PIWIK PRO

Kubernetes Operators

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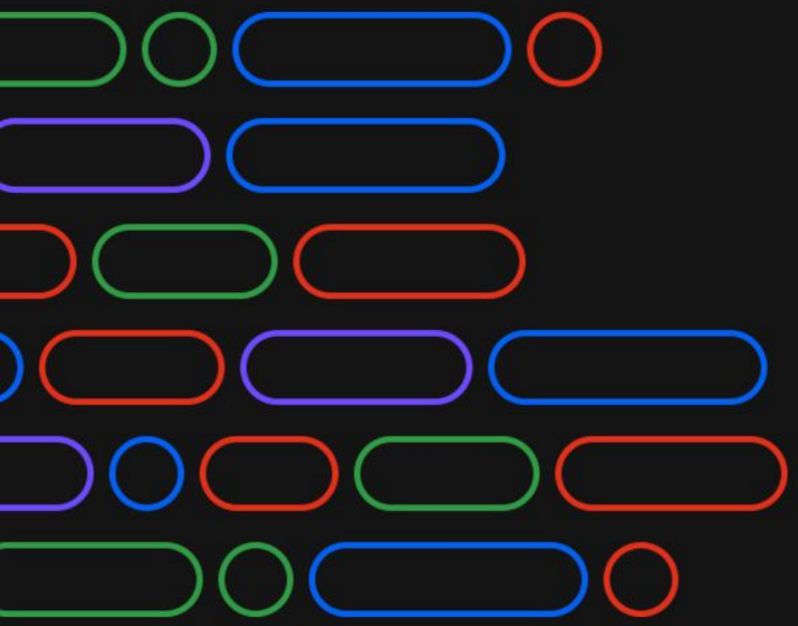
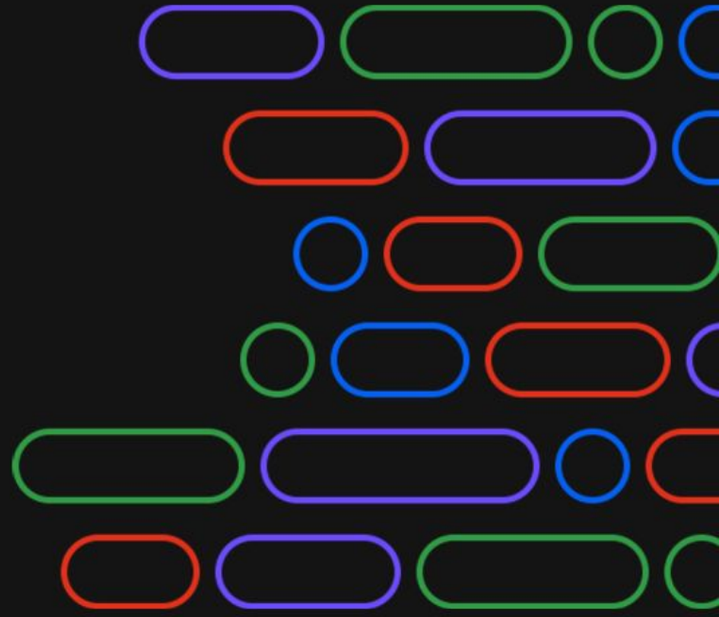




http://piwik.pro

Agenda

- Kubernetes introduction
- Custom resources
- Operators framework
- Ansible

Kubernetes introduction

- Open source container orchestrator
- Developed at google
- First released in 2015
- Inspired by Google’s internal tool - Borg
- Written in go

Control plane

- API Server
  - Receive objects and save to etcd
  - Notify about changed objects
- Controller Manager
  - Read desired object state
  - Try to reconcile state in etc and state in the cluster
- Scheduler
  - Decide where to put pods

Node

- Kubelet
  - Manage pods on the host
  - Synchronize state with control plane
- Kube-Proxy
  - Network configuration
- Container runtime
  - Docker, CRI-O, Podman

Kubernetes objects

Basic primitives used to orchestrate application deployments on a low level.

