

School of Computer Science, Engineering and Applications(SCSEA)

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Subject: Advance Cloud Computing(ACC)

Name of the
Student:

Prakhar Anil Sharma

PRN: 20220801121

Title of Practical:

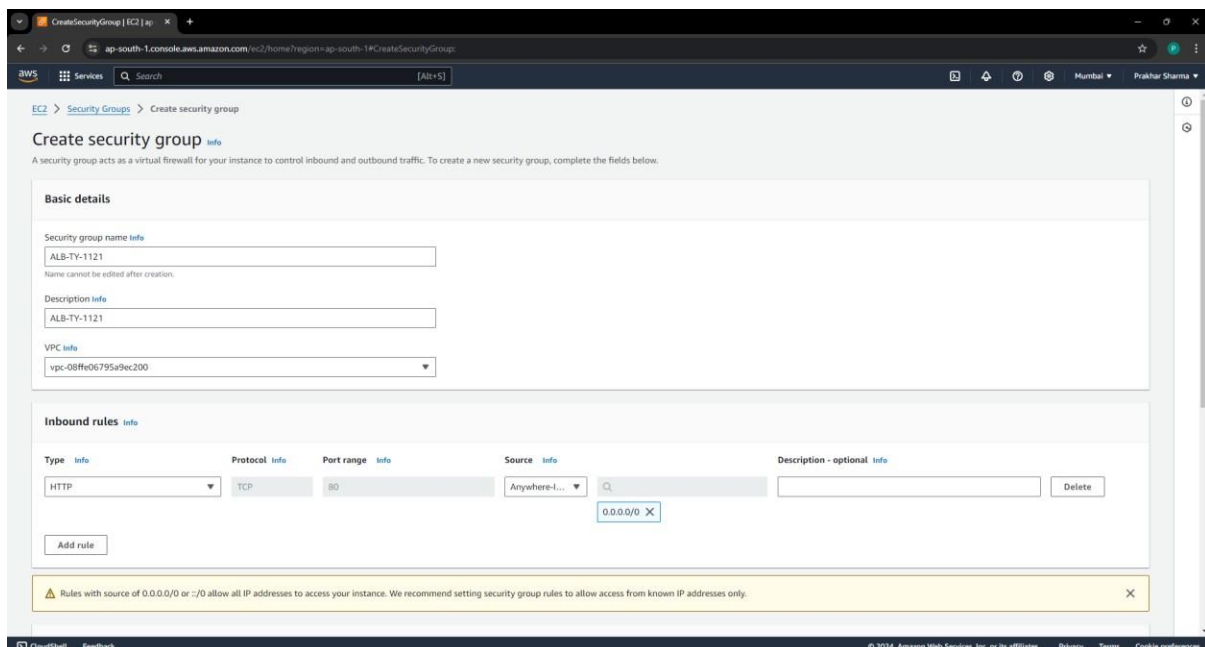
Creating an Application Load Balancer and Auto
Scaling Group in AWS

1. Go to EC2 Service

2. Create Security Groups for Application Load Balancer and Auto Scaling Group

2.1. Security Group for Application Load Balancer

- Name: Of Your Choice
- Inbound Rules:
 - Type: HTTP
 - Source: Anywhere-IPV4



- Click Create Security Group

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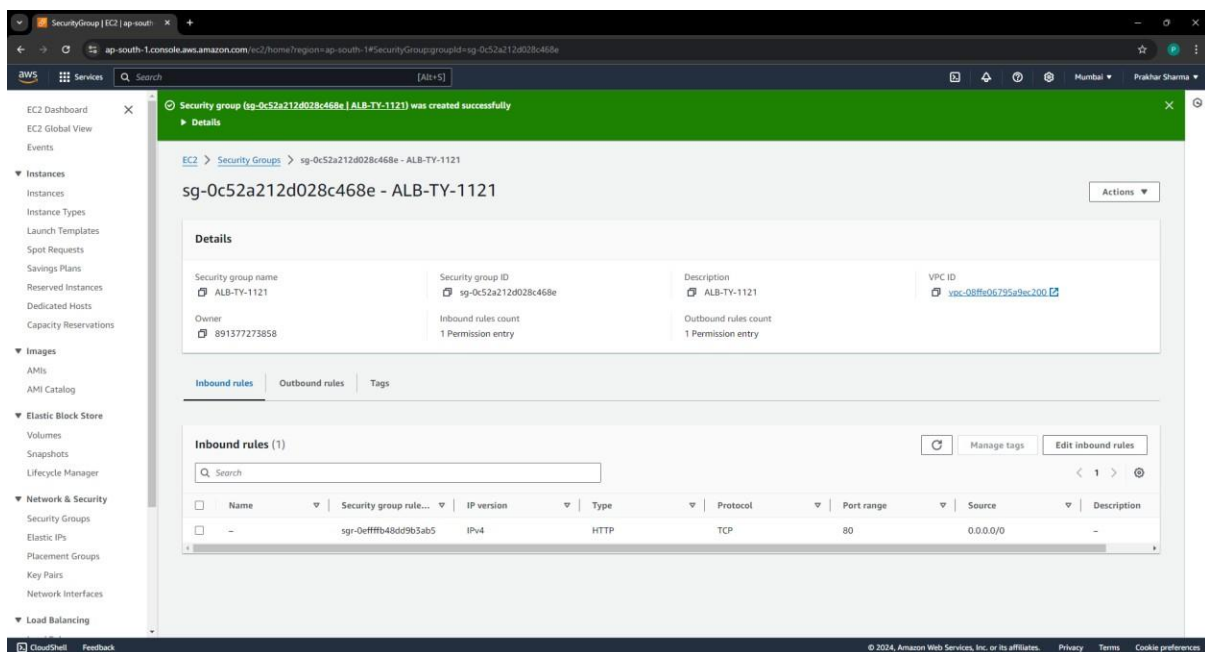
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1.1. Security Group for Auto Scaling Group

- **Name:** Of Your Choice
- **Inbound Rules :**

1.

Type: SSH

Source: Anywhere-IPV4

2.

Type: All TCP

Source: (the security group we just created for application load balancer)

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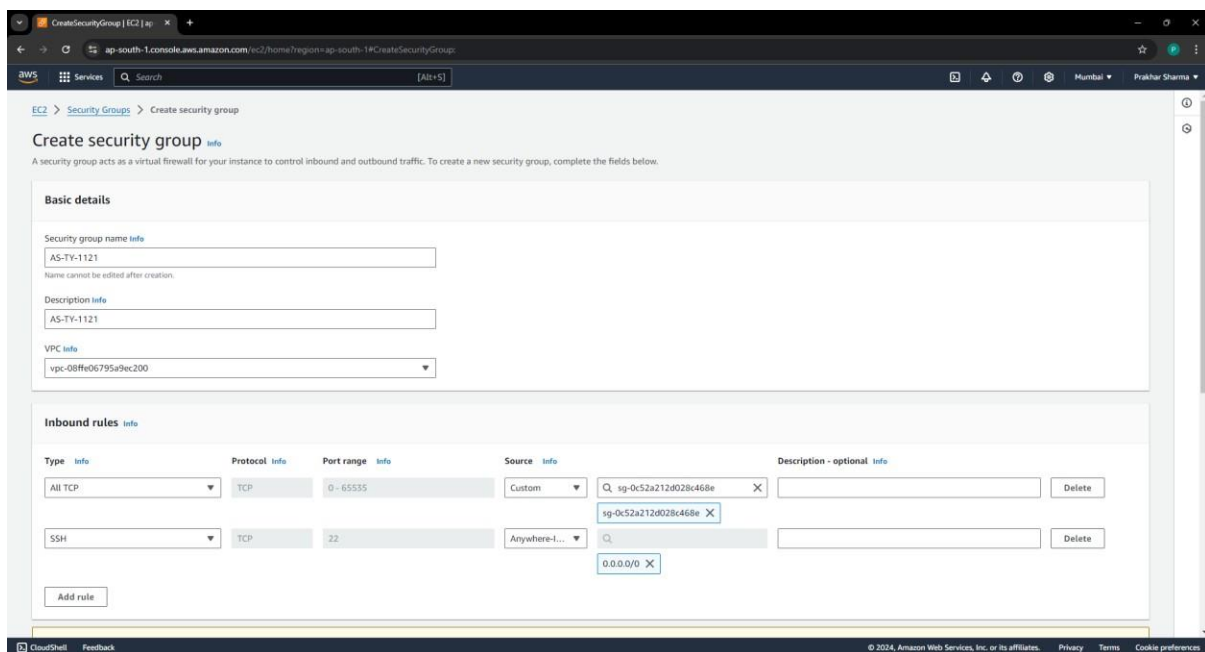
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- Click Create Security Group

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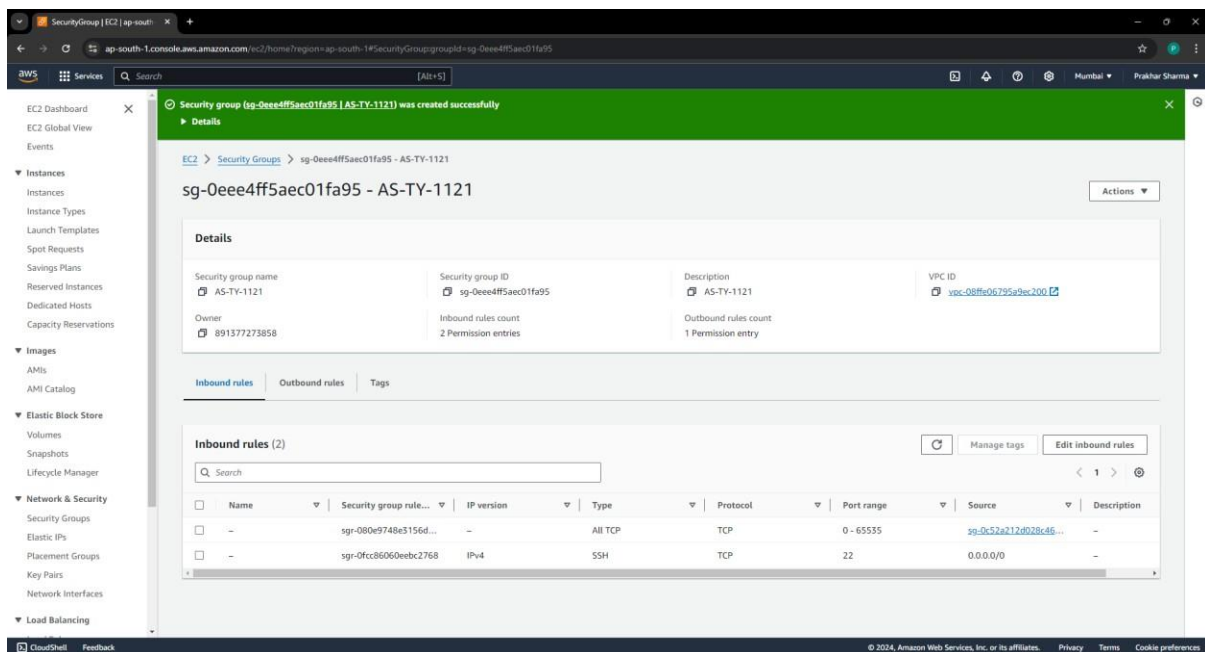
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3. Create the Auto Scaling Group

- Enter Name: Of Your Choice
- Click Create on Launch Template
 - Give Name: (Choose any)

