

RDS – RELATIONAL DATABASE SYSTEM.

1. Create MariaDB DB on EC2.

- go ec2 and launch an instance
- connect to terminal
- install maria db as we are using amazon linux 2023
- use command – sudo yum install mariadb105-server -y

```
[root@ip-10-0-1-110 ec2-user]# sudo yum install mariadb105-server -y
Last metadata expiration check: 23:41:58 ago on Wed Nov  5 07:58:25 2025.
Dependencies resolved.
=====
Package                                         Architecture                               Ver
=====
Installing:
mariadb105-server                             x86_64                                   3:1
Installing dependencies:
mariadb-connector-c                           x86_64                                   3.1
mariadb-connector-c-config                   noarch                                   3.1
mariadb105                                   x86_64                                   3:1
mariadb105-common                           x86_64                                   3:1
mariadb105-errmsg                           x86_64                                   3:1
mysql-selinux                                noarch                                   1.0
perl-B                                        x86_64                                   1.8
perl-DBD-MariaDB                            x86_64                                   1.2
perl-DBI                                    x86_64                                   1.6
perl-Data-Dumper                            x86_64                                   2.1
perl-File-Copy                               noarch                                   2.1
perl-FileHandle                             noarch                                   2.0
```

- sudo yum enable mariadb
- sudo yum start mariadb
- now log in to db with root
- mysql -u root -p
- now create a user
- CREATE USER 'KAMAL'@'%' IDENTIFIED BY 'kamal';
- GRANT ALL PRIVILEGES ON mydb.* TO 'KAMAL'@'%';
- FLUSH PRIVILEGES;
- User will be created
- Now exit from root

```

MariaDB [(none)]> CREATE USER 'KAMAL'@'%' IDENTIFIED BY 'kamal';
Query OK, 0 rows affected (0.001 sec)

MariaDB [(none)]> GRANT ALL PRIVILEGES ON mydb.* TO 'KAMAL'@'%';
Query OK, 0 rows affected (0.001 sec)

MariaDB [(none)]> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.000 sec)

```

- Exit from root = EXIT;
- Now, login to user KAMAL
- Mysql -u KAMAL -P

```

[root@ip-10-0-1-110 ec2-user]# mysql -u KAMAL -P
mysql: option '-P' requires an argument
[root@ip-10-0-1-110 ec2-user]# mysql -u KAMAL -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 5
Server version: 10.5.29-MariaDB MariaDB Server

```

2. Insert some dummy data.

- To insert some data as it is relational data
- We need to create tables
- Login to user, and create one personal db
- CREATE DATABASE kamaldb;
- Go to root and create create kamaldb and grant all privileges to KAMAL.
- GRANT ALL PRIVILEGES ON *.* TO 'KAMAL'@'%' IDENTIFIED BY 'kamal' WITH GRANT OPTION;
- FLUSH PRIVILEGES;
- This command give permission to KAMAL user .

```

Your MariaDB connection id is 6
Server version: 10.5.29-MariaDB MariaDB Server

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 [(none)]> GRANT ALL PRIVILEGES ON *.* TO 'KAMAL'@'%' IDENTIFIED BY 'kamal' WITH GR
Query OK, 0 rows affected (0.001 sec)

MariaDB [(none)]> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.000 sec)

```

- Now login to user= KAMAL
- Create database inside user by
- CREATE DATABASE kamaldb;
- CREATE TABLE user (user_id INT AUTO_INCREMENT PRIMARY KEY,
- name VARCHAR(100) NOT NULL,
- email VARCHAR(100) NOT NULL,
- phone VARCHAR(15),
- created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP
-);

```

MariaDB [(none)]> CREATE DATABASE kamaldb;
Query OK, 0 rows affected (0.000 sec)

MariaDB [(none)]> USE kamaldb;
Query OK, 0 rows affected (0.000 sec)

MariaDB [kamaldb]> CREATE TABLE user ( user_id INT AUTO_INCREMENT PRIMARY KEY, name VARCHAR(100) NOT NULL, email VARCHAR(100) NOT NULL, phone VARCHAR(15), created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP );
Query OK, 0 rows affected (0.008 sec)

