



# This week

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## ■ Storage in the Cloud

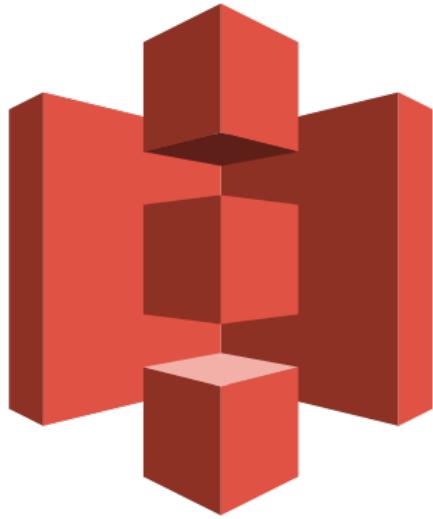
- Big Data
- NFS
- Distributed File Systems (databases next week)

## ■ AWS Storage services (ACF Module 7)

- Amazon Elastic Block Store (Amazon EBS)
  - Plus some extra notes on Instance Storage
- Amazon Elastic File System (Amazon EFS)
- Amazon Simple Storage Service (Amazon S3)
- Amazon Glacier

# Part 3:

# Amazon Simple Storage Service (S3)



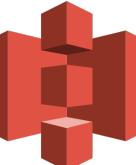
## Amazon Simple Storage Service (Amazon S3)

# Amazon S3 Review



***Managed cloud storage solution designed to scale seamlessly and provide 99.99999999% durability.***

- Store as many objects as you want.
- Bucket names must be unique across all existing bucket names in Amazon S3.
- Amazon S3 cannot be used as a bootable drive.
- Data is stored redundantly.
- Access Amazon S3 with the AWS Management Console, one of the AWS SDKs, or a third-party solution.
- Object uploads or deletes can trigger notifications, workflows, or even scripts.
- Data in transit and at rest can be encrypted automatically.
- Storage class analysis (Amazon S3 Analytics) to analyze storage access patterns and transition the right data to the right storage class.



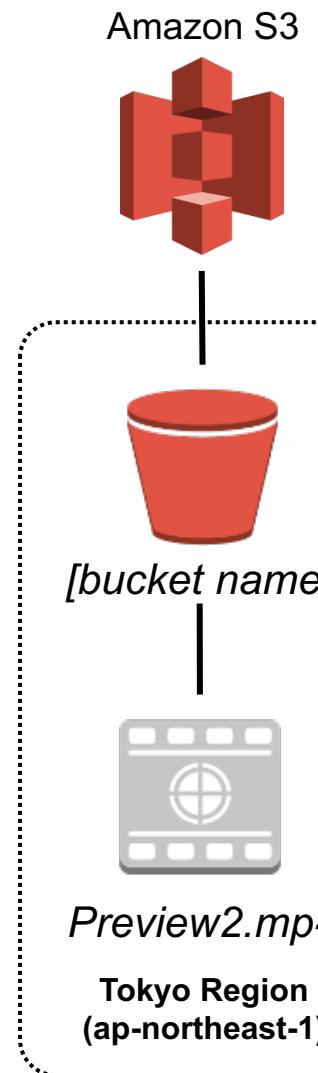
# Amazon S3 storage classes



Amazon S3 offers a range of object-level storage classes that are designed for different use cases:

- Amazon S3 Standard
- Amazon S3 Intelligent-Tiering
- Amazon S3 Standard-Infrequent Access (Amazon S3 Standard-IA)
- Amazon S3 One Zone-Infrequent Access (Amazon S3 One Zone-IA)
- Amazon S3 Glacier
- Amazon S3 Glacier Deep Archive

# Amazon S3 Review



To upload your data (photos, videos, documents, etc.):

1. Create a bucket in one of the AWS Regions.
2. Upload any number of objects to the bucket.

Bucket

[https://s3-ap-northeast-1.amazonaws.com/\[bucket name\]/](https://s3-ap-northeast-1.amazonaws.com/[bucket name]/)

