Deployed a Scalable Web Application on AWS using EC2 Auto Scaling, Load Balancer & CloudWatch Monitoring

STEP 1: Prepare EC2 Instances

You can skip this step if your 3 instances are already set up.

1. Launch 1 EC2 instance
2. Install a web server:

   sudo apt install apache2 -y

   sudo systemctl enable apache2

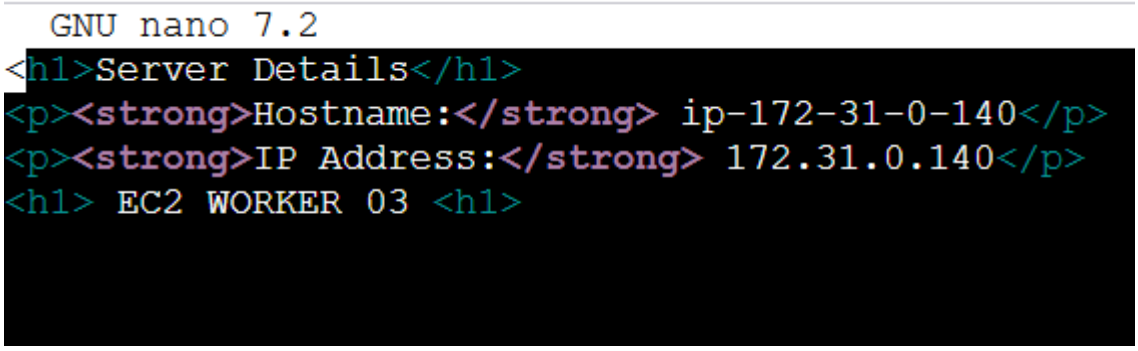
   echo "<h1>Server Details</h1>

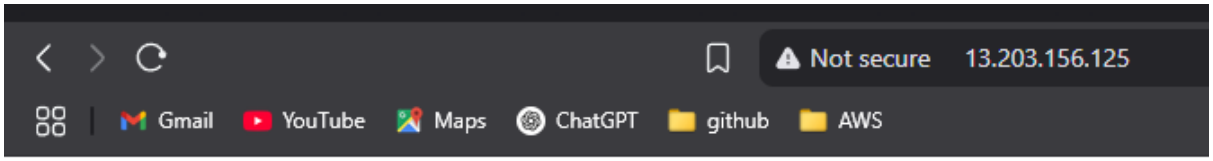
   Hostname: $(hostname)

   IP Address: $(hostname -I | awk '{print $1}') " | sudo tee /var/www/html/index.html

   sudo systemctl restart apache2

3. Create an AMI from this instance (used for Auto Scaling):
   - EC2 Dashboard → Select instance → **Actions > Image > Create image**





