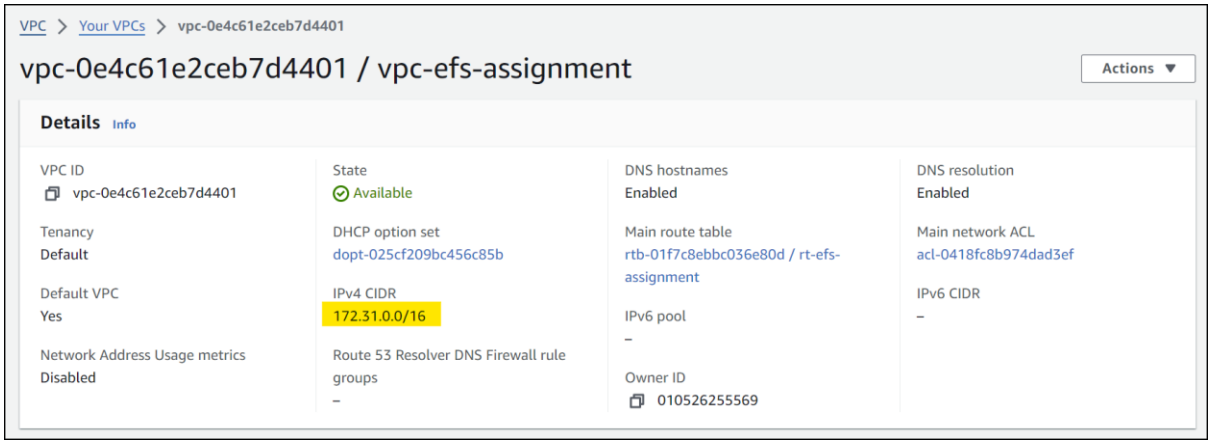
Assignment – VPC

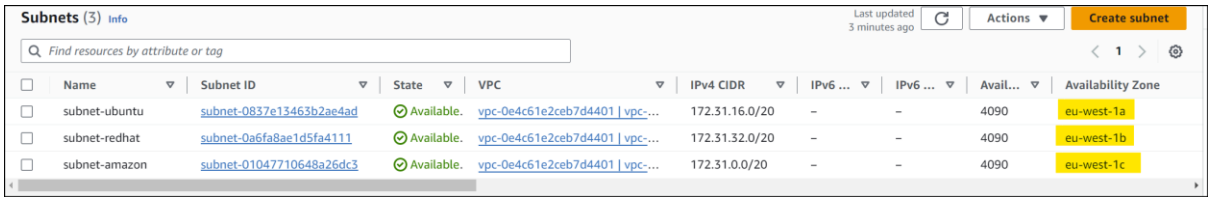
1) VPC Creation

Created VPC ‘vpc-efs-assignment’ with CIDR 172.31.0.0/16



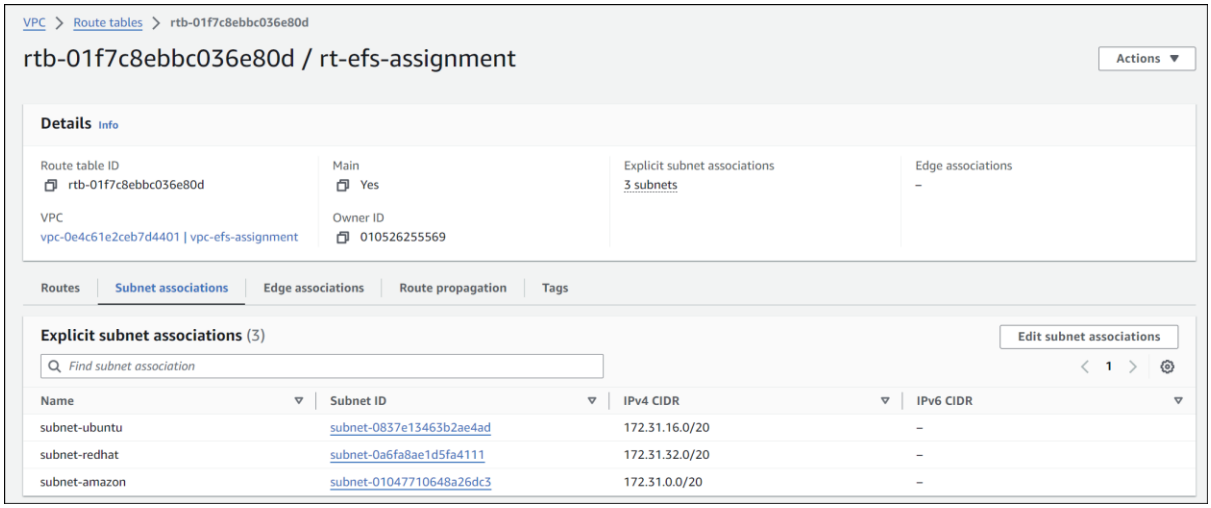
2) Subnet Creation

Created subnets in different AZs for high availability

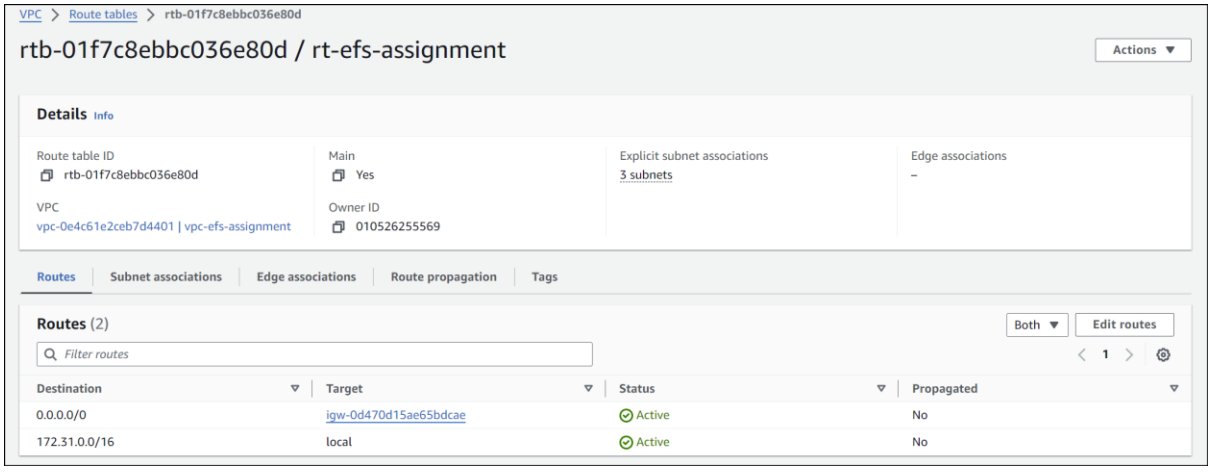


3) Route Table

Created one route table and associated all three subnets under it as the routing rule for all can be same.



