

DEPLOYMENT OF A WEBSITE TO AWS S3 BUCKET ENVIRONMENT

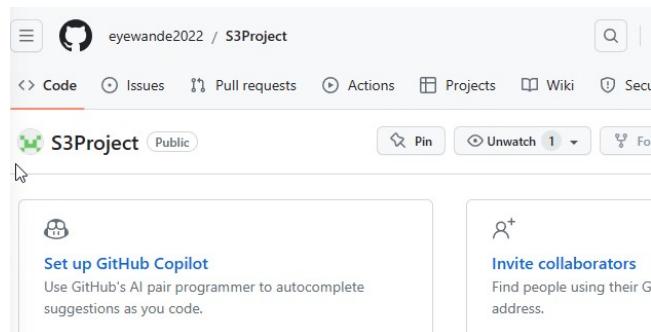
Webpages can be deployed into different cloud environments as they have numerous services and resources that can perform this tasks to continually integrate and deploy them into cloud servers and finally delivering these software solutions in a timely manner for a better user experience. In this section we would be creating a fully functional website on an AWS S3 environment.

Pre-requisite for the projects is the following.

- 1) Fundamental Knowledge of Installing and downloading software
- 2) Basic Understanding of Linux Commands
- 3) S3 Bucket
- 4) AWS Code Pipeline
- 5) Free Web Page Resource (<https://bootstrapmade.com/>)
- 6) Code Repository
- 7) Internet connection
- 8) Visual Studio Code

IMPLEMENTATION STEPS:

We would go to our git repository and create a repo called s3 project.



Navigate to the Bootstrap website to get a website template we would be using as our webpage.



We proceed to our AWS account to search and create the S3 resource which is a scalable storage we would be hosting our website.

The image consists of two screenshots. The top screenshot shows the AWS search results for 'S3'. It lists various services like Features, Resources (New), Blogs, Documentation, Knowledge Articles, and Tutorials. The 'Services' section is expanded, showing S3 (Scalable Storage in the Cloud) and S3 Glacier (Archive Storage in the Cloud). The bottom screenshot shows the 'General configuration' step of the AWS S3 bucket creation wizard. It includes fields for 'Bucket name' (s3projectdevOps), 'AWS Region' (US East (N. Virginia) us-east-1), and a 'Copy settings from existing bucket - optional' section with a 'Choose bucket' button. The 'Object Ownership' section shows two options: 'ACLs disabled (recommended)' (selected) and 'ACLs enabled'. The 'ACLs disabled' option is highlighted with a yellow box and a red arrow pointing to the input field.

In our project we would be not be blocking all public access, but it is always advisable to ensure you choose correctly what you intend to do and acknowledge it. We would also be disabling the bucket versioning as shown below.

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.

⚠️ Turning off block all public access might result in this bucket and the objects within becoming public
AWS recommends that you turn on block all public access, unless public access is required for specific and verified use cases such as static website hosting.

I acknowledge that the current settings might result in this bucket and the objects within becoming public.

Disable
 Enable

Tags (0) - optional
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)
 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 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 stored in KMS. [Learn more](#)
 Disable
 Enable

Click to create the s3 bucket.

► Advanced settings

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

[Cancel](#) [Create bucket](#)

S3 bucket created successfully.

Services Search [Alt+S] Global ▾ mrincredible ▾

☰ **Successfully created bucket "s3projectdevops"** To upload files and folders, or to configure additional bucket settings choose [View details](#).

Click on the bucket name and navigate through properties.

<input type="radio"/>	s3projectdevops	US East (N. Virginia) us-east-1	Objects can be public
<input type="radio"/>	s3projectincredible	US East (N. Virginia) us-east-1	Objects can be public

s3projectdevops [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.

[Copy S3 URI](#) [Copy URL](#) [Download](#) [Open](#) [Delete](#)

Find objects by prefix

Scroll down to the static website hosting and click the edit button to enable it and specify the index and error document you intend to use and save changes.

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

[Edit](#)

Static website hosting
Disabled

Static website hosting

Disable
 Enable

Hosting type

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

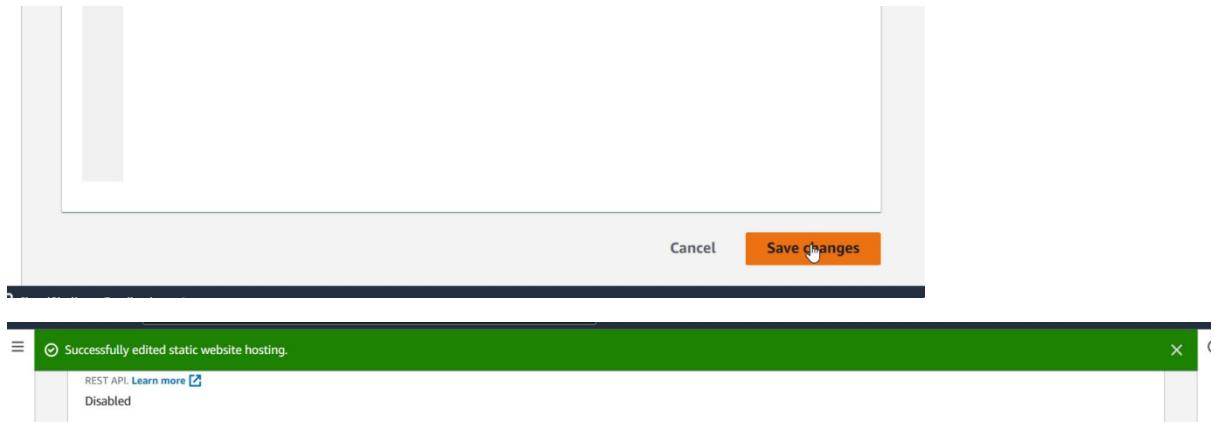
Redirect requests for an object
Redirect requests to another bucket or domain. [Learn more](#)

Index document
Specify the home or default page of the website. [Edit](#)

index.html

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

error.html



We would be setting up the permission of our bucket regardless of the action we performed when creating it. Click Permission to create the bucket policy by adding a new statement

A screenshot of the AWS S3 console. The bucket name is "s3projectdevops". The "Properties" tab is selected. In the "Permissions" section, there is a "Bucket policy" area with a "No policy to display." message. An "Edit" button is highlighted with a yellow box. Below that is a "Policy" section with a "1" and an "Edit statement" button. A "Select a statement" dropdown is open, showing "Select an existing statement in the policy or add a new statement." An "+ Add new statement" button is highlighted with a yellow box.

Search for the s3 service and locate the getObject function and click to add the resources as shown below.

The screenshot shows the AWS IAM Policy Editor interface. On the left, a code editor displays a JSON policy document:

```

1 "Version": "2012-10-17",
2 "Statement": [
3     {
4         "Sid": "Statement1",
5         "Principal": {},
6         "Effect": "Allow",
7         "Action": [
8             "s3:GetObject"
9         ],
10        "Resource": []
11    }
12 ]
13 }
14

```

To the right of the code editor is a sidebar titled "Add actions". It lists various actions under "Access level - read", with "GetObject info" checked. Below this is a list of other actions: GetObjectAcl, GetObjectAttributes, GetObjectLegalHold, GetObjectRetention, GetObjectTagging, GetObjectTorrent, and GetObjectVersion. At the bottom of the sidebar is a yellow "Add" button.

The main area below the sidebar has a title "Add resource" and a subtitle "Specify the resource type and ARN to add for the selected service." It contains three input fields: "Service" (set to "S3"), "Resource type" (set to "All Resources"), and "Resource ARN" (containing the placeholder "*"). At the bottom right are "Cancel" and "Add resource" buttons, with "Add resource" being orange.

Next step would be adding the “arn” and tweaking the principal section to accept everything and save changes.

The screenshot shows the AWS IAM Policy Editor with the policy document updated:

```

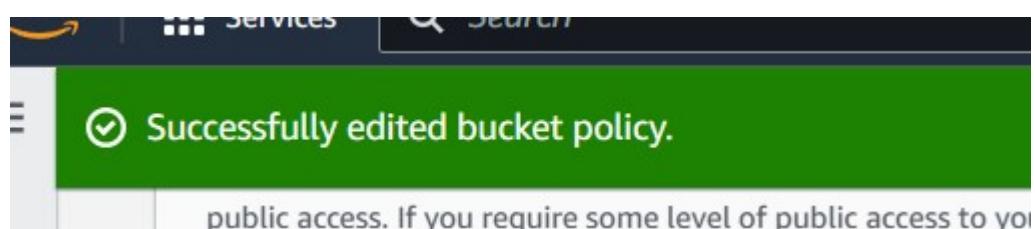
1 "Version": "2012-10-17",
2 "Statement": [
3     {
4         "Sid": "Statement1",
5         "Principal": "*",
6         "Effect": "Allow",
7         "Action": [
8             "s3:GetObject"
9         ],
10        "Resource": [
11            "arn:aws:s3:::s3projectdevops/*"
12        ]
13    }
14 ]
15 }
16 ]

```

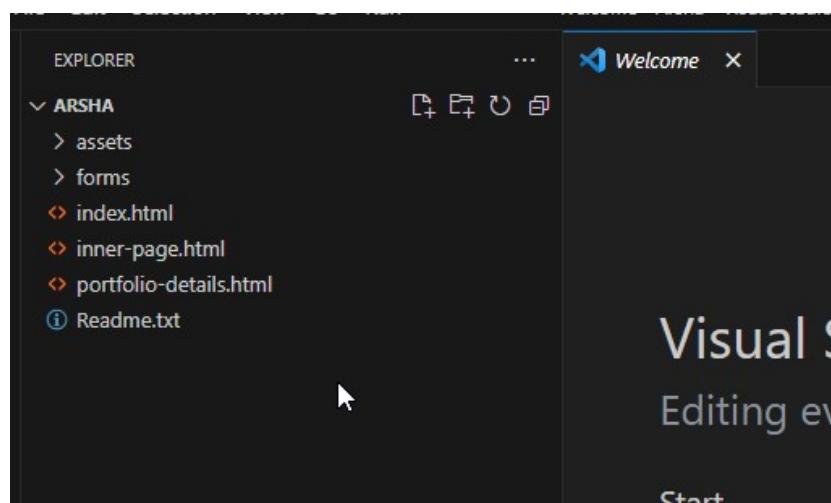
The "Principal" field at line 5 and the "Resource" field at line 11 are highlighted with red boxes. The "Add resource" button from the previous screenshot is no longer visible, indicating the changes have been made.

The screenshot shows the AWS IAM Bucket Policy editor interface. On the left, there is a code editor window displaying a JSON policy document. The policy grants 's3:GetObject' permission to an ARN for the 's3projectdevops' bucket. At the bottom of the code editor, there are buttons for '+ Add new statement' and '- Remove selected statement'. Below the code editor, a status bar shows 'JSON Ln 16, Col 1' and security metrics: 'Security: 0', 'Errors: 0', 'Warnings: 0', and 'Suggestions: 0'. To the right of the code editor, a panel displays the message 'Select an existing statement in the policy or add a new statement.' with a '+ Add new statement' button. At the bottom right of the editor, there are 'Cancel' and 'Save changes' buttons, with 'Save changes' being highlighted by a red arrow.

Bucket Policy successfully edited and our s3 bucket is ready to host the website.



The next step is to navigate to the Visual Studio Code and Open the folder that has the Bootstrap downloaded website resources.

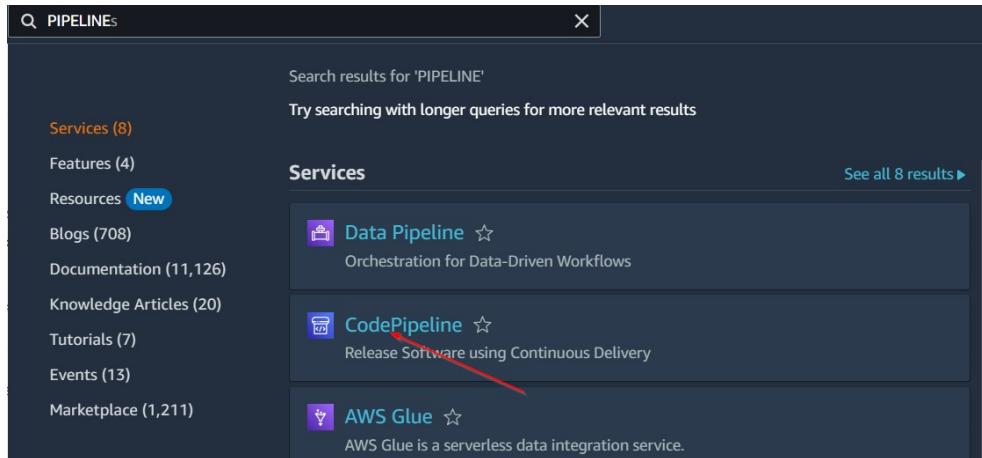


CREATION OF A CI/CD PIPELINE TO THE S3 BUCKET

We would have to create the pipeline and connect to the S3 bucket as well as linking to the git environment with the use of

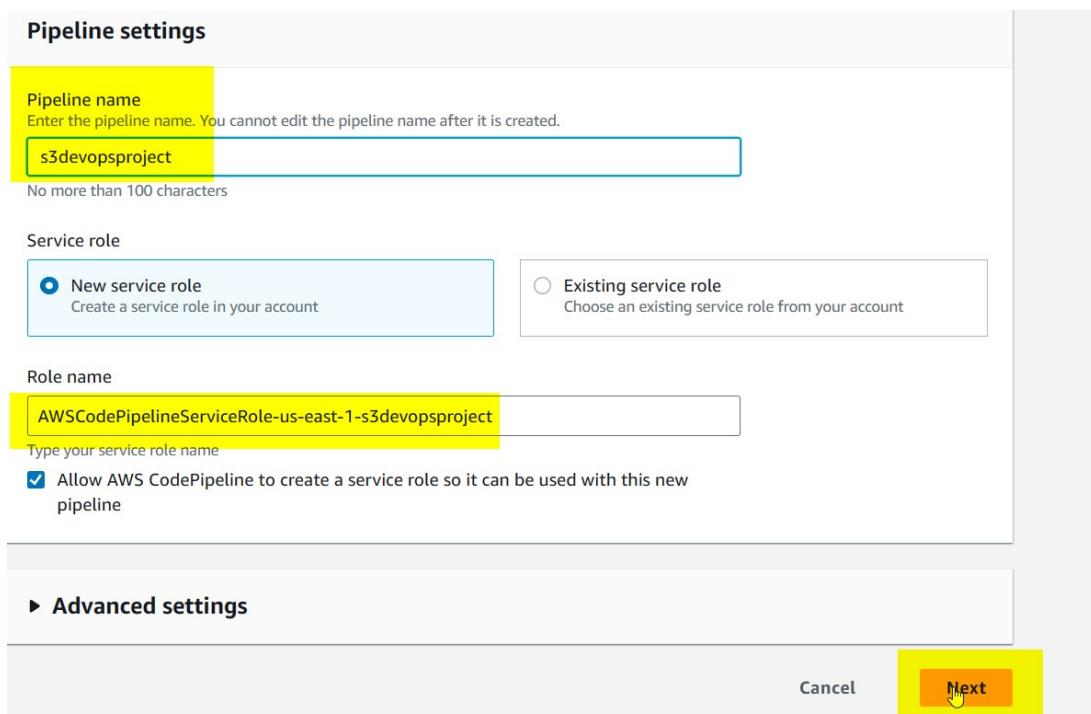
the webhook so that any new code and commit pushed to our git hub would automatically go to the s3 Bucket.

Navigate to the AWS console and search for the code pipeline and click on create pipeline.



The screenshot shows the AWS search interface with the query 'PIPELINE'. The results list includes 'Data Pipeline' and 'CodePipeline' under the 'Services' category. A red arrow points to the 'CodePipeline' entry, which is described as 'Release Software using Continuous Delivery'. Below the results, there is a 'Pipelines' page with a 'Create pipeline' button highlighted by a yellow box.

Edit the pipeline setting as shown below and click Next.



The screenshot shows the 'Pipeline settings' configuration page. The 'Pipeline name' field is set to 's3devopsproject'. Under 'Service role', the 'New service role' option is selected. The 'Role name' field contains 'AWSCodePipelineServiceRole-us-east-1-s3devopsproject'. The 'Allow AWS CodePipeline to create a service role so it can be used with this new pipeline' checkbox is checked. At the bottom, the 'Advanced settings' section is expanded, and the 'Next' button is highlighted by a yellow box.

Add the type of repository you would like to use. In our case Git Hub version1. We would now authorize aws-codesuite to connect our git

Source

Source provider
This is where you stored your input artifacts for your pipeline. Choose the provider and then provide the connection details.

Source

Source provider
This is where you stored your input artifacts for your pipeline. Choose the provider and then provide the connection details.

GitHub (Version 1)

Grant AWS CodePipeline access to your GitHub repository. This allows AWS CodePipeline to upload GitHub to your pipeline.

Connected

✓ You have successfully configured the action with the provider. X

As we can see the pipeline settings is automatically connect to our github version and configured.

We navigate back to our Visual Studio code to commit our new s3 project to our master as shown below.

```
PS C:\Users\oshor\Music\Arsha> git checkout master
oshor/Music/Arsha/.git/
PS C:\Users\oshor\Music\Arsha> git remote add origin https://github.com/eyewande2022/S3Project.git
PS C:\Users\oshor\Music\Arsha> git commit -a -m "This is the new s3 project"
On branch master

Initial commit

Untracked files:
  (use "git add <file>..." to include in what will be committed)
    README.txt
    assets/
    forms/
    index.html
    inner-page.html
    portfolio-details.html

nothing added to commit but untracked files present (use "git add" to track)
PS C:\Users\oshor\Music\Arsha>
```

The screenshot shows a GitHub repository named 'S3Project'. At the top, there's a navigation bar with a green profile icon, the repository name 'S3Project', and a 'Public' button. To the right are 'Pin' and 'Unwatch' buttons. Below the bar, there are buttons for 'master' (selected), '1 branch', '0 tags', 'Go to file', 'Add file', and a green 'Code' button. The main area displays a single commit:

This is first commit		68c5e26 3 minutes ago	1 comm
assets	This is first commit	3 minutes ago	
forms	This is first commit	3 minutes ago	
README.txt	This is first commit	3 minutes ago	
index.html	This is first commit	3 minutes ago	
inner-page.html	This is first commit	3 minutes ago	
portfolio-details.html	This is first commit	3 minutes ago	

We continue with our pipeline settings to ensure it is on the master branch and properly connect to git hub with the git webhook and move to the build stage .

The GitHub (Version 1) action is not recommended

The selected action uses OAuth apps to access your GitHub repository. This is no longer the recommended method. Instead, choose the GitHub (Version 2) action to access your repository by creating a connection. Connections use GitHub Apps to manage authentication and can be shared with other resources. [Learn more](#)

Repository X

Branch X

Change detection options
Choose a detection mode to automatically start your pipeline when a change occurs in the source code.

GitHub webhooks (recommended)
Use webhooks in GitHub to automatically start my pipeline when a change occurs

AWS CodePipeline
Use AWS CodePipeline to check periodically for changes

Cancel Previous Next

In this project we would skip the build stage

Skip build stage X

Your pipeline will not include a build stage. Are you sure you want to skip this stage?

Cancel Skip

We would get to the deploy settings and deploy action provider as shown below.

Deploy

Deploy provider
Choose how you deploy to instances. Choose the provider, and then provide the configuration details for that provider.

Amazon S3

Region
US East (N. Virginia)

Bucket
s3projectdevops

Deployment path - *optional*

Extract file before deploy
The deployed artifact will be unzipped before deployment.

► Additional configuration

Cancel Previous Next

Finally creating the pipeline

Deploy action provider

```
Deploy action provider
Amazon S3
Extract
true
BucketName
s3projectdevops
```

Cancel Previous Create pipeline

Success
Congratulations! The pipeline s3devopsproject has been created.

Create a notification rule for this pipeline X ⓘ

Developer Tools > CodePipeline > Pipelines > s3devopsproject

s3devopsproject Notify ▾ Edit Stop execution Clone pipeline Release change

Source Succeeded
Pipeline execution ID: 2152eda8-457d-414c-9a84-9ca8ef7ee107

As we can see the pipeline has been created and source and deploy successfully confirmed.

Success
Congratulations! The pipeline s3devopsproject has been created.

Create a notification rule for this pipeline X

Developer Tools > CodePipeline > Pipelines > s3devopsproject

s3devopsproject [Notify](#) [Edit](#) [Stop execution](#) [Clone pipeline](#) [Release change](#)

Source Succeeded
Pipeline execution ID: 2152eda8-457d-414c-9a84-9ca8ef7ee107

s3devopsproject [Notify](#) [Edit](#) [Stop execution](#) [Clone pipeline](#) [Release change](#)

Source Succeeded
Pipeline execution ID: 2152eda8-457d-414c-9a84-9ca8ef7ee107

Source GitHub (Version 1) ⓘ
Succeeded - Just now 68c5e26d ⓘ

68c5e26d ⓘ Source: This is first commit

[Disable transition](#)

Deploy Succeeded

By click on history we can see the first deployed made through the code pipeline

▶ Artifacts • CodeArtifact

▶ Build • CodeBuild

▶ Deploy • CodeDeploy

▼ Pipeline • CodePipeline

- Getting started
- Pipelines
- Pipeline
- History**
- Settings

Execution ID	Status	Source revisions	Duration	Completed	Trigger
2152eda8-457d-414c-9a84-9ca8ef7ee107	Succeeded	Source – 68c5e26d ⓘ This is first commit	18 seconds	Jul 29, 2023 12:49 AM (UTC+1:00)	CreatePipeline - root ⓘ

We then navigate back to the S3 BUCKET to click on our project to view the link.

Try searching with longer queries for more relevant results

Services [See all 7 results ▶](#)

S3 ☆ Scalable Storage in the Cloud

20,829) es (20)

Top features Buckets Access points Storage Lens dashboards Batch Operations

We have to ensure our committed web page resources from git hub exists in the bucket with the help of our code pipeline as shown below

codepipeline-us-east-1-183114907621	US East (N. Virginia) us-east-1	Bucket and objects not public	July 29, 2023, 00:48:58 (UTC+01:00)
s3projectdevops	US East (N. Virginia) us-east-1	⚠️ Public	July 28, 2023, 19:54:33 (UTC+01:00)
s3projectincredible	US East (N. Virginia) us-east-1	Objects can be public	July 7, 2023, 19:55:03 (UTC+01:00)

Name	Type	Last modified	Size	Storage class
assets/	Folder	-	-	-
forms/	Folder	-	-	-
index.html	html	July 29, 2023, 00:49:24 (UTC+01:00)	40.3 KB	Standard
inner-page.html	html	July 29, 2023, 00:49:24 (UTC+01:00)	8.3 KB	Standard
portfolio-details.html	html	July 29, 2023, 00:49:24 (UTC+01:00)	10.0 KB	Standard
Readme.txt	txt	July 29, 2023, 00:49:15 (UTC+01:00)	216.0 B	Standard

We have to check the index.html file to view the object url and launch the website.

index.html	html	July 29, 2023, 00:49:24 (UTC+01:00)	40.3 KB	Standard
----------------------------	------	-------------------------------------	---------	----------

Size
40.3 KB

Type
html

Key
[index.html](#)

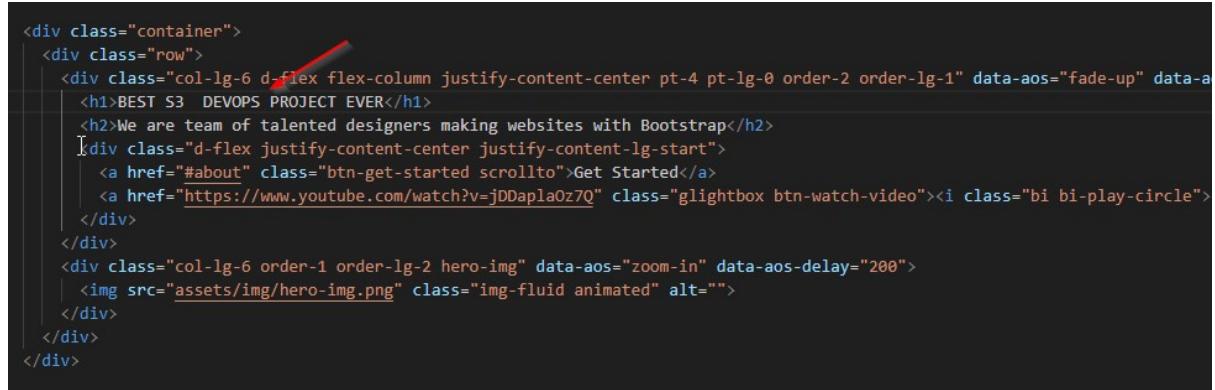
Object URL
<https://s3projectdevops.s3.amazonaws.com/index.html>

Our website is successfully launched as shown below



Website is successfully displayed as shown below.

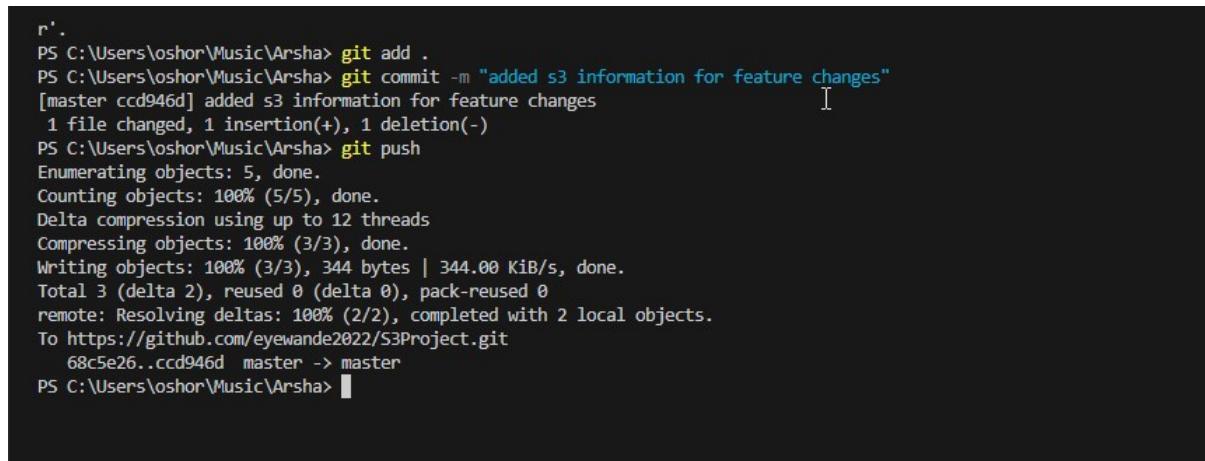
Having succeeded in achieving this, we have to ensure that our pipeline is effectively monitoring the website with respect to any changes .Hence we navigate back to our vs code by adding and committing new changes on git as shown below .



```

<div class="container">
  <div class="row">
    <div class="col-lg-6 d-flex flex-column justify-content-center pt-4 pt-lg-0 order-2 order-lg-1" data-aos="fade-up" data-a>
      <h1>BEST S3 DEVOPS PROJECT EVER</h1>
      <h2>We are team of talented designers making websites with Bootstrap</h2>
      <div class="d-flex justify-content-center justify-content-lg-start">
        <a href="#about" class="btn-get-started scrollto">Get Started</a>
        <a href="https://www.youtube.com/watch?v=jDDaplaoz7Q" class="glightbox btn-watch-video"><i class="bi bi-play-circle"></i></a>
      </div>
    </div>
    <div class="col-lg-6 order-1 order-lg-2 hero-img" data-aos="zoom-in" data-aos-delay="200">
      
    </div>
  </div>
</div>

```

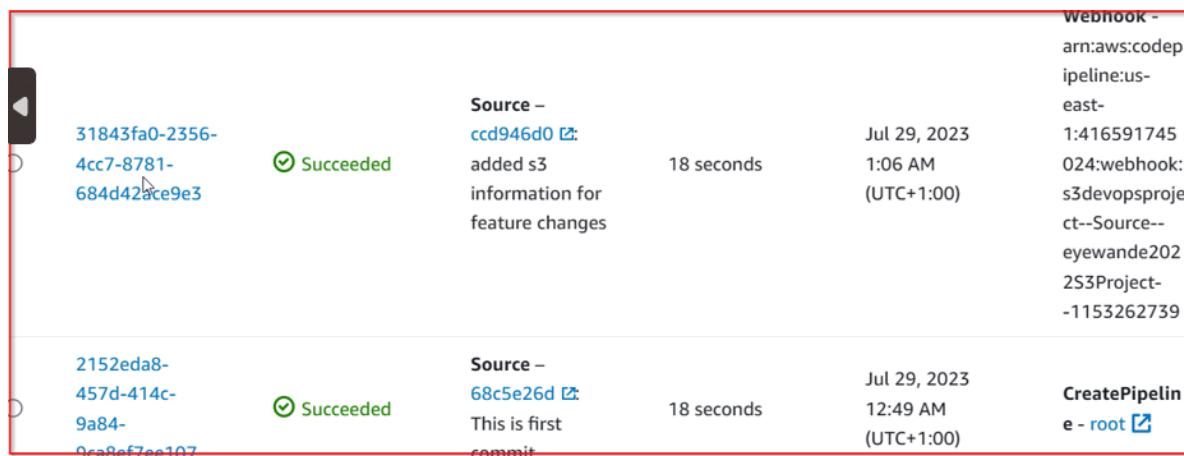


```

r'.
PS C:\Users\oshor\Music\Arsha> git add .
PS C:\Users\oshor\Music\Arsha> git commit -m "added s3 information for feature changes"
[master ccd946d] added s3 information for feature changes
  1 file changed, 1 insertion(+), 1 deletion(-)
PS C:\Users\oshor\Music\Arsha> git push
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 12 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 344 bytes | 344.00 KiB/s, done.
Total 3 (delta 2), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To https://github.com/eyewande2022/S3Project.git
  68c5e26..ccd946d master -> master
PS C:\Users\oshor\Music\Arsha>

```

We then refresh the website page as well as checking our code pipeline execution history.



		Webhook -		
		arn:aws:codepipeline:us-east-1:416591745024:webhook-s3devopsproject--Source--eyewande2022S3Project-1153262739		
31843fa0-2356-	Succeeded	Source - ccd946d0 ↗ added s3 information for feature changes	Jul 29, 2023 18 seconds (UTC+1:00)	1:416591745024:webhook-s3devopsproject--Source--eyewande2022S3Project-1153262739
4cc7-8781- 684d42ace9e3				
2152eda8- 457d-414c- 9a84- 9ca8ef7ee107	Succeeded	Source - 68c5e26d ↗ This is first commit	Jul 29, 2023 18 seconds (UTC+1:00)	CreatePipeline - root ↗

Website successfully displayed on front end .



This shows that our code pipeline effectively monitors any changes and is automatically triggered with any recent changes.

We can perform another one as shown below.

92d8d847-c5f5-48d1-92da-7076f4ede8f3	Success Succeeded	Source – 98e3d9b9 ⓘ New concern	17 seconds	Jul 29, 2023 1:13 AM (UTC+1:00)	east-1:416591745 024:webhook: s3devopsprojec ct--Source-- eyewande202 253Project- -1153262739
31843fa0-2356-4cc7-8781-684d42ace9e3	Success Succeeded	Source – ccd946d0 ⓘ added s3 information for feature changes	18 seconds	Jul 29, 2023 1:06 AM (UTC+1:00)	Webhook – arn:aws:codepipeline:us-east-1:416591745 024:webhook: s3devopsprojec ct--Source-- eyewande202 253Project- -1153262739
2152eda8-457d-414c-9a84-9ea8ef7ee107	Success Succeeded	Source – 68c5e26d ⓘ This is first commit	18 seconds	Jul 29, 2023 12:49 AM (UTC+1:00)	CreatePipeline - root ⓘ



Congratulations. You have successfully deployed a website in an s3 environment using a AWS code pipeline .

