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COS20019 – Cloud Computing Architecture - Wk4: ACF Lab 4: Working with EBS

## Task 1 - Create a New EBS Volume

The screenshot displays the AWS Management Console interface for EC2 Instances. The top navigation bar shows the AWS logo, 'Services', a search bar, and the user's profile information. The left sidebar contains navigation links for EC2 Dashboard, EC2 Global View, Events, Limits, Instances, Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Scheduled Instances, Capacity Reservations, Images, AMIs, AMI Catalog, Elastic Block Store, Volumes, Snapshots, Lifecycle Manager, Network & Security, Security Groups, Elastic IPs, Placement Groups, and Key Pairs.

The main content area shows the 'Instances (1/2) Info' page. A table lists the instances:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
Bastion Host	i-0d4d0c6256926553f	Running	t2.micro	Initializing	No alarms	us-east-1a	ec2-3-239-245-72.com...	3.239.245.72	-
Lab	i-05fb1c0f8cfbec19	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a	ec2-44-195-20-120.co...	44.195.20.120	-

The 'Lab' instance is selected, and its details are shown below. The instance is named 'i-05fb1c0f8cfbec19 (Lab)' and is in the 'Running' state. The details are organized into sections: Instance summary, Networking, Storage, Status checks, Monitoring, and Tags.

**Instance summary:**

- Instance ID: i-05fb1c0f8cfbec19 (Lab)
- IPv6 address: -
- Hostname type: IP name: ip-10-1-11-110.ec2.internal
- Answer private resource DNS name: -
- Auto-assigned IP address: 44.195.20.120 [Public IP]

**Networking:**

- Public IPv4 address: 44.195.20.120 | open address
- Private IPv4 addresses: 10.1.11.110
- Public IPv4 DNS: ec2-44-195-20-120.compute-1.amazonaws.com | open address
- Elastic IP addresses: -

**Storage:**

- VPC ID: vpc-0e8922a534d9edf47 (Lab VPC)

**Status checks:**

- Instance state: Running
- Private IP DNS name (IPv4 only): ip-10-1-11-110.ec2.internal
- Instance type: t2.micro
- Subnet ID: subnet-01e2f270534199f5e (Public Subnet 1)

**Monitoring:**

- AWS Compute Optimizer finding: User: am:aws:sts::646603964535:assumed-role/voclabs/user2564760=104222196@student.swin.edu.au is not authorized to perform: compute-optimizer:GetEnrollmentStatus on resource: \* because no identity-based policy allows the compute-optimizer:GetEnrollmentStatus action. Retry

**Tags:**

- Auto Scaling Group name: -
- Activate Windows: Go to Settings to activate Windows.

Steps 5-7: The Lab EC2 instance running in Availability Zone us-east-1a.

aws Services Search [Alt+S] N. Virginia voclabs/user2564760=104222196@student.swin.edu.au @ 6466-0396...

New EC2 Experience Tell us what you think

EC2 Dashboard  
EC2 Global View  
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Limits

Instances  
Instances  
Instance Types  
Launch Templates  
Spot Requests  
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Dedicated Hosts  
Scheduled Instances  
Capacity Reservations

Images  
AMIs  
AMI Catalog

Elastic Block Store  
Volumes  
Snapshots  
Lifecycle Manager

Network & Security  
Security Groups  
Elastic IPs  
Placement Groups  
Key Pairs

### Volumes (1/2) Info

Search

	Name	Volume ID	Type	Size	IOPS	Throughput	Snapshot	Created	Availability Zone	Volume state
<input checked="" type="checkbox"/>	-	vol-0cb40ddf56ac0f717	gp3	8 GiB	3000	125	snap-02cac53a19fe67217	2023/06/04 10:33 GMT+7	us-east-1a	<span>✓ In-use</span>
<input type="checkbox"/>	-	vol-0713bcc92cd2db78e	gp3	8 GiB	3000	125	snap-02cac53a19fe67217	2023/06/04 10:34 GMT+7	us-east-1a	<span>✓ In-use</span>

