

Connecting EFS to two instances in two availability zones for a shared volume

Amazon Elastic File System (EFS)

Amazon EFS is a simple, **serverless, elastic, set-and-forget file system** that automatically grows and shrinks as you add and remove files with no need for management or provisioning. You can use Amazon EFS with Amazon EC2, AWS Lambda, Amazon ECS, Amazon EKS and other AWS compute instances, or with on-premises servers.

EFS can be **accessed by multiple EC2 instances** simultaneously. This allows multiple instances to read and write data to the same file system, enabling collaboration and data sharing among applications and instances. It provides low-latency and high-throughput performance

EFS can only be used for Linux operating systems



Amazon EFS supports the Network File System version 4 (NFSv4.1 and NFSv4.0) protocol, so the applications and tools that you use today work seamlessly with Amazon EFS

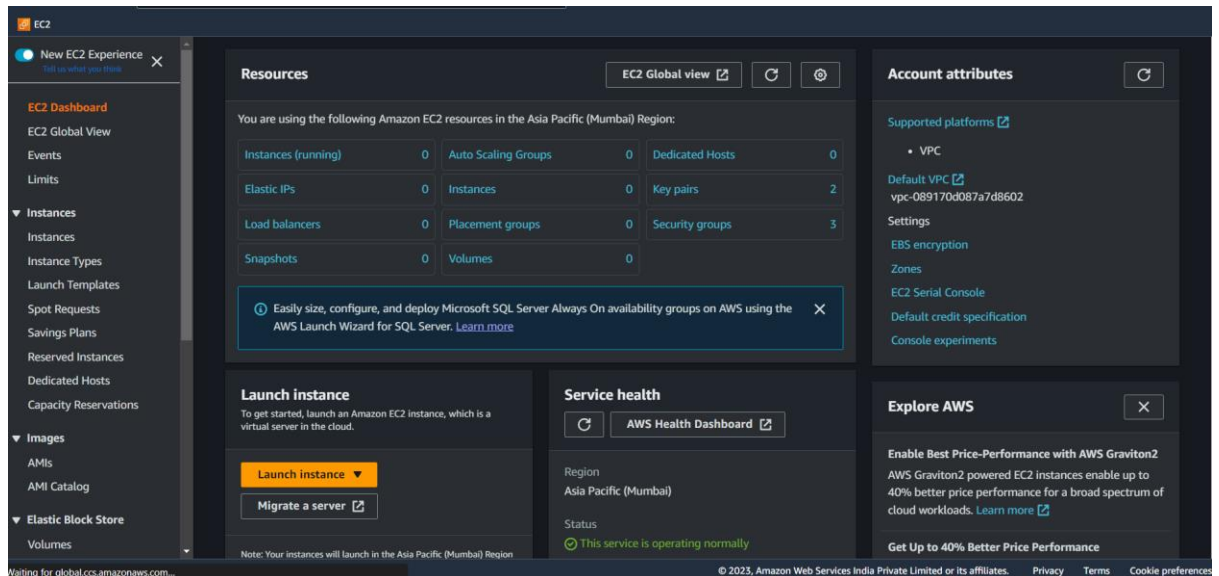
Amazon EFS offers the following storage class options for different use cases:

- **Standard storage classes** (Recommended) – EFS Standard and EFS Standard–Infrequent Access (Standard–IA), which offer Multi-AZ resilience and the highest levels of durability and availability.
- **One Zone storage classes** – EFS One Zone and EFS One Zone–Infrequent Access (EFS One Zone–IA), which offer you the choice of additional savings by choosing to save your data in a single Availability Zone.

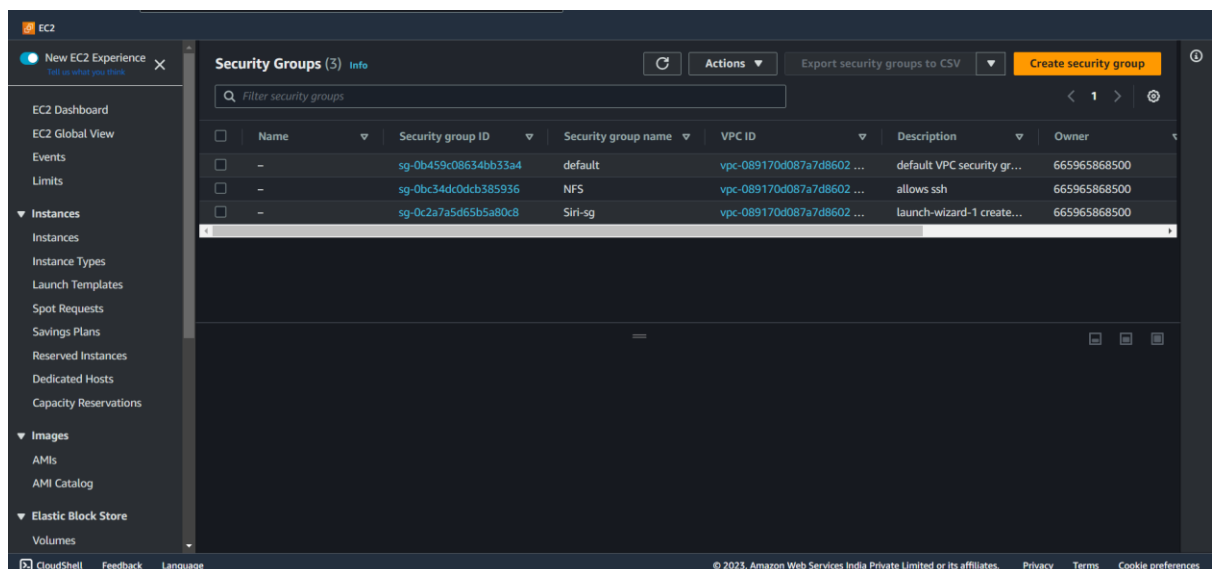
Amazon EFS supports two forms of encryption for file systems: encryption in transit and encryption at rest. NFS client access to EFS is controlled by both AWS Identity and Access Management (IAM)

