Elevator Pitch

Are you using kubectl to deploy your app changes to Kubernetes? If so, that's exactly like doing a right-click publish. Let's take a look at a few options to enable the CD in CI/CD so you can automate the deployment process to your clusters. We'll look at Argo CD, Flux CD, and GitHub Actions.

Description

"Friends don't let friends right-click publish", which may be right for deploying an app to a Web server but what if your app is containerized and runs on Kubernetes? Are you using kubectl to deploy the changes? If so, that's exactly like doing a right-click publish. Let's take a look at a few options to enable the CD in CI/CD so you can automate the deployment process to your clusters. We'll look at Argo CD, Flux CD, and GitHub Actions.

Friends don't let friends kubectl apply

Continuous Delivery to Kubernetes

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Agenda

- The problems with manual deployments
- DevOps principles
- GitOps principles
- Tools overview
  - GitHub Actions
  - ArgoCD
  - FluxCD
    - AKS GitOps

Who am I?

- Guy Barrette
- Dev/Coach/Trainer
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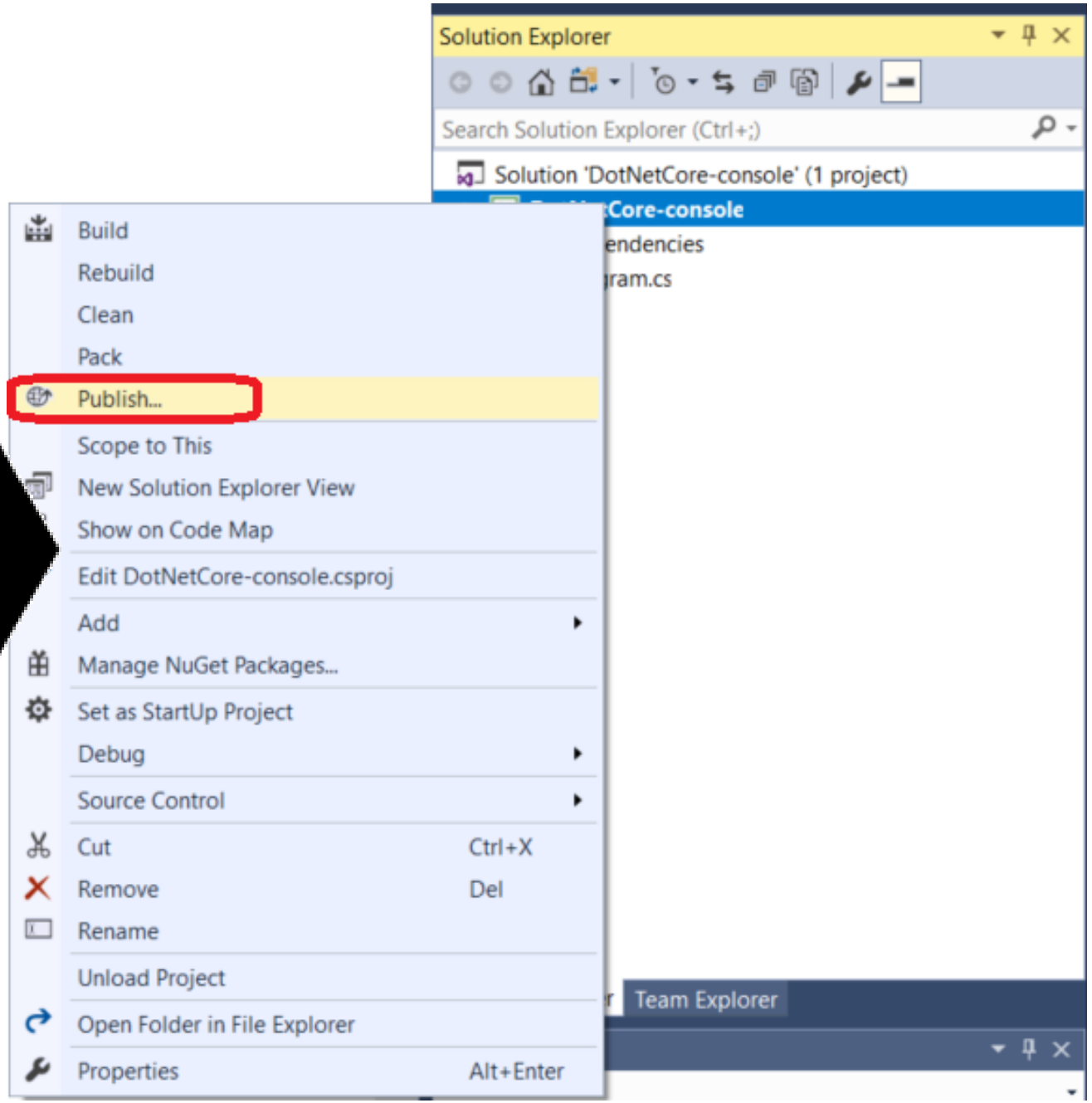
- @GuyBarrette
- linkedin.com/in/guybarrette
- guybarrette.com

Right-Click Publish

https://damianbrady.com.au/2018/02/01/friends-dont-let-friends-right-click-publish/



Maybe...

- You have something installed on your machine that's not in production.
- You didn't merge *all* the changes people made.
- You merged successfully but forgot to run tests.
- You did run the tests, and they work fine on your machine, but not in production.
- There are untested bugs that don't show up until the app is on a server.
- etc

