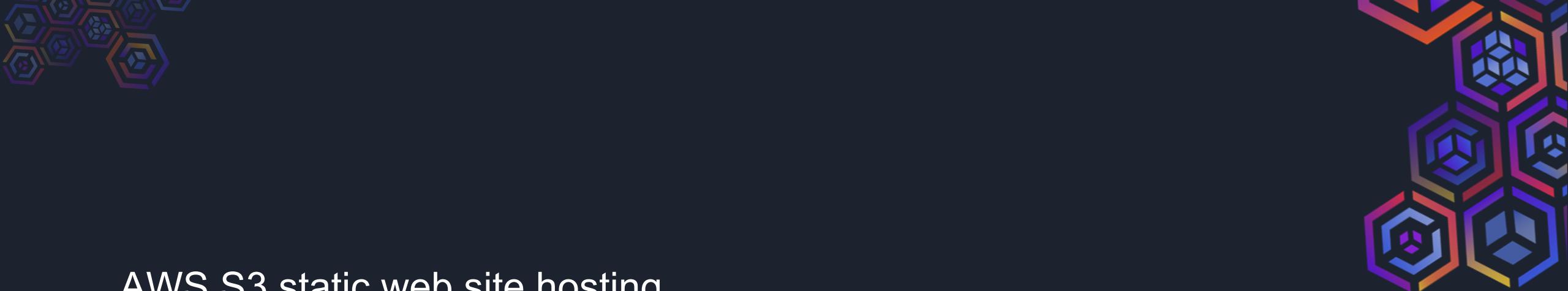




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AWS S3 static web site hosting & CI/CD Pipeline using GitHub

Girish Bhatia | 2023

AWS cloud technology enthusiast
Technology Program Manager



About Girish Bhatia

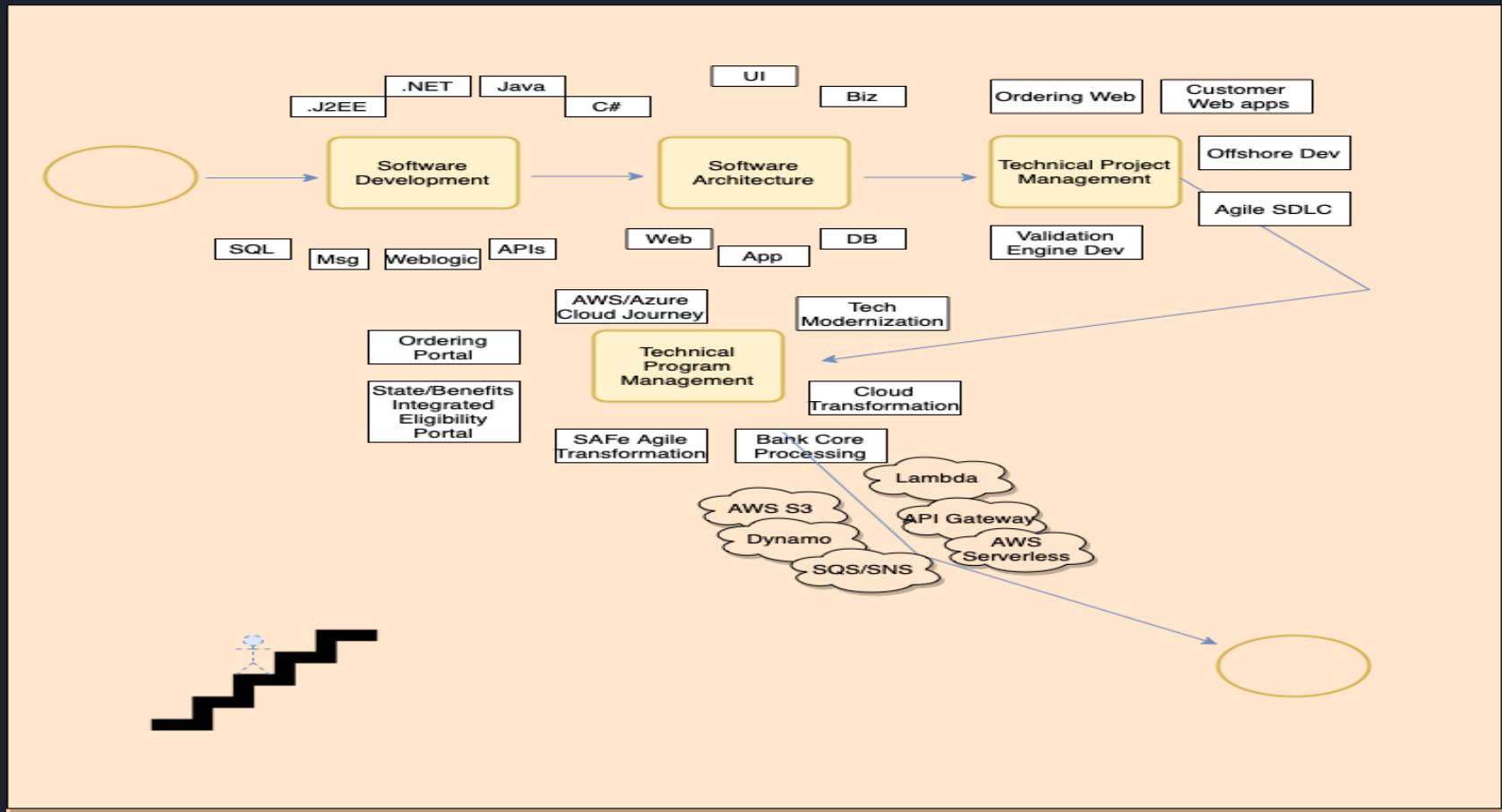
Qualifications:

- Master of Science in Computer Information Systems
- AWS Certified Developer Associate | Amazon Web Services
- AWS Certified Solution Architect: Associate | Amazon Web Services
- AWS Certified Cloud Practitioner | Amazon Web Services
- AWS badges: Serverless, Solution Architecture
- Microsoft Certified: Azure Fundamentals | Microsoft
- Microsoft Certified Professional: Solution Architecture | Microsoft
- Microsoft Certified .NET Solutions Developer | Microsoft
- Project Management Professional (PMP) | Project Management Institute
- Certified Scrum Master | Scrum Alliance)

IT Experience:

- 20+ years in IT
- Software Development using Java, .NET, Oracle, APIs, BI tools in telecom, public/state system, banking/finance domain.
- Onshore/offshore software delivery
- Tech Program/Project Management
- Journey to Cloud, Tech Modernization
- On Prem to Cloud Migration
- Cloud/API integration B2B
- Data center planning/Mainframe Relocation

Girish's Tech Journey



AWS S3 Static Website Hosting & CICD Pipeline using GitHub

- AWS S3 Static Website Hosting
- CICD Pipeline using GitHub
- Update S3 Website using CICD Pipeline

AWS S3 Static Website Hosting

- What is S3?
 - Simple Storage Service
 - Object Storage
 - 99.99% availability
- Setup Budget
- Familiarize yourself with cost explorer



S3 Bucket

Services

- S3 ★**
Scalable Storage in the Cloud
- S3 Glacier ☆**
Archive Storage in the Cloud
- AWS Snow Family ☆**
Large Scale Data Transport
- AWS Transfer Family ☆**
Fully managed support for SFTP, FTPS and FTP

AWS Budget

AWS Billing > Budgets > Budget details

GirishBudget [Info](#)

Budget health [Info](#)

Current vs. budgeted	Forecasted vs. budgeted (MTD)
Amount spent: \$0.50 of \$10.00	Amount spent: \$0.50 of \$10.00

Alerts [Info](#)

Thresholds
 OK

Actions

[View all alerts](#)

Details

Budget name	Budget amount	Start date
GirishBudget	\$10.00	2022-02-01

Budget type	Period	End date
Cost budget Info	Monthly	-

AWS Cost Explorer

AWS Cost Management > Home

Home [Info](#)

Cost summary

Current month costs	Forecasted month-end costs
\$0.50	\$0.50

Up 0% over last month Down 0% over last month

January trends [Info](#)

Once you have more usage across AWS, we will provide helpful cost and usage insights.

Daily unblended costs [View in Cost Explorer](#)

Cost (\$)

0.6
0.45

More resources [?](#)

What is AWS Billing and Cost Management?
Documentation
FAQ

Steps for S3 Web Site Hosting

- Create S3 bucket for static contents
- Enable static web site hosting
- Upload site contents
- Organize html, CSS, image and other contents files
- Identify index and error pages.



See it in action!

- Create S3 bucket for static contents
- Enable static web site hosting
- Upload site contents
- Organize html, CSS, image and other contents files
- Identify index and error pages.



Create bucket Info

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

General configuration

Bucket name

chicago-aws-meetup

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

AWS Region

US East (Ohio) us-east-2

Copy settings from existing bucket - *optional*

Only the bucket settings in the following configuration are copied.

[Choose bucket](#)

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.

Edit Block public access (bucket settings) Info

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

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.

Cancel

Save changes

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

Cancel

Create bucket

 Successfully created bucket "cmh-aws-meetup"

To upload files and folders, or to configure additional bucket settings choose [View details](#).

[View details](#)

X



Amazon S3 > Buckets > chicago-aws-meetup

chicago-aws-meetup Info

Objects Properties Permissions Metrics Management Access Points

Bucket overview

AWS Region
US East (Ohio) us-east-2

Amazon Resource Name (ARN)
 arn:aws:s3:::chicago-aws-meetup

Creation date
May 7, 2023, 09:20:12 (UTC-04:00)

Static website hosting

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

Edit

Static website hosting

Disabled





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 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](#)



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://chicago-aws-meetup.s3-website.us-east-2.amazonaws.com> 

403 Forbidden

- Code: AccessDenied
- Message: Access Denied
- RequestId: 40R3NCNYTXQ9QA05
- HostId: q6AaR+0rkzQlLebua2vCMGKSUeZfBoiO2TF4It3KI4iUKA0yCm3hUt/hgC8OYiVCqgAoLYb4Yrc=

An Error Occurred While Attempting to Retrieve a Custom Error Document

- Code: AccessDenied
- Message: Access Denied



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

[Policy examples](#)

[Policy generator](#)

Bucket ARN

arn:aws:s3:::chicago-aws-meetup

Policy

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





Hello Chicago AWS Meetup!!!

<http://chicago-aws-meetup.s3-website.us-east-2.amazonaws.com>



Hello Chicago AWS Meetup!!!

Got the website endpoint, what's next?