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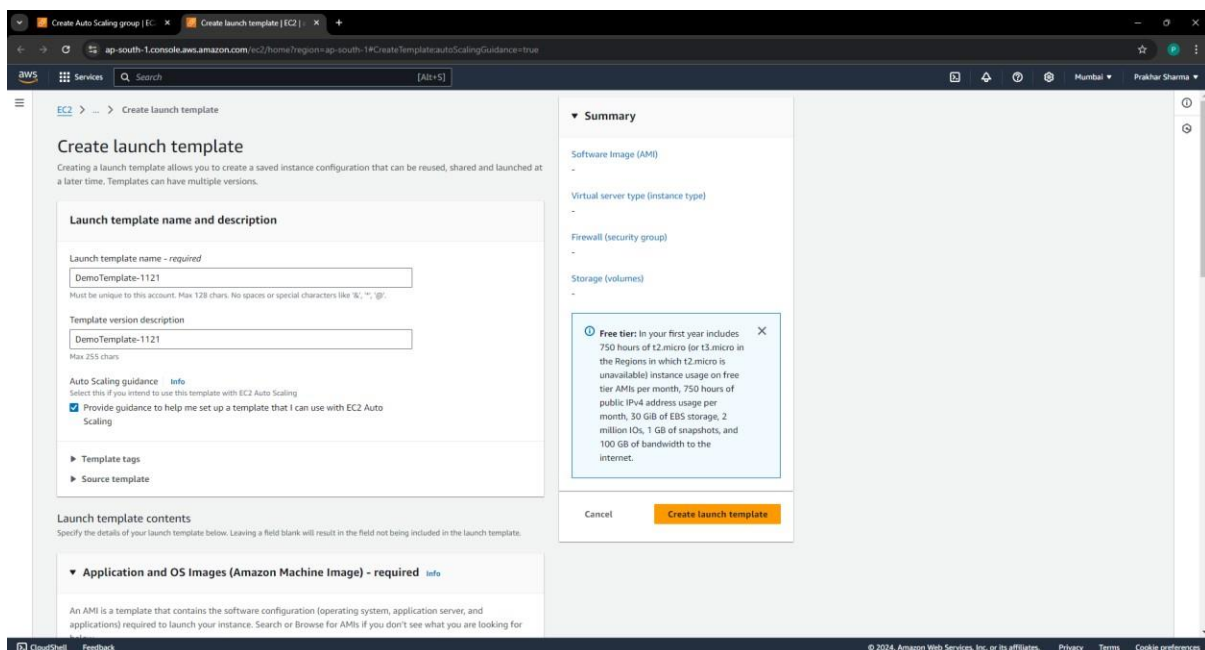
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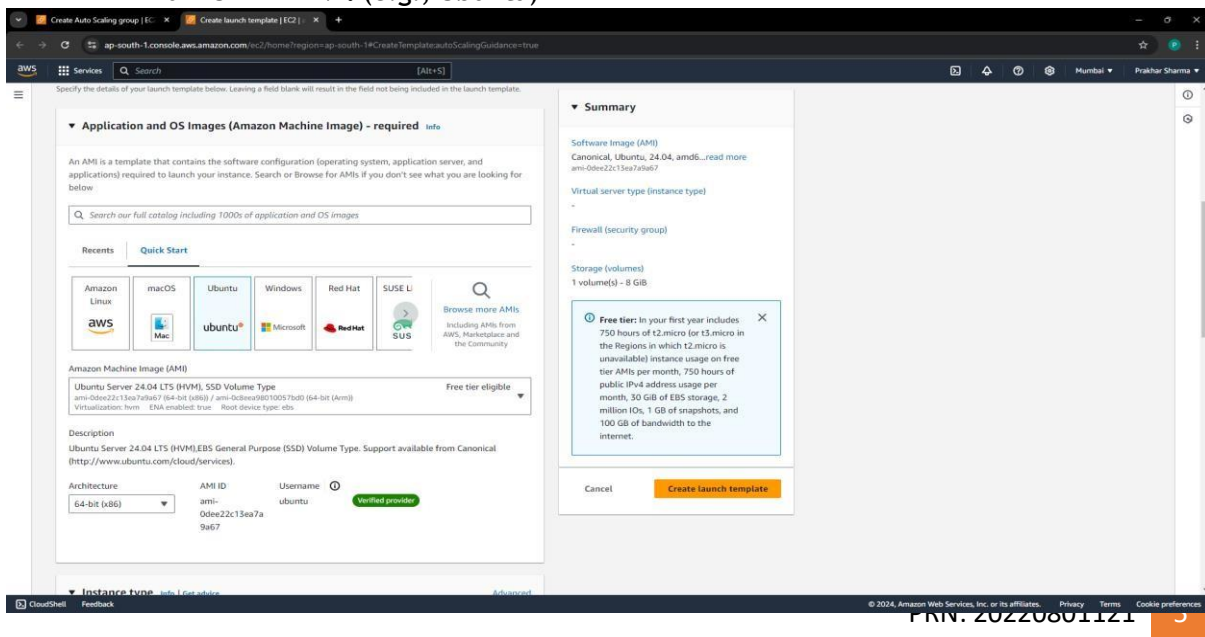
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○ **Select AMI: (e.g., Ubuntu)**



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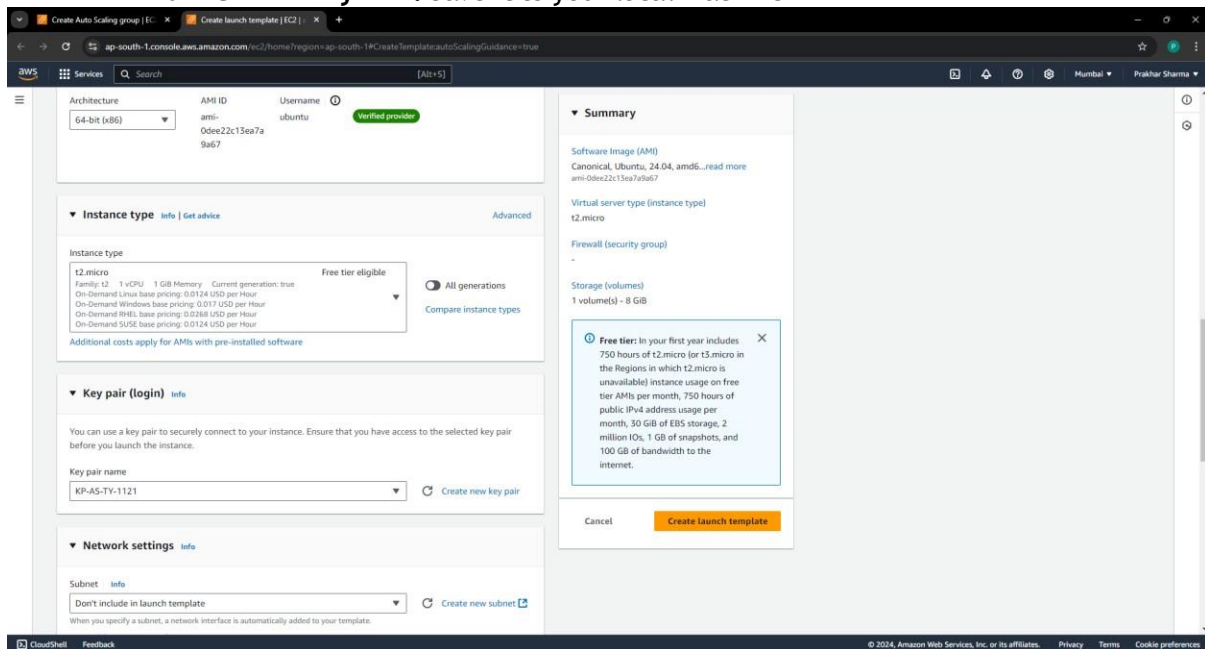
Prakhar Anil Sharma

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- **Instance Type: t2.micro**
- **Create Key Pair: Save it to your local machine**



- **In Network Settings: Select the security group we created
named when creating for AutoScaling**



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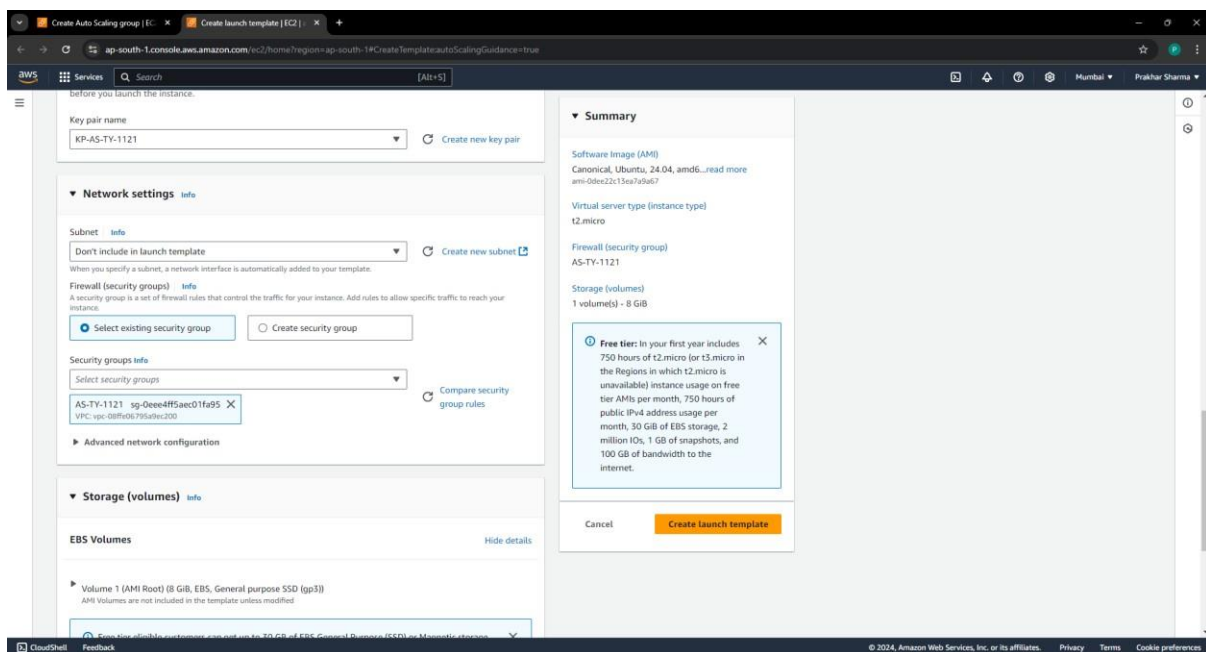
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- **User Data: (Mark as Optional)**

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7



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Go back to Auto Scaling Configuration, select our Launch Template,

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8

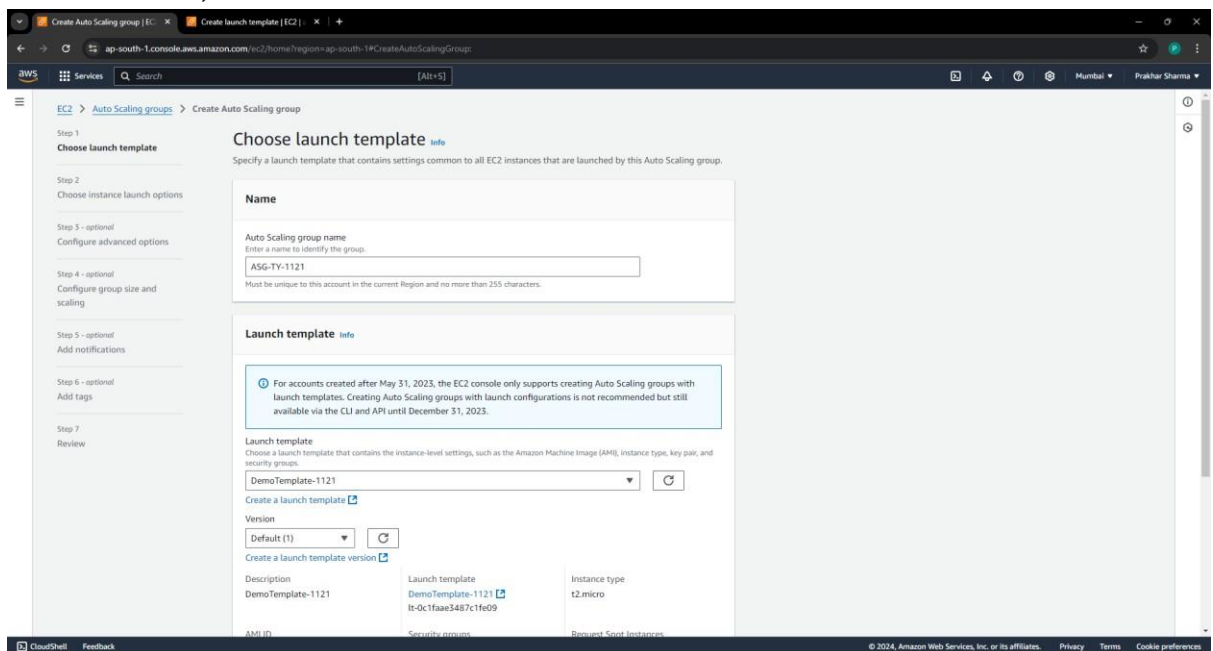
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scroll down, then click on Next



The screenshot shows the AWS Management Console interface for creating an Auto Scaling group. The 'Name' field is filled with 'ASG-TY-1121'. The 'Launch template' dropdown is set to 'DemoTemplate-1121'. The 'Version' dropdown is set to 'Default (1)'. The 'Instance type' is 't2.micro'. The page includes a warning about the deprecation of launch configurations and a table with details for the selected launch template.

