Assignment 5 – RDS

ACCEPTANCE CRITERIA – Include the followings in the PDF:

- A record with your name and student id.
- DB SG inbound rule.
- One screenshot for the process of creating a database instance.
- One screenshot for running SQL commands from the primary instance.

Amazon Relation Database Server (RDS) is so expensive service. Delete it once you are done assignments.

General advice, please don't practice IaaS services (such as RDS, EC2, Load Balancers, NAT Gateway in VPC, and data analytical services with servers) that require you to run instances (or servers).Instead, use serverless services which will not cost.

Task 1. Create an Aurora Database and connect to it from an EC2

1. Create database SG – Allow inbound access from the EC2
    a. Go to EC2 -> In the sidebar, there are Security groups, click on that -> Click Create Security Group
    b. Give name as MyRdsSg -> give description -> select your VPC
    c. In the inbound rules section, click on add rule
    d. Click on Type -> Look for MYSQL/Aurora
    e. Source -> select the SG of the web server that accesses the database -> Create Security Group
2. Create an RDS database. Highly encourage you to play with the creation wizard and review all fields.
    a. Templates -> select dev/test.
    b. Enter the username and password for the database.
    c. DB instance class -> Select Burstable classes -> Select the smallest.
    d. Availability & durability -> Create an Aurora Replica.
    e. Monitoring -> expand Additional configuration -> uncheck "**Enable Enhanced monitoring**".
3. SSH into the instance and install mysql client on EC2

```
sudo dnf install mariadb105 -y
```

4. Connect to the RDS instance, both primary or read replica.

```
mysql -h <endpointUrl> -P 3306 -u root -p
```

5. Create a table and insert some records. These queries are only for your reference. **Make up your own database, tables, and data. And include them in your PDF.**
    a. Create 2 tables with a relation
    b. Insert data to those 2 tables from the main instance and read-replica.
    c. Select data from both tables from the main instance and read-replica.

6. Connect to the read instance and run some queries.

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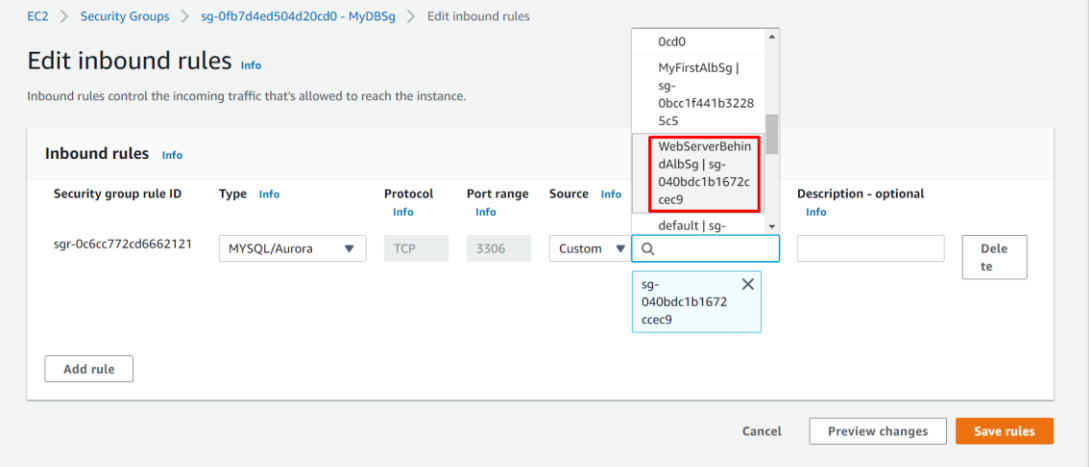
*The EC2 instance that you are using right now to connect to the DB is also known as the **Bastion** (Jump) server. A bastion host is a dedicated server that lets authorized users access a private network (such as databases, private back-end apps, Redis caching server, etc) from an external network such as the internet or your laptop.*