Subnet association

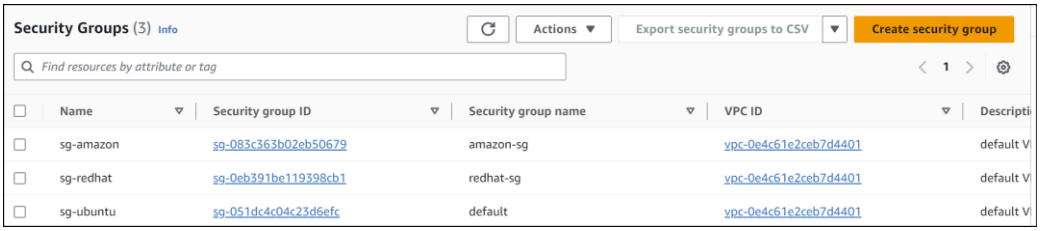


Routing rules

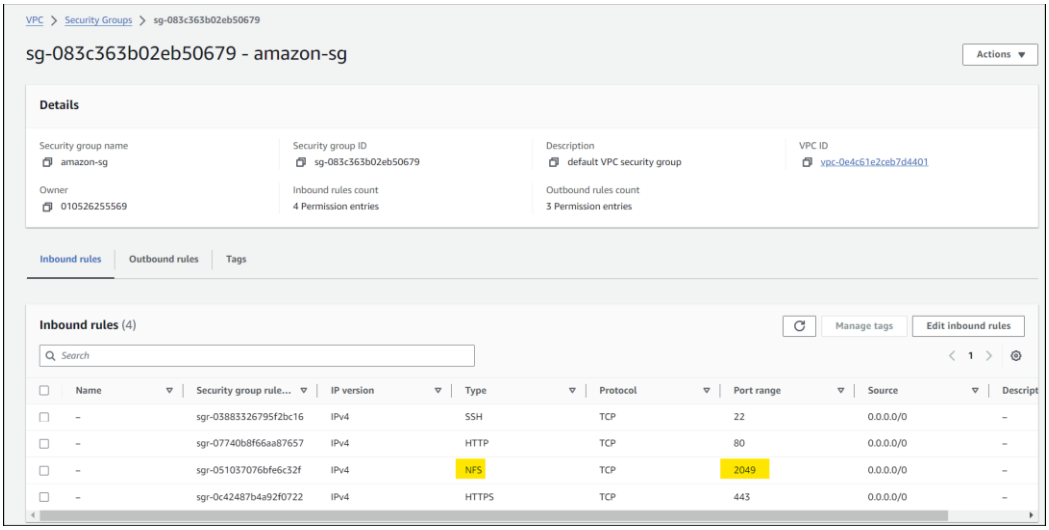
4) Security Groups

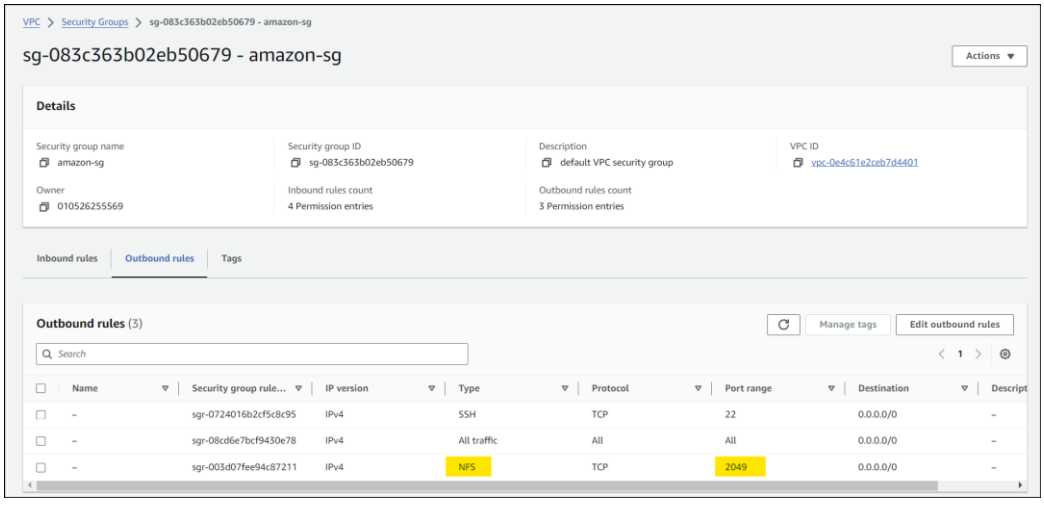
Created security groups to secure the ENI and also created inbound & outbound rules for them. All the rules have been granted access on port 2049 for enabling NFS on the servers.

NOTE: Only 1 SG can also be created for this scenario



Security Groups

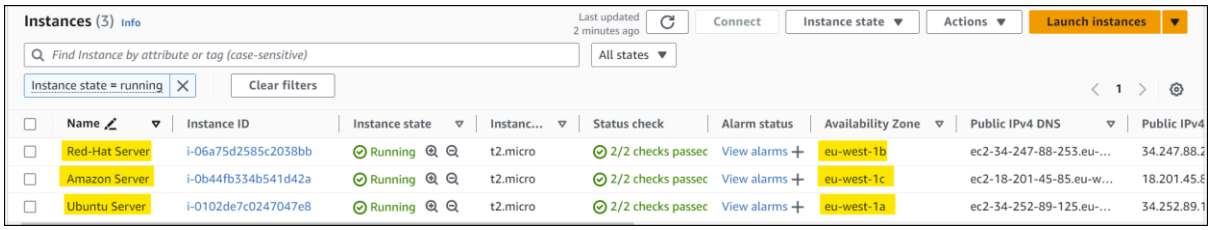




The rules are same for all security groups as all need to linked to EFS.

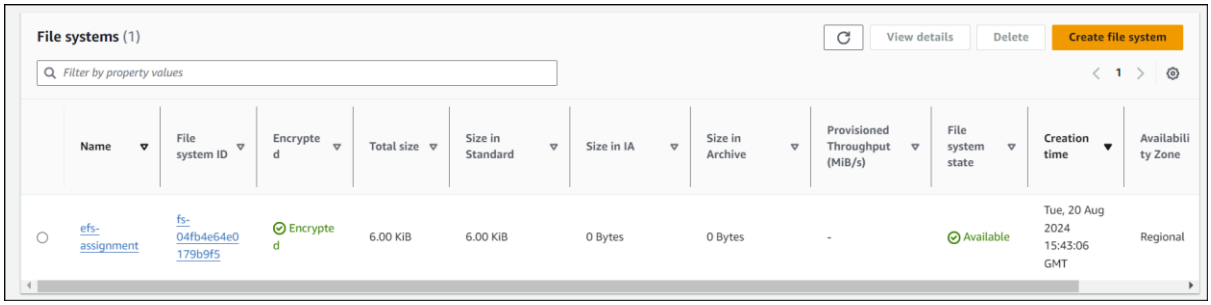
5) EC2 Creation

Created three EC2 instances, Red Hat Linux, Amazon Linux and Ubuntu and attached each to subnets in different AZs for high availability.

