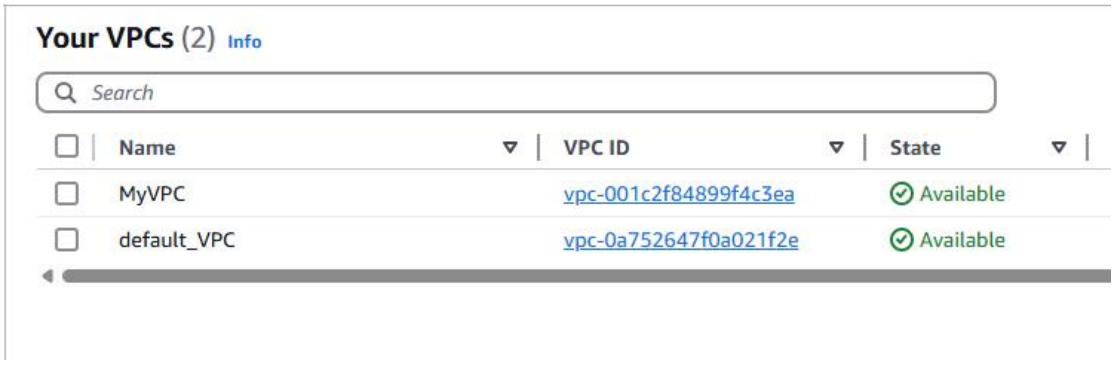
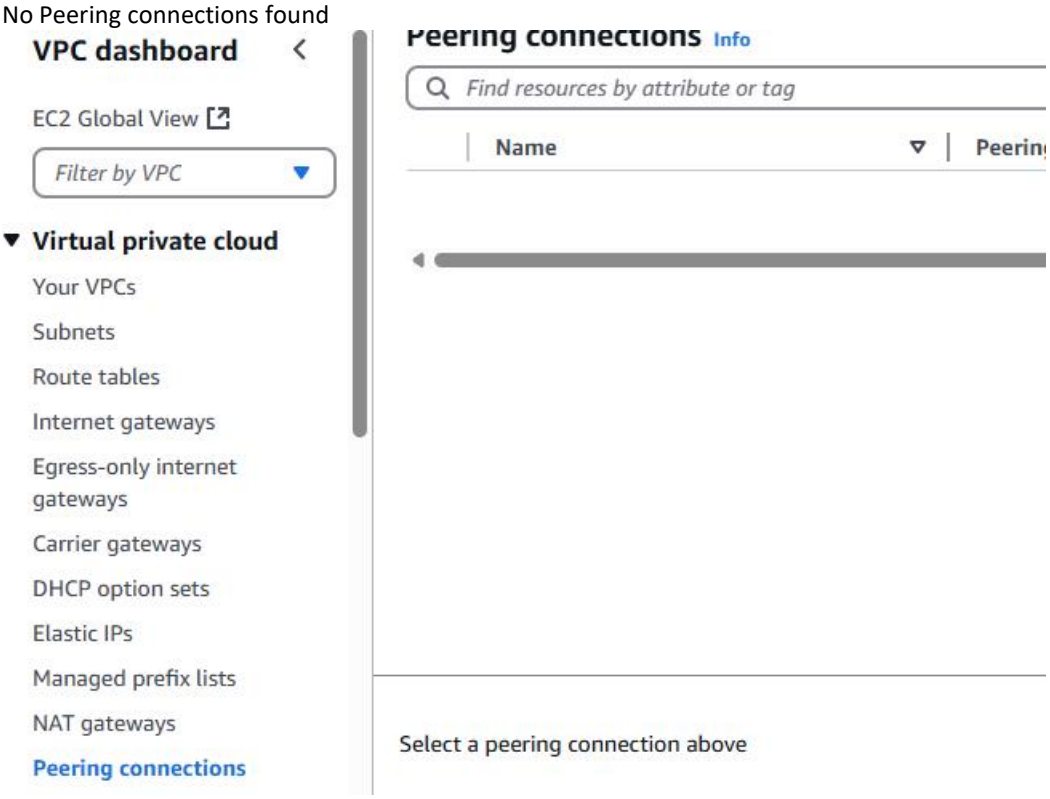
AWS VPC last part:

Lets say we have two VPCs with VMs. These VPCs could be in the same AWS account or different AWS account.

