Databases

RDS - Relational Database Service
AWS RDS
Managed Database Service

• RDS (Relational Database Server) is Amazon’s SQL offering

• Of course, you can always run your own database server, on an instance anywhere...
  • https://www.mysql.com/

• But why go to all that trouble?
**AWS RDS**
Managed Database Service

- Search for RDS in the top search bar.
- Click on RDS in the Services results.
AWS RDS Managed Database Service

• From the dashboard, you may see a “Create Database” button in an announcement.

• If not, click on “Databases” in the left sidebar.

• Click “Create Database”
AWS RDS
Managed Database Service

• Select “Standard Create.” We have to turn off some features which aren’t allowed in AWS Academy.

• Select MySQL

• Leave the Edition and version as default.
  • MySQL Community
  • Version 8.0.x
AWS RDS
Managed Database Service

- Make sure to select “Free tier”
AWS RDS
Managed Database Service

• Set a name for your DB Instance. This only shows up in the AWS console, it’s not used for connecting to the database.

• Choose a good password, and keep it somewhere safe and memorable.

• If you forget it, you can reset this later.
AWS RDS
Managed Database Service

• Change the instance class to db.t3.micro

• Change the Allocated storage to the smallest allowed: 20 GiB

• Un-check “Enable storage autoscaling”

• We won’t use anywhere near that much space.
AWS RDS Managed Database Service

• Don’t connect to an EC2 resource (we’ll configure that ourselves)

• Make sure you have “No” selected for Public access.

• Create a new security group

• Name your security group “database-sg”

• If you delete this RDS instance and create a new one later, you can re-use this VPC security group
AWS RDS
Managed Database Service

• Leave “Password authentication” selected
AWS RDS
Managed Database Service

• Expand “Additional configuration”

• Disable automated backups
  • Automated backups are usually the correct default for things, but we really want to minimize costs for the class, and daily backups really add up!

• Disable encryption
  • Usually a good idea, keep it simple for class.
AWS RDS
Managed Database Service

- Click “Create database”
AWS RDS
Managed Database Service

• Your database may take several minutes to be ready for use. The cloud is not instant 😁
AWS RDS
Managed Database Service

• Dark Patterns:
  • AWS now tries to up-sell you when creating things
  • Can only “hide” for 30 days!
  • You can avoid this by deploying resources through automation
AWS RDS
Managed Database Service

• Eventually your RDS instance will complete. This may take 5 minutes or more.

• Click on your database name to get details on it.
• You will need to copy down the Endpoint domain name. This is how you will connect to your database from a server.
AWS RDS
Security Groups

- Our new RDS instance does NOT have a public IP address
  - Because RDS is a fully managed service, you cannot ssh into it
  - With no Public IP you cannot connect to it directly from your laptop
- Our new RDS instance has a private IP address, and is listening on port 3306
  - We need to give our EC2 instance access
AWS RDS

Security Groups

- With no public access, we must allow our EC2 instance access to the RDS instance
- This is done by allowing the security group attached to the RDS instance
- This is a very common pattern for cloud applications

AWS RDS
Security Groups

- We’ll do this by adding the security group ID attached to our EC2 instance to the ingress rules of the RDS security group.
• We want to add a rule that says, “Connections to the DB [port 3306] are allowed from the EC2 Security Group.”
AWS RDS

Security Groups

- In the EC2 console, select “Security Groups” from the left sidebar
- the launch-wizard-1 SG is the one attached to our EC2 instance
- The database-sg SG is attached to our database
AWS RDS Security Groups

- We need to update the database security group, so select that one
- Then click “Edit inbound rules”
AWS RDS Security Groups

- Add a new rule
- Select MySQL/Aurora for the rule type
- For the source, click in the input field, and scroll down until you find the “launch-wizard-1” security group
- Click “Save rules”
ECS ➞ RDS
Connecting at last

• Connect to your EC2 instance using your method of choice
• We need the mysql client software
• Docker!
• Use the hostname for your RDS instance, and the password you wrote down for the admin user (you did write down the password, right?)

```
sudo docker run -it --rm mysql:latest mysql -h class-db...rds.amazonaws.com -u admin -p
```
Connecting at last

- Docker lets us run programs without installing them permanently.
ECS ➞ RDS
Connecting at last

- Docker lets us run programs without installing them permanently
ECS ➞ RDS
Connecting from python

```
sudo yum install mariadb105-devel gcc python3.11-devel python3.11-pip
sudo pip3.11 install mysqlclient
```

- Now we can use the `MySQLdb` module within python on our EC2 instance.
ECS ➞ RDS

Connecting from python

```python
[ec2-user@ip-172-31-84-94 ~]$ cat mysql.py
import MySQLdb

hostname = "class-db.\[instance-id\].rds.amazonaws.com"
username = "admin"
password = "\[password\]"

db = MySQLdb.connect(host=hostname, user=username, passwd=password)

cursor = db.cursor()
cursor.execute("select * from sys.version")

print(cursor.fetchone())

[ec2-user@ip-172-31-84-94 ~]$ python3 mysql.py
(\[version\])
[ec2-user@ip-172-31-84-94 ~]$ 
```
**AWS RDS Cleaning Up**

- RDS instances are NOT automatically stopped when your AWS Academy lab session ends.
- You will keep getting charged as long as it is active.
- You can temporarily stop an RDS instance though.
AWS RDS Cleaning Up

• Can stop an RDS instance for up to 7 days

• After that it will automatically restart so AWS can keep it patched

• Still have to pay for the storage

• If you are done with an RDS instance, terminate it instead