- Declarative syntax
- Uses yaml
- Extendable

Pod

- The smallest deployment unit
- Consist of one or more containers
  - Always deployed on the same physical machine
  - Containers communicate using localhost

Deployment

- Pod creation
- Replication Controller
- Upgrades and rollbacks
- Upgrade strategies
  - Rolling
  - Recreate

Service

- Exposes objects in network
  - Pods
  - Deployments
  - Replica sets
- ClusterIP
- NodePort
- LoadBalancer

Custom Resource Definitions

- Defines a custom object in Kubernetes
- No logic, only structure
- Uses optional OpenAPIv3 for schema validation

Custom Resources

- Instance of CRD
- Object representation of a resource within the cluster

```
apiVersion: piwik.pro/v1
kind: MySQLDatabase
metadata:
  name: the-database-name
spec:
  foo: bar
```

Operator

CRD

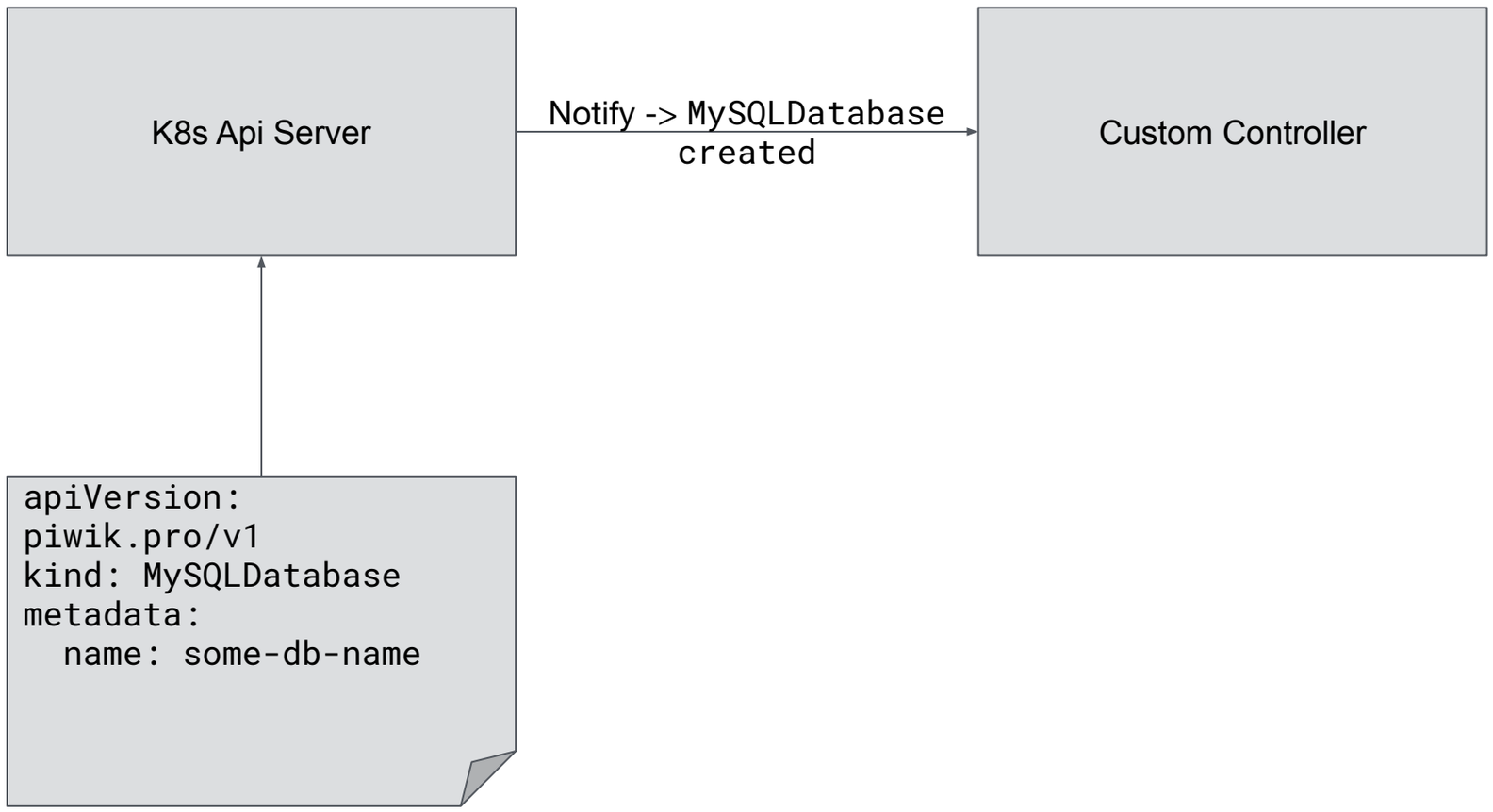
Service Account

Operator

Controller pod

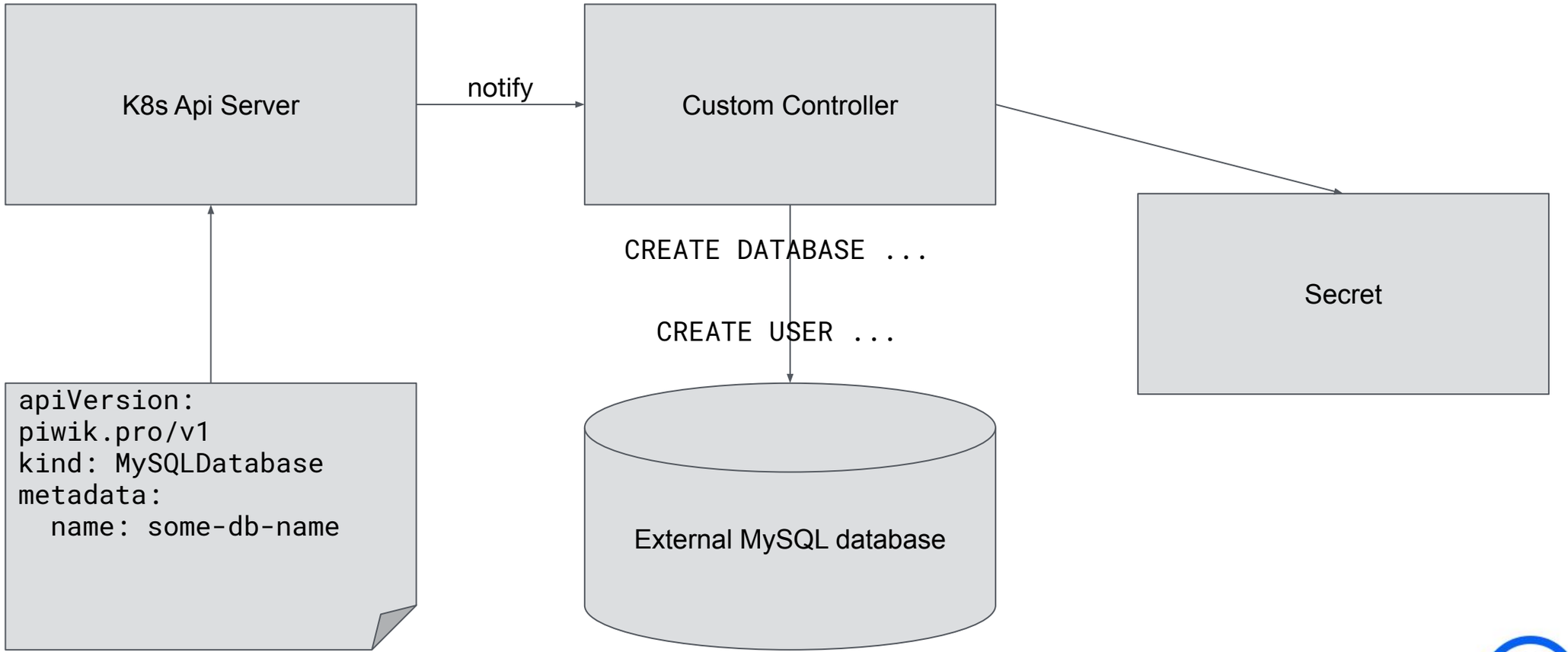
RBAC

Operator


K8s Api Server
Notify -> MySQLDatabase created
Custom Controller
apiVersion:
piwik.pro/v1
kind: MySQLDatabase
metadata:
name: some-db-name

