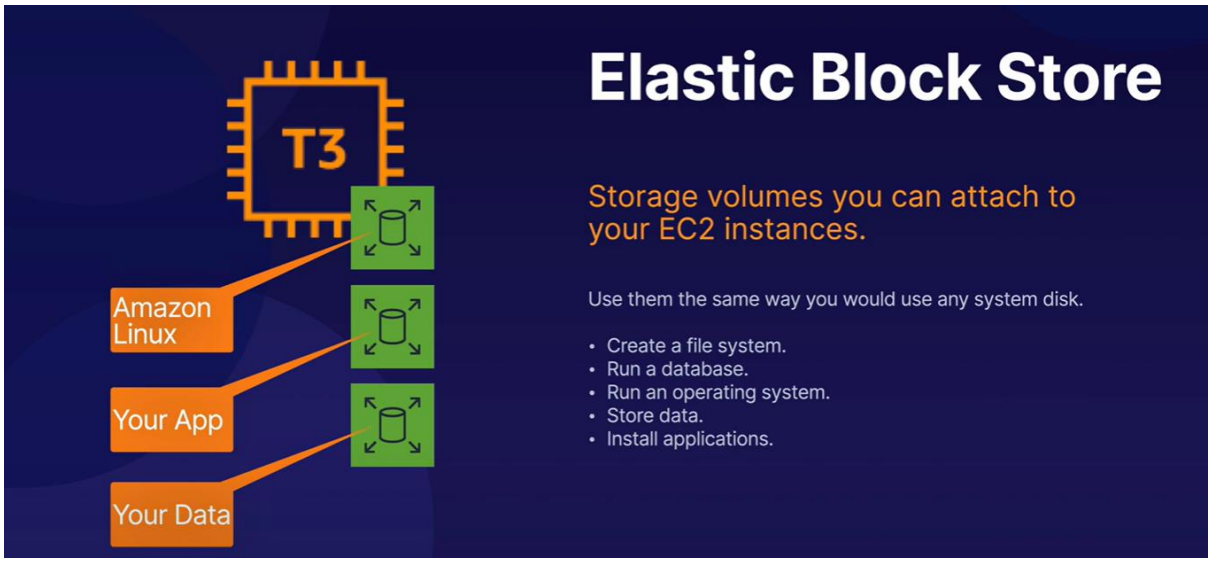
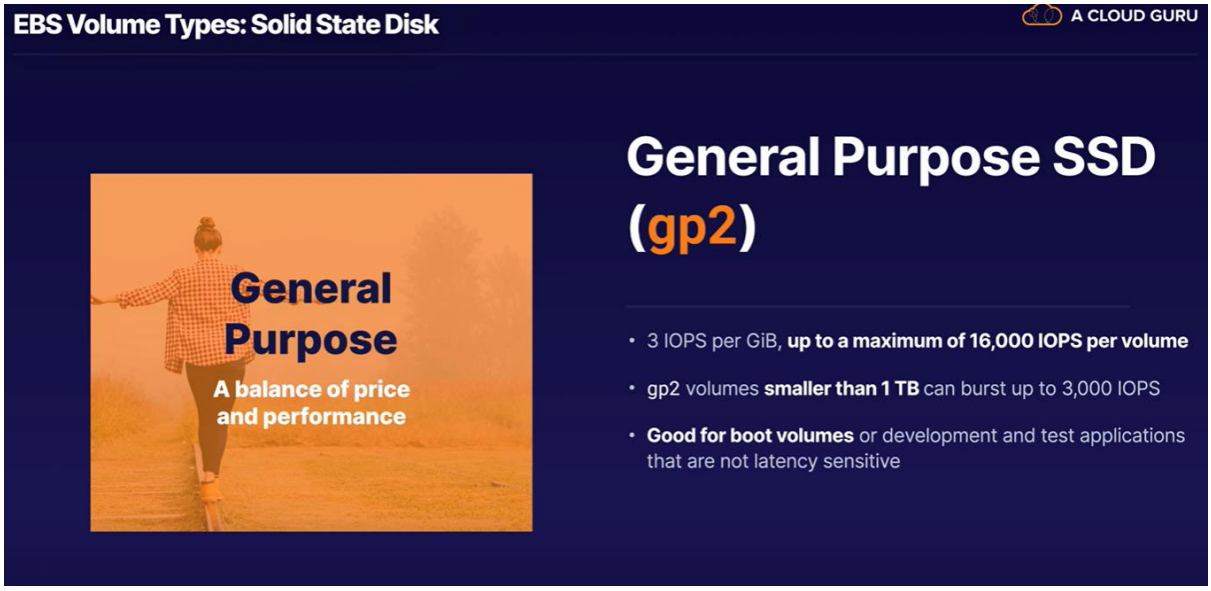
EBS:


T3
Amazon Linux
Your App
Your Data
Elastic Block Store
Storage volumes you can attach to your EC2 instances.
Use them the same way you would use any system disk.
• Create a file system.
• Run a database.
• Run an operating system.
• Store data.
• Install applications.


Mission Critical
1
Production Workloads
Designed for mission-critical workloads.
2
Highly Available
Automatically replicated within a single Availability Zone to protect against hardware failures.
3
Scalable
Dynamically increase capacity and change the volume type with no downtime or performance impact to your live systems.


EBS Volume Types: Solid State Disk
A CLOUD GURU
General Purpose
A balance of price and performance
General Purpose SSD (gp2)
• 3 IOPS per GiB, up to a maximum of 16,000 IOPS per volume
• gp2 volumes smaller than 1 TB can burst up to 3,000 IOPS
• Good for boot volumes or development and test applications that are not latency sensitive

EBS Volume Types: Solid State Disk

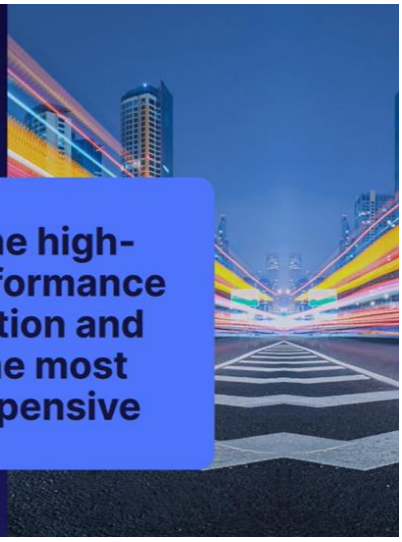
General Purpose SSD (gp3)

- Predictable **3,000 IOPS baseline performance** and 125 MiB/s regardless of volume size.
- Ideal for applications that **require high performance at a low cost**, such as MySQL, Cassandra, virtual desktops, and Hadoop analytics.
- Customers looking for higher performance **can scale up** to 16,000 IOPS and 1,000 MiB/s for an additional fee.

Provisioned IOPS SSD (io1)

Up to 64,000 IOPS per volume.
50 IOPS per GiB.

Use if you need more than 16,000 IOPS.



The high-performance option and the most expensive

Provisioned IOPS SSD (io2)

Latest generation.

Higher durability and more IOPS.

io2 is the same price as **io1**.

500 IOPS per GiB.
Up to 64,000 IOPS.

99.999% durability
instead of up to 99.9%.

I/O-intensive apps, large databases, and latency-sensitive workloads.
Applications that need high levels of durability.

Throughput Optimized HDD (st1)

Low-cost HDD volume

- Baseline throughput of 40 MB/s per TB
- Ability to burst up to 250 MB/s per TB
- Maximum throughput of 500 MB/s per volume
- Frequently accessed, throughput-intensive workloads
- Big data, data warehouses, ETL, and log processing

COLD HDD (SC1)

Lowest Cost Option

- Baseline throughput of 12 MB/s per TB
- Ability to burst up to 80 MB/s per TB
- Max throughput of 250 MB/s per volume
- A good choice for colder data requiring fewer scans per day
- Good for applications that need the lowest cost and performance is not a factor

IOPS

- Measures the number of read and write operations per second
- Important metric for quick transactions, low-latency apps, transactional workloads
- The ability to action reads and writes very quickly
- Choose Provisioned IOPS SSD (io1 or io2)

VS

Throughput

- Measures the number of bits read or written per second (MB/s)
- Important metric for large datasets, large I/O sizes, complex queries
- The ability to deal with large datasets
- Choose Throughput Optimized HDD (st1)

