

High Availability and Scalability: ELB & ASG



High Availability and Scalability

Scalability & High Availability

- Scalability means that an application / system can handle greater loads by adapting.
- There are two kinds of scalability:
 - Vertical Scalability
 - Horizontal Scalability (= elasticity)
- Scalability is linked but different to High Availability
- Let's deep dive into the distinction, using a call center as an example

Vertical Scalability

- Vertically scalability means increasing the size of the instance
- For example, your application runs on a t2.micro
- Scaling that application vertically means running it on a t2.large
- Vertical scalability is very common for non distributed systems, such as a database.
- RDS, ElastiCache are services that can scale vertically.
- There's usually a limit to how much you can vertically scale (hardware limit)



junior operator

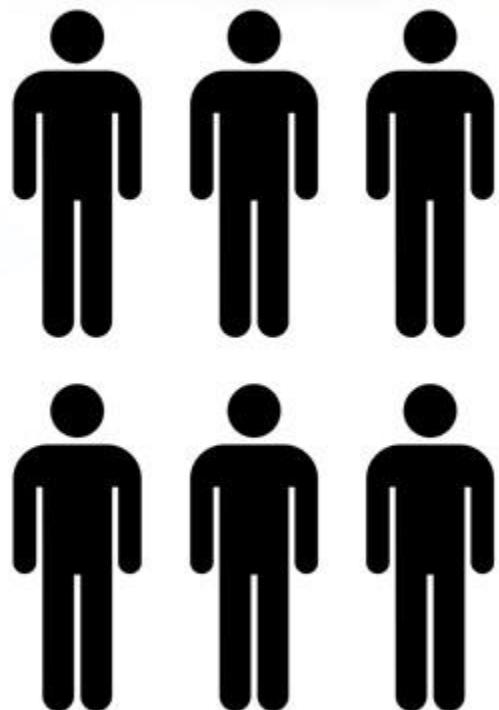


senior operator

Horizontal Scalability

- Horizontal Scalability means increasing the number of instances / systems for your application
- Horizontal scaling implies distributed systems.
- This is very common for web applications/ modern applications
- It's easy to horizontally scale thanks the cloud offerings such as Amazon EC2

operator operator operator



operator operator operator

High Availability

- High Availability usually goes hand in hand with horizontal scaling
- High availability means running your application / system in at least 2 data centers (== Availability Zones)
- The goal of high availability is to survive a data center loss
- The high availability can be passive (for RDS Multi AZ for example)
- The high availability can be active (for horizontal scaling)



High Availability & Scalability For EC2

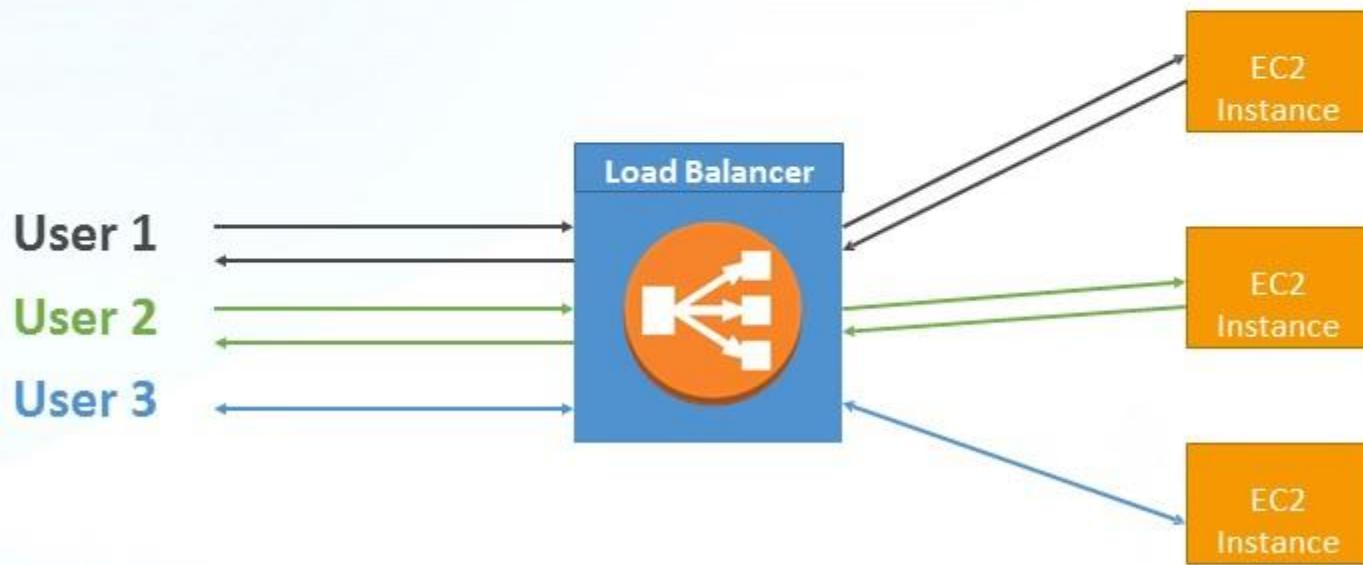
- Vertical Scaling: Increase instance size (= scale up / down)
 - From: t2.nano - 0.5G of RAM, 1 vCPU
 - To: u-12tb1.metal – 12.3 TB of RAM, 448 vCPUs
- Horizontal Scaling: Increase number of instances (= scale out / in)
 - Auto Scaling Group
 - Load Balancer
- High Availability: Run instances for the same application across multi AZ
 - Auto Scaling Group multi AZ
 - Load Balancer multi AZ

Load Balancing Overview

What is load balancing?



- Load balancers are servers that forward internet traffic to multiple servers (EC2 Instances) downstream.



Why use a load balancer?

- Spread load across multiple downstream instances
- Expose a single point of access (DNS) to your application
- Seamlessly handle failures of downstream instances
- Do regular health checks to your instances
- Provide SSL termination (HTTPS) for your websites
- Enforce stickiness with cookies
- High availability across zones
- Separate public traffic from private traffic

Why use an EC2 Load Balancer?

- An ELB (EC2 Load Balancer) is a managed load balancer
 - AWS guarantees that it will be working
 - AWS takes care of upgrades, maintenance, high availability
 - AWS provides only a few configuration knobs
- It costs less to setup your own load balancer but it will be a lot more effort on your end.
- It is integrated with many AWS offerings / services

Types of load balancer on AWS

AWS has 3 kinds of Load Balancers

- Classic Load Balancer (v1 - old generation) - 2009
- Application Load Balancer (v2 - new generation) - 2016
- Network Load Balancer (v2 - new generation) - 2017
- Overall, it is recommended to use the newer / v2 generation load balancers as they provide more features
- You can setup internal (private) or external (public) ELBs

Health Checks

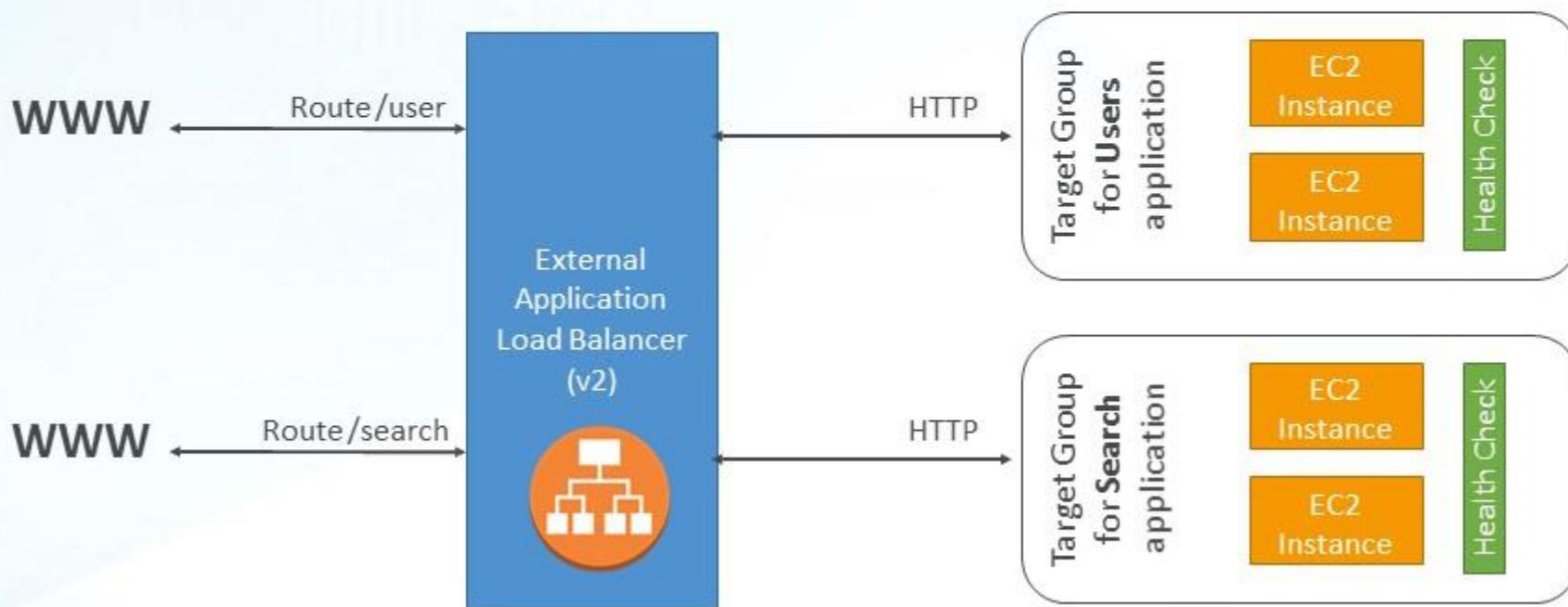
- Health Checks are crucial for Load Balancers
- They enable the load balancer to know if instances it forwards traffic to are available to reply to requests
- The health check is done on a port and a route (/health is common)
- If the response is not 200 (OK), then the instance is unhealthy



Application Load Balancer (v2)

- Application load balancers (Layer 7) allow to do:
 - Load balancing to multiple HTTP applications across machines (target groups)
 - Load balancing to multiple applications on the same machine (ex: containers)
 - Load balancing based on route in URL
 - Load balancing based on hostname in URL
- Basically, they're awesome for micro services & container-based application (example: Docker & Amazon ECS)
- Has a port mapping feature to redirect to a dynamic port
- In comparison, we would need to create one Classic Load Balancer per application before. That was very expensive and inefficient!

Application Load Balancer (v2) HTTP Based Traffic



Application Load Balancer v2 Good to Know

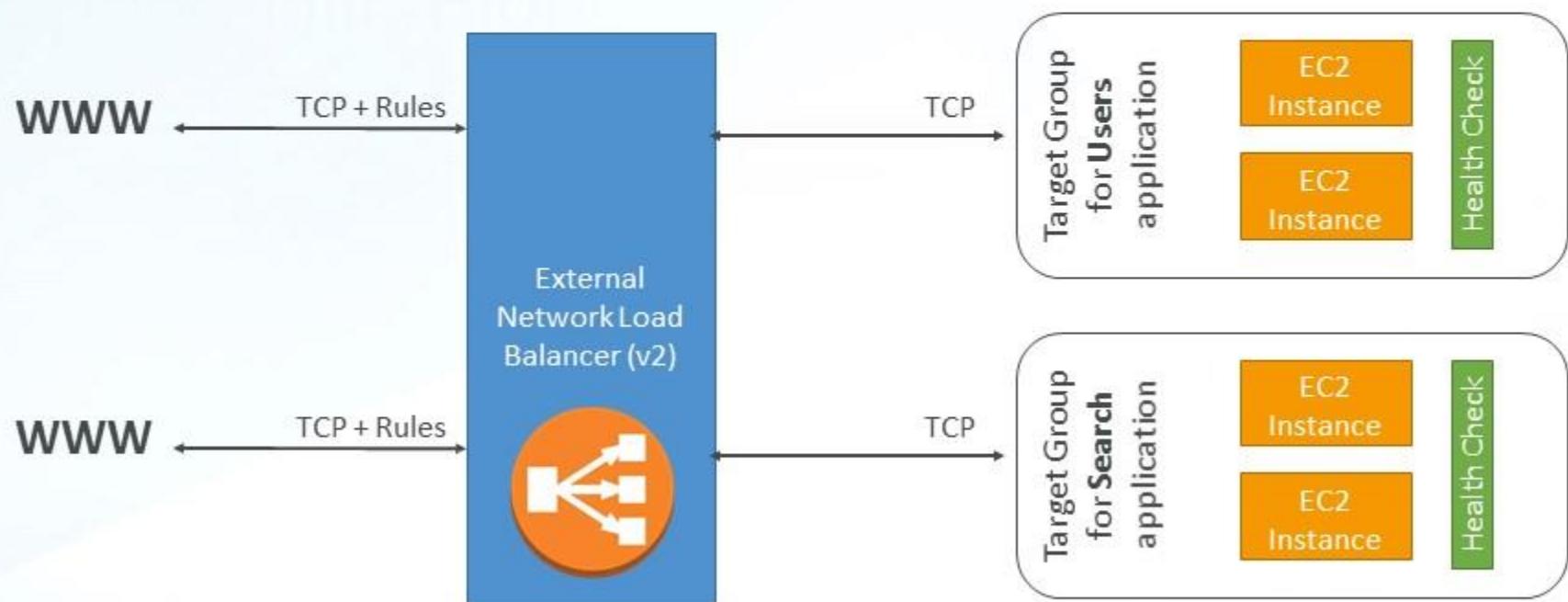
- Stickiness can be enabled at the target group level
 - Same request goes to the same instance
 - Stickiness is directly generated by the ALB (not the application)
- ALB support HTTP/HTTPS & Websockets protocols
- The application servers don't see the IP of the client directly
 - The true IP of the client is inserted in the header X-Forwarded-For
 - We can also get Port (X-Forwarded-Port) and proto (X-Forwarded-Proto)



Network Load Balancer (v2)

- Network load balancers (Layer 4) allow to do:
 - Forward TCP traffic to your instances
 - Handle millions of requests per second
 - Support for static IP or elastic IP
 - Less latency ~100 ms (vs 400 ms for ALB)
- Network Load Balancers are mostly used for extreme performance and should not be the default load balancer you choose
- Overall, the creation process is the same as Application Load Balancers

Network Load Balancer (v2) TCP Based Traffic



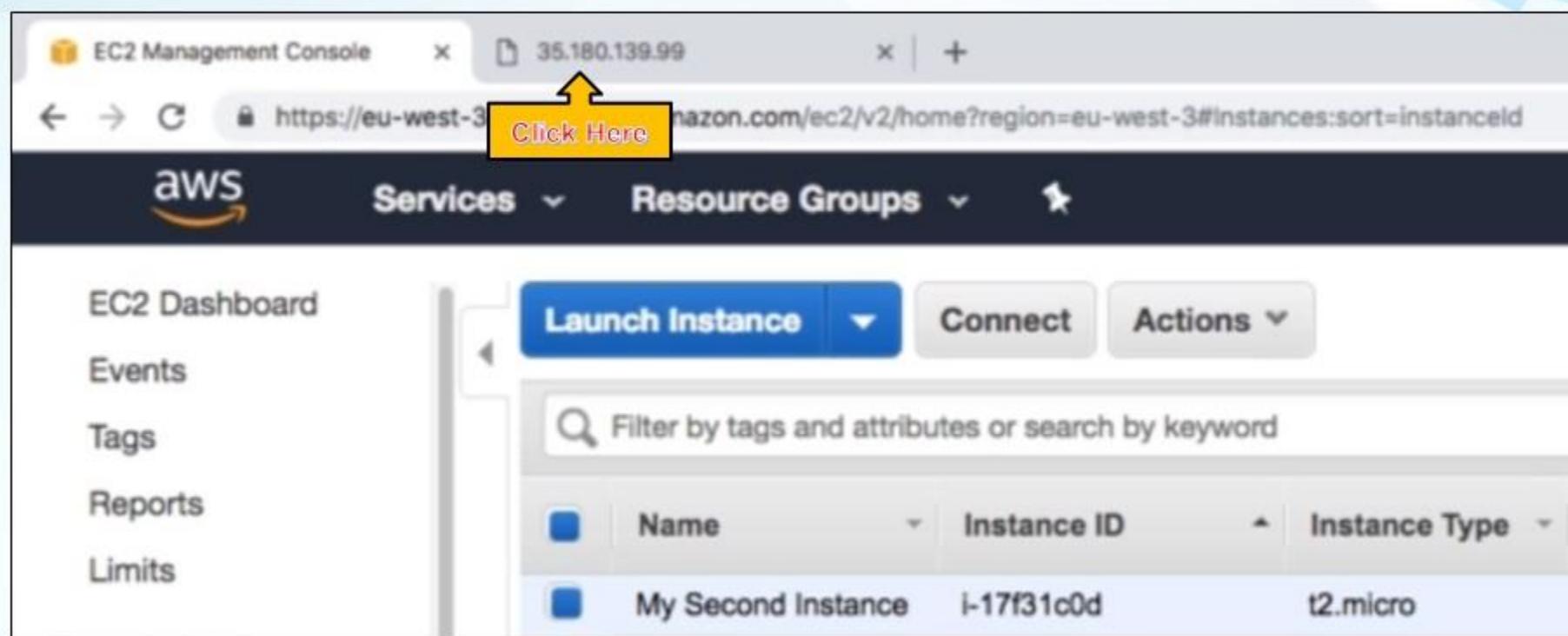
Load Balancer Good to Know

- Classic Load Balancers are Deprecated
 - Application Load Balancers for HTTP / HTTPs & Websocket
 - Network Load Balancer for TCP
- CLB, ALB & NLB support SSL certificates and provide SSL termination
- All Load Balancers have health check capability
- ALB can route based on hostname / path
- ALB is a great fit with ECS (Docker)

Load Balancer Good to Know

- Any Load Balancer (CLB, ALB, NLB) has a static hostname. Do not resolve and use underlying IP
- LBs can scale but not instantaneously – contact AWS for a “warm-up”
- NLB directly see the client IP
- 4xx errors are client induced errors
- 5xx errors are application induced errors
 - Load Balancer Errors 503 means at capacity or no registered target
- If the LB can't connect to your application, check your security groups!

Load Balancers - Hands On



EC2 Management Console 35.180.139.99 Click Here

https://eu-west-3.console.aws.amazon.com/ec2/v2/home?region=eu-west-3#instances:sort=instanceId

