EX.NO 5: Host a Static Website using Amazon S3

Date:

READING MATERIALS:

Storage services

AWS provides a collection of services for data storage and information management. The core service in this area is represented by Amazon Simple Storage Service (S3). This is a distributed object store that allows users to store information in different formats. The core components of S3 are two: buckets and objects. Buckets represent virtual containers in which to store objects; objects represent the content that is actually stored. Objects can also be enriched with metadata that can be used to tag the stored content with additional information.

S3 key concepts

As the name suggests, S3 has been designed to provide a simple storage service that's accessible through a Representational State Transfer (REST) interface, which is quite similar to a distributed file system but which presents some important differences that allow the infrastructure to be highly efficient:

- The storage is organized in a two-level hierarchy. S3 organizes its storage space into buckets that cannot be further partitioned. This means that it is not possible to create directories or other kinds of physical groupings for objects stored in a bucket. Despite this fact, there are few limitations in naming objects, and this allows users to simulate directories and create logical groupings.

- Stored objects cannot be manipulated like standard files. S3 has been designed to essentially provide storage for objects that will not change over time. Therefore, it does not allow renaming, modifying, or relocating an object. Once an object has been added to a bucket, its content and position is immutable, and the only way to change it is to remove the object from the store and add it again.

Content is not immediately available to users. The main design goal of S3 is to provide an eventually consistent data store. As a result, because it is a large distributed storage facility, changes are not immediately reflected. For instance, S3 uses replication to provide redundancy and efficiently serve objects across the globe; this practice introduces latencies when adding objects to the store—especially large ones—which are not available instantly across the entire globe.

- Requests will occasionally fail. Due to the large distributed infrastructure being managed, requests for object may occasionally fail. Under certain conditions, S3 can decide to drop a request by returning an internal server error. Therefore, it is expected to have a small failure rate during day-to-day operations, which is generally not identified as a persistent failure. Access to S3 is provided with RESTful Web services. These express all the operations that can be performed on the storage in the form of HTTP requests (GET, PUT, DELETE, HEAD, and POST), which operate differently according to the element they address. As a rule of thumb PUT/ POST requests add new content to the store, GET/HEAD requests are used to retrieve content and information, and DELETE requests are used to remove elements or information attached to them.

Resource naming

Buckets, objects, and attached metadata are made accessible through a REST interface. Therefore, they are represented by uniform resource identifiers (URIs) under the s3.amazonaws.com domain. All the operations are then performed by expressing the entity they are directed to in the form of a request for a URI. Amazon offers three different ways of addressing a bucket:

- Canonical form: http://s3.amazonaws.com/bukect_name/. The bucket name is expressed as a path component of the domain name s3.amazonaws.com. This is the naming convention that has less restriction in terms of allowed characters, since all the characters that are allowed for a path component can be used.

- Subdomain form: http://bucketname.s3.amazon.com/. Alternatively, it is also possible to reference a bucket as a subdomain of s3.amazonaws.com. To express a bucket name in this form, the name has to do all of the following:

- Be between 3 and 63 characters long

- Contain only letters, numbers, periods, and dashes

- Start with a letter or a number

- Contain at least one letter

- Have no fragments between periods that start with a dash or end with a dash or that are empty strings This form is equivalent to the previous one when it can be used, but it is the one to be preferred since it works more effectively for all the geographical locations serving resources stored in S3.

- Virtual hosting form: http://bucket-name.com/. Amazon also allows referencing of its resources with custom URLs. This is accomplished by entering a CNAME record into the DNS that points to the subdomain form of the bucket URI Since S3 is logically organized as a flat data store, all the buckets are managed under the s3. amazonaws.com domain. Therefore, the names of buckets must be unique across all the users.

Objects are always referred as resources local to a given bucket. Therefore, they always appear as a part of the resource component of a URI. Since a bucket can be expressed in three different ways, objects indirectly inherit this flexibility:

- Canonical form: http://s3.amazonaws.com/bukect_name/object_name
- Subdomain form: http://bucket-name/s3.amzonaws.com/object_name

Objects are always referred as resources local to a given bucket. Therefore, they always appear as a part of the resource component of a URI. Since a bucket can be expressed in three different ways, objects indirectly inherit this flexibility:

- Canonical form: http://s3.amazonaws.com/bukect_name/object_name
- Subdomain form: http://bucket-name/s3.amzonaws.com/object_name

- Virtual hosting form: http://bucket-name.com/object_name Except for the ?, which separates the resource path of a URI from the set of parameters passed with the request, all the characters that follow the / after the bucket reference constitute the name of the object. For instance, path separator characters expressed as part of the object name do not have corresponding physical layout within the bucket store. Despite this fact, they can still be used to create logical groupings that look like directories.

Finally, specific information about a given object, such as its access control policy or the server logging settings defined for a bucket, can be referenced using a specific parameter. More precisely:

- Object ACL: http://s3.amazonaws.com/bukect_name/object_name?acl
- Bucket server logging: http://s3.amzonaws.com/bucket_name?logging

Object metadata are not directly accessible through a specific URI, but they are manipulated by adding attributes in the request of the URL and are not part of the identifier. Buckets A bucket is a container of objects. It can be thought of as a virtual drive hosted on the S3 distributed storage, which provides users with a flat store to which they can add objects.

Buckets are toplevel elements of the S3 storage architecture and do not support nesting. That is, it is not possible to create “subbuckets” or other kinds of physical divisions. A bucket is located in a specific geographic location and eventually replicated for fault tolerance and better content distribution. Users can select the location at which to create buckets, which by default are created in Amazon’s U.S. datacenters.

