GitOps with Flux v2

Kubernetes Melbourne meetup

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About me

French

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Coffee, Cheese, Wine, Beer and Tech

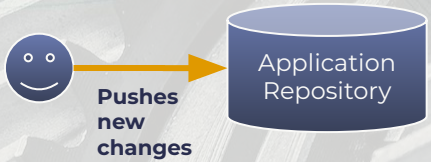
What is GitOps?

GitOps is a set of practices and tools for managing infrastructure and applications so that the whole system is described declaratively and version controlled.

An automated process ensures that the deployed environment matches the state specified in a repository.


GitOps promotes a
pull-based
deployment model

Push-based deployment



Push-based deployment

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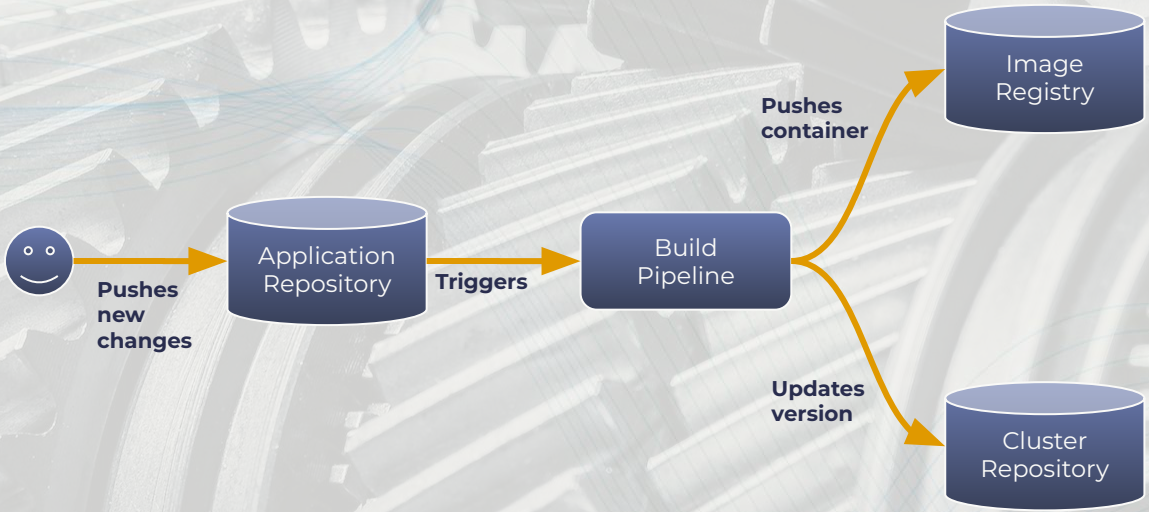

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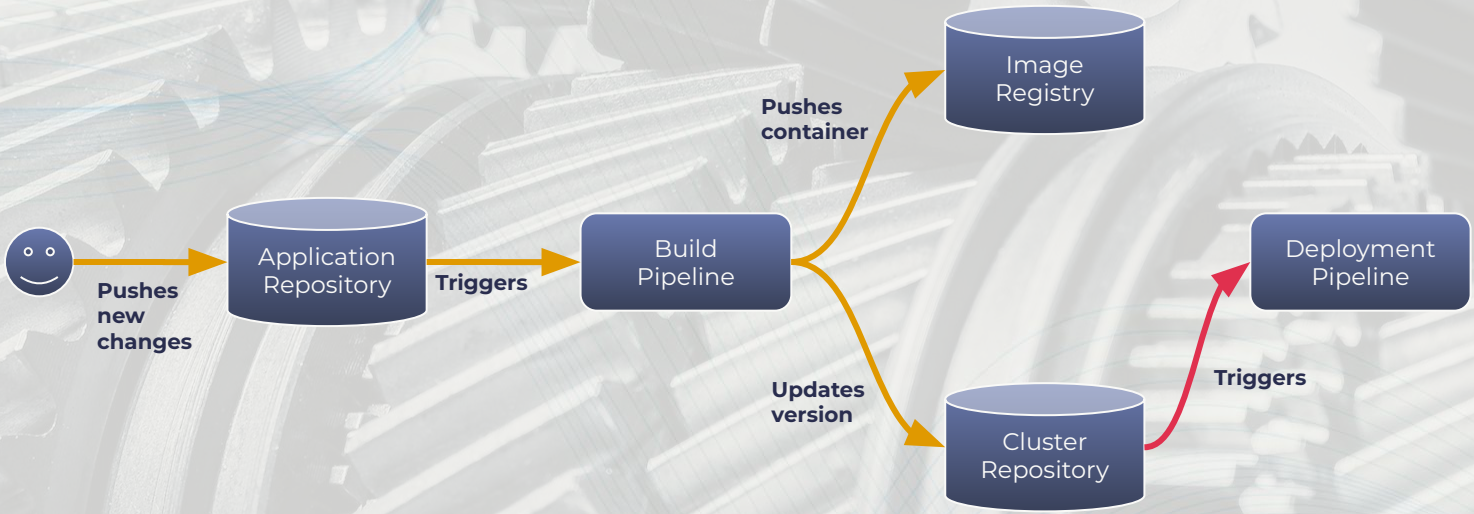

