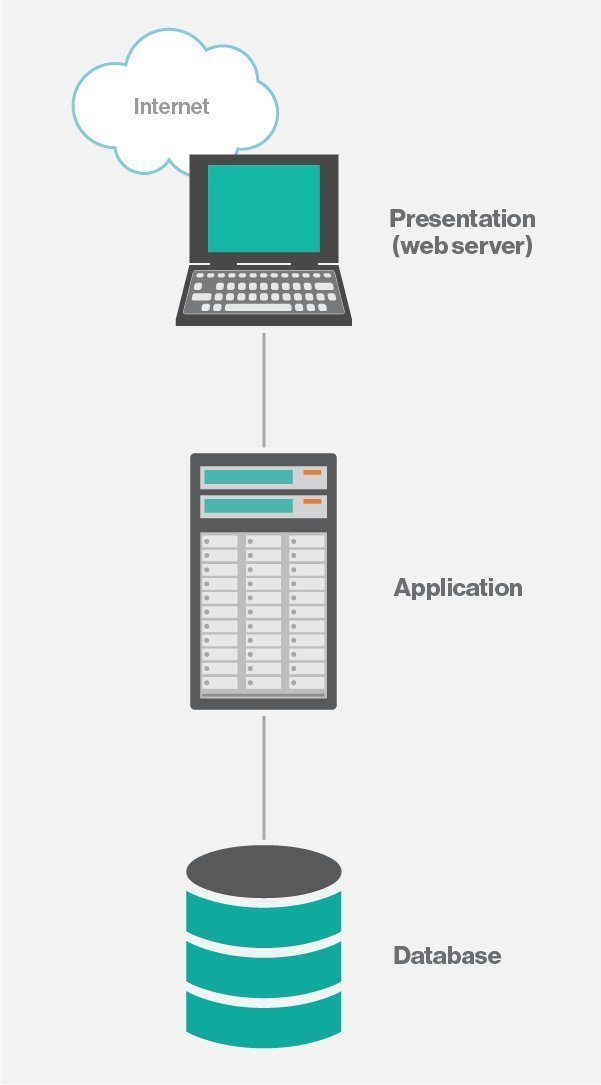
**3 tier Architecture of aws.**

Before start the practical I will explain you how 3 tier architecture works.

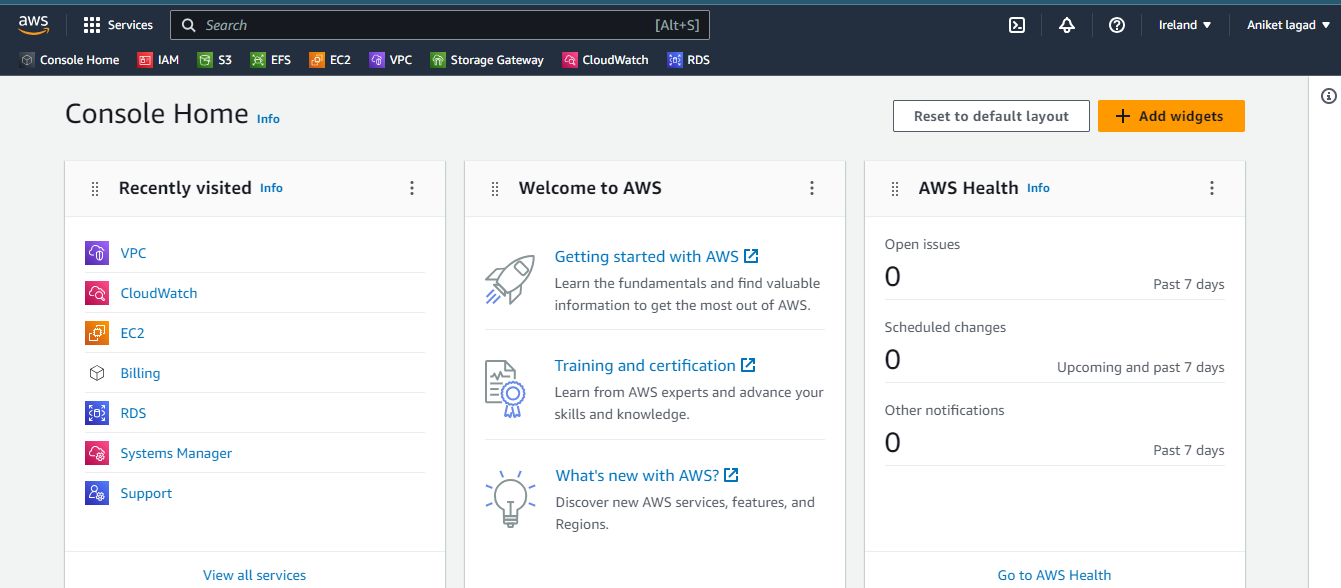


There are three lyres in 3 tier architecture:-

1. Presentation tier:-The presentation tier is the user interface and communication layer of the application, where the end user interacts with the application.
2. Application tier:-The application tier, also known as the logic tier or middle tier, is the heart of the application.
3. Database tier:-The data tier, sometimes called database tier, data access tier or back-end, is where the information processed by the application is stored and managed.

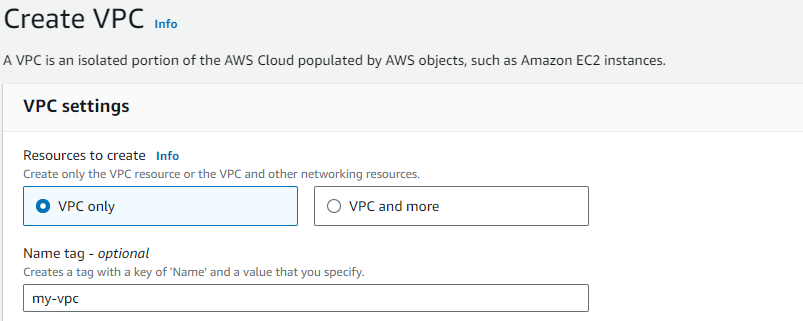
Step 1:-

First of all login to AWS account.

****

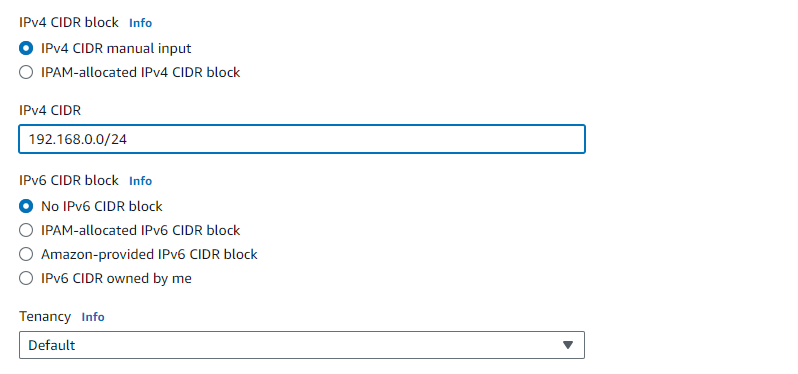
Step 2:-

Now we have to firstly create VPC so go to VPC service. And click on create VPC. Then click on VPC only and then gave VPC name.

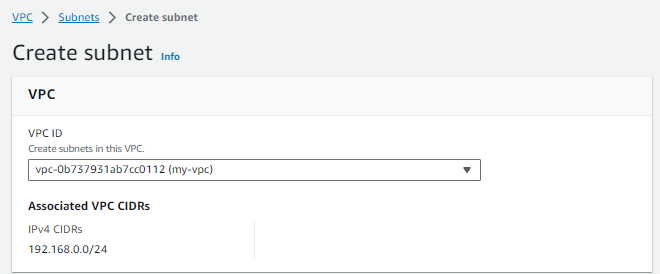


Step 3:-

Now select IPv4 and then select IPv4 range and then tenancy as default.

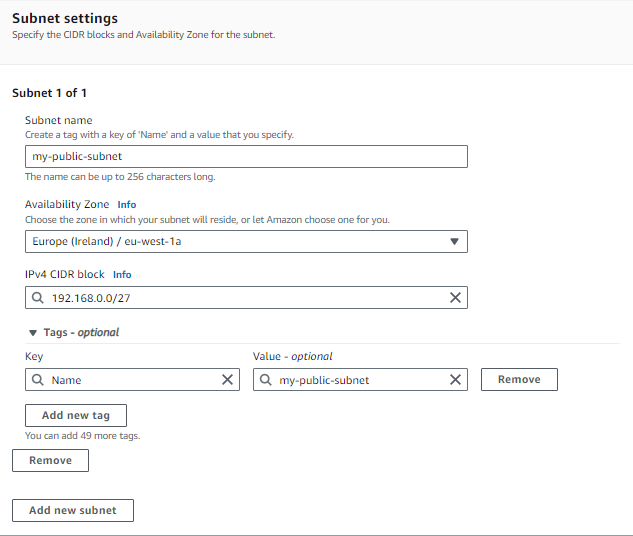


Step 4:-

Now go to subnet session and click on create subnet and select your VPC.

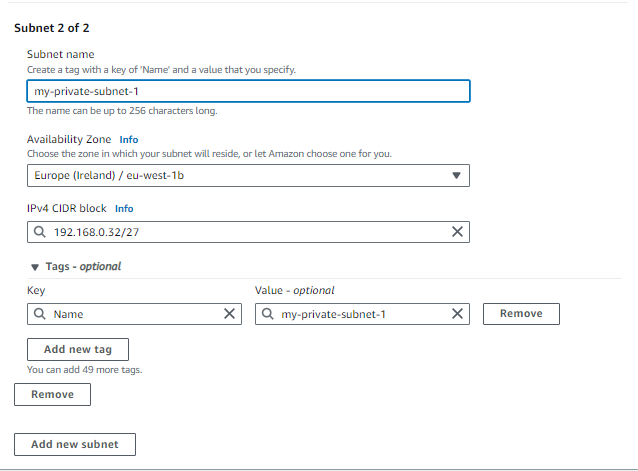
Step 5:-

Now gave a first subnet name as public subnet and then select any availability zone and then ipv4.



