Project -1

3-TIRE ARCHITECTURE

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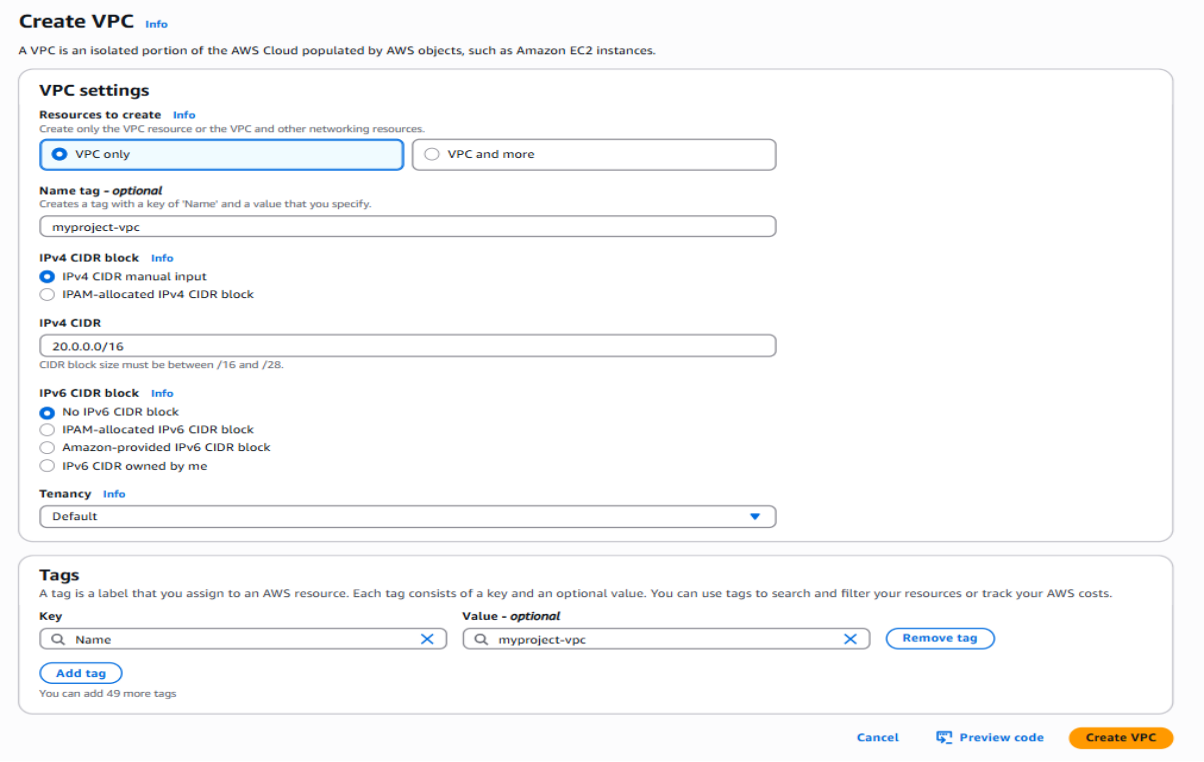
The above architecture is the “Architecting 3 Tier Architecture on AWS”.

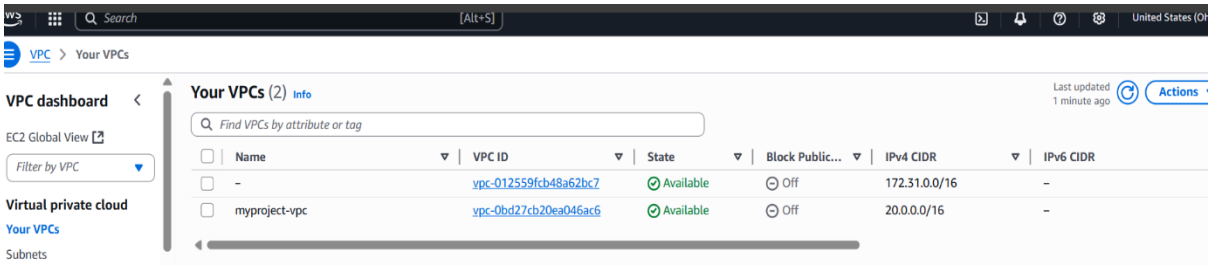
Creating the above architecture we have to follow the following steps:

1. Create VPC, Subnets – 6, Internet gate way – 1, Route tables – 2, Nat gate way – 1.
2. Launch an EC2 instance.
3. Create Load Balancer
4. Create an AMI (image).
5. Create Autoscaling group, Create launch template.
6. Create Subnet group.
7. Create Database (RDS).
8. Establish connection.

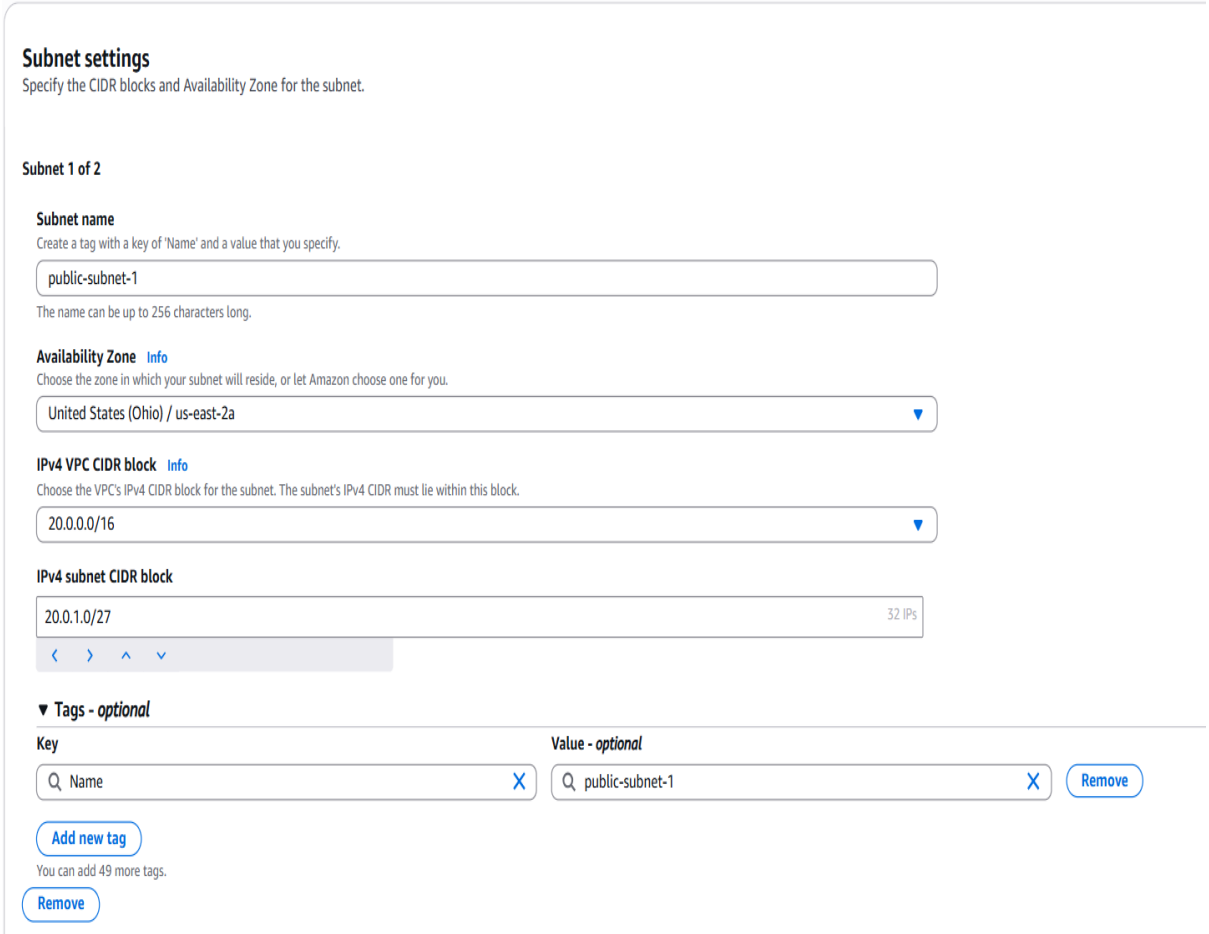
Step: 1

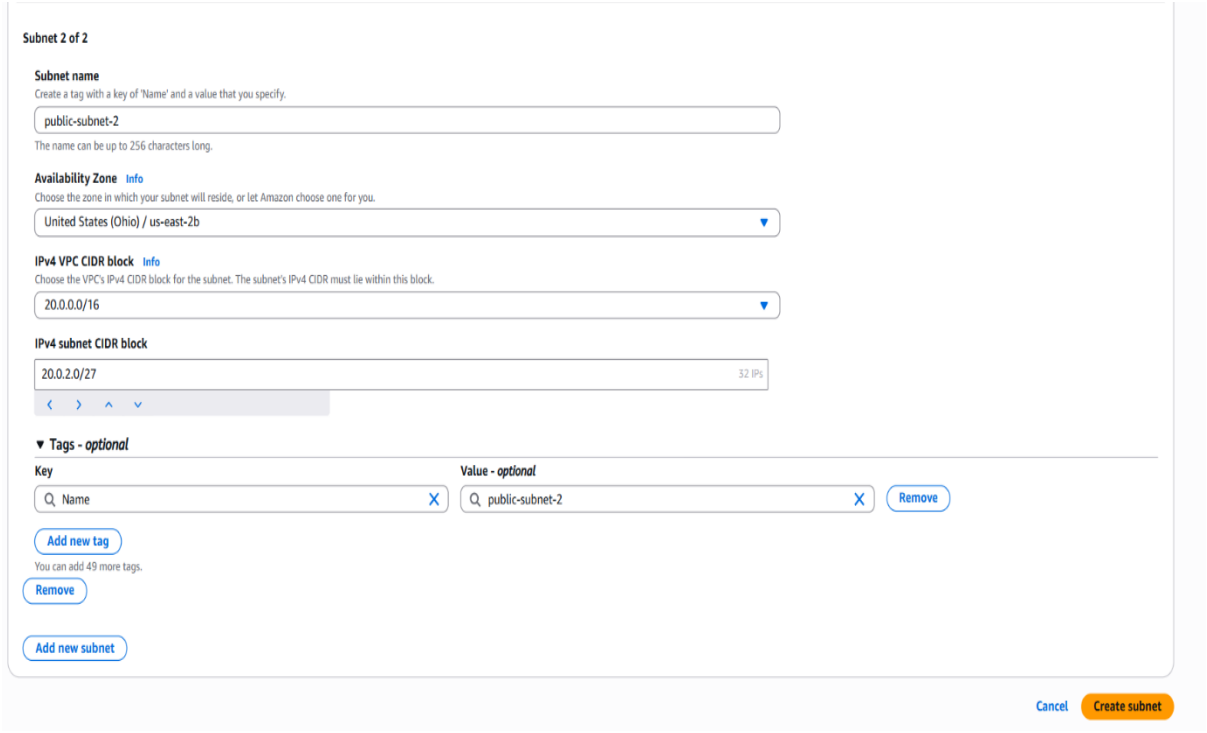
Create VPC and its components :





