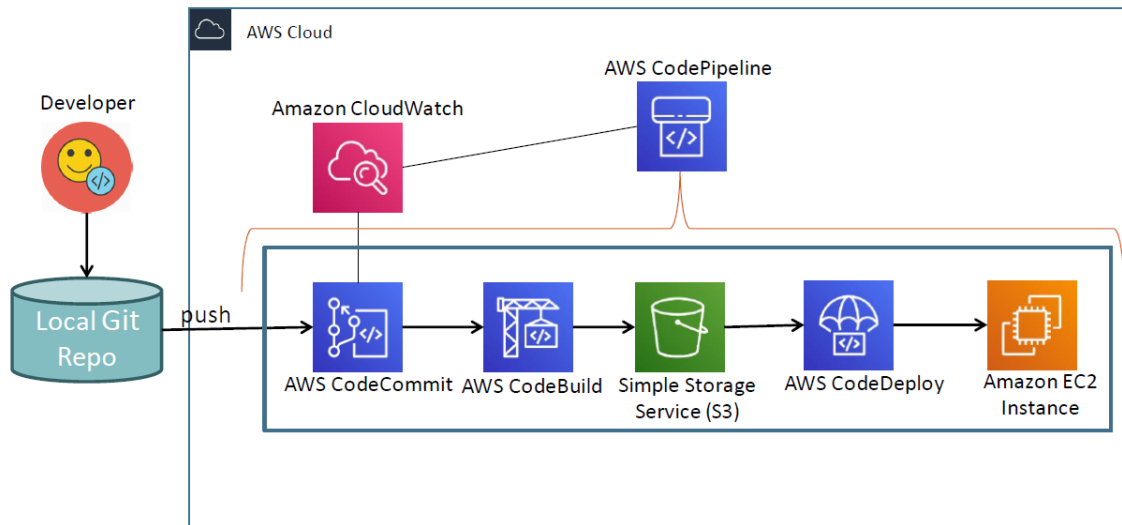


2. CI/CD in AWS - Part I

Objective -

CodePipeline



AWS CodeCommit

- AWS provided a Version control system offered by AWS
- **NOTE:** Access CodeCommit as an IAM User (NOT Root user)

Step #1: Select CodeCommit Create Repository

Developer Tools > CodeCommit > Repositories > Create repository

Create repository

Create a secure repository to store and share your code. Begin by typing a repository name and a description for your repository. Repository names are included in the URLs for that repository.

Repository settings

Repository name

demo

100 characters maximum. Other limits apply.

Description - *optional*

1,000 characters maximum

Tags

Add

- ☐ Enable Amazon CodeGuru Reviewer for Java and Python - *optional*
Get recommendations to improve the quality of the Java and Python code for all pull requests in this repository.
A service-linked role will be created in IAM on your behalf if it does not exist.

Cancel

Create

Step #2: Copy and save the 'git clone {path}'

Success

Repository successfully created

Create a notification rule for this repository

HTTPS

SSH

HTTPS (GRC)

Step 1: Prerequisites

You must use a Git client that supports Git version 1.7.9 or later to connect to an AWS CodeCommit repository. If you do not have a Git client, you can install one from Git downloads. [View Git downloads page](#)

You must have an AWS CodeCommit managed policy attached to your IAM user, belong to a CodeStar project team, or have the equivalent permissions. [Learn how to create and configure an IAM user for accessing AWS CodeCommit](#) | [Learn how to add team members to an AWS CodeStar Project](#)

Step 2: Git credentials

Create Git credentials for your IAM user, if you do not already have them. Download the credentials and save them in a secure location. [Generate Git Credentials](#)

Step 3: Clone the repository

Clone your repository to your local computer and start working on code. Run the following command:

git clone https://git-codecommit.us-east-1.amazonaws.com/v1/repos/demo

Copy

Additional details

You can find more detailed instructions in the documentation. [View documentation](#)

Step #3: Got to IAM Users {Your IAM user} click 'Security Credential' Scroll down to HTTPS Git credentials for AWS CodeCommit 'Generate Credentials'
Save the excel file with username and password

Identity and Access Management (IAM)

Dashboard

Access management

User groups

Users

Roles

Policies

Identity providers

Account settings

Access reports

Access analyzer

New feature to generate a policy based on CloudTrail events

AWS uses your CloudTrail events to identify the services and actions that you use.

