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# AWS CodeBuild

## User Guide

### API Version 2016-10-06



## AWS CodeBuild: User Guide

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## Table of Contents

|  |    |
|--|----|
| What is AWS CodeBuild? .....   | 1  |
| .....  | 1  |
| How to run CodeBuild .....   | 1  |
| Pricing for CodeBuild .....  | 2  |
| How do I get started with CodeBuild? .....   | 2  |
| Concepts .....   | 3  |
| How CodeBuild works .....  | 3  |
| Next steps .....   | 4  |
| Getting started .....  | 5  |
| Getting started using the console .....  | 5  |
| Steps .....  | 5  |
| Step 1: Create the source code .....   | 6  |
| Step 2: Create the buildspec file .....  | 8  |
| Step 3: Create two S3 buckets .....  | 9  |
| Step 4: Upload the source code and the buildspec file .....                                | 10 |
| Step 5: Create the build project .....   | 10 |
| Step 6: Run the build .....  | 12 |
| Step 7: View summarized build information .....  | 12 |
| Step 8: View detailed build information .....  | 13 |
| Step 9: Get the build output artifact .....  | 13 |
| Step 10: Delete the S3 buckets .....   | 14 |
| Wrapping up .....  | 14 |
| Getting started using the AWS CLI .....  | 15 |
| Steps .....  | 15 |
| Step 1: Create the source code .....   | 15 |
| Step 2: Create the buildspec file .....  | 17 |
| Step 3: Create two S3 buckets .....  | 19 |
| Step 4: Upload the source code and the buildspec file .....                                | 19 |
| Step 5: Create the build project .....   | 20 |
| Step 6: Run the build .....  | 23 |
| Step 7: View summarized build information .....  | 24 |
| Step 8: View detailed build information .....  | 26 |
| Step 9: Get the build output artifact .....  | 27 |
| Step 10: Delete the S3 buckets .....   | 28 |
| Wrapping up .....  | 29 |
| Samples .....  | 30 |
| Windows samples .....  | 30 |
| Running the samples .....  | 30 |
| Directory structure .....  | 31 |
| Files .....  | 31 |
| Use case-based samples .....   | 43 |
| Amazon ECR sample .....  | 45 |
| Amazon EFS sample .....  | 49 |
| AWS CodeDeploy sample .....  | 53 |
| AWS CodePipeline integration with batch builds sample .....                                | 56 |
| AWS CodePipeline integration with multiple input sources and output artifacts sample ..... | 61 |
| AWS Config sample .....  | 63 |
| AWS Elastic Beanstalk sample .....   | 64 |
| Bitbucket pull request and webhook filter sample .....                                     | 71 |
| Build badges sample .....  | 74 |
| Build notifications sample .....   | 77 |
| Create a test report using the AWS CLI sample .....  | 90 |
| Docker in custom image sample .....  | 94 |
| Docker sample .....  | 96 |

|   |            |
|---|------------|
| GitHub Enterprise Server sample .....                         | 102        |
| GitHub pull request and webhook filter sample .....           | 108        |
| Host build output in an S3 bucket .....                       | 111        |
| Runtime versions in buildspec file sample .....               | 113        |
| Source version sample .....                                   | 120        |
| Private registry with AWS Secrets Manager sample .....        | 122        |
| Multiple input sources and output artifacts sample .....      | 123        |
| Use semantic versioning to name build artifacts sample .....  | 126        |
| <b>Plan a build .....</b>                                     | <b>128</b> |
| <b>Buildspec reference .....</b>                              | <b>129</b> |
| Buildspec file name and storage location .....                | 129        |
| Buildspec syntax .....  | 130        |
| Buildspec example .....                                       | 144        |
| Buildspec versions .....                                      | 146        |
| Batch buildspec reference .....                               | 146        |
| GitHub Action runner buildspec reference .....                | 151        |
| <b>Build environment reference .....</b>                      | <b>153</b> |
| Docker images provided by CodeBuild .....                     | 153        |
| Build environment compute types .....                         | 160        |
| Shells and commands in build environments .....               | 163        |
| Environment variables in build environments .....             | 164        |
| Background tasks in build environments .....                  | 167        |
| <b>Build locally .....</b>                                    | <b>167</b> |
| Prerequisites .....   | 168        |
| Set up the build image .....                                  | 168        |
| Run the CodeBuild agent .....                                 | 169        |
| Receive notifications for new CodeBuild agent versions .....  | 169        |
| <b>VPC support .....</b>                                      | <b>171</b> |
| Use cases .....   | 171        |
| Allowing Amazon VPC access in your CodeBuild projects .....   | 171        |
| Best practices for VPCs .....                                 | 172        |
| Troubleshooting your VPC setup .....                          | 173        |
| Limitations of VPCs .....                                     | 173        |
| Use VPC endpoints .....                                       | 173        |
| Before you create VPC endpoints .....                         | 174        |
| Creating VPC endpoints for CodeBuild .....                    | 174        |
| Create a VPC endpoint policy for CodeBuild .....              | 174        |
| AWS CloudFormation VPC template .....                         | 175        |
| Use a proxy server .....                                      | 179        |
| Components required to run CodeBuild in a proxy server .....  | 179        |
| Run CodeBuild in an explicit proxy server .....               | 181        |
| Run CodeBuild in a transparent proxy server .....             | 184        |
| Run a package manager and other tools in a proxy server ..... | 185        |
| <b>Working with build projects and builds .....</b>           | <b>187</b> |
| <b>Working with build projects .....</b>                      | <b>187</b> |
| Create a build project .....                                  | 187        |
| Create a notification rule .....                              | 211        |
| View a list of build project names .....                      | 213        |
| View a build project's details .....                          | 214        |
| Build caching .....   | 216        |
| Create build triggers .....                                   | 220        |
| Edit build triggers .....                                     | 222        |
| Webhooks .....  | 224        |
| Change a build project's settings .....                       | 241        |
| Delete a build project .....                                  | 254        |
| Working with shared projects .....                            | 255        |
| Tagging a project .....                                       | 259        |

|   |     |
|---|-----|
| Batch builds .....  | 262 |
| GitHub Action runner .....                                | 265 |
| Public build projects .....                               | 270 |
| Working with builds .....                                 | 271 |
| Run a build .....   | 271 |
| View build details .....                                  | 279 |
| View a list of build IDs .....                            | 281 |
| View a list of build IDs for a build project .....        | 284 |
| Stop a build .....  | 286 |
| Stop a batch build .....                                  | 287 |
| Retry a build .....                                       | 288 |
| Session Manager .....                                     | 289 |
| Delete builds .....                                       | 292 |
| Working with test reporting .....                         | 294 |
| Create a test report .....                                | 295 |
| Working with report groups .....                          | 295 |
| Create a report group .....                               | 296 |
| Update a report group .....                               | 299 |
| Specify test files .....                                  | 301 |
| Specify test commands .....                               | 302 |
| Report group naming .....                                 | 302 |
| Tag a report group .....                                  | 303 |
| Working with shared report groups .....                   | 306 |
| Working with reports .....                                | 310 |
| Working with test report permissions .....                | 311 |
| Create a role for test reports .....                      | 311 |
| Permissions for test reporting operations .....           | 312 |
| Test reporting permissions examples .....                 | 313 |
| View test reports .....                                   | 313 |
| View test reports for a build .....                       | 313 |
| View test reports for a report group .....                | 314 |
| View test reports in your AWS account .....               | 314 |
| Test reporting with test frameworks .....                 | 314 |
| Reporting with Jasmine .....                              | 314 |
| Reporting with Jest .....                                 | 316 |
| Reporting with pytest .....                               | 317 |
| Reporting with RSpec .....                                | 318 |
| Code coverage reports .....                               | 318 |
| Create a code coverage report .....                       | 319 |
| Logging and monitoring .....                              | 320 |
| Logging AWS CodeBuild API calls with AWS CloudTrail ..... | 320 |
| AWS CodeBuild information in CloudTrail .....             | 320 |
| Understanding AWS CodeBuild log file entries .....        | 321 |
| Monitoring AWS CodeBuild .....                            | 322 |
| CloudWatch metrics .....                                  | 323 |
| CloudWatch resource utilization metrics .....             | 325 |
| CloudWatch dimensions .....                               | 326 |
| CloudWatch alarms .....                                   | 326 |
| CodeBuild metrics .....                                   | 326 |
| CodeBuild resource utilization metrics .....              | 331 |
| CodeBuild alarms .....                                    | 336 |
| Security .....  | 337 |
| Data protection .....                                     | 337 |
| Data encryption .....                                     | 338 |
| Key management .....                                      | 339 |
| Traffic privacy .....                                     | 339 |

|  |     |
|--|-----|
| Identity and access management .....   | 339 |
| Overview of managing access .....  | 339 |
| Using identity-based policies .....  | 342 |
| AWS CodeBuild permissions reference .....  | 361 |
| Using tags to control access to AWS CodeBuild resources .....  | 366 |
| Viewing resources in the console .....   | 369 |
| Compliance validation .....  | 369 |
| Resilience .....   | 370 |
| Infrastructure security .....  | 370 |
| Source provider access .....   | 370 |
| GitHub and GitHub Enterprise Server access token .....   | 370 |
| Bitbucket app password .....   | 373 |
| Cross-service confused deputy prevention .....   | 375 |
| Advanced topics .....  | 376 |
| Advanced setup .....   | 376 |
| Add CodeBuild access permissions to an IAM group or user .....   | 376 |
| Create a CodeBuild service role .....  | 381 |
| Creating a customer managed key .....  | 386 |
| Install and configure the AWS CLI .....  | 387 |
| Command line reference .....   | 388 |
| AWS SDKs and tools reference .....   | 389 |
| Supported AWS SDKs and tools for AWS CodeBuild .....   | 389 |
| Specify the endpoint .....   | 389 |
| Specify the AWS CodeBuild endpoint (AWS CLI) .....   | 390 |
| Specify the AWS CodeBuild endpoint (AWS SDK) .....   | 390 |
| Run CodeBuild directly .....   | 391 |
| Prerequisites .....  | 391 |
| Run AWS CodeBuild directly .....   | 392 |
| Use CodePipeline with CodeBuild .....  | 392 |
| Prerequisites .....  | 392 |
| Create pipeline (console) .....  | 394 |
| Create pipeline (AWS CLI) .....  | 396 |
| Add build action .....   | 399 |
| Add test action .....  | 402 |
| Use CodeBuild with Jenkins .....   | 404 |
| Setting up Jenkins .....   | 404 |
| Installing the plugin .....  | 404 |
| Using the plugin .....   | 404 |
| Use CodeBuild with codecov .....   | 405 |
| Integrate codecov into a build project .....   | 406 |
| Serverless applications .....  | 408 |
| Related resources .....  | 49  |
| Troubleshooting .....  | 410 |
| Apache Maven builds reference artifacts from the wrong repository .....  | 411 |
| Build commands run as root by default .....  | 412 |
| Builds might fail when file names have non-U.S. English characters .....   | 412 |
| Builds might fail when getting parameters from Amazon EC2 Parameter Store .....  | 412 |
| Cannot access branch filter in the CodeBuild console .....   | 413 |
| Cannot view build success or failure .....   | 413 |
| Build status not reported to source provider .....   | 414 |
| Cannot find and select the base image of the Windows Server Core 2019 platform .....   | 414 |
| Earlier commands in buildspec files are not recognized by later commands .....   | 414 |
| Error: "Access denied" when attempting to download cache .....   | 415 |
| Error: "BUILD_CONTAINER_UNABLE_TO_PULL_IMAGE" when using a custom build image .....  | 415 |
| Error: "Build container found dead before completing the build. build container died because it was out of memory, or the Docker image is not supported. ErrorCode: 500" ..... | 416 |
| Error: "Cannot connect to the Docker daemon" when running a build .....  | 416 |

|   |     |
|---|-----|
| Error: "CodeBuild is not authorized to perform: sts:AssumeRole" when creating or updating a build project .....   | 417 |
| Error: "Error calling GetBucketAcl: Either the bucket owner has changed or the service role no longer has permission to called s3:GetBucketAcl" .....                             | 417 |
| Error: "Failed to upload artifacts: Invalid arn" when running a build .....   | 418 |
| Error: "Git clone failed: Unable to access 'your-repository-URL': SSL certificate problem: Self signed certificate" .....   | 418 |
| Error: "The bucket you are attempting to access must be addressed using the specified endpoint" when running a build .....  | 418 |
| Error: "The policy's default version was not created by enhanced zero click role creation or was not the most recent version created by enhanced zero click role creation." ..... | 419 |
| Error: "This build image requires selecting at least one runtime version." .....  | 419 |
| Error: "QUEUED: INSUFFICIENT_SUBNET" when a build in a build queue fails .....  | 420 |
| Error: "Unable to download cache: RequestError: Send request failed caused by: x509: Failed to load system roots and no roots provided" .....                                     | 420 |
| Error: "Unable to download certificate from S3. AccessDenied" .....   | 421 |
| Error: "Unable to locate credentials" .....   | 421 |
| RequestError timeout error when running CodeBuild in a proxy server .....   | 422 |
| The bourne shell (sh) must exist in build images .....  | 423 |
| Warning: "Skipping install of runtimes. runtime version selection is not supported by this build image" when running a build .....  | 423 |
| Error: "Unable to verify JobWorker identity" .....  | 423 |
| Build failed to start .....   | 424 |
| Accessing GitHub metadata in locally cached builds .....  | 424 |
| AccessDenied: The bucket owner for the report group does not match the owner of the S3 bucket... ....   | 424 |
| Quotas .....  | 425 |
| Service quotas .....  | 425 |
| Other limits .....  | 427 |
| Build projects .....  | 427 |
| Builds .....  | 427 |
| Reports .....   | 427 |
| Tags .....  | 428 |
| Third party notices for AWS CodeBuild for Windows .....   | 429 |
| 1) base Docker image—windowsservercore .....  | 429 |
| 2) windows-base Docker image—choco .....  | 430 |
| 3) windows-base Docker image—git --version 2.16.2 .....   | 430 |
| 4) windows-base Docker image—microsoft-build-tools --version 15.0.26320.2 .....   | 430 |
| 5) windows-base Docker image—nuget.commandline --version 4.5.1 .....  | 433 |
| 7) windows-base Docker image—netfx-4.6.2-devpack .....  | 433 |
| 8) windows-base Docker image—visualfsharp tools, v 4.0 .....  | 434 |
| 9) windows-base Docker image—netfx-pcl-reference-assemblies-4.6 .....   | 435 |
| 10) windows-base Docker image—visualcppbuildtools v 14.0.25420.1 .....  | 437 |
| 11) windows-base Docker image—microsoft-windows-netfx3-on-demand-package.cab .....  | 439 |
| 12) windows-base Docker image—dotnet-sdk .....  | 440 |
| Document history .....  | 441 |
| Earlier updates .....   | 449 |
| AWS glossary .....  | 456 |

# What is AWS CodeBuild?

AWS CodeBuild is a fully managed build service in the cloud. CodeBuild compiles your source code, runs unit tests, and produces artifacts that are ready to deploy. CodeBuild eliminates the need to provision, manage, and scale your own build servers. It provides prepackaged build environments for popular programming languages and build tools such as Apache Maven, Gradle, and more. You can also customize build environments in CodeBuild to use your own build tools. CodeBuild scales automatically to meet peak build requests.

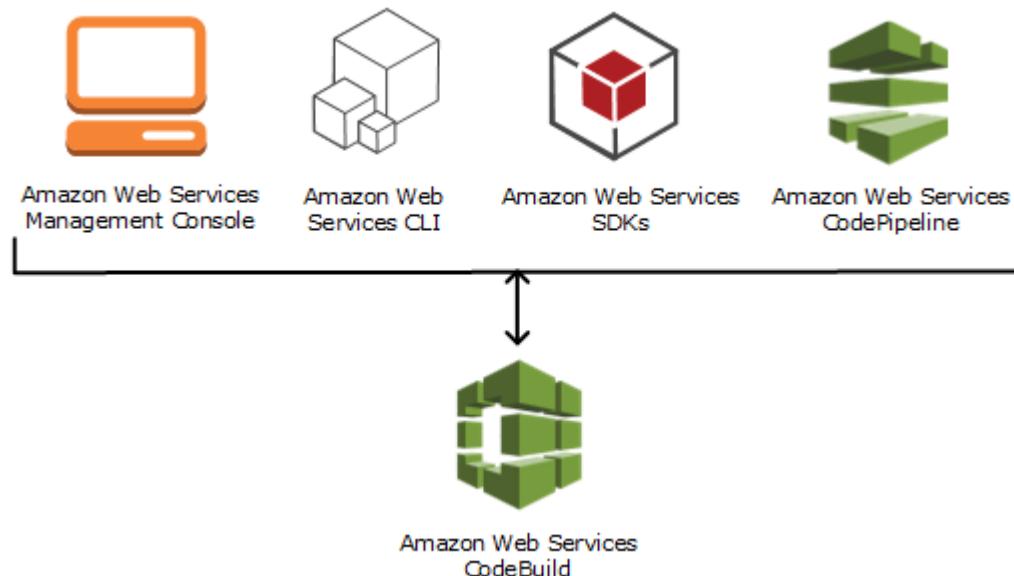
CodeBuild provides these benefits:

- **Fully managed** – CodeBuild eliminates the need to set up, patch, update, and manage your own build servers.
- **On demand** – CodeBuild scales on demand to meet your build needs. You pay only for the number of build minutes you consume.
- **Out of the box** – CodeBuild provides preconfigured build environments for the most popular programming languages. All you need to do is point to your build script to start your first build.

For more information, see [AWS CodeBuild](#).

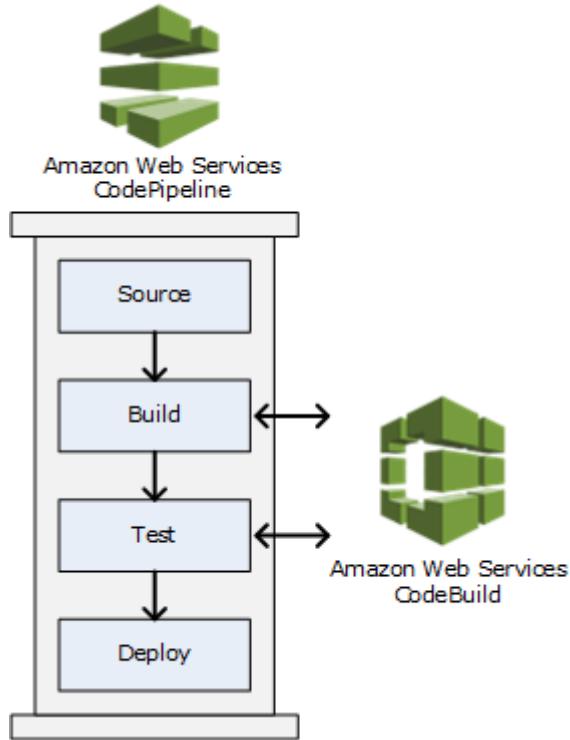
## How to run CodeBuild

You can use the AWS CodeBuild or AWS CodePipeline console to run CodeBuild. You can also automate the running of CodeBuild by using the AWS Command Line Interface (AWS CLI) or the AWS SDKs.



To run CodeBuild by using the CodeBuild console, AWS CLI, or AWS SDKs, see [Run AWS CodeBuild directly \(p. 391\)](#).

As the following diagram shows, you can add CodeBuild as a build or test action to the build or test stage of a pipeline in AWS CodePipeline. AWS CodePipeline is a continuous delivery service that you can use to model, visualize, and automate the steps required to release your code. This includes building your code. A *pipeline* is a workflow construct that describes how code changes go through a release process.



To use CodePipeline to create a pipeline and then add a CodeBuild build or test action, see [Use CodePipeline with CodeBuild \(p. 392\)](#). For more information about CodePipeline, see the [AWS CodePipeline User Guide](#).

The CodeBuild console also provides a way to quickly search for your resources, such as repositories, build projects, deployment applications, and pipelines. Choose **Go to resource** or press the / key, and then enter the name of the resource. Any matches appear in the list. Searches are case insensitive. You only see resources that you have permissions to view. For more information, see [Viewing resources in the console \(p. 369\)](#).

## Pricing for CodeBuild

For information, see [CodeBuild pricing](#).

## How do I get started with CodeBuild?

We recommend that you complete the following steps:

1. **Learn** more about CodeBuild by reading the information in [Concepts \(p. 3\)](#).
2. **Experiment** with CodeBuild in an example scenario by following the instructions in [Getting started using the console \(p. 5\)](#).

3. Use CodeBuild in your own scenarios by following the instructions in [Plan a build \(p. 128\)](#).

## AWS CodeBuild concepts

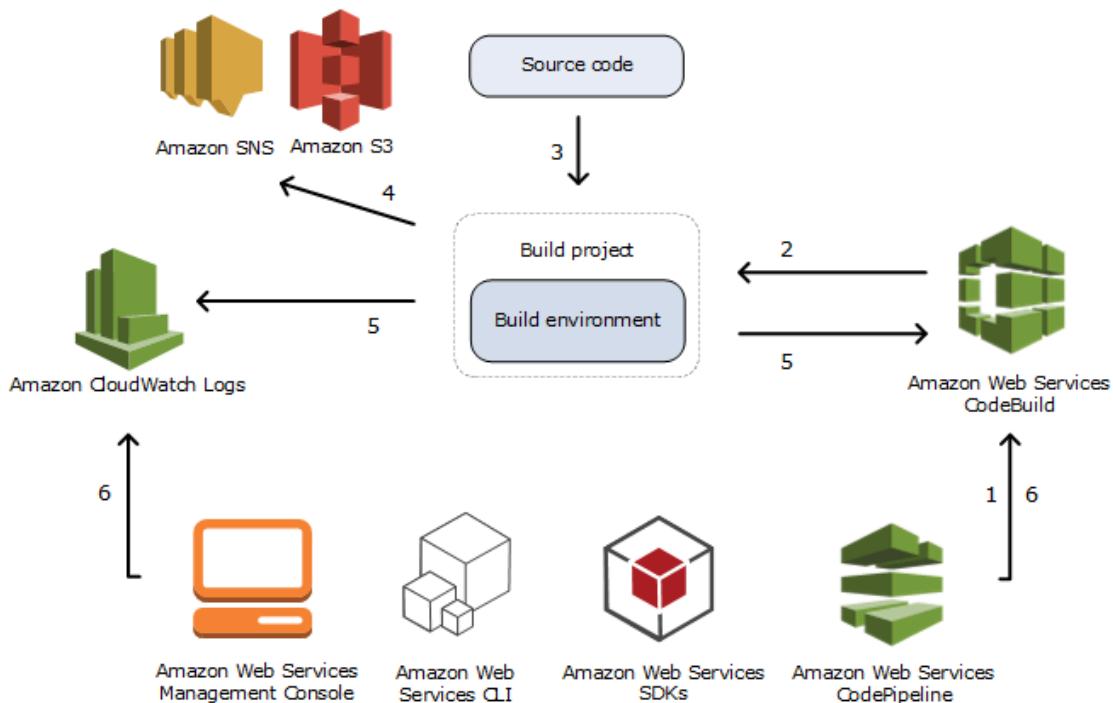
The following concepts are important for understanding how CodeBuild works.

### Topics

- [How CodeBuild works \(p. 3\)](#)
- [Next steps \(p. 4\)](#)

## How CodeBuild works

The following diagram shows what happens when you run a build with CodeBuild:



1. As input, you must provide CodeBuild with a build project. A *build project* includes information about how to run a build, including where to get the source code, which build environment to use, which build commands to run, and where to store the build output. A *build environment* represents a combination of operating system, programming language runtime, and tools that CodeBuild uses to run a build. For more information, see:
  - [Create a build project \(p. 187\)](#)
  - [Build environment reference \(p. 153\)](#)
2. CodeBuild uses the build project to create the build environment.
3. CodeBuild downloads the source code into the build environment and then uses the build specification (*buildspec*), as defined in the build project or included directly in the source code. A *buildspec* is a collection of build commands and related settings, in YAML format, that CodeBuild uses to run a build. For more information, see the [Buildspec reference \(p. 129\)](#).

4. If there is any build output, the build environment uploads its output to an S3 bucket. The build environment can also perform tasks that you specify in the buildspec (for example, sending build notifications to an Amazon SNS topic). For an example, see [Build notifications sample \(p. 77\)](#).
5. While the build is running, the build environment sends information to CodeBuild and Amazon CloudWatch Logs.
6. While the build is running, you can use the AWS CodeBuild console, AWS CLI, or AWS SDKs to get summarized build information from CodeBuild and detailed build information from Amazon CloudWatch Logs. If you use AWS CodePipeline to run builds, you can get limited build information from CodePipeline.

## Next steps

Now that you know more about AWS CodeBuild, we recommend these next steps:

1. **Experiment** with CodeBuild in an example scenario by following the instructions in [Getting started using the console \(p. 5\)](#).
2. **Use** CodeBuild in your own scenarios by following the instructions in [Plan a build \(p. 128\)](#).

# Getting started with CodeBuild

In the following tutorials, you use AWS CodeBuild to build a collection of sample source code input files into a deployable version of the source code.

Both tutorials have the same input and results, but one uses the AWS CodeBuild console and the other uses the AWS CLI.

**Important**

We do not recommend that you use your AWS root account to complete this tutorial.

## Getting started with AWS CodeBuild using the console

In this tutorial, you use AWS CodeBuild to build a collection of sample source code input files (*build input artifacts* or *build input*) into a deployable version of the source code (*build output artifact* or *build output*). Specifically, you instruct CodeBuild to use Apache Maven, a common build tool, to build a set of Java class files into a Java Archive (JAR) file. You do not need to be familiar with Apache Maven or Java to complete this tutorial.

You can work with CodeBuild through the CodeBuild console, AWS CodePipeline, the AWS CLI, or the AWS SDKs. This tutorial demonstrates how to use the CodeBuild console. For information about using CodePipeline, see [Use CodePipeline with CodeBuild \(p. 392\)](#). For information about using the AWS SDKs, see [Run CodeBuild directly \(p. 391\)](#).

**Important**

The steps in this tutorial require you to create resources (for example, an S3 bucket) that might result in charges to your AWS account. These include possible charges for CodeBuild and for AWS resources and actions related to Amazon S3, AWS KMS, and CloudWatch Logs. For more information, see [AWS CodeBuild pricing](#), [Amazon S3 pricing](#), [AWS Key Management Service pricing](#), and [Amazon CloudWatch pricing](#).

## Steps

- [Step 1: Create the source code \(p. 6\)](#)
- [Step 2: Create the buildspec file \(p. 8\)](#)
- [Step 3: Create two S3 buckets \(p. 9\)](#)
- [Step 4: Upload the source code and the buildspec file \(p. 10\)](#)
- [Step 5: Create the build project \(p. 10\)](#)
- [Step 6: Run the build \(p. 12\)](#)
- [Step 7: View summarized build information \(p. 12\)](#)
- [Step 8: View detailed build information \(p. 13\)](#)
- [Step 9: Get the build output artifact \(p. 13\)](#)
- [Step 10: Delete the S3 buckets \(p. 14\)](#)
- [Wrapping up \(p. 14\)](#)

## Step 1: Create the source code

(Part of: [Getting started with AWS CodeBuild using the console \(p. 5\)](#))

In this step, you create the source code that you want CodeBuild to build to the output bucket. This source code consists of two Java class files and an Apache Maven Project Object Model (POM) file.

1. In an empty directory on your local computer or instance, create this directory structure.

```
(root directory name)
  '-- src
    '-- main
      '-- java
    '-- test
      '-- java
```

2. Using a text editor of your choice, create this file, name it `MessageUtil.java`, and then save it in the `src/main/java` directory.

```
public class MessageUtil {
    private String message;

    public MessageUtil(String message) {
        this.message = message;
    }

    public String printMessage() {
        System.out.println(message);
        return message;
    }

    public String salutationMessage() {
        message = "Hi!" + message;
        System.out.println(message);
        return message;
    }
}
```

This class file creates as output the string of characters passed into it. The `MessageUtil` constructor sets the string of characters. The `printMessage` method creates the output. The `salutationMessage` method outputs `Hi!` followed by the string of characters.

3. Create this file, name it `TestMessageUtil.java`, and then save it in the `/src/test/java` directory.

```
import org.junit.Test;
import org.junit.Ignore;
import static org.junit.Assert.assertEquals;

public class TestMessageUtil {

    String message = "Robert";
    MessageUtil messageUtil = new MessageUtil(message);

    @Test
    public void testPrintMessage() {
        System.out.println("Inside testPrintMessage()");
        assertEquals(message, messageUtil.printMessage());
    }

    @Test
    public void testSalutationMessage() {
```

```
        System.out.println("Inside testSalutationMessage()");
        message = "Hi!" + "Robert";
        assertEquals(message,messageUtil.salutationMessage());
    }
}
```

This class file sets the message variable in the MessageUtil class to Robert. It then tests to see if the message variable was successfully set by checking whether the strings Robert and Hi!Robert appear in the output.

4. Create this file, name it pom.xml, and then save it in the root (top level) directory.

```
<project xmlns="http://maven.apache.org/POM/4.0.0"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/
maven-v4_0_0.xsd">
    <modelVersion>4.0.0</modelVersion>
    <groupId>org.example</groupId>
    <artifactId>messageUtil</artifactId>
    <version>1.0</version>
    <packaging>jar</packaging>
    <name>Message Utility Java Sample App</name>
    <dependencies>
        <dependency>
            <groupId>junit</groupId>
            <artifactId>junit</artifactId>
            <version>4.11</version>
            <scope>test</scope>
        </dependency>
    </dependencies>
    <build>
        <plugins>
            <plugin>
                <groupId>org.apache.maven.plugins</groupId>
                <artifactId>maven-compiler-plugin</artifactId>
                <version>3.8.0</version>
            </plugin>
        </plugins>
    </build>
</project>
```

Apache Maven uses the instructions in this file to convert the MessageUtil.java and TestMessageUtil.java files into a file named messageUtil-1.0.jar and then run the specified tests.

At this point, your directory structure should look like this.

```
(root directory name)
|-- pom.xml
|-- src
|   |-- main
|   |   '-- java
|   |       '-- MessageUtil.java
|   '-- test
|       '-- java
|           '-- TestMessageUtil.java
```

## Next step

[Step 2: Create the buildspec file \(p. 8\)](#)

## Step 2: Create the buildspec file

(Previous step: [Step 1: Create the source code \(p. 6\)](#))

In this step, you create a build specification (build spec) file. A *buildspec* is a collection of build commands and related settings, in YAML format, that CodeBuild uses to run a build. Without a build spec, CodeBuild cannot successfully convert your build input into build output or locate the build output artifact in the build environment to upload to your output bucket.

Create this file, name it `buildspec.yml`, and then save it in the root (top level) directory.

```
version: 0.2

phases:
  install:
    runtime-versions:
      java: corretto11
  pre_build:
    commands:
      - echo Nothing to do in the pre_build phase...
  build:
    commands:
      - echo Build started on `date`
      - mvn install
  post_build:
    commands:
      - echo Build completed on `date`
artifacts:
  files:
    - target/messageUtil-1.0.jar
```

### Important

Because a build spec declaration must be valid YAML, the spacing in a build spec declaration is important. If the number of spaces in your build spec declaration does not match this one, the build might fail immediately. You can use a YAML validator to test whether your build spec declaration is valid YAML.

### Note

Instead of including a build spec file in your source code, you can declare build commands separately when you create a build project. This is helpful if you want to build your source code with different build commands without updating your source code's repository each time. For more information, see [Buildspec syntax \(p. 130\)](#).

In this build spec declaration:

- `version` represents the version of the build spec standard being used. This build spec declaration uses the latest version, `0.2`.
- `phases` represents the build phases during which you can instruct CodeBuild to run commands. These build phases are listed here as `install`, `pre_build`, `build`, and `post_build`. You cannot change the spelling of these build phase names, and you cannot create more build phase names.

In this example, during the `build` phase, CodeBuild runs the `mvn install` command. This command instructs Apache Maven to compile, test, and package the compiled Java class files into a build output artifact. For completeness, a few `echo` commands are placed in each build phase in this example.

When you view detailed build information later in this tutorial, the output of these `echo` commands can help you better understand how CodeBuild runs commands and in which order. (Although all build phases are included in this example, you are not required to include a build phase if you do not plan to run any commands during that phase.) For each build phase, CodeBuild runs each specified command, one at a time, in the order listed, from beginning to end.

- `artifacts` represents the set of build output artifacts that CodeBuild uploads to the output bucket. `files` represents the files to include in the build output. CodeBuild uploads the single `messageUtil-1.0.jar` file found in the `target` relative directory in the build environment. The file name `messageUtil-1.0.jar` and the directory name `target` are based on the way Apache Maven creates and stores build output artifacts for this example only. In your own builds, these file names and directories are different.

For more information, see the [Buildspec reference \(p. 129\)](#).

At this point, your directory structure should look like this.

```
(root directory name)
|-- pom.xml
|-- buildspec.yml
\-- src
    |-- main
    |   '-- java
    |       '-- MessageUtil.java
    '-- test
        '-- java
            '-- TestMessageUtil.java
```

## Next step

[Step 3: Create two S3 buckets \(p. 9\)](#)

## Step 3: Create two S3 buckets

(Previous step: [Step 2: Create the buildspec file \(p. 8\)](#))

Although you can use a single bucket for this tutorial, two buckets makes it easier to see where the build input is coming from and where the build output is going.

- One of these buckets (the *input bucket*) stores the build input. In this tutorial, the name of this input bucket is `codebuild-region-ID-account-ID-input-bucket`, where `region-ID` is the AWS Region of the bucket and `account-ID` is your AWS account ID.
- The other bucket (the *output bucket*) stores the build output. In this tutorial, the name of this output bucket is `codebuild-region-ID-account-ID-output-bucket`.

If you chose different names for these buckets, be sure to use them throughout this tutorial.

These two buckets must be in the same AWS Region as your builds. For example, if you instruct CodeBuild to run a build in the US East (Ohio) Region, these buckets must also be in the US East (Ohio) Region.

For more information, see [Creating a Bucket](#) in the *Amazon Simple Storage Service User Guide*.

### Note

Although CodeBuild also supports build input stored in CodeCommit, GitHub, and Bitbucket repositories, this tutorial does not show you how to use them. For more information, see [Plan a build \(p. 128\)](#).

## Next step

[Step 4: Upload the source code and the buildspec file \(p. 10\)](#)

## Step 4: Upload the source code and the buildspec file

(Previous step: [Step 3: Create two S3 buckets \(p. 9\)](#))

In this step, you add the source code and build spec file to the input bucket.

Using your operating system's zip utility, create a file named `MessageUtil.zip` that includes `MessageUtil.java`, `TestMessageUtil.java`, `pom.xml`, and `buildspec.yml`.

The `MessageUtil.zip` file's directory structure must look like this.

```
MessageUtil.zip
  |-- pom.xml
  |-- buildspec.yml
  '-- src
    '-- main
      '-- java
        '-- MessageUtil.java
    '-- test
      '-- java
        '-- TestMessageUtil.java
```

### Important

Do not include the *(root directory name)* directory, only the directories and files in the *(root directory name)* directory.

Upload the `MessageUtil.zip` file to the input bucket named `codebuild-region-ID-account-ID-input-bucket`.

### Important

For CodeCommit, GitHub, and Bitbucket repositories, by convention, you must store a build spec file named `buildspec.yml` in the root (top level) of each repository or include the build spec declaration as part of the build project definition. Do not create a ZIP file that contains the repository's source code and build spec file.

For build input stored in S3 buckets only, you must create a ZIP file that contains the source code and, by convention, a build spec file named `buildspec.yml` at the root (top level) or include the build spec declaration as part of the build project definition.

If you want to use a different name for your build spec file, or you want to reference a build spec in a location other than the root, you can specify a build spec override as part of the build project definition. For more information, see [Buildspec file name and storage location \(p. 129\)](#).

## Next step

[Step 5: Create the build project \(p. 10\)](#)

## Step 5: Create the build project

(Previous step: [Step 4: Upload the source code and the buildspec file \(p. 10\)](#))

In this step, you create a build project that AWS CodeBuild uses to run the build. A *build project* includes information about how to run a build, including where to get the source code, which build environment to use, which build commands to run, and where to store the build output. A *build environment* represents a combination of operating system, programming language runtime, and tools that CodeBuild uses to run a build. The build environment is expressed as a Docker image. For more information, see [Docker overview](#) on the Docker Docs website.

For this build environment, you instruct CodeBuild to use a Docker image that contains a version of the Java Development Kit (JDK) and Apache Maven.

## To create the build project

1. Sign in to the AWS Management Console and open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. Use the AWS region selector to choose an AWS Region where CodeBuild is supported. For more information, see [AWS CodeBuild endpoints and quotas](#) in the *Amazon Web Services General Reference*.
3. If a CodeBuild information page is displayed, choose **Create build project**. Otherwise, on the navigation pane, expand **Build**, choose **Build projects**, and then choose **Create build project**.
4. On the **Create build project** page, in **Project configuration**, for **Project name**, enter a name for this build project (in this example, codebuild-demo-project). Build project names must be unique across each AWS account. If you use a different name, be sure to use it throughout this tutorial.

### Note

On the **Create build project** page, you might see an error message similar to the following: **You are not authorized to perform this operation..** This is most likely because you signed in to the AWS Management Console as an user who does not have permissions to create a build project.. To fix this, sign out of the AWS Management Console, and then sign back in with credentials belonging to one of the following IAM entities:

- An administrator user in your AWS account. For more information, see [Creating your first AWS account root user and group](#) in the *user Guide*.
- An user in your AWS account with the `AWSCodeBuildAdminAccess`, `AmazonS3ReadOnlyAccess`, and `IAMFullAccess` managed policies attached to that user or to an IAM group that the user belongs to. If you do not have an user or group in your AWS account with these permissions, and you cannot add these permissions to your user or group, contact your AWS account administrator for assistance. For more information, see [AWS managed \(predefined\) policies for AWS CodeBuild \(p. 344\)](#).

Both options include administrator permissions that allow you to create a build project so you can complete this tutorial. We recommend that you always use the minimum permissions required to accomplish your task. For more information, see [AWS CodeBuild permissions reference \(p. 361\)](#).

5. In **Source**, for **Source provider**, choose **Amazon S3**.
6. For **Bucket**, choose **codebuild-*region-ID-account-ID*-input-bucket**.
7. For **S3 object key**, enter **MessageUtil.zip**.
8. In **Environment**, for **Environment image**, leave **Managed image** selected.
9. For **Operating system**, choose **Amazon Linux 2**.
10. For **Runtime(s)**, choose **Standard**.
11. For **Image**, choose **aws/codebuild/amazonlinux2-x86\_64-standard:4.0**.
12. In **Service role**, leave **New service role** selected, and leave **Role name** unchanged.
13. For **Buildspec**, leave **Use a buildspec file** selected.
14. In **Artifacts**, for **Type**, choose **Amazon S3**.
15. For **Bucket name**, choose **codebuild-*region-ID-account-ID*-output-bucket**.
16. Leave **Name** and **Path** blank.
17. Choose **Create build project**.

## Next step

[Step 6: Run the build \(p. 12\)](#)

## Step 6: Run the build

(Previous step: [Step 5: Create the build project \(p. 10\)](#))

In this step, you instruct AWS CodeBuild to run the build with the settings in the build project.

### To run the build

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Build projects**.
3. In the list of build projects, choose **codebuild-demo-project**, and then choose **Start build**. The build starts immediately.

## Next step

[Step 7: View summarized build information \(p. 12\)](#)

## Step 7: View summarized build information

(Previous step: [Step 6: Run the build \(p. 12\)](#))

In this step, you view summarized information about the status of your build.

### To view summarized build information

1. If the **codebuild-demo-project:<build-ID>** page is not displayed, in the navigation bar, choose **Build history**. Next, in the list of build projects, for **Project**, choose the **Build run** link for **codebuild-demo-project**. There should be only one matching link. (If you have completed this tutorial before, choose the link with the most recent value in the **Completed** column.)
2. On the **Build status** page, in **Phase details**, the following build phases should be displayed, with **Succeeded** in the **Status** column:
  - **SUBMITTED**
  - **QUEUED**
  - **PROVISIONING**
  - **DOWNLOAD\_SOURCE**
  - **INSTALL**
  - **PRE\_BUILD**
  - **BUILD**
  - **POST\_BUILD**
  - **UPLOAD\_ARTIFACTS**
  - **FINALIZING**
  - **COMPLETED**

In **Build Status**, **Succeeded** should be displayed.

If you see **In Progress** instead, choose the refresh button.

3. Next to each build phase, the **Duration** value indicates how long the build phase lasted. The **End time** value indicates when that build phase ended.

## Next step

[Step 8: View detailed build information \(p. 13\)](#)

# Step 8: View detailed build information

(Previous step: [Step 7: View summarized build information \(p. 12\)](#))

In this step, you view detailed information about your build in CloudWatch Logs.

### Note

To protect sensitive information, the following are hidden in CodeBuild logs:

- AWS access key IDs. For more information, see [Managing Access Keys for IAM Users](#) in the *AWS Identity and Access Management User Guide*.
- Strings specified using the Parameter Store. For more information, see [Systems Manager Parameter Store](#) and [Systems Manager Parameter Store Console Walkthrough](#) in the *Amazon EC2 Systems Manager User Guide*.
- Strings specified using AWS Secrets Manager. For more information, see [Key management \(p. 339\)](#).

### To view detailed build information

1. With the build details page still displayed from the previous step, the last 10,000 lines of the build log are displayed in **Build logs**. To see the entire build log in CloudWatch Logs, choose the **View entire log** link.
2. In the CloudWatch Logs log stream, you can browse the log events. By default, only the last set of log events is displayed. To see earlier log events, scroll to the beginning of the list.
3. In this tutorial, most of the log events contain verbose information about CodeBuild downloading and installing build dependency files into its build environment, which you probably don't care about. You can use the **Filter events** box to reduce the information displayed. For example, if you enter "[INFO]" in **Filter events**, only those events that contain [INFO] are displayed. For more information, see [Filter and pattern syntax](#) in the *Amazon CloudWatch User Guide*.

## Next step

[Step 9: Get the build output artifact \(p. 13\)](#)

# Step 9: Get the build output artifact

(Previous step: [Step 8: View detailed build information \(p. 13\)](#))

In this step, you get the `messageUtil-1.0.jar` file that CodeBuild built and uploaded to the output bucket.

You can use the CodeBuild console or the Amazon S3 console to complete this step.

### To get the build output artifact (AWS CodeBuild console)

1. With the CodeBuild console still open and the build details page still displayed from the previous step, choose the **Build details** tab and scroll down to the **Artifacts** section.

### Note

If the build details page is not displayed, in the navigation bar, choose **Build history**, and then choose the **Build run** link.

2. The link to the Amazon S3 folder is under the **Artifacts upload location**. This link opens the folder in Amazon S3 where you find the messageUtil-1.0.jar build output artifact file.

#### To get the build output artifact (Amazon S3 console)

1. Open the Amazon S3 console at <https://console.aws.amazon.com/s3/>.
2. Open codebuild-*region-ID-account-ID*-output-bucket.
3. Open the codebuild-demo-project folder.
4. Open the target folder, where you find the messageUtil-1.0.jar build output artifact file.

## Next step

[Step 10: Delete the S3 buckets \(p. 14\)](#)

## Step 10: Delete the S3 buckets

(Previous step: [Step 9: Get the build output artifact \(p. 13\)](#))

To prevent ongoing charges to your AWS account, you can delete the input and output buckets used in this tutorial. For instructions, see [Deleting or Emptying a Bucket](#) in the *Amazon Simple Storage Service User Guide*.

If you are using the IAM user or an administrator IAM user to delete these buckets, the user must have more access permissions. Add the following statement between the markers **### BEGIN ADDING STATEMENT HERE ###** and **### END ADDING STATEMENTS HERE ###** to an existing access policy for the user.

The ellipses (...) in this statement are used for brevity. Do not remove any statements in the existing access policy. Do not enter these ellipses into the policy.

```
{  
    "Version": "2012-10-17",  
    "Id": "...",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": [  
                "s3:DeleteBucket",  
                "s3:DeleteObject"  
            ],  
            "Resource": "*"  
        }  
    ]  
}
```

## Next step

[Wrapping up \(p. 14\)](#)

## Wrapping up

In this tutorial, you used AWS CodeBuild to build a set of Java class files into a JAR file. You then viewed the build's results.

You can now try using CodeBuild in your own scenarios. Follow the instructions in [Plan a build \(p. 128\)](#). If you don't feel ready yet, you might want to try building some of the samples. For more information, see [Samples \(p. 30\)](#).

# Getting started with AWS CodeBuild using the AWS CLI

In this tutorial, you use AWS CodeBuild to build a collection of sample source code input files (called *build input artifacts* or *build input*) into a deployable version of the source code (called *build output artifact* or *build output*). Specifically, you instruct CodeBuild to use Apache Maven, a common build tool, to build a set of Java class files into a Java Archive (JAR) file. You do not need to be familiar with Apache Maven or Java to complete this tutorial.

You can work with CodeBuild through the CodeBuild console, AWS CodePipeline, the AWS CLI, or the AWS SDKs. This tutorial demonstrates how to use CodeBuild with the AWS CLI. For information about using CodePipeline, see [Use CodePipeline with CodeBuild \(p. 392\)](#). For information about using the AWS SDKs, see [Run CodeBuild directly \(p. 391\)](#).

## Important

The steps in this tutorial require you to create resources (for example, an S3 bucket) that might result in charges to your AWS account. These include possible charges for CodeBuild and for AWS resources and actions related to Amazon S3, AWS KMS, and CloudWatch Logs. For more information, see [CodeBuild pricing](#), [Amazon S3 pricing](#), [AWS Key Management Service pricing](#), and [Amazon CloudWatch pricing](#).

## Steps

- [Step 1: Create the source code \(p. 15\)](#)
- [Step 2: Create the buildspec file \(p. 17\)](#)
- [Step 3: Create two S3 buckets \(p. 19\)](#)
- [Step 4: Upload the source code and the buildspec file \(p. 19\)](#)
- [Step 5: Create the build project \(p. 20\)](#)
- [Step 6: Run the build \(p. 23\)](#)
- [Step 7: View summarized build information \(p. 24\)](#)
- [Step 8: View detailed build information \(p. 26\)](#)
- [Step 9: Get the build output artifact \(p. 27\)](#)
- [Step 10: Delete the S3 buckets \(p. 28\)](#)
- [Wrapping up \(p. 29\)](#)

## Step 1: Create the source code

(Part of: [Getting started with AWS CodeBuild using the AWS CLI \(p. 15\)](#))

In this step, you create the source code that you want CodeBuild to build to the output bucket. This source code consists of two Java class files and an Apache Maven Project Object Model (POM) file.

1. In an empty directory on your local computer or instance, create this directory structure.

```
(root directory name)
```

```
'-- src
  |-- main
  |   '-- java
  '-- test
      '-- java
```

2. Using a text editor of your choice, create this file, name it `MessageUtil.java`, and then save it in the `src/main/java` directory.

```
public class MessageUtil {
    private String message;

    public MessageUtil(String message) {
        this.message = message;
    }

    public String printMessage() {
        System.out.println(message);
        return message;
    }

    public String salutationMessage() {
        message = "Hi!" + message;
        System.out.println(message);
        return message;
    }
}
```

This class file creates as output the string of characters passed into it. The `MessageUtil` constructor sets the string of characters. The `printMessage` method creates the output. The `salutationMessage` method outputs `Hi!` followed by the string of characters.

3. Create this file, name it `TestMessageUtil.java`, and then save it in the `/src/test/java` directory.

```
import org.junit.Test;
import org.junit.Ignore;
import static org.junit.Assert.assertEquals;

public class TestMessageUtil {

    String message = "Robert";
    MessageUtil messageUtil = new MessageUtil(message);

    @Test
    public void testPrintMessage() {
        System.out.println("Inside testPrintMessage()");
        assertEquals(message, messageUtil.printMessage());
    }

    @Test
    public void testSalutationMessage() {
        System.out.println("Inside testSalutationMessage()");
        message = "Hi!" + "Robert";
        assertEquals(message, messageUtil.salutationMessage());
    }
}
```

This class file sets the `message` variable in the `MessageUtil` class to `Robert`. It then tests to see if the `message` variable was successfully set by checking whether the strings `Robert` and `Hi!Robert` appear in the output.

4. Create this file, name it `pom.xml`, and then save it in the root (top level) directory.

```
<project xmlns="http://maven.apache.org/POM/4.0.0"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/
    maven-v4_0_0.xsd">
    <modelVersion>4.0.0</modelVersion>
    <groupId>org.example</groupId>
    <artifactId>messageUtil</artifactId>
    <version>1.0</version>
    <packaging>jar</packaging>
    <name>Message Utility Java Sample App</name>
    <dependencies>
        <dependency>
            <groupId>junit</groupId>
            <artifactId>junit</artifactId>
            <version>4.11</version>
            <scope>test</scope>
        </dependency>
    </dependencies>
    <build>
        <plugins>
            <plugin>
                <groupId>org.apache.maven.plugins</groupId>
                <artifactId>maven-compiler-plugin</artifactId>
                <version>3.8.0</version>
            </plugin>
        </plugins>
    </build>
</project>
```

Apache Maven uses the instructions in this file to convert the `MessageUtil.java` and `TestMessageUtil.java` files into a file named `messageUtil-1.0.jar` and then run the specified tests.

At this point, your directory structure should look like this.

```
(root directory name)
|-- pom.xml
 '-- src
     '-- main
         |   '-- java
         |       '-- MessageUtil.java
     '-- test
         '-- java
             '-- TestMessageUtil.java
```

## Next step

[Step 2: Create the buildspec file \(p. 17\)](#)

# Step 2: Create the buildspec file

(Previous step: [Step 1: Create the source code \(p. 15\)](#))

In this step, you create a build specification (build spec) file. A *buildspec* is a collection of build commands and related settings, in YAML format, that CodeBuild uses to run a build. Without a build spec, CodeBuild cannot successfully convert your build input into build output or locate the build output artifact in the build environment to upload to your output bucket.

Create this file, name it `buildspec.yml`, and then save it in the root (top level) directory.

```
version: 0.2

phases:
  install:
    runtime-versions:
      java: corretto11
  pre_build:
    commands:
      - echo Nothing to do in the pre_build phase...
  build:
    commands:
      - echo Build started on `date`
      - mvn install
  post_build:
    commands:
      - echo Build completed on `date`
artifacts:
  files:
    - target/messageUtil-1.0.jar
```

### Important

Because a build spec declaration must be valid YAML, the spacing in a build spec declaration is important. If the number of spaces in your build spec declaration does not match this one, the build might fail immediately. You can use a YAML validator to test whether your build spec declaration is valid YAML.

### Note

Instead of including a build spec file in your source code, you can declare build commands separately when you create a build project. This is helpful if you want to build your source code with different build commands without updating your source code's repository each time. For more information, see [Buildspec syntax \(p. 130\)](#).

In this build spec declaration:

- `version` represents the version of the build spec standard being used. This build spec declaration uses the latest version, `0.2`.
- `phases` represents the build phases during which you can instruct CodeBuild to run commands. These build phases are listed here as `install`, `pre_build`, `build`, and `post_build`. You cannot change the spelling of these build phase names, and you cannot create more build phase names.

In this example, during the `build` phase, CodeBuild runs the `mvn install` command. This command instructs Apache Maven to compile, test, and package the compiled Java class files into a build output artifact. For completeness, a few `echo` commands are placed in each build phase in this example.

When you view detailed build information later in this tutorial, the output of these `echo` commands can help you better understand how CodeBuild runs commands and in which order. (Although all build phases are included in this example, you are not required to include a build phase if you do not plan to run any commands during that phase.) For each build phase, CodeBuild runs each specified command, one at a time, in the order listed, from beginning to end.

- `artifacts` represents the set of build output artifacts that CodeBuild uploads to the output bucket. `files` represents the files to include in the build output. CodeBuild uploads the single `messageUtil-1.0.jar` file found in the `target` relative directory in the build environment. The file name `messageUtil-1.0.jar` and the directory name `target` are based on the way Apache Maven creates and stores build output artifacts for this example only. In your own builds, these file names and directories are different.

For more information, see the [Buildspec reference \(p. 129\)](#).

At this point, your directory structure should look like this.

```
(root directory name)
|-- pom.xml
|-- buildspec.yml
-- src
  |-- main
  |   '-- java
  |       '-- MessageUtil.java
  '-- test
      '-- java
          '-- TestMessageUtil.java
```

## Next step

[Step 3: Create two S3 buckets \(p. 19\)](#)

# Step 3: Create two S3 buckets

(Previous step: [Step 2: Create the buildspec file \(p. 17\)](#))

Although you can use a single bucket for this tutorial, two buckets makes it easier to see where the build input is coming from and where the build output is going.

- One of these buckets (the *input bucket*) stores the build input. In this tutorial, the name of this input bucket is `codebuild-region-ID-account-ID-input-bucket`, where `region-ID` is the AWS Region of the bucket and `account-ID` is your AWS account ID.
- The other bucket (the *output bucket*) stores the build output. In this tutorial, the name of this output bucket is `codebuild-region-ID-account-ID-output-bucket`.

If you chose different names for these buckets, be sure to use them throughout this tutorial.

These two buckets must be in the same AWS Region as your builds. For example, if you instruct CodeBuild to run a build in the US East (Ohio) Region, these buckets must also be in the US East (Ohio) Region.

For more information, see [Creating a Bucket](#) in the *Amazon Simple Storage Service User Guide*.

**Note**

Although CodeBuild also supports build input stored in CodeCommit, GitHub, and Bitbucket repositories, this tutorial does not show you how to use them. For more information, see [Plan a build \(p. 128\)](#).

## Next step

[Step 4: Upload the source code and the buildspec file \(p. 19\)](#)

# Step 4: Upload the source code and the buildspec file

(Previous step: [Step 3: Create two S3 buckets \(p. 19\)](#))

In this step, you add the source code and build spec file to the input bucket.

Using your operating system's zip utility, create a file named `MessageUtil.zip` that includes `MessageUtil.java`, `TestMessageUtil.java`, `pom.xml`, and `buildspec.yml`.

The `MessageUtil.zip` file's directory structure must look like this.

```
MessageUtil.zip
  |-- pom.xml
```

```
|-- buildspec.yml
-- src
  |-- main
  |  |-- java
  |  |  `-- MessageUtil.java
  |  '-- test
  |    '-- java
  |      `-- TestMessageUtil.java
```

**Important**

Do not include the (*root directory name*) directory, only the directories and files in the (*root directory name*) directory.

Upload the `MessageUtil.zip` file to the input bucket named `codebuild-region-ID-account-ID-input-bucket`.

**Important**

For CodeCommit, GitHub, and Bitbucket repositories, by convention, you must store a build spec file named `buildspec.yml` in the root (top level) of each repository or include the build spec declaration as part of the build project definition. Do not create a ZIP file that contains the repository's source code and build spec file.

For build input stored in S3 buckets only, you must create a ZIP file that contains the source code and, by convention, a build spec file named `buildspec.yml` at the root (top level) or include the build spec declaration as part of the build project definition.

If you want to use a different name for your build spec file, or you want to reference a build spec in a location other than the root, you can specify a build spec override as part of the build project definition. For more information, see [Buildspec file name and storage location \(p. 129\)](#).

## Next step

[Step 5: Create the build project \(p. 20\)](#)

# Step 5: Create the build project

(Previous step: [Step 4: Upload the source code and the buildspec file \(p. 19\)](#))

In this step, you create a build project that AWS CodeBuild uses to run the build. A *build project* includes information about how to run a build, including where to get the source code, which build environment to use, which build commands to run, and where to store the build output. A *build environment* represents a combination of operating system, programming language runtime, and tools that CodeBuild uses to run a build. The build environment is expressed as a Docker image. For more information, see [Docker overview](#) on the Docker Docs website.

For this build environment, you instruct CodeBuild to use a Docker image that contains a version of the Java Development Kit (JDK) and Apache Maven.

### To create the build project

1. Use the AWS CLI to run the `create-project` command:

```
aws codebuild create-project --generate-cli-skeleton
```

JSON-formatted data appears in the output. Copy the data to a file named `create-project.json` in a location on the local computer or instance where the AWS CLI is installed. If you choose to use a different file name, be sure to use it throughout this tutorial.

Modify the copied data to follow this format, and then save your results:

```
{
```

```
"name": "codebuild-demo-project",
"source": {
    "type": "S3",
    "location": "codebuild-region-ID-account-ID-input-bucket/MessageUtil.zip"
},
"artifacts": {
    "type": "S3",
    "location": "codebuild-region-ID-account-ID-output-bucket"
},
"environment": {
    "type": "LINUX_CONTAINER",
    "image": "aws/codebuild/standard:5.0",
    "computeType": "BUILD_GENERAL1_SMALL"
},
"serviceRole": "serviceIAMRole"
}
```

Replace *serviceIAMRole* with the Amazon Resource Name (ARN) of a CodeBuild service role (for example, arn:aws:iam::*account-ID*:role/*role-name*). To create one, see [Create a CodeBuild service role \(p. 381\)](#).

In this data:

- name represents a required identifier for this build project (in this example, codebuild-demo-project). Build project names must be unique across all build projects in your account.
- For source, type is a required value that represents the source code's repository type (in this example, S3 for an Amazon S3 bucket).
- For source, location represents the path to the source code (in this example, the input bucket name followed by the ZIP file name).
- For artifacts, type is a required value that represents the build output artifact's repository type (in this example, S3 for an Amazon S3 bucket).
- For artifacts, location represents the name of the output bucket you created or identified earlier (in this example, codebuild-*region-ID-account-ID*-output-bucket).
- For environment, type is a required value that represents the type of build environment (in this example, LINUX\_CONTAINER).
- For environment, image is a required value that represents the Docker image name and tag combination this build project uses, as specified by the Docker image repository type (in this example, aws/codebuild/standard:5.0 for a Docker image in the CodeBuild Docker images repository). aws/codebuild/standard is the name of the Docker image. 5.0 is the tag of the Docker image.

To find more Docker images you can use in your scenarios, see the [Build environment reference \(p. 153\)](#).

- For environment, computeType is a required value that represents the computing resources CodeBuild uses (in this example, BUILD\_GENERAL1\_SMALL).

#### Note

Other available values in the original JSON-formatted data, such as description, buildspec, auth (including type and resource), path, namespaceType, name (for artifacts), packaging, environmentVariables (including name and value), timeoutInMinutes, encryptionKey, and tags (including key and value) are optional. They are not used in this tutorial, so they are not shown here. For more information, see [Create a build project \(AWS CLI\) \(p. 198\)](#).

2. Switch to the directory that contains the file you just saved, and then run the **create-project** command again.

```
aws codebuild create-project --cli-input-json file://create-project.json
```

If successful, data similar to this appears in the output.

```
{  
  "project": {  
    "name": "codebuild-demo-project",  
    "serviceRole": "serviceIAMRole",  
    "tags": [],  
    "artifacts": {  
      "packaging": "NONE",  
      "type": "S3",  
      "location": "codebuild-region-ID-account-ID-output-bucket",  
      "name": "message-util.zip"  
    },  
    "lastModified": 1472661575.244,  
    "timeoutInMinutes": 60,  
    "created": 1472661575.244,  
    "environment": {  
      "computeType": "BUILD_GENERAL1_SMALL",  
      "image": "aws/codebuild/standard:5.0",  
      "type": "LINUX_CONTAINER",  
      "environmentVariables": []  
    },  
    "source": {  
      "type": "S3",  
      "location": "codebuild-region-ID-account-ID-input-bucket/MessageUtil.zip"  
    },  
    "encryptionKey": "arn:aws:kms:region-ID:account-ID:alias/aws/s3",  
    "arn": "arn:aws:codebuild:region-ID:account-ID:project/codebuild-demo-project"  
  }  
}
```

- project represents information about this build project.
  - tags represents any tags that were declared.
  - packaging represents how the build output artifact is stored in the output bucket. NONE means that a folder is created in the output bucket. The build output artifact is stored in that folder.
  - lastModified represents the time, in Unix time format, when information about the build project was last changed.
  - timeoutInMinutes represents the number of minutes after which CodeBuild stops the build if the build has not been completed. (The default is 60 minutes.)
  - created represents the time, in Unix time format, when the build project was created.
  - environmentVariables represents any environment variables that were declared and are available for CodeBuild to use during the build.
  - encryptionKey represents the ARN of the customer managed key that CodeBuild used to encrypt the build output artifact.
  - arn represents the ARN of the build project.

### Note

After you run the **create-project** command, an error message similar to the following might be output: **User: *user-ARN* is not authorized to perform: codebuild:CreateProject**. This is most likely because you configured the AWS CLI with the credentials of an user who does not have sufficient permissions to use CodeBuild to create build projects. To fix this, configure the AWS CLI with credentials belonging to one of the following IAM entities:

- An administrator user in your AWS account. For more information, see [Creating your first AWS account root user and group](#) in the *User Guide*.
- An user in your AWS account with the `AWSCodeBuildAdminAccess`, `AmazonS3ReadOnlyAccess`, and `IAMFullAccess` managed policies attached to that user or to an IAM group that the user belongs to. If you do not have an user or group in your AWS account with these permissions, and you cannot add these permissions to your user or group, contact your AWS account administrator for assistance. For more information, see [AWS managed \(predefined\) policies for AWS CodeBuild \(p. 344\)](#).

## Next step

[Step 6: Run the build \(p. 23\)](#)

# Step 6: Run the build

(Previous step: [Step 5: Create the build project \(p. 20\)](#))

In this step, you instruct AWS CodeBuild to run the build with the settings in the build project.

### To run the build

1. Use the AWS CLI to run the `start-build` command:

```
aws codebuild start-build --project-name project-name
```

Replace `project-name` with your build project name from the previous step (for example, `codebuild-demo-project`).

2. If successful, data similar to the following appears in the output:

```
{  
  "build": {  
    "buildComplete": false,  
    "initiator": "user-name",  
    "artifacts": {  
      "location": "arn:aws:s3:::codebuild-region-ID-account-ID-output-bucket/message-util.zip"  
    },  
    " projectName": "codebuild-demo-project",  
    "timeoutInMinutes": 60,  
    "buildStatus": "IN_PROGRESS",  
    "environment": {  
      "computeType": "BUILD_GENERAL1_SMALL",  
      "image": "aws/codebuild/standard:5.0",  
      "type": "LINUX_CONTAINER",  
      "environmentVariables": []  
    },  
    "source": {  
      "type": "S3",  
      "location": "codebuild-region-ID-account-ID-input-bucket/MessageUtil.zip"  
    },  
    "currentPhase": "SUBMITTED",  
    "startTime": 1472848787.882,  
    "id": "codebuild-demo-project:0cfbb6ec-3db9-4e8c-992b-1ab28EXAMPLE",  
    "arn": "arn:aws:codebuild:region-ID:account-ID:build/codebuild-demo-project:0cfbb6ec-3db9-4e8c-992b-1ab28EXAMPLE"  
  }  
}
```

- `build` represents information about this build.
  - `buildComplete` represents whether the build was completed (`true`). Otherwise, `false`.
  - `initiator` represents the entity that started the build.
  - `artifacts` represents information about the build output, including its location.
  - `projectName` represents the name of the build project.
  - `buildStatus` represents the current build status when the **start-build** command was run.
  - `currentPhase` represents the current build phase when the **start-build** command was run.
  - `startTime` represents the time, in Unix time format, when the build process started.
  - `id` represents the ID of the build.
  - `arn` represents the ARN of the build.

Make a note of the `id` value. You need it in the next step.

## Next step

[Step 7: View summarized build information \(p. 24\)](#)

# Step 7: View summarized build information

(Previous step: [Step 6: Run the build \(p. 23\)](#))

In this step, you view summarized information about the status of your build.

## To view summarized build information

Use the AWS CLI to run the **batch-get-builds** command.

```
aws codebuild batch-get-builds --ids id
```

Replace `id` with the `id` value that appeared in the output of the previous step.

If successful, data similar to this appears in the output.

```
{  
  "buildsNotFound": [],  
  "builds": [  
    {  
      "buildComplete": true,  
      "phases": [  
        {  
          "phaseStatus": "SUCCEEDED",  
          "endTime": 1472848788.525,  
          "phaseType": "SUBMITTED",  
          "durationInSeconds": 0,  
          "startTime": 1472848787.882  
        },  
        ... The full list of build phases has been omitted for brevity ...  
        {  
          "phaseType": "COMPLETED",  
          "startTime": 1472848878.079  
        }  
      ],  
      "logs": {  
        "groupName": "/aws/codebuild/codebuild-demo-project",  
      }  
    }  
  ]  
}
```

```

    "deepLink": "https://console.aws.amazon.com/cloudwatch/home?region=region-
ID#logEvent:group=/aws/codebuild/codebuild-demo-project;stream=38ca1c4a-e9ca-4dbc-bef1-
d52bfEXAMPLE",
        "streamName": "38ca1c4a-e9ca-4dbc-bef1-d52bfEXAMPLE"
    },
    "artifacts": {
        "md5sum": "MD5-hash",
        "location": "arn:aws:s3:::codebuild-region-ID-account-ID-output-bucket/message-
util.zip",
        "sha256sum": "SHA-256-hash"
    },
    "projectName": "codebuild-demo-project",
    "timeoutInMinutes": 60,
    "initiator": "user-name",
    "buildStatus": "SUCCEEDED",
    "environment": {
        "computeType": "BUILD_GENERAL1_SMALL",
        "image": "aws/codebuild/standard:5.0",
        "type": "LINUX_CONTAINER",
        "environmentVariables": []
    },
    "source": {
        "type": "S3",
        "location": "codebuild-region-ID-account-ID-input-bucket/MessageUtil.zip"
    },
    "currentPhase": "COMPLETED",
    "startTime": 1472848787.882,
    "endTime": 1472848878.079,
    "id": "codebuild-demo-project:38ca1c4a-e9ca-4dbc-bef1-d52bfEXAMPLE",
    "arn": "arn:aws:codebuild:region-ID:account-ID:build/codebuild-demo-project:38ca1c4a-
e9ca-4dbc-bef1-d52bfEXAMPLE"
}
]
}

```

- `buildsNotFound` represents the build IDs for any builds where information is not available. In this example, it should be empty.
- `builds` represents information about each build where information is available. In this example, information about only one build appears in the output.
  - `phases` represents the set of build phases CodeBuild runs during the build process. Information about each build phase is listed separately as `startTime`, `endTime`, and `durationInSeconds` (when the build phase started and ended, expressed in Unix time format, and how long it lasted, in seconds), and `phaseType` such as (SUBMITTED, PROVISIONING, DOWNLOAD\_SOURCE, INSTALL, PRE\_BUILD, BUILD, POST\_BUILD, UPLOAD\_ARTIFACTS, FINALIZING, or COMPLETED) and `phaseStatus` (such as SUCCEEDED, FAILED, FAULT, TIMED\_OUT, IN\_PROGRESS, or STOPPED). The first time you run the **batch-get-builds** command, there might not be many (or any) phases. After subsequent runs of the **batch-get-builds** command with the same build ID, more build phases should appear in the output.
  - `logs` represents information in Amazon CloudWatch Logs about the build's logs.
  - `md5sum` and `sha256sum` represent MD5 and SHA-256 hashes of the build's output artifact. These appear in the output only if the build project's packaging value is set to ZIP. (You did not set this value in this tutorial.) You can use these hashes along with a checksum tool to confirm file integrity and authenticity.

#### Note

You can also use the Amazon S3 console to view these hashes. Select the box next to the build output artifact, choose **Actions**, and then choose **Properties**. In the **Properties** pane, expand **Metadata**, and view the values for **x-amz-meta-codebuild-content-md5** and **x-amz-meta-codebuild-content-sha256**. (In the Amazon S3 console, the build output artifact's **ETag** value should not be interpreted to be either the MD5 or SHA-256 hash.)

If you use the AWS SDKs to get these hashes, the values are named codebuild-content-md5 and codebuild-content-sha256.

- endTime represents the time, in Unix time format, when the build process ended.

**Note**

Amazon S3 metadata has a CodeBuild header named x-amz-meta-codebuild-buildarn which contains the buildArn of the CodeBuild build that publishes artifacts to Amazon S3. The buildArn is added to allow source tracking for notifications and to reference which build the artifact is generated from.

## Next step

[Step 8: View detailed build information \(p. 26\)](#)

# Step 8: View detailed build information

(Previous step: [Step 7: View summarized build information \(p. 24\)](#))

In this step, you view detailed information about your build in CloudWatch Logs.

**Note**

To protect sensitive information, the following are hidden in CodeBuild logs:

- AWS access key IDs. For more information, see [Managing Access Keys for IAM Users](#) in the *AWS Identity and Access Management User Guide*.
- Strings specified using the Parameter Store. For more information, see [Systems Manager Parameter Store](#) and [Systems Manager Parameter Store Console Walkthrough](#) in the *Amazon EC2 Systems Manager User Guide*.
- Strings specified using AWS Secrets Manager. For more information, see [Key management \(p. 339\)](#).

### To view detailed build information

1. Use your web browser to go to the deepLink location that appeared in the output in the previous step (for example, <https://console.aws.amazon.com/cloudwatch/home?region=region-ID#logEvent:group=/aws/codebuild/codebuild-demo-project;stream=38ca1c4a-e9ca-4dbc-be1f-d52bfEXAMPLE>).
2. In the CloudWatch Logs log stream, you can browse the log events. By default, only the last set of log events is displayed. To see earlier log events, scroll to the beginning of the list.
3. In this tutorial, most of the log events contain verbose information about CodeBuild downloading and installing build dependency files into its build environment, which you probably don't care about. You can use the **Filter events** box to reduce the information displayed. For example, if you enter "[INFO]" in **Filter events**, only those events that contain [INFO] are displayed. For more information, see [Filter and pattern syntax](#) in the *Amazon CloudWatch User Guide*.

These portions of a CloudWatch Logs log stream pertain to this tutorial.

```
...
[Container] 2016/04/15 17:49:42 Entering phase PRE_BUILD
[Container] 2016/04/15 17:49:42 Running command echo Entering pre_build phase...
[Container] 2016/04/15 17:49:42 Entering pre_build phase...
[Container] 2016/04/15 17:49:42 Phase complete: PRE_BUILD Success: true
[Container] 2016/04/15 17:49:42 Entering phase BUILD
```

```
[Container] 2016/04/15 17:49:42 Running command echo Entering build phase...
[Container] 2016/04/15 17:49:42 Entering build phase...
[Container] 2016/04/15 17:49:42 Running command mvn install
[Container] 2016/04/15 17:49:44 [INFO] Scanning for projects...
[Container] 2016/04/15 17:49:44 [INFO]
[Container] 2016/04/15 17:49:44 [INFO]

-----
[Container] 2016/04/15 17:49:44 [INFO] Building Message Utility Java Sample App 1.0
[Container] 2016/04/15 17:49:44 [INFO]

-----
...
[Container] 2016/04/15 17:49:55 -----
[Container] 2016/04/15 17:49:55 T E S T S
[Container] 2016/04/15 17:49:55 -----
[Container] 2016/04/15 17:49:55 Running TestMessageUtil
[Container] 2016/04/15 17:49:55 Inside testSalutationMessage()
[Container] 2016/04/15 17:49:55 Hi!Robert
[Container] 2016/04/15 17:49:55 Inside testPrintMessage()
[Container] 2016/04/15 17:49:55 Robert
[Container] 2016/04/15 17:49:55 Tests run: 2, Failures: 0, Errors: 0, Skipped: 0, Time
elapsed: 0.018 sec
[Container] 2016/04/15 17:49:55
[Container] 2016/04/15 17:49:55 Results :
[Container] 2016/04/15 17:49:55
[Container] 2016/04/15 17:49:55 Tests run: 2, Failures: 0, Errors: 0, Skipped: 0
...
[Container] 2016/04/15 17:49:56 [INFO]

-----
[Container] 2016/04/15 17:49:56 [INFO] BUILD SUCCESS
[Container] 2016/04/15 17:49:56 [INFO]

-----
[Container] 2016/04/15 17:49:56 [INFO] Total time: 11.845 s
[Container] 2016/04/15 17:49:56 [INFO] Finished at: 2016-04-15T17:49:56+00:00
[Container] 2016/04/15 17:49:56 [INFO] Final Memory: 18M/216M
[Container] 2016/04/15 17:49:56 [INFO]

-----
[Container] 2016/04/15 17:49:56 Phase complete: BUILD Success: true
[Container] 2016/04/15 17:49:56 Entering phase POST_BUILD
[Container] 2016/04/15 17:49:56 Running command echo Entering post_build phase...
[Container] 2016/04/15 17:49:56 Entering post_build phase...
[Container] 2016/04/15 17:49:56 Phase complete: POST_BUILD Success: true
[Container] 2016/04/15 17:49:57 Preparing to copy artifacts
[Container] 2016/04/15 17:49:57 Assembling file list
[Container] 2016/04/15 17:49:57 Expanding target/messageUtil-1.0.jar
[Container] 2016/04/15 17:49:57 Found target/messageUtil-1.0.jar
[Container] 2016/04/15 17:49:57 Creating zip artifact
```

In this example, CodeBuild successfully completed the pre-build, build, and post-build build phases. It ran the unit tests and successfully built the messageUtil-1.0.jar file.

## Next step

[Step 9: Get the build output artifact \(p. 27\)](#)

# Step 9: Get the build output artifact

(Previous step: [Step 8: View detailed build information \(p. 26\)](#))

In this step, you get the messageUtil-1.0.jar file that CodeBuild built and uploaded to the output bucket.

You can use the CodeBuild console or the Amazon S3 console to complete this step.

### To get the build output artifact (AWS CodeBuild console)

- With the CodeBuild console still open and the build details page still displayed from the previous step, choose the **Build details** tab and scroll down to the **Artifacts** section.

**Note**

If the build details page is not displayed, in the navigation bar, choose **Build history**, and then choose the **Build run** link.

- The link to the Amazon S3 folder is under the **Artifacts upload location**. This link opens the folder in Amazon S3 where you find the messageUtil-1.0.jar build output artifact file.

### To get the build output artifact (Amazon S3 console)

- Open the Amazon S3 console at <https://console.aws.amazon.com/s3/>.
- Open codebuild-*region-ID-account-ID*-output-bucket.
- Open the codebuild-demo-project folder.
- Open the target folder, where you find the messageUtil-1.0.jar build output artifact file.

## Next step

[Step 10: Delete the S3 buckets \(p. 28\)](#)

## Step 10: Delete the S3 buckets

(Previous step: [Step 9: Get the build output artifact \(p. 27\)](#))

To prevent ongoing charges to your AWS account, you can delete the input and output buckets used in this tutorial. For instructions, see [Deleting or Emptying a Bucket](#) in the *Amazon Simple Storage Service User Guide*.

If you are using the IAM user or an administrator IAM user to delete these buckets, the user must have more access permissions. Add the following statement between the markers **### BEGIN ADDING STATEMENT HERE ###** and **### END ADDING STATEMENTS HERE ###** to an existing access policy for the user.

The ellipses (...) in this statement are used for brevity. Do not remove any statements in the existing access policy. Do not enter these ellipses into the policy.

```
{  
    "Version": "2012-10-17",  
    "Id": "...",  
    "Statement": [  
        ### BEGIN ADDING STATEMENT HERE ###  
        {  
            "Effect": "Allow",  
            "Action": [  
                "s3:DeleteBucket",  
                "s3:DeleteObject"  
            ],  
            "Resource": "*"  
        }  
        ### END ADDING STATEMENT HERE ###  
    ]  
}
```

## Next step

[Wrapping up \(p. 29\)](#)

## Wrapping up

In this tutorial, you used AWS CodeBuild to build a set of Java class files into a JAR file. You then viewed the build's results.

You can now try using CodeBuild in your own scenarios. Follow the instructions in [Plan a build \(p. 128\)](#). If you don't feel ready yet, you might want to try building some of the samples. For more information, see [Samples \(p. 30\)](#).

# CodeBuild samples

These groups of samples can be used to experiment with AWS CodeBuild:

## Topics

- [Microsoft Windows samples for CodeBuild \(p. 30\)](#)
- [CodeBuild use case-based samples \(p. 43\)](#)

## Microsoft Windows samples for CodeBuild

These samples use an AWS CodeBuild build environment running Microsoft Windows Server 2019, the .NET Framework, and the .NET Core SDK to build runtime files out of code written in F# and Visual Basic.

### Important

Running these samples might result in charges to your AWS account. These include possible charges for CodeBuild and for AWS resources and actions related to Amazon S3, AWS KMS, and CloudWatch Logs. For more information, see [CodeBuild pricing](#), [Amazon S3 pricing](#), [AWS Key Management Service pricing](#), and [Amazon CloudWatch pricing](#).

## Running the samples

### To run these samples

1. Create the files as described in the "Directory structure" and "Files" sections of this topic, and then upload them to an S3 input bucket or a CodeCommit or GitHub repository.

### Important

Do not upload *(root directory name)*, just the files inside of *(root directory name)*.

If you are using an S3 input bucket, be sure to create a ZIP file that contains the files, and then upload it to the input bucket. Do not add *(root directory name)* to the ZIP file, just the files inside of *(root directory name)*.

2. Create a build project. The build project must use the `mcr.microsoft.com/dotnet/framework/sdk:4.8` image to build .NET Framework projects.

If you use the AWS CLI to create the build project, the JSON-formatted input to the `create-project` command might look similar to this. (Replace the placeholders with your own values.)

```
{  
    "name": "sample-windows-build-project",  
    "source": {  
        "type": "S3",  
        "location": "codebuild-region-ID-account-ID-input-bucket/windows-build-input-artifact.zip"  
    },  
    "artifacts": {  
        "type": "S3",  
        "location": "codebuild-region-ID-account-ID-output-bucket",  
        "packaging": "ZIP",  
        "name": "windows-build-output-artifact.zip"  
    },  
    "environment": {  
        "type": "WINDOWS_SERVER_2019_CONTAINER",  
        "image": "mcr.microsoft.com/dotnet/framework/sdk:4.8",  
    }  
}
```

```
        "computeType": "BUILD_GENERAL1_MEDIUM"
},
"serviceRole": "arn:aws:iam::account-ID:role/role-name",
"encryptionKey": "arn:aws:kms:region-ID:account-ID:key/key-ID"
}
```

3. Run the build, and follow the steps in [Run CodeBuild directly \(p. 391\)](#).
4. To get the build output artifact, in your S3 output bucket, download the [\*windows-build-output-artifact\*.zip](#) file to your local computer or instance. Extract the contents to get to the runtime and other files.
  - The runtime file for the F# sample using the .NET Framework, FSharpHelloWorld.exe, can be found in the FSharpHelloWorld\bin\Debug directory.
  - The runtime file for the Visual Basic sample using the .NET Framework, VBHelloWorld.exe, can be found in the VBHelloWorld\bin\Debug directory.

## Directory structure

These samples assume the following directory structures.

### F# and the .NET Framework

```
(root directory name)
### buildspec.yml
### FSharpHelloWorld.sln
### FSharpHelloWorld
    ### App.config
    ### AssemblyInfo.fs
    ### FSharpHelloWorld.fsproj
    ### Program.fs
```

### Visual Basic and the .NET Framework

```
(root directory name)
### buildspec.yml
### VBHelloWorld.sln
### VBHelloWorld
    ### App.config
    ### HelloWorld.vb
    ### VBHelloWorld.vbproj
    ### My Project
        ### Application.Designer.vb
        ### Application.myapp
        ### AssemblyInfo.vb
        ### Resources.Designer.vb
        ### Resources.resx
        ### Settings.Designer.vb
        ### Settings.settings
```

## Files

These samples use the following files.

### F# and the .NET Framework

`buildspec.yml` (in *(root directory name)*):

```
version: 0.2

env:
  variables:
    SOLUTION: .\FSharpHelloWorld.sln
    PACKAGE_DIRECTORY: .\packages
    DOTNET_FRAMEWORK: 4.8

phases:
  build:
    commands:
      - '& nuget restore $env:SOLUTION -PackagesDirectory $env:PACKAGE_DIRECTORY'
      - '& msbuild -p:FrameworkPathOverride="C:\Program Files (x86)\Reference Assemblies\Microsoft\Framework\.NETFramework\v$env:DOTNET_FRAMEWORK" $env:SOLUTION'
  artifacts:
    files:
      - .\FSharpHelloWorld\bin\Debug\*
```

FSharpHelloWorld.sln (in *(root directory name)*):

```
Microsoft Visual Studio Solution File, Format Version 12.00
# Visual Studio 14
VisualStudioVersion = 14.0.25420.1
MinimumVisualStudioVersion = 10.0.40219.1
Project("{F2A71F9B-5D33-465A-A702-920D77279786}") = "FSharpHelloWorld", "FSharpHelloWorld\FSharpHelloWorld.fsproj", "{D60939B6-526D-43F4-9A89-577B2980DF62}"
EndProject
Global
  GlobalSection(SolutionConfigurationPlatforms) = preSolution
    Debug|Any CPU = Debug|Any CPU
    Release|Any CPU = Release|Any CPU
  EndGlobalSection
  GlobalSection(ProjectConfigurationPlatforms) = postSolution
    {D60939B6-526D-43F4-9A89-577B2980DF62}.Debug|Any CPU.ActiveCfg = Debug|Any CPU
    {D60939B6-526D-43F4-9A89-577B2980DF62}.Debug|Any CPU.Build.0 = Debug|Any CPU
    {D60939B6-526D-43F4-9A89-577B2980DF62}.Release|Any CPU.ActiveCfg = Release|Any CPU
    {D60939B6-526D-43F4-9A89-577B2980DF62}.Release|Any CPU.Build.0 = Release|Any CPU
  EndGlobalSection
  GlobalSection(SolutionProperties) = preSolution
    HideSolutionNode = FALSE
  EndGlobalSection
EndGlobal
```

App.config (in *(root directory name)*\FSharpHelloWorld):

```
<?xml version="1.0" encoding="utf-8" ?>
<configuration>
  <startup>
    <supportedRuntime version="v4.0" sku=".NETFramework,Version=v4.8" />
  </startup>
</configuration>
```

AssemblyInfo.fs (in *(root directory name)*\FSharpHelloWorld):

```
namespace FSharpHelloWorld.AssemblyInfo

open System.Reflection
open System.Runtime.CompilerServices
open System.Runtime.InteropServices

// General Information about an assembly is controlled through the following
```

```
// set of attributes. Change these attribute values to modify the information
// associated with an assembly.
[<assembly: AssemblyTitle("FSharpHelloWorld")>]
[<assembly: AssemblyDescription("")>]
[<assembly: AssemblyConfiguration("")>]
[<assembly: AssemblyCompany("")>]
[<assembly: AssemblyProduct("FSharpHelloWorld")>]
[<assembly: AssemblyCopyright("Copyright © 2017")>]
[<assembly: AssemblyTrademark("")>]
[<assembly: AssemblyCulture("")>]

// Setting ComVisible to false makes the types in this assembly not visible
// to COM components. If you need to access a type in this assembly from
// COM, set the ComVisible attribute to true on that type.
[<assembly: ComVisible(false)>]

// The following GUID is for the ID of the typelib if this project is exposed to COM
[<assembly: Guid("d60939b6-526d-43f4-9a89-577b2980df62")>]

// Version information for an assembly consists of the following four values:
//
// Major Version
// Minor Version
// Build Number
// Revision
//
// You can specify all the values or you can default the Build and Revision Numbers
// by using the '*' as shown below:
// [<assembly: AssemblyVersion("1.0.*")>]
[<assembly: AssemblyVersion("1.0.0.0")>]
[<assembly: AssemblyFileVersion("1.0.0.0")>]

do
()
```

FSharpHelloWorld.fsproj (in *(root directory name)\FSharpHelloWorld*):

```
<?xml version="1.0" encoding="utf-8"?>
<Project ToolsVersion="14.0" DefaultTargets="Build" xmlns="http://schemas.microsoft.com/
developer/msbuild/2003">
    <Import Project="$(MSBuildExtensionsPath)\$(MSBuildToolsVersion)\Microsoft.Common.props"
Condition="Exists('$(MSBuildExtensionsPath)\$(<PropertyGroup>
<Configuration Condition=" '$(Configuration)' == '' ">Debug</Configuration>
<Platform Condition=" '$(Platform)' == '' ">AnyCPU</Platform>
<SchemaVersion>2.0</SchemaVersion>
<ProjectGuid>d60939b6-526d-43f4-9a89-577b2980df62</ProjectGuid>
<OutputType>Exe</OutputType>
<RootNamespace>FSharpHelloWorld</RootNamespace>
<AssemblyName>FSharpHelloWorld</AssemblyName>
<TargetFrameworkVersion>v4.8</TargetFrameworkVersion>
<AutoGenerateBindingRedirects>true</AutoGenerateBindingRedirects>
<TargetFSharpCoreVersion>4.4.0.0</TargetFSharpCoreVersion>
<Name>FSharpHelloWorld</Name>
</PropertyGroup>
<PropertyGroup Condition=" '$(Configuration)|$(Platform)' == 'Debug|AnyCPU' ">
    <DebugSymbols>true</DebugSymbols>
    <DebugType>full</DebugType>
    <Optimize>false</Optimize>
    <Tailcalls>false</Tailcalls>
    <OutputPath>bin\Debug\</OutputPath>
    <DefineConstants>DEBUG;TRACE</DefineConstants>
    <WarningLevel>3</WarningLevel>
    <PlatformTarget>AnyCPU</PlatformTarget>
```

```

<DocumentationFile>bin\Debug\FSharpHelloWorld.XML</DocumentationFile>
<Prefer32Bit>true</Prefer32Bit>
</PropertyGroup>
<PropertyGroup Condition=" '$(Configuration)|$(Platform)' == 'Release|AnyCPU' ">
    <DebugType>pdbonly</DebugType>
    <Optimize>true</Optimize>
    <Tailcalls>true</Tailcalls>
    <OutputPath>bin\Release</OutputPath>
    <DefineConstants>TRACE</DefineConstants>
    <WarningLevel>3</WarningLevel>
    <PlatformTarget>AnyCPU</PlatformTarget>
    <DocumentationFile>bin\Release\FSharpHelloWorld.XML</DocumentationFile>
    <Prefer32Bit>true</Prefer32Bit>
</PropertyGroup>
<ItemGroup>
    <Reference Include="mscorlib" />
    <Reference Include="FSharp.Core, Version=$(TargetFSharpCoreVersion), Culture=neutral,
    PublicKeyToken=b03f5f7f11d50a3a">
        <Private>True</Private>
    </Reference>
    <Reference Include="System" />
    <Reference Include="System.Core" />
    <Reference Include="System.Numerics" />
</ItemGroup>
<ItemGroup>
    <Compile Include="AssemblyInfo.fs" />
    <Compile Include="Program.fs" />
    <None Include="App.config" />
</ItemGroup>
<PropertyGroup>
    <MinimumVisualStudioVersion Condition=" '$(MinimumVisualStudioVersion)' == ''">11</
    MinimumVisualStudioVersion>
</PropertyGroup>
<Choose>
    <When Condition=" '$(VisualStudioVersion)' == '11.0' ">
        <PropertyGroup Condition="Exists('$(MSBuildExtensionsPath32)..\Microsoft SDKs\F#
    3.0\Framework\v4.0\Microsoft.FSharp.Targets')">
            <FSharpTargetsPath>$(MSBuildExtensionsPath32)..\Microsoft SDKs\F#\3.0\Framework
    \v4.0\Microsoft.FSharp.Targets</FSharpTargetsPath>
        </PropertyGroup>
    </When>
    <Otherwise>
        <PropertyGroup Condition="Exists('$(MSBuildExtensionsPath32)\Microsoft\VisualStudio\v
    $(VisualStudioVersion)\FSharp\Microsoft.FSharp.Targets')">
            <FSharpTargetsPath>$(MSBuildExtensionsPath32)\Microsoft\VisualStudio\v
    $(VisualStudioVersion)\FSharp\Microsoft.FSharp.Targets</FSharpTargetsPath>
        </PropertyGroup>
    </Otherwise>
</Choose>
<Import Project="$(FSharpTargetsPath)" />
<!-- To modify your build process, add your task inside one of the targets below and
uncomment it.
    Other similar extension points exist, see Microsoft.Common.targets.
&lt;Target Name="BeforeBuild"&gt;
&lt;/Target&gt;
&lt;Target Name="AfterBuild"&gt;
&lt;/Target&gt;
--&gt;
&lt;/Project&gt;
</pre>

```

Program.fs (in (*root directory name*)\FSharpHelloWorld):

```
// Learn more about F# at http://fsharp.org
// See the 'F# Tutorial' project for more help.
```

```
[<EntryPoint>]
let main argv =
    printfn "Hello World"
    0 // return an integer exit code
```

## Visual Basic and the .NET Framework

`buildspec.yml` (in *(root directory name)*):

```
version: 0.2

env:
  variables:
    SOLUTION: .\VBHelloWorld.sln
    PACKAGE_DIRECTORY: .\packages
    DOTNET_FRAMEWORK: 4.8

phases:
  build:
    commands:
      - '& "C:\ProgramData\chocolatey\bin\NuGet.exe" restore $env:SOLUTION -'
      PackagesDirectory $env:PACKAGE_DIRECTORY'
      - '& "C:\Program Files (x86)\MSBuild\14.0\Bin\MSBuild.exe" -'
      p:FrameworkPathOverride="C:\Program Files (x86)\Reference Assemblies\Microsoft\Framework \
      \.NETFramework\v$env:DOTNET_FRAMEWORK" $env:SOLUTION'
  artifacts:
    files:
      - .\VBHelloWorld\bin\Debug\*
```

`VBHelloWorld.sln` (in *(root directory name)*):

```
Microsoft Visual Studio Solution File, Format Version 12.00
# Visual Studio 14
VisualStudioVersion = 14.0.25420.1
MinimumVisualStudioVersion = 10.0.40219.1
Project("{F184B08F-C81C-45F6-A57F-5ABD9991F28F}") = "VBHelloWorld", "VBHelloWorld"
VBHelloWorld.vbproj", "{4DCEC446-7156-4FE6-8CCC-219E34DD409D}"
EndProject
Global
  GlobalSection(SolutionConfigurationPlatforms) = preSolution
    Debug|Any CPU = Debug|Any CPU
    Release|Any CPU = Release|Any CPU
  EndGlobalSection
  GlobalSection(ProjectConfigurationPlatforms) = postSolution
    {4DCEC446-7156-4FE6-8CCC-219E34DD409D}.Debug|Any CPU.ActiveCfg = Debug|Any CPU
    {4DCEC446-7156-4FE6-8CCC-219E34DD409D}.Debug|Any CPU.Build.0 = Debug|Any CPU
    {4DCEC446-7156-4FE6-8CCC-219E34DD409D}.Release|Any CPU.ActiveCfg = Release|Any CPU
    {4DCEC446-7156-4FE6-8CCC-219E34DD409D}.Release|Any CPU.Build.0 = Release|Any CPU
  EndGlobalSection
  GlobalSection(SolutionProperties) = preSolution
    HideSolutionNode = FALSE
  EndGlobalSection
EndGlobal
```

`App.config` (in *(root directory name)*\VBHelloWorld):

```
<?xml version="1.0" encoding="utf-8" ?>
<configuration>
  <startup>
    <supportedRuntime version="v4.0" sku=".NETFramework,Version=v4.8" />
  </startup>
```

```
</configuration>
```

HelloWorld.vb (in *(root directory name)*\VBHelloWorld):

```
Module HelloWorld

    Sub Main()
        MsgBox("Hello World")
    End Sub

End Module
```

VBHelloWorld.vbproj (in *(root directory name)*\VBHelloWorld):

```
<?xml version="1.0" encoding="utf-8"?>
<Project ToolsVersion="14.0" DefaultTargets="Build" xmlns="http://schemas.microsoft.com/developer/msbuild/2003">
    <Import Project="$(MSBuildExtensionsPath)\$(MSBuildToolsVersion)\Microsoft.Common.props" Condition="Exists('$(MSBuildExtensionsPath)\\$(MSBuildToolsVersion)\Microsoft.Common.props')"/>
    <PropertyGroup>
        <Configuration Condition=" '$(Configuration)' == '' ">Debug</Configuration>
        <Platform Condition=" '$(Platform)' == '' ">AnyCPU</Platform>
        <ProjectGuid>{4DCEC446-7156-4FE6-8CCC-219E34DD409D}</ProjectGuid>
        <OutputType>Exe</OutputType>
        <StartupObject>VBHelloWorld.HelloWorld</StartupObject>
        <RootNamespace>VBHelloWorld</RootNamespace>
        <AssemblyName>VBHelloWorld</AssemblyName>
        <FileAlignment>512</FileAlignment>
        <MyType>Console</MyType>
        <TargetFrameworkVersion>v4.8</TargetFrameworkVersion>
        <AutoGenerateBindingRedirects>true</AutoGenerateBindingRedirects>
    </PropertyGroup>
    <PropertyGroup Condition=" '$(Configuration)|$(Platform)' == 'Debug|AnyCPU' ">
        <PlatformTarget>AnyCPU</PlatformTarget>
        <DebugSymbols>true</DebugSymbols>
        <DebugType>full</DebugType>
        <DefineDebug>true</DefineDebug>
        <DefineTrace>true</DefineTrace>
        <OutputPath>bin\Debug\</OutputPath>
        <DocumentationFile>VBHelloWorld.xml</DocumentationFile>
        <NoWarn>42016,41999,42017,42018,42019,42032,42036,42020,42021,42022</NoWarn>
    </PropertyGroup>
    <PropertyGroup Condition=" '$(Configuration)|$(Platform)' == 'Release|AnyCPU' ">
        <PlatformTarget>AnyCPU</PlatformTarget>
        <DebugType>pdbonly</DebugType>
        <DefineDebug>false</DefineDebug>
        <DefineTrace>true</DefineTrace>
        <Optimize>true</Optimize>
        <OutputPath>bin\Release\</OutputPath>
        <DocumentationFile>VBHelloWorld.xml</DocumentationFile>
        <NoWarn>42016,41999,42017,42018,42019,42032,42036,42020,42021,42022</NoWarn>
    </PropertyGroup>
    <PropertyGroup>
        <OptionExplicit>On</OptionExplicit>
    </PropertyGroup>
    <PropertyGroup>
        <OptionCompare>Binary</OptionCompare>
    </PropertyGroup>
    <PropertyGroup>
        <OptionStrict>Off</OptionStrict>
    </PropertyGroup>
    <PropertyGroup>
```

```
<OptionInfer>On</OptionInfer>
</PropertyGroup>
<ItemGroup>
    <Reference Include="System" />
    <Reference Include="System.Data" />
    <Reference Include="System.Deployment" />
    <Reference Include="System.Xml" />
    <Reference Include="System.Core" />
    <Reference Include="System.Xml.Linq" />
    <Reference Include="System.Data.DataSetExtensions" />
    <Reference Include="System.Net.Http" />
</ItemGroup>
<ItemGroup>
    <Import Include="Microsoft.VisualBasic" />
    <Import Include="System" />
    <Import Include="System.Collections" />
    <Import Include="System.Collections.Generic" />
    <Import Include="System.Data" />
    <Import Include="System.Diagnostics" />
    <Import Include="System.Linq" />
    <Import Include="System.Xml.Linq" />
    <Import Include="System.Threading.Tasks" />
</ItemGroup>
<ItemGroup>
    <Compile Include="HelloWorld.vb" />
    <Compile Include="My Project\AssemblyInfo.vb" />
    <Compile Include="My Project\Application.Designer.vb">
        <AutoGen>True</AutoGen>
        <DependentUpon>Application.myapp</DependentUpon>
    </Compile>
    <Compile Include="My Project\Resources.Designer.vb">
        <AutoGen>True</AutoGen>
        <DesignTime>True</DesignTime>
        <DependentUpon>Resources.resx</DependentUpon>
    </Compile>
    <Compile Include="My Project\Settings.Designer.vb">
        <AutoGen>True</AutoGen>
        <DependentUpon>Settings.settings</DependentUpon>
        <DesignTimeSharedInput>True</DesignTimeSharedInput>
    </Compile>
</ItemGroup>
<ItemGroup>
    <EmbeddedResource Include="My Project\Resources.resx">
        <Generator>VbMyResourcesResXFileCodeGenerator</Generator>
        <LastGenOutput>Resources.Designer.vb</LastGenOutput>
        <CustomToolNamespace>My.Resources</CustomToolNamespace>
        <SubType>Designer</SubType>
    </EmbeddedResource>
</ItemGroup>
<ItemGroup>
    <None Include="My Project\Application.myapp">
        <Generator>MyApplicationCodeGenerator</Generator>
        <LastGenOutput>Application.Designer.vb</LastGenOutput>
    </None>
    <None Include="My Project\Settings.settings">
        <Generator>SettingsSingleFileGenerator</Generator>
        <CustomToolNamespace>My</CustomToolNamespace>
        <LastGenOutput>Settings.Designer.vb</LastGenOutput>
    </None>
    <None Include="App.config" />
</ItemGroup>
<Import Project="$(MSBuildToolsPath)\Microsoft.VisualBasic.targets" />
<!-- To modify your build process, add your task inside one of the targets below and
uncomment it.
      Other similar extension points exist, see Microsoft.Common.targets.
&lt;Target Name="BeforeBuild"&gt;</pre>
```

```
</Target>
<Target Name="AfterBuild">
</Target>
-->
</Project>
```

Application.Designer.vb (in *(root directory name)*\VBHelloWorld\My Project):

```
'-----
' <auto-generated>
'   This code was generated by a tool.
'   Runtime Version:4.0.30319.42000
'
'   Changes to this file may cause incorrect behavior and will be lost if
'   the code is regenerated.
' </auto-generated>
'-----

Option Strict On
Option Explicit On
```

Application.myapp (in *(root directory name)*\VBHelloWorld\My Project):

```
<?xml version="1.0" encoding="utf-8"?>
<MyApplicationData xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <MySubMain>false</MySubMain>
  <SingleInstance>false</SingleInstance>
  <ShutdownMode>0</ShutdownMode>
  <EnableVisualStyles>true</EnableVisualStyles>
  <AuthenticationMode>0</AuthenticationMode>
  <ApplicationType>2</ApplicationType>
  <SaveMySettingsOnExit>true</SaveMySettingsOnExit>
</MyApplicationData>
```

AssemblyInfo.vb (in *(root directory name)*\VBHelloWorld\My Project):

```
Imports System
Imports System.Reflection
Imports System.Runtime.InteropServices

' General Information about an assembly is controlled through the following
' set of attributes. Change these attribute values to modify the information
' associated with an assembly.

' Review the values of the assembly attributes

<Assembly: AssemblyTitle("VBHelloWorld")>
<Assembly: AssemblyDescription("")>
<Assembly: AssemblyCompany("")>
<Assembly: AssemblyProduct("VBHelloWorld")>
<Assembly: AssemblyCopyright("Copyright © 2017")>
<Assembly: AssemblyTrademark("")>

<Assembly: ComVisible(False)>

'The following GUID is for the ID of the typelib if this project is exposed to COM
<Assembly: Guid("137c362b-36ef-4c3e-84ab-f95082487a5a")>

' Version information for an assembly consists of the following four values:
'
' Major Version
```

```
' Minor Version
' Build Number
' Revision
'

' You can specify all the values or you can default the Build and Revision Numbers
' by using the '*' as shown below:
' <Assembly: AssemblyVersion("1.0.*")>

<Assembly: AssemblyFileVersion("1.0.0.0")>
<Assembly: AssemblyFileVersion("1.0.0.0")>
```

`Resources.Designer.vb` (in *(root directory name)*\VBHelloWorld\My Project):

```
'-----
' <auto-generated>
'   This code was generated by a tool.
'   Runtime Version:4.0.30319.42000
'
'   Changes to this file may cause incorrect behavior and will be lost if
'   the code is regenerated.
' </auto-generated>
'-----

Option Strict On
Option Explicit On

Namespace My.Resources

    'This class was auto-generated by the StronglyTypedResourceBuilder
    'class via a tool like ResGen or Visual Studio.
    'To add or remove a member, edit your .ResX file then rerun ResGen
    'with the /str option, or rebuild your VS project.
    '''<summary>
    ''' A strongly-typed resource class, for looking up localized strings, etc.
    '''</summary>

    <Global.System.CodeDom.Compiler.GeneratedCodeAttribute("System.Resources.Tools.StronglyTypedResourceBu
    "4.0.0.0"), _
     Global.System.Diagnostics.DebuggerNonUserCodeAttribute(), _
     Global.System.Runtime.CompilerServices.CompilerGeneratedAttribute(), _
     Global.Microsoft.VisualBasic.HideModuleNameAttribute()> _
    Friend Module Resources

        Private resourceMan As Global.System.Resources.ResourceManager
        Private resourceCulture As Global.System.Globalization.CultureInfo

        '''<summary>
        ''' Returns the cached ResourceManager instance used by this class.
        '''</summary>

        <Global.System.ComponentModel.EditorBrowsableAttribute(Global.System.ComponentModel.EditorBrowsableState
        -        Friend ReadOnly Property ResourceManager() As Global.System.Resources.ResourceManager
            Get
                If Object.ReferenceEquals(resourceMan, Nothing) Then
                    Dim temp As Global.System.Resources.ResourceManager = New
                    Global.System.Resources.ResourceManager("VBHelloWorld.Resources",
                    GetType(Resources).Assembly)
                    resourceMan = temp
                End If
                Return resourceMan
            End Get
        End Property
```

```

'''<summary>
'''   Overrides the current thread's CurrentUICulture property for all
'''   resource lookups using this strongly typed resource class.
'''</summary>

<Global.System.ComponentModel.EditorBrowsableAttribute(Global.System.ComponentModel.EditorBrowsableState.Inherited) >
    Friend Property Culture() As Global.System.Globalization.CultureInfo
        Get
            Return resourceCulture
        End Get
        Set(ByVal value As Global.System.Globalization.CultureInfo)
            resourceCulture = value
        End Set
    End Property
End Module
End Namespace

```

**Resources.resx (in *(root directory name)*\VBHelloWorld\My Project):**

```

<?xml version="1.0" encoding="utf-8"?>
<root>
    <!--
        Microsoft ResX Schema

        Version 2.0

        The primary goals of this format is to allow a simple XML format
        that is mostly human readable. The generation and parsing of the
        various data types are done through the TypeConverter classes
        associated with the data types.

        Example:

        ... ado.net/XML headers & schema ...
        <resheader name="resmimetype">text/microsoft-resx</resheader>
        <resheader name="version">2.0</resheader>
        <resheader name="reader">System.Resources.ResXResourceReader,
        System.Windows.Forms, ...</resheader>
        <resheader name="writer">System.Resources.ResXResourceWriter,
        System.Windows.Forms, ...</resheader>
        <data name="Name1"><value>this is my long string</value><comment>this is a comment</comment></data>
        <data name="Color1" type="System.Drawing.Color, System.Drawing">Blue</data>
        <data name="Bitmap1" mimetype="application/x-microsoft.net.object.binary.base64">
            <value>[base64 mime encoded serialized .NET Framework object]</value>
        </data>
        <data name="Icon1" type="System.Drawing.Icon, System.Drawing" mimetype="application/x-
        microsoft.net.object.bytearray.base64">
            <value>[base64 mime encoded string representing a byte array form of the .NET
        Framework object]</value>
            <comment>This is a comment</comment>
        </data>

        There are any number of "resheader" rows that contain simple
        name/value pairs.

        Each data row contains a name, and value. The row also contains a
        type or mimetype. Type corresponds to a .NET class that support
        text/value conversion through the TypeConverter architecture.
        Classes that don't support this are serialized and stored with the
        mimetype set.

        The mimetype is used for serialized objects, and tells the
        ResXResourceReader how to depersist the object. This is currently not
    -->
```

extensible. For a given mimetype the value must be set accordingly:

Note - application/x-microsoft.net.object.binary.base64 is the format that the ResXResourceWriter will generate, however the reader can read any of the formats listed below.

```
mimetype: application/x-microsoft.net.object.binary.base64
value   : The object must be serialized with
          : System.Serialization.Formatters.Binary.BinaryFormatter
          : and then encoded with base64 encoding.

mimetype: application/x-microsoft.net.object.soap.base64
value   : The object must be serialized with
          : System.Runtime.Serialization.Formatters.Soap.SoapFormatter
          : and then encoded with base64 encoding.

mimetype: application/x-microsoft.net.object.bytearray.base64
value   : The object must be serialized into a byte array
          : using a System.ComponentModel.TypeConverter
          : and then encoded with base64 encoding.

-->
<xsd:schema id="root" xmlns="" xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns:msdata="urn:schemas-microsoft-com:xml-msdata">
  <xsd:element name="root" msdata:IsDataSet="true">
    <xsd:complexType>
      <xsd:choice maxOccurs="unbounded">
        <xsd:element name="metadata">
          <xsd:complexType>
            <xsd:sequence>
              <xsd:element name="value" type="xsd:string" minOccurs="0" />
            </xsd:sequence>
              <xsd:attribute name="name" type="xsd:string" />
              <xsd:attribute name="type" type="xsd:string" />
              <xsd:attribute name="mimetype" type="xsd:string" />
            </xsd:complexType>
        </xsd:element>
        <xsd:element name="assembly">
          <xsd:complexType>
            <xsd:attribute name="alias" type="xsd:string" />
            <xsd:attribute name="name" type="xsd:string" />
          </xsd:complexType>
        </xsd:element>
        <xsd:element name="data">
          <xsd:complexType>
            <xsd:sequence>
              <xsd:element name="value" type="xsd:string" minOccurs="0"
                msdata:Ordinal="1" />
              <xsd:element name="comment" type="xsd:string" minOccurs="0"
                msdata:Ordinal="2" />
            </xsd:sequence>
              <xsd:attribute name="name" type="xsd:string" msdata:Ordinal="1" />
              <xsd:attribute name="type" type="xsd:string" msdata:Ordinal="3" />
              <xsd:attribute name="mimetype" type="xsd:string" msdata:Ordinal="4" />
            </xsd:complexType>
        </xsd:element>
        <xsd:element name="resheader">
          <xsd:complexType>
            <xsd:sequence>
              <xsd:element name="value" type="xsd:string" minOccurs="0"
                msdata:Ordinal="1" />
            </xsd:sequence>
              <xsd:attribute name="name" type="xsd:string" use="required" />
            </xsd:complexType>
        </xsd:element>
      </xsd:choice>
    </xsd:complexType>
```

```
</xsd:element>
</xsd:schema>
<resheader name="resmimetype">
    <value>text/microsoft-resx</value>
</resheader>
<resheader name="version">
    <value>2.0</value>
</resheader>
<resheader name="reader">
    <value>System.Resources.ResXResourceReader, System.Windows.Forms, Version=2.0.0.0,
Culture=neutral, PublicKeyToken=b77a5c561934e089</value>
</resheader>
<resheader name="writer">
    <value>System.Resources.ResXResourceWriter, System.Windows.Forms, Version=2.0.0.0,
Culture=neutral, PublicKeyToken=b77a5c561934e089</value>
</resheader>
</root>
```

Settings.Designer.vb (in *(root directory name)*\VBHelloWorld\My Project):

```
'-----
' <auto-generated>
'   This code was generated by a tool.
'   Runtime Version:4.0.30319.42000
'
'   Changes to this file may cause incorrect behavior and will be lost if
'   the code is regenerated.
' </auto-generated>
'-----

Option Strict On
Option Explicit On

Namespace My

    <Global.System.Runtime.CompilerServices.CompilerGeneratedAttribute(), _
    Global.System.CodeDom.Compiler.GeneratedCodeAttribute("Microsoft.VisualStudioEditors.SettingsDesigner
    "11.0.0.0"), _
    Global.System.ComponentModel.EditorBrowsableAttribute(Global.System.ComponentModel.EditorBrowsableState
    Partial Friend NotInheritable Class MySettings
        Inherits Global.System.Configuration.ApplicationSettingsBase

        Private Shared defaultInstance As MySettings =
    CType(Global.System.Configuration.ApplicationSettingsBase.Synchronized(New MySettings),
    MySettings)

        #Region "My.Settings Auto-Save Functionality"
        #If _MyType = "WindowsForms" Then
            Private Shared addedHandler As Boolean

            Private Shared addedHandlerLockObject As New Object

            <Global.System.Diagnostics.DebuggerNonUserCodeAttribute(),
    Global.System.ComponentModel.EditorBrowsableAttribute(Global.System.ComponentModel.EditorBrowsableState
        -
            Private Shared Sub AutoSaveSettings(ByVal sender As Global.System.Object, ByVal e
    As Global.System.EventArgs)
                If My.Application.SaveMySettingsOnExit Then
                    My.Settings.Save()
                End If
            End Sub
        #End If
    End Class
End Namespace
```

```
#End Region

Public Shared ReadOnly Property [Default]() As MySettings
Get

#If _MyType = "WindowsForms" Then
    If Not addedHandler Then
        SyncLock addedHandlerLockObject
            If Not addedHandler Then
                AddHandler My.Application.Shutdown, AddressOf AutoSaveSettings
                addedHandler = True
            End If
        End SyncLock
    End If
#End If
    Return defaultInstance
End Get
End Property
End Class
End Namespace

Namespace My

<Global.Microsoft.VisualBasic.HideModuleNameAttribute(), _
Global.System.Diagnostics.DebuggerNonUserCodeAttribute(), _
Global.System.Runtime.CompilerServices.CompilerGeneratedAttribute()> _
Friend Module MySettingsProperty

<Global.System.ComponentModel.Design.HelpKeywordAttribute("My.Settings")> _
Friend ReadOnly Property Settings() As Global.VBHelloWorld.My.MySettings
Get
    Return Global.VBHelloWorld.My.MySettings.Default
End Get
End Property
End Module
End Namespace
```

Settings.settings (in *(root directory name)*\VBHelloWorld\My Project):

```
<?xml version='1.0' encoding='utf-8'?>
<SettingsFile xmlns="http://schemas.microsoft.com/VisualStudio/2004/01/settings"
CurrentProfile="(Default)" UseMySettingsClassName="true">
<Profiles>
    <Profile Name="(Default)" />
</Profiles>
<Settings />
</SettingsFile>
```

## CodeBuild use case-based samples

You can use these use case-based samples to experiment with AWS CodeBuild:

[Amazon ECR sample \(p. 45\)](#)

Uses a Docker image in an Amazon ECR repository to use Apache Maven to produce a single JAR file.

[Amazon EFS sample \(p. 49\)](#)

Shows how to configure a buildspec file so that a CodeBuild project mounts and builds on an Amazon EFS file system.

[AWS CodeDeploy sample \(p. 53\)](#)

Uses Apache Maven to produce a single JAR file. Uses CodeDeploy to deploy the JAR file to an Amazon Linux instance. You can also use CodePipeline to build and deploy the sample.

[AWS CodePipeline integration with batch builds sample \(p. 61\)](#)

Shows how to use AWS CodePipeline to create a build with multiple input sources and multiple output artifacts.

[AWS Config sample \(p. 63\)](#)

Shows how to set up AWS Config. Lists which CodeBuild resources are tracked and describes how to look up CodeBuild projects in AWS Config.

[AWS Elastic Beanstalk sample \(p. 64\)](#)

Uses Apache Maven to produce a single WAR file. Uses Elastic Beanstalk to deploy the WAR file to an Elastic Beanstalk instance.

[Bitbucket pull request and webhook filter sample \(p. 71\)](#)

Uses CodeBuild with Bitbucket as the source repository and webhooks enabled, to rebuild the source code every time a code change is pushed to the repository.

[Build badges sample \(p. 74\)](#)

Shows how to set up CodeBuild with build badges.

[Build notifications sample \(p. 77\)](#)

Uses Apache Maven to produce a single JAR file. Sends a build notification to subscribers of an Amazon SNS topic.

[Create a test report using the AWS CLI sample \(p. 90\)](#)

Uses the AWS CLI to create, run, and view the results of a test report.

[Docker in custom image sample \(p. 94\)](#)

Uses a custom Docker image to produce a Docker image.

[Docker sample \(p. 96\)](#)

Uses a build image provided by CodeBuild with Docker support to produce a Docker image with Apache Maven. Pushes the Docker image to a repository in Amazon ECR. You can also adapt this sample to push the Docker image to Docker Hub.

[GitHub Enterprise Server sample \(p. 102\)](#)

Uses CodeBuild with GitHub Enterprise Server as the source repository, with certificates installed and webhooks enabled, to rebuild the source code every time a code change is pushed to the repository.

[GitHub pull request and webhook filter sample \(p. 108\)](#)

Uses CodeBuild with GitHub as the source repository and webhooks enabled, to rebuild the source code every time a code change is pushed to the repository.

