

Assignment 2

Problem Statement:

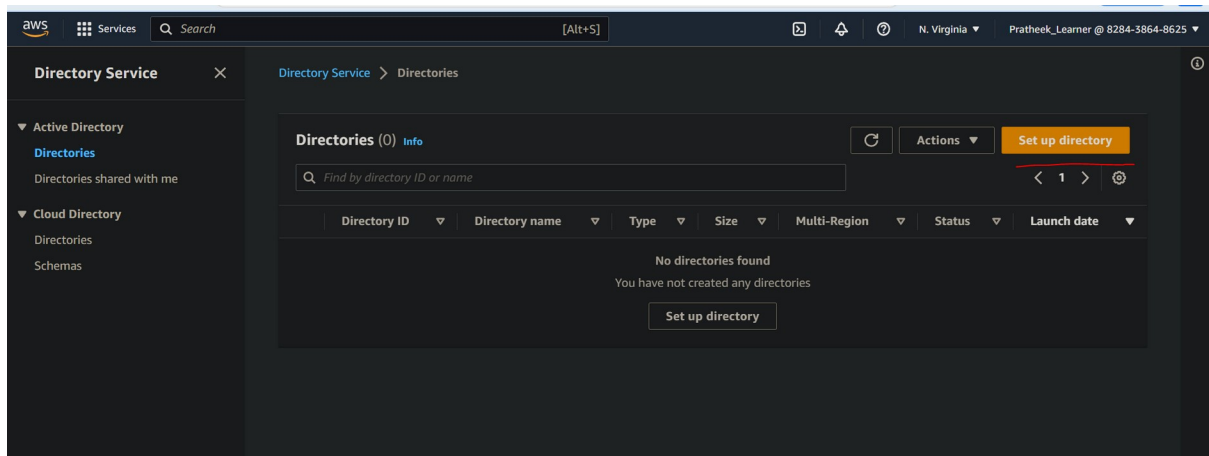
You work for a corporation and the current requirement in the organization is for faster file sharing, which can also help in data replication from on-premises infrastructure.

Tasks To Be Performed:

1. Create an FSX file system for a Windows file server:
 - a. Make sure you have AWS Managed Active Directory with a valid domain name
 - b. Connect it to your Windows EC2 server
2. Create an FSX file system for Lustre and attach it to an Amazon Linux 2 instance.

Solution:

Step 1: - Lets create an Active Directory with a domain for the FSx system.



There are many types of directory types. Select AWS managed Microsoft AD.

In the directory DNS name, provide any name to as it is to store your credentials (AD).

Edition

Info

Microsoft AD is available in the following two editions:

☒ Standard Edition

Best for small to medium sized businesses.

- 1GB of storage for directory objects
- Optimized for up to 30,000 objects

~USD 86.4000/mo (USD 0.1200/hr)*

* includes two domain controllers, USD 43.2000/mo for each additional domain controller.

☐ Enterprise Edition

Best for large businesses.

- 17GB of storage for directory objects
- Optimized for up to 500,000 objects

~USD 288.0000/mo (USD 0.4000/hr)*

* includes two domain controllers, USD 144.0000/mo for each additional domain controller.

Directory DNS name

A fully qualified domain name. This name will resolve inside your VPC only. It does not need to be publicly resolvable.

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Directory NetBIOS name - optional

A short identifier for your domain. If you do not specify a NetBIOS name, it will default to the first part of your Directory DNS name.

CORP

Maximum of 15 characters, can't contain spaces or the following characters: ` \ / : * ? " < > | ` . It must not start with ` .`.

Directory description - optional

Descriptive text that appears on the details page after the directory has been created.

Describe this directory

In the next stage, select your preferred VPCs & subnets.

Finally Review the AD. The creation can take Upto 20-45 mins. Also this AD service doesn't come under free tier.


Review

Directory type	VPC
Microsoft AD	OG_VPC vpc-0ebee9318600cac2c (172.31.0.0/16)
Operating system version	Subnets
Windows Server 2019	OG_Subnet subnet-05b619e6443324bc8 (172.31.80.0/20, us-east-1c)
Directory DNS name	AD_Subnet subnet-082792d5e31e43f40 (172.31.0.0/28, us-east-1a)
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Directory NetBIOS name	
-	
Directory description	
FSx Demo	


Pricing

Edition	Free trial eligible Learn more
Standard	30-day limited trial
Domain controllers charge	
~USD 86.4000/mo (USD 0.1200/hr)*	
* Includes two domain controllers, USD 43.2000/mo for each additional domain controller.	


Directory Service > Directories

 Did you know?
You can deploy an AWS Managed Microsoft AD (Enterprise Edition) directory across AWS Regions. Once configured, AWS automatically replicates your directory data in multiple Regions so everything stays in sync. [Learn more](#)


Directories (1) [Info](#)



 [Actions](#)

Set up directory

 Find by directory ID or name

< 1 >



	Directory ID	Directory name	Type	Size	Multi-Region	Status	Launch date
	d-906781ca83	pratheek.cloud	Microsoft AD	Standard	Not applicable	 Active	Aug 14, 2023

Step 2: Create FSx system. This can be done only after AD is created. Select Windows File server in FSx for windows ec2 instance.

Select file system type

File system options

☐ Amazon FSx for NetApp ONTAP


Amazon FSx
for NetApp ONTAP

☐ Amazon FSx for OpenZFS


Amazon FSx
for OpenZFS

☒ Amazon FSx for Windows File Server


Amazon FSx
for Windows File Server

☐ Amazon FSx for Lustre


Amazon FSx
for Lustre

Amazon FSx for Windows File Server

Amazon FSx for Windows File Server provides simple, fully managed, highly reliable file storage that's accessible over the industry-standard Server Message Block (SMB) protocol.

