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SESSION-5: STORAGE

AWS Cloud Storage

Block storage

Raw storage. Data organized as an array of unrelated blocks.

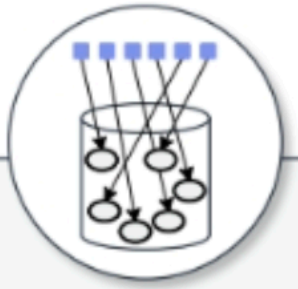
Examples: hard disk, storage area network (SAN), storage arrays

File storage

Unrelated data blocks managed by a file (serving) system. Native file system places data on disk.

Examples: network attached storage (NAS) appliances, Windows file servers

Object storage



Stores virtual containers that encapsulate the data, data attributes, metadata, and object IDs.

Examples: Ceph, OpenStack Swift

AWS Storage Services

- For Block Storage: Amazon Elastic Block Store (Amazon EBS)
- For File Storage: Amazon Elastic File System (Amazon EFS), Amazon FSx
- For Object Storage: Amazon Simple Storage Service (Amazon S3), Amazon S3 Glacier

AWS S3

- It is a durable object storage solution.
- Reduce Cost
- Increase Agility
- Accelerate Innovation
- Strengthen Security
- Cost factors: Storage Type, Replication, Versioning, Data Transfer, Requests and Retrievals, Management and Analytics


Analytics data
Log files
Application data
Videos and pictures
Backup and archival
Move data
Move your data to Amazon S3 from wherever it lives – in the cloud, in applications, or on-premises
Amazon S3
Object storage built to store and retrieve any amount of data from anywhere
Store data
Create bucket, specify the Region, access controls, and management options. Upload any amount of data
Control access to data
Optimize cost with storage classes
Replicate data to any Region
Access from on-premises or VPC
Protect and secure your data
Gain visibility into your storage
Artificial Intelligence (AI)
Advanced analytics
Machine Learning (ML)
Analyze data
Use AWS and 3rd party services to analyze your data to gain insights

AWS S3 - Bucket and Object Names

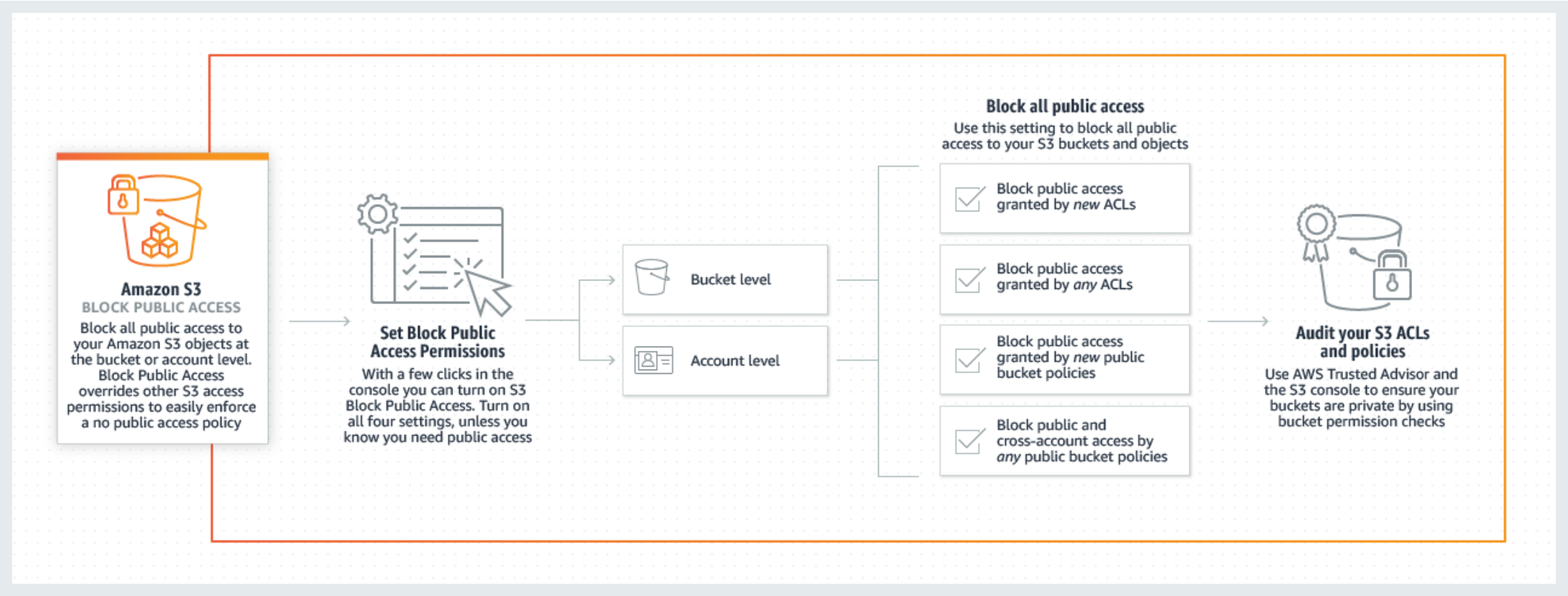
- Data is stored as an object in the bucket.
- An object includes a file and any metadata that describes the file.