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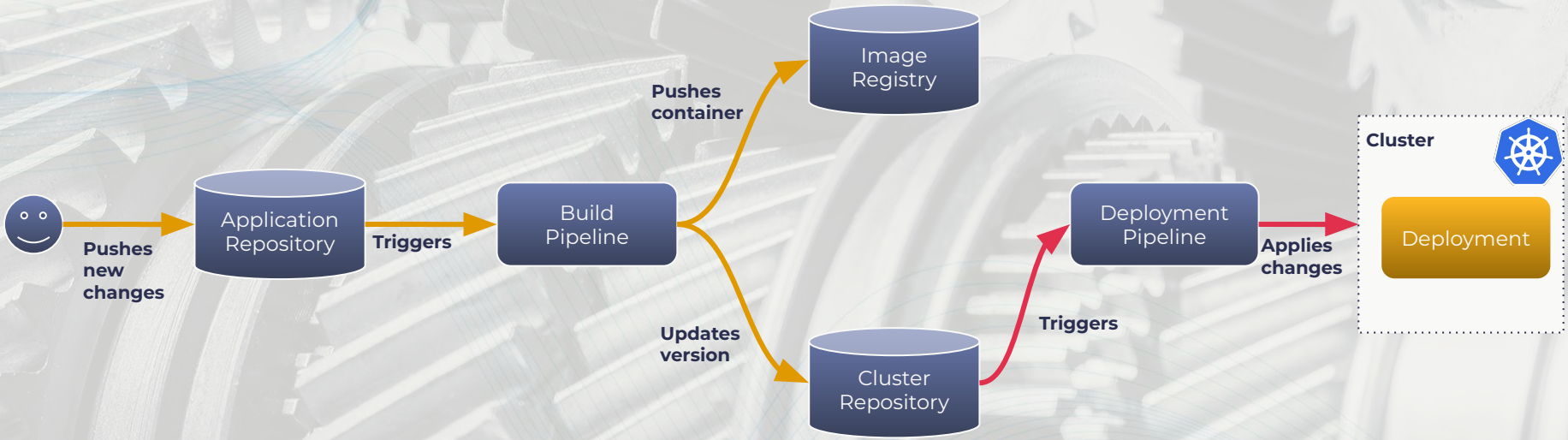
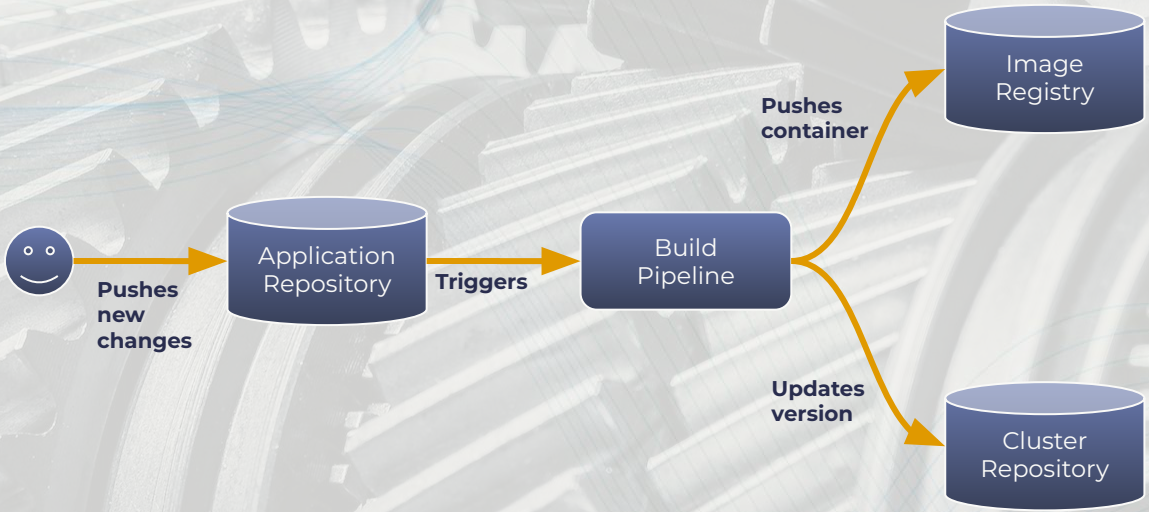


Pull-based deployment



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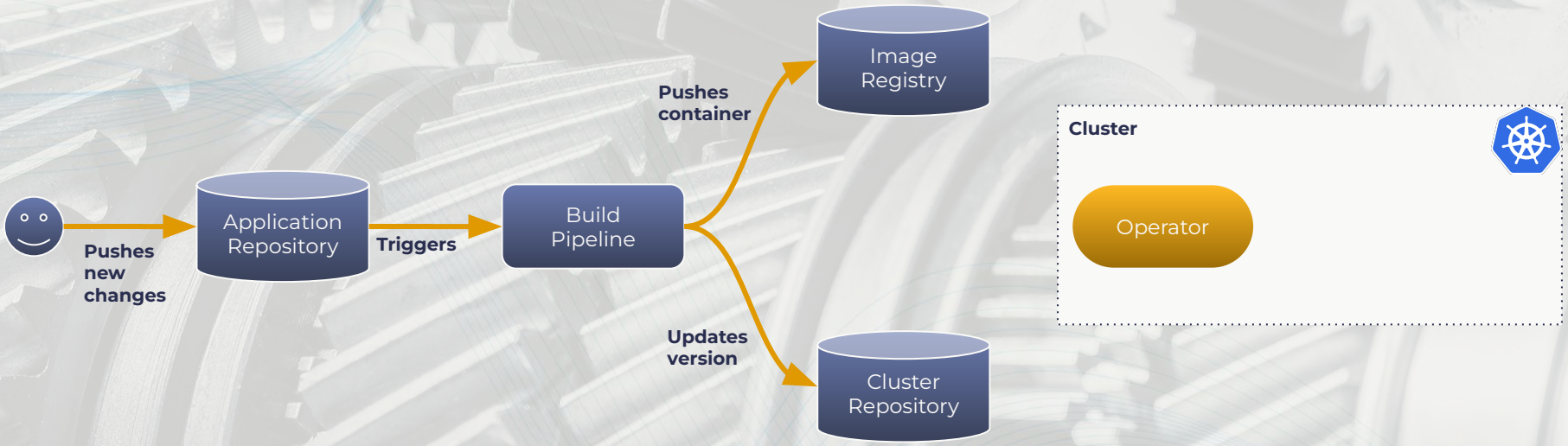