- Broadly accessible from Windows, Linux, and macOS compute instances and devices running on AWS or on-premises
- Built on Windows Server, providing full SMB support and a wide range of administrative features like user quotas, data deduplication, and end-user file restore.
- Delivers hundreds of thousands of IOPS with consistent sub-millisecond latencies, and up to 12 GB/s of throughput.
- Offers highly-available and highly-durable single-AZ and multi-AZ deployment options, SSD and HDD storage

Then specify the file system details in the next page.

In the Windows authentication option, chose AWS managed AD & select the one created.


Windows authentication


Choose an Active Directory to provide user authentication and access control for your file system [Info](#)

☒ AWS Managed Microsoft Active Directory

☐ Self-managed Microsoft Active Directory

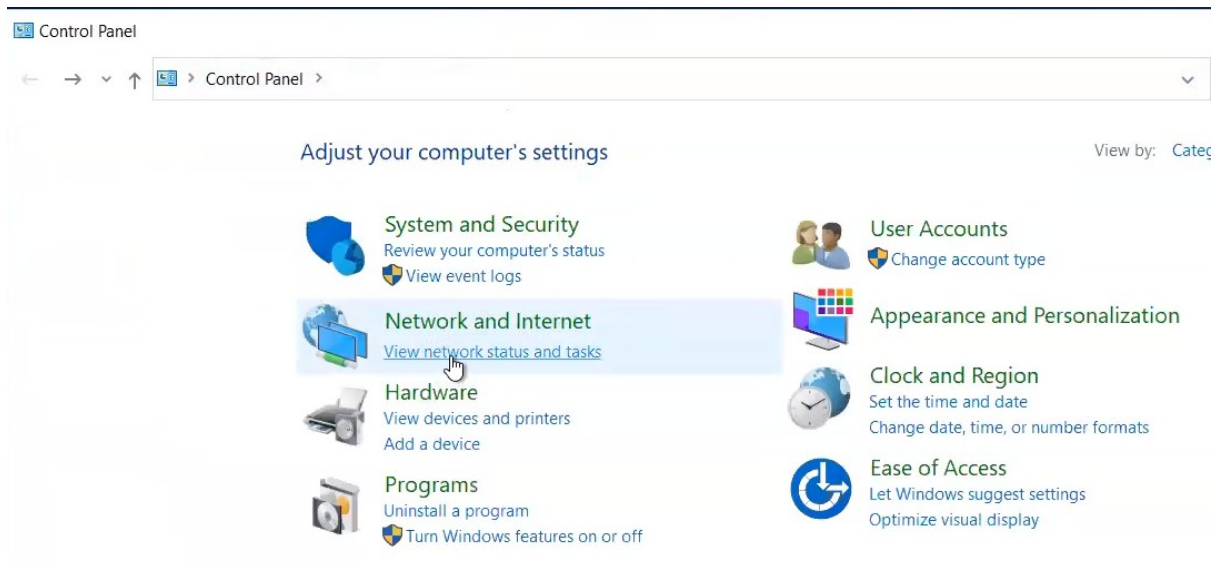
AWS Managed Microsoft Active Directory [Info](#)

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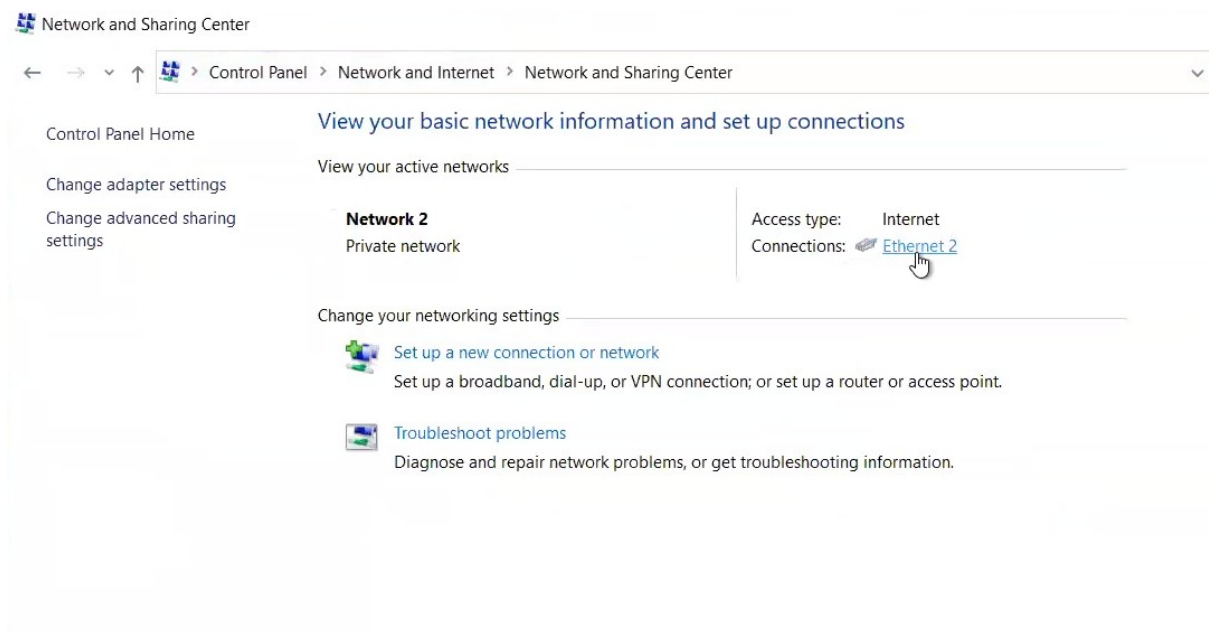
[Create new directory](#) 

Then create the FSx after reviewing. FSx takes time to create.

