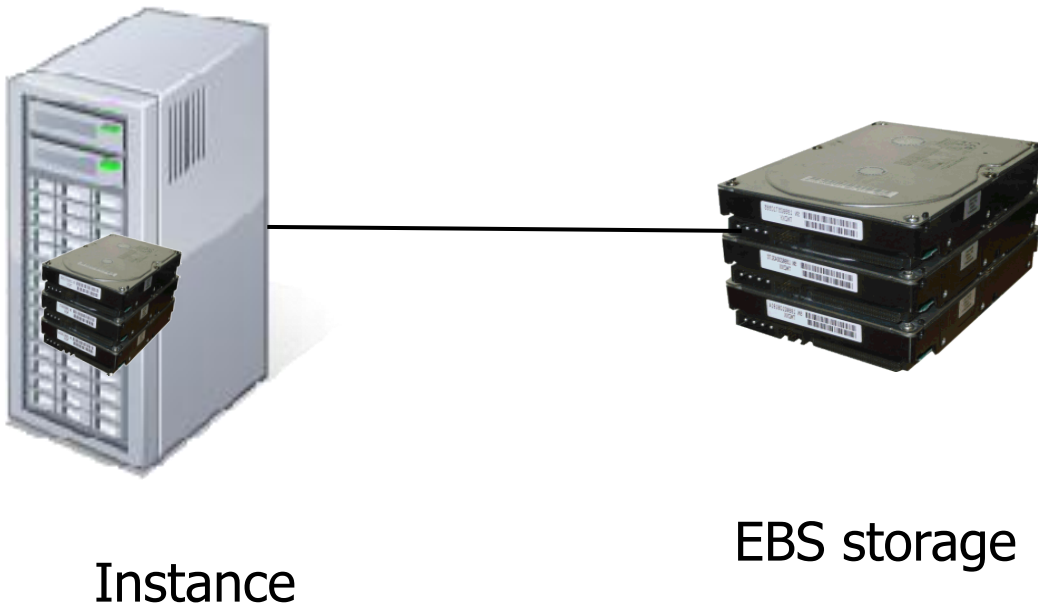


# Elastic Block Store (EBS)

## What is Elastic Block Store (EBS)?



- **Persistent storage**
  - Unlike the local instance store, data stored in EBS is not lost when an instance fails or is terminated
- **Should I use the instance store or EBS?**
  - Typically, instance store is used for temporary data
- **EBS storage is allocated in volumes**
  - A volume is a 'virtual disk' (size: 1GB - 1TB)
  - Basically, a raw block device
  - Can be attached to an instance (but only one at a time)
  - A single instance can access multiple volumes

- **Placed in specific availability zones**
  - Why is this useful?
  - Be sure to place it near instances (otherwise can't attach)
- **Replicated across multiple servers**
  - Data is not lost if a single server fails
  - Amazon: Annual failure rate is 0.1-0.2%
- **EC2 instances can have an EBS volume as their root device ("EBS boot")**
  - Result: Instance data persists independently from the lifetime of the instance
  - You can stop and restart the instance, similar to suspending and resuming a laptop
    - You won't be charged for the instance while it is stopped (only for EBS)
  - You can enable termination protection for the instance
    - Blocks attempts to terminate the instance (e.g., by accident) until termination protection is disabled again

# CREATEEBS VOLUMES

Once you are in the EC2 page, click Volumes under ELASTIC BLOCK STORE on the left pane.

Tags  
Reports  
Limits

INSTANCES

- Instances
- Spot Requests
- Reserved Instances
- Commands
- Dedicated Hosts

IMAGES

- AMIs
- Bundle Tasks

ELASTIC BLOCK STORE

- Volumes**
- Snapshots

Resources

You are using the following Amazon EC2 resources in the Asia Pacific (Singapore) region:

- 0 Running Instances
- 0 Elastic IPs
- 0 Dedicated Hosts
- 0 Snapshots
- 1 Volumes
- 0 Load Balancers
- 4 Key Pairs
- 5 Security Groups
- 0 Placement Groups

Easily deploy Ruby, PHP, Java, .NET, Python, Node.js & Docker applications with [Elastic Beanstalk](#).

Create Instance

When creating Amazon EC2 you will want to launch a virtual server, known as an Amazon EC2 instance.

Launch Instance

Note: Your instances will launch in the Asia Pacific (Singapore) region

Once you are in the Volumes page, click on Create Volume to create a new volume.

Tags  
Reports  
Limits

INSTANCES

- Instances
- Spot Requests
- Reserved Instances
- Commands
- Dedicated Hosts

IMAGES

- AMIs
- Bundle Tasks

ELASTIC BLOCK STORE

- Volumes**
- Snapshots

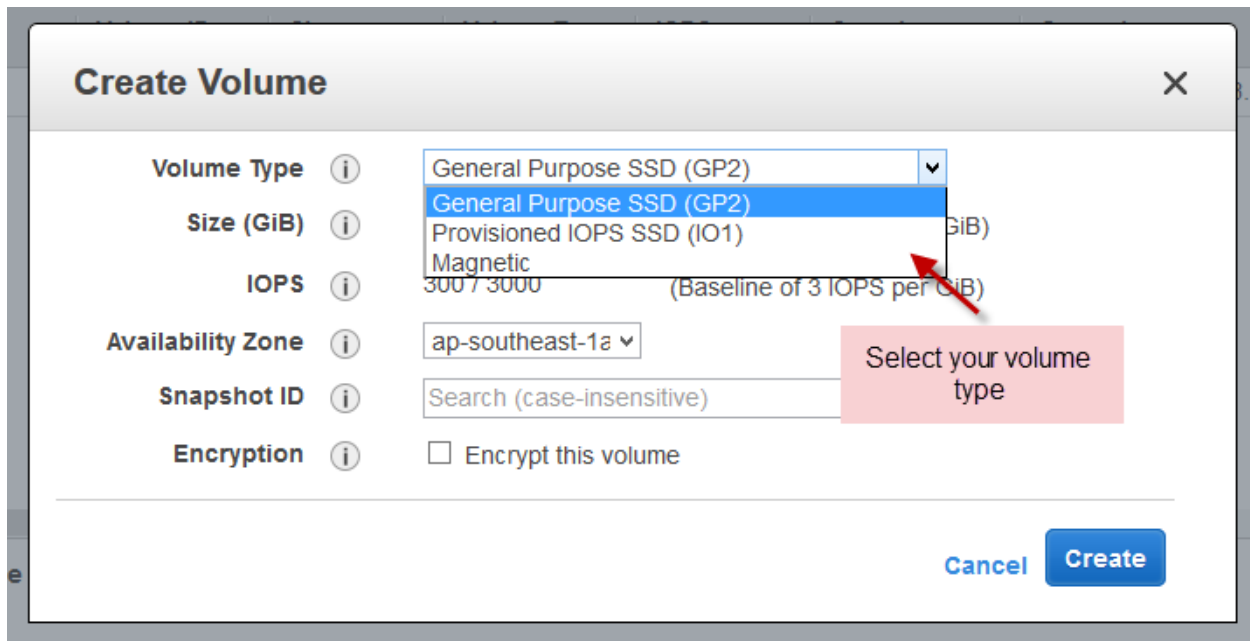
Create Volume Actions

Filter by tags and attributes or search by keyword

Name	Size	Volume Type	IOPS	Snapshot	Created
vol-20000000	80 GiB	gp2	90 / 3000	snap-444a1255	April 9, 2016 at 10:00 AM

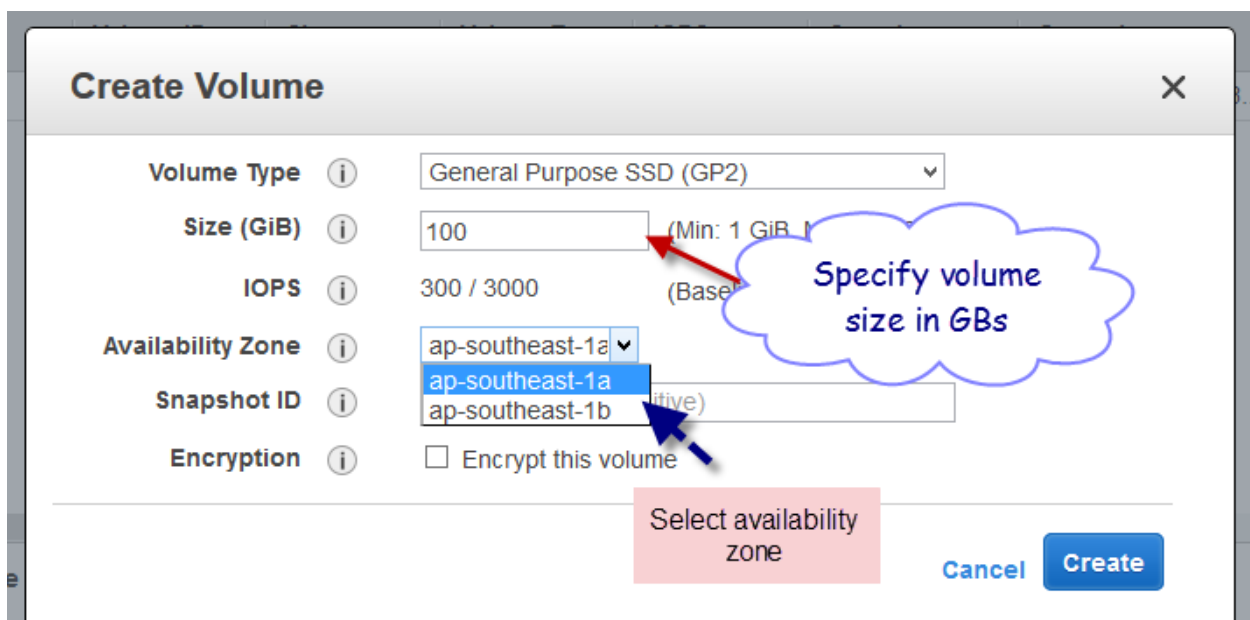
A pop up window will come and there you need to specify the volume specifications.

Select Volume Type from the drop down list.



The screenshot shows the 'Create Volume' dialog box. The 'Volume Type' dropdown menu is open, displaying three options: 'General Purpose SSD (GP2)', 'General Purpose SSD (GP2)', and 'Provisioned IOPS SSD (IO1)'. A red arrow points to the first 'General Purpose SSD (GP2)' option. A pink callout box with the text 'Select your volume type' is positioned to the right of the dropdown menu. The 'Size (GiB)' field is empty, and the 'Availability Zone' dropdown is set to 'ap-southeast-1a'. The 'Encryption' checkbox is unchecked. The 'Cancel' and 'Create' buttons are at the bottom right.

