

TASK 3.1P

CLOUD COMPUTING

Introducing Amazon Elastic File System

Task 1: Creating a security group to access your EFS file system

sg-093e45dac28897ae0 - EFSClient

Details

| | | | |
|----------------------------------|---|--|---------------------------------|
| Security group name EFSClient | Security group ID sg-093e45dac28897ae0 | Description EFS Client | VPC ID vpc-0a7a5ceafa2d74d76 |
| Owner 106982772542 | Inbound rules count 1 Permission entry | Outbound rules count 1 Permission entry | |

Inbound rules (1)

| Name | Security group rule ID | IP version | Type | Protocol | Port range |
|------|------------------------|------------|------|----------|------------|
| - | sgr-01ecfb1444b593a59 | IPv4 | SSH | TCP | 22 |

Resources

| | | | | | |
|---------------------|---|---------------------|---|-----------------------|---|
| Instances (running) | 1 | Auto Scaling Groups | 0 | Capacity Reservations | 0 |
| Dedicated Hosts | 0 | Elastic IPs | 1 | Instances | 1 |
| Key pairs | 1 | Load balancers | 0 | Placement groups | 0 |
| Security groups | 3 | Snapshots | 0 | Volumes | 1 |

Account attributes

| | |
|-------------|--|
| Default VPC | vpc-0c7b591b2420b0def |
| Settings | Data protection and security Allowed AMIs Zones EC2 Serial Console Default credit specification EC2 console preferences |

Launch instance

To get started, launch an Amazon EC2 instance, which is a virtual server in the cloud.

Service health

AWS Health Dashboard

Explore AWS

10 Things You Can Do Today to Reduce AWS Costs

Explore how to effectively manage your AWS costs without compromising on performance or capacity.

Learn more

Amazon GuardDuty Malware Protection

GuardDuty now provides agentless malware detection in Amazon EC2 & EC2 container workloads.

Learn more

Screenshot of the AWS CloudShell interface showing the creation of a new security group named "EFS Mount Target".

Basic details

- Security group name info:** EFS Mount Target
- Description info:** Inbound NFS access from EFS clients
- VPC info:** vpc-0a7a3ceafa2d74d76 (Lab VPC)

Inbound rules info

| Type | Protocol | Port range | Source | Description - optional |
|------|----------|------------|--------|------------------------|
| NFS | TCP | 2049 | Custom | sg-093e45dac28897ae |

Add rule

Outbound rules info

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

Add rule

The screenshot shows the AWS Management Console interface for the EC2 service. The user is navigating through the 'Security Groups' section. A success message at the top indicates that a security group named 'sg-0ed105952269ba88e - EFS Mount Target' was created successfully. The main details page for this security group is displayed, showing its configuration: Security group name is 'EFS Mount Target', Security group ID is 'sg-0ed105952269ba88e', Owner is '106982772542', Description is 'Inbound NFS access from EFS clients', and VPC ID is 'vpc-0a7a3cefa2d74d76'. Below this, the 'Inbound rules' tab is selected, showing one rule: 'sgr-08d6f2f8dfc752377' with IP version '-' and Type 'NFS'. The rule is associated with Protocol 'TCP' and Port range '2049'. The bottom of the screen shows the Windows taskbar with various pinned icons.

Task 2: Creating an EFS file system

Screenshot of the AWS Cloud Console showing the creation of an EFS file system.

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.

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.

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 |

[Cancel](#) [Customize](#) [Create file system](#)

Amazon Elastic File System
Scalable, elastic, cloud-native NFS file system

Amazon Elastic File System (Amazon EFS) provides a simple, scalable, elastic file system for general purpose workloads for use with AWS Cloud services and on-premises resources.

Pricing

With EFS, there are no minimum fees. You pay only for the storage that you use, the data that you read and write, and any additional throughput that you provision.

Estimate your cost using the [AWS Pricing Calculator](#)

[Learn more about pricing](#)

The screenshot shows the second step of the AWS EFS 'Create a file system' wizard. The user is configuring file system settings. Key options include:

- Regionality:** Set to "Regional". A note states: "Offers the highest levels of availability and durability by storing file system data across multiple Availability Zones within an AWS Region."
- One Zone:** Provides continuous availability to data within a single Availability Zone within an AWS Region.
- Automatic backups:** A note says: "Automatically backup your file system data with AWS Backup using recommended settings. Additional pricing applies." A checkbox labeled "Enable automatic backups" is present.
- Lifecycle management:** A note says: "Automatically save money as access patterns change by moving files into the Infrequent Access (IA) or Archive storage class." A "Transition into Infrequent Access (IA)" dropdown is set to "None". A "Transition into Archive" dropdown is set to "90 day(s) since last access". A "Transition into Standard" dropdown is set to "None".
- Encryption:** A note says: "Choose to enable encryption of your file system's data at rest. Uses the AWS KMS service key (aws/elasticfilesystem) by default." A checkbox labeled "Enable encryption of data at rest" is checked.
- Tags:** A section titled "Tags optional" allows adding key-value pairs. One tag is added: "Name" with value "My First EFS File System".
- Buttons:** "Cancel" and "Next" buttons are at the bottom right.

The image consists of three vertically stacked screenshots from the AWS Cloud Console.

Screenshot 1: Review and create - Step 1: File system settings

This screenshot shows the configuration of a new EFS file system. The 'File system' section contains the following details:

| Field | Value | Is editable? |
|----------------------|--|--------------|
| Name | - | Yes |
| Performance mode | General Purpose | No |
| Throughput mode | Elastic | Yes |
| Encrypted | Yes | No |
| KMS Key ID | - | No |
| Lifecycle management | Transition into Infrequent Access (IA): None Transition into Archive: 90 day(s) since last access Transition into Standard: None | Yes |
| Automatic backups | No | Yes |
| VPC ID | vpc-0a7a5ceafa2d74d76 (Lab VPC) | Yes |

Screenshot 2: Success! - File system (fs-0e486af5a5f61ffa7) is available.

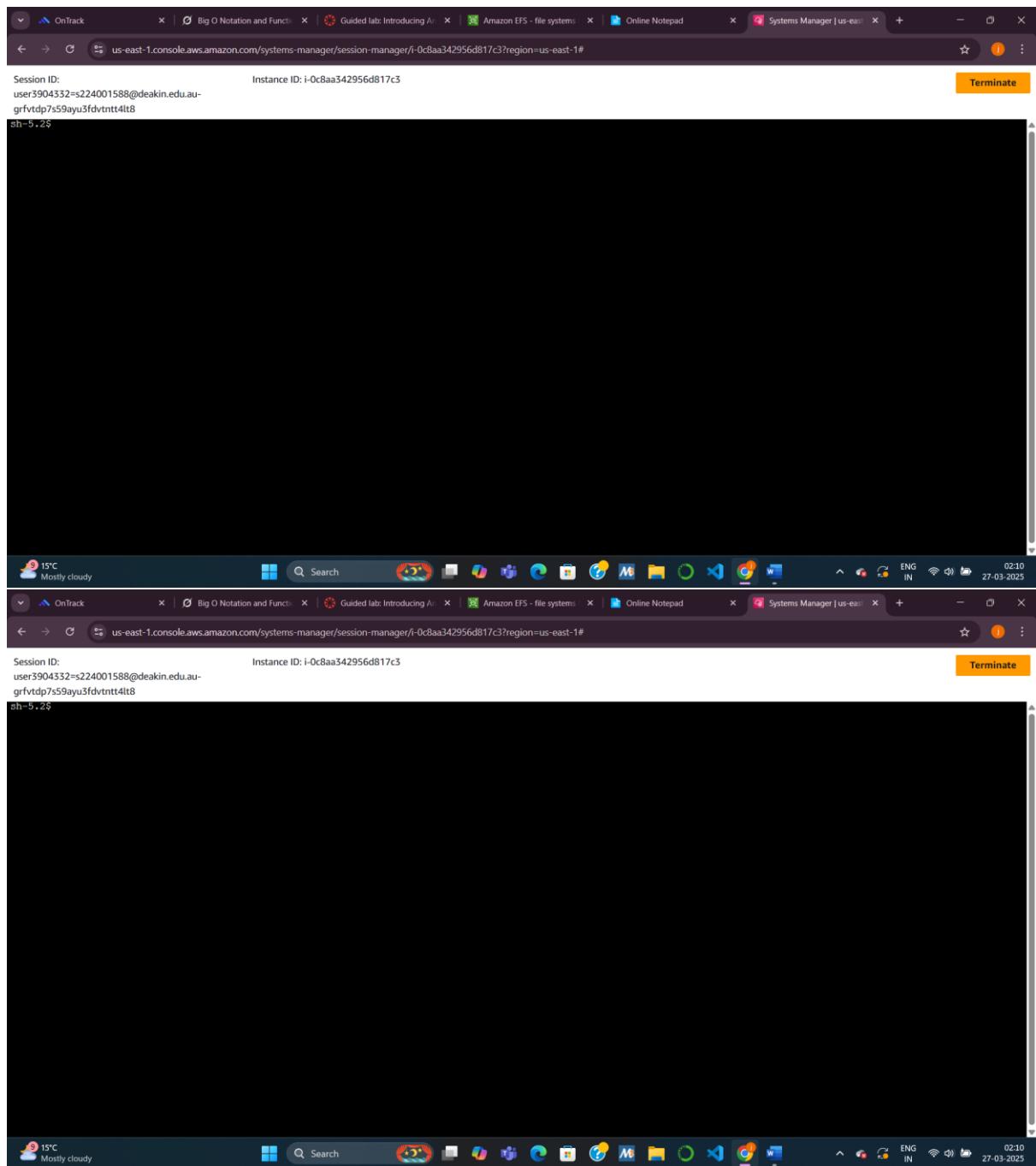
A green success message indicates the file system has been created. The main interface shows the newly created file system in the list:

| Name | File system ID | Encrypted | Total size | Size in Standard | Size in IA | Size in Archive | Provisioned Throughput (MiB/s) |
|--------------------------|----------------------|-----------|------------|------------------|------------|-----------------|--------------------------------|
| My First EFS File System | fs-0e486af5a5f61ffa7 | Encrypted | 6.00 KB | 6.00 KB | 0 Bytes | 0 Bytes | - |

Screenshot 3: File systems (1)

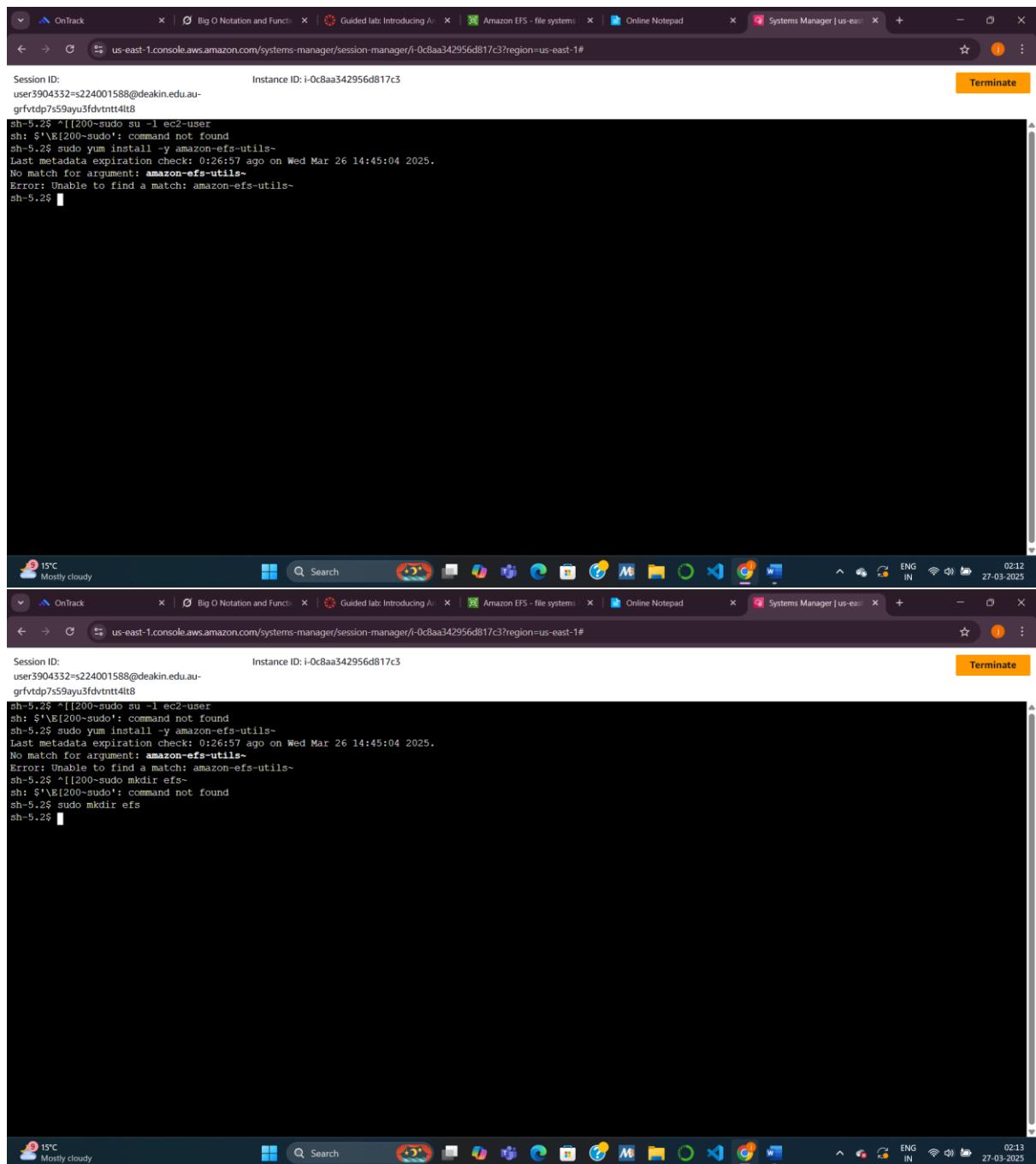
The final screenshot shows the list of file systems again, confirming the creation of 'My First EFS File System'.

Task 3: Connecting to your EC2 instance



Task 4: Creating a new directory and mounting the EFS file system

JASVEENA – 224001588



Session ID: user3904332=s224001588@deakin.edu.au-
Instance ID: i-0c8aa342956d817c3
grfvldp7s59ayu3fdvntt4l8
sh-5.2\$ ^[[200~sudo su -l ec2-user
sh: \$'\E[200~sudo': command not found
sh-5.2\$ sudo yum install -y amazon-efs-utils
Last metadata expiration check: 0:26:57 ago on Wed Mar 26 14:45:04 2025.
No match for argument: **amazon-efs-utils**
