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Canary Releases on Kubernetes with Spinnaker, Istio, and Prometheus

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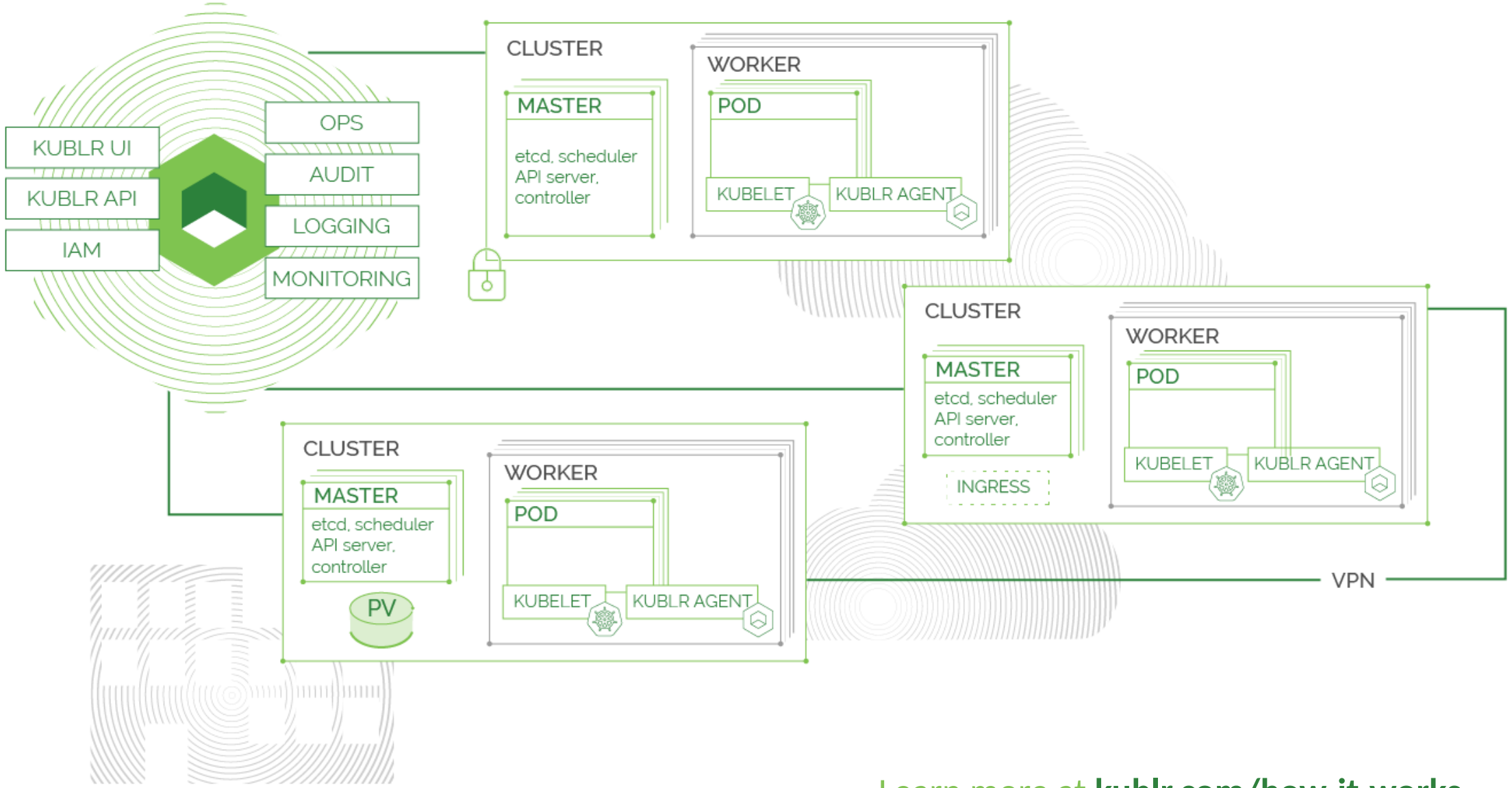


