


# Higher-Order Deployments

Reducing Boilerplate With Kubernetes  
Custom Resource Definitions

@jrbowes  
May 3, 2018



<https://www.manifold.co>

**SIGN UP  
TODAY**



**YES, WE  
ARE HIRING**





Photo by [Tyler Milligan](#) on [Unsplash](#)





HashiCorp

# Packer



HashiCorp

# Terraform



# BASH

THE BOURNE-AGAIN SHELL

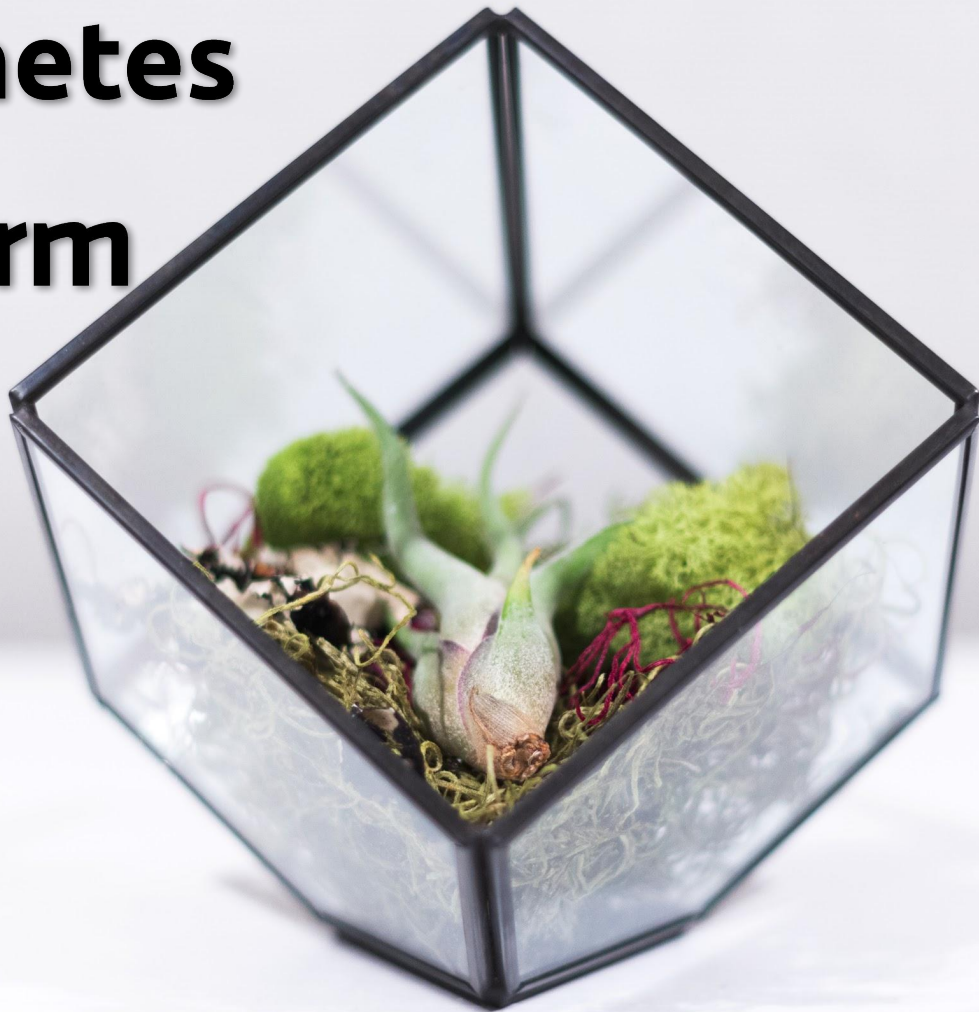




# kubernetes

HashiCorp

# Terraform





Application  
(kubectl)

Kubernetes  
(kubectl + terraform)

Cloud provider  
(kubectl + terraform)