#### Volume ID: vol-0cb40ddf56ac0f717

Details Status checks Monitoring Tags

Volume ID vol-0cb40ddf56ac0f717	Size 8 GiB	Type gp3	Volume status <span>✓ In-use</span>	Volume status <span>✓ Okay</span>
AWS Compute Optimizer finding <span>⊗</span> This user is not authorized to call AWS Compute Optimizer.   <a href="#">Retry</a>	Volume state <span>✓ In-use</span>	IOPS 3000	Throughput 125	Throughput 125
Encryption Not encrypted	KMS key ID -	KMS key alias -	KMS key ARN -	KMS key ARN -
Fast snapshot restored No	Snapshot snap-02cac53a19fe67217	Availability Zone us-east-1a	Created Sun Jun 04 2023 10:33:29 GMT+0700 (Indochina Time)	Created Sun Jun 04 2023 10:33:29 GMT+0700 (Indochina Time)
Multi-Attach enabled No	Attached Instances <u>i-05fb1c0f8cfcbec19 (Lab): /dev/xvda (attached)</u>	Outposts ARN -		

Activate Windows  
Go to Settings to activate Windows.

Step 8: An EBS volume has been set up by the lab and attached to the Lab instance.

aws Services Search [Alt+S] N. Virginia voclabs/user2564760=104222196@student.swin.edu.au @ 6466-0396...

### Volume settings

Volume type [Info](#)  
General Purpose SSD (gp2) ←

Size (GiB) [Info](#)  
1 ←  
Min: 1 GiB, Max: 16384 GiB. The value must be an integer.

IOPS [Info](#)  
100 / 3000  
Baseline of 3 IOPS per GiB with a minimum of 100 IOPS, burstable to 3000 IOPS.

Throughput (MiB/s) [Info](#)  
Not applicable

Availability Zone [Info](#)  
us-east-1a ←

Snapshot ID - optional [Info](#)  
Don't create volume from a snapshot ↻

Encryption [Info](#)  
Use Amazon EBS encryption as an encryption solution for your EBS resources associated with your EC2 instances.  
☐ Encrypt this volume

### Tags - optional [Info](#)

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

Key	Value - optional	
Q Name	Q My Volume	Remove

Activate Windows  
Go to Settings to activate Windows.

Steps 9-10: Setting up a new EBS volume with the required settings: type General Purpose SSD, size 1GiB, availability zone us-east-1a, and name of My Volume.

## Task 2 - Attach the Volume to an Instance

The screenshot shows the AWS Management Console interface for the 'Attach volume' task. The breadcrumb navigation at the top indicates the path: EC2 > Volumes > vol-09f73b42028300e81 > Attach volume. The page title is 'Attach volume' with an 'Info' link. Below the title, a subtitle states: 'Attach a volume to an instance to use it as you would a regular physical hard disk drive.'

The 'Basic details' section contains the following information:

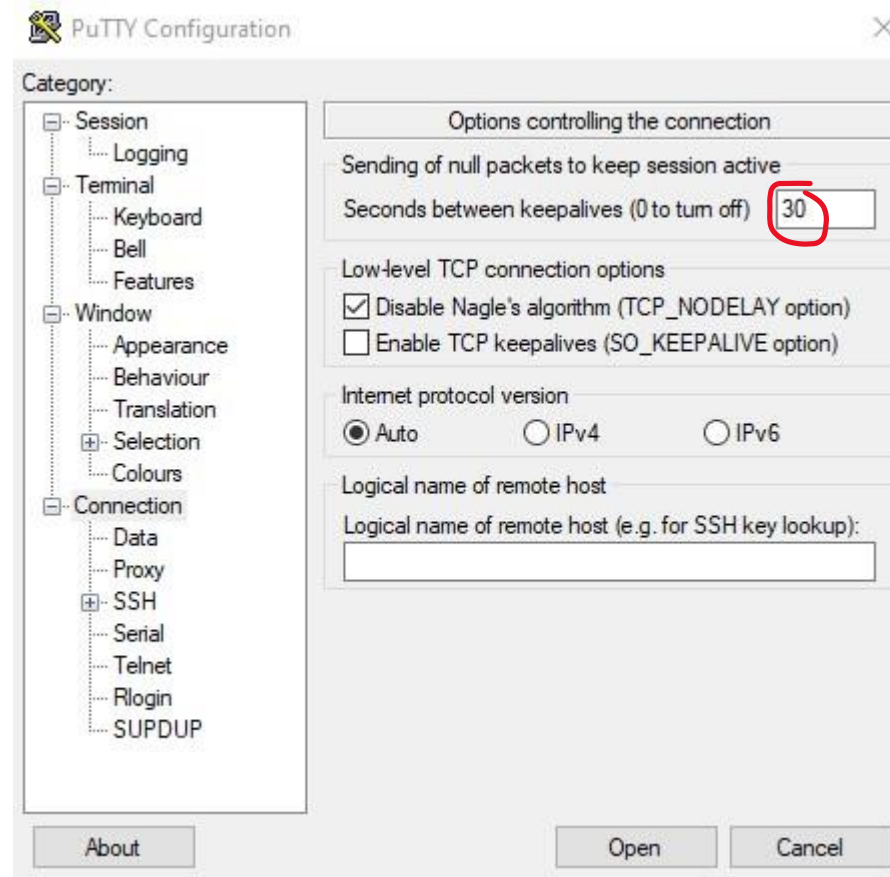
- Volume ID:** vol-09f73b42028300e81 (My Volume)
- Availability Zone:** us-east-1a
- Instance:** A dropdown menu is open, showing a search bar and a list of instances. The instance 'i-05fb1c0f8cfcbec19 (Lab) (running)' is selected and highlighted with a red underline. A blue checkmark is visible next to the selected instance. A note below the list states: 'Newer Linux kernels may rename your devices to `/dev/xvdf` through `/dev/xvdp` internally, even when the device name entered here (and shown in the details) is `/dev/sdf` through `/dev/sdp`.'

