

CLOUD AND SERVERLESS COMPUTING PROJECT

SERVERLESS MEDIA ORCHESTRATION

Aim:

Building a Serverless Video channeling stream using Amazon S3 bucket and CloudFront

Description:

Building a Serverless Video Channeling Stream with Amazon S3 bucket and CloudFront involves storing video content in an S3 bucket and configuring it for static website hosting. CloudFront is then set up with the S3 bucket as the origin, distributing content globally with low latency via edge locations. Permissions on the S3 bucket are adjusted for appropriate access control, and SSL/TLS is enabled for secure communication. Customization of CloudFront settings like cache behavior and TTL ensures optimal performance. Integrating the CloudFront URL into a video player enables seamless streaming for viewers.

Services Used:

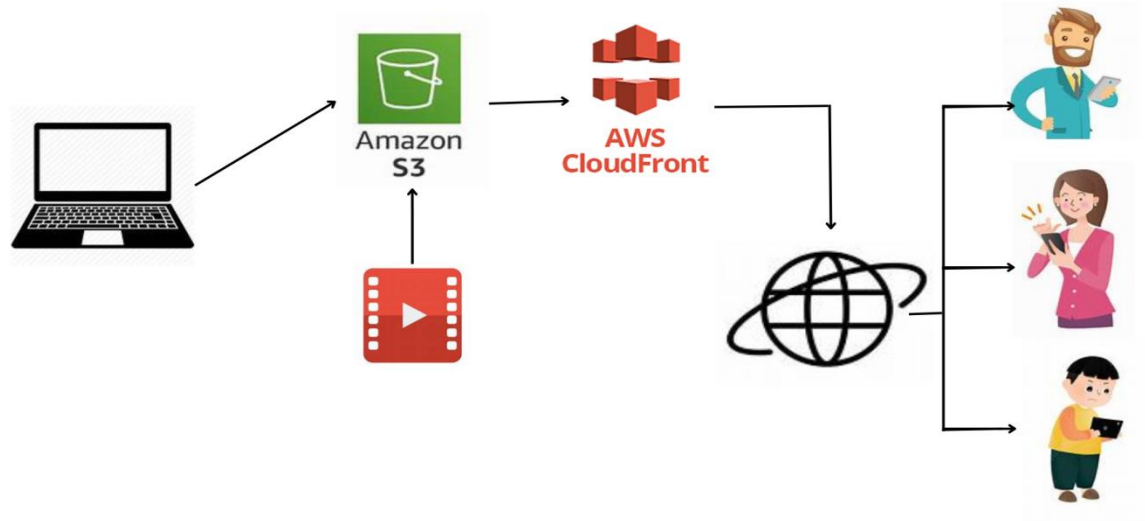
1) Amazon S3 Bucket:

- Create an S3 bucket to store video content.
- Configure bucket permissions for access control.
- Enable static website hosting on the bucket.
- Upload video files to the S3 bucket.
- Set up CloudFront distribution with S3 bucket as origin.
- Customize CloudFront settings for optimal performance.
- Integrate CloudFront URL with video player.
- Monitor performance and scale automatically with CloudFront.

2) CloudFront:

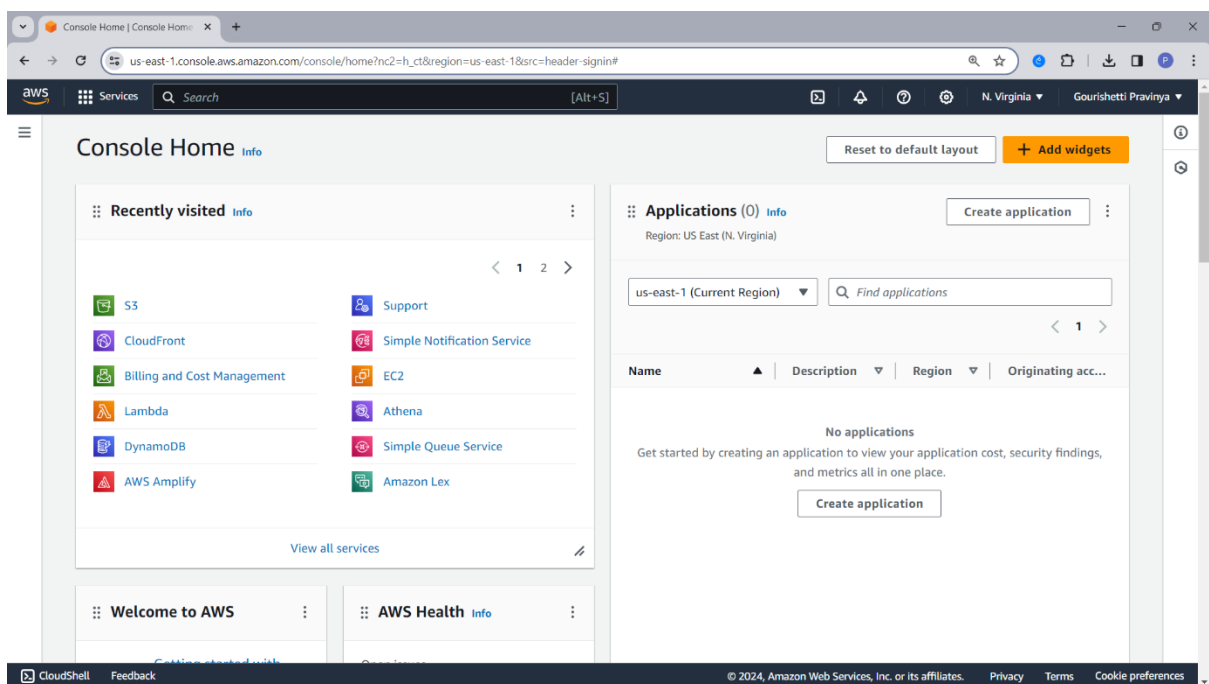
- Set up CloudFront to deliver video content globally.
- Configure CloudFront distribution with S3 bucket as origin.
- Customize cache behaviour and TTL settings for efficiency.
- Enable SSL/TLS for secure communication.
- Utilize edge locations for low-latency content delivery.
- Embed CloudFront URL into video player for seamless streaming.
- Monitor performance through CloudWatch metrics and logs.
- Scale automatically to handle increased demand.

