

AWS PROJECT 2

Deploying Amazon RDS Multi A-Z and read Replica, Stimulate Failover

Step-1: Create EC2 Instance

The screenshot shows the 'Step 3: Configure Instance Details' page of the AWS Launch Instance Wizard. The page is divided into several sections:

- Elastic Inference:** A checkbox labeled 'Add an Elastic Inference accelerator' is unchecked. Below it, a link says 'Additional charges apply.'
- Credit specification:** A dropdown menu is set to 'Unlimited'. Below it, a link says 'Additional charges may apply.'
- File systems:** Two buttons are present: 'Add file system' and 'Create new file system'.
- Advanced Details:** This section is expanded and contains several settings:
 - Enclave:** A checkbox labeled 'Enable' is unchecked.
 - Metadata accessible:** A dropdown menu is set to 'Enabled'.
 - Metadata version:** A dropdown menu is set to 'V1 and V2 (token optional)'.
 - Metadata token response hop limit:** A dropdown menu is set to '1'.
 - User data:** A radio button labeled 'As text' is selected. Below it, a text area contains the following script:

```
#!/bin/bash -ex
yum install mysql -y
```

At the bottom right of the wizard, there are four buttons: 'Cancel', 'Previous', 'Review and Launch' (highlighted in blue), and 'Next: Add Storage'.

The screenshot shows the 'Instances' page in the AWS Management Console. On the left is a navigation sidebar with options like 'EC2 Dashboard', 'Events', 'Tags', 'Limits', 'Instances', 'Instance Types', 'Launch Templates', 'Spot Requests', 'Savings Plans', 'Reserved Instances', 'Dedicated Hosts', 'Scheduled Instances', 'Capacity Reservations', 'Images', 'AMIs', and 'Elastic Block Store'. The main area displays a table of instances.

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
<input type="checkbox"/>	MyRdsEC2Se...	i-0137f49592b30ab0e	Running	t2.micro	2/2 checks ...	No alarms +	us-east-1c	ec2-18-234-238...

Below the table, there is a section titled 'Select an instance above' with three icons for instance actions.

The screenshot displays the AWS Management Console for the 'Instances' section. The left sidebar shows navigation options like 'EC2 Dashboard', 'Events', 'Tags', 'Limits', 'Instances', 'Instance Types', 'Launch Templates', 'Spot Requests', 'Savings Plans', 'Reserved Instances', 'Dedicated Hosts', 'Scheduled Instances', 'Capacity Reservations', 'Images', 'AMIs', 'Elastic Block Store', and 'Volumes'. The main content area shows a list of instances with columns for Name, Instance ID, Instance state, Instance type, Status check, Alarm status, Availability Zone, and Public IPv4 DNS. The instance 'MyRdsEC2Server' (i-0137f49592b30ab0e) is highlighted. Below the list, the 'Instance: i-0137f49592b30ab0e (MyRdsEC2Server)' details are shown, including the Instance ID, Instance state (Running), Instance type (t2.micro), Public IPv4 address (18.234.238.157), Public IPv4 DNS (ec2-18-234-238-157.compute-1.amazonaws.com), Private IPv4 addresses (172.31.28.41), Private IPv4 DNS (ip-172-31-28-41.ec2.internal), Elastic IP addresses, and VPC ID (vpc-92ca0aef).

Step-2: Create Security group for EC2 Instances

The screenshot displays the AWS Management Console for the 'Security Groups' section. The left sidebar shows navigation options like 'AMIs', 'Elastic Block Store', 'Volumes', 'Snapshots', 'Lifecycle Manager', 'Network & Security', 'Security Groups', 'Elastic IPs', 'Placement Groups', 'Key Pairs', 'Network Interfaces', 'Load Balancing', 'Load Balancers', 'Target Groups', 'Auto Scaling', 'Launch Configurations', and 'Auto Scaling Groups'. The main content area shows the details for the security group 'sg-02fc68167e590bf8e - MyEC2Server-SG'. The details section includes the Security group name (MyEC2Server-SG), Security group ID (sg-02fc68167e590bf8e), Description (Security for ec2 server to connect with RDS), VPC ID (vpc-92ca0aef), Owner (304865234293), Inbound rules count (2 Permission entries), and Outbound rules count (1 Permission entry). Below the details, the 'Inbound rules' section is shown, displaying a table with two rules for SSH access on port 22.

