

AWS Advance | Project 2

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

Lab Details :-

- 1. This lab walks through the steps to launch an Amazon Aurora RDS DB instance with multi-AZ enabled. and also simulate a database failover from one AZ to another.**
- 2. Practice using Amazon Aurora.**
- 3. Duration: 1 hour**
- 4. AWS Region: US East (N. Virginia) us-east-1**

Lab Tasks :-

- 1. In this lab session, first we are going to launch an Amazon Aurora RDS DB instance with Multi-AZ enabled.**
- 2. Connect to the RDS database instance (using its endpoint) from our local machine.**
- 3. Create a test database and table in our Master RDS DB instance.**
- 4. Force the Master DB instance to failover.**
- 5. After Failover, Master will change to Reader and Reader will change to Master**
- 6. Connect to the new Master to test the database replication.**

Steps:-

1. Creating an EC2 Instance

The screenshot shows the AWS Management Console interface. The left sidebar contains navigation links for 'New EC2 Experience', 'EC2 Dashboard', 'Events', 'Tags', 'Limits', 'Instances', 'Instance Types', 'Launch Templates', 'Spot Requests', 'Savings Plans', 'Reserved Instances', 'Dedicated Hosts', 'Scheduled Instances', 'Capacity Reservations', and 'Images'. The main content area displays the 'Instances (1)' page. A table lists the instance 'RDS-EC2-Inst...' with ID 'i-070b6104967cba39d', which is in a 'Running' state. The instance type is 't2.micro' and it has '2/2 checks' passed. The 'Launch instances' button is visible in the top right corner.

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability
RDS-EC2-Inst...	i-070b6104967cba39d	Running	t2.micro	2/2 checks ...	No alarms	us-east-1

Instance Details:

The screenshot shows the 'Instance details' page for the instance 'i-070b6104967cba39d (RDS-EC2-Instance)'. The page is updated less than a minute ago. The instance is in a 'Running' state. The instance type is 't2.micro'. The page displays various details including the public IPv4 address (100.25.220.209), public IPv4 DNS (ec2-100-25-220-209.compute-1.amazonaws.com), private IPv4 address (172.31.55.188), private IPv4 DNS (ip-172-31-55-188.ec2.internal), VPC ID (vpc-d6b77cab), and Subnet ID (subnet-6376b552). The IAM Role is also shown as '-'. The AWS Compute Optimizer finding is 'Opt-in to AWS Compute Optimizer for recommendations. | Learn more'.

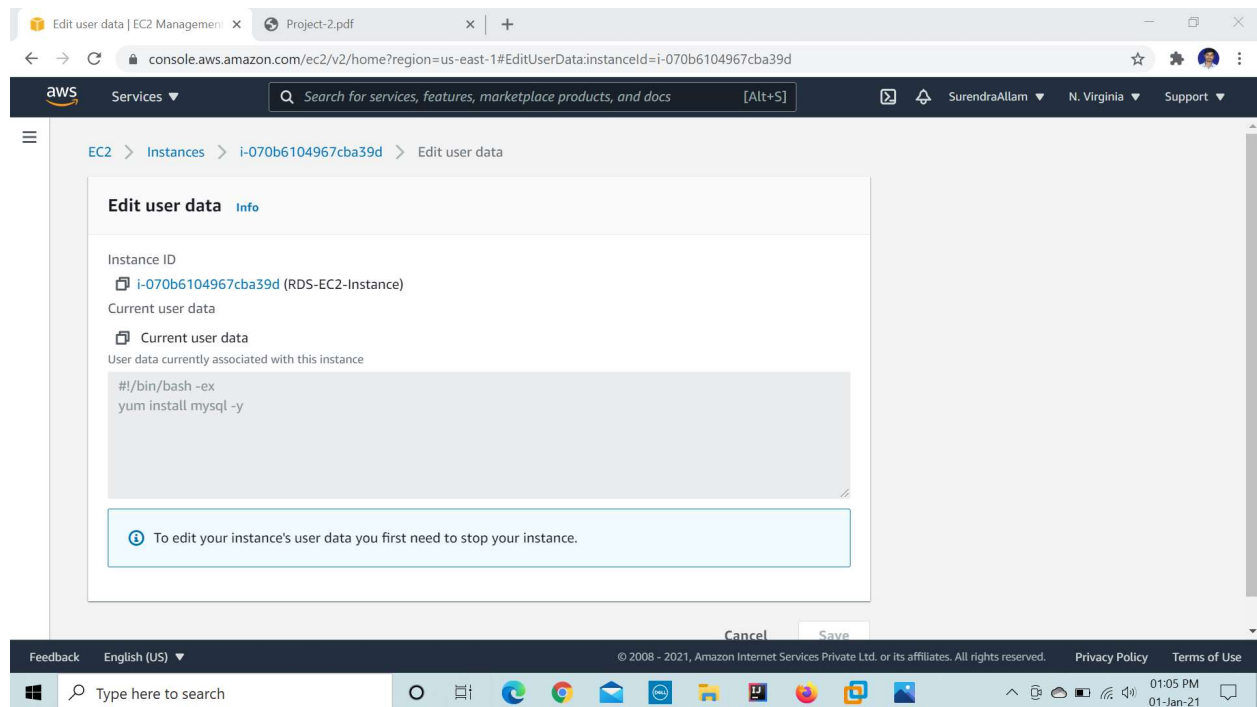
Instance ID	Public IPv4 address	Private IPv4 addresses
i-070b6104967cba39d (RDS-EC2-Instance)	100.25.220.209 open address	172.31.55.188

