

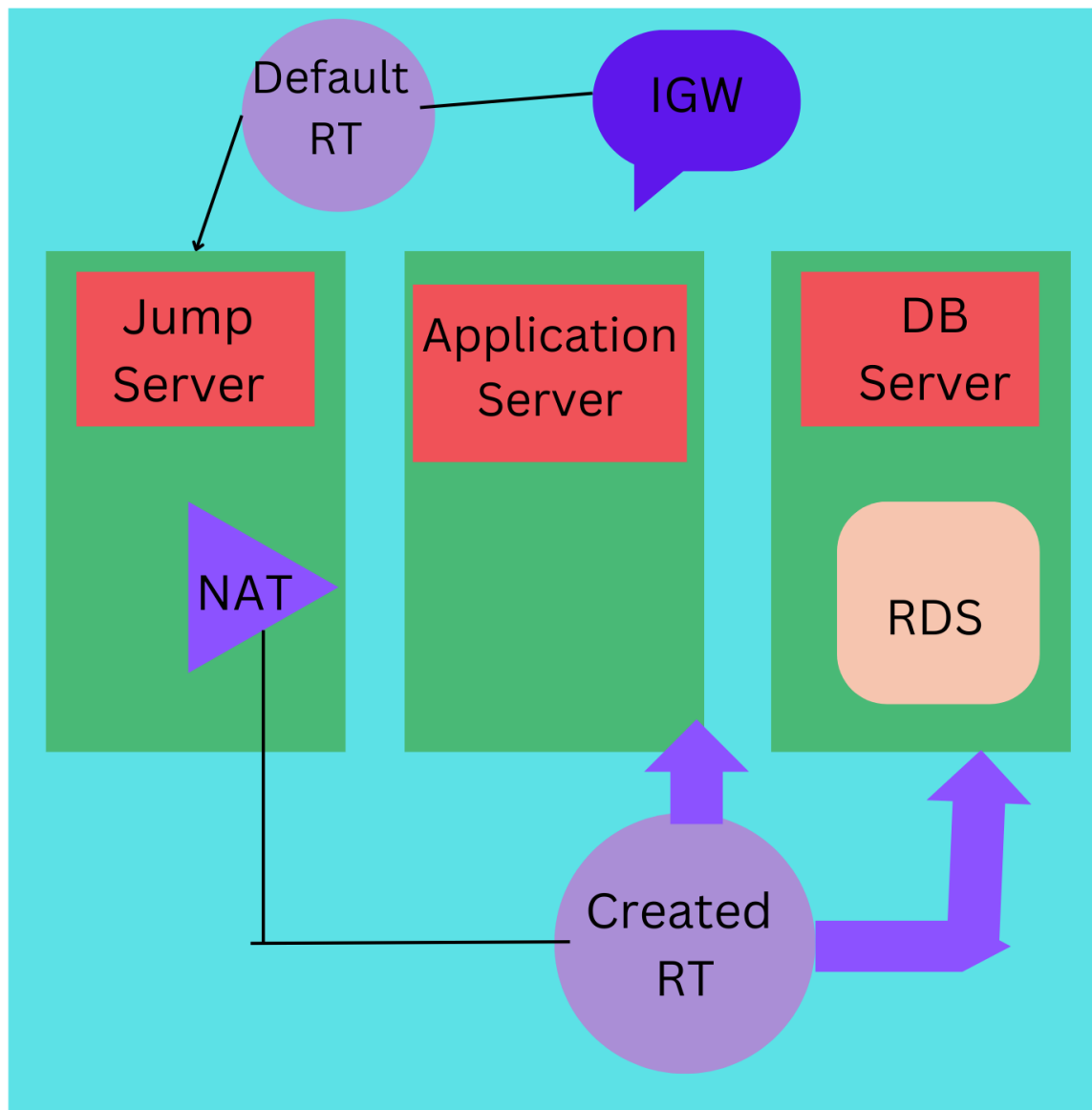
3 Tier Application

What is Three-Tier Architecture?

Three-Tier Architecture is an is an well established software application design pattern which will organizes the application in the three logical and physical computing tiers as following:

- **Presentation Tier**
- **Application Tier**
- **Data Tier**

The major benefit of the three tiers in client-server architecture is that these tiers are developed and maintained independently and this would not impact the other tiers in case of any modification. It allows for better performance and even more scalability in architecture can be made as with the increasing demand, more servers can be added.



The Three Tiers In Detail

Presentation Tier/Jump Server

It is the user interface and topmost tier in the architecture. Its purpose is to take request from the client and displays information to the client. It communicates with other tier by doing ssh. because we have created other two tier in private subnet.

Step1: Login into your AWS Console

Step2: Create Infrastructure

- Create VPC
- Create 3 Subnet in that one is public and other two is Private in different availability Zone.
- Make One Public by Enabling in Setting
- Create one IGW for Public Subnet
- Attach that subnet to VPC
- Create one NAT Gateway to make Subnet Private
- Created RDS in private Subnet
- We have connected Default RT to Public Subnet and added Route of Internet Gateway
- We have Created another RT for other two subnet and associated with them and added Route to NAT Gateway.
- Created 3 Server in 3 different subnet

Step 3:

- In the AWS Management Console search bar, enter VPC, and click the VPC result under Services:
- To start creating VPC, in the left down side, Click on **Your VPC** to Create VPC:

Create VPC [Info](#)

A VPC is an isolated portion of the AWS Cloud populated by AWS objects, such as Amazon EC2 instances.

VPC settings

Resources to create [Info](#)
Create only the VPC resource or the VPC and other networking resources.

☒ VPC only ☐ VPC and more

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

3-tier-application

IPv4 CIDR block [Info](#)

☒ IPv4 CIDR manual input ☐ IPAM-allocated IPv4 CIDR block

IPv4 CIDR

10.0.0.0/24

- Enter VPC name and IPV4 CIDR Range Click on create VPC
- Click on below button create VPC

IPv6 CIDR block [Info](#)

☒ No IPv6 CIDR block ☐ IPAM-allocated IPv6 CIDR block ☐ Amazon-provided IPv6 CIDR block ☐ IPv6 CIDR owned by me

Tenancy [Info](#)

Default

Tags
A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

Key **Value - optional**

Name 3-tier-application Remove tag

Add tag

You can add 49 more tags

Cancel Create VPC

- To start creating subnet , in the left down side, click on Create **subnets**:
- Create 3 Subnet in that one is public and other two is Private in different availability Zone.

us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#CreateSubnet:

aws Services Search [Alt+S] N. Virginia

VPC > Subnets > Create subnet

Create subnet [Info](#)

VPC

VPC ID
Create subnets in this VPC.

vpc-034c146990cb0ad53 (3-tier-application)