Description	Launch template	Instance type
DemoTemplate-1121	DemoTemplate-1121 lt-0c1faae3487c1fe09	t2.micro

4. Network Section

- **Select Availability Zones and Subnets:** Select all available zones and subnets

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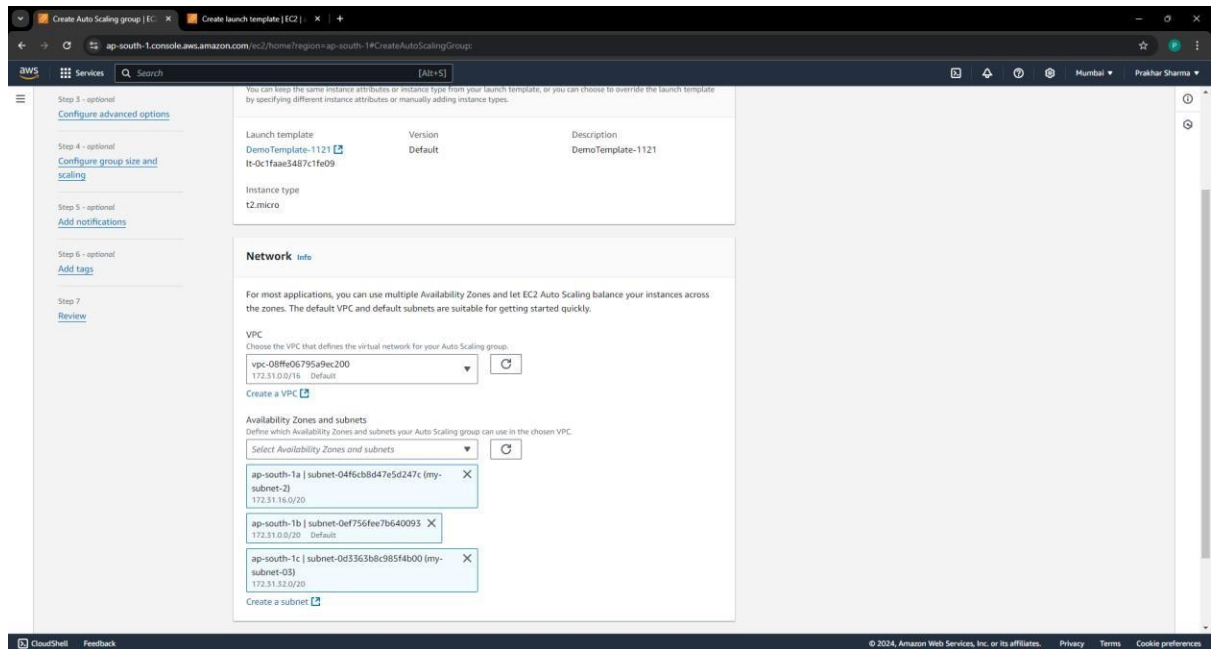
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- Click Next

5. Load Balancing Section

- Select Load Balancer Type: Attach to a New Load Balancer
- Load Balancer Type: Application Load Balancer
- Enter Load Balancer Name: As per Your Choice

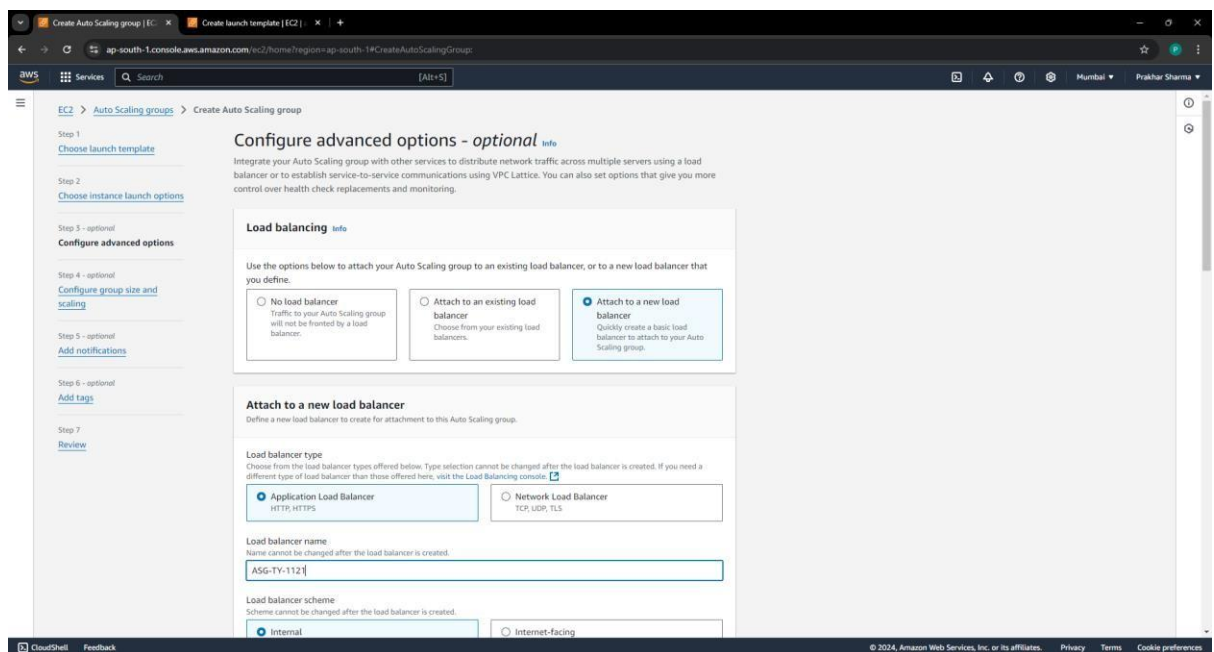
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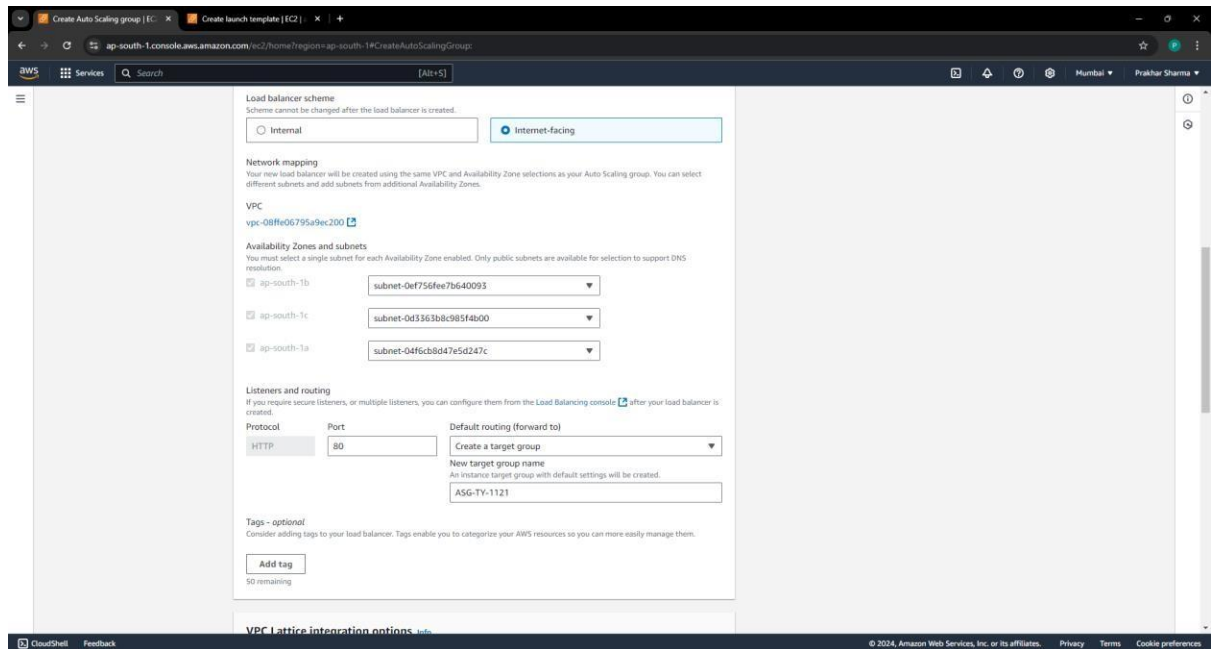
- **Load Balancer Scheme: Internet-Facing**

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- **Listeners and Routing:**
 - **Create Target Group:** Port 80 (Automatically created when selecting from the dropdown)
 - **Health Checks:** Check the box to turn on Elastic Load Balancing health checks



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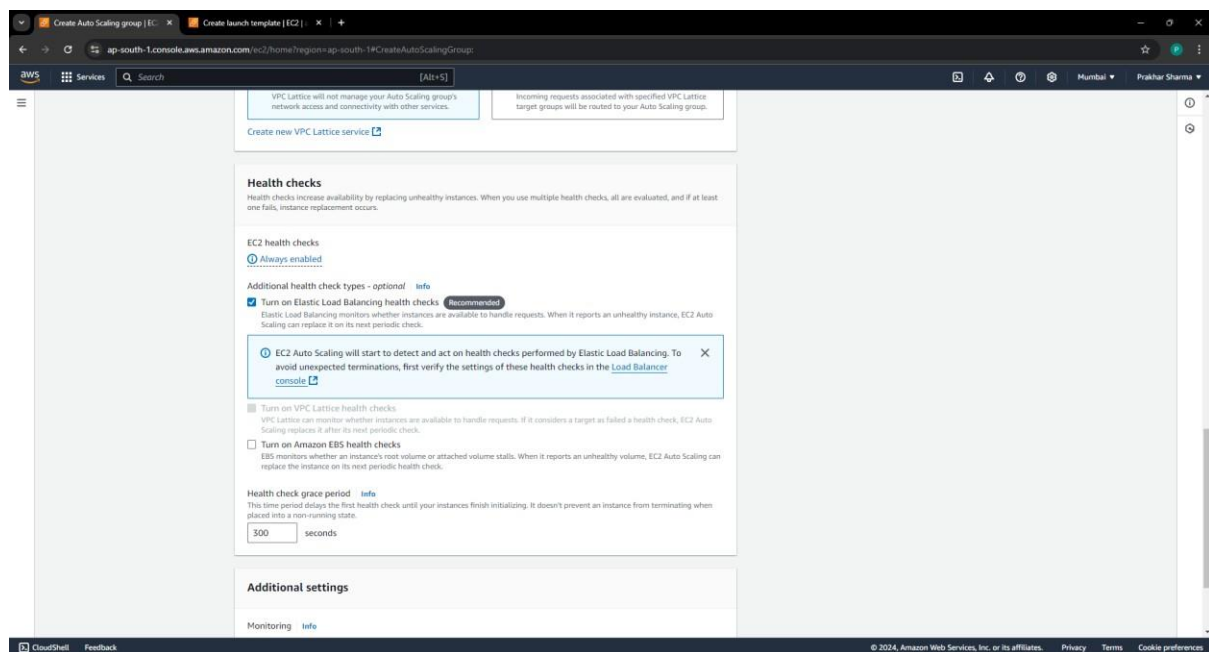
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- Click Next

6. Group Size Section

- Desired Capacity: 1
- Minimum Capacity: 1
- Maximum Capacity: 2

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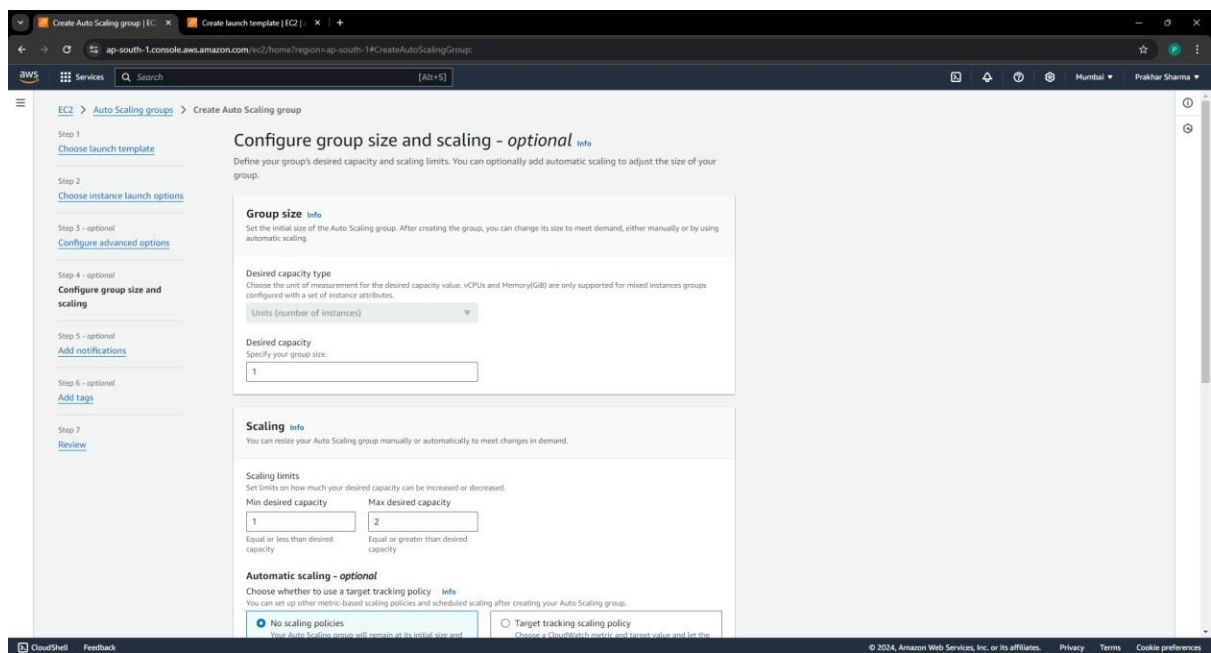
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3

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The screenshot shows the AWS Management Console interface for creating an Auto Scaling group. The browser address bar indicates the URL is `ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#CreateAutoScalingGroup`. The console header shows the user is logged in as 'Prakhar Sharma' in the 'Mumbai' region. The left sidebar shows the navigation menu with 'Auto Scaling groups' selected. The main content area is titled 'Configure group size and scaling - optional' and includes a description: 'Define your group's desired capacity and scaling limits. You can optionally add automatic scaling to adjust the size of your group.' The 'Group size' section has a 'Desired capacity type' dropdown set to 'Units (number of instances)' and a 'Desired capacity' input field with the value '1'. The 'Scaling' section includes 'Scaling limits' with 'Min desired capacity' set to '1' and 'Max desired capacity' set to '2', and 'Automatic scaling - optional' with the 'No scaling policies' radio button selected. The bottom of the console shows the 'CloudShell' and 'Feedback' buttons, and the footer contains the copyright notice '© 2024, Amazon Web Services, Inc. or its affiliates.' and links for 'Privacy', 'Terms', and 'Cookie preferences'.

