

AWS Solutions Architect Training

**Problem Statement:**

You work for XYZ Corporation that uses on-premise solutions and a limited number of systems. With the increase in requests in their application, the load also increases. So, to handle the load the corporation has to buy more systems almost on a regular basis. Realizing the need to cut down the expenses on systems, they decided to move their infrastructure to AWS.

**Tasks To Be Performed:**

1. Manage the scaling requirements of the company by:
  - a. Deploying multiple compute resources on the cloud as soon as the load increases and the CPU utilization exceeds 80%
  - b. Removing the resources when the CPU utilization goes under 60%
2. Create a load balancer to distribute the load between compute resources.
3. Route the traffic to the company's domain.

https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

EC2 EFS VPC S3 RDS IAM CloudWatch Lambda Simple Queue Service CloudFormation Simple Notification Service

EC2 Instances Launch an instance

**Name and tags** Info

Name: Module 4: Case Study- 1 Add additional tags

**Application and OS Images (Amazon Machine Image)** Info

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below.

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Quick Start AMIs: Amazon Linux, macOS, Ubuntu, Windows, Red Hat, SUSE Linux, Debian

Browse more AMIs Including AMIs from AWS Marketplace and the Community

**Summary**

Number of instances: Info 1

Software Image (AMI)  
Canonical, Ubuntu, 24.04, amd64... read more  
ami-0e2c8caa4b6378d8c

Virtual server type (instance type)  
t2.micro

Firewall (security group)  
New security group

Storage (volumes)  
1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4

Cancel Preview code Launch instance

The screenshot shows the AWS EC2 Instances page. On the left, a navigation pane includes 'Instances' (selected), 'Images', 'Elastic Block Store', and other services like EC2, EFS, VPC, RDS, IAM, CloudWatch, Lambda, Simple Queue Service, CloudFormation, and Simple Notification Service. The main content area displays 'Instances (1) Info' with a search bar and filters. A single instance is listed: 'Module 4: Case Study- 1' (Instance ID: i-0a34e8aeb497c5531, Status: Running, Type: t2.micro). Below this, a section titled 'Select an instance' is visible.

Instances (1) [Info](#)

Last updated less than a minute ago

Find Instance by attribute or tag (case-sensitive)

Instance ID = i-0a34e8aeb497c5531 [Clear filters](#)

All states [▼](#)

Connect [Instance state ▾](#) [Actions ▾](#) [Launch instances](#)

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
Module 4: Cas...	i-0a34e8aeb497c5531	Running	t2.micro	Initializing	<a href="#">View alarms +</a>	us-east-1c	ec2-54-225-5-18.co

Select an instance

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The screenshot shows the 'Connect to instance' configuration page for the selected instance. It includes tabs for 'EC2 Instance Connect', 'Session Manager', 'SSH client', and 'EC2 serial console'. The 'EC2 Instance Connect' tab is active. It shows the instance ID (i-0a34e8aeb497c5531) and a 'Connection Type' section with two options: 'Connect using EC2 Instance Connect' (selected) and 'Connect using EC2 Instance Connect Endpoint'. Below this are fields for 'Public IPv4 address' (54.225.5.18) and 'Username' (ubuntu). A note at the bottom states: 'Note: In most cases, the default username, ubuntu, is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI username.'

