

# Little Bit Advance Labs

## Part 1: EC2 with ELB and ASG

**Objective:** Learn how to create a scalable and highly available web application environment using Amazon EC2 instances, ELB, and ASG.

### Approach:

1. **Launch EC2 Instances:** Start by launching two or more EC2 instances. These instances will run a simple web application (e.g., a "Hello World" page or any basic web service).
2. **Configure Load Balancer:** Set up an Elastic Load Balancer (ELB) to distribute incoming web traffic across your EC2 instances. This step ensures high availability and fault tolerance.
3. **Set Up Auto Scaling Group (ASG):** Create an ASG that uses the launched EC2 instances. Configure ASG policies to automatically scale the number of instances up or down based on criteria like CPU usage or network traffic.
4. **Test Your Setup:** Simulate traffic to test the scaling policies and the load balancer. Observe how ASG adds or removes instances and how ELB distributes traffic.
5. **Verify Website Functionality:** Ensure that the website hosted on EC2 instances remains accessible and functional during scaling operations.

**Goal:** By the end of this lab, students will have a hands-on understanding of setting up a load-balanced and auto-scaled web application using AWS services.

### SOLUTION:

#### Launch EC2 Instances:

- Log in to your AWS Management Console.
- Navigate to the EC2 dashboard.
- Click on "Launch Instance" to start the instance creation process.
- Choose an Amazon Machine Image (AMI) based on your requirements (e.g., Amazon Linux, Ubuntu, etc.).
- Select an instance type (e.g., t2.micro for testing purposes).
- Configure instance details such as network settings, subnet, IAM role, etc.
- Add storage as needed.
- Configure security group to allow HTTP/HTTPS traffic.
- Review and launch the instance.

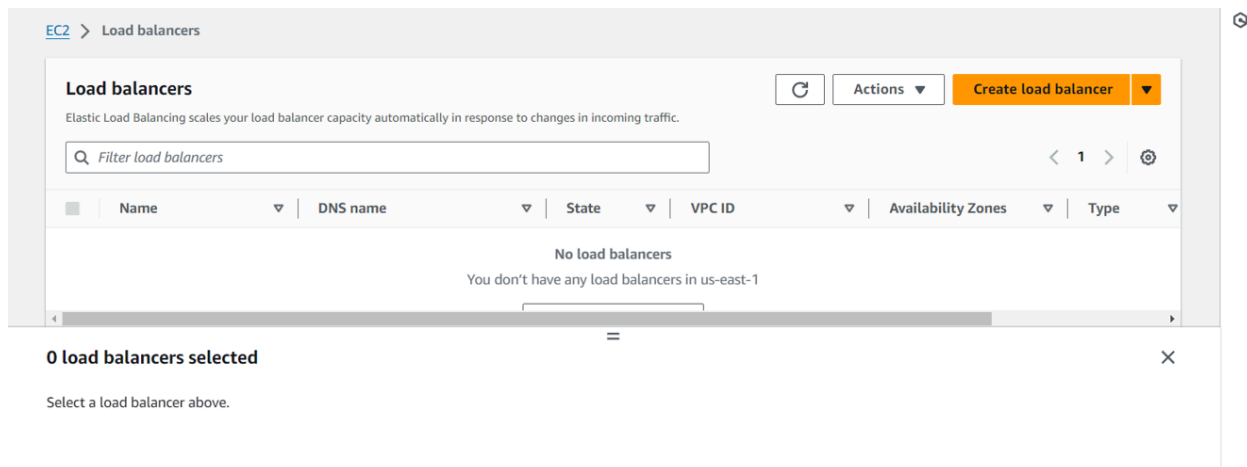
- Repeat the above steps to launch at least two EC2 instances.

Done in basic labs so using a server from the previous lab.

**After that we need to create load balancer**

**Configure Load Balancer:**

- Go to the EC2 dashboard and click on "Load Balancers" in the navigation pane.



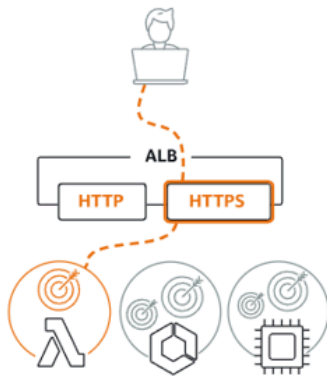
- Click on "Create Load Balancer" and select the type of load balancer (usually Application Load Balancer is preferred).

