Continuous Integration with CodeBuild

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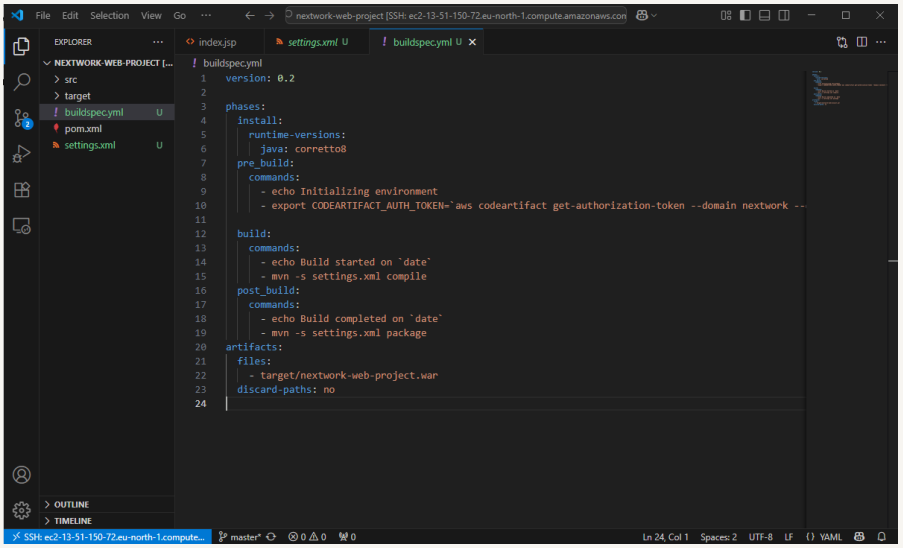

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Introducing Today's Project!

In this project, I will demonstrate how to use AWS CodeBuild to automate the build process for my Java web app. I'm doing this project to learn how to streamline builds in the cloud and integrate automation into my DevOps workflow.

Key tools and concepts

Services I used were AWS CodeBuild, S3, IAM, and CodeArtifact. Key concepts I learnt include setting up CI pipelines, defining build steps with buildspec.yml, managing permissions with IAM roles, and securely storing build artifacts in S3.

Project reflection

This project took me approximately 3 hours. The most challenging part was configuring IAM roles and permissions correctly for CodeBuild to access CodeArtifact. It was most rewarding to see the build complete successfully and the artifact stored in S3

This project is part four of a series of DevOps projects where I'm building a CI/CD pipeline! I'll be working on the next project tomorrow.

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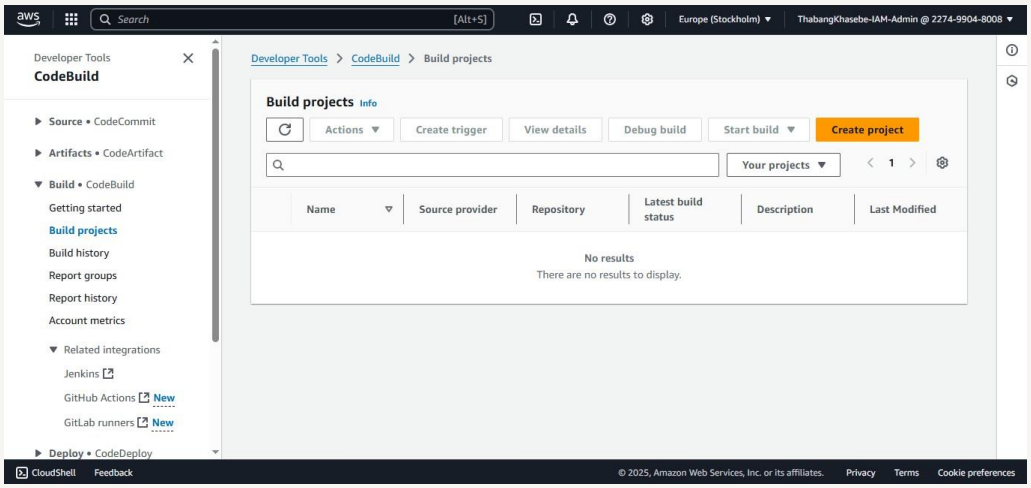
Setting up a CodeBuild Project

CodeBuild is a continuous integration service, which means it automatically builds and tests code changes to ensure quality. Engineering teams use it because it speeds up development, catches errors early, and maintains consistent build environments.

My CodeBuild project's source configuration means where CodeBuild pulls the code to build from, and I selected my GitHub repository where my web app’s code is stored.



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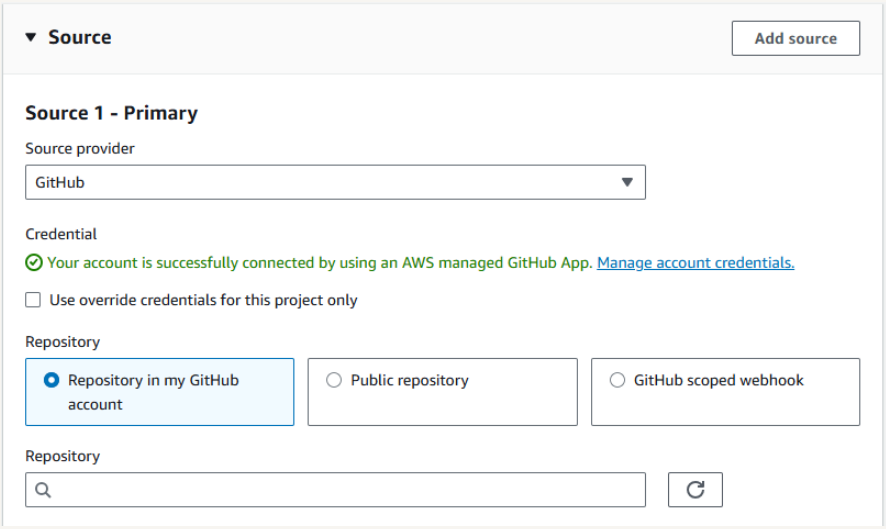
Connecting CodeBuild with GitHub

There are multiple credential types for GitHub, like personal access tokens and OAuth. I used GitHub App because it offers more secure, streamlined authentication and easier management of repository access for AWS services like CodeBuild.