- Click **Next** until you reach **Step 7 (Review)**
- Click **Create Auto Scaling Group**

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1
4

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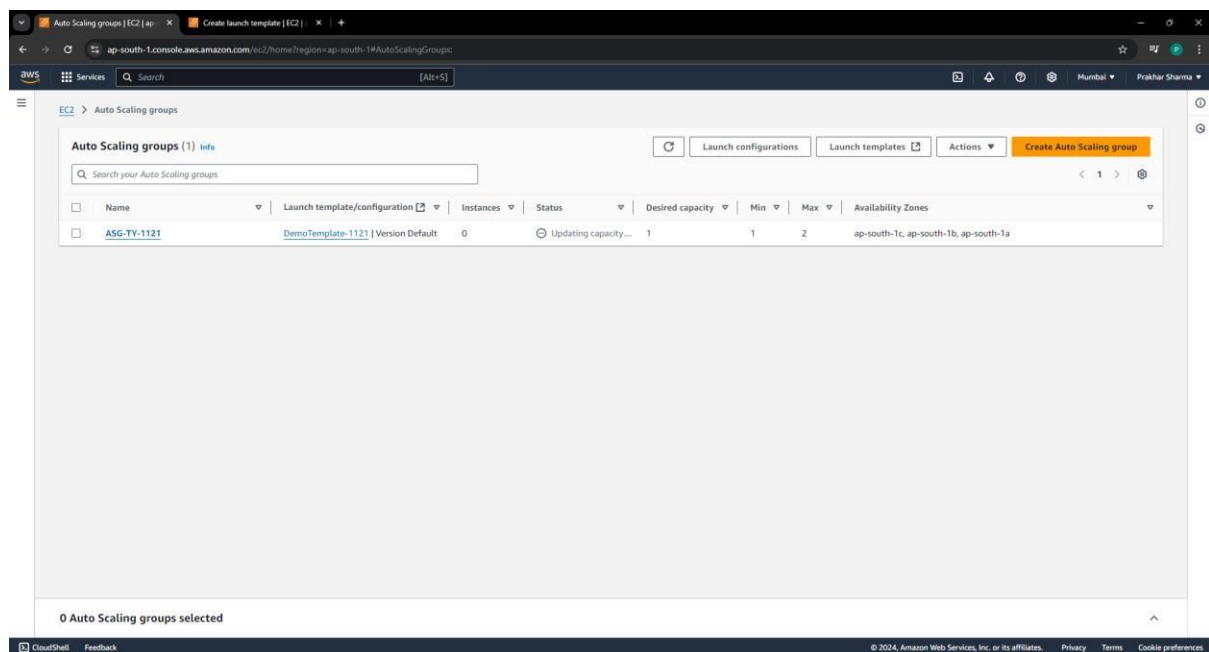
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7. Modify Load Balancer Security Group

- Go to Load Balancer
- **Security Tab:** Verify that it uses the security group of Auto Scaling Group
- **Change Security Group:**
 - Click on **Edit**
 - Select the Security Group **Lab4-ApplicationLoadBalancer-Group**

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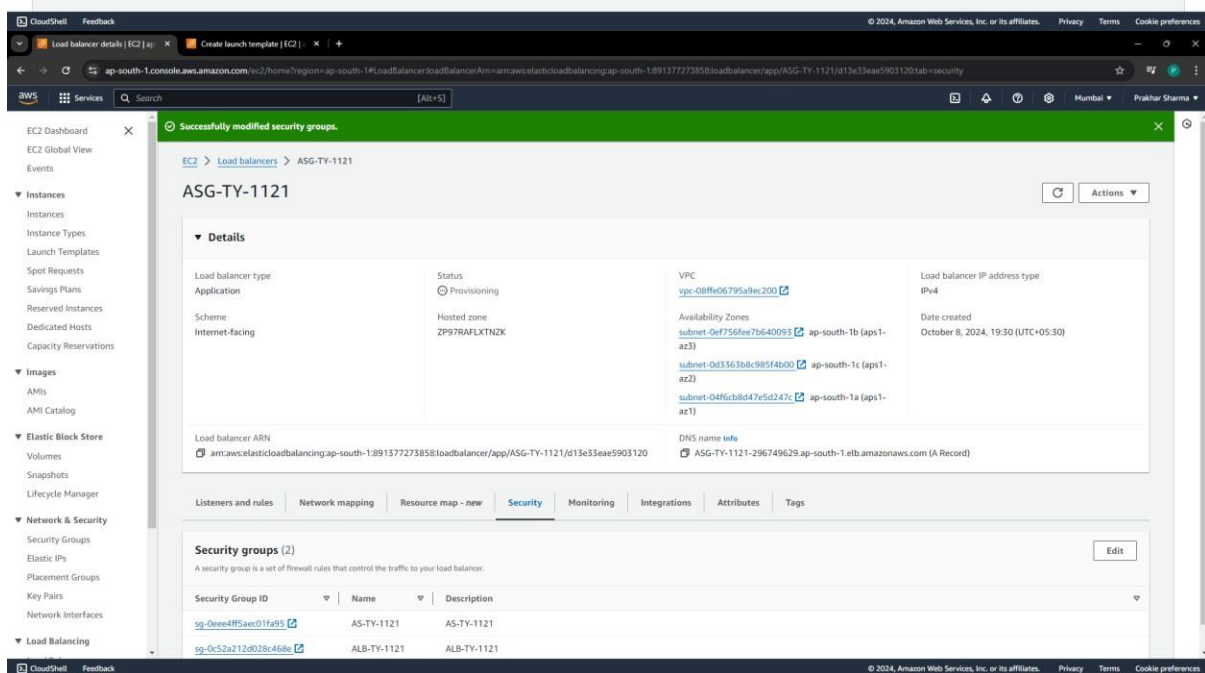
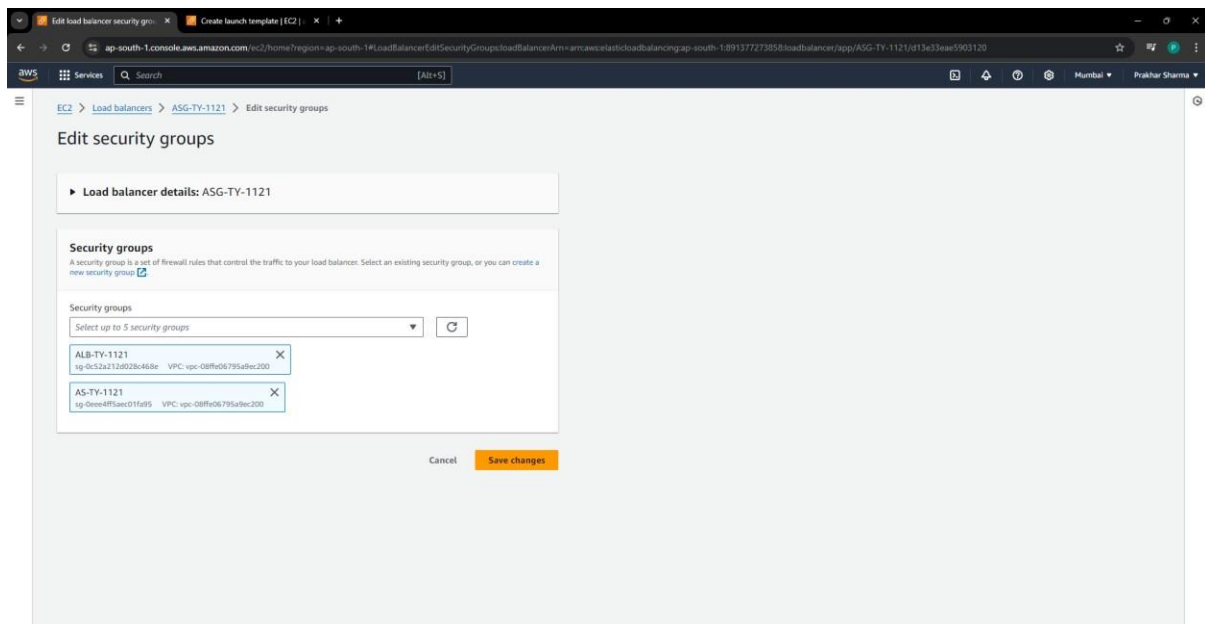
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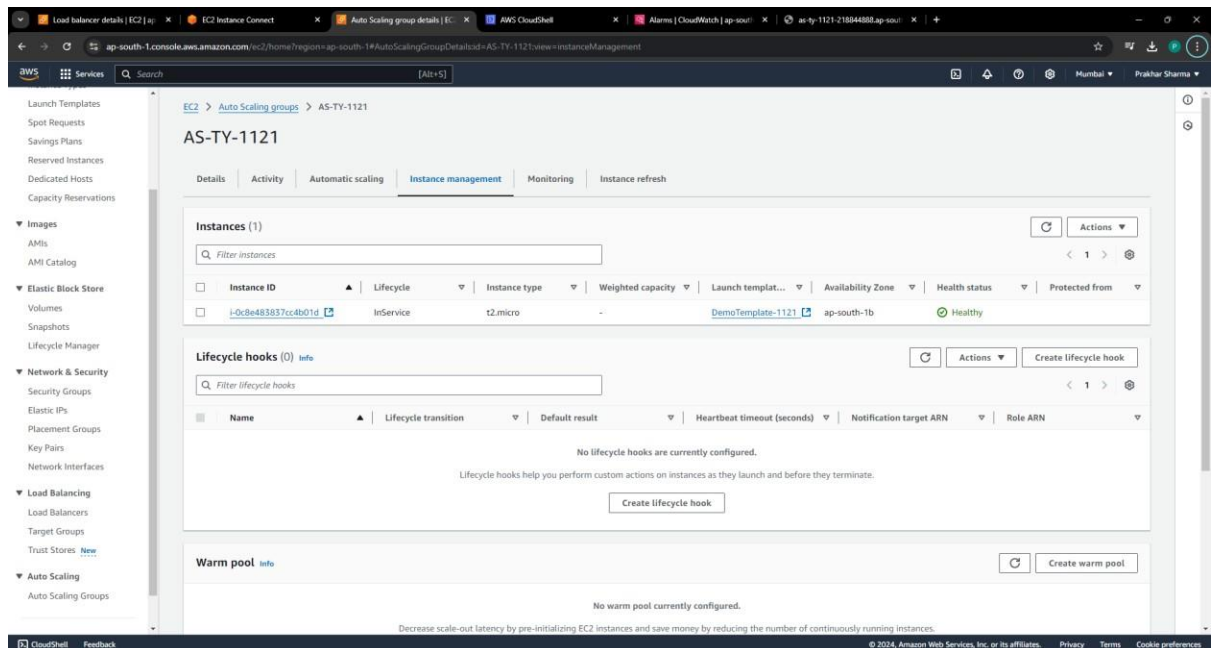
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- Click Save Changes

8. Check EC2 Instances

- **EC2 Instances:** It will show an instance running or being created



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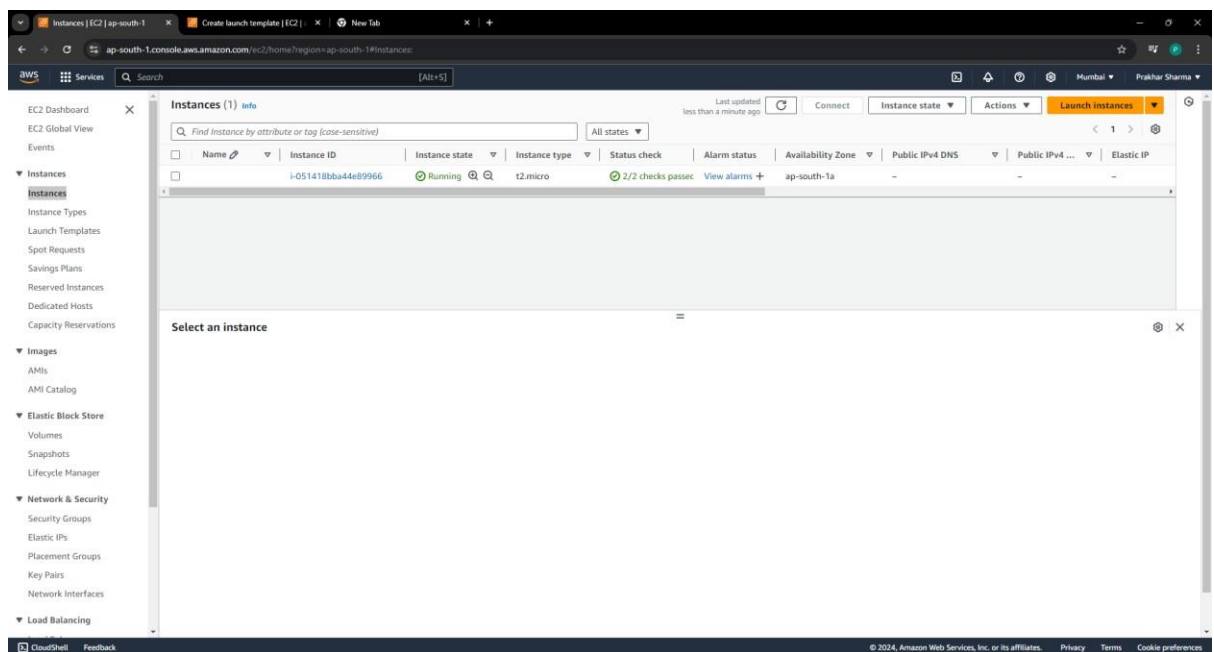
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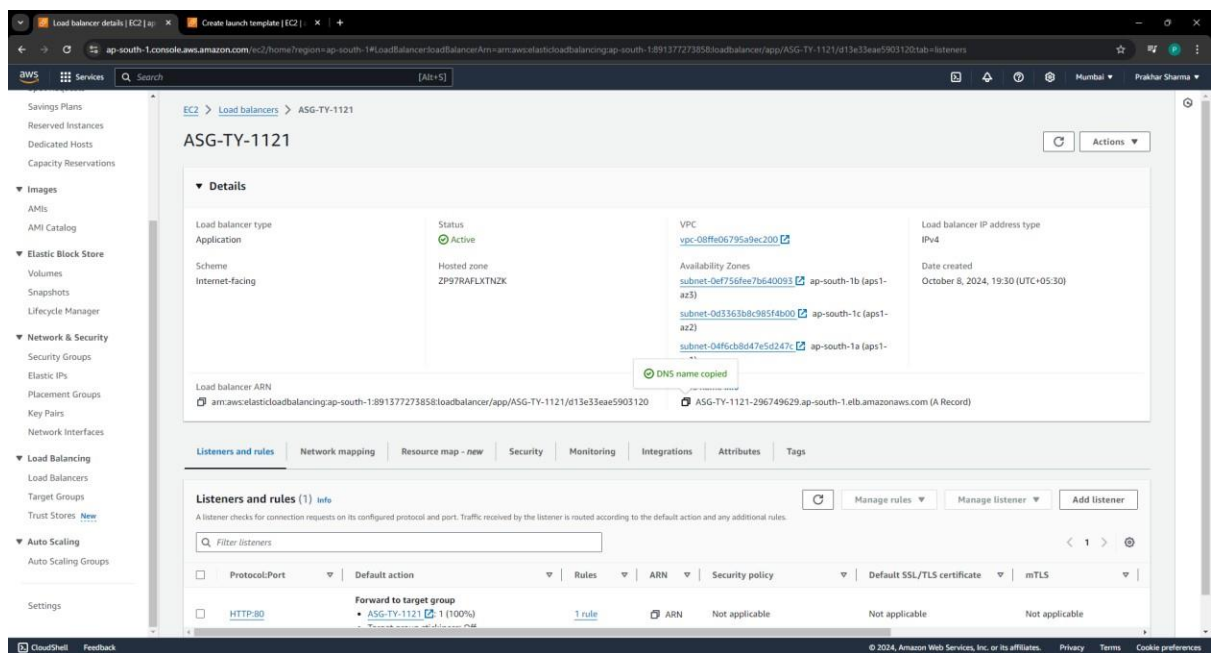
- **DNS Name:** Once the Load Balancer is active, copy its DNS name into your browser in a new tab

