

Hands-On with AWS EBS (Elastic Block Store)

What is EBS?

EBS (Elastic Block Store) is a block-level storage service provided by AWS. It allows users to create **additional storage volumes** for both **Linux and Windows EC2 instances**. These volumes can persist data even after the instance is stopped or terminated.

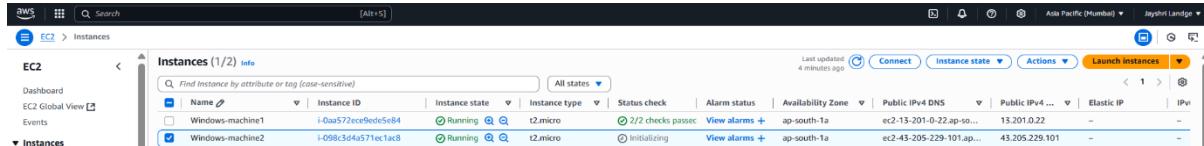
Important Points Before You Begin

- **Zone-Specific:** Volumes and EC2 instances must be in the **same availability zone**.
- **Persistent Storage:** Data remains intact even after stopping or restarting the instance.
- A volume **cannot be attached to multiple instances at the same time**.
- EBS supports both **Linux** and **Windows** operating systems.

Part 1: Hands-On with EBS on Windows EC2 Instance

◆ Step 1: Launch a Windows EC2 Instance

- Launch a new Windows EC2 instance from the AWS Console.



The screenshot shows the AWS EC2 Instances page. At the top, there's a search bar and navigation links for 'Dashboard', 'EC2 Global View', and 'Events'. On the left, a sidebar has 'EC2' selected and shows 'Instances (1/2)'. The main table lists two instances: 'Windows-machine1' and 'Windows-machine2'. Both instances are shown as 'Running' with status codes '2/2 checks passed' and 'Initializing' respectively. They are in the 'ap-south-1a' availability zone, with public IP addresses '13.201.0.22' and '43.205.229.101'. The table includes columns for Name, Instance ID, Instance state, Instance type, Status check, Alarm status, Availability Zone, Public IPv4 DNS, Public IPv4, Elastic IP, and IPv6.

Screenshot 1: Windows instance creation

◆ Step 2: Connect to the Instance

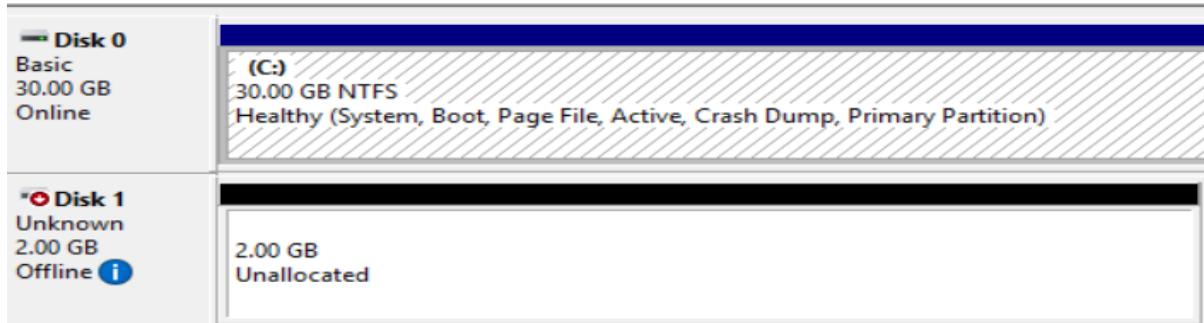
- Use Remote Desktop (RDP) to connect to your Windows instance.