Server Details

Hostname: ip-172-31-0-140

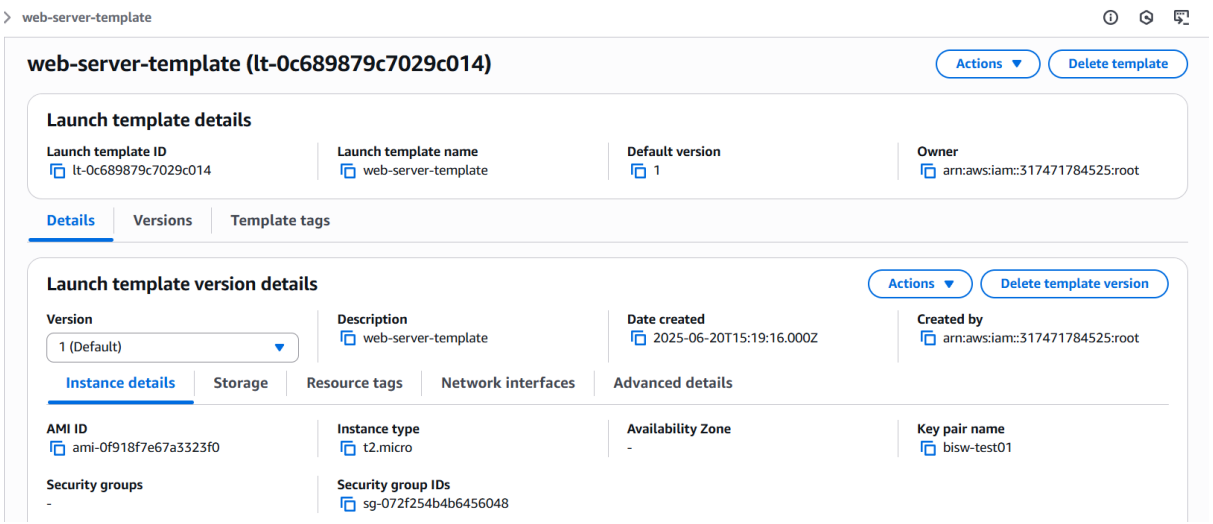
IP Address: 172.31.0.140

EC2 WORKER 03

STEP 2: Create a Launch Template

This defines how new EC2 instances should launch.

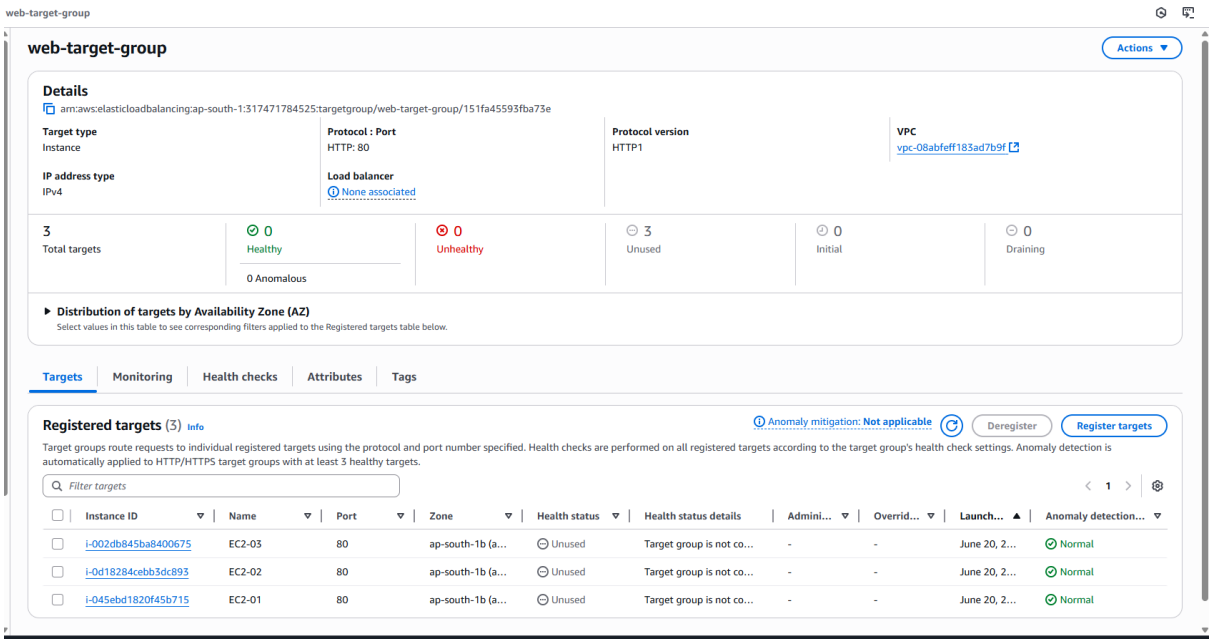
1. Go to **EC2 > Launch Templates > Create Launch Template**
2. Name: web-server-template
3. AMI: Select the one you just created
4. Instance Type: t2.micro (Free Tier)
5. Key pair: Choose existing or create new
6. Security Group: Allow HTTP (80) + SSH (22)
7. Save



STEP 3: Create Target Group

This allows Load Balancer to route traffic.