Users > dev1

Summary

User ARN

arn:aws:iam::481252253919:user/dev1

Path

/

Creation time

2022-07-27 16:27 EDT

Permissions

Groups (1)

Tags

Security credentials

Sign-in credentials

Upload SSH public key

SSH key ID

HTTPS Git credentials for AWS CodeCommit

Generate a user name and password you can use to authenticate with CodeCommit. [Learn more](#)

Generate credentials

No credentials have been generated.

Generate credentials

✔ Your new credentials are available

Save your user name and password now (or download a credentials file).

This is the only time the password can be viewed or downloaded. You cannot recover it later. However, you can reset your password at any time.

You can use these credentials when connecting from your local computer or from tools that require a static user name and password. [Learn more](#)

User name

dev1-at-481252253919

Password

***** [Show](#)

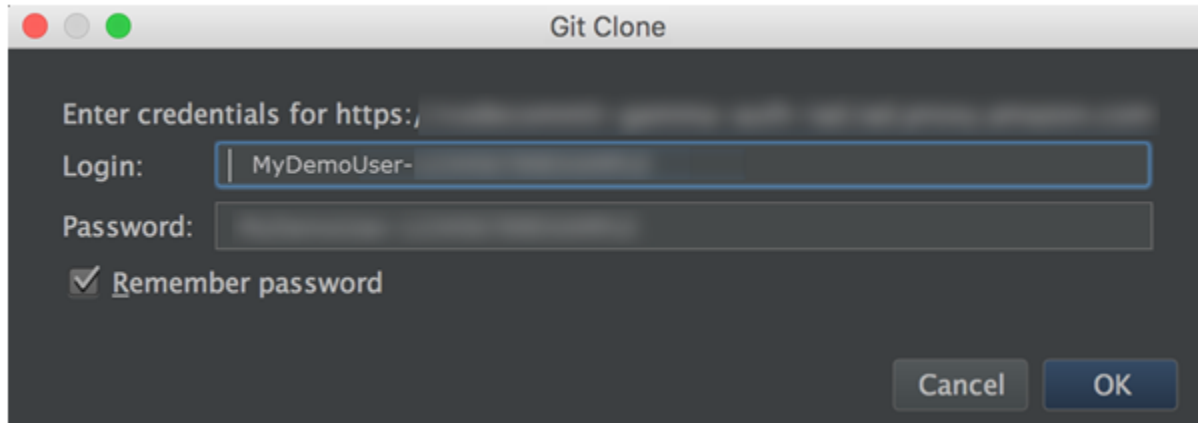
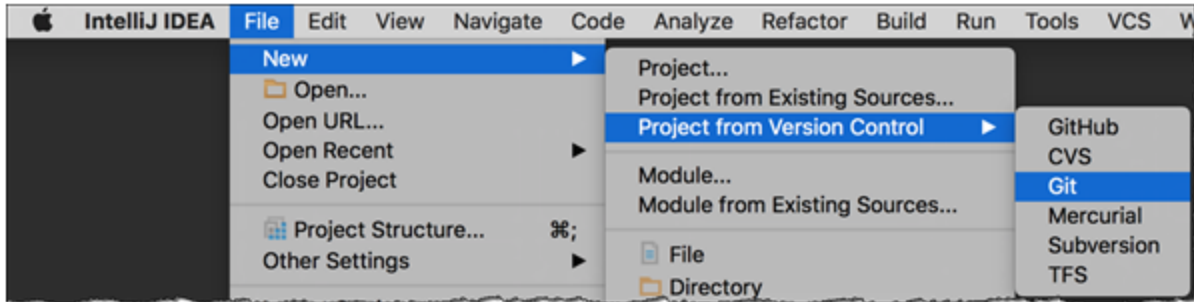
Download credentials

