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AWS Mini Project.

Migrate EC2 Instance & RDS MariaDB Integration

Key Points :

- Deployed an EC2 instance and configured a MariaDB database using AWS RDS.
- Performed database operations like creating databases and inserting values.
- Migrated data from the EC2-hosted database to the RDS instance for seamless integration and scalability.

1. Create a Ec2-instance .

The screenshot shows the 'Launch an instance' wizard in the AWS Management Console. The top navigation bar includes tabs for IAM, S3, EC2, VPC, and RDS. The main content area is titled 'Launch an instance' with a sub-section 'Name and tags'. A 'Name' field contains 'Webapp'. Below it is a 'Software Image (AMI)' section showing 'Amazon Linux 2023 AMI 2023.6.2...'. The 'Virtual server type (instance type)' is set to 't2.micro'. Under 'Application and OS Images (Amazon Machine Image)', there's a search bar and a 'Quick Start' tab selected, showing options for Amazon Linux, macOS, Ubuntu, Windows, Red Hat, and SUSE Linux. On the right, a 'Summary' panel shows 'Number of instances' as 1, and a large orange 'Launch instance' button. The bottom of the screen shows the Windows taskbar with various pinned icons.

2. Successfully created Ec2- instance.

The screenshot shows the 'Instances' page in the AWS Management Console. The left sidebar has sections for Dashboard, EC2 Global View, Events, Instances (selected), Images, and Elastic Block Store. The main content displays a table for 'Instances (1/1)'. It shows one instance named 'Webapp' with the ID 'i-09e39ddf0bfc70b3e', which is currently 'Running'. Below the table is a detailed view for 'i-09e39ddf0bfc70b3e (Webapp)'. The 'Details' tab is active, showing the Instance ID 'i-09e39ddf0bfc70b3e', Public IPv4 address '54.159.28.156', Private IPv4 address '172.31.31.152', and Public IPv4 DNS. Other tabs include Status and alarms, Monitoring, Security, Networking, Storage, and Tags. The bottom of the screen shows the Windows taskbar.

3. Add Security group in ec2-instance.

The screenshot shows the AWS Management Console with the URL us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#ModifyInboundSecurityGroupRules:securityGroupId=sg-01703d36a1f50b18e. The navigation bar includes links for IAM, S3, EC2, VPC, RDS, and Databases. The main content area is titled "Edit inbound rules" and displays two rules:

Security group rule ID	Type	Protocol	Port range	Source	Description - optional
sgr-050751ddd4d0bbcf0	SSH	TCP	22	C... 0.0.0.0/0	<input type="text"/> Delete
-	MySQL/Aurora	TCP	3306	A... 0.0.0.0/0	<input type="text"/> Delete

A message box at the bottom left states: "⚠️ Rules with source of 0.0.0.0/0 or ::/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only." The message has a close button (X).

The taskbar at the bottom shows various pinned icons and the date/time: 24-01-2025, 12:15 PM.

4. Get SSH of your ec2-instance .

(Enter ip address of ec2-instance , username , private key.)

The screenshot shows the MobaXterm application window. The main menu includes Terminal, Sessions, View, X server, Tools, Games, Settings, Macros, Help, Session, Servers, Tools, Games, Sessions, View, Split, MultiExec, Tunneling, Packages, Settings, and Help. A "Quick connect..." section lists sessions: 13.127.227.170 (ec2-user), 13.203.75.5 (ec2-user), and 3.83.121.44 (ec2-user). The central "Session settings" dialog is open, showing the "Basic SSH settings" tab. The "Remote host" field is set to 54.159.28.156, "Specify username" is set to ec2-user, and the "Port" is 22. Other tabs include Advanced SSH settings, Terminal settings, Network settings, and Bookmark settings. At the bottom are OK and Cancel buttons. A watermark at the bottom left reads: "UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: <https://mobaxterm.mobatek.net>". The taskbar at the bottom shows various pinned icons and the date/time: 24-01-2025, 12:13 PM.