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- You should see a message from your EC2 instance displaying its IP address. (In my case it is showing a message)



This Message is from 172.31.22.214

G. Dynamic Scaling Policy

- Go to the **Auto Scaling Group Page**, select the **Automatic Scaling** tab, and click on **Create Dynamic Scaling Policy**
- **Policy Type:** Target Tracking Policy
- **Policy Name:** Target Tracking Policy

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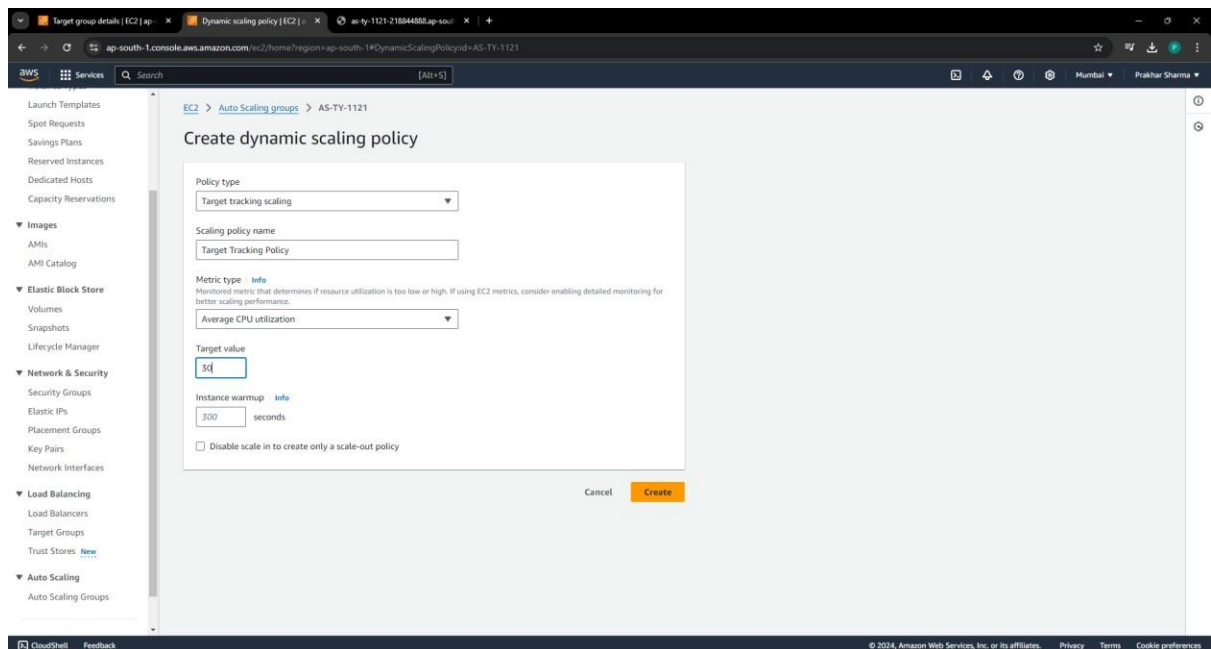
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- **Metric Type: Average CPU Utilization**
- **Target Value: 30**



- **Click Create**
- **Check CloudWatch Alarms**
 - **Go to CloudWatch Service > All Alarms**
 - **You'll see alarms for scale-in and scale-out operations automatically created by the Auto Scaling Group.**

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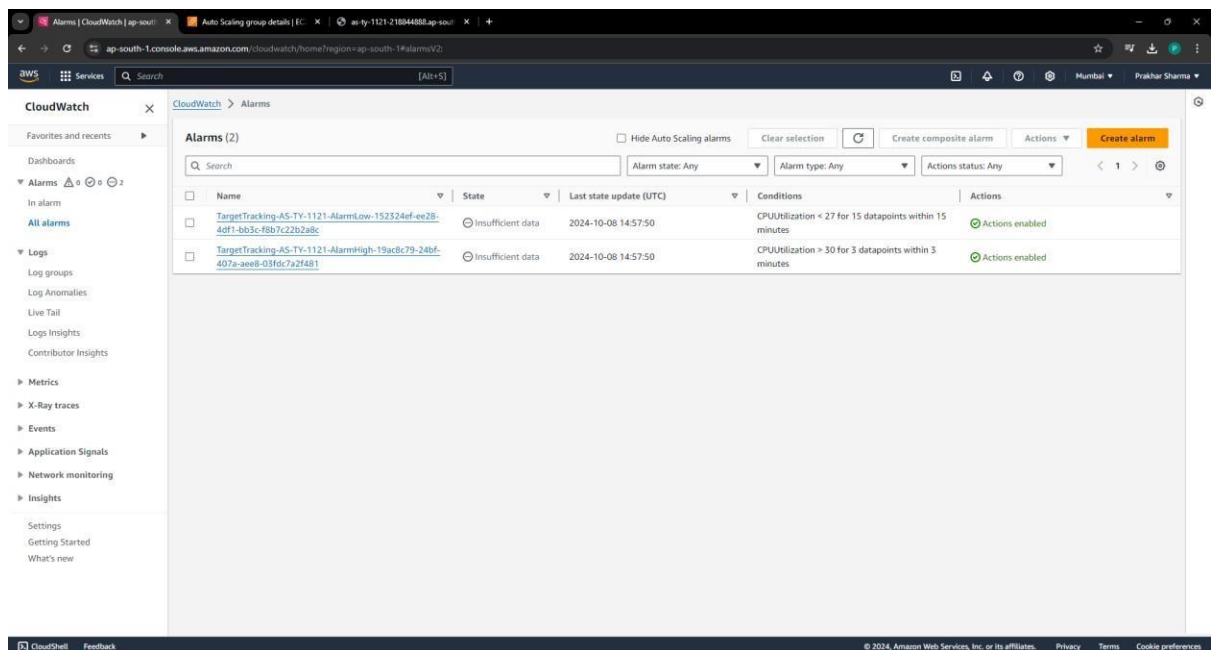
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- Go to the Instance Created by Auto Scaling group and connect it.

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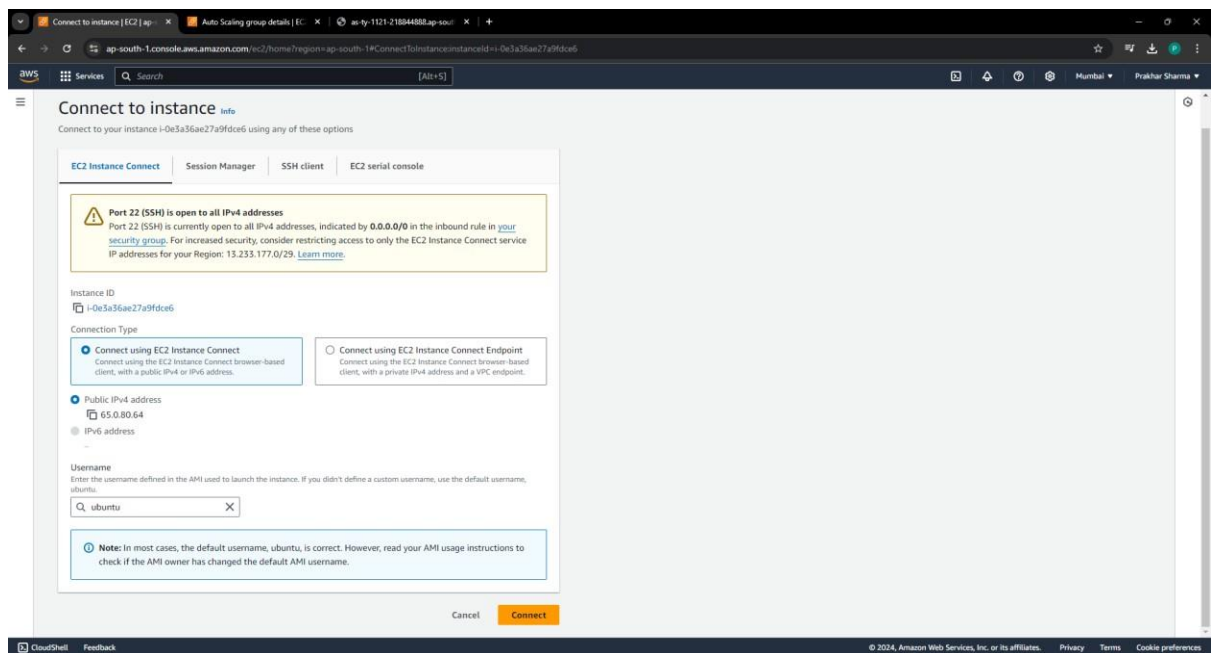
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- Run the following command:
- sudo yum install stress -y

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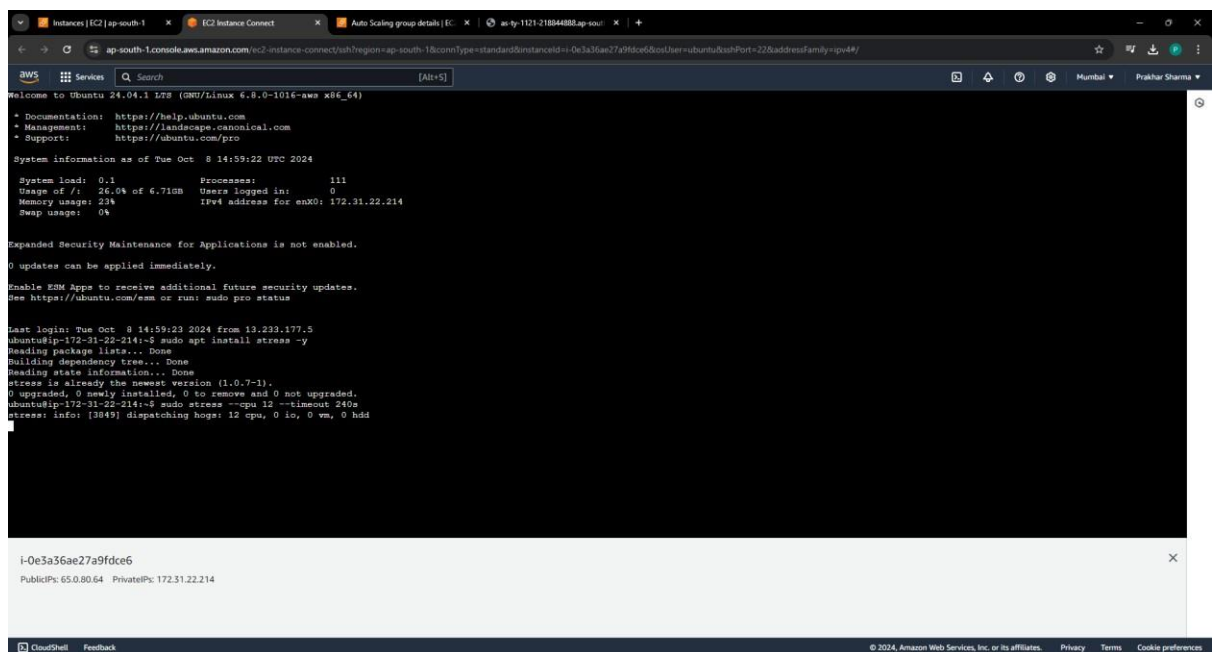
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```