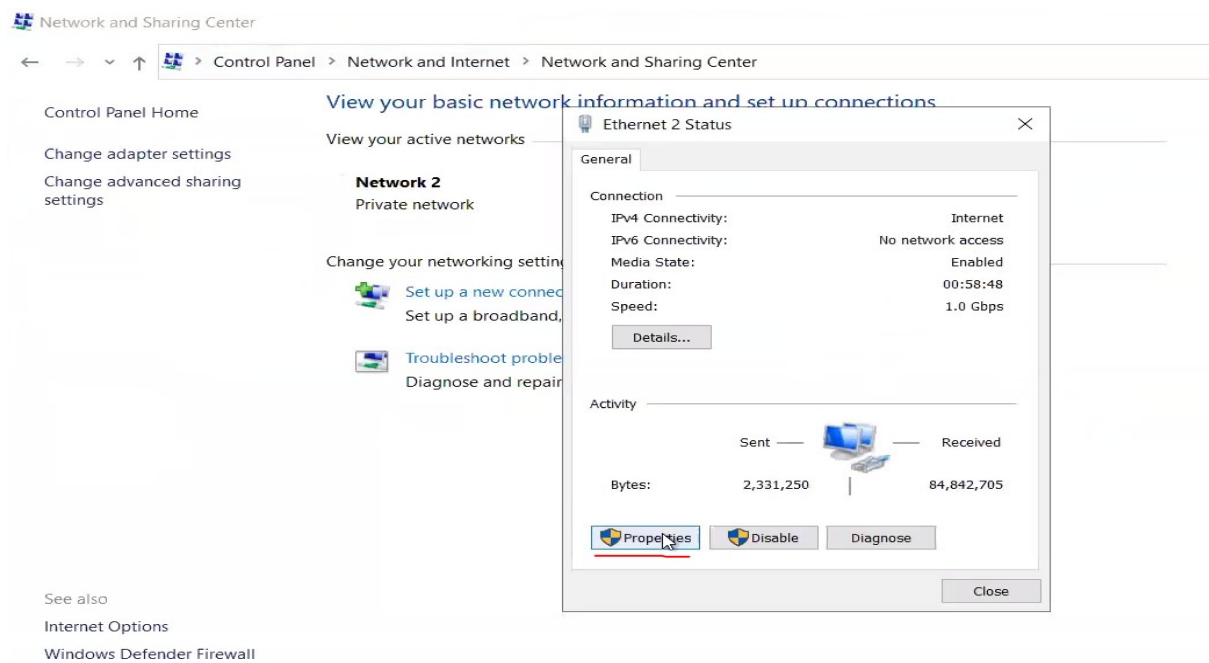
Step 3: We have to associate server (Windows EC2) with AD. Create a Windows EC2 server. In that EC2 go to control panel of your Windows EC2 server & go to Network and internet -> view network status.



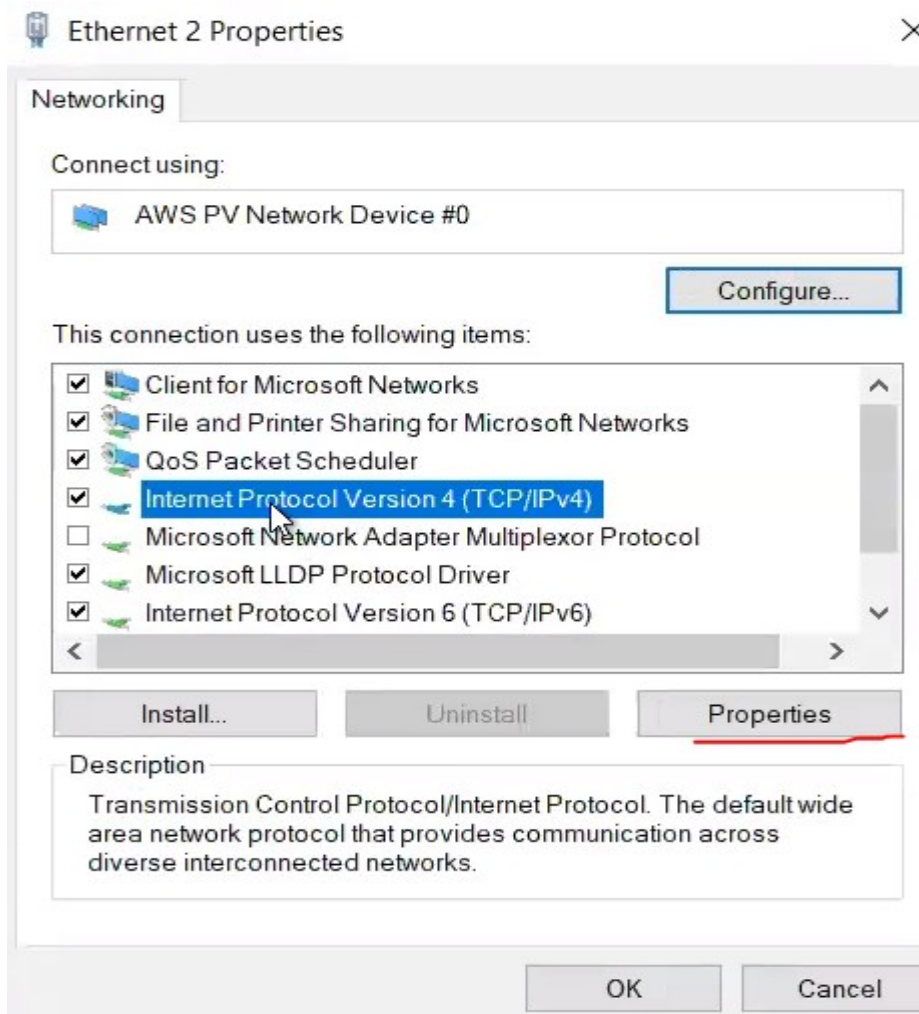
Then go to ethernet.



Edit the properties



Select IPv4 & go to properties,



Select the highlighted options.

