



PROJECT-3

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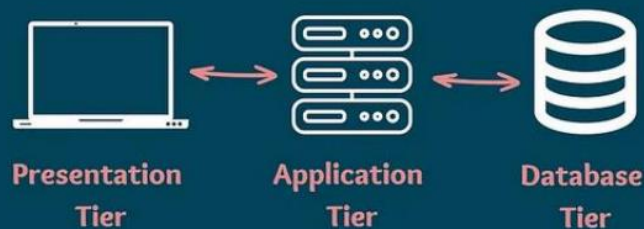
TRAINER:V.MADHUKAR REDDY

PROJECT:AWS 3 TIER ARCHITECTURE

What is three tier architecture?

- Three tier architecture is a well established software application architecture that organizes applications into three logical and physical computing tiers. The presentation tier or web tier, the application tier, and the database tier,where application data is stored and managed.

AWS 3 Tier Architecture



Presentation tier : The presentation tier is the user interface and communication layer of the application, where the end user interacts with the application. Its main purpose is to display information and collect information from the user. Thus top level tier can run on web,desktop application, or a graphical user interface. Web tiers are developed by using HTML,CSS and javascript.

Application tier : The application tier is also known as the logic tier or middle tier, is the heart of the application. In application tier the data that is collect presentation tier is processed sometimes against other informstion in the data tier. The application tier can also add, delete, or modify data in the data tier.

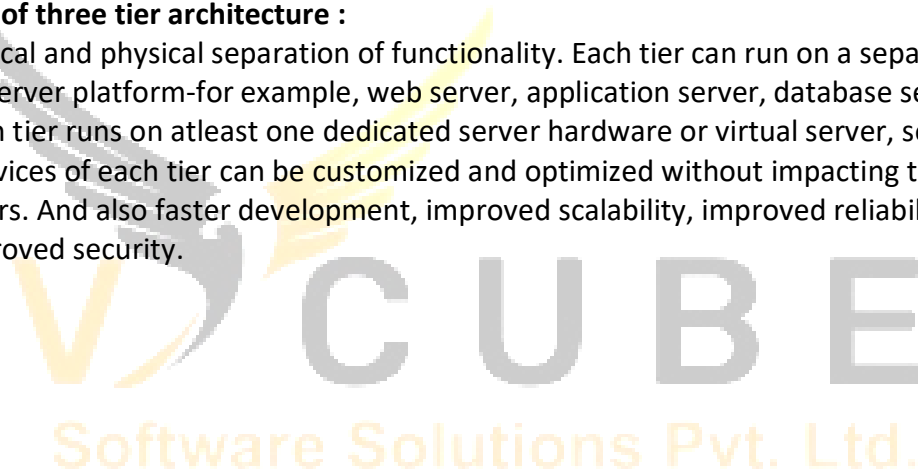
Database tier : The database tier is also known as data access tier or back-end, is where the information that is processed by the application is stored and managed. This can be a RDS management system such as PostgreSQL, MySQL, MariaDB, Oracle, DB2, Informix or Microsoft SQL Server, or in a NoSQL Database server such asCassandra, CouchDB, or MongoDB.