## Compare and select load balancer type

A complete feature-by-feature comparison along with detailed highlights is also available. [Learn more](#)

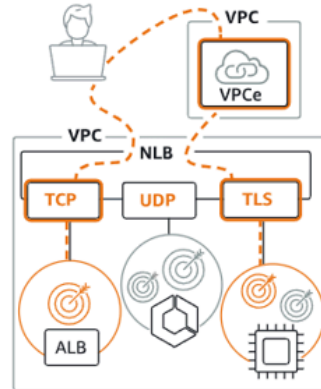
### Load balancer types

#### Application Load Balancer [Info](#)



Choose an Application Load Balancer when you need a flexible

#### Network Load Balancer [Info](#)



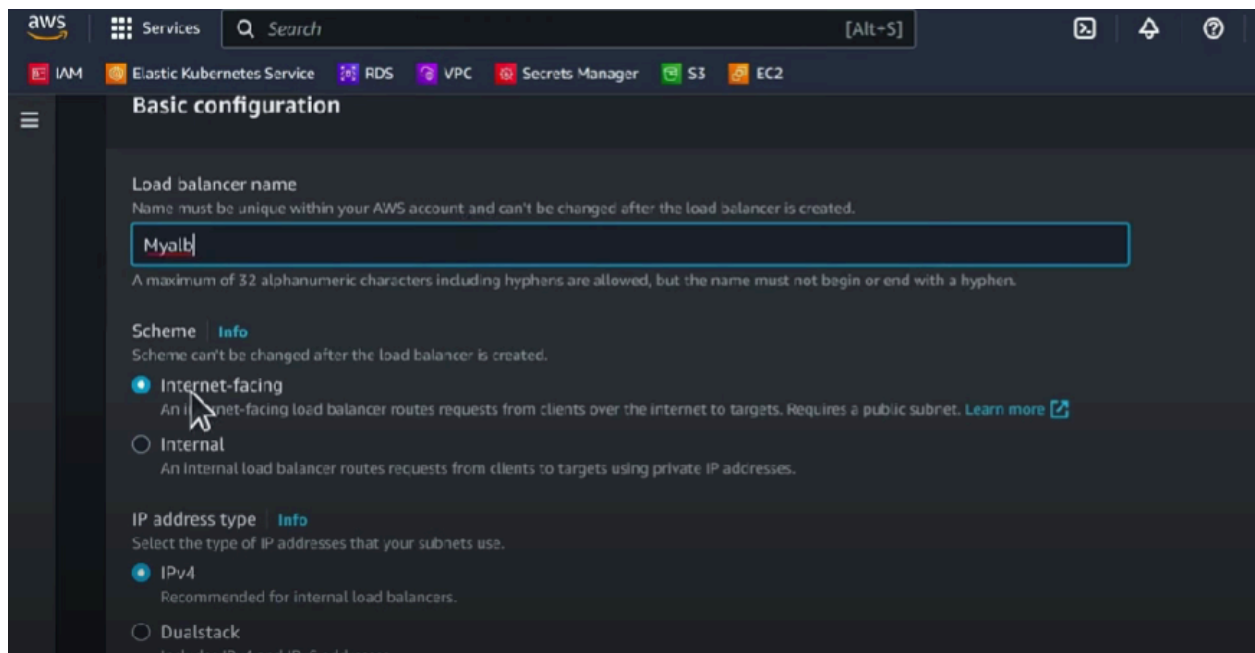
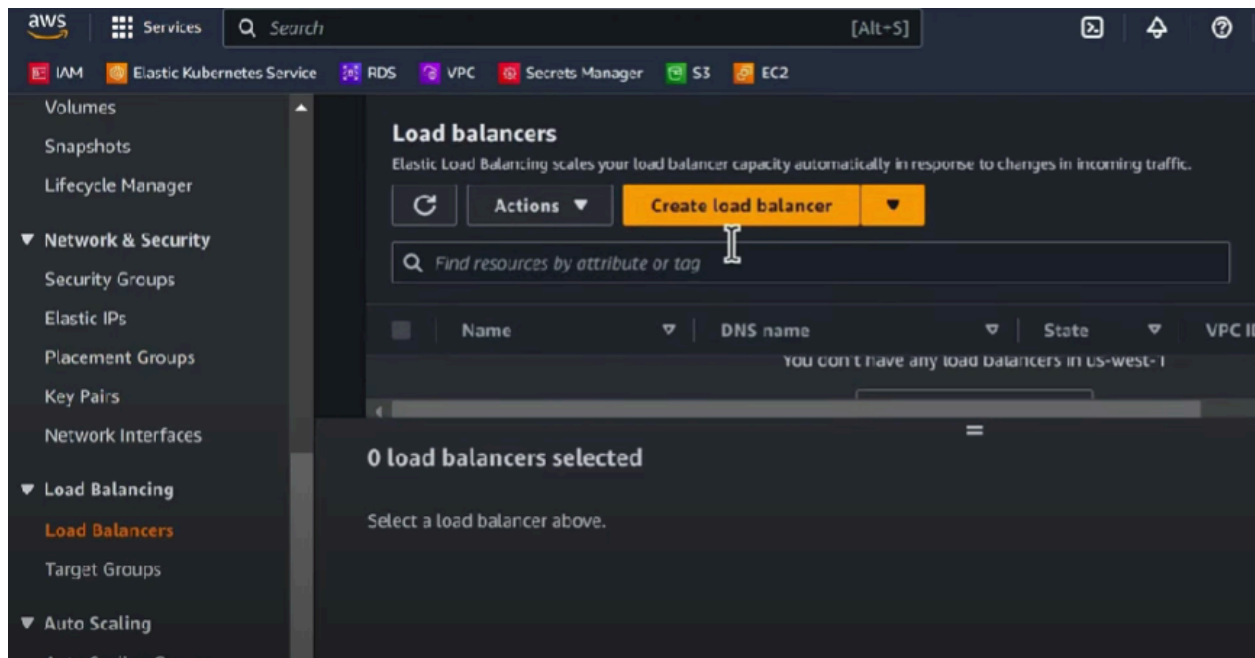
Choose a Network Load Balancer when you need ultra-high

