AWS re:Invent

SVS301-R

Building a CI/CD pipeline for serverless applications

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aws

Prerequisites

300-level advanced workshop

- Hands-on: **You need a laptop**
- Chrome or Firefox installed
- Experience AWS Management Console
- Basic understanding of AWS Lambda
- Comfort interacting with a command line interface
- Comfort reading code

Agenda

1. Infrastructure as code

2. AWS Serverless Application Model (AWS SAM)

2. Development workflow and release process

3. AWS Code Suite

4. Hands-on workshop

Infrastructure as code

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AWS CloudFormation



Enables infrastructure as code by providing a common language to declare infrastructure

Supports templates (recipes) in YAML or JSON

Automates the provisioning of resources by creating AWS CloudFormation stacks from a template

AWS CloudFormation template

```
AWSTemplateFormatVersion: 2010-09-09

Parameters:
    DatabaseName:
        Type: String

Resources:
    MyDatabase:
        Type: AWS::RDS::DBInstance
        Properties:
            DBName: !Ref DatabaseName
            AllocatedStorage: '5'
            DBInstanceClass: db.m5.large
            Engine: MySQL
        DeletionPolicy: Snapshot
```

Parameters are input variables that you can specify during provisioning

Resources are a list of the resources that compose your infrastructure stack with their corresponding configuration

AWS Serverless Application Model (AWS SAM)

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Meet AWS SAM

AWS SAM is an open-source framework you can use to build serverless applications on AWS

It’s an extension of AWS CloudFormation that enables serverless-specific resources

Provides a command line interface for running applications locally and deploying them to AWS



AWS SAM template

```yaml
AWSTemplateFormatVersion: '2010-09-09'
Transform: AWS::Serverless-2016-10-31
Description: Sample SAM Template for sam-app

Globals:
  Function:
    Timeout: 3

Resources:
  HelloWorldFunction:
    Type: AWS::Serverless::Function
    Properties:
      CodeUri: hello-world/
      Handler: app.lambdaHandler
      Runtime: nodejs10.x
      Events:
        HelloWorld:
          Type: Api
          Properties:
            Path: /hello
            Method: get
```

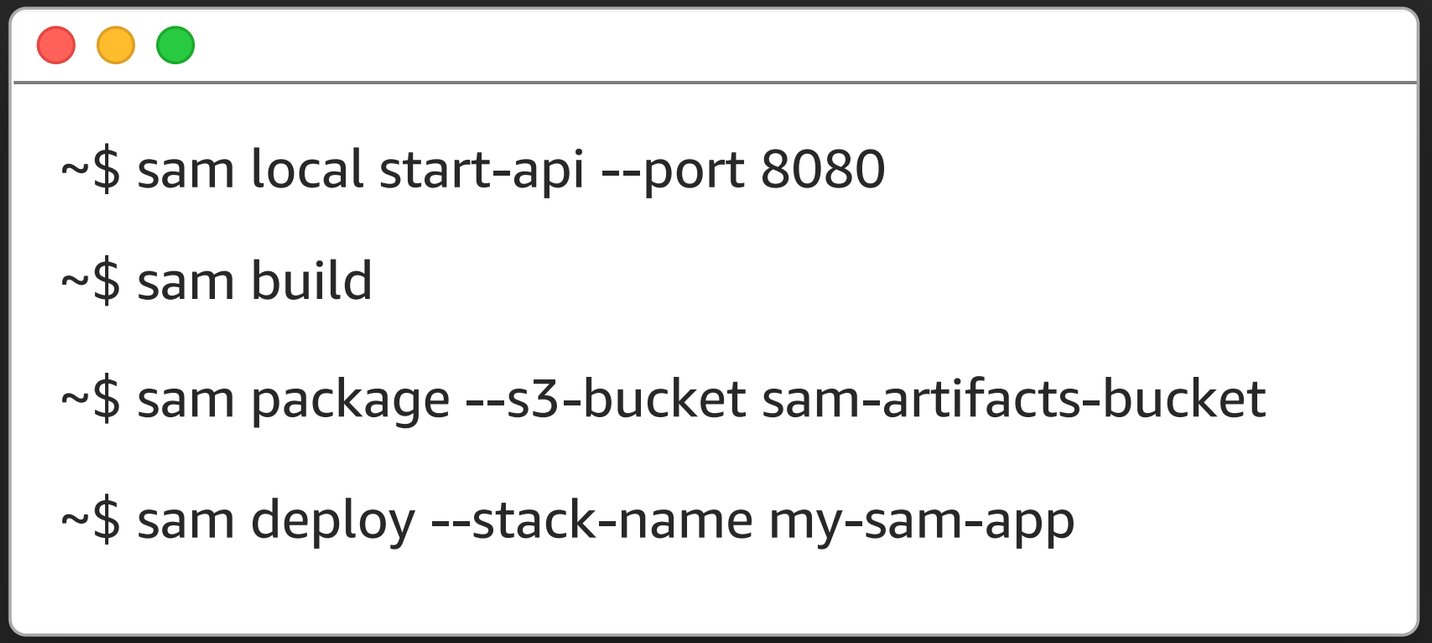
Transform tells AWS CloudFormation that this is an AWS SAM template that needs to be transformed

