

Building a Custom K8S Controller



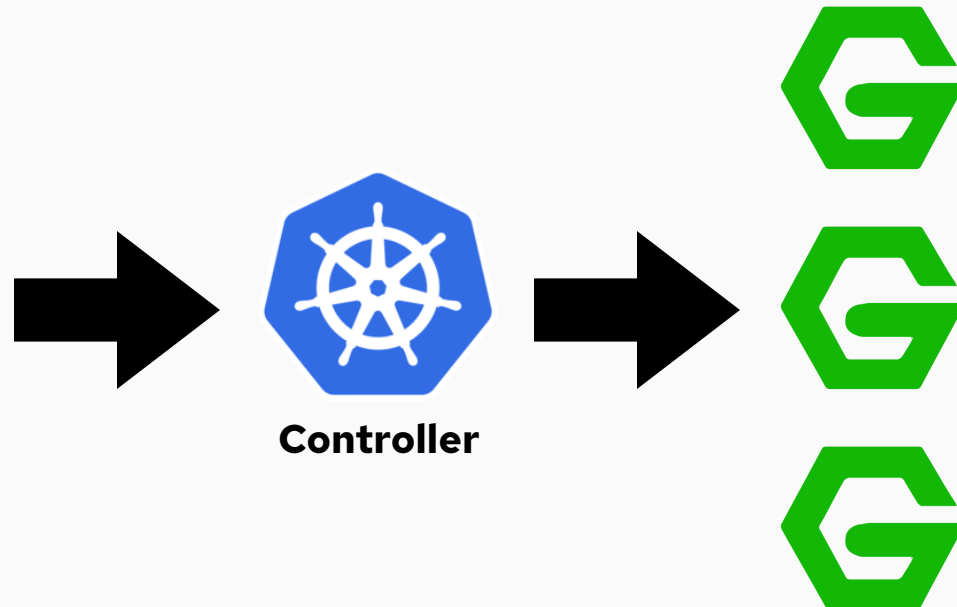
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Contributing to Tekton Pipelines

 **@hrishike8**

Controller(s)

Maintains the **desired** state

```
1 spec:
2   replicas: 3
3   selector:
4     matchLabels:
5       app: nginx
6   template:
7     ....
8   spec:
9     containers:
10      - name: nginx
11        image: nginx:1.7.9
```



Of Resource(s)

Pod Deployment Node

....

```
1  apiVersion: apps/v1
2  kind: Deployment
3  metadata:
4    name: nginx-deployment
5    labels:
6      app: nginx
7  spec:
8    replicas: 3
9    .....
```

Custom Resource(s)

```
type PodSet struct {  
    metav1.TypeMeta  
    metav1.ObjectMeta  
  
    Spec    PodSetSpec  
    Status  PodSetStatus  
}
```

```
apiVersion: apiextensions.k8s.  
kind: CustomResourceDefinition  
metadata:  
  name: podsets.demo.k8s.io  
spec:  
  group: demo.k8s.io  
  version: v1alpha1  
  names:  
    kind: PodSet
```

```
1 apiVersion: demo/v1  
2 kind: PodSet  
3 metadata:  
4   name: two-podset  
5 spec:  
6   replicas: 3
```

Custom Controllers

```
1 apiVersion: demo/v1
2 kind: PodSet
3 metadata:
4   name: two-podset
5 spec:
6   replicas: 3
```

