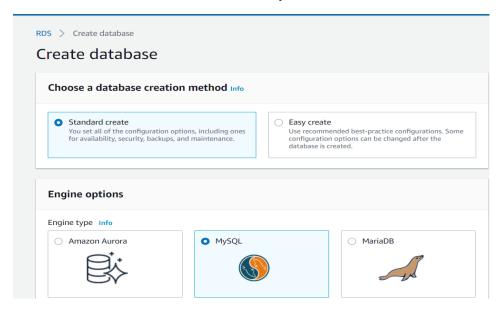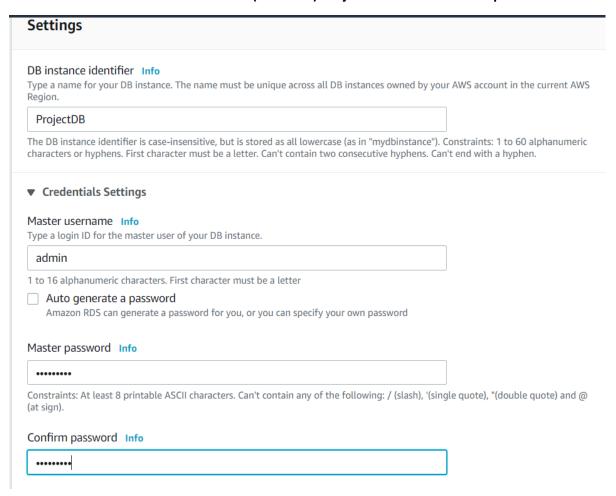1. **Create Database Standard create-MySQL.**
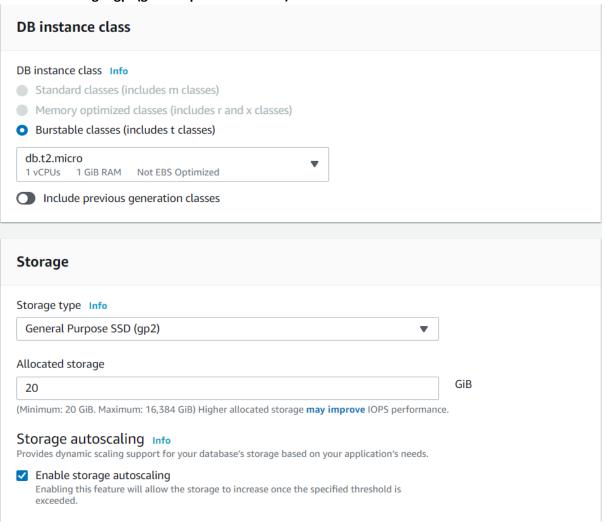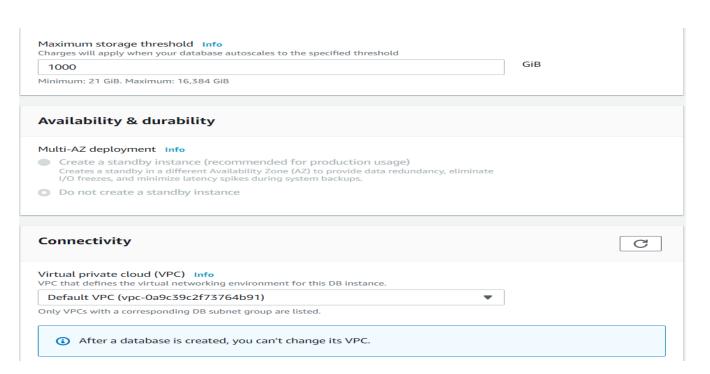

2. **Choose Database instance name(identifier)-ProjectDB and set database password.**

