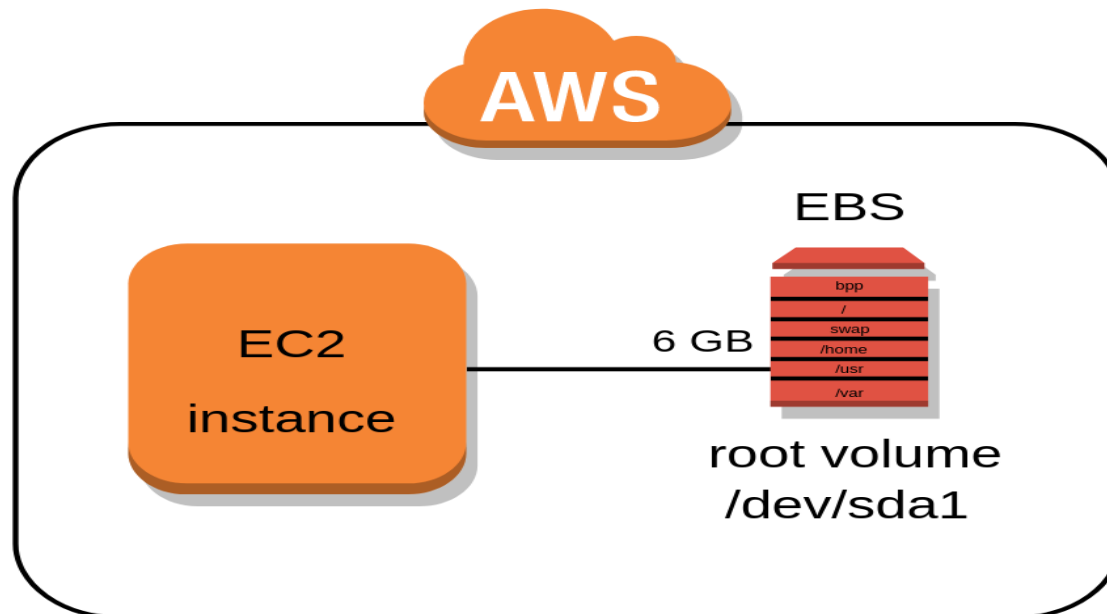


# Elastic Block Store (Amazon EBS)

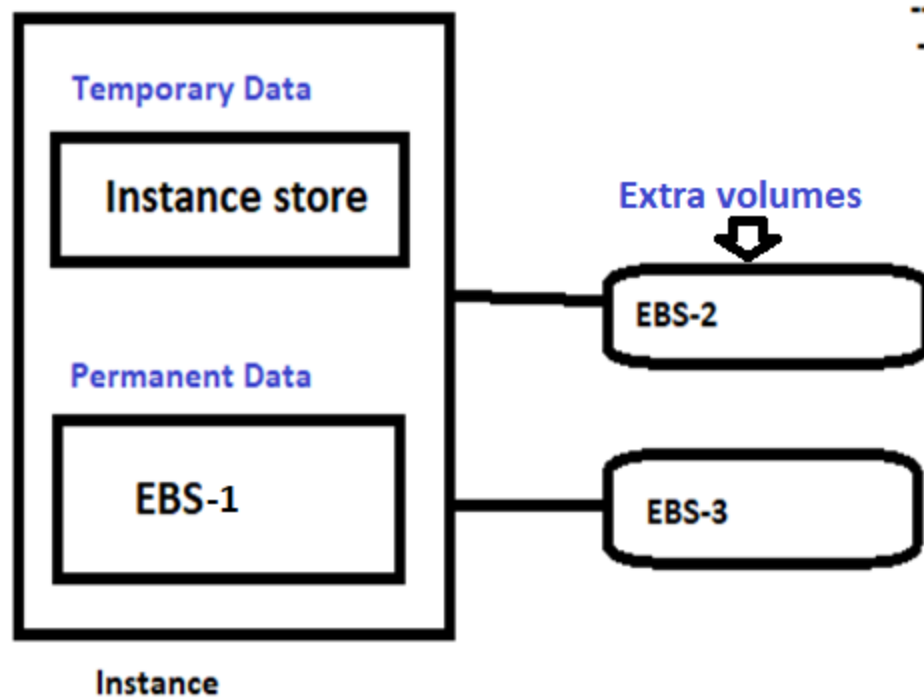
An Amazon EBS volume is a durable, block-level storage device that you can attach to a single EC2 instance.

You can use EBS volumes as primary storage for data that requires frequent updates, such as the system drive for an instance or storage for a database application.