Error: Unable to find a match: amazon-efs-utils
sh-5.2\$

Session ID: user3904332=s224001588@deakin.edu.au-
Instance ID: i-0c8aa342956d817c3
grfvldp7s59ayu3fdvntt4l8
sh-5.2\$ ^[[200~sudo su -l ec2-user
sh: \$'\E[200~sudo': command not found
sh-5.2\$ sudo yum install -y amazon-efs-utils
Last metadata expiration check: 0:26:57 ago on Wed Mar 26 14:45:04 2025.
No match for argument: **amazon-efs-utils**
Error: Unable to find a match: amazon-efs-utils
sh-5.2\$ ^[[200~mkdir efs
sh: \$'\E[200~sudo': command not found
sh-5.2\$ sudo mkdir efs
sh-5.2\$

Session ID: user3904332=s224001588@deakin.edu.au-
Instance ID: i-0c8aa342956d817c3
grfvldp7s59ayu3fdvntt4l8
sh-5.2\$ ^[[200~sudo su -l ec2-user
sh: \$'\E[200~sudo': command not found
sh-5.2\$ sudo yum install -y amazon-efs-utils
Last metadata expiration check: 0:26:57 ago on Wed Mar 26 14:45:04 2025.
No match for argument: **amazon-efs-utils**
Error: Unable to find a match: amazon-efs-utils
sh-5.2\$ ^[[200~mkdir efs
sh: \$'\E[200~sudo': command not found
sh-5.2\$ sudo mkdir efs
sh-5.2\$

Screenshot of the AWS Cloud Console showing the search results for 'efs'.

