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Welcome@2022

<https://github.com/TIDC-PS-Inter/AWS-Workshop>

Part 1



AWS Workshop Series

Day 4: AWS DevOps CI/CD

Taking Enterprise Beyond the Cloud by TruelDC

Mr. Niran Sohinkong

Professional Service Manager

Presented by



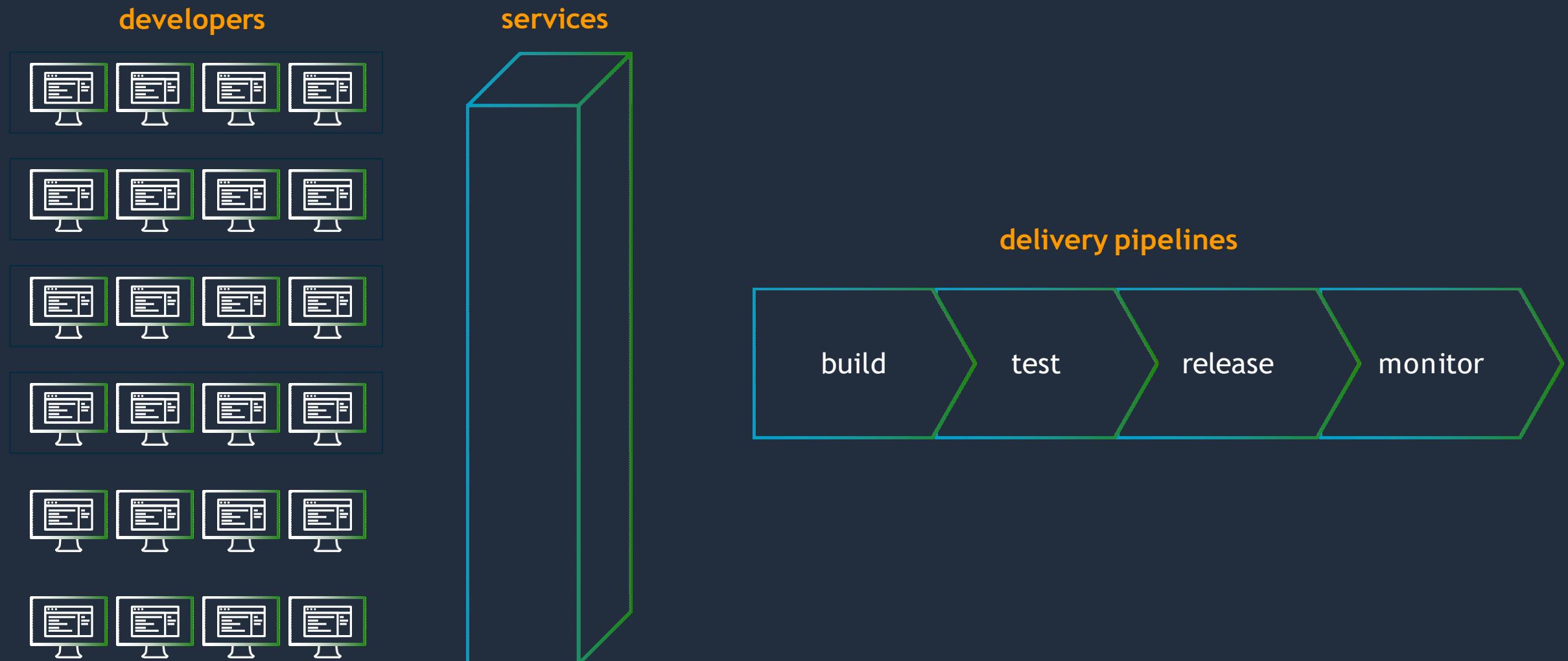
- Niran Sohinkong (Nueng)
- Professional Service Manager, TrueIDC
- AWS DevOps
- AWS SysOps / Architect
- niran.soh@ascendcorp.com



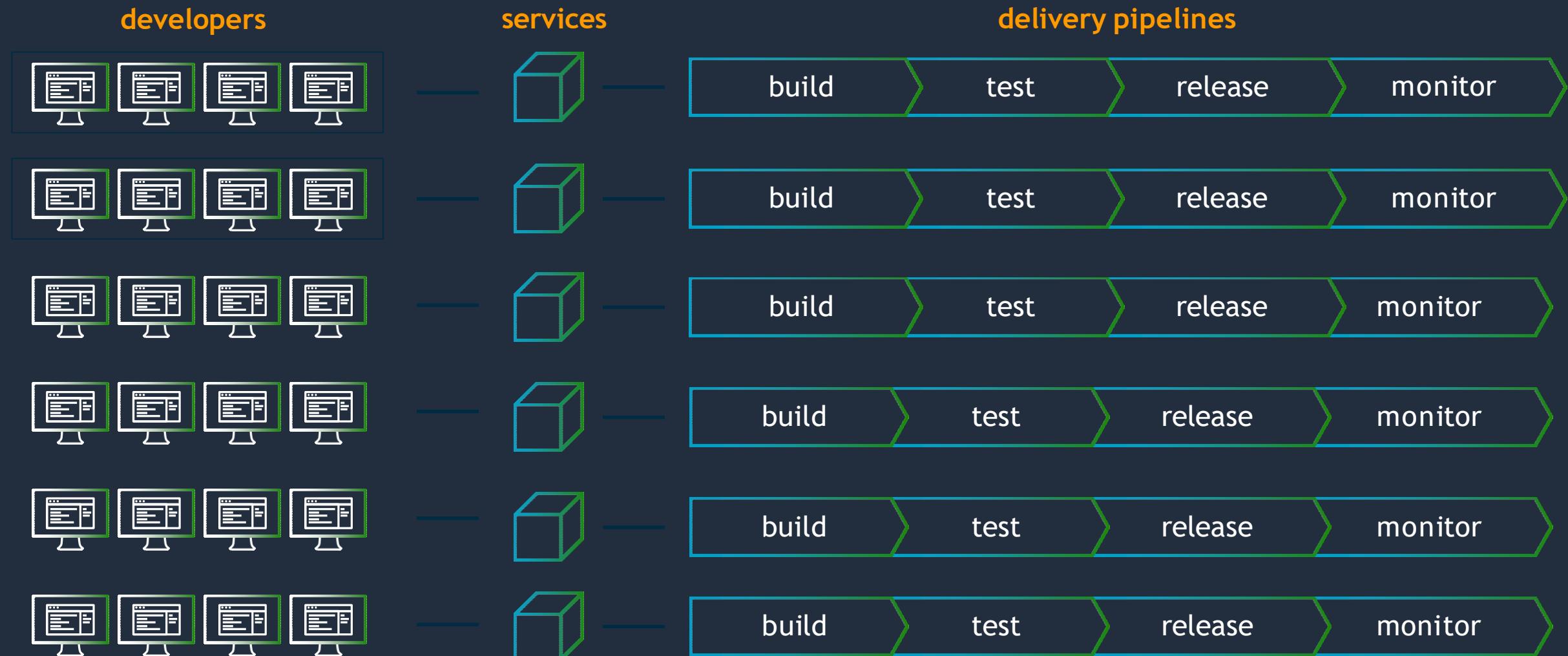
Agenda

- Introduction to DevOps CICD
- AWS CodePipeline
- AWS CodeCommit
- AWS CodeDeploy
- Deployment
- Lab

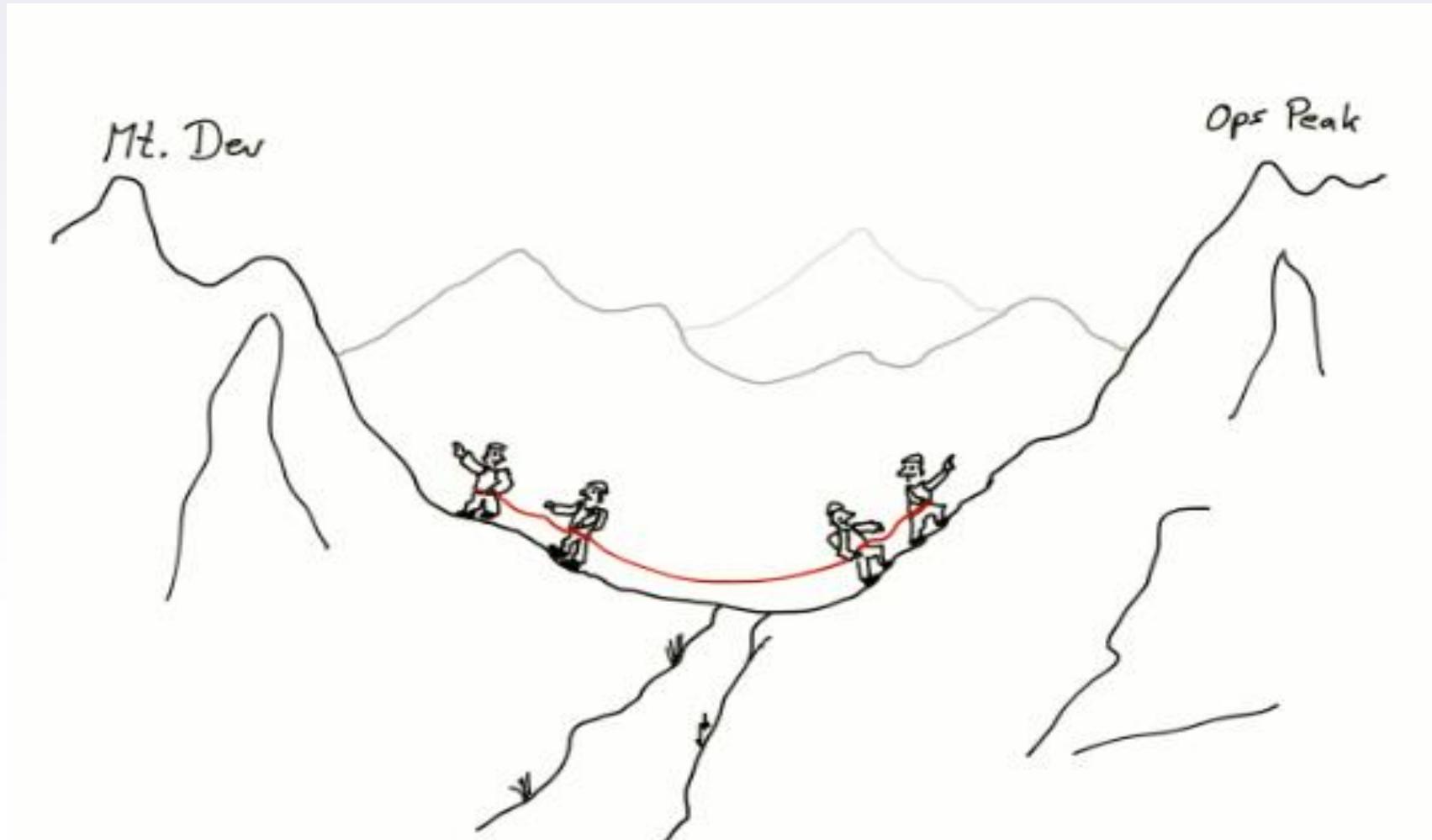
Deployment: Monolith development lifecycle



Deployment: Microservice development lifecycle

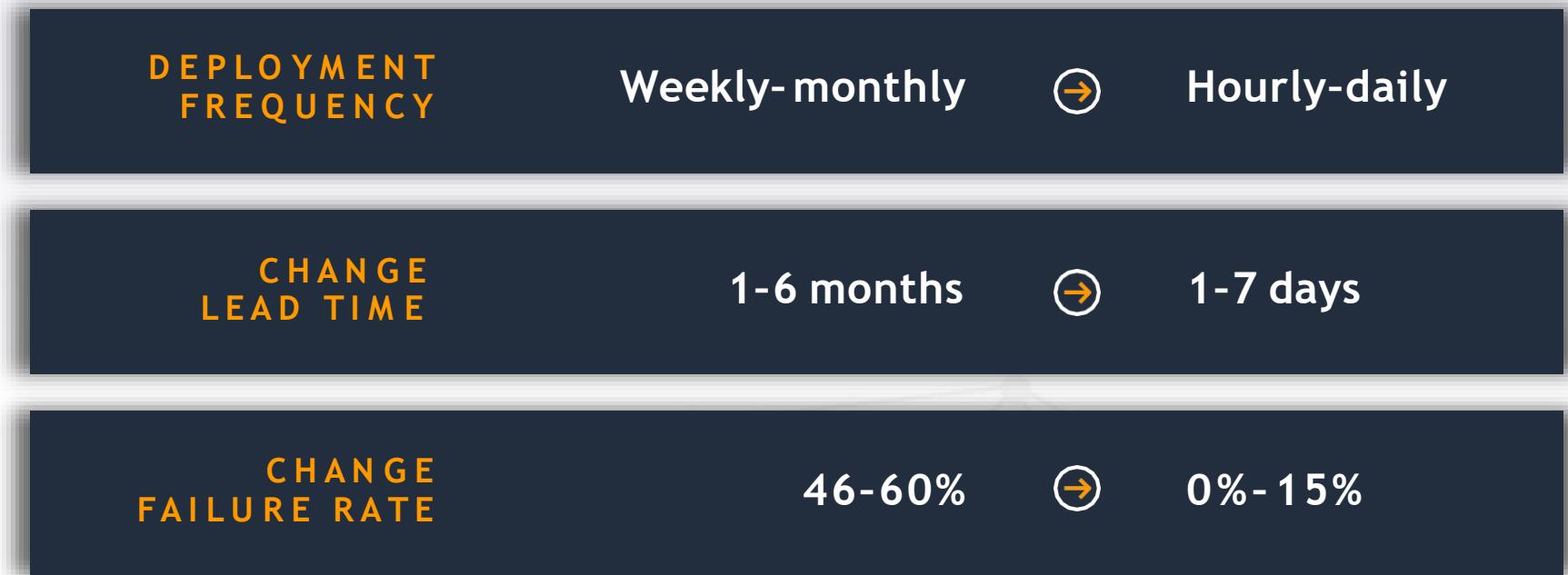


Different Goals & Visions



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

Teams who automate software delivery with continuous delivery:



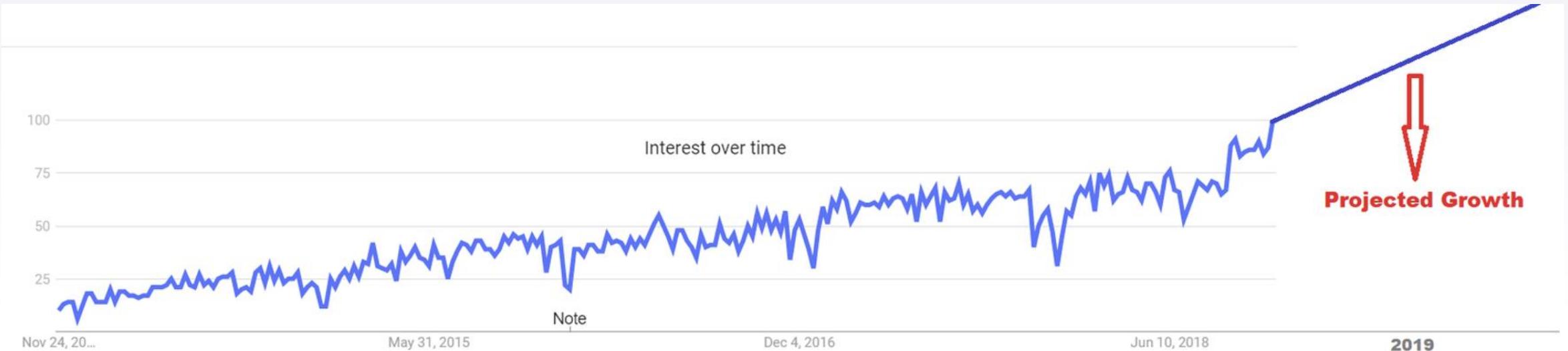
Source: 2019 DORA State of DevOps report

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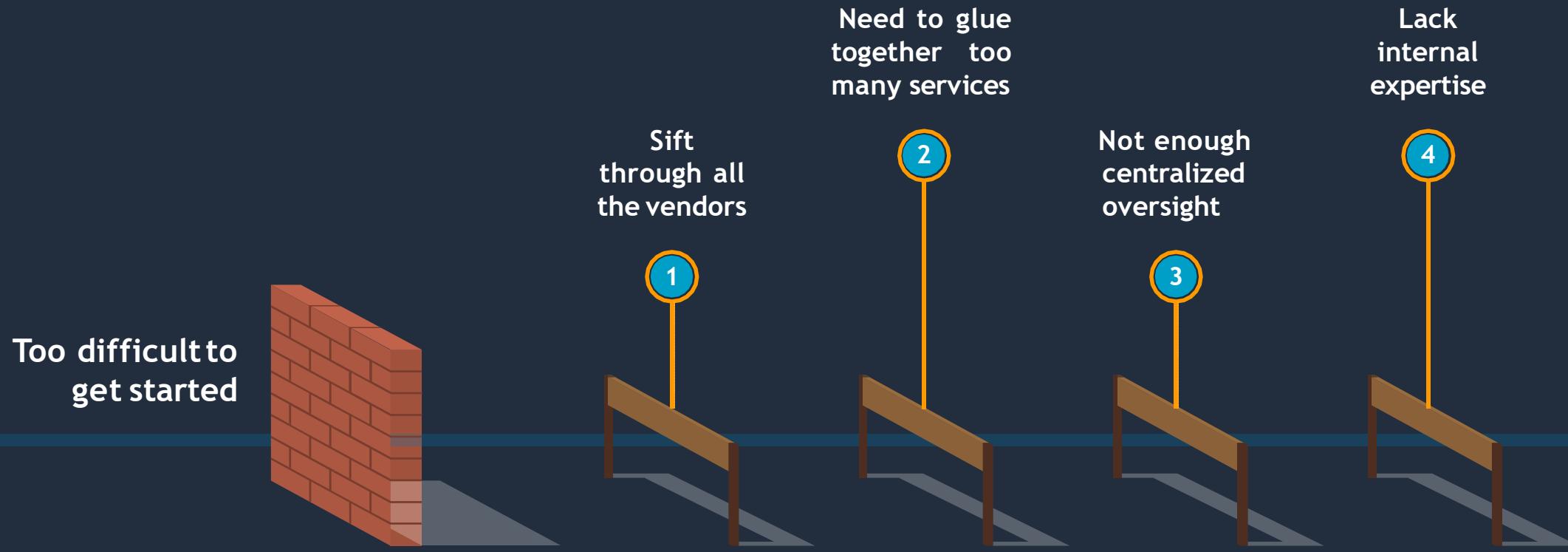


DevOps Trends

DevOps Gets More Exciting in 2019



So why hasn't everyone already moved to DevOps?



DevOps gets distorted

DevOps changed the world!

Brought development and ops
closer together

Helped teams go much faster
with fewer errors

Solving problems improved
happiness of software builders

BUT

DevOps gets distorted

Not about
eliminating operations

Not about developers doing
the job of operators

Not about org structure

AS A RESULT

Explosion of innovation

AS A RESULT

Some think “DevOps isn’t for us”

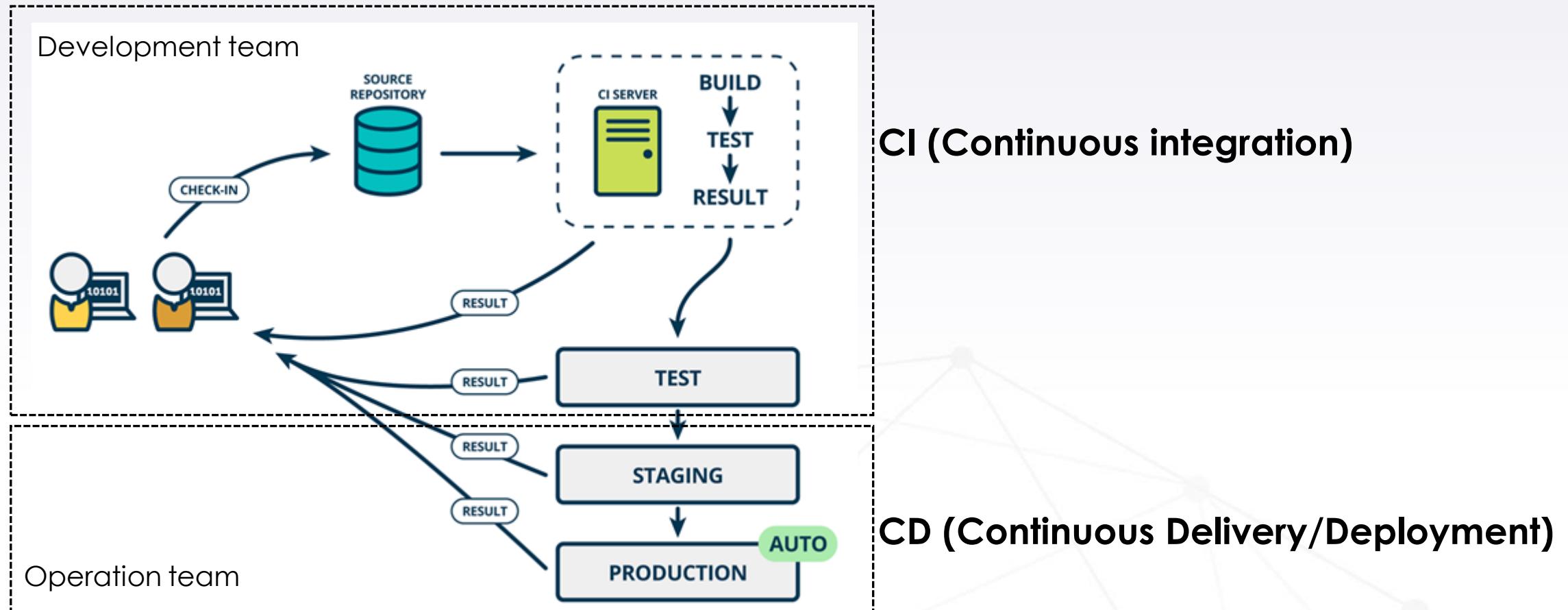
What is DevOps?

DevOps is a set of practices, tools, and a cultural philosophy that automate and integrate the processes between software development and IT teams. It emphasizes **team empowerment, cross-team communication and collaboration, and technology automation**.

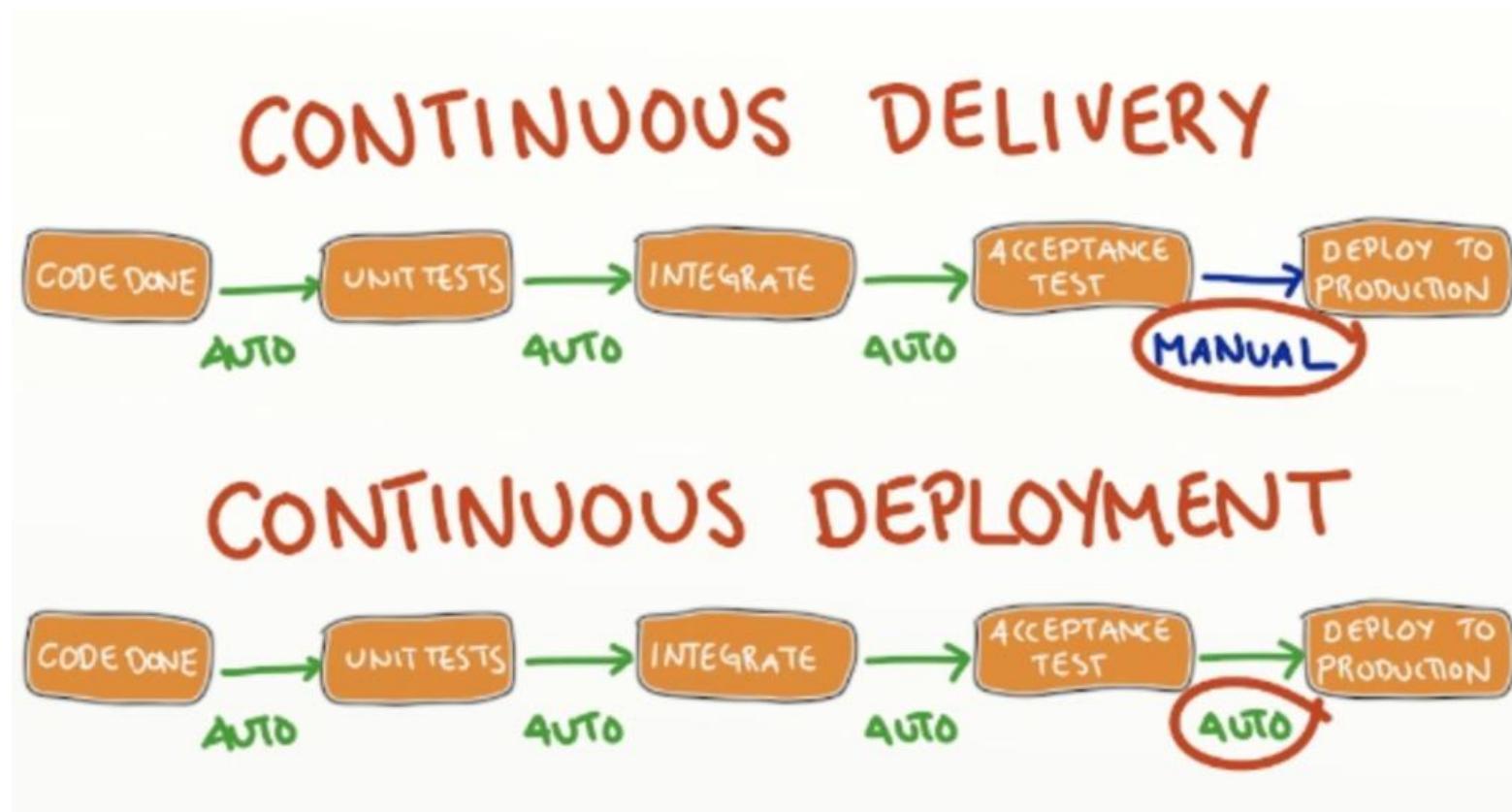


What is CI/CD?

CI/CD refers to a set of development practices and collection of principles that enable the rapid and reliable **delivery of code changes**.