Once a bucket is created, all the objects that belong to the bucket will be stored in the same availability zone of the bucket. Users create a bucket by sending a PUT request to http://s3.amazonaws.com/ with the name of the bucket and, if they want to specify the availability zone, additional information about the preferred location. The content of a bucket can be listed by sending a GET request specifying the name of the bucket. Once created, the bucket cannot be renamed or relocated. If it is necessary to do so, the bucket needs to be deleted and recreated. The deletion of a bucket is performed by a DELETE request, which can be successful if and only if the bucket is empty.

Access control and security

Amazon S3 allows controlling the access to buckets and objects by means of Access Control Policies (ACPs). An ACP is a set of grant permissions that are attached to a resource expressed by means of an XML configuration file. A policy allows defining up to 100 access rules, each of them granting one of the available permissions to a grantee. Currently, five different permissions can be used:

- READ allows the grantee to retrieve an object and its metadata and to list the content of a bucket as well as getting its metadata.

- WRITE allows the grantee to add an object to a bucket as well as modify and remove it.

- READ_ACP allows the grantee to read the ACP of a resource.

- WRITE_ACP allows the grantee to modify the ACP of a resource.

- FULL_CONTROL grants all of the preceding permissions. Grantees can be either single users or groups. Users can be identified by their canonical IDs or the email addresses they provided when they signed up for S3. For groups, only three options are available: all users, authenticated users, and log delivery users. Once a resource is created, S3 attaches a default ACP granting full control permissions to its owner only. Changes to the ACP can be made by using the request to the resource URI followed by ?acl. A GET method allows retrieval of the ACP; a PUT method allows uploading of a new ACP to replace the existing one. Alternatively, it is possible to use a predefined set of permissions called canned policies to set the ACP at the time a resource is created. These policies represent the most common access patterns for S3 resources.

EX.NO 5: Host a Static Website using Amazon S3

Date:

AIM:

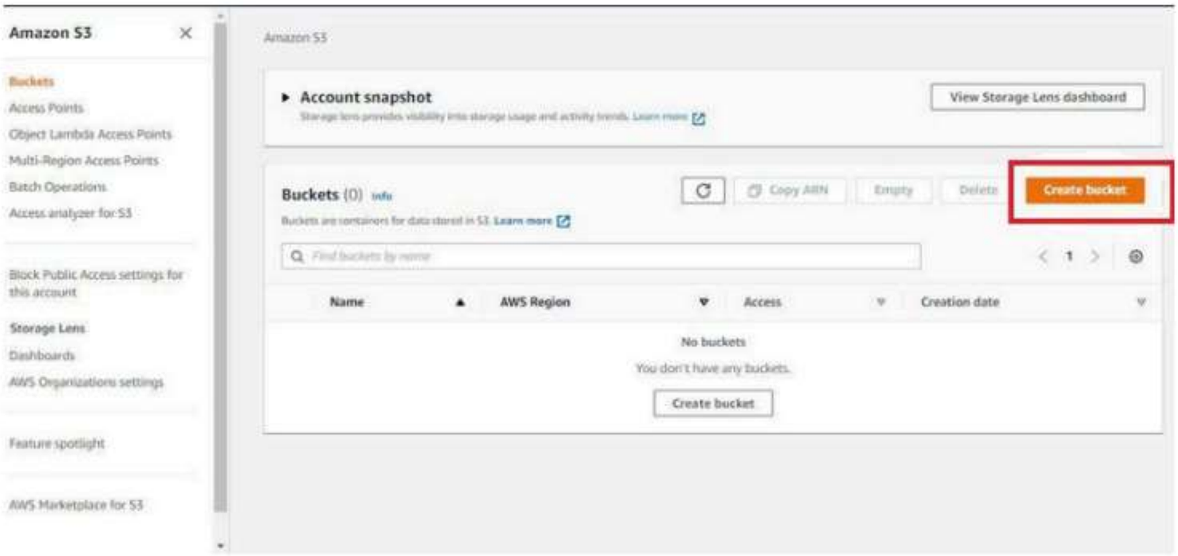
To host a Static Website using Amazon S3.

PROCEDURE with SCREENSHOTS:

Step 1: Creating a Bucket:

Open the Amazon S3 console by logging into the AWS Management Console at https://console.aws.amazon.com/s3/...

Click on Create Bucket.

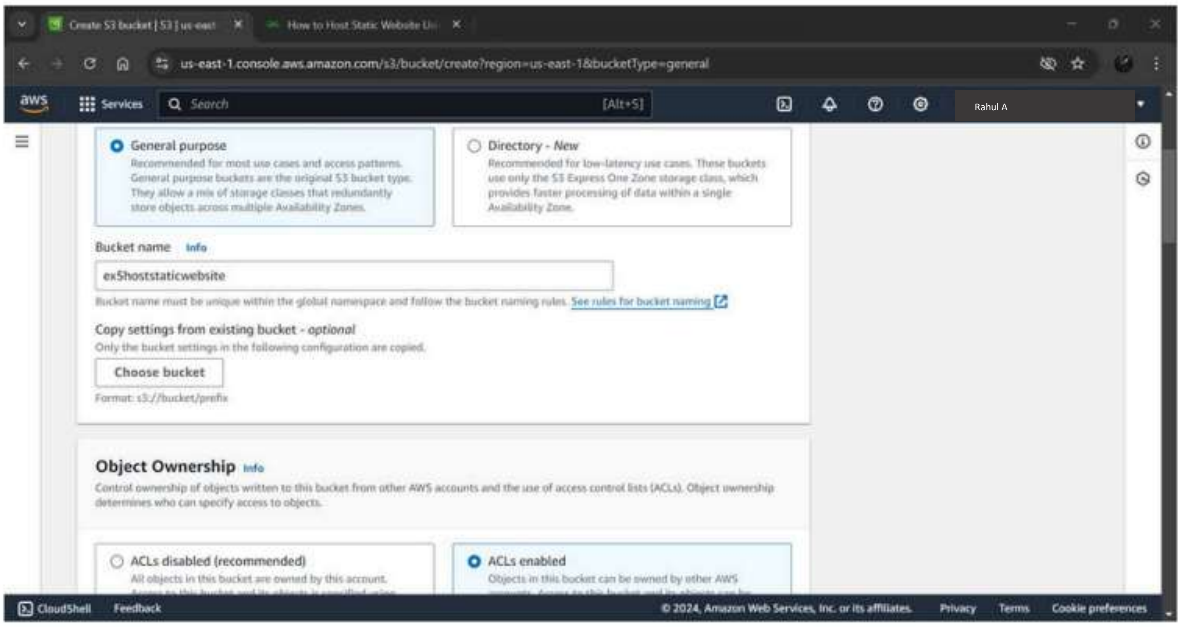


Storage lens provides visibility into storage usage and activity trends. Learn more