AWS::Serverless::Function creates a Lambda function with its IAM role and code at the referenced location

Event type API creates an API Gateway and associates the Lambda function to the /hello resource

AWS SAM CLI

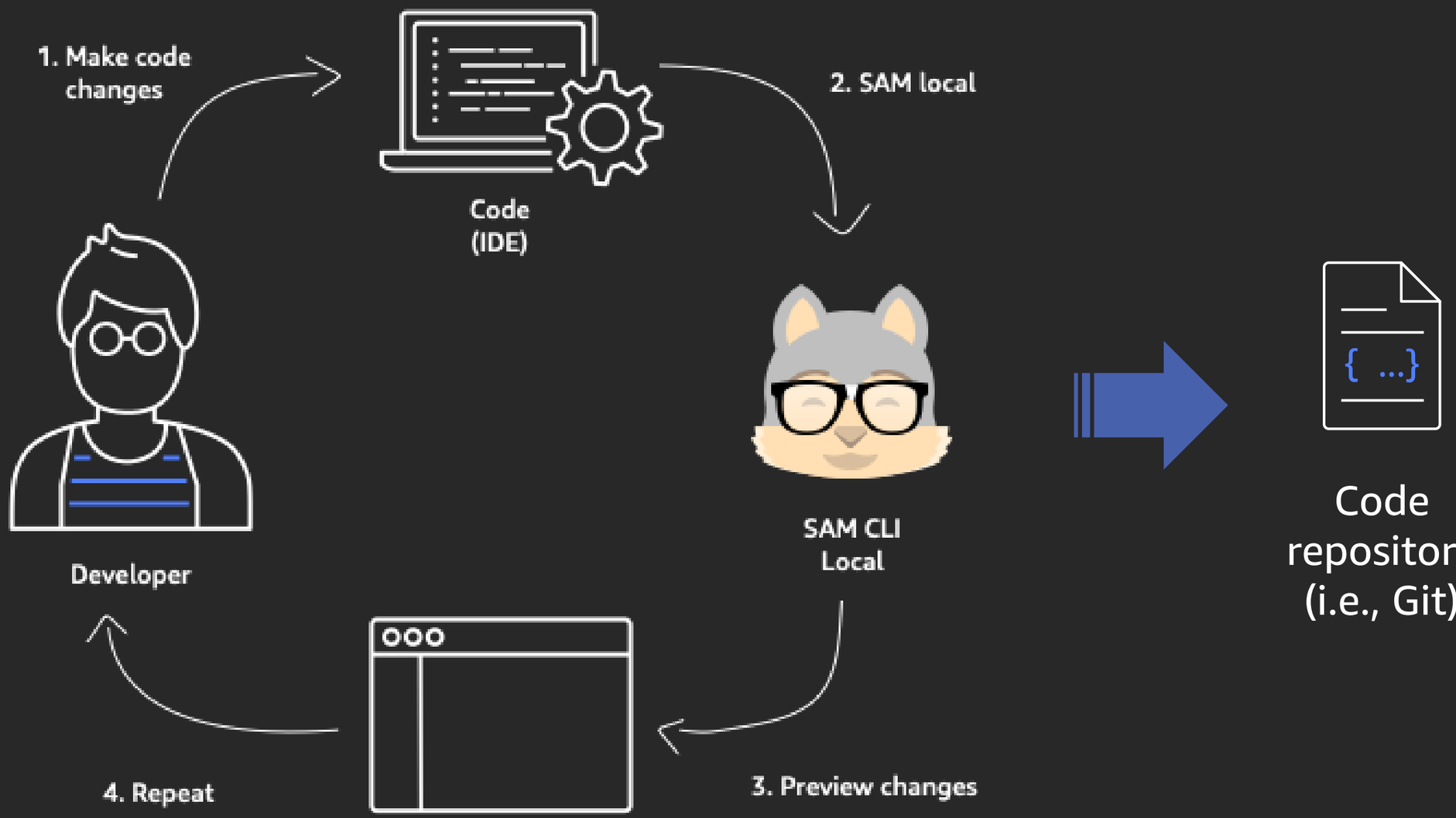
Provides commands to run, package, build, and deploy serverless apps defined by SAM templates