aws Services Resource Groups

EC2 Dashboard

Events

Tags

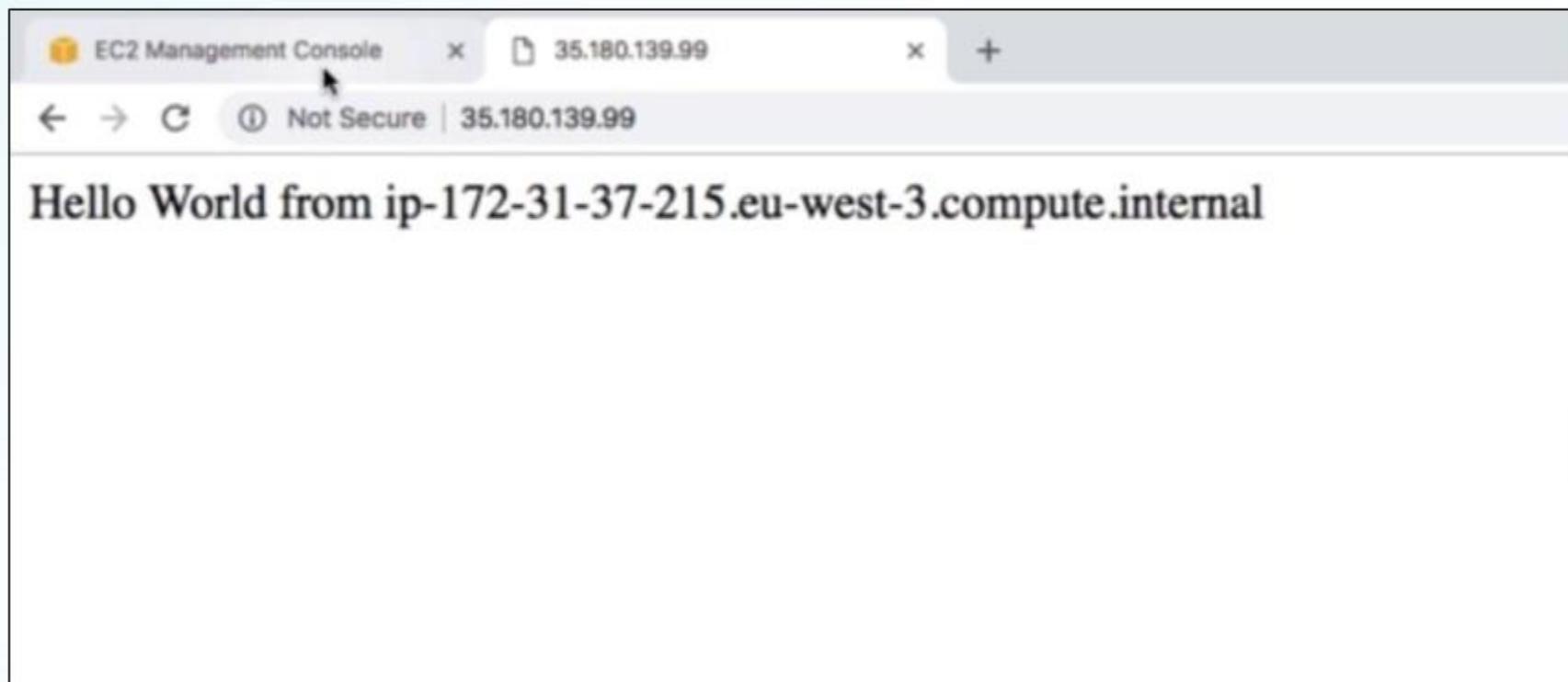
Reports

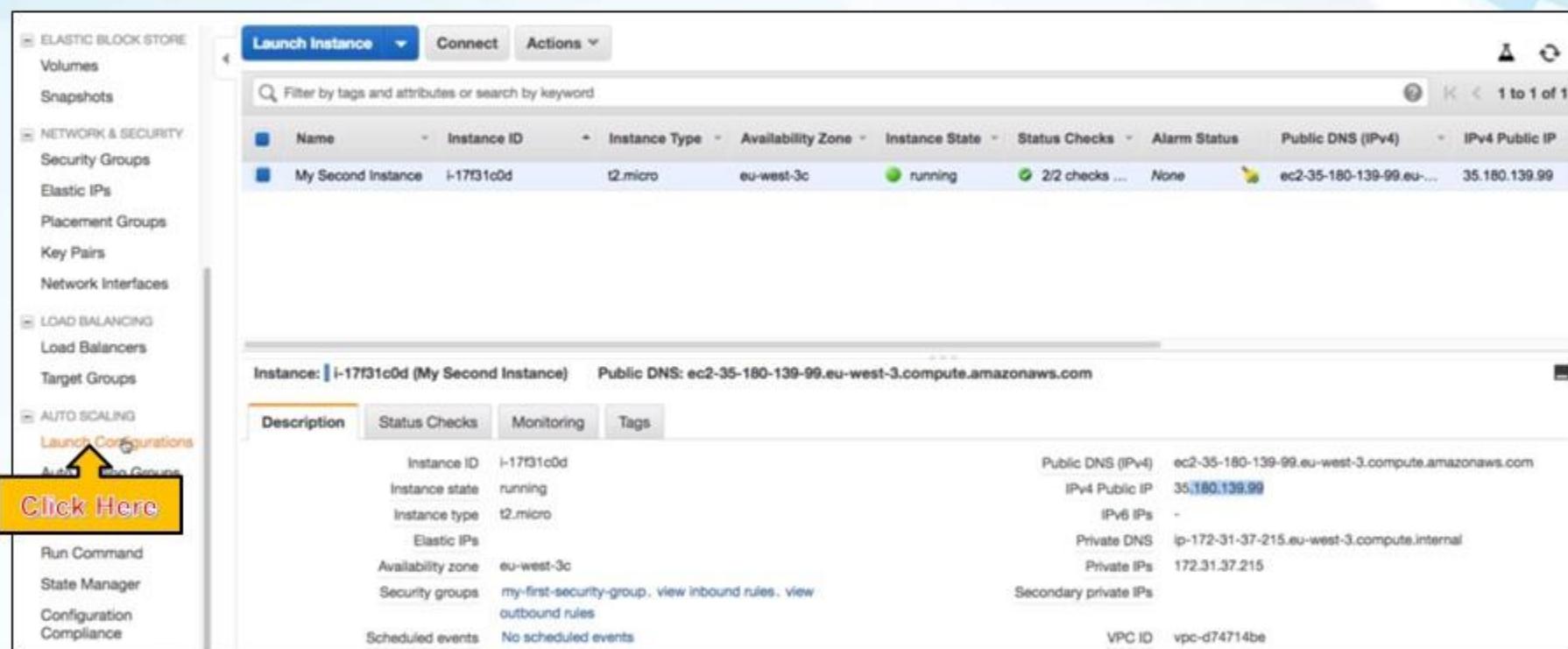
Limits

Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

	Name	Instance ID	Instance Type
<input checked="" type="checkbox"/>	My Second Instance	i-17f31c0d	t2.micro





Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

1 to 1 of 1

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP
My Second Instance	i-17f31c0d	t2.micro	eu-west-3c	running	2/2 checks ...	None	ec2-35-180-139-99.eu...	35.180.139.99

Instance: i-17f31c0d (My Second Instance) Public DNS: ec2-35-180-139-99.eu-west-3.compute.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID	i-17f31c0d	Public DNS (IPv4)	ec2-35-180-139-99.eu-west-3.compute.amazonaws.com
Instance state	running	IPv4 Public IP	35.180.139.99
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-172-31-37-215.eu-west-3.compute.internal
Availability zone	eu-west-3c	Private IPs	172.31.37.215
Security groups	my-first-security-group, view inbound rules, view outbound rules	Secondary private IPs	
Scheduled events	No scheduled events	VPC ID	vpc-d74714be

Launch Configurations

Auto Scaling

Run Command

State Manager

Configuration

Compliance

Click Here

ELASTIC BLOCK STORE

- Volumes
- Snapshots

NETWORK & SECURITY

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

LOAD BALANCING

- Load Balancers**
- Target Groups

AUTO SCALING

Create Load Balancer

Actions

Click Here

Search: Filter by tags and attributes or search by keyword

<input type="checkbox"/>	Name	DNS name	State
--------------------------	------	----------	-------

Select load balancer type

Elastic Load Balancing supports three types of load balancers: Application Load Balancers, Network Load Balancers (new), and Classic Load Balancers. Choose the load balancer type that meets your needs. Learn more about which load balancer is right for you.

Application Load Balancer

[Create](#)

Network Load Balancer

[Create](#)

Classic Load Balancer

PREVIOUS GENERATION

for HTTP, HTTPS, and TCP

[Create](#)

Choose an Application Load Balancer if you need a flexible feature set for your web application. Operating at the request level, Application Load Balancers provide advanced routing, TLS termination and visibility features targeted at application architectures, including microservices and containers.

[Learn more >](#)[Click Here](#)

Choose a Network Load Balancer when you need ultra-high performance and static IP addresses for your application. Operating at the connection level, Network Load Balancers are capable of handling millions of requests per second while maintaining ultra-low latencies.

[Learn more >](#)

Choose a Classic Load Balancer when you have an existing application running in the EC2-Classic network.

[Learn more >](#)

[1. Configure Load Balancer](#)[2. Configure Security Settings](#)[3. Configure Security Groups](#)[4. Configure Routing](#)[5. Register Targets](#)[6. 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 HTTP traffic on port 80.

Name	<input type="text" value="web-app-alb"/>
Scheme	<input checked="" type="radio"/> internet-facing <input type="radio"/> internal
IP address type	<input type="text" value="ipv4"/>

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
HTTP	80

[Add listener](#) X

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 must specify subnets from at least two Availability Zones to increase the availability of your load balancer.

[Cancel](#)[Next: Configure Security Settings](#)

Step 1: Configure Load Balancer

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

Load Balancer Protocol	Load Balancer Port
HTTP	80

[Add listener](#) X

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 must specify subnets from at least two Availability Zones to increase the availability of your load balancer.

VPC vpc-d74714be (172.31.0.0/16) (default)

Availability Zone	Subnet ID	Subnet IPv4 CIDR	Name
eu-west-3a	subnet-c2b2ccab	172.31.0.0/20	
eu-west-3b	subnet-3470e14f	172.31.16.0/20	
eu-west-3c	subnet-391dc774	172.31.32.0/20	

Tags

[Cancel](#) [Next: Configure Security Settings](#)

Click Here

[1. Configure Load Balancer](#) [2. Configure Security Settings](#) [3. Configure Security Groups](#) [4. Configure Routing](#) [5. Register Targets](#) [6. Review](#)

Step 2: Configure Security Settings

 Improve your load balancer's security. Your load balancer is not using any secure listener.

If your traffic to the load balancer needs to be secure, use the HTTPS protocol for your front-end connection. You can go back to the first step to add/configure secure listeners under [Basic Configuration](#) section. You can also continue with current settings.

[Cancel](#)

[Previous](#)

[Next: Configure Security Groups](#)

Click Here

[1. Configure Load Balancer](#)[2. Configure Security Settings](#)[3. Configure Security Groups](#)[4. Configure Routing](#)[5. Register Targets](#)[6. Review](#)

Step 3: Configure Security Groups

A security group is a set of firewall rules that control the traffic to your load balancer. On this page, you can add rules to allow specific traffic to reach your load balancer. First, decide whether to create a new security group or select an existing one.

Assign a security group:

- Create a new security group
- Select an existing security group

Security group name:

Description:

Type	Protocol	Port Range	Source
Custom TCP	TCP	80	Custom 0.0.0.0/0, ::/0

[Add Rule](#)[Cancel](#)[Previous](#)[Next: Configure Routing](#)

Click Here

Step 4: Configure Routing

Target group

Target group	<input type="text" value="New target group"/>
Name	<input type="text" value="my-apache-target-group"/>
Protocol	<input type="text" value="HTTP"/>
Port	<input type="text" value="80"/>
Target type	<input type="text" value="instance"/>

Health checks

Protocol	<input type="text" value="HTTP"/>
Path	<input type="text" value="/"/>

Advanced health check settings

Port	<input type="radio"/> traffic port <input type="radio"/> override
Healthy threshold	<input type="text" value="5"/>
Unhealthy threshold	<input type="text" value="2"/>
Timeout	<input type="text" value="5"/> seconds
Interval	<input type="text" value="30"/> seconds
Success codes	<input type="text" value="200"/>

Step 4: 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	<input type="text" value="New target group"/>
Name	<input type="text" value="my-apache-target-group"/>
Protocol	<input type="text" value="HTTP"/>
Port	<input type="text" value="80"/>
Target type	<input type="text" value="instance"/>

Health checks

Protocol	<input type="text" value="HTTP"/>
Path	<input type="text" value="/"/>

» Advanced health check settings

[Cancel](#) [Previous](#) [Next: Register Targets](#)

Click Here

1. Configure Load Balancer 2. Configure Security Settings 3. Configure Security Groups 4. Configure Routing 5. Register Targets 6. Review

Step 5: Register Targets

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.

[Browse](#)

Instance	Name	Port	State	Security groups	Zone
i-17f31c0d	My Second Instance	80	running	my-first-security-group	eu-west-3c

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

Name	State	Security groups	Zone	Subnet ID	Subnet CIDR
i-17f31c0d	running	my-first-security-group	eu-west-3c	subnet-391dc774	172.31.32.0/20

[Cancel](#) [Previous](#) [Next: Review](#)

Click Here

Click Here

Click Here

1. Configure Load Balancer 2. Configure Security Settings 3. Configure Security Groups 4. Configure Routing 5. Register Targets 6. Review

Step 6: Review

Listeners Port 80 - Protocol:HTTP

IP address type: IPv4
VPC: vpc-d74714be
Subnets: subnet-c2b2ccab, subnet-3470e14f, subnet-391dc774
Tags

Security groups [Edit](#)
Security groups: my-first-load-balancer

Routing [Edit](#)
Target group: New target group
Target group name: my-apache-target-group
Port: 80
Target type: instance
Protocol: HTTP
Health check protocol: HTTP
Path: /
Health check port: traffic port
Healthy threshold: 5
Unhealthy threshold: 2
Timeout: 5
Interval: 30
Success codes: 200

Targets [Edit](#)
Instances: i-17f31c0d (My Second Instance):80

[Cancel](#) [Previous](#) [Create](#)

Click Here

Load Balancer Creation Status

- ✓ Successfully created load balancer

Load balancer `web-app-alb` was successfully created.

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

[Close](#)

[Click Here](#)

Create Load Balancer Actions 

search : am:aws:elasticloadbalancing:eu-west-3... Add filter

Name	DNS name	State	VPC ID	Availability Zones	Type	Created At
web-app-alb	web-app-alb-307564896.eu...	provisioning	vpc-d74714be	eu-west-3b, eu-west-3c...	application	September...

Load balancer: web-app-alb

Description Listeners Monitoring Tags

Basic Configuration

Name:	web-app-alb	Creation time:	September 20, 2018 at 2:02:54 PM UTC+2
ARN:	arn:aws:elasticloadbalancing:eu-west-3:387124123361:loadbalancer/app/web-app-alb/bееed4cf9a13f1e9	Hosted zone:	Z3Q77PNBQS71R4
DNS name:	web-app-alb-307564896.eu-west-3.elb.amazonaws.com	State:	provisioning
Scheme:	internet-facing	IP address type:	ipv4
Type:	application	AWS WAF Web ACL:	An error occurred while a request was made to AWS WAF.
Availability Zones:	subnet-3470e14f - eu-west-3b, subnet-391dc774 - eu-west-3c, subnet-c2b2ccab - eu-west-3a		

[Edit availability zones](#)

Actions: [Create Load Balancer](#) [Actions](#)

search: arn:aws:elasticloadbalancing:eu-west-3:387124123361:loadbalancer/app/web-app-alb/bееed4cf9a13f1e9

Name	DNS name	Status	VPC ID	Availability Zones	Type	Created At
web-app-alb	web-app-alb-307564896.eu-west-3.elb.amazonaws.com	active	vpc-d74714be	eu-west-3b, eu-west-3c	application	September 20, 2018 at 2:02:54 PM UTC+2

Load balancer: web-app-alb

Description [Listeners](#) [Monitoring](#) [Tags](#)

Basic Configuration

Name:	web-app-alb	Creation time:	September 20, 2018 at 2:02:54 PM UTC+2
ARN:	arn:aws:elasticloadbalancing:eu-west-3:387124123361:loadbalancer/app/web-app-alb/bееed4cf9a13f1e9	Hosted zone:	Z3Q77PNBQS71R4
DNS name:	web-app-alb-307564896.eu-west-3.elb.amazonaws.com	State:	active
Scheme:	internet-facing	VPC:	vpc-d74714be
Type:	application	IP address type:	ipv4
Availability Zones:	subnet-3470e14f - eu-west-3b, subnet-391dc774 - eu-west-3c, subnet-c2b2ccab - eu-west-3a	AWS WAF Web ACL:	An error occurred while a request was made to AWS WAF.

[Edit availability zones](#)

Create Load Balancer Actions ▾

search : arn:aws:elasticloadbalancing:eu-west-3:... Add filter

Name	DNS name	State
web-app-alb	web-app-alb-307564896.eu-west-3.elb.amazonaws.com	active

Load balancer: web-app-alb

Description Listeners Monitoring Tags

Basic Configuration

Name: web-app-alb 

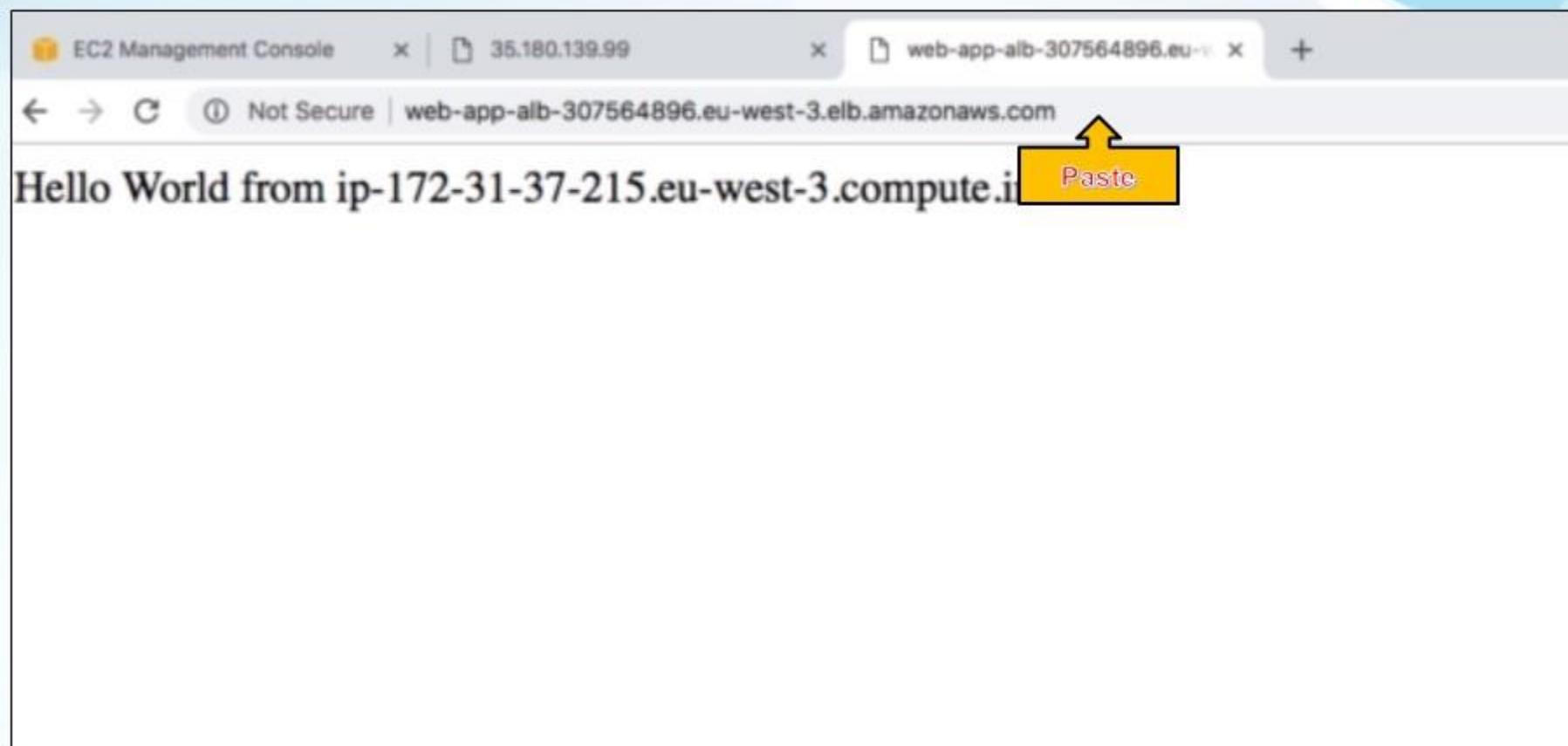
ARN: arn:aws:elasticloadbalancing:eu-west-3:387124123361:loadbalancer/app/web-app-alb/bееed4cf9a13f1e9 

DNS name: web-app-alb-307564896.eu-west-3.elb.amazonaws.com 

Scheme: internet-facing

Type: application





Actions 

search : am:aws:elasticloadbalancing:eu-west-3:... Add filter

1 to 1 of 1

Name	DNS name	State	VPC ID	Availability Zones	Type	Created At
web-app-alb	web-app-alb-307564896.eu...	active	vpc-d74714be	eu-west-3b, eu-west-3c...	application	September

Description Listeners Monitoring Tags

Basic Configuration

Name:	web-app-alb 	Creation time:	September 20, 2018 at 2:02:54 PM UTC+2
ARN:	arn:aws:elasticloadbalancing:eu-west-3:387124123361:loadbalancer/app/web-app-alb/beeed4cf9a13f1e9 	Hosted zone:	Z3Q77PNBQS71R4
DNS name:	web-app-alb-307564896.eu-west-3.elb.amazonaws.com 	State:	active
Scheme:	internet-facing	VPC:	vpc-d74714be
Type:	application	IP address type:	ipv4
Availability Zones:	subnet-3470e14f - eu-west-3b, subnet-391dc774 - eu-west-3c, subnet-c2b2ccab - eu-west-3a	AWS WAF Web ACL:	An error occurred while a request was made to AWS WAF.

[Edit availability zones](#)

Amazon CloudWatch Metrics

Create Load Balancer Actions

search : arn:aws:elasticloadbalancing:eu-west-3:... Add filter

1 to 1 of 1

Name	DNS name	State	VPC ID	Availability Zones	Type	Created At
web-app-alb	web-app-alb-307564896.eu...	active	vpc-d74714be	eu-west-3b, eu-west-3c...	application	September

NET WORK & SECURITY

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

LOAD BALANCING

Load Balancers

Target Groups

AUTO SCALING

Launch Configurations

Auto Scaling Groups

SYSTEMS MANAGER SERVICES

Run Command

State Manager

Configuration Compliance

Automations

Patch Compliance

Patch Baselines

SYSTEMS MANAGER SHARED RESOURCES

Managed Instances

Activations

Description **Listeners** Monitoring Tags

Basic Configuration

Click Here

ARN:	arn:aws:elasticloadbalancing:eu-west-3:387124123361:loadbalancer/app/web-app-alb/beeded4cf9a13f1e9	Creation time:	September 20, 2018 at 2:02:54 PM UTC+2
DNS name:	web-app-alb-307564896.eu-west-3.elb.amazonaws.com	Hosted zone:	Z3Q77PNBQS71R4
Scheme:	internet-facing	State:	active
Type:	application	VPC:	vpc-d74714be
Availability Zones:	subnet-3470e14f - eu-west-3b, subnet-391dc774 - eu-west-3c, subnet-c2b2ccab - eu-west-3a	IP address type:	ipv4
AWS WAF Web ACL: An error occurred while a request was made to AWS WAF.			

Edit availability zones



Create Load Balancer Actions

search : arn:aws:elasticloadbalancing:eu-west-3:... Add filter 1 to 1 of 1

Name	DNS name	State	VPC ID	Availability Zones	Type	Created At
web-app-alb	web-app-alb-307564896.eu...	active	vpc-d74714be	eu-west-3b, eu-west-3c...	application	September 20,

Load balancer: web-app-alb

Description **Listeners** Monitoring Tags

A listener checks for connection requests using its configured protocol and port, and the load balancer uses the listener rules to route requests to targets. You can add, remove, or update listeners and listener rules.

Add listener Edit Delete

Listener ID	Security policy	SSL Certificate	Rules
HTTP : 80 arn:...9c1fd062ff67cfb5	N/A	N/A	Default: forwarding to my-apache-target-group View/edit rules

Click Here

Screenshot of the AWS CloudWatch Metrics interface for a target group monitoring page.