Open VPCs



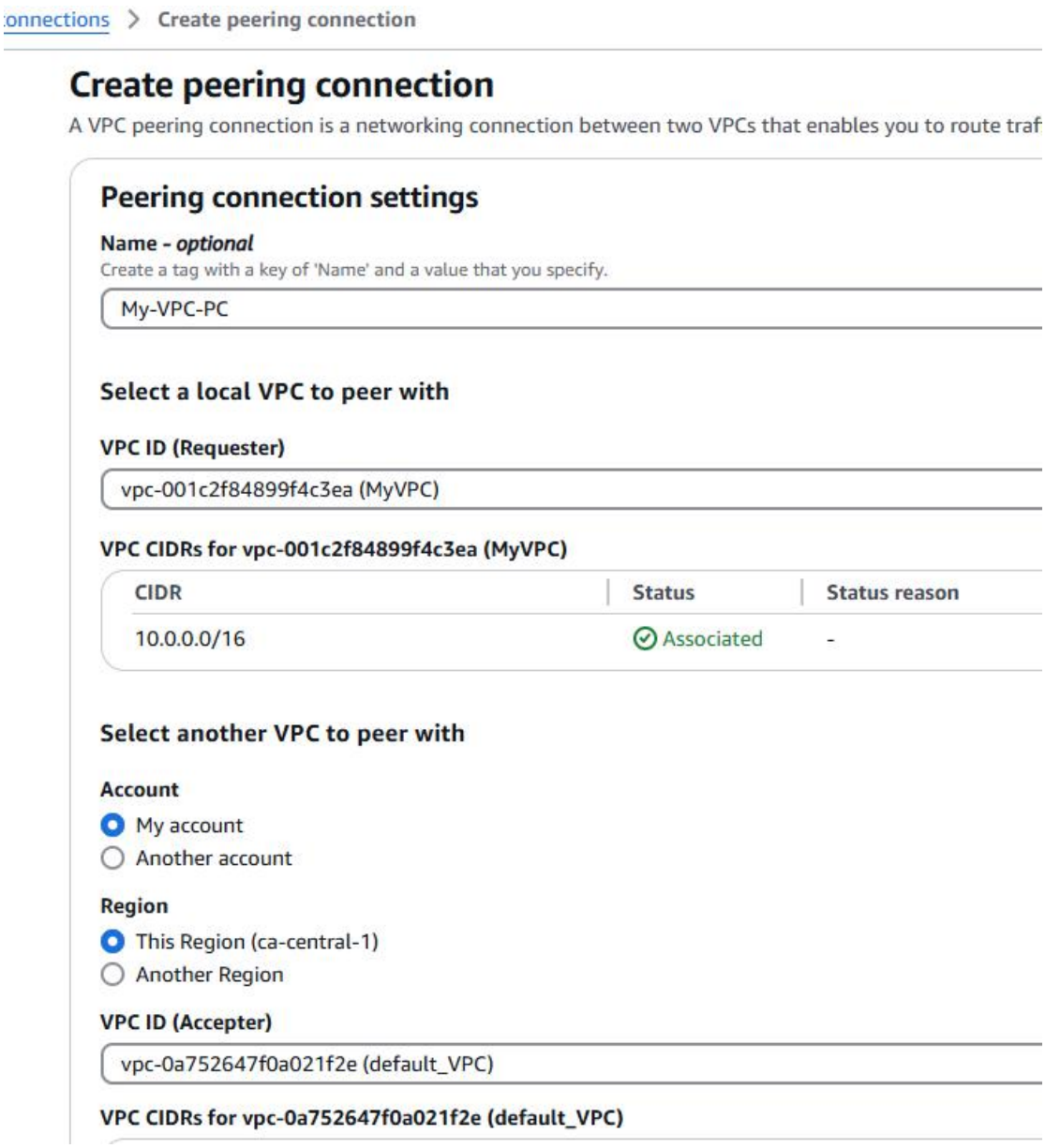
We have 2 VPCs here
Click on Peering connections:
No Peering connections found

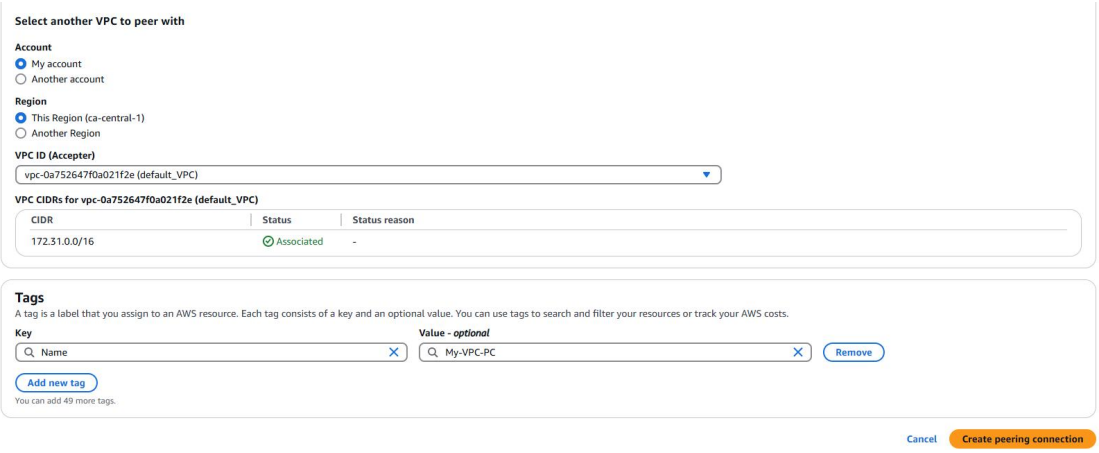


What's the use of Peering connections?

VPC Peering is a networking connection that allows two Amazon Virtual Private Clouds (VPCs) to communicate privately as if they were in the same network.

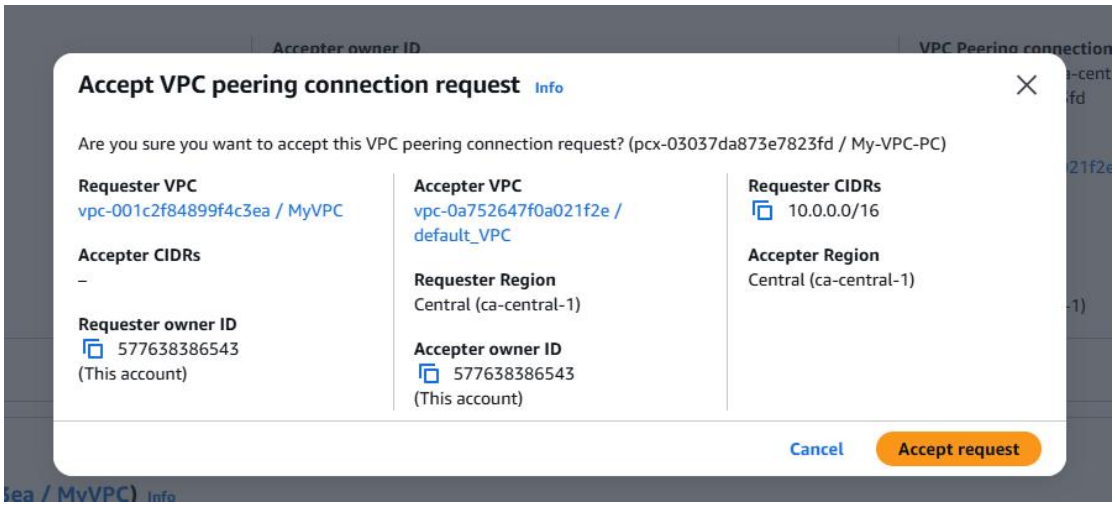
Select Requester as MyVPC and I want to connect with default-VPC