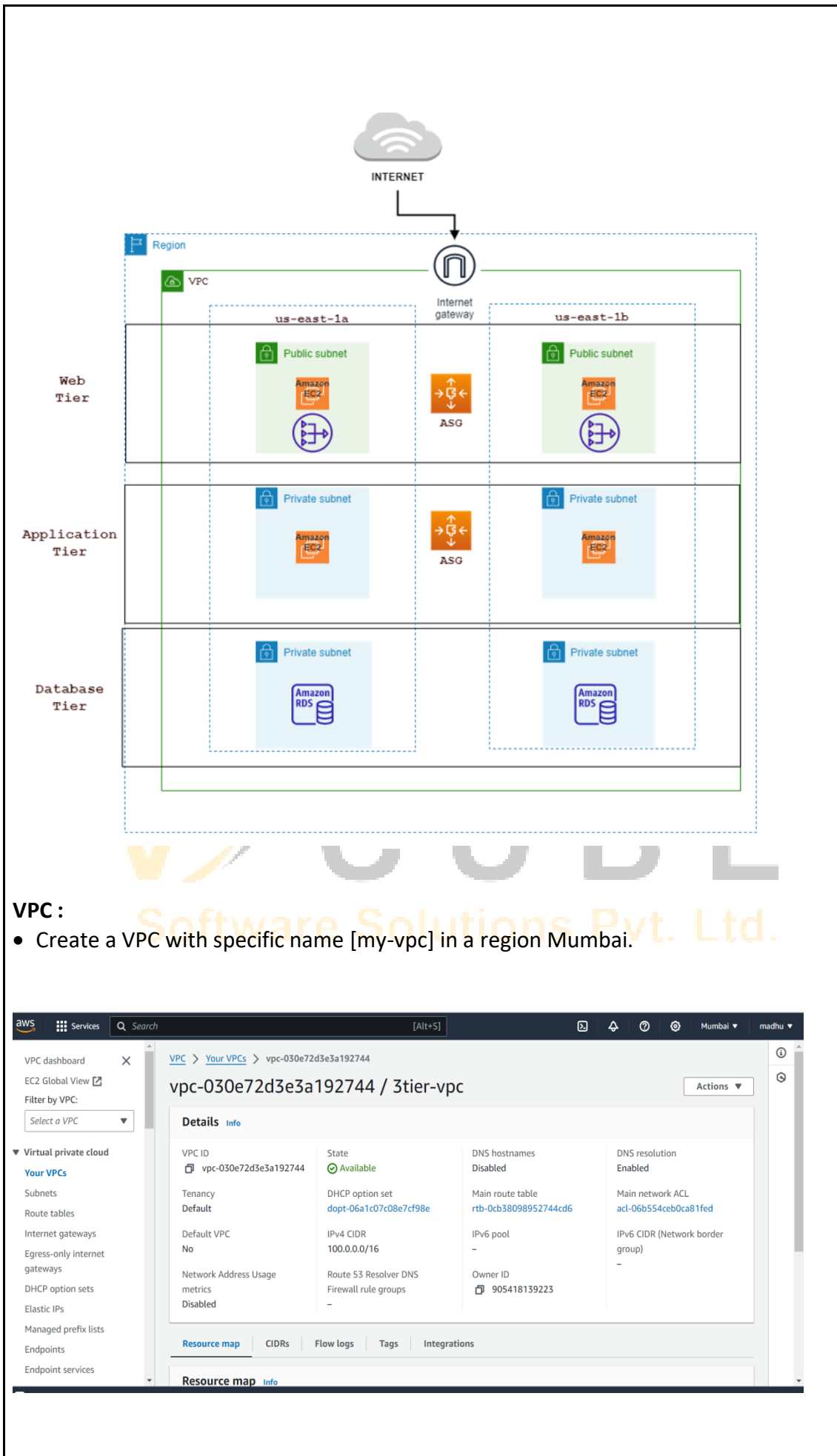
In a three tier application, all communication goes through the application tier. The web tier and the database tier cannot communicate directly with one another.

Benefits of three tier architecture :

It's a logical and physical separation of functionality. Each tier can run on a separate OS and server platform-for example, web server, application server, database server. And each tier runs on atleast one dedicated server hardware or virtual server, so each services of each tier can be customized and optimized without impacting the other tiers. And also faster development, improved scalability, improved reliability, and improved security.

Project:





- Now create 6 subnets [1 public, 2 private subnets in one availability zone and same for the other subnets but in different availability zone] with in the same VPC.

The screenshot shows the AWS Management Console interface for creating a subnet. The top navigation bar includes the AWS logo, 'Services' link, a search bar, and user information for 'Mumbai' and 'madhu'. The main content area is titled 'Subnet 1 of 1'. It contains the following fields:

- Subnet name:** A text input field with the value 'public-3tier-01-1a'. Below it, a note states: 'Create a tag with a key of 'Name' and a value that you specify. The name can be up to 256 characters long.'
- Availability Zone:** A dropdown menu showing 'Asia Pacific (Mumbai) / ap-south-1a'. An 'Info' link is next to it. A note says: 'Choose the zone in which your subnet will reside, or let Amazon choose one for you.'
- IPv4 VPC CIDR block:** A dropdown menu showing '100.0.0.0/16'. An 'Info' link is next to it. A note says: 'Choose the VPC's IPv4 CIDR block for the subnet. The subnet's IPv4 CIDR must lie within this block.'
- IPv4 subnet CIDR block:** A text input field with the value '100.0.1.0/24'. To the right, it says '256 IPs'. Below the input are navigation arrows: '< > ^ v'.
- Tags - optional:** A section with a 'Key' input field containing 'Name' and a 'Value - optional' input field containing 'public-3tier-01-1a'. There is a 'Remove' button to the right.

The screenshot shows the AWS Management Console interface for creating a subnet. The top navigation bar includes the AWS logo, 'Services' link, a search bar, and user information for 'Mumbai' and 'madhu'. The main content area is titled 'Subnet 1 of 1'. It contains the following fields:

- Subnet name:** A text input field with the value 'public-3tier-02-1b'. Below it, a note states: 'Create a tag with a key of 'Name' and a value that you specify. The name can be up to 256 characters long.'
- Availability Zone:** A dropdown menu showing 'Asia Pacific (Mumbai) / ap-south-1b'. An 'Info' link is next to it. A note says: 'Choose the zone in which your subnet will reside, or let Amazon choose one for you.'
- IPv4 VPC CIDR block:** A dropdown menu showing '100.0.0.0/16'. An 'Info' link is next to it. A note says: 'Choose the VPC's IPv4 CIDR block for the subnet. The subnet's IPv4 CIDR must lie within this block.'
- IPv4 subnet CIDR block:** A text input field with the value '100.0.4.0/24'. To the right, it says '256 IPs'. Below the input are navigation arrows: '< > ^ v'.
- Tags - optional:** A section with a 'Key' input field and a 'Value - optional' input field. There is a 'Remove' button to the right.

aws

Services

Search

[Alt+S]

Mumbai

madhu

Subnet 1 of 1

Subnet name

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

private-3tier-01-1a

The name can be up to 256 characters long.

