

@devopschallengehub



What are the different types of storage classes available in S3? Uses cases or scenarios where they will be used.

◆ Amazon S3 Storage Classes (with Use Cases)

Storage Class	Purpose	When to Use
S3 Standard	General-purpose storage for frequently accessed data.	Website images, mobile app assets, daily used files.
S3 Intelligent-Tiering	Automatically moves data between frequent and infrequent access tiers based on usage.	Data with unpredictable access patterns (e.g., user-uploaded content).
S3 Standard-IA (Infrequent Access)	Lower cost for data accessed less often but needs quick access when needed.	Backup files, disaster recovery snapshots.
S3 One Zone-IA	Same as Standard-IA but stored in only one Availability Zone (cheaper, less durability).	Secondary backups, easily re-creatable data.
S3 Glacier Instant Retrieval	Very low-cost archive storage with milliseconds retrieval .	Long-term archives that need occasional instant access (medical records, legal docs).
S3 Glacier Flexible Retrieval	Archival storage with minutes to hours retrieval time (cheaper).	Archives you rarely access but can wait a few minutes/hours.

Storage Class (earlier called just "Glacier")	Purpose	When to Use
S3 Glacier Deep Archive	Lowest cost storage for long-term archiving (retrieval takes 12+ hours).	Government records, compliance archives (7–10 years retention).

◆ Quick Visual Mapping

Access Frequency	Storage Class
Very frequent	S3 Standard
Unpredictable	S3 Intelligent-Tiering
Rarely (but need quick access)	S3 Standard-IA
Rarely (cheaper, less safe)	S3 One Zone-IA
Archiving (need fast retrieval)	S3 Glacier Instant Retrieval
Archiving (can wait)	S3 Glacier Flexible Retrieval
Very long-term archive	S3 Glacier Deep Archive

◆ Example Use Cases

✓ S3 Standard

- Hosting a React/Angular app's static assets
- E-commerce product images

✓ S3 Intelligent-Tiering

- User-uploaded photos, videos (some are seen often, some rarely)
- IoT data, where some devices are busy, some are idle

✓ S3 Standard-IA

- Monthly database backups
- Disaster recovery configurations

✓ S3 One Zone-IA

- Non-critical media files that can be reprocessed if lost
- Logs that you can regenerate

✓ S3 Glacier Instant Retrieval

- Medical imaging records (X-rays, MRIs)
- Historical financial statements

✓ S3 Glacier Flexible Retrieval

- Company emails from 5 years ago

- Research data that needs to be pulled once a year

✅ S3 Glacier Deep Archive

- Compliance data for banks
 - Government census records
 - Old security footage stored for legal reasons
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Tip for Real-Life Architecting:

- Combine different classes using **Lifecycle Policies** —
→ Example:
 - Store new uploads in **S3 Standard** for 90 days
 - Move to **Standard-IA** after 90 days
 - Move to **Glacier** after 1 year!
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Real-World SaaS Example: "MediaShare" - A Cloud-Based Media Sharing Platform

Scenario:

- MediaShare allows users to upload and share photos and videos. The platform handles millions of media files, from **frequently accessed images** to **rarely viewed video archives**.
 - Their goal is to **optimize costs** without sacrificing performance.
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How MediaShare Uses Different S3 Storage Classes:

1. S3 Standard (High-Frequency Access)

- **Use Case:**
Newly uploaded images and videos that are **frequently accessed** within the first 30 days after upload. These are active media that are still part of a user's current feed or active media library.
- **Why S3 Standard?**
 - High durability and availability for active content.
 - Fast access time for user interactions with media.
- **Example:**
 - A user uploads a new photo or video to their profile — this file is stored in **S3 Standard** so it's quickly available when the user or their friends access it.

2. S3 Intelligent-Tiering (Unpredictable Access Patterns)

- **Use Case:**
Media files that **don't have predictable access patterns**. For example, older photos and videos that were viewed initially but not frequently after that.
- **Why S3 Intelligent-Tiering?**
 - It automatically moves objects between frequent and infrequent access tiers without any manual intervention.
 - **Cost-effective** since it only charges for the frequent tier when accessed.
- **Example:**
 - Older videos that were watched during a promotion campaign but aren't accessed often now — they're automatically moved to the **Infrequent Access tier** until needed again.

3. S3 Standard-IA (Infrequent Access) (Occasional Access)

- **Use Case:**
Media files like **old images** and **videos** that aren't frequently accessed but may need to be fetched occasionally (e.g., for viewing or downloading by users).
- **Why S3 Standard-IA?**
 - **Lower storage costs** compared to S3 Standard.
 - Ideal for data that's **rarely used but must be readily available when needed**.
- **Example:**
 - A user's photos or videos that are a few months old but could be accessed if a user decides to revisit them or if a user has a **memory search feature** (e.g., "my old vacation photos").

4. S3 Glacier Instant Retrieval (Fast Archive Retrieval)

- **Use Case:**
Critical media files such as high-resolution videos or important documents (e.g., **user-uploaded video archives** or **promotional content** that is only occasionally accessed but still important to retrieve fast).
- **Why S3 Glacier Instant Retrieval?**
 - Cost-effective long-term storage with **instant retrieval** for when the data is needed quickly, within milliseconds.
- **Example:**

- **Yearly media awards videos** — these videos aren't accessed regularly but might need to be retrieved instantly by users or staff when events come up.
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5. S3 Glacier Flexible Retrieval (Cost-Effective Archiving with Retrieval Delays)

- **Use Case:**
Archival media files that are rarely accessed but must be retained for **legal or compliance purposes** (e.g., old promotional materials, long-term storage).
 - **Why S3 Glacier Flexible Retrieval?**
 - **Low cost** for long-term storage with retrieval delays of hours.
 - Perfect for data that needs to be stored securely for **regulatory** purposes but isn't frequently needed.
 - **Example:**
 - **Archived user-uploaded videos** that have become outdated or are no longer part of active campaigns but must be kept for compliance reasons.
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6. S3 Glacier Deep Archive (Very Long-Term Storage)

- **Use Case:**
Old files that haven't been accessed in **years** and won't be needed for retrieval for a long time. These are files that need to be preserved but can be retrieved within **12+ hours** when necessary.
 - **Why S3 Glacier Deep Archive?**
 - **Super-low cost** for very long-term archival storage.
 - Great for data that must be kept for **7–10 years** or more (e.g., compliance, audit purposes).
 - **Example:**
 - **Old media files** or **company-related video archives** that are only required in rare circumstances, such as a legal dispute, and can be retrieved within a day.
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◆ Summary of How MediaShare Saves on Costs:

Storage Class	Data Type	Use Case	Storage Cost	Access Speed
S3 Standard	Recently uploaded media (active)	Frequently accessed	High	Fast
S3 Intelligent-Tiering	Unpredictable access media	Mixed access	Moderate	Fast or Slow (depends on usage)
S3 Standard-IA	Older but important media	Infrequent access	Lower	Fast (still needs quick access)

Storage Class	Data Type	Use Case	Storage Cost	Access Speed
S3 Glacier Instant Retrieval	Important archived media	Occasional access, fast retrieval needed	Low	Fast (milliseconds)
S3 Glacier Flexible Retrieval	Media archives with less urgent access	Rare access, occasional retrieval	Very low	Slow (minutes to hours)
S3 Glacier Deep Archive	Long-term archive media	Extremely rare access, legal compliance	Ultra-low	Very slow (12+ hours)

◆ The Key Benefits for MediaShare:

- **Optimized cost savings** by moving files to more cost-efficient storage classes based on their usage patterns.
- **Automatic management** via **Lifecycle Policies** ensures that data moves between storage classes based on age or access frequency, without needing manual intervention.
- **Efficient storage management**, ensuring active content is served quickly and archival content is stored cost-effectively.

Conclusion:

By using **S3's multiple storage classes** smartly, MediaShare is able to offer high-performance media sharing while saving significantly on storage costs. It ensures that **only the most accessed data is in expensive storage** while the rest is stored more cheaply and accessed efficiently.

Cost

◆ High Access = High Cost

- **Storage Class:** S3 Standard
- **Why:** Optimized for speed and availability; no retrieval fees.

◆ Moderate to Low Access = Moderate Cost

- **Storage Class:** S3 Standard – Infrequent Access (IA)
- **Why:** Lower storage cost than Standard, but **you pay to retrieve data**.

◆ Very Low Access = Very Low Cost with Retrieval Delay

- **Storage Class:** S3 Glacier & Glacier Deep Archive
- **Why:** Cheapest to store, but **retrieval is slow and potentially expensive**.

◆ Unpredictable Access = Smart Auto-Optimization

- **Storage Class:** S3 Intelligent-Tiering
- **Why:** Monitors usage and automatically shifts data between tiers, balancing cost and access.

1. Which S3 storage class is best suited for data that is accessed frequently?

- A. S3 Standard
- B. S3 Glacier
- C. S3 Standard - Infrequent Access
- D. S3 Glacier Deep Archive

 **Answer: A. S3 Standard**

2. Which storage class offers the lowest storage cost but the longest retrieval time?

- A. S3 Standard
- B. S3 Intelligent-Tiering
- C. S3 Glacier Deep Archive
- D. S3 Standard - Infrequent Access

 **Answer: C. S3 Glacier Deep Archive**

3. What is the trade-off when using S3 Standard - Infrequent Access (IA)?

- A. High retrieval time and low storage cost
- B. Instant retrieval and no retrieval cost
- C. Instant retrieval but retrieval cost per GB
- D. Unpredictable performance

 **Answer: C. Instant retrieval but retrieval cost per GB**

4. Which S3 storage class automatically moves data between tiers based on access patterns?

- A. S3 Glacier
- B. S3 Intelligent-Tiering
- C. S3 Standard
- D. S3 Standard - Infrequent Access

 **Answer: B. S3 Intelligent-Tiering**
