Developing a Kubernetes Operator

from zero to Hero using the Operator-SDK

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About me

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Agenda

- Operator SDK

- Hello World HTTP

- Deploy Hello World HTTP

- Hello World Operator

- Demo

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Operator SDK

- High-level APIs and abstractions

- Tools for scaffolding and code generation

- Integration with Operator Lifecycle Manager (OLM)

- Extensions to cover common Operator use cases

- Metrics endpoint set up automatically with the Prometheus format

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Hello World HTTP

- a container with a simple HTTP web server
- the default serving address is 8080
  - set HELLO_ADDR to change the it
- the default response text is Hello, World!
  - set HELLO_TEXT to change the it

```
$ podman run -p 8080:8080 quay.io/brusdev/hello-world-http
Hello, World HTTP!
The default serving address is :8080, set HELLO_ADDR to change the it.
The default response text is Hello, World!, set HELLO_TEXT to change the it.
Serving :8080 with the text Hello, World!
```

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Deploy Hello World HTTP

```
hello-world-http-deployment.yaml

apiVersion: apps/v1
kind: Deployment
metadata:
 name: hello-world-http-deployment
spec:
 selector:
   matchLabels:
     app: hello-world-http
 replicas: 1
 template:
   metadata:
     labels:
       app: hello-world-http
   spec:
     containers:
       - name: hello-world-http
         image: quay.io/brusdev/hello-world-http:latest
```

```
hello-world-http-service.yaml

apiVersion: v1
kind: Service
metadata:
 name: hello-world-http-service
spec:
 selector:
   app: hello-world-http
 ports:
   - protocol: TCP
     port: 8080
     targetPort: 8080
```

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Hello World Operator

- Automate the deployment of Hello World HTTP
- Expose a service to access Hello World HTTP
- Extend API with HelloWorld

```
apiVersion: examples.brus.dev/v1alpha1
kind: HelloWorld
metadata:
 name: helloworld-sample
spec:
 size: 1
 text: Hello, brusdev!
```

Hello World Operator

```yaml
apiVersion: examples.brus.dev/v1alpha1
kind: HelloWorld
metadata:
 name: helloworld-sample
spec:
 size: 1
 text: Hello, brusdev!
```

```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
 name: helloworld-sample
spec:
 replicas: 1
 template:
   spec:
     containers:
       - name: helloworld
         image: quay.io/brusdev/hello-world-http:latest
         env:
           - name: HELLO_TEXT
             value: Hello, brusdev!
...
```

```yaml
apiVersion: v1
kind: Service
metadata:
 name: helloworld-sample
spec:
 ports:
   - protocol: TCP
     port: 8080
     targetPort: 8080
...
```

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Demo

Resources

- https://github.com/brusdev/hello-world-http
- https://github.com/brusdev/hello-world-operator
- https://sdk.operatorframework.io/
- https://kubernetes.io/docs/concepts/extend-kubernetes/operator/

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Thank you!

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