

AWS PROJECT -1

Description: Amazon Elastic Compute Cloud (Amazon EC2) provides scalable computing capacity in the Amazon Web Services (AWS) cloud. Using Amazon EC2 eliminates your need to invest in hardware up front so you can develop and deploy applications faster. You can use Amazon EC2 to launch as many or as few virtual servers as you need, configure security and networking, and manage storage. Amazon EC2 enables you to scale up or down to handle changes in requirements or spikes in popularity, reducing your need to forecast traffic.

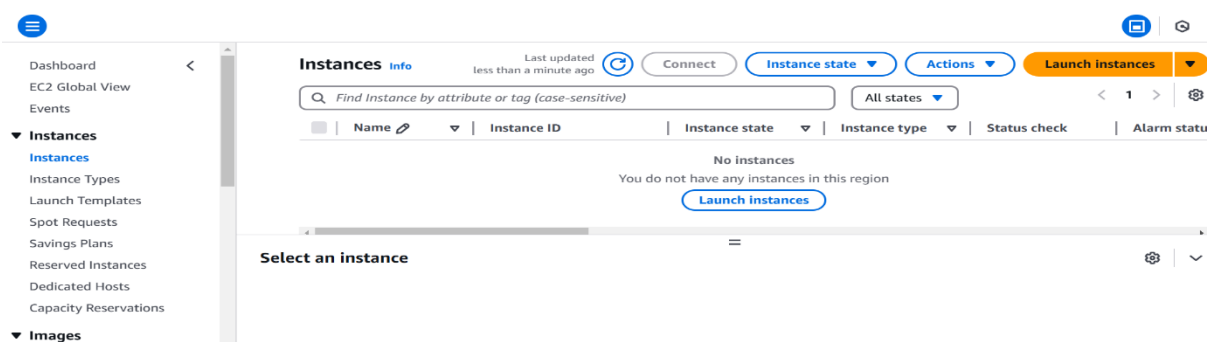
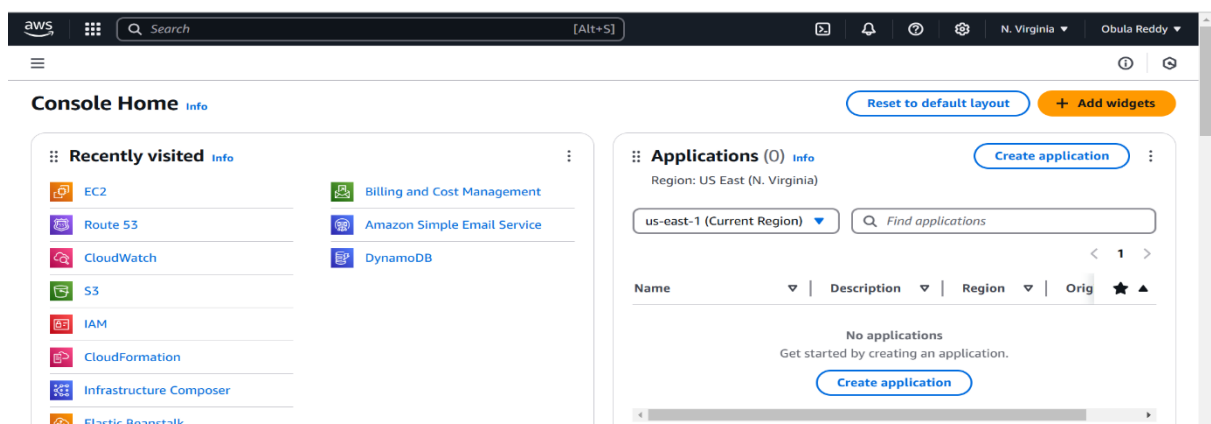
Problem Statement:

Company ABC wants to move their product to AWS. They have the following things set up right now: 1. MySQL DB 2. Website (PHP)

The company wants high availability on this product, therefore wants Auto Scaling to be enabled on this website.

Solution:

Step-1: Login into AWS account. Go to dashboard and search for EC2 and click on instance and launch instance.



Step-2: Create a instance with ubuntu OS and choose instance type, key-pair, networking settings like VPC, subnets and security groups and storage volume and click on launch instance.