Photo by [Etienne Pauthenet](#) on [Unsplash](#)







```
apiVersion: extensions/v1beta1
```

```
kind: Deployment
```

```
metadata:
```

```
  name: worker
```

```
spec:
```

```
  replicas: 2
```

```
  strategy:
```







HashiCorp

**Terraform**

**ANSIBLE**



**puppet**



**CHEF™**

Photo by [Alexandru Tugui](#) on [Unsplash](#)

**@jrbowes**



Photo by [Alexandru Tugui](#) on [Unsplash](#)

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Deployment

ReplicaSet

ReplicaSet

Pod

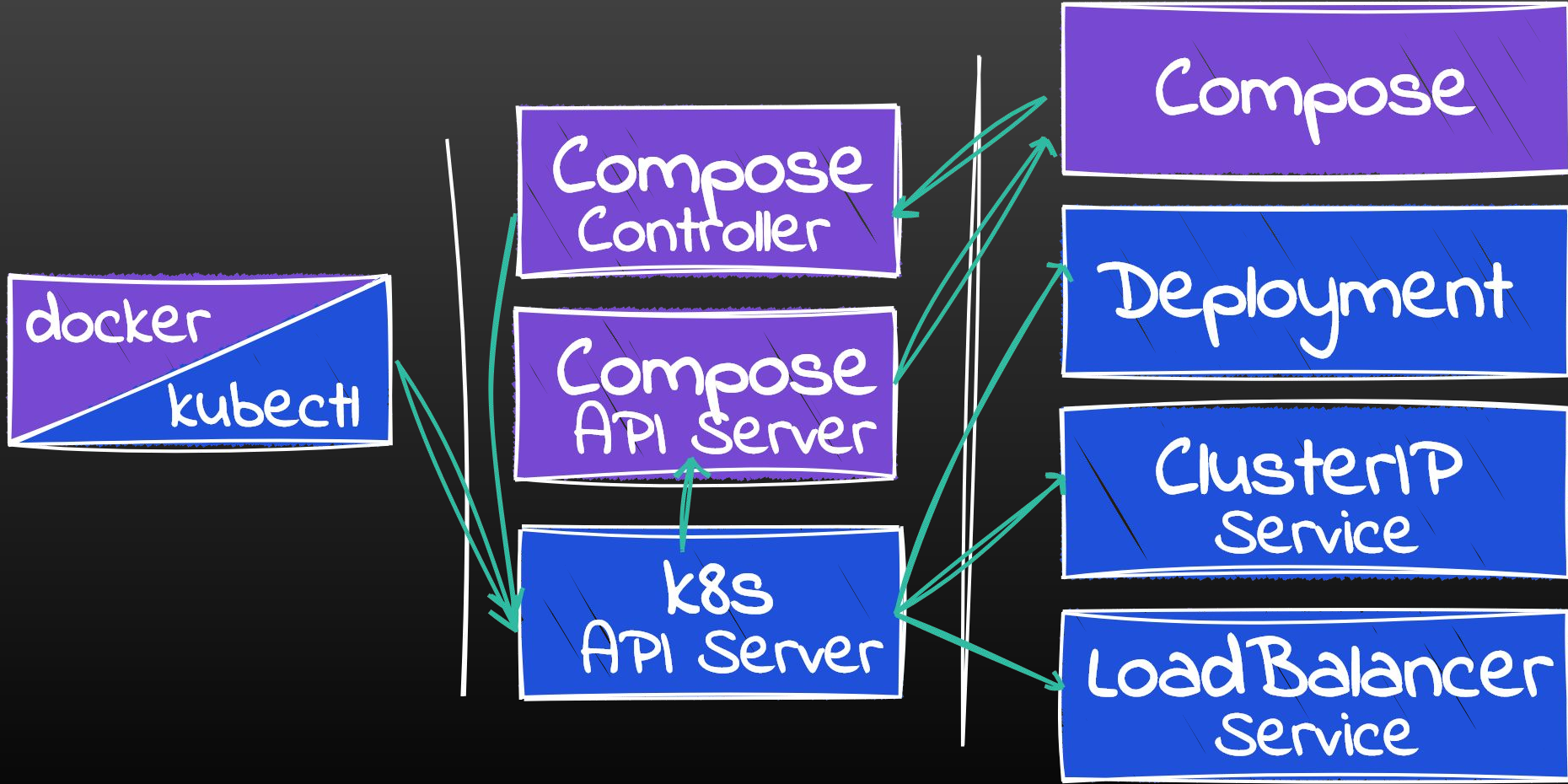
Pod

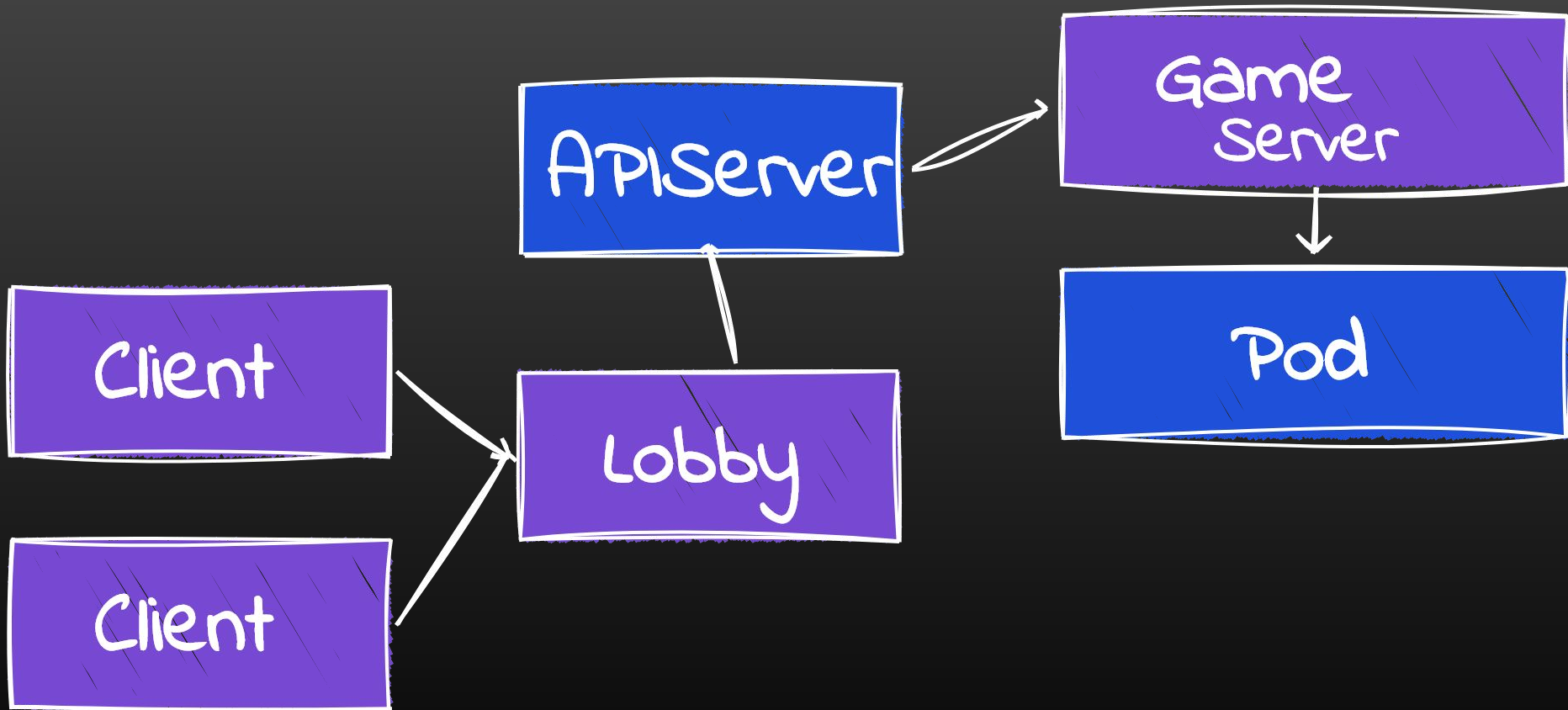
Pod

Pod

Pod







# **Kubernetes is Composition**



**Kubernetes is  
a Database**

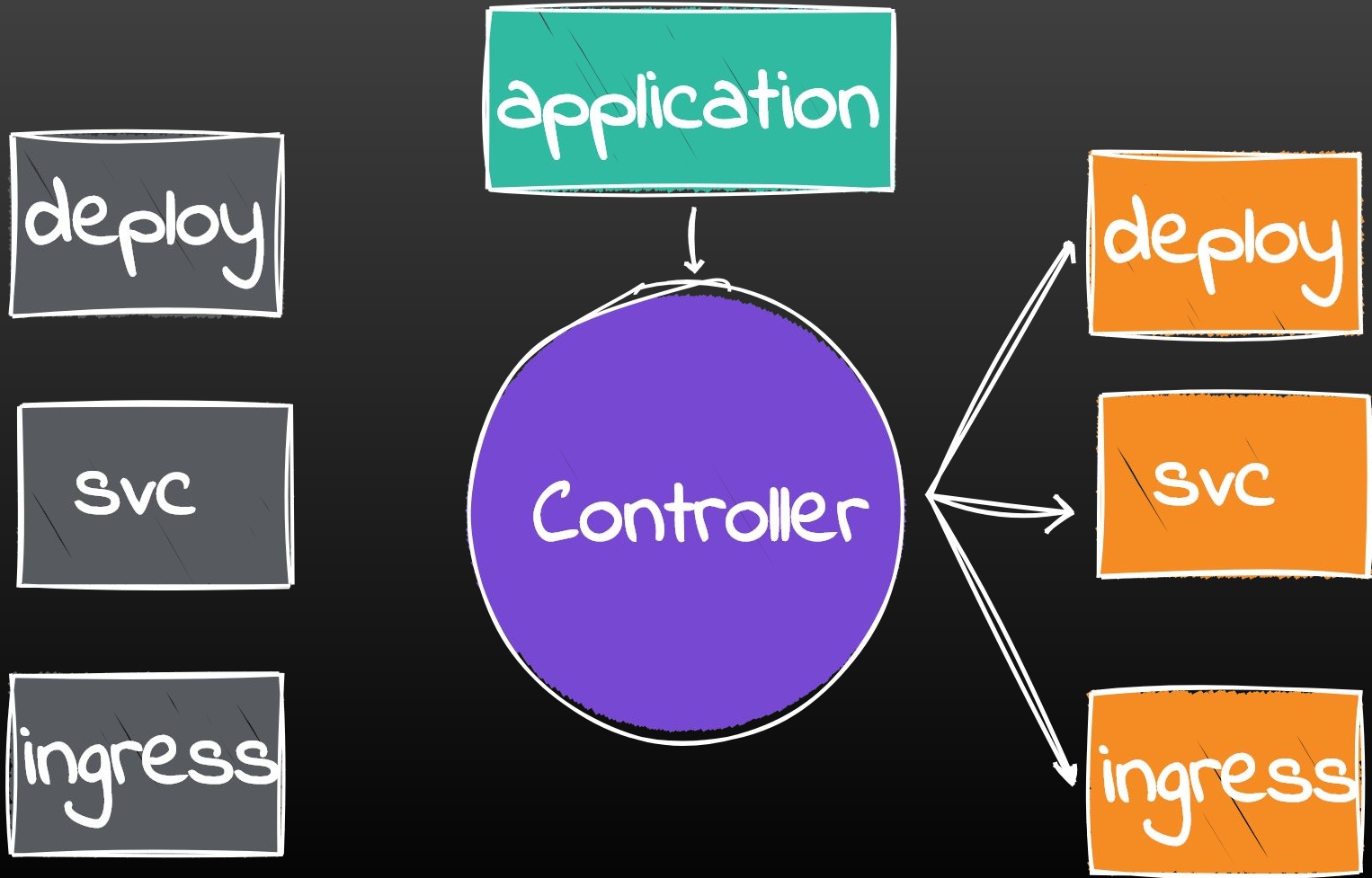
- **1 Custom Resource Definition**
- **1 Controller**
- **Admission Controllers to taste**



```
apiVersion: apiextensions.k8s.io/v1beta1
kind: CustomResourceDefinition
metadata:
  name: applications.manifold.co
spec:
  group: stable.manifold.co
  version: v1
  scope: Namespaced
  names:
    plural: applications
    singular: application
    kind: Application
```

