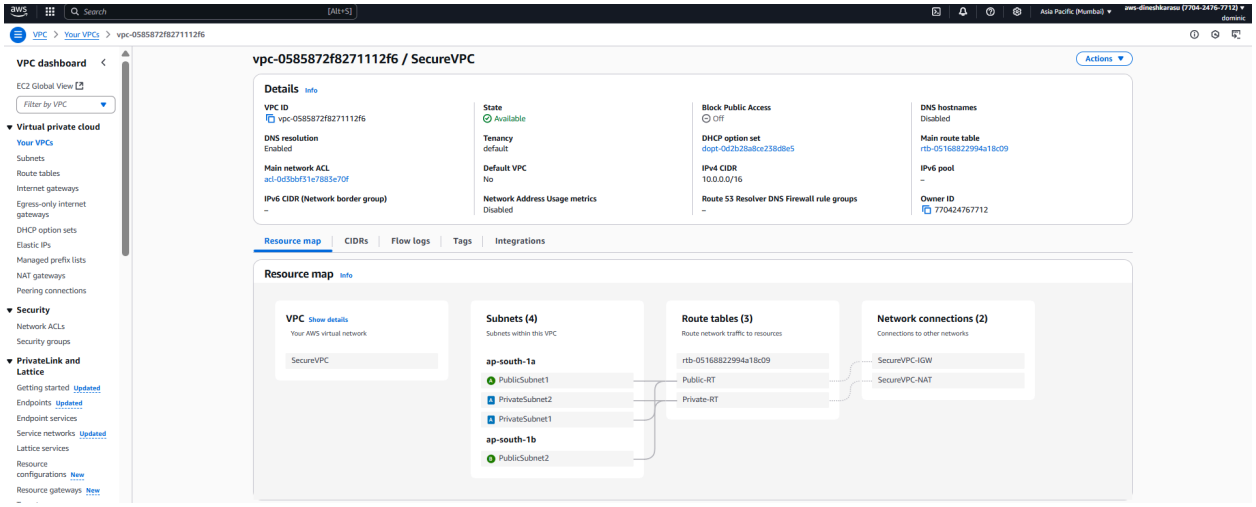
Use case	Use case Description
Secure VPC Architecture	Design a multi-tier VPC with private/public subnets and NAT Gateways.

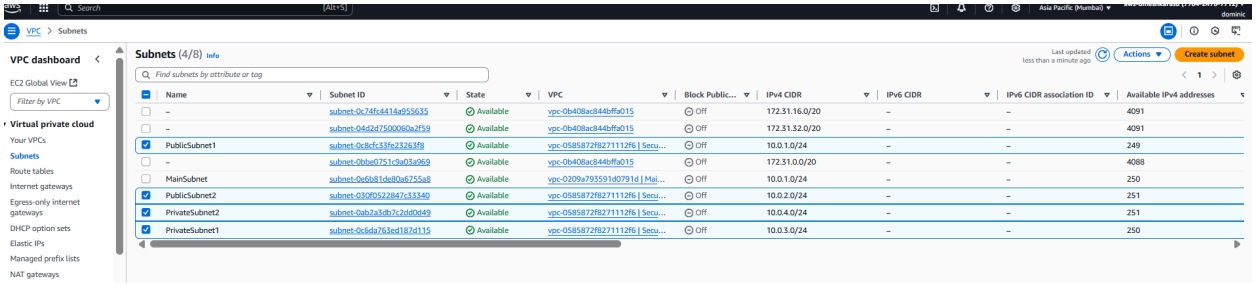
Approach :

1. Create a VPC
2. Create 2 Public Subnets + 2 Private Subnets (in two AZs)
3. Create and attach an Internet Gateway
4. Create Public Route Table - Route to Internet Gateway
5. Create Private Route Table - Route to NAT Gateway
6. Create a NAT Gateway in Public Subnet + Allocate EIP
7. Launch EC2 in Public Subnet
8. Launch EC2 in Private Subnet
9. Configure Security Groups
10. Test: SSH into Public EC2, then SSH into Private EC2 via Public one