AWS S3 - Bucket Policies

- Resource-based policy for an S3 bucket in JSON format
- Controls access without managing permissions in AWS IAM

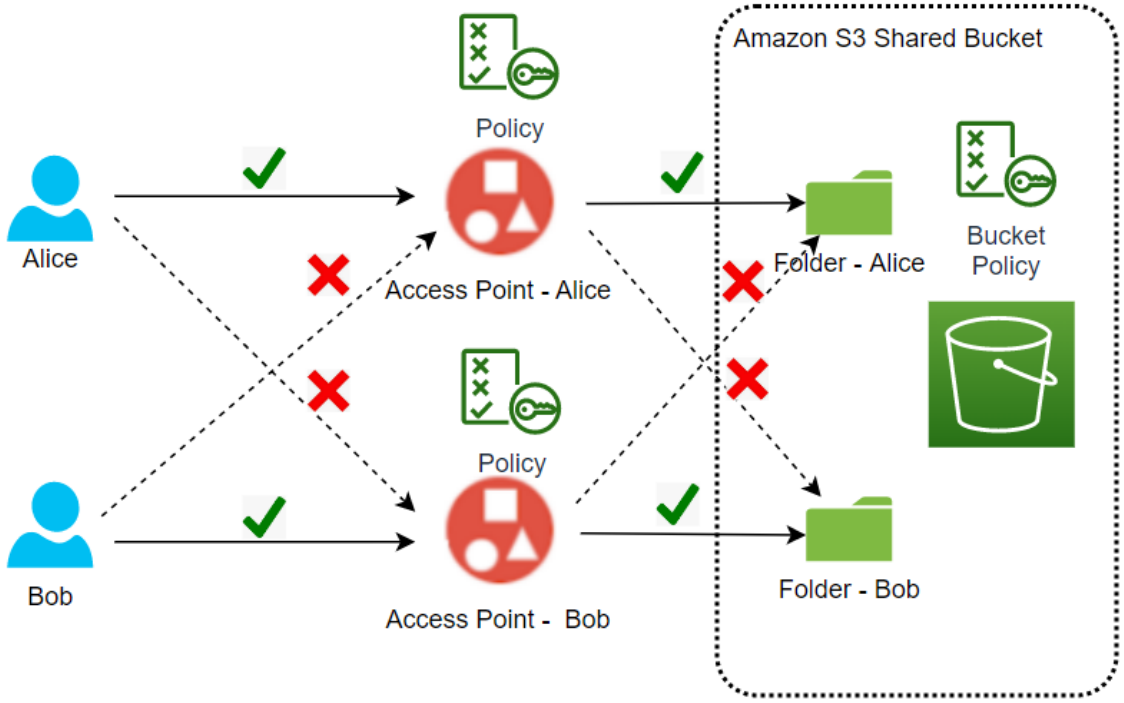
```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "AllowPutObjects",
            "Principal" : {
                "AWS": "arn:aws:iam::123456789012:user/Steve"
            },
            "Effect": "Allow",
            "Action": [
                "s3:PutObject"
            ],
            "Resource": [
                "arn:aws:s3:::stevespublicbucket/*"
            ]
        }
    ]
}
```

AWS S3 - Block Public Access



AWS S3 - Access Points

- Each access point has unique Domain Name System (DNS) and Amazon Resource Name (ARN)
- Access points have distinct permission ve network controls