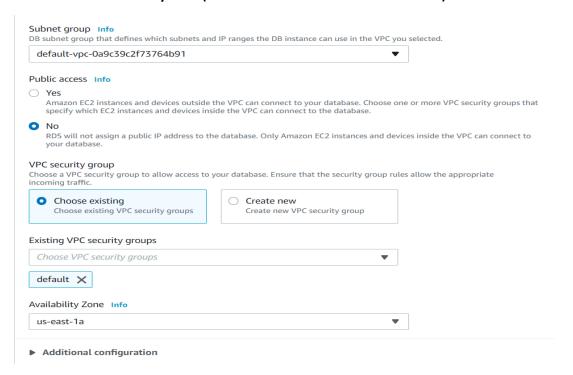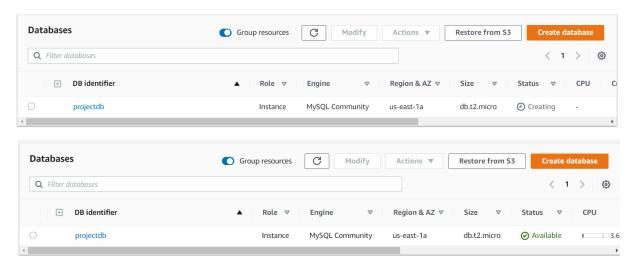### 3. Database storage- gp2(general provisioned ssd)

DB instance class

DB instance class Info
- ○ Standard classes (includes m classes)
- ○ Memory optimized classes (includes r and x classes)
- ● Burstable classes (includes t classes)

db.t2.micro
1 vCPUs   1 GiB RAM   Not EBS Optimized ▼

⬤ Include previous generation classes

Storage

Storage type Info

General Purpose SSD (gp2) ▼

Allocated storage

20   GiB

(Minimum: 20 GiB. Maximum: 16,384 GiB) Higher allocated storage **may improve** IOPS performance.

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 once the specified threshold is exceeded.

Maximum storage threshold Info
Charges will apply when your database autoscales to the specified threshold

1000   GiB

Minimum: 21 GiB. Maximum: 16,384 GiB

Availability & durability

Multi-AZ deployment Info
- ○ Create a standby instance (recommended for production usage)
  Creates a standby in a different Availability Zone (AZ) to provide data redundancy, eliminate I/O freezes, and minimize latency spikes during system backups.
- ○ Do not create a standby instance

Connectivity   ⟳

Virtual private cloud (VPC) Info
VPC that defines the virtual networking environment for this DB instance.

Default VPC (vpc-0a9c39c2f73764b91) ▼

Only VPCs with a corresponding DB subnet group are listed.

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

4. Select availability zone (EC2 must have same AZ as of database)

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

default-vpc-0a9c39c2f73764b91 ▼

Public access Info

○ Yes
   Amazon EC2 instances and devices outside the VPC can connect to your database. Choose one or more VPC security groups that
   specify which EC2 instances and devices inside the VPC can connect to the database.

● No
   RDS will not assign a public IP address to the database. Only Amazon EC2 instances and devices inside the VPC can connect to
   your database.

VPC security group
Choose a VPC security group to allow access to your database. Ensure that the security group rules allow the appropriate
incoming traffic.

| ● Choose existing | ○ Create new |
| Choose existing VPC security groups | Create new VPC security group |

Existing VPC security groups

Choose VPC security groups ▼

default ✕

Availability Zone Info

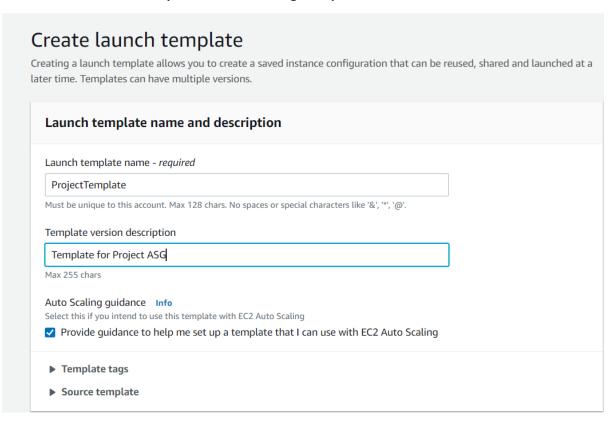us-east-1a ▼

▶ Additional configuration

5. Click on Create Database.

○ **Password and Kerberos authentication**
   Choose a directory in which you want to allow authorized users to authenticate with this DB
   instance using Kerberos Authentication.