CRD



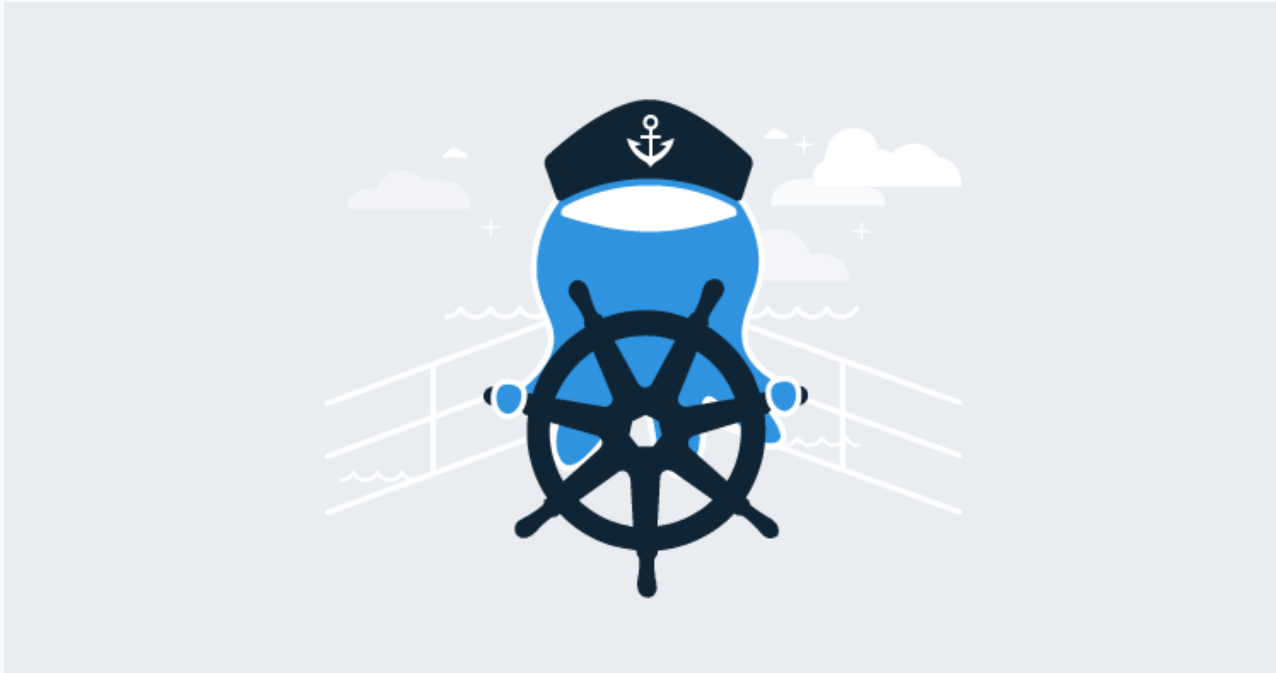
Controller

Use of Custom Controllers?



Extends kubernetes platform

Use of Custom Controllers?



Operators

Operators

Its an autopilot for an application where it extends Kubernetes API to install, configure, scaling or recovery of application instances.

It bakes application operational knowledge into application specific controller

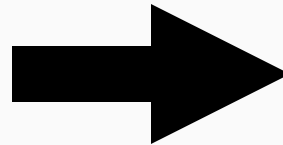
Operators

e.g. Install & Run highly available MySQL database cluster

```
1  apiVersion: mysql.presslabs.org/v1alpha1
2  kind: MysqlCluster
3  metadata:
4    name: mysql-cluster
5  spec:
6    replicas: 3
7    secretName: my-secret
```

PodSet Example

```
1 apiVersion: demo/v1
2 kind: PodSet
3 metadata:
4   name: two-podset
5 spec:
6   replicas: 3
```



**busy box
containers**

Go Lang Dependencies

client-go : k8s.io/client-go

apimachinery : k8s.io/apimachinery

api : k8s.io/api

code-generator : k8s.io/code-generator

Genrate go clients

to get, create, delete, watch
PodSet resource

```
watcher, err := client.DemoV1alpha1().  
    PodSets("pods").  
    Watch(metav1.ListOptions{})
```

```
1 ./vendor/code-generator/generate-groups.sh \  
2 "client" \  
3 github.com/hrishin/podset-operator/pkg/client \  
4 github.com/hrishin/podset-operator/pkg/apis \  
5 demo:v1alpha1
```

Gotchas

```
x-255 ~/go/src/github.com/hrishin/podset-operator [master L|+ 5...4]
19:44 $ ~/go/src/k8s.io/code-generator/generate-groups.sh "deepcopy,client" github.com/hrishin/podset-operator/pkg/apis demo:v1alpha1
Generating deepcopy funcs
F0524 19:44:54.564606      1761 main.go:82] Error: Failed making a parser: unable to add directory "github.com/hrishin/podset-operator/pkg/apis/demo/v1alpha1": go/build: importGo github.com/hrishin/podset-operator/pkg/apis/demo/v1alpha1: cannot find module providing package github.com/hrishin/podset-operator/pkg/apis/demo/v1alpha1"
it status 1
go: finding github.com/hrishin/podset-operator/pkg/apis/demo/v1alpha1 latest
go: finding github.com/hrishin/podset-operator/pkg/apis/demo latest
go: finding github.com/hrishin/podset-operator/pkg/apis latest
go: finding github.com/hrishin/podset-operator/pkg latest
can't load package: package github.com/hrishin/podset-operator/pkg/apis/demo/v1alpha1: unknown import path "github.com/hrishin/podset-operator/pkg/apis/demo/v1alpha1": cannot find module providing package github.com/hrishin/podset-operator/pkg/apis/demo/v1alpha1
```

Write boilerplate code

Define custom types(CRD)

▲ PODSET-OPERATOR

▲ pkg

▲ apis

▲ demo

▲ v1alpha1

👤 doc.go

👤 register.go

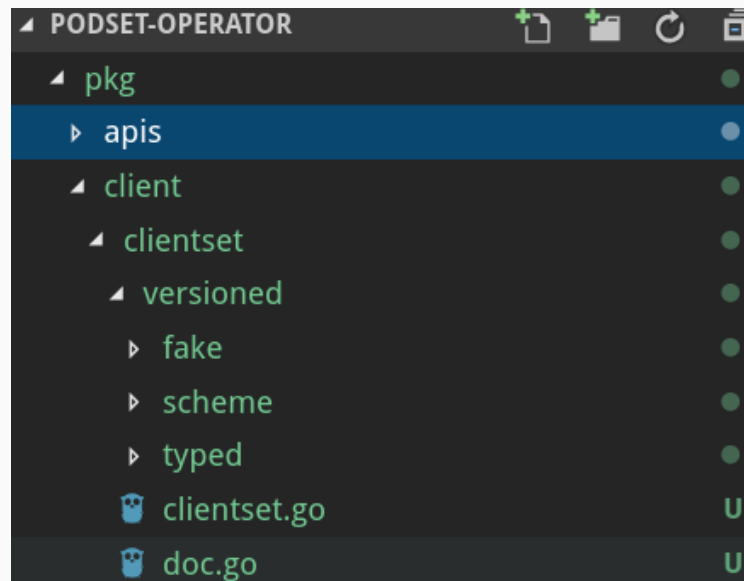
👤 types.go

👤 register.go

CRD and Clients

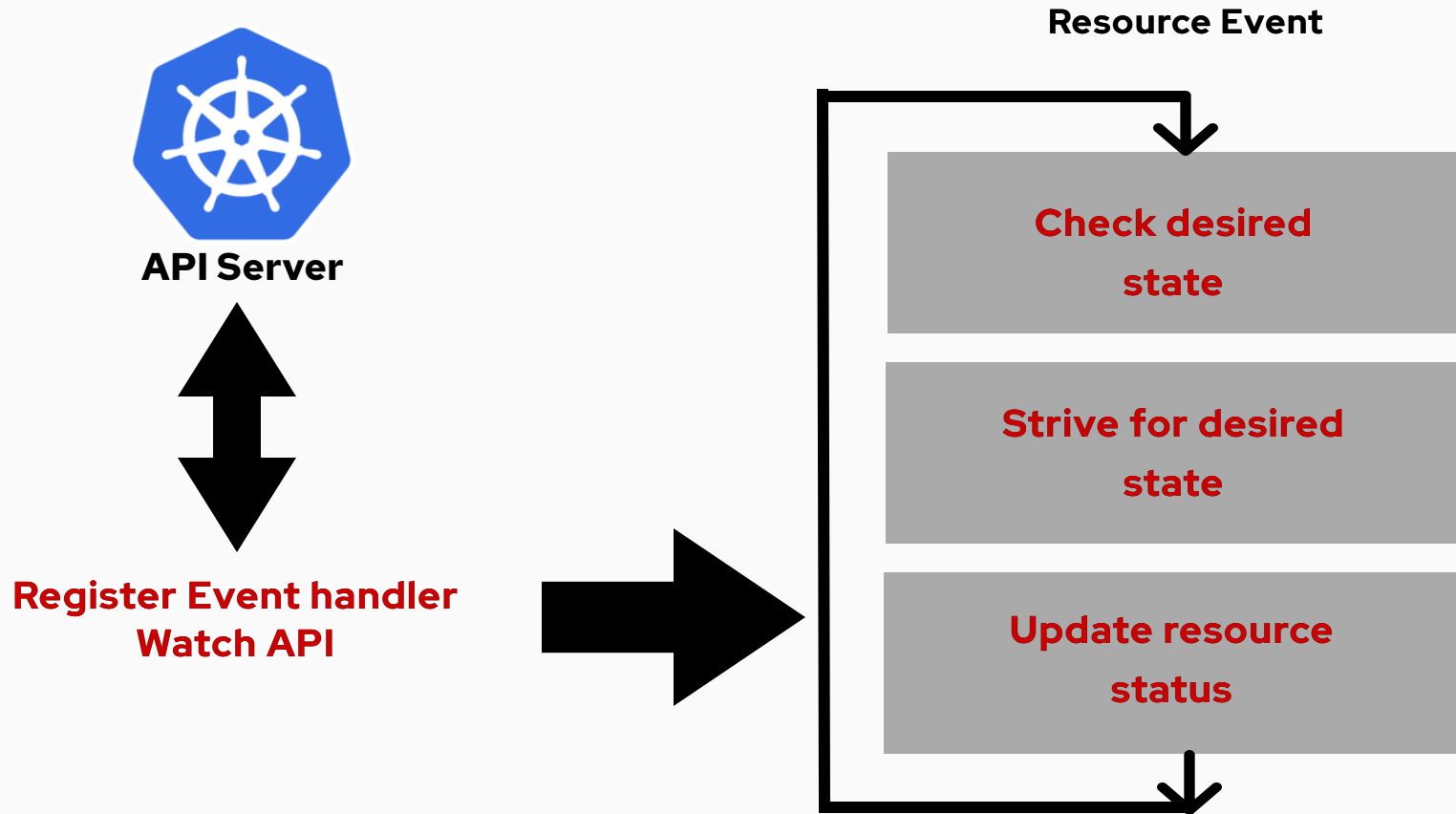
in place now, yay!

```
✓ ~/go/src/github.com/hrishin/podset-operator [master L|+ 2...15]
20:30 $ ~/go/src/k8s.io/code-generator/generate-groups.sh "deepcopy,client" \
> github.com/hrishin/podset-operator/pkg/client \
> github.com/hrishin/podset-operator/pkg/apis \
> demo:v1alpha1
Generating deepcopy funcs
Generating clientset for demo:v1alpha1 at github.com/hrishin/podset-operator/pkg/client/clientset
```

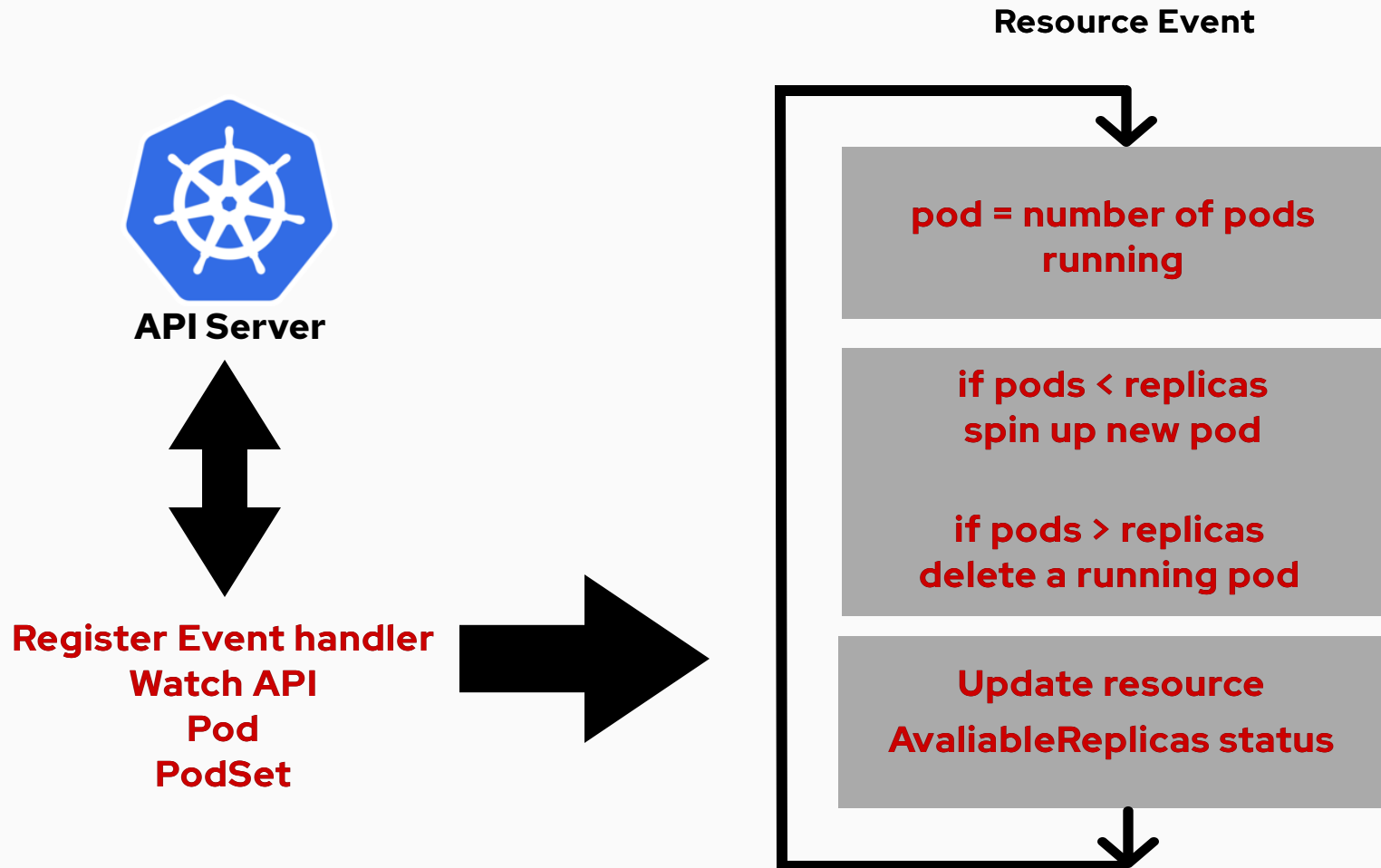


Hello Watch Demo

Controller Flow

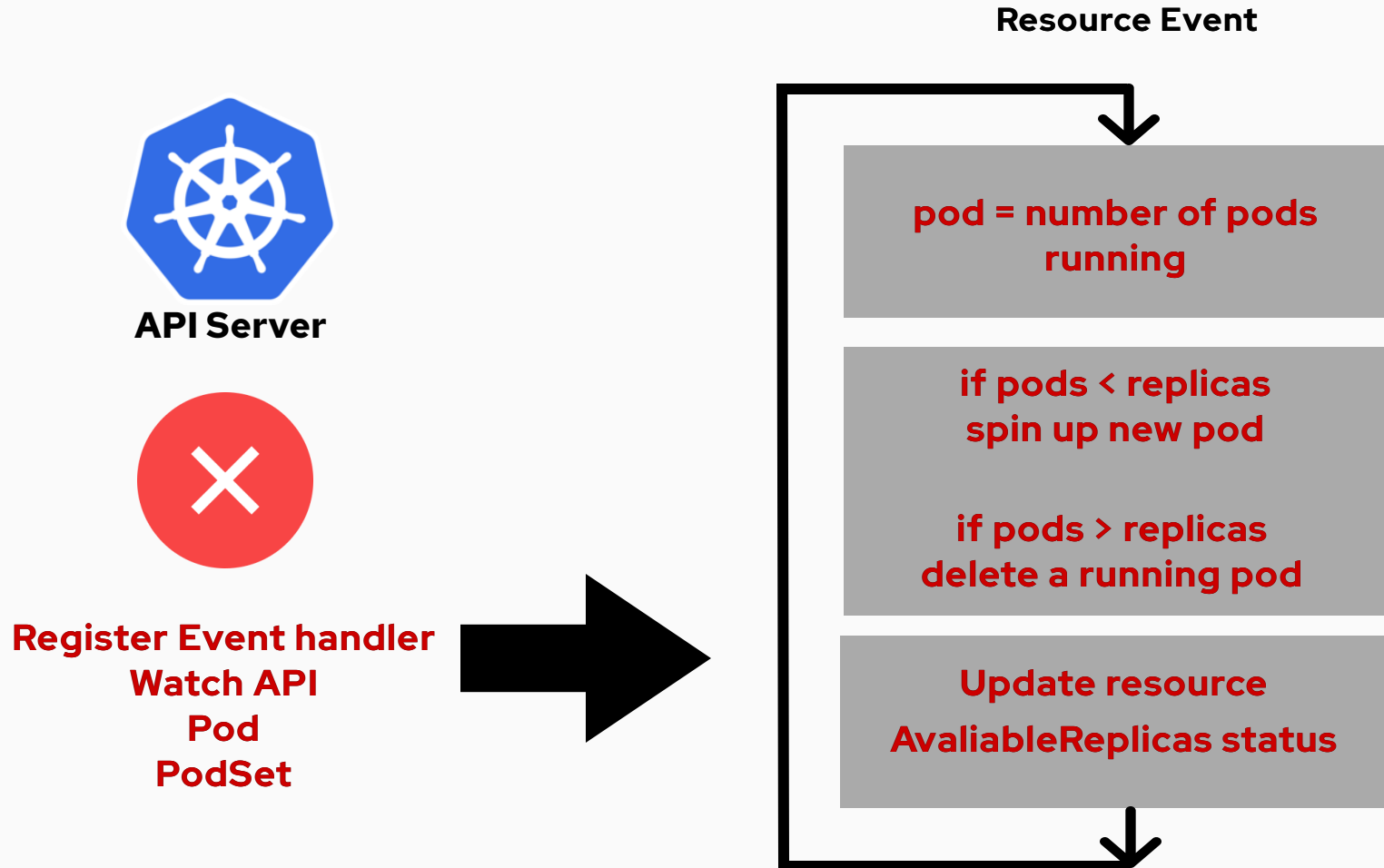


PodSet Controller Flow