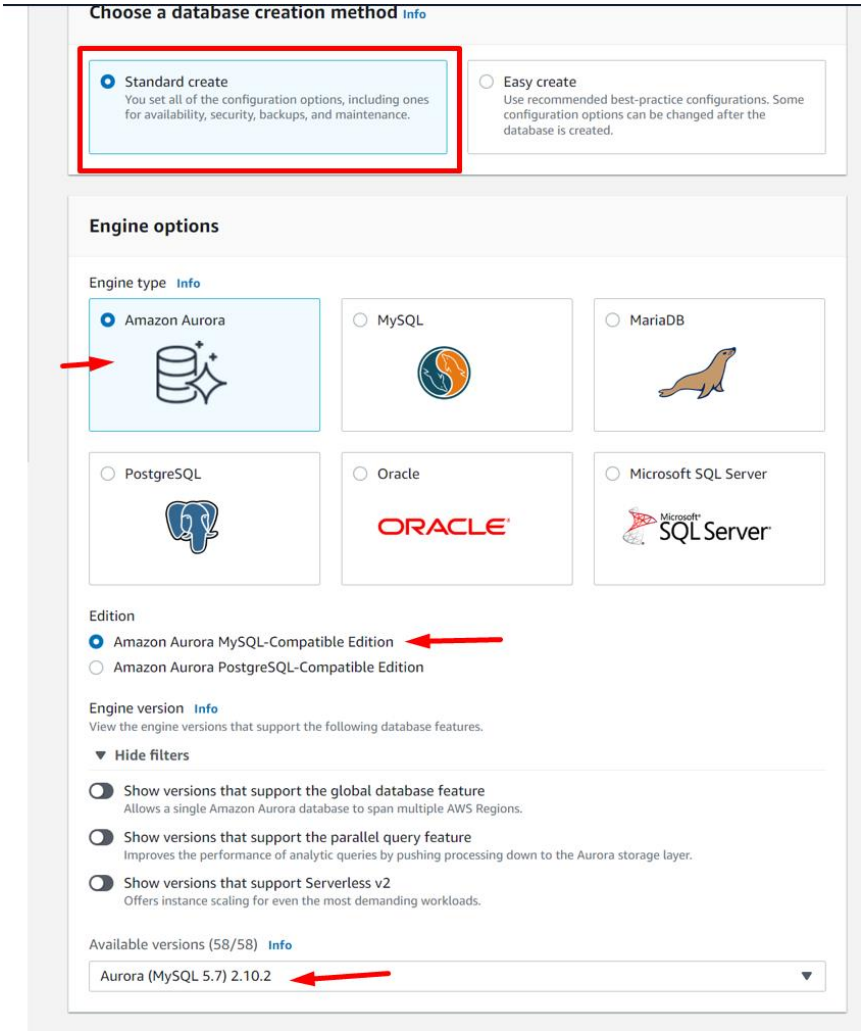
Task 2. Clean up the RDS and EC2 instances after taking screenshots. It costs huge.

Step by step instructions - RDS

Create a Security Group at first



Create a database in RDS



Templates

Choose a sample template to meet your use case.

- ○ **Production**
  Use defaults for high availability and fast, consistent performance.
- ◉ **Dev/Test**
  This instance is intended for development use outside of a production environment.

Settings

DB cluster identifier Info

Type a name for your DB cluster. The name must be unique across all DB clusters owned by your AWS account in the current AWS Region.

myDBCluster

The DB cluster identifier is case-insensitive, but is stored as all lowercase (as in "mydbcluster"). Constraints: 1 to 60 alphanumeric characters or hyphens. First character must be a letter. Can't contain two consecutive hyphens. Can't end with a hyphen.

▼ **Credentials Settings**

Master username Info

Type a login ID for the master user of your DB instance.

root

1 to 32 alphanumeric characters. First character must be a letter.

☐ **Auto generate a password**
Amazon RDS can generate a password for you, or you can specify your own password.

Master password Info

••••••••

Constraints: At least 8 printable ASCII characters. Can't contain any of the following: / (slash), '(single quote), "(double quote) and @ (at sign).

Confirm password Info

••••••••

Instance configuration

The DB instance configuration options below are limited to those supported by the engine that you selected above.