Buckets are containers for data stored in S3. Learn more

You don't have any buckets.

Step 2: Choose Bucket name, AWS Region, Change Object ownership to ACLs enabled.


Create S3 bucket | S3 | us-east
How to Host Static Website U
us-east-1.console.aws.amazon.com/s3/bucket/create?region=us-east-1&bucketType=general
aws
Services
Search
[Alt+S]
Rahul A
CloudShell
Feedback
© 2024, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences

● General purpose
Recommended for most use cases and access patterns. General purpose buckets are the original S3 bucket type. They allow a mix of storage classes that redundantly store objects across multiple Availability Zones.

○ Directory - *New*
Recommended for low-latency use cases. These buckets use only the S3 Express One Zone storage class, which provides faster processing of data within a single Availability Zone.

Bucket name Info

exShoststaticwebsite

Bucket name must be unique within the global namespace and follow the bucket naming rules. See rules for bucket naming

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

Choose bucket

Format: s3://bucket/prefix

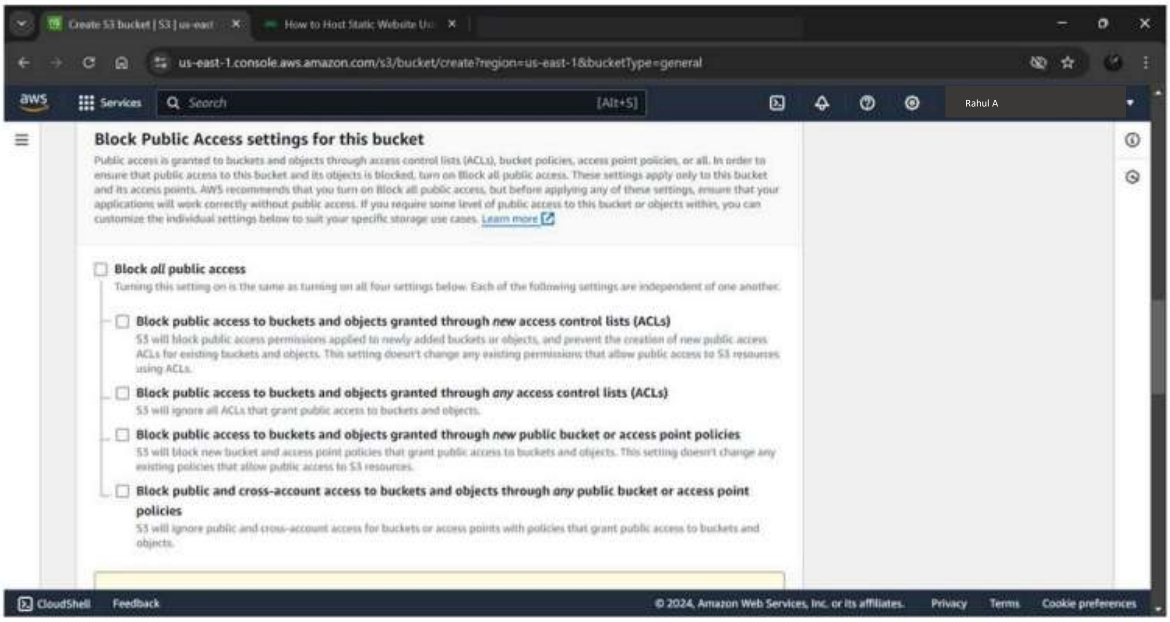
Object Ownership Info

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.

● ACLs enabled
Objects in this bucket can be owned by other AWS

Step 3: Block Public Access settings for the bucket – Uncheck all the boxes to allow public access.


Create S3 bucket | S3 | us-east
How to Host Static Website U
us-east-1.console.aws.amazon.com/s3/bucket/create?region=us-east-1&bucketType=general
aws
Services
Search
[Alt+S]
Rahul A
CloudShell
Feedback
© 2024, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences

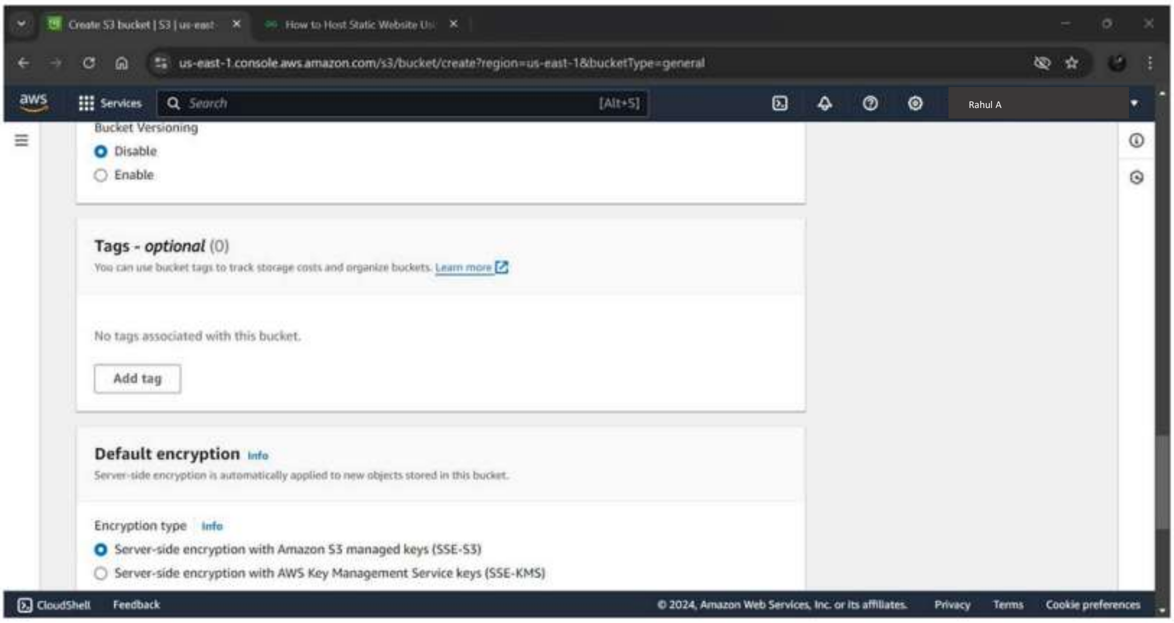
Block Public Access settings for this bucket

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.

Step 4 : Do not change other settings like Bucket Versioning, Tags , Default Encryption settings.


Create S3 bucket | S3 | us-east-
How to Host Static Website Us
us-east-1.console.aws.amazon.com/s3/bucket/create?region=us-east-1&bucketType=general
aws
Services
Search
[Alt+S]
Rahul A

Bucket Versioning

● Disable

○ Enable

Tags - *optional* (0)

You can use bucket tags to track storage costs and organize buckets. Learn more

No tags associated with this bucket.

Add tag

Default encryption Info

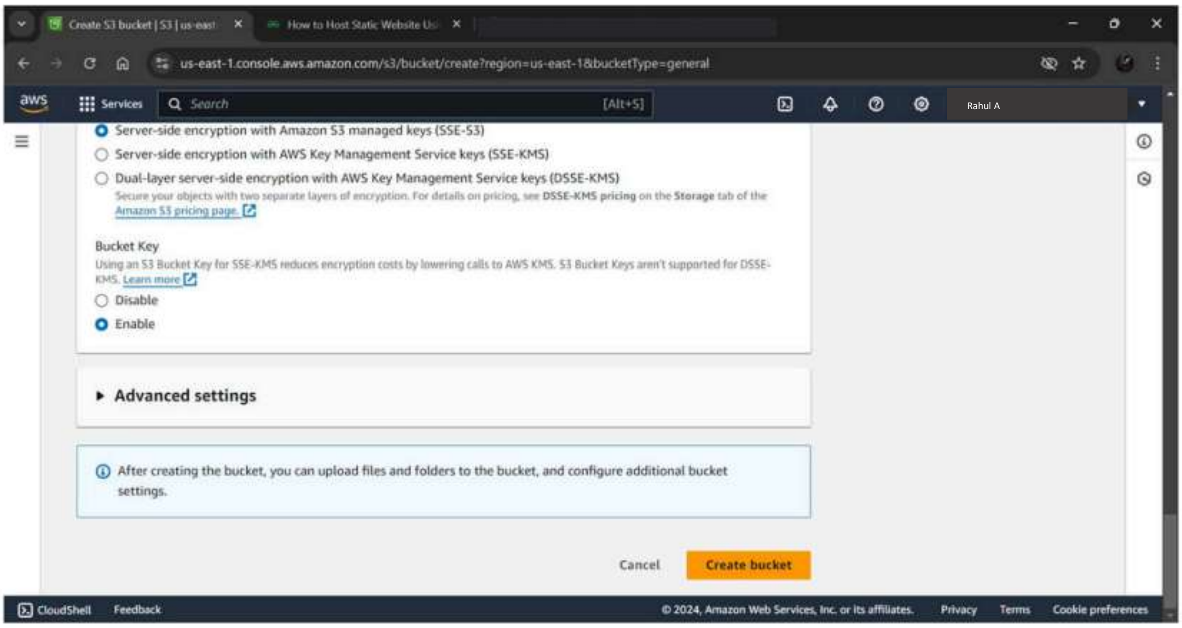
Server-side encryption is automatically applied to new objects stored in this bucket.

Encryption type Info

● Server-side encryption with Amazon S3 managed keys (SSE-S3)

○ Server-side encryption with AWS Key Management Service keys (SSE-KMS)

Step 5 : Click on Create Bucket.


Create S3 bucket | S3 | us-east
How to Host Static Website Us
us-east-1.console.aws.amazon.com/s3/bucket/create?region=us-east-1&bucketType=general
aws
Services
Search
[Alt+S]
Rahul A

● Server-side encryption with Amazon S3 managed keys (SSE-S3)

○ Server-side encryption with AWS Key Management Service keys (SSE-KMS)

○ Dual-layer server-side encryption with AWS Key Management Service keys (DSSE-KMS)

Secure your objects with two separate layers of encryption. For details on pricing, see **DSSE-KMS pricing** on the **Storage** tab of the Amazon S3 pricing page.