### Adding Extra EBS volume advantages

- > Adding extra Storage
- > Keep important data



In case Instance goes down - data in extra EBS volume are safe

# Topics to be covered--EBS

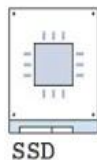
1. EBS Introduction
2. Creating Volume
3. Attaching Volume
4. Making partition and accessing it
5. Detach and attach to other instance
6. Creating snapshot
7. Create volume in other subnet using snapshot
8. Attaching to other instance
9. Modifying Volume
10. Migrating volume from one region to other
11. Migrating volume from one account to other
12. Modifying Instance
13. Troubleshoot lost key pair of linux instance

# EC2 Instance Store **vs** EBS



## EC2 Instance Store

- Local to instance
- Non-persistent data store
- Data not replicated (by default)
- No snapshot support
- SSD or HDD



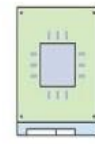
SSD



HDD

## Elastic Block Store

- Persistent block storage volumes
- 99.999% availability
- Automatically replicated within its Availability Zone (AZ)
- Point-in-time snapshot support
- Modify volume type as needs change
- SSD or HDD
- Auto recovery



gp2



io1

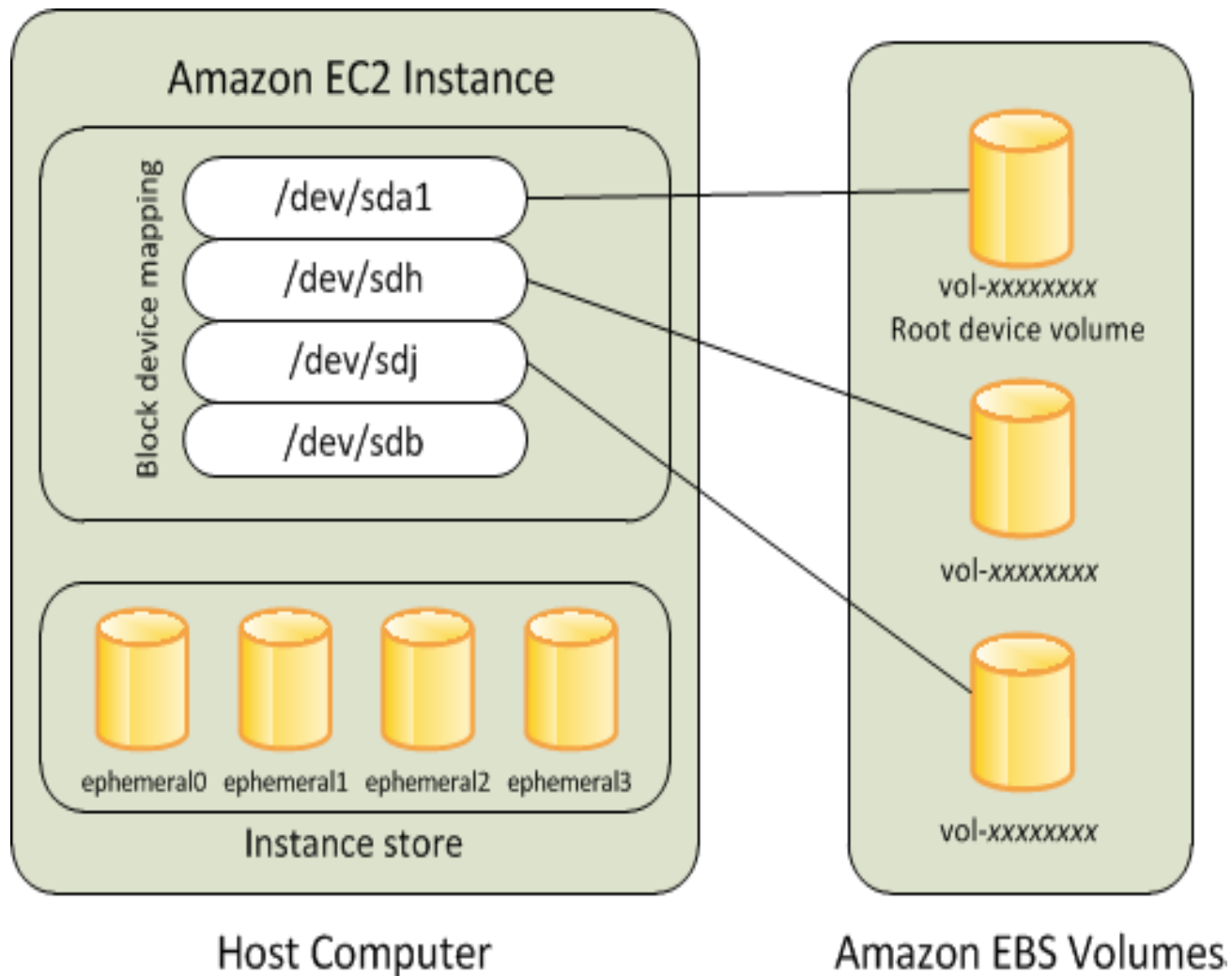


st1



sc1





# EBS Volume Types & Performance



# Creating an Amazon EBS Volume

- You can create an Amazon EBS volume that you can then attach to any EC2 instance within the same Availability Zone. You can choose to create an encrypted EBS volume, but encrypted volumes can only be attached to selected instance types.
- You can apply tags to EBS volumes at the time of creation. With tagging, you can simplify tracking of your Amazon EC2 resource inventory. Tagging on creation can be combined with an IAM policy to enforce tagging on new volumes.