The service that helped connect AWS CodeBuild with GitHub is AWS CodeConnections. It securely links AWS and GitHub accounts, enabling CodeBuild to access the repository for automated builds without exposing sensitive credentials.



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CodeBuild Configurations

Environment

My CodeBuild project's Environment configuration means defining the build's runtime and resources. It includes settings like provisioning model, OS, runtime, and compute type to ensure builds run efficiently and match my app's needs.

Artifacts

Build artifacts are files produced after a build, like compiled code. They're important because they're what get deployed. My build creates a packaged web app, and to store these artifacts, I created an S3 bucket as a secure storage location.

Packaging

When setting up CodeBuild, I also chose to package artifacts in a Zip file because it compresses all build outputs into a single file, making storage, transfer, and deployment easier and more efficient.

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Monitoring

For monitoring, I enabled CloudWatch Logs, which is a service that collects and tracks log data from my builds. It helps me troubleshoot issues by providing detailed real-time and historical logs of the build process.

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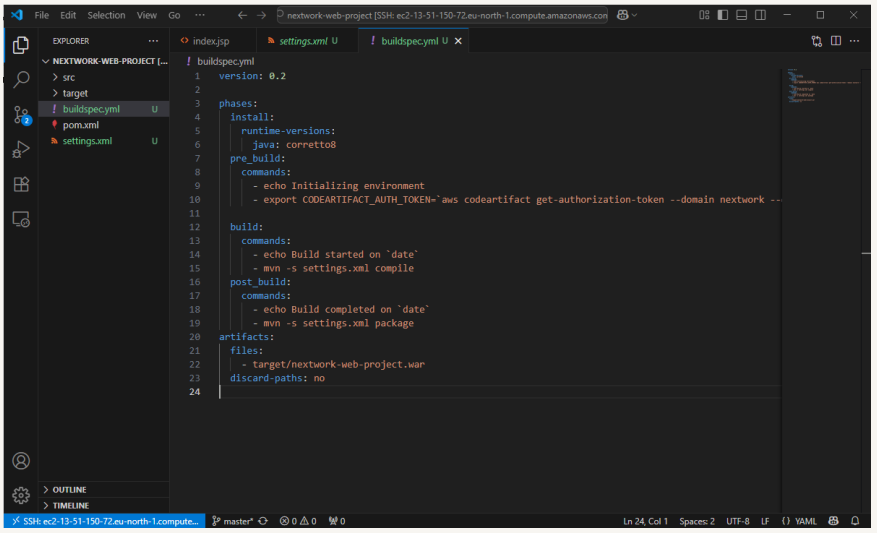
buildspec.yml

My first build failed because CodeBuild didn't have instructions to follow. A buildspec.yml file is needed because it defines the build steps, including installing dependencies, compiling the code, and packaging the output for deployment.

The first two phases in my buildspec.yml file install Java and get the CodeArtifact token. The third phase compiles the project with Maven, and the fourth phase packages it into a WAR file for deployment.



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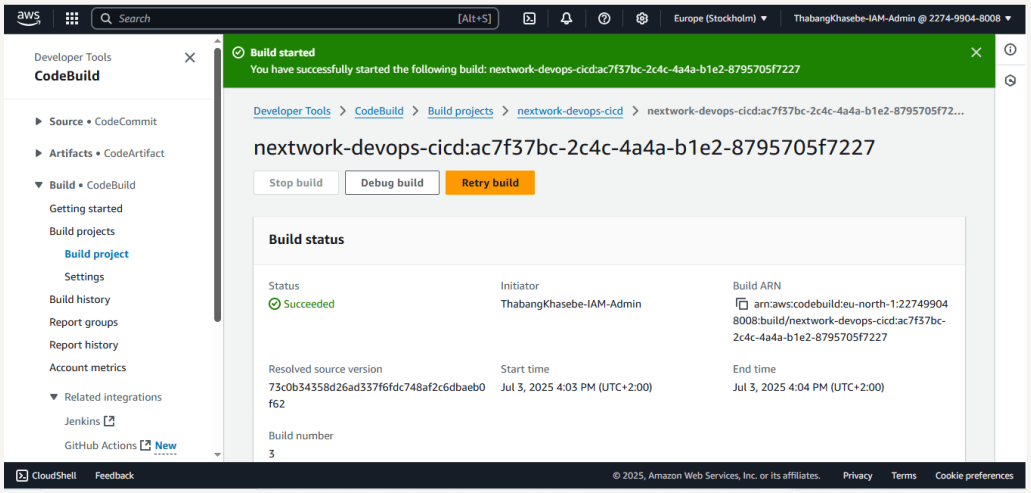
Success!

My second build also failed, but with a different error that said CodeBuild couldn't access CodeArtifact to download dependencies. To fix this, I updated the CodeBuild service role to include permissions for accessing CodeArtifact.

To resolve the second error, I updated the CodeBuild service role by attaching an IAM policy granting access to CodeArtifact. When I built my project again, I saw the build complete successfully and the artifact uploaded to the S3 bucket.

To verify the build, I checked the S3 bucket named nextwork-devops-cicd. Seeing the artifact there tells me the build succeeded and the packaged web app was correctly uploaded for deployment.

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