YouTube CA

Search

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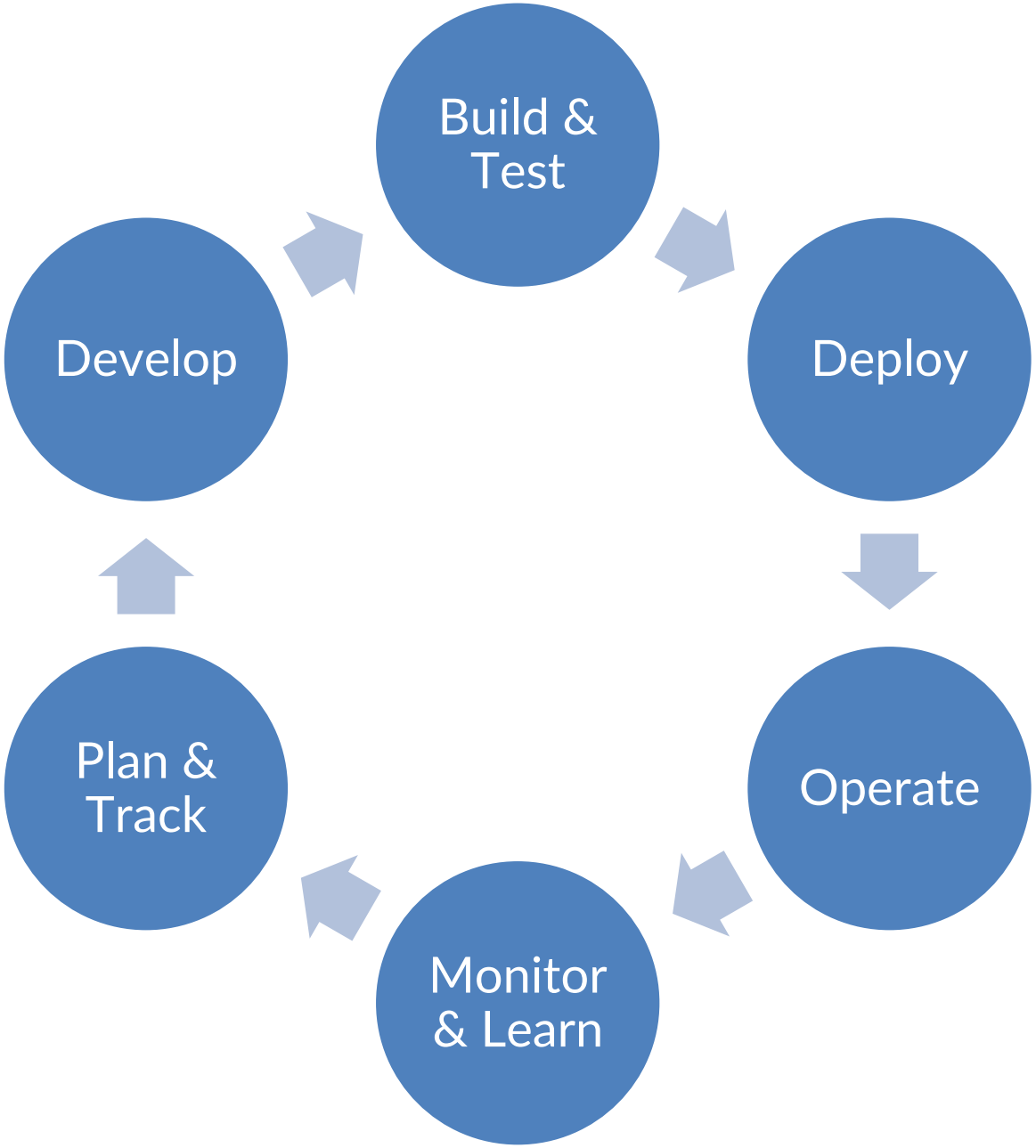
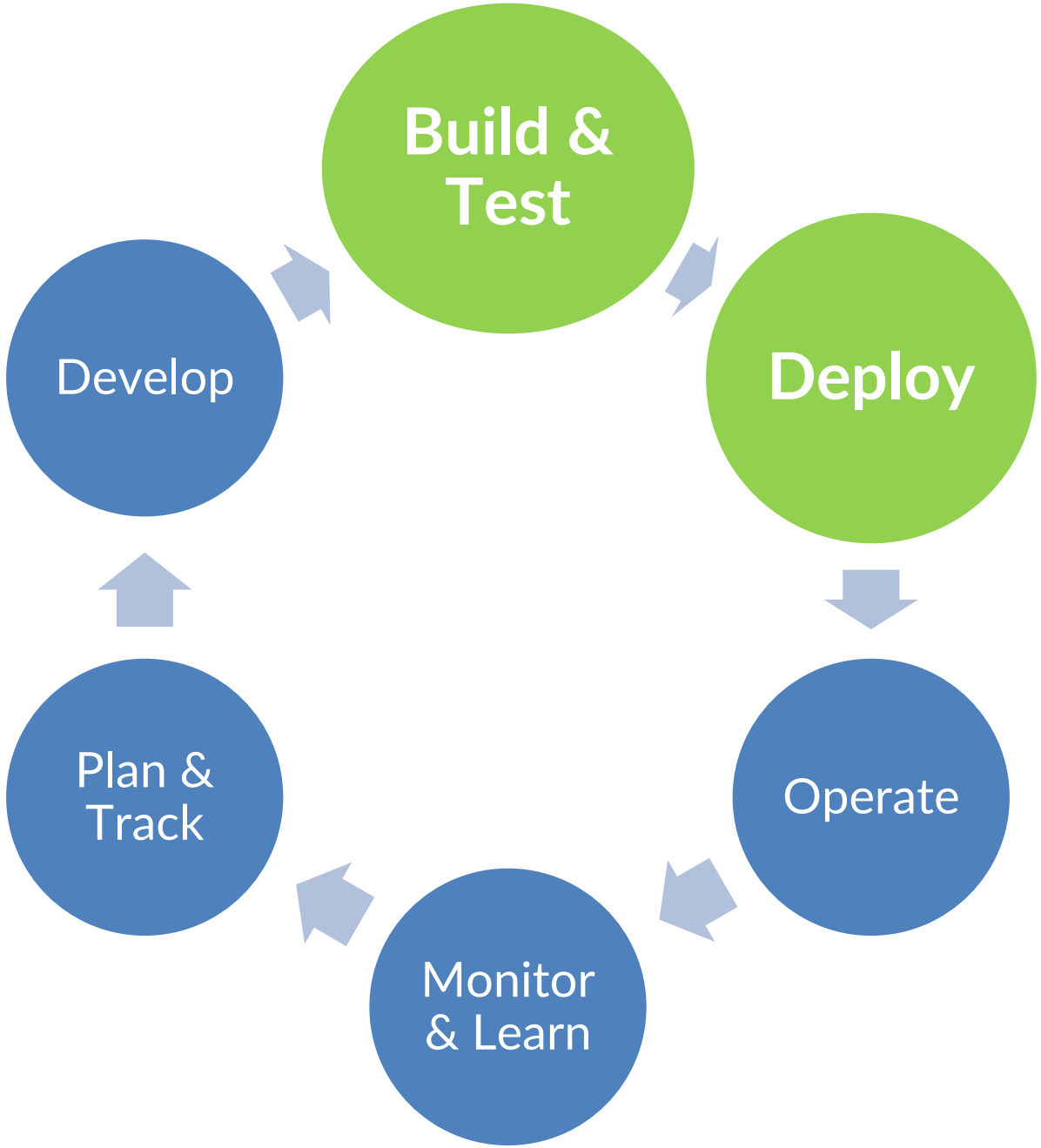

Build & Test
Deploy
Operate
Monitor & Learn
Plan & Track
Develop


Build & Test
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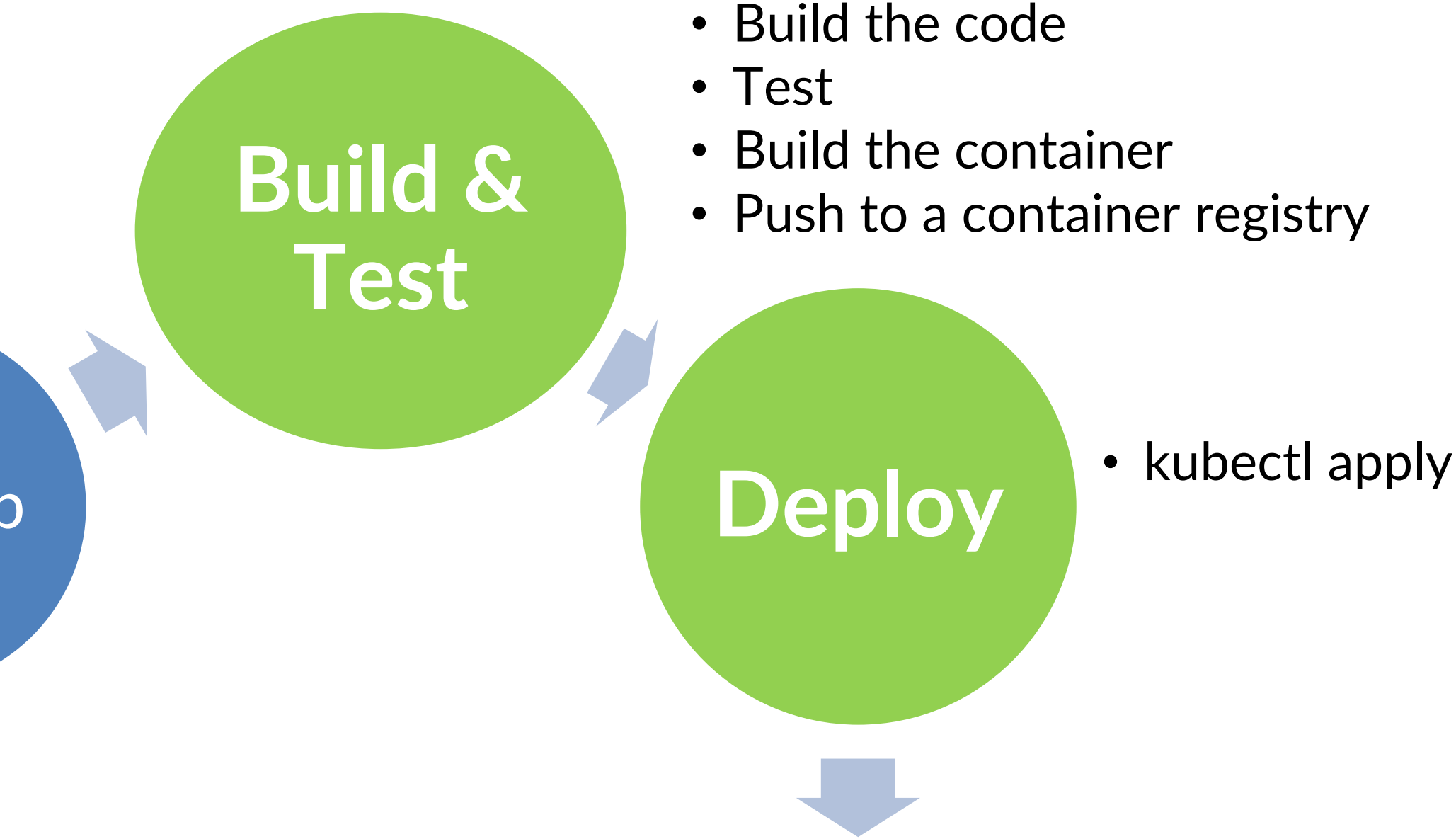


