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DevOps x AWS

Series III

Secure dependencies with CodeArtifact

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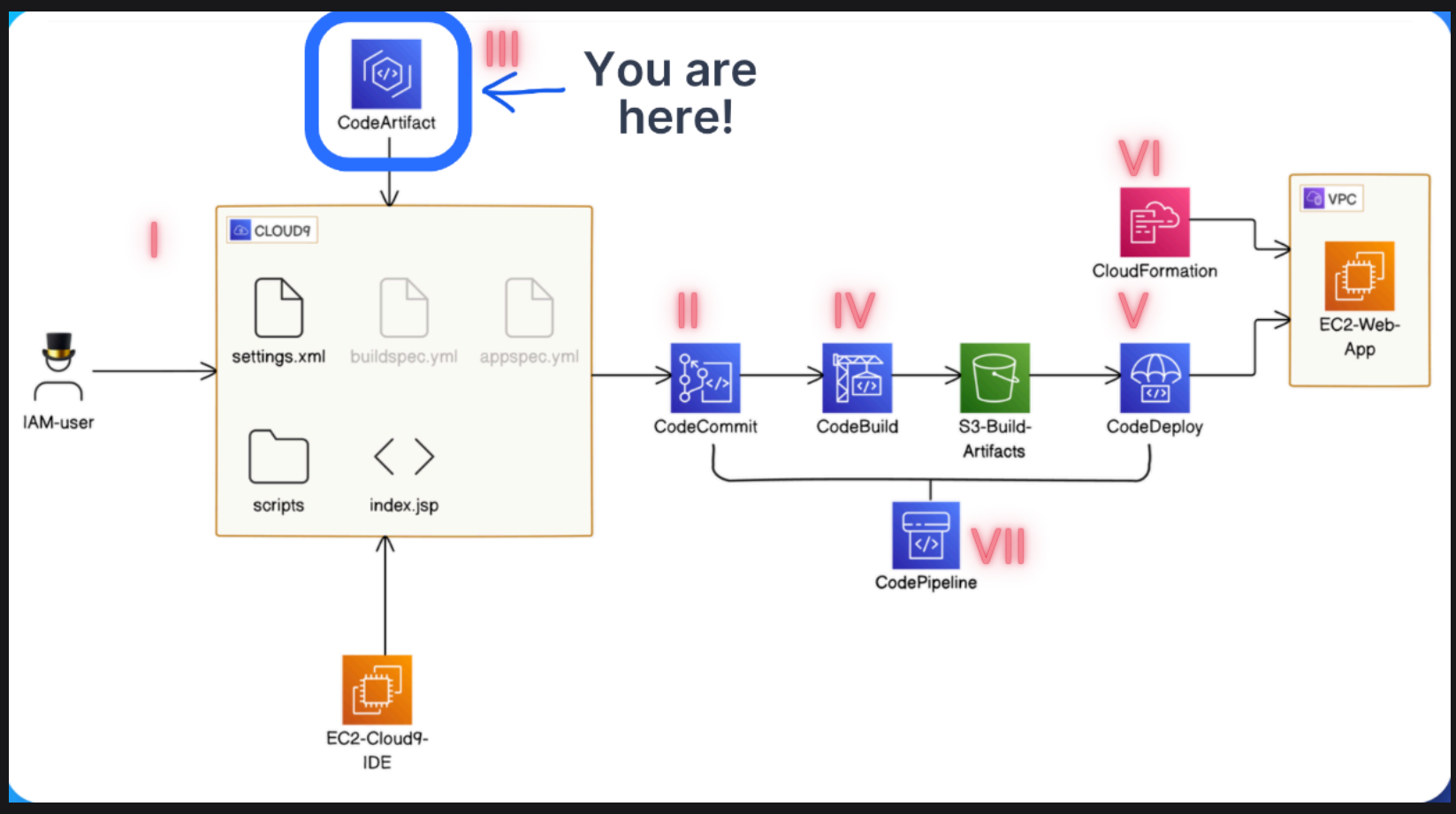
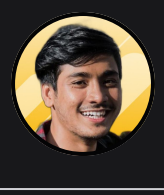
For this DevOps x AWS series, I am sharing 7 projects. In this SEVEN-project series, I will create a CI/CD pipeline to build and deploy a simple web application using AWS Code services. Here's what I'll build at the end of ALL seven projects:

I. Set up a Web App + IDE with Cloud9 ✅
II. Set Up A Git Repository with AWS CodeCommit ✅
III. Secure Project Dependencies with AWS CodeArtifact
IV. Package an App with AWS CodeBuild
V. Deploy an App witth AWS CodeDeploy
VI. Automate with AWS CloudFormation
VII. CI/CD Pipeline with AWS CodePipeline





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Introducing AWS CodeArtifact!

What it does & how it’s useful

AWS CodeArtifact is a secure, scalable package management service that centralizes dependency storage and management for software development.

Developers and teams use AWS CodeArtifact because it simplifies artifact management, enhances security through fine-grained access controls, and integrates seamlessly with existing CI/CD pipelines.

How I’m using it in today’s project

I’m using AWS CodeArtifact in this project to securely manage and store software packages, ensuring consistent dependency versions across my development team.

This project took me...

This project took me approximately 40 minutes to complete.
Documentation took me around 40 minutes to write.

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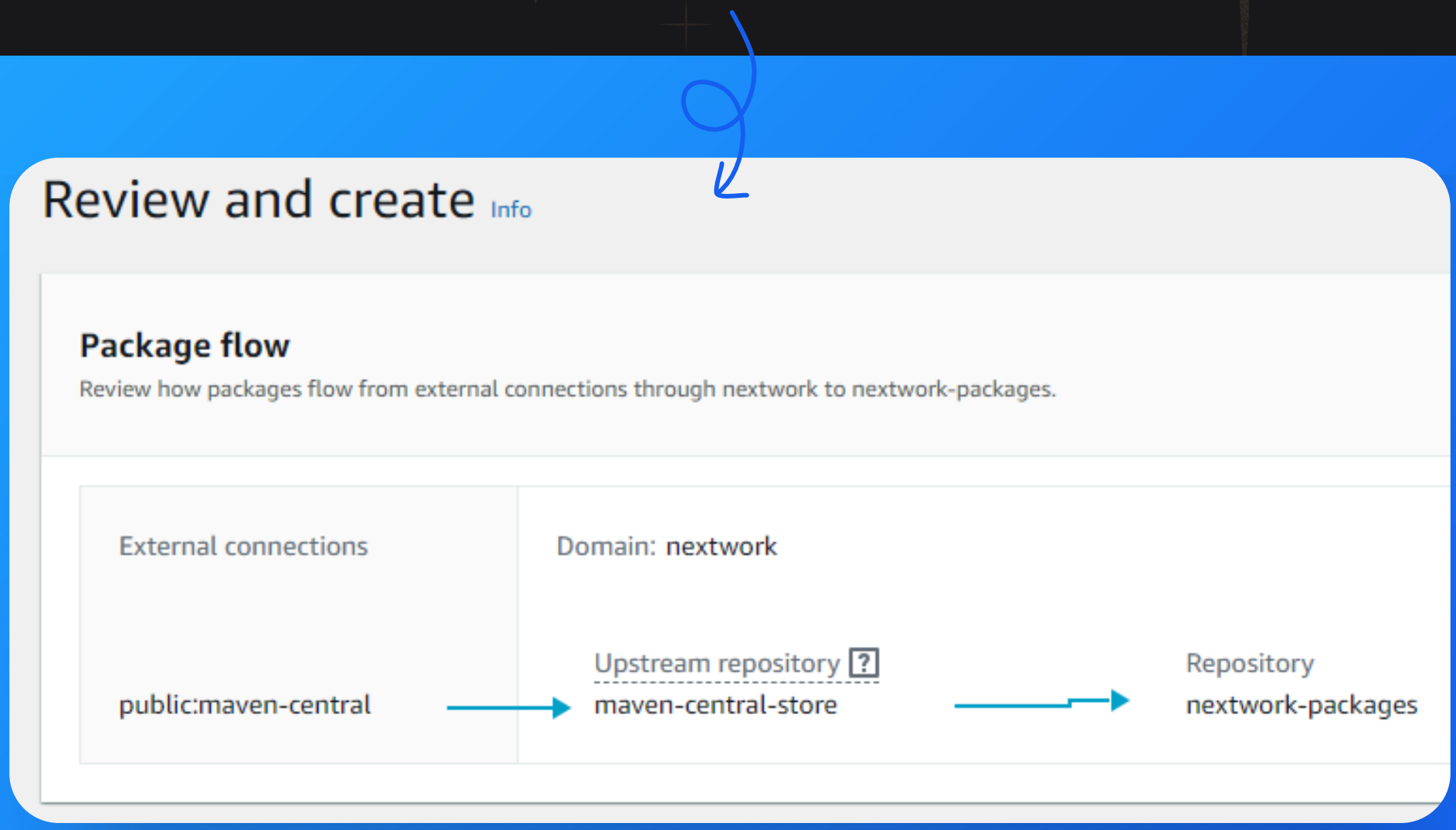
Create a repository

