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Flux Deep Dive

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What is GitOps?



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kubectl apply

kubectl set image

helm upgrade

kubectl apply -k

git push

Flux CD - The GitOps Operator



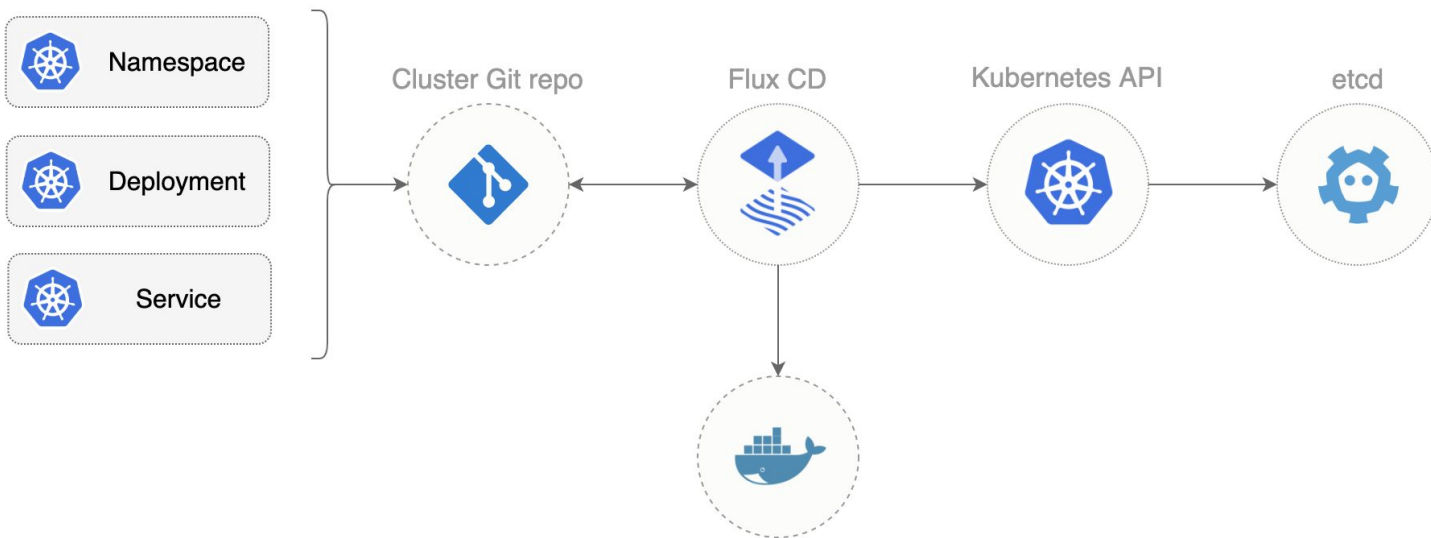
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Flux was created by Weaveworks in 2016 and is now a CNCF sandbox project. Flux is a controller that continually applies Kubernetes configuration, kept in git, to a cluster.



