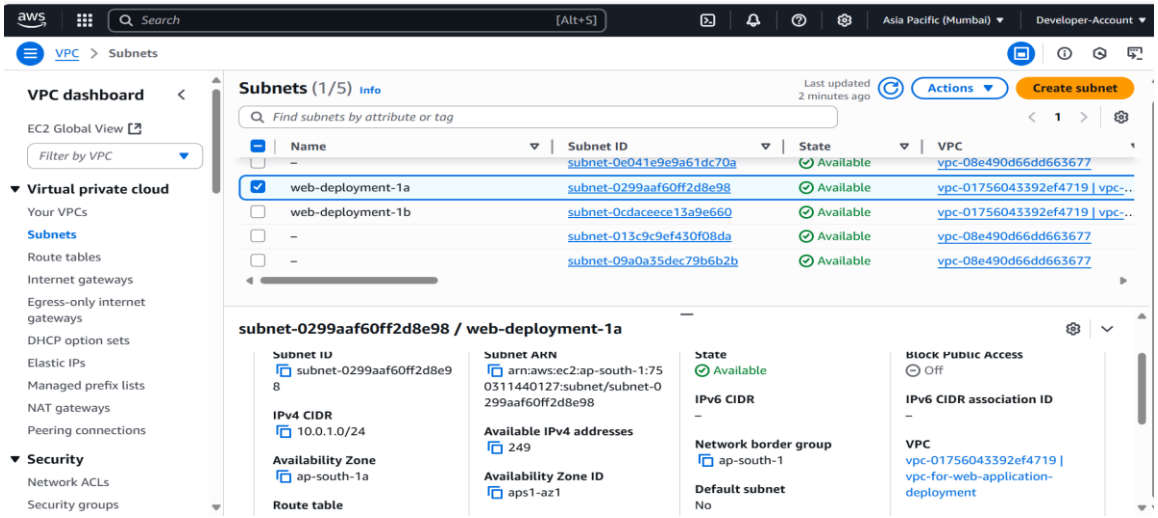
Step 1: Create a VPC

CIDR Block: 10.0.0.0/16



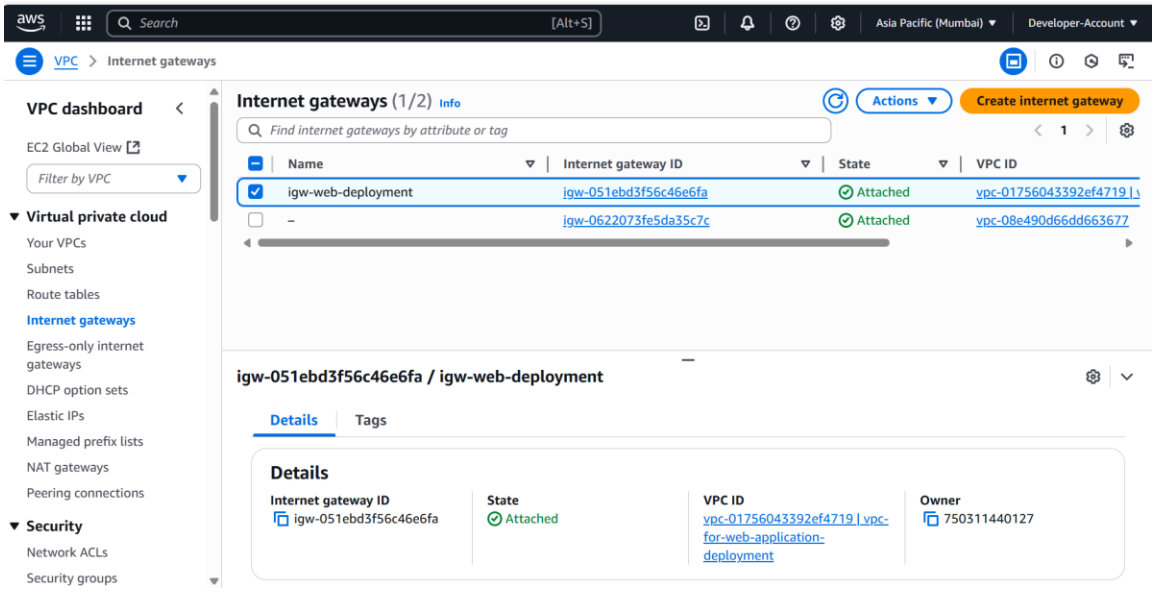
Step 2: Create Two Public Subnets

Subnet-1 | us-east-1a | 10.0.1.0/24
Subnet-2 | us-east-1b | 10.0.2.0/24



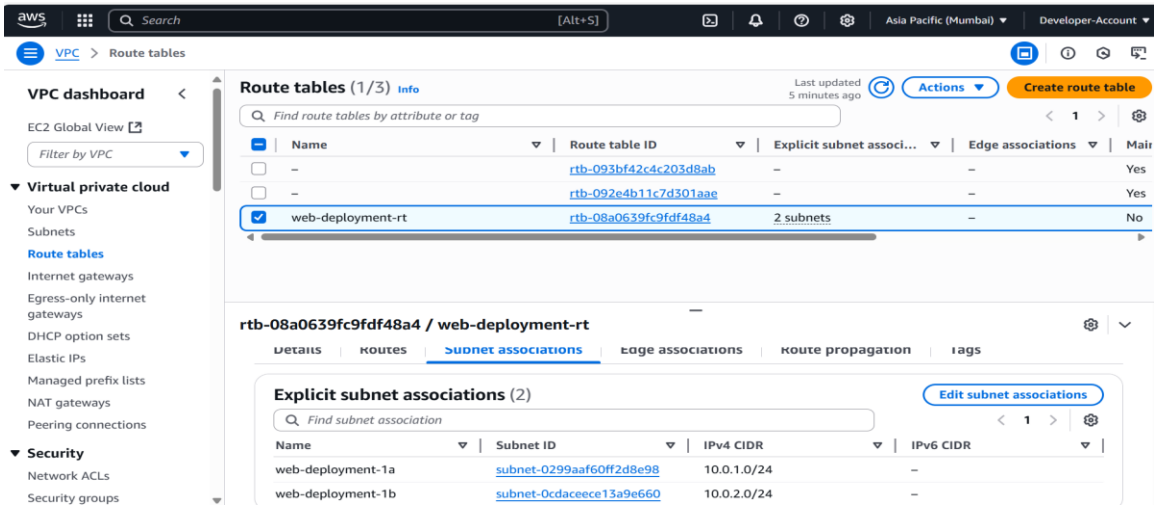
Step 3: Create and Attach an Internet Gateway

Attach it to the VPC.



Step 4: Create a Route Table and Attach to Subnets

Add route: Destination: 0.0.0.0/0 → Target: Internet Gateway
Associate with both public subnets.