Left Navigation Bar:

- NETWORK & SECURITY
 - Security Groups
 - Elastic IPs
 - Placement Groups
 - Key Pairs
 - Network Interfaces
- LOAD BALANCING
 - Load Balancers
 - Target Groups**
- AUTO SCALING
 - Launch Configurations
 - Auto Scaling Groups
- SYSTEMS MANAGER SERVICES
 - Run Command
 - State Manager
 - Configuration Compliance
 - Automations
 - Patch Compliance
 - Patch Baselines
- SYSTEMS MANAGER SHARED RESOURCES
 - Managed Instances
 - Activations

Header: Create target group Actions ▾

Search Bar: search : arn:aws:elasticloadbalancing:eu-west-3:... Add filter

Table Headers: Name, Port, Protocol, Target type, Load Balancer, VPC ID, Monitoring

Table Data:

Name	Port	Protocol	Target type	Load Balancer	VPC ID	Monitoring
my-apache-target-group	80	HTTP	instance	web-app-alb	vpc-d74714be	

Target group: my-apache-target-group

Monitoring Tab: Description, Targets, Health checks, **Monitoring**, Tags

CloudWatch Metrics Section:

Click **Click Here** to view CloudWatch metrics for the selected resources (a maximum of 10). Click on a graph to see an expanded view. All times shown are in UTC. [View all CloudWatch metrics](#)

Unhealthy Hosts (Count)	Healthy Hosts (Count)	Target Response Time (seconds)	Requests (Count)
1	1.25	1	1
0.75	1	0.75	0.75
0.5	0.75	0.5	0.5
0.25	0.5	0.25	0.25
0	0.25	0	0

Showing data for: Last Hour

Yellow Callout: Click Here

Create target group Actions ▾

search : arn:aws:elasticloadbalancing:eu-west-3:... Add filter

1 to 1 of 1

Name	Port	Protocol	Target type	Load Balancer	VPC ID	Monitoring
my-apache-target-group	80	HTTP	instance	web-app-alb	vpc-d74714be	

Target group: my-apache-target-group

Description Targets Health checks Monitoring Tags

The load balancer sends 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 more targets. If demand on your targets decreases, you can deregister targets.

Click Here

Edit

Registered targets

Instance ID	Name	Port	Availability Zone	Status
i-17f31c0d	My Second Instance	80	eu-west-3c	healthy ⓘ

Availability Zones

Availability Zone	Target count	Healthy?
eu-west-3c	1	Yes

Create target group Actions

search : am:aws:elasticloadbalancing:eu-west-3:... Add filter

Name	Port	Protocol	Target type
my-apache-target-group	80	HTTP	instance

Target group: my-apache-target-group

Description Targets **Health checks** Monitoring Tags

Click Here

Path	HTTP
Port	traffic port
Healthy threshold	5
Unhealthy threshold	2
Timeout	5
Interval	30
Success codes	200

Edit health check

EC2 Dashboard

Events

Tags

Reports

Limits

INSTANCES

- Instances
- Launch Templates
- Spot Requests
- Reserved Instances
- Dedicated Hosts

IMAGES

- AMIs
- Bundle Tasks

ELASTIC BLOCK STORE

- Volumes
- Snapshots

NETWORK & SECURITY

- Security Groups
- Elastic IP
- Click Here
- Network Interfaces

Create target group Actions

search : arn:aws:elasticloadbalancing:eu-west-3:... Add filter

1 to 1 of 1

Name	Port	Protocol	Target type	Load Balancer	VPC ID	Monitoring
my-apache-target-group	80	HTTP	instance	web-app-alb	vpc-d74714be	

Target group: my-apache-target-group

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-17f31c0d	My Second Instance	80	eu-west-3c	healthy ⓘ

Availability Zones

Availability Zone	Target count	Healthy?
eu-west-3c	1	Yes

Create Security Group Actions ▾

Filter by tags and attributes or search by keyword

Name	Group ID	Group Name	VPC ID	Description
sg-5df8bf35		my-first-load-balancer	vpc-d74714be	First ALB in the tutorial
sg-cd5b1fa5		my-first-security-group	vpc-d74714be	Created with my first EC2 Instance
sg-de480cb6		default	vpc-d74714be	default VPC security group

Security Group: sg-cd5b1fa5

Description Inbound Outbound Tags

Edit Click Here

Type	Protocol	Port Range	Source	Description
HTTP	TCP	80	0.0.0.0/0	Allow HTTP traffic...
SSH	TCP	22	0.0.0.0/0	SSH allowed from a...

Actions ▾

Filter by tags and attributes or search by keyword

1 to 3 of 3

Name	Group ID	Group Name	VPC ID	Description
sg-5df8bf35	my-first-load-balancer	vpc-d74714be	First ALB in the tutorial	
sg-cd5b1fa5	my-first-security-group	vpc-d74714be	Created with my first EC2 Instance	
sg-de480cb6	default	vpc-d74714be	default VPC security group	

Security Group: sg-cd5b1fa5

Description Inbound Outbound Tags

Edit

Click Here

	Protocol	Port Range	Source	Description
HTTP	TCP	80	0.0.0.0/0	Allow HTTP traffic...
SSH	TCP	22	0.0.0.0/0	SSH allowed from a...

Edit inbound rules

Type	Protocol	Port Range	Source	Description	Actions
HTTP	TCP	80	Custom	0.0.0.0/0	Allow HTTP traffic for... X
SSH	TCP	22	Custom	0.0.0.0/0	SSH allowed from anywh... X

Add Rule Cancel Save

NOTE: Any edits made on existing rules will result in the edited rule being deleted and a new rule created with the new details. This will cause traffic that depends on that rule to be dropped for a very brief period of time until the new rule can be created.

Edit inbound rules

Type	Protocol	Port Range	Source	Description	X
HTTP	TCP	80	Custom sg-5df8bf35	Allow HTTP traffic for Apache only from the LB	X
SSH	TCP	22	Custom 0.0.0.0/0	Allow SSH traffic from anywhere	X

Add Rule

NOTE: Any edits made on existing rules will result in the edited rule being deleted and a new rule created with the new details. This will cause traffic that depends on that rule to be dropped for a very brief period of time until the new rule can be created.

Cancel Save

Click Here

Reports

Limits

INSTANCES

- Instances
- Launch Templates
- Spot Requests
- Reserved Instances
- Dedicated Hosts

IMAGES

- AMIs
- Bundle Tasks

ELASTIC BLOCK STORE

- Volumes
- Snapshots

NETWORK & SECURITY

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

LOAD BALANCING

- Load Balancers**
- Target Groups

AUTO SCALING

Create Load Balancer Actions ▾

search : am:aws:elasticloadbalancing:eu-west-3... Add filter

1 to 1 of 1

Name	DNS name	State	VPC ID	Availability Zones	Type	Created At
web-app-alb	web-app-alb-307564896.eu...	active	vpc-d74714be	eu-west-3b, eu-west-3c...	application	September 20,

Load balancer: web-app-alb

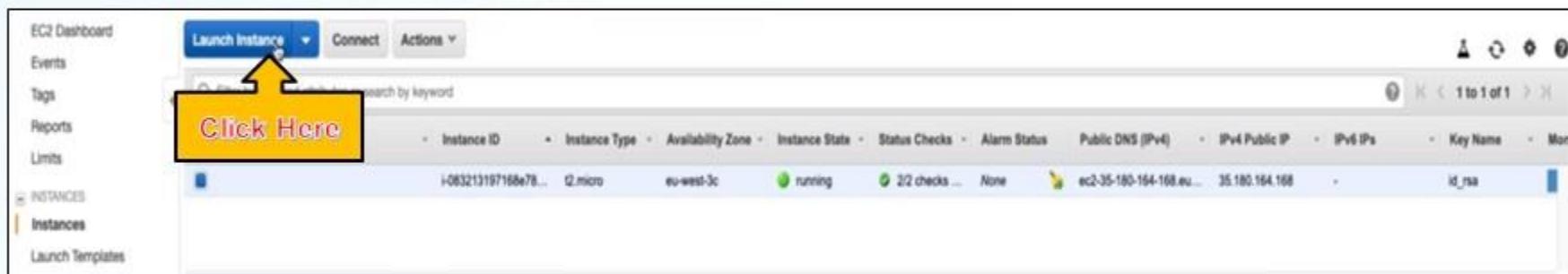
Description **Listeners** Monitoring Tags

A listener checks for connection requests using its configured protocol and port, and the load balancer uses the listener rules to route requests to targets. You can add, remove, or update listeners and listener rules.

Add listener Edit Delete

Listener ID	Security policy	SSL Certificate	Rules
HTTP : 80	N/A	N/A	Default: forwarding to my-apache-target-group View/edit rules

Adding Instances to our Load Balancer



A screenshot of the AWS EC2 Instances page. The page has a top navigation bar with 'Launch Instance', 'Connect', and 'Actions' buttons. Below the navigation is a search bar and a table of instances. The table columns are: Instance ID, Instance Type, Availability Zone, Instance State, Status Checks, Alarm Status, Public DNS (IPv4), IPv4 Public IP, IPv6 IPs, Key Name, and Mon. A single instance is listed with the following details: i-083213197168e78..., t2.micro, eu-west-3c, running, 2/2 checks ..., None, ec2-35-180-164-168.eu..., 35.180.164.168, -, id_rsa. On the left, a sidebar shows 'EC2 Dashboard', 'Events', 'Tags', 'Reports', 'Limits', and a 'INSTANCES' section with 'Instances' (selected) and 'Launch Templates'. A yellow box with the text 'Click Here' and an arrow pointing to the 'Launch Instance' button is overlaid on the top left of the page.

Step 1: Choose an Amazon Machine Image (AMI)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

Search for an AMI by entering a search term e.g. "Windows"

X

Quick Start

My AMIs

AWS Marketplace

Community AMIs

Free tier only ?

 Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-0ad0ddd3324248c4c	<input type="button" value="Select"/>
Amazon Linux <small>Free tier eligible</small> Amazon Linux 2 comes with five years support. It provides Linux kernel 4.14 tuned for optimal performance on Amazon EC2, systemd 219, GCC 7.3, Glibc 2.26, Binutils 2.29.1, and the latest software packages through extras. Root device type: ebs Virtualization type: hvm ENA Enabled: Yes	
 Amazon Linux AMI 2018.03.0 (HVM), SSD Volume Type - ami-05b83cd5a1b552734	<input type="button" value="Select"/>
Amazon Linux <small>Free tier eligible</small> The Amazon Linux AMI is an EBS-backed, AWS-supported image. The default image includes AWS command line tools, Python, Ruby, Perl, and Java. The repositories include Docker, PHP, MySQL, PostgreSQL, and other packages. Root device type: ebs Virtualization type: hvm ENA Enabled: Yes	64-bit (x86)
 SUSE Linux Enterprise Server 15 (HVM), SSD Volume Type - ami-01116bee807116cece	<input type="button" value="Select"/>
SUSE Linux <small>Free tier eligible</small> SUSE Linux Enterprise Server 15 (HVM), EBS General Purpose (SSD) Volume Type. Public Cloud, Advanced Systems Management, Web and Scripting, and Legacy modules enabled. Root device type: ebs Virtualization type: hvm ENA Enabled: Yes	64-bit (x86)
 Ubuntu Server 18.04 LTS (HVM), SSD Volume Type - ami-03bca18cb3dc173c9	<input type="button" value="Select"/>
Ubuntu Server 18.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical (http://www.ubuntu.com/cloud/services). Root device type: ebs Virtualization type: hvm ENA Enabled: Yes	64-bit (x86)
 Ubuntu Server 16.04 LTS (HVM), SSD Volume Type - ami-0a1e17334212f7052	<input type="button" value="Select"/>
Ubuntu Server 16.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical (http://www.ubuntu.com/cloud/services). Root device type: ebs Virtualization type: hvm ENA Enabled: Yes	64-bit (x86)

Click Here



Are you launching a database instance? Try Amazon RDS.

Amazon Relational Database Service (RDS) makes it easy to set up, operate, and scale your database on AWS by automating time-consuming database management tasks. With RDS, you can easily deploy Amazon Aurora, MariaDB, MySQL, Oracle, PostgreSQL, and SQL Server databases on AWS. Aurora is a MySQL- and PostgreSQL-compatible, enterprise-class database at 1/10th the cost of commercial databases. Learn more about RDS.

Hide

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 2: Choose an Instance Type

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. Learn more about instance types and how they can meet your computing needs.

Filter by: All Instance types ▾ Current generation ▾ Show/Hide Columns

Currently selected: t2.micro (Variable ECUs, 1 vCPU, 2.5 GHz, Intel Xeon Family, 1 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance	IPv6 Support
1	General purpose	t2.nano	1	0.5	EBS only	–	Low to Moderate	Yes
2	General purpose	t2.micro <small>For more details</small>	1	1	EBS only	–	Low to Moderate	Yes
3	General purpose	t2.small	1	2	EBS only	–	Low to Moderate	Yes
4	General purpose	t2.medium	2	4	EBS only	–	Low to Moderate	Yes
5	General purpose	t2.large	2	8	EBS only	–	Low to Moderate	Yes
6	General purpose	t2.xlarge	4	16	EBS only	–	Moderate	Yes
7	General purpose	t2.2xlarge	8	32	EBS only	–	Moderate	Yes
8	General purpose	t3.nano	2	0.5	EBS only	Yes	Up to 5 Gigabit	Yes
9	General purpose	t3.micro	2	1	EBS only	Yes	Up to 5 Gigabit	Yes
10	General purpose	t3.small	2	2	EBS only	Yes	Up to 5 Gigabit	Yes
11	General purpose	t3.medium	2	4	EBS only	Yes	Up to 5 Gigabit	Yes
12	General purpose	t3.large	2	8	EBS only	Yes	Up to 5 Gigabit	Yes
13	General purpose	t3.xlarge	4	16	EBS only	Yes	Up to 5 Gigabit	Yes
14	General purpose	t3.2xlarge	8	32	EBS only	Yes	Up to 5 Gigabit	Yes

Cancel Previous **Review and Launch** Next Configure Instance Details

Click Here

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 3: Configure Instance Details

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot Instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of Instances Launch into Auto Scaling Group

Purchasing option Request Spot Instances

Network

Subnet

Auto-assign Public IP

Placement group Add instance to placement group

Capacity Reservation

IAM role

Shutdown behavior

Enable termination protection Protect against accidental termination

Monitoring Enable CloudWatch detailed monitoring
Additional charges apply.

Tenancy Additional charges will apply for dedicated tenancy.

T2/T3 Unlimited Enable
Additional charges may apply.

» Advanced Details

Click Here

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Add Storage](#)

T2/T3 Unlimited (i)

Enable

Additional charges may apply

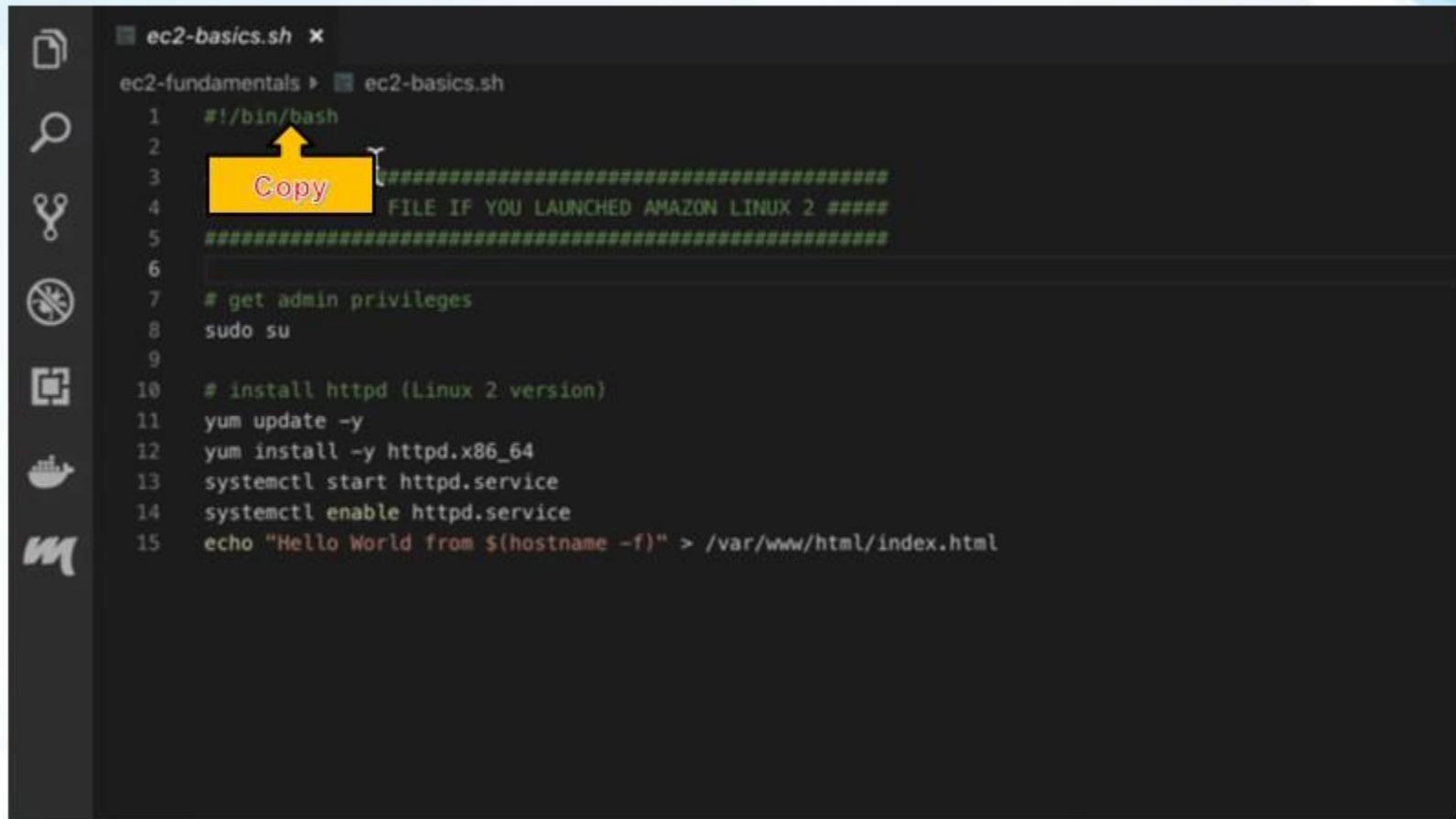
▼ Advanced Details

User data (i)

As text As file Input is already base64 encoded

(Optional)

I



```
ec2-basics.sh x
ec2-fundamentals > ec2-basics.sh
1  #!/bin/bash
2
3  ##### FILE IF YOU LAUNCHED AMAZON LINUX 2 #####
4
5  #####
6
7  # get admin privileges
8  sudo su
9
10 # install httpd (Linux 2 version)
11 yum update -y
12 yum install -y httpd.x86_64
13 systemctl start httpd.service
14 systemctl enable httpd.service
15 echo "Hello World from $(hostname -f)" > /var/www/html/index.html
```

T2/T3 Unlimited i

Enable

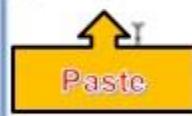
Additional charges may apply

▼ Advanced Details

User data i

As text As file Input is already base64 encoded

(Optional)



```
■ ec2-basics.sh ✘
ec2-fundamentals > ■ ec2-basics.sh
1  #!/bin/bash
2
3  ##### USE THIS FILE IF YOU LAUNCHED AMAZON LINUX 2 #####
4  #####
5  #####
6
7  # get admin privileges
8  sudo su
9
10 # install httpd (Linux 2 version)
11 yum update -y
12 yum install -y httpd.x86_64
13 systemctl start httpd.service
14 systemctl enable httpd.service
15 echo "Hello World from $(hostname -f)" > /var/www/html/index.html
```



Copy

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 3: Configure Instance Details

Purchasing option Request Spot Instances

Network vpc-d74714be (default) Create new VPC

Subnet No preference (default subnet in any Availability Zone) Create new subnet

Auto-assign Public IP Use subnet setting (Enable)

Placement group Add Instance to placement group

Capacity Reservation Open Create new Capacity Reservation

IAM role None Create new IAM role

Shutdown behavior Stop

Enable termination protection Protect against accidental termination

Monitoring Enable CloudWatch detailed monitoring
Additional charges apply.

Tenancy Shared - Run a shared hardware instance
Additional charges will apply for dedicated tenancy.

T2/T3 Unlimited Enable
Additional charges may apply

Advanced Details

User data As text As file Input is already base64 encoded

```
#!/bin/bash
yum update -y
yum install -y httpd.x86_64
systemctl start httpd.service
systemctl enable httpd.service
echo "Hello World" | sudo tee /var/www/html/index.html
```

Paste

Cancel Previous Review and Launch Next: Add Storage

Step 3: Configure Instance Details

Purchasing option Request Spot instances

Network

Subnet

Auto-assign Public IP

Placement group Add instance to placement group

Capacity Reservation

IAM role

Shutdown behavior

Enable termination protection Protect against accidental termination

Monitoring Enable CloudWatch detailed monitoring
Additional charges apply.

Tenancy
Additional charges will apply for dedicated tenancy.

T2/T3 Unlimited Enable
Additional charges may apply

Advanced Details

User data As text As file Input is already base64 encoded

```
#!/bin/bash
yum update -y
yum install -y httpd.x86_64
systemctl start httpd.service
systemctl enable httpd.service
echo "Hello World from $(hostname -f)" > /var/www/html/index.html
```

Cancel

Previous

Review and Launch

Next: Add storage

Click Here

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 4: Add Storage

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. Learn more about storage options in Amazon EC2.

