AWS RDS Database Security Project

Project Title:

Secure Deployment of MySQL Database using Amazon RDS and EC2

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by:

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Date:

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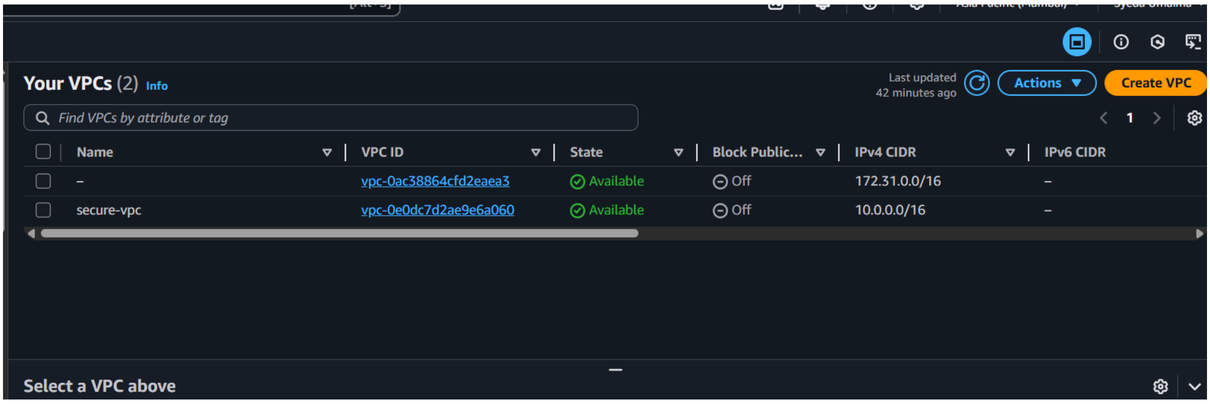
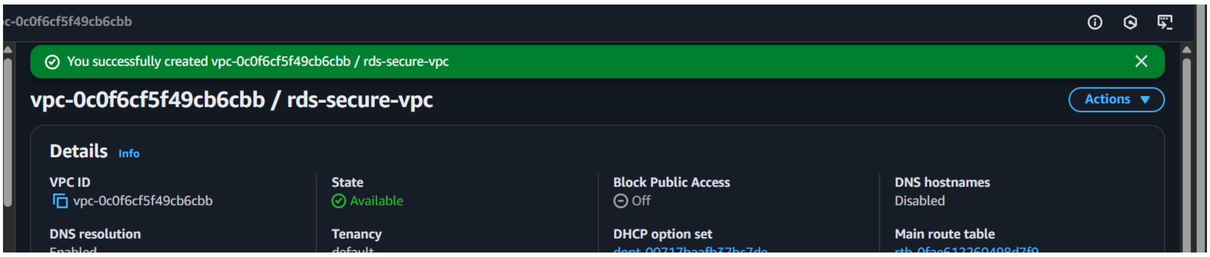
Introduction

The objective of this project was to securely set up an Amazon RDS (Relational Database Service) MySQL instance within a custom Virtual Private Cloud (VPC) on AWS. We created both public and private subnets—placing the RDS instance in the private subnet and the EC2 instance in the public subnet. The EC2 instance was configured to securely connect to the RDS instance using MySQL. Security groups and route tables were carefully configured to ensure that only the EC2 instance could access the database, maintaining strict access control.



Name	VPC ID	State	Block Public...	IPv4 CIDR	IPv6 CIDR
–	vpc-0ac38864cfd2eaea3	Available	Off	172.31.0.0/16	–
secure-vpc	vpc-0e0dc7d2ae9e6a060	Available	Off	10.0.0.0/16	–



c-0c0f6cf5f49cb6cbb

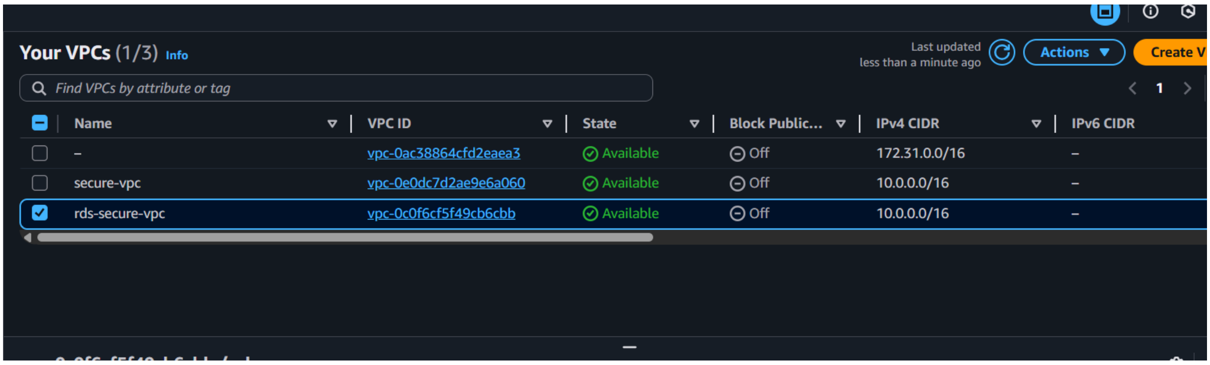
You successfully created vpc-0c0f6cf5f49cb6cbb / rds-secure-vpc

vpc-0c0f6cf5f49cb6cbb / rds-secure-vpc

Details Info

VPC ID	State	Block Public Access	DNS hostnames
vpc-0c0f6cf5f49cb6cbb	Available	Off	Disabled

DNS resolution	Tenancy	DHCP option set	Main route table

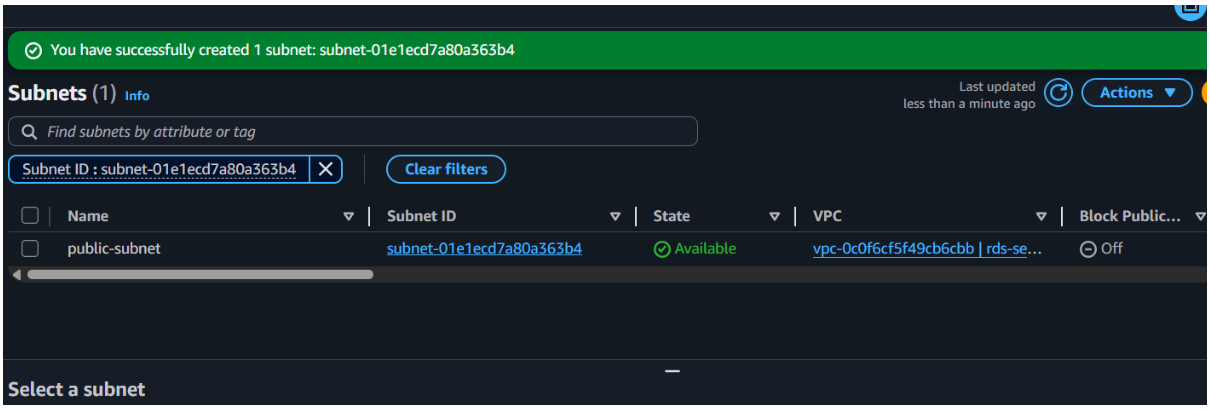


Your VPCs (1/3) Info

Last updated
less than a minute ago

	Name	VPC ID	State	Block Public...	IPv4 CIDR	IPv6 CIDR
□	–	vpc-0ac38864cfd2eaea3	Available	Off	172.31.0.0/16	–
□	secure-vpc	vpc-0e0dc7d2ae9e6a060	Available	Off	10.0.0.0/16	–
☑	rds-secure-vpc	vpc-0c0f6cf5f49cb6cbb	Available	Off	10.0.0.0/16	–

This screenshot shows the creation of a new VPC named rds-secure-vpc with CIDR block 10.0.0.0/16."



You have successfully created 1 subnet: subnet-01e1ecd7a80a363b4

Subnets (1) Info

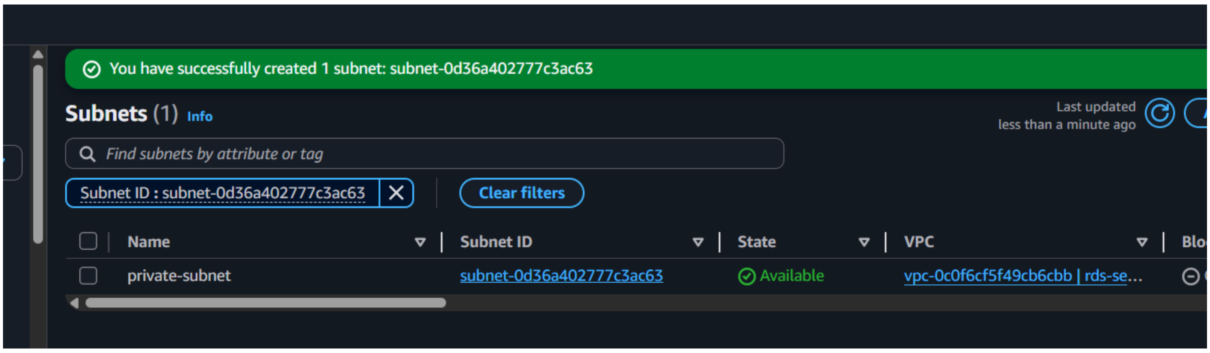
Last updated
less than a minute ago

Actions ▼
Find subnets by attribute or tag
Subnet ID : subnet-01e1ecd7a80a363b4
Clear filters

	Name	Subnet ID	State	VPC	Block Public...
□	public-subnet	subnet-01e1ecd7a80a363b4	Available	vpc-0c0f6cf5f49cb6cbb | rds-se...	Off

Select a subnet

This screenshot shows the creation of public-subnet in ap-south-1a with CIDR 10.0.1.0/24



You have successfully created 1 subnet: subnet-0d36a402777c3ac63

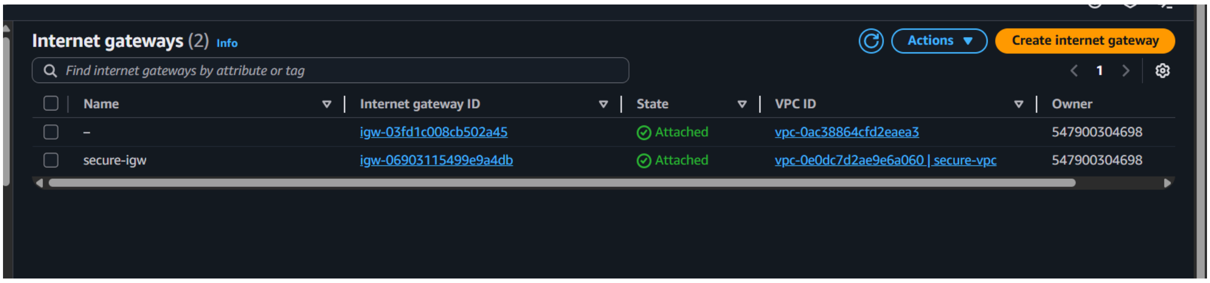
Subnets (1) Info

Last updated
less than a minute ago

Find subnets by attribute or tag
Subnet ID : subnet-0d36a402777c3ac63
Clear filters

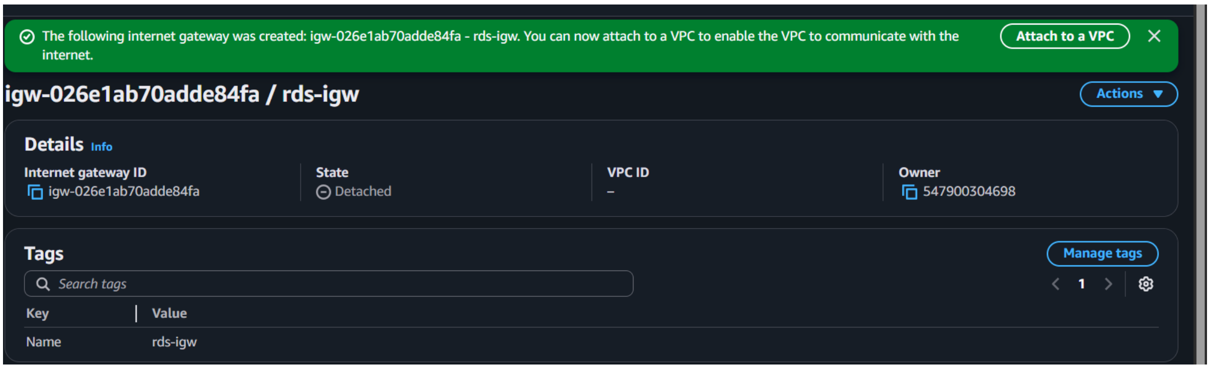
	Name	Subnet ID	State	VPC	Blo
□	private-subnet	subnet-0d36a402777c3ac63	Available	vpc-0c0f6cf5f49cb6cbb | rds-se...	

