

## EBS Volume Replication and Expansion

### Problem Statement:

You work for XYZ Corporation. Your corporation is working on an application and they require secured web servers on Linux to launch the application.

### You have been asked to:

1. Create an Instance in the us-east-1 (N. Virginia) region with Linux OS and manage the requirement of web servers of your company using AMI
2. Replicate the instance in the us-west-2 (Oregon) region
3. Build two EBS volumes and attach them to the instance in the us-east-1 (N. Virginia) region
4. Delete one volume after detaching it and extend the size of the other volume
5. Take a backup of this EBS volume

### Answer:

Login to AWS Management console

<https://aws.amazon.com/console/>

Go to EC2 service → Instances → Launch instances →

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### Launch an instance Info

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

#### Name and tags Info


Name


1 [Add additional tags](#)


#### ▼ Application and OS Images (Amazon Machine Image) Info


An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below


##### Quick Start


  
Amazon Linux  
2


  
macOS

  
Ubuntu

  
Windows

  
Red Hat

  
SUSE Linux

  
[Browse more AMIs](#)  
Including AMIs from AWS, Marketplace and the Community

##### Amazon Machine Image (AMI)

Amazon Linux 2023 AMI  
ami-0f34c5ae932e6f0e4 (64-bit (x86)) / ami-0964d1dc1ed54b42f (64-bit (Arm))  
Virtualization: hvm   ENA enabled: true   Root device type: ebs

[Free tier eligible](#) ▼

##### Description

Amazon Linux 2023 AMI 2023.1.20230725.0 x86\_64 HVM kernel-6.1

Architecture 3  

64-bit (x86) ▼

AMI ID  
ami-0f34c5ae932e6f0e4 Verified provider

1. Provide Instance a name
2. Select Operating system
3. Select Architecture

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The screenshot shows the AWS Management Console configuration page for an EC2 instance. It is divided into three main sections: Key pair (login), Network settings, and Configure storage. The Key pair section shows a dropdown menu with 'techarkit17072023' selected, marked with a red '4'. The Network settings section shows 'vpc-075375a9d0bf3861f' selected, 'Subnet' set to 'No preference', and 'Auto-assign public IP' set to 'Enable'. The Firewall (security groups) section shows 'Create security group' selected, marked with a red '5'. Below this, it shows rules for 'launch-wizard-2' with 'Allow SSH traffic from Anywhere' and 'Allow HTTP traffic from the internet' selected. A warning message states: 'Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.' The Configure storage section shows '1x 8 GiB gp3' selected, marked with a red '6', and a note about free tier eligible customers.

4. Select Key pair
5. Create Security Group and allow SSH and HTTP from anywhere
6. EBS volume (If require add another)

The screenshot shows the 'User data - optional' section of the AWS Management Console. It includes a 'Choose file' button and a text area containing the following commands: 

```
#!/bin/bash
sudo yum update -y
sudo yum install httpd -y
sudo systemctl enable httpd
sudo systemctl start httpd

echo "WelCome to RaviKumar Web services" > /var/www/html/index.html

sudo systemctl restart httpd
```

 Below the text area is a checkbox labeled 'User data has already been base64 encoded'.

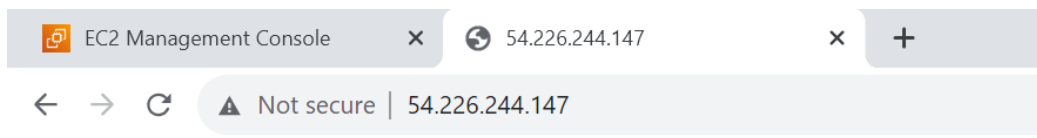
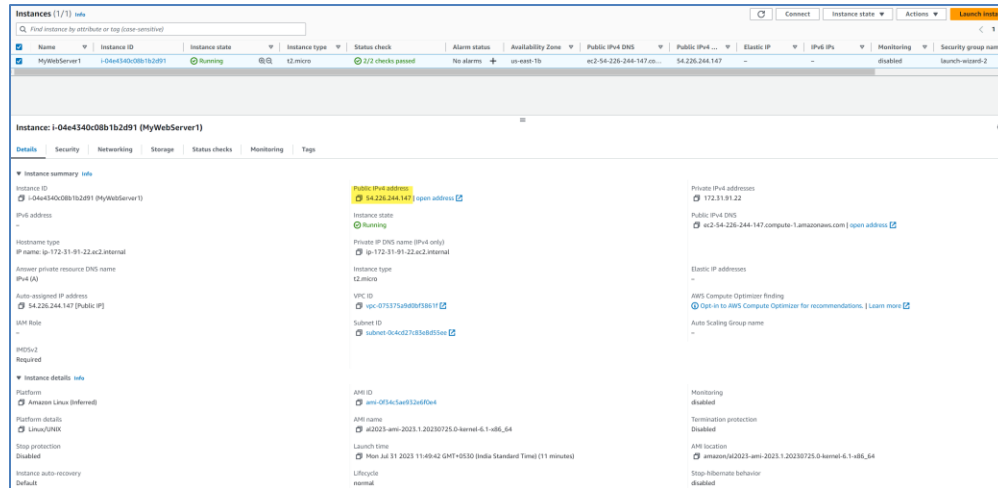
Advanced settings add user data as above to install and start web server.

