

Project - 2

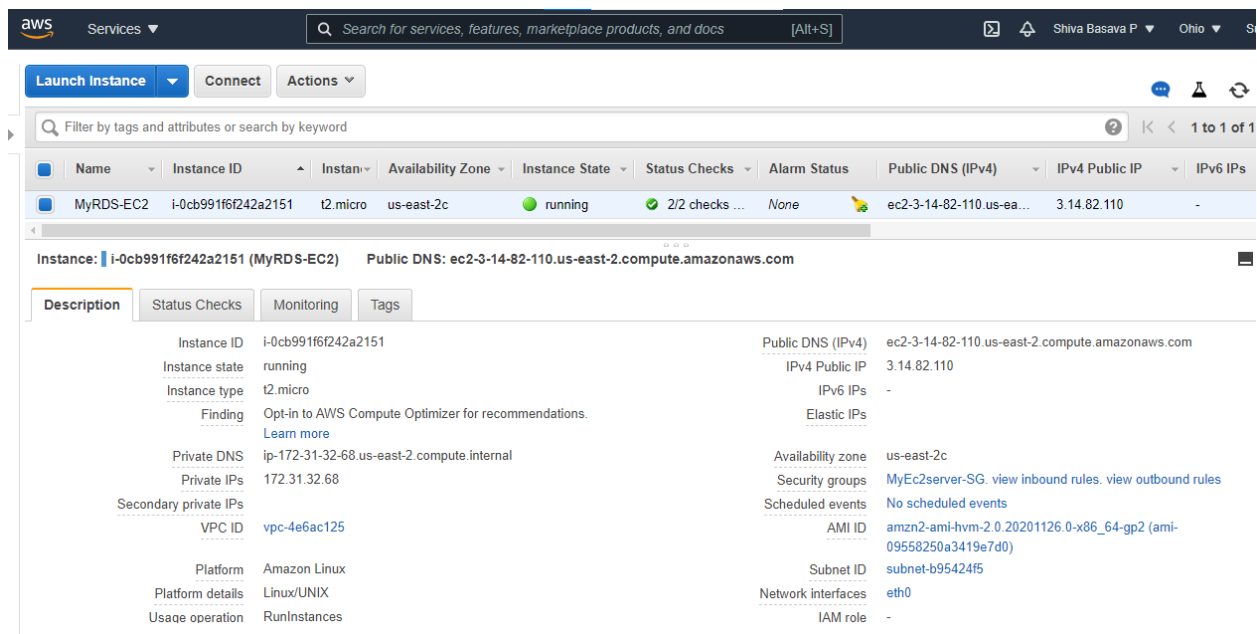
Project Title:

Deploying Amazon RDS Multi-AZ and Read Replica, Simulate Failover

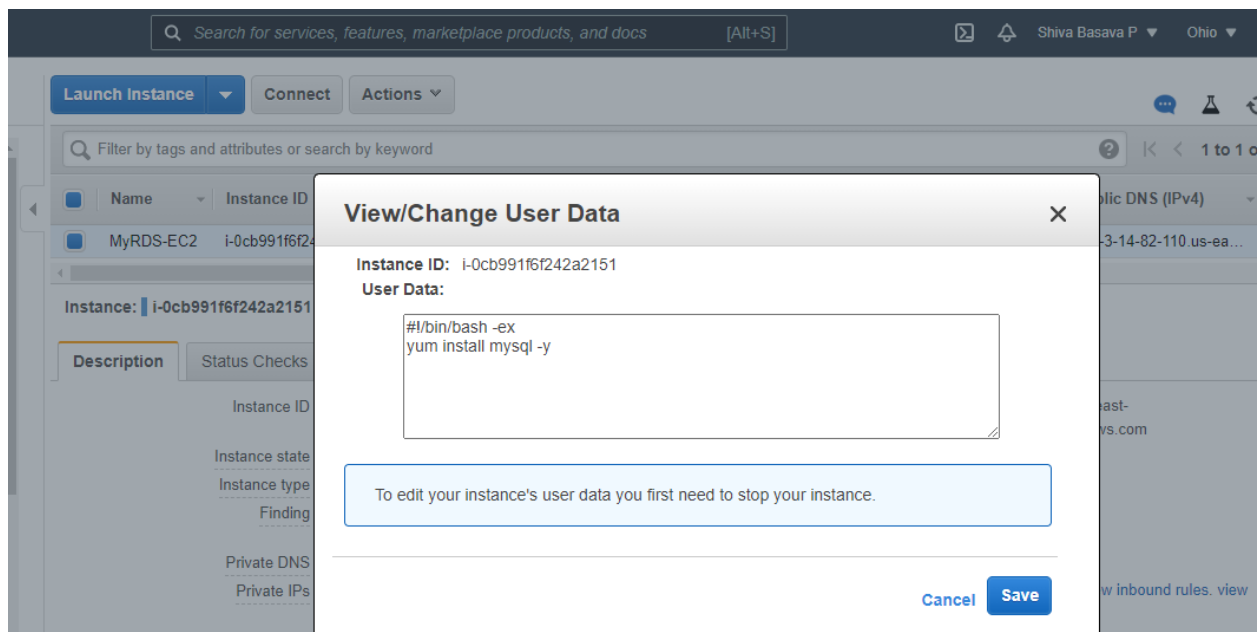
Following are the sequence of steps & screenshots for the solution,