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```
Memory usage: 2% Swap usage: 0% Expanded Security Maintenance for Applications is not enabled. 0 updates can be applied immediately. Enable ESM Apps to receive additional future security updates. See https://ubuntu.com/esm or run: sudo pro status The list of available updates is more than a week old. To check for new updates run: sudo apt update The programs included with the Ubuntu system are free software; the exact distribution terms for each program are described in the individual files in /usr/share/doc/*copyright*. Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by applicable law. To run a command as administrator (user "root"), use "sudo <command>". See "man sudo_root" for details. ubuntu@ip-172-31-43-93:~$ sudo apt get update E: Invalid operation get ubuntu@ip-172-31-43-93:~$ sudo apt-get update[red box]
```

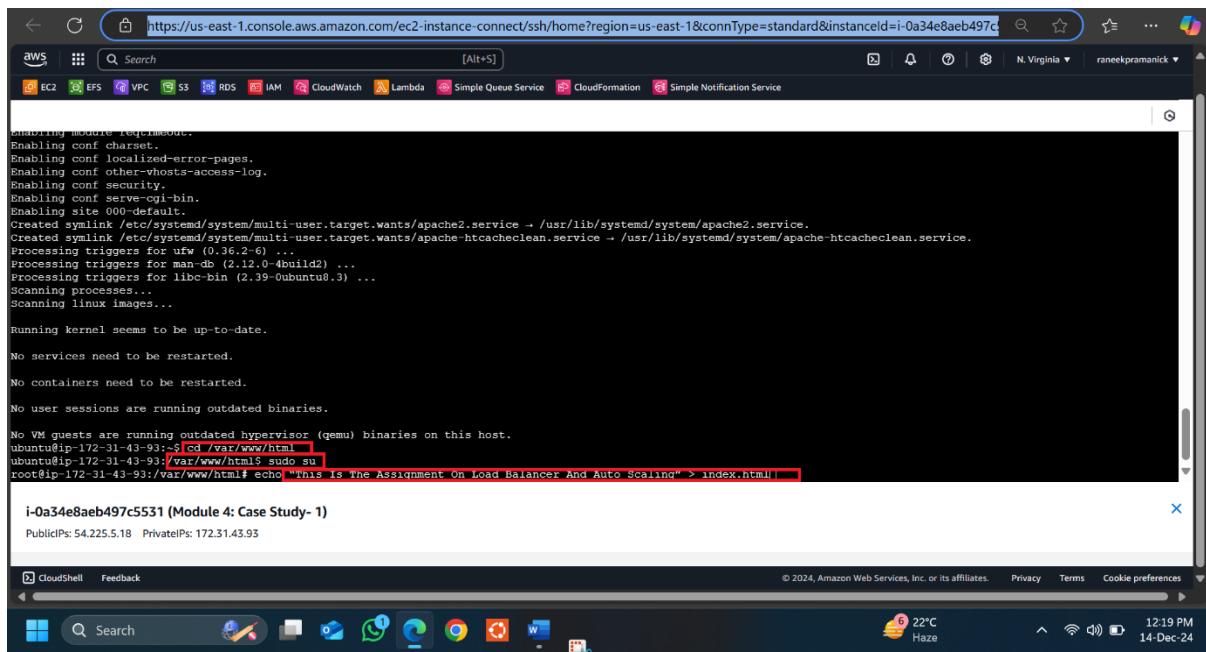
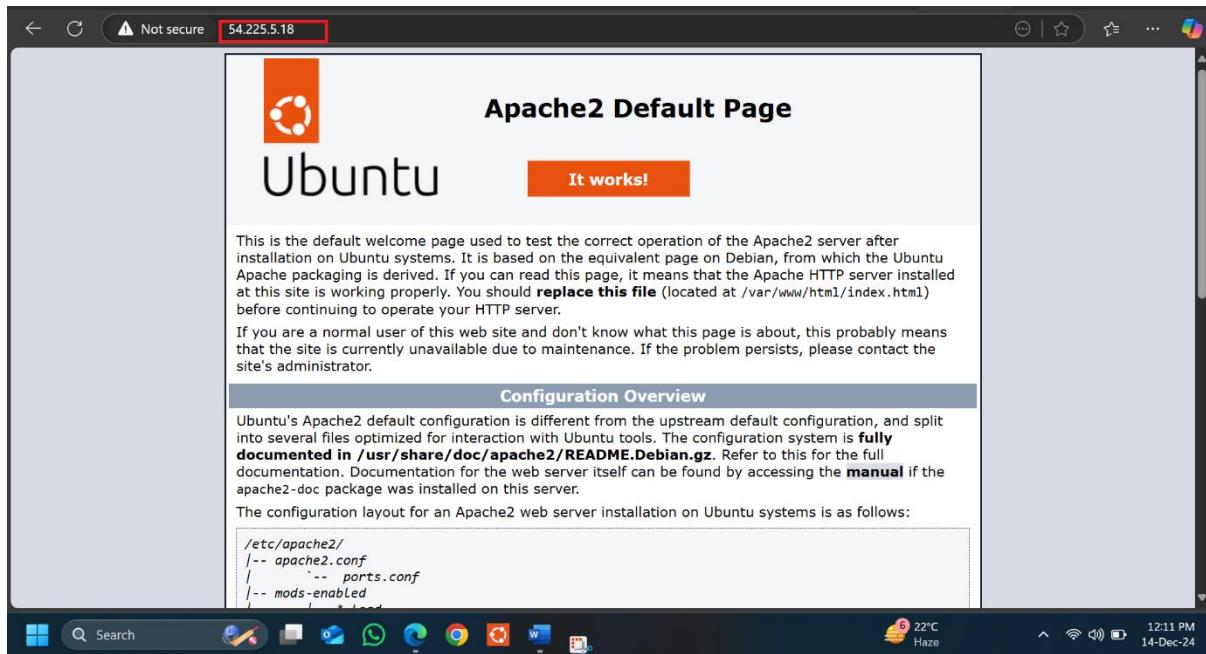
i-0a34e8aebe497c5531 (Module 4: Case Study- 1)  
PublicIPs: 54.225.5.18 PrivateIPs: 172.31.43.93

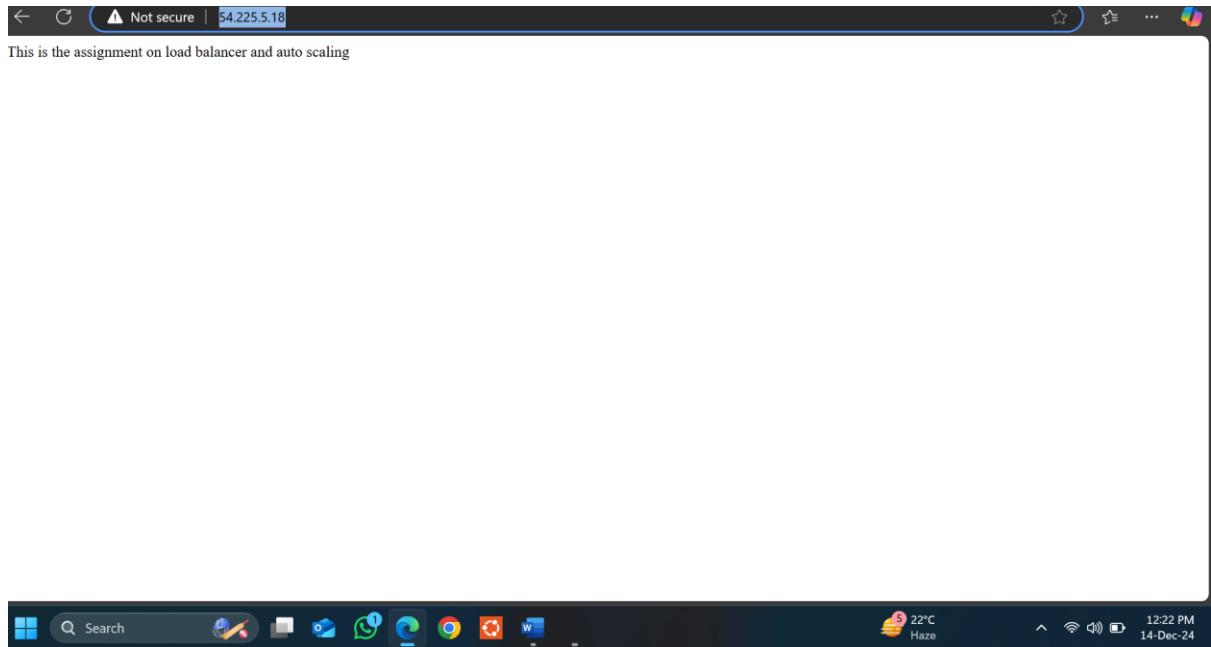
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```
Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/restricted Translation-en [104 kB]
Get:26 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Components [212 B]
Get:27 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Packages [104 B]
Get:28 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/multiverse Translation-en [2044 B]
Get:29 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Components [940 B]
Get:30 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 c-n-f Metadata [552 B]
Get:31 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/main amd64 Components [208 B]
Get:32 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/main amd64 c-n-f Metadata [112 B]
Get:33 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/universe amd64 Packages [10.7 kB]
Get:34 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/universe Translation-en [10.8 kB]
Get:35 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/universe amd64 Components [11.7 kB]
Get:36 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/universe amd64 c-n-f Metadata [1104 B]
Get:37 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/restricted amd64 Components [216 B]
Get:38 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/restricted amd64 c-n-f Metadata [116 B]
Get:39 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/multiverse amd64 Components [212 B]
Get:40 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/multiverse amd64 c-n-f Metadata [116 B]
Get:41 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en [161 kB]
Get:42 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Components [51.9 kB]
Get:43 http://security.ubuntu.com/ubuntu noble-security/universe amd64 c-n-f Metadata [13.5 kB]
Get:44 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages [525 B]
Get:45 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 c-n-f Metadata [10.8 kB]
Get:46 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [212 B]
Get:47 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Packages [12.2 kB]
Get:48 http://security.ubuntu.com/ubuntu noble-security/multiverse Translation-en [2940 B]
Get:49 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [212 B]
Get:50 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 c-n-f Metadata [356 B]
Fetched 31.5 MB in 6s (5480 kB/s)
Reading package lists... Done
ubuntu@ip-172-31-43-93:~$ sudo apt-get install apache2 -y[red box]
```

