PROJECT-1

3 TIER ARCHITECTURE OF AWS

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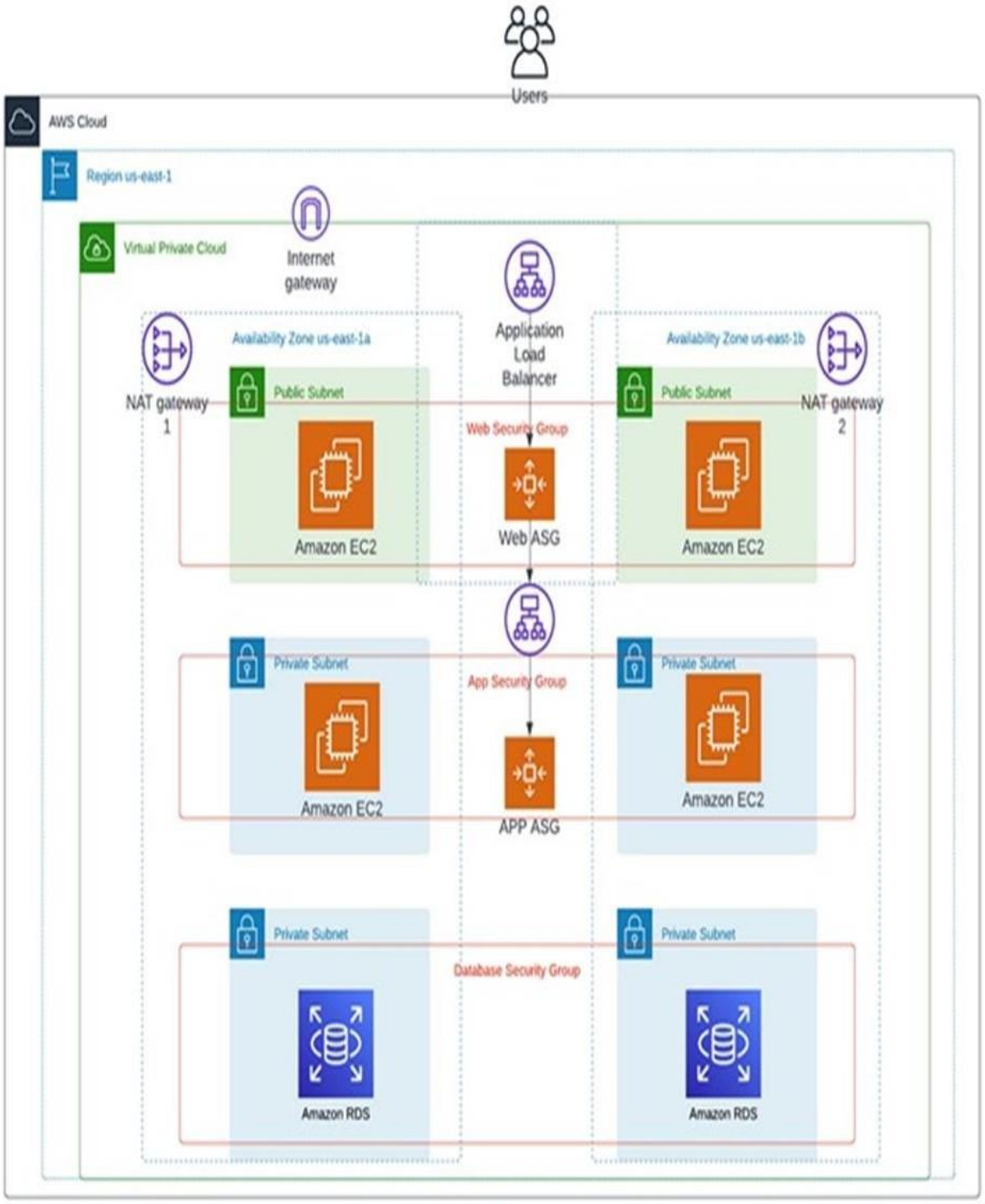


There are three lyres in 3 tier architecture:-

1. ***WEB TIER*** :- The Web 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.

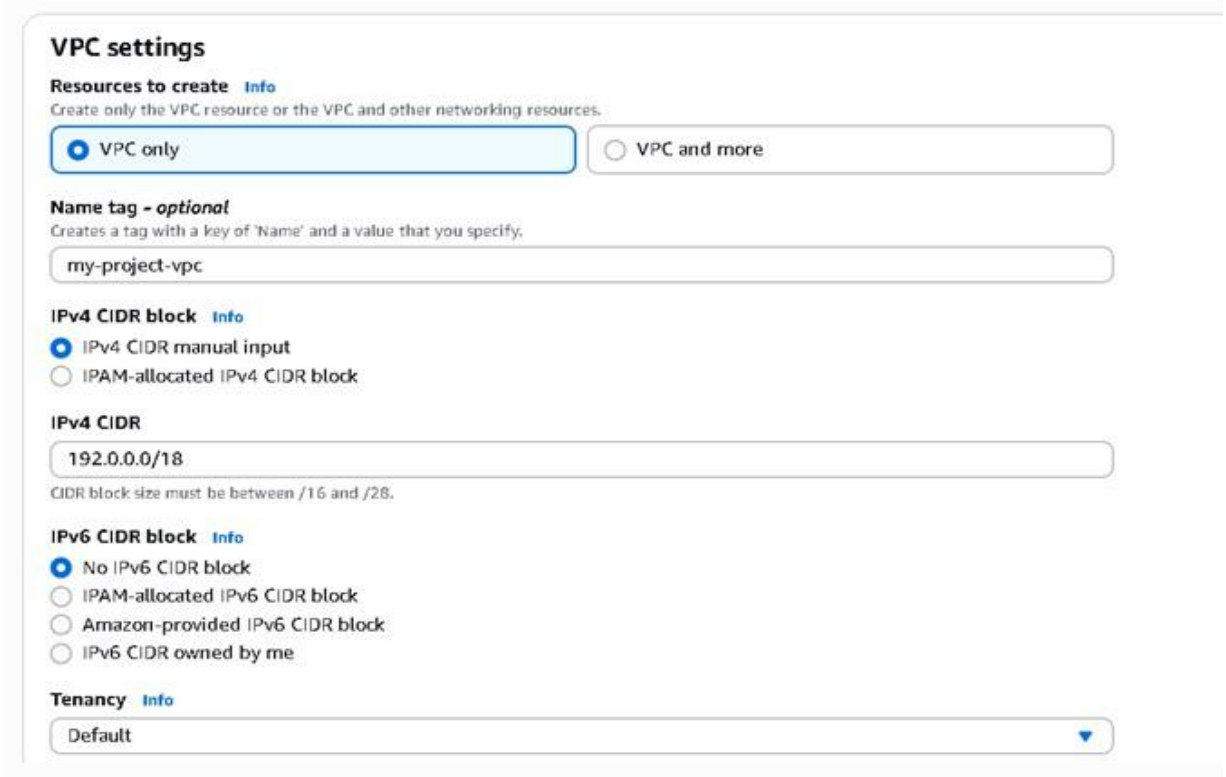
3. .DATABASE TIER :-The data tier, sometimes called database tier, data access tier or back- end, is where the information processed by the application is stored and managed

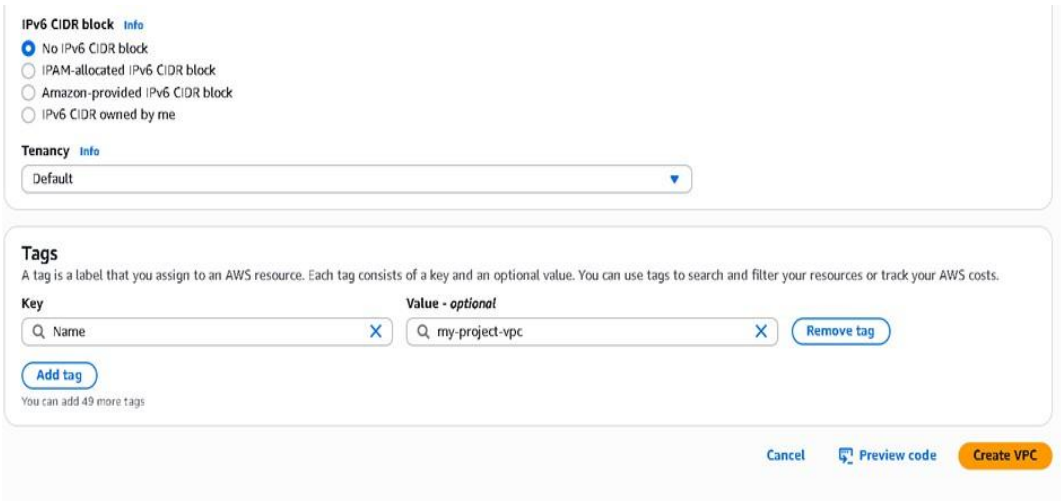
TO IMPLEMENT THE ABOVE ARCHITECTURE WE HAVE TO FOLLOW THESE STEPS

1. Create VPC ,Subnets-6 ,internet gateway – 1,Route tables- 3,Nat gateway-2
2. Launch an EC2 instance.
3. Create Target group.
4. Create Load Balancer.
5. Create an AMI (image).
6. Create launch template.
7. Create Autoscaling Group.
8. Create Subnet Group.
9. Create Database (RDS).
10. Establish connection.

1. **creating VPC and its components** :-

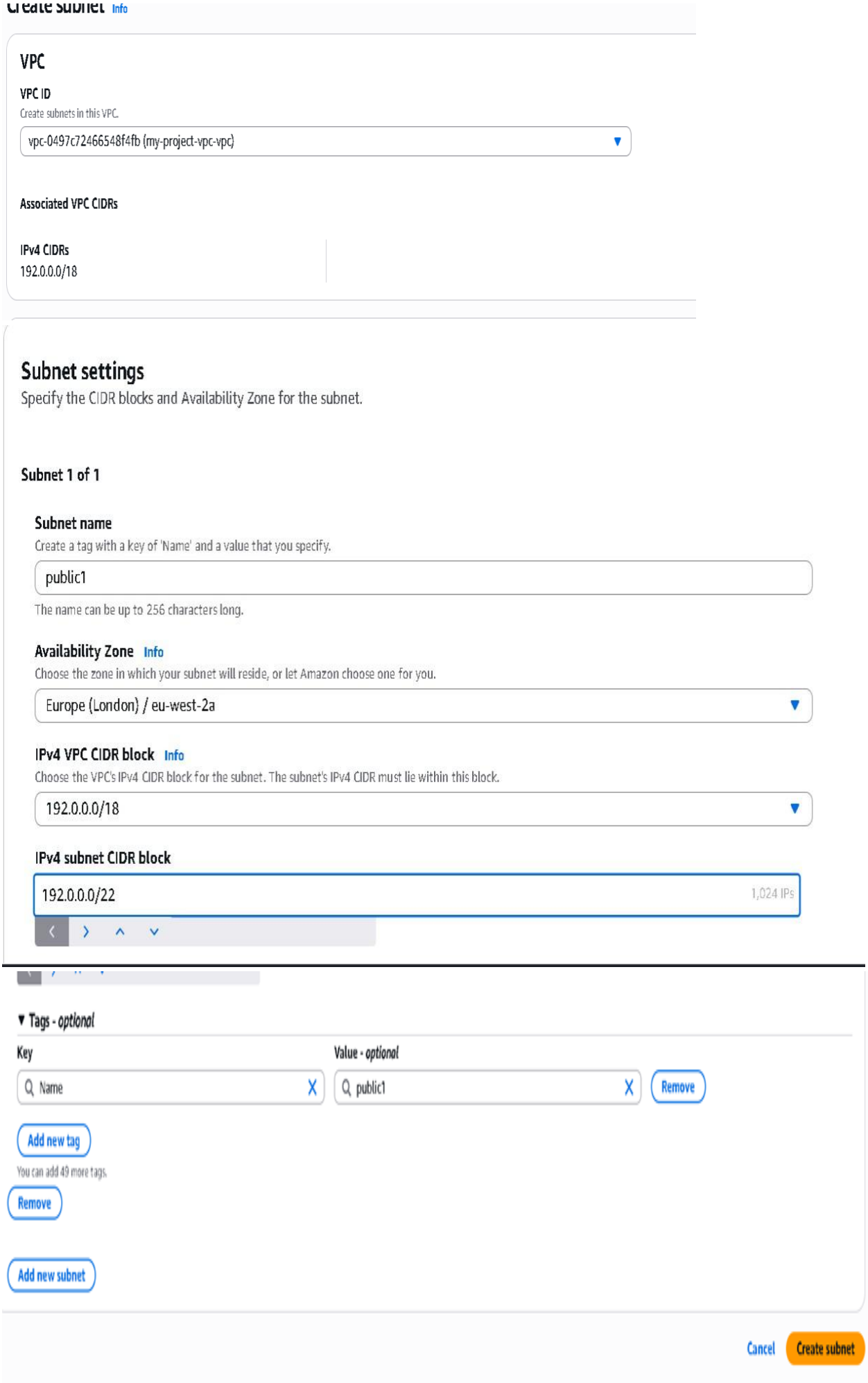
- Click on VPC service .
- Click on Create VPC, give name to the VPC as my-project -vpc .
- Give ipv4 CIDR address as: 192.0.0.0./18
- Click on create vpc.