Architecture:

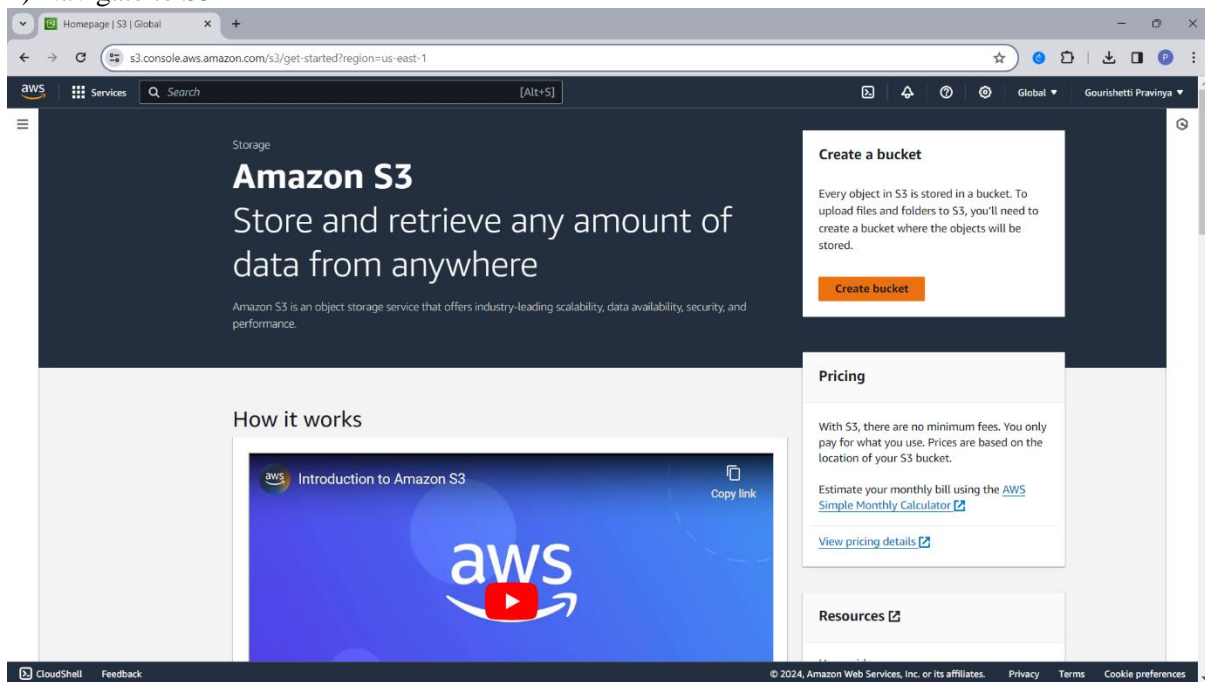


Step-By-Step Procedure:

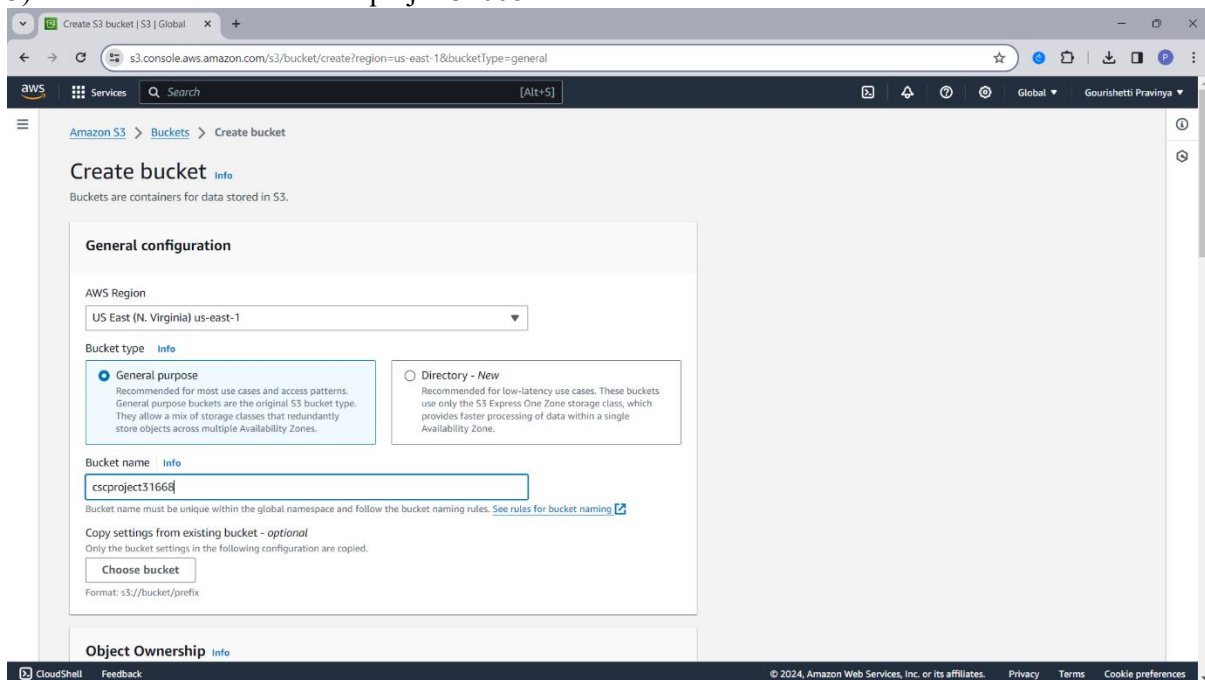
1) Sign in to AWS console



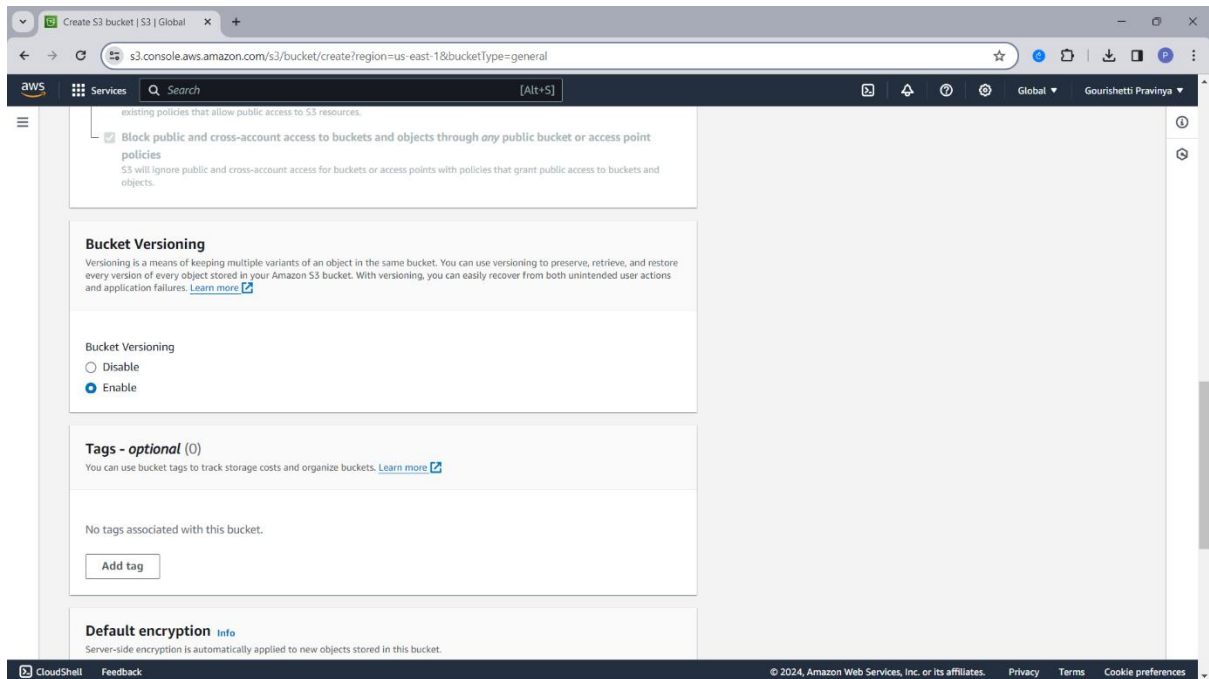
2) Navigate to S3



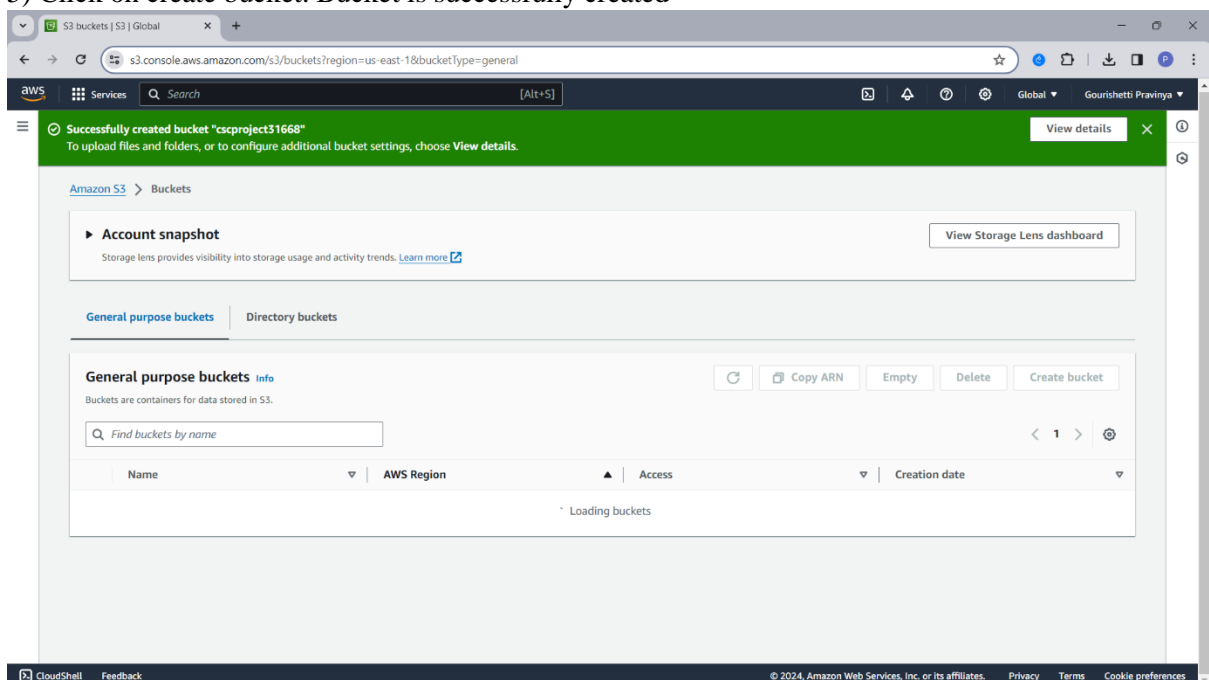
3) Create a Bucket named "cscproject31668"