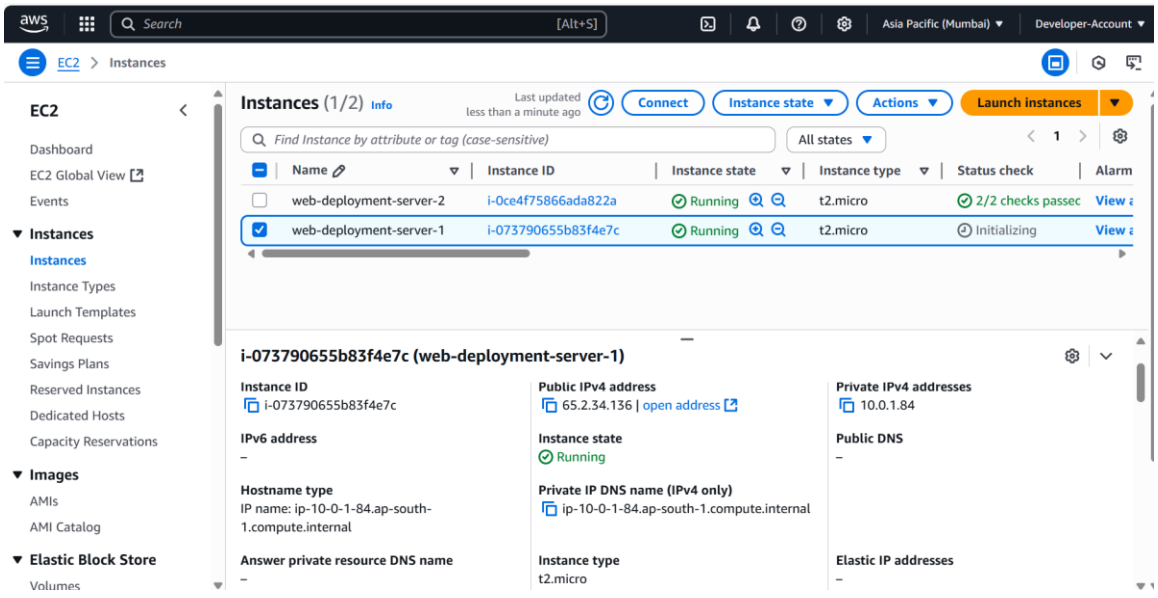


Step 5: Launch Two EC2 Instances (Web Servers) with Created VPC

AMI: Amazon Linux 2, Type: t2.micro, One in each subnet

Use this user data:

```
#!/bin/bash
sudo yum update -y
sudo yum install -y httpd
echo "Welcome to $(hostname) - Web Server" > /var/www/html/index.html
sudo systemctl start httpd
sudo systemctl enable httpd
```