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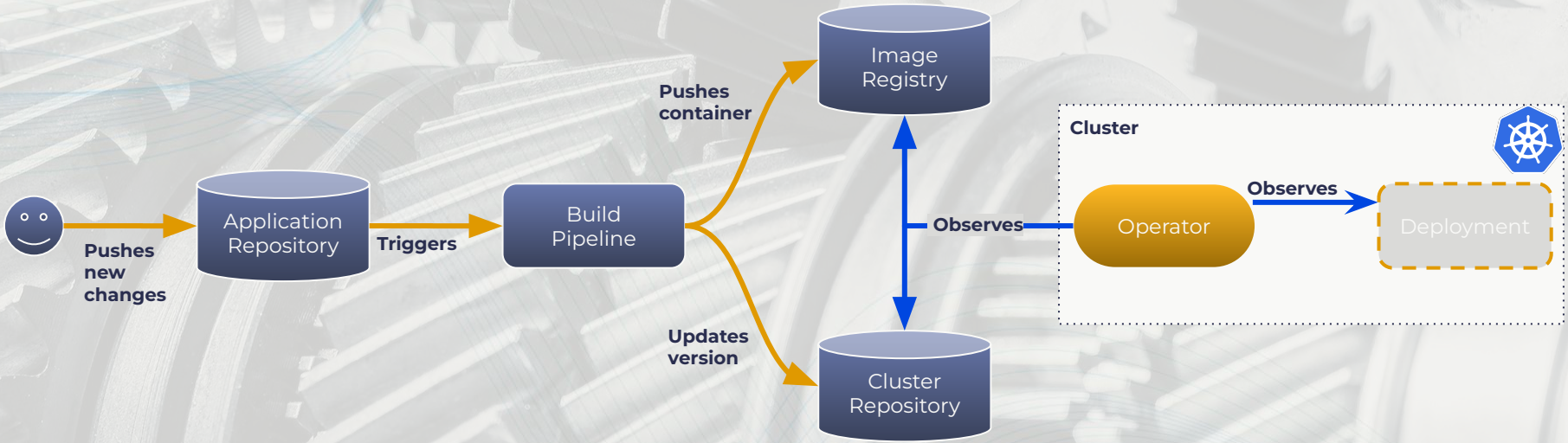

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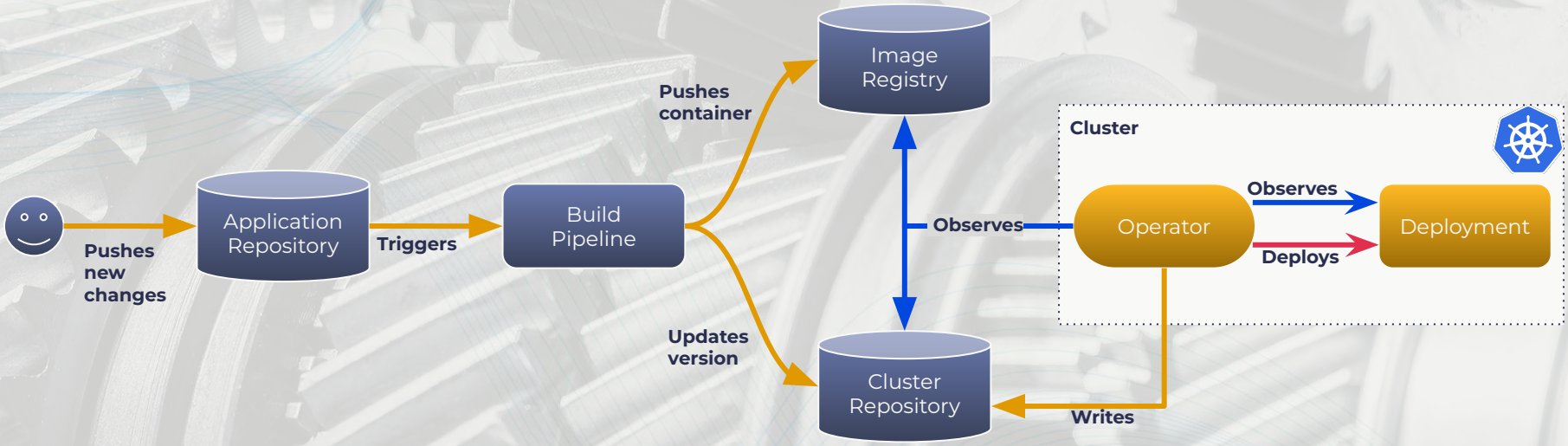