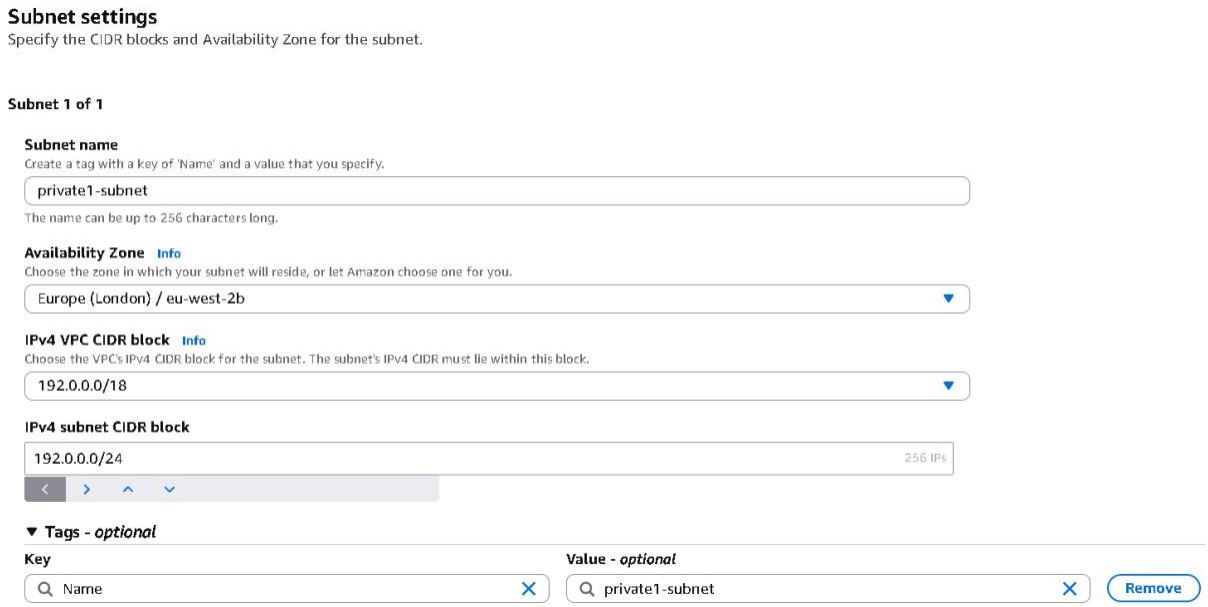
Creating subnets:-

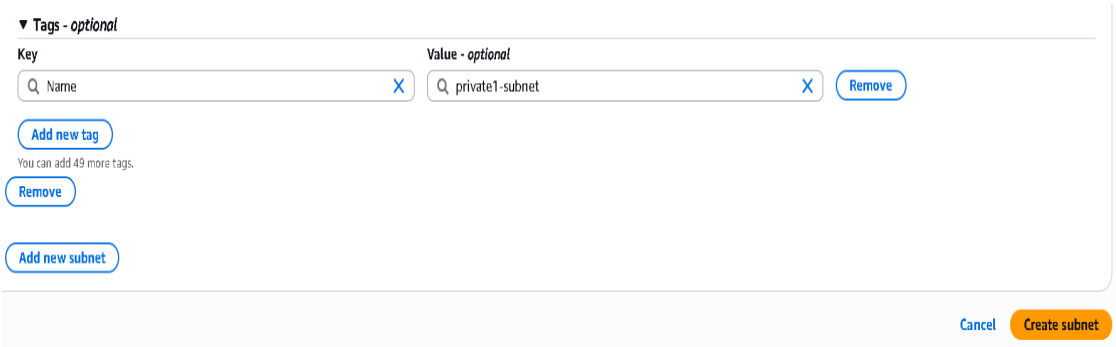
- 2 -public & 4 private subnets.
- Seclect (my-project-vpc).
- Give name tag as availability zone .



In a similar way create public 2subnet.

Creating private subnet:





Create subnet Info

VPC

VPC ID

Create subnets in this VPC.

vpc-0497c72466548f4fb (my-project-vpc-vpc)

Associated VPC CIDRs

IPv4 CIDRs

192.0.0.0/18

Subnet settings

Specify the CIDR blocks and Availability Zone for the subnet.

Subnet 1 of 1

Subnet name

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

private2-subnet

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.

Europe (London) / eu-west-2c

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.

192.0.0.0/18

IPv4 subnet CIDR block

192.2.0.0/20 4,096 IPs

▼ Tags - *optional*

Key Value - *optional*

Name private2-subnet Remove

▼ Tags - *optional*

Key Value - *optional*

Name private2-subnet Remove

Add new tag

You can add 49 more tags.

Remove

Add new subnet

Cancel Create subnet

Create subnet Info

VPC

VPC ID

Create subnets in this VPC.

vpc-0497c72466548f4fb (my-project-vpc-vpc)

Associated VPC CIDRs

IPv4 CIDRs

192.0.0.0/18

Subnet settings

Specify the CIDR blocks and Availability Zone for the subnet.

Subnet 1 of 1

Subnet name

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

private3-subnet

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.

Europe (London) / eu-west-2b

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.

192.0.0.0/18

IPv4 subnet CIDR block

192.2.0.4/26 64 IPs

▼ Tags - *optional*

Key	Value - *optional*	
Name	private3-subnet	Remove

▼ Tags - *optional*

Key	Value - *optional*	
Name	private3-subnet	Remove

Add new tag

You can add 49 more tags.

Remove

Add new subnet

Cancel Create subnet

Create subnet Info

VPC

VPC ID

Create subnets in this VPC.

vpc-0497c72466548f4fb (my-project-vpc-vpc)

Associated VPC CIDRs

IPv4 CIDRs

192.0.0.0/18

Subnet settings

Specify the CIDR blocks and Availability Zone for the subnet.

Subnet 1 of 1

Subnet name

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

private4-subnet

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.

Europe (London) / eu-west-2c

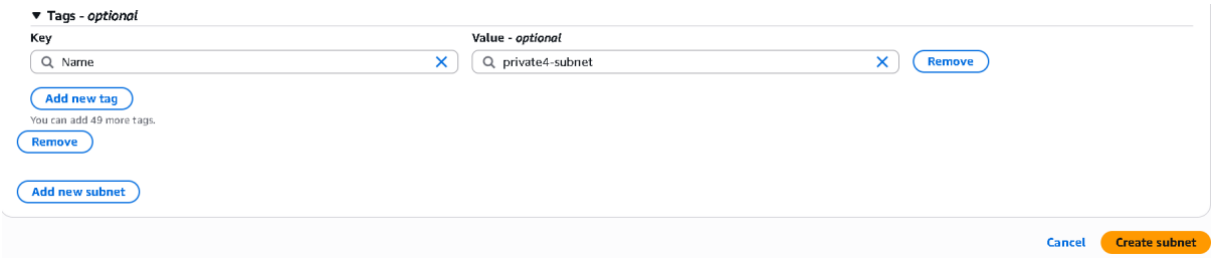
IPv4 VPC CIDR block Info

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

192.0.0.0/18

IPv4 subnet CIDR block

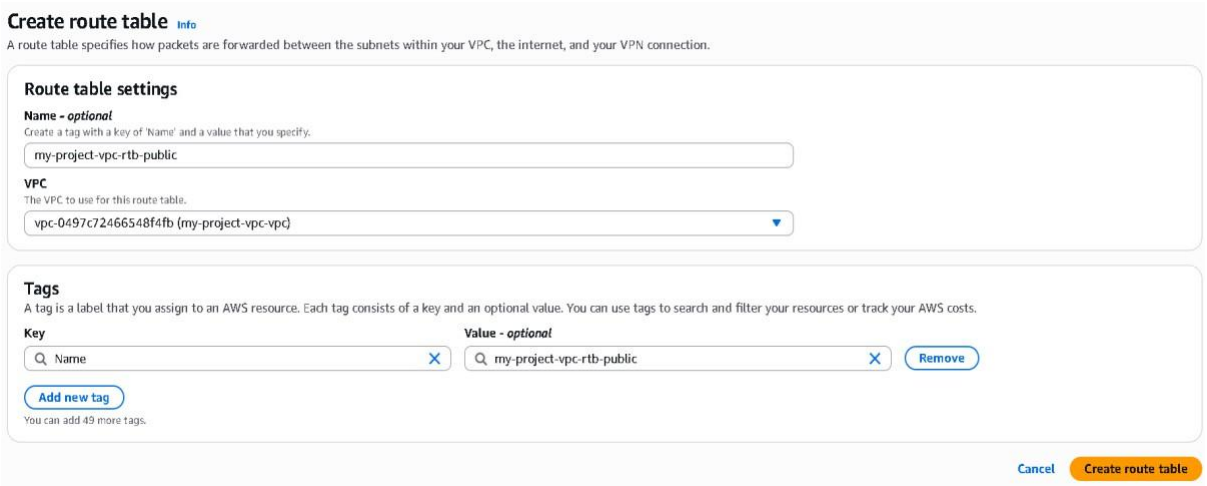
192.2.0.8/17 32,768 IPs

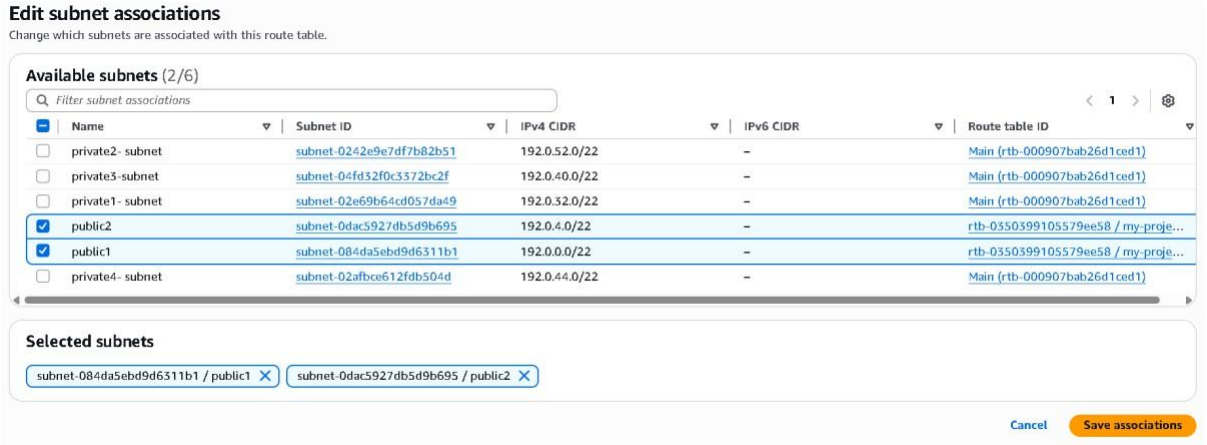


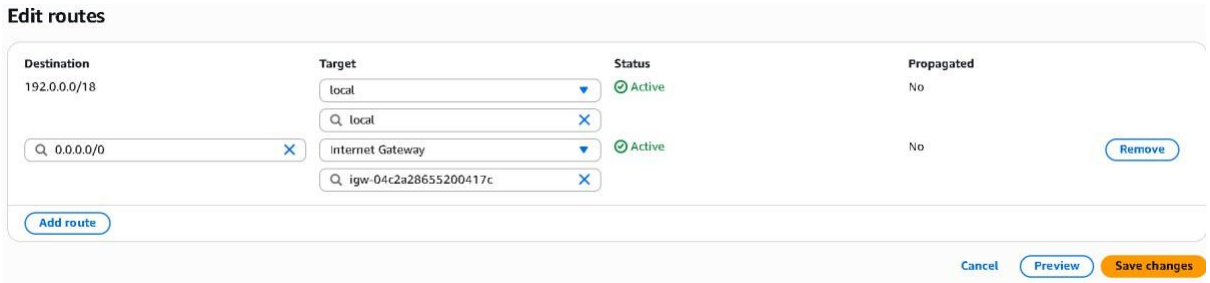
Creating Route Table:-

- Click on route tables
- Give a name as Public, (select my -project-vpc)create route table.
- Open route table click on edit subnet associations and then select two public subnets and save associations.
- Click on add routes give all traffic (0.0.0.00/0)and select our internet gateway.