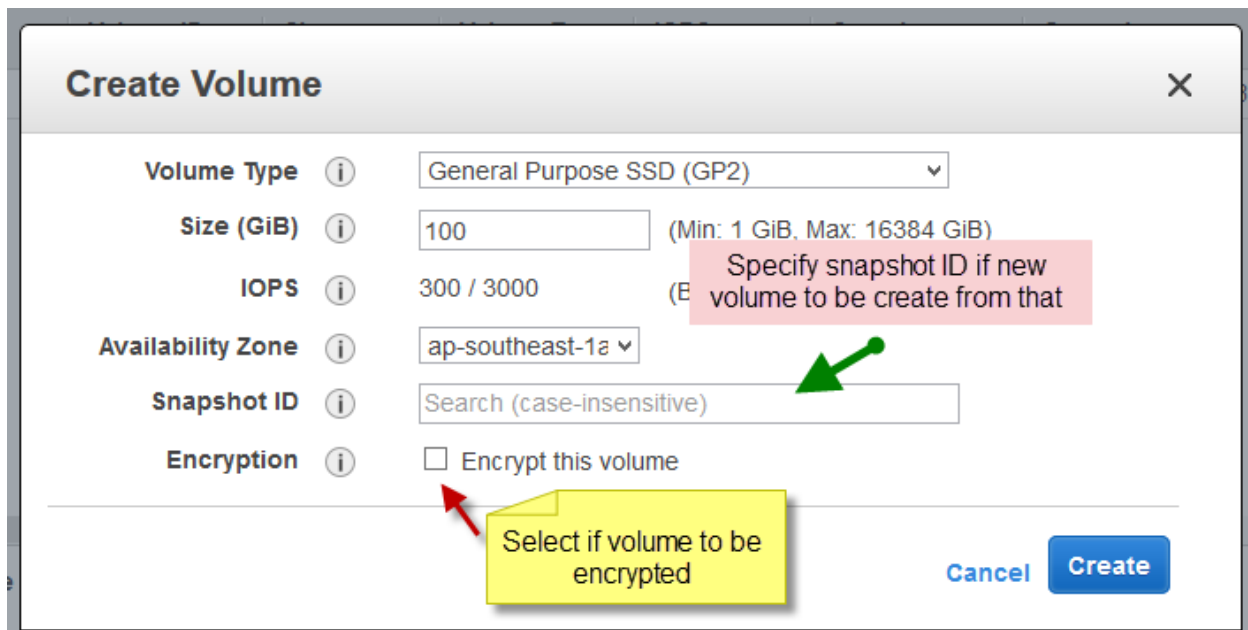
Specify volume size in GBs in Size text field and select availability zone from drop down list in which availability zone you want to create your volume.



The screenshot shows the 'Create Volume' dialog box. The 'Size (GiB)' field is now filled with the value '100'. A red arrow points to this field, and a blue cloud-shaped callout with the text 'Specify volume size in GBs' is positioned to the right. The 'Availability Zone' dropdown menu is open, showing three options: 'ap-southeast-1a', 'ap-southeast-1a', and 'ap-southeast-1b'. A blue arrow points to the first 'ap-southeast-1a' option. A pink callout box with the text 'Select availability zone' is positioned below the dropdown menu. The 'Encryption' checkbox is unchecked. The 'Cancel' and 'Create' buttons are at the bottom right.

Specify Snapshot ID if you want your new volume to be copied data from the snapshot, otherwise leave blank.

And select encrypt option if you want to encrypt your newly creating volume, otherwise leave un selected.

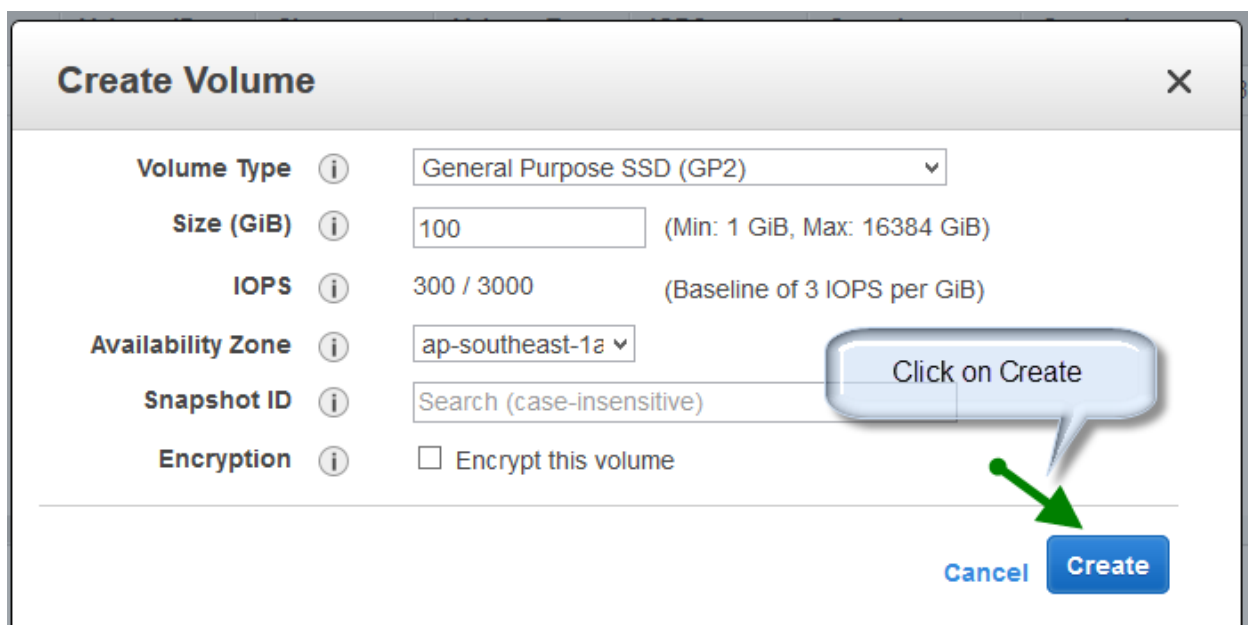


The screenshot shows the 'Create Volume' dialog box with the following fields and annotations:

- Volume Type**: General Purpose SSD (GP2) (dropdown)
- Size (GiB)**: 100 (text input, with note: (Min: 1 GiB, Max: 16384 GiB))
- IOPS**: 300 / 3000 (text input, with note: (Baseline of 3 IOPS per GiB))
- Availability Zone**: ap-southeast-1a (dropdown)
- Snapshot ID**: Search (case-insensitive) (text input, with a green arrow pointing to it and a pink callout box saying 'Specify snapshot ID if new volume to be create from that')
- Encryption**: ☐ Encrypt this volume (checkbox, with a red arrow pointing to it and a yellow callout box saying 'Select if volume to be encrypted')

Buttons: Cancel, Create

Then click on create after specifying the values required.



The screenshot shows the 'Create Volume' dialog box with the same fields as the previous one. A blue callout box with the text 'Click on Create' and a green arrow points to the 'Create' button.

Buttons: Cancel, Create

Your volume will start creating.

The screenshot shows the AWS Management Console interface for the 'Volumes' section. On the left, there is a navigation menu with options: Tags, Reports, Limits, INSTANCES, Instances, Spot Requests, Reserved Instances, Commands, and Dedicated Hosts. The main area has a 'Create Volume' button and an 'Actions' dropdown. Below this is a search bar and a table of volumes. The table has columns: Name, Volume ID, Size, Volume Type, IOPS, Snapshot, Created, Availability Zone, State, and Alarm. There are two volumes listed. The first volume, 'vol-f45bfd32', is in the 'creating' state, indicated by a yellow dot. A red arrow points from a pink callout box 'Volume will start creating' to the 'creating' state. The second volume, 'vol-253693e3', is in the 'in-use' state, indicated by a green dot.

Name	Volume ID	Size	Volume Type	IOPS	Snapshot	Created	Availability Zone	State	Alarm
	vol-f45bfd32	100 GiB	gp2	300 / 3000		April 11, 2016 at 11:...	ap-southeast-1a	creating	None
	vol-253693e3	30 GiB	gp2	90 / 3000	snap-444a1255	April 9	ap-southeast-1a	in-use	None

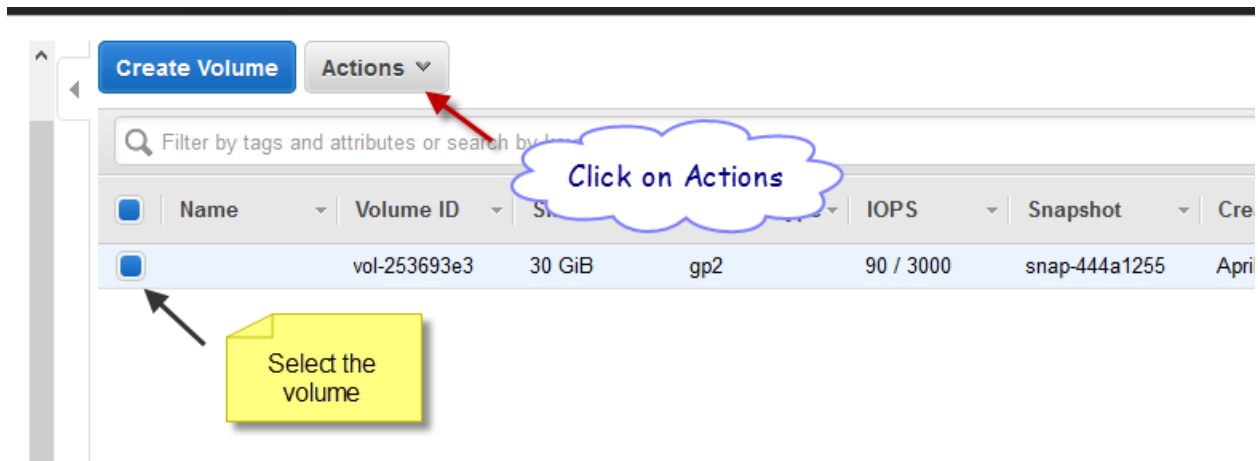
Once created it will be available state under volumes section.

The screenshot shows the AWS Management Console interface for the 'Volumes' section, similar to the previous one. The table now shows the first volume, 'vol-f45bfd32', in the 'available' state, indicated by a blue dot. A red arrow points from a pink callout box 'Once created it will be in available state' to the 'available' state. The second volume, 'vol-253693e3', remains in the 'in-use' state.

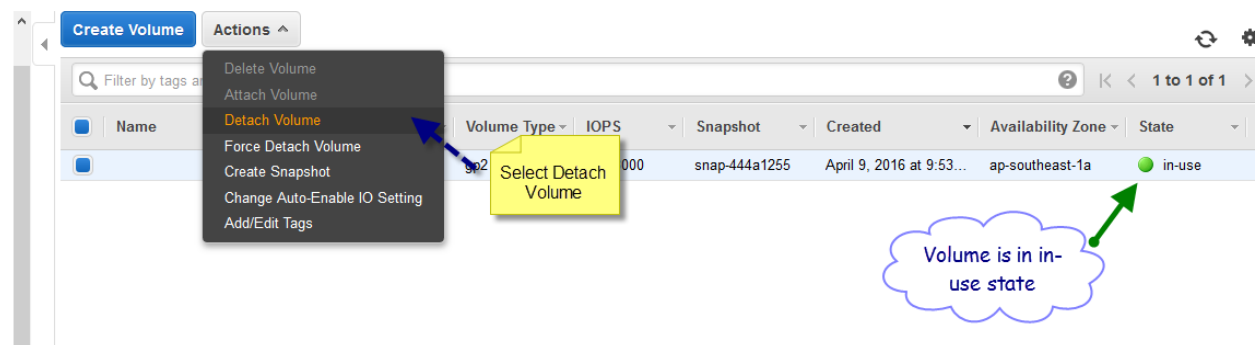
Name	Volume ID	Size	Volume Type	IOPS	Snapshot	Created	Availability Zone	State	Alarm
	vol-f45bfd32	100 GiB	gp2	300 / 3000		April 11, 2016 at 11:...	ap-southeast-1a	available	None
	vol-253693e3	30 GiB	gp2	90 / 3000	snap-444a1255	April 9	ap-southeast-1a	in-use	None

# DELETE EBS VOLUME

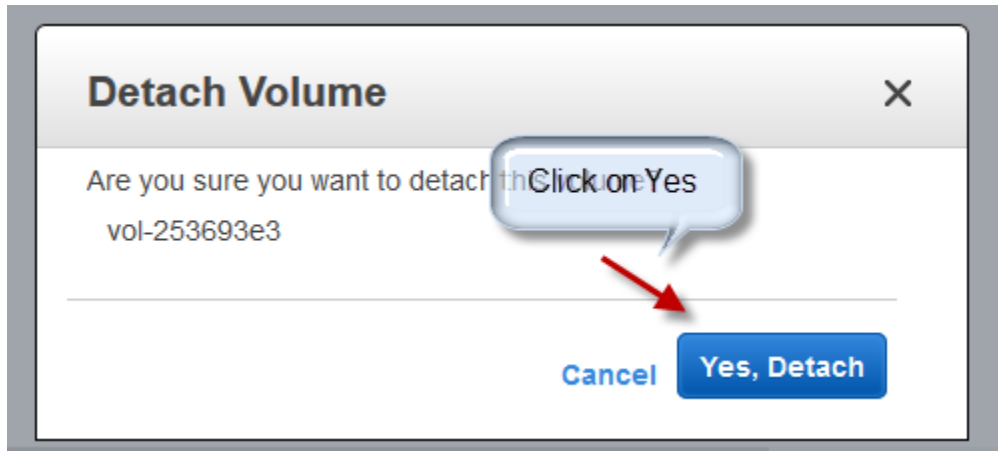
Once you logged in to AWS, go to EC2 section then go to Volumes section. Click the volume which you want to delete and click on actions.