[Host build output in an S3 bucket \(p. 111\)](#)

Shows how to create a static website in an S3 bucket using unencrypted build artifacts.

[Multiple input sources and output artifacts sample \(p. 123\)](#)

Shows how to use multiple input sources and multiple output artifacts in a build project.

[Private registry with AWS Secrets Manager sample \(p. 122\)](#)

Shows how to use a Docker image in a private registry as the runtime environment when building with CodeBuild. The private registry credentials are stored in AWS Secrets Manager.

[Runtime versions in buildspec file sample \(p. 113\)](#)

Shows how to specify runtimes and their versions in the buildspec file. This is a requirement when using the Ubuntu standard image version 2.0.

[Source version sample \(p. 120\)](#)

Shows how to use a specific version of your source in a CodeBuild build project.

[Use semantic versioning to name build artifacts sample \(p. 126\)](#)

Shows how to use semantic versioning to create an artifact name at build time.

## Amazon ECR sample for CodeBuild

This sample uses a Docker image in an Amazon Elastic Container Registry (Amazon ECR) image repository to build a sample Go project.

**Important**

Running this sample might result in charges to your AWS account. These include possible charges for AWS CodeBuild and for AWS resources and actions related to Amazon S3, AWS KMS, CloudWatch Logs, and Amazon ECR. For more information, see [CodeBuild pricing](#), [Amazon S3 pricing](#), [AWS Key Management Service pricing](#), [Amazon CloudWatch pricing](#), and [Amazon Elastic Container Registry pricing](#).

## Running the sample

### To run this sample

1. To create and push the Docker image to your image repository in Amazon ECR, complete the steps in the "Running the sample" section of the [Docker sample \(p. 96\)](#).
2. Create a Go project:
  - a. Create the files as described in the [Go project structure \(p. 48\)](#) and [Go project files \(p. 48\)](#) sections of this topic, and then upload them to an S3 input bucket or an AWS CodeCommit, GitHub, or Bitbucket repository.

**Important**

Do not upload *(root directory name)*, just the files inside of *(root directory name)*.

If you are using an S3 input bucket, be sure to create a ZIP file that contains the files, and then upload it to the input bucket. Do not add *(root directory name)* to the ZIP file, just the files inside of *(root directory name)*.

- b. Create a build project, run the build, and view related build information by following the steps in [Run AWS CodeBuild directly \(p. 391\)](#).

If you use the AWS CLI to create the build project, the JSON-formatted input to the `create-project` command might look similar to this. (Replace the placeholders with your own values.)

```
{  
    "name": "sample-go-project",  
    "source": {  
        "type": "S3",  
        "location": "codebuild-region-ID-account-ID-input-bucket/GoSample.zip"  
    },  
    "artifacts": {  
        "type": "S3",  
        "location": "codebuild-region-ID-account-ID-output-bucket/GoBuildOutput.zip"  
    }  
}
```

```

    "type": "S3",
    "location": "codebuild-<region-ID>-<account-ID>-output-bucket",
    "packaging": "ZIP",
    "name": "GoOutputArtifact.zip"
},
"environment": {
    "type": "LINUX_CONTAINER",
    "image": "aws/codebuild/standard:5.0",
    "computeType": "BUILD_GENERAL1_SMALL"
},
"serviceRole": "arn:aws:iam::<account-ID>:role/<role-name>",
"encryptionKey": "arn:aws:kms:<region-ID>:<account-ID>:key/<key-ID>"
}

```

- c. To get the build output artifact, open your S3 output bucket.
  - d. Download the *GoOutputArtifact*.zip file to your local computer or instance, and then extract the contents of the file. In the extracted contents, get the hello file.
  3. If one of the following is true, you must add permissions to your image repository in Amazon ECR so that AWS CodeBuild can pull its Docker image into the build environment.
    - Your project uses CodeBuild credentials to pull Amazon ECR images. This is denoted by a value of CODEBUILD in the `imagePullCredentialsType` attribute of your `ProjectEnvironment`.
    - Your project uses a cross-account Amazon ECR image. In this case, your project must use its service role to pull Amazon ECR images. To enable this behavior, set the `imagePullCredentialsType` attribute of your `ProjectEnvironment` to SERVICE\_ROLE.
1. Open the Amazon ECR console at <https://console.aws.amazon.com/ecr/>.
  2. In the list of repository names, choose the name of the repository you created or selected.
  3. From the navigation pane, choose **Permissions**, choose **Edit**, and then choose **Add statement**.
  4. For **Statement name**, enter an identifier (for example, **CodeBuildAccess**).
  5. For **Effect**, leave **Allow** selected. This indicates that you want to allow access to another AWS account.
  6. For **Principal**, do one of the following:
    - If your project uses CodeBuild credentials to pull an Amazon ECR image, in **Service principal**, enter **codebuild.amazonaws.com**.
    - If your project uses a cross-account Amazon ECR image, for **AWS account IDs**, enter IDs of the AWS accounts that you want to give access.
  7. Skip the **All IAM entities** list.
  8. For **Action**, select the pull-only actions: **ecr:GetDownloadUrlForLayer**, **ecr:BatchGetImage**, and **ecr:BatchCheckLayerAvailability**.
  9. For **Conditions**, add the following:

```

{
  "StringEquals": {
    "aws:SourceAccount": "<AWS-account-ID>",
    "aws:SourceArn": "arn:aws:codebuild:<region>:<AWS-account-ID>:project/<project-name>"
  }
}

```

10 Choose **Save**.

This policy is displayed in **Permissions**. The principal is what you entered for **Principal** in step 3 of this procedure:

- If your project uses CodeBuild credentials to pull an Amazon ECR image, "`codebuild.amazonaws.com`" appears under **Service principals**.

- If your project uses a cross-account Amazon ECR image, the ID of the AWS account that you want to give access appears under **AWS Account IDs**.

The following sample policy uses both CodeBuild credentials and a cross-account Amazon ECR image.

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "CodeBuildAccessPrincipal",
            "Effect": "Allow",
            "Principal": {
                "Service": "codebuild.amazonaws.com"
            },
            "Action": [
                "ecr:GetDownloadUrlForLayer",
                "ecr:BatchGetImage",
                "ecr:BatchCheckLayerAvailability"
            ],
            "Condition": {
                "StringEquals": {
                    "aws:SourceArn": "arn:aws:codebuild:<region>:<aws-account-id>:project/<project-name>",
                    "aws:SourceAccount": "<aws-account-id>"
                }
            }
        },
        {
            "Sid": "CodeBuildAccessCrossAccount",
            "Effect": "Allow",
            "Principal": {
                "AWS": "arn:aws:iam::<AWS-account-ID>:root"
            },
            "Action": [
                "ecr:GetDownloadUrlForLayer",
                "ecr:BatchGetImage",
                "ecr:BatchCheckLayerAvailability"
            ]
        }
    ]
}
```

- If your projects use CodeBuild credentials and you would like your CodeBuild projects to have open access to the Amazon ECR repository, you can omit the Condition keys and add the following sample policy.

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "CodeBuildAccessPrincipal",
            "Effect": "Allow",
            "Principal": {
                "Service": "codebuild.amazonaws.com"
            },
            "Action": [
                "ecr:GetDownloadUrlForLayer",
                "ecr:BatchGetImage",
                "ecr:BatchCheckLayerAvailability"
            ]
        },
        {

```

```
        "Sid": "CodeBuildAccessCrossAccount",
        "Effect": "Allow",
        "Principal": {
            "AWS": "arn:aws:iam::<AWS-account-ID>:root"
        },
        "Action": [
            "ecr:GetDownloadUrlForLayer",
            "ecr:BatchGetImage",
            "ecr:BatchCheckLayerAvailability"
        ]
    }
}
```

4. Create a build project, run the build, and view build information by following the steps in [Run CodeBuild directly \(p. 391\)](#).

If you use the AWS CLI to create the build project, the JSON-formatted input to the `create-project` command might look similar to this. (Replace the placeholders with your own values.)

```
{
    "name": "amazon-ecri-sample-project",
    "source": {
        "type": "S3",
        "location": "codebuild-<region-ID>-<account-ID>-input-bucket/<GoSample.zip>"
    },
    "artifacts": {
        "type": "S3",
        "location": "codebuild-<region-ID>-<account-ID>-output-bucket",
        "packaging": "ZIP",
        "name": "<GoOutputArtifact.zip>"
    },
    "environment": {
        "type": "LINUX_CONTAINER",
        "image": "<account-ID>.dkr.ecr.<region-ID>.amazonaws.com/<your-Amazon-ECR-repo-name>:<tag>",
        "computeType": "BUILD_GENERAL1_SMALL"
    },
    "serviceRole": "arn:aws:iam::<account-ID>:role/<role-name>",
    "encryptionKey": "arn:aws:kms:<region-ID>:<account-ID>:key/<key-ID>"
}
```

5. To get the build output artifact, open your S3 output bucket.
6. Download the `<GoOutputArtifact.zip>` file to your local computer or instance, and then extract the contents of the `<GoOutputArtifact.zip>` file. In the extracted contents, get the `hello` file.

## Go project structure

This sample assumes this directory structure.

```
(root directory name)
### buildspec.yml
### hello.go
```

## Go project files

This sample uses these files.

`buildspec.yml` (in `(root directory name)`)

```
version: 0.2

phases:
  install:
    runtime-versions:
      golang: 1.13
  build:
    commands:
      - echo Build started on `date`
      - echo Compiling the Go code
      - go build hello.go
  post_build:
    commands:
      - echo Build completed on `date`
artifacts:
  files:
    - hello
```

hello.go (in *root directory name*)

```
package main
import "fmt"

func main() {
    fmt.Println("hello world")
    fmt.Println("1+1 =", 1+1)
    fmt.Println("7.0/3.0 =", 7.0/3.0)
    fmt.Println(true && false)
    fmt.Println(true || false)
    fmt.Println(!true)
}
```

## Related resources

- For information about getting started with AWS CodeBuild, see [Getting started with AWS CodeBuild using the console \(p. 5\)](#).
- For information about troubleshooting issues in CodeBuild, see [Troubleshooting AWS CodeBuild \(p. 410\)](#).
- For information about quotas in CodeBuild, see [Quotas for AWS CodeBuild \(p. 425\)](#).

## Amazon Elastic File System sample for AWS CodeBuild

You might want to create your AWS CodeBuild builds on Amazon Elastic File System, a scalable, shared file service for Amazon EC2 instances. The storage capacity with Amazon EFS is elastic, so it grows or shrinks as files are added and removed. It has a simple web services interface that you can use to create and configure file systems. It also manages all of the file storage infrastructure for you, so you do not need to worry about deploying, patching, or maintaining file system configurations. For more information, see [What is Amazon Elastic File System?](#) in the *Amazon Elastic File System User Guide*.

This sample shows you how to configure a CodeBuild project so that it mounts and then builds a Java application to an Amazon EFS file system. Before you begin, you must have a Java application ready to build that is uploaded to an S3 input bucket or an AWS CodeCommit, GitHub, GitHub Enterprise Server, or Bitbucket repository.

Data in transit for your file system is encrypted. To encrypt data in transit using a different image, see [Encrypting data in transit](#).

## High-level steps

This sample covers the three high-level steps required to use Amazon EFS with AWS CodeBuild:

1. Create a virtual private cloud (VPC) in your AWS account.
2. Create a file system that uses this VPC.
3. Create and build a CodeBuild project that uses the VPC. The CodeBuild project uses the following to identify the file system:
  - A unique file system identifier. You choose the identifier when you specify the file system in your build project.
  - The file system ID. The ID is displayed when you view your file system in the Amazon EFS console.
  - A mount point. This is a directory in your Docker container that mounts the file system.
  - Mount options. These include details about how to mount the file system.

**Note**

A file system created in Amazon EFS is supported on Linux platforms only.

## Create a VPC using AWS CloudFormation

Create your VPC with an AWS CloudFormation template.

1. Follow the instructions in [AWS CloudFormation VPC template \(p. 175\)](#) to use AWS CloudFormation to create a VPC.

**Note**

The VPC created by this AWS CloudFormation template has two private subnets and two public subnets. You must only use private subnets when you use AWS CodeBuild to mount the file system you created in Amazon EFS. If you use one of the public subnets, the build fails.

2. Sign in to the AWS Management Console and open the Amazon VPC console at <https://console.aws.amazon.com/vpc/>.
3. Choose the VPC you created with AWS CloudFormation.
4. On the **Description** tab, make a note of the name of your VPC and its ID. Both are required when you create your AWS CodeBuild project later in this sample.

## Create an Amazon Elastic File System file system with your VPC

Create a simple Amazon EFS file system for this sample using the VPC you created earlier.

1. Sign in to the AWS Management Console and open the Amazon EFS console at <https://console.aws.amazon.com/efs/>.
2. Choose **Create file system**.
3. From **VPC**, choose the VPC name you noted earlier in this sample.
4. Leave the Availability Zones associated with your subnets selected.
5. Choose **Next Step**.
6. In **Add tags**, for the default **Name** key, in **Value**, enter the name of your Amazon EFS file system.
7. Keep **Bursting** and **General Purpose** selected as your default performance and throughput modes, and then choose **Next Step**.
8. For **Configure client access**, choose **Next Step**.
9. Choose **Create File System**.

10. (Optional) We recommend adding a policy to your Amazon EFS file system that enforces encryption of data in transit. In the Amazon EFS console, choose **File system policy**, choose **Edit**, select the box labeled **Enforce in-transit encryption for all clients**, and then choose **Save**.

## Create a CodeBuild project to use with Amazon EFS

Create a AWS CodeBuild project that uses the VPC you created earlier in this sample. When the build is run, it mounts the Amazon EFS file system created earlier. Next, it stores the .jar file created by your Java application in your file system's mount point directory.

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. From the navigation pane, choose **Build projects**, and then choose **Create build project**.
3. In **Project name**, enter a name for your project.
4. From **Source provider**, choose the repository that contains the Java application you want to build.
5. Enter information, such as a repository URL, that CodeBuild uses to locate your application. The options are different for each source provider. For more information, see [Choose source provider](#).
6. From **Environment image**, choose **Managed image**.
7. From **Operating system**, choose **Amazon Linux 2**.
8. From **Runtime(s)**, choose **Standard**.
9. From **Image**, choose **aws/codebuild/amazonlinux2-x86\_64-standard:4.0**.
10. From **Environment type**, choose **Linux**.
11. Select **Privileged**.

**Note**

By default, Docker containers do not allow access to any devices. Privileged mode grants a build project's Docker container access to all devices. For more information, see [Runtime Privilege and Linux Capabilities](#) on the Docker Docs website. Also, Windows does not support privileged mode.

12. Under **Service role**, choose **New service role**. In **Role name**, enter a name for the role CodeBuild creates for you.
13. Expand **Additional configuration**.
14. From **VPC**, choose the VPC ID.
15. From **Subnets**, choose one or more of the private subnets associated with your VPC. You must use private subnets in a build that mounts an Amazon EFS file system. If you use a public subnet, the build fails.
16. From **Security Groups**, choose the default security group.
17. In **File systems**, enter the following information:
  - For **Identifier**, enter a unique file system identifier. It must be fewer than 129 characters and contain only alphanumeric characters and underscores. CodeBuild uses this identifier to create an environment variable that identifies the elastic file system. The environment variable format is **CODEBUILD\_<file\_system\_identifier>** in capital letters. For example, if you enter **my\_efs**, the environment variable is **CODEBUILD\_MY\_EFS**.
  - For **ID**, choose the file system ID.
  - (Optional) Enter a directory in the file system. CodeBuild mounts this directory. If you leave **Directory path** blank, CodeBuild mounts the entire file system. The path is relative to the root of the file system.
  - For **Mount point**, enter the absolute path of the directory in your build container where the file system is mounted. If this directory does not exist, CodeBuild creates it during the build.
  - (Optional) Enter mount options. If you leave **Mount options** blank, CodeBuild uses its default mount options:

```
nfsvers=4.1
rsize=1048576
wsize=1048576
hard
timeo=600
retrans=2
```

For more information, see [Recommended NFS Mount Options](#) in the *Amazon Elastic File System User Guide*.

18. For **Build specification**, choose **Insert build commands**, and then choose **Switch to editor**.
19. Enter the following build spec commands into the editor. Replace `<file_system_identifier>` with the identifier you entered in step 17. Use capital letters (for example, CODEBUILD\_MY\_EFS).

```
version: 0.2
phases:
  install:
    runtime-versions:
      java: corretto11
  build:
    commands:
      - mvn compile -Dgpg.skip=true -Dmaven.repo.local=
$CODEBUILD_<file_system_identifier>
```

20. Use the default values for all other settings, and then choose **Create build project**. When your build is complete, the console page for your project is displayed.
21. Choose **Start build**.

## CodeBuild and Amazon EFS sample summary

After your AWS CodeBuild project is built:

- You have a .jar file created by your Java application that is built to your Amazon EFS file system under your mount point directory.
- An environment variable that identifies your file system is created using the file system identifier you entered when you created the project.

For more information, see [Mounting file systems](#) in the *Amazon Elastic File System User Guide*.

## Troubleshooting

The following are errors you might encounter when setting up Amazon EFS with CodeBuild.

### Topics

- [CLIENT\\_ERROR: mounting '127.0.0.1:/' failed. permission denied \(p. 52\)](#)
- [CLIENT\\_ERROR: mounting '127.0.0.1:/' failed. connection reset by peer \(p. 53\)](#)
- [VPC\\_CLIENT\\_ERROR: Unexpected EC2 error: UnauthorizedOperation \(p. 53\)](#)

### [CLIENT\\_ERROR: mounting '127.0.0.1:/' failed. permission denied](#)

IAM authorization is not supported for mounting Amazon EFS with CodeBuild. If you are using a custom Amazon EFS file system policy, you will need to grant read and write access to all IAM principals. For example:

```
"Principal": {  
    "AWS": "*"  
}
```

## CLIENT\_ERROR: mounting '127.0.0.1:/' failed. connection reset by peer

There are two possible causes for this error:

- The CodeBuild VPC subnet is in a different availability zone than the Amazon EFS mount target. You can resolve this by adding a VPC subnet in the same availability zone as the Amazon EFS mount target.
- The security group does not have permissions to communicate with Amazon EFS. You can resolve this by adding an inbound rule to allow all traffic from either the VPC (add the primary CIDR block for your VPC), or the security group itself.

## VPC\_CLIENT\_ERROR: Unexpected EC2 error: UnauthorizedOperation

This error occurs when all of the subnets in your VPC configuration for the CodeBuild project are public subnets. You must have at least one private subnet in the VPC to ensure network connectivity.

# CodeDeploy sample for CodeBuild

This sample instructs AWS CodeBuild to use Maven to produce as build output a single JAR file named `my-app-1.0-SNAPSHOT.jar`. This sample then uses CodeDeploy to deploy the JAR file to an Amazon Linux instance. You can also use AWS CodePipeline to automate the use of CodeDeploy to deploy the JAR file to an Amazon Linux instance. This sample is based on the [Maven in 5 Minutes](#) topic on the Apache Maven website.

### Important

Running this sample might result in charges to your AWS account. These include possible charges for CodeBuild and for AWS resources and actions related to Amazon S3, AWS KMS, CloudWatch Logs, and Amazon EC2. For more information, see [CodeBuild pricing](#), [Amazon S3 pricing](#), [AWS Key Management Service pricing](#), [Amazon CloudWatch pricing](#), and [Amazon EC2 pricing](#).

## Running the sample

### To run this sample

1. Download and install Maven. For more information, see [Downloading Apache Maven](#) and [Installing Apache Maven](#) on the Apache Maven website.
2. Switch to an empty directory on your local computer or instance, and then run this Maven command.

```
mvn archetype:generate -DgroupId=com.mycompany.app -DartifactId=my-app -  
DarchetypeArtifactId=maven-archetype-quickstart -DinteractiveMode=false
```

If successful, this directory structure and files are created.

```
.  
### my-app  
### pom.xml  
### src  
### main  
#   ### java  
#       ### com
```

```
#           ### mycompany
#           ### app
#
### test
    ### java
        ### com
            ### mycompany
                ### app
                    ### AppTest.java
```

3. Create a file with this content. Name the file `buildspec.yml`, and then add it to the `my-app` directory.

```
version: 0.2

phases:
  install:
    runtime-versions:
      java: corretto8
  build:
    commands:
      - echo Build started on `date`
      - mvn test
  post_build:
    commands:
      - echo Build completed on `date`
      - mvn package
artifacts:
  files:
    - target/my-app-1.0-SNAPSHOT.jar
    - appspec.yml
discard-paths: yes
```

4. Create a file with this content. Name the file `appspec.yml`, and then add it to the `my-app` directory.

```
version: 0.0
os: linux
files:
  - source: ./my-app-1.0-SNAPSHOT.jar
    destination: /tmp
```

When finished, your directory structure and file should look like this.

```
.
### my-app
### buildspec.yml
### appspec.yml
### pom.xml
### SRC
    ### main
    #   ### java
    #       ### com
    #           ### mycompany
    #               ### app
    #                   ### App.java
### test
    ### java
        ### com
            ### mycompany
                ### app
                    ### AppTest.java
```

5. Create a ZIP file that contains the directory structure and files inside of my-app, and then upload the ZIP file to a source code repository type supported by AWS CodeBuild and CodeDeploy, such as an S3 input bucket or a GitHub or Bitbucket repository.

**Important**

If you want to use CodePipeline to deploy the resulting build output artifact, you cannot upload the source code to a Bitbucket repository.

Do not add my-app to the ZIP file, just the directories and files inside of my-app. The ZIP file should contain these directories and files:

```
.
```

    ### *CodeDeploySample.zip*

```
    ### buildspec.yml
    ### appspec.yml
    ### pom.xml
    ### src
        ### main
            #   ### java
            #       ### com
            #           ### mycompany
            #               ### app
            #                   ### App.java
        ### test
            ### java
                ### com
                    ### mycompany
                        ### app
                            ### AppTest.java
```

6. Create a build project by following the steps in [Create a build project \(p. 187\)](#).

If you use the AWS CLI to create the build project, the JSON-formatted input to the `create-project` command might look similar to this. (Replace the placeholders with your own values.)

```
{
    "name": "sample-codedeploy-project",
    "source": {
        "type": "S3",
        "location": "codebuild-region-ID-account-ID-input-bucket/CodeDeploySample.zip"
    },
    "artifacts": {
        "type": "S3",
        "location": "codebuild-region-ID-account-ID-output-bucket",
        "packaging": "ZIP",
        "name": "CodeDeployOutputArtifact.zip"
    },
    "environment": {
        "type": "LINUX_CONTAINER",
        "image": "aws/codebuild/standard:5.0",
        "computeType": "BUILD_GENERAL1_SMALL"
    },
    "serviceRole": "arn:aws:iam::account-ID:role/role-name",
    "encryptionKey": "arn:aws:kms:region-ID:account-ID:key/key-ID"
}
```

7. If you plan to deploy the build output artifact with CodeDeploy, follow the steps in [Run a build \(p. 271\)](#). Otherwise, skip this step. (This is because if you plan to deploy the build output artifact with CodePipeline, CodePipeline uses CodeBuild to run the build automatically.)
8. Complete the setup steps for using CodeDeploy, including:
  - Grant the user access to CodeDeploy and the AWS services and actions CodeDeploy depends on. For more information, see [Provision an user](#) in the *AWS CodeDeploy User Guide*.

- Create or identify a service role to enable CodeDeploy to identify the instances where it deploys the build output artifact. For more information, see [Creating a service role for CodeDeploy](#) in the *AWS CodeDeploy User Guide*.
  - Create or identify an IAM instance profile to enable your instances to access the S3 input bucket or GitHub repository that contains the build output artifact. For more information, see [Creating an IAM instance profile for your Amazon EC2 instances](#) in the *AWS CodeDeploy User Guide*.
9. Create or identify an Amazon Linux instance compatible with CodeDeploy where the build output artifact is deployed. For more information, see [Working with instances for CodeDeploy](#) in the *AWS CodeDeploy User Guide*.
  10. Create or identify a CodeDeploy application and deployment group. For more information, see [Creating an application with CodeDeploy](#) in the *AWS CodeDeploy User Guide*.
  11. Deploy the build output artifact to the instance.

To deploy with CodeDeploy, see [Deploying a revision with CodeDeploy](#) in the *AWS CodeDeploy User Guide*.

To deploy with CodePipeline, see [Use CodePipeline with CodeBuild \(p. 392\)](#).
  12. To find the build output artifact after the deployment is complete, sign in to the instance and look in the /tmp directory for the file named my-app-1.0-SNAPSHOT.jar.

## Related resources

- For information about getting started with AWS CodeBuild, see [Getting started with AWS CodeBuild using the console \(p. 5\)](#).
- For information about troubleshooting issues in CodeBuild, see [Troubleshooting AWS CodeBuild \(p. 410\)](#).
- For information about quotas in CodeBuild, see [Quotas for AWS CodeBuild \(p. 425\)](#).

# AWS CodePipeline integration with CodeBuild and batch builds

AWS CodeBuild now supports batch builds. This sample demonstrates how to use AWS CodePipeline to create a build project that uses batch builds.

You can use a JSON-formatted file that defines the structure of your pipeline, and then use it with the AWS CLI to create the pipeline. For more information, see [AWS CodePipeline Pipeline structure reference](#) in the *AWS CodePipeline User Guide*.

## Batch build with individual artifacts

Use the following JSON file as an example of a pipeline structure that creates a batch build with separate artifacts. To enable batch builds in CodePipeline, set the BatchEnabled parameter of the configuration object to true.

```
{  
  "pipeline": {  
    "roleArn": "arn:aws:iam::account-id:role/my-AWS-CodePipeline-service-role-name",  
    "stages": [  
      {  
        "name": "Source",  
        "actions": [  
          {  
            "inputArtifacts": []],  
            "name": "BatchBuild",  
            "actionTypeId": "AWS::CodeBuild::BatchBuild",  
            "category": "Batch",  
            "version": 1,  
            "configuration": {  
              "batchType": "1-Click",  
              "environmentVariables": [{"name": "BUILD_ID", "value": "1"}]  
            }  
          }  
        ]  
      }  
    ]  
  }  
}
```

```
"name": "Source1",
"actionTypeId": {
    "category": "Source",
    "owner": "AWS",
    "version": "1",
    "provider": "S3"
},
"outputArtifacts": [
    {
        "name": "source1"
    }
],
"configuration": {
    "S3Bucket": "<my-input-bucket-name>",
    "S3ObjectKey": "my-source-code-file-name.zip"
},
"runOrder": 1
},
{
    "inputArtifacts": [],
    "name": "Source2",
    "actionTypeId": {
        "category": "Source",
        "owner": "AWS",
        "version": "1",
        "provider": "S3"
    },
    "outputArtifacts": [
        {
            "name": "source2"
        }
    ],
    "configuration": {
        "S3Bucket": "<my-other-input-bucket-name>",
        "S3ObjectKey": "my-other-source-code-file-name.zip"
    },
    "runOrder": 1
}
],
},
{
    "name": "Build",
    "actions": [
        {
            "inputArtifacts": [
                {
                    "name": "source1"
                },
                {
                    "name": "source2"
                }
            ],
            "name": "Build",
            "actionTypeId": {
                "category": "Build",
                "owner": "AWS",
                "version": "1",
                "provider": "CodeBuild"
            },
            "outputArtifacts": [
                {
                    "name": "build1"
                },
                {
                    "name": "build1_artifact1"
                }
            ]
        }
    ]
}
```

```
{
    "name": "build1_artifact2"
},
{
    "name": "build2_artifact1"
},
{
    "name": "build2_artifact2"
}
],
"configuration": {
    "ProjectName": "my-build-project-name",
    "PrimarySource": "source1",
    "BatchEnabled": "true"
},
"runOrder": 1
}
]
},
"artifactStore": {
    "type": "S3",
    "location": "<AWS-CodePipeline-internal-bucket-name>"
},
"name": "my-pipeline-name",
"version": 1
}
}
```

The following is an example of a CodeBuild buildspec file that will work with this pipeline configuration.

```
version: 0.2
batch:
  build-list:
    - identifier: build1
      env:
        compute-type: BUILD_GENERAL1_SMALL
    - identifier: build2
      env:
        compute-type: BUILD_GENERAL1_MEDIUM

phases:
  build:
    commands:
      - echo 'file' > output_file

artifacts:
  files:
    - output_file
secondary-artifacts:
  artifact1:
    files:
      - output_file
  artifact2:
    files:
      - output_file
```

The names of the output artifacts specified in the pipeline's JSON file must match the identifier of the builds and artifacts defined in your buildspec file. The syntax is *buildIdentifier* for the primary artifacts, and *buildIdentifier\_artifactIdentifier* for the secondary artifacts.

For example, for output artifact name build1, CodeBuild will upload the primary artifact of build1 to the location of build1. For output name build1\_artifact1, CodeBuild will upload the secondary

artifact `artifact1` of build1 to the location of `build1_artifact1`, and so on. If only one output location is specified, the name should be `buildIdentifier` only.

After you create the JSON file, you can create your pipeline. Use the AWS CLI to run the `create-pipeline` command and pass the file to the `--cli-input-json` parameter. For more information, see [Create a pipeline \(CLI\)](#) in the *AWS CodePipeline User Guide*.

## Batch build with combined artifacts

Use the following JSON file as an example of a pipeline structure that creates a batch build with combined artifacts. To enable batch builds in CodePipeline, set the `BatchEnabled` parameter of the configuration object to true. To combine the build artifacts into the same location, set the `CombineArtifacts` parameter of the configuration object to true.

```
{  
  "pipeline": {  
    "roleArn": "arn:aws:iam::account-id:role/my-AWS-CodePipeline-service-role-name",  
    "stages": [  
      {  
        "name": "Source",  
        "actions": [  
          {  
            "inputArtifacts": [],  
            "name": "Source1",  
            "actionTypeId": {  
              "category": "Source",  
              "owner": "AWS",  
              "version": "1",  
              "provider": "S3"  
            },  
            "outputArtifacts": [  
              {  
                "name": "source1"  
              }  
            ],  
            "configuration": {  
              "S3Bucket": "<my-input-bucket-name>",  
              "S3ObjectKey": "my-source-code-file-name.zip"  
            },  
            "runOrder": 1  
          },  
          {  
            "inputArtifacts": [],  
            "name": "Source2",  
            "actionTypeId": {  
              "category": "Source",  
              "owner": "AWS",  
              "version": "1",  
              "provider": "S3"  
            },  
            "outputArtifacts": [  
              {  
                "name": "source2"  
              }  
            ],  
            "configuration": {  
              "S3Bucket": "<my-other-input-bucket-name>",  
              "S3ObjectKey": "my-other-source-code-file-name.zip"  
            },  
            "runOrder": 1  
          }  
        ]  
      },  
      {  
        "name": "BatchBuild",  
        "actions": [  
          {  
            "actionTypeId": {  
              "category": "BatchBuild",  
              "owner": "AWS",  
              "version": "1",  
              "provider": "CodeBuild"  
            },  
            "configuration": {  
              "batchType": "1x1",  
              "codeBuildProjectName": "my-code-build-project",  
              "outputArtifact": "source1",  
              "roleArn": "arn:aws:iam::account-id:role/my-AWS-CodePipeline-service-role-name"  
            },  
            "runOrder": 1  
          }  
        ]  
      }  
    ]  
  },  
  "configuration": {  
    "batchEnabled": true,  
    "combineArtifacts": true  
  }  
}
```

```
{
  "name": "Build",
  "actions": [
    {
      "inputArtifacts": [
        {
          "name": "source1"
        },
        {
          "name": "source2"
        }
      ],
      "name": "Build",
      "actionTypeId": {
        "category": "Build",
        "owner": "AWS",
        "version": "1",
        "provider": "CodeBuild"
      },
      "outputArtifacts": [
        {
          "name": "output1"
        }
      ],
      "configuration": {
        "ProjectName": "my-build-project-name",
        "PrimarySource": "source1",
        "BatchEnabled": "true",
        "CombineArtifacts": "true"
      },
      "runOrder": 1
    }
  ]
},
"artifactStore": {
  "type": "S3",
  "location": "<AWS-CodePipeline-internal-bucket-name>"
},
"name": "my-pipeline-name",
"version": 1
}
```

The following is an example of a CodeBuild buildspec file that will work with this pipeline configuration.

```
version: 0.2
batch:
  build-list:
    - identifier: build1
      env:
        compute-type: BUILD_GENERAL1_SMALL
    - identifier: build2
      env:
        compute-type: BUILD_GENERAL1_MEDIUM

phases:
  build:
    commands:
      - echo 'file' > output_file

artifacts:
  files:
    - output_file
```

If combined artifacts is enabled for the batch build, there is only one output allowed. CodeBuild will combine the primary artifacts of all the builds into one single ZIP file.

After you create the JSON file, you can create your pipeline. Use the AWS CLI to run the **create-pipeline** command and pass the file to the **--cli-input-json** parameter. For more information, see [Create a pipeline \(CLI\)](#) in the *AWS CodePipeline User Guide*.

## AWS CodePipeline integration with CodeBuild and multiple input sources and output artifacts sample

An AWS CodeBuild project can take more than one input source. It can also create more than one output artifact. This sample demonstrates how to use AWS CodePipeline to create a build project that uses multiple input sources to create multiple output artifacts. For more information, see [Multiple input sources and output artifacts sample \(p. 123\)](#).

You can use a JSON-formatted file that defines the structure of your pipeline, and then use it with the AWS CLI to create the pipeline. Use the following JSON file as an example of a pipeline structure that creates a build with more than one input source and more than one output artifact. Later in this sample you see how this file specifies the multiple inputs and outputs. For more information, see [CodePipeline pipeline structure reference](#) in the *AWS CodePipeline User Guide*.

```
{  
  "pipeline": {  
    "roleArn": "arn:aws:iam::account-id:role/my-AWS-CodePipeline-service-role-name",  
    "stages": [  
      {  
        "name": "Source",  
        "actions": [  
          {  
            "inputArtifacts": [],  
            "name": "Source1",  
            "actionTypeId": {  
              "category": "Source",  
              "owner": "AWS",  
              "version": "1",  
              "provider": "S3"  
            },  
            "outputArtifacts": [  
              {  
                "name": "source1"  
              }  
            ],  
            "configuration": {  
              "S3Bucket": "my-input-bucket-name",  
              "S3ObjectKey": "my-source-code-file-name.zip"  
            },  
            "runOrder": 1  
          },  
          {  
            "inputArtifacts": [],  
            "name": "Source2",  
            "actionTypeId": {  
              "category": "Source",  
              "owner": "AWS",  
              "version": "1",  
              "provider": "S3"  
            },  
            "outputArtifacts": [  
              {  
                "name": "source2"  
              }  
            ]  
          }  
        ]  
      }  
    ]  
  }  
}
```

```

        ],
        "configuration": {
            "S3Bucket": "my-other-input-bucket-name",
            "S3ObjectKey": "my-other-source-code-file-name.zip"
        },
        "runOrder": 1
    }
]
},
{
    "name": "Build",
    "actions": [
        {
            "inputArtifacts": [
                {
                    "name": "source1"
                },
                {
                    "name": "source2"
                }
            ],
            "name": "Build",
            "actionTypeId": {
                "category": "Build",
                "owner": "AWS",
                "version": "1",
                "provider": "AWS CodeBuild"
            },
            "outputArtifacts": [
                {
                    "name": "artifact1"
                },
                {
                    "name": "artifact2"
                }
            ],
            "configuration": {
                "ProjectName": "my-build-project-name",
                "PrimarySource": "source1"
            },
            "runOrder": 1
        }
    ]
},
{
    "artifactStore": {
        "type": "S3",
        "location": "AWS-CodePipeline-internal-bucket-name"
    },
    "name": "my-pipeline-name",
    "version": 1
}
}

```

In this JSON file:

- One of your input sources must be designated the PrimarySource. This source is the directory where CodeBuild looks for and runs your buildspec file. The keyword PrimarySource is used to specify the primary source in the configuration section of the CodeBuild stage in the JSON file.
- Each input source is installed in its own directory. This directory is stored in the built-in environment variable \$CODEBUILD\_SRC\_DIR for the primary source and \$CODEBUILD\_SRC\_DIR\_yourInputArtifactName for all other sources. For the pipeline in this sample, the two input source directories are \$CODEBUILD\_SRC\_DIR and

`$CODEBUILD_SRC_DIR_source2`. For more information, see [Environment variables in build environments \(p. 164\)](#).

- The names of the output artifacts specified in the pipeline's JSON file must match the names of the secondary artifacts defined in your buildspec file. This pipeline uses the following buildspec file. For more information, see [Buildspec syntax \(p. 130\)](#).

```
version: 0.2

phases:
  build:
    commands:
      - touch source1_file
      - cd $CODEBUILD_SRC_DIR_source2
      - touch source2_file

  artifacts:
    files:
      - '**/*'
    secondary-artifacts:
      artifact1:
        base-directory: $CODEBUILD_SRC_DIR
        files:
          - source1_file
      artifact2:
        base-directory: $CODEBUILD_SRC_DIR_source2
        files:
          - source2_file
```

After you create the JSON file, you can create your pipeline. Use the AWS CLI to run the `create-pipeline` command and pass the file to the `--cli-input-json` parameter. For more information, see [Create a pipeline \(CLI\)](#) in the *AWS CodePipeline User Guide*.

## Use AWS Config with CodeBuild sample

AWS Config provides an inventory of your AWS resources and a history of configuration changes to these resources. AWS Config now supports AWS CodeBuild as an AWS resource, which means the service can track your CodeBuild projects. For more information about AWS Config, see [What is AWS Config?](#) in the *AWS Config Developer Guide*.

You can see the following information about CodeBuild resources on the **Resource Inventory** page in the AWS Config console:

- A timeline of your CodeBuild configuration changes.
- Configuration details for each CodeBuild project.
- Relationships with other AWS resources.
- A list of changes to your CodeBuild projects.

The procedures in this topic show you how to set up AWS Config and look up and view CodeBuild projects.

### Topics

- [Prerequisites \(p. 64\)](#)
- [Set up AWS Config \(p. 64\)](#)
- [Look up AWS CodeBuild projects \(p. 64\)](#)
- [Viewing AWS CodeBuild configuration details in the AWS Config console \(p. 64\)](#)

## Prerequisites

Create your AWS CodeBuild project. For instructions, see [Create a build project \(p. 187\)](#).

## Set up AWS Config

- [Setting up AWS Config \(console\)](#)
- [Setting up AWS Config \(AWS CLI\)](#)

**Note**

After you complete setup, it might take up to 10 minutes before you can see AWS CodeBuild projects in the AWS Config console.

## Look up AWS CodeBuild projects

1. Sign in to the AWS Management Console and open the AWS Config console at <https://console.aws.amazon.com/config>.
2. On the **Resource inventory** page, select **AWS CodeBuild Project** under **Resource type**. Scroll down and select the **CodeBuild project** check box.
3. Choose **Look up**.
4. After the list of CodeBuild projects is added, choose the CodeBuild project name link in the **Config timeline** column.

## Viewing AWS CodeBuild configuration details in the AWS Config console

When you look up resources on the **Resource inventory** page, you can choose the AWS Config timeline to view details about your CodeBuild project. The details page for a resource provides information about the configuration, relationships, and number of changes made to that resource.

The blocks at the top of the page are collectively called the timeline. The timeline shows the date and time that the recording was made.

For more information, see [Viewing configuration details in the AWS Config console](#) in the *AWS Config Developer Guide*.

## AWS Elastic Beanstalk sample for CodeBuild

This sample uses AWS CodeBuild with Maven to produce a single WAR file named ROOT.war as the build output. This sample then deploys the WAR file to the instances in an AWS Elastic Beanstalk environment.

**Important**

Running this sample might result in charges to your AWS account. These include possible charges for CodeBuild and for AWS resources and actions related to Amazon S3, AWS KMS, CloudWatch Logs, and Amazon EC2. For more information, see [CodeBuild pricing](#), [Amazon S3 pricing](#), [AWS Key Management Service pricing](#), [Amazon CloudWatch pricing](#), and [Amazon EC2 pricing](#).

## Create the source code

In this section, you use Maven to produce the source code. Later, you use CodeBuild to build a WAR file based on this source code.

1. Download and install Maven. For information, see [Downloading Apache Maven](#) and [Installing Apache Maven](#) on the Apache Maven website.
2. Switch to an empty directory on your local computer or instance, and then run this Maven command.

```
mvn archetype:generate "-DgroupId=com.mycompany.app" "-DartifactId=ROOT" "-DarchetypeArtifactId=maven-archetype-webapp" "-DinteractiveMode=false"
```

If successful, this directory structure and files are created.

```
.  
### ROOT  
### pom.xml  
### src  
### main  
### resources  
### webapp  
### WEB-INF  
#   ### web.xml  
### index.jsp
```

3. Create a subdirectory named .ebextensions in the ROOT directory. In the .ebextensions subdirectory, create a file named fix-path.config with this content.

```
container_commands:  
fix_path:  
  command: "unzip ROOT.war 2>&1 > /var/log/my_last_deploy.log"
```

After you run Maven, continue with one of the following scenarios:

- [Scenario A: Run CodeBuild manually and deploy to Elastic Beanstalk manually \(p. 65\)](#)
- [Scenario B: Use CodePipeline to run CodeBuild and deploy to Elastic Beanstalk \(p. 67\)](#)
- [Scenario C: Use the Elastic Beanstalk CLI to run AWS CodeBuild and deploy to an Elastic Beanstalk environment \(p. 69\)](#)

## Scenario A: Run CodeBuild manually and deploy to Elastic Beanstalk manually

In this scenario, you create and upload the source code. You then use the AWS CodeBuild and AWS Elastic Beanstalk consoles to build the source code, create an Elastic Beanstalk application and environment, and deploy the build output to the environment.

### Step a1: Add files to the source code

In this step, you add an Elastic Beanstalk configuration file and a buildspec file to the code in [Create the source code \(p. 64\)](#). You then upload the source code to an S3 input bucket or a CodeCommit, GitHub, or Bitbucket repository.

1. Create a file named buildspec.yml with the following contents. Store the file in the ROOT directory.

```
version: 0.2  
  
phases:  
  install:
```

```
runtime-versions:  
  java: corretto11  
post_build:  
  commands:  
    - mvn package  
    - mv target/ROOT.war ROOT.war  
artifacts:  
  files:  
    - ROOT.war  
    - .ebextensions/**/*
```

2. Your file structure should now look like this.

```
.  
### ROOT  
### .ebextensions  
#   ### fix-path.config  
### src  
#   ### main  
#       ### resources  
#       ### webapp  
#           ### WEB-INF  
#               #   ### web.xml  
#               #   ### index.jsp  
### buildspec.yml  
### pom.xml
```

3. Upload the contents of the ROOT directory to an S3 input bucket or a CodeCommit, GitHub, or Bitbucket repository.

**Important**

Do not upload ROOT, just the directories and files in ROOT.

If you are using an S3 input bucket, it must be versioned. Be sure to create a ZIP file that contains the directory structure and files, and then upload it to the input bucket. Do not add ROOT to the ZIP file, just the directories and files in ROOT. For more information, see [How to Configure Versioning on a Bucket](#) in the *Amazon S3 Developer Guide*.

## Step a2: Create the build project and run the build

In this step, you use the AWS CodeBuild console to create a build project and then run a build.

1. Create or choose an S3 output bucket to store the build output. If you're storing the source code in an S3 input bucket, the output bucket must be in the same AWS region as the input bucket.
2. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.

Use the AWS region selector to choose an AWS Region where CodeBuild is supported. This must be the same Region where your S3 output bucket is stored.

3. Create a build project and then run a build. For more information, see [Create a build project \(console\) \(p. 188\)](#) and [Run a build \(console\) \(p. 272\)](#). Leave all settings at their default values, except for these settings.

- **For Environment:**

- For **Environment image**, choose **Managed image**.
- For **Operating system**, choose **Amazon Linux 2**.
- For **Runtime(s)**, choose **Standard**.
- For **Image**, choose **aws/codebuild/amazonlinux2-x86\_64-standard:4.0**.

- **For Artifacts:**

- For **Type**, choose **Amazon S3**.

- For **Bucket name**, enter the name of an S3 bucket.
- For **Name**, enter a build output file name that's easy for you to remember. Include the `.zip` extension.
- For **Artifacts packaging**, choose **Zip**.

### Step a3: Create the application and environment and deploy

In this step, you use the AWS Elastic Beanstalk console to create an application and environment. As part of creating the environment, you deploy the build output from the previous step to the environment.

1. Open the AWS Elastic Beanstalk console at <https://console.aws.amazon.com/elasticbeanstalk>. Use the AWS Region selector to choose the AWS Region where your S3 output bucket is stored.
2. Create an Elastic Beanstalk application. For more information, see [Managing and configuring AWS Elastic Beanstalk applications](#) in the *AWS Elastic Beanstalk Developer Guide*.
3. Create an Elastic Beanstalk environment for this application. For more information, see [The create new environment wizard](#) in the *AWS Elastic Beanstalk Developer Guide*. Leave all settings at their default values, except for these settings.
  - For **Platform**, choose **Tomcat**.
  - For **Application code**, choose **Upload your code**, and then choose **Upload**. For **Source code origin**, choose **Public S3 URL**, and then enter the full URL to the build output ZIP file in the output bucket. Choose **Upload**.
4. After Elastic Beanstalk deploys the build output to the environment, you can see the results in a web browser. Go to the environment URL for the instance (for example, `http://my-environment-name.random-string.region-ID.elasticbeanstalk.com`). The web browser should display the text `Hello World!`.

## Scenario B: Use CodePipeline to run CodeBuild and deploy to Elastic Beanstalk

In this scenario, you complete the steps to prepare and upload the source code. You create a build project with CodeBuild and an Elastic Beanstalk application and environment with the AWS Elastic Beanstalk console. You then use the AWS CodePipeline console to create a pipeline. After you create the pipeline, CodePipeline builds the source code and deploys the build output to the environment.

### Step b1: Add a buildspec file to the source code

In this step, you create and add a buildspec file to the code you created in [Create the source code \(p. 64\)](#). You then upload the source code to an S3 input bucket or a CodeCommit, GitHub, or Bitbucket repository.

1. Create a file named `buildspec.yml` with the following contents. Store the file in the `ROOT` directory.

```
version: 0.2

phases:
  install:
    runtime-versions:
      java: corretto11
  post_build:
    commands:
      - mvn package
      - mv target/ROOT.war ROOT.war
```

```
artifacts:  
  files:  
    - ROOT.war  
    - .ebextensions/**/*
```

2. Your file structure should now look like this.

```
.  
### ROOT  
### .ebextensions  
#   ### fix-path.config  
### src  
#   ### main  
#       ### resources  
#           ### webapp  
#               ### WEB-INF  
#                   #   ### web.xml  
#                       ### index.jsp  
### buildspec.yml  
### pom.xml
```

3. Upload the contents of the ROOT directory to an S3 input bucket or a CodeCommit, GitHub, or Bitbucket repository.

**Important**

Do not upload ROOT, just the directories and files in ROOT.

If you are using an S3 input bucket, it must be versioned. Be sure to create a ZIP file that contains the directory structure and files, and then upload it to the input bucket. Do not add ROOT to the ZIP file, just the directories and files in ROOT. For more information, see [How to Configure Versioning on a Bucket](#) in the *Amazon S3 Developer Guide*.

## Step b2: Create a build project

In this step, you create an AWS CodeBuild build project to use with your pipeline.

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. Create a build project. For more information, see [Create a build project \(console\) \(p. 188\)](#) and [Run a build \(console\) \(p. 272\)](#). Leave all settings at their default values, except for these settings.
  - For **Environment**:
    - For **Environment image**, choose **Managed image**.
    - For **Operating system**, choose **Amazon Linux 2**.
    - For **Runtime(s)**, choose **Standard**.
    - For **Image**, choose **aws/codebuild/amazonlinux2-x86\_64-standard:4.0**.
  - For **Artifacts**:
    - For **Type**, choose **Amazon S3**.
    - For **Bucket name**, enter the name of an S3 bucket.
    - For **Name**, enter a build output file name that's easy for you to remember. Include the **.zip** extension.
    - For **Artifacts packaging**, choose **Zip**.

## Step b3: Create an Elastic Beanstalk application and environment

In this step, you create an Elastic Beanstalk application and environment to use with CodePipeline.

1. Open the Elastic Beanstalk console at <https://console.aws.amazon.com/elasticbeanstalk/>.

2. Use the AWS Elastic Beanstalk console to create an application. For more information, see [Managing and configuring AWS Elastic Beanstalk applications](#) in the *AWS Elastic Beanstalk Developer Guide*.
3. Use the AWS Elastic Beanstalk console to create an environment. For more information, see [The create new environment wizard](#) in the *AWS Elastic Beanstalk Developer Guide*. Except for **Platform**, leave all settings at their default values. For **Platform**, choose **Tomcat**.

## Step b4: Create the pipeline and deploy

In this step, you use the AWS CodePipeline console to create a pipeline. After you create and run the pipeline, CodePipeline uses CodeBuild to build the source code. CodePipeline then uses Elastic Beanstalk to deploy the build output to the environment.

1. Create or identify a service role that CodePipeline, CodeBuild, and Elastic Beanstalk can use to access resources on your behalf. For more information, see [Prerequisites \(p. 392\)](#).
2. Open the CodePipeline console at <https://console.aws.amazon.com/codesuite/codepipeline/home>.

Use the AWS Region selector to choose an AWS Region where CodeBuild is supported. If you're storing the source code in an S3 input bucket, the output bucket must be in the same AWS region as the input bucket.

3. Create a pipeline. For information, see [Create a pipeline that uses CodeBuild \(CodePipeline console\) \(p. 394\)](#). Leave all settings at their default values, except for these settings.
  - On **Add build stage**, for **Build provider**, choose **AWS CodeBuild**. For **Project name**, choose the build project you just created.
  - On **Add deploy stage**, for **Deploy provider**, choose **AWS Elastic Beanstalk**.
    - For **Application name**, choose the Elastic Beanstalk application you just created.
    - For **Environment name**, choose the environment you just created.
4. After the pipeline has run successfully, you can see the results in a web browser. Go to the environment URL for the instance (for example, `http://my-environment-name.random-string.region-ID.elasticbeanstalk.com`). The web browser should display the text Hello World!.

Now, whenever you make changes to the source code and upload those changes to the original S3 input bucket or to the CodeCommit, GitHub, or Bitbucket repository, CodePipeline detects the change and runs the pipeline again. This causes CodeBuild to rebuild the code and then causes Elastic Beanstalk to deploy the rebuilt output to the environment.

## Scenario C: Use the Elastic Beanstalk CLI to run AWS CodeBuild and deploy to an Elastic Beanstalk environment

In this scenario, you complete the steps to prepare and upload the source code. You then run the Elastic Beanstalk CLI to create an Elastic Beanstalk application and environment, use CodeBuild to build the source code, and then deploy the build output to the environment. For more information, see [Using the EB CLI with CodeBuild](#) in the *AWS Elastic Beanstalk Developer Guide*.

## Step c1: Add files to the source code

In this step, you add an Elastic Beanstalk configuration file and a buildspec file to the code you created in [Create the source code \(p. 64\)](#). You also create or identify a service role for the buildspec file.

1. Create or identify a service role that Elastic Beanstalk and the CLI can use on your behalf. For information, see [Create a CodeBuild service role \(p. 381\)](#).

2. Create a file named `buildspec.yml` with the following contents. Store the file in the ROOT directory.

```
version: 0.2

phases:
  install:
    runtime-versions:
      java: corretto11
  post_build:
    commands:
      - mvn package
      - mv target/ROOT.war ROOT.war
artifacts:
  files:
    - ROOT.war
    - .ebextensions/**/*
eb_codebuild_settings:
  CodeBuildServiceRole: my-service-role-name
  ComputeType: BUILD_GENERAL1_SMALL
  Image: aws/codebuild/standard:5.0
  Timeout: 60
```

In the preceding code, replace *my-service-role-name* with the name of the service role you created or identified earlier.

3. Your file structure should now look like this.

```
.
### ROOT
### .ebextensions
#   ### fix-path.config
### src
#   ### main
#     ### resources
#       ### webapp
#         ### WEB-INF
#           #   ### web.xml
#             ### index.jsp
### buildspec.yml
### pom.xml
```

## Step c2: Install and run the EB CLI

1. If you have not already done so, install and configure the EB CLI on the same computer or instance where you created the source code. For information, see [Install the Elastic Beanstalk command line interface \(EB CLI\)](#) and [Configure the EB CLI](#) in the *AWS Elastic Beanstalk Developer Guide*.
2. From the command line or terminal, run the `cd` command or similar to switch to your (*root directory name*)/ROOT directory. Run the `eb init` command to configure the EB CLI.

```
eb init
```

When prompted:

- Choose an AWS Region where AWS CodeBuild is supported and where you want to create your Elastic Beanstalk application and environment.
- Create an Elastic Beanstalk application, and enter a name for the application.

- Choose the Tomcat platform.
  - Choose the Tomcat 8 Java 8 version.
  - Choose whether you want to use SSH to set up access to your environment's instances.
3. From the same directory, run the **eb create** command to create an Elastic Beanstalk environment.

```
eb create
```

When prompted:

- Enter the name for the environment or accept the suggested name.
  - Enter the DNS CNAME prefix for the environment or accept the suggested value.
  - For this sample, accept the Classic load balancer type.
4. After you run the **eb create** command, the EB CLI does the following:
1. Creates a ZIP file from the source code and then uploads the ZIP file to an S3 bucket in your account.
  2. Creates an Elastic Beanstalk application and application version.
  3. Creates a CodeBuild project.
  4. Runs a build based on the new project.
  5. Deletes the project after the build is complete.
  6. Creates an Elastic Beanstalk environment.
  7. Deploys the build output to the environment.
5. After the EB CLI deploys the build output to the environment, you can see the results in a web browser. Go to the environment URL for the instance (for example, <http://my-environment-name.random-string.region-ID.elasticbeanstalk.com>). The web browser should display the text Hello World!.

If you want, you can make changes to the source code and then run the **eb deploy** command from the same directory. The EB CLI performs the same steps as the **eb create** command, but it deploys the build output to the existing environment instead of creating a new environment.

## Related resources

- For information about getting started with AWS CodeBuild, see [Getting started with AWS CodeBuild using the console \(p. 5\)](#).
- For information about troubleshooting issues in CodeBuild, see [Troubleshooting AWS CodeBuild \(p. 410\)](#).
- For information about quotas in CodeBuild, see [Quotas for AWS CodeBuild \(p. 425\)](#).

## Bitbucket pull request and webhook filter sample for CodeBuild

AWS CodeBuild supports webhooks when the source repository is Bitbucket. This means that for a CodeBuild build project that has its source code stored in a Bitbucket repository, webhooks can be used to rebuild the source code every time a code change is pushed to the repository. For more information, see [Bitbucket webhook events \(p. 224\)](#).

This sample shows you how to create a pull request using a Bitbucket repository. It also shows you how to use a Bitbucket webhook to trigger CodeBuild to create a build of a project.

**Note**

When using webhooks, it is possible for a user to trigger an unexpected build. To mitigate this risk, see [Best practices for using webhooks \(p. 224\)](#).

**Topics**

- [Prerequisites \(p. 72\)](#)
- [Create a build project with Bitbucket as the source repository and enable webhooks \(p. 72\)](#)
- [Trigger a build with a Bitbucket webhook \(p. 74\)](#)

## Prerequisites

To run this sample you must connect your AWS CodeBuild project with your Bitbucket account.

**Note**

CodeBuild has updated its permissions with Bitbucket. If you previously connected your project to Bitbucket and now receive a Bitbucket connection error, you must reconnect to grant CodeBuild permission to manage your webhooks.

## Create a build project with Bitbucket as the source repository and enable webhooks

The following steps describe how to create an AWS CodeBuild project with Bitbucket as a source repository and enable webhooks.

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. If a CodeBuild information page is displayed, choose **Create build project**. Otherwise, on the navigation pane, expand **Build**, choose **Build projects**, and then choose **Create build project**.
3. Choose **Create build project**.
4. In **Project configuration**:

**Project name**

Enter a name for this build project. Build project names must be unique across each AWS account. You can also include an optional description of the build project to help other users understand what this project is used for.

5. In **Source**:

**Source provider**

Choose **Bitbucket**. Follow the instructions to connect (or reconnect) with Bitbucket and then choose **Authorize**.

**Repository**

Choose **Repository in my Bitbucket account**.

If you have not previously connected to your Bitbucket account, enter your Bitbucket username and app password, and select **Save Bitbucket credentials**.

**Bitbucket repository**

Enter the URL for your Bitbucket repository.

6. In **Primary source webhook events**, select the following.

**Note**

The **Primary source webhook events** section is only visible if you chose **Repository in my Bitbucket account** in the previous step.

1. Select **Rebuild every time a code change is pushed to this repository** when you create your project.
2. From **Event type**, choose one or more events.
3. To filter when an event triggers a build, under **Start a build under these conditions**, add one or more optional filters.
4. To filter when an event is not triggered, under **Don't start a build under these conditions**, add one or more optional filters.
5. Choose **Add filter group** to add another filter group, if needed.

For more information about Bitbucket webhook event types and filters, see [Bitbucket webhook events \(p. 224\)](#).

7. In **Environment**:

**Environment image**

Choose one of the following:

To use a Docker image managed by AWS CodeBuild:

Choose **Managed image**, and then make selections from **Operating system**, **Runtime(s)**, **Image**, and **Image version**. Make a selection from **Environment type** if it is available.

To use another Docker image:

Choose **Custom image**. For **Environment type**, choose **ARM**, **Linux**, **Linux GPU**, or **Windows**. If you choose **Other registry**, for **External registry URL**, enter the name and tag of the Docker image in Docker Hub, using the format `docker repository/docker image name`. If you choose **Amazon ECR**, use **Amazon ECR repository** and **Amazon ECR image** to choose the Docker image in your AWS account.

To use a private Docker image:

Choose **Custom image**. For **Environment type**, choose **ARM**, **Linux**, **Linux GPU**, or **Windows**. For **Image registry**, choose **Other registry**, and then enter the ARN of the credentials for your private Docker image. The credentials must be created by Secrets Manager. For more information, see [What Is AWS Secrets Manager?](#) in the *AWS Secrets Manager User Guide*.

**Service role**

Choose one of the following:

- If you do not have a CodeBuild service role, choose **New service role**. In **Role name**, enter a name for the new role.
- If you have a CodeBuild service role, choose **Existing service role**. In **Role ARN**, choose the service role.

**Note**

When you use the console to create or update a build project, you can create a CodeBuild service role at the same time. By default, the role works with that build project only. If you use the console to associate this service role with another build project, the role is updated to work with the other build project. A service role can work with up to 10 build projects.

8. In **Buildspec**, do one of the following:

- Choose **Use a buildspec file** to use the buildspec.yml file in the source code root directory.
- Choose **Insert build commands** to use the console to insert build commands.

For more information, see the [Buildspec reference \(p. 129\)](#).

9. In **Artifacts**:

**Type**

Choose one of the following:

- If you do not want to create build output artifacts, choose **No artifacts**.
- To store the build output in an S3 bucket, choose **Amazon S3**, and then do the following:
  - If you want to use your project name for the build output ZIP file or folder, leave **Name** blank. Otherwise, enter the name. By default, the artifact name is the project name. If you want to use a different name, enter it in the artifacts name box. If you want to output a ZIP file, include the zip extension.
  - For **Bucket name**, choose the name of the output bucket.
  - If you chose **Insert build commands** earlier in this procedure, for **Output files**, enter the locations of the files from the build that you want to put into the build output ZIP file or folder. For multiple locations, separate each location with a comma (for example, `appspec.yml, target/my-app.jar`). For more information, see the description of [files in Buildspec syntax \(p. 130\)](#).

**Additional configuration**

Expand **Additional configuration** and set options as appropriate.

10. Choose **Create build project**. On the **Review** page, choose **Start build** to run the build.

## Trigger a build with a Bitbucket webhook

For a project that uses Bitbucket webhooks, AWS CodeBuild creates a build when the Bitbucket repository detects a change in your source code.

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. On the navigation pane, choose **Build projects**, and then choose a project associated with a Bitbucket repository with webhooks. For information about creating a Bitbucket webhook project, see [the section called "Create a build project with Bitbucket as the source repository and enable webhooks" \(p. 72\)](#).
3. Make some changes in the code in your project's Bitbucket repository.
4. Create a pull request on your Bitbucket repository. For more information, see [Making a pull request](#).
5. On the Bitbucket webhooks page, choose **View request** to see a list of recent events.
6. Choose **View details** to see details about the response returned by CodeBuild. It might look something like this:

```
"response":"Webhook received and build started: https://us-east-1.console.aws.amazon.com/codebuild/home..."  
"statusCode":200
```

7. Navigate to the Bitbucket pull request page to see the status of the build.

## Build badges sample with CodeBuild

AWS CodeBuild now supports the use of build badges, which provide an embeddable, dynamically generated image (*badge*) that displays the status of the latest build for a project. This image is accessible through a publicly available URL generated for your CodeBuild project. This allows anyone to view the

status of a CodeBuild project. Build badges do not contain any security information, so they do not require authentication.

## Create a build project with build badges enabled (console)

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. If a CodeBuild information page is displayed, choose **Create build project**. Otherwise, on the navigation pane, expand **Build**, choose **Build projects**, and then choose **Create build project**.
3. In **Project name**, enter a name for this build project. Build project names must be unique across each AWS account. You can also include an optional description of the build project to help other users understand what this project is used for.
4. In **Source**, for **Source provider**, choose the source code provider type, and then do one of the following:

### Note

CodeBuild does not support build badges with the Amazon S3 source provider. Because AWS CodePipeline uses Amazon S3 for artifact transfers, build badges are not supported for build projects that are part of a pipeline created in CodePipeline.

- If you chose **CodeCommit**, then for **Repository**, choose the name of the repository. Select **Enable build badge** to make your project's build status visible and embeddable.
- If you chose **GitHub**, follow the instructions to connect (or reconnect) with GitHub. On the GitHub **Authorize application** page, for **Organization access**, choose **Request access** next to each repository you want AWS CodeBuild to be able to access. After you choose **Authorize application**, back in the AWS CodeBuild console, for **Repository**, choose the name of the repository that contains the source code. Select **Enable build badge** to make your project's build status visible and embeddable.
- If you chose **Bitbucket**, follow the instructions to connect (or reconnect) with Bitbucket. On the Bitbucket **Confirm access to your account** page, for **Organization access**, choose **Grant access**. After you choose **Grant access**, back in the AWS CodeBuild console, for **Repository**, choose the name of the repository that contains the source code. Select **Enable build badge** to make your project's build status visible and embeddable.

### Important

Updating your project source might affect the accuracy of the project's build badges.

5. In **Environment**:

For **Environment image**, do one of the following:

- To use a Docker image managed by AWS CodeBuild, choose **Managed image**, and then make selections from **Operating system**, **Runtime(s)**, **Image**, and **Image version**. Make a selection from **Environment type** if it is available.
- To use another Docker image, choose **Custom image**. For **Environment type**, choose **ARM**, **Linux**, **Linux GPU**, or **Windows**. If you choose **Other registry**, for **External registry URL**, enter the name and tag of the Docker image in Docker Hub, using the format `docker repository/docker image name`. If you choose **Amazon ECR**, use **Amazon ECR repository** and **Amazon ECR image** to choose the Docker image in your AWS account.
- To use a private Docker image, choose **Custom image**. For **Environment type**, choose **ARM**, **Linux**, **Linux GPU**, or **Windows**. For **Image registry**, choose **Other registry**, and then enter the ARN of the credentials for your private Docker image. The credentials must be created by Secrets Manager. For more information, see [What Is AWS Secrets Manager?](#) in the *AWS Secrets Manager User Guide*.

6. In **Service role**, do one of the following:

- If you do not have a CodeBuild service role, choose **New service role**. In **Role name**, enter a name for the new role.

- If you have a CodeBuild service role, choose **Existing service role**. In **Role ARN**, choose the service role.

**Note**

When you use the console to create or update a build project, you can create a CodeBuild service role at the same time. By default, the role works with that build project only. If you use the console to associate this service role with another build project, the role is updated to work with the other build project. A service role can work with up to 10 build projects.

7. In **Buildspec**, do one of the following:

- Choose **Use a buildspec file** to use the buildspec.yml file in the source code root directory.
- Choose **Insert build commands** to use the console to insert build commands.

For more information, see the [Buildspec reference \(p. 129\)](#).

8. In **Artifacts**, for **Type**, do one of the following:

- If you do not want to create build output artifacts, choose **No artifacts**.
- To store the build output in an S3 bucket, choose **Amazon S3**, and then do the following:
  - If you want to use your project name for the build output ZIP file or folder, leave **Name** blank. Otherwise, enter the name. By default, the artifact name is the project name. If you want to use a different name, enter it in the artifacts name box. If you want to output a ZIP file, include the zip extension.
  - For **Bucket name**, choose the name of the output bucket.
  - If you chose **Insert build commands** earlier in this procedure, for **Output files**, enter the locations of the files from the build that you want to put into the build output ZIP file or folder. For multiple locations, separate each location with a comma (for example, appspec.yml, target/my-app.jar). For more information, see the description of files in [Buildspec syntax \(p. 130\)](#).

9. Expand **Additional configuration** and choose options as appropriate.

10. Choose **Create build project**. On the **Review** page, choose **Start build** to run the build.

## Create a build project with build badges enabled (CLI)

For information about creating a build project, see [Create a build project \(AWS CLI\) \(p. 198\)](#). To include build badges with your AWS CodeBuild project, you must specify **badgeEnabled** with a value of **true**.

## Access your AWS CodeBuild build badges

You can use AWS CodeBuild console or the AWS CLI to access build badges.

- In the CodeBuild console, in the list of build projects, in the **Name** column, choose the link that corresponds to the build project. On the **Build project: *project-name*** page, in **Configuration**, choose **Copy badge URL**. For more information, see [View a build project's details \(console\) \(p. 214\)](#).
- In the AWS CLI, run the batch-get-projects command. The build badge URL is included in the project environment details section of the output. For more information, see [View a build project's details \(AWS CLI\) \(p. 215\)](#).

The build badge request URL is generated with a common default branch, but you can specify any branch in your source repository that you have used to run a build. For example:

```
https://codebuild.us-east-1.amazonaws.com/badges?uuid=...&branch=<branch>
```

You can also specify a tag from your source repository by substituting the branch parameter with the tag parameter in the badge URL. For example:

```
https://codebuild.us-east-1.amazonaws.com/badges?uuid=...&tag=<tag>
```

## Publish your CodeBuild build badges

You can display the status of the latest build in a markdown file using your build badge URL in a markdown image. This is useful to display the status of the most recent build in the `readme.md` file in your source repository (for example, GitHub or CodeCommit). For example:

```

```

## CodeBuild badge statuses

- **PASSING** The most recent build on the given branch passed.
- **FAILING** The most recent build on the given branch timed out, failed, faulted, or was stopped.
- **IN\_PROGRESS** The most recent build on the given branch is in progress.
- **UNKNOWN** The project has not yet run a build for the given branch or at all. Also, the build badges feature might have been disabled.

## Build notifications sample for CodeBuild

Amazon CloudWatch Events has built-in support for AWS CodeBuild. CloudWatch Events is a stream of system events describing changes in your AWS resources. With CloudWatch Events, you write declarative rules to associate events of interest with automated actions to be taken. This sample uses Amazon CloudWatch Events and Amazon Simple Notification Service (Amazon SNS) to send build notifications to subscribers whenever builds succeed, fail, go from one build phase to another, or any combination of these events.

### Important

Running this sample might result in charges to your AWS account. These include possible charges for CodeBuild and for AWS resources and actions related to Amazon CloudWatch and Amazon SNS. For more information, see [CodeBuild pricing](#), [Amazon CloudWatch pricing](#), and [Amazon SNS pricing](#).

## Running the sample

### To run this sample

1. If you already have a topic set up and subscribed to in Amazon SNS that you want to use for this sample, skip ahead to step 4. Otherwise, if you are using an IAM user instead of an AWS root account or an administrator user to work with Amazon SNS, add the following statement (between `### BEGIN ADDING STATEMENT HERE ###` and `### END ADDING STATEMENT HERE ###`) to the user (or IAM group the user is associated with). Using an AWS root account is not recommended. This statement enables viewing, creating, subscribing, and testing the sending of notifications to topics in Amazon SNS. Ellipses (...) are used for brevity and to help you locate where to add the statement. Do not remove any statements, and do not type these ellipses into the existing policy.

```
{  
    "Statement": [  
        ### BEGIN ADDING STATEMENT HERE ###  
        ### END ADDING STATEMENT HERE ###  
    ]  
}
```

```
{  
    "Action": [  
        "sns:CreateTopic",  
        "sns:GetTopicAttributes",  
        "sns>List*",  
        "sns:Publish",  
        "sns:SetTopicAttributes",  
        "sns:Subscribe"  
    ],  
    "Resource": "*",  
    "Effect": "Allow"  
},  
    ### END ADDING STATEMENT HERE ###  
...  
,  
    "Version": "2012-10-17"  
}
```

**Note**

The IAM entity that modifies this policy must have permission in IAM to modify policies. For more information, see [Editing customer managed policies](#) or the "To edit or delete an inline policy for a group, user, or role" section in [Working with inline policies \(console\)](#) in the *IAM User Guide*.

2. Create or identify a topic in Amazon SNS. AWS CodeBuild uses CloudWatch Events to send build notifications to this topic through Amazon SNS.

To create a topic:

1. Open the Amazon SNS console at <https://console.aws.amazon.com/sns>.
2. Choose **Create topic**.
3. In **Create new topic**, for **Topic name**, enter a name for the topic (for example, **CodeBuildDemoTopic**). (If you choose a different name, substitute it throughout this sample.)
4. Choose **Create topic**.
5. On the **Topic details: CodeBuildDemoTopic** page, copy the **Topic ARN** value. You need this value for the next step.

# Topic detail

**Publish to topic**

**Topic ARN**

**Topic owner**

**Region**

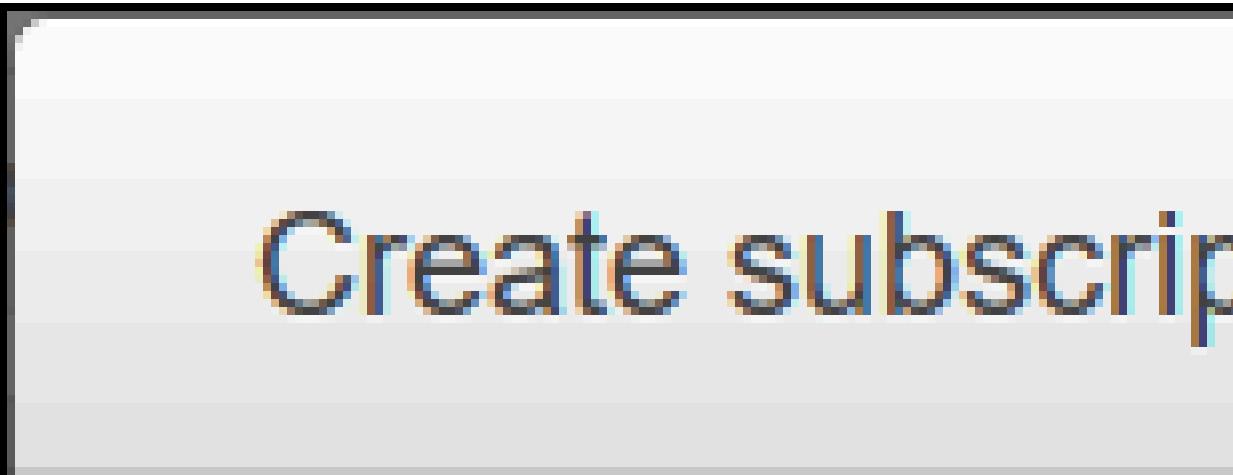
**Display name**

For more information, see [Create a topic](#) in the *Amazon SNS Developer Guide*.

3. Subscribe one or more recipients to the topic to receive email notifications.

To subscribe a recipient to a topic:

1. With the Amazon SNS console open from the previous step, in the navigation pane, choose **Subscriptions**, and then choose **Create subscription**.
2. In **Create subscription**, for **Topic ARN**, paste the topic ARN you copied from the previous step.
3. For **Protocol**, choose **Email**.
4. For **Endpoint**, enter the recipient's full email address.



Create subscription

Topic A

Protocol

Endpoint

5. Choose **Create Subscription**.
6. Amazon SNS sends a subscription confirmation email to the recipient. To begin receiving email notifications, the recipient must choose the **Confirm subscription** link in the subscription confirmation email. After the recipient clicks the link, if successfully subscribed, Amazon SNS displays a confirmation message in the recipient's web browser.

For more information, see [Subscribe to a topic](#) in the *Amazon SNS Developer Guide*.

4. If you are using an user instead of an AWS root account or an administrator user to work with CloudWatch Events, add the following statement (between **### BEGIN ADDING STATEMENT HERE ###** and **### END ADDING STATEMENT HERE ###**) to the user (or IAM group the user is associated with). Using an AWS root account is not recommended. This statement is used to allow the user to work with CloudWatch Events. Ellipses (...) are used for brevity and to help you locate where to add the statement. Do not remove any statements, and do not type these ellipses into the existing policy.

```
{  
  "Statement": [  
    "### BEGIN ADDING STATEMENT HERE ###"  
    {  
      "Action": [  
        "events:*",  
        "iam:PassRole"  
      ],  
      "Resource": "*",  
      "Effect": "Allow"  
    },  
    "### END ADDING STATEMENT HERE ###"  
    ...  
  ],  
  "Version": "2012-10-17"  
}
```

#### Note

The IAM entity that modifies this policy must have permission in IAM to modify policies. For more information, see [Editing customer managed policies](#) or the "To edit or delete an inline policy for a group, user, or role" section in [Working with inline policies \(console\)](#) in the *IAM User Guide*.

5. Create a rule in CloudWatch Events. To do this, open the CloudWatch console, at <https://console.aws.amazon.com/cloudwatch>.
6. In the navigation pane, under **Events**, choose **Rules**, and then choose **Create rule**.
7. On the **Step 1: Create rule page**, **Event Pattern** and **Build event pattern to match events by service** should already be selected.
8. For **Service Name**, choose **CodeBuild**. For **Event Type**, **All Events** should already be selected.
9. The following code should be displayed in **Event Pattern Preview**:

```
{  
  "source": [  
    "aws.codebuild"  
  ]  
}
```

10. Choose **Edit** and replace the code in **Event Pattern Preview** with one of the following two rule patterns.

This first rule pattern triggers an event when a build starts or completes for the specified build projects in AWS CodeBuild.

```
{  
  "source": [  
    "aws.codebuild"  
,  
  "detail-type": [  
    "CodeBuild Build State Change"  
,  
  "detail": {  
    "build-status": [  
      "IN_PROGRESS",  
      "SUCCEEDED",  
      "FAILED",  
      "STOPPED"  
,  
    "project-name": [  
      "my-demo-project-1",  
      "my-demo-project-2"  
,  
    ]  
  }  
}
```

In the preceding rule, make the following code changes as needed.

- To trigger an event when a build starts or completes, either leave all of the values as shown in the build-status array, or remove the build-status array altogether.
- To trigger an event only when a build completes, remove IN\_PROGRESS from the build-status array.
- To trigger an event only when a build starts, remove all of the values except IN\_PROGRESS from the build-status array.
- To trigger events for all build projects, remove the project-name array altogether.
- To trigger events only for individual build projects, specify the name of each build project in the project-name array.

This second rule pattern triggers an event whenever a build moves from one build phase to another for the specified build projects in AWS CodeBuild.

```
{  
  "source": [  
    "aws.codebuild"  
,  
  "detail-type": [  
    "CodeBuild Build Phase Change"  
,  
  "detail": {  
    "completed-phase": [  
      "SUBMITTED",  
      "PROVISIONING",  
      "DOWNLOAD_SOURCE",  
      "INSTALL",  
      "PRE_BUILD",  
      "BUILD",  
      "POST_BUILD",  
      "UPLOAD_ARTIFACTS",  
      "FINALIZING"  
,  
    "completed-phase-status": [  
      "PENDING",  
      "IN_PROGRESS",  
      "SUCCEEDED",  
      "FAILED",  
      "STOPPED"  
,  
    ]  
  }  
}
```

```
"TIMED_OUT",
"STOPPED",
"FAILED",
"SUCCEEDED",
"FAULT",
"CLIENT_ERROR"
],
"project-name": [
"my-demo-project-1",
"my-demo-project-2"
]
}
```

In the preceding rule, make the following code changes as needed.

- To trigger an event for every build phase change (which might send up to nine notifications for each build), either leave all of the values as shown in the completed-phase array, or remove the completed-phase array altogether.
- To trigger events only for individual build phase changes, remove the name of each build phase in the completed-phase array that you do not want to trigger an event for.
- To trigger an event for every build phase status change, either leave all of the values as shown in the completed-phase-status array, or remove the completed-phase-status array altogether.
- To trigger events only for individual build phase status changes, remove the name of each build phase status in the completed-phase-status array that you do not want to trigger an event for.
- To trigger events for all build projects, remove the project-name array.
- To trigger events for individual build projects, specify the name of each build project in the project-name array.

For more information about event patterns, see [Event Patterns](#) in the Amazon EventBridge User Guide.

For more information about filtering with event patterns, see [Content-based Filtering with Event Patterns](#) in the Amazon EventBridge User Guide.

**Note**

If you want to trigger events for both build state changes and build phase changes, you must create two separate rules: one for build state changes and another for build phase changes. If you try to combine both rules into a single rule, the combined rule might produce unexpected results or stop working altogether.

When you have finished replacing the code, choose **Save**.

11. For **Targets**, choose **Add target**.
12. In the list of targets, choose **SNS topic**.
13. For **Topic**, choose the topic you identified or created earlier.
14. Expand **Configure input**, and then choose **Input Transformer**.
15. In the **Input Path** box, enter one of the following input paths.

For a rule with a detail-type value of CodeBuild Build State Change, enter the following.

```
{"build-id":("$.detail.build-id", "project-name":("$.detail.project-name", "build-status":("$.detail.build-status")})
```

For a rule with a detail-type value of CodeBuild Build Phase Change, enter the following.

```
{"build-id": "$.detail.build-id", "project-name": "$.detail.project-name", "completed-phase": "$.detail.completed-phase", "completed-phase-status": "$.detail.completed-phase-status"}
```

To get other types of information, see the [Build notifications input format reference \(p. 85\)](#).

16. In the **Input Template** box, enter one of the following input templates.

For a rule with a detail-type value of CodeBuild Build State Change, enter the following.

```
"Build '<build-id>' for build project '<project-name>' has reached the build status of '<build-status>'."
```

For a rule with a detail-type value of CodeBuild Build Phase Change, enter the following.

```
"Build '<build-id>' for build project '<project-name>' has completed the build phase of '<completed-phase>' with a status of '<completed-phase-status>'."
```

17. Choose **Configure details**.
18. On the **Step 2: Configure rule details** page, enter a name and an optional description. For **State**, leave **Enabled** selected.
19. Choose **Create rule**.
20. Create build projects, run the builds, and view build information by following the steps in [Run CodeBuild directly \(p. 391\)](#).
21. Confirm that CodeBuild is now successfully sending build notifications. For example, check to see if the build notification emails are now in your inbox.

To change a rule's behavior, in the CloudWatch console, choose the rule you want to change, choose **Actions**, and then choose **Edit**. Make changes to the rule, choose **Configure details**, and then choose **Update rule**.

To stop using a rule to send build notifications, in the CloudWatch console, choose the rule you want to stop using, choose **Actions**, and then choose **Disable**.

To delete a rule altogether, in the CloudWatch console, choose the rule you want to delete, choose **Actions**, and then choose **Delete**.

## Related resources

- For information about getting started with AWS CodeBuild, see [Getting started with AWS CodeBuild using the console \(p. 5\)](#).
- For information about troubleshooting issues in CodeBuild, see [Troubleshooting AWS CodeBuild \(p. 410\)](#).
- For information about quotas in CodeBuild, see [Quotas for AWS CodeBuild \(p. 425\)](#).

## Build notifications input format reference

CloudWatch delivers notifications in JSON format.

Build state change notifications use the following format:

```
{  
  "version": "0",  
  "id": "c030038d-8c4d-6141-9545-00ff7b7153EX",
```

```

    "detail-type": "CodeBuild Build State Change",
    "source": "aws.codebuild",
    "account": "123456789012",
    "time": "2017-09-01T16:14:28Z",
    "region": "us-west-2",
    "resources": [
        "arn:aws:codebuild:us-west-2:123456789012:build/my-sample-project:8745a7a9-c340-456a-9166-edf953571bEX"
    ],
    "detail": {
        "build-status": "SUCCEEDED",
        "project-name": "my-sample-project",
        "build-id": "arn:aws:codebuild:us-west-2:123456789012:build/my-sample-project:8745a7a9-c340-456a-9166-edf953571bEX",
        "additional-information": {
            "artifact": {
                "md5sum": "da9c44c8a9a3cd4b443126e823168fEX",
                "sha256sum": "6ccc2ae1df9d155ba83c597051611c42d60e09c6329dc14a312cecc0a8e39EX",
                "location": "arn:aws:s3:::codebuild-123456789012-output-bucket/my-output-artifact.zip"
            },
            "environment": {
                "image": "aws/codebuild/standard:5.0",
                "privileged-mode": false,
                "compute-type": "BUILD_GENERAL1_SMALL",
                "type": "LINUX_CONTAINER",
                "environment-variables": []
            },
            "timeout-in-minutes": 60,
            "build-complete": true,
            "initiator": "MyCodeBuildDemoUser",
            "build-start-time": "Sep 1, 2017 4:12:29 PM",
            "source": {
                "location": "codebuild-123456789012-input-bucket/my-input-artifact.zip",
                "type": "S3"
            },
            "logs": {
                "group-name": "/aws/codebuild/my-sample-project",
                "stream-name": "8745a7a9-c340-456a-9166-edf953571bEX",
                "deep-link": "https://console.aws.amazon.com/cloudwatch/home?region=us-west-2#logEvent:group=/aws/codebuild/my-sample-project;stream=8745a7a9-c340-456a-9166-edf953571bEX"
            },
            "phases": [
                {
                    "phase-context": [],
                    "start-time": "Sep 1, 2017 4:12:29 PM",
                    "end-time": "Sep 1, 2017 4:12:29 PM",
                    "duration-in-seconds": 0,
                    "phase-type": "SUBMITTED",
                    "phase-status": "SUCCEEDED"
                },
                {
                    "phase-context": [],
                    "start-time": "Sep 1, 2017 4:12:29 PM",
                    "end-time": "Sep 1, 2017 4:13:05 PM",
                    "duration-in-seconds": 36,
                    "phase-type": "PROVISIONING",
                    "phase-status": "SUCCEEDED"
                },
                {
                    "phase-context": [],
                    "start-time": "Sep 1, 2017 4:13:05 PM",
                    "end-time": "Sep 1, 2017 4:13:10 PM",
                    "duration-in-seconds": 4,
                    "phase-type": "DOWNLOAD_SOURCE",

```

```
        "phase-status": "SUCCEEDED"
    },
{
    "phase-context": [],
    "start-time": "Sep 1, 2017 4:13:10 PM",
    "end-time": "Sep 1, 2017 4:13:10 PM",
    "duration-in-seconds": 0,
    "phase-type": "INSTALL",
    "phase-status": "SUCCEEDED"
},
{
    "phase-context": [],
    "start-time": "Sep 1, 2017 4:13:10 PM",
    "end-time": "Sep 1, 2017 4:13:10 PM",
    "duration-in-seconds": 0,
    "phase-type": "PRE_BUILD",
    "phase-status": "SUCCEEDED"
},
{
    "phase-context": [],
    "start-time": "Sep 1, 2017 4:13:10 PM",
    "end-time": "Sep 1, 2017 4:14:21 PM",
    "duration-in-seconds": 70,
    "phase-type": "BUILD",
    "phase-status": "SUCCEEDED"
},
{
    "phase-context": [],
    "start-time": "Sep 1, 2017 4:14:21 PM",
    "end-time": "Sep 1, 2017 4:14:21 PM",
    "duration-in-seconds": 0,
    "phase-type": "POST_BUILD",
    "phase-status": "SUCCEEDED"
},
{
    "phase-context": [],
    "start-time": "Sep 1, 2017 4:14:21 PM",
    "end-time": "Sep 1, 2017 4:14:21 PM",
    "duration-in-seconds": 0,
    "phase-type": "UPLOAD_ARTIFACTS",
    "phase-status": "SUCCEEDED"
},
{
    "phase-context": [],
    "start-time": "Sep 1, 2017 4:14:21 PM",
    "end-time": "Sep 1, 2017 4:14:26 PM",
    "duration-in-seconds": 4,
    "phase-type": "FINALIZING",
    "phase-status": "SUCCEEDED"
},
{
    "start-time": "Sep 1, 2017 4:14:26 PM",
    "phase-type": "COMPLETED"
}
]
},
"current-phase": "COMPLETED",
"current-phase-context": "[]",
"version": "1"
}
```

Build phase change notifications use the following format:

```
{
```

```

    "version": "0",
    "id": "43ddc2bd-af76-9ca5-2dc7-b695e15adeEX",
    "detail-type": "CodeBuild Build Phase Change",
    "source": "aws.codebuild",
    "account": "123456789012",
    "time": "2017-09-01T16:14:21Z",
    "region": "us-west-2",
    "resources": [
        "arn:aws:codebuild:us-west-2:123456789012:build/my-sample-project:8745a7a9-c340-456a-9166-edf953571bEX"
    ],
    "detail": {
        "completed-phase": "COMPLETED",
        "project-name": "my-sample-project",
        "build-id": "arn:aws:codebuild:us-west-2:123456789012:build/my-sample-project:8745a7a9-c340-456a-9166-edf953571bEX",
        "completed-phase-context": "[]",
        "additional-information": {
            "artifact": {
                "md5sum": "da9c44c8a9a3cd4b443126e823168fEX",
                "sha256sum": "6ccc2ae1df9d155ba83c597051611c42d60e09c6329dcb14a312cecc0a8e39EX",
                "location": "arn:aws:s3:::codebuild-123456789012-output-bucket/my-output-artifact.zip"
            },
            "environment": {
                "image": "aws/codebuild/standard:5.0",
                "privileged-mode": false,
                "compute-type": "BUILD_GENERAL1_SMALL",
                "type": "LINUX_CONTAINER",
                "environment-variables": []
            },
            "timeout-in-minutes": 60,
            "build-complete": true,
            "initiator": "MyCodeBuildDemoUser",
            "build-start-time": "Sep 1, 2017 4:12:29 PM",
            "source": {
                "location": "codebuild-123456789012-input-bucket/my-input-artifact.zip",
                "type": "S3"
            },
            "logs": {
                "group-name": "/aws/codebuild/my-sample-project",
                "stream-name": "8745a7a9-c340-456a-9166-edf953571bEX",
                "deep-link": "https://console.aws.amazon.com/cloudwatch/home?region=us-west-2#logEvent:group=/aws/codebuild/my-sample-project;stream=8745a7a9-c340-456a-9166-edf953571bEX"
            },
            "phases": [
                {
                    "phase-context": [],
                    "start-time": "Sep 1, 2017 4:12:29 PM",
                    "end-time": "Sep 1, 2017 4:12:29 PM",
                    "duration-in-seconds": 0,
                    "phase-type": "SUBMITTED",
                    "phase-status": "SUCCEEDED"
                },
                {
                    "phase-context": [],
                    "start-time": "Sep 1, 2017 4:12:29 PM",
                    "end-time": "Sep 1, 2017 4:13:05 PM",
                    "duration-in-seconds": 36,
                    "phase-type": "PROVISIONING",
                    "phase-status": "SUCCEEDED"
                },
                {
                    "phase-context": [],
                    "start-time": "Sep 1, 2017 4:13:05 PM",
                    "end-time": "Sep 1, 2017 4:13:05 PM",
                    "duration-in-seconds": 0,
                    "phase-type": "EXECUTION",
                    "phase-status": "SUCCEEDED"
                }
            ]
        }
    }
}

```

```
        "end-time": "Sep 1, 2017 4:13:10 PM",
        "duration-in-seconds": 4,
        "phase-type": "DOWNLOAD_SOURCE",
        "phase-status": "SUCCEEDED"
    },
    {
        "phase-context": [],
        "start-time": "Sep 1, 2017 4:13:10 PM",
        "end-time": "Sep 1, 2017 4:13:10 PM",
        "duration-in-seconds": 0,
        "phase-type": "INSTALL",
        "phase-status": "SUCCEEDED"
    },
    {
        "phase-context": [],
        "start-time": "Sep 1, 2017 4:13:10 PM",
        "end-time": "Sep 1, 2017 4:13:10 PM",
        "duration-in-seconds": 0,
        "phase-type": "PRE_BUILD",
        "phase-status": "SUCCEEDED"
    },
    {
        "phase-context": [],
        "start-time": "Sep 1, 2017 4:13:10 PM",
        "end-time": "Sep 1, 2017 4:14:21 PM",
        "duration-in-seconds": 70,
        "phase-type": "BUILD",
        "phase-status": "SUCCEEDED"
    },
    {
        "phase-context": [],
        "start-time": "Sep 1, 2017 4:14:21 PM",
        "end-time": "Sep 1, 2017 4:14:21 PM",
        "duration-in-seconds": 0,
        "phase-type": "POST_BUILD",
        "phase-status": "SUCCEEDED"
    },
    {
        "phase-context": [],
        "start-time": "Sep 1, 2017 4:14:21 PM",
        "end-time": "Sep 1, 2017 4:14:21 PM",
        "duration-in-seconds": 0,
        "phase-type": "UPLOAD_ARTIFACTS",
        "phase-status": "SUCCEEDED"
    },
    {
        "phase-context": [],
        "start-time": "Sep 1, 2017 4:14:21 PM",
        "end-time": "Sep 1, 2017 4:14:26 PM",
        "duration-in-seconds": 4,
        "phase-type": "FINALIZING",
        "phase-status": "SUCCEEDED"
    },
    {
        "start-time": "Sep 1, 2017 4:14:26 PM",
        "phase-type": "COMPLETED"
    }
],
{
    "completed-phase-status": "SUCCEEDED",
    "completed-phase-duration-seconds": 4,
    "version": "1",
    "completed-phase-start": "Sep 1, 2017 4:14:21 PM",
    "completed-phase-end": "Sep 1, 2017 4:14:26 PM"
}
```

}

## Create a test report in CodeBuild using the AWS CLI sample

Tests that you specify in your buildspec file are run during your build. This sample shows you how to use the AWS CLI to incorporate tests into builds in CodeBuild. You can use JUnit to create unit tests, or you can use another tool to create configuration tests. You can then evaluate the test results to fix issues or optimize your application.

You can use the CodeBuild API or the AWS CodeBuild console to access the test results. This sample shows you how to configure your report so its test results are exported to an S3 bucket.

### Topics

- [Prerequisites \(p. 90\)](#)
- [Create a report group \(p. 91\)](#)
- [Configure a project with a report group \(p. 91\)](#)
- [Run and view results of a report \(p. 93\)](#)

## Prerequisites

- Create your test cases. This sample is written with the assumption that you have test cases to include in your sample test report. You specify the location of your test files in the buildspec file.

The following test report file formats are supported:

- Cucumber JSON (.json)
- JUnit XML (.xml)
- NUnit XML (.xml)
- NUnit3 XML (.xml)
- TestNG XML (.xml)
- Visual Studio TRX (.trx)

Create your test cases with any test framework that can create report files in one of these formats (for example, Surefire JUnit plugin, TestNG, or Cucumber).

- Create an S3 bucket and make a note of its name. For more information, see [How do I create an S3 bucket?](#) in the *Amazon S3 User Guide*.
- Create an IAM role and make a note of its ARN. You need the ARN when you create your build project.
- If your role does not have the following permissions, add them.

```
{  
    "Effect": "Allow",  
    "Resource": [  
        "*"  
    ],  
    "Action": [  
        "codebuild:CreateReportGroup",  
        "codebuild:CreateReport",  
        "codebuild:UpdateReport",  
        "codebuild:BatchPutTestCases"  
    ]  
}
```

For more information, see [Permissions for test reporting operations \(p. 312\)](#).

## Create a report group

1. Create a file named `CreateReportGroupInput.json`.
2. Create a folder in your S3 bucket where your test results are exported.
3. Copy the following into `CreateReportGroupInput.json`. For `<bucket-name>`, use the name of the S3 bucket. For `<path-to-folder>`, enter the path to the folder in your S3 bucket.

```
{  
  "name": "<report-name>",  
  "type": "TEST",  
  "exportConfig": {  
    "exportConfigType": "S3",  
    "s3Destination": {  
      "bucket": "<bucket-name>",  
      "path": "<path-to-folder>",  
      "packaging": "NONE"  
    }  
  }  
}
```

4. Run the following command in the directory that contains `CreateReportGroupInput.json`.

```
aws codebuild create-report-group --cli-input-json file://CreateReportGroupInput.json
```

The output looks like the following. Make a note of the ARN for the `reportGroup`. You use it when you create a project that uses this report group.

```
{  
  "reportGroup": {  
    "arn": "arn:aws:codebuild:us-west-2:123456789012:report-group/<report-name>",  
    "name": "<report-name>",  
    "type": "TEST",  
    "exportConfig": {  
      "exportConfigType": "S3",  
      "s3Destination": {  
        "bucket": "<s3-bucket-name>",  
        "path": "<folder-path>",  
        "packaging": "NONE",  
        "encryptionKey": "arn:aws:kms:us-west-2:123456789012:alias/aws/s3"  
      }  
    },  
    "created": 1570837165.885,  
    "lastModified": 1570837165.885  
  }  
}
```

## Configure a project with a report group

To run a report, you first create a CodeBuild build project that is configured with your report group. Test cases specified for your report group are run when you run a build.

1. Create a `buildspec` file named `buildspec.yml`.
2. Use the following YAML as a template for your `buildspec.yml` file. Be sure to include the commands that run your tests. In the `reports` section, specify the files that contain the results of

your test cases. These files store the test results you can access with CodeBuild. They expire 30 days after they are created. These files are different from the raw test case result files you export to an S3 bucket.

```
version: 0.2
phases:
install:
  runtime-versions:
    java: openjdk8
build:
  commands:
    - echo Running tests
    - <enter commands to run your tests>
reports:
<report-name-or-arn>: #test file information
files:
  - '<test-result-files>'
base-directory: '<optional-base-directory>'
discard-paths: false #do not remove file paths from test result files
```

#### Note

Instead of the ARN of an existing report group, you can also specify a name for a report group that has not been created. If you specify a name instead of an ARN, CodeBuild creates a report group when it runs a build. Its name contains your project name and the name you specify in the buildspec file, in this format: `project-name-report-group-name`. For more information, see [Create a test report \(p. 295\)](#) and [Report group naming \(p. 302\)](#).

3. Create a file named `project.json`. This file contains input for the `create-project` command.
4. Copy the following JSON into `project.json`. For `source`, enter the type and location of the repository that contains your source files. For `serviceRole`, specify the ARN of the role you are using.

```
{
  "name": "test-report-project",
  "description": "sample-test-report-project",
  "source": {
    "type": "CODECOMMIT|CODEPIPELINE|GITHUB|S3|BITBUCKET|GITHUB_ENTERPRISE|NO_SOURCE",
    "location": "<your-source-url>"
  },
  "artifacts": {
    "type": "NO_ARTIFACTS"
  },
  "cache": {
    "type": "NO_CACHE"
  },
  "environment": {
    "type": "LINUX_CONTAINER",
    "image": "aws/codebuild/standard:5.0",
    "computeType": "small"
  },
  "serviceRole": "arn:aws:iam::<your-aws-account-id>:role/service-role/<your-role-name>"
}
```

5. Run the following command in the directory that contains `project.json`. This creates a project named `test-project`.

```
aws codebuild create-project --cli-input-json file://project.json
```

## Run and view results of a report

In this section, you run a build of the project you created earlier. During the build process, CodeBuild creates a report with the results of the test cases. The report is contained in the report group you specified.

1. To start a build, run the following command. `test-report-project` is the name of the build project created above. Make a note of the build ID that appears in the output.

```
aws codebuild start-build --project-name test-report-project
```

2. Run the following command to get information about your build, including the ARN of your report. For `<build-id>`, specify your build ID. Make a note of the report ARN in the `reportArns` property of the output.

```
aws codebuild batch-get-builds --ids <build-id>
```

3. Run the following command to get details about your report. For `<report-arn>`, specify your report ARN.

```
aws codebuild batch-get-reports --report-arns <report-arn>
```

The output looks like the following. This sample output shows how many of the tests were successful, failed, skipped, resulted in an error, or return an unknown status.

```
{
  "reports": [
    {
      "status": "FAILED",
      "reportGroupArn": "<report-group-arn>",
      "name": "<report-group-name>",
      "created": 1573324770.154,
      "exportConfig": {
        "exportConfigType": "S3",
        "s3Destination": {
          "bucket": "<your-S3-bucket>",
          "path": "<path-to-your-report-results>",
          "packaging": "NONE",
          "encryptionKey": "<encryption-key>"
        }
      },
      "expired": 1575916770.0,
      "truncated": false,
      "executionId": "arn:aws:codebuild:us-west-2:123456789012:build/<name-of-build-project>:2c254862-ddf6-4831-a53f-6839a73829c1",
      "type": "TEST",
      "arn": "<report-arn>",
      "testSummary": {
        "durationInNanoSeconds": 6657770,
        "total": 11,
        "statusCounts": {
          "FAILED": 3,
          "SKIPPED": 7,
          "ERROR": 0,
          "SUCCEEDED": 1,
          "UNKNOWN": 0
        }
      }
    }
  ],
}
```

```
    "reportsNotFound": []  
}
```

- Run the following command to list information about test cases for your report. For `<report-arn>`, specify the ARN of your report. For the optional `--filter` parameter, you can specify one status result (SUCCEEDED, FAILED, SKIPPED, ERROR, or UNKNOWN).

```
aws codebuild describe-test-cases \  
  --report-arn <report-arn> \  
  --filter status=SUCCEEDED|FAILED|SKIPPED|ERROR|UNKNOWN
```

The output looks like the following.

```
{  
  "testCases": [  
    {  
      "status": "FAILED",  
      "name": "Test case 1",  
      "expired": 1575916770.0,  
      "reportArn": "<report-arn>",  
      "prefix": "Cucumber tests for agent",  
      "message": "A test message",  
      "durationInNanoSeconds": 1540540,  
      "testRawDataPath": "<path-to-output-report-files>"  
    },  
    {  
      "status": "SUCCEEDED",  
      "name": "Test case 2",  
      "expired": 1575916770.0,  
      "reportArn": "<report-arn>",  
      "prefix": "Cucumber tests for agent",  
      "message": "A test message",  
      "durationInNanoSeconds": 1540540,  
      "testRawDataPath": "<path-to-output-report-files>"  
    }  
  ]  
}
```

## Docker in custom image sample for CodeBuild

This sample builds and runs a Docker image by using AWS CodeBuild and a custom Docker build image (`docker:dind` in Docker Hub).

To learn how to build a Docker image by using a build image provided by CodeBuild with Docker support instead, see our [Docker sample \(p. 96\)](#).

### Important

Running this sample might result in charges to your AWS account. These include possible charges for CodeBuild and for AWS resources and actions related to Amazon S3, AWS KMS, and CloudWatch Logs. For more information, see [CodeBuild pricing](#), [Amazon S3 pricing](#), [AWS Key Management Service pricing](#), and [Amazon CloudWatch pricing](#).

### Topics

- [Running the sample \(p. 95\)](#)
- [Directory structure \(p. 95\)](#)
- [Files \(p. 96\)](#)
- [Related resources \(p. 49\)](#)

## Running the sample

### To run this sample

1. Create the files as described in the "Directory structure" and "Files" sections of this topic, and then upload them to an S3 input bucket or an AWS CodeCommit, GitHub, or Bitbucket repository.

#### Important

Do not upload *(root directory name)*, just the files inside of *(root directory name)*.

If you are using an S3 input bucket, be sure to create a ZIP file that contains the files, and then upload it to the input bucket. Do not add *(root directory name)* to the ZIP file, just the files inside of *(root directory name)*.

2. Create a build project, run the build, and view related build information by following the steps in [Run AWS CodeBuild directly \(p. 391\)](#).

If you use the AWS CLI to create the build project, the JSON-formatted input to the `create-project` command might look similar to this. (Replace the placeholders with your own values.)

```
{  
  "name": "sample-docker-custom-image-project",  
  "source": {  
    "type": "S3",  
    "location": "codebuild-region-ID-account-ID-input-  
    bucket/DockerCustomImageSample.zip"  
  },  
  "artifacts": {  
    "type": "NO_ARTIFACTS"  
  },  
  "environment": {  
    "type": "LINUX_CONTAINER",  
    "image": "docker:dind",  
    "computeType": "BUILD_GENERAL1_SMALL",  
    "privilegedMode": true  
  },  
  "serviceRole": "arn:aws:iam::account-ID:role/role-name",  
  "encryptionKey": "arn:aws:kms:region-ID:account-ID:key/key-ID"  
}
```

#### Note

By default, Docker containers do not allow access to any devices. Privileged mode grants a build project's Docker container access to all devices. For more information, see [Runtime Privilege and Linux Capabilities](#) on the Docker Docs website. Also, Windows does not support privileged mode.

3. To see the build results, look in the build's log for the string Hello, World!. For more information, see [View build details \(p. 279\)](#).

## Directory structure

This sample assumes this directory structure.

```
(root directory name)  
### buildspec.yml  
### Dockerfile
```

## Files

The base image of the operating system used in this sample is Ubuntu. The sample uses these files. For more information about the OverlayFS storage driver referenced in the buildspec file, see [Use the OverlayFS storage driver](#) on the Docker website.

`buildspec.yml` (in *(root directory name)*)

```
version: 0.2

phases:
  install:
    commands:
      - nohup /usr/local/bin/dockerd --host=unix:///var/run/docker.sock --
        host=tcp://127.0.0.1:2375 --storage-driver=overlay2 &
        - timeout 15 sh -c "until docker info; do echo .; sleep 1; done"
  pre_build:
    commands:
      - docker build -t helloworld .
  build:
    commands:
      - docker images
      - docker run helloworld echo "Hello, World!"
```

### Note

If the base operating system is Alpine Linux, in the `buildspec.yml` add the `-t` argument to `timeout`:

```
- timeout -t 15 sh -c "until docker info; do echo .; sleep 1; done"
```

`Dockerfile` (in *(root directory name)*)

```
FROM maven:3.3.9-jdk-8
RUN echo "Hello World"
```

## Related resources

- For information about getting started with AWS CodeBuild, see [Getting started with AWS CodeBuild using the console \(p. 5\)](#).
- For information about troubleshooting issues in CodeBuild, see [Troubleshooting AWS CodeBuild \(p. 410\)](#).
- For information about quotas in CodeBuild, see [Quotas for AWS CodeBuild \(p. 425\)](#).

## Docker sample for CodeBuild

This sample produces as build output a Docker image and then pushes the Docker image to an Amazon Elastic Container Registry (Amazon ECR) image repository. You can adapt this sample to push the Docker image to Docker Hub. For more information, see [Adapting the sample to push the image to Docker Hub \(p. 100\)](#).

To learn how to build a Docker image by using a custom Docker build image (`docker:dind` in Docker Hub), see our [Docker in custom image sample \(p. 94\)](#).

This sample was tested referencing `golang:1.12`.

This sample uses the new multi-stage Docker builds feature, which produces a Docker image as build output. It then pushes the Docker image to an Amazon ECR image repository. Multi-stage Docker image builds help to reduce the size of the final Docker image. For more information, see [Use multi-stage builds with Docker](#).

### Important

Running this sample might result in charges to your AWS account. These include possible charges for AWS CodeBuild and for AWS resources and actions related to Amazon S3, AWS KMS, CloudWatch Logs, and Amazon ECR. For more information, see [CodeBuild pricing](#), [Amazon S3 pricing](#), [AWS Key Management Service pricing](#), [Amazon CloudWatch pricing](#), and [Amazon Elastic Container Registry pricing](#).

### Topics

- [Running the sample \(p. 97\)](#)
- [Directory structure \(p. 99\)](#)
- [Files \(p. 100\)](#)
- [Adapting the sample to push the image to Docker Hub \(p. 100\)](#)
- [Related resources \(p. 49\)](#)

## Running the sample

### To run this sample

1. If you already have an image repository in Amazon ECR you want to use, skip to step 3. Otherwise, if you are using an user instead of an AWS root account or an administrator user to work with Amazon ECR, add this statement (between `### BEGIN ADDING STATEMENT HERE ###` and `### END ADDING STATEMENT HERE ###`) to the user (or IAM group the user is associated with). Using an AWS root account is not recommended. This statement allows the creation of Amazon ECR repositories for storing Docker images. Ellipses (...) are used for brevity and to help you locate where to add the statement. Do not remove any statements, and do not type these ellipses into the policy. For more information, see [Working with inline policies using the AWS Management Console](#) in the *user Guide*.

```
{  
  "Statement": [  
    ### BEGIN ADDING STATEMENT HERE ###  
    {  
      "Action": [  
        "ecr:CreateRepository"  
      ],  
      "Resource": "*",  
      "Effect": "Allow"  
    },  
    ### END ADDING STATEMENT HERE ###  
    ...  
  ],  
  "Version": "2012-10-17"  
}
```

### Note

The IAM entity that modifies this policy must have permission in IAM to modify policies.

2. Create an image repository in Amazon ECR. Be sure to create the repository in the same AWS Region where you create your build environment and run your build. For more information, see [Creating a repository](#) in the *Amazon ECR User Guide*. This repository's name must match the repository name you specify later in this procedure, represented by the IMAGE\_REPO\_NAME environment variable.

Ensure that the Amazon ECR repository policy grants image push access for your CodeBuild service IAM role.

3. Add this statement (between **### BEGIN ADDING STATEMENT HERE ###** and **### END ADDING STATEMENT HERE ###**) to the policy you attached to your AWS CodeBuild service role. This statement allows CodeBuild to upload Docker images to Amazon ECR repositories. Ellipses (...) are used for brevity and to help you locate where to add the statement. Do not remove any statements, and do not type these ellipses into the policy.

```
{  
  "Statement": [  
    "### BEGIN ADDING STATEMENT HERE ###"  
    {  
      "Action": [  
        "ecr:BatchCheckLayerAvailability",  
        "ecr:CompleteLayerUpload",  
        "ecr:GetAuthorizationToken",  
        "ecr:InitiateLayerUpload",  
        "ecr:PutImage",  
        "ecr:UploadLayerPart"  
      ],  
      "Resource": "*",  
      "Effect": "Allow"  
    },  
    "### END ADDING STATEMENT HERE ###"  
    ...  
  ],  
  "Version": "2012-10-17"  
}
```

#### Note

The IAM entity that modifies this policy must have permission in IAM to modify policies.

4. Create the files as described in the "Directory structure" and "Files" sections of this topic, and then upload them to an S3 input bucket or an AWS CodeCommit, GitHub, or Bitbucket repository. For more information, see [Image definitions file reference](#) in the *AWS CodePipeline User Guide*.

#### Important

Do not upload (*root directory name*), just the files inside of (*root directory name*).

If you are using an S3 input bucket, be sure to create a ZIP file that contains the files, and then upload it to the input bucket. Do not add (*root directory name*) to the ZIP file, just the files inside of (*root directory name*).

5. Follow the steps in [Run CodeBuild directly \(p. 391\)](#) to create a build project, run the build, and view build information.

If you use the console to create your project:

- a. For **Operating system**, choose **Ubuntu**.
- b. For **Runtime**, choose **Standard**.
- c. For **Image**, choose **aws/codebuild/standard:5.0**.
- d. Because you use this build project to build a Docker image, select **Privileged**.

#### Note

By default, Docker containers do not allow access to any devices. Privileged mode grants a build project's Docker container access to all devices. For more information, see [Runtime Privilege and Linux Capabilities](#) on the Docker Docs website. Also, Windows does not support privileged mode.

- e. Add the following environment variables:

- AWS\_DEFAULT\_REGION with a value of *region-ID*
- AWS\_ACCOUNT\_ID with a value of *account-ID*
- IMAGE\_TAG with a value of Latest
- IMAGE\_REPO\_NAME with a value of *Amazon-ECR-repo-name*

If you use the AWS CLI to create the build project, the JSON-formatted input to the `create-project` command might look similar to this. (Replace the placeholders with your own values.)

```
{
  "name": "sample-docker-project",
  "source": {
    "type": "S3",
    "location": "codebuild-region-ID-account-ID-input-bucket/DockerSample.zip"
  },
  "artifacts": {
    "type": "NO_ARTIFACTS"
  },
  "environment": {
    "type": "LINUX_CONTAINER",
    "image": "aws/codebuild/standard:5.0",
    "computeType": "BUILD_GENERAL1_SMALL",
    "environmentVariables": [
      {
        "name": "AWS_DEFAULT_REGION",
        "value": "region-ID"
      },
      {
        "name": "AWS_ACCOUNT_ID",
        "value": "account-ID"
      },
      {
        "name": "IMAGE_REPO_NAME",
        "value": "Amazon-ECR-repo-name"
      },
      {
        "name": "IMAGE_TAG",
        "value": "latest"
      }
    ],
    "privilegedMode": true
  },
  "serviceRole": "arn:aws:iam::account-ID:role/role-name",
  "encryptionKey": "arn:aws:kms:region-ID:account-ID:key/key-ID"
}
```

6. Confirm that CodeBuild successfully pushed the Docker image to the repository:

1. Open the Amazon ECR console at <https://console.aws.amazon.com/ecr/>.
2. Choose the repository name. The image should be listed in the **Image tag** column.

## Directory structure

This sample assumes this directory structure.

```
(root directory name)
### buildspec.yml
### Dockerfile
```

## Files

This sample uses these files.

`buildspec.yml` (in *(root directory name)*)

```
version: 0.2

phases:
  pre_build:
    commands:
      - echo Logging in to Amazon ECR...
      - aws ecr get-login-password --region $AWS_DEFAULT_REGION | docker login --username AWS --password-stdin $AWS_ACCOUNT_ID.dkr.ecr.$AWS_DEFAULT_REGION.amazonaws.com
  build:
    commands:
      - echo Build started on `date`
      - echo Building the Docker image...
      - docker build -t $IMAGE_REPO_NAME:$IMAGE_TAG .
      - docker tag $IMAGE_REPO_NAME:$IMAGE_TAG $AWS_ACCOUNT_ID.dkr.ecr.$AWS_DEFAULT_REGION.amazonaws.com/$IMAGE_REPO_NAME:$IMAGE_TAG
  post_build:
    commands:
      - echo Build completed on `date`
      - echo Pushing the Docker image...
      - docker push $AWS_ACCOUNT_ID.dkr.ecr.$AWS_DEFAULT_REGION.amazonaws.com/
$IMAGE_REPO_NAME:$IMAGE_TAG
```

`Dockerfile` (in *(root directory name)*)

```
FROM golang:1.12-alpine AS build
#Install git
RUN apk add --no-cache git
#Get the hello world package from a GitHub repository
RUN go get github.com/golang/example/hello
WORKDIR /go/src/github.com/golang/example/hello
# Build the project and send the output to /bin/HelloWorld
RUN go build -o /bin/HelloWorld

FROM golang:1.12-alpine
#Copy the build's output binary from the previous build container
COPY --from=build /bin/HelloWorld /bin/HelloWorld
ENTRYPOINT ["/bin/HelloWorld"]
```

**Note**

CodeBuild overrides the `ENTRYPOINT` for custom Docker images.

## Adapting the sample to push the image to Docker Hub

To push the Docker image to Docker Hub instead of Amazon ECR, edit this sample's code.

**Note**

If you are using a version of Docker earlier than 17.06, remove the `--no-email` option.

1. Replace these Amazon ECR-specific lines of code in the `buildspec.yml` file:

```
...
  pre_build:
    commands:
```

```

    - echo Logging in to Amazon ECR...
    - aws ecr get-login-password --region $AWS_DEFAULT_REGION | docker login --
username AWS --password-stdin $AWS_ACCOUNT_ID.dkr.ecr.$AWS_DEFAULT_REGION.amazonaws.com
build:
  commands:
    - echo Build started on `date`
    - echo Building the Docker image...
    - docker build -t $IMAGE_REPO_NAME:$IMAGE_TAG .
    - docker tag $IMAGE_REPO_NAME:$IMAGE_TAG $AWS_ACCOUNT_ID.dkr.ecr.
$AWS_DEFAULT_REGION.amazonaws.com/$IMAGE_REPO_NAME:$IMAGE_TAG
post_build:
  commands:
    - echo Build completed on `date`
    - echo Pushing the Docker image...
    - docker push $AWS_ACCOUNT_ID.dkr.ecr.$AWS_DEFAULT_REGION.amazonaws.com/
$IMAGE_REPO_NAME:$IMAGE_TAG
...