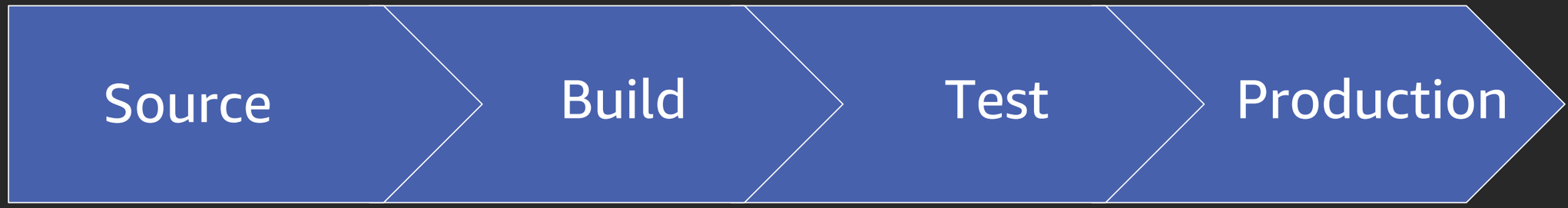
Development workflow and release process

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Local development workflow in serverless



Release process



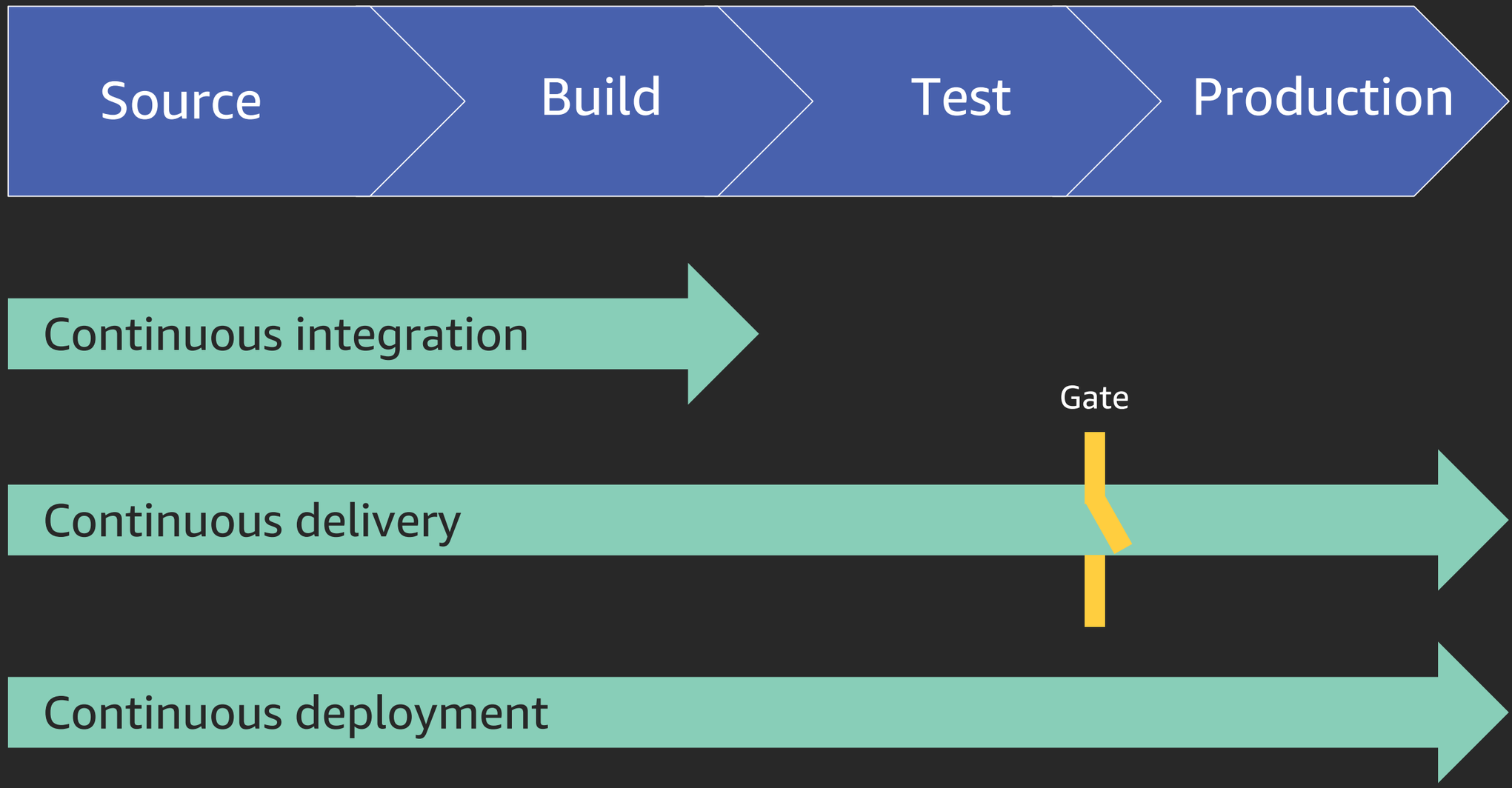