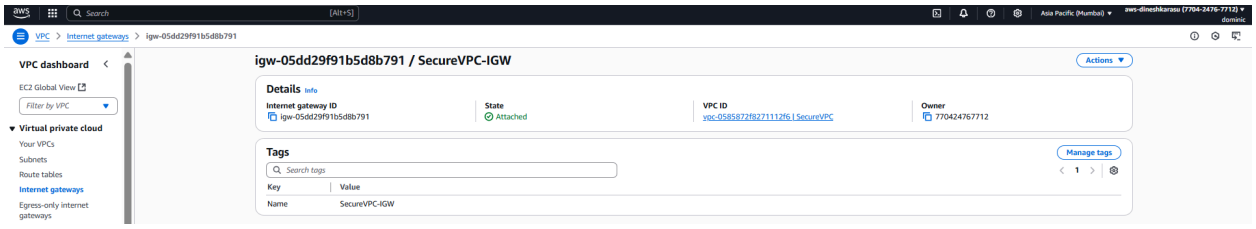
Create VPC



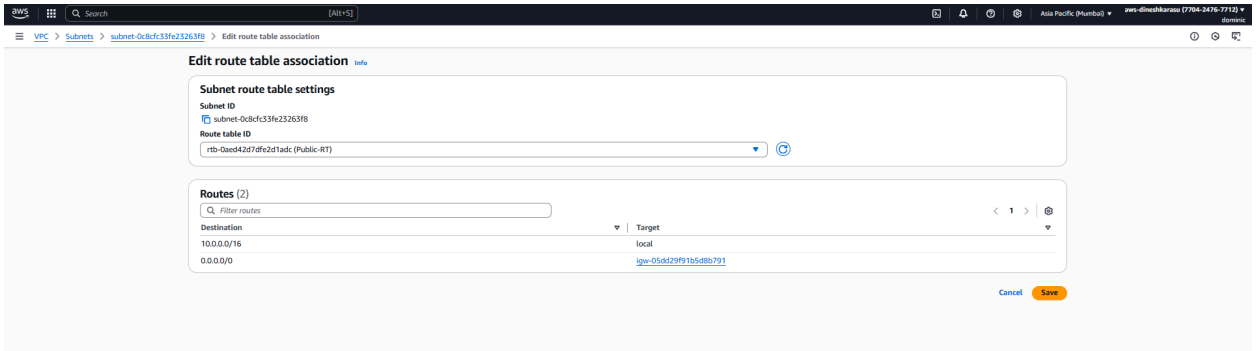
Create Subnets



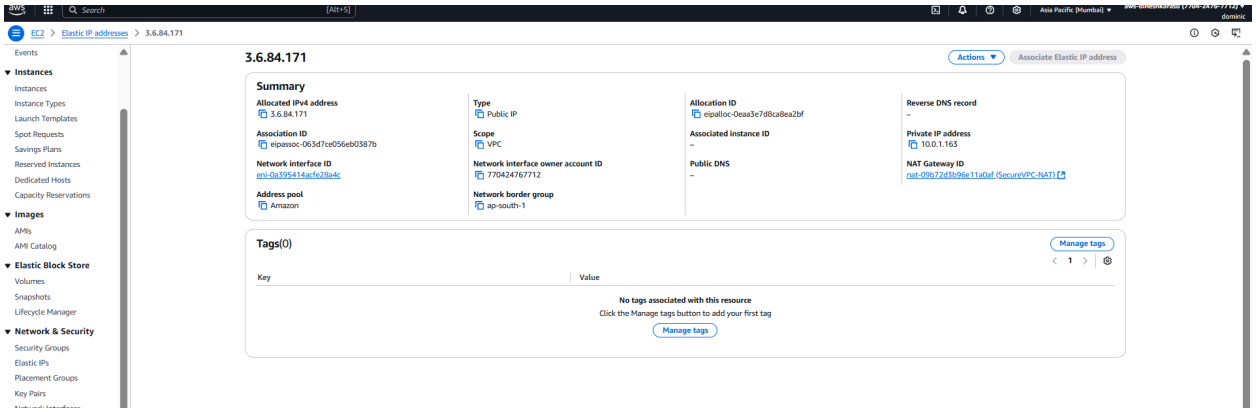
Create Internet Gateway