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Throughput (MB/s)	Delete on Termination	Encryption
Root	/dev/xvda	snap-0669d7db6277ab269	8	General Purpose SSD (gp2)	100 / 3000	N/A	Not Encrypted	

Add New Volume

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. Learn more about free usage tier eligibility and usage restrictions.

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Add Tags](#)

Click Here

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 5: Add Tags

A tag consists of a case-sensitive key-value pair. For example, you could define a tag with key = Name and value = Webserver.

A copy of a tag can be applied to volumes, instances or both.

Tags will be applied to all instances and volumes. [Learn more about tagging your Amazon EC2 resources.](#)

Key (128 characters maximum)

Value (256 characters maximum)

Instances (1)

Volumes (1)

This resource currently has no tags

Choose the Add tag button or click to add a Name tag.
Make sure your IAM policy includes permissions to create tags.

Add Tag

(Up to 50 tags maximum)

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Configure Security Group](#)

Click Here

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 6: Configure Security Group

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. Learn more about Amazon EC2 security groups.

Assign a security group: Create a new security group

[Select an existing security group](#)

Security group name:

created 2019-06-30T18:42:35.688+02:00

Click Here

Type: SSH

Port: TCP

Port Range:

Source: Custom

0.0.0.0/0

Description:

[Add Rule](#)



Warning

Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

[Cancel](#) [Previous](#) [Review and Launch](#)

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 6: Configure Security Group

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. [Learn more about Amazon EC2 security groups.](#)

Assign a security group: Create a new security group

Select an existing security group

Security Group ID	Name	Description	Actions
sg-0e480c06	default	default VPC security group	Copy to new
sg-0781d3c19403d751	launch-wizard-1	launch-wizard-1 created 2018-11-21T09:57:57.249+01:00	Copy to new
sg-07fb0aef1aew636	launch-wizard-2	launch-wizard-2 created 2019-06-22T18:06:31.195+02:00	Copy to new
sg-5dffb35	my-first-load-balancer	First ALB in the tutorial	Copy to new
<input checked="" type="checkbox"/> sg-02501fa5	my-first-security-group	Created with my first EC2 Instance	Copy to new
sg-e47	rds-launch-wizard	Created from the RDS Management Console: 2018/09/20 14:46:43	Copy to new

Click Here

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 6: Configure Security Group

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. Learn more about Amazon EC2 security groups.

Assign a security group: Create a new security group

Select an existing security group

Security Group ID	Name	Description	Actions
sg-de480cb6	default	default VPC security group.	Copy to new
sg-0781d3c194f33d751	launch-wizard-1	launch-wizard-1 created 2018-11-21T09:57:57.249+01:00	Copy to new
sg-07fb0aeeffaae638	launch-wizard-2	launch-wizard-2 created 2019-06-22T18:06:31.195+02:00	Copy to new
sg-5d980f35	my-first-load-balancer	First ALB in the tutorial	Copy to new
sg-cd5b1fa5	my-first-security-group	Created with my first EC2 instance	Copy to new
sg-2f266e47	rds-launch-wizard	Created from the RDS Management Console: 2018/09/20 14:46:43	Copy to new

Inbound rules for sg-cd5b1fa5 (Selected security groups: sg-cd5b1fa5)

Type	Protocol	Port Range	Source	Description
HTTP	TCP	80	sg-5d980f35 (my-first-load-balancer)	Allow HTTP traffic...
SSH	TCP	22	0.0.0.0/0	SSH allowed from a...

[Cancel](#) [Previous](#) [Review and Launch](#)

Click Here

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 7: Review Instance Launch

Please review your instance launch details. You can go back to edit changes for each section. Click Launch to assign a key pair to your instance and complete the launch process.

⚠ Improve your instances' security. Your security group, my-first-security-group, is open to the world.

Your instances may be accessible from any IP address. We recommend that you update your security group rules to allow access from known IP addresses only.

You can also open additional ports in your security group to facilitate access to the application or service you're running, e.g., HTTP (80) for web servers. Edit security groups

AMI Details

Edit AMI

 Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-0adcddd3334248c4c

Amazon Linux 2 comes with five years support. It provides Linux kernel 4.14 tuned for optimal performance on Amazon EC2, systemd 218, GCC 7.3, Glibc 2.26, Binutils 2.29.1, and the latest software packages through extras.

 Root Device Type: ebs Virtualization type: hvm

Instance Type

Edit instance type

Instance Type	ECUs	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance
t2.micro	Variable	1	1	EBS only	-	Low to Moderate

Security Groups

Edit security groups

Security Group ID	Name	Description
sg-c65b1fa5	my-first-security-group	Created with my first EC2 Instance

All selected security groups inbound rules

Type	Protocol	Port Range	Source	Description
HTTP	TCP	80	sg-5df8cb35 (my-first-load-balancer)	Allow HTTP traffic...
SSH	TCP	22	0.0.0.0/0	SSH allowed from a...

Instance Details

Edit instance details

[Cancel](#) [Previous](#) [Launch](#)

Click Here

Select an existing key pair or create a new key pair



A key pair consists of a **public key** that AWS stores, and a **private key file** that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.

Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about [removing existing key pairs from a public AMI](#).

Choose an existing key pair

Select a key pair

EC2 Tutorial

I acknowledge that I have access to the selected private key file (EC2 Tutorial.pem), and that without this file, I won't be able to log into my instance.

Cancel

Launch Instances

Click Here

Launch Status

 Your instances are now launching

The following instance launches have been initiated: i-03eba8631c9a921b0, i-06723ce394ce154a2 [View launch log](#)

 Get notified of estimated charges

Create billing alerts to get an email notification when estimated charges on your AWS bill exceed an amount you define (for example, if you exceed the free usage tier).

How to connect to your instances

Your instances are launching, and it may take a few minutes until they are in the **running** state, when they will be ready for you to use. Usage hours on your new instances will start immediately and continue to accrue until you stop or terminate your instances.

Click [View Instances](#) to monitor your instances' status. Once your instances are in the **running** state, you can [connect](#) to them from the Instances screen. [Find out how to connect to your instances.](#)

▼ Here are some helpful resources to get you started

- [How to connect to your Linux instance](#)
- [Amazon EC2: User Guide](#)
- [Learn about AWS Free Usage Tier](#)
- [Amazon EC2: Discussion Forum](#)

While your instances are launching you can also

[Create status check alarms](#) to be notified when these instances fail status checks. (Additional charges may apply)

[Create and attach additional EBS volumes](#) (Additional charges may apply)

[Manage security groups](#)

[View Instances](#)

Click Here

[Click Here](#)

EC2 Dashboard

Events

Tags

Reports

Limits

INSTANCES

- Instances
- Launch Templates
- Spot Requests
- Reserved Instances
- Dedicated Hosts
- Capacity Reservations

IMAGES

- AMIs
- Bundle Tasks

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**

AUTO SCALING

- Launch Configurations
- Auto Scaling Groups

Create target group Actions

Filter by tags and attributes or search by keyword

1 to 1 of 1

Name	Port	Protocol	Target type	Load Balancer	VPC ID	Monitoring
my-apache-target-group	80	HTTP	instance	web-app-alb	vpc-d74714be	

Target group: my-apache-target-group

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.

Click Here

Name	Port	Availability Zone	Status
	80	eu-west-3c	Healthy

Availability Zones

Availability Zone	Target count	Healthy?
eu-west-3c	1	Yes

Register and deregister targets

Registered targets

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

<input type="checkbox"/> Remove	Instance	Name	Port	State	Security groups	Zone
<input type="checkbox"/>	i-083213197168e7861		80	● running	my-first-security-group	eu-west-3c
<input type="checkbox"/>	i-06723ce394ce154a2		80	● running	my-first-security-group	eu-west-3c
<input type="checkbox"/>	i-03eba8631c9a921b0		80	● running	my-first-security-group	eu-west-3c

Instances

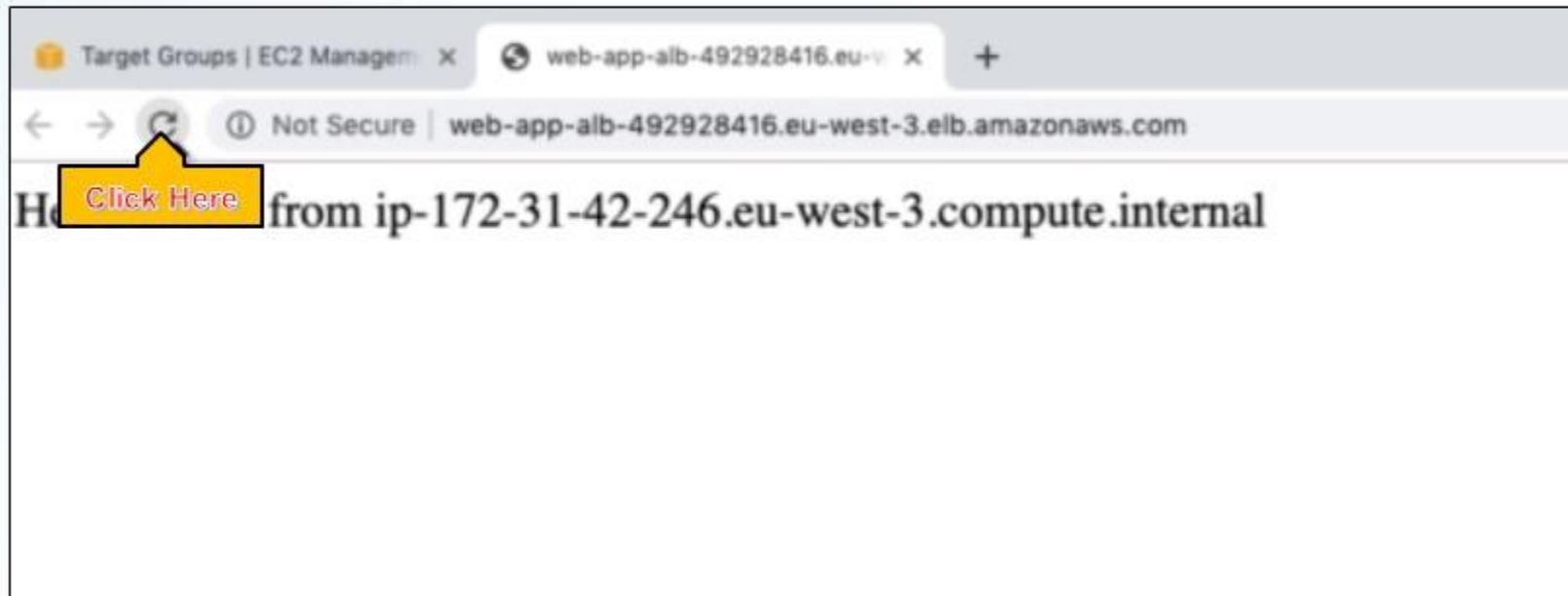
To register additional instances, select one or more running instances, specify a port, and then click Add. The default port is the port specified for the target group. If the instance is already registered on the specified port, you must specify a different port.

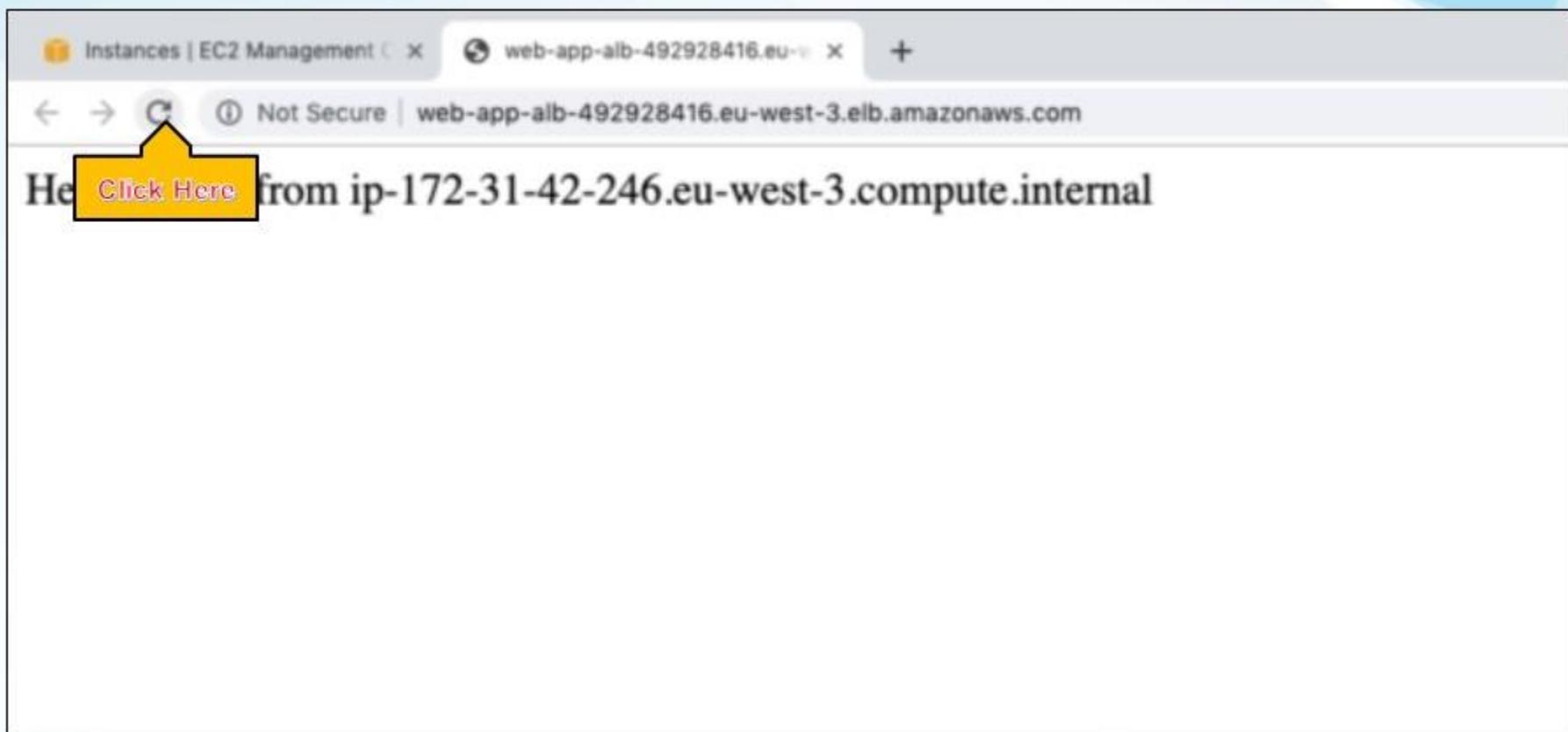
<input type="checkbox"/> Add to registered	on port 80	Search Instances <input type="text"/> X				
Instance	Name	State	Security groups	Zone	Subnet ID	Subnet CIDR
<input type="checkbox"/>	i-083213197168e7861	● running	my-first-security-group	eu-west-3c	subnet-391dc774	172.31.32.0/20
<input checked="" type="checkbox"/>	i-06723ce394ce154a2	● running	my-first-security-group	eu-west-3c	subnet-391dc774	172.31.32.0/20
<input checked="" type="checkbox"/>	i-03eba8631c9a921b0	● running	my-first-security-group	eu-west-3c	subnet-391dc774	172.31.32.0/20

Cancel Save

Click Here



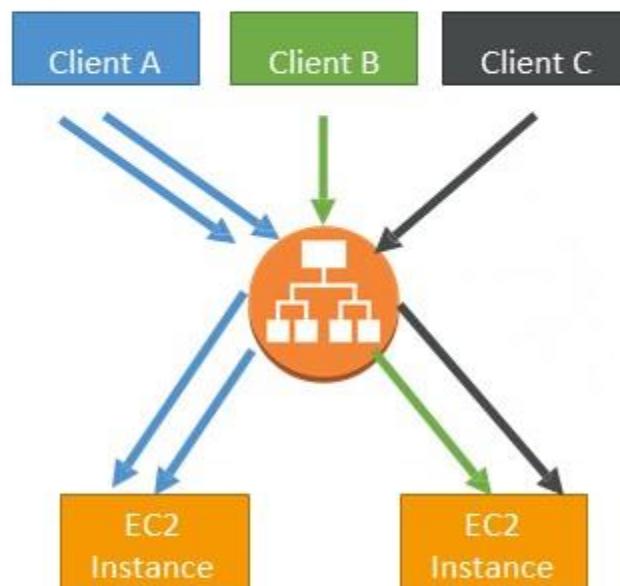




Load Balancers Stickiness

Load Balancer Stickiness

- It is possible to implement stickiness so that the same client is always redirected to the same instance behind a load balancer
- This works for Classic Load Balancers & Application Load Balancers
- The “cookie” used for stickiness has an expiration date you control
- Use case: make sure the user doesn’t lose his session data
- Enabling stickiness may bring imbalance to the load over the backend EC2 instances



Capacity Reservations

Images

AMIs

Bundle Tasks

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

Auto Scaling

Launch Configurations

Auto Scaling Groups

Systems Manager

Run Command

State Manager

Create Load Balancer

Actions

search : am:aws:elasticloadbalancing:eu-west-1:... Add filter

1 to 1 of 1

Name: my-apache-lb, DNS name: my-apache-lb-470653294.eu-west-1.elb.amazonaws.com, State: active, VPC ID: vpc-cf92b5a9, Availability Zones: eu-west-1a, eu-west-1b, Type: application, Created At: November 28.

Load balancer: my-apache-lb

Description, Listeners, Monitoring, Tags

Basic Configuration

Name	my-apache-lb	Creation time	November 28, 2018 at 3:52:33 PM UTC+1
ARN	arn:aws:elasticloadbalancing:eu-west-1:387124123361:loadbalancer/app/my-apache-lb/3a471be3cd2ed5f4	Hosted zone	Z32O12XQLNTSW2
DNS name	my-apache-lb-470653294.eu-west-1.elb.amazonaws.com	State	active
	(A Record)	VPC	vpc-cf92b5a9
Scheme	internet-facing	IP address type	ipv4
Type	application	AWS WAF Web ACL	
Availability Zones	subnet-6476a43e - eu-west-1a, subnet-924bdbf4 - eu-west-1b, subnet-fd0360b5 - eu-west-1c		

Edit availability zones

Capacity Reservations

IMAGES

AMIs

Bundle Tasks

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

Click Here

Auto Scaling Groups

Create target group Actions

search : arn:aws:elasticloadbalancing:eu-west-1:... Add filter (+1) 1 to 1 of 1

Name	Port	Protocol	Target type	Load Balancer	VPC ID	Monitoring
my-apache-web	80	HTTP	instance	my-apache-lb	vpc-cf92b5a9	

Target group: my-apache-web

Description Targets Health checks Monitoring Tags

Basic Configuration

Name	my-apache-web
ARN	arn:aws:elasticloadbalancing:eu-west-1:387124123361:targetgroup/my-apache-web/act551a405423d04
Protocol	HTTP
Port	80
Target type	instance
VPC	vpc-cf92b5a9
Load balancer	my-apache-lb

The screenshot shows the AWS Elastic Load Balancing Target Groups console. The left sidebar navigation includes: Capacity Reservations, IMAGES, AMIs, Bundle Tasks, 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** (which is selected and highlighted in orange), AUTO SCALING Launch Configurations, Auto Scaling Groups, and SYSTEMS MANAGER SERVICES Run Command, State Manager, Configuration.

The main content area displays a table of target groups. A single row is selected, showing the following details:

Name	Port	Protocol	Target type	Load Balancer	VPC ID	Monitoring
my-apache-web	80	HTTP	instance	my-apache-lb	vpc-cf92b5a9	

Basic Configuration

Name	my-apache-web
ARN	arn:aws:elasticloadbalancing:eu-west-1:387124123361:targetgroup/my-apache-web/acf551a405423d04
Protocol	HTTP
Port	80
Target type	instance
VPC	vpc-cf92b5a9
Load balancer	my-apache-lb

Attributes

Deregistration delay	300 seconds
Slow start duration	0 seconds
Stickiness	Disabled

Click Here (A yellow button with a red arrow pointing to the 'Edit attributes' button)

Edit attributes

Deregistration delay i seconds
Specify a value from 0-3600.

Slow start duration i seconds
Specify a value from 30-900 or 0 to disable.