Close

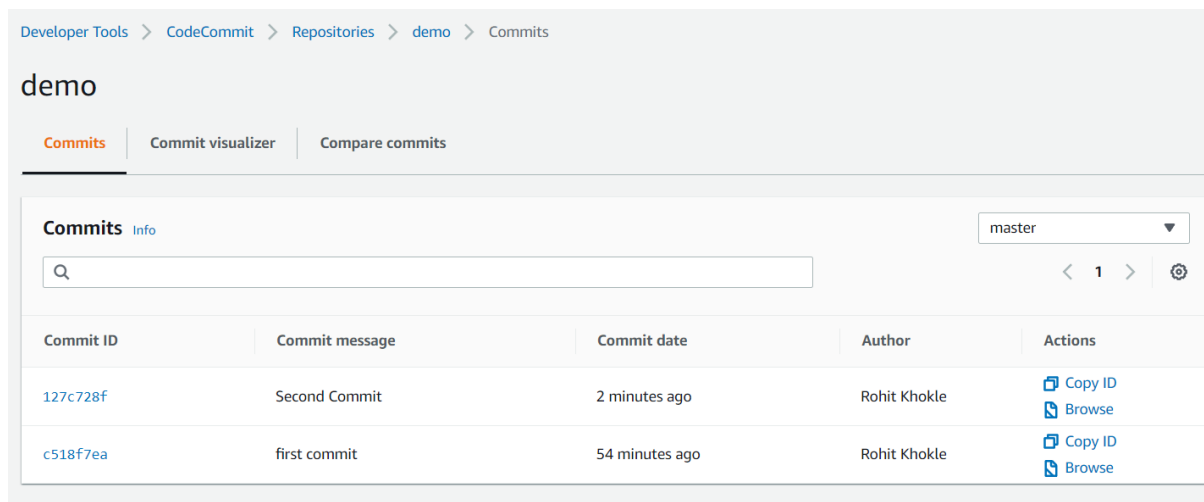
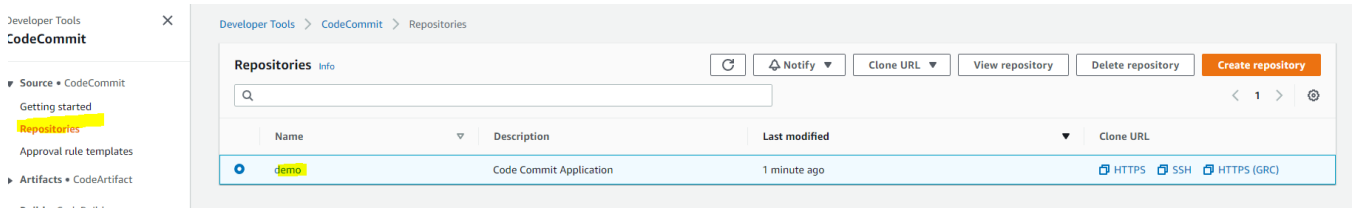
Step #4: To your local project, add git origin with HTTPS URL from Step #2 and credentials in Step #3. Push the code to CodeCommit.