Type	Protocol	Port range	Source	Description - optional
SSH	TCP	22	0.0.0.0/0	-
SSH	TCP	22	::/0	-

Step-3: Create Security group for RDS Instances

The screenshot shows the 'Create security group' page in the AWS Management Console. The page title is 'Create security group' with an 'Info' link. Below the title is a descriptive sentence: 'A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.'

The 'Basic details' section contains three input fields: 'Security group name' with the value 'rds-maz-SG', 'Description' with the value 'Security group for RDS Aurora', and 'VPC' with a dropdown menu showing 'vpc-92ca0aef'. Below these fields is a note: 'Name cannot be edited after creation.'

The 'Inbound rules' section is partially visible, showing a table with columns: 'Type', 'Protocol', 'Port range', 'Source', and 'Description - optional'. The first row has the values: 'MySQL/Aurora', 'TCP', '3306', 'Custom', and an empty description field. The 'Source' field has a dropdown menu set to 'Custom' and a text input field containing '0.0.0.0/0'.

The bottom of the screenshot shows the Windows taskbar with the search bar and several application icons.

The screenshot shows the 'Security Groups' page in the AWS Management Console. The breadcrumb navigation is 'EC2 > Security Groups > sg-0d6cc19d47411893d - rds-maz-SG'. The main heading is 'sg-0d6cc19d47411893d - rds-maz-SG' with an 'Actions' dropdown menu.

The 'Details' section contains a table with the following information:

Security group name	Security group ID	Description	VPC ID
rds-maz-SG	sg-0d6cc19d47411893d	Security group for RDS Aurora	vpc-92ca0aef
Owner	Inbound rules count	Outbound rules count	
304865234293	1 Permission entry	1 Permission entry	

Below the details table are three tabs: 'Inbound rules', 'Outbound rules', and 'Tags'. The 'Inbound rules' tab is selected, showing a table with the following information:

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

The bottom of the screenshot shows the Windows taskbar with the search bar and several application icons.

EC2 Management Console

console.aws.amazon.com/ec2/v2/home?region=us-east-1#ModifyInboundSecurityGroupRules:securityGroupId=sg-0d6cc19d47411893d

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

EC2 > Security Groups > sg-0d6cc19d47411893d - rds-maz-SG > Edit inbound rules

Edit inbound rules Info

Inbound rules control the incoming traffic that's allowed to reach the instance.

Inbound rules Info

Type <small>Info</small>	Protocol <small>Info</small>	Port range <small>Info</small>	Source <small>Info</small>	Description - optional <small>Info</small>	
MySQL/Aurora	TCP	3306	Custom		Delete
			0.0.0.0/0		X
			172.31.28.41/32		X
Add rule					

NOTE: Any edits made on existing rules will result in the edited rule being deleted and a new rule created with the new details. This will cause traffic that depends on that rule to be dropped for a very brief period of time until the new rule can be created.

Cancel Preview changes Save rules

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Type here to search

EC2 Management Console

console.aws.amazon.com/ec2/v2/home?region=us-east-1#SecurityGroup:groupId=sg-0d6cc19d47411893d

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

EC2 > Security Groups > sg-0d6cc19d47411893d - rds-maz-SG

sg-0d6cc19d47411893d - rds-maz-SG

Actions

Details

Security group name	Security group ID	Description	VPC ID
rds-maz-SG	sg-0d6cc19d47411893d	Security group for RDS Aurora	vpc-92ca0aef
Owner	Inbound rules count	Outbound rules count	
304865234293	1 Permission entry	1 Permission entry	