▶ **Additional configuration**
   Database options, backup enabled, backtrack disabled, Enhanced Monitoring disabled, maintenance, CloudWatch Logs, delete
   protection disabled

Estimated monthly costs

The Amazon RDS Free Tier is available to you for 12 months. Each calendar month, the free tier will allow you to
use the Amazon RDS resources listed below for free:

- 750 hrs of Amazon RDS in a Single-AZ db.t2.micro Instance.
- 20 GB of General Purpose Storage (SSD).
- 20 GB for automated backup storage and any user-initiated DB Snapshots.

Learn more about AWS Free Tier. ☑

When your free usage expires or if your application use exceeds the free usage tiers, you simply pay standard,
pay-as-you-go service rates as described in the Amazon RDS Pricing page. ☑

ⓘ You are responsible for ensuring that you have all of the necessary rights for any third-party products or
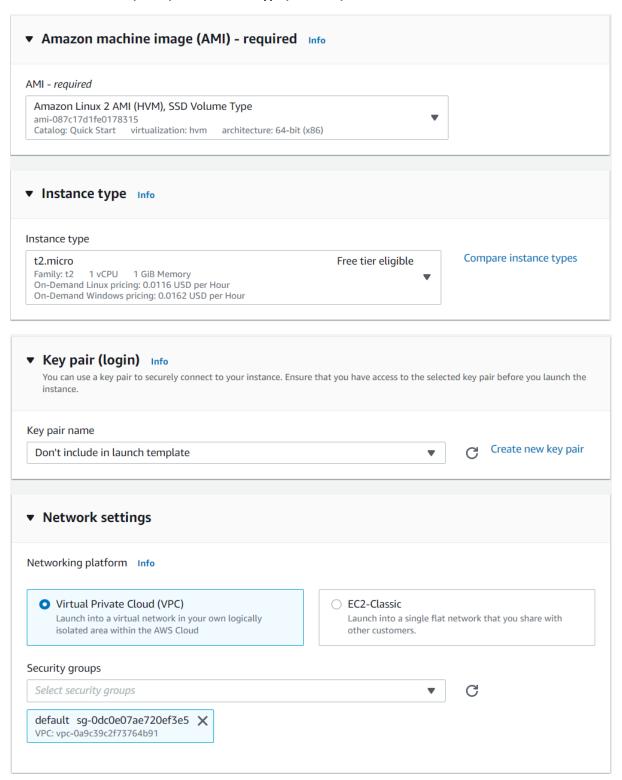   services that you use with AWS services.

Cancel   **Create database**
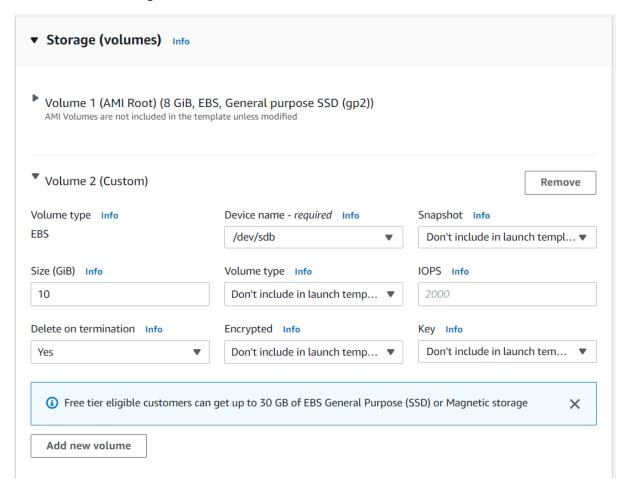
6. Database has been created.

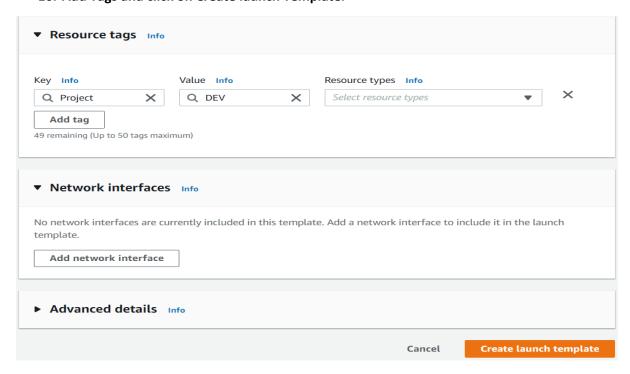**7. Create Launch Template for Auto Scaling Group.**