Screenshot 2: Connected to Windows instance via RDP

◆ Step 3: Open Disk Management

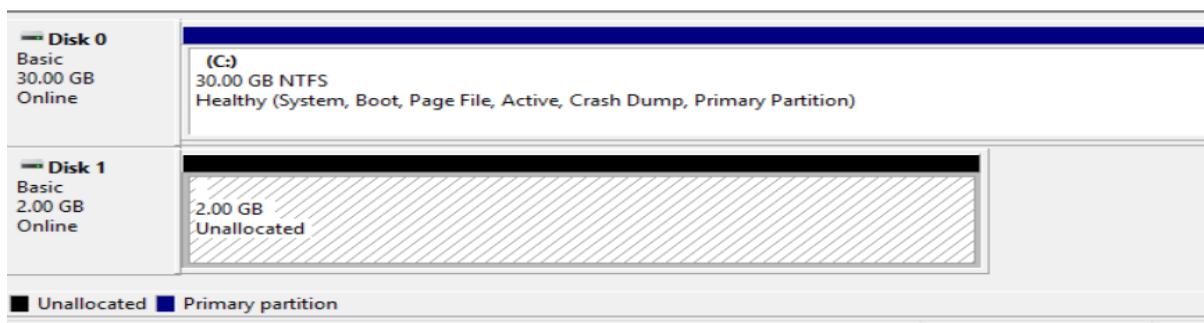
- ➡ Search for "Create and format hard disk partitions" or
- ➡ Right-click Start Menu → Disk Management



Screenshot 3: Disk management screen

◆ Step 4: Bring Disk Online

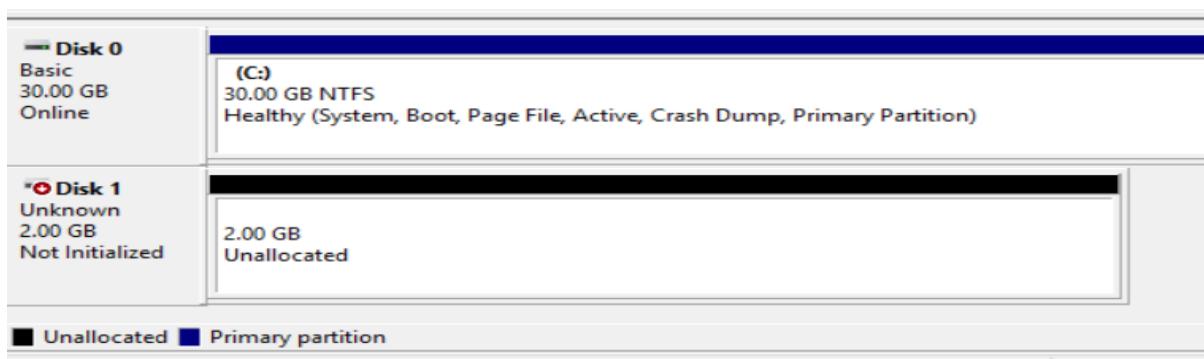
- ➡ Right-click on the unknown disk → Bring Online



Screenshot 4: Bring disk online

◆ Step 5: Initialize the Disk

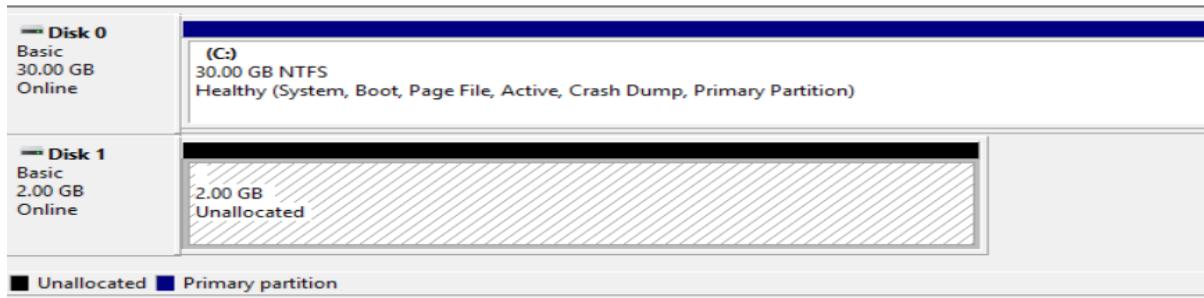
- ➡ Right-click the uninitialized disk → Initialize Disk



