

# Scalable Web Application with ALB and Auto Scaling

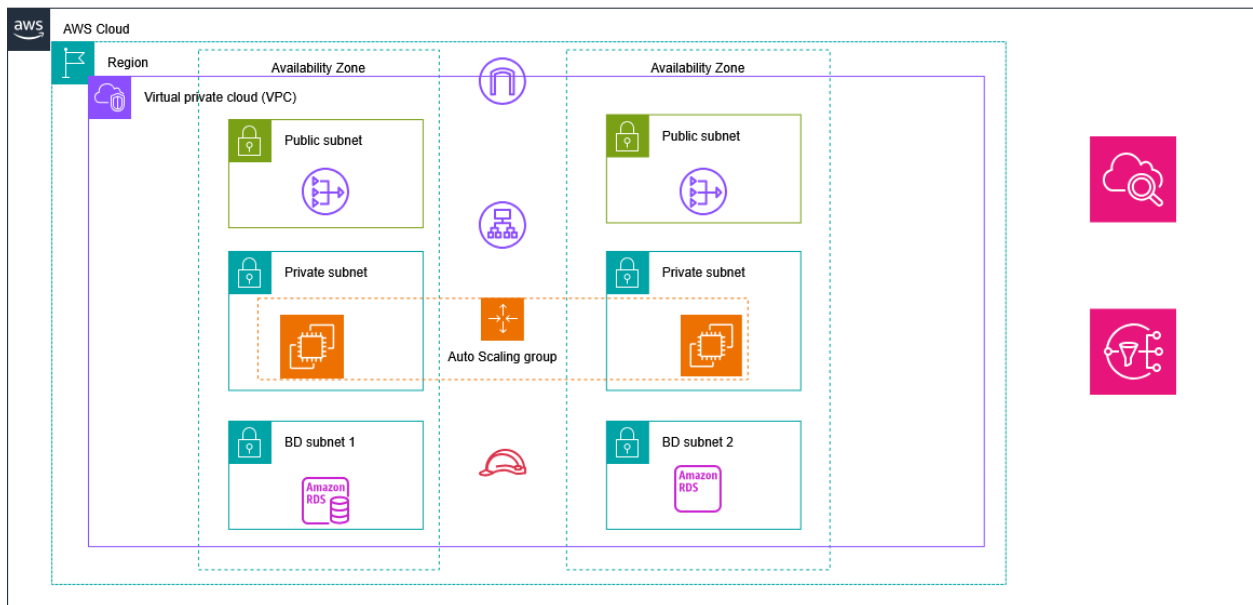
## Solution Overview:

This project deploys a highly available and scalable web application on AWS using Amazon EC2, an Application Load Balancer (ALB), and an Auto Scaling Group (ASG). The application runs on EC2 instances placed in private subnets, while an internet-facing ALB distributes user traffic across them. The ASG automatically scales the number of instances based on demand, ensuring performance and cost efficiency.

Networking is built in a VPC across multiple Availability Zones for fault tolerance. Public subnets host the ALB and NAT Gateways, while private subnets host the EC2 instances. Security is enforced using IAM roles, security groups, and subnet isolation. Monitoring is handled by Amazon CloudWatch with alerts delivered through Amazon SNS.

This architecture ensures resilience, scalability, and secure operations while following AWS best practices.

## Project Architecture:



## Creating VPC:

1. Go to VPS console.
2. Click create VPC.
3. In VPC settings choose VPC and more to create the VPC with the subnets and route table.
4. Write the VPC name.
5. Create ipv4 CIDR block (10.0.0.0/16).
6. Choose number of availability zones (2).
7. Choose the availability zones.
8. Choose the number of public(2) and private subnets (4).
9. Create Nat gateway per AZ .
- 10.enable DNS resolution then create the VPC.

### VPC settings

**Resources to create** [Info](#)  
Create only the VPC resource or the VPC and other networking resources.

☐ VPC only ☒ VPC and more

**Name tag auto-generation** [Info](#)  
Enter a value for the Name tag. This value will be used to auto-generate Name tags for all resources in the VPC.

☒ Auto-generate

manara-proj

**IPv4 CIDR block** [Info](#)  
Determine the starting IP and the size of your VPC using CIDR notation.

10.0.0.0/16 65,536 IPs

CIDR block size must be between /16 and /28.

**IPv6 CIDR block** [Info](#)

☒ No IPv6 CIDR block ☐ Amazon-provided IPv6 CIDR block

**Tenancy** [Info](#)

Default

#### Number of Availability Zones (AZs) [Info](#)

Choose the number of AZs in which to provision subnets. We recommend at least two AZs for high availability.

1 | **2** | 3

#### ▼ Customize AZs

##### First availability zone

euw1-az3 (eu-west-1a) ▼

##### Second availability zone

euw1-az1 (eu-west-1b) ▼

#### Number of public subnets [Info](#)

The number of public subnets to add to your VPC. Use public subnets for web applications that need to be publicly accessible over the internet.

0 | **2**

#### Number of private subnets [Info](#)

The number of private subnets to add to your VPC. Use private subnets to secure backend resources that don't need public access.

0 | 2 | **4**

#### ► Customize subnets CIDR blocks

#### NAT gateways (\$) [Info](#)

Choose the number of Availability Zones (AZs) in which to create NAT gateways. Note that there is a charge for each NAT gateway

None | In 1 AZ | **1 per AZ**

#### VPC endpoints [Info](#)

Endpoints can help reduce NAT gateway charges and improve security by accessing S3 directly from the VPC. By default, full access policy is used. You can customize this policy at any time.