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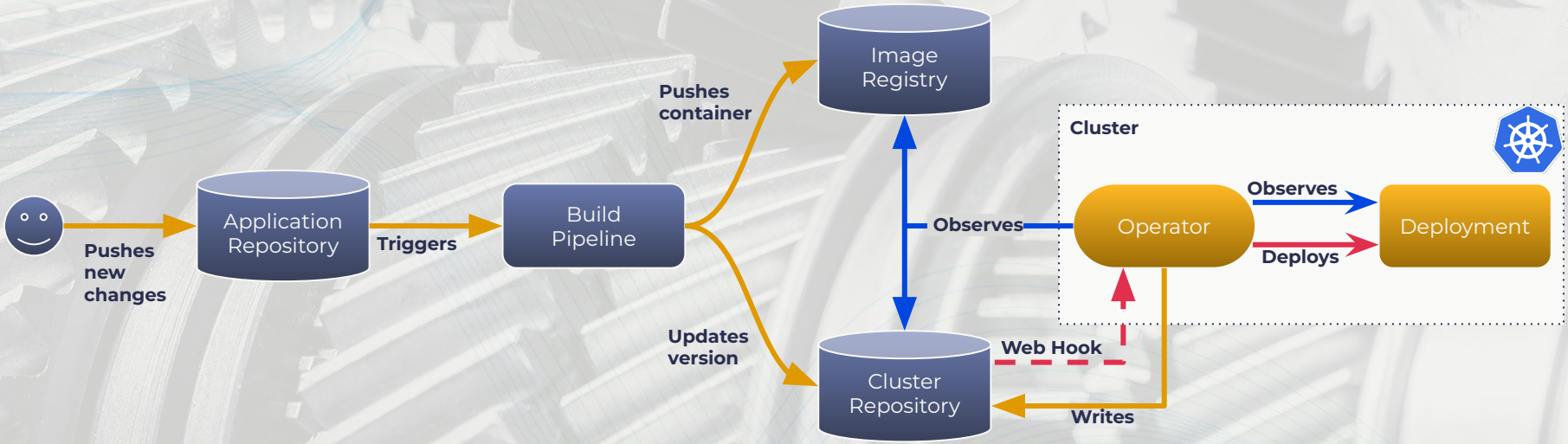


Benefits of GitOps

Same tools developers use

Less drifts in configuration

Increased visibility of changes (Pull Requests)

History and audit logs of changes

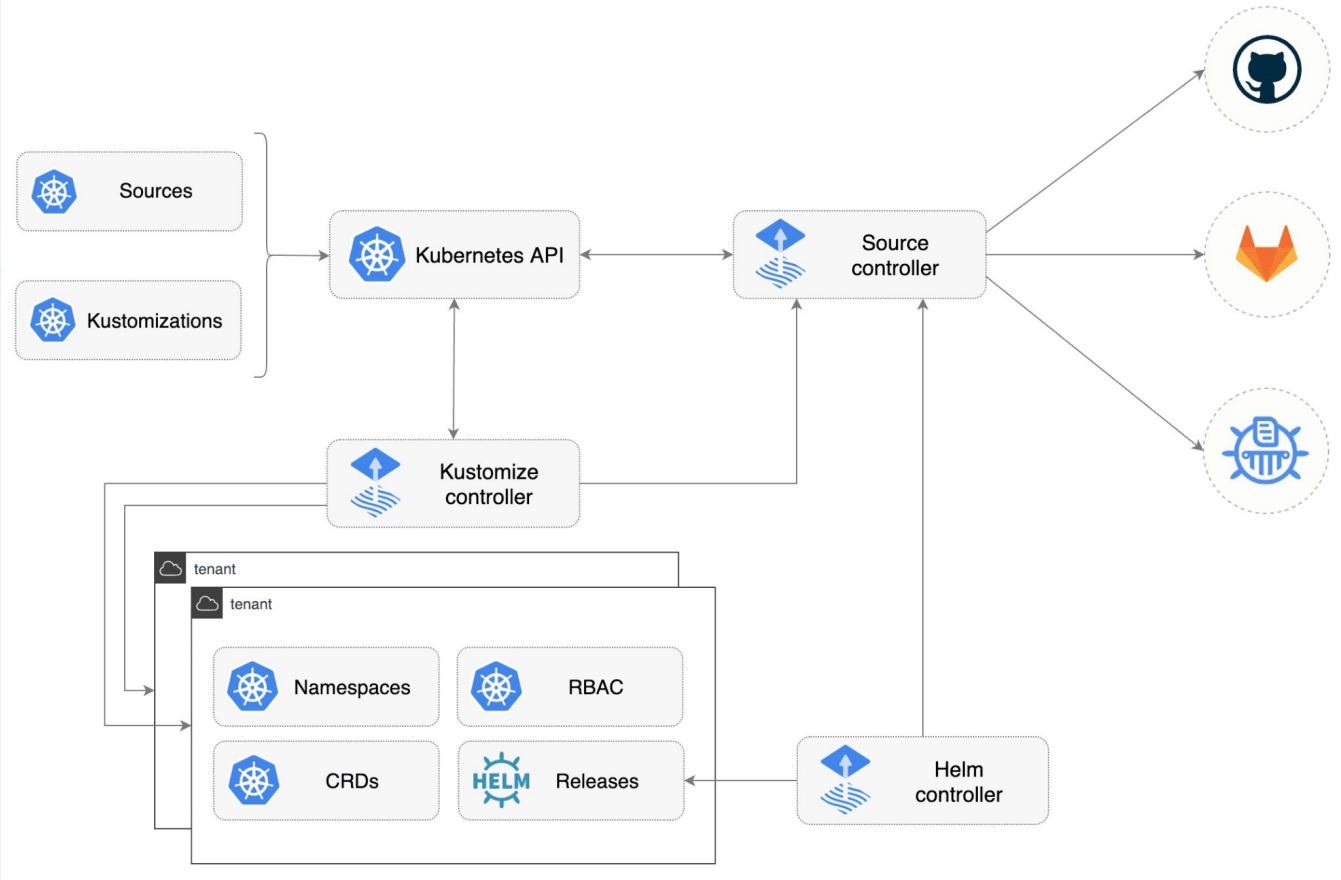
Manage multiple environment from the same source

What is Flux?