This screenshot shows the creation of private-subnet in ap-south-1b with CIDR 10.0.2.0/24.



Internet gateways (2) Info

☐	Name	Internet gateway ID	State	VPC ID	Owner
☐	–	igw-03fd1c008cb502a45	✓ Attached	vpc-0ac38864cfd2eaea3	547900304698
☐	secure-igw	igw-06903115499e9a4db	✓ Attached	vpc-0e0dc7d2ae9e6a060 | secure-vpc	547900304698



The following internet gateway was created: igw-026e1ab70adde84fa - rds-igw. You can now attach to a VPC to enable the VPC to communicate with the internet.

igw-026e1ab70adde84fa / rds-igw

Details Info

Internet gateway ID: igw-026e1ab70adde84fa

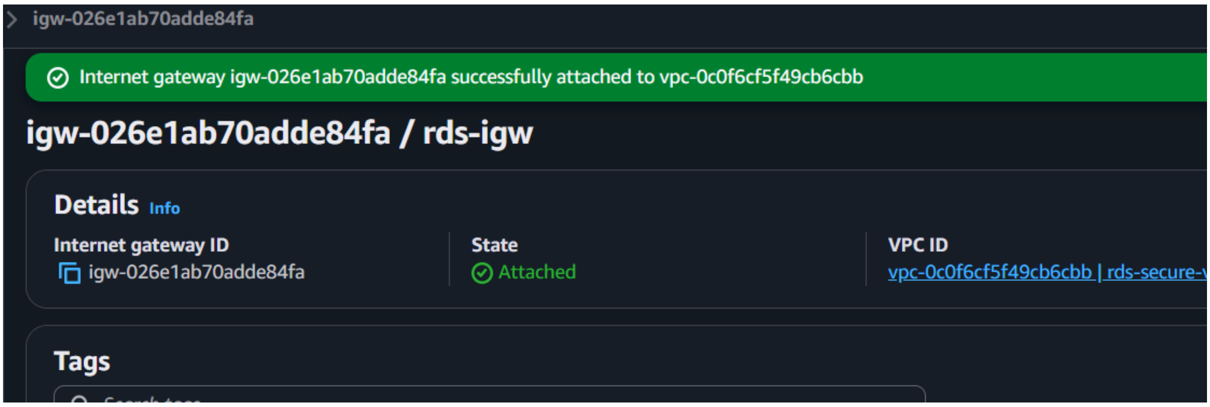
State: Detached

VPC ID: –

Owner: 547900304698

Tags

Key	Value
Name	rds-igw



Internet gateway igw-026e1ab70adde84fa successfully attached to vpc-0c0f6cf5f49cb6cbb

igw-026e1ab70adde84fa / rds-igw

Details Info

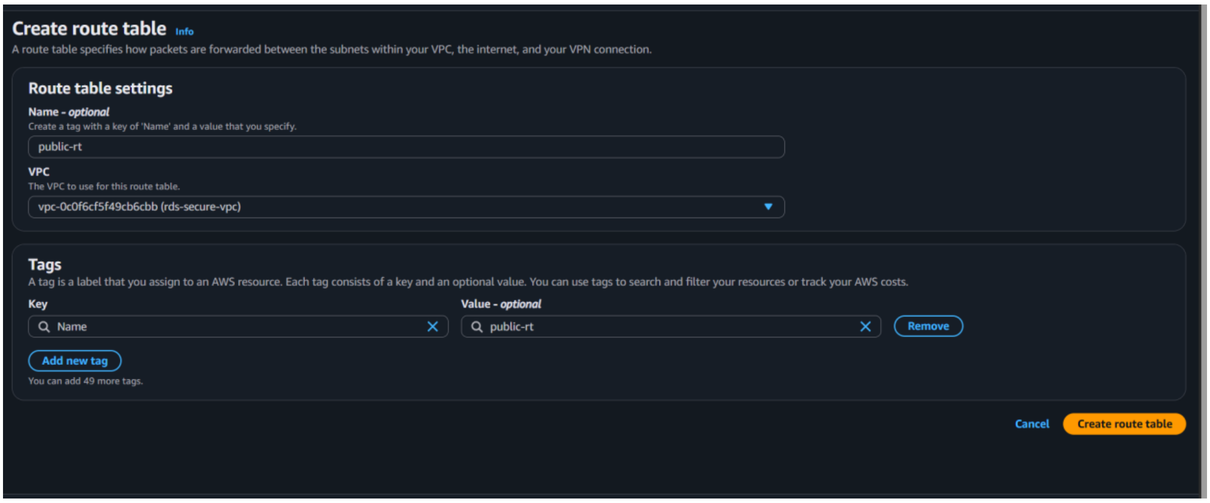
Internet gateway ID: igw-026e1ab70adde84fa

State: Attached

VPC ID: vpc-0c0f6cf5f49cb6cbb | rds-secure-v

Tags

This screenshot shows the creation and attachment of rds-igw Internet Gateway to rds-secure-vpc."



Create route table Info

A route table specifies how packets are forwarded between the subnets within your VPC, the internet, and your VPN connection.

Route table settings

Name - *optional*

Create a tag with a key of 'Name' and a value that you specify.

public-rt

VPC

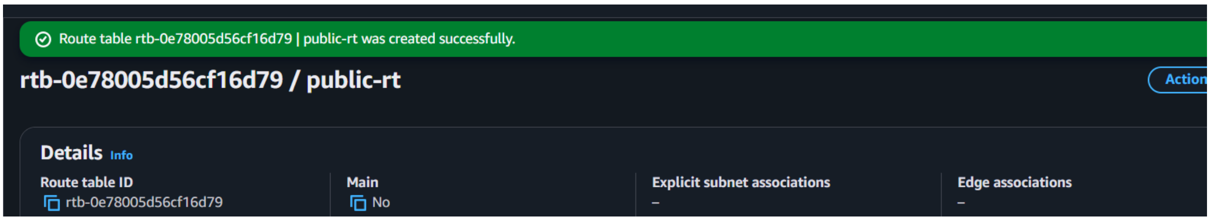
The VPC to use for this route table.

vpc-0c0f6cf5f49cb6cbb (rds-secure-vpc)

Tags

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

Key	Value - *optional*
Name	public-rt



Route table rtb-0e78005d56cf16d79 | public-rt was created successfully.

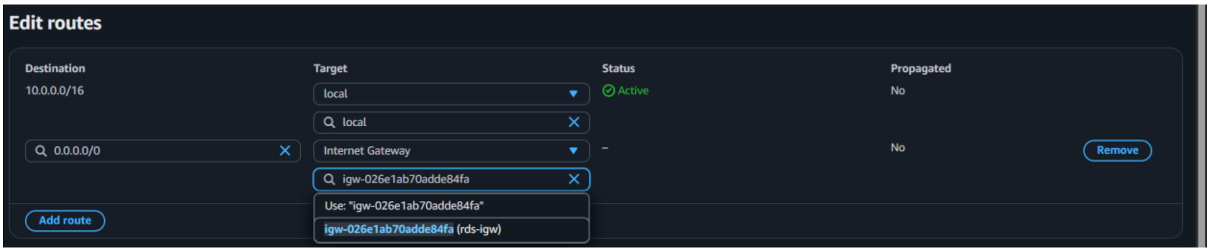
rtb-0e78005d56cf16d79 / public-rt

Details Info

Route table ID	Main	Explicit subnet associations	Edge associations
rtb-0e78005d56cf16d79	No	–	–

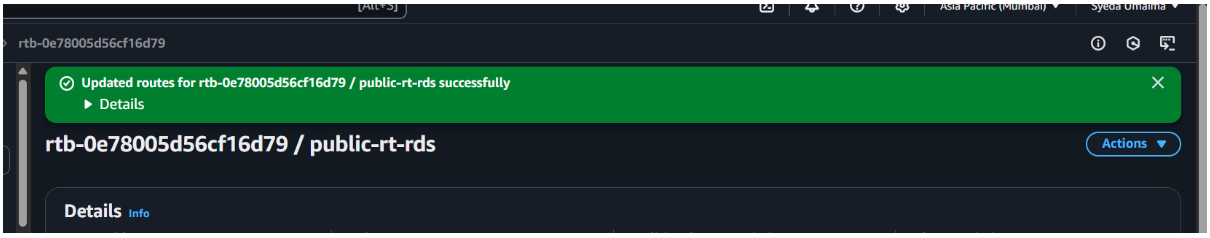
This screenshot shows the creation of public-rt for rds-secure-vpc.

I rename public-rt to public-rt-rds



Edit routes

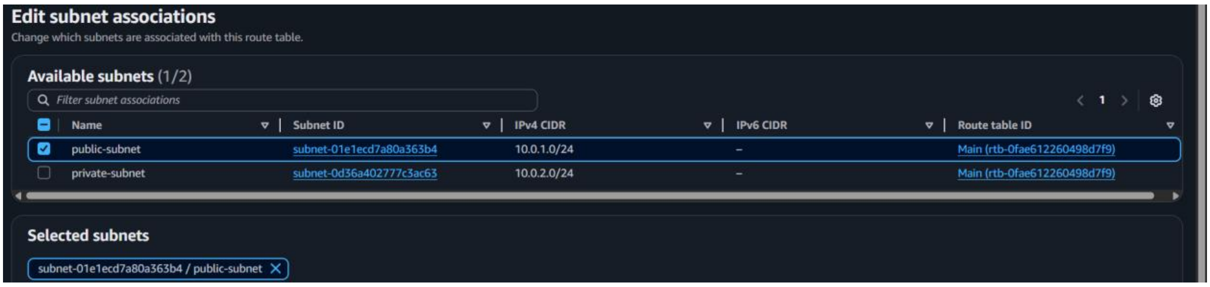
Destination	Target	Status	Propagated
10.0.0.0/16	local local	Active	No
0.0.0.0/0	Internet Gateway igw-026e1ab70adde84fa	-	No



Updated routes for rtb-0e78005d56cf16d79 / public-rt-rds successfully

rtb-0e78005d56cf16d79 / public-rt-rds

This screenshot shows adding route 0.0.0.0/0 pointing to rds-igw in public-rt



Edit subnet associations

Change which subnets are associated with this route table.

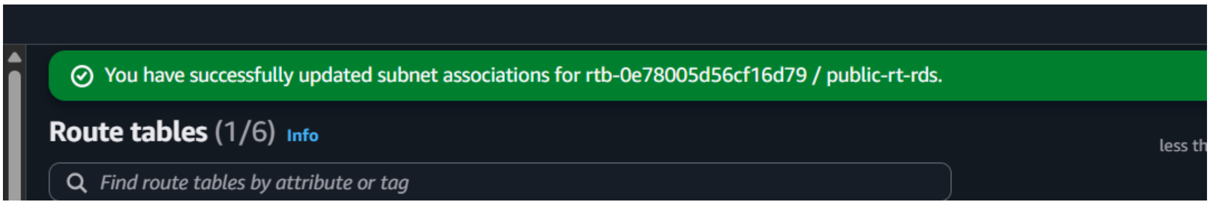
Available subnets (1/2)

Filter subnet associations

☐	Name	Subnet ID	IPv4 CIDR	IPv6 CIDR	Route table ID
☑	public-subnet	subnet-01e1ecd7a80a363b4	10.0.1.0/24	–	Main (rtb-0fae612260498d7f9)
☐	private-subnet	subnet-0d36a402777c3ac63	10.0.2.0/24	–	Main (rtb-0fae612260498d7f9)

Selected subnets

subnet-01e1ecd7a80a363b4 / public-subnet



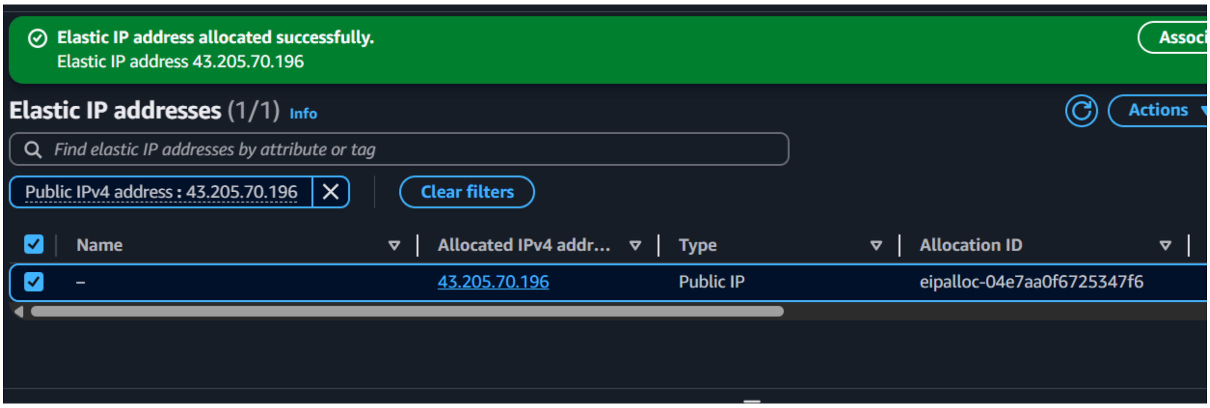
You have successfully updated subnet associations for rtb-0e78005d56cf16d79 / public-rt-rds.