Inbound rules Outbound rules Tags

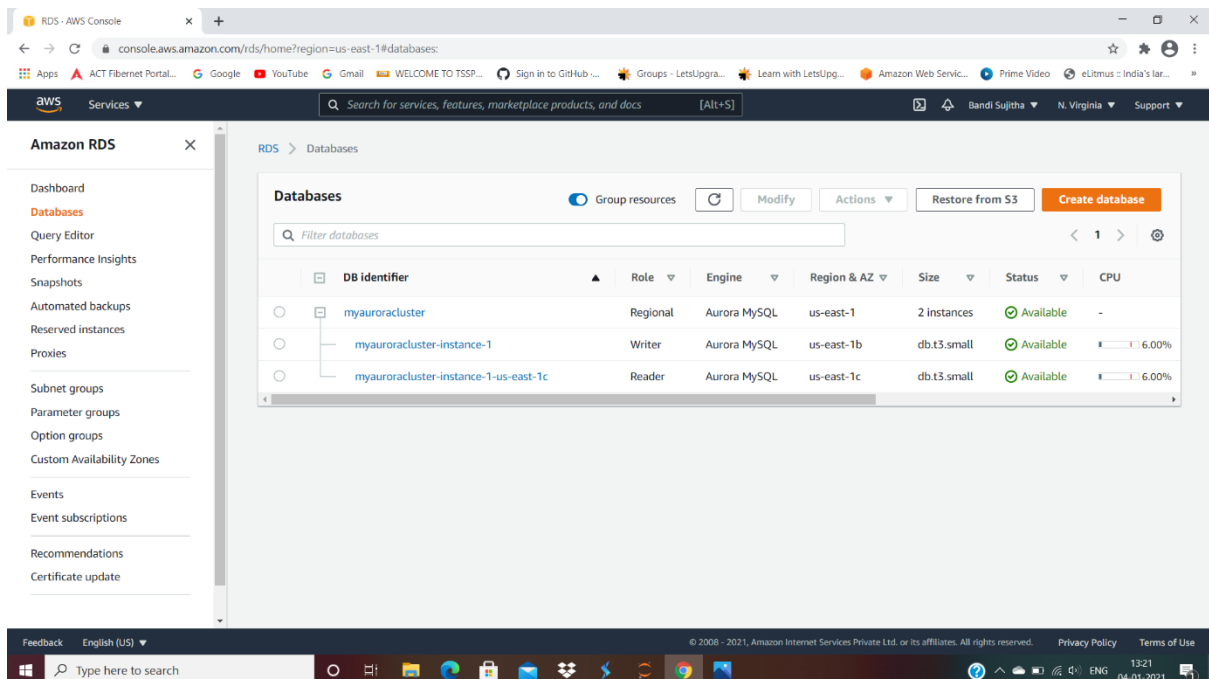
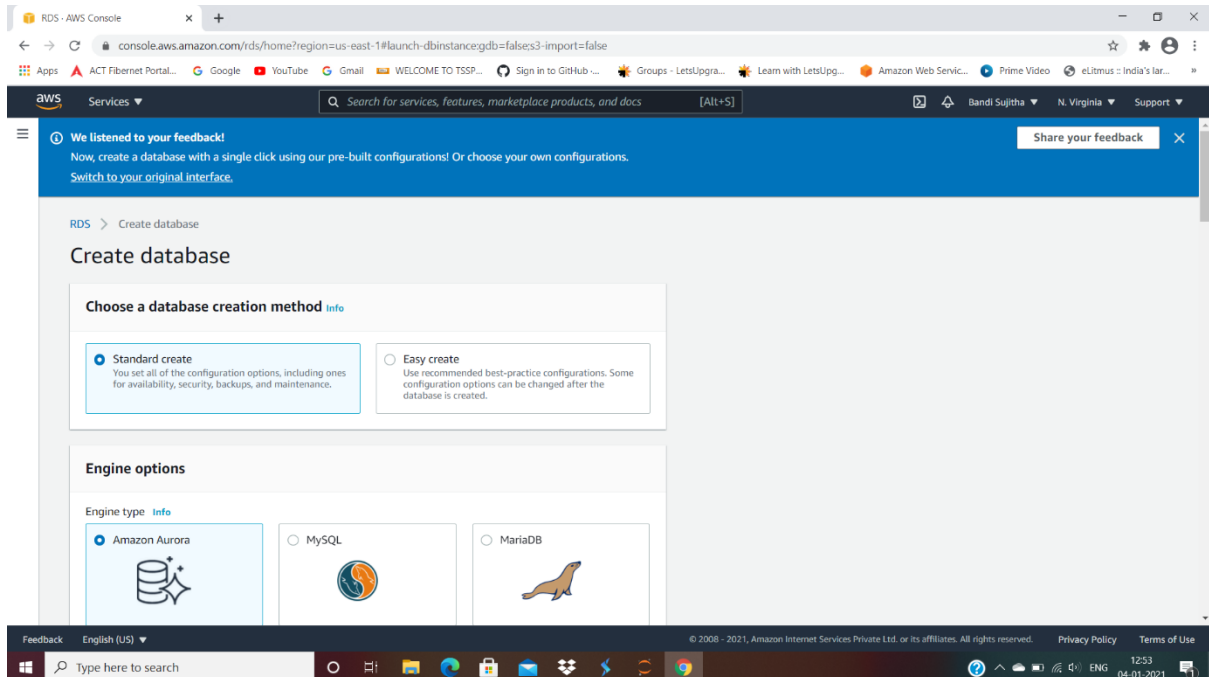
Inbound rules Edit inbound rules

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

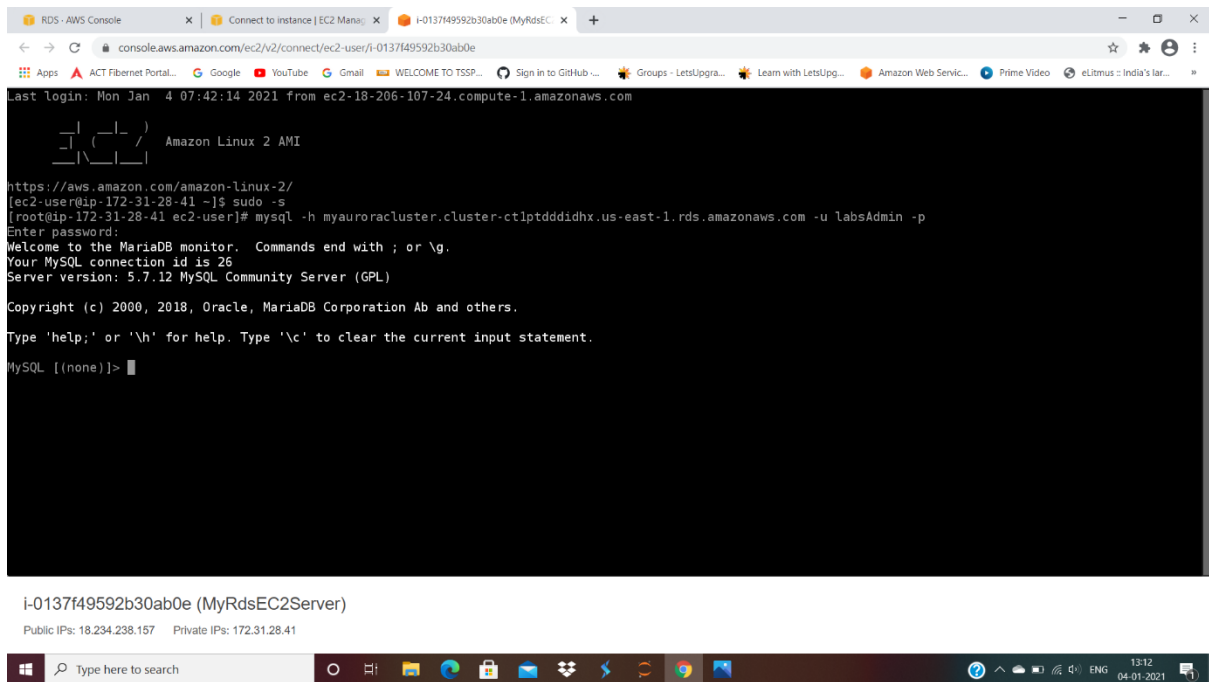
Feedback English (US) © 2008 - 2021, Amazon Internet Services Private Ltd. or its affiliates. All rights reserved. Privacy Policy Terms of Use

Type here to search

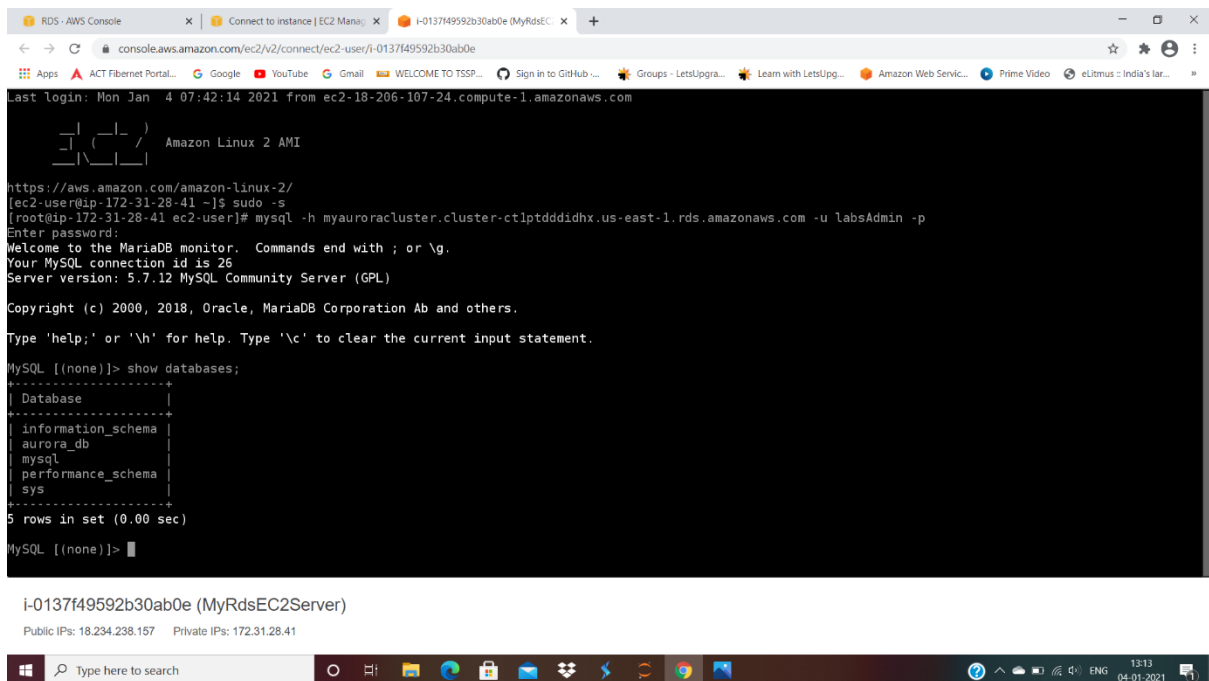
Step-4: Create Amazon Aurora databases with Multi A-Z Enable



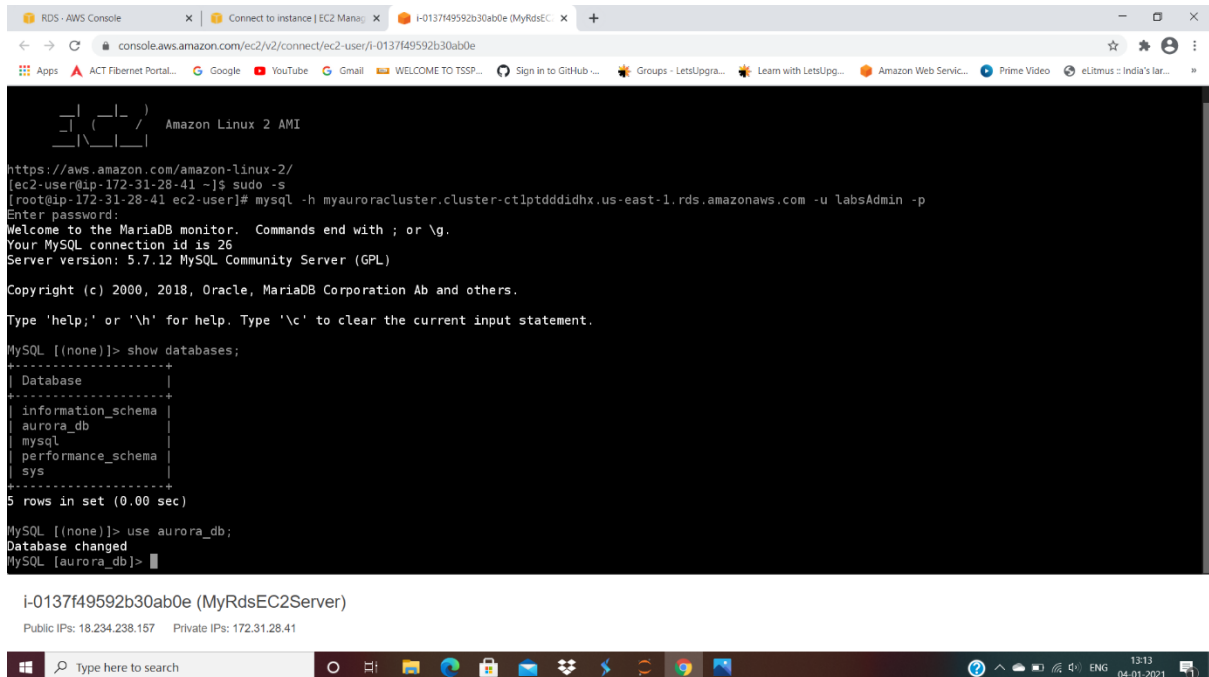
Step-5: Connect to the RDS database instance (using its endpoint) from your local machine.



```
show databases;
```



use auroro db;



```
https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-172-31-28-41 ~]$ sudo -s
[root@ip-172-31-28-41 ec2-user]# mysql -h myauroracluster.cluster-ctlptddidhx.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 26
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.

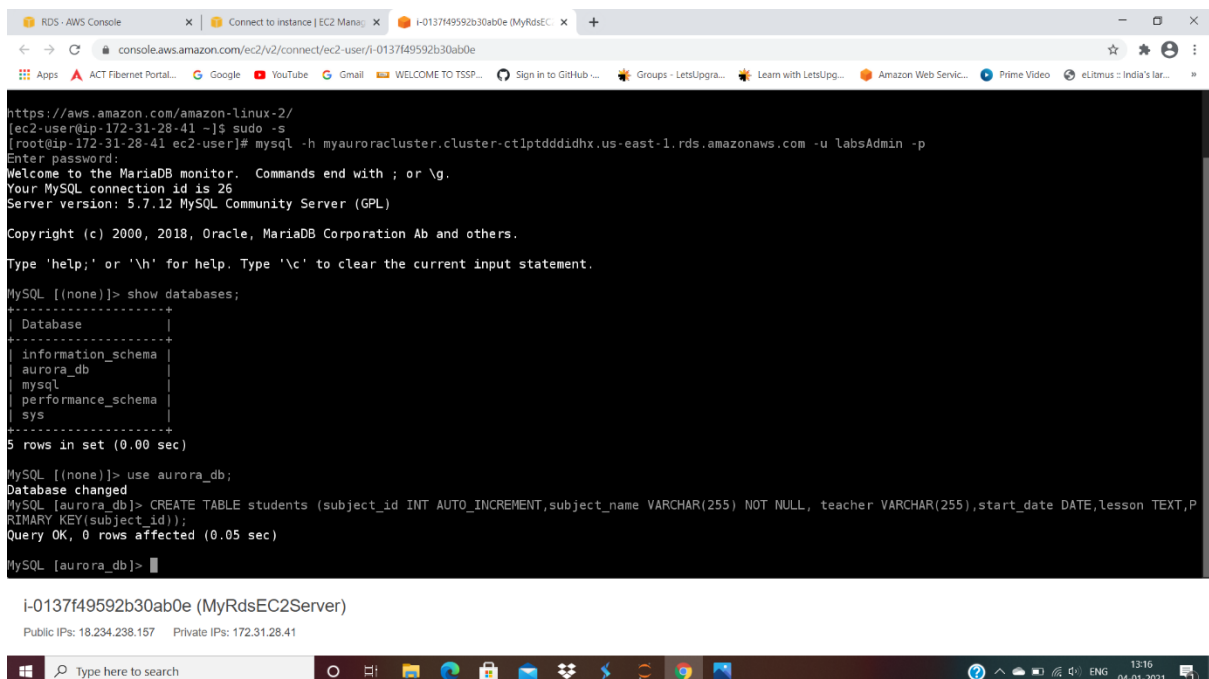
MySQL [(none)]> show databases;
+-----+
| Database |
+-----+
| information_schema |
| aurora_db |
| mysql |
| performance_schema |
| sys |
+-----+
5 rows in set (0.00 sec)

MySQL [(none)]> use aurora_db;
Database changed
MySQL [aurora_db]>
```

i-0137f49592b30ab0e (MyRdsEC2Server)

Public IPs: 18.234.238.157 Private IPs: 172.31.28.41

Step-6 :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));



```
https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-172-31-28-41 ~]$ sudo -s
[root@ip-172-31-28-41 ec2-user]# mysql -h myauroracluster.cluster-ctlptddidhx.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 26
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 |
+-----+
5 rows in set (0.00 sec)

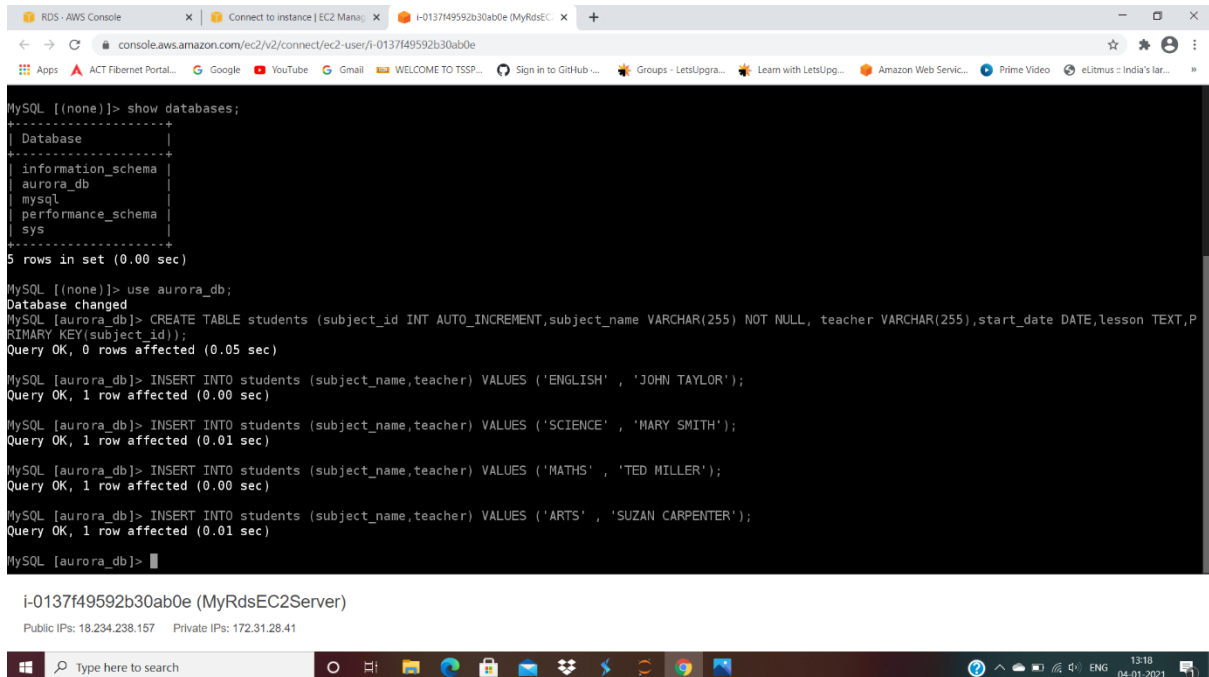
MySQL [(none)]> use aurora_db;
Database changed
MySQL [aurora_db]> CREATE TABLE students (subject_id INT AUTO_INCREMENT,subject_name VARCHAR(255) NOT NULL, teacher VARCHAR(255),start_date DATE,lesson TEXT,P
RIMARY KEY(subject_id));
Query OK, 0 rows affected (0.05 sec)

MySQL [aurora_db]>
```

i-0137f49592b30ab0e (MyRdsEC2Server)

Public IPs: 18.234.238.157 Private IPs: 172.31.28.41

Step-7: Insert data into the table:



The screenshot shows the AWS RDS console with a terminal window open for an Amazon Aurora MySQL instance. The terminal displays the following commands and output:

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

MySQL [(none)]> use aurora_db;
Database changed
MySQL [aurora_db]> 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 (0.05 sec)

MySQL [aurora_db]> INSERT INTO students (subject_name,teacher) VALUES ('ENGLISH' , 'JOHN TAYLOR');
Query OK, 1 row affected (0.00 sec)

MySQL [aurora_db]> INSERT INTO students (subject_name,teacher) VALUES ('SCIENCE' , 'MARY SMITH');
Query OK, 1 row affected (0.01 sec)