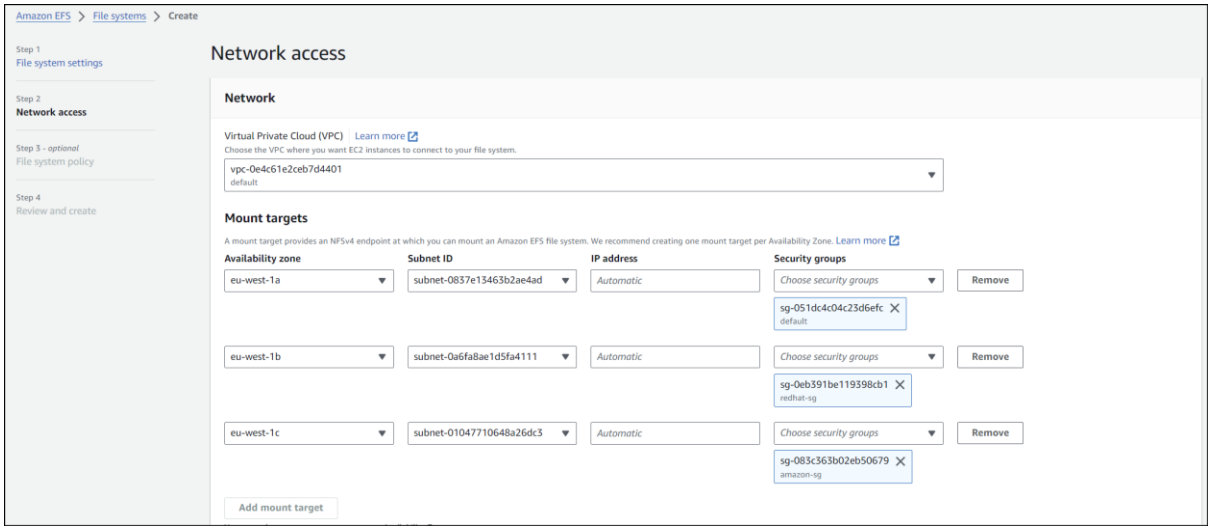


6) EFS Creation

Created three EC2 instances, Red Hat Linux, Amazon Linux and Ubuntu and attached each to subnets in different AZs for high availability.



The mount targets were configured on security groups for Ubuntu, Red Hat Linux and Amazon Linux respectively.