1.**Creating public toute table**:





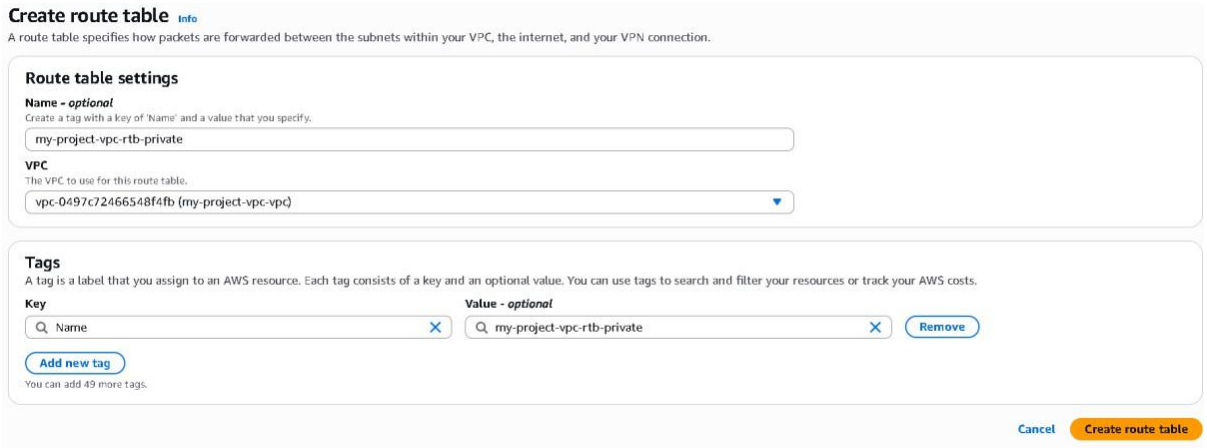


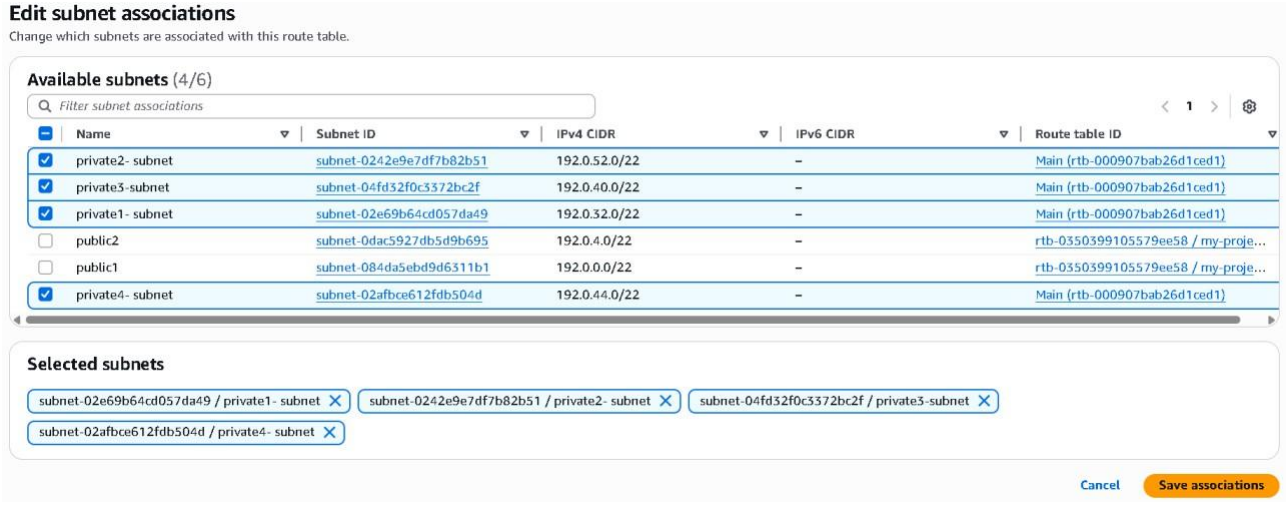
2. creating private route table:

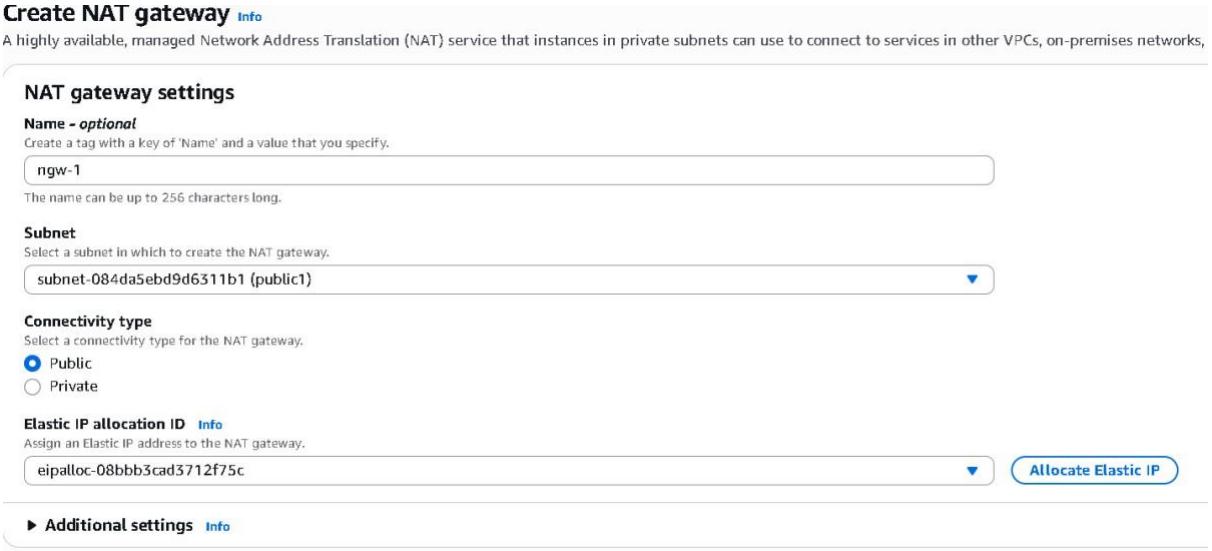
Create a private route table and select(my-project-vpc) create route table.

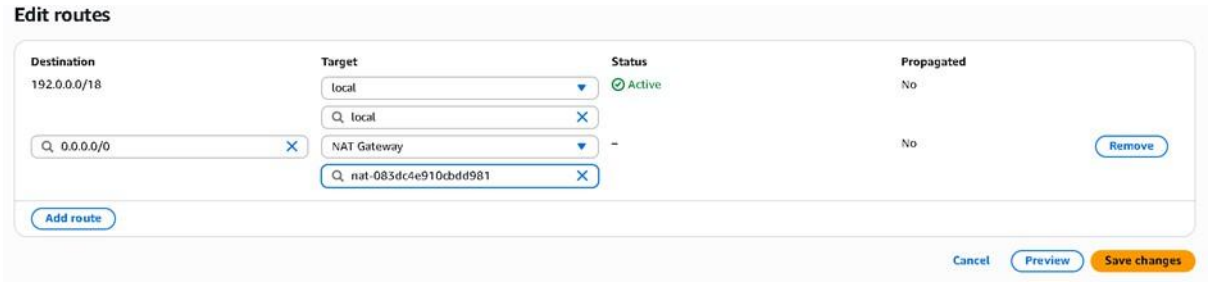
Open route table click on edit subnet associations and then select all private subnets and save associations.

Create NAT gateway and give name as ngw-1









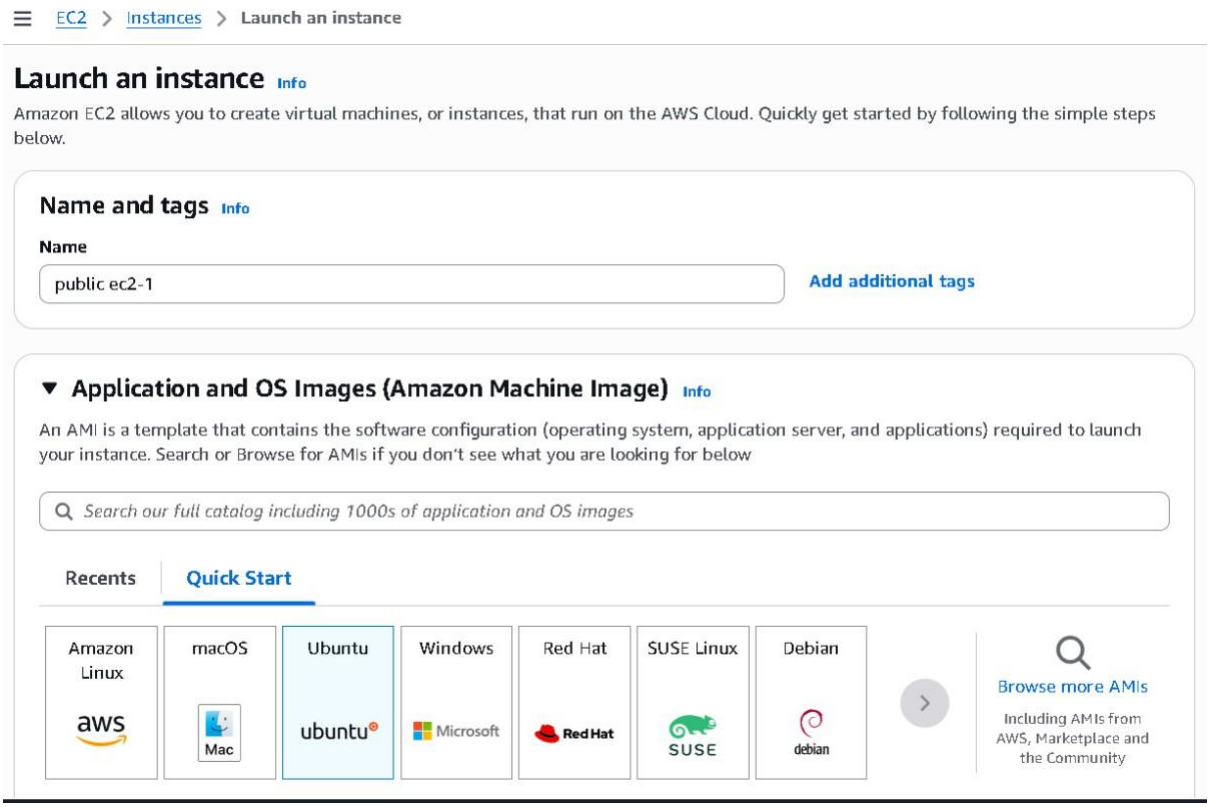
Step :2 Launch instance:-

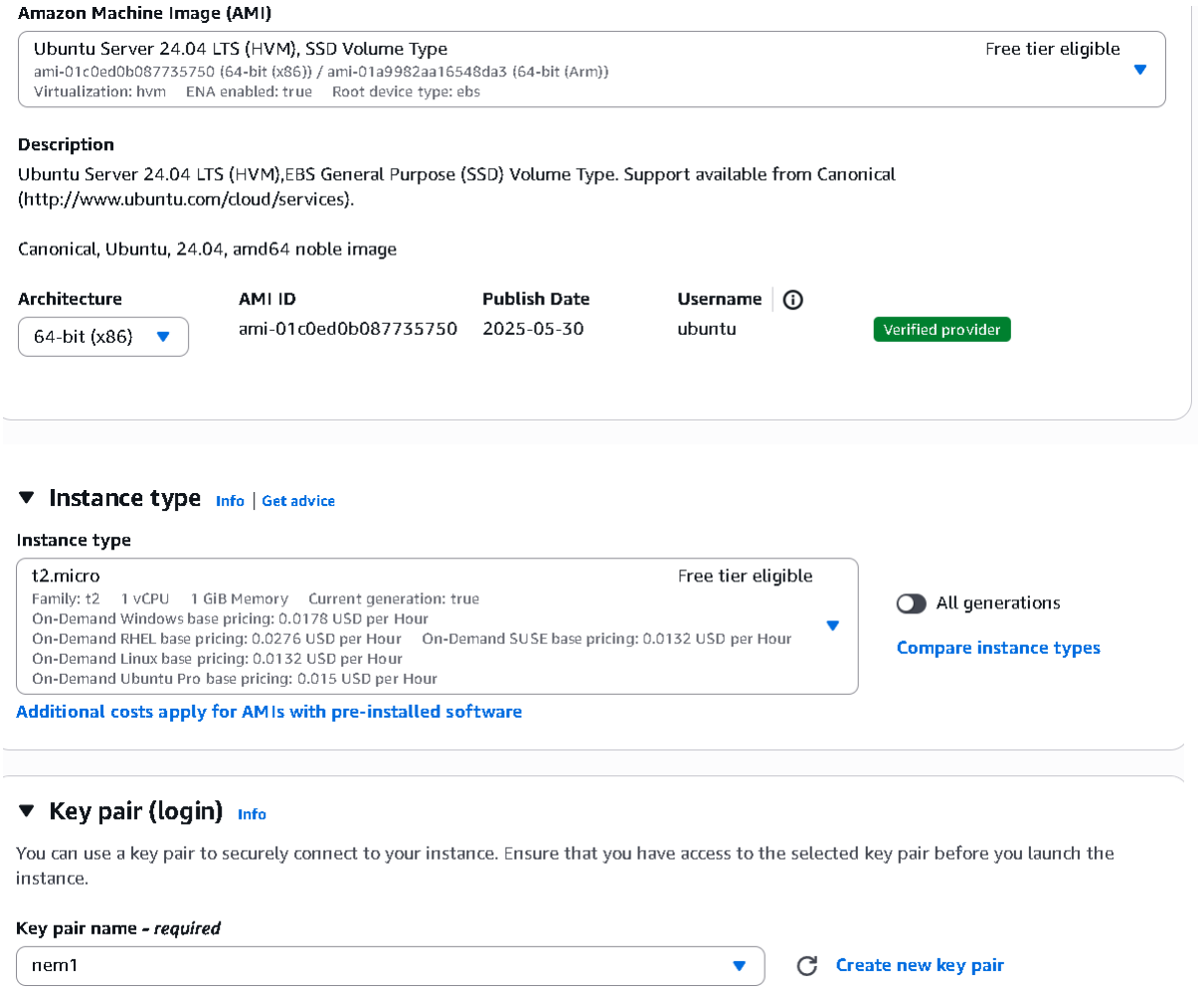
Goto ec2 service click on launch instance, give name as public ec2-1.