```

With these Docker Hub-specific lines of code:

```

...
pre_build:
  commands:
    - echo Logging in to Docker Hub...
      # Type the command to log in to your Docker Hub account here.
build:
  commands:
    - echo Build started on `date`
    - echo Building the Docker image...
    - docker build -t $IMAGE_REPO_NAME:$IMAGE_TAG .
    - docker tag $IMAGE_REPO_NAME:$IMAGE_TAG $IMAGE_REPO_NAME:$IMAGE_TAG
post_build:
  commands:
    - echo Build completed on `date`
    - echo Pushing the Docker image...
    - docker push $IMAGE_REPO_NAME:$IMAGE_TAG
...

```

- Upload the edited code to an S3 input bucket or an AWS CodeCommit, GitHub, or Bitbucket repository.

**Important**

Do not upload (*root directory name*), just the files inside of (*root directory name*).

If you are using an S3 input bucket, be sure to create a ZIP file that contains the files, and then upload it to the input bucket. Do not add (*root directory name*) to the ZIP file, just the files inside of (*root directory name*).

- Replace these lines of code from the JSON-formatted input to the `create-project` command:

```

...
  "environmentVariables": [
    {
      "name": "AWS_DEFAULT_REGION",
      "value": "region-ID"
    },
    {
      "name": "AWS_ACCOUNT_ID",
      "value": "account-ID"
    },
    {
      "name": "IMAGE_REPO_NAME",
      "value": "Amazon-ECR-repo-name"
    }
  ]
}

```

```
        },
        {
            "name": "IMAGE_TAG",
            "value": "latest"
        }
    ]
...
}
```

With these lines of code:

```
...
    "environmentVariables": [
        {
            "name": "IMAGE_REPO_NAME",
            "value": "your-Docker-Hub-repo-name"
        },
        {
            "name": "IMAGE_TAG",
            "value": "latest"
        }
    ]
...
}
```

4. Follow the steps in [Run CodeBuild directly \(p. 391\)](#) to create a build environment, run the build, and view related build information.
5. Confirm that AWS CodeBuild successfully pushed the Docker image to the repository. Sign in to Docker Hub, go to the repository, and choose the **Tags** tab. The latest tag should contain a very recent **Last Updated** value.

## Related resources

- For information about getting started with AWS CodeBuild, see [Getting started with AWS CodeBuild using the console \(p. 5\)](#).
- For information about troubleshooting issues in CodeBuild, see [Troubleshooting AWS CodeBuild \(p. 410\)](#).
- For information about quotas in CodeBuild, see [Quotas for AWS CodeBuild \(p. 425\)](#).

## GitHub Enterprise Server sample for CodeBuild

AWS CodeBuild supports GitHub Enterprise Server as a source repository. This sample shows how to set up your CodeBuild projects when your GitHub Enterprise Server repository has a certificate installed. It also shows how to enable webhooks so that CodeBuild rebuilds the source code every time a code change is pushed to your GitHub Enterprise Server repository.

### Prerequisites

1. Generate a personal access token for your CodeBuild project. We recommend that you create a GitHub Enterprise user and generate a personal access token for this user. Copy it to your clipboard so that it can be used when you create your CodeBuild project. For more information, see [Creating a personal access token for the command line](#) on the GitHub Help website.

When you create the personal access token, include the **repo** scope in the definition.

Select scopes

Scopes define the access for personal tokens. [Read more about OAuth scopes.](#)

|   |                                      |
|---|--------------------------------------|
| <input checked="" type="checkbox"/> repo            | Full control of private repositories |
| <input checked="" type="checkbox"/> repo:status     | Access commit status                 |
| <input checked="" type="checkbox"/> repo_deployment | Access deployment status             |
| <input checked="" type="checkbox"/> public_repo     | Access public repositories           |

2. Download your certificate from GitHub Enterprise Server. CodeBuild uses the certificate to make a trusted SSL connection to the repository.

**Linux/macOS clients:**

From a terminal window, run the following command:

```
echo -n | openssl s_client -connect HOST:PORTNUMBER \  
| sed -ne '/-BEGIN CERTIFICATE-/,/-END CERTIFICATE-/p' > /Folder/filename.pem
```

Replace the placeholders in the command with the following values:

*HOST*. The IP address of your GitHub Enterprise Server repository.

*PORTNUMBER*. The port number you are using to connect (for example, 443).

*Folder*. The folder where you downloaded your certificate.

*filename*. The file name of your certificate file.

**Important**

Save the certificate as a .pem file.

**Windows clients:**

Use your browser to download your certificate from GitHub Enterprise Server. To see the site's certificate details, choose the padlock icon. For information about how to export the certificate, see your browser documentation.

**Important**

Save the certificate as a .pem file.

3. Upload your certificate file to an S3 bucket. For information about how to create an S3 bucket, see [How do I create an S3 Bucket?](#) For information about how to upload objects to an S3 bucket, see [How do I upload files and folders to a bucket?](#)

**Note**

This bucket must be in the same AWS region as your builds. For example, if you instruct CodeBuild to run a build in the US East (Ohio) Region, the bucket must be in the US East (Ohio) Region.

## Create a build project with GitHub Enterprise Server as the source repository and enable webhooks (console)

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. If a CodeBuild information page is displayed, choose **Create build project**. Otherwise, on the navigation pane, expand **Build**, choose **Build projects**, and then choose **Create build project**.

3. In **Project name**, enter a name for this build project. Build project names must be unique across each AWS account. You can also include an optional description of the build project to help other users understand what this project is used for.
4. In **Source**, in **Source provider**, choose **GitHub Enterprise**.
  - For **Personal Access Token**, paste the token you copied to your clipboard and choose **Save Token**. In **Repository URL**, enter the URL for your GitHub Enterprise Server repository.

**Note**

You only need to enter and save the personal access token once. All future AWS CodeBuild projects use this token.

- In **Repository URL**, enter the path to your repository, including the name of the repository.
- Expand **Additional configuration**.
- Select **Rebuild every time a code change is pushed to this repository** to rebuild every time a code change is pushed to this repository.
- Select **Enable insecure SSL** to ignore SSL warnings while you connect to your GitHub Enterprise Server project repository.

**Note**

We recommend that you use **Enable insecure SSL** for testing only. It should not be used in a production environment.

## Source

Source 1 - Primary

Source provider

GitHub Enterprise

Repository URL

`https://<host-name>/<user-name>/<repository-name>`

**Disconnect GitHub Enterprise account**

▼ Additional configuration

Git clone depth, Insecure SSL

Git clone depth - *optional*

1

Webhook - *optional*

Rebuild every time a code change is pushed to this repository

Branch filter - *optional*

Enter a regular expression

Insecure SSL - *optional*

Enable this flag to ignore SSL warnings while connecting to project source.

Enable insecure SSL

5. In **Environment**:

For **Environment image**, do one of the following:

- To use a Docker image managed by AWS CodeBuild, choose **Managed image**, and then make selections from **Operating system**, **Runtime(s)**, **Image**, and **Image version**. Make a selection from **Environment type** if it is available.
  - To use another Docker image, choose **Custom image**. For **Environment type**, choose **ARM**, **Linux**, **Linux GPU**, or **Windows**. If you choose **Other registry**, for **External registry URL**, enter the name and tag of the Docker image in Docker Hub, using the format `docker repository/docker image name`. If you choose **Amazon ECR**, use **Amazon ECR repository** and **Amazon ECR image** to choose the Docker image in your AWS account.
  - To use a private Docker image, choose **Custom image**. For **Environment type**, choose **ARM**, **Linux**, **Linux GPU**, or **Windows**. For **Image registry**, choose **Other registry**, and then enter the ARN of the credentials for your private Docker image. The credentials must be created by Secrets Manager. For more information, see [What Is AWS Secrets Manager?](#) in the *AWS Secrets Manager User Guide*.
6. In **Service role**, do one of the following:
- If you do not have a CodeBuild service role, choose **New service role**. In **Role name**, enter a name for the new role.
  - If you have a CodeBuild service role, choose **Existing service role**. In **Role ARN**, choose the service role.

**Note**

When you use the console to create or update a build project, you can create a CodeBuild service role at the same time. By default, the role works with that build project only. If you use the console to associate this service role with another build project, the role is updated to work with the other build project. A service role can work with up to 10 build projects.

7. Expand **Additional configuration**.

If you want CodeBuild to work with your VPC:

- For **VPC**, choose the VPC ID that CodeBuild uses.
- For **VPC Subnets**, choose the subnets that include resources that CodeBuild uses.
- For **VPC Security groups**, choose the security groups that CodeBuild uses to allow access to resources in the VPCs.

For more information, see [Use AWS CodeBuild with Amazon Virtual Private Cloud \(p. 171\)](#).

8. In **Buildspec**, do one of the following:

- Choose **Use a buildspec file** to use the buildspec.yml file in the source code root directory.
- Choose **Insert build commands** to use the console to insert build commands.

For more information, see the [Buildspec reference \(p. 129\)](#).

9. In **Artifacts**, for **Type**, do one of the following:

- If you do not want to create build output artifacts, choose **No artifacts**.
- To store the build output in an S3 bucket, choose **Amazon S3**, and then do the following:
  - If you want to use your project name for the build output ZIP file or folder, leave **Name** blank. Otherwise, enter the name. By default, the artifact name is the project name. If you want to use a different name, enter it in the artifacts name box. If you want to output a ZIP file, include the zip extension.
  - For **Bucket name**, choose the name of the output bucket.

- If you chose **Insert build commands** earlier in this procedure, for **Output files**, enter the locations of the files from the build that you want to put into the build output ZIP file or folder. For multiple locations, separate each location with a comma (for example, appspec.yml, target/my-app.jar). For more information, see the description of [files in Buildspec syntax \(p. 130\)](#).

10. For **Cache type**, choose one of the following:

- If you do not want to use a cache, choose **No cache**.
- If you want to use an Amazon S3 cache, choose **Amazon S3**, and then do the following:
  - For **Bucket**, choose the name of the S3 bucket where the cache is stored.
  - (Optional) For **Cache path prefix**, enter an Amazon S3 path prefix. The **Cache path prefix** value is similar to a directory name. It makes it possible for you to store the cache under the same directory in a bucket.

**Important**

Do not append a trailing slash (/) to the end of the path prefix.

- If you want to use a local cache, choose **Local**, and then choose one or more local cache modes.

**Note**

Docker layer cache mode is available for Linux only. If you choose it, your project must run in privileged mode.

Using a cache saves considerable build time because reusable pieces of the build environment are stored in the cache and used across builds. For information about specifying a cache in the buildspec file, see [Buildspec syntax \(p. 130\)](#). For more information about caching, see [Build caching in AWS CodeBuild \(p. 216\)](#).

11. Choose **Create build project**. On the build project page, choose **Start build**.

12. If you enabled webhooks in **Source**, a **Create webhook** dialog box is displayed with values for **Payload URL** and **Secret**.

**Important**

The **Create webhook** dialog box appears only once. Copy the payload URL and secret key. You need them when you add a webhook in GitHub Enterprise Server.

If you need to generate a payload URL and secret key again, you must first delete the webhook from your GitHub Enterprise Server repository. In your CodeBuild project, clear the **Webhook** check box and then choose **Save**. You can then create or update a CodeBuild project with the **Webhook** check box selected. The **Create webhook** dialog box appears again.

13. In GitHub Enterprise Server, choose the repository where your CodeBuild project is stored.

14. Choose **Settings**, choose **Hooks & services**, and then choose **Add webhook**.

15. Enter the payload URL and secret key, accept the defaults for the other fields, and then choose **Add webhook**.

The screenshot shows the 'Add webhook' dialog box. At the top, there's a navigation bar with 'requests 0', 'Projects 0', 'Wiki', 'Pulse', 'Graphs', and a 'Settings' tab. Below the navigation is a header 'Webhooks / Add webhook'. A note says: 'We'll send a POST request to the URL below with details of any subscribed events. You can also specify which data format you'd like to receive (JSON, x-www-form-urlencoded, etc). More information can be found in our developer documentation.' The 'Payload URL' field contains a redacted URL. The 'Content type' dropdown is set to 'application/json'. The 'Secret' field contains a long string of redacted characters. There are two buttons: 'Disable SSL verification' and 'SSL verification'. Under 'Which events would you like to trigger this webhook?', the radio button 'Just the push event.' is selected. There are also options 'Send me everything.' and 'Let me select individual events.'. A checked checkbox 'Active' has a note: 'We will deliver event details when this hook is triggered.' At the bottom is a green 'Add webhook' button.

16. Return to your CodeBuild project. Close the **Create webhook** dialog box and choose **Start build**.

## GitHub pull request and webhook filter sample for CodeBuild

AWS CodeBuild supports webhooks when the source repository is GitHub. This means that for a CodeBuild build project that has its source code stored in a GitHub repository, webhooks can be used to rebuild the source code every time a code change is pushed to the repository. For CodeBuild samples, see [AWS CodeBuild Samples](#).

### Note

When using webhooks, it is possible for a user to trigger an unexpected build. To mitigate this risk, see [Best practices for using webhooks \(p. 224\)](#).

## Create a build project with GitHub as the source repository and enable webhooks (console)

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. If a CodeBuild information page is displayed, choose **Create build project**. Otherwise, on the navigation pane, expand **Build**, choose **Build projects**, and then choose **Create build project**.

3. Choose **Create build project**.
4. In **Project configuration**:

#### Project name

Enter a name for this build project. Build project names must be unique across each AWS account. You can also include an optional description of the build project to help other users understand what this project is used for.

5. In **Source**:

#### Source provider

Choose **GitHub**. Follow the instructions to connect (or reconnect) with GitHub and then choose **Authorize**.

#### Repository

Choose **Repository in my GitHub account**.

#### GitHub repository

Enter the URL for your GitHub repository.

6. In **Primary source webhook events**, select the following.

#### Note

The **Primary source webhook events** section is only visible if you chose **Repository in my GitHub account** in the previous step.

1. Select **Rebuild every time a code change is pushed to this repository** when you create your project.
2. From **Event type**, choose one or more events.
3. To filter when an event triggers a build, under **Start a build under these conditions**, add one or more optional filters.
4. To filter when an event is not triggered, under **Don't start a build under these conditions**, add one or more optional filters.
5. Choose **Add filter group** to add another filter group, if needed.

For more information about GitHub webhook event types and filters, see [GitHub webhook events \(p. 233\)](#).

7. In **Environment**:

#### Environment image

Choose one of the following:

To use a Docker image managed by AWS CodeBuild:

Choose **Managed image**, and then make selections from **Operating system**, **Runtime(s)**, **Image**, and **Image version**. Make a selection from **Environment type** if it is available.

To use another Docker image:

Choose **Custom image**. For **Environment type**, choose **ARM**, **Linux**, **Linux GPU**, or **Windows**. If you choose **Other registry**, for **External registry URL**, enter the name and tag of the Docker image in Docker Hub, using the format `docker repository/docker image name`. If you choose **Amazon ECR**, use **Amazon ECR repository** and **Amazon ECR image** to choose the Docker image in your AWS account.

To use a private Docker image:

Choose **Custom image**. For **Environment type**, choose **ARM, Linux, Linux GPU**, or **Windows**. For **Image registry**, choose **Other registry**, and then enter the ARN of the credentials for your private Docker image. The credentials must be created by Secrets Manager. For more information, see [What Is AWS Secrets Manager?](#) in the *AWS Secrets Manager User Guide*.

#### Service role

Choose one of the following:

- If you do not have a CodeBuild service role, choose **New service role**. In **Role name**, enter a name for the new role.
- If you have a CodeBuild service role, choose **Existing service role**. In **Role ARN**, choose the service role.

#### Note

When you use the console to create or update a build project, you can create a CodeBuild service role at the same time. By default, the role works with that build project only. If you use the console to associate this service role with another build project, the role is updated to work with the other build project. A service role can work with up to 10 build projects.

8. In **Buildspec**, do one of the following:

- Choose **Use a buildspec file** to use the buildspec.yml file in the source code root directory.
- Choose **Insert build commands** to use the console to insert build commands.

For more information, see the [Buildspec reference \(p. 129\)](#).

9. In **Artifacts**:

#### Type

Choose one of the following:

- If you do not want to create build output artifacts, choose **No artifacts**.
- To store the build output in an S3 bucket, choose **Amazon S3**, and then do the following:
  - If you want to use your project name for the build output ZIP file or folder, leave **Name** blank. Otherwise, enter the name. By default, the artifact name is the project name. If you want to use a different name, enter it in the artifacts name box. If you want to output a ZIP file, include the zip extension.
  - For **Bucket name**, choose the name of the output bucket.
  - If you chose **Insert build commands** earlier in this procedure, for **Output files**, enter the locations of the files from the build that you want to put into the build output ZIP file or folder. For multiple locations, separate each location with a comma (for example, appspec.yml, target/my-app.jar). For more information, see the description of files in [Buildspec syntax \(p. 130\)](#).

#### Additional configuration

Expand **Additional configuration** and set options as appropriate.

10. Choose **Create build project**. On the **Review** page, choose **Start build** to run the build.

## Verification checks

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Build projects**.

3. Do one of the following:
  - Choose the link for the build project with webhooks you want to verify, and then choose **Build details**.
  - Choose the button next to the build project with webhooks you want to verify, choose **View details**, and then choose the **Build details** tab.
4. In **Primary source webhook events**, choose the **Webhook URL** link.
5. In your GitHub repository, on the **Settings** page, under **Webhooks**, verify that **Pull Requests** and **Pushes** are selected.
6. In your GitHub profile settings, under **Personal settings**, **Applications**, **Authorized OAuth Apps**, you should see that your application has been authorized to access the AWS Region you selected.

## Create a static website with build output hosted in an S3 bucket

You can disable the encryption of artifacts in a build. You might want to do this so that you can publish artifacts to a location that is configured to host a website. (You cannot publish encrypted artifacts.) This sample shows how you can use webhooks to trigger a build and publish its artifacts to an S3 bucket that is configured to be a website.

1. Follow the instructions in [Setting up a static website](#) to configure an S3 bucket to function like a website.
2. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
3. If a CodeBuild information page is displayed, choose **Create build project**. Otherwise, on the navigation pane, expand **Build**, choose **Build projects**, and then choose **Create build project**.
4. In **Project name**, enter a name for this build project. Build project names must be unique across each AWS account. You can also include an optional description of the build project to help other users understand what this project is used for.
5. In **Source**, for **Source provider**, choose **GitHub**. Follow the instructions to connect (or reconnect) with GitHub, and then choose **Authorize**.

For **Webhook**, select **Rebuild every time a code change is pushed to this repository**. You can select this check box only if you chose **Use a repository in my account**.

**Source**

Add source

Source 1 - Primary

Source provider

GitHub

Repository

Public repository       Repository in my GitHub account

GitHub repository

Disconnect GitHub account

▼ Additional configuration

Git clone depth

Git clone depth - *optional*

1

Build Status - *optional*

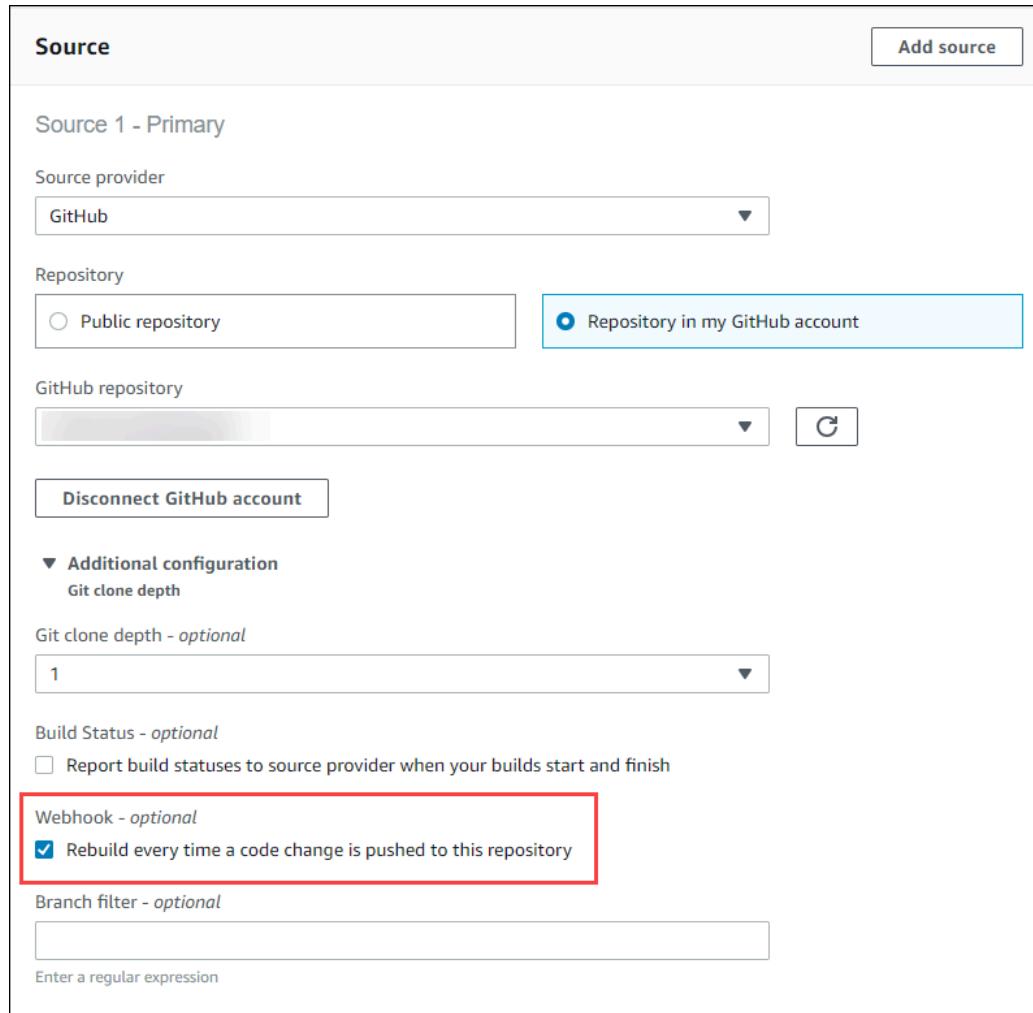
Report build statuses to source provider when your builds start and finish

Webhook - *optional*

Rebuild every time a code change is pushed to this repository

Branch filter - *optional*

Enter a regular expression



6. In **Environment**:

For **Environment image**, do one of the following:

- To use a Docker image managed by AWS CodeBuild, choose **Managed image**, and then make selections from **Operating system**, **Runtime(s)**, **Image**, and **Image version**. Make a selection from **Environment type** if it is available.
- To use another Docker image, choose **Custom image**. For **Environment type**, choose **ARM**, **Linux**, **Linux GPU**, or **Windows**. If you choose **Other registry**, for **External registry URL**, enter the name and tag of the Docker image in Docker Hub, using the format `docker repository/docker image name`. If you choose **Amazon ECR**, use **Amazon ECR repository** and **Amazon ECR image** to choose the Docker image in your AWS account.
- To use a private Docker image, choose **Custom image**. For **Environment type**, choose **ARM**, **Linux**, **Linux GPU**, or **Windows**. For **Image registry**, choose **Other registry**, and then enter the ARN of the credentials for your private Docker image. The credentials must be created by Secrets Manager. For more information, see [What Is AWS Secrets Manager?](#) in the [AWS Secrets Manager User Guide](#).

7. In **Service role**, do one of the following:

- If you do not have a CodeBuild service role, choose **New service role**. In **Role name**, enter a name for the new role.

- If you have a CodeBuild service role, choose **Existing service role**. In **Role ARN**, choose the service role.

**Note**

When you use the console to create or update a build project, you can create a CodeBuild service role at the same time. By default, the role works with that build project only. If you use the console to associate this service role with another build project, the role is updated to work with the other build project. A service role can work with up to 10 build projects.

8. In **Buildspec**, do one of the following:

- Choose **Use a buildspec file** to use the buildspec.yml file in the source code root directory.
- Choose **Insert build commands** to use the console to insert build commands.

For more information, see the [Buildspec reference \(p. 129\)](#).

9. In **Artifacts**, for **Type**, choose **Amazon S3** to store the build output in an S3 bucket.
10. For **Bucket name**, choose the name of the S3 bucket you configured to function as a website in step 1.
11. If you chose **Insert build commands** in **Environment**, then for **Output files**, enter the locations of the files from the build that you want to put into the output bucket. If you have more than one location, use a comma to separate each location (for example, `appspec.yml, target/my-app.jar`). For more information, see [Artifacts reference-key in the buildspec file](#).
12. Select **Disable artifacts encryption**.
13. Expand **Additional configuration** and choose options as appropriate.
14. Choose **Create build project**. On the build project page, in **Build history**, choose **Start build** to run the build.
15. (Optional) Follow the instructions in [Example: Speed up your website with Amazon CloudFront](#) in the [Amazon S3 Developer Guide](#).

## Runtime versions in buildspec file sample for CodeBuild

If you use the Amazon Linux 2 (AL2) standard image version 1.0 or later, or the Ubuntu standard image version 2.0 or later, you can specify one or more runtimes in the `runtime-versions` section of your buildspec file. This sample shows how you can change your project runtime, specify more than one runtime, and specify a runtime that is dependent on another runtime. For information about supported runtimes, see [Docker images provided by CodeBuild \(p. 153\)](#).

**Note**

If you use Docker in your build container, your build must run in privileged mode. For more information, see [Run a build in AWS CodeBuild \(p. 271\)](#) and [Create a build project in AWS CodeBuild \(p. 187\)](#).

### Update your runtime version

You can modify the runtime used by your project to a new version by updating the `runtime-versions` section of your buildspec file. The following examples show how to specify java versions 8 and 11.

- A `runtime-versions` section that specifies version 8 of Java:

```
phases:  
  install:  
    runtime-versions:
```

```
java: corretto8
```

- A `runtime-versions` section that specifies version 11 of Java:

```
phases:  
  install:  
    runtime-versions:  
      java: corretto11
```

The following examples show how to specify different versions of Python using the Ubuntu standard image 5.0 or the Amazon Linux 2 standard image 3.0:

- A `runtime-versions` section that specifies Python version 3.7:

```
phases:  
  install:  
    runtime-versions:  
      python: 3.7
```

- A `runtime-versions` section that specifies Python version 3.8:

```
phases:  
  install:  
    runtime-versions:  
      python: 3.8
```

This sample demonstrates a project that starts with the Java version 8 runtime, and then is updated to the Java version 10 runtime.

1. Follow steps 1 and 2 in [Create the source code \(p. 64\)](#) to generate source code. If successful, a directory named `my-web-app` is created with your source files.
2. Create a file named `buildspec.yml` with the following contents. Store the file in the `(root directory name)/my-web-app` directory.

```
version: 0.2  
  
phases:  
  install:  
    runtime-versions:  
      java: corretto8  
  build:  
    commands:  
      - java -version  
      - mvn package  
  artifacts:  
    files:  
      - '**/*'  
  base-directory: 'target/my-web-app'
```

In the `buildspec` file:

- The `runtime-versions` section specifies that the project uses version 8 of the Java runtime.
- The `- java -version` command displays the version of Java used by your project when it builds.

Your file structure should now look like this.

```
(root directory name)
### my-web-app
### src
#   ### main
#   ### resources
#   ### webapp
#       ### WEB-INF
#           ### web.xml
#               ### index.jsp
### buildspec.yml
### pom.xml
```

3. Upload the contents of the my-web-app directory to an S3 input bucket or a CodeCommit, GitHub, or Bitbucket repository.

**Important**

Do not upload *(root directory name)* or *(root directory name)/my-web-app*,

just the directories and files in *(root directory name)/my-web-app*.

If you are using an S3 input bucket, be sure to create a ZIP file that contains the directory structure and files, and then upload it to the input bucket. Do not add *(root directory name)* or *(root directory name)/my-web-app* to the ZIP file, just the directories and files in *(root directory name)/my-web-app*.

4. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
5. Create a build project. For more information, see [Create a build project \(console\) \(p. 188\)](#) and [Run a build \(console\) \(p. 272\)](#). Leave all settings at their default values, except for these settings.
  - For **Environment**:
    - For **Environment image**, choose **Managed image**.
    - For **Operating system**, choose **Amazon Linux 2**.
    - For **Runtime(s)**, choose **Standard**.
    - For **Image**, choose **aws/codebuild/amazonlinux2-x86\_64-standard:4.0**.
6. Choose **Start build**.
7. On **Build configuration**, accept the defaults, and then choose **Start build**.
8. After the build is complete, view the build output on the **Build logs** tab. You should see output similar to the following:

```
[Container] Date Time Phase is DOWNLOAD_SOURCE
[Container] Date Time CODEBUILD_SRC_DIR=/codebuild/output/src460614277/src
[Container] Date Time YAML location is /codebuild/output/src460614277/src/buildspec.yml
[Container] Date Time Processing environment variables
[Container] Date Time Selecting 'java' runtime version 'corretto8' based on manual
selections...
[Container] Date Time Running command echo "Installing Java version 8 ..."
Installing Java version 8 ...

[Container] Date Time Running command export JAVA_HOME="$JAVA_8_HOME"
[Container] Date Time Running command export JRE_HOME="$JRE_8_HOME"
[Container] Date Time Running command export JDK_HOME="$JDK_8_HOME"
[Container] Date Time Running command for tool_path in "$JAVA_8_HOME"/bin/*
"$JRE_8_HOME"/bin/*;
```

9. Update the `runtime-versions` section with Java version 11:

```
install:
```

```
runtime-versions:  
  java: corretto11
```

10. After you save the change, run your build again and view the build output. You should see that the installed version of Java is 11. You should see output similar to the following:

```
[Container] Date Time Phase is DOWNLOAD_SOURCE  
[Container] Date Time CODEBUILD_SRC_DIR=/codebuild/output/src460614277/src  
[Container] Date Time YAML location is /codebuild/output/src460614277/src/buildspec.yml  
[Container] Date Time Processing environment variables  
[Container] Date Time Selecting 'java' runtime version 'corretto11' based on manual  
  selections...  
Installing Java version 11 ...  
  
[Container] Date Time Running command export JAVA_HOME="$JAVA_11_HOME"  
[Container] Date Time Running command export JRE_HOME="$JRE_11_HOME"  
[Container] Date Time Running command export JDK_HOME="$JDK_11_HOME"  
  
[Container] Date Time Running command for tool_path in "$JAVA_11_HOME"/bin/*  
  "$JRE_11_HOME"/bin/*;
```

## Specify a runtime dependency

This example shows how to specify a runtime and a dependency runtime. For example, any supported Android runtime version is dependent on the Java runtime version 8. For example, if you specify Android version 29 and use Amazon Linux 2 or Ubuntu, you can also specify Java version 8. If you do not specify the dependent runtime, CodeBuild attempts to choose it for you.

The build project in this example uses source code in the GitHub [AWS samples](#) repository. The source code uses the Android version 28 runtime and the build project uses Amazon Linux 2, so the buildspec also specifies Java version 8.

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. Create a build project. For more information, see [Create a build project \(console\) \(p. 188\)](#) and [Run a build \(console\) \(p. 272\)](#). Leave all settings at their default values, except for these settings.
  - For **Source**:
    - For **Source provider**, choose **GitHub**.  
  
If you have not previously connected your GitHub account, choose **Connect using OAuth** or **Connect with a GitHub personal access token** and follow the instructions to connect (or reconnect) to GitHub and authorize access to AWS CodeBuild.
      - For **Repository**, choose **Public repository**.
      - For **Repository URL**, enter <https://github.com/aws-samples/aws-mobile-android-notes-tutorial>.
    - For **Environment**:
      - For **Environment image**, choose **Managed image**.
      - For **Operating system**, choose **Amazon Linux 2**.
      - For **Runtime(s)**, choose **Standard**.
      - For **Image**, choose **aws/codebuild/amazonlinux2-x86\_64-standard:4.0**.
  - 3. For **Build specifications**, choose **Insert build commands**, and then choose **Switch to editor**.
  - 4. In **Build commands**, replace the placeholder text with the following:

```
version: 0.2

phases:
  install:
    runtime-versions:
      android: 29
      java: corretto8
  build:
    commands:
      - ./gradlew assembleDebug
artifacts:
  files:
    - app/build/outputs/apk/app-debug.apk
```

The `runtime-versions` section specifies both Android version 29 and Java version 8 runtimes.

5. Choose **Create build project**.
6. Choose **Start build**.
7. On **Build configuration**, accept the defaults, and then choose **Start build**.
8. After the build is complete, view the build output on the **Build logs** tab. You should see output similar to the following. It shows that Android version 29 and Java version 8 are installed:

```
[Container] 2019/05/14 23:21:42 Entering phase DOWNLOAD_SOURCES
[Container] Date Time Running command echo "Installing Android version 29 ..."
Installing Android version 29 ...

[Container] Date Time Running command echo "Installing Java version 8 ..."
Installing Java version 8 ...
```

## Specify two runtimes

You can specify more than one runtime in the same CodeBuild build project. This sample project uses two source files: one that uses the Go runtime and one that uses the Node.js runtime.

1. Create a directory named `my-source`.
2. Inside the `my-source` directory, create a directory named `golang-app`.
3. Create a file named `hello.go` with the following contents. Store the file in the `golang-app` directory.

```
package main
import "fmt"

func main() {
    fmt.Println("hello world from golang")
    fmt.Println("1+1 =", 1+1)
    fmt.Println("7.0/3.0 =", 7.0/3.0)
    fmt.Println(true && false)
    fmt.Println(true || false)
    fmt.Println(!true)
    fmt.Println("good bye from golang")
}
```

4. Inside the `my-source` directory, create a directory named `nodejs-app`. It should be at the same level as the `golang-app` directory.
5. Create a file named `index.js` with the following contents. Store the file in the `nodejs-app` directory.

```
console.log("hello world from nodejs");
console.log("1+1 =" + (1+1));
console.log("7.0/3.0 =" + 7.0/3.0);
console.log(true && false);
console.log(true || false);
console.log(!true);
console.log("good bye from nodejs");
```

6. Create a file named package.json with the following contents. Store the file in the nodejs-app directory.

```
{
  "name": "mycompany-app",
  "version": "1.0.0",
  "description": "",
  "main": "index.js",
  "scripts": {
    "test": "echo \\\"run some tests here\\\""
  },
  "author": "",
  "license": "ISC"
}
```

7. Create a file named buildspec.yml with the following contents. Store the file in the my-source directory, at the same level as the nodejs-app and golang-app directories. The runtime-versions section specifies the Node.js version 12 and Go version 1.13 runtimes.

```
version: 0.2

phases:
  install:
    runtime-versions:
      golang: 1.13
      nodejs: 12
  build:
    commands:
      - echo Building the Go code...
      - cd $CODEBUILD_SRC_DIR/golang-app
      - go build hello.go
      - echo Building the Node code...
      - cd $CODEBUILD_SRC_DIR/nodejs-app
      - npm run test
  artifacts:
    secondary-artifacts:
      golang_artifacts:
        base-directory: golang-app
        files:
          - hello
      nodejs_artifacts:
        base-directory: nodejs-app
        files:
          - index.js
          - package.json
```

8. Your file structure should now look like this.

```
my-source
### golang-app
#   ### hello.go
### nodejs.app
#   ### index.js
#   ### package.json
```

```
### buildspec.yml
```

9. Upload the contents of the `my-source` directory to an S3 input bucket or a CodeCommit, GitHub, or Bitbucket repository.

**Important**

If you are using an S3 input bucket, be sure to create a ZIP file that contains the directory structure and files, and then upload it to the input bucket. Do not add `my-source` to the ZIP file, just the directories and files in `my-source`.

10. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
11. Create a build project. For more information, see [Create a build project \(console\) \(p. 188\)](#) and [Run a build \(console\) \(p. 272\)](#). Leave all settings at their default values, except for these settings.
  - For **Environment**:
    - For **Environment image**, choose **Managed image**.
    - For **Operating system**, choose **Amazon Linux 2**.
    - For **Runtime(s)**, choose **Standard**.
    - For **Image**, choose **aws/codebuild/amazonlinux2-x86\_64-standard:4.0**.
12. Choose **Create build project**.
13. Choose **Start build**.
14. On **Build configuration**, accept the defaults, and then choose **Start build**.
15. After the build is complete, view the build output on the **Build logs** tab. You should see output similar to the following. It shows output from the Go and Node.js runtimes. It also shows output from the Go and Node.js applications.

```
[Container] Date Time Processing environment variables
[Container] Date Time Selecting 'golang' runtime version '1.13' based on manual
selections...
[Container] Date Time Selecting 'nodejs' runtime version '12' based on manual
selections...
[Container] Date Time Running command echo "Installing Go version 1.13 ..."
Installing Go version 1.13 ...

[Container] Date Time Running command echo "Installing Node.js version 12 ..."
Installing Node.js version 12 ...

[Container] Date Time Running command n $NODE_12_VERSION
           installed : v12.20.1 (with npm 6.14.10)

[Container] Date Time Moving to directory /codebuild/output/src819694850/src
[Container] Date Time Registering with agent
[Container] Date Time Phases found in YAML: 2
[Container] Date Time  INSTALL: 0 commands
[Container] Date Time  BUILD: 1 commands
[Container] Date Time Phase complete: DOWNLOAD_SOURCE State: SUCCEEDED
[Container] Date Time Phase context status code: Message:
[Container] Date Time Entering phase INSTALL
[Container] Date Time Phase complete: INSTALL State: SUCCEEDED
[Container] Date Time Phase context status code: Message:
[Container] Date Time Entering phase PRE_BUILD
[Container] Date Time Phase complete: PRE_BUILD State: SUCCEEDED
[Container] Date Time Phase context status code: Message:
[Container] Date Time Entering phase BUILD
[Container] Date Time Running command echo Building the Go code...
Building the Go code...

[Container] Date Time Running command cd $CODEBUILD_SRC_DIR/golang-app
[Container] Date Time Running command go build hello.go
```

```
[Container] Date Time Running command echo Building the Node code...
Building the Node code...

[Container] Date Time Running command cd $CODEBUILD_SRC_DIR/nodejs-app
[Container] Date Time Running command npm run test
> mycompany-app@1.0.0 test /codebuild/output/src924084119/src/nodejs-app
> echo "run some tests here"

run some tests here
```

## Source version sample with AWS CodeBuild

This sample demonstrates how to specify a version of your source using a format other than a commit ID (also known as a commit SHA). You can specify the version of your source in the following ways:

- For an Amazon S3 source provider, use the version ID of the object that represents the build input ZIP file.
- For CodeCommit, Bitbucket, GitHub, and GitHub Enterprise Server, use one of the following:
  - Pull request as a pull request reference (for example, `refs/pull/1/head`).
  - Branch as a branch name.
  - Commit ID.
  - Tag.
  - Reference and a commit ID. The reference can be one of the following:
    - A tag (for example, `refs/tags/mytagv1.0^{full-commit-SHA}`).
    - A branch (for example, `refs/heads/mydevbranch^{full-commit-SHA}`).
    - A pull request (for example, `refs/pull/1/head^{full-commit-SHA}`).

### Note

You can specify the version of a pull request source only if your repository is GitHub or GitHub Enterprise Server.

If you use a reference and a commit ID to specify a version, the DOWNLOAD\_SOURCE phase of your build is faster than if you provide the version only. This is because when you add a reference, CodeBuild does not need to download the entire repository to find the commit.

- You can specify a source version with only a commit ID, such as `12345678901234567890123467890123456789`. If you do this, CodeBuild must download the entire repository to find the version.
- You can specify a source version with a reference and a commit ID in this format: `refs/heads/branchname^{full-commit-SHA}` (for example, `refs/heads/main^{12345678901234567890123467890123456789}`). If you do this, CodeBuild downloads only the specified branch to find the version..

### Note

To speed up the DOWNLOAD\_SOURCE phase of your build, you can also set **Git clone depth** to a low number. CodeBuild downloads fewer versions of your repository.

### To specify a GitHub repository version with a commit ID

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.

2. Create a build project. For information, see [Create a build project \(console\) \(p. 188\)](#) and [Run a build \(console\) \(p. 272\)](#). Leave all settings at their default values, except for these settings:
  - In **Source**:
    - For **Source provider**, choose **GitHub**. If you are not connected to GitHub, follow the instructions to connect.
    - For **Repository**, choose **Public repository**.
    - For **Repository URL**, enter **https://github.com/aws/aws-sdk-ruby.git**.
  - In **Environment**:
    - For **Environment image**, choose **Managed image**.
    - For **Operating system**, choose **Amazon Linux 2**.
    - For **Runtime(s)**, choose **Standard**.
    - For **Image**, choose **aws/codebuild/amazonlinux2-x86\_64-standard:4.0**.
3. For **Build specifications**, choose **Insert build commands**, and then choose **Switch to editor**.
4. In **Build commands**, replace the placeholder text with the following:

```
version: 0.2

phases:
  install:
    runtime-versions:
      ruby: 2.6
  build:
    commands:
      - echo $CODEBUILD_RESOLVED_SOURCE_VERSION
```

The `runtime-versions` section is required when you use the Ubuntu standard image 2.0. Here, the Ruby version 2.6 runtime is specified, but you can use any runtime. The `echo` command displays the version of the source code stored in the `CODEBUILD_RESOLVED_SOURCE_VERSION` environment variable.

5. On **Build configuration**, accept the defaults, and then choose **Start build**.
6. For **Source version**, enter **046e8b67481d53bdc86c3f6affdd5d1afae6d369**. This is the SHA of a commit in the `https://github.com/aws/aws-sdk-ruby.git` repository.
7. Choose **Start build**.
8. When the build is complete, you should see the following:

- On the **Build logs** tab, which version of the project source was used. Here is an example.

```
[Container] Date Time Running command echo $CODEBUILD_RESOLVED_SOURCE_VERSION
046e8b67481d53bdc86c3f6affdd5d1afae6d369

[Container] Date Time Phase complete: BUILD State: SUCCEEDED
```

- On the **Environment variables** tab, the **Resolved source version** matches the commit ID used to create the build.
- On the **Phase details** tab, the duration of the DOWNLOAD\_SOURCE phase.

These steps show you how to create a build using the same version of the source. This time, the version of the source is specified using a reference with the commit ID.

### To specify a GitHub repository version with a commit ID and reference

1. From the left navigation pane, choose **Build projects**, and then choose the project you created earlier.

2. Choose **Start build**.
3. In **Source version**, enter `refs/heads/main^{046e8b67481d53bcd86c3f6affdd5d1afae6d369}`. This is the same commit ID and a reference to a branch in the format `refs/heads/branchname^{full-commit-SHA}`.
4. Choose **Start build**.
5. When the build is complete, you should see the following:

- On the **Build logs** tab, which version of the project source was used. Here is an example.

```
[Container] Date Time Running command echo $CODEBUILD_RESOLVED_SOURCE_VERSION  
046e8b67481d53bcd86c3f6affdd5d1afae6d369
```

```
[Container] Date Time Phase complete: BUILD State: SUCCEEDED
```

- On the **Environment variables** tab, the **Resolved source version** matches the commit ID used to create the build.
- On the **Phase details** tab, the duration of the DOWNLOAD\_SOURCE phase should be shorter than the duration when you used only the commit ID to specify the version of your source.

## Private registry with AWS Secrets Manager sample for CodeBuild

This sample shows you how to use a Docker image that is stored in a private registry as your AWS CodeBuild runtime environment. The credentials for the private registry are stored in AWS Secrets Manager. Any private registry works with CodeBuild. This sample uses Docker Hub.

### Note

Secrets are visible to actions and are not masked when written to a file.

## Private registry sample requirements

To use a private registry with AWS CodeBuild, you must have the following:

- A Secrets Manager secret that stores your Docker Hub credentials. The credentials are used to access your private repository.

### Note

You will be charged for secrets that you create.

- A private repository or account.
- A CodeBuild service role IAM policy that grants access to your Secrets Manager secret.

Follow these steps to create these resources and then create a CodeBuild build project using the Docker images stored in your private registry.

## Create a CodeBuild project with a private registry

1. For information about how to create a free private repository, see [Repositories on Docker Hub](#). You can also run the following commands in a terminal to pull an image, get its ID, and push it to a new repository.

```
docker pull amazonlinux  
docker images amazonlinux --format {{.ID}}  
docker tag image-id your-username/repository-name:tag
```

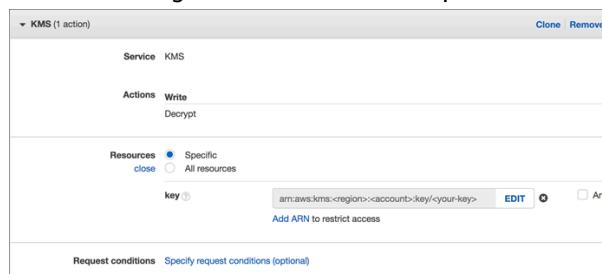
```
docker login  
docker push your-username/repository-name
```

2. Follow the steps in [Create an AWS Secrets Manager secret](#) in the *AWS Secrets Manager User Guide*.
  - a. In step 3, in **Choose secret type**, choose **Other type of secret**.
  - b. In **Key/value pairs**, create one key-value pair for your Docker Hub user name and one key-value pair for your Docker Hub password.
  - c. Continue following the steps in [Create an AWS Secrets Manager secret](#).
  - d. In step 5, on the **Configure automatic rotation** page, turn it off because the keys correspond to your Docker Hub credentials.
  - e. Finish following the steps in [Create an AWS Secrets Manager secret](#).

For more information, see [What is AWS Secrets Manager?](#)

3. When you create an AWS CodeBuild project in the console, CodeBuild attaches the required permission for you. If you use an AWS KMS key other than DefaultEncryptionKey, you must add it to the service role. For more information, see [Modifying a role \(console\)](#) in the *IAM User Guide*.

For your service role to work with Secrets Manager, it must have, at a minimum, the `secretsmanager:GetSecretValue` permission.



4. To use the console to create a project with an environment stored in a private registry, do the following while you create a project. For information, see [Create a build project \(console\) \(p. 188\)](#).

**Note**

If your private registry is in your VPC, it must have public internet access. CodeBuild cannot pull an image from a private IP address in a VPC.

- a. In **Environment image**, choose **Custom image**.
- b. For **Environment type**, choose **Linux or Windows**.
- c. For **Image registry**, choose **Other registry**.
- d. In **External registry URL**, enter the image location and in **Registry credential - optional** enter the ARN or name of your Secrets Manager credentials.

**Note**

If your credentials do not exist in your current Region, then you must use the ARN. You cannot use the credential name if the credentials exist in a different Region.

## Multiple input sources and output artifacts sample

You can create an AWS CodeBuild build project with more than one input source and more than one set of output artifacts. This sample shows you how to set up a build project that:

- Uses multiple sources and repositories of varying types.
- Publishes build artifacts to multiple S3 buckets in a single build.

In this sample, you create a build project and use it to run a build. The sample uses the build project's buildspec file to show you how to incorporate more than one source and create more than one set of artifacts.

1. Upload your sources to one or more S3 buckets, CodeCommit, GitHub, GitHub Enterprise Server, or Bitbucket repositories.
2. Choose which source is the primary source. This is the source in which CodeBuild looks for and runs your buildspec file.
3. Create a build project. For more information, see [Create a build project in AWS CodeBuild \(p. 187\)](#).
4. Follow the instructions in [Run AWS CodeBuild directly \(p. 391\)](#) to create your build project, run the build, and get information about the build.
5. If you use the AWS CLI to create the build project, the JSON-formatted input to the `create-project` command might look similar to the following:

```
{  
    "name": "sample-project",  
    "source": {  
        "type": "S3",  
        "location": "<bucket/sample.zip>"  
    },  
    "secondarySources": [  
        {  
            "type": "CODECOMMIT",  
            "location": "https://git-codecommit.us-west-2.amazonaws.com/v1/repos/repo",  
            "sourceIdentifier": "source1"  
        },  
        {  
            "type": "GITHUB",  
            "location": "https://github.com/aws-labs/aws-codebuild-jenkins-plugin",  
            "sourceIdentifier": "source2"  
        }  
    ],  
    "secondaryArtifacts": [  
        {  
            "type": "S3",  
            "location": "<output-bucket>",  
            "artifactIdentifier": "artifact1"  
        },  
        {  
            "type": "S3",  
            "location": "<other-output-bucket>",  
            "artifactIdentifier": "artifact2"  
        }  
    ],  
    "environment": {  
        "type": "LINUX_CONTAINER",  
        "image": "aws/codebuild/standard:5.0",  
        "computeType": "BUILD_GENERAL1_SMALL"  
    },  
    "serviceRole": "arn:aws:iam::account-ID:role/role-name",  
    "encryptionKey": "arn:aws:kms:region-ID:account-ID:key/key-ID"  
}
```

Your primary source is defined under the `source` attribute. All other sources are called secondary sources and appear under `secondarySources`. All secondary sources are installed in their own directory. This directory is stored in the built-in environment variable `CODEBUILD_SRC_DIR` `sourceIdentifier`. For more information, see [Environment variables in build environments \(p. 164\)](#).

The `secondaryArtifacts` attribute contains a list of artifact definitions. These artifacts use the `secondary-artifacts` block of the buildspec file that is nested inside the `artifacts` block.

Secondary artifacts in the buildspec file have the same structure as artifacts and are separated by their artifact identifier.

**Note**

In the [CodeBuild API](#), the `artifactIdentifier` on a secondary artifact is a required attribute in `CreateProject` and `UpdateProject`. It must be used to reference a secondary artifact.

Using the preceding JSON-formatted input, the buildspec file for the project might look like:

```
version: 0.2

phases:
  install:
    runtime-versions:
      java: openjdk11
  build:
    commands:
      - cd $CODEBUILD_SRC_DIR_source1
      - touch file1
      - cd $CODEBUILD_SRC_DIR_source2
      - touch file2

artifacts:
  files:
    - '**.*'
  secondary-artifacts:
    artifact1:
      base-directory: $CODEBUILD_SRC_DIR_source1
      files:
        - file1
    artifact2:
      base-directory: $CODEBUILD_SRC_DIR_source2
      files:
        - file2
```

You can override the version of the primary source using the API with the `sourceVersion` attribute in `StartBuild`. To override one or more secondary source versions, use the `secondarySourceVersionOverride` attribute.

The JSON-formatted input to the `start-build` command in the AWS CLI might look like:

```
{
  "projectName": "sample-project",
  "secondarySourcesVersionOverride": [
    {
      "sourceIdentifier": "source1",
      "sourceVersion": "codecommit-branch"
    },
    {
      "sourceIdentifier": "source2",
      "sourceVersion": "github-branch"
    }
  ]
}
```

## Project without a source sample

You can configure a CodeBuild project by choosing the `NO_SOURCE` source type when you configure your source. When your source type is `NO_SOURCE`, you cannot specify a buildspec file because your project

does not have a source. Instead, you must specify a YAML-formatted buildspec string in the buildspec attribute of the JSON-formatted input to the create-project CLI command. It might look like this:

```
{  
  "name": "project-name",  
  "source": {  
    "type": "NO_SOURCE",  
    "buildspec": "version: 0.2\n\nphases:\n  build:\n    commands:\n      - command"  
  },  
  "environment": {  
    "type": "LINUX_CONTAINER",  
    "image": "aws/codebuild/standard:5.0",  
    "computeType": "BUILD_GENERAL1_SMALL",  
  },  
  "serviceRole": "arn:aws:iam::account-ID:role/role-name",  
  "encryptionKey": "arn:aws:kms:region-ID:account-ID:key/key-ID"  
}
```

For more information, see [Create a build project \(AWS CLI\) \(p. 198\)](#).

To learn how to create a pipeline that uses multiple source inputs to CodeBuild to create multiple output artifacts, see [AWS CodePipeline integration with CodeBuild and multiple input sources and output artifacts sample \(p. 61\)](#).

## Use semantic versioning to name build artifacts sample

This sample contains example buildspec files that demonstrate how to specify an artifact name that is created at build time. A name specified in a buildspec file can incorporate Shell commands and environment variables to make it unique. A name you specify in a buildspec file overrides a name you enter in the console when you create your project.

If you build multiple times, using an artifact name specified in the buildspec file can ensure your output artifact file names are unique. For example, you can use a date and timestamp that is inserted into an artifact name at build time.

If you want to override the artifact name you entered in the console with a name in the buildspec file, do the following:

1. Set your build project to override the artifact name with a name in the buildspec file.
  - If you use the console to create your build project, select **Enable semantic versioning**. For more information, see [Create a build project \(console\) \(p. 188\)](#).
  - If you use the AWS CLI, set the overrideArtifactName to true in the JSON-formatted file passed to create-project. For more information, see [Create a build project \(AWS CLI\) \(p. 198\)](#).
  - If you use the AWS CodeBuild API, set the overrideArtifactName flag on the ProjectArtifacts object when a project is created or updated or a build is started.
2. Specify a name in the buildspec file. Use the following sample buildspec files as a guide.

This Linux example shows you how to specify an artifact name that includes the date the build is created:

```
version: 0.2  
phases:  
  build:  
    commands:
```

```
    - rspec HelloWorld_spec.rb
artifacts:
  files:
    - '**/*'
  name: myname-$(date +%Y-%m-%d)
```

This Linux example shows you how to specify an artifact name that uses a CodeBuild environment variable. For more information, see [Environment variables in build environments \(p. 164\)](#).

```
version: 0.2
phases:
  build:
    commands:
      - rspec HelloWorld_spec.rb
artifacts:
  files:
    - '**/*'
  name: myname-$AWS_REGION
```

This Windows example shows you how to specify an artifact name that includes the date and time the build is created:

```
version: 0.2
env:
  variables:
    TEST_ENV_VARIABLE: myArtifactName
phases:
  build:
    commands:
      - cd samples/helloworld
      - dotnet restore
      - dotnet run
artifacts:
  files:
    - '**/*'
  name: $Env:TEST_ENV_VARIABLE-$(Get-Date -UFormat "%Y%m%d-%H%M%S")
```

This Windows example shows you how to specify an artifact name that uses a variable declared in the buildspec file and a CodeBuild environment variable. For more information, see [Environment variables in build environments \(p. 164\)](#).

```
version: 0.2
env:
  variables:
    TEST_ENV_VARIABLE: myArtifactName
phases:
  build:
    commands:
      - cd samples/helloworld
      - dotnet restore
      - dotnet run
artifacts:
  files:
    - '**/*'
  name: $Env:TEST_ENV_VARIABLE-$Env:AWS_REGION
```

For more information, see [Build specification reference for CodeBuild \(p. 129\)](#).

# Plan a build in AWS CodeBuild

Before you use AWS CodeBuild, you must answer these questions:

- 1. Where is the source code stored?** CodeBuild currently supports building from the following source code repository providers. The source code must contain a build specification (*buildspec*) file. A *buildspec* is a collection of build commands and related settings, in YAML format, that CodeBuild uses to run a build. You can declare a *buildspec* in a build project definition.

| Repository provider | Required  | Documentation   |
|---------------------|---|---|
| CodeCommit          | Repository name.<br><br>(Optional) Commit ID associated with the source code.   | See these topics in the <i>AWS CodeCommit User Guide</i> :<br><br><a href="#">Create a CodeCommit repository</a><br><a href="#">Create a commit in CodeCommit</a> |
| Amazon S3           | Input bucket name.<br><br>Object name corresponding to the build input ZIP file that contains the source code.<br><br>(Optional) Version ID associated with the build input ZIP file. | See these topics in the <i>Amazon S3 Getting Started Guide</i> :<br><br><a href="#">Create a bucket</a><br><a href="#">Add an object to a bucket</a>              |
| GitHub              | Repository name.<br><br>(Optional) Commit ID associated with the source code.   | See this topic on the GitHub Help website:<br><br><a href="#">Create a repo</a>   |
| Bitbucket           | Repository name.<br><br>(Optional) Commit ID associated with the source code.   | See this topic on the Bitbucket Cloud documentation website:<br><br><a href="#">Create a repository</a>   |

- 2. Which build commands do you need to run and in what order?** By default, CodeBuild downloads the build input from the provider you specify and uploads the build output to the bucket you specify. You use the *buildspec* to instruct how to turn the downloaded build input into the expected build output. For more information, see the [Buildspec reference \(p. 129\)](#).
- 3. Which runtimes and tools do you need to run the build?** For example, are you building for Java, Ruby, Python, or Node.js? Does the build need Maven or Ant or a compiler for Java, Ruby, or Python? Does the build need Git, the AWS CLI, or other tools?

CodeBuild runs builds in build environments that use Docker images. These Docker images must be stored in a repository type supported by CodeBuild. These include the CodeBuild Docker image repository, Docker Hub, and Amazon Elastic Container Registry (Amazon ECR). For more information about the CodeBuild Docker image repository, see [Docker images provided by CodeBuild \(p. 153\)](#).

4. **Do you need AWS resources that aren't provided automatically by CodeBuild? If so, which security policies do those resources need?** For example, you might need to modify the CodeBuild service role to allow CodeBuild to work with those resources.
5. **Do you want CodeBuild to work with your VPC?** If so, you need the VPC ID, the subnet IDs, and security group IDs for your VPC configuration. For more information, see [Use AWS CodeBuild with Amazon Virtual Private Cloud \(p. 171\)](#).

After you have answered these questions, you should have the settings and resources you need to run a build successfully. To run your build, you can:

- Use the AWS CodeBuild console, AWS CLI, or AWS SDKs. For more information, see [Run CodeBuild directly \(p. 391\)](#).
- Create or identify a pipeline in AWS CodePipeline, and then add a build or test action that instructs CodeBuild to automatically test your code, run your build, or both. For more information, see [Use CodePipeline with CodeBuild \(p. 392\)](#).

## Build specification reference for CodeBuild

This topic provides important reference information about build specification (buildspec) files. A *buildspec* is a collection of build commands and related settings, in YAML format, that CodeBuild uses to run a build. You can include a buildspec as part of the source code or you can define a buildspec when you create a build project. For information about how a build spec works, see [How CodeBuild works \(p. 3\)](#).

### Topics

- [Buildspec file name and storage location \(p. 129\)](#)
- [Buildspec syntax \(p. 130\)](#)
- [Buildspec example \(p. 144\)](#)
- [Buildspec versions \(p. 146\)](#)
- [Batch build buildspec reference \(p. 146\)](#)
- [GitHub Action runner buildspec reference \(p. 151\)](#)

## Buildspec file name and storage location

If you include a buildspec as part of the source code, by default, the buildspec file must be named `buildspec.yml` and placed in the root of your source directory.

You can override the default buildspec file name and location. For example, you can:

- Use a different buildspec file for different builds in the same repository, such as `buildspec_debug.yml` and `buildspec_release.yml`.
- Store a buildspec file somewhere other than the root of your source directory, such as `config/buildspec.yml` or in an S3 bucket. The S3 bucket must be in the same AWS Region as your build project. Specify the buildspec file using its ARN (for example, `arn:aws:s3:::<my-codebuild-sample2>/buildspec.yml`).

You can specify only one buildspec for a build project, regardless of the buildspec file's name.

To override the default buildspec file name, location, or both, do one of the following:

- Run the AWS CLI `create-project` or `update-project` command, setting the `buildspec` value to the path to the alternate buildspec file relative to the value of the built-in environment variable `CODEBUILD_SRC_DIR`. You can also do the equivalent with the `create_project` operation in the AWS SDKs. For more information, see [Create a build project \(p. 187\)](#) or [Change a build project's settings \(p. 241\)](#).
- Run the AWS CLI `start-build` command, setting the `buildspecOverride` value to the path to the alternate buildspec file relative to the value of the built-in environment variable `CODEBUILD_SRC_DIR`. You can also do the equivalent with the `start_build` operation in the AWS SDKs. For more information, see [Run a build \(p. 271\)](#).
- In an AWS CloudFormation template, set the `BuildSpec` property of `Source` in a resource of type `AWS::CodeBuild::Project` to the path to the alternate buildspec file relative to the value of the built-in environment variable `CODEBUILD_SRC_DIR`. For more information, see the `BuildSpec` property in [AWS CodeBuild project source](#) in the *AWS CloudFormation User Guide*.

## Buildspec syntax

Buildspec files must be expressed in [YAML](#) format.

If a command contains a character, or a string of characters, that is not supported by YAML, you must enclose the command in quotation marks (""). The following command is enclosed in quotation marks because a colon (:) followed by a space is not allowed in YAML. The quotation mark in the command is escaped (\").

```
"export PACKAGE_NAME=$(cat package.json | grep name | head -1 | awk -F: '{ print $2 }' | sed 's/[\\",]//g')"
```

The buildspec has the following syntax:

```
version (p. 132): 0.2

run-as (p. 132): Linux-user-name

env (p. 132):
  shell (p. 132): shell-tag
  variables (p. 133):
    key: "value"
    key: "value"
  parameter-store (p. 133):
    key: "value"
    key: "value"
  exported-variables (p. 135):
    - variable
    - variable
  secrets-manager (p. 134):
    key: secret-id:json-key:version-stage:version-id
  git-credential-helper (p. 135): no | yes

proxy (p. 135):
  upload-artifacts (p. 135): no | yes
  logs (p. 135): no | yes

batch (p. 146):
  fast-fail: false | true
  # build-list (p. 148):
```

```

# build-matrix (p. 150):
# build-graph (p. 147):

phases (p. 135):
  install (p. 136):
    run-as (p. 136): Linux-user-name
    on-failure (p. 136): ABORT | CONTINUE
    runtime-versions (p. 136):
      runtime: version
      runtime: version
  commands (p. 137):
    - command
    - command
  finally (p. 136):
    - command
    - command
# steps (p. 151):
pre_build (p. 137):
  run-as (p. 136): Linux-user-name
  on-failure (p. 136): ABORT | CONTINUE
  commands (p. 137):
    - command
    - command
  finally (p. 136):
    - command
    - command
# steps (p. 151):
build (p. 137):
  run-as (p. 136): Linux-user-name
  on-failure (p. 136): ABORT | CONTINUE
  commands (p. 137):
    - command
    - command
  finally (p. 136):
    - command
    - command
# steps (p. 151):
post_build (p. 137):
  run-as (p. 136): Linux-user-name
  on-failure (p. 136): ABORT | CONTINUE
  commands (p. 137):
    - command
    - command
  finally (p. 136):
    - command
    - command
# steps (p. 151):
reports (p. 138):
  report-group-name-or-arn:
    files (p. 138):
      - location
      - location
    base-directory (p. 139): location
    discard-paths (p. 139): no | yes
    file-format (p. 138): report-format
artifacts (p. 139):
  files (p. 139):
    - location
    - location
  name (p. 140): artifact-name
  discard-paths (p. 141): no | yes
  base-directory (p. 141): location
  exclude-paths (p. 142): excluded paths
  enable-symlinks (p. 142): no | yes
  s3-prefix (p. 142): prefix
  secondary-artifacts (p. 142):

```

```
artifactIdentifier:  
  files (p. 139):  
    - location  
    - location  
  name (p. 140): secondary-artifact-name  
  discard-paths (p. 141): no | yes  
  base-directory (p. 141): location  
artifactIdentifier:  
  files (p. 139):  
    - location  
    - location  
  discard-paths (p. 141): no | yes  
  base-directory (p. 141): location  
cache (p. 143):  
  paths (p. 143):  
    - path  
    - path
```

The buildspec contains the following:

## version

Required mapping. Represents the buildspec version. We recommend that you use 0.2.

### Note

Although version 0.1 is still supported, we recommend that you use version 0.2 whenever possible. For more information, see [Buildspec versions \(p. 146\)](#).

## run-as

Optional sequence. Available to Linux users only. Specifies a Linux user that runs commands in this buildspec file. run-as grants the specified user read and run permissions. When you specify run-as at the top of the buildspec file, it applies globally to all commands. If you don't want to specify a user for all buildspec file commands, you can specify one for commands in a phase by using run-as in one of the phases blocks. If run-as is not specified, then all commands run as the root user.

## env

Optional sequence. Represents information for one or more custom environment variables.

### Note

To protect sensitive information, the following are hidden in CodeBuild logs:

- AWS access key IDs. For more information, see [Managing Access Keys for IAM Users](#) in the [AWS Identity and Access Management User Guide](#).
- Strings specified using the Parameter Store. For more information, see [Systems Manager Parameter Store](#) and [Systems Manager Parameter Store Console Walkthrough](#) in the [Amazon EC2 Systems Manager User Guide](#).
- Strings specified using AWS Secrets Manager. For more information, see [Key management \(p. 339\)](#).

## env/shell

Optional sequence. Specifies the supported shell for Linux or Windows operating systems.

For Linux operating systems, supported shell tags are:

- bash

- `/bin/sh`

For Windows operating systems, supported shell tags are:

- `powershell.exe`
- `cmd.exe`

#### env/variables

Required if `env` is specified, and you want to define custom environment variables in plain text.

Contains a mapping of `key/value` scalars, where each mapping represents a single custom environment variable in plain text. `key` is the name of the custom environment variable, and `value` is that variable's value.

#### Important

We strongly discourage the storing of sensitive values in environment variables.

Environment variables can be displayed in plain text using tools such as the CodeBuild console and the AWS CLI. For sensitive values, we recommend that you use `parameter-store` or `secrets-manager` mapping instead, as described later in this section.

Any environment variables you set replace existing environment variables. For example, if the Docker image already contains an environment variable named `MY_VAR` with a value of `my_value`, and you set an environment variable named `MY_VAR` with a value of `other_value`, then `my_value` is replaced by `other_value`. Similarly, if the Docker image already contains an environment variable named `PATH` with a value of `/usr/local/sbin:/usr/local/bin`, and you set an environment variable named `PATH` with a value of `$PATH:/usr/share/ant/bin`, then `/usr/local/sbin:/usr/local/bin` is replaced by the literal value `$PATH:/usr/share/ant/bin`.

Do not set any environment variable with a name that starts with `CODEBUILD_`. This prefix is reserved for internal use.

If an environment variable with the same name is defined in multiple places, the value is determined as follows:

- The value in the start build operation call takes highest precedence. You can add or override environment variables when you create a build. For more information, see [Run a build in AWS CodeBuild \(p. 271\)](#).
- The value in the build project definition takes next precedence. You can add environment variables at the project level when you create or edit a project. For more information, see [Create a build project in AWS CodeBuild \(p. 187\)](#) and [Change a build project's settings in AWS CodeBuild \(p. 241\)](#).
- The value in the buildspec declaration takes lowest precedence.

#### env/parameter-store

Required if `env` is specified, and you want to retrieve custom environment variables stored in Amazon EC2 Systems Manager Parameter Store. Contains a mapping of `key/value` scalars, where each mapping represents a single custom environment variable stored in Amazon EC2 Systems Manager Parameter Store. `key` is the name you use later in your build commands to refer to this custom environment variable, and `value` is the name of the custom environment variable stored in Amazon EC2 Systems Manager Parameter Store. To store sensitive values, see [Systems Manager Parameter Store](#) and [Walkthrough: Create and test a String parameter \(console\)](#) in the [Amazon EC2 Systems Manager User Guide](#).

#### Important

To allow CodeBuild to retrieve custom environment variables stored in Amazon EC2 Systems Manager Parameter Store, you must add the `ssm:GetParameters` action to your CodeBuild service role. For more information, see [Create a CodeBuild service role \(p. 381\)](#).

Any environment variables you retrieve from Amazon EC2 Systems Manager Parameter Store replace existing environment variables. For example, if the Docker image already contains an environment variable named `MY_VAR` with a value of `my_value`, and you retrieve an environment variable named `MY_VAR` with a value of `other_value`, then

`my_value` is replaced by `other_value`. Similarly, if the Docker image already contains an environment variable named PATH with a value of `/usr/local/sbin:/usr/local/bin`, and you retrieve an environment variable named PATH with a value of `$PATH:/usr/share/ant/bin`, then `/usr/local/sbin:/usr/local/bin` is replaced by the literal value `$PATH:/usr/share/ant/bin`.

Do not store any environment variable with a name that starts with `CODEBUILD_`. This prefix is reserved for internal use.

If an environment variable with the same name is defined in multiple places, the value is determined as follows:

- The value in the start build operation call takes highest precedence. You can add or override environment variables when you create a build. For more information, see [Run a build in AWS CodeBuild \(p. 271\)](#).
- The value in the build project definition takes next precedence. You can add environment variables at the project level when you create or edit a project. For more information, see [Create a build project in AWS CodeBuild \(p. 187\)](#) and [Change a build project's settings in AWS CodeBuild \(p. 241\)](#).
- The value in the buildspec declaration takes lowest precedence.

#### env/secrets-manager

Required if you want to retrieve custom environment variables stored in AWS Secrets Manager. Specify a Secrets Manager reference-key using the following pattern:

`<key>: <secret-id>:<json-key>:<version-stage>:<version-id>`  
`<key>`

(Required) The local environment variable name. Use this name to access the variable during the build.

`<secret-id>`

(Required) The name or Amazon Resource Name (ARN) that serves as a unique identifier for the secret. To access a secret in your AWS account, simply specify the secret name. To access a secret in a different AWS account, specify the secret ARN.

`<json-key>`

(Optional) Specifies the key name of the Secrets Manager key-value pair whose value you want to retrieve. If you do not specify a json-key, CodeBuild retrieves the entire secret text.

`<version-stage>`

(Optional) Specifies the secret version that you want to retrieve by the staging label attached to the version. Staging labels are used to keep track of different versions during the rotation process. If you use `version-stage`, don't specify `version-id`. If you don't specify a version stage or version ID, the default is to retrieve the version with the version stage value of `AWSCURRENT`.

`<version-id>`

(Optional) Specifies the unique identifier of the version of the secret that you want to use. If you specify `version-id`, don't specify `version-stage`. If you don't specify a version stage or version ID, the default is to retrieve the version with the version stage value of `AWSCURRENT`.

In the following example, `TestSecret` is the name of the key-value pair stored in Secrets Manager. The key for `TestSecret` is `MY_SECRET_VAR`. You access the variable during the build using the `LOCAL_SECRET_VAR` name.

```
env:  
  secrets-manager:
```

```
LOCAL_SECRET_VAR: "TestSecret:MY_SECRET_VAR"
```

For more information, see [What is AWS Secrets Manager](#) in the *AWS Secrets Manager User Guide*.  
**env/exported-variables**

Optional mapping. Used to list environment variables you want to export. Specify the name of each variable you want to export on a separate line under `exported-variables`. The variable you want to export must be available in your container during the build. The variable you export can be an environment variable.

Exported environment variables are used in conjunction with AWS CodePipeline to export environment variables from the current build stage to subsequent stages in the pipeline. For more information, see [Working with variables](#) in the *AWS CodePipeline User Guide*.

During a build, the value of a variable is available starting with the `install` phase. It can be updated between the start of the `install` phase and the end of the `post_build` phase. After the `post_build` phase ends, the value of exported variables cannot change.

**Note**

The following cannot be exported:

- Amazon EC2 Systems Manager Parameter Store secrets specified in the build project.
- Secrets Manager secrets specified in the build project
- Environment variables that start with `AWS_`.

**env/git-credential-helper**

Optional mapping. Used to indicate if CodeBuild uses its Git credential helper to provide Git credentials. `yes` if it is used. Otherwise, `no` or not specified. For more information, see [gitcredentials](#) on the Git website.

**Note**

`git-credential-helper` is not supported for builds that are triggered by a webhook for a public Git repository.

## proxy

Optional sequence. Used to represent settings if you run your build in an explicit proxy server. For more information, see [Run CodeBuild in an explicit proxy server \(p. 181\)](#).

**proxy/upload-artifacts**

Optional mapping. Set to `yes` if you want your build in an explicit proxy server to upload artifacts. The default is `no`.

**proxy/logs**

Optional mapping. Set to `yes` for your build in a explicit proxy server to create CloudWatch logs. The default is `no`.

## phases

Required sequence. Represents the commands CodeBuild runs during each phase of the build.

**Note**

In buildspec version 0.1, CodeBuild runs each command in a separate instance of the default shell in the build environment. This means that each command runs in isolation from all other

commands. Therefore, by default, you cannot run a single command that relies on the state of any previous commands (for example, changing directories or setting environment variables). To get around this limitation, we recommend that you use version 0.2, which solves this issue. If you must use buildspec version 0.1, we recommend the approaches in [Shells and commands in build environments \(p. 163\)](#).

#### phases/\*/**run-as**

Optional sequence. Use in a build phase to specify a Linux user that runs its commands. If `run-as` is also specified globally for all commands at the top of the buildspec file, then the phase-level user takes precedence. For example, if globally `run-as` specifies User-1, and for the `install` phase only a `run-as` statement specifies User-2, then all commands in then buildspec file are run as User-1 except commands in the `install` phase, which are run as User-2.

#### phases/\*/**on-failure**

Optional sequence. Specifies the action to take if a failure occurs during the phase. This can be one of the following values:

- ABORT - Abort the build.
- CONTINUE - Continue to the next phase.

If this property is not specified, the failure process follows the transition phases as shown in [Build phase transitions \(p. 280\)](#).

#### phases/\*/**finally**

Optional block. Commands specified in a `finally` block are run after commands in the `commands` block. The commands in a `finally` block are run even if a command in the `commands` block fails. For example, if the `commands` block contains three commands and the first fails, CodeBuild skips the remaining two commands and runs any commands in the `finally` block. The phase is successful when all commands in the `commands` and the `finally` blocks run successfully. If any command in a phase fails, the phase fails.

The allowed build phase names are:

#### phases/**install**

Optional sequence. Represents the commands, if any, that CodeBuild runs during installation. We recommend that you use the `install` phase only for installing packages in the build environment. For example, you might use this phase to install a code testing framework such as Mocha or RSpec.

#### phases/install/**runtime-versions**

Optional sequence. A runtime version is supported with the Ubuntu standard image 5.0 or later and the Amazon Linux 2 standard image 4.0 or later. If specified, at least one runtime must be included in this section. Specify a runtime using a specific version, a major version followed by `.x` to specify that CodeBuild uses that major version with its latest minor version, or `latest` to use the most recent major and minor version (for example, `ruby: 3.2`, `nodejs: 18.x`, or `java: latest`). You can specify the runtime using a number or an environment variable. For example, if you use the Amazon Linux 2 standard image 4.0, then the following specifies that version 17 of Java, the latest minor version of python version 3, and a version contained in an environment variable of Ruby is installed. For more information, see [Docker images provided by CodeBuild \(p. 153\)](#).

```
phases:  
  install:  
    runtime-versions:  
      java: corretto8  
      python: 3.x
```

```
ruby: "$MY_RUBY_VAR"
```

You can specify one or more runtimes in the `runtime-versions` section of your buildspec file. If your runtime is dependent upon another runtime, you can also specify its dependent runtime in the buildspec file. If you do not specify any runtimes in the buildspec file, CodeBuild chooses the default runtimes that are available in the image you use. If you specify one or more runtimes, CodeBuild uses only those runtimes. If a dependent runtime is not specified, CodeBuild attempts to choose the dependent runtime for you.

If two specified runtimes conflict, the build fails. For example, `android: 29` and `java: openjdk11` conflict, so if both are specified, the build fails.

For more information about the available runtimes, see [Available runtimes \(p. 155\)](#).

**Note**

If you specify a `runtime-versions` section and use an image other than Ubuntu Standard Image 2.0 or later, or the Amazon Linux 2 (AL2) standard image 1.0 or later, the build issues the warning, "Skipping install of runtimes. Runtime version selection is not supported by this build image."

#### phases/install/**commands**

Optional sequence. Contains a sequence of scalars, where each scalar represents a single command that CodeBuild runs during installation. CodeBuild runs each command, one at a time, in the order listed, from beginning to end.

#### phases/pre\_build

Optional sequence. Represents the commands, if any, that CodeBuild runs before the build. For example, you might use this phase to sign in to Amazon ECR, or you might install npm dependencies.

#### phases/pre\_build/**commands**

Required sequence if `pre_build` is specified. Contains a sequence of scalars, where each scalar represents a single command that CodeBuild runs before the build. CodeBuild runs each command, one at a time, in the order listed, from beginning to end.

#### phases/build

Optional sequence. Represents the commands, if any, that CodeBuild runs during the build. For example, you might use this phase to run Mocha, RSpec, or sbt.

#### phases/build/**commands**

Required if `build` is specified. Contains a sequence of scalars, where each scalar represents a single command that CodeBuild runs during the build. CodeBuild runs each command, one at a time, in the order listed, from beginning to end.

#### phases/post\_build

Optional sequence. Represents the commands, if any, that CodeBuild runs after the build. For example, you might use Maven to package the build artifacts into a JAR or WAR file, or you might push a Docker image into Amazon ECR. Then you might send a build notification through Amazon SNS.

#### phases/post\_build/**commands**

Required if `post_build` is specified. Contains a sequence of scalars, where each scalar represents a single command that CodeBuild runs after the build. CodeBuild runs each command, one at a time, in the order listed, from beginning to end.

## reports

### report-group-name-or-arn

Optional sequence. Specifies the report group that the reports are sent to. A project can have a maximum of five report groups. Specify the ARN of an existing report group, or the name of a new report group. If you specify a name, CodeBuild creates a report group using your project name and the name you specify in the format <project-name>-<report-group-name>. For more information, see [Report group naming \(p. 302\)](#).

### reports/<report-group>/files

Required sequence. Represents the locations that contain the raw data of test results generated by the report. Contains a sequence of scalars, with each scalar representing a separate location where CodeBuild can find test files, relative to the original build location or, if set, the base-directory. Locations can include the following:

- A single file (for example, my-test-report-file.json).
- A single file in a subdirectory (for example, *my-subdirectory*/my-test-report-file.json or *my-parent-subdirectory*/*my-subdirectory*/my-test-report-file.json).
- '\*/\*' represents all files recursively.
- *my-subdirectory*/\* represents all files in a subdirectory named *my-subdirectory*.
- *my-subdirectory*/\*\*/\* represents all files recursively starting from a subdirectory named *my-subdirectory*.

### reports/<report-group>/file-format

Optional mapping. Represents the report file format. If not specified, JUNITXML is used. This value is not case sensitive. Possible values are:

#### Test reports

CUCUMBERJSON

Cucumber JSON

JUNITXML

JUnit XML

NUNITXML

NUnit XML

NUNIT3XML

NUnit 3 XML

TESTNGXML

TestNG XML

VISUALSTUDIOTRX

Visual Studio TRX

#### Code coverage reports

CLOVERXML

Clover XML

COBERTURAXML

Cobertura XML

JACOCOXML

JaCoCo XML

SIMPLECOV

SimpleCov JSON

**Note**

CodeBuild accepts JSON code coverage reports generated by [simplecov](#), not [simplecov-json](#).

reports/<report-group>/**base-directory**

Optional mapping. Represents one or more top-level directories, relative to the original build location, that CodeBuild uses to determine where to find the raw test files.

reports/<report-group>/**discard-paths**

Optional. Specifies if the report file directories are flattened in the output. If this is not specified, or contains no, report files are output with their directory structure intact. If this contains yes, all of the test files are placed in the same output directory. For example, if a path to a test result is com/myapp/mytests/TestResult.xml, specifying yes will place this file in /TestResult.xml.

## artifacts

Optional sequence. Represents information about where CodeBuild can find the build output and how CodeBuild prepares it for uploading to the S3 output bucket. This sequence is not required if, for example, you are building and pushing a Docker image to Amazon ECR, or you are running unit tests on your source code, but not building it.

**Note**

Amazon S3 metadata has a CodeBuild header named x-amz-meta-codebuild-buildarn which contains the buildArn of the CodeBuild build that publishes artifacts to Amazon S3. The buildArn is added to allow source tracking for notifications and to reference which build the artifact is generated from.

artifacts/**files**

Required sequence. Represents the locations that contain the build output artifacts in the build environment. Contains a sequence of scalars, with each scalar representing a separate location where CodeBuild can find build output artifacts, relative to the original build location or, if set, the base directory. Locations can include the following:

- A single file (for example, my-file.jar).
- A single file in a subdirectory (for example, *my-subdirectory*/my-file.jar or *my-parent-subdirectory/my-subdirectory*/my-file.jar).
- '\*\*/\*' represents all files recursively.
- *my-subdirectory*/\* represents all files in a subdirectory named *my-subdirectory*.
- *my-subdirectory*/\*\*/\* represents all files recursively starting from a subdirectory named *my-subdirectory*.

When you specify build output artifact locations, CodeBuild can locate the original build location in the build environment. You do not have to prepend your build artifact output locations with

the path to the original build location or specify `./` or similar. If you want to know the path to this location, you can run a command such as `echo $CODEBUILD_SRC_DIR` during a build. The location for each build environment might be slightly different.

#### artifacts/**name**

Optional name. Specifies a name for your build artifact. This name is used when one of the following is true.

- You use the CodeBuild API to create your builds and the `overrideArtifactName` flag is set on the `ProjectArtifacts` object when a project is updated, a project is created, or a build is started.
- You use the CodeBuild console to create your builds, a name is specified in the buildspec file, and you select **Enable semantic versioning** when you create or update a project. For more information, see [Create a build project \(console\) \(p. 188\)](#).

You can specify a name in the buildspec file that is calculated at build time. The name specified in a buildspec file uses the Shell command language. For example, you can append a date and time to your artifact name so that it is always unique. Unique artifact names prevent artifacts from being overwritten. For more information, see [Shell command language](#).

- This is an example of an artifact name appended with the date the artifact is created.

```
version: 0.2
phases:
  build:
    commands:
      - rspec HelloWorld_spec.rb
artifacts:
  files:
    - '**/*'
  name: myname-$(date +%Y-%m-%d)
```

- This is an example of an artifact name that uses a CodeBuild environment variable. For more information, see [Environment variables in build environments \(p. 164\)](#).

```
version: 0.2
phases:
  build:
    commands:
      - rspec HelloWorld_spec.rb
artifacts:
  files:
    - '**/*'
  name: myname-$AWS_REGION
```

- This is an example of an artifact name that uses a CodeBuild environment variable with the artifact's creation date appended to it.

```
version: 0.2
phases:
  build:
    commands:
      - rspec HelloWorld_spec.rb
artifacts:
  files:
    - '**/*'
  name: $AWS_REGION-$(date +%Y-%m-%d)
```

You can add path information to the name so that the named artifacts are placed in directories based on the path in the name. In this example, build artifacts are placed in the output under `builds/<build number>/my-artifacts`.

```
version: 0.2
phases:
  build:
    commands:
      - rspec HelloWorld_spec.rb
artifacts:
  files:
    - '**/*'
  name: builds/$CODEBUILD_BUILD_NUMBER/my-artifacts
```

#### artifacts/**discard-paths**

Optional. Specifies if the build artifact directories are flattened in the output. If this is not specified, or contains no, build artifacts are output with their directory structure intact. If this contains yes, all of the build artifacts are placed in the same output directory. For example, if a path to a file in the build output artifact is com/mycompany/app/HelloWorld.java, specifying yes will place this file in /HelloWorld.java.

#### artifacts/**base-directory**

Optional mapping. Represents one or more top-level directories, relative to the original build location, that CodeBuild uses to determine which files and subdirectories to include in the build output artifact. Valid values include:

- A single top-level directory (for example, my-directory).
- 'my-directory\*' represents all top-level directories with names starting with my-directory.

Matching top-level directories are not included in the build output artifact, only their files and subdirectories.

You can use files and discard-paths to further restrict which files and subdirectories are included. For example, for the following directory structure:

```
.
### my-build-1
#   ###
#   my-file-1.txt
### my-build-2
### my-file-2.txt
### my-subdirectory
### my-file-3.txt
```

And for the following artifacts sequence:

```
artifacts:
  files:
    - '/my-file-3.txt'
  base-directory: my-build-2
```

The following subdirectory and file would be included in the build output artifact:

```
.
### my-subdirectory
### my-file-3.txt
```

While for the following artifacts sequence:

```
artifacts:
```

```
files:  
  - '**/*'  
base-directory: 'my-build*'  
discard-paths: yes
```

The following files would be included in the build output artifact:

```
.  
### my-file-1.txt  
### my-file-2.txt  
### my-file-3.txt
```

#### artifacts/exclude-paths

Optional mapping. Represents one or more paths, relative to base-directory, that CodeBuild will exclude from the build artifacts. The asterisk (\*) character matches zero or more characters of a name component without crossing folder boundaries. A double asterisk (\*\*) matches zero or more characters of a name component across all directories.

Examples of exclude-paths include the following:

- To exclude a file from all directories: "\*/*file-name*/\*\*/\*"
- To exclude all dot folders: "\*/.\*/\*\*/\*"
- To exclude all dot files: "\*/.\*"

#### artifacts/enable-symlinks

Optional. If the output type is ZIP, specifies if internal symbolic links are preserved in the ZIP file. If this contains yes, all internal symbolic links in the source will be preserved in the artifacts ZIP file.

#### artifacts/s3-prefix

Optional. Specifies a prefix used when the artifacts are output to an Amazon S3 bucket and the namespace type is BUILD\_ID. When used, the output path in the bucket is <s3-prefix>/<build-id>/<name>.zip.

#### artifacts/secondary-artifacts

Optional sequence. Represents one or more artifact definitions as a mapping between an artifact identifier and an artifact definition. Each artifact identifiers in this block must match an artifact defined in the secondaryArtifacts attribute of your project. Each separate definition has the same syntax as the artifacts block above.

##### Note

The [artifacts/files \(p. 139\)](#) sequence is always required, even when there are only secondary artifacts defined.

For example, if your project has the following structure:

```
{  
  "name": "sample-project",  
  "secondaryArtifacts": [  
    {  
      "type": "S3",  
      "location": "<output-bucket1>",  
      "artifactIdentifier": "artifact1",  
      "name": "secondary-artifact-name-1"  
    },  
    {  
      "type": "S3",  
      "location": "<output-bucket2>",  
    }]
```

```
        "artifactIdentifier": "artifact2",
        "name": "secondary-artifact-name-2"
    }
}
```

Then your buildspec looks like the following:

```
version: 0.2

phases:
build:
  commands:
    - echo Building...
artifacts:
  files:
    - '**/*'
  secondary-artifacts:
    artifact1:
      files:
        - directory/file1
      name: secondary-artifact-name-1
    artifact2:
      files:
        - directory/file2
      name: secondary-artifact-name-2
```

## cache

Optional sequence. Represents information about where CodeBuild can prepare the files for uploading cache to an S3 cache bucket. This sequence is not required if the cache type of the project is No Cache.

### cache/paths

Required sequence. Represents the locations of the cache. Contains a sequence of scalars, with each scalar representing a separate location where CodeBuild can find build output artifacts, relative to the original build location or, if set, the base directory. Locations can include the following:

- A single file (for example, `my-file.jar`).
- A single file in a subdirectory (for example, `my-subdirectory/my-file.jar` or `my-parent-subdirectory/my-subdirectory/my-file.jar`).
- `'**/*'` represents all files recursively.
- `my-subdirectory/*` represents all files in a subdirectory named `my-subdirectory`.
- `my-subdirectory/**/*` represents all files recursively starting from a subdirectory named `my-subdirectory`.

### Important

Because a buildspec declaration must be valid YAML, the spacing in a buildspec declaration is important. If the number of spaces in your buildspec declaration is invalid, builds might fail immediately. You can use a YAML validator to test whether your buildspec declarations are valid YAML.

If you use the AWS CLI, or the AWS SDKs to declare a buildspec when you create or update a build project, the buildspec must be a single string expressed in YAML format, along with required whitespace and newline escape characters. There is an example in the next section.

If you use the CodeBuild or AWS CodePipeline consoles instead of a `buildspec.yml` file, you can insert commands for the build phase only. Instead of using the preceding syntax, you list, in

a single line, all of the commands that you want to run during the build phase. For multiple commands, separate each command by `&&` (for example, `mvn test && mvn package`). You can use the CodeBuild or CodePipeline consoles instead of a `buildspec.yml` file to specify the locations of the build output artifacts in the build environment. Instead of using the preceding syntax, you list, in a single line, all of the locations. For multiple locations, separate each location with a comma (for example, `buildspec.yml, target/my-app.jar`).

## Buildspec example

Here is an example of a `buildspec.yml` file.

```
version: 0.2

env:
  variables:
    JAVA_HOME: "/usr/lib/jvm/java-8-openjdk-amd64"
  parameter-store:
    LOGIN_PASSWORD: /CodeBuild/dockerLoginPassword

phases:
  install:
    commands:
      - echo Entered the install phase...
      - apt-get update -y
      - apt-get install -y maven
    finally:
      - echo This always runs even if the update or install command fails
  pre_build:
    commands:
      - echo Entered the pre_build phase...
      - docker login -u User -p $LOGIN_PASSWORD
    finally:
      - echo This always runs even if the login command fails
  build:
    commands:
      - echo Entered the build phase...
      - echo Build started on `date`
      - mvn install
    finally:
      - echo This always runs even if the install command fails
  post_build:
    commands:
      - echo Entered the post_build phase...
      - echo Build completed on `date`

reports:
  arn:aws:codebuild:your-region:your-aws-account-id:report-group/report-group-name-1:
    files:
      - "**/*"
    base-directory: 'target/tests/reports'
    discard-paths: no
  reportGroupCucumberJson:
    files:
      - 'cucumber/target/cucumber-tests.xml'
    discard-paths: yes
    file-format: CUCUMBERJSON # default is JUNITXML
artifacts:
  files:
    - target/messageUtil-1.0.jar
  discard-paths: yes
  secondary-artifacts:
    artifact1:
      files:
```

```

        - target/artifact-1.0.jar
discard-paths: yes
artifact2:
  files:
    - target/artifact-2.0.jar
discard-paths: yes
cache:
  paths:
    - '/root/.m2/**/*'

```

Here is an example of the preceding buildspec, expressed as a single string, for use with the AWS CLI, or the AWS SDKs.

```
"version: 0.2\n\nenv:\n  variables:\n    JAVA_HOME: \"/usr/lib/jvm/java-8-openjdk-amd64\"\n  parameter-store:\n    LOGIN_PASSWORD: /CodeBuild/dockerLoginPassword\n  phases:\n    install:\n      commands:\n        - echo Entered the install phase...\n        - apt-get update -y\n        - apt-get install -y maven\n      finally:\n        - echo This always runs even if the update or install command fails\n    pre_build:\n      commands:\n        - echo Entered the pre_build phase...\n        - docker login -u User -p $LOGIN_PASSWORD\n      finally:\n        - echo This always runs even if the login command fails\n    build:\n      commands:\n        - echo Entered the build phase...\n        - echo Build started on `date`\n      - mvn install\n      finally:\n        - echo This always runs even if the install command fails\n    post_build:\n      commands:\n        - echo Entered the post_build phase...\n        - echo Build completed on `date`\n      reports:\n        reportGroupJUnitXml:\n          files:\n            - '**/*'\n        reportGroupCucumberJson:\n          files:\n            - 'cucumber/target/cucumber-tests.xml'\n      file-format: CUCUMBERJSON\n  artifacts:\n    files:\n      - target/messageUtil-1.0.jar\n    discard-paths: yes\n  secondary-artifacts:\n    artifact1:\n      files:\n        - target/messageUtil-1.0.jar\n      discard-paths: yes\n    artifact2:\n      files:\n        - target/messageUtil-1.0.jar\n      discard-paths: yes\n  cache:\n    paths:\n      - '/root/.m2/**/*'"

```

Here is an example of the commands in the build phase, for use with the CodeBuild or CodePipeline consoles.

```
echo Build started on `date` && mvn install
```

In these examples:

- A custom environment variable, in plain text, with the key of `JAVA_HOME` and the value of `/usr/lib/jvm/java-8-openjdk-amd64`, is set.
- A custom environment variable named `dockerLoginPassword` you stored in Amazon EC2 Systems Manager Parameter Store is referenced later in build commands by using the key `LOGIN_PASSWORD`.
- You cannot change these build phase names. The commands that are run in this example are `apt-get update -y` and `apt-get install -y maven` (to install Apache Maven), `mvn install` (to compile, test, and package the source code into a build output artifact and to install the build output artifact in its internal repository), `docker login` (to sign in to Docker with the password that corresponds to the value of the custom environment variable `dockerLoginPassword` you set in Amazon EC2 Systems Manager Parameter Store), and several `echo` commands. The `echo` commands are included here to show how CodeBuild runs commands and the order in which it runs them.
- `files` represents the files to upload to the build output location. In this example, CodeBuild uploads the single file `messageUtil-1.0.jar`. The `messageUtil-1.0.jar` file can be found in the relative directory named `target` in the build environment. Because `discard-paths: yes` is specified, `messageUtil-1.0.jar` is uploaded directly (and not to an intermediate `target` directory). The file name `messageUtil-1.0.jar` and the relative directory name of `target` is based on the way Apache Maven creates and stores build output artifacts for this example only. In your own scenarios, these file names and directories will be different.
- `reports` represents two report groups that generate reports during the build:

- `arn:aws:codebuild:your-region:your-aws-account-id:report-group/report-group-name-1` specifies the ARN of a report group. Test results generated by the test framework are in the `target/tests/reports` directory. The file format is `JunitXml` and the path is not removed from the files that contain test results.
- `reportGroupCucumberJson` specifies a new report group. If the name of the project is `my-project`, a report group with the name `my-project-reportGroupCucumberJson` is created when a build is run. Test results generated by the test framework are in `cucumber/target/cucumber-tests.xml`. The test file format is `CucumberJson` and the path is removed from the files that contain test results.

## Buildspec versions

The following table lists the buildspec versions and the changes between versions.

| Version | Changes   |
|---------|---|
| 0.2     | <ul style="list-style-type: none"> <li>• <code>environment_variables</code> has been renamed to <code>env</code>.</li> <li>• <code>plaintext</code> has been renamed to <code>variables</code>.</li> <li>• The <code>type</code> property for <code>artifacts</code> has been deprecated.</li> <li>• In version 0.1, AWS CodeBuild runs each build command in a separate instance of the default shell in the build environment. In version 0.2, CodeBuild runs all build commands in the same instance of the default shell in the build environment.</li> </ul> |
| 0.1     | This is the initial definition of the build specification format.   |

## Batch build buildspec reference

This topic contains the buildspec reference for batch build properties.

### batch

Optional mapping. The batch build settings for the project.

#### batch/**fast-fail**

Optional. Specifies the behavior of the batch build when one or more build tasks fail.

`false`

The default value. All running builds will complete.

`true`

All running builds will be stopped when one of the build tasks fails.

By default, all batch build tasks run with the build settings such as `env` and `phases`, specified in the buildspec file. You can override the default build settings by specifying different `env` values or a different buildspec file in the batch/`<batch-type>`/buildspec parameter.

The contents of the batch property varies based on the type of batch build being specified. The possible batch build types are:

- [batch/build-graph \(p. 147\)](#)
- [batch/build-list \(p. 148\)](#)
- [batch/build-matrix \(p. 150\)](#)

## batch/build-graph

Defines a *build graph*. A build graph defines a set of tasks that have dependencies on other tasks in the batch. For more information, see [Build graph \(p. 263\)](#).

This element contains an array of build tasks. Each build task contains the following properties.

### identifier

Required. The identifier of the task.

### buildspec

Optional. The path and file name of the buildspec file to use for this task. If this parameter is not specified, the current buildspec file is used.

### debug-session

Optional. A Boolean value that indicates whether session debugging is enabled for this batch build. For more information about session debugging, see [View a running build in Session Manager \(p. 289\)](#).

false

Session debugging is disabled.

true

Session debugging is enabled.

### depend-on

Optional. An array of task identifiers that this task depends on. This task will not run until these tasks are completed.

### env

Optional. The build environment overrides for the task. This can contain the following properties:

#### compute-type

The identifier of the compute type to use for the task. See **computeType** in [the section called "Build environment compute types" \(p. 160\)](#) for possible values.

#### image

The identifier of the image to use for the task. See **Image identifier** in [the section called "Docker images provided by CodeBuild" \(p. 153\)](#) for possible values.

#### privileged-mode

A Boolean value that indicates whether to run the Docker daemon inside a Docker container. Set to true only if the build project is used to build Docker images. Otherwise, a build that attempts to interact with the Docker daemon fails. The default setting is false.

**type**

The identifier of the environment type to use for the task. See [Environment type in the section called "Build environment compute types" \(p. 160\)](#) for possible values.

**variables**

The environment variables that will be present in the build environment. See [env/variables \(p. 133\)](#) for more information.

**ignore-failure**

Optional. A Boolean value that indicates if a failure of this build task can be ignored.

`false`

The default value. If this build task fails, the batch build will fail.

`true`

If this build task fails, the batch build can still succeed.

The following is an example of a build graph buildspec entry:

```
batch:
  fast-fail: false
  build-graph:
    - identifier: build1
      env:
        variables:
          BUILD_ID: build1
      ignore-failure: false
    - identifier: build2
      buildspec: build2.yml
      env:
        variables:
          BUILD_ID: build2
      depend-on:
        - build1
    - identifier: build3
      env:
        variables:
          BUILD_ID: build3
      depend-on:
        - build2
```

## batch/build-list

Defines a *build list*. A build list is used to define a number of tasks that run in parallel. For more information, see [Build list \(p. 263\)](#).

This element contains an array of build tasks. Each build task contains the following properties.

**identifier**

Required. The identifier of the task.

**buildspec**

Optional. The path and file name of the buildspec file to use for this task. If this parameter is not specified, the current buildspec file is used.

### debug-session

Optional. A Boolean value that indicates whether session debugging is enabled for this batch build. For more information about session debugging, see [View a running build in Session Manager \(p. 289\)](#).

false

Session debugging is disabled.

true

Session debugging is enabled.

### env

Optional. The build environment overrides for the task. This can contain the following properties:

#### compute-type

The identifier of the compute type to use for the task. See **computeType** in [the section called "Build environment compute types" \(p. 160\)](#) for possible values.

#### image

The identifier of the image to use for the task. See **Image identifier** in [the section called "Docker images provided by CodeBuild" \(p. 153\)](#) for possible values.

#### privileged-mode

A Boolean value that indicates whether to run the Docker daemon inside a Docker container. Set to `true` only if the build project is used to build Docker images. Otherwise, a build that attempts to interact with the Docker daemon fails. The default setting is `false`.

#### type

The identifier of the environment type to use for the task. See **Environment type** in [the section called "Build environment compute types" \(p. 160\)](#) for possible values.

#### variables

The environment variables that will be present in the build environment. See [env/variables \(p. 133\)](#) for more information.

### ignore-failure

Optional. A Boolean value that indicates if a failure of this build task can be ignored.

false

The default value. If this build task fails, the batch build will fail.

true

If this build task fails, the batch build can still succeed.

The following is an example of a build list buildspec entry:

```
batch:  
  fast-fail: false  
  build-list:  
    - identifier: build1  
    env:  
      variables:
```

```
BUILD_ID: build1
ignore-failure: false
- identifier: build2
buildspec: build2.yml
env:
  variables:
    BUILD_ID: build2
  ignore-failure: true
```

## batch/build-matrix

Defines a *build matrix*. A build matrix defines tasks with different configurations that run in parallel. CodeBuild creates a separate build for each possible configuration combination. For more information, see [Build matrix \(p. 264\)](#).

### static

The static properties apply to all build tasks.

#### ignore-failure

Optional. A Boolean value that indicates if a failure of this build task can be ignored.

false

The default value. If this build task fails, the batch build will fail.

true

If this build task fails, the batch build can still succeed.

#### env

Optional. The build environment overrides for all tasks.

#### privileged-mode

A Boolean value that indicates whether to run the Docker daemon inside a Docker container. Set to true only if the build project is used to build Docker images. Otherwise, a build that attempts to interact with the Docker daemon fails. The default setting is false.

#### type

The identifier of the environment type to use for the task. See [Environment type in the section called "Build environment compute types" \(p. 160\)](#) for possible values.

### dynamic

The dynamic properties define the build matrix.

#### buildspec

Optional. An array that contains the path and file names of the buildspec files to use for these tasks. If this parameter is not specified, the current buildspec file is used.

#### env

Optional. The build environment overrides for these tasks.

#### compute-type

An array that contains the identifiers of the compute types to use for these tasks. See [computeType in the section called "Build environment compute types" \(p. 160\)](#) for possible values.

### image

An array that contains the identifiers of the images to use for these tasks. See [Image identifier](#) in [the section called "Docker images provided by CodeBuild" \(p. 153\)](#) for possible values.

### variables

An array that contains the environment variables that will be present in the build environments for these tasks. See [env/variables \(p. 133\)](#) for more information.

The following is an example of a build matrix buildspec entry:

```
batch:
  build-matrix:
    static:
      ignore-failure: false
    dynamic:
      buildspec:
        - matrix1.yml
        - matrix2.yml
    env:
      variables:
        MY_VAR:
          - VALUE1
          - VALUE2
          - VALUE3
```

For more information, see [Build matrix \(p. 264\)](#).

## GitHub Action runner buildspec reference

This topic contains the buildspec reference for GitHub Action runner properties.

### steps

Optional sequence. Steps are used to run commands and actions in CodeBuild. For more information, see [GitHub Action runner in AWS CodeBuild \(p. 265\)](#).

#### Note

Each build phase supports either a list of commands or a list of steps, but both cannot be used in the same phase.

Each build step contains the following properties.

#### id

Optional. The identifier for the step that can be used to reference the step in other [contexts](#).

#### if

Optional. A conditional statement that can be used to prevent a step from running unless a condition is met. This statement can use any supported [context](#), such as referencing environmental variables from CodeBuild, as well as [expression](#).

#### name

Optional. The name for the step. If the name isn't specified, the name will default to the text specified in the run command.

### uses

The action that runs for the step. Some actions require you to set inputs using with. Reference the action's README to determine which inputs are required. For more information, see [Which GitHub Actions can I use? \(p. 266\)](#).

If uses is specified in your build phase, it can't be used with run.

#### Note

It's recommended that you include the version of the action you are using. This can be done by specifying a Git ref, SHA, or Docker tag. For more information, see [steps.usages syntax](#).

### run

A command that runs command-line programs. These can be single-line commands or multi-line commands. By default, these commands run using non-login shells. To choose a different shell, use shell.

If run is specified in your build phase, it can't be used with uses.

### shell

Optional. The shell specified for this sequence. For supported shell parameters, see [steps.shell](#). If unspecified, the shell used is bash. If bash is unavailable, sh is used.

### with

Optional. A map of input parameters defined by the action. Each parameter is a key/value pair.

### with.args

Optional. A string that defines inputs for a Docker container.

### with.entrypoint

Optional. The Docker entrypoint specified for the Dockerfile.

### env

Optional. The variables specified for steps to use in the environment.

### continue-on-error

Optional. A Boolean value that indicates if a failure of this step sequence can be ignored.

false

The default value. If this step sequence fails, the build will fail.

true

If this step sequence fails, the build can still succeed.

### timeout-minutes

Optional. The maximum number of minutes the step can run for before terminating. By default, there is no timeout. If the step timeout exceeds the build timeout, the step will stop when the build timeout is reached.

The following is an example using the [Super-Linter](#) GitHub Action:

```
version: 0.2
phases:
  build:
    steps:
```

```
- name: Lint Code Base
  uses: github/super-linter@v5
  env:
    VALIDATE_ALL_CODEBASE: true
    USE_FIND_ALGORITHM: true
    FILTER_REGEX_INCLUDE: '/github/workspace/buildspec.yml'
```

## Build environment reference for AWS CodeBuild

When you call AWS CodeBuild to run a build, you must provide information about the build environment. A *build environment* represents a combination of operating system, programming language runtime, and tools that CodeBuild uses to run a build. For information about how a build environment works, see [How CodeBuild works \(p. 3\)](#).

A build environment contains a Docker image. For information, see [the Docker glossary](#) on the Docker Docs website.

When you provide information to CodeBuild about the build environment, you specify the identifier of a Docker image in a supported repository type. These include the CodeBuild Docker image repository, publicly available images in Docker Hub, and Amazon Elastic Container Registry (Amazon ECR) repositories that your AWS account has permissions to access.

- We recommend that you use Docker images stored in the CodeBuild Docker image repository, because they are optimized for use with the service. For more information, see [Docker images provided by CodeBuild \(p. 153\)](#).
- To get the identifier of a publicly available Docker image stored in Docker Hub, see [Searching for Repositories](#) on the Docker Docs website.
- To learn how to work with Docker images stored in Amazon ECR repositories in your AWS account, see [Amazon ECR sample \(p. 45\)](#).

In addition to a Docker image identifier, you also specify a set of computing resources that the build environment uses. For more information, see [Build environment compute types \(p. 160\)](#).

### Topics

- [Docker images provided by CodeBuild \(p. 153\)](#)
- [Build environment compute types \(p. 160\)](#)
- [Shells and commands in build environments \(p. 163\)](#)
- [Environment variables in build environments \(p. 164\)](#)
- [Background tasks in build environments \(p. 167\)](#)

## Docker images provided by CodeBuild

A *supported image* is the latest major version of an image available in CodeBuild and is updated with minor and patch version updates. CodeBuild optimizes the provisioning duration of builds with supported images by caching them in the machine's [Amazon Machine Images \(AMI\)](#). The two most recent minor.patch versions will be cached for all supported images. If you want to benefit from caching and minimize the provisioning duration of your build, select **Always use the latest image for this runtime version** in the **Image version** section of the CodeBuild console instead of a more granular version, such as aws/codebuild/amazonlinux2-x86\_64-standard:4.0-1.0.0.

AWS CodeBuild supports the following Docker images that are available in the CodeBuild.

| Platform                 | Image identifier                                      | Definition                               |
|--------------------------|---|--|
| Amazon Linux 2           | aws/codebuild/amazonlinux2-x86_64-standard:4.0        | <a href="#">al2/standard/4.0</a>         |
| Amazon Linux 2023        | aws/codebuild/amazonlinux2-x86_64-standard:5.0        | <a href="#">al2/standard/5.0</a>         |
| Amazon Linux 2           | aws/codebuild/amazonlinux2-x86_64-standard:corretto8  | <a href="#">al2/standard/corretto8</a>   |
| Amazon Linux 2           | aws/codebuild/amazonlinux2-x86_64-standard:corretto11 | <a href="#">al2/standard/corretto11</a>  |
| Amazon Linux 2           | aws/codebuild/amazonlinux2-aarch64-standard:2.0       | <a href="#">al2/aarch64/standard/2.0</a> |
| Amazon Linux 2023        | aws/codebuild/amazonlinux2-aarch64-standard:3.0       | <a href="#">al2/aarch64/standard/3.0</a> |
| Ubuntu 20.04             | aws/codebuild/standard:5.0                            | <a href="#">ubuntu/standard/5.0</a>      |
| Ubuntu 22.04             | aws/codebuild/standard:6.0                            | <a href="#">ubuntu/standard/6.0</a>      |
| Ubuntu 22.04             | aws/codebuild/standard:7.0                            | <a href="#">ubuntu/standard/7.0</a>      |
| Windows Server Core 2019 | aws/codebuild/windows-base:2019-1.0                   | N/A                                      |
| Windows Server Core 2019 | aws/codebuild/windows-base:2019-2.0                   | N/A                                      |

The base image of the Windows Server Core 2019 platform is only available in the following regions:

- US East (N. Virginia)
- US East (Ohio)
- US West (Oregon)
- Europe (Ireland)

CodeBuild frequently updates the list of Docker images to add the latest images and deprecate old images. To get the most current list, do one of the following:

- In the CodeBuild console, in the **Create build project** wizard or **Edit Build Project** page, for **Environment image**, choose **Managed image**. Choose from the **Operating system**, **Runtime**, and **Runtime version** drop-down lists. For more information, see [Create a build project \(console\) \(p. 188\)](#) or [Change a build project's settings \(console\) \(p. 242\)](#).
- For the AWS CLI, run the `list-curated-environment-images` command:

```
aws codebuild list-curated-environment-images
```

- For the AWS SDKs, call the `ListCuratedEnvironmentImages` operation for your target programming language. For more information, see the [AWS SDKs and tools reference \(p. 389\)](#).

## Deprecated images

A *deprecated image* is an image that is no longer cached or updated by CodeBuild. A deprecated image no longer receives minor version updates or patch version updates, and because they are no longer updated, using them may not be secure. If your CodeBuild project is configured to use an older image version, the provisioning process will download this docker image and use it to create the containerized runtime environment, which can increase the provisioning duration and overall build duration.

CodeBuild has deprecated the following Docker images. You can still use these images, but they won't be cached on the build host and will result in higher provisioning times.

| Platform       | Image identifier   | Definition                            | Deprecation date |
|----------------|--|---------------------------------------|------------------|
| Amazon Linux 2 | <code>aws/codebuild/amazonlinux2-x86_64-standard:3.0</code>  | <code>al2/standard/3.0</code>         | May 9, 2023      |
| Ubuntu 18.04   | <code>aws/codebuild/standard:4.0</code>                      | <code>ubuntu/standard/4.0</code>      | March 31, 2023   |
| Amazon Linux 2 | <code>aws/codebuild/amazonlinux2-aarch64-standard:1.0</code> | <code>al2/aarch64/standard/1.0</code> | March 31, 2023   |
| Ubuntu 18.04   | <code>aws/codebuild/standard:3.0</code>                      | <code>ubuntu/standard/3.0</code>      | June 30, 2022    |
| Amazon Linux 2 | <code>aws/codebuild/amazonlinux2-x86_64-standard:2.0</code>  | <code>al2/standard/2.0</code>         | June 30, 2022    |

### Topics

- [Available runtimes \(p. 155\)](#)
- [Runtime versions \(p. 159\)](#)

## Available runtimes

You can specify one or more runtimes in the `runtime-versions` section of your `buildspec` file. If your runtime is dependent upon another runtime, you can also specify its dependent runtime in the `buildspec` file. If you do not specify any runtimes in the `buildspec` file, CodeBuild chooses the default runtimes that are available in the image you use. If you specify one or more runtimes, CodeBuild uses only those runtimes. If a dependent runtime is not specified, CodeBuild attempts to choose the dependent runtime for you. For more information, see [Specify runtime versions in the buildspec file](#).

### Topics

- [Linux image runtimes \(p. 156\)](#)
- [Windows image runtimes \(p. 158\)](#)

## Linux image runtimes

The following table contains the available runtimes and the standard Linux images that support them.

### Ubuntu and Amazon Linux 2 platform runtimes

| Runtime name | Version    | Images   |
|--------------|------------|--|
| dotnet       | 3.1        | Amazon Linux 2 AArch64 standard:2.0<br>Ubuntu standard:5.0   |
|              | 5.0        | Ubuntu standard:5.0  |
|              | 6.0        | Amazon Linux 2 x86_64 standard:4.0<br>Amazon Linux 2 x86_64 standard:5.0<br>Amazon Linux 2 AArch64 standard:3.0<br>Ubuntu standard:6.0 |
|              |            | Ubuntu standard:7.0  |
|              |            |  |
| golang       | 1.12       | Amazon Linux 2 AArch64 standard:2.0  |
|              | 1.13       | Amazon Linux 2 AArch64 standard:2.0  |
|              | 1.14       | Amazon Linux 2 AArch64 standard:2.0  |
|              | 1.15       | Ubuntu standard:5.0  |
|              | 1.16       | Ubuntu standard:5.0  |
|              | 1.18       | Amazon Linux 2 x86_64 standard:4.0<br>Ubuntu standard:6.0  |
|              | 1.20       | Amazon Linux 2 x86_64 standard:5.0<br>Amazon Linux 2 AArch64 standard:3.0<br>Ubuntu standard:7.0                                       |
| java         | corretto8  | Amazon Linux 2 x86_64 standard:corretto8<br>Amazon Linux 2 AArch64 standard:2.0<br>Ubuntu standard:5.0                                 |
|              | corretto11 | Amazon Linux 2 x86_64 standard:corretto11<br>Amazon Linux 2 AArch64 standard:2.0<br>Ubuntu standard:5.0                                |
|              | corretto17 | Amazon Linux 2 x86_64 standard:4.0<br>Amazon Linux 2 x86_64 standard:5.0   |
|              |            |  |
|              |            |  |
|              |            |  |

| <b>Runtime name</b> | <b>Version</b> | <b>Images</b>  |
|---------------------|----------------|--|
|                     |                | Amazon Linux 2 AArch64 standard:3.0<br>Ubuntu standard:6.0<br>Ubuntu standard:7.0                |
| nodejs              | 10             | Amazon Linux 2 AArch64 standard:2.0  |
|                     | 12             | Amazon Linux 2 AArch64 standard:2.0<br>Ubuntu standard:5.0                                       |
|                     | 14             | Ubuntu standard:5.0  |
|                     | 16             | Amazon Linux 2 x86_64 standard:4.0<br>Ubuntu standard:6.0  |
|                     | 18             | Amazon Linux 2 x86_64 standard:5.0<br>Amazon Linux 2 AArch64 standard:3.0<br>Ubuntu standard:7.0 |
| php                 | 7.3            | Amazon Linux 2 AArch64 standard:2.0<br>Ubuntu standard:5.0                                       |
|                     | 7.4            | Amazon Linux 2 AArch64 standard:2.0<br>Ubuntu standard:5.0                                       |
|                     | 8.0            | Ubuntu standard:5.0  |
|                     | 8.1            | Amazon Linux 2 x86_64 standard:4.0<br>Amazon Linux 2 AArch64 standard:3.0<br>Ubuntu standard:6.0 |
|                     | 8.2            | Amazon Linux 2 x86_64 standard:5.0<br>Ubuntu standard:7.0  |
| python              | 3.7            | Amazon Linux 2 AArch64 standard:2.0<br>Ubuntu standard:5.0                                       |
|                     | 3.8            | Amazon Linux 2 AArch64 standard:2.0<br>Ubuntu standard:5.0                                       |
|                     | 3.9            | Amazon Linux 2 x86_64 standard:4.0<br>Amazon Linux 2 AArch64 standard:2.0<br>Ubuntu standard:5.0 |
|                     | 3.10           | Ubuntu standard:6.0  |

| <b>Runtime name</b> | <b>Version</b> | <b>Images</b>  |
|---------------------|----------------|--|
|                     | 3.11           | Amazon Linux 2 x86_64 standard:5.0<br>Amazon Linux 2 AArch64 standard:3.0<br>Ubuntu standard:7.0 |
| ruby                | 2.6            | Amazon Linux 2 AArch64 standard:2.0<br>Ubuntu standard:5.0                                       |
|                     | 2.7            | Amazon Linux 2 AArch64 standard:2.0<br>Ubuntu standard:5.0                                       |
|                     | 3.1            | Amazon Linux 2 x86_64 standard:4.0<br>Ubuntu standard:6.0  |
|                     | 3.2            | Amazon Linux 2 x86_64 standard:5.0<br>Amazon Linux 2 AArch64 standard:3.0<br>Ubuntu standard:7.0 |

## Windows image runtimes

The base image of the Windows Server Core 2019 contains the following runtimes.

