CLOUD FRONT TO S3 INTEGRATION

HOSTING WEBSITE IN CLOUD FRONT USING S3 BUCKET:

Comprehensive Guide to CDN and CloudFront on AWS for Beginners

If you've never heard of CDN or CloudFront before, don't worry. we'll start from scratch and gradually build up your understanding. By the end, you'll be well-versed in these technologies. So lets get started.

Table of Contents

1. Introduction to Content Delivery Networks (CDN)

Imagine you have a website with lots of cool content, like images, videos, and documents. When a user visits your site from a different location far away from your server, the content might take a long time to load. That's where CDN comes to the rescue!

A CDN is like a network of servers spread across various locations worldwide. These servers store a copy of your website's content. When a user requests your website, the content is delivered from the server closest to the user, making it super fast! It's like having a local store for your website content everywhere in the world.

2. What is CloudFront?

CloudFront is Amazon Web Services' (AWS) very own CDN service. It integrates seamlessly with other AWS services and allows you to deliver content, videos, applications, and APIs securely with low-latency and high transfer speeds.

3. How Does CloudFront Work?

Let's understand how CloudFront works with a simple example:

Imagine you have a website with images stored on an Amazon S3 bucket (a cloud storage service). When a user requests an image, the request goes to CloudFront first.

Here's how the process flows:

- **Step 1**: CloudFront checks if it already has the requested image in its cache (storage). If it does, great! It sends the image directly to the user. If not, it proceeds to Step 2.
- **Step 2**: CloudFront fetches the image from the S3 bucket and stores a copy in its cache for future requests. Then, it sends the image to the user.

The next time someone requests the same image, CloudFront will deliver it from its cache, making it super fast and efficient!

4. Benefits of CloudFront

- **Fast Content Delivery**: CloudFront ensures your content reaches users with minimal delay, making your website lightning fast.
- **Global Reach**: With servers in various locations worldwide, CloudFront brings your content closer to users, regardless of where they are.
- **Security**: CloudFront provides security features like DDoS protection and SSL/TLS encryption to keep your content and users safe.
- **Scalability**: CloudFront can handle traffic spikes effortlessly, ensuring a smooth experience for your users.
- **Cost-Effective**: Pay only for the data transfer and requests made, making it cost-effective for businesses of all sizes.

5. Setting Up CloudFront on AWS

Now, let's get our hands dirty and set up CloudFront on AWS!

Step 1: Create an S3 Bucket

1. Go to the AWS Management Console and navigate to Amazon S3.
2. Create a new bucket to store your website content.

Step 2: Upload Content to the S3 Bucket

1. Upload images, videos, or any other content you want to serve through CloudFront to your S3 bucket.

Step 3: Create a CloudFront Distribution

1. Go to the AWS Management Console and navigate to CloudFront.
2. Click "Create Distribution."
3. Choose whether you want to deliver a web application or content (like images and videos).
4. Configure your settings, such as the origin (your S3 bucket), cache behaviors, and security settings.
5. Click "Create Distribution" to set up CloudFront.

Step 4: Update Website URLs

1. Once your CloudFront distribution is deployed (it may take a few minutes), you'll get a CloudFront domain name (e.g., d1a2b3c4def.cloudfront.net).
2. Replace the URLs of your website content with the CloudFront domain name.

That's it! Your content is now being delivered through CloudFront.

6. Use Cases and Scenarios

Scenario 1: E-Commerce Website

Let's say you have an e-commerce website that sells products globally. By using CloudFront, your product images and videos load quickly for customers all over the world, improving the shopping experience.

Scenario 2: Media Streaming

You're running a video streaming platform. With CloudFront, you can stream videos to users efficiently, regardless of their location, without buffering issues.

Scenario 3: Software Downloads

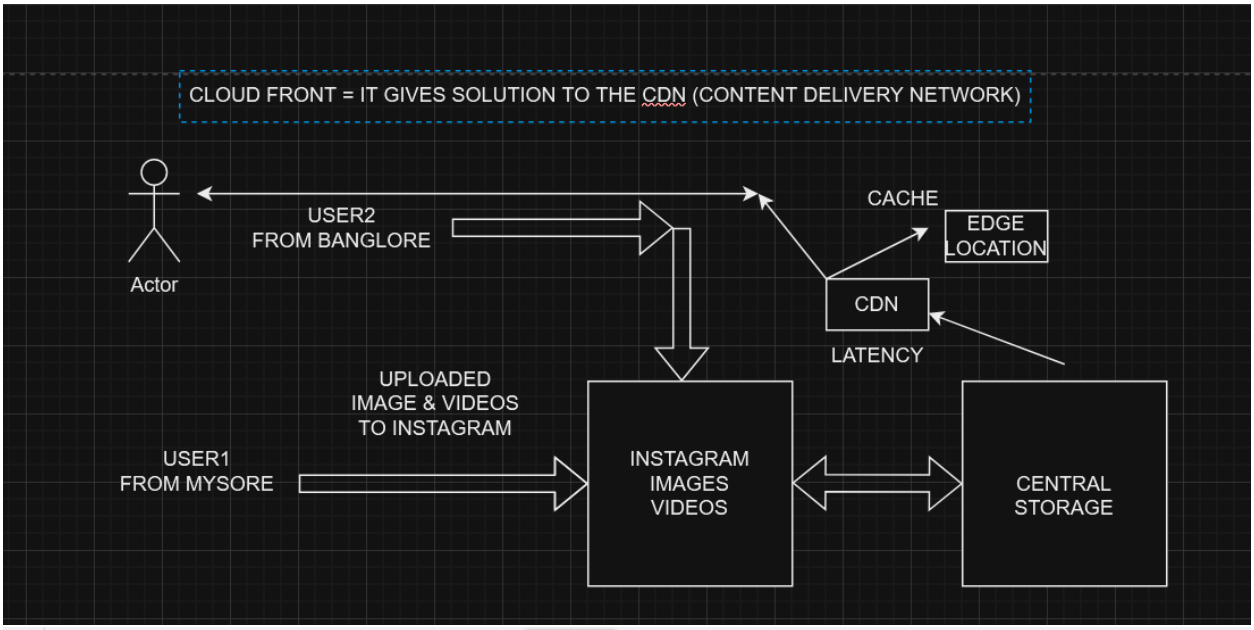
If you offer software downloads, CloudFront can distribute your files faster, reducing download times and providing a better user experience.