Availability Zone

Info

Choose the zone in which your subnet will reside, or let Amazon choose one for you.

Asia Pacific (Mumbai) / ap-south-1a

IPv4 VPC CIDR block

Info

Choose the VPC's IPv4 CIDR block for the subnet. The subnet's IPv4 CIDR must lie within this block.

100.0.0.0/16

IPv4 subnet CIDR block

100.0.2.0/24

256 IPs

< > ^ v

Tags - optional

Key

Value - optional

aws

Services

Search

[Alt+S]

Mumbai

madhu

Subnet 1 of 1

Subnet name

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

private-3tier-02-1a

The name can be up to 256 characters long.

Availability Zone

Info

Choose the zone in which your subnet will reside, or let Amazon choose one for you.

Asia Pacific (Mumbai) / ap-south-1a

IPv4 VPC CIDR block

Info

Choose the VPC's IPv4 CIDR block for the subnet. The subnet's IPv4 CIDR must lie within this block.

100.0.0.0/16

IPv4 subnet CIDR block

100.0.3.0/24

256 IPs

< > ^ v

Tags - optional

Key

Value - optional

Q Name

Q private-3tier-02-1a

Remove

aws

Services

Search

[Alt+S]

Mumbai

madhu

Subnet 1 of 1

Subnet name

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

private-3tier-03-1b

The name can be up to 256 characters long.

Availability Zone

Info

Choose the zone in which your subnet will reside, or let Amazon choose one for you.

Asia Pacific (Mumbai) / ap-south-1b

IPv4 VPC CIDR block

Info

Choose the VPC's IPv4 CIDR block for the subnet. The subnet's IPv4 CIDR must lie within this block.

100.0.0.0/16

IPv4 subnet CIDR block

100.0.5.0/24

256 IPs

< > ^ v

Tags - optional

Key

Value - optional

Q Name

Q private-3tier-03-1b

Remove

CloudShell

Feedback

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Privacy

Terms

Cookie preferences

Subnet name
Create a tag with a key of 'Name' and a value that you specify.

The name can be up to 256 characters long.

Availability Zone [Info](#)
Choose the zone in which your subnet will reside, or let Amazon choose one for you.

IPv4 VPC CIDR block [Info](#)
Choose the VPC's IPv4 CIDR block for the subnet. The subnet's IPv4 CIDR must lie within this block.

IPv4 subnet CIDR block
 256 IPs
< > ^ v

Tags - optional

Key	Value - optional	
<input type="text" value="Name"/>	<input type="text" value="private-3tier-04-1b"/>	<input type="button" value="Remove"/>

- Create a internet gateway and click on actions and attach it to the respective Vpc

Create internet gateway [Info](#)

An internet gateway is a virtual router that connects a VPC to the internet. To create a new internet gateway specify the name for the gateway below.

Internet gateway settings

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

Tags - optional
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	
<input type="text" value="Name"/>	<input type="text" value="pubic-internet-gate-way"/>	<input type="button" value="Remove"/>

You can add 49 more tags.

The following internet gateway was created: igw-046b5a22f5bf96100 - pubic-internet-gate-way. You can now attach to a VPC to enable the VPC to communicate with the internet.

[VPC](#) > [Internet gateways](#) > [Attach to VPC \(igw-046b5a22f5bf96100\)](#)

Attach to VPC (igw-046b5a22f5bf96100) [Info](#)

VPC
Attach an internet gateway to a VPC to enable the VPC to communicate with the internet. Specify the VPC to attach below.

Available VPCs
Attach the internet gateway to this VPC.

AWS Command Line Interface command

- And create route tables 1(public) and associate them with subnets along with the internet connection attaches to the [1a & 2a] public subnets.

Route table settings

Name - optional
Create a tag with a key of 'Name' and a value that you specify.
public-3tier-01-route

VPC
The VPC to use for this route table.
vpc-030e72d3e3a192744 (3tier-vpc)

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: Name, Value: public-3tier-01-route

Buttons: Add new tag, Cancel, Create route table

Edit routes

Destination	Target	Status	Propagated
100.0.0.0/16	local	Active	No
0.0.0.0/0	Internet Gateway igw-046b5a22f5bf96100	-	No

Buttons: Add route, Cancel, Preview, Save changes

Edit subnet associations
Change which subnets are associated with this route table.