8. Choose AMI(Linux) and instance type(t2.micro)

▼ **Amazon machine image (AMI) - required** Info

AMI - *required*

Amazon Linux 2 AMI (HVM), SSD Volume Type
ami-087c17d1fe0178315
Catalog: Quick Start   virtualization: hvm   architecture: 64-bit (x86)   ▼

▼ **Instance type** Info

Instance type

t2.micro   Free tier eligible
Family: t2   1 vCPU   1 GiB Memory
On-Demand Linux pricing: 0.0116 USD per Hour   ▼
On-Demand Windows pricing: 0.0162 USD per Hour

Compare instance types

▼ **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

Don't include in launch template   ▼   ↻   Create new key pair

▼ **Network settings**

Networking platform   Info

⦿ Virtual Private Cloud (VPC)
Launch into a virtual network in your own logically
isolated area within the AWS Cloud

◯ EC2-Classic
Launch into a single flat network that you share with
other customers.

Security groups

Select security groups   ▼   ↻

default   sg-0dc0e07ae720ef3e5   ✕
VPC: vpc-0a9c39c2f73764b91

9. Add EBS storage volume.

▼ **Storage (volumes)** Info

▶ Volume 1 (AMI Root) (8 GiB, EBS, General purpose SSD (gp2))
AMI Volumes are not included in the template unless modified

▼ Volume 2 (Custom)   Remove

Volume type   Info   Device name - *required*   Info   Snapshot   Info
EBS   /dev/sdb   ▼   Don't include in launch templ... ▼

Size (GiB)   Info   Volume type   Info   IOPS   Info
10   Don't include in launch temp... ▼   2000

Delete on termination   Info   Encrypted   Info   Key   Info
Yes   ▼   Don't include in launch temp... ▼   Don't include in launch tem... ▼

ⓘ Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage   ✕

Add new volume

10. Add Tags and click on Create launch Template.

▼ **Resource tags** Info

Key   Info   Value   Info   Resource types   Info
🔍 Project   ✕   🔍 DEV   ✕   *Select resource types*   ▼   ✕
Add tag
49 remaining (Up to 50 tags maximum)

▼ **Network interfaces** Info

No network interfaces are currently included in this template. Add a network interface to include it in the launch template.

Add network interface

▶ **Advanced details** Info

Cancel   **Create launch template**

11. Launch Template has been created.

Launch templates (1) Info				
Launch template ID	Launch template name	Default version	Latest version	
○ lt-09fbfca516d0eab82	ProjectTemplate	1	1	

12. Create Auto Scaling Group.Choose name for ASG and select the launch template that has been created above and click on Next

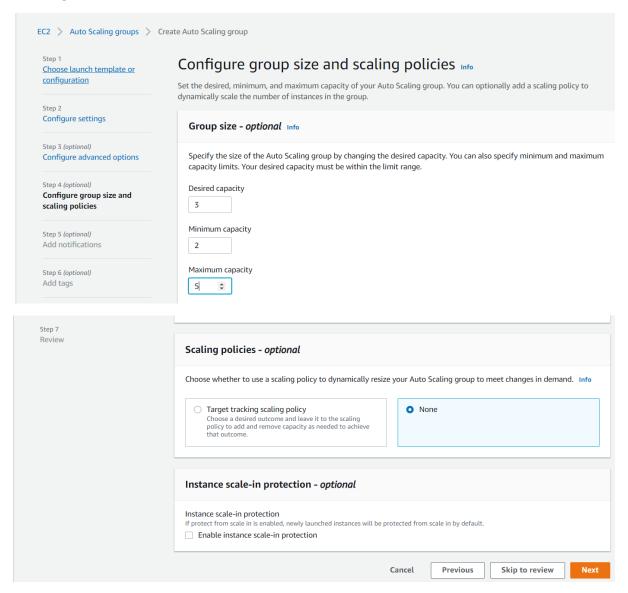EC2 > Auto Scaling groups > Create Auto Scaling group

Step 1
Choose launch template or configuration

Step 2
Configure settings

Step 3 *(optional)*
Configure advanced options

Step 4 *(optional)*
Configure group size and scaling policies

Step 5 *(optional)*
Add notifications

Step 6 *(optional)*
Add tags

Step 7
Review

Choose launch template or configuration Info

Specify a launch template that contains settings common to all EC2 instances that are launched by this Auto Scaling group. If you currently use launch configurations, you might consider migrating to launch templates.