- CodeArtifact is a fully managed artifact repository service that makes it easy to securely store, publish, and share software packages.
- The reason why I'm using CodeArtifact for my web app is to securely manage and can share software packages, streamline dependency management, and enhance collaboration.

- Instead of a single repository, there are actually three connected repositories that Maven uses to fetch packages.
  - First, there's my local repository, housing all software packages installed locally. Maven first checks here for required packages.
  - Second, the public upstream repository, known as "maven-central-store." Maven queries this when packages aren't found locally
  - Third, the Maven Central Repository stores extensive tools and resources. Maven accesses this repository if a needed package isn't in maven-central-store.

Package flow illustrating the connections between the three repositories.



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Connecting my project to CodeArtifact

- Next, I connected my Cloud9 IDE to CodeArtifact so that I could seamlessly manage and access dependencies for my project, ensuring reliable and consistent builds across different development environments.

- I created a new file, settings.xml, in my web app. settings.xml is a Maven configuration file used to define settings such as repositories, plugin configurations, and authentication details, ensuring consistent and reliable build processes across development environments.

- The code I pasted into settings.xml were provided by CodeArtifact, so I did not have to write from scratch. The snippets of code stores authentication tokens to CodeArtifact and defines Maven will visit which repository,

My settings.xml file.

Welcome | index.jsp | settings.xml

```
<settings>

    <servers>
  <server>
    <id>nextwork-nextwork-packages</id>
    <username>aws</username>
    <password>${env.CODEARTIFACT_AUTH_TOKEN}</password>
  </server>
</servers>

<profiles>
  <profile>
    <id>nextwork-nextwork-packages</id>
    <activation>
      <activeByDefault>true</activeByDefault>
    </activation>
    <repositories>
      <repository>
        <id>nextwork-nextwork-packages</id>
        <url>https://nextwork-637423375624.d.codeartifact.ap-southeast-2.amazonaws.com/maven/nextwork-packages/</url>
      </repository>
    </repositories>
  </profile>
</profiles>

<mirrors>
  <mirror>
    <id>nextwork-nextwork-packages</id>
    <name>nextwork-nextwork-packages</name>
```

