

CITS5503 Lab5

Wenxiao Zhang 22792191

Step 1: Configure a target group

For Choose a target type, select Instance to specify targets by instance ID

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 cannot 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.

For Target group name, enter a name for the target group.

Target group name

22792191-tg

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

Protocol

Port

HTTP

:

80

VPC

Select the VPC with the instances that you want to include in the target group.

-

vpc-0b754f714cd1af245

IPv4: 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.

the rest settings are set as default.

Successfully created target group: 22792191-tg



EC2 > Target groups

Target groups (8) [Info](#)



Actions

Create target group

Search or filter target groups

< 1 >

<input type="checkbox"/>	Name	ARN	Port	Protocol	Target type	Load balancer	VPC ID
<input type="checkbox"/>	00108973-targets	arn:aws:elasticloadbalancin...	80	HTTP	Instance	None associated	vpc-0b754f714cd1
<input type="checkbox"/>	22792191-tg	arn:aws:elasticloadbalancin...	80	HTTP	Instance	None associated	vpc-0b754f714cd1
<input type="checkbox"/>	22955548-tg	arn:aws:elasticloadbalancin...	80	HTTP	Instance	22955548-lb	vpc-0b754f714cd1
<input type="checkbox"/>	23145758-tg	arn:aws:elasticloadbalancin...	80	HTTP	Instance	None associated	vpc-0b754f714cd1

=

Step 2: Register targets

Create 2 ec2 instances using aws console:

The first one named **22792191 - a**, availability zone is **ap-southeast-2a** key pair **22792191-key**, port 80, security group **22792191-sg**

EC2 > Instances > Launch an instance

Launch an instance [Info](#)

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

Name and tags [Info](#)

Name

22792191 - a

[Add additional tags](#)

Key pair name - *required*

22792191-key



Create new key pair

▼ Network settings [Info](#)

VPC - *required* [Info](#)

vpc-0b754f714cd1af245
172.31.0.0/16

(default)



Subnet [Info](#)

subnet-0c8d82bdb5c9398b6

VPC: vpc-0b754f714cd1af245 Owner: 523265914192

Availability Zone: ap-southeast-2a IP addresses available: 4082 CIDR: 172.31.0.0/20



Create new subnet



Auto-assign public IP [Info](#)

Enable



Firewall (security groups) [Info](#)

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

☐ Create security group

☒ Select existing security group

Common security groups [Info](#)

Select security groups



Compare security group rules

22792191-sg sg-0625d7c77737ad40c ✕

VPC: vpc-0b754f714cd1af245

Security groups that you add or remove here will be added to or removed from all your network interfaces.

The second one named **22792191 - b**, availability zone is **ap-southeast-2b** key pair **22792191-key**, port 80, security group **22792191-sg**

Launch an instance [Info](#)

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

Name and tags [Info](#)

Name

22792191 - b

Add additional tags

▼ Key pair (login) [Info](#)

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - *required*

22792191-key



[Create new key pair](#)

▼ Network settings [Info](#)

VPC - *required* [Info](#)

vpc-0b754f714cd1af245
172.31.0.0/16

(default) ▼



Subnet [Info](#)

subnet-0b15987d0f01c421f
VPC: vpc-0b754f714cd1af245 Owner: 523265914192
Availability Zone: ap-southeast-2b IP addresses available: 4062
CIDR: 172.31.32.0/20



[Create new subnet](#)

Auto-assign public IP [Info](#)

Enable ▼

Firewall (security groups) [Info](#)

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

☐ Create security group

☒ Select existing security group

Common security groups [Info](#)

Select security groups ▼



[Compare security group rules](#)

22792191-sg sg-0625d7c77737ad40c ✕
VPC: vpc-0b754f714cd1af245

Register targets using the created 2 instances

[EC2](#) > [Target groups](#) > [22792191-tg](#) > Register targets

Register targets

Select instances, specify ports, and add the instances to the list of pending targets. Repeat to add additional combinations of instances and ports to the list of pending targets. Once you are satisfied with your selections, click Register pending targets.

