Managing Thousands of Clusters & Their Workloads with Flux

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Kubernetes Engineer & Flux Engineer

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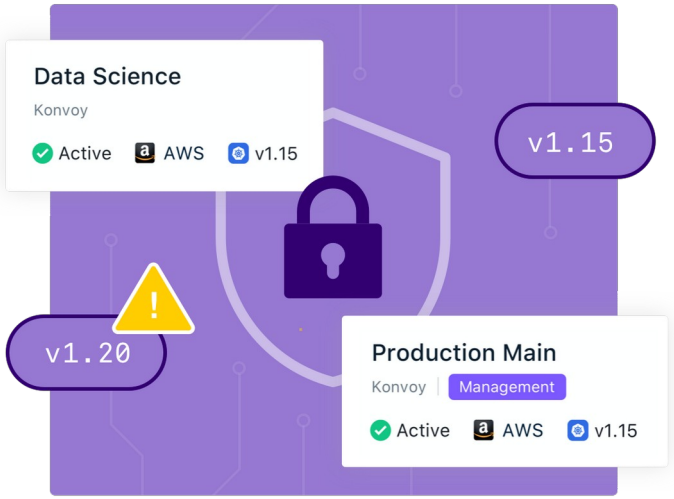
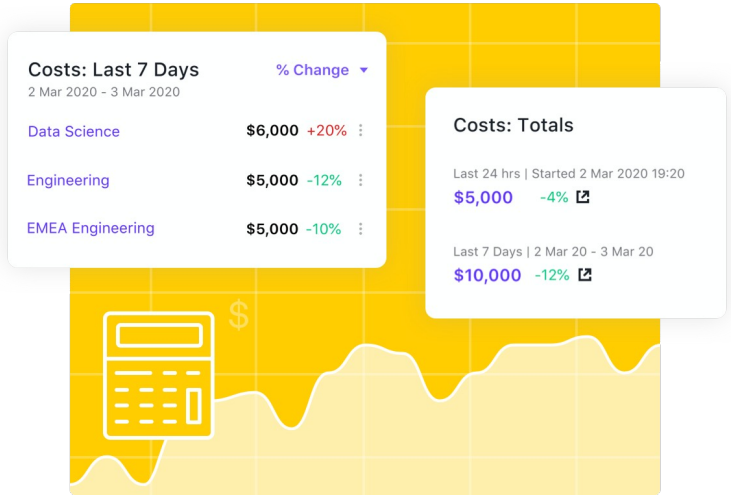
Introduction

What is Kommander?