5. Successfully access the ec2-instance using SSH.

The screenshot shows the MobaXterm interface. The title bar indicates a connection to '54.159.28.156 (ec2-user)'. The main terminal window displays the following text:

```
• MobaXterm Personal Edition v24.3 •
(SSH client, X server and network tools)

> SSH session to ec2-user@54.159.28.156
  • Direct SSH : ✓
  • SSH compression : ✓
  • SSH-browser : ✓
  • X11-forwarding : ✘ (disabled or not supported by server)

> For more info, ctrl+click on help or visit our website.

,
~\ _###_      Amazon Linux 2023
~~ \###\_
~~ \###_
~~ \#_ https://aws.amazon.com/linux/amazon-linux-2023
~~ \~'__>
~~ /
~~ ./
~/m/ [ec2-user@ip-172-31-31-152 ~]$
```

The terminal also shows a 'Remote monitoring' icon in the bottom left and a status bar at the bottom with the message 'UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: https://mobaxterm.mobatek.net'.

6. Switch to root user and install mariadb on ec2-instance.

Cmd for switch user :- ' sudo -l '

The screenshot shows the MobaXterm interface. The title bar indicates a connection to '54.159.28.156 (ec2-user)'. The terminal window displays the following text:

```
[root@ip-172-31-31-152 ~]# yum install mariadb105* -y
Last metadata expiration check: 0:09:20 ago on Fri Jan 24 06:44:44 2025.
Package mariadb105-3:10.5.25-1.amzn2023.0.1.x86_64 is already installed.
Package mariadb105-common-3:10.5.25-1.amzn2023.0.1.x86_64 is already installed.
Dependencies resolved.
=====
Package           Architecture Version       Repository   Size
=====
Installing:
  mariadb105-backup          x86_64    3:10.5.25-1.amzn2023.0.1   amazonlinux  6.3 M
  mariadb105-connect-engine   x86_64    3:10.5.25-1.amzn2023.0.1   amazonlinux  541 k
  mariadb105-cracklib-password-check x86_64    3:10.5.25-1.amzn2023.0.1   amazonlinux  15 k
  mariadb105-devel            x86_64    3:10.5.25-1.amzn2023.0.1   amazonlinux  1.0 M
  mariadb105-errmsg           x86_64    3:10.5.25-1.amzn2023.0.1   amazonlinux  213 k
  mariadb105-gssapi-server    x86_64    3:10.5.25-1.amzn2023.0.1   amazonlinux  17 k
  mariadb105-oqgraph-engine   x86_64    3:10.5.25-1.amzn2023.0.1   amazonlinux  84 k
  mariadb105-pam              x86_64    3:10.5.25-1.amzn2023.0.1   amazonlinux  26 k
  mariadb105-rocksdb-engine  x86_64    3:10.5.25-1.amzn2023.0.1   amazonlinux  3.1 M
  mariadb105-server           x86_64    3:10.5.25-1.amzn2023.0.1   amazonlinux  11 M
  mariadb105-server-utils     x86_64    3:10.5.25-1.amzn2023.0.1   amazonlinux  216 k
  mariadb105-sphinx-engine   x86_64    3:10.5.25-1.amzn2023.0.1   amazonlinux  66 k
  mariadb105-test              x86_64    3:10.5.25-1.amzn2023.0.1   amazonlinux  13 M
Installing dependencies:
  Judy                      x86_64    1.0.5-25.amzn2023.0.3   amazonlinux  153 k
  libdatrie                  x86_64    0.2.13-1.amzn2023.0.2   amazonlinux  33 k
  libpq                     x86_64    16.4-1.amzn2023.0.2   amazonlinux  252 k
  libssh2                   x86_64    2.2.11-24.amzn2023.0.4   amazonlinux  133 k
  libthai                    x86_64    0.1.28-6.amzn2023.0.2   amazonlinux  209 k
  mariadb-connector-c-devel  x86_64    3.1.13-1.amzn2023.0.3   amazonlinux  53 k
  mysql-selinux              noarch   1.0.4-2.amzn2023.0.3   amazonlinux  36 k
  openssl-devel              x86_64    1:3.0.8-1.amzn2023.0.18  amazonlinux  3.0 M
  patch                      x86_64    2.7.6-14.amzn2023.0.2   amazonlinux  129 k
  perl-B                     x86_64    1.80-477.amzn2023.0.6   amazonlinux  179 k
  perl-DBD-MariaDB           x86_64    1.22-1.amzn2023.0.4   amazonlinux  153 k
  perl-DBI                   x86_64    1.643-7.amzn2023.0.3   amazonlinux  700 k
  perl-Data-Dumper            x86_64    2.174-460.amzn2023.0.2  amazonlinux  55 k
  perl-English                noarch   1.11-477.amzn2023.0.6   amazonlinux  14 k
  perl-Env                   noarch   1.04-458.amzn2023.0.2   amazonlinux  20 k
```

The terminal also shows a 'Remote monitoring' icon in the bottom left and a status bar at the bottom with the message 'UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: https://mobaxterm.mobatek.net'.