Steps to create an EFS

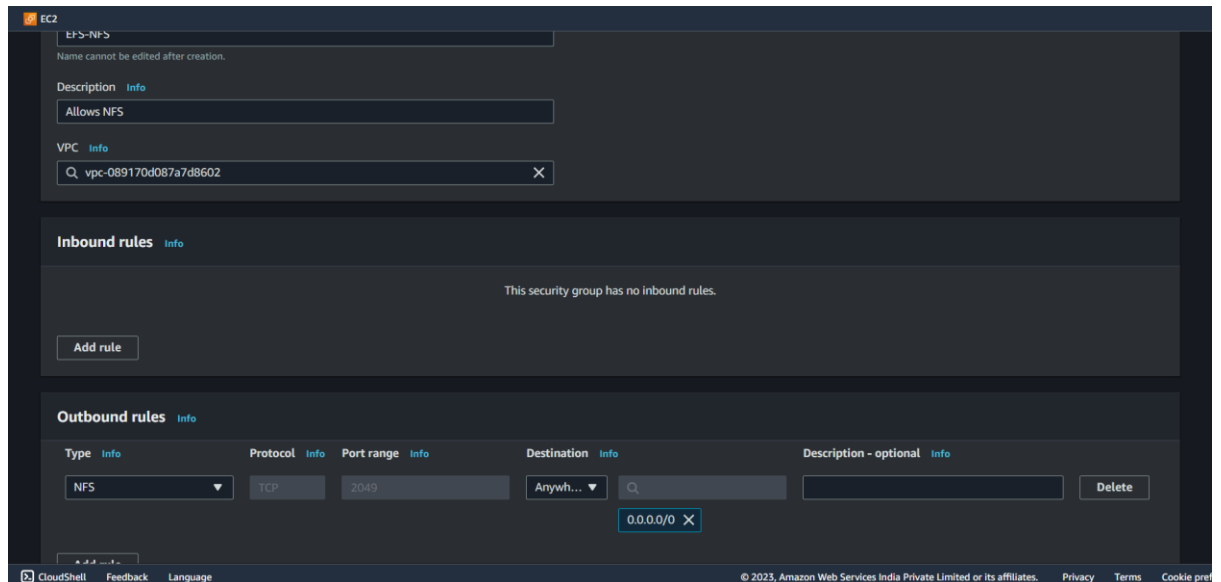
1. First Log in to your AWS free tier account and open your AWS management console and click on services and go to EC2 dashboard



2. Now click on security groups and click on **create new security group**.
A security group controls inbound and outbound traffic for EC2 instances, allowing you to define rules that govern which traffic is allowed to access the instances.
Here we have to use a **NFS protocol**



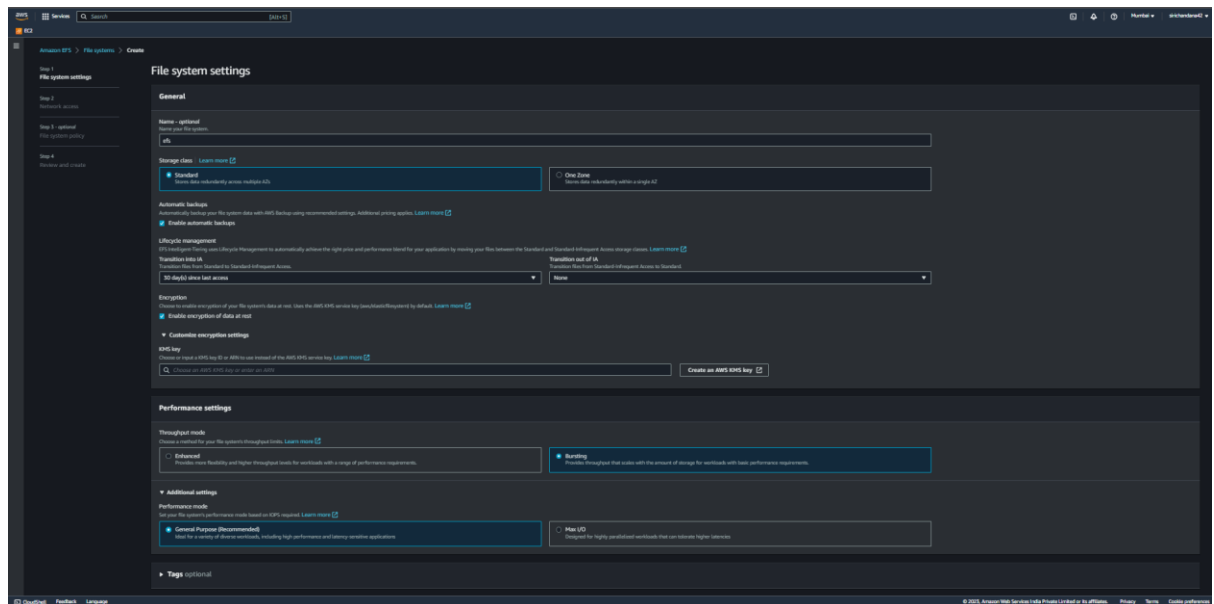
3. Now set a **Name** and **description** for your security group and add **inbound rule as NFS** and set the destination IP address as IPv4 anywhere and click on create security group



