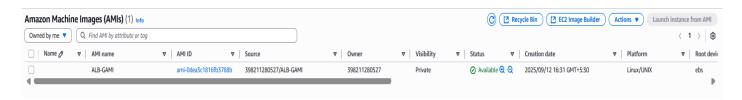
Practical Lab on EC2 Auto Scaling using AWS

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Step 1: Create an Amazon Machine Image (AMI)

- 1. Log in to your AWS Management Console.
- 2. Navigate to the EC2 Dashboard.
- 3. Launch an EC2 instance to serve as your base image. Install all necessary software on this instance, such as a web server (e.g., Apache or Nginx) and your web application code.
- 4. Once the instance is configured, select it from the EC2 Instances list.
- $5. \;\; Go \; to \; Actions \rightarrow Image \;\; and \;\; templates \rightarrow Create \;\; image.$
- 6. Give the image a name (e.g., ALB-GA-AMI) and a description.
- 7. Click Create image. This will create a snapshot of your instance's root volume and create a new AMI.



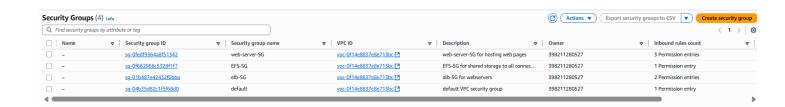
Step 2: Create Security Groups

- 1. From the EC2 Dashboard, navigate to Security Groups.
- 2. Click Create security group to create the following three security groups:
 - o ALB Security Group:
 - Give it a name (e.g., elb-SG).
 - Add an **Inbound rule** for HTTP traffic:
 - Type: HTTPProtocol: TCPPort range: 80
 - **Source:** Anywhere (0.0.0.0/0)
 - This security group allows all incoming HTTP traffic to the load balancer.
 - Web Server Security Group:
 - Give it a name (e.g., web-server-SG).
 - Add an **Inbound rule** for HTTP traffic:
 - Type: HTTPProtocol: TCPPort range: 80
 - Source: Custom, and enter the security group ID for your elb-SG to allow traffic only from the ALB.
 - Add an inbound rule for SSH access for management.
 - This security group allows incoming HTTP traffic only from the load balancer.

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EFS Security Group:

- Give it a name (e.g., EFS-SG).
- Add an **Inbound rule** for EFS traffic:
 - Type: NFSProtocol: TCPPort range: 2049
 - Source: Custom, and enter the security group ID for your web-server-SG to allow traffic only from the web servers.
- This security group allows the EC2 instances to communicate with the EFS file system.



Step 3: Create an Application Load Balancer (ALB)

- 1. From the EC2 Dashboard, navigate to Load Balancers.
- 2. Click Create Load Balancer.
- 3. Choose Application Load Balancer.
- 4. Configure the load balancer:
 - o Name: asg-alb
 - o Scheme: Internet-facing
 - VPC: Select your default VPC.
 - o **Availability Zones:** Select at least two Availability Zones (e.g., ap-south-1b and ap-south-1c).
 - o **Security Groups:** Select the elb-sg security group

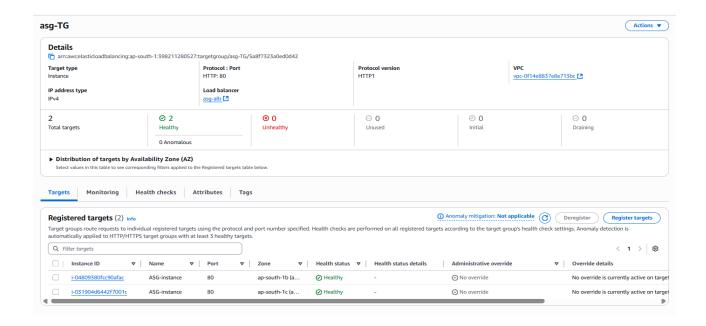
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Step 4: Create a Target Group

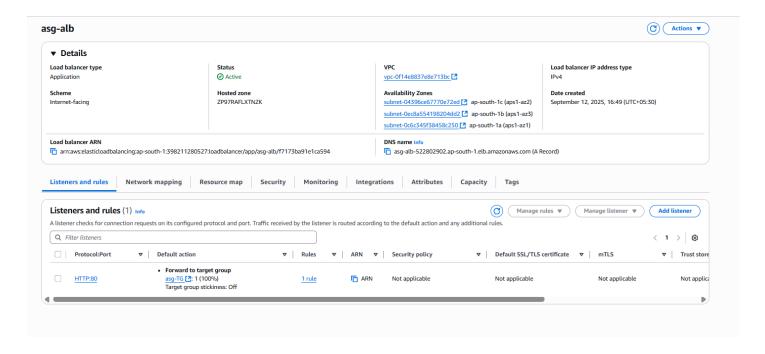
- 1. From the EC2 Dashboard, navigate to Target Groups.
- 2. Click Create target group.
- 3. Choose Instances.
- 4. Target group name: asg-tg
- 5. Protocol: HTTP, Port: 80.
- 6. **VPC:** Select your default VPC.



Step 5: Configure the ALB Listener

- 1. Go back to your asg-alb in the Load Balancers section.
- 2. Click on the Listeners tab.
- 3. Click Add listener.
- 4. Protocol: HTTP, Port: 80.
- 5. **Default action:** Forward to, and select the asg-tg target group you just created.
- 6. Click Add.