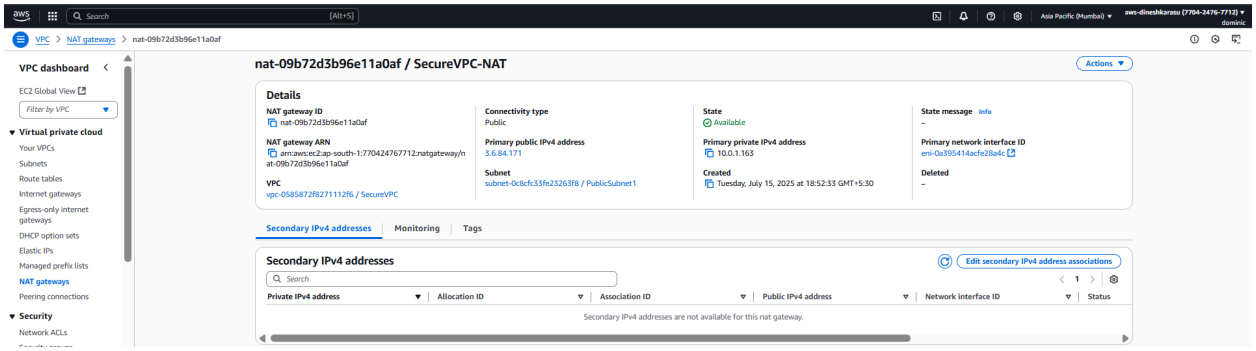
Attach IGW to the public subnet



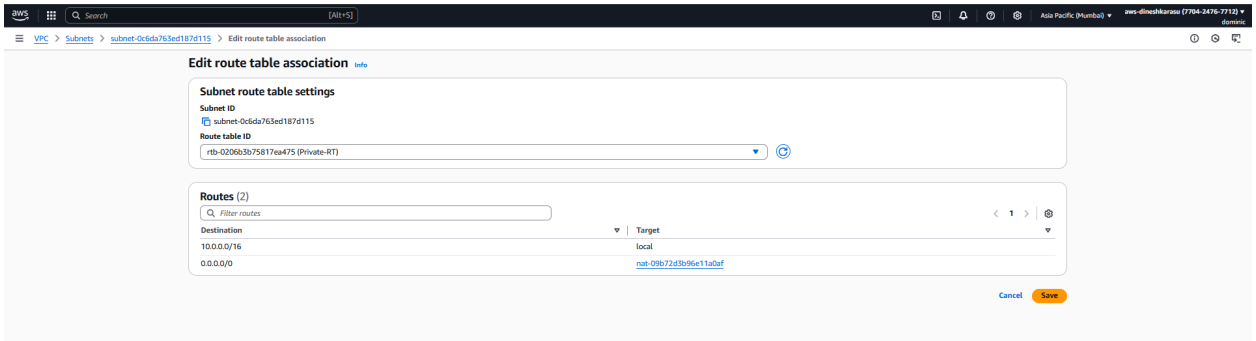
Create elastic IP



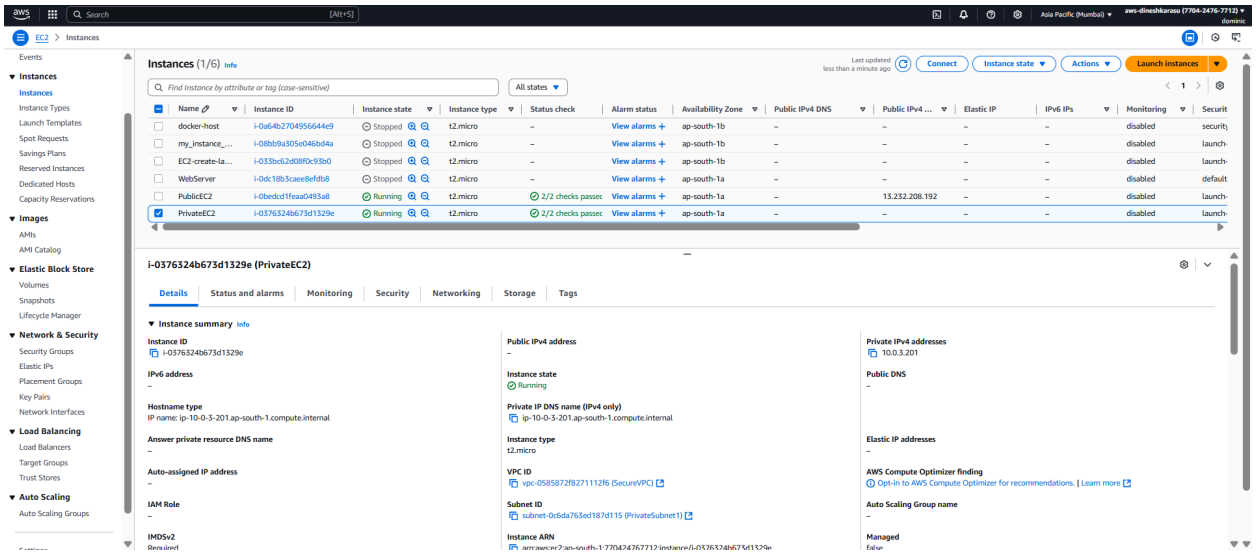
Create NAT Gateway



