CIS 5500: Database and Information Systems

AWS RDS Handout

1. Introduction

This handout provides instructions for creating and using an RDS (Relational Database Service) instance on AWS and getting started with MySQL.

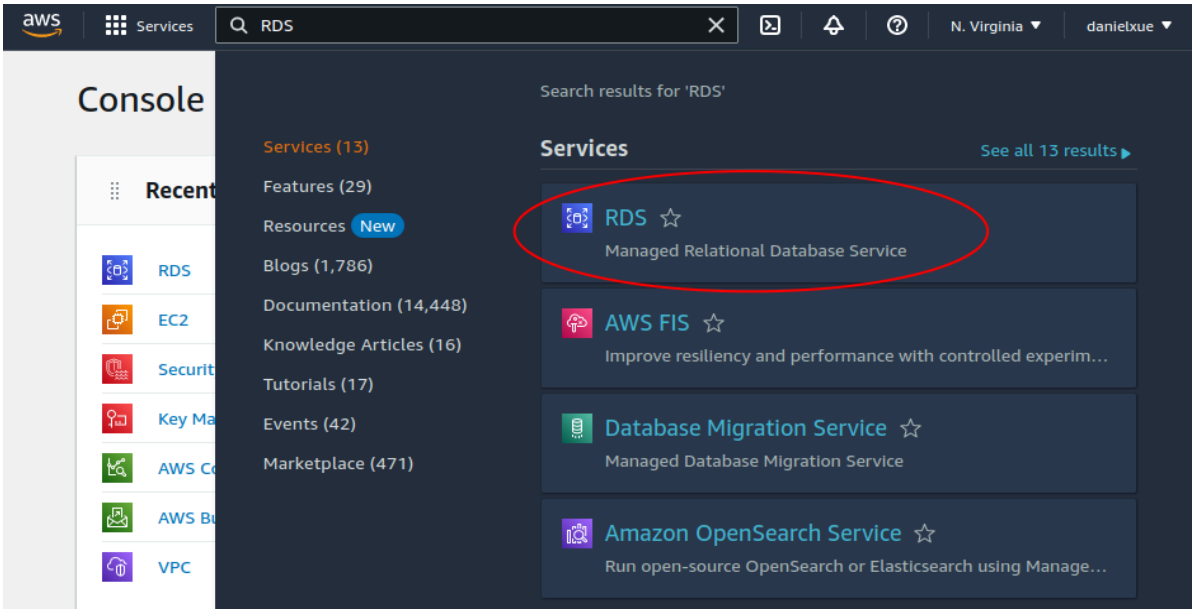
Note: This guide is meant to serve as a general reference - AWS often makes changes to the console interface, but the processes described in this document largely remain the same. You may ask a staff member for assistance in case online resources fail to help. This guide is meant for a root user AWS account, as opposed to an AWS Educate account. In case you have an AWS Educate account, you may choose to create a new account and follow this guide instead or ask a staff member for assistance.

In following this guide, you should remain within the free tier limits (you might be asked to provide payment information on AWS so you can be charged in case you exceed them), but please be sure to follow **all** setup instructions to ensure you do not exceed usage limits. You will *not* be reimbursed for any AWS expenses. Please track your usage in the Billing Dashboard and post on Ed if for some reason your usage is higher than expected so a TA can help resolve the error.

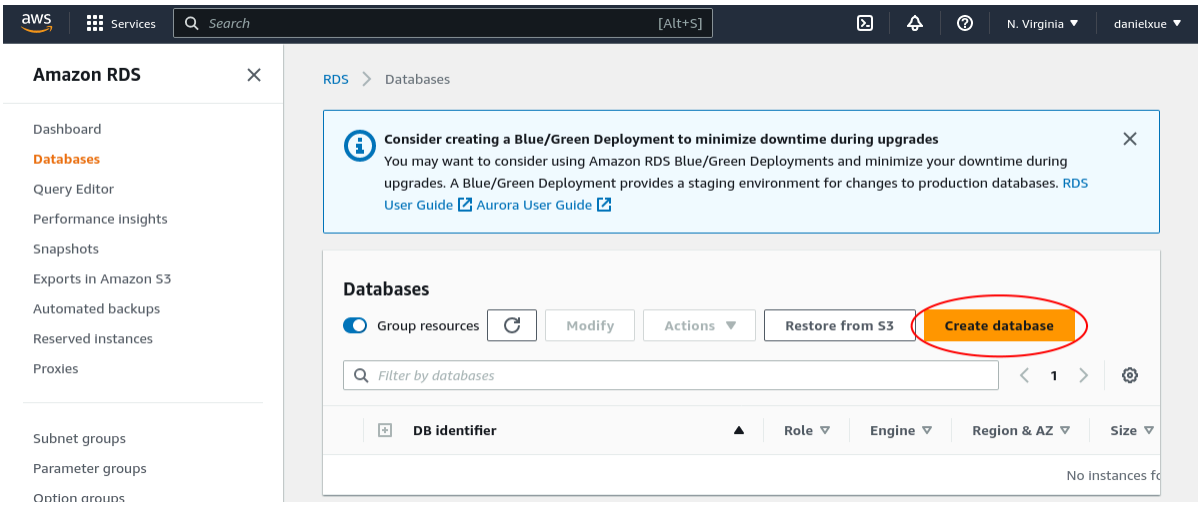
We recommend that you create **one** MySQL RDS instance for all of this semester's assignments and instead create separate databases within this single RDS instance as necessary. Creating multiple RDS instances can cause you to exceed free tier limits.