- Buy a Domain (use Route 53 or similar service)
- Configure S3 bucket end point for your domain. Configure CNAME entry
 - **Public Hosted Zones are meant to be used for people requesting your website through the Internet. Finally, NS records must be updated on the 3rd party Registrar.**
- Optional: Use ACM to generate SSL/TLS Certificate
 - Install certificate to enable HTTPS
 - Use CloudFront (you cannot use https/certificate directly with S3 static web site)

AWS Services used thus far:

- AWS Budget
- AWS Cost Explorer
- AWS S3
- AWS Route 53
- AWS ACM
- AWS CloudFront

Upload site contents - Multiple Way to upload contents

- Use AWS Console to load the contents
- Use IDE/AWS tools like VS Code. (this is my preferred way)
- Use CLI

chicago-aws-meetup [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](#)



[Copy S3 URI](#)

[Copy URL](#)

[Download](#)

[Open](#)

[Delete](#)

[Actions ▾](#)

[Create folder](#)

[Upload](#)

[Find objects by prefix](#)

< 1 >



<input type="checkbox"/>	Name	Type	Last modified	Size	Storage class
<input type="checkbox"/>	error.html	html	May 7, 2023, 09:30:39 (UTC-04:00)	96.0 B	Standard
<input type="checkbox"/>	index.html	html	May 7, 2023, 09:41:48 (UTC-04:00)	333.0 B	Standard
<input type="checkbox"/>	style_gb.css	css	May 7, 2023, 09:44:26 (UTC-04:00)	60.0 B	Standard

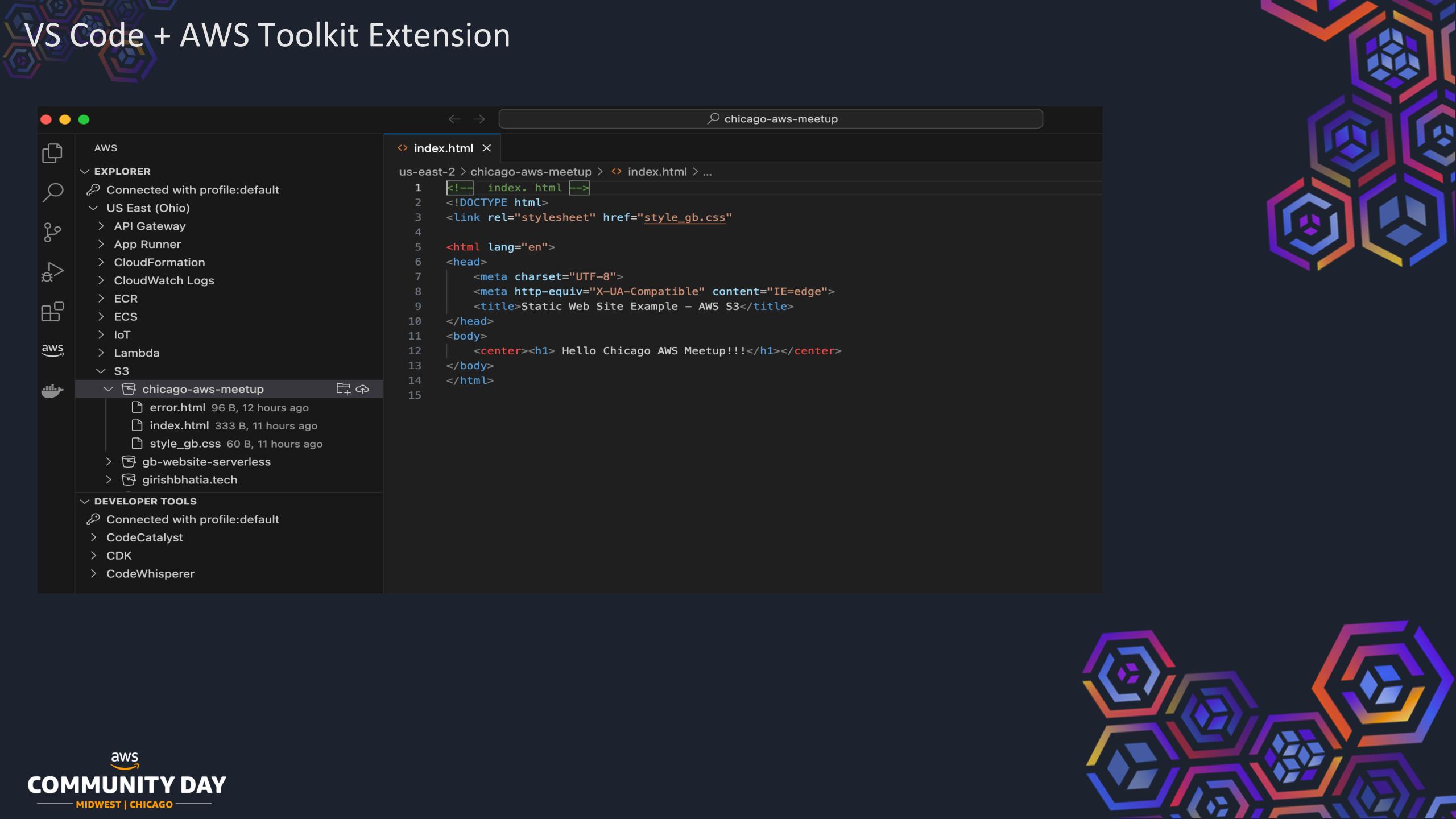


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VS Code + AWS Toolkit Extension