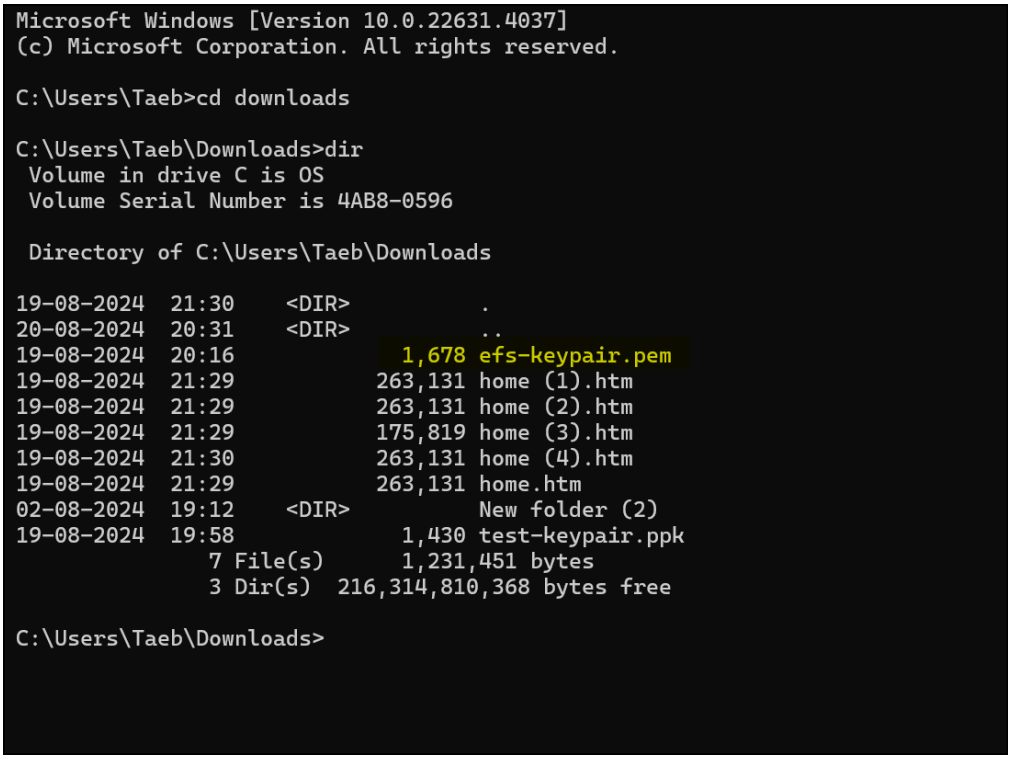


8) Mounting EC2

Launch each EC2 instances and install NFS utils on them

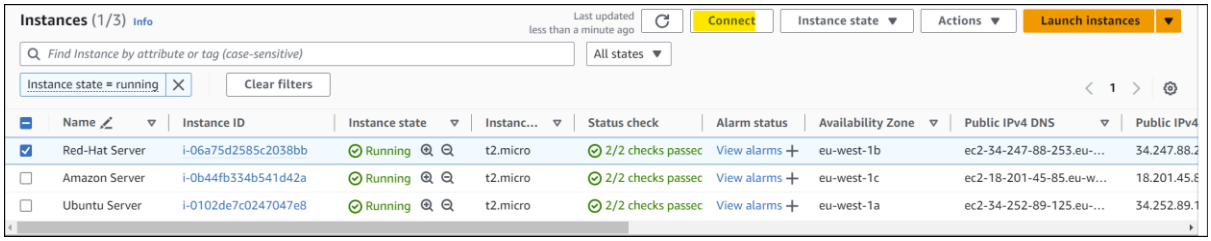
a) Red Hat Linux EC2

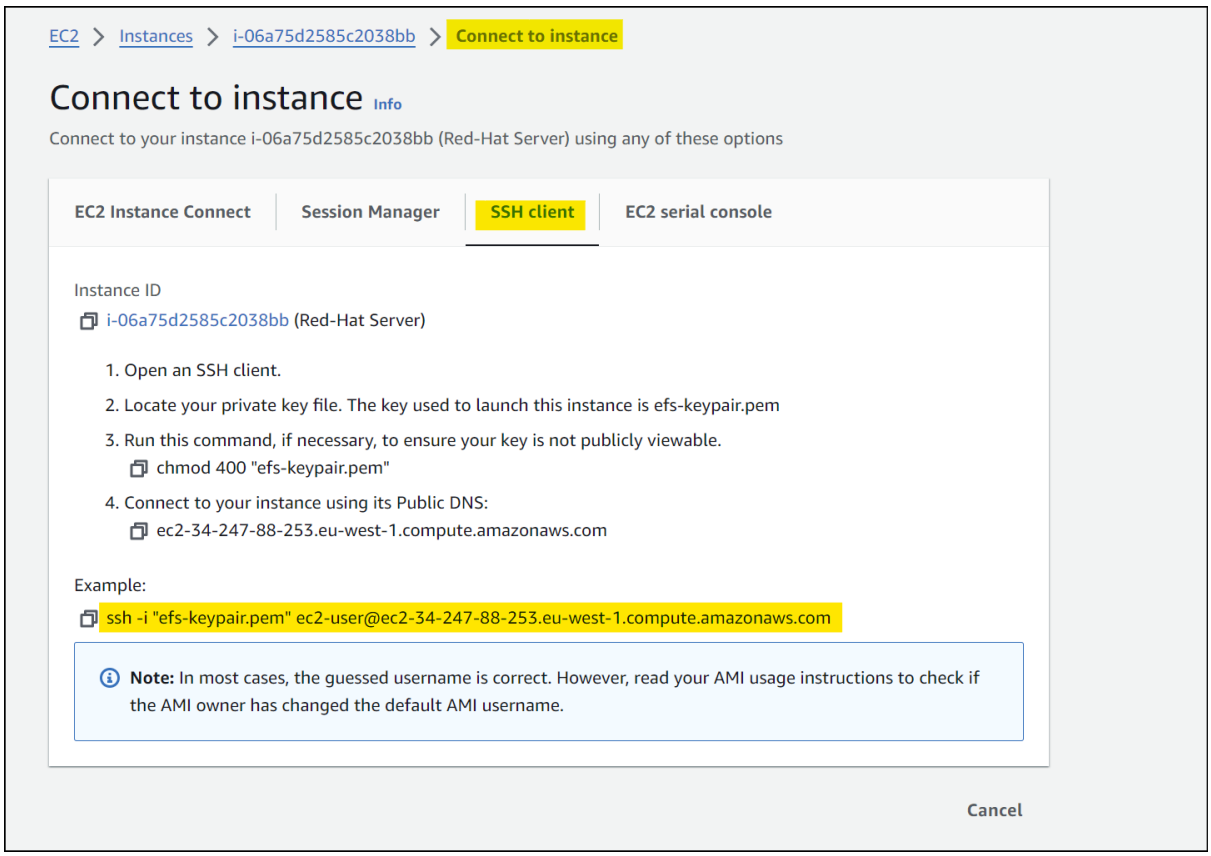
Red Hat Linux instance cannot be launched directly from AWS console. To launch the instance, open command prompt and navigate to the folder where key pair file is saved.



Check for Key Pair

Once, we have moved to the necessary folder, we can connect to the instance using its public DNS which can be located in the 'SSH Client' tab when Connect button is clicked.