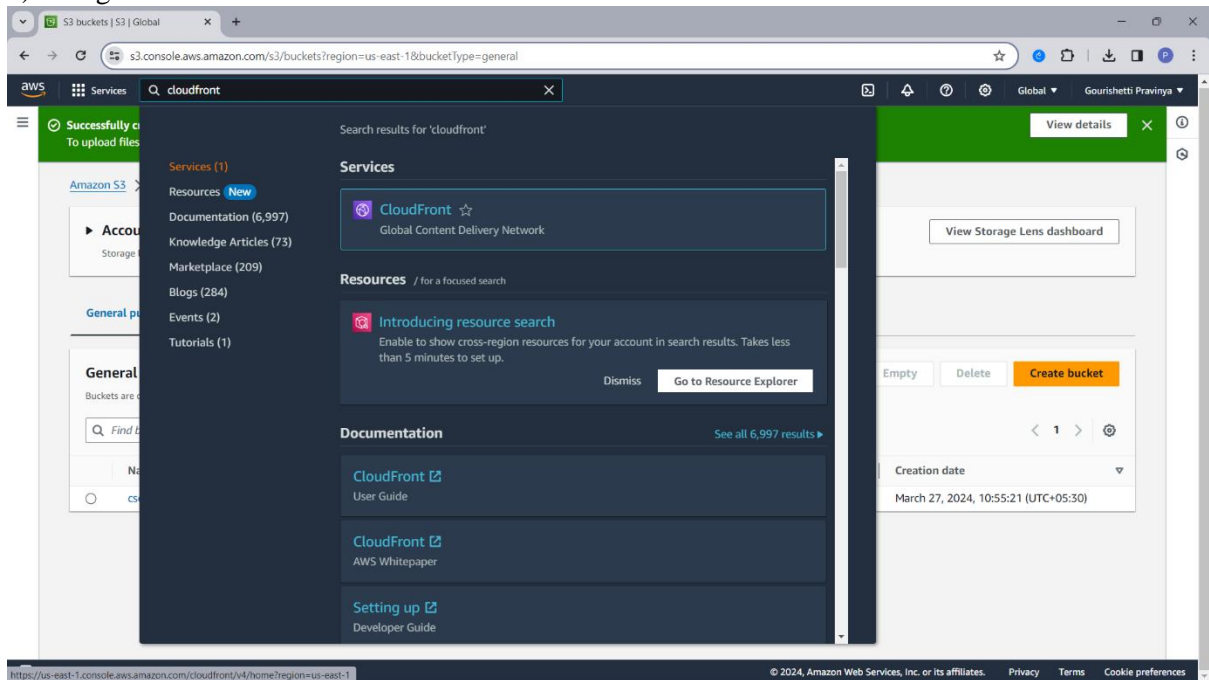
4) Enable bucket versioning as it provides protection against accidental deletion



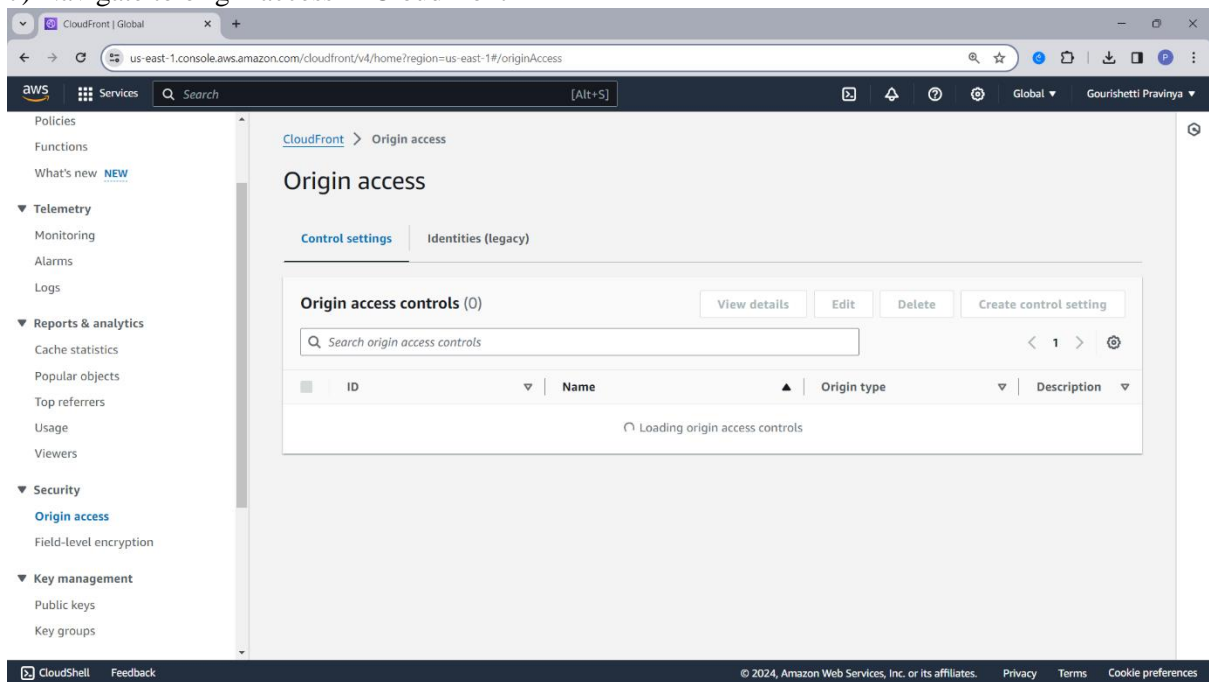
5) Click on create bucket. Bucket is successfully created