EXAM TIPS

Learning EBS: SSD Volumes

Highly available and scalable storage volumes **you can attach to an EC2 instance.**

gp2

General Purpose SSD

- Suitable for boot disks and general applications
- Up to 16,000 IOPS per volume
- Up to 99.9% durability

gp3

General Purpose SSD

- Suitable for high performance applications
- Predictable 3,000 IOPS baseline performance and 125 MiB/s regardless of volume size
- Up to 99.9% durability

io1

Provisioned IOPS SSD

- Suitable for OLTP and latency-sensitive applications
- 50 IOPS/GiB
- Up to 64,000 IOPS per volume
- High performance and most expensive
- Up to 99.9% durability

io2

Provisioned IOPS SSD

- Suitable for OLTP and latency-sensitive applications
- 500 IOPS/GiB

EXAM TIPS

EBS: HDD Volumes

Highly available and scalable storage volumes **you can attach to an EC2 instance.**

st1

Throughput Optimized HDD

- Suitable for big data, data warehouses, and ETL
- Max throughput is 500 MB/s per volume
- Cannot be a boot volume
- Up to 99.9% durability

sc1

Cold HDD

- Max throughput of 250 MB/s per volume
- Less frequently accessed data

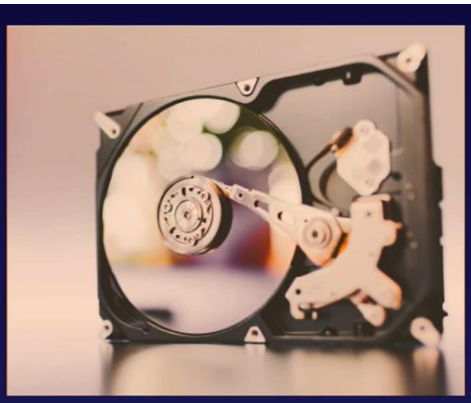
Volumes and Snapshots:

What Are Volumes?

Volumes Exist on EBS

THINK OF IT AS A VIRTUAL HARD DISK

Volumes are simply virtual hard disks. You need a minimum of 1 volume per EC2 instance. **This is called the root device volume.**



What Are Snapshots?

1. **Snapshots exist on S3**
   Think of snapshots as a photograph of the virtual disk/volume.
2. **Snapshots are point in time**
   When you take a snapshot, it is a point-in-time copy of a volume.
3. **Snapshots are incremental**
   This means only the data that has been changed since your last snapshot are moved to S3. This saves dramatically on space and the time it takes to take a snapshot.
4. **The first snapshot**
   If it is your first snapshot, it may take some time to create as there is no previous point-in-time copy.

3 Tips for Snapshots

- **Consistent Snapshots**
  Snapshots only capture data that has been written to your Amazon EBS volume, which might exclude any data that has been locally cached by your application or OS. For a consistent snapshot, it is recommended you stop the instance and take a snap.
- **Encrypted Snapshots**
  If you take a snapshot of an encrypted EBS volume, the snapshot will be encrypted automatically.
- **Sharing Snapshots**
  You can share snapshots, but only in the region in which they were created. To share to other regions, you will need to copy them to the destination region first.

What to Know about EBS Volumes

1. **LOCATION**
   EBS volumes will always be in the same AZ as EC2.
   Your EBS volumes will always be in the same AZ as the EC2 instance to which it is attached.
2. **RESIZING**
   Resize on the fly.
   You can resize EBS volumes on the fly. You do not need to stop or restart the instance. However, you will need to extend the filesystem in the OS so the OS can see the resized volume.
3. **VOLUME TYPE**
   Switch volume types.
   You can change volume types on the fly (e.g., go from gp2 to io2). You do not need to stop or restart the instance.


5
Tips for
EBS Volumes
and Snapshots
Volumes exist on EBS, whereas snapshots exist on S3.
Snapshots are point-in-time photographs of volumes and are incremental in nature.
The first snapshot will take some time to create. For consistent snapshots, stop the instance and detach the volume.
You can share snapshots between AWS accounts as well as between regions, but first you need to copy that snapshot to the target region.
You can resize EBS volumes on the fly as well as changing the volume types.