

Project-1

Building a 3-tier web application architecture with AWS

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Intro:

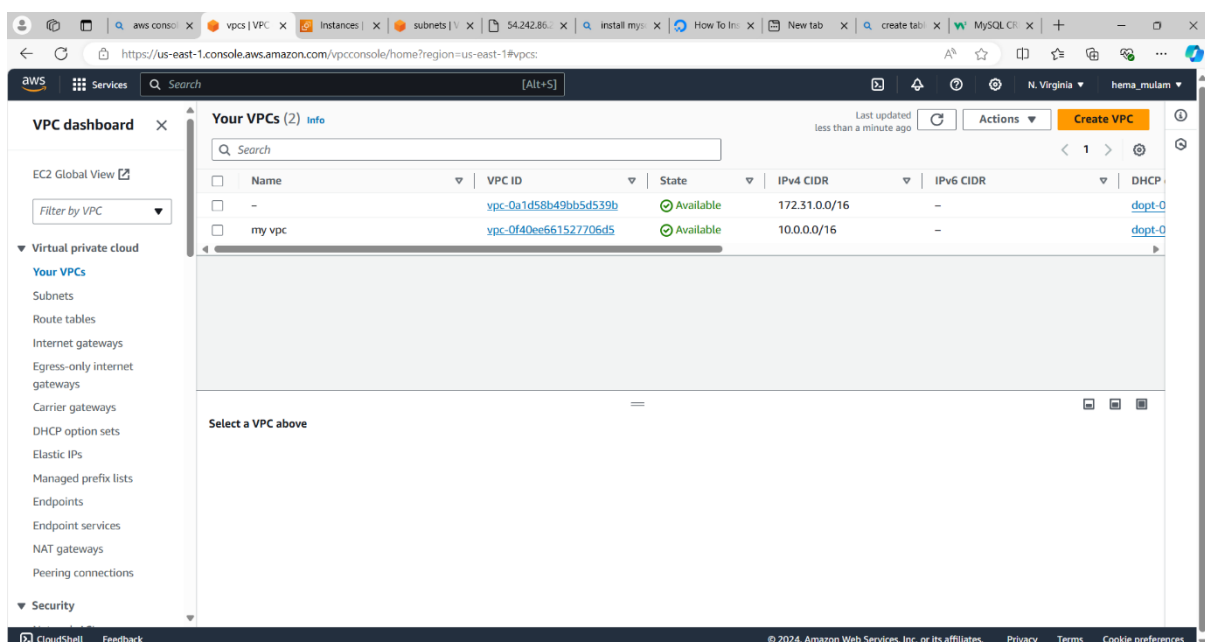
When building a cloud-based application, the underlying architecture and environment are just as critical as the application itself. There are many considerations when deciding on the proper architecture of your app:

1. **Scalability:** How easily and/or frequently does the app need to scale up or down? How much value do you put into not having to constantly micro-manage and monitor resource usage?
2. **Availability:** How readily available is your app? How important is being able to go through long periods of time without failures? If failure does occur in a part of your app, how vulnerable is the rest?
3. **Security:** How secure is your app? How does your app handle security permissions for different parts of your app? If an attack happens in one part of your app, how vulnerable is the rest?

Required AWS Services:

- 1) Virtual Private Cloud (Subnets – 6, Internet gate way – 1, Route tables – 2, Nat gate way – 1)
- 2) Elastic cloud Compute (EC2)
- 3) Load Balancer
- 4) Auto- Scaling Group
- 5) Relational Database Service (RDS)

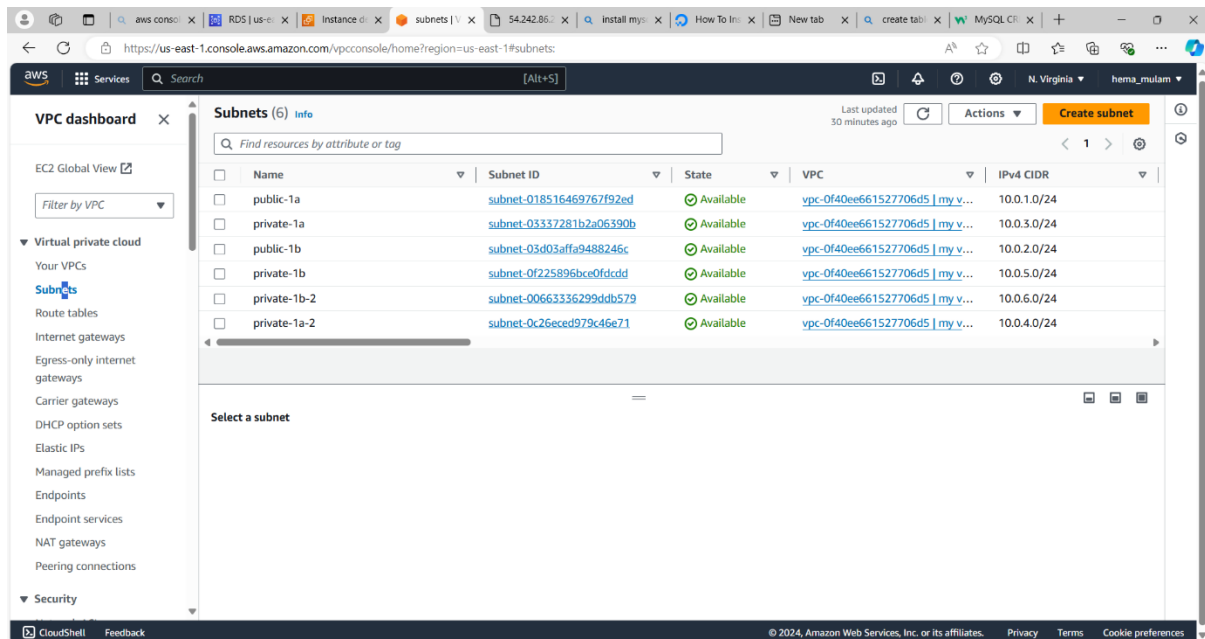
Create VPC :