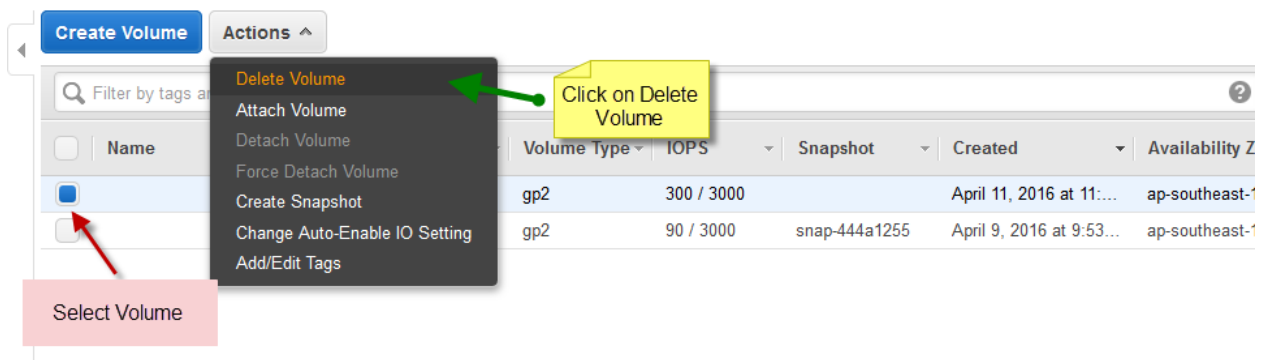
From the Actions menu select Detach Volume as you can see volume state is in **in-use** and those Delete volume option is unselectable.



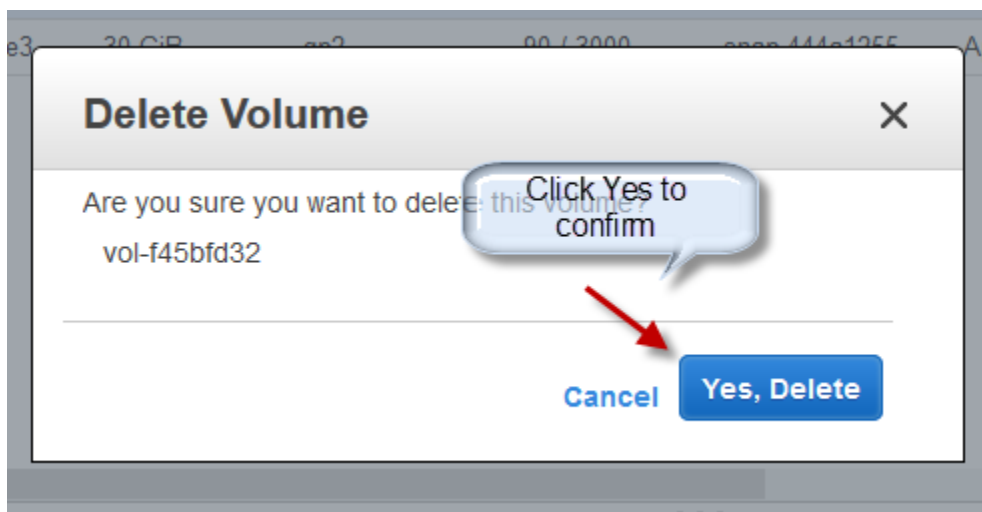
Click on Yes, Detach to detach volume from instance.



Select Volume which you want to delete then click on actions and select Delete Volume from the list.

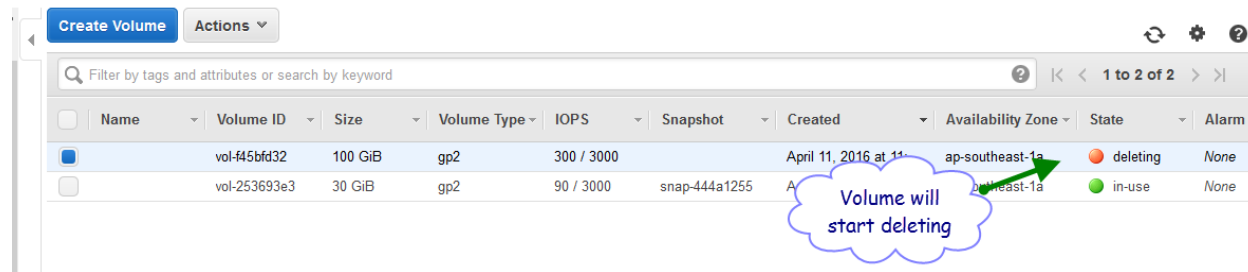


A pop up window will come for confirmation, then click on Yes, Delete to delete.





Volume will delete and the State will change to deleting.



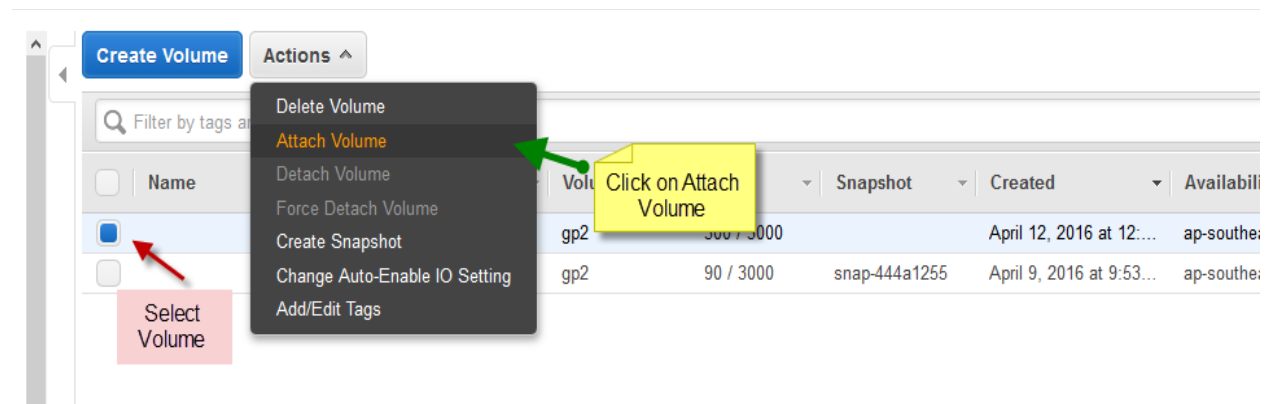
The screenshot shows the AWS Management Console Volumes page. At the top, there are buttons for 'Create Volume' and 'Actions'. Below is a search bar and a table of volumes. The first volume, 'vol-f45bfd32', is highlighted in blue. A blue callout bubble with a green arrow points to the 'deleting' state in the 'State' column, containing the text 'Volume will start deleting'.

	Name	Volume ID	Size	Volume Type	IOPS	Snapshot	Created	Availability Zone	State	Alarm
<input checked="" type="checkbox"/>		vol-f45bfd32	100 GiB	gp2	300 / 3000		April 11, 2016 at 11:...	ap-southeast-1a	deleting	None
<input type="checkbox"/>		vol-253693e3	30 GiB	gp2	90 / 3000	snap-444a1255	April 9, 2016 at 9:53...	ap-southeast-1a	in-use	None

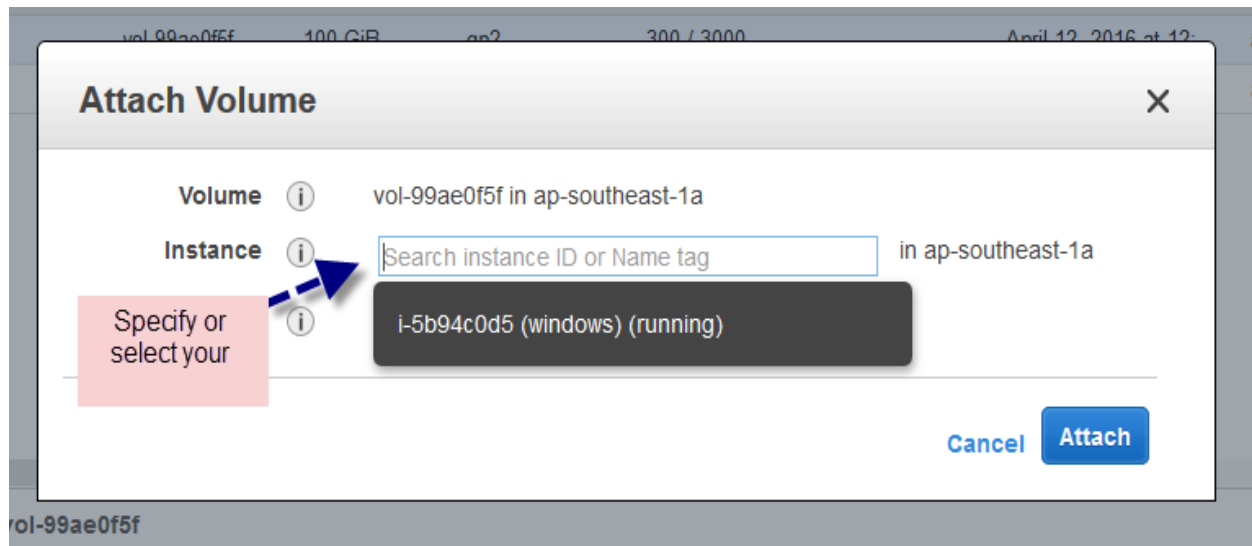
## ATTACHING AND MOUNTING VOLUMES TO WINDOWS INSTANCES

Go to volumes section and create a volume, make sure you select the availability zone same as your instance is residing.