Instance state	Public IPv4 DNS	Private IPv4 DNS
Running	ec2-100-25-220-209.compute-1.amazonaws.com open address	ip-172-31-55-188.ec2.internal

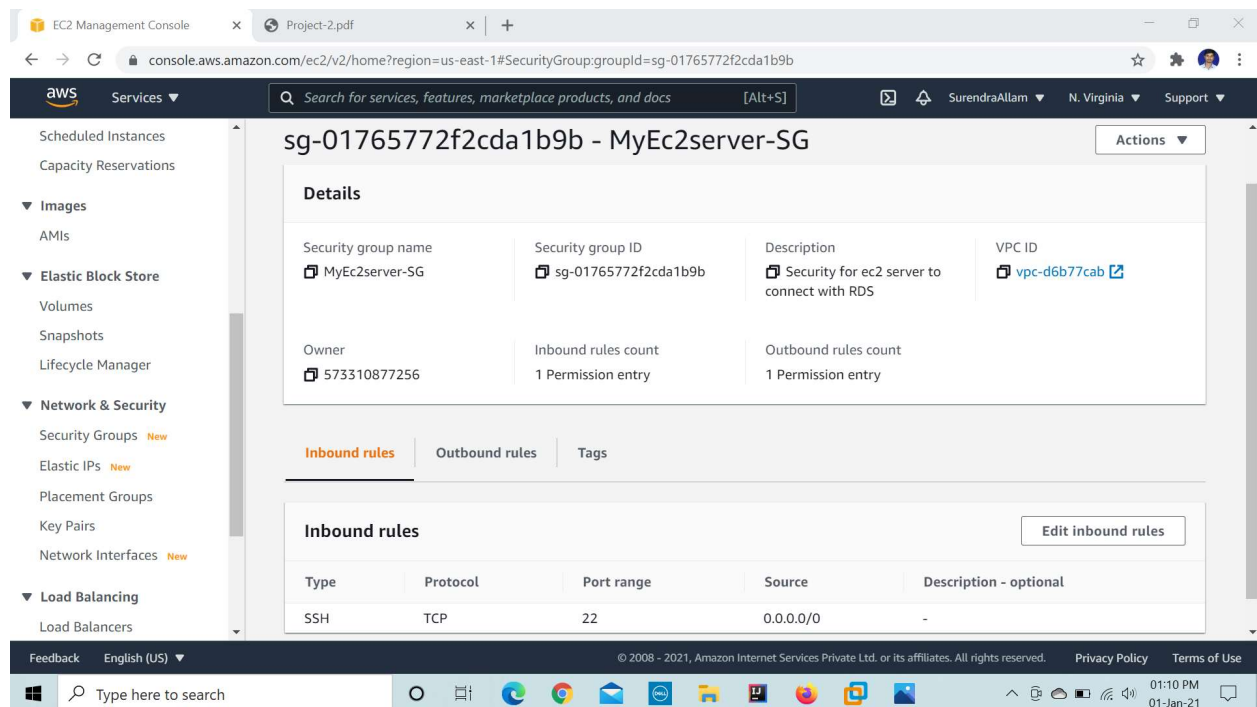
Instance type	Elastic IP addresses	VPC ID
t2.micro	-	vpc-d6b77cab