Associated VPC CIDRs

IPv4 CIDRs
10.0.0.0/16

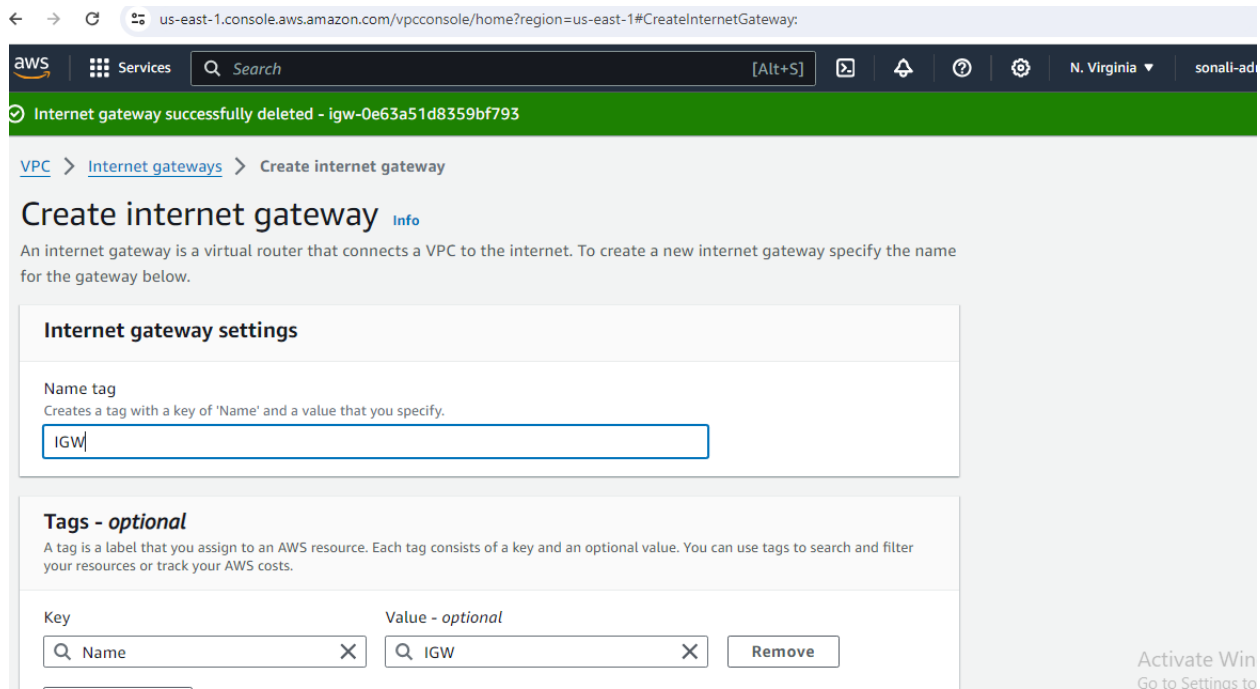
Subnet settings

Specify the CIDR blocks and Availability Zone for the subnet.

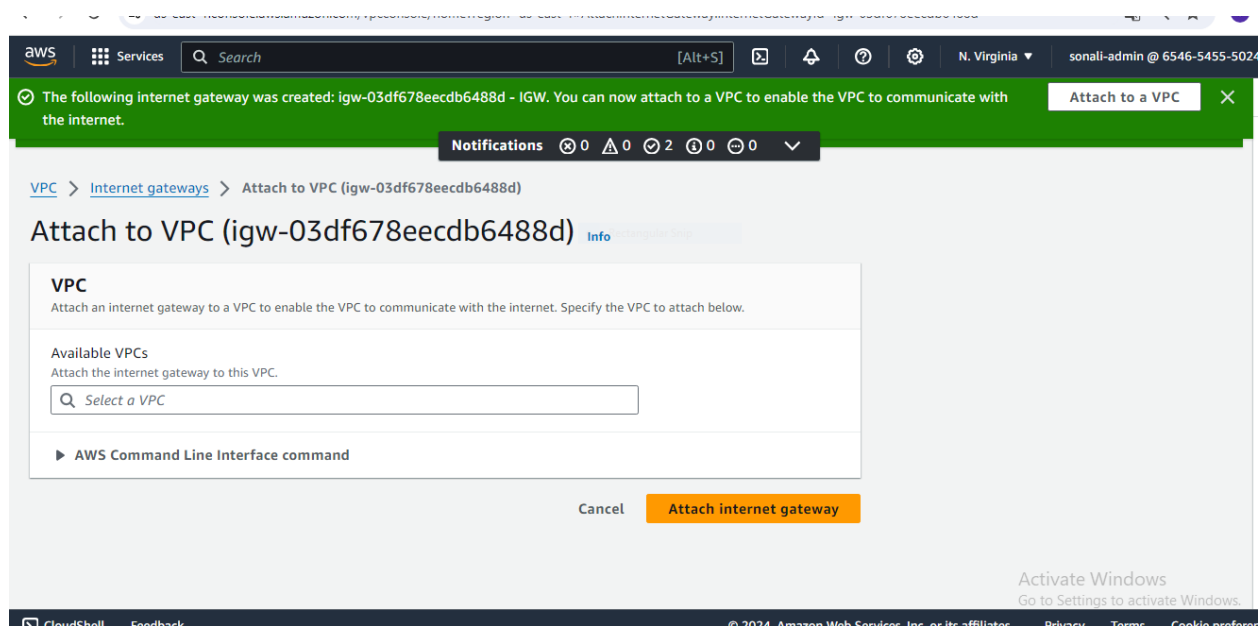
Activate
Go to Settings

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- To start creating IGW , in the left down side, click Create Internet Gateway:
- Give name to internet Gateway and click on create internet gateway



- Select IGW Which you have created recently and Click on **Action** and select option **Attach to VPC**



- Enable Public Setting of Auto -Assign-IP to make our subnet is public

aws Services Search [Alt+S] N. Virginia sonali-admin @ 6

VPC > Subnets > subnet-0752b22a7fc288b57 > Edit subnet settings

Edit subnet settings [Info](#)

Subnet

Subnet ID	Name
subnet-0752b22a7fc288b57	pub-sub

Auto-assign IP settings [Info](#)

Enable AWS to automatically assign a public IPv4 or IPv6 address to a new primary network interface for an instance in this subnet.

☒ Enable auto-assign public IPv4 address [Info](#)

☐ Enable auto-assign customer-owned IPv4 address [Info](#)
Option disabled because no customer owned pools found.

Resource-based name (RBN) settings [Info](#)

Specify the hostname type for EC2 instances in this subnet and optional RBN DNS query settings.

Activate Windows
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- Add Route in Default RT to Internet Gateway

aws Services Search [Alt+S] N. Virginia sonali-admin @ 6

Route 1

Destination	Target	Status
172.31.0.0/16	local	Active
	local	

Propagated: No

Route 2

Destination	Target	Status
0.0.0.0/0	Internet Gateway	Active
	igw-036caa0ada5e60047	

Propagated: No

Activate Windows
Go to Settings to activate

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- Create NAT Gateway for Private Subnet

us-east-1.console.aws.amazon.com/vpconsole/home?region=us-east-1#CreateNatGateway:

aws Services Search [Alt+S] N. Virginia sonali-admin @ 65

✓ Elastic IP address 34.226.100.18 (eipalloc-035433cd25d319895) allocated.

VPC > NAT gateways > Create NAT gateway

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.

subnet-0752b22a7fc288b57 (pub-sub) ▼

Connectivity type
Select a connectivity type for the NAT gateway.