- VS Code View
- Updating the content via VS Code
- Refresh the site



Backup your website code in your local folder

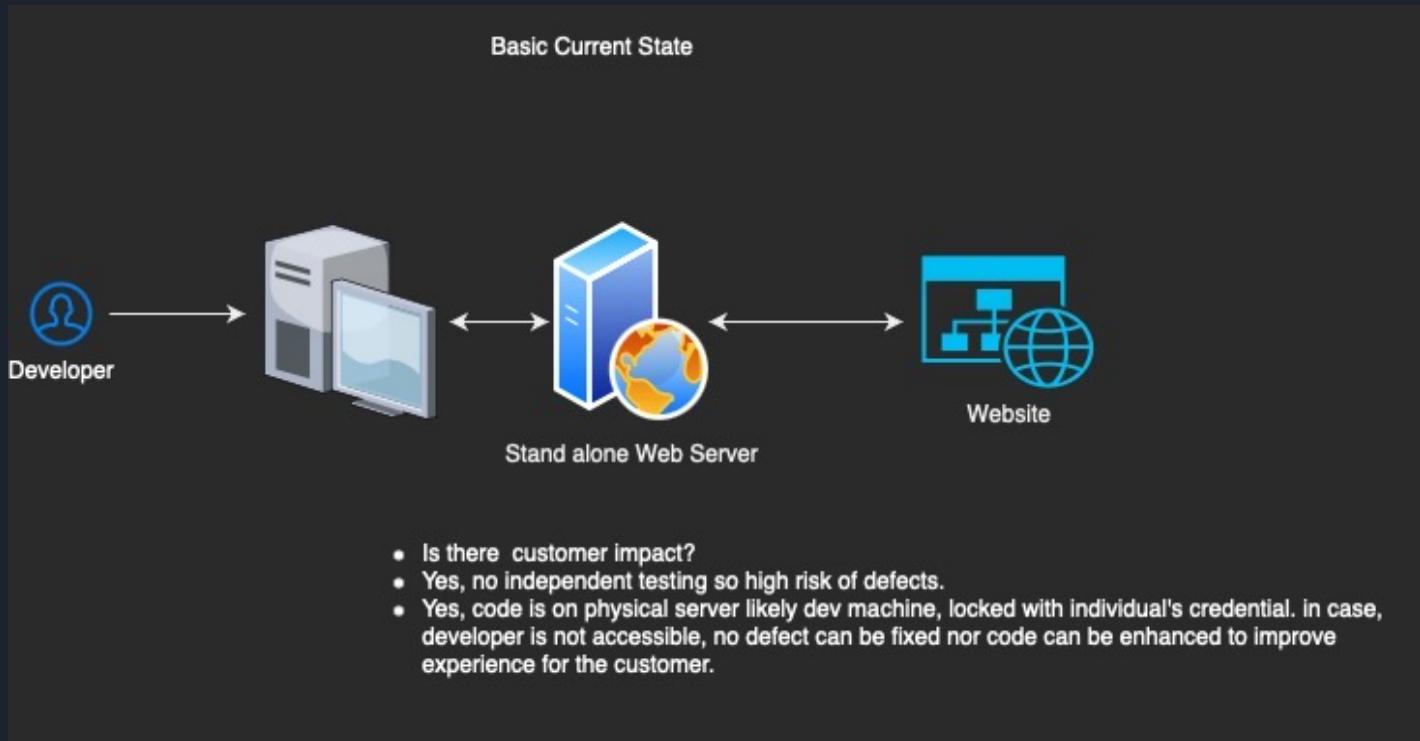
- CLI Command to backup/fetch contents to your local folder
- `aws s3 cp s3://chicago-aws-meetup/ ./ --recursive`