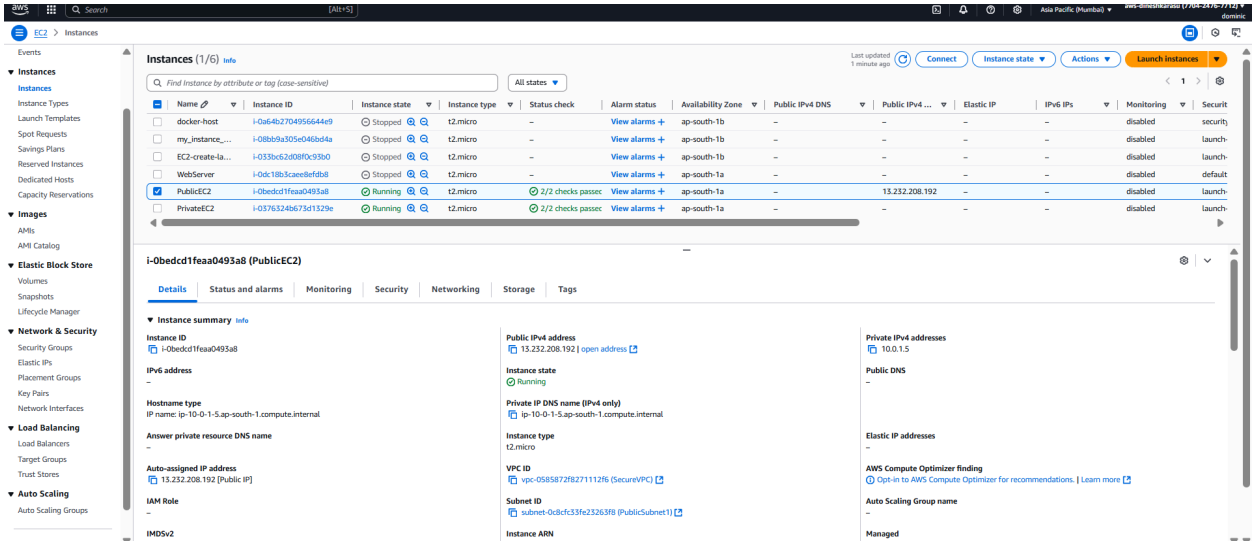
Attach NAT GW to the private subnet



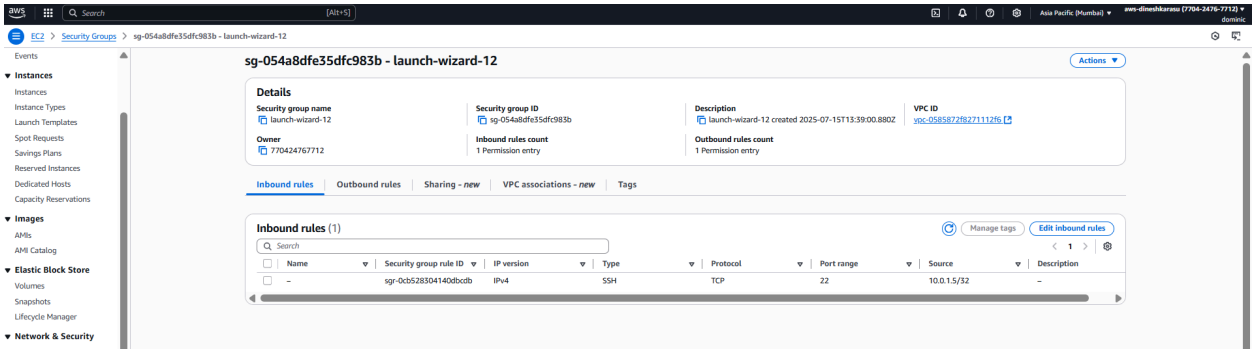
Create a private instance in the VPC



Create a public EC2 instance in the VPC

