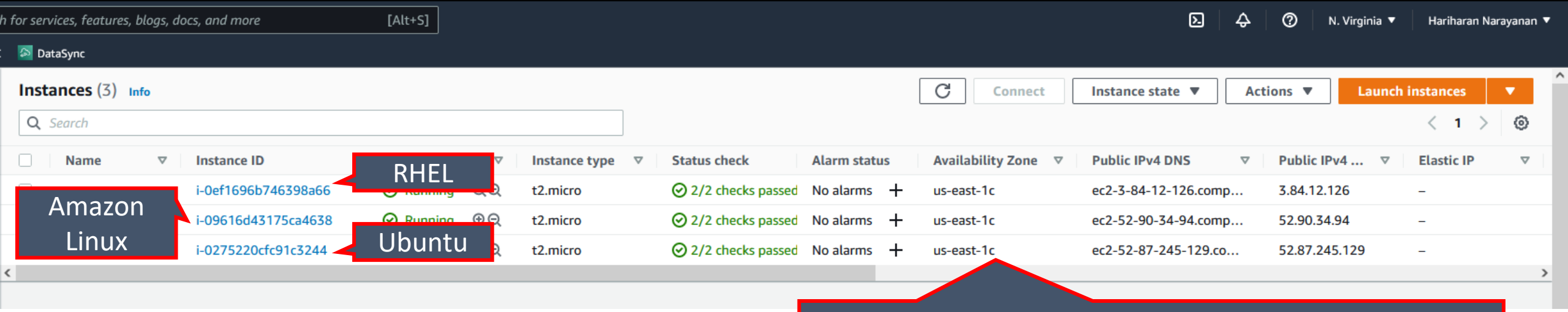
Module-2: EC2 and EFS Assignment - 3

You have been asked to:

1. Create an EFS and connect it to 3 different EC2 instances. Make sure the all instances have different Operating System. For instance, Ubuntu, Red Hat Linux and Amazon Linux 2



1. Use the same steps mentioned in module_2_assignment_1 to create 3 new EC2 instances

EC2 > Security Groups > Create security group

Create security group Info

A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.

2. Create a new security group for EFS only

Basic details

Security group name Info

module_2_assignment_3_efs_sg

Name cannot be edited after creation.

Description Info

Security group for EFS

VPC Info

vpc-05a4f109d9ab4c43c

Inbound rules Info

Type Info	Protocol Info	Port range Info	Source Info		Description - optional Info	
NFS	TCP	2049	Custom	sg-0b7c4fed872fd6bf2	Accept inbound connections only from EC2	Delete