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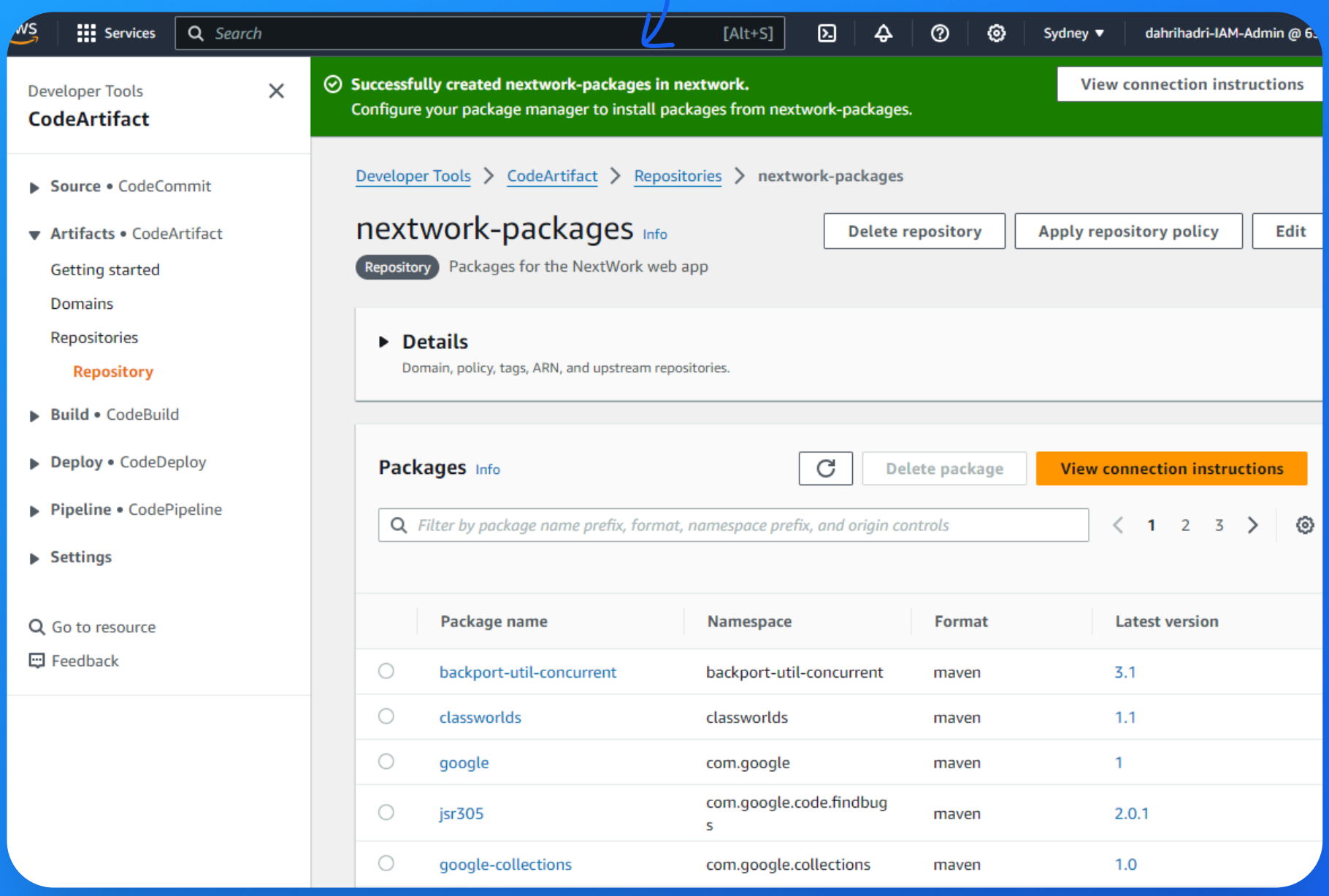
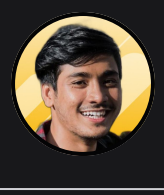
Test the connection

- To test the connection between Cloud9 and CodeArtifact, I compiled my web app. Compiling means translating source code into executable code or intermediate code that can be run on a computer, ensuring all dependencies are resolved from CodeArtifact.