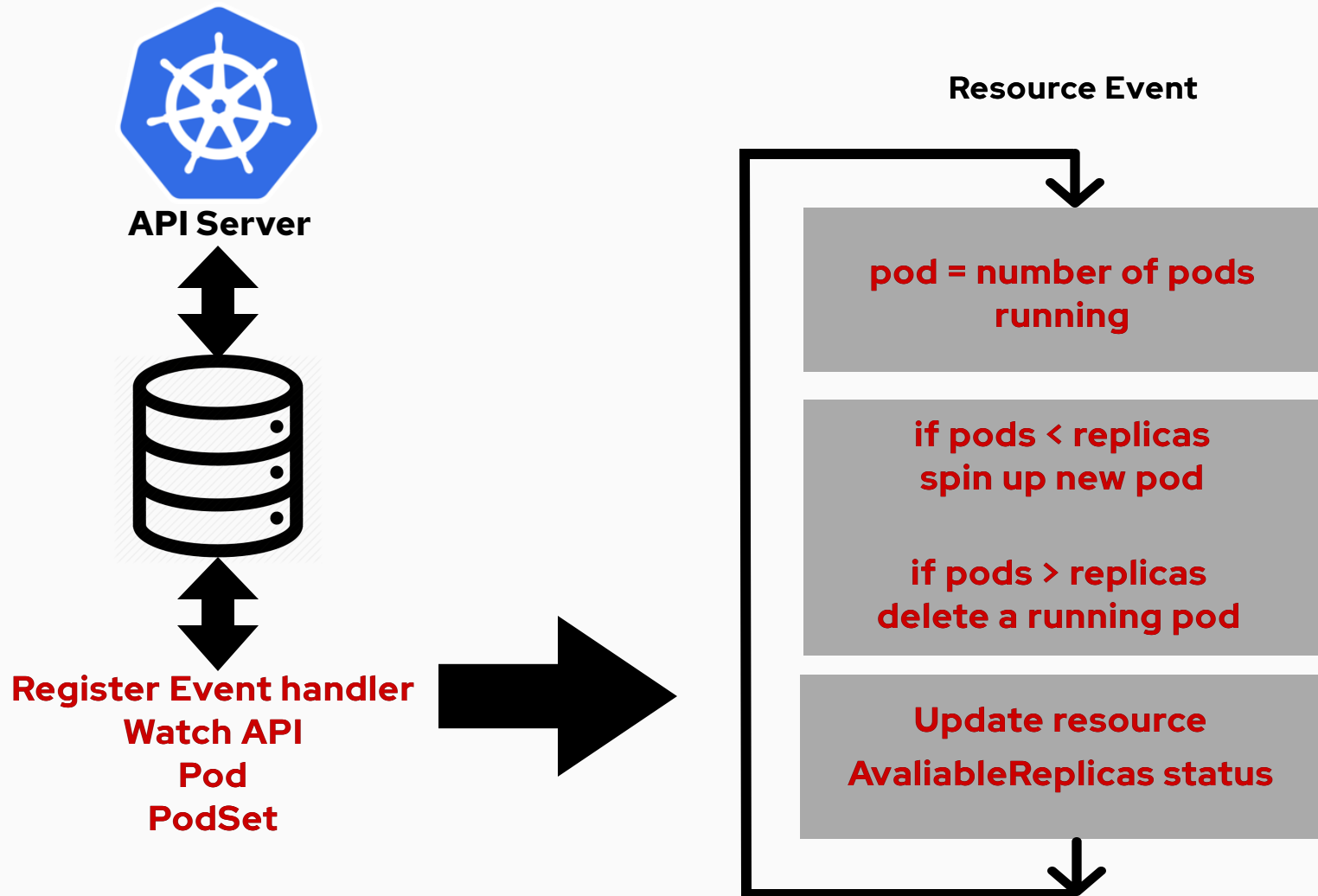


Functional PodSet Controller Demo

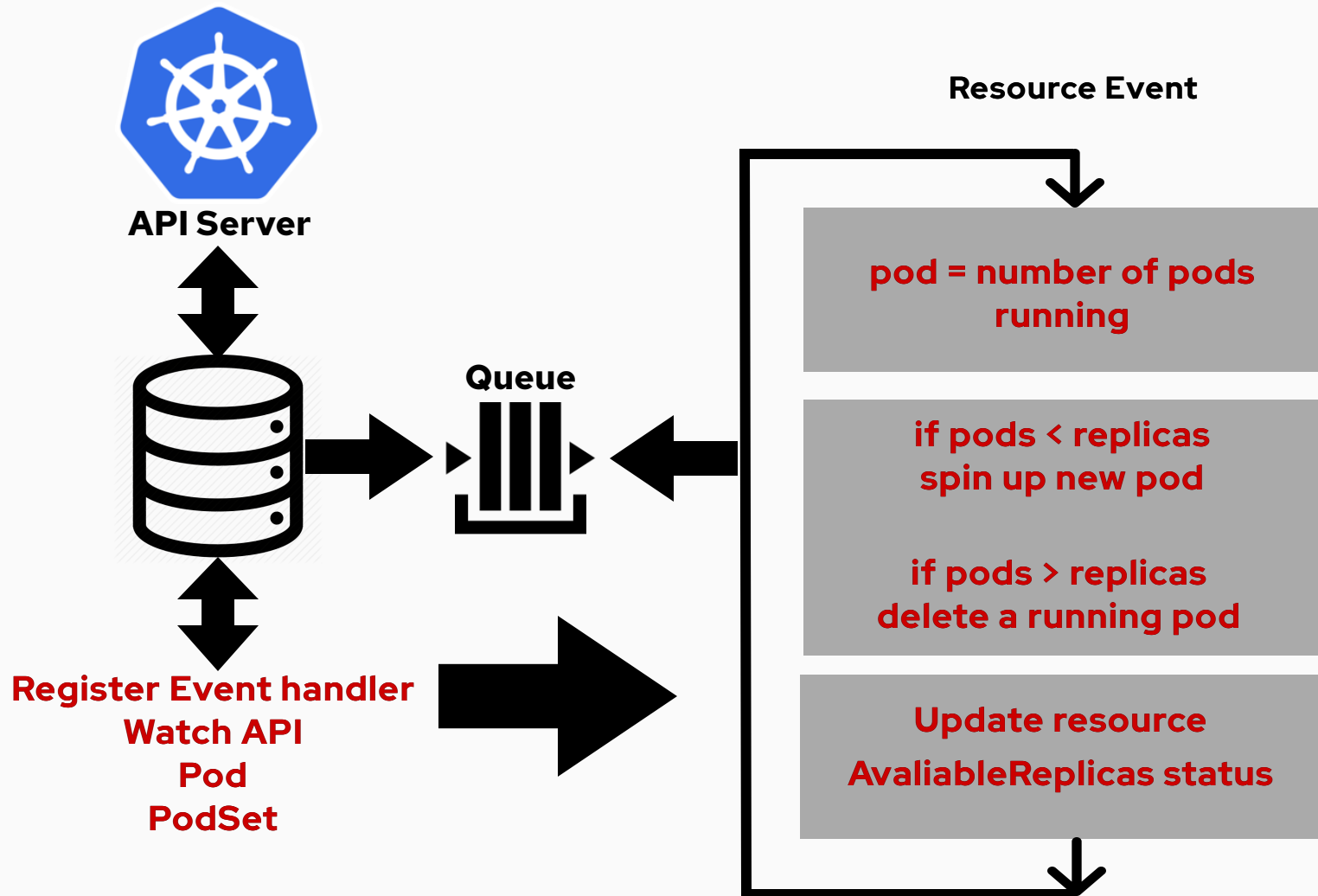
Not enough