- Version control
- Peer code reviews
- Code branching

- Compile code
- Unit tests
- Style checkers
- Code metrics
- Create artifacts

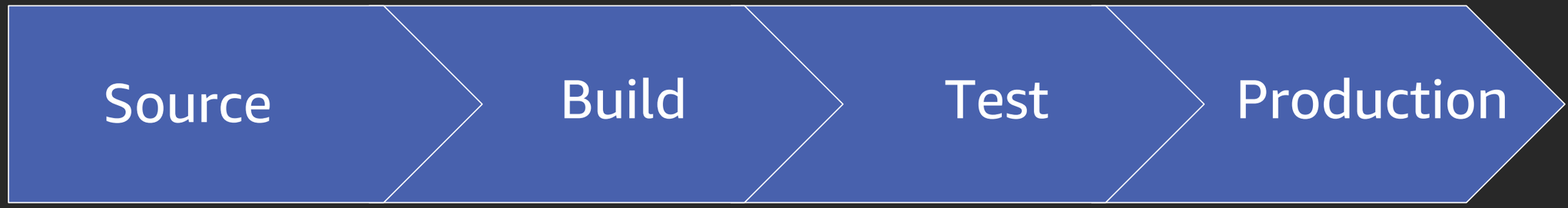
- Integration tests
- Load testing
- UI testing
- Penetration testing

