

# Types of Storage Services

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## Elastic Block Store (EBS) - Block

Data is split into evenly split blocks  
Directly accessed by the Operation System  
Supports only a single write volume

When you need a virtual hard drive attached to a VM



## AWS Elastic File Storage (EFS) - File

File is stored with data and metadata  
Multiple connections via a network share  
Supports multiple reads, writing locks the file.

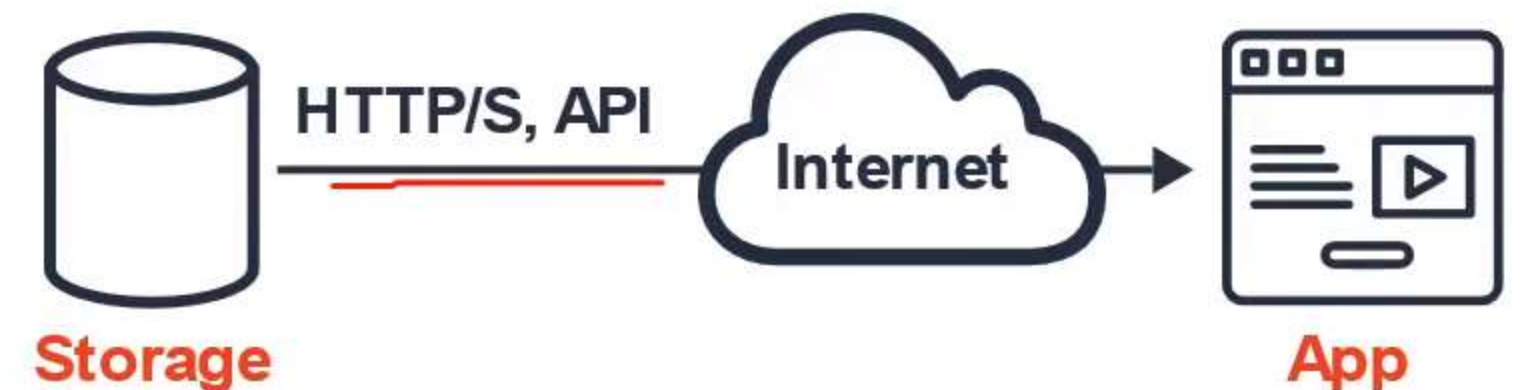
When you need a file-share where multiple users or VMs need to access the same drive



## Amazon Simple Storage Service (S3) - Object

Object is stored with data, metadata and Unique ID  
Scales with limited no file limit or storage limit  
Supports multiple reads and writes (no locks)

When you just want to upload files, and not have to worry about underlying infrastructure. Not intended for high IOPs





# Introduction to S3

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## What is Object Storage (Object-based Storage)?

data storage architecture that manages data as objects, **as opposed** to other storage architectures:

- **file systems** which manages data as a files and fire hierarchy, and
- **block storage** which manages data as blocks within sectors and tracks.



S3 provides you with **unlimited storage**.

You don't need to think about the underlying infrastructure

The S3 Console provides an interface for you to upload and access your data



## S3 Object

Objects contain your data. They are like files.

Object may consist of:

- **Key** this is the name of the object
- **Value** the data itself made up of a sequence of bytes
- **Version ID** when versioning enabled, the version of object
- **Metadata** additional information attached to the object



## S3 Bucket

Buckets hold objects. Buckets can also have folders which in turn hold objects

S3 is a universal namespace so bucket names must be unique (think like having a domain name)

You can store an individual object from **0 Bytes** to **5 Terabytes** in size



# S3 Storage Classes

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AWS offers a range of S3 storage classes that *trade* **Retrieval Time, Accessibility and Durability** for **Cheaper Storage**

## S3 Standard (default)

Fast! 99.99% Availability, 11 9's Durability. Replicated across at least three AZs

## S3 Intelligent Tiering

Uses ML to analyze object usage and determine the appropriate storage class.

Data is moved to the most cost-effective access tier, without any performance impact or added overhead.

## S3 Standard-IA (Infrequent Access)

Still Fast! Cheaper if you access files less than once a month.

Additional retrieval fee is applied. **50% less** than Standard (reduced availability)

## S3 One-Zone-IA

Still Fast! Objects only exist in one AZ. Availability (is 99.5%). but cheaper than Standard IA by 20% less (Reduce durability) Data could get destroyed. A retrieval fee is applied.

## S3 Glacier

For long-term cold storage. Retrieval of data can take minutes to hours but the off is very cheap storage

## S3 Glacier Deep Archive

The lowest cost storage class. Data retrieval time is 12 hours.

↓  
**Cheaper**

S3 Outposts has its own storage class.



# AWS Snow Family

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AWS Snow Family are **storage and compute devices used to physically move data in or out the cloud** when moving data over the internet or private connection it is slow, difficult or costly.



**Snowcone**

Comes in two sizes:

- 8 TB of Storage (HDD)
- 14 TB of Storage (SSD)



**Snowball Edge**

Comes generally in two types:

- Storage Optimized
  - 80 TB
- Compute Optimized
  - 39.5 TB



Data is delivered to Amazon S3



**Snowmobile**

100 PB of storage





# Storage Services

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**Simple Storage Service (S3)** is a **serverless object storage service**. You can upload very large files and an unlimited amount of files. You pay for what you store. You don't worry about the underlying file-system, or upgrading the disk size.



**S3 Glacier** is a **cold storage service**. It design as a low cost storage solution for **archiving and long-term backup**. It uses previous generation HDD drives to get that low cost. Its highly secure and durable.



**Elastic Block Store (EBS)** is a **persistent block storage service**. It is a virtual hard drive in the cloud you attach to EC2 instances. You can choose different kinds of hard drives: **SSD, IOPS SSD, Throughput HDD, Cold HDD**



**Elastic File Storage (EFS)** is a **cloud-native NFS file system service**. File storage you can mount to multiple EC2 instances at the same time. **When you need to share files between multiple servers**



**Storage Gateway** is a **hybrid cloud storage** service that extends your on-premise storage to cloud



**File Gateway** extends your local storage to AWS S3




**Volume Gateway** caches your local drives to S3 so you have a countious backup of local files in the cloud



**Tape Gateway** stores files onto virtual tapes for backing up your files on very cost effective long term storage.



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**AWS Snow Family** are **storage devices used to physically migrate large amounts of data** to the cloud.

- ~~Snowball~~ and **Snowball Edge** are briefcase size data storage devices. **50-80 Terabytes**
- **Snowmobile** is a cargo container filled with racks of storage and compute that is transported via semi-trailer tractor truck to transfer up to **100PB** of data per trailer.
- **Snowcone** is a very small version of Snowball that can transfer **8TB** of data.



**AWS Backup** a fully **managed backup service** that makes it easy to centralize and automate the backup of data across multiple AWS services eg. EC2, EBS, RDS, DynamoDB, EFS, Storage Gateway. You create backup plans.



**CloudEndure Disaster Recovery** continuously replicates your machines into a low-cost staging area in your target AWS account and preferred Region enabling fast and reliable recovery in case of IT data center failures.



**Amazon FSx** is a **feature rich and highly-performant file system**. That can be used for Windows (SMB) or Linux (Lustre)



**Amazon FSx for Window File Server** uses the SMB protocol and allows you to mount FSx to Windows servers



**Amazon FSx for Lustre** uses Linux's Lustre file system and allows you to mount FSx to Linux servers