<https://docs.aws.amazon.com/codecommit/latest/userguide/setting-up-ide.html>

For IntelliJ:



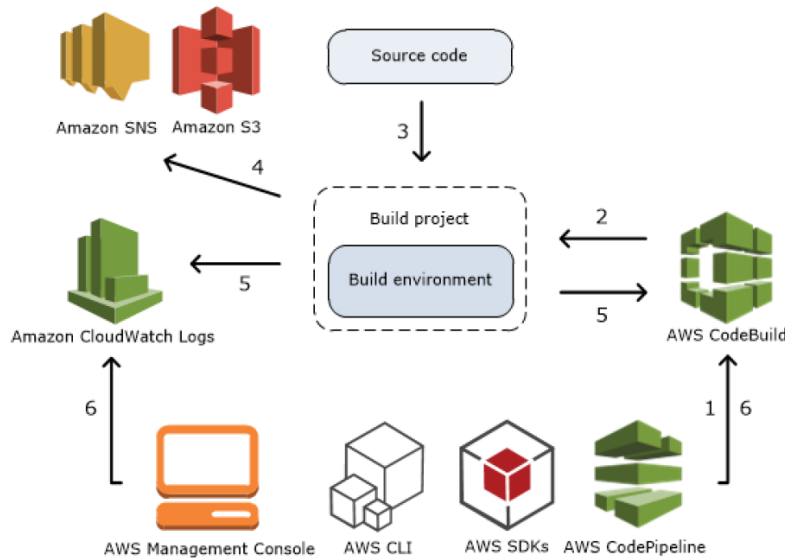
Step #5: View the repository and commits on CodeCommit branch



AWS CodeBuild

- Fully Managed Build Service in AWS
- Compiles source code, runs unit tests, and produces artifacts that are ready to deploy

How CodeBuild works?



Step #1: AWS Console S3 Create Bucket

Storage

Amazon S3

Store and retrieve any amount of data from anywhere

Amazon S3 is an object storage service that offers industry-leading scalability, data availability, security, and performance.

Create a bucket

Every object in S3 is stored in a bucket. To store objects in S3, you'll need to create a bucket. A bucket is a container for objects.

Create bucket

#1.1: Create Bucket with a name and region (**NOTE:** Region has to be same as CodeCommit region.)

Create bucket [Info](#)

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

General configuration

Bucket name

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

AWS Region

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

Copy settings from existing bucket - *optional*

Only the bucket settings in the following configuration are copied.

Choose bucket

#1.2: Create a folder inside the newly created bucket

Buckets (1) [Info](#)

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

Find buckets by name

Name

AWS Region



rest-apps-demo

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

Objects (0)

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 permissions.



Copy S3 URI

Copy URL

Download

Open

Delete

Actions

Create folder

Upload

Find objects by prefix

Name

Type

Last modified

Size

No objects

You don't have any objects in this bucket.

Upload

Folder

Folder name

devbuilds/

Folder names can't contain "/" . See rules for naming

Server-side encryption

The following settings apply only to the new folder object and not to the objects contained within it.

Server-side encryption

Disable

Enable

Cancel

Create folder

Edit Bucket Versioning

Bucket Versioning

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

Bucket Versioning

Suspend

This suspends the creation of object versions for all operations but preserves any existing object versions.

Enable

After enabling Bucket Versioning, you might need to update your lifecycle rules to manage previous versions of objects.

Multi-factor authentication (MFA) delete

An additional layer of security that requires multi-factor authentication for changing Bucket Versioning settings and permanently deleting object versions. To modify MFA delete settings, use the AWS CLI, AWS SDK, or the Amazon S3 REST API. Learn more

Disabled

Cancel

Save changes

#1.3: Enable versioning

Amazon S3 > Buckets > rest-apps-demo

rest-apps-demo

Objects

Properties

Permissions

Metrics

Management

Objects (1)

Objects are the fundamental entities stored in Amazon S3. You can use Amazon S3 in your bucket. For others to access your objects, you'll need to explicitly grant them permission.