Welcome to Ubuntu 24.04.1 LTS (GNU/Linux 6.8.0-1016-aws x86_64)

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

System information as of Tue Oct  8 14:59:22 UTC 2024

System load:  0.1               Processes:    111
Usage of /:   26.9% of 6.71GB   Users logged in:  0
Memory usage: 23%              IPv4 address for enx0: 172.31.22.214
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

Last login: Tue Oct  8 14:59:23 2024 from 13.233.177.5
ubuntu@ip-172-31-22-214:~$ sudo apt install stress -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
stress is already the newest version (1.0.7-1).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
ubuntu@ip-172-31-22-214:~$ sudo stress --cpu 12 --timeout 240s
stress: info: [3049] dispatching hogs: 12 cpu, 0 io, 0 vm, 0 hdd

```

10. Then run this command:

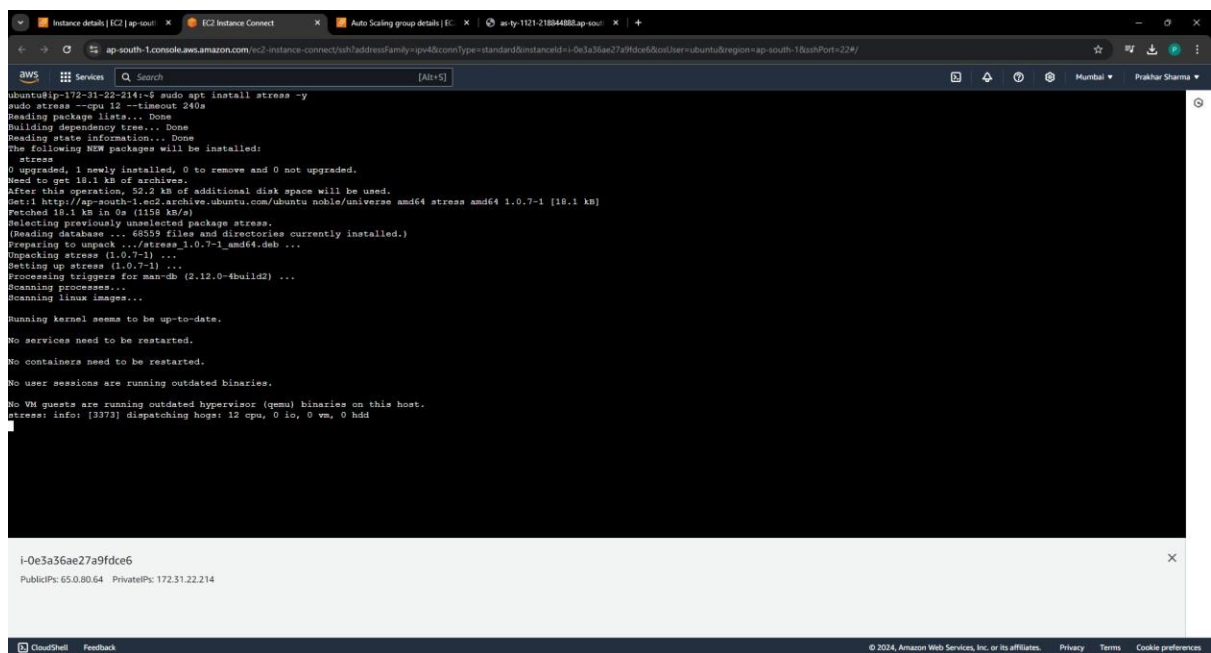
- `sudo stress --cpu 12 --timeout 240s`

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```
ubuntu@ip-172-31-22-214:~$ sudo apt install stress -y
sudo stress --cpu 12 --timeout 240s
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  stress
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 18.1 kB of archives.
After this operation, 32.2 kB of additional disk space will be used.
Get:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 stress amd64 1.0.7-1 [18.1 kB]
Fetched 18.1 kB in 0s (1158 kB/s)
Selecting previously unselected package stress.
(Reading database ... 6859 files and directories currently installed.)
Preparing to unpack .../stress_1.0.7-1_amd64.deb ...
Unpacking stress (1.0.7-1) ...
Setting up stress (1.0.7-1) ...
Processing triggers for man-db (2.12.0-4build2) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.
No services need to be restarted.
No containers need to be restarted.
No user sessions are running outdated binaries.
No VM guests are running outdated hypervisor (qemu) binaries on this host.
stress: info: [3373] dispatching hogs: 12 cpu, 0 io, 0 vm, 0 hdd
```

11. In Auto Scaling Group ,Monitoring Section you can see the stress in given on CPU through the graph.

In CloudWatch Alarms You'll see alarm state for scale-in and scale-out operations

10. You can see In Auto Scaling Activity Section , there is a Instance launched by Auto Scaling.

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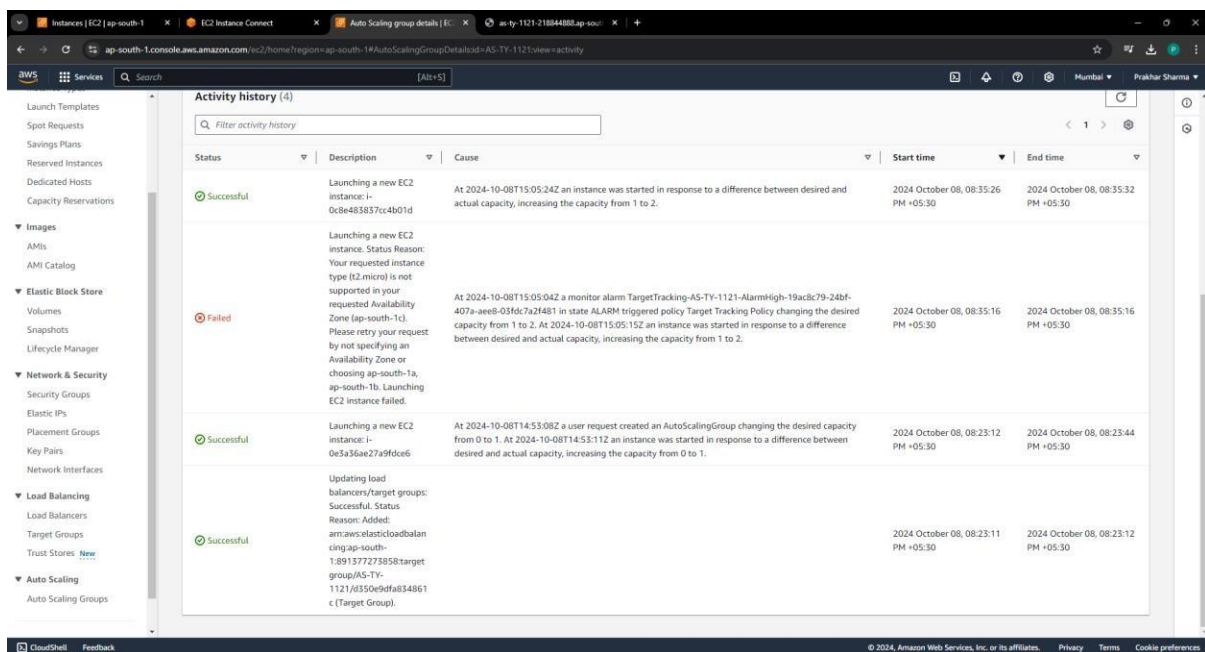
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The screenshot shows the AWS Management Console 'Activity history' page for Auto Scaling Groups. The table lists four activities:

Status	Description	Cause	Start time	End time
Successful	Launching a new EC2 instance: i-0c8e483837cc4b01d	At 2024-10-08T15:05:24Z an instance was started in response to a difference between desired and actual capacity, increasing the capacity from 1 to 2.	2024 October 08, 08:35:26 PM +05:30	2024 October 08, 08:35:32 PM +05:30
Failed	Launching a new EC2 instance. Status Reason: Your requested instance type (t2.micro) is not supported in your requested Availability Zone (ap-south-1c). Please retry your request by not specifying an Availability Zone or choosing ap-south-1a, ap-south-1b. Launching EC2 instance failed.	At 2024-10-08T15:05:04Z a monitor alarm TargetTracking-AS-TY-1121-AlarmHigh-19ac8c79-24bf-407a-ae8-034dc7a2f481 in state ALARM triggered policy Target Tracking Policy changing the desired capacity from 1 to 2. At 2024-10-08T15:05:15Z an instance was started in response to a difference between desired and actual capacity, increasing the capacity from 1 to 2.	2024 October 08, 08:35:16 PM +05:30	2024 October 08, 08:35:16 PM +05:30
Successful	Launching a new EC2 instance: i-0e3a36ae27a9fde6	At 2024-10-08T14:53:08Z a user request created an AutoScalingGroup changing the desired capacity from 0 to 1. At 2024-10-08T14:53:11Z an instance was started in response to a difference between desired and actual capacity, increasing the capacity from 0 to 1.	2024 October 08, 08:23:12 PM +05:30	2024 October 08, 08:23:44 PM +05:30
Successful	Updating load balancers/target groups: Successful. Status Reason: Added: am:aws:elasticloadbalancing:ap-south-1:B91377273858:target-group/AS-TY-1121/AS50e9dfaf34861c(Target Group).		2024 October 08, 08:23:11 PM +05:30	2024 October 08, 08:23:12 PM +05:30

11. Also in the Instance management section ,one more instance is created and running.

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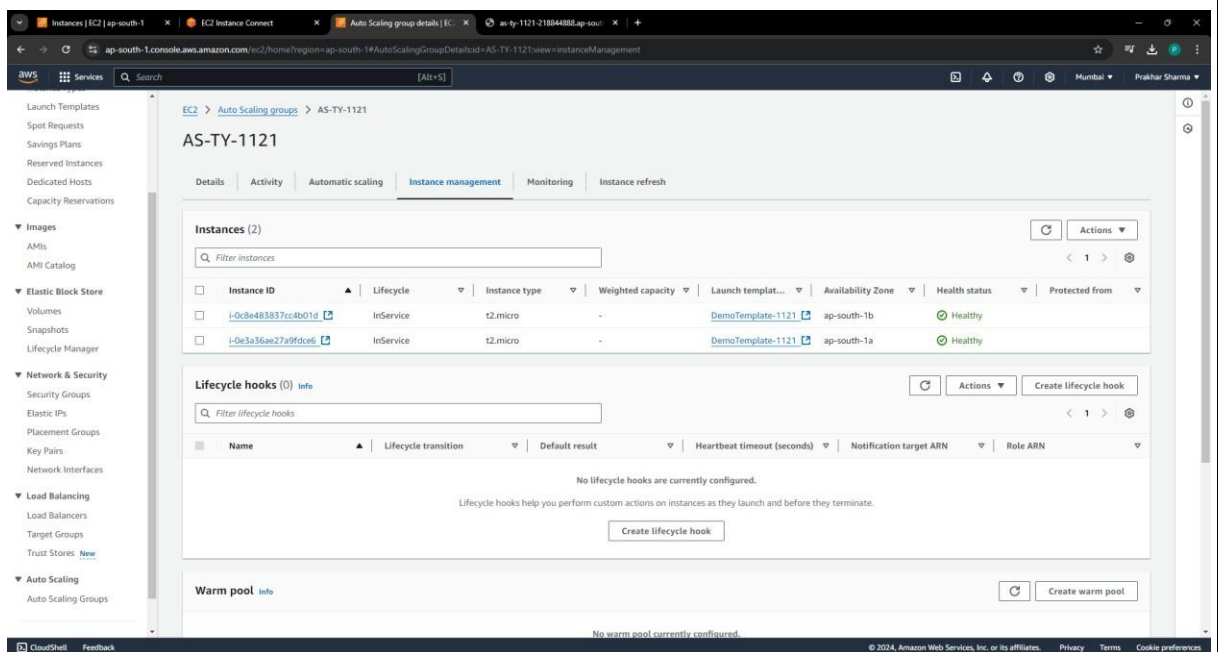
**Name of the
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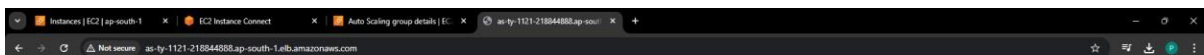
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-Now refresh the browser you can see the change in ip address.