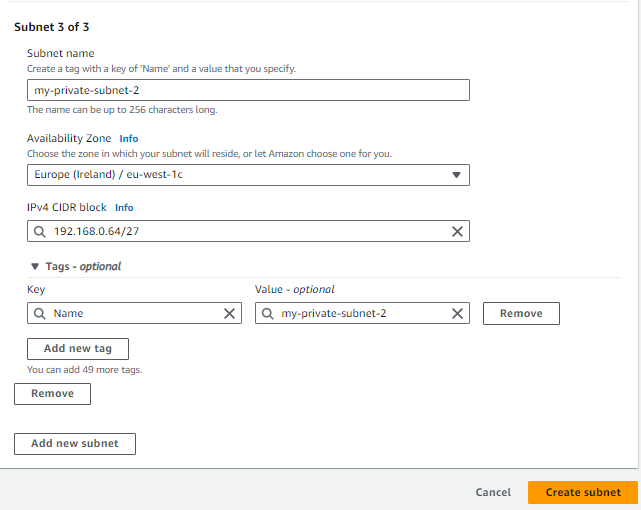
Step 6:-

After that click on add new subnet and select availability zone and then gave IPv4 range.



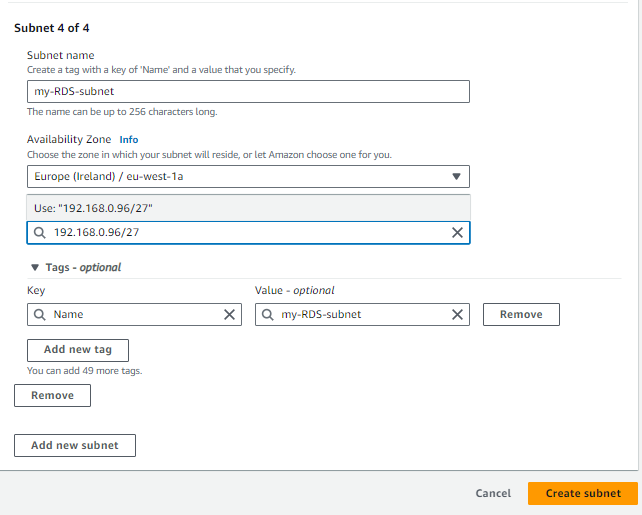
Step 7:-

And next again click on add new subnet and gave it name as private subnet 2 and then select availability zone after that gave IPv4.



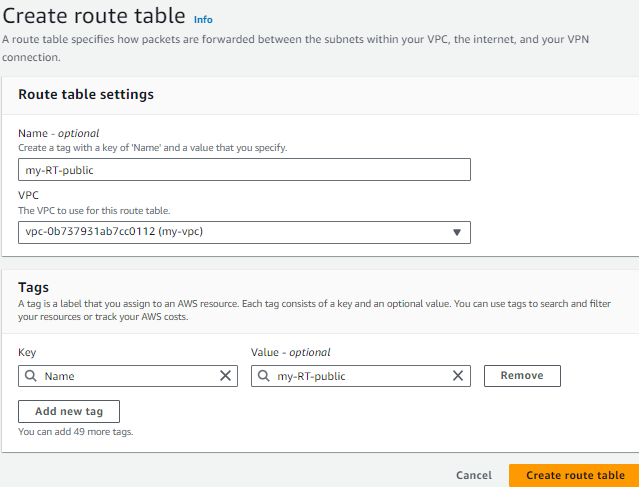
Step 8:-

Now last one subnet you have to add as RDS subnet. So click on add new subnet and gave name RDS subnet and then gave availability zone and then gave IPv4 and click on create subnet.



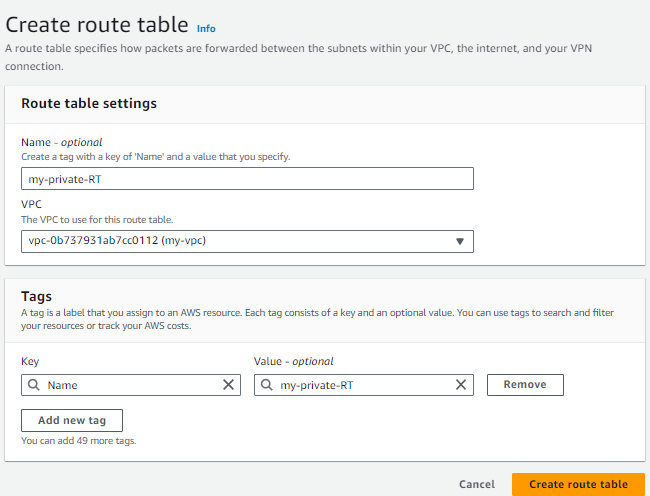
Step 9:-

Now you have to create route table to attach public subnet and IGW.



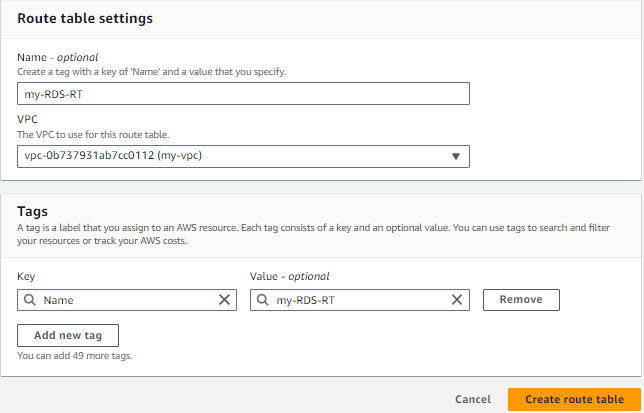
Step 10:-

After that create rote table to connect private subnets and NAT connect.



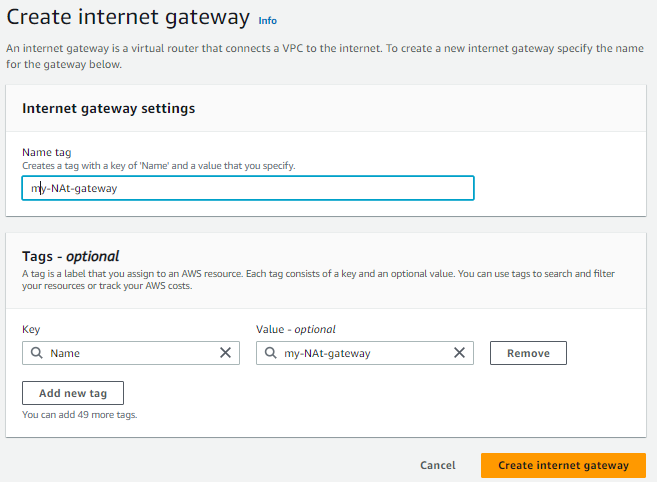
Step 11:-

Now add last one route table to connect RDS subnet.



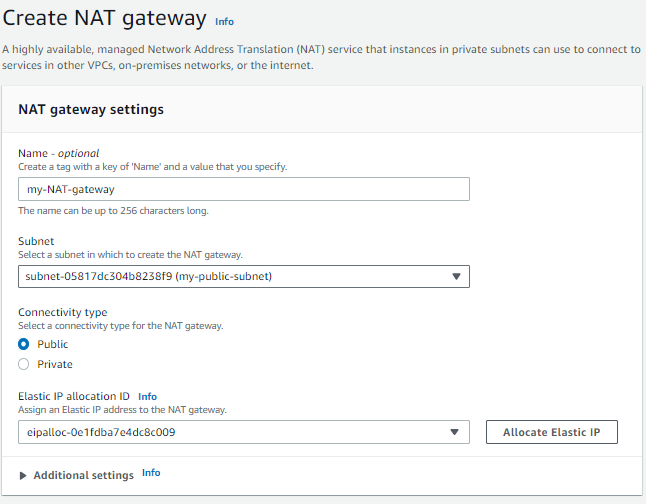
Step 12:-

After that go to internet gateway session to create IGW for connect to public RT. For get internet access to public instance.



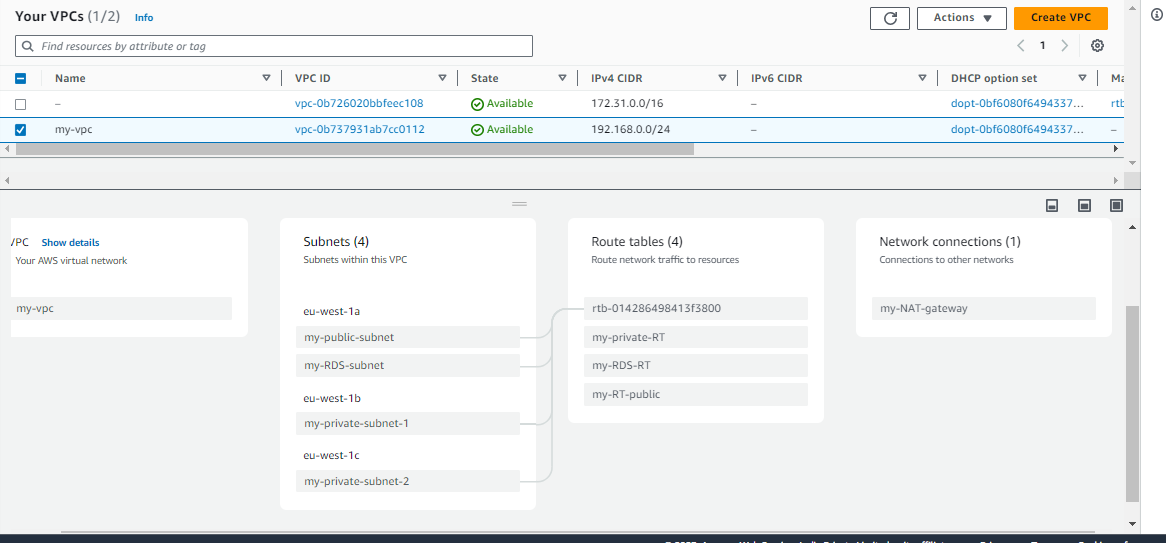
Step 13:-

Now go to NAT session to create NAT gateway to get internet access to private server through the public server. click on create nat gateway and thenn gave it name and select subnet of public and then select connective type public and allocate it Elastic IP and save it .