At the bottom of the 'Basic details' section, there are two buttons: 'Cancel' and 'Attach volume'.

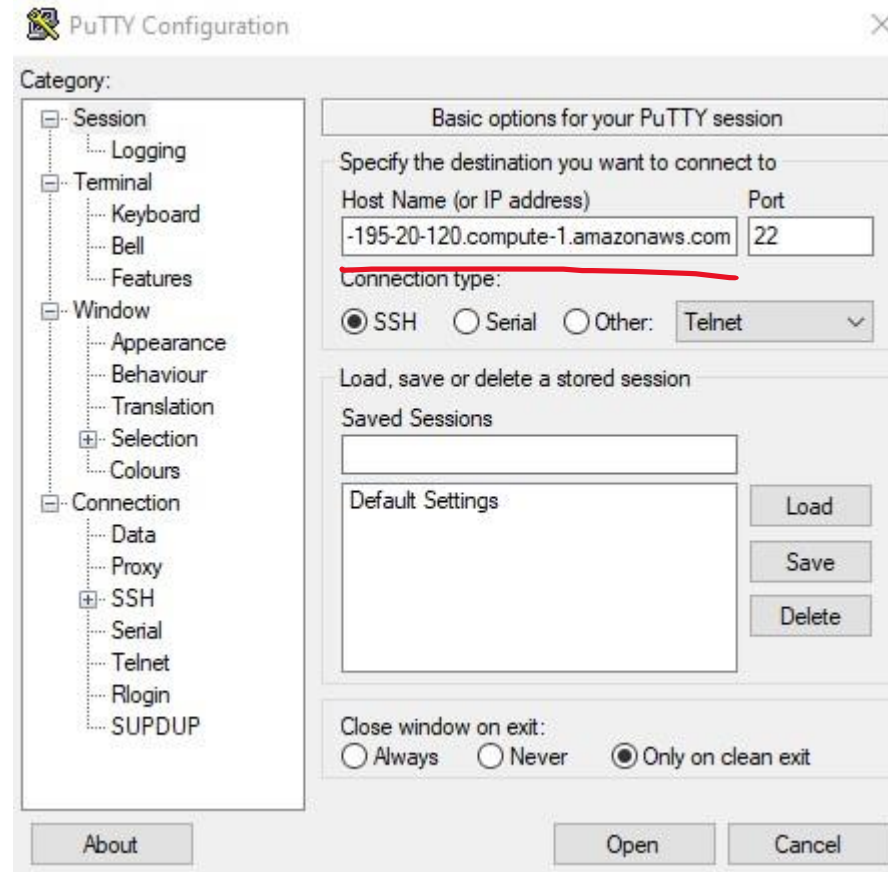
In the bottom right corner of the console, there is a watermark that says: 'Activate Windows Go to Settings to activate Windows.'

Steps 11-14: Attach the newly created volume to the Lab instance.