## How to create EBS and attach to instance

Create two Windows Instance in same subnet

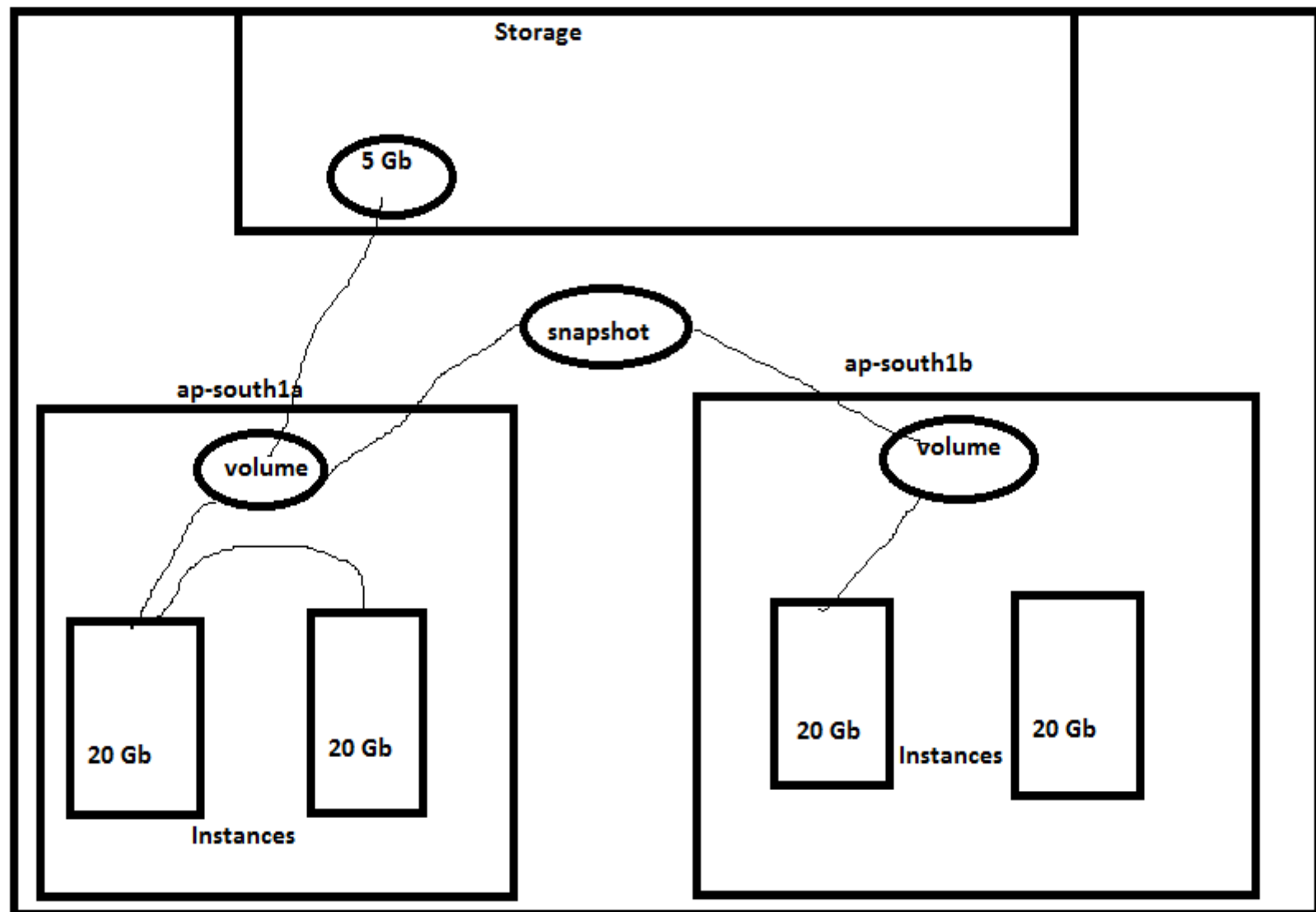
In AWS console – EC2 – volume –Add volume–  
Select size (5 GB) – Add tag : Name – managed  
disk-1 – create

After creating –select it –action –attach volume—  
select instance –Attach—close

Now open the instance and create partition to  
access it



ap-south-1( Mumbai)



# Open EC2 Console-Click on volume

The screenshot shows the AWS Management Console interface for the EC2 Volumes page. The browser address bar indicates the URL: <https://ap-south-1.console.aws.amazon.com/ec2/v2/home?region=ap-south-1#Volumes:sort=desc:createTime>. The left-hand navigation menu is open, and the 'Volumes' section under 'ELASTIC BLOCK STORE' is selected. The main content area displays a table of volumes with the following data:

	Name	Volume ID	Size	Volume Type	IOPS	Snapshot	Created	Availability Zone	State	Alarm Status
<input type="checkbox"/>	W.S.2012 --3...	vol-04a1255...	30 GiB	gp2	100 / 3000	snap-07aeef5f...	August 30, 2018 at ...	ap-south-1a	in-use	None
<input type="checkbox"/>	EBSV-1	vol-08162a5...	2 GiB	gp2	100 / 3000		August 28, 2018 at ...	ap-south-1a	in-use	None
<input type="checkbox"/>	RHEL-Mrth	vol-04adf8ec...	10 GiB	gp2	100 / 3000	snap-0280599...	August 28, 2018 at ...	ap-south-1b	in-use	None
<input type="checkbox"/>	RHEL-BTM	vol-0fe6a9ca...	10 GiB	gp2	100 / 3000	snap-0280599...	August 27, 2018 at ...	ap-south-1a	in-use	None

Below the table, there is a section titled 'Select a volume above' with a horizontal scrollbar. At the bottom of the console, there is a 'Feedback' button, a language selector set to 'English (US)', and a copyright notice: '© 2008 - 2018, Amazon Internet Services Private Ltd. or its affiliates. All rights reserved.' There are also links for 'Privacy Policy' and 'Terms of Use'. The Windows taskbar at the bottom shows the time as 7:17 PM on 8/31/2018.