External MySQL operator

- Create a MySQL database with name equal to MySQLDatabase's object name
- Create a MySQL user with name equal to MySQLDatabase's object name and randomly generated password
- Create opaque Secret with endpoint details

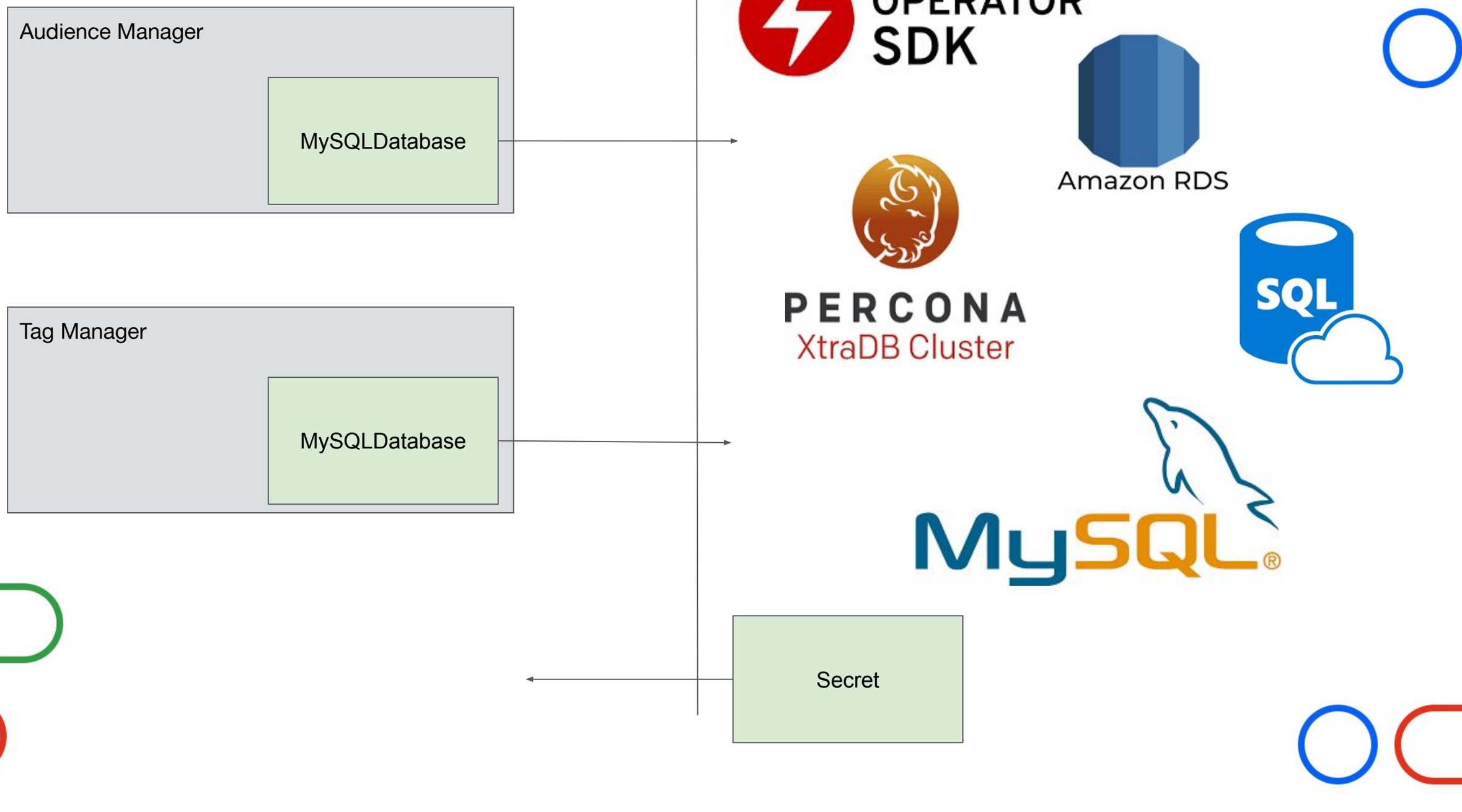


Demo time!

Requirements:

- Running MySQL server
- External service configured in k8s for in-cluster access to the MySQL server
- Secret with root account connection details
- Minikube
- Operator-sdk

Why this matters?



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Questions