Copy the URL from the page as highlighted in the screenshot and in command prompt, paste it in directory where key pair is placed

```
C:\Users\Taeb\Downloads>ssh -i "efs-keypair.pem" ec2-user@ec2-34-247-88-253.eu-west-1.compute.amazonaws.com
Register this system with Red Hat Insights: insights-client --register
Create an account or view all your systems at https://red.ht/insights-dashboard
Last login: Tue Aug 20 15:01:41 2024 from 111.125.235.31
[ec2-user@ip-172-31-38-64 ~]$
```

Once the connection is established instance, install NFS utils

```
[root@ip-172-31-38-64 ec2-user]# sudo yum install -y nfs-utils
```

```
Installed:
  gssproxy-0.8.4-6.el9.x86_64          keyutils-1.6.3-1.el9.x86_64          libev-4.33-5.el9.x86_64
  libnfsidmap-1:2.5.4-25.el9.x86_64    libtirpc-1.3.3-8.el9_4.x86_64        libverto-libev-0.3.2-3.el9.x86_64
  nfs-utils-1:2.5.4-25.el9.x86_64      quota-1:4.06-6.el9.x86_64            quota-nls-1:4.06-6.el9.noarch
  rpcbind-1.2.6-7.el9.x86_64           sssd-nfs-idmap-2.9.4-6.el9_4.x86_64

Complete!
[root@ip-172-31-38-64 ec2-user]#
```

Create a Mount Point

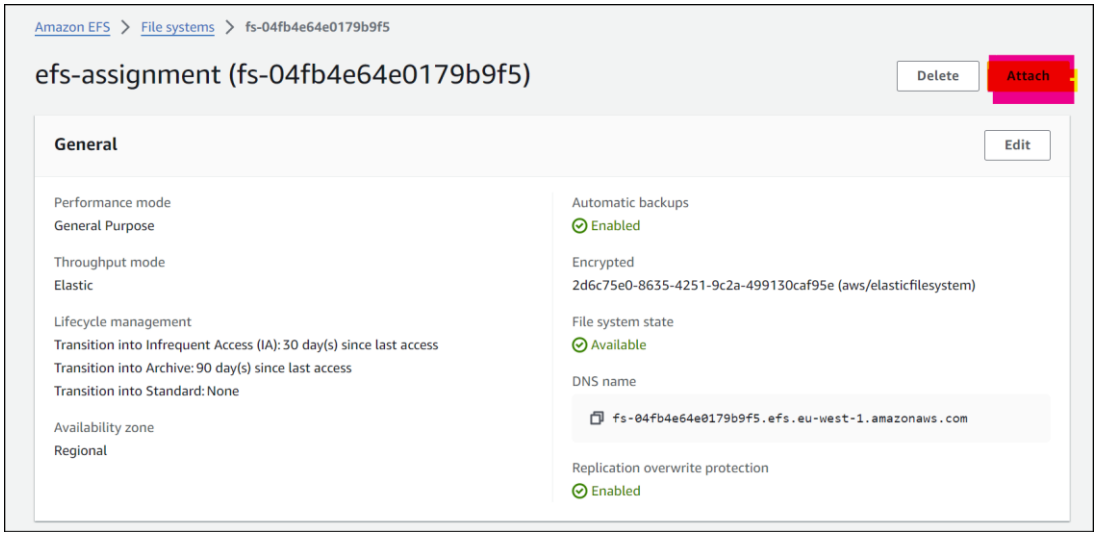
```
[root@ip-172-31-38-64 ec2-user]# mkdir efsTest
```

Verify folder creation

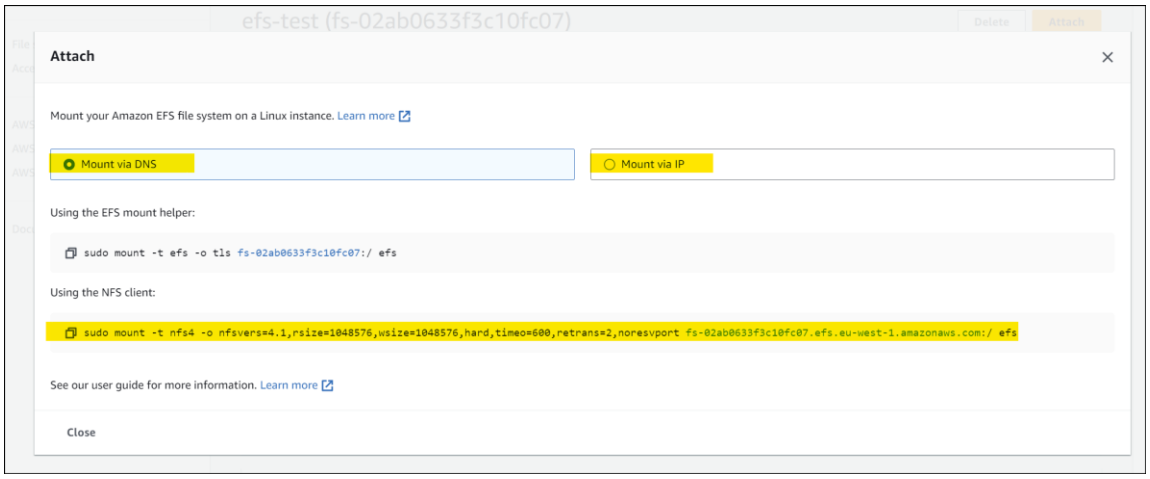
```
[root@ip-172-31-38-64 ec2-user]# ll
total 0
drwxr-xr-x. 2 root root 6 Aug 20 16:22 efsTest
```

