

Name - Yash Lakhtariya
Enrollment number - 21162101012
Branch - CBA Batch - 71
CCE Practical 3

Scenario : When designing a system, you use the principle of "design for failure and nothing will fail". Implement the AWS Service and Resources to achieve this design principle.

This lab walks you through using the Elastic Load Balancing (ELB) to load balance.

Elastic Load Balancing automatically distributes incoming application traffic across multiple Amazon EC2 instances. It enables you to achieve fault tolerance in your applications by seamlessly providing the required amount of load balancing capacity needed to route application traffic.

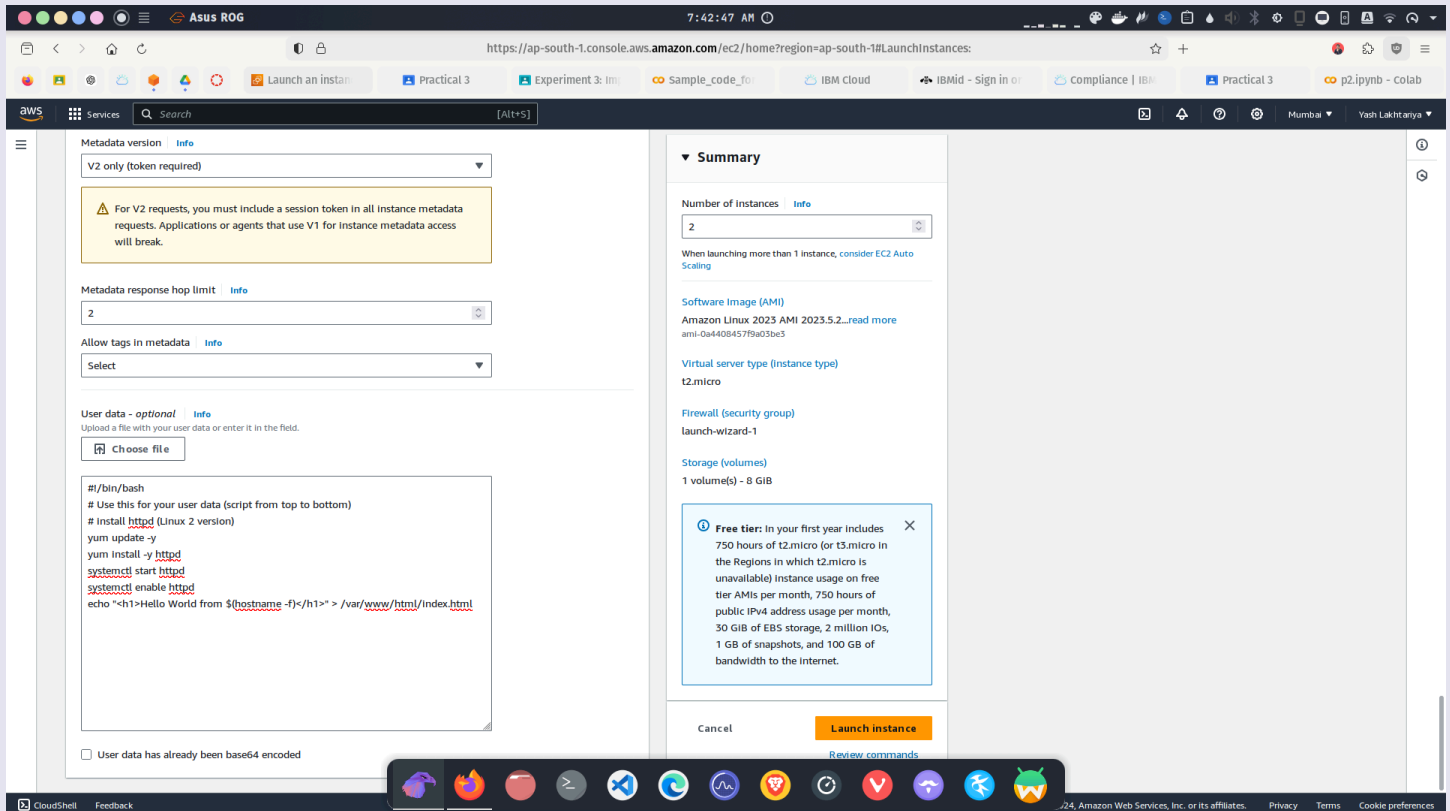
Refer scenario attached herewith & perform the following tasks :

- 1. Create Application Load Balance to balance HTTP traffic**
- 2. Create Network Load Balance to balance HTTP traffic**

Name - Yash Lakhtariya
Enrollment number - 21162101012
Branch - CBA Batch - 71
CCE Practical 3

Screenshots and steps :

Launch 2 or more instances with http enabled security group and html server script



Name - Yash Lakhtariya
Enrollment number - 21162101012
Branch - CBA Batch - 71
CCE Practical 3

Instances | EC2 | Ap-South-1 - Firefox Web Browser

7:43:22 AM

https://ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#instances:

Instances | EC2 | Practical 3 | Experiment 3: imi | Sample_code_for | IBM Cloud | IBMid - Sign in or | Compliance | IBM | Practical 3 | p2.ipynb - Colab



Services Search [Alt+S]

Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations

▼ Images
AMIs
AMI Catalog

▼ Elastic Block Store
Volumes
Snapshots
Lifecycle Manager

▼ Network & Security
Security Groups
Elastic IPs
Placement Groups
Key Pairs
Network Interfaces

▼ Load Balancing
Load Balancers
Target Groups 
Trust Stores 

▼ Auto Scaling
Auto Scaling Groups

Instances (2) info

Find Instance by attribute or tag (case-sensitive) All states

<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
<input type="checkbox"/>	p3-elb	i-013f22bb711c0a545	Pending	t2.micro	-	View alarms	ap-south-1b	ec2-13-200-246-211.ap-...	13.200.246.211	-
<input type="checkbox"/>	p3-elb	i-0db396e57a83dde1d	Running	t2.micro	-	View alarms	ap-south-1b	ec2-65-0-20-207.ap-sou...	65.0.20.207	-

Select an instance

CloudShell Feedback

© 2024, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Step 1 Create Target...P | EC2 | Ap-South-1 - Firefox Web Browser

7:44:01 AM

https://ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#CreateTargetGroup:

Step 1 Create tar | Practical 3 | Experiment 3: imi | Sample_code_for | IBM Cloud | IBMid - Sign in or | Compliance | IBM | Practical 3 | p2.ipynb - Colab

Services Search [Alt+S]

EC2 > Target groups > Create target group

Step 1
Specify group details

Step 2
Register targets

Specify group details

Your load balancer routes requests to the targets in a target group and performs health checks on the targets.

Basic configuration

Settings in this section can't be changed after the target group is created.

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

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

CloudShell Feedback

© 2024, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Name - Yash Lakhtariya
Enrollment number - 21162101012
Branch - CBA Batch - 71
CCE Practical 3

Step 1 Create Target...P | EC2 | Ap-South-1 - Firefox Web Browser 7:44:19 AM

https://ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#CreateTargetGroup:

Step 1 Create tar Practical 3 Experiment 3: lim Sample_code_for IBM Cloud IBMid - Sign in or Compliance | IBM Practical 3 p2.ipynb - Colab

Target group name

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

Protocol : Port

Choose a protocol for your target group that corresponds to the Load Balancer type that will route traffic to it. Some protocols now include anomaly detection for the targets and you can set mitigation options once your target group is created. This choice cannot be changed after creation.

HTTP 80 1-65535

IP address type

Only targets with the indicated IP address type can be registered to this target group.

☒ IPv4

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.

☐ IPv6

Each instance you register must have an assigned primary IPv6 address. This is configured on the instance's default network interface (eth0). [Learn more](#)

VPC

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.

vpc-06e30c5bf80152480
IPv4 VPC CIDR: 172.31.0.0/16

Protocol version

☒ HTTP1

Send requests to targets using HTTP/1.1. Supported when the request protocol is HTTP/1.1 or HTTP/2.

☐ HTTP2

Send requests to targets using HTTP/2. Supported when the request protocol is HTTP/2 or gRPC, but gRPC-specific features are not available.

☐ gRPC

Send requests to targets using gRPC. Supported when the request protocol is gRPC.

Health checks

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

CloudShell Feedback © 2024, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Step 2 Create Target...P | EC2 | Ap-South-1 - Firefox Web Browser 7:45:01 AM

https://ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#CreateTargetGroup:

Step 2 Create tar Practical 3 Experiment 3: lim Sample_code_for IBM Cloud IBMid - Sign in or Compliance | IBM Practical 3 p2.ipynb - Colab

Available instances (2)

Filter instances

<input type="checkbox"/>	Instance ID	Name	State	Security groups	Zone	Private IPv4 address
<input type="checkbox"/>	i-013f22bb711c0a545	p3-elb	Running	launch-wizard-1	ap-south-1b	172.31.7.177
<input type="checkbox"/>	i-0db396e57a83dde1d	p3-elb	Running	launch-wizard-1	ap-south-1b	172.31.3.205

0 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

2 selections are now pending below. Include more or register targets when ready.

Review targets

Targets (2)

Filter targets ☐ Show only pending

Remove all pending

Instance ID	Name	Port	State	Security groups	Zone	Private IPv4 address	Subnet ID	Launch time
i-013f22bb711c0a545	p3-elb	80	Running	launch-wizard-1	ap-south-1b	172.31.7.177	subnet-0adfd56bde1531893	August 12, 2024, 07:42 (UTC+05:30)
i-0db396e57a83dde1d	p3-elb	80	Running	launch-wizard-1	ap-south-1b	172.31.3.205	subnet-0adfd56bde1531893	August 12, 2024, 07:42 (UTC+05:30)

2 pending

Cancel Previous Create target group

CloudShell Feedback © 2024, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Name - Yash Lakhtariya
Enrollment number - 21162101012
Branch - CBA Batch - 71
CCE Practical 3

Load Balancers | EC2 | Ap-South-1 - Firefox Web Browser

7:45:26 AM

https://ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#LoadBalancers:

Load balancers | Practical 3 | Experiment 3: imi | Sample_code_for | IBM Cloud | IBMid - Sign in or | Compliance | IBM | Practical 3 | p2.ipynb - Colab

Services [Alt+S]

Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations

Images
AMIs
AMI Catalog

Elastic Block Store
Volumes
Snapshots
Lifecycle Manager

Network & Security
Security Groups
Elastic IPs
Placement Groups
Key Pairs
Network Interfaces

Load Balancing
Load Balancers
Target Groups
Trust Stores New

Auto Scaling
Auto Scaling Groups

Settings

EC2 > Load balancers

Load balancers

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

Filter load balancers

1

Name	DNS name	State	VPC ID	Availability Zones	Type	Date created
No load balancers						
You don't have any load balancers in ap-south-1						
Create load balancer						

0 load balancers selected

Select a load balancer above.

CloudShell Feedback

© 2024, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Compare And Select L...R | EC2 | Ap-South-1 - Firefox Web Browser

7:45:51 AM

https://ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#SelectCreateELBWizard:

compare and sel | Practical 3 | Experiment 3: imi | Sample_code_for | IBM Cloud | IBMid - Sign in or | Compliance | IBM | Practical 3 | p2.ipynb - Colab

Services [Alt+S]

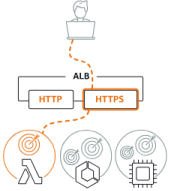
EC2 > Load balancers > Compare and select load balancer type

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

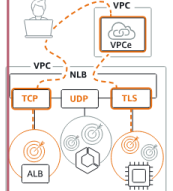


Choose an Application Load Balancer when you need a flexible feature set for your applications with HTTP and HTTPS traffic.

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.

[Create](#)

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](#)

CloudShell Feedback

© 2024, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Name - Yash Lakhtariya
Enrollment number - 21162101012
Branch - CBA Batch - 71
CCE Practical 3

Create Application Load Balancer | EC2 | Ap-South-1 - Firefox Web Browser

7:48:41 AM

https://ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#CreateALBWizard:

Services Search [Alt+S]

How Application Load Balancers work

Basic configuration

Load balancer name

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

p3-alb

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. Compatible with the IPv4 and Dualstack IP address types.

Load balancer IP address type Info

Select the front-end IP address type to assign to the load balancer. The VPC and subnets mapped to this load balancer must include the selected IP address types. Public IPv4 addresses have an additional cost.

☒ IPv4

Includes only IPv4 addresses.

☐ Dualstack

Includes IPv4 and IPv6 addresses.

☐ Dualstack without public IPv4

Includes a public IPv6 address, and private IPv4 and IPv6 addresses. Compatible with Internet-facing load balancers only.

Network mapping

Info

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

VPC Info

The load balancer will exist and scale within the selected VPC. The selected VPC is also where the load balancer targets must be hosted unless routing to Lambda or on-premises targets, or if using VPC peering. To confirm the VPC for your targets, view [target groups](#). For a new VPC, [create a VPC](#).

vpc-06e30c5bf80152480

IPv4 VPC CIDR: 172.31.0.0/16

CloudShell Feedback

© 2024, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Create Application Load Balancer | EC2 | Ap-South-1 - Firefox Web Browser

7:48:57 AM

https://ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#CreateALBWizard:

Services Search [Alt+S]

vpc-06e30c5bf80152480

IPv4 VPC CIDR: 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.

Availability Zones

☒ ap-south-1a (aps1-az1)

Subnet

subnet-04de51459fbd12e78

IPv4 subnet CIDR: 172.31.32.0/20

IPv4 address Assigned by AWS

☒ ap-south-1b (aps1-az3)

Subnet

subnet-0adfd36bde1531893

IPv4 subnet CIDR: 172.31.0.0/20

IPv4 address Assigned by AWS

☐ ap-south-1c (aps1-az2)

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

launch-wizard-1

sg-0262e476e6bde937c VPC: vpc-06e30c5bf80152480

CloudShell Feedback

© 2024, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Name - Yash Lakhtariya
Enrollment number - 21162101012
Branch - CBA Batch - 71
CCE Practical 3

Create Application Load Balancer | EC2 | Ap-South-1 - Firefox Web Browser

7:49:14 AM

https://ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#CreateALBWizard:

Services Search [Alt+S]

Select up to 5 security groups

launch-wizard-1
sg-0262e476eebde937c VPC: vpc-06e30c5bf80152480

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 p3-elb-tg
Target type: Instance, IPv4
Create target group

Listener tags - optional
Consider adding tags to your listeners. 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

► Load balancer tags - optional
Consider adding tags to your load balancer. Tags enable you to categorize your AWS resources so you can more easily manage them. The 'Key' is required, but 'Value' is optional. For example, you can have Key = production-webserver, or Key = webserver, and Value = production.

Optimize with service integrations - optional
Optimize your load balancing architecture by integrating AWS services with this load balancer at launch. You can also add these and other services after your load balancer is created by reviewing the load balancer's 'Integrations' tab.

CloudShell Feedback

© 2024, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Load Balancers | EC2 | Ap-South-1 - Firefox Web Browser

7:53:34 AM

https://ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#LoadBalancers:

Services Search [Alt+S]

EC2 Dashboard
EC2 Global View
Events

▼ Instances
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations

▼ Images
AMIs
AMI Catalog

▼ Elastic Block Store
Volumes
Snapshots
Lifecycle Manager

▼ Network & Security
Security Groups
Elastic IPs
Placement Groups
Key Pairs
Network Interfaces

▼ Load Balancing
Load Balancers

EC2 > Load balancers

Load balancers (1/1)

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

Filter load balancers

Name	DNS name	State	VPC ID	Availability Zones	Type	Date created
p3-alb	p3-alb-869232005.ap-south-1.elb.amazonaws.com	Active	vpc-06e30c5bf80152480	2 Availability Zones	application	August 12, 2024, 07:50 (UTC+05:30)

open in new tab

Load balancer: p3-alb

Details | Listeners and rules | Network mapping | Resource map - new | Security | Monitoring | Integrations | Attributes | Tags