2. Creating an RDS Instance

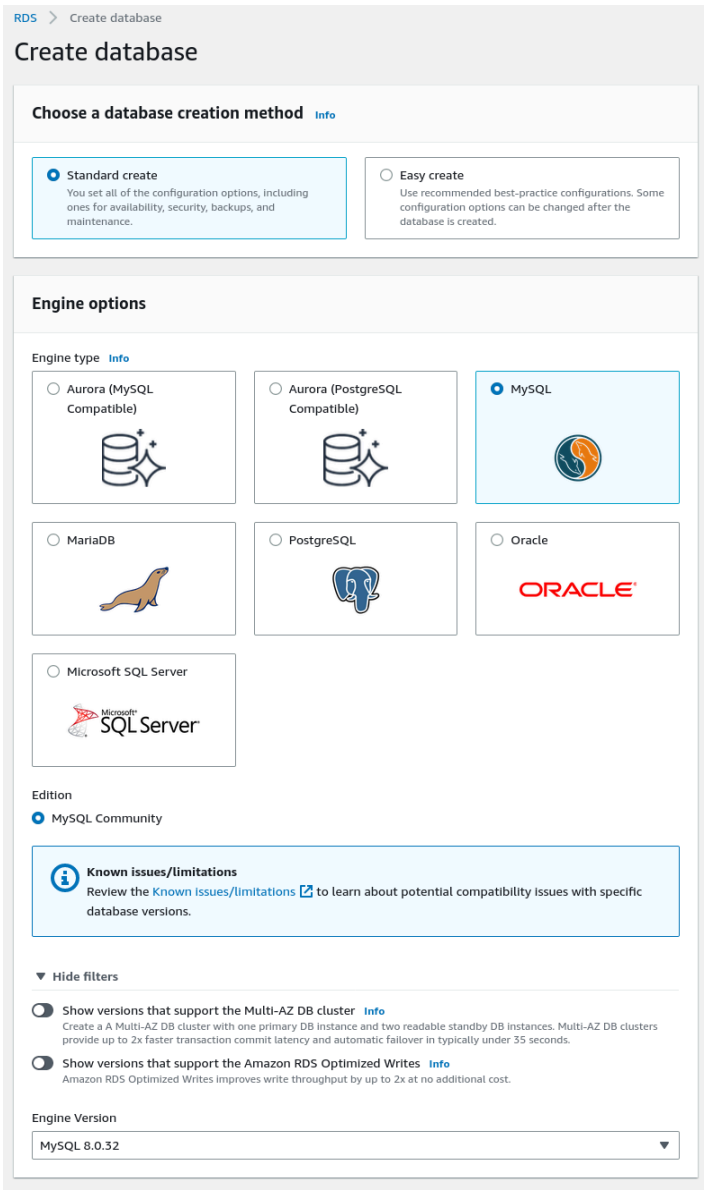
1. Create an AWS account here if you already do not have one. Then, log in and head over to the AWS console. You can then go to the RDS console using this link, but if that does not work, search for RDS on the top of the window and click on 'RDS - Managed Relational Database Service' as shown below:



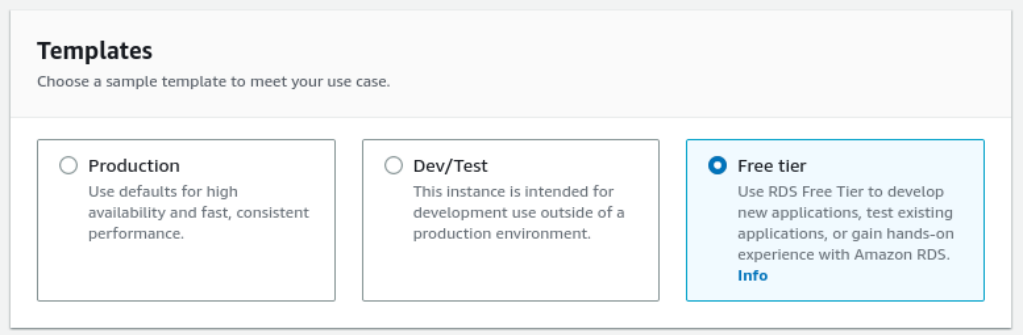
2. From the left menu, select ‘Databases’ and click the ‘Create Database’ button:



3. This will bring up the create database wizard. For ‘Choose a database creation method’ use ‘Standard Create’. For ‘Engine options’ select ‘MySQL’ and leave the Edition as ‘MySQL Community’ with the default version:

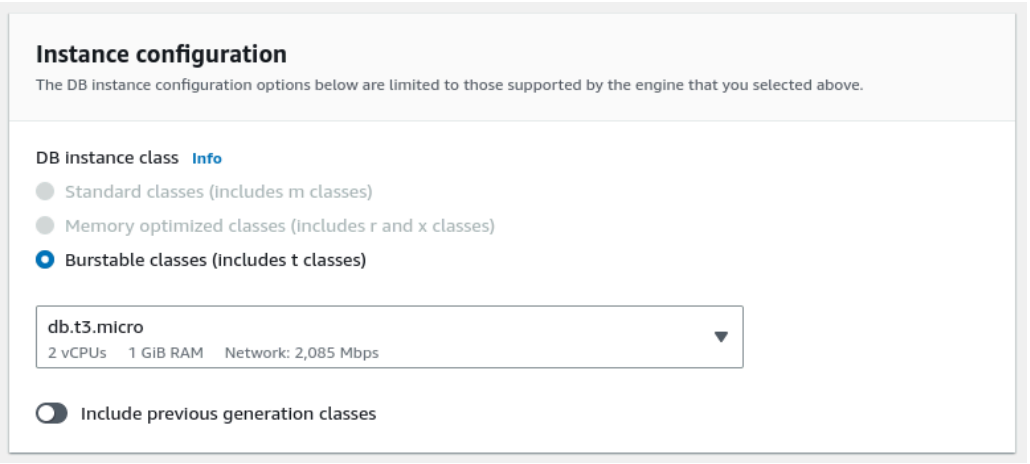


4. Next, under ‘Templates’, select the ‘Free tier’ option:

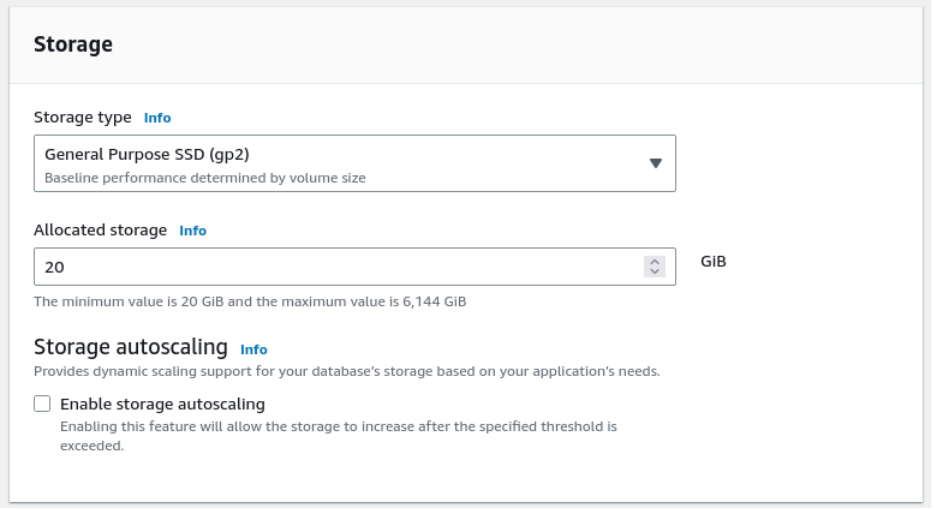


5. Next, fill in the ‘Settings’ section - choose a master username and password that you will use to connect to the instance. Be sure to note down your admin credentials, choose a strong password, do not upload your admin credentials to a public repository, and do NOT store sensitive information in this instance. We have had student databases instances hacked in the past–don’t let that be you!

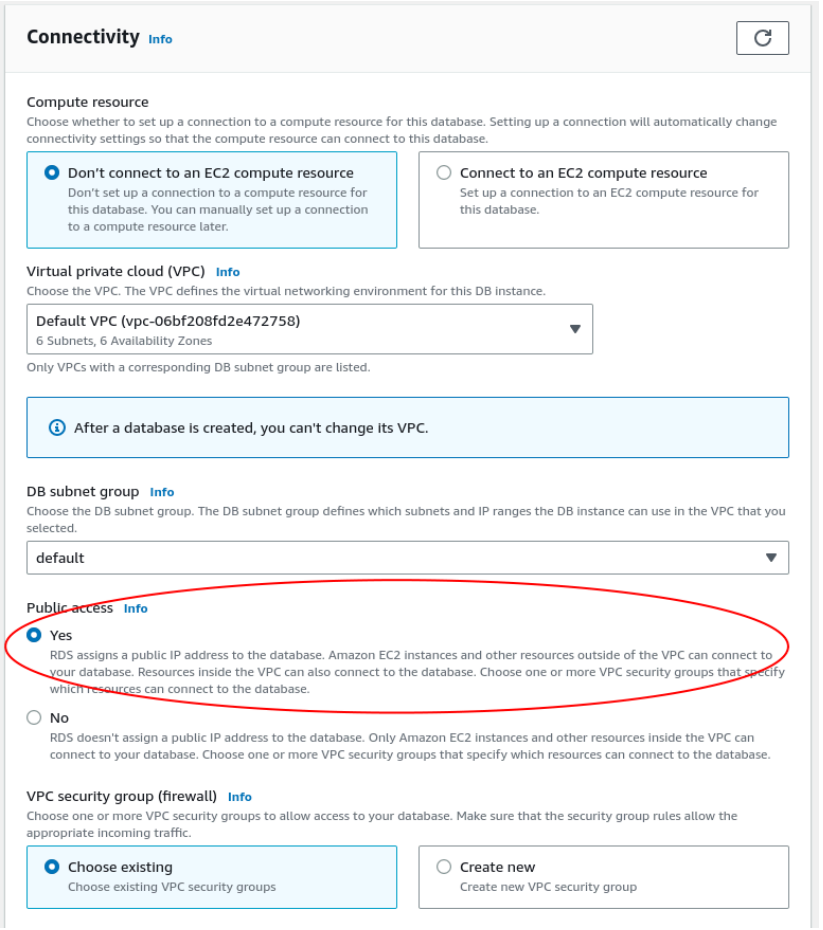
6. Now, under the ‘DB instance class’ - use ‘Burstable classes’ - db.t2.micro or db.t3.micro (whatever the the default option is):