Screenshot 5: Initialize disk prompt

◆ Step 6: Create Volume

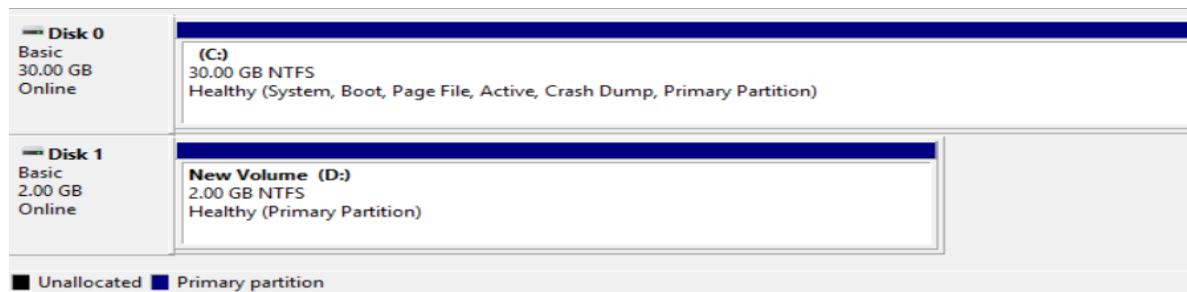
- Right-click the unallocated space → **New Simple Volume** → **Next** → **Finish**



Screenshot 6: Create volume

◆ Step 7: Verify Disk Health

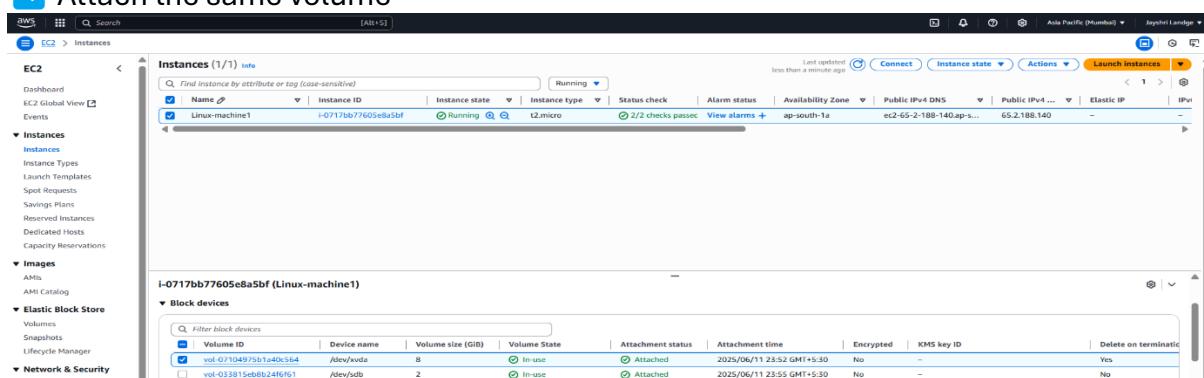
- Both disks should now show as **Healthy**



Screenshot 7: Disk marked as healthy

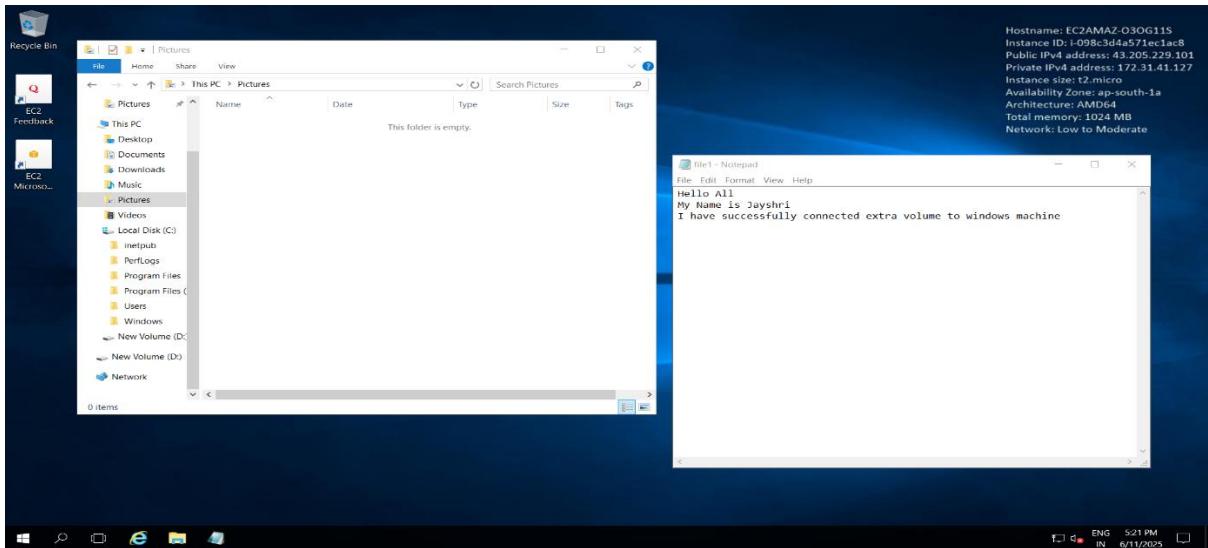
◆ Step 8: Test Persistence

- Detach the volume
- Create a **second Windows instance**
- Attach the same volume



Screenshot 8: Volume attached to second instance

- Verify: Data persists in extra volume.

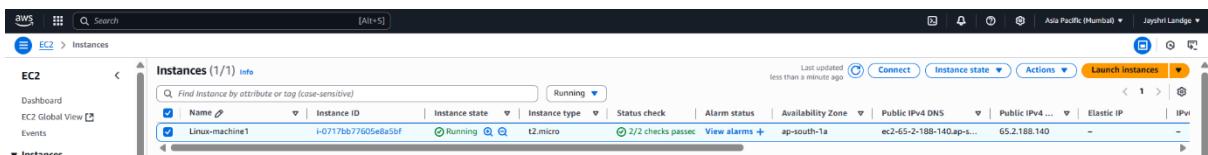


Screenshot 9: Persistent data visible

Part 2: Hands-On with EBS on Linux EC2 Instance

◆ Step 1: Launch Linux EC2 Instance

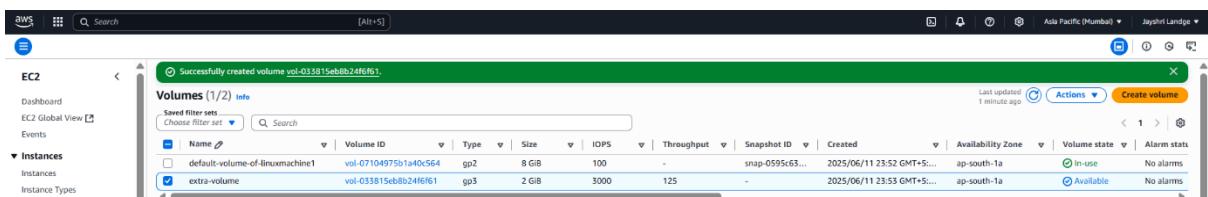
- Launch a new Amazon Linux/Ubuntu instance



Screenshot 10: Linux instance launch

◆ Step 2: Create and Attach Volume

- Create a new **EBS Volume** in the same zone
- Attach it to the instance



Screenshot 11: Volume creation

The screenshot shows the AWS EC2 Instances page. On the left, there's a navigation sidebar with options like Dashboard, EC2 Global View, Events, Instances (selected), Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Capacity Reservations, Images (AMIs, AMI Catalog), Elastic Block Store (Volumes, Snapshots, Lifecycle Manager), Network & Security (Security Groups, Elastic IPs, Placement Groups), and Compute Optimizations.