Route tables (1/6) Info

Find route tables by attribute or tag

less th

This screenshot shows associating public-subnet with public-rt



Elastic IP address allocated successfully.
Elastic IP address 43.205.70.196

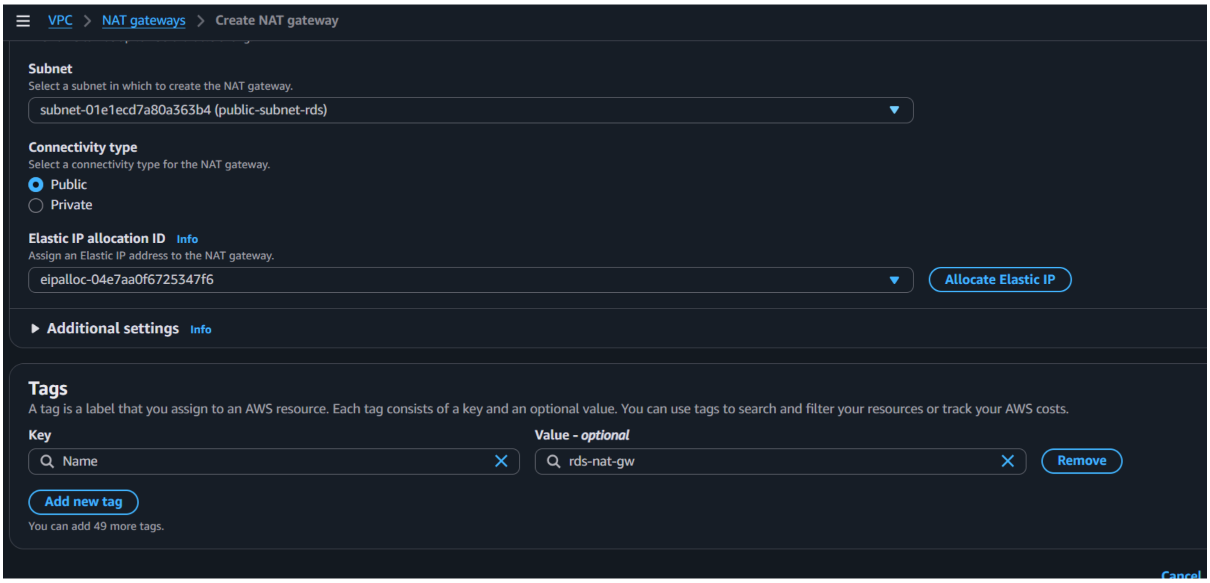
Elastic IP addresses (1/1) Info

Find elastic IP addresses by attribute or tag

Public IPv4 address : 43.205.70.196

☑	Name	Allocated IPv4 addr...	Type	Allocation ID
☑	–	43.205.70.196	Public IP	eipalloc-04e7aa0f6725347f6

This screenshot shows allocating a new Elastic IP for the NAT Gateway.



VPC > NAT gateways > Create NAT gateway

Subnet
Select a subnet in which to create the NAT gateway.
subnet-01e1ecd7a80a363b4 (public-subnet-rds)

Connectivity type
Select a connectivity type for the NAT gateway.
● Public
○ Private

Elastic IP allocation ID Info
Assign an Elastic IP address to the NAT gateway.
eipalloc-04e7aa0f6725347f6

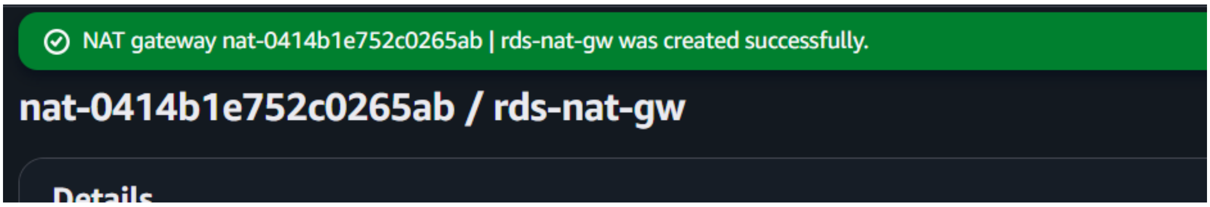
▸ Additional settings Info

Tags

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

Key	Value - *optional*
Name	rds-nat-gw

You can add 49 more tags.

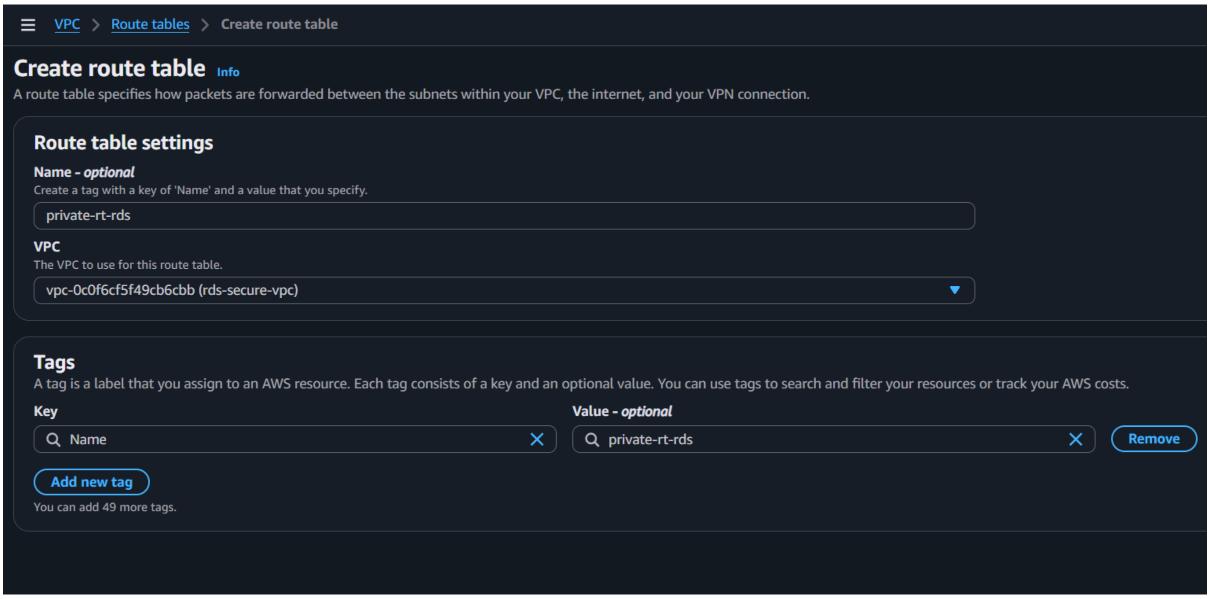


NAT gateway nat-0414b1e752c0265ab | rds-nat-gw was created successfully.

nat-0414b1e752c0265ab / rds-nat-gw

Details

This screenshot shows creating the rds-nat-gw in the public-subnet with the Elastic IP attached.



VPC > Route tables > Create route table

Create route table Info

A route table specifies how packets are forwarded between the subnets within your VPC, the internet, and your VPN connection.

Route table settings

Name - *optional*

Create a tag with a key of 'Name' and a value that you specify.

private-rt-rds

VPC

The VPC to use for this route table.

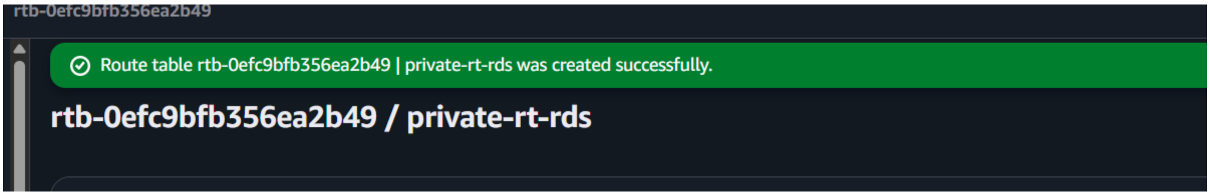
vpc-0c0f6cf5f49cb6cbb (rds-secure-vpc)

Tags

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

Key	Value - *optional*	
Name	private-rt-rds	Remove

You can add 49 more tags.

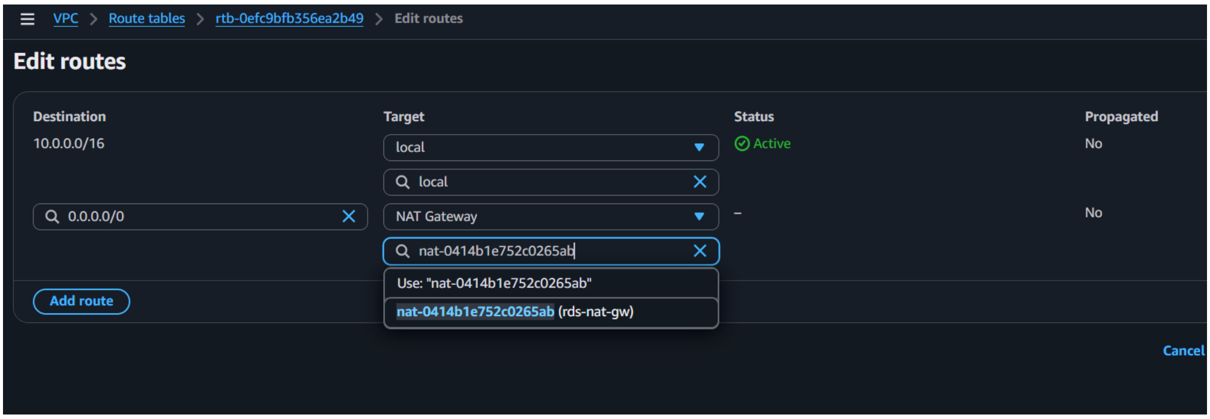


rtb-0efc9bfb356ea2b49

Route table rtb-0efc9bfb356ea2b49 | private-rt-rds was created successfully.

rtb-0efc9bfb356ea2b49 / private-rt-rds

This screenshot shows creating private-rt-rds for the private subnet in rds-secure-vpc



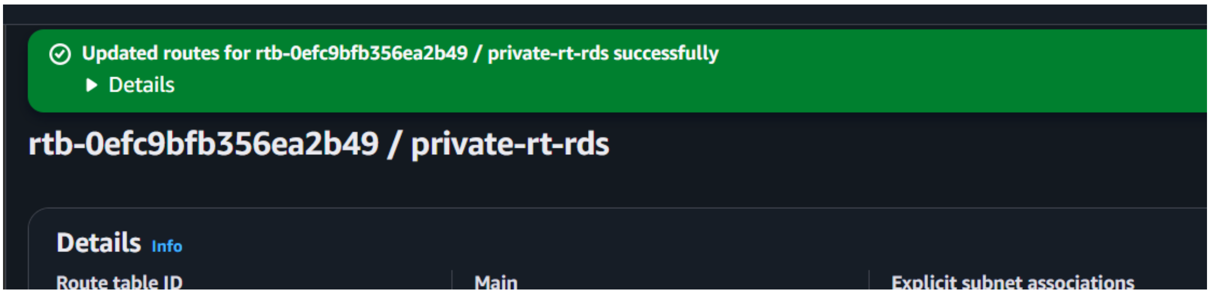
VPC > Route tables > rtb-0efc9bfb356ea2b49 > Edit routes