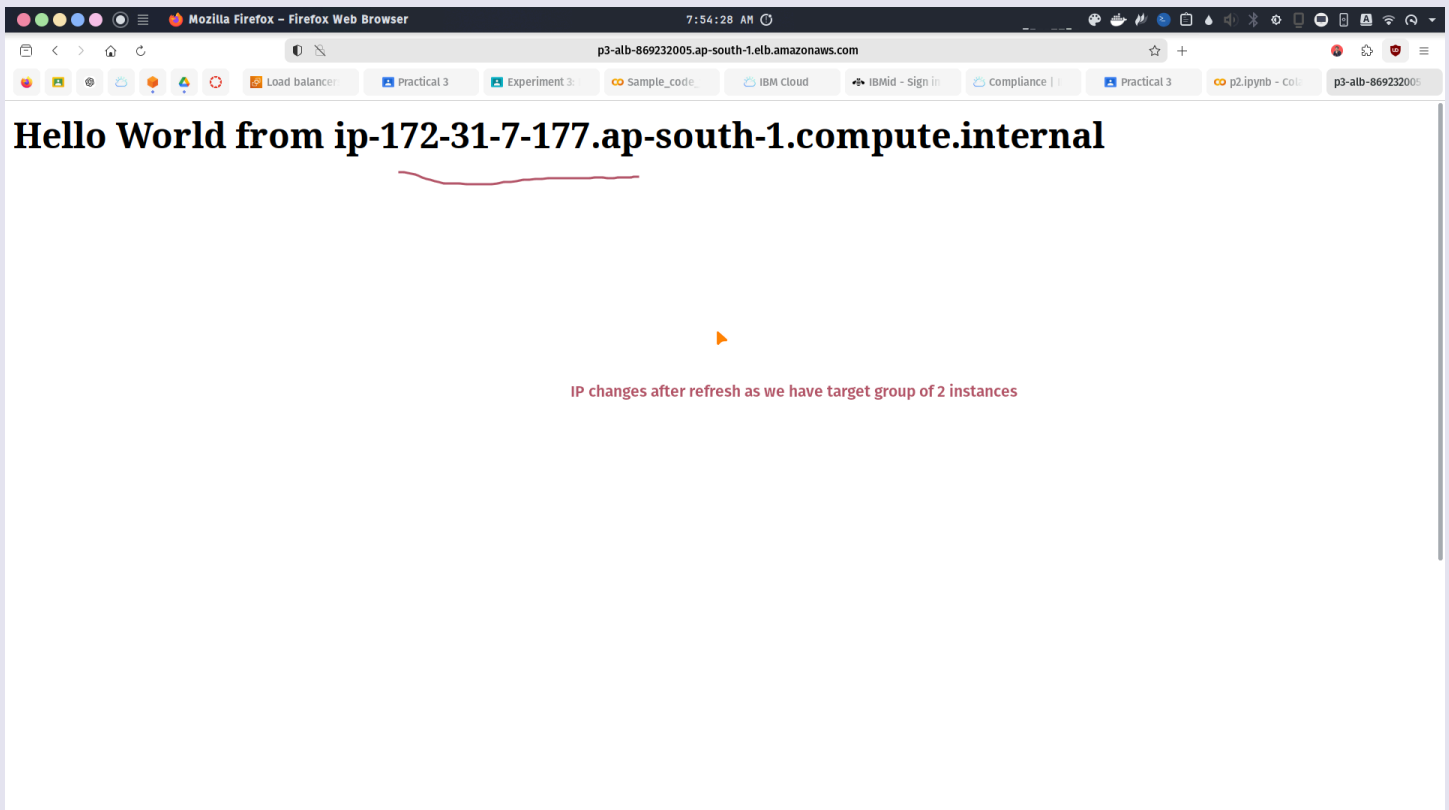
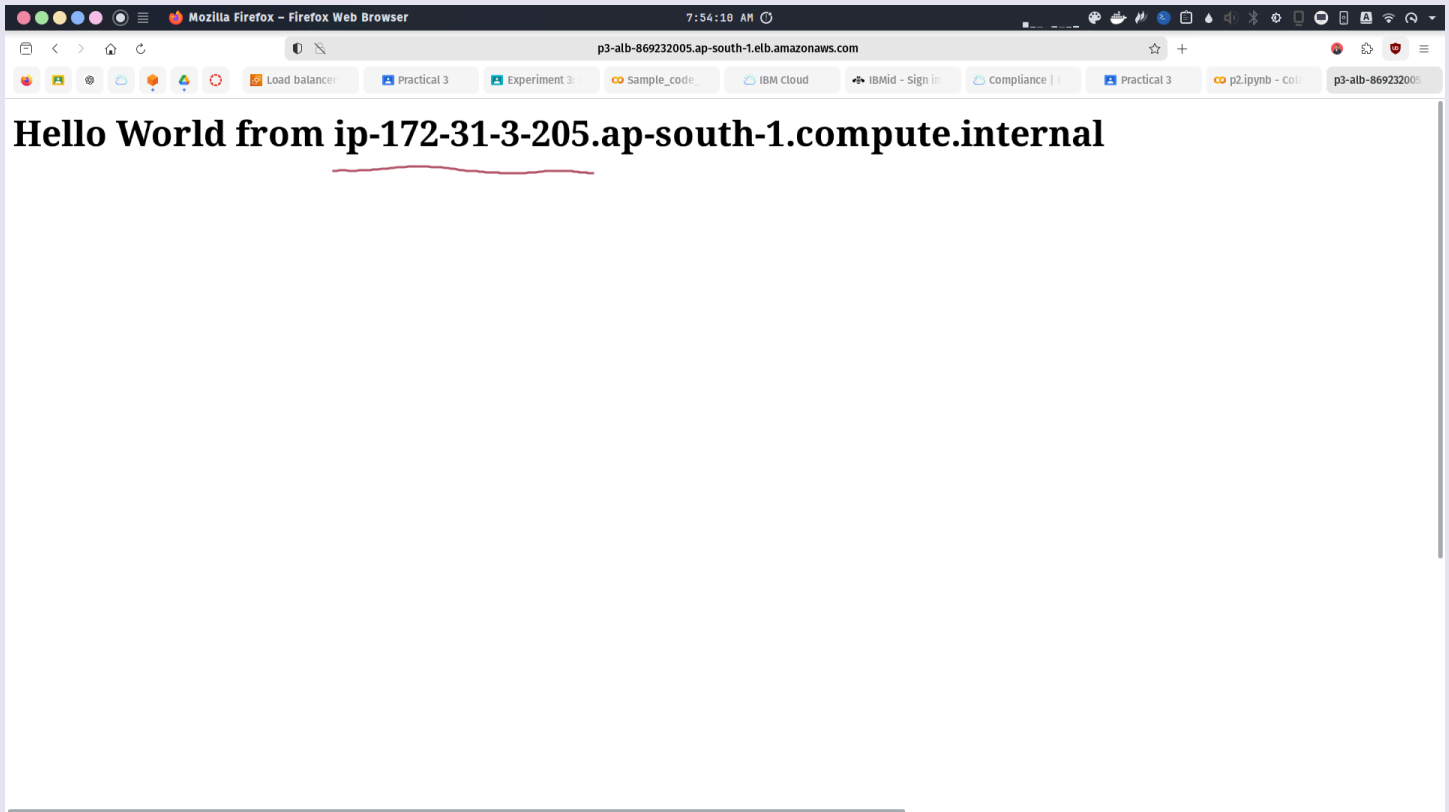
Details

Load balancer type Application	Status Active	VPC vpc-06e30c5bf80152480	Load balancer IP address type IPv4
Scheme Internet-facing	Hosted zone ZP97RAFLXTN2K	Availability Zones subnet-0a4fd36bde1531893 ap-south-1b (aps1-az3) subnet-04de51459fbd12e78 ap-south-1a (aps1-az1)	Date created August 12, 2024, 07:50 (UTC+05:30)
Load balancer ARN arn:aws:elasticloadbalancing:ap-south-1:730335462491:loadbalancer/app/p3-alb/f8720eb941ad12f0	DNS name info p3-alb-869232005.ap-south-1.elb.amazonaws.com (A Record)		

CloudShell Feedback

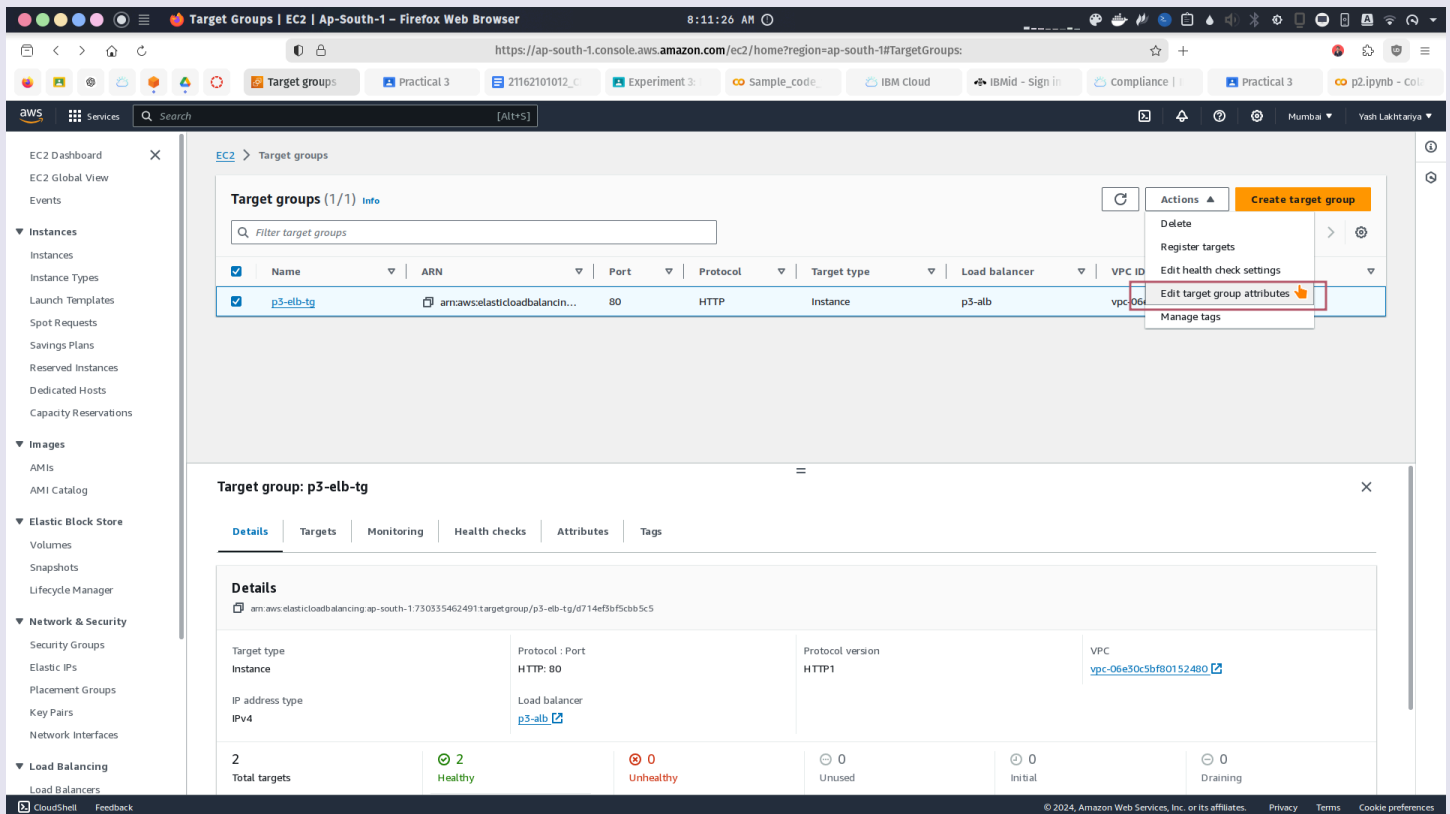
© 2024, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Name - Yash Lakhtariya
Enrollment number - 21162101012
Branch - CBA Batch - 71
CCE Practical 3



Name - Yash Lakhtariya
Enrollment number - 21162101012
Branch - CBA Batch - 71
CCE Practical 3

Sticky sessions are necessary for reducing latency due to TCP handshake again and again, so to turn it ON, visit target group attributes



The screenshot shows the AWS Management Console interface for the 'Target groups' page. The left sidebar contains navigation links for EC2 Dashboard, EC2 Global View, Events, Instances, Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Capacity Reservations, Images, AMIs, AMI Catalog, Elastic Block Store, Volumes, Snapshots, Lifecycle Manager, Network & Security, Security Groups, Elastic IPs, Placement Groups, Key Pairs, Network Interfaces, Load Balancing, and Load Balancers. The main content area displays a table of target groups. The 'p3-elb-tg' target group is selected, and the 'Edit target group attributes' option is highlighted in the Actions menu. The details for the 'p3-elb-tg' target group are shown below the table.

Name	ARN	Port	Protocol	Target type	Load balancer	VPC ID
p3-elb-tg	arn:aws:elasticloadbalancing:ap-south-1:730335462491:targetgroup/p3-elb-tg/d714ef5b5f5cbb5c5	80	HTTP	Instance	p3-alb	vpc-06e30c5bfb0152480

Target group: p3-elb-tg

Details

arn:aws:elasticloadbalancing:ap-south-1:730335462491:targetgroup/p3-elb-tg/d714ef5b5f5cbb5c5

Target type	Protocol : Port	Protocol version	VPC
Instance	HTTP: 80	HTTP1	vpc-06e30c5bfb0152480
IP address type	Load balancer		
IPv4	p3-alb		

2 Total targets

2 Healthy

0 Unhealthy

0 Unused

0 Initial

0 Draining

Name - Yash Lakhtariya
Enrollment number - 21162101012
Branch - CBA Batch - 71
CCE Practical 3

the targets vary in processing capability.
Not compatible with the **Slow start duration** attribute

☐ **Weighted random - new**
Weighted random routes requests evenly across healthy targets, in a random order. While Anomaly detection is applied by default, you must turn on **Anomaly mitigation** for Automatic Target Weights (ATW) to apply.

Slow start duration
Slow start duration is used to specify a period of time where newly registered targets are placed in slow start mode and receive a lower number of requests, giving them time to ramp up. When the slow start duration expires, the load balancer can send the target a full share of requests.

seconds
30-900 seconds or 0 to disable. Not compatible with the **Least outstanding requests** and **Weighted random** routing algorithms.

Target selection configuration

Stickness [Info](#)
Stickness allows the load balancer to bind a user's session to a specific target within the target group. The stickiness type differs based on the type of cookie used.

☒ **Turn on stickiness**
*Not compatible with the **Weighted random** routing algorithm. Can't be turned on if **Cross-zone load balancing** is off.*

Stickness type

☒ **Load balancer generated cookie**
☐ **Application-based cookie**

Stickness duration **Unit of time**

1 second - 7 days

Cross-zone load balancing [Info](#)
Cross-zone load balancing can be configured for each target group or inherited from the load balancer.

Inherit settings from load balancer attributes
Uses the cross-zone settings from the Application Load Balancer attributes - On by default.

► **Target group health requirements** [Info](#)
Specify the target group health requirements and the resulting actions when the minimum is not met.

Hello World from ip-172-31-7-177.ap-south-1.compute.internal

Name - Yash Lakhtariya
Enrollment number - 21162101012
Branch - CBA Batch - 71
CCE Practical 3