i-0a34e8aebe497c5531 (Module 4: Case Study- 1)  
PublicIPs: 54.225.5.18 PrivateIPs: 172.31.43.93

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Screenshot of the AWS CloudWatch Metrics dashboard for the instance i-0a34e8aeb497c5531.

The dashboard displays the following metrics over time:

- CloudWatch Metrics**: Shows a single metric named "CPUUtilization" with a value of approximately 10%.
- CloudWatch Metrics**: Shows a single metric named "MemoryUtilization" with a value of approximately 50%.
- CloudWatch Metrics**: Shows a single metric named "NetworkIn" with a value of approximately 1000 bytes/second.
- CloudWatch Metrics**: Shows a single metric named "NetworkOut" with a value of approximately 1000 bytes/second.

The CloudWatch Metrics section includes a "View details" link for each metric.

The screenshot shows the AWS EC2 console with the URL <https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#Images:visibility=owned-by-me>. The left sidebar is collapsed. The main area displays the 'Amazon Machine Images (AMIs) (1/1)' page. A single AMI named 'Ubuntu-Image' is listed with the AMI ID 'ami-02853541575fe5a54'. The 'Actions' dropdown menu has a red box around the 'Launch instance from AMI' option. The bottom status bar shows the date as 14-Dec-24.

The screenshot shows the 'Create launch template' wizard on the 'Create launch template' step. The URL is <https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTemplate:step1>. The 'EC2' and 'Launch templates' navigation steps are highlighted with red boxes. The 'Create launch template' title is also highlighted. The 'Software Image (AMI)' section shows 'Ubuntu-Image' selected. The 'Virtual server type (instance type)' section is collapsed. The 'Storage (volumes)' section shows '1 volume(s) - 8 GiB'. The 'Free tier' information is displayed in a callout box. The bottom right has a 'Create launch template' button with a red box around it. The bottom status bar shows the date as 14-Dec-24.

https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTemplate:

EC2 > Launch templates > Create launch template

**Launch template contents**

Specify the details of your launch template below. Leaving a field blank will result in the field not being included in the launch template.

**▼ Application and OS Images (Amazon Machine Image) - required**

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below.

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Recents My AMIs Quick Start

Owned by me Shared with me

Amazon Machine Image (AMI)

Ubuntu-Image  
ami-02853541575fe5a54  
2024-12-14T06:57:06.000Z Virtualization: hvm ENA enabled: true Root device type: ebs

Description

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Cancel Create launch template

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https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTemplate:

EC2 > Launch templates > Create launch template

**Instance type**

Free tier eligible

On-Demand Ubuntu-Image base pricing: 0.0134 USD per Hour On-Demand SUSE base pricing: 0.0116 USD per Hour On-Demand Amazon Linux base pricing: 0.0116 USD per Hour

Additional costs apply for AMIs with pre-installed software

**Key pair (login)**

Key pair name: 12345

**Network settings**

Select existing security group: launch-wizard-1

Security group: launch-wizard-1 sg-000add92e427bd127

**Storage (volumes)**

EBS Volumes

Volume 1 (AMI Root) (8 GiB, EBS, General purpose SSD (gp3))

Cancel Create launch template

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https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchTemplates:

EC2 Global View

Instances

Launch Templates

Images

Elastic Block Store

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Launch Templates (1/1)

Launch Template ID	Launch Template Name	Default Version	Latest Version	Create Time
lt-0814448601a1f7953	Ubuntu-Assignment	1	1	2024-12-14T07:37:31.000Z

Ubuntu-Assignment (lt-0814448601a1f7953)

Launch template details

Launch template ID	lt-0814448601a1f7953	Launch template name	Ubuntu-Assignment	Default version	1	Owner	arn:aws:iam::891377389368:root
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Details Versions Template tags

Actions Delete template

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https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateAutoScalingGroup:

Auto Scaling groups

Step 1 Choose launch template

Step 2 Choose instance launch options

Step 3 - optional Integrate with other services

Step 4 - optional Configure group size and scaling

Step 5 - optional Add notifications

Step 6 - optional Add tags

Step 7 Review

Choose launch template

Name

Auto Scaling group name

Ubuntu-ASG

Launch template

For accounts created after May 31, 2023, the EC2 console only supports creating Auto Scaling groups with launch templates. Creating Auto Scaling groups with launch configurations is not recommended but still available via the CLI and API until December 31, 2023.