Edit routes

Destination	Target	Status	Propagated
10.0.0.0/16	local local	Active	No
0.0.0.0/0	NAT Gateway nat-0414b1e752c0265ab	–	No

Use: "nat-0414b1e752c0265ab"

nat-0414b1e752c0265ab (rds-nat-gw)



✓ Updated routes for rtb-0efc9bfb356ea2b49 / private-rt-rds successfully

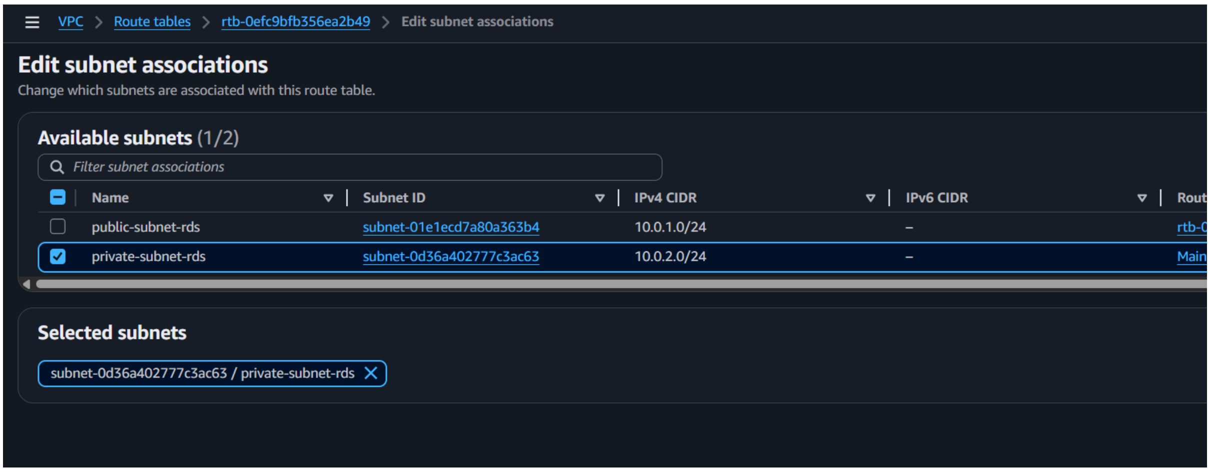
▶ Details

rtb-0efc9bfb356ea2b49 / private-rt-rds

Details Info

Route table ID | Main | Explicit subnet associations

This screenshot shows adding a 0.0.0.0/0 route in private-rt-rds pointing to rds-nat-gw



VPC > Route tables > rtb-0efc9bfb356ea2b49 > Edit subnet associations

Edit subnet associations

Change which subnets are associated with this route table.

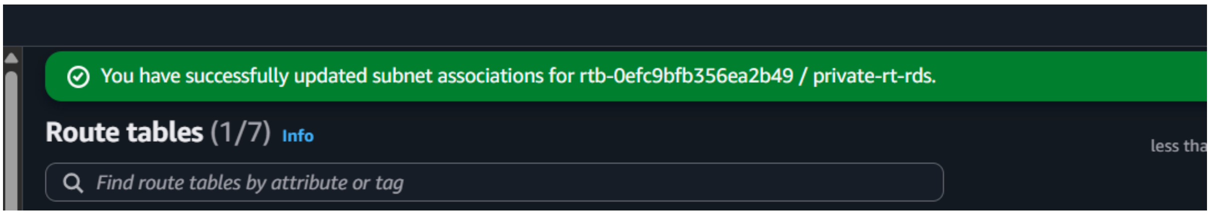
Available subnets (1/2)

Filter subnet associations

	Name	Subnet ID	IPv4 CIDR	IPv6 CIDR	Rout
□	public-subnet-rds	subnet-01e1ecd7a80a363b4	10.0.1.0/24	–	rtb-(
☑	private-subnet-rds	subnet-0d36a402777c3ac63	10.0.2.0/24	–	Main

Selected subnets

subnet-0d36a402777c3ac63 / private-subnet-rds ✕



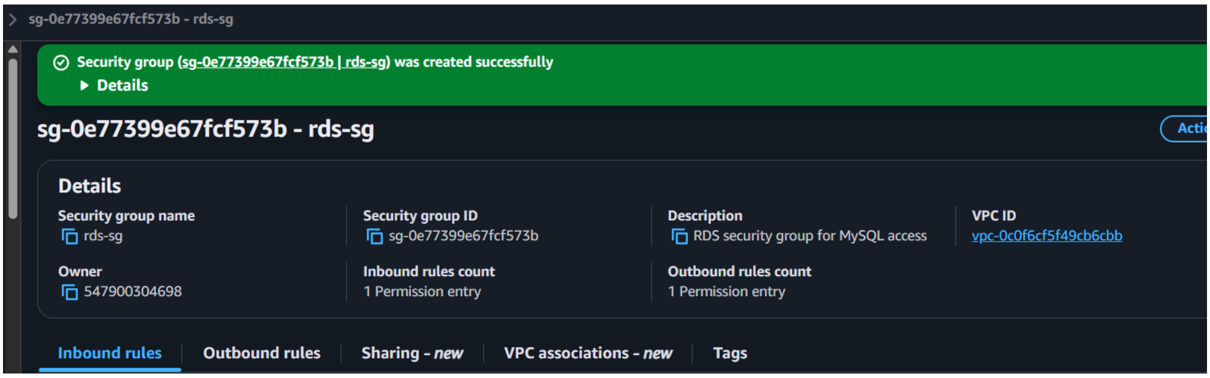
✓ You have successfully updated subnet associations for rtb-0efc9bfb356ea2b49 / private-rt-rds.

Route tables (1/7) Info

less tha

Find route tables by attribute or tag

"This screenshot shows associating private-subnet with private-rt-rds.



> sg-0e77399e67fcf573b - rds-sg

✓ Security group (sg-0e77399e67fcf573b | rds-sg) was created successfully

▶ Details

sg-0e77399e67fcf573b - rds-sg

Acti

Details

Security group name: rds-sg

Security group ID: sg-0e77399e67fcf573b

Description: RDS security group for MySQL access

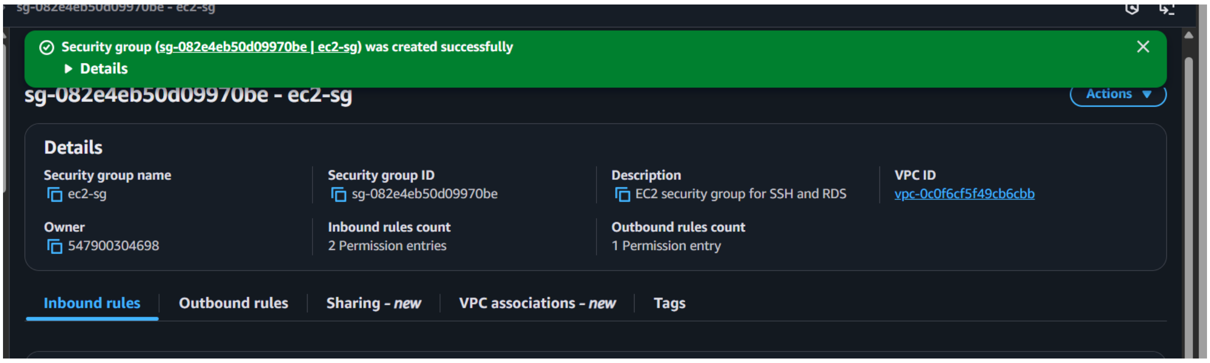
VPC ID: vpc-0c0f6cf5f49cb6cbb

Owner: 547900304698

Inbound rules count: 1 Permission entry

Outbound rules count: 1 Permission entry

This screenshot shows creation of rds-sg to allow MySQL access from EC2.



Security group (sg-082e4eb50d09970be | ec2-sg) was created successfully

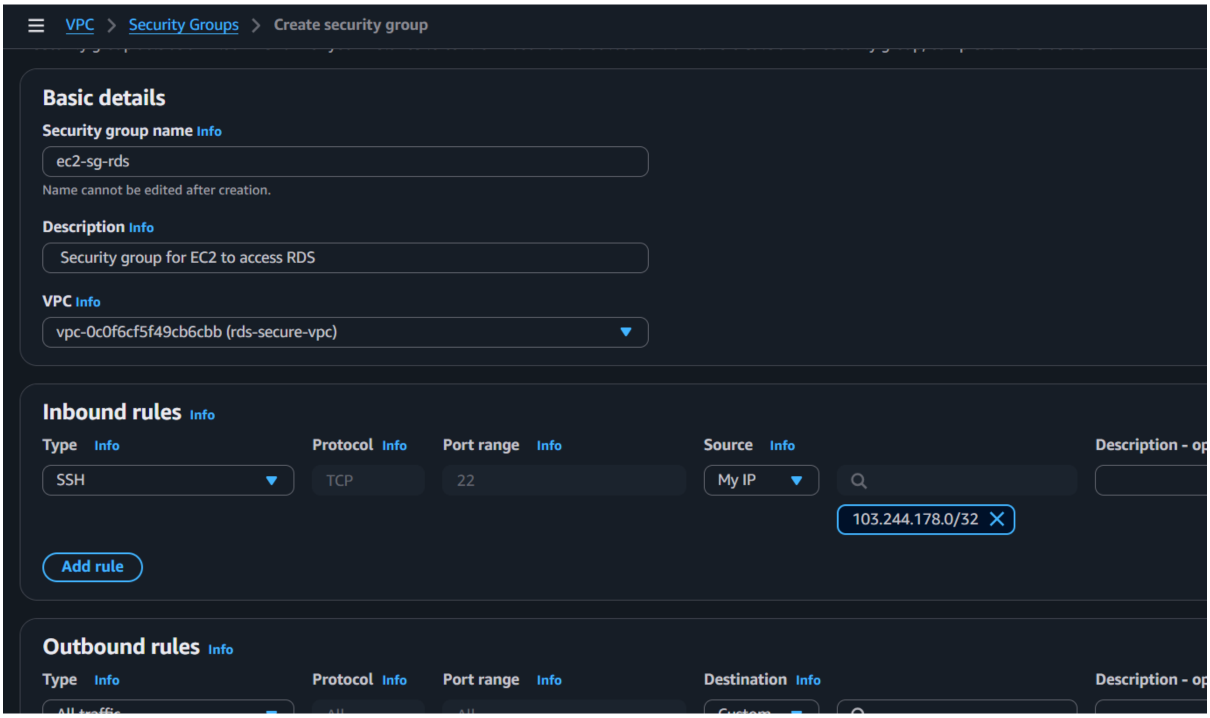
▸ Details

sg-082e4eb50d09970be - ec2-sg

Details

Security group name ec2-sg	Security group ID sg-082e4eb50d09970be	Description EC2 security group for SSH and RDS	VPC ID vpc-0c0f6cf5f49cb6cbb
Owner 547900304698	Inbound rules count 2 Permission entries	Outbound rules count 1 Permission entry	

This screenshot shows creation of ec2-sg to allow SSH from user and access to RDS.



Basic details

Security group name Info

ec2-sg-rds

Name cannot be edited after creation.