- Build the code
- Test
- Build the container
- Push to a container registry

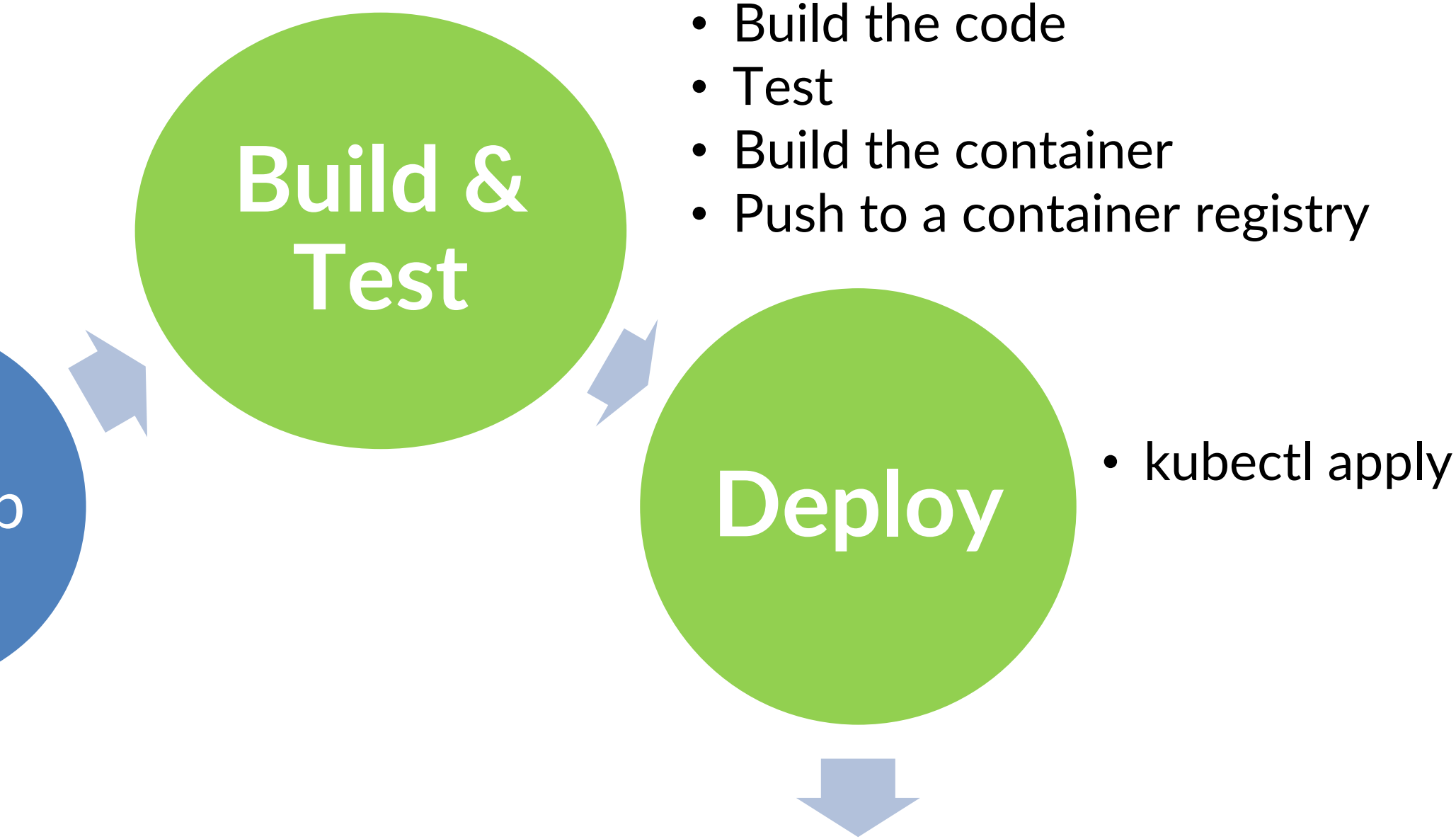
- kubectl apply

Current state

Who deployed it?

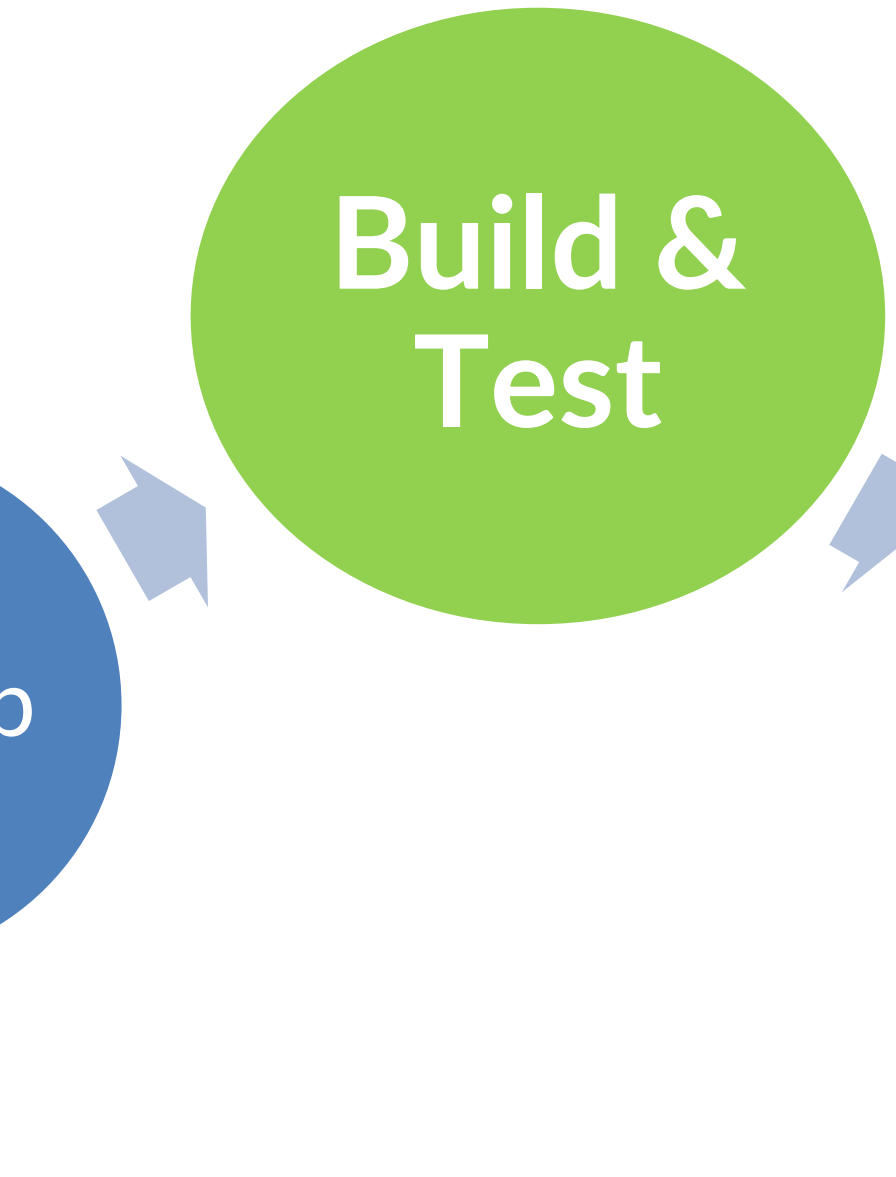
When was it deployed?

What version is running?



- Build the code
- Test
- Build the container
- Push to a container registry

- kubectl apply



- Build the code
- Test
- Build the container
- Push to a container registry

- ~~kubectl apply~~
- Push/Pull the damned thing automatically inside my cluster without me having to type kubectl

How?

DevOps

- Continuous Integration
  - Test and build code
- Continuous Delivery
  - Deploy
  - Human deploys to production
- Continuous Deployment
  - One step further
  - No human intervention

GitOps

GitOps is the practice of using **Git** to store declaratively defined **desired state** and **Continuous Delivery agents** to automate the reconciliation of current state to desired state.

GitOps

Git is the only source of truth

Continuous Delivery Tools

GitHub Actions

But what about Azure DevOps, Jenkins, CircleCI, Octopus Deploy?