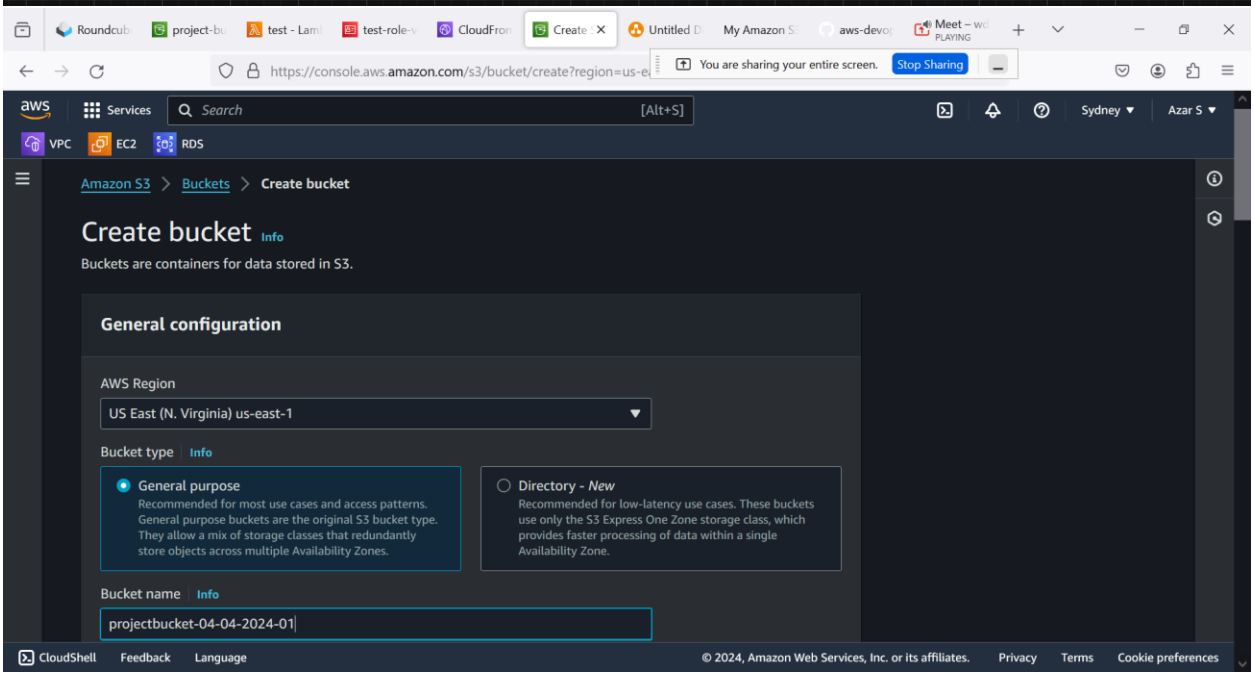
7. Tips and Best Practices

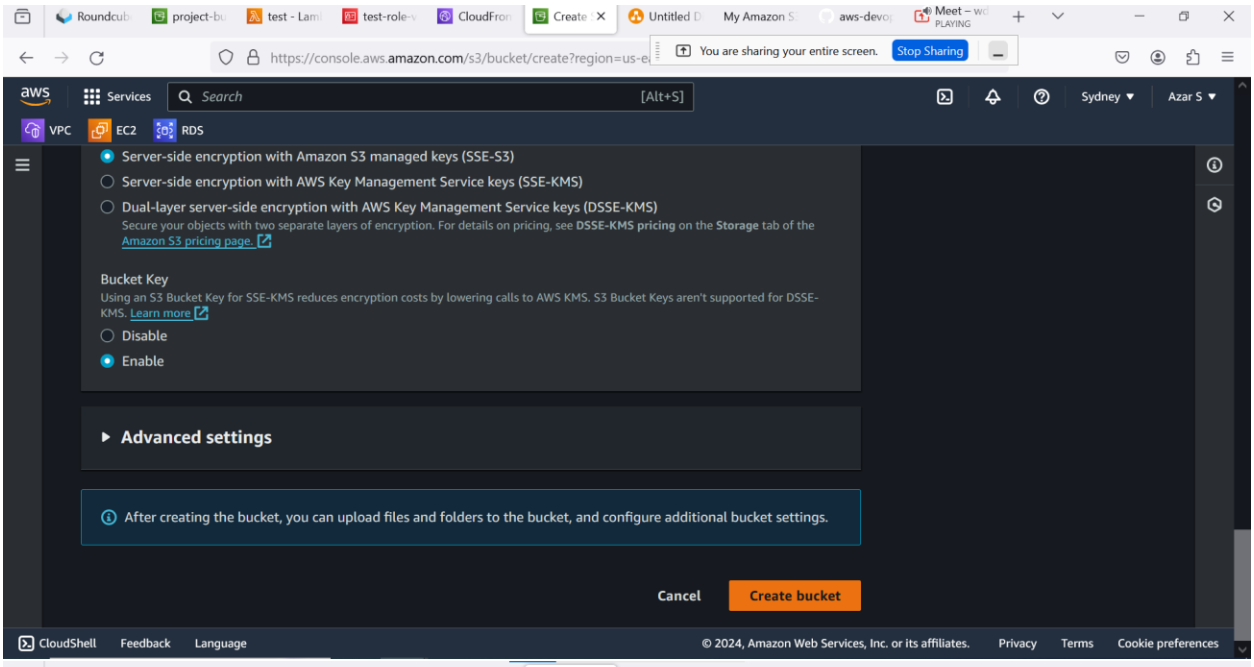
- **Caching Strategies**: Configure cache settings wisely to balance freshness and speed for different types of content.
- **Invalidation**: Learn how to invalidate or clear cached content when you make updates to your website.
- **Monitoring and Reporting**: Use AWS tools to monitor your CloudFront distribution's performance and gain insights into user behavior.

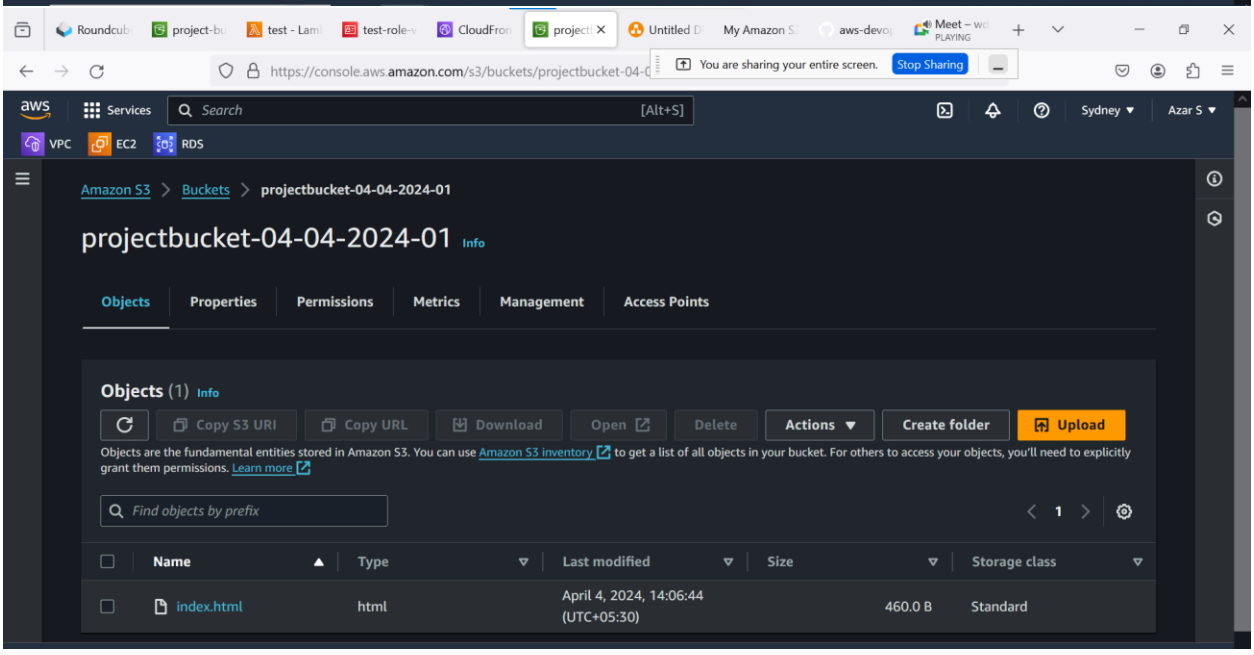
8. Conclusion

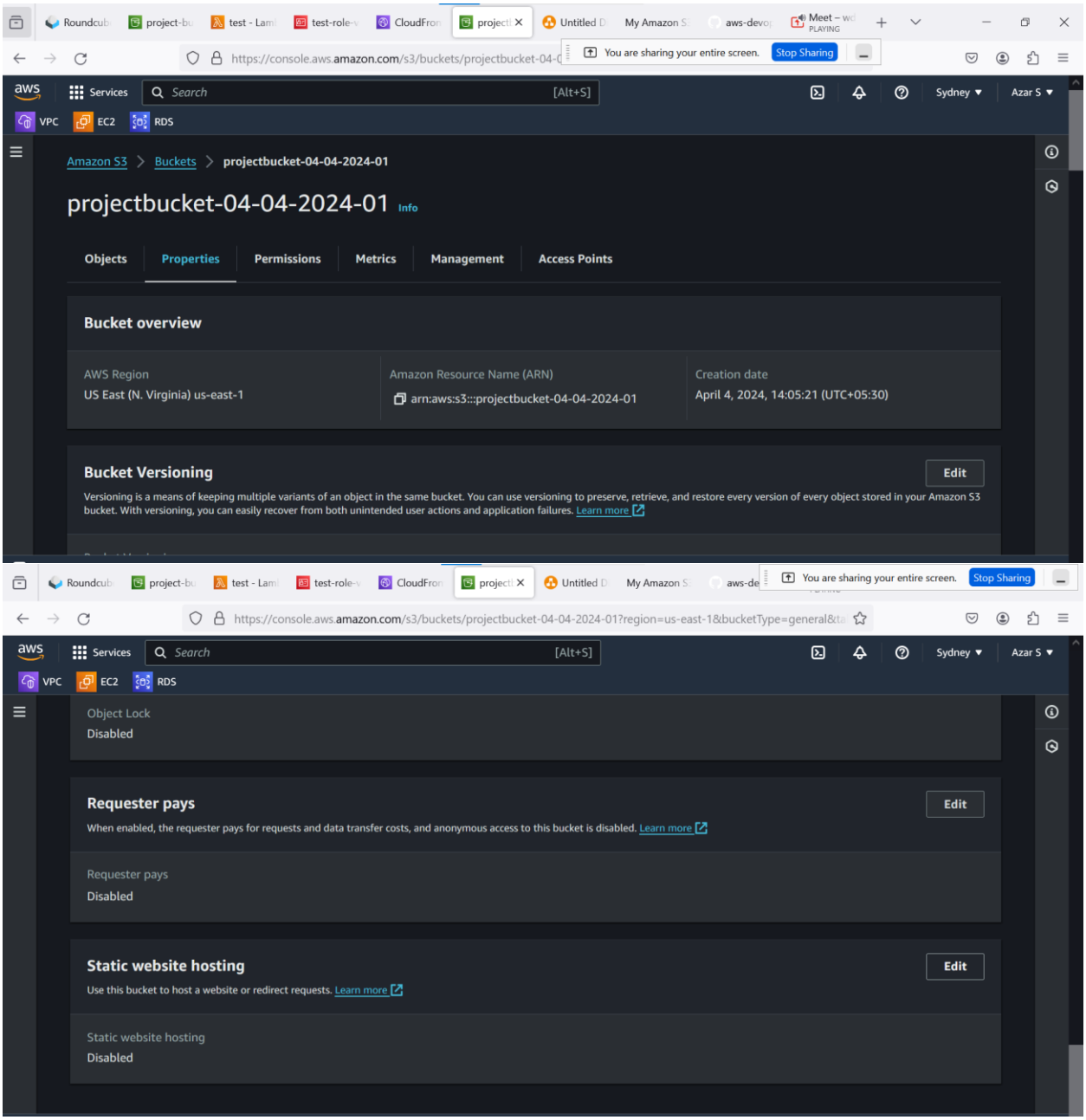
By using CloudFront, you can dramatically improve your website's performance, making users happier and potentially boosting your application and business.