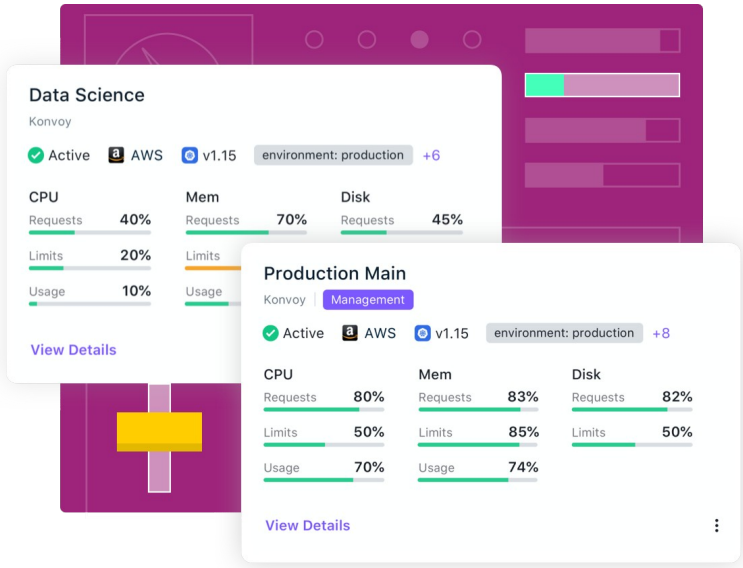
Manage applications and infrastructure



real-time cost management

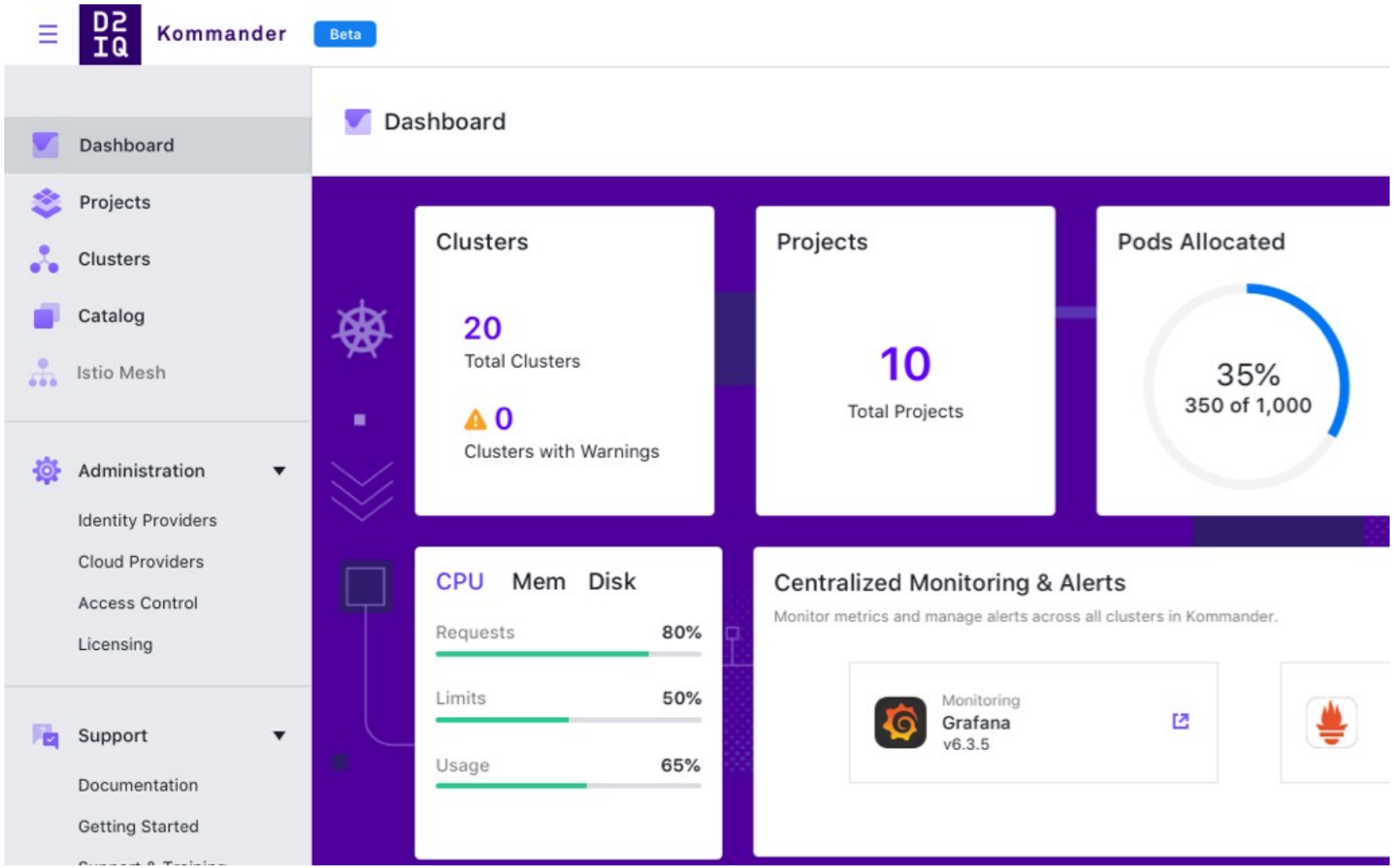


centralized observability



Introduction

What is Kommander?