- After compiling, I checked my CodeArtifact repository. It contained the downloaded dependencies that been fetched.

My web app's packages popping up in my local repository.

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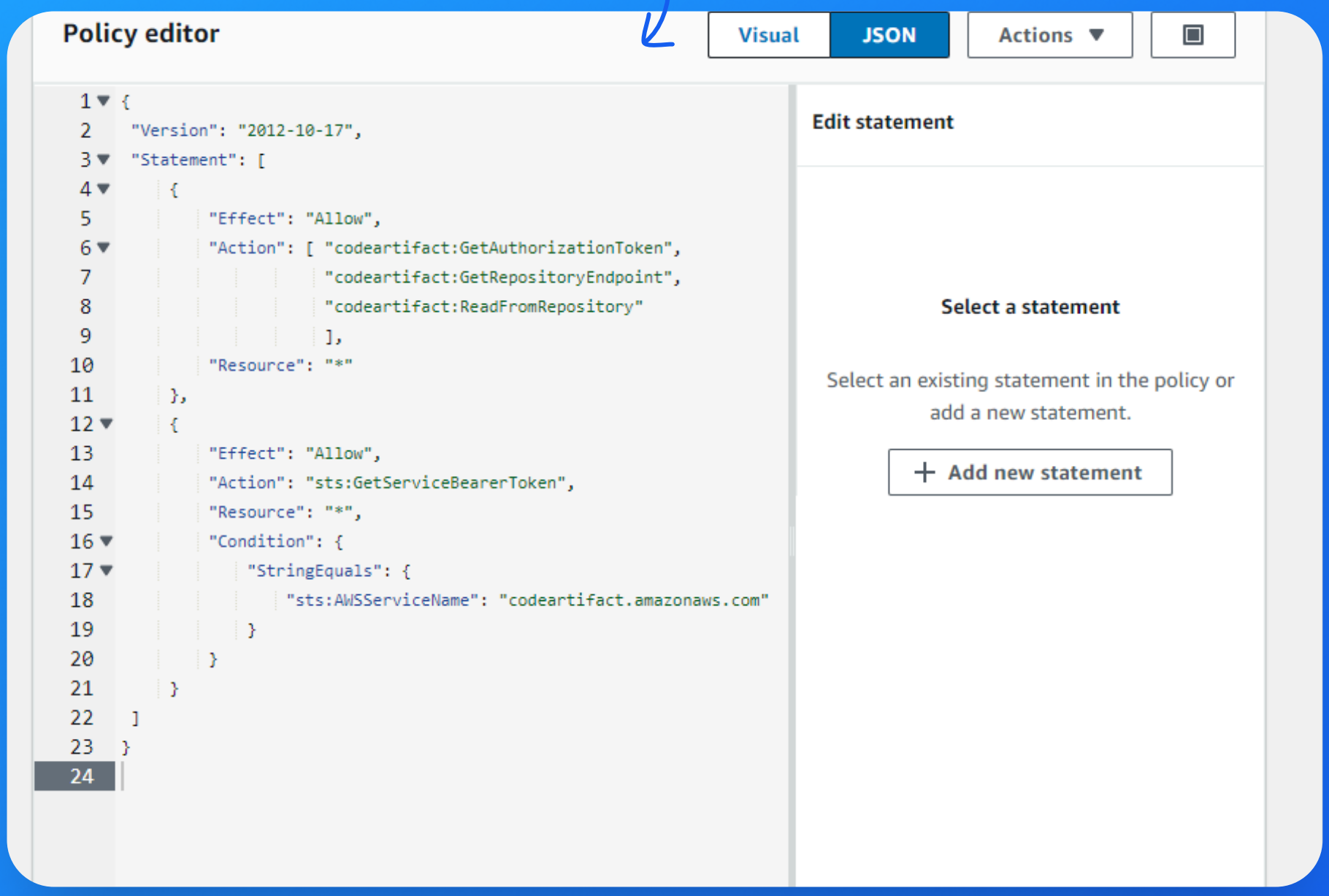
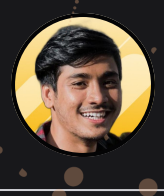
Create IAM policies