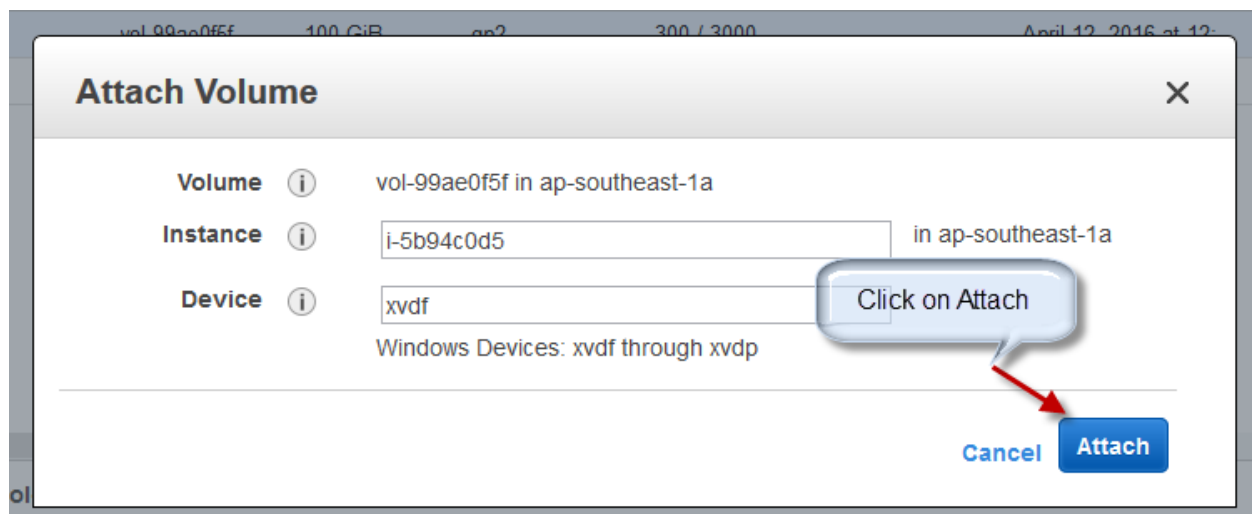
Once created select the Volume and click on actions and select Attach Volume.



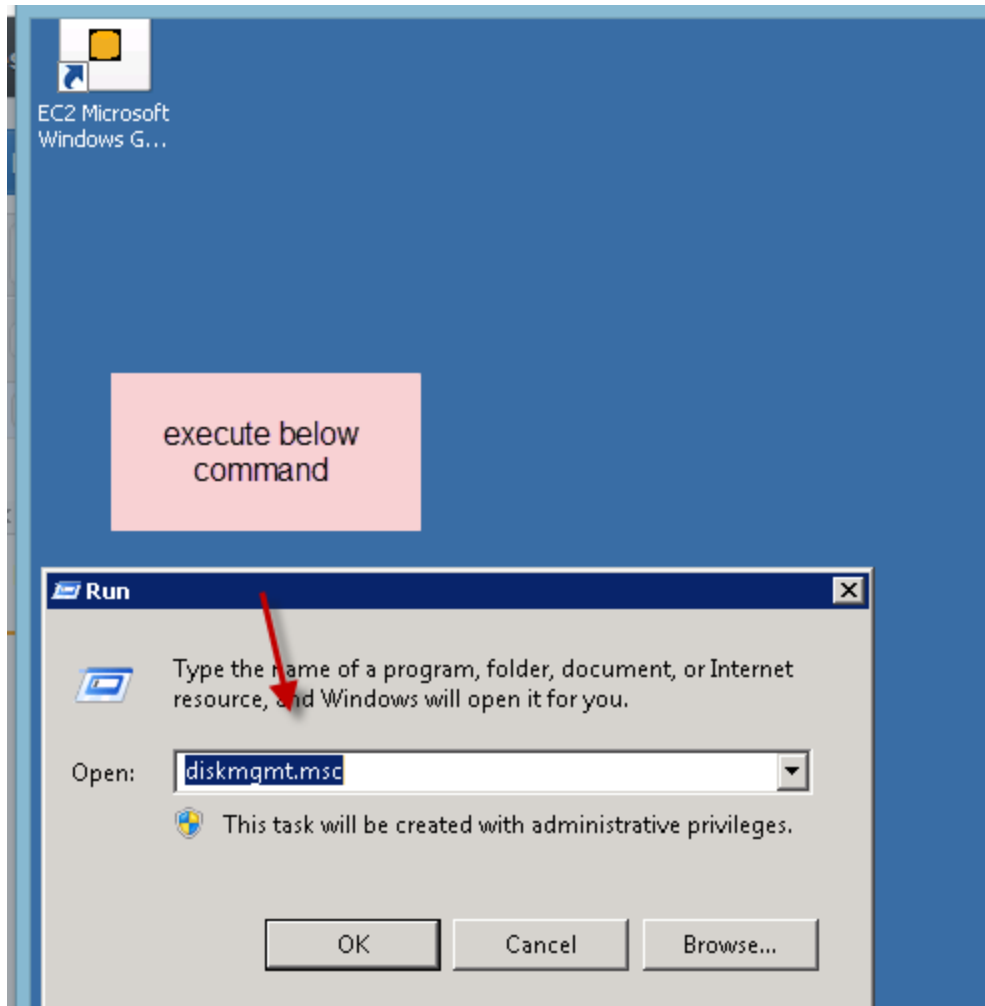
In the next page Select or search in the Instance text field and select your instance.



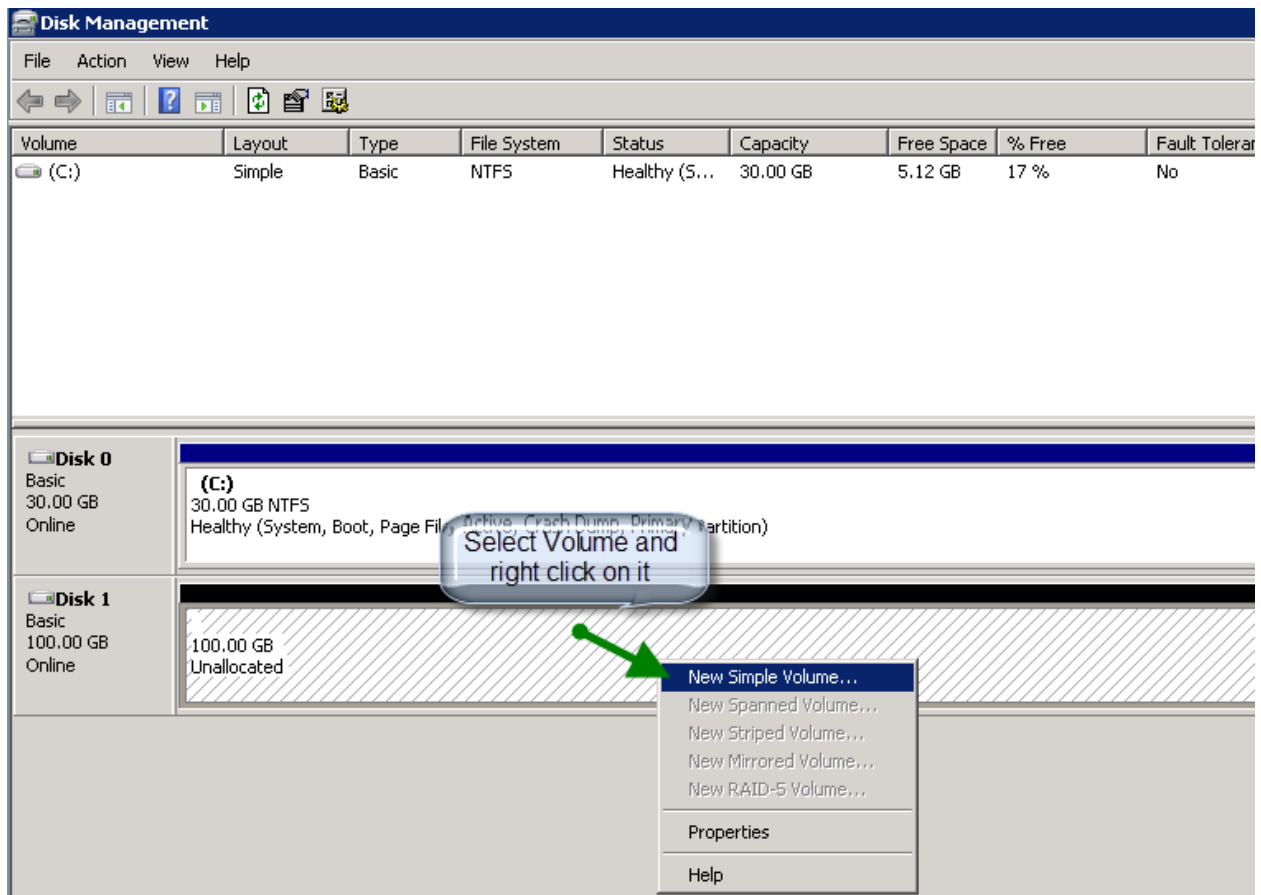
Then click on Attach button.



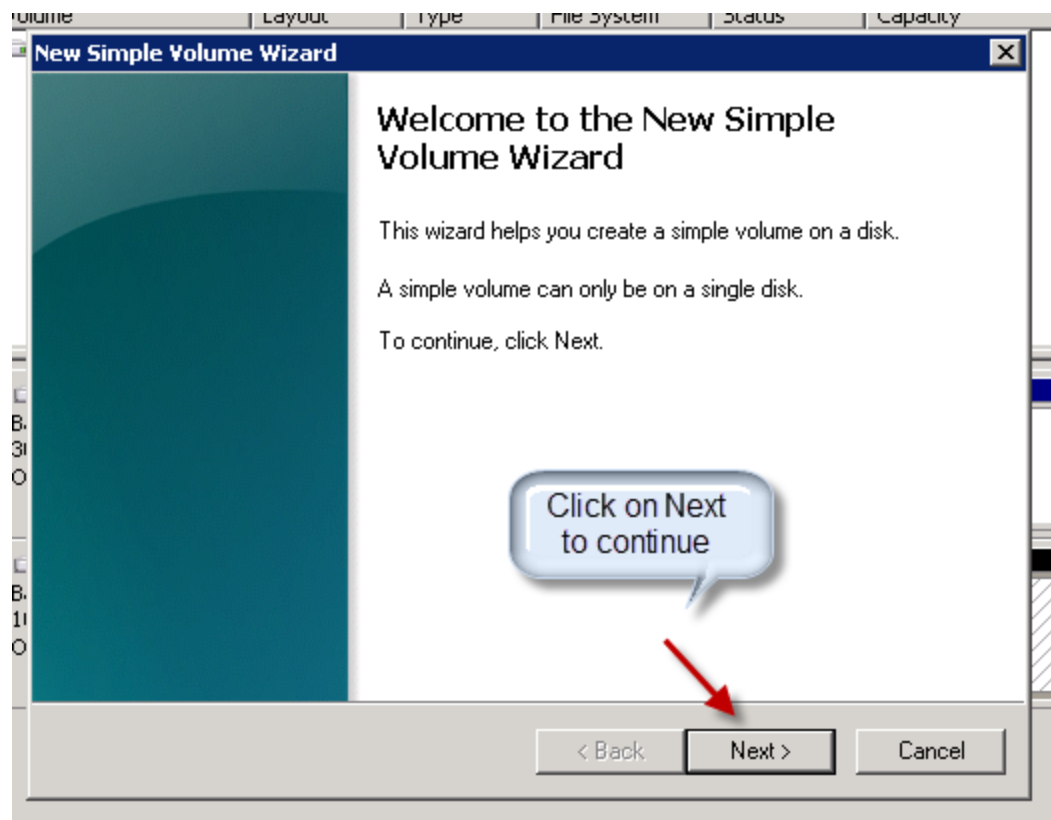
Then go and login to your instance, after logged in open Run and execute diskmgmt.msc command to open storage volumes attached to instance.



