



DevOps on AWS

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Agenda

- Why and What of DevOps
- What is CI/CD?
- Enabling DevOps: AWS Services for CI/CD
- CI/CD in Practice: Demo

DevOps consists of culture, practices, & tools

Culture

- Dev & ops coming together
 - No more “silos”
- Shared responsibility
- Ownership
- Visibility and communication

Practices

- Microservices based architecture
- CI/CD – Continuous integration and continuous delivery
- Infrastructure as code
- Monitoring and logging

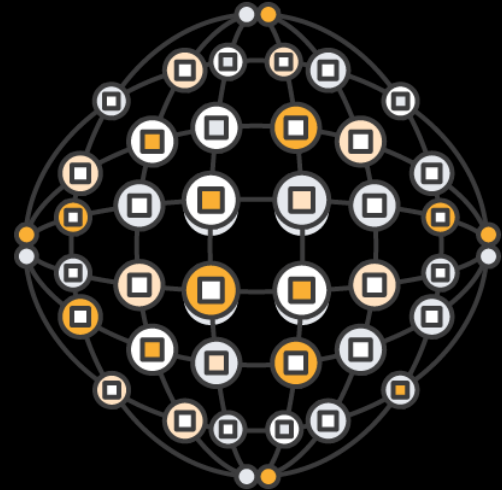
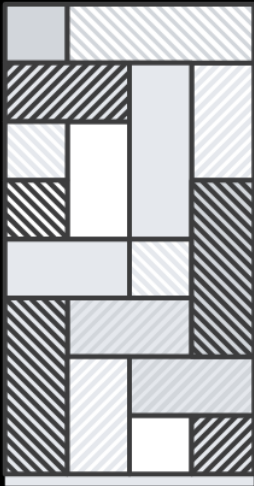
Tools

- Help you automate the major DevOps phases to support faster, smaller releases
 - Source
 - Build
 - Test
 - Deploy
 - Monitor

DevOps Practices

Microservices

Moving away from monolithic application architecture to many individual services




DevOps Practices



Infrastructure as code

AWS CloudFormation

Model your AWS resources using code

```
Parameters  Mappings  Conditions  Metadata  Outputs
template1 
┌───┐
│ 1 {
│ 2   "Parameters": {
│ 3     "KeyPairName": {
│ 4       "Description": "Public/private key pairs allow you to securely connect to your instance after it launches",
│ 5       "Type": "AWS::EC2::KeyPair::KeyName"
│ 6     },
│ 7     "ADInstanceType": {
│ 8       "Description": "Amazon EC2 instance type for the first Active Directory Instance",
│ 9       "Type": "String",
│10       "Default": "m4.xlarge",
│11       "AllowedValues": [
│12         "m4.large",
│13         "m4.xlarge",
│14         "m4.2xlarge",
│15         "m4.4xlarge"
│16       ]
│17     },
│18     "AD2InstanceType": {
│19       "Description": "Amazon EC2 instance type for the second Active Directory Instance",
│20       "Type": "String",
│21       "Default": "m4.xlarge",
│22       "AllowedValues": [
│23         "m4.large",
│24         "m4.xlarge",
│25         "m4.2xlarge",
│26         "m4.4xlarge"
│27     ]
│28   }
│29 }
```

Why does DevOps matter?