Available subnets (2/6)

Name	Subnet ID	IPv4 CIDR	IPv6 CIDR	Route table ID
<input checked="" type="checkbox"/> public-3tier-01-1a	subnet-0cf9292fcaa2623b8	100.0.1.0/24	-	Main (rtb-0cb38098952744cd6)
<input type="checkbox"/> private-3tier-01-1a	subnet-076124ed43bbc67f8	100.0.2.0/24	-	Main (rtb-0cb38098952744cd6)
<input type="checkbox"/> private-3tier-02-1a	subnet-0177577da552d78dd	100.0.3.0/24	-	Main (rtb-0cb38098952744cd6)
<input checked="" type="checkbox"/> public-3tier-02-1b	subnet-0aaa87ab1786cabd6	100.0.4.0/24	-	Main (rtb-0cb38098952744cd6)
<input type="checkbox"/> private-3tier-03-1b	subnet-0df362c37234b676c	100.0.5.0/24	-	Main (rtb-0cb38098952744cd6)
<input type="checkbox"/> private-3tier-04-1b	subnet-093a1ea9039108b6a	100.0.6.0/24	-	Main (rtb-0cb38098952744cd6)

Selected subnets: subnet-0cf9292fcaa2623b8 / public-3tier-01-1a, subnet-0aaa87ab1786cabd6 / public-3tier-02-1b

Buttons: Save changes

- And also set the public route tables as main route tables.

The first screenshot shows the AWS Management Console 'Route tables (1/4)' page. A table lists route tables: 'public-3tier-route' (rtb-02fa85d737e4a948a, 2 subnets) and 'private-3tier-route' (rtb-04e3bebd3b9b6fb2e, 4 subnets). The 'public-3tier-route' is selected, and the 'Actions' menu is open, showing 'Set main route table' as an option.

The second screenshot shows the 'Set main route table' dialog box. It contains the text: 'Main route table controls the routing for all subnets that are not explicitly associated with any other route table. Are you sure you want to set this route table as the main route table?'. Below this, it lists 'rtb-02fa85d737e4a948a / public-3tier-route'. At the bottom, it says 'To confirm setting, type set in the field.' with a text input field containing the word 'set'. 'Cancel' and 'OK' buttons are at the bottom right.

- Create a Nat gateway for one way traffic attach to the private route table.
- Create a Nat gateway for one way traffic attach to the private route table and associate them with subnets along with the natgateway connection attaches to the private subnets.

aws Services Search [Alt+S] Mumbai madhu

VPC > Route tables > rtb-04e3bebd3b9b6fb2e > Edit routes

Edit routes

Destination	Target	Status	Propagated
100.0.0.0/16	local	Active	No
0.0.0.0/0	NAT Gateway nat-0c4423e9117acbbcf	-	No

Add route

Cancel Preview Save changes

aws Services Search [Alt+S] Mumbai madhu

VPC > Route tables > rtb-04e3bebd3b9b6fb2e > Edit subnet associations

Edit subnet associations

Change which subnets are associated with this route table.

Available subnets (4/6)

Filter subnet associations

	Name	Subnet ID	IPv4 CIDR	IPv6 CIDR	Route table ID
<input type="checkbox"/>	public-3tier-01-1a	subnet-0cf9292fcaa2623b8	100.0.1.0/24	-	rtb-02fa85d737e4a948a / pub
<input checked="" type="checkbox"/>	private-3tier-01-1a	subnet-076124ed43bbc67f8	100.0.2.0/24	-	Main (rtb-0cb38098952744cd
<input checked="" type="checkbox"/>	private-3tier-02-1a	subnet-0177577da552d78dd	100.0.3.0/24	-	Main (rtb-0cb38098952744cd
<input type="checkbox"/>	public-3tier-02-1b	subnet-0aaa87ab1786cabd6	100.0.4.0/24	-	rtb-02fa85d737e4a948a / pub
<input checked="" type="checkbox"/>	private-3tier-03-1b	subnet-0df362c37234b676c	100.0.5.0/24	-	Main (rtb-0cb38098952744cd
<input checked="" type="checkbox"/>	private-3tier-04-1b	subnet-093a1ea9039108b6a	100.0.6.0/24	-	Main (rtb-0cb38098952744cd

Selected subnets

- Goto all subnet and click on edit subnets settings to auto assign IPV4.