DB instance class Info

- ○ Memory optimized classes (includes r classes)
- ◉ Burstable classes (includes t classes)

db.t3.small
2 vCPUs 2 GiB RAM Network: 2,085 Mbps ▼

○ Include previous generation classes

Availability & durability

Multi-AZ deployment Info

- (●) Create an Aurora Replica or Reader node in a different AZ (recommended for scaled availability)
  Creates an Aurora Replica for fast failover and high availability.
- ( ) Don't create an Aurora Replica

Connectivity Info

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 so that the compute resource can connect to this database.

- (●) 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 compute resource
  Set up a connection to an EC2 compute resource for this database.

Virtual private cloud (VPC) Info
Choose the VPC. The VPC defines the virtual networking environment for this DB cluster.

Default VPC (vpc-01b8fb7c355b68fc8)

Only VPCs with a corresponding DB subnet group are listed.

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

DB Subnet group Info
Choose the DB subnet group. The DB subnet group defines which subnets and IP ranges the DB cluster can use in the VPC that you selected.

default-vpc-01b8fb7c355b68fc8

Public access Info

- ( ) Yes
  RDS assigns a public IP address to the cluster. Amazon EC2 instances and other resources outside of the VPC can connect to your cluster. Resources inside the VPC can also connect to the cluster. Choose one or more VPC security groups that specify which resources can connect to the cluster.
- (●) No
  RDS doesn't assign a public IP address to the cluster. Only Amazon EC2 instances and other resources inside the VPC can connect to your cluster. Choose one or more VPC security groups that specify which resources can connect to the cluster.

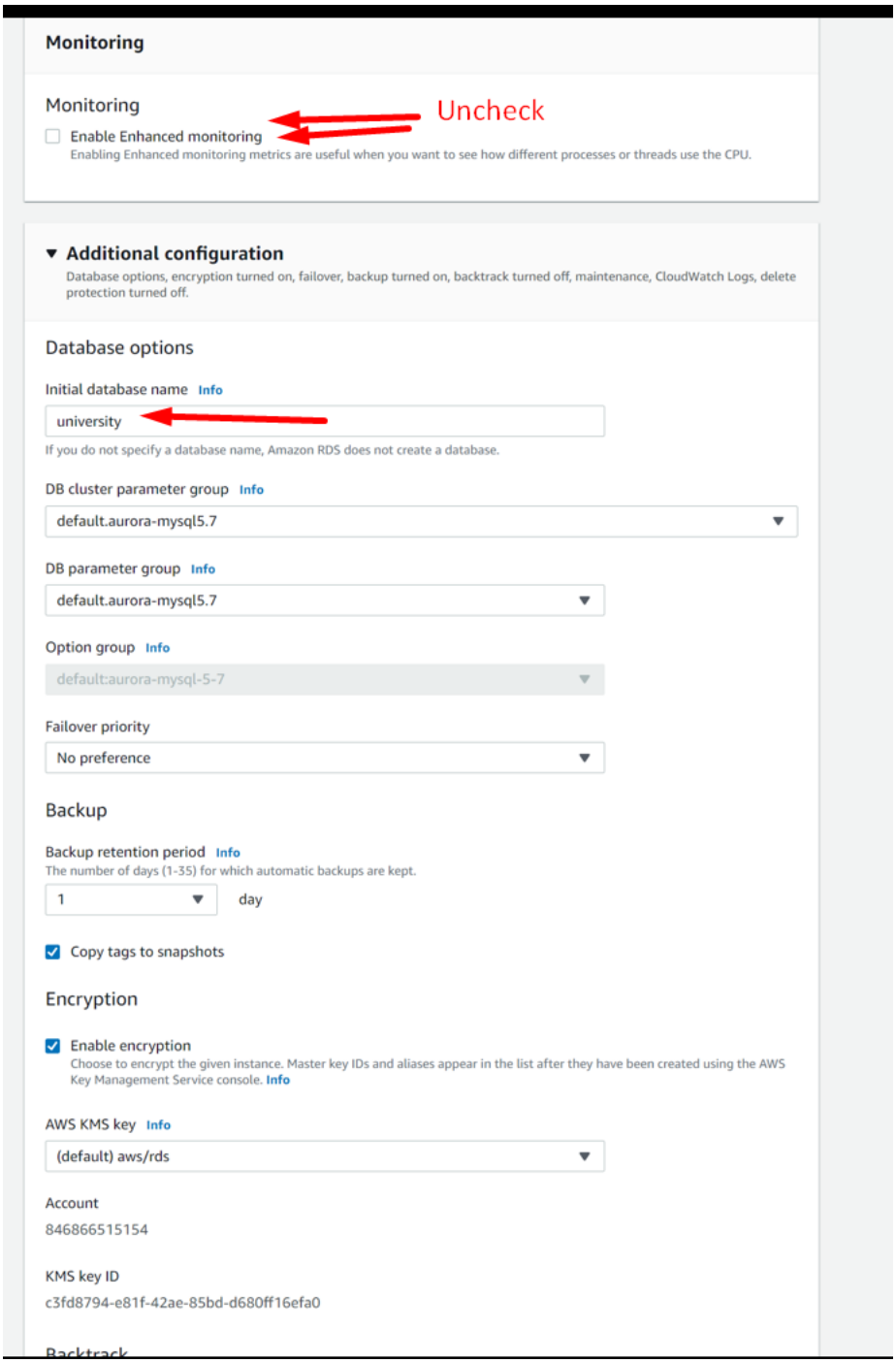
VPC security group (firewall) Info
Choose one or more VPC security groups to allow access to your database. Make sure that the security group rules allow the appropriate incoming traffic.