Description Info

Security group for EC2 to access RDS

VPC Info

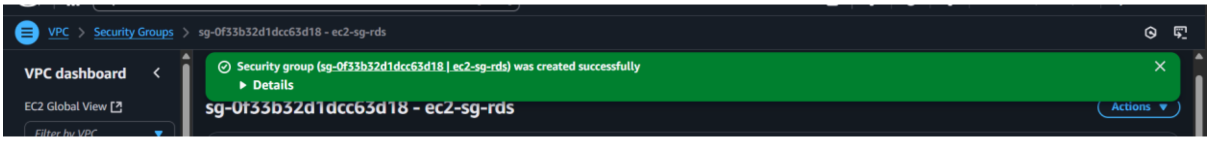
vpc-0c0f6cf5f49cb6cbb (rds-secure-vpc)

Inbound rules Info

Type	Protocol	Port range	Source		Description - op
SSH	TCP	22	My IP	103.244.178.0/32	

Outbound rules Info

Type	Protocol	Port range	Destination	Description - op

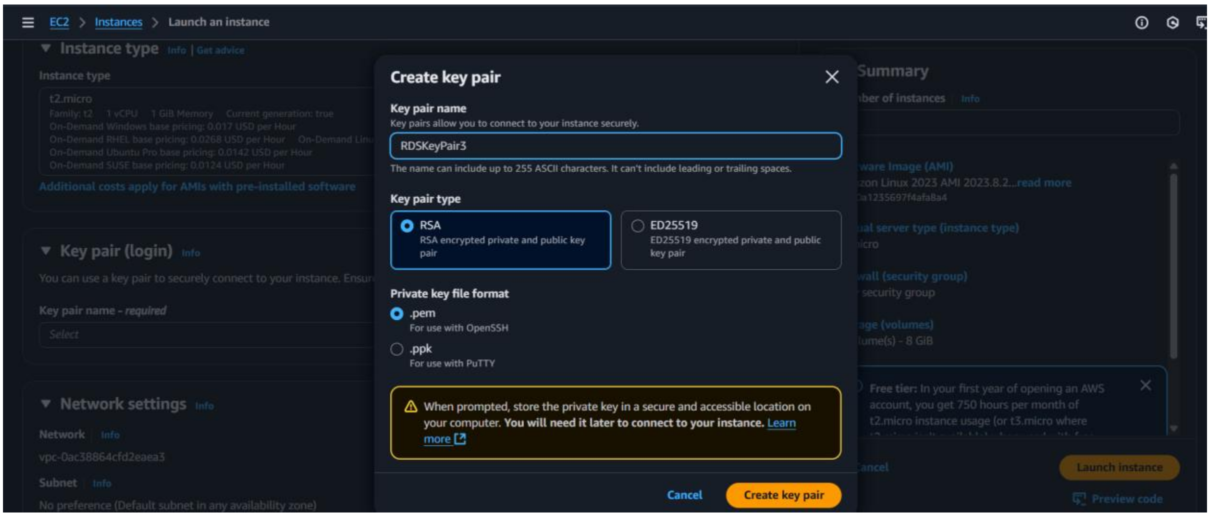


Security group (sg-0f33b32d1dcc63d18 | ec2-sg-rds) was created successfully

▸ Details

sg-0f33b32d1dcc63d18 - ec2-sg-rds

EC2 instance ke liye SSH access dene ke liye ec2-sg-rds security group banaya gaya with My IP as inbound source.



EC2 > Instances > Launch an instance

Instance type
t2.micro
Family: t2 1 vCPU 1 GiB Memory Current generation: true
On-Demand Windows base pricing: 0.017 USD per Hour
On-Demand RHEL base pricing: 0.0268 USD per Hour
On-Demand Ubuntu Pro base pricing: 0.0142 USD per Hour
On-Demand SUSE base pricing: 0.0124 USD per Hour

Key pair name - *required*: Select

Network: vpc-0ac38864cfd2eaea3
Subnet: No preference (Default subnet in any availability zone)

Create key pair

Key pair name
Key pairs allow you to connect to your instance securely.
RDSKeyPair3
The name can include up to 255 ASCII characters. It can't include leading or trailing spaces.

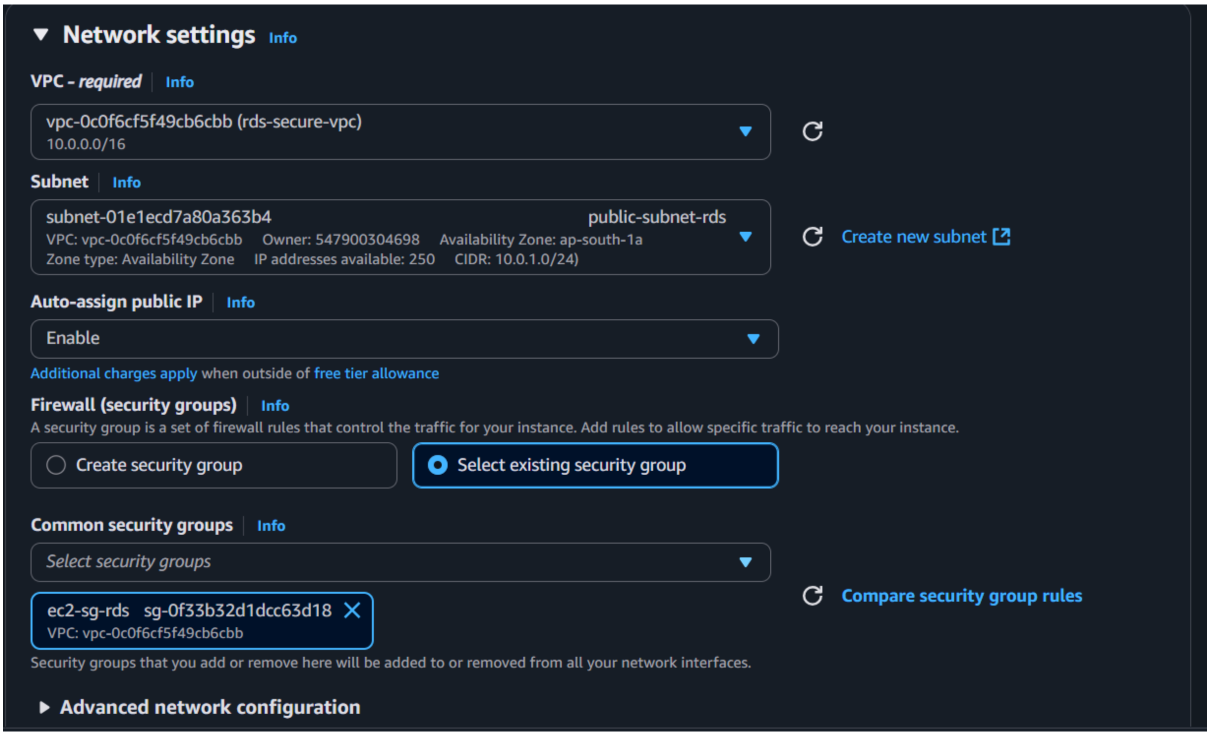
Key pair type
● RSA — RSA encrypted private and public key pair
○ ED25519 — ED25519 encrypted private and public key pair

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
Additional costs apply for AMIs with pre-installed software
Key pair (login)
You can use a key pair to securely connect to your instance. Ensur
Network settings
Summary
ber of instances
ware Image (AMI)
zon Linux 2023 AMI 2023.8.2...read more
al server type (instance type)
wall (security group)
age (volumes)
lume(s) - 8 GiB
Free tier: In your first year of opening an AWS account, you get 750 hours per month of t2.micro instance usage (or t3.micro where
Launch instance
Preview code



Network settings Info

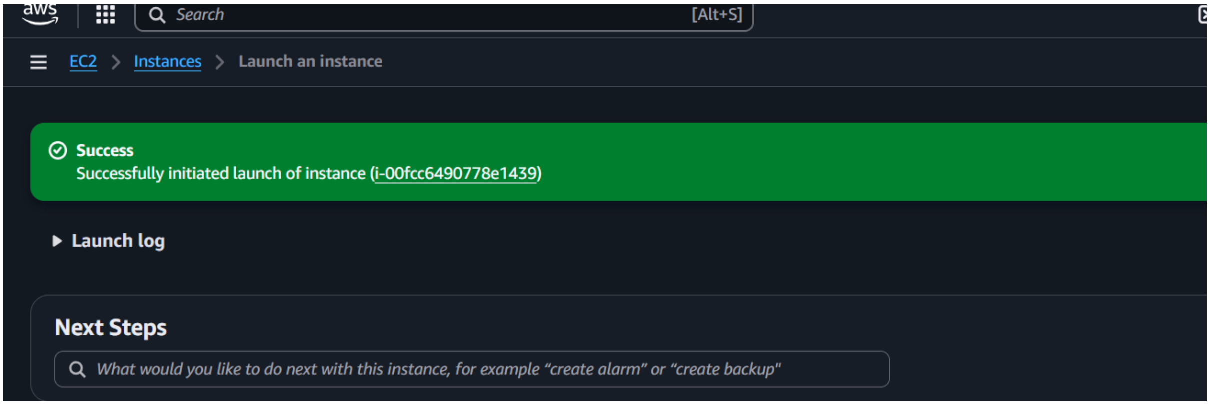
VPC - *required*
vpc-0c0f6cf5f49cb6cbb (rds-secure-vpc)
10.0.0.0/16

Subnet
subnet-01e1ecd7a80a363b4 public-subnet-rds
VPC: vpc-0c0f6cf5f49cb6cbb Owner: 547900304698 Availability Zone: ap-south-1a
Zone type: Availability Zone IP addresses available: 250 CIDR: 10.0.1.0/24)

Auto-assign public IP: Enable
Additional charges apply when outside of free tier allowance

Firewall (security groups)
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
Select security groups
ec2-sg-rds sg-0f33b32d1dcc63d18
VPC: vpc-0c0f6cf5f49cb6cbb
Security groups that you add or remove here will be added to or removed from all your network interfaces.



EC2 > Instances > Launch an instance

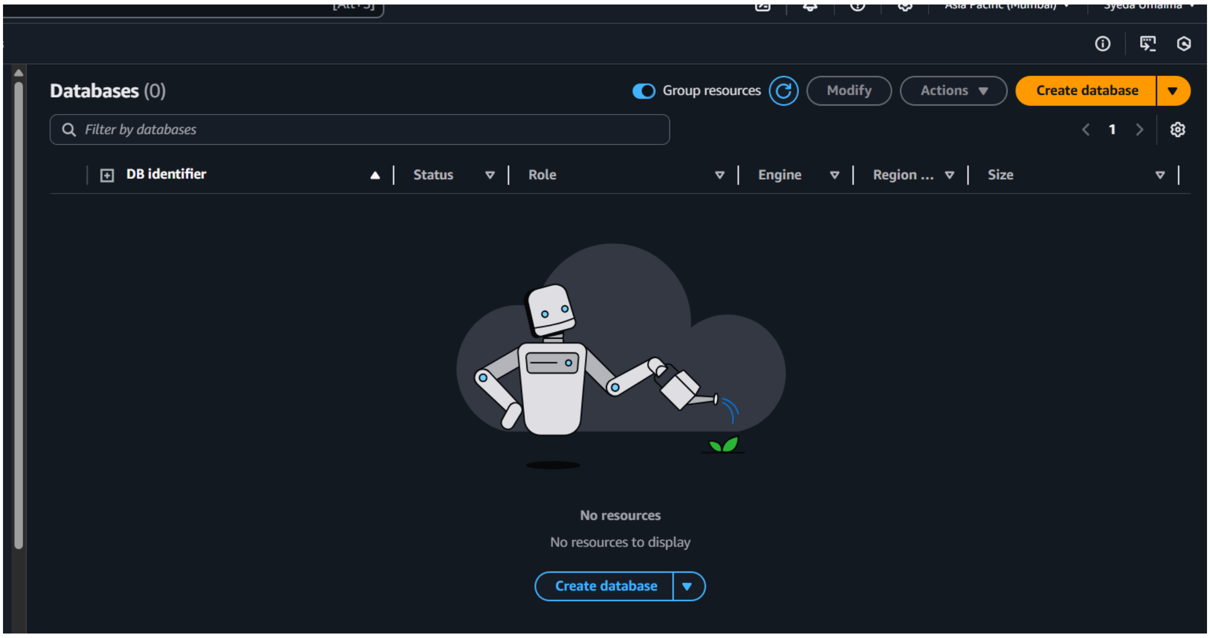
Success
Successfully initiated launch of instance (i-00fcc6490778e1439)

Launch log

Next Steps
What would you like to do next with this instance, for example "create alarm" or "create backup"

Configuring EC2 instance with public subnet and security group allowing SSH access from My IP