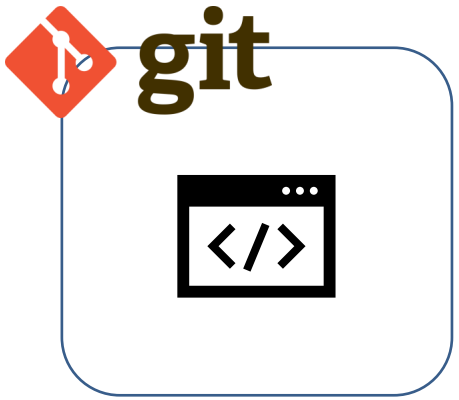
flux

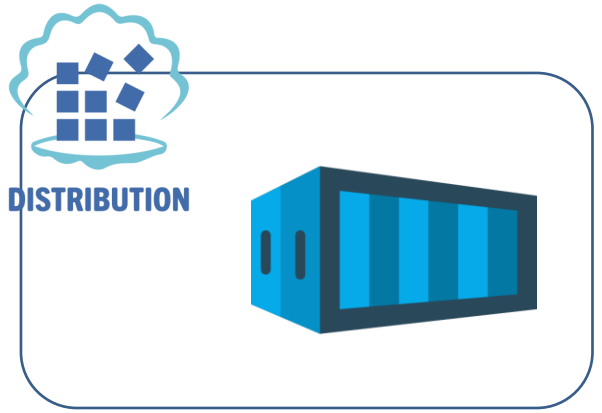
GitHub Actions

What is GitHub Actions?

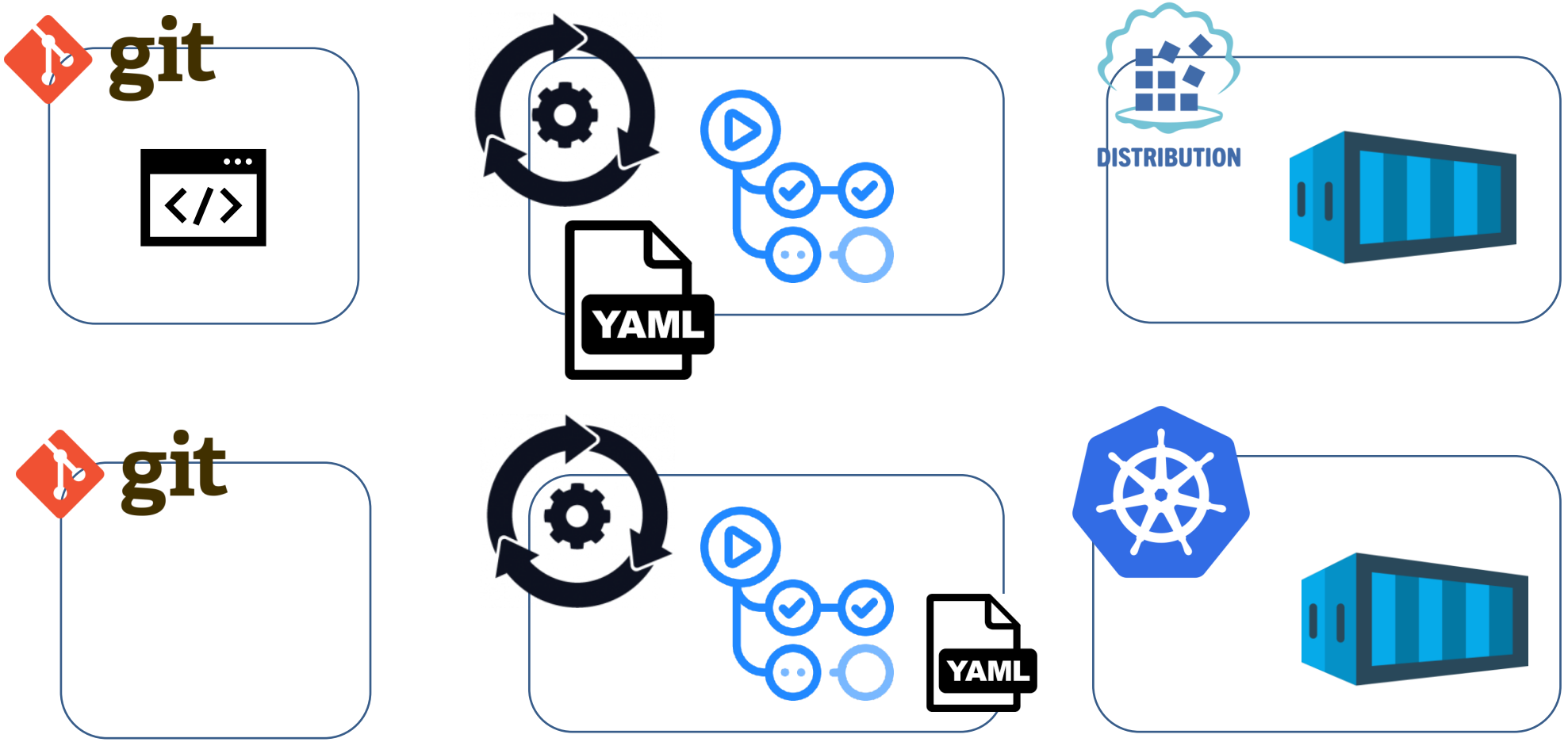
- Build into GitHub
- Workflow automation tool
- Triggered by events in the repository
- Jobs runs in a virtual machine runner or inside a container
- Workflows are defined in YAML
- Mothing to install in the cluster
  - Push system