Click on “Launch instance”

Instance has been launched in N. Virginia region successfully.

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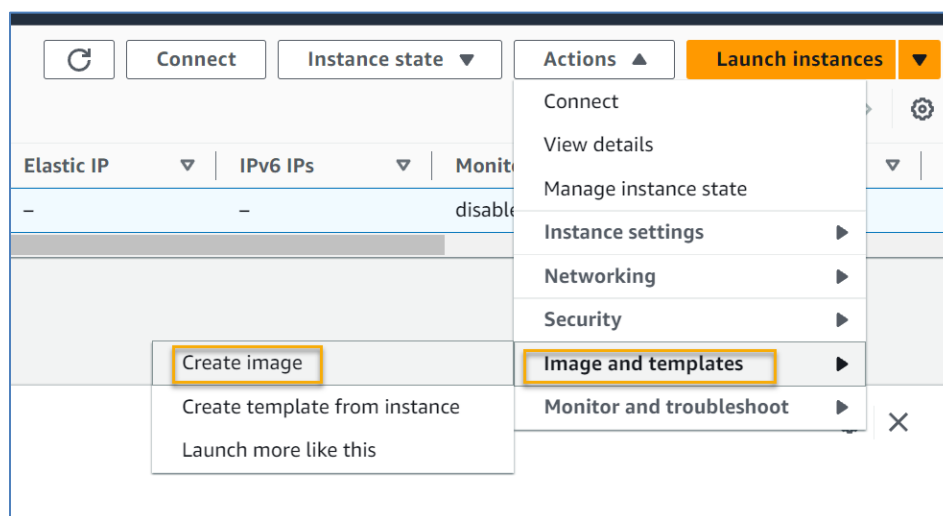
<https://www.youtube.com/@TechArkit/videos>



Welcome to RaviKumar Web services

Web server is accessible from public facing.

Select the instance you wanted to copy to another region then **Actions** → **Image and templates** → **Create Image**



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EC2 > Instances > i-04e4340c08b1b2d91 > Create image

### Create image info

An image (also referred to as an AMI) defines the programs and settings that are applied when you launch an EC2 instance. You can create an image from the configuration of an existing instance.

Instance ID  
i-04e4340c08b1b2d91 (MyWebServer1)

Image name  
WebServerAMI  
Maximum 127 characters. Can't be modified after creation.

Image description - optional  
Web Server AMI v1  
Maximum 255 characters

No reboot  
☐ Enable

Instance volumes

Storage type	Device	Snapshot	Size	Volume type	IOPS	Throughput	Delete on termination	Encrypted
EBS	/dev/...	Create new snapshot fr...	8	EBS General Purpose S...	3000		<input checked="" type="checkbox"/> Enable	<input type="checkbox"/> Enable

[Add volume](#)

During the image creation process, Amazon EC2 creates a snapshot of each of the above volumes.

Tags - optional  
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.

☒ Tag image and snapshots together  
Tag the image and the snapshots with the same tag.

☐ Tag image and snapshots separately  
Tag the image and the snapshots with different tags.

No tags associated with the resource.

[Add new tag](#)  
You can add up to 50 more tags.

[Cancel](#) [Create image](#)

Provide Image name

Image Description

**Note:** Do not select No Reboot option if you wanted to have consistent AMI. No Reboot option will create consistent issues some times.

Click on “Create Image”

Amazon Machine Images (AMIs) (1) info

Owned by me  Find AMI by attribute or tag

Name	AMI ID	AMI name	Source	Owner	Visibility	Status	Creation date	Platform	Root device type	Block devices
	ami-01b12d74fb36109ee	WebServerAMI	208253836762/WebServerAMI	208253836762	Private	Pending	2023/07/31 12:07 GMT+5:30	Linux/UNIX	efs	/dev/vda=81

Wait for a few minutes to create the AMI.

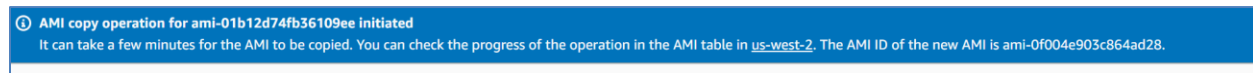
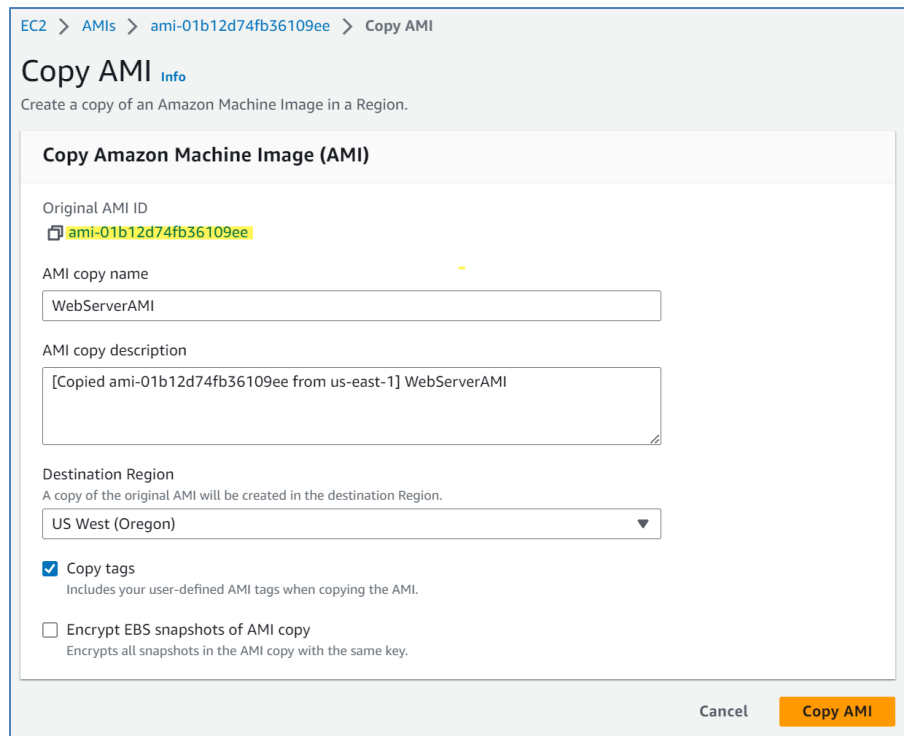
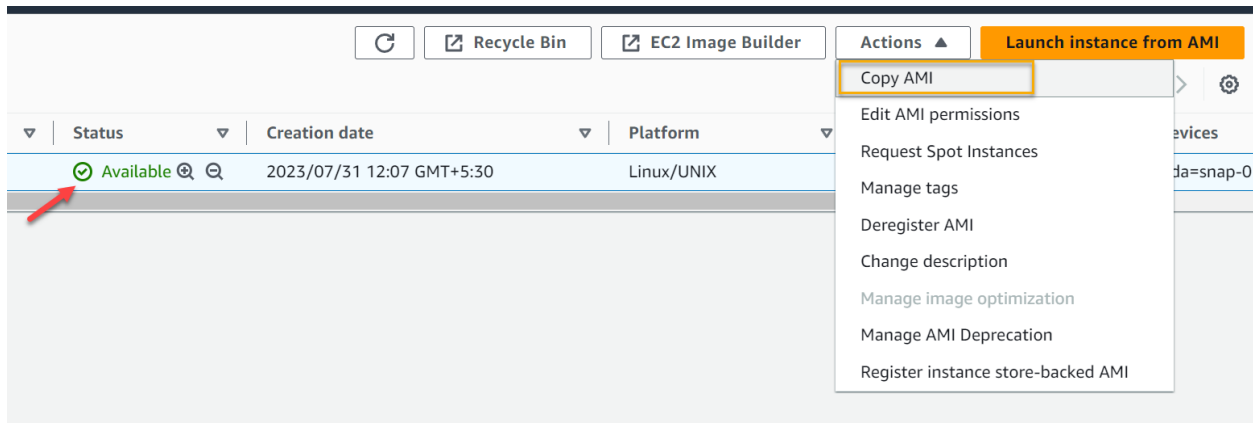
**Note:** AMI Creation takes time depending on instance data size.

Once the AMI state is available then select the AMI

EC2 Dashboard → Images → AMIs → Select the AMI → Actions → Copy AMI

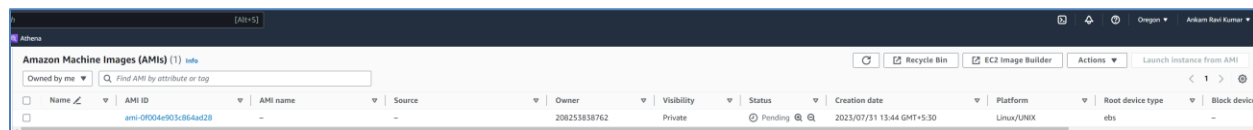
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Amazon Machine Image is still pending

Wait for a few minutes to complete the copy.



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The screenshot shows the Amazon Machine Images (AMIs) console. At the top, there's a search bar and a table of AMIs. The table has columns for Name, AMI ID, AMI name, Source, Owner, Visibility, Status, Creation date, Platform, Root device type, and Block devices. The AMI with ID ami-0f004e903c864ad28 is highlighted, and its status is 'Available'. A red arrow points to the 'Available' status. Below the table, the details for this AMI are shown. The AMI ID is ami-0f004e903c864ad28. The AMI name is WebServerAMI. The Source is 208253838762/WebServerAMI. The Status is Available. The Creation date is Mon Jul 31 2023 13:44:09 GMT+05:30 (India Standard Time). The Platform is Linux/UNIX. The Root device type is EBS. The Block devices are /dev/xvda=snap-0f5b06f343feb7b18:trueegp3. The Deprecation time is -.

Now AMI is available in Oregon region, Lets spin the EC2 instance using the backup AMI.

The screenshot shows the Amazon EC2 console. At the top, there's a navigation bar with icons for Dashboard, Notifications, Help, Region (Oregon), and User (Ankam Ravi Kumar). Below the navigation bar, there's a section for 'Launch instance from AMI'. The section has a title 'Launch instance from AMI' and a button 'Launch instance from AMI'. Below the button, there's a pagination control showing '1' and a settings icon.