Available instances (2/21)

Q Filter resources by property or value

2 matches

< 1 > ⚙

"22792191" ✕

Clear filters

<input checked="" type="checkbox"/>	Instance ID ▼	Name ▼	State ▼	Security groups	Zone ▼	IPv4 address	Subnet ID ▼
<input checked="" type="checkbox"/>	i-041b265977e769947	22792191 - a	🟢 running	22792191-sg	ap-southeast-2a	52.62.65.98	subnet-0c8d82bdb5c9398b6
<input checked="" type="checkbox"/>	i-0c352acc6dedbbf7	22792191 - b	🟢 running	22792191-sg	ap-southeast-2b	54.79.52.138	subnet-0b15987d0f01c421f

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)										Remove all pending
All	Filter resources by property or value									< 1 > ⚙
Remove	Health status	Instance ID	Name	Port	State	Security groups	Zone	IPv4 address	Subnet ID	
×	Pending	i-0c352acc6dedbbf7	22792191 - b	80	running	22792191-sg	ap-southeast-2b	54.79.52.138	subnet-0b15987d0f01c421f	
×	Pending	i-041b265977e769947	22792191 - a	80	running	22792191-sg	ap-southeast-2a	52.62.65.98	subnet-0c8d82bdb5c9398b6	

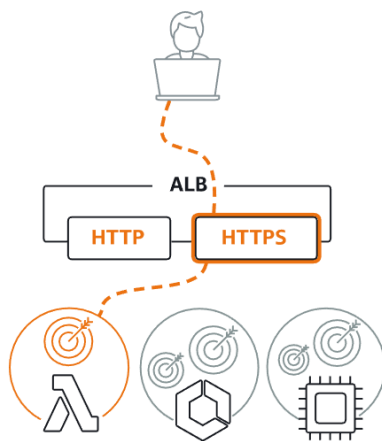
2 pending

Cancel Register pending targets

Step 3: Configure a load balancer and a listener

Under Application Load Balancer, choose Create

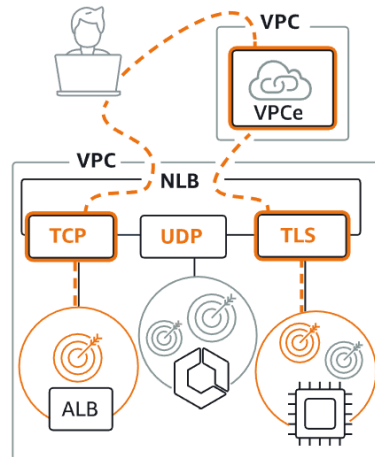
Application Load Balancer Info



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

Basic configuration

Naming the load balancer: 22792191-lb

scheme: internet-facing

IP address type: IPv4

Basic configuration

Load balancer name

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

22792191-lb

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

Scheme [Info](#)

Scheme cannot 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.

Network mapping

select 2 Availability Zones and corresponding subnets: 'ap-southeast-2a' and 'ap-southeast-2b'

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. Only VPCs with an internet gateway are enabled for selection. The selected VPC cannot be changed after the load balancer is created. To confirm the VPC for your targets, view your [target groups](#).

-
vpc-0b754f714cd1af245
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.

☒ ap-southeast-2a

Subnet

subnet-0c8d82bdb5c9398b6

IPv4 settings

Assigned by AWS

☒ ap-southeast-2b

Subnet

subnet-0b15987d0f01c421f

IPv4 settings

Assigned by AWS

Security Group

select an existing security group '22792191-sg'

Security groups [Info](#)

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

Security groups

Select up to 5 security groups

Create new security group [↗](#)

22792191-sg sg-0625d7c77737ad40c [✕](#)
VPC: vpc-0b754f714cd1af245

Listeners and routing

use default settings

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

Port

Default action [Info](#)

HTTP ▼

:

80

Forward to 22792191-tg

HTTP ▼

1-65535

Target type: Instance, IPv4

Create target group [↗](#)

Add listener

Summary and Create

Summary

Review and confirm your configurations. [Estimate cost](#) [↗](#)

Basic configuration [Edit](#)

22792191-lb

- Internet-facing
- IPv4

Security groups [Edit](#)

- 22792191-sg [↗](#)
sg-0625d7c77737ad40c [↗](#)

Network mapping [Edit](#)

VPC [↗](#)
vpc-0b754f714cd1af245 [↗](#)

- ap-southeast-2a [↗](#)
subnet-0c8d82bdb5c9398b6 [↗](#)
- ap-southeast-2b [↗](#)
subnet-0b15987d0f01c421f [↗](#)

Listeners and routing [Edit](#)

- HTTP:80 defaults to 22792191-tg [↗](#)

Add-on services [Edit](#)

None

Tags [Edit](#)

None

Attributes

[i](#) 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

successful page:

✔ Successfully created load balancer: **22792191-lb**

Note: It might take a few minutes for your load balancer to be fully set up and ready to route traffic. Targets will also take a few minutes to complete the registration process and pass initial health checks.