Flux CD - Automated Updates



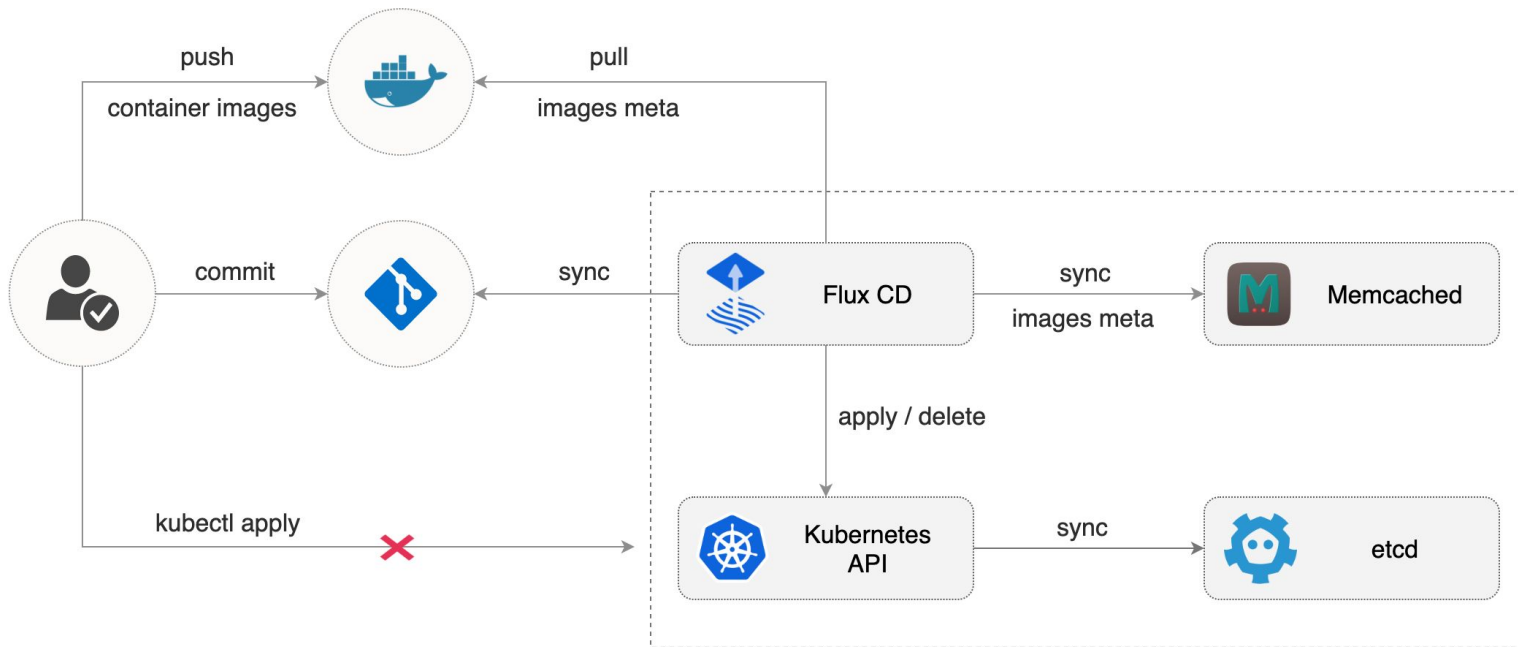
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Flux watches the registry for new image releases and based on deployment policies updates the workload definitions by committing to git on your behalf.