Launch an instance [Info](#)

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

Name and tags [Info](#)

Name

project-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

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

Q

Browse more AMIs

Including AMIs from AWS, Marketplace and the Community

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

Instance type

t2.micro

Family: t2 1 vCPU 1 GiB Memory Current generation: true

On-Demand Windows base pricing: 0.0162 USD per Hour

On-Demand Ubuntu Pro base pricing: 0.0134 USD per Hour

On-Demand SUSE base pricing: 0.0116 USD per Hour

On-Demand RHEL base pricing: 0.026 USD per Hour

On-Demand Linux base pricing: 0.0116 USD per Hour

Free tier eligible

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*

north

▼

↺

Create new key pair

▼ Network settings [Info](#)

[Edit](#)

Network [Info](#)

vpc-04121c394de88d3dd

Subnet [Info](#)

No preference (Default subnet in any availability zone)

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

Common security groups [Info](#)

Select security groups

default sg-0bc8b4818e6ca2d66 [X](#)

VPC: vpc-04121c394de88d3dd

[Compare security group rules](#)

▼ Configure storage [Info](#)

[Advanced](#)

1x GiB Root volume (Not encrypted)

[Free tier eligible customers can get up to 30 GB of EBS General Purpose \(SSD\) or Magnetic storage](#) [X](#)

[Add new volume](#)

The selected AMI contains more instance store volumes than the instance allows. Only the first 0 instance store volumes from the AMI will be accessible from the instance

[Click refresh to view backup information](#)

The tags that you assign determine whether the instance will be backed up by any Data Lifecycle Manager policies.

▼ Summary

Number of instances [Info](#)

1

Software Image (AMI)

Canonical, Ubuntu, 24.04, amd64...[read more](#)
ami-0866a3c8686eaebea

Virtual server type (instance type)

t2.micro

Firewall (security group)

default

[Cancel](#)

[Launch instance](#)

Instances (1) [Info](#)

Last updated
6 minutes ago

[Connect](#)

[Instance state](#)

[Actions](#)

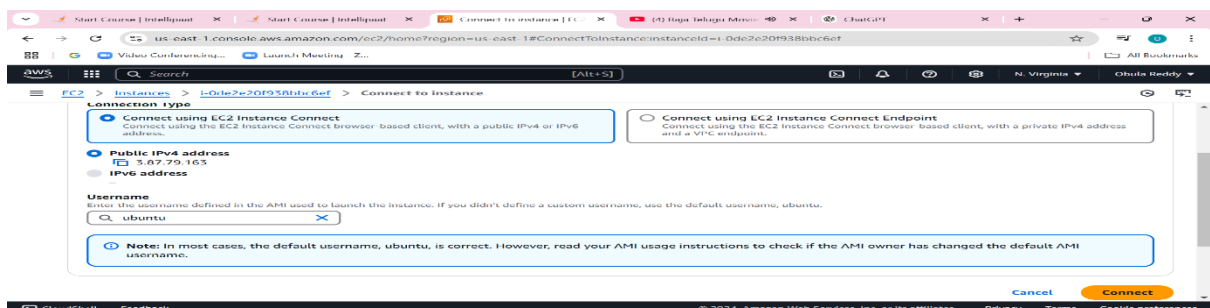
[Launch instances](#)

[All states](#)

[1](#)

<input type="checkbox"/>	Name ✎	Instance ID	Instance state ▼	Instance type ▼	Status check	Alarm status
<input type="checkbox"/>	project-1	i-0de2e20f938bbc6ef	Running	t2.micro	2/2 checks passed	View alarms

Step-3: Select the instance and connect to machine and update the machine and install the apache2 server on machine.



```
Swap usage: 0%

* Ubuntu Pro delivers the most comprehensive open source security and
  compliance features.

  https://ubuntu.com/aws/pro

Expanded Security Maintenance for Applications is not enabled.

70 updates can be applied immediately.
36 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

Last login: Sun Dec 1 08:49:51 2024 from 18.206.107.29
ubuntu@ip-172-31-24-136:~$ sudo apt update
Get:42 http://security.ubuntu.com/ubuntu noble-security/main amd64 c-n-f Metadata [5892 B]
Get:43 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [562 kB]
Get:44 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en [150 kB]
Get:45 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Components [51.8 kB]
Get:46 http://security.ubuntu.com/ubuntu noble-security/universe amd64 c-n-f Metadata [13.5 kB]
Get:47 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages [480 kB]
Get:48 http://security.ubuntu.com/ubuntu noble-security/restricted Translation-en [92.5 kB]
Get:49 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Components [208 B]
Get:50 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 c-n-f Metadata [424 B]
Get:51 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Packages [12.2 kB]
Get:52 http://security.ubuntu.com/ubuntu noble-security/multiverse Translation-en [2940 B]
Get:53 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [208 B]
Get:54 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 c-n-f Metadata [356 B]
Fetched 30.8 MB in 6s (5238 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
58 packages can be upgraded. Run 'apt list --upgradable' to see them.
ubuntu@ip-172-31-24-136:~$ sudo apt install apache2
```

us-east-1.console.aws.amazon.com/ec2-instance-connect/ssh?addressFamily=ipv4&connType=standard&instanceId=i-0de2e20f938bbc6ef&osUser=ubu...

aws [Alt+S] N. Virginia Obula Reddy

i-0de2e20f938bbc6ef (project-1)
PublicIPs: 3.87.79.163 PrivateIPs: 172.31.24.136

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RDS

Step-4: Go to AWS console, select RDS and click on database and create database by selecting the mode of creation, the engine, template, creating credentials or automatic password creation, enable autoscaling and VPC settings and click on create database.

Databases (0) ☐ Group resources ☒

< 1 >

<input type="button" value="+"/> DB identifier	▲ Status ▼	Role ▼	Engine ▼	Region ... ▼	Size
No instances found					

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.

us-east-1.console.aws.amazon.com/rds/home?region=us-east-1#launch-dbinstance:

Video Conferencing... Launch Meeting - Z...

aws Search [Alt+S]

RDS > Create database

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 60 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.

admin

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.

MySQL

MySQL is the most popular open source database in the world. MySQL on RDS offers the rich features of the MySQL community edition with the flexibility to easily scale compute resources or storage capacity for your database.

- Supports database size up to 64 TiB.
- Supports General Purpose, Memory Optimized, and Burstable Performance instance classes.
- Supports automated backup and point-in-time recovery.
- Supports up to 15 Read Replicas per instance, within a

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us-east-1.console.aws.amazon.com/rds/home?region=us-east-1#launch-dbinstance:

Video Conferencing... Launch Meeting - Z...

aws Search [Alt+S]

RDS > Create database

☐ Auto generate password

Amazon RDS can generate a password for you, or you can specify your own password.

Master password Info

.....

Password strength Very strong

The Master password is invalid.

Minimum constraints: At least 8 printable ASCII characters. Can't contain any of the following symbols: / ' " @

Confirm master password Info

.....

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

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us-east-1.console.aws.amazon.com/rds/home?region=us-east-1#launch-dbinstance:

Video Conferencing... Launch Meeting - Z...

aws Search [Alt+S]

RDS > Create database

Storage autoscaling Info

Provides dynamic scaling support for your database's storage based on your application's needs.

☒ Enable storage autoscaling

Enabling this feature will allow the storage to increase after the specified threshold is exceeded.

Maximum storage threshold Info

Charges will apply when your database autoscales to the specified threshold

1000

GIB

Allocated storage value must be 22 GIB to 6,144 GIB

Connectivity Info

Compute resource

Choose whether to set up a connection to a compute resource for this database. Setting up a connection will automatically change connectivity settings so that the compute resource can connect to this database.

☒ Don't connect to an EC2 compute resource

Don't set up a connection to a compute resource for this database. You can manually set up a connection to a compute resource later.

☐ Connect to an EC2 compute resource

Set up a connection to an EC2 compute resource for this database.

MySQL

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us-east-1.console.aws.amazon.com/rds/home?region=us-east-1#launch-dbinstance:

Video Conferencing... Launch Meeting - Z...

aws Search [Alt+S]

RDS > Create database

Virtual private cloud (VPC) Info

Choose the VPC. The VPC defines the virtual networking environment for this DB instance.

Default VPC (vpc-04121c394de88d3dd)

6 Subnets, 6 Availability Zones

Only VPCs with a corresponding DB subnet group are listed.

After a database is created, you can't change its VPC.

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.

default

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.

MySQL

MySQL is the most popular open source database in the world. MySQL on RDS offers the rich features of the MySQL community edition with the flexibility to easily scale compute resources or storage capacity for your database.

- Supports database size up to 64 TiB.
- Supports General Purpose, Memory Optimized, and Burstable Performance instance classes.
- Supports automated backup and point-in-time recovery.
- Supports up to 15 Read Replicas per instance, within a

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us-east-1.console.aws.amazon.com/rds/home?region=us-east-1#database-id=database-1;is-cluster=false

Video Conferencing... Launch Meeting - Z...

aws Search [Alt+S]

RDS > Databases > database-1

Amazon RDS

Dashboard

Databases

Query Editor

Performance insights

Snapshots

Exports in Amazon S3

Automated backups

Reserved instances

Proxies

Subnet groups

Parameter groups

Option groups

Successfully created database database-1

RDS has generated your database master password during the database creation and it will be displayed in the connection details. The only way to view your master password is to choose **View connection details** during database creation. You can modify your DB instance to create a new password at any time.

You can use settings from database-1 to simplify configuration of **suggested database add-ons** while we finish creating your DB for you.

View connection details

database-1

Modify

Actions

Summary

DB identifier

database-1

CPU

19.80%

Status

Backing-up

Class

db.t4g.micro

Role

Instance

Current activity

0

Engine

MySQL

Community

Region & AZ

Recommendations

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Step-5: Once connected to terminal, type “**sudo su -**” to become root user. After then after update the machine by using “**apt-get update**” command and install the apache2 web server by entering “**apt install apache2 -y**” and enter into the folder and remove index.html by entering **rm index.html** command.

```
Swap usage:    0%

* Ubuntu Pro delivers the most comprehensive open source security and
  compliance features.

  https://ubuntu.com/aws/pro

Expanded Security Maintenance for Applications is not enabled.

70 updates can be applied immediately.
36 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

Last login: Sun Dec  1 08:49:51 2024 from 18.206.107.29
ubuntu@ip-172-31-24-136:~$ sudo apt update

root@ip-172-31-20-33:/home/ubuntu# apt install apache2 -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils libapr1t64 libaprutil1-dbd-sqlite3 libaprutil1-ldap libaprutil1t64 liblua5.4-0 ssl-cert
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom www-browser
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils libapr1t64 libaprutil1-dbd-sqlite3 libaprutil1-ldap libaprutil1t64 liblua5.4-0 ssl-cert
0 upgraded, 10 newly installed, 0 to remove and 0 not upgraded.
Need to get 2084 kB of archives.
After this operation, 8094 kB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 libapr1t64 amd64 1.7.2-3.1ubuntu0.1 [108 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libaprutil1t64 amd64 1.6.3-1.1ubuntu7 [91.9 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libaprutil1-dbd-sqlite3 amd64 1.6.3-1.1ubuntu7 [11.2 kB]
Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libaprutil1-ldap amd64 1.6.3-1.1ubuntu7 [9116 B]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 liblua5.4-0 amd64 5.4.6-3build2 [166 kB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 apache2-bin amd64 2.4.58-1ubuntu8.4 [1329 kB]
```

```
No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@ip-172-31-20-33:/home/ubuntu# cd /var/www/html
root@ip-172-31-20-33:/var/www/html# ls
index.html
root@ip-172-31-20-33:/var/www/html# rm index.html
```

Step-6: Create a new file named index.php file by entering **nano index.php**. Enter the php code, save it and exit. Add the repository into ubuntu instance which enables us to install the required php version by entering **apt-add-repository -y ppa:ondrej/php**. Install the required packages by entering **apt install php5.6 mysql-client php5.6-mysql -y**.


```

root@ip-172-31-20-33:/var/www/html# apt-add-repository -y ppa:ondrej/php
PPA publishes dbgsym, you may need to include 'main/debug' component
Repository: 'Types: deb
URLs: https://ppa.launchpadcontent.net/ondrej/php/ubuntu/
Suites: noble
Components: main
'
Description:
Co-installable PHP versions: PHP 5.6, PHP 7.x, PHP 8.x and most requested extensions are included. Only Supported Ubuntu Releases
iki.ubuntu.com/Releases) are provided.

Debian oldstable and stable packages are provided as well: https://deb.sury.org/#debian-dpa

You can get more information about the packages at https://deb.sury.org

BUGS&FEATURES: This PPA now has a issue tracker:
https://deb.sury.org/#bug-reporting
Reading package lists... Done
root@ip-172-31-20-33:/var/www/html# apt install php5.6 mysql-client php5.6-mysqli -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Note, selecting 'php5.6-mysql' instead of 'php5.6-mysqli'
The following additional packages will be installed:
  debfsurorg-archive-keyring libapache2-mod-php5.6 libpcre3 mysql-client-8.0 mysql-client-core-8.0 mysql-common php-comm
  php5.6-common php5.6-json php5.6-opcache php5.6-readline
Suggested packages:
  php-pear
The following NEW packages will be installed:
  debfsurorg-archive-keyring libapache2-mod-php5.6 libpcre3 mysql-client mysql-client-8.0 mysql-client-core-8.0 mysql-co
  php5.6 php5.6-cli php5.6-common php5.6-json php5.6-mysql php5.6-opcache php5.6-readline
0 upgraded, 15 newly installed, 0 to remove and 62 not upgraded.
Need to get 6928 kB of archives.
After this operation, 76.9 MB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu/noble/universe amd64 libpcre3 amd64 2:8.39-15build1 [248 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu/noble-updates/main amd64 mysql-client-core-8.0 amd64 8.0.40-0ubuntu

```

Step-7: Go to RDS and copy the endpoint of created database. Then type **mysql -h database-1.cxs6486eynpe.us-east-1.rds.amazonaws.com -u admin -p** and hit enter and type password and use the sql commands.

```

ERROR 1045 (28000): Access denied for user 'admin'@'172.31.20.33' (using password: YES)
root@ip-172-31-20-33:/var/www/html# mysql -h database-1.cxs6486eynpe.us-east-1.rds.amazonaws.com -u admin -pj7I5x7YYe2EqsFtbfet9
mysql: [Warning] Using a password on the command line interface can be insecure.
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 30
Server version: 8.0.39 Source distribution

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affiliates. Other names may be trademarks of their respective
owners.

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

mysql> show databases ;
+-----+
| Database |
+-----+
| information_schema |
| mysql |
| performance_schema |
| sys |
+-----+
4 rows in set (0.01 sec)

mysql> create database intel;
Query OK, 1 row affected (0.02 sec)

mysql> use intel;
Database changed
mysql> create table data(firstname varchar(50),email varchar(50));
Query OK, 0 rows affected (0.07 sec)

```

Step-8: After copying this IP to your browser, you will observe that your website is working on it. Enter the some data to insert into database.



New record created successfully

Name:

Email:

New record created successfully

Auto-Scaling

Step-9: By going to our EC2 Instance and then click on Actions and Create Image

Instances (1/1) Info Last updated about 1 hour ago

<input checked="" type="checkbox"/>	Name	Instance ID	Instance state	Instance type
<input checked="" type="checkbox"/>	project1	i-042fbaf235b06d950	Running	t2.micro

042fbaf235b06d950 (project1)

Details Status and alarms Monitoring Security Networking Storage Tags

▼ Instance summary Info

Instance ID

i-042fbaf235b06d950 (project1)

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.

Step-10: After the ami is in available state. Now, we'll do the autoscaling of our website.

Amazon EC2 Auto Scaling

helps maintain the availability of your applications

Auto Scaling groups are collections of Amazon EC2 instances that enable automatic scaling and fleet management features. These features help you maintain the health and availability of your applications.

Create Auto Scaling group

Get started with EC2 Auto Scaling by creating an Auto Scaling group.

[Create Auto Scaling group](#)

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

EC2 > Auto Scaling groups > Create Auto Scaling group

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

Name

Auto Scaling group name

Enter a name to identify the group.

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

Launch template

[Info](#)

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.

[Create a launch template](#)

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Auto Scaling groups (1)

[Info](#)

[Launch configurations](#) [Launch templates](#) [Actions](#) [Create Auto Scaling group](#)

<input type="checkbox"/>	Name	Launch template/configuration	Instances	Status	Desired capacity	Min	Ma
<input type="checkbox"/>	ASG	my-ten Version Default	1	-	1	1	2