Internet Protocol Version 4 (TCP/IPv4) Properties

General Alternate Configuration

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

☒ Obtain an IP address automatically

☐ Use the following IP address:

IP address: . . .

Subnet mask: . . .

Default gateway: . . .

☒ Obtain DNS server address automatically

☐ Use the following DNS server addresses

Preferred DNS server: . . .

Alternate DNS server: . . .

☐ Validate settings upon exit

Advanced...

OK Cancel

To fill the 2 DNS servers addresses, go to AD in AWS & copy the DNS addresses from there

Internet Protocol Version 4 (TCP/IPv4) Properties

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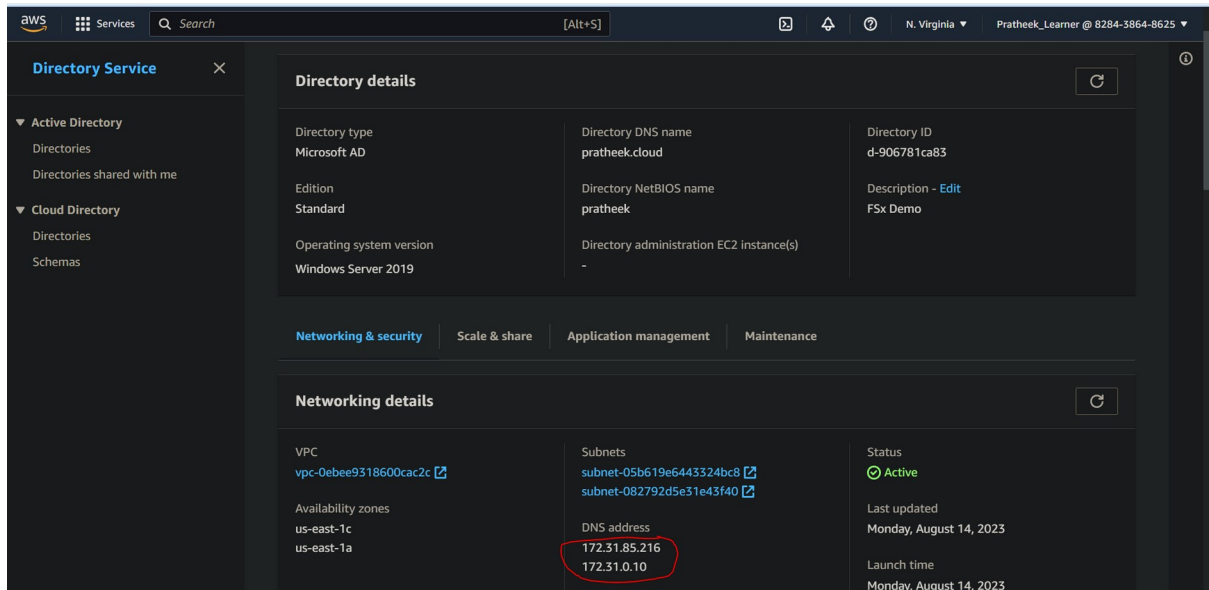
Preferred DNS server: . . .

Alternate DNS server: . . .

☐ Validate settings upon exit

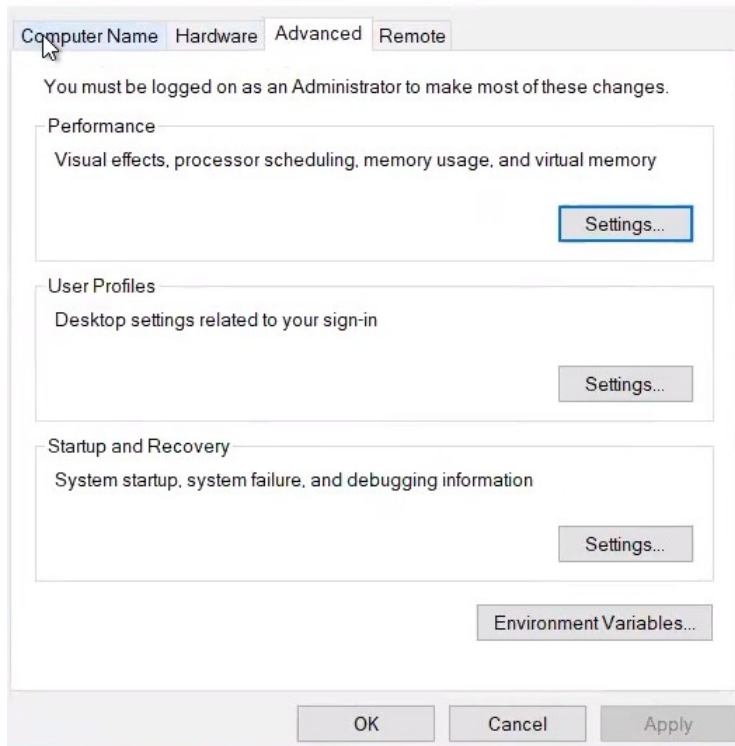
Advanced...