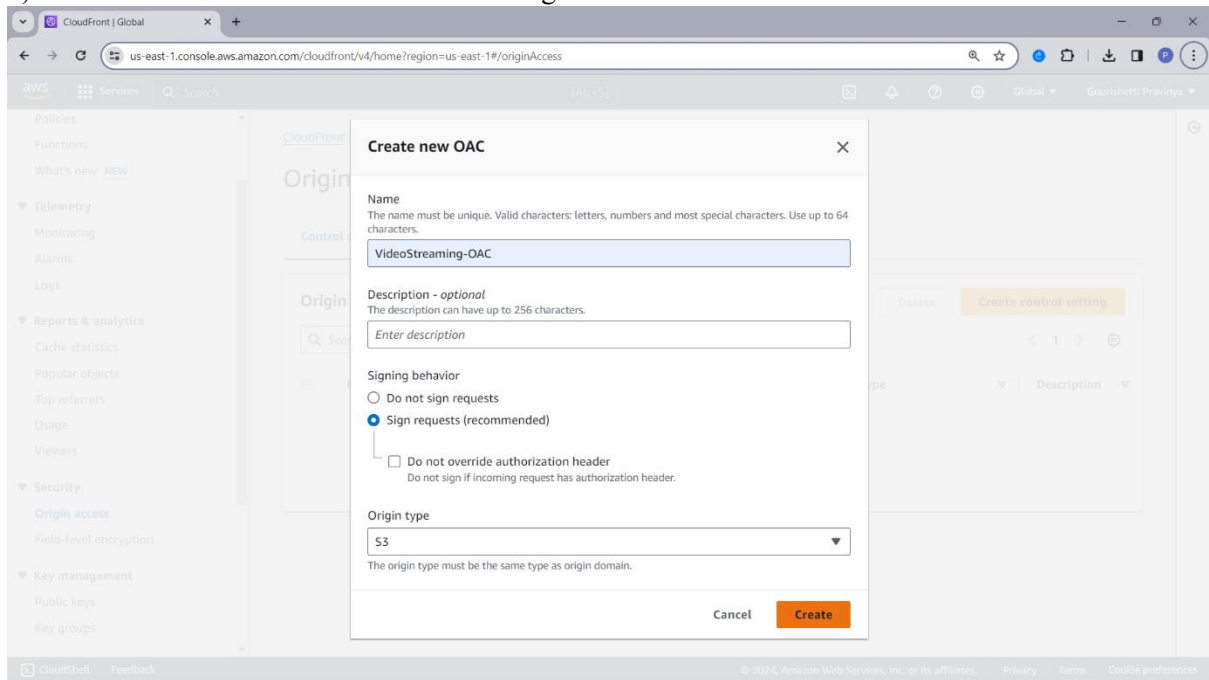
6) Navigate to CloudFront



7) Navigate to origin access in CloudFront



8) Create a new OAC named “VideoStreaming-OAC”

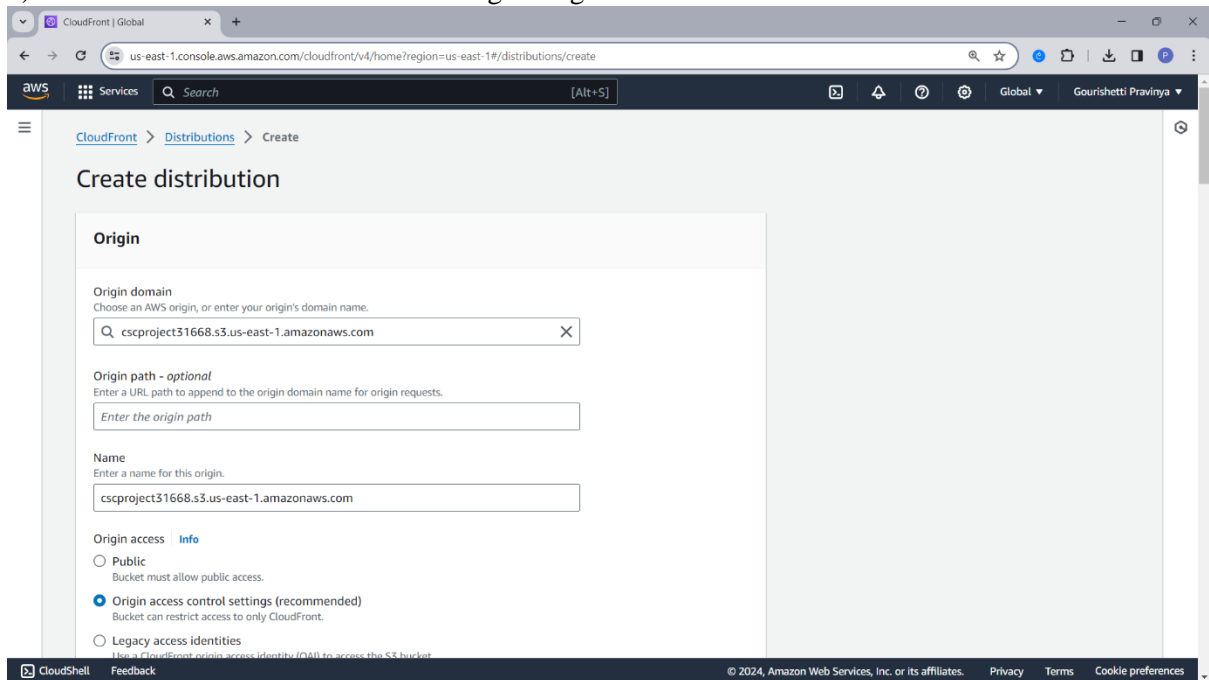


The screenshot shows the AWS CloudFront console with the 'Create new OAC' dialog box open. The dialog box has the following fields and options:

- Name:** VideoStreaming-OAC
- Description - optional:** Enter description
- Signing behavior:**
 - ☐ Do not sign requests
 - ☒ Sign requests (recommended)
 - ☐ Do not override authorization header
- Origin type:** S3

The 'Create' button is highlighted in orange.