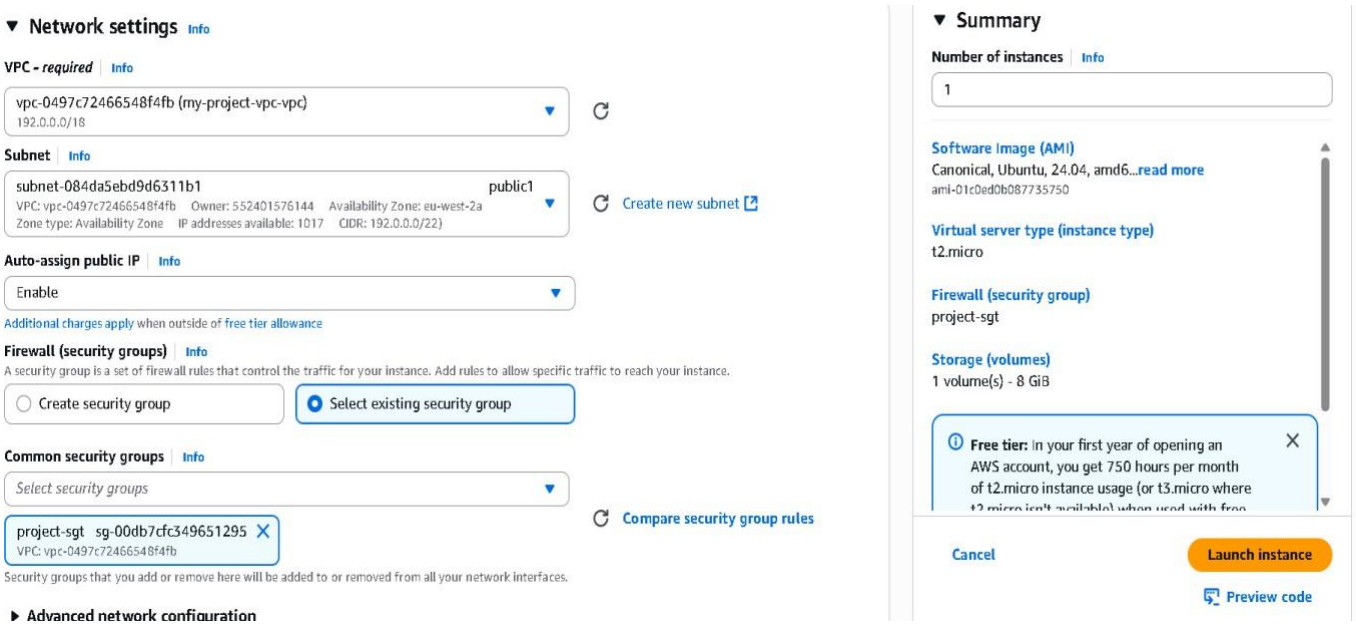
And then select AMI as -ubuntu, select instance type t2 micro, and then create key pair or else use existing once.

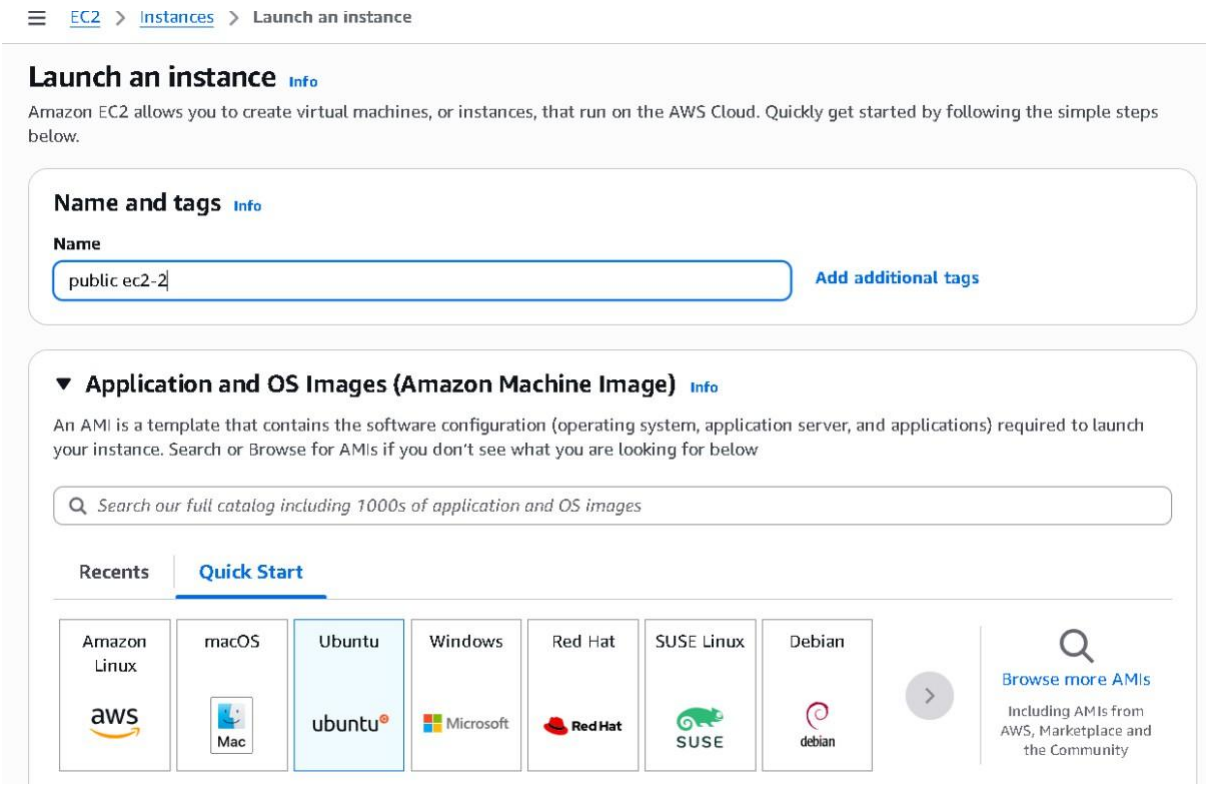
Click on edit network settings, select vpc and public subnet , enable auto ip assign and create a security group as project-stg ,and click on launch instance.

Creating Public instances :-






▼ Network settings Info
VPC - required Info
vpc-0497c72466548f4fb (my-project-vpc-vpc)
192.0.0.0/18
Subnet Info
subnet-084da5ebd9d6311b1 public1
VPC: vpc-0497c72466548f4fb Owner: 552401576144 Availability Zone: eu-west-2a
Zone type: Availability Zone IP addresses available: 1017 CIDR: 192.0.0.0/22)
Create new subnet
Auto-assign public IP Info
Enable
Additional charges apply when outside of free tier allowance
Firewall (security groups) Info
A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.
Create security group
Select existing security group
Common security groups Info
Select security groups
project-sgt sg-00db7cfc349651295
VPC: vpc-0497c72466548f4fb
Compare security group rules
Security groups that you add or remove here will be added to or removed from all your network interfaces.
▶ Advanced network configuration
▼ Summary
Number of instances Info
1
Software Image (AMI)
Canonical, Ubuntu, 24.04, amd6...read more
ami-01c0ed0b087735750
Virtual server type (instance type)
t2.micro
Firewall (security group)
project-sgt
Storage (volumes)
1 volume(s) - 8 GiB
Free tier: In your first year of opening an AWS account, you get 750 hours per month of t2.micro instance usage (or t3.micro where
Cancel
Launch instance
Preview code


EC2 > Instances > Launch an 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
public ec2-2
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
Amazon Linux
macOS
Ubuntu
Windows
Red Hat
SUSE Linux
Debian
Browse more AMIs
Including AMIs from AWS, Marketplace and the Community

Amazon Machine Image (AMI)

Ubuntu Server 24.04 LTS (HVM), SSD Volume Type — Free tier eligible
ami-01c0ed0b087735750 (64-bit (x86)) / ami-01a9982aa16548da3 (64-bit (Arm))
Virtualization: hvm ENA enabled: true Root device type: ebs

Description

Ubuntu Server 24.04 LTS (HVM),EBS General Purpose (SSD) Volume Type. Support available from Canonical (http://www.ubuntu.com/cloud/services).

Canonical, Ubuntu, 24.04, amd64 noble image

Architecture	AMI ID	Publish Date	Username	
64-bit (x86)	ami-01c0ed0b087735750	2025-05-30	ubuntu	Verified provider

Instance type Info | Get advice

Instance type

t2.micro — Free tier eligible
Family: t2 1 vCPU 1 GiB Memory Current generation: true
On-Demand Windows base pricing: 0.0178 USD per Hour
On-Demand RHEL base pricing: 0.0276 USD per Hour On-Demand SUSE base pricing: 0.0132 USD per Hour
On-Demand Linux base pricing: 0.0132 USD per Hour
On-Demand Ubuntu Pro base pricing: 0.015 USD per Hour

All generations

Compare instance types

Additional costs apply for AMIs with pre-installed software

Key pair (login) Info

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - *required*

nem1

Create new key pair

Network settings Info

VPC - *required* Info

vpc-0497c72466548f4fb (my-project-vpc-vpc)
192.0.0.0/18

Subnet Info

subnet-0dac5927db5d9b695 — public2
VPC: vpc-0497c72466548f4fb Owner: 552401576144 Availability Zone: eu-west-2b
Zone type: Availability Zone IP addresses available: 1019 CIDR: 192.0.4.0/22)

Create new subnet

Auto-assign public IP Info

Enable

Additional charges apply when outside of free tier allowance

Firewall (security groups) Info

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

Create security group | Select existing security group

Common security groups Info

Select security groups

project-sgt sg-00db7cfc349651295
VPC: vpc-0497c72466548f4fb

Compare security group rules

Security groups that you add or remove here will be added to or removed from all your network interfaces.

Advanced network configuration

Summary

Number of instances Info

1

Software Image (AMI)
Canonical, Ubuntu, 24.04, amd6...read more
ami-01c0ed0b087735750