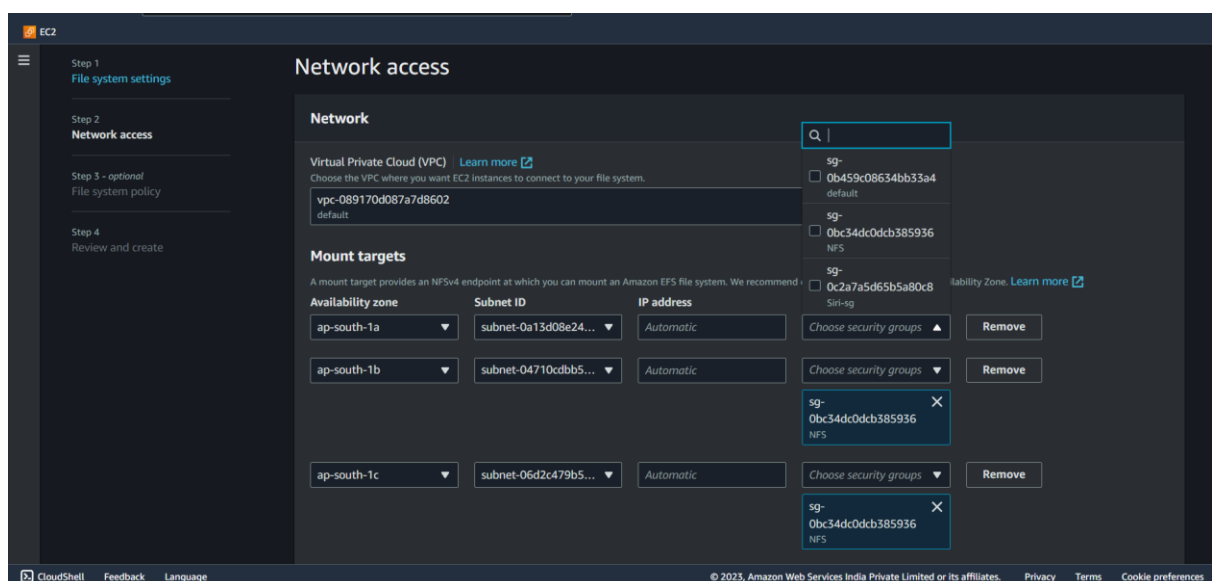
4. Now go to AWS Console home and click on **EFS Service** and click on **Create file system** then click on customize to customise your options



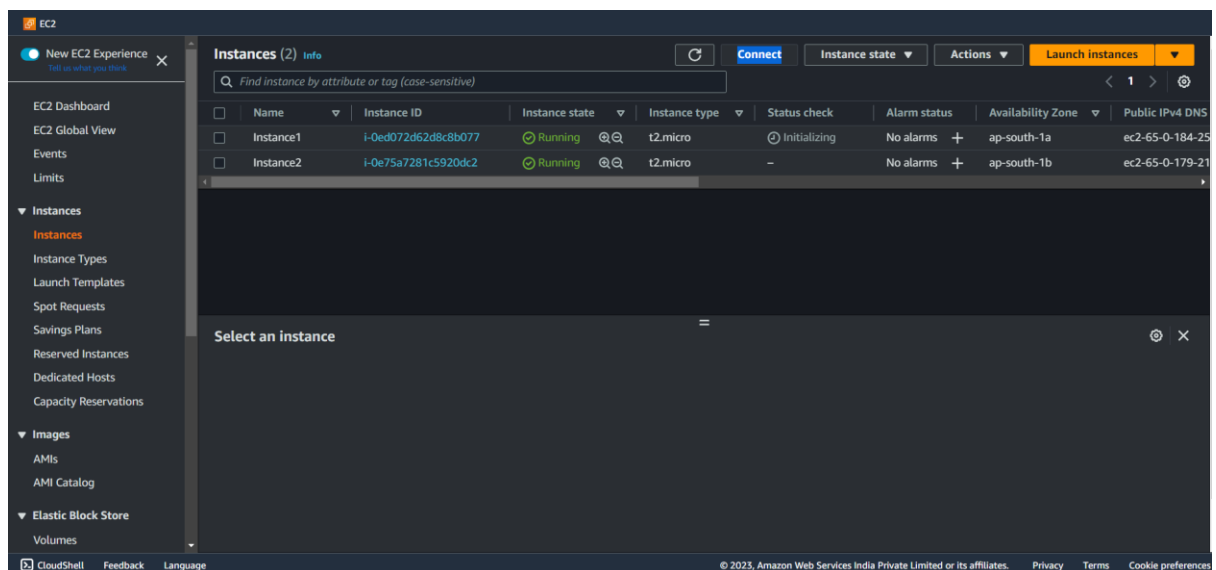
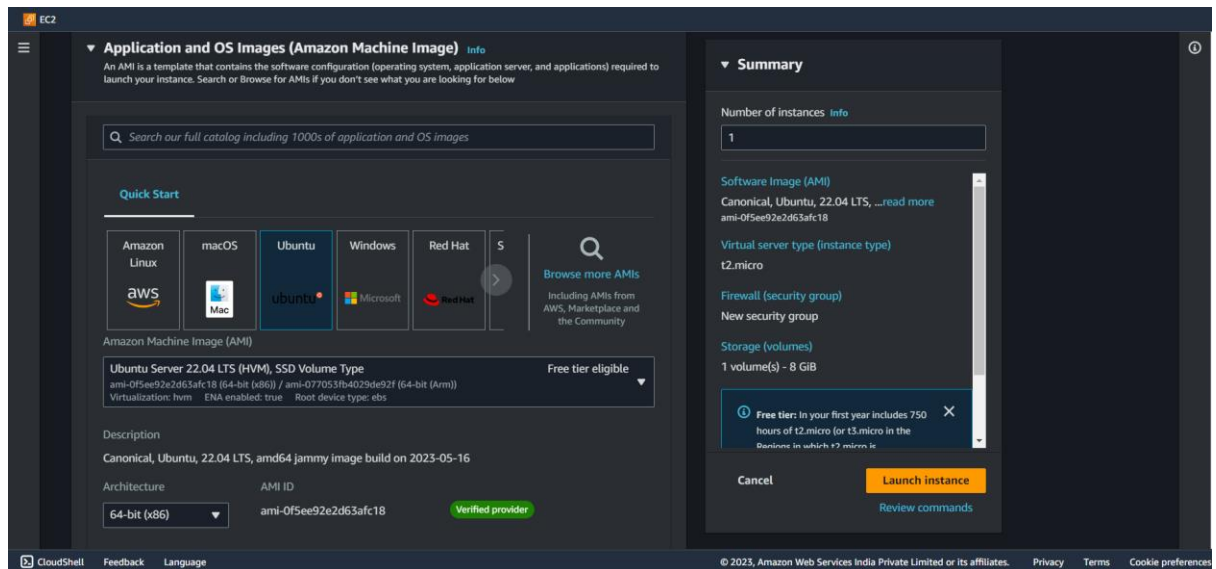
- Now set respective name and **storage class as standard** and enable or disable the automatic backup. Since the account is free tier set the **throughput as bursting** and **performance mode as general purpose**.