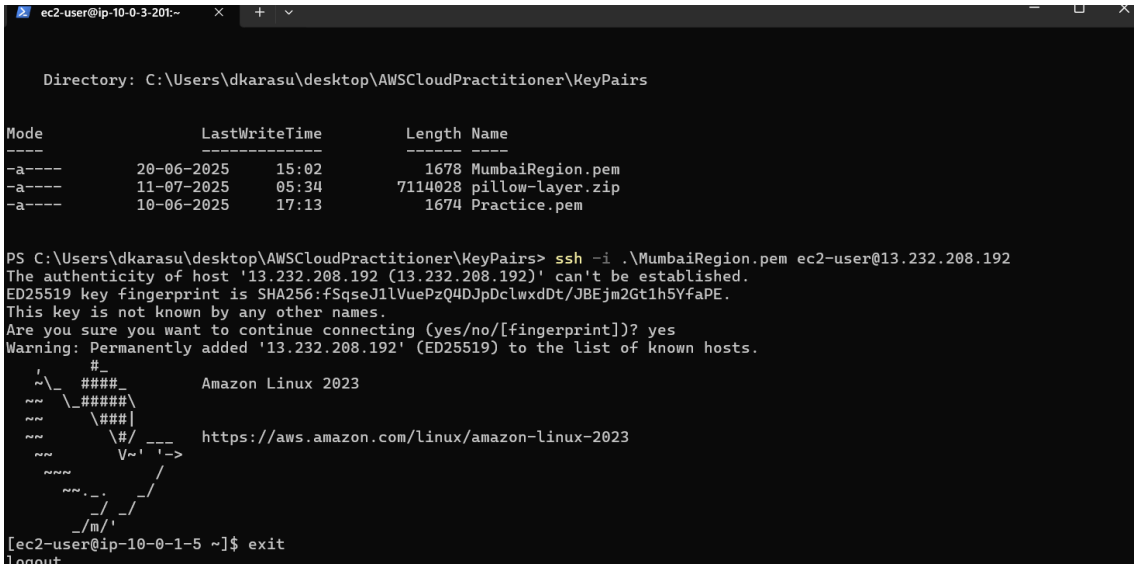


Modify security group inbound rules of Private EC2 instance to allow only the newly created Public instance PrivateIP4 address