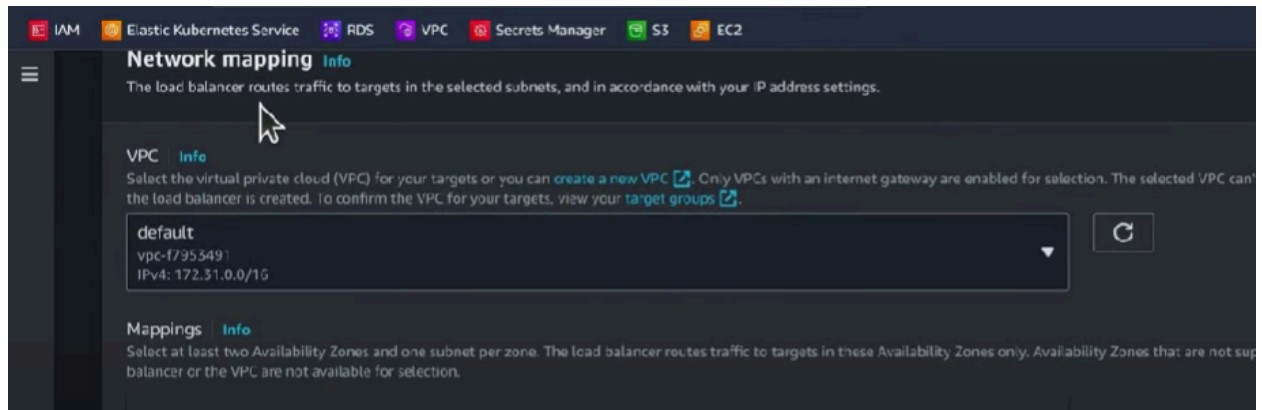
#### Gateway Load Balancer [Info](#)



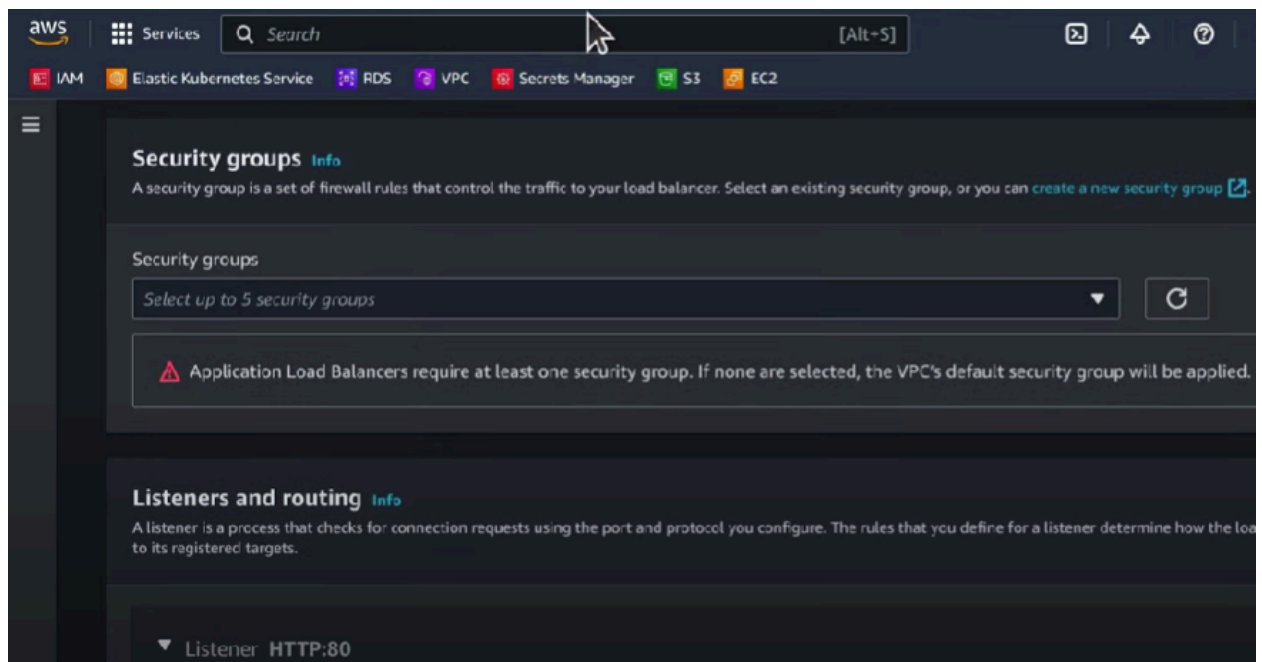
Choose a Gateway Load Balancer when you need to deploy and

- Configure load balancer settings including name, listener configuration (e.g. HTTP or HTTPS), VPC, available subnets, availability zones, and security settings.
- Click on "Create Load Balancer" and select the type of load balancer (usually Application Load Balancer is preferred)





- Now we need security group, either we use selected available security groups or create new security group
- 
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aws Services Search [Alt-S]

IAM Elastic Kubernetes Service RDS VPC Secrets Manager S3 EC2

EC2 > Security Groups > Create security group

## Create security group [Info](#)

A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.