- Now select the **network access settings** and edit the **mount target settings** set the security group as NFS for the availability zones where you want to access the EFS and click on next and now review the settings and create a NFS.



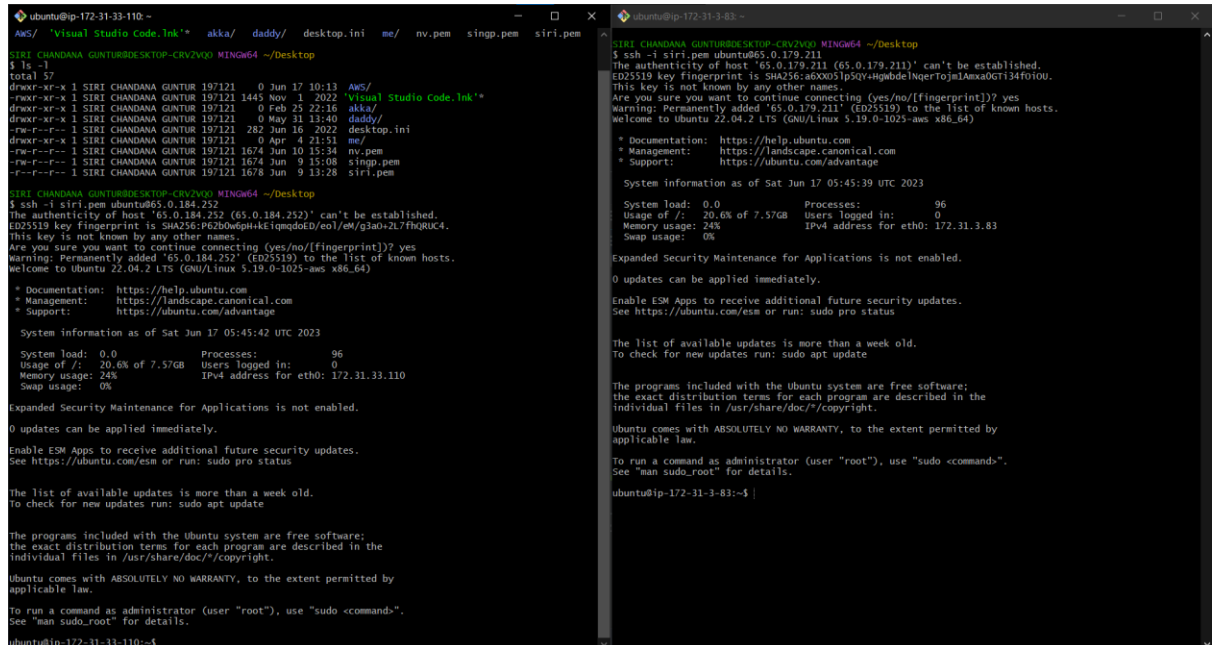
7. Now go to EC2 dashboard and create two instance in two different availability zones with **Linux operating system only**. Since EFS is only available to devices with Linux OS only