AWS Compute Optimizer finding	IAM Role	Subnet ID
Opt-in to AWS Compute Optimizer for recommendations. Learn more	-	subnet-6376b552

User Data field showing mysql installation.



2. Create a Security Group for EC2 instance



3. Create a Security Group for RDS instance

The screenshot shows the AWS Management Console interface. The left sidebar contains navigation links for various services. The main content area displays the details for a Security Group named 'rds-maz-SG' with ID 'sg-07069b9d07f7a65be'. The details include the security group name, ID, description ('Security group for RDS Aurora'), VPC ID ('vpc-d6b77cab'), owner ('573310877256'), inbound rules count ('1 Permission entry'), and outbound rules count ('1 Permission entry'). Below the details, there are tabs for 'Inbound rules', 'Outbound rules', and 'Tags'. The 'Inbound rules' tab is active, showing a table with one rule for MySQL/Aurora on TCP port 3306 from source 0.0.0.0/0.

Type	Protocol	Port range	Source	Description - optional
MYSQL/Aurora	TCP	3306	0.0.0.0/0	-

4. Create an Amazon Aurora database with Multi-AZ enabled

The screenshot shows the AWS Management Console interface for the Amazon RDS service. The left sidebar contains navigation links for various RDS features. The main content area displays the details for an Amazon Aurora database cluster named 'myauroracluster'. The details include the DB identifier, role, engine (Aurora MySQL), region & AZ (us-east-1), and size (2 instance). Below the details, there are tabs for 'Connectivity & security', 'Monitoring', 'Logs & events', 'Configuration', 'Maintenance & backups', and 'Tags'. The 'Connectivity & security' tab is active, showing a table with three endpoints: 'myauroracluster' (Regional), 'myauroracluster-instance-1' (Writer), and 'myauroracluster-instance-1-us-east-1c' (Reader).

DB identifier	Role	Engine	Region & AZ	Size
myauroracluster	Regional	Aurora MySQL	us-east-1	2 instance
myauroracluster-instance-1	Writer	Aurora MySQL	us-east-1b	db.t2.sma
myauroracluster-instance-1-us-east-1c	Reader	Aurora MySQL	us-east-1c	db.t2.sma