☒ Public
☐ Private

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Create one Route table that is my created RT

us-east-1.console.aws.amazon.com/vpconsole/home?region=us-east-1#CreateRouteTable:

aws Services Search [Alt+S] N. Virginia sonali-admin @ 6546-5455-

VPC > Route tables > Create route table

Create route table [Info](#)

A route table specifies how packets are forwarded between the subnets within your VPC, the internet, and your VPN connection.

Route table settings

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

VPC
The VPC to use for this route table.

vpc-034c146990cb0ad53 (3-tier-application) ▼

Tags

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

Key	Value - optional

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Type here to search 25°C Partly sunny 3:00 PM 08/06/202

- Associate that Route table with two private Subnet

aws Services Search [Alt+S] N. Virginia sonali-admin @ 6546-5455-502

VPC > Route tables > rtb-089c3220d88f07eb9 > Edit subnet associations

Edit subnet associations

Change which subnets are associated with this route table.

Available subnets (2/3)

Filter subnet associations

	Name	Subnet ID	IPv4 CIDR	IPv6 CIDR	Route table ID
<input checked="" type="checkbox"/>	pri-subnet2	subnet-0d23138c836fdce19	10.0.30.0/24	-	Main (rtb-0eefb0b2b512a099)
<input checked="" type="checkbox"/>	pri-subnet1	subnet-020bfc7f1d616e798	10.0.20.0/24	-	Main (rtb-0eefb0b2b512a099)
<input type="checkbox"/>	pub-sub	subnet-0752b22a7fc288b57	10.0.10.0/24	-	Main (rtb-0eefb0b2b512a099)

Selected subnets

subnet-020bfc7f1d616e798 / pri-subnet1 X subnet-0d23138c836fdce19 / pri-subnet2 X

Activate Windows Go to Settings to activate Windows.

Cancel Save associations

- Add Route to NAT Gateway into Recently created Route Table

aws Services Search [Alt+S] N. Virginia sonali-admin @ 6546-5455-502

VPC > Route tables > rtb-089c3220d88f07eb9 > Edit routes

Edit routes

Route 1

Destination: 10.0.0.0/16

Target: local

Status: Active

Propagated: No

Route 2

Destination: 0.0.0.0/0

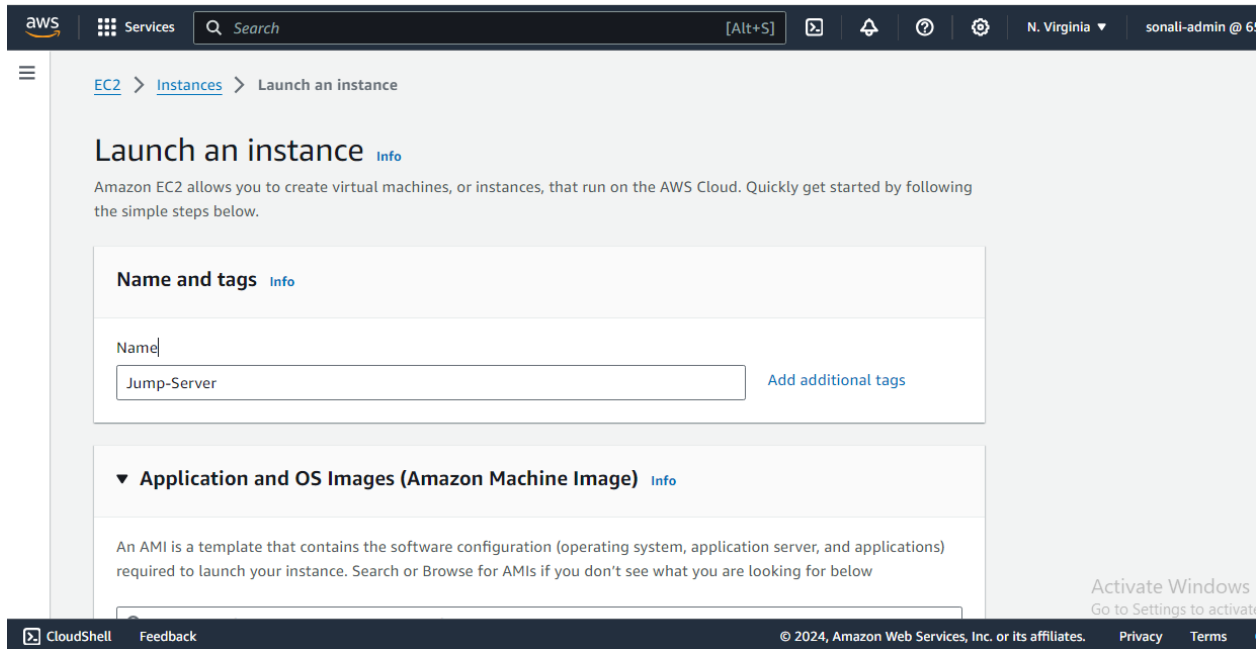
Target: nat-091539b1eff88a076 (3tier-NAT)

Status: -

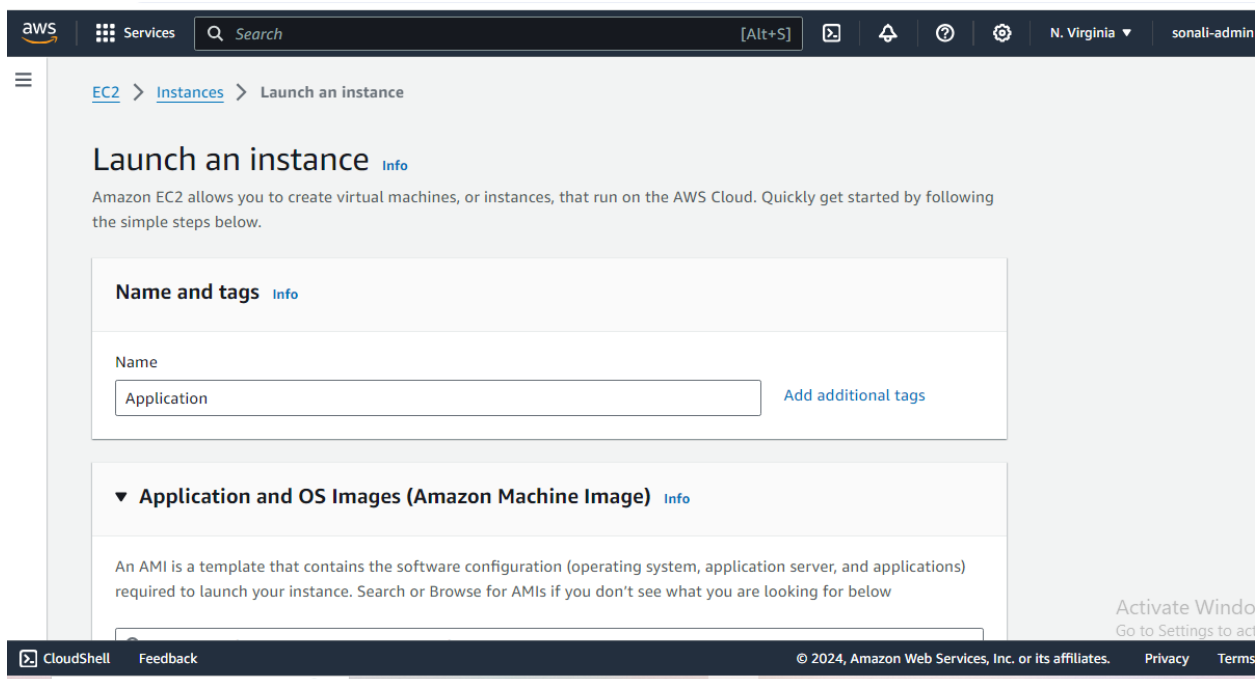
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Launch the Instance for public server and give name to that as Jump Server

- Add SSH Inbound Rule Security Group
- Add **8080 Port in Security Group**

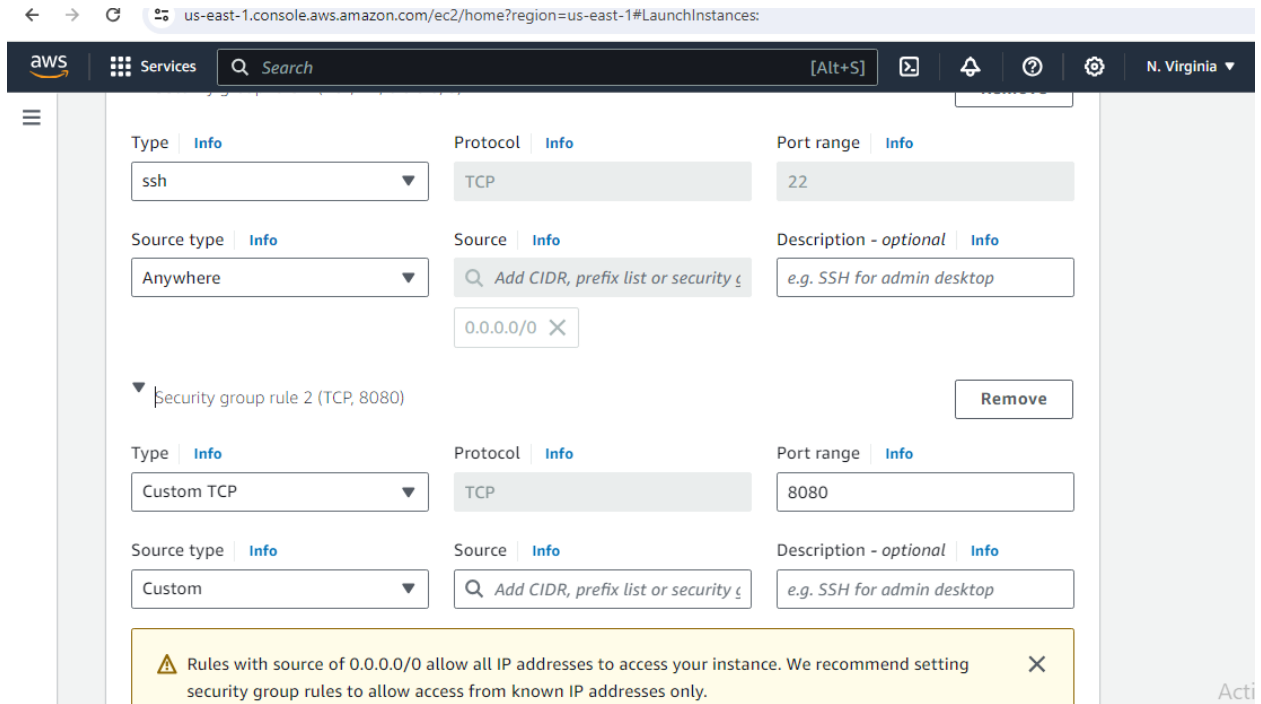


- Create Second Instance for another server in private subnet in different Availability Zone
- Give Name to that as Application

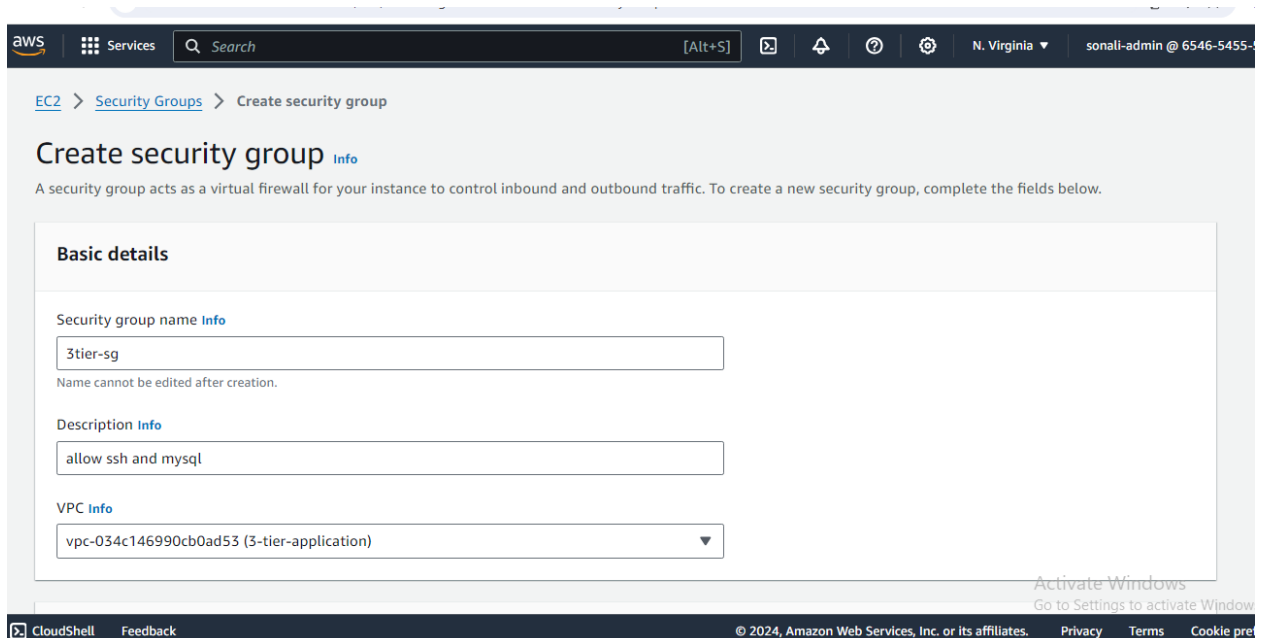


- Add SSH Inbound Rule Security Group

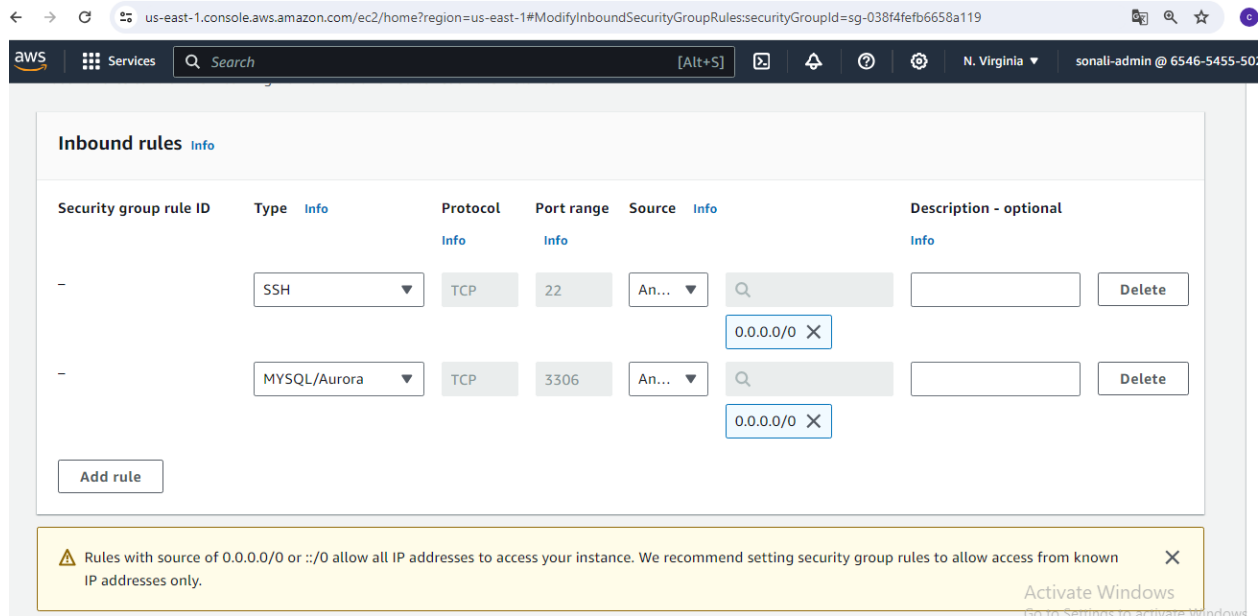
- Add **8080 Port in Security Group**



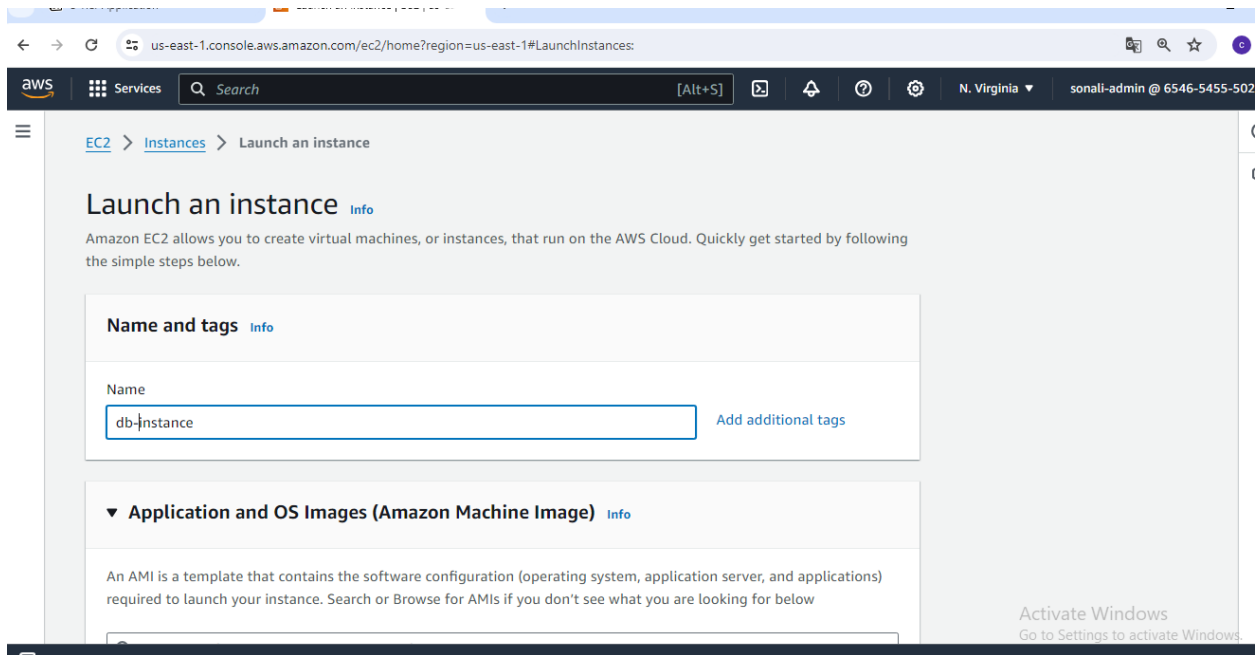
- Create One Security Group For database and Database Instance that is 3tier-sg



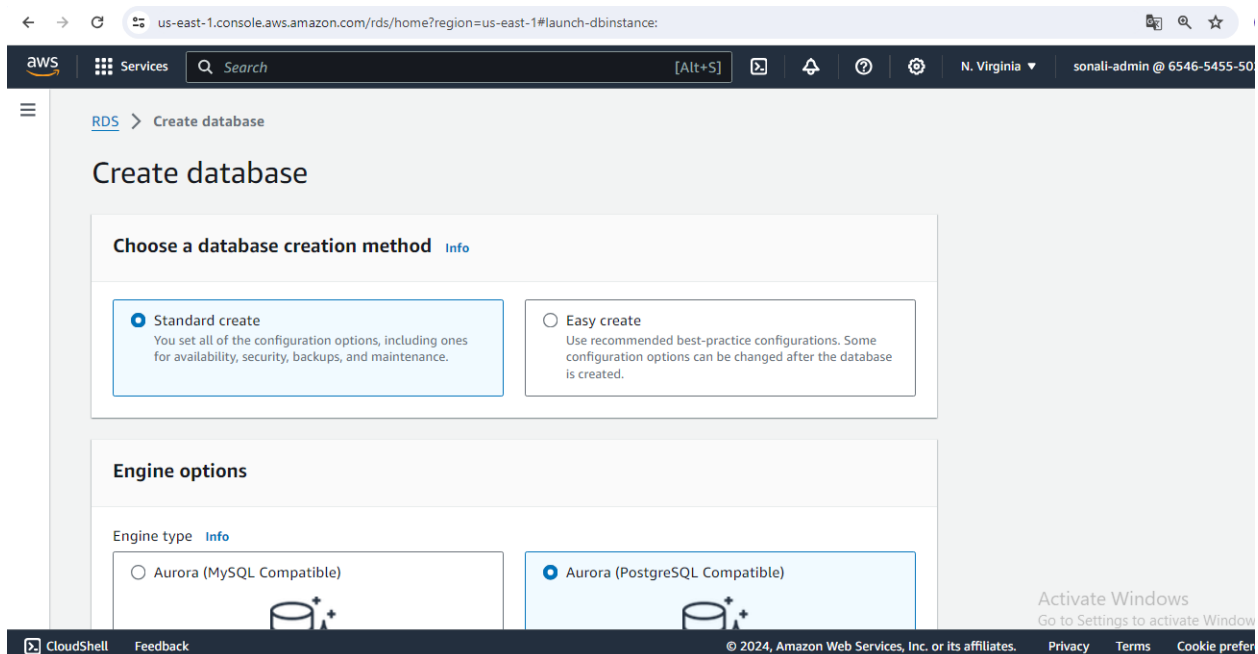
- Add SSH Inbound Rule Security Group
- Add **MYSQL/Aurora that is 3360 Port in Security Group**



- Launch DB-Instance and attach security group that we recently created that is 3tier-sg



Create RDS and Security Group that is 3tier-sg



Step 4: Configuration

- Install Nginx in Jump-Server

```

aws
Services
Search
[Alt+S]
N. Virginia
sonali-admin @ 6546-5455

ec2-user@ip-10-0-10-47 ~]$ sudo yum install nginx -y
bash: sudo: command not found
ec2-user@ip-10-0-10-47 ~]$ sudo yum install nginx -y
amazon Linux 2023 repository
amazon Linux 2023 Kernel Livepatch repository
dependencies resolved.

Package Architecture Version Repository Size
Installing:
nginx x86_64 1:1.24.0-1.amzn2023.0.2 amazonlinux 32 k
Installing dependencies:
generic-logos-httpd noarch 18.0.0-12.amzn2023.0.3 amazonlinux 19 k
gperftools-libs x86_64 2.9.1-1.amzn2023.0.3 amazonlinux 308 k
libunwind x86_64 1.4.0-5.amzn2023.0.2 amazonlinux 66 k
nginx-core x86_64 1:1.24.0-1.amzn2023.0.2 amazonlinux 586 k

i-08c04b2f1392adf79 (Jump-Server)
PublicIPs: 34.229.130.231 PrivateIPs: 10.0.10.47

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```

- Change In Configuration File and add the IP of Application Server and other details
- Restart the Nginx

```

aws
Services
Search
[Alt+S]
N. Virginia
sonali-admin @ 6546-5455

1 root /usr/share/nginx/html;
2
3 # Load configuration files for the default server block.
4 include /etc/nginx/default.d/*.conf;
5
6 error_page 404 /404.html;
7 location = /404.html {
8 }
9 location{
10 proxy_pass http://10.0.20.208:8080/student/;
11 }
12 error_page 500 502 503 504 /50x.html;
13 location = /50x.html {
14 }
15 }
16
17 # Settings for a TLS enabled server.
18 #
19 # server {
20
et nu

i-08c04b2f1392adf79 (Jump-Server)
PublicIPs: 34.229.130.231 PrivateIPs: 10.0.10.47

Activate Windows

```

- Do ssh To Application Server For that
- Copy the Key in Jump-Server from your local machine by doing scp


- Through the Git we have copied key

```
admin@DESKTOP-CLT1FU5 MINGW64 ~/downloads
$ scp -i "sonali-linux-key.pem" sonali-linux-key.pem ec2-user@34.229.130.231:
The authenticity of host '34.229.130.231 (34.229.130.231)' can't be established.
ED25519 key fingerprint is SHA256:5$GD5adYcJSJE067U6elUC4sK/T83j5SSmIMmg2oIkts.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
warning: Permanently added '34.229.130.231' (ED25519) to the list of known hosts.
sonali-linux-key.pem                                     100% 1674      7.4KB/s   00:00

admin@DESKTOP-CLT1FU5 MINGW64 ~/downloads
$ |
```

- SSH done From Jump-Server to Application Server

```
this private key will be ignored.  
oad key "sonali-linux-key.pem": bad permissions  
c2-user@10.0.20.208: Permission denied (publickey,gssapi-keyex,gssapi-with-mic).  
ec2-user@ip-10-0-10-47 ~]$ sudo ssh -i "sonali-linux-key.pem" ec2-user@10.0.20.208  
he authenticity of host '10.0.20.208 (10.0.20.208)' can't be established.  
D25519 key fingerprint is SHA256:Uvsk8Yb5XVixrfu+6o7cc9sFijQl6jCS2zsQksCp6L8.  
his key is not known by any other names  
re you sure you want to continue connecting (yes/no/[fingerprint])? yes  
arning: Permanently added '10.0.20.208' (ED25519) to the list of known hosts.
```



```
#  
~\###  
~~\_##### Amazon Linux 2023  
~~_####/  
~~_\#/ https://aws.amazon.com/linux/amazon-linux-2023  
~~~~V'->  
~~~~_-_  
~-_-/_m/'-<
```

```
ec2-user@ip-10-0-20-208 ~]$
```

i-O8c04b2f1392adf79 (Jump-Server)

PublicIPs: 34.229.130.231 PrivateIPs: 10.0.10.47

In Application Server

- **Install Java**

```

ec2-user@ip-10-0-20-208 ~]$ sudo -i
root@ip-10-0-20-208 ~|# yum install java
amazon Linux 2023 repository
amazon Linux 2023 Kernel Livepatch repository
Last metadata expiration check: 0:00:01 ago on Sat Jun  8 10:26:19 2024.
Dependencies resolved.

Package                                Architecture    Version                                Repository      Size
-----
Installing:
java-22-amazon-corretto                x86_64          1:22.0.1+8-1.amzn2023.1              amazonlinux     213 k
Installing dependencies:
alsa-lib                               x86_64          1.2.7.2-1.amzn2023.0.2              amazonlinux     504 k
cairo                                   x86_64          1.17.6-2.amzn2023.0.1              amazonlinux     684 k
dejavu-sans-fonts                       noarch          2.37-16.amzn2023.0.2              amazonlinux     1.3 M

```

i-08c04b2f1392adf79 (Jump-Server)

PublicIPs: 34.229.130.231 PrivateIPs: 10.0.10.47

- Install Tomcat
- Download Tomcat First by Curl -O and (url of tomcat) option

```
curl -O https://dlcdn.apache.org/tomcat/tomcat8/v8.5.100/bin/apache-tomcat-8.5.100.tar.gz
```
- Unzip that Tar -xvf apache-tomcat-8.5.100.tar.gz -C /opt

```

[root@ip-10-0-20-208 ~]# ls
apache-tomcat-8.5.100.tar.gz
[root@ip-10-0-20-208 ~]# cd /opt
[root@ip-10-0-20-208 opt]# ls
apache-tomcat-8.5.100_aws
[root@ip-10-0-20-208 opt]# cd /apache-tomcat-8.5.100
-bash: cd: /apache-tomcat-8.5.100: No such file or directory
[root@ip-10-0-20-208 opt]# ls
apache-tomcat-8.5.100_aws
[root@ip-10-0-20-208 opt]# cd /apache-tomcat-8.5.100
-bash: cd: /apache-tomcat-8.5.100: No such file or directory
[root@ip-10-0-20-208 opt]#
logout
[ec2-user@ip-10-0-20-208 ~]# ls
[ec2-user@ip-10-0-20-208 ~]# cd /opt
[ec2-user@ip-10-0-20-208 opt]# ls
apache-tomcat-8.5.100_aws
[ec2-user@ip-10-0-20-208 opt]# cd apache-tomcat-8.5.100
[ec2-user@ip-10-0-20-208 apache-tomcat-8.5.100]# ls
BUILDING.txt CONTRIBUTING.md LICENSE NOTICE README.md RELEASE-NOTES RUNNING.txt bin conf lib logs temp webapps work
[ec2-user@ip-10-0-20-208 apache-tomcat-8.5.100]# cd webapps/
-bash: cd: webapps/: Permission denied
[ec2-user@ip-10-0-20-208 apache-tomcat-8.5.100]# sudo -i
[root@ip-10-0-20-208 ~]# ls
apache-tomcat-8.5.100.tar.gz
[root@ip-10-0-20-208 ~]# cd /opt
[root@ip-10-0-20-208 opt]# ls
apache-tomcat-8.5.100_aws
[root@ip-10-0-20-208 opt]# cd apache-tomcat-8.5.100
[root@ip-10-0-20-208 apache-tomcat-8.5.100]# ls
BUILDING.txt CONTRIBUTING.md LICENSE NOTICE README.md RELEASE-NOTES RUNNING.txt bin conf lib logs temp webapps work
[root@ip-10-0-20-208 apache-tomcat-8.5.100]# cd w
webapps/ work/
[root@ip-10-0-20-208 apache-tomcat-8.5.100]# cd webapps/
[root@ip-10-0-20-208 webapps]# ls
ROOT docs examples host-manager manager
[root@ip-10-0-20-208 webapps]# 0 https://s3-us-west-2.amazonaws.com/studentapiclit/student.war
-bash: 0: command not found
[root@ip-10-0-20-208 webapps]# curl -O https://s3-us-west-2.amazonaws.com/studentapiclit/student.war
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
             Dload  Upload  Total   Spent    Left   Speed
100 303    0 303    0    1397      0  --:--:-- --:--:-- --:--:-- 1402
[root@ip-10-0-20-208 webapps]#

```


Cd apache-tomcat-8.5.100/

- Cd webapps
- curl -O

<https://s3-us-west-2.amazonaws.com/studentapicit/student.war>

```
csplit      growpart      lsns         pstree.x11   sha1sum      tracepath     zstd
curl        grub2-amazon-setup  lsof         ptx           sha224sum    traceroute6   zstdcat
cut         grub2-edittenv     make-dummy-cert  pwd           sha224sum    traceroute6   zstdgrep
cvs2svn     grub2-file         man          pwdx          sha256sum    troff          zstdless
cyrusdb2current  grub2-menulst2cfg  man-recode   pmake         sha256sum    truncate      zstdtest
date        grub2-mkimage      man.man-db   pswcore       sha384sum    trust
dbus-broker grub2-mkpasswd-pbkdf2  mandb       pydoc         sha384sum

root@ip-10-0-20-208 bin]# cd
root@ip-10-0-20-208 ~]# cd /opt
root@ip-10-0-20-208 opt]# ls
apache-tomcat-8.5.100  aws
root@ip-10-0-20-208 opt]# cd apache-tomcat-8.5.100
root@ip-10-0-20-208 apache-tomcat-8.5.100]# ls
BUILDING.txt  CONTRIBUTING.md  LICENSE  NOTICE  README.md  RELEASE-NOTES  RUNNING.txt  bin  conf  lib  logs  temp  webapps  work
root@ip-10-0-20-208 apache-tomcat-8.5.100]# cd
root@ip-10-0-20-208 ~]# cd /opt/apache-tomcat-8.5.100/
root@ip-10-0-20-208 ~]# cd /opt
root@ip-10-0-20-208 ~]# cd /opt
root@ip-10-0-20-208 opt]# ls
apache-tomcat-8.5.100  aws
root@ip-10-0-20-208 opt]# cd apache-tomcat-8.5.100/
root@ip-10-0-20-208 apache-tomcat-8.5.100]# ls
BUILDING.txt  CONTRIBUTING.md  LICENSE  NOTICE  README.md  RELEASE-NOTES  RUNNING.txt  bin  conf  lib  logs  temp  webapps  work
root@ip-10-0-20-208 apache-tomcat-8.5.100]# cd bin/
root@ip-10-0-20-208 bin]# ls
bootstrap.jar  catalina.sh  commons-daemon-native.tar.gz  configtest.sh  digest.sh  shutdown.bat  startup.sh  tool-wrapper.bat  version.sh
atalina-tasks.xml  ciphers.bat  commons-daemon.jar  daemon.sh  setclasspath.bat  shutdown.sh  tomcat-juli.jar  tool-wrapper.sh
atalina.bat  ciphers.sh  configtest.bat  digest.bat  setclasspath.sh  startup.bat  tomcat-native.tar.gz  version.bat
root@ip-10-0-20-208 bin]# cd ..
bash: cd.: : command not found
root@ip-10-0-20-208 ~]# cd
root@ip-10-0-20-208 ~]# cd /opt/apache-tomcat-8.5.100/
root@ip-10-0-20-208 apache-tomcat-8.5.100]# ls
BUILDING.txt  CONTRIBUTING.md  LICENSE  NOTICE  README.md  RELEASE-NOTES  RUNNING.txt  bin  conf  lib  logs  temp  webapps  work
root@ip-10-0-20-208 apache-tomcat-8.5.100]# cd lib/
root@ip-10-0-20-208 lib]# ls
annotations-api.jar  catalina-tribes.jar  jasper-el.jar  servlet-api.jar  tomcat-i18n-de.jar  tomcat-i18n-ko.jar  tomcat-jni.jar  websocket-api.jar
atalina-ant.jar  catalina.jar  jasper.jar  tomcat-api.jar  tomcat-i18n-es.jar  tomcat-i18n-ru.jar  tomcat-util-scan.jar
atalina-ha.jar  ecj-4.6.3.jar  jaspic-api.jar  tomcat-coyote.jar  tomcat-i18n-fr.jar  tomcat-i18n-zh-CN.jar  tomcat-util.jar
atalina-storeconfig.jar  el-api.jar  jsp-api.jar  tomcat-dbcp.jar  tomcat-i18n-ja.jar  tomcat-jdbc.jar  tomcat-websocket.jar
root@ip-10-0-20-208 lib]# curl -O https://s3-us-west-2.amazonaws.com/studentapi-cit/mysqlconnector.jar
% Total % Received % Xferd Average Speed Time Time Time Current
Dload Upload Total Spent Left Speed
00 289 0 289 0 0 1265 0 --:--:-- --:--:-- --:--:-- 1267
root@ip-10-0-20-208 lib]# ls
annotations-api.jar  catalina-tribes.jar  jasper-el.jar  mysqlconnector.jar  tomcat-dbcp.jar  tomcat-i18n-ja.jar  tomcat-jdbc.jar  tomcat-websocket.jar
atalina-ant.jar  catalina.jar  jasper.jar  servlet-api.jar  tomcat-i18n-de.jar  tomcat-i18n-ko.jar  tomcat-jni.jar  websocket-api.jar
atalina-ha.jar  ecj-4.6.3.jar  jaspic-api.jar  tomcat-api.jar  tomcat-i18n-es.jar  tomcat-i18n-ru.jar  tomcat-util-scan.jar
atalina-storeconfig.jar  el-api.jar  jsp-api.jar  tomcat-coyote.jar  tomcat-i18n-fr.jar  tomcat-i18n-zh-CN.jar  tomcat-util.jar
root@ip-10-0-20-208 lib]# |
```

Cd ../lib

- curl -O

<https://s3-us-west-2.amazonaws.com/studentapi-cit/mysqlconnector.jar>