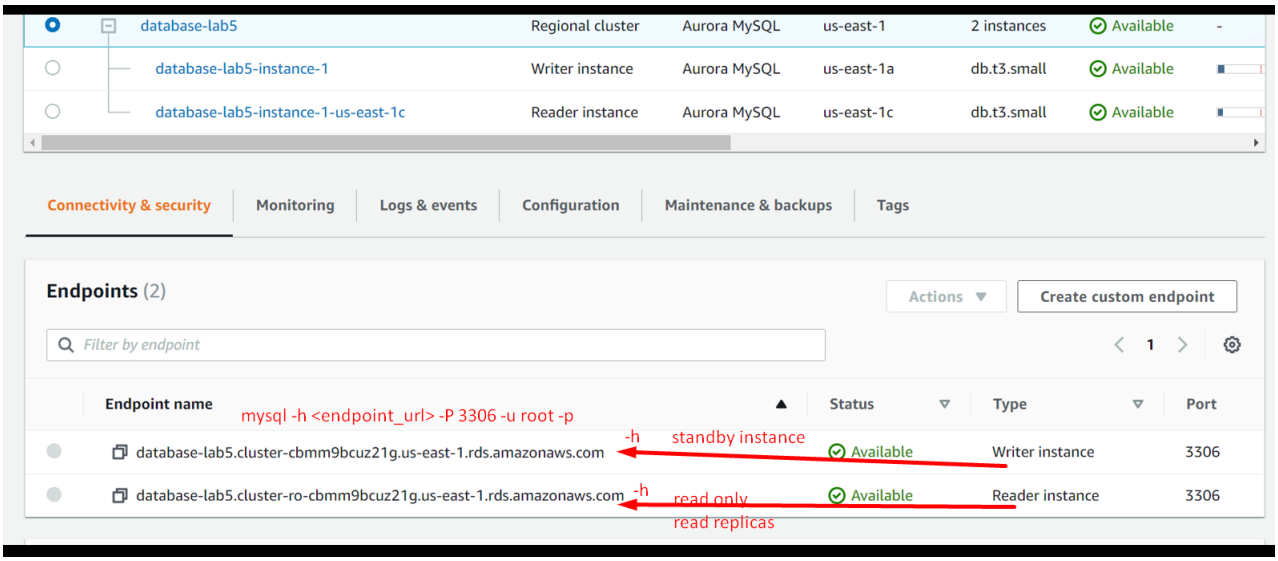
- (●) Choose existing
  Choose existing VPC security groups
- ( ) Create new
  Create new VPC security group