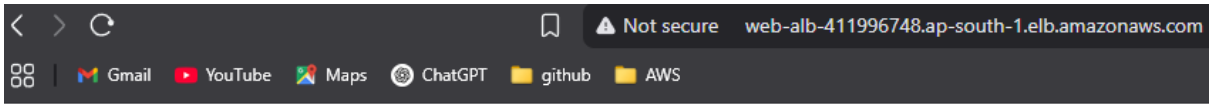
1. Go to **EC2 > Target Groups > Create Target Group**
2. Type: Instances
3. Protocol: HTTP, Port: 80
4. Name: web-target-group
5. Register one existing instance for test
6. Save



STEP 4: Create Application Load Balancer

1. Go to **EC2 > Load Balancers > Create Load Balancer**
2. Choose **Application Load Balancer**
3. Name: web-alb
4. Scheme: Internet-facing
5. Listeners: HTTP (80)
6. Availability Zones: Choose 2+ subnets
7. Target Group: Use web-target-group

After creation, test the **ALB DNS** to see your webpage.

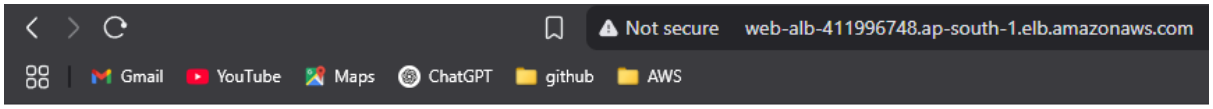


Server Details

Hostname: ip-172-31-13-161

IP Address: 172.31.13.161