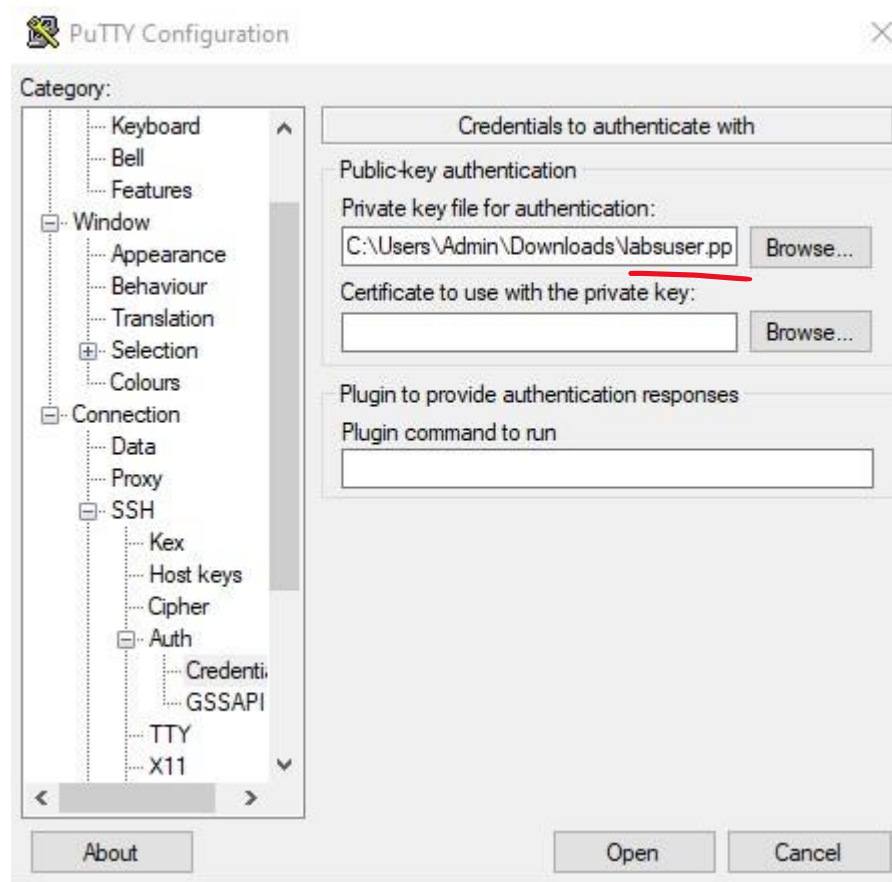
### Task 3 - Connect to Your Amazon EC2 Instance



Steps 15-18: Set seconds between keepalives to 30.



Step 19: Set the host name to the public DNS of the Lab instance.



Step 19 (continued): Use the ppk key file to access the instance.

```
ec2-user@ip-10-1-11-110:~  
login as: ec2-user  
Authenticating with public key "imported-openssh-key"  
#  
~\  ##### Amazon Linux 2023  
~~ \#####\  
~~  \###|  
~~   \#/  https://aws.amazon.com/linux/amazon-linux-2023  
~~    V~'  '->  
~~~  
~~  .  .  
~~ /  /  
~~ /m/ '  ->  
[ec2-user@ip-10-1-11-110 ~]$
```

Steps 20-21: Log into the instance as ec2-user.



## Task 4 - Create and Configure Your File System

```

ec2-user@ip-10-1-11-110:~
login as: ec2-user
Authenticating with public key "imported-openssh-key"

#
~\  ####_      Amazon Linux 2023
~~~\  #####\
~~~\  #####|
~~~\  \###|
~~~\  \#/      https://aws.amazon.com/linux/amazon-linux-2023
~~~\  V~'  '->
~~~\  /
~~~\  /
~~~\  /
~~~\  /m/

[ec2-user@ip-10-1-11-110 ~]$ 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	2.8M	188M	2%	/run
/dev/xvda1	8.0G	1.5G	6.5G	19%	/
tmpfs	475M	0	475M	0%	/tmp
tmpfs	95M	0	95M	0%	/run/user/1000

```

[ec2-user@ip-10-1-11-110 ~]$

```

### Step 30: View the storage available on the instance.