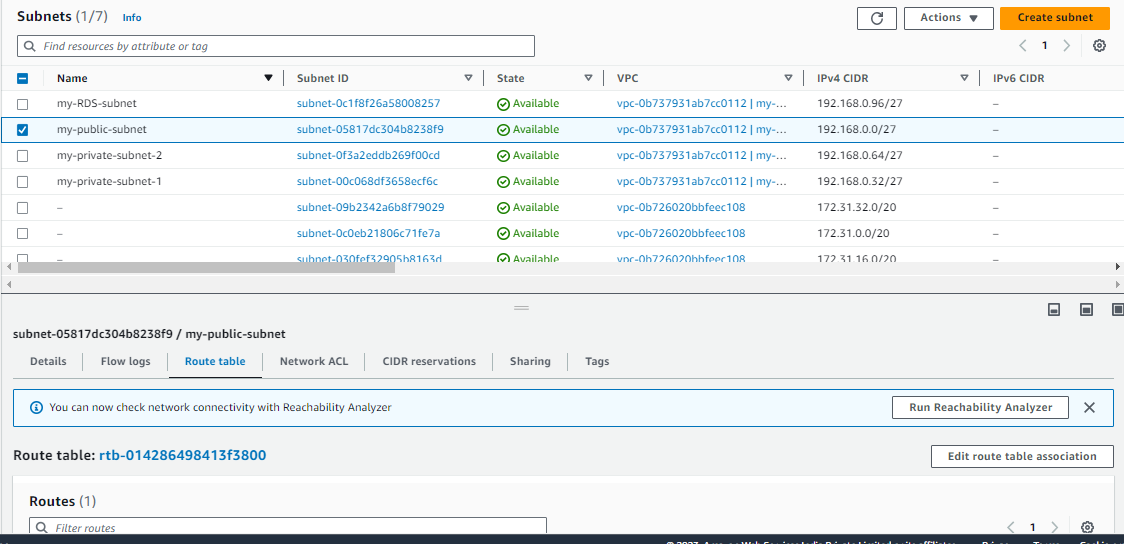
Step 14:-

And your VPC was ready. Select the VPC and and then click on map to see connection between VPC ,Subnet,Route table and Network connection. So we have to connect step by step one.



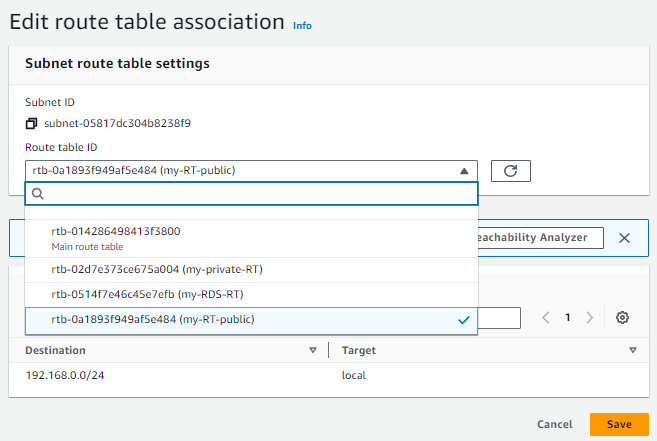
Step 15:-

First of all we connect subnet to route table. Go to subnet session and select public subnet and then click route table option and then click on edit route table assosciation.



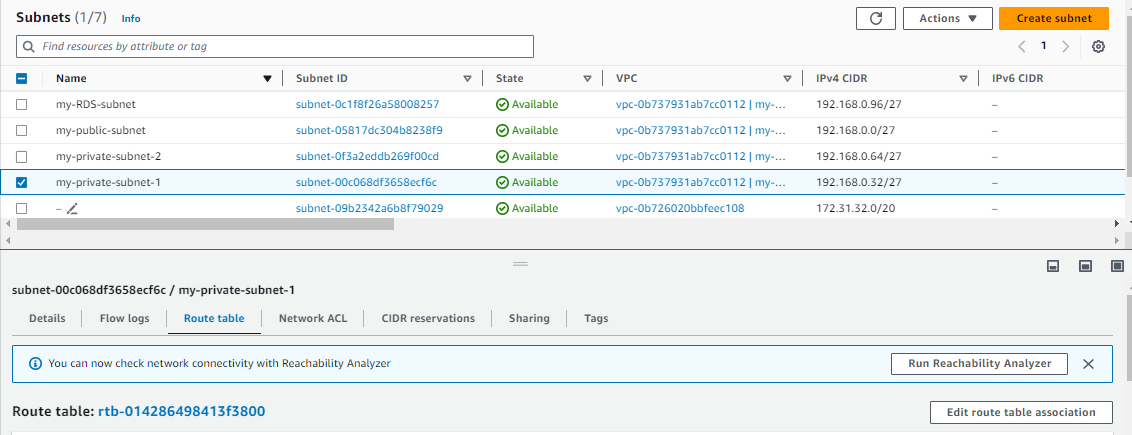
Step 16:-

Now select public Route Table and hit save option.



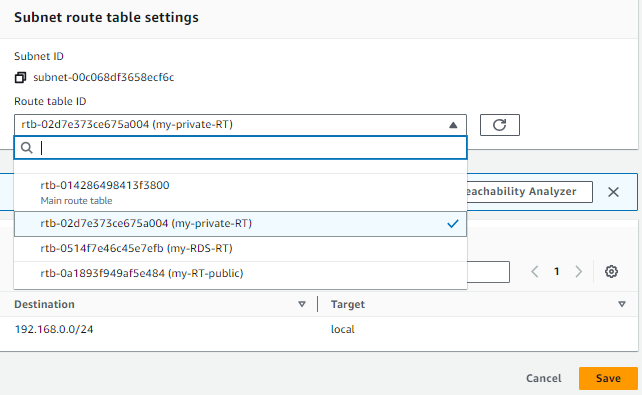
Step 17:-

As it is we do that steps to public subnet do same. Select private instance 1 and then clickc route table and then edit route table association.

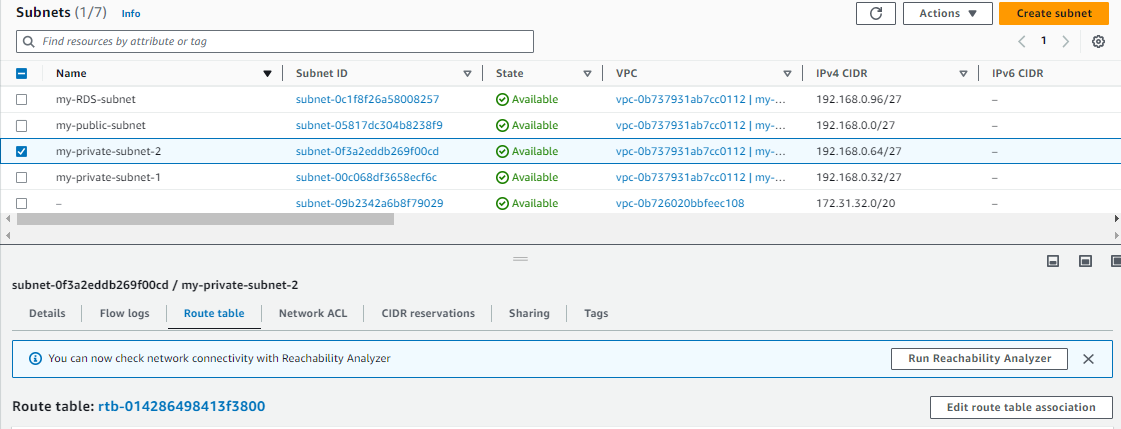


Step 18:-

Now select the private Route table and save it.

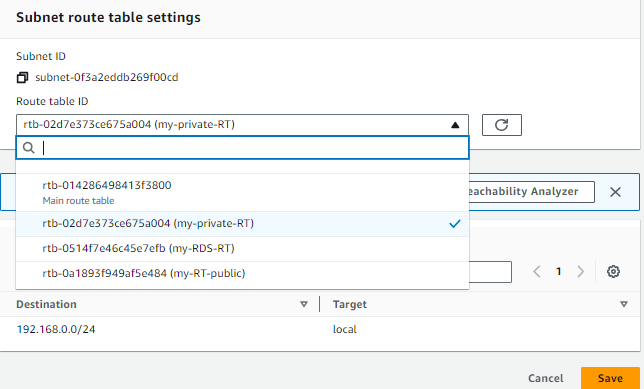


Step 19:-

As it is we do that steps to private subnet do same. Select private instance 1 and then click route table and then edit route table association.

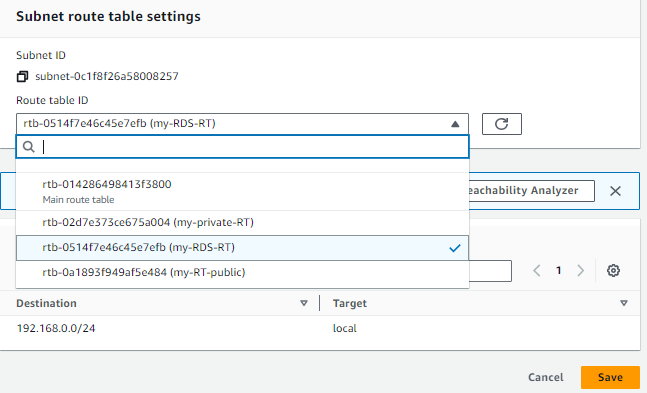
Step 20:-

Now select the private Route table and save it.