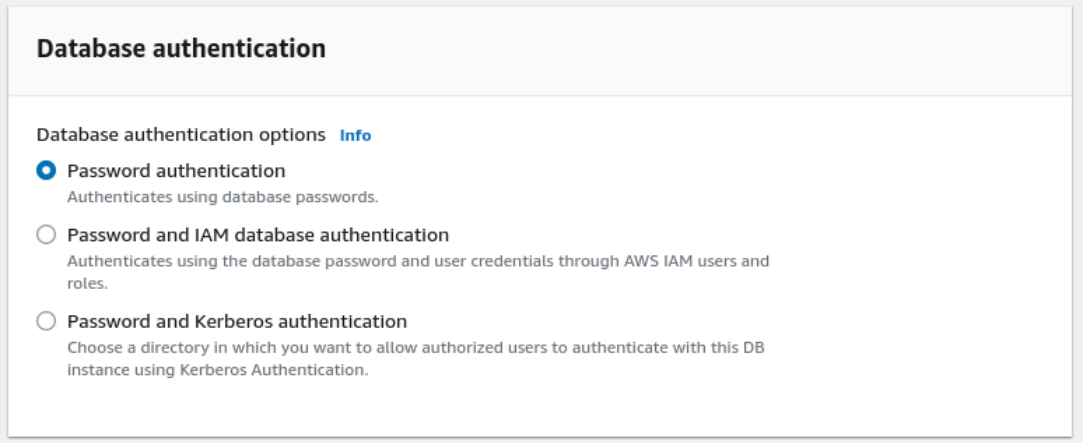
7. Uncheck ‘Enable storage autoscaling’ under ‘Storage’ and leave Storage type as General Purpose (SSD) with a 20 GiB allocated size. Double check you’ve done so! Missing this step is a common reason students exceed their free tier limits:



8. Under connectivity, leave the ‘VPC’ and ‘Subnet group’ settings to their defaults. **Set ‘Public Access’ to ‘Yes’** and leave the rest as is:



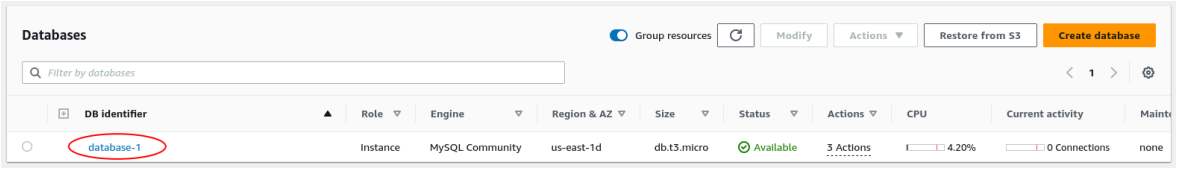
9. Lastly, leave ‘Database authentication options’ set to ‘Password authentication’:



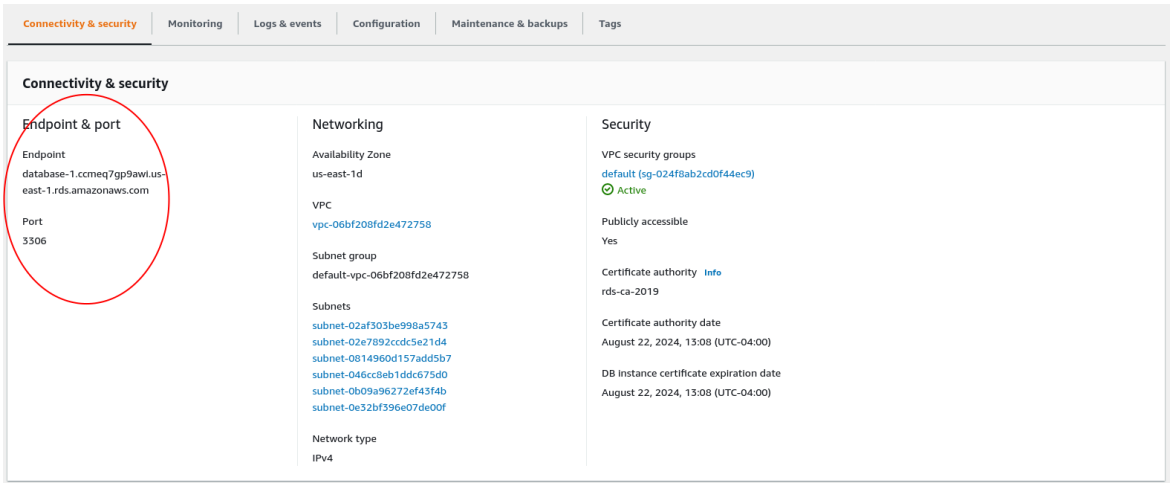
You may now encounter a section on estimated monthly costs. It should provide some information on free tier usage, but if it shows an estimated cost instead, check if correctly selected a free-tier instance template (as opposed to ‘Production’ or ‘Dev/Test’ templates) in step 4 of this section.