```

che-tomcat-8.5.100 aws
ot@ip-10-0-20-208 opt]# cd /opt/apache-tomcat-8.5.100/
ot@ip-10-0-20-208 apache-tomcat-8.5.100]# ls
LDING.txt CONTRIBUTING.md LICENSE NOTICE README.md RELEASE-NOTES RUNNING.txt bin conf lib logs temp webapps work
ot@ip-10-0-20-208 apache-tomcat-8.5.100]# cd bin/
ot@ip-10-0-20-208 bin]# ls
tstrap.jar catalina.sh commons-daemon-native.tar.gz configtest.sh digest.sh shutdown.bat startup.sh tool-wrapper.bat version.sh
alinalna-tasks.xml ciphers.bat commons-daemon.jar daemon.sh setclasspath.bat shutdown.sh tomcat-juli.jar tool-wrapper.sh
alinalna.bat ciphers.sh configtest.bat digest.bat setclasspath.sh startup.bat tomcat-native.tar.gz version.bat
ot@ip-10-0-20-208 bin]# cd ..
sh: cd.: command not found
ot@ip-10-0-20-208 bin]# cd
ot@ip-10-0-20-208 ~]# cd /opt/apache-tomcat-8.5.100/
ot@ip-10-0-20-208 apache-tomcat-8.5.100]# ls
LDING.txt CONTRIBUTING.md LICENSE NOTICE README.md RELEASE-NOTES RUNNING.txt bin conf lib logs temp webapps work
ot@ip-10-0-20-208 apache-tomcat-8.5.100]# cd lib/
ot@ip-10-0-20-208 lib]# ls
notations-api.jar catalina-tribes.jar jasper-el.jar servlet-api.jar tomcat-i18n-de.jar tomcat-i18n-ko.jar tomcat-jni.jar websocket-api.jar
alinalna-ant.jar catalina.jar jasper.jar tomcat-api.jar tomcat-i18n-es.jar tomcat-i18n-ru.jar tomcat-util-scan.jar
alinalna-ha.jar ecj-4.6.3.jar jaspic-api.jar tomcat-coyote.jar tomcat-i18n-fr.jar tomcat-i18n-zh-CN.jar tomcat-util.jar
alinalna-storeconfig.jar el-api.jar jsp-api.jar tomcat-dbcp.jar tomcat-i18n-ja.jar tomcat-jdbc.jar tomcat-websocket.jar
ot@ip-10-0-20-208 lib]# curl -O https://s3-us-west-2.amazonaws.com/studentapi-cit/mysqlconnector.jar
Total Received % Xferd Average Speed Time Time Time Current
Dload Upload Total Spent Left Speed
288 0 288 0 0 1265 0 --:--:-- --:--:-- --:--:-- 1267
ot@ip-10-0-20-208 lib]# ls
notations-api.jar catalina-tribes.jar jasper-el.jar mysqlconnector.jar tomcat-dbcp.jar tomcat-i18n-ja.jar tomcat-jdbc.jar tomcat-websocket.jar
alinalna-ant.jar catalina.jar jasper.jar servlet-api.jar tomcat-i18n-de.jar tomcat-i18n-ko.jar tomcat-jni.jar websocket-api.jar
alinalna-ha.jar ecj-4.6.3.jar jaspic-api.jar tomcat-api.jar tomcat-i18n-es.jar tomcat-i18n-ru.jar tomcat-util-scan.jar
alinalna-storeconfig.jar el-api.jar jsp-api.jar tomcat-coyote.jar tomcat-i18n-fr.jar tomcat-i18n-zh-CN.jar tomcat-util.jar
ot@ip-10-0-20-208 lib]# cd
ot@ip-10-0-20-208 ~]# cd /opt/apache-tomcat-8.5.100/
ot@ip-10-0-20-208 apache-tomcat-8.5.100]# ls
LDING.txt CONTRIBUTING.md LICENSE NOTICE README.md RELEASE-NOTES RUNNING.txt bin conf lib logs temp webapps work
ot@ip-10-0-20-208 apache-tomcat-8.5.100]# cd conf/
ot@ip-10-0-20-208 conf]# ls
alinalna.policy catalina.properties context.xml jaspic-providers.xml jaspic-providers.xsd logging.properties server.xml tomcat-users.xml tomcat-users.xsd web.xml
ot@ip-10-0-20-208 conf]# vim context.xml

```

- Cd ../conf/
- Vim context.xml
- (in context tab [last of page]) <Resource name="jdbc/TestDB" auth="Container" type="javax.sql.DataSource" maxTotal="500" maxIdle="30" maxWaitMillis="1000" username="admin" password="12345678" driverClassName="com.mysql.jdbc.Driver" url="jdbc:mysql://endpoint:3306/studentapp?useUnicode=yes&characterEncoding=utf8"/>
- Cd ../bin
 - ./catalina.sh start
 - Exit

- Mysql -h rdsendpoint -u admin -p(connected to RDS)
- Create database;

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)
);
- Show table

```
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
 mariadb105-3:10.5.23-1.amzn2023.0.1.x86_64         mariadb105-common-3:10.5.23-1.amzn2023.0.1.x86_64
 perl-Sys-Hostname-1.23-477.amzn2023.0.6.x86_64

Complete!
[ec2-user@ip-10-0-30-180 ~]$ ls
[ec2-user@ip-10-0-30-180 ~]$ ls
[ec2-user@ip-10-0-30-180 ~]$ sudo mysql -h database-1.c9e80iomeuei.us-east-1.rds.amazonaws.com -u admin -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 335
Server version: 10.11.6-MariaDB-log managed by https://aws.amazon.com/rds/

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

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

MariaDB [(none)]>
```

i-09496f5e9a03c3ac0 (New-Jump-Server)

PublicIPs: 3.95.18.191 PrivateIPs: 10.0.10.244

```

-> show databases;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MariaDB server version for the
right syntax to use near 'show databases'
show databases' at line 2
MariaDB [(none)]> show databases;
+-----+
| Database |
+-----+
| information_schema |
| innodb |
| mysql |
| performance_schema |
| sys |
+-----+
5 rows in set (0.005 sec)

MariaDB [(none)]> create database studentapp;
Query OK, 1 row affected (0.005 sec)

MariaDB [(none)]>

```

i-09496f5e9a03c3ac0 (New-Jump-Server)

PublicIPs: 3.95.18.191 PrivateIPs: 10.0.10.244

The screenshot shows an AWS CloudShell terminal window. The browser address bar displays the URL: `us-east-1.console.aws.amazon.com/ec2-instance-connect/ssh?region=us-east-1&connType=standard&instanceId=i-09496f5e9a03c3ac0&osUser=ec2-user&...`. The terminal window title is "N. Virginia" and the user is "sonali-admin @ 6546-5455-5024". The terminal output is as follows:

```

+-----+
| Database |
+-----+
| information_schema |
| innodb |
| mysql |
| performance_schema |
| studentapp |
| sys |
+-----+
6 rows in set (0.002 sec)

MariaDB [(none)]> use studentapp
Database changed
MariaDB [studentapp]> 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)
-> );
Query OK, 0 rows affected (0.022 sec)

MariaDB [studentapp]>

```

At the bottom of the terminal window, there is a watermark that says "Activate Windows Go to Settings to activate Windows." and a footer bar with "CloudShell Feedback" and "© 2024 Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences".

Go to google and hit our jump server public IP

Student Registration Form

Student Name	<input type="text"/>
Student Address	<input type="text"/>
Student Age	<input type="text"/>
Student Qualification	<input type="text"/>
Student Percentage	<input type="text"/>
Year Passed	<input type="text"/>
<input type="button" value="register"/>	

A 3-tier application