The main area displays two instances:

- Windows-machine1**: Instance ID i-0aa572ece9ede5e84, Status: Running, Instance type t2.micro, Status check: 2/2 checks passed, Alarm status: View alarms, Availability Zone: ap-south-1a, Public IPv4 DNS: ec2-13-201-0-22.ap-sou..., Public IPv4 IP: 13.201.0.22, Elastic IP: -.
- Windows-machine2**: Instance ID i-098c3d4a571ec1ac8, Status: Running, Instance type t2.micro, Status check: Initializing, Alarm status: View alarms, Availability Zone: ap-south-1a, Public IPv4 DNS: ec2-43-205-229-101.ap..., Public IPv4 IP: 43.205.229.101, Elastic IP: -.

A modal window for **i-098c3d4a571ec1ac8 (Windows-machine2)** is open, showing the EBS volumes attached to the instance. It lists two volumes:

Volume ID	Device name	Volume size (GiB)	Volume State	Attachment status	Attachment time	Encrypted	KMS key ID	Delete on termination
vol-0d00bf18bb1ff9702	/dev/sda1	30	In-use	Attached	2025/06/11 22:36 GMT+5:30	No	-	Yes
vol-0781503af9664d892	xvdb	2	In-use	Attached	2025/06/11 22:39 GMT+5:30	No	-	No

Screenshot 12: Volume attachment

◆ Step 3: Connect via SSH (PuTTY)

→ Connect to instance using terminal or PuTTY

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root@ip-172-31-41-53:~#
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```
[root@ip-172-31-41-53 ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
devtmpfs        468M    0  468M   0% /dev
tmpfs          477M    0  477M   0% /dev/shm
tmpfs          477M  404K  476M   1% /run
tmpfs          477M    0  477M   0% /sys/fs/cgroup
/dev/xvda1     8.0G  1.9G  6.2G  24% /
tmpfs          96M    0   96M   0% /run/user/1000
[root@ip-172-31-41-53 ~]# lsblk
NAME   MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
xvda   202:0    0   8G  0 disk
└─xvda1 202:1    0   8G  0 part /
[root@ip-172-31-41-53 ~]# fdisk -l
Disk /dev/xvda: 8 GiB, 8589934592 bytes, 16777216 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
Disklabel type: gpt
Disk identifier: 3D254912-98DF-4319-A9DC-7935D115D148

Device        Start      End  Sectors  Size Type
/dev/xvda1    4096 16777182 16773087  8G Linux filesystem
/dev/xvda128  2048      4095     2048  1M BIOS boot

Partition table entries are not in disk order.
```

Screenshot 14: Disk list output

◆ **Step 5: Format the Volume**

```
mkfs -t ext4 /dev/xvdb
```

```
[root@ip-172-31-41-53 ~]# mkfs -t ext4 /dev/xvdb
```

Screenshot 15: Formatting output

◆ **Step 6: Mount the Volume**

```
mkdir /dir1
```

```
mount /dev/xvdb /dir1
```

```
[root@ip-172-31-41-53 ~]# mkdir /dir5
[root@ip-172-31-41-53 ~]# mount /dev/xvdb /dir5
```

Screenshot 16: Mounted directory

◆ **Step 7: Create Files**

```
touch file1 file2
```

```
ls
```

```
[root@ip-172-31-41-53 ~]# touch file1 file2
[root@ip-172-31-41-53 ~]# ls
file1  file2
```

Screenshot 17: Files created inside mounted volume

◆ Step 8: Unmount the Volume

cd ..

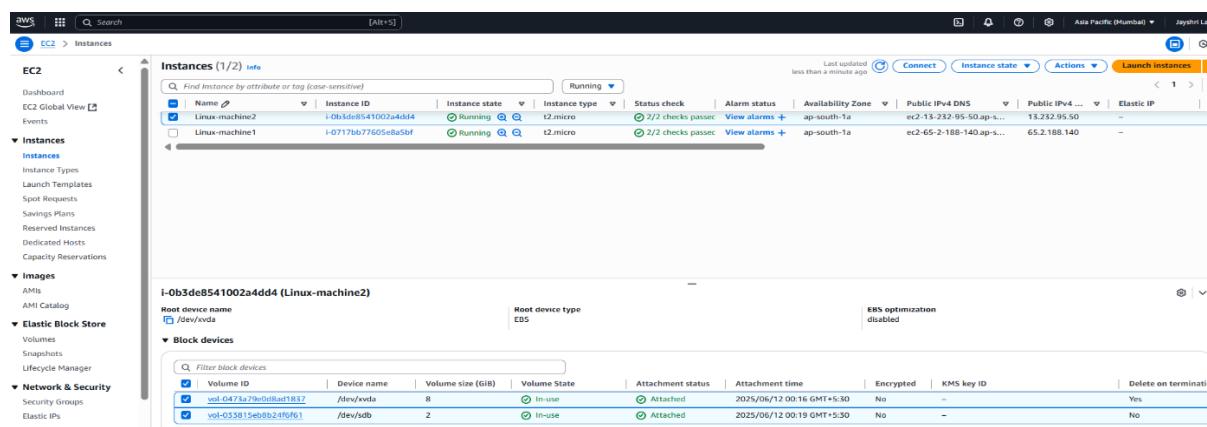
umount /dir2