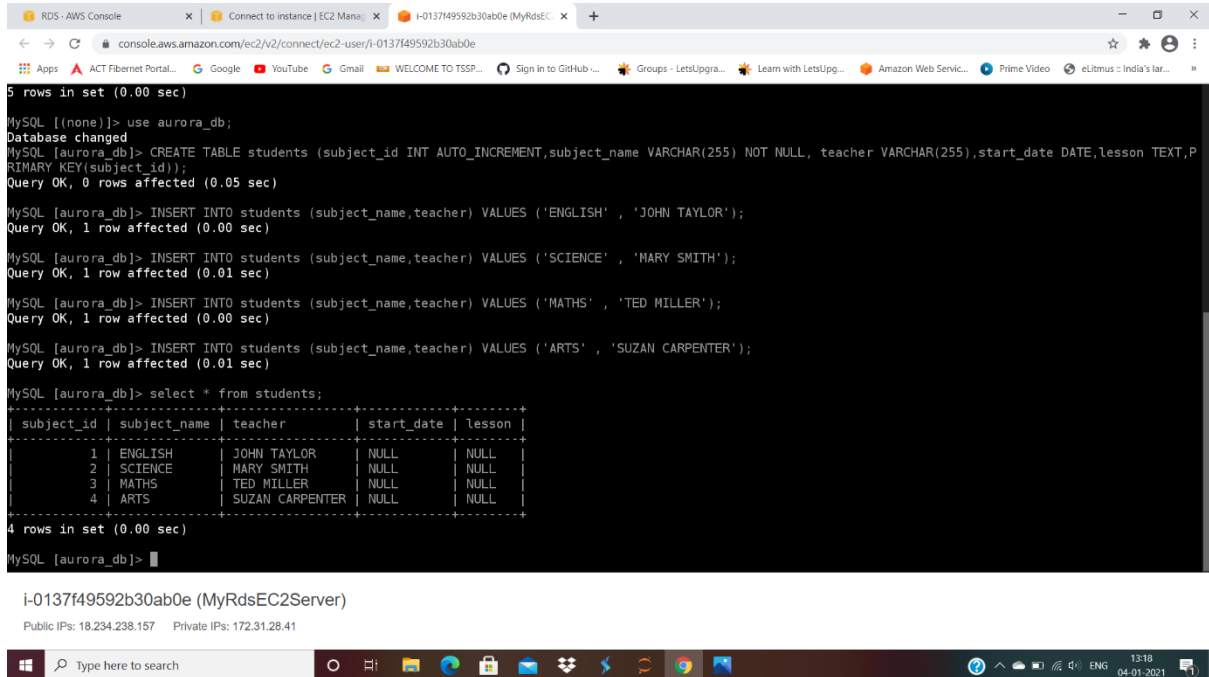
MySQL [aurora_db]> INSERT INTO students (subject_name,teacher) VALUES ('MATHS' , 'TED MILLER');
Query OK, 1 row affected (0.00 sec)

MySQL [aurora_db]> INSERT INTO students (subject_name,teacher) VALUES ('ARTS' , 'SUZAN CARPENTER');
Query OK, 1 row affected (0.01 sec)

MySQL [aurora_db]>
```

Below the terminal, the instance details for `i-0137f49592b30ab0e (MyRdsEC2Server)` are shown, including Public IPs: 18.234.238.157 and Private IPs: 172.31.28.41.

select * from students;



The screenshot shows the AWS RDS console with a terminal window open for the same Amazon Aurora MySQL instance. The terminal displays the following commands and output:

```
MySQL [(none)]> use aurora_db;
Database changed
MySQL [aurora_db]> 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 (0.05 sec)

MySQL [aurora_db]> INSERT INTO students (subject_name,teacher) VALUES ('ENGLISH' , 'JOHN TAYLOR');
Query OK, 1 row affected (0.00 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 (0.00 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 (0.00 sec)

MySQL [aurora_db]>
```

Below the terminal, the instance details for `i-0137f49592b30ab0e (MyRdsEC2Server)` are shown, including Public IPs: 18.234.238.157 and Private IPs: 172.31.28.41.

Step-8: Testing the Failover Condition

The screenshot shows the Amazon RDS console interface. The left sidebar contains navigation links: Dashboard, Databases, Query Editor, Performance Insights, Snapshots, Automated backups, Reserved instances, Proxies, Subnet groups, Parameter groups, Option groups, Custom Availability Zones, Events, Event subscriptions, Recommendations, and Certificate update. The main content area displays the details for the database instance **myauroracluster-instance-1-us-east-1c**. The instance is an Aurora MySQL instance, currently in the **Available** state. The table below summarizes the instance details:

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

Below the table, the **Connectivity & security** tab is selected, showing details for the endpoint, networking, and security groups.

The screenshot shows a terminal window with the following output:

```
Amazon Linux 2 AMI
https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-172-31-28-41 ~]$ sudo -s
[root@ip-172-31-28-41 ec2-user]# mysql -h myauroracluster-instance-1-us-east-1c.ct1ptdddidx.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 13
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 |
+-----+
5 rows in set (0.01 sec)

MySQL [(none)]>
```

Below the terminal output, the instance ID **i-0137f49592b30ab0e (MyRdsEC2Server)** is displayed, along with its public and private IP addresses.