7. Start mariadb service and assign password to database.

54.159.28.156 (ec2-user)

```
[root@ip-172-31-31-152 ~]# systemctl start mariadb.service
[root@ip-172-31-31-152 ~]# mysql_secure_installation

NOTE: RUNNING ALL PARTS OF THIS SCRIPT IS RECOMMENDED FOR ALL MariaDB
SERVERS IN PRODUCTION USE! PLEASE READ EACH STEP CAREFULLY!

In order to log into MariaDB to secure it, we'll need the current
password for the root user. If you've just installed MariaDB, and
haven't set the root password yet, you should just press enter here.

Enter current password for root (enter for none):
OK, successfully used password, moving on...

Setting the root password or using the unix_socket ensures that nobody
can log into the MariaDB root user without the proper authorisation.

You already have your root account protected, so you can safely answer 'n'.

Switch to unix_socket authentication [Y/n] y
Enabled successfully!
Reloading privilege tables..
... Success!

You already have your root account protected, so you can safely answer 'n'.

Change the root password? [Y/n] y
New password:
Re-enter new password:
Password updated successfully!
Reloading privilege tables..
... Success!

By default, a MariaDB installation has an anonymous user, allowing anyone
to log into MariaDB without having to have a user account created for
them. This is intended only for testing, and to make the installation
go a bit smoother. You should remove them before moving into a
```

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Remote monitoring Follow terminal folder

12:29 PM 24-01-2025

8. Get Connect the database created on ec2-instance .

54.159.28.156 (ec2-user)

```
[root@ip-172-31-31-152 ~]# mysql -h localhost -u root -p12345
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 14
Server version: 10.5.25-MariaDB MariaDB Server

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

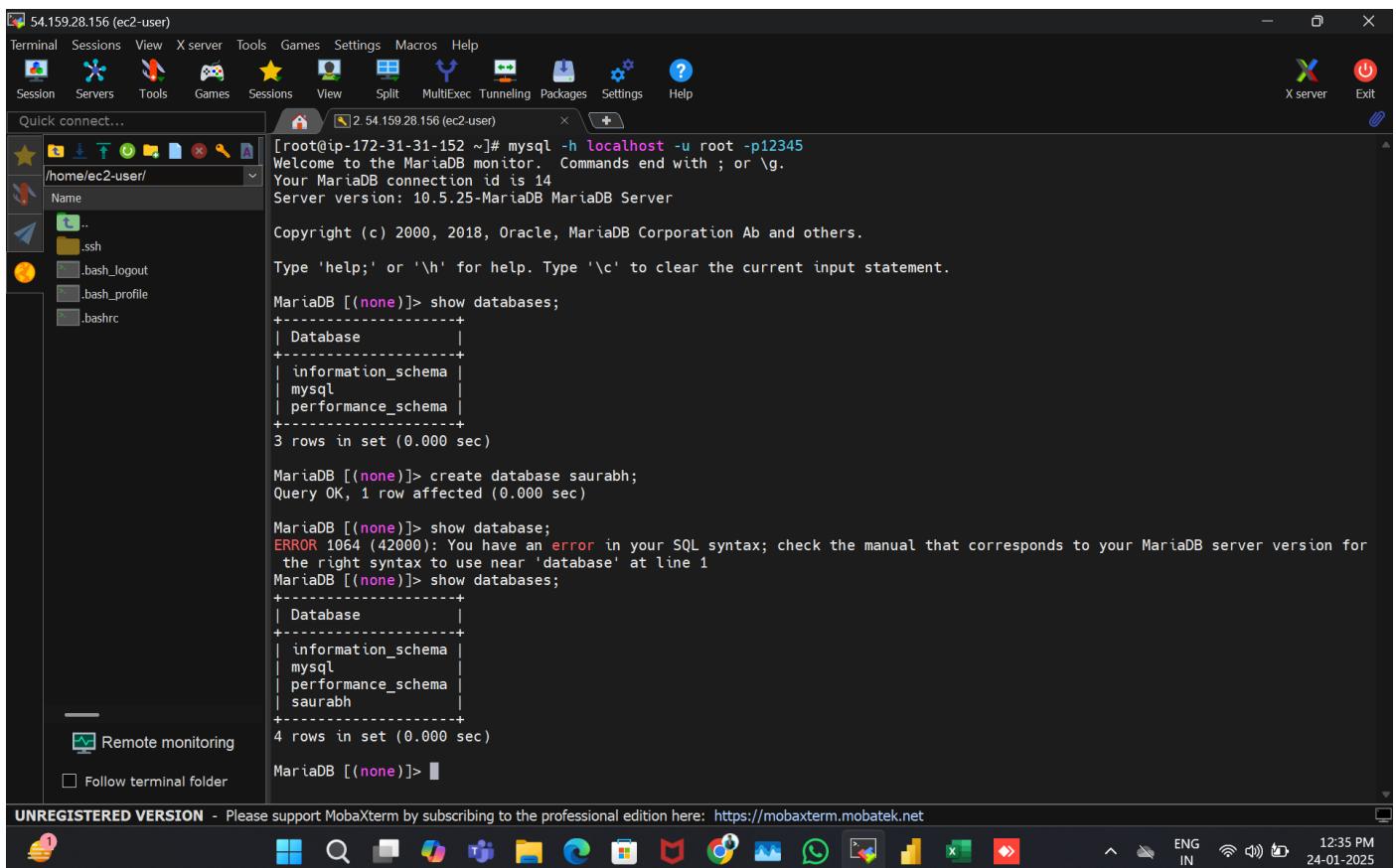
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> 
```