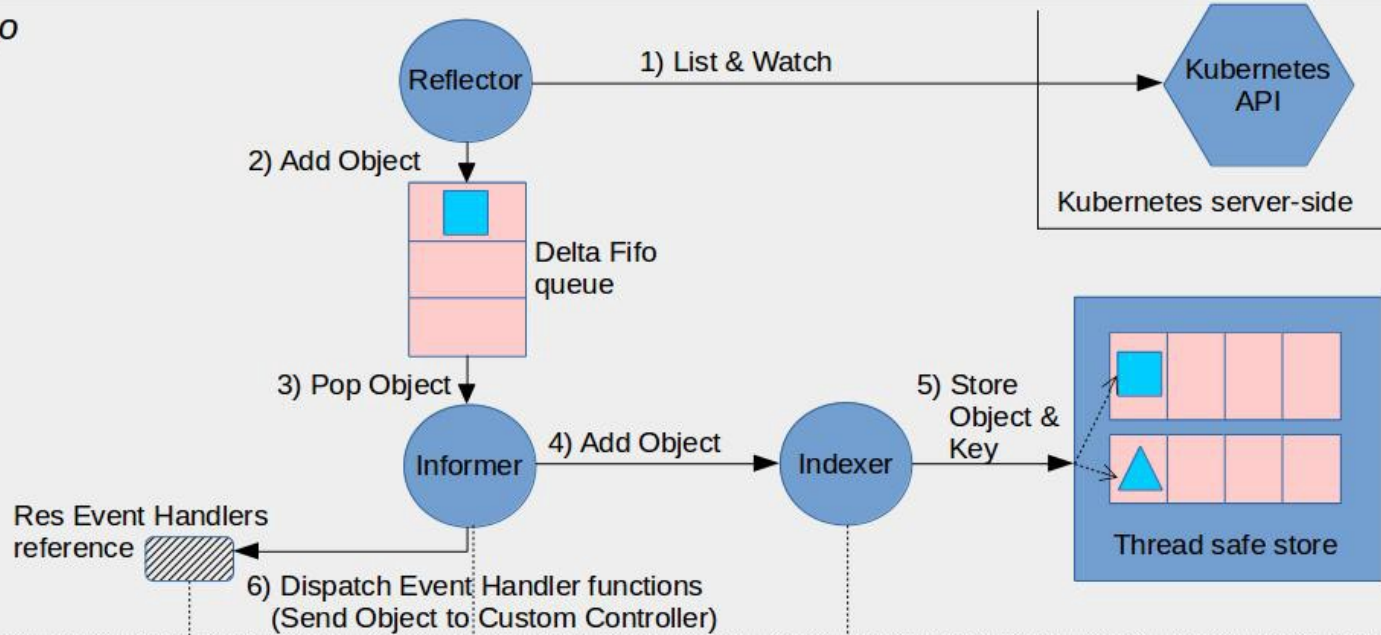
Infromers



Work queue



client-go



Custom
Controller

Credit: Devdutta Kulkarni

Generate informers and listers

```
1 $ ~/go/src/k8s.io/code-generator/generate-groups.sh \  
2 "deepcopy,client,informer,lister" \  
3 github.com/hrishin/podset-operator/pkg/client \  
4 github.com/hrishin/podset-operator/pkg/apis \  
5 demo:v1alpha1
```


Final Controller Demo

Still issues

Thank you!!