Workflow - CI

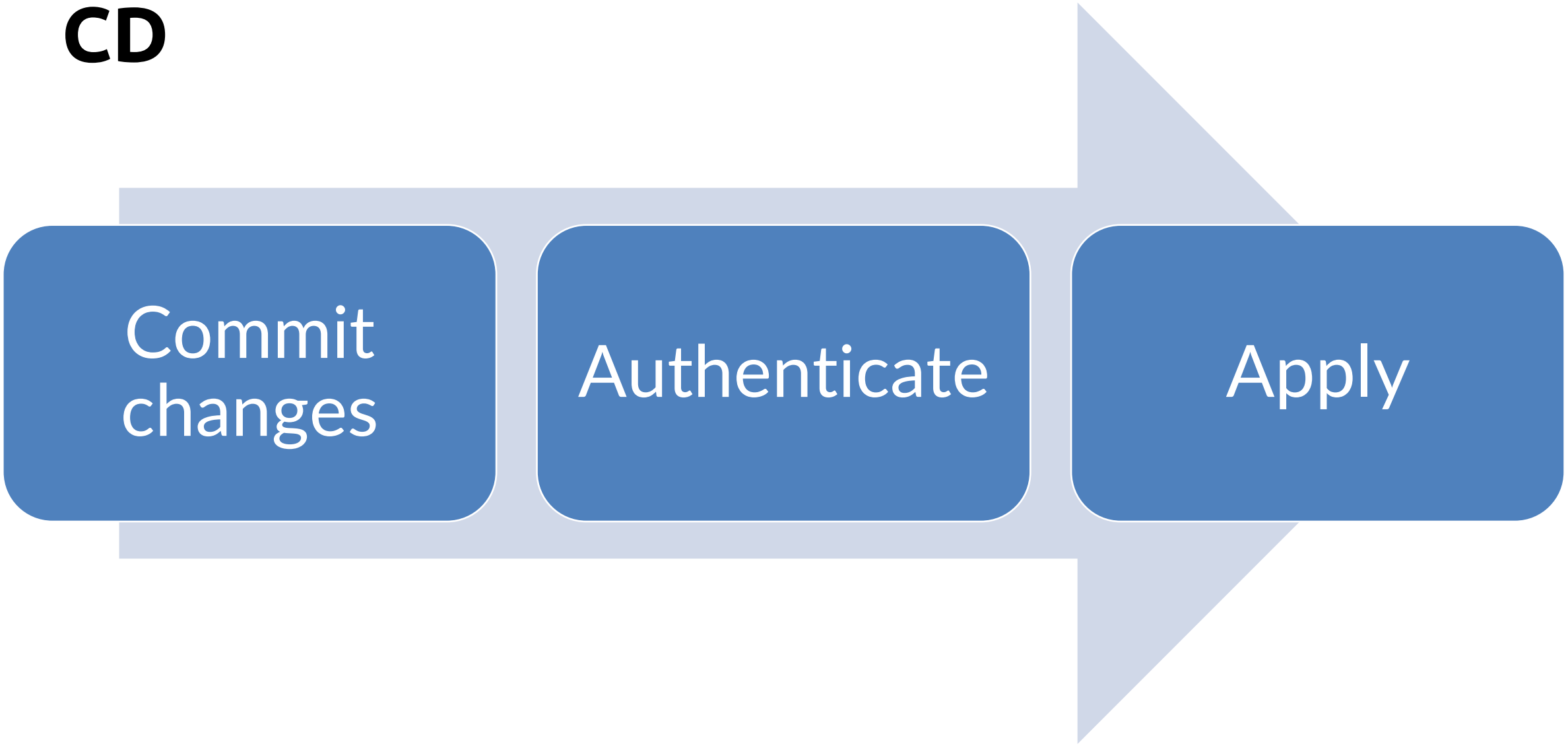




Workflow - CD



CD



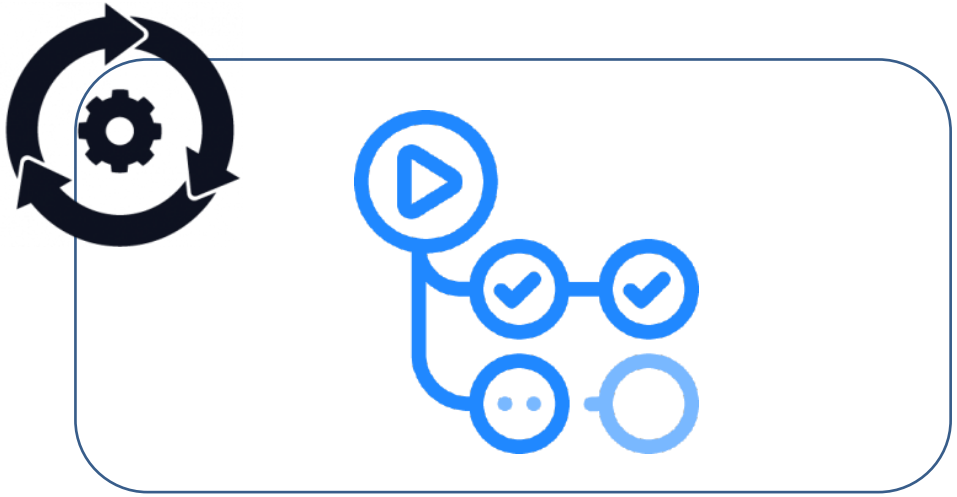
Demo

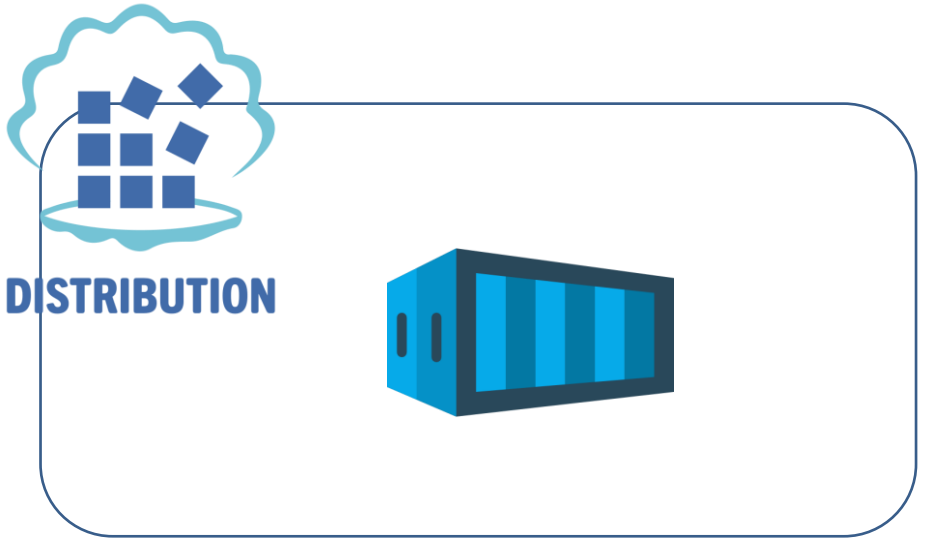
ArgoCD

What is Argo CD?

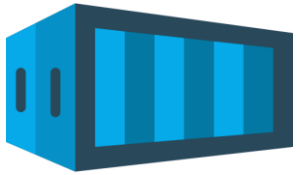
- Continuous deployment tool for Kubernetes
- Originated at Intuit, maintained by Akuity
- Open source
- CNCF Incubating project
- https://argoproj.github.io
- Installed in the cluster
  - Pull system
- Dashboard/UI

