

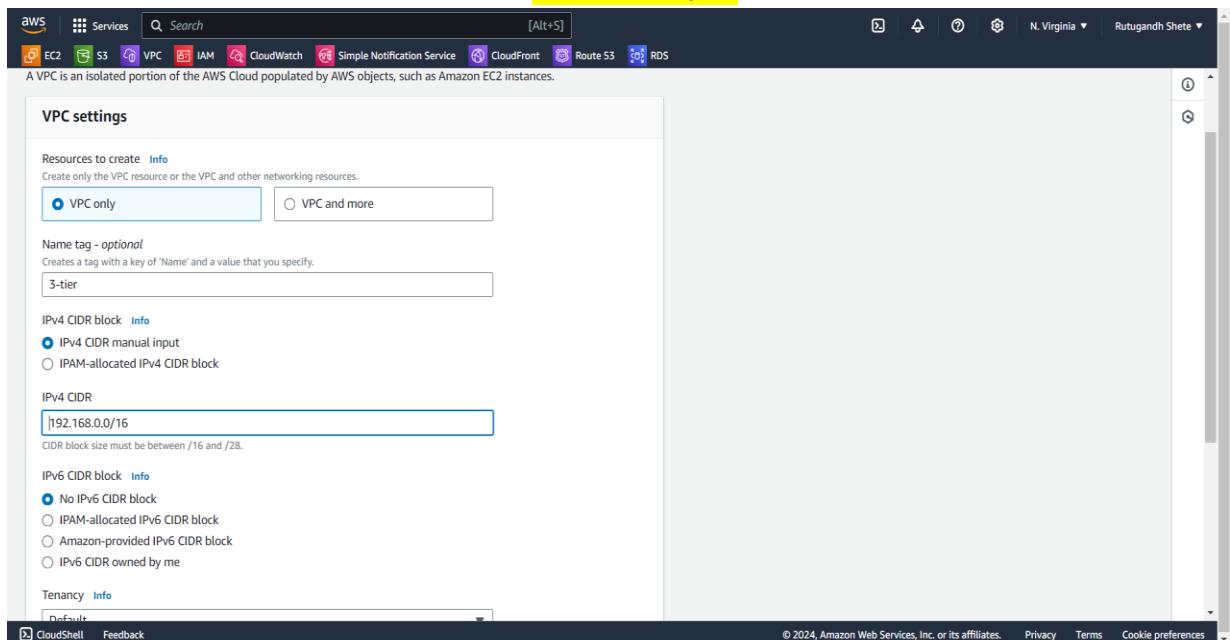
3 Tier Cloud Project

Steps:

- VPC
- Subnets
- Route Table
- Nat Gateway
- Internet Gateway
- instances
- RDS

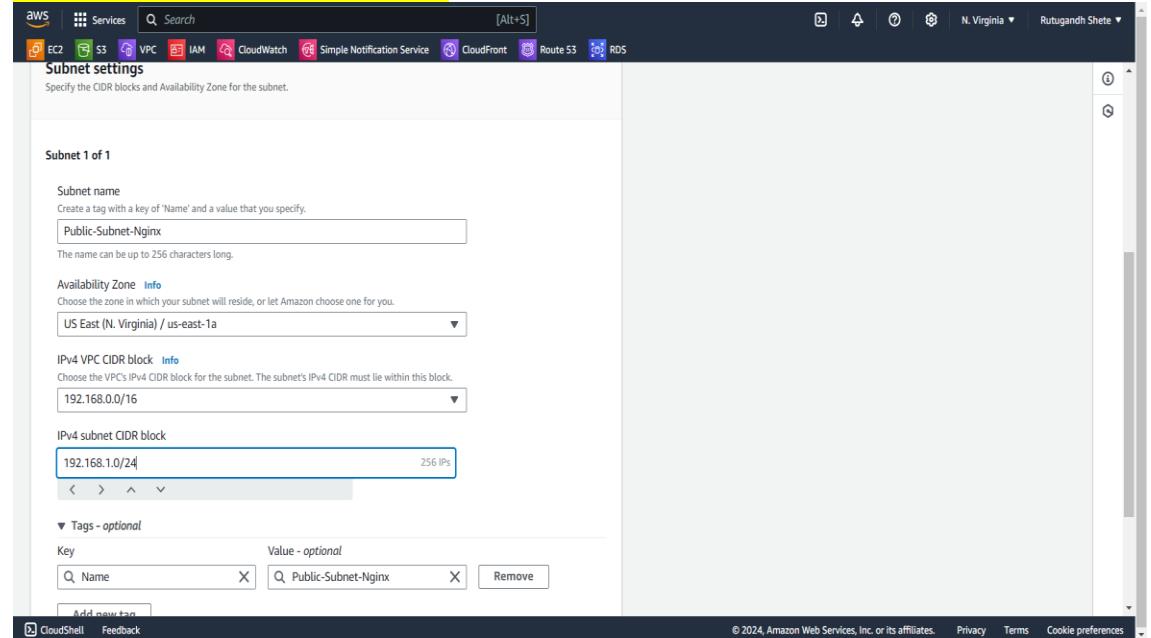
VPC:

- Create VPC → name → mention CIDR: 192.168.0.0/16.

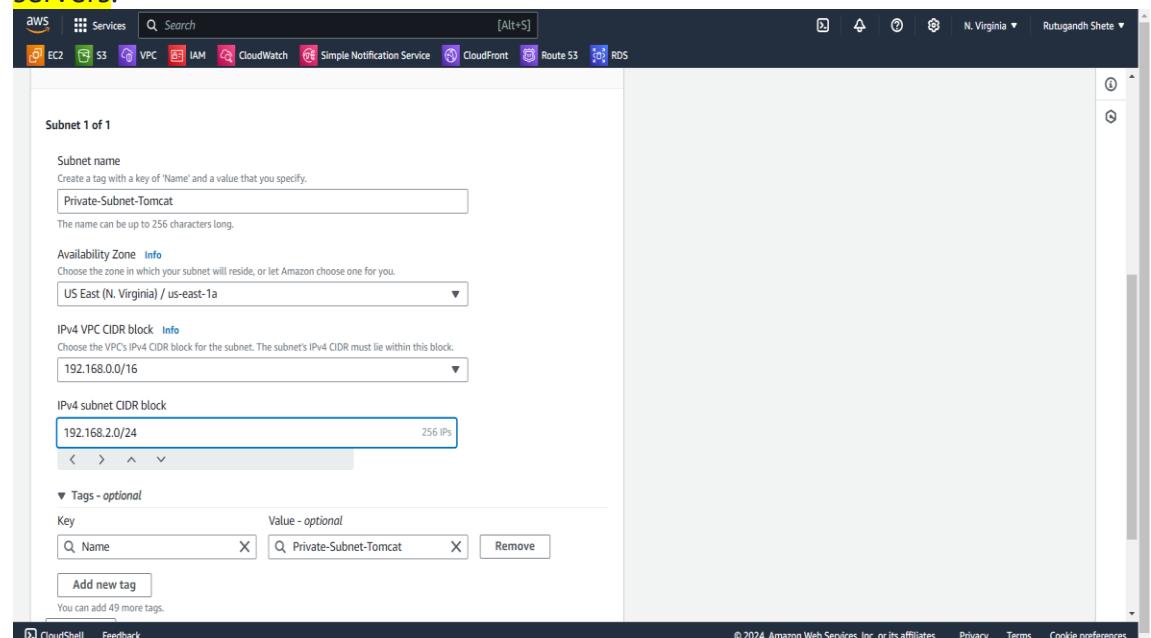


- create 3 subnets

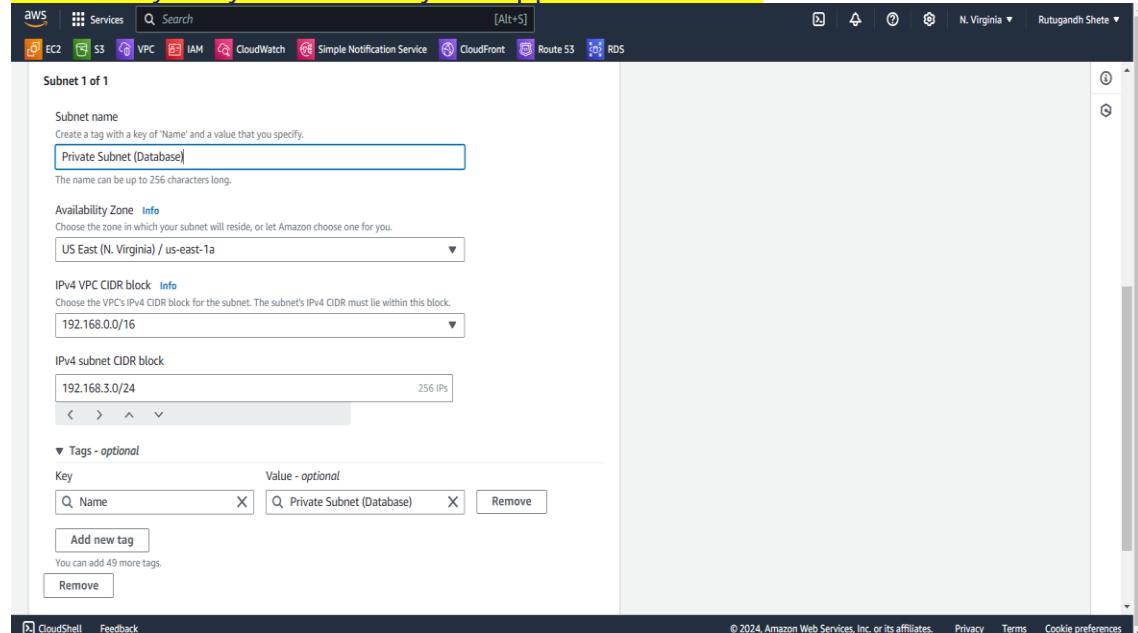
- subnet-1: **Public Subnet (Nginx)** Hosts the web servers (like Nginx) that need to be accessible from the internet. (cidr → 192.168.1.0/24)



- Subnet-2: **Private Subnet (Tomcat)** Hosts the application servers (like Tomcat) that do not need direct internet access, only accessible internally by the web servers.

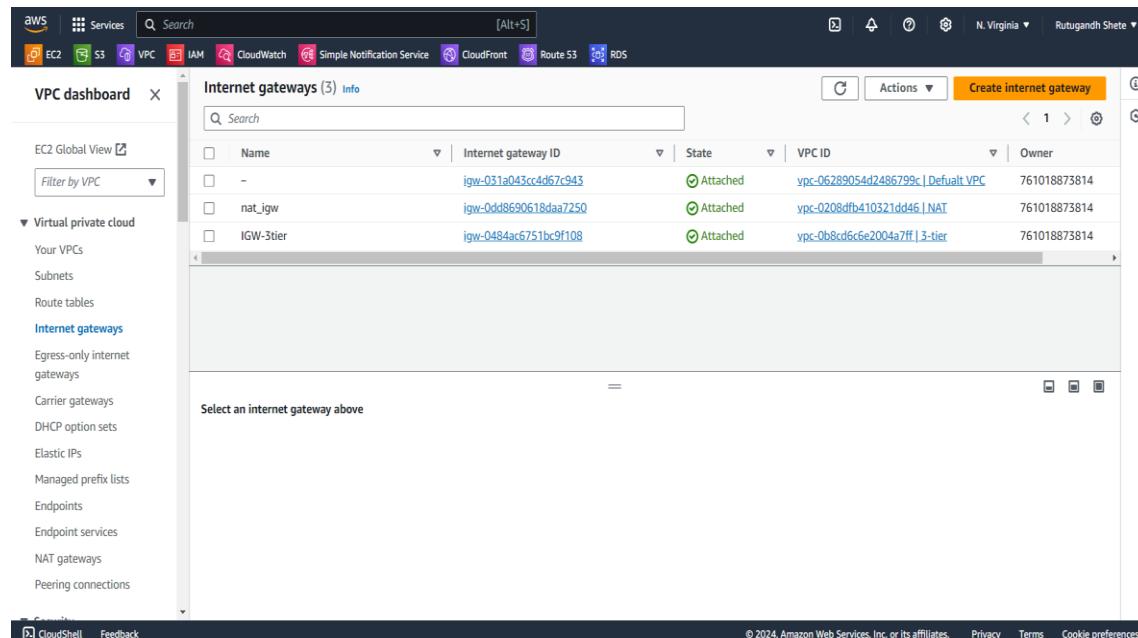


- Subnet-3: **Private Subnet (Database)** Hosts the database servers, kept private for security, only accessible by the application servers.



The screenshot shows the AWS VPC Subnet creation interface. The subnet is named "Private Subnet (Database)". It is located in the "US East (N. Virginia) / us-east-1" availability zone. The IPv4 CIDR block is set to 192.168.0.0/16, and the IPv4 subnet CIDR block is 192.168.3.0/24. A tag "Name" is added with the value "Private Subnet (Database)".

- Create IGW and attach it to VPC



The screenshot shows the AWS VPC Internet Gateways dashboard. There are three internet gateways listed:

Name	Internet gateway ID	State	VPC ID	Owner
-	igw-031a043c4d67c943	Attached	vpc-06289054d2486799c Default vpc	761018873814
nat_igw	igw-0dd8690618daa7250	Attached	vpc-0208dfb410321dd46 NAT	761018873814
IGW-3tier	igw-0484ac6751bc9f108	Attached	vpc-0b8cd6c6e2004a7ff 3-tier	761018873814

A message at the bottom says "Select an internet gateway above".

- Create NAT → name → **Public Subnet (Nginx)**

Create NAT gateway Info
A highly available, managed Network Address Translation (NAT) service that instances in private subnets can use to connect to services in other VPCs, on-premises networks, or the internet.

NAT gateway settings

Name - optional
Create a tag with a key of 'Name' and a value that you specify.

The name can be up to 256 characters long.

Subnet
Select a subnet in which to create the NAT gateway.

Connectivity type
Select a connectivity type for the NAT gateway.
 Public
 Private

Elastic IP allocation ID Info
Assign an Elastic IP address to the NAT gateway.

Info

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- Public route table is created at the when we created VPC

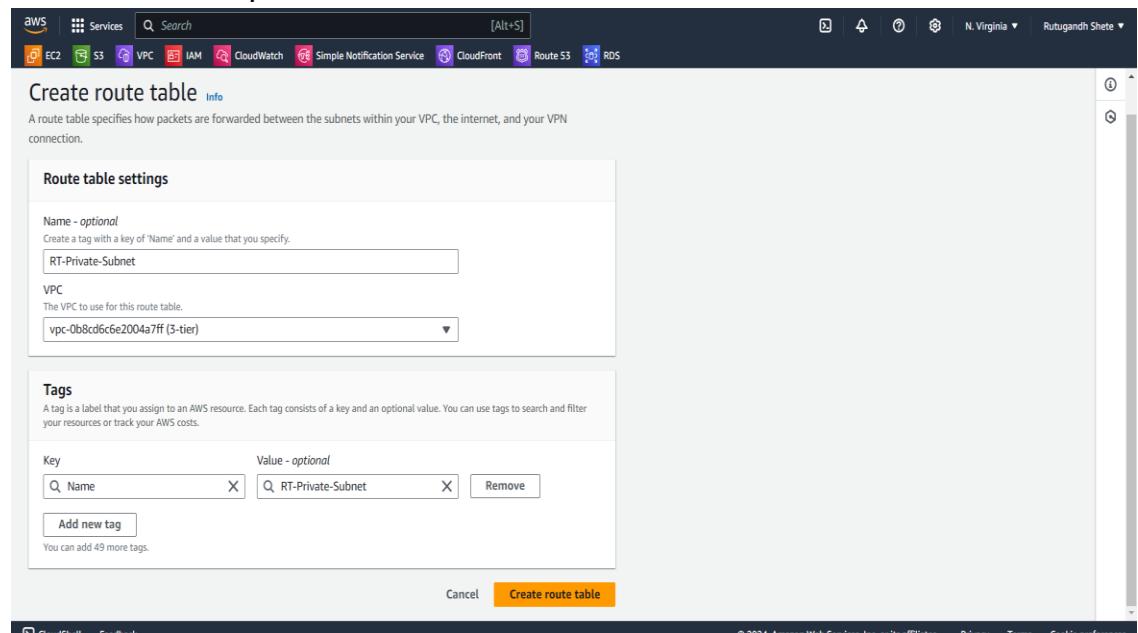
VPC > Route tables > rtb-0cd660cdaff45ebe > Edit routes

Edit routes

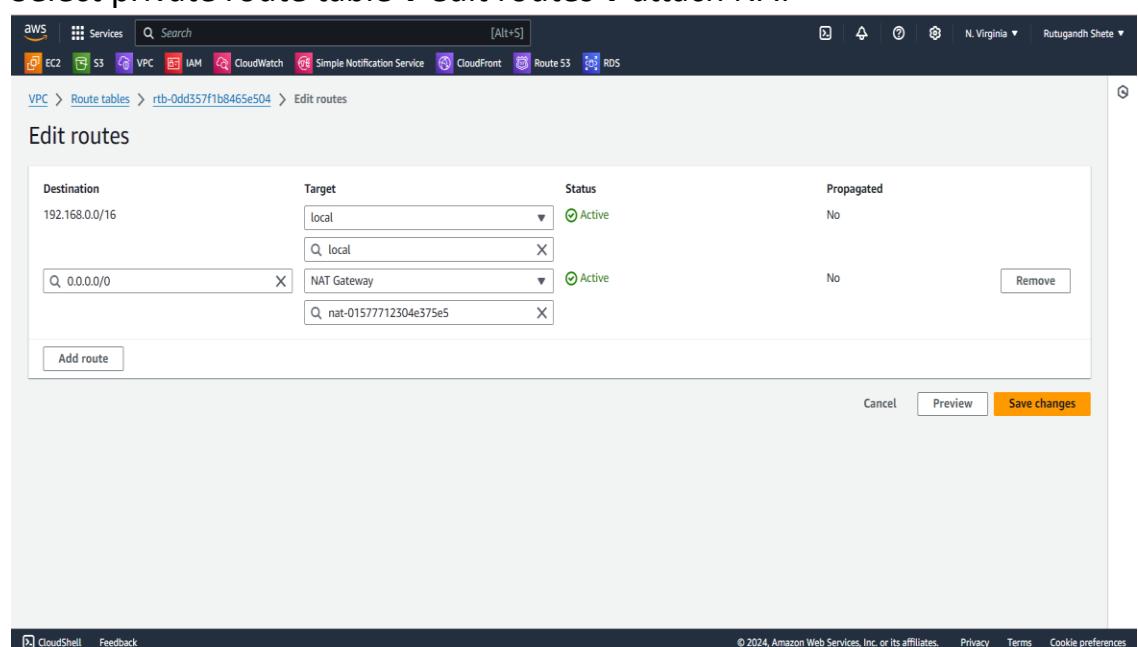
Destination	Target	Status	Propagated
192.168.0.0/16	local	Active	No
0.0.0.0/0	Internet Gateway	Active	No

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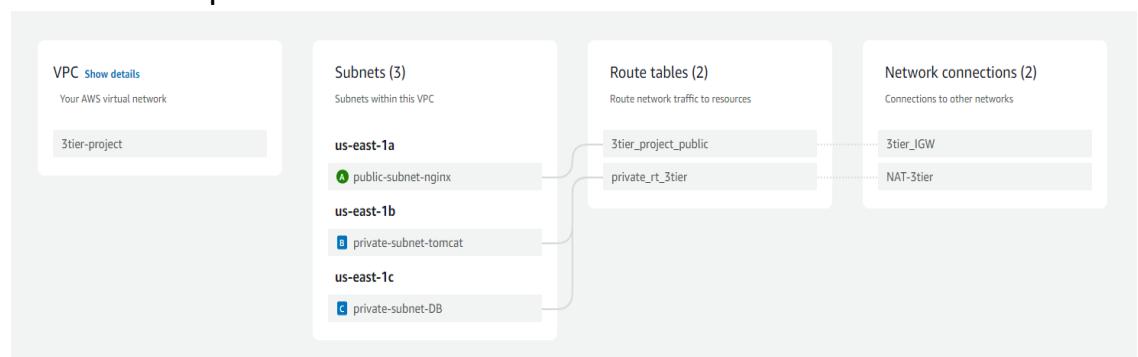
- Create another private route table



- Select private route table → edit routes → attach NAT



- Resource Map



- Add subnet to subnet association of private route table.

The screenshot shows the AWS VPC dashboard with the following details:

- Route tables (1/4) Info:**
 - Default route table: rtb-0c2af92493739620e
 - : rtb-0e6ac573dfe46ba15
- Explicit subnet associations (2):**

Name	Subnet ID	IPv4 CIDR	IPv6 CIDR
Private Subnet (Database)	subnet-06bde8113cc053ade	192.168.3.0/24	-
Private-Subnet-Tomcat	subnet-0a39ea621ca11879e	192.168.2.0/24	-
- Subnets without explicit associations (1):**
 - Public-Subnet-Nginx: subnet-0d5e5576f3a3ba99d

- Create 3 instances.

1. Nginx-Server-Public ->create in public subnet ->allow port = **80,22**

The screenshot shows the AWS EC2 "Launch an instance" wizard with the following configuration:

- Name and tags:** Name: Nginx_server
- Application and OS Images (Amazon Machine Image):** Software Image (AMI): Canonical, Ubuntu, 24.04, amd64... (ami-0866a3c8fb86eaeeba)
- Virtual server type (instance type):** t2.micro
- Firewall (security group):** New security group
- Storage (volumes):** 1 volume(s) - 8 GiB
- Launch instance:** A prominent orange button at the bottom right.

2. Tomcat-Server-Private ->create in private subnet ->allow port = 8080,22

Inbound Security Group Rules

- Security group rule 1 (TCP: 22, 0.0.0.0/0)

Type	Info	Protocol	Info	Port range	Info
ssh		TCP		22	
Source type	Info	Source	Info	Description - optional	Info
Anywhere				e.g. SSH for admin desktop	
0.0.0.0/0 X					
- Security group rule 2 (TCP: 8080, 0.0.0.0/32)

Type	Info	Protocol	Info	Port range	Info
Custom TCP		TCP		8080	
Source type	Info	Source	Info	Description - optional	Info
Custom				e.g. SSH for admin desktop	
0.0.0.0/32 X					

⚠️ Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

3. Database-Server-Private ->create in private subnet ->allow port = 3306,22 → attach same security group to RDS and instance

Launch an instance [Info](#)

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

Name and tags [Info](#)

Name: Database-Server-Private [Add additional tags](#)

Application and OS Images (Amazon Machine Image) [Info](#)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below.

Search our full catalog including 1000s of application and OS images

Recents [Quick Start](#)

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which

- Create RDS → Name → engine type → password → connect to EC2 instance Database-Server-Private

Templates
Choose a sample template to meet your use case.

- Production
Use defaults for high availability and fast, consistent performance.
- Dev/Test
This instance is intended for development use outside of a production environment.
- Free tier
Use RDS Free Tier to develop new applications, test existing applications, or gain hands-on experience with Amazon RDS.

Settings

DB instance identifier **Info**
Type a name for your DB instance. The name must be unique across all DB instances owned by your AWS account in the current AWS Region.
tierRDS

The DB instance identifier is case-insensitive, but is stored as all lowercase (as in "mydbinstance"). Constraints: 1 to 60 alphanumeric characters or hyphens. First character must be a letter. Can't contain two consecutive hyphens. Can't end with a hyphen.

Credentials Settings

Master username **Info**
Type a login ID for the master user of your DB instance.

MariaDB

MariaDB Community Edition is a MySQL-compatible database with strong support from the open source community, and extra features and performance optimizations.

- Supports database size up to 64 TiB.
- Supports General Purpose, Memory Optimized, and Burstable Performance instance classes.
- Supports automated backup and point-in-time recovery.
- Supports up to 15 Read Replicas per instance, within a single Region or 5 read replicas cross-region.
- Supports global transaction ID (GTID) and thread pooling.
- Developed and supported by the MariaDB open source community.

- Now connect public nginx instance to terminal → create new key pair “**vim new_key**” paste all the content to this key pair that we have created → change permission of that file to “**chmod key.pem**”
- After taking ssh connection of private instance

```
[ec2-user@ip-192-168-1-95 ~]$ sudo -i
[ec2-user@ip-192-168-1-95 ~]$ vim new_key
[ec2-user@ip-192-168-1-95 ~]$ chmod 400 new_key
[ec2-user@ip-192-168-1-95 ~]$ ls -l
total 4
-rw-r--r-- 1 root root 1675 Oct  4 12:43 new_key
[ec2-user@ip-192-168-1-95 ~]$ ssh -i new_key ec2-user@ip-192.168.3.248
The authenticity of host 'ip-192.168.3.248 (192.168.3.248)' can't be established.
ECDSA key fingerprint is SHA256:397c900bawyxL/fYcGM1N98XGmjSa2cgxOCQ.
This key is not known by any other name
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.3.248' (ED25519) to the list of known hosts.
[ec2-user@ip-192-168-1-95 ~]$ cd /root/.ssh
[ec2-user@ip-192-168-1-95 ~]$ ll
total 2
-rw-r--r-- 1 root root 399 Oct  4 12:43 id_rsa
[ec2-user@ip-192-168-1-95 ~]$ cat id_rsa
-----BEGIN RSA PRIVATE KEY-----[REDACTED]-----END RSA PRIVATE KEY-----[REDACTED]
[ec2-user@ip-192-168-1-95 ~]$ ssh -i new_key ec2-user@ip-192.168.3.248
[ec2-user@ip-192-168-1-95 ~]$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=49 time=2.65 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=49 time=2.42 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=49 time=2.38 ms
...
8.8.8.8 ping statistics ...
3 packets transmitted, 3 received, 0% packet loss, time 200ms
rtt min/avg/max/mdev = 2.377/2.551/2.859/0.214 ms
[ec2-user@ip-192-168-1-95 ~]$
```

i-00cd05fb4ba5d316e (Public-instance-nginx)
PublicIP: 44.204.196.87 PrivateIP: 192.168.1.95

- Install mariadb server in private instance of DB “`yum install mariadb105-server -y`”

```
aws Services Search [Alt+S] N. Virginia ▾ Rutugandhi Shete ▾
[EC2] 53 VPC IAM CloudWatch Simple Notification Service CloudFront Route 53 RDS
Installing mariadb105-server-utils-3:10.5.25-1.amzn2023.0.1.x86_64
Running script: mysql-test-run.pl -A -2 --amzn2023.0.1.x86_64
Running script: mariadb105-common-3:10.5.25-1.amzn2023.0.1.x86_64
Verifying mariadb-connector-c-3.1.13-1.amzn2023.0.3.x86_64
Verifying mariadb-connector-c-config-3.1.13-1.amzn2023.0.3.noarch
Verifying mariadb105-3:10.5.25-1.amzn2023.0.1.x86_64
Verifying mariadb105-backup-3:10.5.25-1.amzn2023.0.1.x86_64
Verifying mariadb105-binlog-3:10.5.25-1.amzn2023.0.1.x86_64
Verifying mariadb105-cracklib-password-check-3:10.5.25-1.amzn2023.0.1.x86_64
Verifying mariadb105-ermmag-3:10.5.25-1.amzn2023.0.1.x86_64
Verifying mariadb105-gssapi-server-3:10.5.25-1.amzn2023.0.1.x86_64
Verifying mariadb105-server-3:10.5.25-1.amzn2023.0.1.x86_64
Verifying mariadb105-server-utils-3:10.5.25-1.amzn2023.0.1.x86_64
Verifying mysql-test-1.0-2.amzn2023.0.3.noarch
Verifying perl-DBI-MariaDB-1.22-1.amzn2023.0.4.x86_64
Verifying perl-DBD-MariaDB-2.174-460.amzn2023.0.2.x86_64
Verifying perl-Data-Dumper-2.174-460.amzn2023.0.2.x86_64
Verifying perl-File-Copy-2.34-477.amzn2023.0.6.noarch
Verifying perl-Mail-Bigip-1.19-477.amzn2023.0.6.noarch
Verifying perl-Mail-Bigip-SMTP-1.19-477.amzn2023.0.6.noarch
Verifying perl-Mail-Complex-1.59-477.amzn2023.0.6.noarch
Verifying perl-Sys-Hostname-1.23-477.amzn2023.0.6.x86_64
Verifying perl-base-2.27-477.amzn2023.0.6.noarch
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14/22
15/22
16/22
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22/22

Installed:
mariadb-connector-c-3.1.13-1.amzn2023.0.3.x86_64
mariadb105-backup-3:10.5.25-1.amzn2023.0.1.x86_64
mariadb105-ermmag-3:10.5.25-1.amzn2023.0.1.x86_64
mariadb105-server-utils-3:10.5.25-1.amzn2023.0.1.x86_64
perl-DBI-MariaDB-1.22-1.amzn2023.0.4.x86_64
perl-DBD-MariaDB-2.174-460.amzn2023.0.2.x86_64
perl-Data-Dumper-2.174-460.amzn2023.0.2.x86_64
perl-File-Copy-2.34-477.amzn2023.0.6.noarch
perl-Mail-Bigip-1.19-477.amzn2023.0.6.noarch
perl-Mail-Bigip-SMTP-1.19-477.amzn2023.0.6.noarch
perl-Mail-Complex-1.59-477.amzn2023.0.6.noarch
perl-Sys-Hostname-1.23-477.amzn2023.0.6.x86_64
perl-base-2.27-477.amzn2023.0.6.noarch
mariadb-connector-c-config-3.1.13-1.amzn2023.0.3.noarch
mariadb105-common-3:10.5.25-1.amzn2023.0.1.x86_64
mariadb105-gssapi-server-3:10.5.25-1.amzn2023.0.1.x86_64
mysql-selinux-1.4.2-0.4.2-mzm2023.0.3.noarch
perl-DBI-1.643-7.amzn2023.0.3.x86_64
perl-DBD-MariaDB-2.174-460.amzn2023.0.2.x86_64
perl-Data-Dumper-2.174-460.amzn2023.0.2.x86_64
perl-File-Copy-2.34-477.amzn2023.0.6.noarch
perl-Mail-Bigip-1.19-477.amzn2023.0.6.noarch
perl-Mail-Bigip-SMTP-1.19-477.amzn2023.0.6.noarch
perl-Mail-Complex-1.59-477.amzn2023.0.6.noarch
perl-Sys-Hostname-1.23-477.amzn2023.0.6.x86_64
perl-base-2.27-477.amzn2023.0.6.noarch
mariadb105-3:10.5.25-1.amzn2023.0.1.x86_64
mariadb105-cracklib-password-check-3:10.5.25-1.amzn2023.0.1.x86_64
mariadb105-3:10.5.25-1.amzn2023.0.1.x86_64
perl-B-1.80-477.amzn2023.0.6.x86_64
perl-DBI-1.643-7.amzn2023.0.3.x86_64
perl-DBD-MariaDB-2.174-460.amzn2023.0.2.x86_64
perl-Data-Dumper-2.174-460.amzn2023.0.2.x86_64
perl-FileHandle-2.03-477.amzn2023.0.6.noarch
perl-Mail-Complex-1.59-477.amzn2023.0.6.noarch
perl-Sys-Hostname-1.23-477.amzn2023.0.6.x86_64
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22/22
```

- Connect terminal to database “`mysql -h dns-endpoint -u admin -ppassword`”

```
aws Services Q Search [Alt+S] N. Virginia ▾ Rutugandhi Shete ▾
[EC2] [S3] [VPC] [Lambda] [CloudWatch] [Simple Notification Service] [CloudFront] [Route 53] [ROS]
Verifying : mariadb105-ermars-3:10.5.25-1.amzn2023.0.1.x86_64 1/22
Verifying : mariadb105-gaasp-server-3:10.5.25-1.amzn2023.0.1.x86_64 8/22
Verifying : mariadb105-server-3:10.5.25-1.amzn2023.0.1.x86_64 9/22
Verifying : mariadb105-system-utils-3:10.5.25-1.amzn2023.0.1.x86_64 10/22
Verifying : mysql-selinux-1.0.4-2.amzn2023.0.3.noarch 11/22
Verifying : perl-1.80-477.amzn2023.0.6.x86_64 12/22
Verifying : perl-DBD-MariaDB-1.22-1.amzn2023.0.4.x86_64 13/22
Verifying : perl-DBI-1.643-7.amzn2023.0.3.x86_64 14/22
Verifying : perl-Data-Dumper-2.174-460.amzn2023.0.2.x86_64 15/22
Verifying : perl-File-Copy-2.22-1.amzn2023.0.2.noarch 16/22
Verifying : perl-FileHandle-2.03-477.amzn2023.0.4.noarch 17/22
Verifying : perl-Math-BigInt-1.1.9998.39-2.amzn2023.0.2.noarch 18/22
Verifying : perl-Math-BigInt-0.2614-459.amzn2023.0.2.noarch 19/22
Verifying : perl-Math-Complex-1.59-477.amzn2023.0.6.noarch 20/22
Verifying : perl-Sys-Hostname-1.23-477.amzn2023.0.6.x86_64 21/22
Verifying : perl-base-2.27-477.amzn2023.0.6.noarch 22/22

Installed:
mariadb-connector-c-3.1.13-1.amzn2023.0.3.x86_64 mariadb-connector-c-config-3.1.13-1.amzn2023.0.3.noarch mariadb105-3:10.5.25-1.amzn2023.0.1.x86_64
mariadb105-common-3:10.5.25-1.amzn2023.0.1.x86_64 mariadb105-gaasp-server-3:10.5.25-1.amzn2023.0.1.x86_64 mariadb105-server-3:10.5.25-1.amzn2023.0.1.x86_64
perl-DBD-MariaDB-1.22-1.amzn2023.0.4.x86_64 perl-DBI-1.643-7.amzn2023.0.3.x86_64 perl-B-1.80-477.amzn2023.0.6.x86_64
perl-File-Copy-2.22-1.amzn2023.0.2.noarch perl-FileHandle-2.03-477.amzn2023.0.4.noarch perl-Data-Dumper-2.174-460.amzn2023.0.2.x86_64
perl-Math-BigInt-1.1.9998.39-2.amzn2023.0.2.noarch perl-Math-BigInt-0.2614-459.amzn2023.0.2.noarch perl-Math-Complex-1.59-477.amzn2023.0.6.noarch
perl-Sys-Hostname-1.23-477.amzn2023.0.6.x86_64 perl-base-2.27-477.amzn2023.0.6.noarch

Complete!
[root@ip-192-168-3-248 ~]# which mysql
/usr/bin/mysql
[root@ip-192-168-3-248 ~]# mysql -h three-tier-db.cnusayequzw.us-east-1.rds.amazonaws.com -u admin -padmin123
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MySQL connection id is 27
Server version: 8.0.35 Source distribution

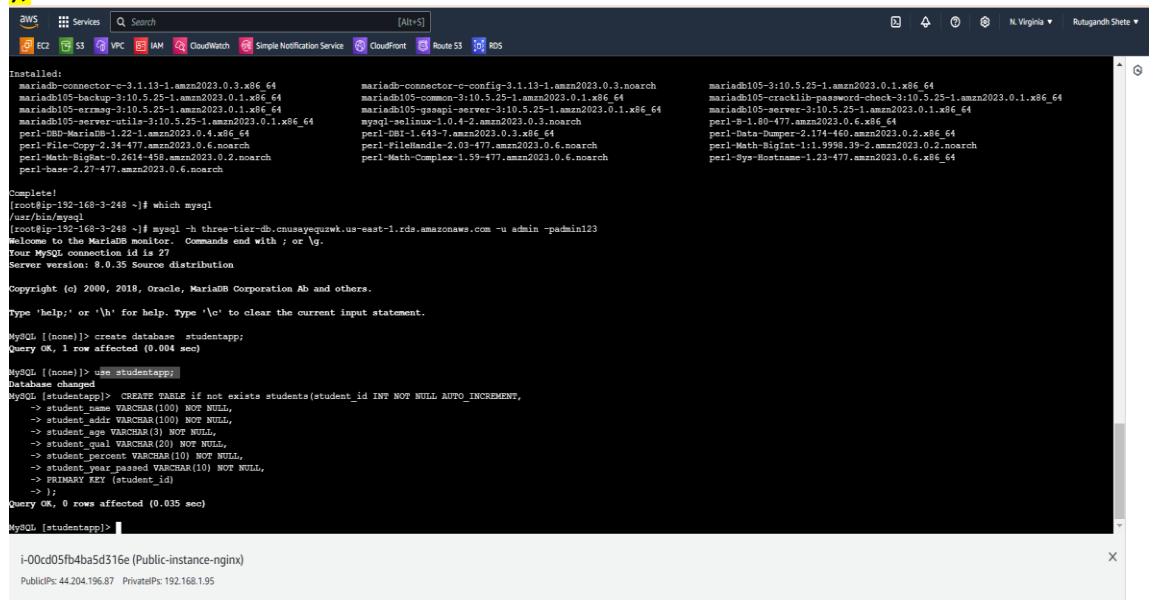
Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

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

MySQL [(none)]>

i-0cd05fb4ba5d316e (Public-instance-nginx)
PublicIPs: 44.204.196.87 PrivateIPs: 192.168.1.95
```

- Create database “`create database studentapp;`”, use database; , `CREATE TABLE` if not exists 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)`)
);



```
mariadb-connector-c-3.1.13-1.amzn2023.0.3.x86_64
mariadb105-backup-3:10.5.25-1.amzn2023.0.1.x86_64
mariadb105-ermsgag-3:10.5.25-1.amzn2023.0.1.x86_64
mariadb105-server-3:10.5.25-1.amzn2023.0.1.x86_64
perl-DBD-MariaDB-1.22-1.amzn2023.0.4.x86_64
perl-DBI-1.649-7.amzn2023.0.3.x86_64
perl-FileHandle-2.09-477.amzn2023.0.6.x86_64
perl-Math-Complex-1.59-477.amzn2023.0.6.x86_64
perl-Math-BigInt-0.2614+458.amzn2023.0.2.noarch
perl-Math-BigRat-1.1998.39-7.amzn2023.0.2.noarch
perl-Sys-Hostname-1.23-477.amzn2023.0.6.x86_64

mariadb105-3:10.5.25-1.amzn2023.0.1.x86_64
mariadb105-cracklib-password-check-3:10.5.25-1.amzn2023.0.1.x86_64
mariadb105-server-3:10.5.25-1.amzn2023.0.1.x86_64
perl-DBI-1.649-7.amzn2023.0.6.x86_64
perl-Data-Dumper-2.174-460.amzn2023.0.2.x86_64
perl-Math-BigInt-1.1998.39-7.amzn2023.0.2.noarch
perl-Sys-Hostname-1.23-477.amzn2023.0.6.x86_64

Complete!
[root@ip-192-168-3-248 ~]# which mysql
/usr/bin/mysql
[root@ip-192-168-3-248 ~]# mysql -h three-tier-db.cnusayeqzukw.us-east-1.rds.amazonaws.com -u admin -padmin123
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 27
Server version: 8.0.35 Source distribution

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

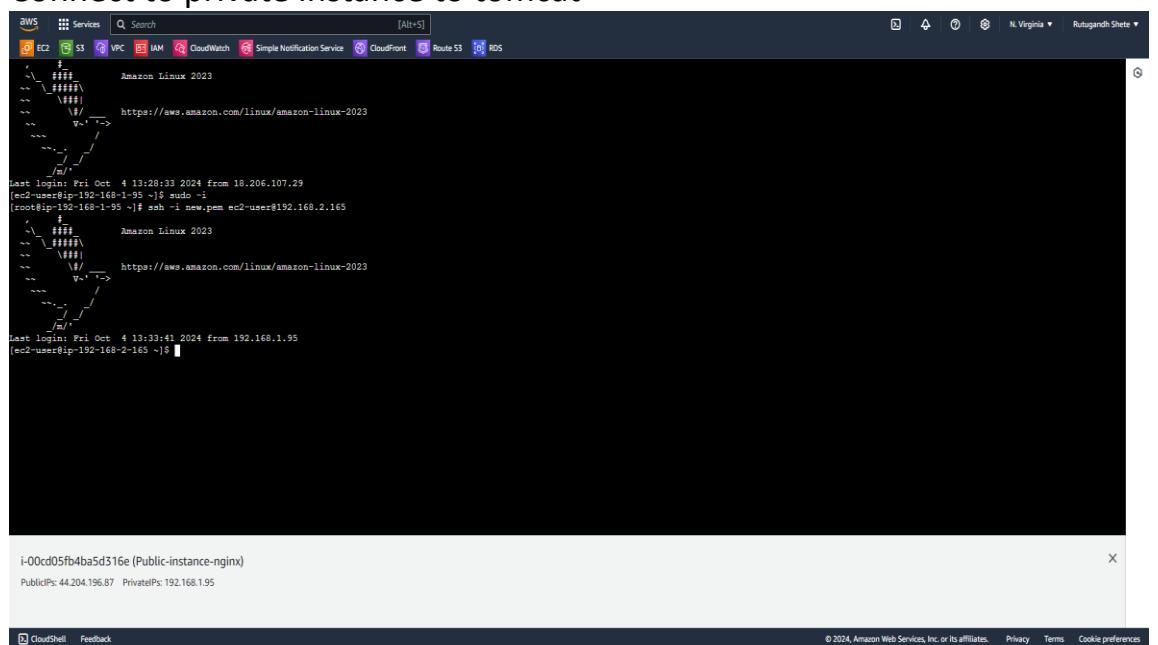
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MySQL [(none)]> create database studentapp;
Query OK, 1 row affected (0.004 sec)

MySQL [(none)]> use studentapp;
Database changed
MySQL [studentapp]> CREATE TABLE IF NOT EXISTS 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)
-> );
Query OK, 0 rows affected (0.035 sec)

MySQL [studentapp]> i-00cd05fb4ba5d316e (Public-instance-nginx)
PublicIPs: 44.204.196.87 PrivateIPs: 192.168.1.95
```

- Connect to private instance to tomcat



```
Amazon Linux 2023
https://aws.amazon.com/linux/amazon-linux-2023

Last login: Fri Oct  4 13:20:33 2024 from 18.206.107.29
[ec2-user@ip-192-168-1-95 ~]$ sudo -i
[root@ip-192-168-1-95 ~]# ssh -i new.pem ec2-user@192.168.2.165
Amazon Linux 2023
https://aws.amazon.com/linux/amazon-linux-2023

Last login: Fri Oct  4 13:33:41 2024 from 192.168.1.95
[ec2-user@ip-192-168-2-165 ~]$ i-00cd05fb4ba5d316e (Public-instance-nginx)
PublicIPs: 44.204.196.87 PrivateIPs: 192.168.1.95
```

- Install java “`yum install java -y`”

```

Verifying : harfbuzz-7.0.0-2.amzn2023.0.1.x86_64
Verifying : java-22-amazon-corretto-headless-1:22.0.2+9-1.amzn2023.1.x86_64
Verifying : javapackages-filesystem-6.0.0-7.amzn2023.0.6.noarch
Verifying : libfontconfig-1.10.8-1.amzn2023.0.2.x86_64
Verifying : libfreetype-2.1.3-8.amzn2023.0.2.x86_64
Verifying : libgcc-1.2.3-8.amzn2023.0.2.x86_64
Verifying : libxml2-1.7.2-3.amzn2023.0.4.x86_64
Verifying : libxau-1.0.9-6.amzn2023.0.2.x86_64
Verifying : libXext-1.3.4-6.amzn2023.0.2.x86_64
Verifying : libXinerama-1.1.4-8.amzn2023.0.2.x86_64
Verifying : libXrandr-1.5.2-6.amzn2023.0.2.x86_64
Verifying : libXrender-0.9.10-14.amzn2023.0.2.x86_64
Verifying : libXt-1.2.0-4.amzn2023.0.2.x86_64
Verifying : libXtst-1.2.3-14.amzn2023.0.2.x86_64
Verifying : libXtrol-1.0-6.amzn2023.0.2.x86_64
Verifying : libXpm-0.9.1-10.amzn2023.0.5.x86_64
Verifying : libXpm-0.9.1-7.amzn2023.0.2.x86_64
Verifying : pixman-0.40.0-3.amzn2023.0.3.x86_64
Verifying : xml-common-0.6.3-56.amzn2023.0.2.noarch

Installed:
alsa-lib-1.2.7.2-1.amzn2023.0.2.x86_64
dejavu-sans-mono-fonts-2.37-16.amzn2023.0.2.noarch
fonts-filesystem-1:2.0.5-12.amzn2023.0.2.noarch
google-noto-fonts-common-20210206-2.amzn2023.0.2.noarch
harfbuzz-7.0.0-2.amzn2023.0.1.x86_64
javapackages-filesystem-6.0.0-7.amzn2023.0.6.noarch
libBME-1.1.9-10.amzn2023.0.2.x86_64
libCms-1.1.4-8.amzn2023.0.2.x86_64
libXt-1.2.0-4.amzn2023.0.2.x86_64
libXtst-1.2.3-14.amzn2023.0.2.x86_64
libXrandr-1.5.2-6.amzn2023.0.2.x86_64
libXtst-1.2.3-14.amzn2023.0.2.x86_64
libXpm-2:1.6.37-10.amzn2023.0.6.x86_64
pixman-0.40.0-3.amzn2023.0.3.x86_64
xml-common-0.6.3-56.amzn2023.0.2.noarch

Completed!
[i-00cd05fb4ba5d316e (Public-instance-nginx)]
Public IPs: 44.204.196.87 Private IPs: 192.168.1.95

```

- Make directory `mkdir /opt/tomcat`
- Install tomcat version 9

```

mkdir -p /opt/tomcat
curl -O http://dlcdn.apache.org/tomcat/tomcat-9/v9.0.95/bin/apache-tomcat-9.0.95.zip

```

Resolving dlcdn.apache.org (dlcdn.apache.org) ... 151.101.2.132, 2a04:fe42:644

Connecting to dlcdn.apache.org (dlcdn.apache.org) |151.101.2.132|:443... connected.

HTTP request sent, awaiting response... 200 OK

Length: 13266998 (13M) [application/xzip]

Saving to: 'apache-tomcat-9.0.95.zip'

apache-tomcat-9.0.95.zip 100%[=====] 12.65M 83.0MB/s in 0.2s

2024-10-04 14:17:27 (83.0 MB/s) - 'apache-tomcat-9.0.95.zip' saved [13266998/13266998]

```

[root@ip-192-168-2-165 ~]# curl -O http://dlcdn.apache.org/tomcat/tomcat-9/v9.0.95/bin/apache-tomcat-9.0.95.zip
[root@ip-192-168-2-165 ~]# wget https://dlcdn.apache.org/tomcat/tomcat-9/v9.0.95/bin/apache-tomcat-9.0.95.zip
--2024-10-04 14:17:26-- https://dlcdn.apache.org/tomcat/tomcat-9/v9.0.95/bin/apache-tomcat-9.0.95.zip
Resolving dlcdn.apache.org (dlcdn.apache.org) ... 151.101.2.132, 2a04:fe42:644
Connecting to dlcdn.apache.org (dlcdn.apache.org) |151.101.2.132|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 13266998 (13M) [application/xzip]
Saving to: 'apache-tomcat-9.0.95.zip'

apache-tomcat-9.0.95.zip          100%[=====] 12.65M 83.0MB/s  in 0.2s

[i-00cd05fb4ba5d316e (Public-instance-nginx)]
Public IPs: 44.204.196.87 Private IPs: 192.168.1.95

```

- Move that unzipped file to /opt/tomcat

```
aws Services Search [Alt+S] N. Virginia ▾ Rutugandhi Shete

[EC2 S3 VPC IAM CloudWatch Simple Notification Service CloudFront Route 53 RDS

inflating: apache-tomcat-9.0.95/webapps/examples/serlets/jspinfo.html
inflating: apache-tomcat-9.0.95/webapps/examples/serlets/comparams.html
inflating: apache-tomcat-9.0.95/webapps/examples/serlets/sessions.html
inflating: apache-tomcat-9.0.95/webapps/examples/websocket/chat.xhtml
inflating: apache-tomcat-9.0.95/webapps/examples/websocket/dashboard.xhtml
inflating: apache-tomcat-9.0.95/webapps/examples/websocket/echo.xhtml
inflating: apache-tomcat-9.0.95/webapps/examples/websocket/index.xhtml
inflating: apache-tomcat-9.0.95/webapps/host-manager/mbeans.xhtml
inflating: apache-tomcat-9.0.95/webapps/host-manager/META-INF/context.xml
inflating: apache-tomcat-9.0.95/webapps/host-manager/WEB-INF/jsp/401.jsp
inflating: apache-tomcat-9.0.95/webapps/host-manager/WEB-INF/jsp/403.jsp
inflating: apache-tomcat-9.0.95/webapps/host-manager/WEB-INF/jsp/404.jsp
inflating: apache-tomcat-9.0.95/webapps/host-manager/WEB-INF/manager.xml
inflating: apache-tomcat-9.0.95/webapps/host-manager/WEB-INF/web.xml
inflating: apache-tomcat-9.0.95/webapps/host-manager/favicon.ico
inflating: apache-tomcat-9.0.95/webapps/host-manager/images/tomcat.css
inflating: apache-tomcat-9.0.95/webapps/host-manager/images/tomcat.svg
inflating: apache-tomcat-9.0.95/webapps/host_manager/index.jsp
inflating: apache-tomcat-9.0.95/webapps/manager/META-INF/context.xml
inflating: apache-tomcat-9.0.95/webapps/manager/WEB-INF/jsp/401.jsp
inflating: apache-tomcat-9.0.95/webapps/manager/WEB-INF/jsp/403.jsp
inflating: apache-tomcat-9.0.95/webapps/manager/WEB-INF/jsp/404.jsp
inflating: apache-tomcat-9.0.95/webapps/manager/WEB-INF/jsp/connectorCerts.jsp
inflating: apache-tomcat-9.0.95/webapps/manager/WEB-INF/jsp/connectorCiphers.jsp
inflating: apache-tomcat-9.0.95/webapps/manager/WEB-INF/jsp/sessionDetail.jsp
inflating: apache-tomcat-9.0.95/webapps/manager/WEB-INF/jsp/sessionList.jsp
inflating: apache-tomcat-9.0.95/webapps/manager/WEB-INF/web.xml
inflating: apache-tomcat-9.0.95/webapps/manager/cas/manager.css
inflating: apache-tomcat-9.0.95/webapps/manager/favicon.ico
inflating: apache-tomcat-9.0.95/webapps/manager/images/tomcat.svg
inflating: apache-tomcat-9.0.95/webapps/manager/index.jsp
inflating: apache-tomcat-9.0.95/webapps/manager/status.xml
inflating: apache-tomcat-9.0.95/webapps/manager/xform.xls
[root@ip-192-168-2-165 ~]# ls
apache-tomcat-9.0.95.zip
[root@ip-192-168-2-165 ~]# mv apache-tomcat-9.0.95 /opt/tomcat
[root@ip-192-168-2-165 ~]# ls /opt/tomcat/
apache-tomcat-9.0.95
[root@ip-192-168-2-165 ~]#
```

- Download student.war file paste into /opt/tomcat/apache/webapps curl -O <https://s3-us-west-2.amazonaws.com/studentapi-cit/student.war>

AWS Services Search [Alt+S]

CloudWatch Simple Notification Service CloudFront Route 53 RDS

infating: apache-tomcat-9.0.95/webapps/manager/WEB-INF/jsp/403.jsp
infating: apache-tomcat-9.0.95/webapps/manager/WEB-INF/jsp/404.jsp
infating: apache-tomcat-9.0.95/webapps/manager/WEB-INF/jsp/connectorCerts.jsp
infating: apache-tomcat-9.0.95/webapps/manager/WEB-INF/jsp/connectorCiphers.jsp
infating: apache-tomcat-9.0.95/webapps/manager/WEB-INF/jsp/connectorMetrics.jsp
infating: apache-tomcat-9.0.95/webapps/manager/WEB-INF/jsp/sessionDetail.jsp
infating: apache-tomcat-9.0.95/webapps/manager/WEB-INF/jsp/sessionList.jsp
infating: apache-tomcat-9.0.95/webapps/manager/WEB-INF/web.xml
infating: apache-tomcat-9.0.95/webapps/manager/css/manager.css
infating: apache-tomcat-9.0.95/webapps/manager/images/asf-logo.svg
infating: apache-tomcat-9.0.95/webapps/manager/images/tomcat.svg
infating: apache-tomcat-9.0.95/webapps/manager/images/x.jsp
infating: apache-tomcat-9.0.95/webapps/manager/status.xhtml
infating: apache-tomcat-9.0.95/webapps/xform.xhtml

```
[root@ip-192-168-2-165 ~]# ls
apache-tomcat-9.0.95 apache-tomcat-9.0.95.zip
[root@ip-192-168-2-165 ~]# mv apache-tomcat-9.0.95 /opt/tomcat
[root@ip-192-168-2-165 ~]# ls /opt/tomcat/
bin lib logs temp
[root@ip-192-168-2-165 ~]# curl -O http://s3-us-west-2.amazonaws.com/studentapi-cit/student.war
  % Total    % Received   % Xferd  Average Speed   Time   Time  Current
                                 Dload  Upload  Total  Spent   Left  Speed
100 89423  100 89423    0     0  170k  0:00:00 --:--:--:--:--:-- 169k
[root@ip-192-168-2-165 ~]# ls
apache-tomcat-9.0.95 apache-tomcat-9.0.95.zip student.war
[root@ip-192-168-2-165 ~]# cd /opt/tomcat/apache-tomcat-9.0.95/webapps
[root@ip-192-168-2-165 webapps]# curl -O http://s3-us-west-2.amazonaws.com/studentapi-cit/student.war
  % Total    % Received   % Xferd  Average Speed   Time   Time  Current
                                 Dload  Upload  Total  Spent   Left  Speed
0     0    0     0  0:00:00 --:--:--:--:--:-- 0
100 89423  100 89423    0     0  169k  0:00:00 --:--:--:--:--:-- 169k
[root@ip-192-168-2-165 webapps]# rm student.war
[root@ip-192-168-2-165 webapps]# ls
ROOT docs examples host-manager manager student.war
[root@ip-192-168-2-165 webapps]# cd ..
[root@ip-192-168-2-165 apache-tomcat-9.0.95]# cd ..lib
[bash: cd: ..lib: No such file or directory]
[root@ip-192-168-2-165 apache-tomcat-9.0.95]# cd lib
[root@ip-192-168-2-165 lib]#
```

i-00cd05fb4ba5d316e (Public-Instance-nginx)

PublicIP: 44.204.196.87 PrivateIP: 192.168.1.95

- Change directory to “Cd lib” and curl -O <https://s3-us-west-2.amazonaws.com/studentapi-cit/mysql-connector.jar>

```
aws Services Search [Alt+S] N. Virginia ▾ Rutugandhi Shete

infloating: apache-tomcat-9.0.95/webapps/manager/images/asf-logo.svg
infloating: apache-tomcat-9.0.95/webapps/manager/images/tomcat.svg
infloating: apache-tomcat-9.0.95/webapps/manager/index.jsp
infloating: apache-tomcat-9.0.95/webapps/manager/status.xml
infloating: apache-tomcat-9.0.95/webapps/manager/manager/xform.xsl
[root@ip-192-168-2-165 ~]# ls
apache-tomcat-9.0.95.zip
[root@ip-192-168-2-165 ~]# mv apache-tomcat-9.0.95 /opt/tomcat
[root@ip-192-168-2-165 ~]# ls /opt/tomcat/
apache-tomcat-9.0.95
[root@ip-192-168-2-165 ~]# curl -o https://s3-us-west-2.amazonaws.com/studentapi-cit/student.war
% Total % Received % Xferd Average Speed Time Time Current
          Dload Upload Total Spent Left Speed
100 89423  100 89423    0  0:170x   0 --::-- --::-- 169k
[root@ip-192-168-2-165 ~]# ls
apache-tomcat-9.0.95.zip student.war
[root@ip-192-168-2-165 ~]# rm -rf student.war
[root@ip-192-168-2-165 ~]# cd /opt/tomcat/apache-tomcat-9.0.95/webapps
[root@ip-192-168-2-165 webapps]# curl -o https://s3-us-west-2.amazonaws.com/studentapi-cit/student.war
% Total % Received % Xferd Average Speed Time Time Current
          Dload Upload Total Spent Left Speed
0       0       0       0  0:169x   0 --::-- --::-- 0
100 89423  100 89423    0  0:169x   0 --::-- --::-- 0
[root@ip-192-168-2-165 webapps]#
[root@ip-192-168-2-165 webapps]# ls
ROOT docket manager host-manager manager student.war
[root@ip-192-168-2-165 webapps]# curl -o https://s3-us-west-2.amazonaws.com/studentapi-cit/mysql-connector.jar
[root@ip-192-168-2-165 apache-tomcat-9.0.95]# cd ..//lib
[bash]: cd: ..//lib: No such file or directory
[root@ip-192-168-2-165 apache-tomcat-9.0.95]# cd lib
[root@ip-192-168-2-165 lib]# curl -o https://s3-us-west-2.amazonaws.com/studentapi-cit/mysql-connector.jar
% Total % Received % Xferd Average Speed Time Time Current
          Dload Upload Total Spent Left Speed
100 983k  100 983k    0  0:1099x   0 --::-- --::-- 1099k
[root@ip-192-168-2-165 lib]# ls
annotations-api.jar catalina-storconfig.jar el-api.jar jsp-api.jar tomcat-coyote-ffm.jar tomcat-118n-de.jar tomcat-118n-ko.jar tomcat-jdb4.jar tomcat-websocket.jar
catalina-ant.jar catalina-tiles.jar jasper-el.jar mysql-connector.jar tomcat-coyote.jar tomcat-118n-es.jar tomcat-118n-pt_BR.jar tomcat-jni.jar websocket-api.jar
catalina-ha.jar catalina.jar jasper.jar servlet-api.jar tomcat-dbcg.jar tomcat-118n-fr.jar tomcat-118n-ru.jar tomcat-util-scan.jar
catalina-ssl.jar ecj-4.20.jar jaspic-api.jar tomcat-apr.jar tomcat-118n-ca.jar tomcat-118n-ja.jar tomcat-118n-zh-CN.jar tomcat-util.jar
[root@ip-192-168-2-165 lib]# 
```

- Edit conf file → context.xml → to 21 line →

```
<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-NAME"/>
```

```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <!--
3 Licensed to the Apache Software Foundation (ASF) under one or more
4 contributor license agreements. See the NOTICE file distributed with
5 this work for additional information regarding copyright ownership.
6 The ASF licenses this file to You under the Apache License, Version 2.0
7 (the "License"); you may not use this file except in compliance with
8 the License. You may obtain a copy of the License at
9
10 http://www.apache.org/licenses/LICENSE-2.0
11
12 Unless required by applicable law or agreed to in writing, software
13 distributed under the License is distributed on an "AS IS" BASIS,
14 WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
15 See the License for the specific language governing permissions and
16 limitations under the License.
17 -->
18 <!-- The contents of this file will be loaded for each web application -->
19 <Context>
20   <Resource name="jdbc/TempDB" auth="Container" type="javax.sql.DataSource"
21     maxTotal="100" maxIdle="30" maxWaitMillis="10000"
22     username="admin" password="admin123" driverClassName="com.mysql.jdbc.Driver"
23     url="jdbc:mysql://three-tier-db.cnusyequwk.us-east-1.rds.amazonaws.com:3306/studentapp"/>
24
25 <!-- Default set of monitored resources. If one of these changes, the -->
26 <!-- web application will be reloaded -->
27 <WatchedResource>WEB-INF/web.xml</WatchedResource>
28 <WatchedResource>WEB-INF/context.xml</WatchedResource>
29 <WatchedResource>${catalina.base}/conf/web.xml</WatchedResource>
30
31 <!-- Uncomment this to disable session persistence across Tomcat restarts -->
32 <!--
33 <Manager pathname="" />
34 -->
35 </Context>
```

- cd .. /bin, change permission chmod +x catalina.sh, ./catalina.sh start

- vim /etc/nginx/nginx.conf , paste it on 47 line “location / { proxy_pass http://private-IP-tomcat:8080/student/; }”

AWS Services Search [Alt+S] N. Virginia Rutugand Shete

EC2 S3 VPC IAM CloudWatch Simple Notification Service CloudFront Route 53 RDS

```
34 # for more information.
35 include /etc/nginx/conf.d/*.conf;
36
37 server {
38     listen      80;
39     listen      [::]:80;
40     server_name _;
41     root        /usr/share/nginx/html;
42
43     # Load configuration files for the default server block.
44     include /etc/nginx/default.d/*.conf;
45
46     error_page 404 /404.html;
47     location = /404.html {
48         location / {
49             proxy_pass http://private-IP-tomcat:8080/student/;
50         }
51
52         error_page 500 502 503 504 /50x.html;
53         location = /50x.html {
54             }
55     }
56
57 # Settings for a TLS enabled server.
58
59 #     server {
60 #         listen      443 ssl http2;
61 #         listen      [::]:443 ssl http2;
62 #         server_name _;
63 #         root        /usr/share/nginx/html;
64 #
65 #         ssl_certificate "/etc/pki/nginx/server.crt";
66 #         ssl_certificate_key "/etc/pki/nginx/private/server.key";
67 #         ssl_session_timeout 10m;
68 #         ssl_stapling_timeout 10s;
69 #         ssl_ciphers PROFILE+SYSTEM;
70 #         ssl_prefer_server_ciphers on;
71 #
72 #     # Load configuration files for the default server block.
73 # }
```

-- INSERT -- 49,9 71%

i-00cd05fb4ba5d316e (Public-Instance-nginx)

PublicIPs: 44.204.196.87 PrivateIPs: 192.168.1.95

- After hitting public IP of nginx server

Student Registration Form

Student Name	<input type="text" value="Rutugandh shete"/>
Student Address	<input type="text" value="pune"/>
Student Age	<input type="text" value="20"/>
Student Qualification	<input type="text" value="12"/>
Student Percentage	<input type="text" value="67"/>
Year Passed	<input type="text" value="2020"/>
<input type="button" value="register"/>	

[Register Student](#)

Students List

Student ID	StudentName	Student Addrs	Student Age	Student Qualification	Student Percentage	Student Year Passed	Edit	Delete
1	Rutugandh shete	pune	20	12	67	2020	edit	delete