5x

Lower change
failure rate

440x

Faster from commit
to deploy

46x

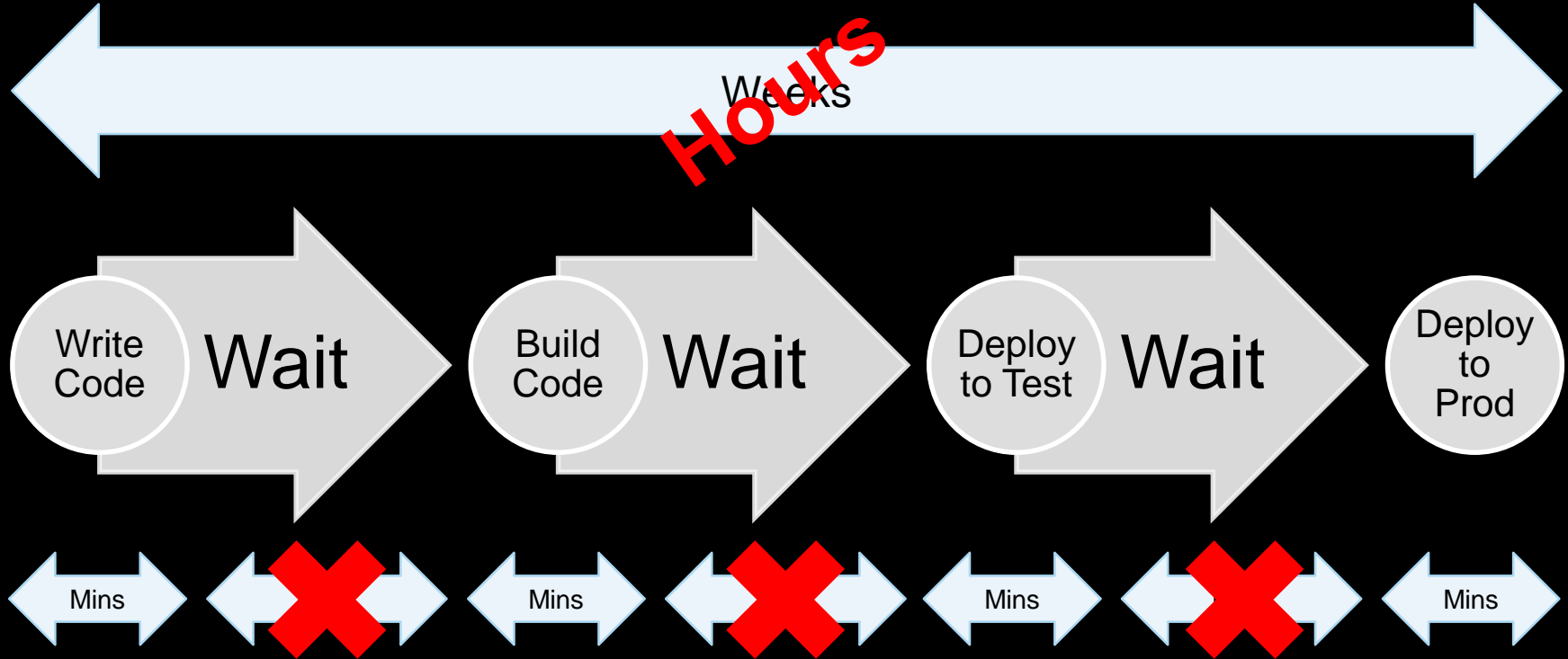
More frequent
deployments

44%

More time spent on
new features and
code

Source: Puppet 2017 State of DevOps Report

Our story: We realized we were just waiting.



The Results Were Very Positive

By 2014

- Thousands of service teams across Amazon
- Building microservices
- Practicing continuous delivery
- Many environments (staging, beta, production)

50 million deployments

CI/CD Best Practices of Amazon Developers

CI/CD is a **MUST!**

Everything is code & Everything goes into a repository

Application, Infrastructure, Documentation

Start with Continuous Delivery (“Gated” Promotion) & build up to Continuous Deployment

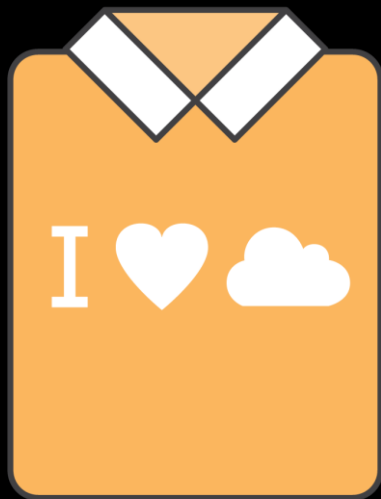
Once clear evidence of a high level of excellence in testing

Deploy small at first, then more broadly

Deploy to canaries; **TEST**

Deploy to an AZ; **TEST**

Deploy to a Region; **TEST**



What is CI/CD?