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12:30 PM 24-01-2025

9. Check existing databases and Create New Database .



54.159.28.156 (ec2-user)
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunnelling Packages Settings Help
Quick connect...
/home/ec2-user/
Name
.. .ssh .bash_logout .bash_profile .bashrc
MariaDB [(none)]> mysql -h localhost -u root -p12345
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 14
Server version: 10.5.25-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 |
| mysql |
| performance_schema |
+-----+
3 rows in set (0.000 sec)

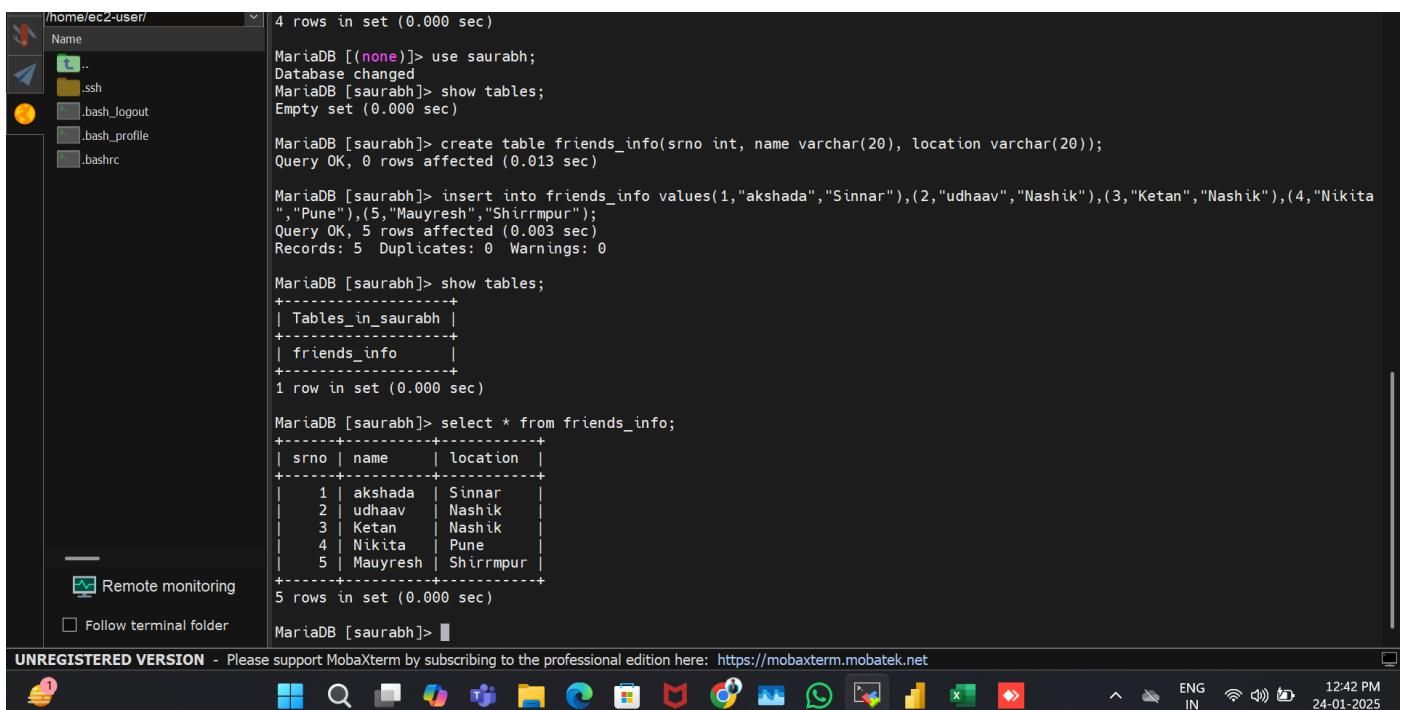
MariaDB [(none)]> create database saurabh;
Query OK, 1 row affected (0.000 sec)