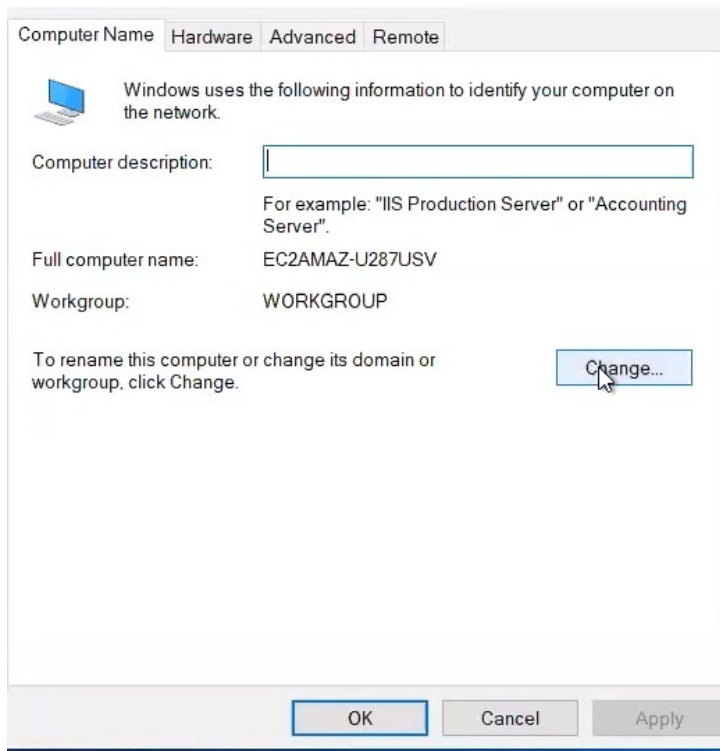
OK Cancel



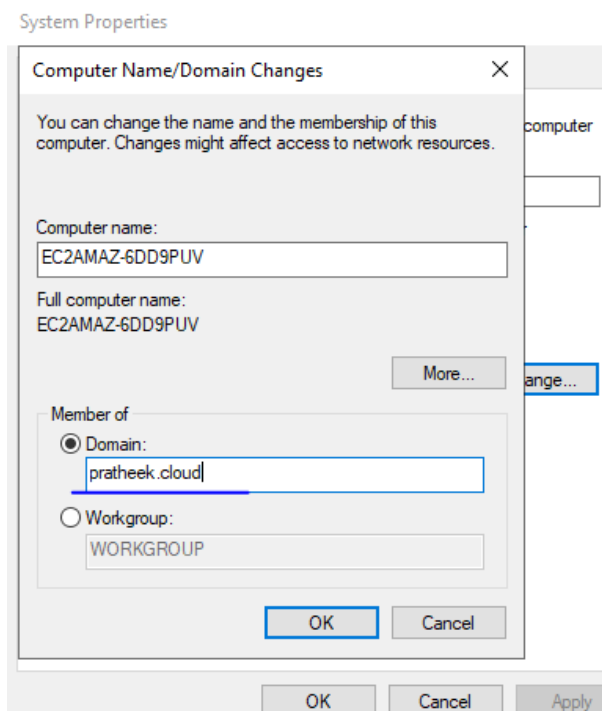
Once filled, close it.

Now we have to configure the domain. Go to advance system settings -> computer name -> Change system Properties