Workflow CI

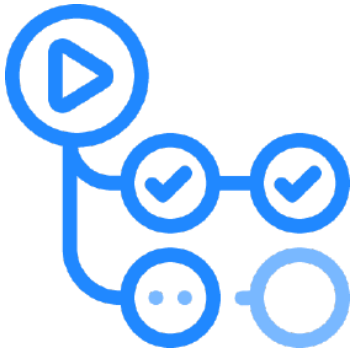


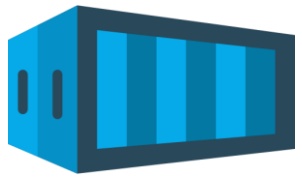


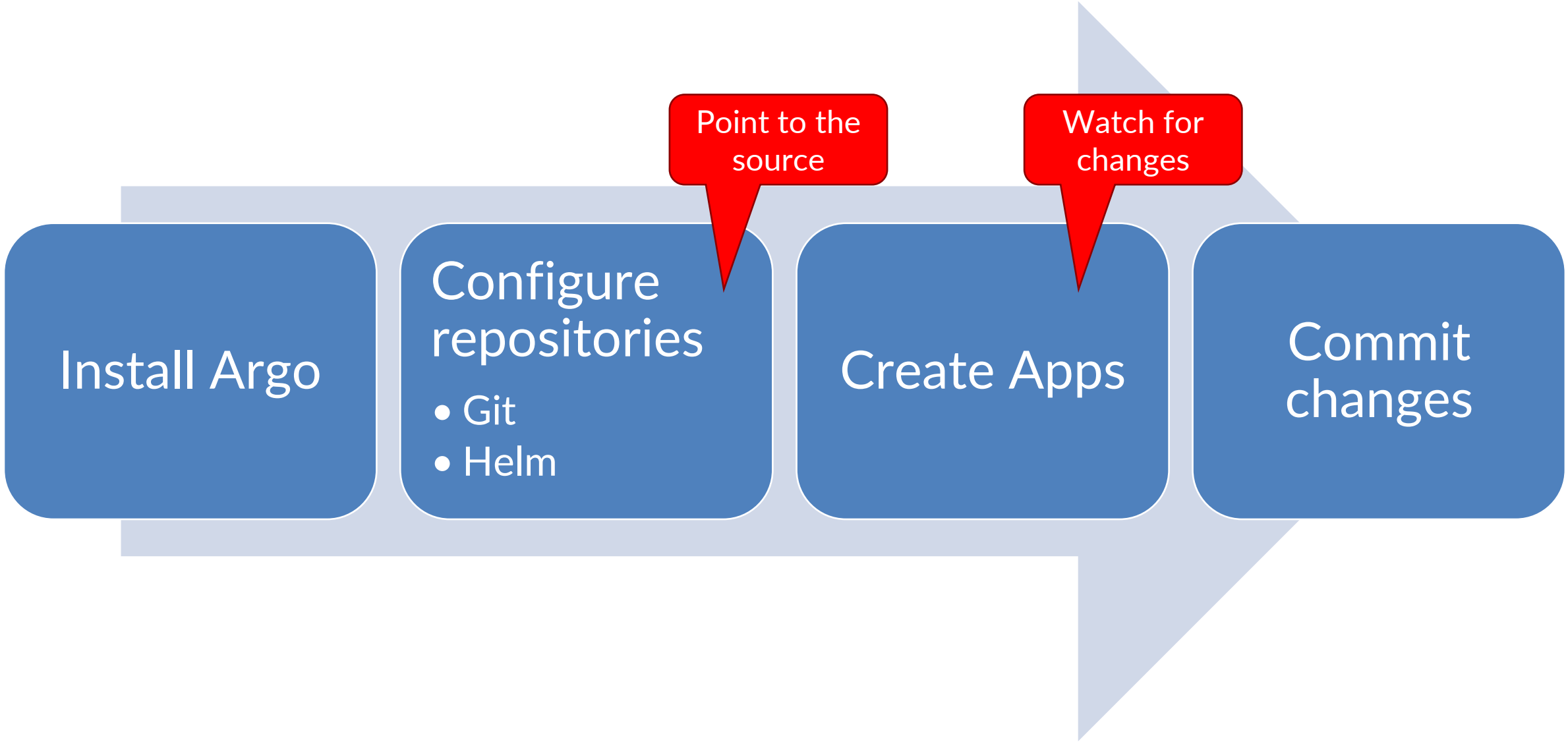
Workflow CD

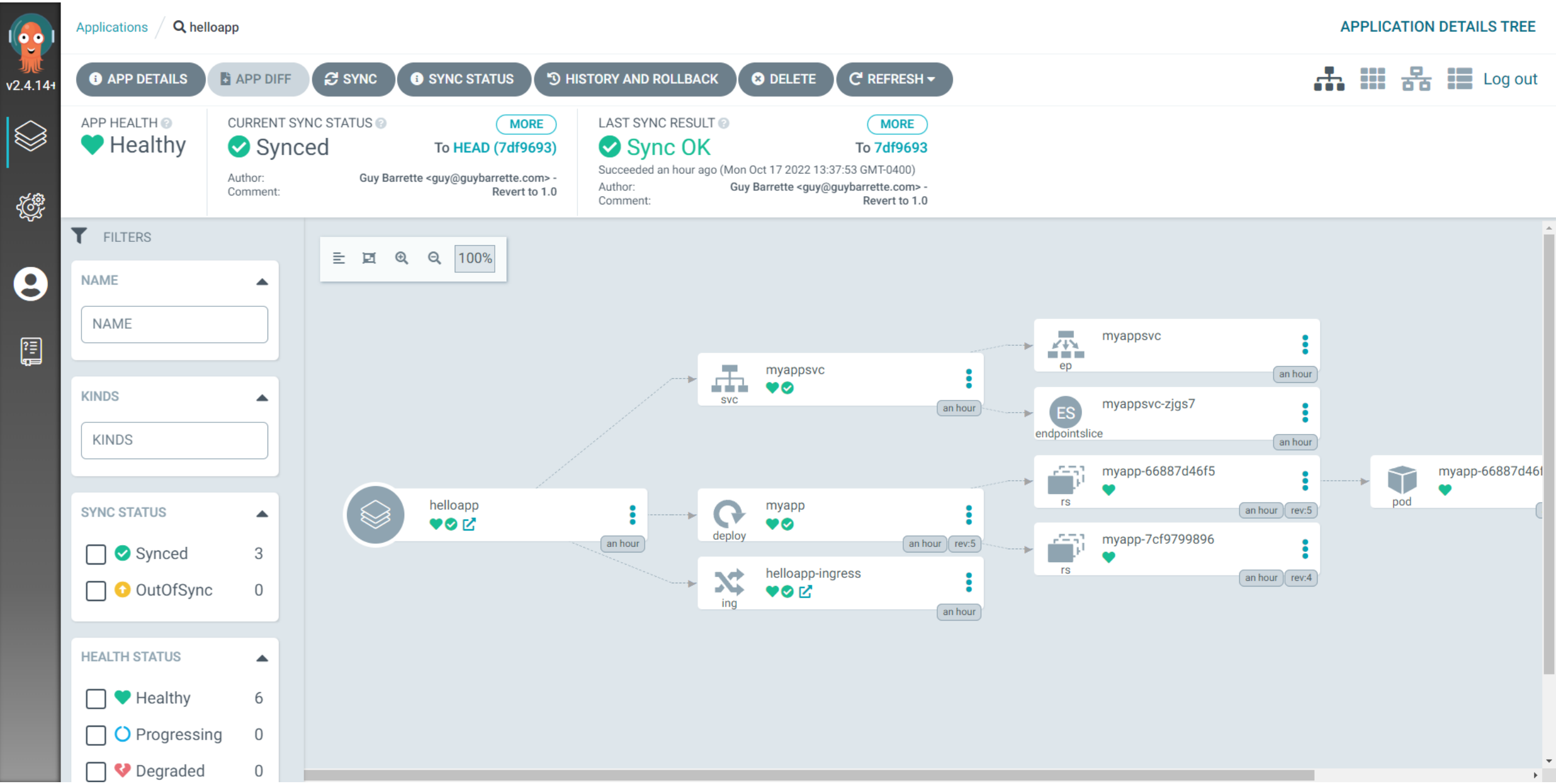


Workflow CD






Point to the source
Watch for changes
Install Argo
Configure repositories
• Git
• Helm
Create Apps
Commit changes

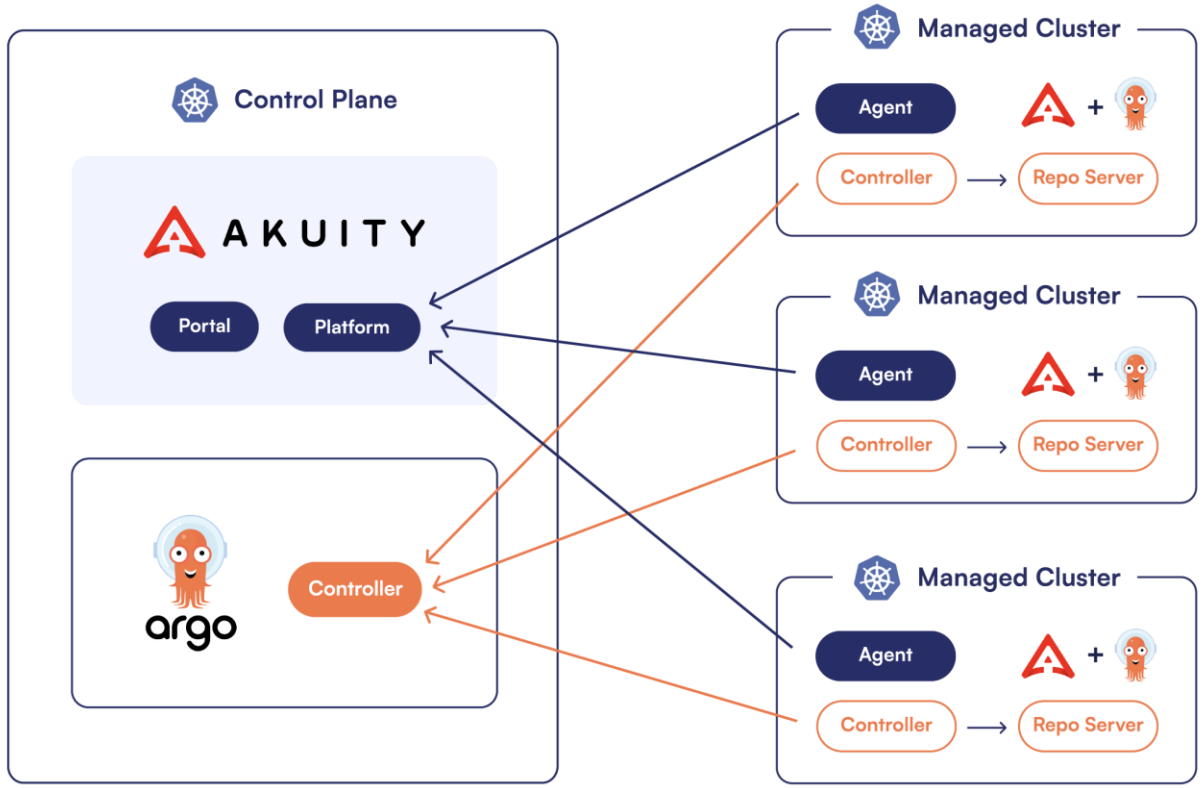

v2.4.14+
Applications
helloapp
APPLICATION DETAILS TREE
APP DETAILS
APP DIFF
SYNC
SYNC STATUS
HISTORY AND ROLLBACK
DELETE
REFRESH
Log out
APP HEALTH
Healthy
CURRENT SYNC STATUS
Synced
MORE
To HEAD (7df9693)
Author: Guy Barrette <guy@guybarrette.com> -
Comment: Revert to 1.0
LAST SYNC RESULT
Sync OK
MORE
To 7df9693
Succeeded an hour ago (Mon Oct 17 2022 13:37:53 GMT-0400)
Author: Guy Barrette <guy@guybarrette.com> -
Comment: Revert to 1.0
FILTERS
NAME
NAME
KINDS
KINDS
SYNC STATUS
Synced 3
OutOfSync 0
HEALTH STATUS
Healthy 6
Progressing 0
Degraded 0
100%
helloapp
an hour
myappsvc
svc
an hour
myapp
deploy
an hour
rev:5
helloapp-ingress
ing
an hour
myappsvc
ep
an hour
myappsvc-zjgs7
ES
endpointslice
an hour
myapp-66887d46f5
rs
an hour
rev:5
myapp-7cf9799896
rs
an hour
rev:4
pod

Argo CD

- Implements the GitOps principles
- Pull model
- Supports Kustomizations & Helm
- UI driven
  - CLI available
- Easy to configure and use

Hosted Argo

- Akuity
  - Hybrid Push/Pull
  - Platform communicates with an agent installed in the cluster
- CodeFresh
  - Complete hosted CI/CD platform