This Message is from 172.31.6.137

12. Now Delete the Dynamic Scaling Policy we created.

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2
6

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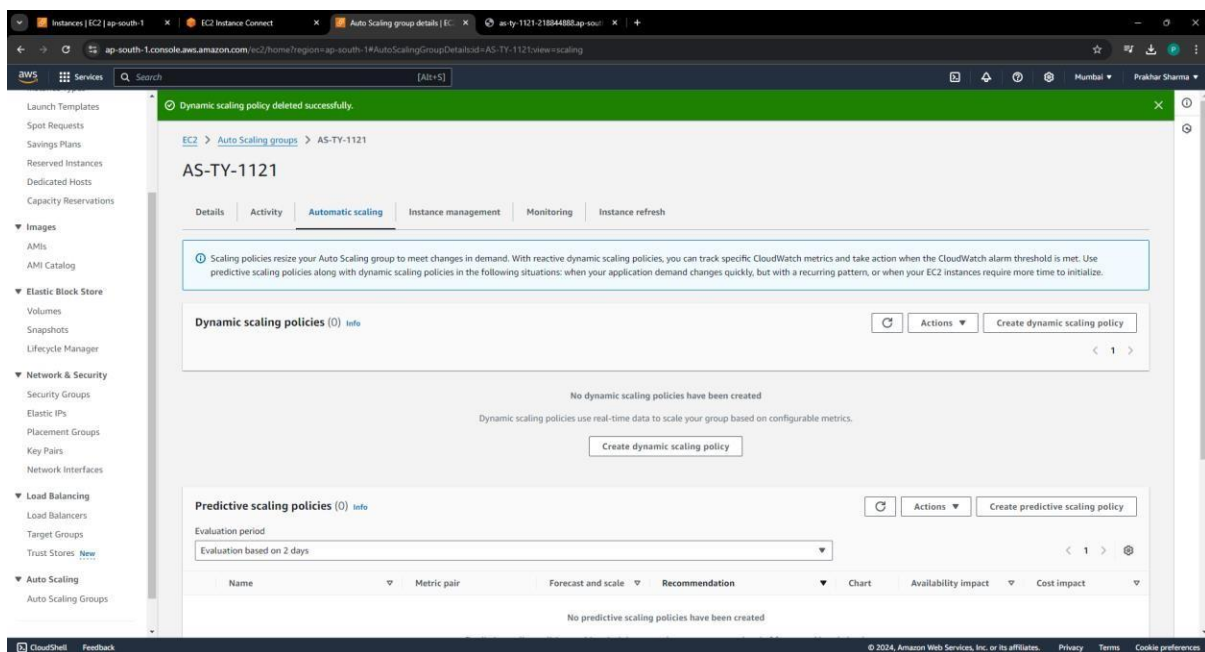
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13. Now again created new dynamic policy.

- **Policy Type:** Simple Scaling Policy
- **Policy Name:** avg-cpu-policy
- Take the action: Add, 1, capacity unit.

14. Now Create a CloudWatch alarm.



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**Creating an Application Load Balancer and Auto
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The screenshot shows the AWS Management Console interface for creating a dynamic scaling policy. The breadcrumb navigation is 'EC2 > Auto Scaling groups > AS-TY-1121'. The main heading is 'Create dynamic scaling policy'. The form contains the following fields and options:

- Policy type:** Simple scaling (dropdown)
- Scaling policy name:** simple-scaling-policy (text input)
- CloudWatch alarm:** Alarm-1121 (dropdown). Below it, a link says 'Create a CloudWatch alarm'. A note states: 'breaches the alarm threshold: CPUUtilization > 30 for 1 consecutive periods of 300 seconds for the metric dimensions:'. Below this, it says 'AutoScalingGroupName = AS-1121'.
- Take the action:** Add (dropdown), 0 (text input), capacity units (dropdown).
- And then wait:** 300 (text input), seconds before allowing another scaling activity.

At the bottom right of the form are 'Cancel' and 'Create' buttons. The 'Create' button is orange.

- Now click on select metric
- Select EC2
- Select By Ayto Scaling Group
- Select CPU Utilization

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2
8

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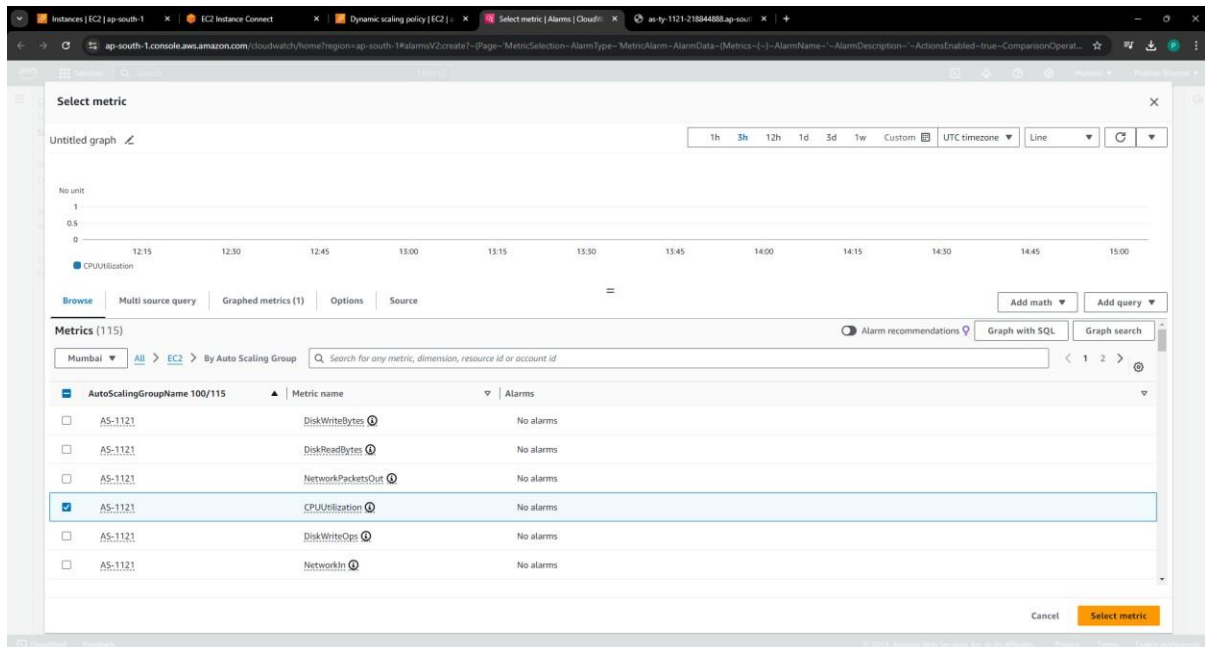
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-Set Period to 5 minutes.

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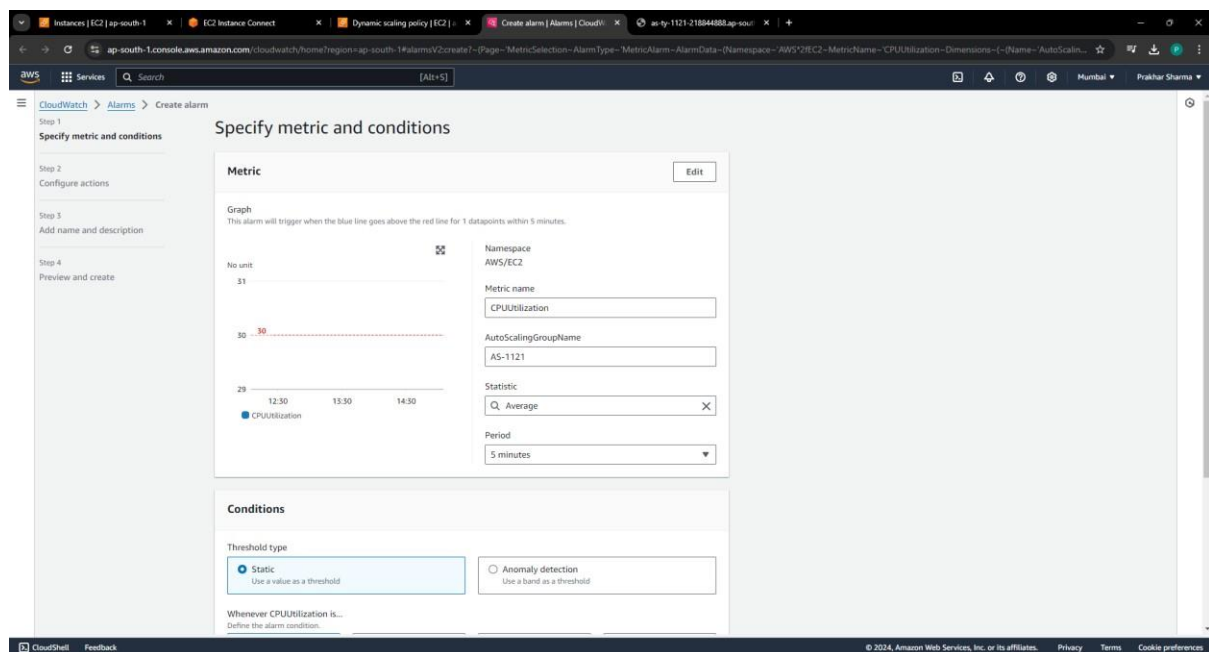
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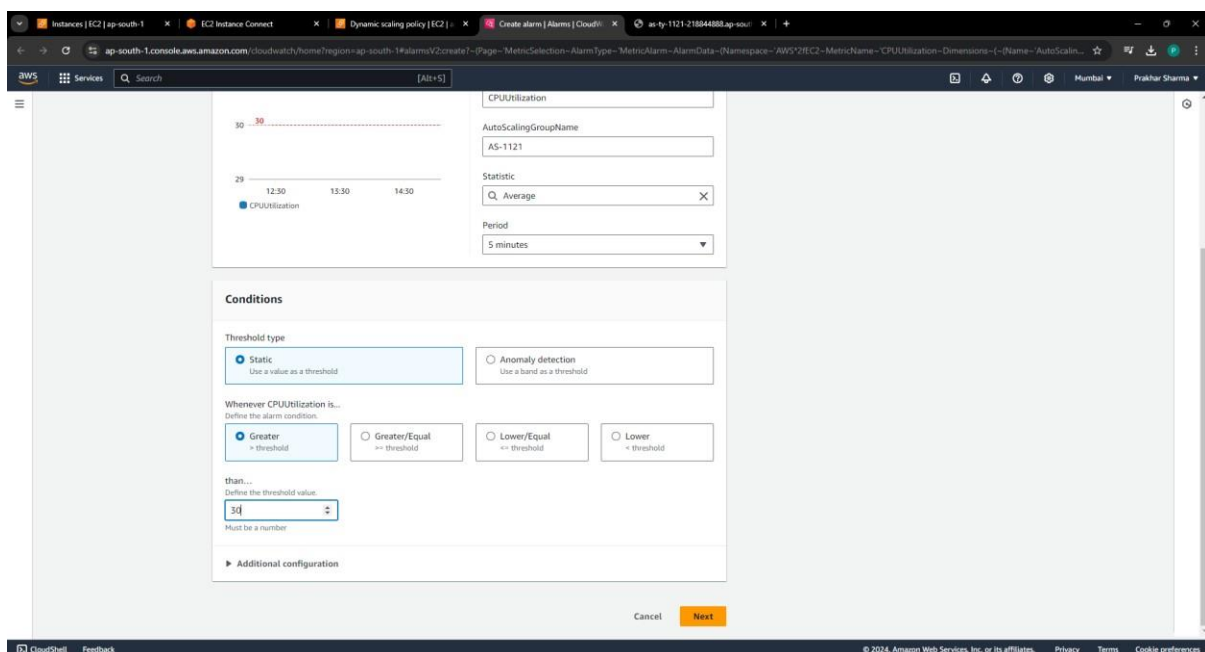
-Set threshold to 30.

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-Click Next

-Click create Alarm

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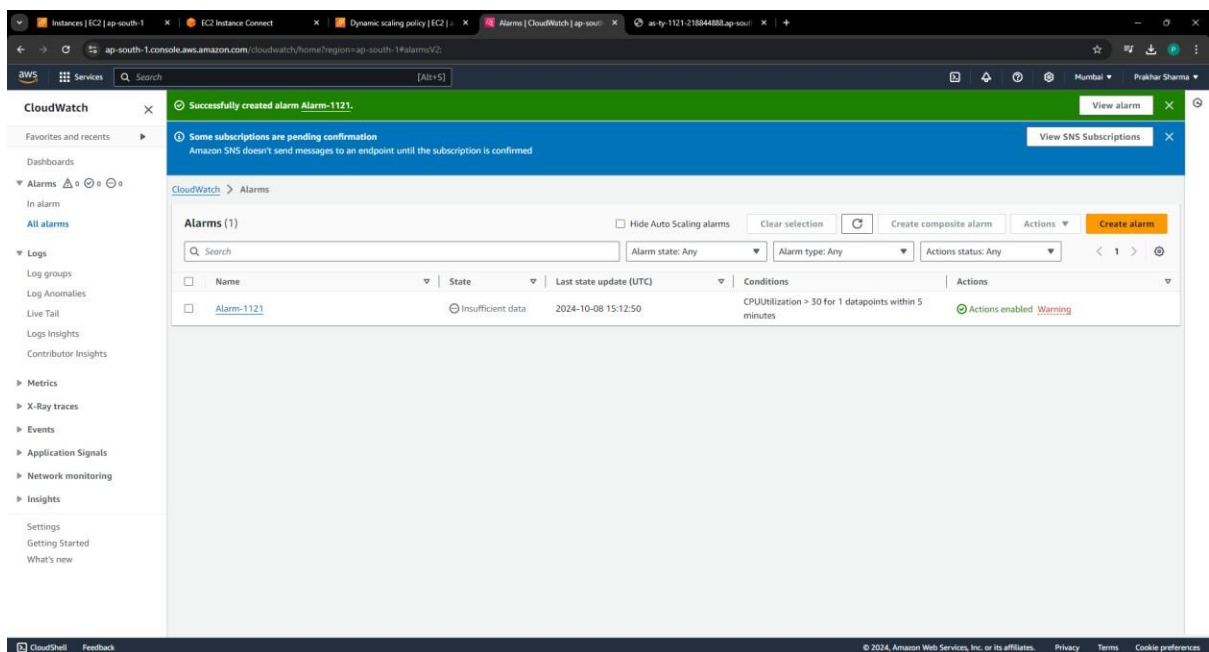
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10. Now after creating alarm ,select it from dropdown and click on create dynamic scaling policy.