Launch template

Ubuntu-Assignment

Version

Default (1)

Description

Launch template

Ubuntu-Assignment lt-0814448601a1f7953

AMI ID

Security groups

Instance type

t2.micro

Request Spot Instances

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https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateAutoScalingGroup:

EC2 VPC S3 RDS IAM CloudWatch Lambda Simple Queue Service CloudFormation Simple Notification Service

EC2 Auto Scaling groups Create Auto Scaling group

Network info

For most applications, you can use multiple Availability Zones and let EC2 Auto Scaling balance your instances across the zones. The default VPC and default subnets are suitable for getting started quickly.

VPC

Choose the VPC that defines the virtual network for your Auto Scaling group.

vpc-0a14596c83e10e3f  
172.31.0.0/16 Default

Create a VPC

Availability Zones and subnets

Define which Availability Zones and subnets your Auto Scaling group can use in the chosen VPC.

Select Availability Zones and subnets

us-east-1a | subnet-0dfe4abcf6f20da | 172.31.80.0/20 Default

us-east-1b | subnet-0c231f1992735c5ae | 172.31.16.0/20 Default

us-east-1c | subnet-0f6878d5a91b0edcc | 172.31.32.0/20 Default

Create a subnet

Availability Zone distribution - new

Auto Scaling automatically balances instances across Availability Zones. If launch failures occur in a zone, select a strategy.

Balanced best effort (selected) If launches fail in one Availability Zone, Auto Scaling will attempt to launch in another healthy Availability Zone.

Balanced only If launches fail in one Availability Zone, Auto Scaling will continue to attempt to launch in the unhealthy Availability Zone to preserve balanced distribution.

Cancel Skip to review Previous Next

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https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateAutoScalingGroup:

EC2 VPC S3 RDS IAM CloudWatch Lambda Simple Queue Service CloudFormation Simple Notification Service

EC2 Auto Scaling groups Create Auto Scaling group

Integrate with other services - optional

Use a load balancer to distribute network traffic across multiple servers. Enable service-to-service communications with VPC Lattice. Shift resources away from impaired Availability Zones with zonal shift. You can also customize health check replacements and monitoring.

Load balancing

Use the options below to attach your Auto Scaling group to an existing load balancer, or to a new load balancer that you define.

No load balancer Traffic to your Auto Scaling group will not be fronted by a load balancer.

Attach to an existing load balancer Choose from your existing load balancers.

Attach to a new load balancer Quickly create a basic load balancer to attach to your Auto Scaling group.

VPC Lattice integration options

To improve networking capabilities and scalability, integrate your Auto Scaling group with VPC Lattice. VPC Lattice facilitates communications between AWS services and helps you connect and manage your applications across compute services in AWS.

Select VPC Lattice service to attach

No VPC Lattice service VPC Lattice will not manage your Auto Scaling group's network access and connectivity with other services.

Attach to VPC Lattice service Incoming requests associated with specified VPC Lattice target groups will be routed to your Auto Scaling group.

Create new VPC Lattice service

Application Recovery Controller (ARC) zonal shift - new

During an Availability Zone impairment, target instance launches towards other healthy Availability Zones.

Enable zonal shift New instance launches will be retargeted towards healthy Availability Zones until the zonal shift is canceled.

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<https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateAutoScalingGroup>

EC2 > Auto Scaling groups > Create Auto Scaling group

Step 4 - optional  
Configure group size and scaling

Step 5 - optional  
Add notifications

Step 6 - optional  
Add tags

Step 7  
Review

Desired capacity type: Set the initial size of the Auto Scaling group. After creating the group, you can change its size to meet demand, either manually or by using automatic scaling.

Desired capacity: Choose the unit of measurement for the desired capacity value. vCPUs and Memory(GiB) are only supported for mixed instances groups configured with a set of instance attributes.

Units (number of instances): 2

Scaling Info: You can resize your Auto Scaling group manually or automatically to meet changes in demand.

Scaling limits: Set limits on how much your desired capacity can be increased or decreased.

Min desired capacity: 1

Max desired capacity: 4

Automatic scaling - optional: Choose whether to use a target tracking policy | Info

No scaling policies: Your Auto Scaling group will remain at its initial size and will not dynamically resize to meet demand.

Target tracking scaling policy: Choose a CloudWatch metric and target value and let the scaling policy adjust the desired capacity in proportion to the metric's value.

Instance maintenance policy: Info

Control your Auto Scaling group's availability during instance replacement events. This includes health checks, instance refreshes, maximum instance lifetime, health threshold, and more. You can also automatically update the behavior of the replacement instances.

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<https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#AutoScalingGroups:id=Ubuntu-ASG&view=details>

EC2 > Auto Scaling groups

Auto Scaling groups (1/1) info

Name	Launch template/configuration	Instances	Status	Desired capacity	Min	Max	Availability Zones
Ubuntu-ASG	Ubuntu-Assignment   Version Default	0	Updating capacity...	2	1	4	us-east-1a, us-east-1b, us-east-1c

Auto Scaling group: Ubuntu-ASG

Details Integrations - new Automatic scaling Instance management Instance refresh Activity Monitoring

Ubuntu-ASG Capacity overview

arn:aws:autoscaling:us-east-1:891377389368:autoScalingGroup:92cca0fd-cd46-4ff9-9c73-e92f0a0bff69:autoScalingGroupName/Ubuntu-ASG

Desired capacity: 2	Scaling limits (Min - Max): 1 - 4	Desired capacity type: Units (number of instances)
Status: Updating capacity		

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https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#instances:instanceState=running