Add rule

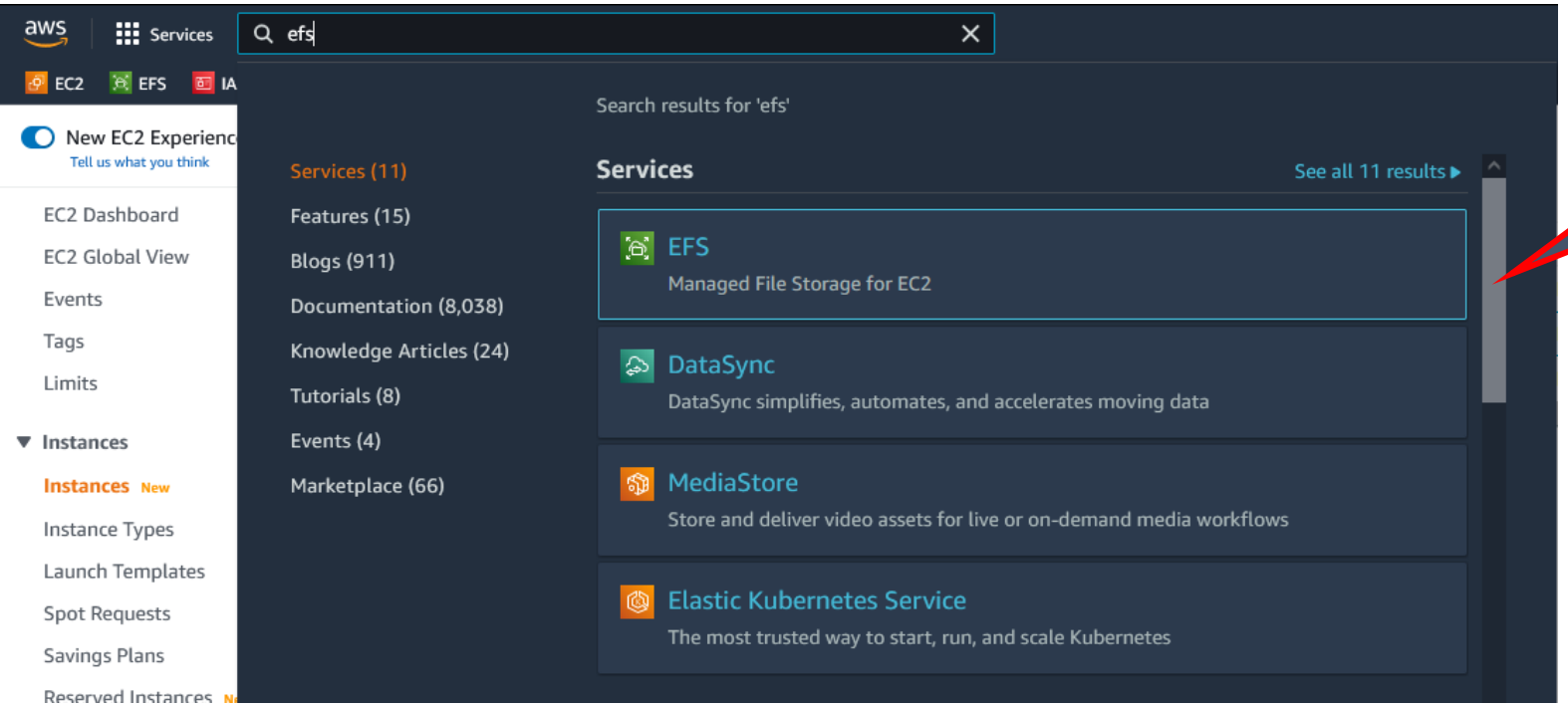
3. Create inbound rule for NFS. Provide the sg of the EC2 instances to accept incoming connections only from EC2

Outbound rules Info

Type Info	Protocol Info	Port range Info	Destination Info		Description - optional Info	
All traffic	All	All	Custom	0.0.0.0/0		Delete

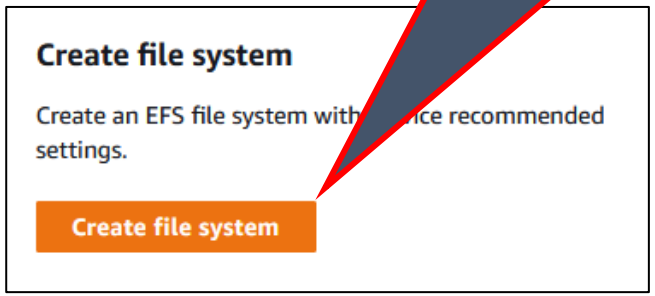
Add rule

4. Create an outbound rule to any connection.



5. Type “efs” in search bar and select EFS

6. In the EFS page, select to create new file system



Create file system

Create an EFS file system with service recommended settings. Learn more

Name - *optional*
Name your file system.

module_2_assignment_3_efs

Name must not be longer than 256 characters, and must only contain letters, numbers, and these characters: + - = . _ : /

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

vpc-05a4f109d9ab4c43c
default

Availability and durability
Choose Regional (recommended) to create a file system using regional storage classes. Choose One Zone to create a file system using One Zone storage classes. Learn more

- (•) **Regional** — Stores data redundantly across multiple AZs
- ( ) **One Zone** — Stores data redundantly within a single AZ

