AWS Storage

Module 4

Units

OVERVIEW : MODULE 04

AWS Storage

Learning Outcomes

- Develop a comprehensive understanding of various AWS storage types and their characteristics
- Master the features and management of Amazon EC2 instance storage and Amazon EBS volumes
- Acquire in-depth knowledge of Amazon S3 as an object storage solution, including its components and features
- Learn how to choose the right storage service based on specific use cases and requirements
- Apply theoretical knowledge in a practical setting through the hands-on lab, reinforcing the ability to create and manage Amazon S3 buckets

Lesson Learning Outcomes

- ✓ Differentiate between various AWS storage services, including Amazon S3, Amazon EBS, Amazon Glacier, Amazon EFS, and others
- ✓ Recognize the specific use cases and characteristics of each storage service
- ✓ Grasp the concept of object storage, as exemplified by Amazon S3, and its suitability for scalable and durable storage of unstructured data
- ✓ Understand the purpose of block storage provided by Amazon EBS, including its role in providing persistent, high-performance storage for EC2 instances

LESSON OVERVIEW

MODULE 4 AWS STORAGE

Lesson 4.1 AWS Storage Types

- AWS Storage Overview
- Block Storage
- Object Storage
- File Storage

4.1

AWS Storage Types

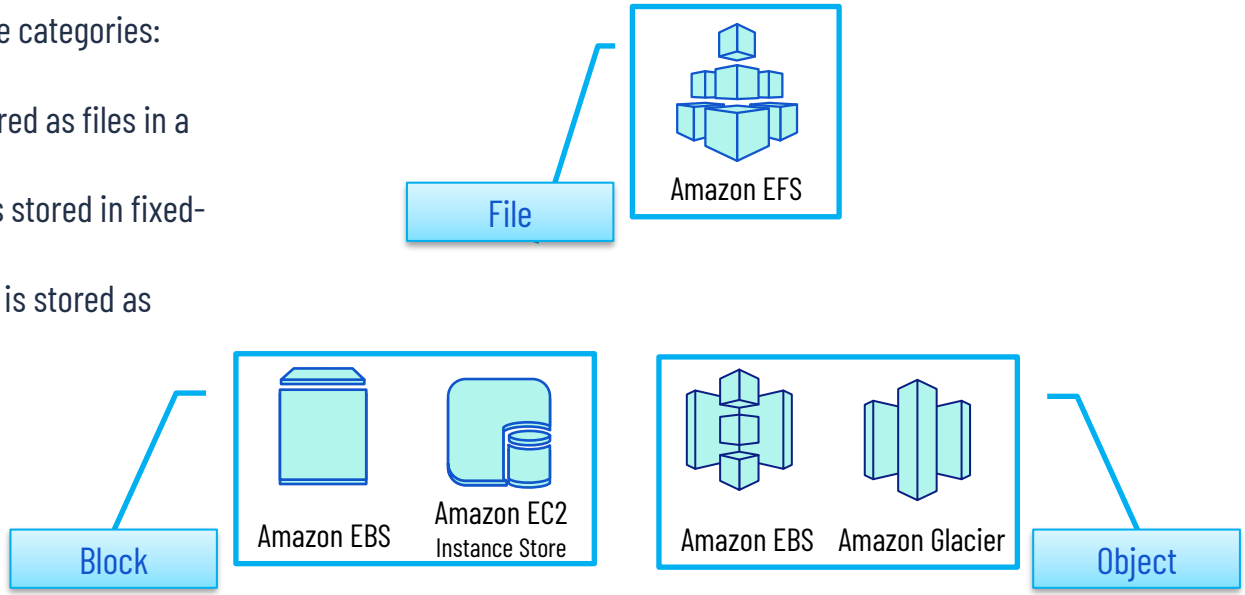
With AWS Cloud Computing, you can create, delete, and modify storage solutions within a matter of minutes

AWS Storage Types

AWS Storage Overview

AWS Storage services are grouped into three categories:

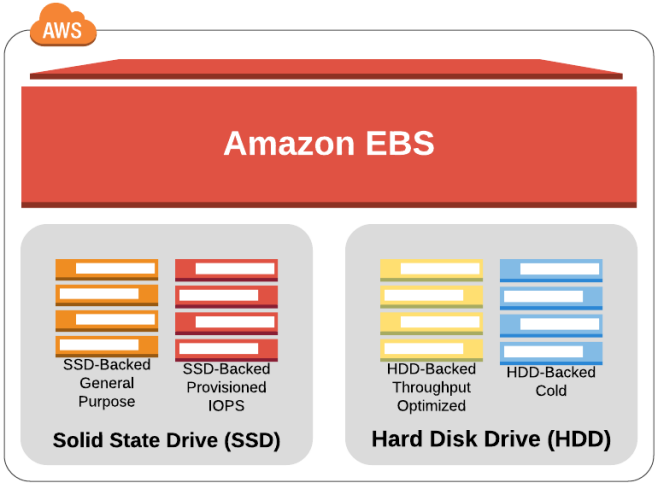
- **File Storage:** In file storage, data is stored as files in a hierarchy.
- **Block Storage:** In block storage, data is stored in fixed-size blocks.
- **Object Storage:** In object storage, data is stored as objects in buckets.



AWS Storage Types

Block Storage

- **AWS Block Storage** is a technology that controls data storage and storage devices. It takes any data, like a file or database entry, and divides it into blocks of equal sizes. The block storage system then stores the data block on underlying physical storage in a manner that is optimized for fast access and retrieval.
- **Amazon Elastic Block Store (EBS):** Provides block-level storage volumes for use with Amazon EC2 instances.
- **Amazon EC2 instance storage**: Storage directly attached to EC2 instances.

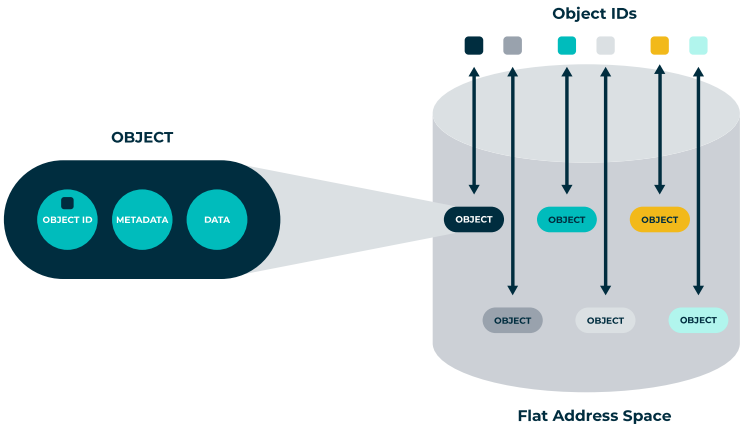


AWS Storage Types

Object Storage

- **AWS** in **Object Storage**, files are stored as objects. Objects, much like files, are treated as a single, distinct unit of data when stored. However, unlike file storage, these objects are stored in a bucket using a flat structure, meaning there are no folders, directories, or complex hierarchies.

- **AWS S3** provides efficient object storage with a flat structure, offering scalability, accessibility, and versatility for diverse storage needs.



AWS Storage Types

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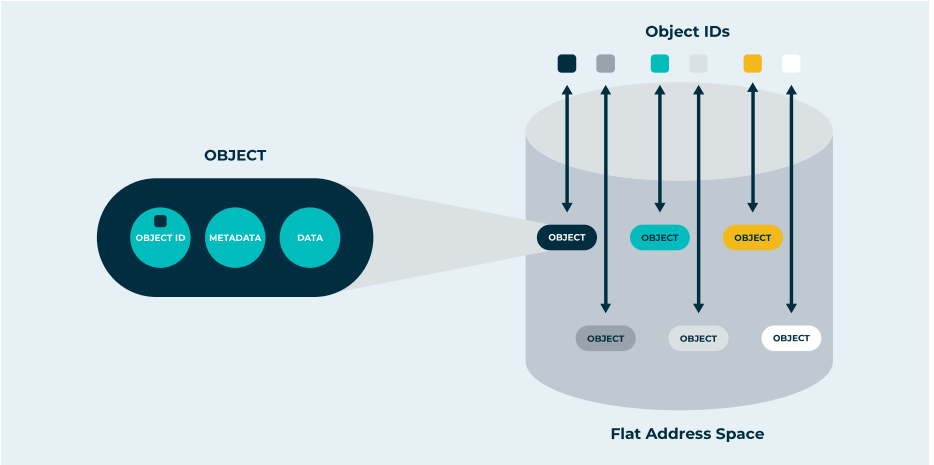


AWS Storage Types

File Storage

File Storage is ideal when you require centralized access to files that must be easily shared and managed by multiple host computers. Typically, this storage is mounted onto multiple hosts, and requires file locking and integration with existing file system communication protocols.