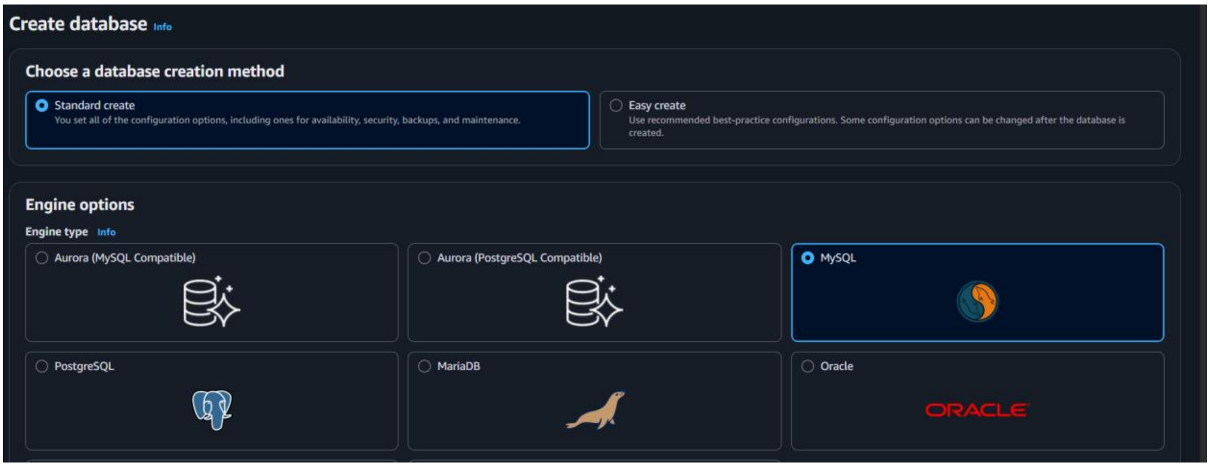
Now we are going to create database



Databases (0)

No resources

No resources to display



Create database

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

○ Aurora (MySQL Compatible)

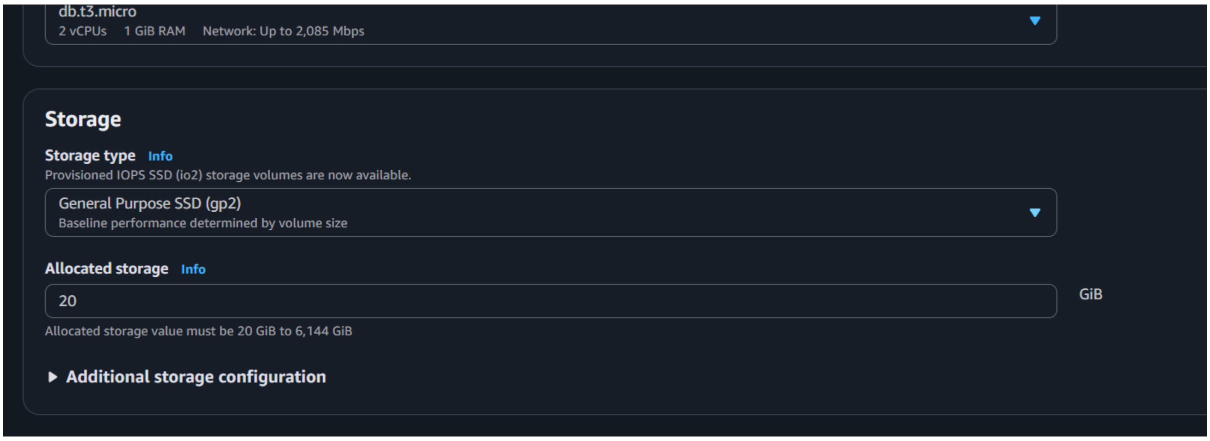
○ Aurora (PostgreSQL Compatible)

● MySQL

○ PostgreSQL

○ MariaDB

○ Oracle



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

Storage

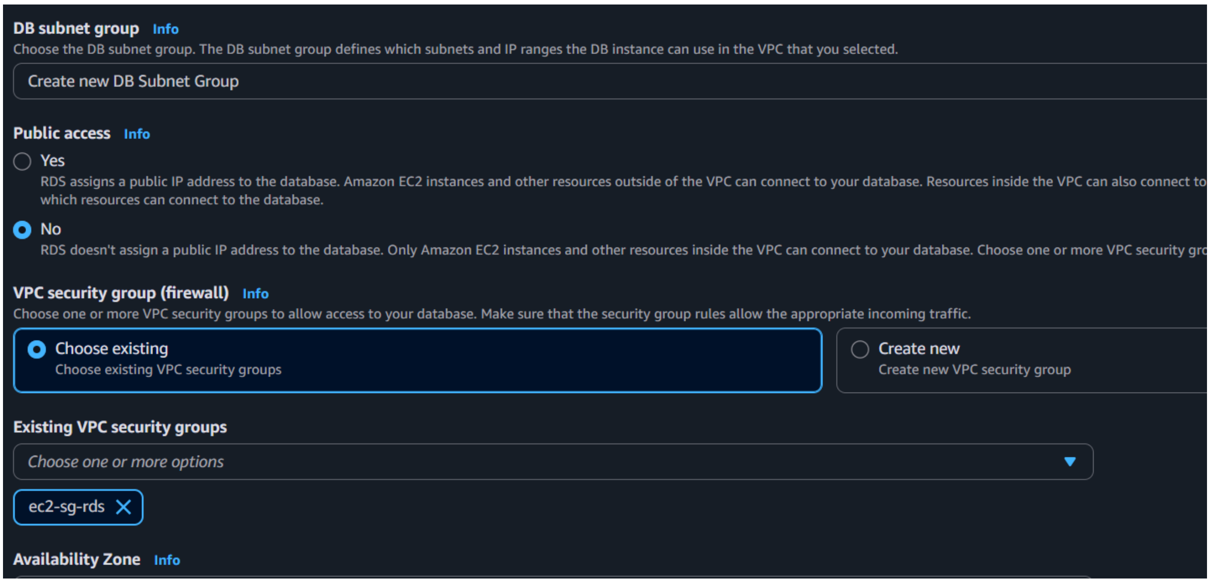
Storage type
Provisioned IOPS SSD (io2) storage volumes are now available.

General Purpose SSD (gp2)
Baseline performance determined by volume size

Allocated storage

20 GiB

Allocated storage value must be 20 GiB to 6,144 GiB



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.

Create new DB Subnet Group

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 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 gro

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

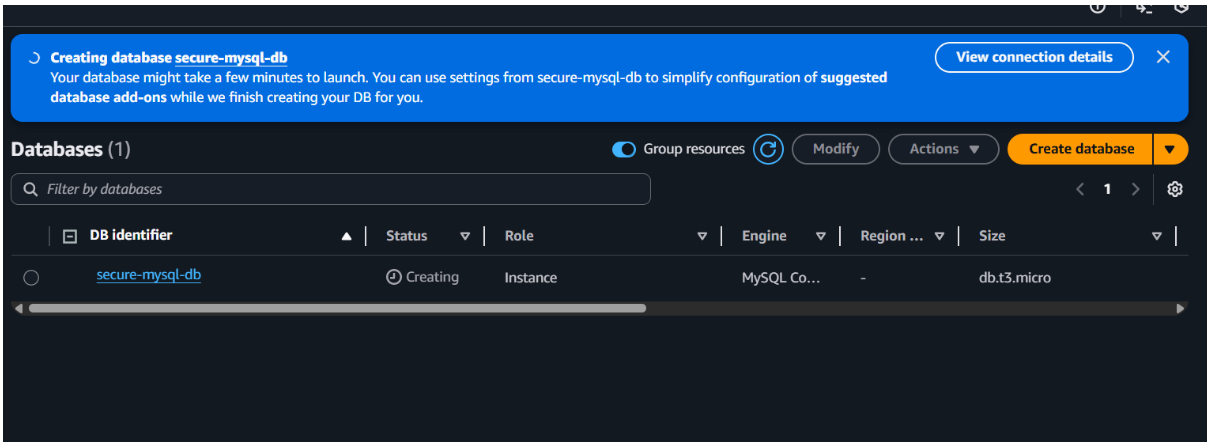
○ Create new
Create new VPC security group

Existing VPC security groups

Choose one or more options ▼

ec2-sg-rds ✕

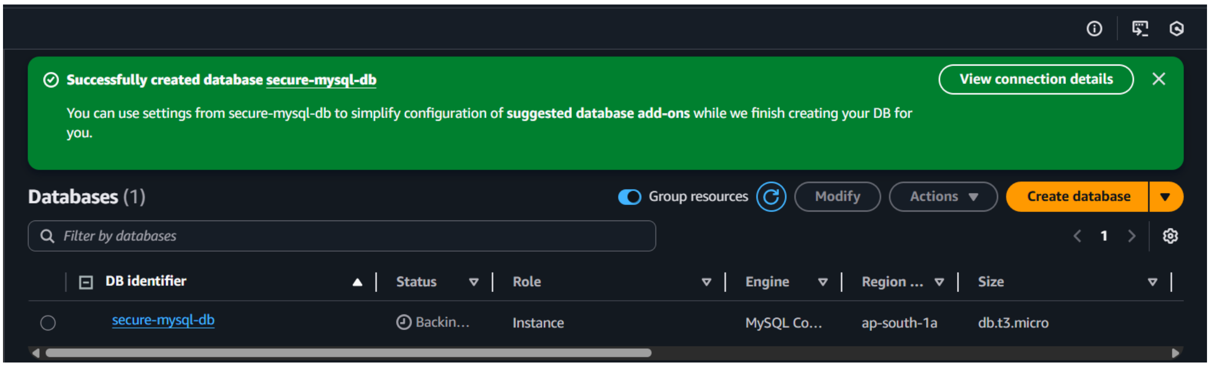
Availability Zone Info



Creating database secure-mysql-db
Your database might take a few minutes to launch. You can use settings from secure-mysql-db to simplify configuration of **suggested database add-ons** while we finish creating your DB for you.

Databases (1)

	DB identifier ▲	Status	Role	Engine	Region ...	Size
○	secure-mysql-db	Creating	Instance	MySQL Co...	-	db.t3.micro



Successfully created database secure-mysql-db

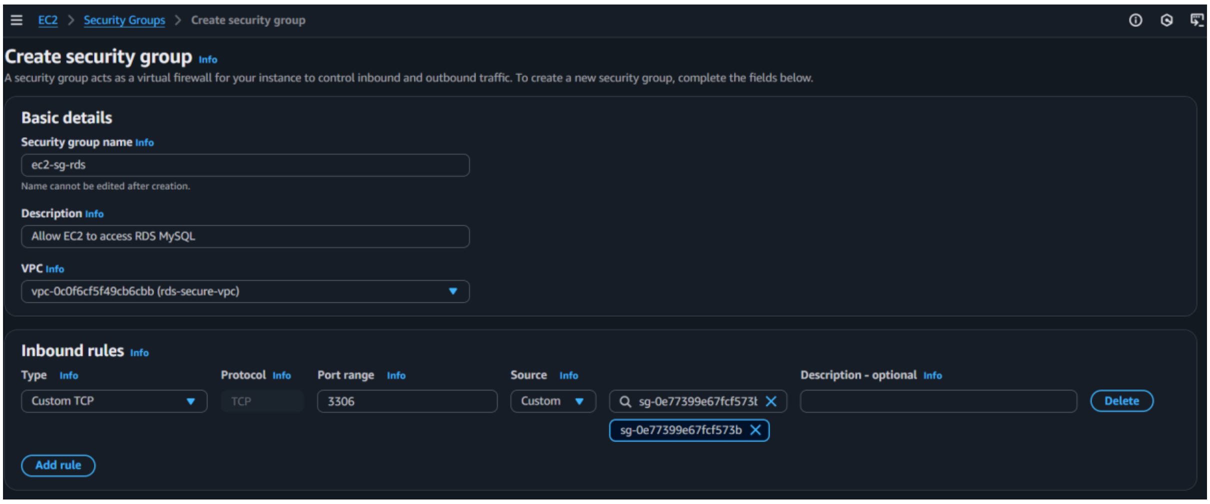
You can use settings from secure-mysql-db to simplify configuration of **suggested database add-ons** while we finish creating your DB for you.

Databases (1)

	DB identifier ▲	Status	Role	Engine	Region ...	Size
○	secure-mysql-db	Backin...	Instance	MySQL Co...	ap-south-1a	db.t3.micro

Created a MySQL RDS instance named secure-mysql-db in secure-vpc using the Free Tier template with version 8.0.41.
Configured private subnet group private-subnet-group, disabled public access, and attached custom security group ec2-sg-rds.
Enabled password authentication, automated backups (1-day retention), and used db.t3.micro instance with 20 GiB gp2 storage.