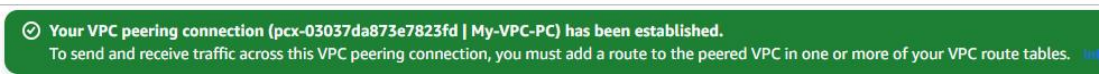




Click Create Peering connection

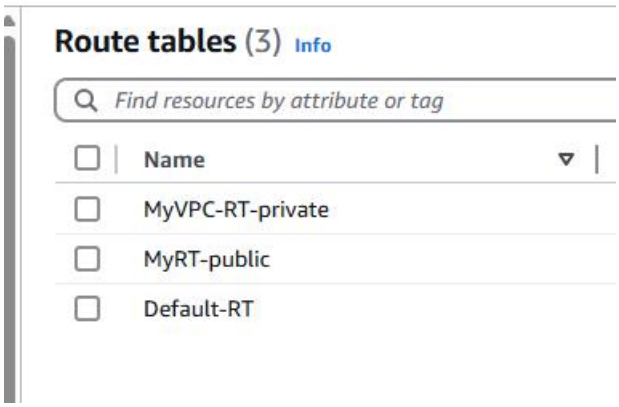
Actions ---> Accept request





We have to go and enable in the route tables that VMs can interact with each other

Go to Route tables



Default-RT	rtb-0167102c60028bf78	–

rtb-0167102c60028bf78 / Default-RT

Details | Routes | Subnet associations | Edge associations | Route propagation

Routes (2)

Filter routes

Destination	Target
0.0.0.0/0	igw-07e4ffa1bfe1a8d7f
172.31.0.0/16	local

Go back to My_VPC

Name	VPC ID	State
MyVPC	vpc-001c2f84899f4c3ea	Available
default_VPC	vpc-0a752647f0a021f2e	Available

vpc-001c2f84899f4c3ea / MyVPC

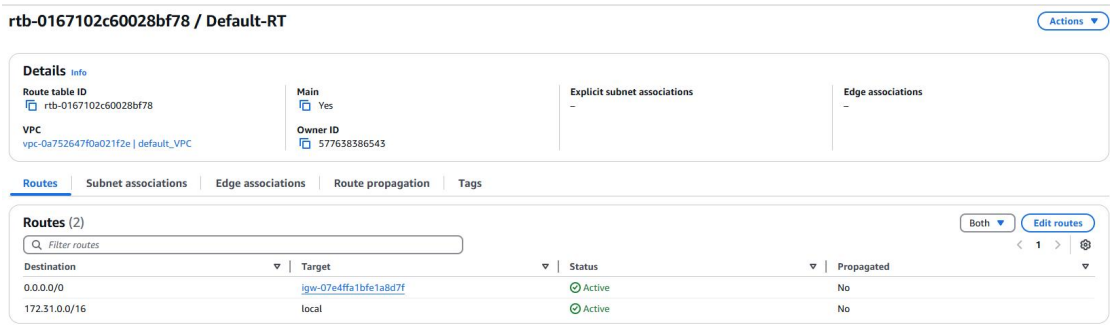
Details | Resource map | CIDRs | Flow logs | Tags | Integrations

IPv4 CIDRs Info

Address family	CIDR
IPv4	10.0.0.0/16

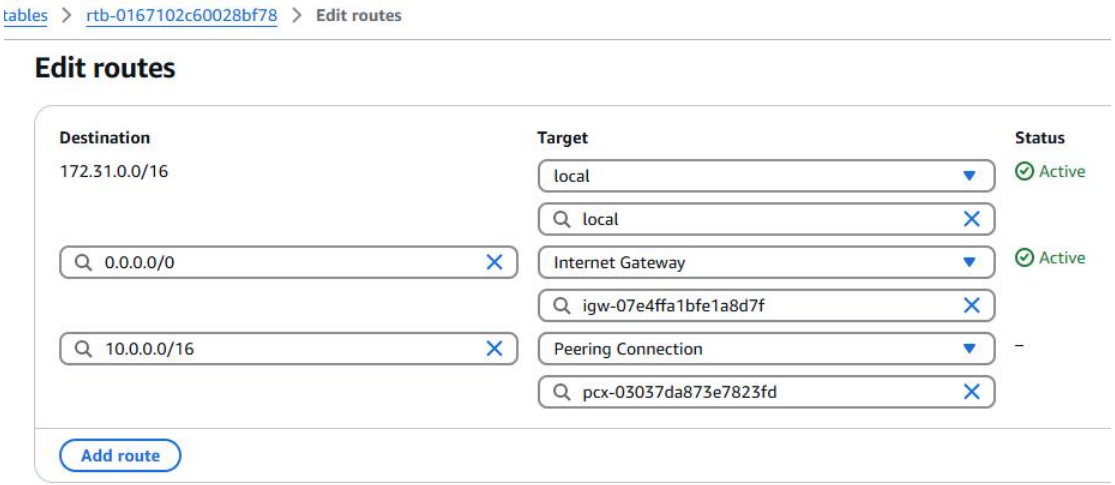
Copy CIDR 10.0.0.0/16

Go back to Default-RT

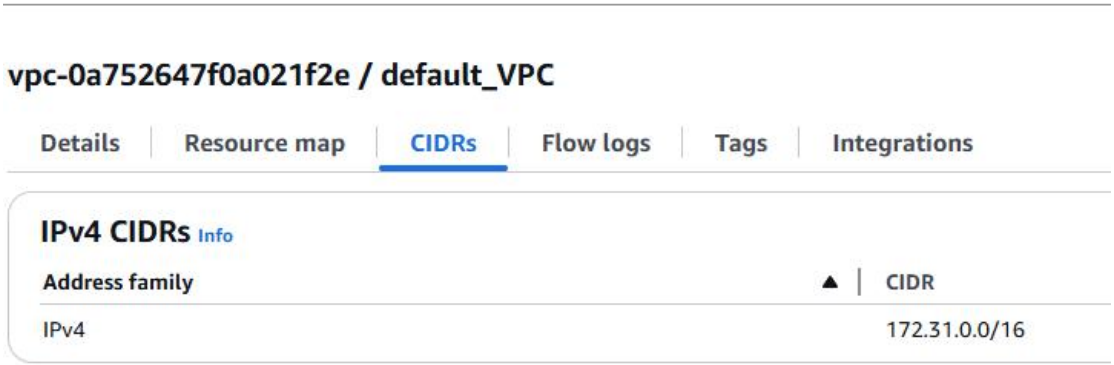


What it means is, allow requests from this IP: 10.0.0.0/16. there will be a request from MyVPC into default-VPC that's the meaning
From this particular CIDR block there will be a request