EC2 Auto Scaling groups

Instances (3) Info

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 IP	Elastic IP
i-023c7e8b439beb44f	i-023c7e8b439beb44f	Running	t2.micro	Initializing	View alarms +	us-east-1a	ec2-3-82-246-155.com...	3.82.246.155	-
Module 4: Cas...	i-0a34eb8eb497c5551	Running	t2.micro	2/2 checks passed	View alarms +	us-east-1c	ec2-54-225-5-18.com...	54.225.5.18	-
	i-075705ef53627d0e	Running	t2.micro	Initializing	View alarms +	us-east-1c	ec2-54-159-78-244.co...	54.159.78.244	-

Select an instance

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https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#AutoScalingGroups:id=Ubuntu-ASG:view=scaling

EC2 Auto Scaling groups

Auto Scaling groups (1/1) Info

Name	Launch template/configuration	Instances	Status	Desired capacity	Min	Max	Availability...
Ubuntu-ASG	Ubuntu-Assignment   Version Default	2	-	2	1	4	us-east-1a, ...

Auto Scaling group: Ubuntu-ASG

Automatic scaling

Scaling policies resize your Auto Scaling group to meet changes in demand. With reactive dynamic scaling policies, you can track specific CloudWatch metrics and take action when the CloudWatch alarm threshold is met. Use predictive scaling policies along with dynamic scaling policies in the following situations: when your application demand changes quickly, but with a recurring pattern, or when your EC2 instances require more time to initialize.

Dynamic scaling policies (0) Info

Actions Create dynamic scaling policy

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<https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#DynamicScalingPolicy:id=Ubuntu-ASG>

EC2 Auto Scaling groups Ubuntu-ASG

Create dynamic scaling policy

**Policy type**: Step scaling

**Scaling policy name**: Add Instance

**CloudWatch alarm**: Choose an alarm that can scale capacity whenever:

**Create a CloudWatch alarm**

**Take the action**: Add

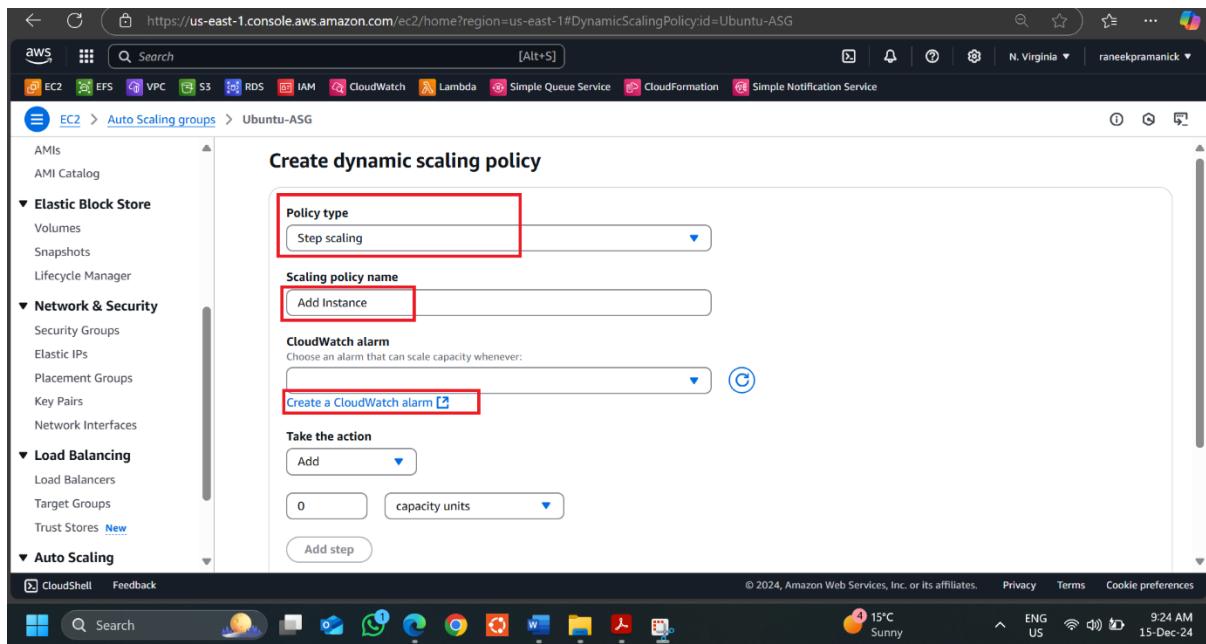
0 capacity units

Add step

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[https://us-east-1.console.aws.amazon.com/cloudwatch/home?region=us-east-1#alarmsV2:create?~\(Page~'MetricSelection~AlarmType~'MetricA...](https://us-east-1.console.aws.amazon.com/cloudwatch/home?region=us-east-1#alarmsV2:create?~(Page~'MetricSelection~AlarmType~'MetricA...)

CloudWatch Alarms Create alarm

Step 1: Specify metric and conditions

Step 2: Configure actions

Step 3: Add name and description

Step 4: Preview and create

**Specify metric and conditions**

**Metric**

**Graph**: This alarm will trigger when the blue line goes above the red line for 1 datapoints within 1 minute.

Percent

7.65

6.39

5.13

01:30 02:30 03:30

CPUUtilization

**Namespace**: AWS/EC2

**Metric name**: CPUUtilization

**AutoScalingGroupName**: Ubuntu-ASG

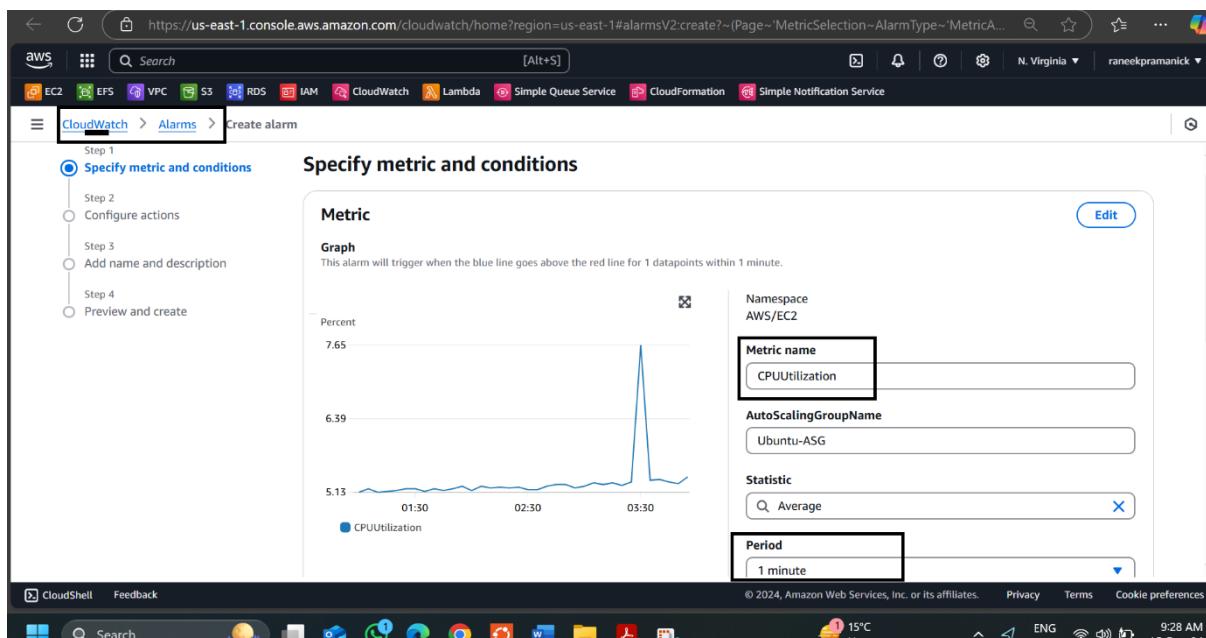
**Statistic**: Average

**Period**: 1 minute

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https://us-east-1.console.aws.amazon.com/cloudwatch/home?region=us-east-1#alarmsV2:create?~(Page~'MetricSelection~AlarmType~'MetricAla

aws Search [Alt+S] N. Virginia raneekpramanick

CloudWatch > Alarms > Create alarm

**Conditions**

**Threshold type**

Static Use a value as a threshold

Anomaly detection Use a band as a threshold

**Whenever CPUUtilization is...**

Greater > threshold

Greater/Equal >= threshold

Lower/Equal <= threshold

Lower < threshold

**than...**

Define the threshold value.

80

Must be a number

▶ Additional configuration

Cancel Next

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CloudFormation Simple Queue Service Lambda CloudWatch IAM RDS S3 VPC EFS EC2 Search ENG US 9:29 AM 15-Dec-24

https://us-east-1.console.aws.amazon.com/cloudwatch/home?region=us-east-1#alarmsV2:create?~(Page~'MetricSelection~AlarmType~'MetricAla

aws Search [Alt+S] N. Virginia raneekpramanick

CloudWatch > Alarms > Create alarm

**Conditions**

**Threshold type**

Static Use a value as a threshold

Anomaly detection Use a band as a threshold

**Whenever CPUUtilization is...**

Greater > threshold

Greater/Equal >= threshold

Lower/Equal <= threshold

Lower < threshold

**than...**

Define the threshold value.

60

Must be a number

▶ Additional configuration

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CloudFormation Simple Queue Service Lambda CloudWatch IAM RDS S3 VPC EFS EC2 Search ENG US 9:29 AM 15-Dec-24

The screenshot shows the AWS CloudWatch Alarms page. The left sidebar navigation includes 'CloudWatch' (selected), 'Dashboards', 'AI Operations', 'Alarms' (with 2 items), 'Logs', 'Metrics', 'X-Ray traces', 'Events', 'Application Signals', and 'Network Monitoring'. The main content area displays 'Alarms (2)'. A search bar and filters for 'Name', 'State', 'Last state update (Local)', and 'Conditions' are present. Two alarms are listed:

Name	State	Last state update (Local)	Condition
Remove Instance	Insufficient data	2024-12-15 09:47:57	CPUUtilization < 60 for 1 datapoints within 1 minute
Add Instance	OK	2024-12-15 09:37:17	CPUUtilization > 80 for 1 datapoints within 1 minute

Buttons for 'Create alarm' and 'Actions' are at the top right. The bottom of the screen shows the AWS navigation bar and system status.

The screenshot shows the AWS EC2 Auto Scaling groups page. The left sidebar navigation includes 'EC2' (selected), 'Instances', 'Images', 'Elastic Block Store', and 'Network & Security'. The main content area shows the 'Edit dynamic scaling policy' configuration for 'Ubuntu-ASG'. The policy type is set to 'Step scaling'. The scaling policy name is 'Add Ec2 instance'. A CloudWatch alarm named 'Add Instance' is selected. The action step adds 1 capacity unit when CPUUtilization is less than or equal to 80. An instance warmup of 60 seconds is configured. The bottom of the screen shows the AWS navigation bar and system status.

<https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#DynamicScalingPolicy:id=Ubuntu-ASG>

**Create dynamic scaling policy**

**Policy type**: Step scaling

**Scaling policy name**: Remove Ec2 Instance

**CloudWatch alarm**: Choose an alarm that can scale capacity whenever: Remove Instance

**Take the action**: Remove

**Capacity units**: 1

**when**: 60 >= CPUUtilization > -infinity

**Add step**

AutoScalingGroupName = Ubuntu-ASG

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ENG US 12:04 PM 15-Dec-24

<https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#AutoScalingGroups:id=Ubuntu-ASG;view=scaling>

**Dynamic scaling policy created or edited successfully.**

**Auto Scaling groups (1/1) Info**

Name	Launch template/configuration	Instances	Status	Desired capacity	Min	Max	Availability zones
<input checked="" type="checkbox"/> Ubuntu-ASG	Ubuntu-Assignment   Version Default	1	-	1	1	4	us-east-1a, ...