Region code

Bucket name

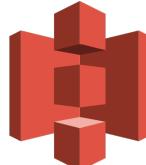
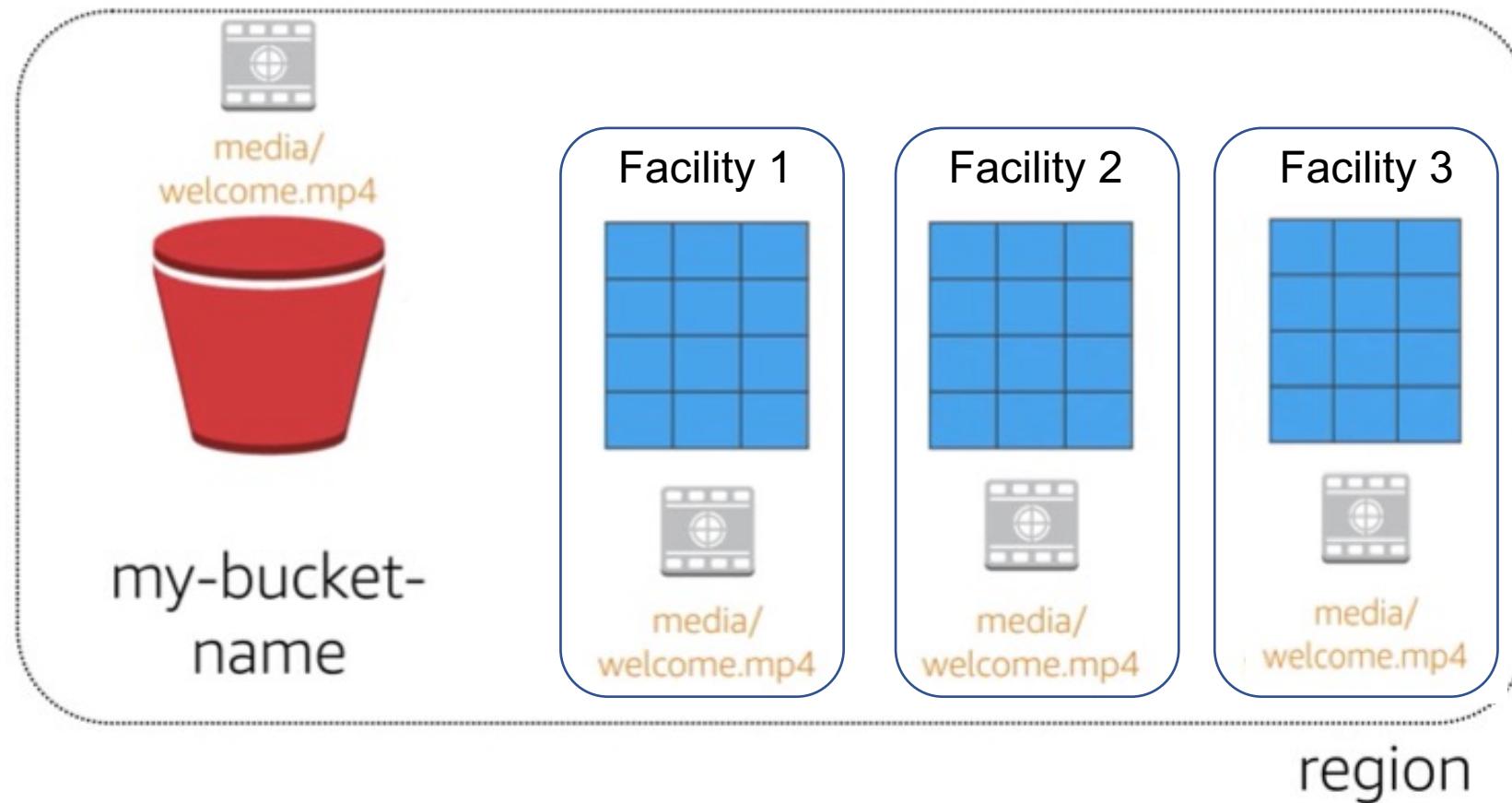
Object

