Databases

RDS - Relational Database Service

AWS RDS

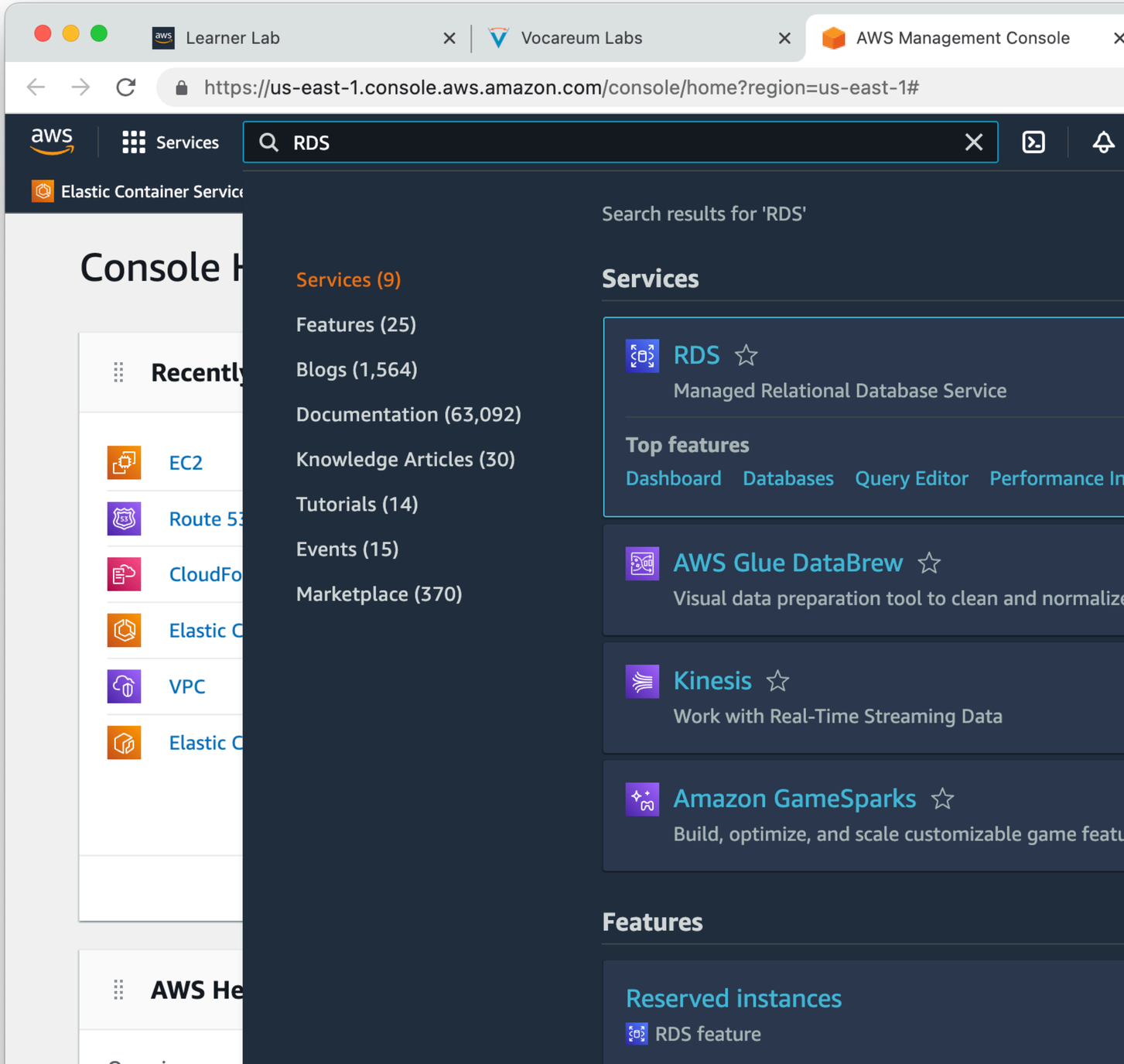
Managed Database Service

- 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

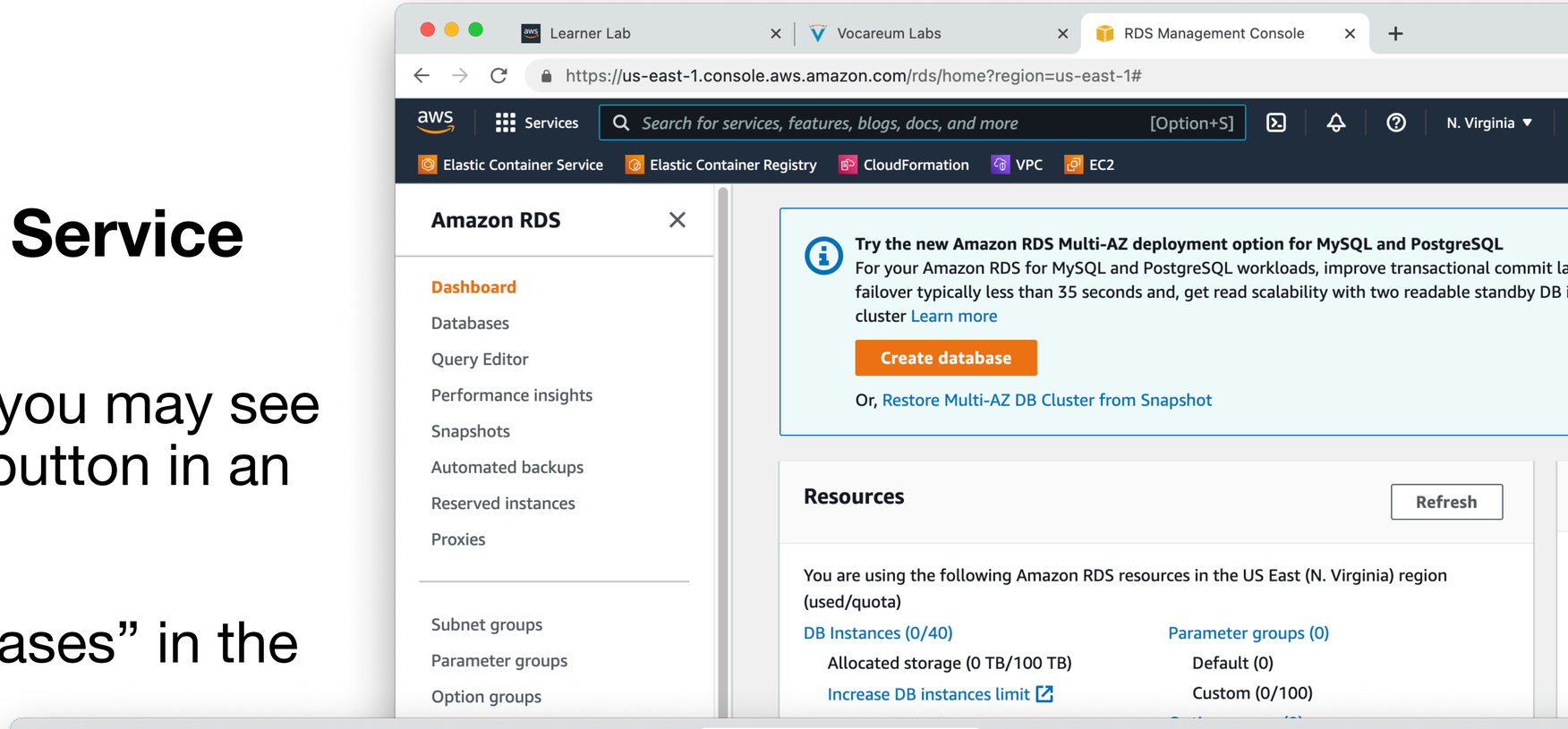
- Search for RDS in the top search bar.
- Click on RDS in the Services results.

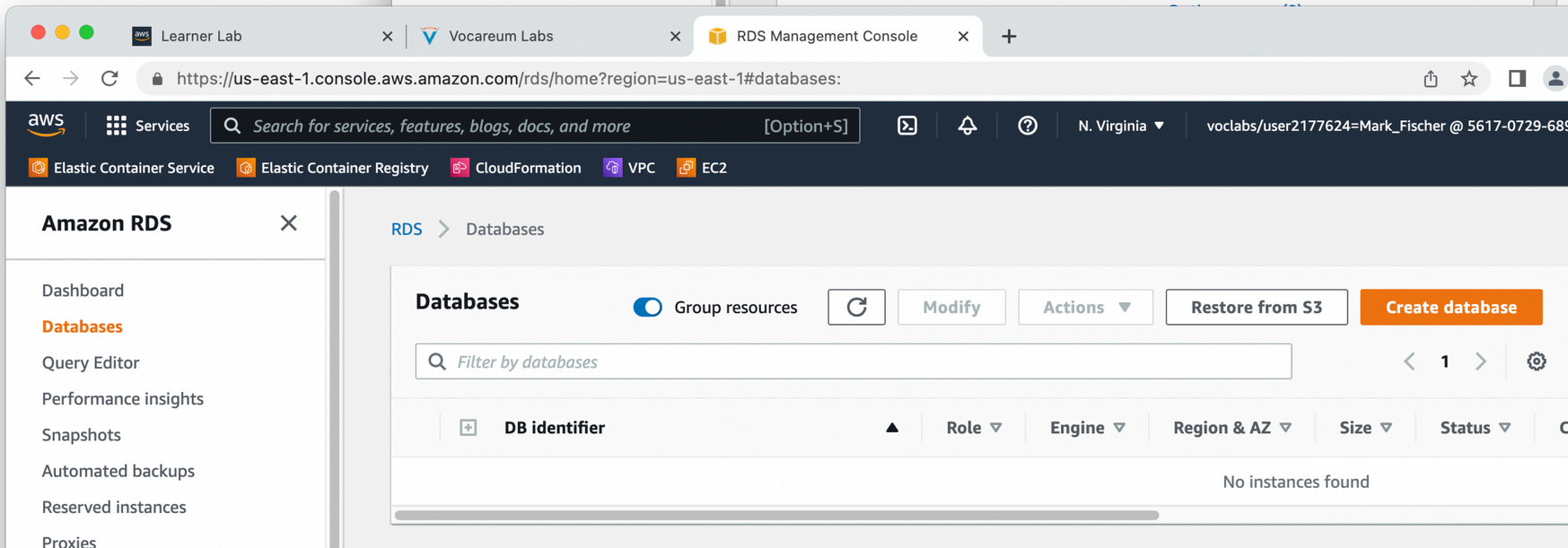


AWS RDS

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”

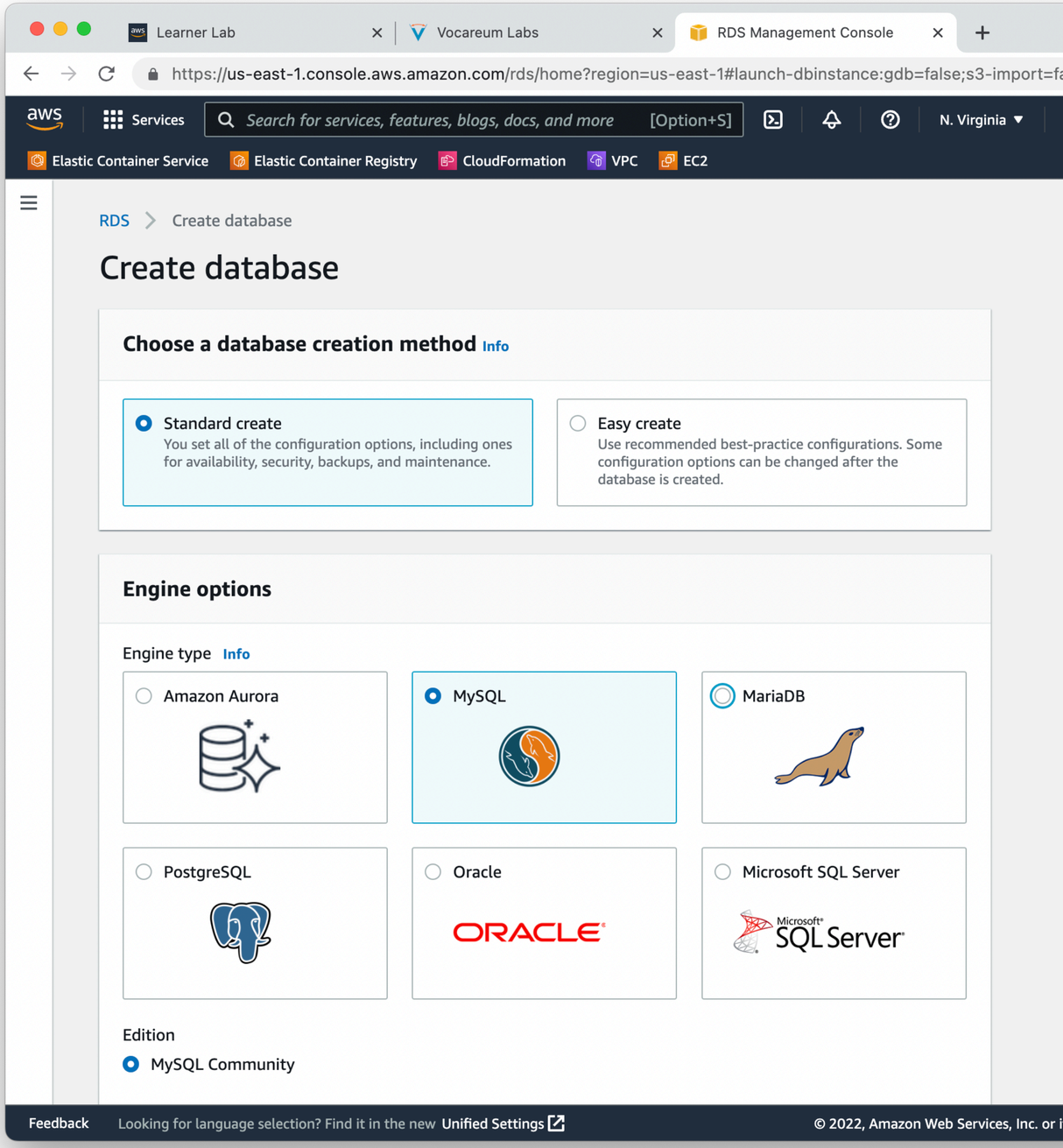




AWS RDS

Managed Database Service

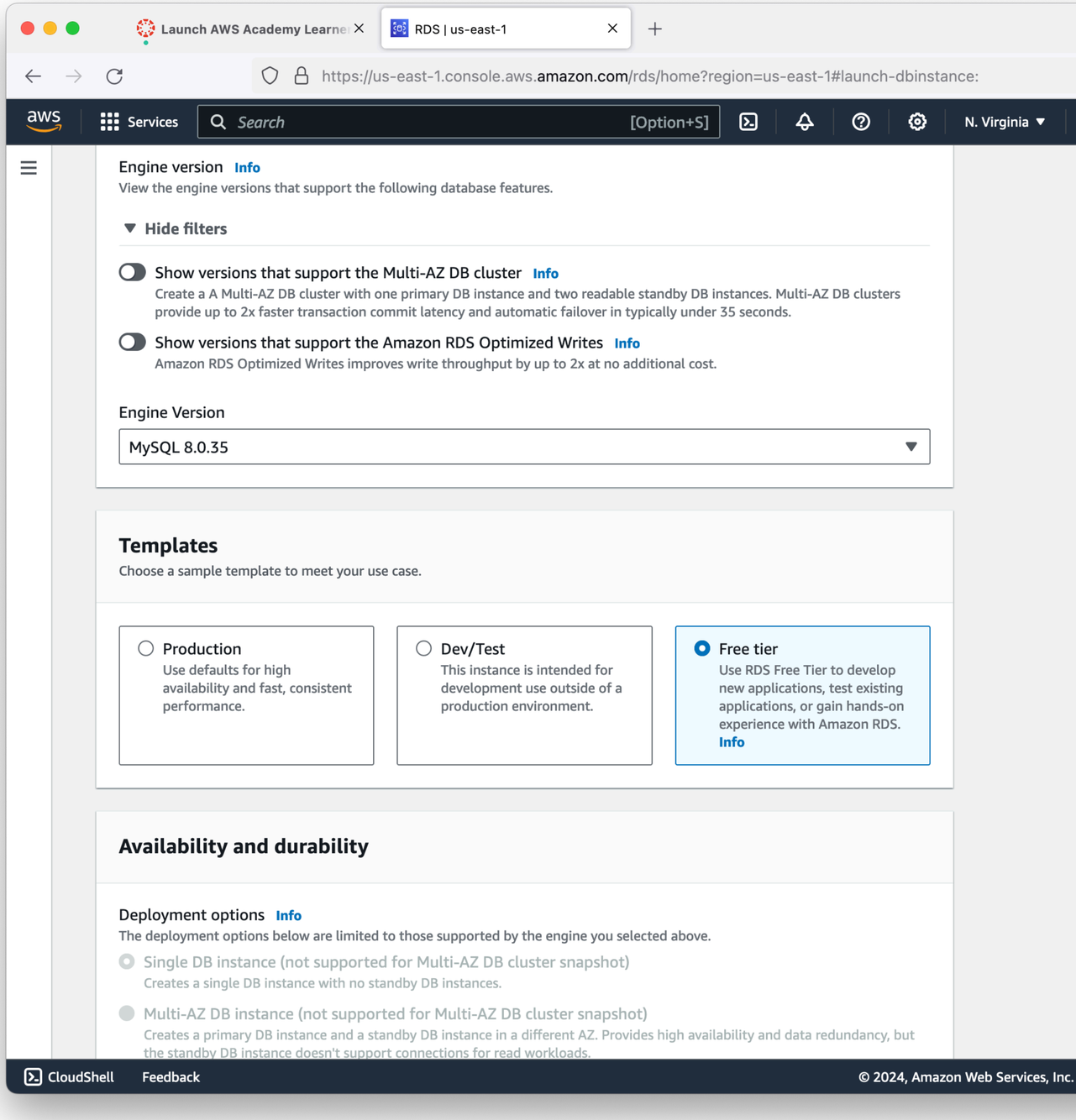
- Select “Standard Create.” We have to turn off some features which aren’t allowed in AWS Academy.
- Select MySQL
- Leave the Edition and version as default.
  - MySQL Community
  - Version 8.0.x



AWS RDS

Managed Database Service

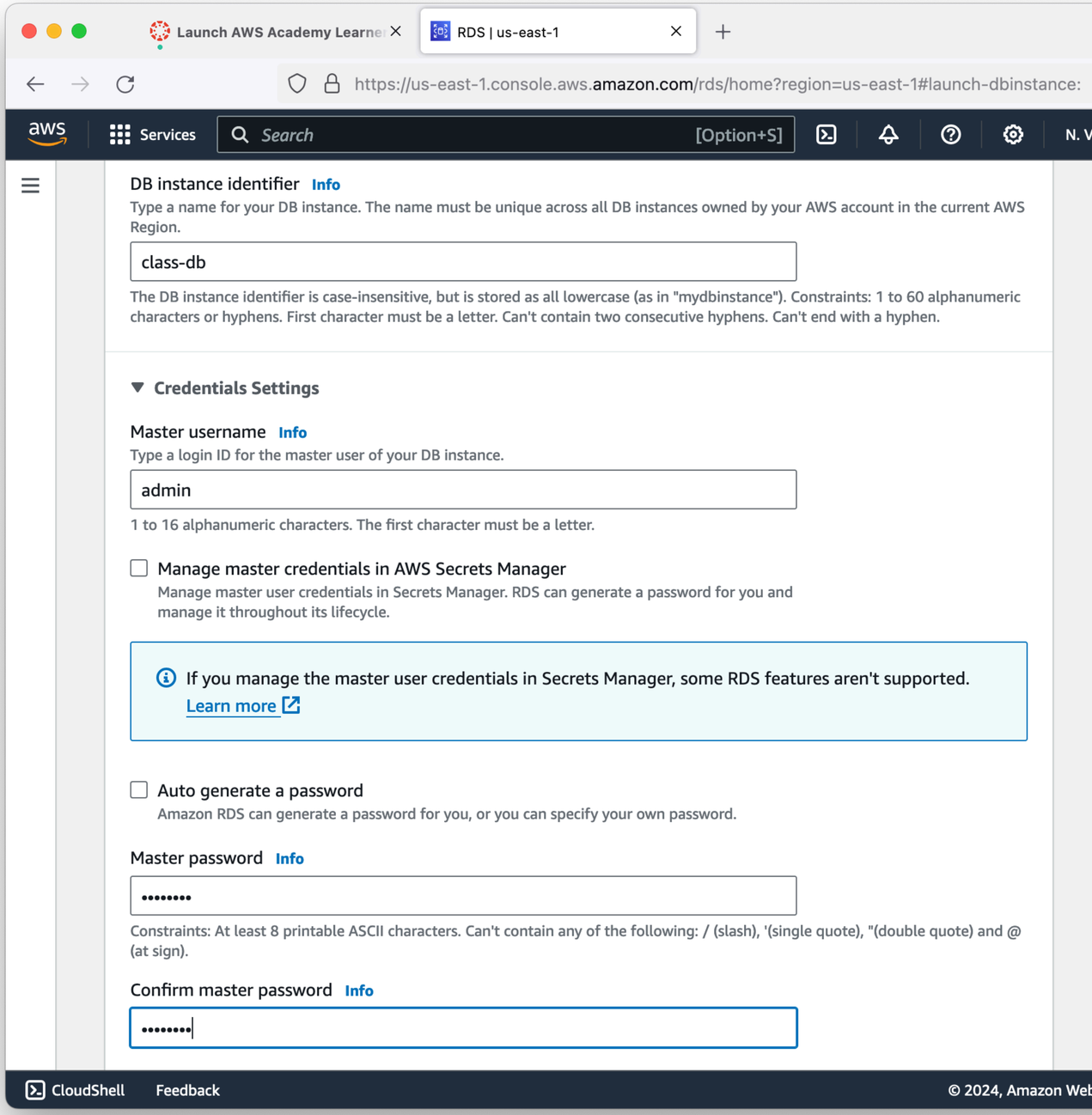
- Make sure to select “Free tier”



AWS RDS

Managed Database Service

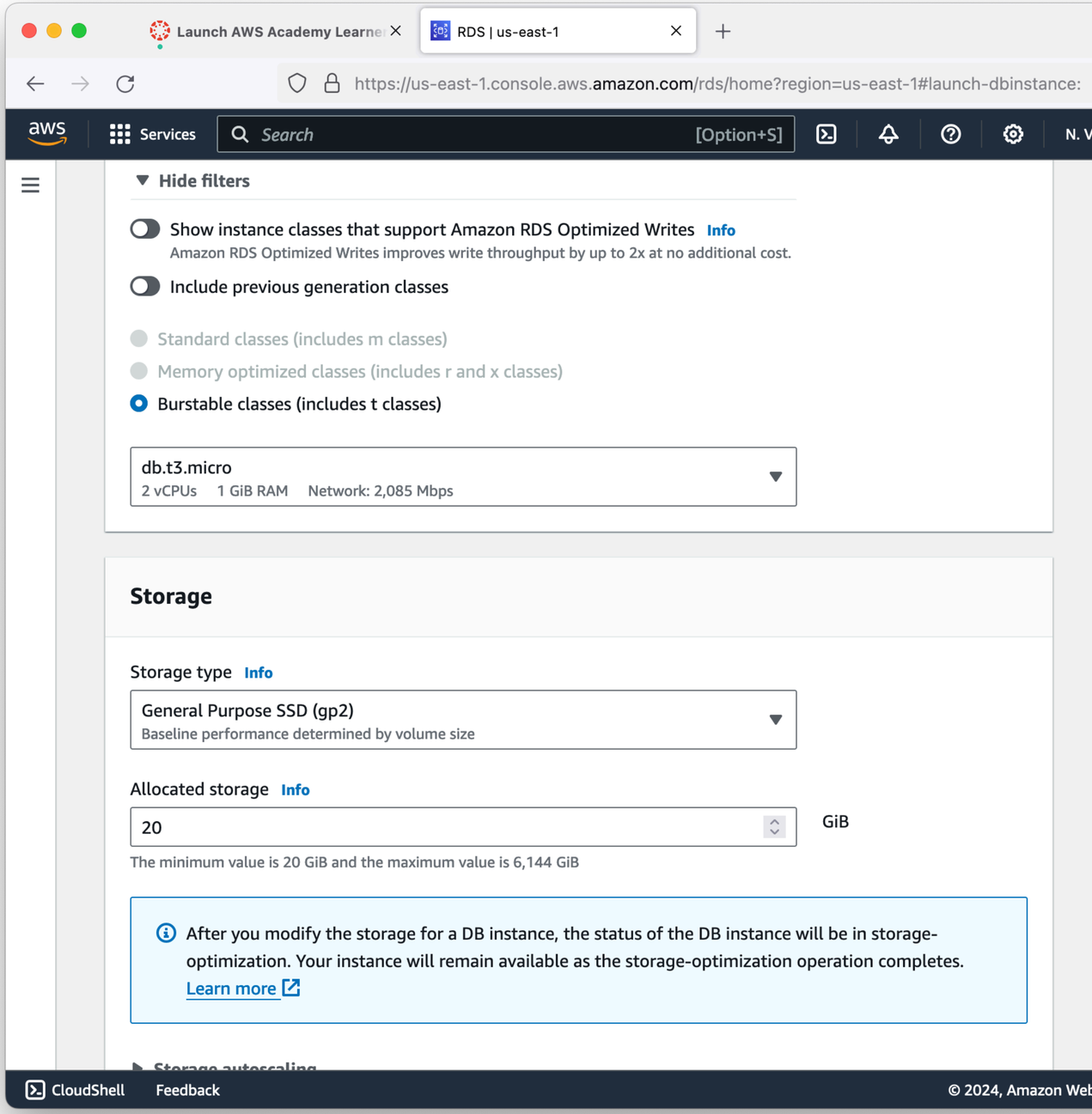
- Set a name for your DB Instance. This only shows up in the AWS console, its not used for connecting to the database
- Choose a good password, and keep it somewhere safe and memorable.
  - If you forget it, you can reset this later.



AWS RDS

Managed Database Service

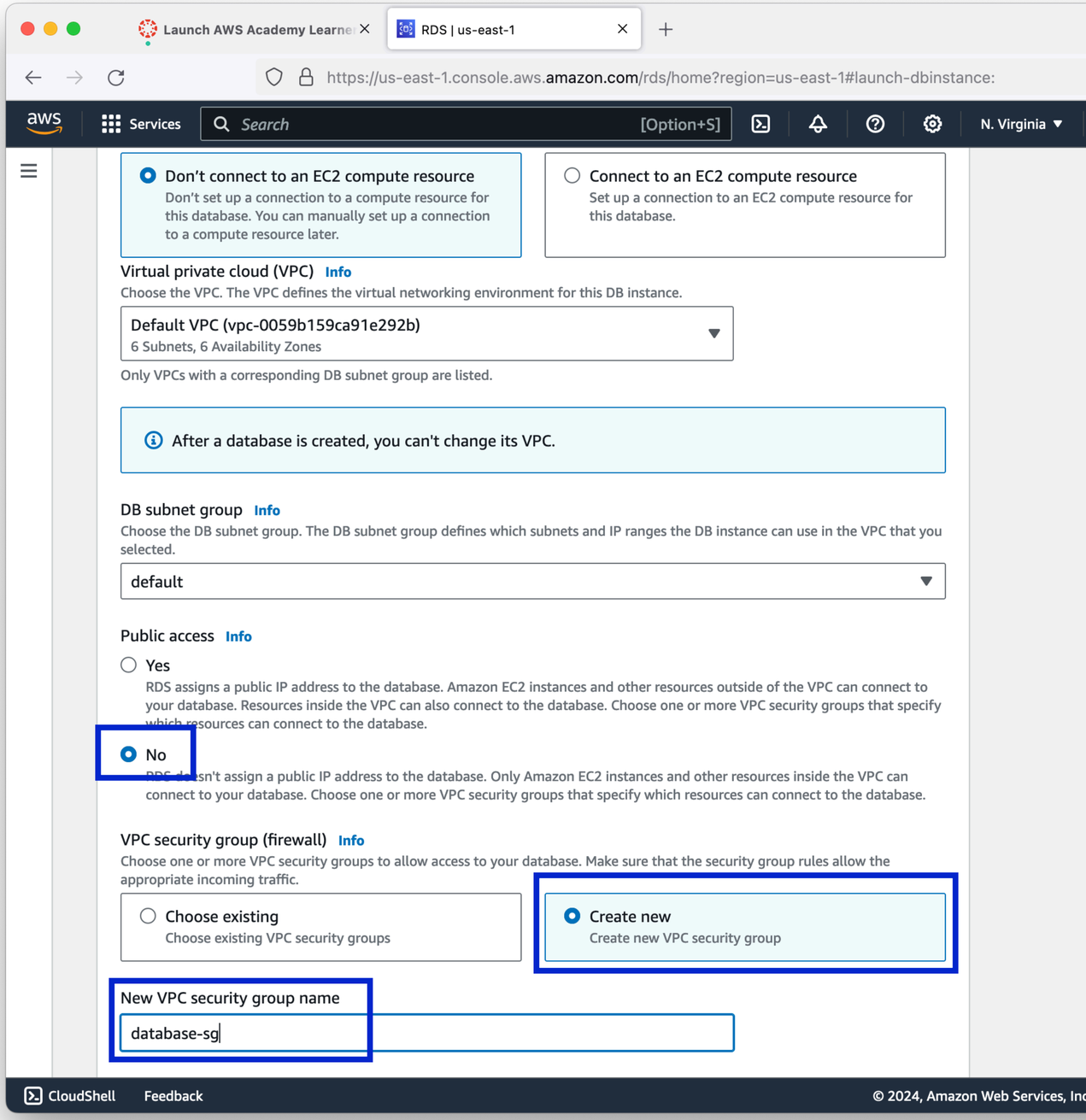
- Change the instance class to `db.t3.micro`
- Change the Allocated storage to the smallest allowed: 20 GiB
- Un-check “Enable storage autoscaling”
  - We won’t use anywhere near that much space.



AWS RDS

Managed Database Service

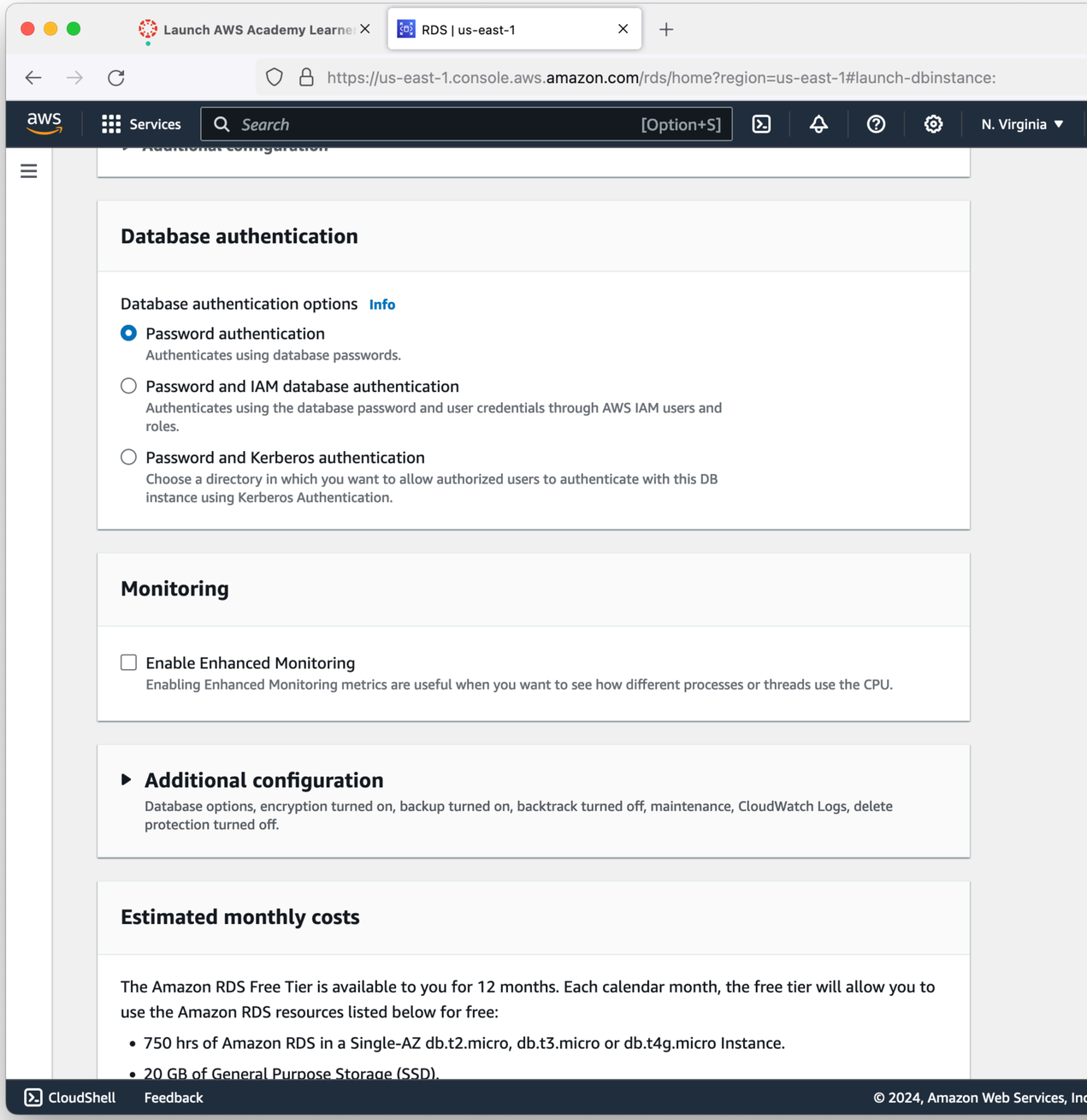
- Don’t connect to an EC2 resource (we’ll configure that ourselves)
- Make sure you have “No” selected for Public access.
- Create a new security group
- Name your security group “database-sg”
  - If you delete this RDS instance and create a new one later, you can re-use this VPC security group



AWS RDS

Managed Database Service

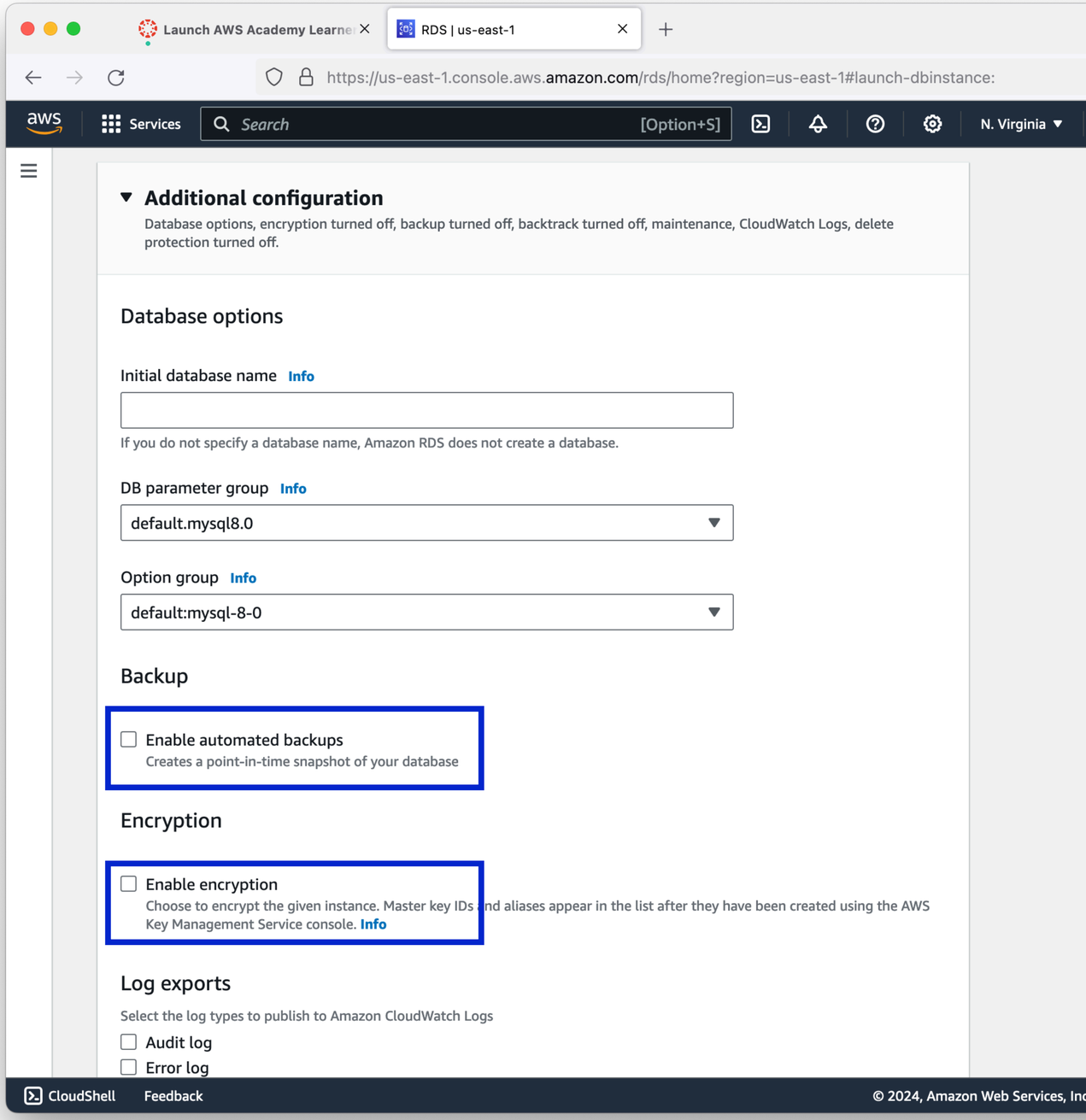
- Leave “Password authentication” selected



AWS RDS

Managed Database Service

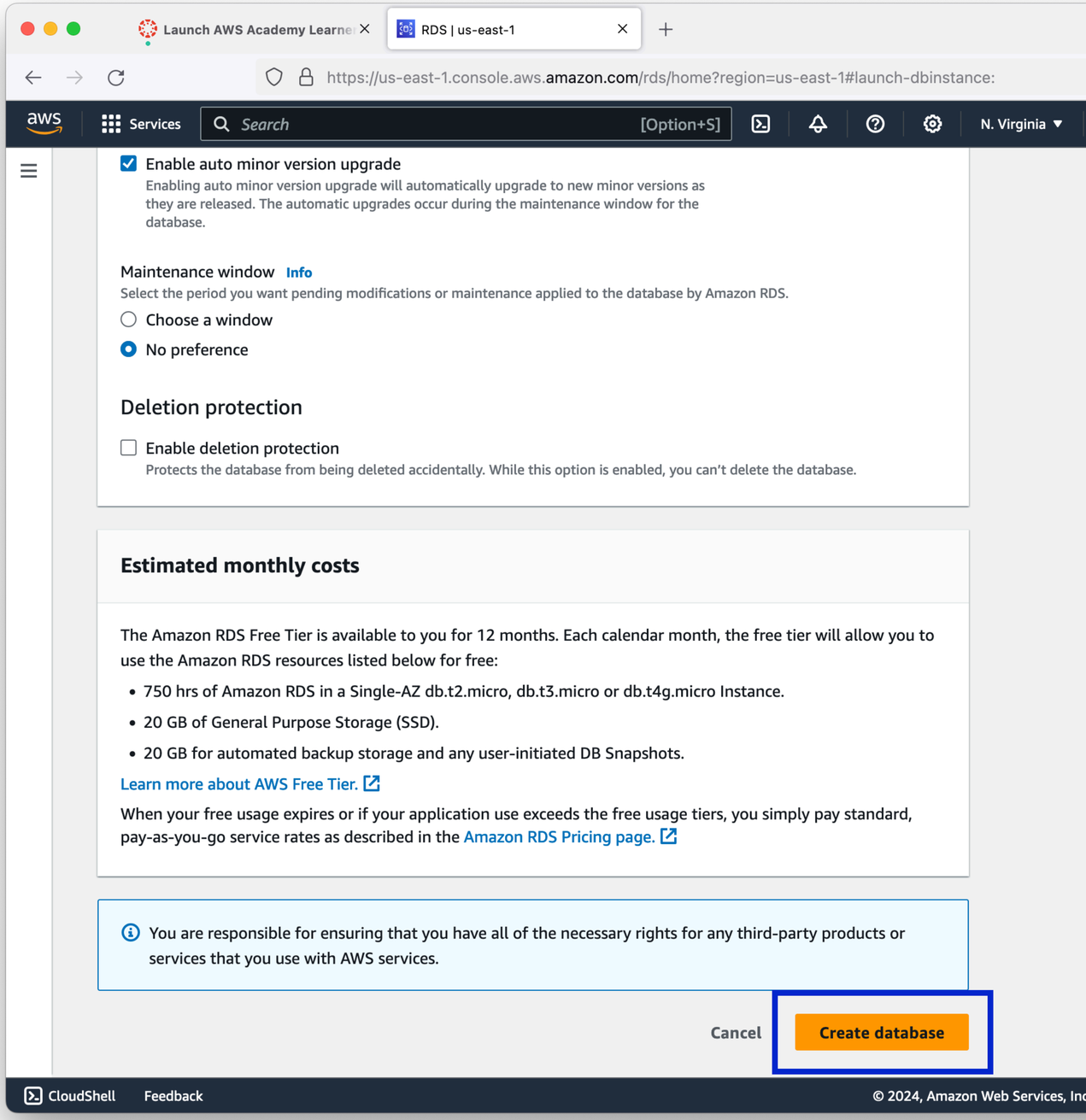
- Expand “Additional configuration”
- Disable automated backups
  - Automated backups are usually the correct default for things, but we really want to minimize costs for the class, and daily backups really add up!
- Disable encryption
  - Usually a good idea, keep it simple for class.



AWS RDS

Managed Database Service

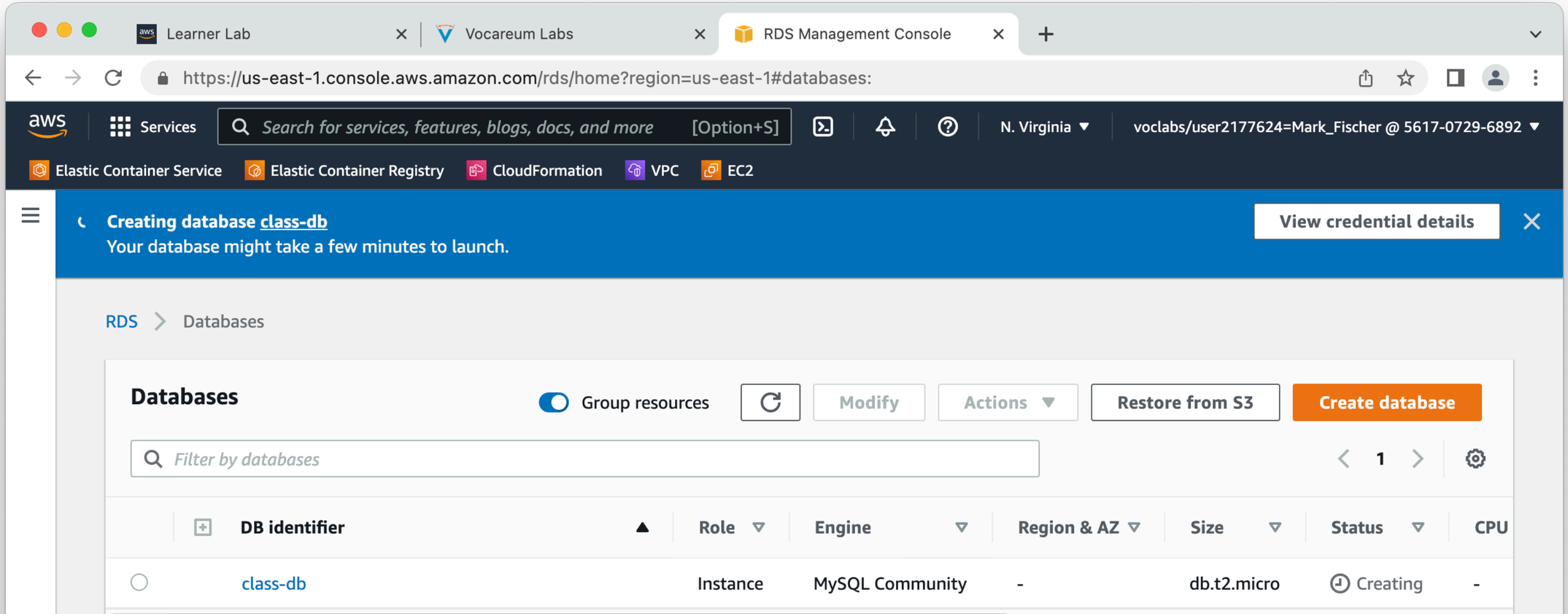
- Click “Create database”



AWS RDS

Managed Database Service

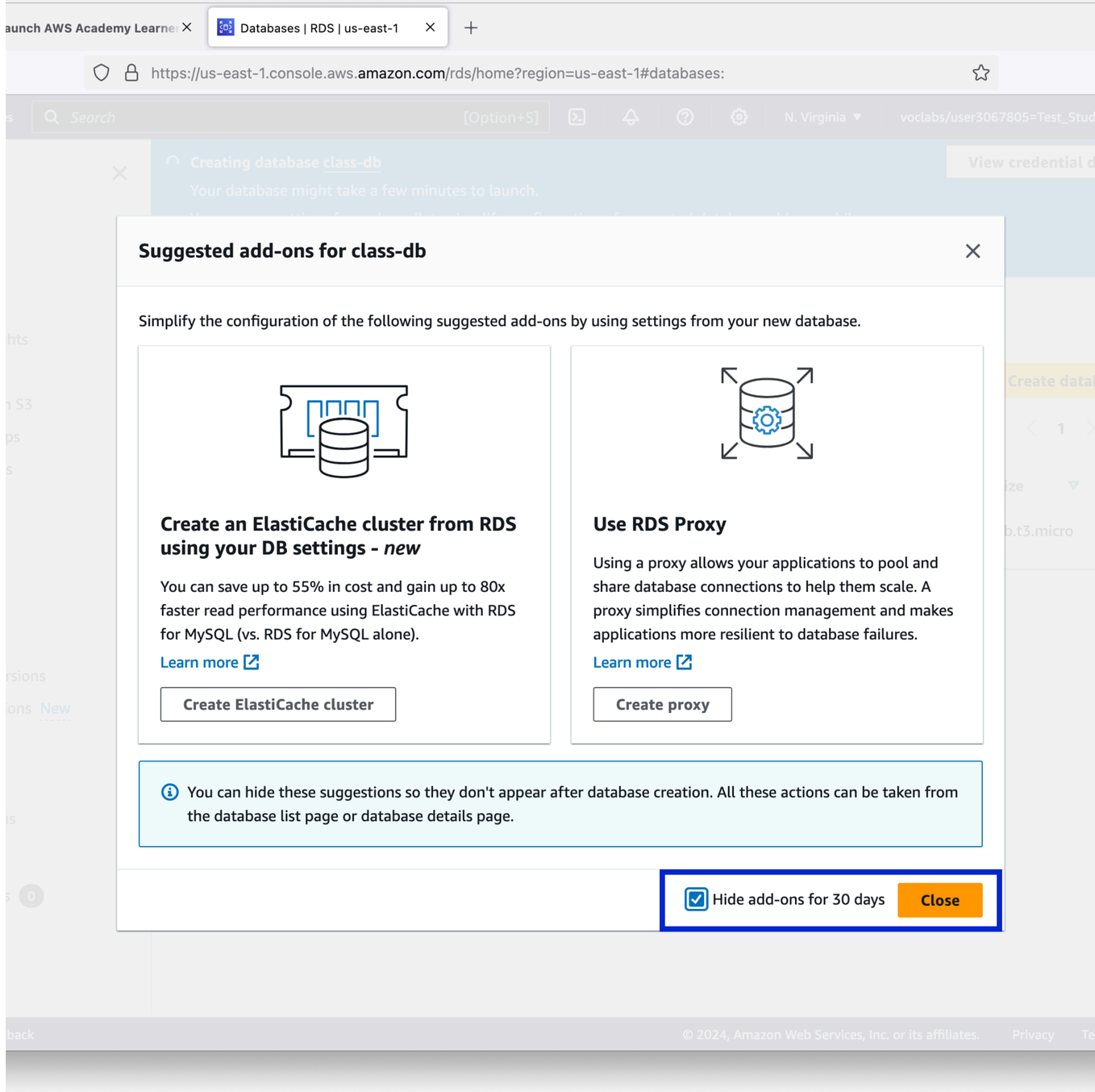
- Your database may take several minutes to be ready for use. The cloud is not instant 😜



AWS RDS

Managed Database Service

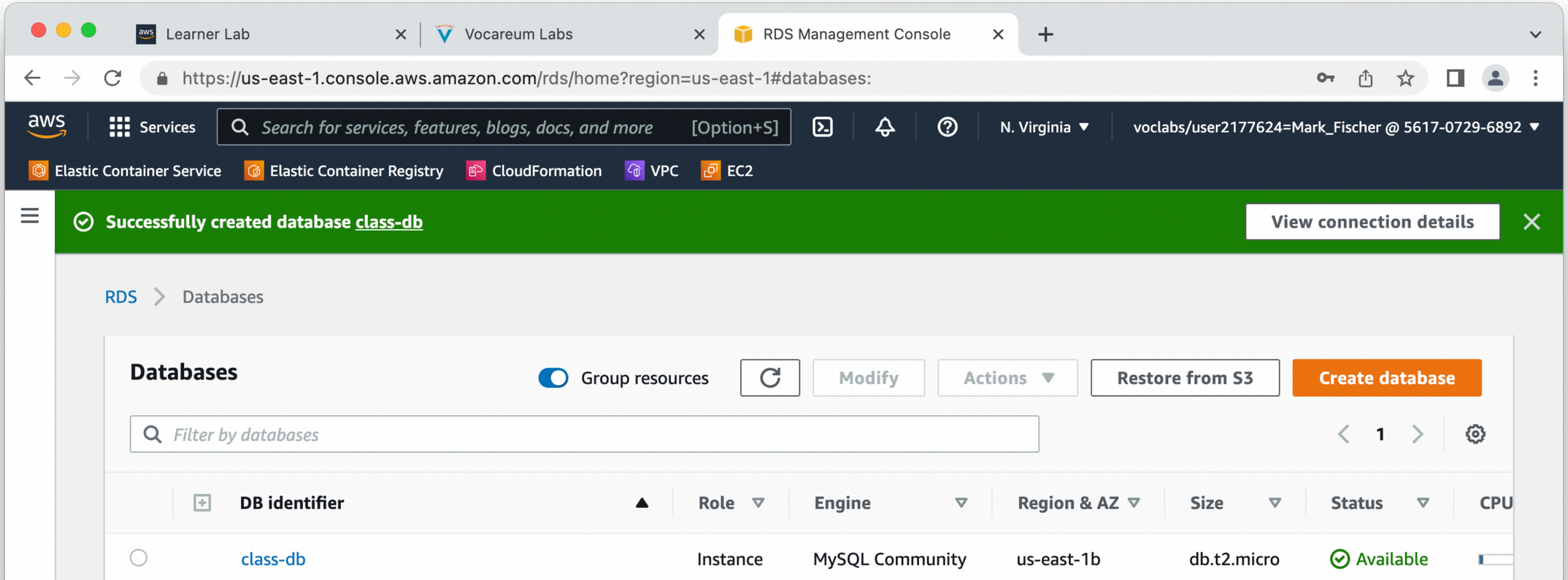
- Dark Patterns:
  - AWS now tries to up-sell you when creating things
  - Can only “hide” for 30 days!
  - You can avoid this by deploying resources through automation



AWS RDS

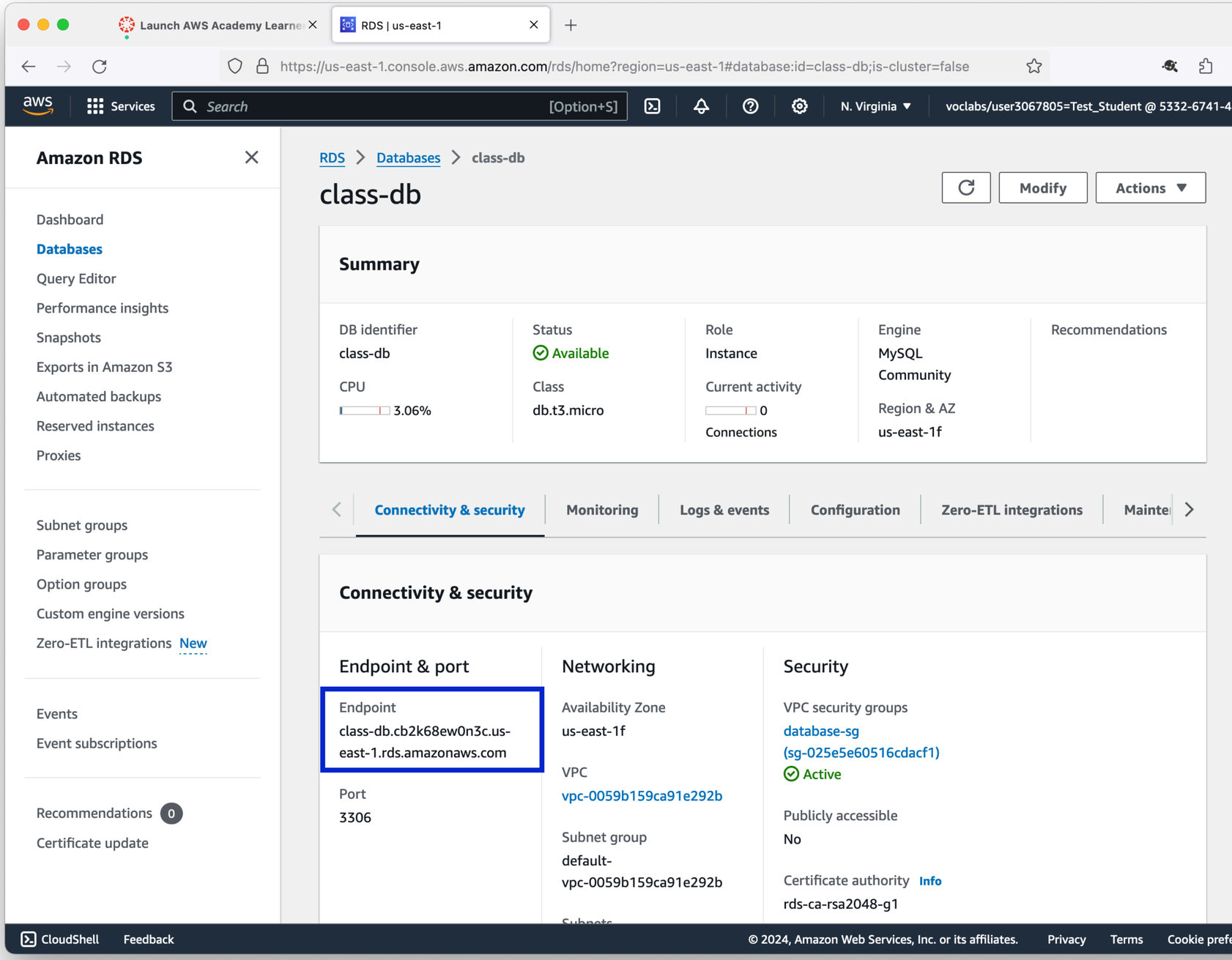
Managed Database Service

- Eventually your RDS instance will complete. This may take 5 minutes or more.
- Click on your database name to get details on it.



AWS RDS

- You will need to copy down the Endpoint domain name. This is how you will connect to your database from a server.



AWS RDS

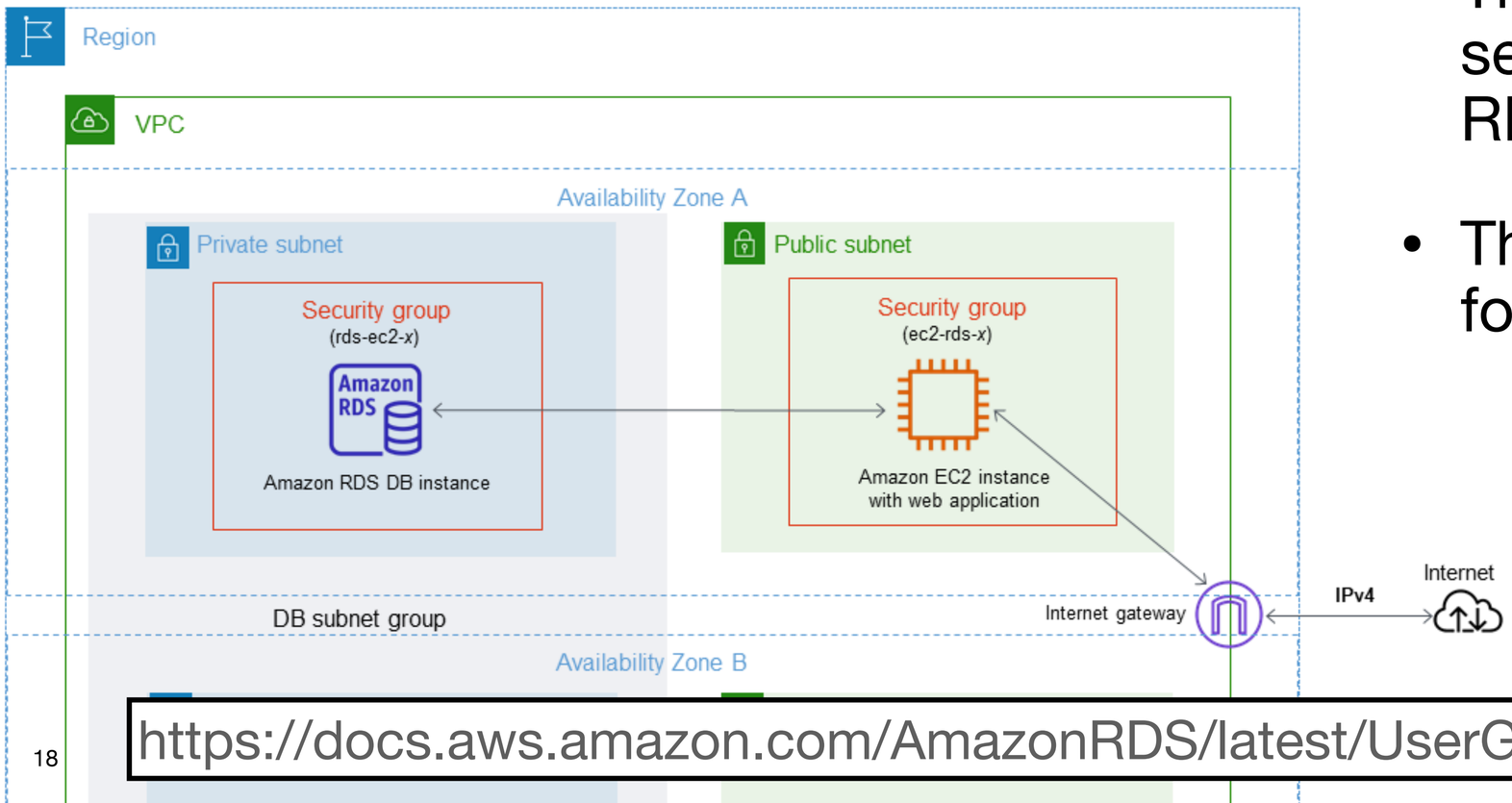
Security Groups

- 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

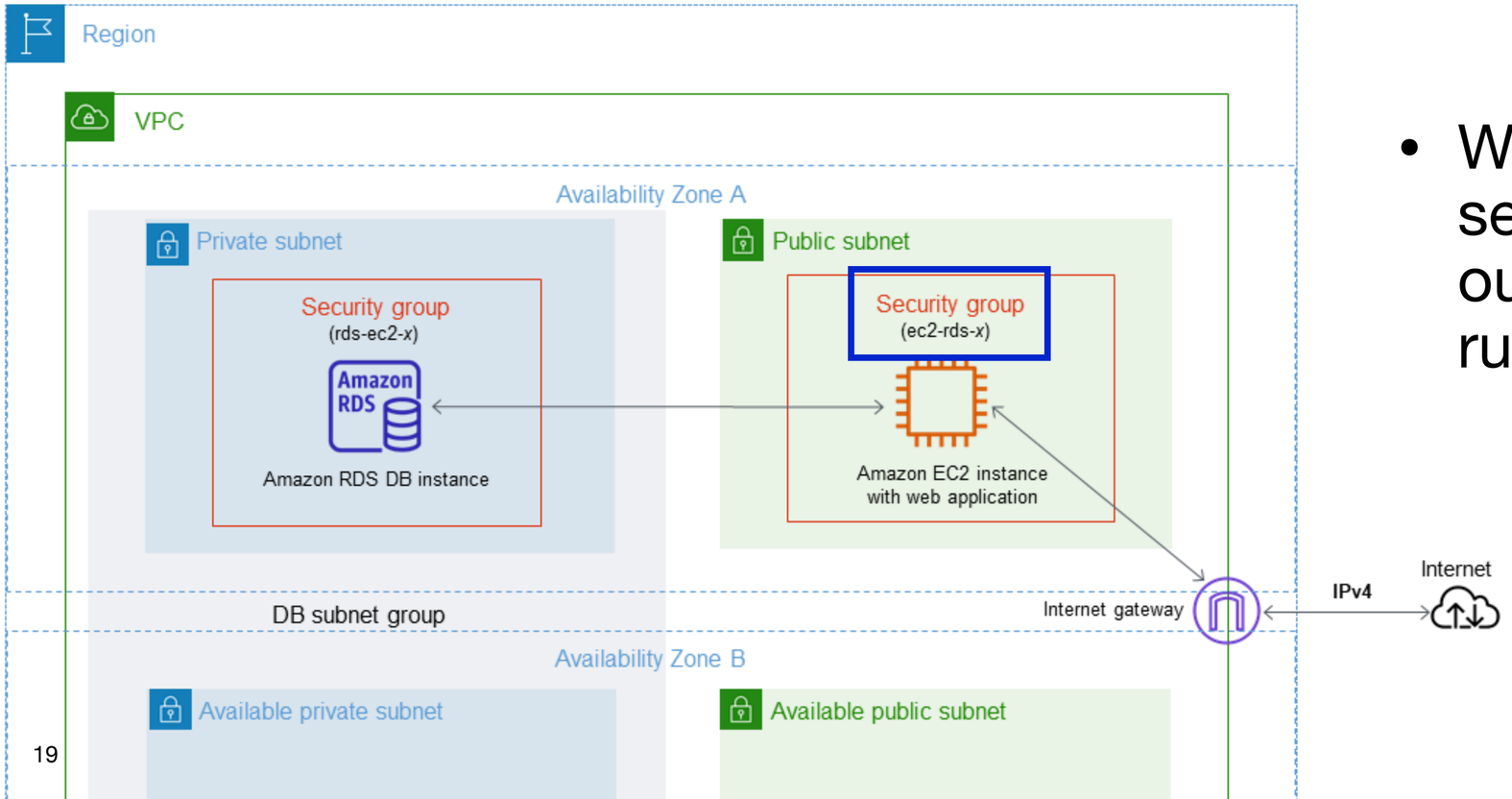
- With no public access, we must allow our EC2 instance access to the RDS instance
- This is done by allowing the security group attached to the RDS instance
- This is a very common pattern for cloud applications



https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/USER_VPC.Scenarios.html

AWS RDS

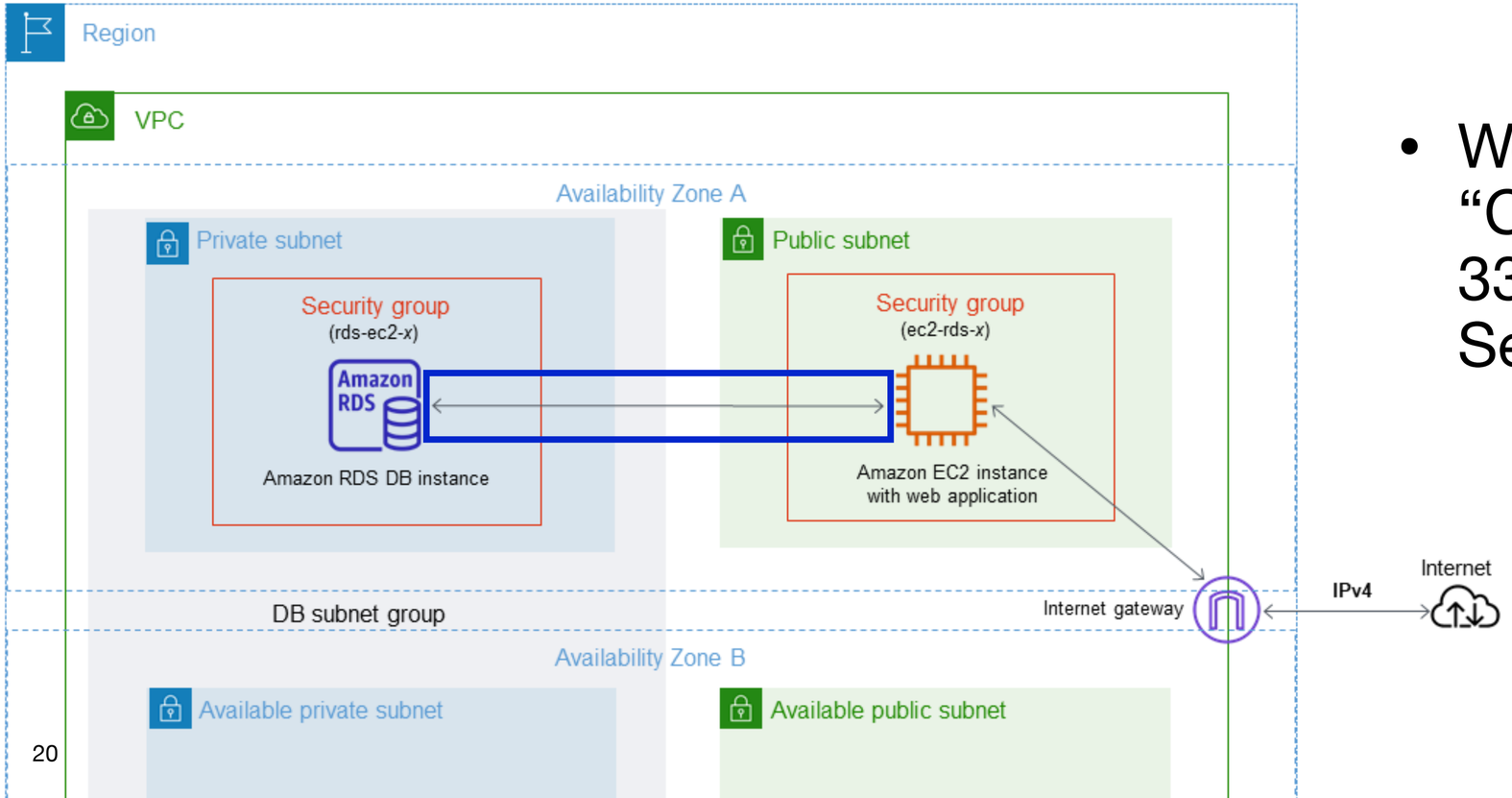
Security Groups



- We'll do this by adding the security group ID attached to our EC2 instance to the ingress rules of the RDS security group

AWS RDS

Security Groups

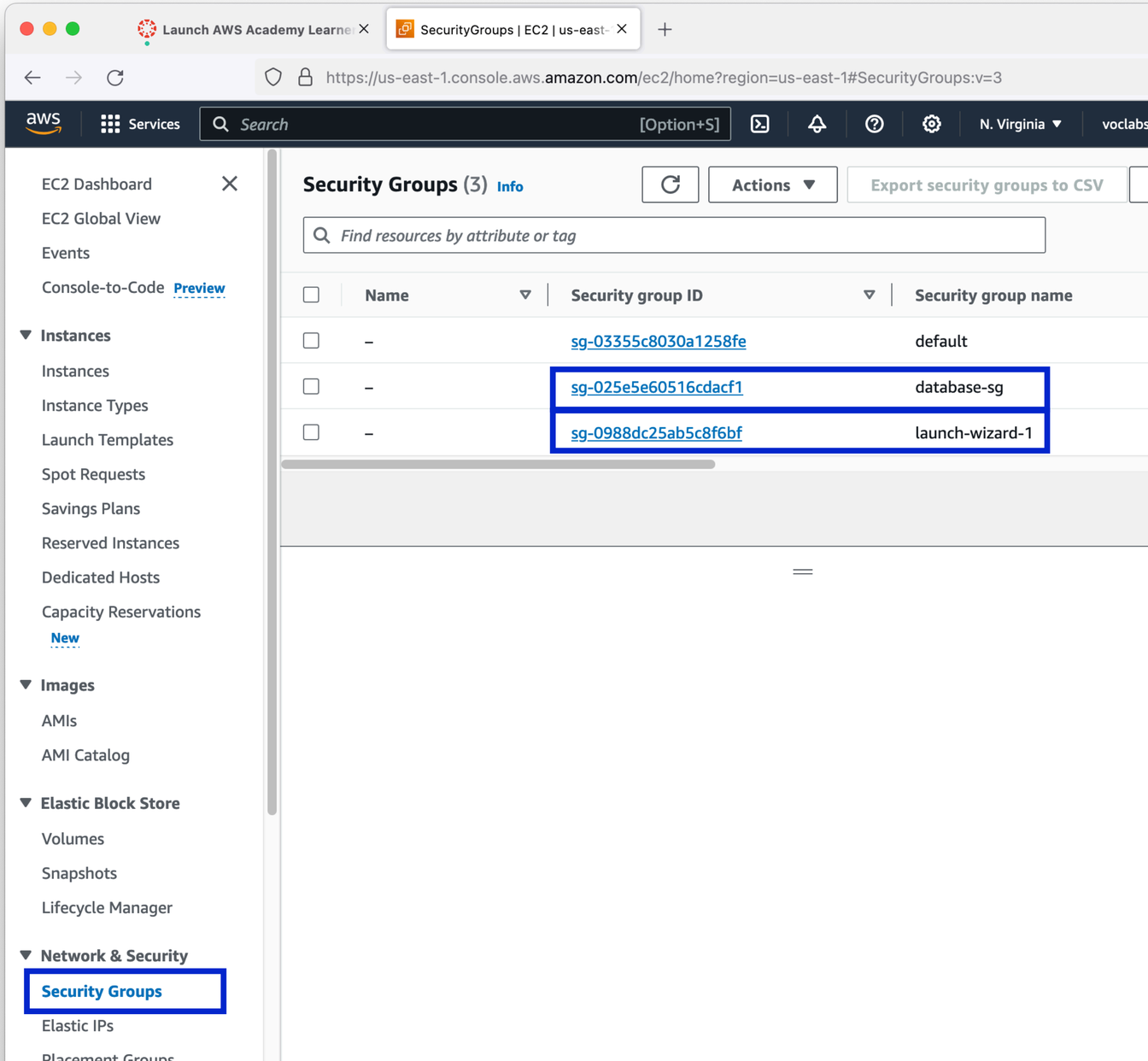


- We want to add a rule that says, “Connections to the DB [port 3306] are allowed from the EC2 Security Group.”

AWS RDS

Security Groups

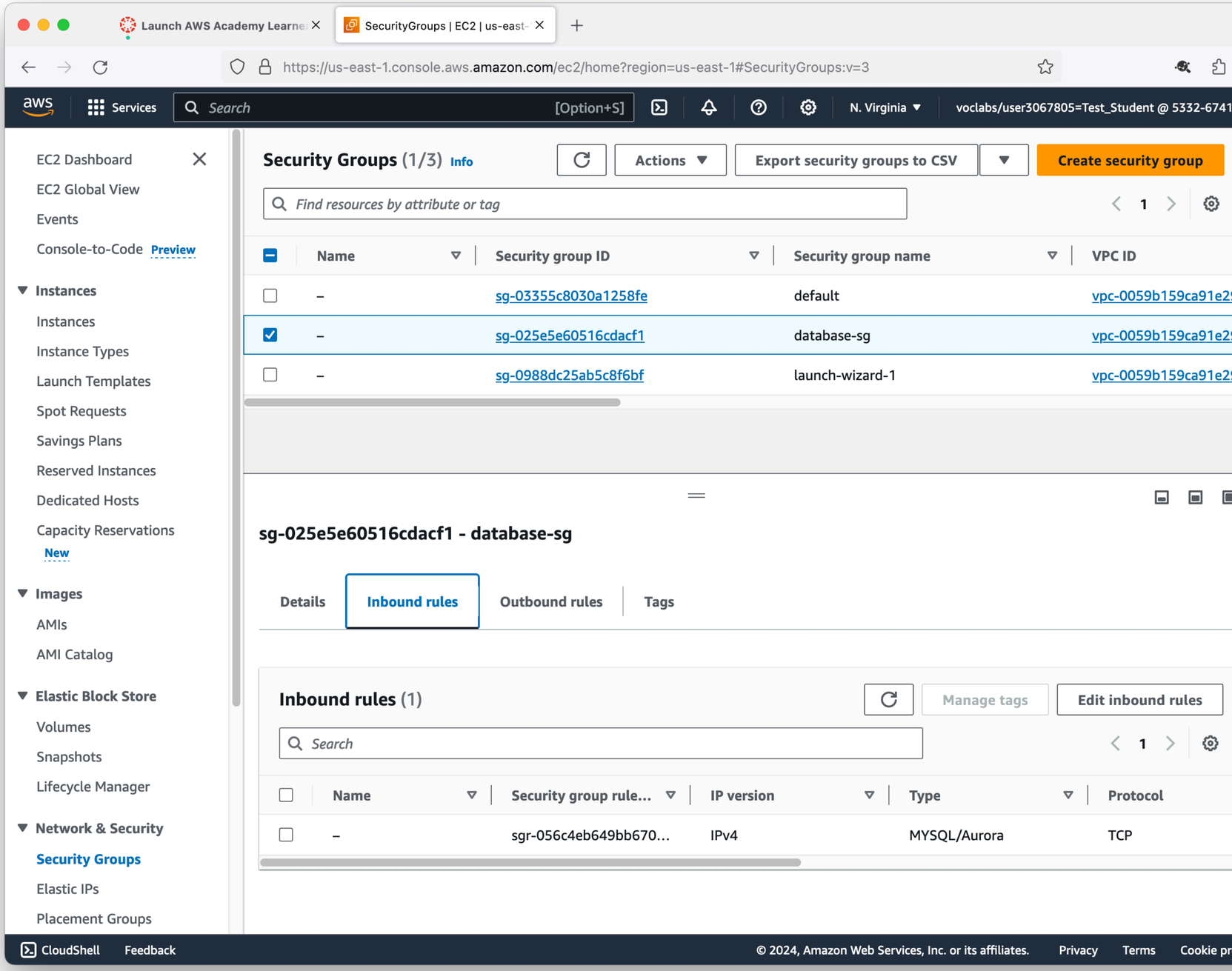
- In the EC2 console, select “Security Groups” from the left sidebar
- the launch-wizard-1 SG is the one attached to our EC2 instance
- The database-sg SG is attached to our database



AWS RDS

Security Groups

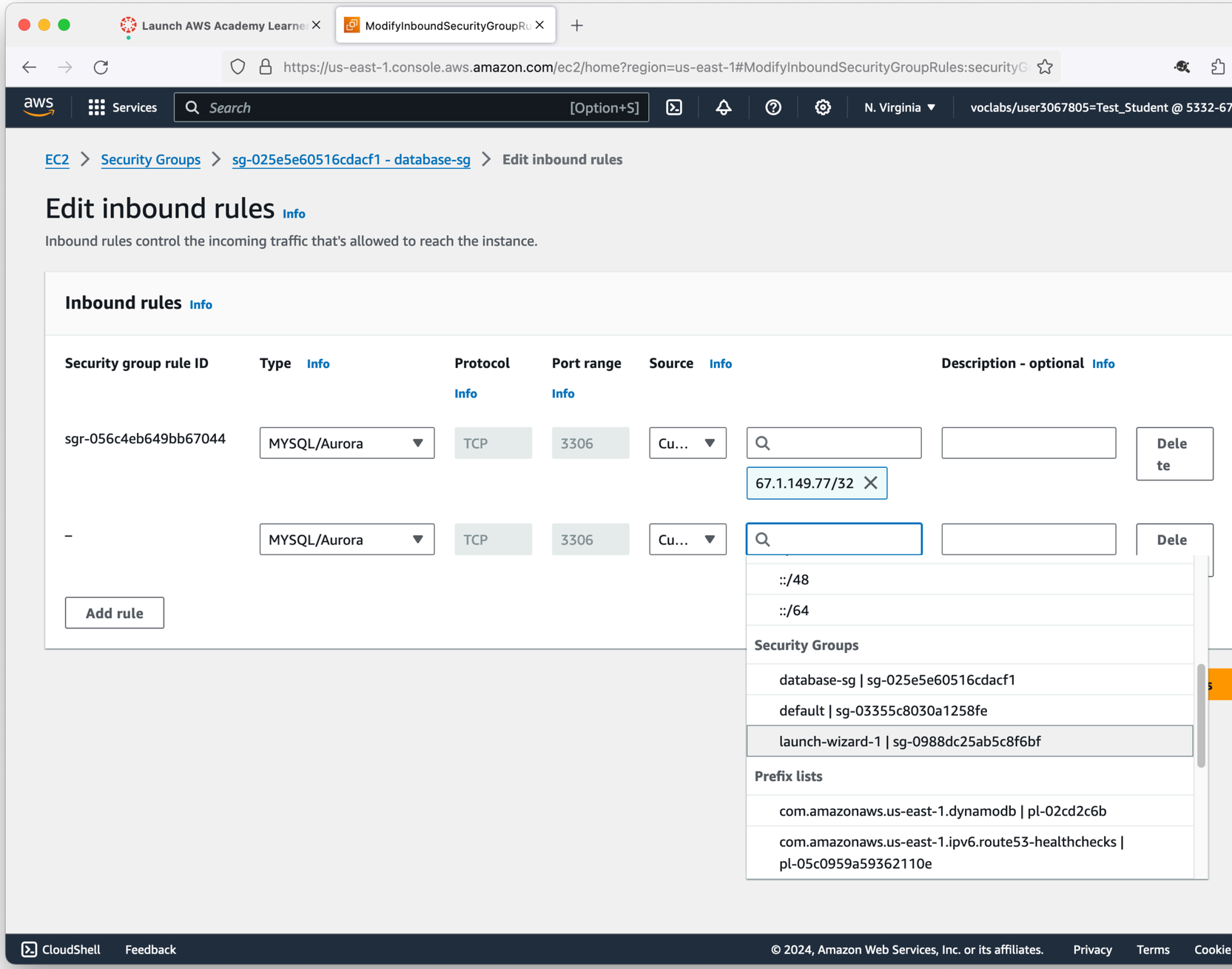
- We need to update the database security group, so select that one
- Then click “Edit inbound rules”



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

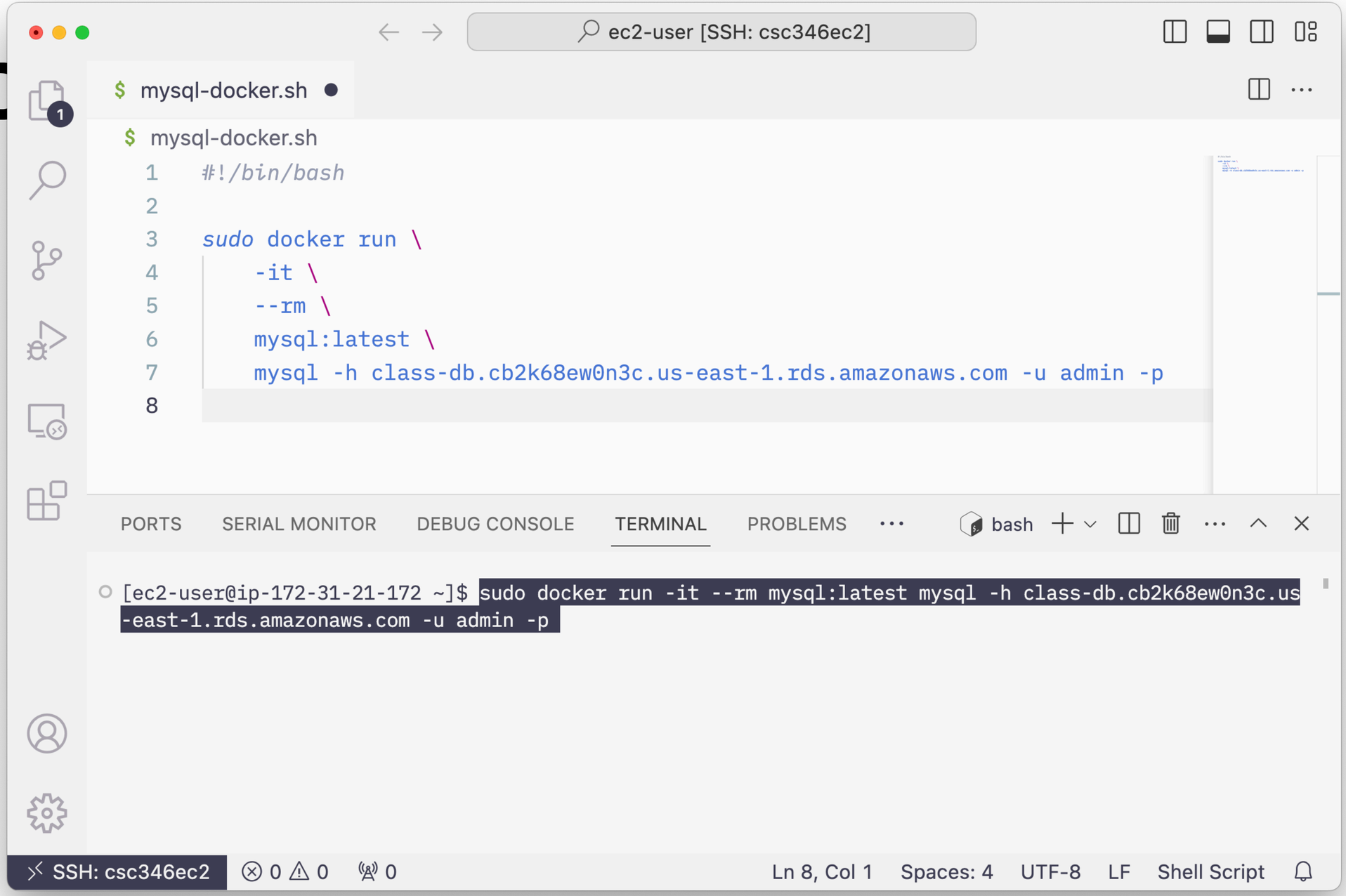
- Connect to your EC2 instance using your method of choice
- We need the mysql client software
- Docker!
- Use the hostname for your RDS instance, and the password you wrote down for the admin user (you did write down the password, right?)

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

ECS ➡ RD

Connecting at

- Docker lets us run programs without installing them permanently



ECS ➡ RD

Connecting at

- Docker lets us run programs without installing them permanently

ECS ➡ RDS

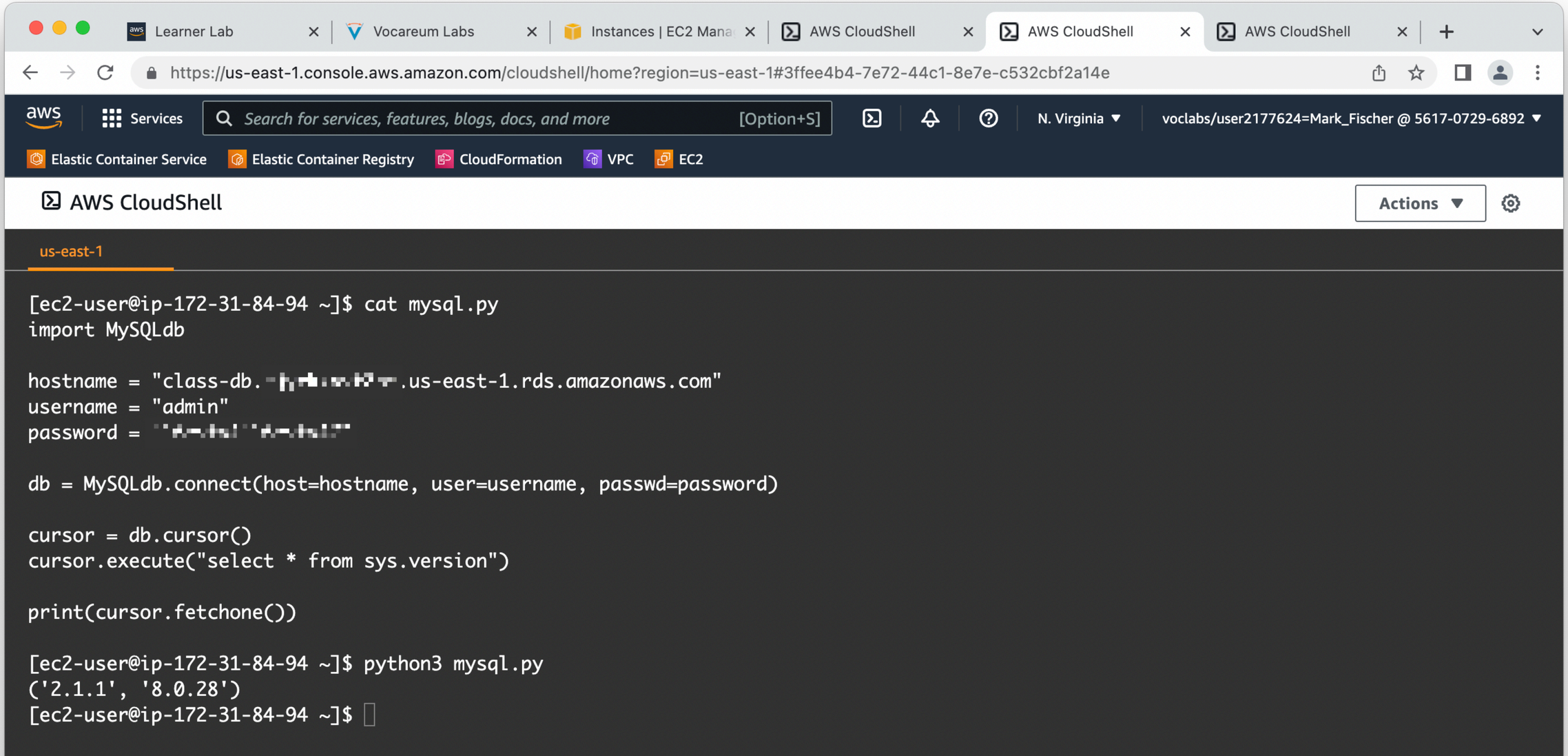
Connecting from python

```
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

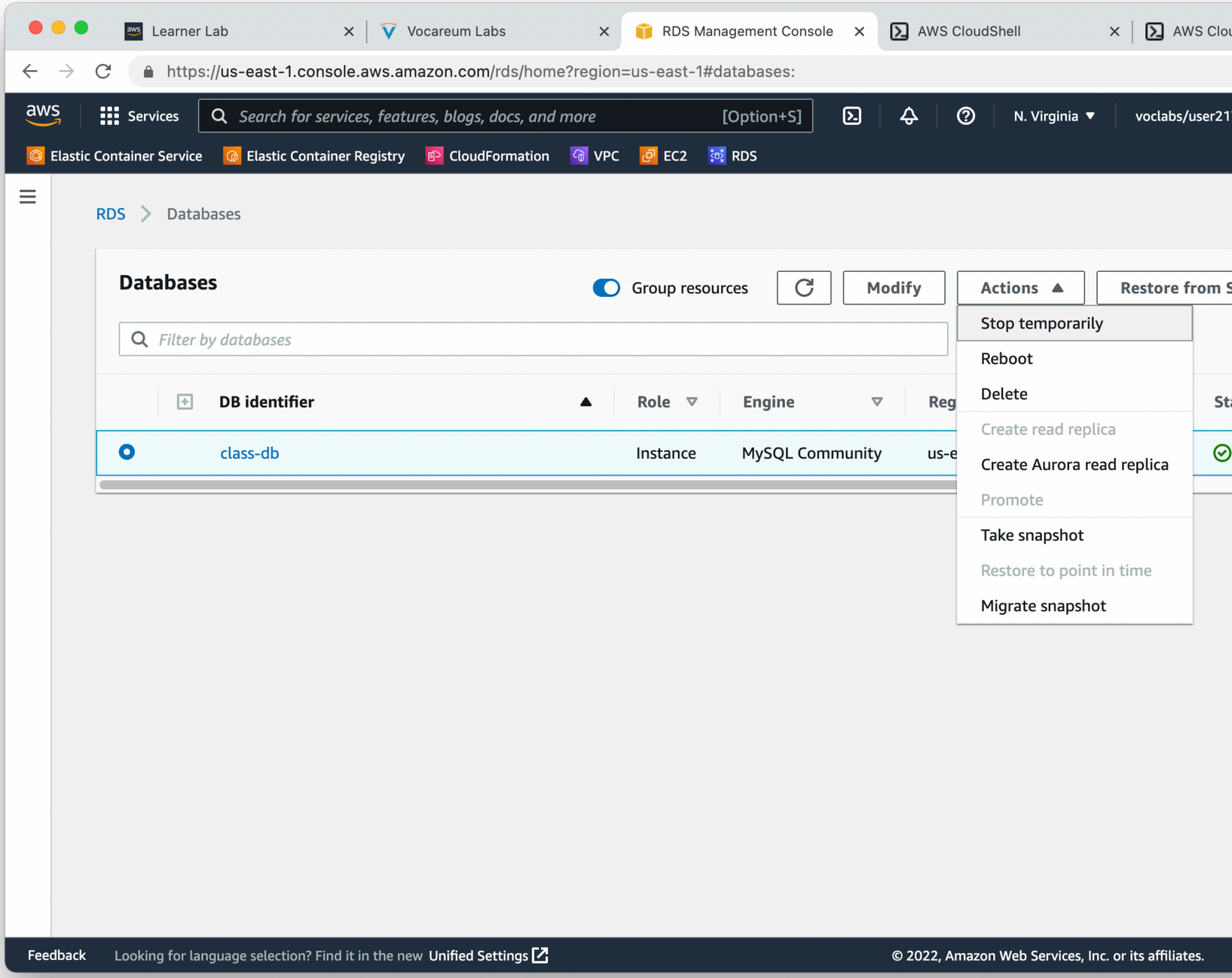
Connecting from python



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