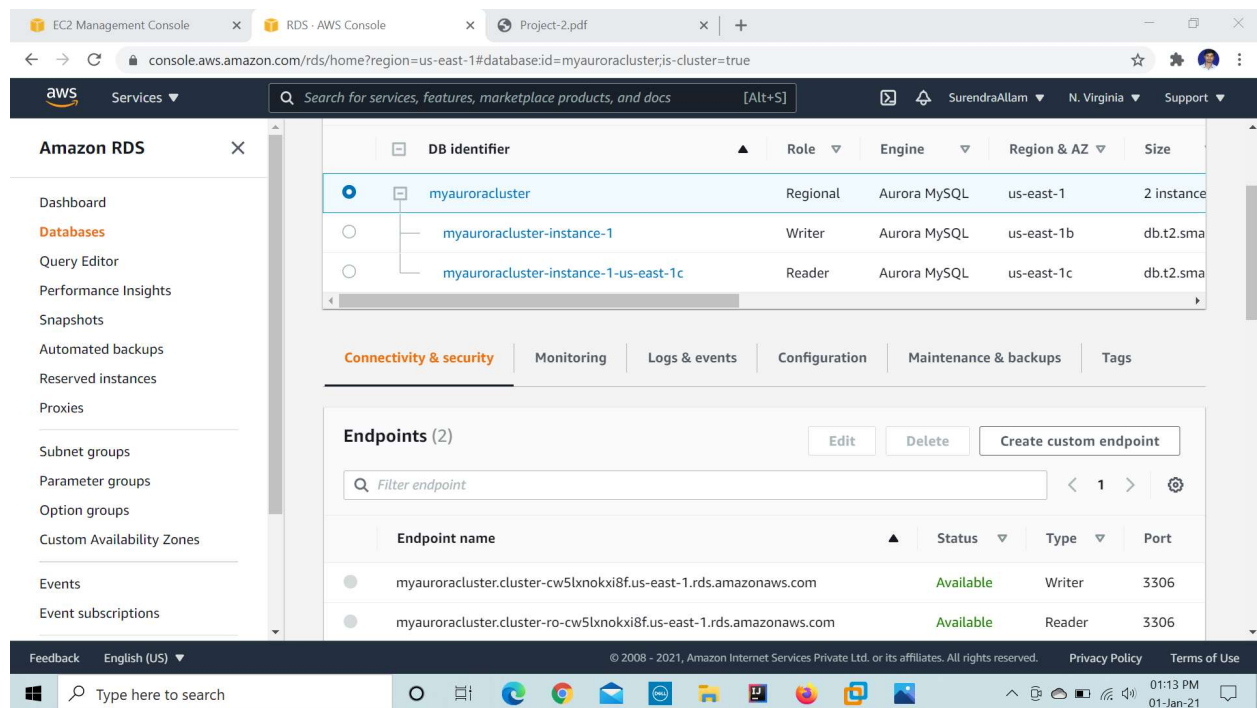
5. Connecting to the Aurora (MySQL) database on RDS

Master(Writer):

myauroracluster-instance-1.cw5lxnokxi8f.us-east-1.rds.amazonaws.com

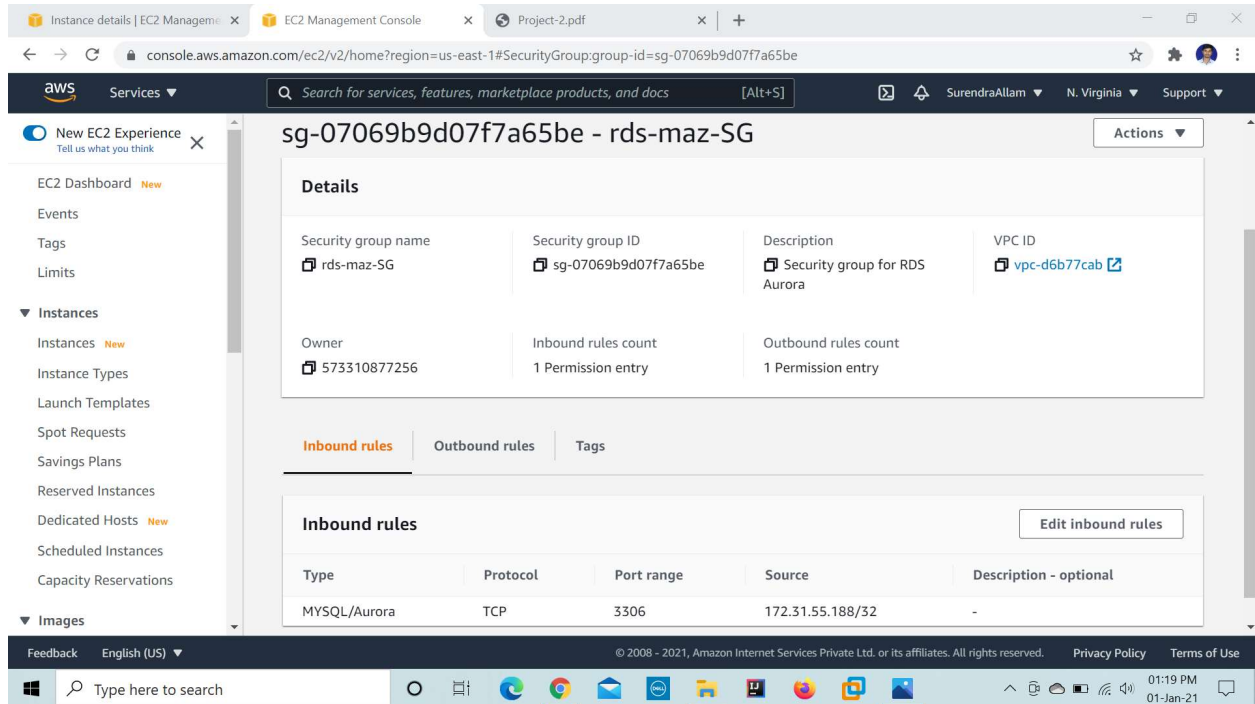
Reader:

myauroracluster-instance-1-us-east-1c.cw5lxnokxi8f.us-east-1.rds.amazonaws.com



6. Connecting the EC2 Server to RDS:

In writer security group change inbound rule under source : delete any pre-populated IP Address and enter the Private IP of your MyRdsEc2server EC2 instance with CIDR /32 (EC2 instance Private IP).



7. Execute Database Operations via SSH

commands:

1. `sudo -s`
2. Syntax: `mysql -h <Hostname> -u <Username> -p`
3. Hostname: Master(writer)'s endpoint
Ex: `myauroracluster-instance-1.cw5lxnokxi8f.us-east-1.rds.amazonaws.com`
4. Username: `labsAdmin`
5. Password: `labs123`
6. `show databases;`
7. `create database aurora_db;`
8. `use auroro_db;`
9. `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));`
10. `INSERT INTO students(subject_name, teacher) VALUES ('English', 'John Taylor');`
11. `select * from students;`
12. `exit`

```
Connect to instance | EC2 Manag x i-070b6104967cba39d (RDS-EC2 x RDS - AWS Console x Project-2.pdf x +
console.aws.amazon.com/ec2/v2/connect/ec2-user/i-070b6104967cba39d
Amazon Linux 2 AMI
https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-172-31-55-188 ~]$ sudo -s
[root@ip-172-31-55-188 ec2-user]# mysql -h myauroracluster-instance-1.cw5lxnokxi8f.us-east-1.rds.amazonaws.com -u labsAdmin -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 20
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 |
| mysql |
| performance_schema |
| sys |
| whizlabsrds |
+-----+
5 rows in set (0.00 sec)
```

i-070b6104967cba39d (RDS-EC2-Instance)

Public IPs: 100.25.220.209 Private IPs: 172.31.55.188



```
Connect to instance | EC2 Manag x i-070b6104967cba39d (RDS-EC2 x Project-2.pdf x +
console.aws.amazon.com/ec2/v2/connect/ec2-user/i-070b6104967cba39d
| subject_id | subject_name | teacher | start_date | lesson |
+-----+
| 1 | English | John Taylor | NULL | NULL |
+-----+
1 row in set (0.01 sec)

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

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

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

MySQL [aurora_db]> select * from students;
+-----+
| subject_id | subject_name | teacher | start_date | lesson |
+-----+
| 1 | English | John Taylor | NULL | NULL |
| 2 | Science | Mary Smith | NULL | NULL |
| 3 | Maths | Ted Miller | NULL | NULL |
| 4 | Arts | Suzan Carpenter | NULL | NULL |
+-----+
4 rows in set (0.01 sec)

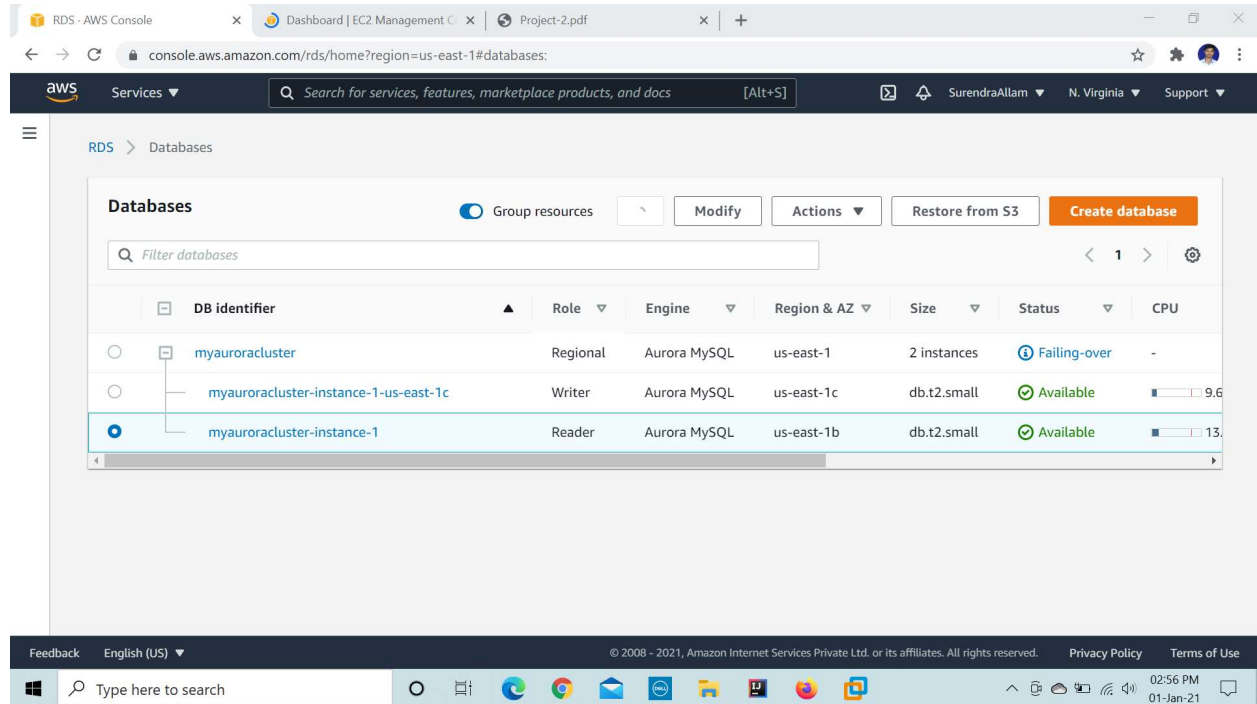
MySQL [aurora_db]>
```