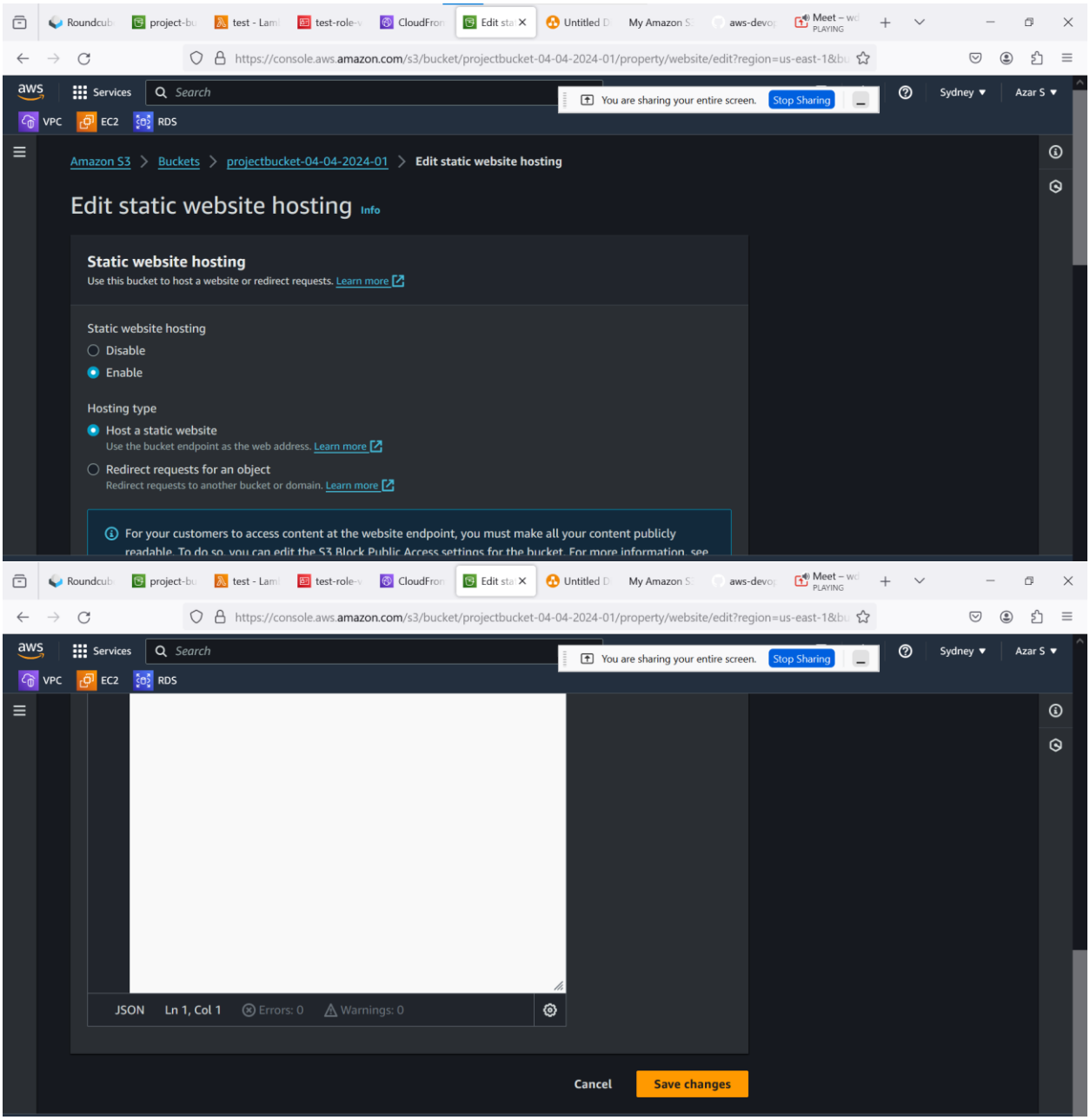


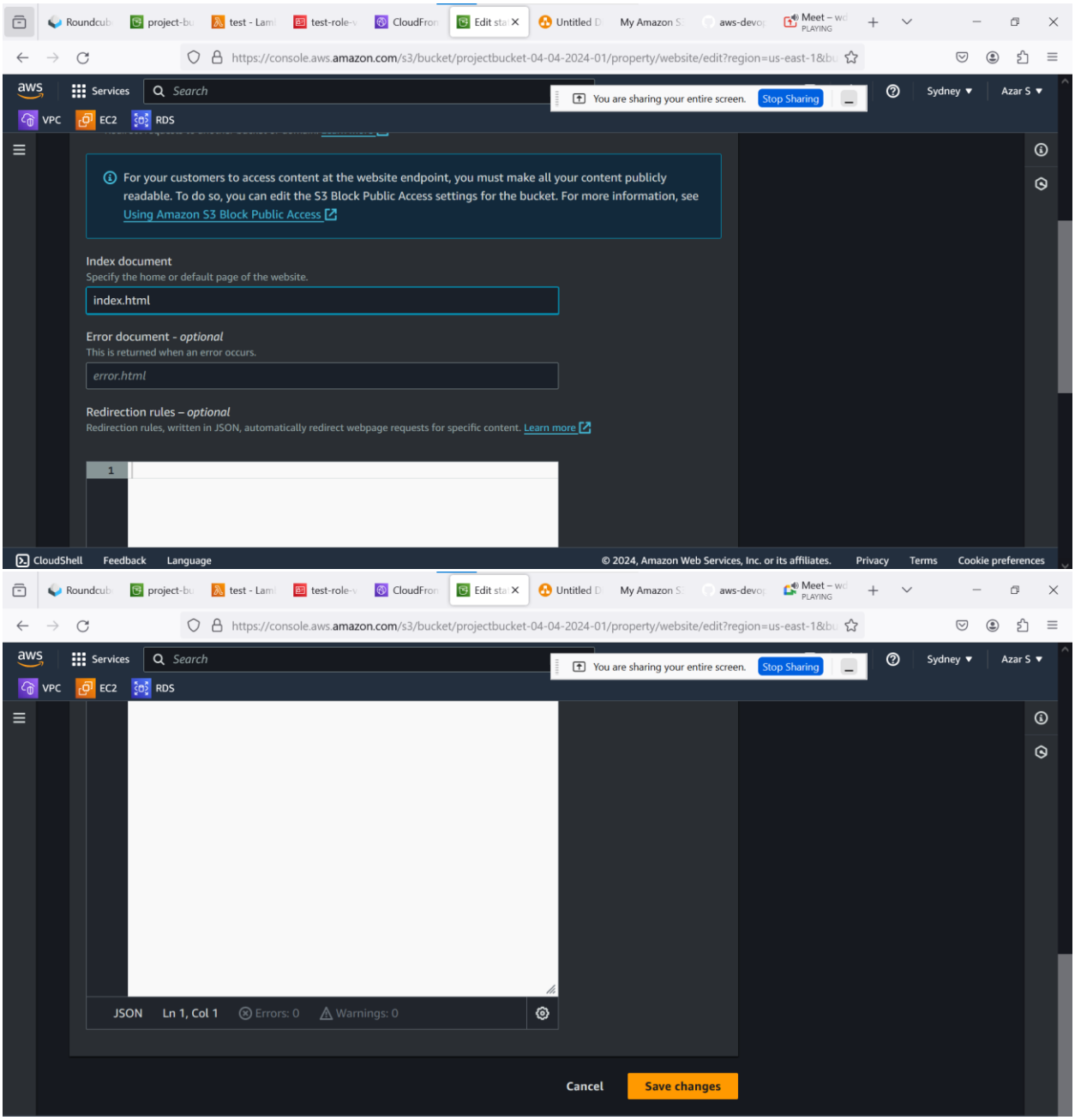


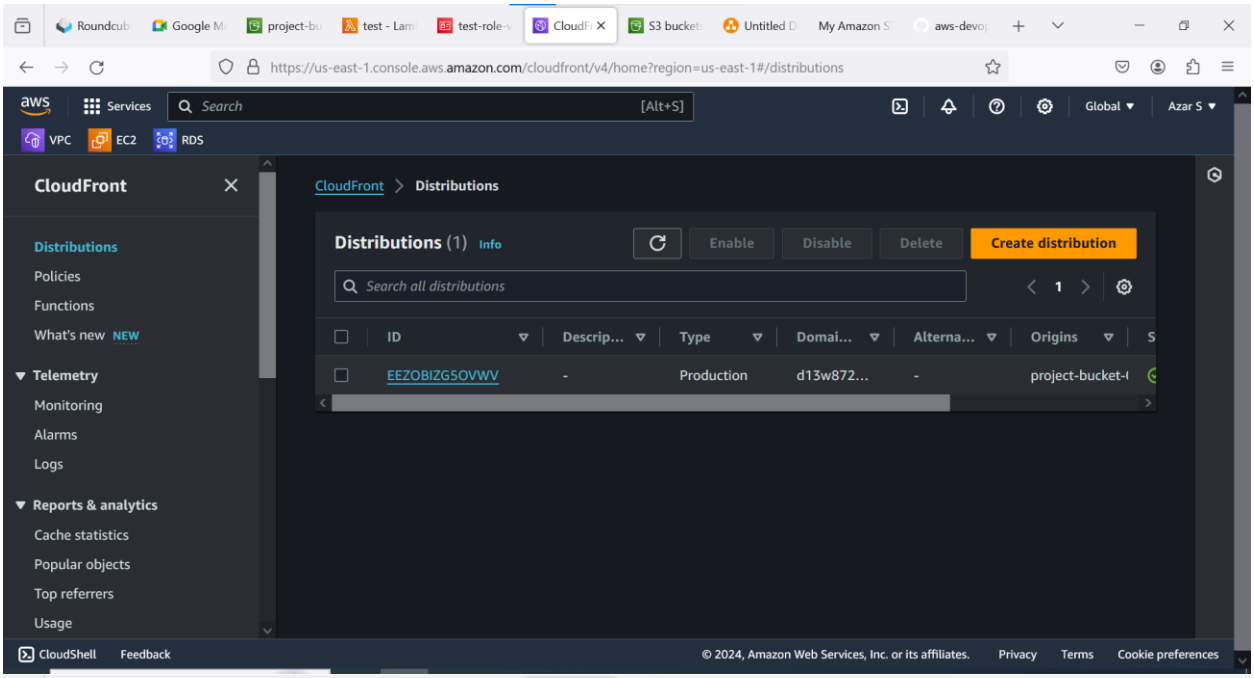

Server-side encryption with Amazon S3 managed keys (SSE-S3)
Server-side encryption with AWS Key Management Service keys (SSE-KMS)
Dual-layer server-side encryption with AWS Key Management Service keys (DSSE-KMS)
Secure your objects with two separate layers of encryption. For details on pricing, see DSSE-KMS 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.
Cancel
Create bucket


Amazon S3 > Buckets > projectbucket-04-04-2024-01
projectbucket-04-04-2024-01 Info
Objects
Properties
Permissions
Metrics
Management
Access Points
Objects (1) Info
Copy S3 URI
Copy URL
Download
Open
Delete
Actions
Create folder
Upload
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
Find objects by prefix
Name
Type
Last modified
Size
Storage class
index.html
html
April 4, 2024, 14:06:44 (UTC+05:30)
460.0 B
Standard


You are sharing your entire screen.
Stop Sharing
Services
Search
[Alt+S]
Sydney
Azar S
VPC
EC2
RDS
Amazon S3 > Buckets > projectbucket-04-04-2024-01
projectbucket-04-04-2024-01 Info
Objects
Properties
Permissions
Metrics
Management
Access Points
Bucket overview
AWS Region
US East (N. Virginia) us-east-1
Amazon Resource Name (ARN)
arn:aws:s3:::projectbucket-04-04-2024-01
Creation date
April 4, 2024, 14:05:21 (UTC+05:30)
Bucket Versioning
Edit
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
Object Lock
Disabled
Requester pays
Edit
When enabled, the requester pays for requests and data transfer costs, and anonymous access to this bucket is disabled. Learn more
Requester pays
Disabled
Static website hosting
Edit
Use this bucket to host a website or redirect requests. Learn more
Static website hosting
Disabled


https://console.aws.amazon.com/s3/bucket/projectbucket-04-04-2024-01/property/website/edit?region=us-east-1&bu
You are sharing your entire screen.
Stop Sharing
Sydney
Azar S
Amazon S3 > Buckets > projectbucket-04-04-2024-01 > Edit static website hosting
Edit static website hosting Info
Static website hosting
Use this bucket to host a website or redirect requests. Learn more
Static website hosting
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
JSON
Ln 1, Col 1
Errors: 0
Warnings: 0
Cancel
Save changes


https://console.aws.amazon.com/s3/bucket/projectbucket-04-04-2024-01/property/website/edit?region=us-east-1&bu
Services
Search
You are sharing your entire screen.
Stop Sharing
Sydney
Azar S
VPC
EC2
RDS
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
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
CloudShell
Feedback
Language
© 2024, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences
JSON
Ln 1, Col 1
Errors: 0
Warnings: 0
Cancel
Save changes