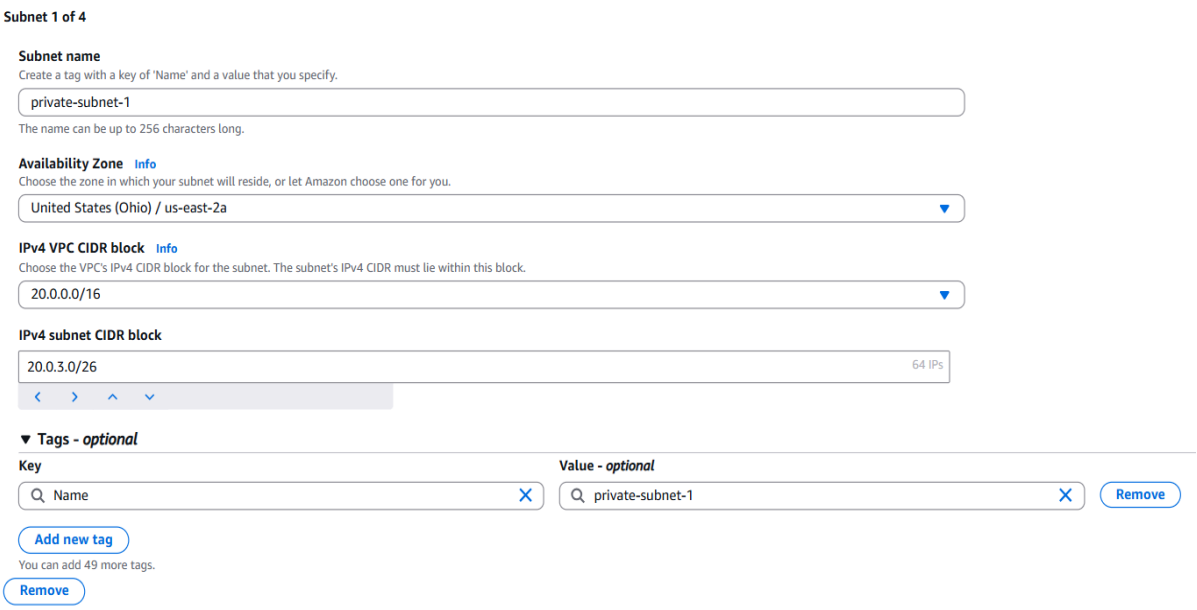
- Create 6 subnets (2-public, 4-private).
- Create first subnet.
- Click on subnet, click on create subnet, select our VPC (my-project-vpc).
- Give name tag as availability zones
- Go to VPC dashboard click on create VPC.
- Click on VPC only and name tag as my-vpc-project1
- Give IPV4 CIDR (classless inter domain routing) as 120.0.0.0/16
- Click on VPC, it is created





Subnet settings

Specify the CIDR blocks and Availability Zone for the subnet.



Subnet 2 of 4

Subnet name
Create a tag with a key of 'Name' and a value that you specify.
private-subnet-2
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.
United States (Ohio) / us-east-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.
20.0.0.0/16

IPv4 subnet CIDR block
20.0.4.0/25 128 IPs

▼ **Tags - *optional***

Key	Value - *optional*	
Name	private-subnet-2	Remove

Add new tag
You can add 49 more tags.
Remove

Subnet 3 of 4

Subnet name
Create a tag with a key of 'Name' and a value that you specify.
private-subnet-3
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.
United States (Ohio) / us-east-2a

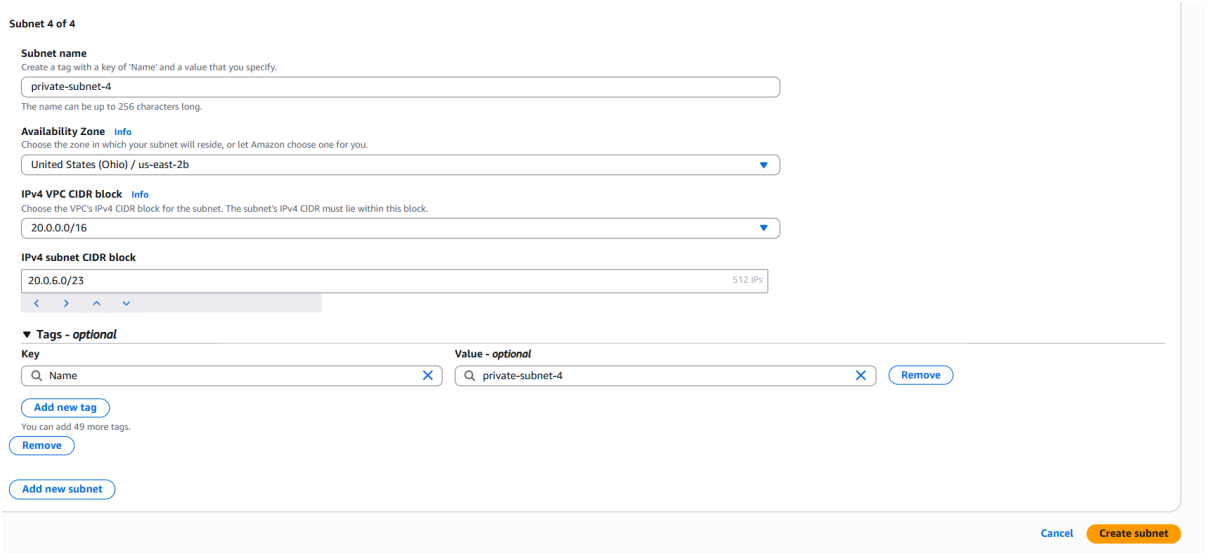
IPv4 VPC CIDR block Info
Choose the VPC's IPv4 CIDR block for the subnet. The subnet's IPv4 CIDR must lie within this block.
20.0.0.0/16

IPv4 subnet CIDR block
20.0.5.0/24 256 IPs

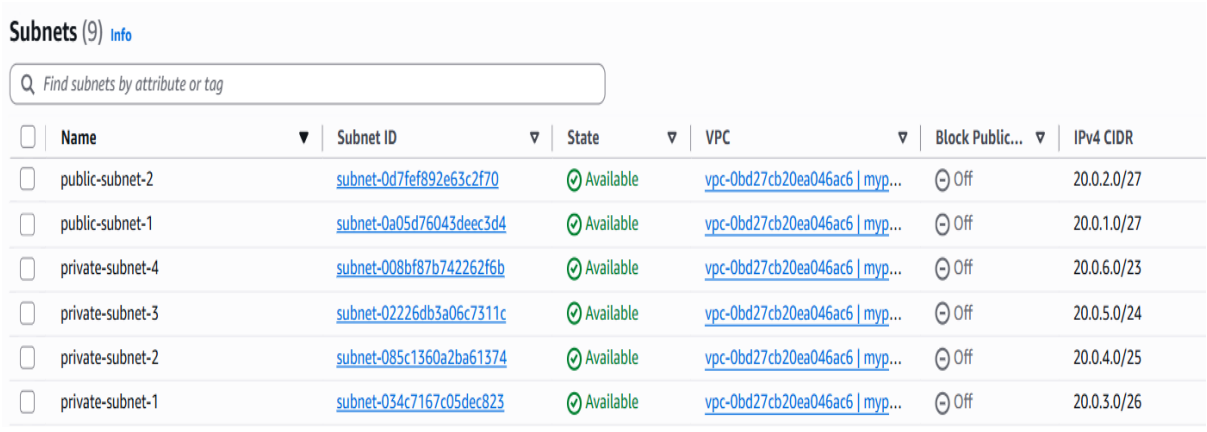
▼ **Tags - *optional***

Key	Value - *optional*
Name	private-subnet-3

Add new tag
You can add 49 more tags.
Remove

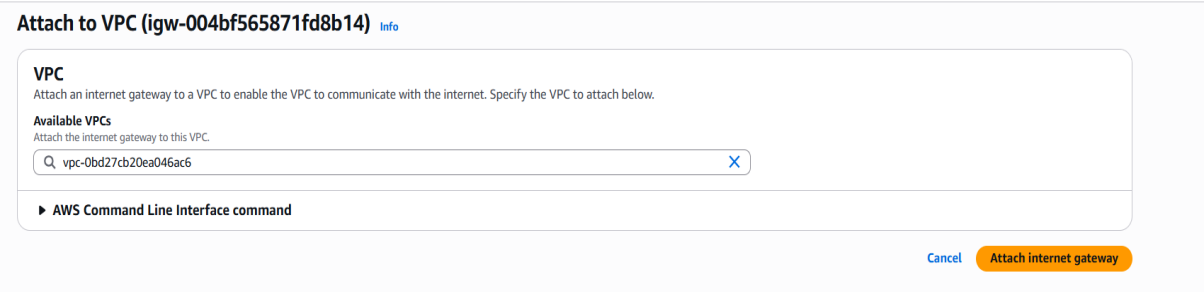


These are the subnets we created.

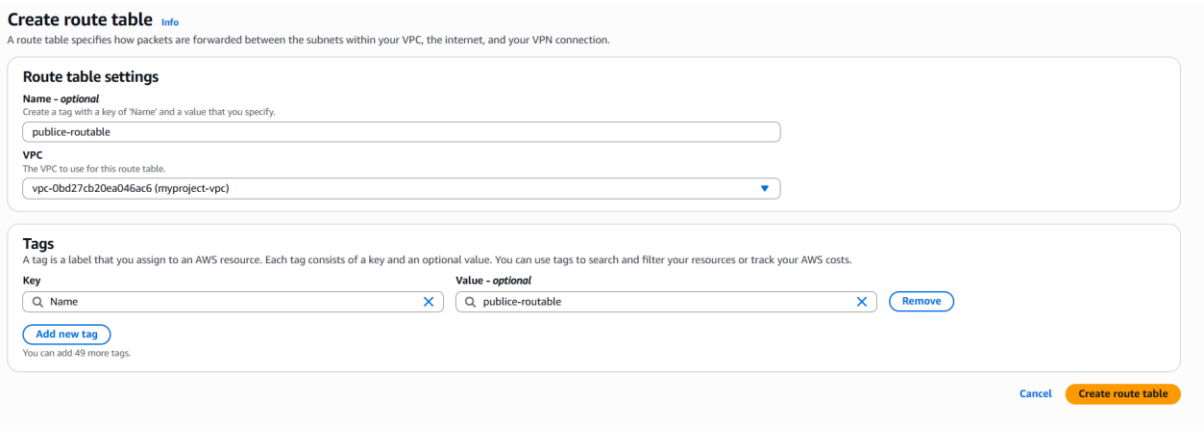


- Create internet gateway name Project-IGW

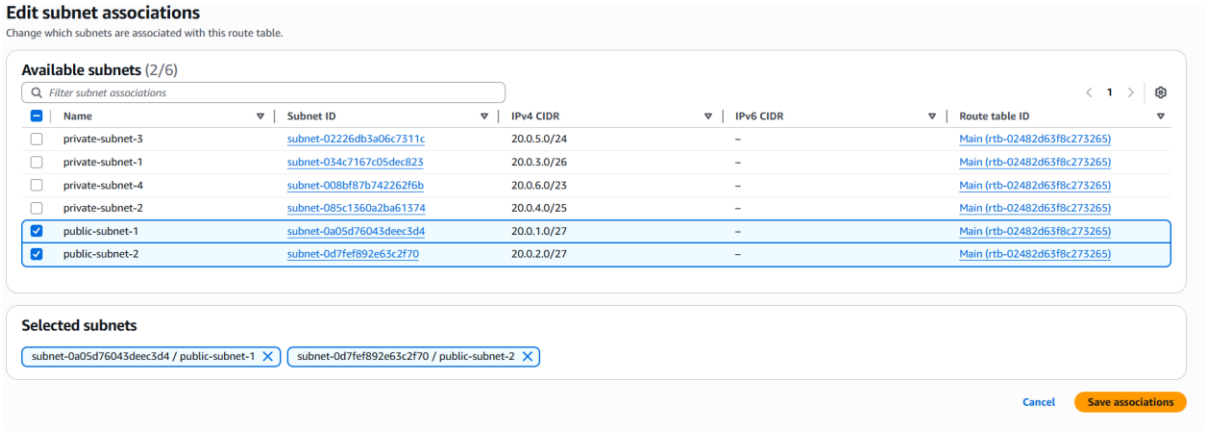
- This igw is attached to VPC.
- Go to actions in internet gate way and click on attach to VPC.
- Select our VPC (my-vpc-project1). Click on attach internet gateway