Virtual server type (instance type)
t2.micro

Firewall (security group)
project-sgt

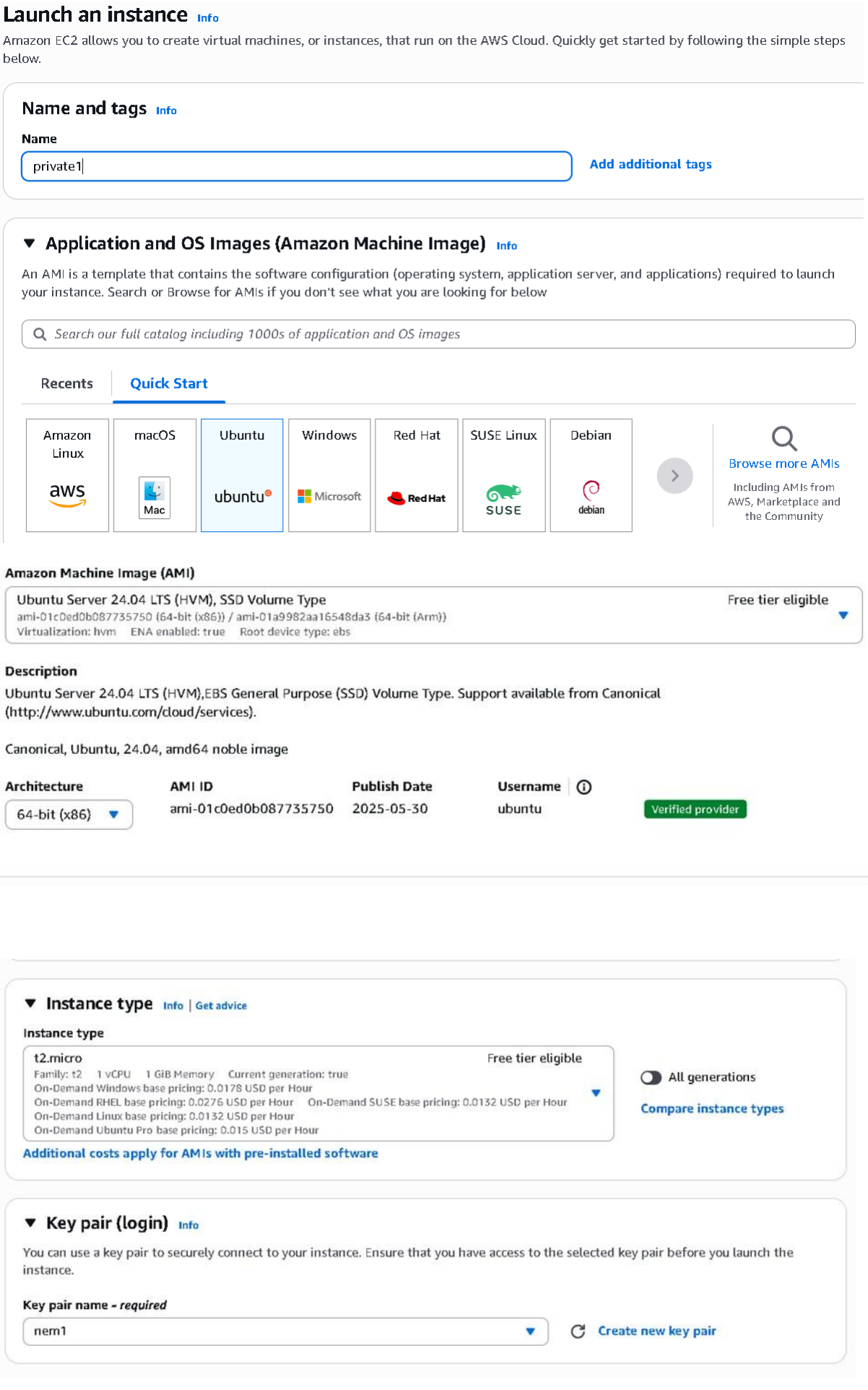
Storage (volumes)
1 volume(s) - 8 GiB

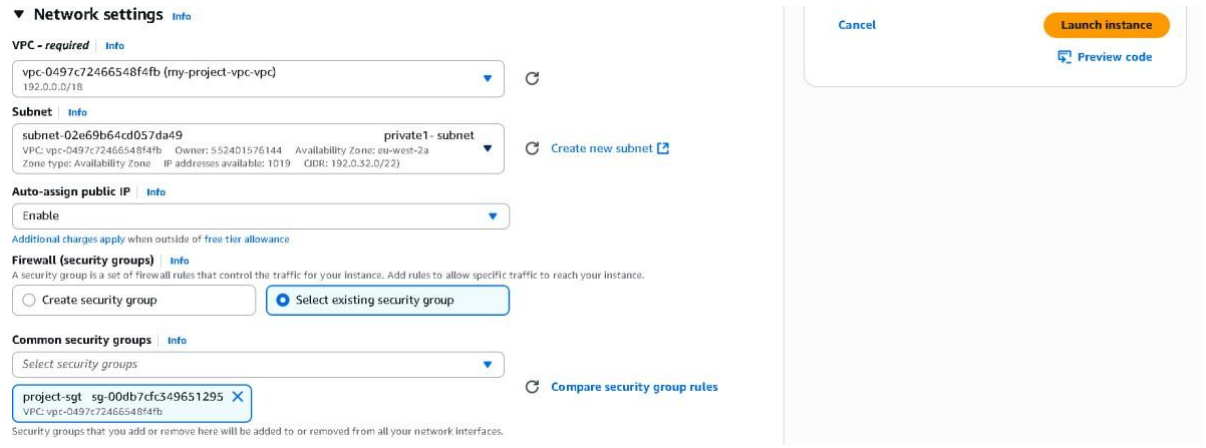
Free tier: In your first year of opening an AWS account, you get 750 hours per month of t2.micro instance usage (or t3.micro where t2.micro isn't available) when used with free

Cancel | Launch instance

Preview code

Creating private ec2 instances:

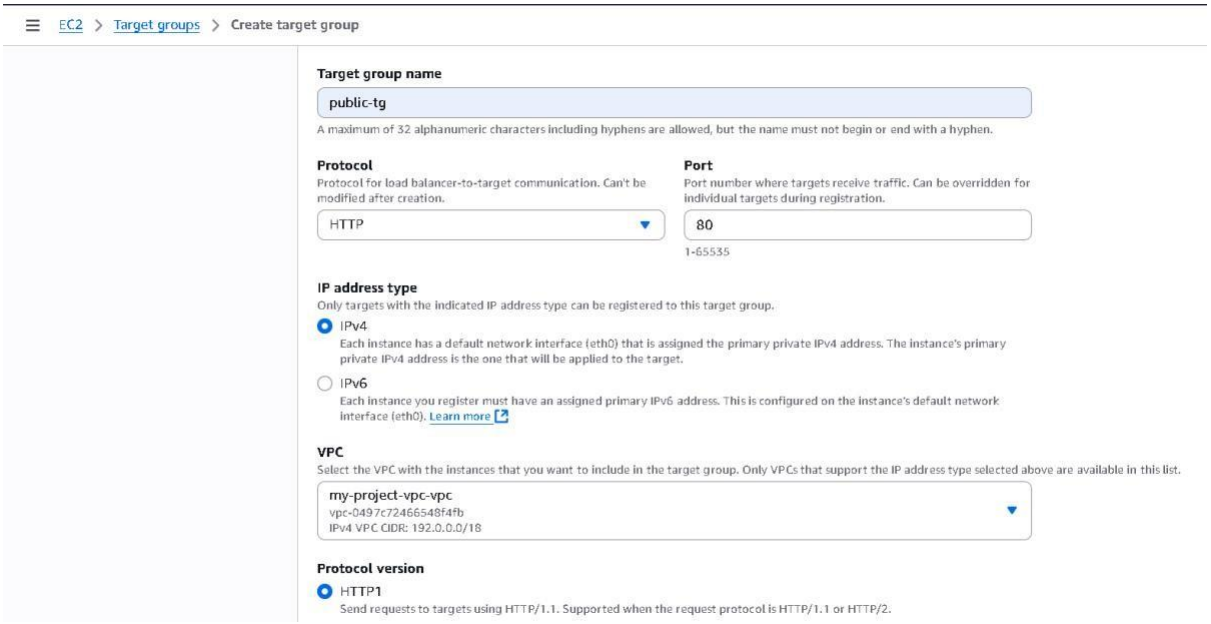


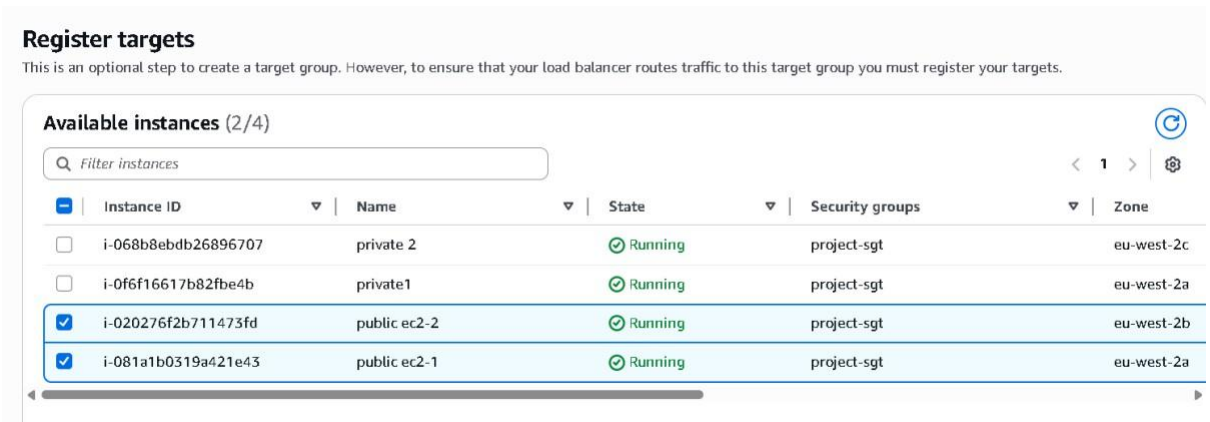


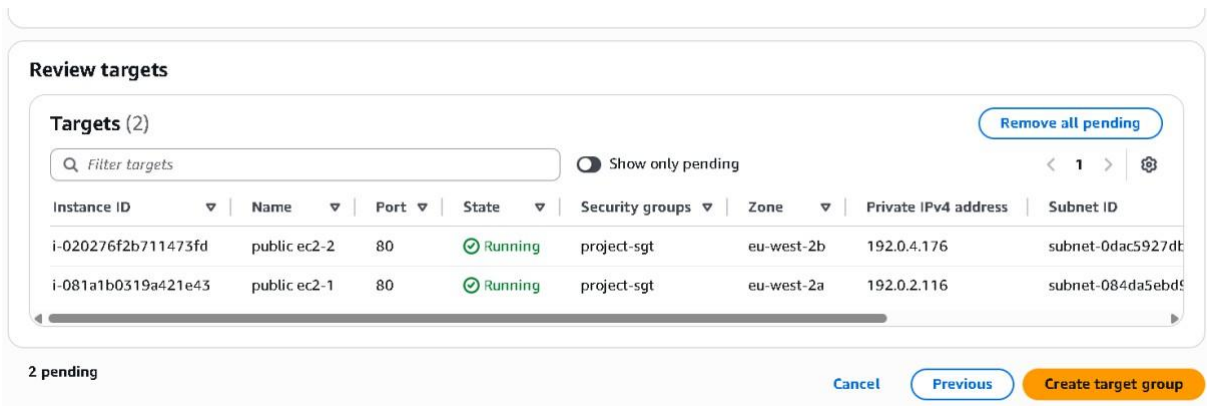
In Similar way create another private instance .

Step 3: **create Target group:-**

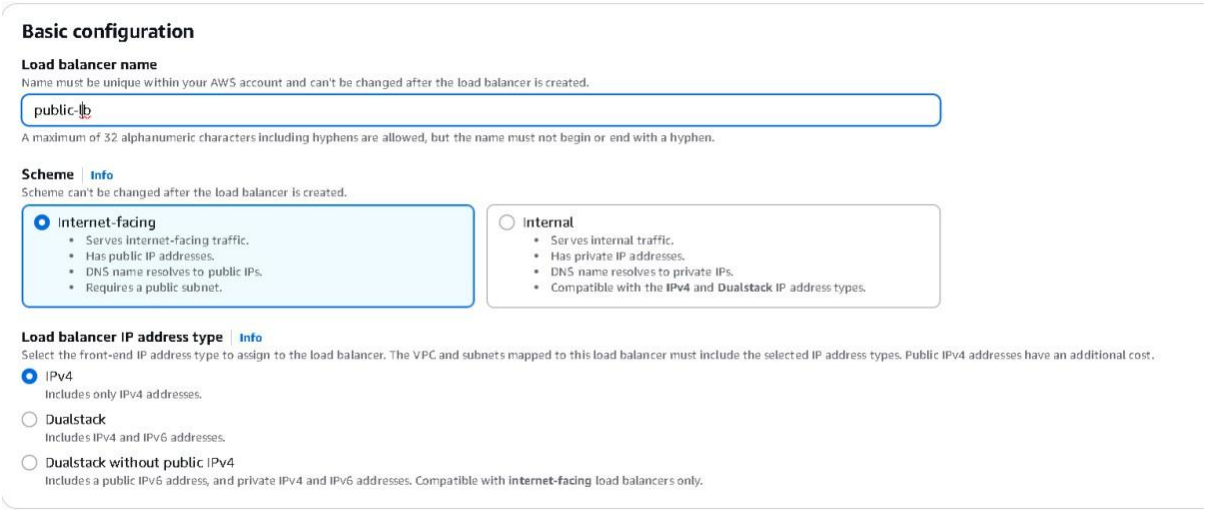
1 for public instance and 1 for private and then create target groups as 2 public and private.

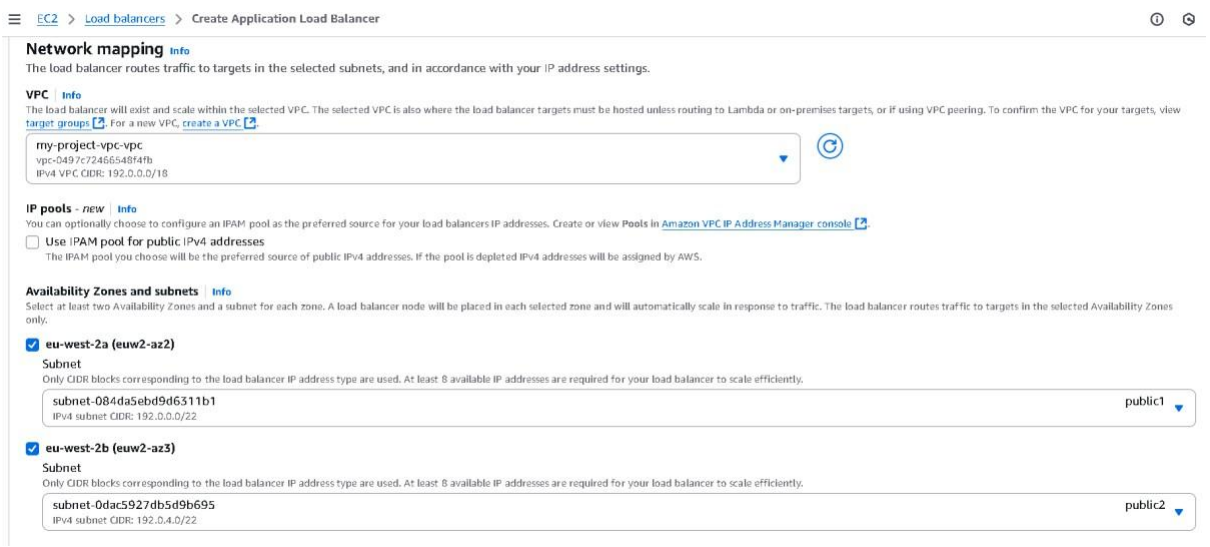


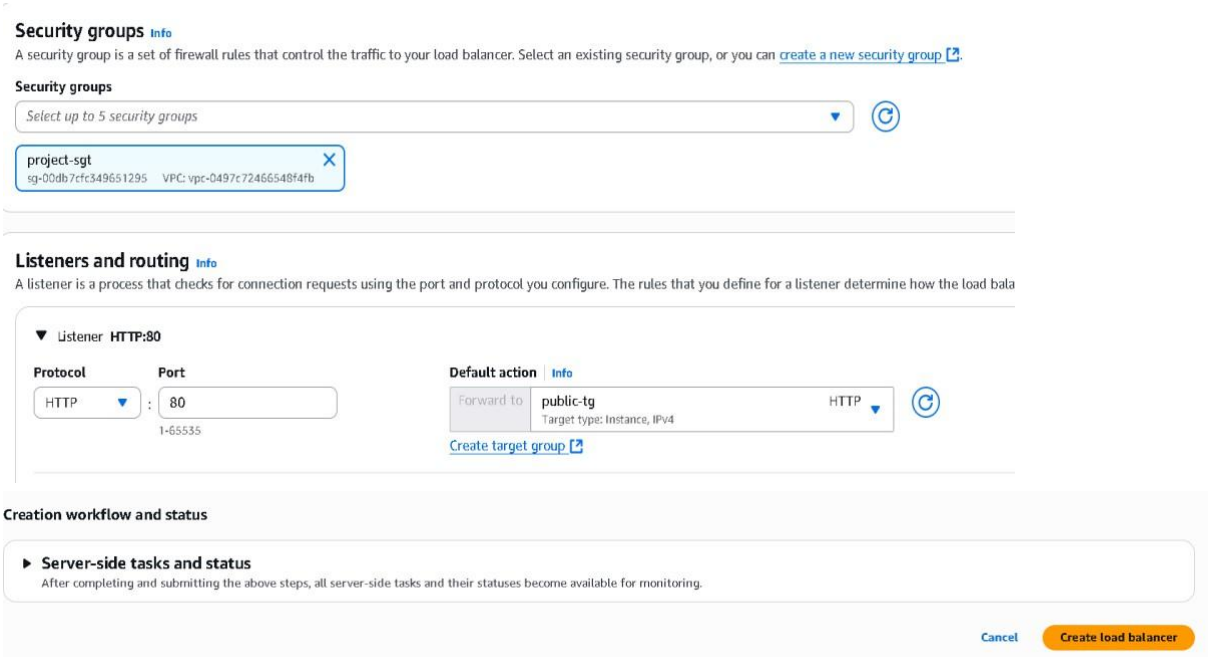




Step 4:-**Create load balancer for public ec2**







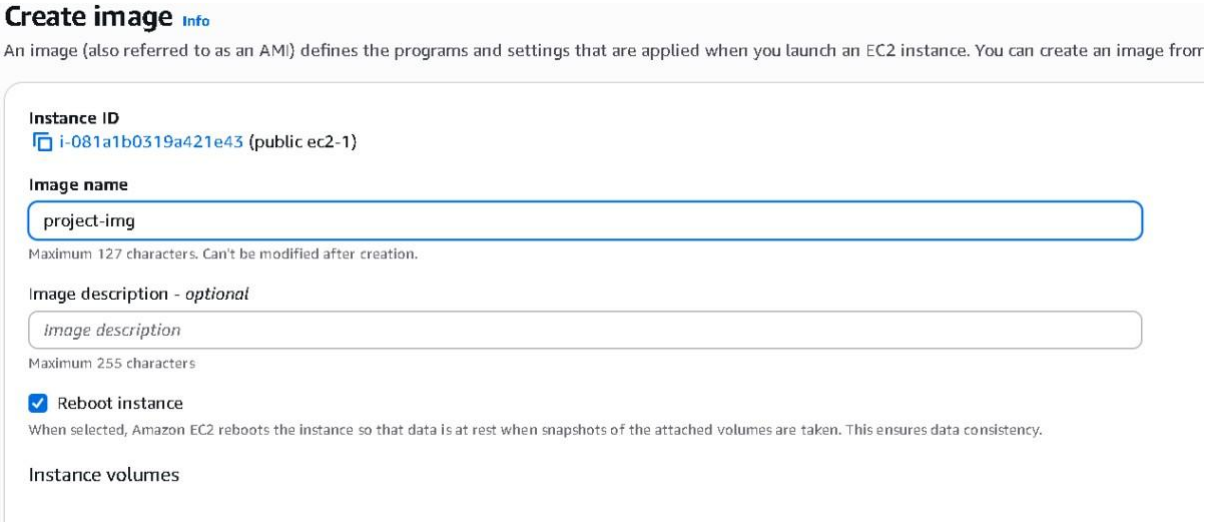

```
No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@ip-10-0-3-175:~#  sudo systemctl start nginx
root@ip-10-0-3-175:~# cd /var/www/html
root@ip-10-0-3-175:/var/www/html# sudo rm index.nginx-debian.html
root@ip-10-0-3-175:/var/www/html# sudo nano index.html
root@ip-10-0-3-175:/var/www/html#  vi index.html
root@ip-10-0-3-175:/var/www/html# systemctl restart nginx
root@ip-10-0-3-175:/var/www/html# cd
root@ip-10-0-3-175:~#
```

This is my web server 1

This is my web server 2

Step 5:- **create an AMI (image):-**

Goto ec2 instances select public ec2-1 and click on actions and select image and give a name as project-img click to create im



Step 6: **Launch template:-**

After image is available ,click on launch template.

Give a template name as temp public, Select AMI's as share with me, select my-image.

Instance type as t2.micro and key pair as nem1,

Select existing security group (project sgt) which is used to launch an EC2 instance.

Click on launch template.

Launch template name and description

Launch template name - *required*

temp-public

Must be unique to this account. Max 128 chars. No spaces or special characters like '&', '*', '@'.

Template version description

A prod webserver for MyApp

Max 255 chars

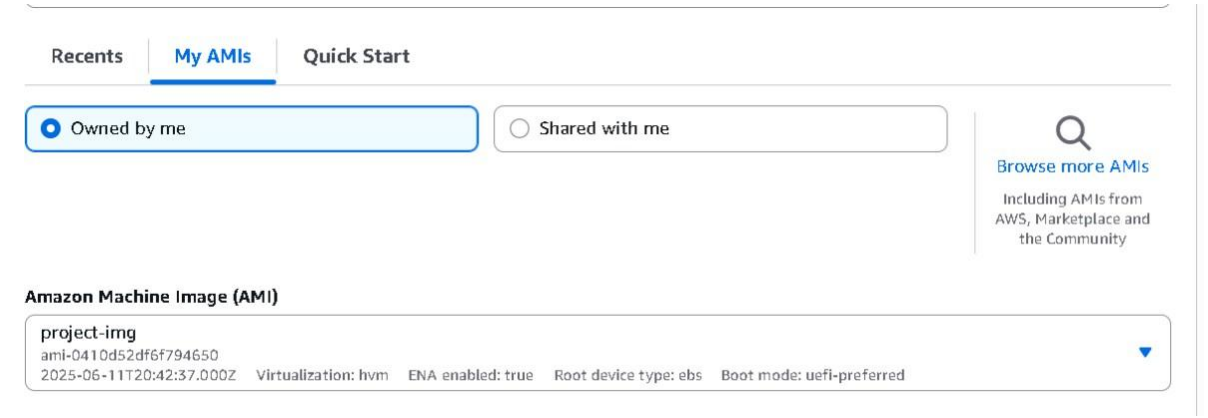
Auto Scaling guidance | Info

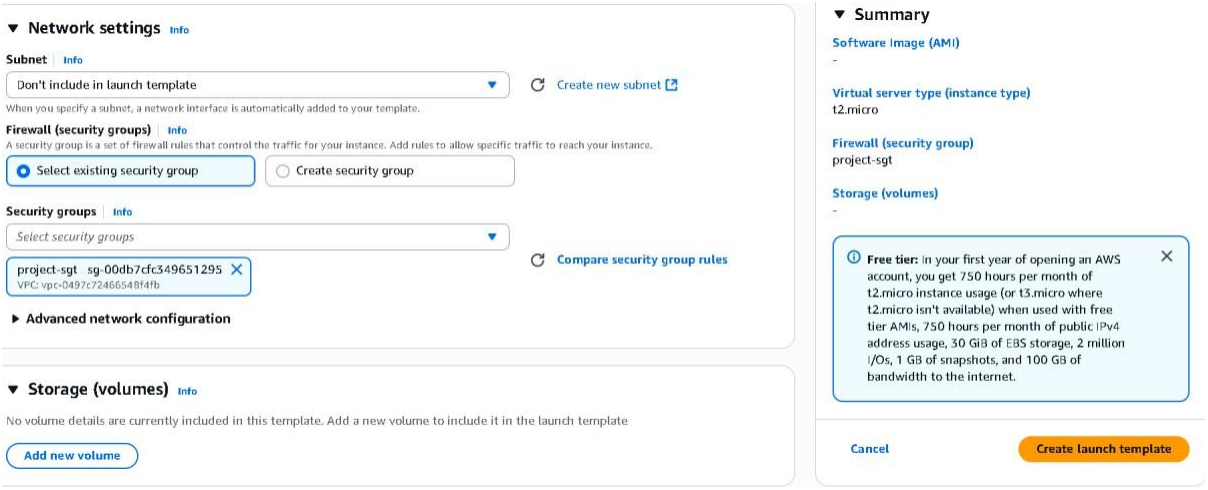
Select this if you intend to use this template with EC2 Auto Scaling

☑ Provide guidance to help me set up a template that I can use with EC2 Auto Scaling

▶ **Template tags**

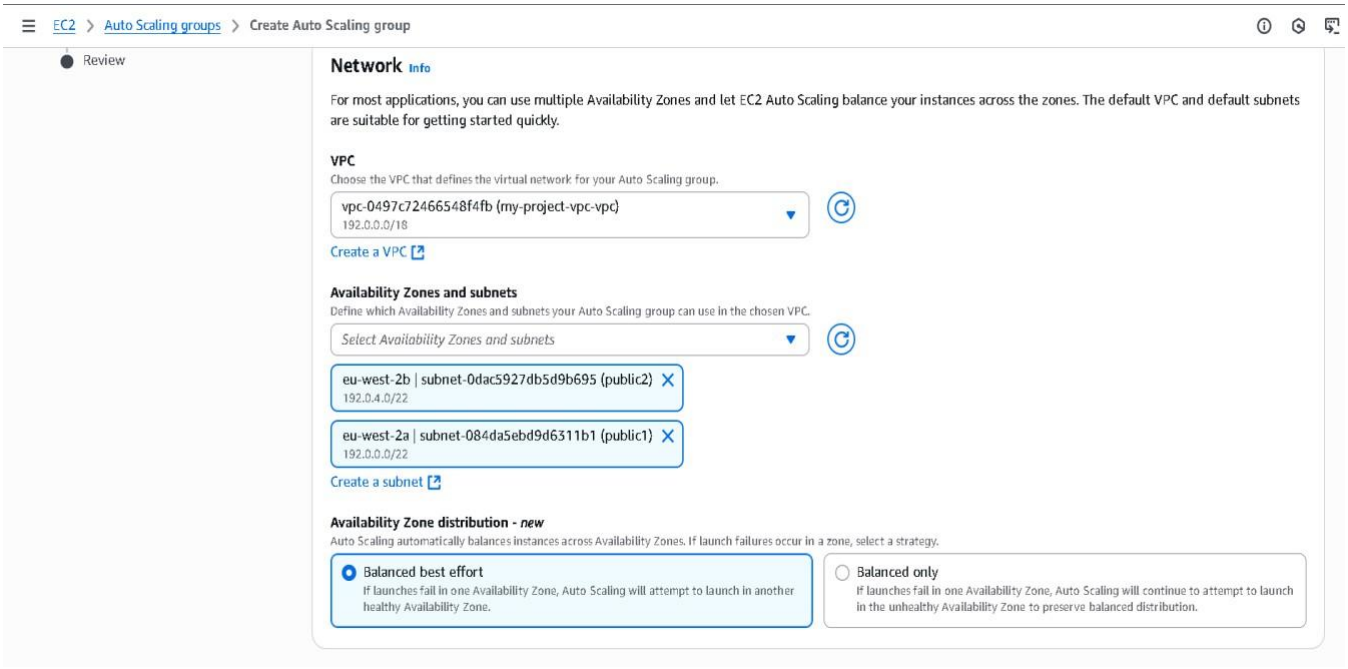
▶ **Source template**

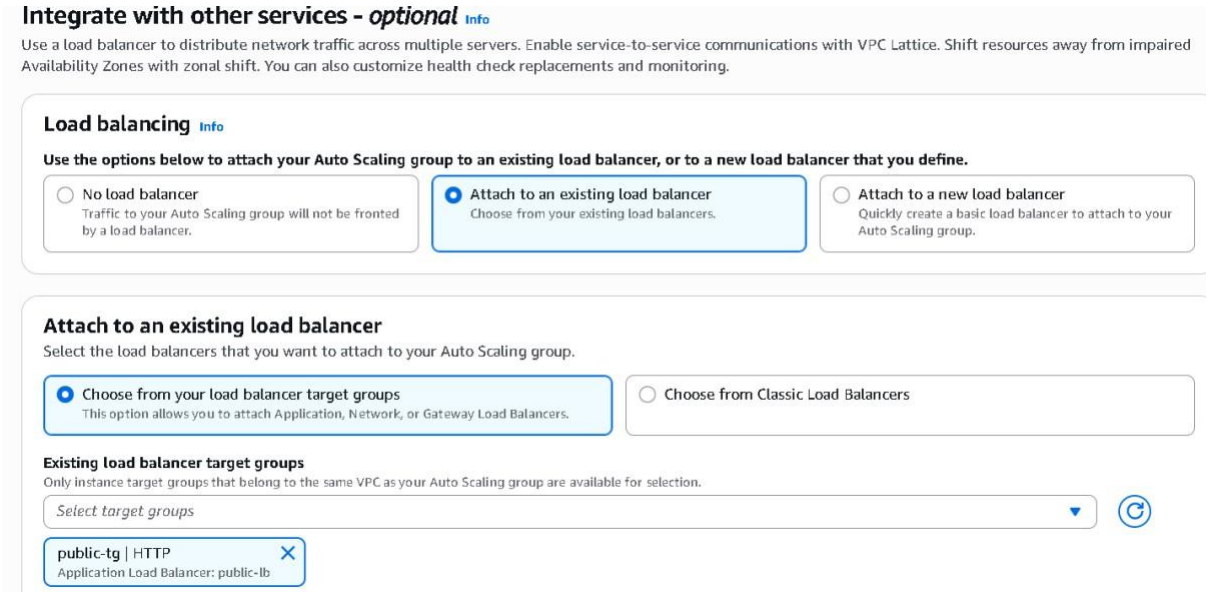




Step 7: **Auto scaling group :-**

We need to create 2 auto scaling groups 1 for public and another for private.