Learn more at **kublr.com/how-it-works**

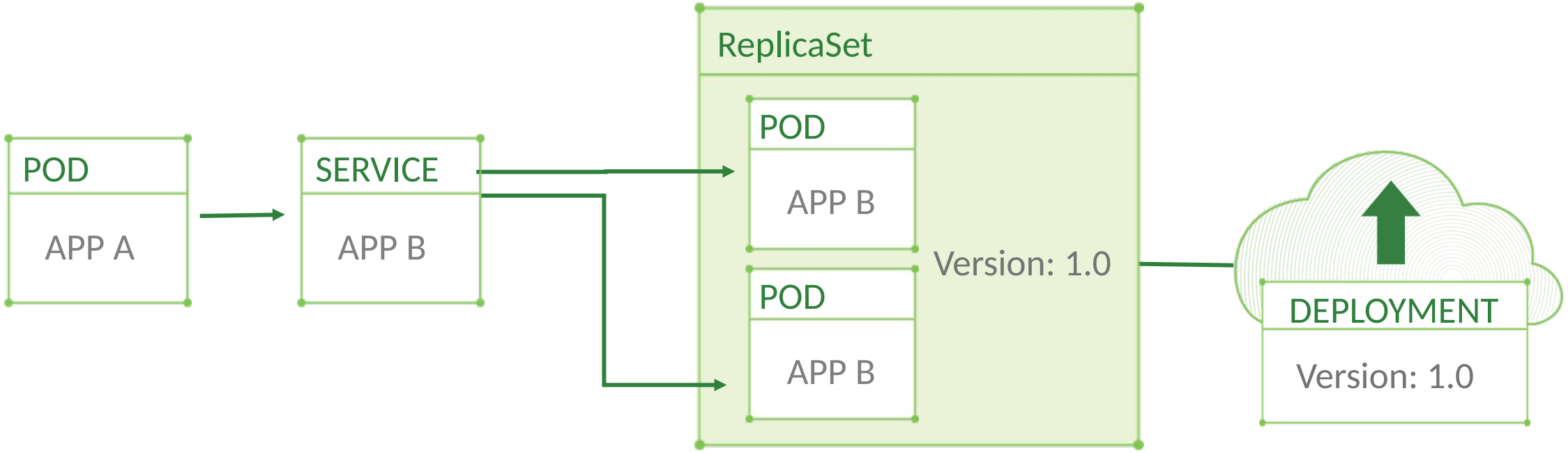
Why Canary?

"**Canary release** 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."

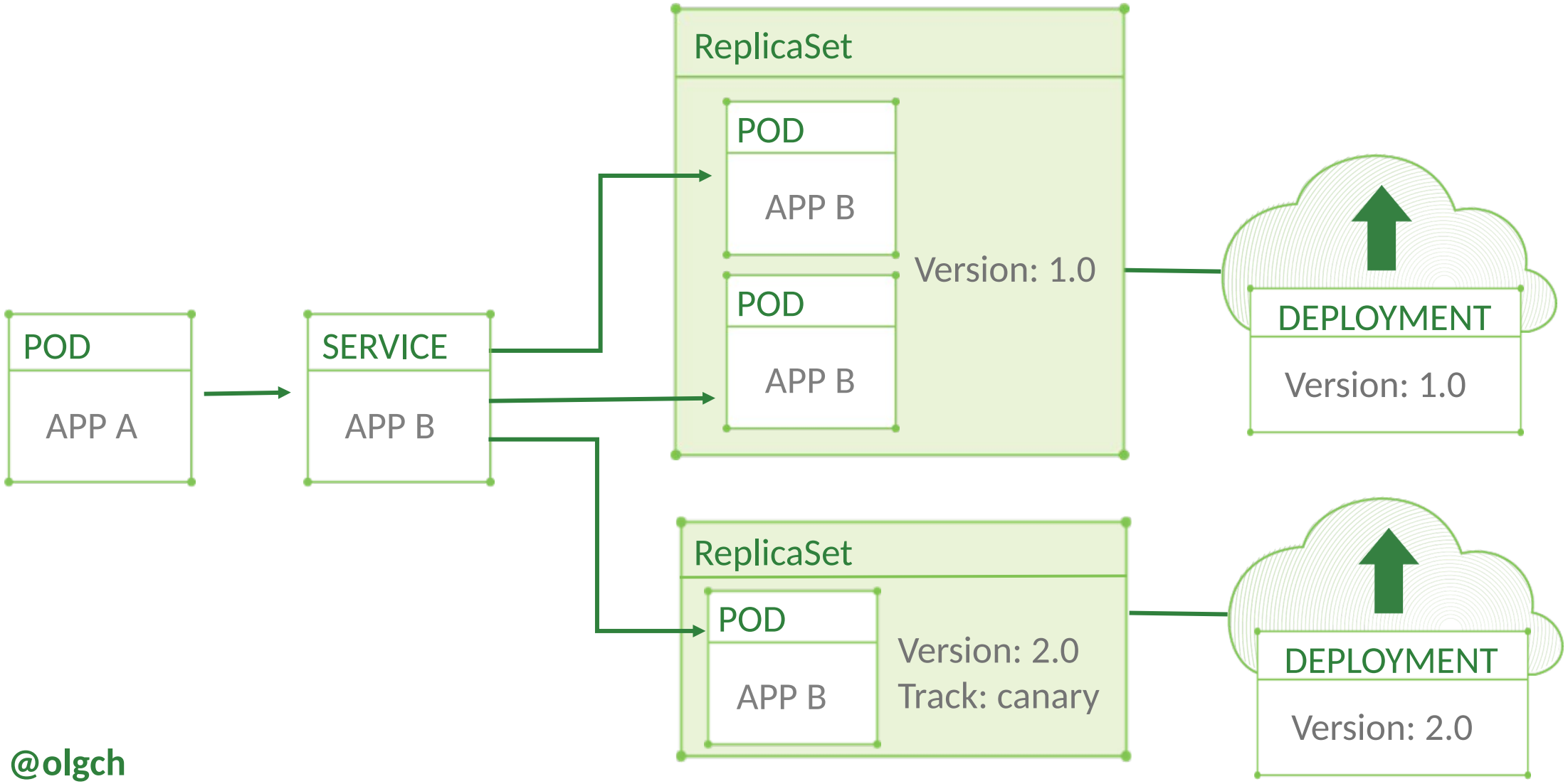
https://martinfowler.com

Canary in Kubernetes

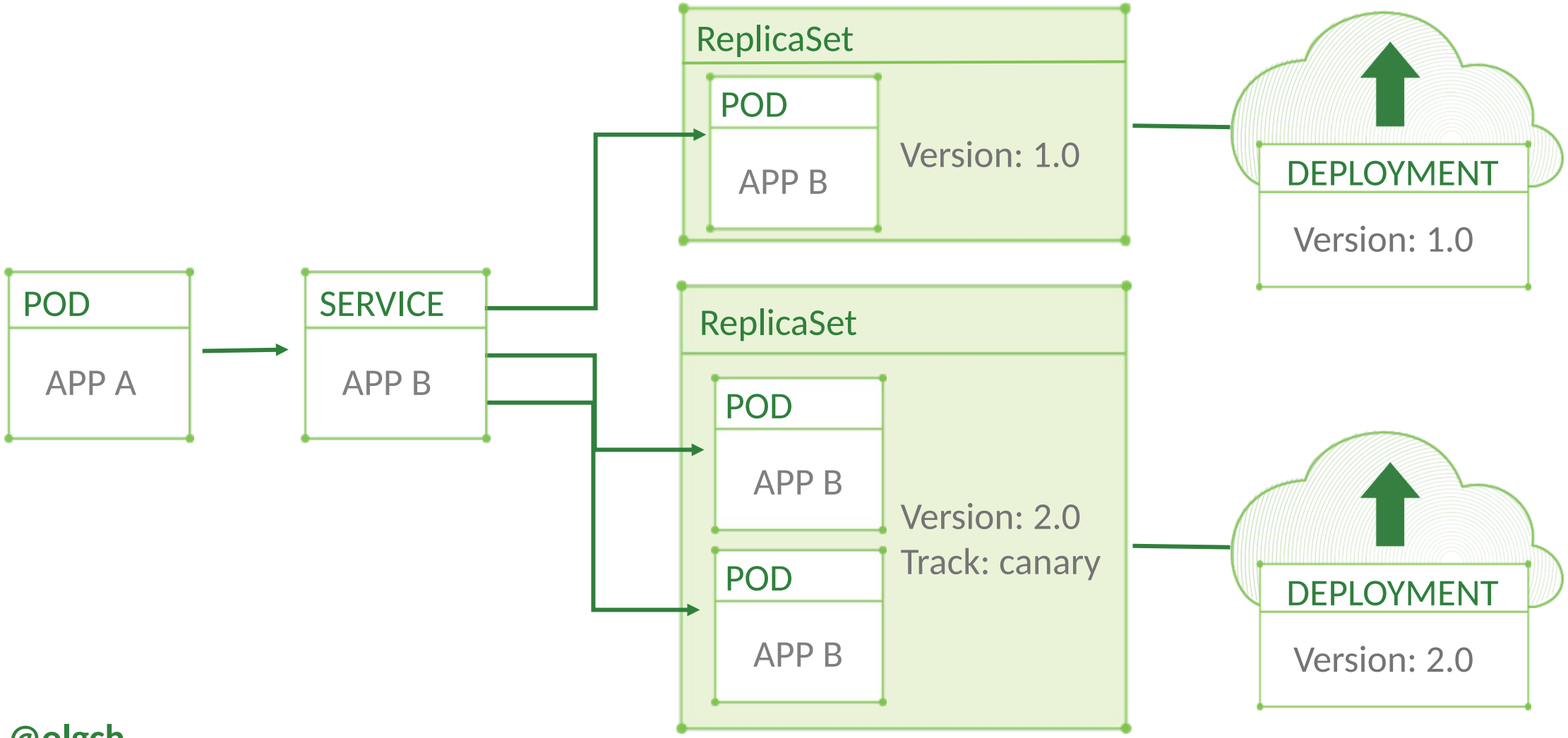
Canary in Kubernetes



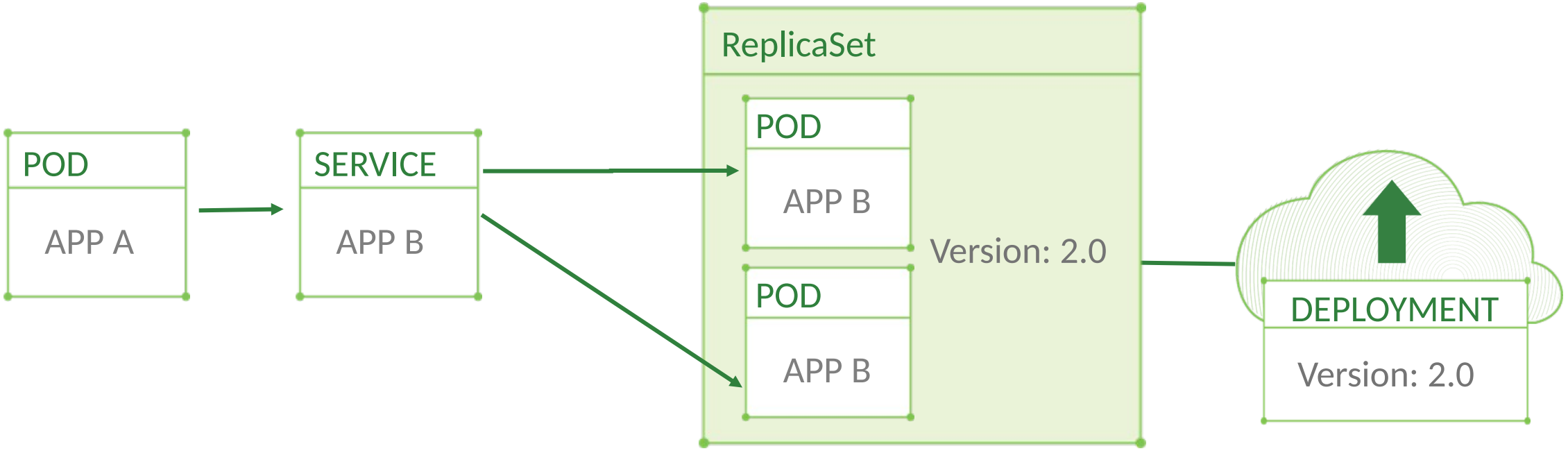
Canary in Kubernetes



Canary in Kubernetes



Canary in Kubernetes



Canary in Kubernetes

- Canary releases in Kubernetes are limited by k8s traffic routing capabilities
- Traffic splitting is managed by manipulating a number of pods in current and canary deployments

Introducing Istio

Pilot

- Service discovery for Envoy and traffic routing
- Splitting: gradual (canary) rollout, A/B testing
- Fault injection
- Mirroring
- Failure recovery: circuit breakers, retries, timeouts

Mixer

- Per-request policies: access and usage control

Auth

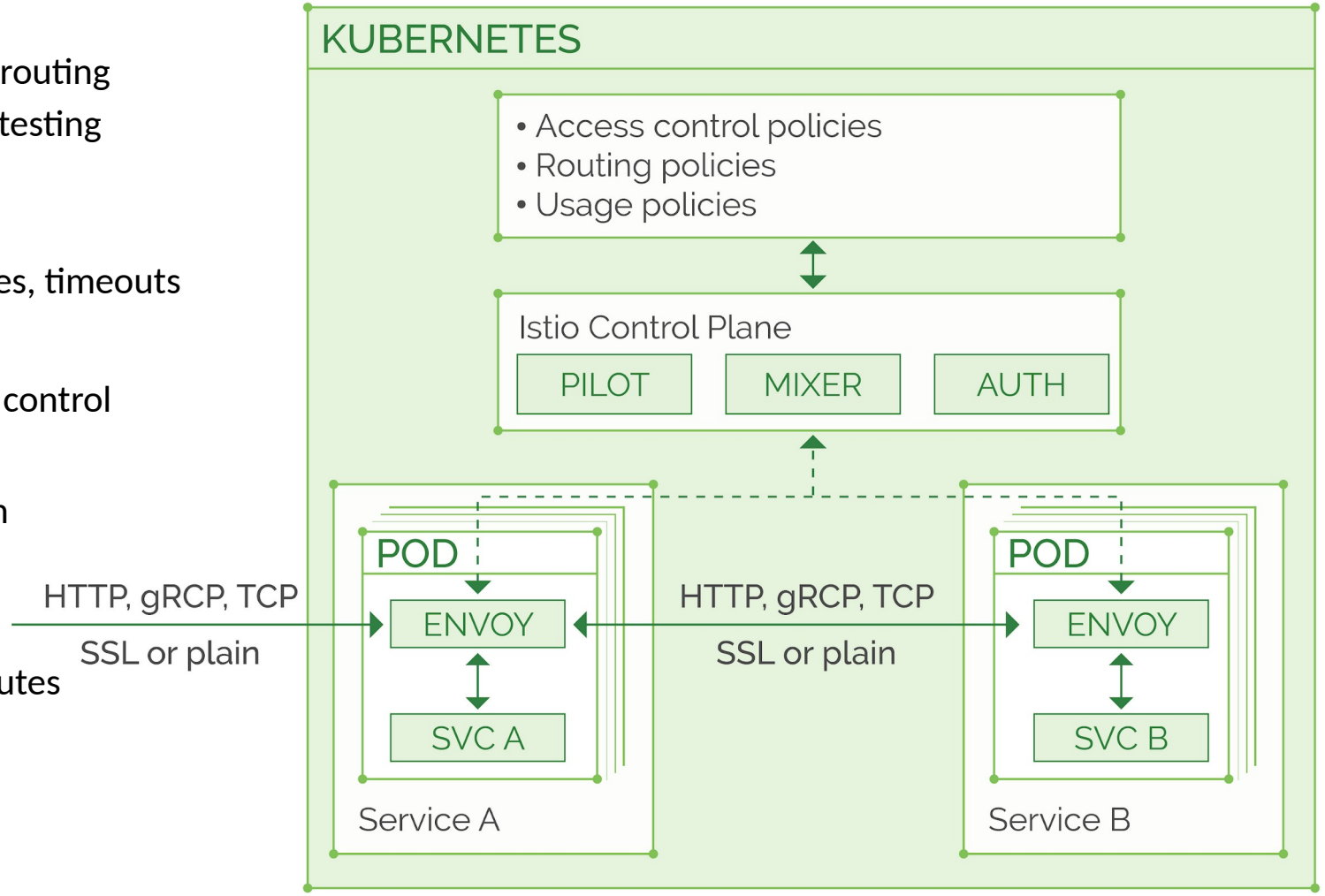
- Request authentication and encryption
- Identity and credential management

Envoy

- Request routing and processing; attributes

Zipkin/Jaeger, Prometheus/Grafana

- Distributed request tracing
- Monitoring



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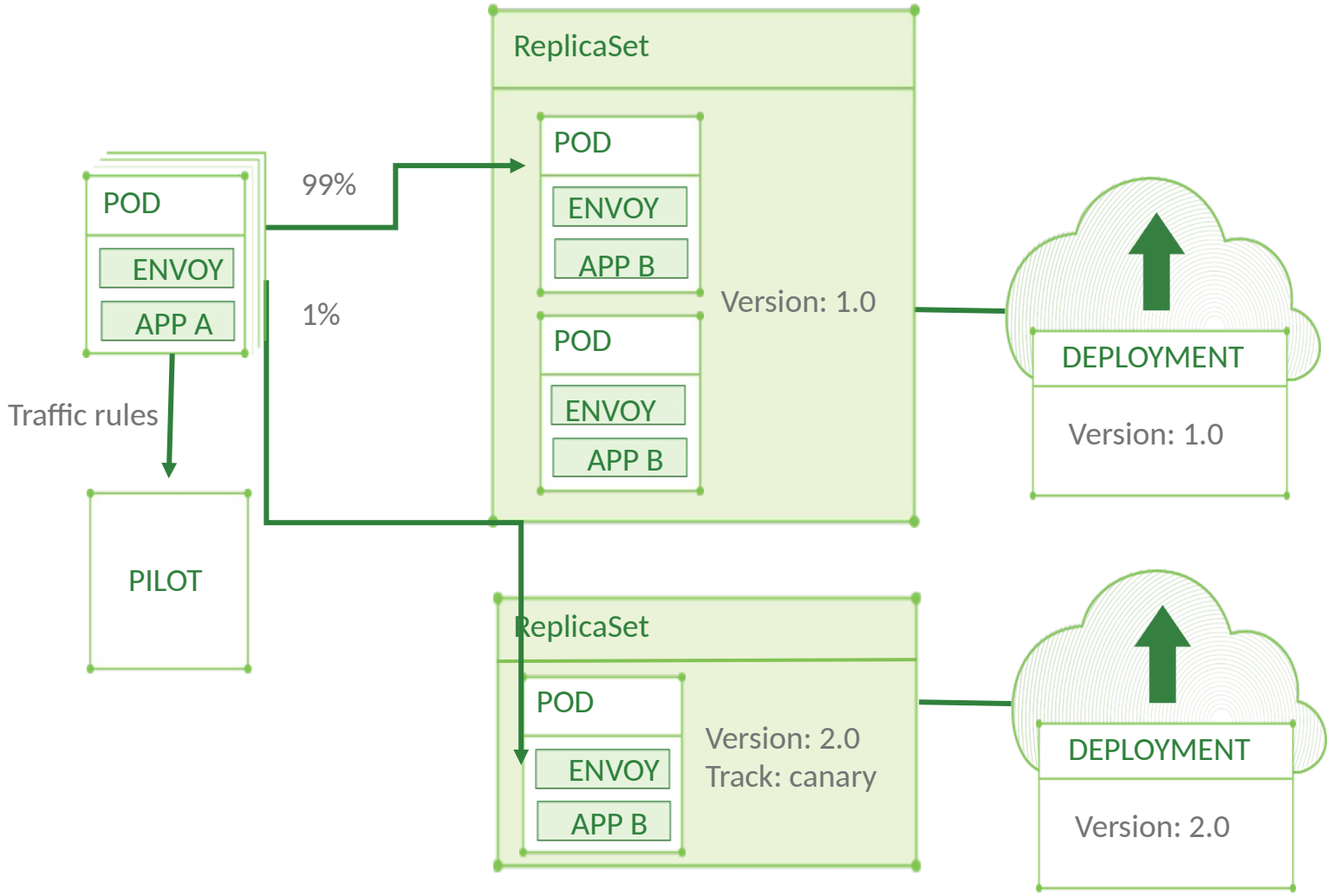
Canary with Istio

```yaml
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  namespace: stg
  name: spinnaker-demo-virtual-service
spec:
  hosts:
  - "*"
  gateways:
  - spinnaker-demo-gateway
  http:
  - route:
    - destination:
        host: spinnaker-demo.stg.cluster.local
        subset: v1
      weight: 99
    - destination:
        host: spinnaker-demo.svc.cluster.local
        subset: canary
      weight: 1
```



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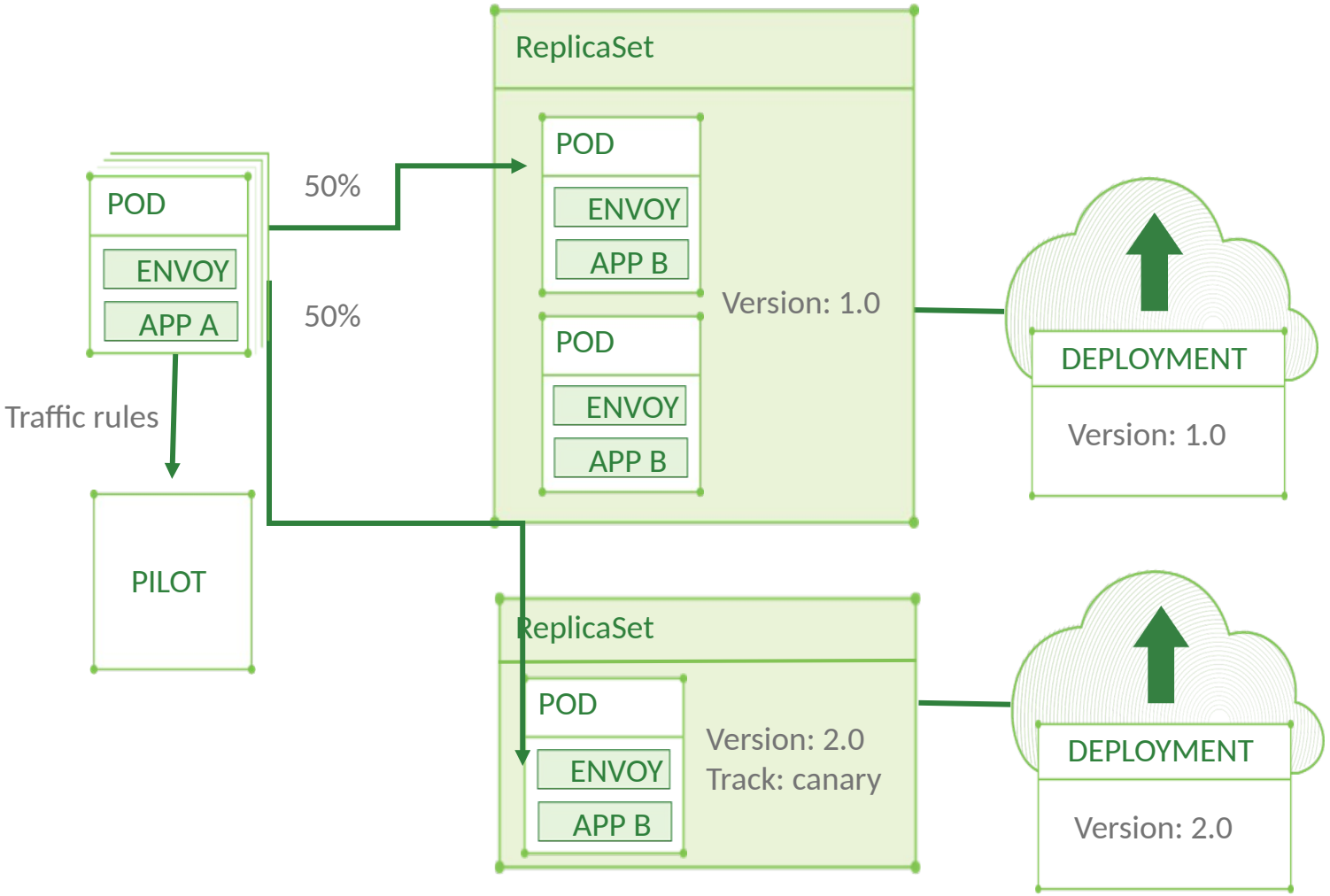
  http:
  - route:
    - destination:
        host: spinnaker-demo.stg.cluster.local
        subset: v1
      weight: 50
    - destination:
        host: spinnaker-demo.svc.cluster.local
        subset: canary
      weight: 50
```



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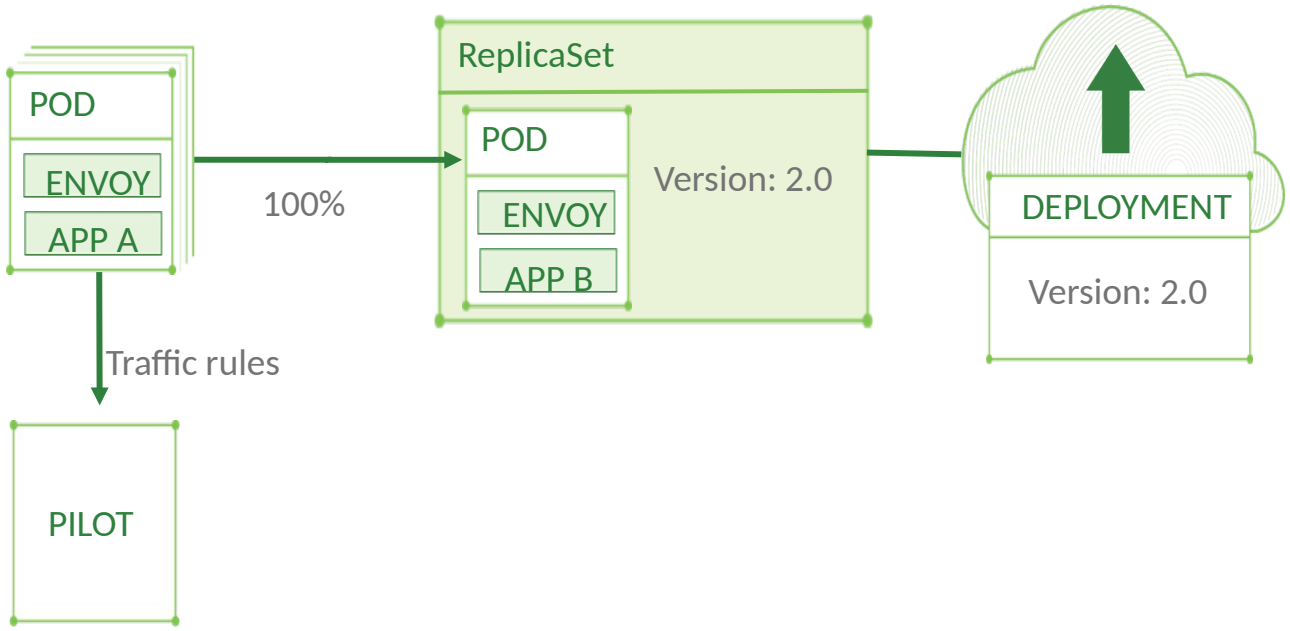

Canary with Istio

- Istio brings all necessary traffic routing capabilities required to implement canary releases in Kubernetes
- A release process still has to be implemented outside

What's Spinnaker?

- Continuous Delivery Platform
- Multi-cloud, multi-region deployment capabilities
- Immutable pipelines to deliver reliably and reproducible
- Deployment strategies enable unified approach across projects and teams
- Zero-downtime and canary deployments out-of-the-box*
- Chaos Engineering

- Open-sourced by Neflix in 2015
- Large community: Netflix, Target, Google, Microsoft, AWS, Pivotal, Mirantis and many others.
- Kubernetes support led by Google. Also used by Google for internal deployments.

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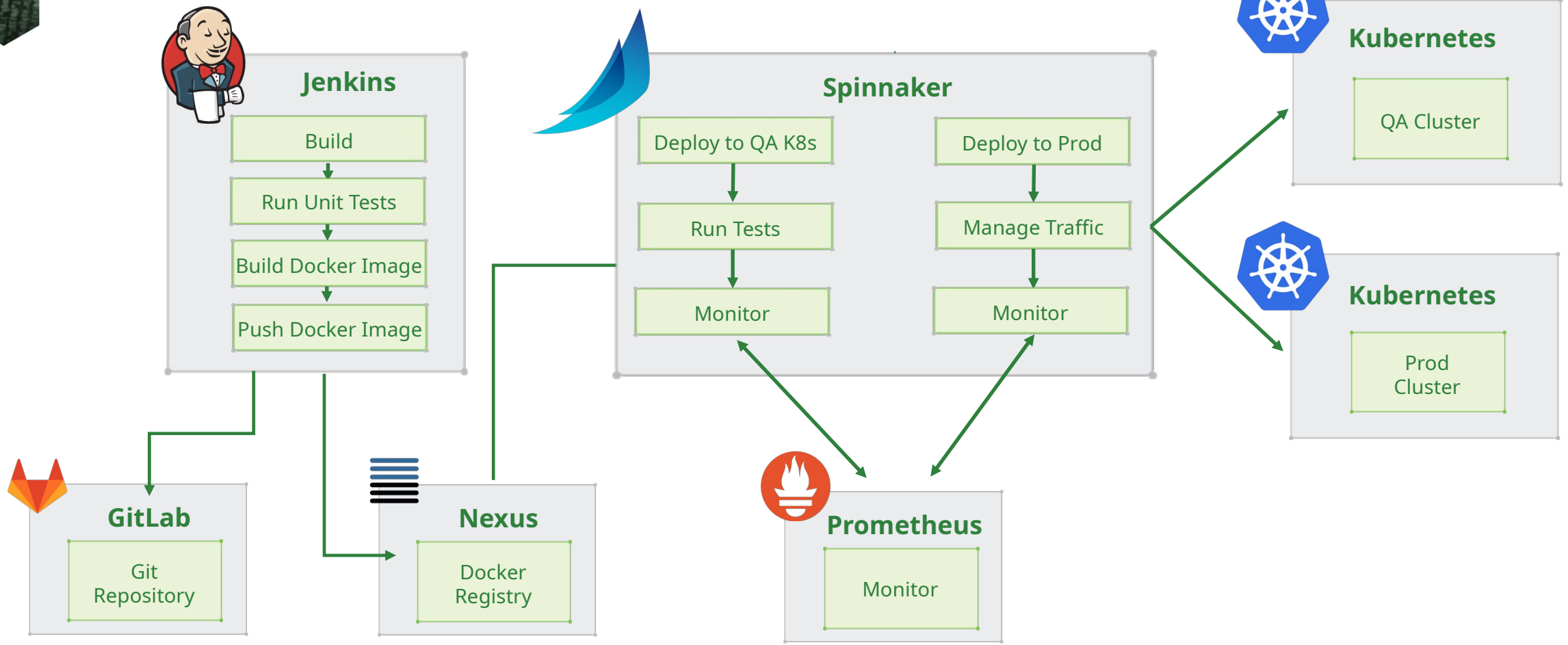
Spinnaker in a CI/CD Process



Spinnaker and Kubernetes

- Manifest-based deployment:
  - Any k8s resource: Deployment, Config, Secret, Custom Resource (Routing rule etc.)
  - May trigger pipeline execution
  - Stored in Git, GCS, S3
  - May be linked to each other
- Docker registry integration and ability to run pipeline w/ new image is pushed

Spinnaker and Kubernetes (cont.)

- Native k8s capabilities enable blue-green deployments
- Istio or Linkerd enable Canary deployments
- Prometheus and Datadog integrations for monitoring
- Pipeline templates
- Helm as a template engine

Canary Pipeline

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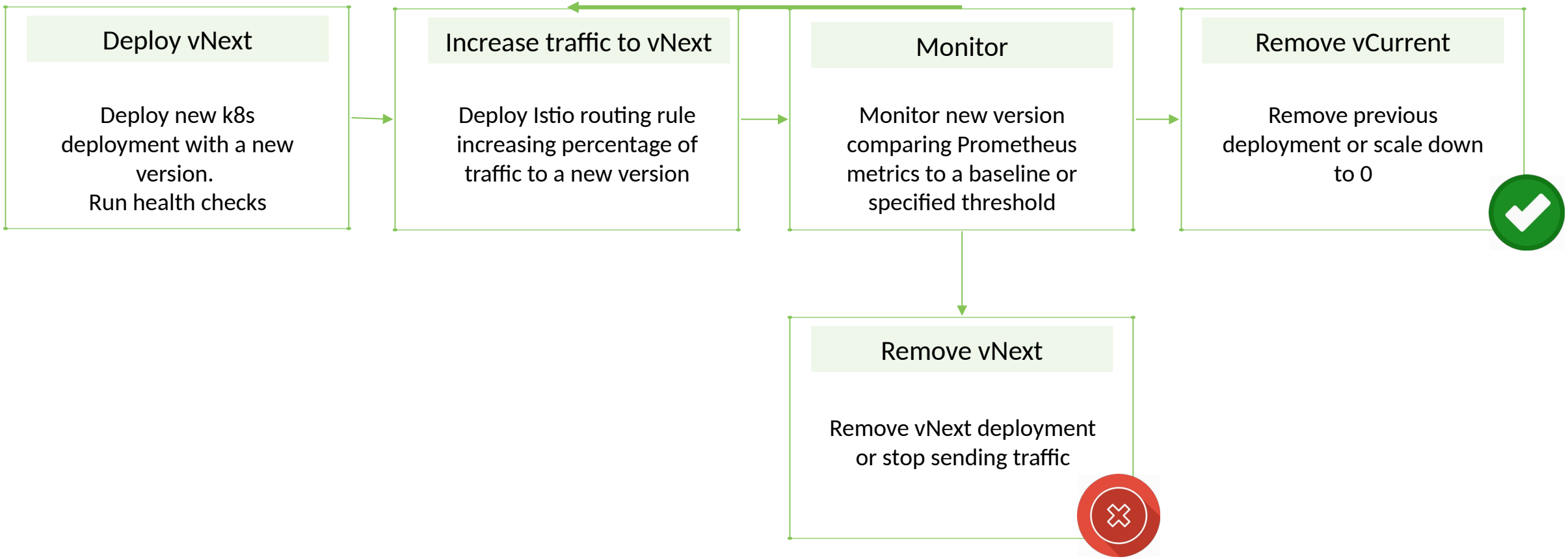
Canary Release Pipeline




)&&j[e]!==c)return
return d===!1?a[e]:D(f,"function")
()+a.slice(1),e=(a+" "+p.join(
+" "+q.join(d+" ")+d).split(" ")
izr",i=b.createElement(h),j=i.style
Webkit Moz O ms",p=o.split(" ")
s={},t={},u={},v=[],
body,n=m||b.create
appendChild
L+=f,

Demo

Beyond Simple Demo

- Reliable graceful service shutdown
- Session-based canary, tracing
- Canary analysis strategies: error rate, real/synth load
- Stateful components
- Continuous Integration
- Branching strategies, multi-branch development

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Q&A

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