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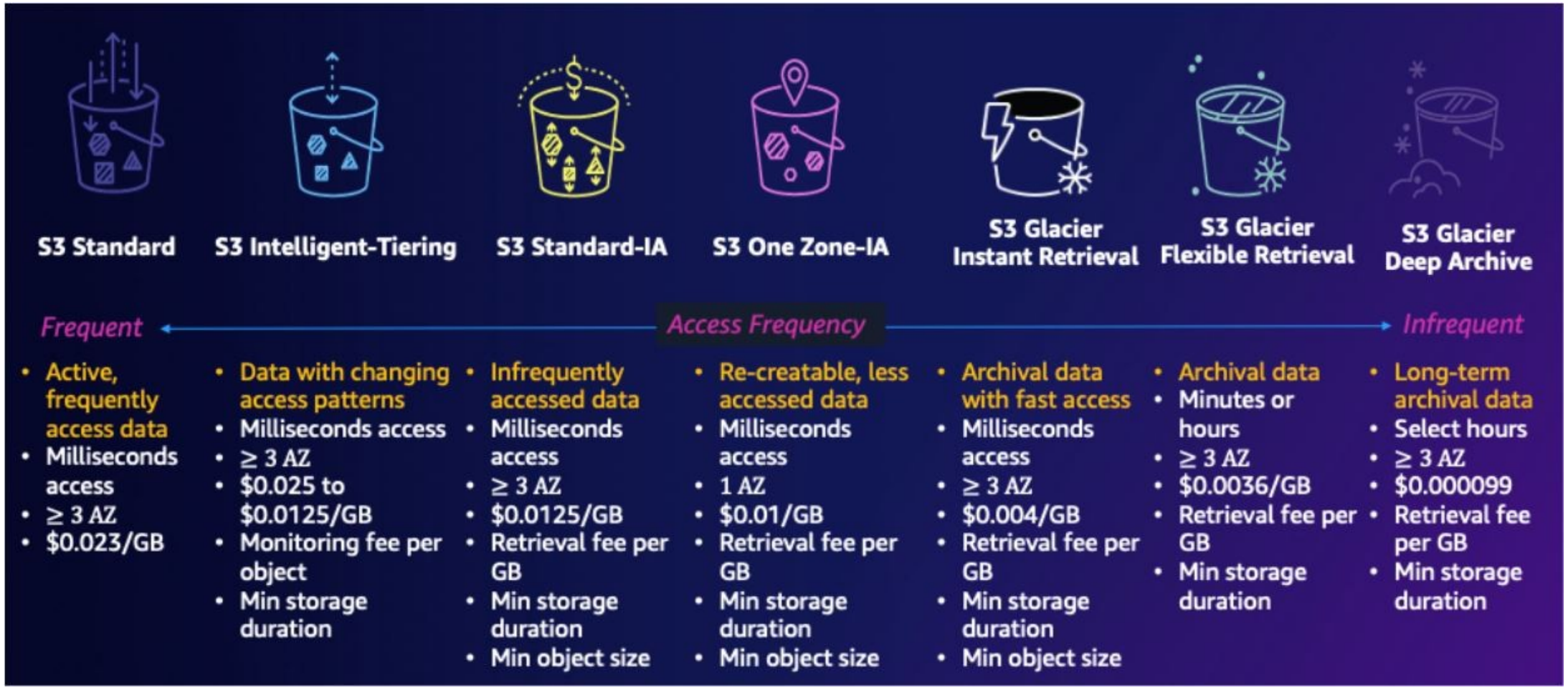
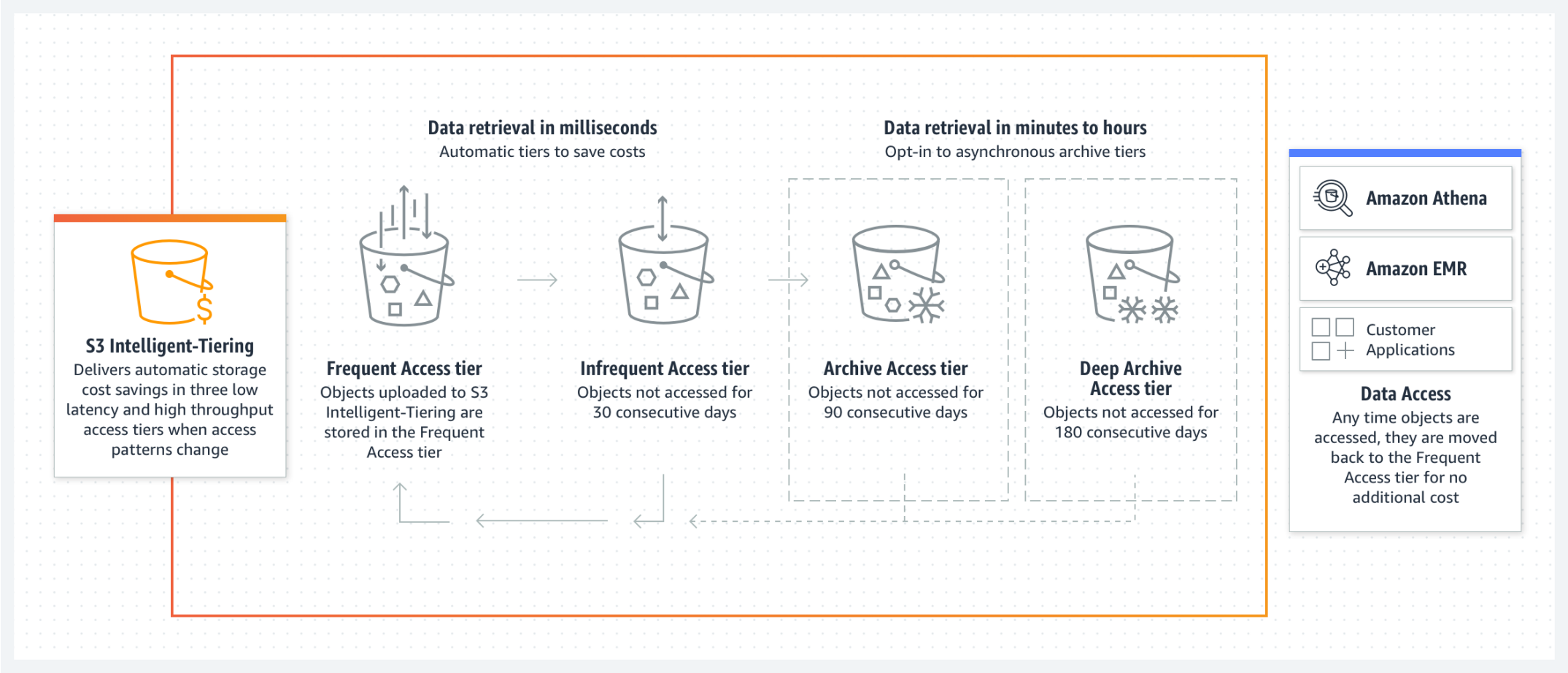
AWS S3 - Server Side Encryption Key Types

- Amazon S3-managed keys (SSE-S3)
- AWS KMS keys (SSE-KMS)
- Duel-layer server-side encryption (DSSE-KMS)
- Customer-provided keys (SSE-C)