Test

SSH into the public instance



```
ec2-user@ip-10-0-3-201:~

    Directory: C:\Users\dkarasu\desktop\AWSCloudPractitioner\KeyPairs


Mode                LastWriteTime         Length Name
----                -------------         ------ ----
-a----        20-06-2025     15:02           1678 MumbaiRegion.pem
-a----        11-07-2025     05:34        7114028 pillow-layer.zip
-a----        10-06-2025     17:13           1674 Practice.pem


PS C:\Users\dkarasu\desktop\AWSCloudPractitioner\KeyPairs> ssh -i .\MumbaiRegion.pem ec2-user@13.232.208.192
The authenticity of host '13.232.208.192 (13.232.208.192)' can't be established.
ED25519 key fingerprint is SHA256:fSqseJ1lVuePzQ4DJpDclwxdDt/JBEjm2Gt1h5YfaPE.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '13.232.208.192' (ED25519) to the list of known hosts.
       ,     #_
       ~\_  ####_        Amazon Linux 2023
      ~~  \_#####\
      ~~     \###|
      ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
       ~~       V~' '->
        ~~~         /
          ~~._.   _/
             _/ _/
           _/m/'
[ec2-user@ip-10-0-1-5 ~]$ exit
logout
```

Secure copy the key pair file to the EC2 instance

```
ec2-user@ip-10-0-3-201:~
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
[ec2-user@ip-10-0-1-5 ~]$ exit
logout
Connection to 13.232.208.192 closed.
PS C:\Users\dkarasu\desktop\AWSCloudPractitioner\KeyPairs> scp -i MumbaiRegion.pem MumbaiRegion.pem ec2-user@13.232.208.
192:/home/ec2-user/
MumbaiRegion.pem                                                                    100% 1678    63.0KB/s   00:00
PS C:\Users\dkarasu\desktop\AWSCloudPractitioner\KeyPairs> ssh -i MumbaiRegion.pem ec2-user@13.232.208.192
   ,     #_
   ~\_  ####_        Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
Last login: Tue Jul 15 13:48:54 2025 from 103.183.203.20
[ec2-user@ip-10-0-1-5 ~]$ ls
MumbaiRegion.pem
```

SSH into the private instance from the already logged in public instance

```
[ec2-user@ip-10-0-1-5 ~]$ ssh -i MumbaiRegion.pem ec2-user@10.0.3.201
The authenticity of host '10.0.3.201 (10.0.3.201)' can't be established.
ED25519 key fingerprint is SHA256:6Tohoe4kRc04cWiv835qdekkvwUeUrIcMzwLudBSXoY.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.0.3.201' (ED25519) to the list of known hosts.
   ,     #_
   ~\_  ####_        Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
[ec2-user@ip-10-0-3-201 ~]$ curl https://google.com
<HTML><HEAD><meta http-equiv="content-type" content="text/html;charset=utf-8">
<TITLE>301 Moved</TITLE></HEAD><BODY>
<H1>301 Moved</H1>
The document has moved
<A HREF="https://www.google.com/">here</A>.
</BODY></HTML>
[ec2-user@ip-10-0-3-201 ~]$ sudo yum update -y
Amazon Linux 2023 Kernel Livepatch repository                                159 kB/s |  17 kB     00:00
Dependencies resolved.
```

Try Logging into the Private instance from the CLI, we get timeout error

```
PS C:\Users\dkarasu\desktop\AWSCloudPractitioner\KeyPairs>  ssh -i MumbaiRegion.pem ec2-user@10.0.1.5
ssh: connect to host 10.0.1.5 port 22: Connection timed out
PS C:\Users\dkarasu\desktop\AWSCloudPractitioner\KeyPairs>
```