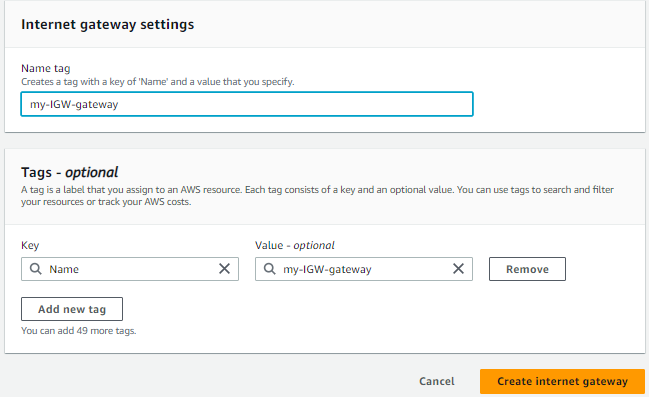
Step 21:-

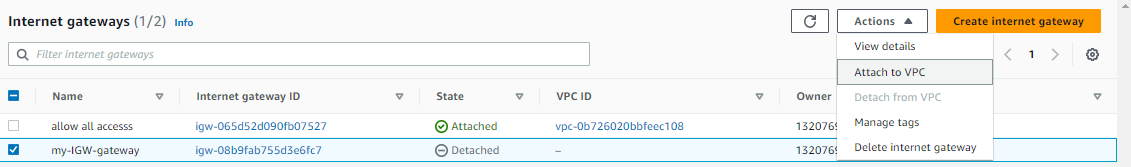
Now you have to select RDS subnet and click on route table and then edit route table association. And then select RDS and then save it.

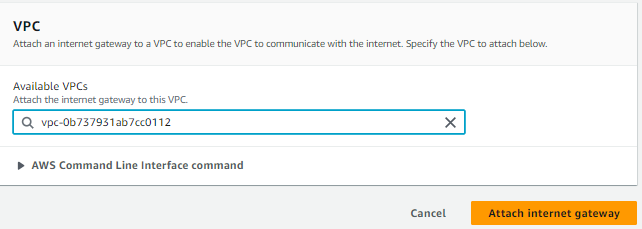


Step 22:-

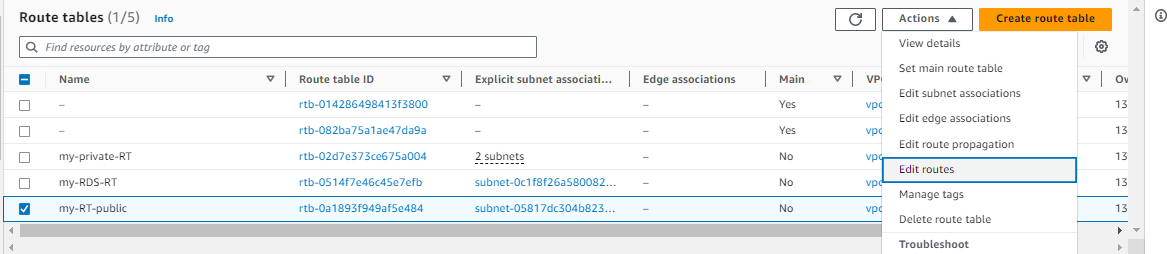
Now you have to create internet gateway to get internet access to public instance. And connect IGW to your VPC and by select it and click on action then click on attach to VPC.

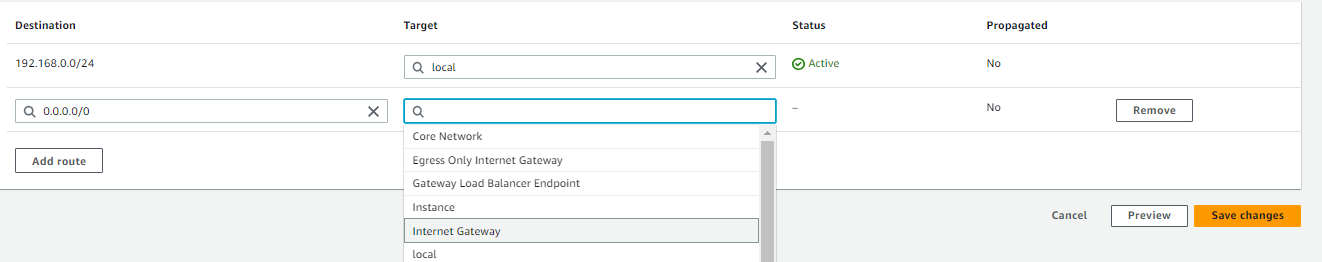


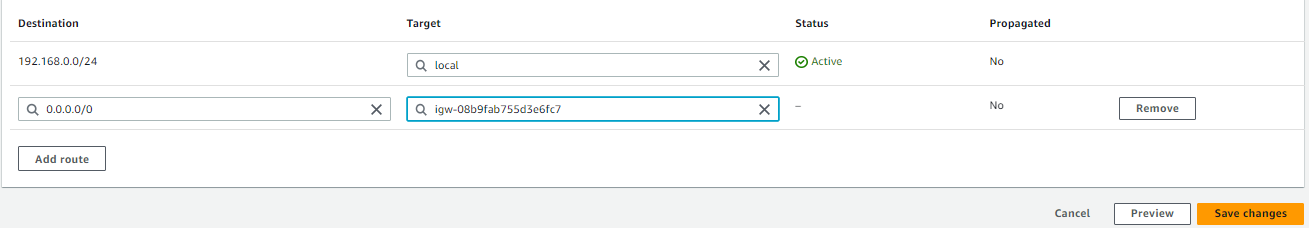




Step 23:-

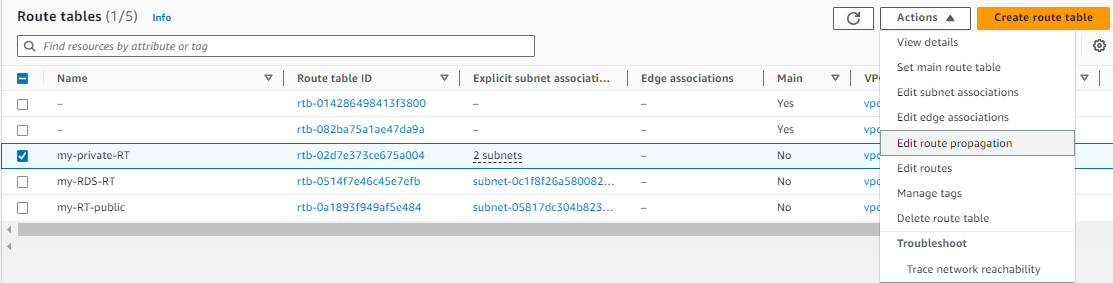
Now go to route table session and select RT public and click on action then click on edit routes and after that you have see add route option click on that option and then select first column and then select 0.0.0.0/0 subnet and then click on second column and select in that internet gateway option and then select your IGW and then click on save changes. 

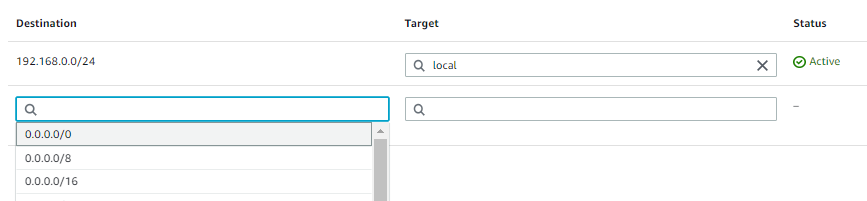


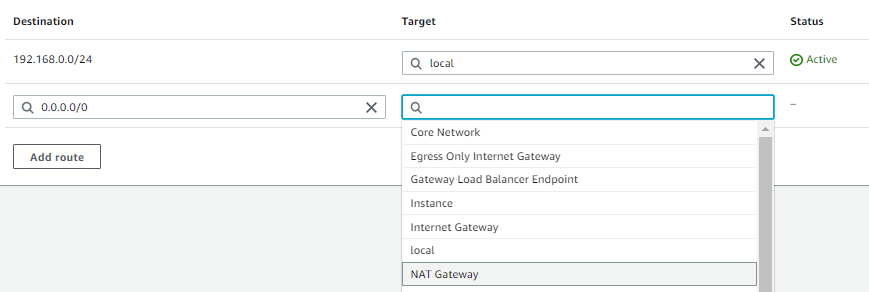


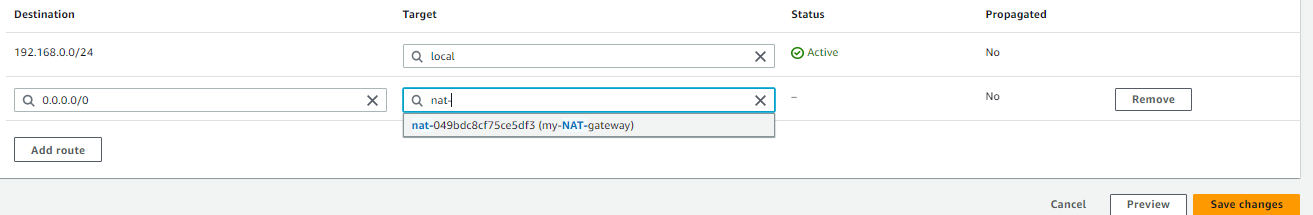
Step 24:-

Now you have to gave a internet connection to private instances so you have to create NAT gateway so go back to RT session and then select RT private and then click on action then select edit route option and then you have see new screen and then click on add route after that click on first column and select 0.0.0.0/0 and then nest click on second column and NAT gateway and then select your NAT gateway and then click on save changes. And your VPC was ready.