- **Elastic File System (EFS):** Centralized file storage for Linux and Unix systems, facilitating collaboration with multi-host mounting and standard protocol integration.
- **Amazon FSx for Windows:** Tailored for Windows environments, providing efficient centralized file management for Windows applications and storage needs.
- **Amazon FSx for Lustre:** Designed for Unix-based systems, offering high-performance file storage ideal for HPC workloads, machine learning, and analytics.

AWS Storage Types

SUMMARY

- ✓ Understanding different type of AWS Storage
- ✓ Gaining concept on Block Storage, Object Storage and File Storage
- ✓ When to use those Storage type

AWS Storage Types

Resources

- https://docs.aws.amazon.com/whitepapers/latest/aws-overview/storage-services.html
- https://aws.amazon.com/products/storage/
- https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/Storage.html

Lesson Learning Outcomes

- ✓ The concept of Amazon EBS as a scalable and persistent block storage service that can be attached to EC2 instances
- ✓ Identify scenarios where instance store is suitable, such as temporary storage, caching, and scratch data that doesn't require persistent storage
- ✓ Should comprehend the concept of instance store, its ephemeral nature, and its association with the local storage physically attached to EC2 instances

LESSON OVERVIEW

MODULE 4 AWS STORAGE

Lesson 4.2 Amazon EC2 Instance Storage and Amazon Elastic Block Storage

- The Difference Between EC2 Instance Storage vs EBS
- Use Case of EC2 Instance Storage
- Use Cases of EBS

4.2

EC2 Instance Storage and Elastic Block Storage

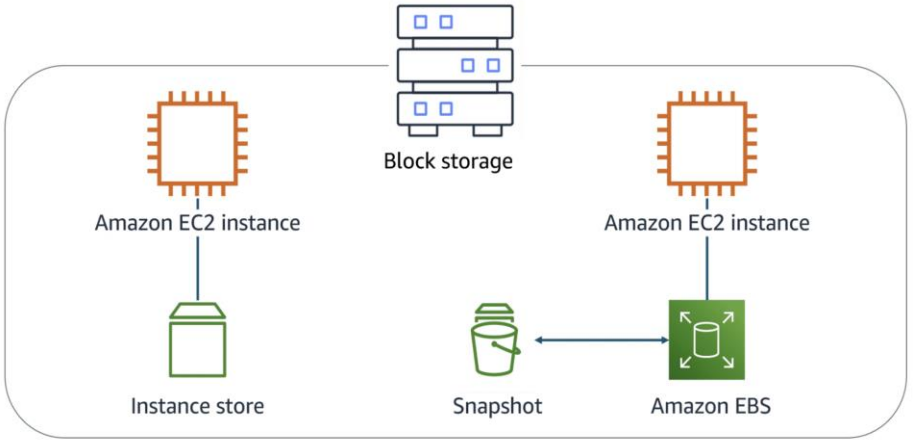
The unique characteristics of block storage make it the preferred option for transactional, mission-critical, and I/O-intensive applications

AWS EC2 Instance Storage and Elastic Block Storage

The Difference Between EBS vs EC2 Instance Storage

Amazon Elastic Compute Cloud (Amazon EC2) Instance Store provides temporary block-level storage for an instance. This storage is located on disks that are physically attached to the host computer.

As the name implies, **Amazon Elastic Block Store (Amazon EBS)** is block-level storage that you can attach to an Amazon EC2 instance. You can compare this to how you much attach an external drive to your laptop. This attachable storage is called an **EBS Volume**. EBS volumes act similarly to external drives in more than one way.



AWS EC2 Instance Storage and Elastic Block Storage

Use Case of EBS

Amazon EBS is useful when you must retrieve data quickly and have data persist long term. **Volumes** are commonly used in the following scenarios:

- Boot and Root volumes can be used to store an operating system
- As a storage layer for databases running on Amazon EC2 that will scale with your performance needs and provide consistent and low-latency performance

AWS EC2 Instance Storage and Elastic Block Storage

Use Case of EC2 Instance Storage

- **Instance Store** is ideal if you host applications that replicate data to other EC2 instances, such as Hadoop clusters. For these cluster-based workloads, having the speed of locally attached volumes and the resiliency of replicated data helps you achieve data distribution at high performance.
- It's also ideal for temporary storage of information that changes frequently, such as buffers, caches, scratch data, and other temporary content.