I. Created an EC2 Instance of Amazon Linux 2 AMI

EC2 console with instance details



II. User data field displaying 'mysql' installation



III. Created a **Security Group - MyEc2server_SG** for EC2 Instance of **Amazon Linux 2 AMI**. Following are its details,

Search for services, features, marketplace products, and docs [Alt+S]

Create Security Group Actions

Group ID : sg-048be8d72bb261c42 Add filter

Name	Group ID	Group Name	VPC ID	Owner	Description
MyEc2server-SG	sg-048be8...	MyEc2serv...	vpc-4e6ac125	973501320577	Security for ec2 server to connect with RDS

Security Group: sg-048be8d72bb261c42

Description Inbound Outbound Tags

Group name MyEc2server-SG Group description Security for ec2 server to connect with RDS
Group ID sg-048be8d72bb261c42 VPC ID vpc-4e6ac125

(Inbound details)

Search for services, features, marketplace products, and docs [Alt+S]

Create Security Group Actions

Group ID : sg-048be8d72bb261c42 Add filter

Name	Group ID	Group Name	VPC ID	Owner	Description
MyEc2server-SG	sg-048be8...	MyEc2serv...	vpc-4e6ac125	973501320577	Security for ec2 server to connect with RDS

Security Group: sg-048be8d72bb261c42

Description Inbound Outbound Tags

Edit

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	0.0.0.0/0	

(Outbound details)

Search for services, features, marketplace products, and docs [Alt+S]

Create Security Group Actions

Group ID : sg-048be8d72bb261c42 Add filter

Name	Group ID	Group Name	VPC ID	Owner	Description
MyEc2server-SG	sg-048be8...	MyEc2serv...	vpc-4e6ac125	973501320577	Security for ec2 server to connect with RDS

Security Group: sg-048be8d72bb261c42

Description Inbound Outbound Tags

Edit

Type	Protocol	Port Range	Destination	Description
All traffic	All	All	0.0.0.0/0	

IV. Created a **Security Group - RDS_lab_SG** for RDS instance. Following are its details,

Search for services, features, marketplace products, and docs [Alt+S]

Shiva Basava P Ohio

Create Security Group Actions

search : sg-07edd40144f65aaee Add filter

Name	Group ID	Group Name	VPC ID	Owner	Description
RDS_Lab_SG	sg-07edd4...	RDS_Lab_...	vpc-4e6ac125	973501320577	RDS_Lab_SG

Security Group: sg-07edd40144f65aaee

Description Inbound Outbound Tags

Group name RDS_Lab_SG Group description RDS_Lab_SG
Group ID sg-07edd40144f65aaee VPC ID vpc-4e6ac125

(Inbound details)

Search for services, features, marketplace products, and docs [Alt+S]

Shiva Basava P Ohio

Create Security Group Actions

search : sg-07edd40144f65aaee Add filter

Name	Group ID	Group Name	VPC ID	Owner	Description
RDS_Lab_SG	sg-07edd4...	RDS_Lab_...	vpc-4e6ac125	973501320577	RDS_Lab_SG

Security Group: sg-07edd40144f65aaee

Description Inbound Outbound Tags

Edit

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	172.31.34.194/32	
MYSQL/Aurora	TCP	3306	0.0.0.0/0	
MYSQL/Aurora	TCP	3306	:::0	

(Outbound details)

Search for services, features, marketplace products, and docs [Alt+S]

Shiva Basava P Ohio

Create Security Group Actions

search : sg-07edd40144f65aaee Add filter

Name	Group ID	Group Name	VPC ID	Owner	Description
RDS_Lab_SG	sg-07edd4...	RDS_Lab_...	vpc-4e6ac125	973501320577	RDS_Lab_SG

Security Group: sg-07edd40144f65aaee

Description Inbound Outbound Tags

Edit

Type	Protocol	Port Range	Destination	Description
All traffic	All	All	0.0.0.0/0	

- V. Created an **Amazon Aurora database with Multi-AZ enabled**. At the bottom of the screenshot we can view the **Multi-AZ as 2 Zones**.

The screenshot shows the AWS Management Console for an Amazon Aurora database cluster. The top navigation bar includes the AWS logo, 'Services', a search bar, and user information 'Shiva Basava P' and 'Ohio'. The main content area is titled 'DB identifier' and lists the cluster and its instances:

DB identifier	Role	Engine	Region & AZ	Size	Status	CPU
myauroradbcluster	Regional	Aurora MySQL	us-east-2	2 instances	Available	-
myauroradbcluster-instance-1-us-east-2b	Writer	Aurora MySQL	us-east-2b	db.t3.small	Available	6.00%
myauroradbcluster-instance-1	Reader	Aurora MySQL	us-east-2a	db.t3.small	Available	7.00%

Below the table, there are tabs for 'Connectivity & security', 'Monitoring', 'Logs & events', 'Configuration' (selected), 'Maintenance & backups', and 'Tags'. The 'Configuration' tab shows the following details:

Configuration	Capacity type	Availability	Encryption
DB cluster role: Primary	Provisioned: single-master	IAM db authentication: Not Enabled	Encryption: Not Enabled
Engine version: 5.7.mysql_aurora.2.07.2	DB cluster id: myauroradbcluster	Master username: labsadmin	
Resource id: cluster-54TJIEMC7FZSFRNNQJ5TP6WEQ	DB name: mydatabase	Master password: *****	
Amazon Resource Name (ARN): arn:aws:rds:us-east-2:973501320577:cluster:myauroradbcluster	DB cluster parameter group: default.aurora-mysql5.7	Multi AZ: 2 Zones	
	Deletion protection: Disabled		

VI. Displaying databases console with Writer and Reader

- Before FailOver option

Writer endpoint - myauroradbcluster-instance-1.c458bphxdvxh.us-east-2.rds.amazonaws.com

Reader endpoint -

myauroradbcluster-instance-1-us-east-2b.c458bphxdvxh.us-east-2.rds.amazonaws.com

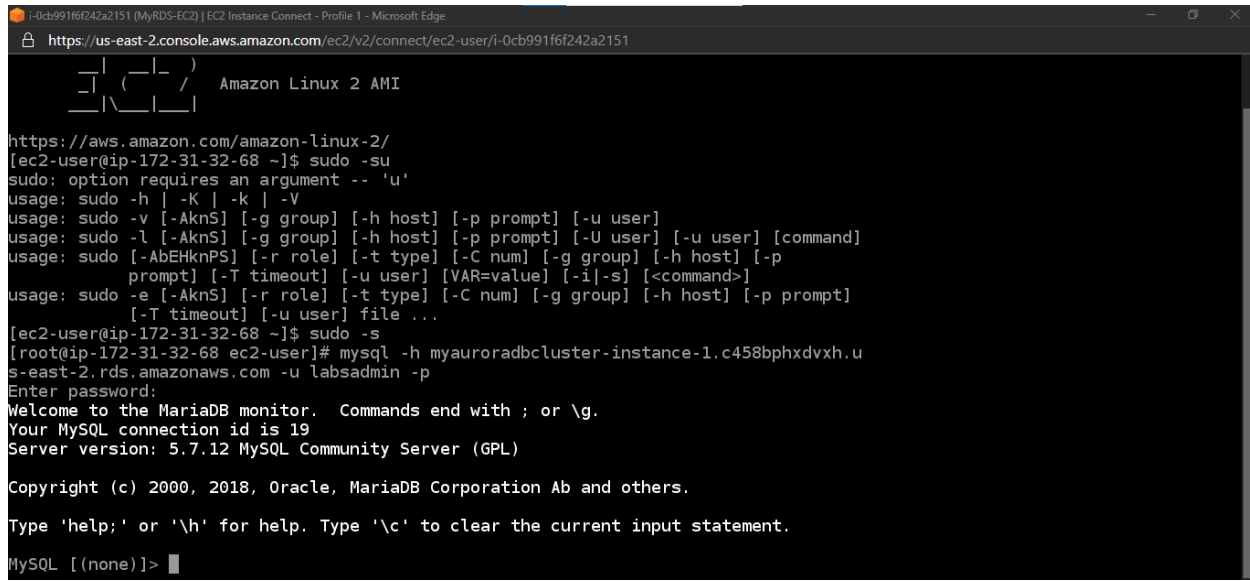
The screenshot shows the AWS Management Console for the 'Databases' section. The top navigation bar includes the AWS logo, 'Services', a search bar, and user information 'Shiva Basava P' and 'Ohio'. The main content area is titled 'Databases' and includes a 'Group resources' toggle, 'Modify', 'Actions', 'Restore from S3', and 'Create database' buttons. Below these are search filters and a table listing the databases:

DB identifier	Role	Engine	Region & AZ	Size	Status	CPU
myauroradbcluster	Regional	Aurora MySQL	us-east-2	2 instances	Available	-
myauroradbcluster-instance-1	Writer	Aurora MySQL	us-east-2a	db.t3.small	Available	9.00%
myauroradbcluster-instance-1-us-east-2b	Reader	Aurora MySQL	us-east-2b	db.t3.small	Available	12.00%

- VII. Connecting to the Aurora (MySQL) database on RDS from EC2 instance(**Public IP - 3.14.82.110**). Connected with, **Writer endpoint** -

myauroradbcluster-instance-1.c458bphxdvxh.us-east-2.rds.amazonaws.com

Command - `mysql -h <Writer endpoint> -u <my_dbuser> -p`



```

https://us-east-2.console.aws.amazon.com/ec2/v2/connect/ec2-user/i-0cb991f6f242a2151

Amazon Linux 2 AMI

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-172-31-32-68 ~]$ sudo -su
sudo: option requires an argument -- 'u'
usage: sudo -h | -K | -k | -V
usage: sudo -v [-AknS] [-g group] [-h host] [-p prompt] [-u user]
usage: sudo -l [-AknS] [-g group] [-h host] [-p prompt] [-U user] [-u user] [command]
usage: sudo [-AbEHknPS] [-r role] [-t type] [-C num] [-g group] [-h host] [-p
prompt] [-T timeout] [-u user] [VAR=value] [-i|-s] [<command>]
usage: sudo -e [-AknS] [-r role] [-t type] [-C num] [-g group] [-h host] [-p prompt]
[-T timeout] [-u user] file ...
[ec2-user@ip-172-31-32-68 ~]$ sudo -s
[root@ip-172-31-32-68 ec2-user]# mysql -h myauroradblcluster-instance-1.c458bphxdvvh.
s-east-2.rds.amazonaws.com -u labsadmin -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 19
Server version: 5.7.12 MySQL Community Server (GPL)

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)]>

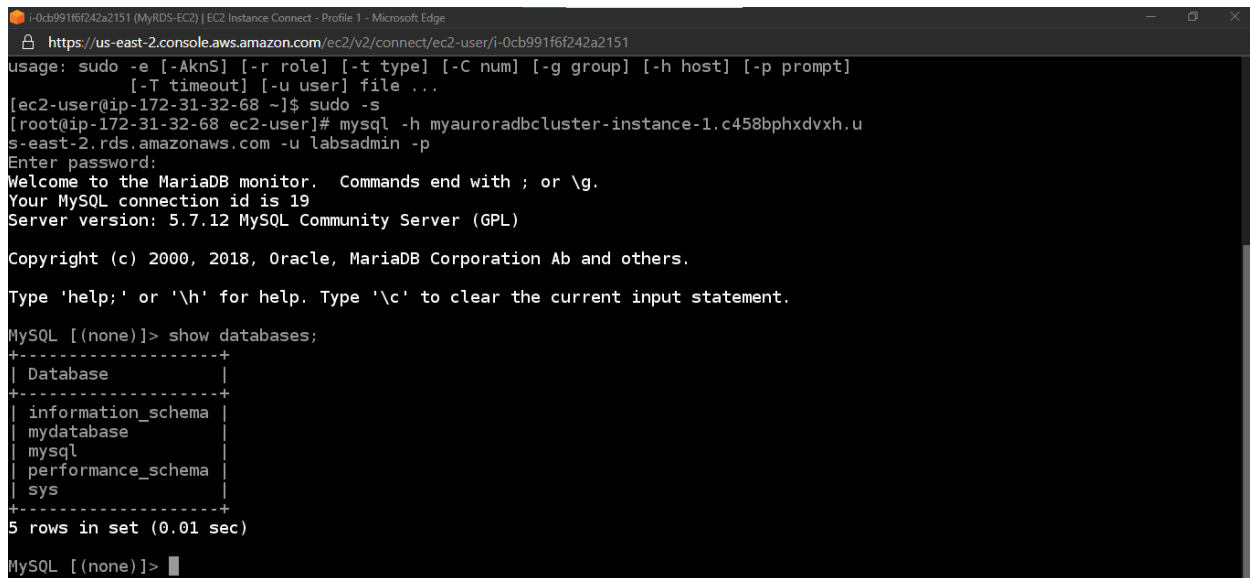
```