### Windows platform runtimes

| <b>Runtime name</b> | <b>Versions available in windows-base:2019-1.0</b> | <b>Versions available in windows-base:2019-2.0</b> |
|---------------------|--|--|
| dotnet              | 3.1.404  | 3.1.419  |
|                     | 5.0  | 6.0.300  |
| golang              | 1.14   | 1.18.2   |
| nodejs              | 12.18  | 16.15.0  |
| java                | corretto11   |  |
|                     | corretto17   |  |
| php                 | 7.4.7  | 8.1.6  |
| powershell          | 7.0.2  | 7.2.4  |
| python              | 3.8.3  | 3.10.4   |
| ruby                | 2.7  | 3.1.1.1  |

## Runtime versions

When you specify a runtime in the [runtime-versions \(p. 136\)](#) section of your buildspec file, you can specify a specific version, a specific major version and the latest minor version, or the latest version. The following table lists the available runtimes and how to specify them. Not all runtime versions are available on all images. Runtime version selection is also not supported for the custom images. For more information, see [Available runtimes \(p. 155\)](#).

### Ubuntu and Amazon Linux 2 platform runtime versions

| Runtime name | Version    | Specific version |
|--------------|------------|------------------|
| android      | 28         | android: 28      |
|              | 29         | android: 29      |
| dotnet       | 3.1        | dotnet: 3.1      |
|              | 5.0        | dotnet: 5.0      |
|              | 6.0        | dotnet: 6.0      |
| golang       | 1.12       | golang: 1.12     |
|              | 1.13       | golang: 1.13     |
|              | 1.14       | golang: 1.14     |
|              | 1.15       | golang: 1.15     |
|              | 1.16       | golang: 1.16     |
|              | 1.18       | golang: 1.18     |
|              | 1.20       | golang: 1.20     |
| java         | corretto8  | java: corretto8  |
|              | corretto11 | java: corretto11 |
|              | corretto17 | java: corretto17 |
| nodejs       | 10         | nodejs: 10       |
|              | 12         | nodejs: 12       |
|              | 14         | nodejs: 14       |
|              | 16         | nodejs: 16       |
|              | 18         | nodejs: 18       |
| php          | 7.3        | php: 7.3         |
|              | 7.4        | php: 7.4         |
|              | 8.0        | php: 8.0         |

| <b>Runtime name</b> | <b>Version</b> | <b>Specific version</b> |
|---------------------|----------------|-------------------------|
|                     | 8.1            | php: 8.1                |
|                     | 8.2            | php: 8.2                |
| python              | 3.7            | python: 3.7             |
|                     | 3.8            | python: 3.8             |
|                     | 3.9            | python: 3.9             |
|                     | 3.10           | python: 3.10            |
|                     | 3.11           | python: 3.11            |
| ruby                | 2.6            | ruby: 2.6               |
|                     | 2.7            | ruby: 2.7               |
|                     | 3.1            | ruby: 3.1               |
|                     | 3.2            | ruby: 3.2               |

You can use a build specification to install other components (for example, the AWS CLI, Apache Maven, Apache Ant, Mocha, RSpec, or similar) during the `install` build phase. For more information, see [Buildspec example \(p. 144\)](#).

## Build environment compute types

AWS CodeBuild provides build environments with the following available memory, vCPUs, and disk space:

| <b>Compute type</b>       | <b>Environment computeType value</b> | <b>Environment type value</b> | <b>Memory</b> | <b>vCPUs</b> | <b>Disk space</b> |
|---------------------------|--------------------------------------|-------------------------------|---------------|--------------|-------------------|
| ARM Small                 | BUILD_GENERAL1                       | ARM_CONTAINER                 | 4 GB          | 2            | 50 GB             |
| ARM Large                 | BUILD_GENERAL1                       | ARM_CONTAINER                 | 16 GB         | 8            | 50 GB             |
| Linux Small <sup>1</sup>  | BUILD_GENERAL1                       | LINUX_CONTAINER               | RGB           | 2            | 64 GB             |
| Linux Medium <sup>1</sup> | BUILD_GENERAL1                       | LINUX_CONTAINER               | RGB           | 4            | 128 GB            |
| Linux Large <sup>1</sup>  | BUILD_GENERAL1                       | LINUX_CONTAINER               | RGB           | 8            | 128 GB            |
| Linux 2XLarge             | BUILD_GENERAL1                       | LINUX_CONTAINER               | 45 GB         | 72           | 824 GB (SSD)      |
| Linux GPU Small           | BUILD_GENERAL1                       | LINUX_GPU_CONTAINER           |               | 4            | 220 GB            |
| Linux GPU Large           | BUILD_GENERAL1                       | LINUX_GPU_CONTAINER           |               | 32           | 50 GB             |

| Compute type   | Environment computeType value | Environment type value                     | Memory | vCPUs | Disk space |
|----------------|-------------------------------|--|--------|-------|------------|
| Windows Medium | BUILD_GENERAL                 | WINDOWS_SERVER_2019_CONTAINER <sup>1</sup> | 4      | 4     | 128 GB     |
| Windows Large  | BUILD_GENERAL                 | WINDOWS_SERVER_2019_CONTAINER <sup>1</sup> | 8      | 8     | 128 GB     |

<sup>1</sup> The latest version of this image type is cached. If you specify a more specific version, then CodeBuild provisions that version instead of the cached version. This can result in longer build times. For example, to benefit from caching, specify `aws/codebuild/amazonlinux2-x86_64-standard:4.0` instead of a more granular version, such as `aws/codebuild/amazonlinux2-x86_64-standard:4.0-1.0.0`.

When using other environment types, it is recommended that you use a custom image to reduce build times.

The disk space listed for each build environment is available only in the directory specified by the `CODEBUILD_SRC_DIR` environment variable.

To choose a compute type:

- In the CodeBuild console, in the **Create build project** wizard or **Edit Build Project** page, in **Environment** expand **Additional configuration**, and then choose one of the options from **Compute type**. For more information, see [Create a build project \(console\) \(p. 188\)](#) or [Change a build project's settings \(console\) \(p. 242\)](#).
- For the AWS CLI, run the `create-project` or `update-project` command, specifying the `computeType` value of the environment object. For more information, see [Create a build project \(AWS CLI\) \(p. 198\)](#) or [Change a build project's settings \(AWS CLI\) \(p. 253\)](#).
- For the AWS SDKs, call the equivalent of the `CreateProject` or `UpdateProject` operation for your target programming language, specifying the equivalent of `computeType` value of the environment object. For more information, see the [AWS SDKs and tools reference \(p. 389\)](#).

Some environment and compute types have Region availability limitations:

- The compute type Linux GPU Small (`LINUX_GPU_CONTAINER`) is only available in these Regions:
  - US East (N. Virginia)
  - US West (Oregon)
  - Asia Pacific (Tokyo)
  - Canada (Central)
  - Europe (Frankfurt)
  - Europe (Ireland)
  - Europe (London)
- The compute type Linux GPU Large (`LINUX_GPU_CONTAINER`) is only available in these Regions:
  - US East (Ohio)
  - US East (N. Virginia)
  - US West (Oregon)
  - Asia Pacific (Seoul)
  - Asia Pacific (Singapore)
  - Asia Pacific (Sydney)
  - Asia Pacific (Tokyo)
  - Canada (Central)
  - China (Beijing)

- China (Ningxia)
- Europe (Frankfurt)
- Europe (Ireland)
- Europe (London)
- The environment type ARM\_CONTAINER is only available in these Regions:
  - US East (Ohio)
  - US East (N. Virginia)
  - US West (N. California)
  - US West (Oregon)
  - Asia Pacific (Hong Kong)
  - Asia Pacific (Jakarta)
  - Asia Pacific (Hyderabad)
  - Asia Pacific (Melbourne)
  - Asia Pacific (Mumbai)
  - Asia Pacific (Osaka)
  - Asia Pacific (Seoul)
  - Asia Pacific (Singapore)
  - Asia Pacific (Sydney)
  - Asia Pacific (Tokyo)
  - Canada (Central)
  - China (Beijing)
  - China (Ningxia)
  - Europe (Frankfurt)
  - Europe (Ireland)
  - Europe (London)
  - Europe (Milan)
  - Europe (Paris)
  - Europe (Spain)
  - Europe (Stockholm)
  - Europe (Zurich)
  - Israel (Tel Aviv)
  - Middle East (Bahrain)
  - Middle East (UAE)
  - South America (São Paulo)
- The compute type BUILD\_GENERAL1\_2XLARGE is only available in these Regions:
  - US East (Ohio)
  - US East (N. Virginia)
  - US West (N. California)
  - US West (Oregon)
  - Asia Pacific (Hyderabad)
  - Asia Pacific (Hong Kong)
  - Asia Pacific (Jakarta)
  - Asia Pacific (Melbourne)
  - Asia Pacific (Mumbai)
  - Asia Pacific (Seoul)

- Asia Pacific (Singapore)
- Asia Pacific (Sydney)
- Asia Pacific (Tokyo)
- Canada (Central)
- China (Beijing)
- China (Ningxia)
- Europe (Frankfurt)
- Europe (Ireland)
- Europe (London)
- Europe (Paris)
- Europe (Spain)
- Europe (Stockholm)
- Europe (Zurich)
- Israel (Tel Aviv)
- Middle East (Bahrain)
- Middle East (UAE)
- South America (São Paulo)

For the compute type BUILD\_GENERAL1\_2XLARGE, Docker images up to 100 GB uncompressed are supported.

**Note**

For custom build environment images, CodeBuild supports Docker images up to 50 GB uncompressed in Linux and Windows, regardless of the compute type. To check your build image's size, use Docker to run the `docker images REPOSITORY:TAG` command.

You can use Amazon EFS to access more space in your build container. For more information, see [Amazon Elastic File System sample for AWS CodeBuild \(p. 49\)](#). If you want to manipulate container disk space during a build, then the build must run in privileged mode.

**Note**

By default, Docker containers do not allow access to any devices. Privileged mode grants a build project's Docker container access to all devices. For more information, see [Runtime Privilege and Linux Capabilities](#) on the Docker Docs website. Also, Windows does not support privileged mode.

## Shells and commands in build environments

You provide a set of commands for AWS CodeBuild to run in a build environment during the lifecycle of a build (for example, installing build dependencies and testing and compiling your source code). There are several ways to specify these commands:

- Create a build specification file and include it with your source code. In this file, specify the commands you want to run in each phase of the build lifecycle. For more information, see the [Build specification reference for CodeBuild \(p. 129\)](#).
- Use the CodeBuild console to create a build project. In **Insert build commands**, for **Build commands**, enter the commands you want to run in the build phase. For more information, see [Create a build project \(console\) \(p. 188\)](#).
- Use the CodeBuild console to change the settings of a build project. In **Insert build commands**, for **Build commands**, enter the commands you want to run in the build phase. For more information, see [Change a build project's settings \(console\) \(p. 242\)](#).
- Use the AWS CLI or AWS SDKs to create a build project or change the settings of a build project. Reference the source code that contains a buildspec file with your commands, or specify a single string

that includes the contents of an equivalent buildspec file. For more information, see [Create a build project \(p. 187\)](#) or [Change a build project's settings \(p. 241\)](#).

- Use the AWS CLI or AWS SDKs to start a build, specifying a buildspec file or a single string that includes the contents of an equivalent buildspec file. For more information, see the description for the `buildspecOverride` value in [Run a build \(p. 271\)](#).

You can specify any Shell Command Language (sh) command. In buildspec version 0.1, CodeBuild runs each Shell command in a separate instance in the build environment. This means that each command runs in isolation from all other commands. Therefore, by default, you cannot run a single command that relies on the state of any previous commands (for example, changing directories or setting environment variables). To get around this limitation, we recommend that you use version 0.2, which solves this issue. If you must use version 0.1, we recommend the following approaches:

- Include a shell script in your source code that contains the commands you want to run in a single instance of the default shell. For example, you could include a file named `my-script.sh` in your source code that contains commands such as `cd MyDir; mkdir -p mySubDir; cd mySubDir; pwd; .`. Then, in your buildspec file, specify the command `./my-script.sh`.
- In your buildspec file or on the **Build commands** setting for the build phase only, enter a single command that includes all of the commands you want to run in a single instance of the default shell (for example, `cd MyDir && mkdir -p mySubDir && cd mySubDir && pwd`).

If CodeBuild encounters an error, the error might be more difficult to troubleshoot compared to running a single command in its own instance of the default shell.

Commands that are run in a Windows Server Core image use the PowerShell shell.

## Environment variables in build environments

AWS CodeBuild provides several environment variables that you can use in your build commands:

### AWS\_DEFAULT\_REGION

The AWS Region where the build is running (for example, `us-east-1`). This environment variable is used primarily by the AWS CLI.

### AWS\_REGION

The AWS Region where the build is running (for example, `us-east-1`). This environment variable is used primarily by the AWS SDKs.

### CODEBUILD\_BATCH\_BUILD\_IDENTIFIER

The identifier of the build in a batch build. This is specified in the batch buildspec. For more information, see [the section called "Batch buildspec reference" \(p. 146\)](#).

### CODEBUILD\_BUILD\_ARN

The Amazon Resource Name (ARN) of the build (for example, `arn:aws:codebuild:region-ID:account-ID:build/codebuild-demo-project:b1e6661e-e4f2-4156-9ab9-82a19EXAMPLE`).

### CODEBUILD\_BUILD\_ID

The CodeBuild ID of the build (for example, `codebuild-demo-project:b1e6661e-e4f2-4156-9ab9-82a19EXAMPLE`).

### CODEBUILD\_BUILD\_IMAGE

The CodeBuild build image identifier (for example, `aws/codebuild/standard:2.0`).

#### CODEBUILD\_BUILD\_NUMBER

The current build number for the project.

#### CODEBUILD\_BUILD\_SUCCEEDING

Whether the current build is succeeding. Set to `0` if the build is failing, or `1` if the build is succeeding.

#### CODEBUILD\_INITIATOR

The entity that started the build. If CodePipeline started the build, this is the pipeline's name (for example, `codepipeline/my-demo-pipeline`). If an user started the build, this is the user's name (for example, `MyUserName`). If the Jenkins plugin for CodeBuild started the build, this is the string `CodeBuild-Jenkins-Plugin`.

#### CODEBUILD\_KMS\_KEY\_ID

The identifier of the AWS KMS key that CodeBuild is using to encrypt the build output artifact (for example, `arn:aws:kms:region-ID:account-ID:key/key-ID` or `alias/key-alias`).

#### CODEBUILD\_LOG\_PATH

The log stream name in CloudWatch Logs for the build.

#### CODEBUILD\_PUBLIC\_BUILD\_URL

The URL of the build results for this build on the public builds website. This variable is only set if the build project has public builds enabled. For more information, see [Public build projects in AWS CodeBuild \(p. 270\)](#).

#### CODEBUILD\_RESOLVED\_SOURCE\_VERSION

The version identifier of a build's source code. The contents depends on the source code repository: CodeCommit, GitHub, GitHub Enterprise Server, and Bitbucket

This variable contains the commit ID.

CodePipeline

This variable contains the source revision provided by CodePipeline.

If CodePipeline is not able to resolve the source revision, such as when the source is an Amazon S3 bucket that does not have versioning enabled, this environment variable is not set.

Amazon S3

This variable is not set.

When applicable, the CODEBUILD\_RESOLVED\_SOURCE\_VERSION variable is only available after the DOWNLOAD\_SOURCE phase.

#### CODEBUILD\_SOURCE\_REPO\_URL

The URL to the input artifact or source code repository. For Amazon S3, this is `s3://` followed by the bucket name and path to the input artifact. For CodeCommit and GitHub, this is the repository's clone URL. If a build originates from CodePipeline, this environment variable may be empty.

For secondary sources, the environment variable for the secondary source repository URL is `CODEBUILD_SOURCE_REPO_URL_<sourceIdentifier>`, where `<sourceIdentifier>` is the source identifier you create.

#### CODEBUILD\_SOURCE\_VERSION

The value's format depends on the source repository.

- For Amazon S3, it is the version ID associated with the input artifact.
- For CodeCommit, it is the commit ID or branch name associated with the version of the source code to be built.

- For GitHub, GitHub Enterprise Server, and Bitbucket it is the commit ID, branch name, or tag name associated with the version of the source code to be built.

**Note**

For a GitHub or GitHub Enterprise Server build that is triggered by a webhook pull request event, it is `pr/pull-request-number`.

For secondary sources, the environment variable for the secondary source version is `CODEBUILD_SOURCE_VERSION_<sourceIdentifier>`, where `<sourceIdentifier>` is the source identifier you create. For more information, see [Multiple input sources and output artifacts sample \(p. 123\)](#).

`CODEBUILD_SRC_DIR`

The directory path that CodeBuild uses for the build (for example, `/tmp/src123456789/src`).

For secondary sources, the environment variable for the secondary source directory path is `CODEBUILD_SRC_DIR_<sourceIdentifier>`, where `<sourceIdentifier>` is the source identifier you create. For more information, see [Multiple input sources and output artifacts sample \(p. 123\)](#).

`CODEBUILD_START_TIME`

The start time of the build specified as a Unix timestamp in milliseconds.

`CODEBUILD_WEBHOOK_ACTOR_ACCOUNT_ID`

The account ID of the user that triggered the webhook event.

`CODEBUILD_WEBHOOK_BASE_REF`

The base reference name of the webhook event that triggers the current build. For a pull request, this is the branch reference.

`CODEBUILD_WEBHOOK_EVENT`

The webhook event that triggers the current build.

`CODEBUILD_WEBHOOK_MERGE_COMMIT`

The identifier of the merge commit used for the build. This variable is set when a Bitbucket pull request is merged with the squash strategy and the pull request branch is closed. In this case, the original pull request commit no longer exists, so this environment variable contains the identifier of the squashed merge commit.

`CODEBUILD_WEBHOOK_PREV_COMMIT`

The ID of the most recent commit before the webhook push event that triggers the current build.

`CODEBUILD_WEBHOOK_HEAD_REF`

The head reference name of the webhook event that triggers the current build. It can be a branch reference or a tag reference.

`CODEBUILD_WEBHOOK_TRIGGER`

Shows the webhook event that triggered the build. This variable is available only for builds triggered by a webhook. The value is parsed from the payload sent to CodeBuild by GitHub, GitHub Enterprise Server, or Bitbucket. The value's format depends on what type of event triggered the build.

- For builds triggered by a pull request, it is `pr/pull-request-number`.
- For builds triggered by creating a new branch or pushing a commit to a branch, it is `branch/branch-name`.
- For builds triggered by a pushing a tag to a repository, it is `tag/tag-name`.

`HOME`

This environment variable is always set to `/root`.

You can also provide build environments with your own environment variables. For more information, see the following topics:

- [Use CodePipeline with CodeBuild \(p. 392\)](#)
- [Create a build project \(p. 187\)](#)
- [Change a build project's settings \(p. 241\)](#)
- [Run a build \(p. 271\)](#)
- [Buildspec reference \(p. 129\)](#)

To list all of the available environment variables in a build environment, you can run the `printenv` command (for Linux-based build environment) or "Get-ChildItem Env:" (for Windows-based build environments) during a build. Except for those previously listed, environment variables that start with `CODEBUILD_` are for CodeBuild internal use. They should not be used in your build commands.

**Important**

We strongly discourage the use of environment variables to store sensitive values, especially AWS access key IDs. Environment variables can be displayed in plain text using tools such as the CodeBuild console and the AWS CLI.

We recommend you store sensitive values in the Amazon EC2 Systems Manager Parameter Store and then retrieve them from your buildspec. To store sensitive values, see [Systems Manager Parameter Store](#) and [Walkthrough: Create and test a String parameter \(console\)](#) in the [Amazon EC2 Systems Manager User Guide](#). To retrieve them, see the parameter-store mapping in [Buildspec syntax \(p. 130\)](#).

## Background tasks in build environments

You can run background tasks in build environments. To do this, in your buildspec, use the `nohup` command to run a command as a task in the background, even if the build process exits the shell. Use the `disown` command to forcibly stop a running background task.

**Examples:**

- Start a background process and wait for it to complete later:

```
|  
nohup sleep 30 & echo $! > pidfile  
...  
wait $(cat pidfile)
```

- Start a background process and do not wait for it to ever complete:

```
|  
nohup sleep 30 & disown $!
```

- Start a background process and kill it later:

```
|  
nohup sleep 30 & echo $! > pidfile  
...  
kill $(cat pidfile)
```

## Run builds locally with the AWS CodeBuild agent

You can use the AWS CodeBuild agent to run CodeBuild builds on a local machine. There are agents available for x86\_64 and ARM platforms.

You can also subscribe to receive notifications when new versions of the agent are published.

## Prerequisites

Before you begin, you need to do the following:

- Install Git on your local machine.
- Install and set up [Docker](#) on your local machine.

## Set up the build image

You only need to set up the build image the first time you run the agent, or when the image has changed.

### To set up the build image

1. If you want to use a curated Amazon Linux 2 image, you can pull it from the CodeBuild public Amazon ECR repository at [https://gallery.ecr.aws/codebuild/amazonlinux2-x86\\_64-standard](https://gallery.ecr.aws/codebuild/amazonlinux2-x86_64-standard) with the following command:

```
$ docker pull public.ecr.aws/codebuild/amazonlinux2-x86_64-standard:4.0
```

Alternatively, if you want to use another Linux image, perform the following steps:

- a. Clone the CodeBuild image repo:

```
$ git clone https://github.com/aws/aws-codebuild-docker-images.git
```

- b. Change to the image directory. For this example, use the `aws/codebuild/standard:5.0` image:

```
$ cd aws-codebuild-docker-images/ubuntu/standard/5.0
```

- c. Build the image. This will take several minutes.

```
$ docker build -t aws/codebuild/standard:5.0 .
```

2. Download the CodeBuild agent.

To download the `x86_64` version of the agent, run the following command:

```
$ docker pull public.ecr.aws/codebuild/local-builds:latest
```

To download the ARM version of the agent, run the following command:

```
$ docker pull public.ecr.aws/codebuild/local-builds:aarch64
```

3. The CodeBuild agent is available from <https://gallery.ecr.aws/codebuild/local-builds>.

The Secure Hash Algorithm (SHA) signature for the `x86_64` version of the agent is:

```
sha256:fac17c6d6c3cb500f6e7975887de1e41d29a9e70a86d6f49f76a2beacf967e
```

The SHA signature for the ARM version of the agent is:

```
sha256:57a5dfda63be50edce13dea16dc5e73e8d8559029658ba08b793c9a7adc68c7
```

You can use the SHA to identify the version of the agent. To see the agent's SHA signature, run the following command and look for the SHA under RepoDigests:

```
$ docker inspect public.ecr.aws/codebuild/local-builds:latest
```

## Run the CodeBuild agent

### To run the CodeBuild agent

1. Change to the directory that contains your build project source.
2. Download the [codebuild\\_build.sh](#) script:

```
$ curl -O https://raw.githubusercontent.com/aws/aws-codebuild-docker-images/master/local_builds/codebuild_build.sh
$ chmod +x codebuild_build.sh
```

3. Run the codebuild\_build.sh script and specify your container image and the output directory.

To run an x86\_64 build, run the following command:

```
$ ./codebuild_build.sh -i <container-image> -a <output directory>
```

To run an ARM build, run the following command:

```
$ ./codebuild_build.sh -i <container-image> -a <output directory> -l public.ecr.aws/codebuild/local-builds:aarch64
```

Replace *<container-image>* with the name of the container image, such as aws/codebuild/standard:5.0 or public.ecr.aws/codebuild/amazonlinux2-x86\_64-standard:4.0.

The script launches the build image and runs the build on the project in the current directory. To specify the location of the build project, add the *-s <build project directory>* option to the script command.

## Receive notifications for new CodeBuild agent versions

You can subscribe to Amazon SNS notifications so you will be notified when new versions of the AWS CodeBuild agent are released.

### To subscribe to CodeBuild agent notifications

1. Open the Amazon SNS console at <https://console.aws.amazon.com/sns/v3/home>.
2. In the navigation bar, if it's not already selected, change the AWS Region to **US East (N. Virginia)**. You must select this AWS Region because the Amazon SNS notifications that you are subscribing to are created in this Region.
3. In the navigation pane, choose **Subscriptions**.
4. Choose **Create subscription**.

5. In **Create subscription**, do the following:

- a. For **Topic ARN**, use the following Amazon Resource Name (ARN):

```
arn:aws:sns:us-east-1:850632864840:AWS-CodeBuild-Local-Agent-Updates
```

- b. For **Protocol**, choose **Email** or **SMS**.
- c. For **Endpoint**, choose where (email or SMS) to receive the notifications. Enter an email or address or phone number, including area code.
- d. Choose **Create subscription**.
- e. Choose **Email** to receive an email asking you to confirm your subscription. Follow the directions in the email to complete your subscription.

If you no longer want to receive these notifications, use the following procedure to unsubscribe.

**To unsubscribe from CodeBuild agent notifications**

1. Open the Amazon SNS console at <https://console.aws.amazon.com/sns/v3/home>.
2. In the navigation pane, choose **Subscriptions**.
3. Select the subscription and from **Actions**, choose **Delete subscriptions**. When you are prompted to confirm, choose **Delete**.

# Use AWS CodeBuild with Amazon Virtual Private Cloud

Typically, AWS CodeBuild cannot access resources in a VPC. To enable access, you must provide additional VPC-specific configuration information in your CodeBuild project configuration. This includes the VPC ID, the VPC subnet IDs, and the VPC security group IDs. VPC-enabled builds can then access resources inside your VPC. For more information about setting up a VPC in Amazon VPC, see the [Amazon VPC User Guide](#).

## Topics

- [Use cases \(p. 171\)](#)
- [Allowing Amazon VPC access in your CodeBuild projects \(p. 171\)](#)
- [Best practices for VPCs \(p. 172\)](#)
- [Troubleshooting your VPC setup \(p. 173\)](#)
- [Limitations of VPCs \(p. 173\)](#)
- [Use VPC endpoints \(p. 173\)](#)
- [AWS CloudFormation VPC template \(p. 175\)](#)
- [Use AWS CodeBuild with a proxy server \(p. 179\)](#)

## Use cases

VPC connectivity from AWS CodeBuild builds makes it possible to:

- Run integration tests from your build against data in an Amazon RDS database that's isolated on a private subnet.
- Query data in an Amazon ElastiCache cluster directly from tests.
- Interact with internal web services hosted on Amazon EC2, Amazon ECS, or services that use internal Elastic Load Balancing.
- Retrieve dependencies from self-hosted, internal artifact repositories, such as PyPI for Python, Maven for Java, and npm for Node.js.
- Access objects in an S3 bucket configured to allow access through an Amazon VPC endpoint only.
- Query external web services that require fixed IP addresses through the Elastic IP address of the NAT gateway or NAT instance associated with your subnet.

Your builds can access any resource that's hosted in your VPC.

## Allowing Amazon VPC access in your CodeBuild projects

Include these settings in your VPC configuration:

- For **VPC ID**, choose the VPC ID that CodeBuild uses.

- For **Subnets**, choose a private subnet with NAT translation that includes or has routes to the resources used by CodeBuild.
- For **Security Groups**, choose the security groups that CodeBuild uses to allow access to resources in the VPCs.

To use the console to create a build project, see [Create a build project \(console\) \(p. 188\)](#). When you create or change your CodeBuild project, in **VPC**, choose your VPC ID, subnets, and security groups.

To use the AWS CLI to create a build project, see [Create a build project \(AWS CLI\) \(p. 198\)](#). If you are using the AWS CLI with CodeBuild, the service role used by CodeBuild to interact with services on behalf of the IAM user must have a policy attached. For information, see [Allow CodeBuild access to AWS services required to create a VPC network interface \(p. 360\)](#).

The *vpcConfig* object should include your *vpcId*, *securityGroupIds*, and *subnets*.

- ***vpcId***: Required. The VPC ID that CodeBuild uses. Run this command to get a list of all Amazon VPC IDs in your Region:

```
aws ec2 describe-vpcs
```

- ***subnets***: Required. The subnet IDs that include resources used by CodeBuild. Run this command to obtain these IDs:

```
aws ec2 describe-subnets --filters "Name=vpc-id,Values=<vpc-id>" --region us-east-1
```

**Note**

Replace `us-east-1` with your Region.

- ***securityGroupIds***: Required. The security group IDs used by CodeBuild to allow access to resources in the VPCs. Run this command to obtain these IDs:

```
aws ec2 describe-security-groups --filters "Name=vpc-id,Values=<vpc-id>" --region us-east-1
```

**Note**

Replace `us-east-1` with your Region.

## Best practices for VPCs

Use this checklist when you set up a VPC to work with CodeBuild.

- Set up your VPC with public and private subnets, and a NAT gateway. The NAT gateway must reside in a public subnet. For more information, see [VPC with public and private subnets \(NAT\)](#) in the *Amazon VPC User Guide*.

**Important**

You need a NAT gateway or NAT instance to use CodeBuild with your VPC so that CodeBuild can reach public endpoints (for example, to run CLI commands when running builds). You cannot use the internet gateway instead of a NAT gateway or a NAT instance because CodeBuild does not support assigning Elastic IP addresses to the network interfaces that it creates, and auto-assigning a public IP address is not supported by Amazon EC2 for any network interfaces created outside of Amazon EC2 instance launches.

- Include multiple Availability Zones with your VPC.

- Make sure that your security groups have no inbound (ingress) traffic allowed to your builds. CodeBuild does not have specific requirements for outbound traffic, but you must allow access to any Internet resources required for your build, such as GitHub or Amazon S3.

For more information, see [Security groups rules](#) in the *Amazon VPC User Guide*.

- Set up separate subnets for your builds.
- When you set up your CodeBuild projects to access your VPC, choose private subnets only.

For more information about setting up a VPC in Amazon VPC, see the [Amazon VPC User Guide](#).

For more information about using AWS CloudFormation to configure a VPC to use the CodeBuild VPC feature, see the [AWS CloudFormation VPC template \(p. 175\)](#).

## Troubleshooting your VPC setup

Use the information that appears in the error message to help you identify, diagnose, and address issues.

The following are some guidelines to assist you when troubleshooting a common CodeBuild VPC error: Build does not have internet connectivity. Please check subnet network configuration.

1. [Make sure that your internet gateway is attached to VPC](#).
2. [Make sure that the route table for your public subnet points to the internet gateway](#).
3. [Make sure that your network ACLs allow traffic to flow](#).
4. [Make sure that your security groups allow traffic to flow](#).
5. [Troubleshoot your NAT gateway](#).
6. [Make sure that the route table for private subnets points to the NAT gateway](#).
7. Make sure that the service role used by CodeBuild to interact with services on behalf of the IAM user has the permissions in [this policy](#). For more information, see [Create a CodeBuild service role \(p. 381\)](#).

If CodeBuild is missing permissions, you might receive an error that says, Unexpected EC2 error: UnauthorizedOperation. This error can occur if CodeBuild does not have the Amazon EC2 permissions required to work with a VPC.

## Limitations of VPCs

- VPC connectivity from CodeBuild is not supported in Windows.
- VPC connectivity from CodeBuild is not supported for shared VPCs.
- If you configure a VPC, [local caching \(p. 217\)](#) is not supported. Starting 02/28/22, your VPC build will take longer since a new Amazon EC2 instance will be used for each build.

## Use VPC endpoints

You can improve the security of your builds by configuring AWS CodeBuild to use an interface VPC endpoint. Interface endpoints are powered by PrivateLink, a technology that you can use to privately access Amazon EC2 and CodeBuild by using private IP addresses. PrivateLink restricts all network traffic

between your managed instances, CodeBuild, and Amazon EC2 to the Amazon network. (Managed instances don't have access to the internet.) Also, you don't need an internet gateway, NAT device, or virtual private gateway. You are not required to configure PrivateLink, but it's recommended. For more information about PrivateLink and VPC endpoints, see [What is AWS PrivateLink?](#)

## Before you create VPC endpoints

Before you configure VPC endpoints for AWS CodeBuild, be aware of the following restrictions and limitations.

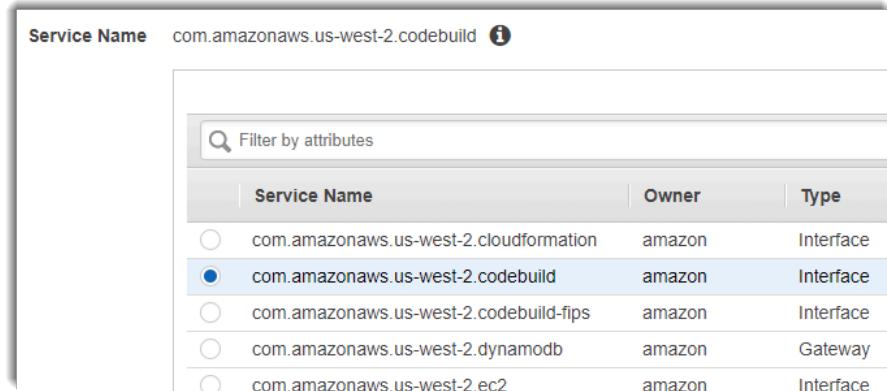
### Note

Use a [NAT gateway](#) if you want to use CodeBuild with AWS services that do not support Amazon VPC PrivateLink connections.

- VPC endpoints support Amazon-provided DNS through Amazon Route 53 only. If you want to use your own DNS, you can use conditional DNS forwarding. For more information, see [DHCP option sets](#) in the [Amazon VPC User Guide](#).
- VPC endpoints currently do not support cross-Region requests. Make sure that you create your endpoint in the same AWS Region as any S3 buckets that store your build input and output. You can use the Amazon S3 console or the [get-bucket-location](#) command to find the location of your bucket. Use a Region-specific Amazon S3 endpoint to access your bucket (for example, `<bucket-name>.s3-us-west-2.amazonaws.com`). For more information about Region-specific endpoints for Amazon S3, see [Amazon Simple Storage Service](#) in the [Amazon Web Services General Reference](#). If you use the AWS CLI to make requests to Amazon S3, set your default Region to the same Region where your bucket was created, or use the `--region` parameter in your requests.

## Creating VPC endpoints for CodeBuild

Follow the instructions in [Creating an interface endpoint](#) to create the endpoint `com.amazonaws.region.codebuild`. This is a VPC endpoint for AWS CodeBuild.



The screenshot shows the AWS Lambda service catalog interface. A search bar at the top contains the query "Filter by attributes". Below it is a table with columns: Service Name, Owner, and Type. The table lists several AWS services:

| Service Name                             | Owner  | Type      |
|--|--------|-----------|
| com.amazonaws.us-west-2.cloudformation   | amazon | Interface |
| <b>com.amazonaws.us-west-2.codebuild</b> | amazon | Interface |
| com.amazonaws.us-west-2.codebuild-fips   | amazon | Interface |
| com.amazonaws.us-west-2.dynamodb         | amazon | Gateway   |
| com.amazonaws.us-west-2.ec2              | amazon | Interface |

`region` represents the region identifier for an AWS Region supported by CodeBuild, such as `us-east-2` for the US East (Ohio) Region. For a list of supported AWS Regions, see [CodeBuild](#) in the [AWS General Reference](#). The endpoint is prepopulated with the Region you specified when you signed in to AWS. If you change your Region, the VPC endpoint is updated accordingly.

## Create a VPC endpoint policy for CodeBuild

You can create a policy for Amazon VPC endpoints for AWS CodeBuild in which you can specify:

- The principal that can perform actions.

- The actions that can be performed.
- The resources that can have actions performed on them.

The following example policy specifies that all principals can only start and view builds for the project-name project.

```
{  
    "Statement": [  
        {  
            "Action": [  
                "codebuild>ListBuildsForProject",  
                "codebuild:StartBuild",  
                "codebuild:BatchGetBuilds"  
            ],  
            "Effect": "Allow",  
            "Resource": "arn:aws:codebuild:region-ID:account-ID:project/project-name",  
            "Principal": "*"  
        }  
    ]  
}
```

For more information, see [Controlling access to services with VPC endpoints](#) in the *Amazon VPC User Guide*.

## AWS CloudFormation VPC template

AWS CloudFormation enables you to create and provision AWS infrastructure deployments predictably and repeatedly, by using template files to create and delete a collection of resources together as a single unit (a *stack*). For more information, see the [AWS CloudFormation User Guide](#).

The following is an AWS CloudFormation YAML template for configuring a VPC to use AWS CodeBuild. This file is also available in [samples.zip](#).

```
Description: This template deploys a VPC, with a pair of public and private subnets spread across two Availability Zones. It deploys an internet gateway, with a default route on the public subnets. It deploys a pair of NAT gateways (one in each AZ), and default routes for them in the private subnets.  
  
Parameters:  
EnvironmentName:  
  Description: An environment name that is prefixed to resource names  
  Type: String  
  
VpcCIDR:  
  Description: Please enter the IP range (CIDR notation) for this VPC  
  Type: String  
  Default: 10.192.0.0/16  
  
PublicSubnet1CIDR:  
  Description: Please enter the IP range (CIDR notation) for the public subnet in the first Availability Zone  
  Type: String  
  Default: 10.192.10.0/24  
  
PublicSubnet2CIDR:  
  Description: Please enter the IP range (CIDR notation) for the public subnet in the second Availability Zone  
  Type: String
```

```
Default: 10.192.11.0/24

PrivateSubnet1CIDR:
  Description: Please enter the IP range (CIDR notation) for the private subnet in the
first Availability Zone
  Type: String
  Default: 10.192.20.0/24

PrivateSubnet2CIDR:
  Description: Please enter the IP range (CIDR notation) for the private subnet in the
second Availability Zone
  Type: String
  Default: 10.192.21.0/24

Resources:
VPC:
  Type: AWS::EC2::VPC
  Properties:
    CidrBlock: !Ref VpcCIDR
    EnableDnsSupport: true
    EnableDnsHostnames: true
    Tags:
      - Key: Name
        Value: !Ref EnvironmentName

InternetGateway:
  Type: AWS::EC2::InternetGateway
  Properties:
    Tags:
      - Key: Name
        Value: !Ref EnvironmentName

InternetGatewayAttachment:
  Type: AWS::EC2::VPCGatewayAttachment
  Properties:
    InternetGatewayId: !Ref InternetGateway
    VpcId: !Ref VPC

PublicSubnet1:
  Type: AWS::EC2::Subnet
  Properties:
    VpcId: !Ref VPC
    AvailabilityZone: !Select [ 0, !GetAZs '' ]
    CidrBlock: !Ref PublicSubnet1CIDR
    MapPublicIpOnLaunch: true
    Tags:
      - Key: Name
        Value: !Sub ${EnvironmentName} Public Subnet (AZ1)

PublicSubnet2:
  Type: AWS::EC2::Subnet
  Properties:
    VpcId: !Ref VPC
    AvailabilityZone: !Select [ 1, !GetAZs '' ]
    CidrBlock: !Ref PublicSubnet2CIDR
    MapPublicIpOnLaunch: true
    Tags:
      - Key: Name
        Value: !Sub ${EnvironmentName} Public Subnet (AZ2)

PrivateSubnet1:
  Type: AWS::EC2::Subnet
  Properties:
    VpcId: !Ref VPC
    AvailabilityZone: !Select [ 0, !GetAZs '' ]
    CidrBlock: !Ref PrivateSubnet1CIDR
```

```
MapPublicIpOnLaunch: false
Tags:
  - Key: Name
    Value: !Sub ${EnvironmentName} Private Subnet (AZ1)

PrivateSubnet2:
  Type: AWS::EC2::Subnet
  Properties:
    VpcId: !Ref VPC
    AvailabilityZone: !Select [ 1, !GetAZs '' ]
    CidrBlock: !Ref PrivateSubnet2CIDR
    MapPublicIpOnLaunch: false
  Tags:
    - Key: Name
      Value: !Sub ${EnvironmentName} Private Subnet (AZ2)

NatGateway1EIP:
  Type: AWS::EC2::EIP
  DependsOn: InternetGatewayAttachment
  Properties:
    Domain: vpc

NatGateway2EIP:
  Type: AWS::EC2::EIP
  DependsOn: InternetGatewayAttachment
  Properties:
    Domain: vpc

NatGateway1:
  Type: AWS::EC2::NatGateway
  Properties:
    AllocationId: !GetAtt NatGateway1EIP.AllocationId
    SubnetId: !Ref PublicSubnet1

NatGateway2:
  Type: AWS::EC2::NatGateway
  Properties:
    AllocationId: !GetAtt NatGateway2EIP.AllocationId
    SubnetId: !Ref PublicSubnet2

PublicRouteTable:
  Type: AWS::EC2::RouteTable
  Properties:
    VpcId: !Ref VPC
  Tags:
    - Key: Name
      Value: !Sub ${EnvironmentName} Public Routes

DefaultPublicRoute:
  Type: AWS::EC2::Route
  DependsOn: InternetGatewayAttachment
  Properties:
    RouteTableId: !Ref PublicRouteTable
    DestinationCidrBlock: 0.0.0.0/0
    GatewayId: !Ref InternetGateway

PublicSubnet1RouteTableAssociation:
  Type: AWS::EC2::SubnetRouteTableAssociation
  Properties:
    RouteTableId: !Ref PublicRouteTable
    SubnetId: !Ref PublicSubnet1

PublicSubnet2RouteTableAssociation:
  Type: AWS::EC2::SubnetRouteTableAssociation
  Properties:
    RouteTableId: !Ref PublicRouteTable
```

```
SubnetId: !Ref PublicSubnet2

PrivateRouteTable1:
  Type: AWS::EC2::RouteTable
  Properties:
    VpcId: !Ref VPC
    Tags:
      - Key: Name
        Value: !Sub ${EnvironmentName} Private Routes (AZ1)

DefaultPrivateRoute1:
  Type: AWS::EC2::Route
  Properties:
    RouteTableId: !Ref PrivateRouteTable1
    DestinationCidrBlock: 0.0.0.0/0
    NatGatewayId: !Ref NatGateway1

PrivateSubnet1RouteTableAssociation:
  Type: AWS::EC2::SubnetRouteTableAssociation
  Properties:
    RouteTableId: !Ref PrivateRouteTable1
    SubnetId: !Ref PrivateSubnet1

PrivateRouteTable2:
  Type: AWS::EC2::RouteTable
  Properties:
    VpcId: !Ref VPC
    Tags:
      - Key: Name
        Value: !Sub ${EnvironmentName} Private Routes (AZ2)

DefaultPrivateRoute2:
  Type: AWS::EC2::Route
  Properties:
    RouteTableId: !Ref PrivateRouteTable2
    DestinationCidrBlock: 0.0.0.0/0
    NatGatewayId: !Ref NatGateway2

PrivateSubnet2RouteTableAssociation:
  Type: AWS::EC2::SubnetRouteTableAssociation
  Properties:
    RouteTableId: !Ref PrivateRouteTable2
    SubnetId: !Ref PrivateSubnet2

NoIngressSecurityGroup:
  Type: AWS::EC2::SecurityGroup
  Properties:
    GroupName: "no-ingress-sg"
    GroupDescription: "Security group with no ingress rule"
    VpcId: !Ref VPC

Outputs:
  VPC:
    Description: A reference to the created VPC
    Value: !Ref VPC

  PublicSubnets:
    Description: A list of the public subnets
    Value: !Join [ ",", [ !Ref PublicSubnet1, !Ref PublicSubnet2 ]]

  PrivateSubnets:
    Description: A list of the private subnets
    Value: !Join [ ",", [ !Ref PrivateSubnet1, !Ref PrivateSubnet2 ]]

  PublicSubnet1:
```

```
Description: A reference to the public subnet in the 1st Availability Zone
Value: !Ref PublicSubnet1

PublicSubnet2:
Description: A reference to the public subnet in the 2nd Availability Zone
Value: !Ref PublicSubnet2

PrivateSubnet1:
Description: A reference to the private subnet in the 1st Availability Zone
Value: !Ref PrivateSubnet1

PrivateSubnet2:
Description: A reference to the private subnet in the 2nd Availability Zone
Value: !Ref PrivateSubnet2

NoIngressSecurityGroup:
Description: Security group with no ingress rule
Value: !Ref NoIngressSecurityGroup
```

## Use AWS CodeBuild with a proxy server

You can use AWS CodeBuild with a proxy server to regulate HTTP and HTTPS traffic to and from the internet. To run CodeBuild with a proxy server, you install a proxy server in a public subnet and CodeBuild in a private subnet in a VPC.

There are two primary use cases for running CodeBuild in a proxy server:

- It eliminates the use of a NAT gateway or NAT instance in your VPC.
- It lets you specify the URLs that instances in the proxy server can access and the URLs to which the proxy server denies access.

You can use CodeBuild with two types of proxy servers. For both, the proxy server runs in a public subnet and CodeBuild runs in a private subnet.

- **Explicit proxy:** If you use an explicit proxy server, you must configure NO\_PROXY, HTTP\_PROXY, and HTTPS\_PROXY environment variables in CodeBuild at the project level. For more information, see [Change a build project's settings in AWS CodeBuild \(p. 241\)](#) and [Create a build project in AWS CodeBuild \(p. 187\)](#).
- **Transparent proxy:** If you use a transparent proxy server, no special configuration is required.

### Topics

- [Components required to run CodeBuild in a proxy server \(p. 179\)](#)
- [Run CodeBuild in an explicit proxy server \(p. 181\)](#)
- [Run CodeBuild in a transparent proxy server \(p. 184\)](#)
- [Run a package manager and other tools in a proxy server \(p. 185\)](#)

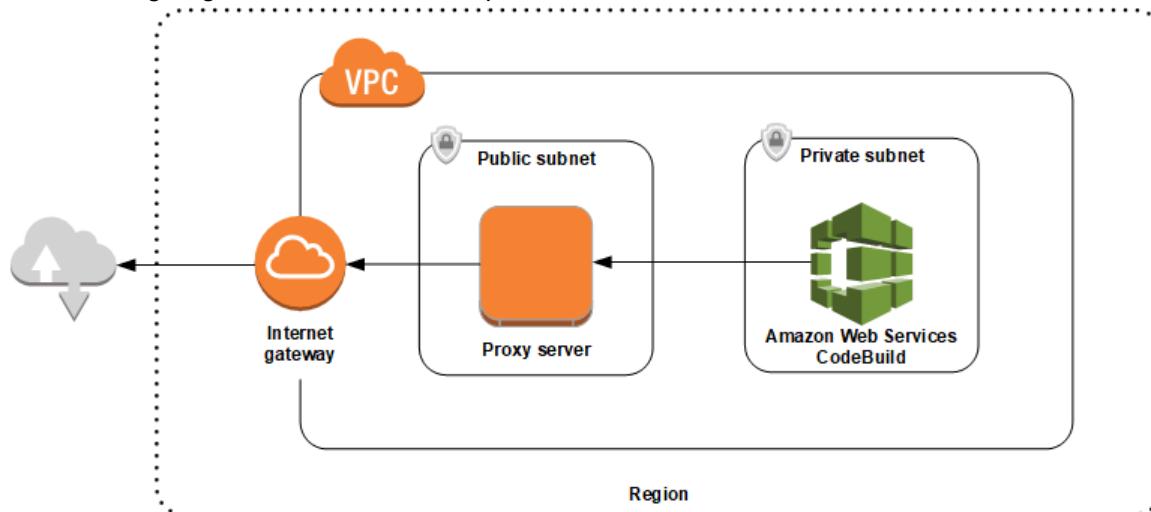
## Components required to run CodeBuild in a proxy server

You need these components to run AWS CodeBuild in a transparent or explicit proxy server:

- A VPC.

- One public subnet in your VPC for the proxy server.
- One private subnet in your VPC for CodeBuild.
- An internet gateway that allows communication between the VPC and the internet.

The following diagram shows how the components interact.



## Set up a VPC, subnets, and a network gateway

The following steps are required to run AWS CodeBuild in a transparent or explicit proxy server.

1. Create a VPC. For information, see [Creating a VPC](#) in the *Amazon VPC User Guide*.
2. Create two subnets in your VPC. One is a public subnet named Public Subnet in which your proxy server runs. The other is a private subnet named Private Subnet in which CodeBuild runs.  
For information, see [Creating a subnet in your VPC](#).
3. Create and attach an internet gateway to your VPC. For more information, see [Creating and attaching an internet gateway](#).
4. Add a rule to the default route table that routes outgoing traffic from the VPC (0.0.0.0/0) to the internet gateway. For information, see [Adding and removing routes from a route table](#).
5. Add a rule to the default security group of your VPC that allows ingress SSH traffic (TCP 22) from your VPC (0.0.0.0/0).
6. Follow the instructions in [Launching an instance using the launch instance wizard](#) in the *Amazon EC2 User Guide* to launch an Amazon Linux instance. When you run the wizard, choose the following options:
  - In **Choose an Instance Type**, choose an Amazon Linux Amazon Machine Image (AMI).
  - In **Subnet**, choose the public subnet you created earlier in this topic. If you used the suggested name, it is **Public Subnet**.
  - In **Auto-assign Public IP**, choose **Enable**.
  - On the **Configure Security Group** page, for **Assign a security group**, choose **Select an existing security group**. Next, choose the default security group.
  - After you choose **Launch**, choose an existing key pair or create one.
- Choose the default settings for all other options.

7. After your EC2 instance is running, disable source/destination checks. For information, see [Disabling Source/Destination checks](#) in the *Amazon VPC User Guide*.

8. Create a route table in your VPC. Add a rule to the route table that routes traffic destined for the internet to your proxy server. Associate this route table with your private subnet. This is required so that outbound requests from instances in your private subnet, where CodeBuild runs, are always routed through the proxy server.

## Install and configure a proxy server

There are many proxy servers from which to choose. An open-source proxy server, Squid, is used here to demonstrate how AWS CodeBuild runs in a proxy server. You can apply the same concepts to other proxy servers.

To install Squid, use a yum repo by running the following commands:

```
sudo yum update -y  
sudo yum install -y squid
```

After you install Squid, edit its `squid.conf` file using the instructions later in this topic.

## Configure Squid for HTTPS traffic

For HTTPS, the HTTP traffic is encapsulated in a Transport Layer Security (TLS) connection. Squid uses a feature called [SslPeekAndSplice](#) to retrieve the Server Name Indication (SNI) from the TLS initiation that contains the requested internet host. This is required so Squid does not need to unencrypt HTTPS traffic. To enable SslPeekAndSplice, Squid requires a certificate. Create this certificate using OpenSSL:

```
sudo mkdir /etc/squid/ssl  
cd /etc/squid/ssl  
sudo openssl genrsa -out squid.key 2048  
sudo openssl req -new -key squid.key -out squid.csr -subj "/C=XX/ST=XX/L=squid/O=squid/  
CN=squid"  
sudo openssl x509 -req -days 3650 -in squid.csr -signkey squid.key -out squid.crt  
sudo cat squid.key squid.crt | sudo tee squid.pem
```

### Note

For HTTP, Squid does not require configuration. From all HTTP/1.1 request messages, it can retrieve the host header field, which specifies the internet host that is being requested.

## Run CodeBuild in an explicit proxy server

### Topics

- [Configure Squid as an explicit proxy server \(p. 181\)](#)
- [Create a CodeBuild project \(p. 183\)](#)
- [Explicit proxy server sample `squid.conf` file \(p. 183\)](#)

To run AWS CodeBuild in an explicit proxy server, you must configure the proxy server to allow or deny traffic to and from external sites, and then configure the `HTTP_PROXY` and `HTTPS_PROXY` environment variables.

## Configure Squid as an explicit proxy server

To configure the Squid proxy server to be explicit, you must make the following modifications to its `/etc/squid/squid.conf` file:

- Remove the following default access control list (ACL) rules.

```
acl localnet src 10.0.0.0/8
acl localnet src 172.16.0.0/12
acl localnet src 192.168.0.0/16
acl localnet src fc00::/7
acl localnet src fe80::/10
```

Add the following in place of the default ACL rules you removed. The first line allows requests from your VPC. The next two lines grant your proxy server access to destination URLs that might be used by AWS CodeBuild. Edit the regular expression in the last line to specify S3 buckets or a CodeCommit repository in an AWS Region. For example:

- If your source is Amazon S3, use the command `acl download_src dstdom_regex .*s3\us-west-1.amazonaws.com` to grant access to S3 buckets in the us-west-1 Region.
- If your source is AWS CodeCommit, use `git-codecommit.<your-region>.amazonaws.com` to add an AWS Region to an allow list.

```
acl localnet src 10.1.0.0/16 #Only allow requests from within the VPC
acl allowed_sites dstdomain .github.com #Allows to download source from GitHub
acl allowed_sites dstdomain .bitbucket.com #Allows to download source from Bitbucket
acl download_src dstdom_regex .*\.amazonaws\.com #Allows to download source from Amazon S3 or CodeCommit
```

- Replace `http_access allow localnet` with the following:

```
http_access allow localnet allowed_sites
http_access allow localnet download_src
```

- If you want your build to upload logs and artifacts, do one of the following:
  1. Before the `http_access deny all` statement, insert the following statements. They allow CodeBuild to access CloudWatch and Amazon S3. Access to CloudWatch is required so that CodeBuild can create CloudWatch logs. Access to Amazon S3 is required for uploading artifacts and Amazon S3 caching.

- ```
https_port 3130 cert=/etc/squid/ssl/squid.pem ssl-bump intercept
acl SSL_port port 443
http_access allow SSL_port
acl allowed_https_sites ssl::server_name .amazonaws.com
acl step1 at_step SslBump1
acl step2 at_step SslBump2
acl step3 at_step SslBump3
ssl_bump peek step1 all
ssl_bump peek step2 allowed_https_sites
ssl_bump splice step3 allowed_https_sites
ssl_bump terminate step2 all
```

- After you save `squid.conf`, run the following command:

```
sudo iptables -t nat -A PREROUTING -p tcp --dport 443 -j REDIRECT --to-port 3130
sudo service squid restart
```

2. Add proxy to your `buildspec` file. For more information, see [Buildspec syntax \(p. 130\)](#).

```
version: 0.2
proxy:
  upload-artifacts: yes
  logs: yes
phases:
  build:
```

```
commands:  
- command
```

**Note**

If you receive a RequestError timeout error, see [RequestError timeout error when running CodeBuild in a proxy server \(p. 422\)](#).

For more information, see [Explicit proxy server sample squid.conf file \(p. 183\)](#) later in this topic.

## Create a CodeBuild project

To run AWS CodeBuild with your explicit proxy server, set its HTTP\_PROXY and HTTPS\_PROXY environment variables with the private IP address of the EC2 instance you created for your proxy server and port 3128 at the project level. The private IP address looks like `http://your-ec2-private-ip-address:3128`. For more information, see [Create a build project in AWS CodeBuild \(p. 187\)](#) and [Change a build project's settings in AWS CodeBuild \(p. 241\)](#).

Use the following command to view the Squid proxy access log:

```
sudo tail -f /var/log/squid/access.log
```

## Explicit proxy server sample squid.conf file

The following is an example of a `squid.conf` file that is configured for an explicit proxy server.

```
acl localnet src 10.0.0.0/16 #Only allow requests from within the VPC  
# add all URLs to be whitelisted for download source and commands to be run in build  
environment  
acl allowed_sites dstdomain .github.com    #Allows to download source from github  
acl allowed_sites dstdomain .bitbucket.com #Allows to download source from bitbucket  
acl allowed_sites dstdomain ppa.launchpad.net #Allows to run apt-get in build environment  
acl download_src dstdom_regex .*\amazonaws\.com #Allows to download source from S3 or  
CodeCommit  
acl SSL_ports port 443  
acl Safe_ports port 80  # http  
acl Safe_ports port 21  # ftp  
acl Safe_ports port 443  # https  
acl Safe_ports port 70  # gopher  
acl Safe_ports port 210 # wais  
acl Safe_ports port 1025-65535 # unregistered ports  
acl Safe_ports port 280 # http-mgmt  
acl Safe_ports port 488 # gss-http  
acl Safe_ports port 591 # filemaker  
acl Safe_ports port 777 # multiling http  
acl CONNECT method CONNECT  
#  
# Recommended minimum Access Permission configuration:  
#  
# Deny requests to certain unsafe ports  
http_access deny !Safe_ports  
# Deny CONNECT to other than secure SSL ports  
http_access deny CONNECT !SSL_ports  
# Only allow cachemgr access from localhost  
http_access allow localhost manager  
http_access deny manager  
# We strongly recommend the following be uncommented to protect innocent  
# web applications running on the proxy server who think the only  
# one who can access services on "localhost" is a local user  
#http_access deny to_localhost
```

```

#
# INSERT YOUR OWN RULE(S) HERE TO ALLOW ACCESS FROM YOUR CLIENTS
#
# Example rule allowing access from your local networks.
# Adapt localnet in the ACL section to list your (internal) IP networks
# from where browsing should be allowed
http_access allow localnet allowed_sites
http_access allow localnet download_src
http_access allow localhost
# Add this for CodeBuild to access CWL end point, caching and upload artifacts S3 bucket
end point
https_port 3130 cert=/etc/squid/ssl/squid.pem ssl-bump intercept
acl SSL_port port 443
http_access allow SSL_port
acl allowed_https_sites ssl::server_name .amazonaws.com
acl step1 at_step SslBump1
acl step2 at_step SslBump2
acl step3 at_step SslBump3
ssl_bump peek step1 all
ssl_bump peek step2 allowed_https_sites
ssl_bump splice step3 allowed_https_sites
ssl_bump terminate step2 all
# And finally deny all other access to this proxy
http_access deny all
# Squid normally listens to port 3128
http_port 3128
# Uncomment and adjust the following to add a disk cache directory.
#cache_dir ufs /var/spool/squid 100 16 256
# Leave core dumps in the first cache dir
coredump_dir /var/spool/squid
#
# Add any of your own refresh_pattern entries above these.
#
refresh_pattern ^ftp: 1440 20% 10080
refresh_pattern ^gopher: 1440 0% 1440
refresh_pattern -i (/cgi-bin/|\.?) 0 0% 0
refresh_pattern . 0 20% 4320

```

## Run CodeBuild in a transparent proxy server

To run AWS CodeBuild in a transparent proxy server, you must configure the proxy server with access to the websites and domains it interacts with.

### Configure Squid as a transparent proxy server

To configure a proxy server to be transparent, you must grant it access to the domains and websites you want it to access. To run AWS CodeBuild with a transparent proxy server, you must grant it access to `amazonaws.com`. You must also grant access to other websites CodeBuild uses. These vary, depending on how you create your CodeBuild projects. Example websites are those for repositories such as GitHub, Bitbucket, Yum, and Maven. To grant Squid access to specific domains and websites, use a command similar to the following to update the `squid.conf` file. This sample command grants access to `amazonaws.com`, `github.com`, and `bitbucket.com`. You can edit this sample to grant access to other websites.

```

cat | sudo tee /etc/squid/squid.conf #EOF
visible_hostname squid
#Handling HTTP requests
http_port 3129 intercept
acl allowed_http_sites dstdomain .amazonaws.com
#acl allowed_http_sites dstdomain domain_name [uncomment this line to add another domain]
http_access allow allowed_http_sites

```

```
#Handling HTTPS requests
https_port 3130 cert=/etc/squid/ssl/squid.pem ssl-bump intercept
acl SSL_port port 443
http_access allow SSL_port
acl allowed_https_sites ssl::server_name .amazonaws.com
acl allowed_https_sites ssl::server_name .github.com
acl allowed_https_sites ssl::server_name .bitbucket.com
#acl allowed_https_sites ssl::server_name [uncomment this line to add another website]
acl step1 at_step SslBump1
acl step2 at_step SslBump2
acl step3 at_step SslBump3
ssl_bump peek step1 all
ssl_bump peek step2 allowed_https_sites
ssl_bump splice step3 allowed_https_sites
ssl_bump terminate step2 all
http_access deny all
EOF
```

Incoming requests from instances in the private subnet must redirect to the Squid ports. Squid listens on port 3129 for HTTP traffic (instead of 80) and 3130 for HTTPS traffic (instead of 443). Use the **iptables** command to route traffic:

```
sudo iptables -t nat -A PREROUTING -p tcp --dport 80 -j REDIRECT --to-port 3129
sudo iptables -t nat -A PREROUTING -p tcp --dport 443 -j REDIRECT --to-port 3130
sudo service iptables save
sudo service squid start
```

## Create a CodeBuild project

After you configure your proxy server, you can use it with AWS CodeBuild in a private subnet without more configuration. Every HTTP and HTTPS request goes through the public proxy server. Use the following command to view the Squid proxy access log:

```
sudo tail -f /var/log/squid/access.log
```

## Run a package manager and other tools in a proxy server

### To run a tool, such as a package manager, in a proxy server

1. Add the tool to the allow list in your proxy server by adding statements to your `squid.conf` file.
2. Add a line to your `buildspec` file that points to the private endpoint of your proxy server.

The following examples demonstrate how to do this for `apt-get`, `curl`, and `maven`. If you use a different tool, the same principles apply. Add it to an allow list in the `squid.conf` file and add a command to your `buildspec` file to make CodeBuild aware of your proxy server's endpoint.

### To run `apt-get` in a proxy server

1. Add the following statements to your `squid.conf` file to add `apt-get` to an allow list in your proxy server. The first three lines allow `apt-get` to run in the build environment.

```
acl allowed_sites dstdomain ppa.launchpad.net # Required for apt-get to run in the
build environment
```

```
acl apt_get dstdom_regex .*\.launchpad.net # Required for CodeBuild to run apt-get in  
the build environment  
acl apt_get dstdom_regex .*\.ubuntu.com # Required for CodeBuild to run apt-get in  
the build environment  
http_access allow localnet allowed_sites  
http_access allow localnet apt_get
```

2. Add the following statement in your buildspec file so that apt-get commands look for the proxy configuration in /etc/apt/apt.conf.d/00proxy.

```
echo 'Acquire::http::Proxy "http://<private-ip-of-proxy-server>:3128";  
Acquire::https::Proxy "http://<private-ip-of-proxy-server>:3128"; Acquire::ftp::Proxy  
"http://<private-ip-of-proxy-server>:3128";' > /etc/apt/apt.conf.d/00proxy
```

### To run curl in a proxy server

1. Add the following to your squid.conf file to add curl to an allow list in your build environment.

```
acl allowed_sites dstdomain ppa.launchpad.net # Required to run apt-get in the build  
environment  
acl allowed_sites dstdomain google.com # Required for access to a website. This example  
uses www.google.com.  
http_access allow localnet allowed_sites  
http_access allow localnet apt_get
```

2. Add the following statement in your buildspec file so curl uses the private proxy server to access the website you added to the squid.conf. In this example, the website is google.com.

```
curl -x <private-ip-of-proxy-server>:3128 https://www.google.com
```

### To run maven in a proxy server

1. Add the following to your squid.conf file to add maven to an allow list in your build environment.

```
acl allowed_sites dstdomain ppa.launchpad.net # Required to run apt-get in the build  
environment  
acl maven dstdom_regex .*\.maven.org # Allows access to the maven repository in the  
build environment  
http_access allow localnet allowed_sites  
http_access allow localnet maven
```

2. Add the following statement to your buildspec file.

```
maven clean install -DproxySet=true -DproxyHost=<private-ip-of-proxy-server> -  
DproxyPort=3128
```

# Working with build projects and builds in AWS CodeBuild

To get started, follow the steps in [Create a build project \(p. 187\)](#), and then follow the steps in [Run a build \(p. 271\)](#). For more information about build projects and builds, see the following topics.

## Topics

- [Working with build projects \(p. 187\)](#)
- [Working with builds in AWS CodeBuild \(p. 271\)](#)

## Working with build projects

A *build project* includes information about how to run a build, including where to get the source code, which build environment to use, which build commands to run, and where to store the build output.

You can perform these tasks when working with build projects:

## Topics

- [Create a build project in AWS CodeBuild \(p. 187\)](#)
- [Create a notification rule \(p. 211\)](#)
- [View a list of build project names in AWS CodeBuild \(p. 213\)](#)
- [View a build project's details in AWS CodeBuild \(p. 214\)](#)
- [Build caching in AWS CodeBuild \(p. 216\)](#)
- [Create AWS CodeBuild triggers \(p. 220\)](#)
- [Edit AWS CodeBuild triggers \(p. 222\)](#)
- [Using webhooks with AWS CodeBuild \(p. 224\)](#)
- [Change a build project's settings in AWS CodeBuild \(p. 241\)](#)
- [Delete a build project in AWS CodeBuild \(p. 254\)](#)
- [Working with shared projects \(p. 255\)](#)
- [Tagging projects in AWS CodeBuild \(p. 259\)](#)
- [Batch builds in AWS CodeBuild \(p. 262\)](#)
- [GitHub Action runner in AWS CodeBuild \(p. 265\)](#)
- [Public build projects in AWS CodeBuild \(p. 270\)](#)

## Create a build project in AWS CodeBuild

You can use the AWS CodeBuild console, AWS CLI, or AWS SDKs to create a build project.

## Prerequisites

Before creating a build project, answer the questions in [Plan a build \(p. 128\)](#).

## Topics

- [Create a build project \(console\) \(p. 188\)](#)
- [Create a build project \(AWS CLI\) \(p. 198\)](#)
- [Create a build project \(AWS SDKs\) \(p. 211\)](#)
- [Create a build project \(AWS CloudFormation\) \(p. 211\)](#)

## Create a build project (console)

Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.

If a CodeBuild information page is displayed, choose **Create build project**. Otherwise, on the navigation pane, expand **Build**, choose **Build projects**, and then choose **Create build project**.

Choose **Create build project**.

Fill in the following sections. Once complete, choose **Create build project** at the bottom of the page.

### Sections:

- [Project configuration \(p. 188\)](#)
- [Source \(p. 189\)](#)
- [Environment \(p. 192\)](#)
- [Buildspec \(p. 195\)](#)
- [Batch configuration \(p. 195\)](#)
- [Artifacts \(p. 196\)](#)
- [Logs \(p. 198\)](#)

## Project configuration

### Project name

Enter a name for this build project. Build project names must be unique across each AWS account.

### Description

Enter an optional description of the build project to help other users understand what this project is used for.

### Build badge

(Optional) Select **Enable build badge** to make your project's build status visible and embeddable. For more information, see [Build badges sample \(p. 74\)](#).

#### Note

Build badge does not apply if your source provider is Amazon S3.

### Enable concurrent build limit

(Optional) If you want to limit the number of concurrent builds for this project, perform the following steps:

1. Select **Restrict number of concurrent builds this project can start**.
2. In **Concurrent build limit**, enter the maximum number of concurrent builds that are allowed for this project. This limit cannot be greater than the concurrent build limit set for the account. If you try to enter a number greater than the account limit, an error message is displayed.

New builds are only started if the current number of builds is less than or equal to this limit. If the current build count meets this limit, new builds are throttled and are not run.

## Additional information

(Optional) For **Tags**, enter the name and value of any tags that you want supporting AWS services to use. Use **Add row** to add a tag. You can add up to 50 tags.

## Source

### Source provider

Choose the source code provider type. Use the following lists to make selections appropriate for your source provider:

#### Note

CodeBuild does not support Bitbucket Server.

### Amazon S3

#### Bucket

Choose the name of the input bucket that contains the source code.

#### S3 object key or S3 folder

Enter the name of the ZIP file or the path to the folder that contains the source code. Enter a forward slash (/) to download everything in the S3 bucket.

#### Source version

Enter the version ID of the object that represents the build of your input file. For more information, see [Source version sample with AWS CodeBuild \(p. 120\)](#).

### CodeCommit

#### Repository

Choose the repository you want to use.

#### Reference type

Choose **Branch**, **Git tag**, or **Commit ID** to specify the version of your source code. For more information, see [Source version sample with AWS CodeBuild \(p. 120\)](#).

#### Note

We recommend that you choose Git branch names that don't look like commit IDs, such as 811dd1ba1aba14473856cee38308caed7190c0d or 5392f7. This helps you avoid Git checkout collisions with actual commits.

#### Git clone depth

Choose to create a shallow clone with a history truncated to the specified number of commits. If you want a full clone, choose **Full**.

#### Git submodules

Select **Use Git submodules** if you want to include Git submodules in your repository.

### Bitbucket

#### Repository

Choose **Connect using OAuth** or **Connect with a Bitbucket app password** and follow the instructions to connect (or reconnect) to Bitbucket.

Choose a public repository or a repository in your account.

#### Source version

Enter a branch, commit ID, tag, or reference and a commit ID. For more information, see [Source version sample with AWS CodeBuild \(p. 120\)](#)

##### Note

We recommend that you choose Git branch names that don't look like commit IDs, such as 811dd1ba1aba14473856cee38308caed7190c0d or 5392f7. This helps you avoid Git checkout collisions with actual commits.

#### Git clone depth

Choose **Git clone depth** to create a shallow clone with a history truncated to the specified number of commits. If you want a full clone, choose **Full**.

#### Git submodules

Select **Use Git submodules** if you want to include Git submodules in your repository.

#### Build status

Select **Report build statuses to source provider when your builds start and finish** if you want the status of your build's start and completion reported to your source provider.

To be able to report the build status to the source provider, the user associated with the source provider must have write access to the repo. If the user does not have write access, the build status cannot be updated. For more information, see [Source provider access \(p. 370\)](#).

For **Status context**, enter the value to be used for the name parameter in the Bitbucket commit status. For more information, see [build](#) in the Bitbucket API documentation.

For **Target URL**, enter the value to be used for the url parameter in the Bitbucket commit status. For more information, see [build](#) in the Bitbucket API documentation.

The status of a build triggered by a webhook is always reported to the source provider. To have the status of a build that is started from the console or an API call reported to the source provider, you must select this setting.

If your project's builds are triggered by a webhook, you must push a new commit to the repo for a change to this setting to take effect.

In **Primary source webhook events**, select **Rebuild every time a code change is pushed to this repository** if you want CodeBuild to build the source code every time a code change is pushed to this repository. For more information about webhooks and filter groups, see [Bitbucket webhook events \(p. 224\)](#).

#### GitHub

#### Repository

Choose **Connect using OAuth** or **Connect with a GitHub personal access token** and follow the instructions to connect (or reconnect) to GitHub and authorize access to AWS CodeBuild.

Choose a public repository or a repository in your account.

#### Source version

Enter a branch, commit ID, tag, or reference and a commit ID. For more information, see [Source version sample with AWS CodeBuild \(p. 120\)](#)

##### Note

We recommend that you choose Git branch names that don't look like commit IDs, such as 811dd1ba1aba14473856cee38308caed7190c0d or 5392f7. This helps you avoid Git checkout collisions with actual commits.

### Git clone depth

Choose **Git clone depth** to create a shallow clone with a history truncated to the specified number of commits. If you want a full clone, choose **Full**.

### Git submodules

Select **Use Git submodules** if you want to include Git submodules in your repository.

### Build status

Select **Report build statuses to source provider when your builds start and finish** if you want the status of your build's start and completion reported to your source provider.

To be able to report the build status to the source provider, the user associated with the source provider must have write access to the repo. If the user does not have write access, the build status cannot be updated. For more information, see [Source provider access \(p. 370\)](#).

For **Status context**, enter the value to be used for the context parameter in the GitHub commit status. For more information, see [Create a commit status](#) in the GitHub developer guide.

For **Target URL**, enter the value to be used for the target\_url parameter in the GitHub commit status. For more information, see [Create a commit status](#) in the GitHub developer guide.

The status of a build triggered by a webhook is always reported to the source provider. To have the status of a build that is started from the console or an API call reported to the source provider, you must select this setting.

If your project's builds are triggered by a webhook, you must push a new commit to the repo for a change to this setting to take effect.

In **Primary source webhook events**, select **Rebuild every time a code change is pushed to this repository** if you want CodeBuild to build the source code every time a code change is pushed to this repository. For more information about webhooks and filter groups, see [GitHub webhook events \(p. 233\)](#).

### GitHub Enterprise Server

#### GitHub Enterprise personal access token

See [GitHub Enterprise Server sample \(p. 102\)](#) for information about how to copy a personal access token to your clipboard. Paste the token in the text field, and then choose **Save Token**.

##### Note

You only need to enter and save the personal access token once. CodeBuild uses this token in all future projects.

### Source version

Enter a pull request, branch, commit ID, tag, or reference and a commit ID. For more information, see [Source version sample with AWS CodeBuild \(p. 120\)](#).

##### Note

We recommend that you choose Git branch names that don't look like commit IDs, such as 811dd1ba1aba14473856cee38308caed7190c0d or 5392f7. This helps you avoid Git checkout collisions with actual commits.

### Git clone depth

Choose **Git clone depth** to create a shallow clone with a history truncated to the specified number of commits. If you want a full clone, choose **Full**.

### Git submodules

Select **Use Git submodules** if you want to include Git submodules in your repository.

## Build status

Select **Report build statuses to source provider when your builds start and finish** if you want the status of your build's start and completion reported to your source provider.

To be able to report the build status to the source provider, the user associated with the source provider must have write access to the repo. If the user does not have write access, the build status cannot be updated. For more information, see [Source provider access \(p. 370\)](#).

For **Status context**, enter the value to be used for the context parameter in the GitHub commit status. For more information, see [Create a commit status](#) in the GitHub developer guide.

For **Target URL**, enter the value to be used for the target\_url parameter in the GitHub commit status. For more information, see [Create a commit status](#) in the GitHub developer guide.

The status of a build triggered by a webhook is always reported to the source provider. To have the status of a build that is started from the console or an API call reported to the source provider, you must select this setting.

If your project's builds are triggered by a webhook, you must push a new commit to the repo for a change to this setting to take effect.

## Insecure SSL

Select **Enable insecure SSL** to ignore SSL warnings while connecting to your GitHub Enterprise project repository.

In **Primary source webhook events**, select **Rebuild every time a code change is pushed to this repository** if you want CodeBuild to build the source code every time a code change is pushed to this repository. For more information about webhooks and filter groups, see [GitHub webhook events \(p. 233\)](#).

## Environment

### Environment image

Do one of the following:

- To use a Docker image managed by AWS CodeBuild, choose **Managed image**, and then make selections from **Operating system**, **Runtime(s)**, **Image**, and **Image version**. Make a selection from **Environment type** if it is available.
- To use another Docker image, choose **Custom image**. For **Environment type**, choose **ARM**, **Linux**, **Linux GPU**, or **Windows**. If you choose **Other registry**, for **External registry URL**, enter the name and tag of the Docker image in Docker Hub, using the format `docker repository/docker image name`. If you choose **Amazon ECR**, use **Amazon ECR repository** and **Amazon ECR image** to choose the Docker image in your AWS account.
- To use a private Docker image, choose **Custom image**. For **Environment type**, choose **ARM**, **Linux**, **Linux GPU**, or **Windows**. For **Image registry**, choose **Other registry**, and then enter the ARN of the credentials for your private Docker image. The credentials must be created by Secrets Manager. For more information, see [What Is AWS Secrets Manager?](#) in the *AWS Secrets Manager User Guide*.

#### Note

CodeBuild overrides the ENTRYPPOINT for custom Docker images.

### Privileged

(Optional) Select **Privileged** only if you plan to use this build project to build Docker images. Otherwise, all associated builds that attempt to interact with the Docker daemon fail. You must

also start the Docker daemon so that your builds can interact with it. One way to do this is to initialize the Docker daemon in the `install` phase of your build spec by running the following build commands. Do not run these commands if you chose a build environment image provided by CodeBuild with Docker support.

**Note**

By default, Docker containers do not allow access to any devices. Privileged mode grants a build project's Docker container access to all devices. For more information, see [Runtime Privilege and Linux Capabilities](#) on the Docker Docs website. Also, Windows does not support privileged mode.

```
- nohup /usr/local/bin/dockerd --host=unix:///var/run/docker.sock --  
host=tcp://127.0.0.1:2375 --storage-driver=overlay2 &  
- timeout 15 sh -c "until docker info; do echo .; sleep 1; done"
```

### Service role

Do one of the following:

- If you do not have a CodeBuild service role, choose **New service role**. In **Role name**, enter a name for the new role.
- If you have a CodeBuild service role, choose **Existing service role**. In **Role ARN**, choose the service role.

**Note**

When you use the console to create a build project, you can create a CodeBuild service role at the same time. By default, the role works with that build project only. If you use the console to associate this service role with another build project, the role is updated to work with the other build project. A service role can work with up to 10 build projects.

### Additional configuration

#### Timeout

Specify a value, between 5 minutes and 8 hours, after which CodeBuild stops the build if it is not complete. If **hours** and **minutes** are left blank, the default value of 60 minutes is used.

#### VPC

If you want CodeBuild to work with your VPC:

- For **VPC**, choose the VPC ID that CodeBuild uses.
- For **VPC Subnets**, choose the subnets that include resources that CodeBuild uses.
- For **VPC Security groups**, choose the security groups that CodeBuild uses to allow access to resources in the VPCs.

For more information, see [Use AWS CodeBuild with Amazon Virtual Private Cloud \(p. 171\)](#).

#### Compute

Choose one of the available options.

#### Environment variables

Enter the name and value, and then choose the type of each environment variable for builds to use.

**Note**

CodeBuild sets the environment variable for your AWS Region automatically. You must set the following environment variables if you haven't added them to your `buildspec.yml`:

- `AWS_ACCOUNT_ID`

- IMAGE\_REPO\_NAME
- IMAGE\_TAG

Console and AWS CLI users can see environment variables. If you have no concerns about the visibility of your environment variable, set the **Name** and **Value** fields, and then set **Type** to **Plaintext**.

We recommend that you store an environment variable with a sensitive value, such as an AWS access key ID, an AWS secret access key, or a password as a parameter in Amazon EC2 Systems Manager Parameter Store or AWS Secrets Manager.

If you use Amazon EC2 Systems Manager Parameter Store, then for **Type**, choose **Parameter**. For **Name**, enter an identifier for CodeBuild to reference. For **Value**, enter the parameter's name as stored in Amazon EC2 Systems Manager Parameter Store. Using a parameter named /CodeBuild/dockerLoginPassword as an example, for **Type**, choose **Parameter**. For **Name**, enter LOGIN\_PASSWORD. For **Value**, enter /CodeBuild/dockerLoginPassword.

### Important

If you use Amazon EC2 Systems Manager Parameter Store, we recommend that you store parameters with parameter names that start with /CodeBuild/ (for example, /CodeBuild/dockerLoginPassword). You can use the CodeBuild console to create a parameter in Amazon EC2 Systems Manager. Choose **Create parameter**, and then follow the instructions in the dialog box. (In that dialog box, for **KMS key**, you can specify the ARN of an AWS KMS key in your account. Amazon EC2 Systems Manager uses this key to encrypt the parameter's value during storage and decrypt it during retrieval.) If you use the CodeBuild console to create a parameter, the console starts the parameter name with /CodeBuild/ as it is being stored. For more information, see [Systems Manager Parameter Store](#) and [Systems Manager Parameter Store Console Walkthrough](#) in the [Amazon EC2 Systems Manager User Guide](#).

If your build project refers to parameters stored in Amazon EC2 Systems Manager Parameter Store, the build project's service role must allow the `ssm:GetParameters` action. If you chose **New service role** earlier, CodeBuild includes this action in the default service role for your build project. However, if you chose **Existing service role**, you must include this action to your service role separately.

If your build project refers to parameters stored in Amazon EC2 Systems Manager Parameter Store with parameter names that do not start with /CodeBuild/, and you chose **New service role**, you must update that service role to allow access to parameter names that do not start with /CodeBuild/. This is because that service role allows access only to parameter names that start with /CodeBuild/.

If you choose **New service role**, the service role includes permission to decrypt all parameters under the /CodeBuild/ namespace in the Amazon EC2 Systems Manager Parameter Store.

Environment variables you set replace existing environment variables. For example, if the Docker image already contains an environment variable named MY\_VAR with a value of my\_value, and you set an environment variable named MY\_VAR with a value of other\_value, then my\_value is replaced by other\_value. Similarly, if the Docker image already contains an environment variable named PATH with a value of /usr/local/sbin:/usr/local/bin, and you set an environment variable named PATH with a value of \$PATH:/usr/share/ant/bin, then /usr/local/sbin:/usr/local/bin is replaced by the literal value \$PATH:/usr/share/ant/bin.

Do not set any environment variable with a name that begins with CODEBUILD\_. This prefix is reserved for internal use.

If an environment variable with the same name is defined in multiple places, the value is determined as follows:

- The value in the start build operation call takes highest precedence.
- The value in the build project definition takes next precedence.
- The value in the buildspec declaration takes lowest precedence.

If you use Secrets Manager, for **Type**, choose **Secrets Manager**. For **Name**, enter an identifier for CodeBuild to reference. For **Value**, enter a reference-key using the pattern `secret-id:json-key:version-stage:version-id`. For information, see [Secrets Manager reference-key in the buildspec file](#).

#### Important

If you use Secrets Manager, we recommend that you store secrets with names that start with /CodeBuild/ (for example, /CodeBuild/dockerLoginPassword). For more information, see [What Is AWS Secrets Manager?](#) in the *AWS Secrets Manager User Guide*. If your build project refers to secrets stored in Secrets Manager, the build project's service role must allow the `secretsmanager:GetSecretValue` action. If you chose **New service role** earlier, CodeBuild includes this action in the default service role for your build project. However, if you chose **Existing service role**, you must include this action to your service role separately.

If your build project refers to secrets stored in Secrets Manager with secret names that do not start with /CodeBuild/, and you chose **New service role**, you must update the service role to allow access to secret names that do not start with /CodeBuild/. This is because the service role allows access only to secret names that start with /CodeBuild/.

If you choose **New service role**, the service role includes permission to decrypt all secrets under the /CodeBuild/ namespace in the Secrets Manager.

## Buildspec

### Build specifications

Do one of the following:

- If your source code includes a buildspec file, choose **Use a buildspec file**. 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 in **Buildspec name** (for example, `buildspec-two.yml` or `configuration/buildspec.yml`). If the buildspec file is in an S3 bucket, it must be in the same AWS Region as your build project. Specify the buildspec file using its ARN (for example, `arn:aws:s3:::<my-codebuild-sample2>/buildspec.yml`).
- If your source code does not include a buildspec file, or if you want to run build commands different from the ones specified for the build phase in the `buildspec.yml` file in the source code's root directory, choose **Insert build commands**. For **Build commands**, enter the commands you want to run in the build phase. For multiple commands, separate each command by `&&` (for example, `mvn test && mvn package`). To run commands in other phases, or if you have a long list of commands for the build phase, add a `buildspec.yml` file to the source code root directory, add the commands to the file, and then choose **Use the buildspec.yml in the source code root directory**.

For more information, see the [Buildspec reference \(p. 129\)](#).

## Batch configuration

You can run a group of builds as a single operation. For more information, see [Batch builds in AWS CodeBuild \(p. 262\)](#).

### Define batch configuration

Select to allow batch builds in this project.

#### Batch service role

Provides the service role for batch builds.

Choose one of the following:

- If you do not have a batch service role, choose **New service role**. In **Service role**, enter a name for the new role.
- If you have a batch service role, choose **Existing service role**. In **Service role**, choose the service role.

Batch builds introduce a new security role in the batch configuration. This new role is required as CodeBuild must be able to call the StartBuild, StopBuild, and RetryBuild actions on your behalf to run builds as part of a batch. Customers should use a new role, and not the same role they use in their build, for two reasons:

- Giving the build role StartBuild, StopBuild, and RetryBuild permissions would allow a single build to start more builds via the buildspec.
- CodeBuild batch builds provide restrictions that restrict the number of builds and compute types that can be used for the builds in the batch. If the build role has these permissions, it is possible the builds themselves could bypass these restrictions.

#### Allowed compute type(s) for batch

Select the compute types allowed for the batch. Select all that apply.

#### Maximum builds allowed in batch

Enter the maximum number of builds allowed in the batch. If a batch exceeds this limit, the batch will fail.

#### Batch timeout

Enter the maximum amount of time for the batch build to complete.

#### Combine artifacts

Select **Combine all artifacts from batch into a single location** to have all of the artifacts from the batch combined into a single location.

#### Batch report mode

Select the desired build status report mode for batch builds.

##### Note

This field is only available when the project source is Bitbucket, GitHub, or GitHub Enterprise, and **Report build statuses to source provider when your builds start and finish** is selected under **Source**.

#### Aggregated builds

Select to have the statuses for all builds in the batch combined into a single status report.

#### Individual builds

Select to have the build statuses for all builds in the batch reported separately.

## Artifacts

#### Type

Do one of the following:

- If you do not want to create any build output artifacts, choose **No artifacts**. You might want to do this if you're only running build tests or you want to push a Docker image to an Amazon ECR repository.
- To store the build output in an S3 bucket, choose **Amazon S3**, and then do the following:
  - If you want to use your project name for the build output ZIP file or folder, leave **Name** blank. Otherwise, enter the name. (If you want to output a ZIP file, and you want the ZIP file to have a file extension, be sure to include it after the ZIP file name.)

- Select **Enable semantic versioning** if you want a name specified in the buildspec file to override any name that is specified in the console. The name in a buildspec file is calculated at build time and uses the Shell command language. For example, you can append a date and time to your artifact name so that it is always unique. Unique artifact names prevent artifacts from being overwritten. For more information, see [Buildspec syntax \(p. 130\)](#).
- For **Bucket name**, choose the name of the output bucket.
- If you chose **Insert build commands** earlier in this procedure, then for **Output files**, enter the locations of the files from the build that you want to put into the build output ZIP file or folder. For multiple locations, separate each location with a comma (for example, appspec.yml, target/my-app.jar). For more information, see the description of files in [Buildspec syntax \(p. 130\)](#).
- If you do not want your build artifacts encrypted, select **Remove artifacts encryption**.

For each secondary set of artifacts you want:

1. For **Artifact identifier**, enter a value that is fewer than 128 characters and contains only alphanumeric characters and underscores.
2. Choose **Add artifact**.
3. Follow the previous steps to configure your secondary artifacts.
4. Choose **Save artifact**.

## Additional configuration

### Encryption key

(Optional) Do one of the following:

- To use the AWS managed key for Amazon S3 in your account to encrypt the build output artifacts, leave **Encryption key** blank. This is the default.
- To use a customer managed key to encrypt the build output artifacts, in **Encryption key**, enter the ARN of the KMS key. Use the format `arn:aws:kms:region-ID:account-ID:key/key-ID`.

### Cache type

For **Cache type**, choose one of the following:

- If you do not want to use a cache, choose **No cache**.
- If you want to use an Amazon S3 cache, choose **Amazon S3**, and then do the following:
  - For **Bucket**, choose the name of the S3 bucket where the cache is stored.
  - (Optional) For **Cache path prefix**, enter an Amazon S3 path prefix. The **Cache path prefix** value is similar to a directory name. It makes it possible for you to store the cache under the same directory in a bucket.

#### Important

Do not append a trailing slash (/) to the end of the path prefix.

- If you want to use a local cache, choose **Local**, and then choose one or more local cache modes.

#### Note

Docker layer cache mode is available for Linux only. If you choose it, your project must run in privileged mode.

Using a cache saves considerable build time because reusable pieces of the build environment are stored in the cache and used across builds. For information about specifying a cache in the buildspec file, see [Buildspec syntax \(p. 130\)](#). For more information about caching, see [Build caching in AWS CodeBuild \(p. 216\)](#).

## Logs

Choose the logs you want to create. You can create Amazon CloudWatch Logs, Amazon S3 logs, or both.

### CloudWatch

If you want Amazon CloudWatch Logs logs:

#### CloudWatch logs

Select **CloudWatch logs**.

#### Group name

Enter the name of your Amazon CloudWatch Logs log group.

#### Stream name

Enter your Amazon CloudWatch Logs log stream name.

### S3

If you want Amazon S3 logs:

#### S3 logs

Select **S3 logs**.

#### Bucket

Choose the name of the S3 bucket for your logs.

#### Path prefix

Enter the prefix for your logs.

#### Disable S3 log encryption

Select if you do not want your S3 logs encrypted.

## Create a build project (AWS CLI)

For more information about using the AWS CLI with CodeBuild, see the [Command line reference \(p. 388\)](#).

To create a CodeBuild build project using the AWS CLI, you create a JSON-formatted [Project](#) structure, fill in the structure, and call the [create-project](#) command to create the project.

### Create the JSON file

Create a skeleton JSON file with the [create-project](#) command, using the --generate-cli-skeleton option:

```
aws codebuild create-project --generate-cli-skeleton > <json-file>
```

This creates a JSON file with the path and file name specified by [`<json-file>`](#).

### Fill in the JSON file

Modify the JSON data as follows and save your results.

```
{  
  "name (p. 201)": "<project-name>",  
  "description (p. 201)": "<description>,"
```

```

"source (p. 201)": {
    "type (p. 201)": "CODECOMMIT" | "CODEPIPELINE" | "GITHUB" | "GITHUB_ENTERPRISE" | "BITBUCKET" | "S3" | "NO_SOURCE",
    "location (p. 201)": "<source-location>",
    "gitCloneDepth (p. 202)": "<git-clone-depth>",
    "buildspec (p. 202)": "<buildspec>",
    "InsecureSsl (p. 203)": "<insecure-ssl>",
    "reportBuildStatus (p. 202)": "<report-build-status>",
    "buildStatusConfig": {
        "context (p. 203)": "<context>",
        "targetUrl (p. 203)": "<target-url>"
    },
    "gitSubmodulesConfig": {
        "fetchSubmodules (p. 203)": "<fetch-submodules>"
    },
    "auth": {
        "type (p. 202)": "<auth-type>",
        "resource (p. 202)": "<auth-resource>"
    },
    "sourceIdentifier (p. 204)": "<source-identifier>"
},
"secondarySources (p. 204)": [
{
    "type": "CODECOMMIT" | "CODEPIPELINE" | "GITHUB" | "GITHUB_ENTERPRISE" | "BITBUCKET" | "S3" | "NO_SOURCE",
    "location": "<source-location>",
    "gitCloneDepth": "<git-clone-depth>",
    "buildspec": "<buildspec>",
    "InsecureSsl": "<insecure-ssl>",
    "reportBuildStatus": "<report-build-status>",
    "auth": {
        "type": "<auth-type>",
        "resource": "<auth-resource>"
    },
    "sourceIdentifier": "<source-identifier>"
}
],
"secondarySourceVersions (p. 204)": [
{
    "sourceIdentifier": "<secondary-source-identifier>",
    "sourceVersion": "<secondary-source-version>"
}
],
"sourceVersion (p. 204)": "<source-version>",
"artifacts (p. 204)": {
    "type (p. 204)": "CODEPIPELINE" | "S3" | "NO_ARTIFACTS",
    "location (p. 204)": "<artifacts-location>",
    "path (p. 205)": "<artifacts-path>",
    "namespaceType (p. 205)": "<artifacts-namespacetype>",
    "name (p. 205)": "<artifacts-name>",
    "overrideArtifactName (p. 205)": "<override-artifact-name>",
    "packaging (p. 205)": "<artifacts-packaging>"
},
"secondaryArtifacts (p. 205)": [
{
    "type": "CODEPIPELINE" | "S3" | "NO_ARTIFACTS",
    "location": "<secondary-artifact-location>",
    "path": "<secondary-artifact-path>",
    "namespaceType": "<secondary-artifact-namespaceType>",
    "name": "<secondary-artifact-name>",
    "packaging": "<secondary-artifact-packaging>",
    "artifactIdentifier": "<secondary-artifact-identifier>"
}
],
"cache (p. 205)": {
    "type": "<cache-type>",
}

```

```

    "location": "<cache-location>",
    "mode": [
        "<cache-mode>"
    ],
    "environment (p. 205)": {
        "type (p. 206)": "LINUX_CONTAINER" | "LINUX_GPU_CONTAINER" | "ARM_CONTAINER" |
        "WINDOWS_SERVER_2019_CONTAINER",
        "image (p. 206)": "<image>",
        "computeType (p. 206)": "BUILD_GENERAL1_SMALL" | "BUILD_GENERAL1_MEDIUM" |
        "BUILD_GENERAL1_LARGE" | "BUILD_GENERAL1_2XLARGE",
        "certificate (p. 206)": "<certificate>",
        "environmentVariables (p. 206)": [
            {
                "name": "<environmentVariable-name>",
                "value": "<environmentVariable-value>",
                "type": "<environmentVariable-type>"
            }
        ],
        "registryCredential (p. 207)": [
            {
                "credential": "<credential-arn-or-name>",
                "credentialProvider": "<credential-provider>"
            }
        ],
        "imagePullCredentialsType (p. 208)": "CODEBUILD" | "SERVICE_ROLE",
        "privilegedMode (p. 208)": "<privileged-mode>"
    },
    "serviceRole (p. 208)": "<service-role>",
    "timeoutInMinutes (p. 208)": <timeout>,
    "queuedTimeoutInMinutes (p. 208)": <queued-timeout>,
    "encryptionKey (p. 208)": "<encryption-key>",
    "tags (p. 209)": [
        {
            "key": "<tag-key>",
            "value": "<tag-value>"
        }
    ],
    "vpcConfig (p. 209)": {
        "securityGroupIds": [
            "<security-group-id>"
        ],
        "subnets": [
            "<subnet-id>"
        ],
        "vpcId": "<vpc-id>"
    },
    "badgeEnabled (p. 209)": "<badge-enabled>",
    "logsConfig (p. 209)": {
        "cloudWatchLogs (p. 209)": {
            "status": "<cloudwatch-logs-status>",
            "groupName": "<group-name>",
            "streamName": "<stream-name>"
        },
        "s3Logs (p. 209)": {
            "status": "<s3-logs-status>",
            "location": "<s3-logs-location>",
            "encryptionDisabled": "<s3-logs-encryption-disabled>"
        }
    },
    "fileSystemLocations (p. 209)": [
        {
            "type": "EFS",
            "location": "<EFS-DNS-name-1>/<directory-path>",
            "mountPoint": "<mount-point>",
            "identifier": "<efs-identifier>",
            "fileSystemArn": "<file-system-arn>"
        }
    ]
}

```

```
        "mountOptions": "<efs-mount-options>"  
    }  
],  
"buildBatchConfig (p. 210)": {  
    "serviceRole": "<batch-service-role>",  
    "combineArtifacts": <combine-artifacts>,  
    "restrictions": {  
        "maximumBuildsAllowed": <max-builds>,  
        "computeTypesAllowed": [  
            "<compute-type>"  
        ]  
    },  
    "timeoutInMins": <batch-timeout>,  
    "batchReportMode": "REPORT_AGGREGATED_BATCH" | "REPORT_INDIVIDUAL_BUILDS"  
},  
"concurrentBuildLimit (p. 210)": <concurrent-build-limit>  
}
```

Replace the following:

#### **name**

Required. The name for this build project. This name must be unique across all of the build projects in your AWS account.

#### **description**

Optional. The description for this build project.

#### **source**

Required. A [ProjectSource](#) object that contains information about this build project's source code settings. After you add a source object, you can add up to 12 more sources using the [the section called "secondarySources"](#). These settings include the following:

#### **source/type**

Required. The type of repository that contains the source code to build. Valid values include:

- CODECOMMIT
- CODEPIPELINE
- GITHUB
- GITHUB\_ENTERPRISE
- BITBUCKET
- S3
- NO\_SOURCE

If you use NO\_SOURCE, the buildspec cannot be a file because the project does not have a source. Instead, you must use the buildspec attribute to specify a YAML-formatted string for your buildspec. For more information, see [Project without a source sample \(p. 125\)](#).

#### **source/location**

Required unless you set [`<source-type>`](#) to CODEPIPELINE. The location of the source code for the specified repository type.

- For CodeCommit, the HTTPS clone URL to the repository that contains the source code and the buildspec file (for example, <https://git-codecommit.<region-id>.amazonaws.com/v1/repos/<repo-name>>).
- For Amazon S3, the build input bucket name, followed by the path and name of the ZIP file that contains the source code and the buildspec. For example:

- For a ZIP file located at the root of the input bucket: `<bucket-name>/<object-name>.zip`.
- For a ZIP file located in a subfolder in the input bucket: `<bucket-name>/<subfolder-path>/<object-name>.zip`.
- For GitHub, the HTTPS clone URL to the repository that contains the source code and the buildspec file. The URL must contain `github.com`. You must connect your AWS account to your GitHub account. To do this, use the CodeBuild console to create a build project.
  1. On the GitHub **Authorize application** page, in the **Organization access** section, choose **Request access** next to each repository you want CodeBuild to be able to access in the .
  2. Choose **Authorize application**. (After you have connected to your GitHub account, you do not need to finish creating the build project. You can close the CodeBuild console.)
- For GitHub Enterprise Server, the HTTP or HTTPS clone URL to the repository that contains the source code and the buildspec file. You must also connect your AWS account to your GitHub Enterprise Server account. To do this, use the CodeBuild console to create a build project.
  1. Create a personal access token in GitHub Enterprise Server.
  2. Copy this token to your clipboard so you can use it when you create your CodeBuild project. For more information, see [Creating a personal access token for the command line](#) on the GitHub Help website.
  3. When you use the console to create your CodeBuild project, in **Source**, for **Source provider**, choose **GitHub Enterprise**.
  4. For **Personal Access Token**, paste the token that was copied to your clipboard. Choose **Save Token**. Your CodeBuild account is now connected to your GitHub Enterprise Server account.
- For Bitbucket, the HTTPS clone URL to the repository that contains the source code and the buildspec file. The URL must contain `bitbucket.org`. You must also connect your AWS account to your Bitbucket account. To do this, use the CodeBuild console to create a build project.
  1. When you use the console to connect (or reconnect) with Bitbucket, on the Bitbucket **Confirm access to your account** page, choose **Grant access**. (After you have connected to your Bitbucket account, you do not need to finish creating the build project. You can close the CodeBuild console.)
  - For AWS CodePipeline, do not specify a location value for source. CodePipeline ignores this value because when you create a pipeline in CodePipeline, you specify the source code location in the Source stage of the pipeline.

#### source/**gitCloneDepth**

Optional. The depth of history to download. Minimum value is 0. If this value is 0, greater than 25, or not provided, then the full history is downloaded with each build project. If your source type is Amazon S3, this value is not supported.

#### source/**buildspec**

Optional. The build specification definition or file to use. If this value is not provided or is set to an empty string, the source code must contain a `buildspec.yml` file in its root directory. If this value is set, it can be either an inline buildspec definition, the path to an alternate buildspec file relative to the root directory of your primary source, or the path to an S3 bucket. The bucket must be in the same AWS Region as the build project. Specify the buildspec file using its ARN (for example, `arn:aws:s3:::<my-codebuild-sample2>/buildspec.yml`). For more information, see [Buildspec file name and storage location \(p. 129\)](#).

#### source/**auth**

Do not use. This object is used by the CodeBuild console only.

#### source/**reportBuildStatus**

Specifies whether to send your source provider the status of a build's start and completion. If you set this with a source provider other than GitHub, GitHub Enterprise Server, or Bitbucket, an `invalidInputException` is thrown.

To be able to report the build status to the source provider, the user associated with the source provider must have write access to the repo. If the user does not have write access, the build status cannot be updated. For more information, see [Source provider access \(p. 370\)](#).

#### source/buildStatusConfig

Contains information that defines how the CodeBuild build project reports the build status to the source provider. This option is only used when the source type is GITHUB, GITHUB\_ENTERPRISE, or BITBUCKET.

#### source/buildStatusConfig/context

For Bitbucket sources, this parameter is used for the name parameter in the Bitbucket commit status. For GitHub sources, this parameter is used for the context parameter in the GitHub commit status.

For example, you can have the context contain the build number and the webhook trigger using the CodeBuild environment variables:

```
AWS CodeBuild sample-project Build $$CODEBUILD_BUILD_NUMBER -  
$CODEBUILD_WEBHOOK_TRIGGER
```

This results in the context appearing like this for build #24 triggered by a webhook pull request event:

```
AWS CodeBuild sample-project Build #24 - pr/8
```

#### source/buildStatusConfig/targetUrl

For Bitbucket sources, this parameter is used for the url parameter in the Bitbucket commit status. For GitHub sources, this parameter is used for the target\_url parameter in the GitHub commit status.

For example, you can set the `targetUrl` to `https://aws.amazon.com/codebuild/<path to build>` and the commit status will link to this URL.

You can also include CodeBuild environment variables in the `targetUrl` to add additional information to the URL. For example, to add the build region to the URL, set the `targetUrl` to:

```
"targetUrl": "https://aws.amazon.com/codebuild/<path to build>?region=$AWS_REGION"
```

If the build region is `us-east-2`, this will expand to:

```
https://aws.amazon.com/codebuild/<path to build>?region=us-east-2
```

#### source/gitSubmodulesConfig

Optional. Information about the Git submodules configuration. Used with CodeCommit, GitHub, GitHub Enterprise Server, and Bitbucket only.

#### source/gitSubmodulesConfig/fetchSubmodules

Set `fetchSubmodules` to `true` if you want to include the Git submodules in your repository. Git submodules that are included must be configured as HTTPS.

#### source/insecureSsl

Optional. Used with GitHub Enterprise Server only. Set this value to `true` to ignore TLS warnings while connecting to your GitHub Enterprise Server project repository. The default value is `false`.

InsecureSsl should be used for testing purposes only. It should not be used in a production environment.

#### source/sourceIdentifier

A user-defined identifier for the project source. Optional for the primary source. Required for secondary sources.

#### secondarySources

Optional. An array of [ProjectSource](#) objects that contain information about the secondary sources for a build project. You can add up to 12 secondary sources. The `secondarySources` objects use the same properties used by the [the section called "source"](#) object. In a secondary source object, the `sourceIdentifier` is required.

#### secondarySourceVersions

Optional. An array of [ProjectSourceVersion](#) objects. If `secondarySourceVersions` is specified at the build level, then they take precedence over this.

#### sourceVersion

Optional. The version of the build input to be built for this project. If not specified, the latest version is used. If specified, it must be one of:

- For CodeCommit, the commit ID, branch, or Git tag to use.
- For GitHub, the commit ID, pull request ID, branch name, or tag name that corresponds to the version of the source code you want to build. If a pull request ID is specified, it must use the format pr/pull-request-ID (for example pr/25). If a branch name is specified, the branch's HEAD commit ID is used. If not specified, the default branch's HEAD commit ID is used.
- For Bitbucket, the commit ID, branch name, or tag name that corresponds to the version of the source code you want to build. If a branch name is specified, the branch's HEAD commit ID is used. If not specified, the default branch's HEAD commit ID is used.
- For Amazon S3, the version ID of the object that represents the build input ZIP file to use.

If `sourceVersion` is specified at the build level, then that version takes precedence over this `sourceVersion` (at the project level). For more information, see [Source version sample with AWS CodeBuild \(p. 120\)](#).

#### artifacts

Required. A [ProjectArtifacts](#) object that contains information about this build project's output artifact settings. After you add an `artifacts` object, you can add up to 12 more artifacts using the [the section called "secondaryArtifacts"](#). These settings include the following:

#### artifacts/type

Required. The type of build output artifact. Valid values are:

- CODEPIPELINE
- NO\_ARTIFACTS
- S3

#### artifacts/location

Only used with the S3 artifact type. Not used for other artifact types.

The name of the output bucket you created or identified in the prerequisites.

#### artifacts/**path**

Only used with the S3 artifact type. Not used for other artifact types.

The path in of the output bucket to place ZIP file or folder. If you do not specify a value for path, CodeBuild uses namespaceType (if specified) and name to determine the path and name of the build output ZIP file or folder. For example, if you specify MyPath for path and MyArtifact.zip for name, the path and name would be MyPath/MyArtifact.zip.

#### artifacts/**namespaceType**

Only used with the S3 artifact type. Not used for other artifact types.

The namespace of the build output ZIP file or folder. Valid values include BUILD\_ID and NONE. Use BUILD\_ID to insert the build ID into the path of the build output ZIP file or folder. Otherwise, use NONE. If you do not specify a value for namespaceType, CodeBuild uses path (if specified) and name to determine the path and name of the build output ZIP file or folder. For example, if you specify MyPath for path, BUILD\_ID for namespaceType, and MyArtifact.zip for name, the path and name would be MyPath/*build-ID*/MyArtifact.zip.

#### artifacts/**name**

Only used with the S3 artifact type. Not used for other artifact types.

The name of the build output ZIP file or folder inside of location. For example, if you specify MyPath for path and MyArtifact.zip for name, the path and name would be MyPath/MyArtifact.zip.

#### artifacts/**overrideArtifactName**

Only used with the S3 artifact type. Not used for other artifact types.

Optional. If set to true, the name specified in the artifacts block of the buildspec file overrides name. For more information, see [Build specification reference for CodeBuild \(p. 129\)](#).

#### artifacts/**packaging**

Only used with the S3 artifact type. Not used for other artifact types.

Optional. Specifies how to package the artifacts. Allowed values are:

NONE

Create a folder that contains the build artifacts. This is the default value.

ZIP

Create a ZIP file that contains the build artifacts.

#### [secondaryArtifacts](#)

Optional. An array of [ProjectArtifacts](#) objects that contain information about the secondary artifacts settings for a build project. You can add up to 12 secondary artifacts. The secondaryArtifacts uses many of the same settings used by the [the section called "artifacts"](#) object.

#### [cache](#)

Required. A [ProjectCache](#) object that contains information about this build project's cache settings. For more information, see [Build caching \(p. 216\)](#).

#### [environment](#)

Required. A [ProjectEnvironment](#) object that contains information about this project's build environment settings. These settings include:

#### environment/**type**

Required. The type of build environment. For more information, see [type](#) in the *CodeBuild API Reference*.

#### environment/**image**

Required. The Docker image identifier used by this build environment. Typically, this identifier is expressed as *image-name:tag*. For example, in the Docker repository that CodeBuild uses to manage its Docker images, this could be `aws/codebuild/standard:5.0`. In Docker Hub, `maven:3.3.9-jdk-8`. In Amazon ECR, `account-id.dkr.ecr.region-id.amazonaws.com/your-Amazon-ECR-repo-name:tag`. For more information, see [Docker images provided by CodeBuild \(p. 153\)](#).

#### environment/**computeType**

Required. Specifies the compute resources used by this build environment. For more information, see [computeType](#) in the *CodeBuild API Reference*.

#### environment/**certificate**

Optional. The ARN of the Amazon S3 bucket, path prefix, and object key that contains the PEM-encoded certificate. The object key can be either just the .pem file or a .zip file containing the PEM-encoded certificate. For example, if your Amazon S3 bucket name is `<my-bucket>`, your path prefix is `<cert>`, and your object key name is `<certificate.pem>`, then acceptable formats for certificate are `<my-bucket/cert/certificate.pem>` or `arn:aws:s3:::<my-bucket>/cert/certificate.pem>`.

#### environment/**environmentVariables**

Optional. An array of [EnvironmentVariable](#) objects that contains the environment variables you want to specify for this build environment. Each environment variable is expressed as an object that contains a name, value, and type of name, value, and type.

Console and AWS CLI users can see all environment variables. If you have no concerns about the visibility of your environment variable, set name and value, and set type to PLAINTEXT.

We recommend you store environment variables with sensitive values, such as an AWS access key ID, an AWS secret access key, or a password, as a parameter in Amazon EC2 Systems Manager Parameter Store or AWS Secrets Manager. For name, for that stored parameter, set an identifier for CodeBuild to reference.

If you use Amazon EC2 Systems Manager Parameter Store, for value, set the parameter's name as stored in the Parameter Store. Set type to PARAMETER\_STORE. Using a parameter named /CodeBuild/dockerLoginPassword as an example, set name to LOGIN\_PASSWORD. Set value to /CodeBuild/dockerLoginPassword. Set type to PARAMETER\_STORE.

#### Important

If you use Amazon EC2 Systems Manager Parameter Store, we recommend that you store parameters with parameter names that start with /CodeBuild/ (for example, /CodeBuild/dockerLoginPassword). You can use the CodeBuild console to create a parameter in Amazon EC2 Systems Manager. Choose **Create parameter**, and then follow the instructions in the dialog box. (In that dialog box, for **KMS key**, you can specify the ARN of an AWS KMS key in your account. Amazon EC2 Systems Manager uses this key to encrypt the parameter's value during storage and decrypt it during retrieval.) If you use the CodeBuild console to create a parameter, the console starts the parameter name with /CodeBuild/ as it is being stored. For more information, see [Systems Manager Parameter Store](#) and [Systems Manager Parameter Store Console Walkthrough](#) in the *Amazon EC2 Systems Manager User Guide*.

If your build project refers to parameters stored in Amazon EC2 Systems Manager Parameter Store, the build project's service role must allow the `ssm:GetParameters` action. If you chose **New service role** earlier, CodeBuild includes this action in the default

service role for your build project. However, if you chose **Existing service role**, you must include this action to your service role separately.

If your build project refers to parameters stored in Amazon EC2 Systems Manager Parameter Store with parameter names that do not start with /CodeBuild/, and you chose **New service role**, you must update that service role to allow access to parameter names that do not start with /CodeBuild/. This is because that service role allows access only to parameter names that start with /CodeBuild/.

If you choose **New service role**, the service role includes permission to decrypt all parameters under the /CodeBuild/ namespace in the Amazon EC2 Systems Manager Parameter Store.

Environment variables you set replace existing environment variables. For example, if the Docker image already contains an environment variable named MY\_VAR with a value of my\_value, and you set an environment variable named MY\_VAR with a value of other\_value, then my\_value is replaced by other\_value. Similarly, if the Docker image already contains an environment variable named PATH with a value of /usr/local/sbin:/usr/local/bin, and you set an environment variable named PATH with a value of \$PATH:/usr/share/ant/bin, then /usr/local/sbin:/usr/local/bin is replaced by the literal value \$PATH:/usr/share/ant/bin.

Do not set any environment variable with a name that begins with CODEBUILD\_. This prefix is reserved for internal use.

If an environment variable with the same name is defined in multiple places, the value is determined as follows:

- The value in the start build operation call takes highest precedence.
- The value in the build project definition takes next precedence.
- The value in the buildspec declaration takes lowest precedence.

If you use Secrets Manager, for value, set the parameter's name as stored in Secrets Manager. Set type to SECRETS\_MANAGER. Using a secret named /CodeBuild/dockerLoginPassword as an example, set name to LOGIN\_PASSWORD. Set value to /CodeBuild/dockerLoginPassword. Set type to SECRETS\_MANAGER.

### Important

If you use Secrets Manager, we recommend that you store secrets with names that start with /CodeBuild/ (for example, /CodeBuild/dockerLoginPassword). For more information, see [What Is AWS Secrets Manager?](#) in the *AWS Secrets Manager User Guide*. If your build project refers to secrets stored in Secrets Manager, the build project's service role must allow the secretsmanager:GetSecretValue action. If you chose **New service role** earlier, CodeBuild includes this action in the default service role for your build project. However, if you chose **Existing service role**, you must include this action to your service role separately.