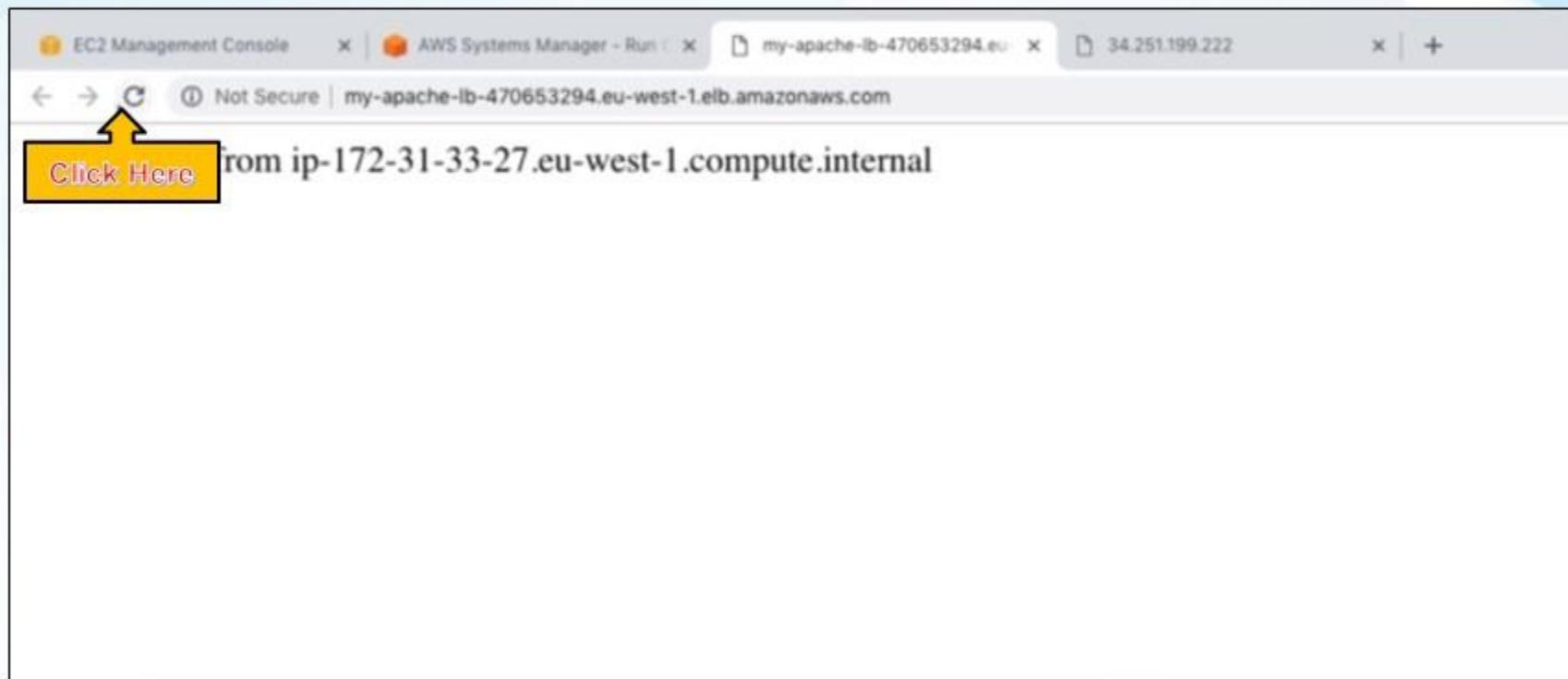
Stickiness i Enable

Stickiness duration minutes ▼
Specify a value between 1 second and 7 days.

[Cancel](#) [Save](#)

Click Here ↗





Load Balancing for Solutions Architects

Load Balancers for Solutions Architect

- **Application Load Balancer (Layer 7 of OSI):**

- Support routing based on hostname (users.example.com & payments.example.com)
- Support routing based on path (example.com/users & example.com/payments)
- Support redirects (from HTTP to HTTPS for example)
- Support dynamic host port mapping with ECS

- **NLB (Layer 4 of OSI) gets a static IP per AZ :**

- Public facing: must attach Elastic IP – can help whitelist by clients
- Private facing: will get random private IP based on free ones at time of creation
- Has cross zone balancing
- Has SSL termination (Jan 2019)

Load Balancer Security Groups LOAD BALANCER



Load Balancer Security Group:

Type	Protocol	Port Range	Source	Description
HTTP	TCP	80	0.0.0.0/0	Allow HTTP from an...
HTTPS	TCP	443	0.0.0.0/0	Allow HTTPS from a...

Application Security Group: Allow traffic only from Load Balancer

Type	Protocol	Port Range	Source	Description
HTTP	TCP	80	sg-054b5ff5ea02f2b6e (load-b	Allow Traffic only...

Load Balancer - SSL Certificates LOAD BALANCER



- The load balancer uses an X.509 certificate (SSL/TLS server certificate)
- You can manage certificates using ACM (AWS Certificate Manager)
- You can create/upload your own certificates alternatively
- **HTTPS listener:**
 - You must specify a default certificate
 - You can add an optional list of certs to support multiple domains
 - Clients can use SNI (Server Name Indication) to specify the hostname they reach
 - Ability to specify a security policy to support older versions of SSL / TLS (legacy clients)

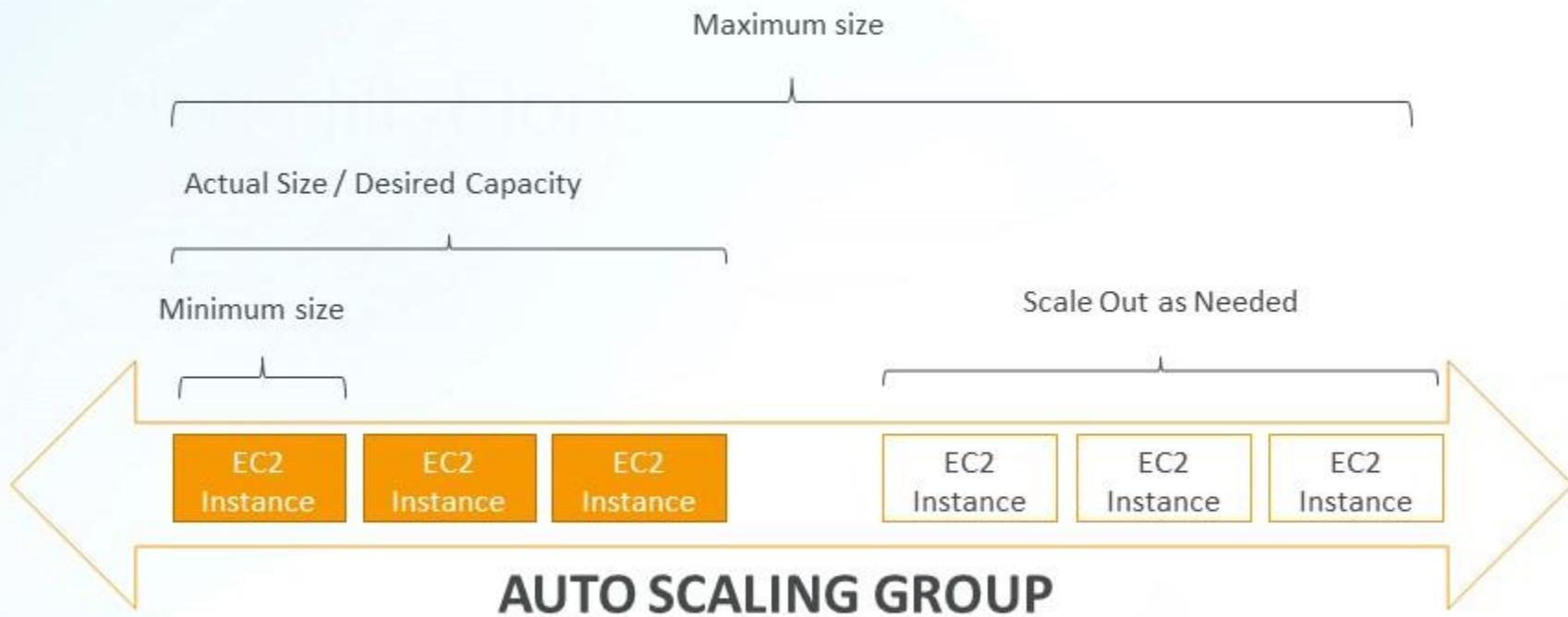
Auto Scaling Groups Overview

What's an Auto Scaling Group?

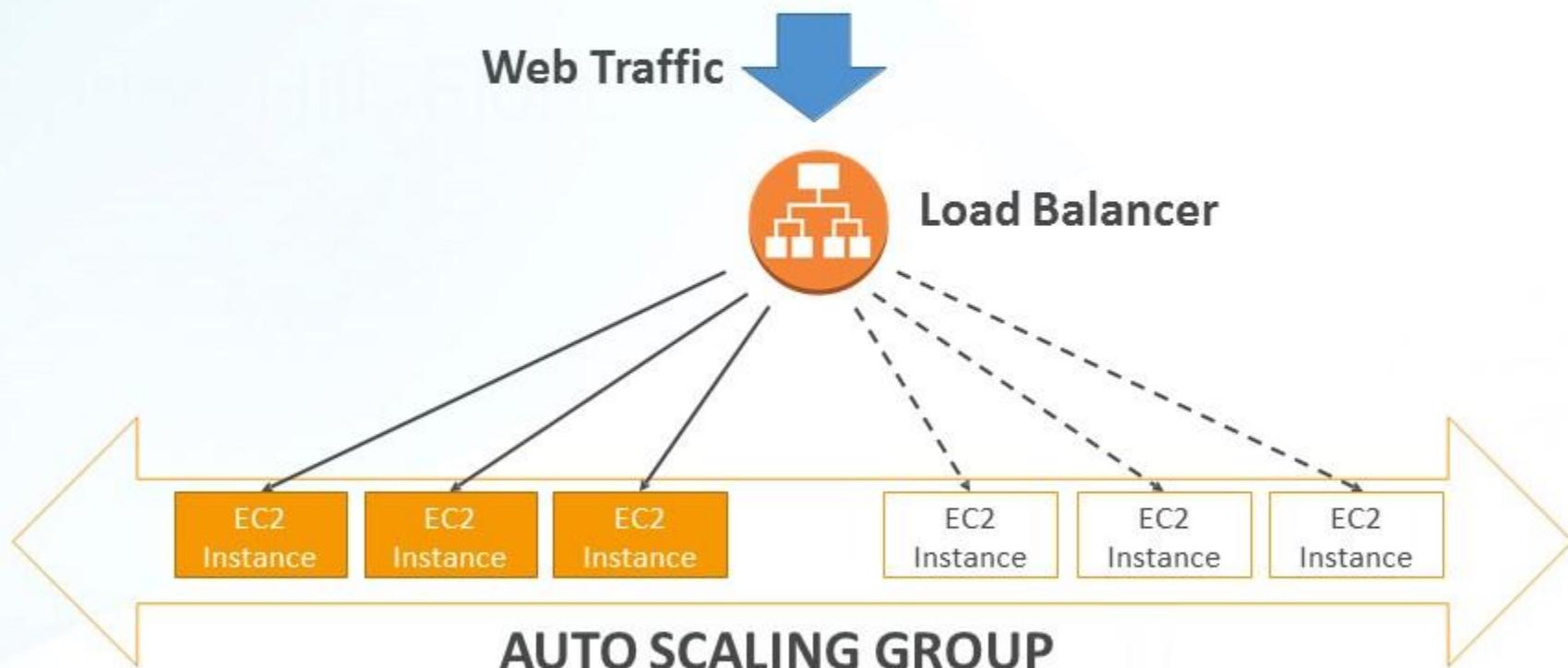


- In real-life, the load on your websites and application can change
- In the cloud, you can create and get rid of servers very quickly
- The goal of an Auto Scaling Group (ASG) is to:
 - Scale out (add EC2 instances) to match an increased load
 - Scale in (remove EC2 instances) to match a decreased load
 - Ensure we have a minimum and a maximum number of machines running
 - Automatically Register new instances to a load balancer

Auto Scaling Group in AWS



Auto Scaling Group in AWS With Load Balancer



ASGs have the following attributes

- A launch configuration
 - AMI + Instance Type
 - EC2 User Data
 - EBS Volumes
 - Security Groups
 - SSH Key Pair
- Min Size / Max Size / Initial Capacity
- Network + Subnets Information
- Load Balancer Information
- Scaling Policies

Auto Scaling Alarms

- It is possible to scale an ASG based on CloudWatch alarms
- An Alarm monitors a metric (such as Average CPU)
- Metrics are computed for the overall ASG instances
- Based on the alarm:
 - We can create scale-out policies (increase the number of instances)
 - We can create scale-in policies (decrease the number of instances)



Auto Scaling New Rules

- It is now possible to define "better" auto scaling rules that are directly managed by EC2
 - Target Average CPU Usage
 - Number of requests on the ELB per instance
 - Average Network In
 - Average Network Out

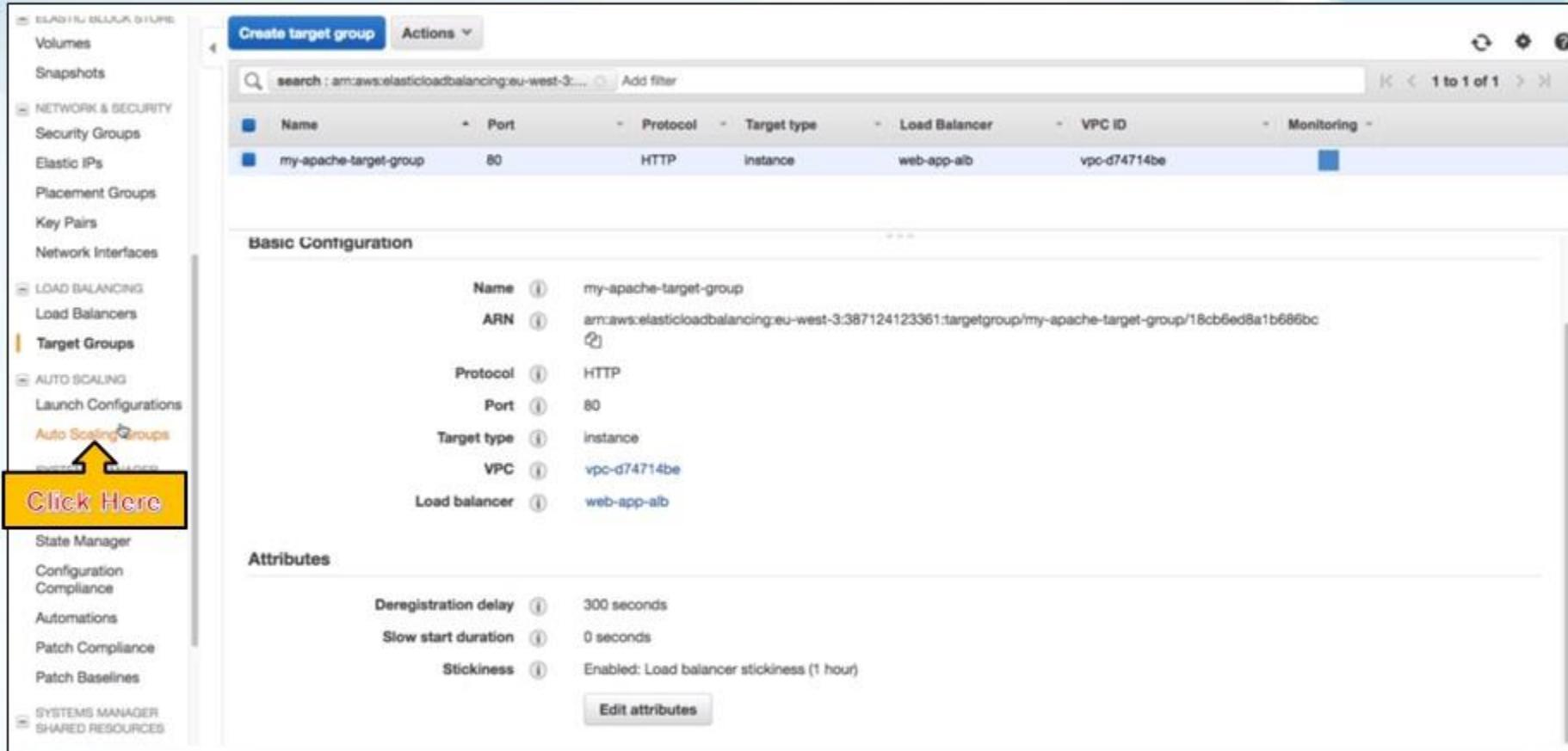
Auto Scaling Custom Metric

- We can auto scale based on a custom metric (ex: number of connected users)
- 1. Send custom metric from application on EC2 to CloudWatch (PutMetric API)
- 2. Create CloudWatch alarm to react to low / high values
- 3. Use the CloudWatch alarm as the scaling policy for ASG

ASG Brain Dump

- Scaling policies can be on CPU, Network... and can even be on custom metrics or based on a schedule (if you know your visitors patterns)
- ASGs use Launch configurations and you update an ASG by providing a new launch configuration
- IAM roles attached to an ASG will get assigned to EC2 instances
- ASG are free. You pay for the underlying resources being launched
- Having instances under an ASG means that if they get terminated for whatever reason, the ASG will restart them. Extra safety!
- ASG can terminate instances marked as unhealthy by an LB (and hence replace them)

Auto Scaling Groups Hands On



Click Here

Create target group Actions ?

search : arn:aws:elasticloadbalancing:eu-west-3:... Add filter

1 to 1 of 1

Name	Port	Protocol	Target type	Load Balancer	VPC ID	Monitoring
my-apache-target-group	80	HTTP	Instance	web-app-alb	vpc-d74714be	⋮

Basic Configuration

Name	my-apache-target-group
ARN	arn:aws:elasticloadbalancing:eu-west-3:387124123361:targetgroup/my-apache-target-group/18cb6ed8a1b686bc
Protocol	HTTP
Port	80
Target type	instance
VPC	vpc-d74714be
Load balancer	web-app-alb

Attributes

Deregistration delay	300 seconds
Slow start duration	0 seconds
Stickiness	Enabled: Load balancer stickiness (1 hour)

Edit attributes

State Manager
Configuration
Compliance
Automations
Patch Compliance
Patch Baselines
SYSTEMS MANAGER
SHARED RESOURCES

Load Balancers
Target Groups
Auto Scaling Groups

EC2 Dashboard
Events
Tags
Reports
Limits

INSTANCES

Instances
Launch Templates
Spot Requests
Reserved Instances
Dedicated Hosts

IMAGES

AMIs
Bundle Tasks

ELASTIC BLOCK STORE

Volumes
Snapshots

NETWORK & SECURITY

Security Groups
Elastic IPs
Placement Groups
Key Pairs
Network Interfaces

LOAD BALANCING

Load Balancers
Target Groups

Launch Templates have arrived!

The EC2 Auto Scaling console now has full support for launch templates. Launch templates can be updated and versioned, and include support for the latest features of Amazon EC2. Create an Auto Scaling group to get started or [Learn more](#).

Welcome to Auto Scaling

You can use Auto Scaling to manage Amazon EC2 capacity automatically, maintain the right number of instances for your application, operate a healthy group of instances, and scale it according to your needs.

[Learn more](#)

[Create Auto Scaling group](#)

Note: To create Auto Scaling groups in a different region, select your region from the navigation bar.

Click Here

Automated Provisioning



Keep your Auto Scaling group healthy and balanced, whether you need one instance or 1,000.

[Learn more](#)

Adjustable Capacity



Maintain a fixed group size or adjust dynamically based on Amazon CloudWatch metrics.

[Learn more](#)

Launch Template Support



Provision instances easily using EC2 Launch Templates.

[Learn more](#)

Additional Information

[Getting Started Guide](#)
[Documentation](#)
[All EC2 Resources](#)
[Forums](#)
[Pricing](#)
[Contact Us](#)

Create Auto Scaling Group

[Cancel and Exit](#)

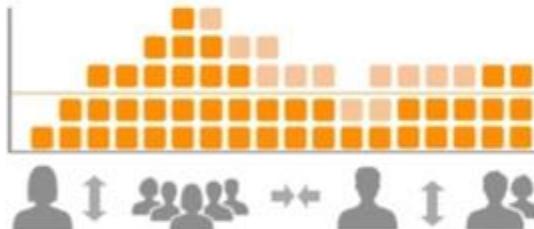
Complete this wizard to create your Auto Scaling group. First, choose either a launch configuration or a launch template to specify the parameters that your Auto Scaling group uses to launch instances.



Step 1: Create or select a launch template

Create or select the launch template that your Auto Scaling group will use to launch your EC2 instances.

You can change your group's launch template at any time.



Step 2: Create Auto Scaling group

Next, give your group a name and specify how many instances you want to run in it.

Your group will maintain this number of instances, and replace any that become unhealthy or impaired.

You can optionally configure your group to adjust its capacity according to demand, in response to Amazon CloudWatch metrics.

[Cancel](#) [Get started](#)[Click Here](#)

Create Launch Configuration

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

Quick Start

My AMIs

AWS Marketplace

Community AMIs

Free tier only 

Amazon Linux

 Free tier eligible

Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-06340c8c12baa6a09

Amazon Linux 2 comes with five years support. It provides Linux kernel 4.14 tuned for optimal performance on Amazon EC2, systemd 219, GCC 7.3, Glibc 2.26, Binutils 2.29.1, and the latest software packages through extras.

Root device type: ebs Virtualization type: hvm

[Select](#)

 Click Here

Amazon Linux

 Free tier eligible

Amazon Linux AMI 2018.03.0 (HVM), SSD Volume Type - ami-0ebc281c20e89ba4b

The Amazon Linux AMI is an EBS-backed, AWS-supported image. The default image includes AWS command line tools, Python, Ruby, Perl, and Java. The repositories include Docker, PHP, MySQL, PostgreSQL, and other packages.

Root device type: ebs Virtualization type: hvm

[Select](#)

64-bit

SUSE Linux

 Free tier eligible

SUSE Linux Enterprise Server 15 (HVM), SSD Volume Type - ami-01116bee807116ce

SUSE Linux Enterprise Server 15 (HVM), EBS General Purpose (SSD) Volume Type. Public Cloud, Advanced Systems Management, Web and Scripting, and Legacy modules enabled.

Root device type: ebs Virtualization type: hvm

[Select](#)

64-bit

 Free tier eligible

Ubuntu Server 16.04 LTS (HVM), SSD Volume Type - ami-0370f4064dbc392b9

Ubuntu Server 16.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical (<http://www.ubuntu.com/cloud/services>).

Root device type: ebs Virtualization type: hvm

[Select](#)

64-bit

Red Hat

 Free tier eligible

Red Hat Enterprise Linux 7.5 (HVM), SSD Volume Type - ami-5026902d

Red Hat Enterprise Linux version 7.5 (HVM), EBS General Purpose (SSD) Volume Type

[Select](#)

64-bit

Create Launch Configuration

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. Learn more about instance types and how they can meet your computing needs.