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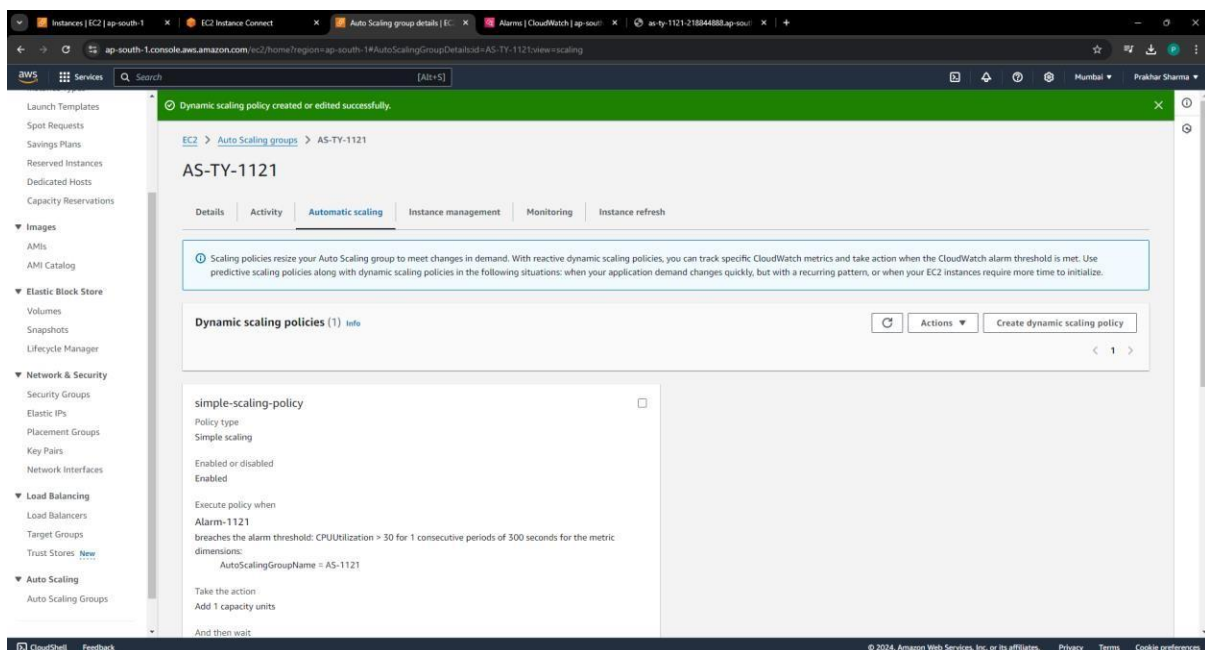
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10. Now in Auto Scaling Group Details ,edit group detail.

11. Click on edit

12. Set group size desired capacity from 2 to 1.

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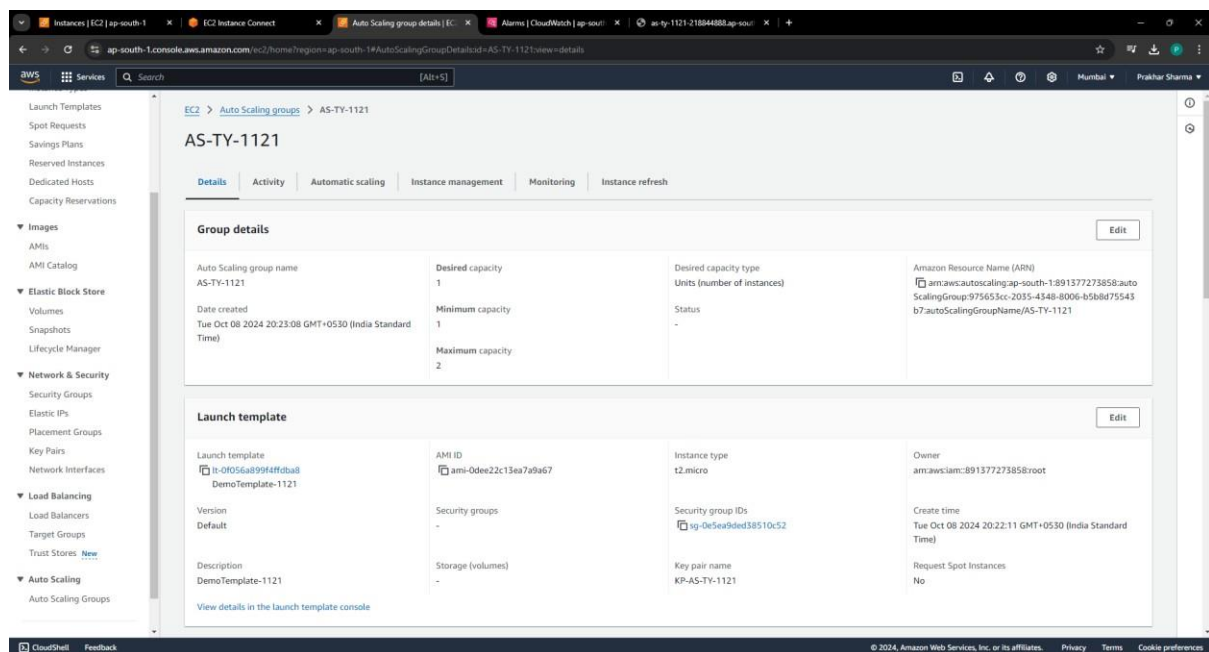
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15. You can see in Auto Scaling in Activity in Activity History ,a Instance is getting terminated.



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The screenshot shows the AWS Management Console Activity History for an Auto Scaling Group. The table lists five activities with their status, descriptions, causes, and timestamps.

Status	Description	Cause	Start time	End time
Successful	Terminating EC2 Instance: i-0e3a36ae27a9f0ce6	At 2024-10-08T15:14:11Z a user request update of AutoScalingGroup constraints to min: 1, max: 2, desired: 1 changing the desired capacity from 2 to 1. At 2024-10-08T15:14:15Z an instance was taken out of service in response to a difference between desired and actual capacity, shrinking the capacity from 2 to 1. At 2024-10-08T15:14:15Z instance i-0e3a36ae27a9f0ce6 was selected for termination.	2024 October 08, 08:44:15 PM +05:30	2024 October 08, 08:50:00 PM +05:30
Successful	Launching a new EC2 Instance: i-0c8e483837cc4b01d	At 2024-10-08T15:05:24Z an instance was started in response to a difference between desired and actual capacity, increasing the capacity from 1 to 2.	2024 October 08, 08:35:26 PM +05:30	2024 October 08, 08:35:32 PM +05:30
Failed	Launching a new EC2 Instance. Status Reason: Your requested instance type (t2.micro) is not supported in your requested Availability Zone (ap-south-1c). Please retry your request by not specifying an Availability Zone or choosing ap-south-1a, ap-south-1b. Launching EC2 instance failed.	At 2024-10-08T15:05:04Z a monitor alarm TargetTracking-AS-TY-1121-AlarmHigh-19ac8c79-24bf-407a-ae9-039d-7a2d4811 in state ALARM triggered policy Target Tracking Policy changing the desired capacity from 1 to 2. At 2024-10-08T15:05:15Z an instance was started in response to a difference between desired and actual capacity, increasing the capacity from 1 to 2.	2024 October 08, 08:35:16 PM +05:30	2024 October 08, 08:35:16 PM +05:30
Successful	Launching a new EC2 Instance: i-0e3a36ae27a9f0ce6	At 2024-10-08T14:53:08Z a user request created an AutoScalingGroup changing the desired capacity from 0 to 1. At 2024-10-08T14:53:11Z an instance was started in response to a difference between desired and actual capacity, increasing the capacity from 0 to 1.	2024 October 08, 08:23:12 PM +05:30	2024 October 08, 08:23:44 PM +05:30
Successful	Updating load balancers/target groups: Successful. Status Reason: Added			

16. Open the terminal from the icon next to the notification icon in the title bar where you see your account name .

17. Run the following command :

Aws cloudwatch set-alarm-state --alarm-name YOUR ALARM NAME --state-value ALARM --state-reason "test"

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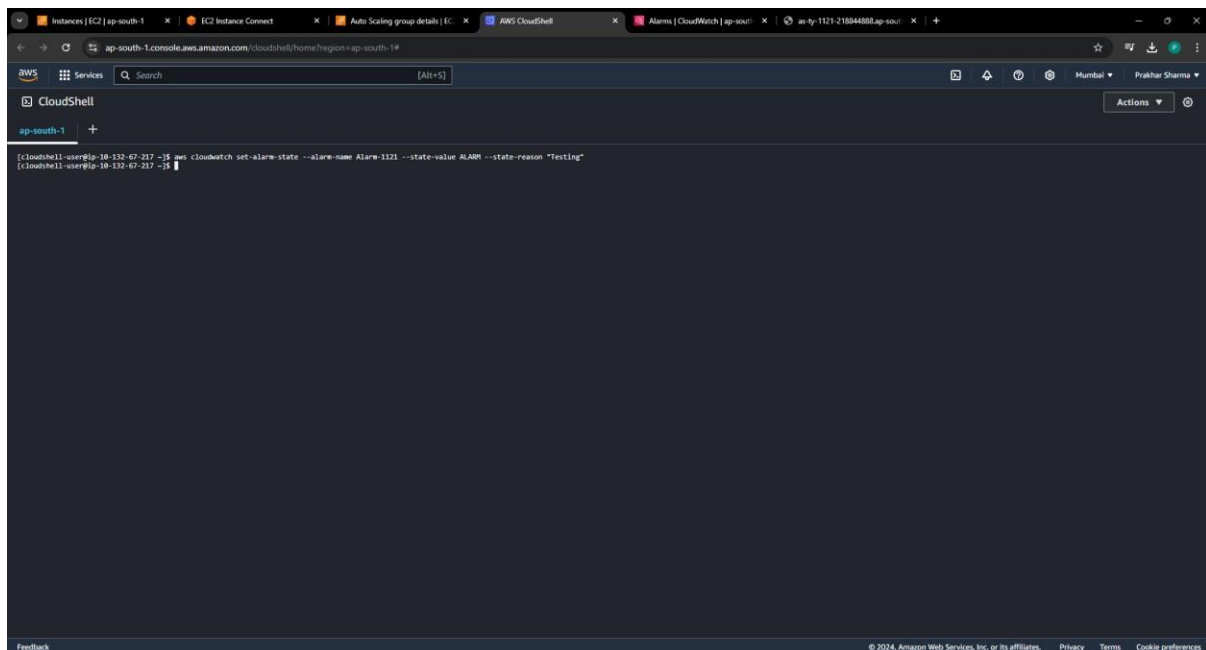
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10. Now go to cloudwatch alarm in alarms you can see the alarm is in IN ALARM state after refreshing it.



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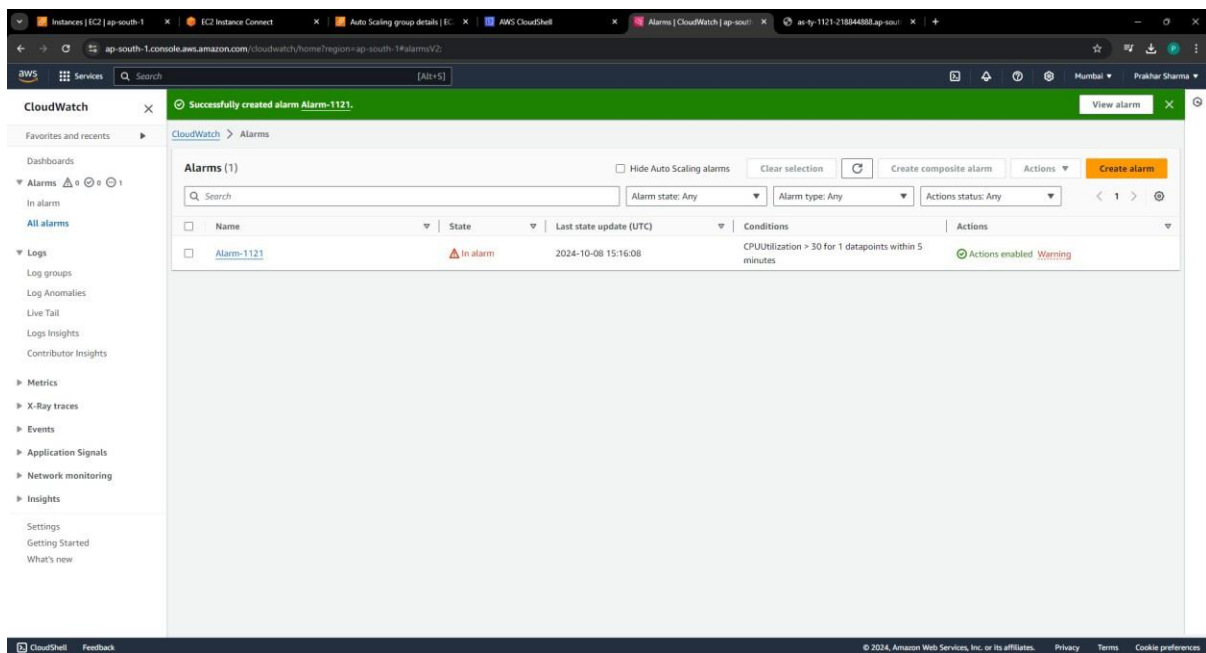
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3
7