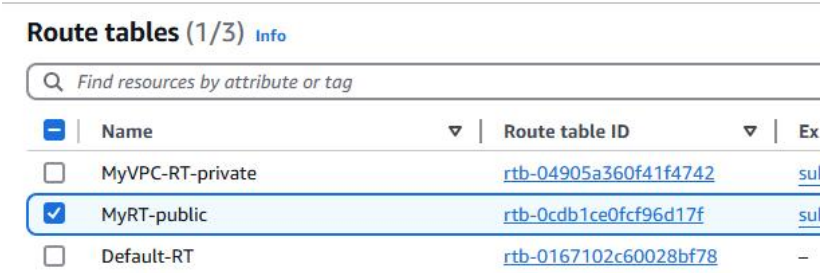
Add route

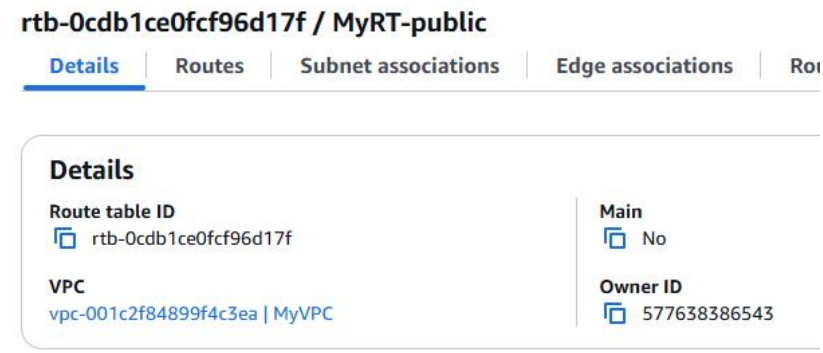


For two way, update default-VPC CIDR in My-Route table

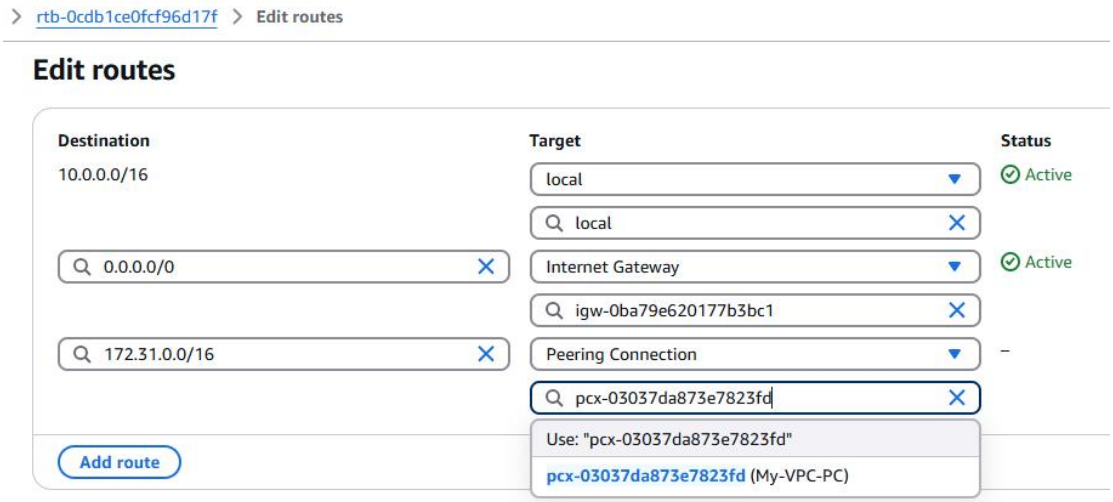


Click on public Route table

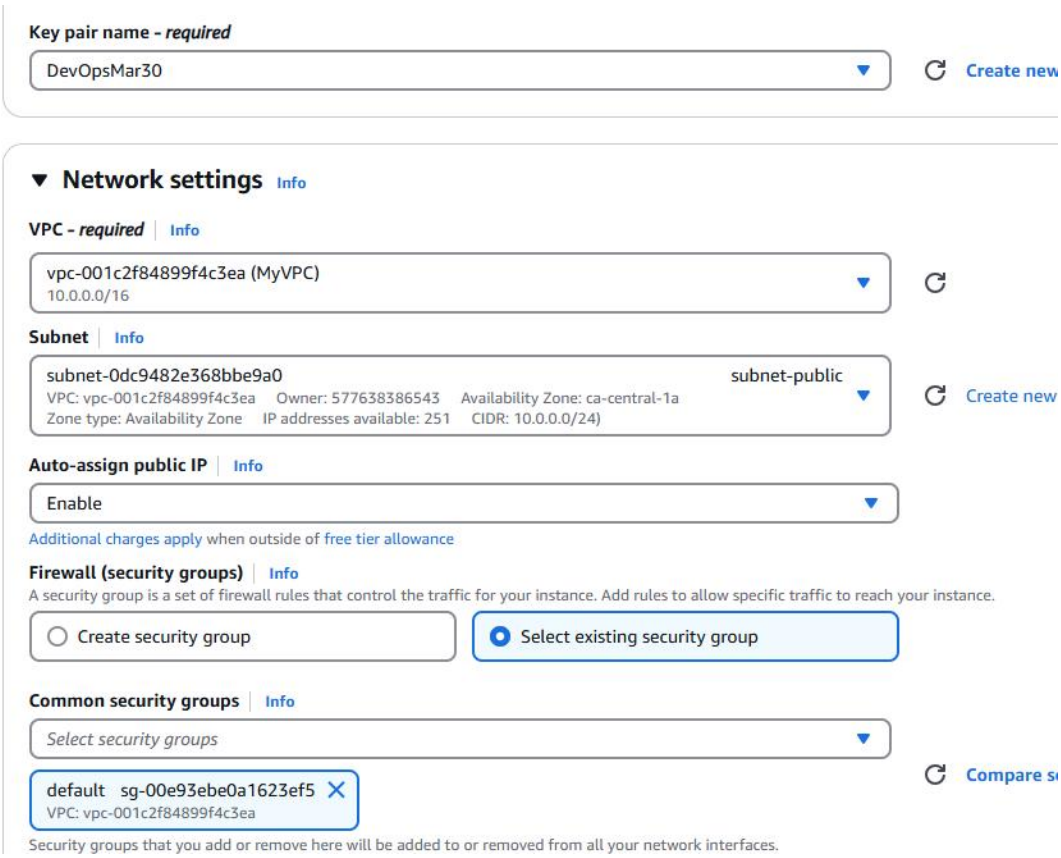




Routes ---> Edit route --> Add route
Added default-VPC CIDR into Public-RT

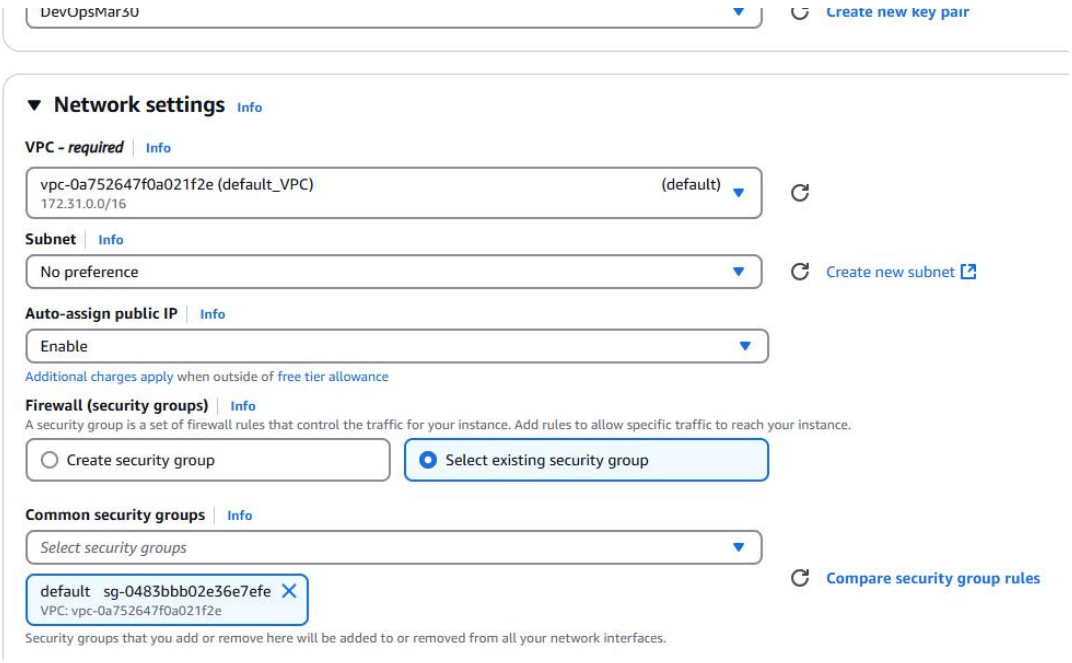


Launch an EC2 instance

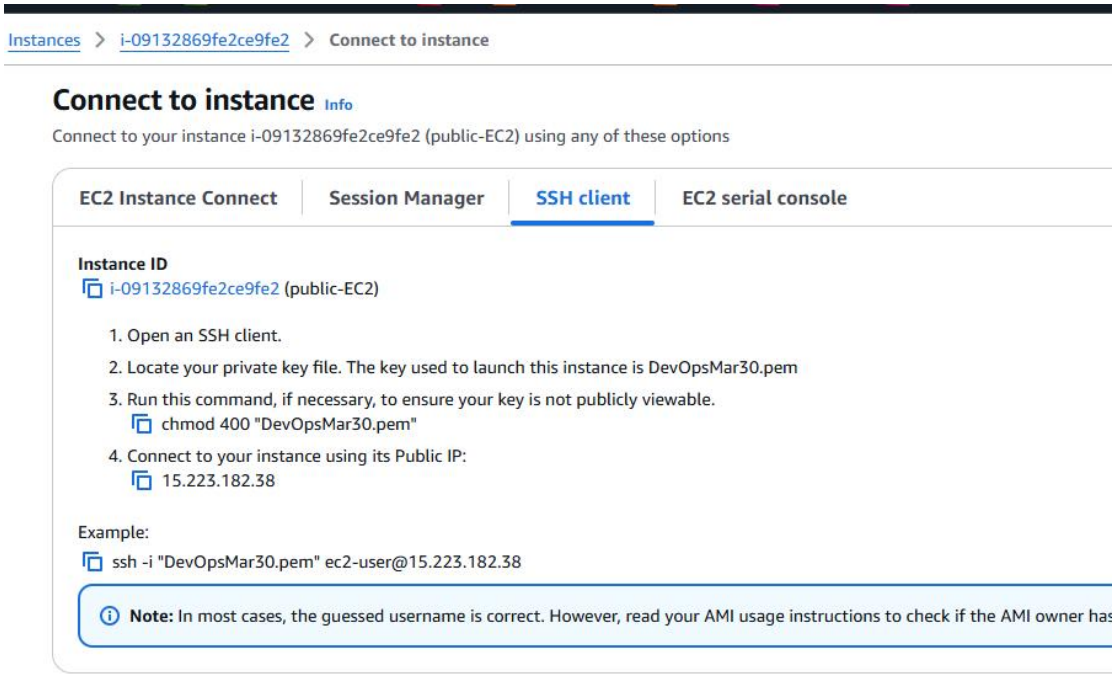


subnet-public is there

Create another VM into default-VPC



Click on Connect in public-EC2



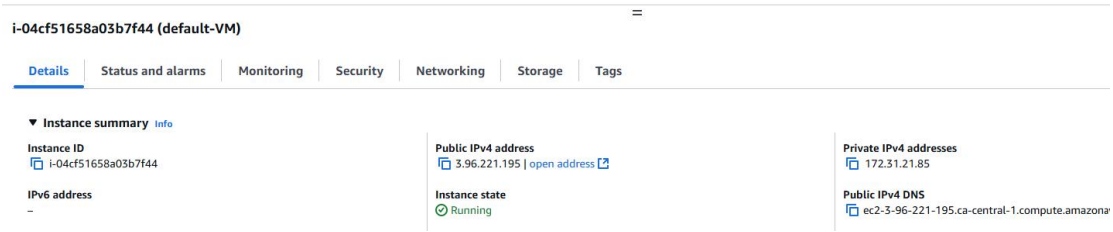
Connect to public-EC2

```
• X11-forwarding  :  ✘  (disabled or not supported by server)

▸ For more info, ctrl+click on help or visit our website.

   ,     #_
   ~\_  ####_        Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
[ec2-user@ip-10-0-0-23 ~]$
[ec2-user@ip-10-0-0-23 ~]$