```

```

CREATE TABLE users (

    user_id INT AUTO_INCREMENT PRIMARY KEY,

    name VARCHAR(100) NOT NULL,

    email VARCHAR(100) NOT NULL,

    phone VARCHAR(15),

    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP

);

```

```

MariaDB [kamaldb]> USE kamaldb;
Database changed
MariaDB [kamaldb]> CREATE TABLE users (
  ->   user_id INT AUTO_INCREMENT PRIMARY KEY,
  ->   name VARCHAR(100) NOT NULL,
  ->   email VARCHAR(100) NOT NULL,
  ->   phone VARCHAR(15),
  ->   created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP
  -> );
Query OK, 0 rows affected (0.009 sec)

```

- To insert
- INSERT INTO users (name, email, phone) VALUES
- ('kamal', 'kamal@gmail.com', '1234567891'),
- ('bro', 'bro@gmail.com', '9876543211');

```

MariaDB [kamaldb]> INSERT INTO users (name, email, phone) VALUES
  -> ('kamal', 'kamal@gmail.com', '1234567891'),
  -> ('bro', 'bro@gmail.com', '9876543211');
Query OK, 2 rows affected (0.002 sec)
Records: 2  Duplicates: 0  Warnings: 0

```

- Check data
- SELECT * FROM users;

```

MariaDB [kamaldb]> SELECT * FROM users;
+-----+-----+-----+-----+-----+
| user_id | name  | email                | phone    | created_at                |
+-----+-----+-----+-----+-----+
| 1       | kamal | kamal@gmail.com      | 1234567891 | 2025-11-06 12:23:50 |
| 2       | bro   | bro@gmail.com        | 9876543211 | 2025-11-06 12:23:50 |
+-----+-----+-----+-----+-----+
2 rows in set (0.000 sec)

```

3 . Take the backup of dummy data on EC2.

- Exit from db
- Go to linux terminal
- By command EXIT;
- mysqldump -u KAMAL -p kamaldb users > /home/ec2-user/users_table_backup.sql
- backup created now check,

- `ls -l /home/ec2-user`

```
root@ip-10-0-1-110 ec2-user]# /home/ec2-user/
ash: /home/ec2-user/: Is a directory
root@ip-10-0-1-110 ec2-user]# ls -l /home/ec2-user
total 4
-rw-r--r--. 1 root root 2225 Nov  6 12:29 users_table_backup.sql
root@ip-10-0-1-110 ec2-user]#
```

4. Launch MariaDB RDS instance.

- Open aws console
- Navigate to RDS
- Create a database
- Given name
- Add standard
- Add vpc and existing subnets
- Add maira db

[Aurora and RDS](#) > [Databases](#) > [Create database](#)

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.

☒ **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**
Set up a connection to a compute resource.

Network type [Info](#)
To use dual-stack mode, make sure that you associate an IPv6 CIDR block with a subnet in the VPC you specify.


☒ **IPv4**
Your resources can communicate only over the IPv4 addressing protocol.

☐ **Dual-stack mode**
Your resources can communicate over both IPv4 and IPv6.