Name

Auto Scaling group name
Enter a name to identify the group.

ProjectASG

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

Launch template Info   Switch to launch configuration

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.

ProjectTemplate

Create a launch template ↗

Version

Default (1)

Create a launch template version ↗

Step 6 *(optional)*
Add tags

Step 7
Review

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.

ProjectTemplate

Create a launch template ↗

Version

Default (1)

Create a launch template version ↗

Description	Launch template	Instance type
Template for Project ASG	ProjectTemplate ↗	t2.micro
	lt-09fbfca516d0eab82	
AMI ID	Security groups	Request Spot Instances
ami-087c17d1fe0178315	-	No
Key pair name	Security group IDs	
-	sg-0dc0e07ae720ef3e5 ↗	

Additional details

Storage (volumes)	Date created
/dev/sdb	Tue Oct 05 2021 21:22:36 GMT+0530 (India Standard Time)

Cancel   Next

13. Select AZ(should be same as used while creating DB)

Step 1
Choose launch template or configuration

Step 2
Configure settings

Step 3 *(optional)*
Configure advanced options

Step 4 *(optional)*
Configure group size and scaling policies

Step 5 *(optional)*
Add notifications

Step 6 *(optional)*
Add tags

Step 7
Review

Configure settings Info

Configure the settings below. Depending on whether you chose a launch template, these settings may include options to help you make optimal use of EC2 resources.

Instance purchase options Info

Use the launch template to create a uniform configuration among all of the instances in the group. Or define options to accommodate a wide variety of requirements, such as launching Spot and On-Demand Instances.

◉ **Adhere to launch template**
The launch template determines the purchase option (On-Demand or Spot) and instance type.

○ **Combine purchase options and instance types**
Specify how much On-Demand and Spot capacity to launch and multiple instance types (optional). This choice is most helpful for optimizing the scale and cost for a fleet of instances.

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

vpc-0a9c39c2f73764b91
172.31.0.0/16   Default

Create a VPC ↗

Subnets

Step 6 *(optional)*
Add tags

Step 7
Review

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

vpc-0a9c39c2f73764b91
172.31.0.0/16   Default

Create a VPC ↗

Subnets

Select subnets

us-east-1a | subnet-0a4741537b32f6e66 ✕
172.31.32.0/20   Default

Create a subnet ↗

Cancel   Previous   Skip to review   Next

14. Attach ASG to Load Balancer and click on next.

EC2 > Auto Scaling groups > Create Auto Scaling group

Configure advanced options Info

Choose a load balancer to distribute incoming traffic for your application across instances to make it more reliable and easily scalable. You can also set options that give you more control over health check replacements and monitoring.

Load balancing - *optional* Info

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.

Attach to a new load balancer

Define a new load balancer to create for attachment to this Auto Scaling group.

Load balancer type
Choose from the load balancer types offered below. Type selection cannot be changed after the load balancer is created. If you need a different type of load balancer than those offered here, **visit the Load Balancing console.** 🔗

- ● **Application Load Balancer**
  HTTP, HTTPS

- ○ **Network Load Balancer**
  TCP, UDP, TLS

Listeners and routing
If you require secure listeners, or multiple listeners, you can configure them from the **Load Balancing console** 🔗 after your load balancer is created.

Protocol	Port	Default routing (forward to)
HTTP	80	Create a target group ▼

New target group name
An instance target group with default settings will be created.

ProjectASG-1

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

Add tag

50 remaining

Health checks – *optional*

Health check type Info
EC2 Auto Scaling automatically replaces instances that fail health checks. If you enabled load balancing, you can enable ELB health checks in addition to the EC2 health checks that are always enabled.
- ☑ EC2
- ☐ ELB

Health check grace period
The amount of time until EC2 Auto Scaling performs the first health check on new instances after they are put into service.

