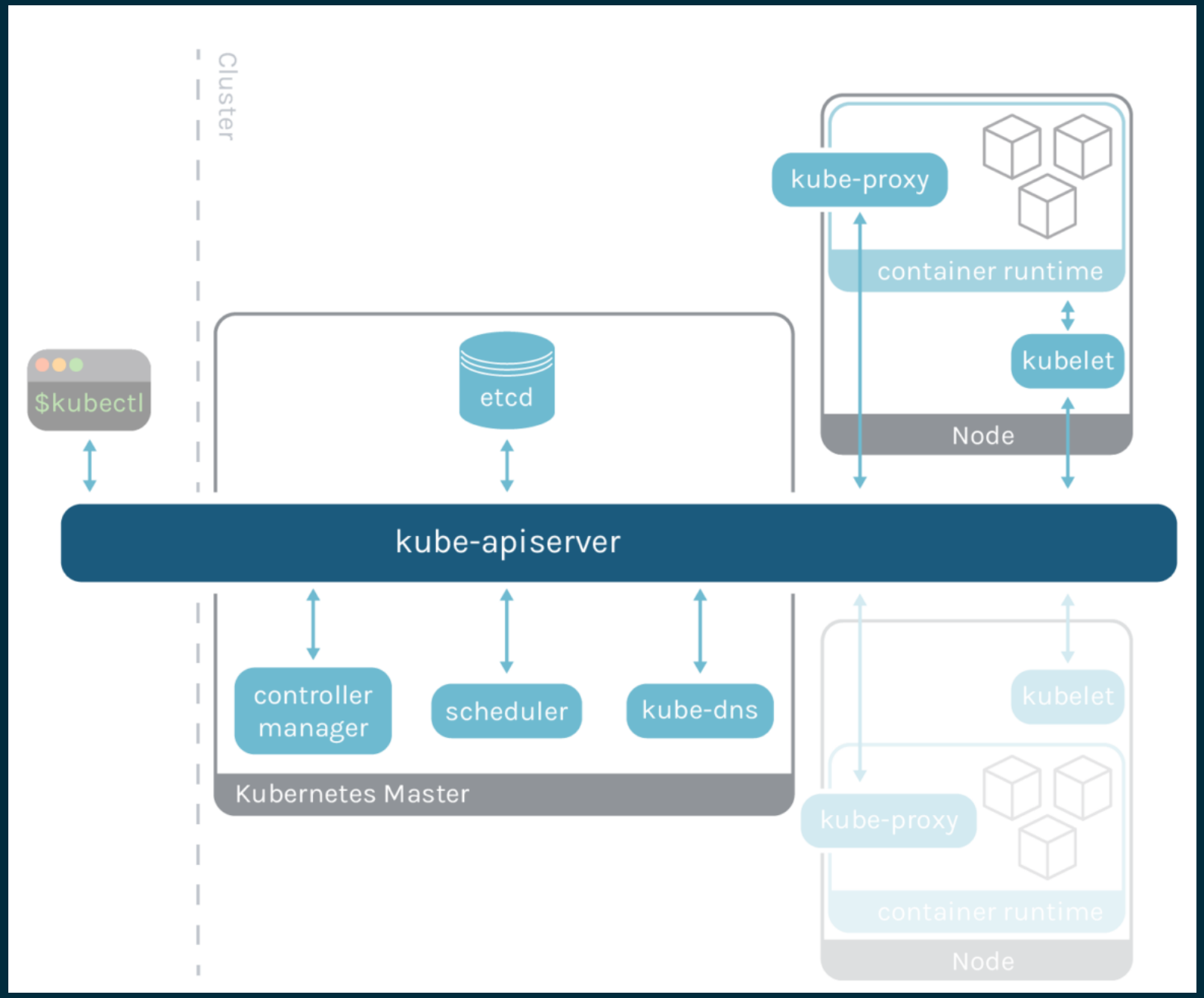
Creating a Kubernetes Operator in Java

Rudy De Busscher

payara®


Cluster
kube-proxy
container runtime
kubelet
Node
$kubectl
etcd
kube-apiserver
controller manager
scheduler
kube-dns
Kubernetes Master
kubelet
kube-proxy
container runtime
Node

Rudy De Busscher

- **Payara**
  - Technical Sales
  - Developer Advocate
- **Involved in**
  - Committer of MicroProfile
  - Committer in Eclipse EE4J groups
  - Java EE Security API Expert group member

@rdebusscher

https://blog.payara.fish/
https://www.atbash.be

payara®

Agenda

- Kubernetes overview
  - Kubernetes Operator
- Java Client for Kubernetes API
- Watcher principle
- Custom resources
- ‘Complete’ example

payara®

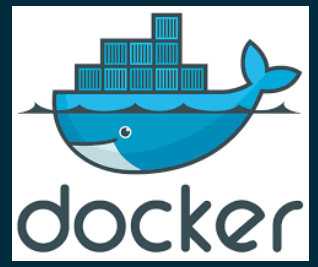
Kubernetes

- Kubernetes is a portable, extensible, open-source platform for managing containerized workloads and services, that facilitates both declarative configuration and automation.