Configure group size and scaling - *optional* Info

Define your group's desired capacity and scaling limits. You can optionally add automatic scaling to adjust th

Group size Info

Set the initial size of the Auto Scaling group. After creating the group, you can change its size to meet d

Desired capacity type

Choose the unit of measurement for the desired capacity value. vCPUs and Memory(GiB) are only supported for mixed insta

Units (number of instances)

Desired capacity

Specify your group size.

2

Scaling Info

You can resize your Auto Scaling group manually or automatically to meet changes in demand.

Scaling limits

Set limits on how much your desired capacity can be increased or decreased.

Min desired capacity

2

Equal or less than desired capacity

Max desired capacity

5

Equal or greater than desired capacity

Automatic scaling - *optional*

Choose whether to use a target tracking policy Info

You can set up other metric-based scaling policies and scheduled scaling after creating your Auto Scaling group.

- No scaling policies
  Your Auto Scaling group will remain at its initial size and will not dynamically resize to meet demand.
- (selected) Target tracking scaling policy
  Choose a CloudWatch metric and target value and let the scaling policy adjust the desired capacity in proportion to the metric's value.

Scaling policy name

Target Tracking Policy

Metric type Info

Monitored metric that determines if resource utilization is too low or high. If using EC2 metrics, consider enabling detailed monitoring for better scaling performance.

Average CPU utilization

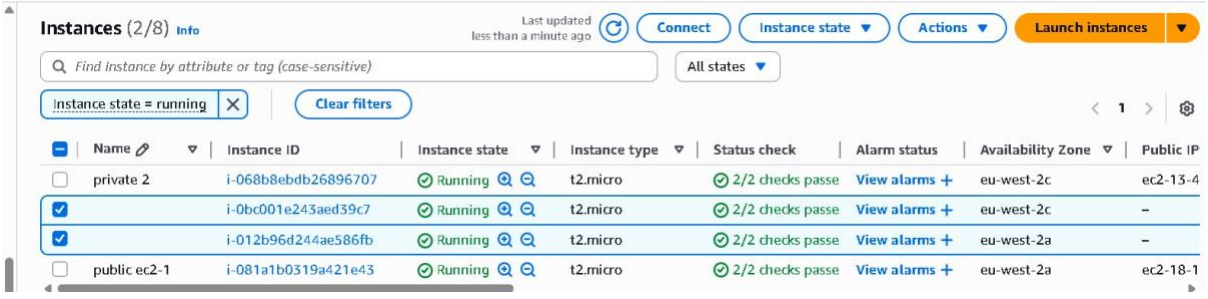
Target value

50

Instance warmup Info

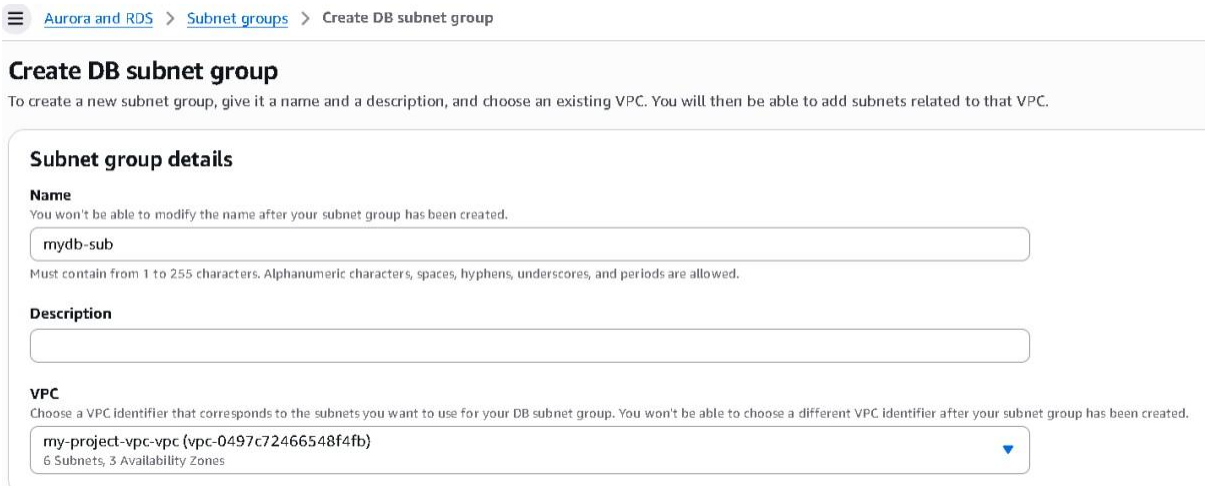
100 seconds

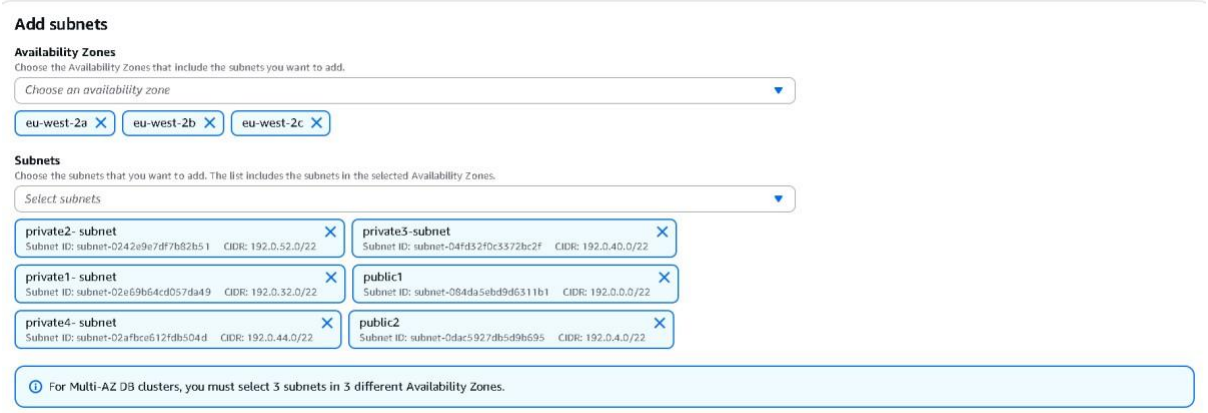
☐ Disable scale in to create only a scale-out policy



Ina similar way create private autoscaling group.

Step 8: **Create subnet group:-**





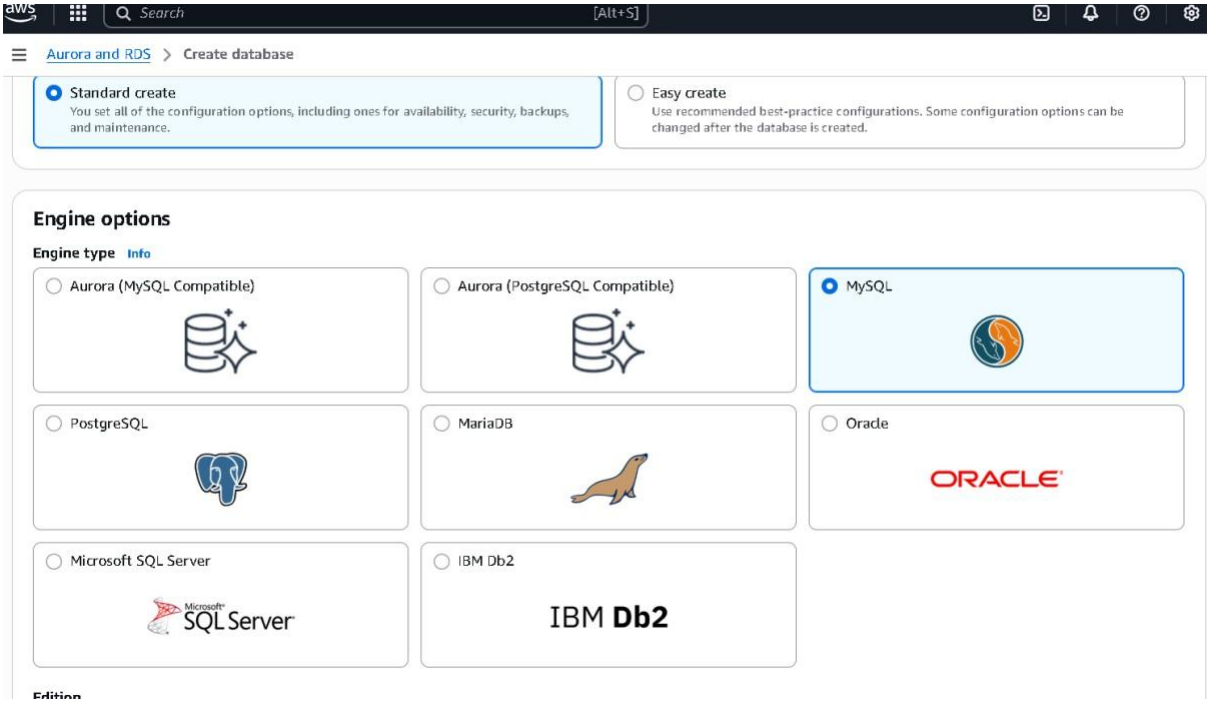
Subnets selected (6)

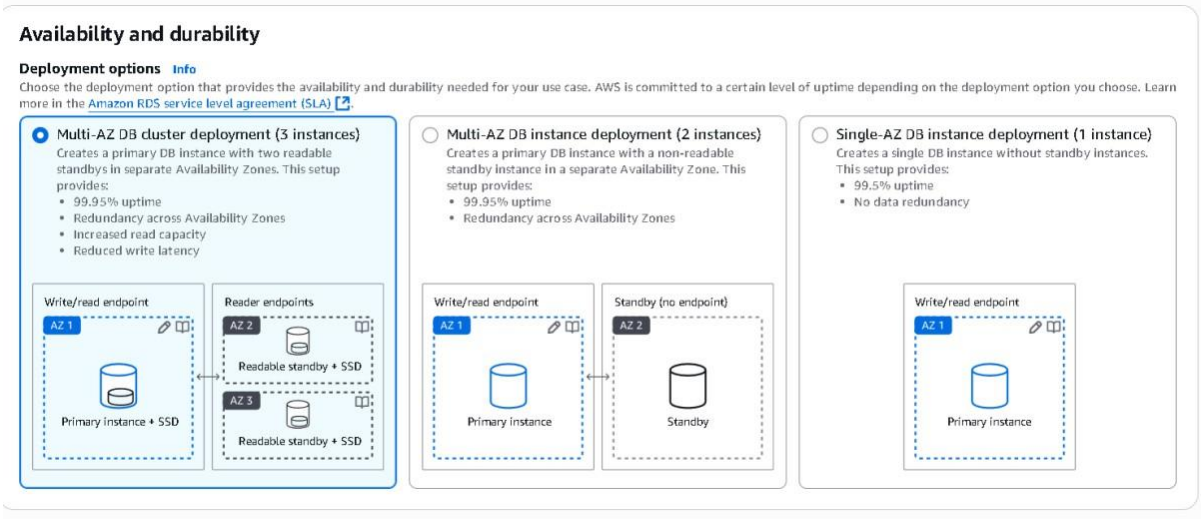
Subnets selected (6)

Availability zone	Subnet name	Subnet ID	CIDR block
eu-west-2c	private2- subnet	subnet-0242e9e7df7b82b51	192.0.52.0/22
eu-west-2c	private3-subnet	subnet-04fd32f0c3372bc2f	192.0.40.0/22
eu-west-2a	private1- subnet	subnet-02e69b64cd057da49	192.0.32.0/22
eu-west-2a	public1	subnet-084da5ebd9d6311b1	192.0.0.0/22
eu-west-2a	private4- subnet	subnet-02afbce612fdb504d	192.0.44.0/22
eu-west-2b	public2	subnet-0dac5927db5d9b695	192.0.4.0/22

Step 9**: Create database instance:-**

- **Click on create database and select standard create, and choose database engine.**
- **Give a database cluster as db1.**
- **Select multi Az availability zone cluster, select self managed ,set user name and password.**
- **Select VPC(my-project- vpc), select subnet group (db-sub) and give public access**
- **Select security group(project sgt) and click on create database.**





Settings

DB cluster identifier Info

Enter a name for your DB cluster. The name must be unique across all DB clusters owned by your AWS account in the current AWS Region.