### Basic details

Security group name [Info](#)

ALBSecurityGroup

Name cannot be edited after creation.

Description [Info](#)

This is my security for Load balancer

VPC [Info](#)

Q vpc-f7953491 X

aws Services Search [Alt-S]

IAM Elastic Kubernetes Service RDS VPC Secrets Manager S3 EC2

ALBSecurityGroup

Name cannot be edited after creation.

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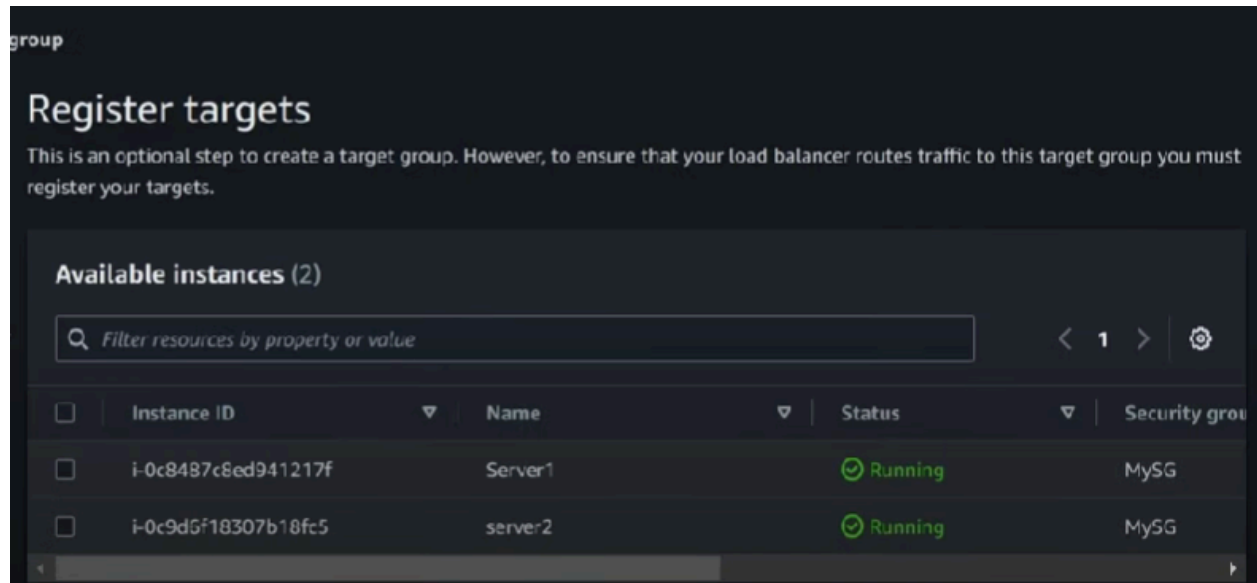
VPC [Info](#)

Q vpc-f7953491 X

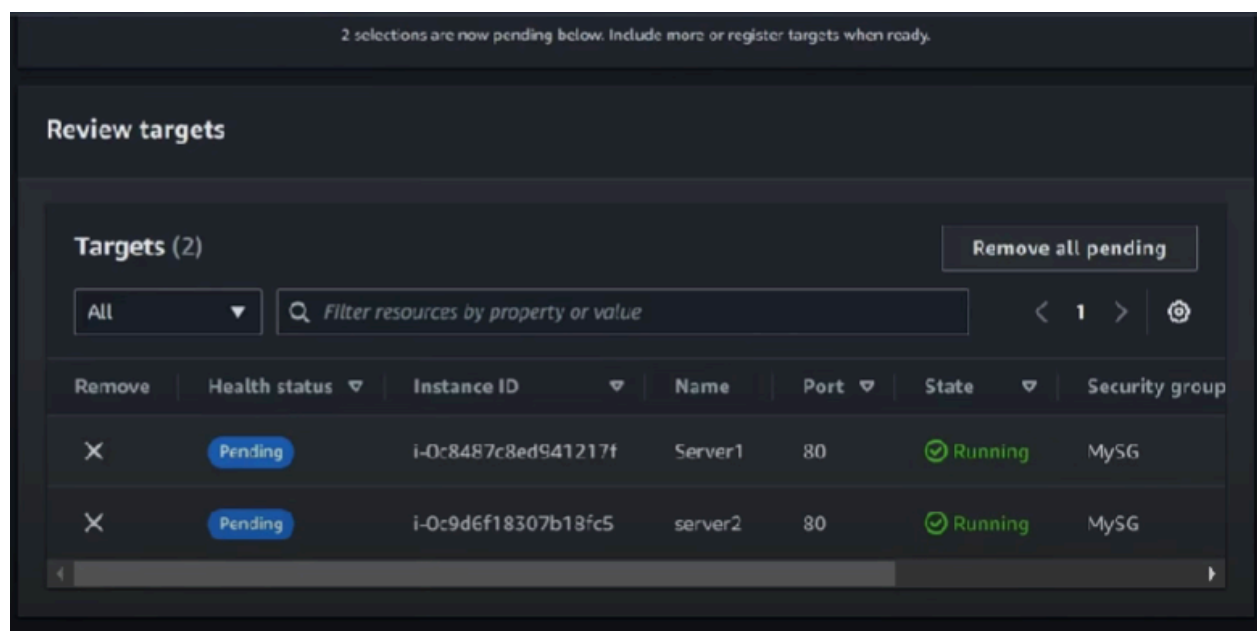
### Inbound rules [Info](#)