If your build project refers to secrets stored in Secrets Manager with secret names that do not start with /CodeBuild/, and you chose **New service role**, you must update the service role to allow access to secret names that do not start with /CodeBuild/. This is because the service role allows access only to secret names that start with /CodeBuild/.

If you choose **New service role**, the service role includes permission to decrypt all secrets under the /CodeBuild/ namespace in the Secrets Manager.

#### environment/registryCredential

Optional. A [RegistryCredential](#) object that specifies the credentials that provide access to a private Docker registry.

#### environment/registryCredential/credential

Specifies the ARN or name of credentials created using AWS Managed Services. You can use the name of the credentials only if they exist in your current Region.

#### environment/registryCredential/credentialProvider

The only valid value is SECRETS\_MANAGER.

When this is set:

- `imagePullCredentials` must be set to `SERVICE_ROLE`.
- The image cannot be a curated image or an Amazon ECR image.

#### environment/`imagePullCredentialsType`

Optional. The type of credentials CodeBuild uses to pull images in your build. There are two valid values:

`CODEBUILD`

`CODEBUILD` specifies that CodeBuild uses its own credentials. You must edit your Amazon ECR repository policy to trust the CodeBuild service principal.

`SERVICE_ROLE`

Specifies that CodeBuild uses your build project's service role.

When you use a cross-account or private registry image, you must use `SERVICE_ROLE` credentials.

When you use a CodeBuild curated image, you must use `CODEBUILD` credentials.

#### environment/`privilegedMode`

Set to `true` only if you plan to use this build project to build Docker images. Otherwise, all associated builds that attempt to interact with the Docker daemon fail. You must also start the Docker daemon so that your builds can interact with it. One way to do this is to initialize the Docker daemon in the `install` phase of your `buildspec` file by running the following build commands. Do not run these commands if you specified a build environment image provided by CodeBuild with Docker support.

##### Note

By default, Docker containers do not allow access to any devices. Privileged mode grants a build project's Docker container access to all devices. For more information, see [Runtime Privilege and Linux Capabilities](#) on the Docker Docs website. Also, Windows does not support privileged mode.

```
- nohup /usr/local/bin/dockerd --host=unix:///var/run/docker.sock --  
host=tcp://127.0.0.1:2375 --storage-driver=overlay2 &  
- timeout 15 sh -c "until docker info; do echo .; sleep 1; done"
```

#### serviceRole

Required. The ARN of the service role CodeBuild uses to interact with services on behalf of the user (for example, `arn:aws:iam::account-id:role/role-name`).

#### timeoutInMinutes

Optional. The number of minutes, between 5 to 480 (8 hours), after which CodeBuild stops the build if it is not complete. If not specified, the default of 60 is used. To determine if and when CodeBuild stopped a build due to a timeout, run the `batch-get-builds` command. To determine if the build has stopped, look in the output for a `buildStatus` value of `FAILED`. To determine when the build timed out, look in the output for the `endTime` value associated with a `phaseStatus` value of `TIMED_OUT`.

#### queuedTimeoutInMinutes

Optional. The number of minutes, between 5 to 480 (8 hours), after which CodeBuild stops the build if it is still queued. If not specified, the default of 60 is used.

#### encryptionKey

Optional. The alias or ARN of the AWS KMS key used by CodeBuild to encrypt the build output. If you specify an alias, use the format `arn:aws:kms:region-ID:account-ID:key/key-ID` or, if an alias

exists, use the format alias/*key-alias*. If not specified, the AWS-managed KMS key for Amazon S3 is used.

### tags

Optional. An array of [Tag](#) objects that provide the tags you want to associate with this build project. You can specify up to 50 tags. These tags can be used by any AWS service that supports CodeBuild build project tags. Each tag is expressed as an object with a key and a value.

### vpcConfig

Optional. A [VpcConfig](#) object that contains information about the VPC configuration for your project. For more information, see [Use AWS CodeBuild with Amazon Virtual Private Cloud \(p. 171\)](#).

These properties include:

#### vpcId

Required. The VPC ID that CodeBuild uses. Run this command to get a list of all VPC IDs in your Region:

```
aws ec2 describe-vpcs --region <region-ID>
```

#### subnets

Required. An array of subnet IDs that include resources used by CodeBuild. Run this command to get these IDs:

```
aws ec2 describe-subnets --filters "Name=vpc-id,Values=<vpc-id>" --region <region-ID>
```

#### securityGroupIds

Required. An array of security group IDs used by CodeBuild to allow access to resources in the VPC. Run this command to get these IDs:

```
aws ec2 describe-security-groups --filters "Name=vpc-id,Values=<vpc-id>" --<region-ID>
```

### badgeEnabled

Optional. Specifies whether to include build badges with your CodeBuild project. Set to `true` to enable build badges, or `false` otherwise. For more information, see [Build badges sample with CodeBuild \(p. 74\)](#).

### logsConfig

A [LogsConfig](#) object that contains information about where this build's logs are located.

#### logsConfig/cloudWatchLogs

A [CloudWatchLogsConfig](#) object that contains information about pushing logs to CloudWatch Logs.

#### logsConfig/s3Logs

An [S3LogsConfig](#) object that contains information about pushing logs to Amazon S3.

### fileSystemLocations

Optional. An array of [ProjectFileSystemsLocation](#) objects that contains information about your Amazon EFS configuration.

## buildBatchConfig

Optional. The `buildBatchConfig` object is a [ProjectBuildBatchConfig](#) structure that contains the batch build configuration information for the project.

### buildBatchConfig/serviceRole

The service role ARN for the batch build project.

### buildBatchConfig/combineArtifacts

A Boolean value that specifies whether to combine the build artifacts for the batch build into a single artifact location.

### buildBatchConfig/restrictions/maximumBuildsAllowed

The maximum number of builds allowed.

### buildBatchConfig/restrictions/computeTypesAllowed

An array of strings that specify the compute types that are allowed for the batch build. See [Build environment compute types](#) for these values.

### buildBatchConfig/timeoutInMinutes

The maximum amount of time, in minutes, that the batch build must be completed in.

### buildBatchConfig/batchReportMode

Specifies how build status reports are sent to the source provider for the batch build. Valid values include:

REPORT\_AGGREGATED\_BATCH

(Default) Aggregate all of the build statuses into a single status report.

REPORT\_INDIVIDUAL\_BUILDS

Send a separate status report for each individual build.

## concurrentBuildLimit

The maximum number of concurrent builds that are allowed for this project.

New builds are only started if the current number of builds is less than or equal to this limit. If the current build count meets this limit, new builds are throttled and are not run.

## Create the project

To create the project, run the [create-project](#) command again, passing your JSON file:

```
aws codebuild create-project --cli-input-json file://<json-file>
```

If successful, the JSON representation of a [Project](#) object appears in the console output. See the [CreateProject Response Syntax](#) for an example of this data.

Except for the build project name, you can change any of the build project's settings later. For more information, see [Change a build project's settings \(AWS CLI\) \(p. 253\)](#).

To start running a build, see [Run a build \(AWS CLI\) \(p. 272\)](#).

If your source code is stored in a GitHub repository, and you want CodeBuild to rebuild the source code every time a code change is pushed to the repository, see [Start running builds automatically \(AWS CLI\) \(p. 278\)](#).

## Create a build project (AWS SDKs)

For information about using AWS CodeBuild with the AWS SDKs, see the [AWS SDKs and tools reference \(p. 389\)](#).

## Create a build project (AWS CloudFormation)

For information about using AWS CodeBuild with AWS CloudFormation, see [the AWS CloudFormation template for CodeBuild](#) in the *AWS CloudFormation User Guide*.

## Create a notification rule

You can use notification rules to notify users when important changes, such as build successes and failures, occur. Notification rules specify both the events and the Amazon SNS topic that is used to send notifications. For more information, see [What are notifications?](#)

You can use the console or the AWS CLI to create notification rules for AWS CodeBuild.

### To create a notification rule (console)

1. Sign in to the AWS Management Console and open the CodeBuild console at <https://console.aws.amazon.com/codebuild/>.
2. Choose **Build**, choose **Build projects**, and then choose a build project where you want to add notifications.
3. On the build project page, choose **Notify**, and then choose **Create notification rule**. You can also go to the **Settings** page for the build project and choose **Create notification rule**.
4. In **Notification name**, enter a name for the rule.
5. In **Detail type**, choose **Basic** if you want only the information provided to Amazon EventBridge included in the notification. Choose **Full** if you want to include information provided to Amazon EventBridge and information that might be supplied by the CodeBuild or the notification manager.

For more information, see [Understanding Notification Contents and Security](#).

6. In **Events that trigger notifications**, select the events for which you want to send notifications. For more information, see [Events for Notification Rules on Build Projects](#).
7. In **Targets**, do one of the following:
  - If you have already configured a resource to use with notifications, in **Choose target type**, choose either **AWS Chatbot (Slack)** or **SNS topic**. In **Choose target**, choose the name of the client (for a Slack client configured in AWS Chatbot) or the Amazon Resource Name (ARN) of the Amazon SNS topic (for Amazon SNS topics already configured with the policy required for notifications).
  - If you have not configured a resource to use with notifications, choose **Create target**, and then choose **SNS topic**. Provide a name for the topic after **codestar-notifications-**, and then choose **Create**.

### Note

- If you create the Amazon SNS topic as part of creating the notification rule, the policy that allows the notifications feature to publish events to the topic is applied for you. Using a topic created for notification rules helps ensure that you subscribe only those users that you want to receive notifications about this resource.

- You cannot create an AWS Chatbot client as part of creating a notification rule. If you choose AWS Chatbot (Slack), you will see a button directing you to configure a client in AWS Chatbot. Choosing that option opens the AWS Chatbot console. For more information, see [Configure Integrations Between Notifications and AWS Chatbot](#).
  - If you want to use an existing Amazon SNS topic as a target, you must add the required policy for AWS CodeStar Notifications in addition to any other policies that might exist for that topic. For more information, see [Configure Amazon SNS Topics for Notifications](#) and [Understanding Notification Contents and Security](#).
8. To finish creating the rule, choose **Submit**.
  9. You must subscribe users to the Amazon SNS topic for the rule before they can receive notifications. For more information, see [Subscribe Users to Amazon SNS Topics That Are Targets](#). You can also set up integration between notifications and AWS Chatbot to send notifications to Amazon Chime chatrooms. For more information, see [Configure Integration Between Notifications and AWS Chatbot](#).

### To create a notification rule (AWS CLI)

1. At a terminal or command prompt, run the **create-notification rule** command to generate the JSON skeleton:

```
aws codestarnotifications create-notification-rule --generate-cli-skeleton > rule.json
```

You can name the file anything you want. In this example, the file is named *rule.json*.

2. Open the JSON file in a plain-text editor and edit it to include the resource, event types, and target you want for the rule. The following example shows a notification rule named **MyNotificationRule** for a build project named **MyBuildProject** in an AWS account with the ID **123456789012**. Notifications are sent with the full detail type to an Amazon SNS topic named **codestar-notifications-MyNotificationTopic** when builds are successful:

```
{  
    "Name": "MyNotificationRule",  
    "EventTypeId": [  
        "codebuild-project-build-state-succeeded"  
    ],  
    "Resource": "arn:aws:codebuild:us-east-2:123456789012:MyBuildProject",  
    "Targets": [  
        {  
            "TargetType": "SNS",  
            "TargetAddress": "arn:aws:sns:us-east-2:123456789012:codestar-notifications-MyNotificationTopic"  
        }  
    ],  
    "Status": "ENABLED",  
    "DetailType": "FULL"  
}
```

Save the file.

3. Using the file you just edited, at the terminal or command line, run the **create-notification-rule** command again to create the notification rule:

```
aws codestarnotifications create-notification-rule --cli-input-json file://rule.json
```

4. If successful, the command returns the ARN of the notification rule, similar to the following:

```
{
```

```
"Arn": "arn:aws:codestar-notifications:us-east-1:123456789012:notificationrule/dc82df7a-EXAMPLE"
```

## View a list of build project names in AWS CodeBuild

You can use the AWS CodeBuild console, AWS CLI, or AWS SDKs to view a list of build projects in CodeBuild.

### Topics

- [View a list of build project names \(console\) \(p. 213\)](#)
- [View a list of build project names \(AWS CLI\) \(p. 213\)](#)
- [View a list of build project names \(AWS SDKs\) \(p. 214\)](#)

## View a list of build project names (console)

You can view a list of build projects in an AWS Region in the console. Information includes the name, source provider, repository, latest build status, and description, if any.

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Build projects**.

### Note

By default, only the 10 most recent build projects are displayed. To view more build projects, choose the gear icon, and then choose a different value for **Projects per page** or use the back and forward arrows.

## View a list of build project names (AWS CLI)

Run the **list-projects** command:

```
aws codebuild list-projects --sort-by sort-by --sort-order sort-order --next-token next-token
```

In the preceding command, replace the following placeholders:

- ***sort-by***: Optional string used to indicate the criterion to be used to list build project names. Valid values include:
  - **CREATED\_TIME**: List the build project names based on when each build project was created.
  - **LAST\_MODIFIED\_TIME**: List the build project names based on when information about each build project was last changed.
  - **NAME**: List the build project names based on each build project's name.
- ***sort-order***: Optional string used to indicate the order in which to list build projects, based on ***sort-by***. Valid values include **ASCENDING** and **DESCENDING**.
- ***next-token***: Optional string. During a previous run, if there were more than 100 items in the list, only the first 100 items are returned, along with a unique string called *next token*. To get the next batch of items in the list, run this command again, adding the next token to the call. To get all of the items in the list, keep running this command with each subsequent next token, until no more next tokens are returned.

For example, if you run this command:

```
aws codebuild list-projects --sort-by NAME --sort-order ASCENDING
```

A result similar to the following might appear in the output:

```
{  
    "nextToken": "Ci33ACF6...The full token has been omitted for brevity...U+AkMx8=",  
    "projects": [  
        "codebuild-demo-project",  
        "codebuild-demo-project2",  
        ... The full list of build project names has been omitted for brevity ...  
        "codebuild-demo-project99"  
    ]  
}
```

If you run this command again:

```
aws codebuild list-projects --sort-by NAME --sort-order ASCENDING --next-token  
Ci33ACF6...The full token has been omitted for brevity...U+AkMx8=
```

A result similar to the following might appear in the output:

```
{  
    "projects": [  
        "codebuild-demo-project100",  
        "codebuild-demo-project101",  
        ... The full list of build project names has been omitted for brevity ...  
        "codebuild-demo-project122"  
    ]  
}
```

## View a list of build project names (AWS SDKs)

For more information about using AWS CodeBuild with the AWS SDKs, see the [AWS SDKs and tools reference \(p. 389\)](#).

## View a build project's details in AWS CodeBuild

You can use the AWS CodeBuild console, AWS CLI, or AWS SDKs to view the details of a build project in CodeBuild.

### Topics

- [View a build project's details \(console\) \(p. 214\)](#)
- [View a build project's details \(AWS CLI\) \(p. 215\)](#)
- [View a build project's details \(AWS SDKs\) \(p. 216\)](#)

## View a build project's details (console)

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Build projects**.

### Note

By default, only the 10 most recent build projects are displayed. To view more build projects, choose the gear icon, and then choose a different value for **Projects per page** or use the back and forward arrows.

3. In the list of build projects, in the **Name** column, choose the link for the build project.
4. On the **Build project:** *project-name* page, choose **Build details**.

## View a build project's details (AWS CLI)

Run the **batch-get-projects** command:

```
aws codebuild batch-get-projects --names names
```

In the preceding command, replace the following placeholder:

- ***names*:** Required string used to indicate one or more build project names to view details about. To specify more than one build project, separate each build project's name with a space. You can specify up to 100 build project names. To get a list of build projects, see [View a list of build project names \(AWS CLI\) \(p. 213\)](#).

For example, if you run this command:

```
aws codebuild batch-get-projects --names codebuild-demo-project codebuild-demo-project2 my-other-demo-project
```

A result similar to the following might appear in the output. Ellipses (...) are used to represent data omitted for brevity.

```
{  
  "projectsNotFound": [  
    "my-other-demo-project"  
,  
  "projects": [  
    {  
      ...  
      "name": "codebuild-demo-project",  
      ...  
    },  
    {  
      ...  
      "name": "codebuild-demo-project2",  
      ...  
    }  
  ]  
}
```

In the preceding output, the `projectsNotFound` array lists any build project names that were specified, but not found. The `projects` array lists details for each build project where information was found. Build project details have been omitted from the preceding output for brevity. For more information, see the output of [Create a build project \(AWS CLI\) \(p. 198\)](#).

The **batch-get-projects** command does not support filtering for certain property values, but you can write a script that enumerates the properties for a project. For example, the following Linux shell script enumerates the projects in the current region for the current account, and prints the image used by each project.

```
#!/usr/bin/sh
```

```
# This script enumerates all of the projects for the current account
# in the current region and prints out the image that each project is using.

imageName=""

function getimageName(){
    local environmentValues=(${1//$/\t'/' })
    imageName=${environmentValues[1]}
}

function processProjectInfo() {
    local projectInfo=$1

    while IFS=$'\t' read -r section value; do
        if [[ "$section" == *"ENVIRONMENT"* ]]; then
            getimageName "$value"
        fi
    done <<< "$projectInfo"
}

# Get the list of projects.
projectList=$(aws codebuild list-projects --output=text)

for projectName in $projectList
do
    if [[ "$projectName" != *"PROJECTS"* ]]; then
        echo "====="

        # Get the detailed information for the project.
        projectInfo=$(aws codebuild batch-get-projects --output=text --names "$projectName")

        processProjectInfo "$projectInfo"

        printf 'Project "%s" has image "%s"\n' "$projectName" "$imageName"
    fi
done
```

For more information about using the AWS CLI with AWS CodeBuild, see the [Command line reference \(p. 388\)](#).

## View a build project's details (AWS SDKs)

For more information about using AWS CodeBuild with the AWS SDKs, see the [AWS SDKs and tools reference \(p. 389\)](#).

## Build caching in AWS CodeBuild

You can save time when your project builds by using a cache. A cache can store reusable pieces of your build environment and use them across multiple builds. Your build project can use one of two types of caching: Amazon S3 or local. If you use a local cache, you must choose one or more of three cache modes: source cache, Docker layer cache, and custom cache.

### Note

Docker layer cache mode is available for the Linux environment only. If you choose this mode, you must run your build in privileged mode. CodeBuild projects granted privileged mode grants its container access to all devices. For more information, see [Runtime privilege and Linux capabilities](#) on the Docker Docs website.

### Topics

- [Amazon S3 caching \(p. 217\)](#)

- [Local caching \(p. 217\)](#)

## Amazon S3 caching

Amazon S3 caching stores the cache in an Amazon S3 bucket that is available across multiple build hosts. This is a good option for small to intermediate sized build artifacts that are more expensive to build than to download. This is not the best option for large build artifacts because they can take a long time to transfer over your network, which can affect build performance. It also is not the best option if you use Docker layers.

### Local caching

Local caching stores a cache locally on a build host that is available to that build host only. This is a good option for intermediate to large build artifacts because the cache is immediately available on the build host. This is not the best option if your builds are infrequent. This means that build performance is not impacted by network transfer time.

If you choose local caching, you must choose one or more of the following cache modes:

- Source cache mode caches Git metadata for primary and secondary sources. After the cache is created, subsequent builds pull only the change between commits. This mode is a good choice for projects with a clean working directory and a source that is a large Git repository. If you choose this option and your project does not use a Git repository (AWS CodeCommit, GitHub, GitHub Enterprise Server, or Bitbucket), the option is ignored.
- Docker layer cache mode caches existing Docker layers. This mode is a good choice for projects that build or pull large Docker images. It can prevent the performance issues caused by pulling large Docker images down from the network.

#### Note

- You can use a Docker layer cache in the Linux environment only.
- The `privileged` flag must be set so that your project has the required Docker permissions.

By default, Docker containers do not allow access to any devices. Privileged mode grants a build project's Docker container access to all devices. For more information, see [Runtime Privilege and Linux Capabilities](#) on the Docker Docs website. Also, Windows does not support privileged mode.

- You should consider the security implication before you use a Docker layer cache.
- Custom cache mode caches directories you specify in the `buildspec` file. This mode is a good choice if your build scenario is not suited to one of the other two local cache modes. If you use a custom cache:
  - Only directories can be specified for caching. You cannot specify individual files.
  - Symlinks are used to reference cached directories.
  - Cached directories are linked to your build before it downloads its project sources. Cached items overrides source items if they have the same name. Directories are specified using cache paths in the `buildspec` file. For more information, see [Buildspec syntax \(p. 130\)](#).
  - Avoid directory names that are the same in the source and in the cache. Locally-cached directories may override, or delete the contents of, directories in the source repository that have the same name.

#### Note

Local caching is not supported with the `LINUX_GPU_CONTAINER` environment type and the `BUILD_GENERAL1_2XLARGE` compute type. For more information, see [Build environment compute types \(p. 160\)](#).

**Note**

Local caching is not supported when you configure CodeBuild to work with a VPC. For more information on using VPCs with CodeBuild, see [Use AWS CodeBuild with Amazon Virtual Private Cloud \(p. 171\)](#).

**Topics**

- [Specify local caching \(CLI\) \(p. 218\)](#)
- [Specify local caching \(console\) \(p. 218\)](#)
- [Specify local caching \(AWS CloudFormation\) \(p. 220\)](#)

You can use the AWS CLI, console, SDK, or AWS CloudFormation to specify a local cache.

## Specify local caching (CLI)

You can use the the `--cache` parameter in the AWS CLI to specify each of the three local cache types.

- To specify a source cache:

```
--cache type=LOCAL,mode=[LOCAL_SOURCE_CACHE]
```

- To specify a Docker layer cache:

```
--cache type=LOCAL,mode=[LOCAL_DOCKER_LAYER_CACHE]
```

- To specify a custom cache:

```
--cache type=LOCAL,mode=[LOCAL_CUSTOM_CACHE]
```

For more information, see [Create a build project \(AWS CLI\) \(p. 198\)](#).

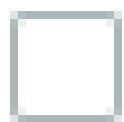
## Specify local caching (console)

You specify a cache in the **Artifacts** section of the console. For **Cache type**, choose **Amazon S3** or **Local**. If you choose **Local**, choose one or more of the three local cache options.

## Cache type

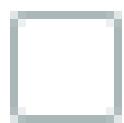
**Local**

Select one or more local caches.



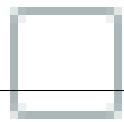
**Docker layer cache**

Caches existing Docker layers.



**Source cache**

Caches .git metadata so it can be used by multiple builds.



**Custom cache**

API version 2016-10-06

219

Caches directories specified in the buildspec file.

For more information, see [Create a build project \(console\) \(p. 188\)](#).

## Specify local caching (AWS CloudFormation)

If you use AWS CloudFormation to specify a local cache, on the Cache property, for Type, specify LOCAL. The following sample YAML-formatted AWS CloudFormation code specifies all three local cache types. You can specify any combination of the types. If you use a Docker layer cache, under Environment, you must set PrivilegedMode to true and Type to LINUX\_CONTAINER.

```
CodeBuildProject:
  Type: AWS::CodeBuild::Project
  Properties:
    Name: MyProject
    ServiceRole: <service-role>
    Artifacts:
      Type: S3
      Location: <bucket-name>
      Name: myArtifact
      EncryptionDisabled: true
      OverrideArtifactName: true
    Environment:
      Type: LINUX_CONTAINER
      ComputeType: BUILD_GENERAL1_SMALL
      Image: aws/codebuild/standard:5.0
      Certificate: <bucket/cert.zip>
      # PrivilegedMode must be true if you specify LOCAL_DOCKER_LAYER_CACHE
      PrivilegedMode: true
    Source:
      Type: GITHUB
      Location: <github-location>
      InsecureSsl: true
      GitCloneDepth: 1
      ReportBuildStatus: false
    TimeoutInMinutes: 10
  Cache:
    Type: LOCAL
    Modes: # You can specify one or more cache mode,
    - LOCAL_CUSTOM_CACHE
    - LOCAL_DOCKER_LAYER_CACHE
    - LOCAL_SOURCE_CACHE
```

### Note

By default, Docker containers do not allow access to any devices. Privileged mode grants a build project's Docker container access to all devices. For more information, see [Runtime Privilege and Linux Capabilities](#) on the Docker Docs website. Also, Windows does not support privileged mode.

For more information, see [Create a build project \(AWS CloudFormation\) \(p. 211\)](#).

## Create AWS CodeBuild triggers

### Create AWS CodeBuild triggers (console)

You can create a trigger on a project to schedule a build once every hour, day, or week. You can also create a trigger using a custom rule with an Amazon CloudWatch cron expression. For example, using a cron expression, you can schedule a build at a specific time every weekday.

### Note

It is not possible to start a batch build from a build trigger, an Amazon EventBridge event, or an AWS Step Functions task.

#### To create a trigger

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Build projects**.
3. Choose the link for the build project to which you want to add a trigger, and then choose the **Build triggers** tab.

**Note**

By default, the 100 most recent build projects are displayed. To view more build projects, choose the gear icon, and then choose a different value for **Projects per page** or use the back and forward arrows.

4. Choose **Create trigger**.
5. Enter a name in **Trigger name**.
6. From the **Frequency** drop-down list, choose the frequency for your trigger. If you want to create a frequency using a cron expression, choose **Custom**.
7. Specify the parameters for the frequency of your trigger. You can enter the first few characters of your selections in the text box to filter drop-down menu items.

**Note**

Start hours and minutes are zero-based. The start minute is a number between zero and 59. The start hour is a number between zero and 23. For example, a daily trigger that starts every day at 12:15 P.M. has a start hour of 12 and a start minute of 15. A daily trigger that starts every day at midnight has a start hour of zero and a start minute of zero. A daily trigger that starts every day at 11:59 P.M. has a start hour of 23 and a start minute of 59.

| Frequency | Required Parameters                     | Details                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hourly    | Start minute                            | Use the <b>Start minute</b> drop-down menu.                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Daily     | Start minute<br>Start hour              | Use the <b>Start minute</b> drop-down menu.<br>Use the <b>Start hour</b> drop-down menu.                                                                                                                                                                                                                                                                                                                                                                     |
| Weekly    | Start minute<br>Start hour<br>Start day | Use the <b>Start minute</b> drop-down menu.<br>Use the <b>Start hour</b> drop-down menu.<br>Use the <b>Start day</b> drop-down menu.                                                                                                                                                                                                                                                                                                                         |
| Custom    | Cron expression                         | Enter a cron expression in <b>Cron expression</b> . A cron expression has six required fields that are separated by white space. The fields specify a start value for minute, hour, day of month, month, day of week, and year. You can use wildcards to specify a range, additional values, and more. For example, the cron expression <b>0 9 ? * MON-FRI *</b> schedules a build every weekday at 9:00 A.M. For more information, see <a href="#">Cron</a> |

| Frequency | Required Parameters | Details                                                                         |
|-----------|---------------------|---------------------------------------------------------------------------------|
|           |                     | <a href="#">Expressions</a> in the <i>Amazon CloudWatch Events User Guide</i> . |

8. Select **Enable this trigger**.
9. (Optional) Expand **Advanced section**. In **Source version**, type a version of your source.
  - For Amazon S3, enter the version ID that corresponds to the version of the input artifact you want to build. If **Source version** is left blank, the latest version is used.
  - For AWS CodeCommit, type a commit ID. If **Source version** is left blank, the default branch's HEAD commit ID is used.
  - For GitHub or GitHub Enterprise, type a commit ID, a pull request ID, a branch name, or a tag name that corresponds to the version of the source code you want to build. If you specify a pull request ID, it must use the format pr/*pull-request-ID* (for example, pr/25). If you specify a branch name, the branch's HEAD commit ID is used. If **Source version** is blank, the default branch's HEAD commit ID is used.
  - For Bitbucket, type a commit ID, a branch name, or a tag name that corresponds to the version of the source code you want to build. If you specify a branch name, the branch's HEAD commit ID is used. If **Source version** is blank, the default branch's HEAD commit ID is used.
10. (Optional) Specify a timeout between 5 minutes and 480 minutes (8 hours). This value specifies how long AWS CodeBuild attempts a build before it stops. If **Hours** and **Minutes** are left blank, the default timeout value specified in the project is used.
11. Choose **Create trigger**.

## Create AWS CodeBuild triggers programmatically

CodeBuild uses Amazon EventBridge rules for build triggers. You can use the EventBridge API to programmatically create build triggers for your CodeBuild projects. See [Amazon EventBridge API Reference](#) for more information.

## Edit AWS CodeBuild triggers

### Edit AWS CodeBuild triggers (console)

You can edit a trigger on a project to schedule a build once every hour, day, or week. You can also edit a trigger to use a custom rule with an Amazon CloudWatch cron expression. For example, using a cron expression, you can schedule a build at a specific time on every weekday. For information about creating a trigger, see [Create AWS CodeBuild triggers \(p. 220\)](#).

#### To edit a trigger

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Build projects**.
3. Choose the link for the build project you want to change, and then choose the **Build triggers** tab.

#### Note

By default, the 100 most recent build projects are displayed. To view more build projects, choose the gear icon, and then choose a different value for **Projects per page** or use the back and forward arrows.

4. Choose the radio button next to the trigger you want to change, and then choose **Edit**.
5. From the **Frequency** drop-down list, choose the frequency for your trigger. If you want to create a frequency using a cron expression, choose **Custom**.

6. Specify the parameters for the frequency of your trigger. You can enter the first few characters of your selections in the text box to filter drop-down menu items.

**Note**

Start hours and minutes are zero-based. The start minute is a number between zero and 59. The start hour is a number between zero and 23. For example, a daily trigger that starts every day at 12:15 P.M. has a start hour of 12 and a start minute of 15. A daily trigger that starts every day at midnight has a start hour of zero and a start minute of zero. A daily trigger that starts every day at 11:59 P.M. has a start hour of 23 and a start minute of 59.

| Frequency | Required Parameters                     | Details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hourly    | Start minute                            | Use the <b>Start minute</b> drop-down menu.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Daily     | Start minute<br>Start hour              | Use the <b>Start minute</b> drop-down menu.<br>Use the <b>Start hour</b> drop-down menu.                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Weekly    | Start minute<br>Start hour<br>Start day | Use the <b>Start minute</b> drop-down menu.<br>Use the <b>Start hour</b> drop-down menu.<br>Use the <b>Start day</b> drop-down menu.                                                                                                                                                                                                                                                                                                                                                                                         |
| Custom    | Cron expression                         | Enter a cron expression in <b>Cron expression</b> . A cron expression has six required fields that are separated by white space. The fields specify a start value for minute, hour, day of month, month, day of week, and year. You can use wildcards to specify a range, additional values, and more. For example, the cron expression <b>0 9 ? * MON-FRI *</b> schedules a build every weekday at 9:00 A.M. For more information, see <a href="#">Cron Expressions</a> in the <i>Amazon CloudWatch Events User Guide</i> . |

7. Select **Enable this trigger**.

**Note**

You can use the Amazon CloudWatch console at <https://console.aws.amazon.com/cloudwatch/> to edit source version, timeout, and other options that are not available in AWS CodeBuild.

## Edit AWS CodeBuild triggers programmatically

CodeBuild uses Amazon EventBridge rules for build triggers. You can use the EventBridge API to programmatically edit the build triggers for your CodeBuild projects. See [Amazon EventBridge API Reference](#) for more information.

# Using webhooks with AWS CodeBuild

AWS CodeBuild supports webhook integration with GitHub, GitHub Enterprise Server, and Bitbucket.

## Topics

- [Best practices for using webhooks with AWS CodeBuild \(p. 224\)](#)
- [Bitbucket webhook events \(p. 224\)](#)
- [GitHub webhook events \(p. 233\)](#)

## Best practices for using webhooks with AWS CodeBuild

For projects that use public repositories to setup webhooks, we recommend the following options:

### Setup ACTOR\_ACCOUNT\_ID filters

Add ACTOR\_ACCOUNT\_ID filters to your project's webhook filter groups to specify which users can trigger a build. Every webhook event delivered to CodeBuild comes with sender information that specifies the actor's identifier. CodeBuild will filter the webhooks based on the regular expression pattern provided in the filters. You can specify the specific users that are allowed to trigger builds with this filter. For more information, see [GitHub webhook events \(p. 233\)](#) and [Bitbucket webhook events \(p. 224\)](#).

### Setup FILE\_PATH filters

Add FILE\_PATH filters to your project's webhook filter groups to include or exclude the files that can trigger a build when changed. For example, you can deny build requests for changes to the buildspec .yml file using a regular expression pattern such as ^buildspec .yml\$, along with the excludeMatchedPattern property. For more information, see [GitHub webhook events \(p. 233\)](#) and [Bitbucket webhook events \(p. 224\)](#).

### Scope down the permissions for your build IAM role

Builds triggered by a webhook use the IAM service role specified in the project. We recommend setting the permissions in the service role to the minimum set of permissions required to run the build. For example, in a test and deploy scenario, create one project for testing and another project for deployment. The testing project accepts webhook builds from the repository, but provides no write permissions to your resources. The deployment project provides write permissions to your resources, and the webhook filter is configured to only allow trusted users to trigger builds.

### Use an inline or an Amazon S3 stored buildspec

If you define your buildspec inline within the project itself, or store the buildspec file in an Amazon S3 bucket, the buildspec file is only visible to the project owner. This prevents pull requests from making code changes to the buildspec file and triggering unwanted builds. For more information, see [ProjectSource.buildspec](#) in the *CodeBuild API Reference*.

## Bitbucket webhook events

You can use webhook filter groups to specify which Bitbucket webhook events trigger a build. For example, you can specify that a build is only triggered for changes to specific branches.

You can create one or more webhook filter groups to specify which webhook events trigger a build. A build is triggered if any filter group evaluates to true, which occurs when all the filters in the group evaluate to true. When you create a filter group, you specify:

### An event

For Bitbucket, you can choose one or more of the following events:

- PUSH
- PULL\_REQUEST\_CREATED
- PULL\_REQUEST\_UPDATED
- PULL\_REQUEST\_MERGED

The webhook's event type is in its header in the X-Event-Key field. The following table shows how X-Event-Key header values map to the event types.

**Note**

You must enable the merged event in your Bitbucket webhook setting if you create a webhook filter group that uses the PULL\_REQUEST\_MERGED event type.

| X-Event-Key Header value | Event type           |
|--------------------------|----------------------|
| repo:push                | PUSH                 |
| pullrequest:created      | PULL_REQUEST_CREATED |
| pullrequest:updated      | PULL_REQUEST_UPDATED |
| pullrequest:fulfilled    | PULL_REQUEST_MERGED  |

For PULL\_REQUEST\_MERGED, if a pull request is merged with the squash strategy and the pull request branch is closed, the original pull request commit no longer exists. In this case, the CODEBUILD\_WEBHOOK\_MERGE\_COMMIT environment variable contains the identifier of the squashed merge commit.

**One or more optional filters**

Use a regular expression to specify a filter. For an event to trigger a build, every filter within the group associated with it must evaluate to true.

**ACTOR\_ACCOUNT\_ID (ACTOR\_ID in the console)**

A webhook event triggers a build when a Bitbucket account ID matches the regular expression pattern. This value appears in the account\_id property of the actor object in the webhook filter payload.

**HEAD\_REF**

A webhook event triggers a build when the head reference matches the regular expression pattern (for example, refs/heads/branch-name and refs/tags/tag-name). A HEAD\_REF filter evaluates the Git reference name for the branch or tag. The branch or tag name appears in the name field of the new object in the push object of the webhook payload. For pull request events, the branch name appears in the name field in the branch object of the source object in the webhook payload.

**BASE\_REF**

A webhook event triggers a build when the base reference matches the regular expression pattern. A BASE\_REF filter works with pull request events only (for example, refs/heads/branch-name). A BASE\_REF filter evaluates the Git reference name for the branch. The branch name appears in the name field of the branch object in the destination object in the webhook payload.

**FILE\_PATH**

A webhook triggers a build when the path of a changed file matches the regular expression pattern.

## COMMIT\_MESSAGE

A webhook triggers a build when the head commit message matches the regular expression pattern.

### Note

You can find the webhook payload in the webhook settings of your Bitbucket repository.

### Topics

- [Filter Bitbucket webhook events \(console\) \(p. 226\)](#)
- [Filter Bitbucket webhook events \(SDK\) \(p. 229\)](#)
- [Filter Bitbucket webhook events \(AWS CloudFormation\) \(p. 232\)](#)

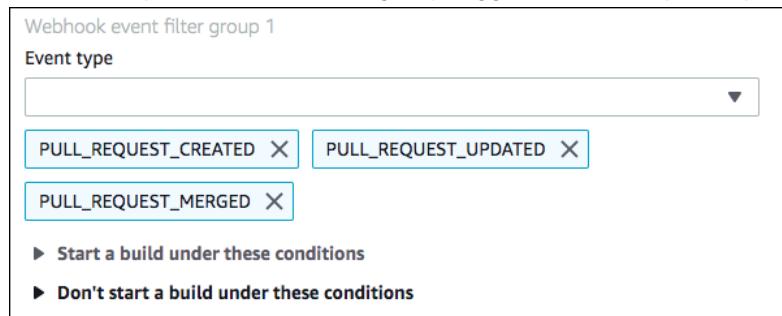
## Filter Bitbucket webhook events (console)

To use the AWS Management Console to filter webhook events:

1. Select **Rebuild every time a code change is pushed to this repository** when you create your project.
2. From **Event type**, choose one or more events.
3. To filter when an event triggers a build, under **Start a build under these conditions**, add one or more optional filters.
4. To filter when an event is not triggered, under **Don't start a build under these conditions**, add one or more optional filters.
5. Choose **Add filter group** to add another filter group.

For more information, see [Create a build project \(console\) \(p. 188\)](#) and [WebhookFilter](#) in the AWS *CodeBuild API Reference*.

In this example, a webhook filter group triggers a build for pull requests only:



Using an example of two filter groups, a build is triggered when one or both evaluate to true:

- The first filter group specifies pull requests that are created or updated on branches with Git reference names that match the regular expression `^refs/heads/main$` and head references that match `^refs/heads/branch1!`.
- The second filter group specifies push requests on branches with Git reference names that match the regular expression `^refs/heads/branch1$`.

Webhook event filter group 1

**Event type**  
Add one or more webhook event filter groups to specify which events trigger a new build. If you do not add a webhook event filter group, then a new build is triggered every time a code change is pushed to your repository.

PULL\_REQUEST\_CREATED X    PULL\_REQUEST\_UPDATED X

▼ Start a build under these conditions

ACTOR\_ID - optional    HEAD\_REF - optional    BASE\_REF - optional    FILE\_PATH - optional

   ^refs/heads/branch1\$    ^refs/heads/main\$   

COMMIT\_MESSAGE - optional

► Don't start a build under these conditions

Webhook event filter group 2

**Remove filter group**

**Event type**  
Add one or more webhook event filter groups to specify which events trigger a new build. If you do not add a webhook event filter group, then a new build is triggered every time a code change is pushed to your repository.

PUSH X

▼ Start a build under these conditions

ACTOR\_ID - optional    HEAD\_REF - optional    BASE\_REF - optional    FILE\_PATH - optional

   ^refs/heads/branch1\$       

COMMIT\_MESSAGE - optional

► Don't start a build under these conditions

In this example, a webhook filter group triggers a build for all requests except tag events.

Webhook event filter group 1

**Event type**

PUSH X    PULL\_REQUEST\_CREATED X    PULL\_REQUEST\_UPDATED X

PULL\_REQUEST\_MERGED X

► Start a build under these conditions

▼ Don't start a build under these conditions

ACTOR\_ID - optional    HEAD\_REF - optional    BASE\_REF - optional    FILE\_PATH - optional

   ^refs/tags/\*

In this example, a webhook filter group triggers a build only when files with names that match the regular expression `^buildspec.*` change.

#### Webhook event filter group 1

##### Event type

PUSH 

##### ▼ Start a build under these conditions

ACTOR\_ID - *optional*

HEAD\_REF - *optional*

BASE\_REF - *optional*

FILE\_PATH - *optional*

`^buildspec.*`

COMMIT\_MESSAGE -  
*optional*

##### ► Don't start a build under these conditions

In this example, a webhook filter group triggers a build only when files are changed in `src` or `test` folders.

#### Webhook event filter group 1

##### Event type

Add one or more webhook event filter groups to specify which events trigger a new build. If you do not add a webhook event filter group, then a new build is triggered every time a code change is pushed to your repository.

PUSH 

##### ▼ Start a build under these conditions

ACTOR\_ID - *optional*

HEAD\_REF - *optional*

BASE\_REF - *optional*

FILE\_PATH - *optional*

`^src/.+|^test/.+`

COMMIT\_MESSAGE -  
*optional*

##### ► Don't start a build under these conditions

In this example, a webhook filter group triggers a build only when a change is made by a Bitbucket user who does not have an account ID that matches the regular expression `actor-account-id`.

**Note**

For information about how to find your Bitbucket account ID, see [https://api.bitbucket.org/2.0/users/\*user-name\*](https://api.bitbucket.org/2.0/users/<i>user-name</i>), where *user-name* is your Bitbucket user name.

Webhook event filter group 1

Event type

PUSH X PULL\_REQUEST\_CREATED X PULL\_REQUEST\_UPDATED X  
PULL\_REQUEST\_MERGED X

▼ Start a build under these conditions

ACTOR\_ID - optional HEAD\_REF - optional BASE\_REF - optional FILE\_PATH - optional

actor-account-id [ ] [ ] [ ] [ ]

► Don't start a build under these conditions

In this example, a webhook filter group triggers a build for a push event when the head commit message matches the regular expression \[CodeBuild\].

Webhook event filter group 1

Event type

PUSH X

▼ Start a build under these conditions

ACTOR\_ID - optional HEAD\_REF - optional BASE\_REF - optional FILE\_PATH - optional

[ ] [ ] [ ] [ ]

COMMIT\_MESSAGE -  
optional

\[CodeBuild\]

► Don't start a build under these conditions

## Filter Bitbucket webhook events (SDK)

To use the AWS CodeBuild SDK to filter webhook events, use the `filterGroups` field in the request syntax of the `CreateWebhook` or `UpdateWebhook` API methods. For more information, see [WebhookFilter](#) in the *CodeBuild API Reference*.

To create a webhook filter that triggers a build for pull requests only, insert the following into the request syntax:

```
"filterGroups": [  
  [  
    {  
      "type": "EVENT",  
      "pattern": "PULL_REQUEST_CREATED, PULL_REQUEST_UPDATED, PULL_REQUEST_MERGED"
```

```
        ],
    ]}
```

To create a webhook filter that triggers a build for specified branches only, use the `pattern` parameter to specify a regular expression to filter branch names. Using an example of two filter groups, a build is triggered when one or both evaluate to true:

- The first filter group specifies pull requests that are created or updated on branches with Git reference names that match the regular expression `^refs/heads/main$` and head references that match `^refs/heads/myBranch$`.
- The second filter group specifies push requests on branches with Git reference names that match the regular expression `^refs/heads/myBranch$`.

```
"filterGroups": [
  [
    {
      "type": "EVENT",
      "pattern": "PULL_REQUEST_CREATED, PULL_REQUEST_UPDATED"
    },
    {
      "type": "HEAD_REF",
      "pattern": "^refs/heads/myBranch$"
    },
    {
      "type": "BASE_REF",
      "pattern": "^refs/heads/main$"
    }
  ],
  [
    {
      "type": "EVENT",
      "pattern": "PUSH"
    },
    {
      "type": "HEAD_REF",
      "pattern": "^refs/heads/myBranch$"
    }
  ]
]
```

You can use the `excludeMatchedPattern` parameter to specify which events do not trigger a build. In this example, a build is triggered for all requests except tag events.

```
"filterGroups": [
  [
    {
      "type": "EVENT",
      "pattern": "PUSH, PULL_REQUEST_CREATED, PULL_REQUEST_UPDATED, PULL_REQUEST_MERGED"
    },
    {
      "type": "HEAD_REF",
      "pattern": "^refs/tags/.*",
      "excludeMatchedPattern": true
    }
  ]
]
```

You can create a filter that triggers a build only when a change is made by a Bitbucket user with account ID `actor-account-id`.

**Note**

For information about how to find your Bitbucket account ID, see [https://api.bitbucket.org/2.0/users/\*user-name\*](https://api.bitbucket.org/2.0/users/user-name), where *user-name* is your Bitbucket user name.

```
"filterGroups": [
  [
    {
      "type": "EVENT",
      "pattern": "PUSH, PULL_REQUEST_CREATED, PULL_REQUEST_UPDATED, PULL_REQUEST_MERGED"
    },
    {
      "type": "ACTOR_ACCOUNT_ID",
      "pattern": "actor-account-id"
    }
]
```

You can create a filter that triggers a build only when files with names that match the regular expression in the pattern argument change. In this example, the filter group specifies that a build is triggered only when files with a name that matches the regular expression `^buildspec.*` change.

```
"filterGroups": [
  [
    {
      "type": "EVENT",
      "pattern": "PUSH"
    },
    {
      "type": "FILE_PATH",
      "pattern": "^buildspec.*"
    }
]
```

In this example, the filter group specifies that a build is triggered only when files are changed in `src` or `test` folders.

```
"filterGroups": [
  [
    {
      "type": "EVENT",
      "pattern": "PUSH"
    },
    {
      "type": "FILE_PATH",
      "pattern": "^src/.+|^test/.+"
    }
]
```

You can create a filter that triggers a build only when the head commit message matches the regular expression in the pattern argument. In this example, the filter group specifies that a build is triggered only when the head commit message of the push event matches the regular expression `\[CodeBuild\]`.

```
"filterGroups": [
  [
    {
      "type": "EVENT",
      "pattern": "PUSH"
```

```

},
{
  "type": "COMMIT_MESSAGE",
  "pattern": "\[CodeBuild\]"
}
]

```

## Filter Bitbucket webhook events (AWS CloudFormation)

To use an AWS CloudFormation template to filter webhook events, use the AWS CodeBuild project's `FilterGroups` property. The following YAML-formatted portion of an AWS CloudFormation template creates two filter groups. Together, they trigger a build when one or both evaluate to true:

- The first filter group specifies pull requests are created or updated on branches with Git reference names that match the regular expression `^refs/heads/main$` by a Bitbucket user who does not have account ID 12345.
- The second filter group specifies push requests are created on branches with Git reference names that match the regular expression `^refs/heads/.*`.
- The third filter group specifies a push request with a head commit message matching the regular expression `\[CodeBuild\]`.

```

CodeBuildProject:
  Type: AWS::CodeBuild::Project
  Properties:
    Name: MyProject
    ServiceRole: service-role
    Artifacts:
      Type: NO_ARTIFACTS
    Environment:
      Type: LINUX_CONTAINER
      ComputeType: BUILD_GENERAL1_SMALL
      Image: aws/codebuild/standard:5.0
    Source:
      Type: BITBUCKET
      Location: source-location
    Triggers:
      Webhook: true
      FilterGroups:
        - - Type: EVENT
            Pattern: PULL_REQUEST_CREATED,PULL_REQUEST_UPDATED
        - Type: BASE_REF
            Pattern: ^refs/heads/main$
            ExcludeMatchedPattern: false
        - Type: ACTOR_ACCOUNT_ID
            Pattern: 12345
            ExcludeMatchedPattern: true
        - - Type: EVENT
            Pattern: PUSH
        - Type: HEAD_REF
            Pattern: ^refs/heads/.*
        - Type: FILE_PATH
            Pattern: READ_ME
            ExcludeMatchedPattern: true
        - - Type: EVENT
            Pattern: PUSH
        - Type: COMMIT_MESSAGE
            Pattern: \[CodeBuild\]
        - Type: FILE_PATH
            Pattern: ^src/.+|^test/.+
```

## GitHub webhook events

You can use webhook filter groups to specify which GitHub webhook events trigger a build. For example, you can specify that a build is only triggered for changes to specific branches.

You can create one or more webhook filter groups to specify which webhook events trigger a build. A build is triggered if any filter group evaluates to true, which occurs when all the filters in the group evaluate to true. When you create a filter group, you specify:

### An event

For GitHub, you can choose one or more of the following events: PUSH, PULL\_REQUEST\_CREATED, PULL\_REQUEST\_UPDATED, PULL\_REQUEST\_REOPENED, and PULL\_REQUEST\_MERGED. The webhook event type is in the X-GitHub-Event header in the webhook payload. In the X-GitHub-Event header, you might see pull\_request or push. For a pull request event, the type is in the action field of the webhook event payload. The following table shows how X-GitHub-Event header values and webhook pull request payload action field values map to the available event types.

| X-GitHub-Event Header value | Webhook event payload action value   | Event type            |
|-----------------------------|--------------------------------------|-----------------------|
| pull_request                | opened                               | PULL_REQUEST_CREATED  |
| pull_request                | reopened                             | PULL_REQUEST_REOPENED |
| pull_request                | synchronize                          | PULL_REQUEST_UPDATED  |
| pull_request                | closed, and the merged field is true | PULL_REQUEST_MERGED   |
| push                        | n/a                                  | PUSH                  |

### Note

The PULL\_REQUEST\_REOPENED event type can be used with GitHub and GitHub Enterprise Server only.

### One or more optional filters

Use a regular expression to specify a filter. For an event to trigger a build, every filter within the group associated with it must evaluate to true.

ACTOR\_ACCOUNT\_ID (ACTOR\_ID in the console)

A webhook event triggers a build when a GitHub or GitHub Enterprise Server account ID matches the regular expression pattern. This value is found in the id property of the sender object in the webhook payload.

HEAD\_REF

A webhook event triggers a build when the head reference matches the regular expression pattern (for example, refs/heads/branch-name or refs/tags/tag-name). For a push event, the reference name is found in the ref property in the webhook payload. For pull requests events, the branch name is found in the ref property of the head object in the webhook payload.

BASE\_REF

A webhook event triggers a build when the base reference matches the regular expression pattern (for example, refs/heads/branch-name). A BASE\_REF filter can be used with pull

request events only. The branch name is found in the `ref` property of the base object in the webhook payload.

#### FILE\_PATH

A webhook triggers a build when the path of a changed file matches the regular expressions pattern. A FILE\_PATH filter can be used with GitHub push and pull request events and GitHub Enterprise Server push events. It cannot be used with GitHub Enterprise Server pull request events.

#### COMMIT\_MESSAGE

A webhook triggers a build when the head commit message matches the regular expression pattern. A COMMIT\_MESSAGE filter can be used with GitHub push and pull request events and GitHub Enterprise Server push events. It cannot be used with GitHub Enterprise Server pull request events.

#### Note

You can find the webhook payload in the webhook settings of your GitHub repository.

#### Topics

- [Filter GitHub webhook events \(console\) \(p. 234\)](#)
- [Filter GitHub webhook events \(SDK\) \(p. 238\)](#)
- [Filter GitHub webhook events \(AWS CloudFormation\) \(p. 240\)](#)

### Filter GitHub webhook events (console)

In **Primary source webhook events**, select the following. This section is only available when you chose **Repository in my GitHub account** for the source repository.

1. Select **Rebuild every time a code change is pushed to this repository** when you create your project.
2. From **Event type**, choose one or more events.
3. To filter when an event triggers a build, under **Start a build under these conditions**, add one or more optional filters.
4. To filter when an event is not triggered, under **Don't start a build under these conditions**, add one or more optional filters.
5. Choose **Add filter group** to add another filter group, if needed.

For more information, see [Create a build project \(console\) \(p. 188\)](#) and [WebhookFilter](#) in the AWS CodeBuild API Reference.

In this example, a webhook filter group triggers a build for pull requests only:

Webhook event filter group 1

Event type

PULL\_REQUEST\_CREATED X PULL\_REQUEST\_UPDATED X

PULL\_REQUEST\_REOPENED X PULL\_REQUEST\_MERGED X

► Start a build under these conditions

► Don't start a build under these conditions

Using an example of two webhook filter groups, a build is triggered when one or both evaluate to true:

- The first filter group specifies pull requests that are created, updated, or reopened on branches with Git reference names that match the regular expression `^refs/heads/main$` and head references that match `^refs/heads/branch1$`.
- The second filter group specifies push requests on branches with Git reference names that match the regular expression `^refs/heads/branch1$`.

Webhook event filter group 1

**Event type**  
Add one or more webhook event filter groups to specify which events trigger a new build. If you do not add a webhook event filter group, then a new build is triggered every time a code change is pushed to your repository.

PULL\_REQUEST\_CREATED X

PULL\_REQUEST\_UPDATED X

PULL\_REQUEST\_REOPENED X

▼ Start a build under these conditions

ACTOR\_ID - *optional*   
HEAD\_REF - *optional*  ^refs/heads/branch1\$  
BASE\_REF - *optional*  ^refs/heads/main\$  
FILE\_PATH - *optional*

COMMIT\_MESSAGE - *optional*

► Don't start a build under these conditions

Webhook event filter group 2

Remove filter group

**Event type**  
Add one or more webhook event filter groups to specify which events trigger a new build. If you do not add a webhook event filter group, then a new build is triggered every time a code change is pushed to your repository.

PUSH X

▼ Start a build under these conditions

ACTOR\_ID - *optional*   
HEAD\_REF - *optional*  ^refs/heads/branch1\$  
BASE\_REF - *optional*   
FILE\_PATH - *optional*

COMMIT\_MESSAGE - *optional*

► Don't start a build under these conditions

In this example, a webhook filter group triggers a build for all requests except tag events.

Webhook event filter group 1

Event type

PUSH X PULL\_REQUEST\_CREATED X PULL\_REQUEST\_UPDATED X

PULL\_REQUEST\_REOPENED X PULL\_REQUEST\_MERGED X

► Start a build under these conditions

▼ Don't start a build under these conditions

ACTOR\_ID - optional HEAD\_REF - optional BASE\_REF - optional FILE\_PATH - optional

^refs/tags/\*

In this example, a webhook filter group triggers a build only when files with names that match the regular expression ^buildspec.\* change.

Webhook event filter group 1

Event type

PUSH X

▼ Start a build under these conditions

ACTOR\_ID - optional

HEAD\_REF - optional

BASE\_REF - optional

FILE\_PATH - optional

^buildspec.\*

COMMIT\_MESSAGE -  
optional

► Don't start a build under these conditions

In this example, a webhook filter group triggers a build only when files are changed in src or test folders.

## Webhook event filter group 1

### Event type

Add one or more webhook event filter groups to specify which events trigger a new build. If you do not add a webhook event filter group, then a new build is triggered every time a code change is pushed to your repository.

PUSH X

### ▼ Start a build under these conditions

ACTOR\_ID - *optional*

HEAD\_REF - *optional*

BASE\_REF - *optional*

FILE\_PATH - *optional*

^src/.+|^test/.+

COMMIT\_MESSAGE -

*optional*

### ► Don't start a build under these conditions

In this example, a webhook filter group triggers a build only when a change is made by a specified GitHub or GitHub Enterprise Server user with an account ID that matches the regular expression `actor-account-id`.

#### Note

For information about how to find your GitHub account ID, see [https://api.github.com/users/\*user-name\*](https://api.github.com/users/user-name), where *user-name* is your GitHub user name.

Webhook event filter group 1

Event type

PUSH X PULL\_REQUEST\_CREATED X PULL\_REQUEST\_UPDATED X  
PULL\_REQUEST\_REOPENED X PULL\_REQUEST\_MERGED X

▼ Start a build under these conditions

ACTOR\_ID - *optional*

actor-account-id

HEAD\_REF - *optional*

BASE\_REF - *optional*

FILE\_PATH - *optional*

► Don't start a build under these conditions

In this example, a webhook filter group triggers a build for a push event when the head commit message matches the regular expression `\[CodeBuild\]`.

Webhook event filter group 1

Event type

PUSH 

▼ Start a build under these conditions

ACTOR\_ID - *optional*

HEAD\_REF - *optional*

BASE\_REF - *optional*

FILE\_PATH - *optional*

COMMIT\_MESSAGE -  
*optional*

\[CodeBuild\]

► Don't start a build under these conditions

## Filter GitHub webhook events (SDK)

To use the AWS CodeBuild SDK to filter webhook events, use the `filterGroups` field in the request syntax of the `CreateWebhook` or `UpdateWebhook` API methods. For more information, see [WebhookFilter](#) in the *CodeBuild API Reference*.

To create a webhook filter that triggers a build for pull requests only, insert the following into the request syntax:

```
"filterGroups": [  
    [  
        {  
            "type": "EVENT",  
            "pattern": "PULL_REQUEST_CREATED, PULL_REQUEST_UPDATED, PULL_REQUEST_REOPENED,  
PULL_REQUEST_MERGED"  
        }  
    ]  
]
```

To create a webhook filter that triggers a build for specified branches only, use the `pattern` parameter to specify a regular expression to filter branch names. Using an example of two filter groups, a build is triggered when one or both evaluate to true:

- The first filter group specifies pull requests that are created, updated, or reopened on branches with Git reference names that match the regular expression `^refs/heads/main$` and head references that match `^refs/heads/myBranch$`.
- The second filter group specifies push requests on branches with Git reference names that match the regular expression `^refs/heads/myBranch$`.

```
"filterGroups": [  
    [  
        {  
            "type": "EVENT",  
            "pattern": "PULL_REQUEST_CREATED, PULL_REQUEST_UPDATED, PULL_REQUEST_REOPENED"  
        }  
    ]  
]
```

```

        },
        {
            "type": "HEAD_REF",
            "pattern": "^refs/heads/myBranch$"
        },
        {
            "type": "BASE_REF",
            "pattern": "^refs/heads/main$"
        }
    ],
    [
        {
            "type": "EVENT",
            "pattern": "PUSH"
        },
        {
            "type": "HEAD_REF",
            "pattern": "^refs/heads/myBranch$"
        }
    ]
]

```

You can use the `excludeMatchedPattern` parameter to specify which events do not trigger a build. For example, in this example a build is triggered for all requests except tag events.

```

"filterGroups": [
    [
        {
            "type": "EVENT",
            "pattern": "PUSH, PULL_REQUEST_CREATED, PULL_REQUEST_UPDATED,
PULL_REQUEST_REOPENED, PULL_REQUEST_MERGED"
        },
        {
            "type": "HEAD_REF",
            "pattern": "^refs/tags/.",
            "excludeMatchedPattern": true
        }
    ]
]

```

You can create a filter that triggers a build only when files with names that match the regular expression in the `pattern` argument change. In this example, the filter group specifies that a build is triggered only when files with a name that matches the regular expression `^buildspec.*` change.

```

"filterGroups": [
    [
        {
            "type": "EVENT",
            "pattern": "PUSH"
        },
        {
            "type": "FILE_PATH",
            "pattern": "^buildspec.*"
        }
    ]
]

```

In this example, the filter group specifies that a build is triggered only when files are changed in `src` or `test` folders.

```
"filterGroups": [
```

```
[  
  {  
    "type": "EVENT",  
    "pattern": "PUSH"  
  },  
  {  
    "type": "FILE_PATH",  
    "pattern": "^src/.+|^test/.+"  
  }  
]
```

You can create a filter that triggers a build only when a change is made by a specified GitHub or GitHub Enterprise Server user with account ID `actor-account-id`.

**Note**

For information about how to find your GitHub account ID, see [https://api.github.com/users/\*user-name\*](https://api.github.com/users/<i>user-name</i>), where *user-name* is your GitHub user name.

```
"filterGroups": [  
  [  
    {  
      "type": "EVENT",  
      "pattern": "PUSH, PULL_REQUEST_CREATED, PULL_REQUEST_UPDATED,  
PULL_REQUEST_REOPENED, PULL_REQUEST_MERGED"  
    },  
    {  
      "type": "ACTOR_ACCOUNT_ID",  
      "pattern": "actor-account-id"  
    }  
  ]
```

You can create a filter that triggers a build only when the head commit message matches the regular expression in the pattern argument. In this example, the filter group specifies that a build is triggered only when the head commit message of the push event matches the regular expression `\[CodeBuild\]`.

```
"filterGroups": [  
  [  
    {  
      "type": "EVENT",  
      "pattern": "PUSH"  
    },  
    {  
      "type": "COMMIT_MESSAGE",  
      "pattern": "\[CodeBuild\]"  
    }  
  ]
```

## Filter GitHub webhook events (AWS CloudFormation)

To use an AWS CloudFormation template to filter webhook events, use the AWS CodeBuild project's `FilterGroups` property. The following YAML-formatted portion of an AWS CloudFormation template creates two filter groups. Together, they trigger a build when one or both evaluate to true:

- The first filter group specifies pull requests are created or updated on branches with Git reference names that match the regular expression `^refs/heads/main$` by a GitHub user who does not have account ID 12345.

- The second filter group specifies push requests are created on files with names that match the regular expression READ\_ME in branches with Git reference names that match the regular expression ^refs/heads/.\*.
- The third filter group specifies a push request with a head commit message matching the regular expression \[CodeBuild\].

```
CodeBuildProject:  
  Type: AWS::CodeBuild::Project  
  Properties:  
    Name: MyProject  
    ServiceRole: service-role  
    Artifacts:  
      Type: NO_ARTIFACTS  
    Environment:  
      Type: LINUX_CONTAINER  
      ComputeType: BUILD_GENERAL1_SMALL  
      Image: aws/codebuild/standard:5.0  
    Source:  
      Type: GITHUB  
      Location: source-location  
    Triggers:  
      Webhook: true  
      FilterGroups:  
        - - Type: EVENT  
          Pattern: PULL_REQUEST_CREATED,PULL_REQUEST_UPDATED  
        - Type: BASE_REF  
          Pattern: ^refs/heads/main$  
          ExcludeMatchedPattern: false  
        - Type: ACTOR_ACCOUNT_ID  
          Pattern: 12345  
          ExcludeMatchedPattern: true  
        - - Type: EVENT  
          Pattern: PUSH  
        - Type: HEAD_REF  
          Pattern: ^refs/heads/*  
        - Type: FILE_PATH  
          Pattern: READ_ME  
          ExcludeMatchedPattern: true  
        - - Type: EVENT  
          Pattern: PUSH  
        - Type: COMMIT_MESSAGE  
          Pattern: \[CodeBuild\]  
        - Type: FILE_PATH  
          Pattern: ^src/.+|^test/.+
```

## Change a build project's settings in AWS CodeBuild

You can use the AWS CodeBuild console, AWS CLI, or AWS SDKs to change a build project's settings.

If you add test reporting to a build project, make sure your IAM role has the permissions described in [Working with test report permissions \(p. 311\)](#).

### Topics

- [Change a build project's settings \(console\) \(p. 242\)](#)
- [Change a build project's settings \(AWS CLI\) \(p. 253\)](#)
- [Change a build project's settings \(AWS SDKs\) \(p. 254\)](#)

## Change a build project's settings (console)

To change the settings for a build project, perform the following procedure:

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Build projects**.
3. Do one of the following:
  - Choose the link for the build project you want to change, and then choose **Build details**.
  - Choose the button next to the build project you want to change, choose **View details**, and then choose **Build details**.

You can modify the following sections:

### Sections

- [Project configuration \(p. 242\)](#)
- [Source \(p. 243\)](#)
- [Environment \(p. 247\)](#)
- [Buildspec \(p. 250\)](#)
- [Batch configuration \(p. 250\)](#)
- [Artifacts \(p. 251\)](#)
- [Logs \(p. 253\)](#)

## Project configuration

In the **Project configuration** section, choose **Edit**. When your changes are complete, choose **Update configuration** to save the new configuration.

You can modify the following properties.

### Description

Enter an optional description of the build project to help other users understand what this project is used for.

### Build badge

Select **Enable build badge** to make your project's build status visible and embeddable. For more information, see [Build badges sample \(p. 74\)](#).

#### Note

Build badge does not apply if your source provider is Amazon S3.

### Enable concurrent build limit

If you want to limit the number of concurrent builds for this project, perform the following steps:

1. Select **Restrict number of concurrent builds this project can start**.
2. In **Concurrent build limit**, enter the maximum number of concurrent builds that are allowed for this project. This limit cannot be greater than the concurrent build limit set for the account. If you try to enter a number greater than the account limit, an error message is displayed.

New builds are only started if the current number of builds is less than or equal to this limit. If the current build count meets this limit, new builds are throttled and are not run.

## Enable public build access

To make your project's build results available to the public, including users without access to an AWS account, select **Enable public build access** and confirm that you want to make the build results public. The following properties are used for public build projects:

### Public build service role

Select **New service role** if you want to have CodeBuild create a new service role for you, or **Existing service role** if you want to use an existing service role.

The public build service role enables CodeBuild to read the CloudWatch Logs and download the Amazon S3 artifacts for the project's builds. This is required to make the project's build logs and artifacts available to the public.

### Service role

Enter the name of the new service role or an existing service role.

To make your project's build results private, clear **Enable public build access**.

For more information, see [Public build projects in AWS CodeBuild \(p. 270\)](#).

### Warning

The following should be kept in mind when making your project's build results public:

- All of a project's build results, logs, and artifacts, including builds that were run when the project was private, are available to the public.
- All build logs and artifacts are available to the public. Environment variables, source code, and other sensitive information may have been output to the build logs and artifacts. You must be careful about what information is output to the build logs. Some best practices are:
  - Do not store sensitive values, especially AWS access key IDs and secret access keys, in environment variables. We recommend that you use an Amazon EC2 Systems Manager Parameter Store or AWS Secrets Manager to store sensitive values.
  - Follow [Best practices for using webhooks \(p. 224\)](#) to limit which entities can trigger a build, and do not store the buildspec in the project itself, to ensure that your webhooks are as secure as possible.
- A malicious user can use public builds to distribute malicious artifacts. We recommend that project administrators review all pull requests to verify that the pull request is a legitimate change. We also recommend that you validate any artifacts with their checksums to make sure that the correct artifacts are being downloaded.

## Additional information

For **Tags**, enter the name and value of any tags that you want supporting AWS services to use. Use **Add row** to add a tag. You can add up to 50 tags.

## Source

In the **Source** section, choose **Edit**. When your changes are complete, choose **Update configuration** to save the new configuration.

You can modify the following properties:

### Source provider

Choose the source code provider type. Use the following lists to make selections appropriate for your source provider:

**Note**

CodeBuild does not support Bitbucket Server.

## Amazon S3

**Bucket**

Choose the name of the input bucket that contains the source code.

**S3 object key or S3 folder**

Enter the name of the ZIP file or the path to the folder that contains the source code. Enter a forward slash (/) to download everything in the S3 bucket.

**Source version**

Enter the version ID of the object that represents the build of your input file. For more information, see [Source version sample with AWS CodeBuild \(p. 120\)](#).

## CodeCommit

**Repository**

Choose the repository you want to use.

**Reference type**

Choose **Branch**, **Git tag**, or **Commit ID** to specify the version of your source code. For more information, see [Source version sample with AWS CodeBuild \(p. 120\)](#).

**Note**

We recommend that you choose Git branch names that don't look like commit IDs, such as 811dd1ba1aba14473856cee38308caed7190c0d or 5392f7. This helps you avoid Git checkout collisions with actual commits.

**Git clone depth**

Choose to create a shallow clone with a history truncated to the specified number of commits. If you want a full clone, choose **Full**.

**Git submodules**

Select **Use Git submodules** if you want to include Git submodules in your repository.

## Bitbucket

**Repository**

Choose **Connect using OAuth** or **Connect with a Bitbucket app password** and follow the instructions to connect (or reconnect) to Bitbucket.

Choose a public repository or a repository in your account.

**Source version**

Enter a branch, commit ID, tag, or reference and a commit ID. For more information, see [Source version sample with AWS CodeBuild \(p. 120\)](#)

**Note**

We recommend that you choose Git branch names that don't look like commit IDs, such as 811dd1ba1aba14473856cee38308caed7190c0d or 5392f7. This helps you avoid Git checkout collisions with actual commits.

### Git clone depth

Choose **Git clone depth** to create a shallow clone with a history truncated to the specified number of commits. If you want a full clone, choose **Full**.

### Git submodules

Select **Use Git submodules** if you want to include Git submodules in your repository.

### Build status

Select **Report build statuses to source provider when your builds start and finish** if you want the status of your build's start and completion reported to your source provider.

To be able to report the build status to the source provider, the user associated with the source provider must have write access to the repo. If the user does not have write access, the build status cannot be updated. For more information, see [Source provider access \(p. 370\)](#).

For **Status context**, enter the value to be used for the name parameter in the Bitbucket commit status. For more information, see [build](#) in the Bitbucket API documentation.

For **Target URL**, enter the value to be used for the url parameter in the Bitbucket commit status. For more information, see [build](#) in the Bitbucket API documentation.

The status of a build triggered by a webhook is always reported to the source provider. To have the status of a build that is started from the console or an API call reported to the source provider, you must select this setting.

If your project's builds are triggered by a webhook, you must push a new commit to the repo for a change to this setting to take effect.

In **Primary source webhook events**, select **Rebuild every time a code change is pushed to this repository** if you want CodeBuild to build the source code every time a code change is pushed to this repository. For more information about webhooks and filter groups, see [Bitbucket webhook events \(p. 224\)](#).

## GitHub

### Repository

Choose **Connect using OAuth** or **Connect with a GitHub personal access token** and follow the instructions to connect (or reconnect) to GitHub and authorize access to AWS CodeBuild.

Choose a public repository or a repository in your account.

### Source version

Enter a branch, commit ID, tag, or reference and a commit ID. For more information, see [Source version sample with AWS CodeBuild \(p. 120\)](#)

#### Note

We recommend that you choose Git branch names that don't look like commit IDs, such as 811dd1ba1aba14473856cee38308caed7190c0d or 5392f7. This helps you avoid Git checkout collisions with actual commits.

### Git clone depth

Choose **Git clone depth** to create a shallow clone with a history truncated to the specified number of commits. If you want a full clone, choose **Full**.

### Git submodules

Select **Use Git submodules** if you want to include Git submodules in your repository.

## Build status

Select **Report build statuses to source provider when your builds start and finish** if you want the status of your build's start and completion reported to your source provider.

To be able to report the build status to the source provider, the user associated with the source provider must have write access to the repo. If the user does not have write access, the build status cannot be updated. For more information, see [Source provider access \(p. 370\)](#).

For **Status context**, enter the value to be used for the context parameter in the GitHub commit status. For more information, see [Create a commit status](#) in the GitHub developer guide.

For **Target URL**, enter the value to be used for the target\_url parameter in the GitHub commit status. For more information, see [Create a commit status](#) in the GitHub developer guide.

The status of a build triggered by a webhook is always reported to the source provider. To have the status of a build that is started from the console or an API call reported to the source provider, you must select this setting.

If your project's builds are triggered by a webhook, you must push a new commit to the repo for a change to this setting to take effect.

In **Primary source webhook events**, select **Rebuild every time a code change is pushed to this repository** if you want CodeBuild to build the source code every time a code change is pushed to this repository. For more information about webhooks and filter groups, see [GitHub webhook events \(p. 233\)](#).

## GitHub Enterprise Server

### GitHub Enterprise personal access token

See [GitHub Enterprise Server sample \(p. 102\)](#) for information about how to copy a personal access token to your clipboard. Paste the token in the text field, and then choose **Save Token**.

#### Note

You only need to enter and save the personal access token once. CodeBuild uses this token in all future projects.

## Source version

Enter a pull request, branch, commit ID, tag, or reference and a commit ID. For more information, see [Source version sample with AWS CodeBuild \(p. 120\)](#).

#### Note

We recommend that you choose Git branch names that don't look like commit IDs, such as 811dd1ba1aba14473856cee38308caed7190c0d or 5392f7. This helps you avoid Git checkout collisions with actual commits.

## Git clone depth

Choose **Git clone depth** to create a shallow clone with a history truncated to the specified number of commits. If you want a full clone, choose **Full**.

## Git submodules

Select **Use Git submodules** if you want to include Git submodules in your repository.

## Build status

Select **Report build statuses to source provider when your builds start and finish** if you want the status of your build's start and completion reported to your source provider.

To be able to report the build status to the source provider, the user associated with the source provider must have write access to the repo. If the user does not have write access, the build status cannot be updated. For more information, see [Source provider access \(p. 370\)](#).

For **Status context**, enter the value to be used for the context parameter in the GitHub commit status. For more information, see [Create a commit status](#) in the GitHub developer guide.

For **Target URL**, enter the value to be used for the target\_url parameter in the GitHub commit status. For more information, see [Create a commit status](#) in the GitHub developer guide.

The status of a build triggered by a webhook is always reported to the source provider. To have the status of a build that is started from the console or an API call reported to the source provider, you must select this setting.

If your project's builds are triggered by a webhook, you must push a new commit to the repo for a change to this setting to take effect.

#### Insecure SSL

Select **Enable insecure SSL** to ignore SSL warnings while connecting to your GitHub Enterprise project repository.

In **Primary source webhook events**, select **Rebuild every time a code change is pushed to this repository** if you want CodeBuild to build the source code every time a code change is pushed to this repository. For more information about webhooks and filter groups, see [GitHub webhook events \(p. 233\)](#).

## Environment

In the **Environment** section, choose **Edit**. When your changes are complete, choose **Update configuration** to save the new configuration.

You can modify the following properties:

#### Environment image

To change the build image, choose **Override image** and do one of the following:

- To use a Docker image managed by AWS CodeBuild, choose **Managed image**, and then make selections from **Operating system**, **Runtime(s)**, **Image**, and **Image version**. Make a selection from **Environment type** if it is available.
- To use another Docker image, choose **Custom image**. For **Environment type**, choose **ARM**, **Linux**, **Linux GPU**, or **Windows**. If you choose **Other registry**, for **External registry URL**, enter the name and tag of the Docker image in Docker Hub, using the format `docker repository/docker image name`. If you choose **Amazon ECR**, use **Amazon ECR repository** and **Amazon ECR image** to choose the Docker image in your AWS account.
- To use a private Docker image, choose **Custom image**. For **Environment type**, choose **ARM**, **Linux**, **Linux GPU**, or **Windows**. For **Image registry**, choose **Other registry**, and then enter the ARN of the credentials for your private Docker image. The credentials must be created by Secrets Manager. For more information, see [What Is AWS Secrets Manager?](#) in the *AWS Secrets Manager User Guide*.

#### Note

CodeBuild overrides the ENTRYPPOINT for custom Docker images.

#### Privileged

Select **Privileged** only if you plan to use this build project to build Docker images. Otherwise, all associated builds that attempt to interact with the Docker daemon fail. You must also start the

Docker daemon so that your builds can interact with it. One way to do this is to initialize the Docker daemon in the `install` phase of your build spec by running the following build commands. Do not run these commands if you chose a build environment image provided by CodeBuild with Docker support.

**Note**

By default, Docker containers do not allow access to any devices. Privileged mode grants a build project's Docker container access to all devices. For more information, see [Runtime Privilege and Linux Capabilities](#) on the Docker Docs website. Also, Windows does not support privileged mode.

```
- nohup /usr/local/bin/dockerd --host=unix:///var/run/docker.sock --  
host=tcp://127.0.0.1:2375 --storage-driver=overlay2 &  
- timeout 15 sh -c "until docker info; do echo .; sleep 1; done"
```

### Service role

Do one of the following:

- If you do not have a CodeBuild service role, choose **New service role**. In **Role name**, enter a name for the new role.
- If you have a CodeBuild service role, choose **Existing service role**. In **Role ARN**, choose the service role.

**Note**

When you use the console to create a build project, you can create a CodeBuild service role at the same time. By default, the role works with that build project only. If you use the console to associate this service role with another build project, the role is updated to work with the other build project. A service role can work with up to 10 build projects.

### Additional configuration

#### Timeout

Specify a value, between 5 minutes and 8 hours, after which CodeBuild stops the build if it is not complete. If **hours** and **minutes** are left blank, the default value of 60 minutes is used.

#### VPC

If you want CodeBuild to work with your VPC:

- For **VPC**, choose the VPC ID that CodeBuild uses.
- For **VPC Subnets**, choose the subnets that include resources that CodeBuild uses.
- For **VPC Security groups**, choose the security groups that CodeBuild uses to allow access to resources in the VPCs.

For more information, see [Use AWS CodeBuild with Amazon Virtual Private Cloud \(p. 171\)](#).

#### Compute

Choose one of the available options.

#### Environment variables

Enter the name and value, and then choose the type of each environment variable for builds to use.

**Note**

CodeBuild sets the environment variable for your AWS Region automatically. You must set the following environment variables if you haven't added them to your `buildspec.yml`:

- `AWS_ACCOUNT_ID`

- IMAGE\_REPO\_NAME
- IMAGE\_TAG

Console and AWS CLI users can see environment variables. If you have no concerns about the visibility of your environment variable, set the **Name** and **Value** fields, and then set **Type** to **Plaintext**.

We recommend that you store an environment variable with a sensitive value, such as an AWS access key ID, an AWS secret access key, or a password as a parameter in Amazon EC2 Systems Manager Parameter Store or AWS Secrets Manager.

If you use Amazon EC2 Systems Manager Parameter Store, then for **Type**, choose **Parameter**. For **Name**, enter an identifier for CodeBuild to reference. For **Value**, enter the parameter's name as stored in Amazon EC2 Systems Manager Parameter Store. Using a parameter named /CodeBuild/dockerLoginPassword as an example, for **Type**, choose **Parameter**. For **Name**, enter LOGIN\_PASSWORD. For **Value**, enter /CodeBuild/dockerLoginPassword.

### Important

If you use Amazon EC2 Systems Manager Parameter Store, we recommend that you store parameters with parameter names that start with /CodeBuild/ (for example, /CodeBuild/dockerLoginPassword). You can use the CodeBuild console to create a parameter in Amazon EC2 Systems Manager. Choose **Create parameter**, and then follow the instructions in the dialog box. (In that dialog box, for **KMS key**, you can specify the ARN of an AWS KMS key in your account. Amazon EC2 Systems Manager uses this key to encrypt the parameter's value during storage and decrypt it during retrieval.) If you use the CodeBuild console to create a parameter, the console starts the parameter name with /CodeBuild/ as it is being stored. For more information, see [Systems Manager Parameter Store](#) and [Systems Manager Parameter Store Console Walkthrough](#) in the [Amazon EC2 Systems Manager User Guide](#).

If your build project refers to parameters stored in Amazon EC2 Systems Manager Parameter Store, the build project's service role must allow the `ssm:GetParameters` action. If you chose **New service role** earlier, CodeBuild includes this action in the default service role for your build project. However, if you chose **Existing service role**, you must include this action to your service role separately.

If your build project refers to parameters stored in Amazon EC2 Systems Manager Parameter Store with parameter names that do not start with /CodeBuild/, and you chose **New service role**, you must update that service role to allow access to parameter names that do not start with /CodeBuild/. This is because that service role allows access only to parameter names that start with /CodeBuild/.

If you choose **New service role**, the service role includes permission to decrypt all parameters under the /CodeBuild/ namespace in the Amazon EC2 Systems Manager Parameter Store.

Environment variables you set replace existing environment variables. For example, if the Docker image already contains an environment variable named MY\_VAR with a value of my\_value, and you set an environment variable named MY\_VAR with a value of other\_value, then my\_value is replaced by other\_value. Similarly, if the Docker image already contains an environment variable named PATH with a value of /usr/local/sbin:/usr/local/bin, and you set an environment variable named PATH with a value of \$PATH:/usr/share/ant/bin, then /usr/local/sbin:/usr/local/bin is replaced by the literal value \$PATH:/usr/share/ant/bin.

Do not set any environment variable with a name that begins with CODEBUILD\_. This prefix is reserved for internal use.

If an environment variable with the same name is defined in multiple places, the value is determined as follows:

- The value in the start build operation call takes highest precedence.
- The value in the build project definition takes next precedence.
- The value in the buildspec declaration takes lowest precedence.

If you use Secrets Manager, for **Type**, choose **Secrets Manager**. For **Name**, enter an identifier for CodeBuild to reference. For **Value**, enter a reference-key using the pattern `secret-id:json-key:version-stage:version-id`. For information, see [Secrets Manager reference-key in the buildspec file](#).

### Important

If you use Secrets Manager, we recommend that you store secrets with names that start with /CodeBuild/ (for example, /CodeBuild/dockerLoginPassword). For more information, see [What Is AWS Secrets Manager?](#) in the *AWS Secrets Manager User Guide*. If your build project refers to secrets stored in Secrets Manager, the build project's service role must allow the secretsmanager:GetSecretValue action. If you chose **New service role** earlier, CodeBuild includes this action in the default service role for your build project. However, if you chose **Existing service role**, you must include this action to your service role separately.

If your build project refers to secrets stored in Secrets Manager with secret names that do not start with /CodeBuild/, and you chose **New service role**, you must update the service role to allow access to secret names that do not start with /CodeBuild/. This is because the service role allows access only to secret names that start with /CodeBuild/.

If you choose **New service role**, the service role includes permission to decrypt all secrets under the /CodeBuild/ namespace in the Secrets Manager.

## Buildspec

In the **Buildspec** section, choose **Edit**. When your changes are complete, choose **Update configuration** to save the new configuration.

You can modify the following properties:

### Build specifications

Do one of the following:

- If your source code includes a buildspec file, choose **Use a buildspec file**. 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 in **Buildspec name** (for example, buildspec-two.yml or configuration/buildspec.yml). If the buildspec file is in an S3 bucket, it must be in the same AWS Region as your build project. Specify the buildspec file using its ARN (for example, arn:aws:s3:::<my-codebuild-sample2>/buildspec.yml).
- If your source code does not include a buildspec file, or if you want to run build commands different from the ones specified for the build phase in the buildspec.yml file in the source code's root directory, choose **Insert build commands**. For **Build commands**, enter the commands you want to run in the build phase. For multiple commands, separate each command by && (for example, mvn test && mvn package). To run commands in other phases, or if you have a long list of commands for the build phase, add a buildspec.yml file to the source code root directory, add the commands to the file, and then choose **Use the buildspec.yml in the source code root directory**.

For more information, see the [Buildspec reference \(p. 129\)](#).

## Batch configuration

In the **Batch configuration** section, choose **Edit**. When your changes are complete, choose **Update configuration** to save the new configuration. For more information, see [Batch builds in AWS CodeBuild \(p. 262\)](#).

You can modify the following properties:

### Batch service role

Provides the service role for batch builds.

Choose one of the following:

- If you do not have a batch service role, choose **New service role**. In **Service role**, enter a name for the new role.
- If you have a batch service role, choose **Existing service role**. In **Service role**, choose the service role.

Batch builds introduce a new security role in the batch configuration. This new role is required as CodeBuild must be able to call the StartBuild, StopBuild, and RetryBuild actions on your behalf to run builds as part of a batch. Customers should use a new role, and not the same role they use in their build, for two reasons:

- Giving the build role StartBuild, StopBuild, and RetryBuild permissions would allow a single build to start more builds via the buildspec.
- CodeBuild batch builds provide restrictions that restrict the number of builds and compute types that can be used for the builds in the batch. If the build role has these permissions, it is possible the builds themselves could bypass these restrictions.

### Allowed compute type(s) for batch

Select the compute types allowed for the batch. Select all that apply.

### Maximum builds allowed in batch

Enter the maximum number of builds allowed in the batch. If a batch exceeds this limit, the batch will fail.

### Batch timeout

Enter the maximum amount of time for the batch build to complete.

### Combine artifacts

Select **Combine all artifacts from batch into a single location** to have all of the artifacts from the batch combined into a single location.

### Batch report mode

Select the desired build status report mode for batch builds.

#### Note

This field is only available when the project source is Bitbucket, GitHub, or GitHub Enterprise, and **Report build statuses to source provider when your builds start and finish** is selected under **Source**.

### Aggregated builds

Select to have the statuses for all builds in the batch combined into a single status report.

### Individual builds

Select to have the build statuses for all builds in the batch reported separately.

## Artifacts

In the **Artifacts** section, choose **Edit**. When your changes are complete, choose **Update configuration** to save the new configuration.

You can modify the following properties:

## Type

Do one of the following:

- If you do not want to create any build output artifacts, choose **No artifacts**. You might want to do this if you're only running build tests or you want to push a Docker image to an Amazon ECR repository.
- To store the build output in an S3 bucket, choose **Amazon S3**, and then do the following:
  - If you want to use your project name for the build output ZIP file or folder, leave **Name** blank. Otherwise, enter the name. (If you want to output a ZIP file, and you want the ZIP file to have a file extension, be sure to include it after the ZIP file name.)
  - Select **Enable semantic versioning** if you want a name specified in the buildspec file to override any name that is specified in the console. The name in a buildspec file is calculated at build time and uses the Shell command language. For example, you can append a date and time to your artifact name so that it is always unique. Unique artifact names prevent artifacts from being overwritten. For more information, see [Buildspec syntax \(p. 130\)](#).
  - For **Bucket name**, choose the name of the output bucket.
  - If you chose **Insert build commands** earlier in this procedure, then for **Output files**, enter the locations of the files from the build that you want to put into the build output ZIP file or folder. For multiple locations, separate each location with a comma (for example, appspec.yml, target/my-app.jar). For more information, see the description of files in [Buildspec syntax \(p. 130\)](#).
  - If you do not want your build artifacts encrypted, select **Remove artifacts encryption**.

For each secondary set of artifacts you want:

1. For **Artifact identifier**, enter a value that is fewer than 128 characters and contains only alphanumeric characters and underscores.
2. Choose **Add artifact**.
3. Follow the previous steps to configure your secondary artifacts.
4. Choose **Save artifact**.

## Additional configuration

### Encryption key

Do one of the following:

- To use the AWS managed key Amazon S3 in your account to encrypt the build output artifacts, leave **Encryption key** blank. This is the default.
- To use a customer managed key to encrypt the build output artifacts, in **Encryption key**, enter the ARN of the customer managed key. Use the format `arn:aws:kms:region-ID:account-ID:key/key-ID`.

### Cache type

For **Cache type**, choose one of the following:

- If you do not want to use a cache, choose **No cache**.
- If you want to use an Amazon S3 cache, choose **Amazon S3**, and then do the following:
  - For **Bucket**, choose the name of the S3 bucket where the cache is stored.
  - (Optional) For **Cache path prefix**, enter an Amazon S3 path prefix. The **Cache path prefix** value is similar to a directory name. It makes it possible for you to store the cache under the same directory in a bucket.

### Important

Do not append a trailing slash (/) to the end of the path prefix.

- If you want to use a local cache, choose **Local**, and then choose one or more local cache modes.

**Note**

Docker layer cache mode is available for Linux only. If you choose it, your project must run in privileged mode.

Using a cache saves considerable build time because reusable pieces of the build environment are stored in the cache and used across builds. For information about specifying a cache in the buildspec file, see [Buildspec syntax \(p. 130\)](#). For more information about caching, see [Build caching in AWS CodeBuild \(p. 216\)](#).

## Logs

In the **Logs** section, choose **Edit**. When your changes are complete, choose **Update configuration** to save the new configuration.

You can modify the following properties:

Choose the logs you want to create. You can create Amazon CloudWatch Logs, Amazon S3 logs, or both.

### CloudWatch

If you want Amazon CloudWatch Logs logs:

#### CloudWatch logs

Select **CloudWatch logs**.

#### Group name

Enter the name of your Amazon CloudWatch Logs log group.

#### Stream name

Enter your Amazon CloudWatch Logs log stream name.

### S3

If you want Amazon S3 logs:

#### S3 logs

Select **S3 logs**.

#### Bucket

Choose the name of the S3 bucket for your logs.

#### Path prefix

Enter the prefix for your logs.

#### Disable S3 log encryption

Select if you do not want your S3 logs encrypted.

## Change a build project's settings (AWS CLI)

For information about using the AWS CLI with AWS CodeBuild, see the [Command line reference \(p. 388\)](#).

To update a CodeBuild project with the AWS CLI, you create a JSON file with the updated properties and pass that file to the [update-project](#) command. Any properties not contained in the update file remain unchanged.

In the update JSON file, only the name property and the modified properties are required. The name property identifies the project to modify. For any modified structures, the required parameters for those structures must also be included. For example, to modify the environment for the project, the environment/type and environment/computeType properties are required. Here is an example that updates the environment image:

```
{  
  "name": "<project-name>",  
  "environment": {  
    "type": "LINUX_CONTAINER",  
    "computeType": "BUILD_GENERAL1_SMALL",  
    "image": "aws/codebuild/amazonlinux2-x86_64-standard:4.0"  
  }  
}
```

If you need to obtain the current property values for a project, use the [batch-get-projects](#) command to obtain the current properties of the project you are modifying, and write the output to a file.

```
aws codebuild batch-get-projects --names "<project-name>" > project-info.json
```

The [project-info.json](#) file contains an array of projects, so it cannot be used directly to update a project. You can, however, copy the properties that you want to modify from the [project-info.json](#) file and paste them into your update file as a baseline for the properties you want to modify. For more information, see [View a build project's details \(AWS CLI\) \(p. 215\)](#).

Modify the update JSON file as described in [Create a build project \(AWS CLI\) \(p. 198\)](#), and save your results. When you are finished modifying the update JSON file, run the [update-project](#) command, passing the update JSON file.

```
aws codebuild update-project --cli-input-json file://<update-project-file>
```

If successful, the updated project JSON appears in the output. If any required parameters are missing, an error message is displayed in the output that identifies the missing parameters. For example, this is the error message displayed if the environment/type parameter is missing:

```
aws codebuild update-project --cli-input-json file://update-project.json  
  
Parameter validation failed:  
Missing required parameter in environment: "type"
```

## Change a build project's settings (AWS SDKs)

For information about using AWS CodeBuild with the AWS SDKs, see the [AWS SDKs and tools reference \(p. 389\)](#).

## Delete a build project in AWS CodeBuild

You can use the CodeBuild console, AWS CLI, or AWS SDKs to delete a build project in CodeBuild. If you delete a project, its builds are not deleted.

### Warning

You cannot delete a project that has builds and a resource policy. To delete a project with a resource policy and builds, you must first remove the resource policy and delete its builds.

## Topics

- [Delete a build project \(console\) \(p. 255\)](#)
- [Delete a build project \(AWS CLI\) \(p. 255\)](#)
- [Delete a build project \(AWS SDKs\) \(p. 255\)](#)

## Delete a build project (console)

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Build projects**.
3. Do one of the following:
  - Choose the radio button next to the build project you want to delete, and then choose **Delete**.
  - Choose the link for the build project you want to delete, and then choose **Delete**.

### Note

By default, only the most recent 10 build projects are displayed. To view more build projects, choose a different value for **Projects per page** or use the back and forward arrows for viewing projects.

## Delete a build project (AWS CLI)

1. Run the `delete-project` command:

```
aws codebuild delete-project --name name
```

Replace the following placeholder:

- *name*: Required string. The name of the build project to delete. To get a list of available build projects, run the `list-projects` command. For more information, see [View a list of build project names \(AWS CLI\) \(p. 213\)](#).

2. If successful, no data and no errors appear in the output.

For more information about using the AWS CLI with AWS CodeBuild, see the [Command line reference \(p. 388\)](#).

## Delete a build project (AWS SDKs)

For more information about using AWS CodeBuild with the AWS SDKs, see the [AWS SDKs and tools reference \(p. 389\)](#).

## Working with shared projects

Project sharing allows project owners to share their AWS CodeBuild projects with other AWS accounts or users. In this model, the account that owns the project (owner) shares a project with other accounts (consumers). A consumer cannot edit or run a project.

### Contents

- [Prerequisites for sharing projects \(p. 256\)](#)
- [Prerequisites for accessing shared projects shared with you \(p. 256\)](#)

- [Related services \(p. 256\)](#)
- [Sharing a project \(p. 256\)](#)
- [Unsharing a shared project \(p. 258\)](#)
- [Identifying a shared project \(p. 258\)](#)
- [Shared project permissions \(p. 259\)](#)

## Prerequisites for sharing projects

To share a project, your AWS account must own it. You cannot share a project that has been shared with you.

## Prerequisites for accessing shared projects shared with you

To access a shared project, a consumer's IAM role requires the `BatchGetProjects` permission. You can attach the following policy to their IAM role:

```
{  
    "Effect": "Allow",  
    "Resource": [  
        "*"  
    ],  
    "Action": [  
        "codebuild:BatchGetProjects"  
    ]  
}
```

For more information, see [Using identity-based policies for AWS CodeBuild \(p. 342\)](#).

## Related services

Project sharing integrates with AWS Resource Access Manager (AWS RAM), a service that makes it possible for you to share your AWS resources with any AWS account or through AWS Organizations. With AWS RAM, you share resources by creating a *resource share* that specifies the resources and the consumers to share them with. Consumers can be individual AWS accounts, organizational units in AWS Organizations, or an entire organization in AWS Organizations.

For more information, see the [AWS RAM User Guide](#).

## Sharing a project

The consumer can use both the AWS CLI and AWS CodeBuild console to view the project and builds you've shared. The consumer cannot edit or run the project.

You can add a project to an existing resource share or you can create one in the [AWS RAM console](#).

### Note

You cannot delete a project with builds that has been added to a resource share.

To share a project with organizational units or an entire organization, you must enable sharing with AWS Organizations. For more information, see [Enable sharing with AWS Organizations](#) in the *AWS RAM User Guide*.

You can use the AWS CodeBuild console, AWS RAM console, or the AWS CLI to share a project that you own.

### To share a project that you own (CodeBuild console)

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Build projects**.

**Note**  
By default, only the 10 most recent build projects are displayed. To view more build projects, choose the gear icon, and then choose a different value for **Projects per page** or use the back and forward arrows.
3. Choose the project you want to share, and then choose **Share**. For more information, see [Create a resource share](#) in the *AWS RAM User Guide*.

### To share a project that you own (AWS RAM console)

See [Creating a resource share](#) in the *AWS RAM User Guide*.

### To share a project that you own (AWS RAM command)

Use the [create-resource-share](#) command.

### To share a project that you own (CodeBuild command)

Use the [put-resource-policy](#) command:

1. Create a file named policy.json and copy the following into it.

```
{  
    "Version": "2012-10-17",  
    "Statement": [{  
        "Effect": "Allow",  
        "Principal": {  
            "AWS": "<consumer-aws-account-id-or-user>"  
        },  
        "Action": [  
            "codebuild:BatchGetProjects",  
            "codebuild:BatchGetBuilds",  
            "codebuild>ListBuildsForProject"],  
        "Resource": "<arn-of-project-to-share>"  
    }]  
}
```

2. Update policy.json with the project ARN and identifiers to share it with. The following example grants read-only access to the root user for the AWS account identified by 123456789012.

```
{  
    "Version": "2012-10-17",  
    "Statement": [{  
        "Effect": "Allow",  
        "Principal": {  
            "AWS": [  
                "123456789012"  
            ]  
        },  
        "Action": [  
            "codebuild:BatchGetProjects",  
            "codebuild:BatchGetBuilds",  
            "codebuild>ListBuildsForProject"],  
        "Resource": "arn:aws:codebuild:us-west-2:123456789012:project/my-project"  
    }]  
}
```

3. Run the [put-resource-policy](#) command.

```
aws codebuild put-resource-policy --resource-arn <project-arn> --policy file://policy.json
```

4. Get the AWS RAM resource share ARN.

```
aws ram list-resources --resource-owner SELF --resource-arns <project-arn>
```

This will return a response similar to this:

```
{  
  "resources": [  
    {  
      "arn": "<project-arn>",  
      "type": "<type>",  
      "resourceShareArn": "<resource-share-arn>",  
      "creationTime": "<creation-time>",  
      "lastUpdatedTime": "<last-update-time>"  
    }  
  ]  
}
```

From the response, copy the `<resource-share-arn>` value to use in the next step.

5. Run the AWS RAM [promote-resource-share-created-from-policy](#) command.

```
aws ram promote-resource-share-created-from-policy --resource-share-arn <resource-share-arn>
```

## Unsharing a shared project

An unshared project, including its builds, can be accessed only by its owner. If you unshare a project, any AWS account or user you previously shared it with cannot access the project or its builds.

To unshare a shared project that you own, you must remove it from the resource share. You can use the AWS CodeBuild console, AWS RAM console, or AWS CLI to do this.

### To unshare a shared project that you own (AWS RAM console)

See [Updating a resource share](#) in the *AWS RAM User Guide*.

### To unshare a shared project that you own (AWS CLI)

Use the [disassociate-resource-share](#) command.

### To unshare project that you own (CodeBuild command)

Run the [delete-resource-policy](#) command and specify the ARN of the project you want to unshare:

```
aws codebuild delete-resource-policy --resource-arn <project-arn>
```

## Identifying a shared project

Owners and consumers can use the AWS CLI to identify shared projects.

### To identify projects shared with your AWS account or user (AWS CLI)

Use the [list-shared-projects](#) command to return the projects that are shared with you.

## Shared project permissions

### Permissions for owners

A project owner can edit the project and use it to run builds.

### Permissions for consumers

A project consumer can view a project and its builds, but cannot edit a project or use it to run builds.

## Tagging projects in AWS CodeBuild

A *tag* is a custom attribute label that you or AWS assigns to an AWS resource. Each AWS tag has two parts:

- A *tag key* (for example, CostCenter, Environment, Project, or Secret). Tag keys are case sensitive.
- An optional field known as a *tag value* (for example, 111122223333, Production, or a team name). Omitting the tag value is the same as using an empty string. Like tag keys, tag values are case sensitive.

Together these are known as key-value pairs. For information about the number of tags you can have on a project and restrictions on tag keys and values, see [Tags \(p. 428\)](#).

Tags help you identify and organize your AWS resources. Many AWS services support tagging, so you can assign the same tag to resources from different services to indicate that the resources are related. For example, you can assign the same tag to a CodeBuild project that you assign to an S3 bucket. For more information about using tags, see [Tagging Best Practices](#).

In CodeBuild, the primary resources are the project and the report group. You can use the CodeBuild console, the AWS CLI, CodeBuild APIs, or AWS SDKs to add, manage, and remove tags for a project. In addition to identifying, organizing, and tracking your project with tags, you can use tags in IAM policies to help control who can view and interact with your project. For examples of tag-based access policies, see [Using tags to control access to AWS CodeBuild resources \(p. 366\)](#).

### Topics

- [Add a tag to a project \(p. 259\)](#)
- [View tags for a project \(p. 260\)](#)
- [Edit tags for a project \(p. 261\)](#)
- [Remove a tag from a project \(p. 261\)](#)

## Add a tag to a project

Adding tags to a project can help you identify and organize your AWS resources and manage access to them. First, you add one or more tags (key-value pairs) to a project. Keep in mind that there are limits on the number of tags you can have on a project. There are restrictions on the characters you can use in the key and value fields. For more information, see [Tags \(p. 428\)](#). After you have tags, you can create IAM policies to manage access to the project based on these tags. You can use the CodeBuild console or the AWS CLI to add tags to a project.

### Important

Before you add a tag to a project, make sure to review any IAM policies that might use tags to control access to resources such as build projects. For examples of tag-based access policies, see [Using tags to control access to AWS CodeBuild resources \(p. 366\)](#).

For more information about adding tags to a project when you create it, see [Add a tag to a project \(console\) \(p. 260\)](#).

#### Topics

- [Add a tag to a project \(console\) \(p. 260\)](#)
- [Add a tag to a project \(AWS CLI\) \(p. 260\)](#)

## Add a tag to a project (console)

You can use the CodeBuild console to add one or more tags to a CodeBuild project.

1. Open the CodeBuild console at <https://console.aws.amazon.com/codebuild/>.
2. In **Build projects**, choose the name of the project where you want to add tags.
3. In the navigation pane, choose **Settings**. Choose **Build project tags**.
4. If no tags have been added to the project, choose **Add tag**. Otherwise, choose **Edit**, and then choose **Add tag**.
5. In **Key**, enter a name for the tag. You can add an optional value for the tag in **Value**.
6. (Optional) To add another tag, choose **Add tag** again.
7. When you have finished adding tags, choose **Submit**.

## Add a tag to a project (AWS CLI)

To add a tag to a project when you create it, see [Create a build project \(AWS CLI\) \(p. 198\)](#). In `create-project.json`, add your tags.

In these steps, we assume that you have already installed a recent version of the AWS CLI or updated to the current version. For more information, see [Installing the AWS Command Line Interface](#).

If successful, this command returns nothing.

## View tags for a project

Tags can help you identify and organize your AWS resources and manage access to them. For more information about using tags, see the [Tagging best practices](#) whitepaper. For examples of tag-based access policies, see [Using tags to control access to AWS CodeBuild resources \(p. 366\)](#).

## View tags for a project (console)

You can use the CodeBuild console to view the tags associated with a CodeBuild project.

1. Open the CodeBuild console at <https://console.aws.amazon.com/codebuild/>.
2. In **Build projects**, choose the name of the project where you want to view tags.
3. In the navigation pane, choose **Settings**. Choose **Build project tags**.

## View tags for a project (AWS CLI)

To view tags for a build project, run the following command. Use the name of your project for the `--names` parameter.

```
aws codebuild batch-get-projects --names your-project-name
```

If successful, this command returns JSON-formatted information about your build project that includes something like the following:

```
{  
    "tags": [  
        {"Status": "Secret",  
         "Team": "JanesProject"}  
    ]  
}
```

If the project does not have tags, the tags section is empty:

```
"tags": []
```

## Edit tags for a project

You can change the value for a tag associated with a project. You can also change the name of the key, which is equivalent to removing the current tag and adding a different one with the new name and the same value as the other key. Keep in mind that there are limits on the characters you can use in the key and value fields. For more information, see [Tags \(p. 428\)](#).

### Important

Editing tags for a project can impact access to that project. Before you edit the name (key) or value of a tag for a project, make sure to review any IAM policies that might use the key or value for a tag to control access to resources such as build projects. For examples of tag-based access policies, see [Using tags to control access to AWS CodeBuild resources \(p. 366\)](#).

### Edit a tag for a project (console)

You can use the CodeBuild console to edit the tags associated with a CodeBuild project.

1. Open the CodeBuild console at <https://console.aws.amazon.com/codebuild/>.
2. In **Build projects**, choose the name of the project where you want to edit tags.
3. In the navigation pane, choose **Settings**. Choose **Build project tags**.
4. Choose **Edit**.
5. Do one of the following:
  - To change the tag, enter a new name in **Key**. Changing the name of the tag is the equivalent of removing a tag and adding a new tag with the new key name.
  - To change the value of a tag, enter a new value. If you want to change the value to nothing, delete the current value and leave the field blank.
6. When you have finished editing tags, choose **Submit**.

### Edit tags for a project (AWS CLI)

To add, change, or delete tags from a build project, see [Change a build project's settings \(AWS CLI\) \(p. 253\)](#). Update the tags section in the JSON-formatted data you use to update the project.

## Remove a tag from a project

You can remove one or more tags associated with a project. Removing a tag does not delete the tag from other AWS resources that are associated with that tag.

### Important

Removing tags for a project can impact access to that project. Before you remove a tag from a project, make sure to review any IAM policies that might use the key or value for a tag to control access to resources such as build projects. For examples of tag-based access policies, see [Using tags to control access to AWS CodeBuild resources \(p. 366\)](#).

## Remove a tag from a project (console)

You can use the CodeBuild console to remove the association between a tag and a CodeBuild project.

1. Open the CodeBuild console at <https://console.aws.amazon.com/codebuild/>.
2. In **Build projects**, choose the name of the project where you want to remove tags.
3. In the navigation pane, choose **Settings**. Choose **Build project tags**.
4. Choose **Edit**.
5. Find the tag you want to remove, and then choose **Remove tag**.
6. When you have finished removing tags, choose **Submit**.

## Remove a tag from a project (AWS CLI)

To delete one or more tags from a build project, see [Change a build project's settings \(AWS CLI\) \(p. 253\)](#). Update the tags section in the JSON-formatted data with an updated list of tags that does not contain the ones you want to delete. If you want to delete all tags, update the tags section to:

```
"tags: []"
```

### Note

If you delete a CodeBuild build project, all tag associations are removed from the deleted build project. You do not have to remove tags before you delete a build project.

## Batch builds in AWS CodeBuild

You can use AWS CodeBuild to run concurrent and coordinated builds of a project with batch builds.

### Topics

- [Security role \(p. 262\)](#)
- [Batch build types \(p. 262\)](#)
- [Batch report mode \(p. 264\)](#)
- [More information \(p. 265\)](#)

## Security role

Batch builds introduce a new security role in the batch configuration. This new role is required as CodeBuild must be able to call the StartBuild, StopBuild, and RetryBuild actions on your behalf to run builds as part of a batch. Customers should use a new role, and not the same role they use in their build, for two reasons:

- Giving the build role StartBuild, StopBuild, and RetryBuild permissions would allow a single build to start more builds via the buildspec.
- CodeBuild batch builds provide restrictions that restrict the number of builds and compute types that can be used for the builds in the batch. If the build role has these permissions, it is possible the builds themselves could bypass these restrictions.

## Batch build types

CodeBuild supports the following batch build types:

### Batch build types

- [Build graph \(p. 263\)](#)
- [Build list \(p. 263\)](#)
- [Build matrix \(p. 264\)](#)

## Build graph

A build graph defines a set of tasks that have dependencies on other tasks in the batch.

The following example defines a build graph that creates a dependency chain.

```
batch:  
  fast-fail: false  
  build-graph:  
    - identifier: build1  
      env:  
        variables:  
          BUILD_ID: build1  
        ignore-failure: false  
    - identifier: build2  
      buildspec: build2.yml  
      env:  
        variables:  
          BUILD_ID: build2  
      depend-on:  
        - build1  
    - identifier: build3  
      env:  
        variables:  
          BUILD_ID: build3  
      depend-on:  
        - build2
```

In this example:

- build1 runs first because it has no dependencies.
- build2 has a dependency on build1, so build2 runs after build1 completes.
- build3 has a dependency on build2, so build3 runs after build2 completes.

For more information about the build graph buildspec syntax, see [batch/build-graph \(p. 147\)](#).

## Build list

A build list defines a number of tasks that run in parallel.

The following example defines a build list. The build1 and build2 builds will run in parallel.

```
batch:  
  fast-fail: false  
  build-list:  
    - identifier: build1  
      env:  
        variables:  
          BUILD_ID: build1  
        ignore-failure: false  
    - identifier: build2  
      buildspec: build2.yml  
      env:  
        variables:  
          BUILD_ID: build2
```

```
ignore-failure: true
```

For more information about the build list buildspec syntax, see [batch/build-list \(p. 148\)](#).

## Build matrix

A build matrix defines tasks with different configurations that run in parallel. CodeBuild creates a separate build for each possible configuration combination.

The following example shows a build matrix with two buildspec files and three values for an environment variable.

```
batch:
  build-matrix:
    static:
      ignore-failure: false
    dynamic:
      buildspec:
        - matrix1.yml
        - matrix2.yml
    env:
      variables:
        MY_VAR:
          - VALUE1
          - VALUE2
          - VALUE3
```

In this example, CodeBuild creates six builds:

- matrix1.yml with \$MY\_VAR=VALUE1
- matrix1.yml with \$MY\_VAR=VALUE2
- matrix1.yml with \$MY\_VAR=VALUE3
- matrix2.yml with \$MY\_VAR=VALUE1
- matrix2.yml with \$MY\_VAR=VALUE2
- matrix2.yml with \$MY\_VAR=VALUE3

Each build will have the following settings:

- ignore-failure set to false
- env/type set to LINUX\_CONTAINER
- env/image set to aws/codebuild/amazonlinux2-x86\_64-standard:4.0
- env/privileged-mode set to true

These builds run in parallel.

For more information about the build matrix buildspec syntax, see [batch/build-matrix \(p. 150\)](#).

## Batch report mode

If the source provider for your project is Bitbucket, GitHub, or GitHub Enterprise, and your project is configured to report build statuses to the source provider, you can select how you want your batch build statuses sent to the source provider. You can select to have the statuses sent as a single aggregate status report for the batch, or have the status of each build in the batch reported individually.

For more information, see the following topics:

- [Batch configuration \(create\) \(p. 195\)](#)
- [Batch configuration \(update\) \(p. 250\)](#)

## More information

For more information, see the following topics:

- [Batch build buildspec reference \(p. 146\)](#)
- [Batch configuration \(p. 195\)](#)
- [Run a batch build \(AWS CLI\) \(p. 276\)](#)
- [Stop a batch build in AWS CodeBuild \(p. 287\)](#)

## GitHub Action runner in AWS CodeBuild

You can use an action runner to run GitHub Actions within CodeBuild. This can be done by adding steps to any [phase \(p. 135\)](#) in your buildspec file.

CodeBuild buildspecs support a list of sequential GitHub Action steps which run in a separate phase from CodeBuild commands. These GitHub Actions integrate with CodeBuild's existing features, which include dependency caching, batch builds, access to AWS Secrets Manager, and more.

### Topics

- [How do I get started with the GitHub action runner? \(p. 265\)](#)
- [Which GitHub Actions can I use? \(p. 266\)](#)
- [Can I use source providers other than GitHub when using GitHub Actions in my CodeBuild project? \(p. 266\)](#)
- [Why do I need to connect to GitHub as a source provider in order to use GitHub Actions? \(p. 266\)](#)
- [How much does it cost to use the GitHub Action runner? \(p. 266\)](#)
- [Which regions support the GitHub Action runner? \(p. 266\)](#)
- [Best practices for GitHub Actions \(p. 266\)](#)
- [Limitations of the GitHub action runner in CodeBuild \(p. 266\)](#)
- [GitHub Action samples with AWS CodeBuild \(p. 267\)](#)

## How do I get started with the GitHub action runner?

The high-level steps to add a GitHub Action are as follows:

1. If you haven't done so already, connect your project to GitHub.

To do so, you can do one of the following:

- You can add GitHub as a source provider in the console. For more information, see [Connect GitHub with an access token \(console\) \(p. 371\)](#).
- You can import your GitHub credentials via the [CodeBuild API](#). For more information, see [Connect GitHub with an access token \(CLI\) \(p. 371\)](#).

### Note

This only needs to be done if you haven't connected to GitHub in another project.

2. In your project's buildspec, you can add steps, each of which references a GitHub Action. This can be edited in the CodeBuild console or in your source repository. Each build phase supports either a list of commands or a list of steps, but both cannot be used in the same phase. For more information, see [GitHub Action runner buildspec reference \(p. 151\)](#).

## Which GitHub Actions can I use?

You can use any action available in the [GitHub Marketplace](#) that doesn't conflict with these [limitations \(p. 266\)](#).

## Can I use source providers other than GitHub when using GitHub Actions in my CodeBuild project?

Yes, but connecting to GitHub is still required to authenticate with GitHub and access GitHub Actions. For more information, see [GitHub and GitHub Enterprise Server access token \(p. 370\)](#).

## Why do I need to connect to GitHub as a source provider in order to use GitHub Actions?

In order to use GitHub Actions, the source must be downloaded on a build compute. Anonymous downloads will be rate limited, so by connecting to GitHub, it can help ensure consistent access.

## How much does it cost to use the GitHub Action runner?

Running GitHub Actions is supported at no additional cost.

## Which regions support the GitHub Action runner?

GitHub Actions is supported in all CodeBuild regions. For more information about AWS Regions where CodeBuild is available, see [AWS Services by Region](#).

## Best practices for GitHub Actions

GitHub Actions are open source, built and maintained by the community. We follow the [shared responsibility model](#) and consider GitHub Actions source code as customer data for which you are responsible. GitHub Actions can be granted access to secrets, repository tokens, source code, and account links. Make sure you are confident in the trustworthiness and security of the GitHub Actions you plan to run.

More specific guidance and security best practices for GitHub Actions:

- [Security hardening](#)
- [Preventing pwn requests](#)
- [Untrusted input](#)
- [How to trust your building blocks](#)

## Limitations of the GitHub action runner in CodeBuild

- GitHub Actions that internally rely on the [github context](#) or that reference GitHub-specific resources, such as pull requests and issues, aren't supported in CodeBuild. For example, the following actions won't work in CodeBuild:
  - GitHub Actions that attempt to add, change, or update GitHub resources, such as actions that update pull requests, or create issues in GitHub.

### Note

Most official GitHub Actions listed in <https://github.com/actions> rely on github context. Instead, use actions available in the [GitHub Marketplace](#).

- GitHub Actions that are [Docker container actions](#) will work, but your build project must have [privileged mode \(p. 247\)](#) enabled and be run by the default Docker user (root).