AWS EC2 Instance Storage and Elastic Block Storage

SUMMARY

- ✓ Understanding difference between EC2 Instance Storage and Elastic Block Storage
- ✓ When to use those block storages

AWS EC2 Instance Storage and Elastic Block Storage

Resources

- https://aws.amazon.com/ebs/
- https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/AmazonEBS.html
- https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/InstanceStorage.html

Lesson Learning Outcomes

- ✓ Define what Amazon S3 is and its fundamental purpose as a scalable object storage service in the cloud
- ✓ Differentiate between the various storage classes provided by Amazon S3, such as STANDARD, INTELLIGENT_TIERING, ONEZONE_IA, GLACIER
- ✓ Recognize S3's key components: buckets, objects, and URL for accessing data
- ✓ Implement proper access controls using S3 bucket policies, IAM (Identity and Access Management) roles, and Access Control Lists (ACLs)

LESSON OVERVIEW

MODULE 4 AWS STORAGE

Lesson 4.3 Object Storage with Amazon S3

- What is S3 ?
- S3 Basis
- Classes of S3

4.3

Object Storage with Amazon S3

Object storage is built for the cloud and delivers virtually unlimited scalability, high durability, and cost effectiveness

Object Storage with Amazon S3

What is S3 ?

Amazon S3 or Amazon Simple Storage Service

- It provides developers and IT teams with secure, durable, highly scalable object storage
- It S3 is easy to use, the simple web services interfaces to store and retrieve any amount of data from anywhere on the web

Object Storage with Amazon S3

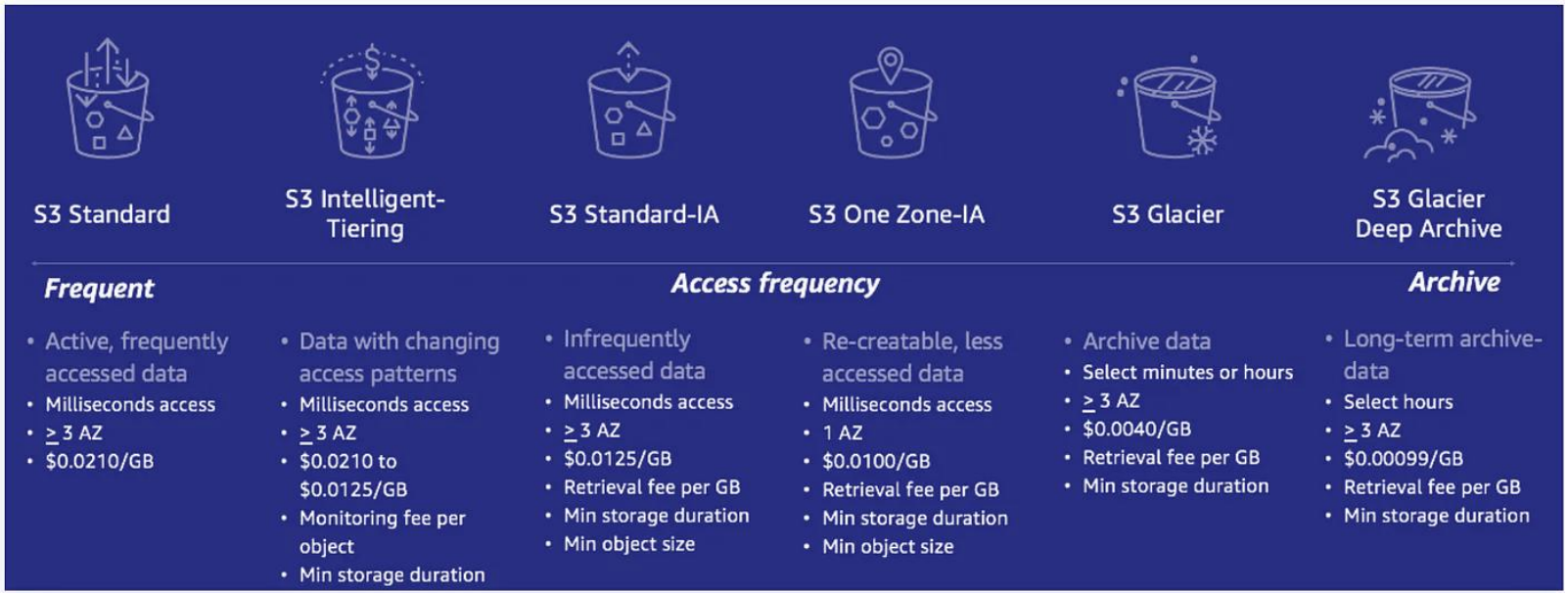
S3 Basis

- It allows us to upload our files
- File can be 0 Byte to 5 TB
- Unlimited Storage
- File stored in **Bucket**
- **Return 200** codes if uploaded successfully