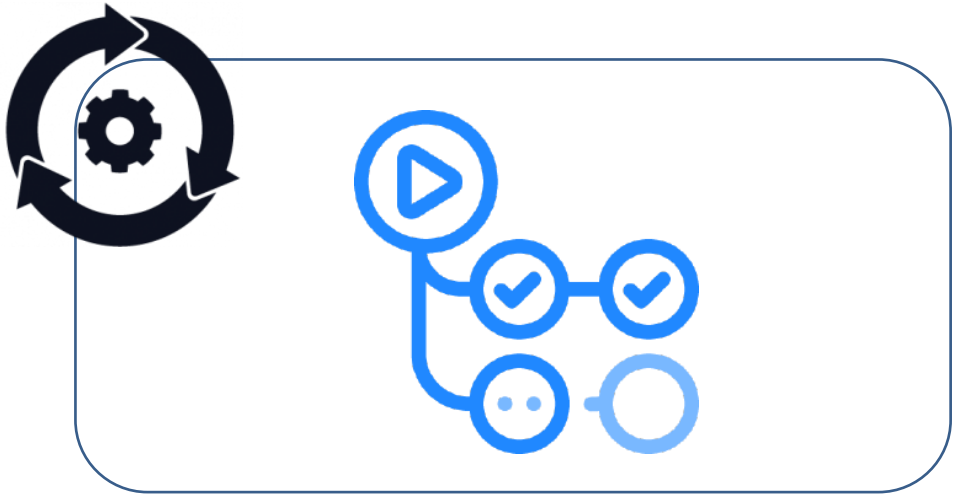
Demo

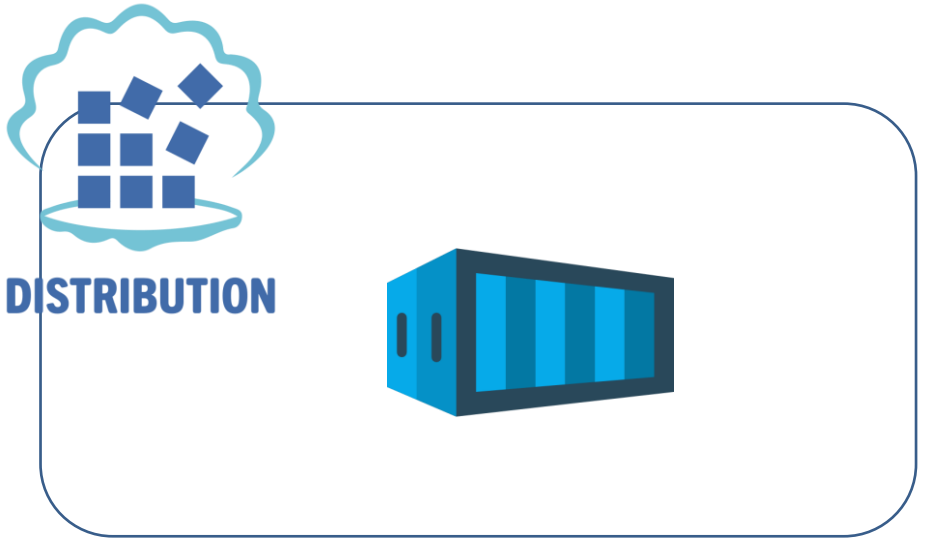
FluxCD

What is Flux?

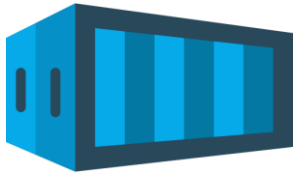
- Continuous delivery solution for Kubernetes
- Originated/maintained by WeaveWorks
- Open source
- CNCF Incubating project
- https://fluxcd.io
- Installed in the cluster
  - Pull system
- No UI