Cancel | Customize | Create

7. Type a name for the EFS

8. Leave default VPC as it is

9. Select Regional

10. Select Create

Success!
File system (fs-0e5b88ff7b706b44c) is available

View file system

Amazon EFS > File systems

Reduce your storage price to $0.08/GB-month* using EFS Lifecycle Management and Intelligent-Tiering. Learn more
* pricing in US East (N. Virginia) region, assumes 80% of your storage in EFS IA
What's new | Documentation | AWS Storage Blog

11. Wait until EFS status becomes “Available”

File systems (1)

Create file system

Filter by property values

Name	File system ID	Encrypted	Total size	Size in Standard / One Zone	Size in Standard-IA / One Zone-IA	Provisioned Throughput (MiB/s)	...tate	Creation time	Availability Zone
module_2_assignment_3_efs	fs-0e5b88ff7b706b44c	Encrypted	6.00 KiB	6.00 KiB	0 Bytes	-	Available	Tue, 21 Dec 2021 03:09:09 GMT	Regional

13. Select to view details

12. Select the EFS created

14. Select “Network” tab to view mount targets

15. Select “Manage”

File systems (1)

View details | Delete | Create file system

Filter by property values

1

Name	File system ID	Encrypted	Total size	Size in Standard / One Zone	Size in Standard-IA / One Zone-IA	Provisioned Throughput (MiB/s)	File system state	Creation time	Availability Zone
module_2_assignment_3_efs	fs-0e5b88ff7b706b44c	Encrypted	6.00 KiB	6.00 KiB	0 Bytes	-	Available	Tue, 21 Dec 2021 03:09:09 GMT	Regional

Metered size | Monitoring | Tags | File system policy | Access points | Network

Network

Manage

Availability zone	Mount target ID	Subnet ID	Mount target state	IP address	Network interface ID	Security groups
us-east-1a	fsmt-066d9c25eaadb8eb7	subnet-06e773d674ee5fd8a	Available	172.31.47.44	eni-08a6cd60e12a16157	sg-0b7c4fed872fd6bf2 (default)
us-east-1b	fsmt-0fb317e683c129dd1	subnet-060af38694e37fae9	Available	172.31.15.65	eni-0125b5db36c1a821e	sg-0b7c4fed872fd6bf2 (default)
us-east-1c	fsmt-07fd7bd45ff1b02fe	subnet-099436460fb3ecea4	Available	172.31.88.174	eni-070205ebbd5dcf2d7	sg-0b7c4fed872fd6bf2 (default)
us-east-1d	fsmt-066ab39dd1ac51049	subnet-0e40cf59fbb32cddb	Available	172.31.31.127	eni-03f5f1a32ce67d830	sg-0b7c4fed872fd6bf2 (default)
us-east-1e	fsmt-077ac7d8eb95eb995	subnet-01d3cea107de0cdf4	Available	172.31.55.51	eni-08de4ef23f6eed2f0	sg-0b7c4fed872fd6bf2 (default)
us-east-1f	fsmt-0f4dcc96e5344377b	subnet-026908bd9ed58b20f	Available	172.31.77.207	eni-058672dc17114ece7	sg-0b7c4fed872fd6bf2 (default)

16. For each mount target repeat the below 2 steps (a) and (b) …

Mount targets

A mount target provides an NFSv4 endpoint at which you can mount an Amazon EFS file system. We recommend creating one mount target per Availability Zone. Learn more

Availability zone	Subnet ID	IP address	Security groups	
us-east-1a	subnet-06e773d674ee5fd8a	172.31.47.44	Choose security groups	Remove
us-east-1b				Remove
us-east-1c	subnet-099436460fb3ecea4	172.31.88.174	sg-0b7c4fed872fd6bf2 default	Remove
us-east-1d	subnet-0e40cf59fbb32cddb	172.31.31.127	Choose security groups sg-0b7c4fed872fd6bf2 default	Remove
us-east-1e	subnet-01d3cea107de0cdf4	172.31.55.51	Choose security groups sg-0b7c4fed872fd6bf2 default	Remove
us-east-1f	subnet-026908bd9ed58b20f	172.31.77.207	Choose security groups sg-0b7c4fed872fd6bf2 default	Remove

Security groups dropdown options:
- sg-01d747e72dfeb06ec module_2_assignment_3_sg
- sg-04f57fb97e97266c4 launch-wizard-2
- sg-0b7c4fed872fd6bf2 default
- sg-0bb7bca627f494701 launch-wizard-1

(a) Select the security group created in slide 2 steps 2-4

(a) Delete the default security group assigned

Add mount target

You can only create one mount target per Availability Zone.

