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## Module 4: Case Study- 1

### **Problem Statement:**

You work for XYZ Corporation which uses on-premise solutions and a limited number of systems. With the increase in requests in their application, the load also increases. So, to handle the load the corporation must buy more systems almost on a regular basis. Realizing the need to cut down the expenses on systems, they decided to move their infrastructure to AWS.

### **Tasks To Be Performed:**

1. Manage the scaling requirements of the company by:
  - a. Deploying multiple compute resources on the cloud as soon as the load increases and the CPU utilization exceeds 80%
  - b. Removing the resources when the CPU utilization goes under 60%
2. Create a load balancer to distribute the load between compute resources.
3. Route the traffic to the company's domain.

### **Answer:**

Login to AWS Console and go to the EC2 dashboard.

### **Create Key Pair**



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### Key pair

A key pair, consisting of a private key and a public key, is a set of security credentials that you use to prove your identity when connecting to an instance.

Name

Mumbai\_KeyPair

The name can include up to 255 ASCII characters. It can't include leading or trailing spaces.

Key pair type [Info](#)

☒ RSA

☐ ED25519

Private key file format

☐ .pem

For use with OpenSSH

☒ .ppk

For use with PuTTY

Tags - *optional*

No tags associated with the resource.

Add new tag

You can add up to 50 more tags.

Cancel

Create key pair

Create a Key Pair for accessing the EC2 instances.

## Create Security Groups

Go to the Security Groups → Create Security Group (WEBSG) and allow port 80 and 22.

Security group name [Info](#)

WEBSG

Name cannot be edited after creation.

Description [Info](#)

Allows 80 and 22 Ports

VPC [Info](#)

vpc-0153e269

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>
SSH	TCP	22	Anyw... 0.0.0.0/0	
HTTP	TCP	80	Anyw... 0.0.0.0/0	

Now Security Group is created successfully.

EC2 Dashboard → Load Balancing → Target Groups → Create Target Group



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The screenshot shows the AWS Management Console interface. At the top, there is a navigation bar with a 'Create target group' button highlighted in orange. A red arrow points to this button. Below the navigation bar, there is a section for 'Target type' and 'Load balancer', both with dropdown menus. The 'Target type' dropdown is currently set to 'Instances'.

## Choose target Type

### Instances

The screenshot shows the 'Create target group' form in the AWS Management Console. The form is titled 'Target group name' and has a text input field containing 'app1'. Below this, there is a note: 'A maximum of 52 alphanumeric characters including hyphens are allowed, but the name must not begin or end with a hyphen.' The 'Protocol : Port' section has a dropdown menu set to 'HTTP' and a port number '80'. Below this, there is a section for 'IP address type' with two radio buttons: 'IPv4' (selected) and 'IPv6'. The 'IPv4' section has a note: 'Each instance has a default network interface (eth0) that is assigned the primary private IPv4 address. The instance's primary private IPv4 address is the one that will be applied to the target.' The 'IPv6' section has a note: 'Each instance you register must have an assigned primary IPv6 address. This is configured on the instance's default network interface (eth0). [Learn more](#)'. The 'VPC' section has a dropdown menu set to 'vpc-0153e269' with the note: 'Select the VPC with the instances that you want to include in the target group. Only VPCs that support the IP address type selected above are available in this list.' The 'Protocol version' section has a radio button set to 'HTTP1' with the note: 'Send requests to targets using HTTP/1.1. Supported when the request protocol is HTTP/1.1 or'. At the bottom, there are 'Cancel' and 'Next' buttons.

The screenshot shows the 'Health check protocol' section in the AWS Management Console. The 'Health check protocol' dropdown menu is set to 'HTTP'. The 'Health check path' section has a text input field containing '/'. Below this, there is a note: 'Use the default path of "/" to ping the root, or specify a custom path if preferred. Up to 1024 characters allowed.' The 'Advanced health check settings' section is collapsed. The 'Attributes' section is expanded and shows a note: 'Certain default attributes will be applied to your target group. You can view and edit them after creating the target group.' The 'Tags - optional' section is expanded and shows a note: 'Consider adding tags to your target group. Tags enable you to categorize your AWS resources so you can more easily manage them.' At the bottom, there are 'Cancel' and 'Next' buttons.



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Click **Next**

**Available instances (0)**

Filter instances

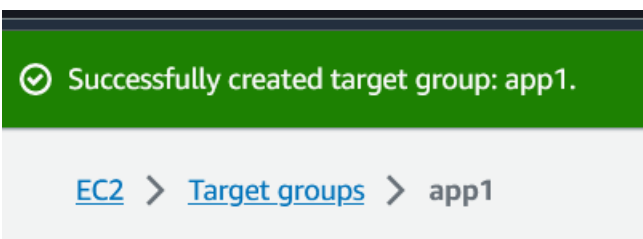
Instance ID	Name	State	Security groups
No instances			

0 selected

Ports for the selected instances  
Ports for routing traffic to the selected instances.