9) Create a distribution with the following configurations



The screenshot shows the AWS CloudFront console with the 'Create distribution' form. The form has the following sections and fields:

- Origin:**
 - Origin domain:** cscproject31668.s3.us-east-1.amazonaws.com
 - Origin path - optional:** Enter the origin path
 - Name:** cscproject31668.s3.us-east-1.amazonaws.com
- Origin access:**
 - ☐ Public
 - ☒ Origin access control settings (recommended)
 - ☐ Legacy access identities

The 'Create' button is highlighted in orange.

10) Select “cscproject31668” s3 bucket as origin domain

CloudFront | Global

us-east-1.console.aws.amazon.com/cloudfront/v4/home?region=us-east-1#/distributions/create

Services Search [Alt+S]

Origin access control settings (recommended)
Bucket can restrict access to only CloudFront.

☐ Legacy access identities
Use a CloudFront origin access identity (OAI) to access the S3 bucket.

Origin access control
Select an existing origin access control (recommended) or create a new control.

VideoStreaming-OAC Create new OAC

⚠ You must update the S3 bucket policy
CloudFront will provide you with the policy statement after creating the distribution.

Add custom header - optional
CloudFront includes this header in all requests that it sends to your origin.

Add header

Enable Origin Shield
Origin shield is an additional caching layer that can help reduce the load on your origin and help protect its availability.

☒ No
☐ Yes

▶ Additional settings

Default cache behavior

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CloudFront | Global

us-east-1.console.aws.amazon.com/cloudfront/v4/home?region=us-east-1#/distributions/create

Services Search [Alt+S]

Compress objects automatically [info](#)

☐ No
☒ Yes

Viewer

Viewer protocol policy

☐ HTTP and HTTPS
☒ Redirect HTTP to HTTPS
☐ HTTPS only

Allowed HTTP methods

☒ GET, HEAD
☐ GET, HEAD, OPTIONS
☐ GET, HEAD, OPTIONS, PUT, POST, PATCH, DELETE

Restrict viewer access
If you restrict viewer access, viewers must use CloudFront signed URLs or signed cookies to access your content.