Create EC2 Security Group (ec2-sg) and Allow RDS Access



EC2 > Security Groups > Create security group

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-rds

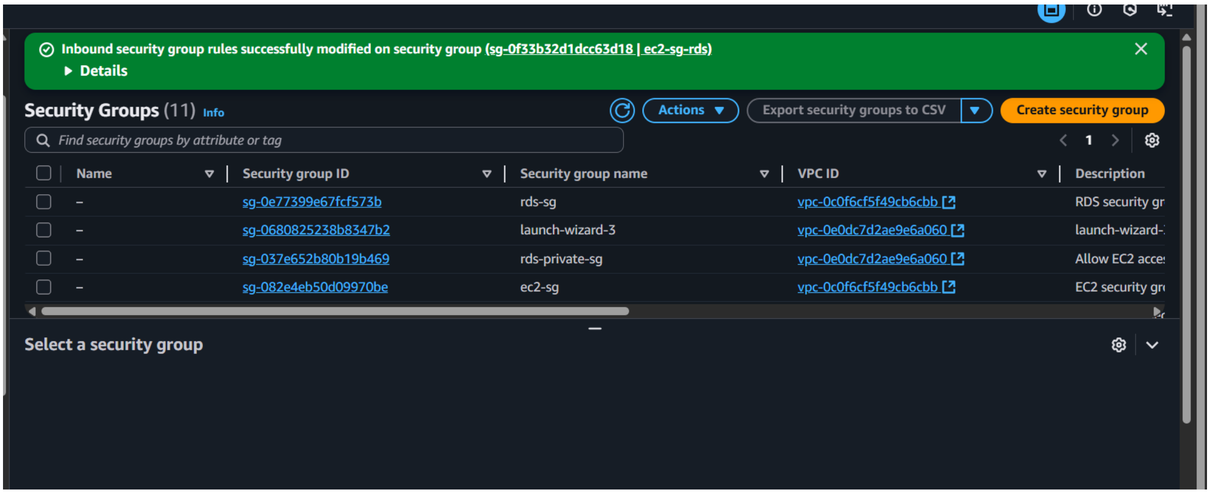
Name cannot be edited after creation.

Description Info: Allow EC2 to access RDS MySQL

VPC Info: vpc-0c0f6cf5f49cb6cbb (rds-secure-vpc)

Inbound rules Info

Type	Protocol	Port range	Source		Description - optional
Custom TCP	TCP	3306	Custom	sg-0e77399e67fcf573t sg-0e77399e67fcf573b	



Inbound security group rules successfully modified on security group (sg-0f33b32d1dcc63d18 | ec2-sg-rds)

▶ Details

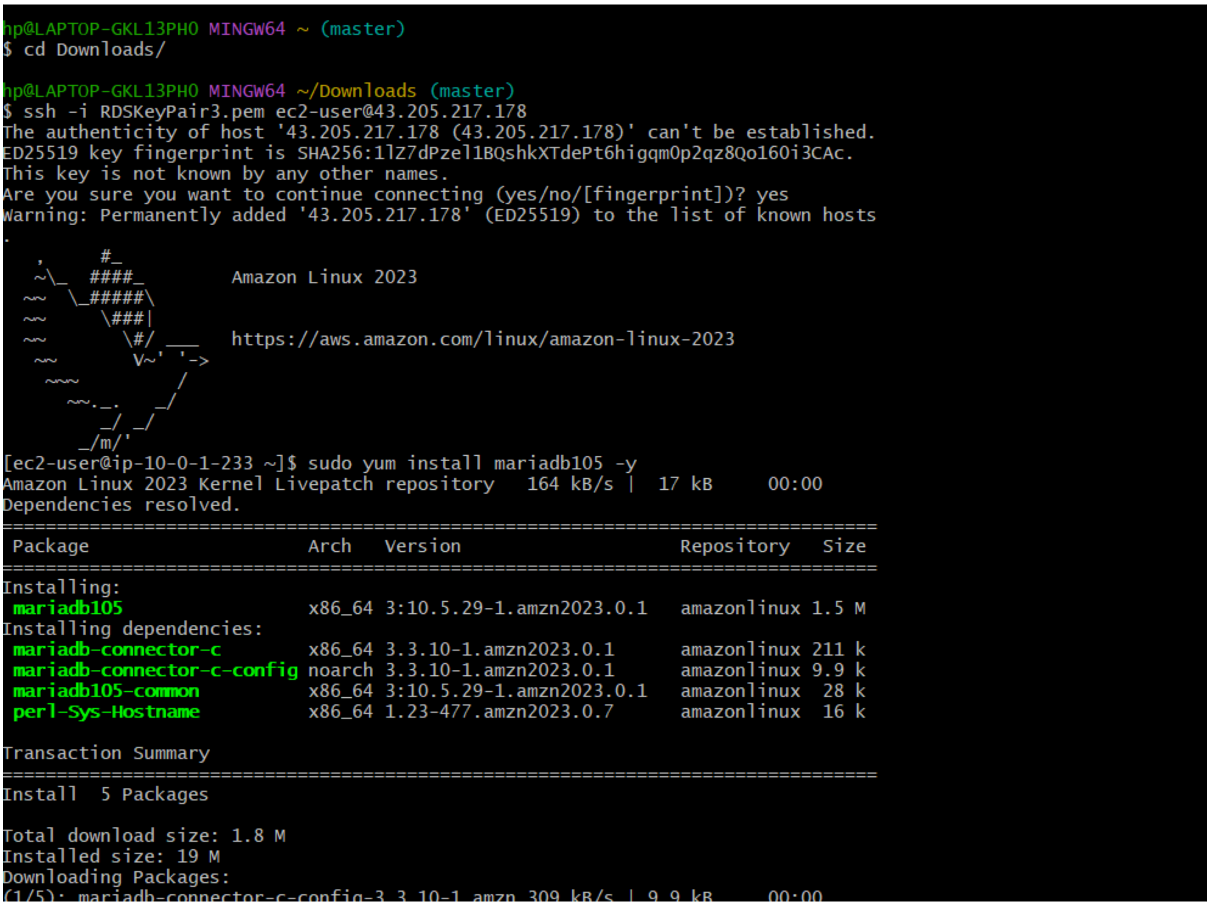
Security Groups (11) Info

Actions
Export security groups to CSV
Create security group
Find security groups by attribute or tag
1

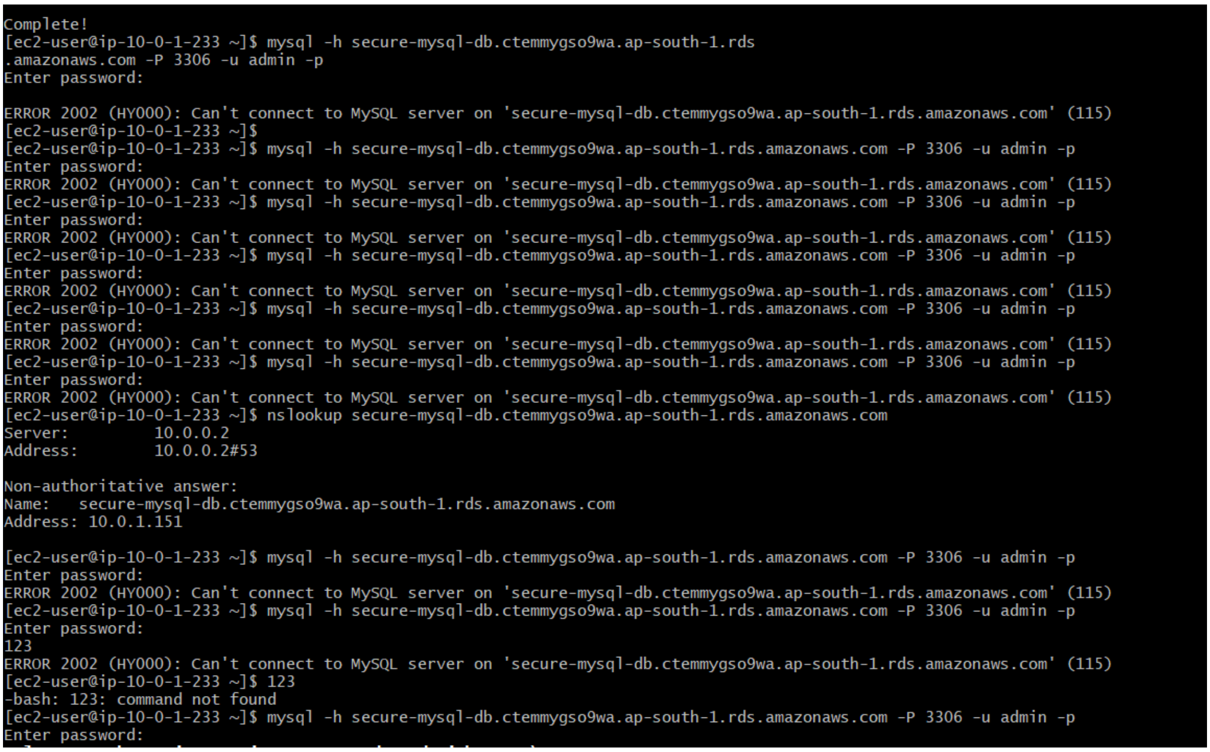
□	Name	Security group ID	Security group name	VPC ID	Description
□	–	sg-0e77399e67fcf573b	rds-sg	vpc-0c0f6cf5f49cb6cbb	RDS security gr
□	–	sg-0680825238b8347b2	launch-wizard-3	vpc-0e0dc7d2ae9e6a060	launch-wizard-
□	–	sg-037e652b80b19b469	rds-private-sg	vpc-0e0dc7d2ae9e6a060	Allow EC2 acce:
□	–	sg-082e4eb50d09970be	ec2-sg	vpc-0c0f6cf5f49cb6cbb	EC2 security gr

Select a security group

Added an inbound rule in ec2-sg-rds to allow incoming MySQL traffic (port 3306) from EC2 security group ec2-sg.

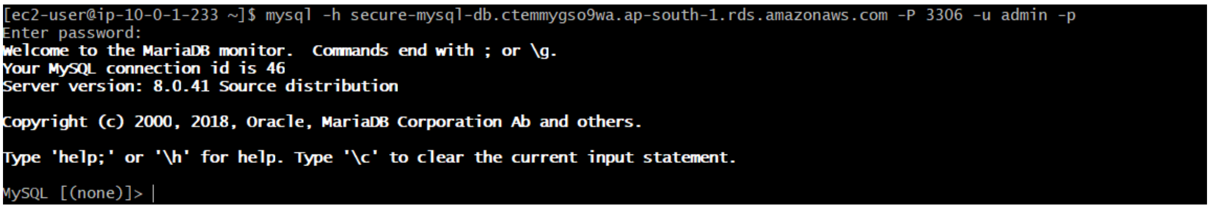


```
hp@LAPTOP-GKL13PHO MINGW64 ~ (master)
$ cd Downloads/

hp@LAPTOP-GKL13PHO MINGW64 ~/Downloads (master)
$ ssh -i RDSKeyPair3.pem ec2-user@43.205.217.178
The authenticity of host '43.205.217.178 (43.205.217.178)' can't be established.
ED25519 key fingerprint is SHA256:1lZ7dPzel1BQshkXTdePt6higqm0p2qz8Qo160i3CAc.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '43.205.217.178' (ED25519) to the list of known hosts
.
   ,     #_
   ~\_  ####_        Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
[ec2-user@ip-10-0-1-233 ~]$ sudo yum install mariadb105 -y
Amazon Linux 2023 Kernel Livepatch repository   164 kB/s |  17 kB     00:00
Dependencies resolved.
================================================================================
 Package                     Arch   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
================================================================================
Install  5 Packages

Total download size: 1.8 M
Installed size: 19 M
Downloading Packages:
(1/5): mariadb-connector-c-config-3.3.10-1.amzn 309 kB/s | 9.9 kB     00:00
```