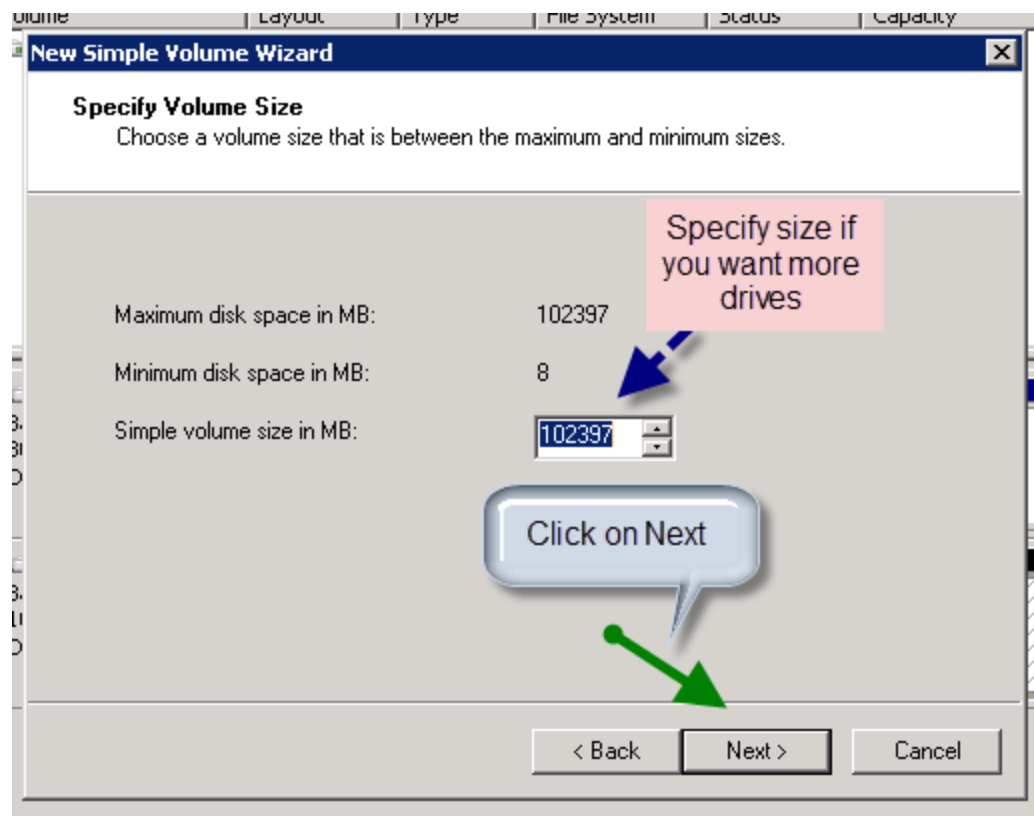
Then in the disk management screen select the volume which we have created and do a right click on the volume.



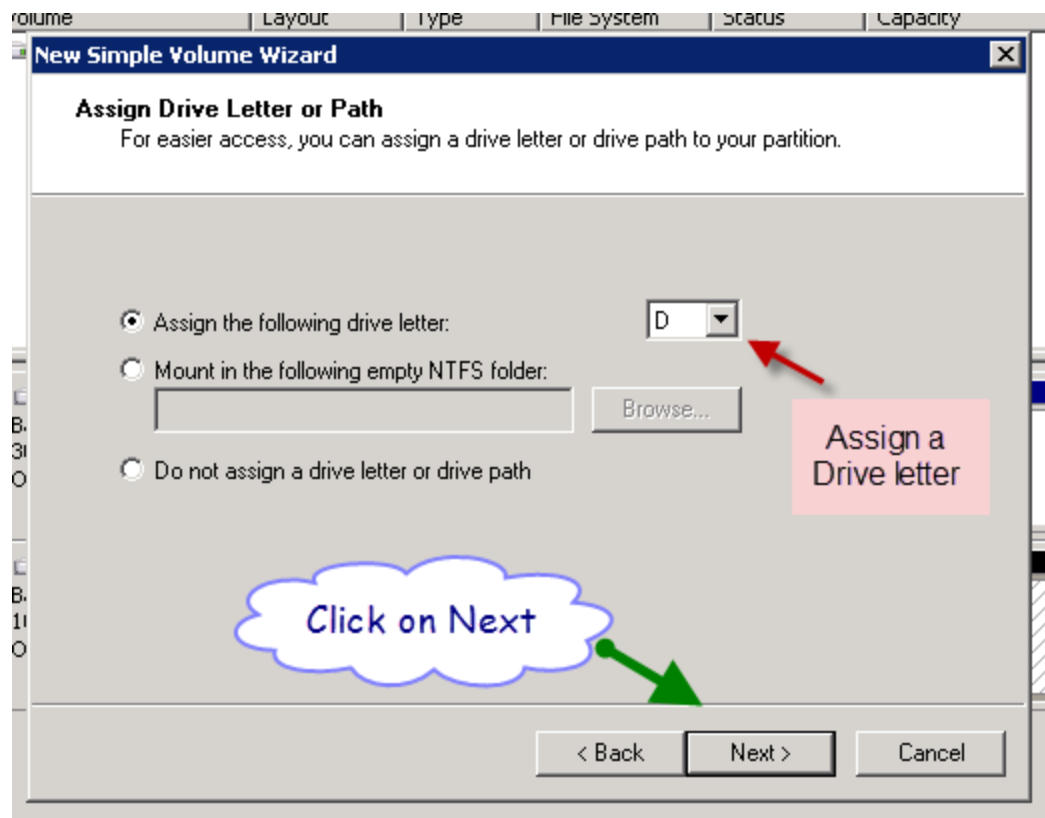
Click on Next to continue.



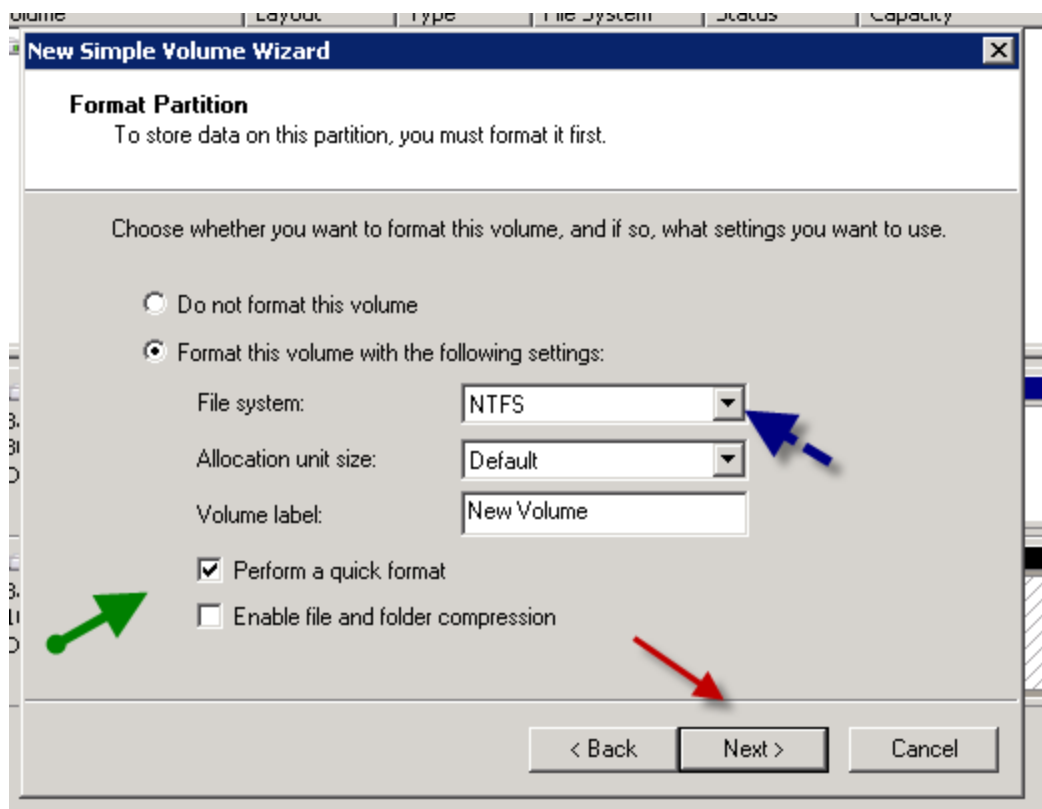
In the following screen specify size if you want to create more drives or leave as full size and click on Next.



Specify a drive for the newly creating volume and click on Next.

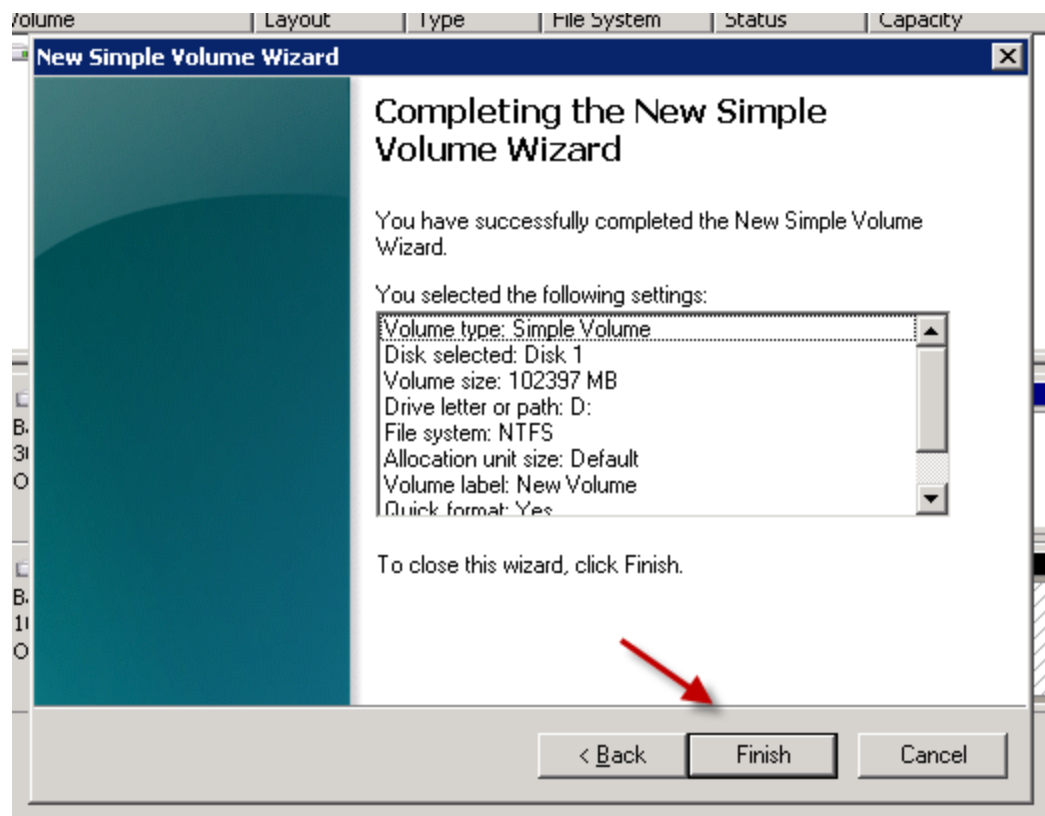


In the screen go with default selections and click on Next.

