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Aim: Demonstrate the Auto Scaling and Load Balancing of a Web Application in the Public Cloud. (CO4)

Scenario:

Ram is assigned with a task of setting up a scalable and highly available web application architecture in a cloud environment. The architecture should include load balancers and auto-scaling to handle varying levels of traffic. Describe how you would design and implement this architecture using load balancers and auto-scaling mechanisms.

Task 1: Create and select a Load Balancer among the application and network set out an appropriate instances for the application.

Task 2: Create an Auto Scaling Policies based on the varying workload distribution depending on the capacity of the instances.

Step1: Create 2 ubuntu instance.

Instances (2) Info

Find instance by attribute or tag (case-sensitive)

< 1 >

Connect

Instance state ▾


Actions ▾

Launch instances

<input type="checkbox"/>	Name ▾	Instance ID	Instance state ▾	Instance type ▾	Status check	Alarm status	Availability Zone ▾	Public IP
<input type="checkbox"/>	server2	i-0a4cb98a5aa7e33e5	<div>Running</div>	t2.micro	<div>2/2 checks passed</div>	No alarms +	us-east-1b	ec2-54-
<input type="checkbox"/>	server1	i-0e44b8c7c687a066f	<div>Running</div>	t2.micro	<div>2/2 checks passed</div>	No alarms +	us-east-1b	ec2-54-

Step 2: Install apache2 in both of them and configure /var/www/html/index.html and add server's name in body section.

Server 1



Apache2 Default Page

Ubuntu

It works!

This is the default welcome page used to test the correct operation of the Apache2 server after installation on Ubuntu systems. It is based on the equivalent page on Debian, from which the Ubuntu Apache packaging is derived. If you can read this page, it means that the Apache HTTP server installed at this site is working properly. You should **replace this file** (located at `/var/www/html/index.html`) before continuing to operate your HTTP server.

If you are a normal user of this web site and don't know what this page is about, this probably means that the site is currently unavailable due to maintenance. If the problem persists, please contact the site's administrator.

Configuration Overview

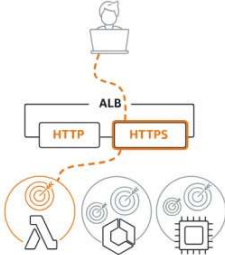
Ubuntu's Apache2 default configuration is different from the upstream default configuration, and split into several files optimized for interaction with Ubuntu tools. The configuration system is **fully documented in `/usr/share/doc/apache2/README.Debian.gz`**. Refer to this for the full documentation. Documentation for the web server itself can be found by accessing the **manual** if the `apache2-doc` package was installed on this server.

The configuration layout for an Apache2 web server installation on Ubuntu systems is as follows:

```
/etc/apache2/  
|-- apache2.conf  
|-- ports.conf  
|-- mods-enabled  
|   |-- *.load  
|   |-- *.conf  
|-- conf-enabled  
|   |-- *.conf  
|-- sites-enabled  
|   |-- *.conf
```

Step3: Create a Application Load Balancer.

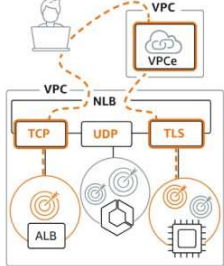
Application Load Balancer [Info](#)



Choose an Application Load Balancer when you need a flexible feature set for your applications with HTTP and HTTPS traffic. Operating at the request level, Application Load Balancers provide advanced routing and visibility features targeted at application architectures, including microservices and containers.


Create

Network Load Balancer [Info](#)



Choose a Network Load Balancer when you need ultra-high performance, TLS offloading at scale, centralized certificate deployment, support for UDP, and static IP addresses for your applications. Operating at the connection level, Network Load Balancers are capable of handling millions of requests per second securely while maintaining ultra-low latencies.

Gateway Load Balancer [Info](#)



Choose a Gateway Load Balancer when you need to deploy and manage a fleet of third-party virtual appliances that support GENEVE. These appliances enable you to improve security, compliance, and policy controls.

Create

Step4: Name the load balancer, select schema and select the IP address type.

► How Elastic Load Balancing works

Basic configuration

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

load-balancer

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

☐ **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.

Step5: Select the Availability Zones for which you need load balancer.

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 can't be changed after the load balancer is created. To confirm the VPC for your targets, view your [target groups](#).

-
vpc-0a79bfcba7ccaba3
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 supported by the load balancer or the VPC are not available for selection.

☒ **us-east-1a (use1-az4)**

Subnet
subnet-0a5af5e92182fcc34

IPv4 address
Assigned by AWS

☒ **us-east-1b (use1-az6)**

Subnet
subnet-072bf514ec758f222

Step6: Configure Security Group and click on create target group.

Security groups [Info](#)

A security group is a set of firewall rules that control the traffic to your load balancer. Select an existing security group, or you can [create a new security group](#).

Security groups
Select up to 5 security groups

↺

↻

default
sg-0f36757b63bf6415b VPC: vpc-0a79bfcba7ccaba3

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 Select a target group
↺

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.

Step7: Choose target type as instances and provide name to target group.

Choose a target type

☒ Instances

- Supports load balancing to instances within a specific VPC.
- Facilitates the use of [Amazon EC2 Auto Scaling](#) to manage and scale your EC2 capacity.

☐ IP addresses

- Supports load balancing to VPC and on-premises resources.
- Facilitates routing to multiple IP addresses and network interfaces on the same instance.
- Offers flexibility with microservice based architectures, simplifying inter-application communication.
- Supports IPv6 targets, enabling end-to-end IPv6 communication, and IPv4-to-IPv6 NAT.

☐ Lambda function

- Facilitates routing to a single Lambda function.
- Accessible to Application Load Balancers only.

☐ Application Load Balancer

- Offers the flexibility for a Network Load Balancer to accept and route TCP requests within a specific VPC.
- Facilitates using static IP addresses and PrivateLink with an Application Load Balancer.

Target group name

practarget

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

Step7: Add path of index.html file to check its health.

Health checks

The associated load balancer periodically sends requests, per the settings below, to the registered targets to test their status.

Health check protocol

HTTP

Health check path

Use the default path of "/" to ping the root, or specify a custom path if preferred.

/index.html

Up to 1024 characters allowed.

► Advanced health check settings

Attributes

Certain default attributes will be applied to your target group. You can view and edit them after creating the target group.

► Tags - optional

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

Step8: Add the Server1 and Server2 in target group.

Available instances (2/2)

Filter instances

< 1 > ⚙

<input checked="" type="checkbox"/>	Instance ID	Name	State	Security groups	Zone
<input checked="" type="checkbox"/>	i-0e44b8c7c687a066f	server1	Running	launch-wizard-7	us-east-1b
<input checked="" type="checkbox"/>	i-0a4cb98a5aa7e33e5	server2	Running	launch-wizard-8	us-east-1b

2 selected

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

80

1-65535 (separate multiple ports with commas)

Include as pending below

Review targets

Targets (2)

Filter targets

Show only pending

Remove all pending

Remove	Health status	Instance ID	Name	Port	State	Security groups	Zone	Private IPv4
×	Pending	i-0e44b8c7c687a066f	server1	80	Running	launch-wizard-7	us-east-1b	172.31.39.41
×	Pending	i-0a4cb98a5aa7e33e5	server2	80	Running	launch-wizard-8	us-east-1b	172.31.45.23

Step9: Select the target group in the load balancer and create load balancer.

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

practarget

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

Step10: Now unlink index.html from server2 and check if it shows its health.

mytarget

Actions

Details

arn:aws:elasticloadbalancing:us-east-1:012634630016:targetgroup/mytarget/47f308f9df63e46f

Target type	Protocol : Port	Protocol version	VPC
Instance	HTTP: 80	HTTP1	vpc-0a79bfcba7ccaba3
IP address type	Load balancer		
IPv4	myload		

Total targets	Healthy	Unhealthy	Unused	Initial	Draining
2	✔ 1	✖ 1	⊖ 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.

Registered targets (2)

Filter targets

Deregister

Register targets

< 1 >

<input type="checkbox"/>	Instance ID	Name	Port	Zone	Health status	Health status details
<input type="checkbox"/>	i-0e44b8c7c687a066f	server1	80	us-east-1b	✔ healthy	
<input type="checkbox"/>	i-0a4cb98a5aa7e33e5	server2	80	us-east-1b	✖ unhealthy	Health checks failed ...