Five Major Phases of Release and Monitor



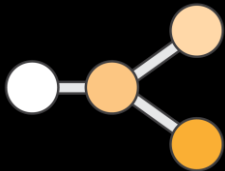
- Check-in source code such as .java files.
- Peer review new code

- Compile code
- Unit tests
- Style checkers
- Code metrics
- Create container images

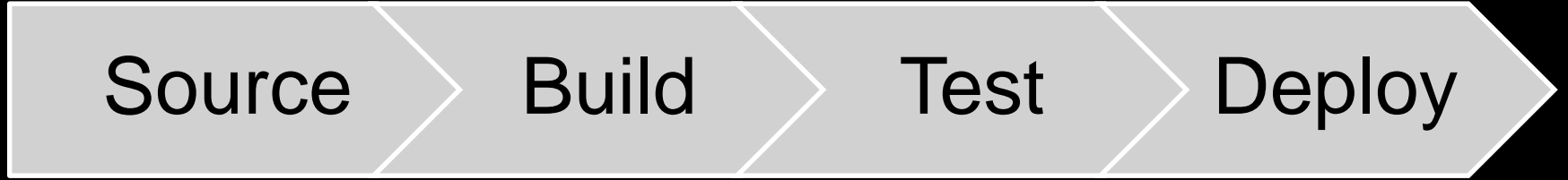
- Integration tests with other systems
- Load testing
- UI tests
- Penetration testing

- Deployment to production environments

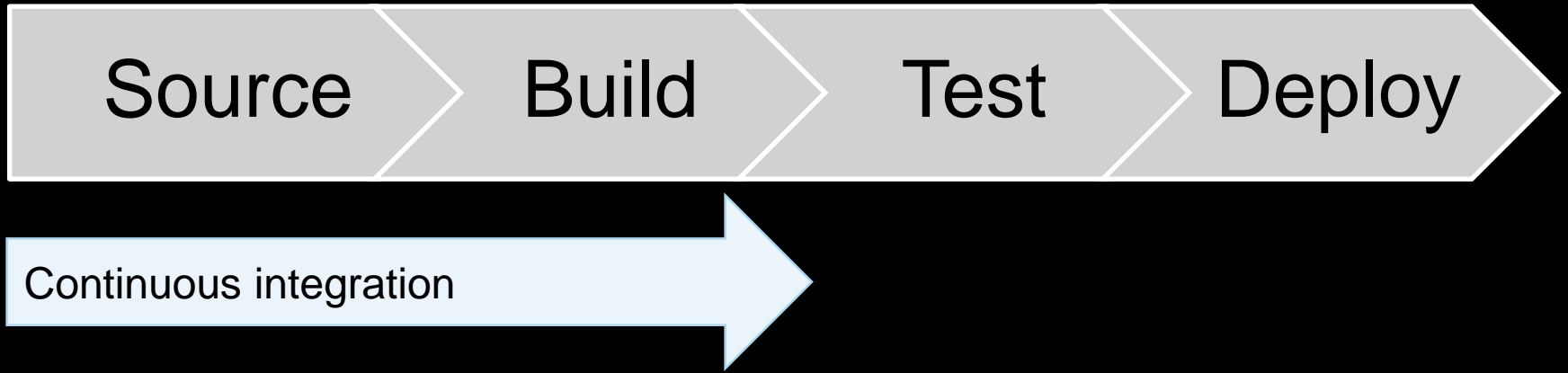
- Monitor code in production to quickly detect unusual activity or errors