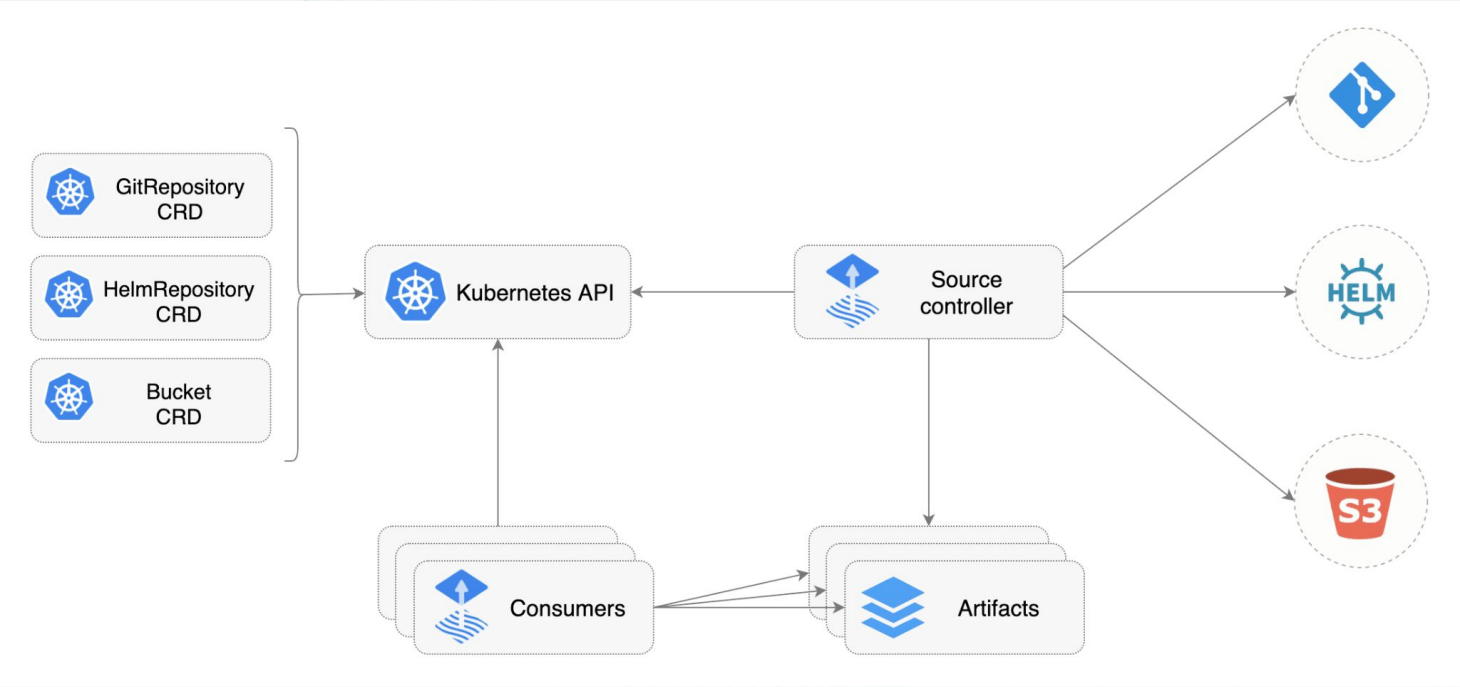
A CNCF project providing a set of specialised tools and Kubernetes controllers which:

- Pull changes from Sources
- Reconcile the changes in the cluster
- Notify of changes