Copy S3 URI

Copy URL

Download

Actions

Create folder

Upload

Find objects by prefix

Name

Type

Last modified

devbuilds/

Folder

-

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::rest-apps-demo

Creation date

July 27, 2022, 19:40:03 (UTC-04:00)

Bucket Versioning

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

Edit

Bucket Versioning

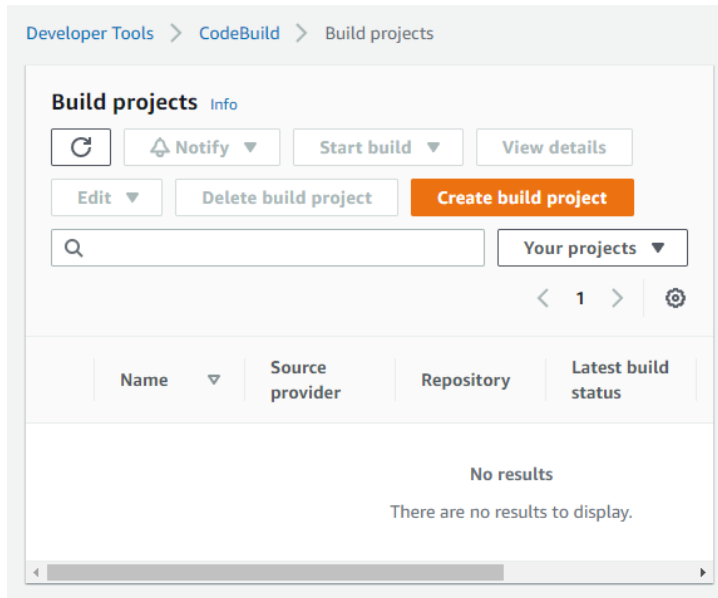
Disabled

Multi-factor authentication (MFA) delete

An additional layer of security that requires multi-factor authentication for changing Bucket Versioning settings and permanently deleting object versions. To modify MFA delete settings, use the AWS CLI, AWS SDK, or the Amazon S3 REST API. Learn more

Disabled

Step #2: AWS Console CodeBuild



#2.1: Project Configuration

Build Badge is notify the integrated applications (GitHub/Git Enterprise) if the build is successful/failed

Developer Tools > CodeBuild > Build projects > Create build project

Create build project

Project configuration

Project name

A project name must be 2 to 255 characters. It can include the letters A-Z and a-z, the numbers 0-9, and the special characters - and _.

Description - *optional*

Build badge - *optional*

☒ Enable build badge

Enable concurrent build limit - *optional*

Limit the number of allowed concurrent builds for this project.

☐ Restrict number of concurrent builds this project can start

► Additional configuration

tags

#2.2: Source Provider

Source 1 - Primary

Source provider

AWS CodeCommit ▼

Repository

Q demo X

Reference type

Choose the source version reference type that contains your source code.

- ☒ Branch
☐ Git tag
☐ Commit ID

Branch

Choose a branch that contains the code to build.

master ▼

Commit ID - *optional*

Choose a commit ID. This can shorten the duration of your build.

Q

Source version [Info](#)

refs/heads/master

127c728f Second Commit

▼ Additional configuration

Git clone depth, Git submodules

Git clone depth - *optional*

1 ▼

Git submodules - *optional*

☒ Use Git submodules

Git Clone depth # of commits that will be cloned. eg, if it is set to 5, it will clone/download the last 5 commits
Git submodules Let's use other repository in the project (different repos)

#2.3: Environment

Environment

Environment image



Managed image

Use an image managed by AWS CodeBuild



Custom image

Specify a Docker image

Operating system

Ubuntu



The programming language runtimes are now included in the standard image of Ubuntu 18.04, which is recommended for new CodeBuild projects created in the console. See [Docker Images Provided by CodeBuild for details](#).

Runtime(s)

Standard



Image

aws/codebuild/standard:6.0



Image version

Always use the latest image for this runtime version



Environment type

Linux



Privileged



Enable this flag if you want to build Docker images or want your builds to get elevated privileges

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

codebuild-demo-cb1-service-role

Type your service role name

► Additional configuration

Timeout, certificate, VPC, compute type, environment variables, file systems

▼ Additional configuration

Timeout, certificate, VPC, compute type, environment variables, file systems

Timeout

Default timeout is 1 hour

Hours

Minutes

Timeout must be between 5 minutes and 8 hours

Queued timeout

Default time in build queue is 8 hours

Hours

Minutes

Timeout must be between 5 minutes and 8 hours

Certificate

If you have a self-signed certificate or a certificate signed by a certification authority, choose the option to install it from your S3 bucket.