- Deploy to production

Release process



Release process





AWS
CodeCommit



AWS
CodeBuild



AWS
CloudFormation



AWS
CodeDeploy



AWS
CodePipeline

AWS CodeCommit

Fully managed source control service that hosts secure Git-based repositories



- Supports HTTPS or SSH
- Native integration with IAM
- Support for webhooks

AWS CodeBuild

Fully managed build service that can compile source code, run tests, and produce software packages



- Bring your own build environment as a Docker image
- Specify your commands in a YAML file
- Easy integration with services like:
  - AWS CodePipeline
  - Amazon CloudWatch Logs
  - GitHub
  - Atlassian Bitbucket
- Pay only for the time it takes to complete a build

CodeBuild buildspec.yaml

```yaml
version: 0.2
phases:
  install:
    runtime-versions:
      nodejs: 10
    commands:
      - npm install

  pre_build:
    commands:
      - npm run test

  build:
    commands:
      - npm build

artifacts:
  files:
    - binary.zip
```

Install phase
Download third-party libraries

Pre-build phase
Run unit tests, style checkers, lint, etc.

Build phase
Compile code, generate artifacts

Artifacts
Specify local artifacts to be passed to downstream steps in the pipeline

AWS CodeDeploy

Fully managed deployment service that automates software deployments to a variety of compute services such as AWS Lambda



- Blue/green or rolling deployments
- Deployment health tracking
- Rollbacks
- Deployment history
- No charge to use it for deploying Lambda functions