300 seconds

Additional settings - *optional*

Monitoring Info
- ☐ Enable group metrics collection within CloudWatch

Cancel   Previous   Skip to review   **Next**

15. Specify Minimum,Maximum and Desired number of instances(Minimum should always be greater than 1). Click on next.

16. Add notifications if required.

17. Add Tags.

Step 1
Choose launch template or configuration

Step 2
Configure settings

Step 3 *(optional)*
Configure advanced options

Step 4 *(optional)*
Configure group size and scaling policies

Step 5 *(optional)*
Add notifications

Step 6 *(optional)*
Add tags

Step 7
Review

Add tags Info

Add tags to help you search, filter, and track your Auto Scaling group across AWS. You can also choose to automatically add these tags to instances when they are launched.

ⓘ You can optionally choose to add tags to instances (and their attached EBS volumes) by specifying tags in your launch template. We recommend caution, however, because the tag values for instances from your launch template will be overridden if there are any duplicate keys specified for the Auto Scaling group.   ✕

Tags (1)

Key	Value - optional	Tag new instances	
Project	dev	☑	Remove

Add tag

49 remaining

Cancel   Previous   Next

18. Review and click on create ASG.

Step 1
Choose launch template or configuration

Step 2
Configure settings

Step 3 *(optional)*
Configure advanced options

Step 4 *(optional)*
Configure group size and scaling policies

Step 5 *(optional)*
Add notifications

Step 6 *(optional)*
Add tags

Step 7
Review

Review Info

Step 1: Choose launch template or configuration   Edit

Group details

Auto Scaling group name
ProjectASG

Launch template

Launch template	Version	Description
ProjectTemplate ↗ lt-09fbfca516d0eab82	Default	Template for Project ASG

Step 2: Configure settings   Edit

Instance purchase options

This Auto Scaling group will adhere to the launch template

Network

Network

VPC
vpc-0a9c39c2f73764b91 ↗

Availability Zone	Subnet	
us-east-1a	subnet-0a4741537b32f6e66 ↗	172.31.32.0/20

Step 3: Configure advanced options   [Edit]

Load balancing

Load balancer 1

Name	Type	Target group
ProjectASG-1	Application/HTTP	ProjectASG-1

Health checks

Health check type	Health check grace period
EC2	300 seconds

Additional settings

Monitoring
Disabled

Step 4: Configure group size and scaling policies   [Edit]

Group size

Desired capacity	Minimum capacity	Maximum capacity
3	2	5

Scaling policy

No scaling policy

Instance scale-in protection

Instance scale-in protection

☐ Enable instance protection from scale in

Step 5: Add notifications   Edit

Notifications

No notifications

Step 6: Add tags   Edit

Tags (1)

Key	Value	Tag new instances
Project	dev	Yes

Cancel   **Create Auto Scaling group**

---

19. ASG has been created successfully.

EC2 > Auto Scaling groups

Auto Scaling groups (1)   ⟳   Edit   Delete   **Create an Auto Scaling group**

🔍 Search your Auto Scaling groups   ‹ 1 ›   ⚙

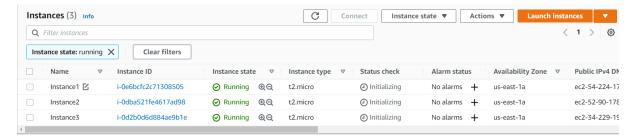| ☐	Name ▽	Launch template/configuration ⧉ ▽	Instances ▽	Status ▽	Desired capacity ▽	Min ▽	Max ▽	Availabi
☐	**ProjectASG**	ProjectTemplate | Version Default	3	-	3	2	5	us-east-

20. Number of EC2 instances created will be equal to number of instances specified in Desired capacity while creating ASG. Hence 3 EC2 instances have been created.

