AWS SUMMIT ONLINE



B U I O 8

Kubernetes GitOps on AWS

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Has any of this happened to you?



The deployment just failed

But it worked on my machine / in the X environment!



All of the sudden there's a problem...

Did anyone just change anything? Who? When? What?

Development





Operations, Network, DBAs, etc.

All of the sudden there's a problem...

We've lost the server(s)/environment!?! We have documentation on how to rebuild it right?







Things just seem generally



What is GitOps?



Modern software development

Traditionally there have been three key activities/systems in managing change







Changes to the code

Building and testing the application

Deploying the new version

CI/CD

Automating that on success is called Continuous Integration / Continuous Deployment (CI/CD)



Changes to the code

Building and testing the application

Deploying the new version

Application code vs. infrastructure

We used to have bespoke and long-lived hardware that we deployed the code to





VS.

Application code

Infrastructure



Application code vs. infrastructure

But with the cloud we don't need to worry about hardware and can ask for things as 'code'



Application code

Infrastructure



Can we apply git-driven CI/CD processes to infrastructure code?



Changes to the infrastructure code are merged

CodePipeline or Flux notices the changes to CloudFormation or PodSpec

The changes are deployed to AWS or Kubernetes

What is Flux?



What is the AWS Cloud Development Kit (AWS CDK)

The big picture - from AWS CDK app to CloudFormation to provisioned infrastructure



"compiler"

"source"

"assembly language"

CloudFormation

"processor"

What is GitOps?

Control via PRs & environment branches (merge to them and it'll deploy there on successful tests)



Production

Integration

Developer X's personal

What is GitOps?

Control via PRs & environment branches (merge to them and it'll deploy there on successful tests)



Production

Integration

Developer X's personal

Main trunk

Why GitOps?



Git is the tool that developers are already using Instead of dev and ops using separate tools/workflows GitOps helps them play nicely together

Management

Devs App code git

Ops Infra code

Git is a great source of truth

It keeps track of the full history of changes serving as a great auditing and reporting tool





Who

What

When

12

2

3

Why

ToDo Progress Testing

Stories





Git is a great source of truth

It keeps track of the full history of changes serving as a great auditing and reporting tool



Enforced peer review (via pull request) of every change!

Git is a great place to control change

It is easier to control change if you force it all through one entry point to one pipeline



Git can help with rollbacks

Because you have the full change history you can just re-deploy older commits to the trunk*



*some architecture/thought needs to go into things to allow for this re: DB schema change etc.

Production

Integration

Developer X's personal

Main trunk

Cloud vs. Kubernetes management





CDK/CloudFormation vs. Kubernetes Operators

It's a spectrum!



Everything on Cluster fully via Operators

Demo





Our Demo app is Ghost

Ghost is a good example as it is both opensource and distributed as a 12-factor Docker image.

It is stateless (storing all its state in a MySQL database) and gets its environment settings from environment variables at runtime.

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Let's Encrypt

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Slack

Nuxt

Fiercely independent, professional publishing

Ghost is the most popular open source, headless Node.js CMS which already works with all the tools you know and love.

*

Zapier

Discourse

Unsplash

Mailchim

Gatsby

Analytics

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https://github.com/jasonumiker/k8s-plus-aws-gitops





In closing

Go back to the office and try GitOps so that:

- Your app works in every environment
- Your developers and operations play nice together with the same tool
- You know the who, what, when, why (and who approved) of every change
- You are in control of your environments and changes to them
- You can roll back to a known, and self-documenting, earlier state

GO BUILD!

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Thank you!