Type <a href="#">Info</a>	Protocol <a href="#">Info</a>	Port range <a href="#">Info</a>	Source <a href="#">Info</a>	Description - optional <a href="#">Info</a>
HTTP ▼	TCP	80	Custom ▼ Q	

- We also need a target group , so “create target group”



- We need to select instances from the list of available instances and click on include as pending below and then click on the “target group” button.



- Then our load balancer will be created and it will be available which we can select and then click on the “create load balancer” button.
- In the target group we need to check if all our instances are healthy, if they are not healthy we will not be able to see the traffic.

2

✔ 2

✖ 0

⌵ 0

⌴ 0

⌵ 0

► Distribution of targets by Availability Zone (AZ)

Select values in this table to see corresponding filters applied to the Registered targets table below.

Targets

Monitoring

Health checks

Attributes

Tags

Registered targets (2)

↻

Deregister

Register targets

🔍 Filter resources by property or value

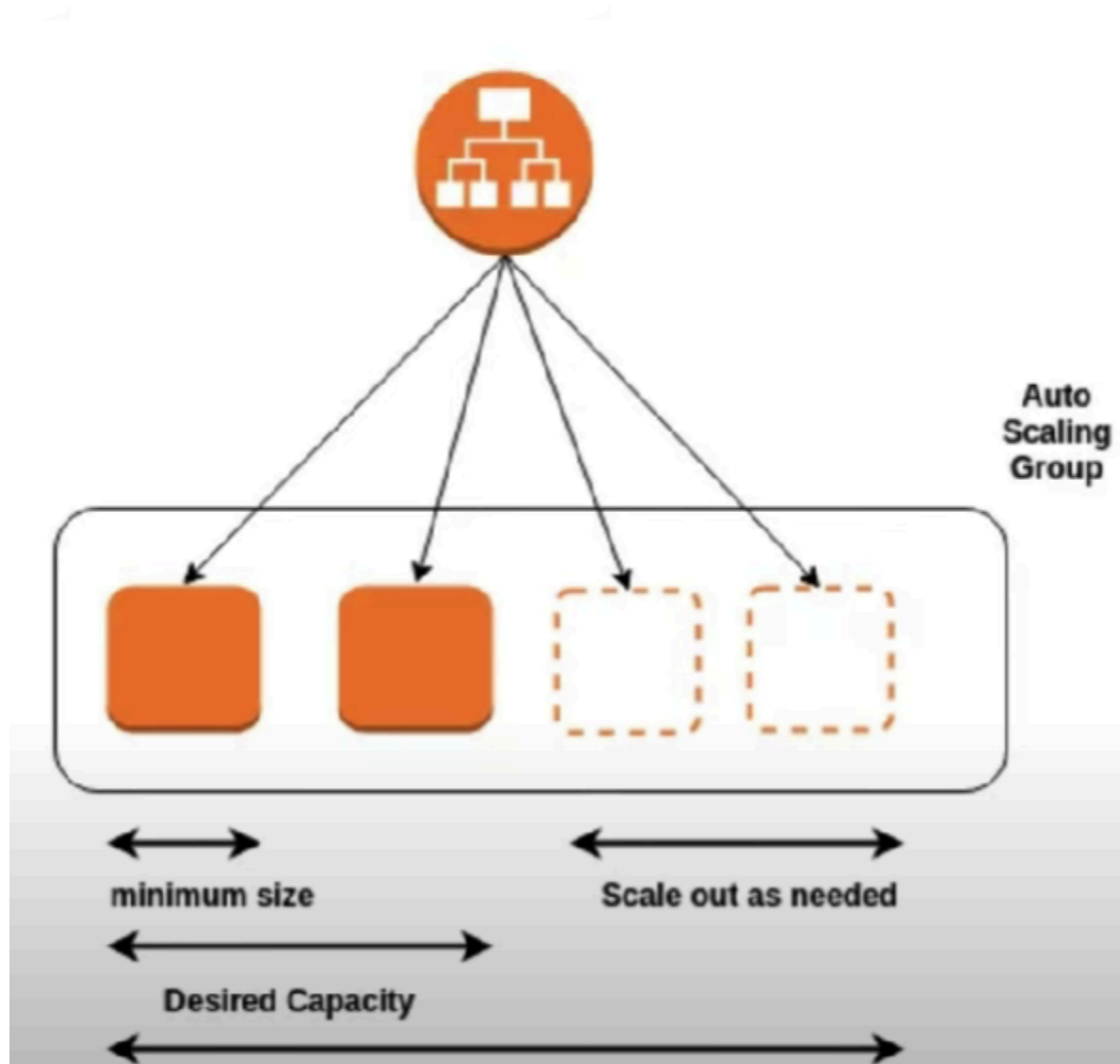
< 1 > ⚙

<input type="checkbox"/>	Instance ID ▾	Name ▾	Port ▾	Zone ▾	Health status ▾	Health status ...
<input type="checkbox"/>	i-Oc8487c3ed...	Server1	80	us-west-1c	✔ healthy	
<input type="checkbox"/>	i-Oc9d6f1830...	server2	80	us-west-1c	✔ healthy	

- To check if the server is running, copy the DNS name from the newly created load balancer and paste in the browser.