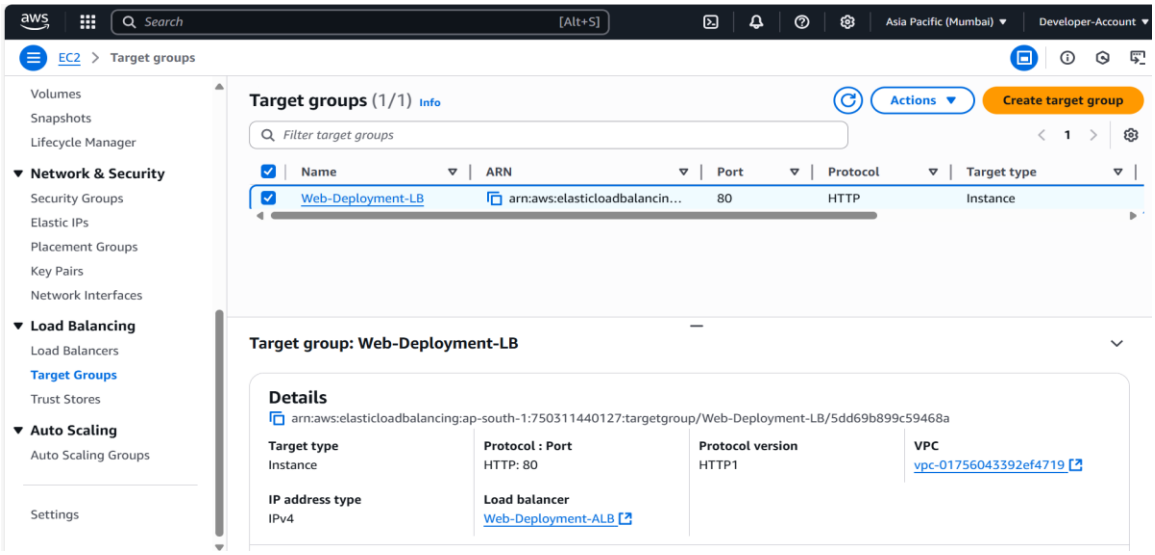


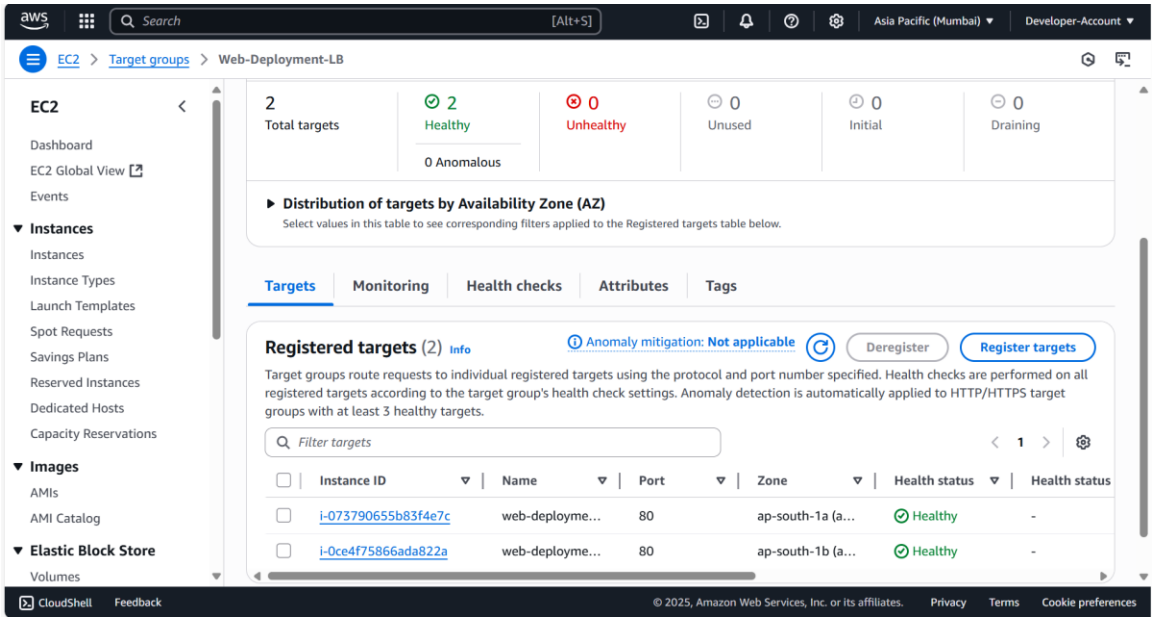
Step 6: Configure Security Group for EC2s

Allow SSH (22) from your IP and