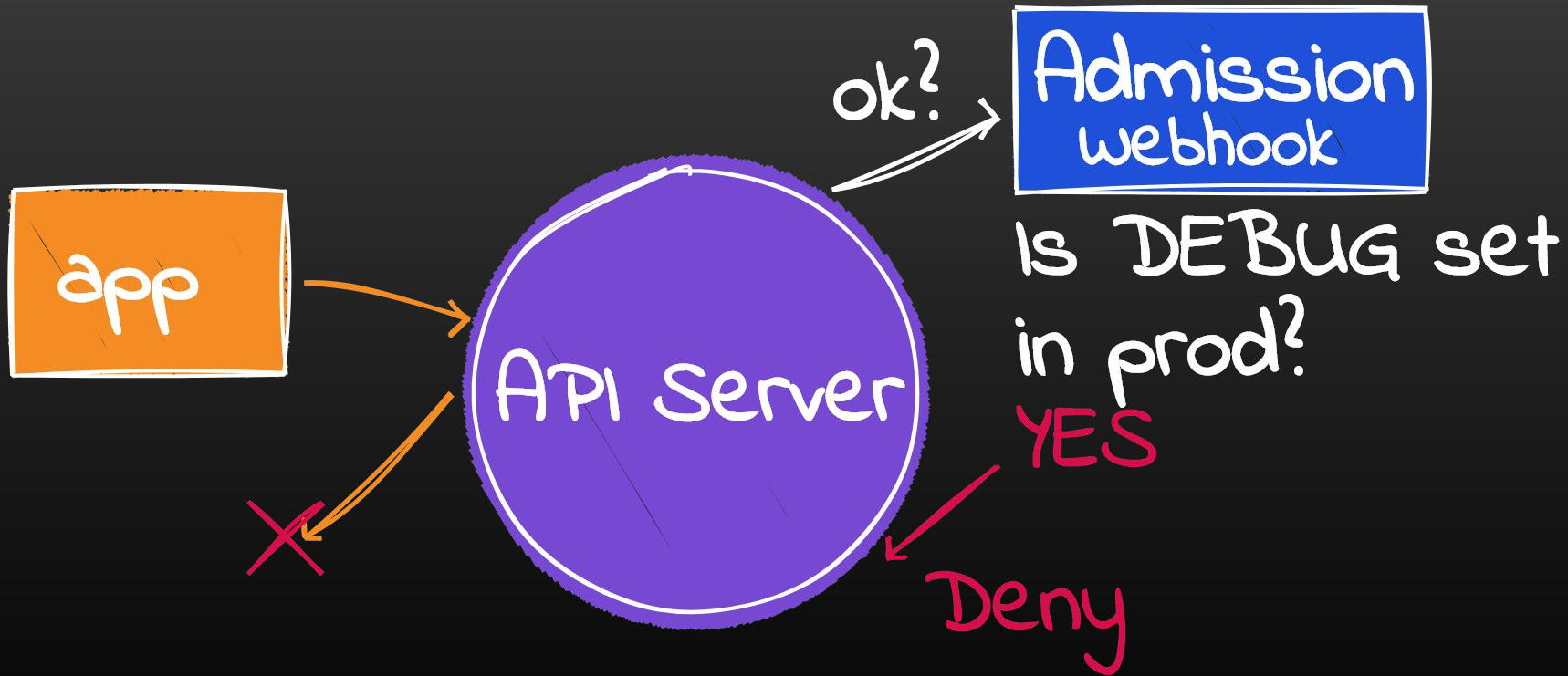


```
validation:
  openAPIV3Schema:
    properties:
      spec:
        properties:
          replicas:
            type: integer
            minimum: 2
          image:
            type: string
```



# Start with Metacontroller





**Why?**

Your laptop

Kubernetes

tmpl

deploy

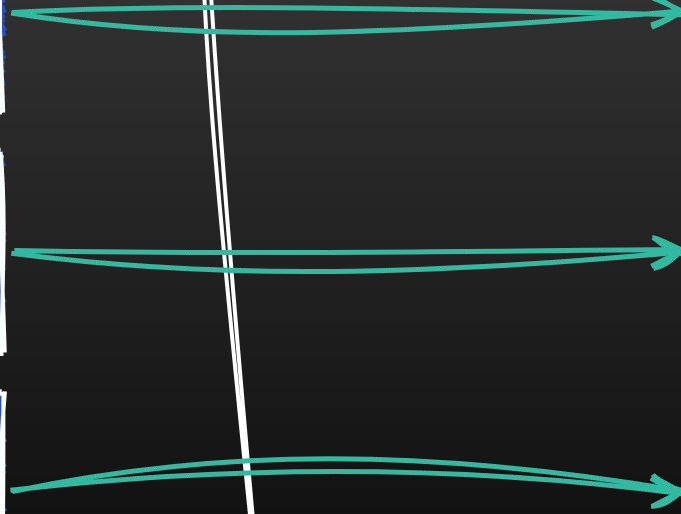
deploy

svc

deploy

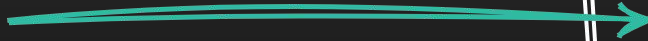
deploy

svc

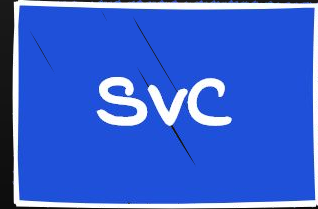
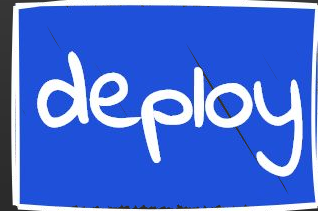
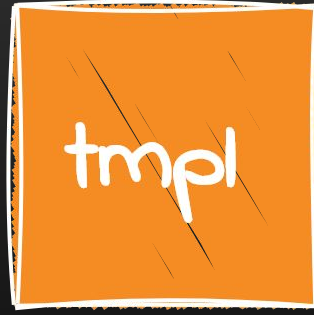