☒ Do not install any certificate

☐ Install certificate from your S3 bucket

VPC

Select a VPC that your AWS CodeBuild project will access.

Compute

- ☒ 3 GB memory, 2 vCPUs
- ☐ 7 GB memory, 4 vCPUs
- ☐ 15 GB memory, 8 vCPUs
- ☐ 145 GB memory, 72 vCPUs

#2.4: Build Spec

-- Custom Image can be selected for Docker

Buildspec

Build specifications

☒ Use a buildspec file
Store build commands in a YAML-formatted buildspec file

☐ Insert build commands
Store build commands as build project configuration

Buildspec name - *optional*

By default, CodeBuild looks for a file named buildspec.yml in the source code root directory. If your buildspec file uses a different name or location, enter its path from the source root here (for example, buildspec-two.yml or configuration/buildspec.yml).

Batch configuration

You can run a group of builds as a single execution. Batch configuration is also available in advanced option when starting build.

☐ Define batch configuration - *optional*
You can also define or override batch configuration when starting a build batch.

#2.5: Artifacts

Artifacts

Add artifact

Artifact 1 - Primary

Type

Amazon S3

You might choose no artifacts if you are running tests or pushing a Docker image to Amazon ECR.

Bucket name

rest-apps-demo

Name

The name of the folder or compressed file in the bucket that will contain your output artifacts. Use Artifacts packaging under Additional configuration to choose whether to use a folder or compressed file. If the name is not provided, defaults to project name.

☒ Enable semantic versioning

Use the artifact name specified in the buildspec file

Path - *optional*

The path to the build output ZIP file or folder.

devbuilds

Example: MyPath/MyArtifact.zip.

Namespace type - *optional*

None

Choose Build ID to insert the build ID into the path to the build output ZIP file or folder, e.g. MyPath/MyBuildID/MyArtifact.zip. Otherwise, choose None.

Artifacts packaging

☐ None

The artifact files will be uploaded to the bucket.

☒ Zip

AWS CodeBuild will upload artifacts into a compressed file that is put into the specified bucket.

☒ Disable artifact encryption

Disable encryption if using the artifact to publish a static website or sharing content with others

▼ Additional configuration

Cache, encryption key

Encryption key - *optional*

Provide the AWS KMS customer master key used to encrypt this build's output artifacts. The default is your AWS-managed customer master key for S3.

arn:aws:kms:<region-ID>:<account-ID>:key/<key-ID>

Cache type

No cache

#2.6: Logs

Logs

CloudWatch

☒ **CloudWatch logs - optional**
Checking this option will upload build output logs to CloudWatch.

Group name

Stream name

S3

☐ **S3 logs - optional**
Checking this option will upload build output logs to S3.

[Cancel](#)
[Create build project](#)

Create Build project

Project created
 You have successfully created the following project: demo-cb1

[Create a notification rule for this project](#)

[Developer Tools](#) > [CodeBuild](#) > [Build projects](#) > demo-cb1

demo-cb1

[Notify](#)
[Share](#)
[Edit](#)
[Delete build project](#)
[Start build with overrides](#)

[Start build](#)

Configuration

Source provider AWS CodeCommit	Primary repository demo	Artifacts upload location rest-apps-demo	Build badge Enabled
Public builds Disabled	Copy badge URL		