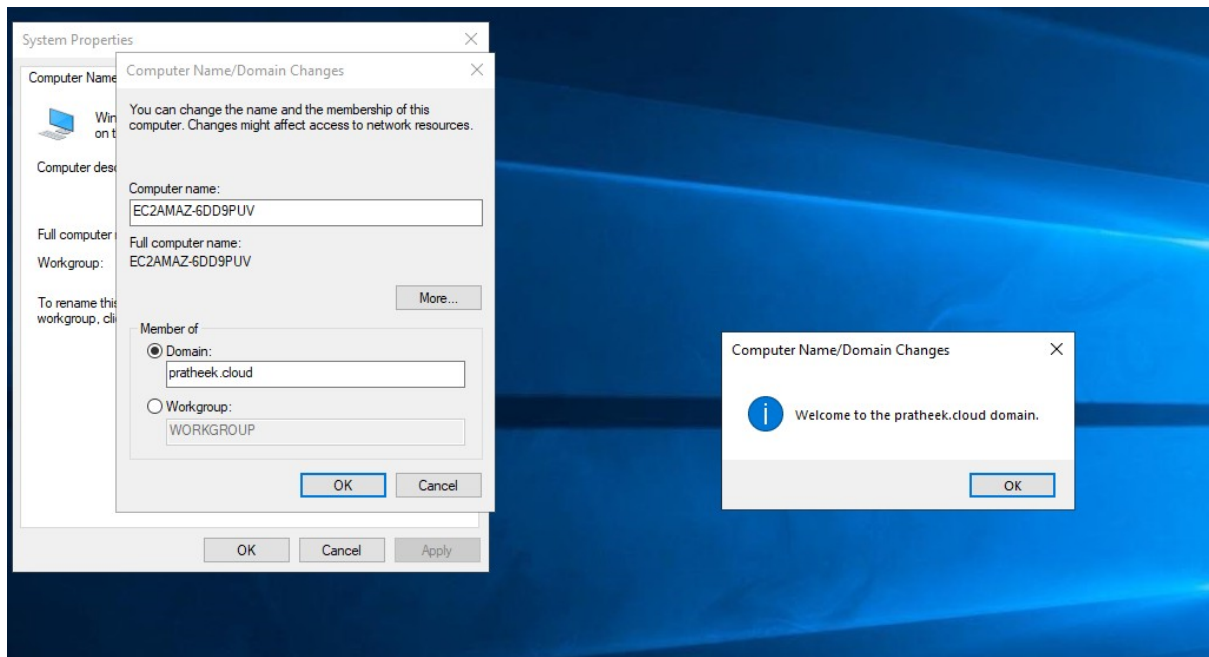




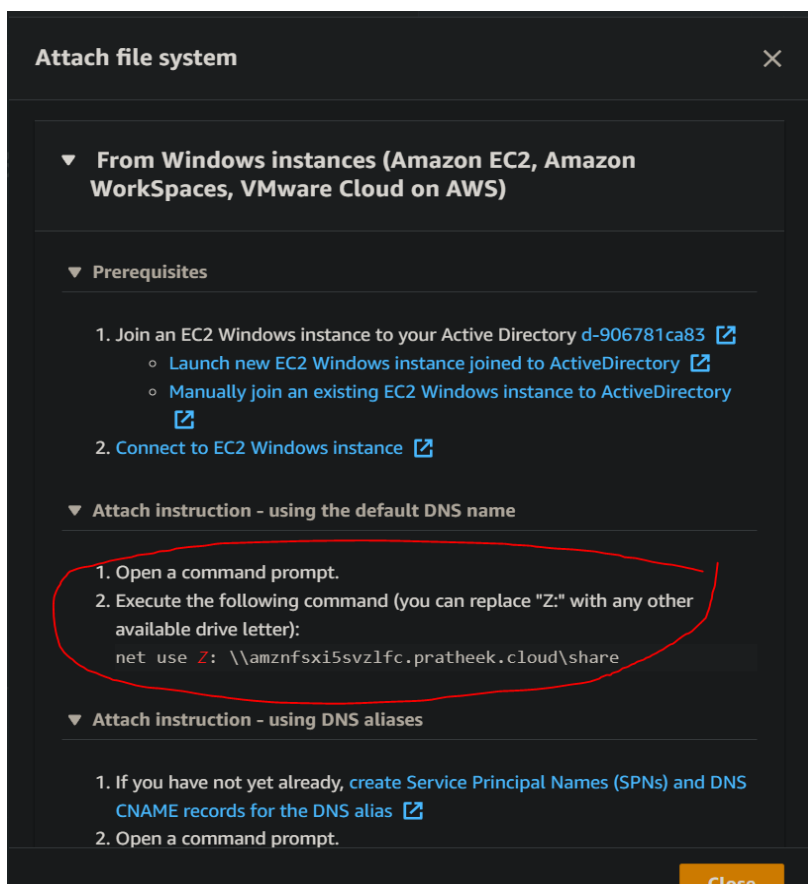
Fill the domain with the AD domain name



Clicking to ok you will be prompted for Username & password. Fill with the ones that you have provided while creating the AWS AD. Then the AD will be changed to our AD. The procedure of AD is completed.



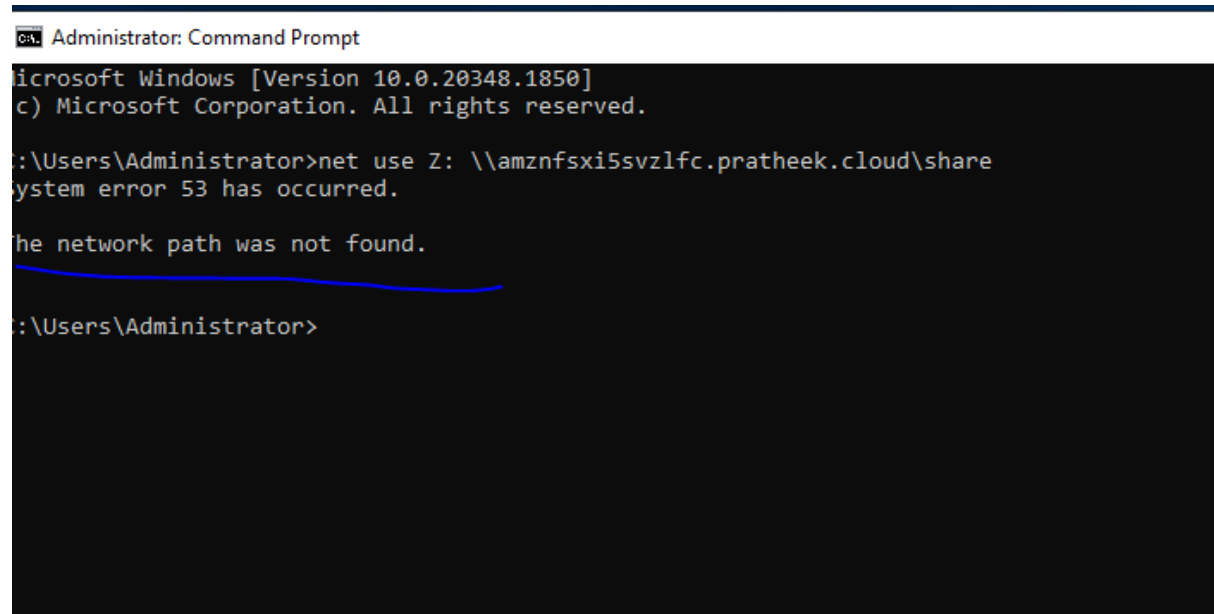
Now we have to mount the FSx to the Windows System. Now go to FSx system in AWS, select attach & copy the command.



Now paste the command into the command prompt of the Windows-EC2 server.

(Side-Note :- You may see this Network 53 error when the storage gateway is not allowing all the three required NFSv3 ports. I would suggest verifying the gateway EC2 instance **security group** and check if it has **allowed ports 20048, 111 and 2049** in its Inbound rules from the client IP address that you are trying to mount. Or you can have all traffic enabled in Security group & bypass this issue, though in production that is not recommended & you enable only the required ports at the required time. If all else fails, fully delete the FSx & Then the AD, & recreated the AD and FSx. Painful but in this way it worked for me).

Error 53:



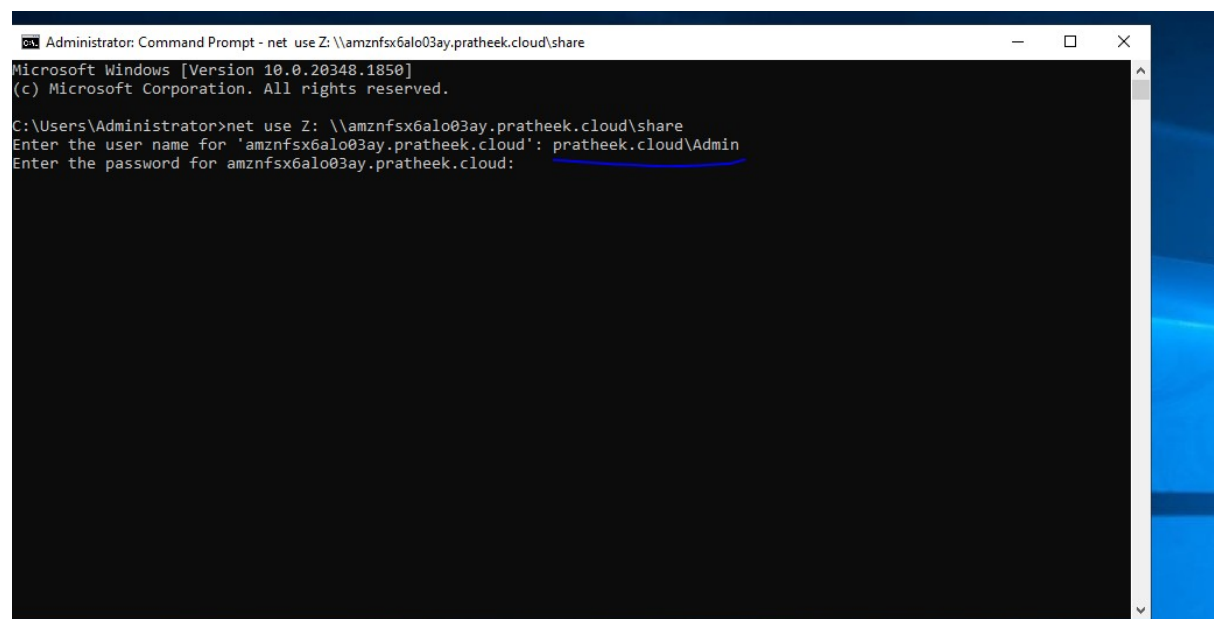
```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.20348.1850]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Administrator>net use Z: \\amznfsxi5svz1fc.pratheek.cloud\share
system error 53 has occurred.

The network path was not found.

C:\Users\Administrator>
```

Now the actual command paste:

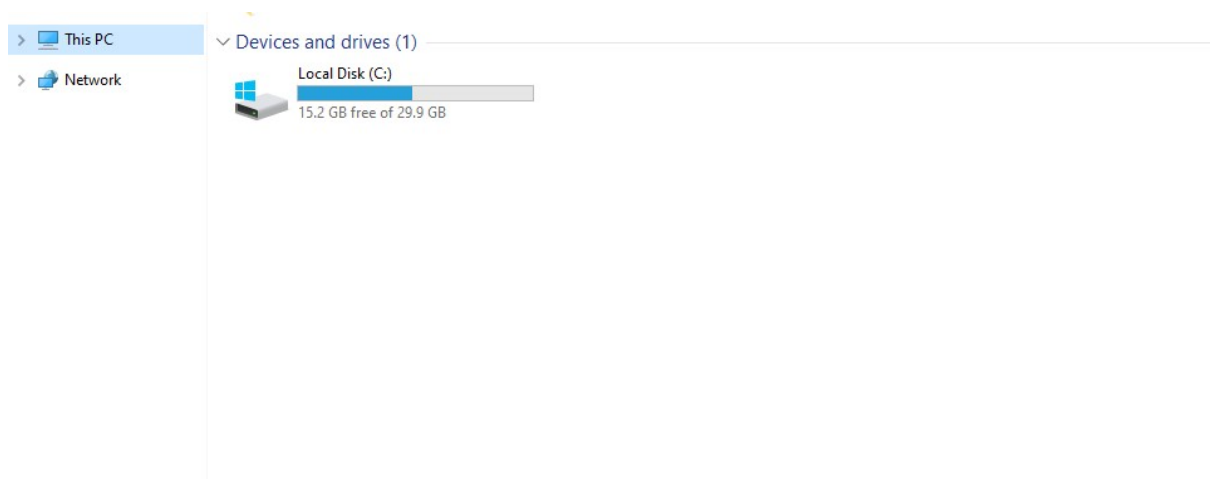


```
Administrator: Command Prompt - net use Z: \\amznfsx6alo03ay.pratheek.cloud\share
Microsoft Windows [Version 10.0.20348.1850]
(c) Microsoft Corporation. All rights reserved.

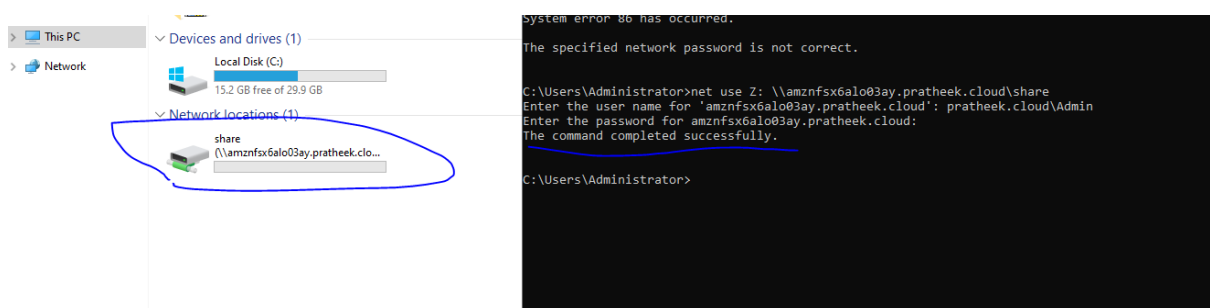
C:\Users\Administrator>net use Z: \\amznfsx6alo03ay.pratheek.cloud\share
Enter the user name for 'amznfsx6alo03ay.pratheek.cloud': pratheek.cloud\Admin
Enter the password for amznfsx6alo03ay.pratheek.cloud:
```

In the username, put your "domain\username". Then enter the password.