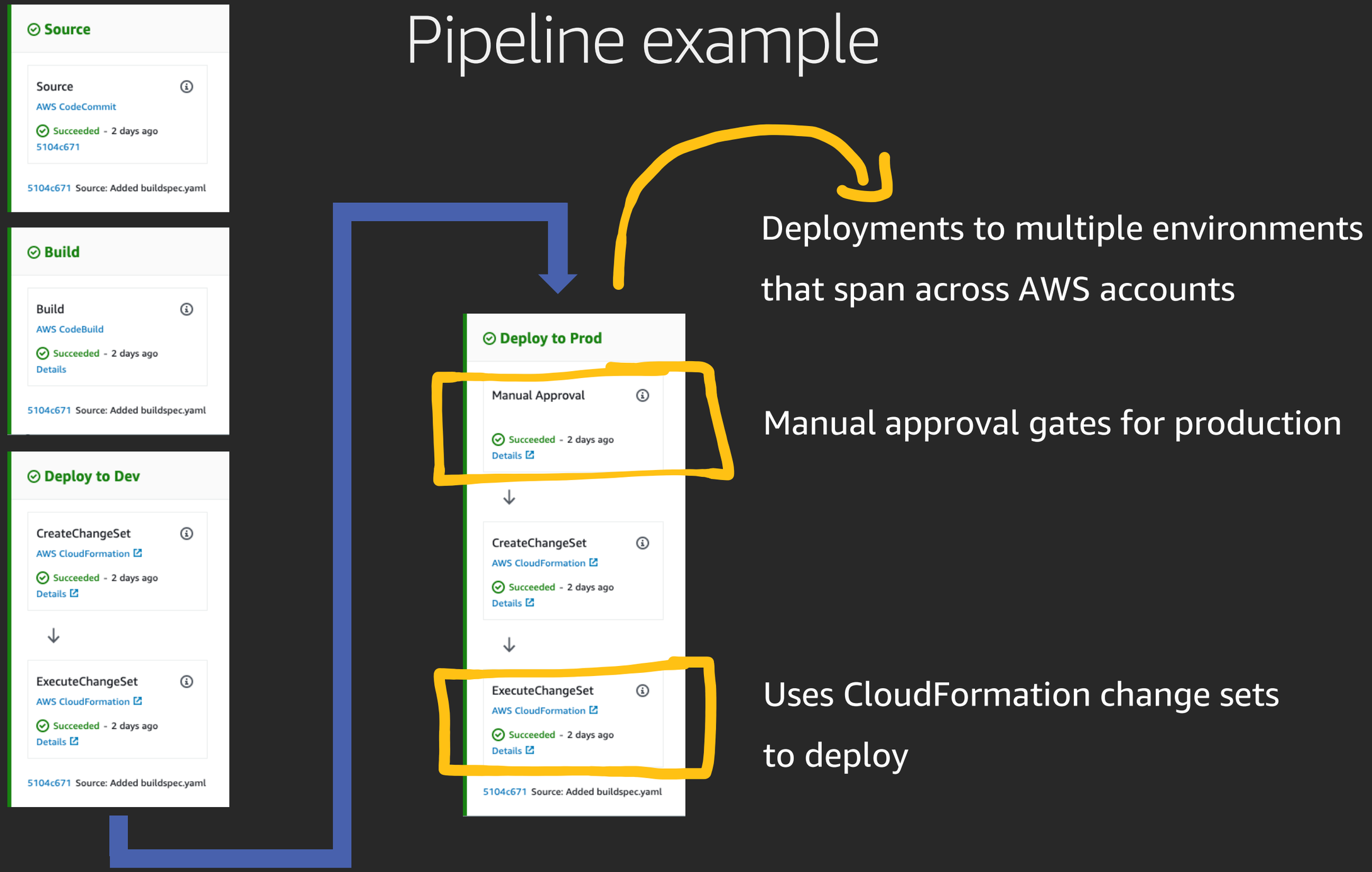
AWS CodePipeline

Fully managed continuous delivery service to build release pipelines for fast and reliable application and infrastructure changes



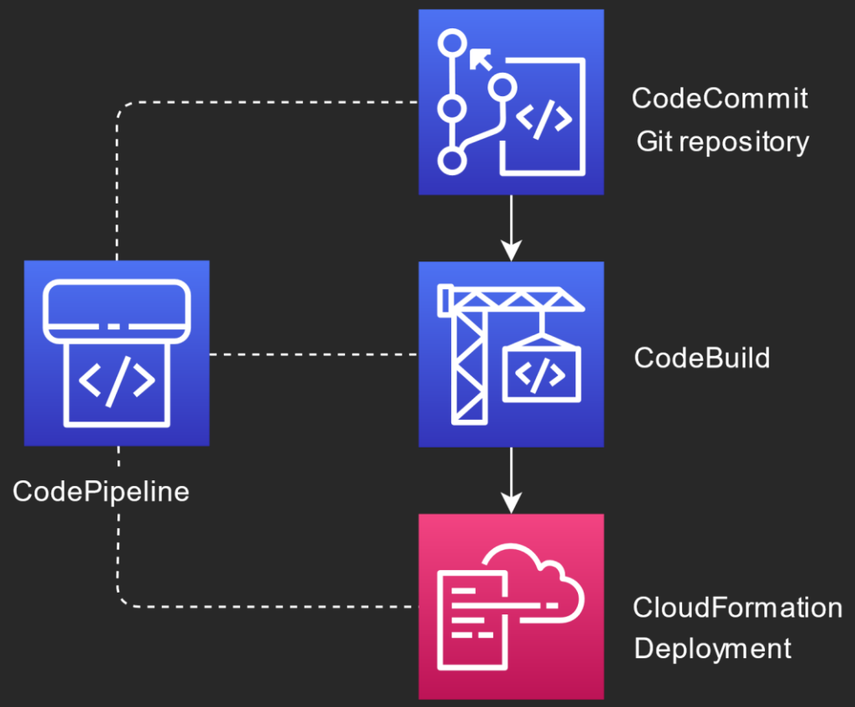
- Workflow modeling with parallel executions.
- Native integration with AWS services
- Integration with third-party products like:
  - Jenkins, GitHub, TeamCity, BlazeMeter, and more