- Start the build we require a buildspec.yml

Create buildspec.yml

Step #1: Create buildspec.yml and check in code

1.1: In pom.xml, add finalName as artifactId

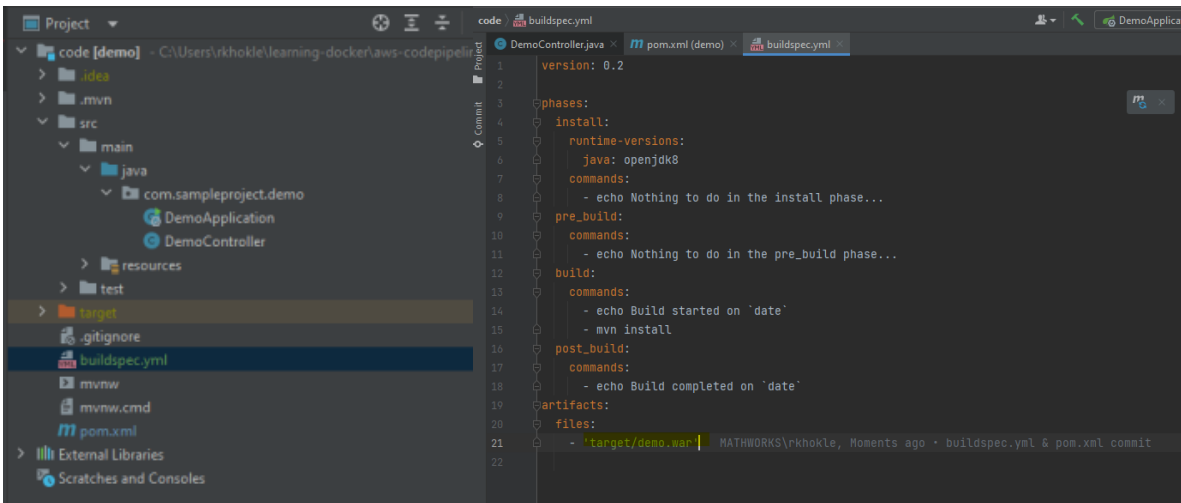
```

        <scope>test</scope>
      </dependency>
    </dependencies>

    <build>
      <plugins>
        <plugin>
          <groupId>org.springframework.boot</groupId>
          <artifactId>spring-boot-maven-plugin</artifactId>
        </plugin>
      </plugins>
      <finalName>${project.artifactId}</finalName>
    </build>
  </project>

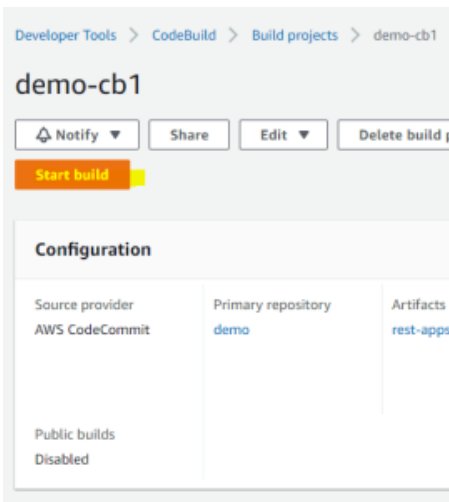
```

1.2: Create a new file with name - buildspec.yml

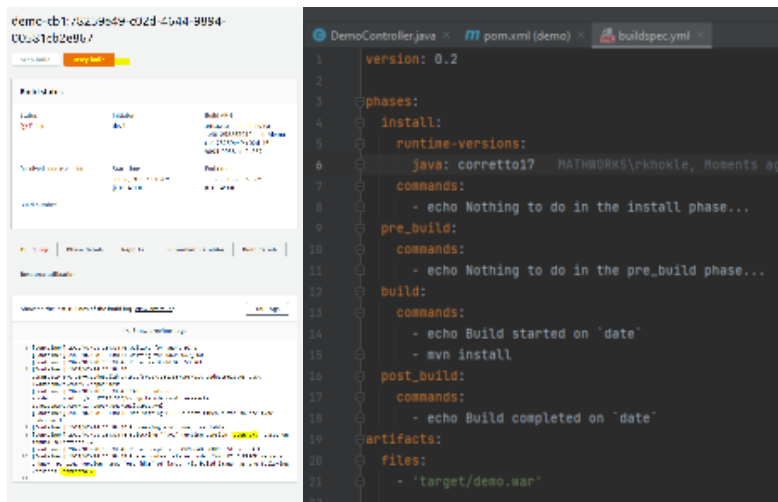


Commit and push above changes to CodeCommit

1.3: Build Project in CodeBuild



NOTE: Results in an error, troubleshoot solution below, change jdk8 in spec file to corretto17 and retry build.