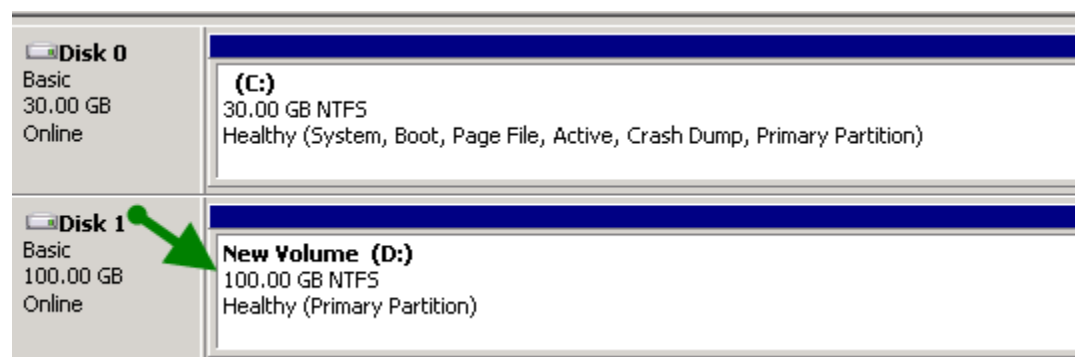


On the next screen click finish to complete the setup.

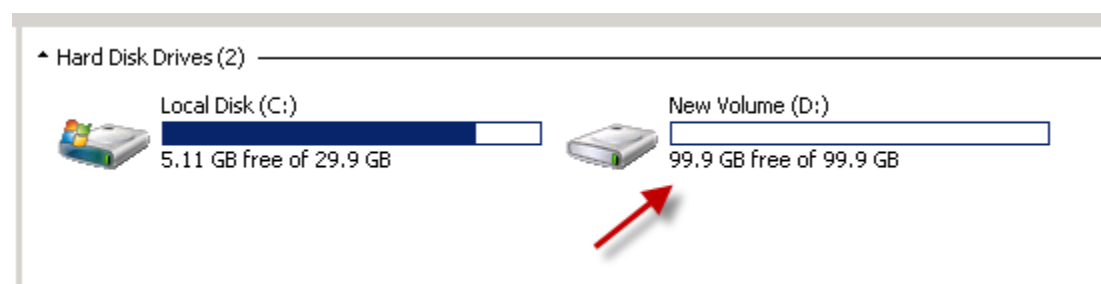




After formatting it will show as Healthy, then close disk management console.

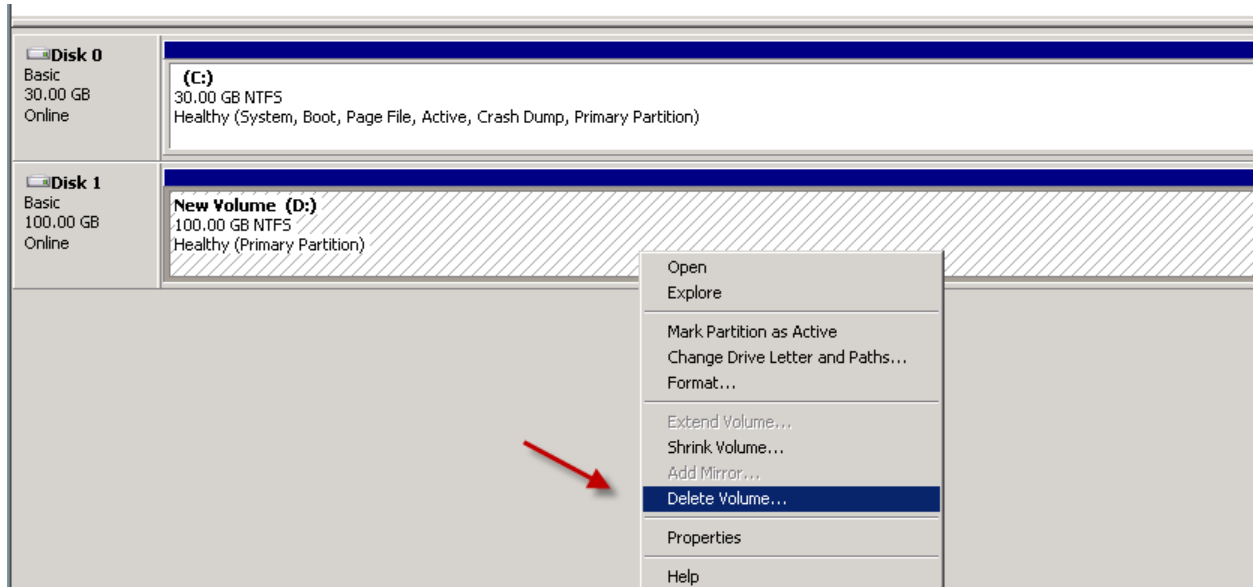


Open My Computer to see the newly formatted volume.

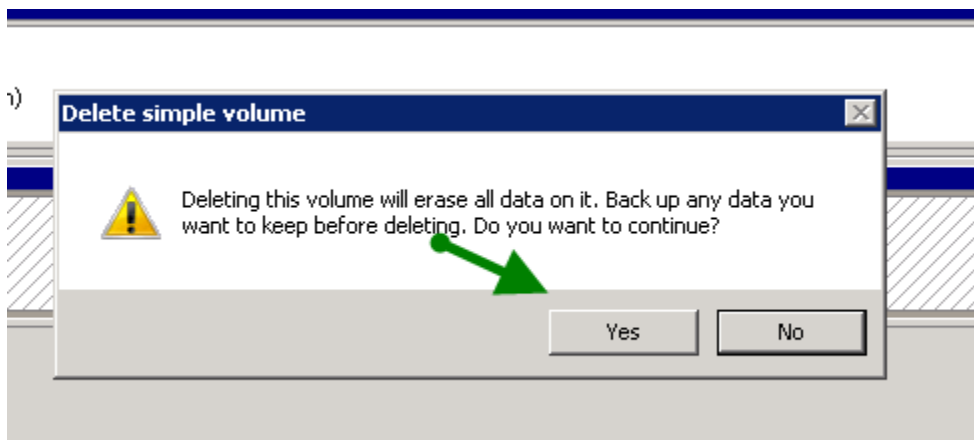


To unmount the Volume, once again open run and execute diskmgmt.msc to disk management console.

Then select your volume and right click on it and select Delete Volume.

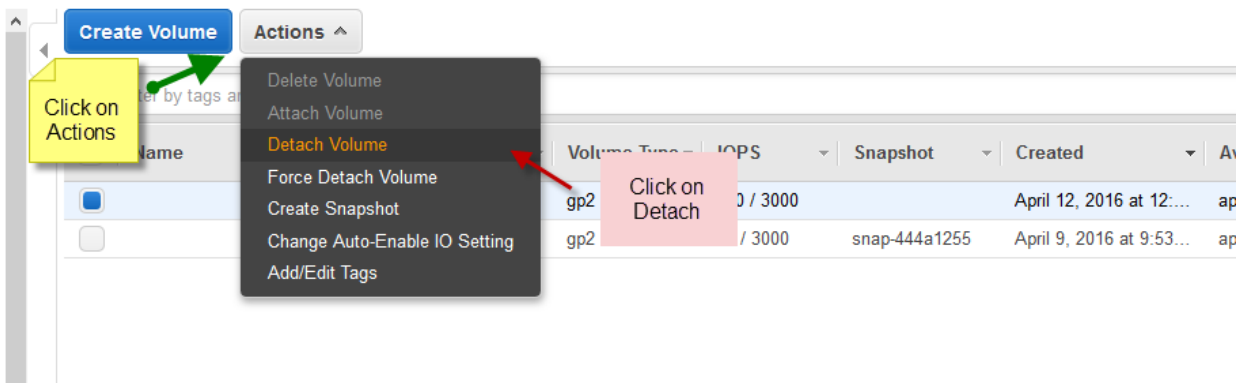


Click yes to confirm.

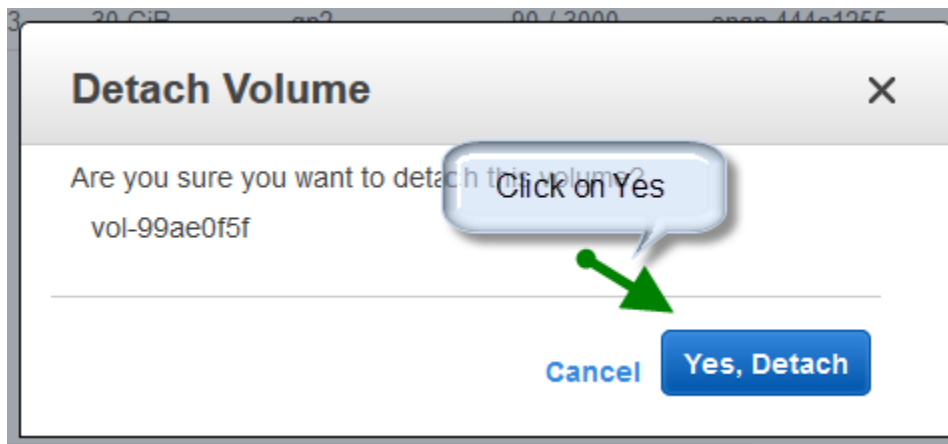


Then go to Volumes section on the EC2 page on AWS console.

Select the volume and go to Actions click on Detach Volume.



Click on Yes, Detach to confirming detaching from the Instance.

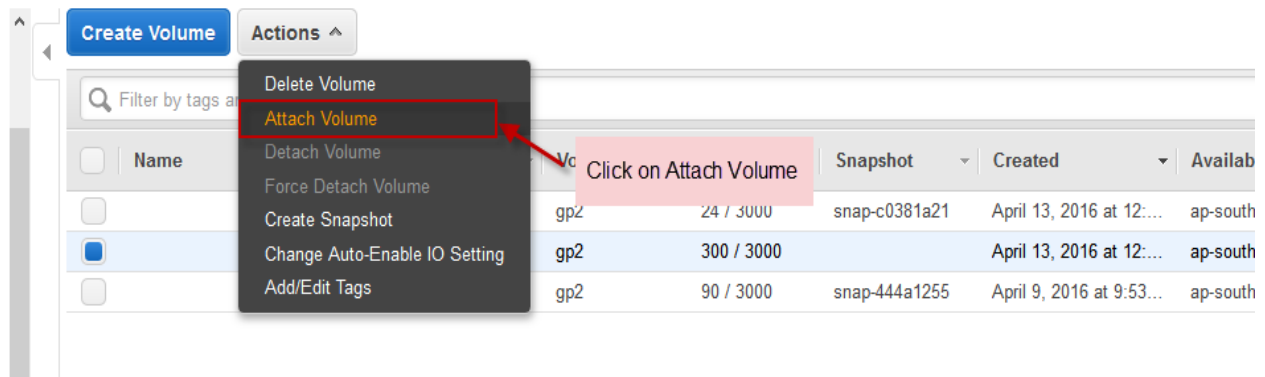


## ATTACHING AND MOUNTING VOLUMES TO LINUX INSTANCES

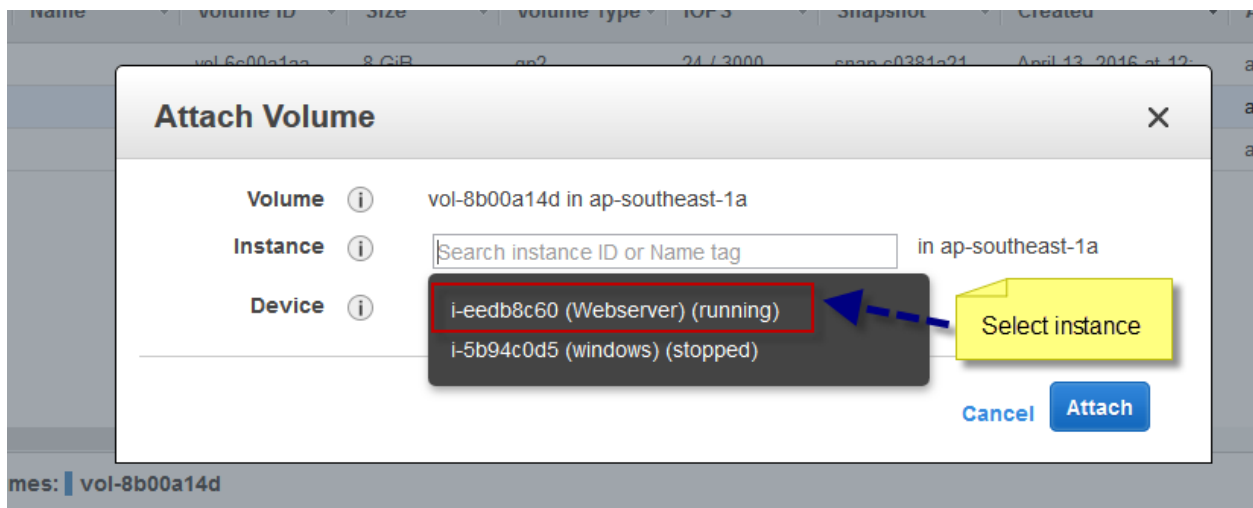
Once you logged in to AWS, go Volumes section under EC2.