Now connect to these instances using git bash

Git Bash

1. Connect to the instances using the SSH client using git bash by clicking
ssh -i nv.pem ubuntu@public ip address



```
ubuntu@ip-172-31-33-110 ~
AKS/ 'Visual Studio Code, Ink' akka/ daddy/ desktop.ini me/ nv.pem singp.pem siri.pem
SIRI CHANDANA GUNTURIBESTOP-CRV2V00 MINGW64 ~/Desktop
$ ls -l
total 57
drwxr-xr-x 1 SIRI CHANDANA GUNTUR 197121  0 Jun 17 10:13 AWS/
drwxr-xr-x 1 SIRI CHANDANA GUNTUR 197121 1445 Nov  1 2022 'Visual Studio Code, Ink'
drwxr-xr-x 1 SIRI CHANDANA GUNTUR 197121  0 Feb 25 22:16 akka/
drwxr-xr-x 1 SIRI CHANDANA GUNTUR 197121  0 May 31 13:40 daddy/
drwxr-xr-x 1 SIRI CHANDANA GUNTUR 197121 282 Jun 16 2022 desktop.ini
drwxr-xr-x 1 SIRI CHANDANA GUNTUR 197121  0 Apr  4 21:51 me/
drwxr-xr-x 1 SIRI CHANDANA GUNTUR 197121 1674 Jun 10 15:34 nv.pem
drwxr-xr-x 1 SIRI CHANDANA GUNTUR 197121 1674 Jun  9 15:08 singp.pem
drwxr-xr-x 1 SIRI CHANDANA GUNTUR 197121 1678 Jun  9 13:28 siri.pem
SIRI CHANDANA GUNTURIBESTOP-CRV2V00 MINGW64 ~/Desktop
$ ssh -i siri.pem ubuntu@65.0.184.252
The authenticity of host '65.0.184.252 (65.0.184.252)' can't be established.
ED25519 key fingerprint is SHA256:P6ZbDw6H4K1qgdoD/eo/ew/g3a0zL7fH0UC4.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '65.0.184.252' (ED25519) to the list of known hosts.
Welcome to Ubuntu 22.04.2 LTS (GNU/Linux 5.19.0-1025-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

System information as of Sat Jun 17 05:45:42 UTC 2023

System load:  0.0          Processes:    96
Usage of /:   20.6% of 7.5GB Users logged in:    0
Memory usage: 24%         IPv4 address for eth0: 172.31.33.110
Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-33-110:~$

ubuntu@ip-172-31-3-83 ~
$ ssh -i siri.pem ubuntu@65.0.179.211
The authenticity of host '65.0.179.211 (65.0.179.211)' can't be established.
ED25519 key fingerprint is SHA256:a6X005lp5QY+HgwdeINqerTojmlAmxaOGT134foiOU.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '65.0.179.211' (ED25519) to the list of known hosts.
Welcome to Ubuntu 22.04.2 LTS (GNU/Linux 5.19.0-1025-aws x86_64)

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System information as of Sat Jun 17 05:45:39 UTC 2023

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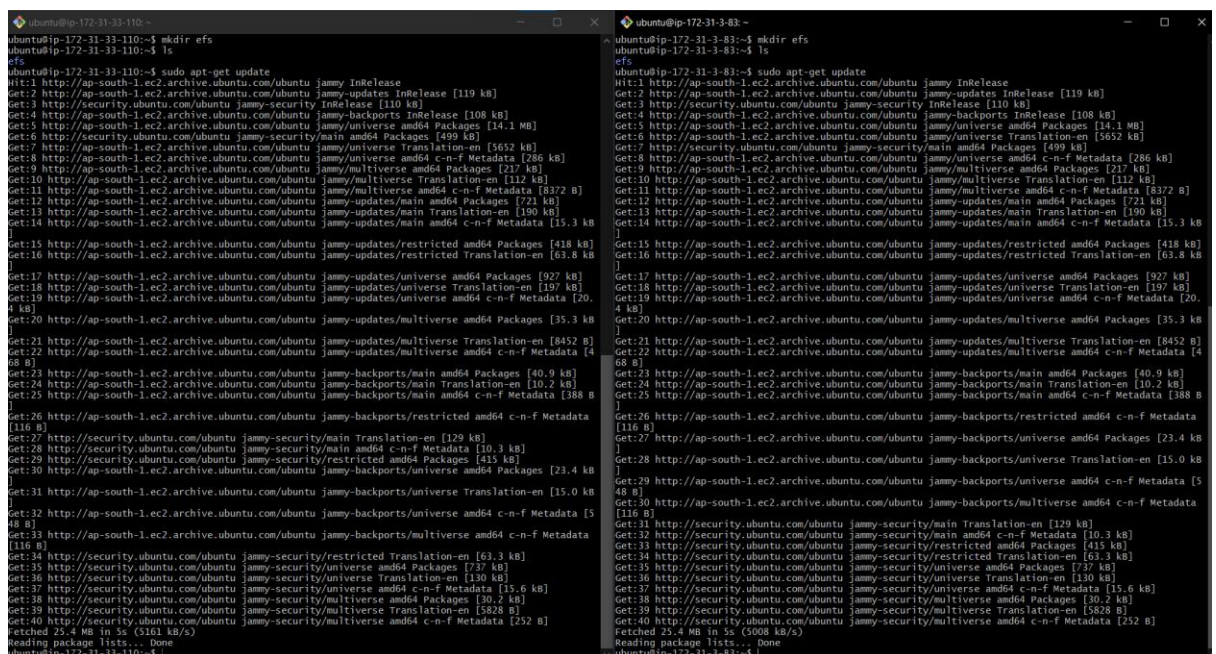
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See "man sudo_root" for details.

ubuntu@ip-172-31-3-83:~$
```