- Containerized workloads
  - Work done in a container (Docker, RunC, cri-o, container, ..)
- Extensible
  - ‘Basic’ functionality can be extended.
- Automation
  - Automate as much as possible
- Declarative
  - Describe what you need

payara®

Side note

- Automation leads to a whole set of new technologies
- 

Helm Chart Automate charts

Kubernetes Operator

- Method of packaging, deploying, and managing a Kubernetes application.

- Kubernetes Application
  - Enterprise-ready containerized solutions with prebuilt deployment templates, featuring portability.

image: freepik.com

payara®

Kubernetes API

- HTTP based API
  - Query and manipulate the state of objects (for example: Pods, Namespaces, ConfigMaps, and Events).
  - *kubectl* and *kubeadm* uses this API.

- Java Implementations
  - Official Java client
  - Fabric8io client
    - Seems the most popular one

payara®

How To Use it

- Plain Java SE program

- *Config config = new ConfigBuilder().build();*
- *KubernetesClient client = new DefaultKubernetesClient(config);*

- *Watcher*
  - Daemon program to watch Objects
  - Interact on changes within the cluster

payara®

Demo

payara®

Custom Resources

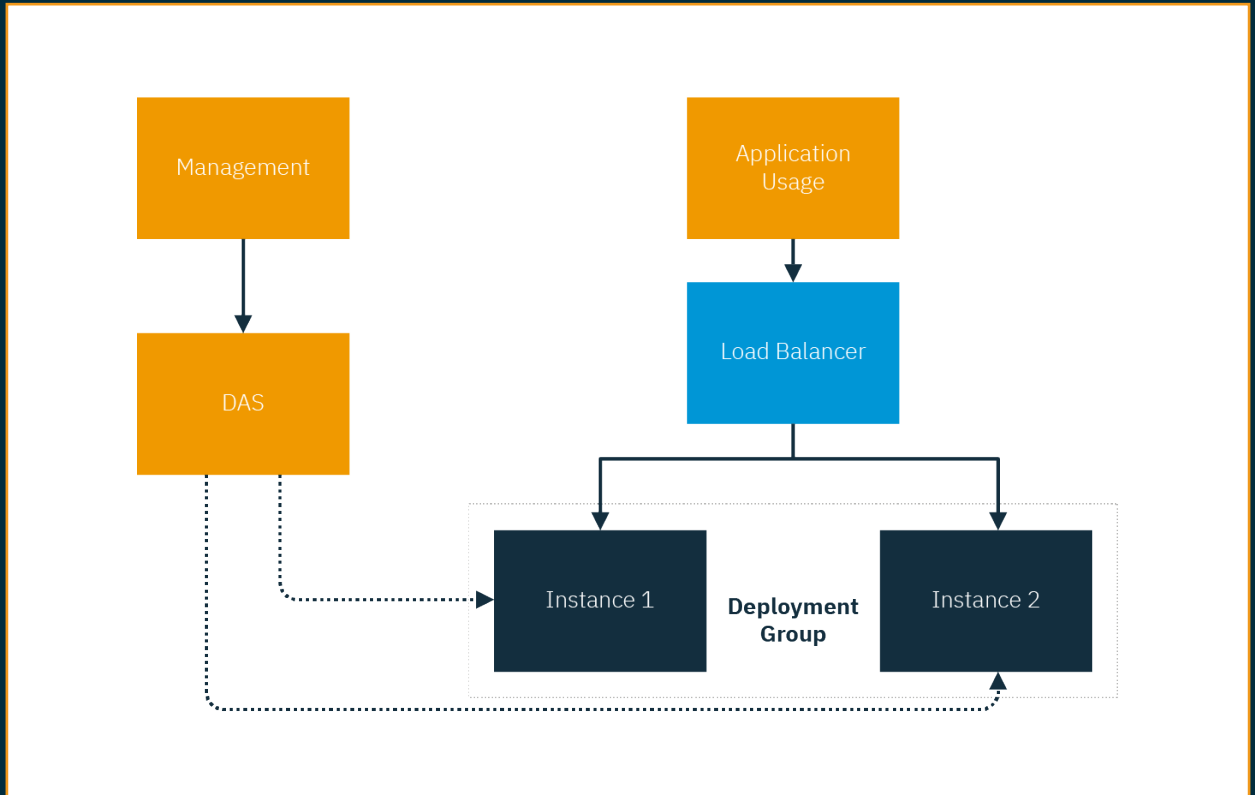
- Extensions of the Kubernetes API
- Resource is an endpoint in the Kubernetes API
  - Like pods, services, …

- Custom YAML
- Create and start resources

payara®

Example

- Deploy application to new ‘clustered’ Payara Server environment
  - Using deployment groups
  - Configurable number of instances



Demo

payara®

Payara Reef: Community Growth Program

Let us help you spread the word about our open source software. Join the Reef!

We'll Support You With:

- Event, JUG, conference sponsorship
- Freebies, swag, handouts, speakers
- Promotion and advertising of events and articles
- Community forum

Learn More:

www.payara.fish/reef

payara®

Thank You

Download the open source software:
payara.fish/downloads

Get Started:
payara.fish/get-started

payara®