None | **S3 Gateway**

#### DNS options [Info](#)

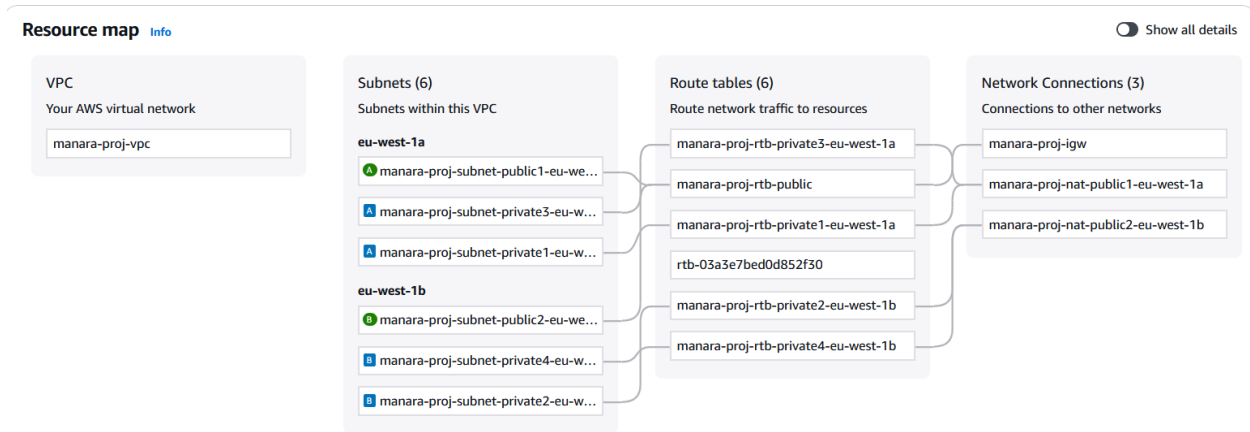
- ☒ Enable DNS hostnames
- ☒ Enable DNS resolution

#### ► Additional tags

Cancel

 [Preview code](#)

Create VPC



## Create Security Groups for ALB, EC2, and RDS:

- 1.click create SG
- 2.write SG name
- 3.write description for it which traffic will allow
- 4.choose VPC
- 5.Add inbound and outbound rules

### For ALB:

**Create security group** [Info](#)  
A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.

**Basic details**

**Security group name** [Info](#)  
ALB SG  
Name cannot be edited after creation.

**Description** [Info](#)  
Allow HTTP and HTTPS from all internet users

**VPC** [Info](#)  
vpc-09ea4adfe8be34649 (manara-proj-vpc)

**Inbound rules** [Info](#)

Type	Protocol	Port range	Source	Description - optional	
HTTP	TCP	80	Anywhere...		Delete
			0.0.0.0/0		
HTTPS	TCP	443	Anywhere...		Delete
			0.0.0.0/0		

[Add rule](#)

Activate Windows

**For EC2:**

**Create security group** [Info](#)

A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.

Basic details

Security group name [Info](#)  

EC2 SG

Name cannot be edited after creation.

Description [Info](#)  

Allow all traffic from only ALB

VPC [Info](#)  

vpc-09ea4adfe8be34649 (manara-proj-vpc)

Inbound rules [Info](#)

Type [Info](#)  
All traffic

Protocol [Info](#)  
All

Port range [Info](#)  
All

Source [Info](#)  
Custom  
sg-09ad4604d0c3c45e4  
sg-09ad4604d0c3c45e4

Description - optional [Info](#)  

Delete

Add rule

**For RDS:**

### Create security group [Info](#)

A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.

Basic details

Security group name

Info

RDS SG

Name cannot be edited after creation.

Description

Info

allow traffic from EC2 only

VPC

Info

vpc-09ea4adfe8be34649 (manara-proj-vpc)

Inbound rules

Info

Type	Protocol	Port range	Source	Description - optional
MYSQL/Aurora	TCP	3306	Custom	sg-0db71471bc2de2a41
				sg-0db71471bc2de2a41

Add rule

Delete

## Creating DB:

**First, we create a DB subnet group:**

- 1.navigate to aurora and RDS
- 2.click subnet groups and create one
- 3.write name and description
- 4.choose VPC
- 5.choose AZs and Subnets

### Subnet group details

#### Name

You won't be able to modify the name after your subnet group has been created.

manara-proj-RDS-subnet-group

Must contain from 1 to 255 characters. Alphanumeric characters, spaces, hyphens, underscores, and periods are allowed.

#### Description

manara-proj-RDS-subnet-group

#### VPC

Choose a VPC identifier that corresponds to the subnets you want to use for your DB subnet group. You won't be able to choose a different VPC identifier after your subnet group has been created.

manara-proj-vpc (vpc-09ea4adfe8be34649)  
6 Subnets, 2 Availability Zones

### Add subnets

#### Availability Zones

Choose the Availability Zones that include the subnets you want to add.

Choose an availability zone

eu-west-1a

eu-west-1b

#### Subnets

Choose the subnets that you want to add. The list includes the subnets in the selected Availability Zones.

Select subnets

manara-proj-subnet-private4-eu-west-1b

Subnet ID: subnet-0580e784a638a39d8 CIDR: 10.0.176.0/20

manara-proj-subnet-private3-eu-west-1a

Subnet ID: subnet-08b8e4769ddb33645 CIDR: 10.0.160.0/20

## Creating the RDS:

1. Go to the RDS console.
2. Click Create database.
3. Choose Standard create.
4. Select the Engine type (MariaDB).
5. Choose the Version you want.
6. In Templates, pick the deployment option (Dev/Test).
7. In DB instance class, select the instance size (db.t3.micro).
8. Set DB instance identifier .
9. Choose credentials to be stored in AWS Secrete Manager.
10. Under Storage, choose the allocated storage size and enable storage autoscaling if needed.
11. In Availability & durability, enable Multi-AZ deployment (recommended for high availability).
12. In Connectivity, choose your VPC.
13. Select the DB Subnet Group (private subnets across 2 AZs).
14. Set Public access = No (to keep it private).
15. Select or create a Security Group that only allows inbound traffic from your EC2 SG.


Create database [Info](#)


Choose a database creation method


- ☒ **Standard create**  
You set all of the configuration options, including ones for availability, security, backups, and maintenance.
- ☐ **Easy create**  
Use recommended best-practice configurations. Some configuration options can be changed after the database is created.


Engine options


Engine type [Info](#)


☐ Aurora (MySQL Compatible)  


☐ Aurora (PostgreSQL Compatible)  


☐ MySQL  


☐ PostgreSQL  


☒ MariaDB  


☐ Oracle  


Templates

- Choose a sample template to meet your use case.
- ☐ **Production**  
Use defaults for high availability and fast, consistent performance.
- ☒ **Dev/Test**  
This instance is intended for development use outside of a production environment.
- ☐ **Free tier**  
Use RDS Free Tier to develop new applications, test existing applications, or gain hands-on experience with Amazon RDS. [Info](#)

Settings

**DB instance identifier** [Info](#)  
Type a name for your DB instance. The name must be unique across all DB instances owned by your AWS account in the current AWS Region.

database-1

The DB instance identifier is case-insensitive, but is stored as all lowercase (as in "mydbinstance"). Constraints: 1 to 63 alphanumeric characters or hyphens. First character must be a letter. Can't contain two consecutive hyphens. Can't end with a hyphen.