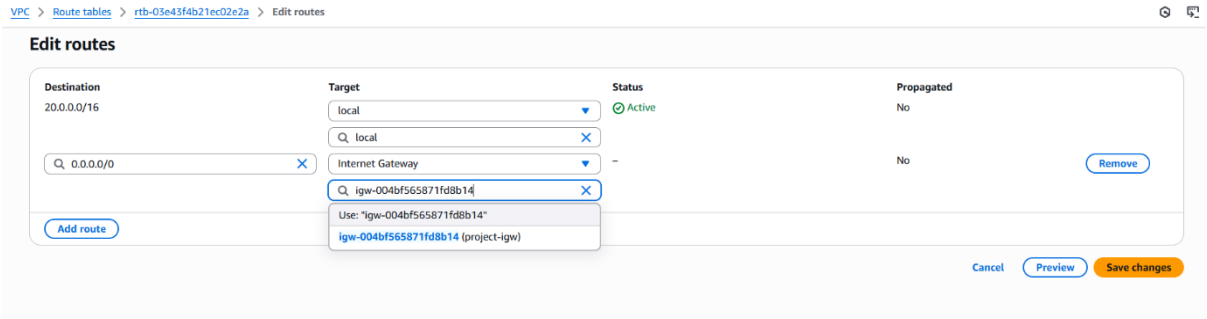


- Create route table, give name as Public-Route-Table
- Select our VPC (my-vpc-project), create it.
-

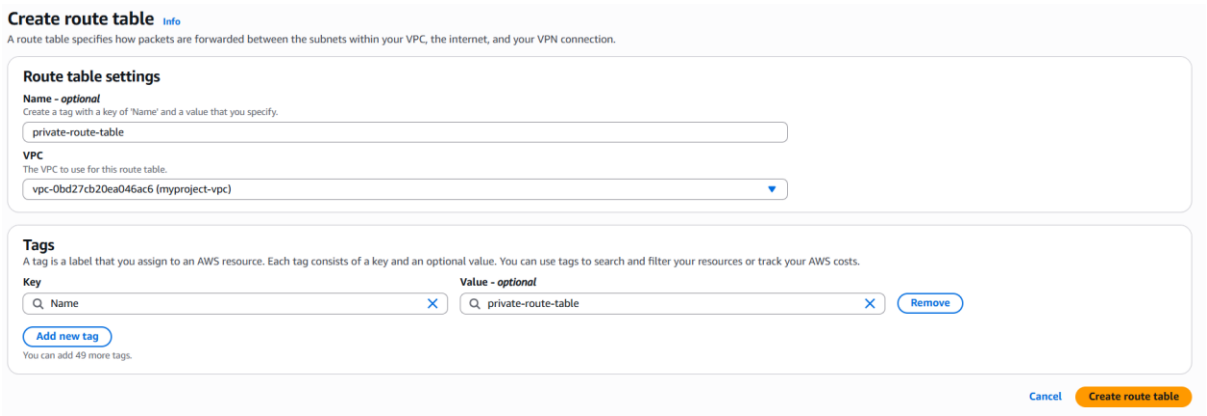


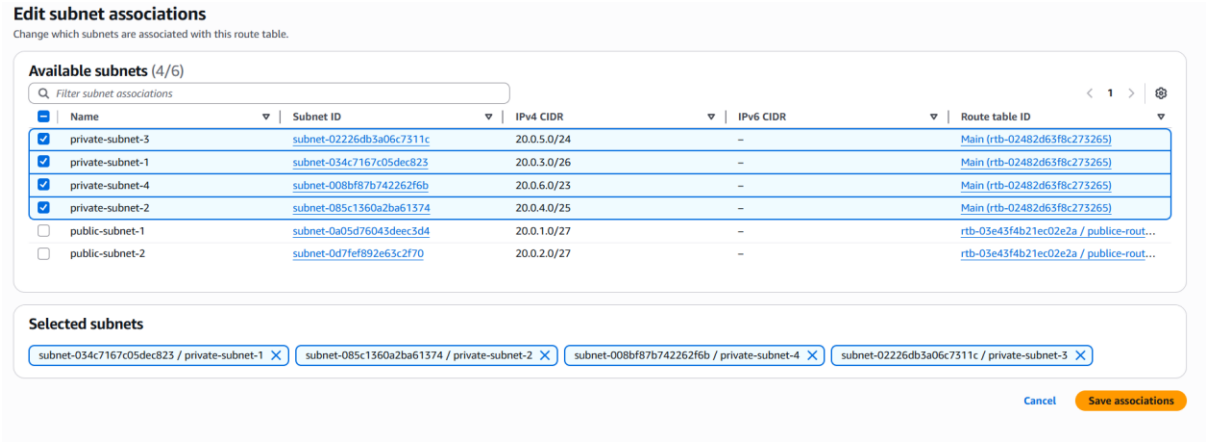
- Click on route table id, open it.
- Go down click on edit subnet association.
- Select both public subnet and click on save association
- Go actions and click on edit routes .
- Click on add routes give all traffic (0.0.0.0/0) and select our internet gateway, save changes .



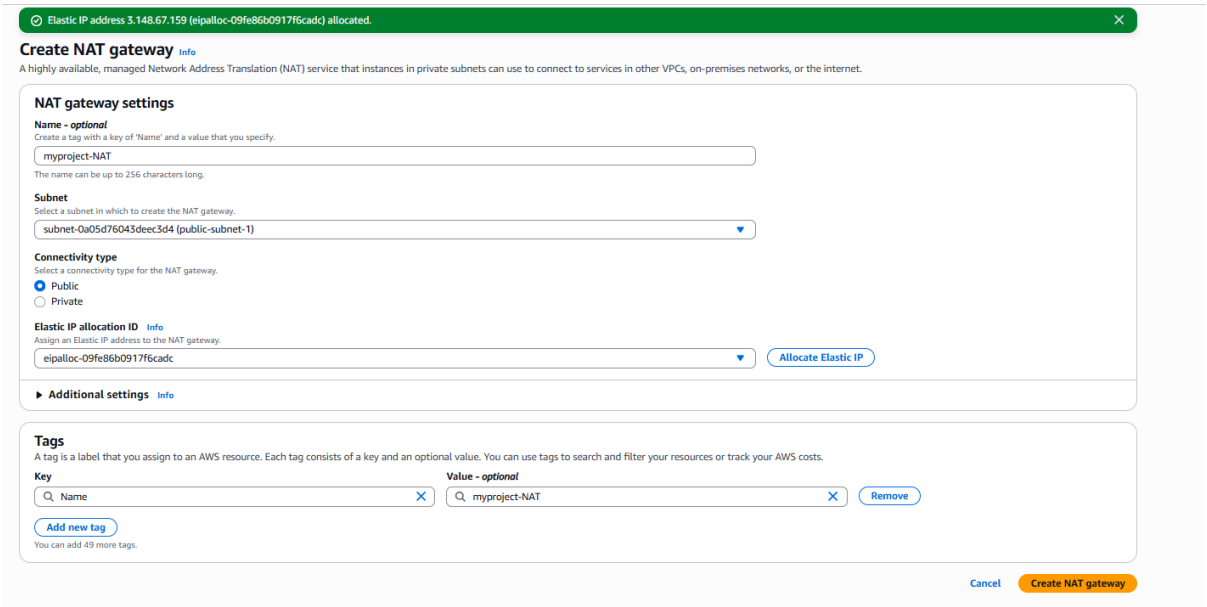


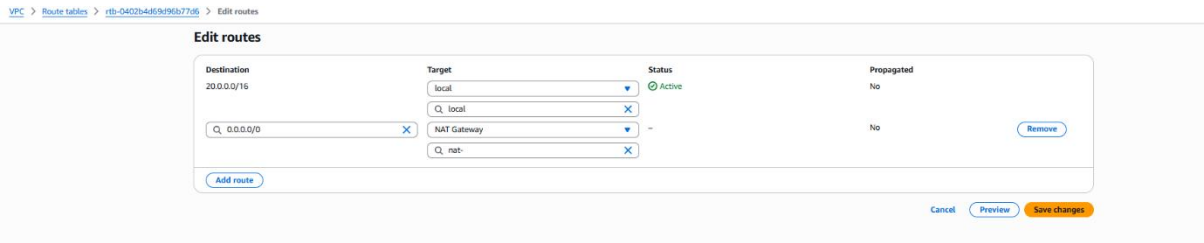
- Create private route table name as Private-Route-Table
- Select our VPC, (my-vpc-project1), create it.
- Click on route table id, open it.
- Go down click on edit subnet association.
- Select all private subnet and click on save association





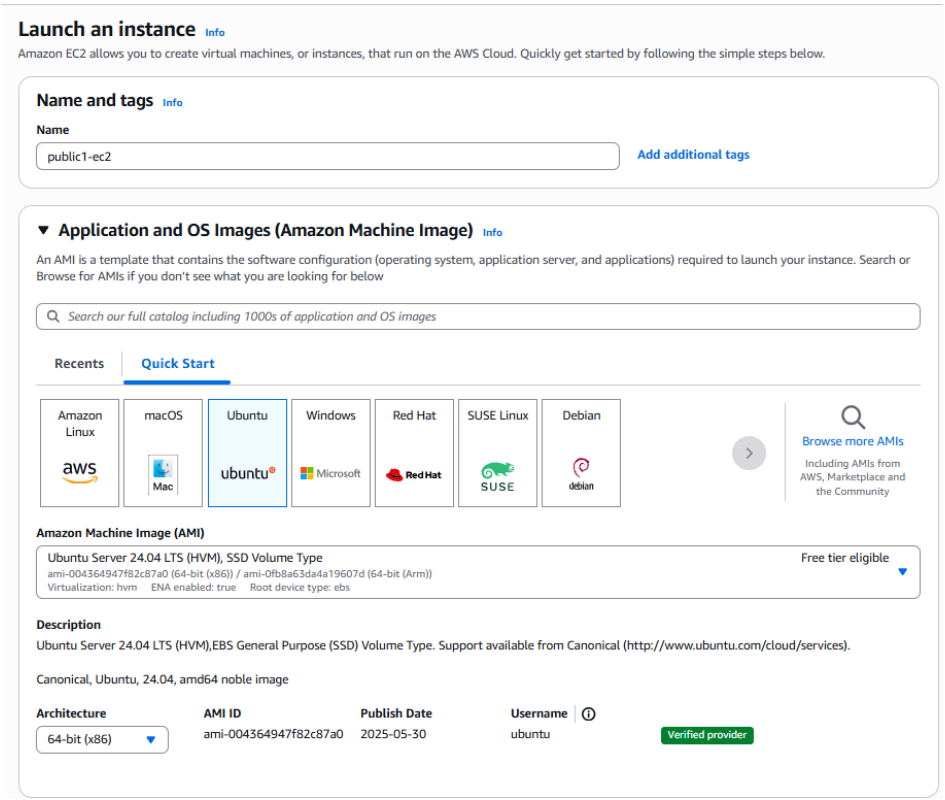
- Create NAT gateway, give name as Project-NAT
- Select public subnet(my-sub-public1).
- Select connectivity type as IPV4.
- Click on allocate Elastic IP. Now go to private route and click on actions.
- Click on edit routes and add route.
- Give all traffic (0.0.0.0/0) and select NAT gateway





Step2: Launch an EC2 instance.