CICD Pipeline

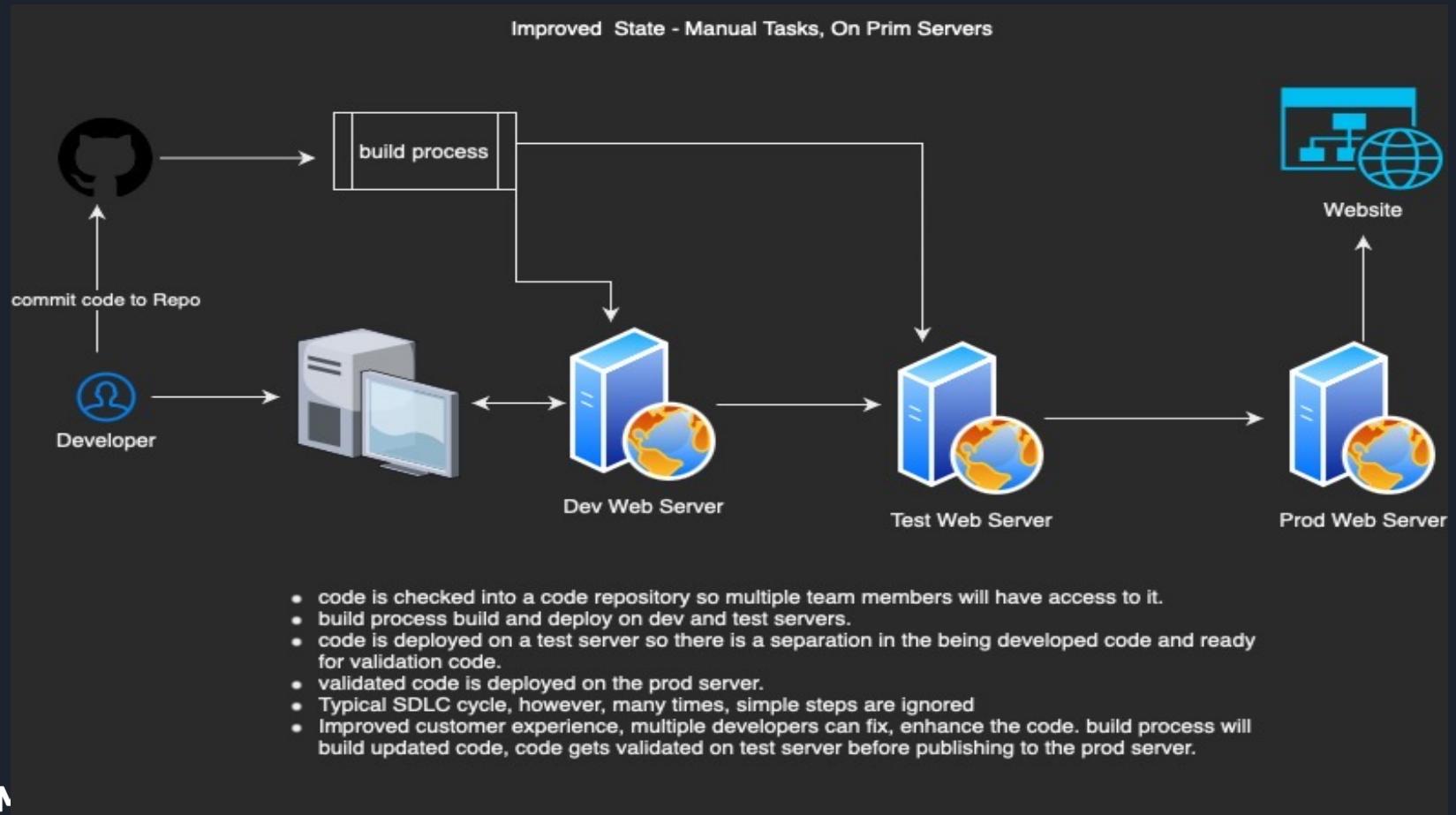
CICD Pipeline using GitHub

- VS Code + GitHub
- *AWS Code Commit*
- *AWS Code Build*
- AWS Code Deploy
- AWS Code Pipeline
- AWS S3

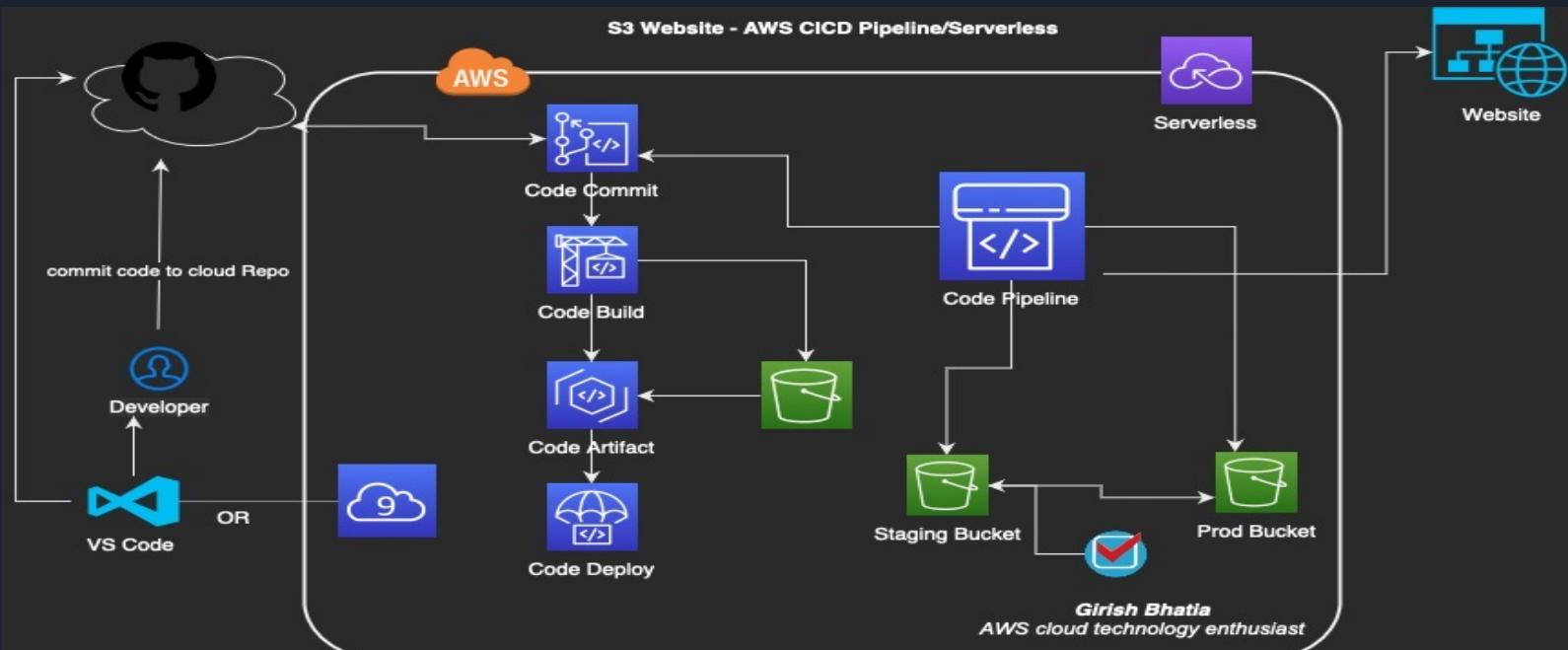
Current State: Basic Architecture (on prim)



Current State: Improved Architecture (on prim)



Future State: AWS Cloud enabled Architecture



- VS code or Cloud9 IDE is used
- IDE is integrated with GitHub or Code Commit
- Code pipeline is built so that code is built and deploy every time developer commit a change to the repo.
- Code artifact is built and deploy in a staging S3 bucket.
- Manual review/approval task
- Once manual task is approved, code is promoted from staging bucket to prod bucket.
- revised website is published and live!
- All Serverless, No EC2 instance or on prem server!
- code guru service can be used for code review.



See it in action!

- Create Code Pipeline
- Commit change
- Push to GitHub
- Code Pipeline gets triggered and update S3 Bucket
- Updated website is published!



Create Code Pipeline

Developer Tools > CodePipeline > Pipelines

Pipelines Info



Notify ▾

View history

Release change

Delete pipeline

Create pipeline



< 1 > |

Name

Most recent execution

Latest source revisions

Last executed

No results

There are no results to display.

