

## Practical – 5

### **Aim: Implementing Load-balancing/High Availability for Web Application using Amazon Web Services (AWS).**

#### **Theory:**

##### **Elastic Load-Balancer:**

Elastic Load Balancing automatically distributes incoming application traffic across multiple targets, such as Amazon EC2 instances, containers, IP addresses, and Lambda functions. It can handle the varying load of your application traffic in a single Availability Zone or across multiple Availability Zones. Elastic Load Balancing offers three types of load balancers that all feature the high availability, automatic scaling, and robust security necessary to make your applications fault tolerant.

##### **Application Load-Balancer:**

Application Load Balancer is best suited for load balancing of HTTP and HTTPS traffic and provides advanced request routing targeted at the delivery of modern application architectures, including micro services and containers. Operating at the individual request level (Layer 7), Application Load Balancer routes traffic to targets within Amazon Virtual Private Cloud (Amazon VPC) based on the content of the request.

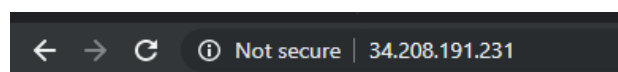
##### **Network Load-Balancer:**

Network Load Balancer is best suited for load balancing of Transmission Control Protocol (TCP), User Datagram Protocol (UDP) and Transport Layer Security (TLS) traffic where extreme performance is required. Operating at the connection level (Layer 4), Network Load Balancer routes traffic to targets within Amazon Virtual Private Cloud (Amazon VPC) and is capable of handling millions of requests per second while maintaining ultra-low latencies. Network Load Balancer is also optimized to handle sudden and volatile traffic patterns.

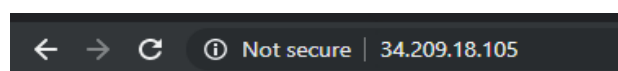
##### **Classic Load-Balancer:**

Classic Load Balancer provides basic load balancing across multiple Amazon EC2 instances and operates at both the request level and connection level. Classic Load Balancer is intended for applications that were built within the EC2-Classic network.

#### **Output:**



Test Website - EC2 Instance 1



Test Website - EC2 Instance 2

## Configuration of load Balancer:

1. Configure Load Balancer2. Configure Security Settings3. Configure Routing4. Register Targets5. Review

Step 1: Configure Load Balancer

Basic Configuration

To configure your load balancer, provide a name, select a scheme, specify one or more listeners, and select a network. The default configuration is an Internet-facing load balancer in the selected network with a listener that receives TCP traffic on port 80.

Name ⓘmyELB

Scheme ⓘ

Internet-facing

Internal

Listeners

A listener is a process that checks for connection requests, using the protocol and port that you configured.

Load Balancer Protocol

Load Balancer Port

TCP80

Add listener

Availability Zones

Specify the Availability Zones to enable for your load balancer. The load balancer routes traffic to the targets in these Availability Zones only. You can specify only one subnet per Availability Zone. You may also add one Elastic IP per Availability Zone if you wish to have specific addresses for your load balancer.

Create and manage Elastic IPs in the VPC console [↗](#)

VPC ⓘvpc-049a00094d899c131 (10.1.0.0/16) | Lab VPC

Availability Zones

us-west-2a

subnet-0edc7a17faa2f5020 (Public Subnet 1)

IPv4 address ⓘAssigned by AWS

us-west-2b

subnet-0c994b4312809df (Public Subnet 2)

IPv4 address ⓘAssigned by AWS

Cancel

Next: Configure Security Settings

1. Configure Load Balancer2. Configure Security Settings3. Configure Routing4. Register Targets5. Review

Step 3: Configure Routing

Your load balancer routes requests to the targets in this target group using the protocol and port that you specify, and performs health checks on the targets using these health check settings. Note that each target group can be associated with only one load balancer.

Target group

Target group ⓘNew target group

Name ⓘMyELBTargeGroup

Target type

Instance

IP

Protocol ⓘTCP

Port ⓘ80

Health checks

Protocol ⓘTCP

Advanced health check settings

Port ⓘ

traffic port

override

Healthy threshold ⓘ2

Unhealthy threshold ⓘ2

Timeout ⓘ10 seconds

Interval ⓘ

10 seconds

30 seconds

Cancel

Previous

Next: Register Targets

1. Configure Load Balancer2. Configure Security Settings3. Configure Routing4. Register Targets5. Review

Step 4: Register Targets

Configure Security Groups

The security groups for your instances must allow traffic from the VPC CIDR on the health check port.