https://us-east-1.console.aws.amazon.com/cloudfront/v4/home?region=us-east-1#/distributions
Services
Search
[Alt+S]
Global
Azar S
VPC
EC2
RDS
CloudFront
Distributions
Policies
Functions
What's new NEW
Telemetry
Monitoring
Alarms
Logs
Reports & analytics
Cache statistics
Popular objects
Top referrers
Usage
CloudFront > Distributions
Distributions (1) Info
Enable
Disable
Delete
Create distribution
Search all distributions
ID
Descrip...
Type
Domai...
Alterna...
Origins
EEZOBIZG5OVWV
Production
d13w872...
project-bucket-
CloudShell
Feedback
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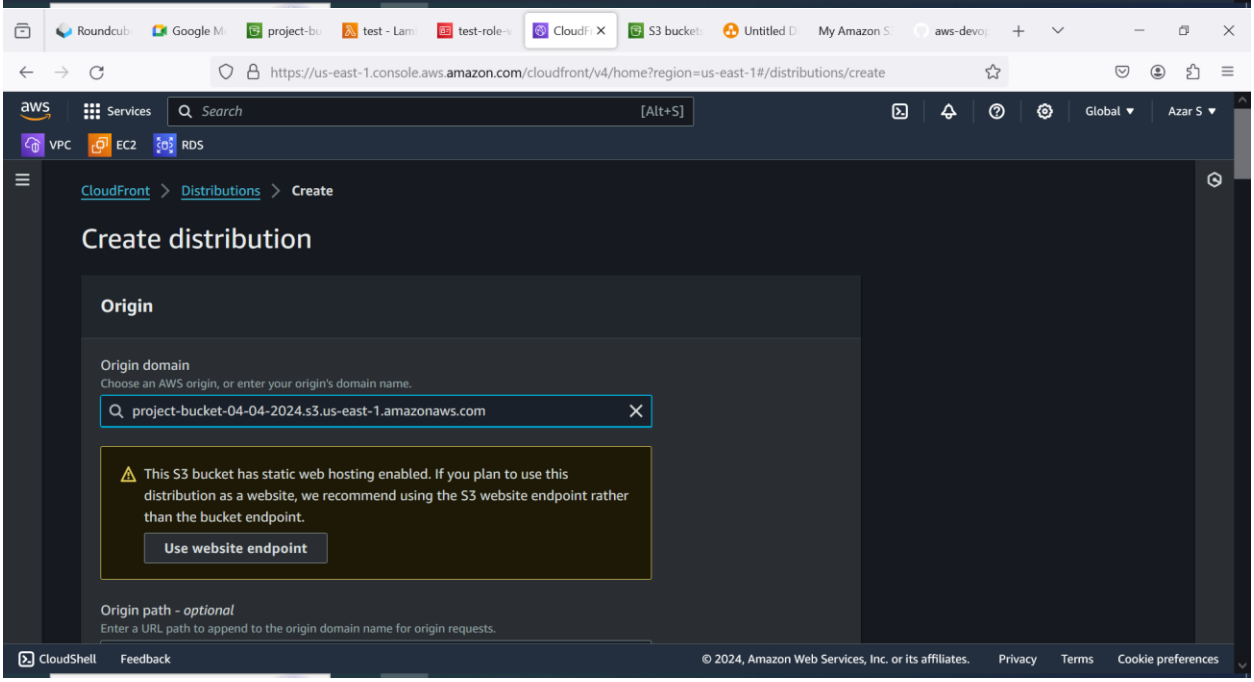
https://us-east-1.console.aws.amazon.com/cloudfront/v4/home?region=us-east-1#/distributions/create
Services
Search
[Alt+S]
Global
Azar S
VPC
EC2
RDS
CloudFront > Distributions > Create
Create distribution
Origin
Origin domain
Choose an AWS origin, or enter your origin's domain name.
project-bucket-04-04-2024.s3.us-east-1.amazonaws.com