**Auto Scaling group: Ubuntu-ASG**

**Enabled or disabled**: Enabled

**Execute policy when**: Add Instance

breaches the alarm threshold: CPUUtilization > 80 for 1 consecutive periods of 60 seconds for the metric dimensions:  
AutoScalingGroupName = Ubuntu-ASG

**Take the action**

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The screenshot shows the AWS EC2 Auto Scaling Groups console for the group 'Ubuntu-ASG'. The left sidebar includes sections for Dashboard, EC2 Global View, Events, Instances (with sub-options like Instances, Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Capacity Reservations), Images (AMIs, AMI Catalog), Elastic Block Store (Volumes, Snapshots, Lifecycle Manager), Network & Security (Security Groups, Elastic IPs, Placement Groups, Key Pairs, Network Interfaces), and CloudShell/Feedback. The main content area has tabs for Details, Integrations - new, Automatic scaling, Instance management, Instance refresh, Activity (selected), and Monitoring. The 'Activity notifications (0)' section shows a search bar and a 'Create notification' button. The 'Activity history (3)' section shows a table with columns for Status, Description, Cause, Start time, and End time. One entry is visible: 'Successful Terminating EC2 instance: i-075705e5f53627d0e At 2024-12-15T06:38:15Z a monitor alarm Remove Instance in state ALARM triggered policy Remove Ec2 Instance changing the desired capacity from 2 to 1. At 2024-12-15T06:38:21Z 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 2024-12-15T06:38:22Z instance i-075705e5f53627d0e was selected for termination.' The bottom of the screen shows standard browser controls, a taskbar with various icons, and a status bar indicating the date and time.

The screenshot shows the 'Create Application Load Balancer' wizard on the 'Basic configuration' step. The top navigation bar includes EC2, EFS, VPC, S3, RDS, IAM, CloudWatch, Lambda, Simple Queue Service, CloudFormation, and Simple Notification Service. The main content area has a title 'Create Application Load Balancer' and a sub-section 'How Application Load Balancers work'. Below this is a 'Basic configuration' section with a 'Load balancer name' field containing 'Ubuntu-LB' (which is highlighted with a red box). A note states 'Name must be unique within your AWS account and can't be changed after the load balancer is created.' Below the name field is a note: 'A maximum of 32 alphanumeric characters including hyphens are allowed, but the name must not begin or end with a hyphen.' Under the 'Scheme' section, there are two options: 'Internet-facing' (selected, highlighted with a red box) and 'Internal'. The 'Internet-facing' option includes bullet points: 'Serves internet-facing traffic.', 'Has public IP addresses.', 'DNS name is publicly resolvable.', and 'Requires a public subnet.' The 'Internal' option includes bullet points: 'Serves internal traffic.', 'Has private IP addresses.', 'DNS name is publicly resolvable.', and 'Compatible with the IPv4 and Dualstack IP address types.' The bottom of the screen shows standard browser controls, a taskbar with various icons, and a status bar indicating the date and time.

<https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateALBWizard>

EC2 > Load balancers > Create Application Load Balancer

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

**IPv4**  
Includes only IPv4 addresses.

**Dualstack**  
Includes IPv4 and IPv6 addresses.

**Dualstack without public IPv4**  
Includes a public IPv6 address, and private IPv4 and IPv6 addresses. Compatible with internet-facing load balancers only.

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

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

vpc-0a14596c83ec10e3f  
IPv4 VPC CIDR: 172.31.0.0/16

**Mappings** Info  
Select at least two Availability Zones and one subnet per zone. The load balancer routes traffic to targets in these Availability Zones only. Availability Zones that are not supported by the load balancer or the VPC are not available for selection.

**Availability Zones**  
Select at least two availability zones and one subnet per zone. The load balancer routes traffic to targets in these availability zones only. Availability zones that are not supported by the load balancer or the VPC are not available for selection.

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<https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateALBWizard>

EC2 > Load balancers > Create Application Load Balancer

Select at least two availability zones and one subnet per zone. The load balancer routes traffic to targets in these availability zones only. Availability zones that are not supported by the load balancer or the VPC are not available for selection.

**Availability Zones**

**us-east-1a (use1-az2)**  
Subnet  
subnet-0dfc44abc6f6f20da  
IPv4 subnet CIDR: 172.31.80.0/20

**us-east-1b (use1-az4)**  
Subnet  
subnet-0c231f1992735c5ac  
IPv4 subnet CIDR: 172.31.16.0/20

**us-east-1c (use1-az6)**  
Subnet  
subnet-0f6878d5a91b0edcc  
IPv4 subnet CIDR: 172.31.32.0/20

**IPv4 address**

Assigned by AWS

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<https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateALBWizard>

EC2 EFS VPC S3 RDS IAM CloudWatch Lambda Simple Queue Service CloudFormation Simple Notification Service N. Virginia raneekpramanick

EC2 > Load balancers > Create Application Load Balancer

**Listeners and routing** [Info](#)

A listener is a process that checks for connection requests using the port and protocol you configure. The rules that you define for a listener determine how the load balancer routes requests to its registered targets.

**Listener HTTP:80**

Protocol	Port	Default action
HTTP	: 80	Forward to <a href="#">Select a target group</a> <a href="#">Create target group</a>

**Listener tags - optional**

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

[Add listener tag](#)

You can add up to 50 more tags.

[Add listener](#)

**Load balancer tags - optional**

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<https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTargetGroup:protocol=HTTP;vpc=vpc-0a14596c83ec10e3f>

EC2 EFS VPC S3 RDS IAM CloudWatch Lambda Simple Queue Service CloudFormation Simple Notification Service N. Virginia raneekpramanick

EC2 > Target groups > Create target group

**Specify group details**

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

**Basic configuration**

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

**Choose a target type**

Instances

- Supports load balancing to instances within a specific VPC.
- Familiar interface for managing multiple targets across multiple interfaces on the same instance.
- Offers flexibility with microservices-based architectures, simplifying inter-application communication.
- Supports IP targets, enabling end-to-end SSL communication and IP-level failover.