Filter by: All instance types

Current generation

Show/Hide Columns

Currently selected: t2.micro (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 1 GiB memory, EBS only)

Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance
General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate
General purpose	t2.micro <small>Free tier eligible</small>	1	1	EBS only	-	Low to Moderate
General purpose	t2.small	1	2	EBS only	-	Low to Moderate
General purpose	t2.medium	2	4	EBS only	-	Low to Moderate
General purpose	t2.large	2	8	EBS only	-	Low to Moderate
General purpose	t2.xlarge	4	16	EBS only	-	Moderate
General purpose	t2.2xlarge	8	32	EBS only	-	Moderate
General purpose	m5.large	2	8	EBS only	Yes	Up to 10 Gigabit
General purpose	m5.xlarge	4	16	EBS only	Yes	Up to 10 Gigabit

Cancel

Previous

Next: Configure details

Click Here

Create Launch Configuration

Name (i)

Purchasing option (i) Request Spot Instances

IAM role (i)

Monitoring (i) Enable CloudWatch detailed monitoring
[Learn more](#)

Advanced Details

Kernel ID (i)

RAM Disk ID (i)

User data (i) As text As file Input is already base64 encoded

```
#!/bin/bash
```

IP Address Type (i) Only assign a public IP address to instances launched in the default VPC and subnet. (default)

Assign a public IP address to every instance.

Do not assign a public IP address to any instances.

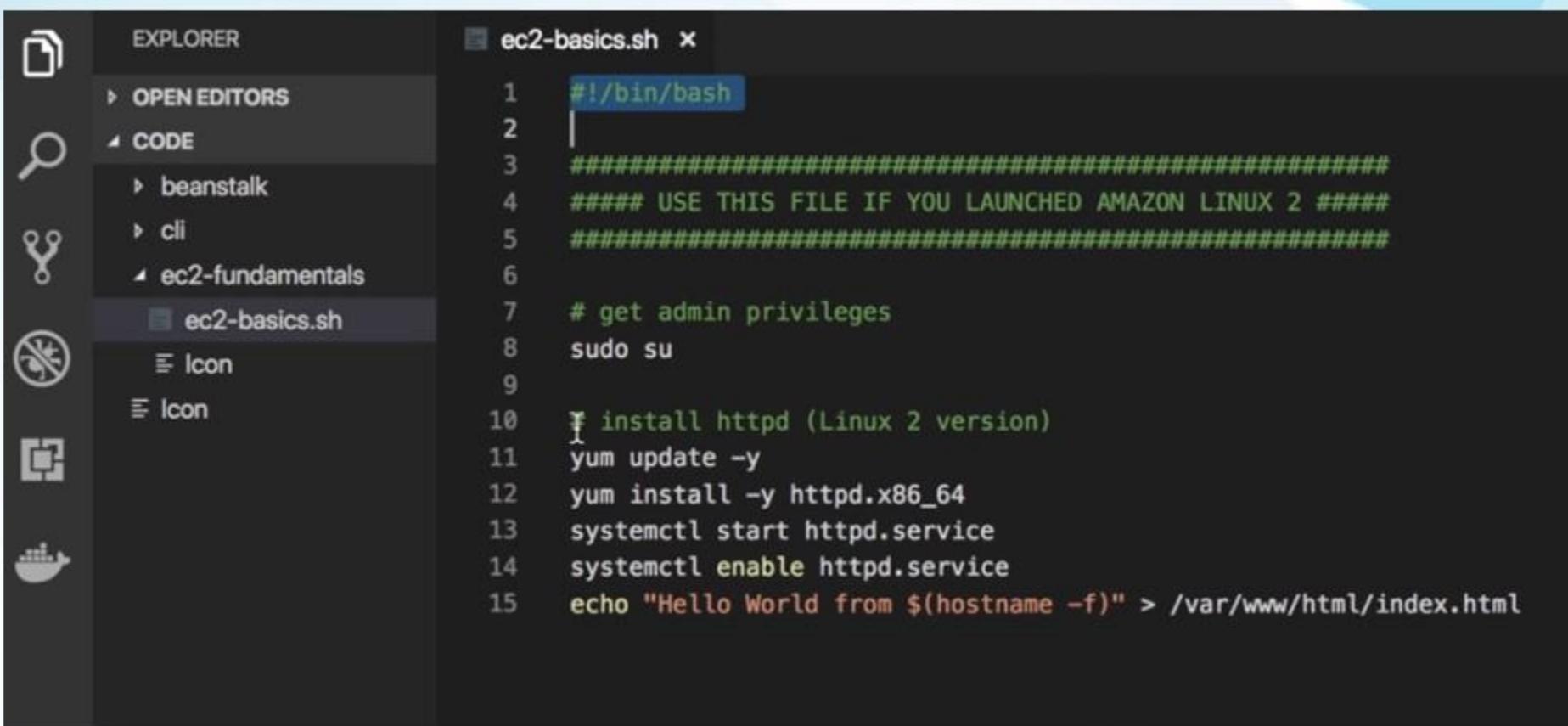
Note: this option only affects instances launched into an Amazon VPC

[Cancel](#)

[Previous](#)

[Skip to review](#)

[Next: Add Storage](#)



EXPLORER

OPEN EDITORS

CODE

- beanstalk
- cli
- ec2-fundamentals
 - ec2-basics.sh
- Icon

ec2-basics.sh x

```
1 #!/bin/bash
2
3 #####
4 ##### USE THIS FILE IF YOU LAUNCHED AMAZON LINUX 2 #####
5 #####
6
7 # get admin privileges
8 sudo su
9
10 # install httpd (Linux 2 version)
11 yum update -y
12 yum install -y httpd.x86_64
13 systemctl start httpd.service
14 systemctl enable httpd.service
15 echo "Hello World from $(hostname -f)" > /var/www/html/index.html
```

Create Launch Configuration

Name (i)

Purchasing option (i)

 Request Spot Instances

IAM role (i)

Monitoring (i)

 Enable CloudWatch detailed monitoring[Learn more](#)

Advanced Details

Kernel ID (i)

RAM Disk ID (i)

User data (i)

As text As file Input is already base64 encoded

```
#!/usr/bin/python
# install httpd (Linux 2 version)
yum update -y
yum install -y httpd.x86_64
systemctl start httpd.service
systemctl enable httpd.service
echo "Hello World from $(hostname -f)" > /var/www/html/index.html
```

IP Address Type (i)

Only assign a public IP address to instances launched in the default VPC and subnet. (default)

Assign a public IP address to every instance.

Do not assign a public IP address to any instances.

Note: this option only affects instances launched into an Amazon VPC

[Cancel](#)

[Previous](#)

[Skip to review](#)

[Next: Add Storage](#)

Click Here

1. Choose AMI 2. Choose Instance Type 3. Configure details 4. Add Storage 5. Configure Security Group 6. Review

Create Launch Configuration

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes.

<https://docs.aws.amazon.com/console/ec2/launchinstance/storage> about storage options in Amazon EC2.

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Throughput	Delete on Termination	Encrypted
Root	/dev/xvda	snap-06fbc87e38aa3b3ea	8	General Purpose (SSD)	100 / 3000	N/A	<input checked="" type="checkbox"/>	No

[Add New Volume](#)

 Free tier eligible customers can get up to 30 GB of EBS storage. [Learn more](#) about free usage tier eligibility and usage restrictions.

[Cancel](#) [Previous](#) [Skip to review](#) [Next: Configure Security Group](#)

Click Here

1. Choose AMI 2. Choose Instance Type 3. Configure details 4. Add Storage 5. Configure Security Group 6. Review

Create Launch Configuration

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow Internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. Learn more about Amazon EC2 security groups.

Assign a security group: Create a new security group
 Select an existing security group

Security Group ID	Name	VPC ID	Description	Actions
sg-de480cb6	default	vpc-d74714be	default VPC security group	Copy to new
sg-5df8bf35	my-first-load-balancer	vpc-d74714be	First ALB in the tutorial	Copy to new
sg-cd5b1fa5	my-first-security-group	vpc-d74714be	Created with my first EC2 instance	Copy to new

Inbound rules for sg-cd5b1fa5 Selected security groups: sg-cd5b1fa5.

Type	Protocol	Port Range	Source
HTTP	TCP	80	sg-5df8bf35 (my-first-load-balancer)
SSH	TCP	22	0.0.0.0/0

[Cancel](#) [Previous](#) [Review](#)

Click Here

Create Launch Configuration

Review the details of your launch configuration. You can go back to edit the details of each section before you finish.



Improve security of instances launched using your launch configuration, first-launch-config. Your security group, my-first-security-group, is open to the world.

Your instances may be accessible from any IP address. We recommend that you update your security group rules to allow access from known IP addresses only.

You can also open additional ports in your security group to facilitate access to the application or service you're running, e.g., HTTP (80) for web servers. [Edit security groups](#)

AMI Details



Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-06340c8c12baa6a09



Amazon Linux 2 comes with five years support. It provides Linux kernel 4.14 tuned for optimal performance on Amazon EC2, systemd 219, GCC 7.3, Glibc 2.26, Binutils 2.29.1, and the latest software packages through extras.

Root device type: ebs Virtualization Type: hvm

[Edit AMI](#)

Instance Type

[Edit instance type](#)

Instance Type	ECUs	vCPUs	Memory GiB	Instance Storage (GiB) GiB	EBS-Optimized Available	Network Performance
t2.micro	Variable	1	1	EBS only	-	Low to Moderate

Launch configuration details

[Edit details](#)

Name: first-launch-config

Purchasing option: On demand

EBS Optimized: No

Monitoring: No

[Cancel](#)

[Previous](#)

Create launch configuration

Click Here

Select an existing key pair or create a new key pair



A key pair consists of a **public key** that AWS stores, and a **private key file** that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.

Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about [removing existing key pairs from a public AMI](#).

Choose an existing key pair

Select a key pair

EC2 Tutorial

I acknowledge that I have access to the selected private key file (EC2 Tutorial.pem), and that without this file, I won't be able to log into my instance.

Click Here

Cancel

Create launch configuration

Select an existing key pair or create a new key pair



A key pair consists of a **public key** that AWS stores, and a **private key file** that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.

Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about [removing existing key pairs from a public AMI](#).

Choose an existing key pair



Select a key pair

EC2 Tutorial



I acknowledge that I have access to the selected private key file (EC2 Tutorial.pem), and that without this file, I won't be able to log into my instance.

Cancel

Create launch configuration

Click Here



1. Configure Auto Scaling group details

2. Configure scaling policies

3. Configure Notifications

4. Configure Tags

5. Review

Create Auto Scaling Group

Launch Configuration (i) first-launch-config

Group name (i)

Group size (i) Start with instances

Network (i) C Create new VPC

Subnet (i) Create new subnet

Each instance in this Auto Scaling group will be assigned a public IP address. (i)

► Advanced Details

[1. Configure Auto Scaling group details](#)[2. Configure scaling policies](#)[3. Configure Notifications](#)[4. Configure Tags](#)[5. Review](#)

Create Auto Scaling Group

[Cancel and Exit](#)**Launch Configuration** ⓘ first-launch-config**Group name** ⓘ first-asg**Group size** ⓘ Start with 1 instances**Network** ⓘ vpc-d74714be (172.31.0.0/16) (default)[C Create new VPC](#)**Subnet** ⓘ
subnet-c2b2ccab(172.31.0.0/20) | Default in eu-west-3a
subnet-3470e14f(172.31.16.0/20) | Default in eu-west-3b
subnet-391dc774(172.31.32.0/20) | Default in eu-west-3c[Create new subnet](#)

Each instance in this Auto Scaling group will be assigned a public IP address. ⓘ

[Advanced Details](#) ⓘ[Cancel](#)[Next: Configure scaling policies](#)

Advanced Details

Load Balancing i Receive traffic from one or more load balancers [Learn about Elastic Load Balancing](#)

Classic Load Balancers i

Target Groups i my-apache-target-group X

Health Check Type i ELB EC2

Health Check Grace Period i 60 seconds

Monitoring i Amazon EC2 Detailed Monitoring metrics, which are provided at 1 minute frequency, are not enabled for the launch configuration first-launch-config. Instances launched from it will use Basic Monitoring metrics, provided at 5 minute frequency.

[Learn more](#)

Instance Protection i

Service-Linked Role i AWSServiceRoleForAutoScaling C

The default role does not exist. It will be automatically created on your behalf.

[Cancel](#)

[Next: Configure scaling policies](#)

Click Here

1. Configure Auto Scaling group details 2. Configure scaling policies 3. Configure Notifications 4. Configure Tags 5. Review

Create Auto Scaling Group

You can optionally add scaling policies if you want to adjust the size (number of instances) of your group automatically. A scaling policy is a set of instructions for making such adjustments in response to an Amazon CloudWatch alarm that you assign to it. In each policy, you can choose to add or remove a specific number of instances or a percentage of the existing group size, or you can set the group to an exact size. When the alarm triggers, it will execute the policy and adjust the size of your group accordingly. [Learn more about scaling policies.](#)

- Keep this group at its initial size
- Use scaling policies to adjust the capacity of this group

Scale between and instances. These will be the minimum and maximum size of your group.

Scale Group Size

Name:	<input type="text" value="Scale Group Size"/>
Metric type:	<input type="text" value="Average CPU Utilization"/>
Target value:	<input type="text" value="40"/>
Instances need:	<input type="text" value="60"/> seconds to warm up after scaling
Disable scale-in:	<input type="checkbox"/>

Scale the Auto Scaling group using step or simple scaling policies [\(i\)](#)

[Cancel](#) [Previous](#) [Review](#) [Next: Configure Notifications](#)

Click Here

1. Configure Auto Scaling group details 2. Configure scaling policies 3. Configure Notifications 4. Configure Tags 5. Review

Create Auto Scaling Group

Configure your Auto Scaling group to send notifications to a specified endpoint, such as an email address, whenever a specified event takes place, including: successful launch of an instance, failed instance launch, instance termination, and failed instance termination.

If you created a new topic, check your email for a confirmation message and click the included link to confirm your subscription. Notifications can only be sent to confirmed addresses.

[Add notification](#)

[Cancel](#) [Previous](#) [Review](#) [Next: Configure Tags](#)

Click Here

1. Configure Auto Scaling group details 2. Configure scaling policies 3. Configure Notifications 4. Configure Tags 5. Review

Create Auto Scaling Group

A tag consists of a case sensitive key-value pair that you can use to identify your group. For example, you could define a tag with Key = Environment and Value = Production. You can optionally choose to apply these tags to instances in the group when they launch. [Learn more...](#)

Key	Value	Tag New Instances <small>(i)</small>
<input type="text"/>	<input type="text"/>	<input type="checkbox"/> X

[Add tag](#) 49 remaining

[Cancel](#) [Previous](#) [Review](#)

Click Here 

[1. Configure Auto Scaling group details](#)[2. Configure scaling policies](#)[3. Configure Notifications](#)[4. Configure Tags](#)[5. Review](#)

Create Auto Scaling Group

Please review your Auto Scaling group details. You can go back to edit changes for each section. Click **Create Auto Scaling group** to complete the creation of an Auto Scaling group.

Auto Scaling Group Details

[Edit details](#)

Group name	first-asg
Group size	1
Minimum Group Size	1
Maximum Group Size	3
Subnet(s)	subnet-c2b2ccab,subnet-3470e14f,subnet-391dc774
Load Balancers	
Target Groups	my-apache-target-group
Health Check Type	ELB
Health Check Grace Period	60
Detailed Monitoring	No
Instance Protection	None
Service-Linked Role	AWSServiceRoleForAutoScaling

Scaling Policies

[Edit scaling policies](#)

Scale Group Size Maintain metric type Average CPU Utilization at target value 40, with 60 seconds for instances to warm up.

Notifications

[Edit notifications](#)

Tags

[Edit tags](#)[Cancel](#)[Previous](#)[Create Auto Scaling group](#)Click Here

Auto Scaling group creation status



Initiating Auto Scaling group creation

Please do not close your browser

Creating Auto Scaling group...

Note: if you get an error here, just retry and it should fix itself

Auto Scaling group creation status

 Successfully created Auto Scaling group

[View creation log](#)

▼ View

[View your Auto Scaling groups](#)
[View your launch configurations](#)

► Here are some helpful resources to get you started

[Close](#)

Note: if you get an error here, just retry and it should fix itself

Launch Templates have arrived!
The EC2 Auto Scaling console now has full support for launch templates. Launch templates can be updated and versioned, and include support for the latest features of Amazon EC2. Create an Auto Scaling group to get started or [Learn more](#).

Create Auto Scaling group **Actions**    

Filter:    **1 to 1 of 1 Auto Scaling Groups**  

Name	Launch Configuration	Instances	Desired	Min	Max	Availability Zones	Default Cooldown	Health Check Grace
first-asg	first-launch-config	1	1	1	3	eu-west-3a, eu-west-3b, eu...	300	60

Auto Scaling Group: first-asg   

Details	Activity History	Scaling Policies	Instances	Monitoring	Notifications	Tags	Scheduled Actions	Lifecycle Hooks
Launch Template  -								Termination Policies  Default
Launch Template Version  -								Creation Time  Thu Sep 20 14:32:44 GMT+200 2018
Launch Configuration  first-launch-config								Availability Zone(s)  eu-west-3a, eu-west-3b, eu-west-3c
Service-Linked Role  arn:aws:iam:367124123361:role/aws-service-role/autoscaling.amazonaws.com/AWSS...								Subnet(s)  subnet-c2b2ccab,subnet-3470e14f,subnet-391dc774
Classic Load Balancers  -								Default Cooldown  300
								Placement Groups  -

EC2 Dashboard

Events

Tags

Reports

Limits

INSTANCES

- Instances
- Launch Templates
- Spot Requests
- Reserved Instances
- Dedicated Hosts

IMAGES

- AMIs
- Bundle Tasks

ELASTIC BLOCK STORE

- Volumes
- Snapshots

NETWORK & SECURITY

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

LOAD BALANCING

- Load Balancers
- Target Groups

All IT's in One Place

Create Auto Scaling group Actions

Filter: Filter Auto Scaling groups... X

1 to 1 of 1 Auto Scaling Groups

Name	Launch Configuration	Instances	Desired	Min	Max	Availability Zones	Default Cooldown	Health Check Grace
first-asg	first-launch-config	1	1	1	3	eu-west-3a, eu-west-3b, eu-west-3c	300	60

Details Activity History Scaling Policies Instances Monitoring Notifications Tags Scheduled Actions Lifecycle Hooks

Launch Template - Termination Policies Default

Launch Template Version - Creation Time Thu Sep 20 14:32:44 GMT+200 2018

Launch Configuration first-launch-config Availability Zone(s) eu-west-3a, eu-west-3b, eu-west-3c

Service-Linked Role am:aws:iam::387124123361:role/aws-service-role/autoscaling.amazonaws.com/AWSS...

Classic Load Balancers Subnet(s) subnet-c2b2ccab,subnet-3470e14f,subnet-391dc774

Target Groups my-apache-target-group Default Cooldown 300

Desired Capacity 1 Placement Groups

Min 1 Suspended Processes

Max 3 Enabled Metrics

Instance Protection

EC2 Dashboard

Events

Tags

Reports

Limits

INSTANCES

Instances

Launch Templates

Spot Requests

Reserved Instances

Dedicated Hosts

IMAGES

AMIs

Bundle Tasks

ELASTIC BLOCK STORE

Volumes

Snapshots

NETWORK & SECURITY

Security Groups

Elastic IPs

Placement Groups

Key Pairs

Network Interfaces

LOAD BALANCING

Load Balancers

Target Groups

All My Items

Create Auto Scaling group

Actions

Filter: Filter Auto Scaling groups...

1 to 1 of 1 Auto Scaling Groups

Name	Launch Configuration	Instances	Desired	Min	Max	Availability Zones	Default Cooldown	Health Check Grace
first-asg	first-launch-config	1	1	1	3	eu-west-3a, eu-west-3b, eu...	300	60

Activity History 

Scaling Policies

Instances

Monitoring

Notifications

Tags

Scheduled Actions

Lifecycle Hooks

Launch Configuration: first-launch-config

Service-Linked Role: arn:aws:iam::387124123361:role/aws-service-role/autoscaling.amazonaws.com/AWSS...