[ec2-user@ip-10-0-0-23 ~]$
[ec2-user@ip-10-0-0-23 ~]$
```

Copy Private IPv4 address from default-VM



Private IP: 172.31.21.85

Connect from Public-EC2 to default-VM

Make sure in the Security groups All Traffic is enabled

```
[ec2-user@ip-10-0-0-23 ~]$
[ec2-user@ip-10-0-0-23 ~]$
[ec2-user@ip-10-0-0-23 ~]$ ping 172.31.21.85
PING 172.31.21.85 (172.31.21.85) 56(84) bytes of data.
64 bytes from 172.31.21.85: icmp_seq=1 ttl=127 time=0.256 ms
64 bytes from 172.31.21.85: icmp_seq=2 ttl=127 time=0.304 ms
64 bytes from 172.31.21.85: icmp_seq=3 ttl=127 time=0.424 ms
64 bytes from 172.31.21.85: icmp_seq=4 ttl=127 time=0.750 ms
64 bytes from 172.31.21.85: icmp_seq=5 ttl=127 time=0.939 ms
```

In this example, both VPCs are in the same account
Yes, we can establish connection between two VPCs in different accounts as well. This is called as VPC peering

Security Groups:
Why do we have security groups?
Acts like a firewall to secure our resources, decides incoming traffic and outgoing traffic
SG contains two important parts -> inbound rules and outbound rules

Inbound rules: incoming traffic to your VM
Outgoing rules: outgoing traffic from your VM

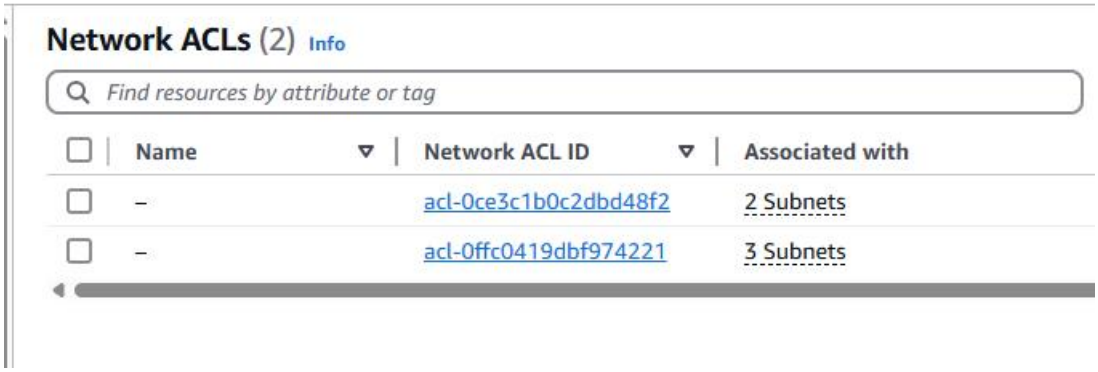
In One Security group, we can add 50 rules
By default, all traffic is denied in security groups, unless and until you make the request for what kind of traffic is allowed etc

--> Security group only allows rules, by default all rules are denied
--> We cannot configure deny rules in security group
--> Security groups are applicable at resource level (not at subnet or VPC) and manually we have to add Security group to a resource
--> Security groups are stateful (any changes we apply to the incoming rules it is applicable to outgoing rules also)