This S3 bucket has static web hosting enabled. If you plan to use this distribution as a website, we recommend using the S3 website endpoint rather than the bucket endpoint.
Use website endpoint
Origin path - optional
Enter a URL path to append to the origin domain name for origin requests.
CloudShell
Feedback
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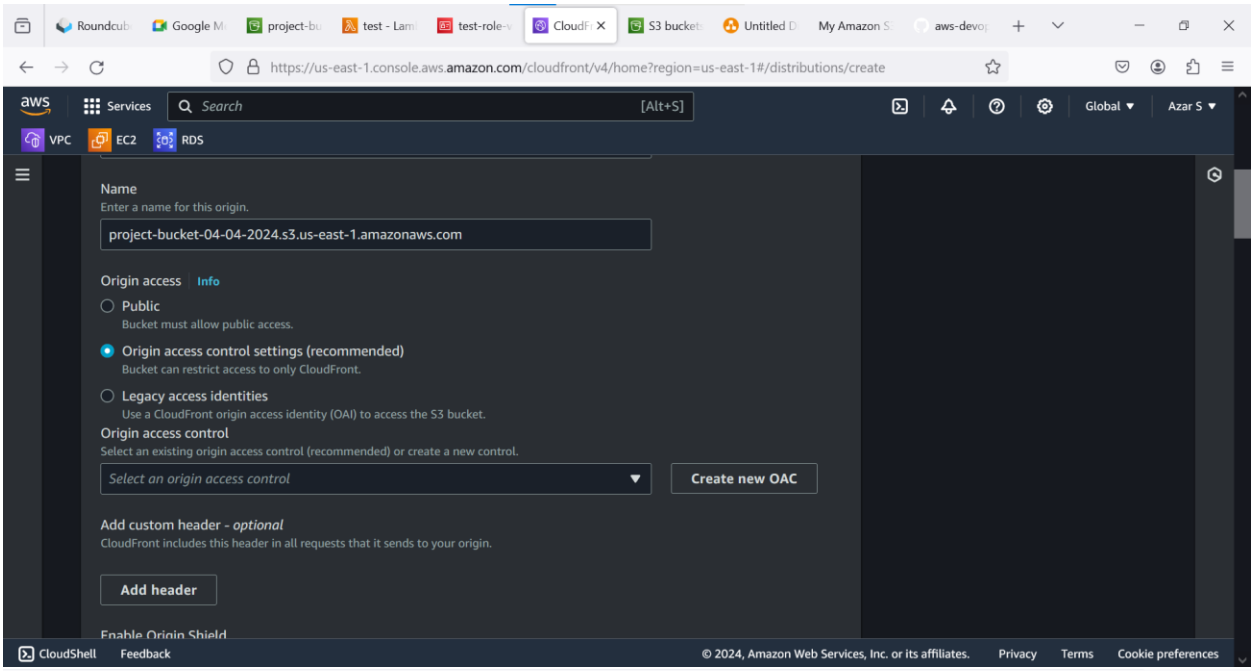
https://us-east-1.console.aws.amazon.com/cloudfront/v4/home?region=us-east-1#/distributions/create
Services
Search
[Alt+S]
Global
Azar S
VPC
EC2
RDS
Name
Enter a name for this origin.
project-bucket-04-04-2024.s3.us-east-1.amazonaws.com
Origin access Info
Public
Bucket must allow public access.
Origin 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.
Select an origin access control
Create new OAC
Add custom header - optional
CloudFront includes this header in all requests that it sends to your origin.
Add header
Enable Origin Shield
CloudShell
Feedback
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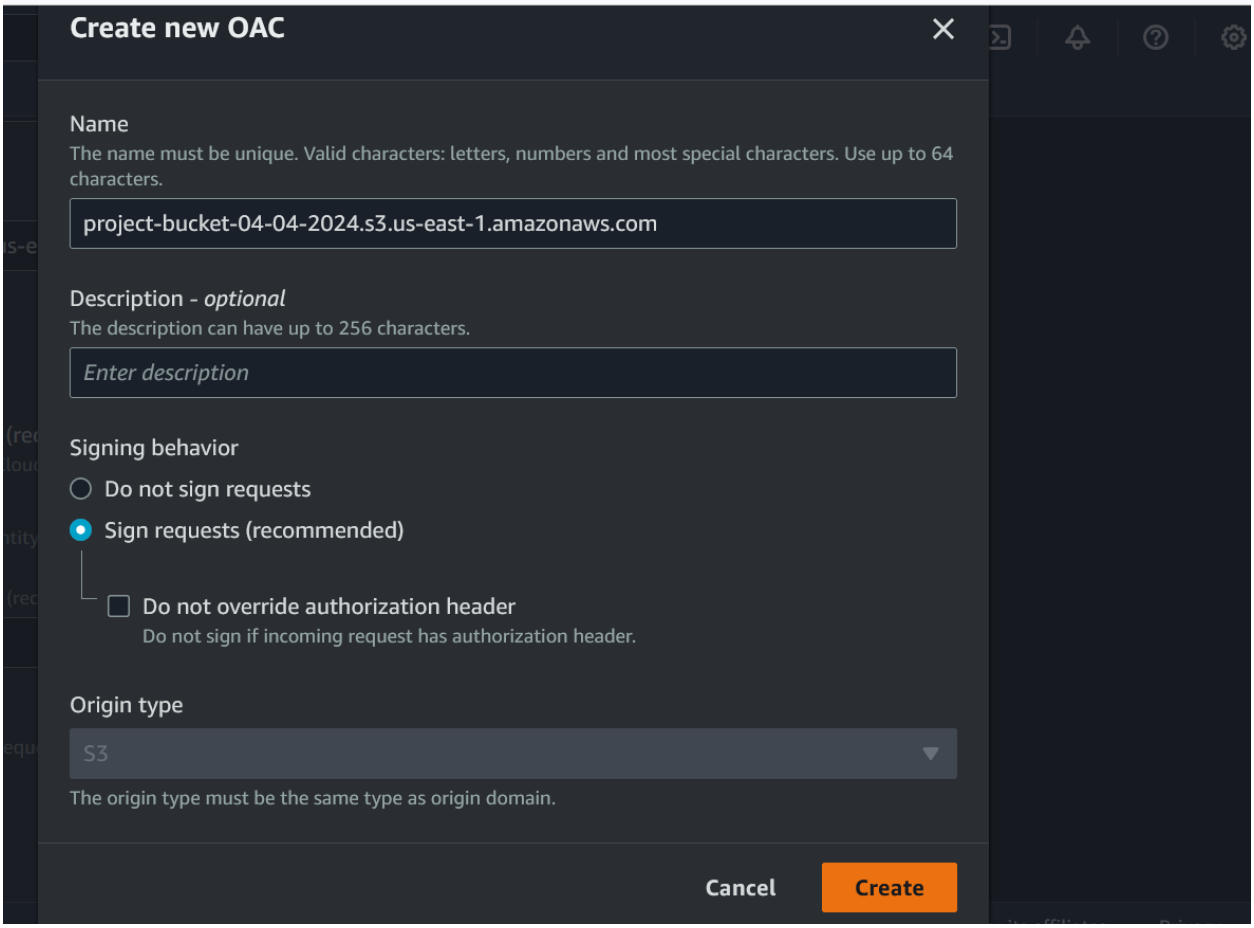
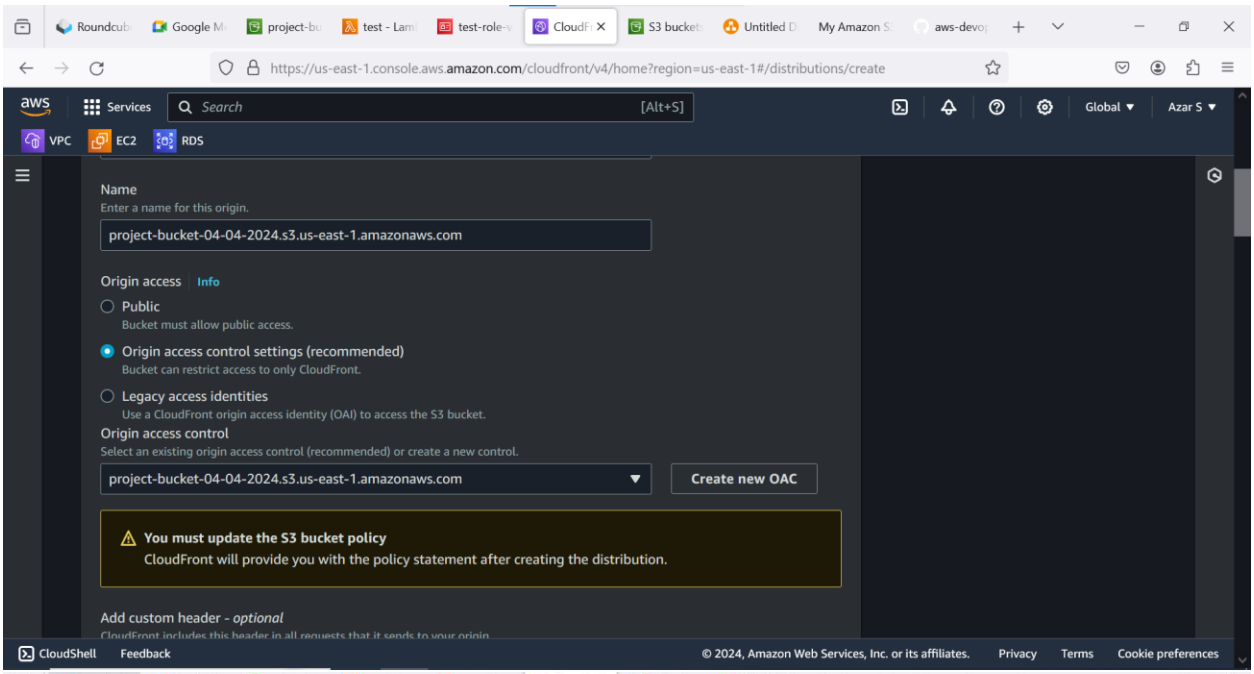

Create new OAC
Name
The name must be unique. Valid characters: letters, numbers and most special characters. Use up to 64 characters.
project-bucket-04-04-2024.s3.us-east-1.amazonaws.com
Description - optional
The description can have up to 256 characters.
Enter description
Signing behavior
Do not sign requests
Sign requests (recommended)
Do not override authorization header
Do not sign if incoming request has authorization header.
Origin type
S3
The origin type must be the same type as origin domain.
Cancel
Create


https://us-east-1.console.aws.amazon.com/cloudfront/v4/home?region=us-east-1#/distributions/create
Services
Search
[Alt+S]
Global
Azar S
VPC
EC2
RDS
Name
Enter a name for this origin.
project-bucket-04-04-2024.s3.us-east-1.amazonaws.com
Origin access Info
Public
Bucket must allow public access.
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.
project-bucket-04-04-2024.s3.us-east-1.amazonaws.com
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
CloudShell
Feedback
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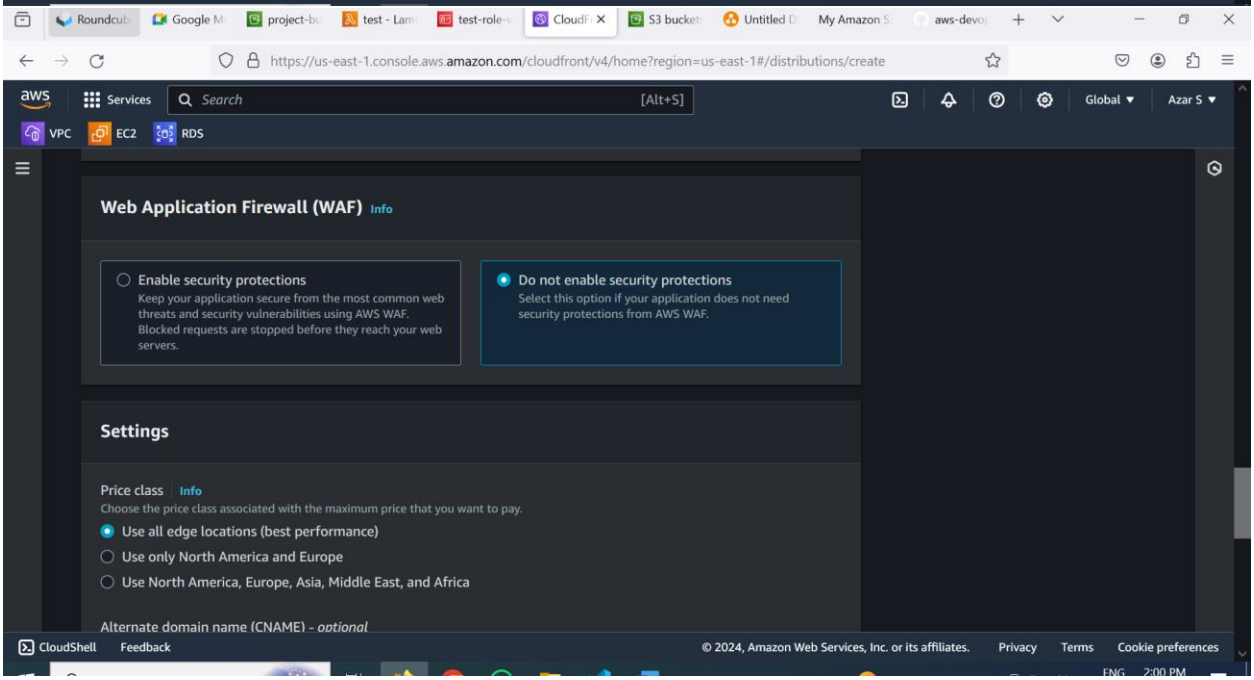
https://us-east-1.console.aws.amazon.com/cloudfront/v4/home?region=us-east-1#/distributions/create
Services
Search
[Alt+S]
Global
Azar S
VPC
EC2
RDS
Web Application Firewall (WAF) Info
Enable security protections
Keep your application secure from the most common web threats and security vulnerabilities using AWS WAF. Blocked requests are stopped before they reach your web servers.
Do not enable security protections
Select this option if your application does not need security protections from AWS WAF.
Settings
Price class Info
Choose the price class associated with the maximum price that you want to pay.
Use all edge locations (best performance)
Use only North America and Europe
Use North America, Europe, Asia, Middle East, and Africa
Alternate domain name (CNAME) - optional
CloudShell
Feedback
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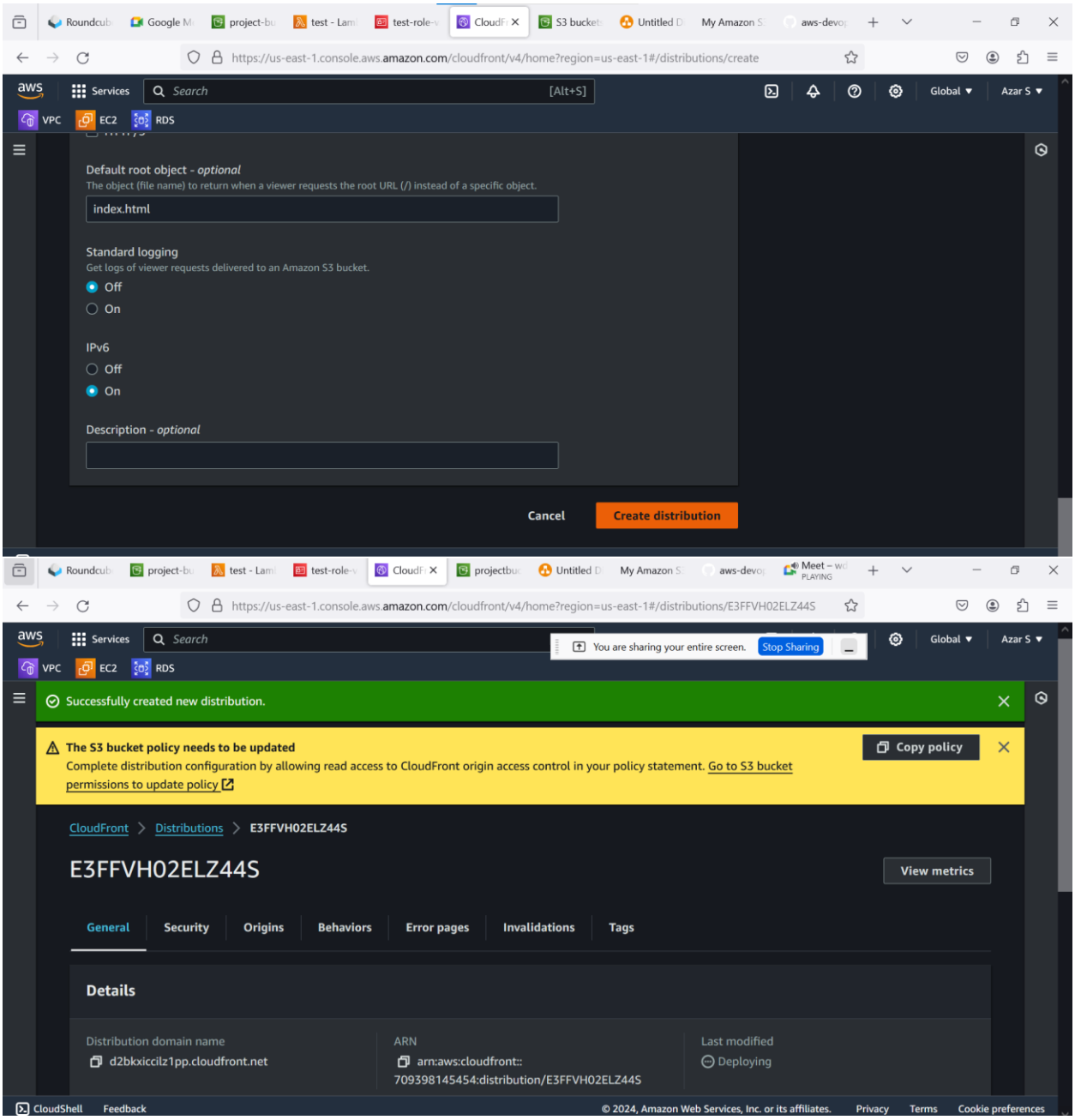
https://us-east-1.console.aws.amazon.com/cloudfront/v4/home?region=us-east-1#/distributions/create
Default root object - optional
The object (file name) to return when a viewer requests the root URL (/) instead of a specific object.
index.html
Standard logging
Get logs of viewer requests delivered to an Amazon S3 bucket.
Off
On
IPv6
Off
On
Description - optional
Cancel
Create distribution
https://us-east-1.console.aws.amazon.com/cloudfront/v4/home?region=us-east-1#/distributions/E3FFVH02ELZ44S
You are sharing your entire screen.
Stop Sharing
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 > E3FFVH02ELZ44S
E3FFVH02ELZ44S
View metrics
General
Security
Origins
Behaviors
Error pages
Invalidations
Tags
Details
Distribution domain name
d2bkxiccilz1pp.cloudfront.net
ARN
arn:aws:cloudfront::709398145454:distribution/E3FFVH02ELZ44S
Last modified
Deploying
CloudShell
Feedback
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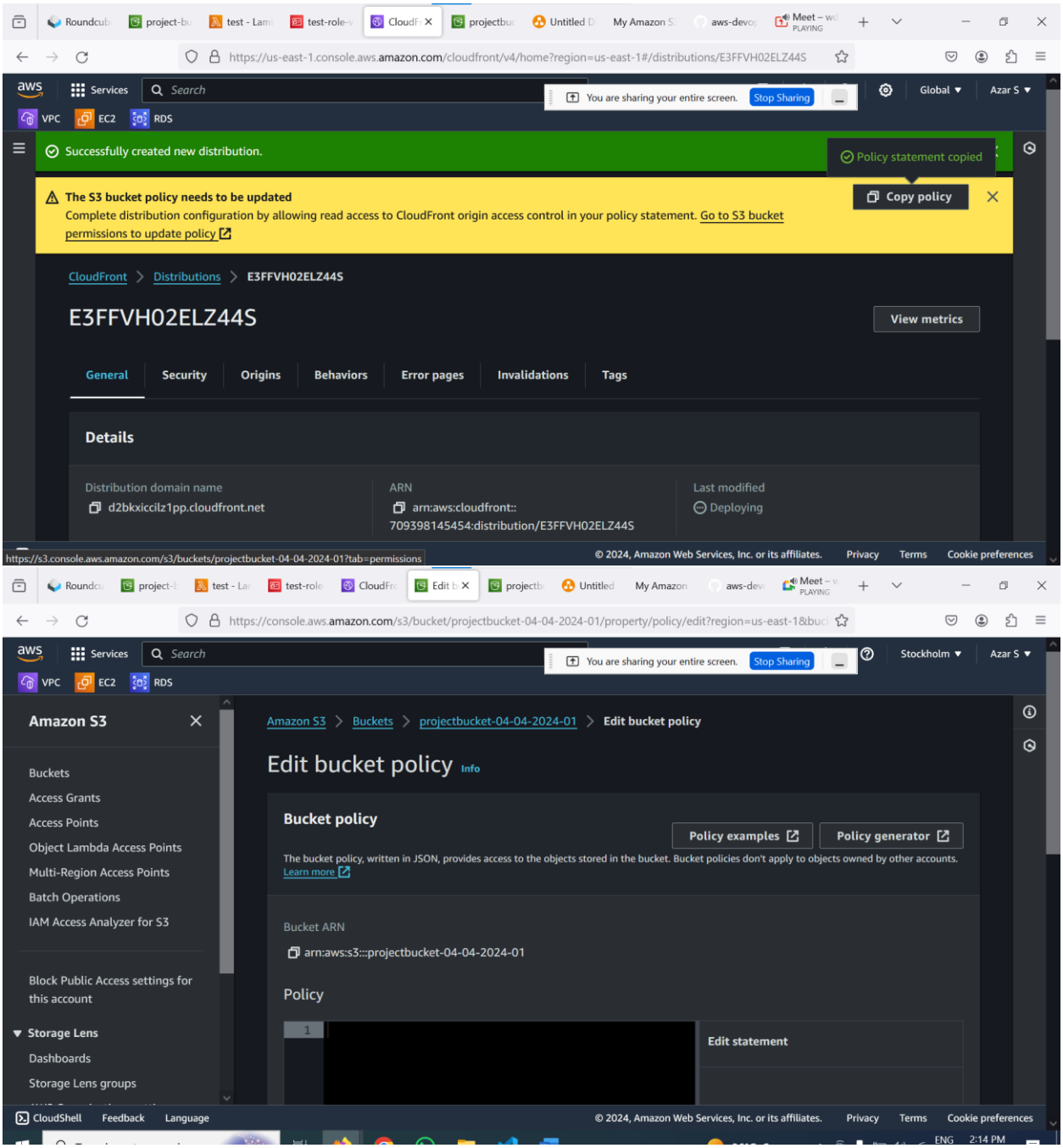
https://us-east-1.console.aws.amazon.com/cloudfront/v4/home?region=us-east-1#/distributions/E3FFVH02ELZ44S
You are sharing your entire screen.
Stop Sharing
Successfully created new distribution.
Policy statement copied
The S3 bucket policy needs to be updated
Complete distribution configuration by allowing read access to CloudFront origin access control in your policy statement. Go to S3 bucket permissions to update policy
Copy policy
CloudFront > Distributions > E3FFVH02ELZ44S
E3FFVH02ELZ44S
View metrics
General
Security
Origins
Behaviors
Error pages
Invalidations
Tags
Details
Distribution domain name
d2bkxiccilz1pp.cloudfront.net
ARN
arn:aws:cloudfront::709398145454:distribution/E3FFVH02ELZ44S
Last modified
Deploying
https://s3.console.aws.amazon.com/s3/buckets/projectbucket-04-04-2024-01?tab=permissions
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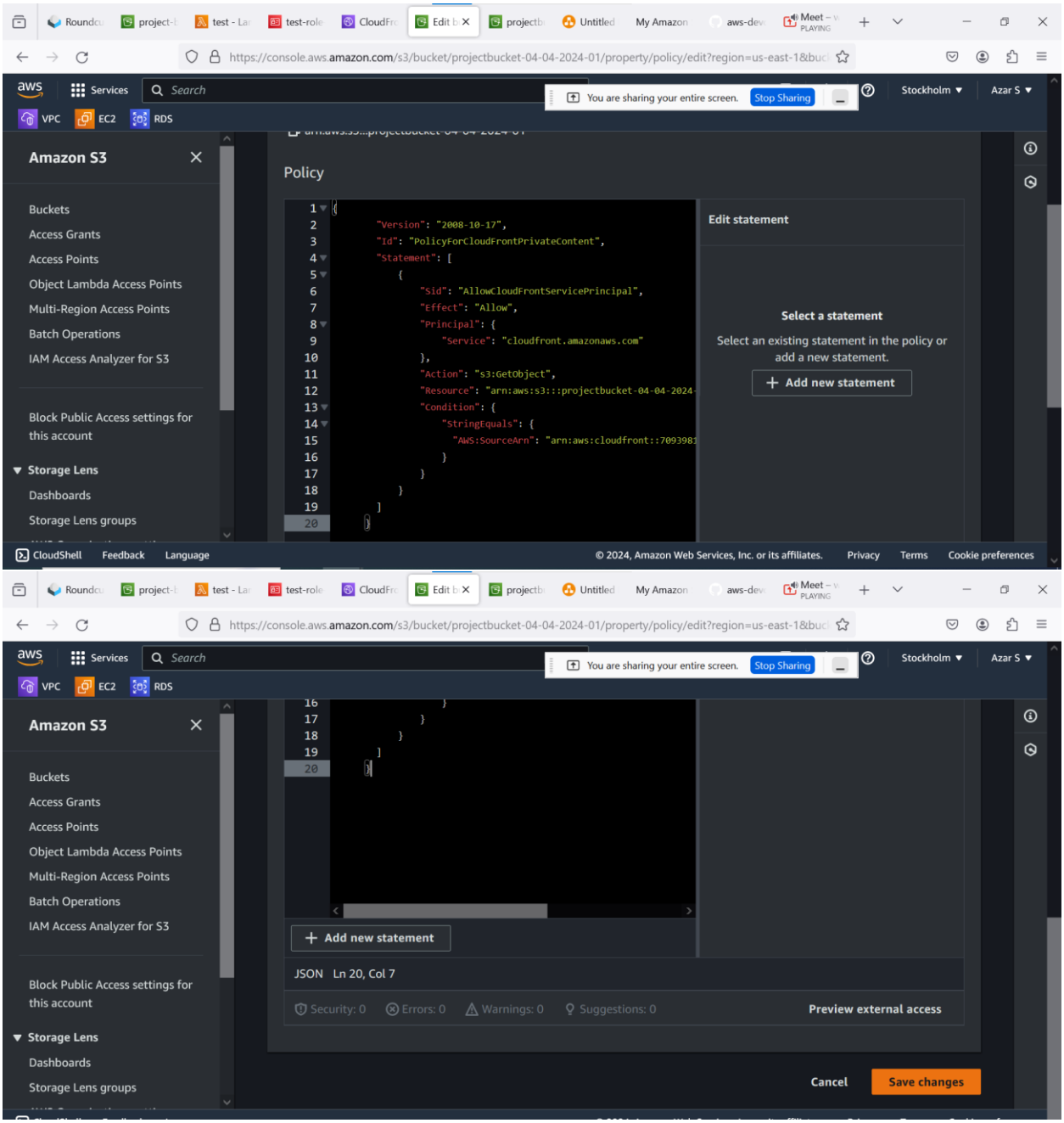
Terms
Cookie preferences
https://console.aws.amazon.com/s3/bucket/projectbucket-04-04-2024-01/property/policy/edit?region=us-east-1
Amazon S3
Buckets
Access Grants
Access Points
Object Lambda Access Points
Multi-Region Access Points
Batch Operations
IAM Access Analyzer for S3
Block Public Access settings for this account
Storage Lens
Dashboards
Storage Lens groups
Amazon S3 > Buckets > projectbucket-04-04-2024-01 > Edit bucket policy
Edit bucket policy Info
Bucket policy
Policy examples
Policy generator
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
Bucket ARN
arn:aws:s3:::projectbucket-04-04-2024-01
Policy
Edit statement
CloudShell
Feedback
Language


https://console.aws.amazon.com/s3/bucket/projectbucket-04-04-2024-01/property/policy/edit?region=us-east-1&buc
You are sharing your entire screen.
Stop Sharing
Stockholm
Azar 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
Policy
"Version": "2008-10-17",
"Id": "PolicyForCloudFrontPrivateContent",
"Statement": [
"Sid": "AllowCloudFrontServicePrincipal",
"Effect": "Allow",
"Principal": {
"Service": "cloudfront.amazonaws.com"
},
"Action": "s3:GetObject",
"Resource": "arn:aws:s3:::projectbucket-04-04-2024-
"Condition": {
"StringEquals": {
"AWS:SourceArn": "arn:aws:cloudfront::709398
Edit statement
Select a statement
Select an existing statement in the policy or add a new statement.
Add new statement
CloudShell
Feedback
Language
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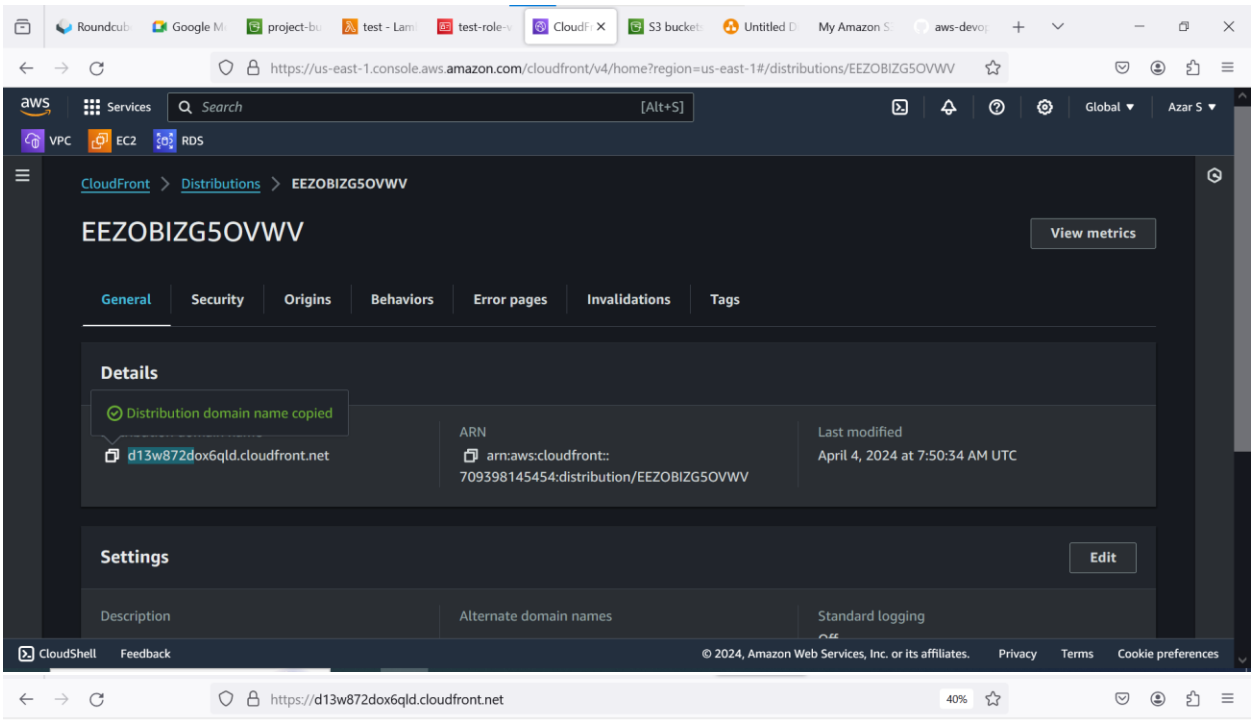
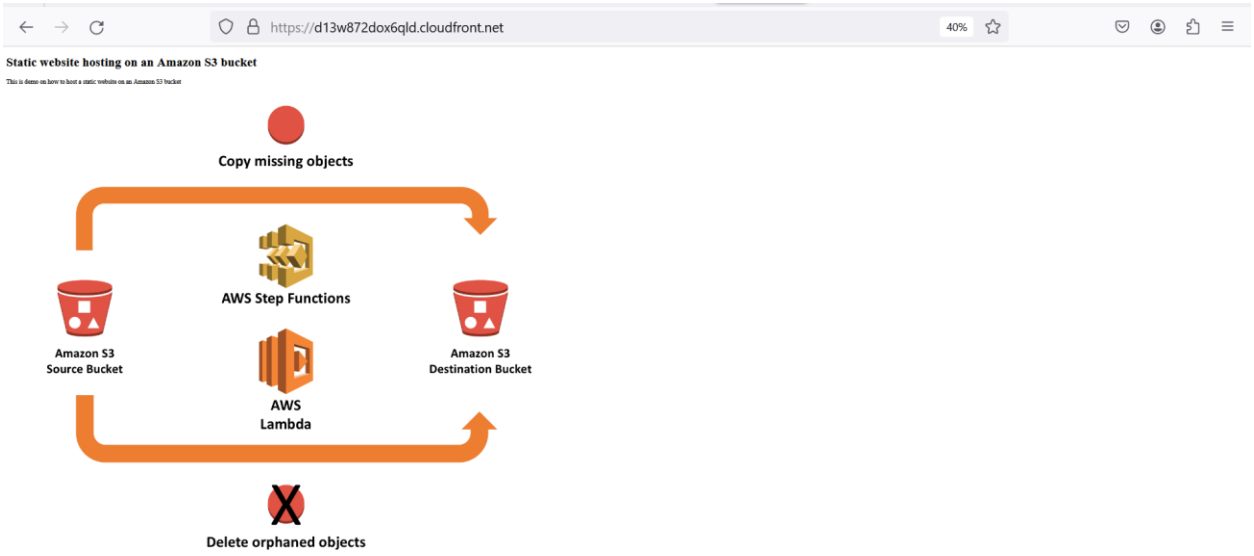
Terms
Cookie preferences
Add new statement
JSON Ln 20, Col 7
Security: 0
Errors: 0
Warnings: 0
Suggestions: 0
Preview external access
Cancel
Save changes





S3 BUCKET POLICY:

```
{
    "Version": "2008-10-17",
    "Id": "PolicyForCloudFrontPrivateContent",
    "Statement": [
      {
        "Sid": "AllowCloudFrontServicePrincipal",
```

```
        "Effect": "Allow",
        "Principal": {
            "Service": "cloudfront.amazonaws.com"
        },
        "Action": "s3:GetObject",
        "Resource": "arn:aws:s3:::projectbucket-04-04-2024-01/*",
        "Condition": {
            "StringEquals": {
              "AWS:SourceArn": "arn:aws:cloudfront::709398145454:distribution/E3FFVH02ELZ44S"
            }
        }
    }
 ]
}
```