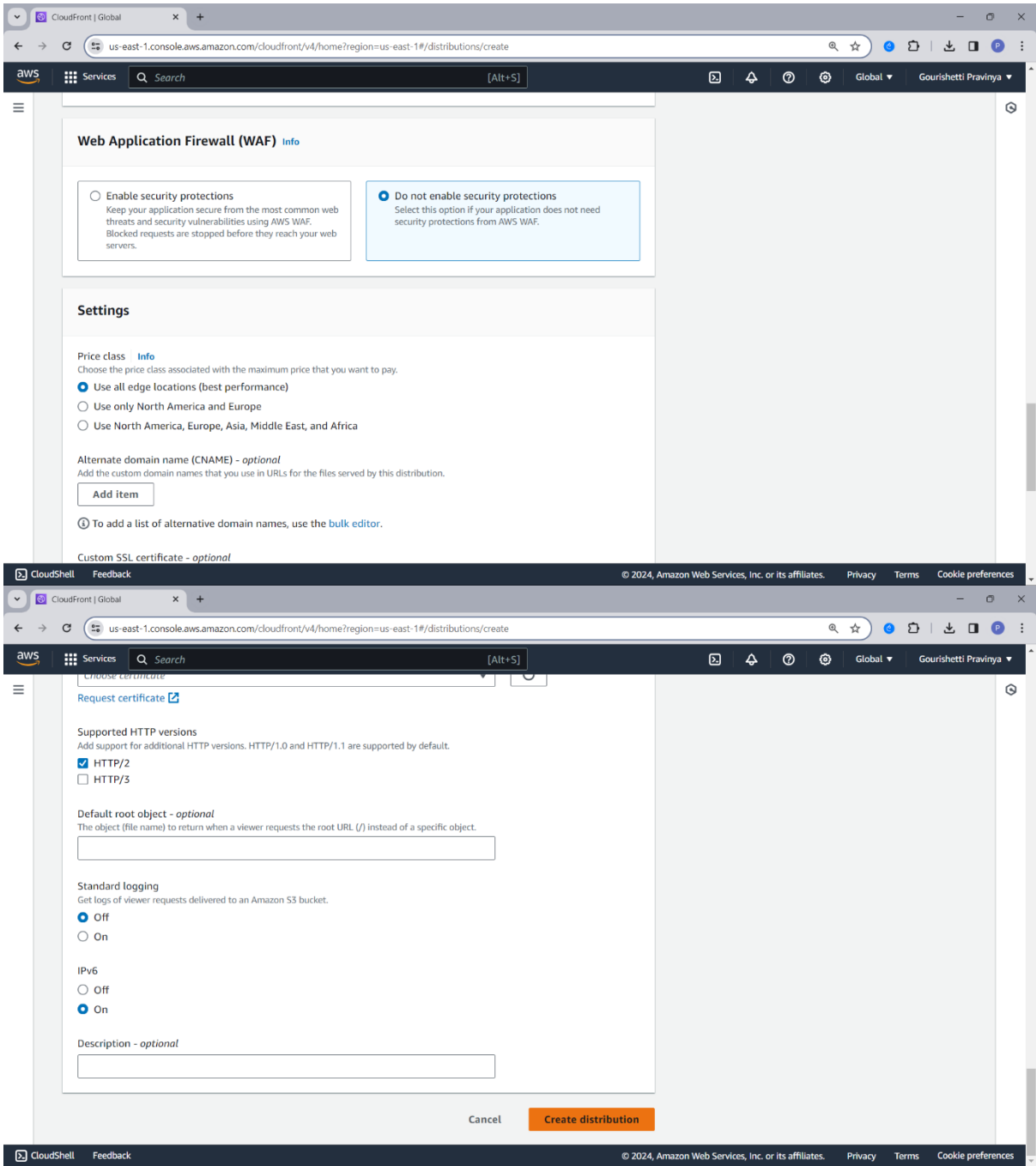
☒ No
☐ Yes

Cache key and origin requests
We recommend using a cache policy and origin request policy to control the cache key and origin requests.

☒ Cache policy and origin request policy (recommended)
☐ Legacy cache settings

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11) Copy the policy

CloudFront | Global

us-east-1.console.aws.amazon.com/cloudfront/v4/home?region=us-east-1#/distributions/EG9O8RWEK5AFF

Services Search [Alt+S]

Successfully created new distribution.

The S3 bucket policy needs to be updated
Complete distribution configuration by allowing read access to CloudFront origin access control in your policy statement. [Go to S3 bucket permissions to update policy](#) [Copy policy](#)

CloudFront > Distributions > EG9O8RWEK5AFF

EG9O8RWEK5AFF [View metrics](#)

General Security Origins Behaviors Error pages Invalidations Tags

Details

Distribution domain name d33msa1g2hf8xx.cloudfront.net	ARN arn:aws:cloudfront::307931407881:distribution/EG9O8RWEK5AFF	Last modified Deploying
---	--	----------------------------

Settings [Edit](#)

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12) Go to bucket and In permissions tab click on edit policy

CloudFront | Global

s3.console.aws.amazon.com/s3/buckets/cscproject31668?tab=permissions®ion=us-east-1&bucketType=general

Services Search [Alt+S]

Amazon S3

Buckets
Access Grants
Access Points
Object Lambda Access Points
Multi-Region Access Points
Batch Operations
IAM Access Analyzer for S3

Block Public Access settings for this account

Storage Lens
Dashboards
Storage Lens groups
AWS Organizations settings

Feature spotlight

AWS Marketplace for S3

Individual Block Public Access settings for this bucket

Bucket policy [Edit](#) [Delete](#)

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](#)

Public access is blocked because Block Public Access settings are turned on for this bucket
To determine which settings are turned on, check your Block Public Access settings for this bucket. [Learn more about using Amazon S3 Block Public Access](#)

No policy to display. [Copy](#)

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13) Paste the Policy and click on “save changes”

The first screenshot shows the 'Edit bucket policy' page in the AWS console. The URL is `s3.console.aws.amazon.com/s3/bucket/cscproject31668/property/policy/edit?region=us-east-1&bucketType=general`. The left sidebar shows the 'Amazon S3' navigation menu. The main content area displays the 'Policy' editor with a JSON policy document. The policy is a versioned policy (Version: 2008-10-17) with a single statement that allows the CloudFront service to get objects in the bucket. The 'Edit statement' panel on the right shows a 'Select a statement' dialog with an 'Add new statement' button.

```
1 {
2   "Version": "2008-10-17",
3   "Id": "PolicyForCloudFrontPrivateContent",
4   "Statement": [
5     {
6       "Sid": "AllowCloudFrontServicePrincipal",
7       "Effect": "Allow",
8       "Principal": {
9         "Service": "cloudfront.amazonaws.com"
10      },
11      "Action": "s3:GetObject",
12      "Resource": "arn:aws:s3:::cscproject31668/*",
13      "Condition": {
14        "StringEquals": {
15          "AWS:SourceArn": "arn:aws:cloudfront::307931407881:distribution/E6908RMEK5AFF"
16        }
17      }
18    }
19  ]
20 }
```

The second screenshot shows the 'cscproject31668' bucket page in the AWS console, specifically the 'Permissions' tab. A green banner at the top indicates 'Successfully edited bucket policy.' The 'Permissions overview' section shows 'Access' settings with a link to 'Bucket and objects not public'. The 'Block public access (bucket settings)' section shows that 'Block all public access' is set to 'On'.

14) Upload the Mp4 Video file in to the bucket

The image shows two screenshots of the AWS Management Console. The top screenshot displays the 'cscproject31668' bucket page, which is currently empty. The bottom screenshot shows the 'Upload' page for the same bucket, where a file named 'videoplayback.mp4' has been added for upload.

Top Screenshot: Amazon S3 Bucket Overview

URL: `s3.console.aws.amazon.com/s3/buckets/cscproject31668?region=us-east-1&bucketType=general&tab=objects`

Page Title: **cscproject31668**

Navigation tabs: Objects, Properties, Permissions, Metrics, Management, Access Points

Objects (0) Info

Buttons: Copy S3 URI, Copy URL, Download, Open, Delete, Actions, Create folder, Upload

Text: 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](#)

Search: Find objects by prefix

Show versions: ☐

Table Headers: Name, Type, Last modified, Size, Storage class

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

Button: Upload

Bottom Screenshot: Upload Page

URL: `s3.console.aws.amazon.com/s3/upload/cscproject31668?region=us-east-1&bucketType=general`

Page Title: **Upload**

Text: Add the files and folders you want to upload to S3. To upload a file larger than 160GB, use the AWS CLI, AWS SDK or Amazon S3 REST API. [Learn more](#)

Drag and drop files and folders you want to upload here, or choose [Add files](#) or [Add folder](#).

