

# 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   Version
=====
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
mariadb105errmsg                          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        1.0
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 privilges 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

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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 [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
otal 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 an EC2 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 addressing protocols.

##### 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.

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

- Database created in rds

The screenshot shows the AWS RDS console for creating a new database. At the top, there's a message: "Creating database database-1. Your database might take a few minutes to launch. You can use settings from database-1 to simplify configuration of suggested database add-ons while we finish creating your DB for you." Below this, the database identifier is "database-1". The status is "Creating", role is "Instance", engine is "MariaDB", and the class is "db.m7g.large". The "Connectivity & security" tab is active. Other tabs include "Monitoring", "Logs & events", "Configuration", "Maintenance & backups", and "Data migration".

## 5. Migrate database from EC2 to RDS.

- Take backup first to migrate
- mysql dump -u KAMAL -p kamaldb > /home/ec2-user/kamaldb\_backup.sql
- to migrate we need rds database – end point
- copy endpoint

The screenshot shows the "Connectivity & security" section for the database "database-1". It displays the endpoint and port information. A message box indicates that the endpoint has been copied successfully. The endpoint listed is "database-1.c6z8iso4qc5p.us-east-1.rds.amazonaws.com" and the port is "3306".

- 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 adm
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 to 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 (mariadb)
       Status: "Taking your SQL requests now..."
      Tasks: 8 (limit: 1053)
     Memory: 85.5M
        CPU: 514ms
      CGroup: /system.slice/mariadb.service
              └─1507 /usr/libexec/mariadb --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

i 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

<b>RDS Extended Support</b>	<b>RAM</b>
Disabled	8 GB
<b>DB name</b>	<b>Availability</b>
-	
<b>License model</b>	<b>Master username</b>
Postgresql License	postgres
<b>Option groups</b>	<b>Master password</b>
default:postgres-17  In sync	*****
<b>Amazon Resource Name (ARN)</b>	<b>IAM DB authentication</b>
 arn:aws:rds:us-east-1:4146919 12691:db:database-multiaz	Not enabled
<b>Resource ID</b>	<b>Multi-AZ</b>
db- FOC2QH5FHGXW72JHOQM7MHV THA	Yes
<b>Created time</b>	<b>Secondary Zone</b>
-	-
<b>DB instance parameter group</b>	
default.postgres17  In sync	

## 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)  
Public IPs: 3.88.171.201 Private IPs: 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/backup/kamaldb_backup.sql
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
- Backup created

## 10 . create read replica

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

**Summary**

DB identifier database-1	Status <span style="color: green;">Available</span>	Role Instance	Engine MariaDB
CPU <div style="width: 2.17%;">2.17%</div>	Class db.m7g.large	Current activity <div style="width: 0.00%;">0.00 sessions</div>	Region & AZ us-east-1a

**Connectivity & security**

<b>Endpoint &amp; port</b>	<b>Networking</b>	<b>Security</b>
Endpoint <a href="#">database-1.c6z8iso4qc5p.us-east-1.rds.amazonaws.com</a>	Availability Zone us-east-1a	VPC security groups default (sg-0afe7e3379e26dce8) <span style="color: green;">Active</span>
Port 3306	VPC autoscaling (vpc-Oad3c0b33feecd285e)	Publicly accessible No

## 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 identifier 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)**

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

# Main db replicationg new

Replication (2)						
DB identifier	▲	Role	▼	Region & AZ	▼	Replicator
<a href="#">database-1</a>		Primary		us-east-1a		-
<a href="#">db-1-rr</a>		Replica	-			database-1