```
ec2-user@ip-10-1-11-110:~  
devtmpfs      4.0M    0  4.0M    0% /dev  
tmpfs          475M    0  475M    0% /dev/shm  
tmpfs          190M   2.8M  188M    2% /run  
/dev/xvda1     8.0G   1.5G   6.5G   19% /  
tmpfs          475M    0  475M    0% /tmp  
tmpfs          95M     0   95M    0% /run/user/1000  
[ec2-user@ip-10-1-11-110 ~]$ sudo mkfs -t ext3 /dev/sdf ←  
mke2fs 1.46.5 (30-Dec-2021)  
Creating filesystem with 262144 4k blocks and 65536 inodes  
Filesystem UUID: 96cfba13-103f-4391-ab2a-ddcb2cbc2400  
Superblock backups stored on blocks:  
        32768, 98304, 163840, 229376  
  
Allocating group tables: done  
Writing inode tables: done  
Creating journal (8192 blocks): done  
Writing superblocks and filesystem accounting information: done  
  
[ec2-user@ip-10-1-11-110 ~]$ sudo mkdir /mnt/data-store ←  
[ec2-user@ip-10-1-11-110 ~]$ sudo mount /dev/sdf /mnt/data-store ←  
[ec2-user@ip-10-1-11-110 ~]$ echo "/dev/sdf  /mnt/data-store ext3 defaults,noatime 1 2" | sudo tee -a /etc/fstab  
/dev/sdf  /mnt/data-store ext3 defaults,noatime 1 2  
[ec2-user@ip-10-1-11-110 ~]$
```

Steps 31-33: Create a new file system on the volume, create a directory for mounting the volume, and mount the volume.

```
ec2-user@ip-10-1-11-110:~  
mke2fs 1.46.5 (30-Dec-2021)  
Creating filesystem with 262144 4k blocks and 65536 inodes  
Filesystem UUID: 96cfba13-103f-4391-ab2a-ddcb2cbc2400  
Superblock backups stored on blocks:  
    32768, 98304, 163840, 229376  
  
Allocating group tables: done  
Writing inode tables: done  
Creating journal (8192 blocks): done  
Writing superblocks and filesystem accounting information: done  
  
[ec2-user@ip-10-1-11-110 ~]$ sudo mkdir /mnt/data-store  
[ec2-user@ip-10-1-11-110 ~]$ sudo mount /dev/sdf /mnt/data-store  
[ec2-user@ip-10-1-11-110 ~]$ echo "/dev/sdf  /mnt/data-store ext3 defaults,noatime 1 2" | sudo tee -a /etc/fstab  
/dev/sdf  /mnt/data-store ext3 defaults,noatime 1 2  
[ec2-user@ip-10-1-11-110 ~]$ cat /etc/fstab  
#  
UUID=55alaebd-f196-4f84-8afe-075f5dldda63  /          xfs      defaults,noatime 1 1  
UUID=0383-1543  /boot/efi    vfat     defaults,noatime,uid=0,gid=0,umask=0077,shortname=winnt,x-systemd.automount 0 2  
/dev/sdf  /mnt/data-store ext3 defaults,noatime 1 2  
[ec2-user@ip-10-1-11-110 ~]$
```

Step 34: View the configuration file.

```
ec2-user@ip-10-1-11-110:~  
Writing superblocks and filesystem accounting information: done  
  
[ec2-user@ip-10-1-11-110 ~]$ sudo mkdir /mnt/data-store  
[ec2-user@ip-10-1-11-110 ~]$ sudo mount /dev/sdf /mnt/data-store  
[ec2-user@ip-10-1-11-110 ~]$ echo "/dev/sdf /mnt/data-store ext3 defaults,noatime 1 2" | sudo tee -a /etc/fstab  
/dev/sdf /mnt/data-store ext3 defaults,noatime 1 2  
[ec2-user@ip-10-1-11-110 ~]$ cat /etc/fstab  
#  
UUID=55alaebd-f196-4f84-8afe-075f5d1dda63 / xfs defaults,noatime 1 1  
UUID=0383-1543 /boot/efi vfat defaults,noatime,uid=0,gid=0,umask=0077,shortname=winnt,x-systemd.automount 0 2  
/dev/sdf /mnt/data-store ext3 defaults,noatime 1 2  
[ec2-user@ip-10-1-11-110 ~]$ 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  2.8M  188M   2% /run  
/dev/xvda1      8.0G  1.5G  6.5G  19% /  
tmpfs           475M   0  475M   0% /tmp  
tmpfs           95M    0   95M   0% /run/user/1000  
/dev/xvdf      975M  60K  924M   1% /mnt/data-store  
[ec2-user@ip-10-1-11-110 ~]$
```

Step 35: View the storage again. A new line /dev/xvdf correctly shows.