80

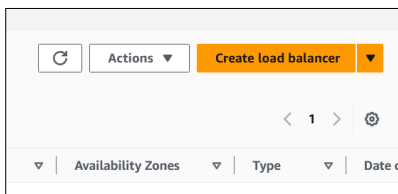
1-65535 (separate multiple ports with commas)



Now Target group has been created successfully.

## Create Load Balancer

EC2 Dashboard → Load Balancing → Load Balancer → Create Load Balancer



**Basic configuration**

**Load balancer name**  
Name must be unique within your AWS account and can't be changed after the load balancer is created.

myalb

A maximum of 32 alphanumeric characters including hyphens are allowed, but the name must not begin or end with a hyphen.

**Scheme** [Info](#)  
Scheme can't be changed after the load balancer is created.

☒ **Internet-facing** [Learn more](#)  
An internet-facing load balancer routes requests from clients over the internet to targets. Requires a public subnet.

☐ **Internal**  
An internal load balancer routes requests from clients to targets using private IP addresses.

**IP address type** [Info](#)  
Select the type of IP addresses that your subnets use.

☒ **IPv4**  
Recommended for internal load balancers.

☐ **Dualstack**  
Includes IPv4 and IPv6 addresses.



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### Network mapping [Info](#)

The load balancer routes traffic to targets in the selected subnets, and in accordance with your IP address settings.

#### VPC [Info](#)

Select the virtual private cloud (VPC) for your targets or you can [create a new VPC](#). Only VPCs with an internet gateway are enabled for selection. The selected VPC must be in the same region as the load balancer is created. To confirm the VPC for your targets, view your [target groups](#).

vpc-0153e269  
IPv4: 172.31.0.0/16

#### Mappings [Info](#)

Select at least two Availability Zones and one subnet per zone. The load balancer routes traffic to targets in these Availability Zones only. Availability Zones that are not available for selection or the VPC are not available for selection.

##### ☒ ap-south-1a (aps1-az1)

Subnet

subnet-b38033db

IPv4 address

Assigned by AWS

##### ☒ ap-south-1b (aps1-az3)

Subnet

subnet-ce799a82

IPv4 address

Assigned by AWS

Select the appropriate VPC settings. Select a minimum two subnets for redundancy

### Security groups [Info](#)

A security group is a set of firewall rules that control the traffic to your

#### Security groups

Select up to 5 security groups

WEBSG

sg-03681635fd4ebfc7e VPC: vpc-0153e269

Select the Security Group which we have created at the first step

### Listeners and routing [Info](#)

A listener is a process that checks for connection requests using the port and protocol you configure. The rules that you define for a listener determine how the load balancer routes requests to its registered targets.

#### ▼ Listener HTTP:80

Remove

Protocol

HTTP

Port

80

1-65535

Default action [Info](#)

Forward to

app1

Target type: Instance, IPv4

HTTP

[Create target group](#)

#### Listener tags - optional

Consider adding tags to your listener. Tags enable you to categorize your AWS resources so you can more easily manage them.

Add listener tag

You can add up to 50 more tags.

Add listener



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Select the Target group which we have created

Add-on services [Edit](#) Tags [Edit](#)

None

Attributes

ⓘ Certain default attributes will be applied to your load balancer. You can view and edit them after creating the load balancer.

Cancel Create load balancer

Create Load Balancer

Load balancers (1/1)

Elastic Load Balancing scales your load balancer capacity automatically in response to changes in incoming traffic.

Filter load balancers 1 match

myalb X Clear filters

<input checked="" type="checkbox"/>	Name	DNS name	State	VPC ID	Availability Zones	Type	Date created
<input checked="" type="checkbox"/>	myalb	myalb-1719526393.ap-so...	Provisioning	vpc-0153e269	3 Availability Zones	application	October 1, 2023

Load balancer: myalb

Details Listeners and rules Network mapping Security Monitoring Integrations Attributes Tags

Details

Load balancer type	Status	VPC	IP address type
Application	Provisioning	vpc-0153e269	IPv4

ALB creation will take a few minutes.

## Create Launch Template

EC2 Dashboard → Instances → Launch Templates

New launch template

Create launch template



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### Launch template name and description

Launch template name - *required*

myalunchtemplate

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

Template version description

v1

Max 255 chars

Auto Scaling guidance [Info](#)

Select this if you intend to use this template with EC2 Auto Scaling

☐ Provide guidance to help me set up a template that I can use with EC2 Auto Scaling

► Template tags

► Source template

- Select OS as Amazon Linux
- Instance Type is t2.micro (Free Tier Eligible)
- Select the Key Pair
- Select the Security Group as WEBSEG

In Advanced options provide the user data script to make your website ready



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### User data - optional [Info](#)

Upload a file with your user data or enter it in the field.

 Choose file

```
#!/bin/bash
yum update -u
yum install httpd -y
systemctl enable httpd
systemctl start httpd
echo "Welcome to my Website " > /var/www/html/index.html
systemctl restart httpd
```

☐ User data has already been base64 encoded



**Success**

Successfully created [myalunchtemplate\(lt-08bc9ece4076b50ab\)](#).

Launch Template has been created successfully.

## Create Auto Scaling Groups

EC2 Dashboard → Auto Scaling → Create Auto Scaling Groups

### Create Auto Scaling group

Get started with EC2 Auto Scaling by creating an Auto Scaling group.

Create Auto Scaling group

Provide the Auto Scaling Group name Ex: asg1





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security groups.

**myalunchtemplate**

[Create a launch template](#)

Version

**Default (1)**

[Create a launch template version](#)

Description	Launch template	Instance type
v1	<b>myalunchtemplate</b> lt-08bc9ece4076b50ab	t2.micro
AMI ID	Security groups	Request Spot Instances
ami-06791f9213cbb608b	-	No
Key pair name	Security group IDs	
Mumbai_KeyPair	<a href="#">sg-03681635fd4ebfc7e</a>	

Additional details

Storage (volumes)	Date created
-	Sat Oct 28 2023 15:36:18 GMT+0530 (India Standard Time)

Cancel **Next**

Click **Next**

**Network** [Info](#)

For most applications, you can use multiple Availability Zones and let EC2 Auto Scaling balance your instances across the zones. The default VPC and default subnets are suitable for getting started quickly.

VPC

Choose the VPC that defines the virtual network for your Auto Scaling group.

**vpc-0153e269**   
172.31.0.0/16 Default

[Create a VPC](#)

Availability Zones and subnets

Define which Availability Zones and subnets your Auto Scaling group can use in the chosen VPC.

**Select Availability Zones and subnets**

**ap-south-1c | subnet-eb05d090**   
172.31.32.0/20 Default

**ap-south-1b | subnet-ce799a82**   
172.31.0.0/20 Default

**ap-south-1a | subnet-b38033db**   
172.31.16.0/20 Default

[Create a subnet](#)

Cancel Skip to review Previous **Next**

Select the VPC Settings and Subnets

Click **Next**



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### Load balancing [Info](#)

Use the options below to attach your Auto Scaling group to an existing load balancer, or to a new load balancer that you define.

☐ No load balancer

Traffic to your Auto Scaling group will not be fronted by a load balancer.

☒ Attach to an existing load balancer

Choose from your existing load balancers.

☐ Attach to a new load balancer

Quickly create a basic load balancer to attach to your Auto Scaling group.

### Attach to an existing load balancer

Select the load balancers that you want to attach to your Auto Scaling group.

☒ Choose from your load balancer target groups

This option allows you to attach Application, Network, or Gateway Load Balancers.

☐ Choose from Classic Load Balancers

#### Existing load balancer target groups

Only instance target groups that belong to the same VPC as your Auto Scaling group are available for selection.

Select target group



app1 | HTTP

Application Load Balancer: myalb



Load Balancing options Attach to an existing load balancer.

Choose from your load balancer target groups (Since we already created one)

### Health checks

Health checks increase availability by replacing unhealthy instances. When you use multiple health checks, all are evaluated, and if at least one fails, instance replacement occurs.

#### EC2 health checks

[Always enabled](#)

#### Additional health check types - optional [Info](#)

☒ Turn on Elastic Load Balancing health checks [Recommended](#)

Elastic Load Balancing monitors whether instances are available to handle requests. When it reports an unhealthy instance, EC2 Auto Scaling can replace it on its next periodic check.

EC2 Auto Scaling will start to detect and act on health checks performed by Elastic Load Balancing. To avoid unexpected terminations, first verify the settings of these health checks in the [Load Balancer console](#)

#### Health check grace period [Info](#)

This time period delays the first health check until your instances finish initializing. It doesn't prevent an instance from terminating when placed into a non-running state.

10



seconds



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### Additional settings

#### Monitoring [Info](#)

☐ Enable group metrics collection within CloudWatch

#### Default instance warmup [Info](#)

The amount of time that CloudWatch metrics for new instances do not contribute to the group's aggregated instance metrics, as their usage data is not reliable yet.

☐ Enable default instance warmup

Cancel

Skip to review

Previous

Next

Click **Next**

### Group size - optional [Info](#)

Specify the size of the Auto Scaling group by changing the desired capacity. You can also specify minimum and maximum capacity limits. Your desired capacity must be within the limit range.

#### Desired capacity

1

#### Minimum capacity

1

#### Maximum capacity

2

### Scaling policies - optional

Choose whether to use a scaling policy to dynamically resize your Auto Scaling group to meet changes in demand. [Info](#)

#### ☒ Target tracking scaling policy

Choose a desired outcome and leave it to the scaling policy to add and remove capacity as needed to achieve that outcome.

☐ None

#### Scaling policy name

Target Tracking Policy

#### Metric type [Info](#)

Monitored metric that determines if resource utilization is too low or high. If using EC2 metrics, consider enabling detailed monitoring for better scaling performance.

Average CPU utilization

#### Target value

80

#### Instance warmup [Info](#)

5

seconds

☐ Disable scale in to create only a scale-out policy

Configure Scaling Policies as described in questions, when CPU 80% utilized it should create another EC2 instance



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### Instance scale-in protection - optional

#### Instance scale-in protection

If protect from scale in is enabled, newly launched instances will be protected from scale in by default.

☐ Enable instance scale-in protection

Cancel

Skip to review

Previous

Next

Click **Next**

### Add notifications - optional [Info](#)

Send notifications to SNS topics whenever Amazon EC2 Auto Scaling launches or terminates the EC2 instances in your Auto Scaling group.

Add notification

Cancel

Skip to review

Previous

Next

Click **Next**

#### Step 6: Add tags

Edit

#### Tags (0)

Key	Value	Tag new instances
No tags		

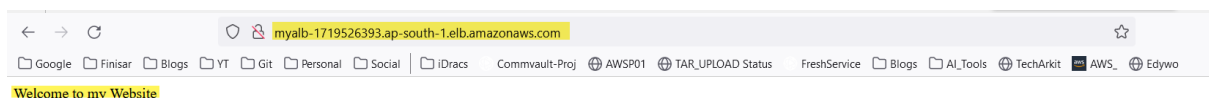
Cancel

Previous

Create Auto Scaling group

Create ASG


Access the Website using ALB URL.



The ASG is working fine as expected

Instances (16) <a href="#">Info</a>								
<input type="text" value="Find Instance by attribute or tag (case-sensitive)"/>								
<input type="checkbox"/>	Name <a href="#">↗</a>	Instance ID	Instance state <a href="#">▲</a>	Instance type <a href="#">▼</a>	Status check	Alarm status	Availability Zone <a href="#">▼</a>	Public IPv4 DNS
<input type="checkbox"/>		i-0ead54c8e0bc1fdd0	<span>Running</span>	t2.micro	<span>2/2 checks passed</span>	No alarms +	ap-south-1b	ec2-65-0-176-232...
<input type="checkbox"/>		i-042a449920781e64d	<span>Running</span>	t2.micro	<span>2/2 checks passed</span>	No alarms +	ap-south-1b	ec2-13-126-208-14...
<input type="checkbox"/>		i-0b68379029ae3c724	<span>Running</span>	t2.micro	<span>2/2 checks passed</span>	No alarms +	ap-south-1a	ec2-13-126-174-26...
<input type="checkbox"/>		i-0ca696070a01f2b35	<span>Terminated</span>	t2.micro	-	No alarms +	ap-south-1b	-
<input type="checkbox"/>		i-00259911584c37d5c	<span>Terminated</span>	t2.micro	-	No alarms +	ap-south-1b	-
<input type="checkbox"/>		i-00d2238925e8c1a3a	<span>Terminated</span>	t2.micro	-	No alarms +	ap-south-1b	-

**Map the Company Domain**



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route 53

Search results for 'route'

Try searching with longer queries for more relevant results

Services (4)


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### Services

**Route 53** ☆  
Scalable DNS and Domain Name Registration

Go to Route 53

Create a hosted zone ex: (Techarkit.com)

Hosted zone name	Type	Created by	Record count
 techarkit.com	Public	Route 53	2

**Quick create record**[Switch to wizard](#)

**Record 1**[Delete](#)

**Record name** [Info](#)

myweb .techarkit.com

Keep blank to create a record for the root domain.

**Record type** [Info](#)

CNAME – Routes traffic to another domain name and to some AWS reso...

☒ Alias

**Value** [Info](#)

myalb-1719526393.ap-south-1.elb.amazonaws.com

Enter multiple values on separate lines.

**TTL (seconds)** [Info](#)

300

1m1h1d

Recommended values: 60 to 172800 (two days)

**Routing policy** [Info](#)

Simple routing

Add another record

CancelCreate records

That's it, if the domain is already registered then you can browse the website using myweb.techarkit.com