Services

- Elastic File System**
- File systems
- Access points
- AWS Backup
- AWS DataSync
- AWS Transfer
- Documentation
- Knowledge articles
- Marketplace
- Blog posts
- Events
- Tutorials

Search results for 'efs'

Services

- EFS** ☆ Managed File Storage for EC2
- DataSync** ☆ DataSync simplifies, automates, and accelerates moving data
- AWS Transfer Family** ☆ Fully managed support for SFTP, FTPS, FTP, and AS2

Features

- Access points** EFS feature
- File systems** EFS feature
- Create a SFTP server** AWS Transfer Family feature

View file system

Create file system

File system details

| Size in Archive | Provisioned Throughput (MiB/s) |
|-----------------|--------------------------------|
| 0 Bytes | - |

Amazon EFS > File systems > fs-0e486af5a5f61ffa7

My First EFS File System (fs-0e486af5a5f61ffa7)

General

Amazon resource name (ARN): arn:aws:elasticfilesystem:us-east-1:106982772542:file-system/fs-0e486af5a5f61ffa7

Performance mode: General Purpose

Throughput mode: Elastic

Lifecycle management: Transition into Infrequent Access (IA): None, Transition into Archive: None, Transition into Standard: None

Availability zone: Regional

Automatic backups: Disabled

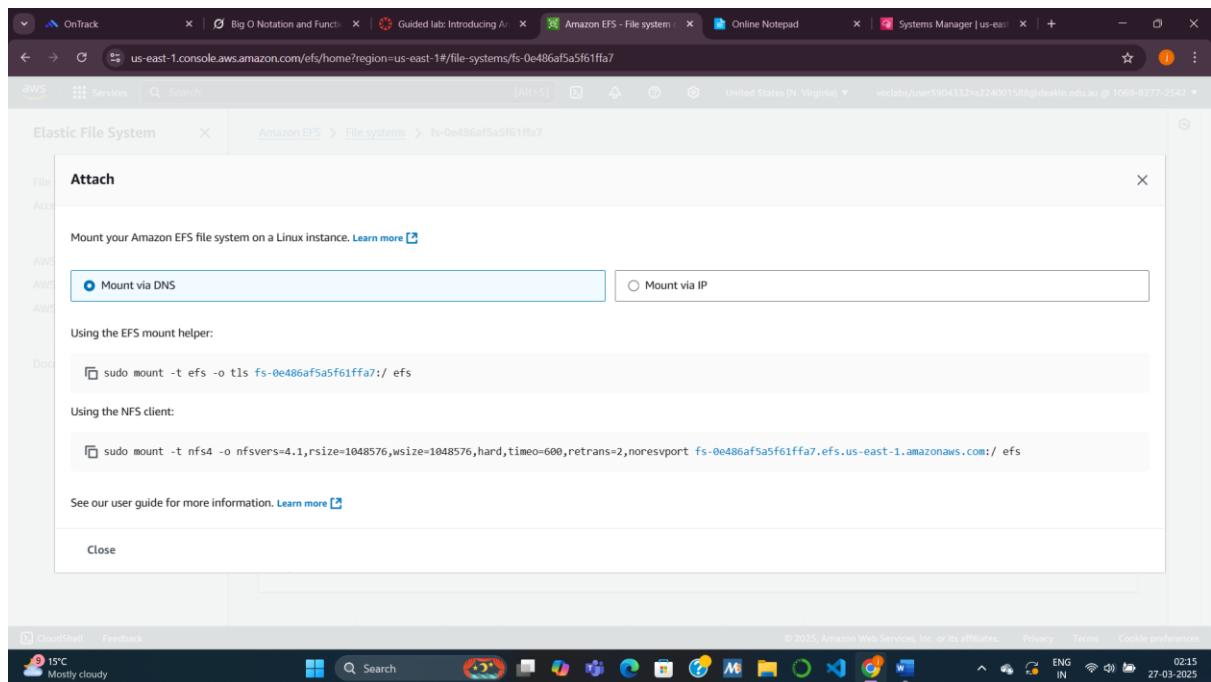
Encrypted: c56122b-7729-4f79-be3a-49d46cc042a8 (aws/elasticfilesystem)