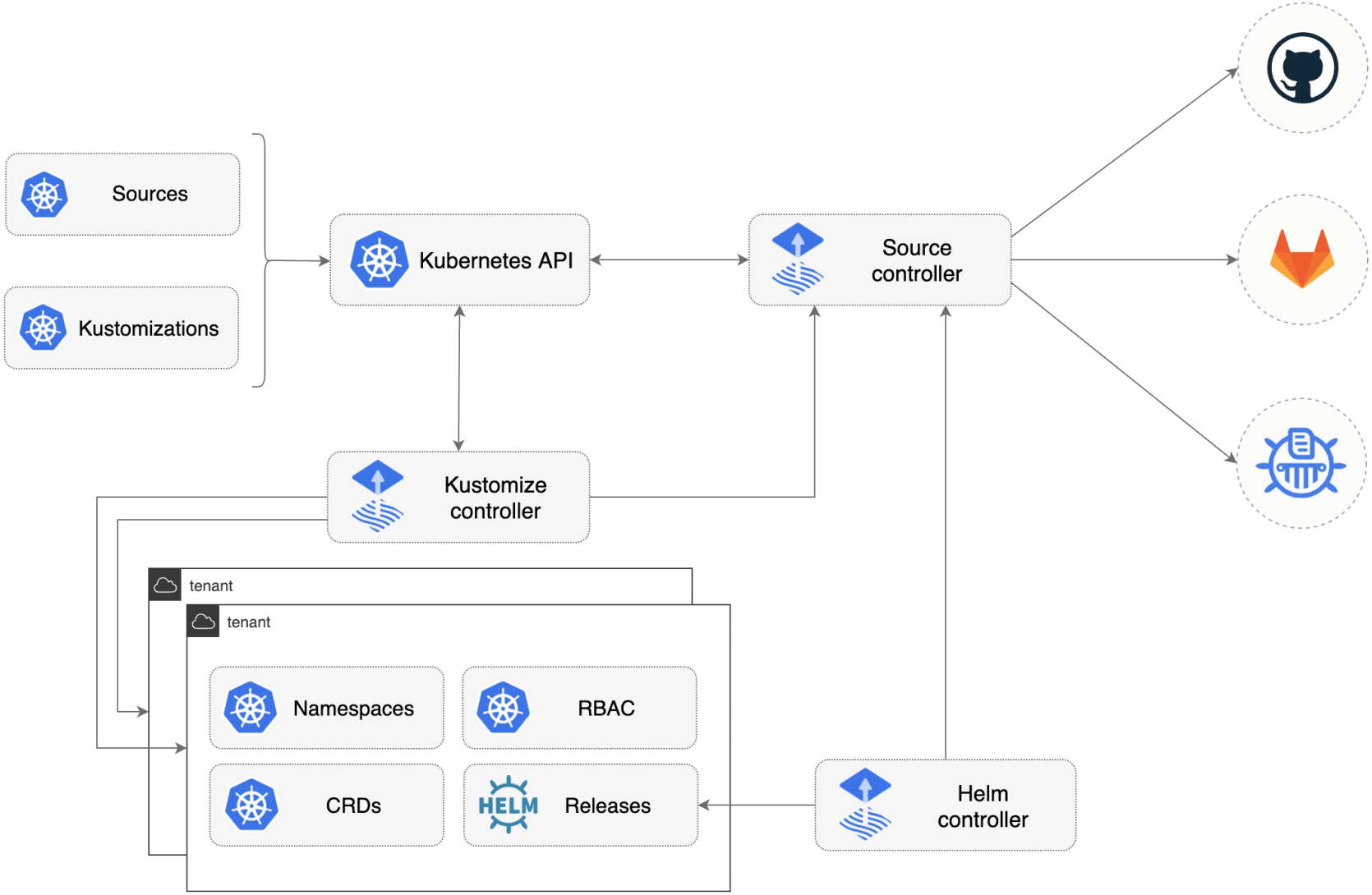
Introduction

Before Flux came along

kubeaddons + kubefed

Introduction

Along came Flux



Introduction

Along came Flux

```
$ flux install
$ flux create source git podinfo \
    --url=https://github.com/stefanprodan/podinfo \
    --branch=master --interval=10m
$ flux create kustomization common \
    --source=GitRepository/podinfo \
    --path=deploy/webapp/common
$ flux create kustomization backend \
    --source=GitRepository/podinfo \
    --path=deploy/webapp/backend --depends-on common
$ kubectl -n webapp get deploy -w
NAME      READY   UP-TO-DATE   AVAILABLE   AGE
backend   0/1     1            0           11s
backend   1/1     1            0           21s
```