Then create a volume as depicted above.

Once created select the volume and click Actions and choose Attach Volume.



Select instance from the Instance text field or specify Instance id.



Then click on Attach to attach volume to selected instance.

**Attach Volume** [X]

**Volume** ⓘ vol-8b00a14d in ap-southeast-1a

**Instance** ⓘ  in ap-southeast-1a

**Device** ⓘ   
Linux Devices: /dev/sdf through /dev/sdp

Note: 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](#)

Then go and login to Linux and execute the below commands to format and mount to your instance.

### Create the partition for newly attached volume.

[root@ip-172-31-25-51 ~]#fdisk /dev/xvdf

Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.

Be careful before using the write command.

Device does not contain a recognized partition table

Building a new DOS disklabel with disk identifier 0x7ee209a3.

Command (m for help): n

Partition type:

p primary (0 primary, 0 extended, 4 free)

e extended

Select (default p):

Using default response p

Partition number (1-4, default 1):

First sector (2048-209715199, default 2048):

Using default value 2048

Last sector, +sectors or +size{K,M,G} (2048-209715199, default 209715199):

Using default value 209715199

Partition 1 of type Linux and of size 100 GiB is set

Command (m for help): p

Disk /dev/xvdf: 107.4 GB, 107374182400 bytes, 209715200 sectors

Units = sectors of 1 \* 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk label type: dos

Disk identifier: 0x7ee209a3

Device	Boot	Start	End	Blocks	Id	System
/dev/xvdf1		2048	209715199	104856576	83	Linux

Command (m for help): w

The partition table has been altered!

Calling ioctl() to re-read partition table.

Syncing disks.

### Formatting newly created partition.

```
[root@ip-172-31-25-51 ~]# mkfs.ext4 /dev/xvdf1
mke2fs 1.42.12 (29-Aug-2014)
Creating filesystem with 26214144 4k blocks and 6553600 inodes
Filesystem UUID: 6459b7c0-440f-4fc0-9422-94de2ee5dc34
Superblock backups stored on blocks:
    32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
    4096000, 7962624, 11239424, 20480000, 23887872
```

Allocating group tables: done

Writing inode tables: done

Creating journal (32768 blocks): done

Writing superblocks and filesystem accounting information: done

Once formatted, we are now mounting to a directory.

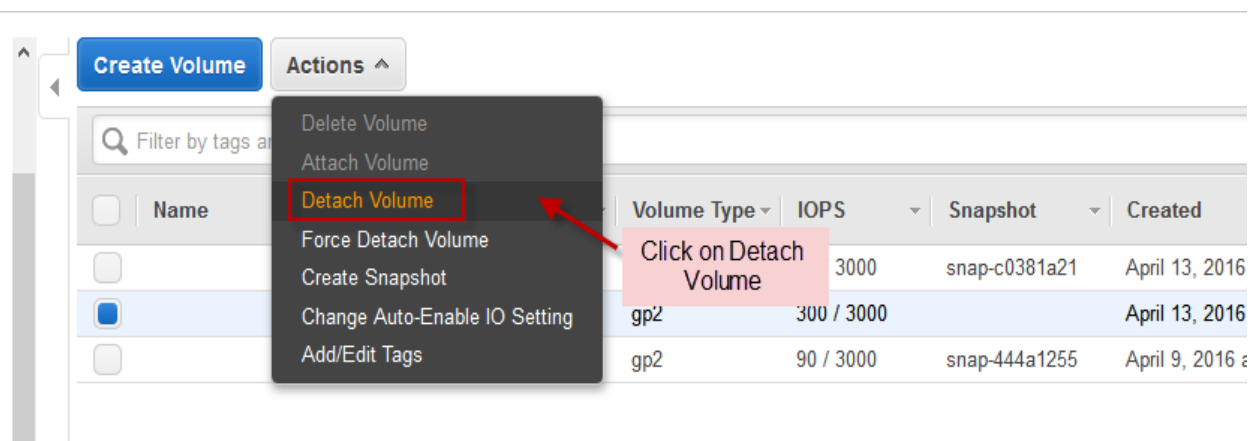
```
[root@ip-172-31-25-51 ~]# mount /dev/xvdf1 /mnt/
[root@ip-172-31-25-51 ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/xvda1       7.8G  1.1G  6.6G  15% /
devtmpfs        490M   64K  490M   1% /dev
tmpfs           498M    0  498M   0% /dev/shm
/dev/xvdf1       99G   60M   94G   1% /mnt
```

To unmount from the instance, follow below process.

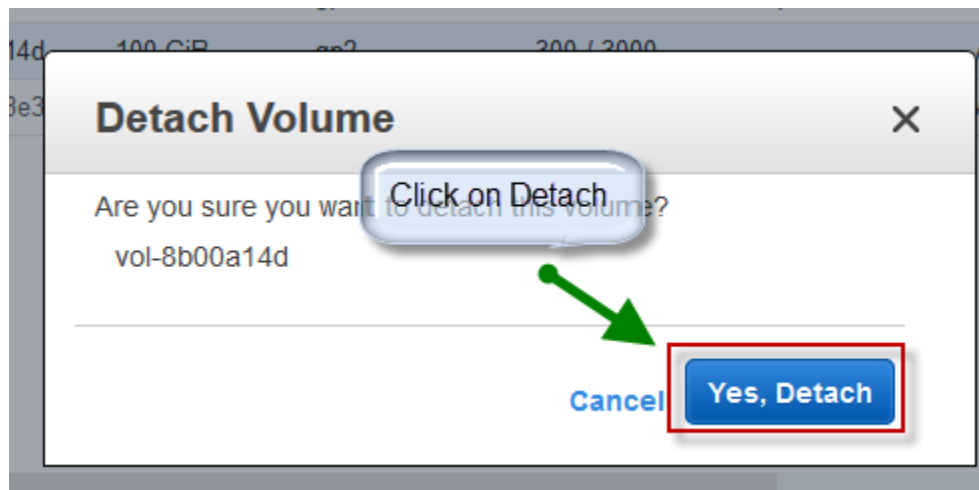
```
[root@ip-172-31-25-51 ~]# umount /mnt/

[root@ip-172-31-25-51 ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/xvda1       7.8G  1.1G  6.6G  15% /
devtmpfs        490M   64K  490M   1% /dev
tmpfs           498M    0  498M   0% /dev/shm
```

After unmounting, go to Volumes section, select the volume and click on Actions. Under the Actions, click on Detach Volume.



Click on Yes, Detach to detach volume.

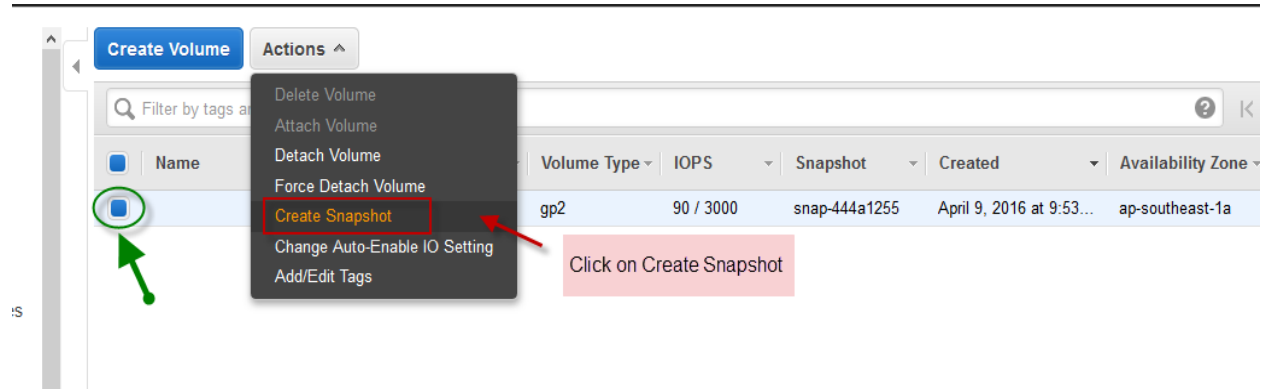


Once Volume detached, you can select and delete the volume.