EC2 WORKER 02

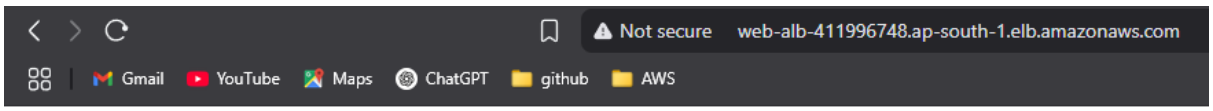


Server Details

Hostname: ip-172-31-0-140

IP Address: 172.31.0.140

EC2 WORKER 03



Server Details

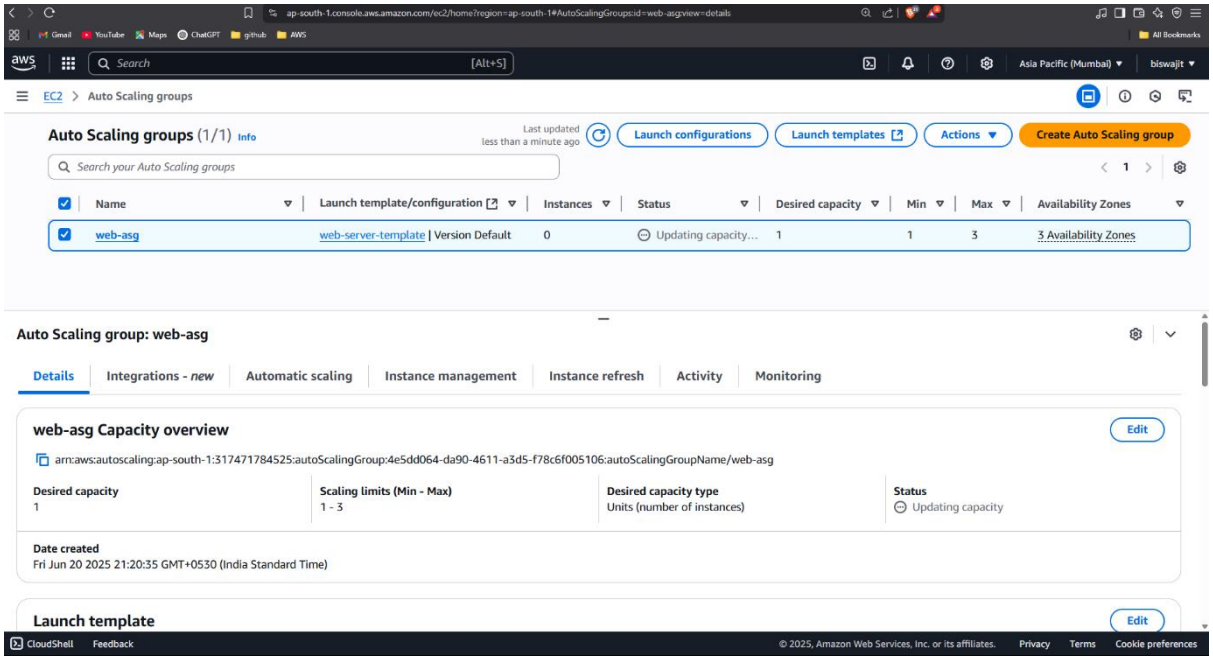
Hostname: ip-172-31-0-39

IP Address: 172.31.0.39

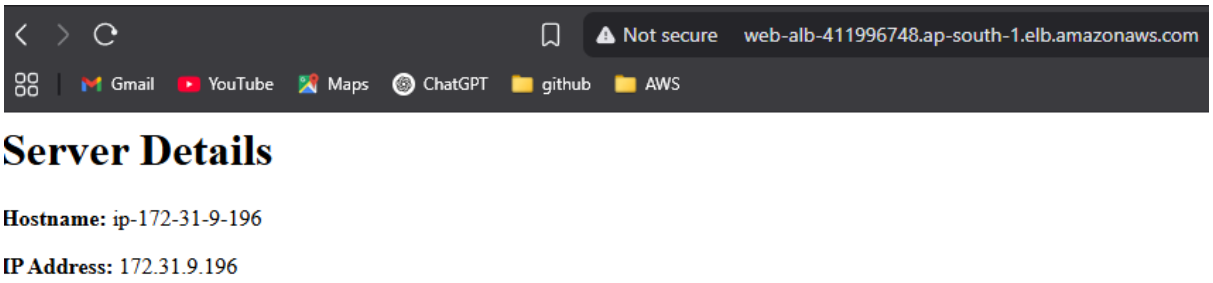
EC2 WORKER 01

STEP 5: Create Auto Scaling Group (ASG)

1. Go to **EC2 > Auto Scaling Groups > Create**
2. Name: web-asg
3. Launch Template: web-server-template
4. VPC & Subnets: Select existing
5. Attach to Load Balancer: Yes → Choose your target group
6. Group Size: Desired=2, Min=1, Max=3
7. Scaling Policy: Target tracking
    - Metric type: Average CPU Utilization
    - Target: 50%