```
42 cd ..
43 umount /dir2
44 df -h
```

Screenshot 18: Unmounting volume

◆ Step 9: Attach Volume to Another Instance

- ➡ Detach volume from first instance
- ➡ Attach to second Linux instance



Screenshot 19: Volume attached to second Linux instance

◆ Step 10: Mount and Verify

mount /dev/xvdb /mnt

cd /dir5

ls

```
[root@ip-172-31-41-217 /]# mount /dev/xvdb /mnt
[root@ip-172-31-41-217 /]# cd /mnt
[root@ip-172-31-41-217 mnt]# ls
lost+found
[root@ip-172-31-41-217 mnt]# touch file1 file2
[root@ip-172-31-41-217 mnt]# cd ..
[root@ip-172-31-41-217 /]# umount /mnt
[root@ip-172-31-41-217 /]# cd /dir5
[root@ip-172-31-41-217 dir5]# mount /dev/xvdb /dir5
[root@ip-172-31-41-217 dir5]# ls
[root@ip-172-31-41-217 dir5]# cd ..
[root@ip-172-31-41-217 /]# mount /dev/xvdb /dir5
mount: /dir5: /dev/xvdb already mounted on /dir5.
[root@ip-172-31-41-217 /]# cd /dir5
[root@ip-172-31-41-217 dir5]# ls
file1  file2  lost+found
```

Screenshot 20: Persistent files visible on 2nd instance

EBS Backup and Sharing

Resource	Backup Method	Share Across Region	Share Across Account
AMI	AMI	<input checked="" type="checkbox"/> Copy AMI	<input checked="" type="checkbox"/> Edit AMI permissions
Volume	Snapshot	<input checked="" type="checkbox"/> Copy Snapshot	<input checked="" type="checkbox"/> Modify permissions

Extra Info

◆ SAN Technology in EBS

EBS uses **SAN (Storage Area Network)** to split large data into small blocks (chunks), each with a unique ID for efficient storage.

◆ Types of EBS Volumes

1. General Purpose SSD (gp3/gp2)
2. Provisioned IOPS SSD (io1/io2)
3. Throughput Optimized HDD (st1)
4. Cold HDD (sc1)
5. Magnetic (deprecated)

◆ Definitions

- **IOPS (Input/Output Operations Per Second):** Speed of read/write transactions.
- **Throughput:** Number of bytes written per second.

Advantages of EBS

1. Supports **persistent storage**
2. Works with **both Linux and Windows**
3. Volume size up to **16TB**
4. Snapshots for **backup & recovery**
5. Bootable volumes for EC2 root disks
6. Snapshot sharing across **regions/accounts**

Disadvantages of EBS

1. Cannot attach same volume to **multiple instances**
2. Cannot **shrink volume size**
3. Cannot attach volume to instance in **another zone**
4. Minimum size = **1GB**

Conclusion

AWS EBS is an essential service for expanding storage in EC2 instances with persistent and scalable block-level volumes. It is especially useful when:

- You need more storage without changing the instance
- You want to back up your data using snapshots
- You need to migrate data between instance