Mount the EFS

Go to EFS instance created and click ‘Attach’



Select the mounting technique and copy the mounting URL



Paste the URL in command prompt and at the end replace efs with the mounting folder

```
[root@ip-172-31-38-64 ec2-user]# sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsize=1048576,hard,timeo=600,retrans=2,noresvport fs-02ab0633f3c10fc07.efs.
eu-west-1.amazonaws.com:/ efsTest
[root@ip-172-31-38-64 ec2-user]#
```

Verify mounting

```
[root@ip-172-31-38-64 ec2-user]# df -h
Filesystem                                      Size  Used Avail Use% Mounted on
devtmpfs                                        4.0M     0  4.0M   0% /dev
tmpfs                                           383M     0  383M   0% /dev/shm
tmpfs                                           154M  4.4M  149M   3% /run
/dev/xvda4                                      8.8G  1.6G  7.3G  18% /
/dev/xvda3                                      960M  168M  793M  18% /boot
/dev/xvda2                                      200M  7.1M  193M   4% /boot/efi
tmpfs                                            77M     0   77M   0% /run/user/1000
fs-02ab0633f3c10fc07.efs.eu-west-1.amazonaws.com:/  8.0E     0  8.0E   0% /home/ec2-user/efsTest
[root@ip-172-31-38-64 ec2-user]#
```

b) Amazon Linux instance

Launch Amazon Linux EC2 instance and check if NFS utils is installed

```
A newer release of "Amazon Linux" is available.
  Version 2023.5.20240819:
Run "/usr/bin/dnf check-release-update" for full release and version update info
   ,     #_
   ~\_   ####_        Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
Last login: Tue Aug 20 15:08:34 2024 from 18.202.216.52
[ec2-user@ip-172-31-10-205 ~]$ sudo su
[root@ip-172-31-10-205 ec2-user]# sudo yum install -y amazon-efs-utils
Last metadata expiration check: 4:11:06 ago on Tue Aug 20 12:22:04 2024.
Package amazon-efs-utils-2.0.4-1.amzn2023.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[root@ip-172-31-10-205 ec2-user]#
```

i-0b44fb334b541d42a (Amazon Server)

PublicIPs: 18.201.45.85 PrivateIPs: 172.31.10.205

Once verified, create mounting folder with the same commands as used in red hat Linux server

Mounting of folder completed on Amazon Linux EC2

```
[root@ip-172-31-10-205 /]# sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsize=1048576,h
.amazonaws.com:/ efsAmazon
[root@ip-172-31-10-205 /]# df -h
Filesystem                                      Size  Used Avail Use% Mounted on
devtmpfs                                        4.0M     0  4.0M   0% /dev
tmpfs                                           475M     0  475M   0% /dev/shm
tmpfs                                           190M  440K  190M   1% /run
/dev/xvda1                                      8.0G  1.6G  6.4G  20% /
tmpfs                                           475M     0  475M   0% /tmp
/dev/xvda128                                     10M  1.3M  8.7M  13% /boot/efi
tmpfs                                            95M     0   95M   0% /run/user/1000
fs-02ab0633f3c10fc07.efs.eu-west-1.amazonaws.com:/  8.0E     0  8.0E   0% /efsAmazon
[root@ip-172-31-10-205 /]#
```

c) Ubuntu instance

Launch Ubuntu EC2 instance and check if NFS utils is installed

```
root@ip-172-31-16-88:/home/ubuntu# sudo apt-get update
sudo apt-get install -y nfs-common
Hit:1 http://eu-west-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://eu-west-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://eu-west-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu jammy-security InRelease
Reading package lists... Done
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
nfs-common is already the newest version (1:2.6.1-1ubuntu1.2).
0 upgraded, 0 newly installed, 0 to remove and 35 not upgraded.
root@ip-172-31-16-88:/home/ubuntu#
```

i-0102de7c0247047e8 (Ubuntu Server)

PublicIPs: 34.252.89.125 PrivateIPs: 172.31.16.88

Once verified, create mounting folder with the same commands as used in Red Hat Linux and Amazon Linux servers