Classic Load Balancers

Target Groups: my-apache-target-group

Desired Capacity: 1

Min: 1

Max: 3

Termination Policies: Default

Creation Time: Thu Sep 20 14:32:44 GMT+200 2018

Availability Zone(s): eu-west-3a, eu-west-3b, eu-west-3c

Subnet(s): subnet-c2b2ccab, subnet-3470e14f, subnet-391dc774

Default Cooldown: 300

Placement Groups

Suspended Processes

Enabled Metrics

Instance Protection

Auto Scaling Group: first-asg

Details	Activity History	Scaling Policies	Instances	Monitoring	Notifications	Tags	Scheduled Actions	Lifecycle Hooks
								
Filter: Any Status	<input type="text" value="Filter scaling history..."/>							
Status	Description		Start Time		End Time			
▶ Successful	Launching a new EC2 instance: i-0b57a76479d9c784e		2018 September 20 14:33:51 UTC+2		2018 September 20 14:34:23 UTC+2			
▶ Failed	Launching a new EC2 instance		2018 September 20 14:32:49 UTC+2		2018 September 20 14:32:49 UTC+2			

Auto Scaling Group: first-asg

Details Activity History Scaling Policies Instances Monitoring Notifications Tags Scheduled Actions Lifecycle Hooks

Filter: Any Status Q, Filter scaling history... 1 to 2 of 2 History Items

Click Here

Status	Description	Start Time	End Time
Successful	Launching a new EC2 instance: i-0b57a76479d9c784e Description: Launching a new EC2 instance: i-0b57a76479d9c784e Cause: At 2018-09-20T12:33:49Z an instance was started in response to a difference between desired and actual capacity, increasing the capacity from 0 to 1.	2018 September 20 14:33:51 UTC+2	2018 September 20 14:34:23 UTC+2
Failed	Launching a new EC2 instance	2018 September 20 14:32:49 UTC+2	2018 September 20 14:32:49 UTC+2

Create Auto Scaling group Actions ▾

Filter: X 1 to 1 of 1 Auto Scaling Groups

Name	Launch Configuration	Instances	Desired	Min	Max	Availability Zones	Default Cooldown	Health Check Grace Period
first-asg	first-launch-config	1	1	1	3	eu-west-3a, eu-west-3b, eu-west-3c	300	60

Auto Scaling Group: first-asg

Details Activity History Scaling Policies Instances Monitoring Notifications Tags Scheduled Actions Lifecycle Hooks Actions ▾

Filter: Any Health Status ▾ Any Lifecycle State ▾ X 1 to 1 of 1 Instances

Instance ID	Lifecycle	Launch Configuration Name	Availability Zone	Health Status	Protected from
i-0b57a76479d9c784e	InService	first-launch-config	eu-west-3c	Healthy	

EC2 Dashboard

Events

Tags

Reports

Limits

INSTANCES

Instances

Launch Templates

Spot Requests

Reserved Instances

Dedicated Hosts

AMIs

Bundle Tasks

ELASTIC BLOCK STORE

Volumes

Snapshots

NETWORK & SECURITY

Security Groups

Elastic IPs

Placement Groups

Key Pairs

Network Interfaces

Launch Instance

Connect

Actions

Filter by tags and attributes or search by keyword

1 to 2 of 2

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6
	i-0b57a76479d9c784e	t2.micro	eu-west-3c	running	Initializing	None	ec2-35-180-98-35.eu-w...	35.180.98.35	
My Second Instance	i-17f31c0d	t2.micro	eu-west-3c	running	2/2 checks ...	None	ec2-35-180-139-99.eu...	35.180.139.99	

Select an instance above

Instances

Launch Templates

Spot Requests

Reserved Instances

Dedicated Hosts

AMIs

Bundle Tasks

Volumes

Snapshots

Security Groups

Elastic IPs

Placement Groups

Key Pairs

Network Interfaces

Load Balancers

Target Groups

Launch Configurations

Auto Scaling Groups

Create target group Actions

Filter by tags and attributes or search by keyword

Name: my-apache-target-group, Port: 80, Protocol: HTTP, Target type: instance, Load Balancer: web-app-alb, VPC ID: vpc-d74714be, Monitoring: Off

Target group: my-apache-target-group

Description Targets Health checks Monitoring Tags

Basic

Click Here

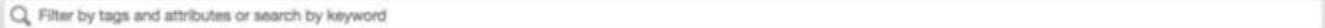
Name: my-apache-target-group
ARN: arn:aws:elasticloadbalancing:eu-west-3:387124123361:targetgroup/my-apache-target-group/18cb6ed8a1b686bc
Protocol: HTTP
Port: 80
Target type: instance
VPC: vpc-d74714be
Load balancer: web-app-alb

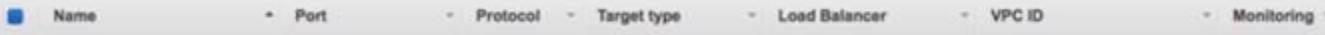
Attributes

Deregistration delay: 300 seconds
Slow start duration: 0 seconds

Actions 

Create target group 

 Filter by tags and attributes or search by keyword

 **Name** **Port** **Protocol** **Target type** **Load Balancer** **VPC ID** **Monitoring**

Name	Port	Protocol	Target type	Load Balancer	VPC ID	Monitoring
my-apache-target-group	80	HTTP	instance	web-app-alb	vpc-d74714be	

Target group: **my-apache-target-group** 

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.

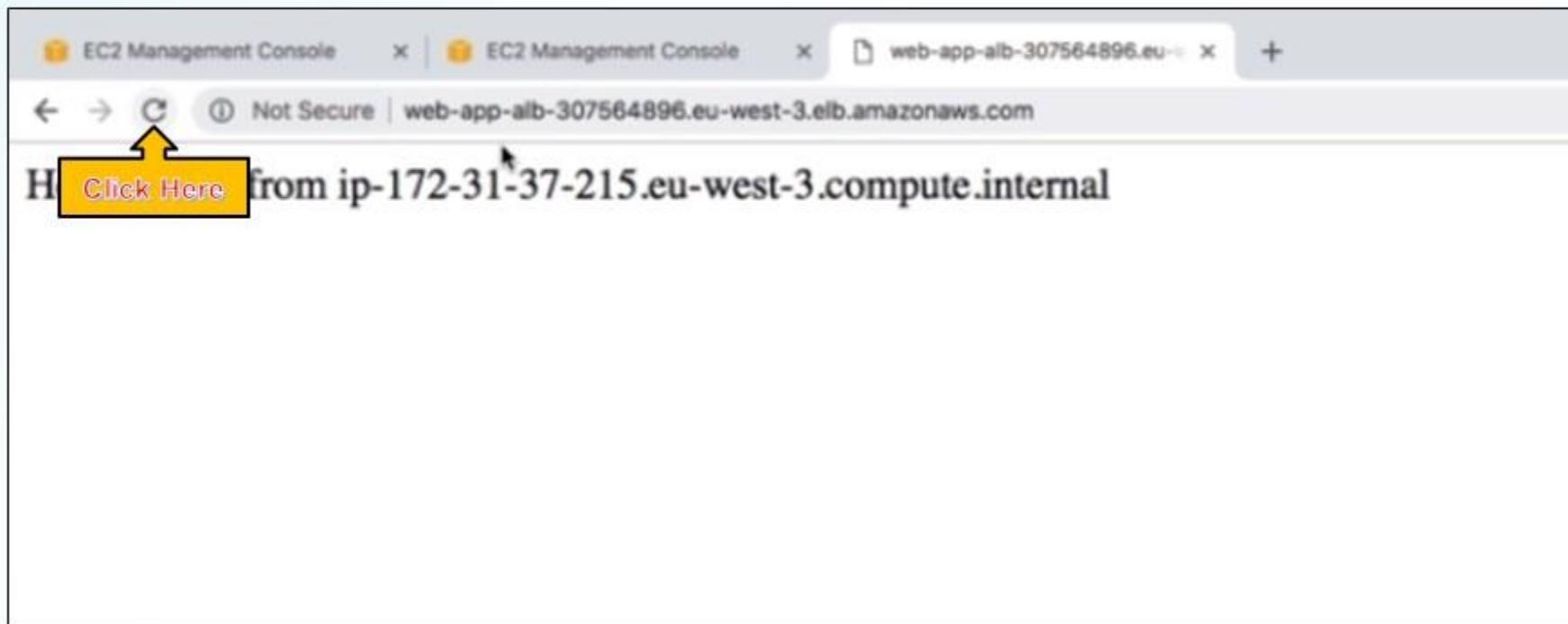
Edit 

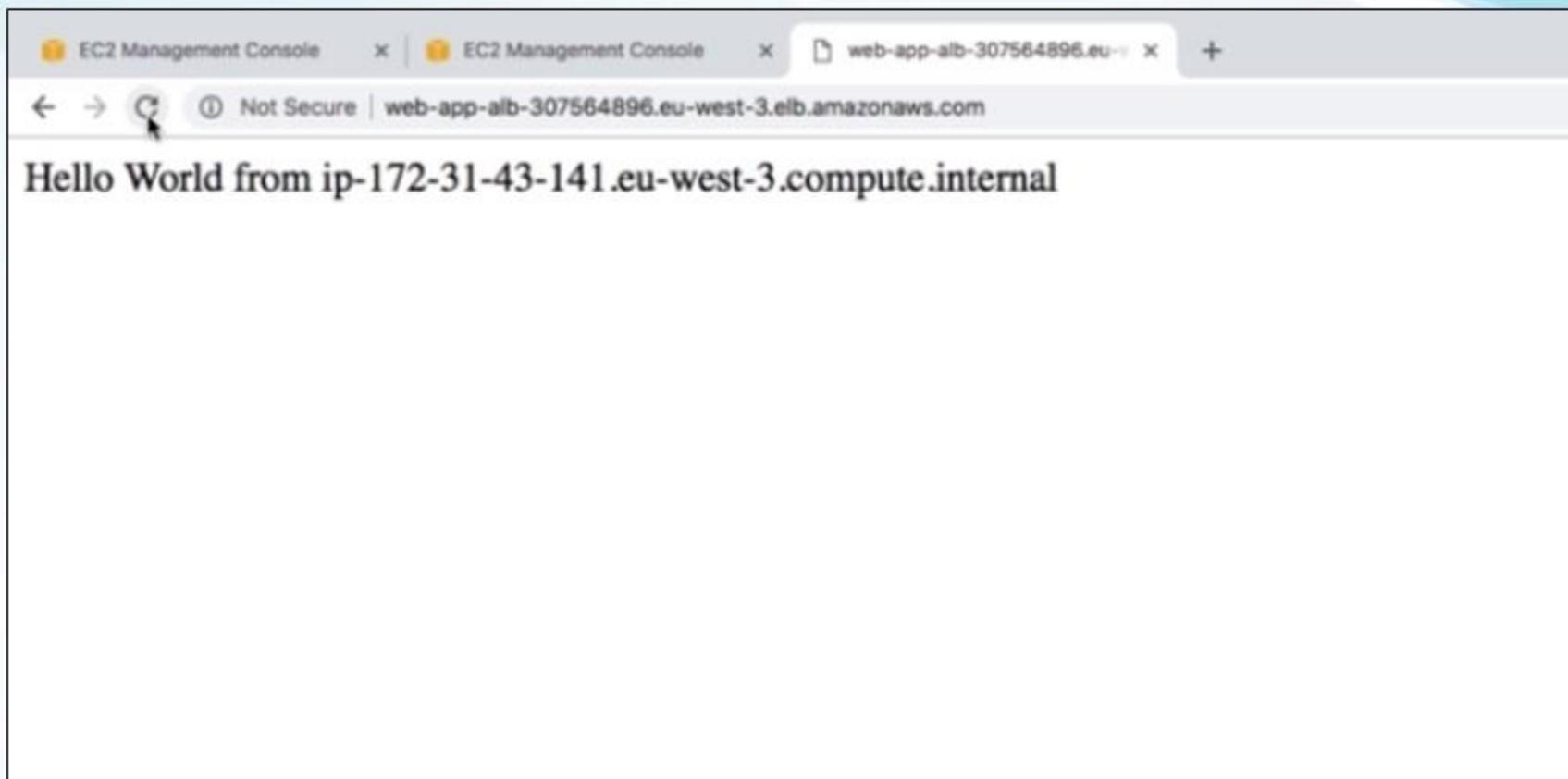
Registered targets

Instance ID	Name	Port	Availability Zone	Status
i-17f31c0d	My Second Instance	80	eu-west-3c	healthy 
i-0b57a76479d9c784e		80	eu-west-3c	healthy 

Availability Zones

Availability Zone	Target count	Healthy?
eu-west-3c	2	Yes





EC2 Dashboard

Events

Tags

Reports

Limits

INSTANCES

Instances

Launch Templates

Spot Requests

Reserved Instances

Dedicated Hosts

IMAGES

AMIs

Bundle Tasks

ELASTIC BLOCK STORE

Volumes

Snapshots

NETWORK & SECURITY

Security Groups

Launch Instance

Connect

Actions

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Stat
	i-0b57a76479d9c784e	t2.micro	eu-west-3c	running	2/2 checks ...	None
My Second Instance			eu-west-3c	running	2/2 checks ...	None

Instance: i-17f31c0d (My Second Instance) 80-139-99.eu-west-3.compute.amazonaws.com

Description Status Checks Monitoring Click Here

Instance ID	i-17f31c0d	Public DNS (IPv4)	ec2-35-
Instance state	running	IPv4 Public IP	35.180.
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-172-3-
Availability zone	eu-west-3c	Private IPs	172.31.
Security groups	my-first-security-group, view inbound rules, view outbound rules	Secondary private IPs	

Let's terminate the instance which we created manually earlier.

Terminate Instances

X

⚠ Warning

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-17f31c0d (My Second Instance, ec2-35-180-139-99.eu-west-3.compute.amazonaws.com)

Cancel

Yes, Terminate

Click Here

EC2 Dashboard

Events

Tags

Reports

Limits

INSTANCES

Instances

Launch Templates

Spot Requests

Reserved Instances

Dedicated Hosts

IMAGES

AMIs

Bundle Tasks

ELASTIC BLOCK STORE

Volumes

Snapshots

NETWORK & SECURITY

Security Groups

Elastic IPs

Placement Groups

Key Pairs

Network Interfaces

LOAD BALANCING

Load Balancers

Target Groups

All IT/IT+ RELATED

Create Auto Scaling group

Actions

Filter: Filter Auto Scaling groups...

1 to 1 of 1 Auto Scaling Groups

Name	Launch Configuration	Instances	Desired	Min	Max	Availability Zones	Default Cooldown	Health Check Grace
first-asg	first-launch-config	1	1	1	3	eu-west-3a, eu-west-3b, eu...	300	60

Auto Scaling Group: first-asg

Details Activity History Scaling Policies Instances Monitoring Notifications Tags Scheduled Actions Lifecycle Hooks

Launch Template	first-launch-config	Termination Policies	Default
Launch Template Version	-	Creation Time	Thu Sep 20 14:32:44 GMT+200 2018
Launch Configuration	first-launch-config	Availability Zone(s)	eu-west-3a, eu-west-3b, eu-west-3c
Service-Linked Role	arn:aws:iam::387124123361:role/aws-service-role/autoscaling.amazonaws.com/AWSS...	Subnet(s)	subnet-c2b2ccab,subnet-3470e14f,subnet-391dc774
Classic Load Balancers	my-apache-target-group	Default Cooldown	300
Target Groups	1	Placement Groups	
Desired Capacity	1	Suspended Processes	
Min	1	Enabled Metrics	
Max	3	Instance Protection	

Click Here

Create Auto Scaling group Actions ▾

Filter: X

1 to 1 of 1 Auto Scaling Groups

Name	Launch Configuration	Instances	Desired	Min	Max	Availability Zones	Default Cooldown	Health Check Grace Period
first-asg	first-launch-config	1	1	1	3	eu-west-3a, eu-west-3b, eu-west-3c	300	60

Launch Instances Using Launch Template Launch Configuration

Launch Configuration first-launch-config

Service-Linked Role arn:aws:iam::387124123361:role/aws-service-role/autoscaling.amazonaws.com/AWSServiceRoleForAutoScaling

Classic Load Balancers

Target Groups my-apache-target-group X

Desired Capacity

Min

Max

Health Check Type

Termination Policies Default X

Creation Time Thu Sep 20 14:32:44 GMT+200 2018

Availability Zone(s) X

Subnet(s)

Default Cooldown

Placement Groups

Suspended Processes

Auto Scaling Group: first-asg

Details Activity History Scaling Policies Instances Monitoring Notifications Tags Scheduled Actions Lifecycle Hooks

Launch Template	(i)	-	Termination Policies	(i)	Default
Launch Template Version	(i)	-	Creation Time	(i)	Thu Sep 20 14:32:44 GMT+200 2018
Launch Configuration	(i)	first-launch-config	Availability Zone(s)	(i)	eu-west-3a, eu-west-3b, eu-west-3c
Service-Linked Role	(i)	arn:aws:iam::387124123361:role/aws-service-role/autoscaling.amazonaws.com/AWSS...	Subnet(s)	(i)	subnet-c2b2ccab,subnet-3470e14f,subnet-391dc774
Classic Load Balancers	(i)		Default Cooldown	(i)	300
Target Groups	(i)	my-apache-target-group	Placement Groups	(i)	
Desired Capacity	(i)	2	Suspended Processes	(i)	
Min	(i)	1	Enabled Metrics	(i)	
Max	(i)	3	Instance Protection	(i)	

Click Here 

Creates Auto Scaling group Actions ▾

Filter: Filter Auto Scaling groups... X

1 to 1 of 1 Auto Scaling Groups

Name	Launch Configuration	Instances	Desired	Min	Max	Availability Zones	Default Cooldown	Health Check Grace
first-asg	first-launch-config	1 i	2	1	3	eu-west-3a, eu-west-3b, eu...	300	60

Auto Scaling Group: first-asg

Details Activity History Scaling Policies Instances Monitoring Notifications Tags Scheduled Actions Lifecycle Hooks

Click Here

Status	Description	Start Time	End Time
Not yet in service	Launching a new EC2 instance: i-05adcc68933809eda	2018 September 20 14:39:24 UTC+2	
Successful	Launching a new EC2 instance: i-0b57a76479d9c784e	2018 September 20 14:33:51 UTC+2	2018 September 20 14:34:23 UTC+2
Failed	Launching a new EC2 instance	2018 September 20 14:32:49 UTC+2	2018 September 20 14:32:49 UTC+2

EC2 Dashboard

Events

Tags

Reports

Limits

INSTANCES

- Instances
- Launch Templates
- Spot Requests
- Reserved Instances
- Dedicated Hosts

IMAGES

- AMIs
- Bundle Tasks

ELASTIC BLOCK STORE

- Volumes
- Snapshots

NETWORK & SECURITY

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

LOAD BALANCING

- Load Balancers
- Target Groups

Create Auto Scaling group

Actions ▾

Filter: Filter Auto Scaling groups... X

1 to 1 of 1 Auto Scaling Groups < > ▾

Name	Launch Configuration	Instances	Desired	Min	Max	Availability Zones	Default Cooldown	Health Check Grace
first-asg	first-launch-config	2	2	1	3	eu-west-3a, eu-west-3b, eu...	300	60

Auto Scaling Group: first-asg

Details Activity History Scaling Policies Instances Monitoring Notifications Tags Scheduled Actions Lifecycle Hooks Actions ▾

Filter: Any Health Status ▾ Any Lifecycle State ▾ Filter Instances... X

1 to 2 of 2 Instances < > ▾

Instance ID	Lifecycle	Launch Configuration Name	Availability Zone	Health Status	Protected from
i-05adccff33380f9fa	Pending	first-launch-config	eu-west-3a	Healthy	
i-0b57223d9c784e	InService	first-launch-config	eu-west-3c	Healthy	

Click Here

EC2 Management Console

Launch Instance Connect Actions

search : i-05adcce6933809eda Add filter

1 to 1 of 1

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6
	i-05adcce6933809eda	t2.micro	eu-west-3a	running	Initializing	None	ec2-35-180-136-101.eu...	35.180.136.101	-

Instance: i-05adcce6933809eda Public DNS: ec2-35-180-136-101.eu-west-3.compute.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID	i-05adcce6933809eda	Public DNS (IPv4)	ec2-35-180-136-101.eu-west-3.compute.amazonaws.com
Instance state	running	IPv4 Public IP	35.180.136.101
Instance type	t2.micro	IPv6 IPs	-
Elastic IPs		Private DNS	ip-172-31-3-136.eu-west-3.compute.internal
Availability zone	eu-west-3a	Private IPs	172.31.3.136
Security groups	my-first-security-group, view inbound rules, view outbound rules	Secondary private IPs	
Scheduled events	No scheduled events	VPC ID	vpc-d74714be
AMI ID	amzn2-ami-hvm-2.0.20180810-x86_64-gp2 (ami-06340c8c12baa6a09)	Subnet ID	subnet-c2b2ccab
Platform	-	Network interfaces	eth0
IAM role	-	Source/dest. check	True
Key pair name	EC2 Tutorial	T2 Unlimited	Disabled

Click Here

Load Balancers Target Groups

SEARCHED RESULTS

Create target group Actions ▾

Filter by tags and attributes or search by keyword

1 to 1 of 1

Name	Port	Protocol	Target type	Load Balancer	VPC ID	Monitoring
my-apache-target-group	80	HTTP	instance	web-app-alb	vpc-d74714be	

Target group: my-apache-target-group

Description Targets **Health checks** Monitoring Tags

Basic Configuration

Click Here

Name	my-apache-target-group
ARN	arn:aws:elasticloadbalancing:eu-west-3:387124123361:targetgroup/my-apache-target-group/18cb6ed8a1b686bc
Protocol	HTTP
Port	80
Target type	instance
VPC	vpc-d74714be
Load balancer	web-app-alb

Attributes

Deregistration delay 300 seconds

AMIs

Bundle Tasks

ELASTIC BLOCK STORE

Volumes

Snapshots

NETWORK & SECURITY

Security Groups

Elastic IPs

Placement Groups

Key Pairs

Network Interfaces

LOAD BALANCING

Load Balancers

Target Groups

AUTO SCALING

Launch Configurations

Auto Scaling Groups

SYSTEMS MANAGER SERVICES

Run Command

State Manager

Configuration Compliance

The screenshot shows the AWS Lambda console with the sidebar navigation open. The 'Target Groups' option is selected, indicated by a yellow box and an arrow pointing to it. The main content area shows a table of target groups with one entry: 'my-apache-target-group'. The table columns are: Name, Port, Protocol, Target type, Load Balancer, VPC ID, and Monitoring. The entry details are: Name - my-apache-target-group, Port - 80, Protocol - HTTP, Target type - Instance, Load Balancer - web-app-alb, VPC ID - vpc-d74714be, and Monitoring - (checkbox). Below the table, the 'Health checks' tab is selected, showing configuration details for the target group. A yellow box with the text 'Click Here' is overlaid on the 'Edit health check' button. The 'Targets' tab is also highlighted with a yellow box and an arrow pointing to it.