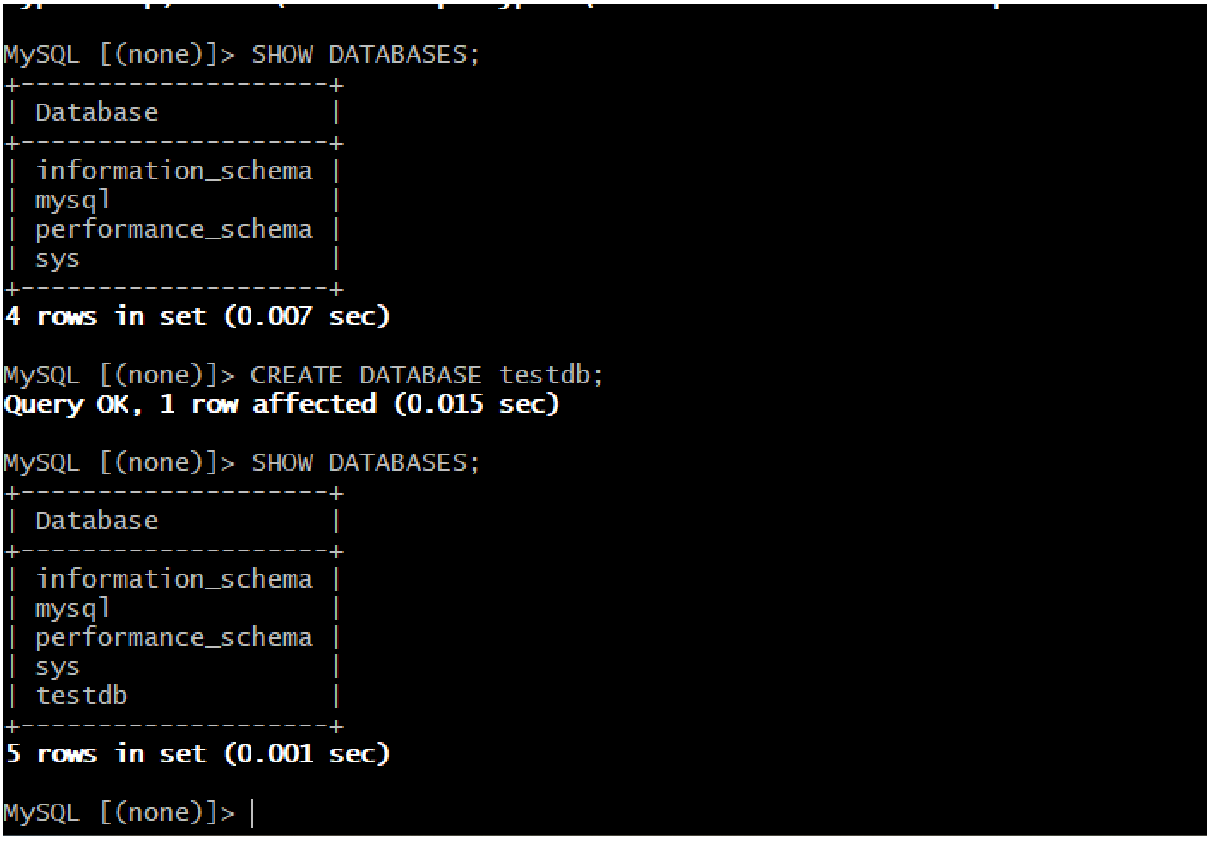
```
Complete!
[ec2-user@ip-10-0-1-233 ~]$ mysql -h secure-mysql-db.ctemmygso9wa.ap-south-1.rds
.amazonaws.com -P 3306 -u admin -p
Enter password:

ERROR 2002 (HY000): Can't connect to MySQL server on 'secure-mysql-db.ctemmygso9wa.ap-south-1.rds.amazonaws.com' (115)
[ec2-user@ip-10-0-1-233 ~]$
[ec2-user@ip-10-0-1-233 ~]$ mysql -h secure-mysql-db.ctemmygso9wa.ap-south-1.rds.amazonaws.com -P 3306 -u admin -p
Enter password:
ERROR 2002 (HY000): Can't connect to MySQL server on 'secure-mysql-db.ctemmygso9wa.ap-south-1.rds.amazonaws.com' (115)
[ec2-user@ip-10-0-1-233 ~]$ mysql -h secure-mysql-db.ctemmygso9wa.ap-south-1.rds.amazonaws.com -P 3306 -u admin -p
Enter password:
ERROR 2002 (HY000): Can't connect to MySQL server on 'secure-mysql-db.ctemmygso9wa.ap-south-1.rds.amazonaws.com' (115)
[ec2-user@ip-10-0-1-233 ~]$ mysql -h secure-mysql-db.ctemmygso9wa.ap-south-1.rds.amazonaws.com -P 3306 -u admin -p
Enter password:
ERROR 2002 (HY000): Can't connect to MySQL server on 'secure-mysql-db.ctemmygso9wa.ap-south-1.rds.amazonaws.com' (115)
[ec2-user@ip-10-0-1-233 ~]$ mysql -h secure-mysql-db.ctemmygso9wa.ap-south-1.rds.amazonaws.com -P 3306 -u admin -p
Enter password:
ERROR 2002 (HY000): Can't connect to MySQL server on 'secure-mysql-db.ctemmygso9wa.ap-south-1.rds.amazonaws.com' (115)
[ec2-user@ip-10-0-1-233 ~]$ mysql -h secure-mysql-db.ctemmygso9wa.ap-south-1.rds.amazonaws.com -P 3306 -u admin -p
Enter password:
ERROR 2002 (HY000): Can't connect to MySQL server on 'secure-mysql-db.ctemmygso9wa.ap-south-1.rds.amazonaws.com' (115)
[ec2-user@ip-10-0-1-233 ~]$ nslookup secure-mysql-db.ctemmygso9wa.ap-south-1.rds.amazonaws.com
Server:         10.0.0.2
Address:        10.0.0.2#53

Non-authoritative answer:
Name:   secure-mysql-db.ctemmygso9wa.ap-south-1.rds.amazonaws.com
Address: 10.0.1.151

[ec2-user@ip-10-0-1-233 ~]$ mysql -h secure-mysql-db.ctemmygso9wa.ap-south-1.rds.amazonaws.com -P 3306 -u admin -p
Enter password:
ERROR 2002 (HY000): Can't connect to MySQL server on 'secure-mysql-db.ctemmygso9wa.ap-south-1.rds.amazonaws.com' (115)
[ec2-user@ip-10-0-1-233 ~]$ mysql -h secure-mysql-db.ctemmygso9wa.ap-south-1.rds.amazonaws.com -P 3306 -u admin -p
Enter password:
123
ERROR 2002 (HY000): Can't connect to MySQL server on 'secure-mysql-db.ctemmygso9wa.ap-south-1.rds.amazonaws.com' (115)
[ec2-user@ip-10-0-1-233 ~]$ 123
-bash: 123: command not found
[ec2-user@ip-10-0-1-233 ~]$ mysql -h secure-mysql-db.ctemmygso9wa.ap-south-1.rds.amazonaws.com -P 3306 -u admin -p
Enter password:
```

after so many troubleshooting



```
[ec2-user@ip-10-0-1-233 ~]$ mysql -h secure-mysql-db.ctemmygso9wa.ap-south-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 46
Server version: 8.0.41 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)]> |
```

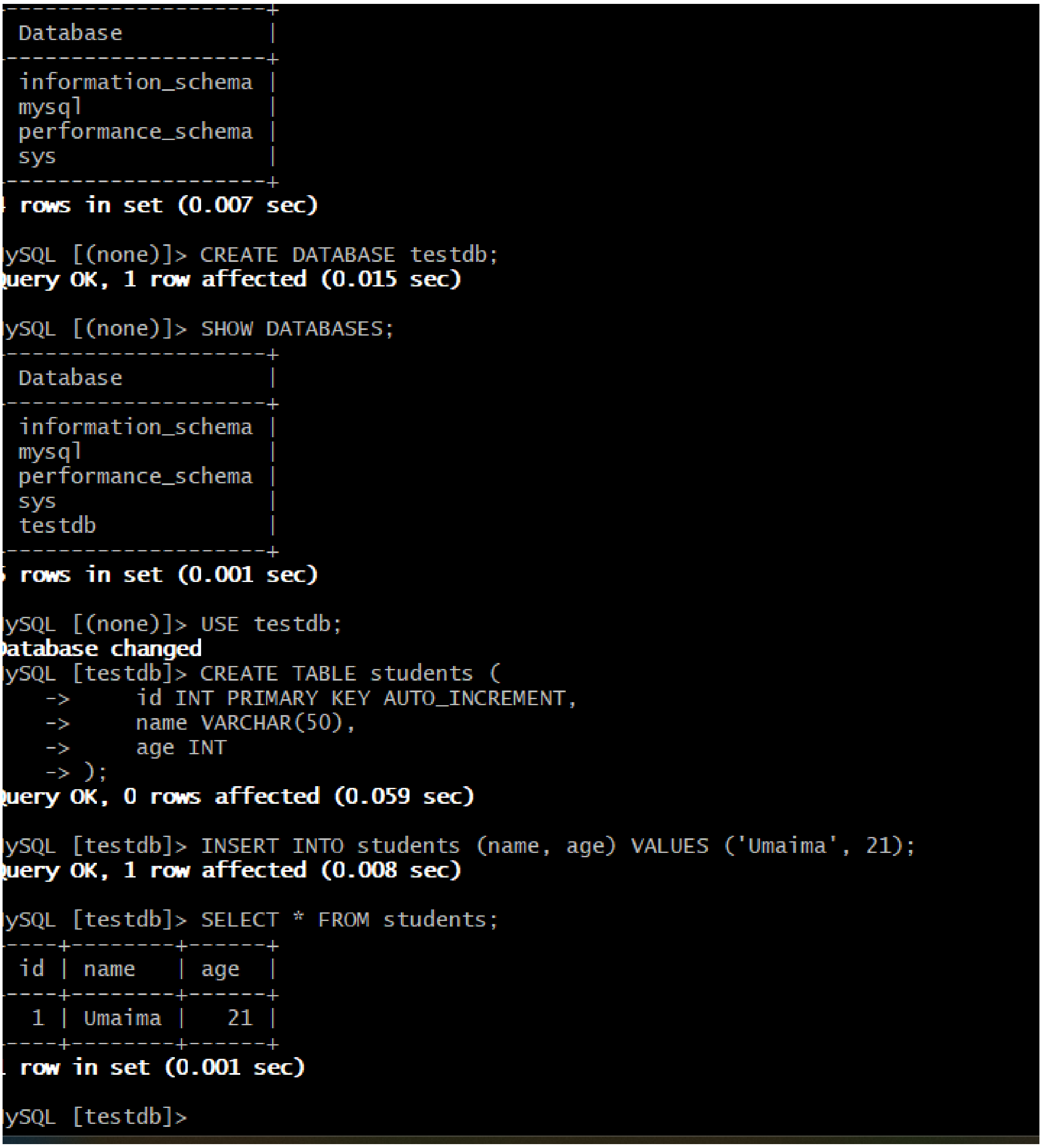
Connected EC2 instance to private RDS MySQL using secure VPC, custom security groups, and MySQL client via terminal on port 3306.



```
MySQL [(none)]> SHOW DATABASES;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
| sys                |
+--------------------+
4 rows in set (0.007 sec)

MySQL [(none)]> CREATE DATABASE testdb;
Query OK, 1 row affected (0.015 sec)

MySQL [(none)]> SHOW DATABASES;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
| sys                |
| testdb             |
+--------------------+
5 rows in set (0.001 sec)

MySQL [(none)]> |
```

This command creates a new database named testdb to verify write access on the RDS instance.

I can run any database query from there



```
--------------------+
 Database           |
--------------------+
 information_schema |
 mysql              |
 performance_schema |
 sys                |
--------------------+
 rows in set (0.007 sec)

ySQL [(none)]> CREATE DATABASE testdb;
uery OK, 1 row affected (0.015 sec)

ySQL [(none)]> SHOW DATABASES;
--------------------+
 Database           |
--------------------+
 information_schema |
 mysql              |
 performance_schema |
 sys                |
 testdb             |
--------------------+
 rows in set (0.001 sec)

ySQL [(none)]> USE testdb;
atabase changed
ySQL [testdb]> CREATE TABLE students (
   ->     id INT PRIMARY KEY AUTO_INCREMENT,
   ->     name VARCHAR(50),
   ->     age INT
   -> );
uery OK, 0 rows affected (0.059 sec)

ySQL [testdb]> INSERT INTO students (name, age) VALUES ('Umaima', 21);
uery OK, 1 row affected (0.008 sec)

ySQL [testdb]> SELECT * FROM students;
----+--------+------+
 id | name   | age  |
----+--------+------+
  1 | Umaima |   21 |
----+--------+------+
 row in set (0.001 sec)

ySQL [testdb]>
```

Through this project, we successfully deployed a secure RDS MySQL database and tested its connectivity using an EC2 instance. We implemented best practices such as network isolation, restricted access using security groups, and private subnet placement for the database. This project strengthened our understanding of secure cloud-based database deployment and laid a solid foundation for future production-level implementations.