Files and folders (1 Total, 97.9 MB)

Buttons: Remove, Add files, Add folder

Text: All files and folders in this table will be uploaded.

Search: Find by name

Table Headers: Name, Folder, Type

Table Data:

Name	Folder	Type
videoplayback.mp4	-	video/mp4

Destination Info

Destination: `s3://cscproject31668`

Destination details

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

CloudFront | Global

Upload objects - S3 bucket csc...

s3.console.aws.amazon.com/s3/upload/cscproject31668?region=us-east-1&bucketType=general

aws

Services

Search

[Alt+S]

Global

Gourishetti Pravinya

Upload succeeded

View details below.

Upload: status

Close

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

Summary

Destination

s3://cscproject31668

Succeeded

1 file, 97.9 MB (100.00%)

Failed

0 files, 0 B (0%)

Files and folders

Configuration

Files and folders (1 Total, 97.9 MB)

Find by name

< 1 >

Name	Folder	Type	Size	Status	Error
videoplayba...	-	video/mp4	97.9 MB	Succeeded	-

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Cookie preferences

15) Copy the domain name

cscproject31668 - S3 bucket | S

CloudFront | Global

us-east-1.console.aws.amazon.com/cloudfront/v4/home?region=us-east-1#/distributions

aws

Services

Search

[Alt+S]

Global

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CloudFront

Distributions

Policies

Functions

What's new

NEW

Telemetry

Monitoring

Alarms

Logs

Reports & analytics

Cache statistics

Popular objects

Top referrers

Usage

Viewers

Security

Origin access

Field-level encryption

CloudFront

Distributions (1) Info

Enable

Disable

Delete

Create distribution

Search all distributions

< 1 >

ID	Descript...	Type	Domain name	Alternat
EG9O8RWEK5AFF	-	Production	d33msa1g2hf8xx.cloudfront.net	-

CloudShell

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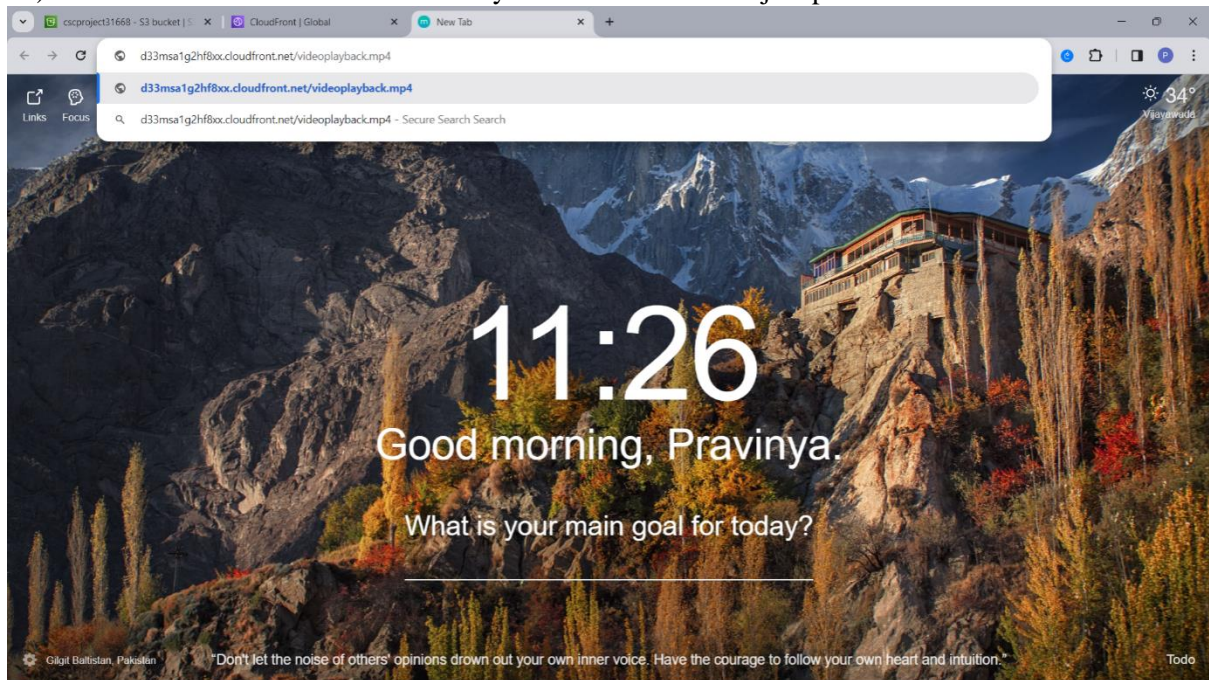
Privacy

Terms

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The image is a vertical composition. The top half features a scenic background of a mountain with a traditional building perched on a cliff. Overlaid on this is a large digital clock showing '11:26' and a personalized greeting 'Good morning, Pravinya.' Below the greeting is a motivational quote: 'What is your main goal for today?' and another quote at the bottom: 'Don't let the noise of others' opinions drown out your own inner voice. Have the courage to follow your own heart and intuition.' The bottom half of the image is a screenshot of the AWS Management Console. It shows the 'cscproject31668' bucket with one object, 'videoplayback.mp4', which is 97.9 MB and was uploaded on March 27, 2024. The console interface includes a left-hand navigation menu with options like 'Buckets', 'Access Grants', and 'Storage Lens', and a top navigation bar with the AWS logo and search functionality.

16) Concatenate the domain name and key name of the video object paste it in new browser



17) Serverless Media Orchestration is built successfully