Instances (3) Info   ⟳   Connect   Instance state ▼   Actions ▼   **Launch instances** ▼

🔍 Filter instances   ‹ 1 ›   ⚙

Instance state: running ✕   Clear filters

☐	Name ▽	Instance ID	Instance state ▽	Instance type ▽	Status check	Alarm status	Availability Zone ▽	Public IPv4 DN
☐	Instance1 ✎	i-0e6bcfc2c71308505	⊘ Running ⊕⊖	t2.micro	⊕ Initializing	No alarms +	us-east-1a	ec2-54-224-17
☐	Instance2	i-0dba521fe4617ad98	⊘ Running ⊕⊖	t2.micro	⊕ Initializing	No alarms +	us-east-1a	ec2-52-90-178
☐	Instance3	i-0d2b0d6d884ae9b1e	⊘ Running ⊕⊖	t2.micro	⊕ Initializing	No alarms +	us-east-1a	ec2-34-229-19

21. Now to connect the EC2 instance to database you must edit inbound rules and add mysql on port no 3306. Also to SSH into the instance port 80 must be specified in inbound rule .

Instances (1/3) Info   [↻]   Connect   Instance state ▾   Actions ▾   **Launch instan**

🔍 Filter instances

Instance state: running ✕   Clear filters

☐	Name ▽	Instance ID	Instance state ▽	Instance type ▽	Status check	Alarm status	Availability Zone ▽
☑	Instance1	i-0e6bcfc2c71308505	⊘ Running ⊕⊖	t2.micro	⏱ Initializing	No alarms ✛	us-east-1a
☐	Instance2	i-0dba521fe4617ad98	⊘ Running ⊕⊖	t2.micro	⏱ Initializing	No alarms ✛	us-east-1a
☐	Instance3	i-0d2b0d6d884ae9b1e	⊘ Running ⊕⊖	t2.micro	⏱ Initializing	No alarms ✛	us-east-1a

=

Instance: i-0e6bcfc2c71308505 (Instance1)

Details   **Security**   Networking   Storage   Status checks   Monitoring   Tags

▼ Security details

IAM Role   Owner ID   Launch time
–   🗇 578063774930   Tue Oct 05 2021 21:56:42 GMT+0530 (India Standa

Security groups
🗇 sg-0dc0e07ae720ef3e5 (default)

▼ Inbound rules

EC2 > Security Groups > sg-0dc0e07ae720ef3e5 – default

sg-0dc0e07ae720ef3e5 – default   Actions ▾

Details

Security group name	Security group ID	Description	VPC ID
🗇 default	🗇 sg-0dc0e07ae720ef3e5	🗇 default VPC security group	🗇 vpc-0a9c39c2f73764b91 ☒

Owner	Inbound rules count	Outbound rules count	
🗇 578063774930	3 Permission entries	1 Permission entry	

Inbound rules   Outbound rules   Tags

ⓘ You can now check network connectivity with Reachability Analyzer   Run Reachability Analyzer   ✕

Inbound rules (3)   [↻]   Manage tags   Edit inbound rules

🔍 Filter security group rules   ‹ 1 › ⚙

EC2 > Security Groups > sg-0dc0e07ae720ef3e5 – default > Edit inbound rules

Edit inbound rules Info

Inbound rules control the incoming traffic that's allowed to reach the instance.

Inbound rules Info

Security group rule ID	Type Info	Protocol Info	Port range Info	Source Info	Description – optional Info	
sgr-0a44c0ba3b840533b	SSH ▾	TCP	22	Custom ▾ 🔍		Delete
				0.0.0.0/0 ✕		
sgr-01cee2da6fc8c4b38	MYSQL/Aurora ▾	TCP	3306	Custom ▾ 🔍		Delete
				0.0.0.0/0 ✕		
sgr-0155104c981d8a81a	All traffic ▾	All	All	Custom ▾ 🔍		Delete
				sg-0dc0e07ae720ef3e5 ✕		

Add rule

Cancel   Preview changes   **Save rules**

22. Now connect to the EC2 instance by clicking on connect.

Instances (1/3) Info

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability
☑	Instance1	i-0e6bcfc2c71308505	⊘ Running ⊕⊖	t2.micro	⏱ Initializing	No alarms ＋	us-east-1a
☐	Instance2	i-0dba521fe4617ad98	⊘ Running ⊕⊖	t2.micro	⏱ Initializing	No alarms ＋	us-east-1a
☐	Instance3	i-0d2b0d6d884ae9b1e	⊘ Running ⊕⊖	t2.micro	⏱ Initializing	No alarms ＋	us-east-1a

Instance state: running ✕   Clear filters

EC2 ＞ Instances ＞ i-0e6bcfc2c71308505 ＞ Connect to instance

Connect to instance Info

Connect to your instance i-0e6bcfc2c71308505 using any of these options

EC2 Instance Connect | **Session Manager** | **SSH client** | **EC2 Serial Console**

Instance ID

▣ i-0e6bcfc2c71308505

Public IP address

▣ 54.224.175.147

User name

```
ec2-user
```

Connect using a custom user name, or use the default user name ec2-user for the AMI used to launch the instance.