- I also created an IAM policy because it defines specific permissions for accessing AWS CodeArtifact repositories. This ensures secure and controlled management of artifact repositories within my AWS environment.
- I defined my IAM policy using JSON. This policy allows:
  - `codeartifact:GetAuthorizationToken, codeartifact:GetRepositoryEndpoint, and codeartifact:ReadFromRepository actions for accessing CodeArtifact resources.`
  - `sts:GetServiceBearerToken action for retrieving service bearer tokens, specifically for codeartifact.amazonaws.com.`
- These permissions enable fetching authorization tokens, accessing repository endpoints, reading from repositories, and obtaining service bearer tokens for AWS CodeArtifact operations.

A peek at the policy that will provide access to CodeArtifact





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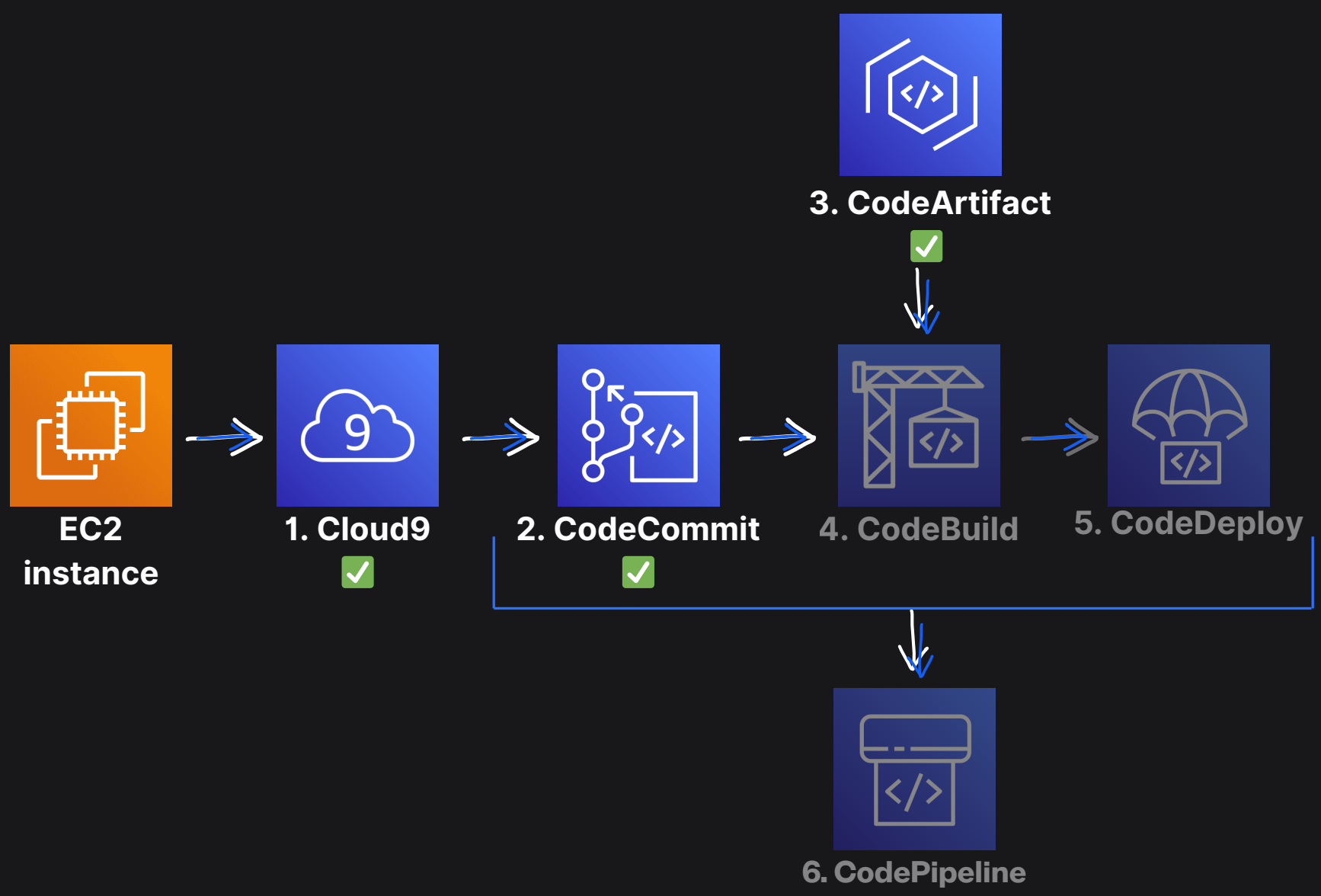
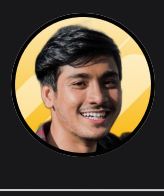
My CI/CD pipeline so far...