NACL: Network Access Control List / Network ACL

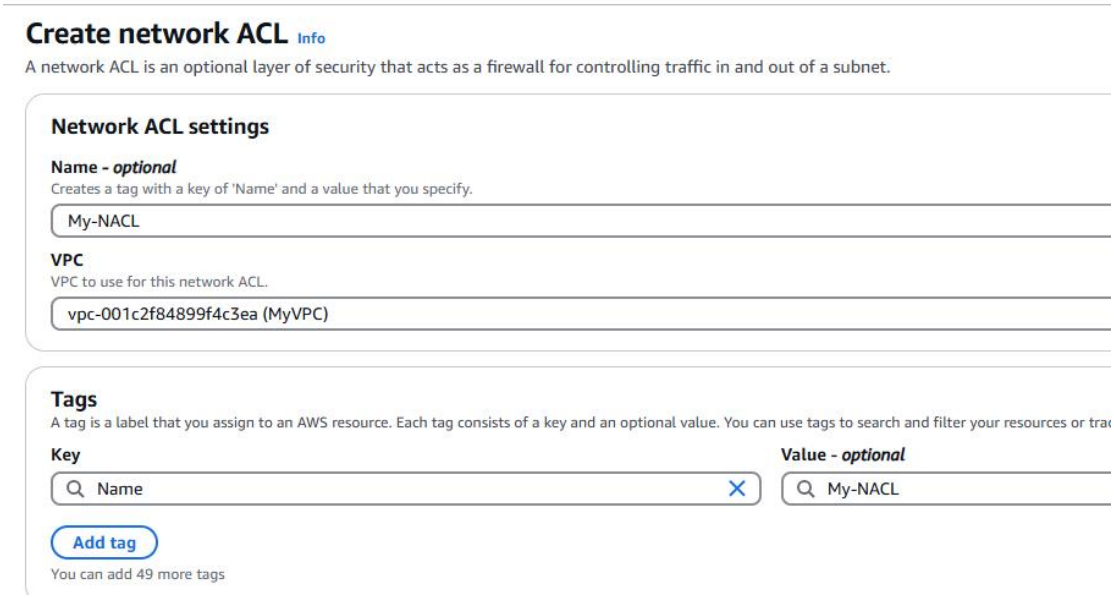
NACL acts as a Firewall for our subnets in VPC
It is applicable at the subnet level
NACL rules are applicable resources, which are part of a subnet
NACL is Stateless (Any rule for the incoming traffic must be manually added to outgoing traffic)
In NACL, we can configure both allow and deny rules
One Subnet can have only one NACL
However, one NACL can be added to multiple subnets
NACL acts as first level of defense for incoming traffic while security group acts as first level of defense for outgoing traffic
We have Subnet first then VM inside, so first level of defense for incoming is NACL but for outgoing is Security group

In VPC, we can find NACL

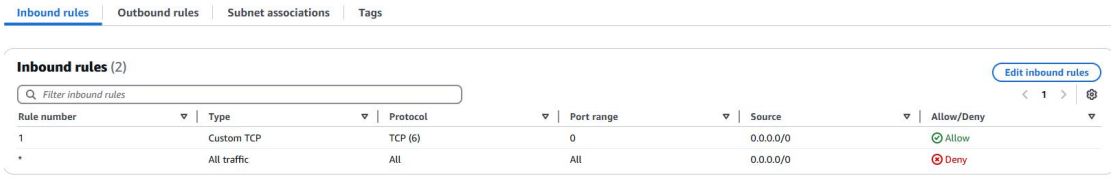


By default, 2 NACLs are created. We are using only 2 NACLs for all the subnets. Multiple NACLs cannot be used in one subnet but vice-versa is possible.

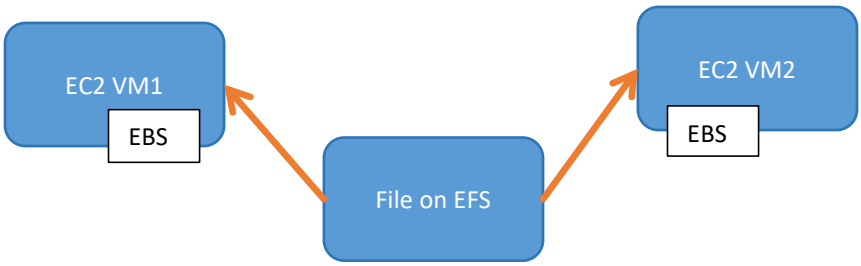
Create NACL



In NACL, we have both options: Allow and Deny



Elastic File System (EFS):
EBS --> Elastic Block Store
S3 --> unlimited storage
EFS --> File system storage --> shared that means this particular file can work with multiple resources



This file on EFS can be accessed by multiple resources at the same time

Advantage:
Create scalable file storage to be used on EC2
Fully managed by AWS, Low cost, pay for what you use, highly available and scalable performance

Create file system

Create a file system with the recommended settings shown below by choosing Create file system. To view all settings or to customize your file system, choose Customize. Learn more

Name - *optional*
Name your file system.

MyTestEFS

Name can include letters, numbers, and +-=._:/ symbols, up to 256 characters.

Virtual Private Cloud (VPC)
Choose the VPC where you want EC2 instances to connect to your file system.

vpc-0a752647f0a021f2e
default

Recommended settings

Your file system is created with the following recommended settings unless you choose to customize the file system. You will be charged for storage and throughput. We recommend reviewing pricing for these features using the AWS Pricing Calculator.

Setting	Value	Editable after creation
Throughput mode Learn more	Elastic	Yes
Transition into Infrequent Access (IA)	30 day(s) since last access	Yes
Transition into Archive	90 day(s) since last access	Yes
Transition into Standard	None	Yes
Automatic backups	Enabled	Yes
Encryption	Enabled	No

Cancel | Customize | Create file system

File ID that’s required

File systems (1)

Filter by property values

	Name	File system ID	Encrypted	Total size	Size in Standard
○	MyTestEFS	fs-03ab33f2b0d3ad481	Encrypted	6.00 KiB	6.00 KiB

I am using the defaultVM

```
   ,     #_
   ~\_  ####_        Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
[ec2-user@ip-172-31-21-85 ~]$
[ec2-user@ip-172-31-21-85 ~]$
[ec2-user@ip-172-31-21-85 ~]$
[ec2-user@ip-172-31-21-85 ~]$
```

[ec2-user@ip-172-31-21-85 ~]$ sudo yum install -y amazon-efs-utils

```
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing        :
  Installing       : stunnel-5.58-1.amzn2023.0.2.x86_64
  Running scriptlet: stunnel-5.58-1.amzn2023.0.2.x86_64
  Installing       : amazon-efs-utils-2.1.0-1.amzn2023.x86_64
  Running scriptlet: amazon-efs-utils-2.1.0-1.amzn2023.x86_64
  Verifying        : amazon-efs-utils-2.1.0-1.amzn2023.x86_64
  Verifying        : stunnel-5.58-1.amzn2023.0.2.x86_64

Installed:
  amazon-efs-utils-2.1.0-1.amzn2023.x86_64                                  stunnel-5.58-1.amzn2023.0.2.x86_64

Complete!
[ec2-user@ip-172-31-21-85 ~]$
```

```
[ec2-user@ip-172-31-21-85 ~]$
[ec2-user@ip-172-31-21-85 ~]$ sudo mkdir efsdir
[ec2-user@ip-172-31-21-85 ~]$
[ec2-user@ip-172-31-21-85 ~]$ ls
efsdir
[ec2-user@ip-172-31-21-85 ~]$
[ec2-user@ip-172-31-21-85 ~]$
```