- Go to EC2 dashboard click on launch instance.
- Name as and select ami as ubuntu
- Instance type as t2.micro and key pair as project.
- Click on edit network settings, select our VPC and public subnet.
- Auto assign IP enable and create a security group as project-sg.
- Launch the instance.



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*

sivaproject

Create new key pair

Network settings Info

VPC - *required* | Info

vpc-0bd27cb20ea046ac6 (myproject-vpc)
20.0.0.0/16

Subnet | Info

subnet-0a05d76043deec3d4 public-subnet-1
VPC: vpc-0bd27cb20ea046ac6 Owner: 013399894273 Availability Zone: us-east-2a
Zone type: Availability Zone IP addresses available: 26 CIDR: 20.0.1.0/27)

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

Security group name - *required*

myproject-sg

This security group will be added to all network interfaces. The name can't be edited after the security group is created. Max length is 255 characters. Valid characters: a-z, A-Z, 0-9, spaces, and ._-:/()#,@[]+=&;{}!$*

Description - *required* | Info

myproject-sg

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

Add additional tags

Application and OS Images (Amazon Machine Image) Info

Instance type Info | Get advice

Instance type

t2.micro Free tier eligible
Family: t2 1 vCPU 1 GiB Memory Current generation: true
On-Demand Ubuntu Pro base pricing: 0.0134 USD per Hour On-Demand Linux base pricing: 0.0116 USD per Hour
On-Demand SUSE base pricing: 0.0116 USD per Hour On-Demand Windows base pricing: 0.0162 USD per Hour
On-Demand RHEL base pricing: 0.026 USD per Hour

All generations

Compare instance types

Additional costs apply for AMIs with pre-installed software

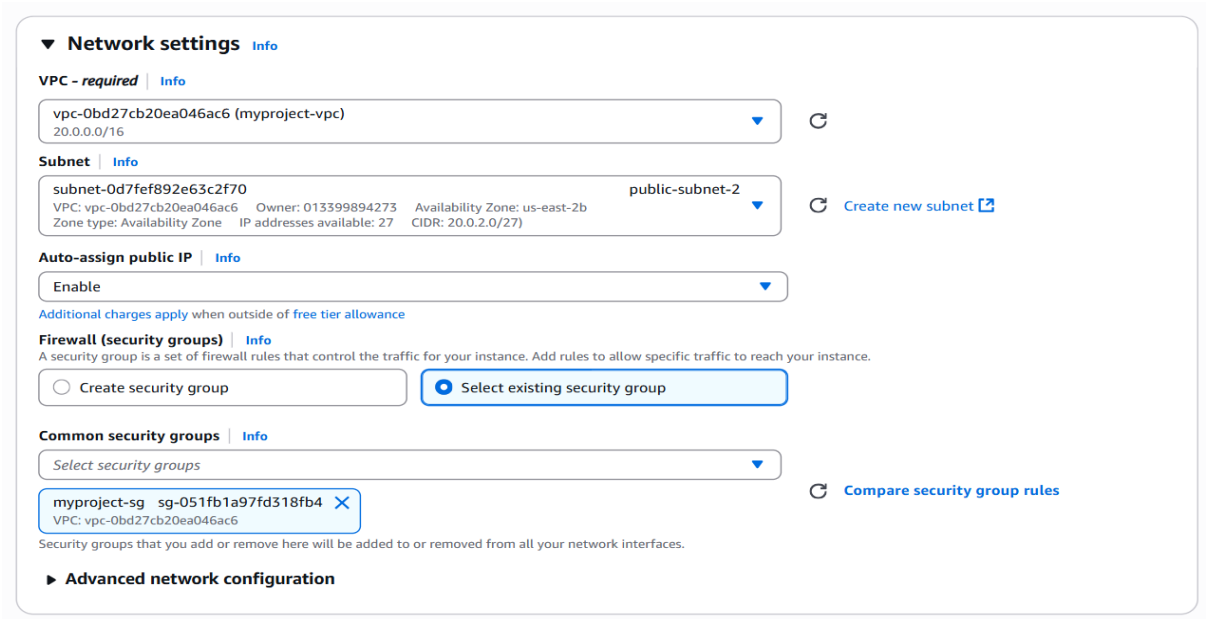
Key pair (login) Info

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.

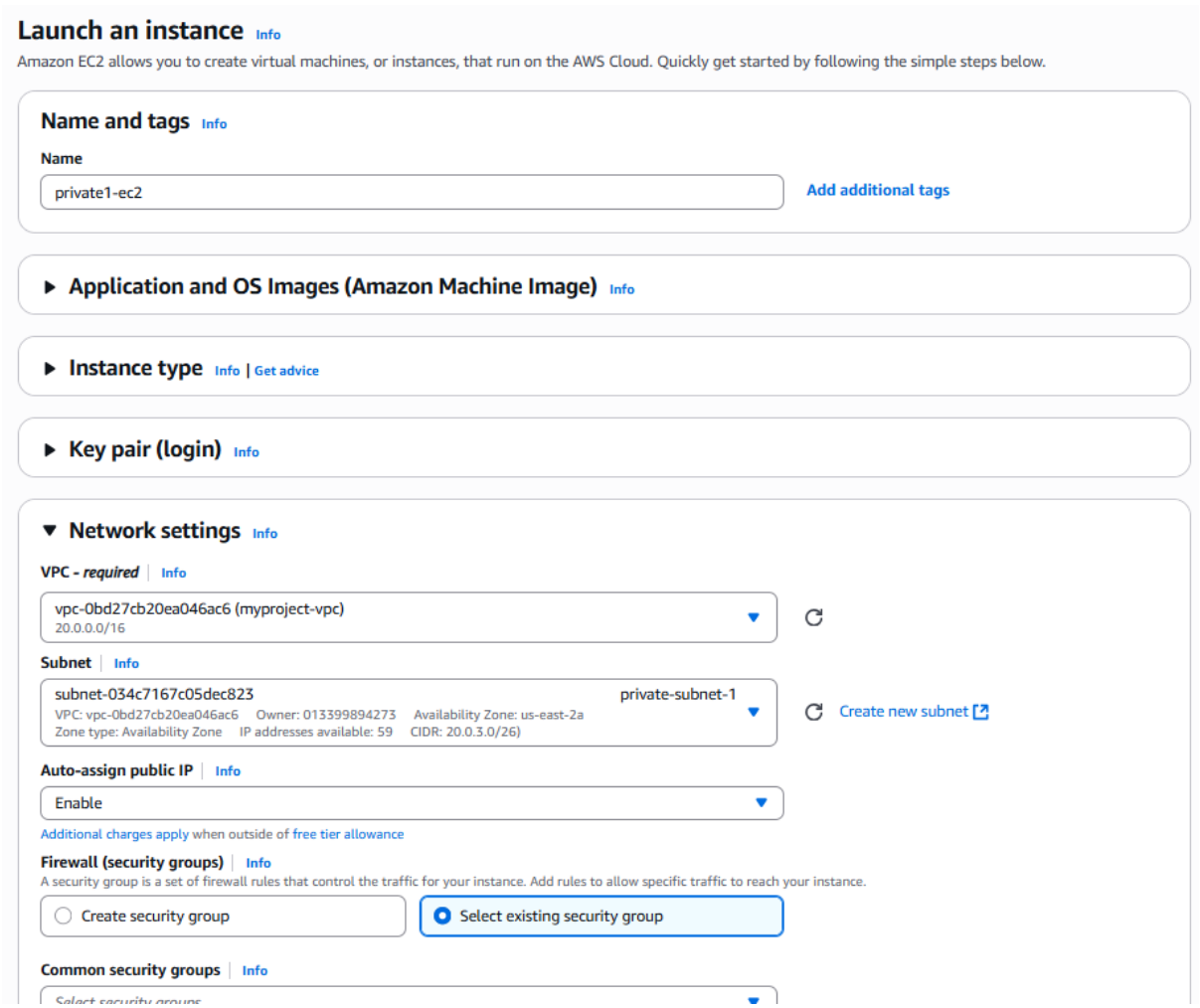
Key pair name - *required*

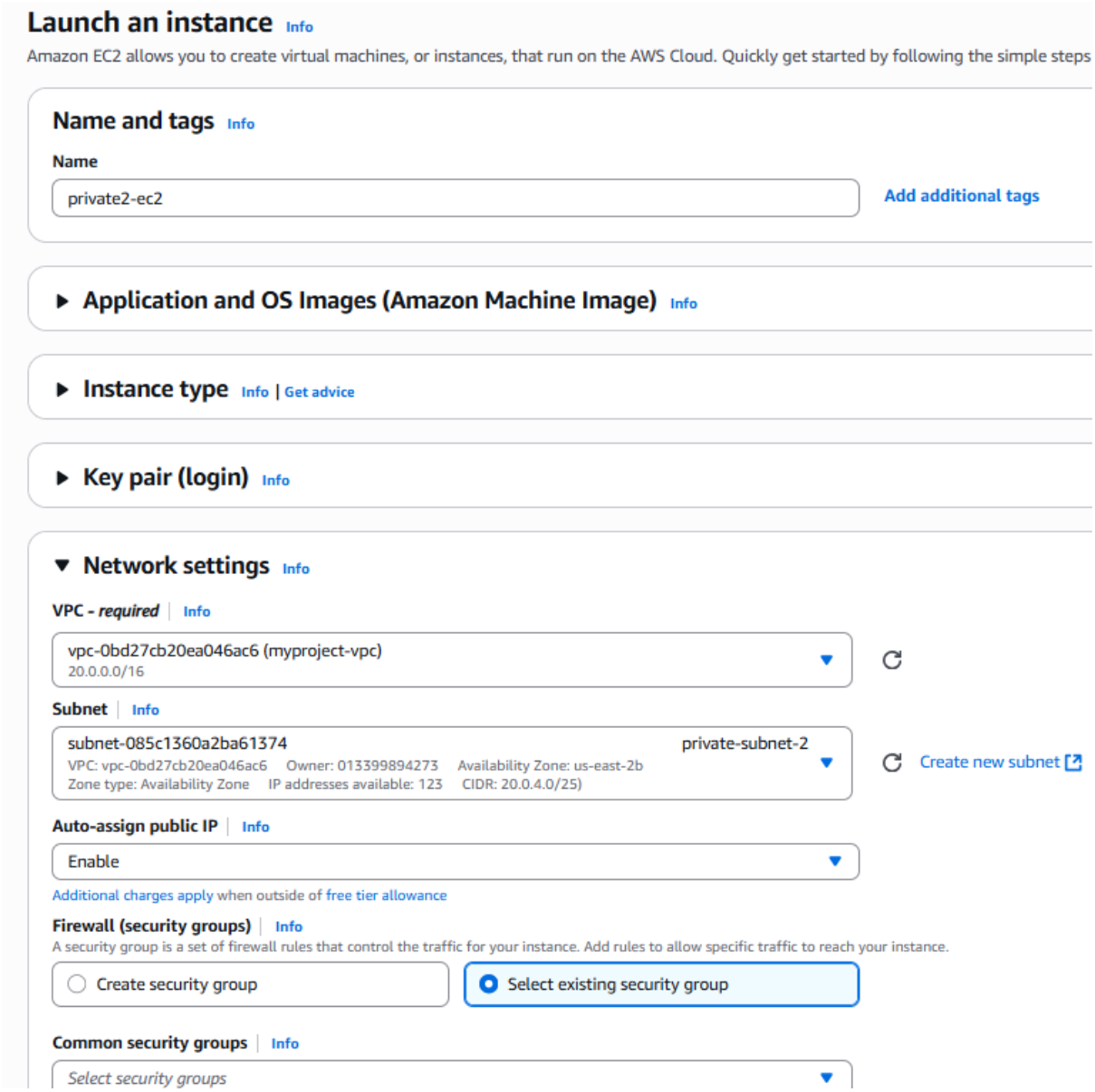
sivaproject

Create new key pair



Launching private instances:





Step 3:

- Now we create 2 LoadBalancer
- One is public instances and another one is private instances
- Then create target groups and attached the instance and check the
- Instance ssh -i copied and paste on the server
- Then next apt update -y apt install -y cd /var/www/html
- Systemctl restart apache2
- We take another instance like same procedure

Create target group

Step 1
Specify group details

Step 2
Register targets

Register targets

This is an optional step to create a target group. However, to ensure that your load balancer routes traffic to this target group you must register your targets.

Available instances (2/4)

Filter instances

Instance ID	Name	State	Security groups	Zone	Private IPv4 address
i-01eb1febe9446a9a8	private2-ec2	Running	myproject-sg	us-east-2b	20.0.4.27
i-02fa3c2b8837387ea	private1-ec2	Running	myproject-sg	us-east-2a	20.0.3.36
i-020c717b89ff439f1	public2-ec2	Running	myproject-sg	us-east-2b	20.0.2.25
i-0cc75c2d5373ec4b2	public1-ec2	Running	myproject-sg	us-east-2a	20.0.1.19

Step 1
Specify group details

Step 2
Register targets

Register targets

This is an optional step to create a target group. However, to ensure that your load balancer routes traffic to this target group you must register your targets.

Available instances (2/4)

Filter instances

Instance ID	Name	State	Security groups	Zone	Private IPv4 address	Subnet ID	Launch time
i-01eb1febe9446a9a8	private2-ec2	Running	myproject-sg	us-east-2b	20.0.4.27	subnet-085c1360a2ba61374	June 11, 2025, 1
i-02fa3c2b8837387ea	private1-ec2	Running	myproject-sg	us-east-2a	20.0.3.36	subnet-034c7167c05dec823	June 11, 2025, 1
i-020c717b89ff439f1	public2-ec2	Running	myproject-sg	us-east-2b	20.0.2.25	subnet-0d7fef892e63c2f70	June 11, 2025, 1
i-0cc75c2d5373ec4b2	public1-ec2	Running	myproject-sg	us-east-2a	20.0.1.19	subnet-0a05d76043deec3d4	June 11, 2025, 1

Target groups (2) Info

Filter target groups

Name	ARN	Port	Protocol	Target type	Load balancer	VPC ID
private-tg	arn:aws:elasticloadbalancin...	80	HTTP	Instance	None associated	vpc-0bd27cb20ea046ac6
public-tg	arn:aws:elasticloadbalancin...	80	HTTP	Instance	None associated	vpc-0bd27cb20ea046ac6

Load balancers (2)

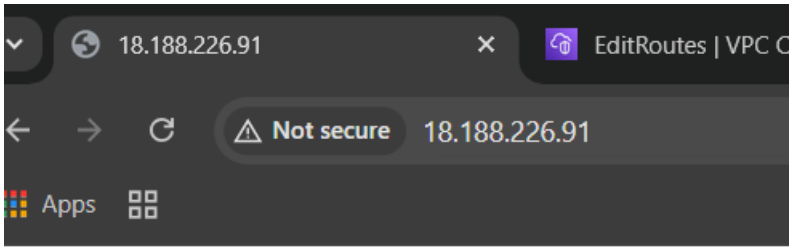
Elastic Load Balancing scales your load balancer capacity automatically in response to changes in incoming traffic.

Filter load balancers

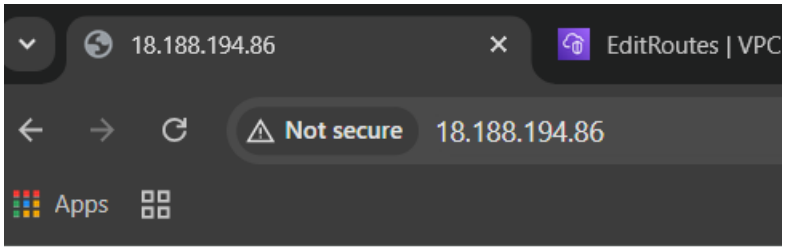
Name	DNS name	State	VPC ID	Availability Zones	Type	Date created
publice-lb	publice-lb-172130729.us-e...	Active	vpc-0bd27cb20ea046ac6	2 Availability Zones	application	June 11, 2025, 13:20 (UTC+05:30)
private-lb	private-lb-863760465.us-e...	Active	vpc-0bd27cb20ea046ac6	2 Availability Zones	application	June 11, 2025, 13:25 (UTC+05:30)

```
root@ip-20-0-1-19: /var/www/html
root@ip-20-0-1-19:~# cd /var/www/html
root@ip-20-0-1-19:/var/www/html# ls
index.html
root@ip-20-0-1-19:/var/www/html# rm index.html
root@ip-20-0-1-19:/var/www/html# vi index.html
root@ip-20-0-1-19:/var/www/html# systemctl restart apache2
root@ip-20-0-1-19:/var/www/html#
```

```
root@ip-20-0-2-25: /var/www/html
root@ip-20-0-2-25:~# cd /var/www/html
root@ip-20-0-2-25:/var/www/html# ls
index.html
root@ip-20-0-2-25:/var/www/html# rm index.html
root@ip-20-0-2-25:/var/www/html# vi index.html
root@ip-20-0-2-25:/var/www/html# systemctl restart apache2
root@ip-20-0-2-25:/var/www/html#
```



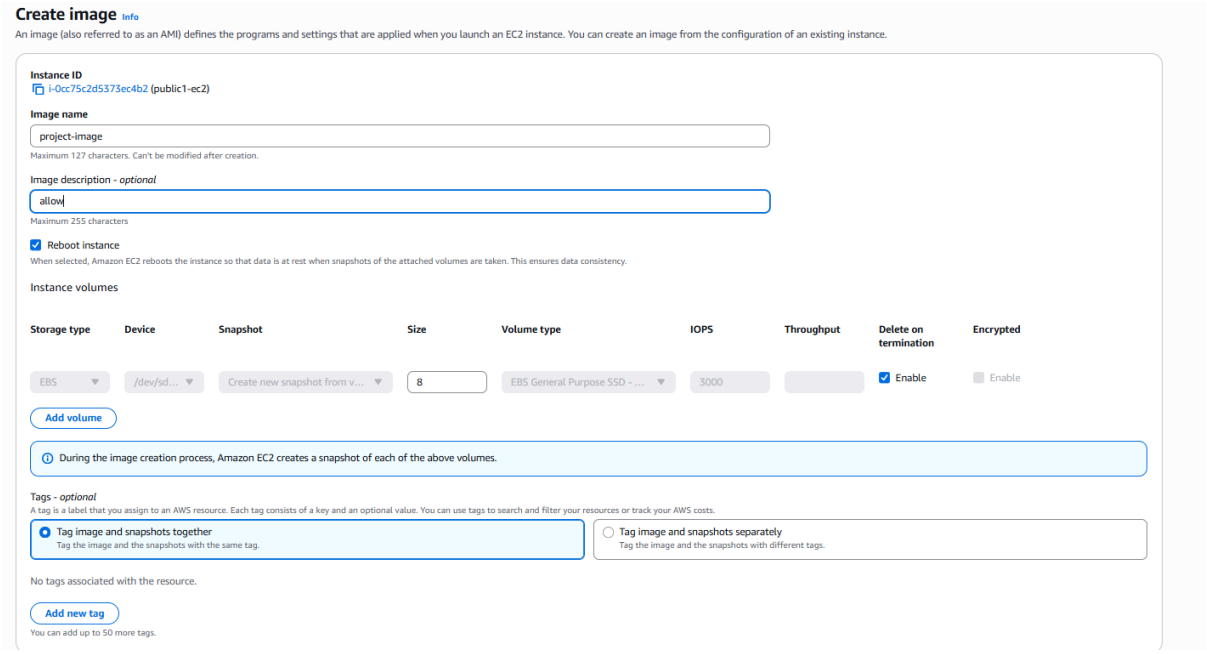
this is my project 1

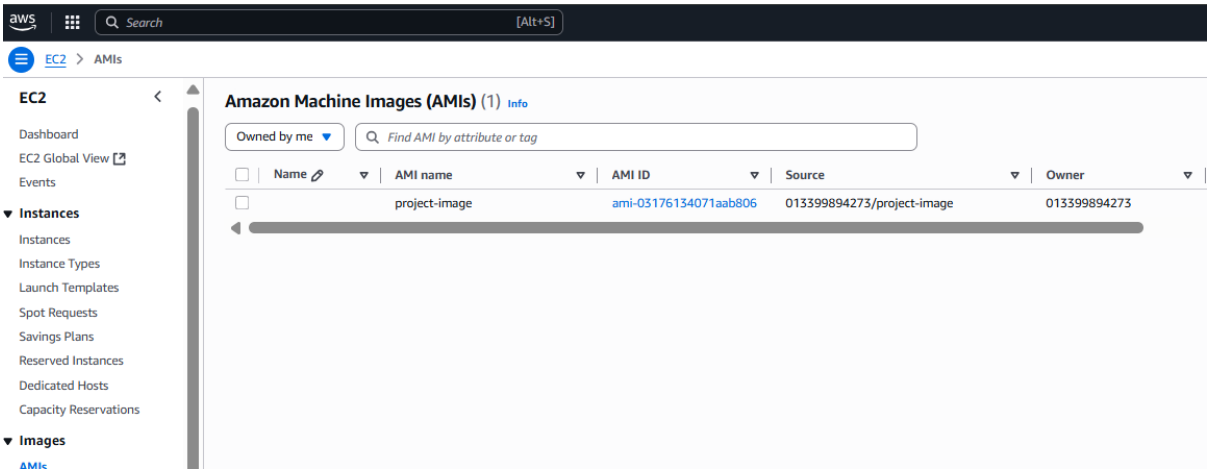


this my project 2

Step 4: Create an AMI (image)

- After running the instance, click on actions.
- Click on image and templates and click on create image.
- Give image name as my-image.
- Wait until the image is available.





Step 5: Create Autoscaling group.