IP addresses

- Supports load balancing to VPC and non-VPC resources.
- Each target must have a unique IP address and a public interface.
- Accessible to Application Load Balancers only.

Lambda function

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

Application Load Balancer

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

**Target group name**

Ubuntu 16

It's recommended to use descriptive, lowercase including hyphens are allowed, but the name must not begin or end with a hyphen.

**Protocol & Port**

Choose a protocol for your target group that corresponds to the Load Balancer type that will route traffic to it. Some protocols now include anomaly detection for the targets and you can set integration options once your target group is created. These settings can't be changed after the target group is created.

HTTP : 80

**IP address type**

IP

Each instance has a default network interface (eni) that is assigned the primary private IPv4 address. The instance's primary private IPv4 address is the one that will be used in the load.

IP6

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<https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTargetGroup:protocol=HTTP:vpc=vpc-0a14596c83ec10e3f>

EC2 > Target groups > Create target group

IP6  
Each instance you register must have an assigned primary IPv6 address. This is configured on the instance's default network interface (eth0). [Learn more](#)

VPC  
Select one VPC with the instances that you want to include in the target group. Only VPCs that support the IP address type selected above are available in this list.

Protocol version  
 **HTTP1** Send requests to targets using HTTP/1.1. Supported when the request protocol is HTTP/1.1 or HTTP/2.  
 **HTTP2** Send requests to targets using HTTP/2. Supported when the request protocol is HTTP/2 or gRPC, but gRPC-specific features are not available.  
 **gRPC** Send requests to targets using gRPC. Supported when the request protocol is gRPC.

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

Health check protocol  
**HTTP**

Health check path  
Use the default path of "/" to perform health checks on the root, or specify a custom path if preferred.  
/j  
Up to 16384 characters allowed.

Advanced health check settings

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

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

Cancel **Next**

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<https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTargetGroup:protocol=HTTP:vpc=vpc-0a14596c83ec10e3f>

EC2 > Target groups > Create target group

Specify group details  
This is an optional step to create a target group. However, to ensure that your load balancer routes traffic to this target group you must register your targets.

Register targets  
Available instances (2/2)

Instance ID	Name	State	Security groups	Zone	Private IPv4 address	Subnet ID	Launch time
i-02347eb4b4918eb4af	Module 4 Case Study- 1	Running	launch-wizard-1	us-east-1a	172.31.93.9	subnet-0f644fab469620da	December 14, 2024, 13:18 (UTC+05:30)
i-02348eb497c5531	Module 4 Case Study- 1	Running	launch-wizard-1	us-east-1c	172.31.43.95	subnet-0f68785a91b0edc	December 14, 2024, 11:59 (UTC+05:30)

2 selected  
Ports for the selected instances  
Ports for routing traffic to the selected instances.  
80  
1-65535 (separate multiple ports with comma)  
Include as pending below

Review targets  
Targets (0)  
No instances added yet  
Specify instances above, or leave the group empty if you prefer to add targets later.

Remove all pending  
Cancel Previous **Create target group**

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**Listeners and routing** Info

A listener is a process that checks for connection requests using the port and protocol you configure. The rules that you define for a listener determine how the load balancer routes requests to its registered targets.

**Listener HTTP:80**

Protocol	Port
HTTP	80 1-65535

**Default action** Info

Forward to **UbuntuTG** Target type: Instance, IPv4

**Create target group**

**Listener tags - optional**  
Consider adding tags to your listener. Tags enable you to categorize your AWS resources so you can more easily manage them.

**Add listener tag**  
You can add up to 50 more tags.

**Add listener**

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

**Optimize with service integrations - optional** Info

**Ubuntu-LB**

**Details**

**Load balancer type**: Application

**Status**: Active

**Hosted zone**: Z355XD0TRQ7X7K

**VPC**: [vpc-0a14596c83ec10e3f](#)

**Availability Zones**:

- subnet-0c231f1992735c5ac us-east-1b (use1-az4)
- subnet-0f6878d5a91b1dedcc us-east-1c (use1-az6)
- subnet-0fe44abc6f6f20da us-east-1a (use1-az2)
- subnet-034b94804f05cab13 us-east-1d (use1-az1)

**Load balancer IP address type**: IPv4

**Date created**: December 15, 2024, 13:03 (UTC+05:30)

**Load balancer ARN**: [arn:aws:elasticloadbalancing:us-east-1:891377389368:loadbalancer/app/Ubuntu-LB/830e0557d5e9d902](#)

**DNS name** Info: [Ubuntu-LB-1817062126.us-east-1.elb.amazonaws.com](#) (A Record)

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

**Security groups (1)** Edit

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

**CloudShell** **Feedback**

21°C Haze ENG US 1:06 PM 15-Dec-24

The screenshot shows the AWS CloudWatch Metrics Insights interface. A search bar at the top contains the query: `CloudWatch Metrics Insights usage`. Below the search bar is a toolbar with various AWS services: EC2, EFS, VPC, S3, RDS, IAM, CloudWatch Metrics Insights, Lambda, Simple Queue Service, CloudFormation, and Simple Notification Service. The left sidebar includes sections for Metrics, Catalog, Block Store, Volumes, Snapshots, Lifecycle Manager, Network & Security, Security Groups, Elastic IPs, Placement Groups, Key Pairs, Network Interfaces, Load Balancing, Load Balancers, Target Groups, and Auto Scaling. The main content area displays the results of the search query, showing a table of metrics with columns for Metric Name, Value, Unit, and Time Range. The table includes rows for CloudWatch Metrics Insights usage, CloudWatch Metrics Insights Metrics, CloudWatch Metrics Insights Metrics, CloudWatch Metrics Insights Metrics, and CloudWatch Metrics Insights Metrics.