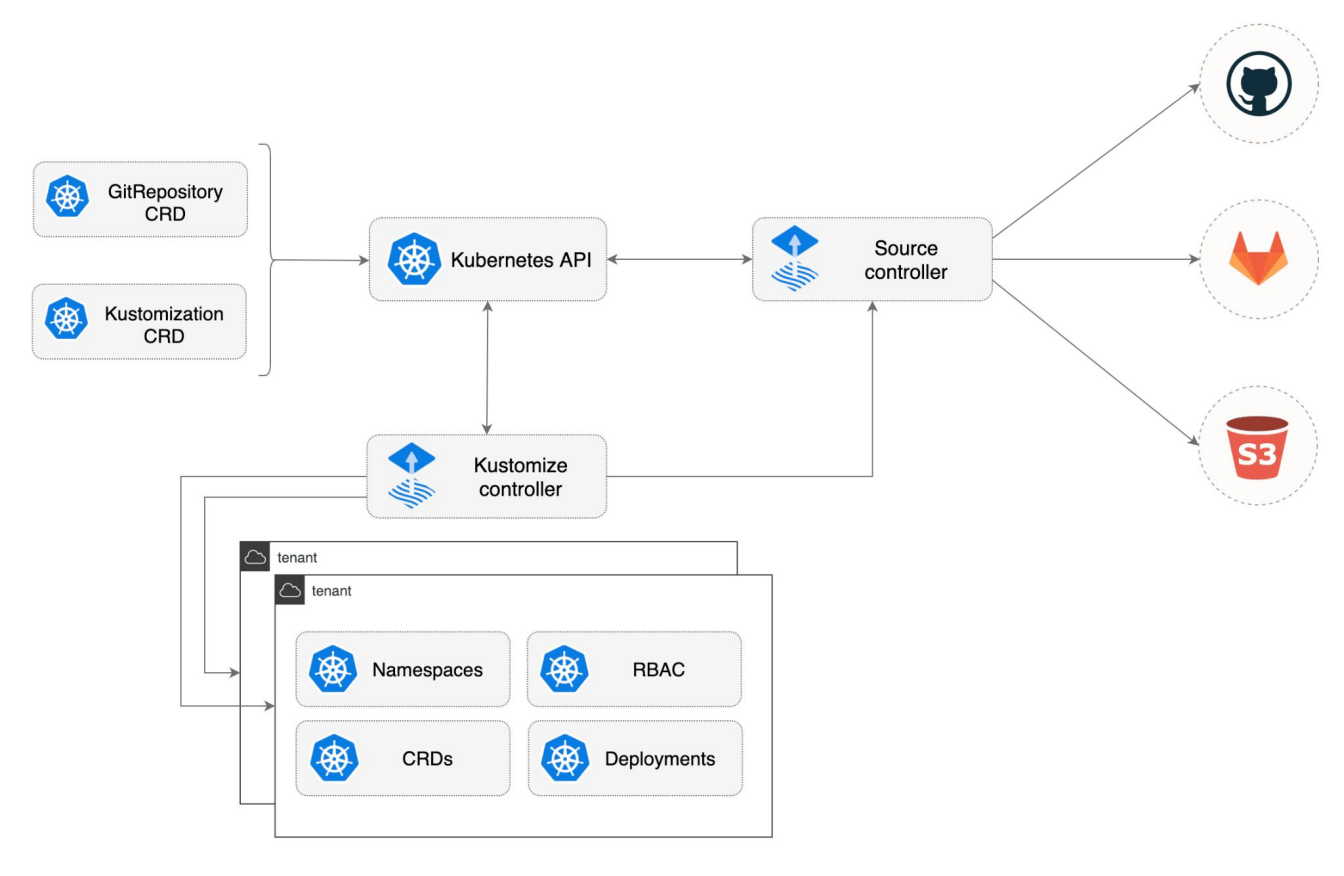
Flux Components



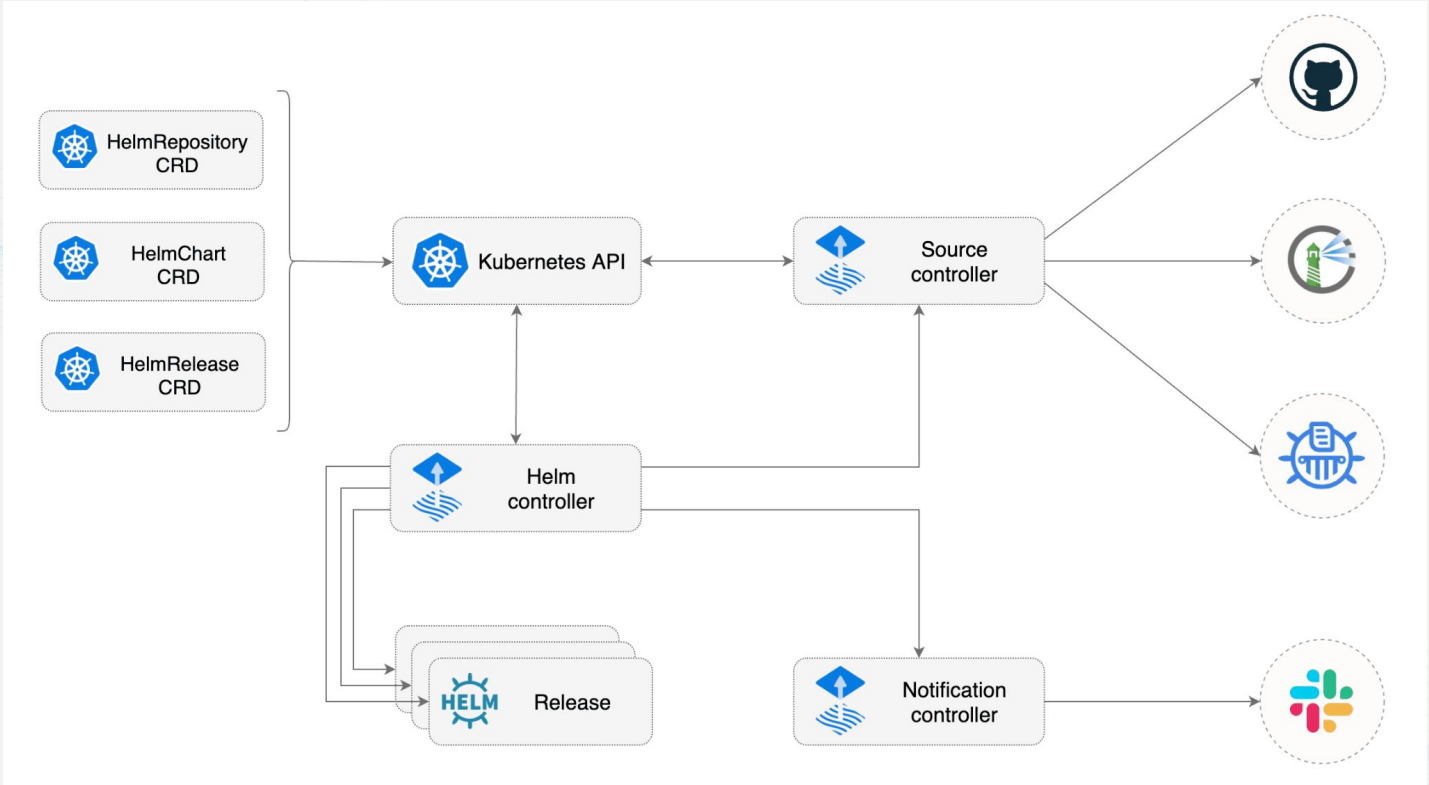
Flux Components | Source Controller



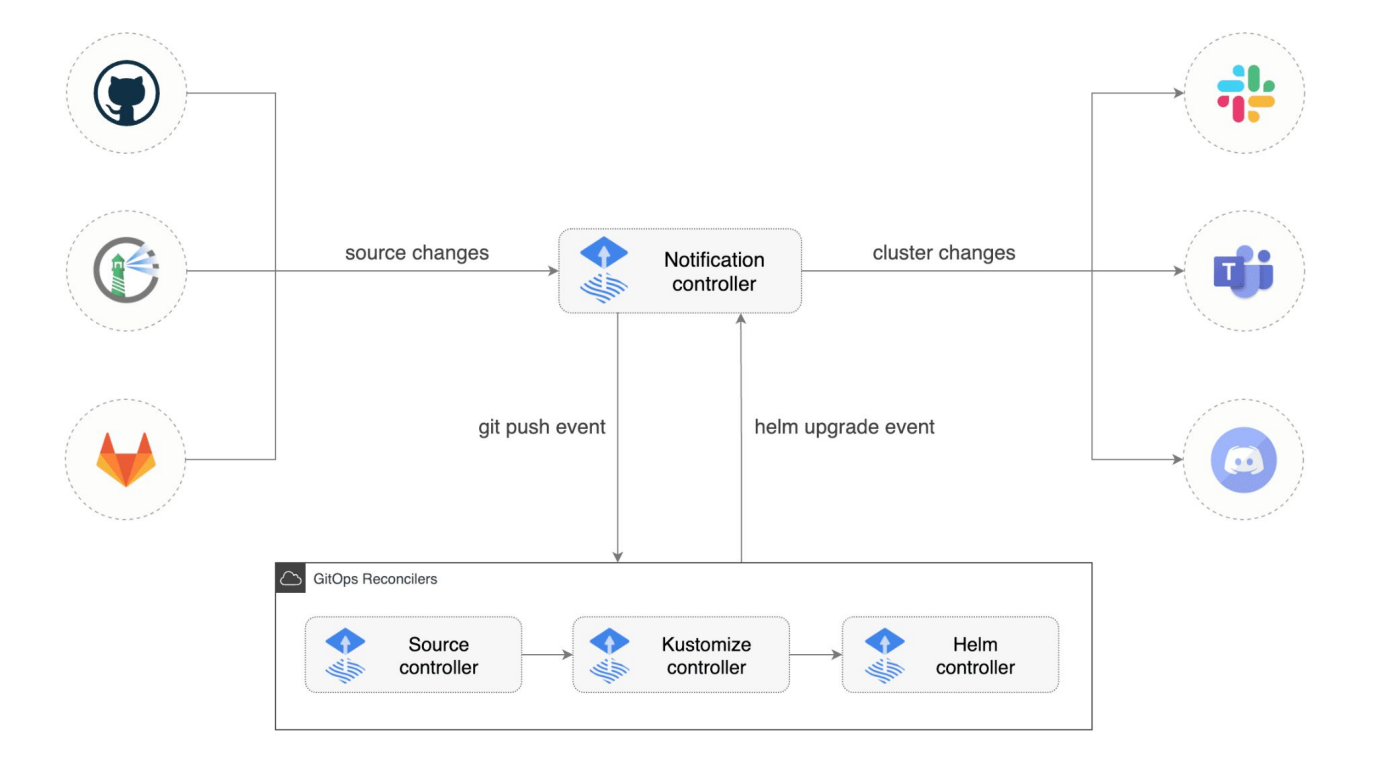
Flux Components | Kustomize Controller



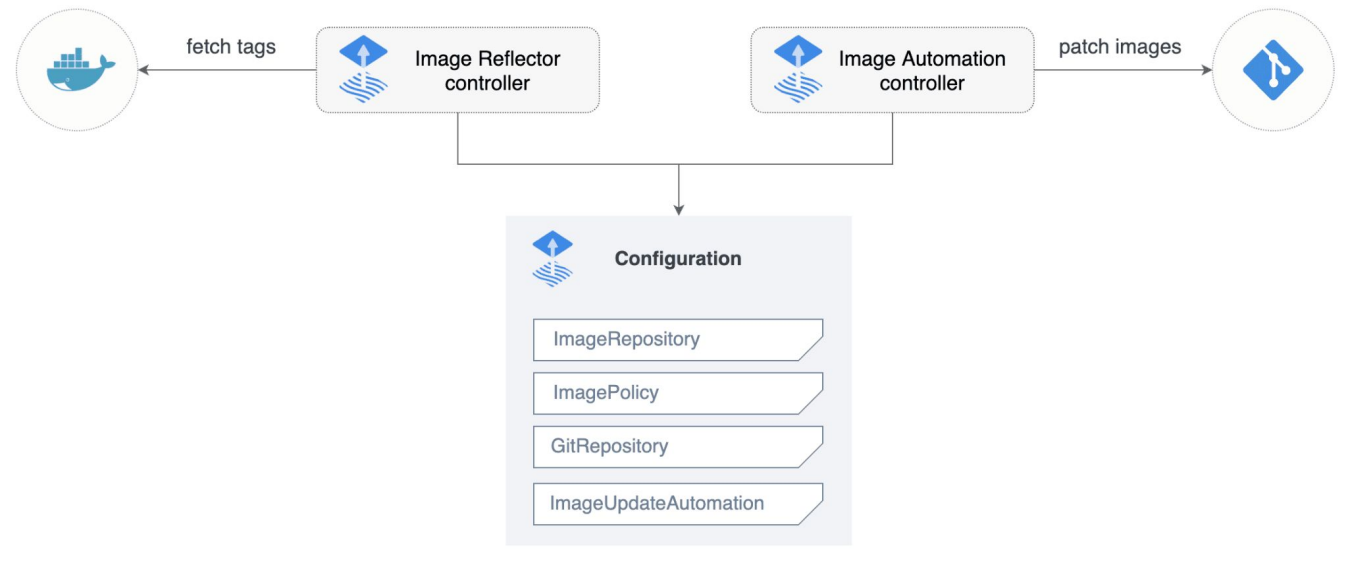
Flux Components | Helm Controller



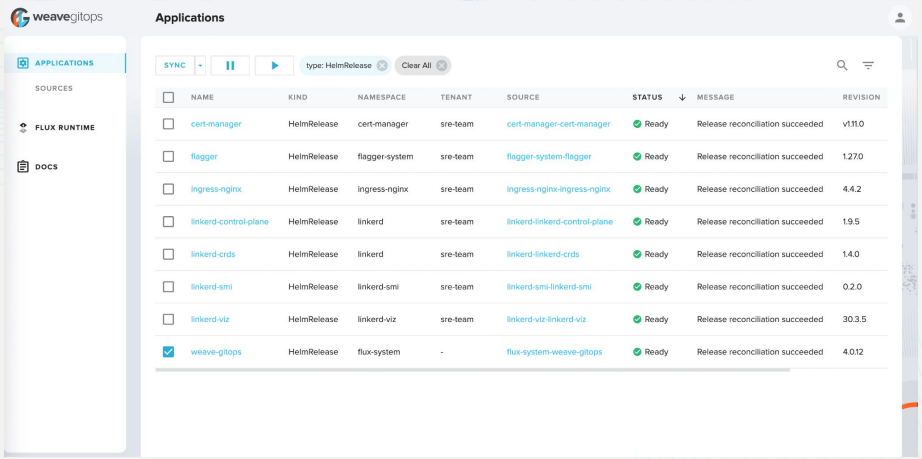
Flux Components | Notification Controller

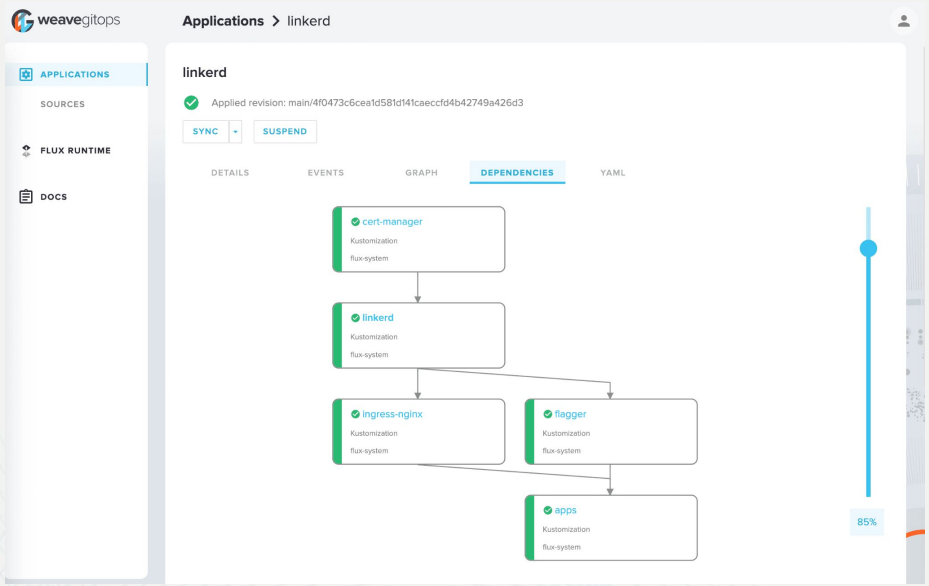


Flux Components | Image Controller



Flux Components | Web UI





Bootstrapping Flux

Manual process:

- Deploy the Controllers in the cluster
- Create a GitRepository resource pointing at a Git repo
- Create a Secret resource to access the Git repo
- Commiting the resource in the Git repo

Or

Install FluxCD Cli and run the **`flux boostrap`** command

Or

Use the Flux Terraform Provider


Demo Time

Summary

- Bootstrapped Flux on a fresh Kubernetes Cluster
- Deployed a simple application: Podinfo
- Upgraded Podinfo
- Configured an application using Variable substitution
- Enabled Helm Chart drift detection
- Deployed Cert-Manager and used components dependency
- Deployed an Ingress controller (Traefik) and exposed Podinfo
- Bootstrapped Flux on a cluster using the Flux Terraform Provider
- Deployed everything in one commit

Next Steps

- Flux Get Started guide: https://fluxcd.io/flux/get-started/
- Home labs K8s + Flux projects: https://nanne.dev/k8s-at-home-search/
- Integrate Renovate for automatic version update
- Configure a GitHub WebHook receiver
- Configure Notifications to send alerts to Slack and update Git Commit Status
- Deploy **`tf-controller`** to apply Terraform scripts using Flux
- Deploy Weave GitOps WebUI
- Collect metrics and deploy Grafana dashboard
- Integrate **`flagger`** with Ingress controller for progressive deployment

Questions

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