- For creating autoscaling group we need to create an launch template.
- After available of image. Click on create a launch template.
- Template name as my-public-template, description as nothing.
- Select AMI's as share with me, select my-image.
- Instance type as t2.micro and key pair as project.
- Select existing security group (my-instance-SG) which is used to launch an EC2 instance
- Now click on create launch template.
- Open autoscaling group.
- Click on create autoscaling group.
- Give name as public-AS
- Choose the created launch template (my-public-tm) and click on next.
- Select our VPC (my-project-vpc), and both public subnets.
- Click on next and click on no load balancer
- Give desired capacity as 2 in sizing desired capacity min – 2 and max – 3
- and click on next.
- Click on add notification, give name as my-topic and give email.
- Click on next and click on create auto scaling group

Create launch template

Creating a launch template allows you to create a saved instance configuration that can be reused, shared and launched at a later time. Templates can have multiple versions.

Launch template name and description

Launch template name - *required*

myProject-template

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

Template version description

allow

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**

Launch template contents

Specify the details of your launch template below. Leaving a field blank will result in the field not being included in the launch template.

▶ **Application and OS Images (Amazon Machine Image) - required** Info

▼ **Instance type** Info | Get advice — Advanced

Instance type

Don't include in launch template — All generations

Compare instance types

▼ **Network settings** Info

Subnet | Info

Don't include in launch template — Create new subnet

When you specify a subnet, a network interface is automatically added to your template.

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.

◉ Select existing security group ○ Create security group

Security groups | Info

Select security groups — Compare security group rules

myproject-sg sg-051fb1a97fd318fb4 ✕

VPC: vpc-0bd27cb20ea046ac6

▶ **Advanced network configuration**

▼ **Storage (volumes)** Info

EBS Volumes — Hide details

▶ Volume 1 (AMI Root) : 8 GiB, EBS, General purpose SSD (gp3), 3000 IOPS

AMI Volumes are not included in the template unless modified

ⓘ Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage ✕

Add new volume

The selected AMI contains instance store volumes, however the instance does not allow any instance store volumes. None of the instance store volumes from the AMI will be accessible from the instance

▼ **Summary**

Software Image (AMI)
allow
ami-0317613407 1aab806

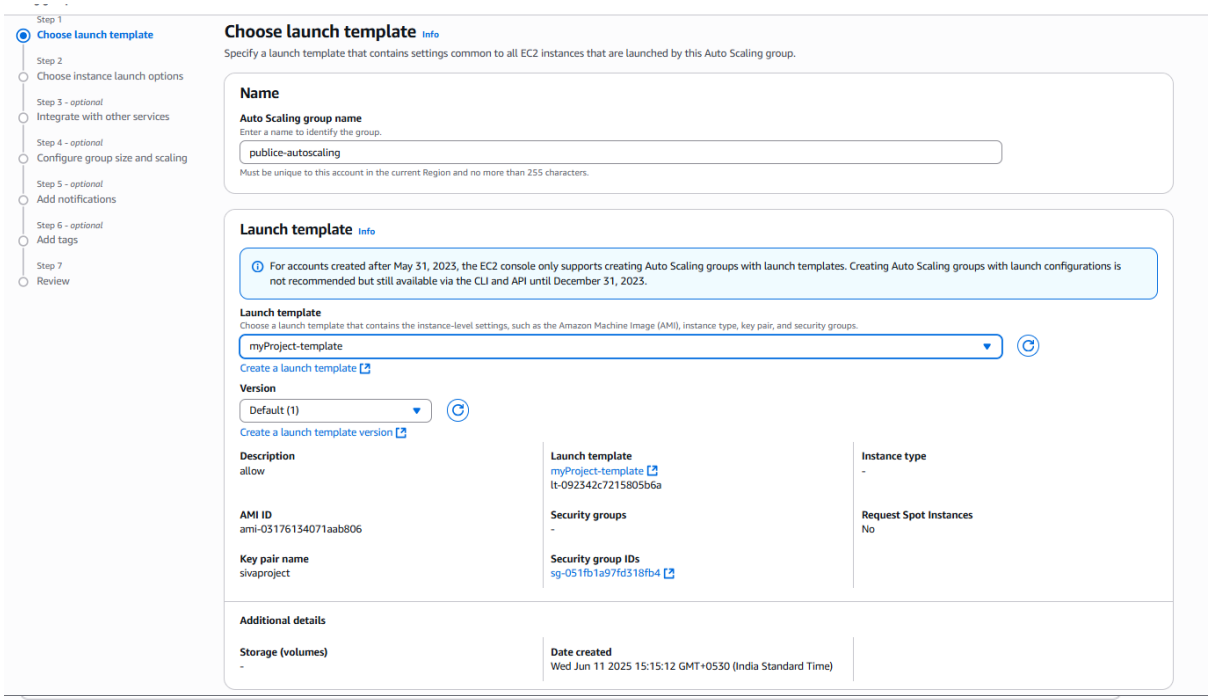
Virtual server type (instance type)
-

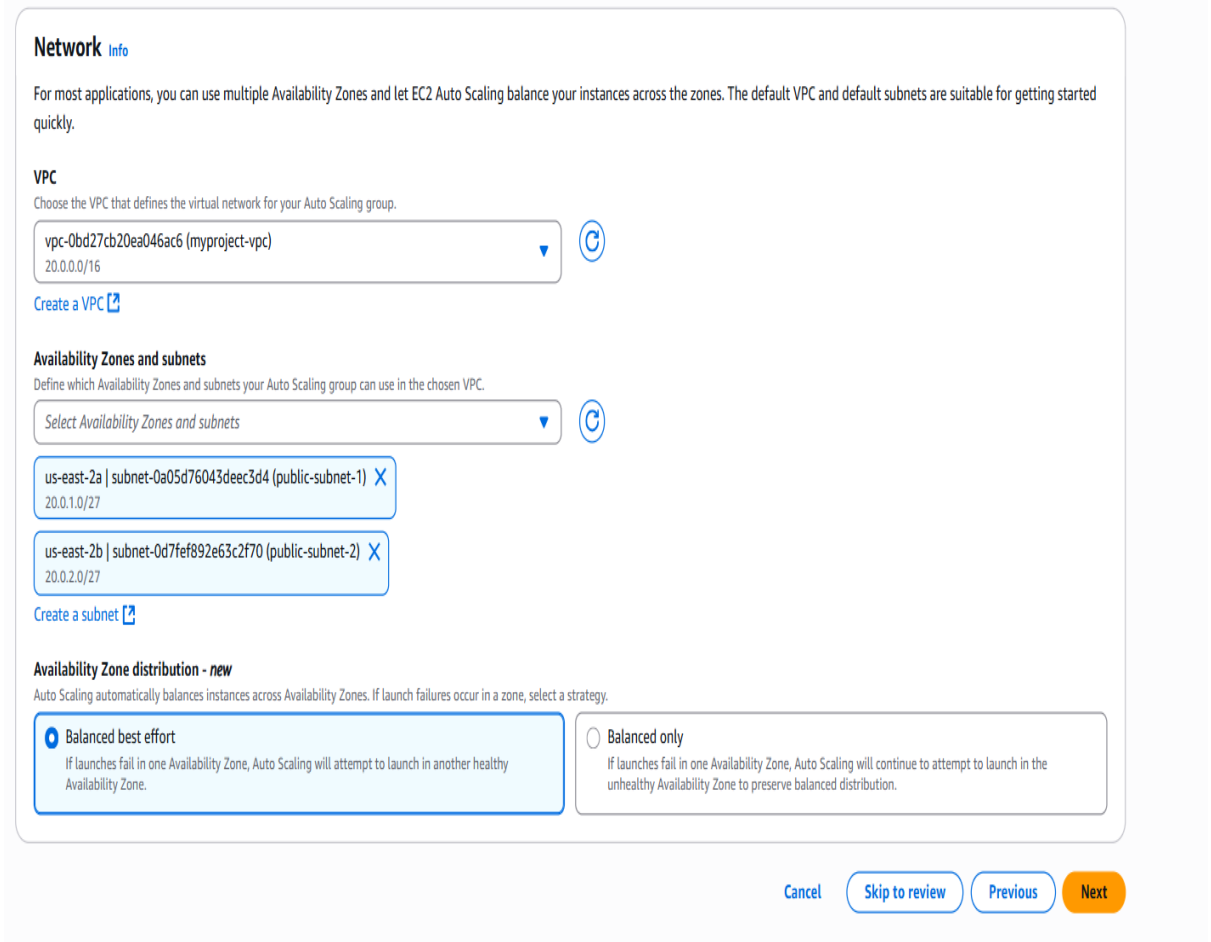
Firewall (security group)
myproject-sg

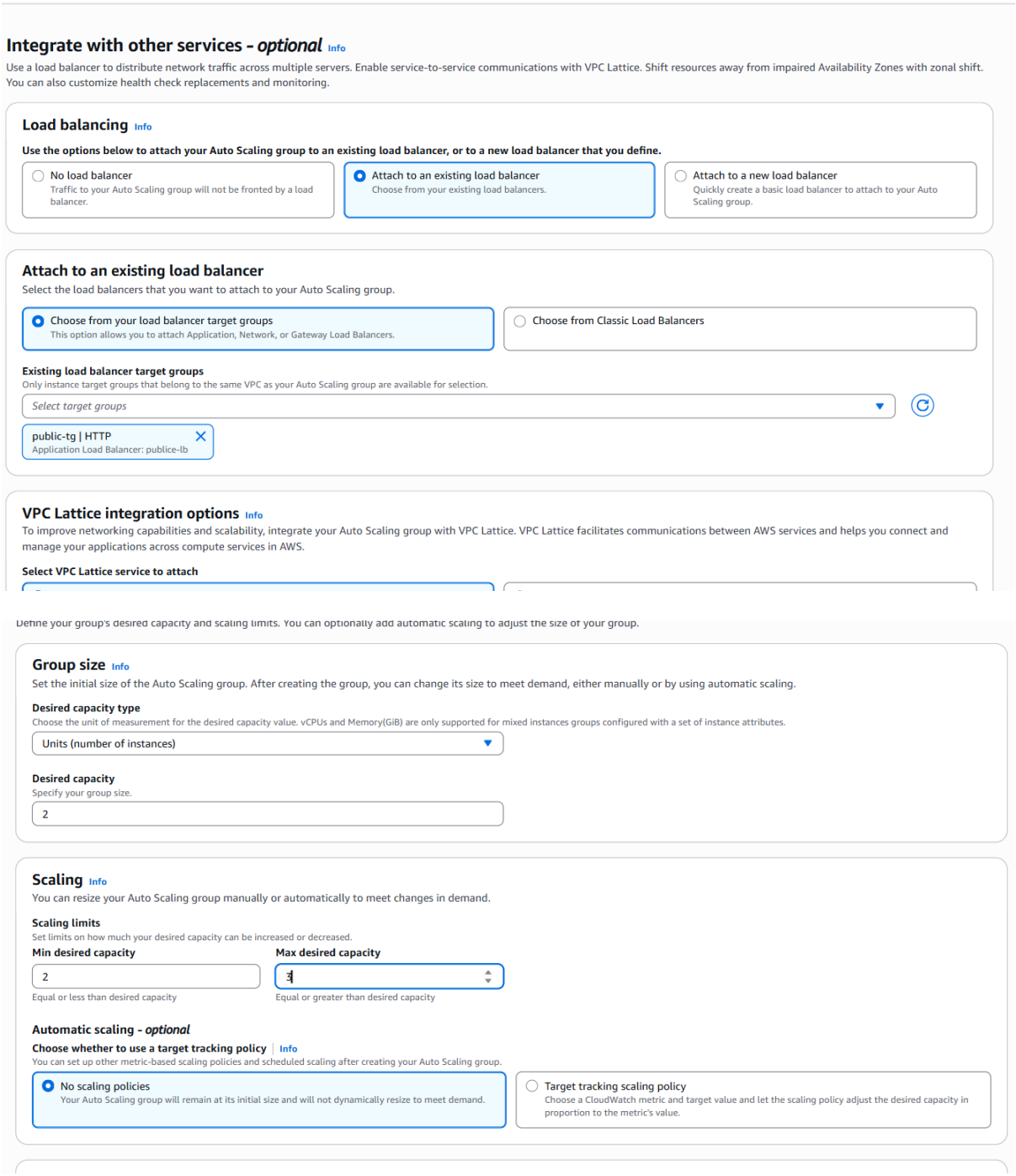
Storage (volumes)
1 volume(s) - 8 GiB

ⓘ **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 tier AMIs, 750 hours per month of public IPv4 address usage, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet. ✕