The screenshot shows the 'Create volume' form in the Amazon EC2 console. The form has a title 'Create volume' and a subtitle 'Create an Amazon EBS volume to attach to any EC2 instance in the same Availability Zone.' The form is divided into several sections: 'Volume settings', 'Encryption', and 'Tags - optional'. In the 'Volume settings' section, there are fields for 'Volume type' (General Purpose SSD (gp3)), 'Size (GiB)' (10), 'IOPS' (3000), 'Throughput (MiB/s)' (125), and 'Availability Zone' (us-east-1b). There are also checkboxes for 'Snapshot ID - optional' and 'Encrypt this volume'. In the 'Encryption' section, there's a checkbox for 'Encrypt this volume'. In the 'Tags - optional' section, there are fields for 'Key' and 'Value' and a button 'Add tag'.

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**Launch an instance** [Info](#)

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

**Name and tags** [Info](#)

Name  
MyWebServer1 [Add additional tags](#)

**Application and OS Images (Amazon Machine Image)** [Info](#)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below.

Search our full catalog including 1000s of application and OS images

[AMI from catalog](#) | [My AMIs](#) | [Quick Start](#)

Amazon Machine Image (AMI)

**WebServerAMI**  
**ami-0f004e903c864ad28** [Browse more AMIs](#)

Published: 2023-07-31T08:14:09.00Z  
Architecture: x86\_64  
Virtualization: hvm  
Root device type: ebs  
ENA Enabled: Yes

Provide new EC2 instance name

Validate your launching from the correct AMI

Select the Key pair and Security Group

Allow SSH and HTTP from anywhere to access the EC2 instance as well as browse the Webserver

Click **“Launch instance”**

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP	IPv6 IPs	Monitoring
MyWebServer1	i-015964fc81fc31ae7	running	t2.micro	Initializing	No alarms	us-west-2b	ec2-35-88-138-232.us-west-2.compute.amazonaws.com	35.88.138.232	-	-	disabled

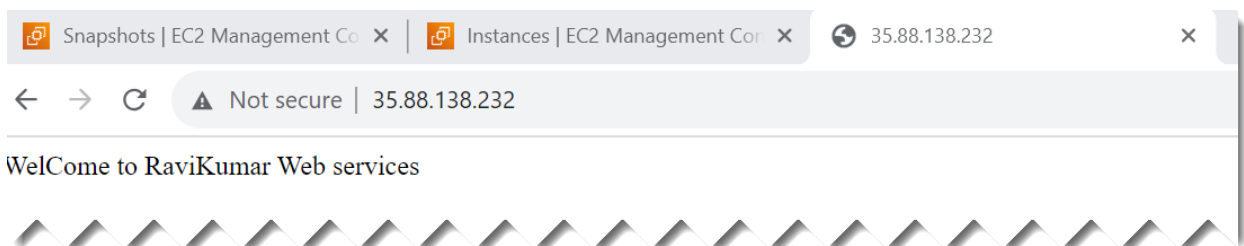
**Instance: i-015964fc81fc31ae7 (MyWebServer1)**

[Details](#) | [Security](#) | [Networking](#) | [Storage](#) | [Status checks](#) | [Monitoring](#) | [Tags](#)

**Instance summary** [Info](#)

Instance ID i-015964fc81fc31ae7 (MyWebServer1)	Public IPv4 address 35.88.138.232 <a href="#">open address</a>	Private IPv4 addresses 172.31.24.116
IPv6 address -	Instance state Running	Public IPv4 DNS ec2-35-88-138-232.us-west-2.compute.amazonaws.com <a href="#">open address</a>
Hostname type IP name: ip-172-31-24-116.us-west-2.compute.internal	Private IP DNS name (IPv4 only) ip-172-31-24-116.us-west-2.compute.internal	

Grab the instance public IP Address and check web server is working fine.





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Successfully copied the EX2 instance from N.Virginia to Oregon

## **Step 3: Create EBS volumes**

To attach the EBS volumes first we need to create two EBS volumes and follow the steps

Note: Please check the instance AZ details before going to create volume.

We have to create the volume in the same AZ where instance is running.

**EC2 → Elastic Block Store → Volumes → Create volume**

1. Select the volume type (This is based on application required performance (I/O))
2. Provide Size
3. Availability Zone if you select wrong AZ you can't attach to instance

Click “Create volume”

**Create volume** [Info](#)

Create an Amazon EBS volume to attach to any EC2 instance in the same Availability Zone.

**Volume settings**

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

Size (GiB) [Info](#)  
20  
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-1b

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.

No tags associated with the resource.

[Add tag](#)  
You can add 50 more tags.

[Cancel](#) [Create volume](#)

Similarly create another volume this time 20GB in size

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Wait for a few seconds to EBS volume to come in Available status

Successfully created volume vol-09d25ee84143d2e58

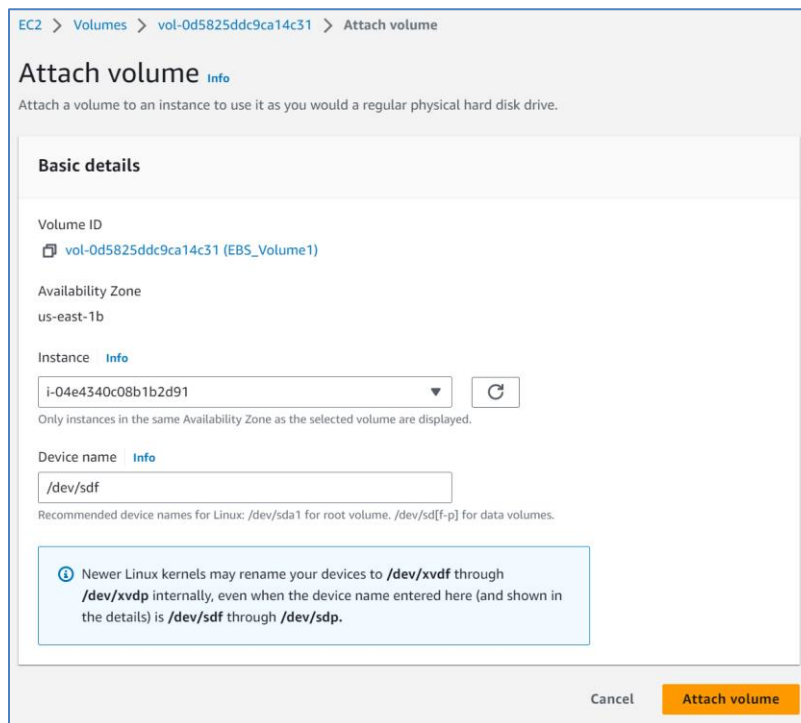
Volumes (3) info

Search

	Name	Volume ID	Type	Size	IOPS	Throughput	Snapshot	Created	Availability Zone	Volume state	Alarm status	Attached instances	Volume sta...	Encryption	
<input type="checkbox"/>		vol-0d5d42a63eb51e3c3	gp3	8 GiB	3000	125	snap-096d6f9e...	2023/07/31 11:49 GMT+5:30	us-east-1b	<span>In-use</span>	No alarms	+	i-04e4340c08b1b2d91 (My...	<span>Okay</span>	Not encrypted
<input checked="" type="checkbox"/>	EBS_Volume1	vol-0d5825ddc9ca14c31	gp3	10 GiB	3000	125	-	2023/07/31 13:59 GMT+5:30	us-east-1b	<span>Available</span>	No alarms	+	-	<span>Okay</span>	Not encrypted
<input checked="" type="checkbox"/>	EBS_Volume2	vol-09d25ee84143d2e58	gp2	20 GiB	100	-	-	2023/07/31 14:01 GMT+5:30	us-east-1b	<span>Available</span>	No alarms	+	-	<span>Okay</span>	Not encrypted

Now select the volume and attach to the instance

Select EBS volume → Actions → Attach volume



EC2 > Volumes > vol-0d5825ddc9ca14c31 > Attach volume

### Attach volume [Info](#)

Attach a volume to an instance to use it as you would a regular physical hard disk drive.

**Basic details**

Volume ID  
vol-0d5825ddc9ca14c31 (EBS\_Volume1)

Availability Zone  
us-east-1b

Instance [Info](#)  
i-04e4340c08b1b2d91

Only instances in the same Availability Zone as the selected volume are displayed.

Device name [Info](#)  
/dev/sdf

Recommended device names for Linux: /dev/sda1 for root volume, /dev/sd[f-p] for data volumes.

**Info** 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.

Cancel **Attach volume**

Click **“Attach volume”**

Once you attach the volume state becomes **In-use**

In similar way attach another EBS volume.

Login to EC2 instance

```
[ec2-user@ip-172-31-91-22 ~]$ sudo -s
[root@ip-172-31-91-22 ec2-user]# lsblk
NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
xvda         202:0    0   8G  0 disk
├─xvda1      202:1    0   8G  0 part /
├─xvda127    259:0    0   1M  0 part
└─xvda128    259:1    0  10M  0 part
xvdf         202:80    0  10G  0 disk
xvdg         202:96    0  20G  0 disk
[root@ip-172-31-91-22 ec2-user]# mkdir /volume1 /volume2
[root@ip-172-31-91-22 ec2-user]# mkfs.xfs /dev/xvdf
meta-data=/dev/xvdf            isize=512    agcount=4, agsize=655360 blks
        =                       sectsz=512    attr=2, projid32bit=1
        =                       crc=1        finobt=1, sparse=1, rmapbt=0
        =                       reflink=1    bigtime=1 inobtcount=1
data      =                       bsize=4096   blocks=2621440, imaxpct=25
        =                       sunit=0      swidth=0 blks
naming    =version 2             bsize=4096   ascii-ci=0, ftype=1
log        =internal log        bsize=4096   blocks=16384, version=2
        =                       sectsz=512    sunit=0 blks, lazy-count=1
realtime  =none                  extsz=4096   blocks=0, rtextents=0
[root@ip-172-31-91-22 ec2-user]# mkfs.xfs /dev/xvdg
meta-data=/dev/xvdg            isize=512    agcount=4, agsize=1310720 blks
        =                       sectsz=512    attr=2, projid32bit=1
        =                       crc=1        finobt=1, sparse=1, rmapbt=0
        =                       reflink=1    bigtime=1 inobtcount=1
data      =                       bsize=4096   blocks=5242880, imaxpct=25
        =                       sunit=0      swidth=0 blks
naming    =version 2             bsize=4096   ascii-ci=0, ftype=1
log        =internal log        bsize=4096   blocks=16384, version=2
        =                       sectsz=512    sunit=0 blks, lazy-count=1
realtime  =none                  extsz=4096   blocks=0, rtextents=0
[root@ip-172-31-91-22 ec2-user]# mount /dev/xvdf /volume1
[root@ip-172-31-91-22 ec2-user]# mount /dev/xvdg /volume2
[root@ip-172-31-91-22 ec2-user]# 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  1.6G  6.5G  20% /
tmpfs           475M   0  475M   0% /tmp
tmpfs           95M    0   95M   0% /run/user/1000
/dev/xvdf       10G  104M   9.9G   2% /volume1
/dev/xvdg       20G  175M   20G   1% /volume2
[root@ip-172-31-91-22 ec2-user]#
```

sudo -s to switch to root user to do the activity

lsblk to identify the disk paths

mkdir /volume1 /volume2

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```
mkfs.xfs /dev/xvdf #To make file system in xvdf disk
```

```
mkfs.xfs /dev/xvdg #To make file system in xvdg disk
```

```
mount /dev/xvdf /volume1 #To mount the disk
```

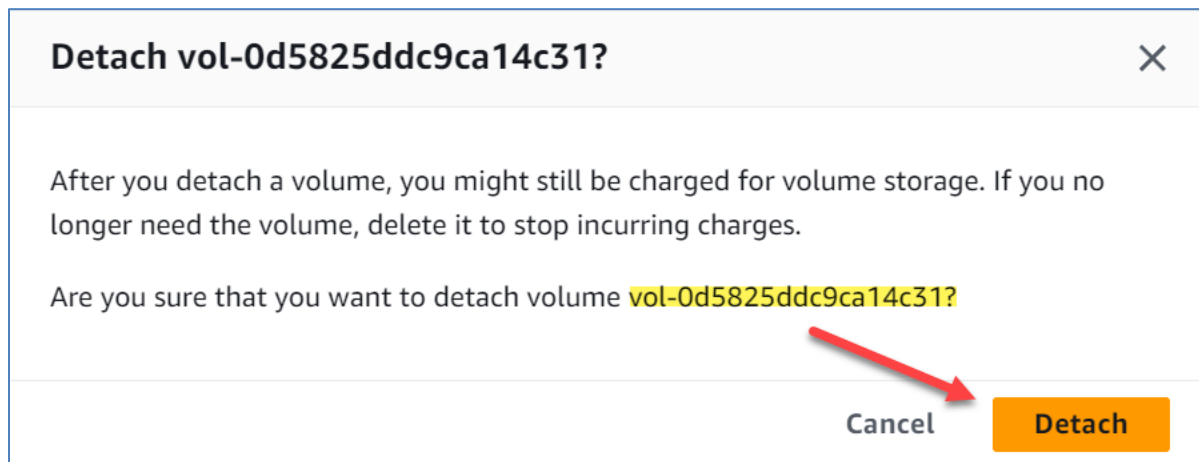
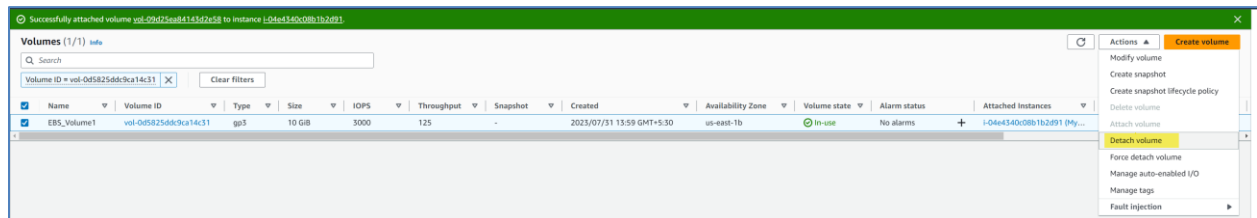
```
df -h # To check the mount point status
```

## Remove Disk from EC2 instance

Un-mount the disk using a below command

```
umount -l /volume1
```

Now detach volume from the instance

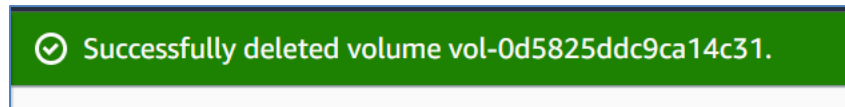
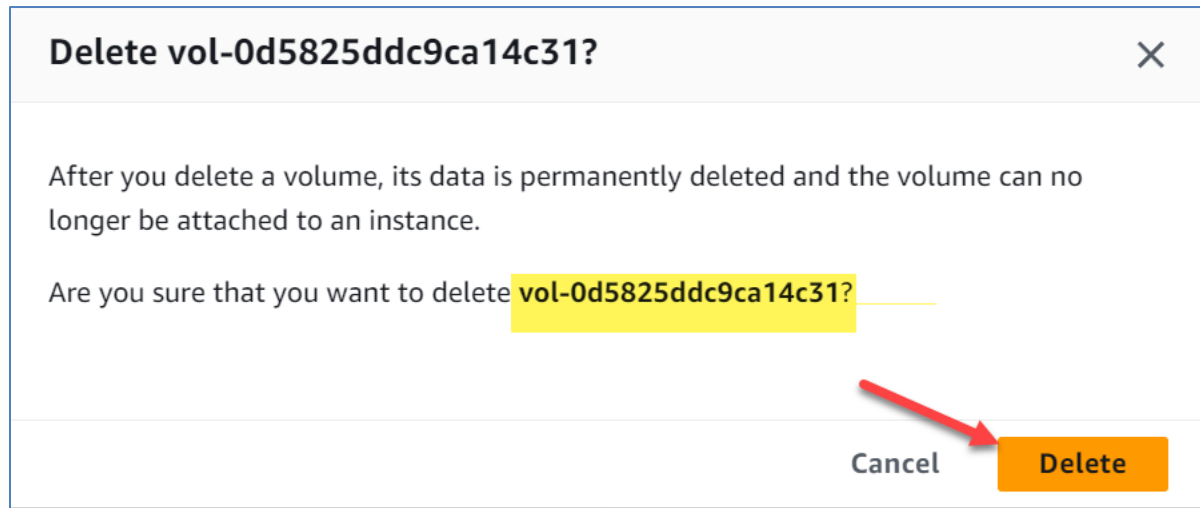
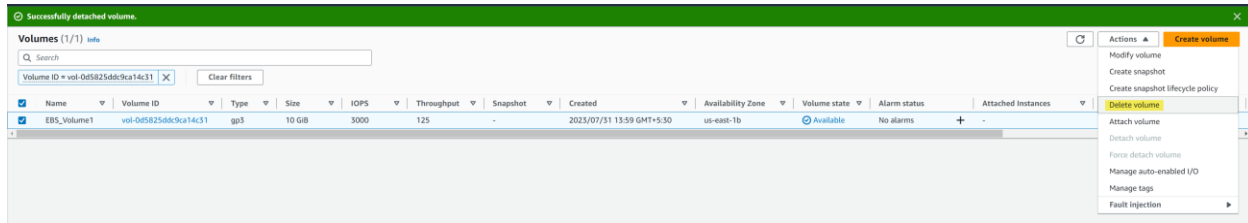


Validate the volume ID before you click on detach



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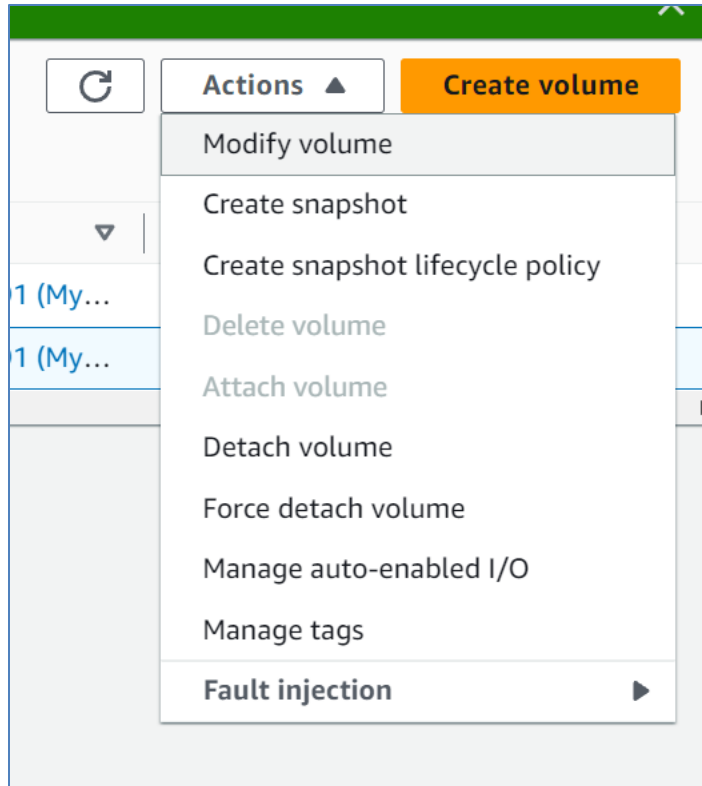
<https://www.youtube.com/@TechArkit/videos>



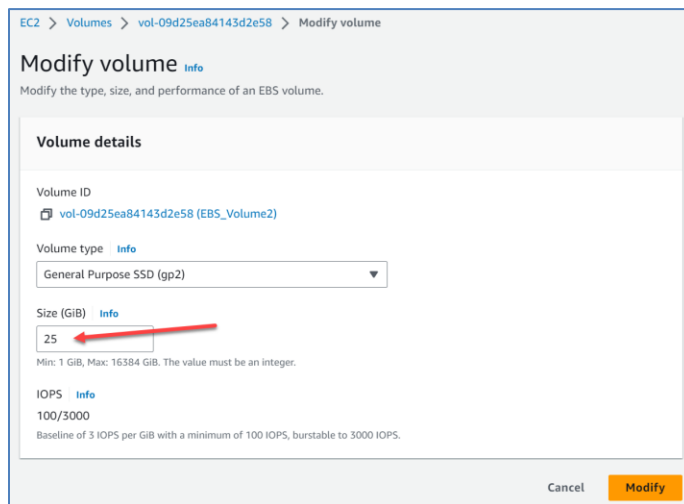
Expand the second volume

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Select the volume Actions → Modify volume →



Update the size details from 20 to 25 which become 25GB

Click Modify

## Modify vol-09d25ea84143d2e58?



If you are increasing the size of the volume, you must extend the file system to the new size of the volume. You can only do this when the volume enters the optimizing state. For more information see extending the file system for [Linux](#) and [Windows](#).

The modification might take a few minutes to complete.

You are charged for the new volume configuration after volume modification starts. For pricing information, see [Amazon EBS Pricing](#).

Are you sure that you want to modify **vol-09d25ea84143d2e58?**

Cancel

Modify

Requested volume modification for volume vol-09d25ea84143d2e58.  
The volume is being modified.

Volumes (2) Info

Search

<input type="checkbox"/>	Name	Volume ID	Type	Size	IOPS	Throughput	Snapshot	Created	Availability Zone
<input type="checkbox"/>	-	vol-0d3d42a63eb51e3c3	gp3	8 GiB	3000	125	snap-096dd96...	2023/07/31 11:49 GMT+5:30	us-east-1b
<input type="checkbox"/>	EBS_Volume2	vol-09d25ea84143d2e58	gp2	25 GiB	100	-	-	2023/07/31 14:01 GMT+5:30	us-east-1b

Volume is now become 25GB, expanding the same from Linux OS.