Mounting of folder completed on Ubuntu EC@

```
root@ip-172-31-16-88:/# sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsize=1048576,hard,time
azonaws.com:/ efsUbuntu
root@ip-172-31-16-88:/# df -h
Filesystem                                      Size  Used Avail Use% Mounted on
/dev/root                                       7.6G  2.0G  5.6G  27% /
tmpfs                                           475M     0  475M   0% /dev/shm
tmpfs                                           190M  876K  189M   1% /run
tmpfs                                           5.0M     0  5.0M   0% /run/lock
/dev/xvda15                                     105M  6.1M   99M   6% /boot/efi
tmpfs                                            95M  4.0K   95M   1% /run/user/1000
fs-02ab0633f3c10fc07.efs.eu-west-1.amazonaws.com:/  8.0E     0  8.0E   0% /efsUbuntu
root@ip-172-31-16-88:/#
```

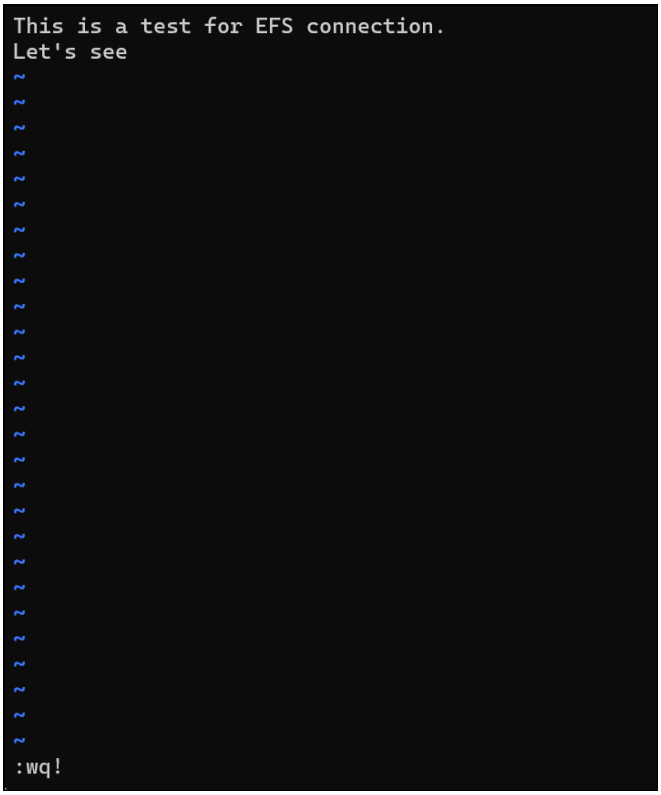
9) Test EFS establishment

Create a sample file in the mounted folder and write some text into it. If EFS connection was established successfully between the servers, the other EC2 instances should also be able to access the file.

Move to the mounted folder and create a file

```
[root@ip-172-31-38-64 /]# cd efsRedHat
[root@ip-172-31-38-64 efsRedHat]# vi TestEFSConnection.txt
```

Write to the file



Note: To save the file, press ESC button, then enter colon, press ‘s’ to save and ‘q’ to quit and ‘!’ and hit ENTER.

Verify file content

```
[root@ip-172-31-38-64 efsRedHat]# cat TestEFSConnection.txt
This is a test for EFS connection.
Let's see
[root@ip-172-31-38-64 efsRedHat]#
```

10) Verify the created file in other servers

Ubuntu

Move to the mounted folder and check if file exists

```
root@ip-172-31-16-88:/efsUbuntu# ll
total 12
drwxr-xr-x  2 root root 6144 Aug 20 17:14 ./
drwxr-xr-x 20 root root 4096 Aug 20 16:45 ../
-rw-r--r--  1 root root   45 Aug 20 17:14 TestEFSConnection.txt
root@ip-172-31-16-88:/efsUbuntu#
```

```
root@ip-172-31-16-88:/efsUbuntu# cat TestEFSConnection.txt
This is a test for EFS connection.
Let's see
root@ip-172-31-16-88:/efsUbuntu#
```

The file exists; hence, we can conclude that this server is mounted properly to the EFS

Amazon Linux

Move to the mounted folder and check if file exists

```
[root@ip-172-31-10-205 /]# cd efsAmazon
```

```
[root@ip-172-31-10-205 efsAmazon]# ll
total 4
-rw-r--r--. 1 root root 45 Aug 20 17:14 TestEFSConnection.txt
```

```
[root@ip-172-31-10-205 efsAmazon]# cat TestEFSConnection.txt
This is a test for EFS connection.
Let's see
[root@ip-172-31-10-205 efsAmazon]#
```

As all servers are able to access the file created in one of the mounted folders, we can conclude that the EFS connection was established successfully