Introduction

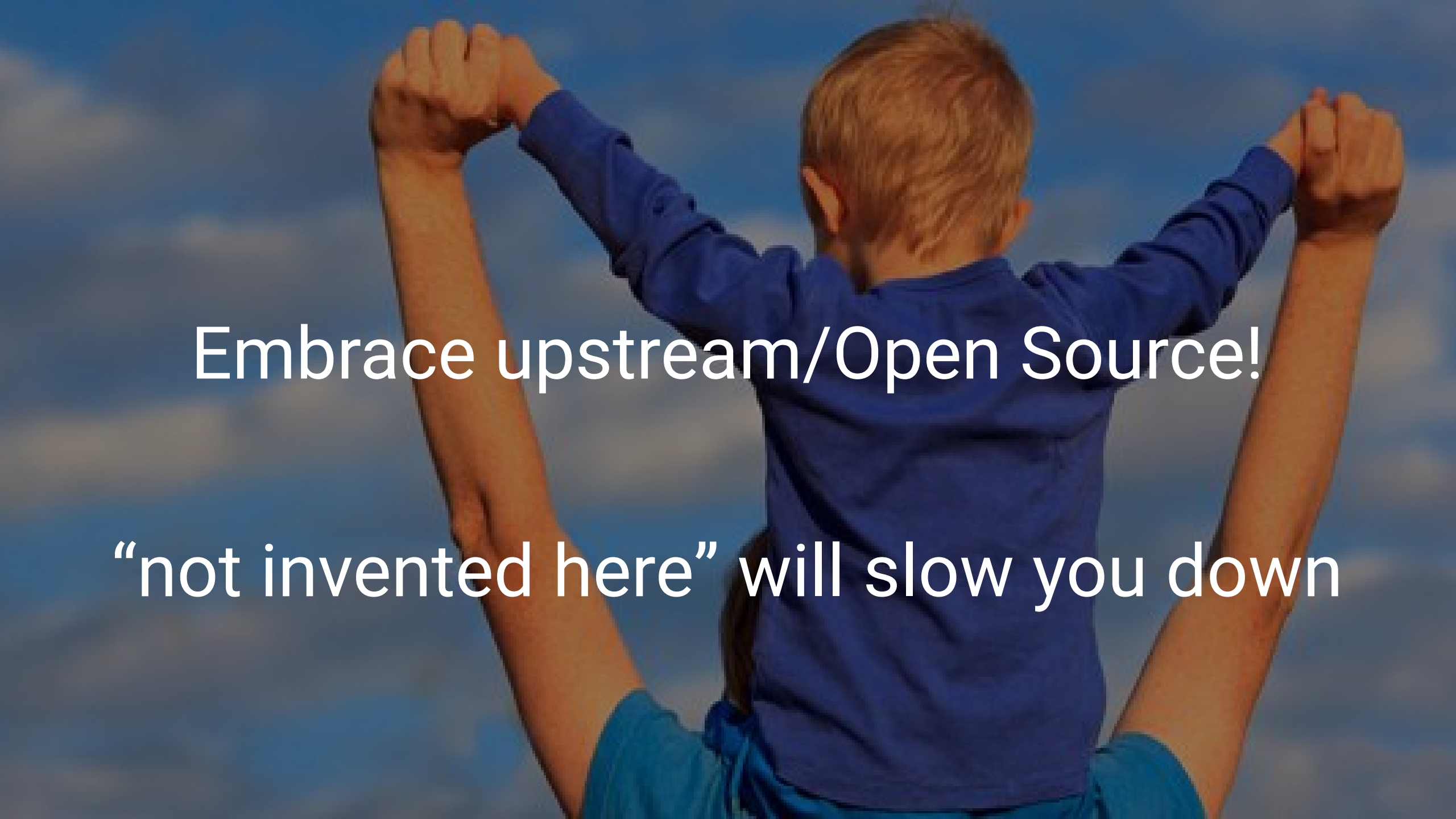
Why Flux now?

Provide users with benefits of GitOps workflow that they already successfully apply:

- central log of which applications have been enabled/disabled on which cluster
- central storage of application configuration
- employing well-known practices like code review
- simple way to roll back changes

Demo time

Takeaways?!