Flux CD - Helm Operator



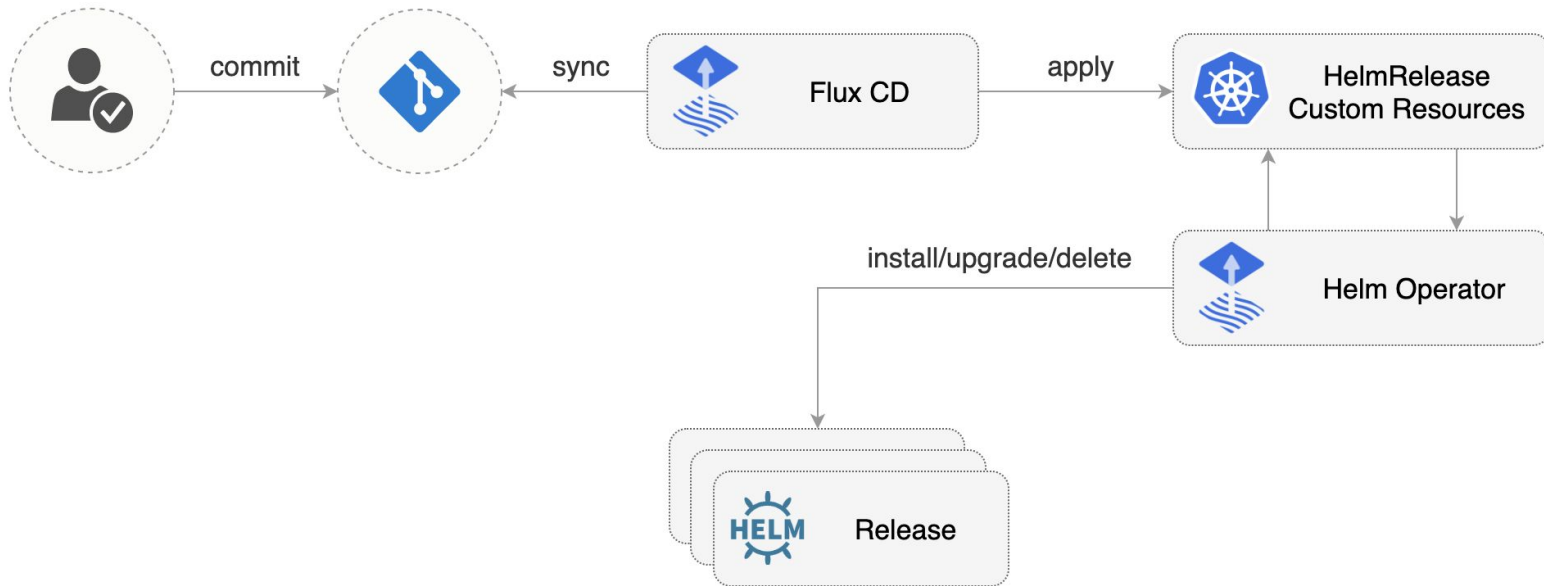
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Helm Operator is a Flux CD sub-project that makes Helm releases declarative, so they can be managed in the same way as Kubernetes resources.



Flux CD - Helm Operator



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Helm Operator features

- declarative helm install/upgrade/delete of charts
- works with Helm v2 and Tiller as well as with Helm v3
- pulls charts from:
 - public or private Helm repositories over HTTPS
 - public Git repositories over HTTPS
 - private Git repositories over SSH
- chart release values can be specified:
 - inline in the HelmRelease object
 - with secrets, configmaps or URLs
- automated chart upgrades based on Flux image tag policies
- automatic purging on chart install failures
- automatic rollback on chart upgrade failures

Flux CD - Helm Release CRD



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```
apiVersion: helm.fluxcd.io/v1
kind: HelmRelease
metadata:
  name: sealed-secrets
spec:
  releaseName: sealed-secrets
  chart:
    repository: https://kubernetes-charts.storage.googleapis.com/
    name: sealed-secrets
    version: 1.3.4
```

yami

Flux CD - Sem Ver Update Policy



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yaml

```
apiVersion: helm.fluxcd.io/v1
kind: HelmRelease
metadata:
  annotations:
    fluxcd.io/automated: "true"
    fluxcd.io/tag.chart-image: semver:~3.0
spec:
  values:
    image:
      repository: stefanprodan/podinfo
      tag: 3.0.0
```


Flux CD - Production Users

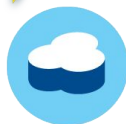


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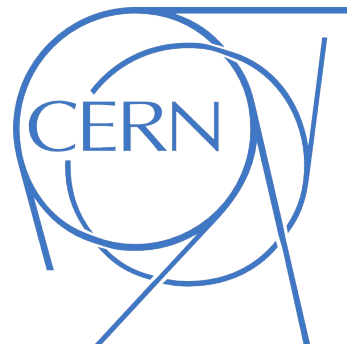
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Flux CD - Multi-tenancy



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A multi-tenant Kubernetes cluster is shared by multiple teams. A tenant is a group of users who share a Kubernetes namespace.

Operations:

- The cluster wide operations are performed by cluster administrators
- The namespace scoped operations are performed by team members

Restrictions:

- A team member can't create or modify cluster wide objects
- A team member can't change something in another team namespace

Flux CD - Multi-tenancy



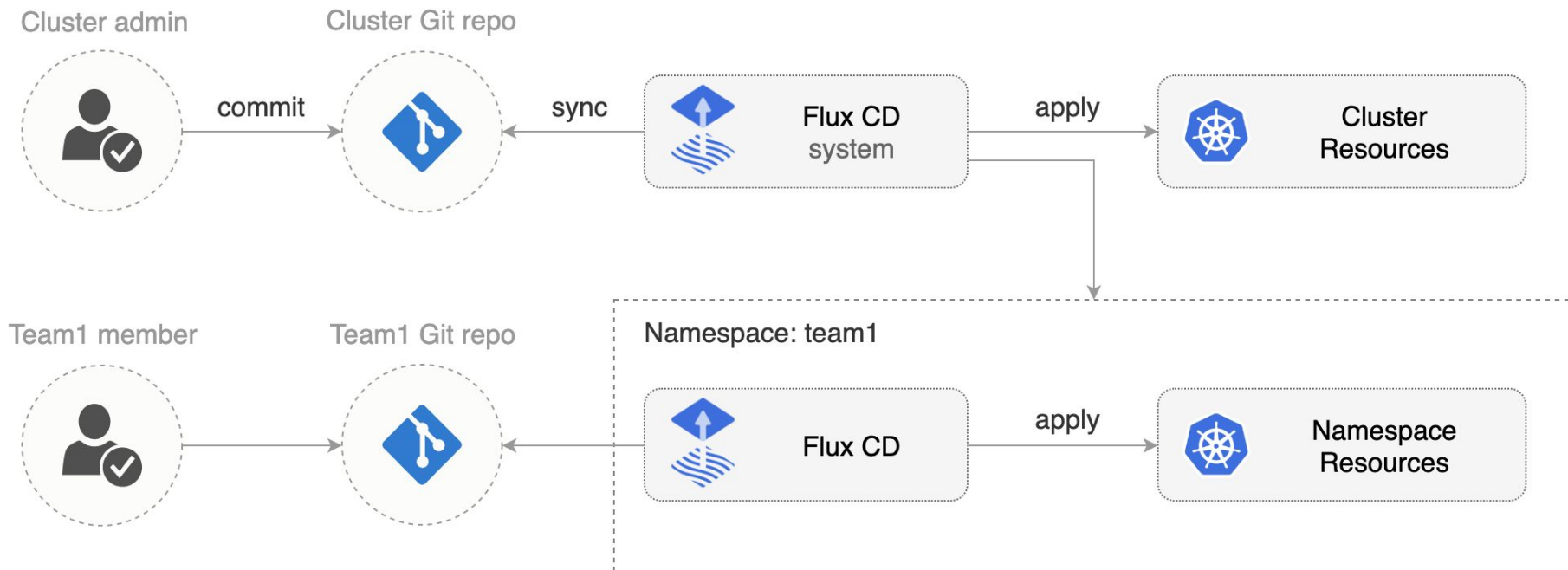
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Manage a multi-tenant cluster with Flux and Kustomize <https://github.com/fluxcd/multi-tenancy>



Flux CD - Multi-tenancy



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Cluster Administrators

- One Git repository
 - cluster wide objects (CRDs, controllers, policies)
 - team definitions (namespaces, service accounts, Flux instances)
- One Flux instance (cluster role binding)

Dev Teams

- One Git repository per team/namespace
 - applications (deployments, helm releases, canaries)
 - networking (services, ingresses, network policies)
- One Flux instance per team (namespace role binding)

Flux CD - Kustomize Support



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Flux can be configured to run generators and patches by placing `.flux.yaml` in the git repository next to your main kustomization file.

```
version: 1
patchUpdated:
  generators:
    - command: kustomize build .
  patchFile: flux-patch.yaml
```

yaml

Flux CD - Open Policy Agent



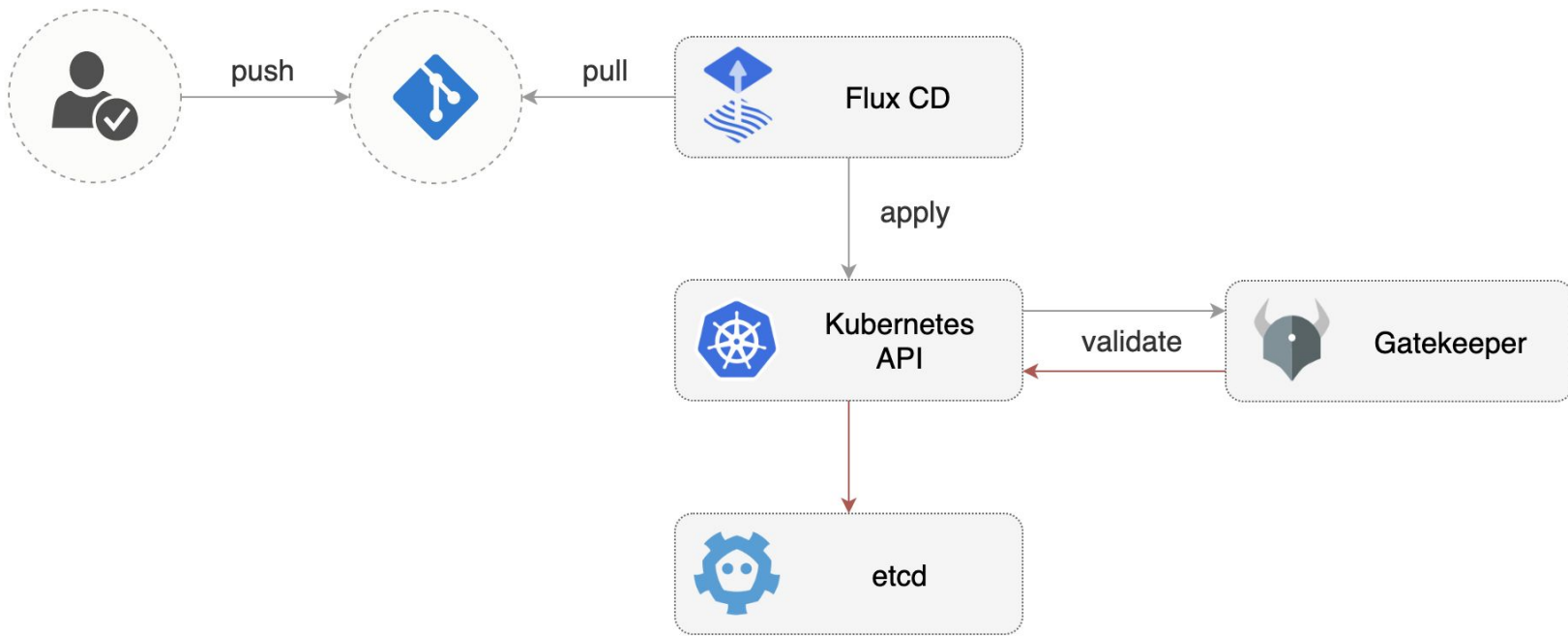
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Enforce custom policies with Flux and Gatekeeper's validating webhook.



Flux CD - Secrets Support



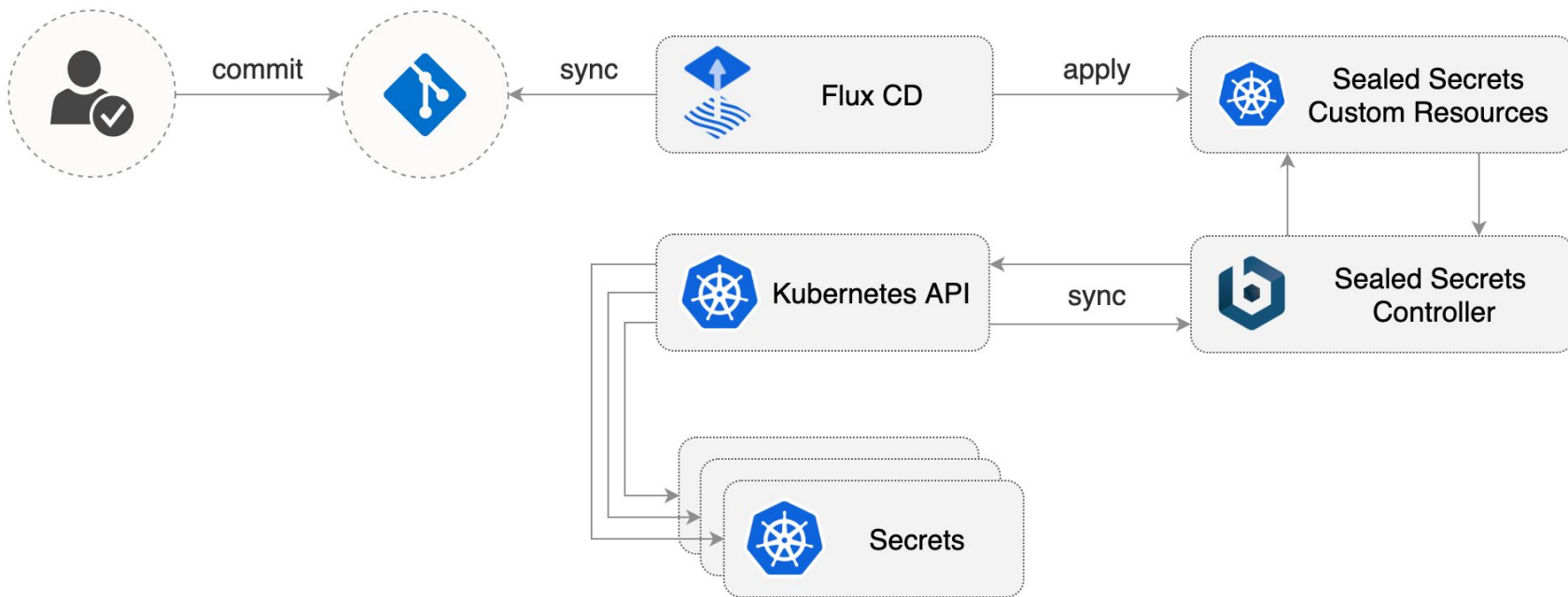
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In order to store secrets safely in a public Git repo you can use Flux with Bitnami [Sealed Secrets](#) controller, git-secret or Mozilla SOPS.



Flux CD - Progressive Delivery



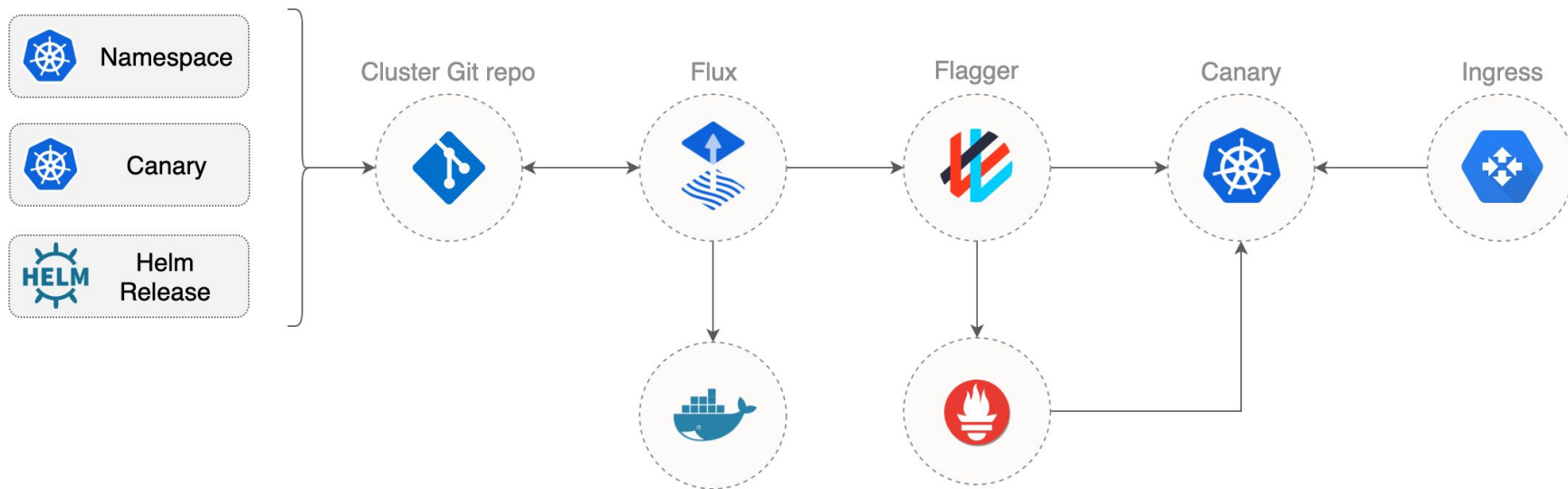
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For advanced deployment patterns like Canary releases, A/B testing