# Give the EBS size and add tag then create volume

Online Learning | edjiO x ebs aws - Google Search x Creating an Amazon EBS x Amazon EBS Update - N x ebs in aws - Google Search x EC2 Management Console x

Secure | https://ap-south-1.console.aws.amazon.com/ec2/v2/home?region=ap-south-1#CreateVolume:

aws Services Resource Groups

deepak Mumbai Support

## Create Volume

**Volume Type** General Purpose SSD (GP2) ⓘ

**Size (GiB)** 2 (Min: 1 GiB, Max: 16384 GiB) ⓘ

**IOPS** 100 / 3000 (Baseline of 3 IOPS per GiB with a minimum of 100 IOPS, burstable to 3000 IOPS) ⓘ

**Availability Zone\*** ap-south-1a ⓘ

**Throughput (MB/s)** Not applicable ⓘ

**Snapshot ID** Select a snapshot ⓘ ⓘ

**Encryption** ☐ Encrypt this volume ⓘ

Key	Value
Name	31st-Aug-EBS-V1

**Add Tag** 49 remaining (Up to 50 tags maximum)

Activate Windows  
Go to System in Control Panel to activate Windows.

Feedback English (US)

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7:25 PM 8/31/2018

# Attaching Volume

## Select the created volume-Action-Attach Volume

Online Learning | edjio x ebs aws - Google Search x Creating an Amazon EBS x Amazon EBS Update - N x ebs in aws - Google Search x EC2 Management Console x

Secure | https://ap-south-1.console.aws.amazon.com/ec2/v2/home?region=ap-south-1#Volumes:sort=desc:createTime

aws Services Resource Groups deepak Mumbai Support

EC2 Dashboard  
Events  
Tags  
Reports  
Limits  
INSTANCES  
Instances  
Launch Templates  
Spot Requests  
Reserved Instances  
Dedicated Hosts  
IMAGES  
AMIs  
Bundle Tasks  
ELASTIC BLOCK STORE  
Volumes  
Snapshots  
Lifecycle Manager  
NETWORK & SECURITY  
Security Groups  
Elastic IPs  
Placement Groups  
Key Pairs  
Network Interfaces

Create Volume Actions

Filter by tags

Name	Volume Type	IOPS	Snapshot	Created	Availability Zone	State	Alarm Status
31st-Aug-EB	gp2	100 / 3000		August 31, 2018 at ...	ap-south-1a	available	None
W.S.2012--3	gp2	100 / 3000	snap-07ae5f...	August 30, 2018 at ...	ap-south-1a	available	None
RHEL-Mrth	gp2	100 / 3000	snap-0280599...	August 28, 2018 at ...	ap-south-1b	in-use	None
RHEL-BTM	gp2	100 / 3000	snap-0280599...	August 27, 2018 at ...	ap-south-1a	in-use	None

Modify Volume  
Create Snapshot  
Delete Volume  
Attach Volume  
Detach Volume  
Force Detach Volume  
Change Auto-Enable IO Setting  
Add/Edit Tags

Volumes: vol-01ef615258fa1bbe3 (31st-Aug-EBS-V1)

Description Status Checks Monitoring Tags

Volume ID	vol-01ef615258fa1bbe3	Alarm status	None
Size	2 GiB	Snapshot	-
Created	August 31, 2018 at 7:27:02 PM UTC+5:30	Availability Zone	ap-south-1a
State	available	Encrypted	Not Encrypted
Attachment information		KMS Key ID	

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Windows 7:27 PM 8/31/2018

# Select the running instance available on same availability zone

Online Learning | edjio x ebs aws - Google Search x Creating an Amazon EBS x Amazon EBS Update - N x ebs in aws - Google Search x EC2 Management Console x

Secure | https://ap-south-1.console.aws.amazon.com/ec2/v2/home?region=ap-south-1#Volumes:sort=desc:createTime

aws Services Resource Groups

EC2 Dashboard Events Tags Reports Limits INSTANCES Instances Launch Templates Spot Requests Reserved Instance Dedicated Hosts IMAGES AMIs Bundle Tasks ELASTIC BLOCK STORE Volumes Snapshots Lifecycle Manager NETWORK & SECURITY Security Groups Elastic IPs Placement Groups Key Pairs Network Interfaces

Create Volume Actions

Filter by tags and attributes or search by keyword

	Name	Volume ID	Size	Volume Type	IOPS	Snapshot	Created	Availability Zone	State	Alarm Status
<input checked="" type="checkbox"/>	31st-Aug-EB...	vol-01ef6152...	2 GiB	gp2	100 / 3000		August 31, 2018 at ...	ap-south-1a	available	None
<input type="checkbox"/>	W.S.2012 --3...	vol-04a1255...	30 GiB	gp2	100 / 3000	snap-07aeef5f...	August 30, 2018 at ...	ap-south-1a	available	None

