OpenShift

Jens Kühnel

About Me

- Longtime Student (HIS)
- Freelancing since 2000
- Linux-Trainer
  - From 2000 to 2008 primarily for Red Hat
    - #8 RHCA 2nd in Europe
- Author
  - Samba 3 – Wanderer zwischen den Welten
- Administrator
  - Freelancing from 2000 – 2016
    - Deutsche Börse 2008-2016
- Since 2017
  - 10% Freelancing
  - 90% Employed Sysadmin @ Deutschen Börse AG, Frankfurt

Platform as a service

Container as a Service

Truth

- There is no Cloud,
  only other peoples computer

- Container are not designed to be secure

RedHat Centos Fedora

- Upsteam – Downsteam

- Fedora
- RedHat
- Centos
- CoreOS

- All are 100% OpenSource
- Centos / Fedora are influenced by Red Hat
- Trademark owned by Red Hat

Container

- Normal processes, run in a contained way
  - chroot
  - Namespaces (PID, net, time, User, mnt, IPC ...)
  - Capabilities
  - Cgroups
  - SELinux
- Filesystem Layers (empheral)
- Persistence data is a problem
- Should fix the „works for me“ problem.
- Container standard = OCI
- Missing: Handling large number of containers

History

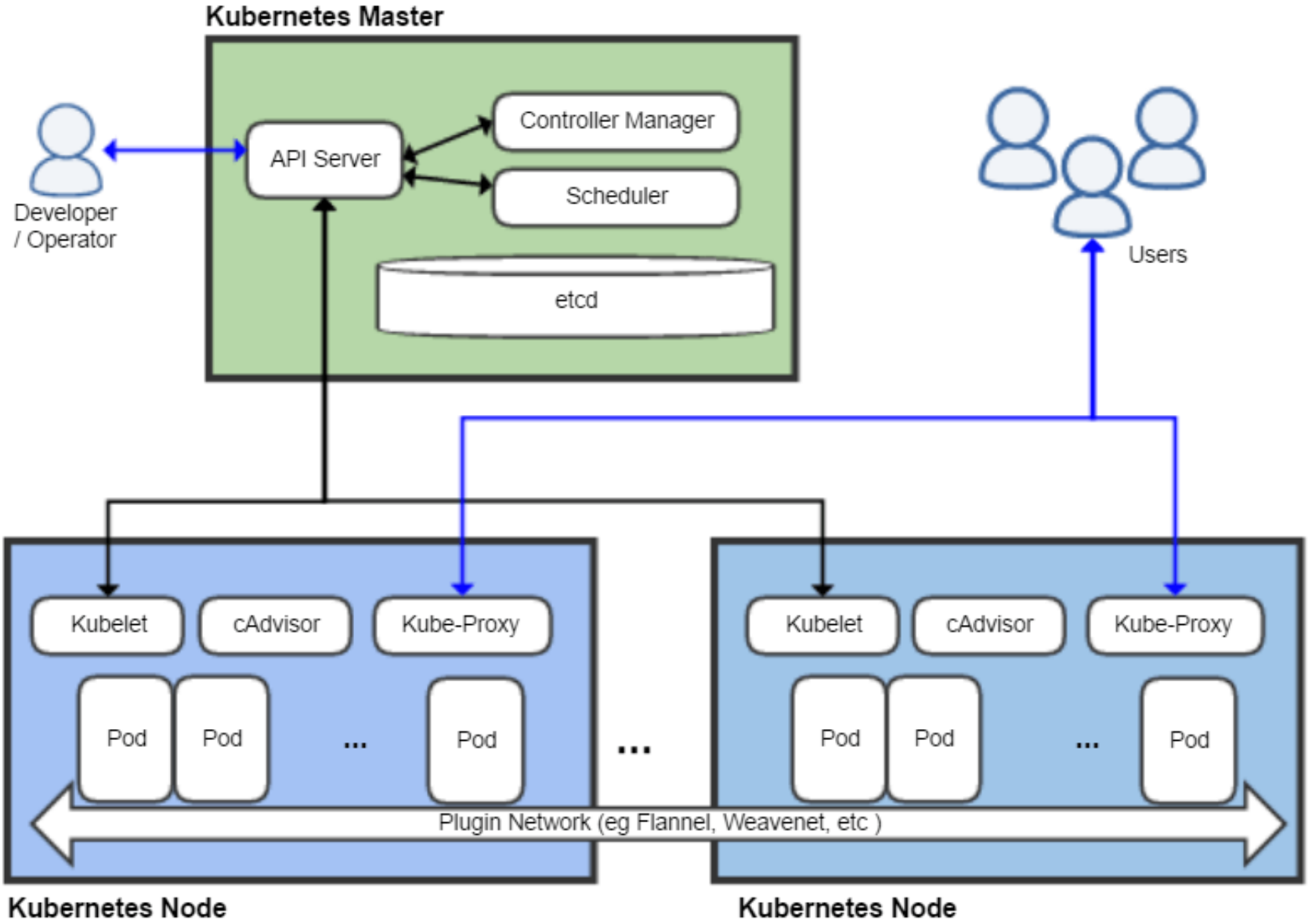
- **Container are not new**
- 1979 chroot syscall in Unix v7
- 1982 Chroot command in 4.2BSD
- 2000 Jails in FreeBSD (inkl. Extra IP)
- 2001 Vserver for Linux (FS,network,Mem)
- 2005 OpenVZ (+ resource mgmt, checkpoint)
- 2005 Zones in Solaris (+ Cloning)
- 2008 lxc in Linux (included in vanilla kernel)

Docker

- Created 2013
- New: Easy to use file system layers
- Only the best known container tool
- One big daemon, does everything, runs as root
- Will be (is) replaced
  - by CRI-O (podman) or rkt
  - with a lot of single purpose tools (Unix Style).

Kubernetes

- Kubernetes is greek for Pilot or Helmsman
- Google used a tool called Borg, re-implemented with Codename Seven (nicer Borg), seven sticks on the wheel.
- Now Cloud Native Foundation (Linux Foundation)
- Used with Rancher Labs, Azure, CoreOS Tectonic, Mirantis, openshift, ...


Kubernetes Master
Developer
/ Operator
API Server
Controller Manager
Scheduler
etcd
Users
Kubelet
cAdvisor
Kube-Proxy
Pod
Pod
...
Pod
...
Kubelet
cAdvisor
Kube-Proxy
Pod
Pod
...
Pod
Plugin Network (eg Flannel, Weavenet, etc)
Kubernetes Node
Kubernetes Node

Kubernetes

- Pods (Running Conatiner)
- Nodes (Machine that runs Container)
- Project (multiple container, secluded)
- Controller Manager
- Master
- Etcd (from CoreOS)

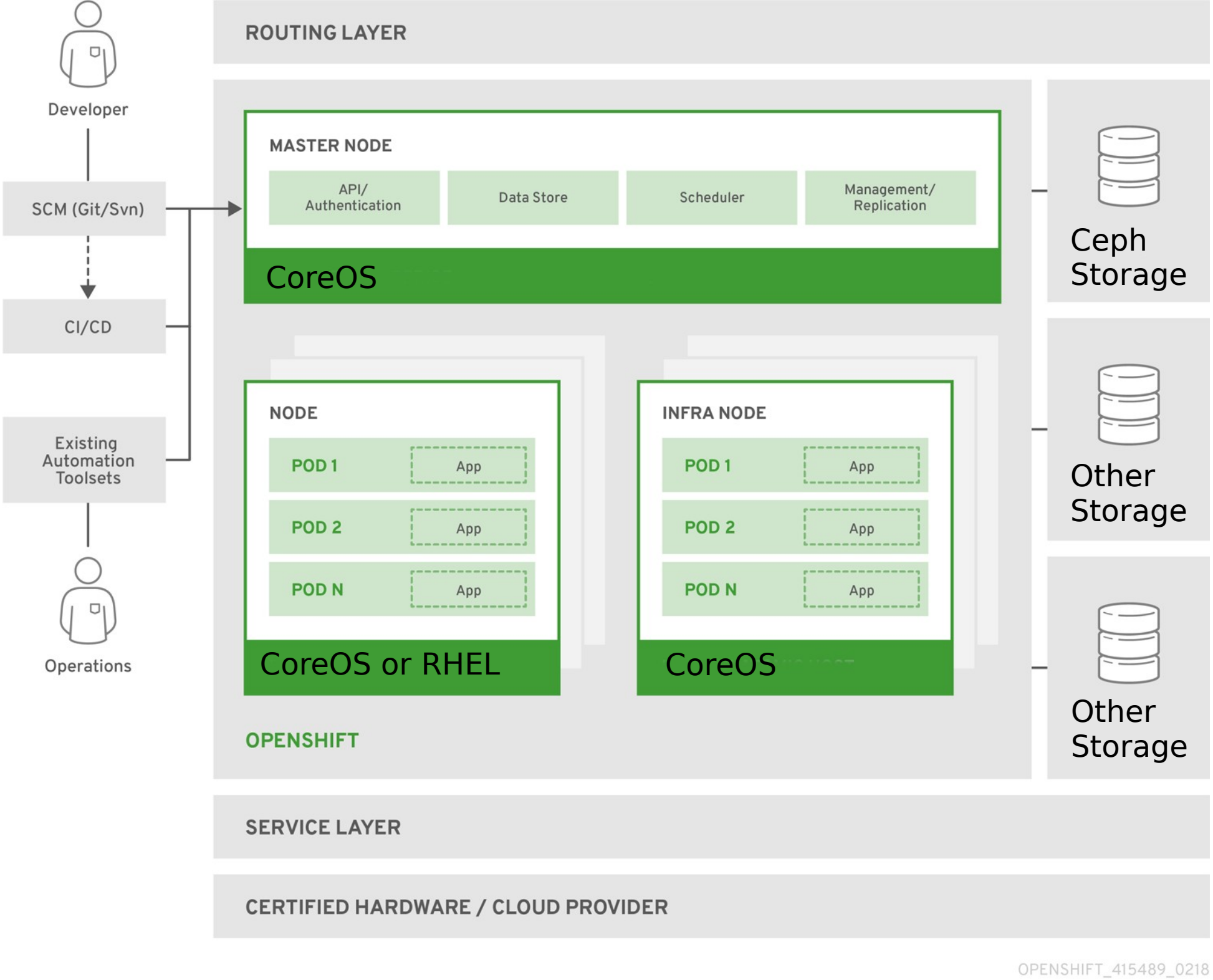
- Readyness vs. Liveness Probe vs. Startup Probe
- Missing: Network, Storage and a GUI