Amazon S3 Bucket

Object Storage with Amazon S3

Classes of S3



Object Storage with Amazon S3

SUMMARY

- ✓ The characteristic of S3
- ✓ Concept of Bucket
- ✓ Different type of S3 object classes

Object Storage with Amazon S3

Resources

- ✓ https://docs.aws.amazon.com/AmazonS3/latest/userguide/Welcome.html
- ✓ https://en.wikipedia.org/wiki/Amazon_S3
- ✓ https://aws.amazon.com/s3/whitepaper-best-practices-s3-performance/

Lesson Learning Outcomes

- ✓ Distinguish among diverse AWS storage services, encompassing Amazon S3, Amazon EBS, Amazon Glacier, Amazon EFS, and additional offerings
- ✓ Comprehend the function of Amazon EBS block storage, elucidating its role in furnishing enduring, high-performance storage tailored for EC2 instances
- ✓ Comprehend the idea of object storage, illustrated by Amazon S3, and its appropriateness for the scalable and resilient storage of unstructured data

LESSON OVERVIEW

MODULE 4 AWS STORAGE

Lesson 4.4 Choose the Right Storage Service

- Purpose Driven Right Storage Selection

4.4

Choose the Right Storage Service

Selecting the appropriate AWS storage service is contingent upon various factors, such as the specific requirements and characteristics of your workload

Choose the Right Storage Service

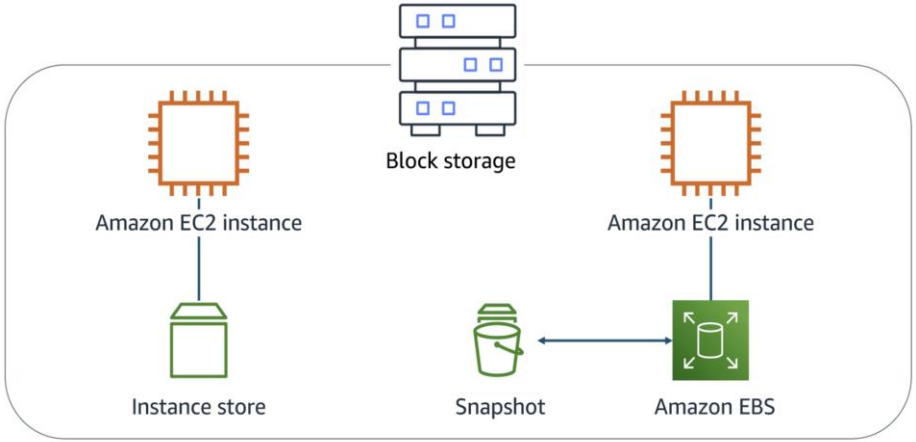
Purpose Driven Right Storage Selection

Amazon EC2 instance store

- Caching and Buffers
- Temporary Data and Scratch Space
- Stateless Applications

Amazon EBS

- Root Volume for EC2 Instances
- Applications and Database Storage
- Backup and Snapshots



Choose the Right Storage Service

Purpose Driven Right Storage Selection

Amazon S3

- Data Storage, Backup and long-time archiving
- Media and Web Object Content
- Static Website Hosting

Amazon EFS

- Shared File Storage for EC2 Instances
- Big Data and Analytics
- Container Storage for Docker and Kubernetes

Amazon Elastic File System

Choose the Right Storage Service

SUMMARY

- ✓ Understanding the use cases of different types of AWS Storage
- ✓ Comprehend the idea of object storage, illustrated by Amazon S3, and its appropriateness for the scalable and resilient storage of unstructured data

Choose the Right Storage Service

Resources

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- ✓ https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/Storage.html

4.5

Hands-On Lab

Create an Amazon S3 Bucket