2. Now update the git bash using the command
sudo apt-get update
Now your git will be updated to latest version.

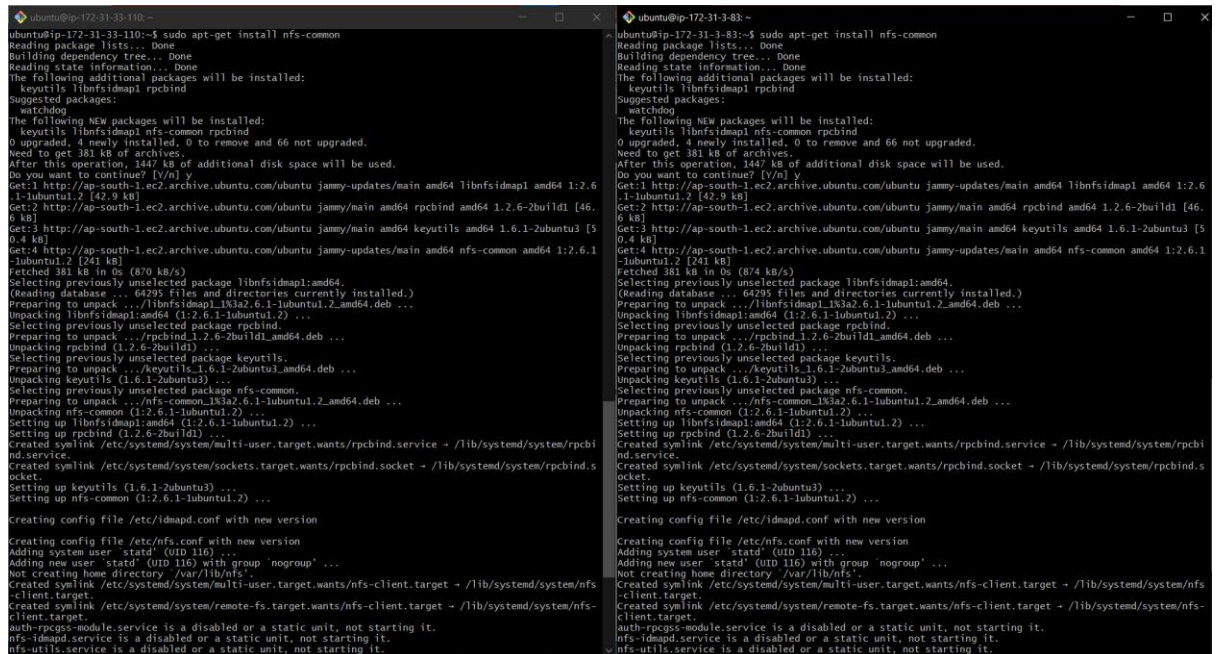


```
ubuntu@ip-172-31-33-110:~$ sudo apt-get update
Hit:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:3 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Get:4 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [108 kB]
Get:5 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [14.1 MB]
Get:6 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [499 kB]
Get:7 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe Translation-en [5652 kB]
Get:8 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 c-n-f Metadata [286 kB]
Get:9 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [217 kB]
Get:10 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse Translation-en [112 kB]
Get:11 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 c-n-f Metadata [8372 B]
Get:12 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [721 kB]
Get:13 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [190 kB]
Get:14 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [15.3 kB]
Get:15 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [418 kB]
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Get:22 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 c-n-f Metadata [4.68 kB]
Get:23 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [40.9 kB]
Get:24 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main Translation-en [10.2 kB]
Get:25 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 c-n-f Metadata [388 B]
Get:26 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/restricted amd64 c-n-f Metadata [116 B]
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Get:39 http://security.ubuntu.com/ubuntu jammy-security/multiverse Translation-en [5828 B]
Get:40 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [252 B]
Fetched 25.4 MB in 1s (6361 kB/s)
Reading package lists... Done
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ubuntu@ip-172-31-3-83:~$ sudo apt-get update
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ubuntu@ip-172-31-3-83:~$
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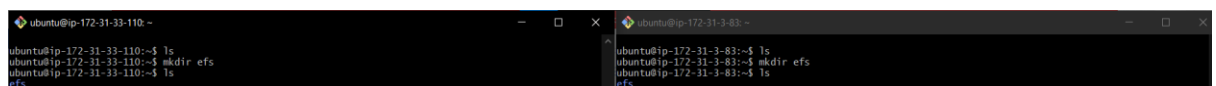

- Now Install Network File System client into your instance virtual machines using the command

sudo apt-get install nfs-common