[https://s3-ap-northeast-1.amazonaws.com/\[bucket name\]/Preview2.mp4](https://s3-ap-northeast-1.amazonaws.com/[bucket name]/Preview2.mp4)

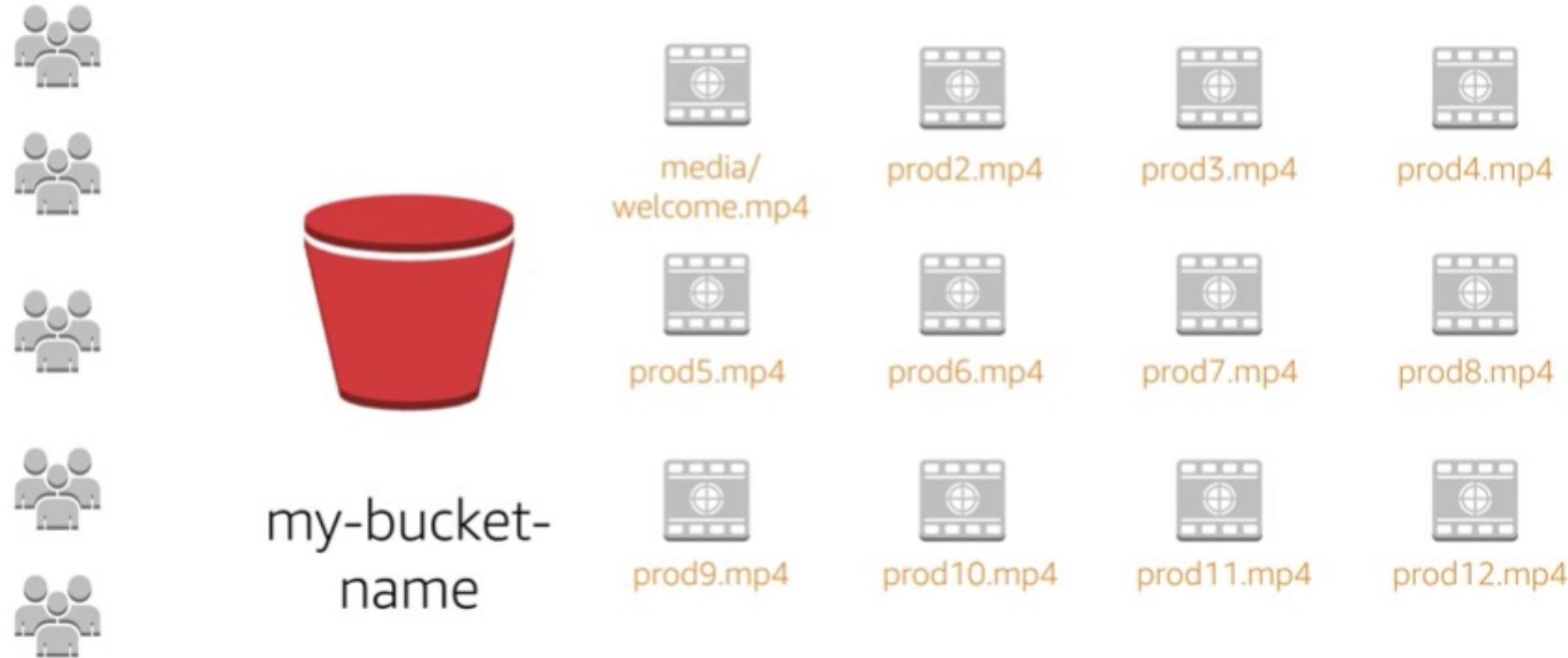
Key



# Data Redundantly Stored in Region



# Designed for Seamless Scaling



# Access the Data Anywhere



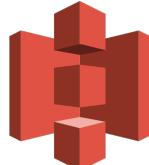
AWS Management  
Console



AWS CLI

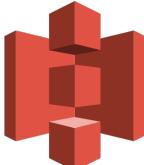
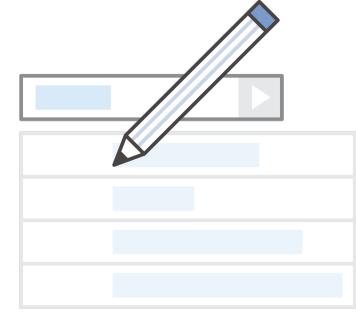