## AUTO SCALING GROUP:



Here we have created 2 servers manually but if traffic is increased, we might want to have more servers and in those situations the server should be increased and if less traffic then server should be decreased.

For this purpose we need an Auto Scaling Group which can automatically create the required number of servers depending on the traffic and also delete the server if the traffic is less.

Thereafter, we need to create Auto scaling group :

- To create an auto scaling group we need a launch template or launch configuration.
- Select the auto scaling group on the left navbar in the EC2 page and Click on “create auto scaling group” .

The screenshot shows the AWS Management Console interface for creating an Auto Scaling group. The left sidebar lists steps: Step 3 - optional (Configure advanced options), Step 4 - optional (Configure group size and scaling policies), Step 5 - optional (Add notifications), Step 6 - optional (Add tags), and Step 7 (Review). The main content area is titled 'Name' and contains a text input for 'Auto Scaling group name' with the value 'MyASG' entered. Below the input is a note: 'Must be unique to this account in the current Region and no more than 255 characters.' The 'Launch template' section has a dropdown menu labeled 'Select a launch template' and a link 'Create a launch template'.

The screenshot shows the AWS Management Console interface for creating an Auto Scaling group. The main content area is titled 'Choose launch template or configuration' and contains a subtitle: 'Specify a launch template that contains settings common to all EC2 instances that are launched by this Auto Scaling group. If you currently use launch configurations, you might consider migrating to launch templates.' Below this is a 'Name' section with a text input for 'Auto Scaling group name' and a note: 'Must be unique to this account in the current Region and no more than 255 characters.' The 'Launch template' section has a link 'Switch to launch configuration'.

- We will see launch template and configure auto scaling group name and click on “create a launch template”
- Then we will be redirected to a create launch template page

EC2 > Launch templates > Create launch template

## Create launch template

Creating a launch template allows you to create a saved instance configuration that can be reused, shared and launched at a later time. Templates can have multiple versions.

### Launch template name and description

Launch template name - *required*

Must be unique to this account. Max 128 chars. No spaces or special characters like '&', '\*', '@'.

Template version description

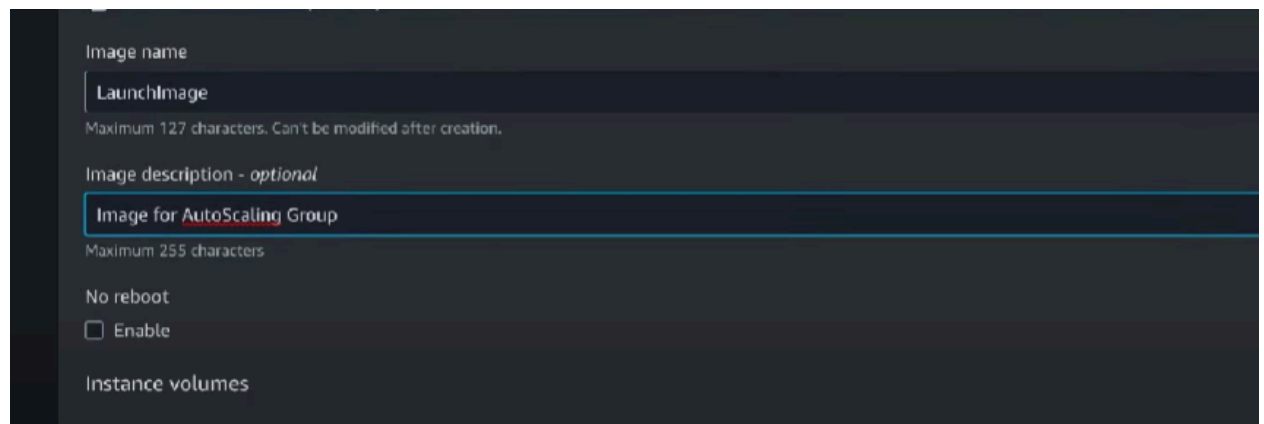
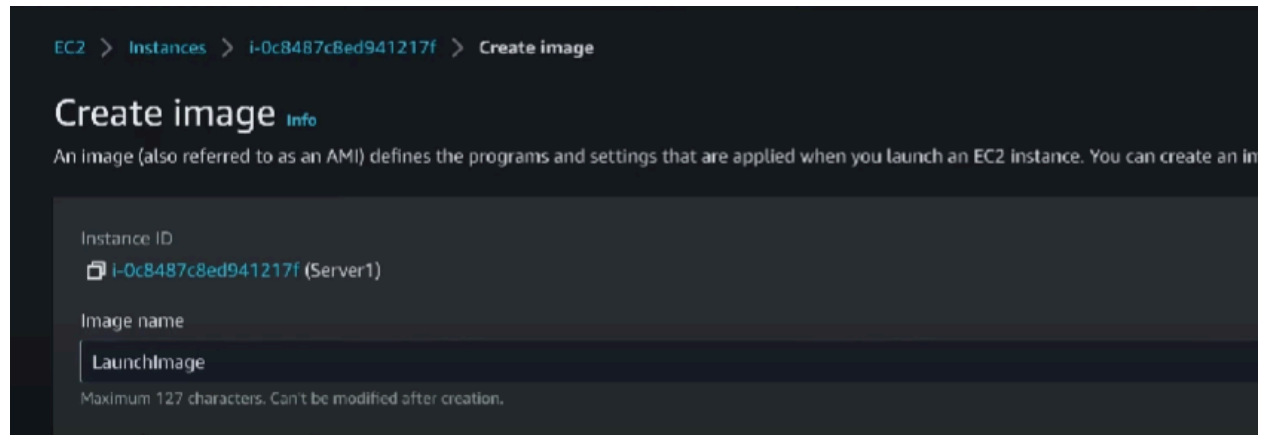
Max 255 chars