and Blue/Green deployments, Flux can be used together with [Flagger](#) and a service mesh of your choice (Istio, Linkerd, App Mesh).



Flux CD - Kubernetes Profiles



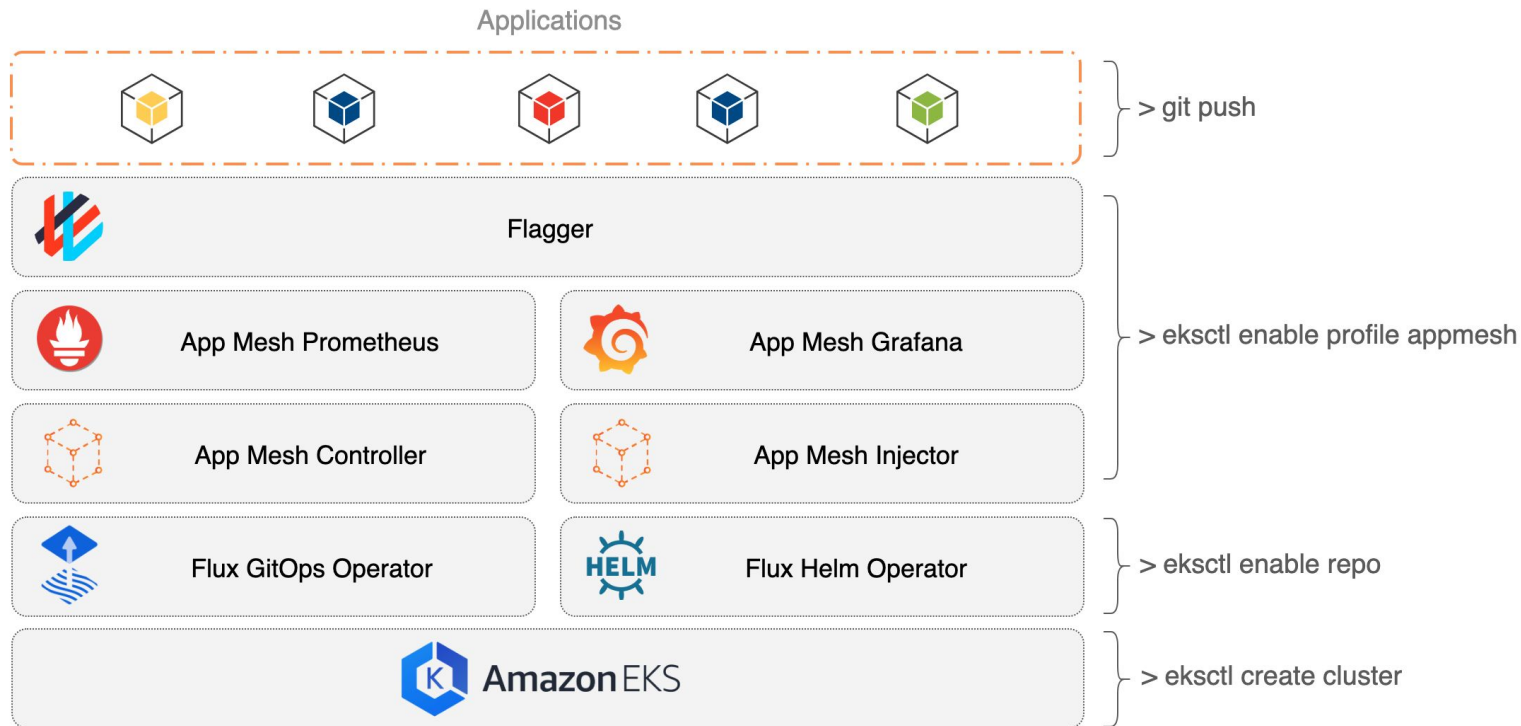
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Flux and Helm Operator power the GitOps features in [eksctl](#).



Flux CD - 2020 Roadmap



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- **Adopt the gitops-engine (Argo Flux common core)**
 - **Support multiple Git repositories**
 - **Multi-phase apply (e.g. admission webhooks readiness checks)**
 - **Observability improvements (sync failures tracing)**
- **Sub-projects**
 - **Container registry scanning and image updates**
 - **Helm OCI-based registry scanning and automated chart updates**
 - **Git and container registry hooks**

GitOps online workshop



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Try our GitOps Hands-On!
<https://eks.handson.flagger.dev>

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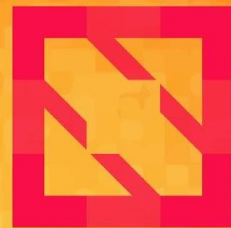
- Flux docs <https://docs.fluxcd.io>
- Flux repo <https://github.com/fluxcd/flux>
- Helm Operator docs <https://docs.fluxcd.io/projects/helm-operator/en/latest/>
- Helm Operator repo <https://github.com/fluxcd/helm-operator>

Progressive Delivery

- Flagger docs <https://docs.flagger.app>
- Flagger repo <https://github.com/weaveworks/flagger>
- GitOps Helm v3 hands-on <https://helm.workshop.flagger.dev>
- GitOps EKS hands-on <https://eks.handson.flagger.dev>



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