Bucket Key

Using an S3 Bucket Key for SSE-KMS reduces encryption costs by lowering calls to AWS KMS. S3 Bucket Keys aren't supported for DSSE-KMS. Learn more

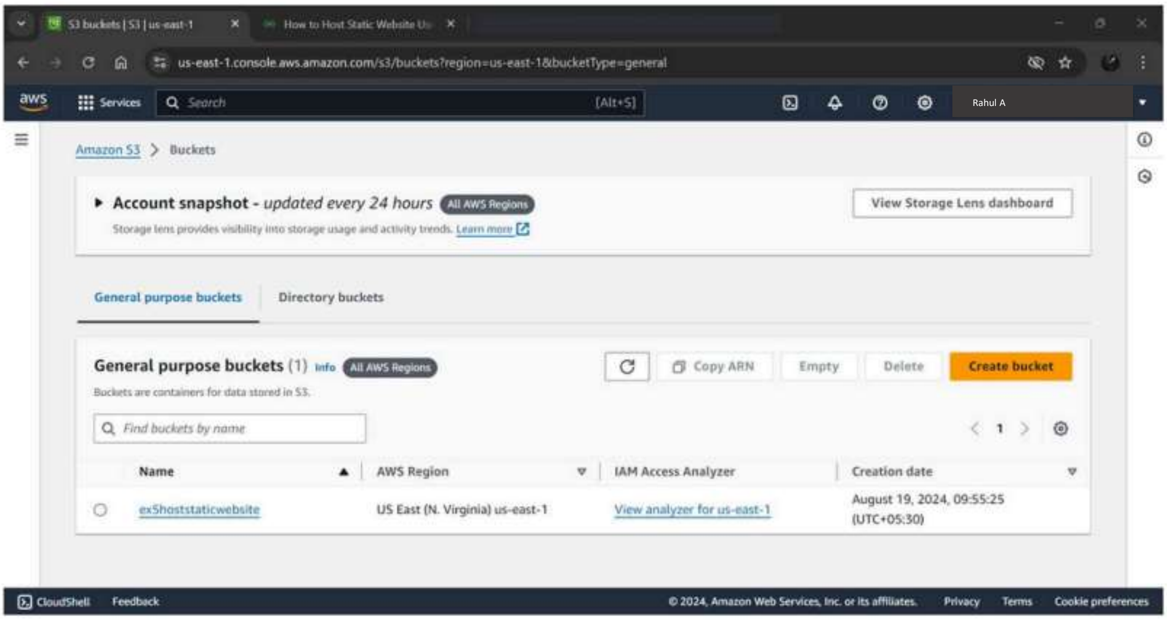
○ Disable

● Enable

▸ **Advanced settings**

After creating the bucket, you can upload files and folders to the bucket, and configure additional bucket settings.

Step 6 : Select Bucket and upload the Website files.



S3 buckets | S3 | us-east-1
How to Host Static Website U
us-east-1.console.aws.amazon.com/s3/buckets?region=us-east-1&bucketType=general
Services
Search
[Alt+S]
Rahul A
Amazon S3 > Buckets

Account snapshot - *updated every 24 hours* All AWS Regions

Storage lens provides visibility into storage usage and activity trends. Learn more

View Storage Lens dashboard
General purpose buckets
Directory buckets

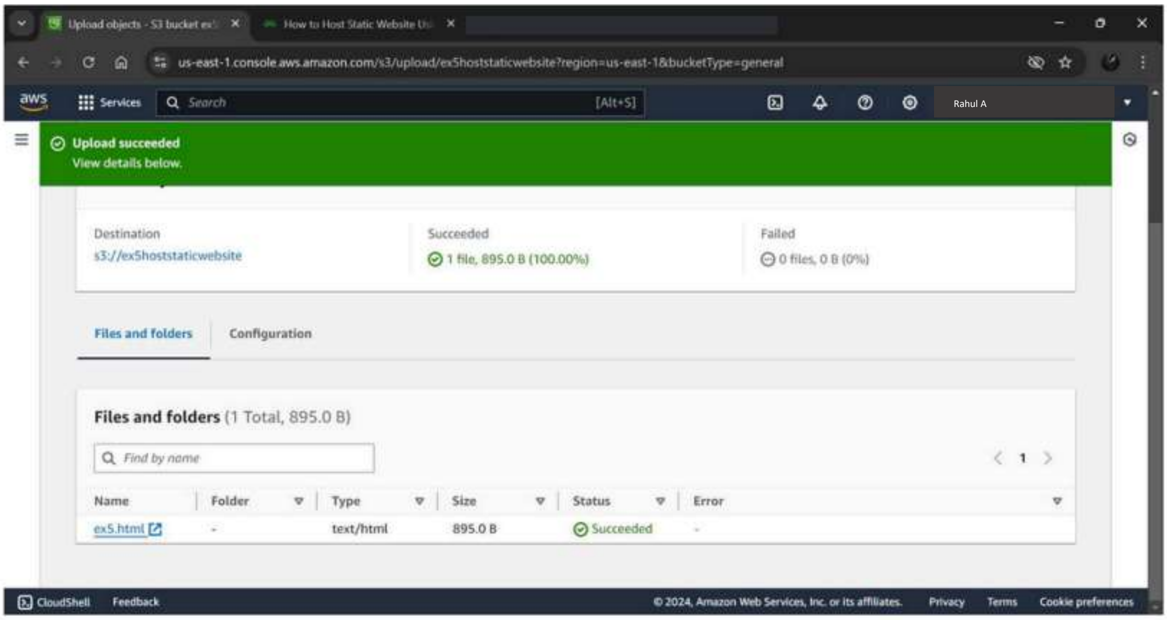
General purpose buckets (1) Info All AWS Regions

Buckets are containers for data stored in S3.

Copy ARN
Empty
Delete
Create bucket
Find buckets by name

	Name	AWS Region	IAM Access Analyzer	Creation date
○	ex5hoststaticwebsite	US East (N. Virginia) us-east-1	View analyzer for us-east-1	August 19, 2024, 09:55:25 (UTC+05:30)

CloudShell
Feedback
© 2024, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences



Upload objects - S3 bucket ex5
How to Host Static Website U
us-east-1.console.aws.amazon.com/s3/upload/ex5hoststaticwebsite?region=us-east-1&bucketType=general
Services
Search
[Alt+S]
Rahul A

Upload succeeded
View details below.

Destination	Succeeded	Failed
s3://ex5hoststaticwebsite	1 file, 895.0 B (100.00%)	0 files, 0 B (0%)

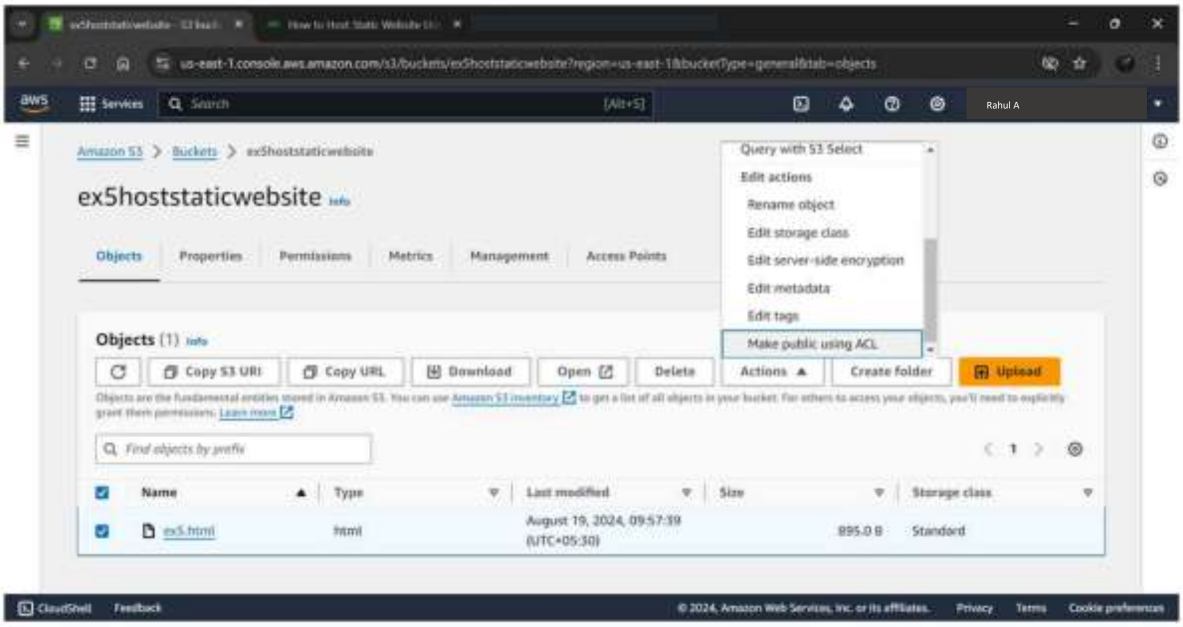
Files and folders
Configuration

Files and folders (1 Total, 895.0 B)

Name	Folder	Type	Size	Status	Error
ex5.html	-	text/html	895.0 B	Succeeded	-

CloudShell
Feedback
© 2024, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences

Step 7 : Select the uploaded file , then Actions and click on Make public using ACL.

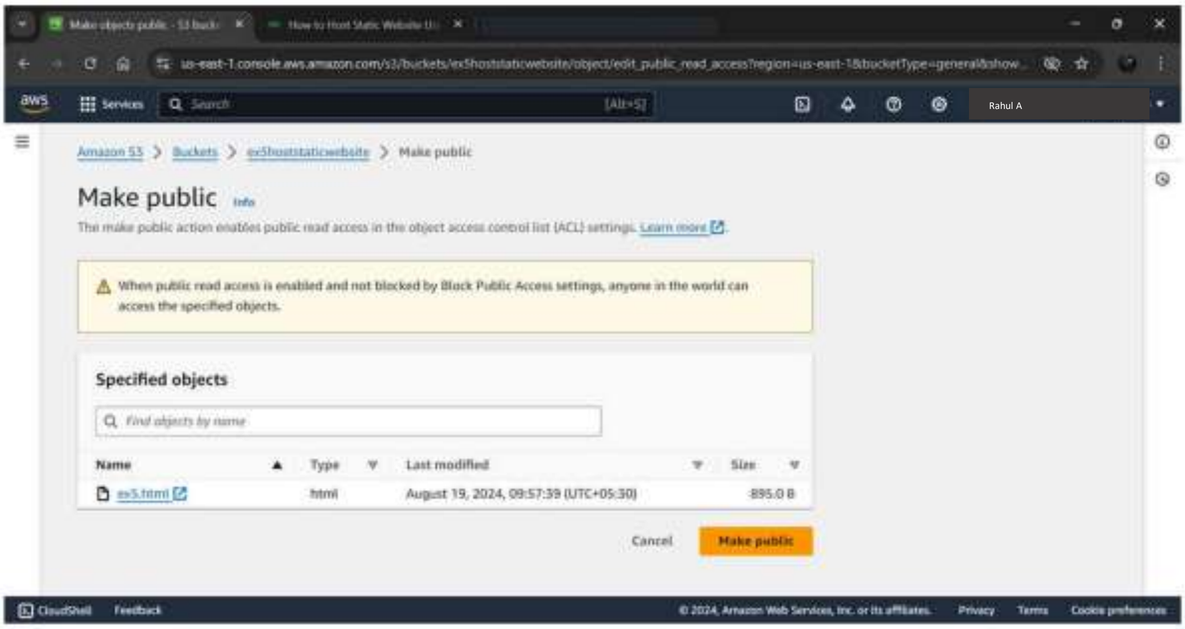


ex5hoststaticwebsite Info

Objects (1) Info

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	Last modified	Size	Storage class
☑	ex5.html	html	August 19, 2024, 09:57:39 (UTC+05:30)	895.0 B	Standard


us-east-1.console.aws.amazon.com/s3/buckets/ex5hoststaticwebsite/object/edit_public_read_access?region=us-east-1&bucketType=general&show...
Services
Search
[Alt+S]
Rahul A
Amazon S3 > Buckets > ex5hoststaticwebsite > Make public
Find objects by name
Cancel
Make public
CloudShell
Feedback
© 2024, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences

Make public Info

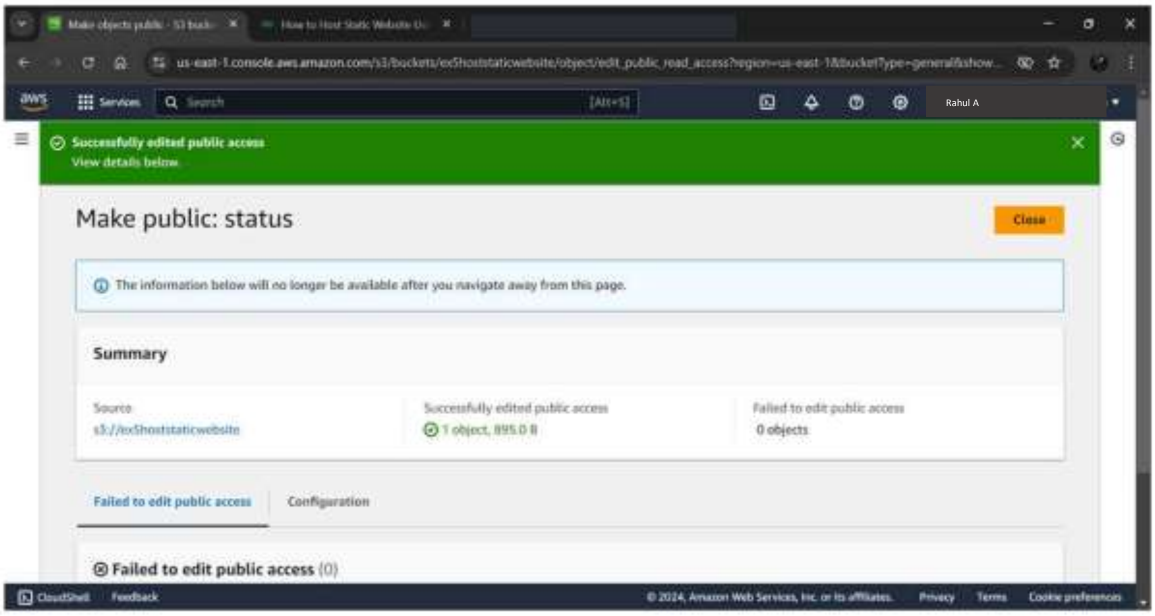
The make public action enables public read access in the object access control list (ACL) settings. Learn more.

⚠ When public read access is enabled and not blocked by Block Public Access settings, anyone in the world can access the specified objects.

Specified objects

Name	Type	Last modified	Size
ex5.html	html	August 19, 2024, 09:57:39 (UTC+05:30)	895.0 B

Step 8: Click Make public.



Successfully edited public access
View details below

Make public: status

The information below will no longer be available after you navigate away from this page.

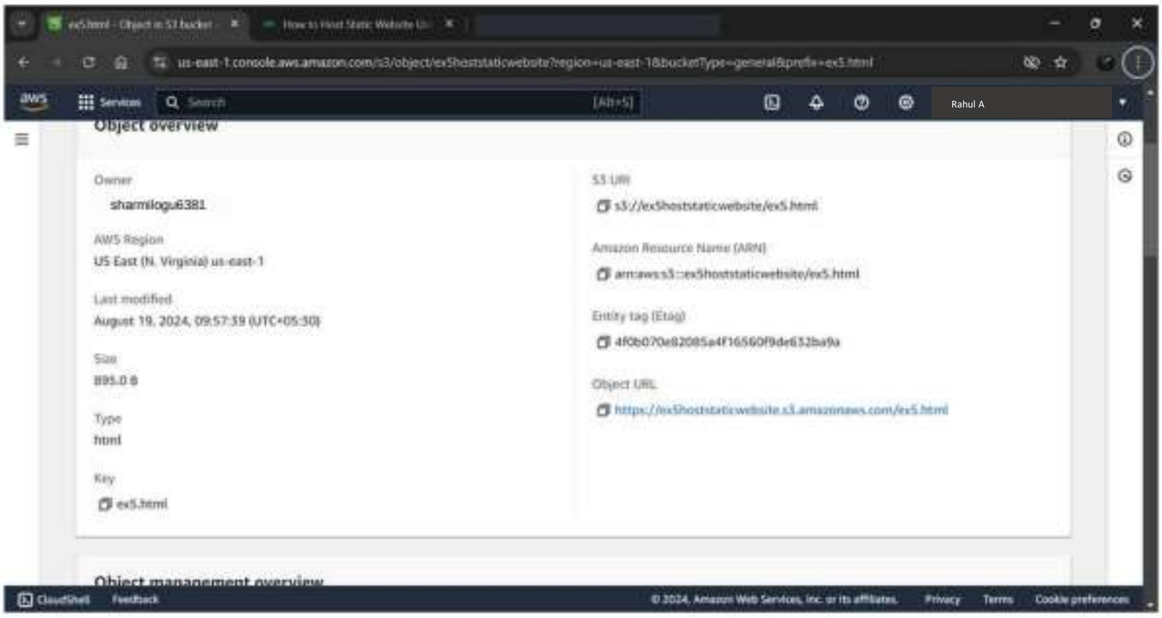
Summary

Source	Successfully edited public access	Failed to edit public access
s3://ex5hoststaticwebsite	1 object, 895.0 B	0 objects

Failed to edit public access (0)

Make objects public - S3 buck
How to Host Static Website U
us-east-1.console.aws.amazon.com/s3/buckets/ex5hoststaticwebsite/object/edit_public_read_access?region=us-east-1&bucketType=general&show...
Services
Search
[Alt+S]
Rahul A
Close
Failed to edit public access
Configuration
CloudShell
Feedback
© 2024, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences

Step 9 : Click on the uploaded file and copy the link.



Object overview

Owner
sharmilogu6381

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

Last modified
August 19, 2024, 09:57:39 (UTC+05:30)

Size
895.0 B

Type
html

Key
ex5.html

S3 URI
s3://ex5hoststaticwebsite/ex5.html

Amazon Resource Name (ARN)
arn:aws:s3:::ex5hoststaticwebsite/ex5.html

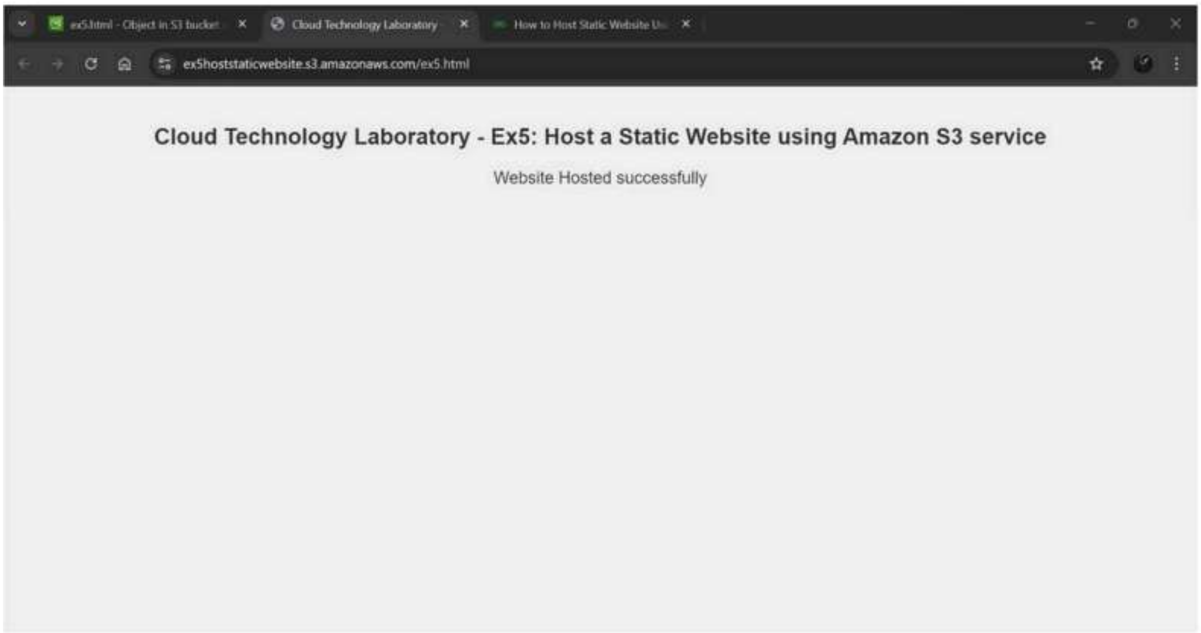
Entity tag (Etag)
4f0b070e82085a4f16560f9de632ba9a

Object URL
https://ex5hoststaticwebsite.s3.amazonaws.com/ex5.html

Object management overview

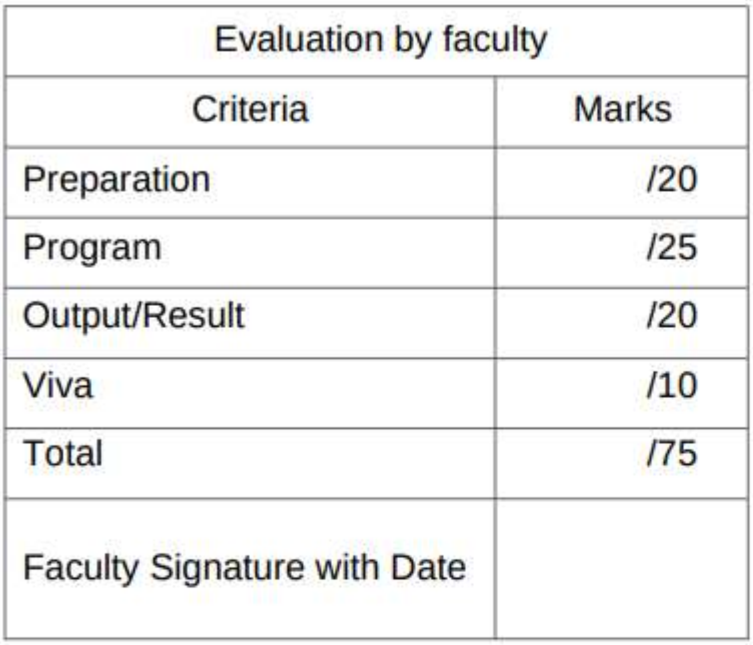
ex5.html - Object in S3 bucket
How to Host Static Website U
us-east-1.console.aws.amazon.com/s3/object/ex5hoststaticwebsite?region=us-east-1&bucketType=general&prefix=ex5.html
Services
Search
[Alt+S]
Rahul A
CloudShell
Feedback
© 2024, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences

Step 10 : Open the link in new browser tab.


ex5.html - Object in S3 bucket
Cloud Technology Laboratory
How to Host Static Website U
ex5hoststaticwebsite.s3.amazonaws.com/ex5.html

Cloud Technology Laboratory - Ex5: Host a Static Website using Amazon S3 service

Website Hosted successfully



Evaluation by faculty	
Criteria	Marks
Preparation	/20
Program	/25
Output/Result	/20
Viva	/10
Total	/75
Faculty Signature with Date	

RESULT: