



# aws INNOVATE

MODERN APPLICATIONS EDITION

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# Infrastructure as Code and CI/CD in Practice with AWS CDK

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# Agenda

- DevOps Overview
- Infrastructure as Code
- AWS CDK
- CI/CD Foundations
- Demos

# Let's talk about DevOps

# What is DevOps?



# Teams that adopt modern software practices are more agile and higher performing

Teams who automate software delivery with continuous delivery:

**DEPLOYMENT  
FREQUENCY**

Weekly-monthly



Hourly-daily

**CHANGE  
LEAD TIME**

1-6 months



1-7 days

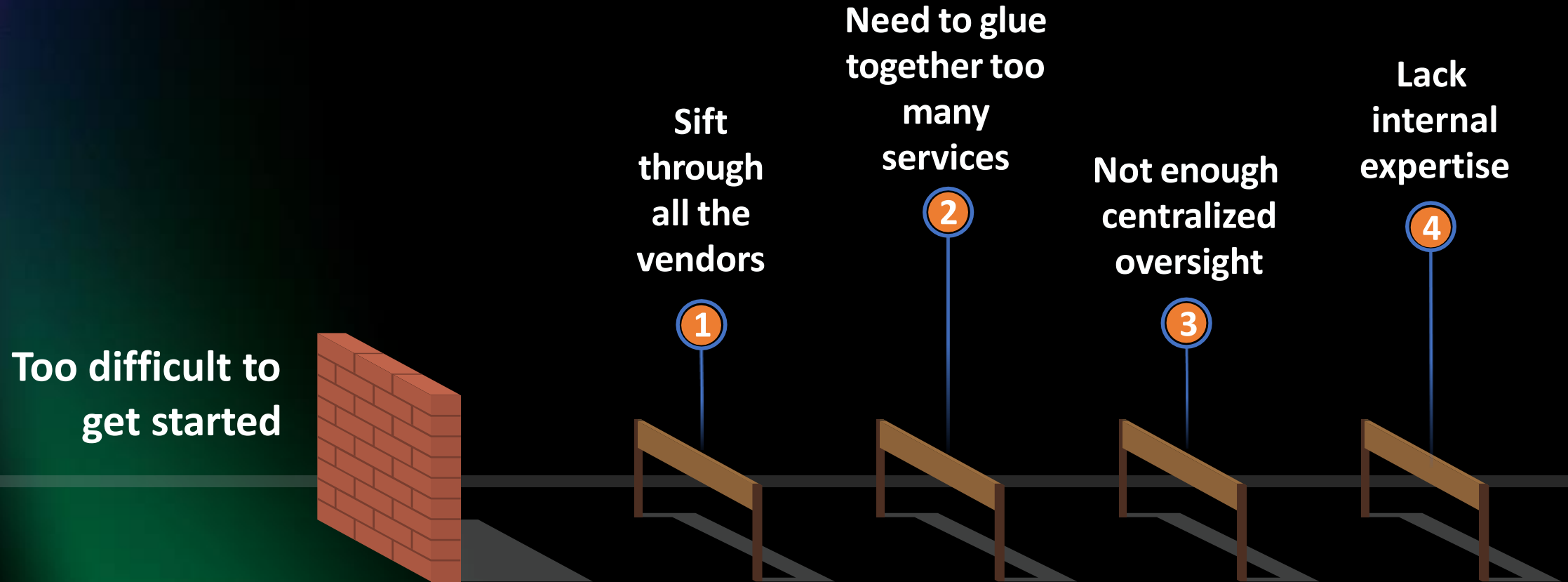
**CHANGE  
FAILURE RATE**

46-60%



0%-15%

# So why hasn't everyone already moved to DevOps?



# Infrastructure ~~as~~ is Code



# Treat Infrastructure the Same Way Developers Treat Code

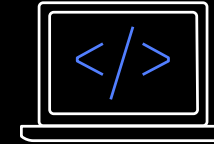
1. Make infrastructure changes repeatable and predictable
2. Release infrastructure changes using the same tools as code changes
3. Replicate production environment in a staging environment to enable continuous testing

# AWS CDK Accelerates Development Teams

```
class UrlShortener extends Stack {
  constructor(scope: App, id: string, props?: UrlShortenerProps) {
    super(scope, id, props);

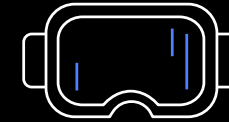
    const vpc = new ec2.Vpc(this, 'vpc', { maxAzs: 2 });
    const cluster = new ecs.Cluster(this, 'cluster', { vpc: vpc });
    const service = new patterns.NetworkLoadBalancedFargateService(this, 'sample-app', {
      cluster,
      taskImageOptions: {
        image: ecs.ContainerImage.fromAsset('ping'),
      },
      dom
    });
    // Setup AutoScaling policy
    const scaling = service.service.autoScaleTask
    scaling.scaleOnCpuUtilization('CpuScaling',
      targetUtilizationPercent: 50,
      scaleInCooldown: Duration.seconds(60),
      scaleOutCooldown: Duration.seconds(60)
    ));
  }
}
```

domainName	(property) patterns.NetworkLoadBalancedServiceBaseProps.domainName?: string   undefined
domainZone	The domain name for the service, e.g. "api.example.com."
	@default
	- No domain name.



## Familiar

Your language  
Just code



## Tool support

Autocomplete  
Inline documentation



## Abstraction

Sane defaults  
Reusable classes



# Construct Levels

L3+

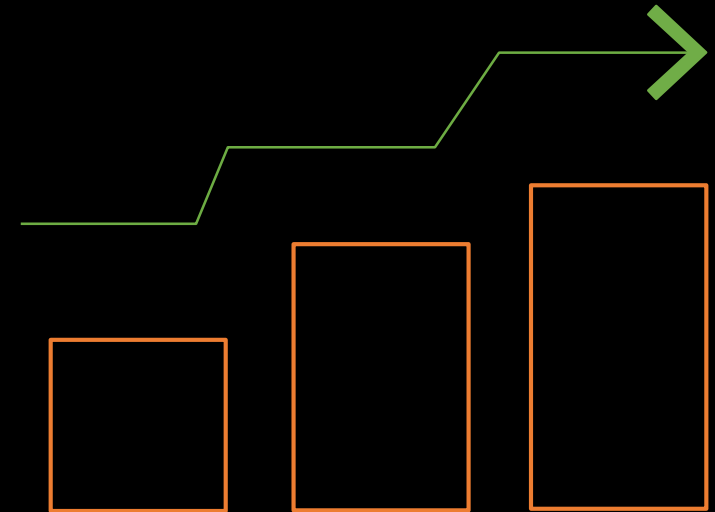
Purpose-built constructs

L2

AWS Constructs

L1

CloudFormation resources



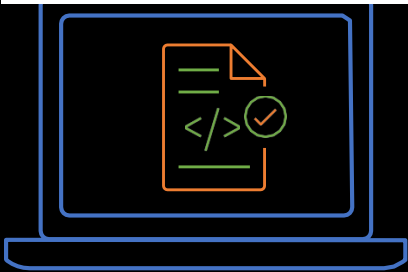
# Workflow

```
> cdk init
```



Generate project

```
> npm run  
build
```



Build  
project

```
> cdk  
synth
```



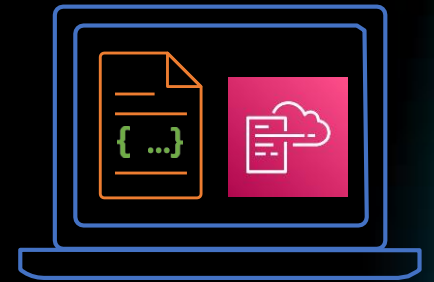
Create  
templates and  
assets

```
> cdk diff
```



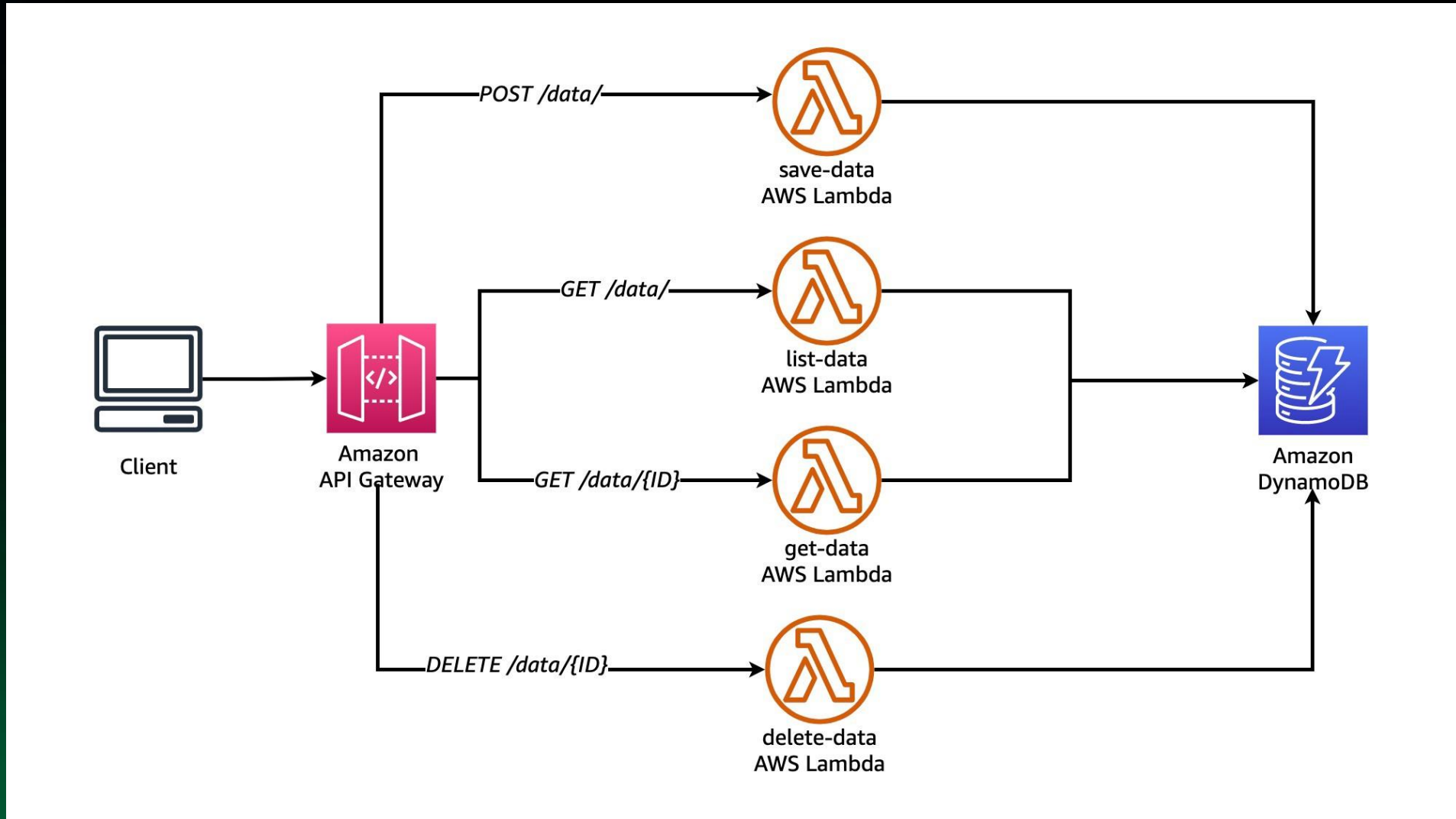
Check what will  
change

```
> cdk deploy
```



Push changes to  
the cloud

# Architecture Diagram



# CI/CD Foundations

# Release Process Stages



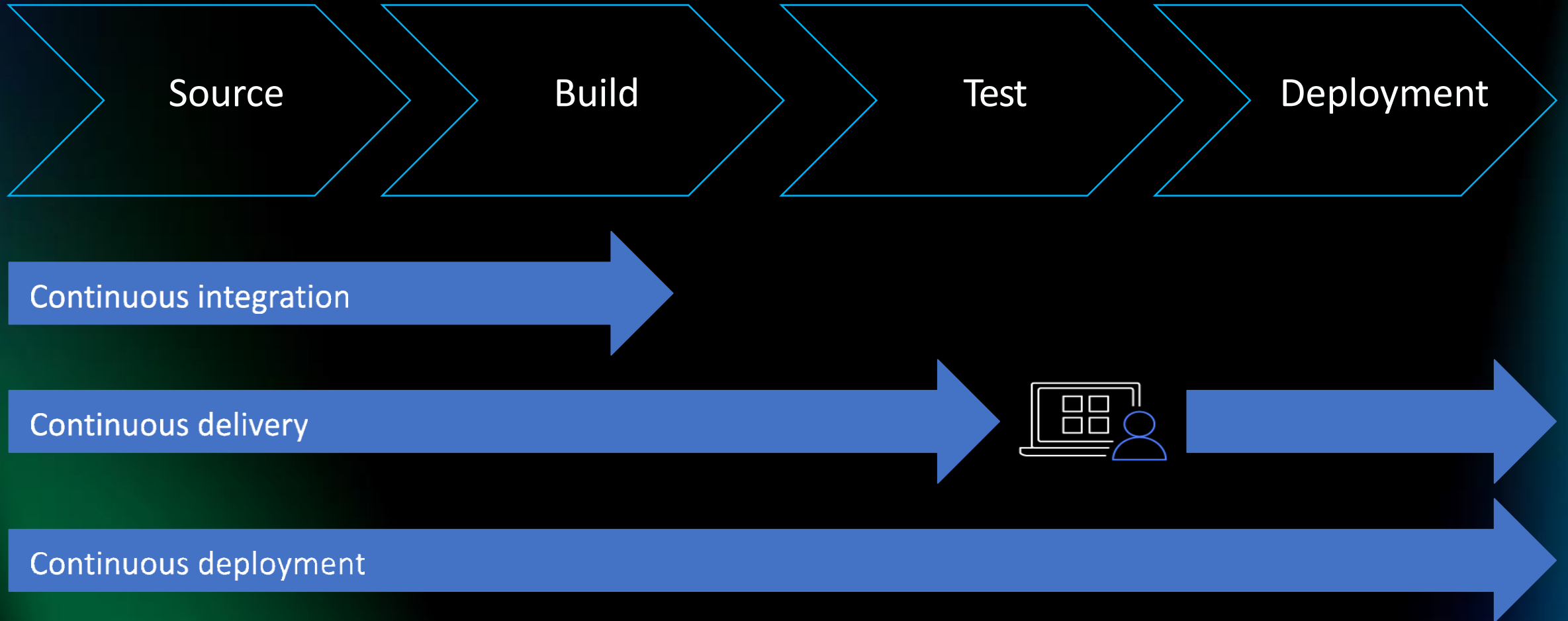
- Check-in source code such as .java files
- Peer review new code

- Compile code
- Unit tests
- Style checkers
- Create container images and function deployment packages

- Integration testing with other systems
- Load testing
- UI testing
- Security testing

- Deploy to application environments
- Monitor code in production to quickly detect errors

# Release Process Stages





# AWS CodePipeline



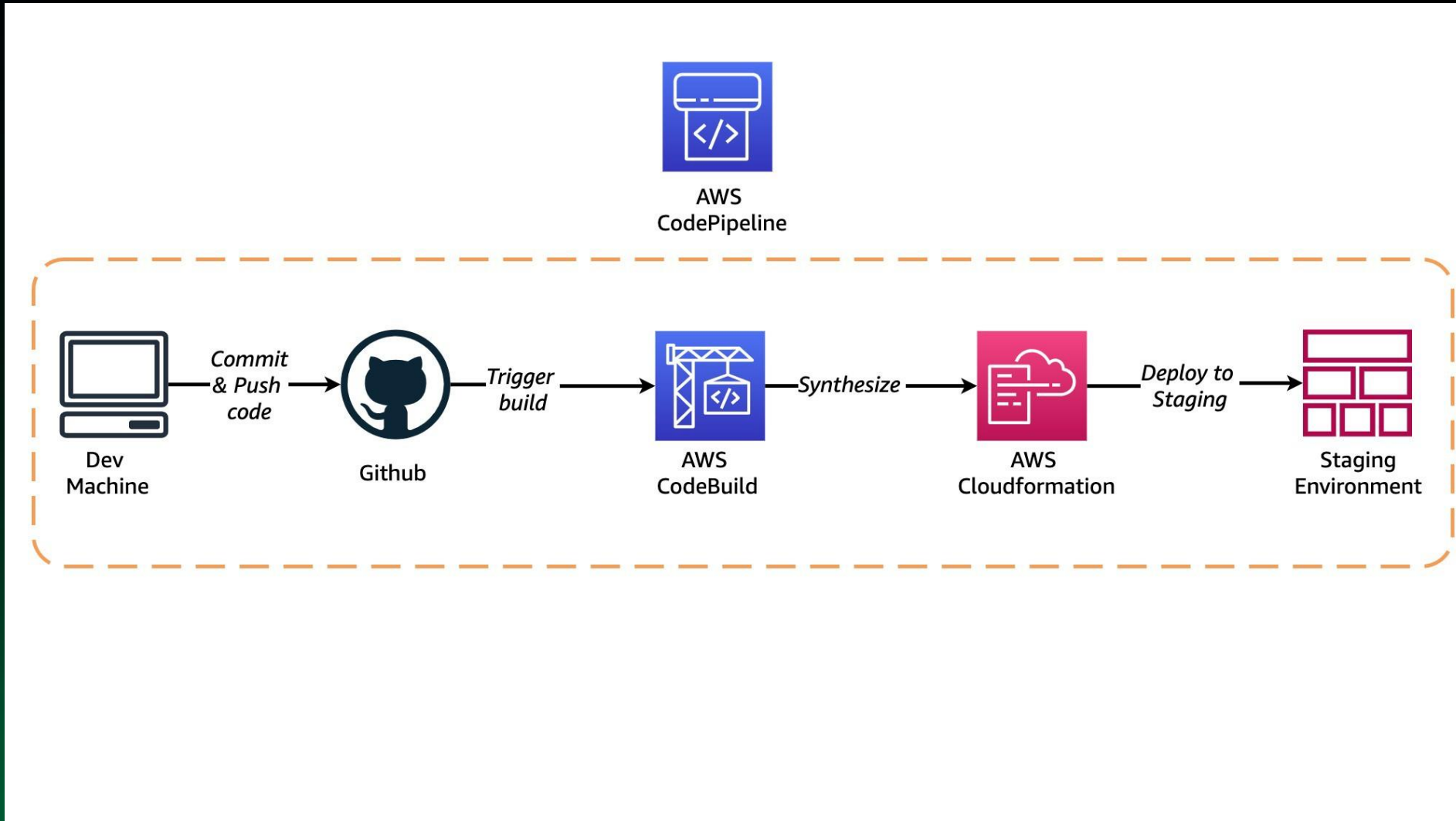
- Continuous delivery service for fast and reliable application updates
- Model and visualize your software release process
- Builds, tests, and deploys your code every time there is a code change
- Integrates with third-party tools and AWS