1. **AWS Cloud9** is responsible for IDE setup and development environment management.

2. **AWS CodeCommit** is responsible for hosting secure and scalable Git repositories in the AWS cloud, facilitating collaborative software development workflows.

3. **AWS CodeArtifact** is responsible for securely storing and managing software packages and dependencies, ensuring reliable and scalable artifact management.





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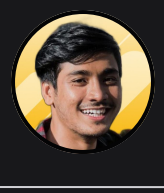
My key learnings

1. A public upstream repository is a centralized source for accessing shared software packages and dependencies from external sources.

2. settings.xml is a configuration file used to define Maven settings, including repositories like AWS CodeArtifact, for fetching project dependencies efficiently.

3. To test the connection between Cloud9 and CodeArtifact, I compiled my web app to verify dependency fetching and integration success.

4. One thing I didn’t expect was the seamless integration and dependency management provided by AWS CodeArtifact, streamlining my development workflow significantly.



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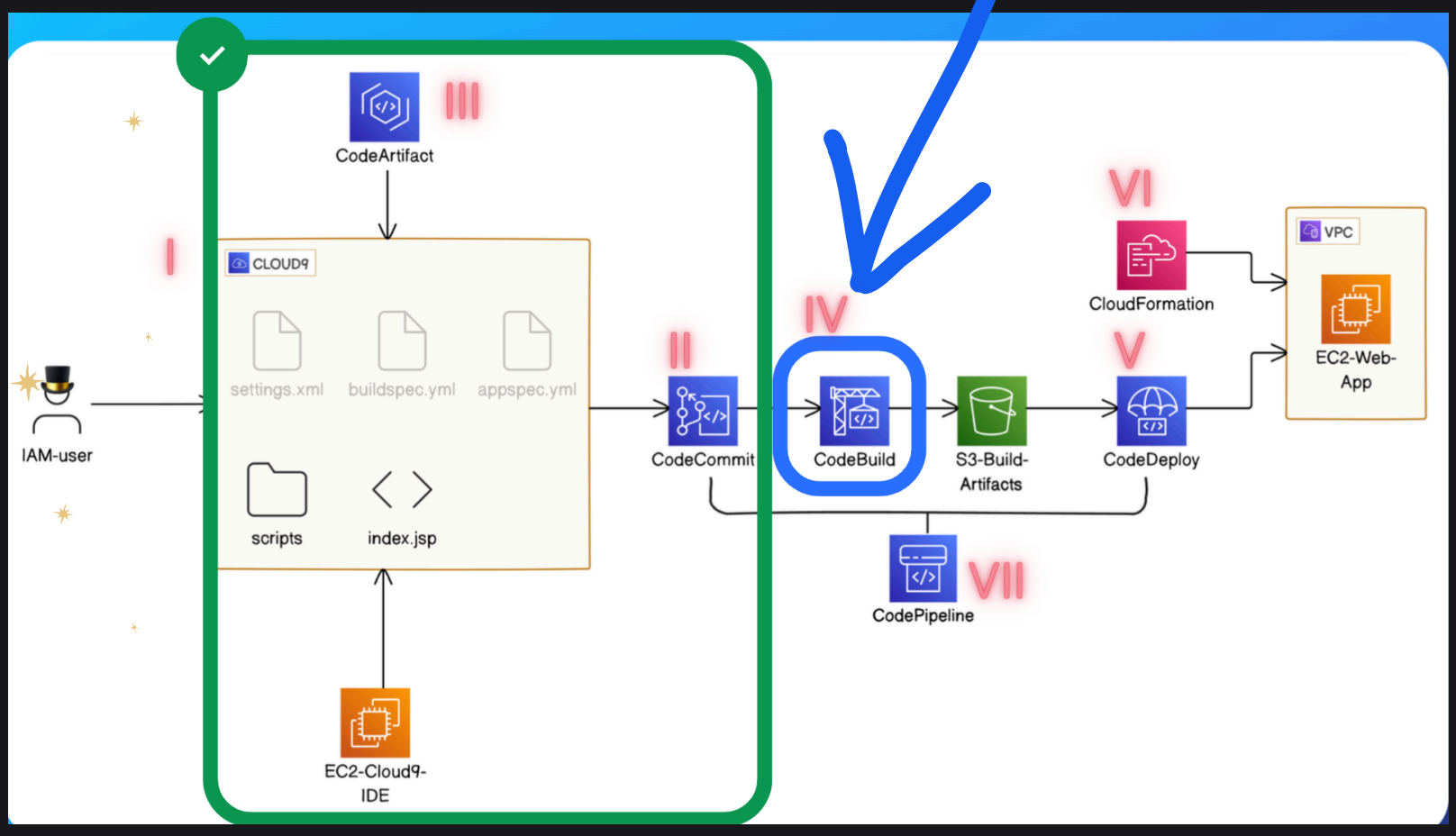
Great!

we are done with series III

coming up next in series IV - CodeBuild!



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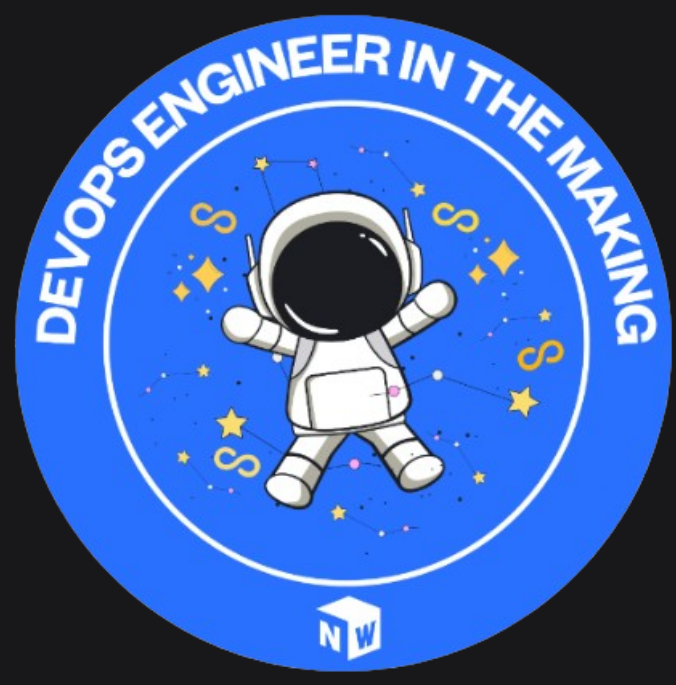

Ask me about it