aws Services Search [Alt+S] Mumbai madhu

VPC > Subnets > subnet-0177577da552d78dd > Edit subnet settings

Edit subnet settings

Subnet

Subnet ID: subnet-0177577da552d78dd Name: private-3tier-02-1a

Auto-assign IP settings

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

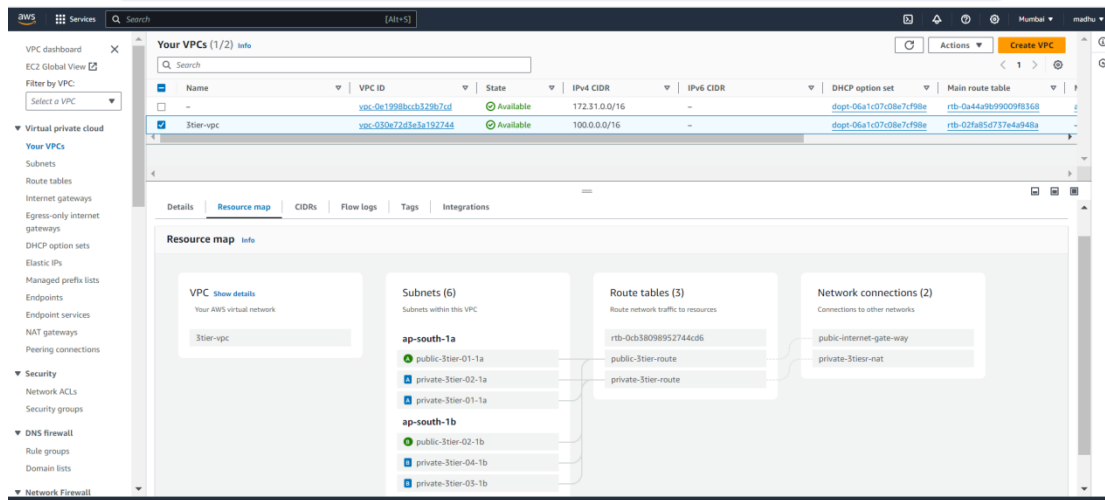
☒ Enable auto-assign public IPv4 address

☐ Enable auto-assign customer-owned IPv4 address

Resource-based name (RBN) settings

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

- After all connections established in VPC.

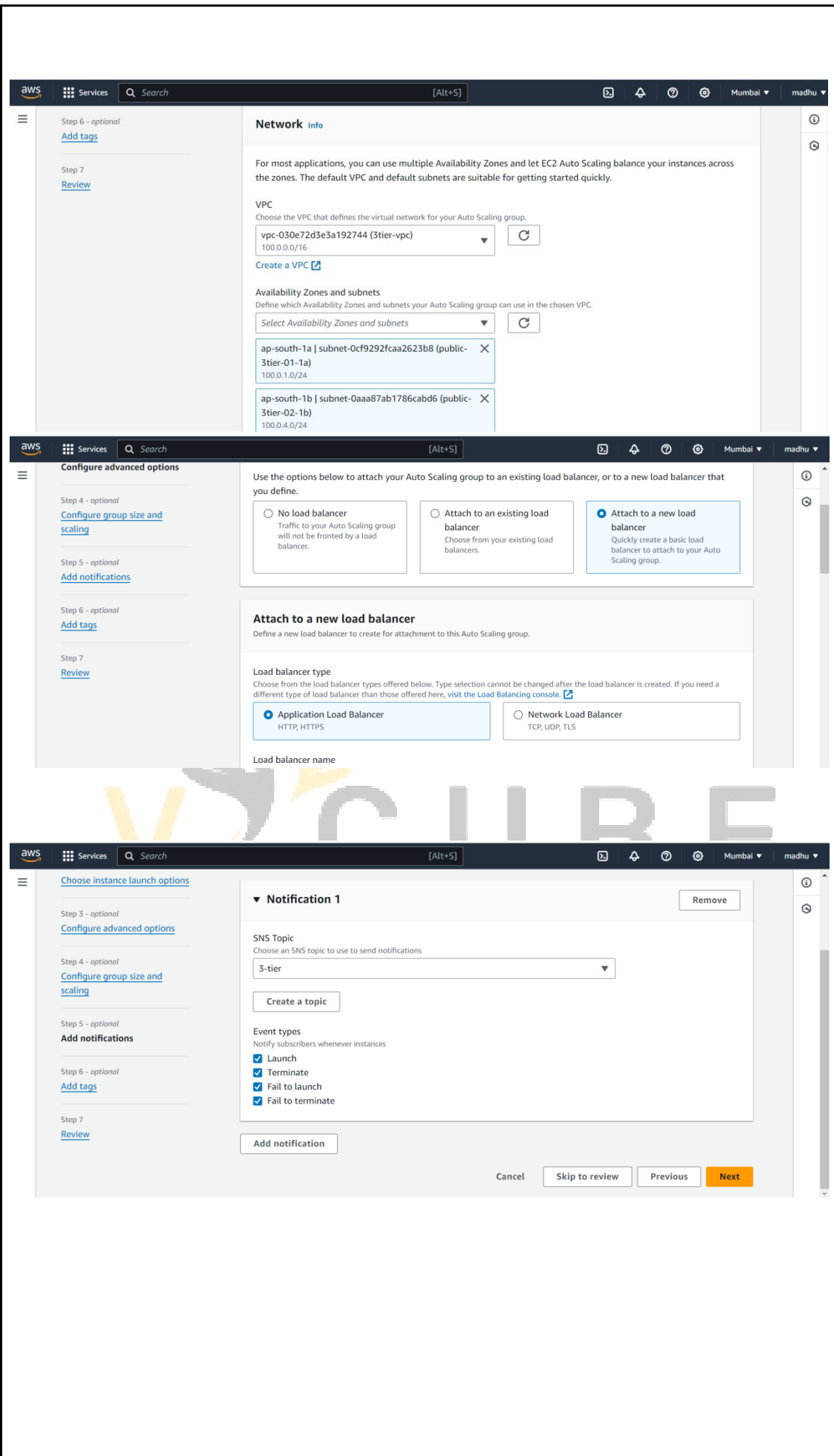


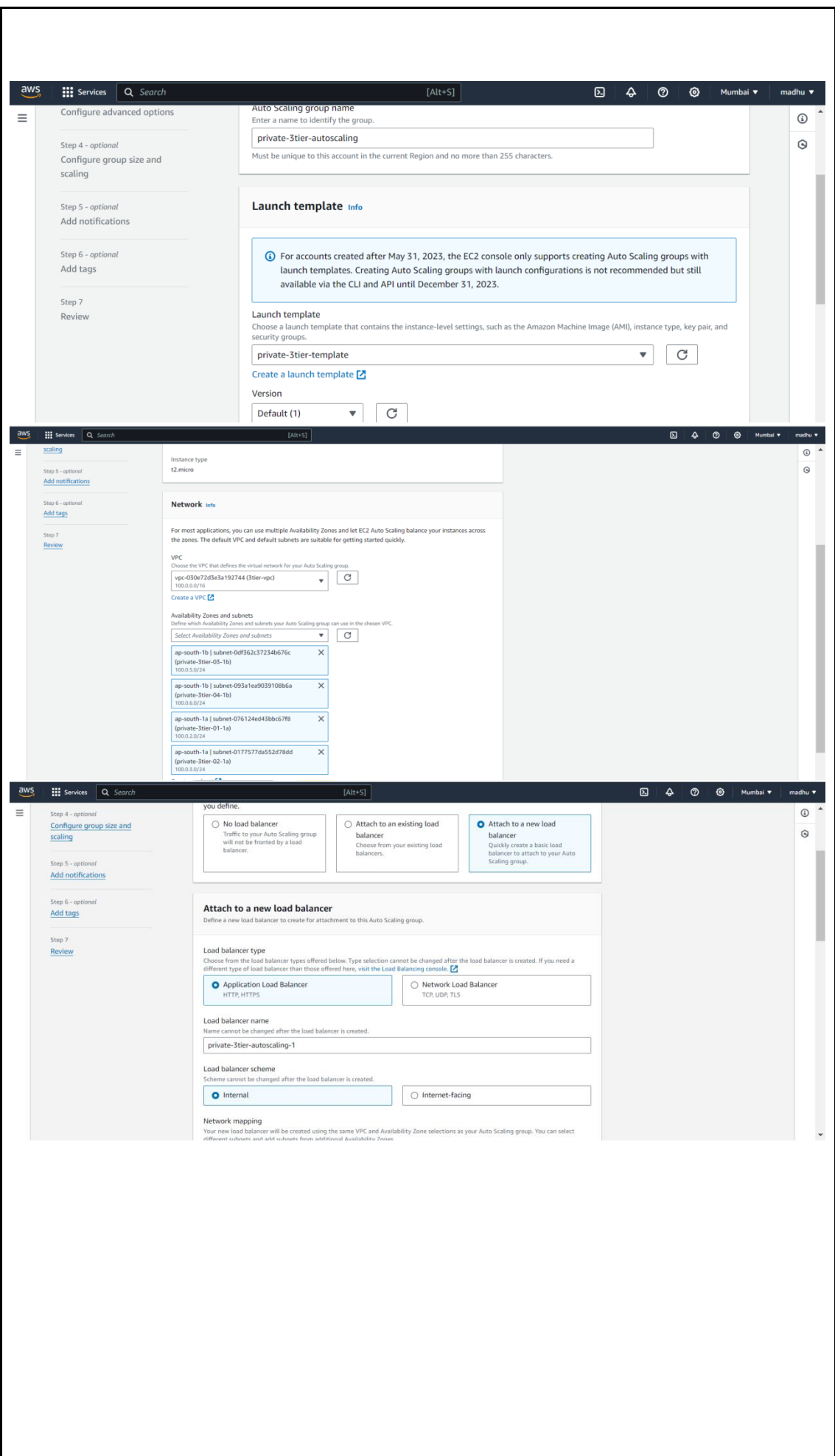
Web tier:

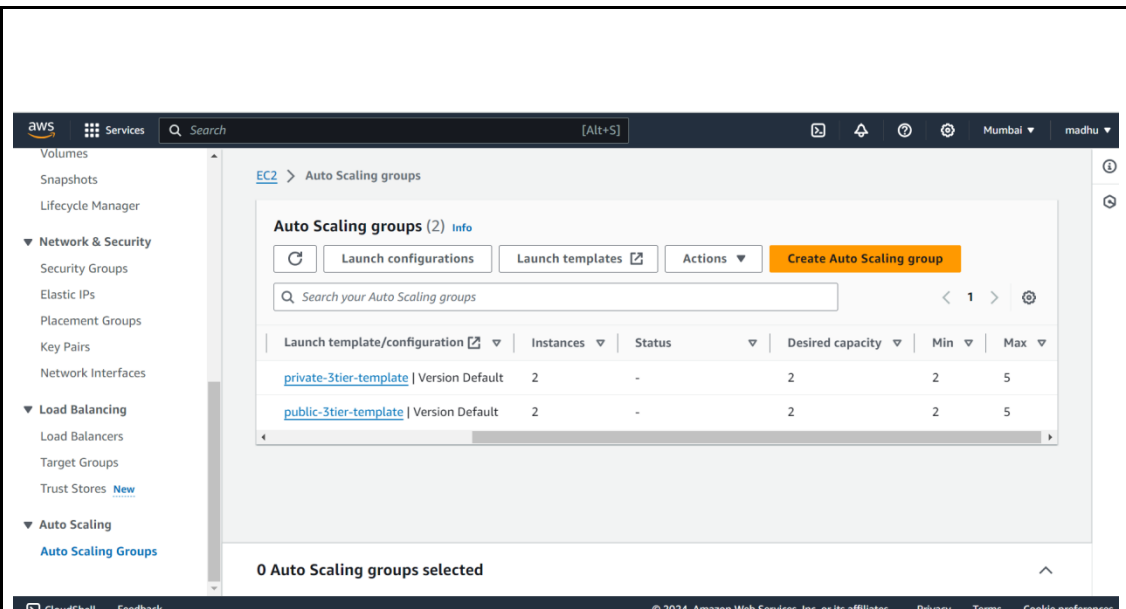
- create a web tier launch template

1. Give a specific name public-3tier-autoscaling and private-3tier-autoscaling create autoscaling it will create load blancer and target groups









● Now connect public instance



● Now connect public instance to private instance



- Now install mariadb in web

```
aws
Services Search [Alt+S]
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '100.0.5.153' (ED25519) to the list of known hosts.
#####
Amazon Linux 2023
#####
https://aws.amazon.com/linux/amazon-linux-2023
[ec2-user@ip-100-0-5-153 ~]$ sudo -i
[root@ip-100-0-5-153 ~]# yum update -y
Last metadata expiration check: 0:03:37 ago on Thu Apr 4 06:13:02 2024.
Dependencies resolved.
Nothing to do.
Complete!
[root@ip-100-0-5-153 ~]# yum install mariadb105-server -y
```

i-07ec64c7e571f41c6
PublicIPs: 3.6.89.35 PrivateIPs: 100.0.1.113

```
aws
Services Search [Alt+S]
Complete!
[root@ip-100-0-5-153 ~]# systemctl start mariadb
[root@ip-100-0-5-153 ~]# systemctl status mariadb
● mariadb.service - MariaDB 10.5 database server
   Loaded: loaded (/usr/lib/systemd/system/mariadb.service; disabled; preset: disabled)
   Active: active (running) since Thu 2024-04-04 06:19:59 UTC; 16s ago
     Docs: man:mariadb(8)
           https://mariadb.com/kb/en/library/systemd/
   Process: 12374 ExecStartPre=/usr/libexec/mariadb-check-socket (code=exited, status=0/SUCCESS)
   Process: 12468 ExecStartPre=/usr/libexec/mariadb-prepare-db-dir mariadb.service (code=exited, status=0/SUCCESS)
   Process: 15507 ExecStartPost=/usr/libexec/mariadb-check-upgrade (code=exited, status=0/SUCCESS)
  Main PID: 15262 (mariabdb)
    Status: "Taking your SQL requests now..."
     Tasks: 12 (limit: 1114)
    Memory: 66.2M
       CPU: 442ms
   CGroup: /system.slice/mariadb.service
           └─15262 /usr/libexec/mariabdb --basedir=/usr

Apr 04 06:19:59 ip-100-0-5-153.ap-south-1.compute.internal mariadb-prepare-db-dir[14196]: The second is mysql@localhost, it has no password
```