```
ubuntu@ip-172-31-33-110:~$ sudo apt-get install nfs-common
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  keyutils libnfsidmap1 rpcbind
Suggested packages:
  watchdog
The following NEW packages will be installed:
  keyutils libnfsidmap1 nfs-common rpcbind
0 upgraded, 4 newly installed, 0 to remove and 66 not upgraded.
Need to get 381 kB of archives.
After this operation, 1447 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libnfsidmap1 amd64 1:2.6.1-1ubuntu1.2 [42.9 kB]
Get:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 rpcbind amd64 1.2.6-2build1 [46.6 kB]
Get:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 keyutils amd64 1.6.1-2ubuntu3 [50.4 kB]
Get:4 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 nfs-common amd64 1:2.6.1-1ubuntu1.2 [241 kB]
Fetched 381 kB in 0s (870 kB/s)
Selecting previously unselected package libnfsidmap1:amd64.
(Reading database ... 6295 files and directories currently installed.)
Preparing to unpack .../libnfsidmap1_1k3a2.6.1-1ubuntu1.2_and64.deb ...
Unpacking libnfsidmap1:amd64 (1:2.6.1-1ubuntu1.2) ...
Selecting previously unselected package rpcbind.
Preparing to unpack .../rpcbind_1.2.6-2build1_and64.deb ...
Unpacking rpcbind (1.2.6-2build1) ...
Selecting previously unselected package keyutils.
Preparing to unpack .../keyutils_1.6.1-2ubuntu3_and64.deb ...
Unpacking keyutils (1.6.1-2ubuntu3) ...
Selecting previously unselected package nfs-common.
Preparing to unpack .../nfs-common_1k3a2.6.1-1ubuntu1.2_and64.deb ...
Unpacking nfs-common (1:2.6.1-1ubuntu1.2) ...
Setting up libnfsidmap1:amd64 (1:2.6.1-1ubuntu1.2) ...
Setting up rpcbind (1.2.6-2build1) ...
Created symlink /etc/systemd/system/multi-user.target.wants/rpcbind.service → /lib/systemd/system/rpcbind.service.
Created symlink /etc/systemd/system/sockets.target.wants/rpcbind.socket → /lib/systemd/system/rpcbind.socket.
Setting up keyutils (1.6.1-2ubuntu3) ...
Setting up nfs-common (1:2.6.1-1ubuntu1.2) ...
Creating config file /etc/idmapd.conf with new version
Creating config file /etc/nfs.conf with new version
Adding system user 'statd' (UID 116) ...
Adding new user 'statd' (UID 116) with group 'nogroup' ...
Not creating home directory '/var/lib/nfs'.
Created symlink /etc/systemd/system/multi-user.target.wants/nfs-client.target → /lib/systemd/system/nfs-client.target.
Created symlink /etc/systemd/system/remote-fs.target.wants/nfs-client.target → /lib/systemd/system/nfs-client.target.
auth-rpcgss-module.service is a disabled or a static unit, not starting it.
nfs-idmapd.service is a disabled or a static unit, not starting it.
nfs-utils.service is a disabled or a static unit, not starting it.
```

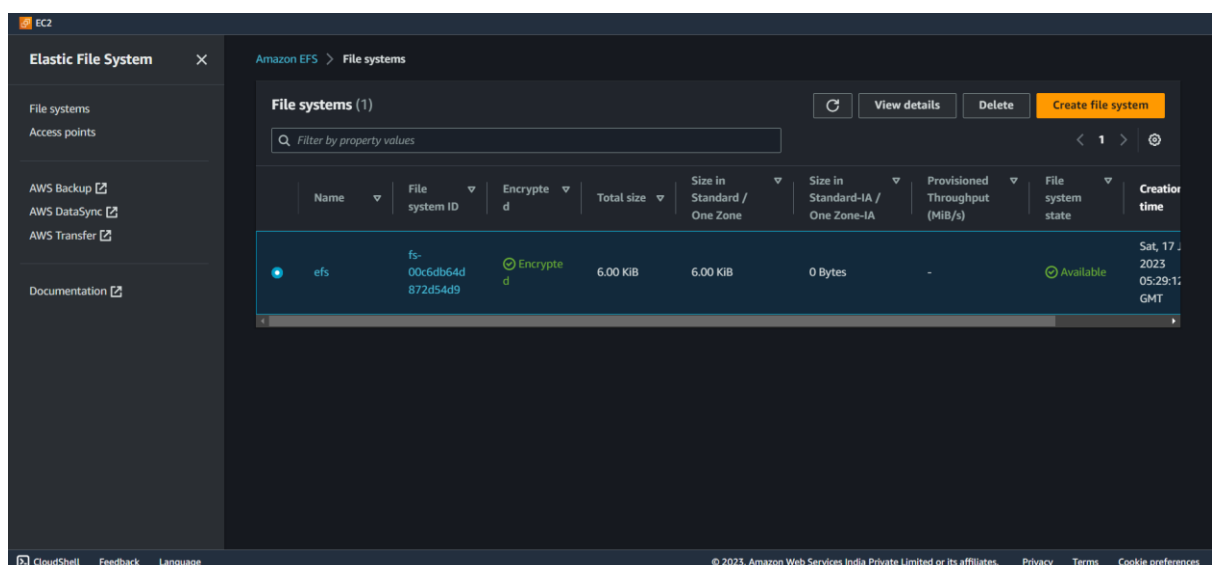
- Now make a directory in both the instances to mount the EFS



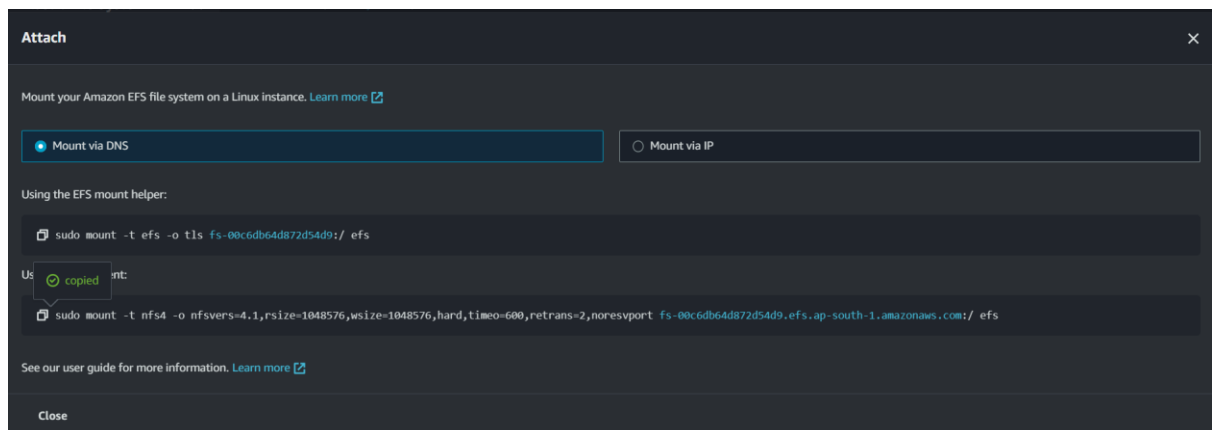
```
ubuntu@ip-172-31-33-110:~$ ls
ubuntu@ip-172-31-33-110:~$ mkdir efs
ubuntu@ip-172-31-33-110:~$ ls
efs

ubuntu@ip-172-31-3-83:~$ ls
ubuntu@ip-172-31-3-83:~$ mkdir efs
ubuntu@ip-172-31-3-83:~$ ls
efs
```

- Now go to EFS dash board and select the file system and click on view details



- Now click on attach and and copy the NFS client command and run it on git bash to mount the target