Name	Port	Protocol	Target type	Load Balancer	VPC ID	Monitoring
my-apache-target-group	80	HTTP	Instance	web-app-alb	vpc-d74714be	<input type="checkbox"/>

Target group: my-apache-target-group

Description Targets **Health checks** Monitoring Tags

Protocol: HTTP
Path: /
Port: traffic port
Healthy threshold: 5
Unhealthy threshold: 2
Timeout: 5
Interval: 30
Success codes: 200

Click Here **Edit health check**

Navigation sidebar (partial):

- Unpublished items
- Images
- AMIs
- Bundle Tasks
- Elastic Block Store
- Volumes
- Snapshots
- Network & Security
- Security Groups
- Elastic IPs
- Placement Groups
- Key Pairs
- Network Interfaces
- Load Balancers
- Target Groups**
- Auto Scaling
- Launch Configurations
- Auto Scaling Groups
- Systems Manager Services
- Run Command
- State Manager
- Configuration Compliance

UNPUBLISHED PUBLISH

[Create target group](#) [Actions](#)

Filter by tags and attributes or search by keyword

1 to 1 of 1

Name	Port	Protocol	Target type	Load Balancer	VPC ID	Monitoring
my-apache-target-group	80	HTTP	instance	web-app-alb	vpc-d74714be	Edit

Target group: my-apache-target-group

[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.

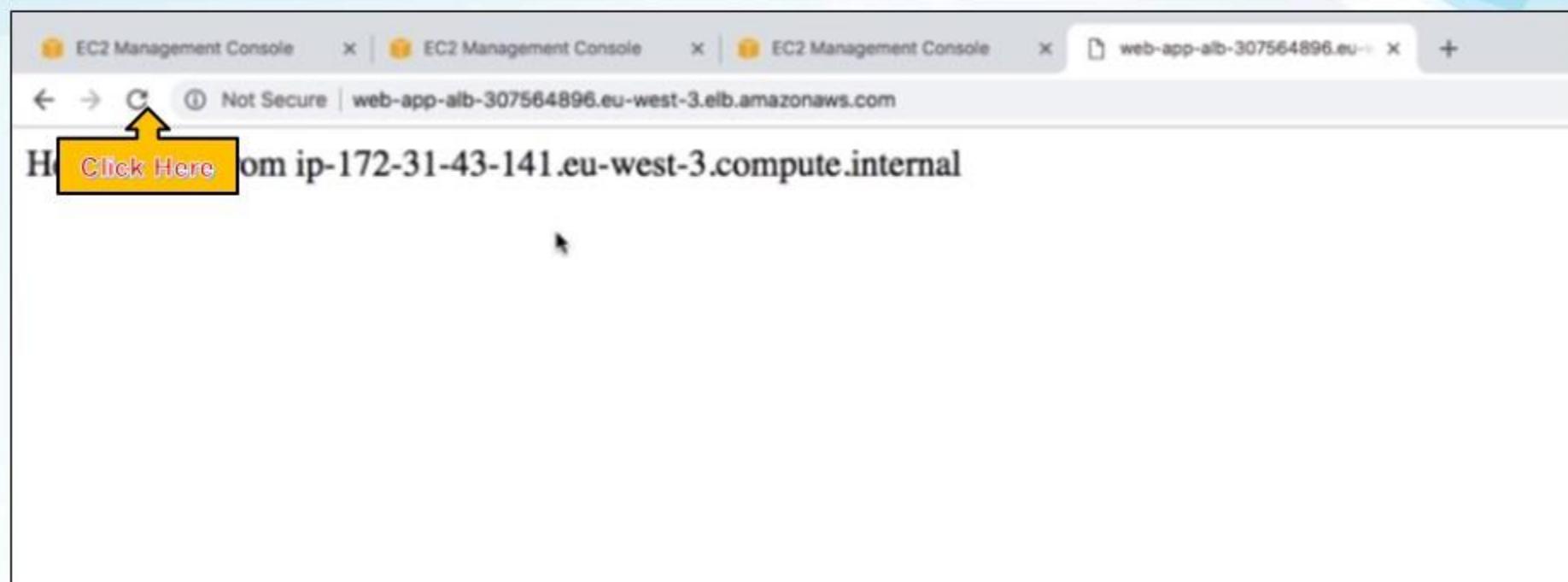
[Edit](#)

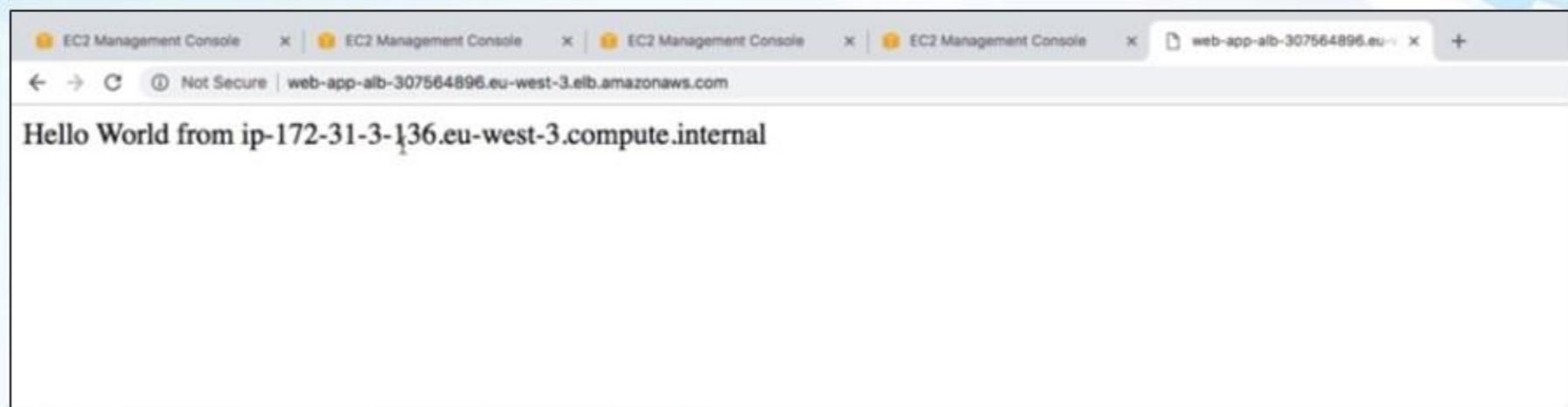
Registered targets

Instance ID	Name	Port	Availability	Status
i-0b57a78479d9c784e		80	eu-west-3c	Target registration is in progress
i-05adcc6933829eda		80	eu-west-3a	initial

Availability Zones

Availability Zone	Target count	Healthy?
eu-west-3a	1	No (Availability Zone contains no healthy targets)
eu-west-3c	1	Yes





EC2 Dashboard

Events

Tags

Reports

Limits

INSTANCES

- Instances
- Launch Templates
- Spot Requests
- Reserved Instances
- Dedicated Hosts

IMAGES

- AMIs
- Bundle Tasks

ELASTIC BLOCK STORE

- Volumes
- Snapshots

NETWORK & SECURITY

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

LOAD BALANCING

- Load Balancers
- Target Groups

Create Auto Scaling group Actions ▾

Filter: Q Filter Auto Scaling groups... 1 to 1 of 1 Auto Scaling Groups

Name	Launch Configuration	Instances	Desired	Min	Max	Availability Zones	Default Cooldown	Health Check Grace Period
first-asg	first-launch-config	2	2	1	3	eu-west-3a, eu-west-3b, eu-west-3c	300	60

Auto Scaling Group: first-asg

Details Activity History Scaling Policies Instances Monitoring Notifications Tags Scheduled Actions Lifecycle Hooks

Launch Template	-	Termination Policies	Default
Launch Template Version	-	Creation Time	Thu Sep 20 14:32:44 GMT+200 2018
Launch Configuration	first-launch-config	Availability Zone(s)	eu-west-3a, eu-west-3b, eu-west-3c
Service-Linked Role	arn:aws:iam::387124123361:role/aws-service-role/autoscaling.amazonaws.com/AWSS...	Subnet(s)	subnet-c2b2ccab, subnet-3470e14f, subnet-391dc774
Classic Load Balancers	-	Default Cooldown	300
Target Groups	my-apache-target-group	Placement Groups	-
Desired Capacity	2	Suspended Processes	-
Min	1	Enabled Metrics	-
Max	3	Instance Protection	-

Click Here

EC2 Dashboard

Events

Tags

Reports

Limits

INSTANCES

- Instances
- Launch Templates
- Spot Requests
- Reserved Instances
- Dedicated Hosts

IMAGES

- AMIs
- Bundle Tasks

ELASTIC BLOCK STORE

- Volumes
- Snapshots

NETWORK & SECURITY

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

LOAD BALANCING

- Load Balancers
- Target Groups

All ITIN Resources

Create Auto Scaling group

Actions

Filter: Filter Auto Scaling groups...

1 to 1 of 1 Auto Scaling Groups

Name	Launch Configuration	Instances	Desired	Min	Max	Availability Zones	Default Cooldown	Health Check Grace
first-asg	first-launch-config	2	2	1	3	eu-west-3a, eu-west-3b, eu...	300	60

Launch Instances Using Launch Template Launch Configuration

Launch Configuration first-launch-config

Service-Linked Role arn:aws:iam::387124123361:role/aws-service-role/autoscaling.amazonaws.com/AWSServiceRoleForAutoScaling

Classic Load Balancers

Target Groups my-apache-target-group

Desired Capacity 1

Min 1

Max 3

Termination Policies Default

Creation Time Thu Sep 20 14:32:44 GMT+200 201

Availability Zone(s) eu-west-3a eu-west-3b eu-west-3c

Subnet(s) subnet-c2b2ccab(172.31.0.0/20) | Default in eu-west-3a

Click Here 

Default Cooldown 300

Placement Groups

Auto Scaling Group: first-asg

Details	Activity History	Scaling Policies	Instances	Monitoring	Notifications	Tags	Scheduled Actions	Lifecycle Hooks
Launch Template	first-launch-template	first-launch-template	-	-	-	-	Termination Policies	Default
Launch Template Version	1	1	-	-	-	-	Creation Time	Thu Sep 20 14:32:44 GMT+200 2018
Launch Configuration	1	1	first-launch-config	first-launch-config	-	-	Availability Zone(s)	eu-west-3a, eu-west-3b, eu-west-3c
Service-Linked Role	1	1	arn:aws:iam::387124123361:role/aws-service-role/autoscaling.amazonaws.com/AWSS...	arn:aws:iam::387124123361:role/aws-service-role/autoscaling.amazonaws.com/AWSS...	-	-	Subnet(s)	subnet-c2b2ccab,subnet-3470e14f,subnet-391dc774
Classic Load Balancers	1	1	-	-	-	-	Default Cooldown	300
Target Groups	1	1	my-apache-target-group	my-apache-target-group	-	-	Placement Groups	-
Desired Capacity	1	1	1	1	-	-	Suspended Processes	-
Min	1	1	1	1	-	-	Enabled Metrics	-
					-	-	Instance Protection	-

Click Here

Create Auto Scaling group Actions

Filter: X 1 to 1 of 1 Auto Scaling Groups »

Name	Launch Configuration	Instances	Desired	Min	Max	Availability Zones	Default Cooldown	Health Check Grace Period
first-asg	first-launch-config	2 ⓘ	1	1	3	eu-west-3a, eu-west-3b, eu-west-3c	300	60

Auto Scaling Group: first-asg

Details Activity History Scaling Policies Instances Monitoring Notifications Tags Scheduled Actions Lifecycle Hooks

Filter: Any Status 1 to 4 of 4 History Items »

Status	Description	Start Time	End Time
Waiting for ELB connection draining	Terminating EC2 instance: i-0b57a76479d9c784e - Waiting for ELB connection draining	2018 September 20 14:50:59 UTC+2	
Successful	Launching a new EC2 instance: i-05adcce6933809eda - Successful	2018 September 20 14:39:24 UTC+2	2018 September 20 14:39:56 UTC+2
Successful	Launching a new EC2 instance: i-0b57a76479d9c784e - Successful	2018 September 20 14:33:51 UTC+2	2018 September 20 14:34:23 UTC+2
Successful	Launching a new EC2 instance - Successful	2018 September 20 14:32:49 UTC+2	2018 September 20 14:32:49 UTC+2

Click Here 

Auto Scaling Group: first-asg

Details Activity History Scaling Policies Instances Monitoring Notifications Tags Scheduled Actions Lifecycle Hooks

Status	Description	Start Time	End Time
Waiting for ELB connection draining	Terminating EC2 instance: i-0b57a76479d9c784e - Wa...	2018 September 20 14:50:59 UTC+2	
	Description: Terminating EC2 instance: i-0b57a76479d9c784e - Waiting For ELB Connection Draining.		
	Cause: At 2018-09-20T12:50:55Z a monitor alarm TargetTracking-first-asg-AlarmLow-3b916549-3c68-48b3-bed8-e4dd41880c10 in state ALARM triggered policy Scale Group Size changing the desired capacity from 2 to 1. At 2018-09-20T12:50:59Z an instance was taken out of service in response to a difference between desired and actual capacity, shrinking the capacity from 2 to 1. At 2018-09-20T12:50:59Z instance i-0b57a76479d9c784e was selected for termination.		
Successful	Launching a new EC2 instance: i-05adcce6933809eda	2018 September 20 14:39:24 UTC+2	2018 September 20 14:39:56 UTC+2
Successful	Launching a new EC2 instance: i-0b57a76479d9c784e	2018 September 20 14:33:51 UTC+2	2018 September 20 14:34:23 UTC+2

Auto Scaling Groups for Solutions Architects

ASG for Solutions Architects

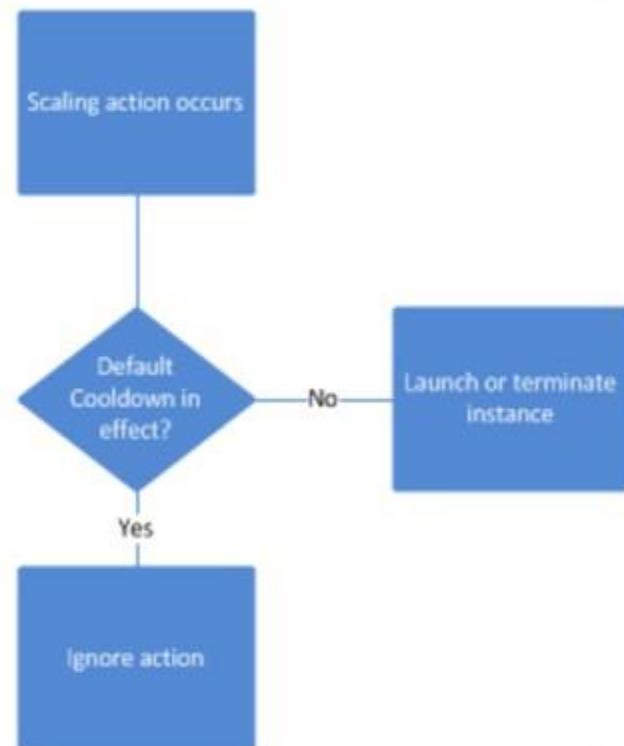
- ASG Default Termination Policy (simplified version):
- Find the AZ which has the most number of instances
- If there are multiple instances in the AZ to choose from, delete the one with the oldest launch configuration
- ASG tries to balance the number of instances across AZ by default

- **V1 – Launch Configuration 1**
- **V2 – Launch Configuration 2**



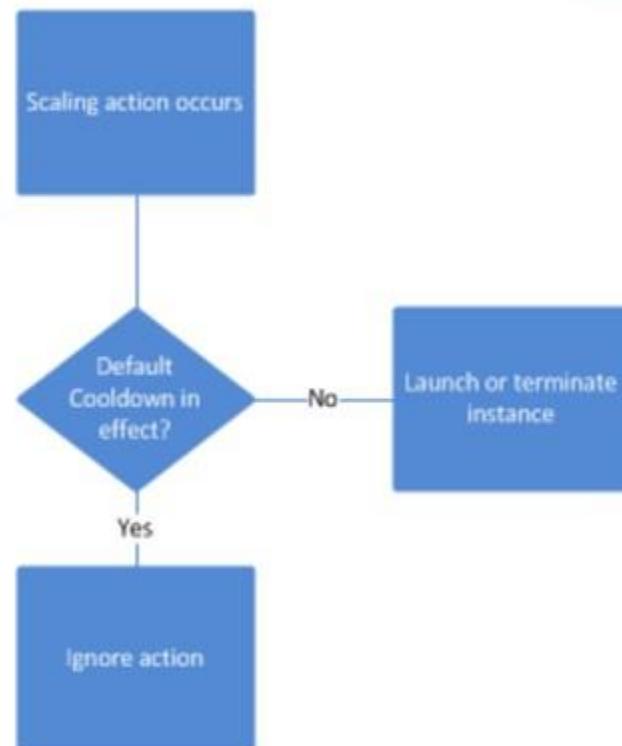
ASG for Solutions Architects Scaling Cooldowns

- The cooldown period helps to ensure that your Auto Scaling group doesn't launch or terminate additional instances before the previous scaling activity takes effect.
- In addition to default cooldown for Auto Scaling group, we can create cooldowns that apply to a specific **simple scaling policy**
- A scaling-specific cooldown period overrides the default cooldown period.



ASG for Solutions Architects Scaling Cooldowns

- If the default cooldown period of 300 seconds is too long—you can reduce costs by applying a scaling-specific cooldown period of 180 seconds to the scale-in policy.
- If your application is scaling up and down multiple times each hour, modify the Auto Scaling Groups cool-down timers and the CloudWatch Alarm Period that triggers the scale in



<https://docs.aws.amazon.com/autoscaling/ec2/userguide/Cooldown.html>

Fundamentals 2 Quiz

Question 1:

Load Balancers provide a

- static IPv4 we can use in our application
- static DNS name we can use in our application
- static IPv6 we can use in our application

Question 2:

You are running a website with a load balancer and 10 EC2 instances. Your users are complaining about the fact that your website always asks them to re-authenticate when they switch pages. You are puzzled, because it's working just fine on your machine and in the dev environment with 1 server. What could be the reason?

The application must have a bug

The Load Balancer does not have stickiness enabled

The EC2 instances log out users because they don't see their true IPs

Question 3:

Your application is using an Application Load Balancer. It turns out your application only sees traffic coming from private IP which are in fact your load balancer's. What should you do to find the true IP of the clients connected to your website?

Modify the front-end of the website so that the users send their IP in the requests

 Look into the X-Forwarded-For header in the backend

Look into the X-Forwarded-Proto header in the backend

Question 4:

You quickly created an ELB and it turns out your users are complaining about the fact that sometimes, the servers just don't work. You realise that indeed, your servers do crash from time to time. How to protect your users from seeing these crashes?

Enable Stickiness



Enable Health Checks

Enable SSL Termination

Question 5:

You are designing a high performance application that will require millions of connections to be handled, as well as low latency. The best Load Balancer for this is

Application Load Balancer

Classic Load Balancer

Network Load Balancer

Question 6:

Application Load Balancers handle all these protocols except

HTTP

HTTPS

Websocket

TCP

Question 7:

The application load balancer can route to different target groups based on all these except...

Hostname

Request Path

Client IP

Question 8:

You are running at desired capacity of 3 and the maximum capacity of 3. You have alarms set at 60% CPU to scale out your application. Your application is now running at 80% capacity. What will happen?



Nothing

- The desired capacity will go up to 4 and the maximum will stay at 3
- The desired capacity will go up to 4 and the maximum will stay at 4

Question 9:

I have an ASG and an ALB, and I setup my ASG to get health status of instances thanks to my ALB. One instance has just been reported unhealthy. What will happen?

- The ASG will keep the instance running and re-start the application
- The ASG will detach the EC2 instance from the group, and leave it running
- The ASG will terminate the EC2 Instance

Question 10:

Your boss wants to scale your ASG based on the number of requests per minute your application makes to your database.

You politely tell him it's impossible

You create a CloudWatch custom metric and build an alarm on this to scale your ASG

You enable detailed monitoring and use that to scale your ASG

Question 11:

Scaling an instance from an r4.large to an r4.4xlarge is called

Horizontal Scalability

Vertical Scalability

Question 12:

Running an application on an auto scaling group that scales the number of instances in and out is called

Vertical Scalability



Horizontal Scalability

Question 13:

You would like to expose a fixed static IP to your end users for compliance purposes, so they can write firewall rules that will be stable and approved by regulators. Which Load Balancer should you use?

Application Load Balancer with Elastic IP attached to it



Network Load Balancer

Classic Load Balancer

Question 14:

A web application hosted in EC2 is managed by an ASG. You are exposing this application through an Application Load Balancer. The ALB is deployed on the VPC with the following CIDR: 192.168.0.0/18. How do you configure the EC2 instance security group to ensure only the ALB can access the port 80?

- Open up the EC2 security group on port 80 to 0.0.0.0/0
- Open up the EC2 security group on port 80 to 192.168.0.0/18
- Open up the EC2 security on port 80 to the ALB's security group
- Load an SSL client certificate on the ALB

Question 15:

Your application load balancer is hosting 3 target groups with hostnames being users.example.com, api.external.example.com and checkout.example.com. You would like to expose HTTPS traffic for each of these hostnames. How do you configure your ALB SSL certificates to make this work?

- Use SNI
- Use a wildcard SSL certificate
- Use an HTTP to HTTPS redirect rule
- Use a security group SSL certificate

Question 16:

An ASG spawns across 2 availability zones. AZ-A has 3 EC2 instances and AZ-B has 4 EC2 instances. The ASG is about to go into a scale-in event. What will happen?

- The AZ-A will terminate an instance randomly
- The AZ-A will terminate the instance with the oldest launch configuration
- The AZ-B will terminate the instance with the oldest launch configuration
- The AZ-B will terminate an instance randomly
- The AZ-A will create an EC2 instance.

Thank You