EC2 > Load balancers > Create Application Load Balancer

Create Application Load Balancer



Suggested next steps

- Review, customize, or enable attributes for your load balancer and listeners using the **Description** and **Listeners** tabs within **22792191-lb**.
- Discover other services that you can integrate with your load balancer. Visit the **Integrated services** tab within **22792191-lb**.

[View load balancer](#)

Install **apache2** to instance **22792191** - a:

```
moebuta@Lenovo-MoeBuTa:~/2022s2/cits5503/labs/lab2$ aws ec2 describe-instances --instance-ids i-041b265977e769947 --query 'Reservations[0].Instances[0].PublicIpAddress'
"52.62.65.98"
moebuta@Lenovo-MoeBuTa:~/2022s2/cits5503/labs/lab2$ ssh -i 22792191-key.pem ubuntu@52.62.65.98
The authenticity of host '52.62.65.98 (52.62.65.98)' can't be established.
ECDSA key fingerprint is SHA256:GifKPvFHqOqg84crSW8g2D6HFI6qBJ1tMqZWCsD6amM.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '52.62.65.98' (ECDSA) to the list of known hosts.
Welcome to Ubuntu 20.04.4 LTS (GNU/Linux 5.13.0-1029-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Mon Sep 12 16:03:23 UTC 2022

System load:  0.09          Processes:            104
Usage of /:   19.2% of 7.58GB Users logged in:       0
Memory usage: 21%          IPv4 address for eth0: 172.31.0.113
Swap usage:   0%

1 update can be applied immediately.
To see these additional updates run: apt list --upgradable

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
```

```
ubuntu@ip-172-31-0-113:~$ sudo apt-get update
Hit:1 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu focal-updates InRelease
Reading package lists... Done
ubuntu@ip-172-31-0-113:~$ sudo apt-get install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
```


Install `apache2` to instance `22792191 - b`:

```
moebuta@Lenovo-MoeBuTa:~/2022s2/cits5503/labs/lab2$ aws ec2 describe-instances --instance-ids i-0c352accc6dedbbf7 --query 'Reservations[0].Instances[0].PublicIpAddress'
"54.79.52.138"
moebuta@Lenovo-MoeBuTa:~/2022s2/cits5503/labs/lab2$ ssh -i 22792191-key.pem ubuntu@54.79.52.138
The authenticity of host '54.79.52.138 (54.79.52.138)' can't be established.
ECDSA key fingerprint is SHA256:ktG8deYyZDimFE7m5HtP8TJ9r4aDSbQcFN/m/eTkIYs.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '54.79.52.138' (ECDSA) to the list of known hosts.
Welcome to Ubuntu 20.04.4 LTS (GNU/Linux 5.13.0-1029-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Mon Sep 12 16:09:33 UTC 2022

System load:  0.0          Processes:      102
Usage of /:   19.5% of 7.58GB Users logged in:  0
Memory usage: 21%         IPv4 address for eth0: 172.31.43.221
Swap usage:   0%

1 update can be applied immediately.
To see these additional updates run: apt list --upgradable

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.



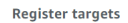



To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-43-221:~$ sudo apt-get update
```

```
ubuntu@ip-172-31-43-221:~$ sudo apt-get update
Hit:1 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu focal-updates InRelease [48.4 kB]
Get:3 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu focal-backports InRelease [48.4 kB]
```

```
ubuntu@ip-172-31-43-221:~$ sudo apt-get install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
```

Check registered targets

Registered targets (2)								  	
<input type="text" value="Filter resources by property or value"/>								< 1 > 	
<input type="checkbox"/>	Instance ID	Name	Port	Zone	Health status	Health status details			
<input type="checkbox"/>	i-041b265977e769947	22792191 - a	80	ap-southeast-2a	 healthy				
<input type="checkbox"/>	i-0c352accc6dedbbf7	22792191 - b	80	ap-southeast-2b	 healthy				

Step 4: Test the load balancer

Choose Targets and verify that the instances are ready.