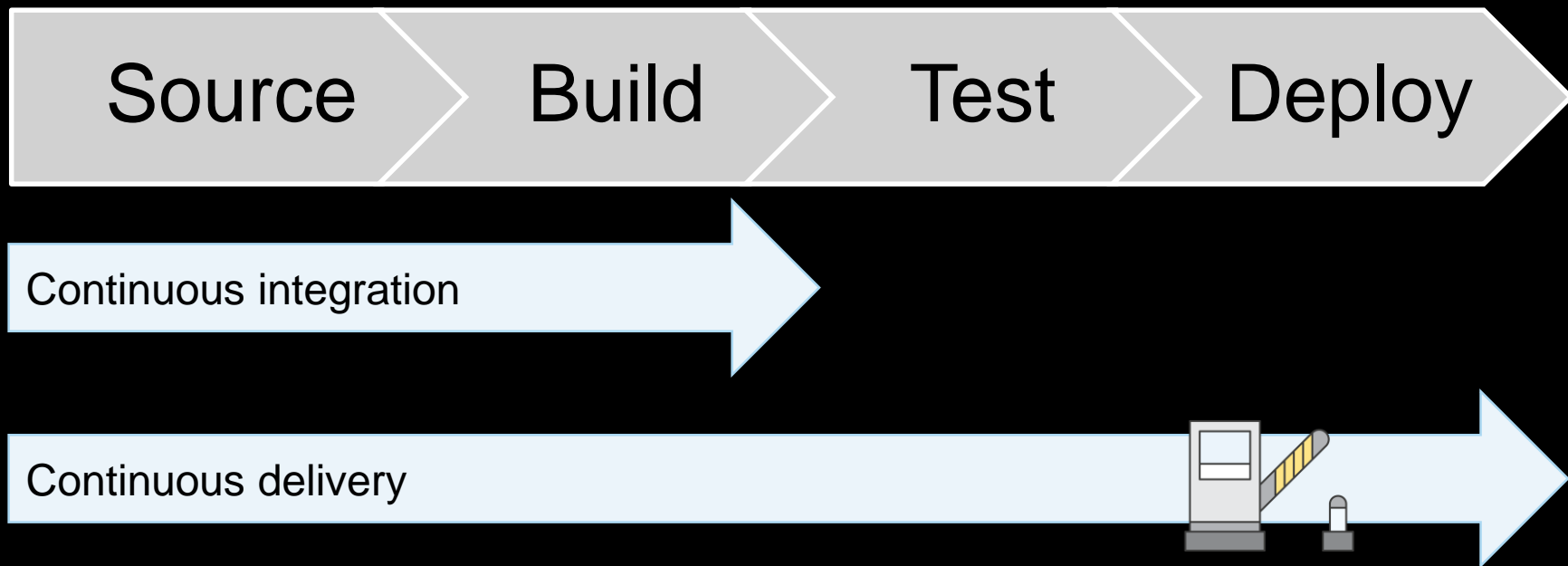
Release Process Levels



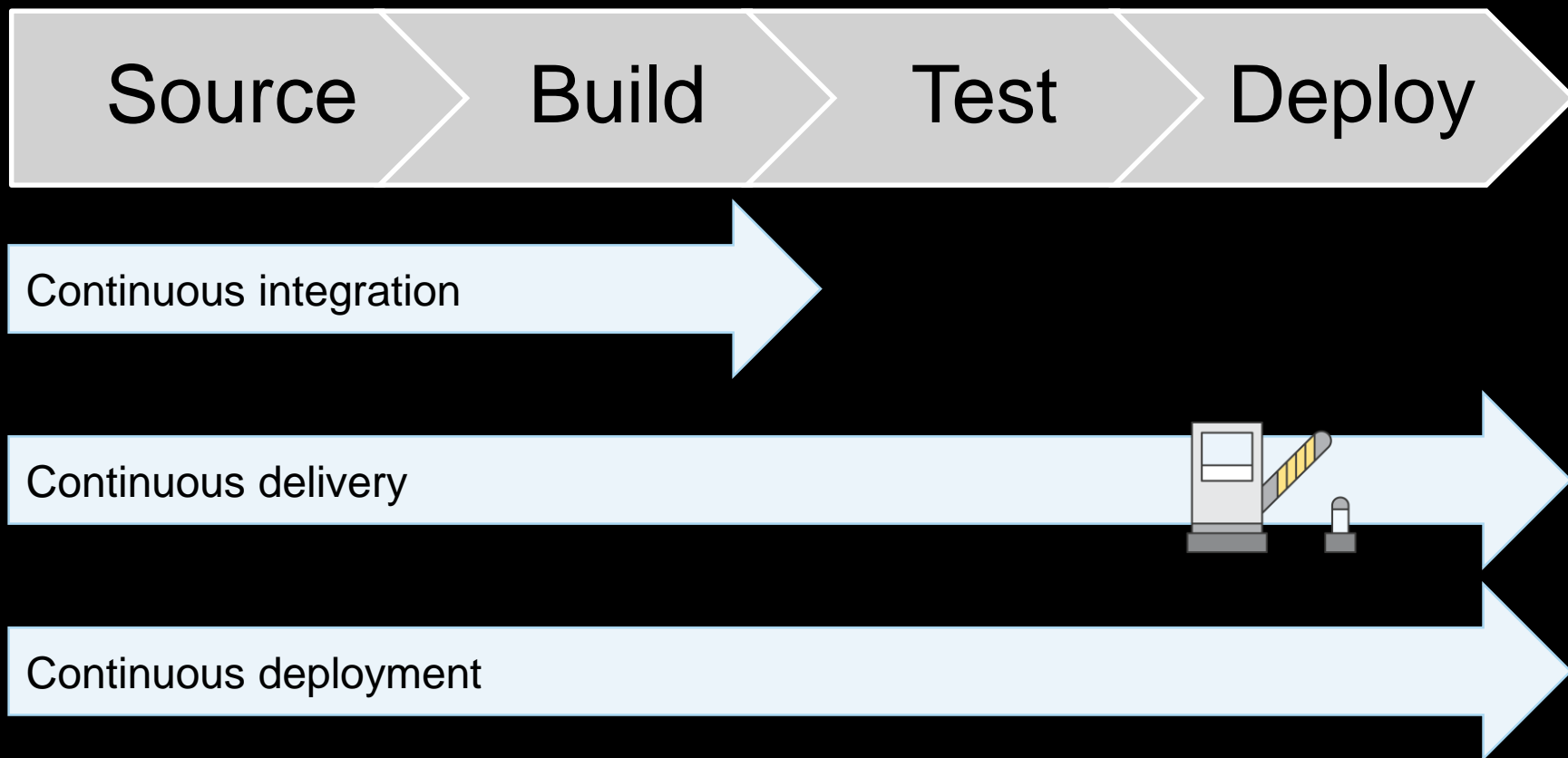
Release Process Levels



Release Process Levels



Release Process Levels



Enabling DevOps

AWS Services for CI/CD

AWS DevOps Portfolio

Enabling Release and Monitor phases

Software Development and
Continuous Delivery Toolchain



AWS CodeStar



AWS CodeCommit



AWS CodeBuild



AWS
CodeDeploy



AWS
CodePipeline

Infrastructure
as Code



AWS CloudFormation



AWS OpsWorks



AWS OpsWorks
for
Chef Automate

Monitoring
& Logging



AWS X-Ray



Amazon
CloudWatch



AWS CloudTrail



AWS Config

AWS Code Services

Enabling CI/CD and Software Development



AWS CodeStar



AWS Cloud9



AWS CodeCommit



AWS CodeBuild



AWS CodeBuild



AWS CodeDeploy



or



AWS CodePipeline

Start developing on AWS
in minutes

AWS Code Services

Enabling CI/CD and Software Release steps



AWS
CodeStar

Source

Build