HTTP (80) from 0.0.0.0/0

Step 7: Create a Target Group

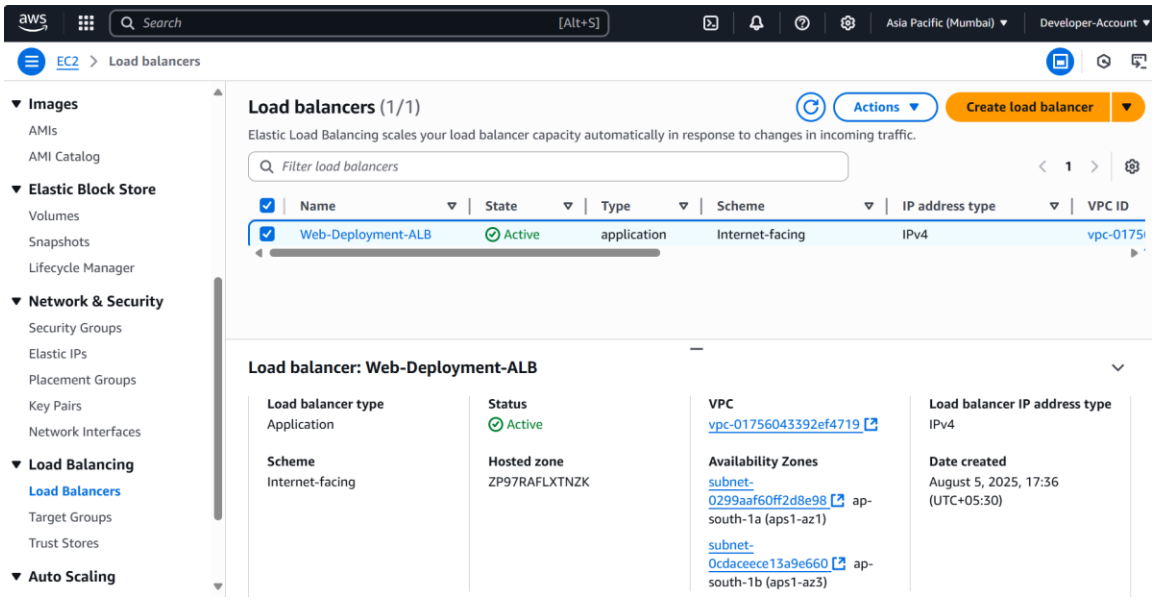
Type: Instance, Protocol: HTTP, Port: 80, Health check path: /

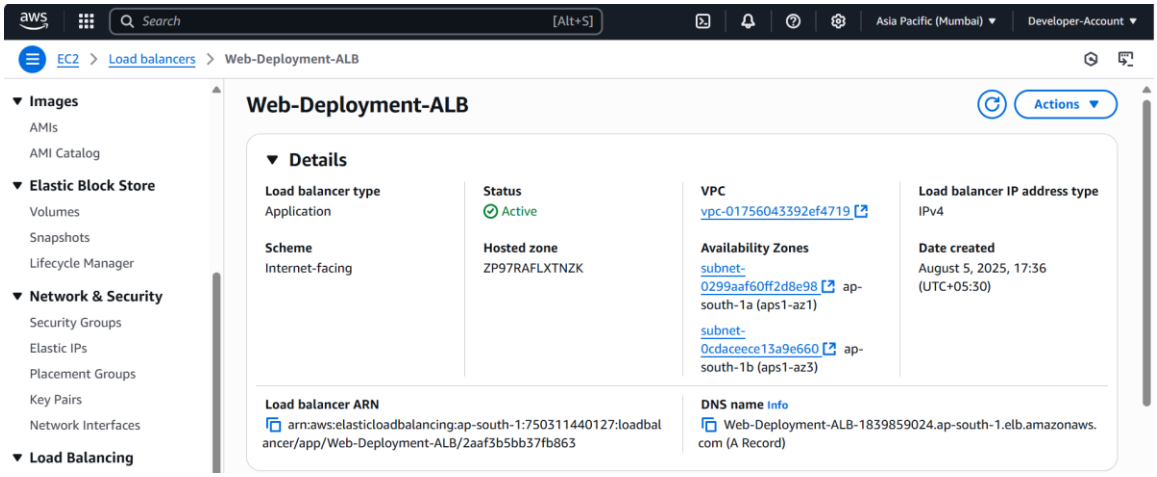




Step 8: Create an Application Load Balancer

Internet-facing, Listener on HTTP 80, Subnet-1 and Subnet-2, Attach target group

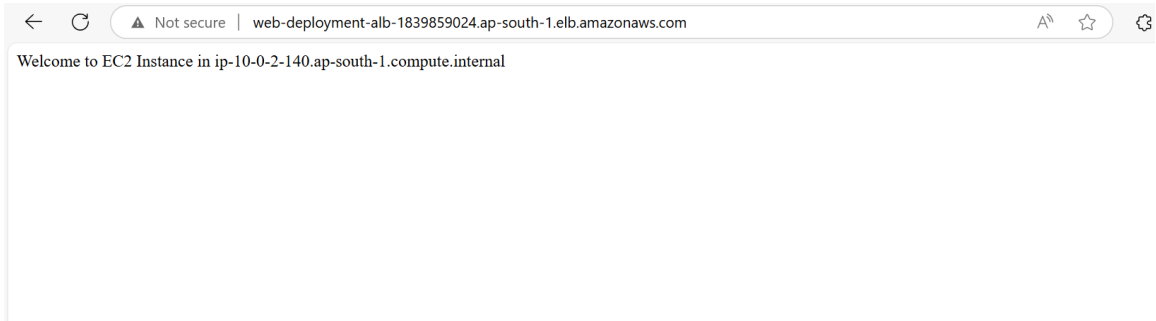


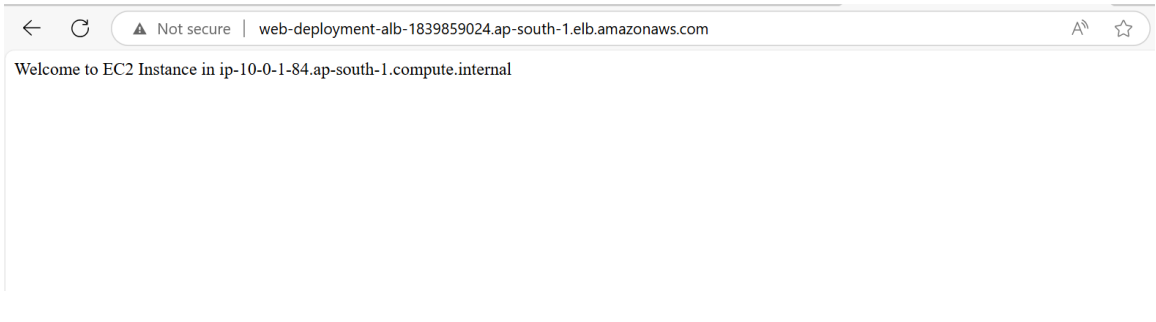


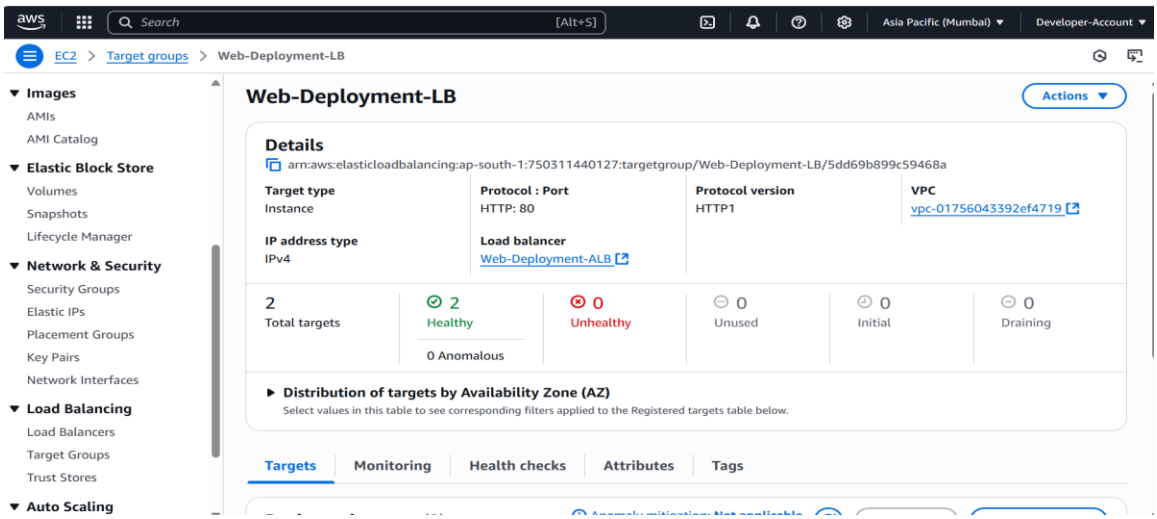
Step 9: Test the ALB in Browser

Find ALB DNS in EC2 → Load Balancers.
Open in browser: http://<ALB-DNS-Name>

web-deployment-alb-1839859024.ap-south-1.elb.amazonaws.com



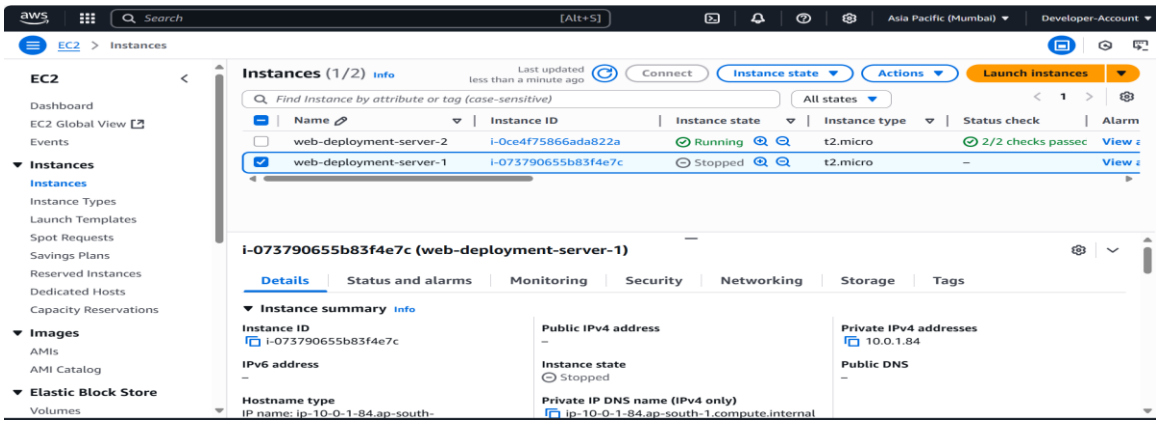


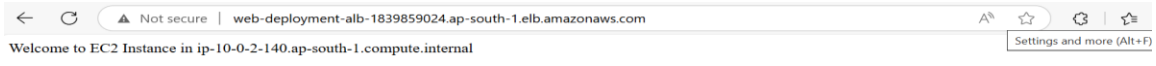


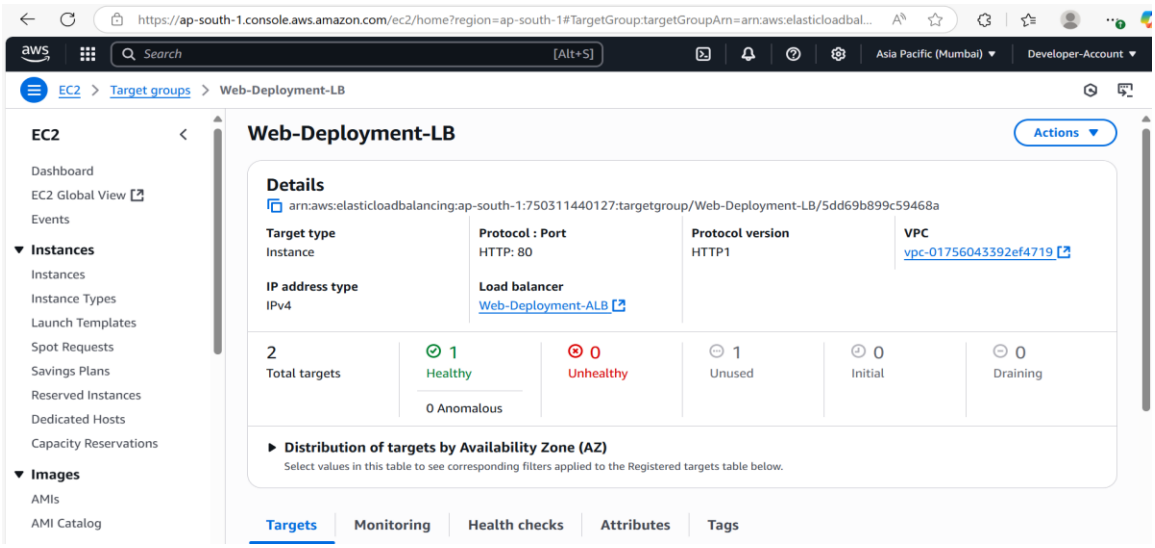
Step 10: Test High Availability

Stop EC2-A. Refresh ALB DNS. Traffic should route to EC2-B.

Target group: Healthy: 1, Unused: 1







Routing Table Summary:

Destination: 0.0.0.0/0 → Target: Internet Gateway

Final Output Verification:

Check	Result
ALB URL reachable	Yes
EC2 servers show web page	Yes
Stopping one EC2 works	Traffic goes to other EC2
Target group health status	One Healthy, One Unused

Conclusion:

Successfully deployed a highly available web application in AWS using:
- Two EC2s in different AZs
- Application Load Balancer
- Proper routing tables and health checks

This setup ensures traffic is served even if one instance fails.