- Actions must be run as a root user. For more information, see the [USER](#) topic in [Dockerfile support for GitHub Actions](#).
- GitHub Actions are not supported in CodeBuild projects which are configured to run on Windows.
- GitHub Action jobs (groups of steps) and GitHub Action job properties are not supported.
- GitHub Actions are not supported in CodeBuild projects that are configured to be triggered by a webhook for a public Git repository. For more information, see [git-credential-helper \(p. 135\)](#).
- VPC builds without public internet access cannot run GitHub Actions.
- Each build phase supports either a list of commands or a list of steps, but both cannot be used in the same phase. For example, in the following sample, steps are used in the pre-build phase to list GitHub Actions, while commands are used in the build phase to list CodeBuild commands.

```
version: 0.2
phases:
  pre-build:
    steps:
      - name: Lint Code Base
        uses: github/super-linter@v4
        env:
          VALIDATE_ALL_CODEBASE: 'true'
          DEFAULT_BRANCH: main
  build:
    commands:
      - echo "Building..."
      - npm run build
```

## GitHub Action samples with AWS CodeBuild

These groups of samples can be used to experiment with GitHub Actions in CodeBuild.

### Topics

- [Super-Linter GitHub Action sample \(p. 267\)](#)
- [Batch build graph sample \(p. 268\)](#)
- [Amazon CodeGuru Reviewer sample \(p. 268\)](#)
- [AWS Secrets Manager sample \(p. 269\)](#)
- [Environment variable sample \(p. 269\)](#)
- [Exported environment variable sample \(p. 270\)](#)

### Super-Linter GitHub Action sample

This sample demonstrates how to add the [Super-Linter](#) GitHub Action to a CodeBuild project. The Super-Linter action inspects code, finds areas where the code has errors, formatting issues, and suspicious constructs, and then outputs the results to the CodeBuild console.

You can add the Super-Linter GitHub Action to your CodeBuild project by updating the phase section of your buildspec file.

```
version: 0.2
phases:
  build:
    steps:
      - name: Lint Code Base
        uses: github/super-linter@v5
        env:
          VALIDATE_ALL_CODEBASE: true
```

The Super-Linter logs will look similar to the following:

```
/github/workspace/hello-world/app.js:3:13: Extra semicolon.  
/github/workspace/hello-world/app.js:9:92: Trailing spaces not allowed.  
/github/workspace/hello-world/app.js:21:7: Unnecessarily quoted property 'body' found.  
/github/workspace/hello-world/app.js:31:1: Expected indentation of 2 spaces but found 4.  
/github/workspace/hello-world/app.js:32:2: Newline required at end of file but not found.
```

## Batch build graph sample

The following example defines a build graph that creates a dependency chain and runs commands using steps. In this example, build1 runs first because it has no dependencies. Since build2 has a dependency on build1, so build2 runs after build1 completes. For information, see [Build graph \(p. 263\)](#).

```
version: 0.2
batch:
  fast-fail: false
  build-graph:
    - identifier: build1
      env:
        variables:
          BUILD_ID: build1
      ignore-failure: false
    - identifier: build2
      env:
        variables:
          BUILD_ID: build2
      depend-on:
        - build1

phases:
  build:
    steps:
      - run: echo $BUILD_ID
```

## Amazon CodeGuru Reviewer sample

Amazon CodeGuru Reviewer finds issues in your Java and Python code and recommends how to remediate them. The following example uses CodeGuru Reviewer to provide full repository analysis code reviews. These code reviews scan all the code in a specified branch. For information, see [Create code reviews with GitHub Actions](#) in the *Amazon CodeGuru Reviewer User Guide*.

```
version: 0.2
phases:
  build:
    steps:
      - name: Amazon CodeGuru Reviewer Scanner
        if: ${{ always() }}
        uses: aws-actions/codeguru-reviewer@v1.1
        with:
          s3_bucket: codeguru-reviewer-user

artifacts:
  files:
    - codeguru-results.sarif.json
```

### Note

Your Amazon S3 bucket must start with the codeguru-reviewer- prefix.

The logs will look similar to the following:

```
INFO CodeReview created with arn=arn:aws:codeguru-reviewer:region:account-id:association:id:code-review:RepositoryAnalysis-job for job=job
INFO SARIF persisted to /github/workspace/codeguru-results.sarif.json
INFO Amazon CodeGuru Reviewer job execution completed
```

After the Amazon CodeGuru Reviewer job is complete, a sarif report is generated as CodeBuild artifact. For information, see [Full repository analysis](#) in the *Amazon CodeGuru Reviewer User Guide*.

## AWS Secrets Manager sample

AWS Secrets Manager helps you manage, retrieve, and rotate database credentials, application credentials, OAuth tokens, API keys, and other secrets throughout their lifecycles. The following example defines a secret using Secrets Manager and runs commands using steps. For information, see [What is AWS Secrets Manager?](#) in the *AWS Secrets Manager User Guide*.

```
version: 0.2
env:
  secrets-manager:
    SECRET_VALUE: "arn:aws:secretsmanager:us-east-1:xxxx:secret:/secret-13IJg9:my_super_secret_key"
phases:
  build:
    steps:
      - run: echo $SECRET_VALUE
```

The logs will look similar to the following:

```
echo $SECRET_VALUE
env:
  SECRET_VALUE: ***
***
```

## Environment variable sample

The following example defines environment variables under the env sequence. A *S3\_BUCKET* variable is defined in the buildspec and assigned *<bucket-name>* as its value. This variable is referenced in the if conditional like a regular environment variable by using the dollar sign (\$) to access the GitHub Action env context. For more information, see [env sequence \(p. 132\)](#).

```
version: 0.2
env:
  variables:
    S3_BUCKET: "<bucket-name>"
phases:
  build:
    steps:
      - if: ${{ env.S3_BUCKET == '<bucket-name>' }}
        run: echo "S3 bucket is $S3_BUCKET"
```

The logs will look similar to the following:

```
echo "S3 bucket is $S3_BUCKET"
env:
  S3_BUCKET: my-s3-bucket
S3 bucket is my-s3-bucket
```

## Exported environment variable sample

Exported environment variables are used in conjunction with CodePipeline to export environment variables from the current build stage to subsequent stages in the pipeline. The following example defines an exported environment variable under the env sequence named `MY_VARIABLE` and writes to the `GITHUB_ENV` environment file.

```
version: 0.2
env:
  exported-variables:
    - MY_VARIABLE
phases:
  build:
    steps:
      - run: echo "MY_VARIABLE=my-value" >> $GITHUB_ENV
```

For more information, see [ExportedEnvironmentVariable](#) in the *AWS CodeBuild API Reference*.

## Public build projects in AWS CodeBuild

AWS CodeBuild allows you to make the build results, logs, and artifacts for your build projects available to the general public. This allows contributors to your source repositories to view the results and download the artifacts of a build, without requiring them to have access to an AWS account.

When you make your project's builds available to the public, all of a project's build results, logs, and artifacts, including builds that were run when the project was private, are made available to the public. Likewise, when you make a public build project private, the build results for that project are no longer available to the public.

For information about how to change the public visibility of your project's build results, see [Enable public build access \(p. 243\)](#).

CodeBuild provides a URL for the public builds for your project that is unique to your project. To obtain the public URL for your build project, perform the following procedure:

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Build projects**.
3. Choose the link for the build project you want to obtain the public URL for.
4. The public URL is displayed in the **Public project URL** field in the **Configuration** section. You can choose the link to open the URL, or copy the URL with the copy button.

### Warning

The following should be kept in mind when making your project's build results public:

- All of a project's build results, logs, and artifacts, including builds that were run when the project was private, are available to the public.
- All build logs and artifacts are available to the public. Environment variables, source code, and other sensitive information may have been output to the build logs and artifacts. You must be careful about what information is output to the build logs. Some best practices are:
  - Do not store sensitive values, especially AWS access key IDs and secret access keys, in environment variables. We recommend that you use an Amazon EC2 Systems Manager Parameter Store or AWS Secrets Manager to store sensitive values.
  - Follow [Best practices for using webhooks \(p. 224\)](#) to limit which entities can trigger a build, and do not store the buildspec in the project itself, to ensure that your webhooks are as secure as possible.

- A malicious user can use public builds to distribute malicious artifacts. We recommend that project administrators review all pull requests to verify that the pull request is a legitimate change. We also recommend that you validate any artifacts with their checksums to make sure that the correct artifacts are being downloaded.

## Working with builds in AWS CodeBuild

A *build* represents a set of actions performed by AWS CodeBuild to create output artifacts (for example, a JAR file) based on a set of input artifacts (for example, a collection of Java class files).

The following rules apply when you run multiple builds:

- When possible, builds run concurrently. The maximum number of concurrently running builds can vary. For more information, see [Quotas for AWS CodeBuild \(p. 425\)](#).
- If the build project has a concurrent build limit set, builds return an error if the number of running builds reaches the concurrent build limit for the project. For more information, see [Enable concurrent build limit \(p. 188\)](#).
- If the build project does not have a concurrent build limit set, builds are queued if the number of running builds reaches the concurrent build limit for the platform and compute type. The maximum number of builds in a queue is five times the concurrent build limit. For more information, see [Quotas for AWS CodeBuild \(p. 425\)](#).

A build in a queue that does not start after the number of minutes specified in its time out value is removed from the queue. The default timeout value is eight hours. You can override the build queue timeout with a value between five minutes and eight hours when you run your build. For more information, see [Run a build in AWS CodeBuild \(p. 271\)](#).

It is not possible to predict the order in which queued builds start.

**Note**

You can access the history of a build for one year.

You can perform these tasks when working with builds:

**Topics**

- [Run a build in AWS CodeBuild \(p. 271\)](#)
- [View build details in AWS CodeBuild \(p. 279\)](#)
- [View a list of build IDs in AWS CodeBuild \(p. 281\)](#)
- [View a list of build IDs for a build project in AWS CodeBuild \(p. 284\)](#)
- [Stop a build in AWS CodeBuild \(p. 286\)](#)
- [Stop a batch build in AWS CodeBuild \(p. 287\)](#)
- [Retry a build in AWS CodeBuild \(p. 288\)](#)
- [View a running build in Session Manager \(p. 289\)](#)
- [Delete builds in AWS CodeBuild \(p. 292\)](#)

## Run a build in AWS CodeBuild

You can use the AWS CodeBuild console, AWS CLI, or AWS SDKs to run a build in CodeBuild.

**Topics**

- [Run a build \(console\) \(p. 272\)](#)

- [Run a build \(AWS CLI\) \(p. 272\)](#)
- [Run a batch build \(AWS CLI\) \(p. 276\)](#)
- [Start running builds automatically \(AWS CLI\) \(p. 278\)](#)
- [Stop running builds automatically \(AWS CLI\) \(p. 278\)](#)
- [Run a build \(AWS SDKs\) \(p. 279\)](#)

## Run a build (console)

To use AWS CodePipeline to run a build with CodeBuild, skip these steps and follow the instructions in [Use CodePipeline with CodeBuild \(p. 392\)](#).

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Build projects**.
3. In the list of build projects, choose the build project.
4. You can run the build with the default build project settings, or override build settings for this build only.
  - a. If you want to run the build with the default build project settings, choose **Start build**. The build starts immediately.
  - b. If you want to override the default build project settings, choose **Start build with overrides**. In the **Start build** page, you can override the following:
    - **Build configuration**
    - **Source**
    - **Environment variable overrides**

If you need to select more advanced overrides, choose **Advanced build overrides**. In this page, you can override the following:

- **Build configuration**
- **Source**
- **Environment**
- **Buildspec**
- **Artifacts**
- **Logs**

When you have made your override selections, choose **Start build**.

For detailed information about this build, see [View build details \(console\) \(p. 279\)](#).

## Run a build (AWS CLI)

### Note

To use CodePipeline to run a build with AWS CodeBuild, skip these steps and follow the instructions in [Create a pipeline that uses CodeBuild \(AWS CLI\) \(p. 396\)](#).

For more information about using the AWS CLI with CodeBuild, see the [Command line reference \(p. 388\)](#).

1. Run the `start-build` command in one of the following ways:

```
aws codebuild start-build --project-name <project-name>
```

Use this if you want to run a build that uses the latest version of the build input artifact and the build project's existing settings.

```
aws codebuild start-build --generate-cli-skeleton
```

Use this if you want to run a build with an earlier version of the build input artifact or if you want to override the settings for the build output artifacts, environment variables, buildspec, or default build timeout period.

2. If you run the **start-build** command with the `--project-name` option, replace `<project-name>` with the name of the build project, and then skip to step 6 of this procedure. To get a list of build projects, see [View a list of build project names \(p. 213\)](#).
3. If you run the **start-build** command with the `--idempotency-token` option, a unique case-sensitive identifier or token, is included with the start-build request. The token is valid for 5 minutes after the request. If you repeat the start-build request with the same token, but change a parameter, CodeBuild returns a parameter mismatch error.
4. If you run the **start-build** command with the `--generate-cli-skeleton` option, JSON-formatted data appears in the output. Copy the data to a file (for example, `start-build.json`) in a location on the local computer or instance where the AWS CLI is installed. Modify the copied data to match the following format, and save your results:

```
{
    "projectName": "projectName",
    "sourceVersion": "sourceVersion",
    "artifactsOverride": {
        "type": "type",
        "location": "location",
        "path": "path",
        "namespaceType": "namespaceType",
        "name": "artifactsOverride-name",
        "packaging": "packaging"
    },
    "buildspecOverride": "buildspecOverride",
    "cacheOverride": {
        "location": "cacheOverride-location",
        "type": "cacheOverride-type"
    },
    "certificateOverride": "certificateOverride",
    "computeTypeOverride": "computeTypeOverride",
    "environmentTypeOverride": "environmentTypeOverride",
    "environmentVariablesOverride": {
        "name": "environmentVariablesOverride-name",
        "value": "environmentVariablesValue",
        "type": "environmentVariablesOverride-type"
    },
    "gitCloneDepthOverride": "gitCloneDepthOverride",
    "imageOverride": "imageOverride",
    "idempotencyToken": "idempotencyToken",
    "insecureSslOverride": "insecureSslOverride",
    "privilegedModeOverride": "privilegedModeOverride",
    "queuedTimeoutInMinutesOverride": "queuedTimeoutInMinutesOverride",
    "reportBuildStatusOverride": "reportBuildStatusOverride",
    "timeoutInMinutesOverride": "timeoutInMinutesOverride",
    "sourceAuthOverride": "sourceAuthOverride",
    "sourceLocationOverride": "sourceLocationOverride",
    "serviceRoleOverride": "serviceRoleOverride",
    "sourceTypeOverride": "sourceTypeOverride"
}
```

Replace the following placeholders:

- *projectName*: Required string. The name of the build project to use for this build.
- *sourceVersion*: Optional string. A version of the source code to be built, as follows:
  - For Amazon S3, the version ID that corresponds to the version of the input ZIP file you want to build. If *sourceVersion* is not specified, then the latest version is used.
  - For CodeCommit, the commit ID that corresponds to the version of the source code you want to build. If *sourceVersion* is not specified, the default branch's HEAD commit ID is used. (You cannot specify a tag name for *sourceVersion*, but you can specify the tag's commit ID.)
  - For GitHub, the commit ID, pull request ID, branch name, or tag name that corresponds to the version of the source code you want to build. If a pull request ID is specified, it must use the format pr/*pull-request-ID* (for example, pr/25). If a branch name is specified, the branch's HEAD commit ID is used. If *sourceVersion* is not specified, the default branch's HEAD commit ID is used.
  - For Bitbucket, the commit ID, branch name, or tag name that corresponds to the version of the source code you want to build. If a branch name is specified, the branch's HEAD commit ID is used. If *sourceVersion* is not specified, the default branch's HEAD commit ID is used.
- The following placeholders are for *artifactsOverride*.
  - *type*: Optional. The build output artifact type that overrides for this build the one defined in the build project.
  - *location*: Optional. The build output artifact location that overrides for this build the one defined in the build project.
  - *path*: Optional. The build output artifact path that overrides for this build the one defined in the build project.
  - *namespaceType*: Optional. The build output artifact path type that overrides for this build the one defined in the build project.
  - *name*: Optional. The build output artifact name that overrides for this build the one defined in the build project.
  - *packaging*: Optional. The build output artifact packaging type that overrides for this build the one defined in the build project.
- *buildspecOverride*: Optional. A buildspec declaration that overrides for this build the one defined in the build project. If this value is set, it can be either an inline buildspec definition, the path to an alternate buildspec file relative to the value of the built-in CODEBUILD\_SRC\_DIR environment variable, or the path to an S3 bucket. The S3 bucket must be in the same AWS Region as the build project. Specify the buildspec file using its ARN (for example, arn:aws:s3:::<my-codebuild-sample2>/buildspec.yml). If this value is not provided or is set to an empty string, the source code must contain a buildspec.yml file in its root directory. For more information, see [Buildspec file name and storage location \(p. 129\)](#).
- The following placeholders are for *cacheOverride*.
  - *cacheOverride-location*: Optional. The location of a ProjectCache object for this build that overrides the ProjectCache object specified in the build project. *cacheOverride* is optional and takes a ProjectCache object. *location* is required in a ProjectCache object.
  - *cacheOverride-type*: Optional. The type of a ProjectCache object for this build that overrides the ProjectCache object specified in the build project. *cacheOverride* is optional and takes a ProjectCache object. *type* is required in a ProjectCache object.
- *certificateOverride*: Optional. The name of a certificate for this build that overrides the one specified in the build project.
- *environmentTypeOverride*: Optional. A container type for this build that overrides the one specified in the build project. The current valid string is LINUX\_CONTAINER.
- The following placeholders are for *environmentVariablesOverride*.
  - *environmentVariablesOverride-name*: Optional. The name of an environment variable in the build project whose value you want to override for this build.

- *environmentVariablesOverride-type*: Optional. The type of environment variable in the build project whose value you want to override for this build.
- *environmentVariablesValue*: Optional. The value of the environment variable defined in the build project that you want to override for this build.
- *gitCloneDepthOverride*: Optional. The value of the **Git clone depth** in the build project whose value you want to override for this build. If your source type is Amazon S3, this value is not supported.
- *imageOverride*: Optional. The name of an image for this build that overrides the one specified in the build project.
- *idempotencyToken*: Optional. A string that serves as a token to specify that the build request is idempotent. You can choose any string that is 64 characters or less. The token is valid for 5 minutes after the start-build request. If you repeat the start-build request with the same token, but change a parameter, CodeBuild returns a parameter mismatch error.
- *insecureSslOverride*: Optional boolean that specifies whether to override the insecure TLS setting specified in the build project. The insecure TLS setting determines whether to ignore TLS warnings while connecting to the project source code. This override applies only if the build's source is GitHub Enterprise Server.
- *privilegedModeOverride*: Optional boolean. If set to true, the build overrides privileged mode in the build project.
- *queuedTimeoutInMinutesOverride*: Optional integer that specifies the number of minutes a build is allowed to be queued before it times out. Its minimum value is five minutes and its maximum value is 480 minutes (eight hours).
- *reportBuildStatusOverride*: Optional boolean that specifies whether to send your source provider the status of a build's start and completion. If you set this with a source provider other than GitHub, GitHub Enterprise Server, or Bitbucket, an `invalidInputException` is thrown.
- *sourceAuthOverride*: Optional string. An authorization type for this build that overrides the one defined in the build project. This override applies only if the build project's source is Bitbucket or GitHub.
- *sourceLocationOverride*: Optional string. A location that overrides for this build the source location for the one defined in the build project.
- *serviceRoleOverride*: Optional string. The name of a service role for this build that overrides the one specified in the build project.
- *sourceTypeOverride*: Optional string. A source input type for this build that overrides the source input defined in the build project. Valid strings are NO\_SOURCE, CODECOMMIT, CODEPIPELINE, GITHUB, S3, BITBUCKET, and GITHUB\_ENTERPRISE.
- *timeoutInMinutesOverride*: Optional number. The number of build timeout minutes that overrides for this build the one defined in the build project.

We recommend that you store an environment variable with a sensitive value, such as an AWS access key ID, an AWS secret access key, or a password as a parameter in Amazon EC2 Systems Manager Parameter Store. CodeBuild can use a parameter stored in Amazon EC2 Systems Manager Parameter Store only if that parameter's name starts with /CodeBuild/ (for example, /CodeBuild/dockerLoginPassword). You can use the CodeBuild console to create a parameter in Amazon EC2 Systems Manager. Choose **Create a parameter**, and then follow the instructions. (In that dialog box, for **KMS key**, you can optionally specify the ARN of an AWS KMS key in your account. Amazon EC2 Systems Manager uses this key to encrypt the parameter's value during storage and decrypt during retrieval.) If you use the CodeBuild console to create a parameter, the console starts the parameter with /CodeBuild/ as it is being stored. However, if you use the Amazon EC2 Systems Manager Parameter Store console to create a parameter, you must start the parameter's name with /CodeBuild/, and you must set **Type to Secure String**. For more information, see [AWS Systems Manager parameter store](#) and [Walkthrough: Create and test a String parameter \(console\)](#) in the [Amazon EC2 Systems Manager User Guide](#).

If your build project refers to parameters stored in Amazon EC2 Systems Manager Parameter Store, the build project's service role must allow the `ssm:GetParameters` action. If you chose **Create a new service role in your account** earlier, then CodeBuild includes this action in the default service role for your build project automatically. However, if you chose **Choose an existing service role from your account**, then you must include this action in your service role separately.

Environment variables you set replace existing environment variables. For example, if the Docker image already contains an environment variable named `MY_VAR` with a value of `my_value`, and you set an environment variable named `MY_VAR` with a value of `other_value`, then `my_value` is replaced by `other_value`. Similarly, if the Docker image already contains an environment variable named `PATH` with a value of `/usr/local/sbin:/usr/local/bin`, and you set an environment variable named `PATH` with a value of `$PATH:/usr/share/ant/bin`, then `/usr/local/sbin:/usr/local/bin` is replaced by the literal value `$PATH:/usr/share/ant/bin`.

Do not set any environment variable with a name that begins with `CODEBUILD_`. This prefix is reserved for internal use.

If an environment variable with the same name is defined in multiple places, the environment variable's value is determined as follows:

- The value in the start build operation call takes highest precedence.
- The value in the build project definition takes next precedence.
- The value in the buildspec file declaration takes lowest precedence.

For information about valid values for these placeholders, see [Create a build project \(AWS CLI\) \(p. 198\)](#). For a list of the latest settings for a build project, see [View a build project's details \(p. 214\)](#).

5. Switch to the directory that contains the file you just saved, and run the `start-build` command again.

```
aws codebuild start-build --cli-input-json file://start-build.json
```

6. If successful, data similar to that described in the [To run the build \(p. 23\)](#) procedure appears in the output.

To work with detailed information about this build, make a note of the `id` value in the output, and then see [View build details \(AWS CLI\) \(p. 279\)](#).

## Run a batch build (AWS CLI)

1. Run the `start-build-batch` command in one of the following ways:

```
aws codebuild start-build-batch --project-name <project-name>
```

Use this if you want to run a build that uses the latest version of the build input artifact and the build project's existing settings.

```
aws codebuild start-build-batch --generate-cli-skeleton > <json-file>
```

Use this if you want to run a build with an earlier version of the build input artifact or if you want to override the settings for the build output artifacts, environment variables, buildspec, or default build timeout period.

2. If you run the **start-build-batch** command with the `--project-name` option, replace `<project-name>` with the name of the build project, and then skip to step 6 of this procedure. To get a list of build projects, see [View a list of build project names \(p. 213\)](#).
3. If you run the **start-build-batch** command with the `--idempotency-token` option, a unique case-sensitive identifier, or token, is included with the `start-build-batch` request. The token is valid for 5 minutes after the request. If you repeat the `start-build-batch` request with the same token, but change a parameter, CodeBuild returns a parameter mismatch error.
4. If you run the **start-build-batch** command with the `--generate-cli-skeleton` option, JSON-formatted data is output to the `<json-file>` file. This file is similar to the skeleton produced by the **start-build** command, with the addition of the following object. For more information about the common objects, see [Run a build \(AWS CLI\) \(p. 272\)](#).

Modify this file to add any build overrides, and save your results.

```
"buildBatchConfigOverride": {  
    "combineArtifacts": combineArtifacts,  
    "restrictions": {  
        "computeTypesAllowed": [  
            allowedComputeTypes  
        ],  
        "maximumBuildsAllowed": maximumBuildsAllowed  
    },  
    "serviceRole": "batchServiceRole",  
    "timeoutInMins": batchTimeout  
}
```

The `buildBatchConfigOverride` object is a [ProjectBuildBatchConfig](#) structure that contains the batch build configuration overides for this build.

#### *combineArtifacts*

A boolean that specifies if the build artifacts for the batch build should be combined into a single artifact location.

#### *allowedComputeTypes*

An array of strings that specify the compute types that are allowed for the batch build. See [Build environment compute types](#) for these values.

#### *maximumBuildsAllowed*

Specifies the maximum number of builds allowed.

#### *batchServiceRole*

Specifies the service role ARN for the batch build project.

#### *batchTimeout*

Specifies the maximum amount of time, in minutes, that the batch build must be completed in.

5. Switch to the directory that contains the file you just saved, and run the `start-build-batch` command again.

```
aws codebuild start-build-batch --cli-input-json file://start-build.json
```

6. If successful, the JSON representation of a [BuildBatch](#) object appears in the console output. See the [StartBuildBatch Response Syntax](#) for an example of this data.

## Start running builds automatically (AWS CLI)

If your source code is stored in a GitHub or a GitHub Enterprise Server repository, you can use GitHub webhooks to have AWS CodeBuild rebuild your source code whenever a code change is pushed to the repository.

Run the **create-webhook** command as follows:

```
aws codebuild create-webhook --project-name <project-name>
```

<*project-name*> is the name of the build project that contains the source code to be rebuilt.

For GitHub, information similar to the following appears in the output:

```
{  
  "webhook": {  
    "url": "<url>"  
  }  
}
```

<*url*> is the URL to the GitHub webhook.

For GitHub Enterprise Server, information similar to the following appears in the output:

```
{  
  "webhook": {  
    "secret": "YRV4JYAGFsekJiirp5ytx86o2pyhUdySNSDTLNuXoXX1c7aZ6XYdf37-ZFyY02rs4JSE70mLW3w-gh-ryv0VB80SSSC1aAtBtuPktw  
YuncCmndogCVfnI07ukYX2_xM-_n1dma5EngTg_Bi_N465yi33zyTUNpoQ01xcpLO-BvgchcVa91AurnR77-YV1-XCfahwMxf4ubgBSmMT2A16apqjo  
QjOKSbd1xVkyzYtGiuy4n1lAxvf9wN9m76CaCnsdb3fVIET78fpvgf04ixxs06vp06lRTKtPzbyetHbVXGdaP2vnk8lnKmDjoobRtg1m2o2Yr17dwziQlrrvo  
Cohgy1500_7LKFa-nMXFc_F1s1fyAqemB43_o0cdkzbhncE810TrueUCFfmx-A1CumlXvOkg6G77925bpzefrlkhspwIf193_bb_jOHDLnk6101Ppf2  
jIDATZgMlagq7ewlb-axDeTaBop08J6gf11yk05aq9l51z1C1PERUSmgjFTJr_a-Z_L_kylr-4hsqSxaS5NuJ43_X0BRWqT51xqvH-A69bV07kbvT_Kcc6wxk  
SHYCEmoa_Pfa77QgyY68a0ogWj31yfbj1tORN1cDo6-3-McDLoYnrtsSe0V90nxzsGzuINs-220rkJtg_MoflwocfUutXb7vrgTduHlR1dZLxRusHu  
xOVVUDLwm9vhulMr_hukeoq_1kDky4E20FvZxpjYwvtfV-dwxRR_mlfpxu1wyfmt21FLkp_ZYj_4leFckgefrr_i1NaYszsp2xj78Ae1dVolf48AmDn  
2pwsWj1atU9z7942gijsfMakcvuy5yxHxxbbhUyC8NHViESUWPrfqngrMsrbOp3PA4AUCh1piZYuiwl_cac_pIUBoXaur_lu_fyFghg0C7cfTA36  
rv5x5DnfFMBP3HNBe1af9QZ6AiJegPwTHKJON3AUWpkx_hvTXyuAUJ8Md2fPTxb0t6N52THBhsYxr",  
    "payloadUrl": "https://codebuild.us-east-2.amazonaws.com/webhooks?i=eyJlbmNyexB0ZWREYXRhIjoiUmfqMmJERGRQbgwLzNT  
N1d3r0vGRjzOTNlwlz1ZGInZlpIR1e0RsxdzhGeWhnVTFqWTR0WfWt2drJnmRlc3S3RNc0xyMENmncxFtak1c1nSy9PSIsIm12UGFyYw1ldgVvU381  
Yy16IndSo10rc2PQjBCzhhPeVY1lCjXR1cmhbC1GMX0K3d&v=1"  
  }  
}
```

1. Copy the secret key and payload URL from the output. You need them to add a webhook in GitHub Enterprise Server.
2. In GitHub Enterprise Server, choose the repository where your CodeBuild project is stored. Choose **Settings**, choose **Hooks & services**, and then choose **Add webhook**.
3. Enter the payload URL and secret key, accept the defaults for the other fields, and then choose **Add webhook**.

## Stop running builds automatically (AWS CLI)

If your source code is stored in a GitHub or a GitHub Enterprise Server repository, you can set up GitHub webhooks to have AWS CodeBuild rebuild your source code whenever a code change is pushed to the repository. For more information, see [Start running builds automatically \(AWS CLI\) \(p. 278\)](#).

If you have enabled this behavior, you can turn it off by running the **delete-webhook** command as follows:

```
aws codebuild delete-webhook --project-name <project-name>
```

- where <*project-name*> is the name of the build project that contains the source code to be rebuilt.

If this command is successful, no information and no errors appear in the output.

**Note**

This deletes the webhook from your CodeBuild project only. You should also delete the webhook from your GitHub or GitHub Enterprise Server repository.

## Run a build (AWS SDKs)

To use CodePipeline to run a build with AWS CodeBuild, skip these steps and follow the instructions in [Use AWS CodePipeline with AWS CodeBuild to test code and run builds \(p. 392\)](#) instead.

For information about using CodeBuild with the AWS SDKs, see the [AWS SDKs and tools reference \(p. 389\)](#).

## View build details in AWS CodeBuild

You can use the AWS CodeBuild console, AWS CLI, or AWS SDKs to view details about builds managed by CodeBuild.

**Topics**

- [View build details \(console\) \(p. 279\)](#)
- [View build details \(AWS CLI\) \(p. 279\)](#)
- [View build details \(AWS SDKs\) \(p. 280\)](#)
- [Build phase transitions \(p. 280\)](#)

## View build details (console)

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. Do one of the following:
  - In the navigation pane, choose **Build history**. In the list of builds, in the **Build run** column, choose the link for the build.
  - In the navigation pane, choose **Build projects**. In the list of build projects, in the **Name** column, choose the link for the name of the build project. Then, in the list of builds, in the **Build run** column, choose the link for the build.

**Note**

By default, only the 10 most recent builds or build projects are displayed. To view more builds or build projects, choose the gear icon, and then choose a different value for **Builds per page** or **Projects per page** or use the back and forward arrows.

## View build details (AWS CLI)

For more information about using the AWS CLI with AWS CodeBuild, see the [Command line reference \(p. 388\)](#).

Run the **batch-get-builds** command:

```
aws codebuild batch-get-builds --ids ids
```

Replace the following placeholder:

- *ids*: Required string. One or more build IDs to view details about. To specify more than one build ID, separate each build ID with a space. You can specify up to 100 build IDs. To get a list of build IDs, see the following topics:

- [View a list of build IDs \(AWS CLI\) \(p. 282\)](#)
- [View a list of build IDs for a build project \(AWS CLI\) \(p. 284\)](#)

For example, if you run this command:

```
aws codebuild batch-get-builds --ids codebuild-demo-project:e9c4f4df-3f43-41d2-ab3a-60fe2EXAMPLE codebuild-demo-project:815e755f-bade-4a7e-80f0-efe51EXAMPLE my-other-project:813bb6c6-891b-426a-9dd7-6d8a3EXAMPLE
```

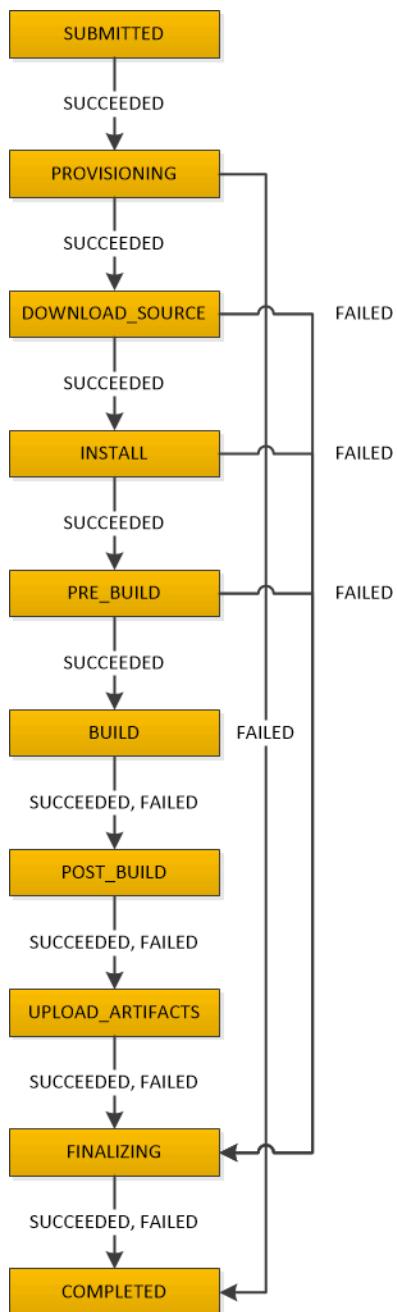
If the command is successful, data similar to that described in [To view summarized build information \(p. 24\)](#) appears in the output.

## View build details (AWS SDKs)

For more information about using AWS CodeBuild with the AWS SDKs, see the [AWS SDKs and tools reference \(p. 389\)](#).

## Build phase transitions

Builds in AWS CodeBuild proceed in phases:



**Important**

The `UPLOAD_ARTIFACTS` phase is always attempted, even if the `BUILD` phase fails.

## View a list of build IDs in AWS CodeBuild

You can use the AWS CodeBuild console, AWS CLI, or AWS SDKs to view a list of build IDs for builds managed by CodeBuild.

### Topics

- [View a list of build IDs \(console\) \(p. 282\)](#)

- [View a list of build IDs \(AWS CLI\) \(p. 282\)](#)
- [View a list of batch build IDs \(AWS CLI\) \(p. 283\)](#)
- [View a list of build IDs \(AWS SDKs\) \(p. 284\)](#)

## View a list of build IDs (console)

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Build history**.

**Note**

By default, only the 10 most recent builds are displayed. To view more builds, choose the gear icon, and then choose a different value for **Builds per page** or use the back and forward arrows.

## View a list of build IDs (AWS CLI)

For more information about using the AWS CLI with CodeBuild, see the [Command line reference \(p. 388\)](#).

- Run the **list-builds** command:

```
aws codebuild list-builds --sort-order sort-order --next-token next-token
```

In the preceding command, replace the following placeholders:

- **sort-order**: Optional string used to indicate how to list the build IDs. Valid values include ASCENDING and DESCENDING.
- **next-token**: Optional string. During a previous run, if there were more than 100 items in the list, only the first 100 items are returned, along with a unique string called *next token*. To get the next batch of items in the list, run this command again, adding the next token to the call. To get all of the items in the list, keep running this command with each subsequent next token, until no more next tokens are returned.

For example, if you run this command:

```
aws codebuild list-builds --sort-order ASCENDING
```

A result similar to the following might appear in the output:

```
{  
    "nextToken": "4AEA6u7J...The full token has been omitted for brevity...MzY20A==",  
    "ids": [  
        "codebuild-demo-project:815e755f-bade-4a7e-80f0-efe51EXAMPLE",  
        "codebuild-demo-project:84a7f3d1-d40e-4956-b4cf-7a9d4EXAMPLE",  
        ... The full list of build IDs has been omitted for brevity ...  
        "codebuild-demo-project:931d0b72-bf6f-4040-a472-5c707EXAMPLE"  
    ]  
}
```

If you run this command again:

```
aws codebuild list-builds --sort-order ASCENDING --next-token 4AEA6u7J...The full token  
has been omitted for brevity...MzY20A==
```

A result similar to the following might appear in the output:

```
{  
  "ids": [  
    "codebuild-demo-project:49015049-21cf-4b50-9708-df115EXAMPLE",  
    "codebuild-demo-project:543e7206-68a3-46d6-a4da-759abEXAMPLE",  
    ... The full list of build IDs has been omitted for brevity ...  
    "codebuild-demo-project:c282f198-4582-4b38-bdc0-26f96EXAMPLE"  
  ]  
}
```

## View a list of batch build IDs (AWS CLI)

For more information about using the AWS CLI with CodeBuild, see the [Command line reference \(p. 388\)](#).

- Run the **list-build-batches** command:

```
aws codebuild list-build-batches --sort-order sort-order --next-token next-token
```

In the preceding command, replace the following placeholders:

- sort-order***: Optional string used to indicate how to list the batch build IDs. Valid values include ASCENDING and DESCENDING.
- next-token***: Optional string. During a previous run, if there were more than 100 items in the list, only the first 100 items are returned, along with a unique string called *next token*. To get the next batch of items in the list, run this command again, adding the next token to the call. To get all of the items in the list, keep running this command with each subsequent next token, until no more next tokens are returned.

For example, if you run this command:

```
aws codebuild list-build-batches --sort-order ASCENDING
```

A result similar to the following might appear in the output:

```
{  
  "nextToken": "4AEA6u7J...The full token has been omitted for brevity...MzY20A==",  
  "ids": [  
    "codebuild-demo-project:815e755f-bade-4a7e-80f0-efe51EXAMPLE",  
    "codebuild-demo-project:84a7f3d1-d40e-4956-b4cf-7a9d4EXAMPLE",  
    ... The full list of build IDs has been omitted for brevity ...  
    "codebuild-demo-project:931d0b72-bf6f-4040-a472-5c707EXAMPLE"  
  ]  
}
```

If you run this command again:

```
aws codebuild list-build-batches --sort-order ASCENDING --next-token 4AEA6u7J...The full token has been omitted for brevity...MzY20A==
```

A result similar to the following might appear in the output:

```
{  
    "ids": [  
        "codebuild-demo-project:49015049-21cf-4b50-9708-df115EXAMPLE",  
        "codebuild-demo-project:543e7206-68a3-46d6-a4da-759abEXAMPLE",  
        ... The full list of build IDs has been omitted for brevity ...  
        "codebuild-demo-project:c282f198-4582-4b38-bdc0-26f96EXAMPLE"  
    ]  
}
```

## View a list of build IDs (AWS SDKs)

For more information about using CodeBuild with the AWS SDKs, see the [AWS SDKs and tools reference \(p. 389\)](#).

## View a list of build IDs for a build project in AWS CodeBuild

You can use the AWS CodeBuild console, AWS CLI, or AWS SDKs to view a list of build IDs for a build project in CodeBuild.

### Topics

- [View a list of build IDs for a build project \(console\) \(p. 284\)](#)
- [View a list of build IDs for a build project \(AWS CLI\) \(p. 284\)](#)
- [View a list of batch build IDs for a build project \(AWS CLI\) \(p. 285\)](#)
- [View a list of build IDs for a build project \(AWS SDKs\) \(p. 286\)](#)

## View a list of build IDs for a build project (console)

1. Open the CodeBuild console at <https://console.aws.amazon.com/codebuild/>.
2. In the navigation pane, choose **Build projects**. In the list of build projects, in the **Name** column, choose the build project.

### Note

By default, only the most recent 100 builds or build projects are displayed. To view more builds or build projects, choose the gear icon, and then choose a different value for **Builds per page** or **Projects per page** or use the back and forward arrows.

## View a list of build IDs for a build project (AWS CLI)

For more information about using the AWS CLI with AWS CodeBuild, see the [Command line reference \(p. 388\)](#).

Run the **list-builds-for-project** command, as follows:

```
aws codebuild list-builds-for-project --project-name project-name --sort-order sort-order  
--next-token next-token
```

In the preceding command, replace the following placeholders:

- ***project-name***: Required string used to indicate the name of the build project to list builds IDs for. To get a list of build projects, see [View a list of build project names \(AWS CLI\) \(p. 213\)](#).

- **sort-order**: Optional string used to indicate how to list the build IDs. Valid values include ASCENDING and DESCENDING.
- **next-token**: Optional string. During a previous run, if there were more than 100 items in the list, only the first 100 items are returned, along with a unique string called *next token*. To get the next batch of items in the list, run this command again, adding the next token to the call. To get all of the items in the list, keep running this command with each subsequent next token that is returned, until no more next tokens are returned.

For example, if you run this command similar to this:

```
aws codebuild list-builds-for-project --project-name codebuild-demo-project --sort-order ASCENDING
```

A result like the following might appear in the output:

```
{  
  "nextToken": "4AEA6u7J...The full token has been omitted for brevity...MzY20A==",  
  "ids": [  
    "codebuild-demo-project:9b175d16-66fd-4e71-93a0-50a08EXAMPLE"  
    "codebuild-demo-project:a9d1bd09-18a2-456b-8a36-7d65aEXAMPLE"  
    ... The full list of build IDs has been omitted for brevity ...  
    "codebuild-demo-project:fe70d102-c04f-421a-9cfa-2dc15EXAMPLE"  
  ]  
}
```

If you run this command again:

```
aws codebuild list-builds-for-project --project-name codebuild-demo-project --sort-order ASCENDING --next-token 4AEA6u7J...The full token has been omitted for brevity...MzY20A==
```

You might see a result like the following in the output:

```
{  
  "ids": [  
    "codebuild-demo-project:98253670-7a8a-4546-b908-dc890EXAMPLE"  
    "codebuild-demo-project:ad5405b2-1ab3-44df-ae2d-fba84EXAMPLE"  
    ... The full list of build IDs has been omitted for brevity ...  
    "codebuild-demo-project:f721a282-380f-4b08-850a-e0ac1EXAMPLE"  
  ]  
}
```

## View a list of batch build IDs for a build project (AWS CLI)

For more information about using the AWS CLI with AWS CodeBuild, see the [Command line reference \(p. 388\)](#).

Run the **list-build-batches-for-project** command, as follows:

```
aws codebuild list-build-batches-for-project --project-name project-name --sort-order sort-order --next-token next-token
```

In the preceding command, replace the following placeholders:

- **project-name**: Required string used to indicate the name of the build project to list builds IDs for. To get a list of build projects, see [View a list of build project names \(AWS CLI\) \(p. 213\)](#).

- **sort-order**: Optional string used to indicate how to list the build IDs. Valid values include ASCENDING and DESCENDING.
- **next-token**: Optional string. During a previous run, if there were more than 100 items in the list, only the first 100 items are returned, along with a unique string called *next token*. To get the next batch of items in the list, run this command again, adding the next token to the call. To get all of the items in the list, keep running this command with each subsequent next token that is returned, until no more next tokens are returned.

For example, if you run this command similar to this:

```
aws codebuild list-build-batches-for-project --project-name codebuild-demo-project --sort-order ASCENDING
```

A result like the following might appear in the output:

```
{  
  "nextToken": "4AEA6u7J...The full token has been omitted for brevity...MzY20A==",  
  "ids": [  
    "codebuild-demo-project:9b175d16-66fd-4e71-93a0-50a08EXAMPLE"  
    "codebuild-demo-project:a9d1bd09-18a2-456b-8a36-7d65aEXAMPLE"  
    ... The full list of build IDs has been omitted for brevity ...  
    "codebuild-demo-project:fe70d102-c04f-421a-9cfa-2dc15EXAMPLE"  
  ]  
}
```

If you run this command again:

```
aws codebuild list-build-batches-for-project --project-name codebuild-demo-project  
--sort-order ASCENDING --next-token 4AEA6u7J...The full token has been omitted for brevity...MzY20A==
```

You might see a result like the following in the output:

```
{  
  "ids": [  
    "codebuild-demo-project:98253670-7a8a-4546-b908-dc890EXAMPLE"  
    "codebuild-demo-project:ad5405b2-1ab3-44df-ae2d-fba84EXAMPLE"  
    ... The full list of build IDs has been omitted for brevity ...  
    "codebuild-demo-project:f721a282-380f-4b08-850a-e0ac1EXAMPLE"  
  ]  
}
```

## View a list of build IDs for a build project (AWS SDKs)

For more information about using AWS CodeBuild with the AWS SDKs, see the [AWS SDKs and tools reference \(p. 389\)](#).

## Stop a build in AWS CodeBuild

You can use the AWS CodeBuild console, AWS CLI, or AWS SDKs to stop a build in AWS CodeBuild.

### Topics

- [Stop a build \(console\) \(p. 287\)](#)
- [Stop a build \(AWS CLI\) \(p. 287\)](#)
- [Stop a build \(AWS SDKs\) \(p. 287\)](#)

## Stop a build (console)

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. Do one of the following:
  - If the ***build-project-name:build-ID*** page is displayed, choose **Stop build**.
  - In the navigation pane, choose **Build history**. In the list of builds, select the box for the build, and then choose **Stop build**.
  - In the navigation pane, choose **Build projects**. In the list of build projects, in the **Name** column, choose the link for the build project's name. In the list of builds, select the box for the build, and then choose **Stop build**.

### Note

By default, only the most recent 100 builds or build projects are displayed. To view more builds or build projects, choose the gear icon, and then choose a different value for **Builds per page** or **Projects per page** or use the back and forward arrows.

If AWS CodeBuild cannot successfully stop a build (for example, if the build process is already complete), the **Stop** button is disabled or might not appear.

## Stop a build (AWS CLI)

- Run the **stop-build** command:

```
aws codebuild stop-build --id id
```

In the preceding command, replace the following placeholder:

- *id*: Required string. The ID of the build to stop. To get a list of build IDs, see the following topics:
  - [View a list of build IDs \(AWS CLI\) \(p. 282\)](#)
  - [View a list of build IDs for a build project \(AWS CLI\) \(p. 284\)](#)

If AWS CodeBuild successfully stops the build, the `buildStatus` value in the `build` object in the output is `STOPPED`.

If CodeBuild cannot successfully stop the build (for example, if the build is already complete), the `buildStatus` value in the `build` object in the output is the final build status (for example, `SUCCEEDED`).

## Stop a build (AWS SDKs)

For more information about using AWS CodeBuild with the AWS SDKs, see the [AWS SDKs and tools reference \(p. 389\)](#).

## Stop a batch build in AWS CodeBuild

You can use the AWS CodeBuild console, AWS CLI, or AWS SDKs to stop a batch build in AWS CodeBuild.

### Topics

- [Stop a batch build \(console\) \(p. 288\)](#)
- [Stop a batch build \(AWS CLI\) \(p. 288\)](#)
- [Stop a batch build \(AWS SDKs\) \(p. 288\)](#)

## Stop a batch build (console)

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. Do one of the following:
  - If the ***build-project-name:build-ID*** page is displayed, choose **Stop build**.
  - In the navigation pane, choose **Build history**. In the list of builds, select the box for the build, and then choose **Stop build**.
  - In the navigation pane, choose **Build projects**. In the list of build projects, in the **Name** column, choose the link for the build project's name. In the list of builds, select the box for the build, and then choose **Stop build**.

### Note

By default, only the most recent 100 builds or build projects are displayed. To view more builds or build projects, choose the gear icon, and then choose a different value for **Builds per page** or **Projects per page** or use the back and forward arrows.

If AWS CodeBuild cannot successfully stop a batch build (for example, if the build process is already complete), the **Stop build** button is disabled.

## Stop a batch build (AWS CLI)

- Run the [stop-build-batch](#) command:

```
aws codebuild stop-build-batch --id <batch-build-id>
```

In the preceding command, replace the following placeholder:

- **<batch-build-id>**: Required string. The identifier of the batch build to stop. To get a list of batch build identifiers, see the following topics:
  - [View a list of batch build IDs \(AWS CLI\) \(p. 283\)](#)
  - [View a list of batch build IDs for a build project \(AWS CLI\) \(p. 285\)](#)

If AWS CodeBuild successfully stops the batch build, the `buildBatchStatus` value in the `buildBatch` object in the output is `STOPPED`.

If CodeBuild cannot successfully stop the batch build (for example, if the batch build is already complete), the `buildBatchStatus` value in the `buildBatch` object in the output is the final build status (for example, `SUCCEEDED`).

## Stop a batch build (AWS SDKs)

For more information about using AWS CodeBuild with the AWS SDKs, see the [AWS SDKs and tools reference \(p. 389\)](#).

## Retry a build in AWS CodeBuild

You can use the AWS CodeBuild console, AWS CLI, or AWS SDKs to retry either a single build or a batch build in AWS CodeBuild.

### Topics

- [Retry a build \(console\) \(p. 289\)](#)
- [Retry a build \(AWS CLI\) \(p. 289\)](#)

- [Retry a build \(AWS SDKs\) \(p. 289\)](#)

## Retry a build (console)

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. Do one of the following:
  - If the ***build-project-name:build-ID*** page is displayed, choose **Retry build**.
  - In the navigation pane, choose **Build history**. In the list of builds, select the box for the build, and then choose **Retry build**.
  - In the navigation pane, choose **Build projects**. In the list of build projects, in the **Name** column, choose the link for the build project's name. In the list of builds, select the box for the build, and then choose **Retry build**.

### Note

By default, only the most recent 100 builds or build projects are displayed. To view more builds or build projects, choose the gear icon, and then choose a different value for **Builds per page** or **Projects per page** or use the back and forward arrows.

## Retry a build (AWS CLI)

- Run the **retry-build** command:

```
aws codebuild retry-build --id <build-id> --idempotency-token <idempotencyToken>
```

In the preceding command, replace the following placeholder:

- **<build-id>**: Required string. The ID of the build or batch build to retry. To get a list of build IDs, see the following topics:
  - [View a list of build IDs \(AWS CLI\) \(p. 282\)](#)
  - [View a list of batch build IDs \(AWS CLI\) \(p. 283\)](#)
  - [View a list of build IDs for a build project \(AWS CLI\) \(p. 284\)](#)
  - [View a list of batch build IDs for a build project \(AWS CLI\) \(p. 285\)](#)
- **--idempotency-token**: Optional. If you run the **retry-build** command with the option, a unique case-sensitive identifier, or token, is included with the **retry-build** request. The token is valid for 5 minutes after the request. If you repeat the **retry-build** request with the same token, but change a parameter, CodeBuild returns a parameter mismatch error.

## Retry a build (AWS SDKs)

For more information about using AWS CodeBuild with the AWS SDKs, see the [AWS SDKs and tools reference \(p. 389\)](#).

## View a running build in Session Manager

In AWS CodeBuild, you can pause a running build and then use AWS Systems Manager Session Manager to connect to the build container and view the state of the container.

### Note

This feature is not available in Windows environments.

### Topics

- [Prerequisites \(p. 290\)](#)
- [Pause the build \(p. 291\)](#)
- [Start the build \(p. 291\)](#)
- [Connect to the build container \(p. 292\)](#)
- [Resume the build \(p. 292\)](#)

## Prerequisites

To allow Session Manager to be used with the build session, you must enable session connection for the build. There are two prerequisites:

- CodeBuild Linux standard curated images already have the SSM agent installed and the SSM agent ContainerMode enabled.

If you are using a custom image for your build, do the following:

1. Install the SSM Agent. For more information, see [Manually install SSM Agent on EC2 instances for Linux](#) in the AWS Systems Manager User Guide. The SSM Agent version must be 3.0.1295.0 or later.
2. Copy the file <https://github.com/aws/aws-codebuild-docker-images/blob/master/ubuntu/standard/5.0/amazon-ssm-agent.json> to the /etc/amazon/ssm/ directory in your image. This enables Container Mode in the SSM agent.

### Note

Custom images would require most updated SSM agent for this feature to work as expected.

- The CodeBuild service role must have the following SSM policy:

```
{  
    "Effect": "Allow",  
    "Action": [  
        "ssmmessages:CreateControlChannel",  
        "ssmmessages:CreateDataChannel",  
        "ssmmessages:OpenControlChannel",  
        "ssmmessages:OpenDataChannel"  
    ],  
    "Resource": "*"  
}
```

You can have the CodeBuild console automatically attach this policy to your service role when you start the build. Alternatively, you can attach this policy to your service role manually.

- If you have **Auditing and logging session activity** enabled in Systems Manager preferences, the CodeBuild service role must also have additional permissions. The permissions are different, depending on where the logs are stored.

### CloudWatch Logs

If using CloudWatch Logs to store your logs, add the following permission to the CodeBuild service role:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "logs:DescribeLogGroups",  
            "Resource": "arn:aws:logs:<region-id>:<account-id>:log-group:*:*"  
        }  
    ]  
}
```

```
        },
        {
            "Effect": "Allow",
            "Action": [
                "logs:CreateLogStream",
                "logs:PutLogEvents"
            ],
            "Resource": "arn:aws:logs:<region-id>:<account-id>:log-group:<log-group-name>:/*"
        }
    ]
}
```

### Amazon S3

If using Amazon S3 to store your logs, add the following permission to the CodeBuild service role:

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "s3:GetEncryptionConfiguration",
                "s3:PutObject"
            ],
            "Resource": [
                "arn:aws:s3:::<bucket-name>",
                "arn:aws:s3:::<bucket-name>/*"
            ]
        }
    ]
}
```

For more information, see [Auditing and logging session activity](#) in the *AWS Systems Manager User Guide*.

## Pause the build

To pause the build, insert the **codebuild-breakpoint** command in any of the build phases in your buildspec file. The build will be paused at this point, which allows you to connect to the build container and view the container in its current state.

For example, add the following to the build phases in your buildspec file.

```
phases:
  pre_build:
    commands:
      - echo Entered the pre_build phase...
      - echo "Hello World" > /tmp/hello-world
      - codebuild-breakpoint
```

This code creates the /tmp/hello-world file and then pauses the build at this point.

## Start the build

To allow Session Manager to be used with the build session, you must enable session connections for the build. To do this, when starting the build, follow these steps:

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.

2. In the navigation pane, choose **Build projects**. Choose the build project, and then choose **Start build with overrides**.
3. Choose **Advanced build overrides**.
4. In the **Environment** section, choose the **Enable session connection** option. If this option is not selected, all of the `codebuild-breakpoint` and `codebuild-resume` commands are ignored.
5. In the **Environment** section, choose the **Allow AWS CodeBuild to modify this service role so it can be used with this build project** option to allow the CodeBuild console to automatically attach the session manager policy to your service role. If you have already added the session manager policy to your role, you do not need to select this option.
6. Make any other desired changes, and choose **Start build**.
7. Monitor the build status in the console. When the session is available, the **AWS Session Manager** link appears in the **Build status** section.

## Connect to the build container

You can connect to the build container in one of two ways:

CodeBuild console

In a web browser, open the **AWS Session Manager** link to connect to the build container. A terminal session opens that allows you to browse and control the build container.

AWS CLI

### Note

Your local machine must have the Session Manager plugin installed for this procedure. For more information, see [Install the Session Manager Plugin for the AWS CLI](#) in the AWS Systems Manager User Guide.

1. Call the **batch-get-builds** api with the build ID to get information about the build, including the session target identifier. The session target identifier property name varies depending on the output type of the aws command. This is why `--output json` is added to the command.

```
aws codebuild batch-get-builds --ids <buildID> --region <region> --output json
```

2. Copy the `sessionTarget` property value. The `sessionTarget` property name can vary depending on the output type of the aws command. This is why `--output json` is added to the command in the previous step.
3. Use the following command to connect to the build container.

```
aws ssm start-session --target <sessionTarget> --region <region>
```

For this example, verify that the `/tmp/hello-world` file exists and contains the text Hello World.

## Resume the build

After you finish examining the build container, issue the **codebuild-resume** command from the container shell.

```
$ codebuild-resume
```

## Delete builds in AWS CodeBuild

You can use the AWS CLI or the AWS SDKs to delete builds in AWS CodeBuild.

## Delete builds (AWS CLI)

Run the `batch-delete-builds` command:

```
aws codebuild batch-delete-builds --ids ids
```

In the preceding command, replace the following placeholder:

- *ids*: Required string. The IDs of the builds to delete. To specify multiple builds, separate each build ID with a space. To get a list of build IDs, see the following topics:
  - [View a list of build IDs \(AWS CLI\) \(p. 282\)](#)
  - [View a list of build IDs for a build project \(AWS CLI\) \(p. 284\)](#)

If successful, a `buildsDeleted` array appears in the output, containing the Amazon Resource Name (ARN) of each build that was successfully deleted. Information about builds that were not successfully deleted appears in output within a `buildsNotDeleted` array.

For example, if you run this command:

```
aws codebuild batch-delete-builds --ids my-demo-build-project:f8b888d2-5e1e-4032-8645-b115195648EX my-other-demo-build-project:a18bc6ee-e499-4887-b36a-8c90349c7eEX
```

Information similar to the following appears in the output:

```
{  
  "buildsNotDeleted": [  
    {  
      "id": "arn:aws:codebuild:us-west-2:123456789012:build/my-demo-build-project:f8b888d2-5e1e-4032-8645-b115195648EX",  
      "statusCode": "BUILD_IN_PROGRESS"  
    }  
  ],  
  "buildsDeleted": [  
    "arn:aws:codebuild:us-west-2:123456789012:build/my-other-demo-build-project:a18bc6ee-e499-4887-b36a-8c90349c7eEX"  
  ]  
}
```

## Delete builds (AWS SDKs)

For information about using AWS CodeBuild with the AWS SDKs, see the [AWS SDKs and tools reference \(p. 389\)](#).

# Working with test reporting in AWS CodeBuild

You can create reports in CodeBuild that contain details about tests that are run during builds. You can create tests such as unit tests, configuration tests, and functional tests.

The following test report file formats are supported:

- Cucumber JSON (.json)
- JUnit XML (.xml)
- NUnit XML (.xml)
- NUnit3 XML (.xml)
- TestNG XML (.xml)
- Visual Studio TRX (.trx)

**Note**

The latest supported version of `cucumber-js` is 7.3.2.

Create your test cases with any test framework that can create report files in one of these formats (for example, Surefire JUnit plugin, TestNG, or Cucumber).

To create a test report, you add a report group name to the `buildspec` file of a build project with information about your test cases. When you run the build project, the test cases are run and a test report is created. You do not need to create a report group before you run your tests. If you specify a report group name, CodeBuild creates a report group for you when you run your reports. If you want to use a report group that already exists, you specify its ARN in the `buildspec` file.

You can use a test report to help troubleshoot a problem during a build run. If you have many test reports from multiple builds of a build project, you can use your test reports to view trends and test and failure rates to help you optimize builds.

A report expires 30 days after it was created. You cannot view an expired test report. If you want to keep test reports for more than 30 days, you can export your test results' raw data files to an Amazon S3 bucket. Exported test files do not expire. Information about the S3 bucket is specified when you create the report group.

**Note**

The CodeBuild service role specified in the project is used for permissions to upload to the S3 bucket.

**Topics**

- [Create a test report \(p. 295\)](#)
- [Working with report groups \(p. 295\)](#)
- [Working with reports \(p. 310\)](#)
- [Working with test report permissions \(p. 311\)](#)
- [View test reports \(p. 313\)](#)

- [Test reporting with test frameworks \(p. 314\)](#)
- [Code coverage reports \(p. 318\)](#)

## Create a test report

To create a test report, you run a build project that is configured with one to five report groups in its buildspec file. A test report is created during the run. It contains the results of the test cases that are specified for the report groups. A new test report is generated for each subsequent build that uses the same buildspec file.

### To create a test report

1. Create a build project. For information, see [Create a build project in AWS CodeBuild \(p. 187\)](#).
2. Configure the buildspec file of your project with test report information:
  - a. Add a `reports:` section and specify either the ARN of an existing report group, or the name of a report group.

If you specify an ARN, CodeBuild uses that report group.

If you specify a name, CodeBuild creates a report group for you using your project name, and the name you specified, in the format `<project-name>-<report-group-name>`. If the named report group already exists, CodeBuild uses that report group.
  - b. Under the report group, specify the location of the files that contain the test results. If you use more than one report group, specify test result file locations for each one. A new test report is created each time your build project runs. For more information, see [Specify test files \(p. 301\)](#).
  - c. In the `commands` section of the build or `post_build` sequence, specify the commands that run the test cases you specified for your report groups. For more information, see [Specify test commands \(p. 302\)](#).

The following is an example of a buildspec `reports` section:

```
reports:  
  php-reports:  
    files:  
      - "reports/php/*.xml"  
    file-format: "JUNITXML"  
  nunit-reports:  
    files:  
      - "reports/nunit/*.xml"  
    file-format: "NUNITXML"
```

3. Run a build of the build project. For more information, see [Run a build in AWS CodeBuild \(p. 271\)](#).
4. When the build is complete, choose the new build run from **Build history** on your project page. Choose **Reports** to view the test report. For more information, see [View test reports for a build \(p. 313\)](#).

## Working with report groups

A *report group* contains test reports and specifies shared settings. You use the buildspec file to specify the test cases to run and the commands to run them when it builds. For each report group configured in a build project, a run of the build project creates a test report. Multiple runs of a build project configured

with a report group create multiple test reports in that report group, each with results of the same test cases specified for that report group.

The test cases are specified for a report group in the buildspec file of a build project. You can specify up to five report groups in one build project. When you run a build, all the test cases run. A new test report is created with the results of each test case specified for a report group. Each time you run a new build, the test cases run and a new test report is created with the new test results.

Report groups can be used in more than one build project. All test reports created with one report group share the same configuration, such as its export option and permissions, even if the test reports are created using different build projects. Test reports created with one report group in multiple build projects can contain the results from running different sets of test cases (one set of test cases for each build project). This is because you can specify different test case files for the report group in each project's buildspec file. You can also change the test case files for a report group in a build project by editing its buildspec file. Subsequent build runs create new test reports that contain the results of the test case files in the updated buildspec.

#### Topics

- [Create a report group \(p. 296\)](#)
- [Update a report group \(p. 299\)](#)
- [Specify test files \(p. 301\)](#)
- [Specify test commands \(p. 302\)](#)
- [Report group naming \(p. 302\)](#)
- [Tagging report groups in AWS CodeBuild \(p. 303\)](#)
- [Working with shared report groups \(p. 306\)](#)

## Create a report group

You can use the CodeBuild console, the AWS CLI, or a buildspec file to create a report group. Your IAM role must have the permissions required to create a report group. For more information, see [Working with test report permissions \(p. 311\)](#).

#### Topics

- [Create a report group \(buildspec\) \(p. 296\)](#)
- [Create a report group \(console\) \(p. 297\)](#)
- [Create a report group \(CLI\) \(p. 298\)](#)
- [Create a report group \(AWS CloudFormation\) \(p. 299\)](#)

## Create a report group (buildspec)

A report group created using the buildspec does not export raw test result files. You can view your report group and specify export settings. For more information, see [Update a report group \(p. 299\)](#).

#### To create a report group using a buildspec file

1. Choose a report group name that is not associated with a report group in your AWS account.
2. Configure the reports section of the buildspec file with this name. In this example, the report group name is new-report-group and the test cases are created with the JUnit framework:

```
reports:
```

```
new-report-group: #surefire junit reports
  files:
    - '**/*'
  base-directory: 'surefire/target/surefire-reports'
```

For more information, see [Specify test files \(p. 301\)](#) and [Reports syntax in the buildspec file](#).

3. In the commands section, specify the command to run your tests. For more information, see [Specify test commands \(p. 302\)](#).
4. Run the build. When the build is complete, a new report group is created with a name that uses the format project-name-report-group-name. For more information, see [Report group naming \(p. 302\)](#).

## Create a report group (console)

### To create a test report

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Report groups**.
3. Choose **Create report group**.
4. For **Report group name**, enter a name for your report group.
5. (Optional) For **Tags**, enter the name and value of any tags that you want supporting AWS services to use. Use **Add row** to add a tag. You can add up to 50 tags.
6. If you want to upload the raw data of your test report results to an Amazon S3 bucket:
  - a. Select **Export to Amazon S3**.
  - b. For **S3 bucket name**, enter the name of the S3 bucket.
  - c. (Optional) For **S3 bucket owner**, enter the AWS account identifier of the account that owns the S3 bucket. This allows report data to be exported to an Amazon S3 bucket that is owned by an account other than the account running the build.
  - d. For **Path prefix**, enter the path in your S3 bucket where you want to upload your test results.
  - e. Select **Compress test result data in a zip file** to compress your raw test result data files.
  - f. Expand **Additional configuration** to display encryption options. Choose one of the following:
    - **Default AWS managed key** to use a AWS managed key for Amazon S3. For more information, see [Customer managed CMKs](#) in the *AWS Key Management Service User Guide*. This is the default encryption option.
    - **Choose a custom key** to use a customer managed key that you create and configure. For **AWS KMS encryption key**, enter the ARN of your encryption key. Its format is `arn:aws:kms:<region-id>: <aws-account-id>:key/<key-id>`. For more information, see [Creating KMS keys](#) in the *AWS Key Management Service User Guide*.
    - **Disable artifact encryption** to disable encryption. You might choose this if you want to share your test results, or publish them to a static website. (A dynamic website can run code to decrypt test results.)

For more information about encryption of data at rest, see [Data encryption \(p. 338\)](#).

### Note

The CodeBuild service role specified in the project is used for permissions to upload to the S3 bucket.

7. Choose **Create report group**.

## Create a report group (CLI)

### To create a report group

1. Create a file named `CreateReportGroup.json`.
2. Depending on your requirements, copy one of the following JSON code snippets into `CreateReportGroup.json`:
  - Use the following JSON to specify that your test report group exports raw test result files to an Amazon S3 bucket.

```
{  
  "name": "<report-name>",  
  "type": "TEST",  
  "exportConfig": {  
    "exportConfigType": "S3",  
    "s3Destination": {  
      "bucket": "<bucket-name>",  
      "bucketOwner": "<bucket-owner>",  
      "path": "<path>",  
      "packaging": "NONE | ZIP",  
      "encryptionDisabled": "false",  
      "encryptionKey": "<your-key>"  
    },  
    "tags": [  
      {  
        "key": "tag-key",  
        "value": "tag-value"  
      }  
    ]  
  }  
}
```

- Replace `<bucket-name>` with your Amazon S3 bucket name and `<path>` with the path in your bucket to where you want to export the files.
- If you want to compress the exported files, for packaging, specify ZIP. Otherwise, specify NONE.
- `bucketOwner` is optional and is only required if the Amazon S3 bucket is owned by an account other than the account running the build.
- Use `encryptionDisabled` to specify whether to encrypt the exported files. If you encrypt the exported files, enter your customer managed key. For more information, see [Update a report group \(p. 299\)](#).
- Use the following JSON to specify that your test report does not export raw test files:

```
{  
  "name": "<report-name>",  
  "type": "TEST",  
  "exportConfig": {  
    "exportConfigType": "NO_EXPORT"  
  }  
}
```

#### Note

The CodeBuild service role specified in the project is used for permissions to upload to the S3 bucket.

3. Run the following command:

```
aws codebuild create-report-group --cli-input-json file://CreateReportGroupInput.json
```

## Create a report group (AWS CloudFormation)

### To create a test report using the AWS CloudFormation template

You can use an AWS CloudFormation template file to create and provision a report group. For more information, see [AWS CloudFormation User Guide](#).

The following AWS CloudFormation YAML template creates a report group that does not export raw test result files.

```
Resources:  
  CodeBuildReportGroup:  
    Type: AWS::CodeBuild::ReportGroup  
    Properties:  
      Name: my-report-group-name  
      Type: TEST  
      ExportConfig:  
        ExportConfigType: NO_EXPORT
```

The following AWS CloudFormation YAML template creates a report group that exports raw test result files to an Amazon S3 bucket.

```
Resources:  
  CodeBuildReportGroup:  
    Type: AWS::CodeBuild::ReportGroup  
    Properties:  
      Name: my-report-group-name  
      Type: TEST  
      ExportConfig:  
        ExportConfigType: S3  
        S3Destination:  
          Bucket: my-s3-bucket-name  
          Path: path-to-folder-for-exported-files  
          Packaging: ZIP  
          EncryptionKey: my-KMS-encryption-key  
          EncryptionDisabled: false
```

### Note

The CodeBuild service role specified in the project is used for permissions to upload to the S3 bucket.

## Update a report group

When you update a report group, you can specify information about whether to export the raw test result data to files in an Amazon S3 bucket. If you choose to export to an S3 bucket, you can specify the following for your report group:

- Whether the raw test results files are compressed in a ZIP file.
- Whether the raw test result files are encrypted. You can specify encryption with one of the following:
  - An AWS managed key for Amazon S3.
  - A customer managed key that you create and configure.

For more information, see [Data encryption \(p. 338\)](#).

If you use the AWS CLI to update a report group, you can also update or add tags. For more information, see [Tagging report groups in AWS CodeBuild \(p. 303\)](#).

**Note**

The CodeBuild service role specified in the project is used for permissions to upload to the S3 bucket.

**Topics**

- [Update a report group \(console\) \(p. 300\)](#)
- [Update a report group \(CLI\) \(p. 300\)](#)

## Update a report group (console)

### To update a report group

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Report groups**.
3. Choose the report group you want to update.
4. Choose **Edit**.
5. Select or clear **Backup to Amazon S3**. If you selected this option, specify your export settings:
  - a. For **S3 bucket name**, enter the name of the S3 bucket.
  - b. For **Path prefix**, enter the path in your S3 bucket where you want to upload your test results.
  - c. Select **Compress test result data in a zip file** to compress your raw test result data files.
  - d. Expand **Additional configuration** to display encryption options. Choose one of the following:
    - **Default AWS managed key** to use a AWS managed key for Amazon S3. For more information, see [Customer managed CMKs](#) in the *AWS Key Management Service User Guide*. This is the default encryption option.
    - **Choose a custom key** to use a customer managed key that you create and configure. For **AWS KMS encryption key**, enter the ARN of your encryption key. Its format is `arn:aws:kms:<region-id>: <aws-account-id>:key/<key-id>`. For more information, see [Creating KMS keys](#) in the *AWS Key Management Service User Guide*.
    - **Disable artifact encryption** to disable encryption. You might choose this if you want to share your test results, or publish them to a static website. (A dynamic website can run code to decrypt test results.)

## Update a report group (CLI)

### To update a report group

1. Create a file named `UpdateReportGroupInput.json`.
2. Copy the following into `UpdateReportGroupInput.json`:

```
{  
    "arn": "",  
    "exportConfig": {  
        "exportConfigType": "S3",  
        "s3Destination": {  
            "bucket": "bucket-name",  
            "path": "path",  
            "packaging": "NONE | ZIP",  
            "encryptionDisabled": "false",  
            "kmsKeyArn": ""  
        }  
    }  
}
```

```
        "encryptionKey": "your-key"
    }
},
"tags": [
{
    "key": "tag-key",
    "value": "tag-value"
}
]
```

3. Enter the ARN of your report group in the `arn` line (for example, `"arn":"arn:aws:codebuild:region:123456789012:report-group/report-group-1"`).
4. Update `UpdateReportGroupInput.json` with the updates you want to apply to your report group.
  - If you want to update your report group to export raw test result files to an S3 bucket, update the `exportConfig` section. Replace `bucket-name` with your S3 bucket name and path with the path in your S3 bucket that you want to export the files to. If you want to compress the exported files, for packaging, specify ZIP. Otherwise, specify NONE. Use `encryptionDisabled` to specify whether to encrypt the exported files. If you encrypt the exported files, enter your customer managed key.
  - If you want to update your report group so that it does not export raw test result files to an S3 bucket, update the `exportConfig` section with the following JSON:

```
{
    "exportConfig": {
        "exportConfigType": "NO_EXPORT"
    }
}
```

- If you want to update the report group's tags, update the `tags` section. You can change, add, or remove tags. If you want to remove all tags, update it with the following JSON:

```
"tags": []
```

5. Run the following command:

```
aws codebuild update-report-group \
--cli-input-json file://UpdateReportGroupInput.json
```

## Specify test files

You specify the test result files and their location for each report group in the `reports` section of your build project's `buildspec` file. For more information, see [Reports syntax in the buildspec file](#).

The following is a sample `reports` section that specifies two report groups for a build project. One is specified with its ARN, the other with a name. The `files` section specifies the files that contain the test case results. The optional `base-directory` section specifies the directory where the test case files are located. The optional `discard-paths` section specifies whether paths to test result files uploaded to an Amazon S3 bucket are discarded.

```
reports:
  arn:aws:codebuild:your-region:your-aws-account-id:report-group/report-group-name-1:
  #surefire junit reports
  files:
    - '**/*'
```

```
base-directory: 'surefire/target/surefire-reports'
discard-paths: false

sampleReportGroup: #Cucumber reports from json plugin
  files:
    - 'cucumber-json/target/cucumber-json-report.json'
  file-format: CUCUMBERJSON #Type of the report, defaults to JUNITXML
```

## Specify test commands

You specify the commands that run your test cases in the `commands` section of your buildspec file. These commands run the test cases specified for your report groups in the `reports` section of your buildspec file. The following is a sample `commands` section that includes commands to run the tests in test files:

```
commands:
  - echo Running tests for surefire junit
  - mvn test -f surefire/pom.xml -fn
  - echo
  - echo Running tests for cucumber with json plugin
    - mvn test -Dcucumber.options="--plugin json:target/cucumber-json-report.json" -f
      cucumber-json/pom.xml -fn
```

For more information, see [Buildspec syntax \(p. 130\)](#).

## Report group naming

When you use the AWS CLI or the AWS CodeBuild console to create a report group, you specify a name for the report group. If you use the buildspec to create a new report group, it is named using the format *project-name-report-group-name-specified-in-buildspec*. All reports created by running builds of that build project belong to the new report group that has the new name.

If you do not want CodeBuild to create a new report group, specify the ARN of the report group in a build project's buildspec file. You can specify a report group's ARN in multiple build projects. After each build project runs, the report group contains test reports created by each build project.

For example, if you create one report group with the name `my-report-group`, and then use its name in two different build projects named `my-project-1` and `my-project-2` and create a build of both projects, two new report groups are created. The result is three report groups with the following names:

- `my-report-group`: Does not have any test reports.
- `my-project-1-my-report-group`: Contains reports with results of tests run by the build project named `my-project-1`.
- `my-project-2-my-report-group`: Contains reports with results of tests run by the build project named `my-project-2`.

If you use the ARN of the report group named `my-report-group` in both projects, and then run builds of each project, you still have one report group (`my-report-group`). That report group contains test reports with results of tests run by both build projects.

If you choose a report group name that doesn't belong to a report group in your AWS account, and then use that name for a report group in a buildspec file and run a build of its build project, a new report group is created. The format of name of the new report group is *project-name-new-group-name*. For example, if there is not a report group in your AWS account with the name `new-report-group`, and specify it in a build project called `test-project`, a build run creates a new report group with the name `test-project-new-report-group`.

# Tagging report groups in AWS CodeBuild

A *tag* is a custom attribute label that you or AWS assigns to an AWS resource. Each AWS tag has two parts:

- A *tag key* (for example, CostCenter, Environment, Project, or Secret). Tag keys are case sensitive.
- An optional field known as a *tag value* (for example, 111122223333, Production, or a team name). Omitting the tag value is the same as using an empty string. Like tag keys, tag values are case sensitive.

Together these are known as key-value pairs. For limits on the number of tags you can have on a report group and restrictions on tag keys and values, see [Tags \(p. 428\)](#).

Tags help you identify and organize your AWS resources. Many AWS services support tagging, so you can assign the same tag to resources from different services to indicate that the resources are related. For example, you can assign the same tag to a CodeBuild report group that you assign to an Amazon S3 bucket. For more information about using tags, see the [Tagging best practices](#) whitepaper.

In CodeBuild, the primary resources are the report group and the project. You can use the CodeBuild console, the AWS CLI, CodeBuild APIs, or AWS SDKs to add, manage, and remove tags for a report group. In addition to identifying, organizing, and tracking your report group with tags, you can use tags in IAM policies to help control who can view and interact with your report group. For examples of tag-based access policies, see [Using tags to control access to AWS CodeBuild resources \(p. 366\)](#).

## Topics

- [Add a tag to a report group \(p. 303\)](#)
- [View tags for a report group \(p. 304\)](#)
- [Edit tags for a report group \(p. 305\)](#)
- [Remove a tag from a report group \(p. 306\)](#)

## Add a tag to a report group

Adding tags to a report group can help you identify and organize your AWS resources and manage access to them. First, you add one or more tags (key-value pairs) to a report group. Keep in mind that there are limits on the number of tags you can have on a report group. There are restrictions on the characters you can use in the key and value fields. For more information, see [Tags \(p. 428\)](#). After you have tags, you can create IAM policies to manage access to the report group based on these tags. You can use the CodeBuild console or the AWS CLI to add tags to a report group.

### Important

Adding tags to a report group can impact access to that report group. Before you add a tag to a report group, make sure to review any IAM policies that might use tags to control access to resources such as report groups. For examples of tag-based access policies, see [Using tags to control access to AWS CodeBuild resources \(p. 366\)](#).

For more information about adding tags to a report group when you create it, see [Create a report group \(console\) \(p. 297\)](#).

## Topics

- [Add a tag to a report group \(console\) \(p. 304\)](#)
- [Add a tag to a report group \(AWS CLI\) \(p. 304\)](#)

## Add a tag to a report group (console)

You can use the CodeBuild console to add one or more tags to a CodeBuild report group.

1. Open the CodeBuild console at <https://console.aws.amazon.com/codebuild/>.
2. In **Report groups**, choose the name of the report group where you want to add tags.
3. In the navigation pane, choose **Settings**.
4. If no tags have been added to the report group, choose **Add tag**. You can also choose **Edit**, and then choose **Add tag**.
5. In **Key**, enter a name for the tag. You can add an optional value for the tag in **Value**.
6. (Optional) To add another tag, choose **Add tag** again.
7. When you have finished adding tags, choose **Submit**.

## Add a tag to a report group (AWS CLI)

To add a tag to a report group when you create it, see [Create a report group \(CLI\) \(p. 298\)](#). In `CreateReportGroup.json`, add your tags.

To add tags to an existing report group, see [Update a report group \(CLI\) \(p. 300\)](#) and add your tags in `UpdateReportGroupInput.json`.

In these steps, we assume that you have already installed a recent version of the AWS CLI or updated to the current version. For more information, see [Installing the AWS Command Line Interface](#).

## View tags for a report group

Tags can help you identify and organize your AWS resources and manage access to them. For more information about using tags, see the [Tagging best practices](#) whitepaper. For examples of tag-based access policies, see [Deny or allow actions on report groups based on resource tags](#).

## View tags for a report group (console)

You can use the CodeBuild console to view the tags associated with a CodeBuild report group.

1. Open the CodeBuild console at <https://console.aws.amazon.com/codebuild/>.
2. In **Report groups**, choose the name of the report group where you want to view tags.
3. In the navigation pane, choose **Settings**.

## View tags for a report group (AWS CLI)

Follow these steps to use the AWS CLI to view the AWS tags for a report group. If no tags have been added, the returned tags list is empty.

1. Use the console or the AWS CLI to locate the ARN of your report group. Make a note of it.

### AWS CLI

Run the following command.

```
aws list-report-groups
```

This command returns JSON-formatted information similar to the following:

```
{  
    "reportGroups": [  
        "arn:aws:codebuild:region:123456789012:report-group/report-group-1",  
        "arn:aws:codebuild:region:123456789012:report-group/report-group-2",  
        "arn:aws:codebuild:region:123456789012:report-group/report-group-3"  
    ]  
}
```

A report group ARN ends with its name, which you can use to identify the ARN for your report group.

#### Console

1. Open the CodeBuild console at <https://console.aws.amazon.com/codebuild/>.
  2. In **Report groups**, choose the name of your report group with the tags you want to view.
  3. In **Configuration** locate your report group's ARN.
2. Run the following command. Use the ARN you made a note of for the `--report-group-arns` parameter.

```
aws codebuild batch-get-report-groups --report-group-arns  
arn:aws:codebuild:region:123456789012:report-group/report-group-name
```

If successful, this command returns JSON-formatted information that contains a `tags` section similar to the following:

```
{  
    ...  
    "tags": {  
        "Status": "Secret",  
        "Project": "TestBuild"  
    }  
    ...  
}
```

## Edit tags for a report group

You can change the value for a tag associated with a report group. You can also change the name of the key, which is equivalent to removing the current tag and adding a different one with the new name and the same value as the other key. Keep in mind that there are restrictions on the characters you can use in the key and value fields. For more information, see [Tags \(p. 428\)](#).

#### Important

Editing tags for a report group can impact access to that report group. Before you edit the name (key) or value of a tag for a report group, make sure to review any IAM policies that might use the key or value for a tag to control access to resources such as report groups. For examples of tag-based access policies, see [Deny or allow actions on report groups based on resource tags](#).

## Edit a tag for a report group (console)

You can use the CodeBuild console to edit the tags associated with a CodeBuild report group.

1. Open the CodeBuild console at <https://console.aws.amazon.com/codebuild/>.
2. In **Report groups**, choose the name of the report group where you want to edit tags.
3. In the navigation pane, choose **Settings**.
4. Choose **Edit**.

5. Do one of the following:
  - To change the tag, enter a new name in **Key**. Changing the name of the tag is the equivalent of removing a tag and adding a new tag with the new key name.
  - To change the value of a tag, enter a new value. If you want to change the value to nothing, delete the current value and leave the field blank.
6. When you have finished editing tags, choose **Submit**.

## Edit tags for a report group (AWS CLI)

To add, change, or delete tags from a report group, see [Update a report group \(CLI\) \(p. 300\)](#). Update the tags in `UpdateReportGroupInput.json`.

## Remove a tag from a report group

You can remove one or more tags associated with a report group. Removing a tag does not delete the tag from other AWS resources that are associated with that tag.

### Important

Removing tags for a report group can impact access to that report group. Before you remove a tag from a report group, make sure to review any IAM policies that might use the key or value for a tag to control access to resources such as report groups. For examples of tag-based access policies, see [Using tags to control access to AWS CodeBuild resources \(p. 366\)](#).

## Remove a tag from a report group (console)

You can use the CodeBuild console to remove the association between a tag and a CodeBuild report group.

1. Open the CodeBuild console at <https://console.aws.amazon.com/codebuild/>.
2. In **Report groups**, choose the name of the report group where you want to remove tags.
3. In the navigation pane, choose **Settings**.
4. Choose **Edit**.
5. Find the tag you want to remove, and then choose **Remove tag**.
6. When you have finished removing tags, choose **Submit**.

## Remove a tag from a report group (AWS CLI)

Follow these steps to use the AWS CLI to remove a tag from a CodeBuild report group. Removing a tag does not delete it, but simply removes the association between the tag and the report group.

### Note

If you delete a CodeBuild report group, all tag associations are removed from the deleted report group. You do not have to remove tags before you delete a report group.

To delete one or more tags from a report group, see [Edit tags for a report group \(AWS CLI\) \(p. 306\)](#). Update the `tags` section in the JSON-formatted data with an updated list of tags that does not contain the ones you want to delete. If you want to delete all tags, update the `tags` section to:

```
"tags: []"
```

## Working with shared report groups

Report group sharing allows multiple AWS accounts or users to view a report group, its unexpired reports, and the test results of its reports. In this model, the account that owns the report group (owner)

shares a report group with other accounts (consumers). A consumer cannot edit a report group. A report expires 30 days after it is created.

### Contents

- [Prerequisites for sharing report groups \(p. 307\)](#)
- [Prerequisites for accessing report groups shared with you \(p. 307\)](#)
- [Related services \(p. 307\)](#)
- [Sharing a report group \(p. 307\)](#)
- [Unsharing a shared report group \(p. 309\)](#)
- [Identifying a shared report group \(p. 309\)](#)
- [Shared report group permissions \(p. 310\)](#)

## Prerequisites for sharing report groups

To share a report group, your AWS account must own it. You cannot share a report group that has been shared with you.

## Prerequisites for accessing report groups shared with you

To access a shared report group, a consumer's IAM role requires the `BatchGetReportGroups` permission. You can attach the following policy to their IAM role:

```
{  
    "Effect": "Allow",  
    "Resource": [  
        "*"  
    ],  
    "Action": [  
        "codebuild:BatchGetReportGroups"  
    ]  
}
```

For more information, see [Using identity-based policies for AWS CodeBuild \(p. 342\)](#).

## Related services

Report group sharing integrates with AWS Resource Access Manager (AWS RAM), a service that makes it possible for you to share your AWS resources with any AWS account or through AWS Organizations. With AWS RAM, you share resources that you own by creating a *resource share* that specifies the resources and the consumers to share them with. Consumers can be individual AWS accounts, organizational units in AWS Organizations, or an entire organization in AWS Organizations.

For more information, see the [AWS RAM User Guide](#).

## Sharing a report group

When you share a report group, the consumer is granted read-only access to the report group and its reports. The consumer can use the AWS CLI to view the report group, its reports, and the test case results for each report. The consumer cannot:

- View a shared report group or its reports in the CodeBuild console.
- Edit a shared report group.
- Use the ARN of the shared report group in a project to run a report. A project build that specifies a shared report group fails.

You can use the CodeBuild console to add a report group to an existing resource share. If you want to add the report group to a new resource share, you must first create it in the [AWS RAM console](#).

To share a report group with organizational units or an entire organization, you must enable sharing with AWS Organizations. For more information, see [Enable sharing with AWS Organizations](#) in the *AWS RAM User Guide*.

You can use the CodeBuild console, AWS RAM console, or AWS CLI to share report groups that you own.

### To share a report group that you own (CodeBuild console)

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Report groups**.
3. Choose the project you want to share, and then choose **Share**. For more information, see [Create a resource share](#) in the *AWS RAM User Guide*.

### To share report groups that you own (AWS RAM console)

See [Creating a resource share](#) in the *AWS RAM User Guide*.

### To share report groups that you own (AWS RAM command)

Use the [create-resource-share](#) command.

### To share a report group that you own (CodeBuild command)

Use the [put-resource-policy](#) command:

1. Create a file named policy.json and copy the following into it.

```
{  
    "Version": "2012-10-17",  
    "Statement": [{  
        "Effect": "Allow",  
        "Principal": {  
            "AWS": "consumer-aws-account-id-or-user"  
        },  
        "Action": [  
            "codebuild:BatchGetReportGroups",  
            "codebuild:BatchGetReports",  
            "codebuild>ListReportsForReportGroup",  
            "codebuild:DescribeTestCases"],  
        "Resource": "arn-of-report-group-to-share"  
    }]  
}
```

2. Update policy.json with the report group ARN and identifiers to share it with. The following example grants read-only access to the report group with the ARN arn:aws:codebuild:us-west-2:123456789012:report-group/my-report-group to Alice and the root user for the AWS account identified by 123456789012.

```
{  
    "Version": "2012-10-17",  
    "Statement": [{  
        "Effect": "Allow",  
        "Principal": {  
            "AWS": [  
                "arn:aws:iam::123456789012:user/Alice",  
                "123456789012"  
            ]  
        },  
        "Action": [  
            "codebuild:BatchGetReportGroups",  
            "codebuild:BatchGetReports",  
            "codebuild>ListReportsForReportGroup",  
            "codebuild:DescribeTestCases"],  
        "Resource": "arn-of-report-group-to-share"  
    }]  
}
```

```
        },
        "Action": [
            "codebuild:BatchGetReportGroups",
            "codebuild:BatchGetReports",
            "codebuild>ListReportsForReportGroup",
            "codebuild:DescribeTestCases"],
        "Resource":"arn:aws:codebuild:us-west-2:123456789012:report-group/my-report-group"
    }]
}
```

- Run the following command.

```
aws codebuild put-resource-policy --resource-arn report-group-arn --policy file:// policy.json
```

## Unsharing a shared report group

An unshared report group, including its reports and their test case results, can be accessed only by its owner. If you unshare a report group, any AWS account or user you previously shared it with cannot access the report group, its reports, or the results of test cases in the reports.

To unshare a shared report group that you own, you must remove it from the resource share. You can use the AWS RAM console or AWS CLI to do this.

### To unshare a shared report group that you own (AWS RAM console)

See [Updating a resource share](#) in the *AWS RAM User Guide*.

### To unshare a shared report group that you own (AWS RAM command)

Use the [disassociate-resource-share](#) command.

### To unshare report group that you own CodeBuild command)

Run the [delete-resource-policy](#) command and specify the ARN of the report group you want to unshare:

```
aws codebuild delete-resource-policy --resource-arn report-group-arn
```

## Identifying a shared report group

Owners and consumers can use the AWS CLI to identify shared report groups.

To identify and get information about a shared report group and its reports, use the following commands:

- To see the ARNs of report groups shared with you, run [list-shared-report-groups](#):

```
aws codebuild list-shared-report-groups
```

- To see the ARNs of the reports in a report group, run [list-reports-for-report-group](#) using the report group ARN:

```
aws codebuild list-reports-for-report-group --report-group-arn report-group-arn
```

- To see information about test cases in a report, run [describe-test-cases](#) using the report ARN:

```
aws codebuild describe-test-cases --report-arn report-arn
```

The output looks like the following:

```
{  
    "testCases": [  
        {  
            "status": "FAILED",  
            "name": "Test case 1",  
            "expired": 1575916770.0,  
            "reportArn": "report-arn",  
            "prefix": "Cucumber tests for agent",  
            "message": "A test message",  
            "durationInNanoSeconds": 1540540,  
            "testRawDataPath": "path-to-output-report-files"  
        },  
        {  
            "status": "SUCCEEDED",  
            "name": "Test case 2",  
            "expired": 1575916770.0,  
            "reportArn": "report-arn",  
            "prefix": "Cucumber tests for agent",  
            "message": "A test message",  
            "durationInNanoSeconds": 1540540,  
            "testRawDataPath": "path-to-output-report-files"  
        }  
    ]  
}
```

## Shared report group permissions

### Permissions for owners

A report group owner can edit the report group and specify it in a project to run reports.

### Permissions for consumers

A report group consumer can view a report group, its reports, and the test case results for its reports. A consumer cannot edit a report group or its reports, and cannot use it to create reports.

## Working with reports

A report contains the results of test cases that are specified for one report group. A test report is created during the run of a build project. You specify a report group, test case files, and commands to run the test cases in its buildspec file. Each time the test cases run, a new test report is created in the report group.

A test report expires 30 days after it is created. You cannot view an expired test report, but you can export the test results to raw test result files in an S3 bucket. Exported raw test files do not expire. For more information, see [Update a report group \(p. 299\)](#).

The status of a test report can be one of the following:

- GENERATING: The run of the test cases is still in progress.
- DELETING: The test report is being deleted. When a test report is deleted, its test cases are also deleted. Raw test result data files exported to an S3 bucket are not deleted.
- INCOMPLETE: The test report was not completed. This status might be returned for one of the following reasons:

- A problem with the configuration of the report group that specifies this report's test cases. For example, the path to the test cases under the report group in the buildspec file might be incorrect.
- The IAM user that ran the build does not have permissions to run tests. For more information, see [Working with test report permissions \(p. 311\)](#).
- The build was not completed because of an error that is not related to the tests.
- SUCCEEDED: All test cases were successful.
- FAILED: Some of the test cases were not successful.

Each test case returns a status. The status for a test case can be one of the following:

- SUCCEEDED: The test case passed.
- FAILED: The test case failed.
- ERROR: The test case resulted in an unexpected error.
- SKIPPED: The test case did not run.
- UNKNOWN: The test case returned a status other than SUCCEEDED, FAILED, ERROR, or SKIPPED.

A test report can have a maximum of 500 test case results. If more than 500 test cases are run, CodeBuild prioritizes tests with the status FAILED and truncates the test case results.

## Working with test report permissions

This topic describes important information about permissions related to test reporting.

### Topics

- [Create a role for test reports \(p. 311\)](#)
- [Permissions for test reporting operations \(p. 312\)](#)
- [Test reporting permissions examples \(p. 313\)](#)

## Create a role for test reports

To run a test report, and to update a project to include test reports, your IAM role requires the following permissions. These permissions are included in the predefined AWS managed policies. If you want to add test reporting to an existing build project, you must add these permissions yourself.

- CreateReportGroup
- CreateReport
- UpdateReport
- BatchPutTestCases

To run a code coverage report, your IAM role must also include the BatchPutCodeCovverages permission.

### Note

BatchPutTestCases, CreateReport, UpdateReport, and BatchPutCodeCovverages are not public permissions. You cannot call a corresponding AWS CLI command or SDK method for these permissions.

To make sure you have these permissions, you can attach the following policy to your IAM role:

```
{  
    "Effect": "Allow",  
    "Resource": [  
        "*"  
    ],  
    "Action": [  
        "codebuild:CreateReportGroup",  
        "codebuild:CreateReport",  
        "codebuild:UpdateReport",  
        "codebuild:BatchPutTestCases",  
        "codebuild:BatchPutCodeCoverages"  
    ]  
}
```

We recommend that you restrict this policy to only those report groups you must use. The following restricts permissions to only the report groups with the two ARNs in the policy:

```
{  
    "Effect": "Allow",  
    "Resource": [  
        "arn:aws:codebuild:your-region:your-aws-account-id:report-group/report-group-name-1",  
        "arn:aws:codebuild:your-region:your-aws-account-id:report-group/report-group-name-2"  
    ],  
    "Action": [  
        "codebuild:CreateReportGroup",  
        "codebuild:CreateReport",  
        "codebuild:UpdateReport",  
        "codebuild:BatchPutTestCases",  
        "codebuild:BatchPutCodeCoverages"  
    ]  
}
```

The following restricts permissions to only report groups created by running builds of a project named `my-project`:

```
{  
    "Effect": "Allow",  
    "Resource": [  
        "arn:aws:codebuild:your-region:your-aws-account-id:report-group/my-project-*"  
    ],  
    "Action": [  
        "codebuild:CreateReportGroup",  
        "codebuild:CreateReport",  
        "codebuild:UpdateReport",  
        "codebuild:BatchPutTestCases",  
        "codebuild:BatchPutCodeCoverages"  
    ]  
}
```

**Note**

The CodeBuild service role specified in the project is used for permissions to upload to the S3 bucket.

## Permissions for test reporting operations

You can specify permissions for the following test reporting CodeBuild API operations:

- `BatchGetReportGroups`

- BatchGetReports
- CreateReportGroup
- DeleteReportGroup
- DeleteReport
- DescribeTestCases
- ListReportGroups
- ListReports
- ListReportsForReportGroup
- UpdateReportGroup

For more information, see [AWS CodeBuild permissions reference \(p. 361\)](#).

## Test reporting permissions examples

For information about sample policies related to test reporting, see the following:

- [Allow a user to change a report group \(p. 357\)](#)
- [Allow a user to create a report group \(p. 355\)](#)
- [Allow a user to delete a report \(p. 355\)](#)
- [Allow a user to delete a report group \(p. 355\)](#)
- [Allow a user to get information about report groups \(p. 354\)](#)
- [Allow a user to get information about reports \(p. 354\)](#)
- [Allow a user to get a list of report groups \(p. 358\)](#)
- [Allow a user to get a list of reports \(p. 358\)](#)
- [Allow a user to get a list of reports for a report group \(p. 358\)](#)
- [Allow a user to get a list of test cases for a report \(p. 359\)](#)

## View test reports

You can view details about a test report, such as information about its test cases, pass and fail numbers, and how long it took for it to run. You can view test reports grouped by build run, report group, or your AWS account. Choose a test report in the console to see its details and results of its test cases.

You can see view test reports that are not expired. Test reports expire 30 days after they are created. You cannot view an expired report in CodeBuild.

### Topics

- [View test reports for a build \(p. 313\)](#)
- [View test reports for a report group \(p. 314\)](#)
- [View test reports in your AWS account \(p. 314\)](#)

## View test reports for a build

### To view test reports for a build

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. Locate the build you want to view. If you know the project that ran the build that created the test report:

1. In the navigation pane, choose **Build projects**, and then choose the project with the build that ran the test report you want to view.
2. Choose **Build history**, and then choose the build that ran created the reports you want to view.

You can also locate the build in the build history for your AWS account:

1. In the navigation pane, choose **Build history**, and then choose the build that created the test reports you want to view.
3. In the build page, choose **Reports**, and then choose a test report to see its details.

## View test reports for a report group

### To view test reports in a report group

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Report groups**.
3. Choose the report group that contains the test reports you want to view.
4. Choose a test report to see its details.

## View test reports in your AWS account

### To view test reports in your AWS account

1. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Report history**.
3. Choose a test report to see its details.

## Test reporting with test frameworks

The topics in this section demonstrate how to set up test reporting in AWS CodeBuild for various test frameworks.

### Topics

- [Set up test reporting with Jasmine \(p. 314\)](#)
- [Set up test reporting with Jest \(p. 316\)](#)
- [Set up test reporting with pytest \(p. 317\)](#)
- [Set up test reporting with RSpec \(p. 318\)](#)

## Set up test reporting with Jasmine

The following procedure demonstrates how to set up test reporting in AWS CodeBuild with the [JasmineBDD testing framework](#).

The procedure requires the following prerequisites:

- You have an existing CodeBuild project.

- Your project is a Node.js project that is set up to use the Jasmine testing framework.

Add the [jasmine-reporters](#) package to the devDependencies section of your project's package.json file. This package has a collection of JavaScript reporter classes that can be used with Jasmine.

```
npm install --save-dev jasmine-reporters
```

If it's not already present, add the test script to your project's package.json file. The test script ensures that Jasmine is called when **npm test** is run.

```
{  
  "scripts": {  
    "test": "npx jasmine"  
  }  
}
```

CodeBuild supports the following Jasmine test reporters:

#### JUnitXmlReporter

Used to generate reports in the JunitXml format.

#### NUnitXmlReporter

Used to generate reports in the NunitXml format.

A Node.js project with Jasmine will, by default, have a spec sub-directory, which contains the Jasmine configuration and test scripts.

To configure Jasmine to generate reports in the JunitXML format, instantiate the JUnitXmlReporter reporter by adding the following code to your tests.

```
var reporters = require('jasmine-reporters');  
  
var junitReporter = new reporters.JUnitXmlReporter({  
  savePath: <test report directory>,  
  filePrefix: <report filename>,  
  consolidateAll: true  
});  
  
jasmine.getEnv().addReporter(junitReporter);
```

To configure Jasmine to generate reports in the NunitXML format, instantiate the NUnitXmlReporter reporter by adding the following code to your tests.

```
var reporters = require('jasmine-reporters');  
  
var nunitReporter = new reporters.NUnitXmlReporter({  
  savePath: <test report directory>,  
  filePrefix: <report filename>,  
  consolidateAll: true  
});  
  
jasmine.getEnv().addReporter(nunitReporter)
```

The test reports are exported to the file specified by *<test report directory>/<report filename>*.

In your `buildspec.yml` file, add/update the following sections.

```
version: 0.2

phases:
  pre_build:
    commands:
      - npm install
  build:
    commands:
      - npm build
      - npm test

reports:
  jasmine_reports:
    files:
      - <report filename>
    file-format: JUNITXML
    base-directory: <test report directory>
```

If you are using the the NunitXml report format, change the `file-format` value to the following.

```
file-format: NUNITXML
```

## Set up test reporting with Jest

The following procedure demonstrates how to set up test reporting in AWS CodeBuild with the [Jest testing framework](#).

The procedure requires the following prerequisites:

- You have an existing CodeBuild project.
- Your project is a Node.js project that is set up to use the Jest testing framework.

Add the [jest-junit](#) package to the `devDependencies` section of your project's `package.json` file. CodeBuild uses this package to generate reports in the JunitXml format.

```
npm install --save-dev jest-junit
```

If it's not already present, add the `test` script to your project's `package.json` file. The `test` script ensures that Jest is called when `npm test` is run.

```
{
  "scripts": {
    "test": "jest"
  }
}
```

Configure Jest to use the JunitXml reporter by adding the following to your Jest configuration file. If your project does not have a Jest configuration file, create a file named `jest.config.js` in the root of your project and add the following. The test reports are exported to the file specified by `<test report directory>/<report filename>`.

```
module.exports = {
  reporters: [
    'default',
```

```
[ 'jest-junit', {
    outputDirectory: <test report directory>,
    outputName: <report filename>,
} ]
};
```

In your `buildspec.yml` file, add/update the following sections.

```
version: 0.2

phases:
  pre_build:
    commands:
      - npm install
  build:
    commands:
      - npm build
      - npm test

reports:
  jest_reports:
    files:
      - <report filename>
    file-format: JUNITXML
    base-directory: <test report directory>
```

## Set up test reporting with pytest

The following procedure demonstrates how to set up test reporting in AWS CodeBuild with the [pytest testing framework](#).

The procedure requires the following prerequisites:

- You have an existing CodeBuild project.
- Your project is a Python project that is set up to use the pytest testing framework.

Add the following entry to either the `build` or `post_build` phase of your `buildspec.yml` file. This code automatically discovers tests in the current directory and exports the test reports to the file specified by `<test report directory>/<report filename>`. The report uses the JunitXml format.

```
- python -m pytest --junitxml=<test report directory>/<report filename>
```

In your `buildspec.yml` file, add/update the following sections.

```
version: 0.2

phases:
  install:
    runtime-versions:
      python: 3.7
    commands:
      - pip3 install pytest
  build:
    commands:
      - python -m pytest --junitxml=<test report directory>/<report filename>

reports:
```

```
pytest_reports:  
  files:  
    - <report filename>  
  base-directory: <test report directory>  
  file-format: JUNITXML
```

## Set up test reporting with RSpec

The following procedure demonstrates how to set up test reporting in AWS CodeBuild with the [RSpec testing framework](#).

The procedure requires the following prerequisites:

- You have an existing CodeBuild project.
- Your project is a Ruby project that is set up to use the RSpec testing framework.

Add/update the following in your `buildspec.yml` file. This code runs the tests in the `<test source directory>` directory and exports the test reports to the file specified by `<test report directory>/<report filename>`. The report uses the JunitXml format.

```
version: 0.2  
  
phases:  
  install:  
    runtime-versions:  
      ruby: 2.6  
  pre_build:  
    commands:  
      - gem install rspec  
      - gem install rspec_junit_formatter  
  build:  
    commands:  
      - rspec <test source directory>//* --format RspecJunitFormatter --out <test report directory>/<report filename>  
  reports:  
    rspec_reports:  
      files:  
        - <report filename>  
    base-directory: <test report directory>  
    file-format: JUNITXML
```

## Code coverage reports

CodeBuild allows you to generate code coverage reports for your tests. The following code coverage reports are provided:

### Line coverage

Line coverage measures how many statements your tests cover. A statement is a single instruction, not including comments or conditionals.

$$\text{line coverage} = (\text{total lines covered}) / (\text{total number of lines})$$

### Branch coverage

Branch coverage measures how many branches your tests cover out of every possible branch of a control structure, such as an `if` or `case` statement.

branch coverage = (total branches covered)/(total number of branches)

The following code coverage report file formats are supported:

- JaCoCo XML
- SimpleCov JSON<sup>1</sup>
- Clover XML
- Cobertura XML

<sup>1</sup> CodeBuild accepts JSON code coverage reports generated by [simplecov](#), not [simplecov-json](#).

## Create a code coverage report

To create a code coverage report, you run a build project that is configured with at least one code coverage report group in its buildspec file. CodeBuild will interpret the code coverage results and provide a code coverage report for the run. A new test report is generated for each subsequent build that uses the same buildspec file.

### To create a test report

1. Create a build project. For information, see [Create a build project in AWS CodeBuild \(p. 187\)](#).
2. Configure the buildspec file of your project with test report information:
  - a. Add a `reports`: section and specify the name for your report group. CodeBuild creates a report group for you using your project name and the name you specified in the format `project-name-report-group-name-in-buildspec`. If you already have a report group you want to use, specify its ARN. If you use the name instead of the ARN, CodeBuild creates a new report group. For more information, see [Reports syntax in the buildspec file](#).
  - b. Under the report group, specify the location of the files that contain the code coverage results. If you use more than one report group, specify result file locations for each report group. A new code coverage report is created each time your build project runs. For more information, see [Specify test files \(p. 301\)](#).

This is an example that generates a code coverage report for a JaCoCo XML results file located in `test-results/jacoco-coverage-report.xml`.

```
reports:  
  jacoco-report:  
    files:  
      - 'test-results/jacoco-coverage-report.xml'  
    file-format: 'JACOCOXML'
```

- c. In the `commands` section of the `build` or `post_build` sequence, specify the commands that run the code coverage analysis. For more information, see [Specify test commands \(p. 302\)](#).
3. Run a build of the build project. For more information, see [Run a build in AWS CodeBuild \(p. 271\)](#).
4. When the build is complete, choose the new build run from **Build history** on your project page. Choose **Reports** to view the code coverage report. For more information, see [View test reports for a build \(p. 313\)](#).

# Logging and monitoring in AWS CodeBuild

Monitoring is an important part of maintaining the reliability, availability, and performance of AWS CodeBuild and your AWS solutions. You should collect monitoring data from all of the parts of your AWS solution so that you can more easily debug a multi-point failure, if one occurs. AWS provides the following tools for monitoring your CodeBuild resources and builds and for responding to potential incidents.

## Topics

- [Logging AWS CodeBuild API calls with AWS CloudTrail \(p. 320\)](#)
- [Monitoring AWS CodeBuild \(p. 322\)](#)

## Logging AWS CodeBuild API calls with AWS CloudTrail

AWS CodeBuild is integrated with AWS CloudTrail, a service that provides a record of actions taken by a user, role, or an AWS service in CodeBuild. CloudTrail captures all API calls for CodeBuild as events, including calls from the CodeBuild console and from code calls to the CodeBuild APIs. If you create a trail, you can enable continuous delivery of CloudTrail events to an S3 bucket, including events for CodeBuild. If you don't configure a trail, you can still view the most recent events in the CloudTrail console in **Event history**. Using the information collected by CloudTrail, you can determine the request that was made to CodeBuild, the IP address from which the request was made, who made the request, when it was made, and additional details.

To learn more about CloudTrail, see the [AWS CloudTrail User Guide](#).

## AWS CodeBuild information in CloudTrail

CloudTrail is enabled on your AWS account when you create the account. When activity occurs in CodeBuild, that activity is recorded in a CloudTrail event along with other AWS service events in **Event history**. You can view, search, and download recent events in your AWS account. For more information, see [Viewing events with CloudTrail event history](#) in the *AWS CloudTrail User Guide*.

For an ongoing record of events in your AWS account, including events for CodeBuild, create a trail. A trail enables CloudTrail to deliver log files to an S3 bucket. By default, when you create a trail in the console, the trail applies to all regions. The trail logs events from all regions in the AWS partition and delivers the log files to the S3 bucket that you specify. You can configure other AWS services to further analyze and act upon the event data collected in CloudTrail logs. For more information, see:

- [Overview for creating a trail](#)
- [CloudTrail supported services and integrations](#)
- [Configuring Amazon SNS notifications for CloudTrail](#)
- [Receiving CloudTrail log files from multiple regions](#) and [Receiving CloudTrail log files from multiple accounts](#)

All CodeBuild actions are logged by CloudTrail and are documented in the [CodeBuild API Reference](#). For example, calls to the `CreateProject` (in the AWS CLI, `create-project`), `StartBuild` (in the AWS CLI, `start-project`), and `UpdateProject` (in the AWS CLI, `update-project`) actions generate entries in the CloudTrail log files.

Every event or log entry contains information about who generated the request. The identity information helps you determine the following:

- Whether the request was made with root or user credentials.
- Whether the request was made with temporary security credentials for a role or federated user.
- Whether the request was made by another AWS service.

For more information, see the [CloudTrail userIdentity element](#) in the *AWS CloudTrail User Guide*.

## Understanding AWS CodeBuild log file entries

A trail is a configuration that enables delivery of events as log files to an S3 bucket that you specify. CloudTrail log files contain one or more log entries. An event represents a single request from any source and includes information about the requested action, the date and time of the action, request parameters, and so on. CloudTrail log files are not an ordered stack trace of the public API calls, so they do not appear in any specific order.

### Note

To protect sensitive information, the following are hidden in CodeBuild logs:

- AWS access key IDs. For more information, see [Managing Access Keys for IAM Users](#) in the *AWS Identity and Access Management User Guide*.
- Strings specified using the Parameter Store. For more information, see [Systems Manager Parameter Store](#) and [Systems Manager Parameter Store Console Walkthrough](#) in the *Amazon EC2 Systems Manager User Guide*.
- Strings specified using AWS Secrets Manager. For more information, see [Key management \(p. 339\)](#).

The following example shows a CloudTrail log entry that demonstrates creating a build project in CodeBuild.

```
{  
  "eventVersion": "1.05",  
  "userIdentity": {  
    "type": "FederatedUser",  
    "principalId": "account-ID:user-name",  
    "arn": "arn:aws:sts::account-ID:federated-user/user-name",  
    "accountId": "account-ID",  
    "accessKeyId": "access-key-ID",  
    "sessionContext": {  
      "attributes": {  
        "mfaAuthenticated": "false",  
        "creationDate": "2016-09-06T17:59:10Z"  
      },  
      "sessionIssuer": {  
        "type": "IAMUser",  
        "principalId": "access-key-ID",  
        "arn": "arn:aws:iam::account-ID:user/user-name",  
        "accountId": "account-ID",  
        "userName": "user-name"  
      }  
    }  
  }  
}
```

```

},
"eventTime": "2016-09-06T17:59:11Z",
"eventSource": "codebuild.amazonaws.com",
"eventName": "CreateProject",
"awsRegion": "region-ID",
"sourceIPAddress": "127.0.0.1",
"userAgent": "user-agent",
"requestParameters": {
    "awsActId": "account-ID"
},
"responseElements": {
    "project": {
        "environment": {
            "image": "image-ID",
            "computeType": "BUILD_GENERAL1_SMALL",
            "type": "LINUX_CONTAINER",
            "environmentVariables": []
        },
        "name": "codebuild-demo-project",
        "description": "This is my demo project",
        "arn": "arn:aws:codebuild:region-ID:account-ID:project/codebuild-demo-project:project-ID",
        "encryptionKey": "arn:aws:kms:region-ID:key-ID",
        "timeoutInMinutes": 10,
        "artifacts": {
            "location": "arn:aws:s3:::codebuild-region-ID-account-ID-output-bucket",
            "type": "S3",
            "packaging": "ZIP",
            "outputName": "MyOutputArtifact.zip"
        },
        "serviceRole": "arn:aws:iam::account-ID:role/CodeBuildServiceRole",
        "lastModified": "Sep 6, 2016 10:59:11 AM",
        "source": {
            "type": "GITHUB",
            "location": "https://github.com/my-repo.git"
        },
        "created": "Sep 6, 2016 10:59:11 AM"
    }
},
"requestID": "9d32b228-745b-11e6-98bb-23b67EXAMPLE",
"eventID": "581f7dd1-8d2e-40b0-aeee-0dbf7EXAMPLE",
"eventType": "AwsApiCall",
"recipientAccountId": "account-ID"
}

```

## Monitoring AWS CodeBuild

You can use Amazon CloudWatch to watch your builds, report when something is wrong, and take automatic actions when appropriate. You can monitor your builds at two levels:

### Project level

These metrics are for all builds in the specified project. To see metrics for a project, specify `ProjectName` for the dimension in CloudWatch.

### AWS account level

These metrics are for all builds in an account. To see metrics at the AWS account level, do not enter a dimension in CloudWatch. Build resource utilization metrics are not available at the AWS account level.

CloudWatch metrics show the behavior of your builds over time. For example, you can monitor:

- How many builds were attempted in a build project or an AWS account over time.
- How many builds were successful in a build project or an AWS account over time.
- How many builds failed in a build project or an AWS account over time.
- How much time CodeBuild spent running builds in a build project or an AWS account over time.
- Build resource utilization for a build or an entire build project. Build resource utilization metrics include metrics such as CPU, memory, and storage utilization.

For more information, see [Monitoring CodeBuild metrics \(p. 326\)](#).

## CodeBuild CloudWatch metrics

The following metrics can be tracked per AWS account or build project.

### BuildDuration

Measures the duration of the build's BUILD phase.

Units: Seconds

Valid CloudWatch statistics: Average (recommended), Maximum, Minimum

### Builds

Measures the number of builds triggered.

Units: Count

Valid CloudWatch statistics: Sum

### DownloadSourceDuration

Measures the duration of the build's DOWNLOAD\_SOURCE phase.

Units: Seconds

Valid CloudWatch statistics: Average (recommended), Maximum, Minimum

### Duration

Measures the duration of all builds over time.

Units: Seconds

Valid CloudWatch statistics: Average (recommended), Maximum, Minimum

### FailedBuilds

Measures the number of builds that failed because of client error or a timeout.

Units: Count

Valid CloudWatch statistics: Sum

### FinalizingDuration

Measures the duration of the build's FINALIZING phase.

Units: Seconds

Valid CloudWatch statistics: Average (recommended), Maximum, Minimum

**InstallDuration**

Measures the duration of the build's INSTALL phase.