Embrace upstream/Open Source!
“not invented here” will slow you down

Keep an ear to the ground!

Custom CLIs for tailored user experience!


Experiment!

Reach out!

Email:	max@e13.dev
Twitter:	@makkes
CNCF Slack:	#flux
Kubernetes Slack:	#sig-multicluster

Get hired!

https://d2iq.com/careers

Fin!

Multi-cluster Application Management

Challenges

- Deploy same app multiple times
- Deploy different versions of same app to different clusters
- Dynamically inject values to Flux-managed resources

Multi-cluster Application Management

Challenge: Deploy same app multiple times

AppDeployment “my-metallb”:

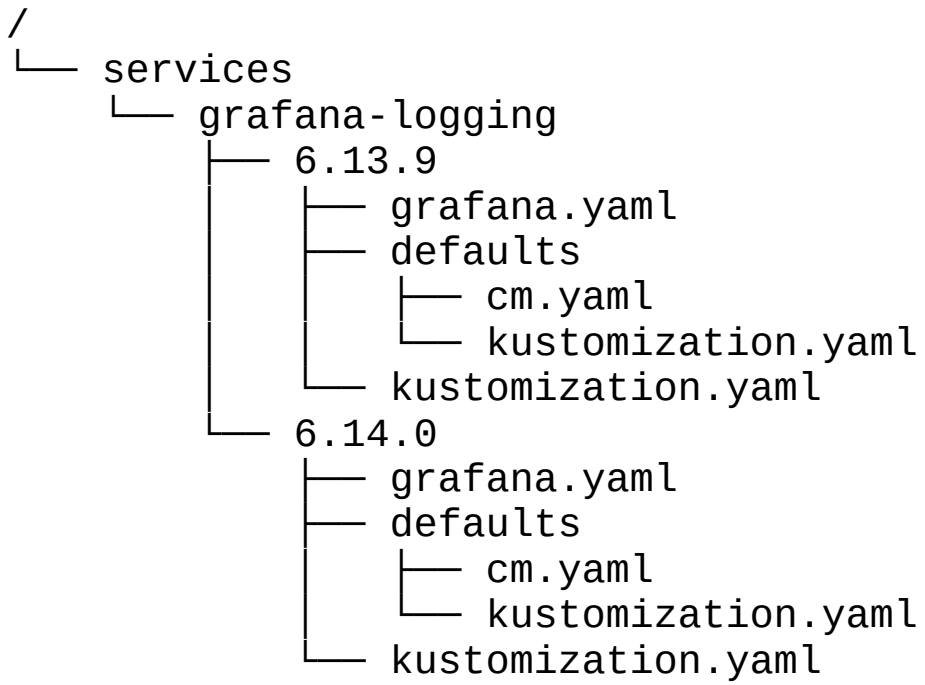
```
patchesJson6902:
- patch:
  - op: replace
    path: /metadata/name
    value: my-metallb
  target:
    kind: HelmRelease
    name: metallb
```

AppDeployment “my-metallb-2”:

```
patchesJson6902:
- patch:
  - op: replace
    path: /metadata/name
    value: my-metallb-2
  target:
    kind: HelmRelease
    name: metallb
```

Multi-cluster Application Management

Challenge: Deploy different versions of same app to different clusters



Multi-cluster Application Management

Challenge: Dynamically inject values to Flux-managed resources

```
apiVersion:
helm.toolkit.fluxcd.io/v2beta1
kind: HelmRelease
metadata:
  name: kubefed
  namespace: ${releaseNamespace}
```

```
apiVersion:
kustomize.toolkit.fluxcd.io/v1beta1
kind: Kustomization
[...]
  postBuild:
    substituteFrom:
    - kind: ConfigMap
      name: substitution-vars
```

```
apiVersion: v1
kind: ConfigMap
data:
  releaseNamespace: foo
[...]
```

Automate all the things!

Don’t be afraid of writing controllers that contribute to a Git repository!

The Future

- Use Flux-native resources to surface Application status
  - Kustomization health checks
  - declarative health checking
  - no additional code needed
- Our mentality is upstream-first
- Multiple Git repositories for better tenant/cluster isolation
- Remote Kustomization application (with `.spec.kubeConfig`)