Command for mounting
Copy the EFS file system ID

File systems (1)

Filter by property values

	Name	File system ID	Encrypted	Total size	Size in Standard	Size in IA	Size in Archive
○	MyTestEFS	fs-03ab33f2b0d3ad481	Encrypted	6.00 KiB	6.00 KiB	0 Bytes	0 Bytes

Attach EFS File system ID to VM
[ec2-user@ip-172-31-21-85 ~]$
[ec2-user@ip-172-31-21-85 ~]$ sudo mount -t efs -o tls fs-03ab33f2b0d3ad481:/ efsdir

[ec2-user@ip-172-31-21-85 ~]$ sudo mount -t efs -o tls fs-03ab33f2b0d3ad481:/ efsdir
[ec2-user@ip-172-31-21-85 ~]$ cd efsdir/
[ec2-user@ip-172-31-21-85 efsdir]$ ls

[ec2-user@ip-172-31-21-85 efsdir]$ sudo touch demo.txt
[ec2-user@ip-172-31-21-85 efsdir]$ ls -l
total 4
-rw-r--r--. 1 root root 0 Mar 31 03:10 demo.txt

We have attached EFS to default-VM

Now opening public-EC2

☐	default-VM	i-04cf51658a03b7f44	Running	t2.n
☑	public-EC2	i-09132869fe2ce9fe2	Running	t2.n

Open public-EC2 in a different terminal window

```
   ~~  \_#####\
   ~~     \###|
   ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-202
    ~~       V~' '->
     ~~~         /
       ~~._.   _/
          _/ _/
        _/m/'
Last login: Mon Mar 31 00:41:24 2025 from 99.228.11.52
[ec2-user@ip-10-0-0-23 ~]$
[ec2-user@ip-10-0-0-23 ~]$
[ec2-user@ip-10-0-0-23 ~]$
```

[ec2-user@ip-10-0-0-23 ~]$ sudo yum install -y amazon-efs-utils

[ec2-user@ip-10-0-0-23 ~]$ sudo mount -t efs -o tls fs-03ab33f2b0d3ad481:/ efsdir
Failed to resolve "fs-03ab33f2b0d3ad481.efs.ca-central-1.amazonaws.com" - check that your file system ID is correct, and ensure that the VPC has an EFS mount target for this file system ID.

Your EC2 instance and EFS must be in the same VPC.

Lets create one more EC2 in the same VPC

☐	public-EC2	i-09132869fe2ce9fe2	Stopped	t2.micro
☑	efs-ec2	i-0728f26f52d9746b8	Running	t2.micro

[ec2-user@ip-172-31-24-90 ~]$
[ec2-user@ip-172-31-24-90 ~]$ sudo yum install -y amazon-efs-utils

We mount EFS once again on this new EC2

[ec2-user@ip-172-31-24-90 ~]$ sudo mkdir efsdir
[ec2-user@ip-172-31-24-90 ~]$ sudo mount -t efs -o tls fs-03ab33f2b0d3ad481:/ efsdir
[ec2-user@ip-172-31-24-90 ~]$ cd efsdir
[ec2-user@ip-172-31-24-90 efsdir]$ ls -l
total 4
-rw-r--r--. 1 root root 0 Mar 31 03:10 demo.txt
[ec2-user@ip-172-31-24-90 efsdir]$

We see the same demo.txt in this efsdir

```
b'mount.nfs4: mount point efsdir does not exist'
[ec2-user@ip-172-31-24-90 ~]$ sudo mkdir efsdir
[ec2-user@ip-172-31-24-90 ~]$ sudo mount -t efs -o tls fs-03ab33f2b0d3ad481:/ efsdir
[ec2-user@ip-172-31-24-90 ~]$ cd efsdir
[ec2-user@ip-172-31-24-90 efsdir]$ ls -l
total 4
-rw-r--r--. 1 root root 0 Mar 31 03:10 demo.txt
[ec2-user@ip-172-31-24-90 efsdir]$
```

[ec2-user@ip-172-31-24-90 efsdir]$ sudo touch newFile.txt
[ec2-user@ip-172-31-24-90 efsdir]$ ls -l
total 8
-rw-r--r--. 1 root root 0 Mar 31 03:10 demo.txt
-rw-r--r--. 1 root root 0 Mar 31 03:26 newFile.txt

We have two files on efs-ec2 new VM

Go to the other EC2:
[ec2-user@ip-172-31-21-85 efsdir]$ ls -l
total 8
-rw-r--r--. 1 root root 0 Mar 31 03:10 demo.txt
-rw-r--r--. 1 root root 0 Mar 31 03:26 newFile.txt

We can see newFile.txt in the default-VM, which we created actually in efs-ec2

```
[ec2-user@ip-172-31-21-85 efsdir]$
[ec2-user@ip-172-31-21-85 efsdir]$ ls -l
total 8
-rw-r--r--. 1 root root 0 Mar 31 03:10 demo.txt
-rw-r--r--. 1 root root 0 Mar 31 03:26 newFile.txt
[ec2-user@ip-172-31-21-85 efsdir]$
```

Steps to work with EFS practicals:
1. Login into AWS console ---> Services ---> EFS (it is in Storage also) --> Create FileSystem
2. Get File System ID
3. Create EC2 instances --> two different instances
4. Login into EC2 instance using Moba
5. Sudo yum install -y amazon-efs-utils
6. Create a folder/directory
7. sudo mkdir efsdir
8. Mounting File system:
9. sudo mount -t efs -o tls <file-id> :/ efsdir
10. cd efsdir
11. Create files in the directory
12. Then Connect to the second EC2 instance
13. Repeat the same steps
14. Check behavior of shared file system check efsdir