i-0cb991f6f242a2151 (MyRDS-EC2)

Public IPs: 3.14.82.110 Private IPs: 172.31.32.68

VIII. Executed database operation and displaying details

1. Displaying the available Databases, run - **show databases;**



```

usage: sudo -e [-AknS] [-r role] [-t type] [-C num] [-g group] [-h host] [-p prompt]
[-T timeout] [-u user] file ...
[ec2-user@ip-172-31-32-68 ~]$ sudo -s
[root@ip-172-31-32-68 ec2-user]# mysql -h myauroradblcluster-instance-1.c458bphxdvvh.
s-east-2.rds.amazonaws.com -u labsadmin -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 19
Server version: 5.7.12 MySQL Community Server (GPL)

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 databases;
+-----+
| Database |
+-----+
| information_schema |
| mydatabase |
| mysql |
| performance_schema |
| sys |
+-----+
5 rows in set (0.01 sec)

MySQL [(none)]>

```

i-0cb991f6f242a2151 (MyRDS-EC2)

Public IPs: 3.14.82.110 Private IPs: 172.31.32.68

2. Created the table - **students**, by using the database - **mydatabase**

```

Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 19
Server version: 5.7.12 MySQL Community Server (GPL)

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 databases;
+-----+
| Database |
+-----+
| information_schema |
| mydatabase |
| mysql |
| performance_schema |
| sys |
+-----+
5 rows in set (0.01 sec)

MySQL [(none)]> use mydatabase;
Database changed
MySQL [mydatabase]> CREATE TABLE students ( subject_id INT AUTO_INCREMENT,
-> subject_name VARCHAR(255) NOT NULL, teacher
-> VARCHAR(255),start_date DATE, lesson TEXT,PRIMARY KEY (subject_id));
Query OK, 0 rows affected (0.03 sec)

```

i-0cb991f6f242a2151 (MyRDS-EC2)

Public IPs: 3.14.82.110 Private IPs: 172.31.32.68

3. Inserted few rows into the table - **students** and displayed the same

```

MySQL [mydatabase]> INSERT INTO students(subject_name, teacher) VALUES ('English', 'John Taylor');
Query OK, 1 row affected (0.00 sec)

MySQL [mydatabase]> INSERT INTO students(subject_name, teacher) VALUES ('Science', 'Mary
> Smith');
Query OK, 1 row affected (0.01 sec)

MySQL [mydatabase]> INSERT INTO students(subject_name, teacher) VALUES ('Maths', 'Ted Miller');
Query OK, 1 row affected (0.01 sec)

MySQL [mydatabase]> INSERT INTO students(subject_name, teacher) VALUES ('Arts', 'Suzan
> Carpenter');
Query OK, 1 row affected (0.01 sec)

MySQL [mydatabase]> select * from students;
+-----+-----+-----+-----+-----+
| subject_id | subject_name | teacher | start_date | lesson |
+-----+-----+-----+-----+-----+
| 1 | English | John Taylor | NULL | NULL |
| 2 | Science | Mary | NULL | NULL |
| 3 | Maths | Ted Miller | NULL | NULL |
| 4 | Arts | Suzan | NULL | NULL |
+-----+-----+-----+-----+-----+
4 rows in set (0.00 sec)

```

i-0cb991f6f242a2151 (MyRDS-EC2)

Public IPs: 3.14.82.110 Private IPs: 172.31.32.68

IX. Showing failover in action

aws Services Search for services, features, marketplace products, and docs [Alt+S] Shiva Basava P Ohio

RDS > Databases > Failover

Failover DB Cluster

Failover

Are you sure you want to failover myauroradbcluster?

Cancel Failover

1. After **FailOver** enabled for **Master(Writer)**, now the endpoints will be swapped between the **Writer** and **Reader**.

- From,

Writer endpoint -

myauroradbcluster-instance-1.c458bphxdvxh.us-east-2.rds.amazonaws.com

Reader endpoint -

myauroradbcluster-instance-1-us-east-2b.c458bphxdvxh.us-east-2.rds.amazonaws.com

- To,

Writer endpoint -

myauroradbcluster-instance-1-us-east-2b.c458bphxdvxh.us-east-2.rds.amazonaws.com

Reader endpoint -

Myauroradbcluster-instance-1.c458bphxdvxh.us-east-2.rds.amazonaws.com

DB identifier	Role	Engine	Region & AZ	Size	Status	CPU
myauroradbcluster	Regional	Aurora MySQL	us-east-2	2 instances	Available	-
myauroradbcluster-instance-1-us-east-2b	Writer	Aurora MySQL	us-east-2b	db.t3.small	Available	6.00%
myauroradbcluster-instance-1	Reader	Aurora MySQL	us-east-2a	db.t3.small	Available	7.00%

2. Connecting to the new **Writer** endpoint, as shown in the previous section.

```

i-0cb991f6f242a2151 (MyRDS-EC2) | EC2 Instance Connect - Profile 1 - Microsoft Edge
https://us-east-2.console.aws.amazon.com/ec2/v2/connect/ec2-user/i-0cb991f6f242a2151
Last login: Sat Dec 26 15:08:34 2020 from ec2-3-16-146-0.us-east-2.compute.amazonaws.com
Amazon Linux 2 AMI
https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-172-31-32-68 ~]$ sudo -s
[root@ip-172-31-32-68 ec2-user]# mysql -h myauroradbcluster-instance-1-us-east-2b.c458bphxdvxh.us-east-2.rds.amazonaws.com -u labsadmin -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 5
Server version: 5.7.12 MySQL Community Server (GPL)

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)]>

```

i-0cb991f6f242a2151 (MyRDS-EC2)

Public IPs: 3.14.82.110 Private IPs: 172.31.32.68

3. Executing the database commands.

Displaying the available Databases & Tables, run - **show databases; show tables;**

```

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

MySQL [(none)]> show databases;
+-----+
| Database |
+-----+
| information_schema |
| mydatabase |
| mysql |
| performance_schema |
| sys |
+-----+
5 rows in set (0.00 sec)

MySQL [(none)]> use mydatabase;
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
MySQL [mydatabase]> show tables;
+-----+
| Tables_in_mydatabase |
+-----+
| students |
+-----+
1 row in set (0.00 sec)

```

i-0cb991f6f242a2151 (MyRDS-EC2)

Public IPs: 3.14.82.110 Private IPs: 172.31.32.68

Inserted a new row into the table - **students** and displayed the same

```

MySQL [mydatabase]> select * from students;
+-----+
| subject_id | subject_name | teacher | start_date | lesson |
+-----+
| 1 | English | John Taylor | NULL | NULL |
| 2 | Science | Mary | NULL | NULL |
| 3 | Maths | Ted Miller | NULL | NULL |
| 4 | Arts | Suzan | NULL | NULL |
| 5 | Spanish | Isabella | NULL | NULL |
+-----+
5 rows in set (0.00 sec)

MySQL [mydatabase]> INSERT INTO students(subject_name, teacher) VALUES ('Spanish',
-> 'Isabella');
Query OK, 1 row affected (0.01 sec)

MySQL [mydatabase]> select * from students;
+-----+
| subject_id | subject_name | teacher | start_date | lesson |
+-----+
| 1 | English | John Taylor | NULL | NULL |
| 2 | Science | Mary | NULL | NULL |
| 3 | Maths | Ted Miller | NULL | NULL |
| 4 | Arts | Suzan | NULL | NULL |
| 5 | Spanish | Isabella | NULL | NULL |
+-----+
5 rows in set (0.00 sec)

MySQL [mydatabase]>

```

i-0cb991f6f242a2151 (MyRDS-EC2)

Public IPs: 3.14.82.110 Private IPs: 172.31.32.68