Choose pipeline settings Info

Pipeline settings

Pipeline name

Enter the pipeline name. You cannot edit the pipeline name after it is created.

No more than 100 characters

Service role

New service role

Create a service role in your account

Existing service role

Choose an existing service role from your account

Role name

Type your service role name

- Allow AWS CodePipeline to create a service role so it can be used with this new pipeline

► Advanced settings

Cancel

Next

Add source stage Info

Source

Source provider

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



AWS CodeCommit

Amazon ECR

Amazon S3

Bitbucket

GitHub (Version 1)

GitHub (Version 2)

GitHub Enterprise Server

Previous

Next

GitHub (Version 2)



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Connect to GitHub

Source provider

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

GitHub (Version 2)



New GitHub version 2 (app-based) action

To add a GitHub version 2 action in CodePipeline, you create a connection, which uses GitHub Apps to access your repository. Use the options below to choose an existing connection or create a new one. [Learn more](#)

Connection

Choose an existing connection that you have already configured, or create a new one and then return to this task.

X or Connect to GitHub



Ready to connect

Your GitHub connection is ready for use.

Repository name

Choose a repository in your GitHub account.

X

<account>/<repository-name>

Branch name

Choose a branch of the repository.

X

Change detection options

Start the pipeline on source code change

Automatically starts your pipeline when a change occurs in the source code. If turned off, your pipeline only runs if you start it manually or on a schedule.



Code pipeline deploy stage

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 (Ohio)

Bucket

chicago-aws-meetup X

S3 object key

S3Web.zip

Enter the object key. You can include a file path without the delimiter character (/) at the beginning. Include the file extension. Example:
SampleApp.zip

Extract file before deploy

The deployed artifact will be unzipped before deployment.

► Additional configuration

Cancel

Previous

Next

Code pipeline Review before creation

Pipeline settings

Pipeline name

chicago-aws-pipeline

Artifact location

A new Amazon S3 bucket will be created as the default artifact store for your pipeline

Service role name

AWSCodePipelineServiceRole-us-east-2-chicago-aws-pipeline

Step 2: Add source stage

Source action provider

Source action provider

GitHub (Version 2)

OutputArtifactFormat

CODE_ZIP

ConnectionArn

arn:aws:codestar-connections:us-east-2:246280982127:connection/b0e608c6-ed7c-405c-94c7-2b76722ed5aa

FullRepositoryId

bhatiagirish/chicago-aws-meetup

BranchName

master



Code pipeline Created!



Success

Congratulations! The pipeline chicago-aws-pipeline has been created.

Create a notification rule for this pipeline

chicago-aws-pipeline

Notify ▾

Edit

Stop execution

Clone pipeline

Release change

✓ Source Succeeded

Pipeline execution ID: [3e2dd33e-efa5-405a-b213-9067d6fed494](#)

Source ⓘ

GitHub (Version 2) ↗

✓ Succeeded - Just now

[70d8ce2a](#) ↗

[70d8ce2a](#) ↗ Source: initial commit

Disable transition

✓ Deploy Succeeded

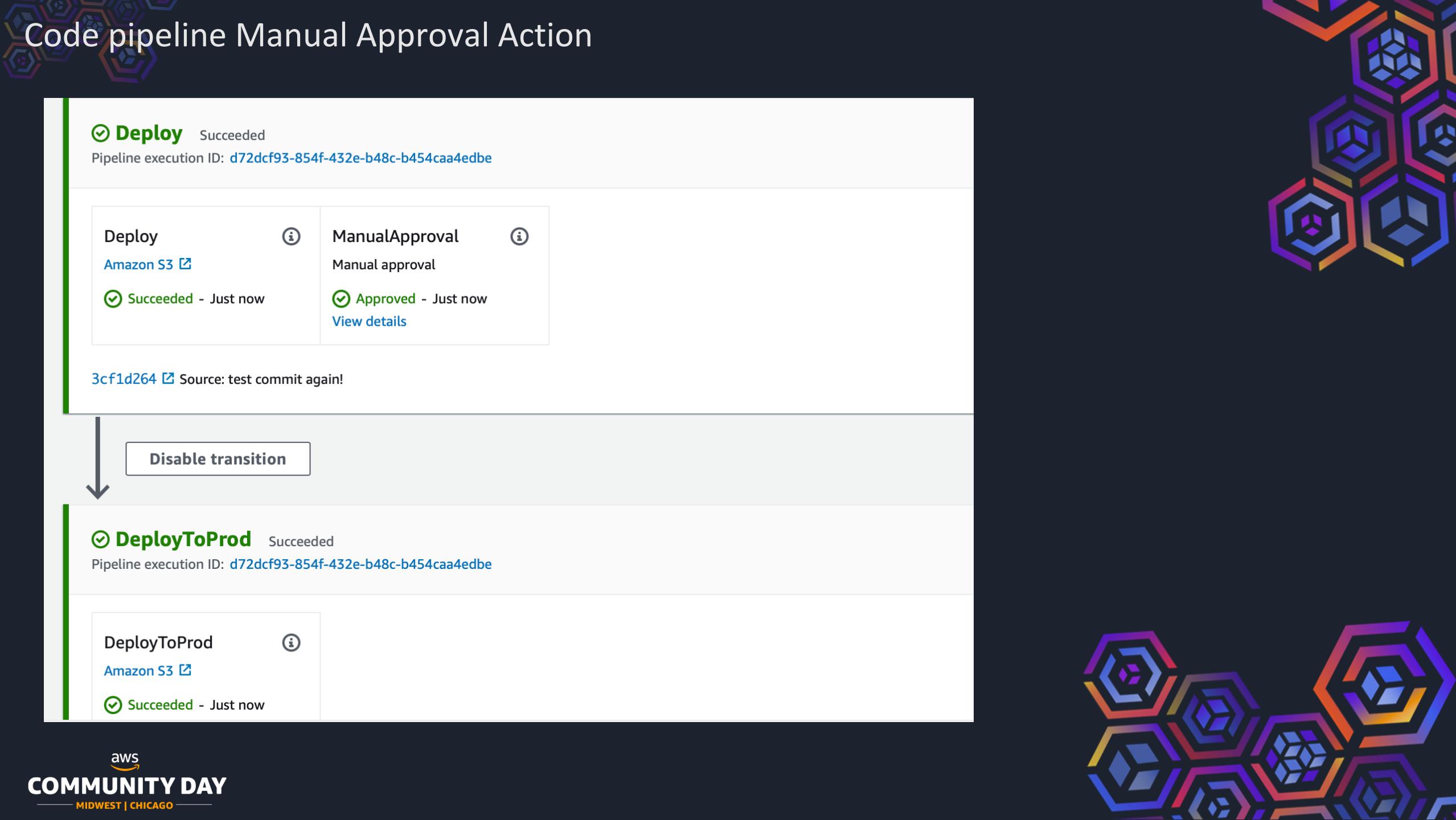
Pipeline execution ID: [3e2dd33e-efa5-405a-b213-9067d6fed494](#)