Credentials Settings

**Master username** [Info](#)  
Type a login ID for the master user of your DB instance.

root

1 to 16 alphanumeric characters. The first character must be a letter.

**Credentials management**  
You can use AWS Secrets Manager or manage your master user credentials.

☒ **Managed in AWS Secrets Manager – most secure**  
RDS generates a password for you and manages it throughout its lifecycle using AWS Secrets Manager.

☐ **Self managed**  
Create your own password or have RDS create a password that you manage. [Activate Windows](#)

Instance configuration

The DB instance configuration options below are limited to those supported by the engine that you selected above.

**DB instance class** [Info](#)

▼ Hide filters

☒ Show instance classes that support Amazon RDS Optimized Writes [Info](#)  
Amazon RDS Optimized Writes improves write throughput by up to 2x at no additional cost.

☐ Include previous generation classes

☐ Standard classes (includes m classes)

☐ Memory optimized classes (includes r and x classes)

☒ Burstable classes (includes t classes)

db.t3.micro  
2 vCPUs 1 GiB RAM Network: Up to 2,085 Mbps

Storage

**Storage type** [Info](#)  
Provisioned IOPS SSD (io2) storage volumes are now available.

General Purpose SSD (gp3)  
Performance scales independently from storage

**Allocated storage** [Info](#)

20

GIB

Minimum: 20 GiB, Maximum: 6,144 GiB

[Activate Windows](#)  
Go to Settings to activate Windows

DB subnet group [Info](#)

Choose the DB subnet group. The DB subnet group defines which subnets and IP ranges the DB instance can use in the VPC that you selected.

manara-proj-rds-subnet-group  
2 Subnets, 2 Availability Zones

Public access [Info](#)

- ☐ **Yes**  
RDS assigns a public IP address to the database. Amazon EC2 instances and other resources outside of the VPC can connect to your database. Resources inside the VPC can also connect to the database. Choose one or more VPC security groups that specify which resources can connect to the database.
- ☒ **No**  
RDS doesn't assign a public IP address to the database. Only Amazon EC2 instances and other resources inside the VPC can connect to your database. Choose one or more VPC security groups that specify which resources can connect to the database.

VPC security group (firewall) [Info](#)

Choose one or more VPC security groups to allow access to your database. Make sure that the security group rules allow the appropriate incoming traffic.

☒ **Choose existing**  
Choose existing VPC security groups

☐ **Create new**  
Create new VPC security group

Existing VPC security groups

Choose one or more options

RDS SG X

[Activate Windows](#)

# Launch EC2 Instance, install the web app, and create an AMI:

- 1.go to EC2 console and choose launch instance
- 2.type a name and choose OS
- 3.choose instance size
4. put or create a keypair
- 5.put it in a public subnet with public IP
6. Login into the instance

Name

EC2 to create custom AMI

Add additional tags

▼ Application and OS Images (Amazon Machine Image) Info

An AMI contains the operating system, application server, and applications for your instance. If you don't see a suitable AMI below, use the search field or choose **Browse more AMIs**.

Q Search our full catalog including 1000s of application and OS images

Quick Start

Amazon Linux  
aws

macOS  
Mac

Ubuntu  
ubuntu

Windows  
Microsoft

Red Hat  
Red Hat

SUSE Linux  
SUSE

Debian  
debian

Q

Browse more AMIs

Including AMIs from AWS, Marketplace and the Community

Amazon Machine Image (AMI)

Create key pair

Key pair name

Key pairs allow you to connect to your instance securely.

men3em

The name can include up to 255 ASCII characters. It can't include leading or trailing spaces.

Key pair type

☒ RSA  
RSA encrypted private and public key pair

☐ ED25519  
ED25519 encrypted private and public key pair

Private key file format

☒ .pem  
For use with OpenSSH

☐ .ppk  
For use with PuTTY

⚠ When prompted, store the private key in a secure and accessible location on your computer. You will need it later to connect to your instance. [Learn more](#)

Cancel

Create key pair



## ▼ Instance type [Info](#) | [Get advice](#)

### Instance type

t2.micro

Free tier eligible

Family: t2 1 vCPU 1 GiB Memory Current generation: true On-Demand RHEL base pricing: 0.027 USD per Hour  
On-Demand Linux base pricing: 0.0126 USD per Hour On-Demand SUSE base pricing: 0.0126 USD per Hour  
On-Demand Ubuntu Pro base pricing: 0.0144 USD per Hour On-Demand Windows base pricing: 0.0172 USD per Hour

☒ All generations

[Compare instance types](#)

Additional costs apply for AMIs with pre-installed software

## ▼ Key pair (login) [Info](#)

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

### Key pair name - required

men3em



[Create new key pair](#)

## ▼ Network settings [Info](#)

### VPC - required [Info](#)

vpc-09ea4adfe8be34649 (manara-proj-vpc)  
10.0.0.0/16



### Subnet [Info](#)

subnet-0c2599a33ba597934

manara-proj-subnet-public1-eu-west-1a

VPC: vpc-09ea4adfe8be34649 Owner: 850470019231 Availability Zone: eu-west-1a (euw1-az3)  
Zone type: Availability Zone IP addresses available: 4090 CIDR: 10.0.0.0/20



[Create new subnet](#)

### Auto-assign public IP [Info](#)

Enable

Additional charges apply when outside of free tier allowance

### Firewall (security groups) [Info](#)

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

☒ Create security group

☐ Select existing security group

### Security group name - required

test

This security group will be added to all network interfaces. The name can't be edited after the security group is created. Max length is 255 characters. Valid characters: a-z, A-Z, 0-9, spaces, and .-:/()#,@!+=&;{}!\$\*

### Description - required [Info](#)

launch-wizard-1 created 2025-08-16T05:45:07.030Z

### Inbound Security Group Rules

▼ Security group rule 1 (TCP, 22, 0.0.0.0/0)

[Remove](#)

#### Type [Info](#)

ssh

#### Protocol [Info](#)

TCP

#### Port range [Info](#)

22

#### Source type [Info](#)

Anywhere

#### Source [Info](#)

0.0.0.0/0

#### Description - optional [Info](#)

e.g. SSH for admin desktop

## Setting the web/app tire:

Install Apache web server

**#yum install -y httpd**

```
[root@ip-10-0-1-201 ~]# yum install -y httpd
Amazon Linux 2023 Kernel Livepatch repository
Dependencies resolved.
```

Package	Architecture	Version	Repository	Size
<b>Installing:</b>				
httpd	x86_64	2.4.64-1.amzn2023.0.1	amazonlinux	47 k
<b>Installing dependencies:</b>				
apr	x86_64	1.7.5-1.amzn2023.0.4	amazonlinux	129 k
apr-util	x86_64	1.6.3-1.amzn2023.0.1	amazonlinux	98 k
generic-logos-httpd	noarch	18.0.0-12.amzn2023.0.3	amazonlinux	19 k
httpd-core	x86_64	2.4.64-1.amzn2023.0.1	amazonlinux	1.4 M
httpd-filesystem	noarch	2.4.64-1.amzn2023.0.1	amazonlinux	13 k
httpd-tools	x86_64	2.4.64-1.amzn2023.0.1	amazonlinux	81 k
libbrotli	x86_64	1.0.9-4.amzn2023.0.2	amazonlinux	315 k
mailcap	noarch	2.1.49-3.amzn2023.0.3	amazonlinux	33 k
<b>Installing weak dependencies:</b>				
apr-util-openssl	x86_64	1.6.3-1.amzn2023.0.1	amazonlinux	17 k
mod_http2	x86_64	2.0.27-1.amzn2023.0.3	amazonlinux	166 k
mod_lua	x86_64	2.4.64-1.amzn2023.0.1	amazonlinux	60 k

```
Transaction Summary
```

Make it active and running all the time

**#systemctl enable --now httpd**

```
[root@ip-10-0-1-201 ~]# systemctl enable --now httpd
Created symlink /etc/systemd/system/multi-user.target.wants/httpd.service → /usr/lib/systemd/system/httpd.service.
[root@ip-10-0-1-201 ~]# systemctl status httpd
● httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; preset: disabled)
   Active: active (running) since Sat 2025-08-16 06:04:39 UTC; 9s ago
     Docs: man:httpd.service(8)
  Main PID: 26606 (httpd)
    Status: "Total requests: 0; Idle/Busy workers 100/0;Requests/sec: 0; Bytes served/sec: 0 B/sec"
     Tasks: 177 (limit: 1111)
    Memory: 12.9M
       CPU: 64ms
   CGroup: /system.slice/httpd.service
           └─26606 /usr/sbin/httpd -DFOREGROUND
             └─26607 /usr/sbin/httpd -DFOREGROUND
               └─26608 /usr/sbin/httpd -DFOREGROUND
                 └─26609 /usr/sbin/httpd -DFOREGROUND
                   └─26610 /usr/sbin/httpd -DFOREGROUND
```

Download the web files in the right place:

**#cd /var/www/html/**

**#wget <https://aws-tc-largeobjects.s3.us-west-2.amazonaws.com/CUR-TF-200-ACACAD-3-113230/22-lab-Capstone-project/s3/Example.zip>**

```
[root@ip-10-0-1-201 ~]# cd /var/www/html/
[root@ip-10-0-1-201 html]# wget https://aws-tc-largeobjects.s3.us-west-2.amazonaws.com/CUR-TF-200-ACACAD-3-113230/22-lab-Capstone-project/s3/Example.zip
--2025-08-16 06:07:29-- https://aws-tc-largeobjects.s3.us-west-2.amazonaws.com/CUR-TF-200-ACACAD-3-113230/22-lab-Capstone-project/s3/Example.zip
Resolving aws-tc-largeobjects.s3.us-west-2.amazonaws.com (aws-tc-largeobjects.s3.us-west-2.amazonaws.com)... 52.92.154.250, 52.92.203.178, 52.218.182.9, ...
Connecting to aws-tc-largeobjects.s3.us-west-2.amazonaws.com (aws-tc-largeobjects.s3.us-west-2.amazonaws.com)|52.92.154.250|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 4917744 (4.7M) [application/zip]
Saving to: 'Example.zip'

Example.zip                               100%[=====] 4.69M  4.99MB/s  in 0.9s

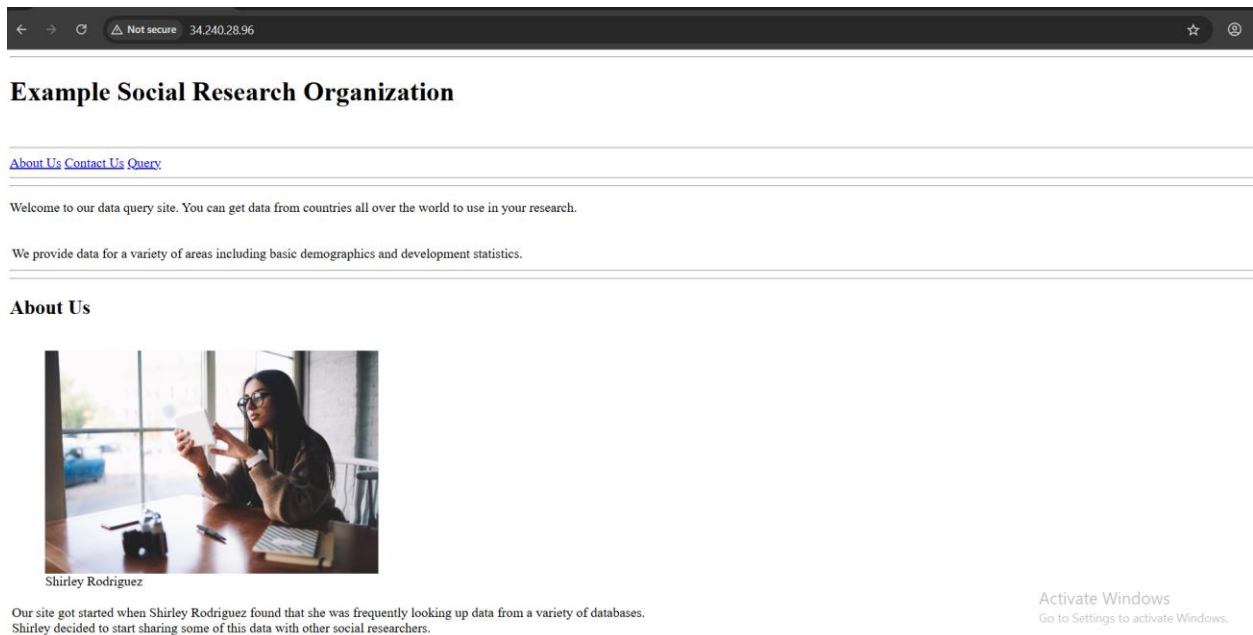
2025-08-16 06:07:31 (4.99 MB/s) - 'Example.zip' saved [4917744/4917744]

[root@ip-10-0-1-201 html]# ls
Example.zip
[root@ip-10-0-1-201 html]#
```

```
[root@ip-10-0-1-201 html]# unzip Example.zip
Archive:  Example.zip
  inflating: Logo.png
  inflating: Shirley.jpeg
  inflating: gdp.php
  inflating: get-parameters.php
  inflating: index.php
  inflating: lifeexpectancy.php
  inflating: menu.php
  inflating: mobile.php
  inflating: mortality.php
  inflating: population.php
  inflating: query.php
  inflating: query2.php
  inflating: query3.php
  extracting: style.css
[root@ip-10-0-1-201 html]# cp index.php index.html
[root@ip-10-0-1-201 html]#
```