```
ec2-user@ip-10-1-11-110:~  
ime 1 2" | sudo tee -a /etc/fstab  
/dev/sdf /mnt/data-store ext3 defaults,noatime 1 2  
[ec2-user@ip-10-1-11-110 ~]$ cat /etc/fstab  
#  
UUID=55alaebd-f196-4f84-8afe-075f5dldda63 / xfs defaults,noatim  
e 1 1  
UUID=0383-1543 /boot/efi vfat defaults,noatime,uid=0,gid=0,umask  
=0077,shortname=winnt,x-systemd.automount 0 2  
/dev/sdf /mnt/data-store ext3 defaults,noatime 1 2  
[ec2-user@ip-10-1-11-110 ~]$ 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  2.8M  188M   2% /run  
/dev/xvda1       8.0G  1.5G  6.5G  19% /  
tmpfs            475M    0  475M   0% /tmp  
tmpfs            95M    0   95M   0% /run/user/1000  
/dev/xvdf        975M   60K  924M   1% /mnt/data-store  
[ec2-user@ip-10-1-11-110 ~]$ sudo sh -c "echo some text has been written > /mnt/  
data-store/file.txt"  
[ec2-user@ip-10-1-11-110 ~]$  
cat /mnt/data-store/file.txt  
some text has been written  
[ec2-user@ip-10-1-11-110 ~]$
```

Steps 36-37: Add a text file to the mounted volume and verify it is created.

## Task 5 - Create an Amazon EBS Snapshot

The screenshot shows the AWS Management Console interface for creating an EBS snapshot. The breadcrumb navigation at the top reads: EC2 > Volumes > vol-09f73b42028300e81 > Create snapshot. The main heading is 'Create snapshot' with an 'Info' link. Below the heading is a descriptive sentence: 'Create a point-in-time snapshot to back up the data on an Amazon EBS volume to Amazon S3.'

The 'Details' section contains the following fields:

- Volume ID:** A dropdown menu showing 'vol-09f73b42028300e81 (My Volume)', which is underlined in red.
- Description:** A text input field with the placeholder 'Add a description for your snapshot' and a note '255 characters maximum.'
- Encryption:** A section with an 'Info' link and the text 'Not encrypted'.

The 'Tags' section includes an 'Info' link and a descriptive sentence: 'A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.'

Below this, there is a table for adding tags:

Key	Value - optional	
<input type="text" value="Name"/>	<input type="text" value="My Snapshot"/>	<input type="button" value="Remove"/>

Below the table is an 'Add tag' button and a note: 'You can add 49 more tags.'

At the bottom of the form are two buttons: 'Cancel' and 'Create snapshot'.

In the bottom right corner, there is a watermark: 'Activate Windows Go to Settings to activate Windows.'

Steps 38-40: Create a snapshot of the EBS volume.

aws Services Search [Alt+S] N. Virginia voclabs/user2564760=104222196@student.swin.edu.au @ 6466-0396...

New EC2 Experience Tell us what you think

EC2 Dashboard  
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Launch Templates  
Spot Requests  
Savings Plans  
Reserved Instances  
Dedicated Hosts  
Scheduled Instances  
Capacity Reservations

▼ Images  
AMIs  
AMI Catalog

▼ Elastic Block Store  
Volumes  
**Snapshots**  
Lifecycle Manager

▼ Network & Security  
Security Groups  
Elastic IPs  
Placement Groups  
Knu Paire

### Snapshots (1/1) Info

Owned by me Search

<input checked="" type="checkbox"/>	Name	Snapshot ID	Size	Description	Storage...	Snapshot status	Started	Progress	Encryption	KMS
<input checked="" type="checkbox"/>	My Snapshot	snap-048fd48605d910f19	1 GiB	-	Standard	✓ Completed	2023/06/04 11:00 GMT+7	✓ Available (100%)	Not encrypted	-

Snapshot ID: snap-048fd48605d910f19 (My Snapshot)

Details Permissions Storage tier Tags

Snapshot ID snap-048fd48605d910f19 (My Snapshot)	Size 1 GiB	Progress ✓ Available (100%)	Snapshot status ✓ Completed
Owner 646603964535	Volume ID vol-09f73b42028300e81	Started Sun Jun 04 2023 11:00:51 GMT+0700 (Indochina Time)	Product codes -
Encryption Not encrypted	KMS key ID -	KMS key alias -	KMS key ARN -
Fast snapshot restore -	Description -		

Activate Windows  
Go to Settings to activate Windows.

Step 41: The snapshot has been created and is available.