Test

Deploy

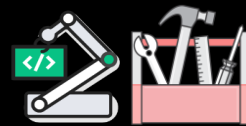
Monitor



AWS CodeCommit



AWS CodeBuild



AWS CodeBuild +
Third Party



AWS CodeDeploy



AWS X-Ray

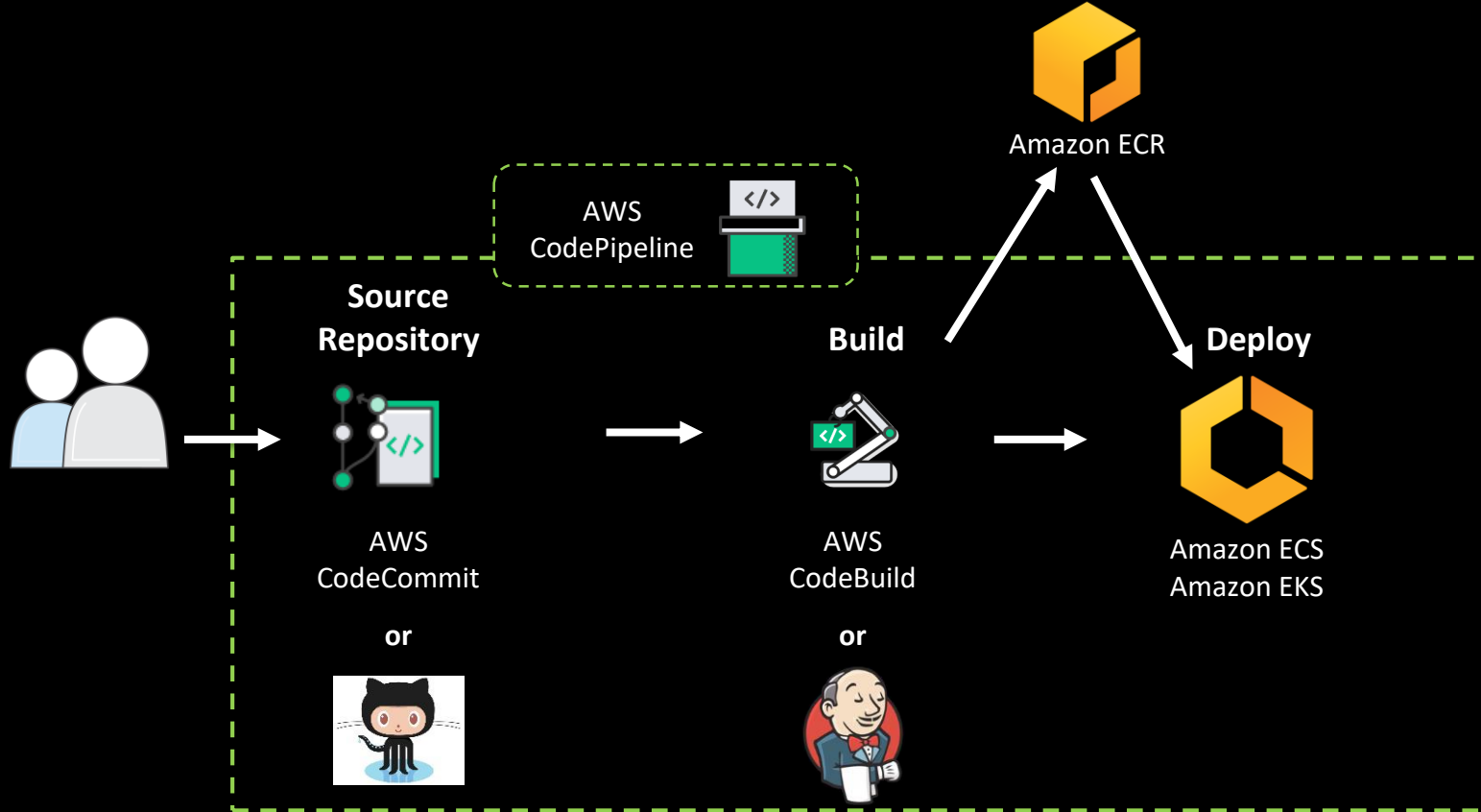


AWS CodePipeline

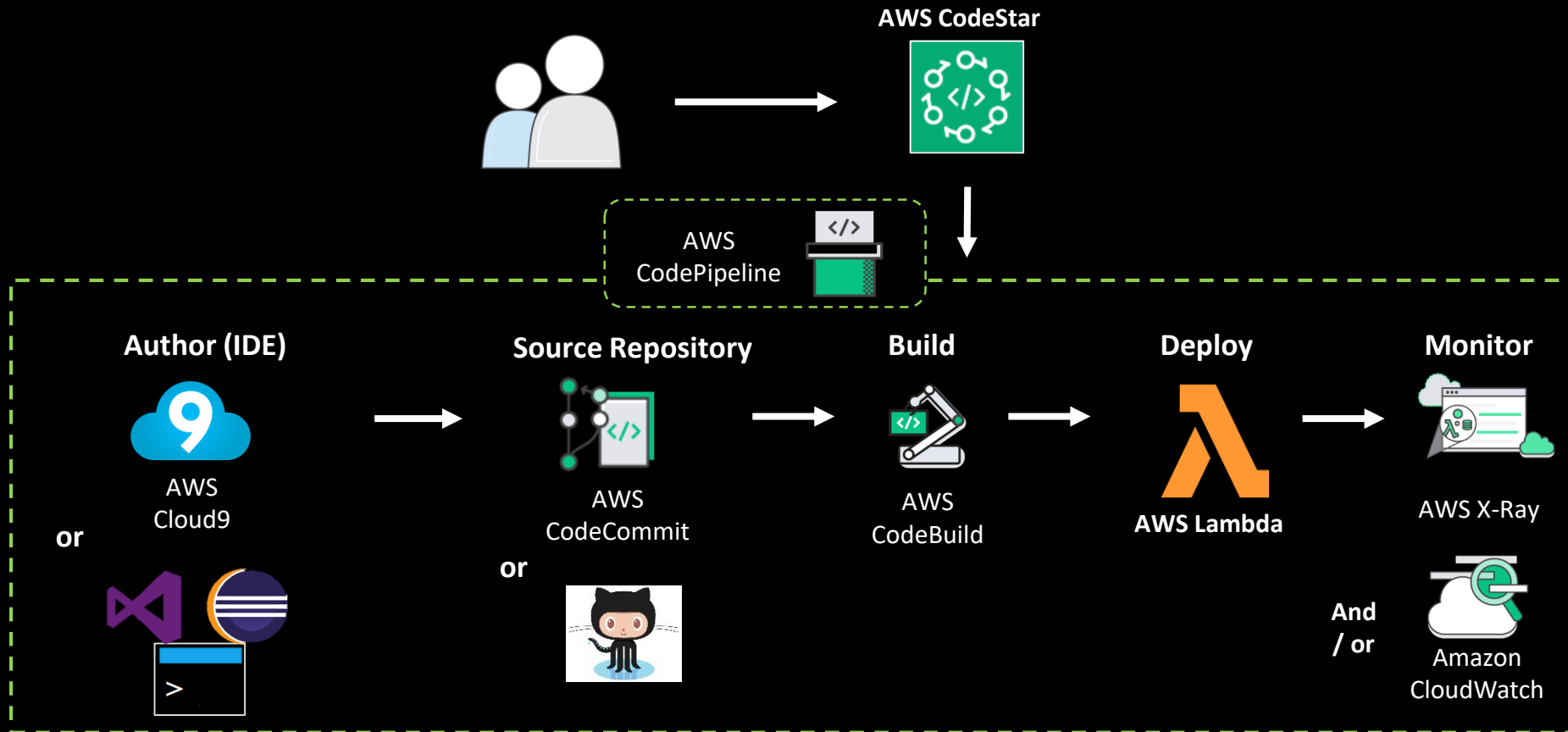


Amazon
CloudWatch

Continuous Delivery for Containers



Continuous Delivery for Serverless Applications



AWS CodeCommit



- Secure, scalable, and managed Git source control
- Use standard Git tools
- Scalability, availability, and durability of Amazon S3
- Encryption at rest with customer-specific keys
- No repo size limit
- Post commit hooks to call out to SNS/Lambda

AWS CodeBuild



- Fully managed build service that compiles source code, runs tests, and produces software packages
- Scales continuously and processes multiple builds concurrently
- You can provide custom build environments suited to your needs via Docker images