AWS SDKs



# Common Use Cases

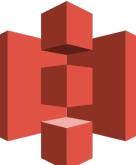
- Storing application assets
- Static web hosting
- Backup and disaster recovery (DR)
- Staging area for big data
- *Many more....*



# Amazon S3 Pricing



- 💡 Pay only for what you use, including:
  - 💡 GBs per month
  - 💡 Transfer OUT to other regions
  - 💡 PUT, COPY, POST, LIST, and GET requests
  
- 💡 You do NOT have to pay for:
  - 💡 Transfer IN to Amazon S3
  - 💡 Transfer OUT from Amazon S3 to Amazon CloudFront or Amazon EC2 in the same region.



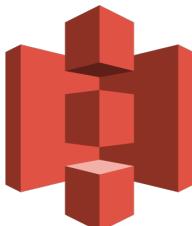
To estimate Amazon S3 costs, consider the following:

## 1. Types of storage classes

- cube Standard Storage
  - cube 99.99999999% durability
  - cube 99.99% availability
- cube Standard-Infrequent Access (SIA)
  - cube 99.99999999% durability
  - cube 99.9% availability

## 2. Amount of storage

- cube The number and size of objects

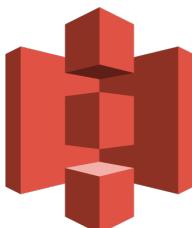


## 3. Requests:

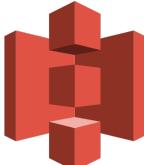
- ❖ The number of requests (**GET, PUT, COPY**):
- ❖ Type of requests
  - ❖ Different rates for GET requests than other requests

## 4. Data Transfer:

- ❖ Pricing based on the amount of data transferred out of the Amazon S3 region
- ❖ Data transfer in is free, charge for data transfer out



- Amazon S3 is a fully managed cloud storage service
- Store a virtually unlimited number of objects
- Pay for only what you use
- Access at any time, from anywhere
- Amazon S3 offers rich security controls





# This week

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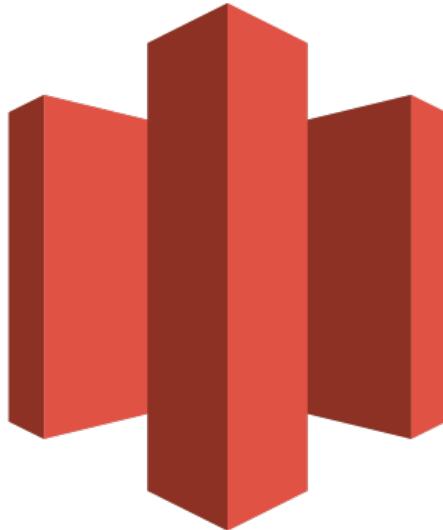
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# Amazon Glacier