EC2 > Target groups > 22792191-tg

22792191-tg

Actions

Details

arn:aws:elasticloadbalancing:ap-southeast-2:523265914192:targetgroup/22792191-tg/0aef1c111ae1b650

Target type	Protocol : Port	Protocol version	VPC
Instance	HTTP: 80	HTTP1	vpc-0b754f714cd1af245
IP address type	Load balancer		
IPv4	22792191-lb		

Total targets	Healthy	Unhealthy	Unused	Initial	Draining
2	2	0	0	0	0

Targets

Monitoring

Health checks

Attributes

Tags

Registered targets (2)

Filter resources by property or value

< 1 >

	Instance ID	Name	Port	Zone	Health status	Health status details
<input type="checkbox"/>	i-041b265977e769947	22792191 - a	80	ap-southeast-2a	healthy	
<input type="checkbox"/>	i-0c352acc6dedbbf7	22792191 - b	80	ap-southeast-2b	healthy	

Select the new created load balancer

search : 22792191 Add filter

	Name	DNS name	State	VPC ID	Availability Zones	Type
<input checked="" type="checkbox"/>	22792191-lb	22792191-lb-707575599.ap-southeast-2.elb.amazonaws.com	Active	vpc-0b754f714cd1af245	ap-southeast-2b, ap-southeast-2a	application

Load balancer: 22792191-lb

Description

Listeners

Monitoring

Integrated services

Tags

Basic Configuration

Name	22792191-lb
ARN	arn:aws:elasticloadbalancing:ap-southeast-2:523265914192:loadbalancer/app/22792191-lb/f7cbf086a46fa4a5
DNS name	22792191-lb-707575599.ap-southeast-2.elb.amazonaws.com (A Record)
State	Active
Type	application
Scheme	internet-facing
IP address type	ipv4
VPC	vpc-0b754f714cd1af245
Availability Zones	subnet-0b15987d0f01c421f - ap-southeast-2b subnet-0c8d82bdb5c9398b6 - ap-southeast-2a
Hosted zone	Z1GM3OXH4ZPM65
Creation time	September 12, 2022 at 6:15:13 PM UTC+8

Choose Description and copy the DNS name of the load balancer

http://22792191-lb-707575599.ap-southeast-2.elb.amazonaws.com/



ubuntu

Apache2 Ubuntu Default Page

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
```

- `apache2.conf` is the main configuration file. It puts the pieces together by including all remaining configuration files when starting up the web server.
- `ports.conf` is always included from the main configuration file. It is used to determine the listening ports for incoming connections, and this file can be customized anytime.
- Configuration files in the `mods-enabled/`, `conf-enabled/` and `sites-enabled/` directories contain particular configuration snippets which manage modules, global configuration fragments, or virtual host configurations, respectively.
- They are activated by symlinking available configuration files from their respective `*-available/` counterparts. These should be managed by using our helpers `a2enmod`, `a2dismod`, `a2ensite`, `a2dissite`, and `a2enconf`, `a2disconf`. See their respective man pages for detailed information.
- The binary is called `apache2`. Due to the use of environment variables, in the default configuration, `apache2` needs to be started/stopped with `/etc/init.d/apache2` or `apache2ctl`. **Calling `/usr/bin/apache2` directly will not work** with the default configuration.

Delete load balancer and terminate ec2 instances

Delete Load Balancer



Are you sure you want to delete the following load balancer?

- 22792191-lb

Cancel

Yes, Delete

Create Load Balancer

Actions


search : 22792191

Add filter


<input type="checkbox"/>	Name	DNS name	State	VPC ID	Availability Zones	Type
No results found. Please alter your search.						

terminate 22792191 - a

Terminate instance?

 On an EBS-backed instance, the default action is for the root EBS volume to be deleted when the instance is terminated. Storage on any local drives will be lost.


Are you sure you want to terminate these instances?

 i-041b265977e769947 (22792191 - a)

To confirm that you want to terminate the instances, choose the terminate button below. Terminating the instance cannot be undone.

Cancel

Terminate

 Successfully terminated i-041b265977e769947

terminate 22792191 - b

×

⚠ On an EBS-backed instance, the default action is for the root EBS volume to be deleted when the instance is terminated. Storage on any local drives will be lost.

Are you sure you want to terminate these instances?
📄 i-0c352accc6dedbbf7 (22792191 - b)
To confirm that you want to terminate the instances, choose the terminate button below. Terminating the instance cannot be undone.

Cancel Terminate

✔ Successfully terminated i-0c352accc6dedbbf7