Register targets with your target group. If you register a target in an enabled Availability Zone, the load balancer starts routing requests to the targets as soon as the registration process completes and the target passes the initial health checks.

Registered targets

To deregister instances, select one or more registered instances and then click Remove.

Remove

Instance	Name	Port	State	Security groups	Zone	
<input type="checkbox"/>	i-048325709212195cb	Ec2WebServer02	80	running	ELBSecurityGroup	us-west-2b
<input type="checkbox"/>	i-0472a076e81359b30	Ec2WebServer01	80	running	ELBSecurityGroup	us-west-2a

Instances

To register additional instances, select one or more running instances, specify a port, and then click Add. The default port is the port specified for the target group. If the instance is already registered on the specified port, you must specify a different port.

Add to registered

on port 80

Search instances

X

Instance	Name	State	Security groups	Zone	Subnet ID	Subnet CIDR	
<input checked="" type="checkbox"/>	i-048325709212195cb	Ec2WebServer02	running	ELBSecurityGroup	us-west-2b	subnet-0c994b4312809df	10.1.12.0/24
<input checked="" type="checkbox"/>	i-0472a076e81359b30	Ec2WebServer01	running	ELBSecurityGroup	us-west-2a	subnet-0edc7a17faa2f5020	10.1.11.0/24

Cancel

Previous

Next: Review

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1. Configure Load Balancer2. Configure Security Settings3. Configure Routing4. Register Targets5. Review

Step 5: Review

Please review the load balancer details before continuing

▼ Load balancer

Name

myELB

Scheme

internet-facing

Listeners

Port 80 - Protocol TCP

VPC

vpc-049a00094d899c131 (Lab VPC)

Subnets

subnet-0ede7a176aa2f5020 (Public Subnet 1), subnet-0c9994bd31280f8d7 (Public Subnet 2)

Tags

▼ Routing

Target group

New target group

Target group name

MyELBTargeGroup

Port

80

Target type

instance

Protocol

TCP

Health check protocol

TCP

Health check port

traffic port

Healthy threshold

2

Unhealthy threshold

2

Interval

10

▼ Targets

Instances

i-048325709212190cb (Ec2WebServer02) 80, i-0472a876e81359b30 (Ec2WebServer01) 80

Cancel

Previous

Create

Create Load Balancer

Actions ▼

Filter by tags and attributes or search by keyword

Name

myELB

DNS name

myELB-7c26ed317d397629...

State

provisioning

VPC ID

vpc-049a00094d899c131

Availability Zones

us-west-2b, us-west-2a

Type

network

Created At

September 3, 2019 at 2:40 4...

Monitoring

Create target group

Actions ▼

Filter by tags and attributes or search by keyword

Name

MyELBTargeGroup

Port

80

Protocol

TCP

Target type

instance

Load Balanc

myELB

VPC ID

vpc-049a00094d899c131

Monitoring

Target group: MyELBTargeGroup

Description

Targets

Health checks

Monitoring

Tags

The load balancer starts routing requests to a newly registered target as soon as the registration process completes and the target passes the initial health checks. If demand on your targets increases, you can register additional targets. If demand on your targets decreases, you can deregister targets.

Edit

None of these Availability Zones contains a healthy target. Requests are being routed to all targets.

Registered targets

Instance ID	Name	Port	Availability Zone	Status
i-048325709212190cb	Ec2WebServer02	80	us-west-2b	initial ⓘ
i-0472a876e81359b30	Ec2WebServer01	80	us-west-2a	initial ⓘ

Availability Zones

Availability Zone	Target count	Healthy?
us-west-2a	1	No (Availability Zone contains no healthy targets)
us-west-2b	1	No (Availability Zone contains no healthy targets)

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**Create target group** Actions

Filter by tags and attributes or search by keyword

Name	Port	Protocol	Target type	Load Balanc	VPC ID	Monitoring
MyELBTargeGroup	80	TCP	Instance	myELB	vpc-049a0094d899c131	

Target group: MyELBTargeGroup

Description Targets Health checks Monitoring Tags

The load balancer starts routing requests to a newly registered target as soon as the registration process completes and the target passes the initial health checks. If demand on your targets increases, you can register additional targets. If demand on your targets decreases, you can deregister targets.