- Only pay by the minute for the compute resources you use
- Launched with AWS CodePipeline and Jenkins integration

AWS CodeDeploy



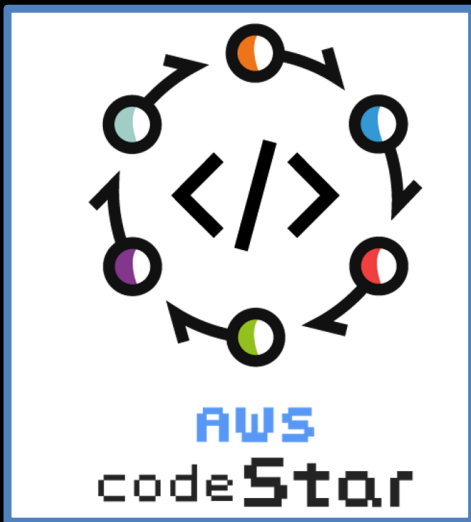
- Automates code deployments to any instance or Lambda function
- Handles the complexity of updating your applications
- Avoid downtime during application deployment
- Rollback automatically if failure detected
- Deploy to Amazon EC2, Lambda, or on-premises servers
- Integrates with third-party tools and AWS

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 CodeStar



- Quickly develop, build, and deploy applications on AWS
- Start developing on AWS in minutes
- Securely work across your team
- Manage software delivery easily
- Choose from a variety of project templates

AWS X-Ray



Debug and analyze production applications in cloud or on-premises

Visualize service graph to identify performance bottlenecks

Troubleshoot and fix performance issues

Quantify customer impact

Integration with Lambda enables you to monitor serverless applications

X-Ray SDK available in Java, .NET, Node.js, and Python

AWS Cloud9



- Cloud-based integrated development environment (IDE)
- Lets you write, run, and debug your code with just a browser
- Share your environment with your team to pair-program in real time
- Direct terminal access to AWS
- Provides great serverless experience: enables local testing and preconfigures the development environment with all SDKs, libraries, and plugins

Demo CI/CD with AWS

Summary

Learn More

- ✓ DevOps on AWS:
<http://aws.amazon.com/devops/>
- ✓ Continuous Integration with AWS:
<http://aws.amazon.com/devops/continuous-integration/>
- ✓ Continuous Delivery with AWS:
<http://aws.amazon.com/devops/continuous-delivery/>
- ✓ Get started with CI/CD in under 5 minutes:
<http://aws.amazon.com/codestar/>



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