AWS re:Invent

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Continuous integration strategies and best practices

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Agenda

- Introduction and overview
- Components and services
- Workflows
- GitOps
- Next steps
- Q&A

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Overview

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DevOps stages



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Advantages of automation

Make releases boring



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Make releases boring

- Push to production every hour/day/week
- Reduce risk
- Catch problems early
- Make small, incremental improvements



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Components and services

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AWS Cloud9

Managed IDE in browser



AWS CodeCommit

Fully managed private Git repos

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Amazon CodeGuru

Automated Code Reviews



AWS CodeBuild

Managed build servers



AWS CodeArtifact

Managed artifact repository

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AWS CodeBuild

Managed test servers



AWS Device Farm

Test on remote mobile devices and web browsers



Fault Injection Simulator

Improve resiliency and performance

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AWS CodeArtifact

Managed artifact repository



AWS CodePipeline

Automated release pipeline

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AWS CodeDeploy

Managed deployments



AWS Proton

Self-service deployment



AWS CDK

Define cloud infrastructure in code

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Amazon CloudWatch

Monitor resources and applications



AWS CloudTrail

Track user activity and API usage



Amazon EventBridge

Real-time event bus

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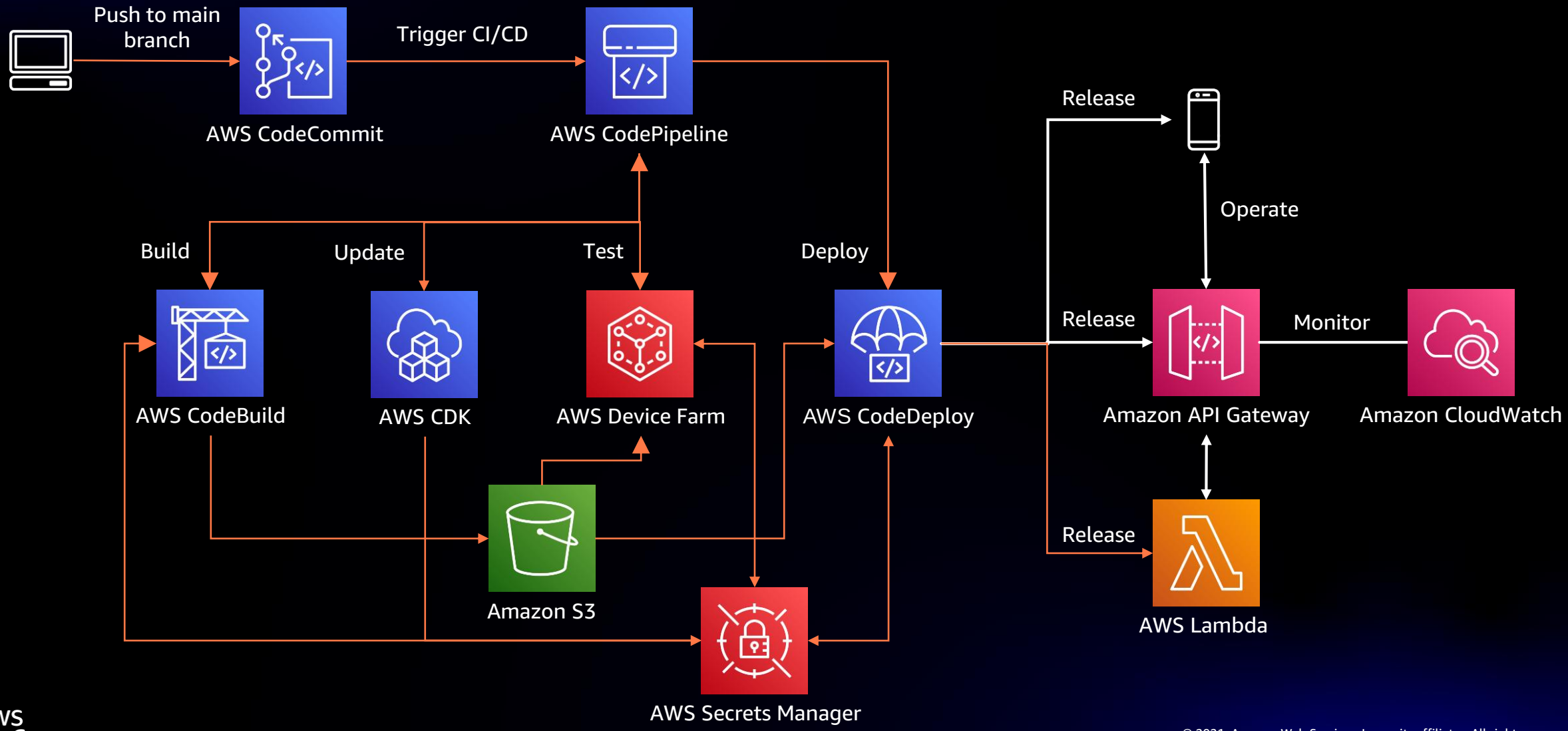
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Workflows

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Lifecycle



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Tips - 1

- Use AWS CDK to automate infrastructure as code
- Use Secrets Manager to store secure configs
- Use CloudWatch alarms to monitor health of system



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Tips - 2

- Break build process into discrete, easy-to-test steps
- Use CodeDeploy to monitor deployment and rollback to reduce blast radius
- Integrate security scans in pipelines



Make releases boring

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GitOps

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What is GitOps

GitOps is an approach where infrastructure is defined as code (IaC) alongside application code, versioned in a git repository, and then provisioned following the same merge request process as application software code

Infrastructure as code
hosted just like software code

+

Git
versioning and pull requests workflows

+

CI/CD
for automated build, test, and deploy

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GitOps principles

YAML



Kubernetes

flux

Declarative desired state

Immutable desired state version

Operations through declaration

Continuous state reconciliation

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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

Drift solutions

- AWS CloudFormation
- AWS Config
- Amazon CloudTrail

AWS Partner solutions

Pulimi

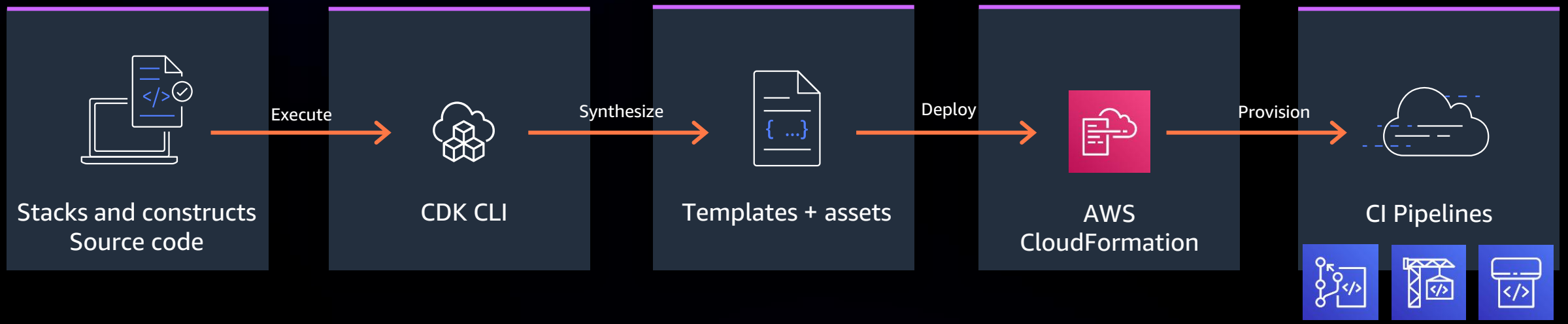
TravisCI

flux

argo

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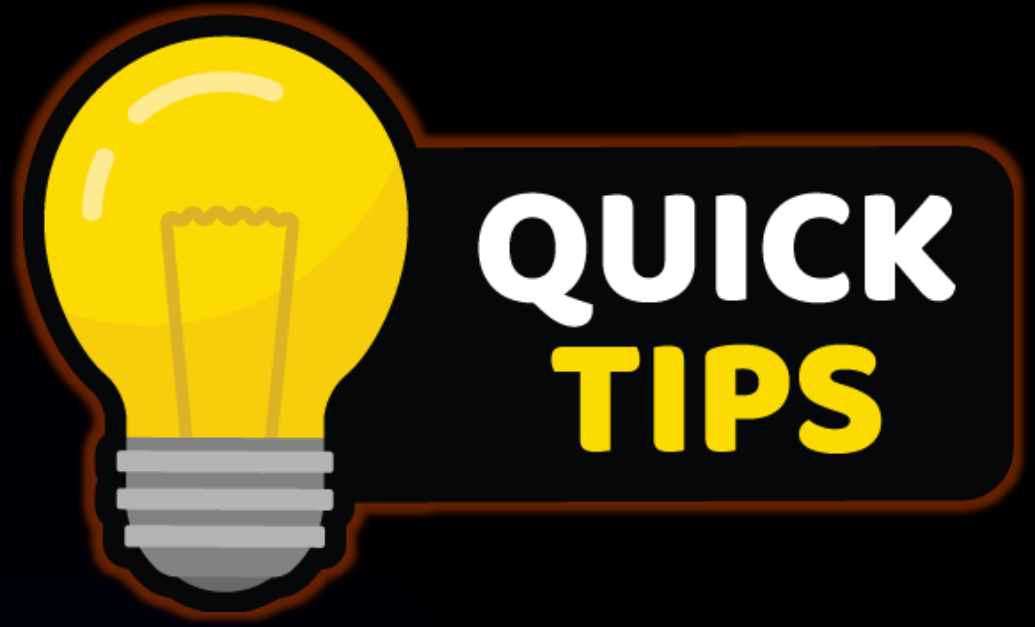
Use CDK to build CI pipelines



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Tips - 1

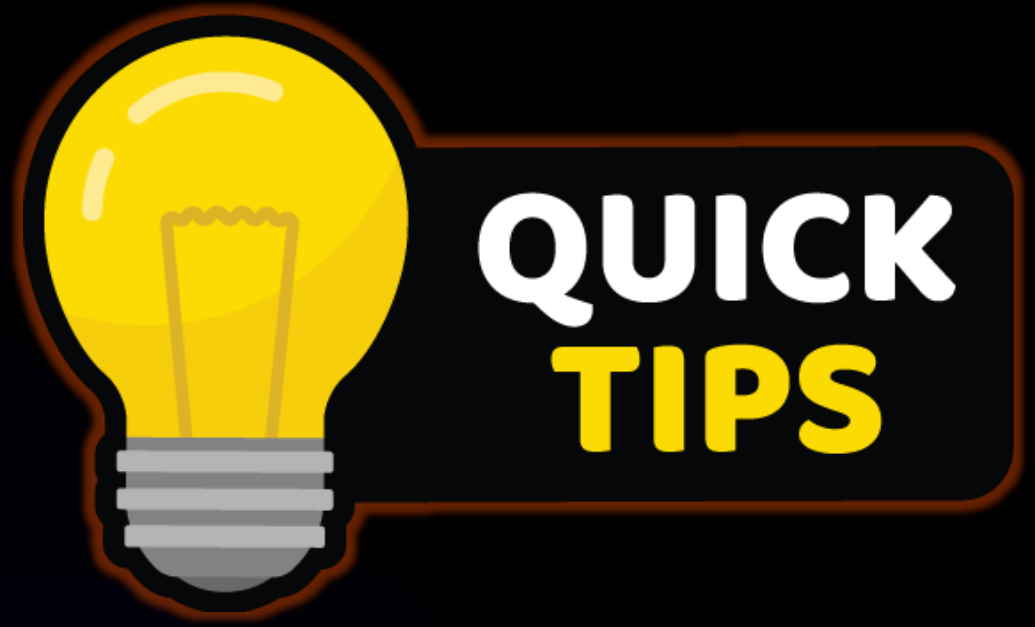
- Verify resource limits when launching new pipeline stacks
- Be mindful of infrastructure deployment time
- Discover docker images on Amazon ECR Public Gallery
- Build a pipeline to deploy your pipelines



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Tips - 2

- Adopt a build promotion strategy
- Use notifications to improve visibility
- Plan a Git repository layout
- Build custom dashboards to track key metrics
- Turn your pipelines into a service



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Next steps

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References

- AWS DevOps Blogs: https://aws.amazon.com/blogs/devops/tag/ci-cd/
- Complete CI/CD with AWS CodeCommit, AWS CodeBuild, AWS CodeDeploy, and AWS CodePipeline: https://aws.amazon.com/blogs/devops/complete-ci-cd-with-aws-codecommit-aws-codebuild-aws-codedeploy-and-aws-codepipeline/
- CI/CD for serverless applications, now with container image support: https://www.youtube.com/watch?v=JKmzqozp4ys
- Practicing Continuous Integration and Continuous Delivery on AWS: https://docs.aws.amazon.com/whitepapers/latest/practicing-continuous-integration-continuous-delivery/welcome.html
- Getting Started with GitOps: https://www.youtube.com/watch?v=1gczrnUYZ_8
- CDK Pipelines: Continuous delivery for AWS CDK applications: https://aws.amazon.com/blogs/developer/cdk-pipelines-continuous-delivery-for-aws-cdk-applications/

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Thank you!

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