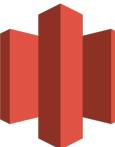
## Amazon Glacier

# Amazon Glacier Review

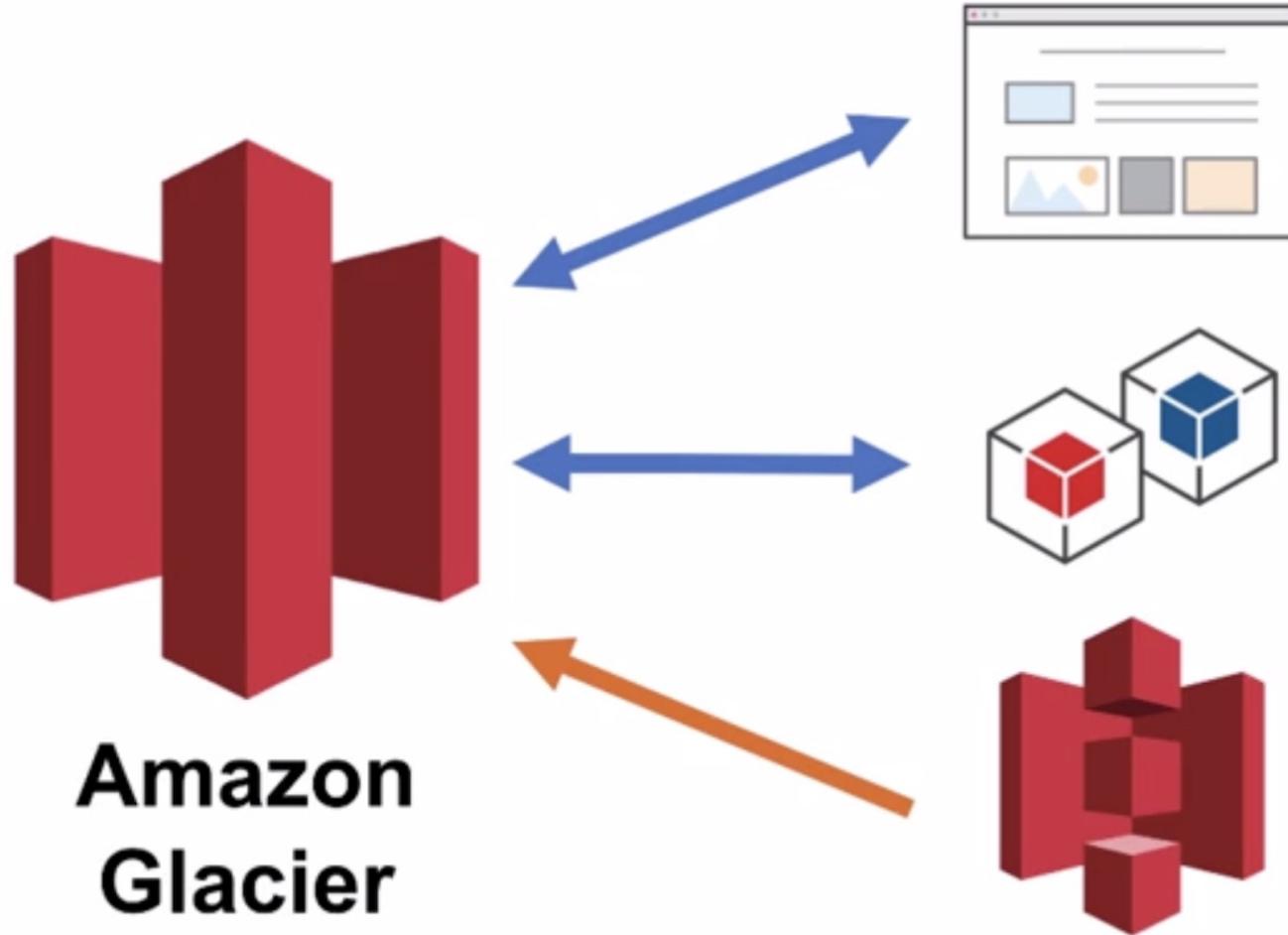


*Amazon Glacier is a **data archiving service** designed for **security, durability, and an extremely low cost**.*

- Designed for durability of 99.99999999% of objects
- Supports SSL/TLS encryption of data in transit and at rest
- The Vault Lock feature enforces compliance via a lockable policy
- Extremely low-cost design is ideal for long-term archiving
  - Provides three options for access to archives (Expedited, Standard, and Bulk) from a few minutes to several hours



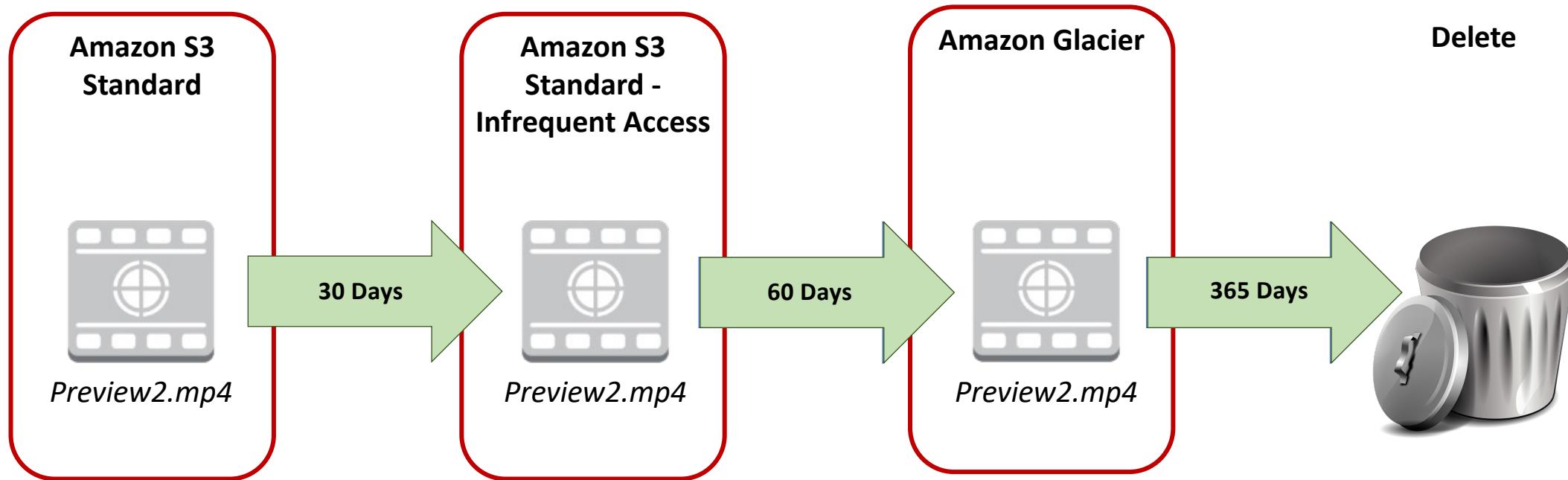
# Using Amazon Glacier



**Amazon  
Glacier**

# Lifecycle Policies

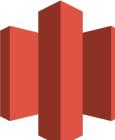
**Amazon S3 lifecycle policies** allow you to delete or move objects based on age.