Units: Seconds

Valid CloudWatch statistics: Average (recommended), Maximum, Minimum

**PostBuildDuration**

Measures the duration of the build's POST\_BUILD phase

Units: Seconds

Valid CloudWatch statistics: Average (recommended), Maximum, Minimum

**PreBuildDuration**

Measures the duration of the build's PRE\_BUILD phase.

Units: Seconds

Valid CloudWatch statistics: Average (recommended), Maximum, Minimum

**ProvisioningDuration**

Measures the duration of the build's PROVISIONING phase.

Units: Seconds

Valid CloudWatch statistics: Average (recommended), Maximum, Minimum

**QueuedDuration**

Measures the duration of the build's QUEUED phase.

Units: Seconds

Valid CloudWatch statistics: Average (recommended), Maximum, Minimum

**SubmittedDuration**

Measures the duration of the build's SUBMITTED phase.

Units: Seconds

Valid CloudWatch statistics: Average (recommended), Maximum, Minimum

**SucceededBuilds**

Measures the number of successful builds.

Units: Count

Valid CloudWatch statistics: Sum

**UploadArtifactsDuration**

Measures the duration of the build's UPLOAD\_ARTIFACTS phase.

Units: Seconds

Valid CloudWatch statistics: Average (recommended), Maximum, Minimum

## CodeBuild CloudWatch resource utilization metrics

### Note

CodeBuild resource utilization metrics are only available in the following regions:

- Asia Pacific (Tokyo) Region
- Asia Pacific (Seoul) Region
- Asia Pacific (Mumbai) Region
- Asia Pacific (Singapore) Region
- Asia Pacific (Sydney) Region
- Canada (Central) Region
- Europe (Frankfurt) Region
- Europe (Ireland) Region
- Europe (London) Region
- Europe (Paris) Region
- South America (São Paulo) Region
- US East (N. Virginia) Region
- US East (Ohio) Region
- US West (N. California) Region
- US West (Oregon) Region

The following resource utilization metrics can be tracked.

#### CPUUtilized

The number of CPU units of allocated processing used by the build container.

Units: CPU units

Valid CloudWatch statistics: Average (recommended), Maximum, Minimum

#### CPUUtilizedPercent

The percentage of allocated processing used by the build container.

Units: Percent

Valid CloudWatch statistics: Average (recommended), Maximum, Minimum

#### MemoryUtilized

The number of megabytes of memory used by the build container.

Units: Megabytes

Valid CloudWatch statistics: Average (recommended), Maximum, Minimum

#### MemoryUtilizedPercent

The percentage of allocated memory used by the build container.

Units: Percent

Valid CloudWatch statistics: Average (recommended), Maximum, Minimum  
**StorageReadBytes**

The storage read speed used by the build container.

Units: Bytes/second

Valid CloudWatch statistics: Average (recommended), Maximum, Minimum  
**StorageWriteBytes**

The storage write speed used by the build container.

Units: Bytes/second

Valid CloudWatch statistics: Average (recommended), Maximum, Minimum

## CodeBuild CloudWatch dimensions

CodeBuild provides the following CloudWatch metric dimensions. If none of these are specified, the metrics are for the current AWS account.

**BuildId, BuildNumber, ProjectName**

Metrics are provided for a build identifier, build number, and project name.

**ProjectName**

Metrics are provided for a project name.

## CodeBuild CloudWatch alarms

You can use the CloudWatch console to create alarms based on CodeBuild metrics so you can react if something goes wrong with your builds. The two metrics that are most useful with alarms are:

- **FailedBuild**. You can create an alarm that is triggered when a certain number of failed builds are detected within a predetermined number of seconds. In CloudWatch, you specify the number of seconds and how many failed builds trigger an alarm.
- **Duration**. You can create an alarm that is triggered when a build takes longer than expected. You specify how many seconds must elapse after a build is started and before a build is completed before the alarm is triggered.

For information about how to create alarms for CodeBuild metrics, see [Monitoring builds with CloudWatch alarms \(p. 336\)](#). For more information about alarms, see [Creating Amazon CloudWatch alarms](#) in the *Amazon CloudWatch User Guide*.

## Monitoring CodeBuild metrics

AWS CodeBuild monitors functions on your behalf and reports metrics through Amazon CloudWatch. These metrics include the number of total builds, failed builds, successful builds, and the duration of builds.

You can use the CodeBuild console or the CloudWatch console to monitor metrics for CodeBuild. The following procedures show you how to access metrics.

## Topics

- [Access build metrics \(CodeBuild console\) \(p. 327\)](#)
- [Access build metrics \(Amazon CloudWatch console\) \(p. 327\)](#)

## Access build metrics (CodeBuild console)

### Note

You can't customize the metrics or the graphs used to display them in the CodeBuild console. If you want to customize the display, use the Amazon CloudWatch console to view your build metrics.

### Account-level metrics

#### To access AWS account-level metrics

1. Sign in to the AWS Management Console and open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Account metrics**.

### Project-level metrics

#### To access project-level metrics

1. Sign in to the AWS Management Console and open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Build projects**.
3. In the list of build projects, in the **Name** column, choose the project where you want to view metrics.
4. Choose the **Metrics** tab.

## Access build metrics (Amazon CloudWatch console)

You can customize the metrics and the graphs used to display them with the CloudWatch console.

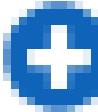
### Account-level metrics

#### To access account-level metrics

1. Sign in to the AWS Management Console and open the CloudWatch console at <https://console.aws.amazon.com/cloudwatch/>.
2. In the navigation pane, choose **Metrics**.
3. On the **All metrics** tab, choose **CodeBuild**.

# Metrics

## Favorites

 Add a dashboard

4. Choose **Account Metrics**.
5. Choose one or more projects and metrics. For each project, you can choose the **SucceededBuilds**, **FailedBuilds**, **Builds**, and **Duration** metrics. All selected project and metric combinations are displayed in the graph on the page.

## Project-level metrics

### To access project-level metrics

1. Sign in to the AWS Management Console and open the CloudWatch console at <https://console.aws.amazon.com/cloudwatch/>.
2. In the navigation pane, choose **Metrics**.
3. On the **All metrics** tab, choose **CodeBuild**.

# Metrics

## Favorites

 Add a dashboard

4. Choose By Project.
5. Choose one or more project and metric combinations. For each project, you can choose the **SucceededBuilds**, **FailedBuilds**, **Builds**, and **Duration** metrics. All selected project and metric combinations are displayed in the graph on the page.
6. (Optional) You can customize your metrics and graphs. For example, from the drop-down list in the **Statistic** column, you can choose a different statistic to display. Or from the drop-down menu in the **Period** column, you can choose a different time period to use to monitor the metrics.

For more information, see [Graph metrics](#) and [View available metrics](#) in the *Amazon CloudWatch User Guide*.

## Monitoring CodeBuild resource utilization metrics

AWS CodeBuild monitors build resource utilization on your behalf and reports metrics through Amazon CloudWatch. These include metrics such as CPU, memory, and storage utilization.

**Note**

CodeBuild resource utilization metrics are only recorded for builds that run for more than one minute.

You can use the CodeBuild console or the CloudWatch console to monitor resource utilization metrics for CodeBuild.

**Note**

CodeBuild resource utilization metrics are only available in the following regions:

- Asia Pacific (Tokyo) Region
- Asia Pacific (Seoul) Region
- Asia Pacific (Mumbai) Region
- Asia Pacific (Singapore) Region
- Asia Pacific (Sydney) Region
- Canada (Central) Region
- Europe (Frankfurt) Region
- Europe (Ireland) Region
- Europe (London) Region
- Europe (Paris) Region
- South America (São Paulo) Region
- US East (N. Virginia) Region
- US East (Ohio) Region
- US West (N. California) Region
- US West (Oregon) Region

The following procedures show you how to access your resource utilization metrics.

**Topics**

- [Access resource utilization metrics \(CodeBuild console\) \(p. 332\)](#)
- [Access resource utilization metrics \(Amazon CloudWatch console\) \(p. 332\)](#)

## Access resource utilization metrics (CodeBuild console)

### Note

You can't customize the metrics or the graphs used to display them in the CodeBuild console. If you want to customize the display, use the Amazon CloudWatch console to view your build metrics.

### Project-level resource utilization metrics

#### To access project-level resource utilization metrics

1. Sign in to the AWS Management Console and open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Build projects**.
3. In the list of build projects, in the **Name** column, choose the project you want to view the utilization metrics for.
4. Choose the **Metrics** tab. The resource utilization metrics are displayed in the **Resource utilization metrics** section.
5. To view the project-level resource utilization metrics in the CloudWatch console, choose **View in CloudWatch** in the **Resource utilization metrics** section.

### Build-level resource utilization metrics

#### To access build-level resource utilization metrics

1. Sign in to the AWS Management Console and open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
2. In the navigation pane, choose **Build history**.
3. In the list of builds, in the **Build run** column, choose the build you want to view the utilization metrics for.
4. Choose the **Resource utilization** tab.
5. To view the build-level resource utilization metrics in the CloudWatch console, choose **View in CloudWatch** in the **Resource utilization metrics** section.

## Access resource utilization metrics (Amazon CloudWatch console)

The Amazon CloudWatch console can be used to access CodeBuild resource utilization metrics.

### Project-level resource utilization metrics

#### To access project-level resource utilization metrics

1. Sign in to the AWS Management Console and open the CloudWatch console at <https://console.aws.amazon.com/cloudwatch/>.
2. In the navigation pane, choose **Metrics**.
3. On the **All metrics** tab, choose **CodeBuild**.

# Metrics

## Favorites

 Add a dashboard

4. Choose **By Project**.
5. Choose one or more project and metric combinations to add to the graph. All selected project and metric combinations are displayed in the graph on the page.
6. (Optional) You can customize your metrics and graphs from the **Graphed metrics** tab. For example, from the drop-down list in the **Statistic** column, you can choose a different statistic to display. Or from the drop-down menu in the **Period** column, you can choose a different time period to use to monitor the metrics.

For more information, see [Graphing metrics](#) and [Viewing available metrics](#) in the *Amazon CloudWatch User Guide*.

## Build-level resource utilization metrics

### To access build-level resource utilization metrics

1. Sign in to the AWS Management Console and open the CloudWatch console at <https://console.aws.amazon.com/cloudwatch/>.
2. In the navigation pane, choose **Metrics**.
3. On the **All metrics** tab, choose **CodeBuild**.

# Metrics

## Favorites

 Add a dashboard

4. Choose **BuildId**, **BuildNumber**, **ProjectName**.
5. Choose one or more build and metric combinations to add to the graph. All selected build and metric combinations are displayed in the graph on the page.
6. (Optional) You can customize your metrics and graphs from the **Graphed metrics** tab. For example, from the drop-down list in the **Statistic** column, you can choose a different statistic to display. Or from the drop-down menu in the **Period** column, you can choose a different time period to use to monitor the metrics.

For more information, see [Graphing metrics](#) and [Viewing available metrics](#) in the *Amazon CloudWatch User Guide*.

## Monitoring builds with CloudWatch alarms

You can create a CloudWatch alarm for your builds. An alarm watches a single metric over a period of time that you specify and performs one or more actions based on the value of the metric relative to a specified threshold over a number of time periods. Using native CloudWatch alarm functionality, you can specify any of the actions supported by CloudWatch when a threshold is exceeded. For example, you can specify that an Amazon SNS notification is sent when more than three builds in your account fail within fifteen minutes.

### To create a CloudWatch alarm for a CodeBuild metric

1. Sign in to the AWS Management Console and open the CloudWatch console at <https://console.aws.amazon.com/cloudwatch/>.
2. In the navigation pane, choose **Alarms**.
3. Choose **Create Alarm**.
4. Under **CloudWatch Metrics by Category**, choose **CodeBuild Metrics**. If you know you want only project-level metrics, choose **By Project**. If you know you want only account-level metrics, choose **Account Metrics**.
5. On **Create Alarm**, if it isn't already selected, choose **Select Metric**.
6. Choose a metric for which you want to create an alarm. The options are **By Project** or **Account Metrics**.
7. Choose **Next or Define Alarm** and then create your alarm. For more information, see [Creating Amazon CloudWatch alarms](#) in the *Amazon CloudWatch User Guide*. For more information about setting up Amazon SNS notifications when an alarm is triggered, see [Set up Amazon SNS notifications](#) in the *Amazon SNS Developer Guide*.
8. Choose **Create Alarm**.

# Security in AWS CodeBuild

Cloud security at AWS is the highest priority. As an AWS customer, you benefit from a data center and network architecture that is built to meet the requirements of the most security-sensitive organizations.

Security and compliance is a shared responsibility between AWS and you. This shared model can help relieve your operational burden: AWS operates, manages, and controls the components from the host operating system and virtualization layer down to the physical security of the service facilities. You assume responsibility and management of the guest operating system (including updates and security patches) and other associated application software. You're also responsible for the configuration of the AWS provided security group firewall. Your responsibilities vary with the services you use, the integration of those services into your IT environment, and applicable laws and regulations. Therefore, you should carefully consider the services that your organization uses. For more information, see [Shared responsibility model](#).

To learn how to secure your CodeBuild resources, see the following topics.

## Topics

- [Data protection in AWS CodeBuild \(p. 337\)](#)
- [Identity and access management in AWS CodeBuild \(p. 339\)](#)
- [Compliance validation for AWS CodeBuild \(p. 369\)](#)
- [Resilience in AWS CodeBuild \(p. 370\)](#)
- [Infrastructure security in AWS CodeBuild \(p. 370\)](#)
- [Access your source provider in CodeBuild \(p. 370\)](#)
- [Cross-service confused deputy prevention \(p. 375\)](#)

## Data protection in AWS CodeBuild

The AWS [shared responsibility model](#) applies to data protection in AWS CodeBuild. As described in this model, AWS is responsible for protecting the global infrastructure that runs all of the AWS Cloud. You are responsible for maintaining control over your content that is hosted on this infrastructure. This content includes the security configuration and management tasks for the AWS services that you use. For more information about data privacy, see the [Data Privacy FAQ](#). For information about data protection in Europe, see the [AWS Shared Responsibility Model and GDPR](#) blog post on the [AWS Security Blog](#).

For data protection purposes, we recommend that you protect AWS account credentials and set up individual users with AWS IAM Identity Center or AWS Identity and Access Management (IAM). That way, each user is given only the permissions necessary to fulfill their job duties. We also recommend that you secure your data in the following ways:

- Use multi-factor authentication (MFA) with each account.
- Use SSL/TLS to communicate with AWS resources. We require TLS 1.2 and recommend TLS 1.3.
- Set up API and user activity logging with AWS CloudTrail.
- Use AWS encryption solutions, along with all default security controls within AWS services.
- Use advanced managed security services such as Amazon Macie, which assists in discovering and securing sensitive data that is stored in Amazon S3.

- If you require FIPS 140-2 validated cryptographic modules when accessing AWS through a command line interface or an API, use a FIPS endpoint. For more information about the available FIPS endpoints, see [Federal Information Processing Standard \(FIPS\) 140-2](#).

We strongly recommend that you never put confidential or sensitive information, such as your customers' email addresses, into tags or free-form text fields such as a **Name** field. This includes when you work with CodeBuild or other AWS services using the console, API, AWS CLI, or AWS SDKs. Any data that you enter into tags or free-form text fields used for names may be used for billing or diagnostic logs. If you provide a URL to an external server, we strongly recommend that you do not include credentials information in the URL to validate your request to that server.

To protect sensitive information, the following are hidden in CodeBuild logs:

- Strings specified using the Parameter Store in CodeBuild project environment variables or the buildspec env/parameter-store section. For more information, see [Systems Manager Parameter Store](#) and [Systems Manager Parameter Store console walkthrough](#) in the *Amazon EC2 Systems Manager User Guide*.
- Strings specified using AWS Secrets Manager in CodeBuild project environment variables or the buildspec env/secrets-manager section. For more information, see [Key management \(p. 339\)](#).

For more information about data protection, see the [AWS shared responsibility model and GDPR](#) blog post on the [AWS Security Blog](#).

#### Topics

- [Data encryption \(p. 338\)](#)
- [Key management \(p. 339\)](#)
- [Traffic privacy \(p. 339\)](#)

## Data encryption

Encryption is an important part of CodeBuild security. Some encryption, such as for data in-transit, is provided by default and does not require you to do anything. Other encryption, such as for data at-rest, you can configure when you create your project or build.

- **Encryption of data at-rest** - Build artifacts, such as a cache, logs, exported raw test report data files, and build results, are encrypted by default using AWS managed keys. If you do not want to use these KMS keys, you must create and configure a customer managed key. For more information [Creating KMS Keys](#) and [AWS Key Management Service concepts](#) in the *AWS Key Management Service User Guide*.
  - You can store the identifier of the AWS KMS key that CodeBuild uses to encrypt the build output artifact in the CODEBUILD\_KMS\_KEY\_ID environment variable. For more information, see [Environment variables in build environments \(p. 164\)](#)
  - You can specify a customer managed key when you create a build project. For more information, see [Set the Encryption Key Using the Console](#) and [Set the encryption key using the CLI](#).

The Amazon Elastic Block Store volumes of your build fleet are encrypted by default using AWS managed keys.

- **Encryption of data in-transit** - All communication between customers and CodeBuild and between CodeBuild and its downstream dependencies is protected using TLS connections that are signed using the Signature Version 4 signing process. All CodeBuild endpoints use SHA-256 certificates that are managed by AWS Private Certificate Authority. For more information, see [Signature Version 4 signing process](#) and [What is ACM PCA](#).
- **Build artifact encryption** - The CodeBuild service role associated with the build project requires access to a KMS key in order to encrypt its build output artifacts. By default, CodeBuild uses an AWS

managed key for Amazon S3 in your AWS account. If you do not want to use this AWS managed key, you must create and configure a customer managed key. For more information, see [Creating a customer managed key \(p. 386\)](#) and [Creating keys](#) in the *AWS KMS Developer Guide*.

## Key management

You can protect your content from unauthorized use through encryption. Store your encryption keys in AWS Secrets Manager, and then give the CodeBuild service role associated with the build project permission to obtain the encryption keys from your Secrets Manager account. For more information, see [Create and configure a customer managed key for CodeBuild \(p. 386\)](#), [Create a build project in AWS CodeBuild \(p. 187\)](#), [Run a build in AWS CodeBuild \(p. 271\)](#), and [Tutorial: Storing and retrieving a secret](#).

Use the CODEBUILD\_KMS\_KEY\_ID environment variable in a build command to obtain the AWS KMS key identifier. For more information, see [Environment variables in build environments \(p. 164\)](#).

You can use Secrets Manager to protect credentials to a private registry that stores a Docker image used for your runtime environment. For more information, see [Private registry with AWS Secrets Manager sample for CodeBuild \(p. 122\)](#).

## Traffic privacy

You can improve the security of your builds by configuring CodeBuild to use an interface VPC endpoint. To do this, you do not need an internet gateway, NAT device, or virtual private gateway. It also is not required to configure PrivateLink, though it is recommended. For more information, see [Use VPC endpoints \(p. 173\)](#). For more information about PrivateLink and VPC endpoints, see [AWS PrivateLink](#) and [Accessing AWS services through PrivateLink](#).

# Identity and access management in AWS CodeBuild

Access to AWS CodeBuild requires credentials. Those credentials must have permissions to access AWS resources, such as storing and retrieving build artifacts in S3 buckets and viewing Amazon CloudWatch Logs for builds. The following sections describe how you can use [AWS Identity and Access Management \(IAM\)](#) and CodeBuild to help secure access to your resources:

## Overview of managing access permissions to your AWS CodeBuild resources

Every AWS resource is owned by an AWS account, and permissions to create or access a resource are governed by permissions policies. An account administrator can attach permissions policies to IAM identities (that is, users, groups, and roles).

### Note

An account administrator (or administrator user) is a user with administrator privileges. For more information, see [IAM Best Practices](#) in the *IAM User Guide*.

When you grant permissions, you decide who is getting the permissions, the resources they can access, and the actions that can be performed on those resources.

### Topics

- [AWS CodeBuild resources and operations \(p. 340\)](#)
- [Understanding resource ownership \(p. 341\)](#)
- [Managing access to resources \(p. 341\)](#)
- [Specifying policy elements: Actions, effects, and principals \(p. 341\)](#)

## AWS CodeBuild resources and operations

In AWS CodeBuild, the primary resource is a build project. In a policy, you use an Amazon Resource Name (ARN) to identify the resource the policy applies to. Builds are also resources and have ARNs associated with them. For more information, see [Amazon Resource Names \(ARN\) and AWS Service Namespaces](#) in the [Amazon Web Services General Reference](#).

| Resource type                                                                      | ARN format                                                                                              |
|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Build project                                                                      | <code>arn:aws:codebuild:<i>region-ID</i>:<i>account-ID</i>:project/<i>project-name</i></code>           |
| Build                                                                              | <code>arn:aws:codebuild:<i>region-ID</i>:<i>account-ID</i>:build/<i>build-ID</i></code>                 |
| Report group                                                                       | <code>arn:aws:codebuild:<i>region-ID</i>:<i>account-ID</i>:report-group/<i>report-group-name</i></code> |
| Report                                                                             | <code>arn:aws:codebuild:<i>region-ID</i>:<i>account-ID</i>:report/<i>report-ID</i></code>               |
| All CodeBuild resources                                                            | <code>arn:aws:codebuild:*</code>                                                                        |
| All CodeBuild resources owned by the specified account in the specified AWS Region | <code>arn:aws:codebuild:<i>region-ID</i>:<i>account-ID</i>:*</code>                                     |

### Note

Most AWS services treat a colon (:) or a forward slash (/) as the same character in ARNs. However, CodeBuild uses an exact match in resource patterns and rules. Be sure to use the correct characters when you create event patterns so that they match the ARN syntax in the resource.

For example, you can indicate a specific build project (*myBuildProject*) in your statement using its ARN as follows:

```
"Resource": "arn:aws:codebuild:us-east-2:123456789012:project/myBuildProject"
```

To specify all resources, or if an API action does not support ARNs, use the wildcard character (\*) in the Resource element as follows:

```
"Resource": "*"
```

Some CodeBuild API actions accept multiple resources (for example, BatchGetProjects). To specify multiple resources in a single statement, separate their ARNs with commas, as follows:

```
"Resource": [
    "arn:aws:codebuild:us-east-2:123456789012:project/myBuildProject",
    "arn:aws:codebuild:us-east-2:123456789012:project/myOtherBuildProject"
```

]

CodeBuild provides a set of operations to work with the CodeBuild resources. For a list, see [AWS CodeBuild permissions reference \(p. 361\)](#).

## Understanding resource ownership

The AWS account owns the resources that are created in the account, regardless of who created the resources. Specifically, the resource owner is the AWS account of the [principal entity](#) (that is, the root account, an user, or an IAM role) that authenticates the resource creation request. The following examples illustrate how this works:

- If you use the root account credentials of your AWS account to create a rule, your AWS account is the owner of the CodeBuild resource.
- If you create an user in your AWS account and grant permissions to create CodeBuild resources to that user, the user can create CodeBuild resources. However, your AWS account, to which the user belongs, owns the CodeBuild resources.
- If you create an IAM role in your AWS account with permissions to create CodeBuild resources, anyone who can assume the role can create CodeBuild resources. Your AWS account, to which the role belongs, owns the CodeBuild resources.

## Managing access to resources

A permissions policy describes who has access to which resources.

### Note

This section discusses the use of IAM in AWS CodeBuild. It doesn't provide detailed information about the IAM service. For complete IAM documentation, see [What Is IAM?](#) in the *IAM User Guide*. For information about IAM policy syntax and descriptions, see [AWS IAM Policy Reference](#) in the *IAM User Guide*.

Policies attached to an IAM identity are referred to as identity-based policies (IAM policies). Policies attached to a resource are referred to as resource-based policies. CodeBuild supports identity-based policies, and resource-based policies for certain read only APIs for the purpose of cross-account resource sharing.

## Secure access to S3 buckets

We strongly recommend that you include the following permissions in your IAM role to verify the S3 bucket associated with your CodeBuild project is owned by you or someone you trust. These permissions are not included in AWS managed policies and roles. You must add them yourself.

- `s3:GetBucketAcl`
- `s3:GetBucketLocation`

If the owner of an S3 bucket used by your project changes, you must verify you still own the bucket and update permissions in your IAM role if not. For more information, see [Add CodeBuild access permissions to an IAM group or user \(p. 376\)](#) and [Create a CodeBuild service role \(p. 381\)](#).

## Specifying policy elements: Actions, effects, and principals

For each AWS CodeBuild resource, the service defines a set of API operations. To grant permissions for these API operations, CodeBuild defines a set of actions that you can specify in a policy. Some API operations can require permissions for more than one action in order to perform the API operation.

For more information, see [AWS CodeBuild resources and operations \(p. 340\)](#) and [AWS CodeBuild permissions reference \(p. 361\)](#).

The following are the basic policy elements:

- **Resource** – You use an Amazon Resource Name (ARN) to identify the resource that the policy applies to.
  - **Action** – You use action keywords to identify resource operations you want to allow or deny. For example, the codebuild:CreateProject permission gives the user permissions to perform the CreateProject operation.
  - **Effect** – You specify the effect, either allow or deny, when the user requests the action. If you don't explicitly grant access to (allow) a resource, access is implicitly denied. You can also explicitly deny access to a resource. You might do this to make sure a user cannot access a resource, even if a different policy grants access.
  - **Principal** – In identity-based policies (IAM policies), the user the policy is attached to is the implicit principal. For resource-based policies, you specify the user, account, service, or other entity that you want to receive permissions.

To learn more about IAM policy syntax and descriptions, see [AWS IAM Policy Reference](#) in the *IAM User Guide*.

For a table showing all of the CodeBuild API actions and the resources they apply to, see the [AWS CodeBuild permissions reference \(p. 361\)](#).

# Using identity-based policies for AWS CodeBuild

This topic provides examples of identity-based policies that demonstrate how an account administrator can attach permissions policies to IAM identities (that is, users, groups, and roles) and thereby grant permissions to perform operations on AWS CodeBuild resources.

## **Important**

We recommend that you first review the introductory topics that explain the basic concepts and options available to manage access to your CodeBuild resources. For more information, see [Overview of managing access permissions to your AWS CodeBuild resources \(p. 339\)](#).

## Topics

- [Permissions required to use the AWS CodeBuild console \(p. 343\)](#)
  - [Permissions required for AWS CodeBuild to connect to Amazon Elastic Container Registry \(p. 343\)](#)
  - [Permissions required for the AWS CodeBuild console to connect to source providers \(p. 344\)](#)
  - [AWS managed \(predefined\) policies for AWS CodeBuild \(p. 344\)](#)
  - [CodeBuild managed policies and notifications \(p. 350\)](#)
  - [CodeBuild updates to AWS managed policies \(p. 352\)](#)
  - [Customer-managed policy examples \(p. 352\)](#)

The following shows an example of a permissions policy that allows a user to get information about build projects only in the us-east-2 region for account 123456789012 for any build project that starts with the name mv:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",
```

```
        "Action": "codebuild:BatchGetProjects",
        "Resource": "arn:aws:codebuild:us-east-2:123456789012:project/my*"
    }
}
```

## Permissions required to use the AWS CodeBuild console

A user who uses the AWS CodeBuild console must have a minimum set of permissions that allows the user to describe other AWS resources for the AWS account. You must have permissions from the following services:

- AWS CodeBuild
- Amazon CloudWatch
- CodeCommit (if you are storing your source code in an AWS CodeCommit repository)
- Amazon Elastic Container Registry (Amazon ECR) (if you are using a build environment that relies on a Docker image in an Amazon ECR repository)

**Note**

As of July 26, 2022, the default IAM policy has been updated. For more information, see [Permissions required for AWS CodeBuild to connect to Amazon Elastic Container Registry \(p. 343\)](#).

- Amazon Elastic Container Service (Amazon ECS) (if you are using a build environment that relies on a Docker image in an Amazon ECR repository)
- AWS Identity and Access Management (IAM)
- AWS Key Management Service (AWS KMS)
- Amazon Simple Storage Service (Amazon S3)

If you create an IAM policy that is more restrictive than the minimum required permissions, the console won't function as intended.

## Permissions required for AWS CodeBuild to connect to Amazon Elastic Container Registry

As of July 26, 2022, AWS CodeBuild has updated its default IAM policy for Amazon ECR permission. The following permissions have been removed from the default policy:

```
"ecr:PutImage",
"ecr:InitiateLayerUpload",
"ecr:UploadLayerPart",
"ecr:CompleteLayerUpload"
```

For CodeBuild projects that were created before July 26, 2022, we recommend you update your policy with the following Amazon ECR policy:

```
"Action": [
    "ecr:BatchCheckLayerAvailability",
    "ecr:GetDownloadUrlForLayer",
    "ecr:BatchGetImage"
]
```

For more information on updating your policy, see [Add CodeBuild access permissions to an IAM group or user \(p. 376\)](#).

## Permissions required for the AWS CodeBuild console to connect to source providers

The AWS CodeBuild console uses the following API actions to connect to source providers (for example, GitHub repositories).

- `codebuild>ListConnectedOAuthAccounts`
- `codebuild>ListRepositories`
- `codebuild>PersistOAuthToken`
- `codebuild ImportSourceCredentials`

You can associate source providers (such as GitHub repositories) with your build projects using the AWS CodeBuild console. To do this, you must first add the preceding API actions to IAM access policies associated with the user you use to access the AWS CodeBuild console.

The `ListConnectedOAuthAccounts`, `ListRepositories`, and `PersistOAuthToken` API actions are not intended to be called by your code. Therefore, these API actions are not included in the AWS CLI and AWS SDKs.

## AWS managed (predefined) policies for AWS CodeBuild

AWS addresses many common use cases by providing standalone IAM policies that are created and administered by AWS. These AWS managed policies grant necessary permissions for common use cases so you can avoid having to investigate what permissions are needed. The managed policies for CodeBuild also provide permissions to perform operations in other services, such as IAM, AWS CodeCommit, Amazon EC2, Amazon ECR, Amazon SNS, and Amazon CloudWatch Events, as required for the responsibilities for the users who have been granted the policy in question. For example, the `AWSCodeBuildAdminAccess` policy is an administrative-level user policy that allows users with this policy to create and manage CloudWatch Events rules for project builds and Amazon SNS topics for notifications about project-related events (topics whose names are prefixed with `arn:aws:codebuild:`), as well as administer projects and report groups in CodeBuild. For more information, see [AWS Managed Policies](#) in the *IAM User Guide*.

The following AWS managed policies, which you can attach to users in your account, are specific to AWS CodeBuild.

### **AWSCodeBuildAdminAccess**

Provides full access to CodeBuild including permissions to administrate CodeBuild build projects.

### **AWSCodeBuildDeveloperAccess**

Provides access to CodeBuild but does not allow build project administration.

### **AWSCodeBuildReadOnlyAccess**

Provides read-only access to CodeBuild.

To access build output artifacts that CodeBuild creates, you must also attach the AWS managed policy named `AmazonS3ReadOnlyAccess`.

To create and manage CodeBuild service roles, you must also attach the AWS managed policy named `IAMFullAccess`.

You can also create your own custom IAM policies to allow permissions for CodeBuild actions and resources. You can attach these custom policies to the users or groups that require those permissions.

### **Topics**

- [AWSCodeBuildAdminAccess \(p. 345\)](#)
- [AWSCodeBuildDeveloperAccess \(p. 347\)](#)
- [AWSCodeBuildReadOnlyAccess \(p. 349\)](#)

## AWSCodeBuildAdminAccess

The AWSCodeBuildAdminAccess policy provides full access to CodeBuild, including permissions to administer CodeBuild build projects. Apply this policy only to administrative-level users to grant them full control over CodeBuild projects, report groups, and related resources in your AWS account, including the ability to delete projects and report groups.

The AWSCodeBuildAdminAccess policy contains the following policy statement:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Action": [  
                "codebuild:*",  
                "codecommit:GetBranch",  
                "codecommit:GetCommit",  
                "codecommit:GetRepository",  
                "codecommit>ListBranches",  
                "codecommit>ListRepositories",  
                "cloudwatch:GetMetricStatistics",  
                "ec2:DescribeVpcs",  
                "ec2:DescribeSecurityGroups",  
                "ec2:DescribeSubnets",  
                "ecr:DescribeRepositories",  
                "ecr>ListImages",  
                "elasticfilesystem:DescribeFileSystems",  
                "events>DeleteRule",  
                "events:DescribeRule",  
                "events:DisableRule",  
                "events:EnableRule",  
                "events>ListTargetsByRule",  
                "events>ListRuleNamesByTarget",  
                "events:PutRule",  
                "events:PutTargets",  
                "events:RemoveTargets",  
                "logs:GetLogEvents",  
                "s3:GetBucketLocation",  
                "s3>ListAllMyBuckets"  
            ],  
            "Effect": "Allow",  
            "Resource": "*"  
        },  
        {  
            "Action": [  
                "logs>DeleteLogGroup"  
            ],  
            "Effect": "Allow",  
            "Resource": "arn:aws:logs:*:log-group:/aws/codebuild/*:log-stream:/*"  
        },  
        {  
            "Effect": "Allow",  
            "Action": [  
                "ssm:PutParameter"  
            ],  
            "Resource": "arn:aws:ssm:*:parameter/CodeBuild/*"  
        },  
        {  
    ]  
}
```

```

    "Effect": "Allow",
    "Action": [
        "ssm:StartSession"
    ],
    "Resource": "arn:aws:ecs:*:*:task/*/*"
},
{
    "Sid": "CodeStarConnectionsReadWriteAccess",
    "Effect": "Allow",
    "Action": [
        "codestar-connections>CreateConnection",
        "codestar-connections>DeleteConnection",
        "codestar-connections>UpdateConnectionInstallation",
        "codestar-connections>TagResource",
        "codestar-connections>UntagResource",
        "codestar-connections>ListConnections",
        "codestar-connections>ListInstallationTargets",
        "codestar-connections>ListTagsForResource",
        "codestar-connections>GetConnection",
        "codestar-connections>GetIndividualAccessToken",
        "codestar-connections>GetInstallationUrl",
        "codestar-connections>PassConnection",
        "codestar-connections>StartOAuthHandshake",
        "codestar-connections>UseConnection"
    ],
    "Resource": "arn:aws:codestar-connections:*:*:connection/*"
},
{
    "Sid": "CodeStarNotificationsReadWriteAccess",
    "Effect": "Allow",
    "Action": [
        "codestar-notifications>CreateNotificationRule",
        "codestar-notifications>DescribeNotificationRule",
        "codestar-notifications>UpdateNotificationRule",
        "codestar-notifications>DeleteNotificationRule",
        "codestar-notifications>Subscribe",
        "codestar-notifications>Unsubscribe"
    ],
    "Resource": "*",
    "Condition": {
        "StringLike": {
            "codestar-notifications>NotificationsForResource": "arn:aws:codebuild:*
        }
    }
},
{
    "Sid": "CodeStarNotificationsListAccess",
    "Effect": "Allow",
    "Action": [
        "codestar-notifications>ListNotificationRules",
        "codestar-notifications>ListEventTypes",
        "codestar-notifications>ListTargets",
        "codestar-notifications>ListTagsForResource"
    ],
    "Resource": "*"
},
{
    "Sid": "CodeStarNotificationsSNSTopicCreateAccess",
    "Effect": "Allow",
    "Action": [
        "sns>CreateTopic",
        "sns:SetTopicAttributes"
    ],
    "Resource": "arn:aws:sns:*:*:codestar-notifications*"
},
{

```

```
    "Sid": "SNSTopicListAccess",
    "Effect": "Allow",
    "Action": [
        "sns>ListTopics",
        "sns>GetTopicAttributes"
    ],
    "Resource": "*"
},
{
    "Sid": "CodeStarNotificationsChatbotAccess",
    "Effect": "Allow",
    "Action": [
        "chatbot>DescribeSlackChannelConfigurations",
        "chatbot>ListMicrosoftTeamsChannelConfigurations"
    ],
    "Resource": "*"
}
]
```

## AWSCodeBuildDeveloperAccess

The AWSCodeBuildDeveloperAccess policy allows access to all of the functionality of CodeBuild and project and report group-related resources. This policy does not allow users to delete CodeBuild projects or report groups, or related resources in other AWS services, such as CloudWatch Events. We recommend that you apply this policy to most users.

The AWSCodeBuildDeveloperAccess policy contains the following policy statement:

```
{
    "Statement": [
        {
            "Action": [
                "codebuild>StartBuild",
                "codebuild>StopBuild",
                "codebuild>StartBuildBatch",
                "codebuild>StopBuildBatch",
                "codebuild>RetryBuild",
                "codebuild>RetryBuildBatch",
                "codebuild>BatchGet*",
                "codebuild>GetResourcePolicy",
                "codebuild>DescribeTestCases",
                "codebuild>DescribeCodeCoverages",
                "codebuild>List*",
                "codecommit>GetBranch",
                "codecommit>GetCommit",
                "codecommit>GetRepository",
                "codecommit>ListBranches",
                "cloudwatch>GetMetricStatistics",
                "events>DescribeRule",
                "events>ListTargetsByRule",
                "events>ListRuleNamesByTarget",
                "logs>GetLogEvents",
                "s3>GetBucketLocation",
                "s3>ListAllMyBuckets"
            ],
            "Effect": "Allow",
            "Resource": "*"
        },
        {
            "Effect": "Allow",
            "Action": [
                "ssm>PutParameter"
            ],
            "Resource": "*"
        }
    ]
}
```

```

    "Resource": "arn:aws:ssm:*:*:parameter/CodeBuild/*"
},
{
  "Effect": "Allow",
  "Action": [
    "ssm:StartSession"
  ],
  "Resource": "arn:aws:ecs:*:*:task/*/*"
},
{
  "Sid": "CodeStarConnectionsUserAccess",
  "Effect": "Allow",
  "Action": [
    "codestar-connections>ListConnections",
    "codestar-connections>GetConnection"
  ],
  "Resource": "arn:aws:codestar-connections:*:*:connection/*"
},
{
  "Sid": "CodeStarNotificationsReadWriteAccess",
  "Effect": "Allow",
  "Action": [
    "codestar-notifications>CreateNotificationRule",
    "codestar-notifications>DescribeNotificationRule",
    "codestar-notifications>UpdateNotificationRule",
    "codestar-notifications>Subscribe",
    "codestar-notifications>Unsubscribe"
  ],
  "Resource": "*",
  "Condition": {
    "StringLike": {
      "codestar-notifications>NotificationsForResource": "arn:aws:codebuild:)"
    }
  }
},
{
  "Sid": "CodeStarNotificationsListAccess",
  "Effect": "Allow",
  "Action": [
    "codestar-notifications>ListNotificationRules",
    "codestar-notifications>ListEventTypes",
    "codestar-notifications>ListTargets",
    "codestar-notifications>ListTagsForResource"
  ],
  "Resource": "*"
},
{
  "Sid": "SNSTopicListAccess",
  "Effect": "Allow",
  "Action": [
    "sns>ListTopics",
    "sns>GetTopicAttributes"
  ],
  "Resource": "*"
},
{
  "Sid": "CodeStarNotificationsChatbotAccess",
  "Effect": "Allow",
  "Action": [
    "chatbot>DescribeSlackChannelConfigurations",
    "chatbot>ListMicrosoftTeamsChannelConfigurations"
  ],
  "Resource": "*"
},
],
"Version": "2012-10-17"

```

}

## AWSCodeBuildReadOnlyAccess

The AWSCodeBuildReadOnlyAccess policy grants read-only access to CodeBuild and related resources in other AWS services. Apply this policy to users who can view and run builds, view projects, and view report groups, but cannot make any changes to them.

The AWSCodeBuildReadOnlyAccess policy contains the following policy statement:

```
{  
    "Statement": [  
        {  
            "Action": [  
                "codebuild:BatchGet*",  
                "codebuild:GetResourcePolicy",  
                "codebuild>List*",  
                "codebuild:DescribeTestCases",  
                "codebuild:DescribeCodeCoverages",  
                "codecommit:GetBranch",  
                "codecommit:GetCommit",  
                "codecommit:GetRepository",  
                "cloudwatch:GetMetricStatistics",  
                "events:DescribeRule",  
                "events>ListTargetsByRule",  
                "events>ListRuleNamesByTarget",  
                "logs:GetLogEvents"  
            ],  
            "Effect": "Allow",  
            "Resource": "*"  
        },  
        {  
            "Sid": "CodeStarConnectionsUserAccess",  
            "Effect": "Allow",  
            "Action": [  
                "codestar-connections>ListConnections",  
                "codestar-connections:GetConnection"  
            ],  
            "Resource": "arn:aws:codestar-connections:*:*:connection/*"  
        },  
        {  
            "Sid": "CodeStarNotificationsPowerUserAccess",  
            "Effect": "Allow",  
            "Action": [  
                "codestar-notifications:DescribeNotificationRule"  
            ],  
            "Resource": "*",  
            "Condition": {  
                "StringLike": {  
                    "codestar-notifications:NotificationsForResource": "arn:aws:codebuild:*"  
                }  
            }  
        },  
        {  
            "Sid": "CodeStarNotificationsListAccess",  
            "Effect": "Allow",  
            "Action": [  
                "codestar-notifications>ListNotificationRules",  
                "codestar-notifications>ListEventTypes",  
                "codestar-notifications>ListTargets"  
            ],  
            "Resource": "*"  
        }  
    ]  
}
```

```
    "Version": "2012-10-17"
}
```

## CodeBuild managed policies and notifications

CodeBuild supports notifications, which can notify users of important changes to build projects. Managed policies for CodeBuild include policy statements for notification functionality. For more information, see [What are notifications?](#)

### Permissions related to notifications in full access managed policies

The AWSCodeBuildFullAccess managed policy includes the following statements to allow full access to notifications. Users with this managed policy applied can also create and manage Amazon SNS topics for notifications, subscribe and unsubscribe users to topics, list topics to choose as targets for notification rules, and list AWS Chatbot clients configured for Slack.

```
{
    "Sid": "CodeStarNotificationsReadWriteAccess",
    "Effect": "Allow",
    "Action": [
        "codestar-notifications>CreateNotificationRule",
        "codestar-notifications>DescribeNotificationRule",
        "codestar-notifications>UpdateNotificationRule",
        "codestar-notifications>DeleteNotificationRule",
        "codestar-notifications>Subscribe",
        "codestar-notifications>Unsubscribe"
    ],
    "Resource": "*",
    "Condition": {
        "StringLike" : {"codestar-notifications:NotificationsForResource" :
"arn:aws:codebuild:*"}
    }
},
{
    "Sid": "CodeStarNotificationsListAccess",
    "Effect": "Allow",
    "Action": [
        "codestar-notifications>ListNotificationRules",
        "codestar-notifications>ListTargets",
        "codestar-notifications>ListTagsForResource",
        "codestar-notifications>ListEventTypes"
    ],
    "Resource": "*"
},
{
    "Sid": "CodeStarNotificationsSNSTopicCreateAccess",
    "Effect": "Allow",
    "Action": [
        "sns>CreateTopic",
        "sns:SetTopicAttributes"
    ],
    "Resource": "arn:aws:sns:*::codestar-notifications*"
},
{
    "Sid": "SNSTopicListAccess",
    "Effect": "Allow",
    "Action": [
        "sns>ListTopics"
    ],
    "Resource": "*"
},
{
    "Sid": "CodeStarNotificationsChatbotAccess",
```

```

    "Effect": "Allow",
    "Action": [
        "chatbot:DescribeSlackChannelConfigurations",
        "chatbot>ListMicrosoftTeamsChannelConfigurations"
    ],
    "Resource": "*"
}

```

## Permissions related to notifications in read-only managed policies

The AWSCodeBuildReadOnlyAccess managed policy includes the following statements to allow read-only access to notifications. Users with this managed policy applied can view notifications for resources, but cannot create, manage, or subscribe to them.

```

{
    "Sid": "CodeStarNotificationsPowerUserAccess",
    "Effect": "Allow",
    "Action": [
        "codestar-notifications:DescribeNotificationRule"
    ],
    "Resource": "*",
    "Condition": {
        "StringLike": {"codestar-notifications:NotificationsForResource" :
            "arn:aws:codebuild:*"}
    }
},
{
    "Sid": "CodeStarNotificationsListAccess",
    "Effect": "Allow",
    "Action": [
        "codestar-notifications>ListNotificationRules",
        "codestar-notifications>ListEventTypes",
        "codestar-notifications>ListTargets"
    ],
    "Resource": "*"
}

```

## Permissions related to notifications in other managed policies

The AWSCodeBuildDeveloperAccess managed policy includes the following statements to allow users to create, edit, and subscribe to notifications. Users cannot delete notification rules or manage tags for resources.

```

{
    "Sid": "CodeStarNotificationsReadWriteAccess",
    "Effect": "Allow",
    "Action": [
        "codestar-notifications>CreateNotificationRule",
        "codestar-notifications:DescribeNotificationRule",
        "codestar-notifications:UpdateNotificationRule",
        "codestar-notifications:Subscribe",
        "codestar-notifications:Unsubscribe"
    ],
    "Resource": "*",
    "Condition": {
        "StringLike": {"codestar-notifications:NotificationsForResource" :
            "arn:aws:codebuild*"}
    }
},
{
    "Sid": "CodeStarNotificationsListAccess",
    "Effect": "Allow",

```

```

        "Action": [
            "codestar-notifications>ListNotificationRules",
            "codestar-notifications>ListTargets",
            "codestar-notifications>ListTagsForResource",
            "codestar-notifications>ListEventTypes"
        ],
        "Resource": "*"
    },
    {
        "Sid": "SNSTopicListAccess",
        "Effect": "Allow",
        "Action": [
            "sns>ListTopics"
        ],
        "Resource": "*"
    },
    {
        "Sid": "CodeStarNotificationsChatbotAccess",
        "Effect": "Allow",
        "Action": [
            "chatbot>DescribeSlackChannelConfigurations",
            "chatbot>ListMicrosoftTeamsChannelConfigurations"
        ],
        "Resource": "*"
    }
}

```

For more information about IAM and notifications, see [Identity and Access Management for AWS CodeStar Notifications](#).

## CodeBuild updates to AWS managed policies

View details about updates to AWS managed policies for CodeBuild since this service began tracking these changes. For automatic alerts about changes to this page, subscribe to the RSS feed on [AWS CodeBuild User Guide document history \(p. 441\)](#).

| Change                                                                                | Description                                                                                                                                                                                                                                                                                | Date         |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| AWSCodeBuildAdminAccess and AWSCodeBuildDeveloperAccess – Update to existing policies | <p>CodeBuild added a permission to these policies to support an additional notification type using AWS Chatbot.</p> <p>The AWSCodeBuildAdminAccess and AWSCodeBuildDeveloperAccess policies have been changed to add a permission, chatbot&gt;ListMicrosoftTeamsChannelConfigurations.</p> | May 16, 2023 |
| CodeBuild started tracking changes                                                    | CodeBuild started tracking changes for its AWS managed policies.                                                                                                                                                                                                                           | May 16, 2021 |

## Customer-managed policy examples

In this section, you can find example user policies that grant permissions for AWS CodeBuild actions. These policies work when you are using the CodeBuild API, AWS SDKs, or AWS CLI. When you are using

the console, you must grant additional, console-specific permissions. For information, see [Permissions required to use the AWS CodeBuild console \(p. 343\)](#).

You can use the following sample IAM policies to limit CodeBuild access for your users and roles.

## Topics

- [Allow a user to get information about build projects \(p. 353\)](#)
- [Allow a user to get information about report groups \(p. 354\)](#)
- [Allow a user to get information about reports \(p. 354\)](#)
- [Allow a user to create build projects \(p. 354\)](#)
- [Allow a user to create a report group \(p. 355\)](#)
- [Allow a user to delete a report group \(p. 355\)](#)
- [Allow a user to delete a report \(p. 355\)](#)
- [Allow a user to delete build projects \(p. 356\)](#)
- [Allow a user to get a list of build project names \(p. 356\)](#)
- [Allow a user to change information about build projects \(p. 356\)](#)
- [Allow a user to change a report group \(p. 357\)](#)
- [Allow a user to get information about builds \(p. 357\)](#)
- [Allow a user to get a list of build IDs for a build project \(p. 357\)](#)
- [Allow a user to get a list of build IDs \(p. 357\)](#)
- [Allow a user to get a list of report groups \(p. 358\)](#)
- [Allow a user to get a list of reports \(p. 358\)](#)
- [Allow a user to get a list of reports for a report group \(p. 358\)](#)
- [Allow a user to get a list of test cases for a report \(p. 359\)](#)
- [Allow a user to start running builds \(p. 359\)](#)
- [Allow a user to attempt to stop builds \(p. 359\)](#)
- [Allow a user to attempt to delete builds \(p. 359\)](#)
- [Allow a user to get information about Docker images that are managed by CodeBuild \(p. 360\)](#)
- [Allow CodeBuild access to AWS services required to create a VPC network interface \(p. 360\)](#)
- [Use a deny statement to prevent AWS CodeBuild from disconnecting from source providers \(p. 361\)](#)

## Allow a user to get information about build projects

The following example policy statement allows a user to get information about build projects in the us-east-2 Region for account 123456789012 for any build project that starts with the name my:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "codebuild:BatchGetProjects",  
            "Resource": "arn:aws:codebuild:us-east-2:123456789012:project/my*"  
        }  
    ]  
}
```

## Allow a user to get information about report groups

The following example policy statement allows a user to get information about report groups in the us-east-2 Region for account 123456789012:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "codebuild:BatchGetReportGroups",  
            "Resource": "arn:aws:codebuild:us-east-2:123456789012:report-group/*"  
        }  
    ]  
}
```

## Allow a user to get information about reports

The following example policy statement allows a user to get information about reports in the us-east-2 Region for account 123456789012:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "codebuild:BatchGetReports",  
            "Resource": "arn:aws:codebuild:us-east-2:123456789012:report-group/*"  
        }  
    ]  
}
```

## Allow a user to create build projects

The following example policy statement allows a user to create build projects with any name but only in the us-east-2 Region for account 123456789012 and only using the specified CodeBuild service role:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "codebuild>CreateProject",  
            "Resource": "arn:aws:codebuild:us-east-2:123456789012:project/*"  
        },  
        {  
            "Effect": "Allow",  
            "Action": "iam:PassRole",  
            "Resource": "arn:aws:iam::123456789012:role/CodeBuildServiceRole"  
        }  
    ]  
}
```

The following example policy statement allows a user to create build projects with any name but only in the us-east-2 Region for account 123456789012 and only using the specified CodeBuild service role. It also enforces that the user can only use the specified service role with AWS CodeBuild and not any other AWS services.

```
{
```

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "codebuild>CreateProject",  
            "Resource": "arn:aws:codebuild:us-east-2:123456789012:project/*"  
        },  
        {  
            "Effect": "Allow",  
            "Action": "iam:PassRole",  
            "Resource": "arn:aws:iam::123456789012:role/CodeBuildServiceRole",  
            "Condition": {  
                "StringEquals": {"iam:PassedToService": "codebuild.amazonaws.com"}  
            }  
        }  
    ]  
}
```

## Allow a user to create a report group

The following example policy statement allows a user to create a report group in the us-east-2 Region for account 123456789012:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "codebuild>CreateReportGroup",  
            "Resource": "arn:aws:codebuild:us-east-2:123456789012:report-group/*"  
        }  
    ]  
}
```

## Allow a user to delete a report group

The following example policy statement allows a user to delete a report group in the us-east-2 Region for account 123456789012:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "codebuild>DeleteReportGroup",  
            "Resource": "arn:aws:codebuild:us-east-2:123456789012:report-group/*"  
        }  
    ]  
}
```

## Allow a user to delete a report

The following example policy statement allows a user to delete a report in the us-east-2 Region for account 123456789012:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "codebuild>DeleteReport",  
            "Resource": "arn:aws:codebuild:us-east-2:123456789012:report/*"  
        }  
    ]  
}
```

```
        "Action": "codebuild>DeleteReport",
        "Resource": "arn:aws:codebuild:us-east-2:123456789012:report-group/*"
    }
}
```

## Allow a user to delete build projects

The following example policy statement allows a user to delete build projects in the us-east-2 Region for account 123456789012 for any build project that starts with the name my:

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": "codebuild>DeleteProject",
            "Resource": "arn:aws:codebuild:us-east-2:123456789012:project/my*"
        }
    ]
}
```

## Allow a user to get a list of build project names

The following example policy statement allows a user to get a list of build project names for the same account:

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": "codebuild>ListProjects",
            "Resource": "*"
        }
    ]
}
```

## Allow a user to change information about build projects

The following example policy statement allows a user to change information about build projects with any name but only in the us-east-2 Region for account 123456789012 and only using the specified AWS CodeBuild service role:

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": "codebuild>UpdateProject",
            "Resource": "arn:aws:codebuild:us-east-2:123456789012:project/*"
        },
        {
            "Effect": "Allow",
            "Action": "iam:PassRole",
            "Resource": "arn:aws:iam::123456789012:role/CodeBuildServiceRole"
        }
    ]
}
```

## Allow a user to change a report group

The following example policy statement allows a user to change a report group in the us-east-2 Region for account 123456789012:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "codebuild:UpdateReportGroup",  
            "Resource": "arn:aws:codebuild:us-east-2:123456789012:report-group/*"  
        }  
    ]  
}
```

## Allow a user to get information about builds

The following example policy statement allows a user to get information about builds in the us-east-2 Region for account 123456789012 for the build projects named my-build-project and my-other-build-project:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "codebuild:BatchGetBuilds",  
            "Resource": [  
                "arn:aws:codebuild:us-east-2:123456789012:project/my-build-project",  
                "arn:aws:codebuild:us-east-2:123456789012:project/my-other-build-project"  
            ]  
        }  
    ]  
}
```

## Allow a user to get a list of build IDs for a build project

The following example policy statement allows a user to get a list of build IDs in the us-east-2 Region for account 123456789012 for the build projects named my-build-project and my-other-build-project:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "codebuild>ListBuildsForProject",  
            "Resource": [  
                "arn:aws:codebuild:us-east-2:123456789012:project/my-build-project",  
                "arn:aws:codebuild:us-east-2:123456789012:project/my-other-build-project"  
            ]  
        }  
    ]  
}
```

## Allow a user to get a list of build IDs

The following example policy statement allows a user to get a list of all build IDs for the same account:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "codebuild>ListBuilds",  
            "Resource": "*"  
        }  
    ]  
}
```

## Allow a user to get a list of report groups

The following example policy statement allows a user to get a list of report groups in the us-east-2 Region for account 123456789012:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "codebuild>ListReportGroups",  
            "Resource": "*"  
        }  
    ]  
}
```

## Allow a user to get a list of reports

The following example policy statement allows a user to get a list of reports in the us-east-2 Region for account 123456789012:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "codebuild>ListReports",  
            "Resource": "*"  
        }  
    ]  
}
```

## Allow a user to get a list of reports for a report group

The following example policy statement allows a user to get a list of reports for a report group in the us-east-2 Region for account 123456789012:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "codebuild>ListReportsForReportGroup",  
            "Resource": "arn:aws:codebuild:us-east-2:123456789012:report-group/*"  
        }  
    ]  
}
```

## Allow a user to get a list of test cases for a report

The following example policy statement allows a user to get a list of test cases for a report in the us-east-2 Region for account 123456789012:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "codebuild:DescribeTestCases",  
            "Resource": "arn:aws:codebuild:us-east-2:123456789012:report-group/*"  
        }  
    ]  
}
```

## Allow a user to start running builds

The following example policy statement allows a user to run builds in the us-east-2 Region for account 123456789012 for a build project that starts with the name my:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "codebuild:StartBuild",  
            "Resource": "arn:aws:codebuild:us-east-2:123456789012:project/my*"  
        }  
    ]  
}
```

## Allow a user to attempt to stop builds

The following example policy statement allows a user to attempt to stop running builds only in the us-east-2 region for account 123456789012 for any build project that starts with the name my:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "codebuild:StopBuild",  
            "Resource": "arn:aws:codebuild:us-east-2:123456789012:project/my*"  
        }  
    ]  
}
```

## Allow a user to attempt to delete builds

The following example policy statement allows a user to attempt to delete builds only in the us-east-2 Region for account 123456789012 for any build project that starts with the name my:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": "codebuild:BatchDeleteBuilds",  
            "Resource": "arn:aws:codebuild:us-east-2:123456789012:project/my*"  
        }  
    ]  
}
```

```
        "Resource": "arn:aws:codebuild:us-east-2:123456789012:project/my*"
    }
]
```

## Allow a user to get information about Docker images that are managed by CodeBuild

The following example policy statement allows a user to get information about all Docker images that are managed by CodeBuild:

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": "codebuild>ListCuratedEnvironmentImages",
      "Resource": "*"
    }
  ]
}
```

## Allow CodeBuild access to AWS services required to create a VPC network interface

The following example policy statement grants AWS CodeBuild permission to create a network interface in a VPC with two subnets:

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "ec2>CreateNetworkInterface",
        "ec2>DescribeDhcpOptions",
        "ec2>DescribeNetworkInterfaces",
        "ec2>DeleteNetworkInterface",
        "ec2>DescribeSubnets",
        "ec2>DescribeSecurityGroups",
        "ec2>DescribeVpcs"
      ],
      "Resource": "*"
    },
    {
      "Effect": "Allow",
      "Action": [
        "ec2>CreateNetworkInterfacePermission"
      ],
      "Resource": "arn:aws:ec2:region:account-id:network-interface/*",
      "Condition": {
        "StringEquals": {
          "ec2:AuthorizedService": "codebuild.amazonaws.com"
        },
        "ArnEquals": [
          "ec2:Subnet": [
            "arn:aws:ec2:region:account-id:subnet/subnet-id-1",
            "arn:aws:ec2:region:account-id:subnet/subnet-id-2"
          ]
        }
      }
    }
}
```

```
        ]
    }
```

## Use a deny statement to prevent AWS CodeBuild from disconnecting from source providers

The following example policy statement uses a deny statement to prevent AWS CodeBuild from disconnecting from source providers. It uses `codebuild:DeleteOAuthToken`, which is the inverse of `codebuild:PersistOAuthToken` and `codebuild:ImportSourceCredentials`, to connect with source providers. For more information, see [Permissions required for the AWS CodeBuild console to connect to source providers \(p. 344\)](#).

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Deny",
      "Action": "codebuild:DeleteOAuthToken",
      "Resource": "*"
    }
  ]
}
```

## AWS CodeBuild permissions reference

You can use AWS-wide condition keys in your AWS CodeBuild policies to express conditions. For a list, see [Available Keys](#) in the *IAM User Guide*.

You specify the actions in the policy's Action field. To specify an action, use the `codebuild:` prefix followed by the API operation name (for example, `codebuild:CreateProject` and `codebuild:StartBuild`). To specify multiple actions in a single statement, separate them with commas (for example, "Action": [ "codebuild:CreateProject", "codebuild:StartBuild" ]).

### Using Wildcard Characters

You specify an ARN, with or without a wildcard character (\*), as the resource value in the policy's Resource field. You can use a wildcard to specify multiple actions or resources. For example, `codebuild:*` specifies all CodeBuild actions and `codebuild:Batch*` specifies all CodeBuild actions that begin with the word Batch. The following example grants access to all build project with names that begin with my:

```
arn:aws:codebuild:us-east-2:123456789012:project/my*
```

### CodeBuild API operations and required permissions for actions

#### BatchDeleteBuilds

**Action:** `codebuild:BatchDeleteBuilds`

Required to delete builds.

**Resource:** `arn:aws:codebuild:region-ID:account-ID:project/project-name`

#### BatchGetBuilds

**Action:** `codebuild:BatchGetBuilds`

Required to get information about builds.

**Resource:** arn:aws:codebuild:*region-ID*:*account-ID*:project/*project-name*  
BatchGetProjects

**Action:** codebuild:BatchGetProjects

Required to get information about build projects.

**Resource:** arn:aws:codebuild:*region-ID*:*account-ID*:project/*project-name*  
BatchGetReportGroups

**Action:** codebuild:BatchGetReportGroups

Required to get information about report groups.

**Resource:** arn:aws:codebuild:*region-ID*:*account-ID*:report-group/*report-group-name*

BatchGetReports

**Action:** codebuild:BatchGetReports

Required to get information about reports.

**Resource:** arn:aws:codebuild:*region-ID*:*account-ID*:report-group/*report-group-name*

BatchPutTestCases <sup>1</sup>

**Action:** codebuild:BatchPutTestCases

Required to create or update a test report.

**Resource:** arn:aws:codebuild:*region-ID*:*account-ID*:report-group/*report-group-name*

CreateProject

**Actions:** codebuild:CreateProject, iam:PassRole

Required to create build projects.

**Resources:**

- arn:aws:codebuild:*region-ID*:*account-ID*:project/*project-name*
- arn:aws:iam::*account-ID*:role/*role-name*

CreateReport <sup>1</sup>

**Action:** codebuild>CreateReport

Required to create a test report.

**Resource:** arn:aws:codebuild:*region-ID*:*account-ID*:report-group/*report-group-name*

CreateReportGroup

**Action:** codebuild>CreateReportGroup

Required to create a report group.

**Resource:** arn:aws:codebuild:*region-ID*:*account-ID*:report-group/*report-group-name*

CreateWebhook

**Action:** codebuild:CreateWebhook

Required to create a webhook.

**Resource:** arn:aws:codebuild:*region-ID*:*account-ID*:project/*project-name*

DeleteProject

**Action:** codebuild:DeleteProject

Required to delete a CodeBuild project.

**Resource:** arn:aws:codebuild:*region-ID*:*account-ID*:project/*project-name*

DeleteReport

**Action:** codebuild:DeleteReport

Required to delete a report.

**Resource:** arn:aws:codebuild:*region-ID*:*account-ID*:report-group/*report-group-name*

DeleteReportGroup

**Action:** codebuild:DeleteReportGroup

Required to delete a report group.

**Resource:** arn:aws:codebuild:*region-ID*:*account-ID*:report-group/*report-group-name*

DeleteSourceCredentials

**Action:** codebuild:DeleteSourceCredentials

Required to delete a set of SourceCredentialsInfo objects that contain information about credentials for a GitHub, GitHub Enterprise Server, or Bitbucket repository.

**Resource:** \*

DeleteWebhook

**Action:** codebuild:DeleteWebhook

Required to create a webhook.

**Resource:** arn:aws:codebuild:*region-ID*:*account-ID*:project/*project-name*

DescribeTestCases

**Action:** codebuild:DescribeTestCases

Required to return a paginated list of test cases.

**Resource:** arn:aws:codebuild:*region-ID*:*account-ID*:report-group/*report-group-name*

ImportSourceCredentials

**Action:** codebuild:ImportSourceCredentials

Required to import a set of `SourceCredentialsInfo` objects that contain information about credentials for a GitHub, GitHub Enterprise Server, or Bitbucket repository.

**Resource:** \*

`InvalidateProjectCache`

**Action:** `codebuild:InvalidateProjectCache`

Required to reset the cache for a project.

**Resource:** `arn:aws:codebuild:region-ID:account-ID:project/project-name`

`ListBuildBatches`

**Action:** `codebuild>ListBuildBatches`

Required to get a list of build batch IDs.

**Resource:** \*

`ListBuildBatchesForProject`

**Action:** `codebuild>ListBuildBatchesForProject`

Required to get a list of build batch IDs for a specific project.

**Resource:** `arn:aws:codebuild:region-ID:account-ID:project/project-name`

`ListBuilds`

**Action:** `codebuild>ListBuilds`

Required to get a list of build IDs.

**Resource:** \*

`ListBuildsForProject`

**Action:** `codebuild>ListBuildsForProject`

Required to get a list of build IDs for a build project.

**Resource:** `arn:aws:codebuild:region-ID:account-ID:project/project-name`

`ListCuratedEnvironmentImages`

**Action:** `codebuild>ListCuratedEnvironmentImages`

Required to get information about all Docker images that are managed by AWS CodeBuild.

**Resource:** \* (required, but does not refer to an addressable AWS resource)

`ListProjects`

**Action:** `codebuild>ListProjects`

Required to get a list of build project names.

**Resource:** \*

`ListReportGroups`

**Action:** `codebuild>ListReportGroups`

Required to get a list of report groups.

**Resource:** \*

ListReports

**Action:** codebuild:ListReports

Required to get a list of reports.

**Resource:** \*

ListReportsForReportGroup

**Action:** codebuild>ListReportsForReportGroup

Required to get a list of reports for a report group.

**Resource:** arn:aws:codebuild:*region-ID*:*account-ID*:report-group/*report-group-name*

RetryBuild

**Action:** codebuild:RetryBuild

Required to retry builds.

**Resource:** arn:aws:codebuild:*region-ID*:*account-ID*:project/*project-name*

StartBuild

**Action:** codebuild:StartBuild

Required to start running builds.

**Resource:** arn:aws:codebuild:*region-ID*:*account-ID*:project/*project-name*

StopBuild

**Action:** codebuild:StopBuild

Required to attempt to stop running builds.

**Resource:** arn:aws:codebuild:*region-ID*:*account-ID*:project/*project-name*

UpdateProject

**Actions:** codebuild:UpdateProject, iam:PassRole

Required to change information about builds.

**Resources:**

- arn:aws:codebuild:*region-ID*:*account-ID*:project/*project-name*
- arn:aws:iam::*account-ID*:role/*role-name*

UpdateProjectVisibility

**Actions:** codebuild:UpdateProjectVisibility, iam:PassRole

Required to change the public visibility of a project's builds.

**Resources:**

- `arn:aws:codebuild:region-ID:account-ID:project/project-name`
- `arn:aws:iam::account-ID:role/role-name`

UpdateReport<sup>1</sup>

**Action:** codebuild:UpdateReport

Required to create or update a test report.

**Resource:** `arn:aws:codebuild:region-ID:account-ID:report-group/report-group-name`

UpdateReportGroup

**Action:** codebuild:UpdateReportGroup

Required to update a report group.

**Resource:** `arn:aws:codebuild:region-ID:account-ID:report-group/report-group-name`

UpdateWebhook

**Action:** codebuild:UpdateWebhook

Required to update a webhook.

**Resource:** `arn:aws:codebuild:region-ID:account-ID:project/project-name`

<sup>1</sup> Used for permission only. There is no API for this action.

## Using tags to control access to AWS CodeBuild resources

Conditions in IAM policy statements are part of the syntax that you can use to specify permissions to CodeBuild project-based actions. You can create a policy that allows or denies actions on projects based on the tags associated with those projects, and then apply those policies to the IAM groups you configure for managing users. For information about applying tags to a project using the console or AWS CLI, see [Create a build project in AWS CodeBuild \(p. 187\)](#). For information about applying tags using the CodeBuild SDK, see [CreateProject](#) and [Tags](#) in the *CodeBuild API Reference*. For information about using tags to control access to AWS resources, see [Controlling Access to AWS Resources Using Resource Tags](#) in the *IAM User Guide*.

### Example Example 1: Limit CodeBuild project actions based on resource tags

The following example denies all BatchGetProjects actions on projects tagged with the key Environment with the key value of Production. A user's administrator must attach this IAM policy in addition to the managed user policy to unauthorized users. The `aws:ResourceTag` condition key is used to control access to resources based on their tags.

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Deny",  
            "Action": [  
                "codebuild:BatchGetProjects"  
            ],  
            "Condition": {  
                "StringLike": {  
                    "aws:ResourceTag/Environment": "Production"  
                }  
            }  
        }  
    ]  
}
```

```

        "Resource": "*",
        "Condition": {
            "ForAnyValue:StringEquals": {
                "aws:ResourceTag/Environment": "Production"
            }
        }
    ]
}

```

### **Example Example 2: Limit CodeBuild project actions based on request tags**

The following policy denies users permission to the `CreateProject` action if the request contains a tag with the key `Environment` and the key value `Production`. In addition, the policy prevents these unauthorized users from modifying projects by using the `aws:TagKeys` condition key to not allow `UpdateProject` if the request contains a tag with the key `Environment`. An administrator must attach this IAM policy in addition to the managed user policy to users who are not authorized to perform these actions. The `aws:RequestTag` condition key is used to control which tags can be passed in an IAM request

```

{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Deny",
            "Action": [
                "codebuild:CreateProject"
            ],
            "Resource": "*",
            "Condition": {
                "ForAnyValue:StringEquals": {
                    "aws:RequestTag/Environment": "Production"
                }
            }
        },
        {
            "Effect": "Deny",
            "Action": [
                "codebuild:UpdateProject"
            ],
            "Resource": "*",
            "Condition": {
                "ForAnyValue:StringEquals": {
                    "aws:TagKeys": ["Environment"]
                }
            }
        }
    ]
}

```

### **Example Example 3: Deny or allow actions on report groups based on resource tags**

You can create a policy that allows or denies actions on CodeBuild resources (projects and report groups) based on the AWS tags associated with those resources, and then apply those policies to the IAM groups you configure for managing users. For example, you can create a policy that denies all CodeBuild actions on any report group with the AWS tag key `Status` and the key value of `Secret`, and then apply that policy to the IAM group you created for general developers (*Developers*). You then need to make sure that the developers working on those tagged report groups are not members of that general *Developers* group, but belong instead to a different IAM group that does not have the restrictive policy applied (*SecretDevelopers*).

The following example denies all CodeBuild actions on report groups tagged with the key `Status` and the key value of `Secret`:

```
{
  "Version": "2012-10-17",
  "Statement" : [
    {
      "Effect" : "Deny",
      "Action" : [
        "codebuild:BatchGetReportGroups",
        "codebuild>CreateReportGroup",
        "codebuild>DeleteReportGroup",
        "codebuild>ListReportGroups",
        "codebuild>ListReportsForReportGroup",
        "codebuild:UpdateReportGroup"
      ],
      "Resource" : "*",
      "Condition" : {
        "StringEquals" : "aws:ResourceTag/Status: "Secret"
      }
    }
  ]
}
```

#### **Example Example 4: Limit CodeBuild actions to AWSCodeBuildDeveloperAccess based on resource tags**

You can create policies that allow CodeBuild actions on all report groups and projects that are not tagged with specific tags. For example, the following policy allows the equivalent of [AWSCodeBuildDeveloperAccess \(p. 347\)](#) permissions for all report groups and projects except those tagged with the specified tags:

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "codebuild:StartBuild",
        "codebuild:StopBuild",
        "codebuild:BatchGet*",
        "codebuild:GetResourcePolicy",
        "codebuild:DescribeTestCases",
        "codebuild>List*",
        "codecommit:GetBranch",
        "codecommit:GetCommit",
        "codecommit:getRepository",
        "codecommit>ListBranches",
        "cloudwatch:GetMetricStatistics",
        "events:DescribeRule",
        "events>ListTargetsByRule",
        "events>ListRuleNamesByTarget",
        "logs:GetLogEvents",
        "s3:GetBucketLocation",
        "s3>ListAllMyBuckets"
      ],
      "Resource": "*",
      "Condition": {
        "StringNotEquals": {
          "aws:ResourceTag/Status: "Secret",
          "aws:ResourceTag/Team: "Saanvi"
        }
      }
    }
  ]
}
```

```
    ]  
}
```

## Viewing resources in the console

The AWS CodeBuild console requires the `ListRepositories` permission to display a list of repositories for your AWS account in the AWS Region where you are signed in. The console also includes a **Go to resource** function to quickly perform a case insensitive search for resources. This search is performed in your AWS account in the AWS Region where you are signed in. The following resources are displayed across the following services:

- AWS CodeBuild: Build projects
- AWS CodeCommit: Repositories
- AWS CodeDeploy: Applications
- AWS CodePipeline: Pipelines

To perform this search across resources in all services, you must have the following permissions:

- `CodeBuild: ListProjects`
- `CodeCommit: ListRepositories`
- `CodeDeploy: ListApplications`
- `CodePipeline: ListPipelines`

Results are not returned for a service's resources if you do not have permissions for that service. Even if you have permissions for viewing resources, some resources are not returned if there is an explicit Deny to view those resources.

## Compliance validation for AWS CodeBuild

Third-party auditors assess the security and compliance of AWS CodeBuild as part of multiple AWS compliance programs. These include SOC, PCI, FedRAMP, HIPAA, and others.

For a list of AWS services in scope of specific compliance programs, see [AWS services in scope by compliance program](#). For general information, see [AWS compliance programs](#).

You can download third-party audit reports using AWS Artifact. For more information, see [Downloading reports in AWS Artifact](#).

Your compliance responsibility when using CodeBuild is determined by the sensitivity of your data, your company's compliance objectives, and applicable laws and regulations. If your use of CodeBuild is subject to compliance with standards such as HIPAA, PCI, or FedRAMP, AWS provides resources to help:

- [Security and compliance quick start guides](#) – These deployment guides discuss architectural considerations and provide steps for deploying security- and compliance-focused baseline environments on AWS.
- [Architecting for HIPAA Security and Compliance Whitepaper](#) – This whitepaper describes how companies can use AWS to create HIPAA-compliant applications.
- [AWS compliance resources](#) – This collection of workbooks and guides might apply to your industry and location.
- [AWS Config](#) – This AWS service assesses how well your resource configurations comply with internal practices, industry guidelines, and regulations.

- [AWS Security Hub](#) – Monitor your usage of AWS CodeBuild as it relates to security best practices by using [AWS Security Hub](#). Security Hub uses security controls to evaluate resource configurations and security standards to help you comply with various compliance frameworks. For more information about using Security Hub to evaluate CodeBuild resources, see [AWS CodeBuild controls](#) in the AWS Security Hub User Guide.

## Resilience in AWS CodeBuild

The AWS global infrastructure is built around AWS Regions and Availability Zones. AWS Regions provide multiple physically separated and isolated Availability Zones, which are connected with low-latency, high-throughput, and highly redundant networking. With Availability Zones, you can design and operate applications and databases that automatically fail over between Availability Zones without interruption. Availability Zones are more highly available, fault tolerant, and scalable than traditional single or multiple data center infrastructures.

For more information about AWS Regions and Availability Zones, see [AWS global infrastructure](#).

## Infrastructure security in AWS CodeBuild

As a managed service, AWS CodeBuild is protected by AWS global network security. For information about AWS security services and how AWS protects infrastructure, see [AWS Cloud Security](#). To design your AWS environment using the best practices for infrastructure security, see [Infrastructure Protection](#) in [Security Pillar AWS Well-Architected Framework](#).

You use AWS published API calls to access CodeBuild through the network. Clients must support the following:

- Transport Layer Security (TLS). We require TLS 1.2 and recommend TLS 1.3.
- Cipher suites with perfect forward secrecy (PFS) such as DHE (Ephemeral Diffie-Hellman) or ECDHE (Elliptic Curve Ephemeral Diffie-Hellman). Most modern systems such as Java 7 and later support these modes.

Additionally, requests must be signed by using an access key ID and a secret access key that is associated with an IAM principal. Or you can use the [AWS Security Token Service](#) (AWS STS) to generate temporary security credentials to sign requests.

## Access your source provider in CodeBuild

For GitHub or GitHub Enterprise Server, you use a personal access token to access the source provider. For Bitbucket, you use an app password to access the source provider.

### Topics

- [GitHub and GitHub Enterprise Server access token \(p. 370\)](#)
- [Bitbucket app password \(p. 373\)](#)

## GitHub and GitHub Enterprise Server access token

### Access token prerequisites

Before you begin, you must add the proper permission scopes to your GitHub access token.

For GitHub, your personal access token must have the following scopes.

- **repo**: Grants full control of private repositories.
- **repo:status**: Grants read/write access to public and private repository commit statuses.
- **admin:repo\_hook**: Grants full control of repository hooks. This scope is not required if your token has the **repo** scope.

For more information, see [Understanding scopes for OAuth apps](#) on the GitHub website.

## Connect GitHub with an access token (console)

To use the console to connect your project to GitHub using an access token, do the following when you create a project. For information, see [Create a build project \(console\) \(p. 188\)](#).

1. For **Source provider**, choose **GitHub**.
2. For **Repository**, choose **Connect with a GitHub personal access token**.
3. In **GitHub personal access token**, enter your GitHub personal access token.
4. Choose **Save token**.

## Connect GitHub with an access token (CLI)

Follow these steps to use the AWS CLI to connect your project to GitHub using an access token. For information about using the AWS CLI with AWS CodeBuild, see the [Command line reference \(p. 388\)](#).

1. Run the **import-source-credentials** command:

```
aws codebuild import-source-credentials --generate-cli-skeleton
```

JSON-formatted data appears in the output. Copy the data to a file (for example, *import-source-credentials.json*) in a location on the local computer or instance where the AWS CLI is installed. Modify the copied data as follows, and save your results.

```
{  
  "serverType": "server-type",  
  "authType": "auth-type",  
  "shouldOverwrite": "should-overwrite",  
  "token": "token",  
  "username": "username"  
}
```

Replace the following:

- **server-type**: Required value. The source provider used for this credential. Valid values are GITHUB or GITHUB\_ENTERPRISE.
- **auth-type**: Required value. The type of authentication used to connect to a GitHub or GitHub Enterprise Server repository. Valid values include PERSONAL\_ACCESS\_TOKEN and BASIC\_AUTH. You cannot use the CodeBuild API to create an OAUTH connection. You must use the CodeBuild console instead.
- **should-overwrite**: Optional value. Set to `false` to prevent overwriting the repository source credentials. Set to `true` to overwrite the repository source credentials. The default value is `true`.
- **token**: Required value. For GitHub or GitHub Enterprise Server, this is the personal access token.
- **username**: Optional value. This parameter is ignored for GitHub and GitHub Enterprise Server source providers.

2. To connect your account with an access token, switch to the directory that contains the `import-source-credentials.json` file you saved in step 1 and run the **import-source-credentials** command again.

```
aws codebuild import-source-credentials --cli-input-json file://import-source-credentials.json
```

JSON-formatted data appears in the output with an Amazon Resource Name (ARN).

```
{  
  "arn": "arn:aws:codebuild:region:account-id:token/server-type"  
}
```

**Note**

If you run the **import-source-credentials** command with the same server type and auth type a second time, the stored access token is updated.

After your account is connected with an access token, you can use `create-project` to create your CodeBuild project. For more information, see [Create a build project \(AWS CLI\) \(p. 198\)](#).

3. To view the connected access tokens, run the **list-source-credentials** command.

```
aws codebuild list-source-credentials
```

A JSON-formatted `sourceCredentialsInfos` object appears in the output:

```
{  
  "sourceCredentialsInfos": [  
    {  
      "authType": "auth-type",  
      "serverType": "server-type",  
      "arn": "arn"  
    }  
  ]  
}
```

The `sourceCredentialsObject` contains a list of connected source credentials information:

- The `authType` is the type of authentication used by credentials. This can be OAUTH, BASIC\_AUTH, or PERSONAL\_ACCESS\_TOKEN.
  - The `serverType` is the type of source provider. This can be GITHUB, GITHUB\_ENTERPRISE, or BITBUCKET.
  - The `arn` is the ARN of the token.
4. To disconnect from a source provider and remove its access tokens, run the **delete-source-credentials** command with its ARN.

```
aws codebuild delete-source-credentials --arn arn-of-your-credentials
```

JSON-formatted data is returned with an ARN of the deleted credentials.

```
{  
  "arn": "arn:aws:codebuild:region:account-id:token/server-type"  
}
```

## Bitbucket app password

### App password prerequisites

Before you begin, you must add the proper permission scopes to your Bitbucket app password.

For Bitbucket, your app password must have the following scopes.

- **repository:read**: Grants read access to all the repositories to which the authorizing user has access.
- **pullrequest:read**: Grants read access to pull requests. If your project has a Bitbucket webhook, then your app password must have this scope.
- **webhook**: Grants access to webhooks. If your project has a webhook operation, then your app password must have this scope.

For more information, see [Scopes for Bitbucket Cloud REST API](#) and [OAuth on Bitbucket Cloud](#) on the Bitbucket website.

### Connect Bitbucket with an app password (console)

To use the console to connect your project to Bitbucket using an app password, do the following when you create a project. For information, see [Create a build project \(console\) \(p. 188\)](#).

1. For **Source provider**, choose **Bitbucket**.

**Note**

CodeBuild does not support Bitbucket Server.

2. For **Repository**, choose **Connect with a Bitbucket app password**.
3. In **Bitbucket username**, enter your Bitbucket user name.
4. In **Bitbucket app password**, enter your Bitbucket app password.
5. Choose **Save Bitbucket credentials**.

### Connect Bitbucket with an app password (CLI)

Follow these steps to use the AWS CLI to connect your project to Bitbucket using an app password. For information about using the AWS CLI with AWS CodeBuild, see the [Command line reference \(p. 388\)](#).

1. Run the **import-source-credentials** command:

```
aws codebuild import-source-credentials --generate-cli-skeleton
```

JSON-formatted data appears in the output. Copy the data to a file (for example, *import-source-credentials.json*) in a location on the local computer or instance where the AWS CLI is installed. Modify the copied data as follows, and save your results.

```
{  
    "serverType": "BITBUCKET",  
    "authType": "auth-type",  
    "shouldOverwrite": "should-overwrite",  
    "token": "token",  
    "username": "username"  
}
```

Replace the following:

- **auth-type**: Required value. The type of authentication used to connect to a Bitbucket repository. Valid values include PERSONAL\_ACCESS\_TOKEN and BASIC\_AUTH. You cannot use the CodeBuild API to create an OAUTH connection. You must use the CodeBuild console instead.
  - **should-overwrite**: Optional value. Set to false to prevent overwriting the repository source credentials. Set to true to overwrite the repository source credentials. The default value is true.
  - **token**: Required value. For Bitbucket, this is the app password.
  - **username**: Optional value. The Bitbucket user name when authType is BASIC\_AUTH. This parameter is ignored for other types of source providers or connections.
2. To connect your account with an app password, switch to the directory that contains the import-source-credentials.json file you saved in step 1 and run the **import-source-credentials** command again.

```
aws codebuild import-source-credentials --cli-input-json file://import-source-credentials.json
```

JSON-formatted data appears in the output with an Amazon Resource Name (ARN).

```
{  
    "arn": "arn:aws:codebuild:region:account-id:token:server-type"  
}
```

**Note**

If you run the **import-source-credentials** command with the same server type and auth type a second time, the stored access token is updated.

After your account is connected with an app password, you can use **create-project** to create your CodeBuild project. For more information, see [Create a build project \(AWS CLI\) \(p. 198\)](#).

3. To view the connected app passwords, run the **list-source-credentials** command.

```
aws codebuild list-source-credentials
```

A JSON-formatted sourceCredentialsInfos object appears in the output:

```
{  
    "sourceCredentialsInfos": [  
        {  
            "authType": "auth-type",  
            "serverType": "BITBUCKET",  
            "arn": "arn"  
        }  
    ]  
}
```

The sourceCredentialsObject contains a list of connected source credentials information:

- The authType is the type of authentication used by credentials. This can be OAUTH, BASIC\_AUTH, or PERSONAL\_ACCESS\_TOKEN.
  - The arn is the ARN of the token.
4. To disconnect from a source provider and remove its app password, run the **delete-source-credentials** command with its ARN.

```
aws codebuild delete-source-credentials --arn arn-of-your-credentials
```

JSON-formatted data is returned with an ARN of the deleted credentials.

```
{  
    "arn": "arn:aws:codebuild:region:account-id:token/server-type"  
}
```

## Cross-service confused deputy prevention

The confused deputy problem is a security issue where an entity that doesn't have permission to perform an action can coerce a more-privileged entity to perform the action. In AWS, cross-service impersonation can result in the confused deputy problem. Cross-service impersonation can occur when one service (the *calling service*) calls another service (the *called service*). The calling service can be manipulated to use its permissions to act on another customer's resources in a way it should not otherwise have permission to access. To prevent this, AWS provides tools that help you protect your data for all services with service principals that have been given access to resources in your account.

We recommend using the [aws:SourceArn](#) and [aws:SourceAccount](#) global condition context keys in resource policies to limit the permissions that AWS CodeBuild gives another service to the resource. Use `aws:SourceArn` if you want only one resource to be associated with the cross-service access. Use `aws:SourceAccount` if you want to allow any resource in that account to be associated with the cross-service use.

The most effective way to protect against the confused deputy problem is to use the `aws:SourceArn` global condition context key with the full ARN of the resource. If you don't know the full ARN of the resource or if you are specifying multiple resources, use the `aws:SourceArn` global context condition key with wildcard characters (\*) for the unknown portions of the ARN. For example, `arn:aws:codebuild:*:123456789012:*`.

If the `aws:SourceArn` value does not contain the account ID, such as an Amazon S3 bucket ARN, you must use both global condition context keys to limit permissions.

The value of `aws:SourceArn` must be the CodeBuild project ARN.

The following example shows how you can use the `aws:SourceArn` and `aws:SourceAccount` global condition context keys in CodeBuild to prevent the confused deputy problem.

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Principal": {  
                "Service": "codebuild.amazonaws.com"  
            },  
            "Action": "sts:AssumeRole",  
            "Condition": {  
                "StringEquals": {  
                    "aws:SourceArn": "arn:aws:codebuild:region-ID:account-ID:project/project-name"  
                }  
            }  
        }  
    ]  
}
```

# Advanced topics

This section includes several advanced topics that are useful to more experienced AWS CodeBuild users.

## Topics

- [Advanced setup \(p. 376\)](#)
- [Command line reference for AWS CodeBuild \(p. 388\)](#)
- [AWS SDKs and tools reference for AWS CodeBuild \(p. 389\)](#)
- [Specify the AWS CodeBuild endpoint \(p. 389\)](#)
- [Run AWS CodeBuild directly \(p. 391\)](#)
- [Use AWS CodePipeline with AWS CodeBuild to test code and run builds \(p. 392\)](#)
- [Use AWS CodeBuild with Jenkins \(p. 404\)](#)
- [Use AWS CodeBuild with Codecov \(p. 405\)](#)
- [Use AWS CodeBuild with serverless applications \(p. 408\)](#)

## Advanced setup

If you follow the steps in [Getting started using the console \(p. 5\)](#) to access AWS CodeBuild for the first time, you most likely do not need the information in this topic. However, as you continue using CodeBuild, you might want to do things such as give IAM groups and users in your organization access to CodeBuild, modify existing service roles in IAM or AWS KMS keys to access CodeBuild, or set up the AWS CLI across your organization's workstations to access CodeBuild. This topic describes how to complete the related setup steps.

We assume you already have an AWS account. However, if you do not already have one, go to <http://aws.amazon.com>, choose **Sign In to the Console**, and follow the online instructions.

## Topics

- [Add CodeBuild access permissions to an IAM group or user \(p. 376\)](#)
- [Create a CodeBuild service role \(p. 381\)](#)
- [Create and configure a customer managed key for CodeBuild \(p. 386\)](#)
- [Install and configure the AWS CLI \(p. 387\)](#)

## Add CodeBuild access permissions to an IAM group or user

To access AWS CodeBuild with an IAM group or user, you must add access permissions. This section describes how to do this with the IAM console or the AWS CLI.

If you will access CodeBuild with your AWS root account (not recommended) or an administrator user in your AWS account, then you do not need to follow these instructions.

For information about AWS root accounts and administrator users, see [The AWS account root user](#) and [Creating Your First AWS account root user and Group](#) in the *user Guide*.

## To add CodeBuild access permissions to an IAM group or user (console)

1. Open the IAM console at <https://console.aws.amazon.com/iam/>.

You should have already signed in to the AWS Management Console by using one of the following:

- Your AWS root account. This is not recommended. For more information, see [The AWS account root user](#) in the *user Guide*.
- An administrator user in your AWS account. For more information, see [Creating Your First AWS account root user and Group](#) in the *user Guide*.
- An user in your AWS account with permission to perform the following minimum set of actions:

```
iam:AttachGroupPolicy
iam:AttachUserPolicy
iam:CreatePolicy
iam>ListAttachedGroupPolicies
iam>ListAttachedUserPolicies
iam>ListGroups
iam>ListPolicies
iam>ListUsers
```

For more information, see [Overview of IAM Policies](#) in the *user Guide*.

2. In the navigation pane, choose **Policies**.
3. To add a custom set of AWS CodeBuild access permissions to an IAM group or IAM user, skip ahead to step 4 in this procedure.

To add a default set of CodeBuild access permissions to an IAM group or IAM user, choose **Policy Type, AWS Managed**, and then do the following:

- To add full access permissions to CodeBuild, select the box named **AWSCodeBuildAdminAccess**, choose **Policy Actions**, and then choose **Attach**. Select the box next to the target IAM group or user, and then choose **Attach Policy**. Repeat this for the policies named **AmazonS3ReadOnlyAccess** and **IAMFullAccess**.
- To add access permissions to CodeBuild for everything except build project administration, select the box named **AWSCodeBuildDeveloperAccess**, choose **Policy Actions**, and then choose **Attach**. Select the box next to the target IAM group or user, and then choose **Attach Policy**. Repeat this for the policy named **AmazonS3ReadOnlyAccess**.
- To add read-only access permissions to CodeBuild, select the boxes named **AWSCodeBuildReadOnlyAccess**. Select the box next to the target IAM group or user, and then choose **Attach Policy**. Repeat this for the policy named **AmazonS3ReadOnlyAccess**.

You have now added a default set of CodeBuild access permissions to an IAM group or user. Skip the rest of the steps in this procedure.

4. Choose **Create Policy**.
5. On the **Create Policy** page, next to **Create Your Own Policy**, choose **Select**.
6. On the **Review Policy** page, for **Policy Name**, enter a name for the policy (for example, **CodeBuildAccessPolicy**). If you use a different name, be sure to use it throughout this procedure.
7. For **Policy Document**, enter the following, and then choose **Create Policy**.

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Sid": "CodeBuildAccessPolicy",  
            "Effect": "Allow",  
            "Action": "codebuild:BatchGetBuilds",  
            "Resource": "*"  
        }  
    ]  
}
```

```
"Effect": "Allow",
"Action": [
    "codebuild:*"
],
"Resource": "*"
},
{
    "Sid": "CodeBuildRolePolicy",
    "Effect": "Allow",
    "Action": [
        "iam:PassRole"
    ],
    "Resource": "arn:aws:iam::account-ID:role/role-name"
},
{
    "Sid": "CloudWatchLogsAccessPolicy",
    "Effect": "Allow",
    "Action": [
        "logs:FilterLogEvents",
        "logs:GetLogEvents"
    ],
    "Resource": "*"
},
{
    "Sid": "S3AccessPolicy",
    "Effect": "Allow",
    "Action": [
        "s3>CreateBucket",
        "s3:GetObject",
        "s3>List*",
        "s3:PutObject"
    ],
    "Resource": "*"
},
{
    "Sid": "S3BucketIdentity",
    "Effect": "Allow",
    "Action": [
        "s3:GetBucketAcl",
        "s3:GetBucketLocation"
    ],
    "Resource": "*"
}
]
```

#### Note

This policy allows access to all CodeBuild actions and to a potentially large number of AWS resources. To restrict permissions to specific CodeBuild actions, change the value of codebuild:\* in the CodeBuild policy statement. For more information, see [Identity and access management \(p. 339\)](#). To restrict access to specific AWS resources, change the value of the Resource object. For more information, see [Identity and access management \(p. 339\)](#).

The CodeBuildRolePolicy statement is required to allow a build project to be created or modified.

8. In the navigation pane, choose **Groups or Users**.
9. In the list of groups or users, choose the name of the IAM group or IAM user to which you want to add CodeBuild access permissions.
10. For a group, on the group settings page, on the **Permissions** tab, expand **Managed Policies**, and then choose **Attach Policy**.

For a user, on the user settings page, on the **Permissions** tab, choose **Add permissions**.

11. For a group, on the **Attach Policy** page, select **CodeBuildAccessPolicy**, and then choose **Attach Policy**.

For a user, on the **Add permissions** page, choose **Attach existing policies directly**. Select **CodeBuildAccessPolicy**, choose **Next: Review**, and then choose **Add permissions**.

#### To add CodeBuild access permissions to an IAM group or user (AWS CLI)

1. Make sure you have configured the AWS CLI with the AWS access key and AWS secret access key that correspond to one of the IAM entities, as described in the previous procedure. For more information, see [Getting Set Up with the AWS Command Line Interface](#) in the *AWS Command Line Interface User Guide*.
2. To add a custom set of AWS CodeBuild access permissions to an IAM group or IAM user, skip to step 3 in this procedure.

To add a default set of CodeBuild access permissions to an IAM group or IAM user, do the following:

Run one of the following commands, depending on whether you want to add permissions to an IAM group or user:

```
aws iam attach-group-policy --group-name group-name --policy-arn policy-arn
aws iam attach-user-policy --user-name user-name --policy-arn policy-arn
```

You must run the command three times, replacing *group-name* or *user-name* with the IAM group name or user name, and replacing *policy-arn* once for each of the following policy Amazon Resource Names (ARNs):

- To add full access permissions to CodeBuild, use the following policy ARNs:
  - `arn:aws:iam::aws:policy/AWSCodeBuildAdminAccess`
  - `arn:aws:iam::aws:policy/AmazonS3ReadonlyAccess`
  - `arn:aws:iam::aws:policy/IAMFullAccess`
- To add access permissions to CodeBuild for everything except build project administration, use the following policy ARNs:
  - `arn:aws:iam::aws:policy/AWSCodeBuildDeveloperAccess`
  - `arn:aws:iam::aws:policy/AmazonS3ReadonlyAccess`
- To add read-only access permissions to CodeBuild, use the following policy ARNs:
  - `arn:aws:iam::aws:policy/AWSCodeBuildReadonlyAccess`
  - `arn:aws:iam::aws:policy/AmazonS3ReadonlyAccess`

You have now added a default set of CodeBuild access permissions to an IAM group or user. Skip the rest of the steps in this procedure.

3. In an empty directory on the local workstation or instance where the AWS CLI is installed, create a file named `put-group-policy.json` or `put-user-policy.json`. If you use a different file name, be sure to use it throughout this procedure.

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "CodeBuildAccessPolicy",
      "Effect": "Allow",
      "Action": [
        "codebuild:*"
      ]
    }
  ]
}
```

```
        ],
        "Resource": "*"
    },
{
    "Sid": "CodeBuildRolePolicy",
    "Effect": "Allow",
    "Action": [
        "iam:PassRole"
    ],
    "Resource": "arn:aws:iam::account-ID:role/role-name"
},
{
    "Sid": "CloudWatchLogsAccessPolicy",
    "Effect": "Allow",
    "Action": [
        "logs:FilterLogEvents",
        "logs:GetLogEvents"
    ],
    "Resource": "*"
},
{
    "Sid": "S3AccessPolicy",
    "Effect": "Allow",
    "Action": [
        "s3:CreateBucket",
        "s3:GetObject",
        "s3>List*",
        "s3:PutObject"
    ],
    "Resource": "*"
},
{
    "Sid": "S3BucketIdentity",
    "Effect": "Allow",
    "Action": [
        "s3:GetBucketAcl",
        "s3:GetBucketLocation"
    ],
    "Resource": "*"
}
]
```

#### Note

This policy allows access to all CodeBuild actions and to a potentially large number of AWS resources. To restrict permissions to specific CodeBuild actions, change the value of `codebuild:*` in the CodeBuild policy statement. For more information, see [Identity and access management \(p. 339\)](#). To restrict access to specific AWS resources, change the value of the related `Resource` object. For more information, see [Identity and access management \(p. 339\)](#) or the specific AWS service's security documentation.

The `CodeBuildRolePolicy` statement is required to allow a build project to be created or modified.

4. Switch to the directory where you saved the file, and then run one of the following commands. You can use different values for `CodeBuildGroupAccessPolicy` and `CodeBuildUserAccessPolicy`. If you use different values, be sure to use them here.

For an IAM group:

```
aws iam put-group-policy --group-name group-name --policy-name
CodeBuildGroupAccessPolicy --policy-document file://put-group-policy.json
```

For an user:

```
aws iam put-user-policy --user-name user-name --policy-name CodeBuildUserAccessPolicy  
--policy-document file://put-user-policy.json
```

In the preceding commands, replace *group-name* or *user-name* with the name of the target IAM group or user.

## Create a CodeBuild service role

You need an AWS CodeBuild service role so that CodeBuild can interact with dependent AWS services on your behalf. You can create a CodeBuild service role by using the CodeBuild or AWS CodePipeline consoles. For information, see:

- [Create a build project \(console\) \(p. 188\)](#)
- [Create a pipeline that uses CodeBuild \(CodePipeline console\) \(p. 394\)](#)
- [Add a CodeBuild build action to a pipeline \(CodePipeline console\) \(p. 399\)](#)
- [Change a build project's settings \(console\) \(p. 242\)](#)

If you do not plan to use these consoles, this section describes how to create a CodeBuild service role with the IAM console or the AWS CLI.

### Important

CodeBuild uses the service role for all operations that are performed on your behalf. If the role includes permissions that the user shouldn't have, you can unintentionally escalate a user's permissions. Ensure that the role grants [least privilege](#).

The service role described on this page contains a policy that grants the minimum permissions required to use CodeBuild. You may need to add additional permissions, depending on your use case.

### To create a CodeBuild service role (console)

1. Open the IAM console at <https://console.aws.amazon.com/iam/>.

You should have already signed in to the console by using one of the following:

- Your AWS root account. This is not recommended. For more information, see [The AWS account root user](#) in the *user Guide*.
- An administrator user in your AWS account. For more information, see [Creating Your First AWS account root user and Group](#) in the *user Guide*.
- An user in your AWS account with permission to perform the following minimum set of actions:

```
iam:AddRoleToInstanceProfile  
iam:AttachRolePolicy  
iam:CreateInstanceProfile  
iam:CreatePolicy  
iam:CreateRole  
iam:GetRole  
iam>ListAttachedRolePolicies  
iam>ListPolicies  
iam>ListRoles  
iam:PassRole  
iam:PutRolePolicy  
iam:UpdateAssumeRolePolicy
```

For more information, see [Overview of IAM Policies](#) in the *user Guide*.

2. In the navigation pane, choose **Policies**.
3. Choose **Create Policy**.
4. On the **Create Policy** page, choose **JSON**.
5. For the JSON policy, enter the following, and then choose **Review Policy**:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Sid": "CloudWatchLogsPolicy",  
            "Effect": "Allow",  
            "Action": [  
                "logs:CreateLogGroup",  
                "logs:CreateLogStream",  
                "logs:PutLogEvents"  
            ],  
            "Resource": "*"  
        },  
        {  
            "Sid": "CodeCommitPolicy",  
            "Effect": "Allow",  
            "Action": [  
                "codecommit:GitPull"  
            ],  
            "Resource": "*"  
        },  
        {  
            "Sid": "S3GetObjectPolicy",  
            "Effect": "Allow",  
            "Action": [  
                "s3:GetObject",  
                "s3:GetObjectVersion"  
            ],  
            "Resource": "*"  
        },  
        {  
            "Sid": "S3PutObjectPolicy",  
            "Effect": "Allow",  
            "Action": [  
                "s3:PutObject"  
            ],  
            "Resource": "*"  
        },  
        {  
            "Sid": "ECRPullPolicy",  
            "Effect": "Allow",  
            "Action": [  
                "ecr:BatchCheckLayerAvailability",  
                "ecr:GetDownloadUrlForLayer",  
                "ecr:BatchGetImage"  
            ],  
            "Resource": "*"  
        },  
        {  
            "Sid": "ECRAuthPolicy",  
            "Effect": "Allow",  
            "Action": [  
                "ecr:GetAuthorizationToken"  
            ],  
            "Resource": "*"  
        },  
    ]  
}
```

```
{  
    "Sid": "S3BucketIdentity",  
    "Effect": "Allow",  
    "Action": [  
        "s3:GetBucketAcl",  
        "s3:GetBucketLocation"  
    ],  
    "Resource": "*"  
}  
]  
}
```

**Note**

This policy contains statements that allow access to a potentially large number of AWS resources. To restrict AWS CodeBuild to access specific AWS resources, change the value of the Resource array. For more information, see the security documentation for the AWS service.

6. On the **Review Policy** page, for **Policy Name**, enter a name for the policy (for example, **CodeBuildServiceRolePolicy**), and then choose **Create policy**.

**Note**

If you use a different name, be sure to use it throughout this procedure.

7. In the navigation pane, choose **Roles**.
8. Choose **Create role**.
9. On the **Create role** page, with **AWS Service** already selected, choose **CodeBuild**, and then choose **Next:Permissions**.
10. On the **Attach permissions policies** page, select **CodeBuildServiceRolePolicy**, and then choose **Next: Review**.
11. On the **Create role and review** page, for **Role name**, enter a name for the role (for example, **CodeBuildServiceRole**), and then choose **Create role**.

**To create a CodeBuild service role (AWS CLI)**

1. Make sure you have configured the AWS CLI with the AWS access key and AWS secret access key that correspond to one of the IAM entities, as described in the previous procedure. For more information, see [Getting Set Up with the AWS Command Line Interface](#) in the *AWS Command Line Interface User Guide*.
2. In an empty directory on the local workstation or instance where the AWS CLI is installed, create two files named `create-role.json` and `put-role-policy.json`. If you choose different file names, be sure to use them throughout this procedure.

`create-role.json:`

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Principal": {  
                "Service": "codebuild.amazonaws.com"  
            },  
            "Action": "sts:AssumeRole"  
        }  
    ]  
}
```

**Note**

We recommend that you use the `aws:SourceAccount` and `aws:SourceArn` condition keys to protect yourself against [the confused deputy problem](#). For example, you can edit the previous trust policy with the following condition blocks. The `aws:SourceAccount` is the owner of the CodeBuild project and the `aws:SourceArn` is the CodeBuild project ARN.

If you would like to restrict your service role to an AWS account, `create-role.json` might look similar to this:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Principal": {  
                "Service": "codebuild.amazonaws.com"  
            },  
            "Action": "sts:AssumeRole",  
            "Condition": {  
                "StringEquals": {  
                    "aws:SourceAccount": [  
                        "account-ID"  
                    ]  
                }  
            }  
        }  
    ]  
}
```

If you would like to restrict your service role to a specific CodeBuild project, `create-role.json` might look similar to this:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Principal": {  
                "Service": "codebuild.amazonaws.com"  
            },  
            "Action": "sts:AssumeRole",  
            "Condition": {  
                "StringEquals": {  
                    "aws:SourceArn": "arn:aws:codebuild:region-ID:account-ID:project/project-name"  
                }  
            }  
        }  
    ]  
}
```

**Note**

If you don't know or haven't decided on a name for your CodeBuild project and want a trust policy restriction on a particular ARN pattern, you can replace that portion of the ARN with a wildcard (\*). After you create your project, you can then update the trust policy.

`put-role-policy.json`:

```
{  
    "Version": "2012-10-17",
```

```
"Statement": [
    {
        "Sid": "CloudWatchLogsPolicy",
        "Effect": "Allow",
        "Action": [
            "logs:CreateLogGroup",
            "logs:CreateLogStream",
            "logs:PutLogEvents"
        ],
        "Resource": "*"
    },
    {
        "Sid": "CodeCommitPolicy",
        "Effect": "Allow",
        "Action": [
            "codecommit:GitPull"
        ],
        "Resource": "*"
    },
    {
        "Sid": "S3GetObjectPolicy",
        "Effect": "Allow",
        "Action": [
            "s3:GetObject",
            "s3:GetObjectVersion"
        ],
        "Resource": "*"
    },
    {
        "Sid": "S3PutObjectPolicy",
        "Effect": "Allow",
        "Action": [
            "s3:PutObject"
        ],
        "Resource": "*"
    },
    {
        "Sid": "S3BucketIdentity",
        "Effect": "Allow",
        "Action": [
            "s3:GetBucketAcl",
            "s3:GetBucketLocation"
        ],
        "Resource": "*"
    }
]
```

#### Note

This policy contains statements that allow access to a potentially large number of AWS resources. To restrict AWS CodeBuild to access specific AWS resources, change the value of the Resource array. For more information, see the security documentation for the AWS service.

3. Switch to the directory where you saved the preceding files, and then run the following two commands, one at a time, in this order. You can use different values for CodeBuildServiceRole and CodeBuildServiceRolePolicy, but be sure to use them here.

```
aws iam create-role --role-name CodeBuildServiceRole --assume-role-policy-document file://create-role.json
```

```
aws iam put-role-policy --role-name CodeBuildServiceRole --policy-name CodeBuildServiceRolePolicy --policy-document file://put-role-policy.json
```

## Create and configure a customer managed key for CodeBuild

For AWS CodeBuild to encrypt its build output artifacts, it needs access to a KMS key. By default, CodeBuild uses the AWS managed key for Amazon S3 in your AWS account.

If you do not want to use the AWS managed key, you must create and configure a customer managed key yourself. This section describes how to do this with the IAM console.

For information about customer managed keys, see [AWS Key Management Service Concepts](#) and [Creating Keys](#) in the *AWS KMS Developer Guide*.

To configure a customer managed key for use by CodeBuild, follow the instructions in the "How to Modify a Key Policy" section of [Modifying a Key Policy](#) in the *AWS KMS Developer Guide*. Then add the following statements (between **### BEGIN ADDING STATEMENTS HERE ###** and **### END ADDING STATEMENTS HERE ###**) to the key policy. Ellipses (...) are used for brevity and to help you locate where to add the statements. Do not remove any statements, and do not type these ellipses into the key policy.

```
{
    "Version": "2012-10-17",
    "Id": "...",
    "Statement": [
        ### BEGIN ADDING STATEMENTS HERE ###
        {
            "Sid": "Allow access through Amazon S3 for all principals in the account that are authorized to use Amazon S3",
            "Effect": "Allow",
            "Principal": {
                "AWS": "*"
            },
            "Action": [
                "kms:Encrypt",
                "kms:Decrypt",
                "kms:ReEncrypt*",
                "kms:GenerateDataKey*",
                "kms:DescribeKey"
            ],
            "Resource": "*",
            "Condition": {
                "StringEquals": {
                    "kms:ViaService": "s3.region-ID.amazonaws.com",
                    "kms:CallerAccount": "account-ID"
                }
            }
        },
        {
            "Effect": "Allow",
            "Principal": {
                "AWS": "arn:aws:iam::account-ID:role/CodeBuild-service-role"
            },
            "Action": [
                "kms:Encrypt",
                "kms:Decrypt",
                "kms:ReEncrypt*",
                "kms:GenerateDataKey*",
                "kms:DescribeKey"
            ]
        }
    ]
}
```

```
        "kms:DescribeKey"
    ],
    "Resource": "*"
},
### END ADDING STATEMENTS HERE ####
{
    "Sid": "Enable IAM User Permissions",
    ...
},
{
    "Sid": "Allow access for Key Administrators",
    ...
},
{
    "Sid": "Allow use of the key",
    ...
},
{
    "Sid": "Allow attachment of persistent resources",
    ...
}
]
```

- *region-ID* represents the ID of the AWS region where the Amazon S3 buckets associated with CodeBuild are located (for example, us-east-1).
- *account-ID* represents the ID of the AWS account that owns the customer managed key.
- *CodeBuild-service-role* represents the name of the CodeBuild service role you created or identified earlier in this topic.

#### Note

To create or configure a customer managed key through the IAM console, you must first sign in to the AWS Management Console by using one of the following:

- Your AWS root account. This is not recommended. For more information, see [The Account Root User](#) in the *user Guide*.
- An administrator user in your AWS account. For more information, see [Creating Your First AWS account root user and Group](#) in the *user Guide*.
- An user in your AWS account with permission to create or modify the customer managed key. For more information, see [Permissions Required to Use the AWS KMS Console](#) in the *AWS KMS Developer Guide*.

## Install and configure the AWS CLI

To access AWS CodeBuild, you can use the AWS CLI with—or instead of—the CodeBuild console, the CodePipeline console, or the AWS SDKs. To install and configure the AWS CLI, see [Getting Set Up with the AWS Command Line Interface](#) in the *AWS Command Line Interface User Guide*.

1. Run the following command to confirm whether your installation of the AWS CLI supports CodeBuild:

```
aws codebuild list-builds
```

If successful, information similar to the following will appear in the output:

```
{
```

```
    "ids": []  
}
```

The empty square brackets indicate that you have not yet run any builds.

2. If an error is output, you must uninstall your current version of the AWS CLI and then install the latest version. For more information, see [Uninstalling the AWS CLI](#) and [Installing the AWS Command Line Interface](#) in the *AWS Command Line Interface User Guide*.

## Command line reference for AWS CodeBuild

The AWS CLI provides commands for automating AWS CodeBuild. Use the information in this topic as a supplement to the [AWS Command Line Interface User Guide](#) and the [AWS CLI Reference for AWS CodeBuild](#).

Not what you're looking for? If you want to use the AWS SDKs to call CodeBuild, see the [AWS SDKs and tools reference \(p. 389\)](#).

To use the information in this topic, you should have already installed the AWS CLI and configured it for use with CodeBuild, as described in [Install and configure the AWS CLI \(p. 387\)](#).

To use the AWS CLI to specify the endpoint for CodeBuild, see [Specify the AWS CodeBuild endpoint \(AWS CLI\) \(p. 390\)](#).

Run this command to get a list of CodeBuild commands.

```
aws codebuild help
```

Run this command to get information about a CodeBuild command, where *command-name* is the name of the command.

```
aws codebuild command-name help
```

CodeBuild commands include:

- **batch-delete-builds**: Deletes one or more builds in CodeBuild. For more information, see [Delete builds \(AWS CLI\) \(p. 293\)](#).
- **batch-get-builds**: Gets information about multiple builds in CodeBuild. For more information, see [View build details \(AWS CLI\) \(p. 279\)](#).
- **batch-get-projects**: Gets information about one or more specified build projects. For more information, see [View a build project's details \(AWS CLI\) \(p. 215\)](#).
- **create-project**: Creates a build project. For more information, see [Create a build project \(AWS CLI\) \(p. 198\)](#).
- **delete-project**: Deletes a build project. For more information, see [Delete a build project \(AWS CLI\) \(p. 255\)](#).
- **list-builds**: Lists Amazon Resource Names (ARNs) for builds in CodeBuild. For more information, see [View a list of build IDs \(AWS CLI\) \(p. 282\)](#).
- **list-builds-for-project**: Gets a list of build IDs that are associated with a specified build project. For more information, see [View a list of build IDs for a build project \(AWS CLI\) \(p. 284\)](#).
- **list-curated-environment-images**: Gets a list of Docker images managed by CodeBuild that you can use for your builds. For more information, see [Docker images provided by CodeBuild \(p. 153\)](#).
- **list-projects**: Gets a list of build project names. For more information, see [View a list of build project names \(AWS CLI\) \(p. 213\)](#).
- **start-build**: Starts running a build. For more information, see [Run a build \(AWS CLI\) \(p. 272\)](#).

- `stop-build`: Attempts to stop the specified build from running. For more information, see [Stop a build \(AWS CLI\) \(p. 287\)](#).
- `update-project`: Changes information about the specified build project. For more information, see [Change a build project's settings \(AWS CLI\) \(p. 253\)](#).

## AWS SDKs and tools reference for AWS CodeBuild

To use one the AWS SDKs or tools to automate AWS CodeBuild, see the following resources.

If you want to use the AWS CLI to run CodeBuild, see the [Command line reference \(p. 388\)](#).

## Supported AWS SDKs and tools for AWS CodeBuild

The following AWS SDKs and tools support CodeBuild:

- The [AWS SDK for C++](#). For more information, see the `Aws::CodeBuild` namespace section of the [AWS SDK for C++ API Reference](#).
- The [AWS SDK for Go](#). For more information, see the `codebuild` section of the [AWS SDK for Go API Reference](#).
- The [AWS SDK for Java](#). For more information, see the `com.amazonaws.services.codebuild` and `com.amazonaws.services.codebuild.model` sections of the [AWS SDK for Java API reference](#).
- The [AWS SDK for JavaScript in the browser](#) and the [AWS SDK for JavaScript in Node.js](#). For more information, see the `Class: AWS.CodeBuild` section of the [AWS SDK for JavaScript API Reference](#).
- The [AWS SDK for .NET](#). For more information, see the `Amazon.CodeBuild` and `Amazon.CodeBuild.Model` namespace sections of the [AWS SDK for .NET API Reference](#).
- The [AWS SDK for PHP](#). For more information, see the `Namespace Aws\CodeBuild` section of the [AWS SDK for PHP API Reference](#).
- The [AWS SDK for Python \(Boto3\)](#). For more information, see the `CodeBuild` section of the [Boto 3 Documentation](#).
- The [AWS SDK for Ruby](#). For more information, see the `Module: Aws::CodeBuild` section of the [AWS SDK for Ruby API Reference](#).
- The [AWS Tools for PowerShell](#). For more information, see the `AWS CodeBuild` section of the [AWS Tools for PowerShell Cmdlet Reference](#).

