## Storage Services

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## Simple Storage Service - S3

* S3 is an object storage service for the cloud that is highly available.
* Objects(files) are stored in buckets(directories).
* Unlimited storage that can hold millions of objects per bucket.
* Objects can be public or private.
* You can upload objects via the console, CLI, or programmatically within code using SDKs.

###### Features

1. You can set bucket level or object-level access control using Access control lists, bucket policies, or access point policies.
2. You can use S3 logs to track access to your buckets and objects.
3. You can enable versioning to create multiple versions of your file in order to protect against accidental deletion and to use a previous version.
4. S3 is a regional service, but bucket names must be globally unique.
5. **Durability is important so your objects are never lost or compromised. S3 is designed for 99.999999999% (11 9’s) of durability.**
6. **Availability is important so you can access your data quickly when you need it. S3 standard availability is 99.99%.**

###### Types of storage classes

1. S3 standard
   1. General-purpose storage.
   2. Data stored across multiple availability zones.
   3. Low latency and high throughput.
   4. Recommended for frequently accessed data.
2. S3 Intelligent-Tiering
   1. Automatically moves your data to the most cost-efficient storage class.
   2. Automatic cost savings.
   3. No retrieval fees.
   4. Data stored across multiple availability zones.
   5. Recommended for data with the unknown or changing access pattern.
3. S3 Standard-Infrequent Access(IA)
   1. Data accessed less frequently but required rapid access.
   2. Data stored across multiple availability zones.
   3. Cheaper than the S3 standard.
   4. Recommended for:
      1. Long-lived data.
      2. Infrequently accessed.
      3. Millisecond access when needed.
4. S3 One Zone-Infrequent Access(IA)
   1. Like S3 Standard IA but data stored in a single availability zone.
   2. Cost 20% less than S3 Standard-IA.
   3. Data stored in this storage class can be lost.
   4. Recommended for:
      1. Re-creatable data.
      2. Infrequently accessed with millisecond access.
      3. Availability and durability are not essential. Still, availability is 99.5%.
5. S3 Glacier
   1. Long-term data storage and archival for lower costs.
   2. Data retrieval takes longer.
   3. 3 retrieval options:
      1. 1-5 minutes
      2. 3-5 hours
      3. 5-12 hours
   4. Data stored across multiple availability zones
   5. Recommended for:
      1. Long-term backups.
      2. Cheaper storage options.
6. S3 Glacier Deep Archive
   1. Like S3 glacier but longer access times.
   2. 2 retrieval options:
      1. 12 hours
      2. 48 hours
   3. Cheapest of all S3 options.
   4. Data stored across multiple availability zones.
   5. Recommended for:
      1. Long-term data archival is accessed once or twice a year.
      2. Retaining data for regulatory compliance requirements.
7. S3 Outposts
   1. Provide object storage on-premises.
   2. A single storage class.
   3. Store data across multiple devices and servers.
   4. Recommended for:
      1. Data that needs to be kept local.
      2. Demanding application performance needs.

###### Uses:

1. Static Website hosting
2. Data Archive
3. Analytics systems
4. Mobile Applications

###### Important for exams:

1. S3 is a regional service but has a global namespace.
2. S3 offers unlimited storage with many storage classes. Understand the use cases for each storage class.