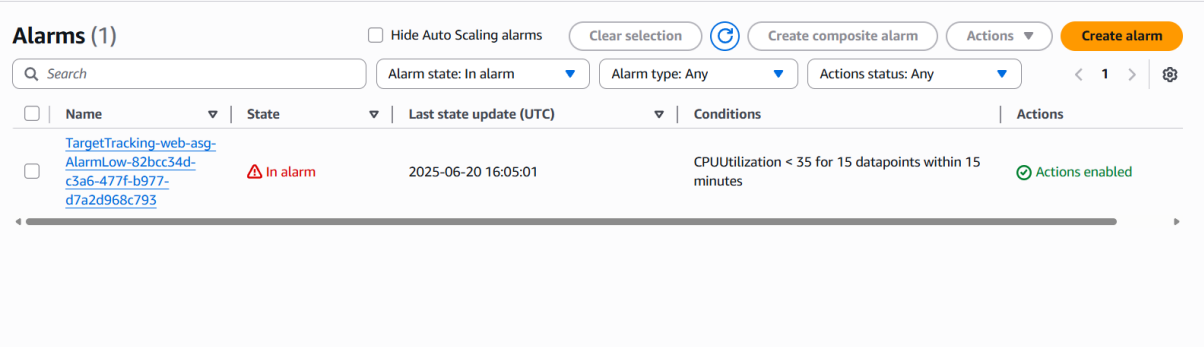


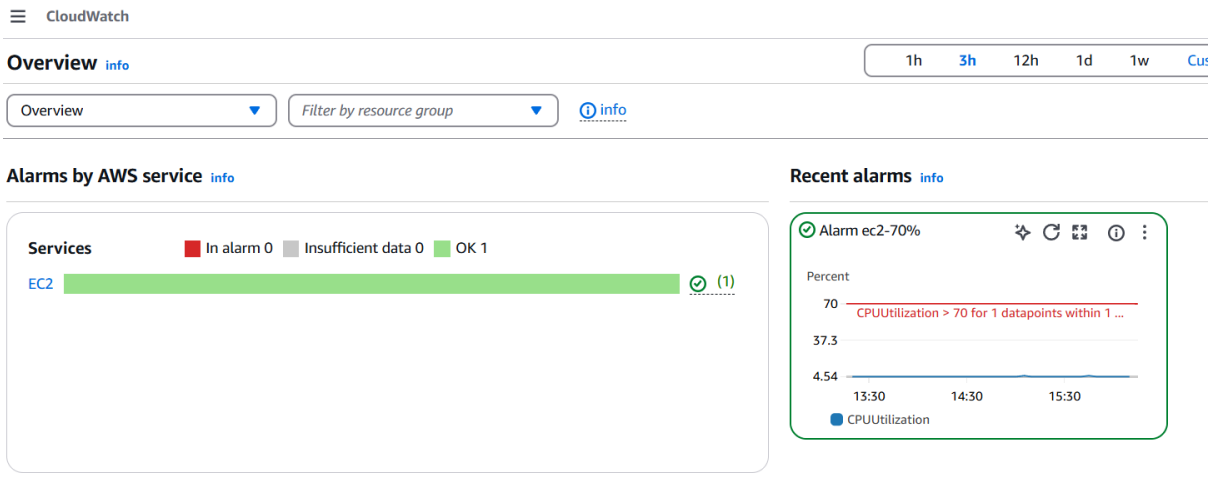
After generating some load, Auto Scaling automatically added one instance



STEP 6: Set Up CloudWatch Alarms

1. Go to **CloudWatch > Alarms > Create Alarm**
2. Metric: EC2 → Per-Instance Metrics → CPUUtilization
3. Condition: CPU > 70% for 2 periods (1 min each)
4. Action: Trigger Auto Scaling (optional)
5. Set Notification (optional): Use SNS to get email alerts





