AWS —Amazon S3 Storage Classes Overview

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Introduction to AWS S3 Storage Classes

Amazon S3

Amazon S3 offers a range of storage classes designed for different use cases. These include **Standard** for general-purpose storage of frequently accessed data; **Intelligent-Tiering** for data with unknown or changing access patterns; **Standard-IA** and **One**

Zone-IA for long-lived, but less frequently accessed data; and **Glacier** and **Glacier Deep Archive** for long-term archive and digital preservation.

Amazon S3 storage classes are designed to sustain the concurrent loss of data in one or two facilities. Allow lifecycle management for automatic migration of objects for cost savings. They support SSL encryption of data in transit and data encryption at rest. S3 also regularly verifies the integrity of your data using checksums and provides auto healing capability.

Amazon S3 has six different types of storage classes. When we upload a file into S3 we can choose which storage class is apt for our files.

S3 Standard

- Ideal for performance-sensitive use cases and frequently accessed data.
- Designed to sustain the loss of 2 facilities concurrently. Data is stored in multiple locations. Resilient against events that impact an entire Availability Zone (3 AZs).
- Default storage class if none of the storage class is specified during upload.
- Delivers low latency and high throughput performance.
- Designed for 99.99% availability and 99.999999999% (11 9's) durability.
- Most expensive storage class among all others.
- Use case: We can store files which we use regularly. It is appropriate for a wide variety of use cases, including cloud applications, dynamic websites, content distribution, mobile and gaming applications, and big data analytics.

Intelligent-Tiering

- Designed to optimize costs by automatically moving data to the most cost-effective access tier, without performance impact or operational overhead.
- It works by storing objects in two access tiers: one tier that is optimized for frequent access and another lower-cost tier that is optimized for infrequent access.

- Automatically moves objects between two access tiers based on changing access patterns. It moves objects that have not been accessed for 30 consecutive days to the infrequent access tier. If an object in the infrequent access tier is accessed, it is automatically moved back to the frequent access tier.
- Delivers same low latency and high throughput performance of S3 Standard.
- Designed for 99.99% availability and 99.999999999% (11 9's) durability (same as Standard).
- Small monthly monitoring and auto-tiering fee. There are no retrieval fees when using the S3 Intelligent-Tiering storage class, and no additional tiering fees when objects are moved between access tiers.
- Use case: It is the ideal storage class for long-lived data with access patterns that are unknown or unpredictable. It is ideal to optimize storage costs automatically for long-lived data when access patterns are unknown or unpredictable.

S3 Standard-Infrequent Access (S3 Standard-IA)

- Optimized for long-lived and less frequently accessed data. i.e. It is for data that is accessed less frequently, but requires rapid access when needed. Objects are available for real-time access.
- Designed to sustain the loss of 2 facilities concurrently (same as S3 Standard).
- It has data stored redundantly across multiple geographically separated AZs and are resilient to the loss of an Availability Zone (3 AZs).
- Delivers same low latency and high throughput performance of S3 Standard.
- Designed for 99.99% availability and 99.999999999% (11 9's) durability (same as Standard).
- It offers the high durability, high throughput, and low latency of S3 Standard, with a low per GB storage price and per GB retrieval fee.
- It is less expensive than S3 Standard storage but you will be charged for a retrieval fee. So they are most suitable for infrequently accessed data.

- It offers greater availability and resiliency than the OneZone-IA storage.
- It is suitable for larger objects greater than 128 KB (smaller objects are charged for 128 KB only) kept for at least 30 days (charged for minimum 30 days)
- Use case: This combination of low cost and high performance make S3 Standard-IA ideal for long-term storage, backups, and as a data store for disaster recovery files where access is limited, but the use case still demands high performance. It is ideal for use for the primary or only copy of data that can't be recreated.

S3 One Zone-Infrequent Access (S3 One Zone-IA)

- Optimized for long-lived and less frequently accessed data. i.e. It is for data that is accessed less frequently, but requires rapid access when needed. It is designed for long-lived and infrequently accessed data (similar to the Standard and Standard-IA storage class).
- Unlike other S3 Storage Classes which store data in a minimum of three Availability Zones (AZs), S3 One Zone-IA stores data in a single AZ and costs 20% less than S3 Standard-IA, which makes it less expensive than Standard-IA.
- Data stored in this storage class will be lost in the event of Availability Zone destruction.
- Ideal for a low-cost storage option for infrequently accessed data but do not require the availability and resilience of S3 Standard or S3 Standard-IA.
- Designed for 99.5% availability and 99.999999999% (11 9's) durability in a single Availability Zone (same as Standard).
- It is suitable for larger objects greater than 128 KB (smaller objects are charged for 128 KB only) kept for at least 30 days (charged for minimum 30 days)
- Use case: It's a good choice for storing secondary backup copies of on-premises data or easily re-creatable data if AZ fails. You can also use it as cost-effective storage for data that is replicated from another AWS Region using S3 Cross-Region Replication (CRR).

Glacier

- Low-cost design is ideal for long-term archiving.
- Configurable retrieval times, from minutes to hours.
- Data is resilient in the event of one entire Availability Zone destruction.
- Designed for 99.99% availability and 99.999999999% (11 9's) durability in a multiple Availability Zone.
- Charges are levied for both the archive (Glacier rate) and the copy restored temporarily (RRS rate)
- Vault Lock feature enforces compliance via a lockable policy
- It has a minimum storage duration period of 90 days and can be accessed in as little as 1–5 minutes using expedited retrieval.

Glacier Deep Archive

- Lowest-cost storage class and supports long-term retention and digital preservation for data that will be retained for 7–10 years and may be accessed once or twice in a year.
- Lowest cost storage option in S3. Storage costs for Glacier Archive is less expensive than using the Glacier storage class.
- Designed for 99.99% availability and 99.999999999% (11 9's) durability in a multiple Availability Zone (same as Glacier).
- Ideal alternative to magnetic tape libraries.
- It has a minimum storage duration period of 180 days and can be accessed in at a default retrieval time of 12 hours.
- Retrieval costs can be reduced by using bulk retrieval, which returns data within 48 hours.
- Use case: It is designed for customers — particularly those in highly-regulated industries, such as the Financial Services, Healthcare, and Public Sectors — that retain data sets for 7–10 years or longer to meet regulatory compliance requirements. It can also be used for backup and disaster recovery use cases.

S3 Glacier provides three types of Retrieval Options:

- **Expedited Retrieval —** It allows you to quickly access your data when occasional urgent requests for a subset of archives are required. For all but the largest archives (250 MB+), data accessed using Expedited retrievals are typically made available within 1–5 minutes for Glacier. It is not available for objects stored in the Glacier Deep Archive storage class.
- **Standard Retrieval —** It allows you to access any of your archives within several hours.This is the default option for retrieval requests that do not specify the retrieval option. Typically, retrievals of this type are implemented within 3–5 hours for objects stored in the Glacier storage class and within 12 hours for objects stored in the Deep Archive storage class respectively.
- **Bulk Retrieval —** It is lowest-cost retrieval option, which you can use to retrieve large amounts, even petabytes, of data inexpensively in a day. Bulk retrieval is the best option for scheduled or non-urgent data retrieval. Bulk retrievals are typically implemented within 5–12 hours for objects stored in the Glacier storage class and within 48 hours for objects stored in the Glacier Deep Archive storage class.

Notes

- All storage classes are designed for 99.999999999% (11 9's) durability in a multiple Availability Zone (≥ 3 AZs). (except One Zone-IA, which is Single AZ)

Happy Clouding!!!