```
[root@ip-172-31-91-22 ec2-user]# lsblk
NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
xvda        202:0    0   8G  0 disk
├─xvda1     202:1    0   8G  0 part /
├─xvda127   259:0    0    1M  0 part
└─xvda128   259:1    0   10M  0 part
xvdg        202:96    0  25G  0 disk /volume2
[root@ip-172-31-91-22 ec2-user]# xfs_growfs /volume2
meta-data=/dev/xvdg             isize=512    agcount=4, agsize=1310720 blks
      =                       sectsz=512    attr=2, projid32bit=1
      =                       crc=1        finobt=1, sparse=1, rmapbt=0
      =                       reflink=1    bigtime=1 inobtcount=1
data      =                       bsize=4096   blocks=5242880, imaxpct=25
      =                       sunit=0      swidth=0 blks
naming    =version 2           bsize=4096   ascii-ci=0, ftype=1
log        =internal log      bsize=4096   blocks=16384, version=2
      =                       sectsz=512    sunit=0 blks, lazy-count=1
realtime  =none                extsz=4096   blocks=0, rtextents=0
data blocks changed from 5242880 to 6553600
[root@ip-172-31-91-22 ec2-user]# 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  1.6G  6.5G  20% /
tmpfs           475M   0  475M   0% /tmp
tmpfs           95M    0   95M   0% /run/user/1000
/dev/xvdg       25G   21M   25G   1% /volume2
[root@ip-172-31-91-22 ec2-user]#
```

Login to the EC2 instance then run above commands

```
lsblk
```

`xfs_growfs /volum2` #since it is a XFS file system, to grow we have to run this command

OR

`resize2fs` #for ext4, ext3 file systems

## **EBS Volume Backup**

Go to Elastic Block Store → Volumes → Select volume → Actions → Create Snapshot



Created by TechArkit Youtube Channel. Follow us for more videos and Documents:

<https://www.youtube.com/@TechArkit/videos>

### Create snapshot Info

Create a point-in-time snapshot to back up the data on an Amazon EBS volume to Amazon S3.

#### Details

Volume ID  
vol-09d25ea84143d2e58 (EBS\_Volume2)

Description  
Add a description for your snapshot  
  
255 characters maximum.

Encryption Info  
Not encrypted

#### Tags 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

Remove

Add tag

You can add 49 more tags.

Cancel

Create snapshot

Provide description to refer later point of time.

Add Tags for easy identification

Click “Create snapshot”

✔ Successfully created snapshot snap-0322603a2b3a75ef7 from volume vol-09d25ea84143d2e58.  
If you need your snapshot to be immediately available consider using Fast Snapshot Restore.

Snapshots (2) <small>Info</small>										
Owned by me		<input type="text" value="Search"/>								
<input type="checkbox"/>	Name	Snapshot ID	Volume size	Description	Storage tier	Snapshot status	Started	Progress	Encryption	KMS key ID
<input type="checkbox"/>	-	snap-01b1d66c58695b9f9	8 GiB	Created by CreateImagef...	Standard	Completed	2023/07/31 12:09 GMT+5:30	Available (100%)	Not encrypted	-
<input type="checkbox"/>	-	snap-0322603a2b3a75ef7	25 GiB	31st July 2023 Backup Copy	Standard	Pending	2023/07/31 14:36 GMT+5:30	Unavailable (6%)	Not encrypted	-