i-07ec64c7e571f41c6
PublicIPs: 3.6.89.35 PrivateIPs: 100.0.1.113

- Now create RDS

1. frist we have to create subnet group

Amazon RDS

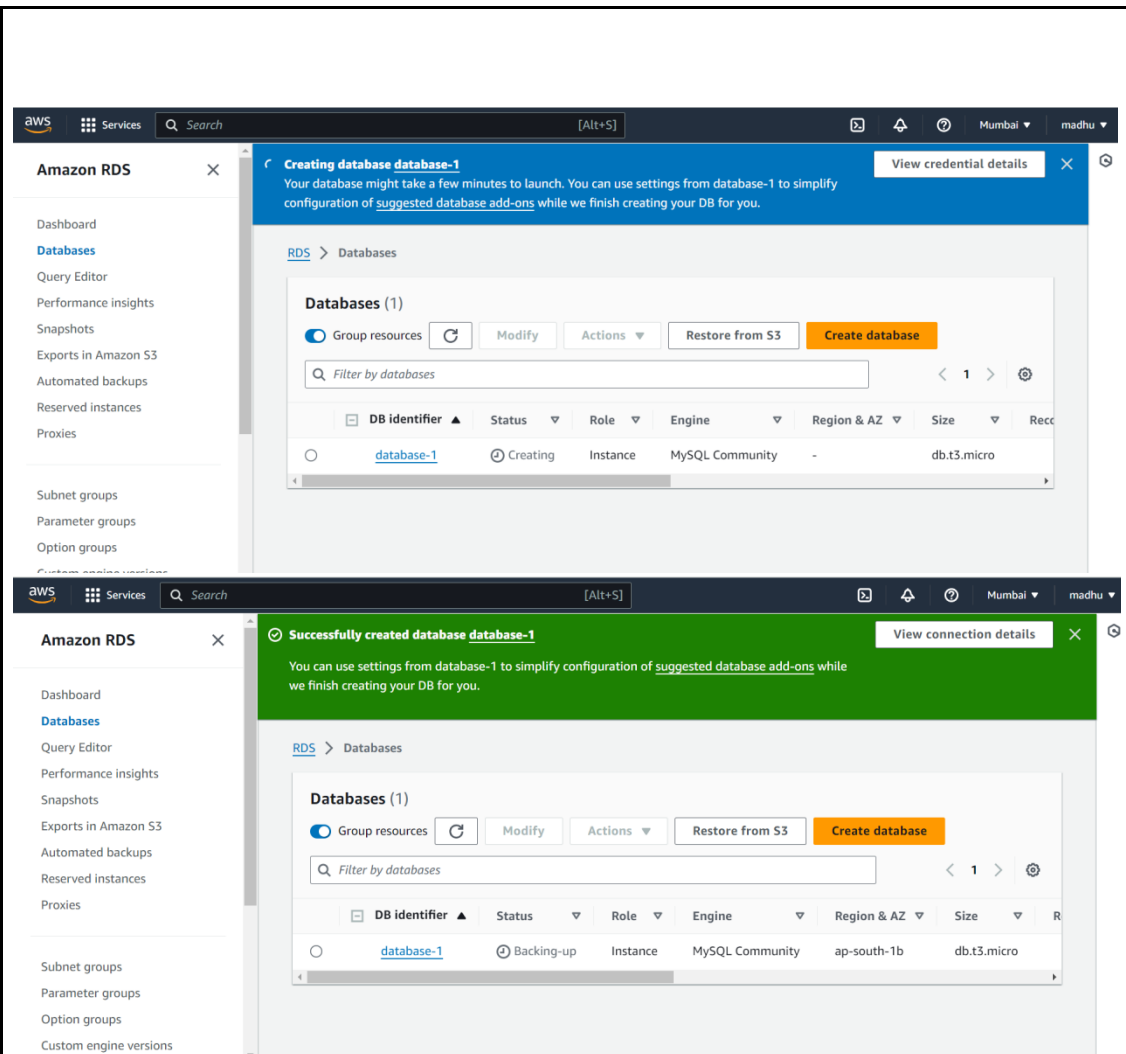
Subnet groups

Subnet groups (1)

Filter by subnet group

	Name	Description	Status	VPC
<input type="checkbox"/>	thiru3tierdrs	allow	Complete	vpc-030e72d3e3a192744

2. Now create database



- Connect to the database.

1. Connect to the server
2. Install MySQL

3. And enter command `MySQL -h YOUR_DB_ENDPOINT -P 3306 -u YOUR_DB_USERNAME -p` in this command instead of `your_db_endpoint` we should enter our database endpoint and also edit username as well after that enter password that you have given while creating a relational database.

```
[ec2-user@ip-10-0-156-224 ~]$ mysql -h brainiac-webapp-db.cgwzuzkgdaxy.us-east-1
.rds.amazonaws.com -P 3306 -u admin -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 115
Server version: 8.0.28 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)]> |
```