# AWS CodeBuild

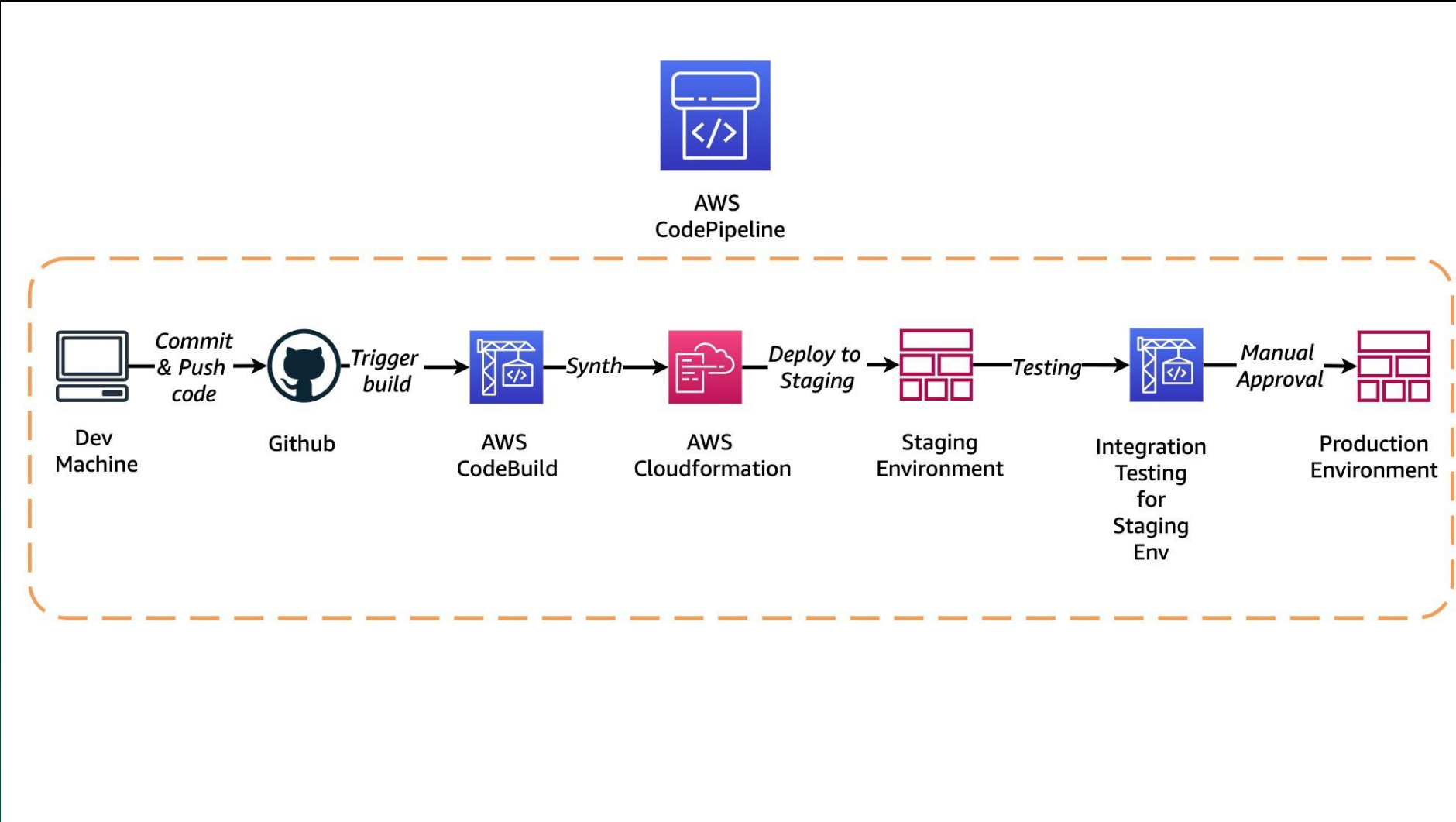


- Each build runs in a new Docker container for a consistent, immutable environment
- Docker and AWS CLI are installed in every official CodeBuild image
- Provide custom build environments suited to your needs through the use of Docker images

# Implement CI/CD with CDK Pipelines



# CI/CD on AWS



# Recap/Resources

Blog Post – CDK Pipelines Continuous Delivery for AWS CDK Applications

<https://aws.amazon.com/blogs/developer/cdk-pipelines-continuous-delivery-for-aws-cdk-applications/>

Github - AWS CDK Example

<https://github.com/aws-samples/aws-cdk-examples>

Guide - Continuous integration and delivery (CI/CD) using CDK Pipelines

[https://docs.aws.amazon.com/cdk/v2/guide/cdk\\_pipeline.html](https://docs.aws.amazon.com/cdk/v2/guide/cdk_pipeline.html)

Pattern - Automatically build CI/CD pipelines and Amazon ECS clusters for microservices using AWS CDK

<https://docs.aws.amazon.com/prescriptive-guidance/latest/patterns/automatically-build-ci-cd-pipelines-and-amazon-ecs-clusters-for-microservices-using-aws-cdk.html>

# Visit the Modern Applications resource hub

Dive deeper with these resources to help you develop an effective plan for your modernization journey.

- Build modern applications on AWS
- Business value of cloud modernization
- An introduction to event-driven architectures
- Accelerate full-stack web and mobile app development
- Determining the total cost of ownership: Comparing serverless and server-based technologies
- Building event-driven architectures with AWS
- Continuous learning, continuous modernization



<https://tinyurl.com/modern-apps-aws>

Visit resource hub

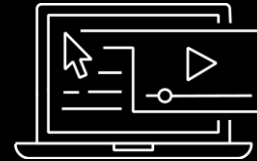


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# Thank you!