## Testing the website:

Paste the public IP of the EC2 and do not forget to make the SG to allow http



## Making the DB tier:

### Download DB dump to use as DB:

**#wget https://aws-tc-largeobjects.s3.us-west-2.amazonaws.com/CUR-TF-200-ACACAD-3-113230/22-lab-Capstone-project/s3/Countrydatadump.sql**

```
[root@ip-10-0-1-201 ~]# wget https://aws-tc-largeobjects.s3.us-west-2.amazonaws.com/CUR-TF-200-ACACAD-3-113230/22-lab-Capstone-project/s3/Countrydatadump.sql
--2025-08-16 06:14:43-- https://aws-tc-largeobjects.s3.us-west-2.amazonaws.com/CUR-TF-200-ACACAD-3-113230/22-lab-Capstone-project/s3/Countrydatadump.sql
Resolving aws-tc-largeobjects.s3.us-west-2.amazonaws.com (aws-tc-largeobjects.s3.us-west-2.amazonaws.com)... 52.92.224.50, 3.5.79.117, 3.5.79.125, ...
Connecting to aws-tc-largeobjects.s3.us-west-2.amazonaws.com (aws-tc-largeobjects.s3.us-west-2.amazonaws.com)|52.92.224.50|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 15508 (15K) [binary/octet-stream]
Saving to: 'Countrydatadump.sql'

Countrydatadump.sql 100%[=====] 15.14K --.-KB/s in 0s

2025-08-16 06:14:43 (123 MB/s) - 'Countrydatadump.sql' saved [15508/15508]

[root@ip-10-0-1-201 ~]# ls
Countrydatadump.sql
```

## Install MariaDB client

**#yum install -y mariadb105**

```
[root@ip-10-0-1-201 ~]# sudo yum install -y mariadb105
Last metadata expiration check: 0:15:07 ago on Sat Aug 16 06:02:04 2025.
Dependencies resolved.
=====
Package                                Architecture      Version            Repository          Size
-----
Installing:
mariadb105                                x86_64            3:10.5.29-1.amzn2023.0.1  amazonlinux        1.5 M
Installing dependencies:
mariadb-connector-c                        x86_64            3.3.10-1.amzn2023.0.1  amazonlinux        211 k
mariadb-connector-c-config                noarch            3.3.10-1.amzn2023.0.1  amazonlinux        9.9 k
mariadb105-common                         x86_64            3:10.5.29-1.amzn2023.0.1  amazonlinux        28 k
perl-Sys-Hostname                         x86_64            1.23-477.amzn2023.0.7   amazonlinux        16 k
=====
Transaction Summary
=====
```

## Move the DB dump to the RDS and connect to it:

**# mysql -h database-1.c3m64s8ywaii.eu-west-1.rds.amazonaws.com -u root -p myappdb < Countrydatadump.sql**

**# mysql -h database-1.c3m64s8ywaii.eu-west-1.rds.amazonaws.com -u root -p myappdb**

```
[root@ip-10-0-1-201 ~]# mysql -h database-1.c3m64s8ywaii.eu-west-1.rds.amazonaws.com -u root -p myappdb < Countrydatadump.sql
Enter password:
[root@ip-10-0-1-201 ~]# mysql -h database-1.c3m64s8ywaii.eu-west-1.rds.amazonaws.com -u root -p myappdb
Enter password:
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 85
Server version: 11.4.5-MariaDB-log managed by https://aws.amazon.com/rds/

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.
```

```
MariaDB [myappdb]> select myappdb;
ERROR 1054 (42S22): Unknown column 'myappdb' in 'SELECT'
MariaDB [myappdb]> SHOW TABLES;
```

```
+-----+
| Tables_in_myappdb |
+-----+
| countrydata_final |
+-----+
1 row in set (0.001 sec)
```

```
MariaDB [myappdb]> SHOW TABLES;
```

```
+-----+
| Tables_in_myappdb |
+-----+
| countrydata_final |
+-----+
1 row in set (0.001 sec)
```

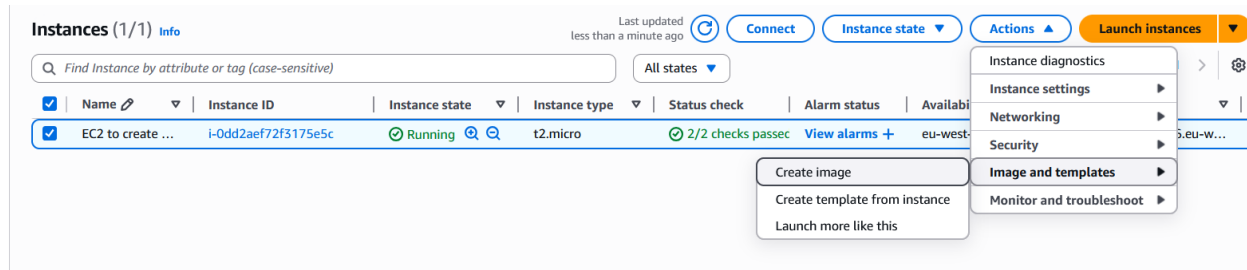
```
MariaDB [myappdb]> DESCRIBE countrydata_final;
```

Field	Type	Null	Key	Default	Extra
name	text	YES		NULL	
mobilephones	double	YES		NULL	
mortalityunder5	double	YES		NULL	
healthexpenditurepercapita	double	YES		NULL	
healthexpenditurepercentGDP	double	YES		NULL	
population	double	YES		NULL	
populationurban	double	YES		NULL	
birthrate	double	YES		NULL	

# Create AMI from this instance:

1. choose the instance > actions > Image and template > create image

2. type a name



## Create image [Info](#)

An image (also referred to as an AMI) defines the programs and settings that are applied when you launch an EC2 instance. You can create an image from the configuration of an existing instance.