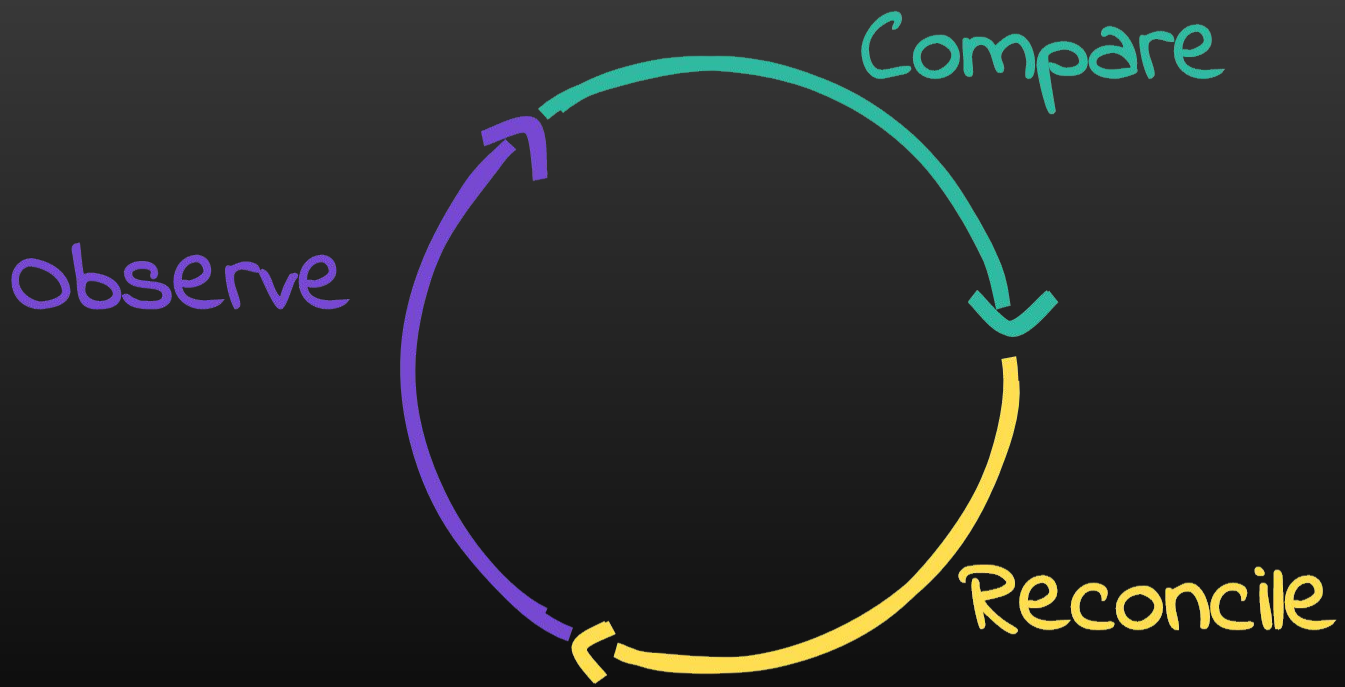


Your laptop



Kubernetes





```
- name: Create my app's deployment
  k8s_raw:
    state: present
    definition:
      apiVersion: extensions/v1beta1
      kind: Deployment
      metadata:
        name: my-app
      spec:
        replicas: 2
```



```
- name: Create all of my app
  k8s_raw:
    state: present
    definition:
      apiVersion: manifold.co/v1
      kind: Application
      metadata:
        name: my-app
      spec:
        external: true
```

# **Build your own Operators**

A photograph of a construction site at night. In the foreground, there are several white and red striped traffic barriers with large, glowing orange traffic lights on top. In the background, a yellow excavator is visible, and other workers in high-visibility vests are scattered across the site. The scene is dimly lit, with the primary light sources being the traffic lights and some distant site lights.

**CRDs are new & incomplete**  
**No multi-version support yet**

A photograph of a construction site at night. In the foreground, there are several white and red striped traffic barriers with large, glowing orange traffic lights on top. In the background, a yellow excavator is visible, and other construction equipment and workers in high-visibility vests are scattered across the site. The scene is dimly lit, with the primary light sources being the traffic lights and some distant site lights.

# Many moving parts

## Definition, controller, webhooks



# Attempts to simplify are still early

- Metacontroller
- Kubekit
- operator-sdk
- Your cool project?

**NEW!**



# Thank you!

@jrbowes

April 18, 2018