Cancel Save

17. Save

18. Login by SSH into RHEL instance

```
$ ssh -i '/c/Users/harihn/Downloads/personal/IIT_Roorkee_Advanced_Certification_in_Cloud_Computing_&_DevOps/module_2_elastic_compute_and_storage_volumes/module_2_assignment_1/module2_assignment_1_key_pair.pem' ec2-user@ec2-3-84-12-126.compute-1.amazonaws.com
The authenticity of host 'ec2-3-84-12-126.compute-1.amazonaws.com (3.84.12.126)' can't be established.
ED25519 key fingerprint is SHA256:IKgbqjvDbB91rb2XHy6Mqk3xLS7f3U/gVItu7zgdm9M.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-3-84-12-126.compute-1.amazonaws.com' (ED25519) to the list of known hosts.
[ec2-user@ip-172-31-80-112 ~]$
```

19. First execute “sudo yum update”
11. Then reboot the EC2 instance

```
[ec2-user@ip-172-31-80-112 ~]$ sudo yum update -y
Updating Subscription Management repositories.
Unable to read consumer identity

This system is not registered with an entitlement server. You can use subscription-manager to register.

Red Hat Enterprise Linux 8 for x86_64 - AppStream from RHUI (RPMs)
Red Hat Enterprise Linux 8 for x86_64 - BaseOS from RHUI (RPMs)
Red Hat Ansible Engine 2 for RHEL 8 (RPMs) from RHUI
Red Hat Update Infrastructure 3 Client Configuration Server 8
Dependencies resolved.
Nothing to do.
Complete!
[ec2-user@ip-172-31-80-112 ~]$ sudo reboot
```

20. Install nfs-utils

```
[ec2-user@ip-172-31-80-112 ~]$ sudo yum install -y nfs-utils
```

21. Restart nfs

```
[ec2-user@ip-172-31-80-112 ~]$ sudo service nfs-server start
Redirecting to /bin/systemctl start nfs-server.service
```

22. Verify that nfs-server is started and running correctly

```
[ec2-user@ip-172-31-80-112 ~]$ sudo service nfs-server status
Redirecting to /bin/systemctl status nfs-server.service
● nfs-server.service - NFS server and services
   Loaded: loaded (/usr/lib/systemd/system/nfs-server.service; disabled; vendor preset: disabled)
   Active: active (exited) since Tue 2021-12-21 04:51:53 UTC; 26s ago
  Process: 5458 ExecStart=/bin/sh -c if systemctl -q is-active gssproxy; then systemctl reload gssproxy ; fi (code=exited, status=0/SUCCESS)
  Process: 5446 ExecStart=/usr/sbin/rpc.nfsd (code=exited, status=0/SUCCESS)
  Process: 5445 ExecStartPre=/usr/sbin/exportfs -r (code=exited, status=0/SUCCESS)
 Main PID: 5458 (code=exited, status=0/SUCCESS)

Dec 21 04:51:52 ip-172-31-80-112.ec2.internal systemd[1]: Starting NFS server and services...
Dec 21 04:51:53 ip-172-31-80-112.ec2.internal systemd[1]: Started NFS server and services.
```

```
$ ssh -i '/c/Users/harihn/Downloads/personal/IIT_Roorkee_Advanced_Certification_in_Cloud_Computing_&_DevOps/module_2_elastic_compute_and_storage_volumes/module_2_assignment_1/module2_assignment_1_key_pair.pem' ec2-user@ec2-52-90-34-94.compute-1.amazonaws.com
Last login: Wed Dec 22 03:14:45 2021 from ec2-18-206-107-24.compute-1.amazonaws.com

       __|  __|_  )
       _|  (     /   Amazon Linux 2 AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-172-31-85-12 ~]$
```

23. Login by SSH into AmazonLinux instance

```
Last login: Wed Dec 22 03:12:38 2021 from ec2-18-206-107-26.compute-1.amazonaws.com

       __|  __|_  )
       _|  (     /   Amazon Linux 2 AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-172-31-85-12 ~]$ sudo yum update -y
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
No packages marked for update
[ec2-user@ip-172-31-85-12 ~]$ sudo reboot
```

24. Execute “sudo yum update”
25. Then reboot the EC2 instance

```
[ec2-user@ip-172-31-85-12 ~]$ sudo yum install -y nfs-utils
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
Package 1:nfs-utils-1.3.0-0.54.amzn2.0.2.x86_64 already installed and latest version
Nothing to do
[ec2-user@ip-172-31-85-12 ~]$ sudo service nfs-server status
Redirecting to /bin/systemctl status nfs-server.service
● nfs-server.service - NFS server and services
   Loaded: loaded (/usr/lib/systemd/system/nfs-server.service; disabled; vendor preset: disabled)
   Active: inactive (dead)
[ec2-user@ip-172-31-85-12 ~]$
```

26. Verify that nfs-server is started and running correctly

```
$ ssh -i '/c/Users/harihn/Downloads/personal/IIT_Roorkee_Advanced_Certification_in_Cloud_Computing_&_DevOps/module_2_elastic_compute_and_storage_volumes/module_2_assignment_1/module2_assignment_1_key_pair.pem' ubuntu@52.87.245.129
The authenticity of host '52.87.245.129 (52.87.245.129)' can't be established.
ED25519 key fingerprint is SHA256:+fMKcL57yQSdonOp8s18QnTmV8OhtyNAHvk+ulJTL5k.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '52.87.245.129' (ED25519) to the list of known hosts.
Welcome to Ubuntu 20.04.3 LTS (GNU/Linux 5.11.0-1022-aws x86_64)
```

27. Login by SSH into Ubuntu instance

```
ubuntu@ip-172-31-85-96:~$ sudo apt update -y
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:4 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Fetched 336 kB in 0s (707 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
16 packages can be upgraded. Run 'apt list --upgradable' to see them.
ubuntu@ip-172-31-85-96:~$ sudo reboot
```

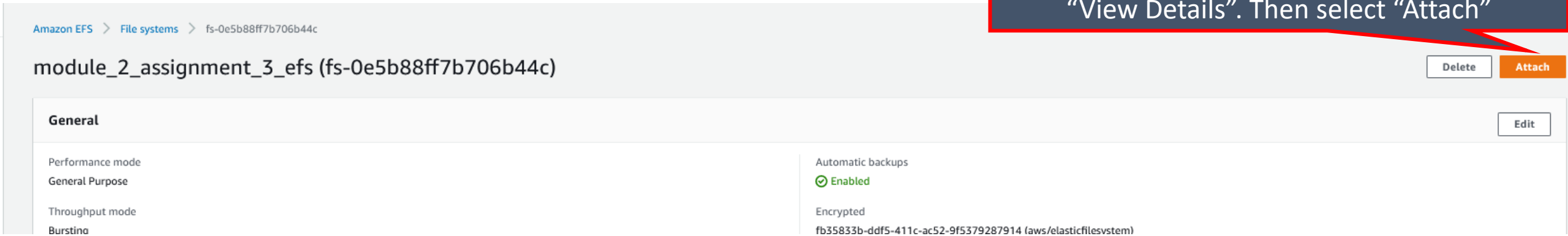
28. Execute “sudo apt update”
29. Then reboot the EC2 instance

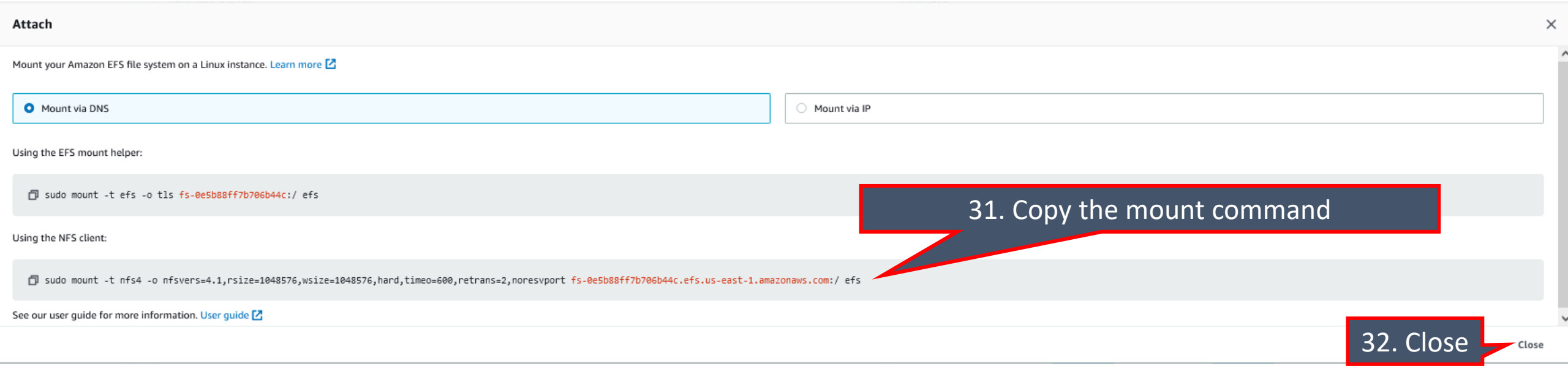
```
ubuntu@ip-172-31-85-96:~$ sudo apt install -y nfs-common
```

```
ubuntu@ip-172-31-85-96:~$ sudo service nfs-common status
● nfs-common.service
     Loaded: masked (Reason: Unit nfs-common.service is masked.)
     Active: inactive (dead)
ubuntu@ip-172-31-85-96:~$
```

30. Verify that nfs is started and running correctly

30. In the EFS page, select the EFS and select "View Details". Then select "Attach"





31. Copy the mount command

32. Close

```
ubuntu@ip-172-31-89-78:~$ mkdir efs
```

32. In the Ubuntu instance, Create a local directory ~/efs

```
ubuntu@ip-172-31-89-78:~$ sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsize=1048576,hard,timeo=600,retrans=2,noresvport fs-036605bc31a3252d2.efs.us-east-1.amazonaws.com:/ efs
```

33. Type this comment to mount the EFS as a local directory ~/efs

```
ubuntu@ip-172-31-89-78:~$ df -T
Filesystem                                     Type            1K-blocks     Used        Available Use% Mounted on
/dev/root                                      ext4              8065444  1645872          6403188  21% /
devtmpfs                                       devtmpfs           489496        0           489496   0% /dev
tmpfs                                          tmpfs              496100        0           496100   0% /dev/shm
tmpfs                                          tmpfs               99224      836            98388   1% /run
tmpfs                                          tmpfs                5120        0             5120   0% /run/lock
tmpfs                                          tmpfs              496100        0           496100   0% /sys/fs/cgroup
/dev/loop1                                     squashfs            56832    56832                0 100% /snap/core18/2253
/dev/loop0                                     squashfs            25600    25600                0 100% /snap/amazon-ssm-agent/4046
/dev/loop2                                     squashfs            63360    63360                0 100% /snap/core20/1242
/dev/loop3                                     squashfs            68864    68864                0 100% /snap/lxd/21835
/dev/loop4                                     squashfs            43264    43264                0 100% /snap/snapd/14066
tmpfs                                          tmpfs               99220        0            99220   0% /run/user/1000
fs-036605bc31a3252d2.efs.us-east-1.amazonaws.com:/ nfs4     9007199254739968        0 9007199254739968   0% /home/ubuntu/efs
```

34. Execute the command “df –T” to see that the new EFS is mounted as local directory /home/ubuntu/efs

35. Repeat the same steps 32..34 in the RHEL and Amazon Linux EC2 instances also.