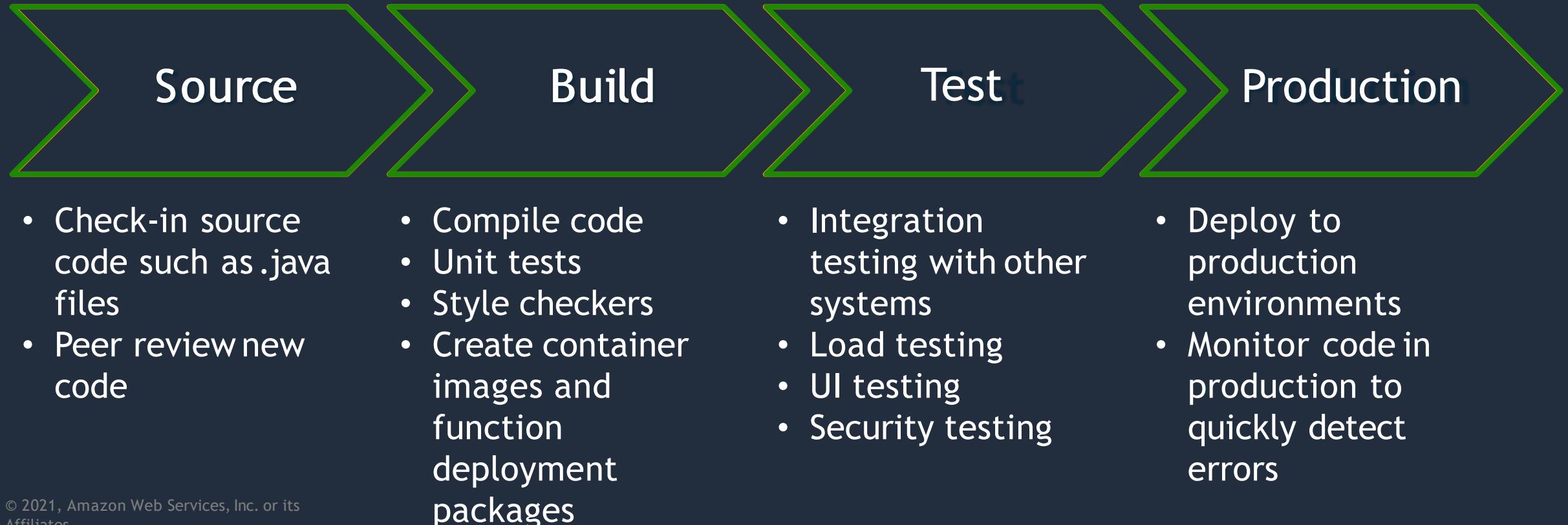
Continuous Delivery/Deployment (CD)



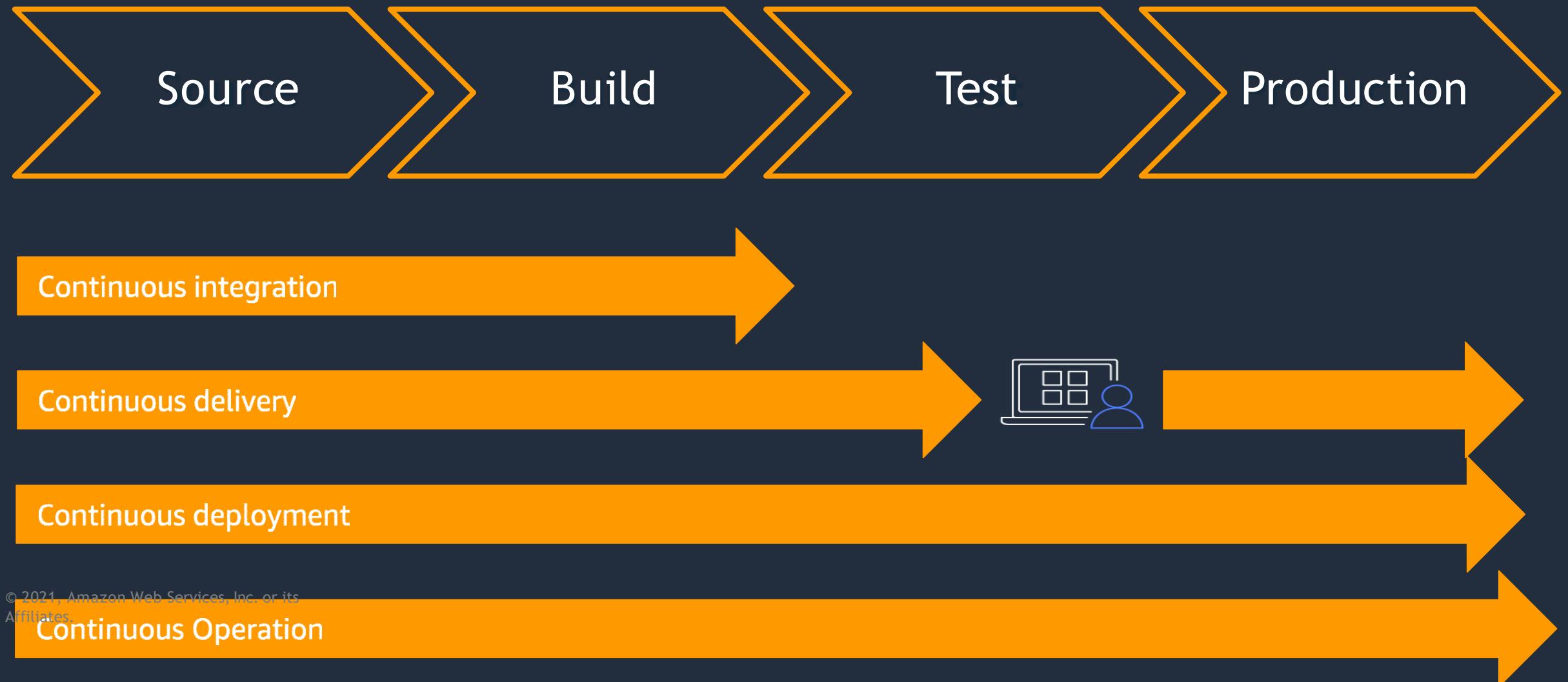
Continuous delivery is an extension of continuous integration since it automatically deploys all code changes to a testing and/or production environment after the build stage.

Continuous deployment goes one step further than continuous delivery. There's no human intervention deployed to production

Release process stages



Release lifecycle



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Continuous Operation



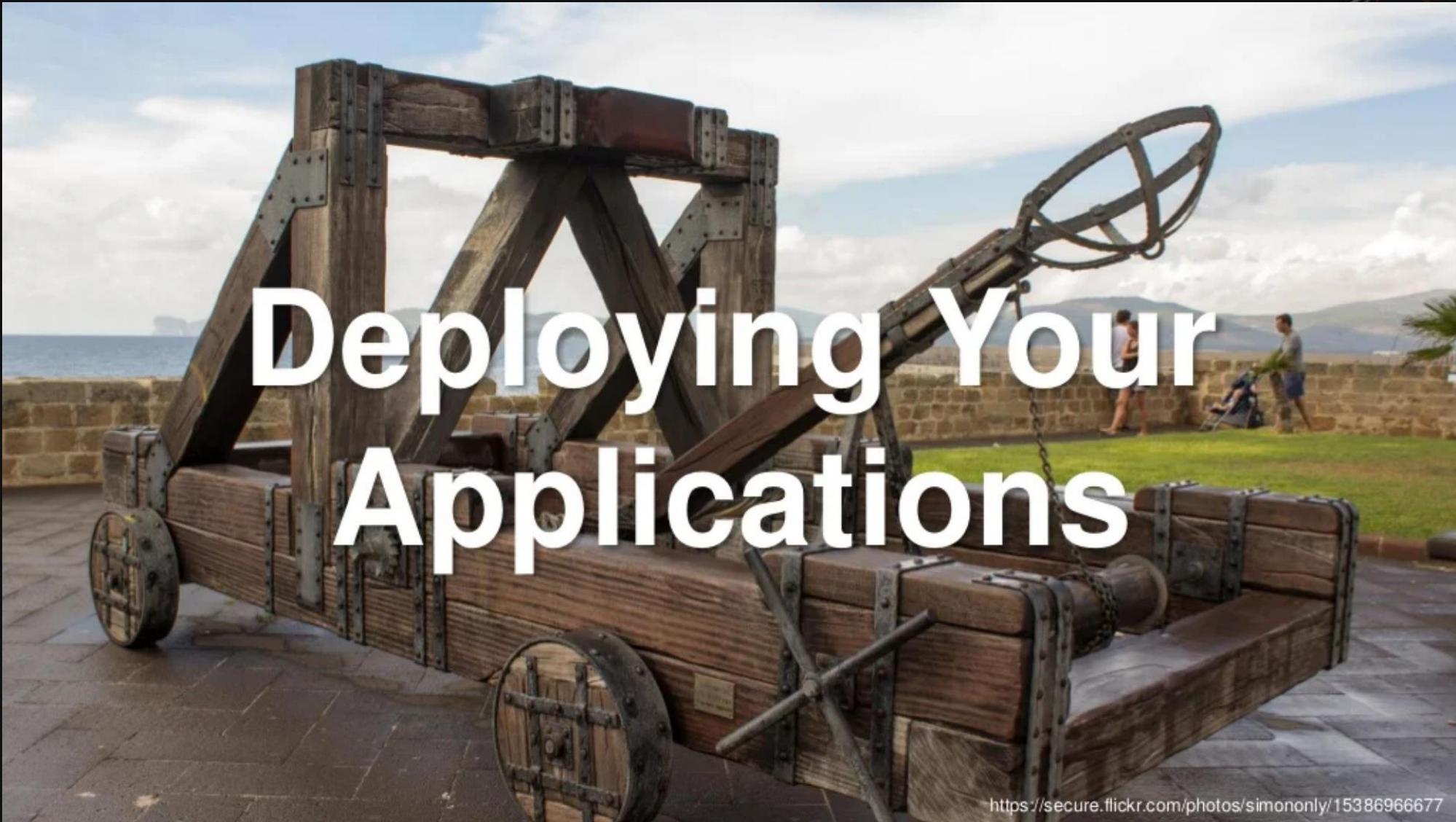
Continuous Delivery vs Continuous Deployment



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Traditional System



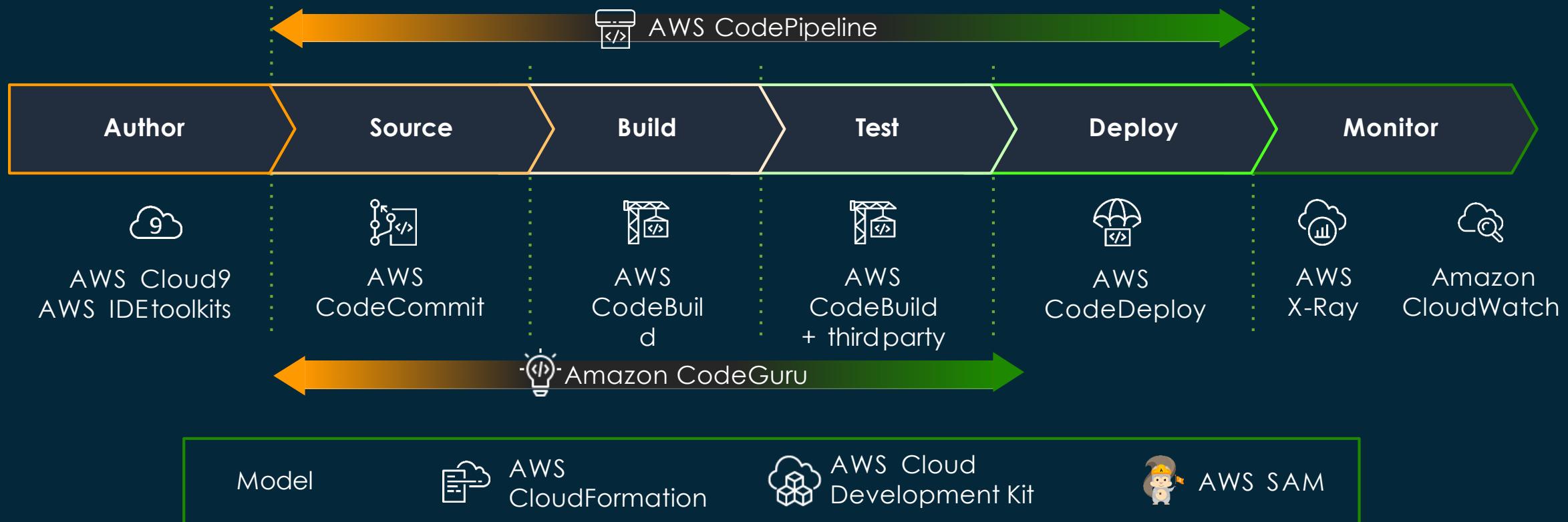
<https://secure.flickr.com/photos/simononly/15386966677>

Automation System



<https://secure.flickr.com/photos/spencyc/7481166880>

DevOps CI/CD for modern software delivery on AWS



The AWS GitOps Stack

Git solutions



AWS CodeCommit

IaC solutions



AWS CloudFormation



AWS Cloud Development Kit (CDK)



AWS Serverless Application Model (SAM)

CI/CD solutions



AWS CodeBuild



AWS CodePipeline

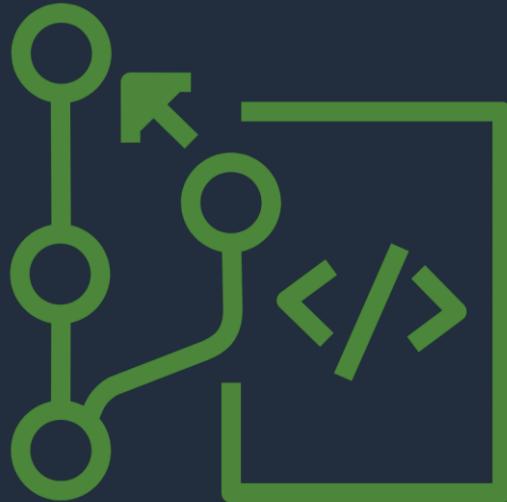


AWS CodeDeploy

AWS Partnersolutions

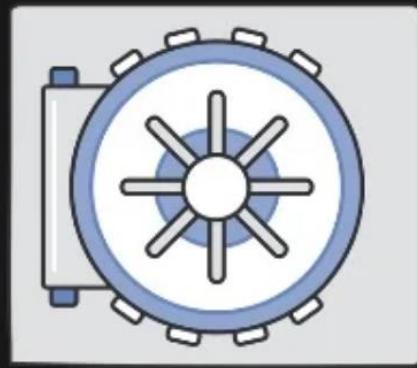


AWS CodeCommit



- Secure, highly scalable, managed source control service that hosts private git repositories
- Works with existing git tools
- Integrates with AWS services like IAM, Amazon EventBridge, KMS, Amazon SNS
- No hardware to provision and scale
- Highly available and durable (backed by s3)

Source Control in the Cloud



Secure



Fully
managed

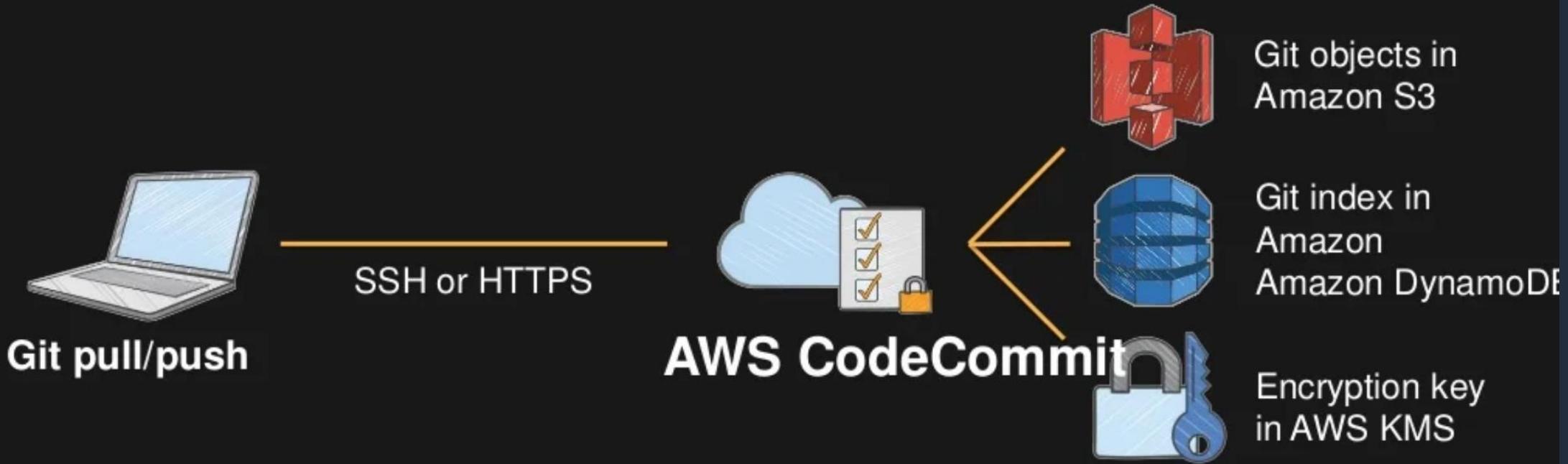


High
availability

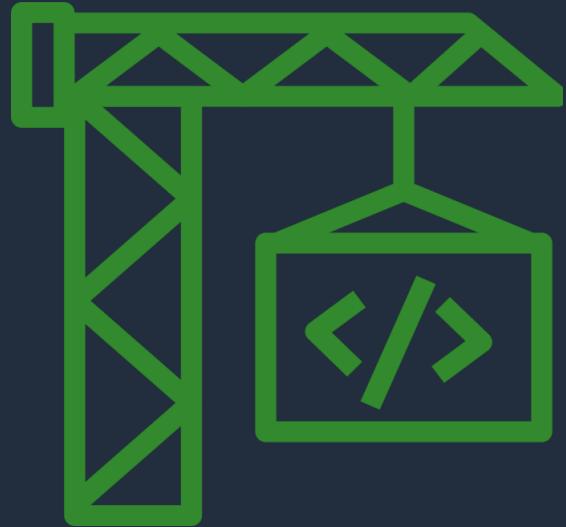


Store
anything

AWS CodeCommit



AWS CodeBuild



- Fully managed build service that compiles source code, runs tests, and produces software packages
- Scales continuously and processes multiple builds concurrently
- No build servers to manage
- Pay by the minute, only for the compute resources you use
- Monitor builds through CloudWatch Events

Building Your Code

“Building” code typically refers to languages that require compiled binaries:

- .NET languages: C#, F#, VB.net, etc.
- Java and JVM languages: Java, Scala, JRuby
- Go
- iOS languages: Swift, Objective-C

We also refer to the process of creating Docker container images as “building” the image

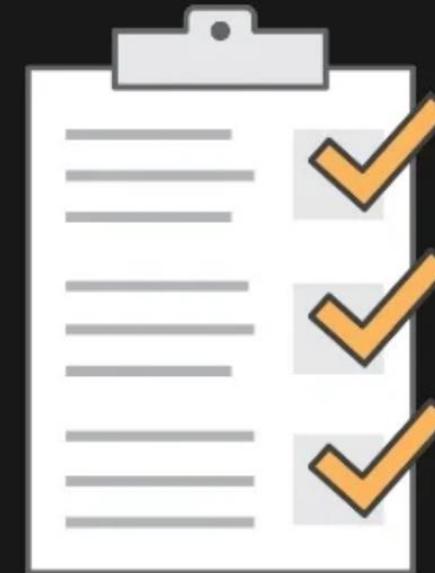


Testing Your Code

Testing is both a science and an art form!

Goals for testing your code:

- Want to confirm intended functionality
- Catch programming syntax errors
- Standardize code patterns and format
- Reduce bugs due to unwanted application usage and logic failures
- Make applications more secure



AWS CodeDeploy



- Automates code deployments to any instance and Lambda
- Handles the complexity of updating your applications
- Avoids downtime during application deployment
- Rollsback automatically if failure detected
- Deploys to Amazon **ECS**, **EC2**, **Fargate**, **Lambda**, or **on-premises** servers

AWS CodeDeploy: Blue/Green Deployment

- Provisions “green” tasks, then flips traffic at the load balancer
- Validation “hooks” enable testing at each stage of the deployment
- Fast rollback to “blue” tasks in seconds in the event of hook failure or CloudWatch alarms
- Monitor deployment status and history via console, API, Amazon SNS, and CloudWatch Events
- Use “CodeDeploy-ECS” deploy action in CodePipeline or “aws ecs deploy” command in Jenkins

AWS Blue/Green Deployment



- **Canary** — Traffic is shifted in two increments. You can choose from predefined canary options that specify the percentage of traffic shifted to your updated task set in the first increment and the interval, in minutes, before the remaining traffic is shifted in the second increment.
- **Linear** — Traffic is shifted in equal increments with an equal number of minutes between each increment. You can choose from predefined linear options that specify the percentage of traffic shifted in each increment and the number of minutes between each increment.
- **All-at-once** — All traffic is shifted from the original task set to the updated task set all at once.

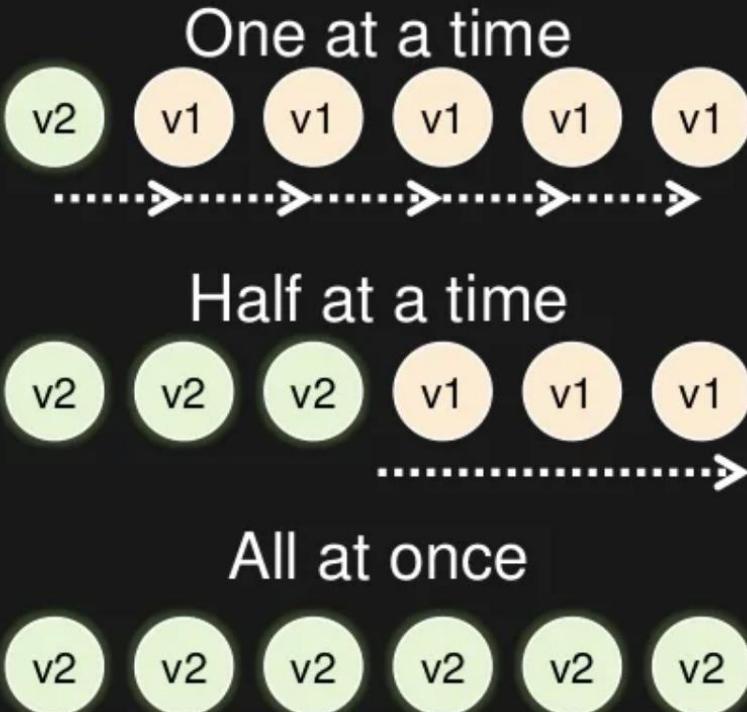
AWS Blue/Green Deployment



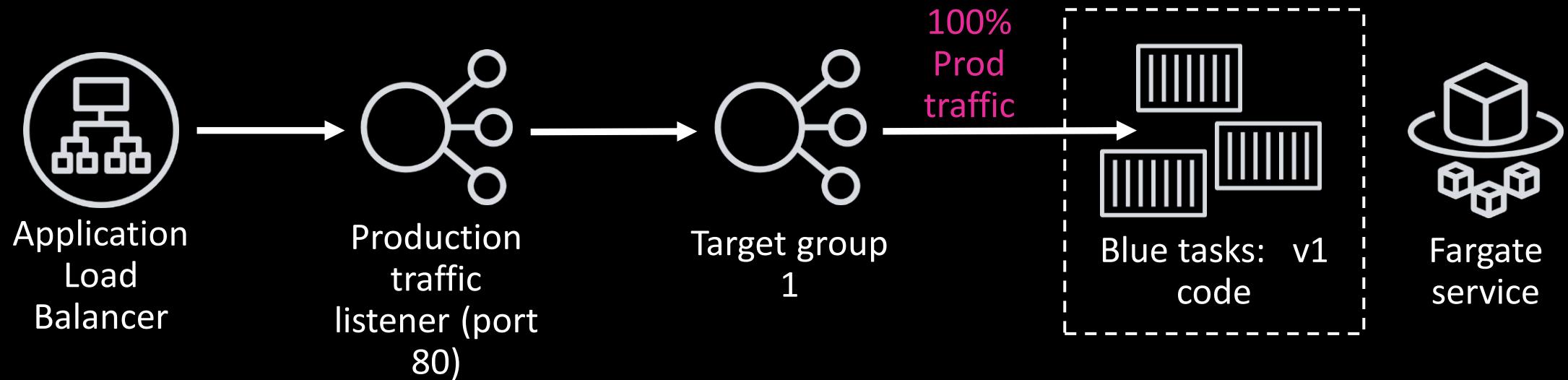
Deployment configuration	Description
CodeDeployDefault.ECSLinear10PercentEvery1Minutes	Shifts 10 percent of traffic every minute until all traffic is shifted.
CodeDeployDefault.ECSLinear10PercentEvery3Minutes	Shifts 10 percent of traffic every three minutes until all traffic is shifted.
CodeDeployDefault.ECSCanary10percent5Minutes	Shifts 10 percent of traffic in the first increment. The remaining 90 percent is deployed five minutes later.
CodeDeployDefault.ECSCanary10percent15Minutes	Shifts 10 percent of traffic in the first increment. The remaining 90 percent is deployed 15 minutes later.
CodeDeployDefault.ECSAllAtOnce	Shifts all traffic to the updated Amazon ECS container at once.

Rolling Update Deployment

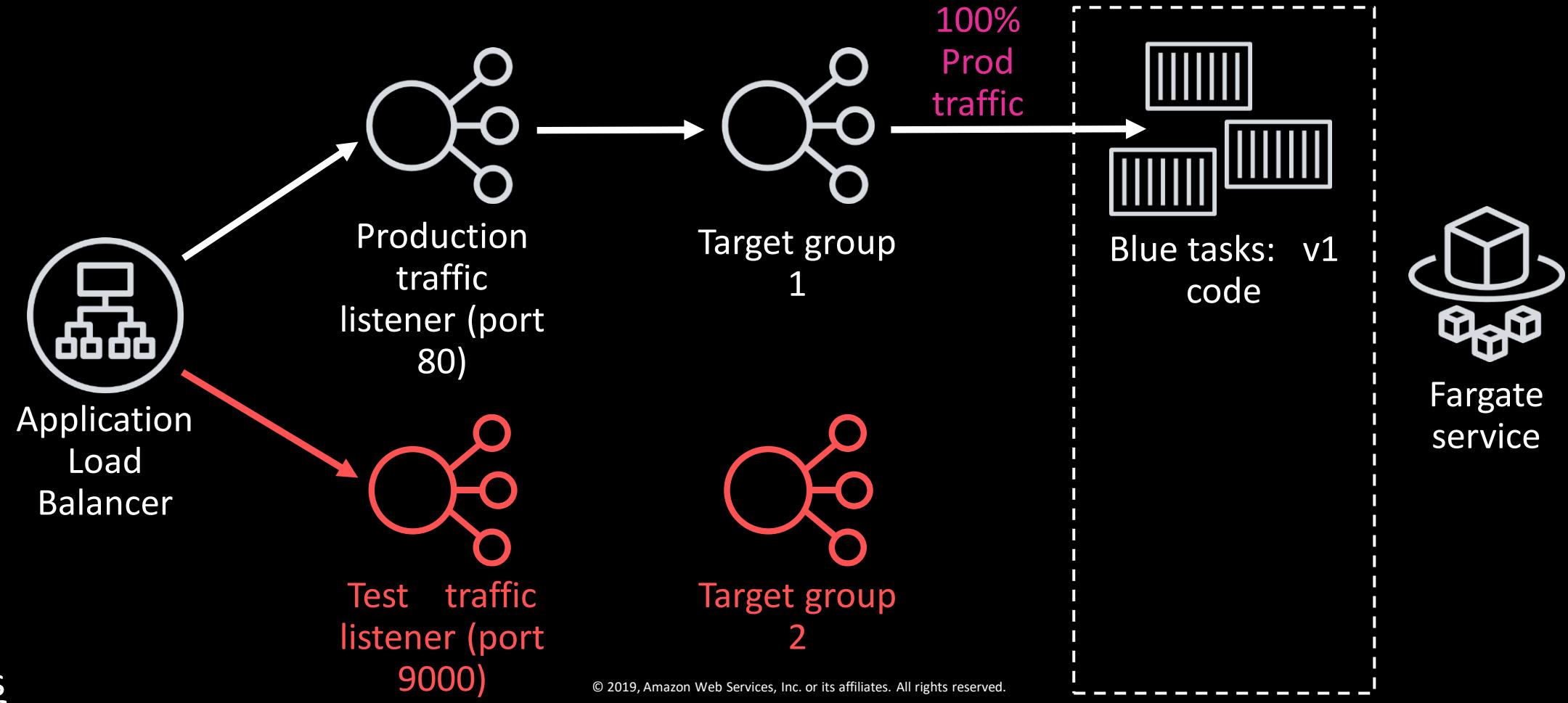
Choose Deployment Speed and Group



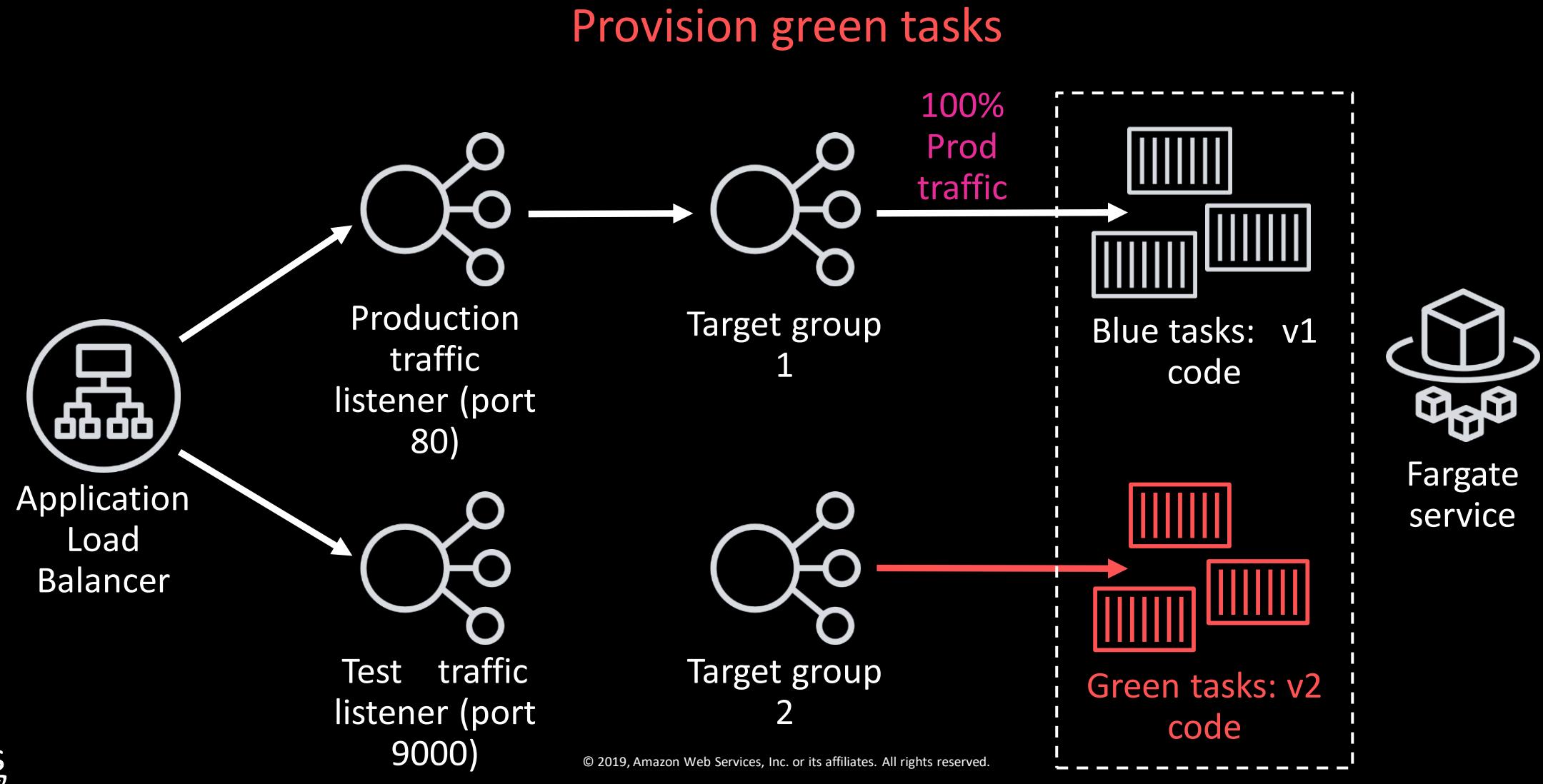
AWS CodeDeploy: ECS blue/green deployment



AWS CodeDeploy: ECS blue/green deployment

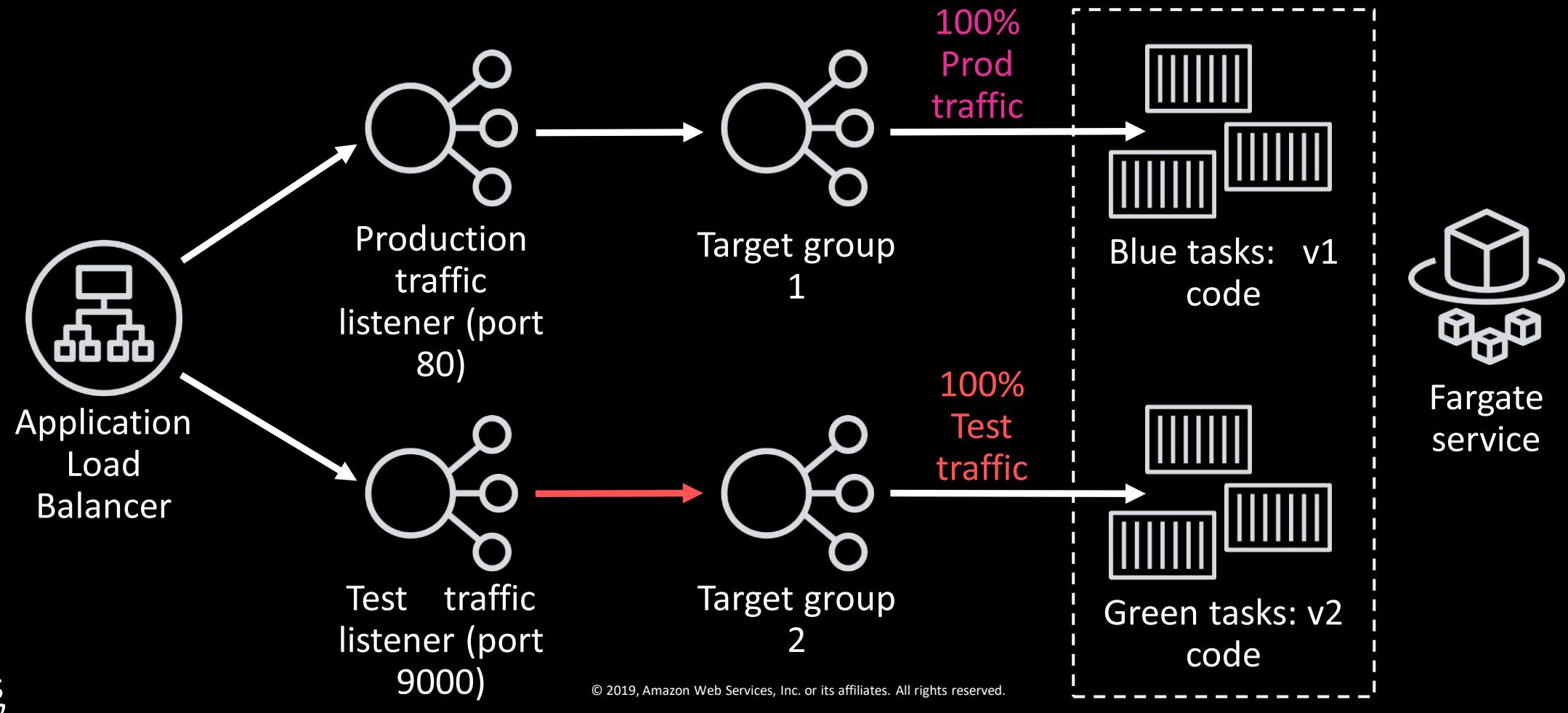


AWS CodeDeploy: ECS blue/green deployment



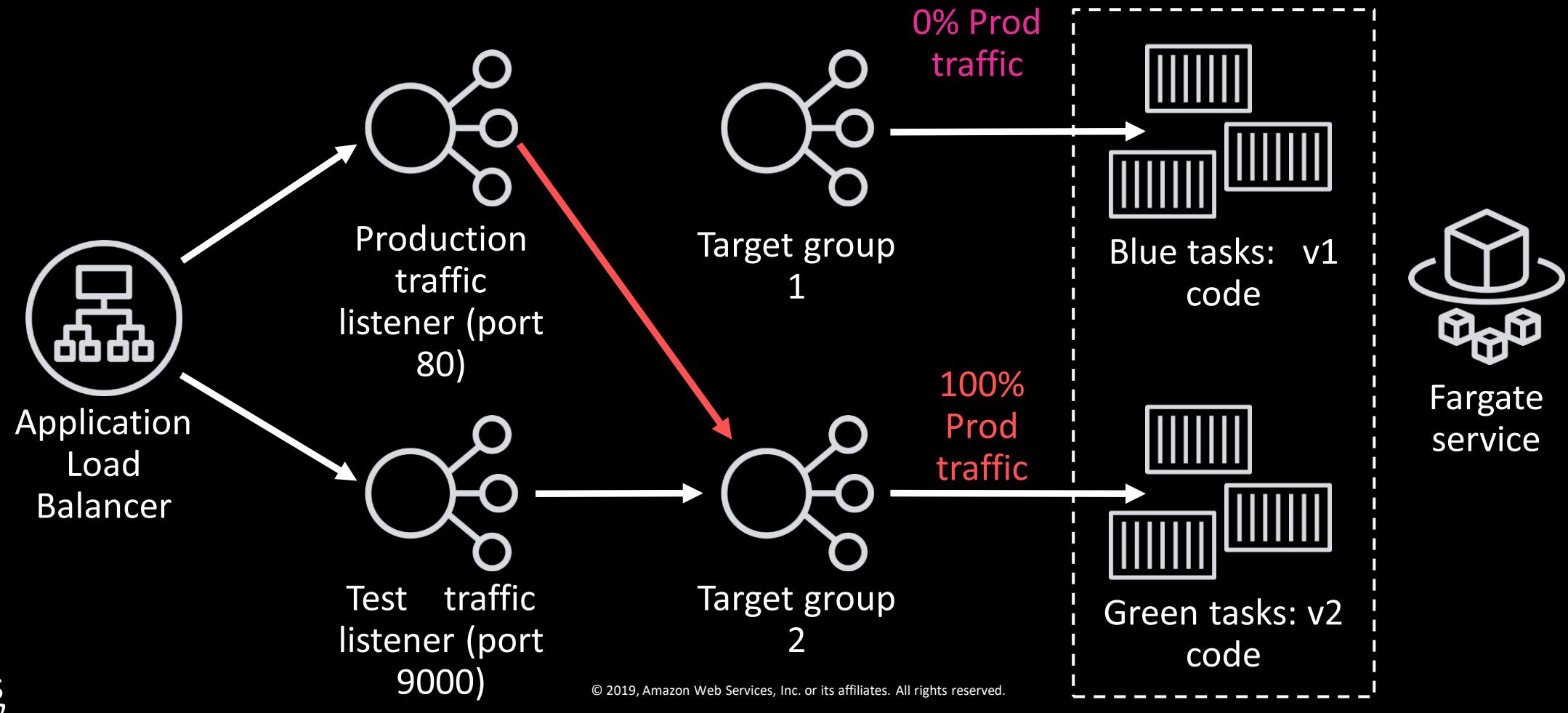
AWS CodeDeploy: ECS blue/green deployment

Run hook against test endpoint before green tasks receive prod traffic

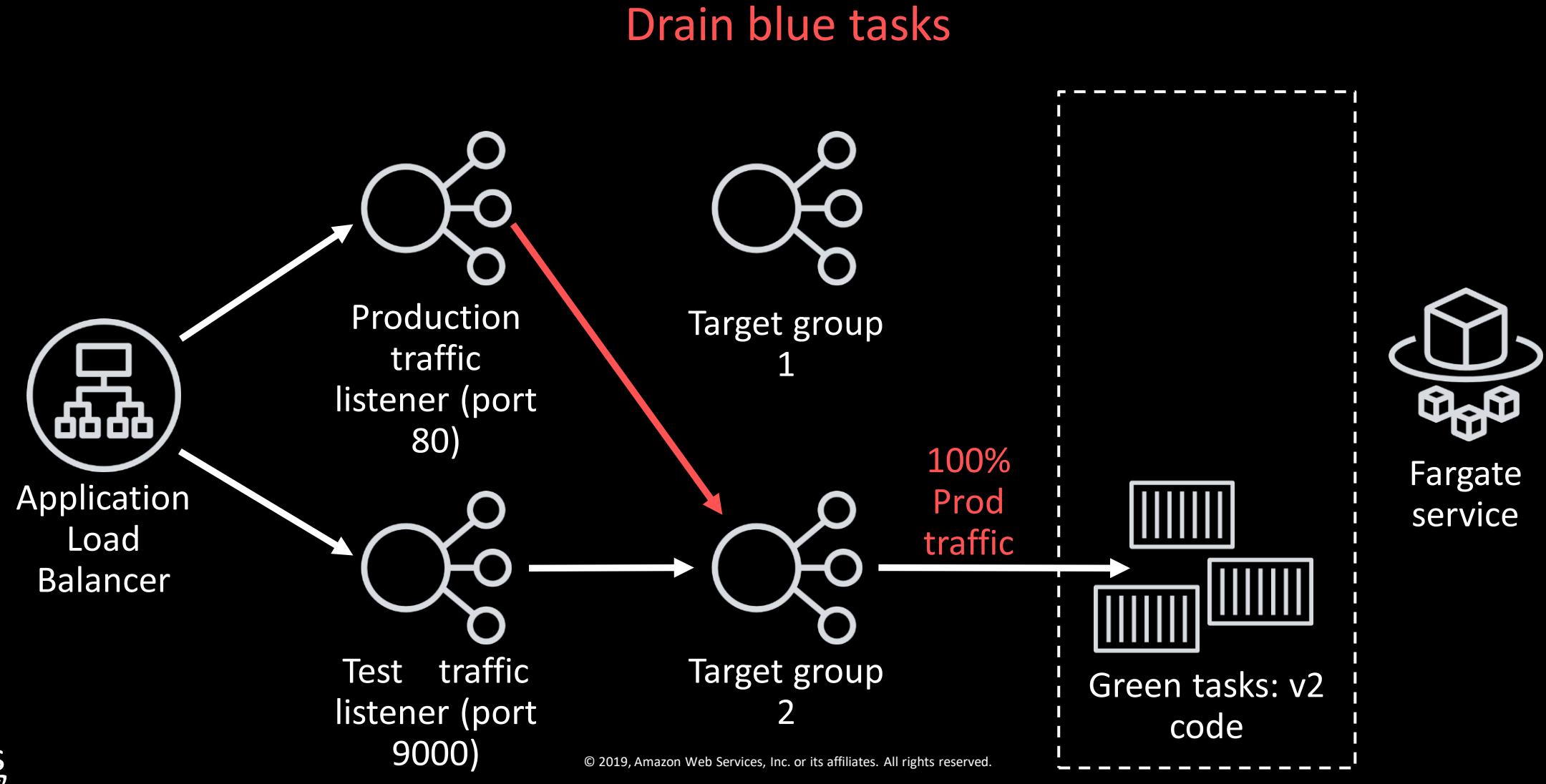


AWS CodeDeploy: ECS blue/green deployment

Flip traffic to green tasks, rollback in case of alarm



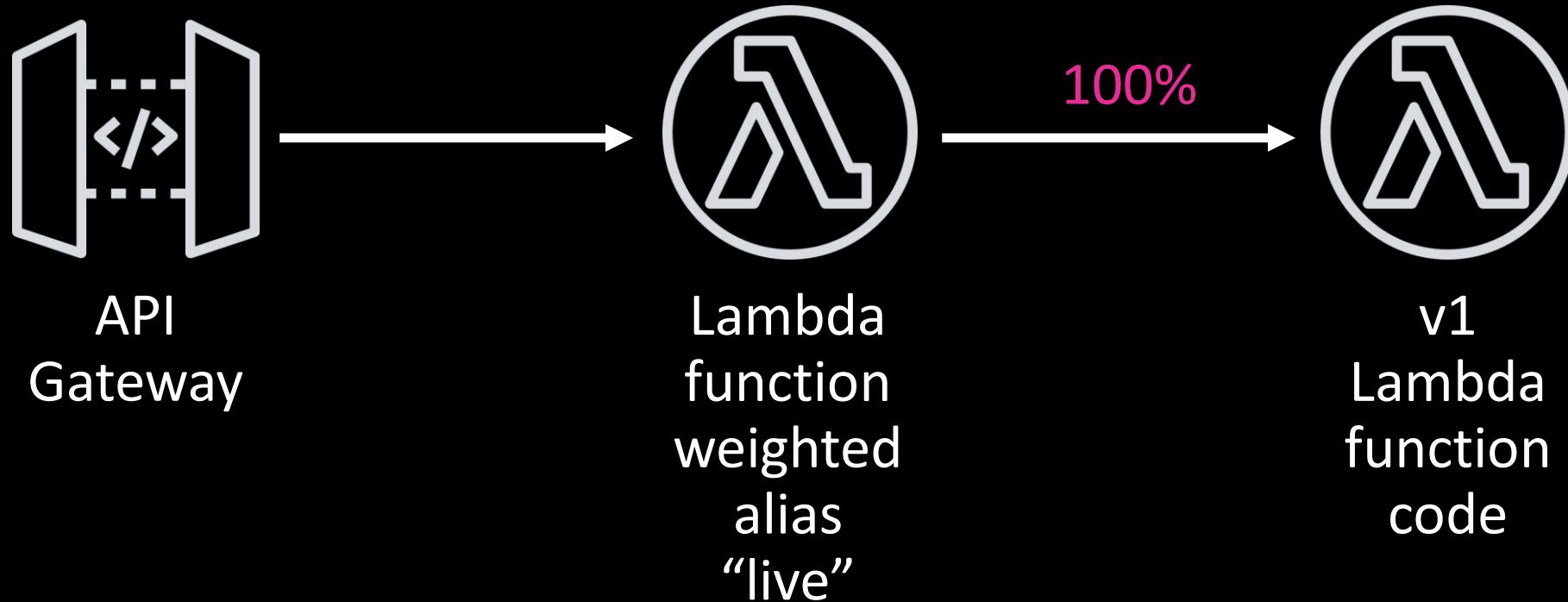
AWS CodeDeploy: ECS blue/green deployment



AWS CodeDeploy: Lambda **Canary** Deployment

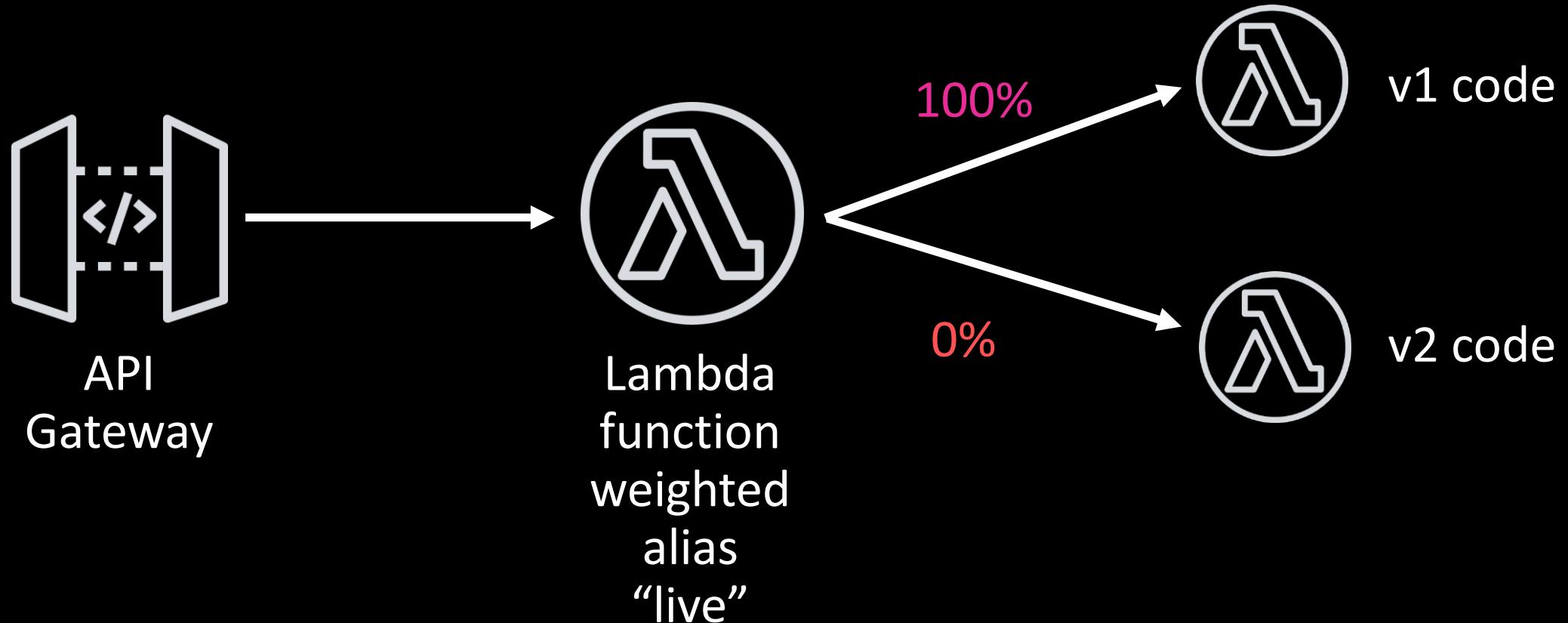
- Shifts traffic using Lambda function weighted aliases
- Choose canary (“shift 10% of traffic for 10 minutes, then shift rest”) or linear (“shift 10% more traffic every 10 minutes”)
- Validation “hooks” enable testing at each stage of the deployment
- Fast rollback in seconds if case of hook failure or CloudWatch alarms
- Monitor deployment status and history via console, API, Amazon Simple Notification Service (Amazon SNS), and CloudWatch Events

AWS CodeDeploy: Lambda canary deployment



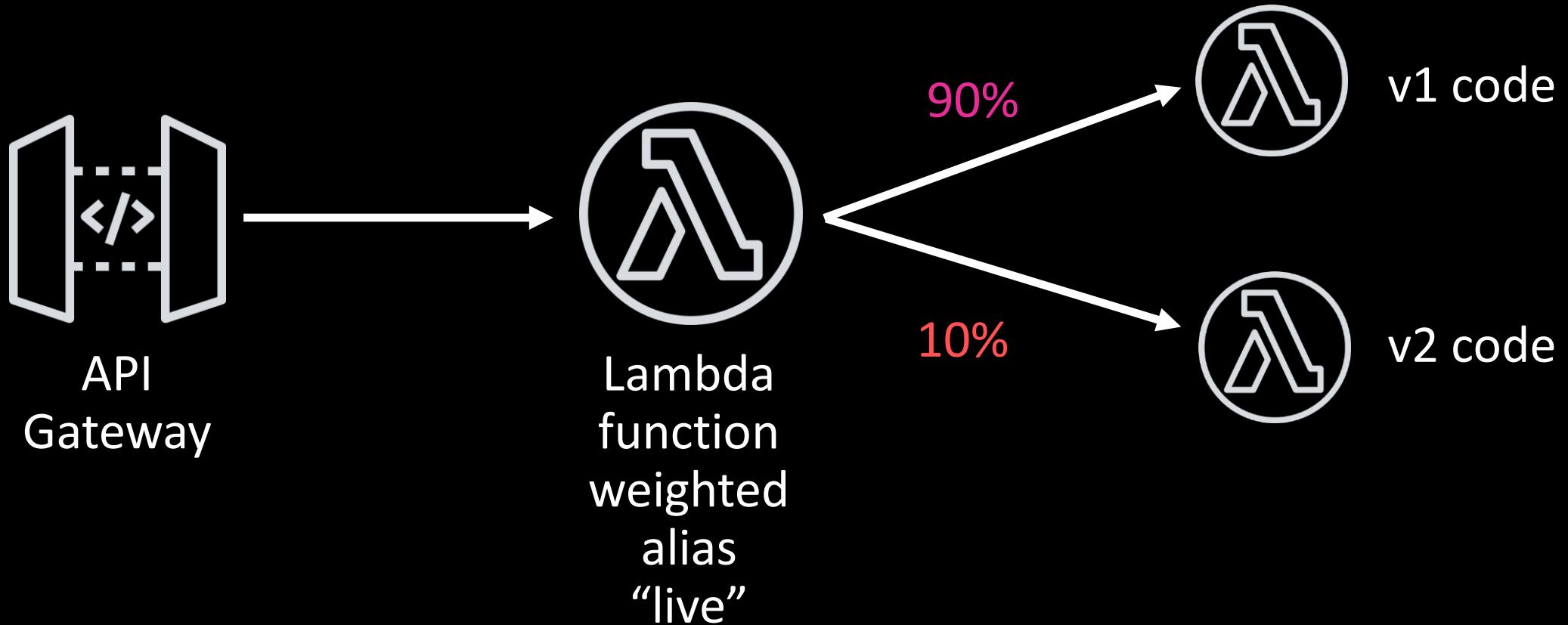
AWS CodeDeploy: Lambda canary deployment

Run hook against v2 code before it receives traffic



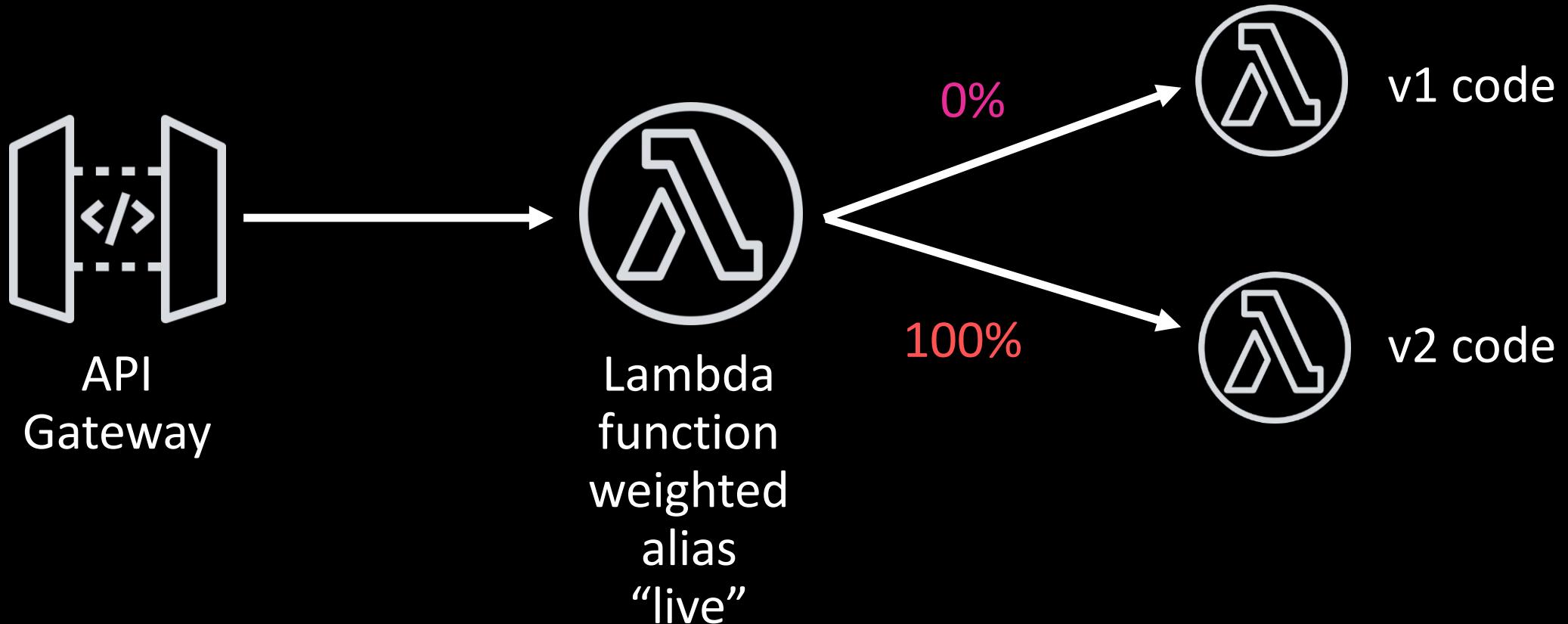
AWS CodeDeploy: Lambda canary deployment

Wait for 10 minutes, roll back in case of alarm



AWS CodeDeploy: Lambda canary deployment

Complete deployment



AWS CodePipeline

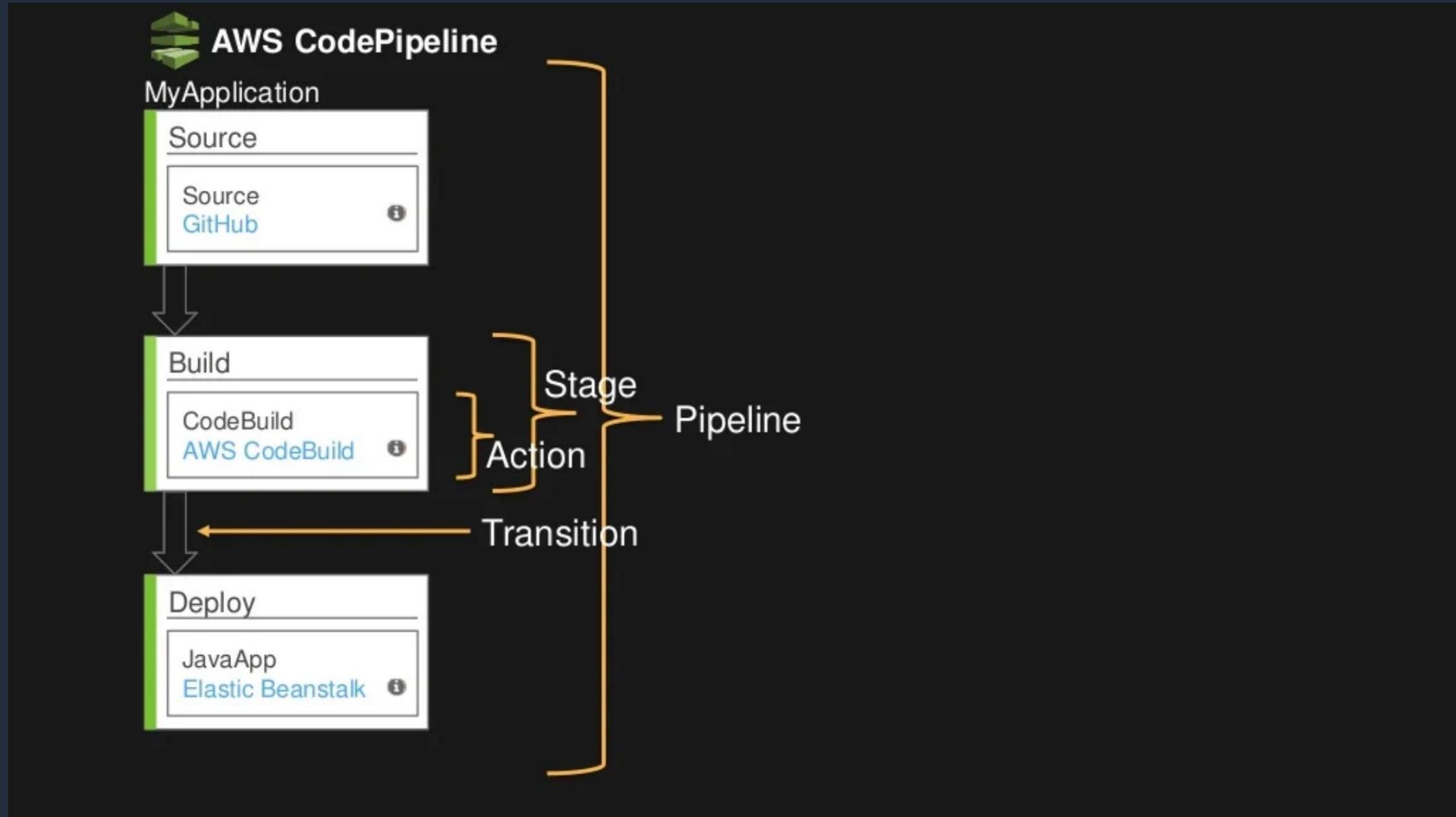


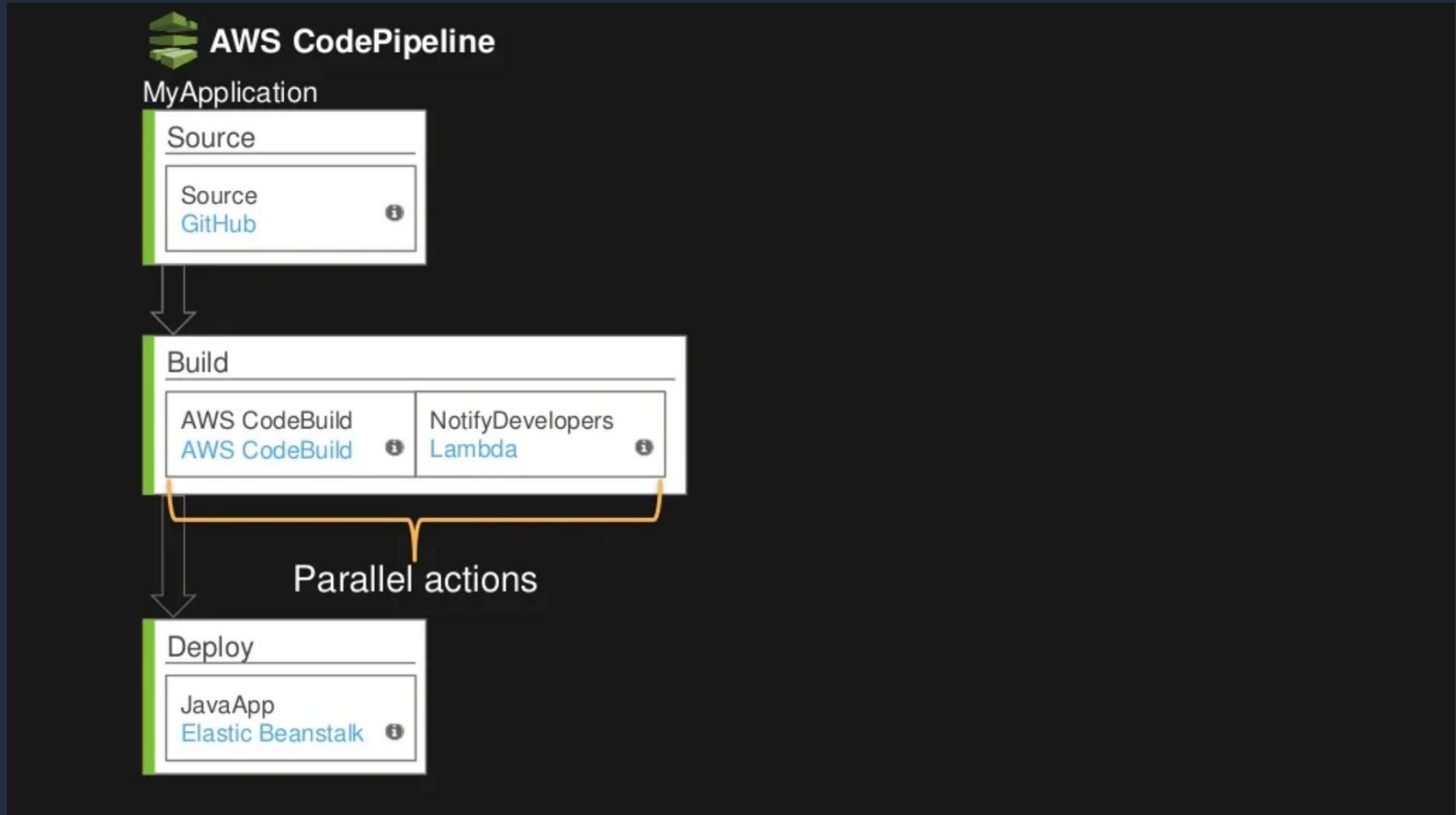
- Continuous delivery service for fast and reliable application updates
- Model and visualize your software release process
- Builds, tests, and deploys your code every time there is a code change
- Integrates with third-party tools and AWS



Orchestrating Build and Deploy with a Pipeline

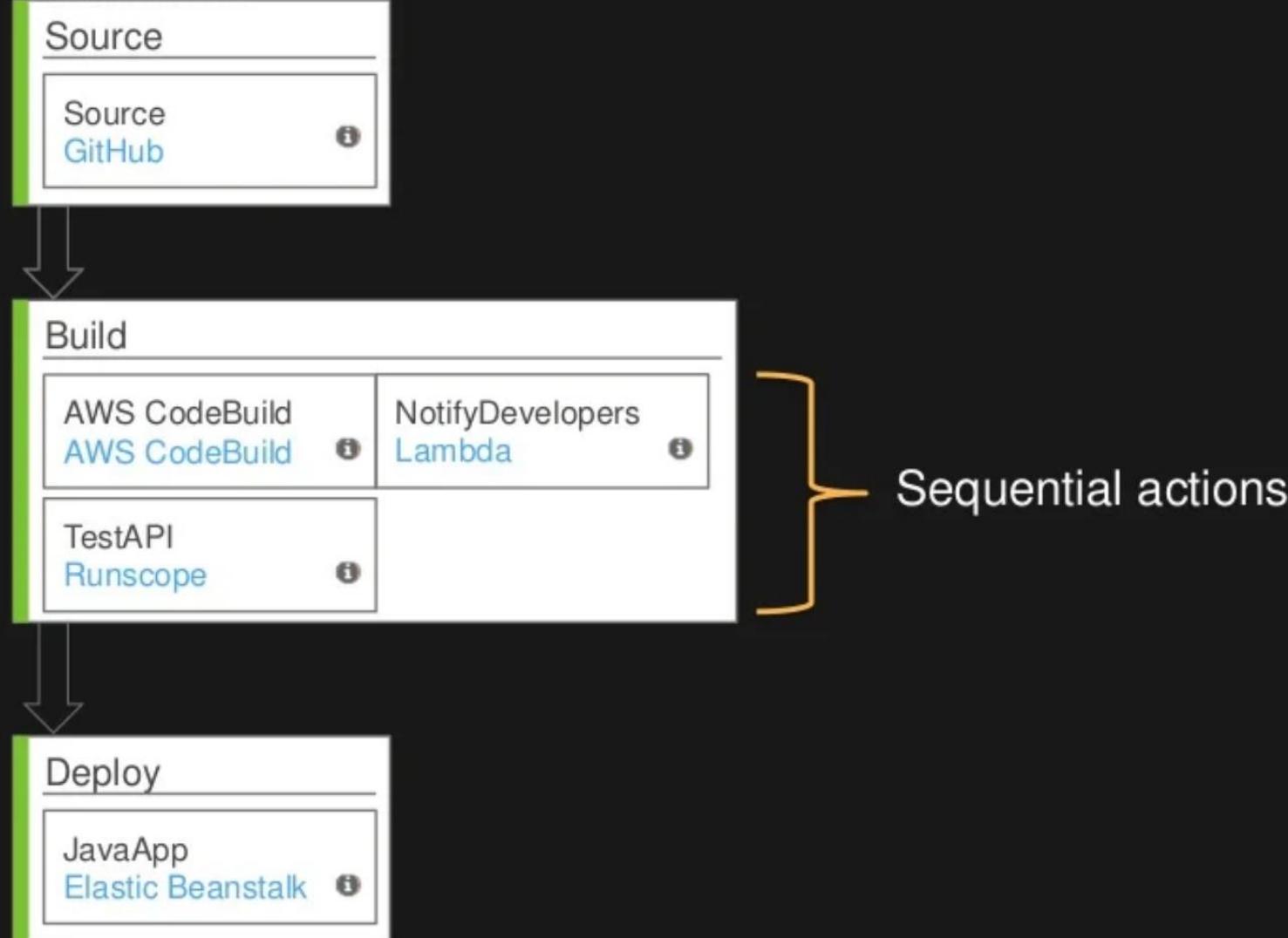
<https://www.flickr.com/photos/seattlemunicipalarchives/12504672623/>