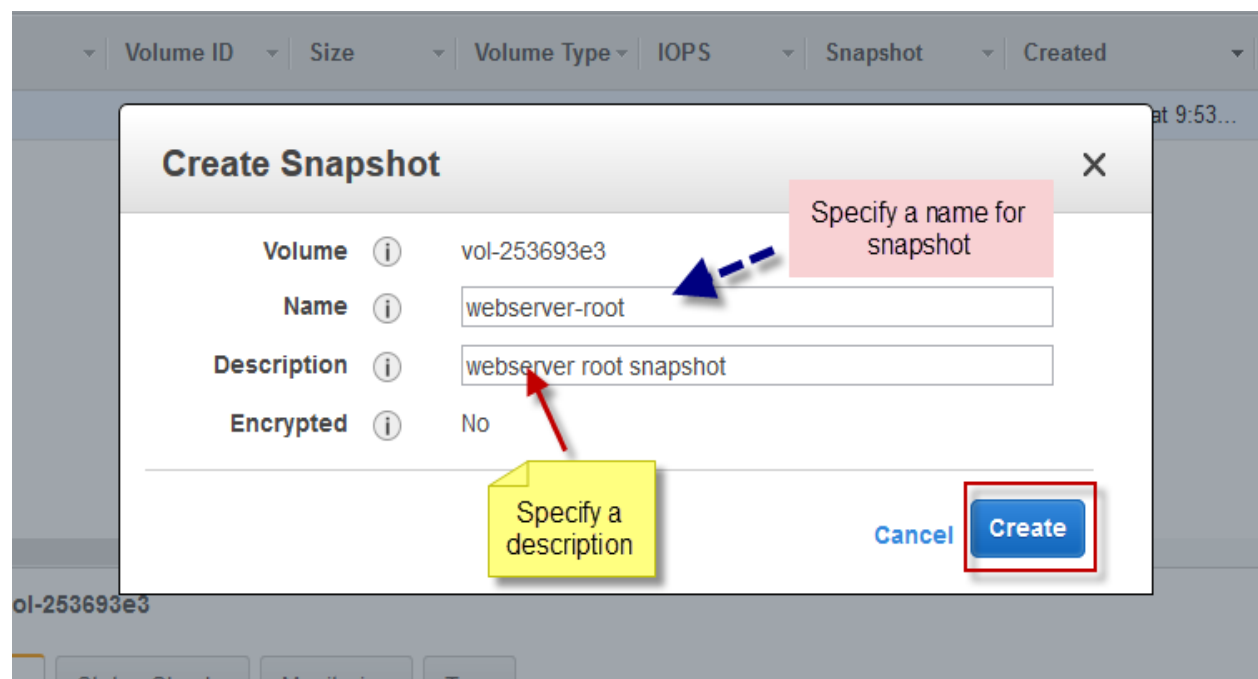


# CREATING AND DELETING SNAPSHOTS

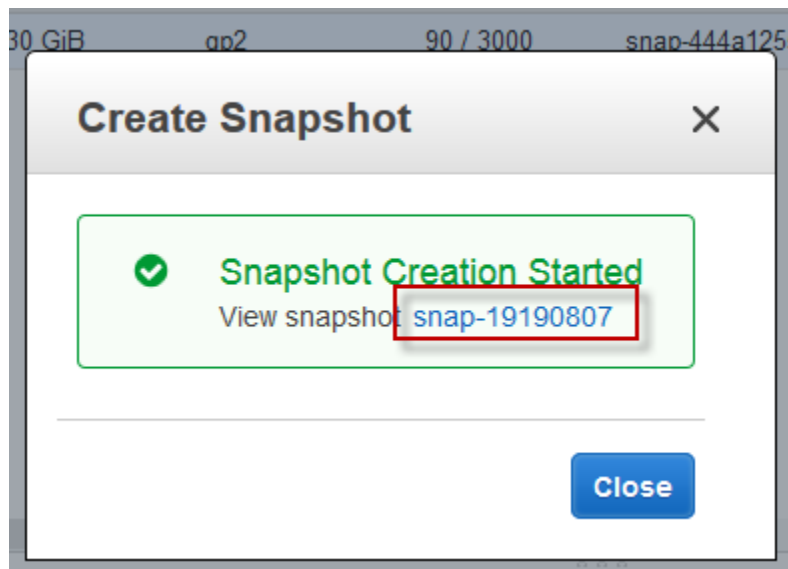
Go to Volumes section under EC2 on AWS console.  
Select the volume which you want to take a snapshot and click on Actions.  
Under Actions menu, select Create Snapshot.



In the next page specify name for snapshot and add description, click on Create button to create.



A confirmation box will pop up with Snapshot id.



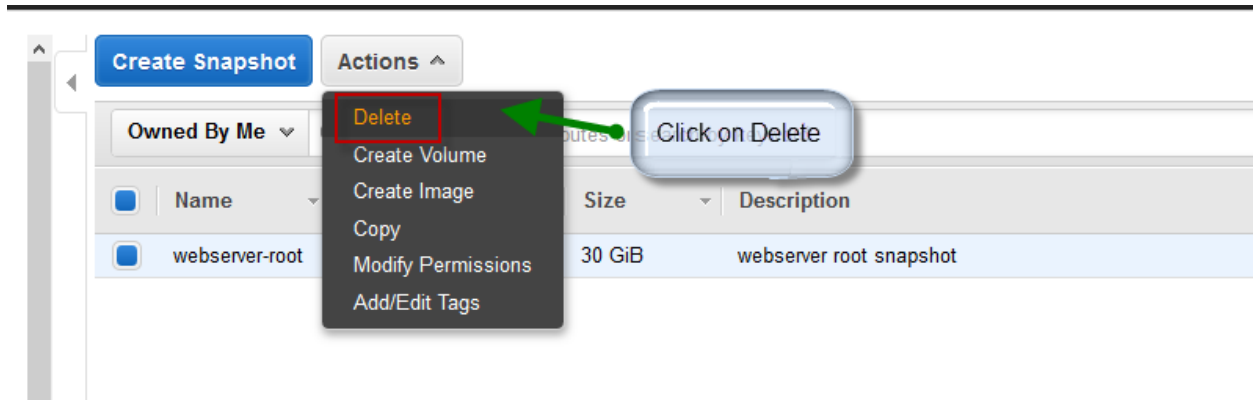
Click on the snapshot id to go the snapshot section or go to Snapshots under ELASTIC BLOCK STORE on EC2 left pane.

You will find your snapshot which is created.

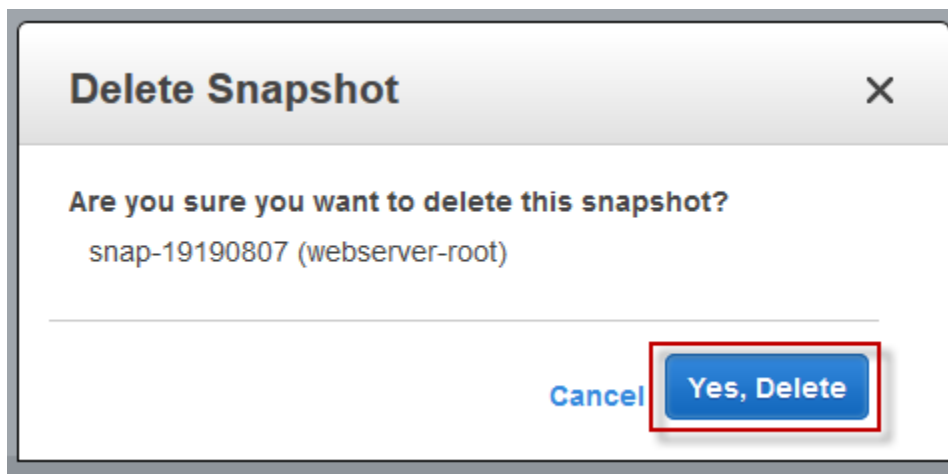
# DELETING SNAPSHOTS

Go to Snapshots section under EC2 page, then select your snapshot which you want to delete.

Click on Actions, select Delete to delete the snapshot.

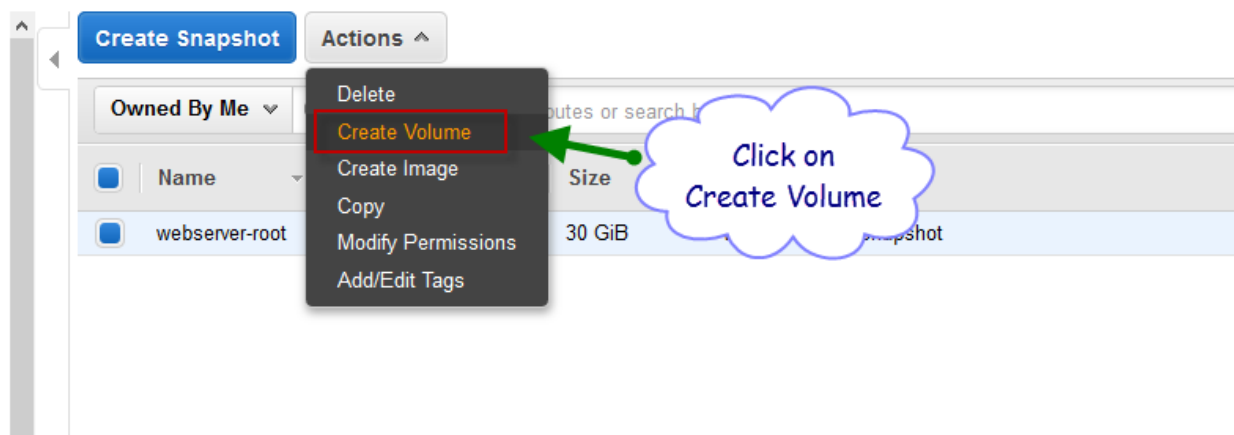


A confirmation pop up will show, click on Yes, Delete to delete the snapshot.

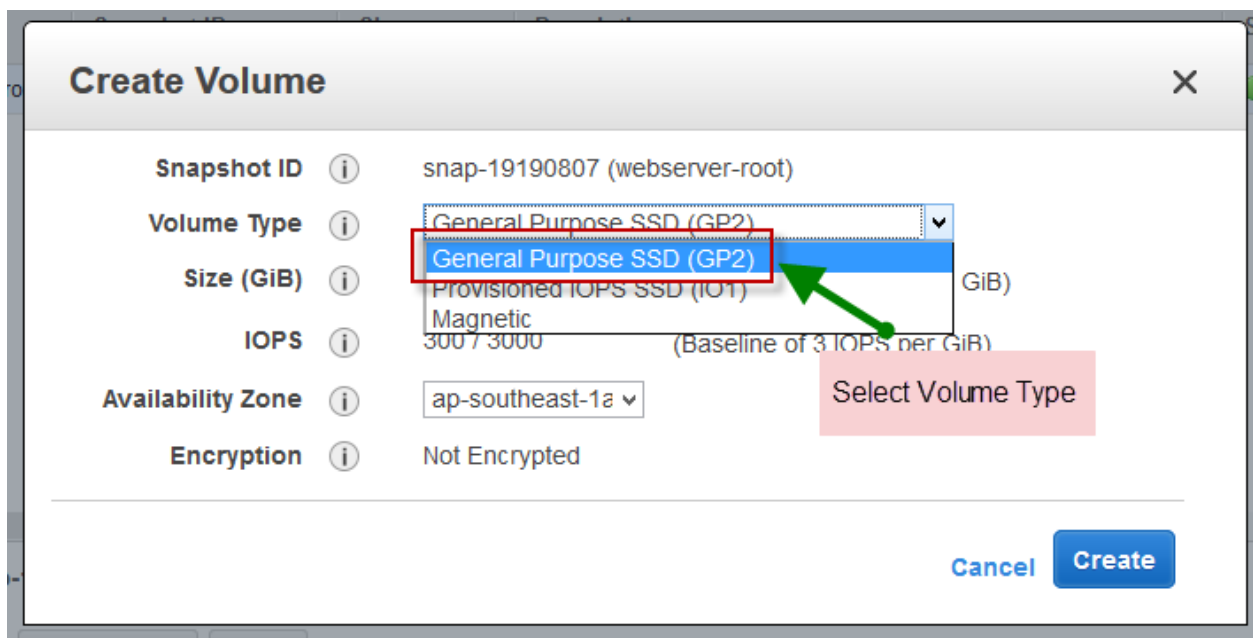


# CREATING VOLUMES FROM SNAPSHOTS

Go to Snapshots section under EC2 page.  
Select the snapshot and click on Actions, then select Create Volume to create a new volume.



In the next page, select the Volume Type from the drop down list.



Specify size in size text field, select availability zone from drop down list.  
Then click on create button to create a volume.

**Create Volume**

Snapshot ID ⓘ snap-19190807 (webserver-root)

Volume Type ⓘ General Purpose SSD (GP2) ▼

Size (GiB) ⓘ 100 (Min: 20 GiB, Max: 16384 GiB)

IOPS ⓘ 300 / 3000 (baseline of 3 IOPS per GiB)

Availability Zone ⓘ ap-southeast-1a ▼

Encryption ⓘ

Select AZ

Cancel Create

A confirmation pop up with volume id will show, click on volume id to go to the volume.

30 GiB webserver root snapshot

**Create Volume**

✓ **Volume Successfully Created**

View volume [vol-b654f470](#)

Close

After creation volume, you can attach to other instances.