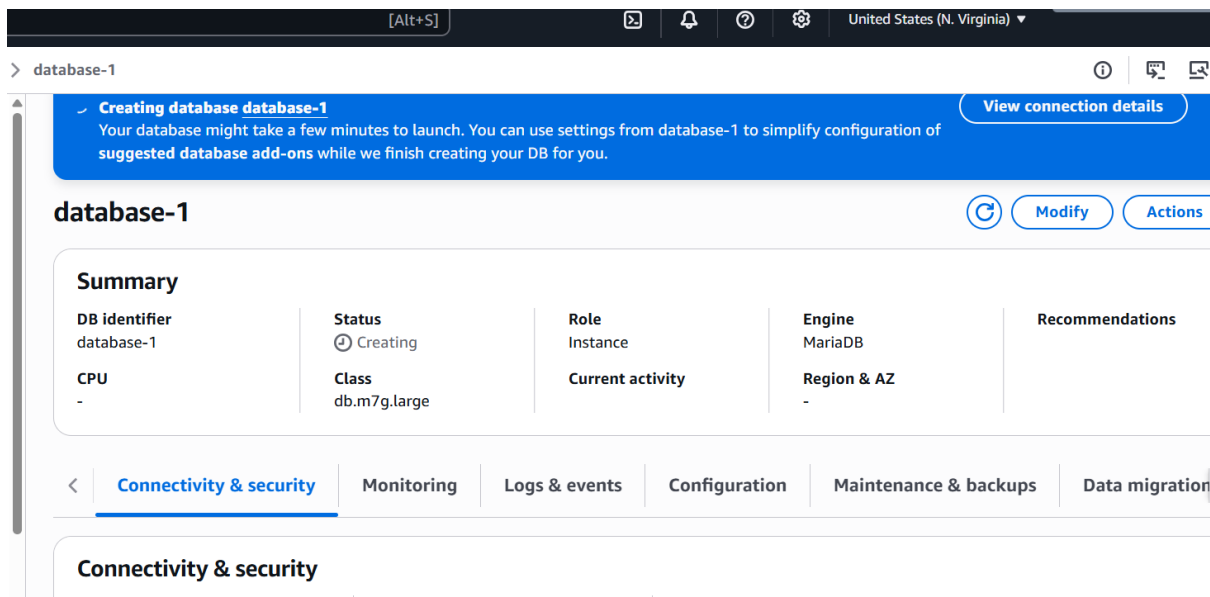
Virtual private cloud (VPC) [Info](#)
Choose the VPC. The VPC defines the virtual networking environment for this DB instance.

autoscaling (vpc-0ad3c0b33fecd285e)
3 Subnets, 2 Availability Zones

Only VPCs with a corresponding DB subnet group are listed.

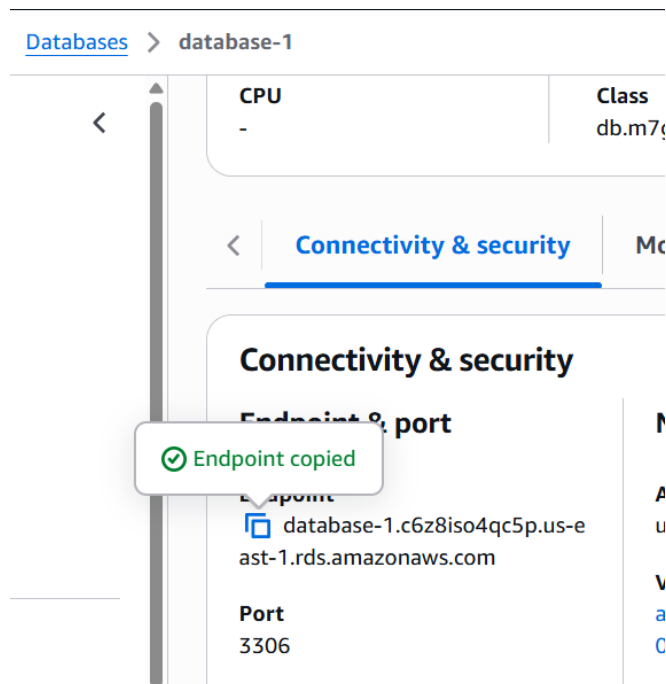
 After a database is created, you can't change its VPC.

- Database created in rds



5. Migrate database from EC2 to RDS.

- Take backup first to migrate
- `mysqldump -u KAMAL -p kamaldb > /home/ec2-user/kamaldb_backup.sql`
- to migrate we need rds database – end point
- copy endpoint



- **RDS → Create Database**

- Engine: **MariaDB**
- Set username & password
- Add manual password
- Enable **Public Access = Yes (for testing)**
- Add your **EC2 Security Group** to RDS Inbound Rules
- Create database instance

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

- Exit from database
-

```
[ec2-user@ip-10-0-1-110 ~]$ ls -l
total 8
-rw-r--r--. 1 root root 2960 Nov  6 12:37 kamaldb_backup.sql
-rw-r--r--. 1 root root 2225 Nov  6 12:29 users_table_backup.sql
[ec2-user@ip-10-0-1-110 ~]$
```

- Now loginto rds from ec2

```
[ec2-user@ip-10-0-1-110 ~]$ mysql -h database-1.c6z8iso4qc5p.us-east-1.rds.amazonaws.com -u admin
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 1846
Server version: 11.4.8-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 [(none)]> CREATE DATABASE kamaldb;
Query OK, 1 row affected (0.005 sec)
```