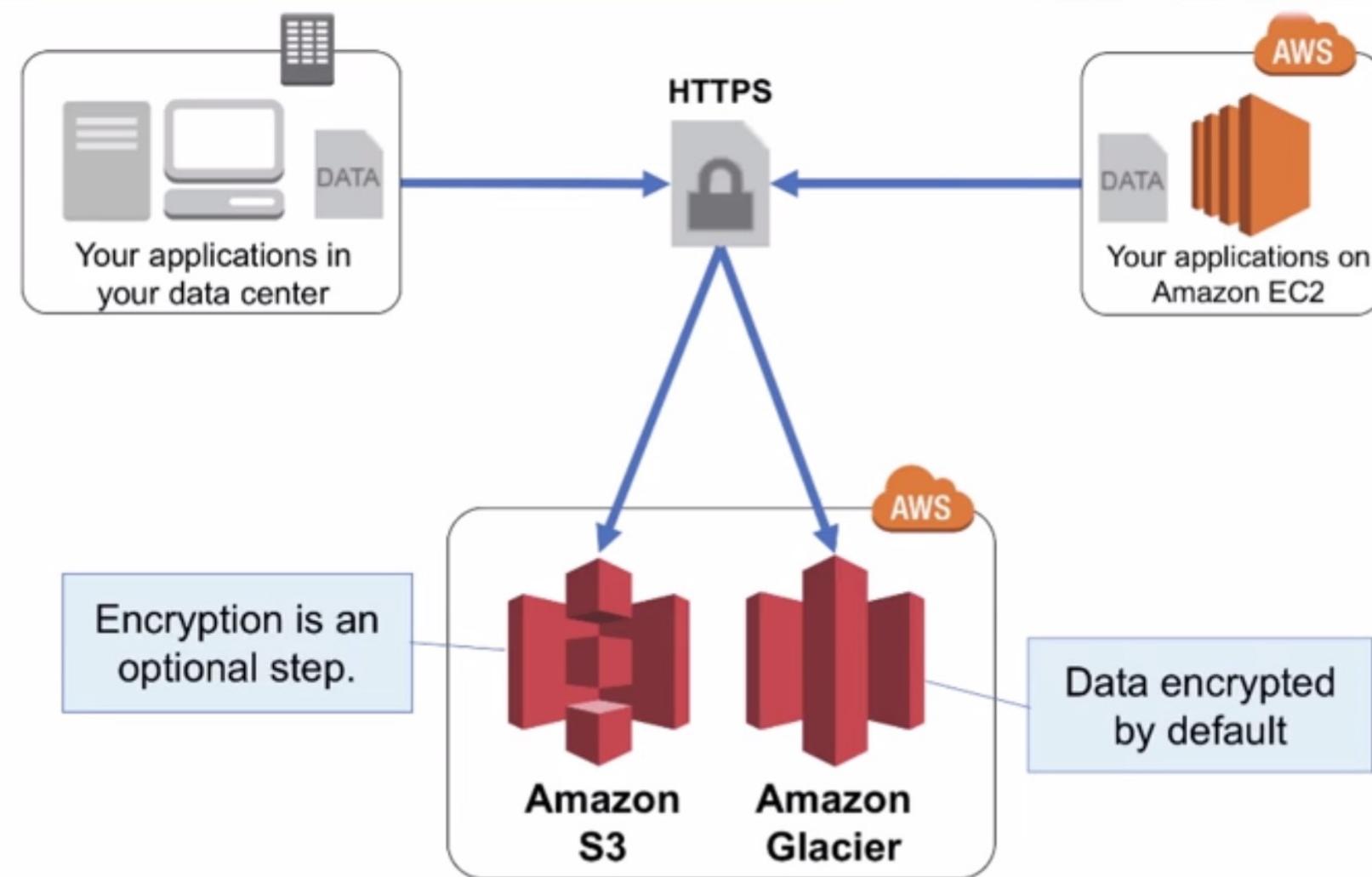
# Storage Comparison



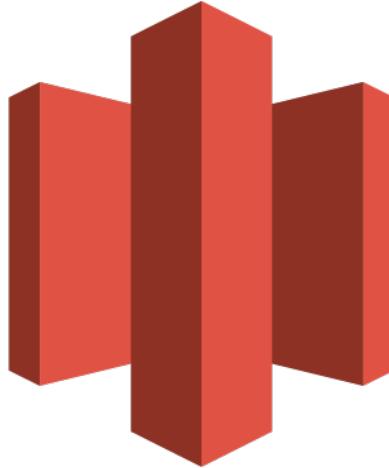
	Amazon S3	Amazon Glacier
Data volume	No limit	No limit
Average latency	ms	min/hrs
Item size	5 TB max	40 TB max
Cost/GB per month	¢¢	¢
Billed requests	PUT, COPY, POST, LIST, and GET	UPLOAD and retrieval
Retrieval pricing	¢ Per request	¢¢ Per request and per GB



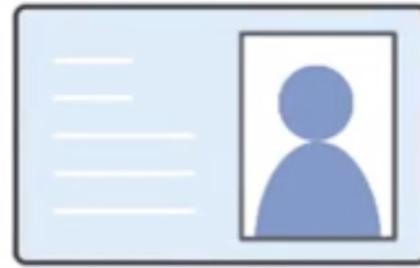
# Server-Side Encryption



# Security with Amazon Glacier



**Amazon  
Glacier**



**Control access with  
AWS IAM**



**Amazon Glacier encrypts  
your data with AES-256**



**Amazon Glacier manages  
your keys for you**



- Amazon Glacier is a data archiving service designed for security, durability, and an extremely low cost.
- Amazon Glacier pricing is region-based.
- Extremely low-cost design is ideal for long-term archiving.
- The service is designed for durability of 99.99999999% of objects.