ⓘ **Note:** In most cases, the guessed user name is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

Cancel   **Connect**

23. Below are the commands used to access the database through EC2 instance.Employee table has been created which has the employee details.

```
       _|  _|_  )
       _| (     /    Amazon Linux 2 AMI
       _|\___|___|
https://aws.amazon.com/amazon-linux-2/
11 package(s) needed for security, out of 35 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-47-33 ~]$ sudo su
[root@ip-172-31-47-33 ec2-user]# yum install mysql
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
amzn2-core                                                                                              | 3.7 kB  00:00:00
Resolving Dependencies
--> Running transaction check
---> Package mariadb.x86_64 1:5.5.68-1.amzn2 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

================================================================================================================================
 Package                    Arch                    Version                    Repository                    Size
================================================================================================================================
Installing:
 mariadb                    x86_64                  1:5.5.68-1.amzn2           amzn2-core                    8.8 M

Transaction Summary
================================================================================================================================
Install  1 Package

Total download size: 8.8 M
Installed size: 49 M
Is this ok [y/d/N]: y
Downloading packages:
mariadb-5.5.68-1.amzn2.x86_64.rpm                                                                       | 8.8 MB  00:00:00
```

```
mariadb-5.5.68-1.amzn2.x86_64.rpm                                                                       | 8.8 MB  00:00:00
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : 1:mariadb-5.5.68-1.amzn2.x86_64                                                                          1/1
  Verifying  : 1:mariadb-5.5.68-1.amzn2.x86_64                                                                          1/1

Installed:
  mariadb.x86_64 1:5.5.68-1.amzn2

Complete!
[root@ip-172-31-47-33 ec2-user]# mysql -h projectdb.cmwry523zjlb.us-east-1.rds.amazonaws.com -P 3306 -u admin -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 21
Server version: 8.0.23 Source distribution

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

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

MySQL [(none)]> show databses;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near 'dat
abses' at line 1
MySQL [(none)]> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
| sys                |
+--------------------+
```

```
4 rows in set (0.00 sec)

MySQL [(none)]> create database Project;
Query OK, 1 row affected (0.01 sec)

MySQL [(none)]> use Project;
Database changed
MySQL [Project]> create table Project.employee(empid integer,empName varchar(20).empDept varchar(20),empSalary integer);
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near '.em
pDept varchar(20),empSalary integer)' at line 1
MySQL [Project]> create table Project.employee(empid integer,empName varchar(20),empDept varchar(20),empSalary integer);
Query OK, 0 rows affected (0.03 sec)

MySQL [Project]> insert into Project.employee values(1,"Rohit","IT",500000);
Query OK, 1 row affected (0.01 sec)

MySQL [Project]> insert into Project.employee values(2,"Mansi","Sales",550000);
Query OK, 1 row affected (0.01 sec)

MySQL [Project]> insert into Project.employee values(3,"Aditi","HR",350000);
Query OK, 1 row affected (0.00 sec)

MySQL [Project]> select * from Project.employee;
+-------+---------+---------+-----------+
| empid | empName | empDept | empSalary |
+-------+---------+---------+-----------+
|     1 | Rohit   | IT      |    500000 |
|     2 | Mansi   | Sales   |    550000 |
|     3 | Aditi   | HR      |    350000 |
+-------+---------+---------+-----------+
3 rows in set (0.00 sec)

MySQL [Project]> select empName from Project.employee where empid=3;
+---------+
```

```
MySQL [Project]> select empName from Project.employee where empid=3;
+---------+
| empName |
+---------+
| Aditi   |
+---------+
1 row in set (0.00 sec)

MySQL [Project]> 
```