Workflow CI

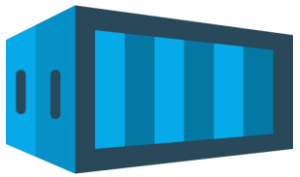




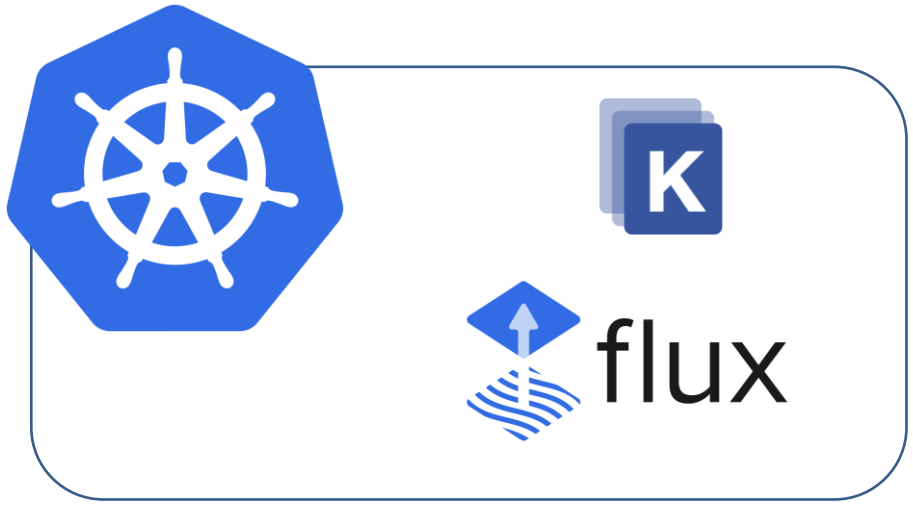
Workflow CD



Workflow CD



Repositories

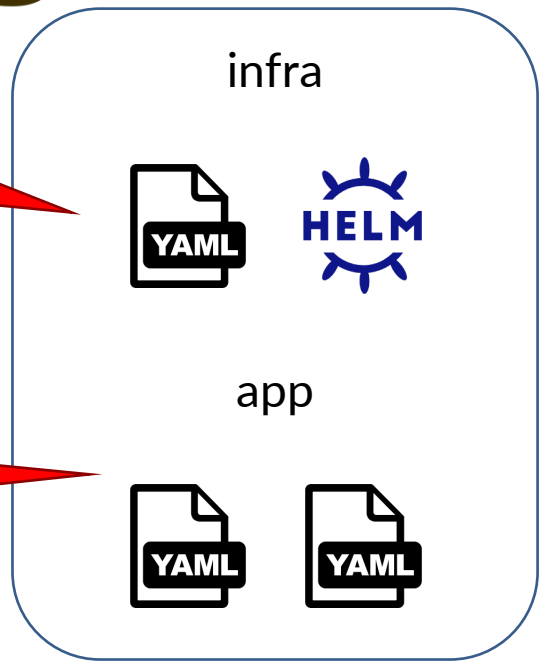


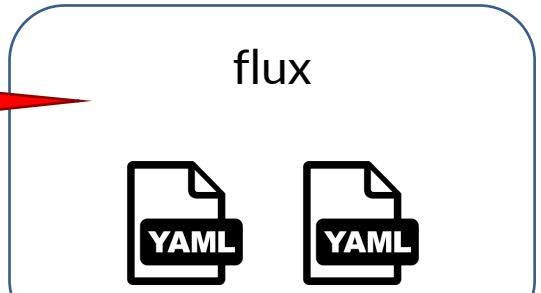
git

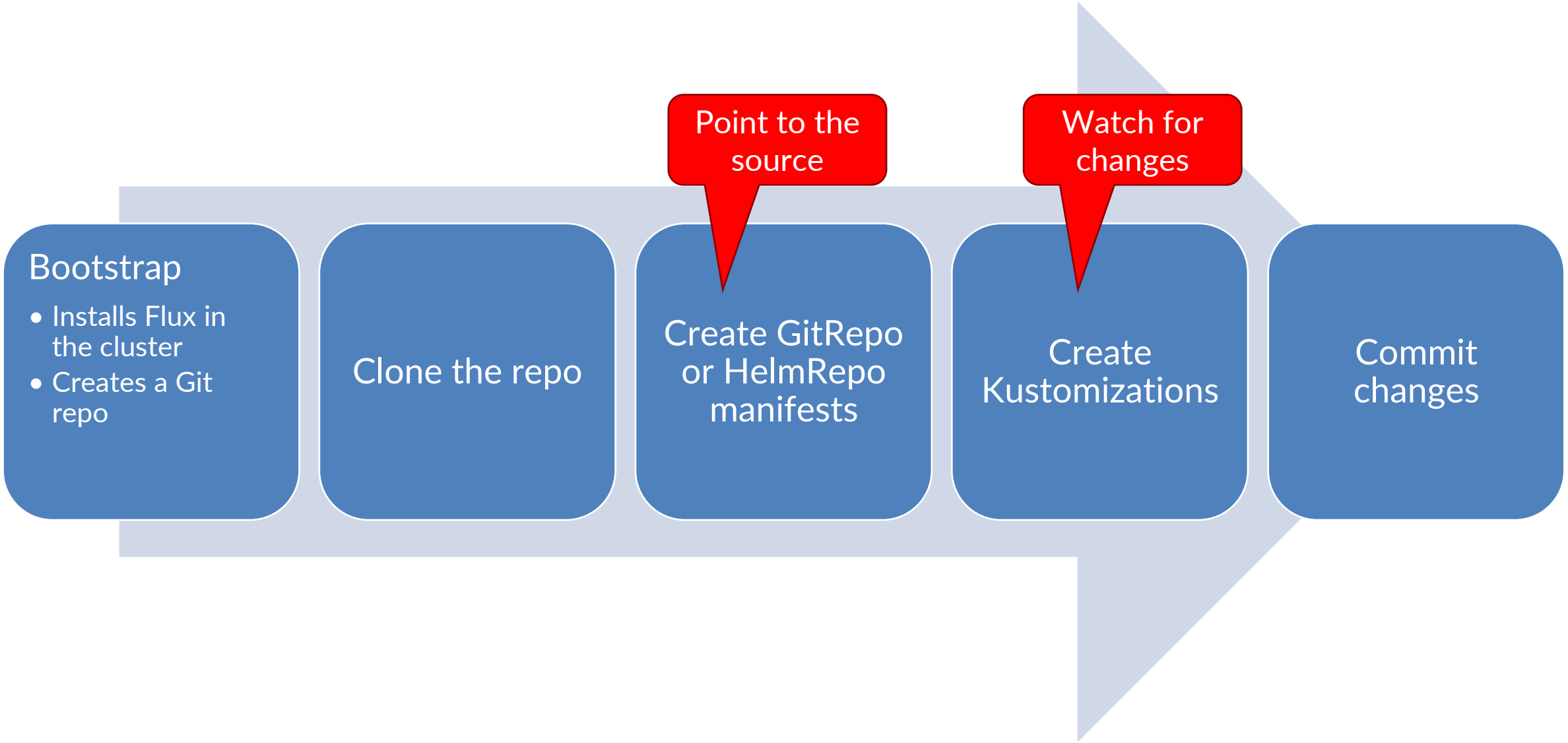
Ex: Install Nginx Ingress

Install the app

Flux config






Point to the source
Watch for changes
Bootstrap
• Installs Flux in the cluster
• Creates a Git repo
Clone the repo
Create GitRepo or HelmRepo manifests
Create Kustomizations
Commit changes

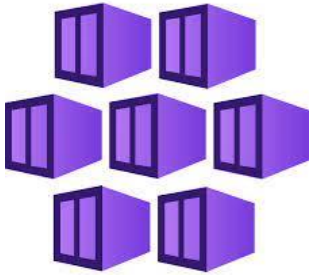
Flux

- Implements the GitOps principles up to it's own installation
- Supports Kustomizations & Helm
- Higher learning curve
- CLI driven
- No UI
  - Weave Gitops Core

Demo

AKS GitOps

What is AKS GitOps?



- It's actually Flux installed in AKS as an extension
- Installed at the command line
  - Installs the Flux controllers
- Managed at the command line or using the Portal
- Benefits
  - Azure verified versions
  - Automatic agent updates
  - Support

fluxgitops | GitOps

Kubernetes service

Search

Configuration

Settings

- Node pools
- Cluster configuration
- Networking
- Open Service Mesh
- GitOps
- Deployment center (preview)
- Automated deployments (preview)
- Policies
- Properties

Create | Delete | Refresh

Set up continuous deployment to your cluster in a few quick steps

Create a GitOps configuration to automatically deploy your application from source control to your Kubernetes cluster. Learn more

Create

Create a GitOps configuration ...

1 Basics | 2 Source | 3 Kustomizations | 4 Review + create

Create a GitOps configuration to automatically deploy configurations and applications from source repository to the cluster using Flux. Learn more

Configuration name *

Operator details

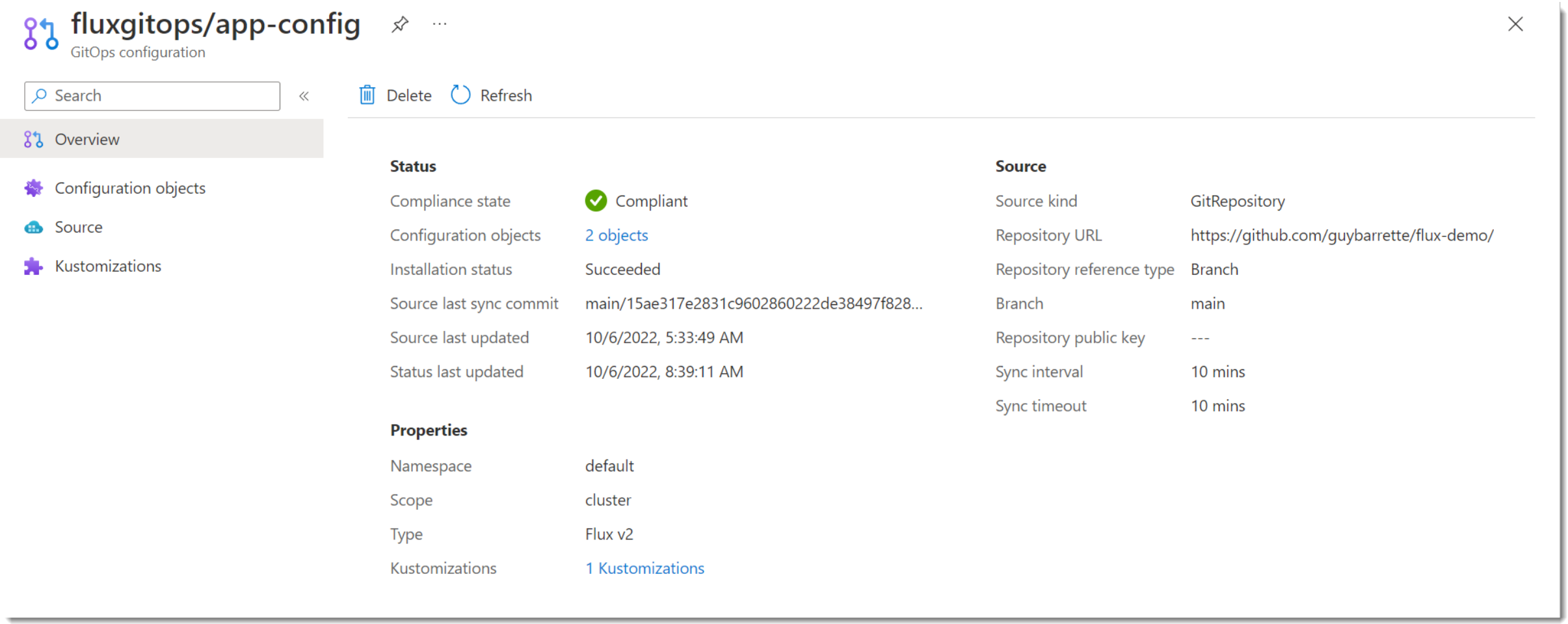
Namespace *

Scope
- (•) Namespace
- ( ) Cluster

Type: Flux v2

Continuous reconciliation
- (•) Enable
- ( ) Suspend

Previous | Next

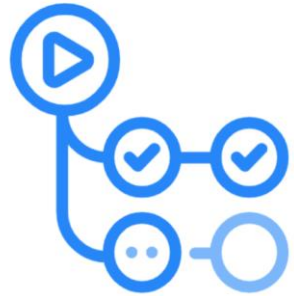

fluxgitops/app-config
GitOps configuration
Search
Overview
Configuration objects
Source
Kustomizations
Delete
Refresh
Status
Compliance state
Compliant
Configuration objects
2 objects
Installation status
Succeeded
Source last sync commit
main/15ae317e2831c9602860222de38497f828...
Source last updated
10/6/2022, 5:33:49 AM
Status last updated
10/6/2022, 8:39:11 AM
Properties
Namespace
default
Scope
cluster
Type
Flux v2
Kustomizations
1 Kustomizations
Source
Source kind
GitRepository
Repository URL
https://github.com/guybarrette/flux-demo/
Repository reference type
Branch
Branch
main
Repository public key

Sync interval
10 mins
Sync timeout
10 mins

In Summary

Conclusion

- The problems with manual deployments
- DevOps principles
- GitOps principles
- Tools overview
  - GitHub Actions
  - ArgoCD
  - FluxCD
    - AKS GitOps



GitHub Actions

END OF LINE

Thank You!