Cancel — Create launch template

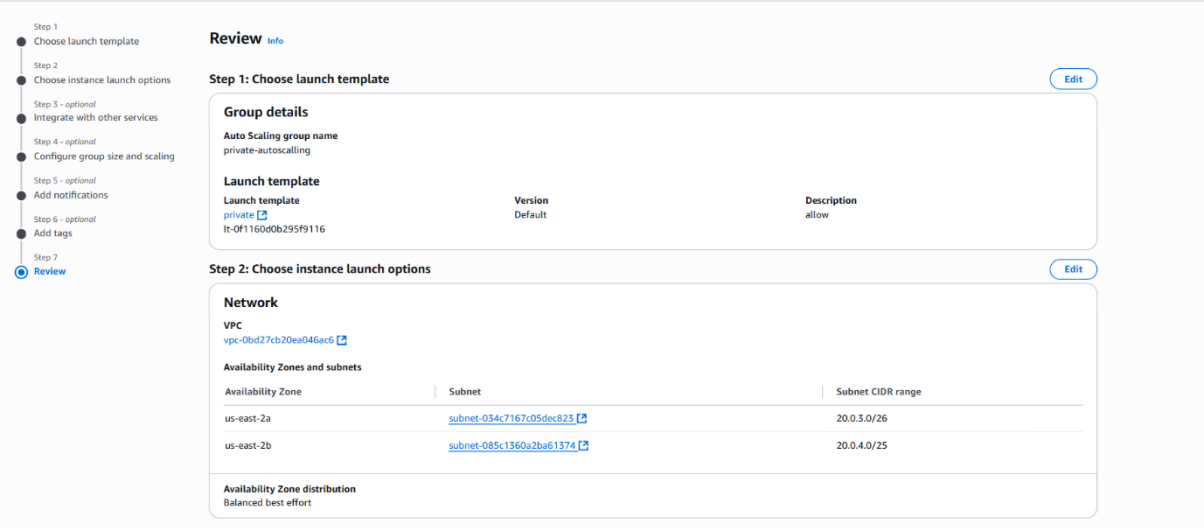

Step 1
Choose launch template
Step 2
Choose instance launch options
Step 3 - optional
Integrate with other services
Step 4 - optional
Configure group size and scaling
Step 5 - optional
Add notifications
Step 6 - optional
Add tags
Step 7
Review
Choose launch template Info
Specify a launch template that contains settings common to all EC2 instances that are launched by this Auto Scaling group.
Name
Auto Scaling group name
Enter a name to identify the group.
publice-autoscaling
Must be unique to this account in the current Region and no more than 255 characters.
Launch template Info
For accounts created after May 31, 2023, the EC2 console only supports creating Auto Scaling groups with launch templates. Creating Auto Scaling groups with launch configurations is not recommended but still available via the CLI and API until December 31, 2023.
Launch template
Choose a launch template that contains the instance-level settings, such as the Amazon Machine Image (AMI), instance type, key pair, and security groups.
myProject-template
Create a launch template
Version
Default (1)
Create a launch template version
Description
allow
Launch template
myProject-template
lt-092342c7215805b6a
Instance type
-
AMI ID
ami-03176134071aab806
Security groups
-
Request Spot Instances
No
Key pair name
sivaproject
Security group IDs
sg-051fb1a97fd318fb4
Additional details
Storage (volumes)
-
Date created
Wed Jun 11 2025 15:15:12 GMT+0530 (India Standard Time)


Network Info
For most applications, you can use multiple Availability Zones and let EC2 Auto Scaling balance your instances across the zones. The default VPC and default subnets are suitable for getting started quickly.
VPC
Choose the VPC that defines the virtual network for your Auto Scaling group.
vpc-0bd27cb20ea046ac6 (myproject-vpc)
20.0.0.0/16
Create a VPC
Availability Zones and subnets
Define which Availability Zones and subnets your Auto Scaling group can use in the chosen VPC.
Select Availability Zones and subnets
us-east-2a | subnet-0a05d76043deec3d4 (public-subnet-1)
20.0.1.0/27
us-east-2b | subnet-0d7fef892e63c2f70 (public-subnet-2)
20.0.2.0/27
Create a subnet
Availability Zone distribution - new
Auto Scaling automatically balances instances across Availability Zones. If launch failures occur in a zone, select a strategy.
Balanced best effort
If launches fail in one Availability Zone, Auto Scaling will attempt to launch in another healthy Availability Zone.
Balanced only
If launches fail in one Availability Zone, Auto Scaling will continue to attempt to launch in the unhealthy Availability Zone to preserve balanced distribution.
Cancel
Skip to review
Previous
Next

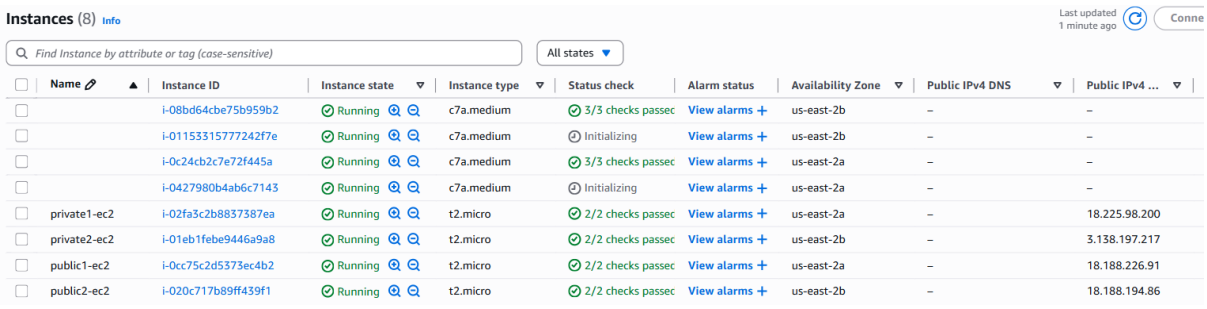


- In similar way create another launch template name as private-tm and create auto scaling group name as MY-PRIVATE-AS
- In it select create VPC and give two private subnets

- Now create private auto scaling

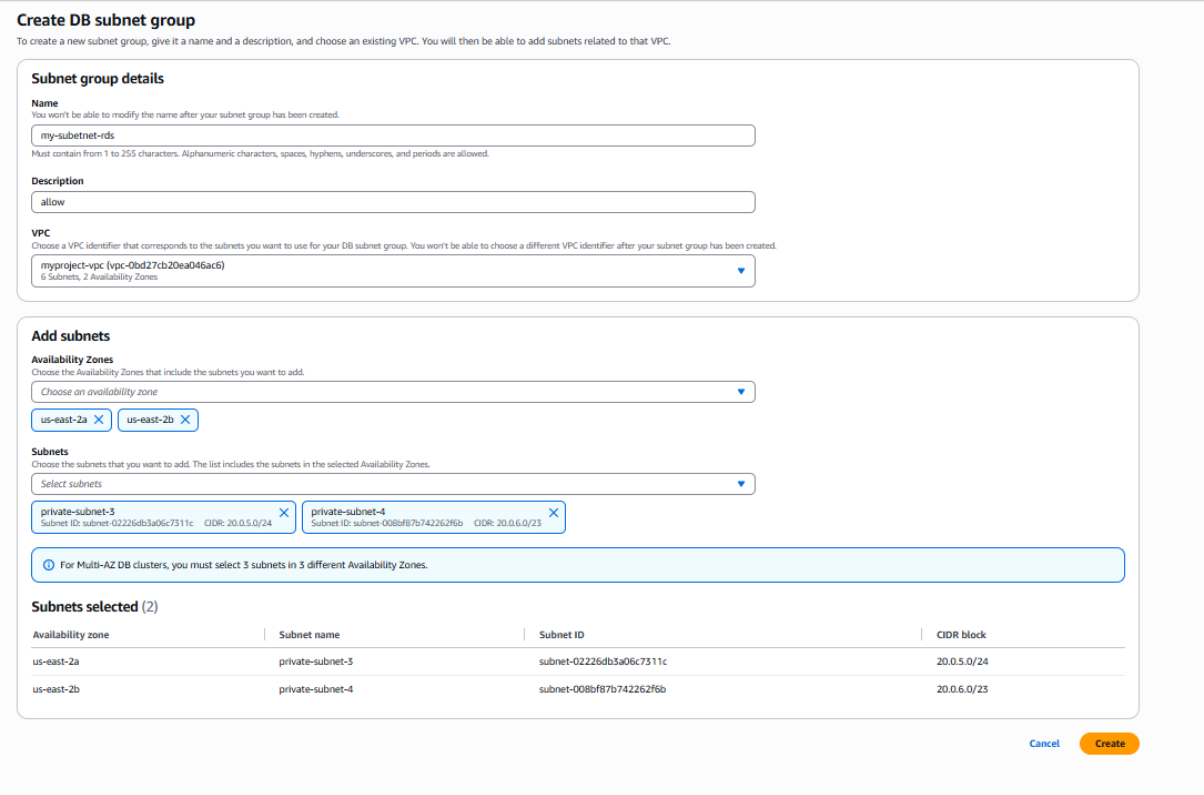


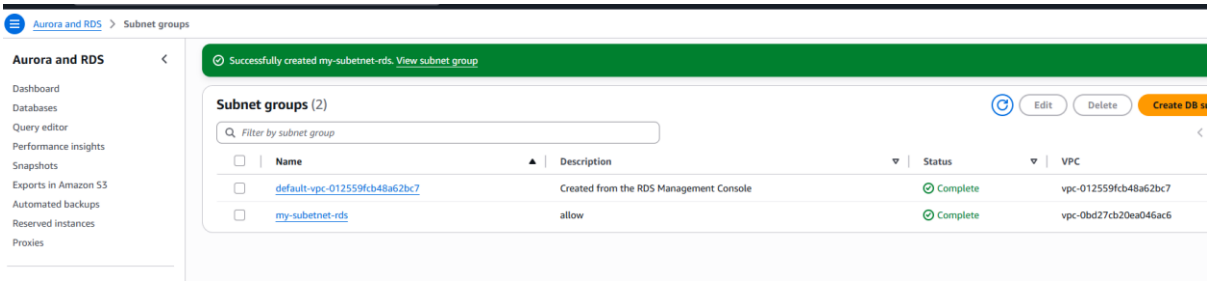
- After creating autoscaling group we can get the four extra servers from
- both public and private auto scaling group.



Step 6: Create subnet group

- Give name as my-subnet-grp and description nothing.
- Select created VPC.
- Give availability zones and select private subnets from each zone.
- Create the DB subnet group.