Before:



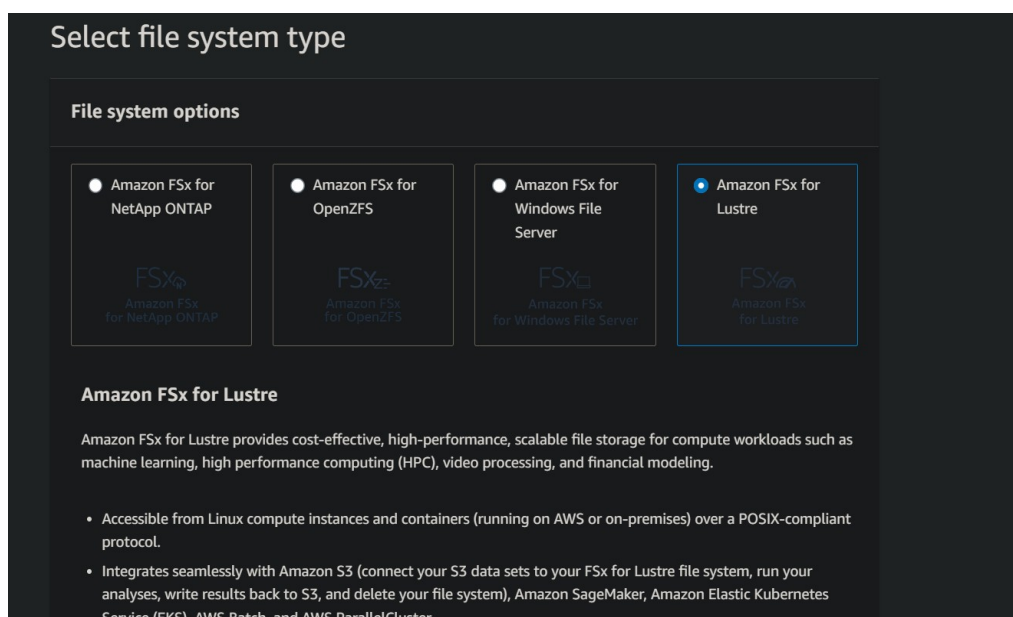
After the password:



The Shared FSx system is now successfully mounted to the Windows system.

Step 4:- Now to mount FSx to Linux system using FSx Lustre.

Go to the FSx & this time create FSx under Lustre



FSx > File systems > Create file system

Step 1
Select file system type

Step 2
Specify file system details

Step 3
Review and create

Review and create

Verify the following attributes before proceeding

To mount your filesystem use the mount name parameter in the summary section of the file system overview page

File system details

Attribute	Value	Editable after creation
File system type	Amazon FSx for Lustre	✗
File system name	Lustre-FSx	✓
Deployment type	Persistent 2	✗
Storage type	SSD	✗
Throughput per unit of storage	125 MB/s/TiB	✗
Storage capacity	1.2 TiB	✓
Throughput capacity	150 MB/s	✗
Data compression type	LZ4	✓
Lustre version	2.12	✗

Now you have to launch Amazon Linux EC2 for this to work. Use AMI - Amazon Linux 2 for the following command to work. Then install lustre client in the ec2 instance.

Command :- `sudo amazon-linux-extras install lustre -y`

Then go to the Lustre FSx & click on attach & copy the commands to the linux ec2.

From Linux instances (Amazon EC2, Amazon WorkSpaces, VMware Cloud on AWS)

▼ Prerequisites

1. Create or select your Linux EC2 instance in the same AWS VPC as your file system.
2. Open an SSH client and connect to your EC2 instance. ([Find out how to connect.](#))
3. [Install the open-source Lustre client](#) , which is supported on most Linux distributions.

▼ Attach instruction - using the default DNS name

1. Open a terminal
2. Create a new directory on your EC2 instance, for example `/fsx`
 - `sudo mkdir /fsx`
3. `sudo mount -t lustre -o noatime,flock fs-0d19f86bfb145c09e.fsx.us-east-1.amazonaws.com@tcp:/rk173bev /fsx`

From Amazon Elastic Kubernetes Service (EKS) use the Amazon FSx for Lustre CSI Driver

▼ Attach instruction - using the default DNS name

Instructions on accessing Persistent Volumes (PVs) backed by Amazon FSx for Lustre based filesystems from Amazon EKS clusters can be found [here](#).

Close

FSx lustre for linux is successfully mounted.

```
aws Services Search [Alt+S] N. Virginia Prathe

59 postgresql13 available [ =stable ]
60 mock2 available [ =stable ]
61 dnsmasq2.85 available [ =stable ]
62 kernel-5.15 available [ =stable ]
63 postgresql14 available [ =stable ]
64 firefox available [ =stable ]
65 lustre=latest enabled [ =stable ]
66 php8.1 available [ =stable ]
67 awscli1 available [ =stable ]
68 php8.2 available [ =stable ]
69 dnsmasq available [ =stable ]
70 unbound1.17 available [ =stable ]
71 golang1.19 available [ =stable ]
72 collectd-python3 available [ =stable ]

[root@ip-172-31-82-91 ec2-user]# mkdir /fsx
[root@ip-172-31-82-91 ec2-user]# mount -t lustre -o noatime,flock fs-0d19f86bfb145c09e.fsx.us-east-1.amazonaws.com@tcp:/rkl73bev /fsx
[root@ip-172-31-82-91 ec2-user]# df -h
Filesystem                Size      Used Avail Use% Mounted on
devtmpfs                  468M        0  468M   0% /dev
tmpfs                     477M        0  477M   0% /dev/shm
tmpfs                     477M    408K  476M   1% /run
tmpfs                     477M        0  477M   0% /sys/fs/cgroup
/dev/xvda1                8.0G    1.7G   6.4G  21% /
tmpfs                     96M        0   96M   0% /run/user/1000
172.31.94.67@tcp:/rkl73bev 1.2T    7.5M  1.2T   1% /fsx
[root@ip-172-31-82-91 ec2-user]#
```

Note – Cleanup all the resources post completion so as to avoid further charges.