File system state: Available

DNS name: fs-0e486af5a5f61ffa7.efs.us-east-1.amazonaws.com

Replication overwrite protection: Enabled

Delete **Edit** **Attach**



The image shows a Windows desktop environment with two terminal windows open in a browser. Both terminals are connected to the same AWS Systems Manager session (Session ID: i-0c8aa342956d817c3). The top terminal window displays the initial steps of setting up an EFS file system, including attempting to install the amazon-efs-utils package via yum, which fails due to a missing argument. It then shows the output of the 'df' command, which lists several temporary file systems (tmpfs) and one xfs partition mounted at /dev/xvda1. The bottom terminal window shows the continuation of the setup process, including mounting the EFS file system at /mnt/efs and running a fio benchmark test to measure its performance.

```

Session ID: i-0c8aa342956d817c3
Instance ID: i-0c8aa342956d817c3
Terminate

sh-5.2$ ^[[200-sudo su -l ec2-user
sh: $'\E[200-sudo': command not found
sh-5.2$ sudo yum install -y amazon-efs-utils-
Last metadata expiration check: 0:26:57 ago on Wed Mar 26 14:45:04 2025.
No match for argument: amazon-efs-utils-
Error: Unable to find a match: amazon-efs-utils-
sh-5.2$ ^[[200-sudo mkdir efs-
sh: $'\E[200-sudo': command not found
sh-5.2$ sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsize=1048576,hard,timeo=600,retrans=2,noresvport fs-0e486af5a5f61ffa7.efs.us-east-1.amazonaws.com:/ efs
sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsize=1048576,hard,timeo=600,retrans=2,noresvport fs-0e486af5a5f61ffa7.efs.us-east-1.amazonaws.com:/ efs
sudo df -HT
sudo df -HT
mount.nfs4: Connection timed out
sh-5.2$ sudo df -HT
Filesystem      Type   Size  Used Avail Use% Mounted on
/devtmpfs       devtmpfs 4.0M    0  4.0M  0% /dev
tmpfs          tmpfs   475M    0  475M  0% /dev/shm
tmpfs          tmpfs   190M  448K 190M  1% /run
/dev/xvda1      xfs    8.0G  1.6G  6.4G  20% /
tmpfs          tmpfs   475M    0  475M  0% /tmp
/dev/xvda128    vfat    10M  1.3M  8.7M  13% /boot/efi
tmpfs          tmpfs   95M    0   95M  0% /run/user/0
sh-5.2$ 

Session ID: i-0c8aa342956d817c3
Instance ID: i-0c8aa342956d817c3
Terminate

sh-5.2$ ^[[200-sudo su -l ec2-user
sh: $'\E[200-sudo': command not found
sh-5.2$ sudo yum install -y amazon-efs-utils-
Last metadata expiration check: 0:26:57 ago on Wed Mar 26 14:45:04 2025.
No match for argument: amazon-efs-utils-
Error: Unable to find a match: amazon-efs-utils-
sh-5.2$ ^[[200-sudo mkdir efs-
sh: $'\E[200-sudo': command not found
sh-5.2$ sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsize=1048576,hard,timeo=600,retrans=2,noresvport fs-0e486af5a5f61ffa7.efs.us-east-1.amazonaws.com:/ efs
sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsize=1048576,hard,timeo=600,retrans=2,noresvport fs-0e486af5a5f61ffa7.efs.us-east-1.amazonaws.com:/ efs
sudo df -HT
sudo df -HT
mount.nfs4: Connection timed out
sh-5.2$ sudo df -HT
Filesystem      Type   Size  Used Avail Use% Mounted on
/devtmpfs       devtmpfs 4.0M    0  4.0M  0% /dev
tmpfs          tmpfs   475M    0  475M  0% /dev/shm
tmpfs          tmpfs   190M  448K 190M  1% /run
/dev/xvda1      xfs    8.0G  1.6G  6.4G  20% /
tmpfs          tmpfs   475M    0  475M  0% /tmp
/dev/xvda128    vfat    10M  1.3M  8.7M  13% /boot/efi
tmpfs          tmpfs   95M    0   95M  0% /run/user/0
sh-5.2$ sudo fio --name=fio-efs --filesize=10G --filename=../efs/fio-efs-test.img --bs=1M --nrfiles=1 --direct=1 --sync=0 --rw=write --iodepth=200 --ioengine=libaio
fio-efs: (g=0): rw=write, bs=(R) 1024KiB-1024KiB, (W) 1024KiB-1024KiB, (T) 1024KiB-1024KiB, ioengine=libaio, iodepth=200
fio-3.32
Starting 1 process
fio-efs: Laying out IO file (1 file / 10240MiB)
Jobs: 1 (f=1): [ (W)(I) ] [w=120MiB/s] [w=120 IOPS] [eta 01m:46s]
02:22 27-03-2025