AWS S3 - Storage Classes

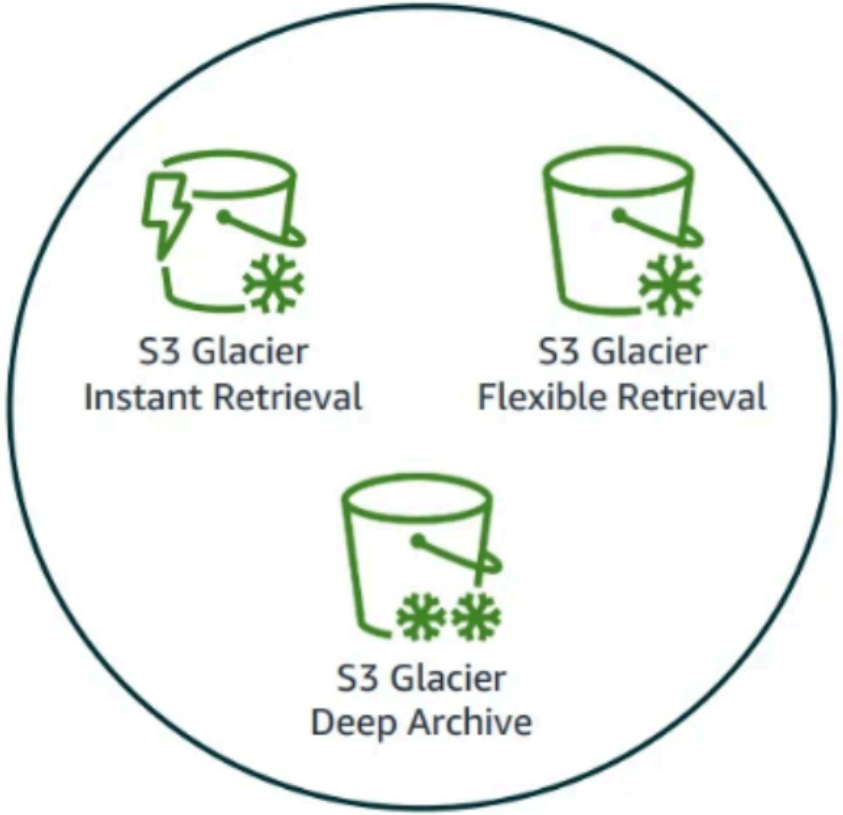


AWS S3 - Intelligent Tiering



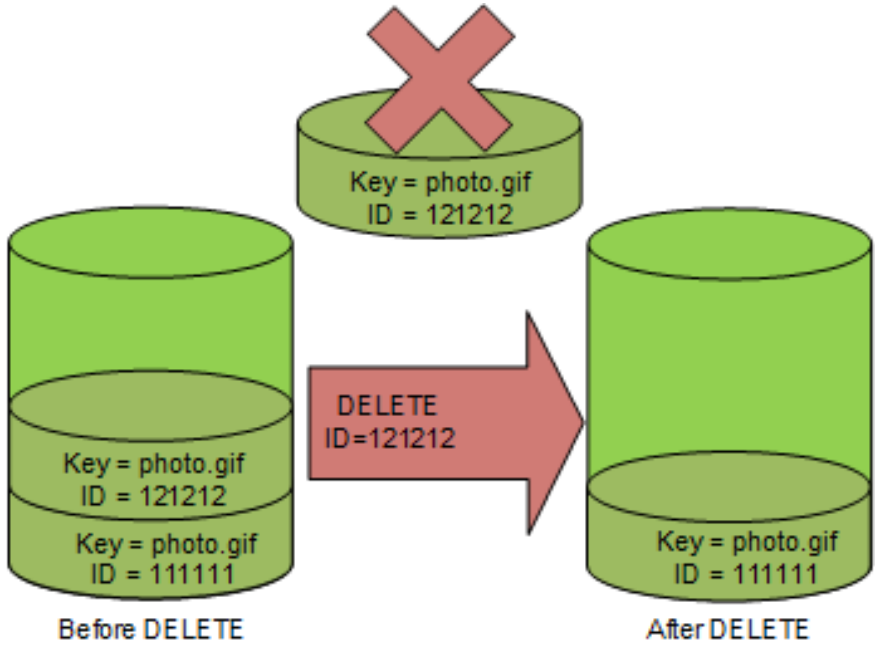
AWS S3 - Glacier

1. **Cost-effective storage**
   Lowest cost for specific data access patterns
2. **Flexible data retrieval**
   Three storage classes with variable access options
3. **Secure and compliant**
   Encryption at rest, AWS CloudTrail integration, and retrieval policies
4. **Scalable and durable**
   Meets needs from gigabytes to exabytes with 11 9s of durability



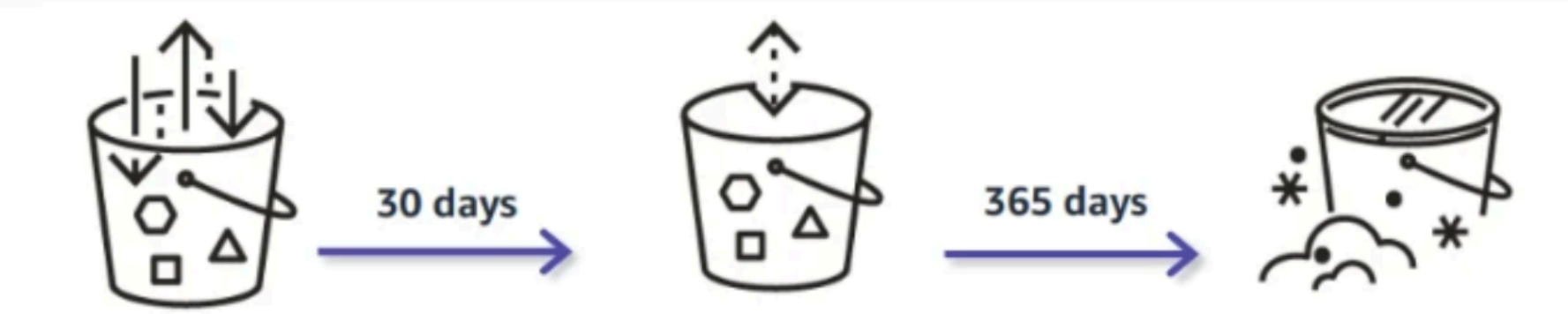
AWS S3 - Versioning

- Keep multiple variants of an object in the same bucket.
- Restore an object to a previous or specific version.
- Use S3 Object Lock for data retention or protection.

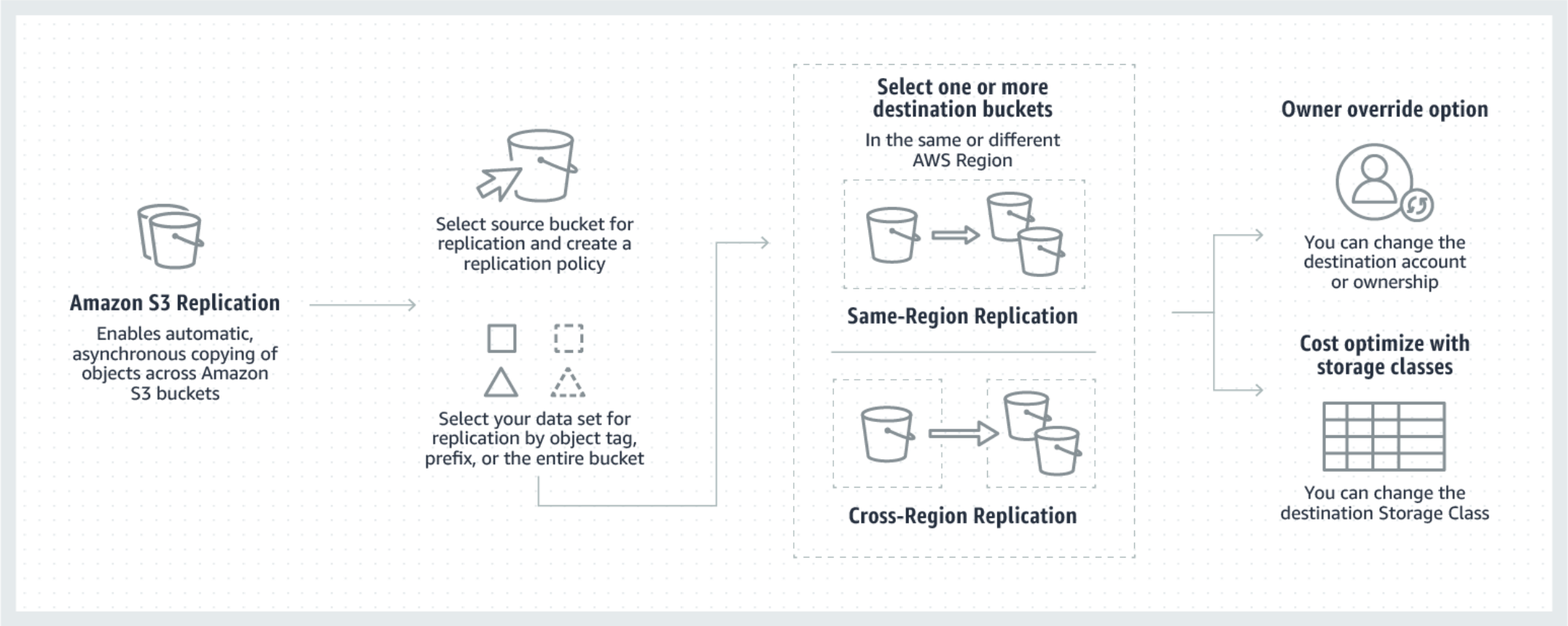


AWS S3 - Lifecycle Policies

- S3 Lifecycle policies are used to transition objects to another storage class. S3 Lifecycle rules take action based on object age.
- Example: Move objects older than 30 days to S3 Standard-IA, Move objects older than 365 days to Amazon S3 Glacier Deep Archive.

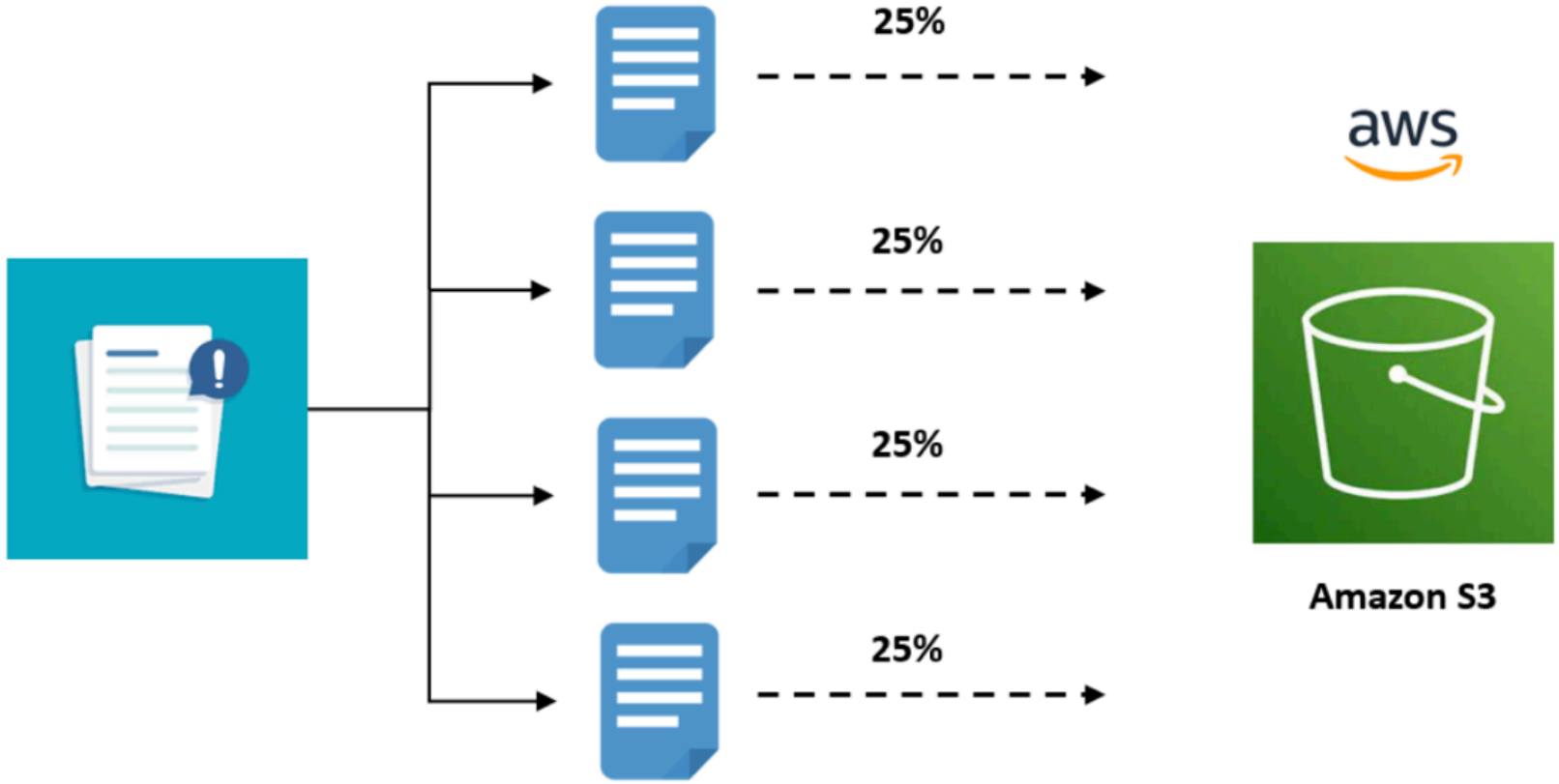


AWS S3 - Replicating Objects



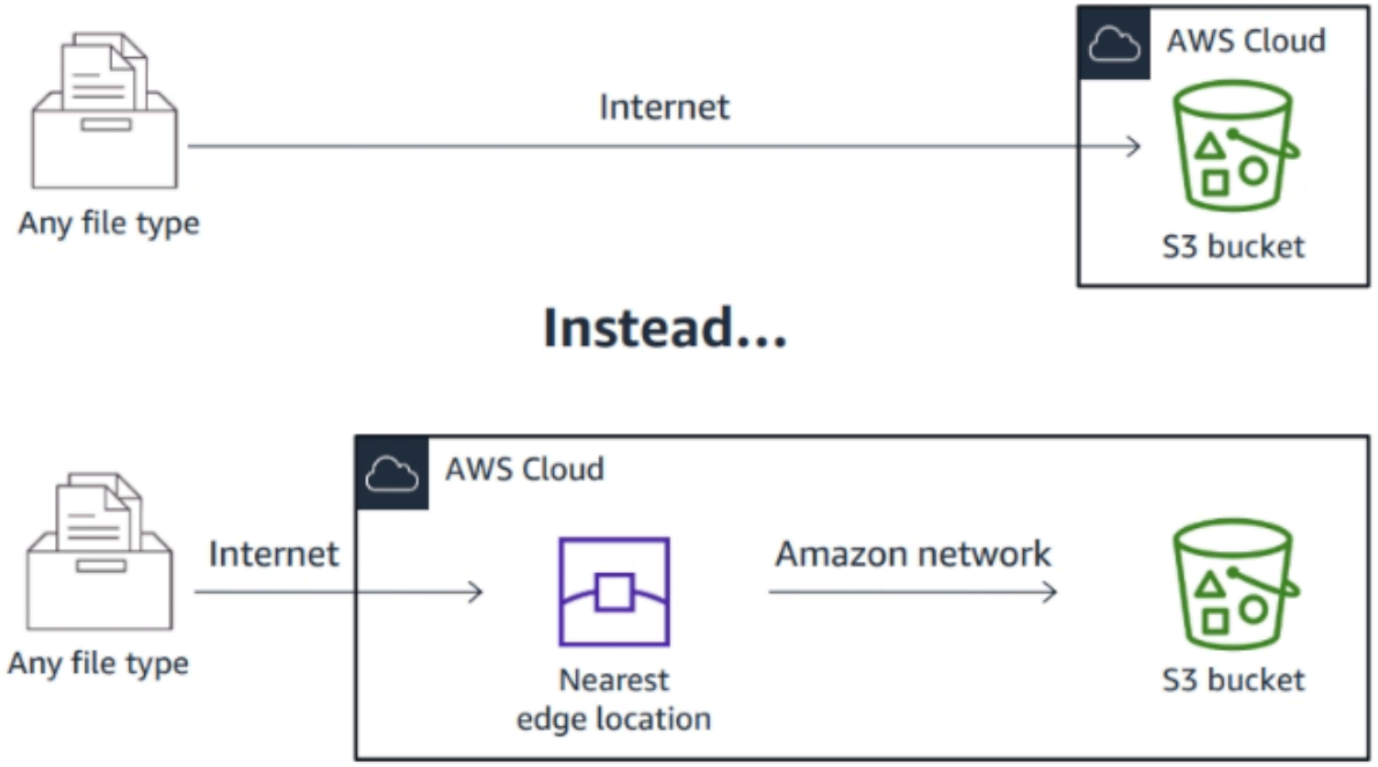
AWS S3 - Multipart Upload

- Initiate the upload, upload the object parts and complete the multipart upload.



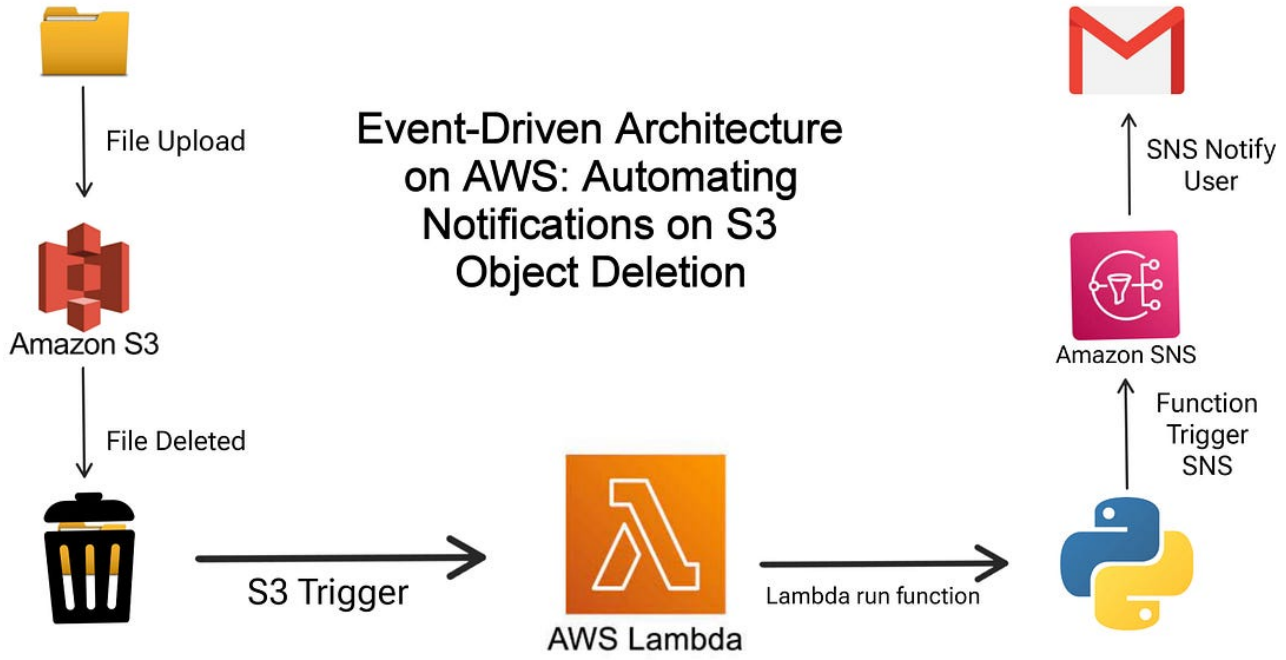
AWS S3 - Transfer Acceleration

- Move data faster over long distances.
- Reduce network variability.



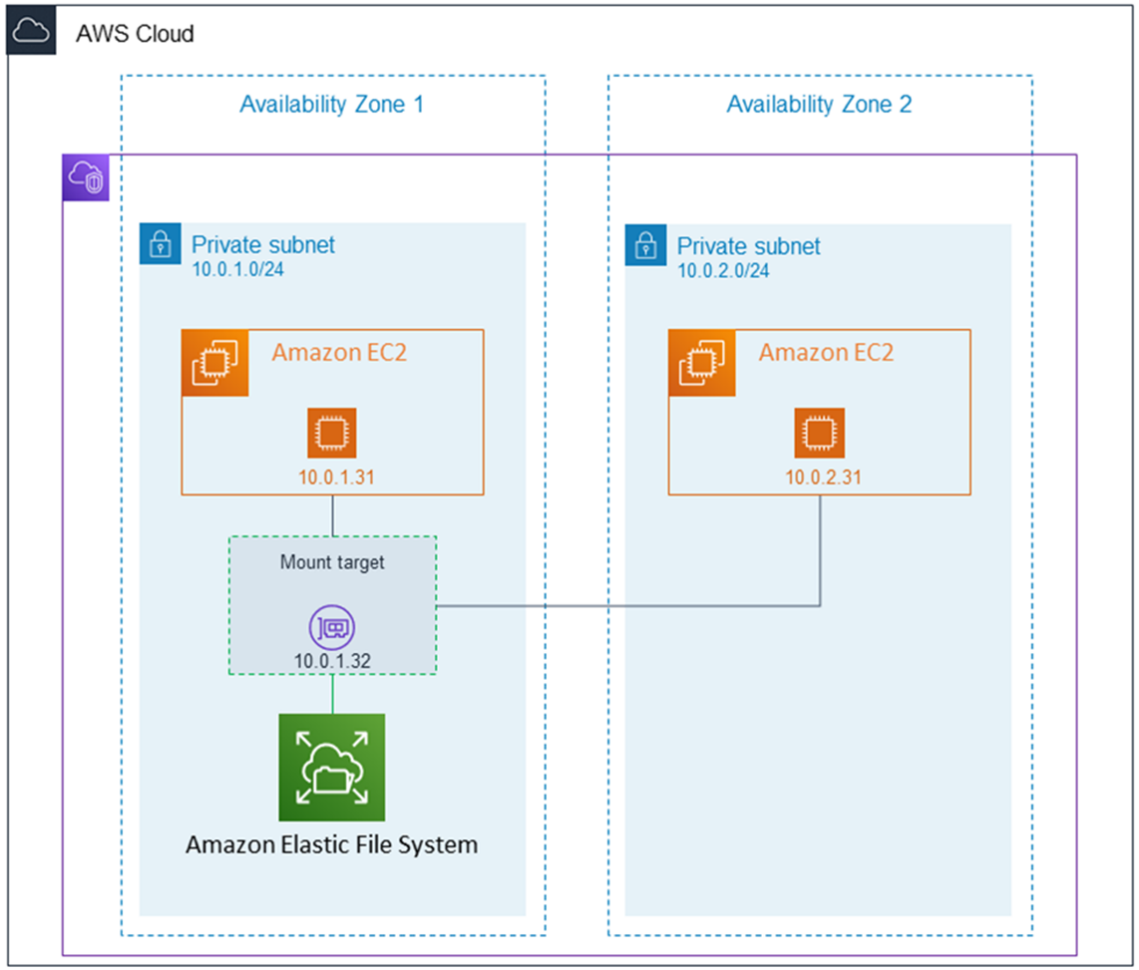
AWS S3 - Event Notifications

- Get notifications sent when events happen in your S3 bucket.
- Let AWS manage event monitoring: no polling needed.



Amazon EFS

- It is used if multiple instances need to use the same storage.
- Files systems are accessed from EC2 instances at the same time.
- File systems are connected by using the NFSv4 protocol.



Amazon EFS Benefits

Amazon EFS uses burst throughput mode to **scale throughput** based on your storage use.

Additionally, you can **provision throughput** independent of storage.

Amazon EFS **automatically grows and shrinks** file storage without provisioning.

Monitoring is not required to avoid storage limits.

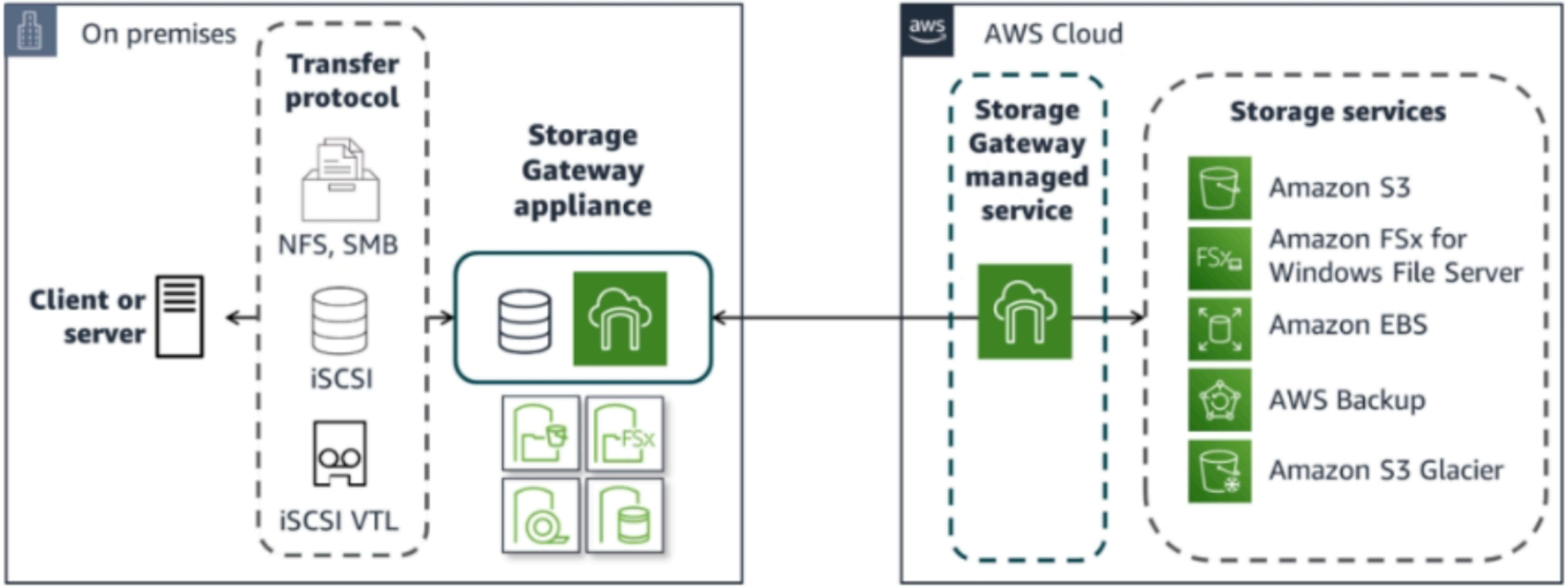
Amazon EFS managed file systems **lower your total cost of ownership (TCO)**. Pay only for what you use.

Save on cost with EFS Infrequent Access or One Zone storage types.

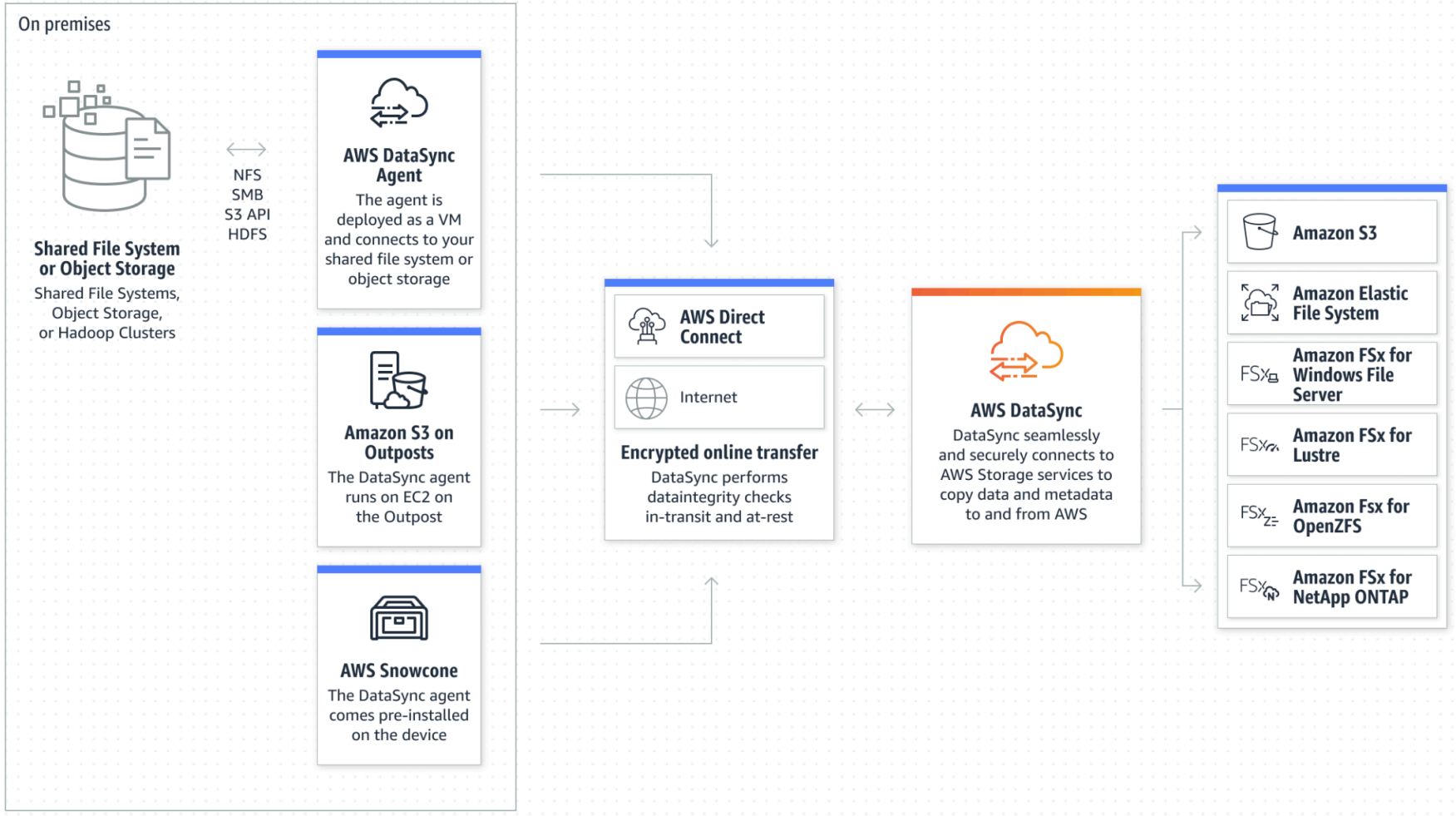
Amazon FSx

- Launch, run, and scale high-performing file systems on AWS.
- Use familiar and feature-rich products without managing hardware provisioning, patching and backups.
- Amazon FSx for Windows File Server, Amazon FSx for Lustre, Amazon FSX for NetApp ONTAP, Amazon FSx for OpenZFS

AWS Storage Gateway



AWS Data Sync



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AWS Snow Family

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THANKS FOR LISTENING