```
ec2-user@ip-10-1-11-110:~  
#  
UUID=55alaebd-f196-4f84-8afe-075f5d1dda63      /          xfs      defaults,noatim  
e 1 1  
UUID=0383-1543      /boot/efi      vfat      defaults,noatime,uid=0,gid=0,umask  
=0077,shortname=winnt,x-systemd.automount 0 2  
/dev/sdf  /mnt/data-store ext3 defaults,noatime 1 2  
[ec2-user@ip-10-1-11-110 ~]$ 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  2.8M  188M   2% /run  
/dev/xvda1       8.0G  1.5G  6.5G  19% /  
tmpfs            475M   0  475M   0% /tmp  
tmpfs            95M    0   95M   0% /run/user/1000  
/dev/xvdf        975M   60K  924M   1% /mnt/data-store  
[ec2-user@ip-10-1-11-110 ~]$ sudo sh -c "echo some text has been written > /mnt/  
data-store/file.txt"  
[ec2-user@ip-10-1-11-110 ~]$  
cat /mnt/data-store/file.txt  
some text has been written  
[ec2-user@ip-10-1-11-110 ~]$ sudo rm /mnt/data-store/file.txt  
[ec2-user@ip-10-1-11-110 ~]$ ls /mnt/data-store  
lost+found  
[ec2-user@ip-10-1-11-110 ~]$
```

Steps 42-43: Delete the previous text file.



## Task 6: Restore the Amazon EBS Snapshot

aws Services Search [Alt+S]

Snapshot ID  
snap-048fd48605d910f19 (My Snapshot) ←

Volume type [Info](#)  
General Purpose SSD (gp2)

Size (GiB)  
1  
Min: 1 GiB, Max: 16384 GiB. The value must be an integer.

IOPS  
100 / 3000  
Baseline of 3 IOPS per GiB with a minimum of 100 IOPS, burstable to 3000 IOPS.

Throughput (MiB/s) [Info](#)  
Not applicable

Availability Zone [Info](#)  
us-east-1a

Fast snapshot restore [Info](#)  
Not enabled for selected snapshot

Encryption [Info](#)  
Use Amazon EBS encryption as an encryption solution for your EBS resources associated with your EC2 instances.  
☐ Encrypt this volume

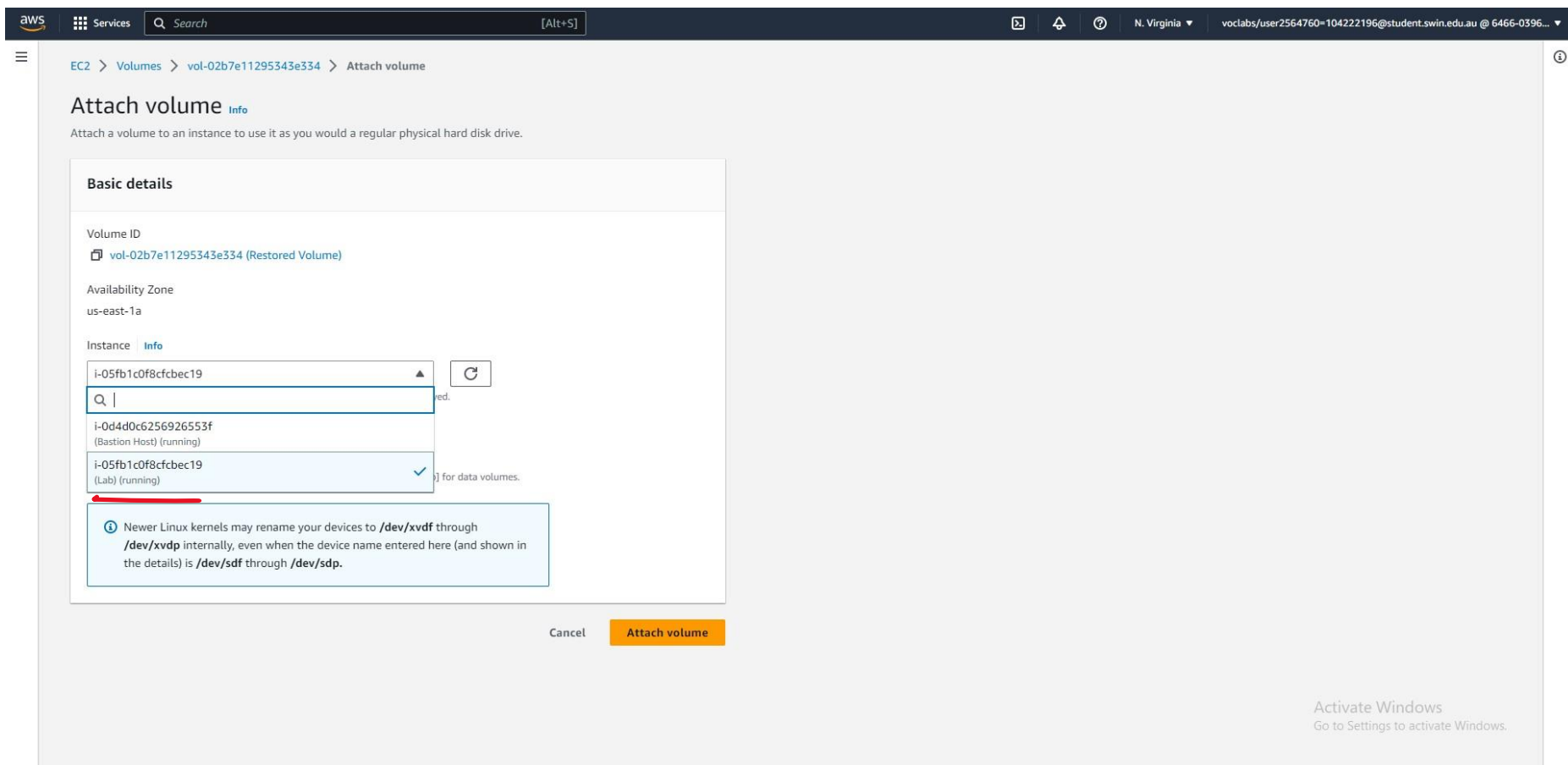
**Tags - optional** [Info](#)  
A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

Key	Value - optional	
Name	Restored Volume	Remove

Add tag

Activate Windows  
Go to Settings to activate Windows.

Steps 44-47: Create a new volume out of the snapshot in the same Availability Zone as the old volume.



Steps 48-52: Attach the new volume to the Lab instance.