- Now send database from ec2 to rds

```
[ec2-user@ip-10-0-1-110 ~]$ mysql -h database-1.c6z8iso4qc5p.us-east-1.rds.amazonaws.com -u admin -p kamaldb < kamaldb_backup.sql
Enter password:
[ec2-user@ip-10-0-1-110 ~]$ mysql -h database-1.c6z8iso4qc5p.us-east-1.rds.amazonaws.com -u admin -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 1849
Server version: 11.4.8-MariaDB-log managed by https://aws.amazon.com/rds/

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

```

MariaDB [(none)]> SHOW DATABASES;
+-----+
| Database |
+-----+
| information_schema |
| innodb |
| kamaldb |
| mysql |
| performance_schema |
| sys |
+-----+
6 rows in set (0.001 sec)

```

- Verified.

6 . Install MySQL DB on EC2

- Login too ec2,
- Install mysql
- `sudo yum install mariadb105-server -y`

```

[ec2-user@ip-10-0-1-110 ~]$ sudo yum install mariadb105-server -y
Last metadata expiration check: 0:44:07 ago on Fri Nov 7 09:20:42 2025.
Package mariadb105-server-3:10.5.29-1.amzn2023.0.1.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[ec2-user@ip-10-0-1-110 ~]$

```

```

[ec2-user@ip-10-0-1-110 ~]$ sudo systemctl enable --now mariadb
[ec2-user@ip-10-0-1-110 ~]$ sudo systemctl start --now mariadb
[ec2-user@ip-10-0-1-110 ~]$ sudo systemctl status --now mariadb
● mariadb.service - MariaDB 10.5 database server
   Loaded: loaded (/usr/lib/systemd/system/mariadb.service; enabled; preset: disabled)
   Active: active (running) since Fri 2025-11-07 09:20:14 UTC; 47min ago
     Docs: man:mariadb\(8\)
           https://mariadb.com/kb/en/library/systemd/
  Main PID: 1507 (mariabdd)
    Status: "Taking your SQL requests now..."
     Tasks: 8 (limit: 1053)
  Memory: 85.5M
       CPU: 514ms
    CGroup: /system.slice/mariadb.service
            └─1507 /usr/libexec/mariabdd --basedir=/usr

```

7. Launch MySQL RDS image.

- **Connect to RDS from your EC2 Instance**
- Run this command on your EC2 terminal:
- `mysql -h database-1.c6z8iso4qc5p.us-east-1.rds.amazonaws.com -u admin -p`
-


```
[ec2-user@ip-10-0-1-110 ~]$ mysql -h database-1.c6z8iso4qc5p.us-east-1.rds.amazonaws.com -u admin -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 1870
Server version: 11.4.8-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.
```

8. Configure Multi-AZ.

- Go to **RDS** → **Databases**
- Click your DB
- Click **Modify**
- Scroll to **Availability & Durability**

[Aurora and RDS](#) > [Databases](#) > Modify DB instance: database-1

Your actual IOPS might vary from the amount that you provisioned based on your database workload and instance type. [Learn more](#)

► **Additional storage configuration**

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

Network type [Info](#)

To use dual-stack mode, make sure that you associate an IPv6 CIDR block with a subnet in the VPC you specify.

☒ **IPv4**
Your resources can communicate only over the IPv4 addressing protocol.

☐ **Dual-stack mode**
Your resources can communicate over IPv4, IPv6, or both.

"Create a standby instance"

- Scroll down
- → **Apply Immediately**
- → Click **Modify DB Instance**
- AWS will now create a standby copy in another

database-multiaz

RDS Extended Support

Disabled

DB name

-


License model

Postgresql License

Option groups

default:postgres-17  In sync

Amazon Resource Name (ARN)

 arn:aws:rds:us-east-1:414691912691:db:database-multiaz

Resource ID

db-FOC2QH5FHXGW72JHOQM7MHV
THA

Created time

-

DB instance parameter group

default.postgres17  In sync

RAM

8 GB

Availability

Master username

postgres

Master password

IAM DB authentication

Not enabled

Multi-AZ

Yes

Secondary Zone

-

9. Take backup of DB and restore the DB.

- Login into db
- `mysql -u KAMAL -p`