i-070b6104967cba39d (RDS-EC2-Instance)

Public IPs: 100.25.220.209 Private IPs: 172.31.55.188



8. Forcing a Failover to Test Multi-AZ



9. Testing the Failover Condition

1. Now connect to RDS with new Master endpoint

Commands:

1. show databases;
2. use auroro_db;


```
Connect to instance | EC2 Manag x i-070b6104967cba39d (RDS-EC2 x Project-2.pdf x +
console.aws.amazon.com/ec2/v2/connect/ec2-user/i-070b6104967cba39d
[ec2-user@ip-172-31-55-188 ~]$ sudo -s
[root@ip-172-31-55-188 ec2-user]# mysql -h myauroracluster-instance-1-us-east-1c.cw5lxnokxi8f.us-east-1.rds.amazonaws.com -u labsAdmin -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
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 |
| aurora_db |
| mysql |
| performance_schema |
| sys |
| whizlabsrds |
+-----+
6 rows in set (0.00 sec)

MySQL [(none)]> use aurora_db;
Reading table information for completion of table and column names
```

i-070b6104967cba39d (RDS-EC2-Instance)

Public IPs: 100.25.220.209 Private IPs: 172.31.55.188



3. show tables;

4. select * from students;

```
Connect to instance | EC2 Manag x i-070b6104967cba39d (RDS-EC2 x Project-2.pdf x +
console.aws.amazon.com/ec2/v2/connect/ec2-user/i-070b6104967cba39d
MySQL [(none)]> use aurora_db;
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 [aurora_db]> show tables;
+-----+
| Tables_in_aurora_db |
+-----+
| students |
+-----+
1 row in set (0.00 sec)

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