```

Task 5: Examining the performance behavior of your new EFS file system

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```
OnTrack x Big O Notation and Func... x Guided lab: Introducing A... x Amazon EFS - File system x Online Notepad x Systems Manager | us-east-1 + Terminate  
us-east-1.console.aws.amazon.com/systems-manager/session-manager/i-0c8aa342956d817c3?region=us-east-1#  
  
Session ID: i-0c8aa342956d817c3  
user5904352=s224001588@deakin.edu.au  
grfvtdp759ayu3fdvtnt4t8  
  
File: io_u error on file ./efs/fio-efs-test.img: No space left on device: write offset=7023362048, buflen=1048576  
File: io_u error on file ./efs/fio-efs-test.img: No space left on device: write offset=7024410624, buflen=1048576  
File: io_u error on file ./efs/fio-efs-test.img: No space left on device: write offset=7025459200, buflen=1048576  
File: io_u error on file ./efs/fio-efs-test.img: No space left on device: write offset=7026507776, buflen=1048576  
File: io_u error on file ./efs/fio-efs-test.img: No space left on device: write offset=7027556352, buflen=1048576  
File: pid: 27053, err=28:file:io_u:c1846, func=io_u error, error=No space left on device  
  
fio-efs: (groupid=0, jobs=1): err=28 (file:io_u:c1846, func=io_u error, error=No space left on device): pid=27053: Wed Mar 26 15:23:04 2025  
write: IOPS=131, BW=127MiB/s (134MB/s) (6503MiB/51060msec)  
        0 zone resets  
        slat (usec): min=25, max=30047, avg=7608.18, stdev=1588.85  
        clat (msec): min=22, max=1632, avg=1548.60, stdev=186.63  
        lat (msec): min=30, max=1640, avg=1556.44, stdev=186.98  
        clat percentiles (msec):  
          | 1.00th=[ 535], 5.00th=[ 1217], 10.00th=[ 1586], 20.00th=[ 1586],  
          | 30.00th=[ 1586], 40.00th=[ 1586], 50.00th=[ 1586], 60.00th=[ 1586],  
          | 70.00th=[ 1586], 80.00th=[ 1586], 90.00th=[ 1586], 95.00th=[ 1586],  
          | 99.00th=[ 1636], 99.50th=[ 1636], 99.90th=[ 1636], 99.95th=[ 1636],  
          | 99.99th=[ 1636]  
        bw (KiB/s): min=55296, max=178176, per=98.04%, avg=127860.22, stdev=8934.67, samples=101  
        iops : min= 54, max= 174, avg=124.74, stdev= 8.73, samples=101  
lat (msec) : 50=0.06%, 100=0.09%, 250=0.28%, 500=0.48%, 750=0.46%  
lat (msec) : 1000=2.21%, 2000=93.44%  
cpu : user=0.86%, sys=1.31%, ctxt=7037, majf=0, minf=17  
IO depths : 1=0.1%, 2=0.1%, 4=0.1%, 8=0.1%, 16=0.2%, 32=0.5%, >64=99.1%  
submit : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >64=0.0%  
complete : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >64=0.1%  
issued rwt: total=0, 6703,0 short=0,0,0 dropped=0,0,0  
latency : target=0, window=0, percentile=100.00%, depth=200  
  