- To create a launch template we need the image of the server so let's go to EC2 and select a server on the checkbox and on the actions button on the top right button select image and template from dropdown and from there select create template.

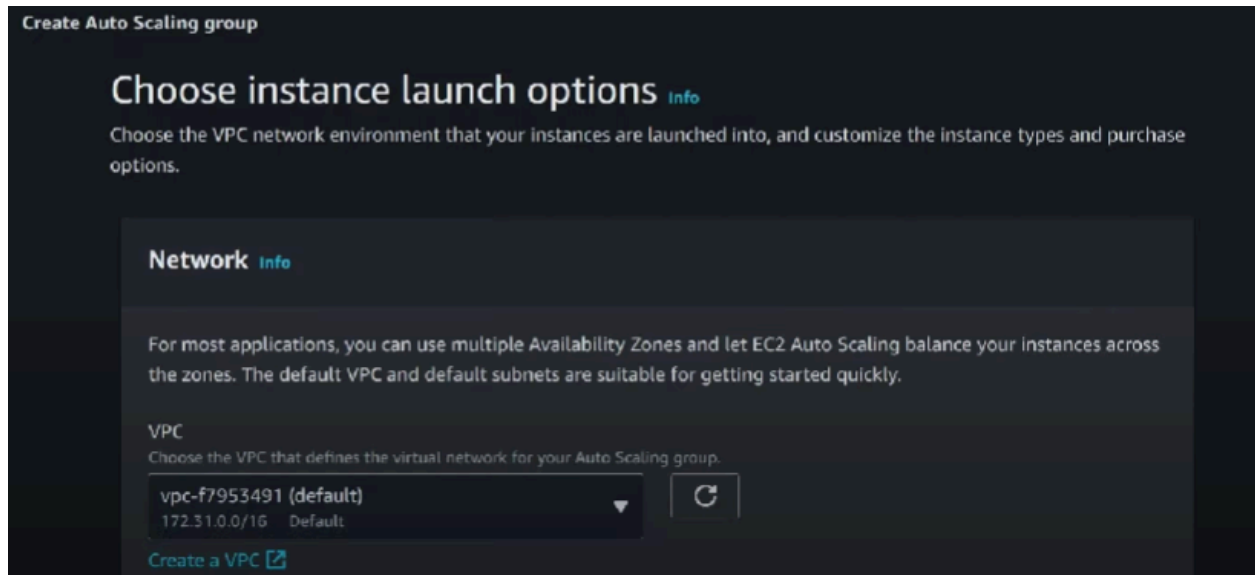
Instances (2) <a href="#">Info</a>							
<input type="text" value="Find instance by attribute or tag (case-sensitive)"/> <span>&lt; 1 &gt;</span>							
<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	
<input type="checkbox"/>	Server1	i-Oc8487c8ed941217f	<span>Running</span>	t2.micro	<span>2/2 checks passed</span>	No alarms	<a href="#">+</a>
<input type="checkbox"/>	server2	i-Oc9d6f18307b18fc5	<span>Running</span>	t2.micro	<span>2/2 checks passed</span>	No alarms	<a href="#">+</a>

Instances (1/2) <a href="#">Info</a>							
<input type="text" value="Find instance by attribute or tag (case-sensitive)"/> <span>&lt; 1 &gt;</span>							
<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	
<input checked="" type="checkbox"/>	Server1	i-Oc8487c8ed941217f	<span>Running</span>	t2.micro	<span>2/2 checks passed</span>	No alarms	<a href="#">+</a>
<input type="checkbox"/>	server2	i-Oc9d6f18307b18fc5	<span>Running</span>	t2.micro	<span>2/2 checks passed</span>	No alarms	<a href="#">+</a>