10. Click on ‘Create database’. Upon redirection to the ‘Databases’ page, wait until the instance is created (the status parameter should read ✓ Available before you are able to connect to the instance). This process can take a few minutes!

11. Once the instance is created, you will be able to click on the corresponding entry for your instance in the DB identifier column:



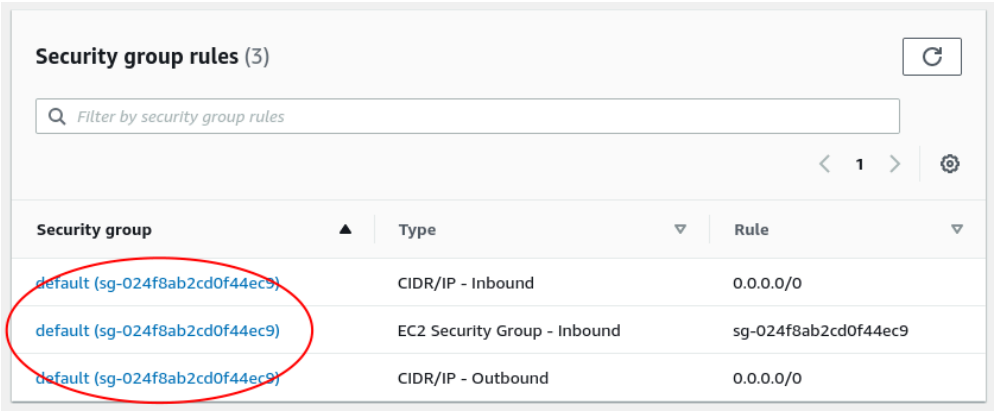
This will open the instance specific information page. Take a look at the 'Connectivity and security' pane and note down the endpoint (host) and port information. You will need this to connect to the instance as in section 4:



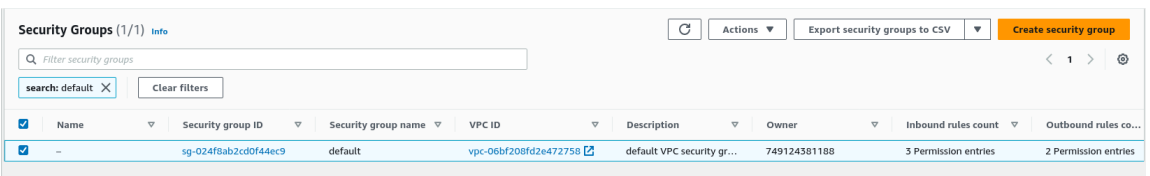
3. Configuring Security Groups

To allow for your client as well as the autograder to connect to your database, please allow access to all traffic from any IP in and out of the instance. Note this is not best practice for security in production systems, but will suffice for the purposes of this course. To do this:

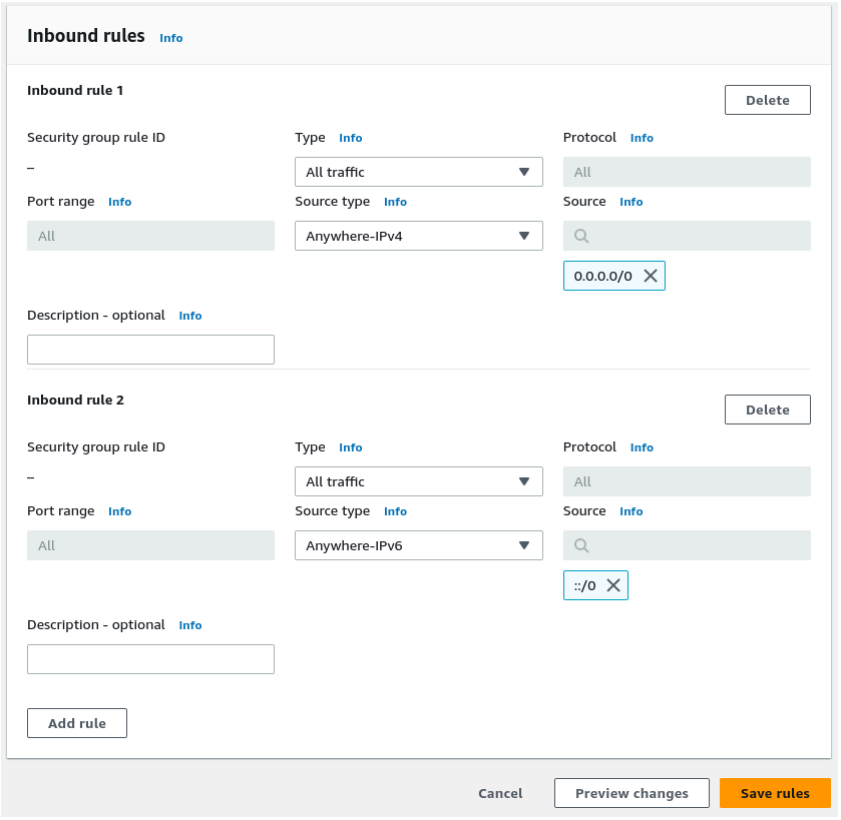
1. From the database instance page, click on any one of the security group items form under 'Security Group Rules':



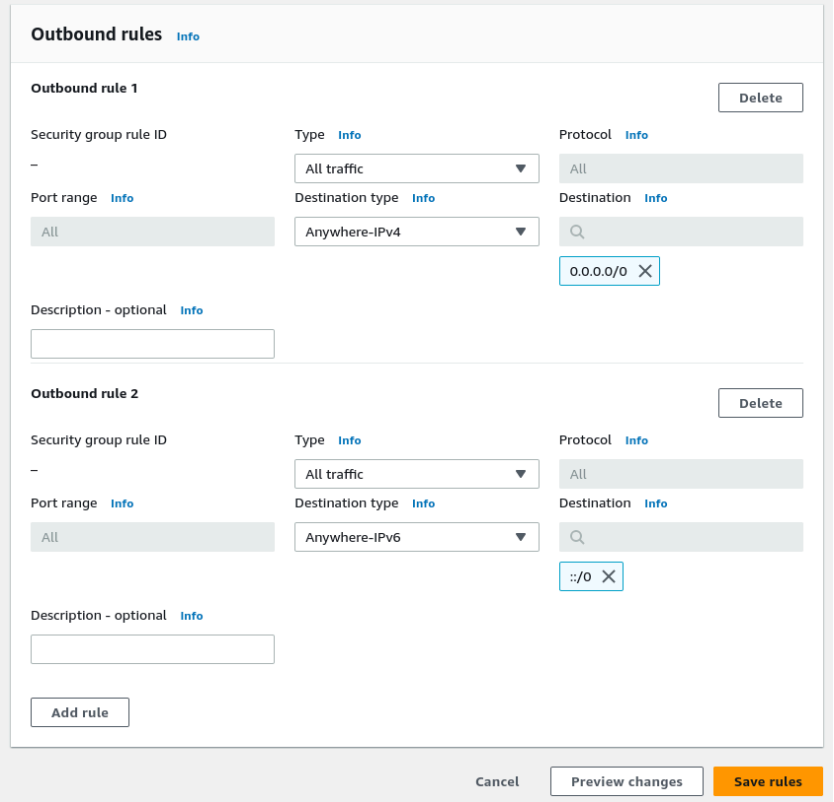
This will bring you to the security groups page as shown below:



2. Click on the Security group ID (there should be only 1 since the link will filter the others to match only the one for the RDS instance). Under the 'Inbound tab, click on the ‘Edit inbound rules’. First delete all existing rules and and then add two rules with type ‘All traffic’ and sources ‘Anywhere-IPv4’ and ‘Anywhere-IPv6’:



3. Click on 'Save Rules'. Now go to the 'Outbound rules tab and click 'Edit Outbound Rules’ and do the same–delete all existing rules and and then add two rules with type ‘All traffic’ and sources ‘Anywhere-IPv4’ and ‘Anywhere-IPv6’:



4. Connecting to the RDS Instance via DataGrip

This process is very similar to the one described in the **Section 5** of the DataGrip Handout. The key differences are:

1. In step 1, you should select the option for ‘MySQL’ instead of ‘Oracle’

2. In step 2, once the data sources and driver connection prompt, you will use only the following connection parameters:
   a. Host: From section 2 step 11
   b. User: the username you selected in step 5 of section 2
   c. Password: the password you selected in step 5 of section 2
   d. Port: the port assigned for the MySQL service - from section 2 step 11

3. Again, hit ‘Apply’ and test the connection, and then ‘OK’ to open the corresponding editor console.

Note: MySQL connections also have a ‘database’ parameter. Since at the time of connection, you won’t have a database set up, leave this blank and once the database is set up in section 5, use the ‘USE <database-name>’ command instead. MySQL instances default to running on port 3306 unless specified otherwise (please leave it as its default port to avoid issues).

5 Getting Started and Setting up a Database

Once connected to the instance, you may use the following commands to create and delete tables or databases. You should read through and understand these before proceeding with Homework 1 Part 2.

SHOW DATABASES; prints all current databases. For a MySQL instance, there will be a few system

information databases named *'information_schema'*, *'mysql'*, *'performance_schema'*, and *'sys'*.

To create a database named 'SCHOOL_DB', run the command: **CREATE DATABASE SCHOOL_DB;**

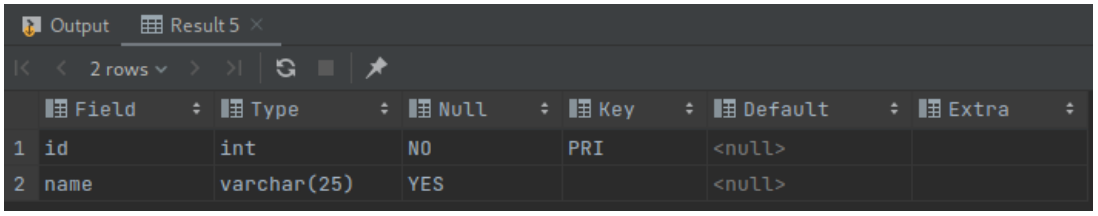
You must then select the database by running: **USE SCHOOL_DB;**

To create a table named MY_TABLE with the following schema (the key id is underlined):

	Attribute	Type
MY_TABLE	id	int
	name	varchar(25)

Run the CREATE command:
CREATE TABLE STUDENTS (id int, name varchar(25), PRIMARY KEY(id));

To display the schema and constraints of **STUDENTS** use the describe command:
DESCRIBE STUDENTS;



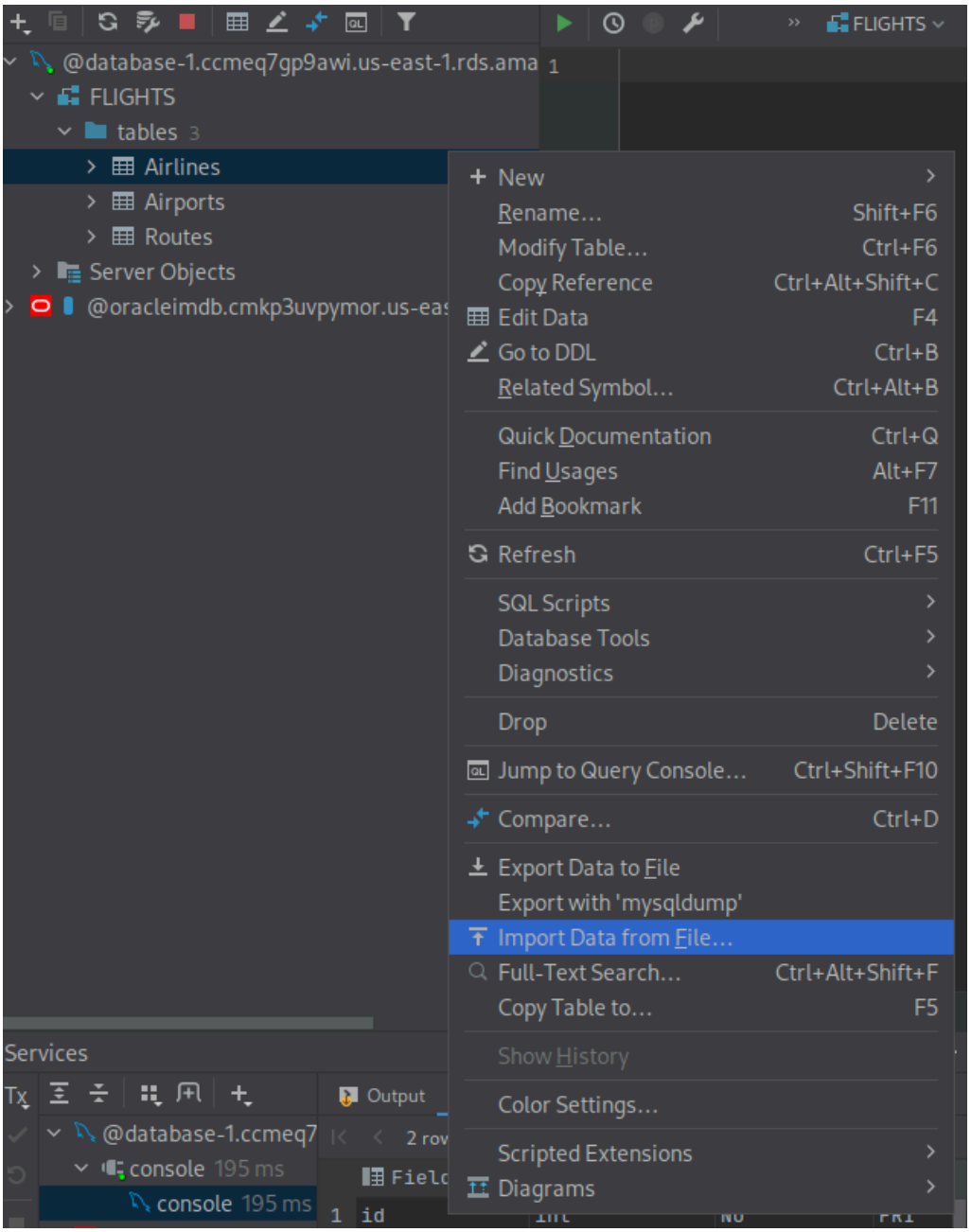
Finally, use the DROP command delete the table: **DROP TABLE STUDENTS;**

You could also use the DROP command to delete the entire **SCHOOL_DB** database:
DROP DATABASE SCHOOL_DB;

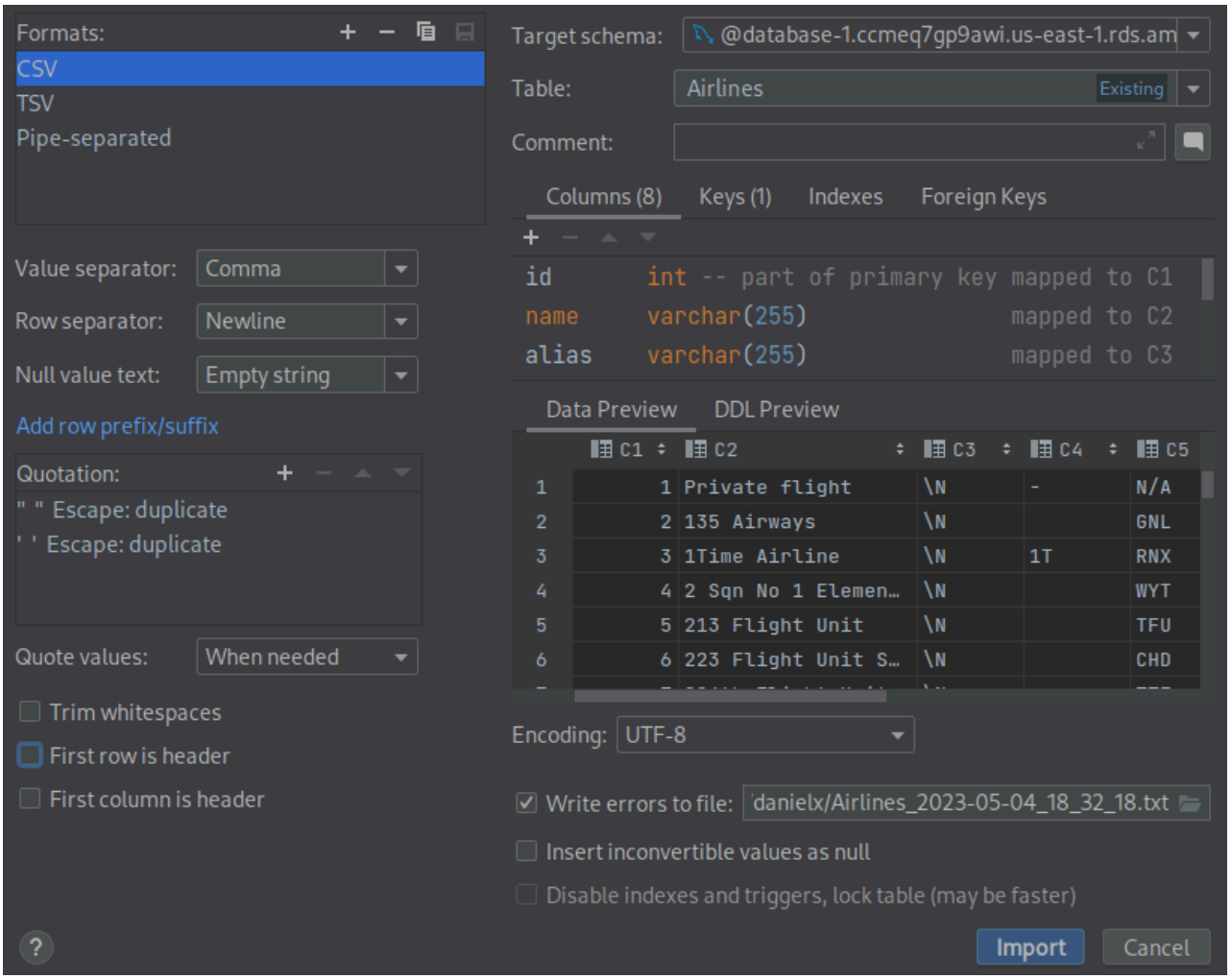
6. Uploading Data to Your Instance

This section contains instructions on uploading data to tables in an existing database using DataGrip's import wizard. It is also possible to use the LOAD DATA statement in MySQL to do this as described here. If you have not already created a database, refer to section 5 before proceeding. If you have not already made tables to upload data to, create all necessary tables. Take a look at Homework 1 Part 2 for instructions on creating tables needed for Parts 2 and 3 of the homework.

Once the database and tables are created, you will be able to see them on the left pane under 'Database'. Look for the data source you're currently working on (ex. *database-1*), and look for the database (ex. *FLIGHTS*) and tables (ex. *Airlines*, …). To import data into a table, right click on it, and then select the 'Import Data from File' option:



Select the file you want to import (ex. *Airlines.csv*). This will bring up the import wizard, which will automatically detect the required formatting settings. Ex. for the flights dataset following settings are automatically detected.



Note the different options however. “null value text” may useful for handling how you want null values to be imported, “First row is header” may be useful for if the CSV has a header row (which is not the case for homework 1, but may be the case for other homeworks or datasets).

The wizard will also show you column mappings and a preview of the imported data. You may need to adjust Click on ‘Import’ once the import settings are satisfactory.

7. Modifying or Instance State

To avoid continuing to incur charges, you should be sure to **shut down your instance** from the instance page when you are done with the homework.