### Attach Volume

**Volume** ⓘ vol-01ef615258fa1bbe3 (31st-Aug-EBS-V1) in ap-south-1a

**Instance** ⓘ  in ap-south-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

Volume ID	vol-01ef615258fa1bbe3	Alarm status	None
Size	2 GiB	Snapshot	-
Created	August 31, 2018 at 7:27:02 PM UTC+5:30	Availability Zone	ap-south-1a
State	available	Encrypted	Not Encrypted
Attachment information		KMS Key ID	

Feedback English (US)

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7:33 PM 8/31/2018

## WELCOME TO SERVER MANAGER

QUICK START

WHAT'S NEW

LEARN MORE

- 1 **Configure this local server**
- 2 Add roles and features
- 3 Add other servers to manage
- 4 Create a server group
- 5 Connect this server to cloud services

## ROLES AND SERVER GROUPS

Roles: 1 | Server groups: 1 | Servers total: 1

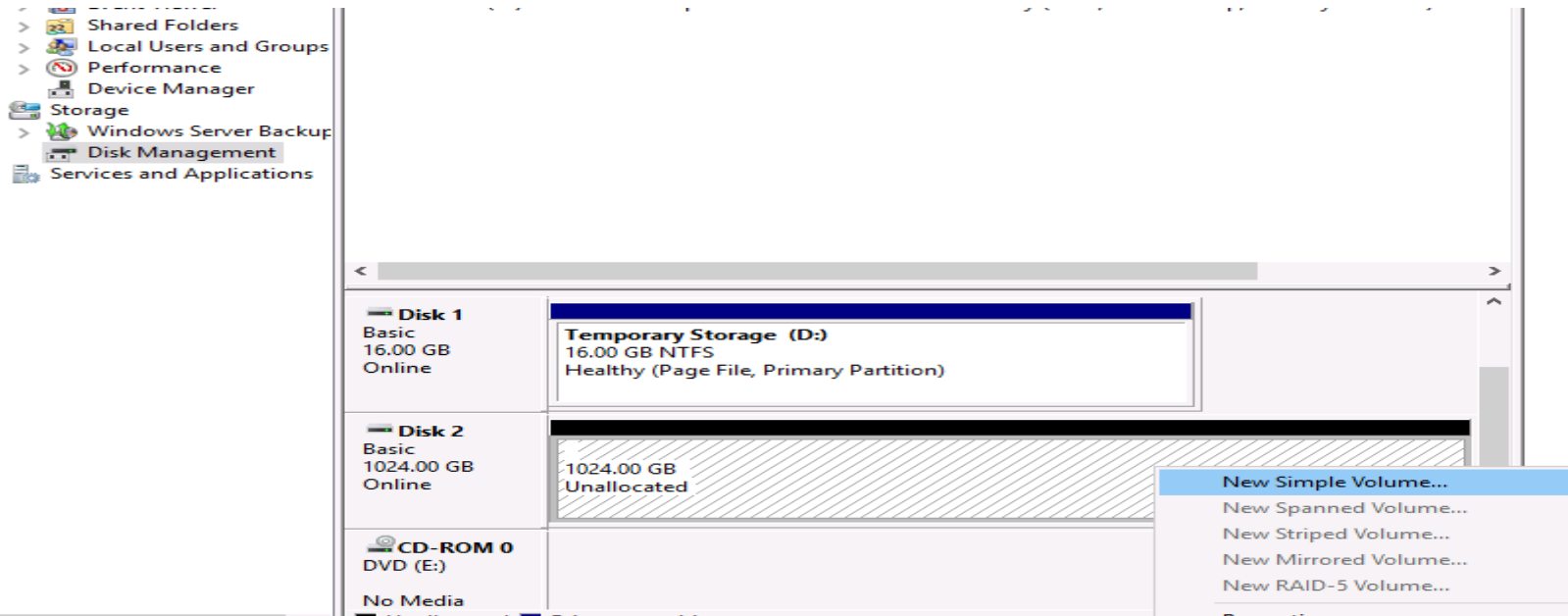
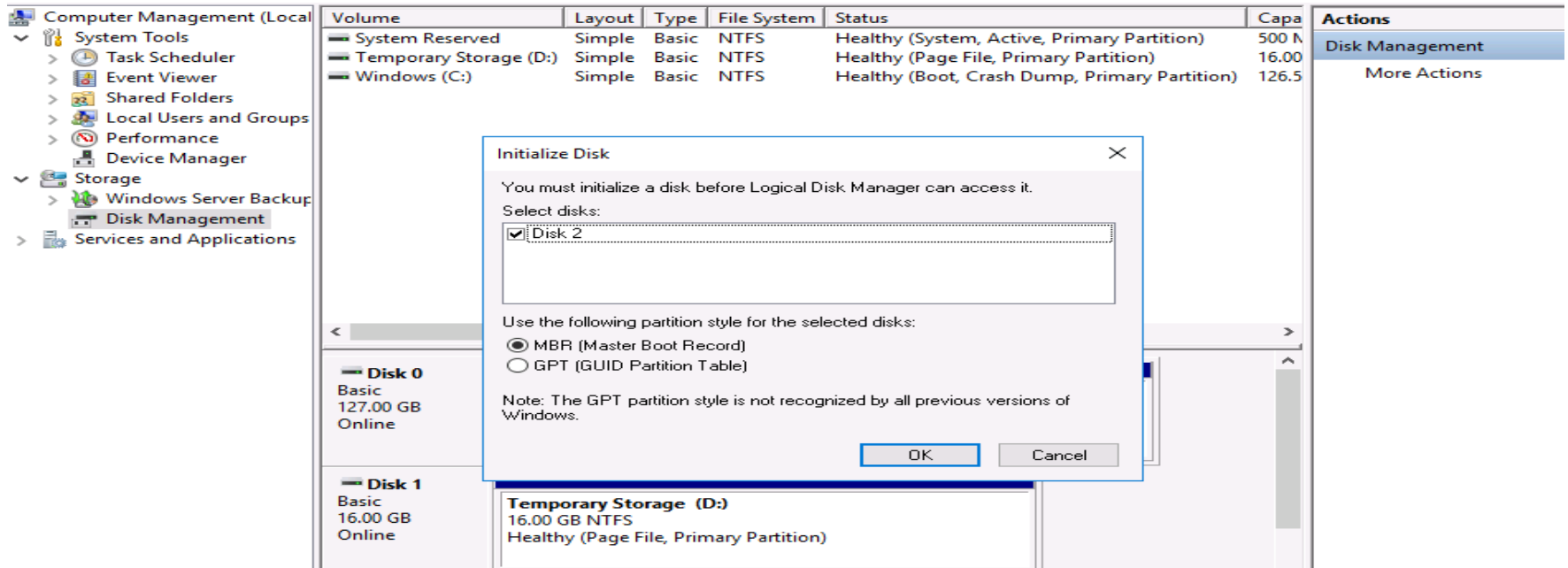
- Component Services
- Computer Management**
- Defragment and Optimize Drives
- Disk Cleanup
- Event Viewer
- iSCSI Initiator
- Local Security Policy
- Microsoft Azure Services
- ODBC Data Sources (32-bit)
- ODBC Data Sources (64-bit)
- Performance Monitor
- Print Management
- Resource Monitor
- Services
- System Configuration
- System Information
- Task Scheduler
- Windows Firewall with Advanced Security
- Windows Memory Diagnostic
- Windows PowerShell

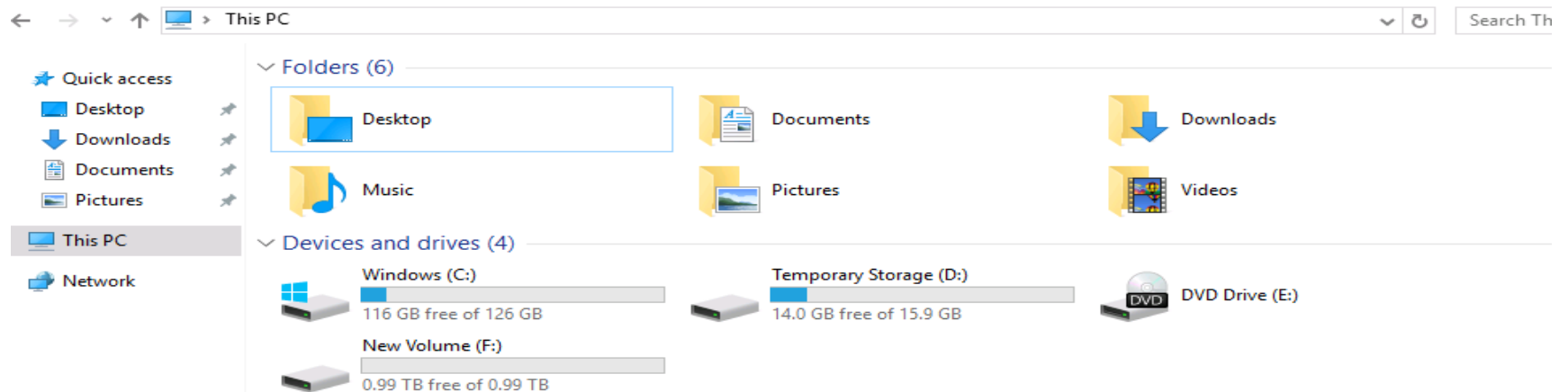
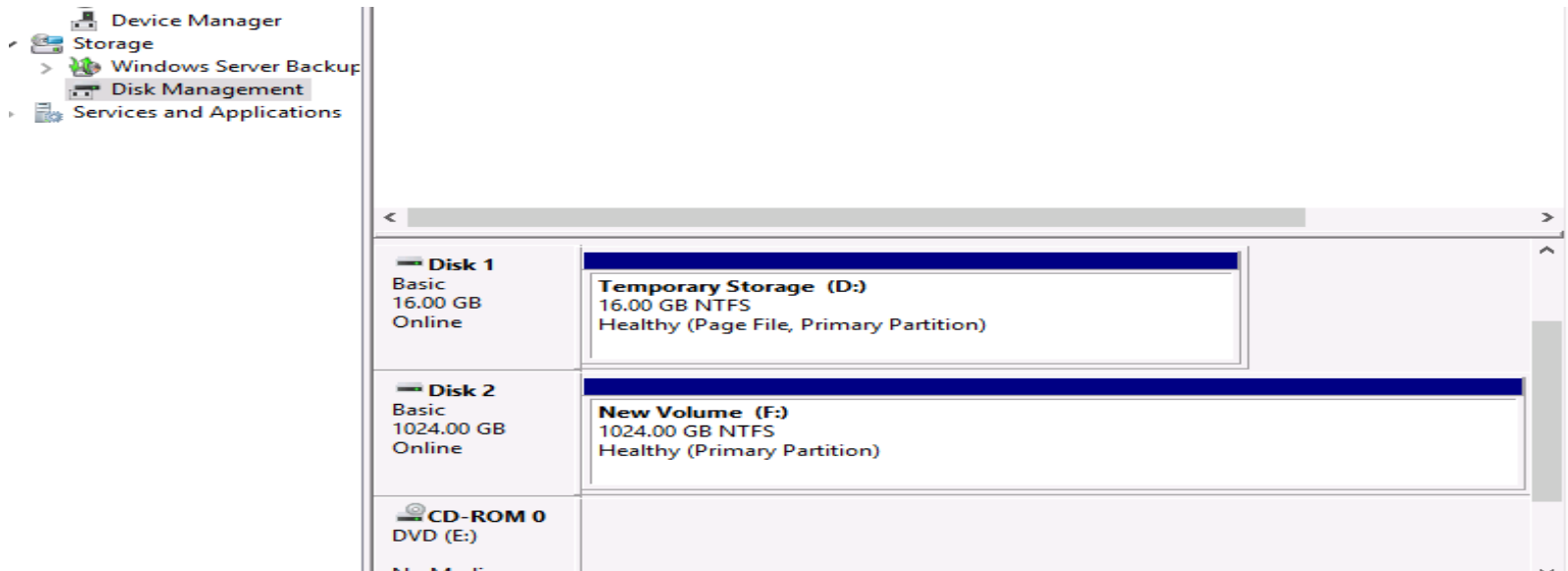
- Device Manager
- Storage
- Windows Server Backup
- Disk Management**
- Services and Applications