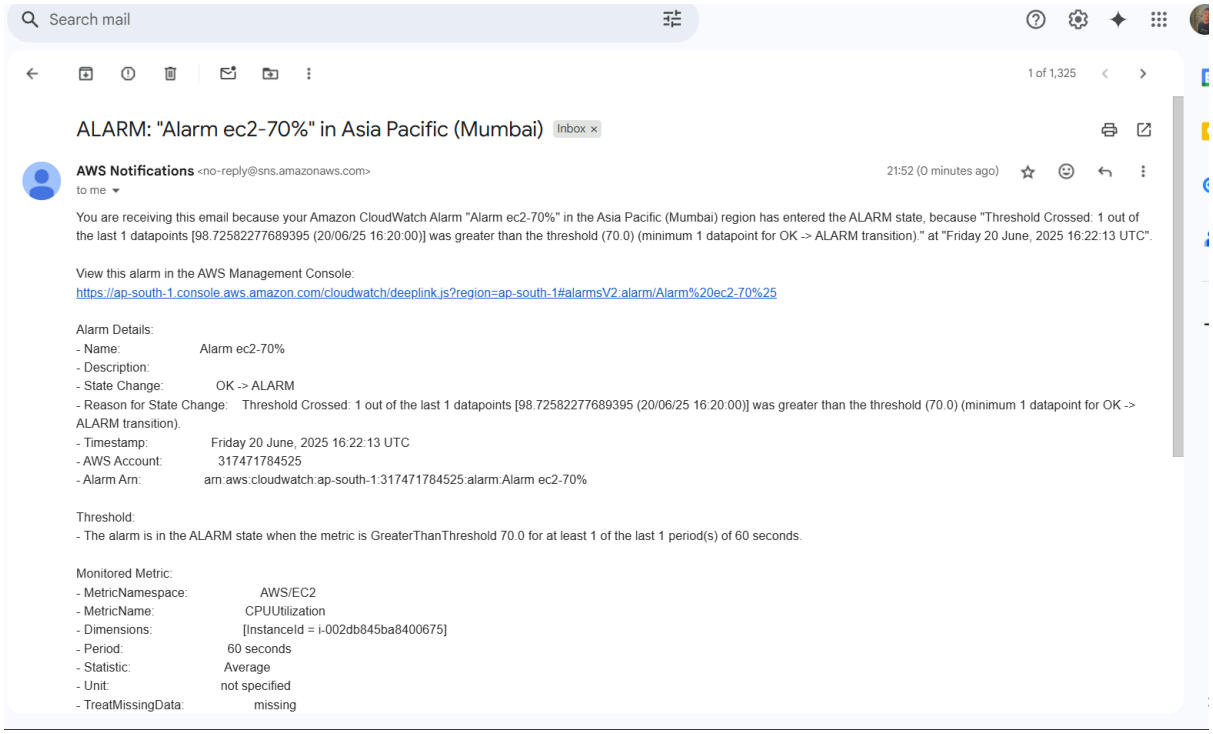
Test the Alarm

To simulate high CPU usage:

sudo apt install stress -y

stress --cpu 2 --timeout 300

Then wait a few minutes → the alarm will go **“In Alarm”**, and you’ll get an email notification.


Search mail
1 of 1,325
ALARM: "Alarm ec2-70%" in Asia Pacific (Mumbai)
Inbox ×
AWS Notifications <no-reply@sns.amazonaws.com>
to me
21:52 (0 minutes ago)
You are receiving this email because your Amazon CloudWatch Alarm "Alarm ec2-70%" in the Asia Pacific (Mumbai) region has entered the ALARM state, because "Threshold Crossed: 1 out of the last 1 datapoints [98.72582277689395 (20/06/25 16:20:00)] was greater than the threshold (70.0) (minimum 1 datapoint for OK -> ALARM transition)." at "Friday 20 June, 2025 16:22:13 UTC".
View this alarm in the AWS Management Console:
https://ap-south-1.console.aws.amazon.com/cloudwatch/deeplink.js?region=ap-south-1#alarmsV2:alarm/Alarm%20ec2-70%25
Alarm Details:
- Name: Alarm ec2-70%
- Description:
- State Change: OK -> ALARM
- Reason for State Change: Threshold Crossed: 1 out of the last 1 datapoints [98.72582277689395 (20/06/25 16:20:00)] was greater than the threshold (70.0) (minimum 1 datapoint for OK -> ALARM transition).
- Timestamp: Friday 20 June, 2025 16:22:13 UTC
- AWS Account: 317471784525
- Alarm Arn: arn:aws:cloudwatch:ap-south-1:317471784525:alarm:Alarm ec2-70%
Threshold:
- The alarm is in the ALARM state when the metric is GreaterThanThreshold 70.0 for at least 1 of the last 1 period(s) of 60 seconds.
Monitored Metric:
- MetricNamespace: AWS/EC2
- MetricName: CPUUtilization
- Dimensions: [InstanceId = i-002db845ba8400675]
- Period: 60 seconds
- Statistic: Average
- Unit: not specified
- TreatMissingData: missing