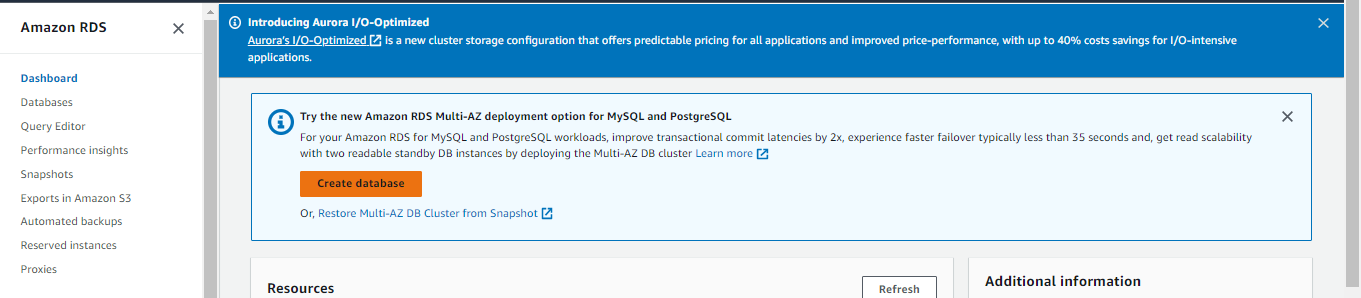






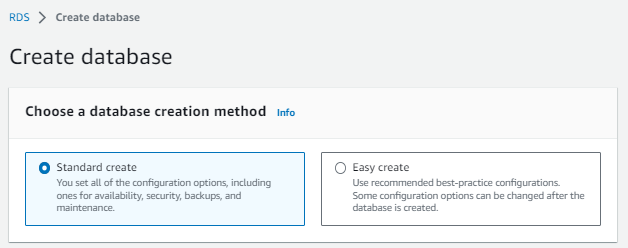
Step 25:-

Now you have to create a data base by RDS service so go to RDS service and then click on create data base option.



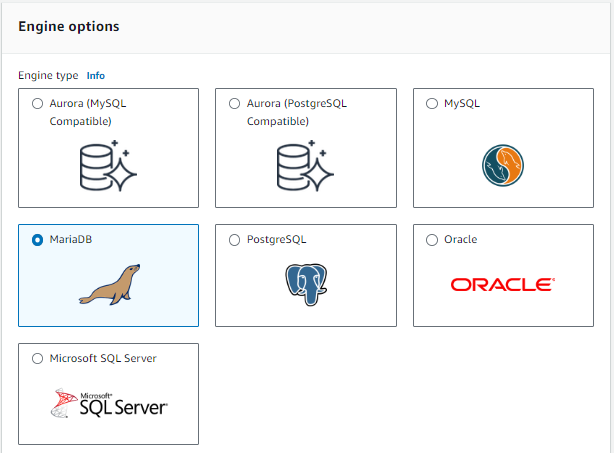
Step 26:-

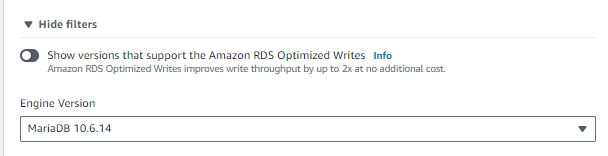
Now you have see the create data base setting so choose a database creation method as standard create.



Step 27:-

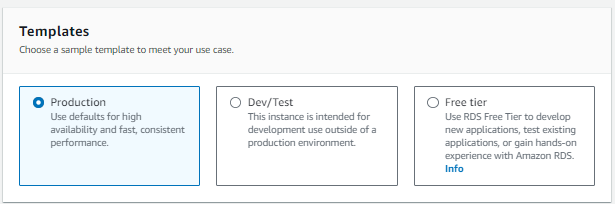
After that select MariaDB engine to create data base. And next select of engine version as you want.





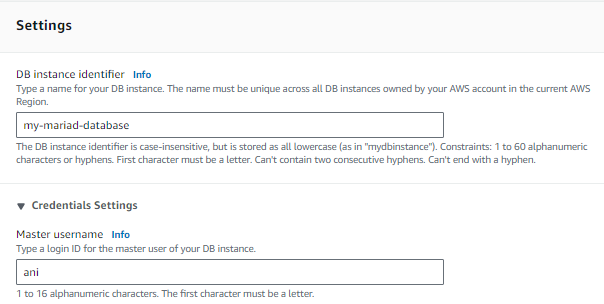
Step 28:-

Now select template type as production.



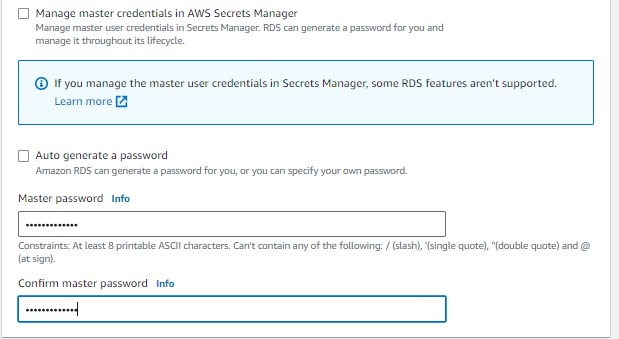
Step 29:-

Now gave database name and then gave username as that database access.



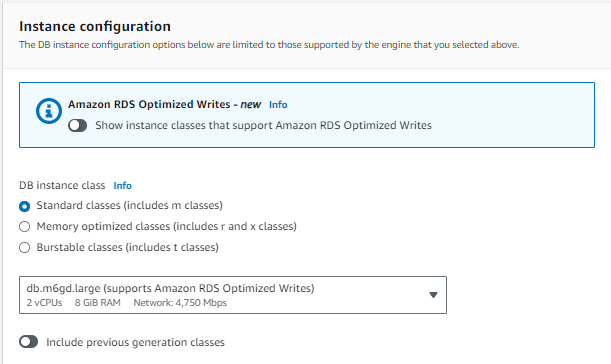
Step 30:-

Now lave manage credentials in aws secrets manager as it as and then gave database user password.



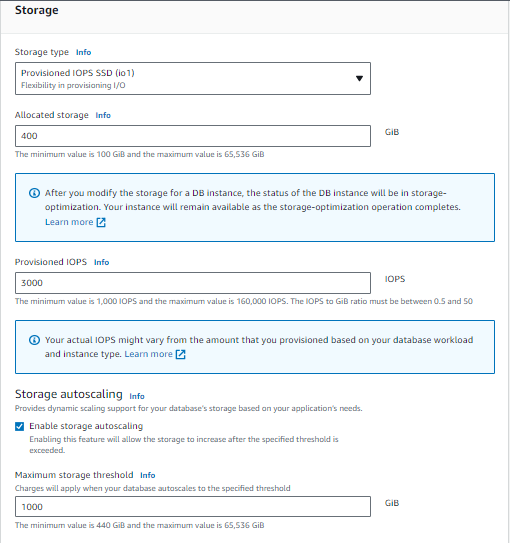
Step 31:

Now choose instance configuration. I leave as it.



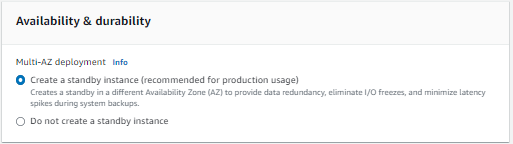
Step 32:-

Now select storage setting as you want and then scroll down.



Step 33:-

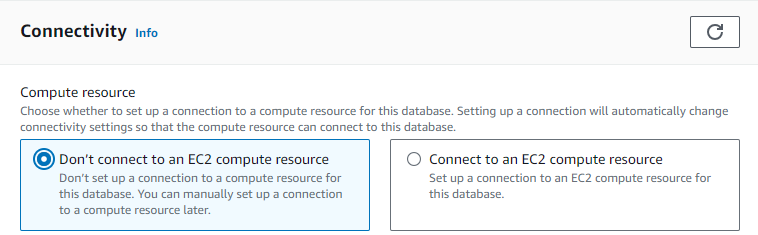
Now select availability and durability to database I gave it and then scroll down.



Step 34:-

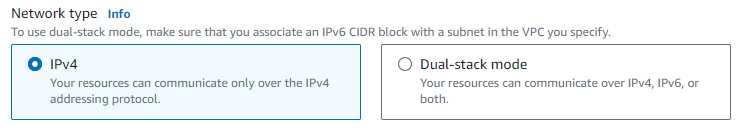
Now you have to gave a connectivity setting properly. Now you have to select instance setting.

I have not connect instance now because I have to gave database a private subnet so I was choose don’t connect ec2 option.



Step 35:-

Then select network type ipv4.



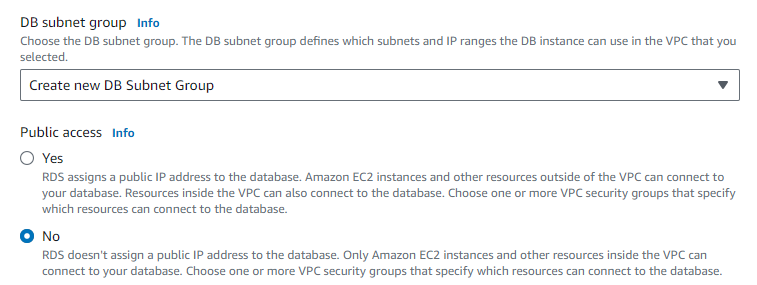
Step 36:-

Now you have to select your own created VPC.



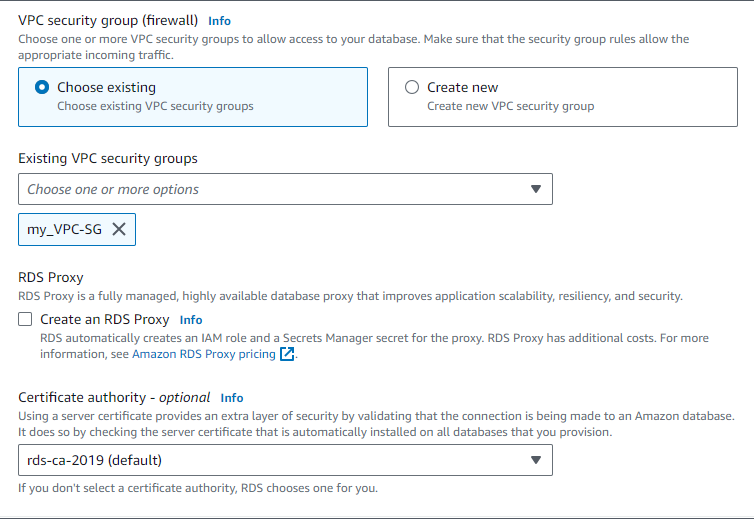
Step 37:-

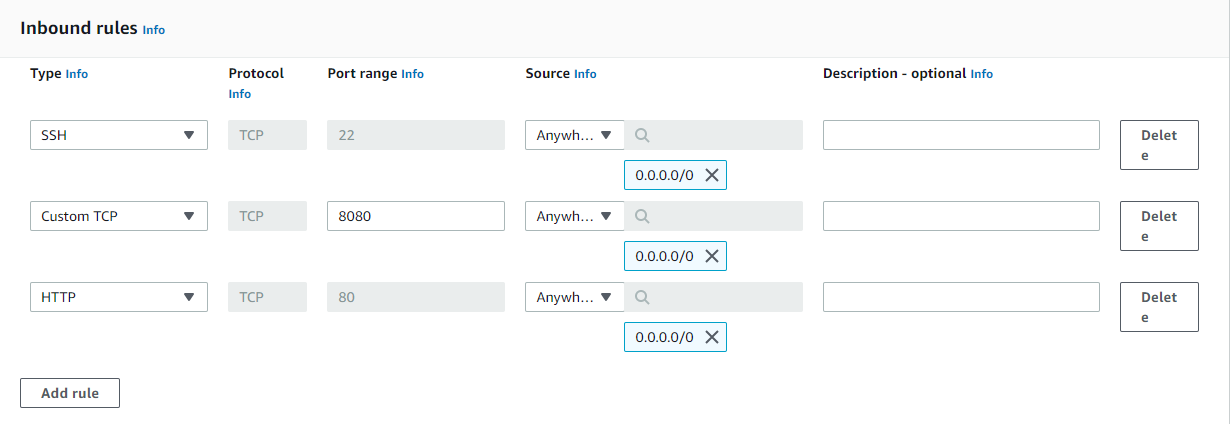
Now select subnet group If you have crated or not then leave as it as and then important onn is don’t select public access to database so select no option.



Step 38:-

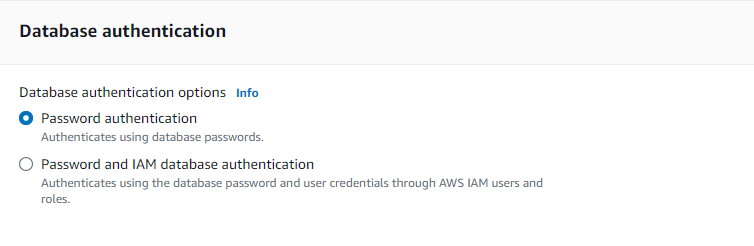
Now select VPC security group in that SG you have to add port 8080 for tomcat,80 for nginx or httpd and 3306 for mariadb. And then scroll down leave other setting as it is. Only select you added port SG.





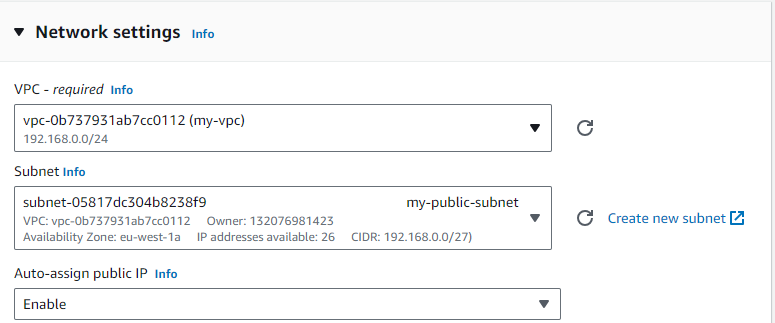
Step 39:-

Now select database authentication for use database so I have choose password authentication. And then click on create database and your database is ready.



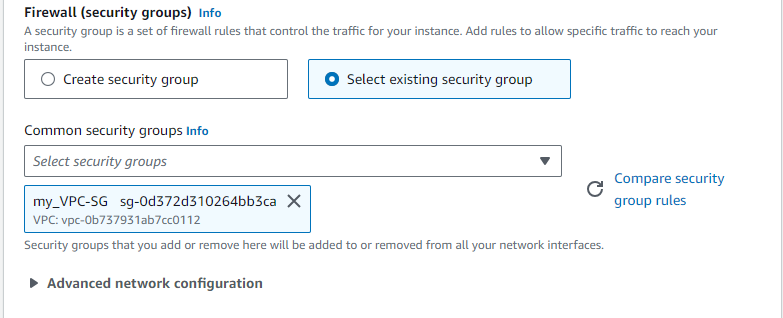
Step 40:-

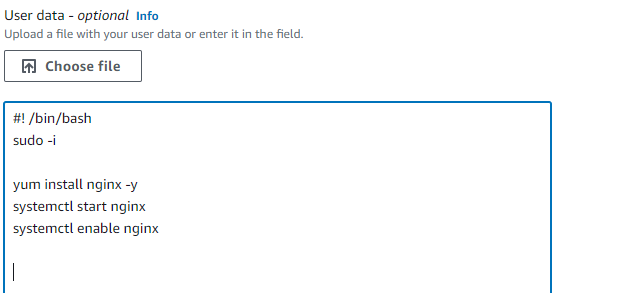
Now you have to launch 3 instance one public and remaining 2 are private. So first add public instance with following configuration. First all configure and then edit network setting and then select your VPC and after that select private subnet then enable public IP.



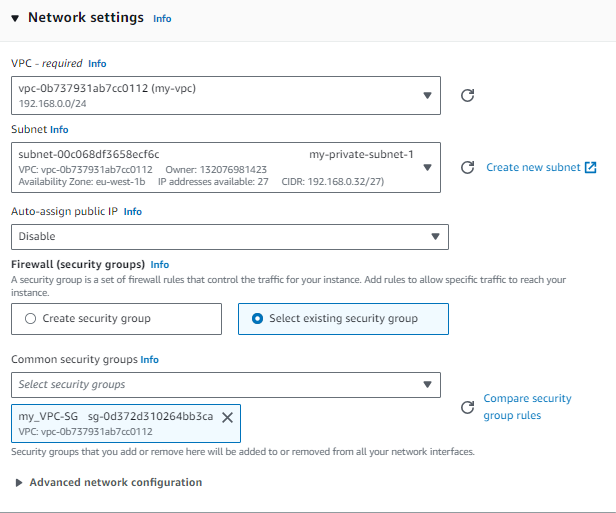
Step 40:-

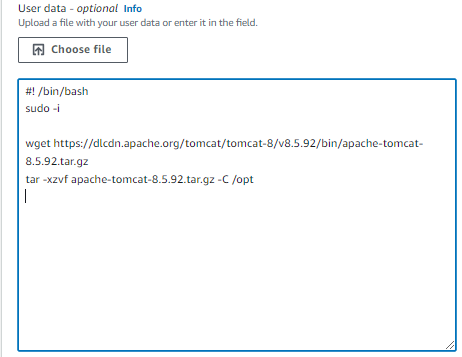
After that select a security group remember that In that SG you have add port 80 ,3306 ,8080 ,22 because we have to host nginx on this instance. And after launch instance with as it. Only add user data of configuration nginx.





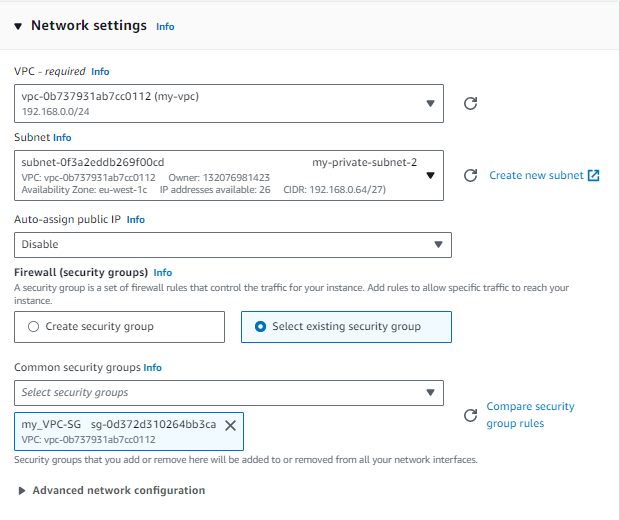
Step 41:-

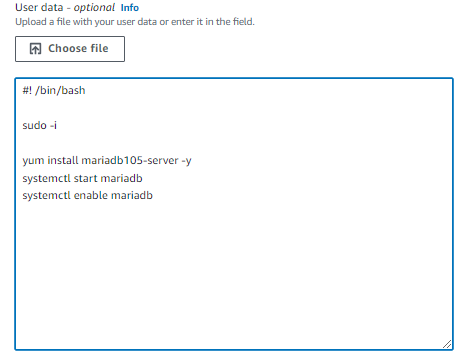
Now you have to launch private instance one so configure it gave name and all and then click on edit network setting and then select your VPC and then select private subnet 1 after that disable public IP and then select security group in that security group you have to add port of tomcat 8080 and then scroll down and write user data of configure tomcat. And then launch instance.

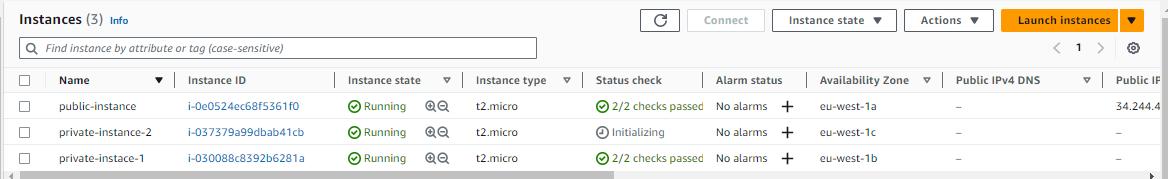


Step 42:-

Now you have to launch a private instance 2 so gave a instance name and then select instance configuration and then edit network setting and select your VPC after that select private subnet 2. This is private instance so don’t gave it public IP. After that select security group in which maridb port Is add 330 port number. And in user data write a installation and configuration process of mariadb service. And then launch instance. And now your three instance is launched.

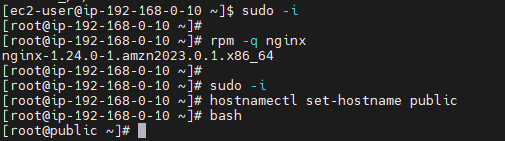






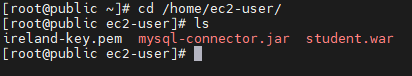
Step 43:-

Now get remotely access of public instance on any third party app. And then enter command sudo –I to switch to root user and then gave machine name “public”.