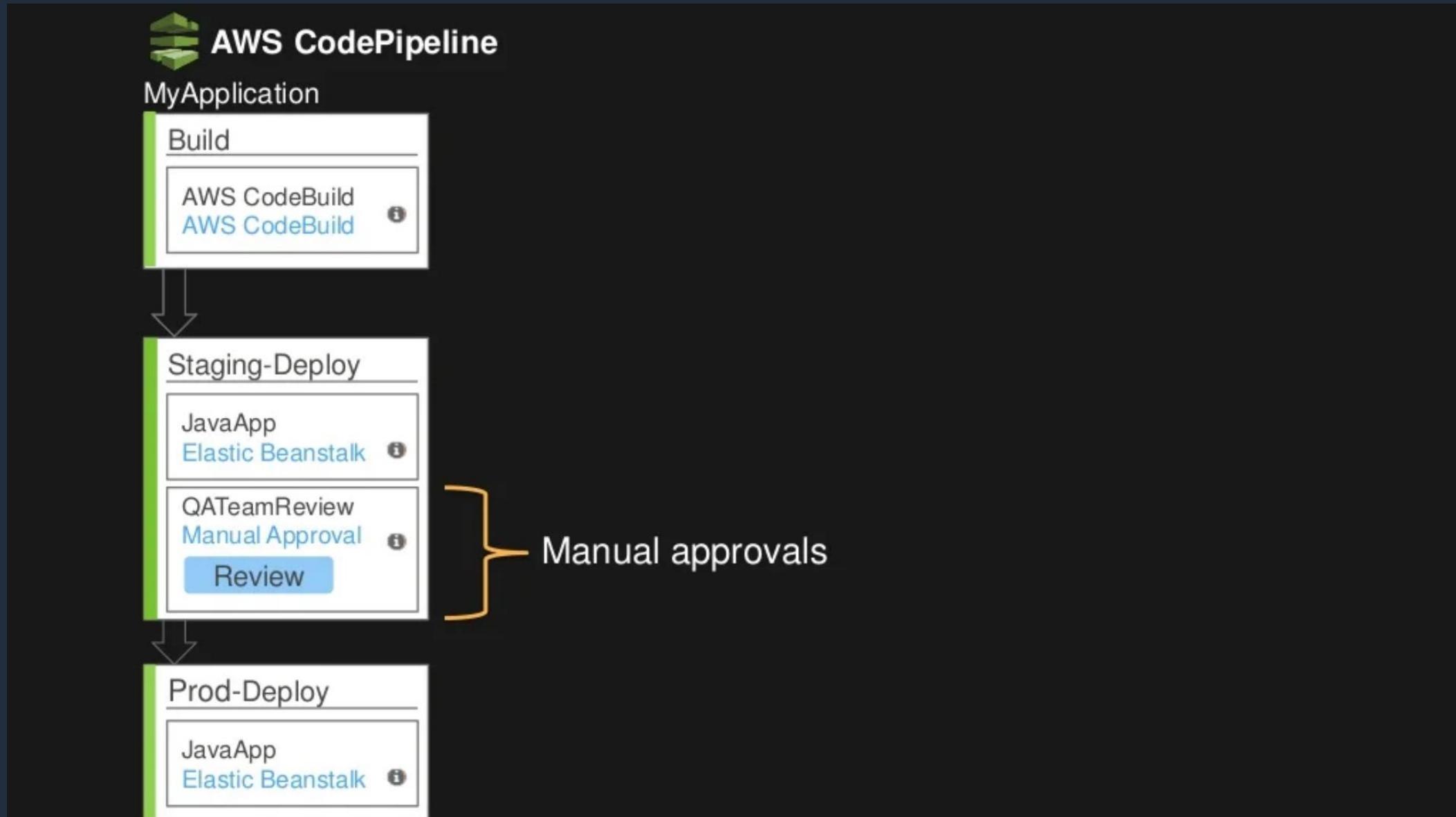






MyApplication





AWS CodePipeline: Supported sources

Automatically kick off release and pull latest source code

Pick branch

AWS CodeCommit

GitHub

Bitbucket

Pick object or folder

Amazon S3

Pick Docker tag

Amazon ECR



AWS CodePipeline: Supported deployment targets

Automatically kick off release and pull latest source code

Compute

EC2

AWS CodeDeploy

AWS Elastic Beanstalk

AWS OpsWorks Stacks

Containers

AWS CodeDeploy

Amazon ECS

Amazon ECS (Blue/Green)

Amazon ECS Fargate

Amazon EKS

Serverless

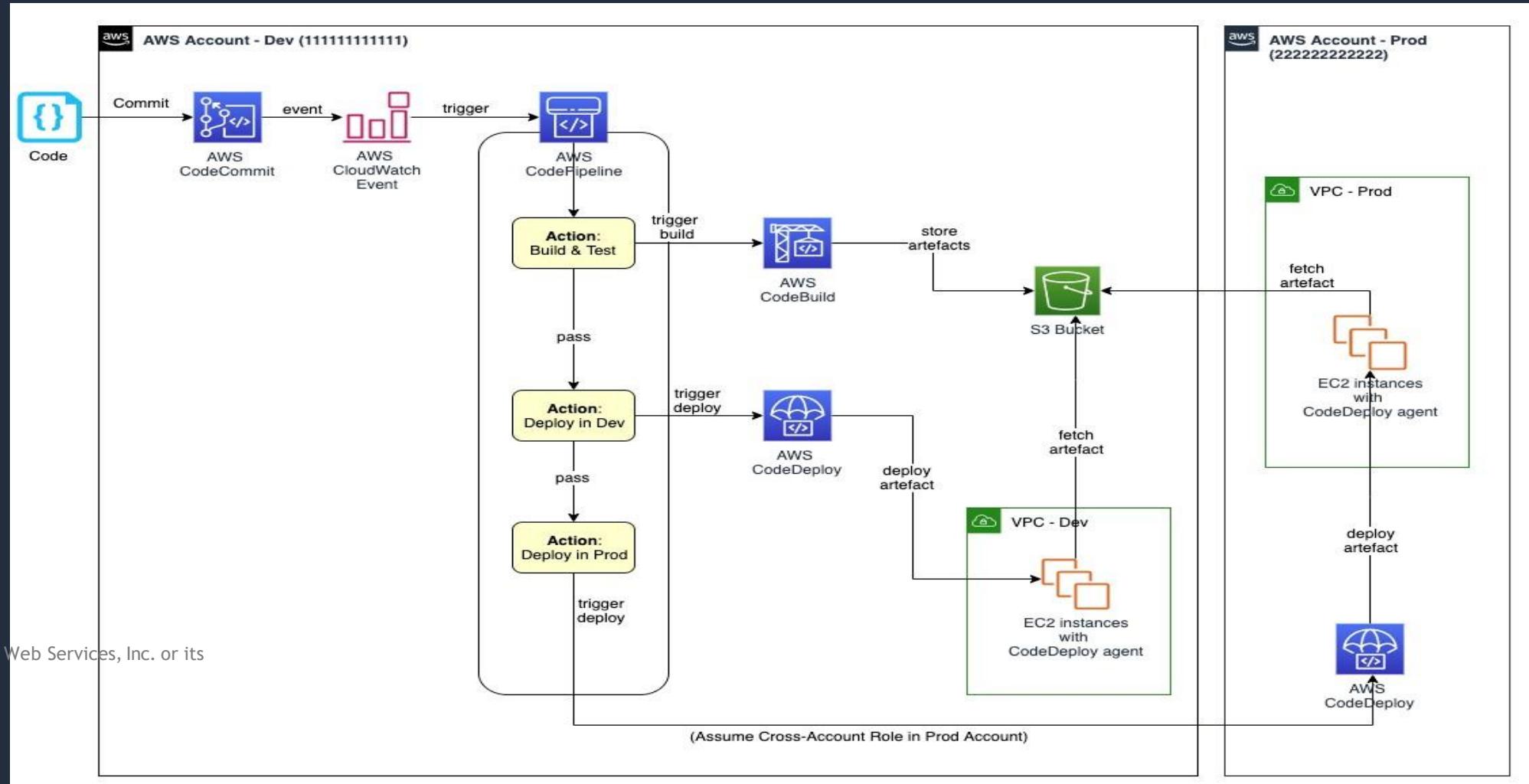
AWS CodeDeploy

CloudFormation (SAM)

Lambda



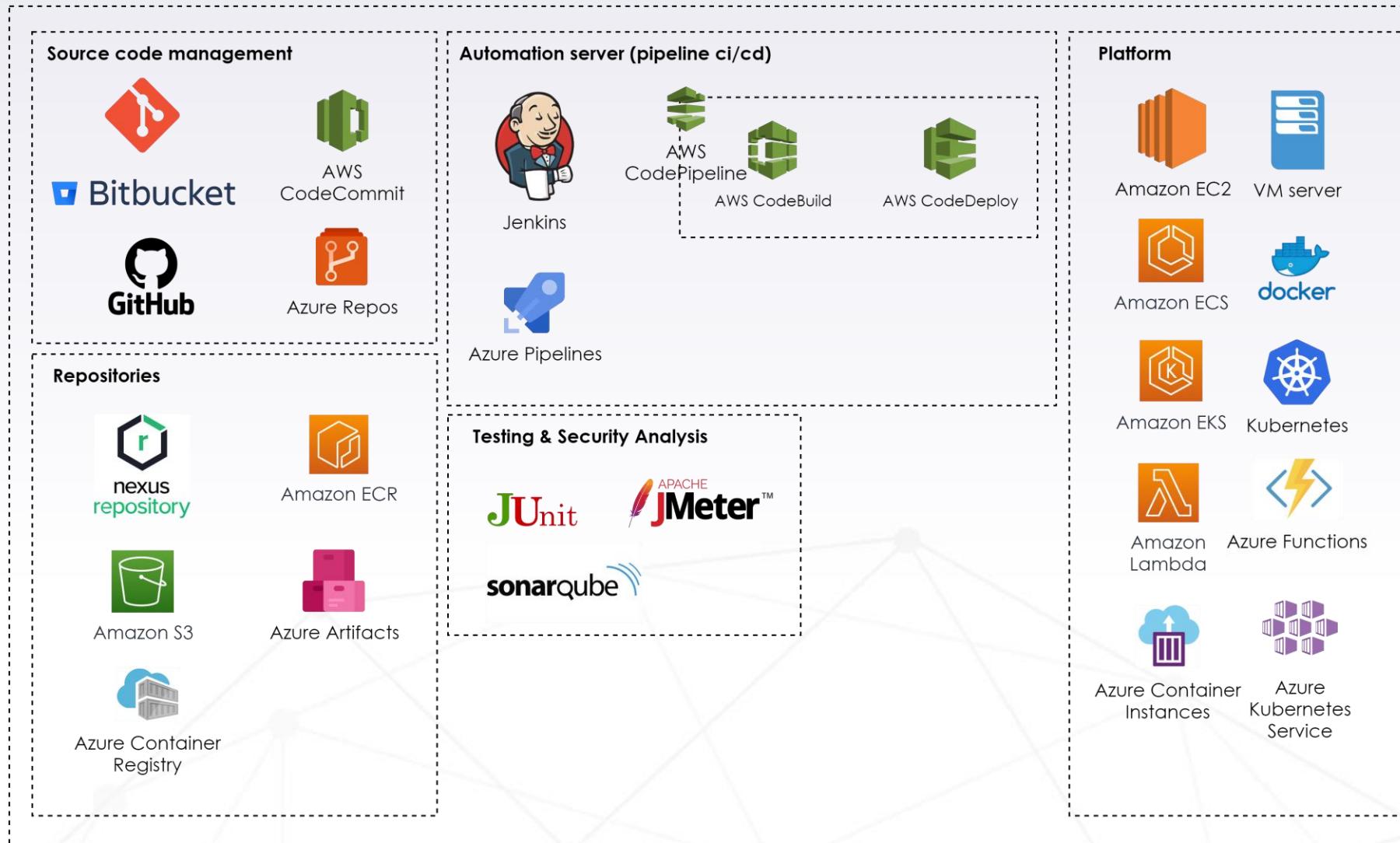
CI/CD with AWS CodeCommit, AWS CodeBuild, AWS CodeDeploy, and AWS CodePipeline



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Automation tools



Comparison Pipeline tools

Topic	Jenkins	AWS CodePipeline (codebuild, codedeploy)	Azure DevOps (Azure Pipeline)
Features			
Features	basically a set of command-line calls on the agent machines.	No need to manage server and agent nodes	Azure works on Windows, Linux, and MacOS to build, test, and deploy various applications including Node.js, Python, java, android, iOS, and many more
	enable defining multi-step build and release processes through a Groovy-based Pipeline DSL.	enable step build and deploy through a buildspec/appspec yaml file	enable step build and deploy through a azure pipeline yaml file
	Pipelines, you can create reusable deployment pipelines that are shared across multiple projects.	Compatible with AWS Services	Compatible with Azure and Microsoft
Installation & Management			
Installation & Management	Need to install and maintain a controller.	It's Software as a Service (SaaS), there's zero installation or patching required.	It's Software as a Service (SaaS), there's zero installation or patching required.
	For best performance, you'll likely want to set up two or more build agents to do the actual heavy lifting.	Serverless	Serverless
	Need someone to setup and administer it.		
Ease of Use			
Pricing	Jenkins as "flexible"	AWS CodeBuild interface is decent	User Interface friendly
	Jenkins is open source. It's free but need to pay for whatever underlying hardware or cloud services you use to host it.	Paying only for whatever capacity you use	For Basic Plan, First 5 users free, then \$6 per user per month. (Boards, Repos, Pipeline, Artifacts)



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