Disk	Format	Size	Status
Disk 0	Basic	127.00 GB	Online
Disk 1	Basic	16.00 GB	Online
Disk 2	Unknown	1024.00 GB	Not Initialized

Partition	Format	Size	Status
System Reserved	500 MB NTFS	Healthy (System, Active)	
Windows (C:)	126.51 GB NTFS	Healthy (Boot, Crash Dump, Primary Partition)	
D:	Primary Partition		
1024.00 GB	Unallocated		







## Attaching and Detaching the EBS volume (Windows)

- 1) Attach EBS volume in one instance ---keep some data there.
- 2) Detach the volume and attach to the second instance.
- 3) Open/connect the second instance---server manager—computer management – disk management –right click on added disk – make online.
- 4) Come to my computer –you will get your volume here

# Create partition in linux

After adding disk to linux Instance – connect the Instance using mobaextrem or any tool

```
$ sudo su
```

```
# fdisk -l
```

```
# fdisk /dev/xvdf
```

type `-n` then `p` then type `1` then press 2 times enter then type `w`

```
#mkfs.xfs /dev/xvdf1
```

```
#mkdir /share1
```

```
#mount /dev/xvdf1 /share1
```

```
#cd /share1 :-- this is your external disk space
```

# Permanently mounting File system

# vi /etc/fstab

At the end of line add

/dev/sdb1 /share1 xfs defaults 0 0

```
(chroot) livecd / # cat /etc/fstab
# /etc/fstab: static file system information.
#
# noatime turns off atimes for increased performance (atimes normally aren't
# needed); notail increases performance of ReiserFS (at the expense of storage
# efficiency). It's safe to drop the noatime options if you want and to
# switch between notail / tail freely.
#
# The root filesystem should have a pass number of either 0 or 1.
# All other filesystems should have a pass number of 0 or greater than 1.
#
# See the manpage fstab(5) for more information.
#
# <fs>                <mountpoint>    <type>          <opts>          <dump/pass>
#
# NOTE: If your BOOT partition is ReiserFS, add the notail option to opts.
#/dev/BOOT             /boot           ext2             noauto,noatime  1 2
#/dev/ROOT             /               ext3             noatime         0 1
#/dev/SWAP             none            swap             sw              0 0
#/dev/cdrom            /mnt/cdrom      auto             noauto,ro       0 0
#/dev/fd0              /mnt/floppy     auto             noauto          0 0
#
/dev/hda1              /boot           ext2             defaults        1 2
/dev/hda2              none            swap             sw              0 0
/dev/hda3              /               ext3             noatime         0 1
```

## Attaching and Detaching the EBS volume (Linux)

1) Attach EBS volume in one instance ---keep some data there.

2) Detach the volume and attach to the second instance.

3) Open/connect the second instance-

```
$sudo su
```

```
# fdisk -l
```

```
# mkdir /storage1
```

```
# mount /dev/xvdf1 /storage1
```

```
# cd /storage1
```

# Migrating volume from one Account to other

Select the volume—Action —Create snapshot—then go to snapshot-action—modify permissions

The screenshot shows the AWS Management Console interface. On the left, the navigation pane is visible with the 'New EC2 Experience' toggle and a search bar. The 'IMAGES' section is expanded, showing 'AMIs', 'Bundle Tasks', and 'ELASTIC BLOCK STORE'. Under 'ELASTIC BLOCK STORE', 'Volumes' is selected, and 'Snapshots' is highlighted in orange. The main content area shows a table of volumes. The first volume is selected, and the 'Actions' menu is open, displaying options: 'Delete', 'Create Volume', 'Manage Fast Snapshot Restore', 'Create Image', 'Copy', 'Modify Permissions' (highlighted in orange), and 'Add/Edit Tags'. Below the table, the snapshot ID 'snap-0cf8984bfb2466b37' is displayed.