Step 44:-

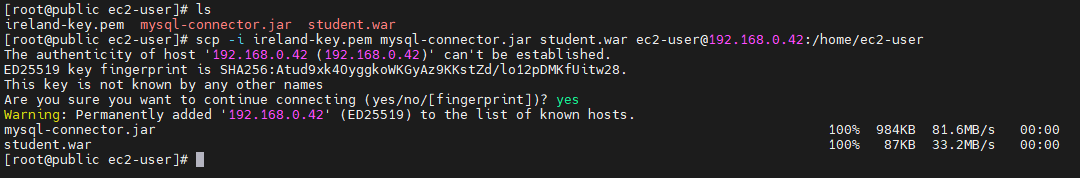
After that get student.war and jdb connecter file in your public instance and your private instance key also put in pubic instance.



Step 45:-

Next you have to send jdb connector and student.war file to your private-insatnce-1 because we have not get private instance so we have to send to that instance by scp command.

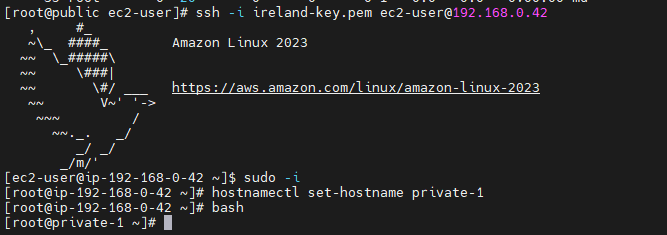
scp -i ireland-key.pem mysql-connector.jar student.war ec2-user@192.168.0.42:/home/ec2-user



Step 46:-

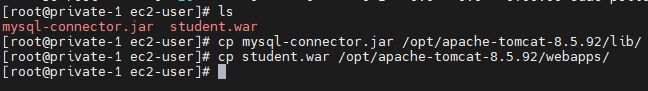
Now get access of private instance 1 to configure tomcat and connect it to nginx server.

So first get access of private-1 by ssh command. Run command

ssh -i ireland-key.pem [ec2-user@192.168.0.42](mailto:ec2-user@192.168.0.42) and then gave that private instance machine name “private-1”.

step 47:-

After that see your tomcat package is configured or not in /opt directory.so now we have to copy myself-connecter.jar and student.war files which we have get from private instance to tomcat service’s directories. Jdb connecter send to /opt/apache-tomcat-8.5.92/lib directory and student.war /opt/apache-tomcat-8.5.92/webapps directory.

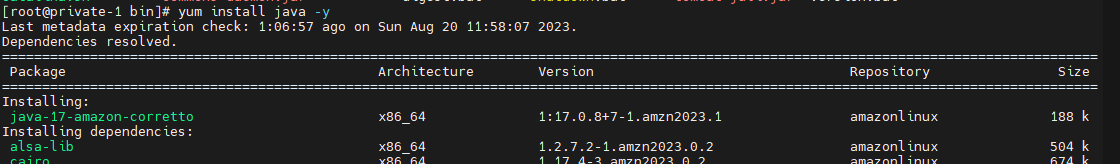


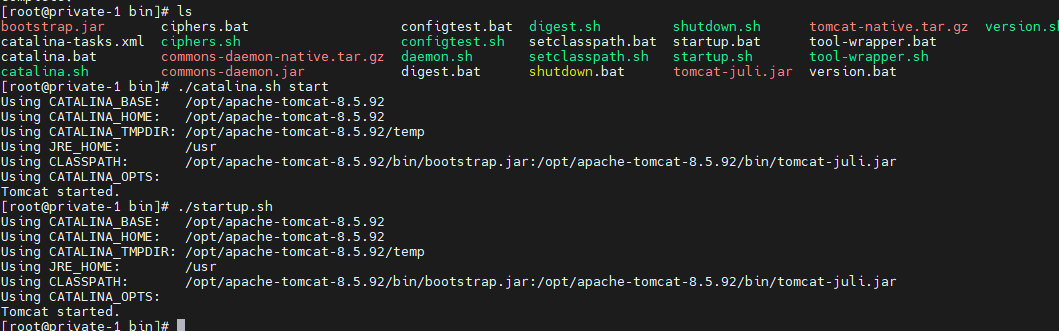
Step 48:-

Next change directory /opt/apache-tomcat-8.5.92/bin. There was a file ./catalina.sh that file is for start and restart tomcat service but that file was not run without java so we have to install it by run command #yum install java –y. Then run that catalina.sh and startup.sh file.

./catalina.sh start and ./satartup.sh

Now your backend server is ready. Now you have to connect backend server to frontend sever.





Step 49:-

So now go back to public server where nginx was installed. And then you have add some data in nginx comfiguration file. So run command vim /etc/nginx/nginx.conf

In that file you have to write some data on line number 47 48 and 49 (as per show in following image).

That data means you have to configure your tomcat servers location.

location / {

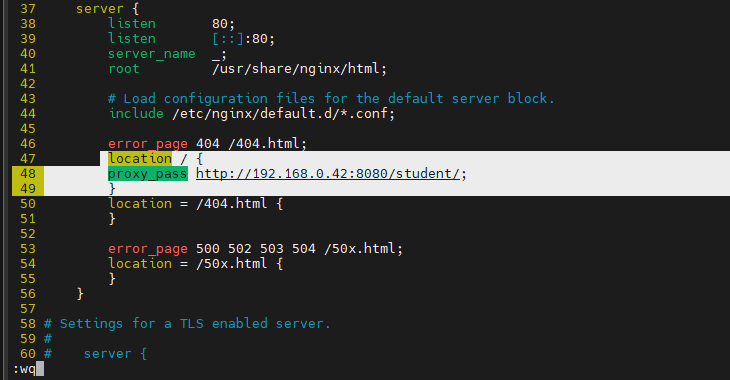
proxy\_pass http:// tomcat servers IP:8080/student/;

}

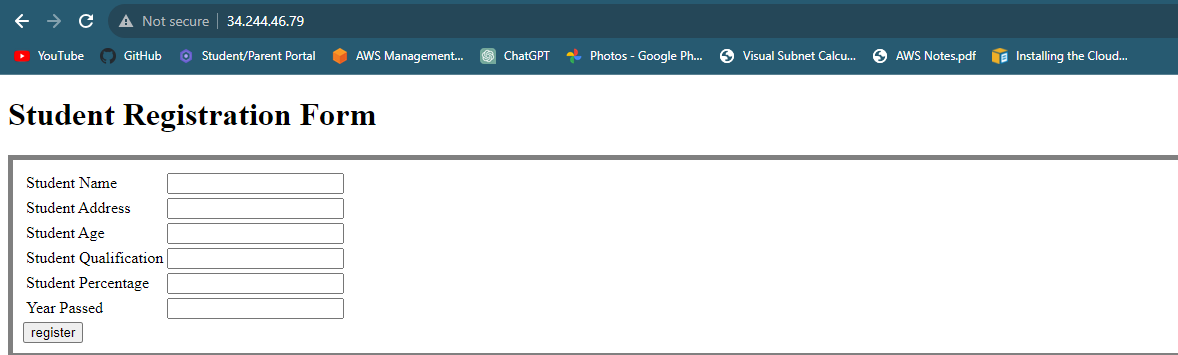
After write this data save this file. And then restart nginx service by run command #systemctl restart nginx.

And your frontend and backend is connected and whenever you hit public ip then you see the backends page. See following image.



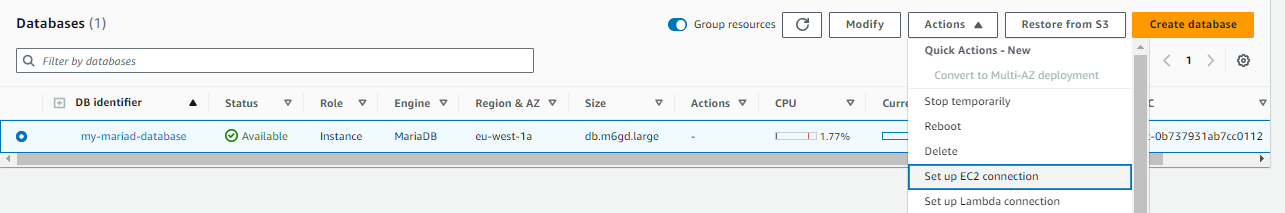






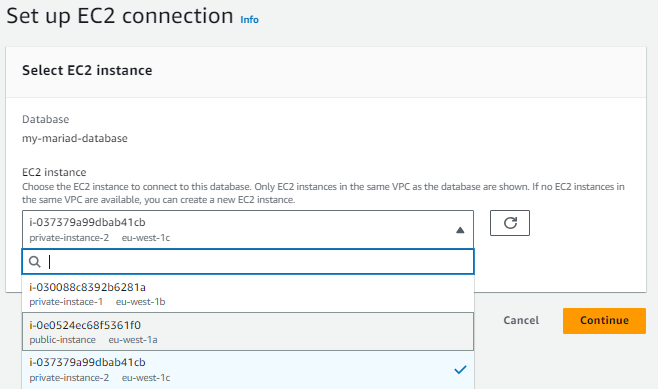
Step 50:-

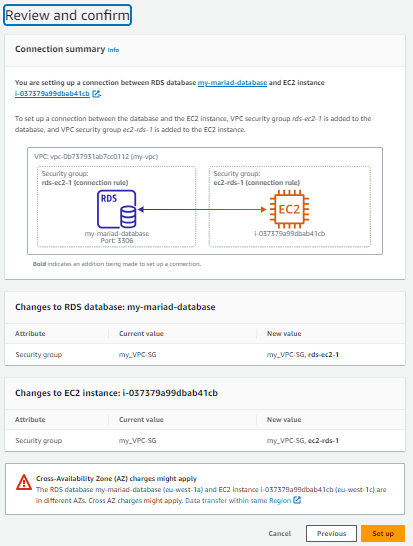
To connect database to your backend firstly you have to add table to your database so we have to get access of database so go to RDS service and select your database and then click on actions and then click on set up EC2 isnatnce.



