Volume Types

**General Purpose SSD**[**¶**](https://notes.arkalim.org/notes/aws%20solutions%20architect%20associate/elastic%20block%20storage%20(ebs)/#general-purpose-ssd)

* Good for system boot volumes, virtual desktops
* Storage: 1 GB - 16 TB
* **gp3**
  + **3,000 lOPS baseline** (max 16,000 - independent of size)
  + 125 MiB/s throughput (max 1000MiB/s - independent of size)
* **gp2**
  + **Burst IOPS up to 3,000**
  + **\3 IOPS per GB**
  + **Max IOPS: 16,000** (at 5,334 GB)

**Provisioned IOPS SSD\*\***[**¶**](https://notes.arkalim.org/notes/aws%20solutions%20architect%20associate/elastic%20block%20storage%20(ebs)/#provisioned-iops-ssd)

* Optimized for **Transaction-intensive Applications** with high frequency of **small & random IO operations**. They are sensitive to increased I/O latency.
* Maintain high IOPS while keeping I/O latency down by maintaining a **low queue length** and a high number of IOPS available to the volume.
* **Supports EBS Multi-attach** (not supported by other types)
* **io1** or **io2**
  + Storage: **4 GB - 16 TB**
  + Max IOPS: **64,000 for Nitro EC2 instances** & **32,000 for non-Nitro**
  + **50 lOPS per GB** (64,000 IOPS at 1,280 GB)
  + io2 have more durability and more IOPS per GB (at the same price as io1)
* **io2 Block Express**
  + Storage: 4 GiB - **64 TB**
  + Sub-millisecond latency
  + Max IOPS: 256,000
  + 1000 lOPS per GB

**Hard Disk Drives (HDD)**[**¶**](https://notes.arkalim.org/notes/aws%20solutions%20architect%20associate/elastic%20block%20storage%20(ebs)/#hard-disk-drives-hdd)

* Optimized for **Throughput-intensive Applications** that require **large & sequential IO operations** and are less sensitive to increased I/O latency (big data, data warehousing, log processing)
* Maintain high throughput to HDD-backed volumes by maintaining a **high queue length** when performing large, sequential I/O
* **Cannot be used as boot volume** for an EC2 instance
* Storage: 125 MB - 16 TB
* **Throughput Optimized HDD (st1)**
  + Optimized for large sequential reads and writes (Big Data, Data Warehouses, Log Processing)
  + **Max throughput: 500 MB/s**
  + **Max IOPS: 500**
* **Cold HDD (sc1)**
  + For infrequently accessed data
  + Cheapest
  + **Max throughput: 250 MB/s**
  + **Max IOPS: 250**

Encryption[¶](https://notes.arkalim.org/notes/aws%20solutions%20architect%20associate/elastic%20block%20storage%20(ebs)/#encryption)

* Optional
* For Encrypted EBS volumes
  + Data at rest is encrypted
  + **Data in-flight between the instance and the volume is encrypted**
  + All snapshots are encrypted
  + All volumes created from the snapshot are encrypted
* Encrypt an un-encrypted EBS volume
  + Create an EBS snapshot of the volume
  + Copy the EBS snapshot and encrypt the new copy
  + Create a new EBS volume from the encrypted snapshot (the volume will be automatically encrypted)

Snapshots[¶](https://notes.arkalim.org/notes/aws%20solutions%20architect%20associate/elastic%20block%20storage%20(ebs)/#snapshots)

* **Data Lifecycle Manager (DLM)** can be used to automate the creation, retention, and deletion of snapshots of EBS volumes
* Snapshots are incremental
* Only the most recent snapshot is required to restore the volume

RAID[¶](https://notes.arkalim.org/notes/aws%20solutions%20architect%20associate/elastic%20block%20storage%20(ebs)/#raid)

* **RAID 0**
  + Improve performance of a storage volume by distributing reads & writes in a stripe across attached volumes
  + If you add a storage volume, you get the straight addition of throughput and IOPS
  + For high performance applications
* **RAID 1**
  + Improve data availability by mirroring data in multiple volumes
  + For critical applications

**EFS Storage tiers**

* **Standard** - for frequently accessed files
* **Infrequent access (EFS-IA)**- cost to retrieve files, lower price to store

**Security**

* EFS Security Groups to control network traffic
* POSIX Permissions to control access from hosts by IAM User or Group

**AMI -**When the new AMI is copied from region A into region B, it automatically creates a snapshot in region B because AMIs are based on the underlying snapshots.

**Instance Metadata**

* Url to fetch metadata about the instance (http://169.254.169.254/latest/meta-data)
* This URL is internal to AWS and can only be hit from the instance