**Image details**

**Instance ID**  
[i-Odd2ae72f3175e5c](#) (EC2 to create custom AMI)

**Image name**  
  
Maximum 127 characters. Can't be modified after creation.

**Image description - optional**  
  
Maximum 255 characters

☒ **Reboot instance**  
When selected, Amazon EC2 reboots the instance so that data is at rest when snapshots of the attached volumes are taken. This ensures data consistency.

**Instance volumes**

Storage type	Device	Snapshot	Size	Volume type	IOPS	Throughput	Delete on termination	Encrypted
--------------	--------	----------	------	-------------	------	------------	-----------------------	-----------

Creating an AMI from this instance to be used in the launch template.

- 1.go to IAM console then role section
- 2.choose create role
- 3.choose aws service then EC2
- 4.then choose secret manager policy
- 5.type role name

### Select trusted entity [Info](#)

#### Trusted entity type

- ☒ **AWS service**  
Allow AWS services like EC2, Lambda, or others to perform actions in this account.
- ☐ **AWS account**  
Allow entities in other AWS accounts belonging to you or a 3rd party to perform actions in this account.
- ☐ **Web identity**  
Allows users federated by the specified external web identity provider to assume this role to perform actions in this account.
- ☐ **SAML 2.0 federation**  
Allow users federated with SAML 2.0 from a corporate directory to perform actions in this account.
- ☐ **Custom trust policy**  
Create a custom trust policy to enable others to perform actions in this account.

#### Use case

Allow an AWS service like EC2, Lambda, or others to perform actions in this account.

##### Service or use case

EC2

Choose a use case for the specified service.

Use case  
☒ EC2




### Add permissions [Info](#)

#### Permissions policies (1/1072) [Info](#)

Choose one or more policies to attach to your new role.

Filter by Type

All types  3 matches

<input type="checkbox"/>	Policy name <a href="#">?</a>	Type
<input type="checkbox"/>	<input type="checkbox"/>  <a href="#">AWSQuickSightSecretsManagerWriteAccess</a>	AWS managed
<input type="checkbox"/>	<input type="checkbox"/>  <a href="#">AWSQuickSightSecretsManagerWritePolicy</a>	AWS managed
<input checked="" type="checkbox"/>	<input type="checkbox"/>  <a href="#">SecretsManagerReadWrite</a>	AWS managed

## Creating a launch template:

- 1.type name and description
- 2.choose the AMI we created
- 3.choose instance type and keypair
- 4.put network details
- 5.put the IAM role

### Launch template name and description

Launch template name - *required*

manaraLT

Must be unique to this account. Max 128 chars. No spaces or special characters like '&', '@', '@'.

### Template version description

web/App tier LT

Max 255 chars

### Auto Scaling guidance [Info](#)

Select this if you intend to use this template with EC2 Auto Scaling

☐ Provide guidance to help me set up a template that I can use with EC2 Auto Scaling

### ▼ Application and OS Images (Amazon Machine Image) [Info](#)

An AMI contains the operating system, application server, and applications for your instance. If you don't see a suitable AMI below, use the search field or choose **Browse more AMIs**.

Q Search our full catalog including 1000s of application and OS images

Recents

**My AMIs**

Quick Start

☐ Don't include in launch template

☒ Owned by me

☐ Shared with me



[Browse more AMIs](#)

Including AMIs from  
AWS, Marketplace and  
the Community

### Amazon Machine Image (AMI)

manara image for launch template

ami-07c572024bf9f3cb0

2025-08-16T07:16:07.000Z

Virtualization: hvm

ENA enabled: true

Root device type: ebs

Boot mode: uefi-preferred



### Description



## ▼ Instance type [Info](#) | [Get advice](#)

[Advanced](#)

### Instance type

t2.micro

Free tier eligible

Family: t2 1 vCPU 1 GiB Memory Current generation: true On-Demand RHEL base pricing: 0.027 USD per Hour  
On-Demand Linux base pricing: 0.0126 USD per Hour On-Demand SUSE base pricing: 0.0126 USD per Hour  
On-Demand Ubuntu Pro base pricing: 0.0144 USD per Hour On-Demand Windows base pricing: 0.0172 USD per Hour

☐ All generations

[Compare instance types](#)

Additional costs apply for AMIs with pre-installed software

## ▼ Key pair (login) [Info](#)

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

### Key pair name

men3em

[Create new key pair](#)

## ▼ Network settings [Info](#)

### Subnet [Info](#)

subnet-008f89dd413c36620

manara-proj-subnet-private1-eu-west-1a

VPC: vpc-09ea4adfe8be34649 Owner: 850470019231 Availability Zone: eu-west-1a (euw1-az3)  
Zone type: Availability Zone IP addresses available: 4091 CIDR: 10.0.128.0/20

[Create new subnet](#)

When you specify a subnet, a network interface is automatically added to your template.

### Availability Zone [Info](#)

eu-west-1a

euw1-az3

[Enable additional zones](#)

### Firewall (security groups) [Info](#)

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

☒ Select existing security group

☐ Create security group

### Common security groups [Info](#)

Select security groups

EC2 SG sg-0db71471bc2de2a41

VPC: vpc-09ea4adfe8be34649

[Compare security group rules](#)

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

## ► Advanced network configuration

## ▼ Advanced details [Info](#)

### IAM instance profile [Info](#)

EC2-retrieve-rds-cred

arn:aws:iam::850470019231:instance-profile/EC2-retrieve-rds-cred

[Create new IAM profile](#)

# Creating Auto-scaling group:

1.type a name and choose the launch template

2.choose VPC and subnets

3.choose the capacity

4.choose scaling policy

## Name

### Auto Scaling group name

Enter a name to identify the group.

manaraASG

Must be unique to this account in the current Region and no more than 255 characters.

## Launch template [Info](#)

**i** 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

Choose a launch template that contains the instance-level settings, such as the Amazon Machine Image (AMI), instance type, key pair, and security groups.

manaraLT

[Create a launch template](#)

### Version

## 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-09ea4adfe8be34649 (manara-proj-vpc)  
10.0.0.0/16

[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

euw1-az1 (eu-west-1b) | subnet-0b443971147bc2a39 (manara-proj-subnet-private2-eu-west-1b)  
10.0.144.0/20

euw1-az3 (eu-west-1a) | subnet-008f89dd413c36620 (manara-proj-subnet-private1-eu-west-1a)  
10.0.128.0/20

[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

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.

[Activate Windows](#)

Group size [Info](#)

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 type

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) ▼

Desired capacity

Specify your group size.