- Go to VPC dashboard click on create VPC.

- Click on VPC only and name tag as my vpc.
- Give IPV4 CIDR (classless inter domain routing) as 10.0.0.0/16.
- Click on VPC, it is created.

Create Subnets :



- Create 6 subnets (2-public, 4-private).

Create first subnet

- Click on subnet, click on create subnet, select our VPC (my vpc).
- Give name tag as public-1a, select availability zone as us-east-1a. Give CIDR as 10.0.1.0/24 and created it.

Create Second subnet

- Click on subnet, click on create subnet, select our VPC (my vpc).
- Give name tag as public-1b, select availability zone as us-east-1b. Give CIDR as 10.0.2.0/24 and created it.

Create Third subnet

- Click on subnet, click on create subnet, select our VPC (my vpc).
- Give name tag as private-1a, select availability zone as us-east-1a. Give CIDR as 10.0.3.0/24 and created it.

Create fourth subnet

- Click on subnet, click on create subnet, select our VPC (my vpc).

- Give name tag as private-1a-2, select availability zone as us-east-1a. Give CIDR as 10.0.4.0/24 and created it.

Create FIFTH subnet

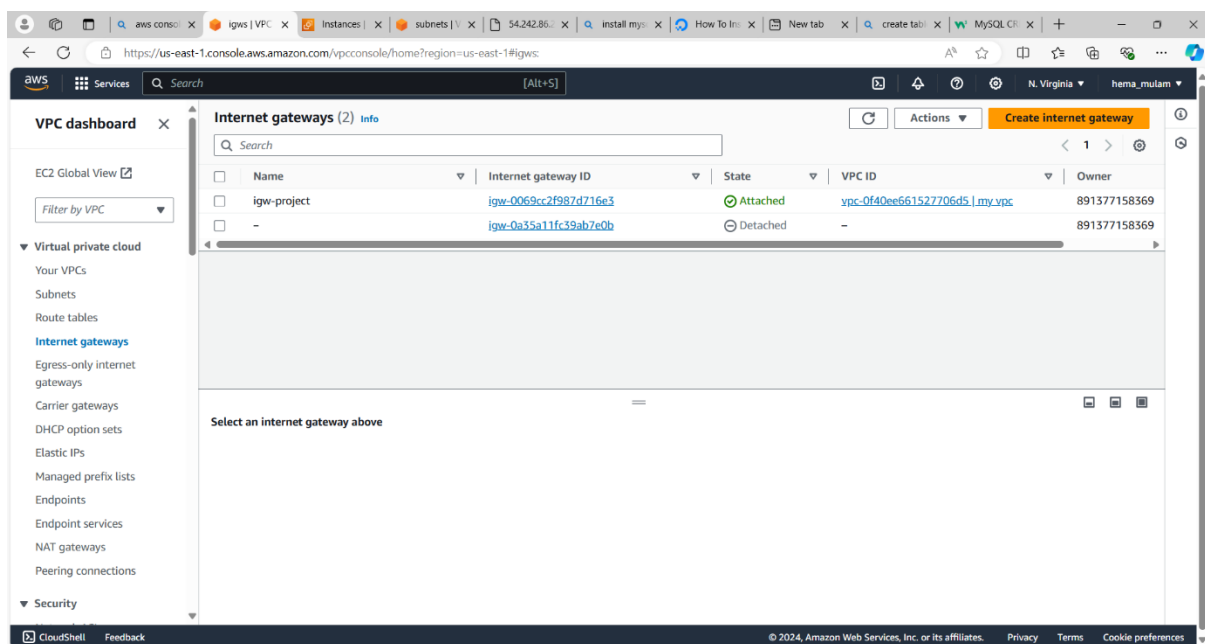
- Click on subnet, click on create subnet, select our VPC (my vpc).
- Give name tag as private-1b, select availability zone as us-east-1b. Give CIDR as 10.0.5.0/24 and created it.

Create SIXTH subnet

- Click on subnet, click on create subnet, select our VPC (my vpc).
- Give name tag as private-1b-2, select availability zone as us-east-1b. Give CIDR as 10.0.6.0/24 and created it.

Create Internet gateway:

Click on Create internet gateway with name tag as igw-project.



This internet gateway is attached to VPC.

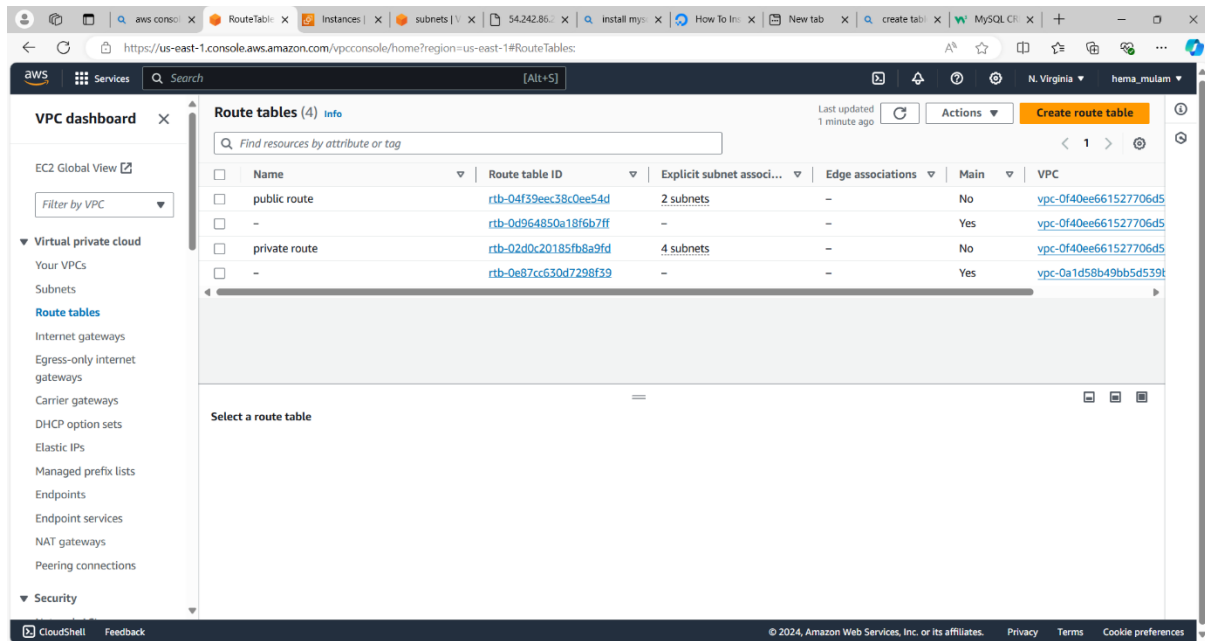
- Go to actions in internet gateway and click on attach to VPC
- Select our VPC (my vpc). Click on attach internet gateway.

Create Route Tables :

Public Route Table:

- Click on create route table and create route with the name public route.

- Select our VPC (my vpc), create it. Click on route table id, open it.
- Go down click on edit subnet association.
- Select both public subnet and click on save association. Go to actions click on edit routes.
- Click on add routes give all traffic (0.0.0.0/0) and select our internet gateway, save changes.

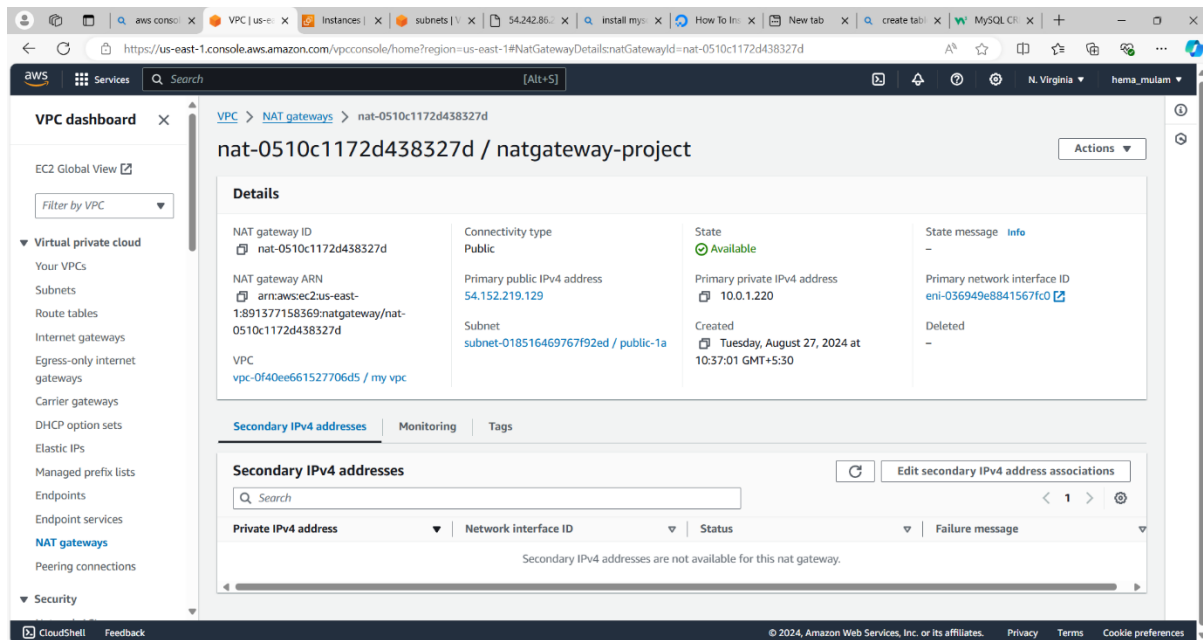


Private Route Table:

- Click on create route table and create it with a name as private route.
- Select our VPC, (my vpc), create it.
- Click on route table id, open it.
- Go down click on edit subnet association.
- Select all private subnet and click on save association.

Create NAT gateway:

- Create NAT gateway with name as natgateway-project.
- Select public subnet(private-1a).
- Select connectivity type as IPV4.
- Click on allocate Elastic IP

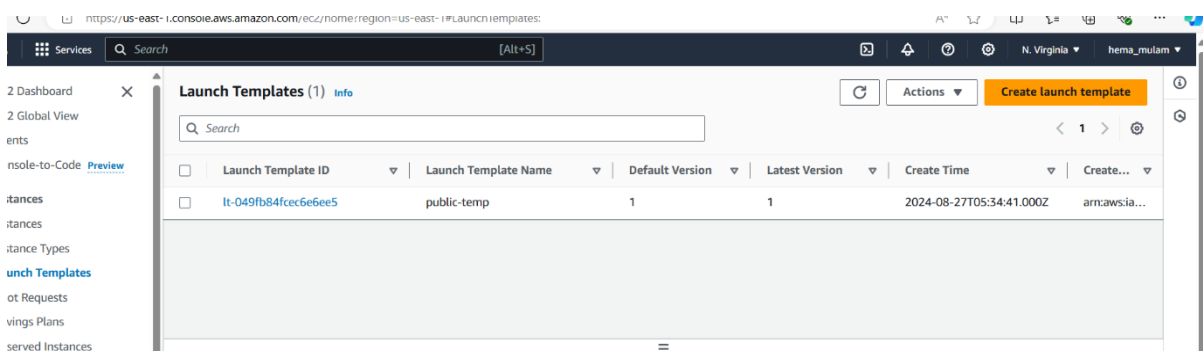


Now go to private route and click on actions.

- Click on edit routes and add route.
- Give all traffic (0.0.0.0/0) and select NAT gateway.

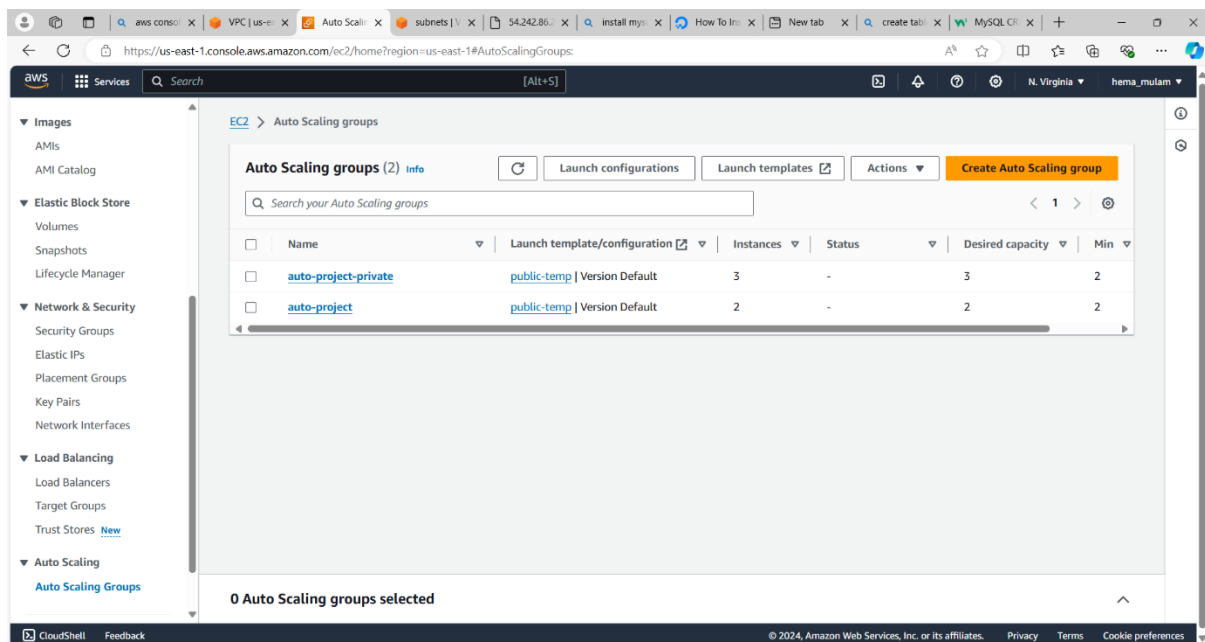
Create Autoscaling Groups:

- For creating autoscaling group we need to create an launch template.
- Click on create a launch template.
- Template name as public-temp.

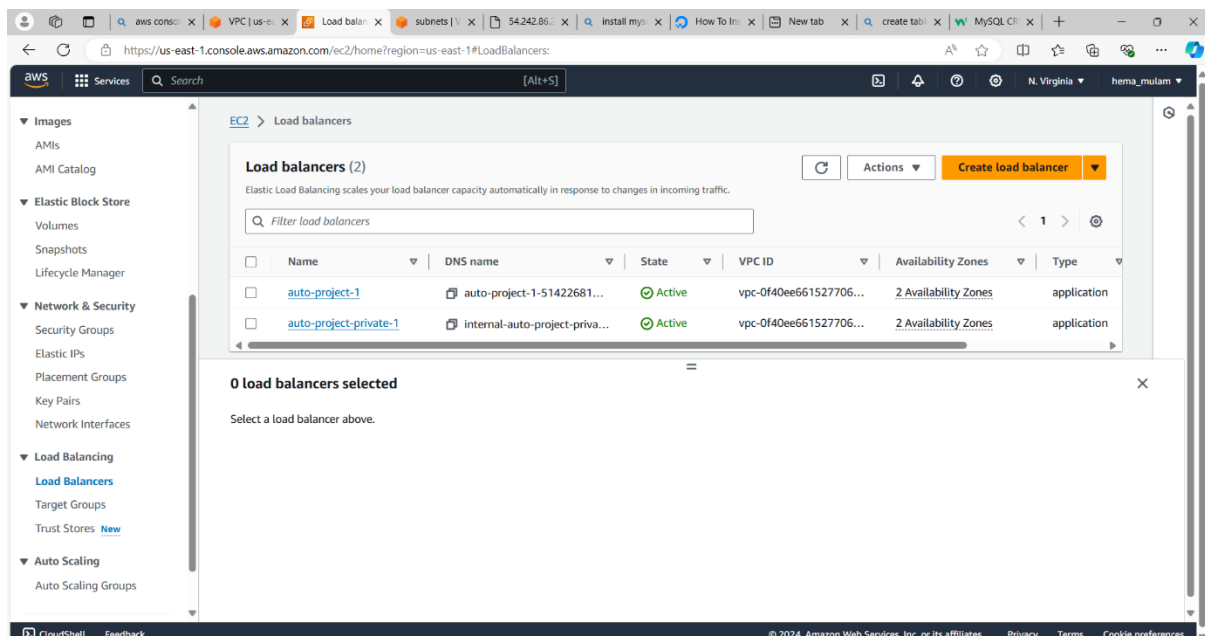


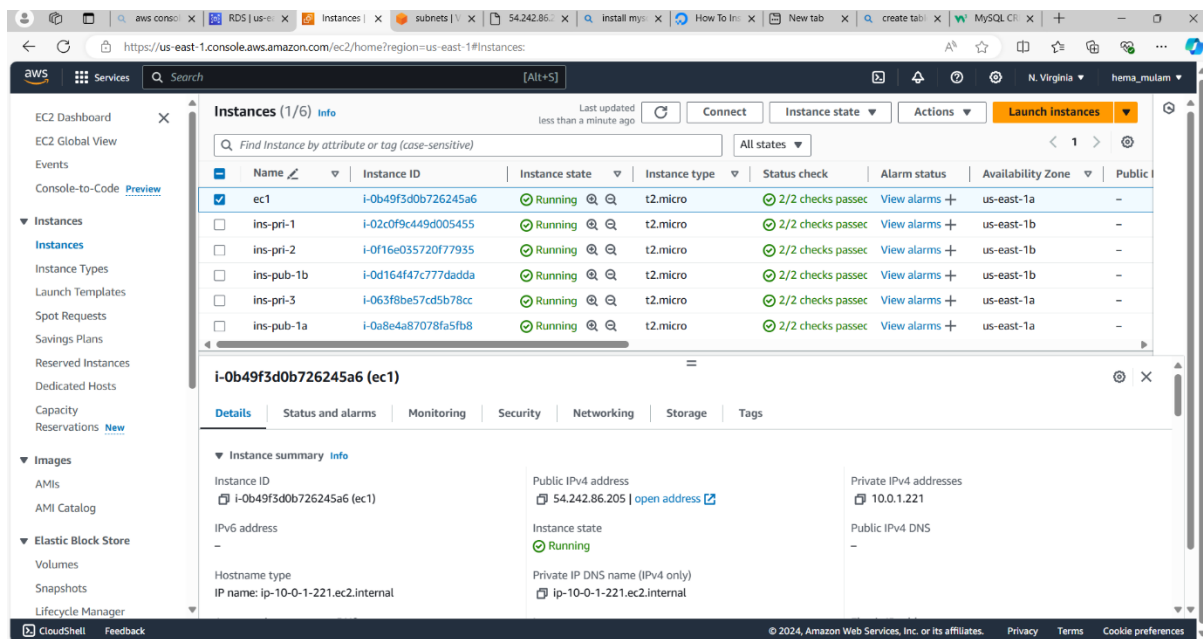
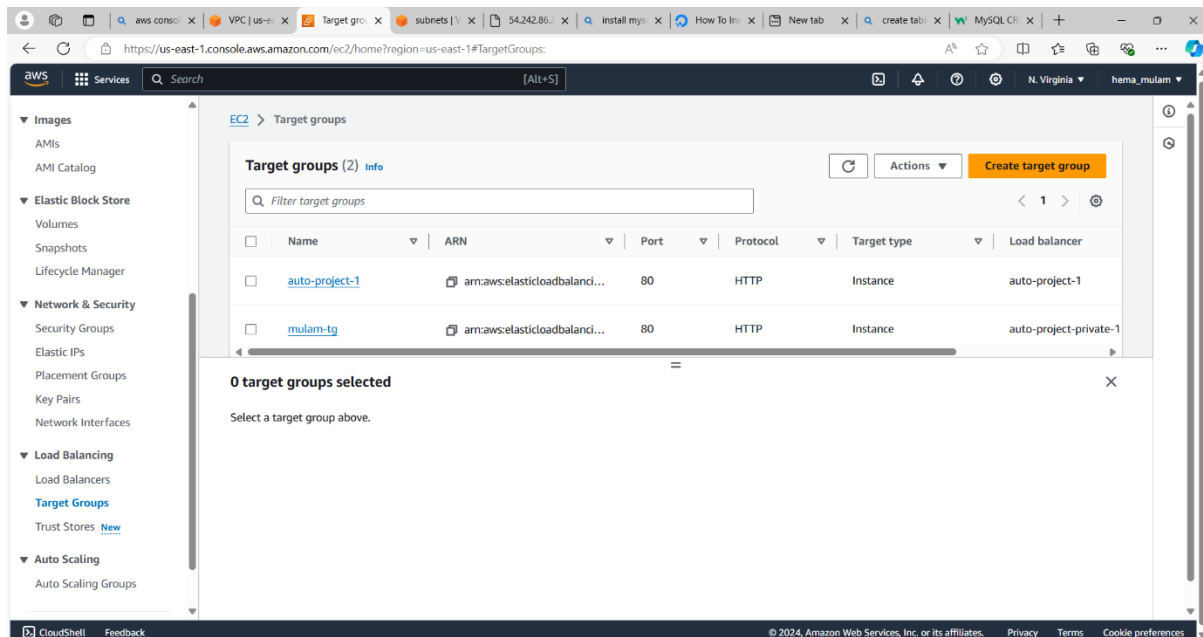
- After creating template go to auto scaling groups
- Create two auto scaling groups as auto-project and auto-project-private.
- Choose the created launch template and click on next.
- Select our VPC (my vpc), and both public subnets for auto-project.
- Select our VPC (my vpc), and both private subnets for auto-project-private.

- At the time of creating auto scaling groups automatically we will create load balancer & target groups & Ec2 instances.



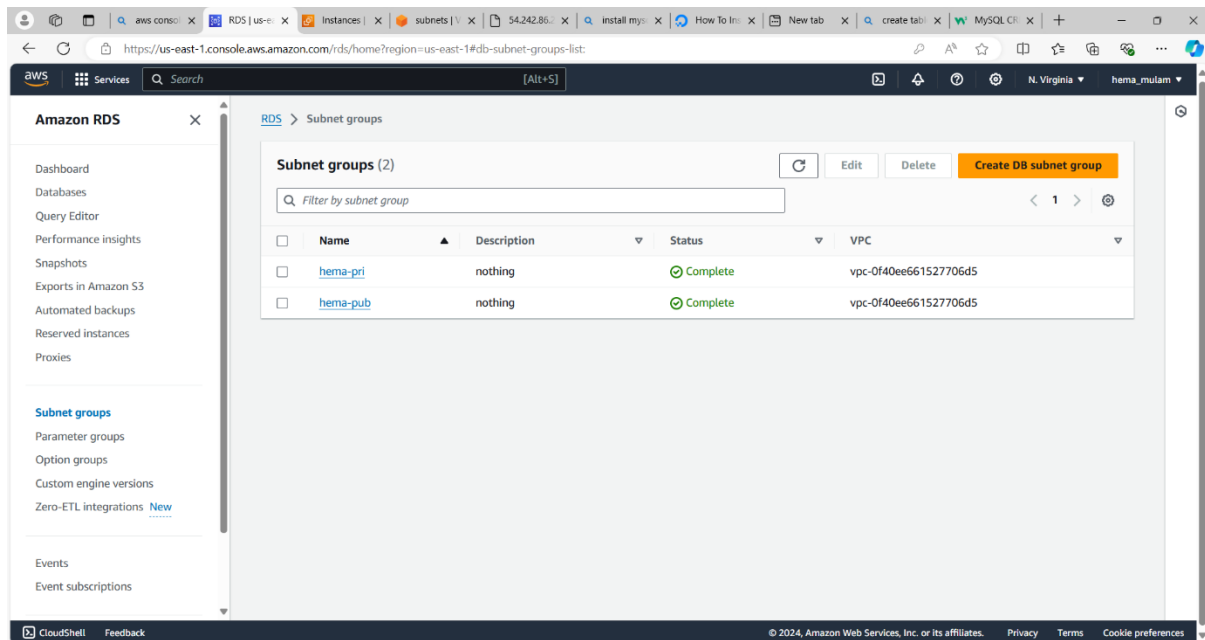
- We create a load balancer as auto-project-1 and target group as auto-project-1 for auto-project auto scaling group
- And we create a load balancer as auto-project-private-1 and target group as hema-tg for auto-project-private auto scaling group





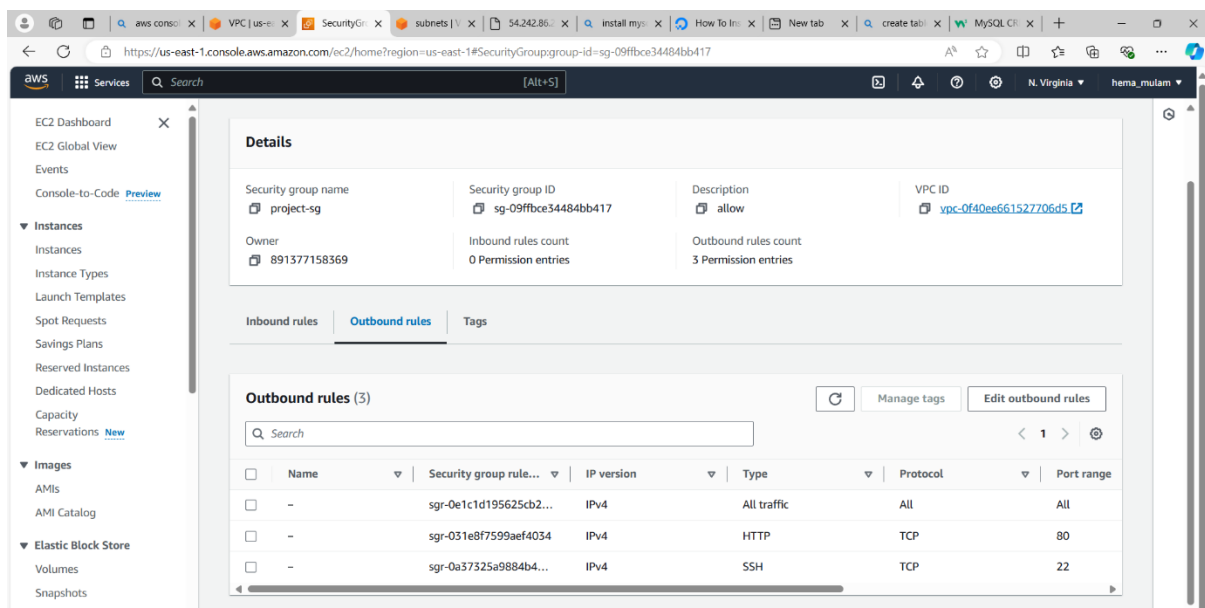
Create Subnet groups in RDS:

- Create two subnet groups as hema-pub for public subnet , hema-pri for private subnet and description nothing.
- Select created VPC.
- Give availability zones and select private subnets from each zone.
- Create the DB subnet group.

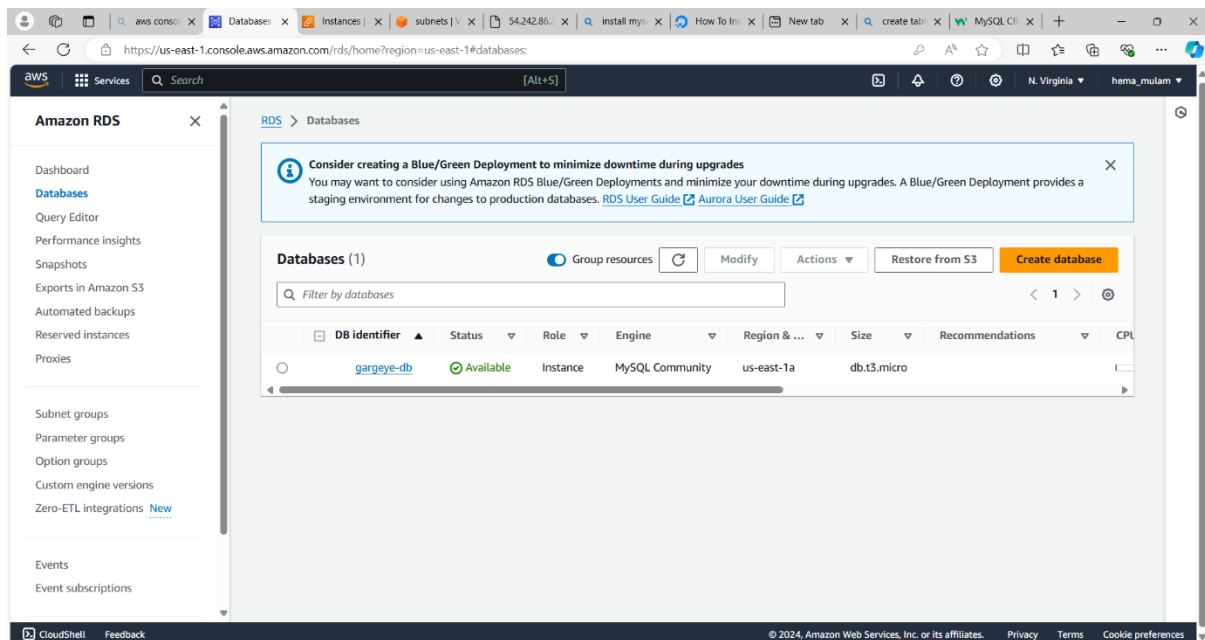


Create Database (RDS):

- Click on create database, select standard create, select engine type as MySQL.
- Select templates as production and select multi-AZ DB cluster.
- Select on self-managed, give password and confirm the password.
- Select memory optimized class.
- In connectivity, click on Don't connect to the EC2 compute resource and select created vpc (my vpc).
- Select subnet group and give public access as yes.



- Go to VPC dashboard, click on VPC, click on actions, go to edit VPC settings and click on the enable DNS hostnames.
- Create the database (gargeye-db)



Establish connection:

- Go to EC2 instance, click on public-east-1a, through public instance we will connect to private instance through pem file and connect to private instance and after that .
- Give commands as:
 1. `sudo -i` (convert from normal user to root user).
 2. `apt update -y`
 3. `sudo apt install mysql-server` (to install mysql).
- After installing mysql connect to rds server through the RDS EndPoint and provide user name and password.

```

root@ip-10-0-1-221:~# mysql -h gargeye-db.c3mksuokc144.us-east-1.rds.amazonaws.com -u admin -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 26
Server version: 8.0.35 Source distribution

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owners.

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

mysql> show databases;
+-----+
| Database |
+-----+
| information_schema |
| mysql |
| performance_schema |
| sys |
+-----+
4 rows in set (0.00 sec)

mysql> create database hema;
Query OK, 1 row affected (0.01 sec)

mysql> show databases;
+-----+
| Database |
+-----+

```

Now we can see that we are connected to MySQL server.

Use commands like:

- show databases; (to show the list of databases are there)
- create database project; (to create a new database)
- use project (database).
- create a table using this command

```

CREATE TABLE Persons (
    PersonID int,
    LastName varchar(255),
    FirstName varchar(255),
    Address varchar(255),
    City varchar(255)
);

```

Insert the fiels and the values

```

INSERT INTO Reddy (PersonID, LastName, FirstName, Address, City)
Values ('101', 'hema', 'hemalatha', 'guntur', 'hyderabad');

```

- To see the content in the table
- Use command select * from Persons; (to check the content in table)

```

-> -> 'Emp_ID' varchar(20) NOT NULL,
-> -> 'Name' varchar(255) NOT NULL,
-> -> 'Age' INT NOT NULL,
-> -> 'Phone_No' varchar(10) NOT NULL,
-> ->
-> -> 'Address' varchar(100) NOT NULL
-> -> PRIMARY KEY (Emp_ID)
-> -> ;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near '-> 'Emp_ID' varchar(20) NOT NULL,
-> 'Name' varchar(255) NOT NULL,
-> 'A' at line 2
mysql> CREATE TABLE Persons (
-> PersonID int,
-> LastName varchar(255),
-> FirstName varchar(255),
-> Address varchar(255),
-> City varchar(255)
-> );
Query OK, 0 rows affected (0.05 sec)

mysql> INSERT INTO Persons(PersonID,LastName,FirstName,Address,City)
-> Values('101','hema','hemalatha','guntur','hydrabad');
Query OK, 1 row affected (0.00 sec)

mysql> select * from Persons;
+-----+-----+-----+-----+-----+
| PersonID | LastName | FirstName | Address | City |
+-----+-----+-----+-----+-----+
| 101 | hema | hemalatha | guntur | hydrabad |
+-----+-----+-----+-----+-----+
1 row in set (0.00 sec)

mysql> |

```