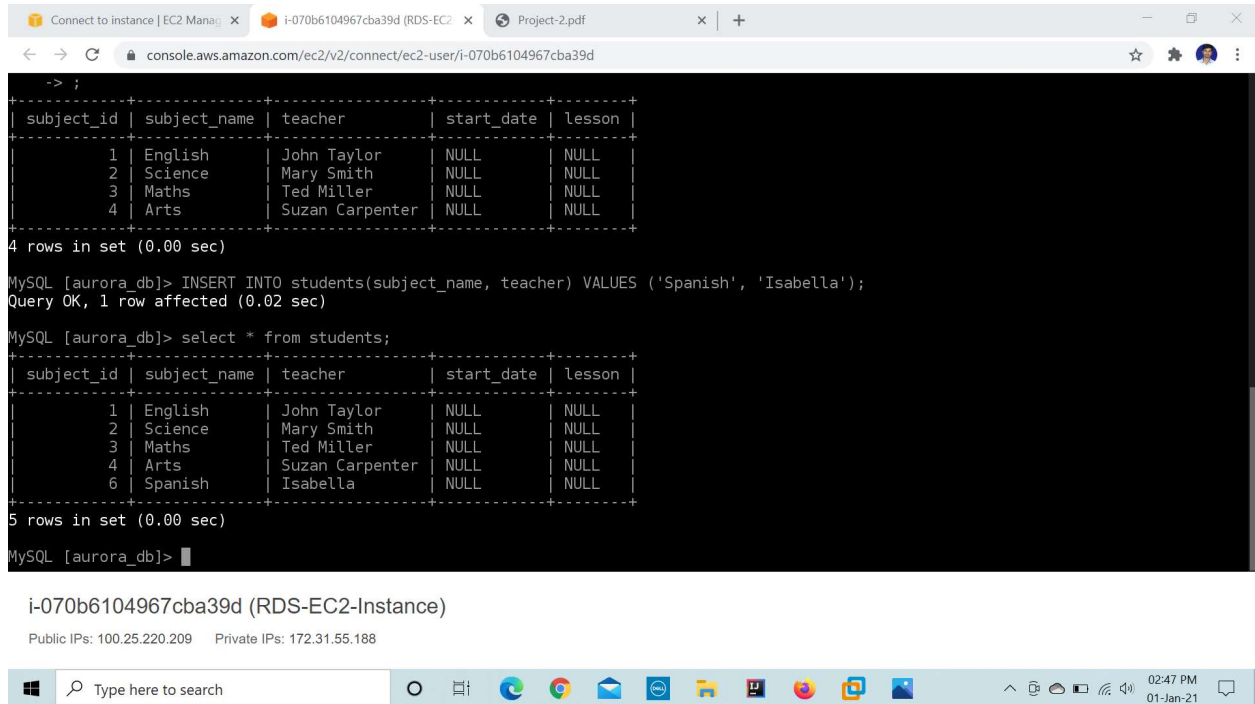
MySQL [aurora_db]> █
```

i-070b6104967cba39d (RDS-EC2-Instance)

Public IPs: 100.25.220.209 Private IPs: 172.31.55.188



5. INSERT INTO students(subject_name, teacher) VALUES ('Spanish', 'Isabella');
6. select * from students;



The screenshot shows a terminal window titled "i-070b6104967cba39d (RDS-EC2)" with a browser address bar showing "console.aws.amazon.com/ec2/v2/connect/ec2-user/i-070b6104967cba39d". The terminal displays the following MySQL commands and results:

```
--> ;
```

subject_id	subject_name	teacher	start_date	lesson
1	English	John Taylor	NULL	NULL
2	Science	Mary Smith	NULL	NULL
3	Maths	Ted Miller	NULL	NULL
4	Arts	Suzan Carpenter	NULL	NULL

4 rows in set (0.00 sec)

```
MySQL [aurora_db]> INSERT INTO students(subject_name, teacher) VALUES ('Spanish', 'Isabella');
Query OK, 1 row affected (0.02 sec)
```

```
MySQL [aurora_db]> select * from students;
```

subject_id	subject_name	teacher	start_date	lesson
1	English	John Taylor	NULL	NULL
2	Science	Mary Smith	NULL	NULL
3	Maths	Ted Miller	NULL	NULL
4	Arts	Suzan Carpenter	NULL	NULL
6	Spanish	Isabella	NULL	NULL

5 rows in set (0.00 sec)

```
MySQL [aurora_db]>
```

i-070b6104967cba39d (RDS-EC2-Instance)

Public IPs: 100.25.220.209 Private IPs: 172.31.55.188

The bottom of the image shows a Windows taskbar with various application icons and a system clock indicating 02:47 PM on 01-Jan-21.