Mydb-1

The DB cluster identifier is case-insensitive, but is stored as all lowercase (as in "mydbcluster"). Constraints: 1 to 63 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 cluster.

admin

1 to 16 alphanumeric characters. The first character must be a letter.

Credentials management

You can use AWS Secrets Manager or manage your master user credentials.

- ○ Managed in AWS Secrets Manager - *most secure*
  RDS generates a password for you and manages it throughout its lifecycle using AWS Secrets Manager.
- ◉ Self managed
  Create your own password or have RDS create a password that you manage.

☐ Auto generate password

Amazon RDS can generate a password for you, or you can specify your own password.

Master password | Info

••••••••••

Password strength Strong

Minimum constraints: At least 8 printable ASCII characters. Can't contain any of the following symbols: / ' " @

Confirm master password | Info

••••••••••

Connectivity Info

Compute resource

Choose whether to set up a connection to a compute resource for this database. Setting up a connection will automatically change connectivity settings so that the compute resource can connect to this database.

- ◉ Don't connect to an EC2 compute resource
  Don't set up a connection to a compute resource for this database. You can manually set up a connection to a compute resource later.
- ○ Connect to an EC2 compute resource
  Set up a connection to an EC2 compute resource for this database.

Virtual private cloud (VPC) Info

Choose the VPC. The VPC defines the virtual networking environment for this DB cluster.

my-project-vpc-vpc (vpc-0497c72466548f4fb)
6 Subnets, 3 Availability Zones

Only VPCs with a corresponding DB subnet group are listed.

ⓘ After a database is created, you can't change its VPC.

DB subnet group Info

Choose the DB subnet group. The DB subnet group defines which subnets and IP ranges the DB cluster can use in the VPC that you selected.

mydb-sub
6 Subnets, 3 Availability Zones

Public access Info

- ◉ Yes
  RDS assigns a public IP address to the cluster. Amazon EC2 instances and other resources outside of the VPC can connect to your cluster. Resources inside the VPC can also connect to the cluster. Choose one or more VPC security groups that specify which resources can connect to the cluster.
- ○ No
  RDS doesn't assign a public IP address to the cluster. Only Amazon EC2 instances and other resources inside the VPC can connect to your cluster. Choose one or more VPC security groups that specify

Connectivity Info

Compute resource

Choose whether to set up a connection to a compute resource for this database. Setting up a connection will automatically change connectivity settings so that the compute resource can connect to this database.

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Choose the VPC. The VPC defines the virtual networking environment for this DB cluster.

my-project-vpc-vpc (vpc-0497c72466548f4fb)
6 Subnets, 3 Availability Zones

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- ( ) No
  RDS doesn't assign a public IP address to the cluster. Only Amazon EC2 instances and other resources inside the VPC can connect to your cluster. Choose one or more VPC security groups that specify

VPC security group (firewall) Info

Choose one or more VPC security groups to allow access to your database. Make sure that the security group rules allow the appropriate incoming traffic.

- (•) Choose existing
  Choose existing VPC security groups
- ( ) Create new
  Create new VPC security group

Existing VPC security groups

Choose one or more options

project-sgt ✕

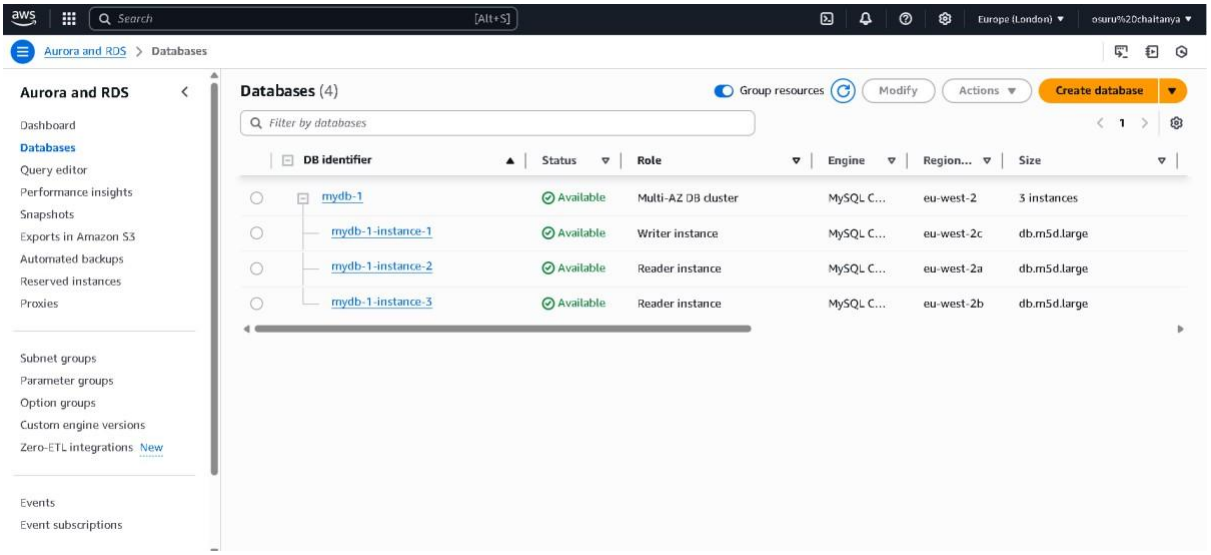
Certificate authority - *optional* Info

Using a server certificate provides an extra layer of security by validating that the connection is being made to an Amazon database. It does so by checking the server certificate that installed on all databases that you provision.

rds-ca-rsa2048-g1 (default)
Expiry: May 22, 2061

If you don't select a certificate authority, RDS chooses one for you.

▶ **Additional configuration**

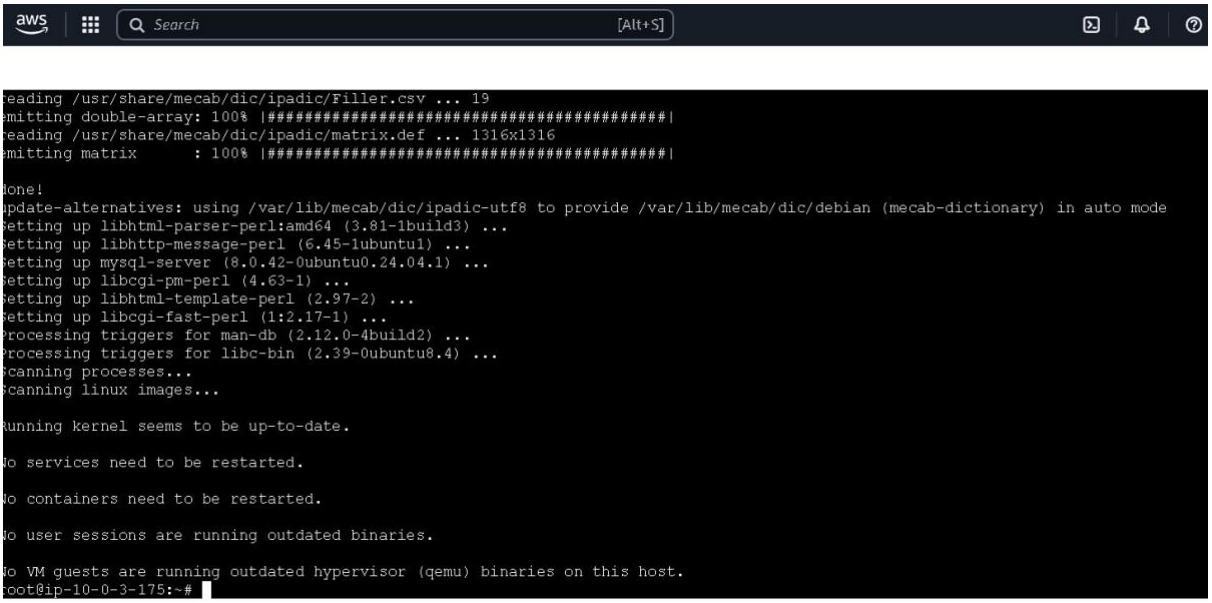


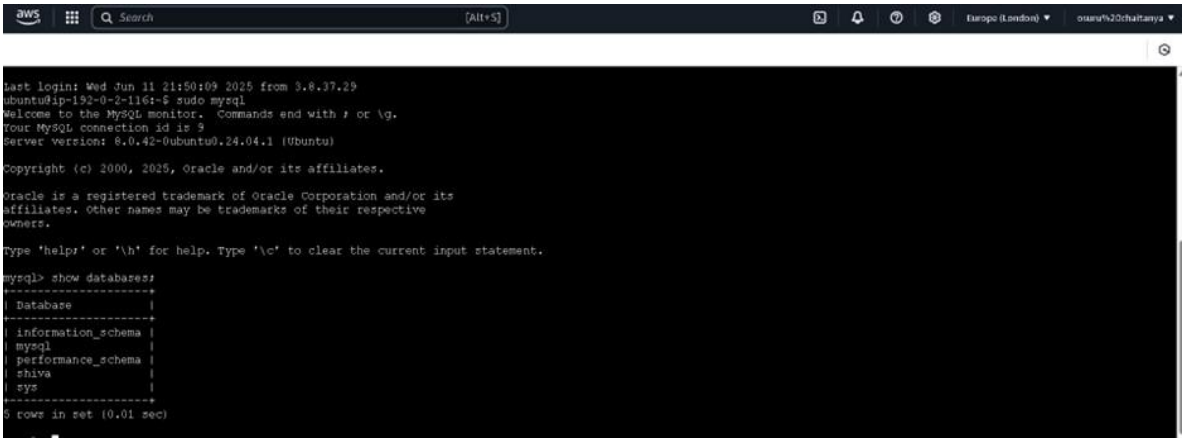
step 10 : Establish connection:-

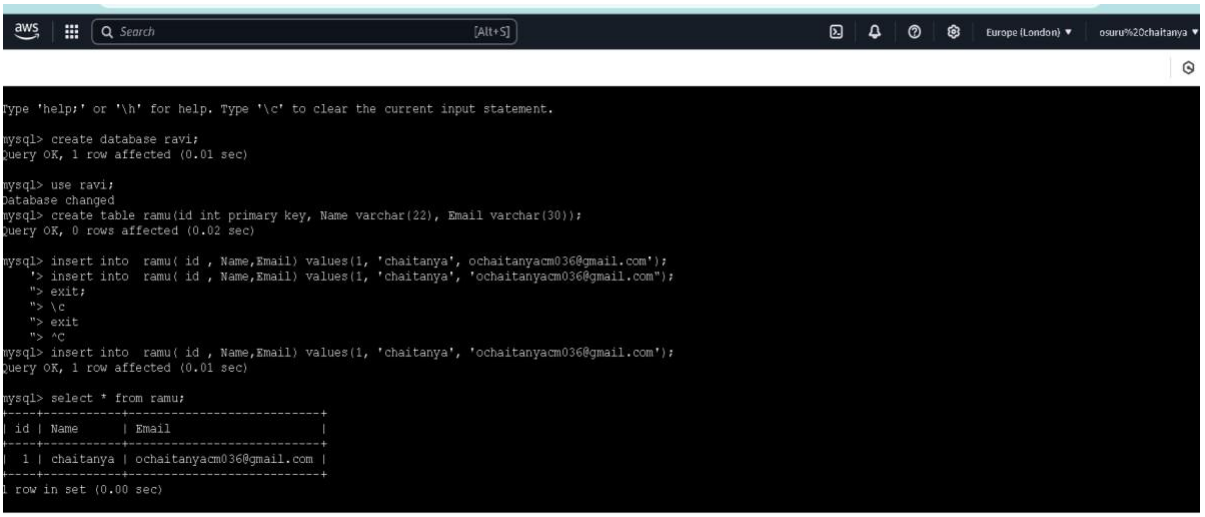
Goto ec2 service , click on public ec2-1 instance and connect to the server.

Type commands:

- Sudo -i
- apt update -y
- Sudo apt install mysql - server .






aws
Search
[Alt+S]
Europe (London)
osuru%20chaitanya
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.
mysql> create database ravi;
Query OK, 1 row affected (0.01 sec)
mysql> use ravi;
Database changed
mysql> create table ramu(id int primary key, Name varchar(22), Email varchar(30));
Query OK, 0 rows affected (0.02 sec)
mysql> insert into ramu(id , Name,Email) values(1, 'chaitanya', ochaitanyacm036@gmail.com');
'> insert into ramu(id , Name,Email) values(1, 'chaitanya', 'ochaitanyacm036@gmail.com");
"> exit;
"> \c
"> exit
"> ^C
mysql> insert into ramu(id , Name,Email) values(1, 'chaitanya', 'ochaitanyacm036@gmail.com');
Query OK, 1 row affected (0.01 sec)
mysql> select * from ramu;
+----+-----------+--------------------------+
| id | Name | Email |
+----+-----------+--------------------------+
| 1 | chaitanya | ochaitanyacm036@gmail.com |
+----+-----------+--------------------------+
1 row in set (0.00 sec)