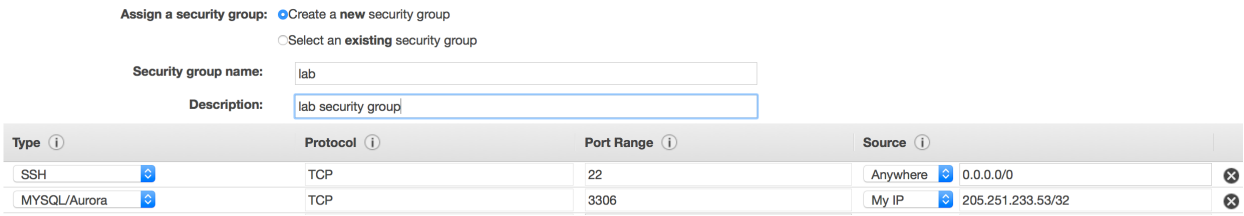
Managed Database Basics
Hands-on Lab

1. Create an Amazon EC2 t2.micro instance with Amazon Linux
   - See documentation at
   http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/EC2_GetStarted.html
   - Create and use a security group that allows inbound TCP access using SSH (port 22) and MYSQL (port 3306)



   You might get an automated warning that your EC2 instance is "open to the world", because we're not limiting the source range for SSH. This is expected. In a production system, you'll want to provide a limited IP range for allowed SSH access. For this lab, disregard the warning.
   - We'll be accessing MySQL from this EC2 instance. Once the instance is created, go back to the security group and update the "Source" for both services to use the IP address of your EC2 instance.
2. Access the linux console. See documentation at
   http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/AccessingInstances.html

Use `ssh` for Linux or Mac; use `PuTTY` for Windows

Example:

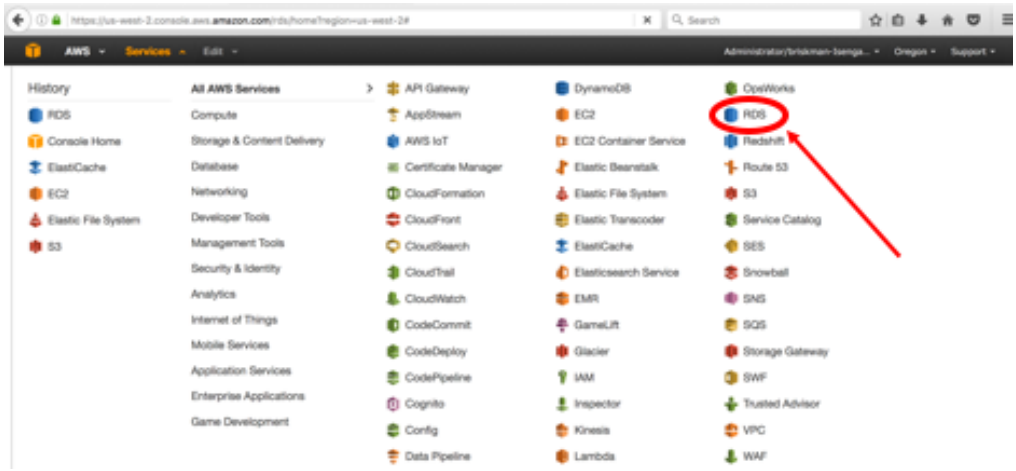
```
ssh –i ~/Downloads/key.pem ec2-user@ec2-01-02-03-99.us-west-2.compute.amazonaws.com

[ec2-user@ip-192-168-0-1 ~]$
```

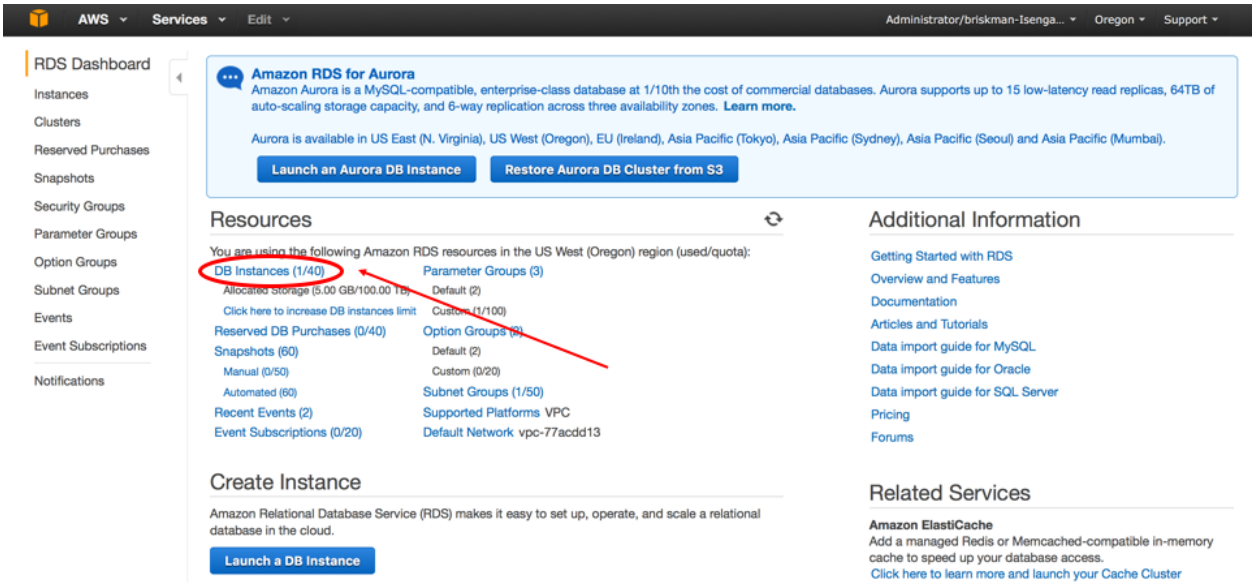
   - Install MySql development client
     `$ sudo yum install mysql-devel`

3. Create an Amazon RDS MySQL db.t2.micro instance
   - See documentation at
   http://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP_GettingStarted.CreatingConnecting.MySQL.html
   - Name the instance sql-lab. Be sure to choose MySQL (not Aurora and not MariaDB) and the db.t2.micro instance size
   - Choose a username and a password (and don't forget them!)

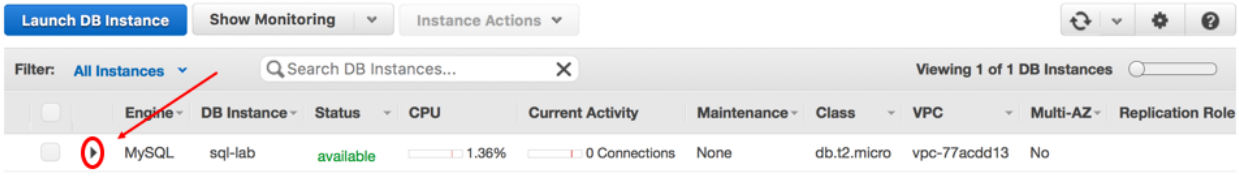
- Do not create a database (we will do that later)
- Once the instance is created, find your mysql node name
    i. On the AWS Console, choose Services, then RDS



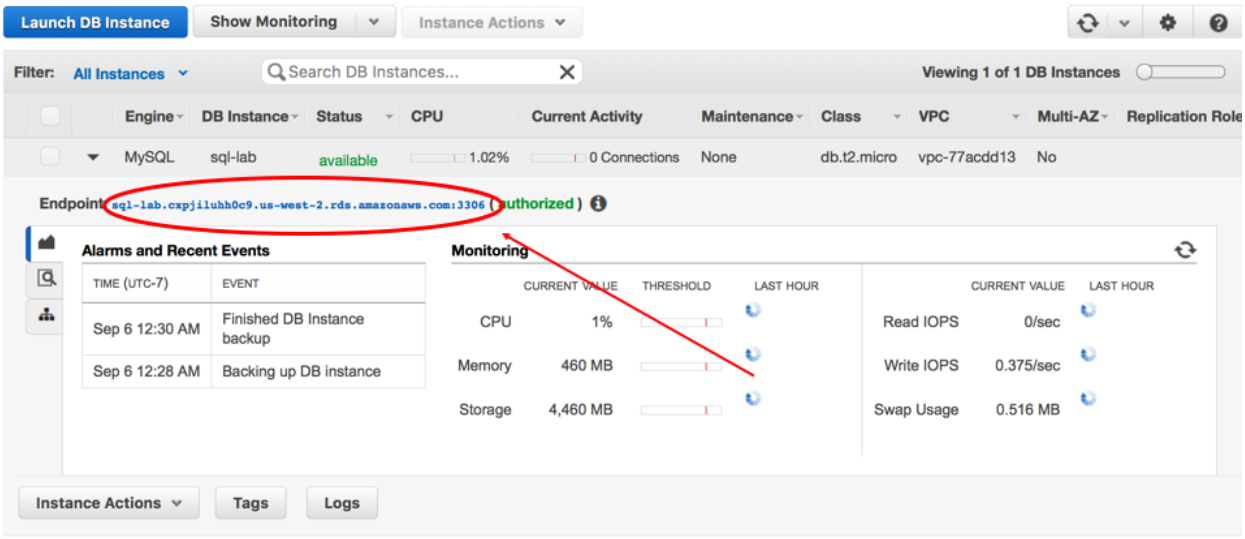
    ii. On the RDS dashboard, choose DB Instances



iii. Select the ▶ next to your DB Instance



iv. Note your endpoint name. You will need it later!



When using the endpoint name, you usually should not use the port extension (:3306), just the name.

- Verify you can access the mysql> console from your EC2 instance
  `$ mysql –h <mysql node name> –u <user name> –p`

Example:

```
$ mysql –h sql–lab.cxpjiluqq0c9.us–west–2.rds.amazonaws.com –u awsuser –p

Enter password:

Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 9999
Server version: 5.6.27–log MySQL Community Server (GPL)

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

mysql>
```

To exit from the mysql> prompt, use CTRL-D

4. Download and Prepare Landsat scenes
    - See documentation at

https://aws.amazon.com/public-data-sets/landsat/

    - From your EC2 instance, download the Landsat scenes

```
$ wget http://landsat-pds.s3.amazonaws.com/scene_list.gz
```

    - Unzip the scene list

```
$ gunzip scene_list.gz
```

    - Trim the list to the last 250,000 scenes

```
$ cp scene_list scene_list.orig
$ tail –n 250000 scene_list.orig > scene_list
```

5. Load to MySQL
    - Log into the mysql> console
    - Create a landsat database

```
mysql> CREATE DATABASE landsat;
mysql> USE landsat;
```

    - Create the scene_list table

```
mysql> CREATE TABLE scene_list (entityId VARCHAR(64),
acquisitionDate DATETIME,cloudCover
DECIMAL(5,2),processingLevel VARCHAR(8),path INT,row
INT,min_lat DECIMAL(8,5),min_lon DECIMAL(8,5),max_lat
DECIMAL(8,5),max_lon DECIMAL(8,5),download_url
VARCHAR(128));
```

    - Load the landsat data

```
mysql> LOAD DATA LOCAL INFILE 'scene_list' INTO TABLE
scene_list FIELDS TERMINATED BY ',';
```

6. Run SQL query
    - Log in to your MySQL node and run a query

```
mysql> SELECT DISTINCT(a.entityId) AS Id, a.cloudCover
FROM scene_list a
INNER JOIN (
      SELECT entityId, acquisitionDate
      FROM scene_list
      WHERE acquisitionDate > (
            SELECT MAX(acquisitionDate)
            FROM scene_list
            WHERE acquisitionDate < CURDATE() - INTERVAL 1 YEAR
      )
) b ON a.entityId = b.entityId AND a.acquisitionDate =
b.acquisitionDate
      WHERE cloudCover < 50
      ORDER BY Id;
```

    - This generates a list of all the satellite images during the last year which have less than 50% cloud cover
    - Note how long it takes to get an answer

7. Experiment with RDS features
    - Stop the database and restart it
    - Turn on MAZ for failover
    - Take a snapshot