Step 51:-

Now select instance private-2 to your database was connected. Because whenever get access of database to get from this instance. And then click on continue . next you have see all configuration see it and click on set up.



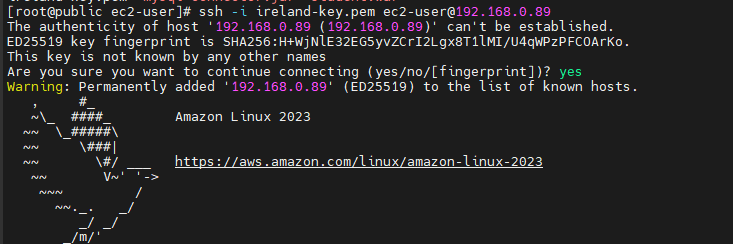


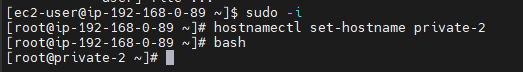
Step 52:-

Now you have to add a database to backend. Get access of private-instance-2 instance where mariadb is configured.

Run a command ssh –I private instance key and then user@private-2 instance IP.

And then gave machine name to private instance as name private-2.



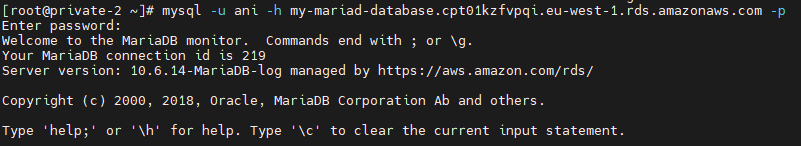


Step 53:-

Now get access of your database and create a table in it so your data is save it that table correctly. And that table save in database securely . so run command

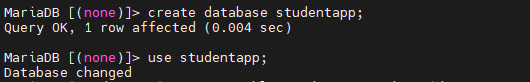
#mysql –u username –h end point of RDS –p password

And you have get access of your RDS database.



Step 54:-

Now create table by run command in mariadb #create table studentapp; and then get on that database by command #use studentapp;



Step 55:-

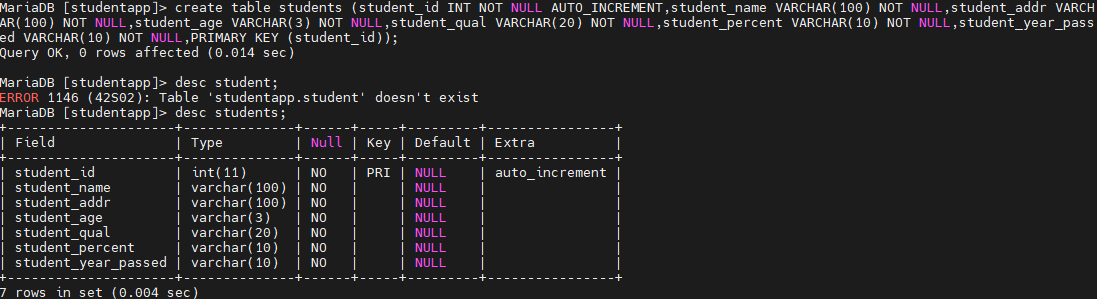
Now create table and configure your table what you want in it.

Run command # create table students (student\_id INT NOT NULL AUTO\_INCREMENT,student\_name VARCHAR(100) NOT NULL,student\_addr VARCHAR(100) NOT NULL,student\_age VARCHAR(3) NOT NULL,student\_qual VARCHAR(20) NOT NULL,student\_percent VARCHAR(10) NOT NULL,student\_year\_passed VARCHAR(10) NOT NULL,PRIMARY KEY (student\_id));

Then you have to see your table then run command

# desc studenets;

Now your table and database is ready. Now connect RDS database to your tomcat sever.

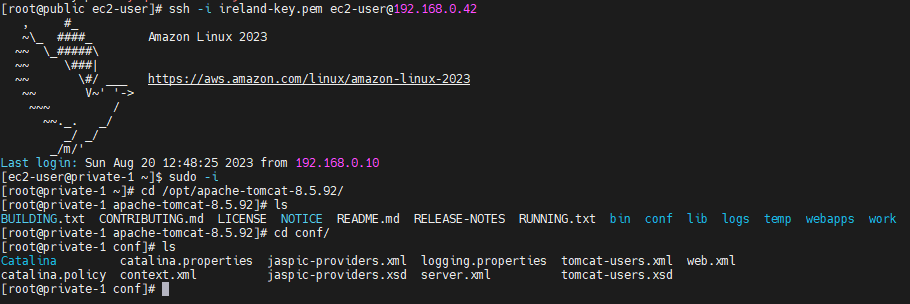


Step 56:-

So you have to connect database to tomcat sever so get access of private instance 1 .

And change directory to /opt/apache-tomcat-8.5.92/conf

In that directory you see the context.xml file you have to write end point of RDS database in it to connect your RDS data.



Step 57:-

So run command

#vim context.xml

After that go on line number 20 and paste data there.

<Resource name="jdbc/TestDB" auth="Container" type="javax.sql.DataSource"

maxTotal="100" maxIdle="30" maxWaitMillis="10000"

username="USERNAME" password="PASSWORD" driverClassName="com.mysql.jdbc.Driver"

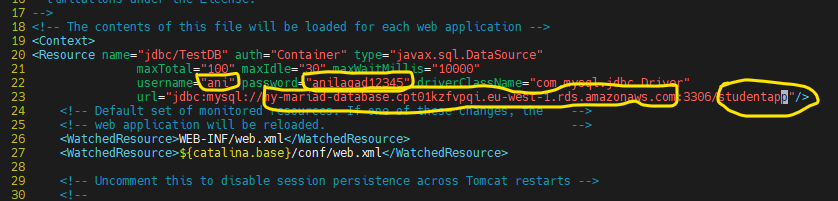
url="jdbc:mysql://DB-ENDPOINT:3306/DATABASE"/>

In that data you have make some changes on line no 22 write a username and then password.

After that change on line number 23 paste your RDS end point and at the end gave a name of your database.

Now save that file.





Step 58:-

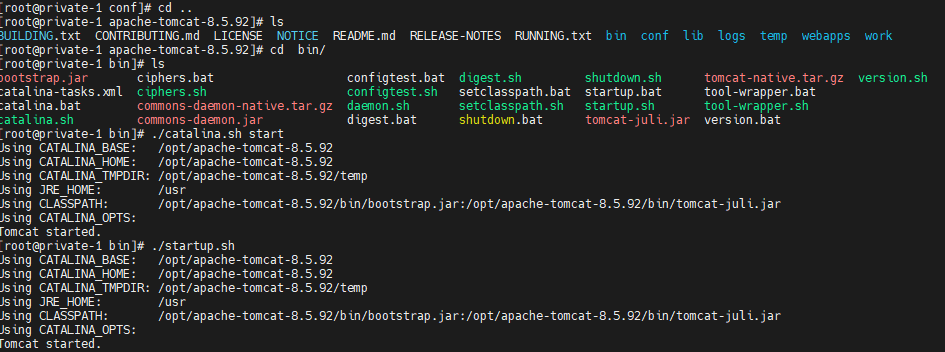
Now run command cd .. to go backward.

And then change directory cd bin.

There where you will see catalina.sh file and startup.sh file.

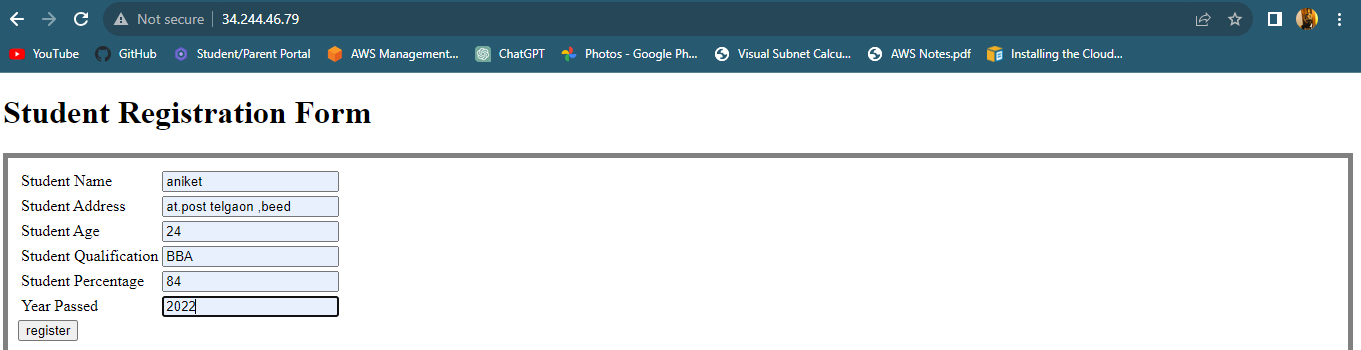
Run that scripted files ./catalina.sh start and then ./startup.sh .

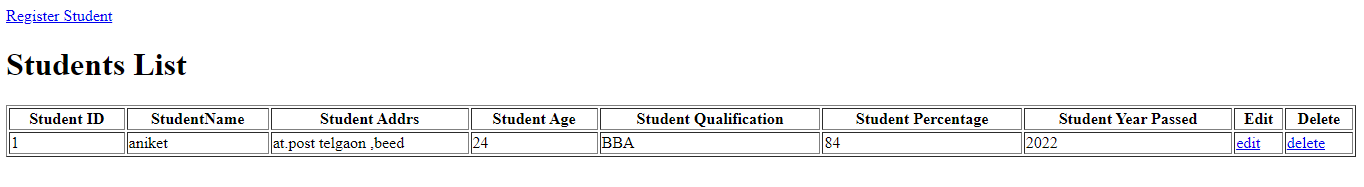
And your backend has connected to database.



Step 59:-

Now hit public IP and then fill there column. And click on register. And your data was saved.





\*\*\* THE END\*\*\*