

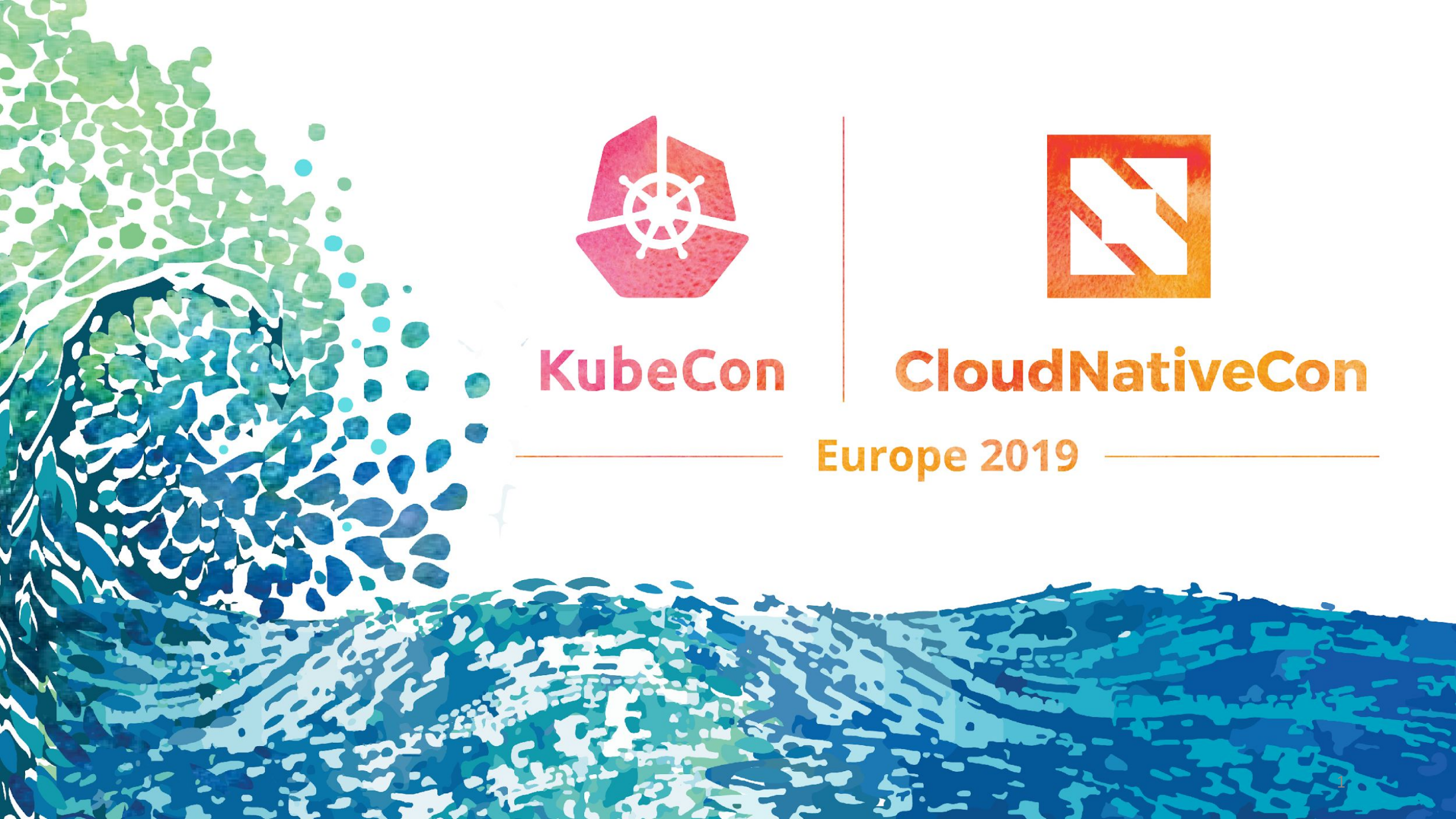


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Kanary

Automated and integrated canary testing using CRD and an operator

Who we are



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Open-Source Software Engineer
Container Ecosystems

Agenda



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- Canary deployment state of the art
- Kanary presentation and advantages
- Demo
- On the code side

Canary deployment in kubernetes



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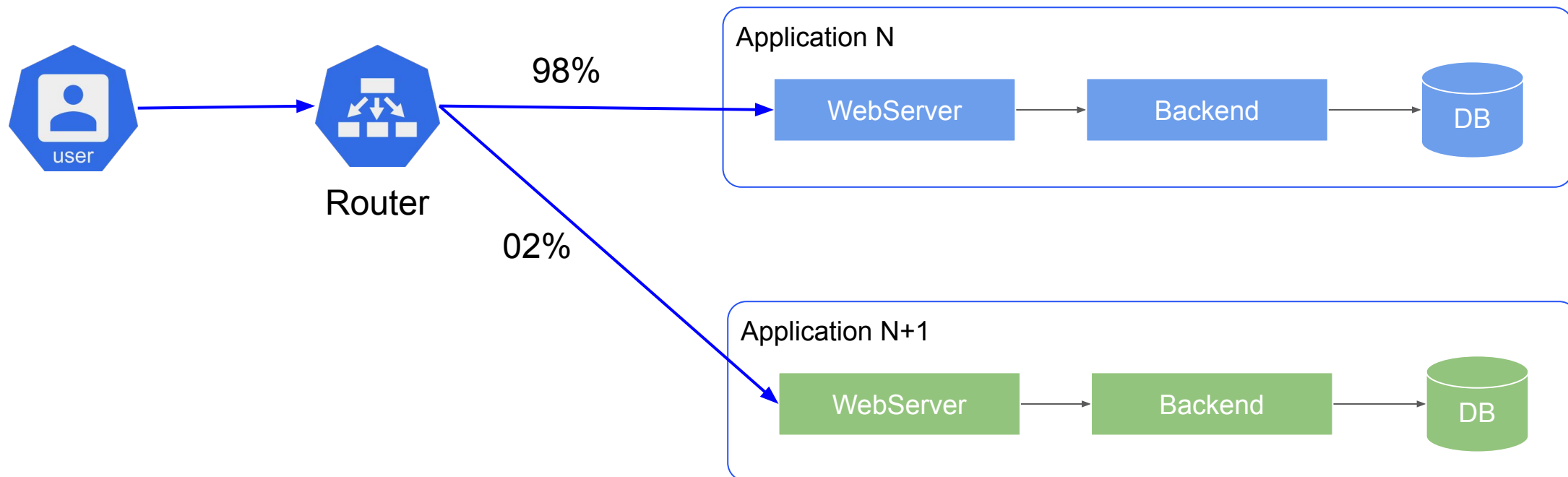


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Canary Deployment is a technique to reduce the risk of introducing a new software version in production by slowly rolling out the change to a small subset of users before rolling it out to the entire infrastructure and making it available to everybody.



Canary deployment in kubernetes



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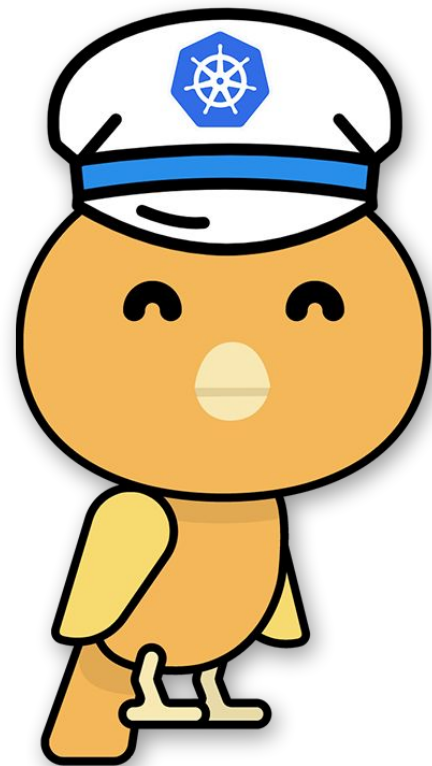
Available solutions:

- Based on your own scripts, jenkinsfiles, (OCP custom deployer)...
- Canary As A Service (code fresh or other)
- Spinnaker deployment canary solution

Kubernetes native solution ?

- Benefit from K8s extensibility (CRD, Admission Controller)
- Benefit with other K8s ecosystem components: Istio, Prometheus

=> [Flagger.app](https://flagger.app)



Kanary Advantages:

- K8s native solution
- Preserve Deployment history
- Allow parallel canary deployments
- Istio and Prometheus are not mandatory

But we can use them :-)

Canary deployment in kubernetes



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- **Canary scale:** fix replicas | % replicas | HorizontalPodAutoscaling
- **Traffic management:** no traffic | % of live traffic | test traffic
tagged traffic | shadow traffic (istio require)
- **Validation:** manual | labelwatch | promql | metrics-server
- **Rolling-Update:** dry-run | automatic update

Canary deployment in kubernetes



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```
apiVersion: kanary.k8s.io/v1alpha1
kind: CanaryDeployment
metadata:
  name: nginx
  labels:
    app: nginx
spec:
  serviceName: nginx
  deploymentName: nginx
  scale:
    static:
      replicas: 1
  traffic:
    source: <[service|kanary
  validation:
    items:
      - manual:
          statusAfterDeadline
  template:
    # deployment template
```

```
validations:
  initialDelay: 20s
  items:
    - promQL:
        allPodsQuery: true
        podNamekey: pod
        prometheusService: prometheus:9090
        query: "histogram_quantile(0.99, ...) by (le)"
        valueInRange:
          max: 0.31
          min: 0
    maxIntervalPeriod: 10s
    validationPeriod: 1m0s
```

Kanary presentation and advantages

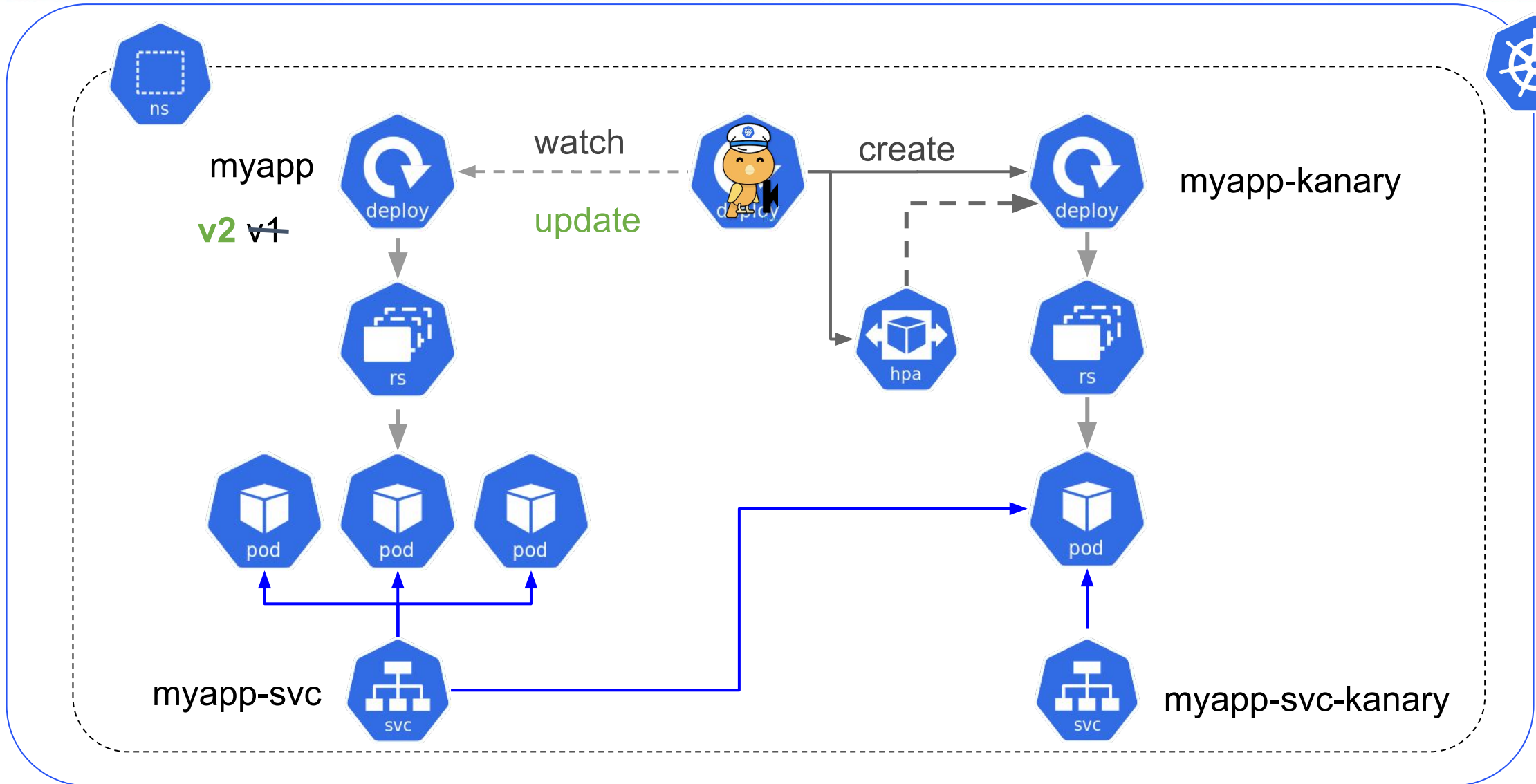


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How we build it



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OPERATOR
SDK

- **Speeds up the development solution**
 - bootstrap project
 - focus on operator logic
 - simplify testing
- **Missing features (yet)**
 - Custom Resource validation [#1217](#)
 - Custom Resource version conversion [#?](#)

How we build it



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```
$ mkdir -p $GOPATH/src/github.com/amadeusitgroup/ && cd ...
```

```
$ operator-sdk new kanary && cd kanary
```

```
$ operator-sdk add api --api-version=kanary.k8s.io/v1alpha1  
--kind=KanaryDeployment
```

```
$ operator-sdk add controller  
--api-version=kanary.k8s.io/v1alpha1 --kind=KanaryDeployment
```

Operator skeleton: Reconcile



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```
func (r *ReconcileKanaryDeployment) Reconcile(request reconcile.Request)
(reconcile.Result, error) {
    reqLogger := log.WithValues("Ns", request.Namespace, "KD", request.Name)
    reqLogger.Info("Reconciling KanaryDeployment")

    // Fetch the KanaryDeployment instance
    instance := &kanaryv1alpha1.KanaryDeployment{}
    err := r.client.Get(context.TODO(), request.NamespacedName, instance)

    // Build your logic here
    // ...

    return reconcile.Result{}, nil
}
```

Operator-sdk: some traps



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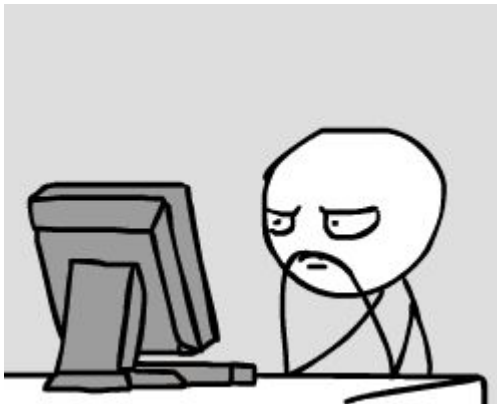
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**OPERATOR
SDK**

- Status Sub-Resource, behaviour change between k8s version (v1.10)
- Invalid Custom Resource skipped
- Log level support



Operator-sdk: some tips



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- For istio users, a controller usually do not expose services, so:

`annotations:`

`sidecar.istio.io/inject: "false"`

- For e2e test using KinD, doing traffic injection:
kubect proxy + api master proxy api

`"http://127.0.0.1:8001/api/v1/namespaces/e2e-ns/services/http:prometheus:9091/proxy"`

- For demos using KinD, doing traffic injection:
kubect port-forward + ingress

Summary



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- Canary Operator is ready for testing
- Future improvements:
 - Custom Metrics server support
 - Daemonset Canary testing
 - What do you need?
- It has never been so easy to create an Operator
 - Focus on the logic, not the boilerplate



Question ?

Link: github.com/AmadeusItGroup/kanary