```

ec2-user@ip-10-1-11-110:~$ df -h
devtmpfs          4.0M    0  4.0M    0% /dev
tmpfs              475M    0  475M    0% /dev/shm
tmpfs             190M  2.8M  188M    2% /run
/dev/xvda1        8.0G  1.5G  6.5G   19% /
tmpfs             475M    0  475M    0% /tmp
tmpfs             95M    0   95M    0% /run/user/1000
/dev/xvdf         975M   60K  924M    1% /mnt/data-store
[ec2-user@ip-10-1-11-110 ~]$ sudo sh -c "echo some text has been written > /mnt/
data-store/file.txt"
[ec2-user@ip-10-1-11-110 ~]$
cat /mnt/data-store/file.txt
some text has been written
[ec2-user@ip-10-1-11-110 ~]$ sudo rm /mnt/data-store/file.txt
[ec2-user@ip-10-1-11-110 ~]$ ls /mnt/data-store
lost+found
[ec2-user@ip-10-1-11-110 ~]$ sudo mkdir /mnt/data-store2
[ec2-user@ip-10-1-11-110 ~]$ sudo mount /dev/sdg /mnt/data-store2
[ec2-user@ip-10-1-11-110 ~]$ ^[[200~ls /mnt/data-store2/
-bash: $'\E[200~ls': command not found
[ec2-user@ip-10-1-11-110 ~]$ ~ls /mnt/data-store2/
-bash: ~ls: command not found
[ec2-user@ip-10-1-11-110 ~]$ ls /mnt/data-store2/
file.txt  lost+found
[ec2-user@ip-10-1-11-110 ~]$

```

Steps 53-55: Create a new directory to mount the new volume, mount the volume, and verify that the old text file exists.