Existing VPC security groups

Choose one or more options

MyDBSg ✕


Monitoring
Monitoring
Uncheck
Enable Enhanced monitoring
Enabling Enhanced monitoring metrics are useful when you want to see how different processes or threads use the CPU.
Additional configuration
Database options, encryption turned on, failover, backup turned on, backtrack turned off, maintenance, CloudWatch Logs, delete protection turned off.
Database options
Initial database name Info
university
If you do not specify a database name, Amazon RDS does not create a database.
DB cluster parameter group Info
default.aurora-mysql5.7
DB parameter group Info
default.aurora-mysql5.7
Option group Info
default:aurora-mysql-5-7
Failover priority
No preference
Backup
Backup retention period Info
The number of days (1-35) for which automatic backups are kept.
1
day
Copy tags to snapshots
Encryption
Enable encryption
Choose to encrypt the given instance. Master key IDs and aliases appear in the list after they have been created using the AWS Key Management Service console. Info
AWS KMS key Info
(default) aws/rds
Account
846866515154
KMS key ID
c3fd8794-e81f-42ae-85bd-d680ff16efa0
Backtrack



Database created

Install mysql client on EC2

mysql -h myfirstclouddb-instance-1.cqzw6byf7zkj.us-east-1.rds.amazonaws.com -P 3306 -u root -p

```
sh-4.2$ sudo -s
[root@ip-10-0-0-204 bin]# mysql -h myfirstclouddb-instance-1.cqzw6byf7zkj.us-east-1.rds.amazonaws.com -P 3306 -u root -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 17
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)]> create database cloudlabdb
    -> ;
Query OK, 1 row affected (0.03 sec)

MySQL [(none)]> show database;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version f
e 1
MySQL [(none)]> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| cloudlabdb         |
| mysql              |
| performance_schema |
| sys                |
+--------------------+
5 rows in set (0.01 sec)

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

```
MySQL [cloudlabdb]> CREATE TABLE COURSE (
    ->  COURSE_ID int,
    ->  COURSE_CODE varchar(255),
    ->  COURSE_NAME varchar(255),
    -> TEACHER_ID int
    -> );
Query OK, 0 rows affected (0.06 sec)

MySQL [cloudlabdb]> show tables;
+----------------------+
| Tables_in_cloudlabdb |
+----------------------+
| COURSE               |
| TEACHER              |
+----------------------+
2 rows in set (0.01 sec)

MySQL [cloudlabdb]> INSERT INTO TEACHER (TEACHER_ID, NAME)
    -> VALUES (1, "UNUBOLD"),
    -> (2, "ASAAD"),
    -> (3, "UMUR");
Query OK, 3 rows affected (0.02 sec)
Records: 3  Duplicates: 0  Warnings: 0

MySQL [cloudlabdb]> INSERT INTO COURSE (COURSE_ID, COURSE_CODE, COURSE_NAME, TEACHER_ID)
    -> VALUES (1, "CS516", "CLOUD COMPUTING", 1),
    -> (2, "CS568", "React", 1),
    -> (3, "CS569", "Angular", 1),
    -> (3, "CS569", "Angular", 2);
Query OK, 4 rows affected (0.01 sec)
Records: 4  Duplicates: 0  Warnings: 0
```

```
MySQL [cloudlabdb]> SELECT TEACHER.NAME, COURSE.COURSE_ID, COURSE.COURSE_NAME
    -> FROM TEACHER JOIN COURSE ON TEACHER.TEACHER_ID = COURSE.TEACHER_ID;
+---------+-----------+-----------------+
| NAME    | COURSE_ID | COURSE_NAME     |
+---------+-----------+-----------------+
| UNUBOLD |         1 | CLOUD COMPUTING |
| UNUBOLD |         2 | React           |
| UNUBOLD |         3 | Angular         |
| ASAAD   |         3 | Angular         |
+---------+-----------+-----------------+
4 rows in set (0.00 sec)
```

For the Reader Instance: