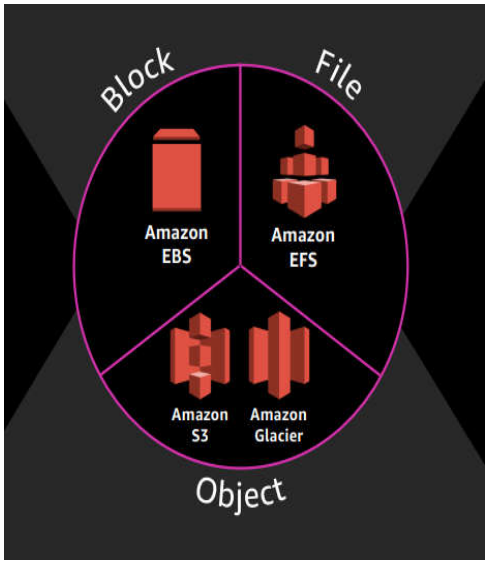
Amazon Elastic Block Store (Amazon EBS)

Dr. R. Karthi

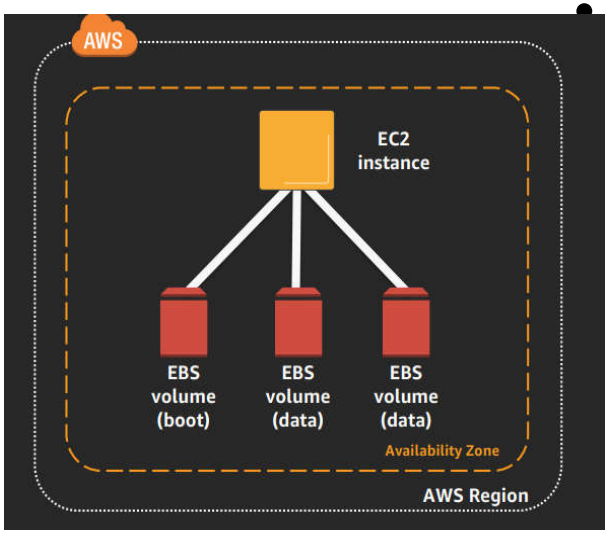
AWS Storage Types

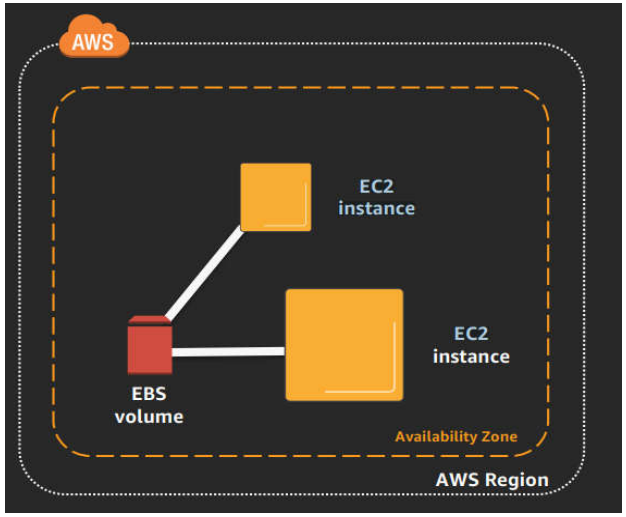
- AWS provides 3 Types of storage service
- **Object Level storage**
  - Object Storage contains object file and meta data associated with the object.
  - Each object has an identifier and is treated as a whole entity. Example: video, image, or document.
- **Block Level Storage**
  - Block storage devices provide raw storage capacity as volumes.
  - Volume are independent disk drive and controlled by an operating system.
  - Volumes are formatted with a file system like FAT32, NTFS, EXT3, and EXT4.
- **File Level Storage**
  - Uses hierarchical file system to organize file by location and path.
  - Attributes can be associated with file system including ownership and access control.
  - Files are shared access across multiple instances.