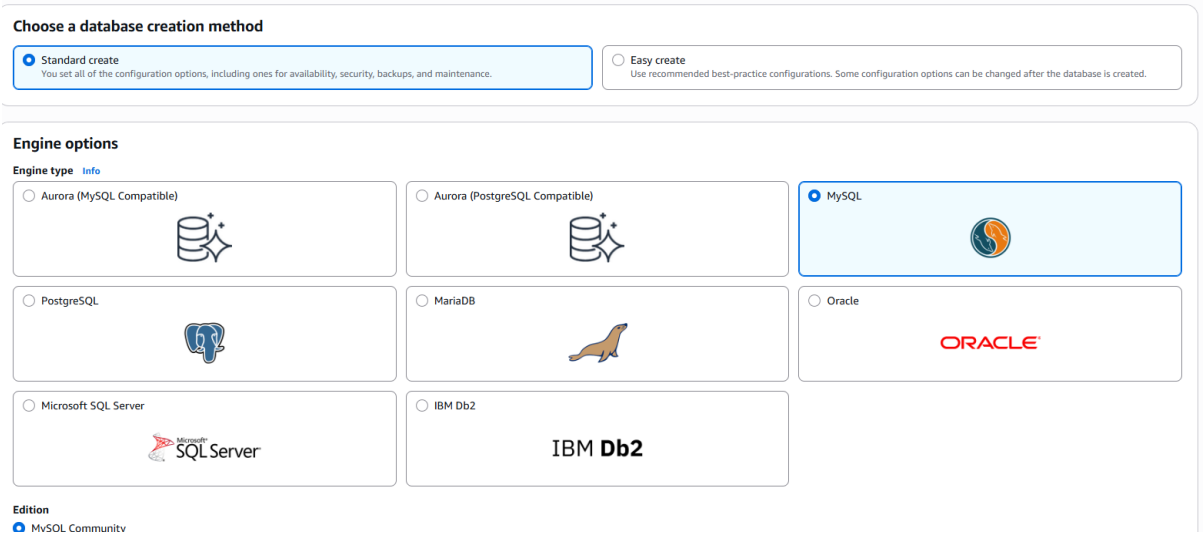


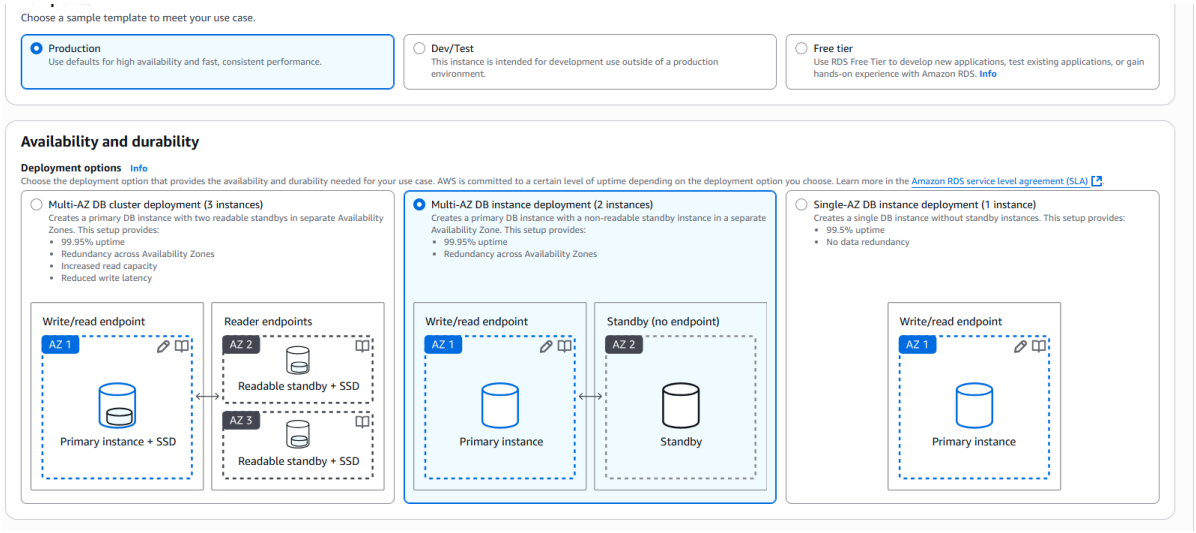


Step 7: Create Database(RDS)

- Click on create database, select standard create, select engine type as MySQL.
- Select templates as production and select multi-AZ DB cluster.
- Select on self-managed, give password and confirm the password.
- Select memory optimized class.
- In connectivity, click on Don't connect to the EC2 compute resource and select created vpc (my-vpc-project1).
- Select subnet group (my-project-dbs) and give public access as yes.

- Choose existing security group (instance1-SG).
- Go to VPC dashboard, click on VPC, click on actions, go to edit VPC settings and click on the enable DNS hostnames.
- Create the database.





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.

database-1

The DB instance identifier is case-insensitive, but is stored as all lowercase (as in "mydbinstance"). 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 instance.

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.
- (selected) 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 Weak

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.

- (selected) 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.

Network type Info

To use dual-stack mode, make sure that you associate an IPv6 CIDR block with a subnet in the VPC you specify.

- (selected) IPv4
  Your resources can communicate only over the IPv4 addressing protocol.
- Dual-stack mode
  Your resources can communicate over IPv4, IPv6, or both.

Virtual private cloud (VPC) Info

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

myproject-vpc (vpc-0bd27cb20ea046ac6)
6 Subnets, 2 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 instance can use in the VPC that you selected.

my-subetnet-rds
2 Subnets, 2 Availability Zones

Public access Info

- Yes
  RDS assigns a public IP address to the database. Amazon EC2 instances and other resources outside of the VPC can connect to your database. Resources inside the VPC can also connect to the database. Choose one or more VPC security groups that specify which resources can connect to the database.
- (selected) No

Go to VPC click on edit vpc settings

Edit VPC settings Info

VPC details

VPC ID
vpc-0bd27cb20ea046ac6
Name
myproject-vpc

DHCP settings

DHCP option set Info

dopt-055b03167c43db205

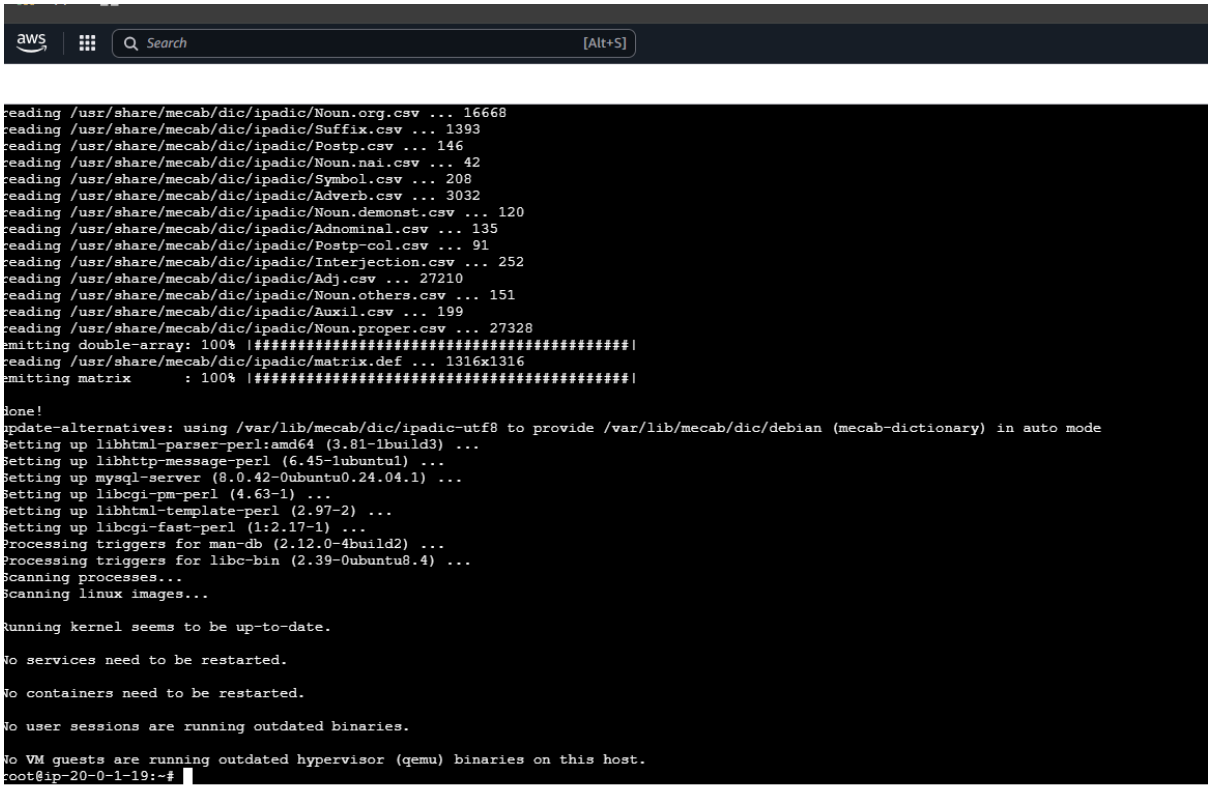
DNS settings

- (checked) Enable DNS resolution Info
- (checked) Enable DNS hostnames Info

Network Address Usage metrics settings

- (unchecked) Enable Network Address Usage metrics Info

Cancel Save



```
root@ip-20-0-1-19:~# mysql -h database-1.cdse42oim2iv.us-east-2.rds.amazonaws.com -u admin -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 38
Server version: 8.0.41 Source distribution

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affiliates. Other names may be trademarks of their respective
owners.

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

mysql>
```

Use commands like:

```
CREATETABLE
   Gowri ( ID int
   NOT NULL,
   LastName varchar(255) NOT NULL,
   FirstName varchar(255),
   Age int,
   PRIMARY KEY (ID)
);
```

- we can insert data into that table using this command
- INSERT INTO Gowri (ID, LastName, FirstName, Age)
- VALUES (432, 'shiva', 'sankar', 23);
- show tables; (to show tables in that DB)
- Select * from Table name


```
owners.

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

mysql> create database Gowri;
Query OK, 1 row affected (0.00 sec)

mysql> show databases;
+--------------------+
| Database           |
+--------------------+
| Gowri              |
| information_schema |
| mysql              |
| performance_schema |
| sys                |
+--------------------+
5 rows in set (0.00 sec)

mysql> use Gowri;
Database changed
mysql> CREATE TABLE Gowri ( ID int NOT NULL,
    -> LastName varchar(255) NOT NULL, FirstName varchar(255),
    -> Age int,
    -> PRIMARY KEY (ID)
    -> );
Query OK, 0 rows affected (0.03 sec)

mysql> INSERT INTO Gowri (ID, LastName, FirstName, Age)
    -> VALUES (432, 'shiva', 'sankar', 23);
Query OK, 1 row affected (0.00 sec)

mysql> select * from Gowri;
+-----+----------+-----------+------+
| ID  | LastName | FirstName | Age  |
+-----+----------+-----------+------+
| 432 | shiva    | sankar    |   23 |
+-----+----------+-----------+------+
1 row in set (0.00 sec)

mysql>
```

i-0cc75c2d5373ec4b2 (public1-ec2)

PublicIPs: 18.188.226.91 PrivateIPs: 20.0.1.19