MariaDB [(none)]> show database;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MariaDB server version for the right syntax to use near 'database' at line 1
MariaDB [(none)]> show databases;
+-----+
| Database |
+-----+
| information_schema |
| mysql |
| performance_schema |
| saurabh |
+-----+
4 rows in set (0.000 sec)

MariaDB [(none)]>

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File Explorer Taskbar 12:35 PM 24-01-2025

10. Inside that database create table and insert the values and show the data.



/home/ec2-user/
Name
.. .ssh .bash_logout .bash_profile .bashrc
4 rows in set (0.000 sec)

MariaDB [(none)]> use saurabh;
Database changed
MariaDB [saurabh]> show tables;
Empty set (0.000 sec)

MariaDB [saurabh]> create table friends_info(srno int, name varchar(20), location varchar(20));
Query OK, 0 rows affected (0.013 sec)

MariaDB [saurabh]> insert into friends_info values(1,"akshada","Sinnar"),(2,"udhaav","Nashik"),(3,"Ketan","Nashik"),(4,"Nikita","Pune"),(5,"Mauyresh","Shirrmpur");
Query OK, 5 rows affected (0.003 sec)
Records: 5 Duplicates: 0 Warnings: 0

MariaDB [saurabh]> show tables;
+-----+
| Tables_in_saurabh |
+-----+
| friends_info |
+-----+
1 row in set (0.000 sec)

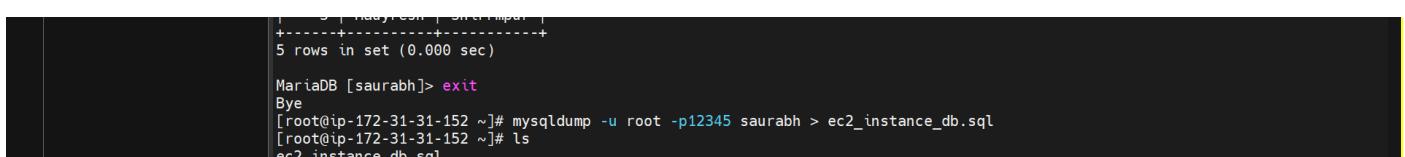
MariaDB [saurabh]> select * from friends_info;
+-----+
| srno | name | location |
+-----+
1	akshada	Sinnar
2	udhaav	Nashik
3	Ketan	Nashik
4	Nikita	Pune
5	Mauyresh	Shirrmpur
+-----+
5 rows in set (0.000 sec)

MariaDB [saurabh]>

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File Explorer Taskbar 12:42 PM 24-01-2025

11. exit the database and create a database file for backup using following cmd .

Mysql -u (username) -p (password) (database_name) > new file name.sql



| 5 rows in set (0.000 sec)

MariaDB [saurabh]> exit
Bye
[root@ip-172-31-31-152 ~]# mysqldump -u root -p12345 saurabh > ec2_instance_db.sql
[root@ip-172-31-31-152 ~]# ls
ec2_instance_db.sql

12. Create a database using RDS service .

The screenshot shows the 'Create database' page in the AWS RDS Management console. In the top left, there's a section titled 'Choose a database creation method' with two options: 'Standard create' (selected) and 'Easy create'. Below this is the 'Engine options' section, which includes engine type selection. Under 'Engine type', 'Aurora (MySQL Compatible)' is selected (radio button is checked). Other options shown are 'MySQL' and 'PostgreSQL'. The interface includes standard AWS navigation elements like CloudShell, Feedback, and a bottom toolbar with various icons.