Amazon Elastic Block Store (EBS)

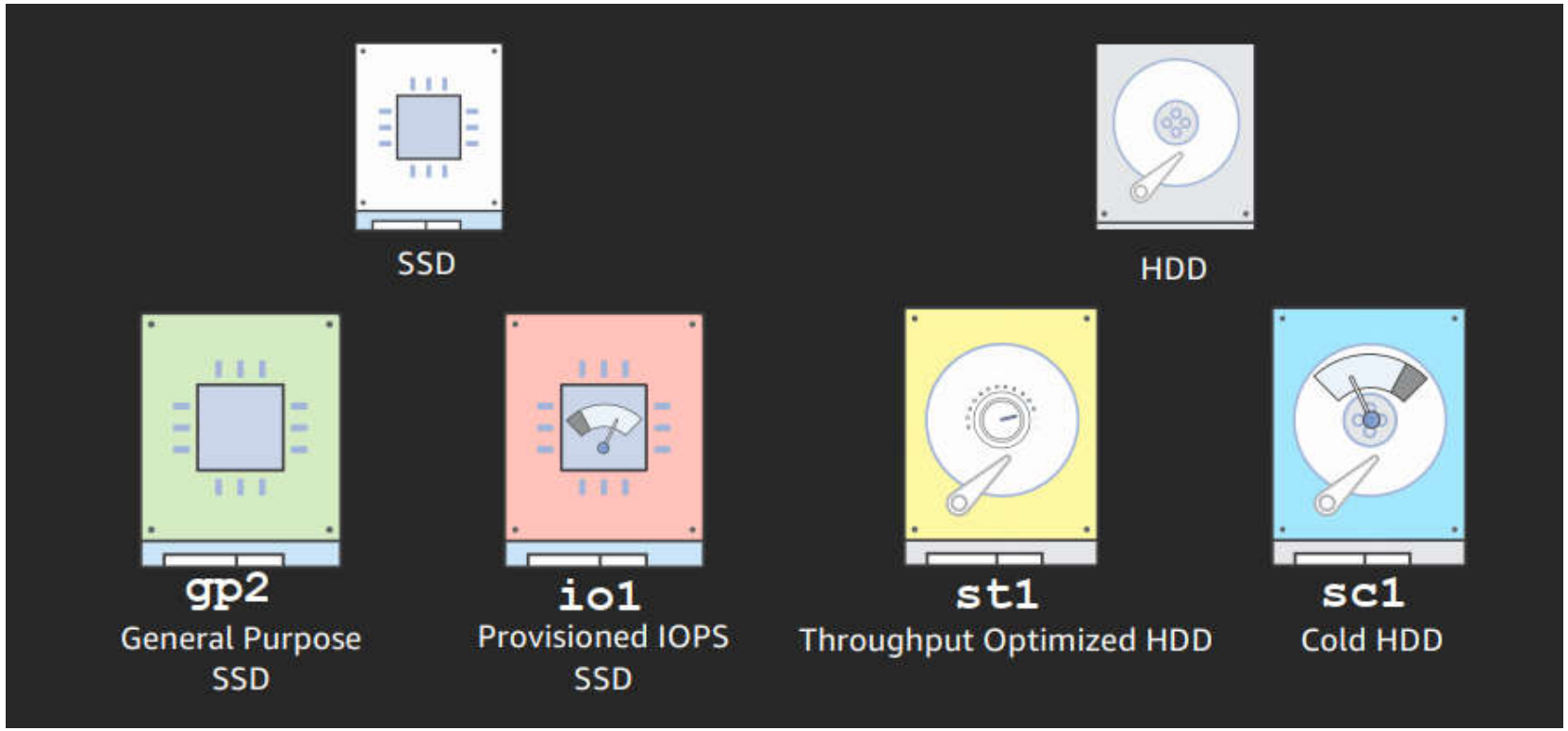
- EBS provides block level storage volumes for use with EC2 instances.
- EBS are attach to your EC2 instances.
- File system are created in each volume and accessible as storage device.
- Volumes persist independent of EC2.
- EBS can be detached and attach between instances within the same Availability Zone.





EBS Volume Types

- **IOPS** - The time taken for a storage system to perform Input/Output operation per second.
- **Throughput-** Data transfer speed in megabytes per second.