```
Your MariaDB connection id is 4
Server version: 10.5.29-MariaDB MariaDB Server

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 [(none)]> SHOW DATABASES;
+-----+
| Database |
+-----+
| information_schema |
| kamaldb |
| mysql |
| performance_schema |
+-----+
4 rows in set (0.002 sec)

MariaDB [(none)]>
```

- Exit from db
- Take backup from terminal
- Now create a directory and a file
- Loginto RDS using admin and master password
- `mysql -h database-1.c6z8iso4qc5p.us-east-1.rds.amazonaws.com -u admin -p`

```
mysqldump: Got error: 1045: Access denied for user 'KAMAL'@'10.0.1.110' (using password: YES) when trying to connect
[ec2-user@ip-10-0-1-110 ~]$ mysql -h database-1.c6z8iso4qc5p.us-east-1.rds.amazonaws.com -u admin -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 7813
Server version: 11.4.8-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 [(none)]> █
```

i-0a4cbcc0493321880 (RDS)

PublicIPs: 3.88.171.201 PrivateIPs: 10.0.1.110

- take backup
- `mysqldump -h database-1.c6z8iso4qc5p.us-east-1.rds.amazonaws.com -u KAMAL -p kamaldb > /tmp/backup/kamaldb_backup.sql`

```
[ec2-user@ip-10-0-1-110 ~]$ mysqldump -h database-1.c6z8iso4qc5p.us-east-1.rds.amazonaws.com -u KAMAL -p kamaldb > /tmp/back
Enter password:
[ec2-user@ip-10-0-1-110 ~]$ ls -lh /tmp/backup/kamaldb_backup.sql
-rw-r--r--. 1 ec2-user ec2-user 3.0K Nov 10 04:43 /tmp/backup/kamaldb_backup.sql
[ec2-user@ip-10-0-1-110 ~]$ █
```

- `ls -lh /tmp/backup/kamaldb_backup.sql`

```
[ec2-user@ip-10-0-1-110 ~]$ ls -lh /tmp/backup/kamaldb_backup.sql
-rw-r--r--. 1 ec2-user ec2-user 3.0K Nov 10 04:43 /tmp/backup/kamaldb_backup.sql
[ec2-user@ip-10-0-1-110 ~]$ █
```

- Backup created

10 . create read replica

- Open aws console ,
- Navigate to rds
- Open data base

database-1

database-1

Summary

DB identifier database-1	Status Available	Role Instance	Engine MariaDB
CPU 2.17%	Class db.m7g.large	Current activity 0.00 sessions	Region & AZ us-east-1a

Connectivity & security | Monitoring | Logs & events | Configuration | Maintenance

Connectivity & security

Endpoint & port	Networking	Security
Endpoint database-1.c6z8iso4qc5p.us-east-1.rds.amazonaws.com	Availability Zone us-east-1a	VPC security groups default (sg-0afe7e3379e26dce8)
Port 3306	VPC autoscaling (vpc-0ad3c0b33fedc285e)	Publicly accessible No

Actions

- Stop temporarily
- Reboot
- Delete
- Set up EC2 connection
- Set up Lambda connection
- Migrate data from EC2 database
- Create read replica
- Create Aurora read replica
- Create blue/green deployment
- Promote
- Convert to Multi-AZ deployment
- Take snapshot
- Restore to point in time
- Migrate snapshot
- Create ElastiCache cluster

Same region

Aurora and RDS > Databases > Create read repli

AWS Region

Destination Region
The Region where the replica will be launched.

US East (N. Virginia)

- Give a identifiert name as
- Db-1-rr

Creating replica db-1-rr in US East (N. Virginia)
Your database might take a few minutes to launch.

Databases (3)

Group resources

Modify Actions Create d

Filter by databases

DB identifier	Status	Role	Engine	Region ...
database-1	Modify...	Primary	MariaDB	us-east-1a
db-1-rr	Creating	Replica	MariaDB	-

Main db replicationg new

Replication (2)

Q

Filter by Replication

DB identifier	▲	Role	▼	Region & AZ	▼	Replication
database-1		Primary		us-east-1a		-
db-1-rr		Replica		-		database-1