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

2 ▼

Equal or less than desired capacity

Max desired capacity

4 ▼

Equal or greater than desired capacity

Instances (3) [Info](#)

Last updated  
less than a minute ago



Connect

Instance state ▼

Actions ▼

Launch instances



Find Instance by attribute or tag (case-sensitive)

All states ▼

< 1 > ⚙

<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
<input type="checkbox"/>	EC2 to create custom AMI	i-0dd2aef72f3175e5c	Running	t2.micro	2/2 checks passed	<a href="#">View alarms +</a>	eu-west-1a	ec2-34-240-28-96.
<input type="checkbox"/>	manara-proj	i-0d0353898896fc6e7	Pending	t2.micro	-	<a href="#">View alarms +</a>	eu-west-1b	-
<input type="checkbox"/>	manara-proj	i-0cae0fa3dbd4b1129	Pending	t2.micro	-	<a href="#">View alarms +</a>	eu-west-1a	-

# Creating a target group:

1. choose target type is instance

2. choose VPC

3. type a name

## Basic configuration

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

### Choose a target type

☒ Instances

- Supports load balancing to instances within a specific VPC.
- Facilitates the use of [Amazon EC2 Auto Scaling](#) to manage and scale your EC2 capacity.

☐ IP addresses

- Supports load balancing to VPC and on-premises resources.
- Facilitates routing to multiple IP addresses and network interfaces on the same instance.
- Offers flexibility with microservice based architectures, simplifying inter-application communication.
- Supports IPv6 targets, enabling end-to-end IPv6 communication, and IPv4-to-IPv6 NAT.

☐ Lambda function

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

☐ Application Load Balancer

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

### Target group name

manaraTG

Activate  
Go to Settings

### Automatic scaling - optional

#### Choose whether to use a target tracking policy | [Info](#)

You can set up other metric-based scaling policies and scheduled scaling after creating your Auto Scaling group.

☐ 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.

#### Scaling policy name

Target Tracking Policy

#### Metric type | [Info](#)

Monitored metric that determines if resource utilization is too low or high. If using EC2 metrics, consider enabling detailed monitoring for better scaling performance.

Average CPU utilization

#### Target value

70

#### Instance warmup | [Info](#)

300

seconds

☐ Disable scale in to create only a scale-out policy

# Edit the ASG to link it to the target group:

## Load balancing - optional

### Load balancers

- ☒ Application, Network or Gateway Load Balancer target groups
- Only instance target groups that belong to the same VPC as your Auto Scaling group are available for selection.

Select target groups

manaraTG | HTTP

Load balancer: Not associated with any load balancer

One of your target groups is not yet associated with any load balancer. In order for routing and scaling to occur, you will need to attach the target group to a load balancer. This can be done later in the [Load Balancing console](#).

- ☐ Classic Load Balancers

### Create and attach new load balancers

Add a new load balancer

# Register targets in the target group:

## Register targets

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

Available instances (2/3)

Filter instances

☒

i-0d0353898896fc6e7

manara-proj

Running

EC2 SG

eu-west-1b

10.0.157.163

subnet-0f...

☒

i-0cae0fa3dbd4b1129

manara-proj

Running

EC2 SG

eu-west-1a

10.0.130.142

subnet-0f...

☐

i-0dd2aef72f3175e5c

EC2 to create custom AMI

Running

ec2-rds-1, test

eu-west-1a

10.0.1.201

subnet-0f...

2 selected

Ports for the selected instances

Ports for routing traffic to the selected instances.

80

1-65535 (separate multiple ports with commas)

Include as pending below

Activate Windows

# Creating a Load Balancer:

- 1.it will be ALB
- 2.type name and choose internet facing
- 3.choose VPC and public subnets
- 4.choose listener and target group

## Basic configuration

### Load balancer name

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

manaraLB

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

### Scheme [Info](#)

Scheme can't be changed after the load balancer is created.

#### ☒ Internet-facing

- Serves internet-facing traffic.
- Has public IP addresses.
- DNS name resolves to public IPs.
- Requires a public subnet.

#### ☐ Internal

- Serves internal traffic.
- Has private IP addresses.
- DNS name resolves to private IPs.
- Compatible with the IPv4 and Dualstack IP address types.

## 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](#).

vpc-09ea4adfe8be34649 (manara-proj-vpc)  
10.0.0.0/16



[Create VPC](#)

### IP pools - new [Info](#)

You can optionally choose to configure an IPAM pool as the preferred source for your load balancers IP addresses. Create or view [Pools](#) in the [Amazon VPC IP Address Manager console](#).

#### ☐ Use IPAM pool for public IPv4 addresses

The IPAM pool you choose will be the preferred source of public IPv4 addresses. If the pool is depleted IPv4 addresses will be assigned by AWS.

### Availability Zones and subnets [Info](#)

Select at least two Availability Zones and a subnet for each zone. A load balancer node will be placed in each selected zone and will automatically scale in response to traffic. The load balancer routes traffic to targets in the se

#### ☒ eu-west-1a (euw1-az3)

##### Subnet

Only CIDR blocks corresponding to the load balancer IP address type are used. At least 8 available IP addresses are required for your load balancer to scale efficiently.

subnet-0c2599a33ba597934  
IPv4 subnet CIDR: 10.0.0.0/20

#### ☒ eu-west-1b (euw1-az1)

##### Subnet

Only CIDR blocks corresponding to the load balancer IP address type are used. At least 8 available IP addresses are required for your load balancer to scale efficiently.

subnet-0074080fb03206a24  
IPv4 subnet CIDR: 10.0.16.0/20

## Security groups [Info](#)

A security group is a set of firewall rules that control the traffic to your load balancer. Select an existing security group, or you can [create a new security group](#).

### Security groups

Select up to 5 security groups

ALB SG  
sg-09ad4604d0c3c45e4 VPC: vpc-09ea4adfe8be34649

## 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.

### ▼ Listener HTTP:80

#### Protocol

HTTP

#### Port

80

1-65535

#### Default action [Info](#)

Forward to

manaraTG

Target type: Instance, IPv4

HTTP

[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.

# Testing the website:



## Example Social Research Organization

[About Us](#) [Contact Us](#) [Query](#)

Welcome to our data query site. You can get data from countries all over the world to use in your research.

We provide data for a variety of areas including basic demographics and development statistics.

### About Us



Shirley Rodriguez

Our site got started when Shirley Rodriguez found that she was frequently looking up data from a variety of databases. Shirley decided to start sharing some of this data with other social researchers.