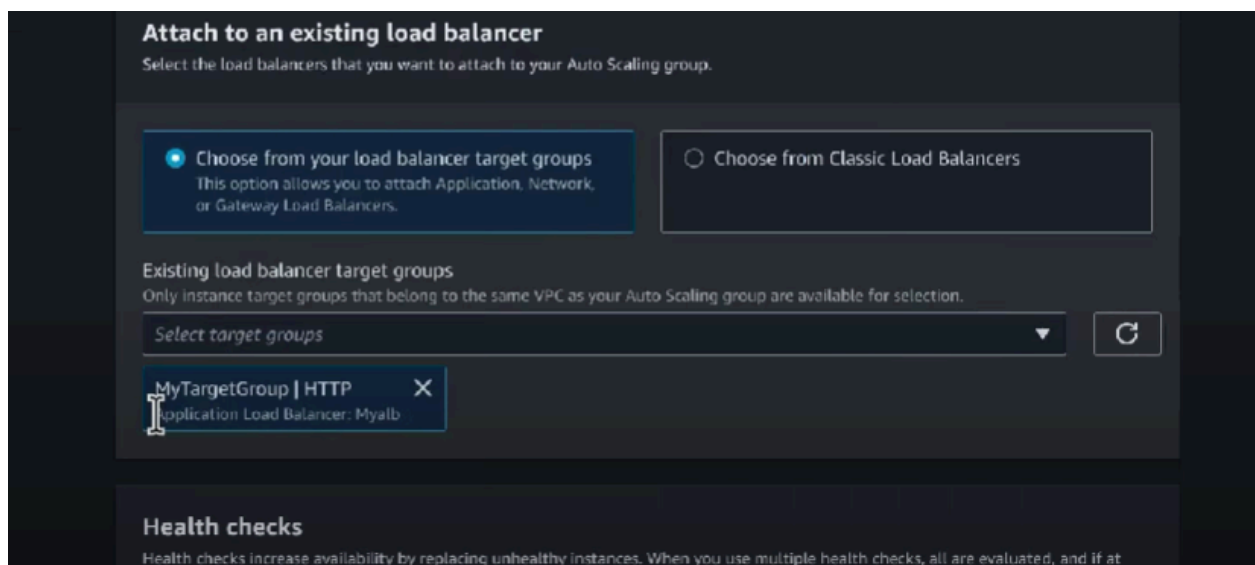
- And then click “create image”



- Now let's create a launch template.
- Give the name and select the ami that we created just now
- Now select the instance t2.micro
- Select security group and click “launch template”

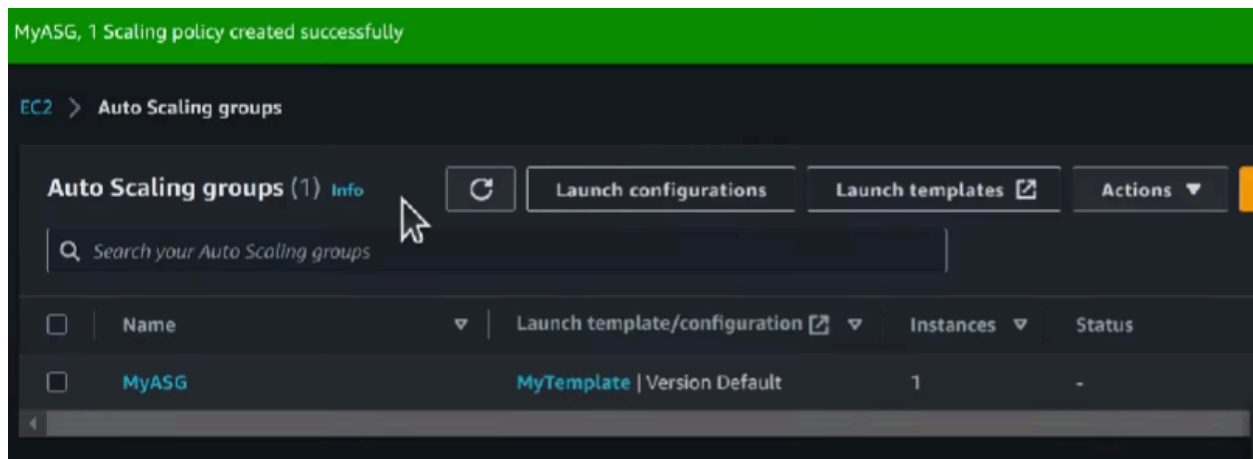


- Now go back to auto scaling group creation and select this launch template . click “next”
- And select the VPC you want to launch, this VPC should be the same where we created the servers, load balancers
- Select all subnets that was created with the VPC and click “next”
- Attach the existing load balancers
- Now we need to enable elastic load balancing health checks and click “next”



- Now we select how many instances auto scaling group to create

- We can select “TARGET TRACKING SCALING POLICY” to launch another server when the previous server reaches a certain percent i.e. if a server reaches 60% it will launch a new server if we set the value 60. We can set the value as our wish depending upon the requirement.
- Click “next” and we will be redirected to the “ add notification” page and other options which we don't need for now, so we simply skip them and click “ next “ and click on the “create auto scaling group” button to create the auto scaling group.
- Now our auto scaling group is created.



- Inside the ec2 inside auto scaling groups our auto scaling group is created
- We can check now we can see new instances that has been created is also in the target group. This instance is created by an auto scaling group .
- Even if we delete this instance, the auto scaling group will create a new instance again as per the requirements of our project.