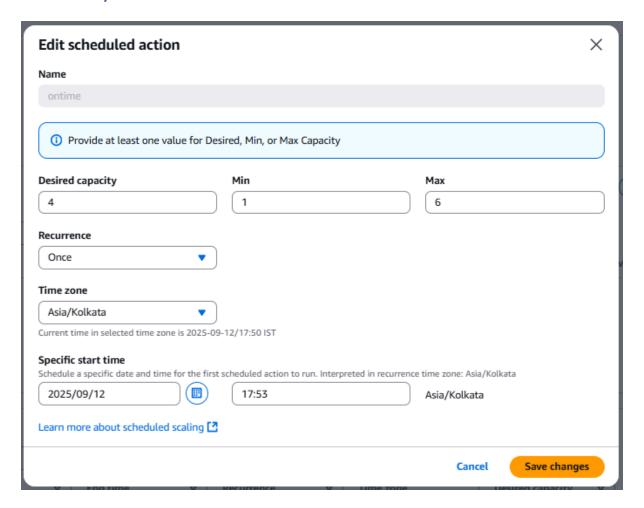
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Step 6: Create an Auto Scaling Group (ASG)

- 1. From the EC2 Dashboard, navigate to Auto Scaling Groups.
- 2. Click Create Auto Scaling group.
- 3. Name: Give it a name, such as my-asg.
- 4. **Launch Template:** Create a new launch template or select an existing one. In the template, specify:
 - The AMI you created in Step 1 (ALB-GA-AMI).
 - o The instance type (c5a.large).
 - o The security group you created for the web server (web-server-SG).
- 5. Network:
 - **VPC:** Select your default VPC.
 - Subnets: Select the same subnets that you used for your ALB.
- 6. Load balancing:
 - o **Attach to an existing load balancer:** Choose your asq-tq target group.
- 7. **Group size:** Set your desired, minimum, and maximum capacity (e.g., **Desired:** 4, **Minimum:** 1, **Maximum:** 6).
- 8. Scaling policies: Configure scaling policies based on metrics like CPU utilization or network traffic.
- 9. Review and click Create Auto Scaling group.

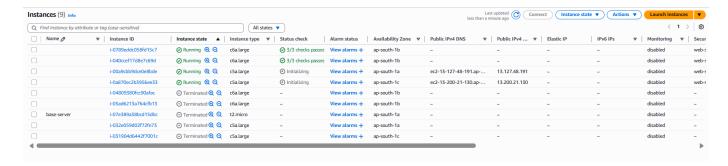
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Step 7: Configure Scheduled Scaling

- 1. Select your newly created Auto Scaling Group.
- 2. Go to the Automatic scaling tab.
- 3. Click Create scheduled action.
- 4. Name: ontime
- 5. Desired capacity: 4, Min capacity: 1, Max capacity: 6.
- 6. Recurrence: once.
- 7. **Start Time:** Set the specific date and time for the scheduled action to occur (e.g., 2025/09/12 at 17:53).
- 8. Click Create.

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In this lab, Auto Scaling was successfully demonstrated using Amazon EC2 instances. The **EC2 console** shows a total of **9 instances**, with multiple instances being launched and terminated automatically according to the scaling policies.

• Running Instances:

- o 4 instances (c6a.large and c5a.large types) are currently in the Running state.
- Two of them (i-0789ed... and i-040cce...) have passed the 3/3 status checks, indicating they are fully operational.
- o The other two (i-00a9cb... and i-0a87ce...) are in the **Initializing** state, showing that Auto Scaling has just launched them as part of the scaling activity.

Terminated Instances:

5 instances have been terminated (c6a.large, c5a.large, and t2.micro), which confirms that Auto Scaling removed excess capacity when it was no longer needed.

Availability Zones:

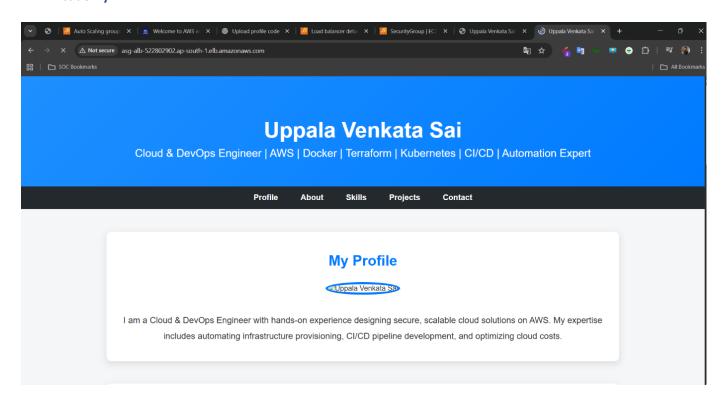
o Instances are distributed across multiple AZs (ap-south-1a, ap-south-1b, and ap-south-1c) for high availability and fault tolerance.

Public IPs:

o Some running instances have public IPv4 addresses assigned (13.127.48.191 and 13.200.21.130), making them accessible over the internet.

This file contains the full HTML code for the webpage. You can use the guide provided earlier to place this code on your EC2 instance. This should complete the test and confirm that your infrastructure is working correctly.

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