New EC2 Experience  
Tell us what you think

Reserved Instances  
Dedicated Hosts **New**  
Capacity Reservations

▼ **IMAGES**  
AMIs  
Bundle Tasks

▼ **ELASTIC BLOCK STORE**  
Volumes  
**Snapshots**  
Lifecycle Manager

Create Snapshot

Owned By Me ▼

☒ Name

☐

Actions ^

- Delete
- Create Volume
- Manage Fast Snapshot Restore
- Create Image
- Copy
- Modify Permissions**
- Add/Edit Tags

Snapshot: snap-0cf8984bfb2466b37

# Migrating volume from one Account to other

Put other aws account number here

The screenshot shows the AWS Management Console interface with a 'Modify Permissions' modal dialog open. The dialog is titled 'Modify Permissions' and contains the following elements:

- A warning message: "This is an unencrypted snapshot. When you share an unencrypted snapshot, you give another account permission to both copy the snapshot and create a volume from it."
- Current status: "This snapshot is currently:" followed by two radio buttons: "Public" (unselected) and "Private" (selected).
- A text input field labeled "AWS Account Number" which is currently empty.
- A message: "This snapshot currently has no permissions."
- Another text input field labeled "AWS Account Number" containing the value "12345678".
- An "Add Permission" button next to the second input field.
- At the bottom right, "Cancel" and "Save" buttons.

In the background, the console shows a table of snapshots. The selected snapshot is 'snap-0cf8984bfb2466b37' with a status of 'completed' and a capacity of '10 GiB'.

Snapshot ID	Status	Progress	Capacity
snap-0cf8984bfb2466b37	completed	100%	10 GiB

# How to check in other account

1) EC2 --- Elastic block store --snapshot—click on owned by me--

☒ New EC2 Experience  
Tell us what you think

Reserved Instances

Dedicated Hosts **New**

Capacity Reservations

▼ **IMAGES**

AMIs

Bundle Tasks

▼ **ELASTIC BLOCK STORE**

Volumes

**Snapshots**

Lifecycle Manager

NETWORK &

**Create Snapshot** **Actions** ▼

**Owned By Me** ▼  Filter by tags and attributes

<input type="checkbox"/>	Name ▼	Snapshot ID ▲	Size
<input type="checkbox"/>		snap-0cf8984bfb24...	10

Snapshot: snap-0cf8984bfb2466b37

# How to check in other account

Owned by me –public snapshot—You will get share snapshot from other account ---go to action—create volume

☒ New EC2 Experience  
Tell us what you think

Reserved Instances

Dedicated Hosts **New**

Capacity Reservations

▼ **IMAGES**

AMIs

Bundle Tasks

▼ **ELASTIC BLOCK STORE**

Volumes

**Snapshots**

Lifecycle Manager

▼ **NETWORK &**

**Create Snapshot** **Actions** ▼

Owned By Me ▲

Owned By Me

Public Snapshots

Private Snapshots

Owned By Me	Snapshot ID	Size
<input checked="" type="checkbox"/>	snap-0cf8984bfb24...	10 GiB

Snapshot: snap-0cf8984bfb2466b37



# Migrating volume from one Region to other

Create Snapshot—Go to snapshot---Action—Copy —select destination—  
Singapore—copy

Go to Singapore —select the snapshot —Action—Create Volume

Now attach to any Instance and check the data

# Modifying Volume--Instance

## Modifying Root Volume of Instance

- 1) Modify the volume size from aws console volume.
- 2) Connect the instance

```
# df -h
```

```
# lsblk
```

```
# growpart /dev/xvda 1
```

```
# lsblk
```

We increased block storage, but we also need to increase file system:

```
# xfs_growfs /dev/xvdf1
```

```
# df -h
```

# Modifying Volume--EBS

## Modifying Root Volume

1) Modify the volume size from aws console volume.

Note: ebs should have xfs file system (hint: mkfs.xfs /dev/xvdf1)

```
# df -h
```

```
# lsblk
```

```
# growpart /dev/xvda 1
```

```
# lsblk
```

```
#xfs_growfs /dev/xvdf1
```

```
# df -h
```

# Troubleshooting

## 1) How to recover lost keypair and access the instance.

Ans:

- a) Create one more recovery instance.
- b) Stop the victim instance
- c) Go to volume – select victim instance—action—detach volume
- d) Again go to action—attach volume—select—recovery instance
- e) Connect recovery instance –

```
# lsblk
```

```
# mkdir /recovery
```

```
# mount -o nouuid /dev/xvdf2 /recovery
```

```
# df -h
```

```
# cat /home/ec2-user/.ssh/authorised_keys >> /recovery/home/ec2-user/.ssh/authorised_keys
```

```
# umount /recovery
```

# Troubleshooting

f) Go aws –volume—select victim instance—action –detach volume—

g) Again go to action –attach volume—select stopped server – device: /dev/xvda ---attach

h) Now go to ec2 instance—copy public ip of victim instance and connect