Hard Disk Drive (HDD)
Solid State Drive (SSD)

EBS Volume Types

	Solid-state drives (SSD)		Hard disk drives (HDD)	
Volume type	General Purpose SSD (gp2)	Provisioned IOPS SSD	Throughput Optimized HDD (st1)	Cold HDD (sc1)
Features	Balances price and used in wide variety of workloads	Highest-performance for mission-critical low-latency or high-throughput workloads.	Low cost, frequently accessed throughput intensive workloads	Low Cost less frequently accessed workloads
Use cases	System boot volumes, Virtual desktops Development and test environments.	Large database workloads such as: MongoDB Cassandra MySQL Oracle server	Big data Data warehouses Log processing	Large volumes of data that is infrequently accessed File storage
Volume size and IOPS	1GiB – 16TiB 16000	4GiB – 16TiB 64000	500 GiB – 15TiB 500	500 GiB – 15TiB 500

Creating an EBS and Provision with EC2 Instance

Commands :

- Lists information about all or the specified block devices. **lsblk**
- Determine file type **-s** option causes **file** to also read argument files which are block or character special files. **sudo file -s /dev/xvda1**
- Build a file system. **mkfs** -

  Build a Linux file system.

  sudo mkfs -t ext4 /dev/xvdb
- Make a Directory : **sudo mkdir data**
- Mount the file system:

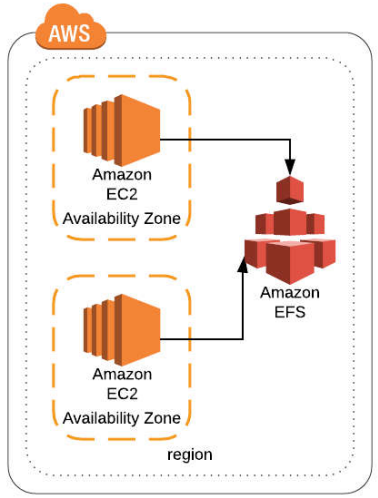
  sudo mount /dev/xvdb data
- Make a File in new volume : **sudo nano file1.txt**
- Unmount a file system : **sudo umount -l data**

Mount File Systems

- Unix systems have a single directory tree. All accessible storage must have an associated location in this single directory tree.
- Mounting is the act of associating a storage device to a particular location in the directory tree.
- Different File system are:
  - Ext2 - Extended File System
  - ext3
  - ext4
  - Xfs
  - Fat - File Allocation Table (FAT)
  - Vfat
  - Fat32
  - Gfs2 – global file system
  - Minix – unix based file system
  - Msdos – DOS file system
  - NTFS - NT File System file system

Amazon Elastic File Store (EFS)

- EFS provides a simple, scalable, fully managed elastic NFS file system.
- A *Network File System* (*NFS*) allows remote hosts to mount file systems over a network and interact with those file systems as though they are mounted locally.
- Amazon EFS supports the Network File System version 4 (NFSv4.1 and NFSv4.0) protocol.
- Multiple Amazon EC2 instances can access an Amazon EFS file system at the same time.
- Performance modes:
  - General Purpose - lowest latency per file system
  - Max I/O- highly parallelized applications



Storage on GCP

Cloud Storage	Service for storing your objects in Google Cloud.	Standard - Best for short-term storage and frequently accessed data Nearline - Best for backups and data accessed less than once a month Coldline - Best for disaster recovery and data accessed less than once a quarter Archive - Best for long-term digital preservation of data accessed less than once a year	Accessed using Console gsutil Client libraries and API
Persistent Disk	Each Compute Engine instance has a single boot persistent disk (PD) that contains the operating system. When your apps require additional storage space, PD are added to instance.	Standard persistent disks (pd-standard) are backed by standard hard disk drives (HDD). SSD persistent disks (pd-ssd) are backed by solid-state drives (SSD). Balanced persistent disks (pd-balanced) are backed by solid-state drives (SSD). They are an alternative to SSD persistent disks that balance performance and cost.	Accessed using mount to EC2. Ssh

Storage on GCP

Service	Features
Cloud SQL	Cloud SQL is a fully-managed database service that helps you set up, maintain, manage, and administer your relational databases on Google Cloud Platform.
Cloud Spanner	For structural relational data built for scale – Horizontal scalability
Cloud Datastore	NoSQL document database built for automatic scaling, high performance and ease of application development.
File Store	Cloud Filestore API is used for creating and managing cloud file servers.
Memstore	Redis and Memcached storage on GCP.