## Specify the AWS CodeBuild endpoint

You can use the AWS Command Line Interface (AWS CLI) or one of the AWS SDKs to specify the endpoint used by AWS CodeBuild. There is an endpoint for each region in which CodeBuild is available. In addition to a regional endpoint, four regions also have a Federal Information Processing Standards (FIPS) endpoint. For more information about FIPS endpoints, see [FIPS 140-2 overview](#).

Specifying an endpoint is optional. If you don't explicitly tell CodeBuild which endpoint to use, the service uses the endpoint associated with the region your AWS account uses. CodeBuild never defaults to a FIPS endpoint. If you want to use a FIPS endpoint, you must associate CodeBuild with it using one of the following methods.

### Note

You can use an alias or region name to specify an endpoint using an AWS SDK. If you use the AWS CLI, then you must use the full endpoint name.

For endpoints that can be used with CodeBuild, see [CodeBuild regions and endpoints](#).

### Topics

- [Specify the AWS CodeBuild endpoint \(AWS CLI\) \(p. 390\)](#)
- [Specify the AWS CodeBuild endpoint \(AWS SDK\) \(p. 390\)](#)

## Specify the AWS CodeBuild endpoint (AWS CLI)

You can use the AWS CLI to specify the endpoint through which AWS CodeBuild is accessed by using the `--endpoint-url` argument in any CodeBuild command. For example, run this command to get a list of project build names using the Federal Information Processing Standards (FIPS) endpoint in the US East (N. Virginia) Region:

```
aws codebuild list-projects --endpoint-url https://codebuild-fips.us-east-1.amazonaws.com
```

Include the `https://` at the beginning of the endpoint.

The `--endpoint-url` AWS CLI argument is available to all AWS services. For more information about this and other AWS CLI arguments, see [AWS CLI Command Reference](#).

## Specify the AWS CodeBuild endpoint (AWS SDK)

You can use an AWS SDK to specify the endpoint through which AWS CodeBuild is accessed. Although this example uses the [AWS SDK for Java](#), you can specify the endpoint with the other AWS SDKs.

Use the `withEndpointConfiguration` method when constructing the `AWSCodeBuild` client. Here is format to use:

```
AWSCodeBuild awsCodeBuild = AWSCodeBuildClientBuilder.standard().  
    withEndpointConfiguration(new AwsClientBuilder.EndpointConfiguration("endpoint",  
        "region")).  
    withCredentials(new AWSStaticCredentialsProvider(sessionCredentials)).  
    build();
```

For information about `AWSCodeBuildClientBuilder`, see [Class AWSCodeBuildClientBuilder](#).

The credentials used in `withCredentials` must be of type `AWSCredentialsProvider`. For more information, see [Working with AWS credentials](#).

Do not include `https://` at the beginning of the endpoint.

If you want to specify a non-FIPS endpoint, you can use the region instead of the actual endpoint. For example, to specify the endpoint in the US East (N. Virginia) region, you can use `us-east-1` instead of the full endpoint name, `codebuild.us-east-1.amazonaws.com`.

If you want to specify a FIPS endpoint, you can use an alias to simplify your code. Only FIPS endpoints have an alias. Other endpoints must be specified using their region or full name.

The following table lists the alias for each of the four available FIPS endpoints:

| Region name           | Region    | Endpoint                               | Alias          |
|-----------------------|-----------|----------------------------------------|----------------|
| US East (N. Virginia) | us-east-1 | codebuild-fips.us-east-1.amazonaws.com | us-east-1-fips |
| US East (Ohio)        | us-east-2 | codebuild-fips.us-east-2.amazonaws.com | us-east-2-fips |

| Region name             | Region    | Endpoint                               | Alias          |
|-------------------------|-----------|----------------------------------------|----------------|
| US West (N. California) | us-west-1 | codebuild-fips.us-west-1.amazonaws.com | us-west-1-fips |
| US West (Oregon)        | us-west-2 | codebuild-fips.us-west-2.amazonaws.com | us-west-2-fips |

To specify use of the FIPS endpoint in the US West (Oregon) region using an alias:

```
AWSCodeBuild awsCodeBuild = AWSCodeBuildClientBuilder.standard().  
    withEndpointConfiguration(new AwsClientBuilder.EndpointConfiguration("us-west-2-fips",  
    "us-west-2")).  
    withCredentials(new AWSStaticCredentialsProvider(sessionCredentials)).  
    build();
```

To specify use of the non-FIPS endpoint in the US East (N. Virginia) region:

```
AWSCodeBuild awsCodeBuild = AWSCodeBuildClientBuilder.standard().  
    withEndpointConfiguration(new AwsClientBuilder.EndpointConfiguration("us-east-1", "us-  
east-1")).  
    withCredentials(new AWSStaticCredentialsProvider(sessionCredentials)).  
    build();
```

To specify use of the non-FIPS endpoint in the Asia Pacific (Mumbai) region:

```
AWSCodeBuild awsCodeBuild = AWSCodeBuildClientBuilder.standard().  
    withEndpointConfiguration(new AwsClientBuilder.EndpointConfiguration("ap-south-1", "ap-  
south-1")).  
    withCredentials(new AWSStaticCredentialsProvider(sessionCredentials)).  
    build();
```

## Run AWS CodeBuild directly

You can use the AWS CodeBuild console, AWS CLI, or AWS SDK to set up, run, and monitor builds directly with CodeBuild.

Not what you're looking for? To use AWS CodePipeline to run CodeBuild, see [Use CodePipeline with CodeBuild \(p. 392\)](#).

### Topics

- [Prerequisites \(p. 391\)](#)
- [Run AWS CodeBuild directly \(p. 392\)](#)

## Prerequisites

Answer the questions in [Plan a build \(p. 128\)](#).

## Run AWS CodeBuild directly

1. Create the build project. To use the console, see [Create a build project \(console\) \(p. 188\)](#). To use the AWS CLI, see [Create a build project \(AWS CLI\) \(p. 198\)](#). To use AWS SDK, see [Create a build project \(AWS SDKs\) \(p. 211\)](#).
2. Run the build. To use the console, see [Run a build \(console\) \(p. 272\)](#). To use the AWS CLI, see [Run a build \(AWS CLI\) \(p. 272\)](#). To use AWS SDK, see [Run a build \(AWS SDKs\) \(p. 279\)](#).
3. Get information about the build. To use the console, see [View build details \(console\) \(p. 279\)](#). To use the AWS CLI, see [View build details \(AWS CLI\) \(p. 279\)](#). To use AWS SDK, see [View build details \(AWS SDKs\) \(p. 280\)](#).

## Use AWS CodePipeline with AWS CodeBuild to test code and run builds

You can automate your release process by using AWS CodePipeline to test your code and run your builds with AWS CodeBuild.

The following table lists tasks and the methods available for performing them. Using the AWS SDKs to accomplish these tasks is outside the scope of this topic.

| Task                                                                                              | Available approaches                                                                                  | Approaches described in this topic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Create a continuous delivery (CD) pipeline with CodePipeline that automates builds with CodeBuild | <ul style="list-style-type: none"><li>CodePipeline console</li><li>AWS CLI</li><li>AWS SDKs</li></ul> | <ul style="list-style-type: none"><li><a href="#">Use the CodePipeline console (p. 394)</a></li><li><a href="#">Use the AWS CLI (p. 396)</a></li><li>You can adapt the information in this topic to use the AWS SDKs. For more information, see the <code>create-pipeline</code> action documentation for your programming language in the <a href="#">SDKs</a> section of <i>Tools for Amazon Web Services</i> or see <a href="#">CreatePipeline</a> in the <i>AWS CodePipeline API Reference</i>.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                    |
| Add test and build automation with CodeBuild to an existing pipeline in CodePipeline              | <ul style="list-style-type: none"><li>CodePipeline console</li><li>AWS CLI</li><li>AWS SDKs</li></ul> | <ul style="list-style-type: none"><li><a href="#">Use the CodePipeline console to add build automation (p. 399)</a></li><li><a href="#">Use the CodePipeline console to add test automation (p. 402)</a></li><li>For the AWS CLI, you can adapt the information in this topic to create a pipeline that contains a CodeBuild build action or test action. For more information, see <a href="#">Edit a pipeline (AWS CLI)</a> and the <a href="#">CodePipeline pipeline structure reference</a> in the <i>AWS CodePipeline User Guide</i>.</li><li>You can adapt the information in this topic to use the AWS SDKs. For more information, see the <code>update-pipeline</code> action documentation for your programming language through the <a href="#">SDKs</a> section of <i>Tools for Amazon Web Services</i> or see <a href="#">UpdatePipeline</a> in the <i>AWS CodePipeline API Reference</i>.</li></ul> |

## Prerequisites

1. Answer the questions in [Plan a build \(p. 128\)](#).

2. If you are using an user to access CodePipeline instead of an AWS root account or an administrator user, attach the managed policy named `AWSCodePipelineFullAccess` to the user (or to the IAM group to which the user belongs). Using an AWS root account is not recommended. This policy grants the user permission to create the pipeline in CodePipeline. For more information, see [Attaching managed policies](#) in the *user Guide*.

**Note**

The IAM entity that attaches the policy to the user (or to the IAM group to which the user belongs) must have permission in IAM to attach policies. For more information, see [Delegating permissions to administer IAM users, groups, and credentials](#) in the *user Guide*.

3. Create a CodePipeline service role, if you do not already have one available in your AWS account. CodePipeline uses this service role to interact with other AWS services, including AWS CodeBuild, on your behalf. For example, to use the AWS CLI to create a CodePipeline service role, run the IAM `create-role` command:

For Linux, macOS, or Unix:

```
aws iam create-role --role-name AWS-CodePipeline-CodeBuild-Service-Role --assume-role-policy-document '{"Version":"2012-10-17","Statement":[{"Effect":"Allow","Principal": {"Service":"codepipeline.amazonaws.com"},"Action":"sts:AssumeRole"}]}
```

For Windows:

```
aws iam create-role --role-name AWS-CodePipeline-CodeBuild-Service-Role --assume-role-policy-document "{\"Version\":\"2012-10-17\",\"Statement\":{\"Effect\":\"Allow\", \"Principal\":[\"Service\":\"codepipeline.amazonaws.com\"],\"Action\":\"sts:AssumeRole\"}}"
```

**Note**

The IAM entity that creates this CodePipeline service role must have permission in IAM to create service roles.

4. After you create a CodePipeline service role or identify an existing one, you must add the default CodePipeline service role policy to the service role as described in [Review the default CodePipeline service role policy](#) in the *AWS CodePipeline User Guide*, if it isn't already a part of the policy for the role.

**Note**

The IAM entity that adds this CodePipeline service role policy must have permission in IAM to add service role policies to service roles.

5. Create and upload the source code to a repository type supported by CodeBuild and CodePipeline, such as CodeCommit, Amazon S3, Bitbucket, or GitHub. The source code should contain a buildspec file, but you can declare one when you define a build project later in this topic. For more information, see the [Buildspec reference \(p. 129\)](#).

**Important**

If you plan to use the pipeline to deploy built source code, the build output artifact must be compatible with the deployment system you use.

- For CodeDeploy, see the [AWS CodeDeploy sample \(p. 53\)](#) in this guide and [Prepare a revision for CodeDeploy](#) in the *AWS CodeDeploy User Guide*.
- For AWS Elastic Beanstalk, see the [AWS Elastic Beanstalk sample \(p. 64\)](#) in this guide and [Create an application source bundle](#) in the *AWS Elastic Beanstalk Developer Guide*.
- For AWS OpsWorks, see [Application source](#) and [Using CodePipeline with AWS OpsWorks](#) in the *AWS OpsWorks User Guide*.

- [Create a pipeline that uses CodeBuild \(CodePipeline console\) \(p. 394\)](#)
- [Create a pipeline that uses CodeBuild \(AWS CLI\) \(p. 396\)](#)
- [Add a CodeBuild build action to a pipeline \(CodePipeline console\) \(p. 399\)](#)
- [Add a CodeBuild test action to a pipeline \(CodePipeline console\) \(p. 402\)](#)

## Create a pipeline that uses CodeBuild (CodePipeline console)

Use the following procedure to create a pipeline that uses CodeBuild to build and deploy your source code.

To create a pipeline that only tests your source code:

- Use the following procedure to create the pipeline, and then delete the Build and Beta stages from the pipeline. Then use the [Add a CodeBuild test action to a pipeline \(CodePipeline console\) \(p. 402\)](#) procedure in this topic to add to the pipeline a test action that uses CodeBuild.
- Use one of the other procedures in this topic to create the pipeline, and then use the [Add a CodeBuild test action to a pipeline \(CodePipeline console\) \(p. 402\)](#) procedure in this topic to add to the pipeline a test action that uses CodeBuild.

### To use the create pipeline wizard in CodePipeline to create a pipeline that uses CodeBuild

1. Sign in to the AWS Management Console by using:

- Your AWS root account. This is not recommended. For more information, see [The account root user in the user Guide](#).
- An administrator user in your AWS account. For more information, see [Creating your first AWS account root user and group in the user Guide](#).
- An user in your AWS account with permission to use the following minimum set of actions:

```
codepipeline:*
iam>ListRoles
iam:PassRole
s3>CreateBucket
s3:GetBucketPolicy
s3:GetObject
s3>ListAllMyBuckets
s3>ListBucket
s3:PutBucketPolicy
codecommit>ListBranches
codecommit>ListRepositories
codedeploy	GetApplication
codedeploy	GetDeploymentGroup
codedeploy>ListApplications
codedeploy>ListDeploymentGroups
elasticbeanstalkDescribeApplications
elasticbeanstalkDescribeEnvironments
lambda:GetFunctionConfiguration
lambda>ListFunctions
opsworksDescribeStacks
opsworksDescribeApps
opsworksDescribeLayers
```

2. Open the AWS CodePipeline console at <https://console.aws.amazon.com/codesuite/codepipeline/home>.

3. In the AWS Region selector, choose the AWS Region where your build project AWS resources are located. This must be an AWS Region where CodeBuild is supported. For more information, see [AWS CodeBuild](#) in the *Amazon Web Services General Reference*.
4. Create a pipeline. If a CodePipeline information page is displayed, choose **Create pipeline**. If a **Pipelines** page is displayed, choose **Create pipeline**.
5. On the **Step 1: Choose pipeline settings** page, for **Pipeline name**, enter a name for the pipeline (for example, `CodeBuildDemoPipeline`). If you choose a different name, be sure to use it throughout this procedure.
6. For **Role name**, do one of the following:

Choose **New service role**, and in **Role Name**, enter the name for your new service role.

Choose **Existing service role**, and then choose the CodePipeline service role you created or identified as part of this topic's prerequisites.

7. For **Artifact store**, do one of the following:

- Choose **Default location** to use the default artifact store, such as the S3 artifact bucket designated as the default, for your pipeline in the AWS Region you have selected for your pipeline.
- Choose **Custom location** if you already have an existing artifact store you have created, such as an S3 artifact bucket, in the same AWS Region as your pipeline.

**Note**

This is not the source bucket for your pipeline's source code. This is the artifact store for your pipeline. A separate artifact store, such as an S3 bucket, is required for each pipeline, in the same AWS Region as the pipeline.

8. Choose **Next**.
9. On the **Step 2: Add source stage** page, for **Source provider**, do one of the following:
  - If your source code is stored in an S3 bucket, choose **Amazon S3**. For **Bucket**, select the S3 bucket that contains your source code. For **S3 object key**, enter the name of the file that contains the source code (for example, `file-name.zip`). Choose **Next**.
  - If your source code is stored in an AWS CodeCommit repository, choose **CodeCommit**. For **Repository name**, choose the name of the repository that contains the source code. For **Branch name**, choose the name of the branch that contains the version of the source code you want to build. Choose **Next**.
  - If your source code is stored in a GitHub repository, choose **GitHub**. Choose **Connect to GitHub**, and follow the instructions to authenticate with GitHub. For **Repository**, choose the name of the repository that contains the source code. For **Branch**, choose the name of the branch that contains the version of the source code you want to build.

Choose **Next**.

10. On the **Step 3: Add build stage** page, for **Build provider**, choose **CodeBuild**.
11. If you already have a build project you want to use, for **Project name**, choose the name of the build project and skip to the next step in this procedure.

If you need to create a new CodeBuild build project, follow the instructions in [Create a build project \(console\) \(p. 188\)](#) and return to this procedure.

If you choose an existing build project, it must have build output artifact settings already defined (even though CodePipeline overrides them). For more information, see [Change a build project's settings \(console\) \(p. 242\)](#).

**Important**

If you enable webhooks for a CodeBuild project, and the project is used as a build step in CodePipeline, then two identical builds are created for each commit. One build is triggered through webhooks, and one through CodePipeline. Because billing is on a per-build basis, you are billed for both builds. Therefore, if you are using CodePipeline, we recommend that you disable webhooks in CodeBuild. In the AWS CodeBuild console, clear the **Webhook** box. For more information, see [Change a build project's settings \(console\) \(p. 242\)](#).

12. On the **Step 4: Add deploy stage** page, do one of the following:

- If you do not want to deploy the build output artifact, choose **Skip**, and confirm this choice when prompted.
- If you want to deploy the build output artifact, for **Deploy provider**, choose a deployment provider, and then specify the settings when prompted.

Choose **Next**.

13. On the **Review** page, review your choices, and then choose **Create pipeline**.
14. After the pipeline runs successfully, you can get the build output artifact. With the pipeline displayed in the CodePipeline console, in the **Build** action, choose the tooltip. Make a note of the value for **Output artifact** (for example, **MyAppBuild**).

**Note**

You can also get the build output artifact by choosing the **Build artifacts** link on the build details page in the CodeBuild console. To get to this page, skip the rest of the steps in this procedure, and see [View build details \(console\) \(p. 279\)](#).

15. Open the Amazon S3 console at <https://console.aws.amazon.com/s3/>.
16. In the list of buckets, open the bucket used by the pipeline. The name of the bucket should follow the format `codepipeline-region-ID-random-number`. You can use the AWS CLI to run the CodePipeline **get-pipeline** command to get the name of the bucket, where `my-pipeline-name` is the display name of your pipeline:

```
aws codepipeline get-pipeline --name my-pipeline-name
```

In the output, the pipeline object contains an `artifactStore` object, which contains a `location` value with the name of the bucket.

17. Open the folder that matches the name of your pipeline (depending on the length of the pipeline's name, the folder name might be truncated), and then open the folder that matches the value for **Output artifact** that you noted earlier.
18. Extract the contents of the file. If there are multiple files in that folder, extract the contents of the file with the latest **Last Modified** timestamp. (You might need to give the file the `.zip` extension so that you can work with it in your system's ZIP utility.) The build output artifact is in the extracted contents of the file.
19. If you instructed CodePipeline to deploy the build output artifact, use the deployment provider's instructions to get to the build output artifact on the deployment targets.

## Create a pipeline that uses CodeBuild (AWS CLI)

Use the following procedure to create a pipeline that uses CodeBuild to build your source code.

To use the AWS CLI to create a pipeline that deploys your built source code or that only tests your source code, you can adapt the instructions in [Edit a pipeline \(AWS CLI\)](#) and the [CodePipeline pipeline structure reference](#) in the *AWS CodePipeline User Guide*.

1. Create or identify a build project in CodeBuild. For more information, see [Create a build project \(p. 187\)](#).

**Important**

The build project must define build output artifact settings (even though CodePipeline overrides them). For more information, see the description of artifacts in [Create a build project \(AWS CLI\) \(p. 198\)](#).

2. Make sure you have configured the AWS CLI with the AWS access key and AWS secret access key that correspond to one of the IAM entities described in this topic. For more information, see [Getting set up with the AWS Command Line Interface](#) in the *AWS Command Line Interface User Guide*.
3. Create a JSON-formatted file that represents the structure of the pipeline. Name the file `create-pipeline.json` or similar. For example, this JSON-formatted structure creates a pipeline with a source action that references an S3 input bucket and a build action that uses CodeBuild:

```
{  
  "pipeline": {  
    "roleArn": "arn:aws:iam::<account-id>:role/<AWS-CodePipeline-service-role-name>",  
    "stages": [  
      {  
        "name": "Source",  
        "actions": [  
          {  
            "inputArtifacts": [],  
            "name": "Source",  
            "actionTypeId": {  
              "category": "Source",  
              "owner": "AWS",  
              "version": "1",  
              "provider": "S3"  
            },  
            "outputArtifacts": [  
              {  
                "name": "MyApp"  
              }  
            ],  
            "configuration": {  
              "S3Bucket": "<bucket-name>",  
              "S3ObjectKey": "<source-code-file-name.zip>"  
            },  
            "runOrder": 1  
          }  
        ]  
      },  
      {  
        "name": "Build",  
        "actions": [  
          {  
            "inputArtifacts": [  
              {  
                "name": "MyApp"  
              }  
            ],  
            "name": "Build",  
            "actionTypeId": {  
              "category": "Build",  
              "owner": "AWS",  
              "version": "1",  
              "provider": "CodeBuild"  
            },  
            "outputArtifacts": [  
              {  
                "name": "default"  
              }  
            ]  
          }  
        ]  
      }  
    ]  
  }  
}
```

```

        ],
        "configuration": {
            "ProjectName": "<build-project-name>"
        },
        "runOrder": 1
    }
}
],
"artifactStore": {
    "type": "S3",
    "location": "<CodePipeline-internal-bucket-name>"
},
"name": "<my-pipeline-name>",
"version": 1
}
}

```

In this JSON-formatted data:

- The value of `roleArn` must match the ARN of the CodePipeline service role you created or identified as part of the prerequisites.
- The values of `S3Bucket` and `S3ObjectKey` in `configuration` assume the source code is stored in an S3 bucket. For settings for other source code repository types, see the [CodePipeline pipeline structure reference](#) in the *AWS CodePipeline User Guide*.
- The value of `ProjectName` is the name of the CodeBuild build project you created earlier in this procedure.
- The value of `location` is the name of the S3 bucket used by this pipeline. For more information, see [Create a policy for an S3 Bucket to use as the artifact store for CodePipeline](#) in the *AWS CodePipeline User Guide*.
- The value of `name` is the name of this pipeline. All pipeline names must be unique to your account.

Although this data describes only a source action and a build action, you can add actions for activities related to testing, deploying the build output artifact, invoking AWS Lambda functions, and more. For more information, see the [AWS CodePipeline pipeline structure reference](#) in the *AWS CodePipeline User Guide*.

4. Switch to the folder that contains the JSON file, and then run the CodePipeline [create-pipeline](#) command, specifying the file name:

```
aws codepipeline create-pipeline --cli-input-json file://create-pipeline.json
```

#### Note

You must create the pipeline in an AWS Region where CodeBuild is supported. For more information, see [AWS CodeBuild](#) in the *Amazon Web Services General Reference*.

The JSON-formatted data appears in the output, and CodePipeline creates the pipeline.

5. To get information about the pipeline's status, run the CodePipeline [get-pipeline-state](#) command, specifying the name of the pipeline:

```
aws codepipeline get-pipeline-state --name <my-pipeline-name>
```

In the output, look for information that confirms the build was successful. Ellipses (...) are used to show data that has been omitted for brevity.

```
{
    ...
}
```

```
"stageStates": [
  ...
  {
    "actionStates": [
      {
        "actionName": "CodeBuild",
        "latestExecution": {
          "status": "SUCCEEDED",
          ...
        },
        ...
      }
    ]
  }
]
```

If you run this command too early, you might not see any information about the build action. You might need to run this command multiple times until the pipeline has finished running the build action.

6. After a successful build, follow these instructions to get the build output artifact. Open the Amazon S3 console at <https://console.aws.amazon.com/s3/>.

**Note**

You can also get the build output artifact by choosing the **Build artifacts** link on the related build details page in the CodeBuild console. To get to this page, skip the rest of the steps in this procedure, and see [View build details \(console\) \(p. 279\)](#).

7. In the list of buckets, open the bucket used by the pipeline. The name of the bucket should follow the format `codepipeline-<region-ID>-<random-number>`. You can get the bucket name from the `create-pipeline.json` file or you can run the CodePipeline `get-pipeline` command to get the bucket's name.

```
aws codepipeline get-pipeline --name <pipeline-name>
```

In the output, the `pipeline` object contains an `artifactStore` object, which contains a `location` value with the name of the bucket.

8. Open the folder that matches the name of your pipeline (for example, `<pipeline-name>`).
9. In that folder, open the folder named `default`.
10. Extract the contents of the file. If there are multiple files in that folder, extract the contents of the file with the latest **Last Modified** timestamp. (You might need to give the file a `.zip` extension so that you can work with it in your system's ZIP utility.) The build output artifact is in the extracted contents of the file.

## Add a CodeBuild build action to a pipeline (CodePipeline console)

1. Sign in to the AWS Management Console by using:
  - Your AWS root account. This is not recommended. For more information, see [The account root user](#) in the *user Guide*.
  - An administrator user in your AWS account. For more information, see [Creating your first AWS account root user and group](#) in the *user Guide*.
  - An user in your AWS account with permission to perform the following minimum set of actions:

```
codepipeline:*  
iam>ListRoles  
iamPassRole  
s3>CreateBucket  
s3GetBucketPolicy  
s3GetObject  
s3ListAllMyBuckets  
s3ListBucket  
s3PutBucketPolicy  
codecommitListBranches  
codecommitListRepositories  
codedeployGetApplication  
codedeployGetDeploymentGroup  
codedeployListApplications  
codedeployListDeploymentGroups  
elasticbeanstalkDescribeApplications  
elasticbeanstalkDescribeEnvironments  
lambdaGetFunctionConfiguration  
lambdaListFunctions  
opsworksDescribeStacks  
opsworksDescribeApps  
opsworksDescribeLayers
```

2. Open the CodePipeline console at <https://console.aws.amazon.com/codesuite/codepipeline/home>.
3. In the AWS region selector, choose the AWS Region where your pipeline is located. This must be a Region where CodeBuild is supported. For more information, see [CodeBuild](#) in the *Amazon Web Services General Reference*.
4. On the **Pipelines** page, choose the name of the pipeline.
5. On the pipeline details page, in the **Source** action, choose the tooltip. Make a note of the value for **Output artifact** (for example, **MyApp**).

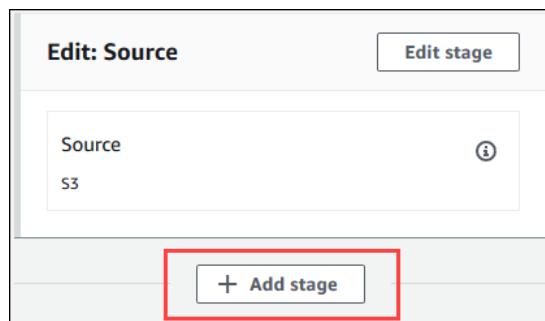
**Note**

This procedure shows you how to add a build action in a build stage between the **Source** and **Beta** stages. If you want to add the build action somewhere else, choose the tooltip on the action just before the place where you want to add the build action, and make a note of the value for **Output artifact**.

6. Choose **Edit**.
7. Between the **Source** and **Beta** stages, choose **Add stage**.

**Note**

This procedure shows you how to add a build stage between the **Source** and **Beta** stages to your pipeline. To add a build action to an existing stage, choose **Edit stage** in the stage, and then skip to step 8 of this procedure. To add the build stage somewhere else, choose **Add stage** in the desired place.



8. For **Stage name**, enter the name of the build stage (for example, **Build**). If you choose a different name, use it throughout this procedure.
9. Inside of the selected stage, choose **Add action**.

**Note**

This procedure shows you how to add the build action inside of a build stage. To add the build action somewhere else, choose **Add action** in the desired place. You might first need to choose **Edit stage** in the existing stage where you want to add the build action.

10. In **Edit action**, for **Action name**, enter a name for the action (for example, **CodeBuild**). If you choose a different name, use it throughout this procedure.
11. For **Action provider**, choose **CodeBuild**.
12. If you already have a build project you want to use, for **Project name**, choose the name of the build project and skip to the next step in this procedure.

If you need to create a new CodeBuild build project, follow the instructions in [Create a build project \(console\) \(p. 188\)](#) and return to this procedure.

If you choose an existing build project, it must have build output artifact settings already defined (even though CodePipeline overrides them). For more information, see the description of **Artifacts** in [Create a build project \(console\) \(p. 188\)](#) or [Change a build project's settings \(console\) \(p. 242\)](#).

**Important**

If you enable webhooks for a CodeBuild project, and the project is used as a build step in CodePipeline, then two identical builds are created for each commit. One build is triggered through webhooks and one through CodePipeline. Because billing is on a per-build basis, you are billed for both builds. Therefore, if you are using CodePipeline, we recommend that you disable webhooks in CodeBuild. In the CodeBuild console, clear the **Webhook** box. For more information, see [Change a build project's settings \(console\) \(p. 242\)](#)

13. For **Input artifacts**, choose the output artifact that you noted earlier in this procedure.
14. For **Output artifacts**, enter a name for the output artifact (for example, **MyAppBuild**).
15. Choose **Add action**.
16. Choose **Save**, and then choose **Save** to save your changes to the pipeline.
17. Choose **Release change**.
18. After the pipeline runs successfully, you can get the build output artifact. With the pipeline displayed in the CodePipeline console, in the **Build** action, choose the tooltip. Make a note of the value for **Output artifact** (for example, **MyAppBuild**).

**Note**

You can also get the build output artifact by choosing the **Build artifacts** link on the build details page in the CodeBuild console. To get to this page, see [View build details \(console\) \(p. 279\)](#), and then skip to step 31 of this procedure.

19. Open the Amazon S3 console at <https://console.aws.amazon.com/s3/>.
20. In the list of buckets, open the bucket used by the pipeline. The name of the bucket should follow the format `codepipeline-region-ID-random-number`. You can use the AWS CLI to run the CodePipeline **get-pipeline** command to get the name of the bucket:

```
aws codepipeline get-pipeline --name my-pipeline-name
```

In the output, the `pipeline` object contains an `artifactStore` object, which contains a `location` value with the name of the bucket.

21. Open the folder that matches the name of your pipeline (depending on the length of the pipeline's name, the folder name might be truncated), and then open the folder matching the value for **Output artifact** that you noted earlier in this procedure.
22. Extract the contents of the file. If there are multiple files in that folder, extract the contents of the file with the latest **Last Modified** timestamp. (You might need to give the file the `.zip` extension)

so that you can work with it in your system's ZIP utility.) The build output artifact is in the extracted contents of the file.

23. If you instructed CodePipeline to deploy the build output artifact, use the deployment provider's instructions to get to the build output artifact on the deployment targets.

## Add a CodeBuild test action to a pipeline (CodePipeline console)

1. Sign in to the AWS Management Console by using:
  - Your AWS root account. This is not recommended. For more information, see [The account root user](#) in the *user Guide*.
  - An administrator user in your AWS account. For more information, see [Creating your first AWS account root user and group](#) in the *user Guide*.
  - An user in your AWS account with permission to perform the following minimum set of actions:

```
codepipeline:*
iam>ListRoles
iam:PassRole
s3>CreateBucket
s3:GetBucketPolicy
s3GetObject
s3>ListAllMyBuckets
s3>ListBucket
s3PutBucketPolicy
codecommit>ListBranches
codecommit>ListRepositories
codedeployGetApplication
codedeployGetDeploymentGroup
codedeployListApplications
codedeployListDeploymentGroups
elasticbeanstalkDescribeApplications
elasticbeanstalkDescribeEnvironments
lambdaGetFunctionConfiguration
lambdaListFunctions
opsworksDescribeStacks
opsworksDescribeApps
opsworksDescribeLayers
```

2. Open the CodePipeline console at <https://console.aws.amazon.com/codesuite/codepipeline/home>.
3. In the AWS region selector, choose the AWS Region where your pipeline is located. This must be an AWS Region where CodeBuild is supported. For more information, see [AWS CodeBuild](#) in the *Amazon Web Services General Reference*.
4. On the **Pipelines** page, choose the name of the pipeline.
5. On the pipeline details page, in the **Source** action, choose the tooltip. Make a note of the value for **Output artifact** (for example, **MyApp**).

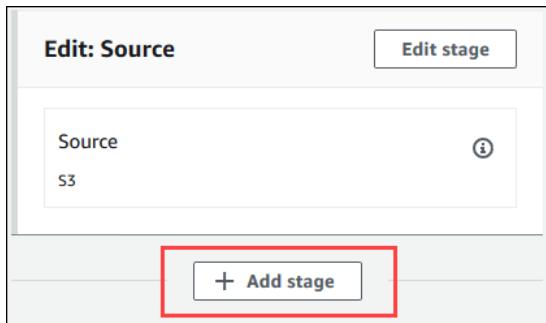
### Note

This procedure shows you how to add a test action inside of a test stage between the **Source** and **Beta** stages. If you want to add the test action somewhere else, rest your mouse pointer on the action just before, and make a note of the value for **Output artifact**.

6. Choose **Edit**.
7. Immediately after the **Source** stage, choose **Add stage**.

**Note**

This procedure shows you how to add a test stage immediately after the **Source** stage to your pipeline. To add a test action to an existing stage, choose **Edit stage** in the stage, and then skip to step 8 of this procedure. To add the test stage somewhere else, choose **Add stage** in the desired place.



8. For **Stage name**, enter the name of the test stage (for example, **Test**). If you choose a different name, use it throughout this procedure.
9. In the selected stage, choose **Add action**.

**Note**

This procedure shows you how to add the test action in a test stage. To add the test action somewhere else, choose **Add action** in the desired place. You might first need to choose **Edit** in the existing stage where you want to add the test action.

10. In **Edit action**, for **Action name**, enter a name for the action (for example, **Test**). If you choose a different name, use it throughout this procedure.
11. For **Action provider**, under **Test**, choose **CodeBuild**.
12. If you already have a build project you want to use, for **Project name**, choose the name of the build project and skip to the next step in this procedure.

If you need to create a new CodeBuild build project, follow the instructions in [Create a build project \(console\) \(p. 188\)](#) and return to this procedure.

**Important**

If you enable webhooks for a CodeBuild project, and the project is used as a build step in CodePipeline, then two identical builds are created for each commit. One build is triggered through webhooks and one through CodePipeline. Because billing is on a per-build basis, you are billed for both builds. Therefore, if you are using CodePipeline, we recommend that you disable webhooks in CodeBuild. In the CodeBuild console, clear the **Webhook** box. For more information, see [Change a build project's settings \(console\) \(p. 242\)](#).

13. For **Input artifacts**, select the value for **Output artifact** that you noted earlier in this procedure.
14. (Optional) If you want your test action to produce an output artifact, and you set up your buildspec accordingly, then for **Output artifact**, enter the value you want to assign to the output artifact.
15. Choose **Save**.
16. Choose **Release change**.
17. After the pipeline runs successfully, you can get the test results. In the **Test** stage of the pipeline, choose the **CodeBuild** hyperlink to open the related build project page in the CodeBuild console.
18. On the build project page, in **Build history**, choose the **Build run** hyperlink.
19. On the build run page, in **Build logs**, choose the **View entire log** hyperlink to open the build log in the Amazon CloudWatch console.
20. Scroll through the build log to view the test results.

# Use AWS CodeBuild with Jenkins

You can use the Jenkins plugin for AWS CodeBuild to integrate CodeBuild with your Jenkins build jobs. Instead of sending your build jobs to Jenkins build nodes, you use the plugin to send your build jobs to CodeBuild. This eliminates the need for you to provision, configure, and manage Jenkins build nodes.

## Setting up Jenkins

For information about setting up Jenkins with the AWS CodeBuild plugin, and to download the plugin source code, see <https://github.com/awslabs/aws-codebuild-jenkins-plugin>.

## Installing the plugin

If you already have a Jenkins server set up and would like to only install the AWS CodeBuild plugin, on your Jenkins instance, in the Plugin Manager, search for **CodeBuild Plugin for Jenkins**.

## Using the plugin

### To use AWS CodeBuild with sources from outside of a VPC

1. Create a project in the CodeBuild console. For more information, see [Create a build project \(console\) \(p. 188\)](#).
  - Choose the AWS Region where you want to run the build.
  - (Optional) Set the Amazon VPC configuration to allow the CodeBuild build container to access resources in your VPC.
  - Write down the name of your project. You need it in step 3.
  - (Optional) If your source repository is not natively supported by CodeBuild, you can set Amazon S3 as the input source type for your project.
2. In the IAMconsole, create an user to be used by the Jenkins plugin.
  - When you create credentials for the user, choose **Programmatic Access**.
  - Create a policy similar to the following and then attach the policy to your user.

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Resource": ["arn:aws:logs:{}{{region}}:{}{{awsAccountId}}:log-group:/aws/  
codebuild/{{{{projectName}}}}:*"],  
            "Action": ["logs:GetLogEvents"]  
        },  
        {  
            "Effect": "Allow",  
            "Resource": ["arn:aws:s3:::{}{{inputBucket}}"],  
            "Action": ["s3:GetBucketVersioning"]  
        },  
        {  
            "Effect": "Allow",  
            "Resource": ["arn:aws:s3:::{}{{inputBucket}}/{{inputObject}}"],  
            "Action": ["s3:PutObject"]  
        },  
        {  
            "Effect": "Allow",  
            "Resource": [
```

```
        "Resource": ["arn:aws:s3:::{outputBucket}/*"],
        "Action": ["s3:GetObject"]
    },
{
    "Effect": "Allow",
    "Resource": ["arn:aws:codebuild:{region}:{awsAccountId}:project/
{{ projectName }}"],
    "Action": ["codebuild:StartBuild",
        "codebuild:BatchGetBuilds",
        "codebuild:BatchGetProjects"]
}
]
```

3. Create a freestyle project in Jenkins.
  - On the **Configure** page, choose **Add build step**, and then choose **Run build on CodeBuild**.
  - Configure your build step.
    - Provide values for **Region**, **Credentials**, and **Project Name**.
    - Choose **Use Project source**.
    - Save the configuration and run a build from Jenkins.
4. For **Source Code Management**, choose how you want to retrieve your source. You might need to install the GitHub plugin (or the Jenkins plugin for your source repository provider) on your Jenkins server.
  - On the **Configure** page, choose **Add build step**, and then choose **Run build on AWS CodeBuild**.
  - Configure your build step.
    - Provide values for **Region**, **Credentials**, and **Project Name**.
    - Choose **Use Jenkins source**.
    - Save the configuration and run a build from Jenkins.

#### To use the AWS CodeBuild plugin with the Jenkins pipeline plugin

- On your Jenkins pipeline project page, use the snippet generator to generate a pipeline script that adds CodeBuild as a step in your pipeline. It should generate a script similar to this:

```
awsCodeBuild projectName: 'project', credentialsType: 'keys', region: 'us-west-2',
sourceControlType: 'jenkins'
```

## Use AWS CodeBuild with Codecov

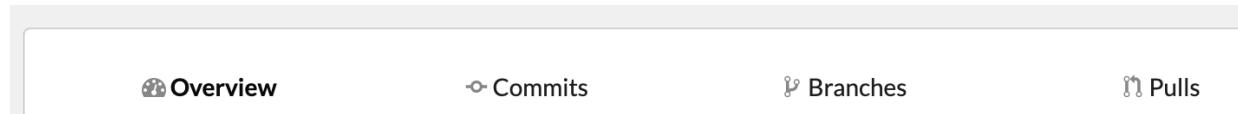
Codecov is a tool that measures the test coverage of your code. Codecov identifies which methods and statements in your code are not tested. Use the results to determine where to write tests to improve the quality of your code. Codecov is available for three of the source repositories supported by CodeBuild: GitHub, GitHub Enterprise Server, and Bitbucket. If your build project uses GitHub Enterprise Server, you must use Codecov Enterprise.

When you run a build of a CodeBuild project that is integrated with Codecov, Codecov reports that analyzes code in your repository are uploaded to Codecov. The build logs include a link to the reports. This sample shows you how to integrate a Python and a Java build project with Codecov. For a list of languages supported by Codecov, see [Codecov supported languages](#) on the Codecov website.

## IntegrateCodecov into a build project

### To integrateCodecov with your build project

1. Go to <https://codecov.io/signup> and sign up for a GitHub or Bitbucket source repository. If you use GitHub Enterprise, see [Codecov Enterprise](#) on the Codecov website.
2. In Codecov, add the repository for which you want coverage.
3. When token information is displayed, choose **Copy**.



## Let's get your project covered

No repository activation required. Simply upload a report and the project will be activated automatically.

### STEP 1 - COPY TOKEN

Upload Token

4. Add the copied token as an environment variable named CODECOV\_TOKEN to your build project. For more information, see [Change a build project's settings \(console\) \(p. 242\)](#).
5. Create a text file named my\_script.sh in your repository. Enter the following into the file:

```
#/bin/bash
bash <(curl -s https://codecov.io/bash) -t $CODECOV_TOKEN
```

6. Choose the **Python** or **Java** tab, as appropriate for your build project uses, and follow these steps.

Java

1. Add the following JaCoCo plugin to pom.xml in your repository.

```
<build>
  <plugins>
    <plugin>
      <groupId>org.jacoco</groupId>
      <artifactId>jacoco-maven-plugin</artifactId>
      <version>0.8.2</version>
      <executions>
        <execution>
          <goals>
            <goal>prepare-agent</goal>
          </goals>
        </execution>
        <execution>
          <id>report</id>
          <phase>test</phase>
          <goals>
            <goal>report</goal>
```

```
        </goals>
    </execution>
</executions>
</plugin>
</plugins>
</build>
```

2. Enter the following commands in your buildspec file. For more information, see [Buildspec syntax](#) (p. 130).

```
build:
  - mvn test -f pom.xml -fn
postbuild:
  - echo 'Connect to CodeCov'
  - bash my_script.sh
```

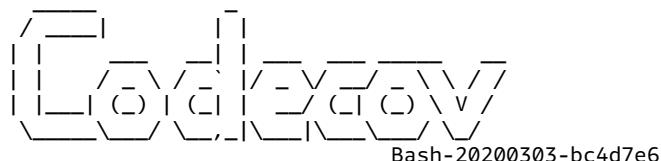
Python

Enter the following commands in your buildspec file. For more information, see [Buildspec syntax \(p. 130\)](#).

```
build:
  - pip install coverage
  - coverage run -m unittest discover
postbuild:
  - echo 'Connect to CodeCov'
  - bash my_script.sh
```

- Run a build of your build project. A link to Codecov reports generated for your project appears in your build logs. Use the link to view the Codecov reports. For more information, see [Run a build in AWS CodeBuild \(p. 271\)](#) and [Logging AWS CodeBuild API calls with AWS CloudTrail \(p. 320\)](#). Codecov information in the build logs looks like the following:

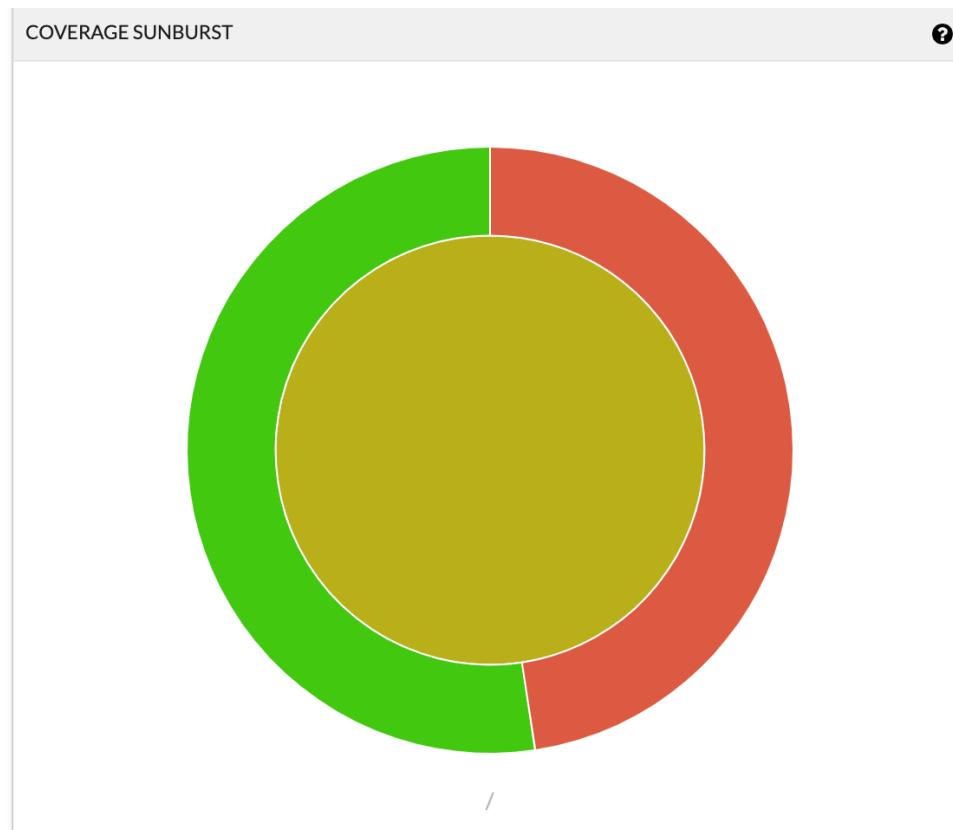
[Container] 2020/03/09 16:31:04 Running command bash my\_script.sh



```
[0;90m==>[0m AWS CodeBuild detected.  
... The full list of codecov log entries has been omitted for brevity ...  
[0;32m->[0m View reports at [0;36mhttps://codecov.io/github/user/test\_py/commit/  
commit-id[0m
```

[Container] 2020/03/09 16:31:07 Phase complete: POST\_BUILD State: SUCCEEDED

The reports look like the following:



| File                            | Line Count |
|---------------------------------|------------|
| code.py                         | 10         |
| tests.py                        | 11         |
| <b>Project Totals (2 files)</b> | <b>21</b>  |

## Use AWS CodeBuild with serverless applications

The AWS Serverless Application Model (AWS SAM) is an open-source framework for building serverless applications. For more information, see the [AWS serverless application model](#) repository on GitHub.

You can use AWS CodeBuild to package and deploy serverless applications that follow the AWS SAM standard. For the deployment step, CodeBuild can use AWS CloudFormation. To automate the building and deployment of serverless applications with CodeBuild and AWS CloudFormation, you can use AWS CodePipeline.

For more information, see [Deploying Serverless Applications](#) in the *AWS Serverless Application Model Developer Guide*.

## Related resources

- For information about getting started with AWS CodeBuild, see [Getting started with AWS CodeBuild using the console \(p. 5\)](#).
- For information about troubleshooting issues in CodeBuild, see [Troubleshooting AWS CodeBuild \(p. 410\)](#).
- For information about quotas in CodeBuild, see [Quotas for AWS CodeBuild \(p. 425\)](#).

# Troubleshooting AWS CodeBuild

Use the information in this topic to help you identify, diagnose, and address issues. To learn how to log and monitor CodeBuild builds to troubleshoot issues, see [Logging and monitoring \(p. 320\)](#).

## Topics

- [Apache Maven builds reference artifacts from the wrong repository \(p. 411\)](#)
- [Build commands run as root by default \(p. 412\)](#)
- [Builds might fail when file names have non-U.S. English characters \(p. 412\)](#)
- [Builds might fail when getting parameters from Amazon EC2 Parameter Store \(p. 412\)](#)
- [Cannot access branch filter in the CodeBuild console \(p. 413\)](#)
- [Cannot view build success or failure \(p. 413\)](#)
- [Build status not reported to source provider \(p. 414\)](#)
- [Cannot find and select the base image of the Windows Server Core 2019 platform \(p. 414\)](#)
- [Earlier commands in buildspec files are not recognized by later commands \(p. 414\)](#)
- [Error: "Access denied" when attempting to download cache \(p. 415\)](#)
- [Error: "BUILD\\_CONTAINER\\_UNABLE\\_TO\\_PULL\\_IMAGE" when using a custom build image \(p. 415\)](#)
- [Error: "Build container found dead before completing the build. build container died because it was out of memory, or the Docker image is not supported. ErrorCode: 500" \(p. 416\)](#)
- [Error: "Cannot connect to the Docker daemon" when running a build \(p. 416\)](#)
- [Error: "CodeBuild is not authorized to perform: sts:AssumeRole" when creating or updating a build project \(p. 417\)](#)
- [Error: "Error calling GetBucketAcl: Either the bucket owner has changed or the service role no longer has permission to called s3:GetBucketAcl" \(p. 417\)](#)
- [Error: "Failed to upload artifacts: Invalid arn" when running a build \(p. 418\)](#)
- [Error: "Git clone failed: Unable to access 'your-repository-URL': SSL certificate problem: Self signed certificate" \(p. 418\)](#)
- [Error: "The bucket you are attempting to access must be addressed using the specified endpoint" when running a build \(p. 418\)](#)
- [Error: "The policy's default version was not created by enhanced zero click role creation or was not the most recent version created by enhanced zero click role creation." \(p. 419\)](#)
- [Error: "This build image requires selecting at least one runtime version." \(p. 419\)](#)
- [Error: "QUEUED: INSUFFICIENT\\_SUBNET" when a build in a build queue fails \(p. 420\)](#)
- [Error: "Unable to download cache: RequestError: Send request failed caused by: x509: Failed to load system roots and no roots provided" \(p. 420\)](#)
- [Error: "Unable to download certificate from S3. AccessDenied" \(p. 421\)](#)
- [Error: "Unable to locate credentials" \(p. 421\)](#)
- [RequestError timeout error when running CodeBuild in a proxy server \(p. 422\)](#)
- [The bourne shell \(sh\) must exist in build images \(p. 423\)](#)
- [Warning: "Skipping install of runtimes. runtime version selection is not supported by this build image" when running a build \(p. 423\)](#)
- [Error: "Unable to verify JobWorker identity" when opening the CodeBuild console \(p. 423\)](#)
- [Build failed to start \(p. 424\)](#)
- [Accessing GitHub metadata in locally cached builds \(p. 424\)](#)

- [AccessDenied: The bucket owner for the report group does not match the owner of the S3 bucket... \(p. 424\)](#)

## Apache Maven builds reference artifacts from the wrong repository

**Issue:** When you use Maven with an AWS CodeBuild-provided Java build environment, Maven pulls build and plugin dependencies from the secure central Maven repository at <https://repo1.maven.org/maven2>. This happens even if your build project's pom.xml file explicitly declares other locations to use instead.

**Possible cause:** CodeBuild-provided Java build environments include a file named settings.xml that is preinstalled in the build environment's /root/.m2 directory. This settings.xml file contains the following declarations, which instruct Maven to always pull build and plugin dependencies from the secure central Maven repository at <https://repo1.maven.org/maven2>.

```
<settings>
  <activeProfiles>
    <activeProfile>securecentral</activeProfile>
  </activeProfiles>
  <profiles>
    <profile>
      <id>securecentral</id>
      <repositories>
        <repository>
          <id>central</id>
          <url>https://repo1.maven.org/maven2</url>
          <releases>
            <enabled>true</enabled>
          </releases>
        </repository>
      </repositories>
      <pluginRepositories>
        <pluginRepository>
          <id>central</id>
          <url>https://repo1.maven.org/maven2</url>
          <releases>
            <enabled>true</enabled>
          </releases>
        </pluginRepository>
      </pluginRepositories>
    </profile>
  </profiles>
</settings>
```

**Recommended solution:** Do the following:

1. Add a settings.xml file to your source code.
2. In this settings.xml file, use the preceding settings.xml format as a guide to declare the repositories you want Maven to pull the build and plugin dependencies from instead.
3. In the install phase of your build project, instruct CodeBuild to copy your settings.xml file to the build environment's /root/.m2 directory. For example, consider the following snippet from a buildspec.yml file that demonstrates this behavior.

```
version 0.2

phases:
  install:
```

```
commands:  
- cp ./settings.xml /root/.m2/settings.xml
```

## Build commands run as root by default

**Issue:** AWS CodeBuild runs your build commands as the root user. This happens even if your related build image's Dockerfile sets the USER instruction to a different user.

**Cause:** By default, CodeBuild runs all build commands as the root user.

**Recommended solution:** None.

## Builds might fail when file names have non-U.S. English characters

**Issue:** When you run a build that uses files with file names that contain non-U.S. English characters (for example, Chinese characters), the build fails.

**Possible cause:** Build environments provided by AWS CodeBuild have their default locale set to POSIX. POSIX localization settings are less compatible with CodeBuild and file names that contain non-U.S. English characters and can cause related builds to fail.

**Recommended solution:** Add the following commands to the pre\_build section of your buildspec file. These commands make the build environment use U.S. English UTF-8 for its localization settings, which is more compatible with CodeBuild and file names that contain non-U.S. English characters.

For build environments based on Ubuntu:

```
pre_build:  
  commands:  
    - export LC_ALL="en_US.UTF-8"  
    - locale-gen en_US en_US.UTF-8  
    - dpkg-reconfigure locales
```

For build environments based on Amazon Linux:

```
pre_build:  
  commands:  
    - export LC_ALL="en_US.utf8"
```

## Builds might fail when getting parameters from Amazon EC2 Parameter Store

**Issue:** When a build tries to get the value of one or more parameters stored in Amazon EC2 Parameter Store, the build fails in the DOWNLOAD\_SOURCE phase with the error Parameter does not exist.

**Possible cause:** The service role the build project relies on does not have permission to call the ssm:GetParameters action or the build project uses a service role that is generated by AWS CodeBuild and allows calling the ssm:GetParameters action, but the parameters have names that do not start with /CodeBuild/.

**Recommended solutions:**

- If the service role was not generated by CodeBuild, update its definition to allow CodeBuild to call the `ssm:GetParameters` action. For example, the following policy statement allows calling the `ssm:GetParameters` action to get parameters with names starting with `/CodeBuild/`:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Action": "ssm:GetParameters",  
            "Effect": "Allow",  
            "Resource": "arn:aws:ssm:REGION_ID:ACCOUNT_ID:parameter/CodeBuild/*"  
        }  
    ]  
}
```

- If the service role was generated by CodeBuild, update its definition to allow CodeBuild to access parameters in Amazon EC2 Parameter Store with names other than those starting with `/CodeBuild/`. For example, the following policy statement allows calling the `ssm:GetParameters` action to get parameters with the specified name:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Action": "ssm:GetParameters",  
            "Effect": "Allow",  
            "Resource": "arn:aws:ssm:REGION_ID:ACCOUNT_ID:parameter/PARAMETER_NAME"  
        }  
    ]  
}
```

## Cannot access branch filter in the CodeBuild console

**Issue:** The branch filter option is not available in the console when you create or update an AWS CodeBuild project.

**Possible cause:** The branch filter option is deprecated. It has been replaced by webhook filter groups, which provide more control over the webhook events that trigger a new build in CodeBuild.

**Recommended solution:** To migrate a branch filter that you created before the introduction of webhook filters, create a webhook filter group with a `HEAD_REF` filter with the regular expression `^refs/heads/branchName$`. For example, if your branch filter regular expression was `^branchName$`, then the updated regular expression you put in the `HEAD_REF` filter is `^refs/heads/branchName$`. For more information, see [Bitbucket webhook events \(p. 224\)](#) and [Filter GitHub webhook events \(console\) \(p. 234\)](#).

## Cannot view build success or failure

**Issue:** You cannot see the success or failure of a retried build.

**Possible cause:** The option to report your build's status is not enabled.

**Recommended solutions:** Enable **Report build status** when you create or update a CodeBuild project. This option tells CodeBuild to report back the status when you trigger a build. For more information, see [reportBuildStatus](#) in the *AWS CodeBuild API Reference*.

## Build status not reported to source provider

**Issue:** After allowing build status reporting to a source provider, such as GitHub or Bitbucket, the build status is not updated.

**Possible cause:** The user associated with the source provider does not have write access to the repo.

**Recommended solutions:** To be able to report the build status to the source provider, the user associated with the source provider must have write access to the repo. If the user does not have write access, the build status cannot be updated. For more information, see [Source provider access \(p. 370\)](#).

## Cannot find and select the base image of the Windows Server Core 2019 platform

**Issue:** You cannot find or select the base image of the Windows Server Core 2019 platform.

**Possible cause:** You are using an AWS Region that does not support this image.

**Recommended solutions:** Use one of the following AWS Regions where the base image of the Windows Server Core 2019 platform is supported:

- US East (N. Virginia)
- US East (Ohio)
- US West (Oregon)
- Europe (Ireland)

## Earlier commands in buildspec files are not recognized by later commands

**Issue:** The results of one or more commands in your buildspec file are not recognized by later commands in the same buildspec file. For example, a command might set a local environment variable, but a command run later might fail to get the value of that local environment variable.

**Possible cause:** In buildspec file version 0.1, AWS CodeBuild runs each command in a separate instance of the default shell in the build environment. This means that each command runs in isolation from all other commands. By default, then, you cannot run a single command that relies on the state of any previous commands.

**Recommended solutions:** We recommend that you use build spec version 0.2, which solves this issue. If you must use buildspec version 0.1, we recommend that you use the shell command chaining operator (for example, `&&` in Linux) to combine multiple commands into a single command. Or include a shell script in your source code that contains multiple commands, and then call that shell script from a single command in the buildspec file. For more information, see [Shells and commands in build environments \(p. 163\)](#) and [Environment variables in build environments \(p. 164\)](#).

## Error: "Access denied" when attempting to download cache

**Issue:** When attempting to download the cache on a build project that has cache enabled, you receive an Access denied error.

**Possible causes:**

- You have just configured caching as part of your build project.
- The cache has recently been invalidated through the `InvalidateProjectCache` API.
- The service role being used by CodeBuild does not have `s3:GetObject` and `s3:PutObject` permissions to the S3 bucket that is holding the cache.

**Recommended solution:** For first time use, it's normal to see this immediately after updating the cache configuration. If this error persists, then you should check to see if your service role has `s3:GetObject` and `s3:PutObject` permissions to the S3 bucket that is holding the cache. For more information, see [Specifying S3 permissions](#) in the *Amazon S3 Developer Guide*.

## Error:

### "BUILD\_CONTAINER\_UNABLE\_TO\_PULL\_IMAGE" when using a custom build image

**Issue:** When you try to run a build that uses a custom build image, the build fails with the error `BUILD_CONTAINER_UNABLE_TO_PULL_IMAGE`.

**Possible cause:** *The build image's overall uncompressed size is larger than the build environment compute type's available disk space. To check your build image's size, use Docker to run the `docker images REPOSITORY:TAG` command. For a list of available disk space by compute type, see [Build environment compute types](#) (p. 160).*

**Recommended solution:** Use a larger compute type with more available disk space, or reduce the size of your custom build image.

**Possible cause:** AWS CodeBuild does not have permission to pull the build image from your Amazon Elastic Container Registry (Amazon ECR).

**Recommended solution:** Update the permissions in your repository in Amazon ECR so that CodeBuild can pull your custom build image into the build environment. For more information, see the [Amazon ECR sample \(p. 45\)](#).

**Possible cause:** The Amazon ECR image you requested is not available in the AWS Region that your AWS account is using.

**Recommended solution:** Use an Amazon ECR image that is in the same AWS Region as the one your AWS account is using.

**Possible cause:** You are using a private registry in a VPC that does not have public internet access. CodeBuild cannot pull an image from a private IP address in a VPC. For more information, see [Private registry with AWS Secrets Manager sample for CodeBuild](#) (p. 122).

**Recommended solution:** If you use a private registry in a VPC, make sure the VPC has public internet access.

Error: "Build container found dead before completing the build. build container died because it was out of memory, or the Docker image is not supported. ErrorCode: 500"

---

**Possible cause:** If the error message contains "**toomanyrequests**", and the image is obtained from Docker Hub, this error means the Docker Hub pull limit has been reached.

**Recommended solution:** Use a Docker Hub private registry, or obtain your image from Amazon ECR. For more information about using a private registry, see [Private registry with AWS Secrets Manager sample for CodeBuild \(p. 122\)](#). For more information about using Amazon ECR, see [Amazon ECR sample for CodeBuild \(p. 45\)](#).

## Error: "Build container found dead before completing the build. build container died because it was out of memory, or the Docker image is not supported. ErrorCode: 500"

**Issue:** When you try to use a Microsoft Windows or Linux container in AWS CodeBuild, this error occurs during the PROVISIONING phase.

**Possible causes:**

- The container OS version is not supported by CodeBuild.
- HTTP\_PROXY, HTTPS\_PROXY, or both are specified in the container.

**Recommended solutions:**

- For Microsoft Windows, use a Windows container with a container OS that is version microsoft/windowsservercore:10.0.x (for example, microsoft/windowsservercore:10.0.14393.2125).
- For Linux, clear the HTTP\_PROXY and HTTPS\_PROXY settings in your Docker image, or specify the VPC configuration in your build project.

## Error: "Cannot connect to the Docker daemon" when running a build

**Issue:** Your build fails and you receive an error similar to Cannot connect to the Docker daemon at unix:/var/run/docker.sock. Is the docker daemon running? in the build log.

**Possible cause:** You are not running your build in privileged mode.

**Recommended solution:** Follow these steps to run your build in privileged mode:

1. Open the CodeBuild console at <https://console.aws.amazon.com/codebuild/>.
2. In the navigation pane, choose **Build projects**, and then choose your build project.
3. From **Edit**, choose **Environment**.
4. Choose **Override images**, and then choose **Environment**.
5. Specify your environment image, operating system, runtime, and image. These settings should match the settings for the build that failed.
6. Select **Privileged**.

**Note**

By default, Docker containers do not allow access to any devices. Privileged mode grants a build project's Docker container access to all devices. For more information, see [Runtime Privilege and Linux Capabilities](#) on the Docker Docs website. Also, Windows does not support privileged mode.

7. Choose **Update environment**.
8. Choose **Start build** to retry your build.

## Error: "CodeBuild is not authorized to perform: sts:AssumeRole" when creating or updating a build project

**Issue:** When you try to create or update a build project, you receive the error `Code:InvalidInputException, Message:CodeBuild is not authorized to perform: sts:AssumeRole on arn:aws:iam::account-ID:role/service-role-name.`

**Possible causes:**

- The AWS Security Token Service (AWS STS) has been deactivated for the AWS region where you are attempting to create or update the build project.
- The AWS CodeBuild service role associated with the build project does not exist or does not have sufficient permissions to trust CodeBuild.

**Recommended solutions:**

- Make sure AWS STS is activated for the AWS region where you are attempting to create or update the build project. For more information, see [Activating and deactivating AWS STS in an AWS Region](#) in the *IAM User Guide*.
- Make sure the target CodeBuild service role exists in your AWS account. If you are not using the console, make sure you did not misspell the Amazon Resource Name (ARN) of the service role when you created or updated the build project.
- Make sure the target CodeBuild service role has sufficient permissions to trust CodeBuild. For more information, see the trust relationship policy statement in [Create a CodeBuild service role \(p. 381\)](#).

## Error: "Error calling GetBucketAcl: Either the bucket owner has changed or the service role no longer has permission to called s3:GetBucketAcl"

**Issue:** When you run a build, you receive an error about a change in ownership of an S3 bucket and GetBucketAcl permissions.

**Possible cause:** You added the `s3:GetBucketAcl` and `s3:GetBucketLocation` permissions to your IAM role. These permissions secure your project's S3 bucket and ensure that only you can access it. After you added these permissions, the owner of the S3 bucket changed.

**Recommended solution:** Verify you are an owner of the S3 bucket, and then add permissions to your IAM role again. For more information, see [Secure access to S3 buckets \(p. 341\)](#).

## Error: "Failed to upload artifacts: Invalid arn" when running a build

**Issue:** When you run a build, the UPLOAD\_ARTIFACTS build phase fails with the error Failed to upload artifacts: Invalid arn.

**Possible cause:** Your S3 output bucket (the bucket where AWS CodeBuild stores its output from the build) is in an AWS Region different from the CodeBuild build project.

**Recommended solution:** Update the build project's settings to point to an output bucket that is in the same AWS Region as the build project.

## Error: "Git clone failed: Unable to access 'your-repository-URL': SSL certificate problem: Self signed certificate"

**Issue:** When you try to run a build project, the build fails with this error.

**Possible cause:** Your source repository has a self-signed certificate, but you have not chosen to install the certificate from your S3 bucket as part of your build project.

**Recommended solutions:**

- Edit your project. For **Certificate**, choose **Install certificate from S3**. For **Bucket of certificate**, choose the S3 bucket where your SSL certificate is stored. For **Object key of certificate**, enter the name of your S3 object key.
- Edit your project. Select **Insecure SSL** to ignore SSL warnings while connecting to your GitHub Enterprise Server project repository.

**Note**

We recommend that you use **Insecure SSL** for testing only. It should not be used in a production environment.

## Error: "The bucket you are attempting to access must be addressed using the specified endpoint" when running a build

**Issue:** When you run a build, the DOWNLOAD\_SOURCE build phase fails with the error The bucket you are attempting to access must be addressed using the specified endpoint. Please send all future requests to this endpoint.

**Possible cause:** Your pre-built source code is stored in an S3 bucket, and that bucket is in an AWS Region different from the AWS CodeBuild build project.

**Recommended solution:** Update the build project's settings to point to a bucket that contains your pre-built source code. Make sure that bucket is in the same AWS Region as the build project.

AWS CodeBuild User Guide  
Error: "The policy's default version was not created by enhanced zero click role creation or was not the most recent version created by enhanced zero click role creation."

## Error: "The policy's default version was not created by enhanced zero click role creation or was not the most recent version created by enhanced zero click role creation."

**Issue:** When you try to update a project in the console, the update failed with this error:

**Possible causes:**

- You have updated the policies attached to the target AWS CodeBuild service role.
- You have selected an earlier version of a policy attached to the target CodeBuild service role.

**Recommended solutions:**

- Edit your CodeBuild project and clear the **Allow CodeBuild to modify this service role so it can be used with this build project** check box. Verify the CodeBuild service role you are using has sufficient permissions. If you edit your CodeBuild project again, you must clear this check box again. For more information, see [Create a CodeBuild service role \(p. 381\)](#).
- Follow these steps to edit your CodeBuild project to use a new service role:
  1. Open the IAM console and create a new service role. For more information, see [Create a CodeBuild service role \(p. 381\)](#).
  2. Open the AWS CodeBuild console at <https://console.aws.amazon.com/codesuite/codebuild/home>.
  3. In the navigation pane, choose **Build projects**.
  4. Choose the button next to your build project, choose **Edit**, and then choose **Environment**.
  5. For **Service role**, choose the role you created.
  6. Choose **Update environment**.

## Error: "This build image requires selecting at least one runtime version."

**Issue:** When you run a build, the DOWNLOAD\_SOURCE build phase fails with the error **YAML\_FILE\_ERROR: This build image requires selecting at least one runtime version.**

**Possible cause:** Your build uses version 1.0 or later of the Amazon Linux 2 (AL2) standard image, or version 2.0 or later of the Ubuntu standard image, and a runtime is not specified in the buildspec file.

**Recommended solution:** If you use the `aws/codebuild/standard:2.0` CodeBuild managed image, you must specify a runtime version in the `runtime-versions` section of the buildspec file. For example, you might use the following buildspec file for a project that uses PHP:

```
version: 0.2
```

```
phases:  
  install:  
    runtime-versions:  
      php: 7.3  
  build:  
    commands:  
      - php --version  
artifacts:  
  files:  
    - README.md
```

**Note**

If you specify a `runtime-versions` section and use an image other than Ubuntu Standard Image 2.0 or later, or the Amazon Linux 2 (AL2) standard image 1.0 or later, the build issues the warning, "Skipping install of runtimes. Runtime version selection is not supported by this build image."

For more information, see [Specify runtime versions in the buildspec file](#).

## Error: "QUEUED: INSUFFICIENT\_SUBNET" when a build in a build queue fails

**Issue:** A build in a build queue fails with an error similar to `QUEUED: INSUFFICIENT_SUBNET`.

**Possible causes:** The IPv4 CIDR block specified for your VPC uses a reserved IP address. The first four IP addresses and the last IP address in each subnet CIDR block are not available for you to use and cannot be assigned to an instance. For example, in a subnet with CIDR block `10.0.0.0/24`, the following five IP addresses are reserved:

- `10.0.0.0`: Network address.
- `10.0.0.1`: Reserved by AWS for the VPC router.
- `10.0.0.2`: Reserved by AWS. The IP address of the DNS server is always the base of the VPC network range plus two; however, we also reserve the base of each subnet range plus two. For VPCs with multiple CIDR blocks, the IP address of the DNS server is located in the primary CIDR. For more information, see [Amazon DNS server](#) in the *Amazon VPC User Guide*.
- `10.0.0.3`: Reserved by AWS for future use.
- `10.0.0.255`: Network broadcast address. We do not support broadcast in a VPC. This address is reserved.

**Recommended solutions:** Check if your VPC uses a reserved IP address. Replace any reserved IP address with one that is not reserved. For more information, see [VPC and subnet sizing](#) in the *Amazon VPC User Guide*.

## Error: "Unable to download cache: RequestError: Send request failed caused by: x509: Failed to load system roots and no roots provided"

**Issue:** When you try to run a build project, the build fails with this error.

**Possible cause:** You configured caching as part of your build project and are using an older Docker image that includes an expired root certificate.

**Recommended solution:** Update the Docker image that is being used in your AWS CodeBuild the project. For more information, see [Docker images provided by CodeBuild \(p. 153\)](#).

## Error: "Unable to download certificate from S3. AccessDenied"

**Issue:** When you try to run a build project, the build fails with this error.

**Possible causes:**

- You have chosen the wrong S3 bucket for your certificate.
- You have entered the wrong object key for your certificate.

**Recommended solutions:**

- Edit your project. For **Bucket of certificate**, choose the S3 bucket where your SSL certificate is stored.
- Edit your project. For **Object key of certificate**, enter the name of your S3 object key.

## Error: "Unable to locate credentials"

**Issue:** When you try to run the AWS CLI, use an AWS SDK, or call another similar component as part of a build, you get build errors that are directly related to the AWS CLI, AWS SDK, or component. For example, you might get a build error such as `Unable to locate credentials`.

**Possible causes:**

- The version of the AWS CLI, AWS SDK, or component in the build environment is incompatible with AWS CodeBuild.
- You are running a Docker container within a build environment that uses Docker, and the container does not have access to the AWS credentials by default.

**Recommended solutions:**

- Make sure your build environment has the following version or higher of the AWS CLI, AWS SDK, or component.
  - AWS CLI: 1.10.47
  - AWS SDK for C++: 0.2.19
  - AWS SDK for Go: 1.2.5
  - AWS SDK for Java: 1.11.16
  - AWS SDK for JavaScript: 2.4.7
  - AWS SDK for PHP: 3.18.28
  - AWS SDK for Python (Boto3): 1.4.0
  - AWS SDK for Ruby: 2.3.22
  - Botocore: 1.4.37
  - CoreCLR: 3.2.6-beta
  - Node.js: 2.4.7

- If you need to run a Docker container in a build environment and the container requires AWS credentials, you must pass through the credentials from the build environment to the container. In your buildspec file, include a Docker `run` command such as the following. This example uses the `aws s3 ls` command to list your available S3 buckets. The `-e` option passes through the environment variables required for your container to access AWS credentials.

```
docker run -e AWS_DEFAULT_REGION -e AWS_CONTAINER_CREDENTIALS_RELATIVE_URI your-image-tag
aws s3 ls
```

- If you are building a Docker image and the build requires AWS credentials (for example, to download a file from Amazon S3), you must pass through the credentials from the build environment to the Docker build process as follows.

1. In your source code's Dockerfile for the Docker image, specify the following ARG instructions.

```
ARG AWS_DEFAULT_REGION
ARG AWS_CONTAINER_CREDENTIALS_RELATIVE_URI
```

2. In your buildspec file, include a Docker build command such as the following. The `--build-arg` options sets the environment variables required for your Docker build process to access the AWS credentials.

```
docker build --build-arg AWS_DEFAULT_REGION=$AWS_DEFAULT_REGION --build-arg
AWS_CONTAINER_CREDENTIALS_RELATIVE_URI=$AWS_CONTAINER_CREDENTIALS_RELATIVE_URI -
t your-image-tag .
```

## RequestError timeout error when running CodeBuild in a proxy server

**Issue:** You receive a RequestError error similar to one of the following:

- RequestError: send request failed caused by: Post `https://logs.<your-region>.amazonaws.com/`: dial tcp 52.46.158.105:443: i/o timeout from CloudWatch Logs.
- Error uploading artifacts: RequestError: send request failed caused by: Put `https://your-bucket.s3.your-aws-region.amazonaws.com/*`: dial tcp 52.219.96.208:443: connect: connection refused from Amazon S3.

### Possible causes:

- `ssl-bump` is not configured properly.
- Your organization's security policy does not allow you to use `ssl_bump`.
- Your buildspec file does not have proxy settings specified using a `proxy` element.

### Recommended solutions:

- Make sure `ssl-bump` is configured properly. If you use Squid for your proxy server, see [Configure Squid as an explicit proxy server \(p. 181\)](#).
- Follow these steps to use private endpoints for Amazon S3 and CloudWatch Logs:
  1. In your private subnet routing table, remove the rule you added that routes traffic destined for the internet to your proxy server. For information, see [Creating a subnet in your VPC](#) in the *Amazon VPC User Guide*.

2. Create a private Amazon S3 endpoint and CloudWatch Logs endpoint and associate them with the private subnet of your Amazon VPC. For information, see [VPC endpoint services](#) in the *Amazon VPC User Guide*.
  3. Confirm **Enable Private DNS Name** in your Amazon VPC is selected. For more information, see [Creating an interface endpoint](#) in the *Amazon VPC User Guide*.
- If you do not use `ssl-bump` for an explicit proxy server, add a proxy configuration to your `buildspec` file using a `proxy` element. For more information, see [Run CodeBuild in an explicit proxy server \(p. 181\)](#) and [Buildspec syntax \(p. 130\)](#).

```
version: 0.2
proxy:
  upload-artifacts: yes
  logs: yes
phases:
  build:
    commands:
```

## The bourne shell (sh) must exist in build images

**Issue:** You are using a build image that is not provided by AWS CodeBuild, and your builds fail with the message `Build container found dead before completing the build`.

**Possible cause:** The Bourne shell (sh) is not included in your build image. CodeBuild needs sh to run build commands and scripts.

**Recommended solution:** If sh is not present in your build image, be sure to include it before you start any more builds that use your image. (CodeBuild already includes sh in its build images.)

## Warning: "Skipping install of runtimes. runtime version selection is not supported by this build image" when running a build

**Issue:** When you run a build, the build log contains this warning.

**Possible cause:** Your build does not use version 1.0 or later of the Amazon Linux 2 (AL2) standard image, or version 2.0 or later of the Ubuntu standard image, and a runtime is specified in a `runtime-versions` section in your `buildspec` file.

**Recommended solution:** Be sure your `buildspec` file does not contain a `runtime-versions` section. The `runtime-versions` section is only required if you use the Amazon Linux 2 (AL2) standard image or later or the Ubuntu standard image version 2.0 or later.

## Error: "Unable to verify JobWorker identity" when opening the CodeBuild console

**Issue:** When you open the CodeBuild console, an "Unable to verify JobWorker identity" error message is displayed.

**Possible cause:** The IAM role that is used for console access has a tag with jobId as the key. This tag key is reserved for CodeBuild and will cause this error if it is present.

**Recommended solution:** Change any custom IAM role tags that have the key jobId to have a different key, such as jobIdentifier.

## Build failed to start

**Issue:** When starting a build, you receive a **Build failed to start** error message.

**Possible cause:** The number of concurrent builds has been reached.

**Recommended solutions:** Wait until other builds are complete, or increase the concurrent build limit for the project, and start the build again. For more information, see [Project configuration \(p. 188\)](#).

## Accessing GitHub metadata in locally cached builds

**Issue:** In some cases, the .git directory in a cached build is a text file and not a directory.

**Possible causes:** When local source caching is enabled for a build, CodeBuild creates a gitlink for the .git directory. This means that the .git directory is actually a text file containing the path to the directory.

**Recommended solutions:** In all cases, use the following command to obtain the Git metadata directory. This command will work no matter the format of .git:

```
git rev-parse --git-dir
```

## AccessDenied: The bucket owner for the report group does not match the owner of the S3 bucket...

**Issue:** When uploading test data to an Amazon S3 bucket, CodeBuild is unable to write the test data to the bucket.

**Possible causes:**

- The account specified for the report group bucket owner does not match the owner of the Amazon S3 bucket.
- The service role does not have write access to the bucket.

**Recommended solutions:**

- Change the report group bucket owner to match the owner of the Amazon S3 bucket.
- Modify the service role to allow write access to the Amazon S3 bucket.

# Quotas for AWS CodeBuild

The following tables list the current quotas in AWS CodeBuild. These quotas are for each supported AWS Region for each AWS account, unless otherwise specified.

## Service quotas

The following are the default quotas for the AWS CodeBuild service.

| Name                                                        | Default                      | Adjust              | Description                                                                                                         |
|-------------------------------------------------------------|------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------|
| Associated tags per project                                 | Each supported Region: 50    | No                  | Maximum number of tags you can associate with a build project                                                       |
| Build projects                                              | Each supported Region: 5,000 | <a href="#">Yes</a> | Maximum number of build projects                                                                                    |
| Build timeout in minutes                                    | Each supported Region: 480   | No                  | Maximum build timeout in minutes                                                                                    |
| Concurrent request for information about builds             | Each supported Region: 100   | No                  | Maximum number of builds you can request information about at any one time using the AWS CLI or an AWS SDK.         |
| Concurrent requests for information on build projects       | Each supported Region: 100   | No                  | Maximum number of build projects you can request information about at any one time using the AWS CLI or an AWS SDK. |
| Concurrently running builds for ARM/Large environment       | Each supported Region: 1     | <a href="#">Yes</a> | Maximum number of concurrently running builds for ARM/Large environment                                             |
| Concurrently running builds for ARM/Small environment       | Each supported Region: 1     | <a href="#">Yes</a> | Maximum number of concurrently running builds for ARM/Small environment                                             |
| Concurrently running builds for Linux GPU Large environment | Each supported Region: 0     | <a href="#">Yes</a> | Maximum number of concurrently running builds for Linux GPU/Large environment                                       |
| Concurrently running builds for Linux GPU Small environment | Each supported Region: 0     | <a href="#">Yes</a> | Maximum number of concurrently running                                                                              |

| Name                                                                   | Default                   | Adjust              | Description                                                                              |
|------------------------------------------------------------------------|---------------------------|---------------------|------------------------------------------------------------------------------------------|
|                                                                        |                           |                     | builds for Linux GPU/Small environment                                                   |
| Concurrently running builds for Linux/2XLarge environment              | Each supported Region: 0  | <a href="#">Yes</a> | Maximum number of concurrently running builds for Linux/2XLarge environment              |
| Concurrently running builds for Linux/Large environment                | Each supported Region: 1  | <a href="#">Yes</a> | Maximum number of concurrently running builds for Linux/Large environment                |
| Concurrently running builds for Linux/Medium environment               | Each supported Region: 1  | <a href="#">Yes</a> | Maximum number of concurrently running builds for Linux/Medium environment               |
| Concurrently running builds for Linux/Small environment                | Each supported Region: 1  | <a href="#">Yes</a> | Maximum number of concurrently running builds for Linux/Small environment                |
| Concurrently running builds for Windows Server 2019/Large environment  | Each supported Region: 1  | <a href="#">Yes</a> | Maximum number of concurrently running builds for Windows Server 2019/Large environment  |
| Concurrently running builds for Windows Server 2019/Medium environment | Each supported Region: 1  | <a href="#">Yes</a> | Maximum number of concurrently running builds for Windows Server 2019/Medium environment |
| Concurrently running builds for Windows/Large environment              | Each supported Region: 1  | <a href="#">Yes</a> | Maximum number of concurrently running builds for Windows/Large environment              |
| Concurrently running builds for Windows/Medium environment             | Each supported Region: 1  | <a href="#">Yes</a> | Maximum number of concurrently running builds for Windows/Medium environment             |
| Minimum period for build timeout in minutes                            | Each supported Region: 5  | No                  | Minimum build timeout in minutes                                                         |
| Security groups under VPC configuration                                | Each supported Region: 5  | No                  | Security groups available for VPC configuration                                          |
| Subnets under VPC configuration                                        | Each supported Region: 16 | No                  | Subnets available for VPC configuration                                                  |

### Note

Internal metrics will determine the default quotas for concurrent running builds.

Quotas for the maximum number of concurrent running builds vary, depending on the compute type. For some platforms and compute types, the default is 20. To request a higher concurrent build quota, or if

you get a "Cannot have more than X active builds for the account" error, use the link above to make the request. For more information on pricing, see [AWS CodeBuild pricing](#).

## Other limits

### Build projects

| Resource                                                                                         | Default                                                                      |
|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Allowed characters in a build project description                                                | Any                                                                          |
| Allowed characters in a build project name                                                       | The letters A-Z and a-z, the numbers 0-9, and the special characters - and _ |
| Length of a build project name                                                                   | 2 to 255 characters, inclusive                                               |
| Maximum length of a build project description                                                    | 255 characters                                                               |
| Maximum number of reports you can add to a project                                               | 5                                                                            |
| Number of minutes you can specify in a build project for the build timeout of all related builds | 5 to 480 (8 hours)                                                           |

### Builds

| Resource                                                                  | Default            |
|---------------------------------------------------------------------------|--------------------|
| Maximum time the history of a build is retained                           | 1 year             |
| Number of minutes you can specify for the build timeout of a single build | 5 to 480 (8 hours) |

### Reports

| Resource                                                        | Default          |
|-----------------------------------------------------------------|------------------|
| Maximum duration a test report is available after it is created | 30 days          |
| Maximum length of a test case message                           | 5,000 characters |
| Maximum length of a test case name                              | 1,000 characters |
| Maximum number of report groups per AWS account                 | 5,000            |
| Maximum number of test cases per report                         | 500              |

## Tags

Tag limits apply to tags on CodeBuild build projects and CodeBuild report group resources.

| Resource               | Default                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Resource tag key names | <p>Any combination of Unicode letters, numbers, spaces, and allowed characters in UTF-8 between 1 and 127 characters in length. Allowed characters are + - = . _ : / @</p> <p>Tag key names must be unique, and each key can only have one value. A tag key name cannot:</p> <ul style="list-style-type: none"><li>begin with aws :</li><li>consist only of spaces</li><li>end with a space</li><li>contain emojis or any of the following characters: ? ^ * [ \ ~ ! # \$ % &amp; * ( ) &gt; &lt;   " ' ` [ ] { } ;</li></ul> |
| Resource tag values    | <p>Any combination of Unicode letters, numbers, spaces, and allowed characters in UTF-8 between 0 and 255 characters in length. Allowed characters are + - = . _ : / @</p> <p>A key can only have one value, but many keys can have the same value. A tag key value cannot contain emojis or any of the following characters: ? ^ * [ \ ~ ! # \$ % &amp; * ( ) &gt; &lt;   " ' ` [ ] { } ;</p>                                                                                                                                |

# Third party notices for AWS CodeBuild for Windows

When you use CodeBuild for Windows builds, you have the option to use some third party packages and modules to enable your built application to run on Microsoft Windows operating systems and to interoperate with some third party products. The following list contains the applicable third-party legal terms that govern your use of the specified third-party packages and modules.

## Topics

- [1\) base Docker image—windowsservercore \(p. 429\)](#)
- [2\) windows-base Docker image—choco \(p. 430\)](#)
- [3\) windows-base Docker image—git --version 2.16.2 \(p. 430\)](#)
- [4\) windows-base Docker image—microsoft-build-tools --version 15.0.26320.2 \(p. 430\)](#)
- [5\) windows-base Docker image—nuget.commandline --version 4.5.1 \(p. 433\)](#)
- [7\) windows-base Docker image—netfx-4.6.2-devpack \(p. 433\)](#)
- [8\) windows-base Docker image—visualfsharp tools, v 4.0 \(p. 434\)](#)
- [9\) windows-base Docker image—netfx-pcl-reference-assemblies-4.6 \(p. 435\)](#)
- [10\) windows-base Docker image—visualcppbuildtools v 14.0.25420.1 \(p. 437\)](#)
- [11\) windows-base Docker image—microsoft-windows-netfx3-on-demand-package.cab \(p. 439\)](#)
- [12\) windows-base Docker image—dotnet-sdk \(p. 440\)](#)

## 1) base Docker image—windowsservercore

(license terms available at: <https://hub.docker.com/r/microsoft/windowsservercore/>)

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(license terms available at: <https://github.com/chocolatey/choco/blob/master/LICENSE>)

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## 3) windows-base Docker image—git --version 2.16.2

(license terms available at: <https://chocolatey.org/packages/git/2.16.2>)

Licensed under GNU General Public License, version 2, available at: <https://www.gnu.org/licenses.old-licenses/gpl-2.0.html>.

## 4) windows-base Docker image—microsoft-build-tools --version 15.0.26320.2

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  - Remote Tools for Visual Studio 2015;
  - Standalone Profiler for Visual Studio 2015;
  - IntelliTraceCollector for Visual Studio 2015;
  - Microsoft VC++ Redistributable 2015;
  - Multibyte MFC Library for Visual Studio 2015;
  - Microsoft Build Tools 2015;
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We may also make a copy of the source code available at <http://thirdpartysource.microsoft.com>.

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## 5) windows-base Docker image— nuget.commandline --version 4.5.1

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## 7) windows-base Docker image—netfx-4.6.2- devpack

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## 8) windows-base Docker image—visualfsharptools, v 4.0

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## 9) windows-base Docker image—netfx-pcl-reference-assemblies-4.6

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## 10) windows-base Docker image— visualcppbuildtools v 14.0.25420.1

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## 11) windows-base Docker image—microsoft-windows-netfx3-on-demand-package.cab

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# AWS CodeBuild User Guide

## document history

The following table describes the important changes to the documentation since the last release of AWS CodeBuild. For notification about updates to this documentation, you can subscribe to an RSS feed.

- **Latest API version:** 2016-10-06

| Change                                                                                        | Description                                                                                                                                                                                   | Date           |
|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <a href="#"><u>New content: GitHub Action runner (p. 265)</u></a>                             | Add new content for the GitHub Action runner                                                                                                                                                  | July 6, 2023   |
| <a href="#"><u>Updated content: Docker images provided by CodeBuild (p. 153) (p. 153)</u></a> | Add support for Amazon Linux 2 (a12/standard/5.0)                                                                                                                                             | May 17, 2023   |
| <a href="#"><u>Changes to managed policies for CodeBuild (p. 441)</u></a>                     | Details about updates to AWS managed policies for CodeBuild are now available. For more information, see <a href="#">CodeBuild updates to AWS managed policies</a> .                          | May 16, 2023   |
| <a href="#"><u>Updated content: Docker images provided by CodeBuild (p. 153) (p. 153)</u></a> | Remove support for Amazon Linux 2 (a12/standard/3.0) and add support for Amazon Linux 2 (a12/standard/corretto8) and Amazon Linux 2 (a12/standard/corretto11)                                 | May 9, 2023    |
| <a href="#"><u>Updated content: Docker images provided by CodeBuild (p. 153) (p. 153)</u></a> | Add support for Ubuntu 22.04 (ubuntu/standard/7.0)                                                                                                                                            | April 13, 2023 |
| <a href="#"><u>Updated content: Docker images provided by CodeBuild (p. 153) (p. 153)</u></a> | Remove support for Ubuntu 18.04 (ubuntu/standard/4.0) and Amazon Linux 2 (a12/aarch64/standard/1.0)                                                                                           | March 31, 2023 |
| <a href="#"><u>Updated content: Docker images provided by CodeBuild (p. 153) (p. 153)</u></a> | Remove support for Ubuntu 18.04 (ubuntu/standard/3.0) and Amazon Linux 2 (a12/standard/2.0)                                                                                                   | June 30, 2022  |
| <a href="#"><u>Amazon ECR Sample: Restrict image access (p. 441)</u></a>                      | When CodeBuild credentials are used to pull an Amazon ECR image, you can restrict image access to a specific CodeBuild project. For more information, see <a href="#">Amazon ECR sample</a> . | March 10, 2022 |

|                                                               |                                                                                                                                                                                                                                               |                    |
|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <a href="#">Added region support (p. 160)</a>                 | The ARM_CONTAINER compute type is now supported in the following additional regions: Asia Pacific (Seoul), Canada (Central), Europe (London), and Europe (Paris). For more information, see <a href="#">Build environment compute types</a> . | March 10, 2022     |
| <a href="#">New VPC limitation (p. 171)</a>                   | If you configure CodeBuild to work with a VPC, local caching is not supported. Starting 02/28/22, your VPC build will take longer since a new Amazon EC2 instance will be used for each build.                                                | February 25, 2022  |
| <a href="#">Batch report mode (p. 264)</a>                    | CodeBuild now allows you to select how batch build statuses are sent to the source provider for a project. For more information, see <a href="#">Batch report mode</a> .                                                                      | October 4, 2021    |
| <a href="#">New compute type (p. 160)</a>                     | CodeBuild now supports a small ARM compute type. For more information, see <a href="#">Build environment compute types</a> .                                                                                                                  | September 13, 2021 |
| <a href="#">Public build projects (p. 270)</a>                | CodeBuild now allows you to make the build results for your build projects available to the public without requiring access to an AWS account. For more information, see <a href="#">Public build projects</a> .                              | August 11, 2021    |
| <a href="#">Session debugging for batch builds (p. 441)</a>   | CodeBuild now supports session debugging for batch builds. For more information, see <a href="#">build-graph</a> and <a href="#">build-list</a> .                                                                                             | March 3, 2021      |
| <a href="#">Project level concurrent build limit (p. 441)</a> | CodeBuild now allows you to limit the number of concurrent builds for a build project. For more information, see <a href="#">Project configuration</a> and <a href="#">concurrentBuildLimit</a> .                                             | February 16, 2021  |
| <a href="#">New buildspec property: s3-prefix (p. 441)</a>    | CodeBuild now provides the s3-prefix buildspec property for artifacts that allows you to specify a path prefix for artifacts that are uploaded to Amazon S3. For more information, see <a href="#">s3-prefix</a> .                            | February 9, 2021   |

|                                                                         |                                                                                                                                                                                                                                       |                  |
|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <a href="#"><u>New buildspec property: on-failure (p. 441)</u></a>      | CodeBuild now provides the on-failure buildspec property for build phases that allows you to determine what happens when a build phase fails. For more information, see <a href="#">on-failure</a> .                                  | February 9, 2021 |
| <a href="#"><u>New buildspec property: exclude-paths (p. 441)</u></a>   | CodeBuild now provides the exclude-paths buildspec property for artifacts that allows you to exclude paths from your build artifacts. For more information, see <a href="#">exclude-paths</a> .                                       | February 9, 2021 |
| <a href="#"><u>New buildspec property: enable-symlinks (p. 441)</u></a> | CodeBuild now provides the enable-symlinks buildspec property for artifacts that allows you to preserve symbolic links in a ZIP artifact. For more information, see <a href="#">enable-symlinks</a> .                                 | February 9, 2021 |
| <a href="#"><u>Buildspec artifact name enhancement (p. 441)</u></a>     | CodeBuild now allows the artifacts/name property to contain path information. For more information, see <a href="#">name</a> .                                                                                                        | February 9, 2021 |
| <a href="#"><u>Code coverage reporting (p. 441)</u></a>                 | CodeBuild now provides code coverage reports. For more information, see <a href="#">Code coverage reports</a> .                                                                                                                       | July 30, 2020    |
| <a href="#"><u>Batch builds (p. 441)</u></a>                            | CodeBuild now supports running concurrent and coordinated builds of a project. For more information, see <a href="#">Batch builds in CodeBuild</a> .                                                                                  | July 30, 2020    |
| <a href="#"><u>Windows Server 2019 image (p. 441)</u></a>               | CodeBuild now provides a Windows Server Core 2019 build image. For more information, see <a href="#">Docker images provided by CodeBuild</a> .                                                                                        | July 20, 2020    |
| <a href="#"><u>Session Manager (p. 441)</u></a>                         | CodeBuild now allows you to pause a running build and then use AWS Systems Manager Session Manager to connect to the build container and view the state of the container. For more information, see <a href="#">Session Manager</a> . | July 20, 2020    |

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|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <a href="#">Updated topic (p. 441)</a>                       | CodeBuild now supports specifying a shell to use in their build environments in the buildspec file. For more information, see <a href="#">Build specification reference</a> .                                                                                                                                                          | June 25, 2020     |
| <a href="#">Test reporting with test frameworks (p. 441)</a> | Added several topics that describe how to generate CodeBuild test reports with several test frameworks. For more information, see <a href="#">Test reporting with test frameworks</a> .                                                                                                                                                | May 29, 2020      |
| <a href="#">Updated topics (p. 441)</a>                      | CodeBuild now supports adding tags to report groups. For more information, see <a href="#">ReportGroup</a> .                                                                                                                                                                                                                           | May 21, 2020      |
| <a href="#">Support for test reporting (p. 441)</a>          | CodeBuild support for test reporting is now generally available.                                                                                                                                                                                                                                                                       | May 21, 2020      |
| <a href="#">Updated topics (p. 441)</a>                      | CodeBuild now supports creating create webhook filters for Github and Bitbucket that trigger builds only when the head commit message matches the specified expression. For more information, see <a href="#">GitHub pull request and webhook filter sample</a> and <a href="#">Bitbucket pull request and webhook filter sample</a> . | May 6, 2020       |
| <a href="#">New topics (p. 441)</a>                          | CodeBuild now supports sharing build project and report group resources. For more information, see <a href="#">Working with shared projects</a> and <a href="#">Working with shared report groups</a> .                                                                                                                                | December 13, 2019 |
| <a href="#">New and updated topics (p. 441)</a>              | CodeBuild now supports test reporting during the run of a build project. For more information, see <a href="#">Working with test reporting</a> , <a href="#">Create a test report</a> , and <a href="#">Create a test report using the AWS CLI sample</a> .                                                                            | November 25, 2019 |
| <a href="#">Updated topic (p. 441)</a>                       | CodeBuild now supports Linux GPU and Arm environment types, and the 2xlarge compute type. For more information, see <a href="#">Build environment compute types</a> .                                                                                                                                                                  | November 19, 2019 |

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|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <a href="#">Updated topics (p. 441)</a> | CodeBuild now supports build numbers on all builds, exporting environment variables, and AWS Secrets Manager integration. For more information, see <a href="#">Exported variables</a> and <a href="#">Secrets Manager</a> in <a href="#">Buildspec syntax</a> . | November 6, 2019   |
| <a href="#">New topic (p. 441)</a>      | CodeBuild now supports notification rules. You can use notification rules to notify users of important changes in build projects. For more information, see <a href="#">Create a notification rule</a> .                                                         | November 5, 2019   |
| <a href="#">Updated topics (p. 441)</a> | CodeBuild now supports the Android version 29 and Go version 1.13 runtimes. For more information, see <a href="#">Docker images provided by CodeBuild</a> and <a href="#">Buildspec syntax</a> .                                                                 | September 10, 2019 |
| <a href="#">Updated topics (p. 441)</a> | When you create a project, you can now choose the Amazon Linux 2 (AL2) managed image. For more information, see <a href="#">Docker images provided by CodeBuild</a> and <a href="#">Runtime versions in buildspec file sample for CodeBuild</a> .                | August 16, 2019    |
| <a href="#">Updated topic (p. 441)</a>  | When you create a project, you can now choose to disable encryption of S3 logs and, if you use a Git-based source repository, include Git submodules. For more information, see <a href="#">Create a build project in CodeBuild</a> .                            | March 8, 2019      |
| <a href="#">New topic (p. 441)</a>      | CodeBuild now supports local caching. You can specify local caching in one or more of four modes when you create a build. For more information, see <a href="#">Build caching in CodeBuild</a> .                                                                 | February 21, 2019  |
| <a href="#">New topics (p. 441)</a>     | CodeBuild now supports webhook filter groups to specify events that trigger a build. For more information, see <a href="#">Filter GitHub webhook events</a> and <a href="#">Filter Bitbucket webhook events</a> .                                                | February 8, 2019   |

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| <a href="#">New topic (p. 441)</a>                             | The CodeBuild User Guide now shows how to use CodeBuild with a proxy server. For more information, see <a href="#">Use CodeBuild with a proxy server</a> .                                                                                                                                           | February 4, 2019  |
| <a href="#">Updated topics (p. 441)</a>                        | CodeBuild now supports using an Amazon ECR image that is in another AWS account. Several topics have been updated to reflect this change, including <a href="#">Amazon ECR sample for CodeBuild</a> , <a href="#">Create a build project</a> , and <a href="#">Create a CodeBuild service role</a> . | January 24, 2019  |
| <a href="#">Support for private Docker registries (p. 441)</a> | CodeBuild now supports using a Docker image that is stored in a private registry as your runtime environment. For more information, see <a href="#">Private registry with AWS Secrets Manager sample</a> .                                                                                           | January 24, 2019  |
| <a href="#">Updated topic (p. 441)</a>                         | CodeBuild now supports using an access token to connect to GitHub (with a personal access token) and Bitbucket (with an app password) repositories. For more information, see <a href="#">Create a build project (console)</a> and <a href="#">Use access tokens with your source provider</a> .     | December 6, 2018  |
| <a href="#">Updated topic (p. 441)</a>                         | CodeBuild now supports new build metrics that measure the duration of each phase in a build. For more information, see <a href="#">CodeBuild CloudWatch metrics</a> .                                                                                                                                | November 15, 2018 |
| <a href="#">VPC endpoint policy topic (p. 441)</a>             | Amazon VPC endpoints for CodeBuild now support policies. For more information, see <a href="#">Create a VPC endpoint policy for CodeBuild</a> .                                                                                                                                                      | November 9, 2018  |
| <a href="#">Updated content (p. 441)</a>                       | Topics have been updated to reflect the new console experience.                                                                                                                                                                                                                                      | October 30, 2018  |
| <a href="#">Amazon EFS sample (p. 441)</a>                     | CodeBuild can mount an Amazon EFS file system during a build using commands in a project's buildspec file. For more information, see <a href="#">Amazon EFS sample for CodeBuild</a> .                                                                                                               | October 26, 2018  |

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|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <a href="#">Bitbucket webhooks (p. 441)</a>                                   | CodeBuild now supports webhooks when you use Bitbucket for your repository. For more information, see <a href="#">Bitbucket pull request sample for CodeBuild</a> .                                                                                                                                                              | October 2, 2018    |
| <a href="#">S3 logs (p. 441)</a>                                              | CodeBuild now supports build logs in an S3 bucket. Previously, you could only build logs using CloudWatch Logs. For more information, see <a href="#">Create project</a> .                                                                                                                                                       | September 17, 2018 |
| <a href="#">Multiple input sources and multiple output artifacts (p. 441)</a> | CodeBuild now supports projects that use more than one input source and publish more than one set of artifacts. For more information, see <a href="#">Multiple input sources and input artifacts sample</a> and <a href="#">CodePipeline integration with CodeBuild and multiple input sources and output artifacts sample</a> . | August 30, 2018    |
| <a href="#">Semantic versioning sample (p. 441)</a>                           | The CodeBuild User Guide now has a use case-based sample that demonstrates how to use semantic versioning to create artifact names at build time. For more information, see <a href="#">Use semantic versioning to name build artifacts sample</a> .                                                                             | August 14, 2018    |
| <a href="#">New static website sample (p. 441)</a>                            | The CodeBuild User Guide now has a use case-based sample that demonstrates how to host build output in an S3 bucket. The sample takes advantage of the recent support of unencrypted build artifacts. For more information, see <a href="#">Create a static website with build output hosted in an S3 bucket</a> .               | August 14, 2018    |

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|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <a href="#">Support for overriding an artifact name with semantic versioning (p. 441)</a> | You can now use semantic versioning to specify a format that CodeBuild uses to name build artifacts. This is useful because a build artifact with a hard-coded name overwrites previous build artifacts that use the same hard-coded name. For example, if a build is triggered multiple times a day, you can now add a timestamp to its artifact name. Each build artifact name is unique and does not overwrite the artifacts of previous builds. | August 7, 2018 |
| <a href="#">Support of unencrypted build artifacts (p. 441)</a>                           | CodeBuild now supports builds with unencrypted build artifacts. For more information, see <a href="#">Create a build project (console)</a> .                                                                                                                                                                                                                                                                                                        | July 26, 2018  |
| <a href="#">Support for Amazon CloudWatch metrics and alarms (p. 441)</a>                 | CodeBuild now provides integration with CloudWatch metrics and alarms. You can use the CodeBuild or CloudWatch console to monitor builds at the project and account level. For more information, see <a href="#">Monitoring builds</a> .                                                                                                                                                                                                            | July 19, 2018  |
| <a href="#">Support for reporting a build's status (p. 441)</a>                           | CodeBuild can now report the status of a build's start and completion to your source provider. For more information, see <a href="#">Create a build project in CodeBuild</a> .                                                                                                                                                                                                                                                                      | July 10, 2018  |
| <a href="#">Environment variables added to CodeBuild documentation (p. 441)</a>           | The <a href="#">Environment variables in build environments</a> page was updated with the CODEBUILD_BUILD_ID, CODEBUILD_LOG_PATH, and CODEBUILD_START_TIME environment variables.                                                                                                                                                                                                                                                                   | July 9, 2018   |
| <a href="#">Support for a finally block in the buildspec file (p. 441)</a>                | The CodeBuild documentation was updated with details about the optional finally block in a buildspec file. Commands in the finally block always run after the commands in its corresponding commands block. For more information, see <a href="#">Buildspec syntax</a> .                                                                                                                                                                            | June 20, 2018  |

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|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| <a href="#">CodeBuild agent update notifications (p. 441)</a> | The CodeBuild documentation was updated with details about how you can use Amazon SNS to be notified when new versions of the CodeBuild agent are released. For more information, see <a href="#">Receive notifications for new AWS CodeBuild agent versions</a> . | June 15, 2018 |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|

## Earlier updates

The following table describes important changes in each release of the *AWS CodeBuild User Guide* before June 2018.

| Change                                             | Description                                                                                                                                                                                                                                      | Date           |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Support for Windows builds                         | CodeBuild now supports builds for the Microsoft Windows Server platform, including a prepackaged build environment for the .NET Core 2.0 on Windows. For more information, see <a href="#">Microsoft Windows samples for CodeBuild (p. 30)</a> . | May 25, 2018   |
| Support for build idempotency                      | When you run the <code>start-build</code> command with the AWS Command Line Interface (AWS CLI), you can specify that the build is idempotent. For more information, see <a href="#">Run a build (AWS CLI) (p. 272)</a> .                        | May 15, 2018   |
| Support for overriding more build project settings | You can now override more build project settings when you create a build. The overrides are only for that build. For more information, see <a href="#">Run a build in AWS CodeBuild (p. 271)</a> .                                               | May 15, 2018   |
| VPC Endpoint support                               | You can now use VPC endpoints to improve the security of your builds. For more information, see <a href="#">Use VPC endpoints (p. 173)</a> .                                                                                                     | March 18, 2018 |
| Support of triggers                                | You can now create triggers to schedule builds at regular frequencies. For more information, see <a href="#">Create AWS CodeBuild triggers (p. 220)</a> .                                                                                        | March 28, 2018 |
| FIPS endpoints documentation                       | You can now learn about how to use the AWS Command Line Interface (AWS CLI) or an AWS SDK to tell CodeBuild                                                                                                                                      | March 28, 2018 |

| Change                                                                                          | Description                                                                                                                                                                                                                                                | Date               |
|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
|                                                                                                 | <p>to use one of four Federal Information Processing Standards (FIPS) endpoints. For more information, see <a href="#">Specify the AWS CodeBuild endpoint (p. 389)</a>.</p>                                                                                |                    |
| AWS CodeBuild available in Asia Pacific (Mumbai), Europe (Paris), and South America (São Paulo) | <p>AWS CodeBuild is now available in the Asia Pacific (Mumbai), Europe (Paris), and South America (São Paulo) regions. For more information, see <a href="#">AWS CodeBuild in the Amazon Web Services General Reference</a>.</p>                           | March 28, 2018     |
| GitHub Enterprise Server support                                                                | <p>CodeBuild can now build from source code stored in a GitHub Enterprise Server repository. For more information, see <a href="#">GitHub Enterprise Server sample (p. 102)</a>.</p>                                                                       | January, 25, 2018  |
| Git clone depth support                                                                         | <p>CodeBuild now supports the creation of a shallow clone with a history truncated to the specified number of commits. For more information, see <a href="#">Create a build project (p. 187)</a>.</p>                                                      | January, 25, 2018  |
| VPC support                                                                                     | <p>VPC-enabled builds are now able to access resources inside your VPC. For more information, see <a href="#">VPC support (p. 171)</a>.</p>                                                                                                                | November, 27, 2017 |
| Dependency caching support                                                                      | <p>CodeBuild now supports the dependency caching. This allows CodeBuild to save certain reusable pieces of the build environment in the cache and use this across builds.</p>                                                                              | November, 27, 2017 |
| Build badges support                                                                            | <p>CodeBuild now supports the use of build badges, which provide an embeddable, dynamically generated image (badge) that displays the status of the latest build for a project. For more information, see <a href="#">Build badges sample (p. 74)</a>.</p> | November 27, 2017  |

| Change                                                                                                                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Date               |
|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| AWS Config integration                                                                                                     | AWS Config now supports CodeBuild as an AWS resource, which means the service can track your CodeBuild projects. For more information about AWS Config, see <a href="#">AWS Config sample (p. 63)</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | October 20, 2017   |
| Automatically rebuild updated source code in GitHub repositories                                                           | If your source code is stored in a GitHub repository, you can enable AWS CodeBuild to rebuild your source code whenever a code change is pushed to the repository. For more information, see <a href="#">GitHub pull request and webhook filter sample (p. 108)</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | September 21, 2017 |
| New ways for storing and retrieving sensitive or large environment variables in Amazon EC2 Systems Manager Parameter Store | You can now use the AWS CodeBuild console or the AWS CLI to retrieve sensitive or large environment variables stored in Amazon EC2 Systems Manager Parameter Store. You can also now use the AWS CodeBuild console to store these types of environment variables in Amazon EC2 Systems Manager Parameter Store. Previously, you could only retrieve these types of environment variables by including them in a buildspec or by running build commands to automate the AWS CLI. You could only store these types of environment variables by using the Amazon EC2 Systems Manager Parameter Store console. For more information, see <a href="#">Create a build project (p. 187)</a> , <a href="#">Change a build project's settings (p. 241)</a> , and <a href="#">Run a build (p. 271)</a> . | September 14, 2017 |
| Build deletion support                                                                                                     | You can now delete builds in AWS CodeBuild. For more information, see <a href="#">Delete builds (p. 292)</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | August 31, 2017    |

| Change                                                                                                                                     | Description                                                                                                                                                                                                                                                                                                                                                                                      | Date            |
|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Updated way to retrieve sensitive or large environment variables stored in Amazon EC2 Systems Manager Parameter Store by using a buildspec | AWS CodeBuild now makes it easier to use a buildspec to retrieve sensitive or large environment variables stored in Amazon EC2 Systems Manager Parameter Store. Previously, you could only retrieve these types of environment variables by running build commands to automate the AWS CLI. For more information, see the <a href="#">parameter-store mapping in Buildspec syntax (p. 130)</a> . | August 10, 2017 |
| AWS CodeBuild supports Bitbucket                                                                                                           | CodeBuild can now build from source code stored in a Bitbucket repository. For more information, see <a href="#">Create a build project (p. 187)</a> and <a href="#">Run a build (p. 271)</a> .                                                                                                                                                                                                  | August 10, 2017 |
| AWS CodeBuild available in US West (N. California), Europe (London), and Canada (Central)                                                  | AWS CodeBuild is now available in the US West (N. California), Europe (London), and Canada (Central) regions. For more information, see <a href="#">AWS CodeBuild</a> in the <a href="#">Amazon Web Services General Reference</a> .                                                                                                                                                             | June 29, 2017   |
| Alternate buildspec file names and locations supported                                                                                     | You can now specify an alternate file name or location of a buildspec file to use for a build project, instead of a default buildspec file named buildspec.yml at the root of the source code. For more information, see <a href="#">Buildspec file name and storage location (p. 129)</a> .                                                                                                     | June 27, 2017   |
| Updated build notifications sample                                                                                                         | CodeBuild now provides built-in support for build notifications through Amazon CloudWatch Events and Amazon Simple Notification Service (Amazon SNS). The previous <a href="#">Build notifications sample (p. 77)</a> has been updated to demonstrate this new behavior.                                                                                                                         | June 22, 2017   |

| Change                                                                                                                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                               | Date           |
|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Docker in custom image sample added                                                                                      | A sample showing how to use CodeBuild and a custom Docker build image to build and run a Docker image has been added. For more information, see the <a href="#">Docker in custom image sample (p. 94)</a> .                                                                                                                                                                                                                               | June 7, 2017   |
| Fetch source code for GitHub pull requests                                                                               | When you run a build with CodeBuild that relies on source code stored in a GitHub repository, you can now specify a GitHub pull request ID to build. You can also specify a commit ID, a branch name, or a tag name instead. For more information, see the <a href="#">Source version value in Run a build (console) (p. 272)</a> or the <a href="#">sourceVersion value in Run a build (AWS CLI) (p. 272)</a> .                          | June 6, 2017   |
| Build specification version updated                                                                                      | A new version of the buildspec format has been released. Version 0.2 addresses the issue of CodeBuild running each build command in a separate instance of the default shell. Also in version 0.2, <code>environment_variables</code> is renamed to <code>env</code> , and <code>plaintext</code> is renamed to <code>variables</code> . For more information, see <a href="#">Build specification reference for CodeBuild (p. 129)</a> . | May 9, 2017    |
| Dockerfiles for build images available in GitHub                                                                         | Definitions for many of the build images provided by AWS CodeBuild are available as Dockerfiles in GitHub. For more information, see the Definition column of the table in <a href="#">Docker images provided by CodeBuild (p. 153)</a> .                                                                                                                                                                                                 | May 2, 2017    |
| AWS CodeBuild available in Europe (Frankfurt), Asia Pacific (Singapore), Asia Pacific (Sydney), and Asia Pacific (Tokyo) | AWS CodeBuild is now available in the Europe (Frankfurt), Asia Pacific (Singapore), Asia Pacific (Sydney), and Asia Pacific (Tokyo) regions. For more information, see <a href="#">AWS CodeBuild in the Amazon Web Services General Reference</a> .                                                                                                                                                                                       | March 21, 2017 |

| Change                                                                                   | Description                                                                                                                                                                                                                                                                                                                                                          | Date             |
|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| CodePipeline test action support for CodeBuild                                           | You can now add to a pipeline in CodePipeline a test action that uses CodeBuild. For more information, see <a href="#">Add a CodeBuild test action to a pipeline (CodePipeline console) (p. 402)</a> .                                                                                                                                                               | March 8, 2017    |
| Buildspec files support fetching build output from within selected top-level directories | Buildspec files now enable you to specify individual top-level directories whose contents you can instruct CodeBuild to include in build output artifacts. You do this by using the <code>base-directory</code> mapping. For more information, see <a href="#">Buildspec syntax (p. 130)</a> .                                                                       | February 8, 2017 |
| Built-in environment variables                                                           | AWS CodeBuild provides additional built-in environment variables for your builds to use. These include environment variables describing the entity that started the build, the URL to the source code repository, the source code's version ID, and more. For more information, see <a href="#">Environment variables in build environments (p. 164)</a> .           | January 30, 2017 |
| AWS CodeBuild available in US East (Ohio)                                                | AWS CodeBuild is now available in the US East (Ohio) region. For more information, see <a href="#">AWS CodeBuild in the Amazon Web Services General Reference</a> .                                                                                                                                                                                                  | January 19, 2017 |
| Shell and command behaviors information                                                  | CodeBuild runs each command you specify in a separate instance of a build environment's default shell. This default behavior can produce some unexpected side effects for your commands. We recommend some approaches to work around this default behavior if needed. For more information, see <a href="#">Shells and commands in build environments (p. 163)</a> . | December 9, 2016 |

| Change                            | Description                                                                                                                                                                                                                                    | Date             |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Environment variables information | CodeBuild provides several environment variables that you can use in your build commands. You can also define your own environment variables. For more information, see <a href="#">Environment variables in build environments (p. 164)</a> . | December 7, 2016 |
| Troubleshooting topic             | Troubleshooting information is now available. For more information, see <a href="#">Troubleshooting AWS CodeBuild (p. 410)</a> .                                                                                                               | December 5, 2016 |
| Jenkins plugin initial release    | This is the initial release of the CodeBuild Jenkins plugin. For more information, see <a href="#">Use AWS CodeBuild with Jenkins (p. 404)</a> .                                                                                               | December 5, 2016 |
| <i>User Guide</i> initial release | This is the initial release of the <i>CodeBuild User Guide</i> .                                                                                                                                                                               | December 1, 2016 |

# AWS glossary

For the latest AWS terminology, see the [AWS glossary](#) in the *AWS Glossary Reference*.