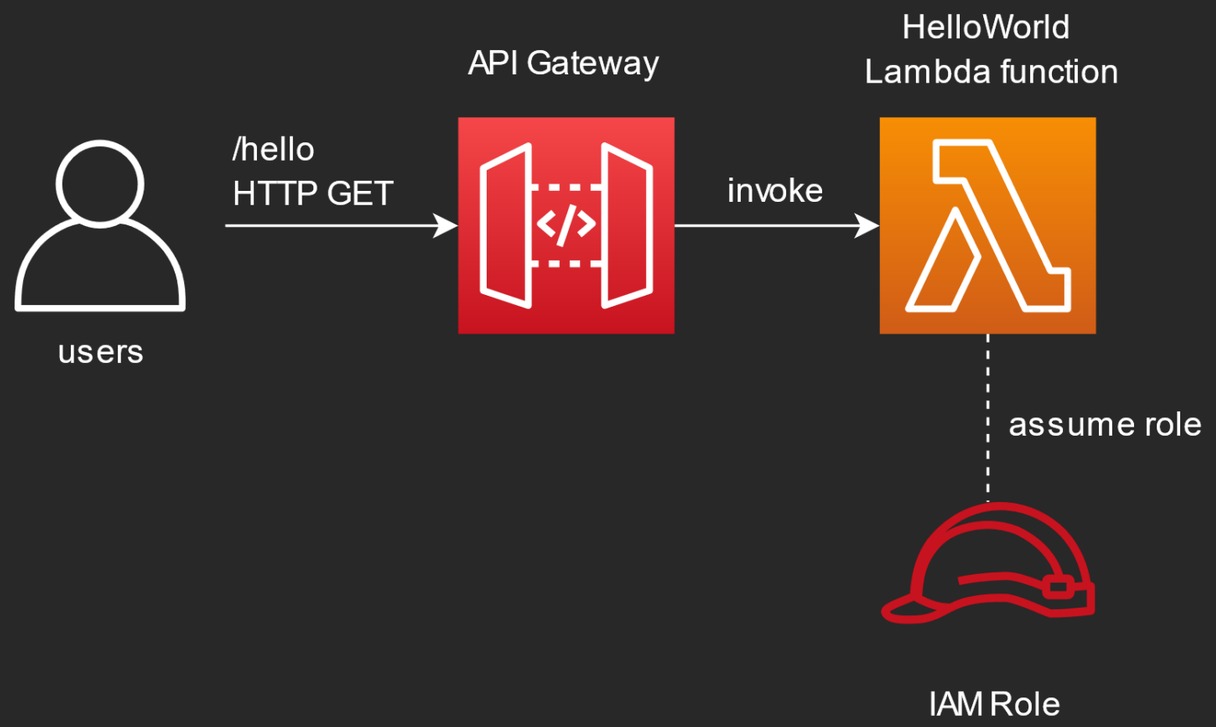
Pipeline example



What are we building today?

Goal: Build a Hello World serverless application from scratch using AWS SAM, and set up a fully automated CI/CD pipeline that deploys to an AWS account





Workshop modules

Module 0. Setup an AWS Cloud9 workspace

Module 1. Create a serverless application using SAM CLI

Module 2. Run a serverless application locally

Module 3. Build, package, and deploy the application

Module 4. Build a pipeline to automate deployments

Module 5. Canary deployments

Demo



AWS Cloud9 is a fully featured web-based IDE

that enables developers to write, run, and debug code

It has a built-in terminal with a pre-authenticated

AWS CLI installed

Workshop instructions

http://bit.ly/2OKP76o

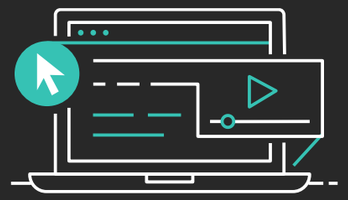
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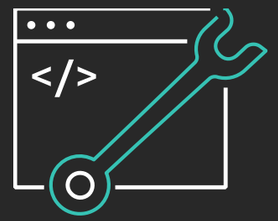
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- Getting into the Serverless Mindset
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- Amazon API Gateway for Serverless Applications
- Amazon DynamoDB for Serverless Architectures



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Thank you!

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Related sessions

DOP305 - Deploying cross-account, cross-region pipelines

DOP306 - Building a scalable serverless app with AWS CDK

DOP336 - Serverless app infrastructure with AWS CDK

ARC316 - Deploy and monitor a serverless application



Please complete the session survey in the mobile app.

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