**Edit**

**Registered targets**

Instance ID	Name	Port	Availability Zone	Status
i-048325709212190cb	Ec2WebServer02	80	us-west-2b	healthy (i)
i-0472a876e81359b30	Ec2WebServer01	80	us-west-2a	healthy (i)

**Availability Zones**

Availability Zone	Target count	Healthy?
us-west-2a	1	Yes
us-west-2b	1	Yes

### Edit load balancer attribute:

**Create Load Balancer** Actions

Filter by tags and attributes or search by keyword

Name	DNS name	State	VPC ID	Availability Zones	Type	Created At	Monitoring
myELB	myELB-7c26ed317d397629.elb.us-west-2.amazonaws.com	active	vpc-049a0094d899c131	us-west-2b, us-west-2a	network	September 3, 2019 at 2:48:4...	

Name myELB  
ARN arn:aws:elasticloadbalancing:us-west-2:742208007258:loadbalancer:net/myELB/7c26ed317d397629  
DNS name myELB-7c26ed317d397629.elb.us-west-2.amazonaws.com (A Record)  
State active  
Type network  
Scheme internet-facing  
IP address type ipv4  
VPC vpc-049a0094d899c131  
Availability Zones subnet-0c9994b2 (IPv4 address), subnet-0ede7a1f (IPv4 address)  
Hosted zone Z18D5FSROUN  
Creation time September 3, 2019

**Edit load balancer attributes**

Delete Protection ☐ Enable  
Cross-Zone Load Balancing ☒ Enable  
Access logs ☐ Enable

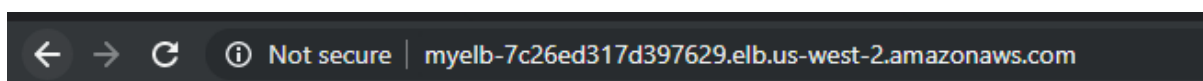
Regional data transfer charges may apply when cross-zone load balancing is enabled. See the documentation for more information.

Cancel Save

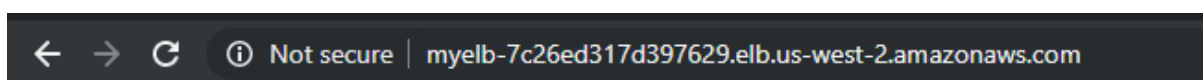
Attributes

Deletion protection Disabled  
Cross-Zone Load Balancing Disabled  
Access logs Disabled

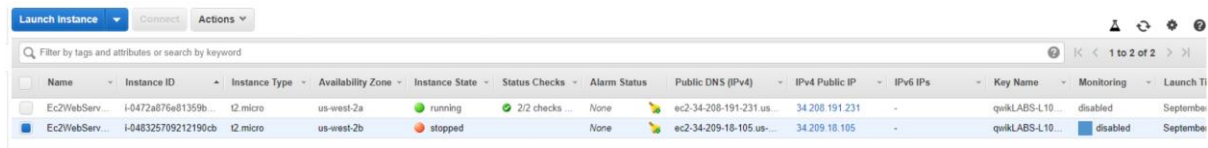
Edit attributes



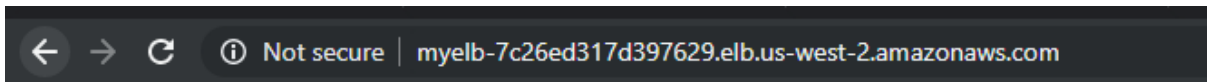
Test Website - EC2 Instance 2



Test Website - EC2 Instance 1

**Stop second instance:**


Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6 IPs	Key Name	Monitoring	Launch Time
Ec2WebServ...	i-0472a876e81359b...	t2.micro	us-west-2a	running	2/2 checks ...	None	ec2-34-208-191-231.us...	34.208.191.231	-	qwikLABS-L10...	disabled	September...
Ec2WebServ...	i-048325709212190cb	t2.micro	us-west-2b	stopped	-	None	ec2-34-209-18-105.us...	34.209.18.105	-	qwikLABS-L10...	disabled	September...



Test Website - EC2 Instance 1

**Conclusion:**

We have understood the concept of load balancer and implemented on AWS with Qwiklab with two ec2 instances and understood how to manage load balancer in AWS.