13. Select MariaDB database.

The screenshot shows the 'Create database' page in the AWS RDS Management console. In the top left, there's a section titled 'Choose a database creation method' with two options: 'Standard create' (selected) and 'Easy create'. Below this is the 'Engine options' section, which includes engine type selection. Under 'Engine type', 'MariaDB' is selected (radio button is checked). Other options shown are 'Oracle', 'Microsoft SQL Server', and 'IBM Db2'. To the right of the engine selection, there's a detailed description of the MariaDB Community Edition, listing its features such as support for up to 64 TiB, various performance classes, and global transaction ID support. The interface includes standard AWS navigation elements like CloudShell, Feedback, and a bottom toolbar with various icons.

14. Assign database name , username , password .

The screenshot shows the 'Create database' page in the AWS RDS console. In the 'Master username' field, 'admin' is entered. The 'Self managed' option is selected for password management. A password '*****' is typed into the 'Master password' field, which is labeled as 'Very weak'. The 'Confirm master password' field also contains '*****'. On the right, a sidebar for 'MariaDB' lists its features, including support for up to 64 TiB and various performance and backup options. The bottom of the screen shows the Windows taskbar with various pinned icons.

15. Successfully created the database.

The screenshot shows the 'Databases' page in the AWS RDS console. A single database named 'database-1' is listed under 'Databases (1)'. The database is in an 'Available' status, associated with the 'MariaDB' engine, the 'us-east-1a' instance, and the 'db.t4g.micro' class. The left sidebar shows other RDS management options like Dashboard, Databases, and Query Editor. The bottom of the screen shows the Windows taskbar with various pinned icons.

16. Copy the endpoint of database .

The screenshot shows the Amazon RDS console for the 'database-1' database. The 'Summary' section displays the following details:

DB identifier	Status	Role	Engine	Recommendations
database-1	Available	Instance	MariaDB	
CPU	Class db.t4g.micro	Current activity 0 Connections	Region & AZ us-east-1a	

The 'Connectivity & security' tab is selected. In the 'Endpoint' section, a tooltip 'Endpoint copied' is shown above the endpoint value. The endpoint value is listed as:

```
database-1.ch2sa2m86jgl.us-east-1.rds.amazonaws.com
```

The 'Networking' and 'Security' sections show the availability zone as 'us-east-1a' and VPC security groups as 'default (sg-00b44ef67483f0512)'. The status of the security group is 'Active'.

17. Get SSH of ec2-instance for RDS service database connection.

The screenshot shows an SSH session in MobaXterm connected to the IP address 54.159.28.156. The session output is as follows:

```
• MobaXterm Personal Edition v24.3 •
(SSH client, X server and network tools)

> SSH session to ec2-user@54.159.28.156
• Direct SSH : ✓
• SSH compression : ✓
• SSH-browser : ✓
• X11-forwarding : ✘ (disabled or not supported by server)

> For more info, ctrl+click on help or visit our website.

,
#_
~\ #####
~\ #####
~~ \###|
~~ #/| https://aws.amazon.com/linux/amazon-linux-2023
~~ \~'__>
~~ .-'/ /
~~ .-/ /
[ec2-user@ip-172-31-31-152 ~]$
```

The terminal window also displays the following footer text:

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18. Switch to root user and install mariadb.

The screenshot shows a terminal window titled "54.159.28.156 (ec2-user)". The command `yum install mariadb105 -y` is run, followed by dependency resolution and a transaction summary. The transaction installs 5 packages, totaling 1.8 MB. The transaction check and test both succeed. The transaction begins, preparing and installing the packages. The process is completed successfully.

```
[root@ip-172-31-31-152 ~]# yum install mariadb105 -y
Last metadata expiration check: 0:01:23 ago on Fri Jan 24 06:44:44 2025.
Dependencies resolved.
=====
 Package           Architecture   Version        Repository  Size
=====
 Installing:
  mariadb105      x86_64        3:10.5.25-1.amzn2023.0.1    amazonlinux 1.6 M
 Installing dependencies:
  mariadb-connector-c      x86_64        3:1.13-1.amzn2023.0.3    amazonlinux 196 k
  mariadb-connector-c-config  noarch      3:1.13-1.amzn2023.0.3    amazonlinux 9.2 k
  mariadb105-common       x86_64        3:10.5.25-1.amzn2023.0.1    amazonlinux 29 k
  perl-Sys-Hostname      x86_64        1.23-477.amzn2023.0.6    amazonlinux 18 k
=====
 Transaction Summary
=====
 Install 5 Packages

Total download size: 1.8 M
Installed size: 19 M
Downloading Packages:
(1/5): mariadb-connector-c-config-3.1.13-1.amzn2023.0.3.noarch.rpm          194 kB/s | 9.2 kB   00:00
(2/5): mariadb-connector-c-3.1.13-1.amzn2023.0.3.x86_64.rpm                  3.3 MB/s | 196 kB   00:00
(3/5): mariadb105-common-10.5.25-1.amzn2023.0.1.x86_64.rpm                 1.2 MB/s | 29 kB   00:00
(4/5): mariadb105-10.5.25-1.amzn2023.0.1.x86_64.rpm                   18 MB/s | 1.6 MB   00:00
(5/5): perl-Sys-Hostname-1.23-477.amzn2023.0.6.x86_64.rpm                525 kB/s | 18 kB   00:00
=====
Total                                         15 MB/s | 1.8 MB   00:00
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing           :
  Installing         : mariadb-connector-c-config-3.1.13-1.amzn2023.0.3.noarch
  Installing         : mariadb-connector-c-3.1.13-1.amzn2023.0.3.x86_64
  Installing         : mariadb105-common-10.5.25-1.amzn2023.0.1.x86_64
  Installing         : perl-Sys-Hostname-1.23-477.amzn2023.0.6.x86_64
=====
1/1      1/5      2/5      3/5      4/5
Preparing           :
Installing         : mariadb-connector-c-config-3.1.13-1.amzn2023.0.3.noarch
Installing         : mariadb-connector-c-3.1.13-1.amzn2023.0.3.x86_64
Installing         : mariadb105-common-10.5.25-1.amzn2023.0.1.x86_64
Installing         : perl-Sys-Hostname-1.23-477.amzn2023.0.6.x86_64
=====
1/1      1/5      2/5      3/5      4/5
=====
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```

19. Connect to database in RDS service and Enter following cmd and paste endpoint.

`mysql -h (endpoint) -u (username) -p (password) (database name where u paste it) < (backup file name) .`

The screenshot shows a terminal window titled "54.159.28.156 (ec2-user)". The command `mysql -h database-1.ch2sa2m86jgl.us-east-1.rds.amazonaws.com -u admin -p123456789 nashik < ec2_instance_db.sql` is run to import a backup file into the 'nashik' database. The command `ls` is used to list files in the current directory, showing 'ec2_instance_db.sql'. The terminal prompt is then shown again.

```
[root@ip-172-31-31-152 ~]# mysql -h database-1.ch2sa2m86jgl.us-east-1.rds.amazonaws.com -u admin -p123456789 nashik < ec2_instance_db.sql
[root@ip-172-31-31-152 ~]# ls
ec2_instance_db.sql
[root@ip-172-31-31-152 ~]#
```

20. Check the Database. Successfully take backup file from Ec2-instance to RDS service database .

The screenshot shows a terminal window titled "54.159.28.156 (ec2-user)". The user connects to the 'nashik' database and runs two queries: `use nashik;` and `show tables;`. The output shows a single table named 'friends_info' with 5 rows. The user then runs another query: `select * from friends_info;` which also returns 5 rows of data.

```
0 rows in set (0.001 sec)

MariaDB [(none)]> use nashik;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MariaDB [nashik]> show tables;
+-----+
| Tables_in_nashik |
+-----+
| friends_info     |
+-----+
1 row in set (0.001 sec)

MariaDB [nashik]> select * from friends_info;
+-----+-----+-----+
| srno | name  | location |
+-----+-----+-----+
| 1   | akshada | Sinnar   |
| 2   | udhaav  | Nashik   |
| 3   | Ketan   | Nashik   |
| 4   | Nikita  | Pune     |
| 5   | Mauresh | Shrirmpur |
+-----+-----+-----+
5 rows in set (0.001 sec)

MariaDB [nashik]>
```