```
ubuntu@ip-172-31-33-110:~$ sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsiz=1048576,hard,timeo=600,retrans=2,noresvport fs-00c6db64d872d54d9.efs.ap-south-1.amazonaws.com:/ efs
ubuntu@ip-172-31-33-110:~$
```

```
ubuntu@ip-172-31-3-83:~$ sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsiz=1048576,hard,timeo=600,retrans=2,noresvport fs-00c6db64d872d54d9.efs.ap-south-1.amazonaws.com:/ efs
ubuntu@ip-172-31-3-83:~$
```

Now that your directories are mounted to the EFS whenever you create a file in that directory in either of the systems it will reflect to both the instances since EFS is a shared volume. Now create a file in instance 1 and check whether it is available on instance 2 or not.

```
ubuntu@ip-172-31-33-110:~/efs$ sudo su
root@ip-172-31-33-110:/home/ubuntu/efs# touch file.txt
root@ip-172-31-33-110:/home/ubuntu/efs# ls
file.txt
root@ip-172-31-33-110:/home/ubuntu/efs#
```

```
ubuntu@ip-172-31-3-83:~/efs$ cd efs
ubuntu@ip-172-31-3-83:~/efs$ sudo su
root@ip-172-31-3-83:/home/ubuntu/efs# ls
file.txt
root@ip-172-31-3-83:/home/ubuntu/efs# D
```

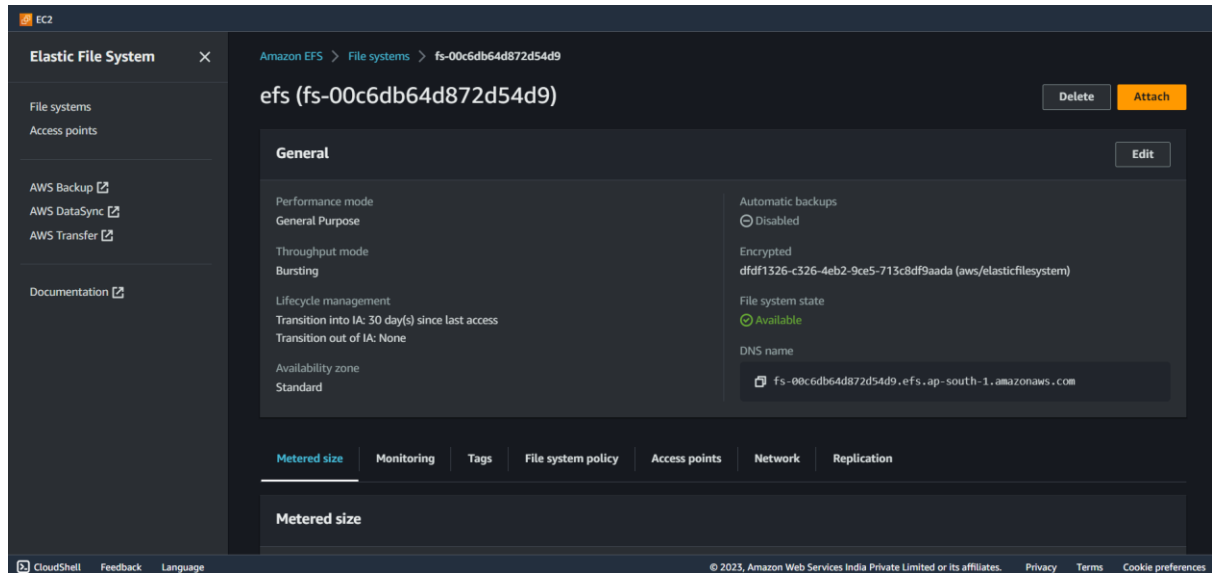
Now create another file in instance 2 and check if it is available in instance 1

```
ubuntu@ip-172-31-33-110:~/efs$ sudo su
root@ip-172-31-33-110:/home/ubuntu/efs# touch file.txt
root@ip-172-31-33-110:/home/ubuntu/efs# ls
file.txt
root@ip-172-31-33-110:/home/ubuntu/efs# ls
file.txt file2.txt
root@ip-172-31-33-110:/home/ubuntu/efs#
```

```
ubuntu@ip-172-31-3-83:~/efs$ sudo su
root@ip-172-31-3-83:/home/ubuntu/efs# ls
file.txt
root@ip-172-31-3-83:/home/ubuntu/efs# touch file2.txt
root@ip-172-31-3-83:/home/ubuntu/efs# ls
file.txt file2.txt
root@ip-172-31-3-83:/home/ubuntu/efs#
```


Cleaning up workspace

1. Click on EFS and click on **delete**



2. Click on Ec2 dashboard and go to instances and select the instances and **terminate** the instances