Activate Windows

Go to Settings to activate Windows

# Creating SNS topic:

- 1.create topic
- 2.add subscription
- 3.confrim subscriptio

Create topic

Details

Type | Info

Topic type cannot be modified after topic is created

☐ FIFO (first-in, first-out)

- Strictly-preserved message ordering
- Exactly-once message delivery
- Subscription protocols: SQS

☒ Standard

- Best-effort message ordering
- At-least once message delivery
- Subscription protocols: SQS, Lambda, Data Firehose, HTTP, SMS, email, mobile application endpoints

Name

HighCPUAlarmTopic

Maximum 256 characters. Can include alphanumeric characters, hyphens (-) and underscores (\_).

Display name - optional | Info

To use this topic with SMS subscriptions, enter a display name. Only the first 10 characters are displayed in an SMS message.

My Topic

Maximum 100 characters.

Details

ARN

arn:aws:sns:eu-west-1:850470019231:HighCPUAlarmTopic:cb602334-6026-4243-bd12-ee05735bfb50

Endpoint

muhammedabdelmonm@gmail.com

Topic

HighCPUAlarmTopic

Subscription Principal

arn:aws:iam::850470019231:user/m.abelmeneim

Status

⌚

Pending confirmation

Protocol

EMAIL-JSON



## AWS Notification - Subscription Confirmation

AN

AWS Notifications<no-reply@sns.amazonaws.com>

To: You

Sat 8/16/2025 10:56 AM

```
{
  "Type": "SubscriptionConfirmation",
  "MessageId": "54930e08-c234-4202-8acd-393751e92a41",
  "Token":
    "2336412f37fb687f5d51e6e2425a8a587855b2cae56f5a12240d08a00a758b278ff27a4bb2e87e615d6a3679360cdc50efc7b66364d99c2b123f9e067497fee83ad1827167dc7b83e544d731d4543a363c3d3565669b448f0d1ddae1b61637d582561c41296ab95c960ec28274f0e1b87afbebc4773c49767b90f1ee53444e9b",
  "TopicArn": "arn:aws:sns:eu-west-1:850470019231:HighCPUAlarmTopic",
  "Message": "You have chosen to subscribe to the topic arn:aws:sns:eu-west-1:850470019231:HighCPUAlarmTopic.\nTo confirm the subscription, visit the SubscribeURL included in this message.",
  "SubscribeURL": "https://sns.eu-west-1.amazonaws.com/?Action=ConfirmSubscription&TopicArn=arn:aws:sns:eu-west-1:850470019231:HighCPUAlarmTopic&Token=2336412f37fb687f5d51e6e2425a8a587855b2cae56f5a12240d08a00a758b278ff27a4bb2e87e615d6a3679360cdc50efc7b66364d99c2b123f9e067497fee83ad1827167dc7b83e544d731d4543a363c3d3565669b448f0d1ddae1b61637d582561c41296ab95c960ec28274f0e1b87afbebc4773c49767b90f1ee53444e9b",
  "Timestamp": "2025-08-16T07:56:52.526Z",
  "SignatureVersion": "1",
  "Signature":
    "nNLg/xHiAPiWLyxsj7yc2m+38VFtjIS+ZjQETVecEBPhdi7l2OoZxT4Fu6Clw7Vv5o8l8oldWldBsxBXAaDHHNdsJ85sxInflDwClqnnu5nBA+hpHlwHHf5d8omVruGMkGjru2XbW8T9B/DwPat+xlJvsl/TdB/dwnnltkmJ0Xz/+btD9rHw7JSFLv2gMg8oEgJIADYXR6jSnnv/8dVvXD582+Auzh8JsUSy2Bm6hi/SQmAuEXjgshn66OUa/ojZ2m4sDPFW1h23G1kmdctC/VE6gffADPdNZjY5Xug8CyNi8YlCQBsw8Yz1HyEONa2hvYrloXx/wf0hdRw6fU+mQ==",
  "SigningCertURL": "https://sns.eu-west-1.amazonaws.com/SimpleNotificationService-6209c161c6221fdf56ec1eb5c821d112.pem"
}
```

Activate Windows

Go to Settings to activate Windows.

## Create cloud watch alarm:

- 1.create alarm
- 2.select metric
- 3.select CPU utilization for ASG
- 4.if greater than or equal to 70%
- 5.put SNS topic to send Email

CPUUtilization					
Browse	Multi source query	Graphed metrics (1)	Options	Source	=
<input type="checkbox"/>	manaraASG	DiskWriteBytes ⓘ			No alarms
<input type="checkbox"/>	manaraASG	DiskReadOps ⓘ			No alarms
<input type="checkbox"/>	manaraASG	DiskReadBytes ⓘ			No alarms
<input type="checkbox"/>	manaraASG	NetworkPacketsOut ⓘ			No alarms
<input checked="" type="checkbox"/>	manaraASG	CPUUtilization ⓘ			No alarms
<input type="checkbox"/>	manaraASG	NetworkOut ⓘ			No alarms
<input type="checkbox"/>	manaraASG	MetadataNoToken ⓘ			No alarms
<input type="checkbox"/>	manaraASG	StatusCheckFailed ⓘ			No alarms

## Conditions

### Threshold type

☒ Static

Use a value as a threshold

☐ Anomaly detection

Use a band as a threshold

### Whenever CPUUtilization is...

Define the alarm condition.

☐ Greater

> threshold

☒ Greater/Equal

>= threshold

☐ Lower/Equal

<= threshold

☐ Lower

< threshold

### than...

Define the threshold value.

70

Must be a number.

Activate Windows

## Notification

### Alarm state trigger

Define the alarm state that will trigger this action.

☒ In alarm

The metric or expression is outside of the defined threshold.

☐ OK

The metric or expression is within the defined

### Send a notification to the following SNS topic

Define the SNS (Simple Notification Service) topic that will receive the notification.

☒ Select an existing SNS topic

☐ Create new topic

☐ Use topic ARN to notify other accounts

### Send a notification to...

🔍

HighCPUAlarmTopic

✕

Only topics belonging to this account are listed here. All persons and applications subscribed to the selected topic will receive notifications.

Email (endpoints)

muhammedabdelmonm@gmail.com - [View in SNS Console](#)

Add notification

## Name and description

### Alarm name

HighCPUAlarm

Alarm description - optional [View formatting guidelines](#)

Edit

Preview

# This is an H1

\*\*double asterisks will produce strong character\*\*

This is [an example](https://example.com/) inline link.

11 of 1024 characters (0/1024)