Step #2: Start Build, Verify Build Logs, Verify and phase details

Step #3: Download Artifacts from S3, unzip and review

Amazon S3 > Buckets > rest-apps-demo > devbuilds/

devbuilds/

Copy S3 URI

Objects | Properties

Objects (1)

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

Show versions

< 1 >

	Name	Type	Last modified	Size	Storage class
	demo-cb1	-	July 28, 2022, 09:43:00 (UTC-04:00)	15.1 MB	Standard

Amazon S3 > Buckets > rest-apps-demo > devbuilds/ > demo-cb1

demo-cb1

Copy S3 URI

Download

Open

Object actions

Properties | Permissions | Versions

Versions (1)

Download

Open

Delete

Actions

< 1 >

	Version ID	Type	Last modified	Size	Storage class
	jBeaLIqUGaGq4Z8FET4WFieRn7I3yP.. (Current version)	-	July 28, 2022, 09:43:00 (UTC-04:00)	15.1 MB	Standard

Step #4: Run one more build and see versioning in S3

Developer Tools > CodeBuild > Build projects > demo-cb1

demo-cb1

Notify

Share

Edit

Delete build project

Start build with overrides

Start build

Configuration

Source provider AWS CodeCommit	Primary repository demo	Artifacts upload location rest-apps-demo	Build badge Enabled
Public builds Disabled			<div>Copy badge URL</div>

Build logs

Phase details

Events

Environment variables

Build details

Resource utilization

Name	Status	Context	Duration	Start time
SUBMITTED	Succeeded	-	<1 sec	Jul 28, 2022 9:53 AM (UTC-04:00)
QUEUED	Succeeded	-	3 secs	Jul 28, 2022 9:53 AM (UTC-04:00)
PROVISIONING	Succeeded	-	100 secs	Jul 28, 2022 9:53 AM (UTC-04:00)
DOWNLOAD_SOURCE	Succeeded	-	6 secs	Jul 28, 2022 9:50 AM (UTC-04:00)
INSTALL	Succeeded	-	<1 sec	Jul 28, 2022 9:50 AM (UTC-04:00)
PRE_BUILD	Succeeded	-	<1 sec	Jul 28, 2022 9:50 AM (UTC-04:00)
BUILD	Succeeded	-	16 secs	Jul 28, 2022 9:50 AM (UTC-04:00)
POST_BUILD	Succeeded	-	<1 sec	Jul 28, 2022 9:59 AM (UTC-04:00)
UPLOAD_ARTIFACTS	Succeeded	-	1 sec	Jul 28, 2022 9:59 AM (UTC-04:00)
FINALISING	Succeeded	-	2 secs	Jul 28, 2022 9:59 AM (UTC-04:00)
COMPLETED	Succeeded	-	-	Jul 28, 2022 9:59 AM (UTC-04:00)

Amazon S3 > Buckets > rest-apps-demo > devbuilds/ > demo-cb1

demo-cb1

Copy S3 URI

Download

Open

Object actions

Properties | Permissions | Versions

Versions (2)

Download

Open

Delete

Actions

< 1 >

	Version ID	Type	Last modified	Size	Storage class
	7FG2yI0v45yICw2Qs2ONfyCElHICyc.. (Current version)	-	July 28, 2022, 09:59:05 (UTC-04:00)	15.1 MB	Standard
	jBeaLIqUGaGq4Z8FET4WFieRn7I3yP..	-	July 28, 2022, 09:43:00 (UTC-04:00)	15.1 MB	Standard