Openshift

- Editions
  - OKD (OpenSource upstream, was OpenShift Origin)
  - Dedicated (Private Instance on Public Cloud)
  - Container Platform (On Premise Privat Cloud, former OpenShift Enterprise)
  - Online (open public Cloud)
- Runs on
  - Bare-Metal (Full Install needs 96GB RAM)
    - Running CoreOS
    - App-Nodes can run latest Redhat, Centos or Fedora normal install
  - Virtual Machines (KVM, VMWare, VirtualBox)
    - Cloud Ready Container (9++ GB RAM for Virtual Machine needed)
  - Public Clouds (AWS, Azure, OpenStack, Google Compute)
- Creates a platform independent layer

Operators

- Tool to install, setup, deploy, run, manage, update and destroy Kubernetis-native applications.
- Used by OpenShift itself.
- Example:
  - Database
  - Monitoring
  - Filesystem
  - OpenShift Nodes
  - OpenShift Internal Services


ROUTING LAYER
Developer
SCM (Git/Svn)
CI/CD
Existing Automation Toolsets
Operations
MASTER NODE
API/ Authentication
Data Store
Scheduler
Management/ Replication
CoreOS
NODE
POD 1
App
POD 2
App
POD N
App
CoreOS or RHEL
INFRA NODE
POD 1
App
POD 2
App
POD N
App
CoreOS
OPENSHIFT
Ceph Storage
Other Storage
Other Storage
SERVICE LAYER
CERTIFIED HARDWARE / CLOUD PROVIDER
OPENSHIFT_415489_0218

OpenShift

- Ceph (Cloud Native Storage)
- Monitoring/Logs integrated
- Network Layer (flanel)
- Extendable by addons

Node selections

- 1 Possible (Code Ready Container)
- 4 = Master +3 Nodes
- Real HA Setups:
  - 2 Loadbalancer
  - 3 Master (HA)
  - 3 Infrastructure Nodes
  - 5 Infrastructure Storage Nodes
  - 5 App Storage Nodes

    3++ App Nodes

DEMO CRC

Secret:
Username
Password

Problems of Container

- Where comes the Container from
- What is the configuration of the Container
- A lot of new concepts = Hugh learning curve

Why Openshift?

- Can Create complete Cloud Independence
- Based on OpenSource
- No Single point of Failure (Cross Cloud possible ...)

Questions

Thanks for all the Fish

Image Sources

- https://de.wikipedia.org/wiki/Datei:Kubernetes.png
- https://github.com/openshift/openshift-docs/blob/master/architecture/images/architecture_overview.png