

SAA-3

Amazon S3 Section

Section introduction

- Amazon S3 is one of the main building blocks of AWS
- It's advertised as "infinitely scaling" storage
- Many websites use Amazon S3 as a backbone
- Many AWS services use Amazon S3 as an integration as well
- We'll have a step-by-step approach to S3

Amazon S3 Use cases

- Backup and storage
- Disaster Recovery
- Archive
- Hybrid Cloud storage
- Application hosting
- Media hosting
- Data lakes & big data analytics
- Software delivery
- Static website

Amazon S3 - Buckets

- Amazon S3 allows people to store objects (files) in "buckets" (directories)
- Buckets must have a **globally unique name (across all regions all accounts)**
- Buckets are defined at the region level
- S3 looks like a global service but buckets are created in a region
- Naming convention
 - No uppercase, No underscore
 - 3-36 characters long
 - Not an IP
 - Must start with lowercase letter or number
 - Must NOT start with the prefix xn--
 - Must NOT end with the suffix -s3alias

Amazon S3 - Objects

- Objects (file) have a Key
- The **key** is the FULL path:
 - s3://my-bucket/**my_file.txt**
 - s3://my-bucket/**my_folder1/another_folder/my_file.txt**
- The key is composed of **prefix** + **object name**
 - s3://my-bucket/**my_folder/another_folder/my_file.txt**
- There's no concept of "directories" within buckets(although the UI will trick you to think otherwise)
- Just keys with very long names that contain slashes("/")

Amazon S3 - Objects (cont.)

- Object values are the content of the body
 - Max.Object Size is 5TB (5000GB)
 - If uploading more than 5GB, must use "multi-part upload"
- Metadata (list of text key / Value pairs - system or user metadata)
- Tags (Unicode key / value pair - up to 10) - useful for security / lifecycle
- Version ID (if versioning is enabled)

Hands on

Create bucket Info

Buckets are containers for data stored in S3. [Learn more](#)

General configuration

Bucket name

Bucket name must be globally unique and must not contain spaces or uppercase letters. [See rules for bucket naming](#)

AWS Region



Copy settings from existing bucket - optional

Only the bucket settings in the following configuration are copied.

Object Ownership Info

Control ownership of objects written to this bucket from other AWS accounts and the use of access control lists (ACLs). Object ownership determines who can specify access to objects.

ACLs disabled (recommended)

All objects in this bucket are owned by this account. Access to this bucket and its objects is specified using only policies.

ACLs enabled

Objects in this bucket can be owned by other AWS accounts. Access to this bucket and its objects can be specified using ACLs.

Object Ownership

Bucket owner enforced

Block Public Access settings for this bucket

Public access is granted to buckets and objects through access control lists (ACLs), bucket policies, access point policies, or all. In order to ensure that public access to this bucket and its objects is blocked, turn on Block all public access. These settings apply only to this bucket and its access points. AWS recommends that you turn on Block all public access, but before applying any of these settings, ensure that your applications will work correctly without public access. If you require some level of public access to this bucket or objects within, you can customize the individual settings below to suit your specific storage use cases. [Learn more](#)

Block all public access

Turning this setting on is the same as turning on all four settings below. Each of the following settings are independent of one another.

Block public access to buckets and objects granted through new access control lists (ACLs)

S3 will block public access permissions applied to newly added buckets or objects, and prevent the creation of new public access ACLs for existing buckets and objects. This setting doesn't change any existing permissions that allow public access to S3 resources using ACLs.

Block public access to buckets and objects granted through any access control lists (ACLs)

S3 will ignore all ACLs that grant public access to buckets and objects.

Block public access to buckets and objects granted through new public bucket or access point policies

S3 will block new bucket and access point policies that grant public access to buckets and objects. This setting doesn't change any existing policies that allow public access to S3 resources.

Block public and cross-account access to buckets and objects through any public bucket or access point policies

S3 will ignore public and cross-account access for buckets or access points with policies that grant public access to buckets and objects.

Bucket Versioning

Versioning is a means of keeping multiple variants of an object in the same bucket. You can use versioning to preserve, retrieve, and restore every version of every object stored in your Amazon S3 bucket. With versioning, you can easily recover from both unintended user actions and application failures. [Learn more](#)

Bucket Versioning

Disable

Enable

Tags (0) - optional
Track storage cost or other criteria by tagging your bucket. [Learn more](#)

No tags associated with this bucket.

[Add tag](#)

Default encryption
Automatically encrypt new objects stored in this bucket. [Learn more](#)

Server-side encryption

Disable
 Enable

► Advanced settings

Amazon S3 > Buckets

► Account snapshot
Storage lens provides visibility into storage usage and activity trends. [Learn more](#)

[View Storage Lens dashboard](#)

Buckets (1) [Info](#)
Buckets are containers for data stored in S3. [Learn more](#)

[Create bucket](#)

[Copy ARN](#) [Empty](#) [Delete](#)

[Name](#) [AWS Region](#) [Access](#) [Creation date](#)

[stephane-demo-s3](#) EU (Ireland) eu-west-1 Bucket and objects not public October 11, 2022, 10:30:36 (UTC+01:00)

Amazon S3 > Buckets > stephane-demo-s3

stephane-demo-s3 [Info](#)

[Objects](#) [Properties](#) [Permissions](#) [Metrics](#) [Management](#) [Access Points](#)

Objects (0)
Objects are the fundamental entities stored in Amazon S3. You can use [Amazon S3 Inventory](#) to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. [Learn more](#)

[Actions](#) [Upload](#)

[Name](#) [Type](#) [Last modified](#) [Size](#) [Storage class](#)

No objects
You don't have any objects in this bucket.

[Upload](#)

Files and folders (1 Total, 108.4 KB)
All files and folders in this table will be uploaded.

[Remove](#) [Add files](#) [Add folder](#)

[Name](#) [Folder](#) [Type](#) [Size](#)

coffee.jpg - image/jpeg 108.4 KB

Destination

Destination
[s3://stephane-demo-s3](#)

► Destination details
Bucket settings that impact new objects stored in the specified destination.

► Permissions
Grant public access and access to other AWS accounts.

► Properties
Specify storage class, encryption settings, tags, and more.

[Cancel](#) [Upload](#)

The screenshot shows the Amazon S3 console interface. At the top, it says 'Amazon S3 > Buckets > stephane-demo-s3'. Below that is the bucket name 'stephane-demo-s3' with a 'Info' link. A navigation bar has tabs for 'Objects' (which is selected), 'Properties', 'Permissions', 'Metrics', 'Management', and 'Access Points'. Under 'Objects', there's a sub-header 'Objects (1)'. A note says 'Objects are the fundamental entities stored in Amazon S3. You can use Amazon S3 inventory [?] to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. Learn more [?]' with a 'Learn more' link. Below this is a toolbar with buttons for 'Actions' (with dropdown options like Copy S3 URI, Copy URL, Download, Open, Delete, Create folder, Upload), a search bar 'Find objects by prefix', and navigation arrows. A table lists the single object: 'Name' (coffee.jpg), 'Type' (jpg), 'Last modified' (October 11, 2022, 10:32:56 (UTC+01:00)), 'Size' (108.4 KB), and 'Storage class' (Standard).

Amazon S3 - Security

- **User - Based**
 - IAM Policies - which API calls should be allowed for a specific user from IAM
- **Resource - Based**
 - **Bucket Policies** - bucket wide rules from the S3 console - allows cross account
 - **Object Access Control List (ACL)** - finer grain (can be disabled)
 - **Bucket Access Control List (ACL)** - less common (can be disabled)
- **Note:** an IAM principal can access an S3 object if
 - The user IAM permissions ALLOW it OR the resource policy ALLOWS it
 - AND there's no explicit DENY
- **Encryption:** encrypt objects in Amazon S3 using encryption keys

S3 Bucket Policies

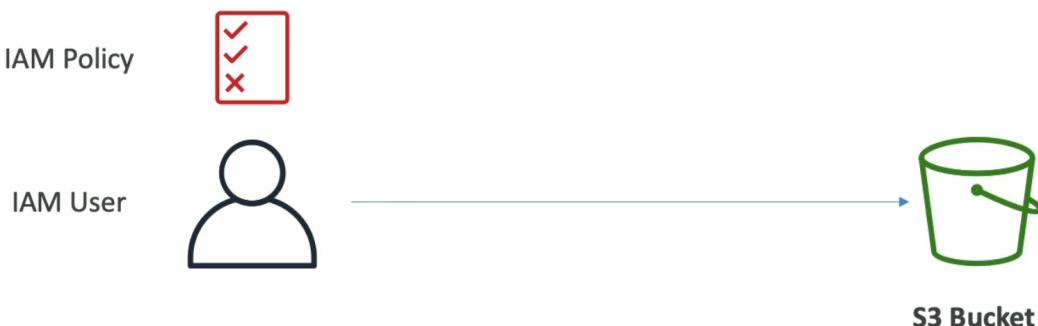
- JSON based policies
 - Resources: buckets and objects
 - Effect: Allow / Deny
 - Actions: Set of API to Allow or Deny Principal: The account or user to apply the policy to
- Use S3 bucket for policy to:
 - Grant public access to the bucket
 - Force objects to be encrypted at upload
 - Grant access to another account (Cross Account)

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "PublicRead",
      "Effect": "Allow",
      "Principal": "*",
      "Action": [
        "s3:GetObject"
      ],
      "Resource": [
        "arn:aws:s3:::examplebucket/*"
      ]
    }
  ]
}
```

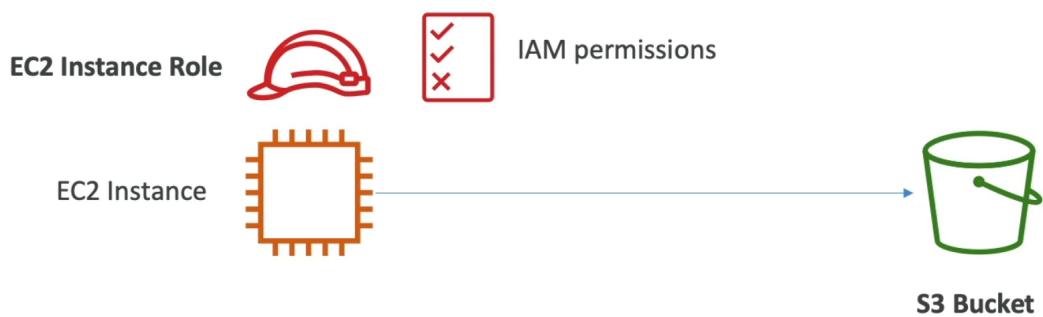
- Example: Public Access - Use Bucket Policy



- Example: User Access to S3 - IAM permissions



- Example: EC2 instance access - Use IAM Roles



- Advanced: Cross - Account Access - Use Bucket Policy



- Bucket settings for Block Public Access

```

Block all public access
On
  - Block public access to buckets and objects granted through new access control lists (ACLs)
    On
  - Block public access to buckets and objects granted through any access control lists (ACLs)
    On
  - Block public access to buckets and objects granted through new public bucket or access point policies
    On
  - Block public and cross-account access to buckets and objects through any public bucket or access point policies
    On
  ○ These settings were created to prevent company data leaks
  ○ If you know your bucket should never be public, leave these on
  ○ Can be set at the account level

```

Hands on

Objects | Properties | **Permissions** | Metrics | Management | Access Points

Permissions overview

Access
Bucket and objects not public

Block public access (bucket settings)
 Public access is granted to buckets and objects through access control lists (ACLs), bucket policies, access point policies, or all. In order to ensure that public access to all your S3 buckets and objects is blocked, turn on Block all public access. These settings apply only to this bucket and its access points. AWS recommends that you turn on Block all public access, but before applying any of these settings, ensure that your applications will work correctly without public access. If you require some level of public access to your buckets or objects within, you can customize the individual settings below to suit your specific storage use cases. [Learn more](#)

Edit

Block all public access
 On
[Individual Block Public Access settings for this bucket](#)

Block public access (bucket settings)

Public access is granted to buckets and objects through access control lists (ACLs), bucket policies, access point policies, or all. In order to ensure that public access to all your S3 buckets and objects is blocked, turn on Block all public access. These settings apply only to this bucket and its access points. AWS recommends that you turn on Block all public access, but before applying any of these settings, ensure that your applications will work correctly without public access. If you require some level of public access to your buckets or objects within, you can customize the individual settings below to suit your specific storage use cases. [Learn more](#)

Block all public access
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- Block public access to buckets and objects granted through new access control lists (ACLs)**
 S3 will block public access permissions applied to newly added buckets or objects, and prevent the creation of new public access ACLs for existing buckets and objects. This setting doesn't change any existing permissions that allow public access to S3 resources using ACLs.
- Block public access to buckets and objects granted through any access control lists (ACLs)**
 S3 will ignore all ACLs that grant public access to buckets and objects.
- Block public access to buckets and objects granted through new public bucket or access point policies**
 S3 will block new bucket and access point policies that grant public access to buckets and objects. This setting doesn't change any existing policies that allow public access to S3 resources.
- Block public and cross-account access to buckets and objects through any public bucket or access point policies**
 S3 will ignore public and cross-account access for buckets or access points with policies that grant public access to buckets and objects.

Cancel **Save changes**

Block public access (bucket settings)
 Public access is granted to buckets and objects through access control lists (ACLs), bucket policies, access point policies, or all. In order to ensure that public access to all your S3 buckets and objects is blocked, turn on Block all public access. These settings apply only to this bucket and its access points. AWS recommends that you turn on Block all public access, but before applying any of these settings, ensure that your applications will work correctly without public access. If you require some level of public access to your buckets or objects within, you can customize the individual settings below to suit your specific storage use cases. [Learn more](#)

Edit

Block all public access
 Off
[Individual Block Public Access settings for this bucket](#)

Bucket policy

The bucket policy, written in JSON, provides access to the objects stored in the bucket. Bucket policies don't apply to objects owned by other accounts. [Learn more](#)

[Policy examples](#) [Policy generator](#)

Bucket ARN
 arn:aws:s3:::stephane-demo-s3

Policy

```

1 - {
2 -   "Id": "Policy1665482300144",
3 -   "Version": "2012-10-17",
4 -   "Statement": [
5 -     {
6 -       "Sid": "Stmt1665482297957",
7 -       "Action": [
8 -         "s3:GetObject"
9 -       ],
10      "Effect": "Allow",
11      "Resource": "arn:aws:s3:::stephane-demo-s3/*",
12      "Principal": "*"
13    }
14  ]
15 }

```

Edit statement

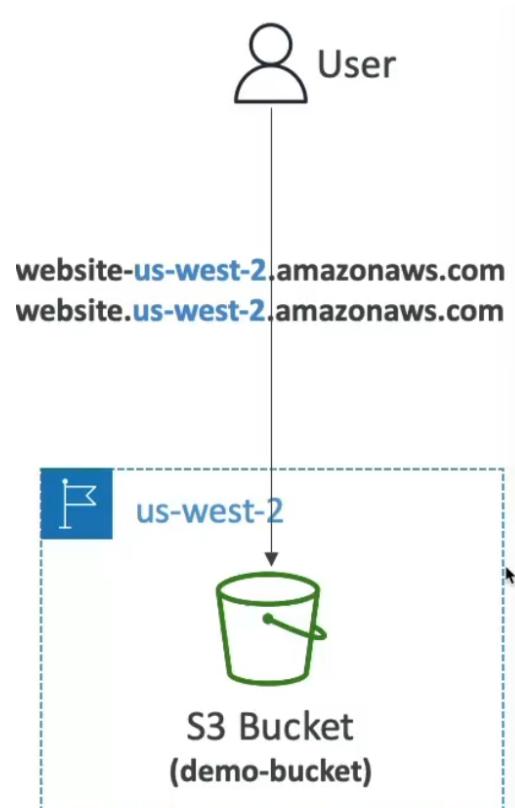
Select a statement
 Select an existing statement in the policy or add a new statement.

+ Add new statement

Amazon S3 - Static Website Hosting

- S3 can host static websites and have them accessible on the Internet
- The website URL will be (depending on the region)
 - <http://bucket-name.s3-website-aws-region.amazonaws.com>
 - OR
 - <http://bucket-name.s3-website.aws-region.amazonaws.com>

- If you get a 403 Forbidden error, make sure the bucket policy allows public reads!



- hands on

stephane-demo-s3 Info

Publicly accessible

Objects Properties Permissions Metrics Management Access Points

Bucket overview

AWS Region EU (Ireland) eu-west-1	Amazon Resource Name (ARN) arn:aws:s3:::stephane-demo-s3	Creation date October 11, 2022, 10:30:36 (UTC+01:00)
--------------------------------------	---	---

Bucket Versioning

Versioning is a means of keeping multiple variants of an object in the same bucket. You can use versioning to preserve, retrieve, and restore every version of every object stored in your Amazon S3 bucket. With versioning, you can easily recover from both unintended user actions and application failures. [Learn more](#)

[Edit](#)

Bucket Versioning
Disabled

Static website hosting

Use this bucket to host a website or redirect requests. [Learn more](#)

[Edit](#)

Static website hosting
Disabled

Amazon S3 > Buckets > stephane-demo-s3 > Edit static website hosting

Edit static website hosting

Static website hosting

Use this bucket to host a website or redirect requests. [Learn more](#)

Disable
 Enable

Hosting type

Host a static website
Use the bucket endpoint as the web address. [Learn more](#)

Redirect requests for an object
Redirect requests to another bucket or domain. [Learn more](#)

ⓘ For your customers to access content at the website endpoint, you must make all your content publicly readable. To do so, you can edit the S3 Block Public Access settings for the bucket. For more information, see [Using Amazon S3 Block Public Access](#)

Index document

Index document
Specify the home or default page of the website.

index.html

Error document - *optional*
This is returned when an error occurs.

error.html

Redirection rules - *optional*
Redirection rules, written in JSON, automatically redirect webpage requests for specific content. [Learn more](#)

1

Amazon S3 > Buckets > stephane-demo-s3

stephane-demo-s3 Info

Publicly accessible

Objects Properties Permissions Metrics Management Access Points

Objects (3)

Objects are the fundamental entities stored in Amazon S3. You can use [Amazon S3 inventory](#) to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. [Learn more](#)

[C](#) [Copy S3 URI](#) [Copy URL](#) [Download](#) [Open](#) [Delete](#) [Actions](#) [Create folder](#) [Upload](#)

[Find objects by prefix](#)

<input type="checkbox"/>	Name	Type	Last modified	Size	Storage class
<input type="checkbox"/>	beach.jpg	jpg	October 11, 2022, 11:08:32 (UTC+01:00)	85.8 KB	Standard
<input type="checkbox"/>	coffee.jpg	jpg	October 11, 2022, 10:32:56 (UTC+01:00)	108.4 KB	Standard
<input type="checkbox"/>	index.html	html	October 11, 2022, 11:09:26 (UTC+01:00)	221.0 B	Standard

Static website hosting
Use this bucket to host a website or redirect requests. [Learn more](#)

Static website hosting
Enabled

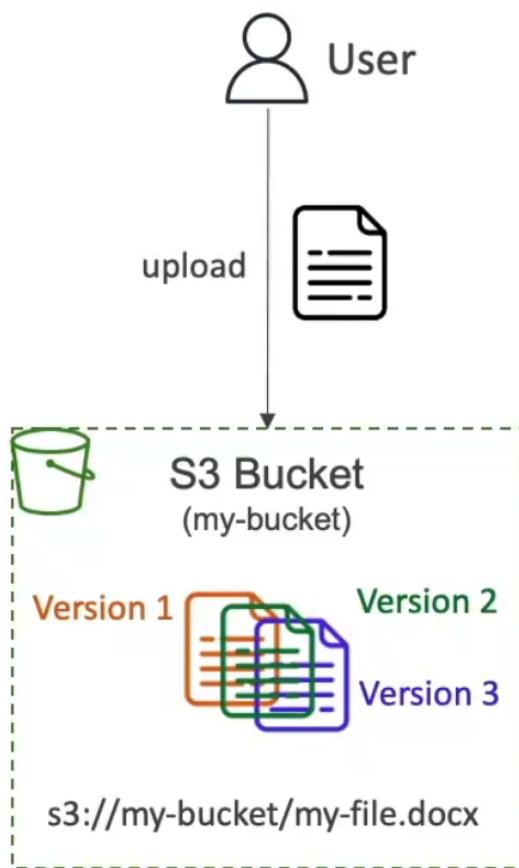
Hosting type
Bucket hosting

Bucket website endpoint
When you configure your bucket as a static website, the website is available at the AWS Region-specific website endpoint of the bucket. [Learn more](#)

<http://stephane-demo-s3.s3-website-eu-west-1.amazonaws.com>

Amazon S3 - Versioning

- You can version your files in Amazon S3
- It is enable at the **bucket level**
- Same key overwrite will change the "version": 1,2,3 ...
- It is best practice to version your buckets
 - Protect against unintended deletes(ability to restore a version)
 - Easy roll back to previous version
- Notes:
 - Any file that is not versioned prior to enabling versioning will have version "null"
 - Suspending versioning does not delete the previous versions



- Hands on

Amazon S3 > Buckets > stephane-demo-s3

stephane-demo-s3 [Info](#)

Publicly accessible

Objects Properties Permissions Metrics Management Access Points

Bucket overview

AWS Region EU (Ireland) eu-west-1	Amazon Resource Name (ARN) <code>arn:aws:s3:::stephane-demo-s3</code>	Creation date October 11, 2022, 10:30:36 (UTC+01:00)
--------------------------------------	--	---

Bucket Versioning

Versioning is a means of keeping multiple variants of an object in the same bucket. You can use versioning to preserve, retrieve, and restore every version of every object stored in your Amazon S3 bucket. With versioning, you can easily recover from both unintended user actions and application failures. [Learn more](#)

[Edit](#)

Bucket Versioning
Disabled

Edit Bucket Versioning [Info](#)

Bucket Versioning

Versioning is a means of keeping multiple variants of an object in the same bucket. You can use versioning to preserve, retrieve, and restore every version of every object stored in your Amazon S3 bucket. With versioning, you can easily recover from both unintended user actions and application failures. [Learn more](#)

Bucket Versioning

Suspend
This suspends the creation of object versions for all operations but preserves any existing object versions.

Enable [Edit](#)

ⓘ After enabling Bucket Versioning, you might need to update your lifecycle rules to manage previous versions of objects.

Multi-factor authentication (MFA) delete

An additional layer of security that requires multi-factor authentication for changing Bucket Versioning settings and permanently deleting object versions. To modify MFA delete settings, use the AWS CLI, AWS SDK, or the Amazon S3 REST API. [Learn more](#)

Disabled

Objects Properties Permissions Metrics Management Access Points

Objects (4)

Objects are the fundamental entities stored in Amazon S3. You can use [Amazon S3 inventory](#) to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. [Learn more](#)

[Copy](#) [Copy S3 URI](#) [Copy URL](#) [Download](#) [Open](#) [Delete](#) Actions Create folder Upload

Find objects by prefix [Show versions](#)

<input type="checkbox"/>	Name	Type	Version ID	Last modified	Size	Storage class
<input type="checkbox"/>	beach.jpg	jpg	null	October 11, 2022, 11:08:32 (UTC+01:00)	85.8 KB	Standard
<input type="checkbox"/>	coffee.jpg	jpg	null	October 11, 2022, 10:32:56 (UTC+01:00)	108.4 KB	Standard
<input type="checkbox"/>	index.html	html	xqkPZwI09SFfCogWMXVvwH1oWv0Fb_4P	October 11, 2022, 11:27:52 (UTC+01:00)	207.0 B	Standard
<input type="checkbox"/>	index.html	html	null	October 11, 2022, 11:11:46 (UTC+01:00)	200.0 B	Standard

Delete coffee.jpg with Bucket Versioning enabled

Objects Properties Permissions Metrics Management Access Points

Objects (4)

Objects are the fundamental entities stored in Amazon S3. You can use [Amazon S3 inventory](#) to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. [Learn more](#)

[Copy](#) [Copy S3 URI](#) [Copy URL](#) [Download](#) [Open](#) [Delete](#) Actions Create folder Upload

Find objects by prefix [Show versions](#)

<input type="checkbox"/>	Name	Type	Version ID	Last modified	Size	Storage class
<input type="checkbox"/>	beach.jpg	jpg	null	October 11, 2022, 11:08:32 (UTC+01:00)	85.8 KB	Standard
<input type="checkbox"/>	coffee.jpg	Delete marker	SbtwLLDyPKVM7CeuxwWBp1jnf2wjQYnf	October 11, 2022, 11:30:43 (UTC+01:00)	0 B	-
<input type="checkbox"/>	coffee.jpg	jpg	null	October 11, 2022, 10:32:56 (UTC+01:00)	108.4 KB	Standard
<input type="checkbox"/>	index.html	html	null	October 11, 2022, 11:11:46 (UTC+01:00)	200.0 B	Standard

Objects Properties Permissions Metrics Management Access Points

Objects (4)

Objects are the fundamental entities stored in Amazon S3. You can use [Amazon S3 inventory](#) to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. [Learn more](#)

[Copy](#) [Copy S3 URI](#) [Copy URL](#) [Download](#) [Open](#) [Delete](#) Actions Create folder Upload

Find objects by prefix [Show versions](#)

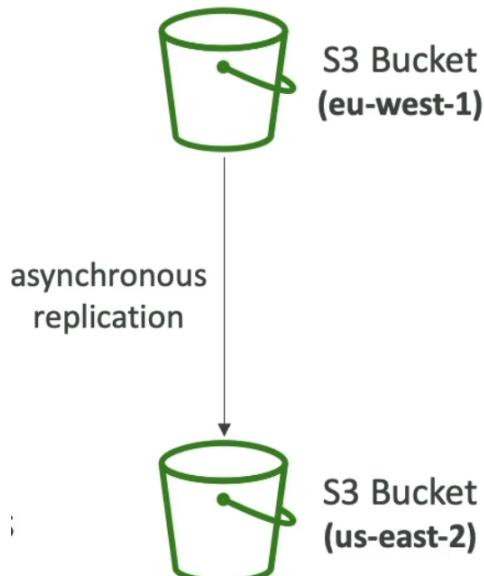
<input type="checkbox"/>	Name	Type	Version ID	Last modified	Size	Storage class
<input type="checkbox"/>	beach.jpg	jpg	null	October 11, 2022, 11:08:32 (UTC+01:00)	85.8 KB	Standard
<input checked="" type="checkbox"/>	coffee.jpg	Delete marker	SbtwLLDyPKVM7CeuxwWBp1jnf2wjQYnf	October 11, 2022, 11:30:43 (UTC+01:00)	0 B	-
<input type="checkbox"/>	coffee.jpg	jpg	null	October 11, 2022, 10:32:56 (UTC+01:00)	108.4 KB	Standard
<input type="checkbox"/>	index.html	html	null	October 11, 2022, 11:11:46 (UTC+01:00)	200.0 B	Standard

The screenshot shows the AWS S3 console interface. At the top, it says 'stephane-demo-s3' with an 'Info' link and a 'Publicly accessible' button. Below that is a navigation bar with tabs: Objects (highlighted in orange), Properties, Permissions, Metrics, Management, and Access Points. Under the 'Objects' tab, there's a sub-header 'Objects (3)'. A note below it says: 'Objects are the fundamental entities stored in Amazon S3. You can use Amazon S3 inventory [?] to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. Learn more [?]'.

Name	Type	Version ID	Last modified	Size	Storage class
beach.jpg	jpg	null	October 11, 2022, 11:08:32 (UTC+01:00)	85.8 KB	Standard
coffee.jpg	jpg	null	October 11, 2022, 10:32:56 (UTC+01:00)	108.4 KB	Standard
index.html	html	null	October 11, 2022, 11:11:46 (UTC+01:00)	200.0 B	Standard

Amazon S3 - Replication (CRR & SRR)

- Must enable **Versioning** in source and destination buckets
- **Cross-Region Replication (CRR)**
- **Same-Region Replication (SRR)**
- Buckets can be in different AWS accounts
- Copying is asynchronous
- Must give proper IAM permissions to S3
- Use cases:
 - CRR - compliance, lower latency access, replication across accounts
 - SRR - log aggregation, live replication between production and test accounts



Amazon S3 - Replication (Notes)

- After you enable Replication, only new objects are replicated
- Optionally, you can replicate existing objects using S3 Batch Replication
 - Replicates existing objects and objects that failed replication
- For DELETE operations
 - Can replicate delete markers from source to target (optional setting)
 - Deletions with a version ID are not replicated (to avoid malicious deletes)
- There is no "chaining" of replication
 - If bucket 1 has replication into buckets 2, which has replication into bucket 3
 - Then objects created in bucket 1 are not replicated to bucket 3

Hands on

Amazon S3 > Buckets > s3-stephane-bucket-origin-v2

s3-stephane-bucket-origin-v2

Objects Properties Permissions Metrics Management Access Points

Lifecycle rules (0)
Use lifecycle rules to define actions you want Amazon S3 to take during an object's lifetime such as transitioning objects to another storage class, archiving them, or deleting them after a specified period of time. [Learn more](#)

View details Edit Delete Actions Create lifecycle rule

Lifecycle rule name	Status	Scope	Current version actions	Noncurrent versions actions	Expired object delete markers	Incomplete multipart uploads
No lifecycle rules						

There are no lifecycle rules for this bucket.

Create lifecycle rule

Replication rules (0)
Use replication rules to define options you want Amazon S3 to apply during replication such as server-side encryption, replica ownership, transitioning replicas to another storage class, and more. [Learn more](#)

View details Edit rule Delete Actions Create replication rule

Replication rule name	Status	Destination bucket	Destination Region	Priority	Scope	Storage class	Replica owner	Replication Time Control	KMS-encrypted objects	Replica modification sync
No replication rules										

You don't have any rules in the replication configuration.

Create replication rule

Amazon S3 > Buckets > s3-stephane-bucket-origin-v2 > Replication rules > Create replication rule

Create replication rule

Replication rule configuration

Replication rule name

Up to 255 characters. In order to be able to use CloudWatch metrics to monitor the progress of your replication rule, the replication rule name must only contain English characters.

Status
Choose whether the rule will be enabled or disabled when created.
 Enabled
 Disabled

Priority
The priority value resolves conflicts that occur when an object is eligible for replication under multiple rules to the same destination. The rule is added to the configuration at the highest priority and the priority can be changed on the replication rules table.
0

Source bucket

Source bucket name
s3-stephane-bucket-origin-v2

Source Region
EU (Ireland) eu-west-1

Choose a rule scope
 Limit the scope of this rule using one or more filters
 Apply to all objects in the bucket

Destination

Destination
You can replicate objects across buckets in different AWS Regions (Cross-Region Replication) or you can replicate objects across buckets in the same AWS Region (Same-Region Replication). You can also specify a different bucket for each rule in the configuration. [Learn more](#) or see [Amazon S3 pricing](#)

Choose a bucket in this account
 Specify a bucket in another account

Bucket name
Choose the bucket that will receive replicated objects.

Destination Region
-

Destination

Destination
 You can replicate objects across buckets in different AWS Regions (Cross-Region Replication) or you can replicate objects across buckets in the same AWS Region (Same-Region Replication). You can also specify a different bucket for each rule in the configuration. [Learn more](#) or see [Amazon S3 pricing](#)

- Choose a bucket in this account
- Specify a bucket in another account

Bucket name
 Choose the bucket that will receive replicated objects.

Browse S3

Destination Region
 US East (N. Virginia) us-east-1

IAM role

- Choose from existing IAM roles
- Enter IAM role ARN

IAM role

[Create new role](#) View

Encryption

Replicate objects encrypted with AWS KMS
 You can replicate objects that are encrypted with AWS Key Management Service (AWS KMS) keys.

Destination storage class

Amazon S3 offers a range of storage classes designed for different use cases. [Learn more](#) or see [Amazon S3 pricing](#)

Change the storage class for the replicated objects

Additional replication options

Replication Time Control (RTC)
 Replication Time Control replicates 99.99% of new objects within 15 minutes and provides replication metrics and notifications. Additional fees will apply. [Learn more](#)

Replication metrics and notifications
 Monitor the progress of your replication rule through Cloudwatch Metrics. Cloudwatch metrics fees apply. [Learn more](#) or see [Amazon Cloudwatch pricing](#)

Delete marker replication

[s3-stephane-bucket-origin-v2](#) Info

Objects	Properties	Permissions	Metrics	Management	Access Points																		
Objects (2)	<input type="checkbox"/> Copy S3 URI <input type="checkbox"/> Copy URL <input type="checkbox"/> Download <input type="checkbox"/> Open <input type="checkbox"/> Delete <input type="checkbox"/> Actions <input type="checkbox"/> Create folder <input checked="" type="checkbox"/> Upload <input type="text" value="Find objects by prefix"/> <input type="checkbox"/> Show versions < 1 >																						
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[s3-stephane-bucket-replica-v2](#) Info

Objects	Properties	Permissions	Metrics	Management	Access Points												
Objects (1)	<input type="checkbox"/> Copy S3 URI <input type="checkbox"/> Copy URL <input type="checkbox"/> Download <input type="checkbox"/> Open <input type="checkbox"/> Delete <input type="checkbox"/> Actions <input type="checkbox"/> Create folder <input checked="" type="checkbox"/> Upload <input type="text" value="Find objects by prefix"/> <input type="checkbox"/> Show versions < 1 >																
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versioning

Objects (3)						
Objects are the fundamental entities stored in Amazon S3. You can use Amazon S3 inventory to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. Learn more						
<input type="button" value="C"/> <input type="button" value="Copy S3 URI"/> <input type="button" value="Copy URL"/> <input type="button" value="Download"/> <input type="button" value="Open"/> <input type="button" value="Delete"/> <input type="button" value="Actions"/> <input type="button" value="Create folder"/> <input type="button" value="Upload"/>						
<input type="checkbox"/> <input type="text" value="Find objects by prefix"/> <input type="radio"/> Show versions <input type="button" value="<"/> <input type="button" value="1"/> <input type="button" value=">"/> <input type="radio"/>						
Name	Type	Version ID	Last modified	Size	Storage class	
<input type="checkbox"/> beach.jpg	jpg	DK2XB3sN1HkzC4J3cePKUslnJz.lLHv1	August 15, 2022, 20:15:22 (UTC+01:00)	85.8 KB	Standard	
<input type="checkbox"/> beach.jpg	jpg	P0wZfICP1N5tCVRgWGkLTvBfpq6Dr205	August 15, 2022, 20:11:57 (UTC+01:00)	85.8 KB	Standard	
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Additional replication options

Replication Time Control (RTC)
Replication Time Control replicates 99.9% of new objects within 15 minutes and provides replication metrics and notifications.
Additional fees will apply. [Learn more](#)

Replication metrics and notifications
Monitor the progress of your replication rule through Cloudwatch Metrics. Cloudwatch metrics fees apply. [Learn more](#) or see [Amazon Cloudwatch pricing](#)

Delete marker replication
Delete markers created by S3 delete operations will be replicated. Delete markers created by lifecycle rules are not replicated. [Learn more](#)

Replica modification sync
Replicate metadata changes made to replicas in this bucket to the destination bucket. [Learn more](#)

Objects (2)						
Objects are the fundamental entities stored in Amazon S3. You can use Amazon S3 inventory to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. Learn more						
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S3 Storage Classes

- Amazon S3 Standard - General Purpose
- Amazon S3 Standard - Infrequent Access (IA)

- Amazon S3 One Zone-Infrequent Access
- Amazon S3 Glacier Instant Retrieval
- Amazon S3 Glacier Flexible Retrieval
- Amazon S3 Glacier Deep Archive
- Amazon S3 Intelligent Tiering

Can move between classes manually or using S3 Lifecycle configurations

S3 Durability and Availability

- Durability:
 - High durability (99.99999999%, 11 9's) of objects across multiple AZ
 - If you store 10,000,000 objects with Amazon S3, you can on average expect to incur a loss of a single object once every 10,000 years
 - Same for all storage classes
- Availability:
 - Measures how readily available a service is
 - Varies depending on storage class
 - Example: S3 standard has 99.99% availability = not available 53 minutes a year

S3 Standard - General Purpose

- 99.99% Availability
- Used for frequently accessed data
- Low latency and high throughput
- Sustains 2 concurrent facility failures
- Use Cases: Big Data analytics, mobile & gaming applications, content distribution ...

S3 Storage Classes - Infrequent Access

- For data that is less frequently accessed, but requires rapid access when needed
- Lower cost than S3 Standard
- **Amazon S3 Standard-Infrequent Access (S3 Standard-IA)**
 - 99.9% Availability
 - Use cases: Disaster Recovery, backups
- **Amazon S3 One Zone-Infrequent Access (S3 One Zone-IA)**
 - High durability (99.99999999%) in a single AZ; data lost when AZ is destroyed
 - 99.5% Availability
 - Use Case: Storing secondary backup copies of on-premise data, or data you can recreate

Amazon S3 Glacier Storage Classes

- Low-cost object storage meant for archiving / backup
- Pricing: price for storage + object retrieval cost
- **Amazon S3 Glacier Instant Retrieval**
 - Millisecond retrieval, great for data accessed once a quarter
 - Minimum storage duration of 90 days
- **Amazon S3 Glacier Flexible Retrieval (formerly Amazon S3 Glacier):**
 - Expedited(1 to 5 minutes), Standard (3 to 5 hours), Bulk(5 to 12 hours) - free
 - Minimum storage duration of 90 days
- **Amazon S3 Glacier Deep Archive - for long term storage:**
 - Standard (12 hours), Bulk(48 hours)
 - Minimum storage duration of 180 days

S3 intelligent - Tiering

- Small monthly monitoring and auto-tiering fee
- Moves objects automatically between Access Tiers based on usage
- There are no retrieval charge in S3 Intelligent - Tiering
- Frequent Access tier (automatic): default tier
- Infrequent Access tier (automatic): objects not accessed for 30 days
- Archive Instant Access tier (automatic): objects not accessed for 90 days
- Archive Access tier (optional): configurable from 90 days to 700+ days
- Deep Archive Access tier (optional): config from 180 days to 700+ days

S3 Storage Classes Comparison

	Standard	Intelligent-Tiering	Standard-IA	One Zone-IA	Glacier Instant Retrieval	Glacier Flexible Retrieval	Glacier Deep Archive
Durability	99.99999999% == (11 9's)						
Availability	99.99%	99.9%	99.9%	99.5%	99.9%	99.99%	99.99%
Availability SLA	99.9%	99%	99%	99%	99%	99.9%	99.9%
Availability Zones	>= 3	>= 3	>= 3	1	>= 3	>= 3	>= 3
Min. Storage Duration Charge	None	None	30 Days	30 Days	90 Days	90 Days	180 Days
Min. Billable Object Size	None	None	128 KB	128 KB	128 KB	40 KB	40 KB
Retrieval Fee	None	None	Per GB retrieved	Per GB retrieved	Per GB retrieved	Per GB retrieved	Per GB retrieved

Hands on

Amazon S3 > Buckets > Create bucket

Create bucket Info

Buckets are containers for data stored in S3. [Learn more](#)

General configuration

Bucket name Bucket name must be unique and must not contain spaces or uppercase letters. [See rules for bucket naming](#)

AWS Region

Copy settings from existing bucket - *optional*
Only the bucket settings in the following configuration are copied.

[Choose bucket](#)

Files and folders (1 Total, 108.4 KB)

All files and folders in this table will be uploaded.

Name	Folder	Type	Size
coffee.jpg	-	image/jpeg	108.4 KB

Destination

Destination
[s3://s3-storage-classes-demos-2022](#)

▶ **Destination details**
Bucket settings that impact new objects stored in the specified destination.

▶ **Permissions**
Grant public access and access to other AWS accounts.

▶ **Properties**
Specify storage class, encryption settings, tags, and more.

Cancel **Upload**

▼ **Properties**
Specify storage class, encryption settings, tags, and more.

Storage class

Amazon S3 offers a range of storage classes designed for different use cases. [Learn more](#) or see [Amazon S3 pricing](#)

Storage class	Designed for	Availability Zones	Min storage duration
Standard	Frequently accessed data (more than once a month) with milliseconds access	≥ 3	-
Intelligent-Tiering	Data with changing or unknown access patterns	≥ 3	-
Standard-IA	Infrequently accessed data (once a month) with milliseconds access	≥ 3	30 days
One Zone-IA	Recreatable, infrequently accessed data (once a month) stored in a single Availability Zone with milliseconds access	1	30 days

Storage class

Amazon S3 offers a range of storage classes designed for different use cases. [Learn more](#) or see [Amazon S3 pricing](#)

Storage class
[One Zone-IA](#)

Edit

Amazon S3 > Buckets > s3-storage-classes-demos-2022

s3-storage-classes-demos-2022

Objects Properties Permissions Metrics **Management** Access Points

Lifecycle rules (0)
Use lifecycle rules to define actions you want Amazon S3 to take during an object's lifetime such as transitioning objects to another storage class, archiving them, or deleting them after a specified period of time. [Learn more](#)

Lifecycle rule name	Status	Scope	Current version actions	Noncurrent versions actions	Expired object delete markers	Incomplete multipart uploads
No lifecycle rules						

There are no lifecycle rules for this bucket.

Create lifecycle rule

Create lifecycle rule

Lifecycle rule configuration

Lifecycle rule name

DemoRule

Up to 255 characters

Choose a rule scope

- Limit the scope of this rule using one or more filters
- Apply to all objects in the bucket

Filter type

You can filter objects by prefix, object tags, object size, or whatever combination suits your usecase.

Prefix

Add filter to limit the scope of this rule to a single prefix.

Enter prefix

Don't include the bucket name in the prefix. Using certain characters in key names can cause problems with some applications and protocols. [Learn more](#)

Object tags

You can limit the scope of this rule to the key/value pairs added below.

Choose a rule scope

- Limit the scope of this rule using one or more filters
- Apply to all objects in the bucket



Apply to all objects in the bucket

If you want the rule to apply to specific objects, you must use a filter to identify those objects. Choose "Limit the scope of this rule using one or more filters". [Learn more](#)

I acknowledge that this rule will apply to all objects in the bucket.

Lifecycle rule actions

Choose the actions you want this rule to perform. Per-request fees apply. [Learn more](#) or see [Amazon S3 pricing](#)

- Move current versions of objects between storage classes
- Move noncurrent versions of objects between storage classes
- Expire current versions of objects
- Permanently delete noncurrent versions of objects
- Delete expired object delete markers or incomplete multipart uploads

These actions are not supported when filtering by object tags or object size.

Transition current versions of objects between storage classes

Choose transitions to move current versions of objects between storage classes based on your use case scenario and performance access requirements. These transitions start from when the objects are created and are consecutively applied. [Learn more](#)

Choose storage class transitions

Choose storage class transitions	Days after object creation	
Standard-IA	30	<button>Remove</button>
Intelligent-Tiering	60	<button>Remove</button>
Glacier Flexible Retrieval (formerly...	180	<button>Remove</button>

[Add transition](#)

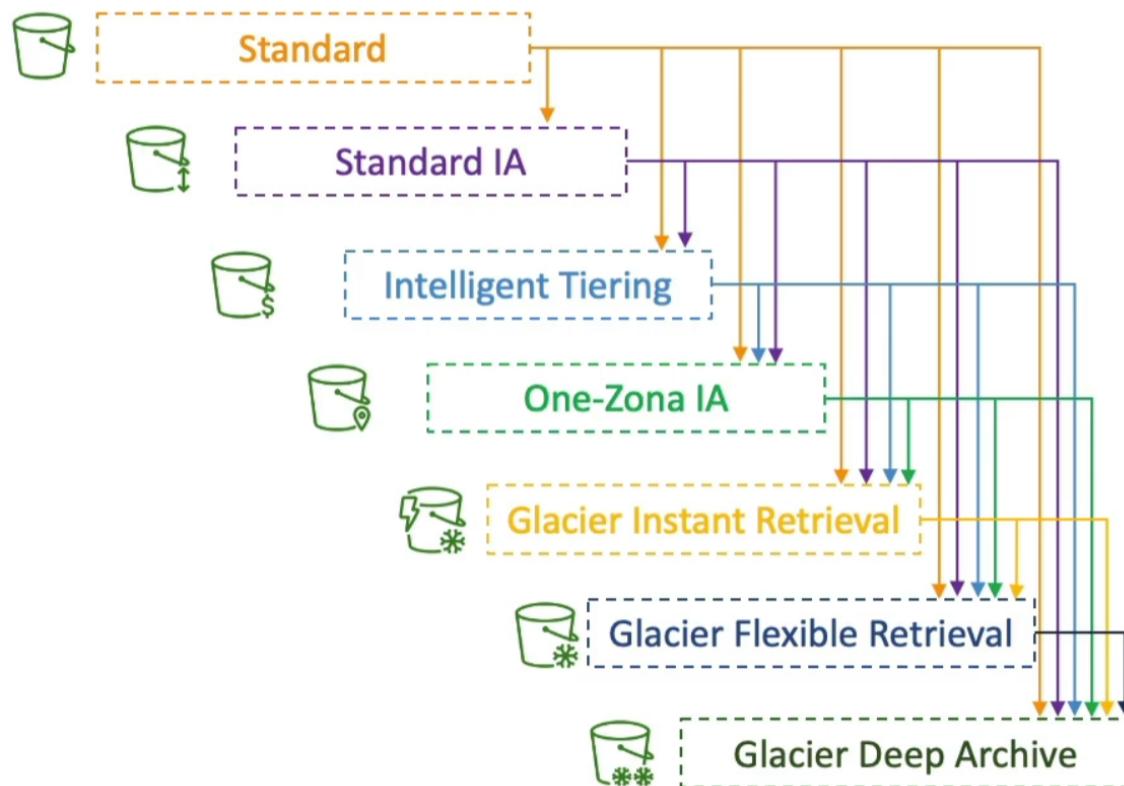
Current version actions	Noncurrent versions actions
Day 0	Day 0
• Objects uploaded	No actions defined.
↓	
Day 30	
• Objects move to Standard-IA	
↓	
Day 60	
• Objects move to Intelligent-Tiering	
↓	
Day 180	
• Objects move to Glacier Flexible Retrieval (formerly Glacier)	

Cancel

Create rule

Amazon S3 - Moving between Storage Classes

- You can transition objects between storage classes
- For infrequently accessed object, move them to **Standard IA**
- For archive objects that you don't need fast access to, move them to **Glacier or Glacier Deep Archive**
- Moving objects can be automated using a **Lifecycle Rules**



Amazon S3 - Lifecycle Rules

- Transition Actions - configure objects to transition to another storage class
 - Move objects to Standard IA class 60 days after creation
 - Move to Glacier for archiving after 6 months
- Expiration actions - configure objects to expire (delete) after some time
 - Access log files can be set to delete after a 365 days
 - Can be used to delete old versions of files (if versioning is enable)
 - Can be used to delete incomplete Multi-Part uploads
- Rules can be created for a certain prefix (example: s3://mybucket/mps/*)
- Rules can be created for certain objects Tags (example:Department:Finance)

Scenario 1

- Your application on EC2 creates images thumbnails after profile photos are uploaded to Amazon S3. These thumbnails can be easily recreated, and only need to be kept for 60 days. The source images should be able to be immediately retrieved for these 60 days, and afterwards, the user can wait up to 6 hours. How would you design this?

S3 source images can be on **Standard**, with a lifecycle configuration to transition them to **Glacier** after 60 days
 S3 thumbnails can be on **One-Zone IA**, with a lifecycle configuration to expire them (delete them) after 60 days

Scenario 2

- A rule in your company states that you should be able to recover your deleted S3 objects immediately for 30 days, although this may happen rarely. After this time, and for up to 365 days, delete objects should be recoverable within 48 hours

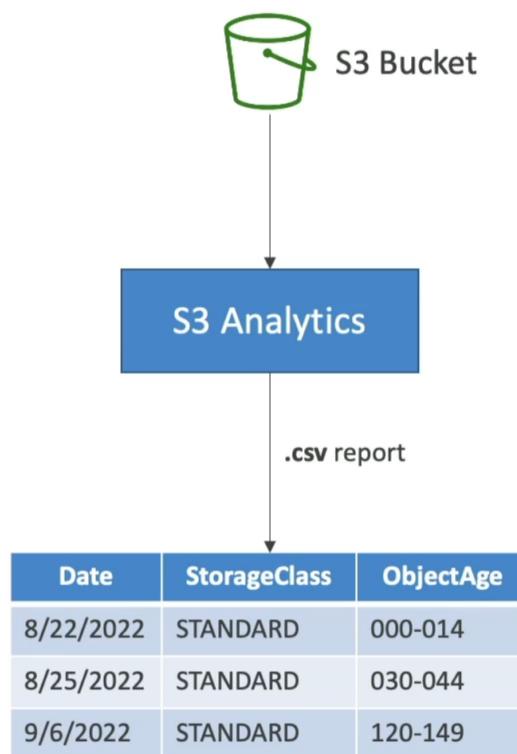
Enable **S3 Versioning** in order to have object versions, so that "deleted objects" are in fact hidden by a "delete marker" and can be recovered

Transition the "noncurrent versions" of the object to **Standard IA**

Transition afterwards the "noncurrent versions" to **Glacier Deep Archive**

Amazon S3 Analytics - Storage Class Analysis

- Help you decide when to transition objects to the right storage class
- Recommendations for **Standard** and **Standard IA**
 - Does NOT work for One-Zone IA or Glacier
- Report is updated daily
- 24 to 48 hours to start seeing data analysis
- Good first step to put together Lifecycle Rules (or improve them)



Hands on

Amazon S3 > Buckets > s3-storage-classes-stephane-demo > Lifecycle configuration > Create lifecycle rule

Create lifecycle rule

Lifecycle rule configuration

Lifecycle rule name: DemoRule
 Choose a rule scope:
 Limit the scope of this rule using one or more filters
 Apply to all objects in the bucket

Apply to all objects in the bucket
 If you want the rule to apply to specific objects, you must use a filter to identify those objects. Choose "Limit the scope of this rule using one or more filters". [Learn more](#)

I acknowledge that this rule will apply to all objects in the bucket.

Lifecycle rule actions
 Choose the actions you want this rule to perform. Per-request fees apply. [Learn more](#) or see [Amazon S3 pricing](#)

Lifecycle rule actions

Choose the actions you want this rule to perform. Per-request fees apply. [Learn more](#) or see [Amazon S3 pricing](#)

<input checked="" type="checkbox"/> Move current versions of objects between storage classes
<input type="checkbox"/> Move noncurrent versions of objects between storage classes
<input type="checkbox"/> Expire current versions of objects
<input type="checkbox"/> Permanently delete noncurrent versions of objects
<input type="checkbox"/> Delete expired object delete markers or incomplete multipart uploads

These actions are not supported when filtering by object tags or object size.

Transition current versions of objects between storage classes

Choose transitions to move current versions of objects between storage classes based on your use case scenario and performance access requirements. These transitions start from when the objects are created and are consecutively applied. [Learn more](#)

Choose storage class transitions	Days after object creation
Standard-IA	30
Intelligent-Tiering	60

[Add transition](#)

Transition noncurrent versions of objects between storage classes

Choose transitions to move noncurrent versions of objects between storage classes based on your use case scenario and performance access requirements. These transitions start from when the objects become noncurrent and are consecutively applied. [Learn more](#)

Choose storage class transitions	Days after objects become noncurrent	Number of newer versions to retain - <i>Optional</i>
Glacier Flexible Ret...	90	Number of versions

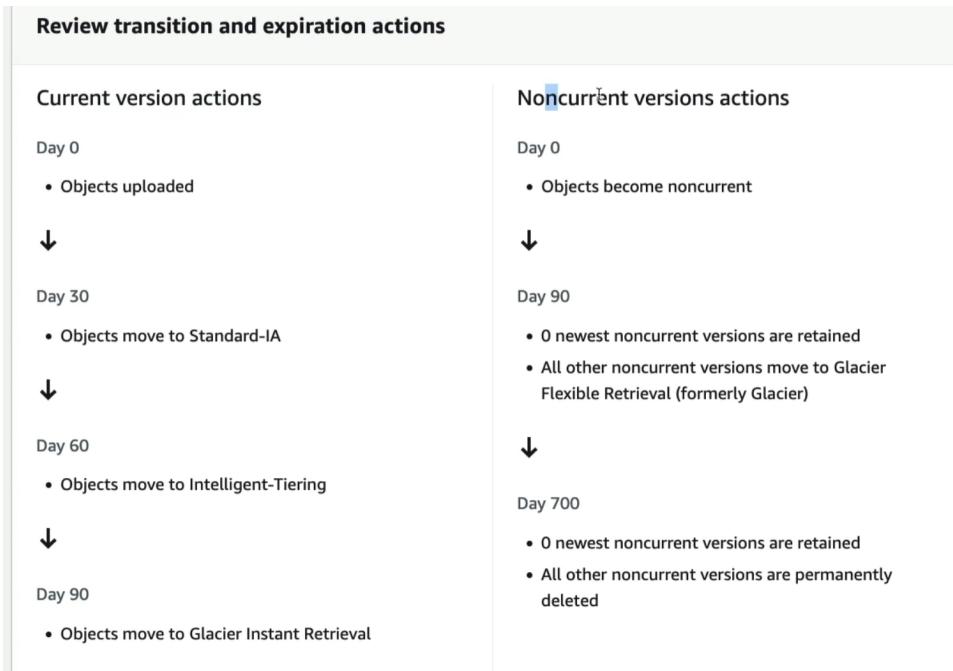
Can be up to 100 versions. All other noncurrent versions will be moved.

[Add transition](#)

⚠️ Transitioning small objects to Glacier Flexible Retrieval (formerly Glacier) or Glacier Deep Archive will incur a per object cost

You will be charged for each object you transition to S3 Glacier Flexible Retrieval (formerly Glacier) or S3 Glacier Deep Archive. A fixed amount of storage is also added to each object to accommodate metadata for managing the object which increases storage costs. You can reduce these costs by limiting the number of objects to transition (by prefix, tag, or version), or by aggregating objects before transitioning them. Learn more about [Glacier Flexible Retrieval \(formerly Glacier\) cost considerations](#) or review the table on Requests and data retrievals tab on the [Amazon S3 pricing page](#)

I acknowledge that this lifecycle rule will incur a one-time lifecycle request cost per object if it transitions small objects.

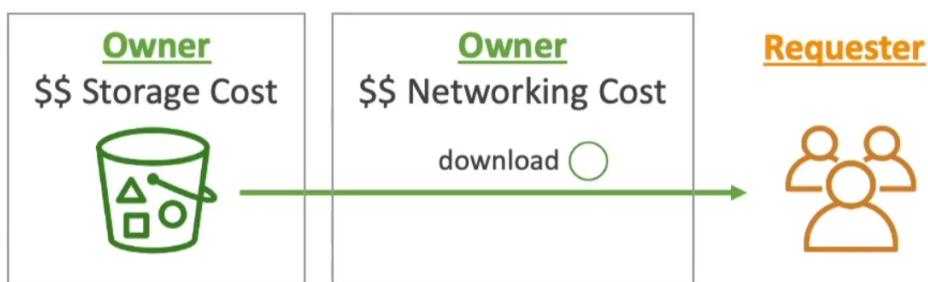


S3 - Requester Pays

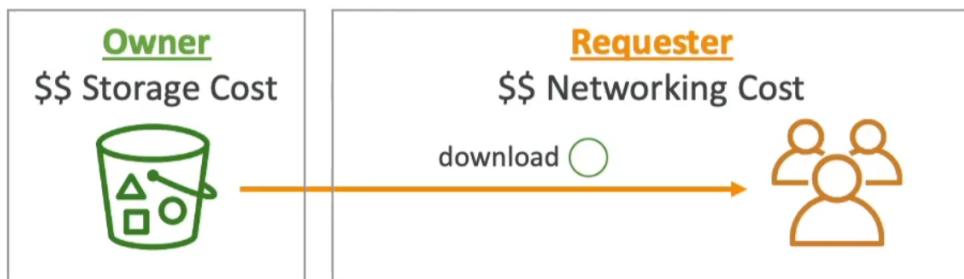
- In general, bucket owners pay for all Amazon S3 storage and data transfer costs associated with their bucket
- **With Requester Pays buckets**, the requester instead of the bucket owner pays the cost of the request and the data download from the bucket
- Helpful when you want to share large datasets with other accounts

- The requester must be authenticated in AWS (cannot be anonymous)

Standard Bucket



Requester Pays Bucket



S3 Event Notifications

- S3: ObjectCreated, S3:ObjectRemoved,
- S3: ObjectRestore, S3:Replication ..
- Object name filtering possible (*.jpg)
- Use case: generate thumbnails of images uploaded to S3
- Can create as many "S3 events" as desired**
- S3 event notifications typically deliver events in seconds but can sometimes take a minute or longer