Deploy ⓘ

Amazon S3 ↗

✓ Succeeded - Just now

[70d8ce2a](#) ↗ Source: initial commit



Code pipeline Manual Approval Action

⌚ Deploy Succeeded

Pipeline execution ID: [d72dcf93-854f-432e-b48c-b454caa4edbe](#)

Deploy

[Amazon S3](#)

⌚ Succeeded - Just now

⌚ ManualApproval

Manual approval

⌚ Approved - Just now

[View details](#)

[3cf1d264](#) Source: test commit again!

[Disable transition](#)

⌚ DeployToProd Succeeded

Pipeline execution ID: [d72dcf93-854f-432e-b48c-b454caa4edbe](#)

DeployToProd

[Amazon S3](#)

⌚ Succeeded - Just now



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Amazon S3 > Buckets > chicago-aws-meetup

chicago-aws-meetup Info

Publicly accessible

Objects Properties Permissions Metrics Management Access Points

Objects (4)

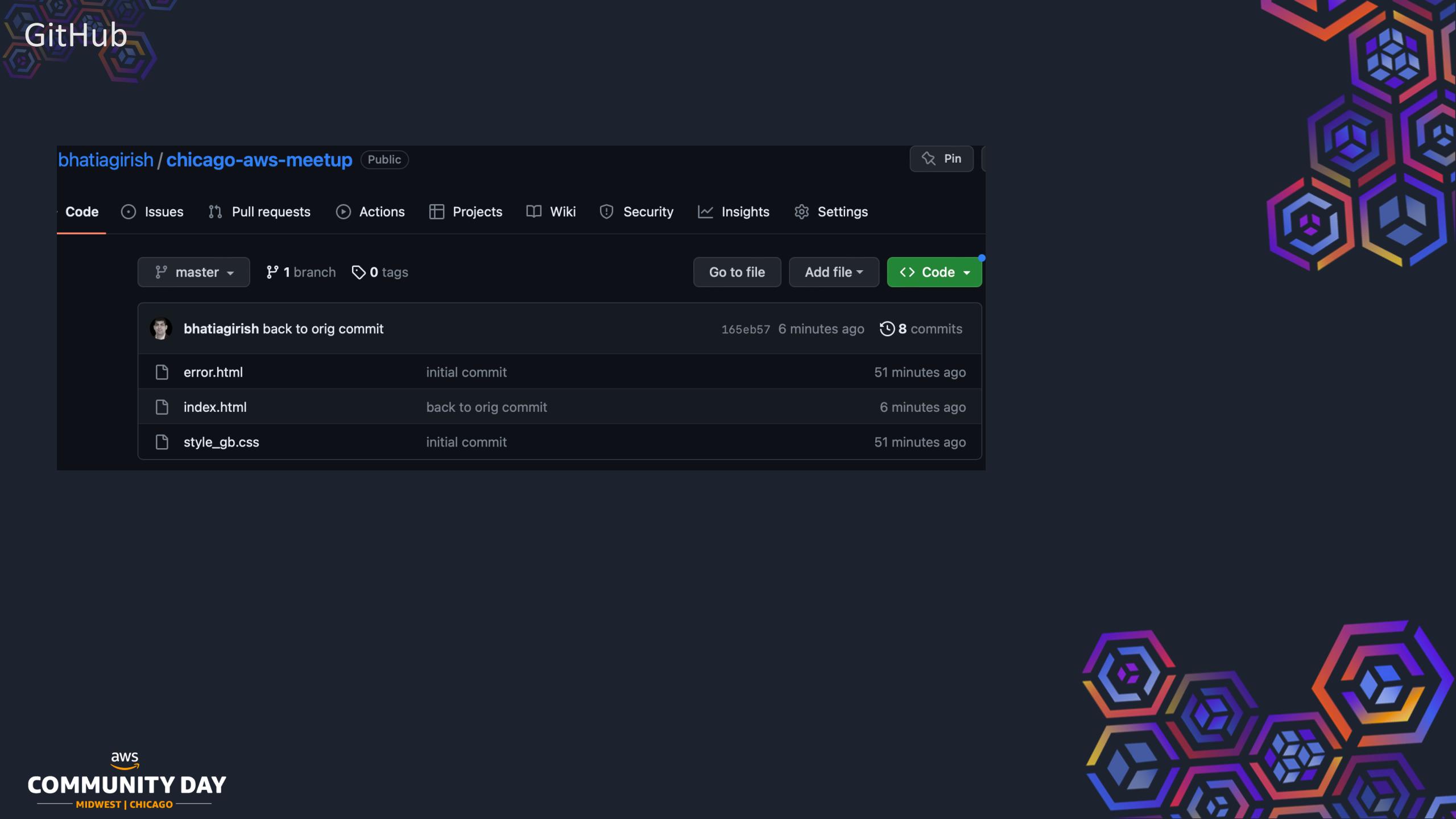
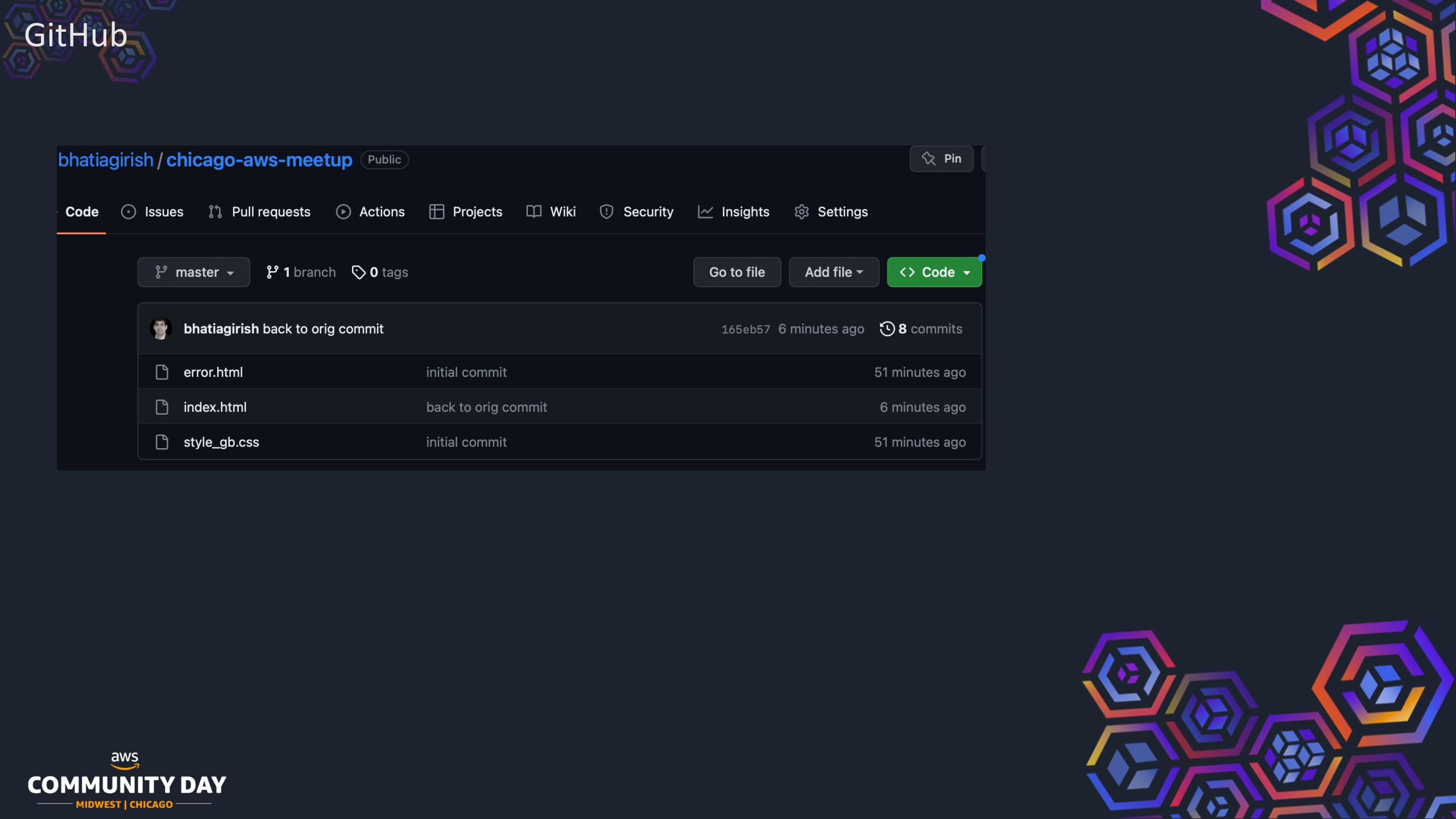
Objects are the fundamental entities stored in Amazon S3. You can use [Amazon S3 inventory](#) to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions.

Find objects by prefix

<input type="checkbox"/>	Name	Type	Last modified	Size	Storage class
<input type="checkbox"/>	error.html	html	May 8, 2023, 14:09:55 (UTC-04:00)	96.0 B	Standard
<input type="checkbox"/>	index.html	html	May 8, 2023, 14:09:55 (UTC-04:00)	338.0 B	Standard
<input type="checkbox"/>	stage/	Folder	-	-	-
<input type="checkbox"/>	style_gb.css	css	May 8, 2023, 14:09:55 (UTC-04:00)	60.0 B	Standard



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AWS Services used:

- AWS Budget
- AWS Cost Explorer
- AWS S3
- AWS Route 53
- AWS ACM
- AWS CloudFront
- AWS Code Deploy
- AWS Code Pipeline
- VS Code
- GitHub

Thank you!

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Website: <http://girishbhatia.tech>

Twitter: <https://twitter.com/BhatiaGirish/>

Code/slide available: [GitHub](#) 