Run status group 0 (all jobs):  
WRITE: bw=127MiB/s (134MB/s), 127MiB/s-127MiB/s (134MB/s-134MB/s), io=6503MiB (6819MB), run=51060-51060msec  
  
Disk stats (read/write):  
    xvdai: ios=0/26055, merge=0/1, ticks=0/151208, in_queue=151208, util=98.22%  
sh=5.25 ENG IN 02-23 27-03-2025
```

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The screenshot displays two side-by-side browser windows.

AWS CloudWatch Metrics (Top Window):

- Left Sidebar:** Shows navigation links like AI Operations, Alarms, Logs, Metrics (selected), X-Ray traces, Events, Application Signals, Network Monitoring, Insights, and Settings.
- Graph Area:** An Untitled graph showing a single metric over time. The Y-axis ranges from 5.226 to 5.376. The X-axis shows dates from 14:30 to 15:25. A blue line starts at approximately 5.226 at 14:30, rises to about 5.296 by 15:05, and then remains flat until 15:25.
- Metrics Filter:** Set to "N. Virginia" and "File System Metrics". A search bar shows "Search for any metric, dimension, resource id or account id". Buttons include "Add math", "Add query", "Create alarm", "Graph with SQL", and "Graph search".

AWS Academy Assignment Submission (Bottom Window):

- Left Sidebar:** Shows Account, Dashboard, Courses (selected), Calendar, Inbox, History, and Help.
- Content Area:** Title: "Guided lab: Introducing Amazon Elastic File System (Amazon EFS)".
 - Due: No Due Date, Points: 15, Status: Submitting an external tool.
 - A modal dialog box asks "Are you sure you want to submit?" with "Yes" and "Cancel" buttons.
 - Text below the dialog: "an EFS file system to provide secured access to shared datasets. Access points can enforce a user identity, including the user's POSIX groups, for all file system requests that are made through the access point. Refer to the section at the bottom for additional information."
 - Congratulations message: "Congratulations! You created an EFS file system, mounted it to an EC2 instance, and ran an I/O benchmark test to examine its performance characteristics."
- Bottom Status Bar:** Shows weather (15°C, Mostly cloudy), system icons (CloudShell, Feedback), and system status (ENG IN, 02:32, 27-03-2025).

Screenshot of the AWS Academy assignment interface for "Guided lab: Introducing Amazon Elastic File System (Amazon EFS)".

The page shows the assignment details and a progress summary:

- Assignment Details:** "Guided lab: Introducing Amazon Elastic File System (Amazon EFS)"
- Score:** Total score 10/15
- Completed Tasks:**
 - [Task 1] Security Group created: 5/5
 - [Task 2] EFS file system created: 5/5
 - [Task 5] Flexible IO was run: 0/5

Submitting your work:

Instructions: At the top of these instructions, choose Submit to record your progress and when you're ready to submit your work.

Screenshot of the AWS CloudWatch console interface.

The sidebar navigation includes:

- CloudWatch
- Favorites and recents
- Dashboards New
- AI Operations Preview
- Alarms 0 0 0 0
- Logs New
- Metrics
- X-Ray traces New
- Events
- Application Signals New
- Network Monitoring New
- Insights
- Settings
- Telemetry config New
- Getting Started New
- What's new

The main content area displays the CloudWatch Overview page with sections for creating alarms, dashboards, logs, and events.