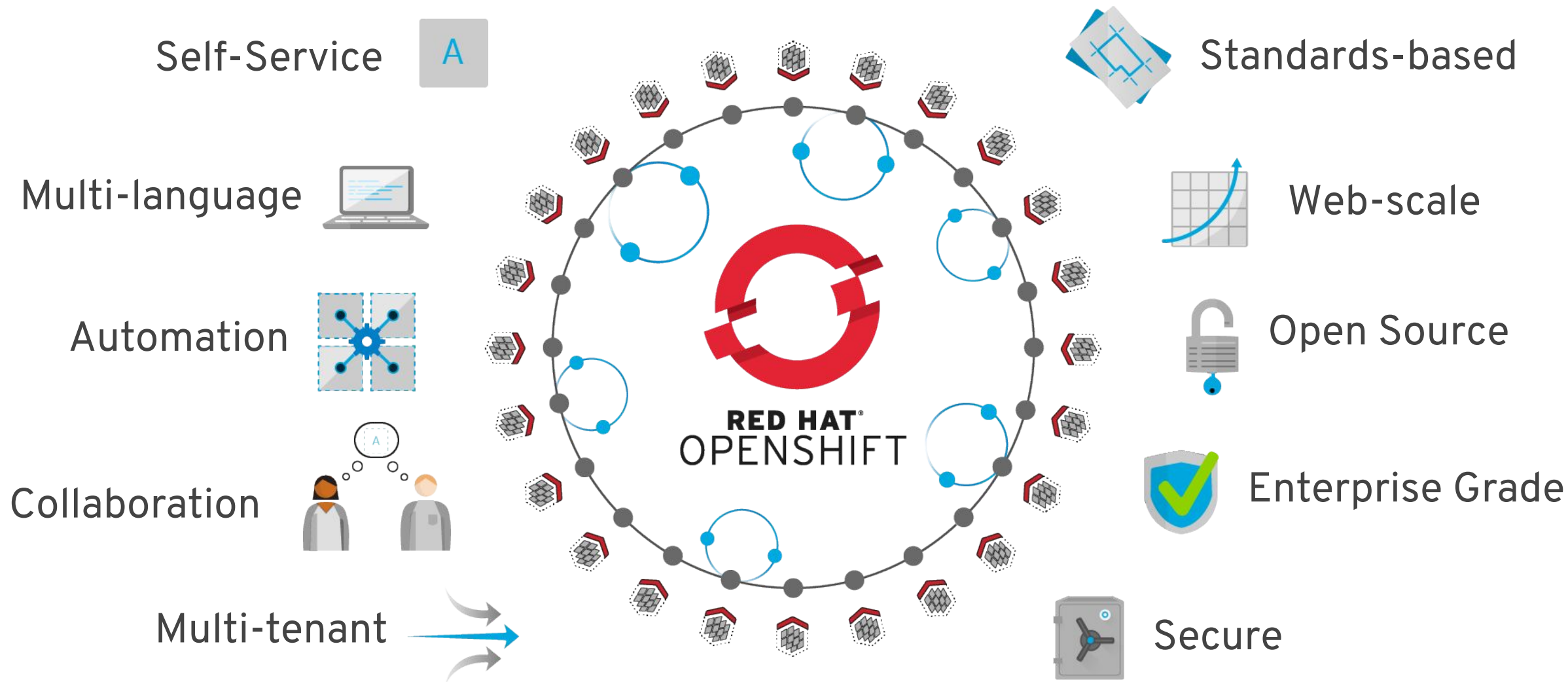
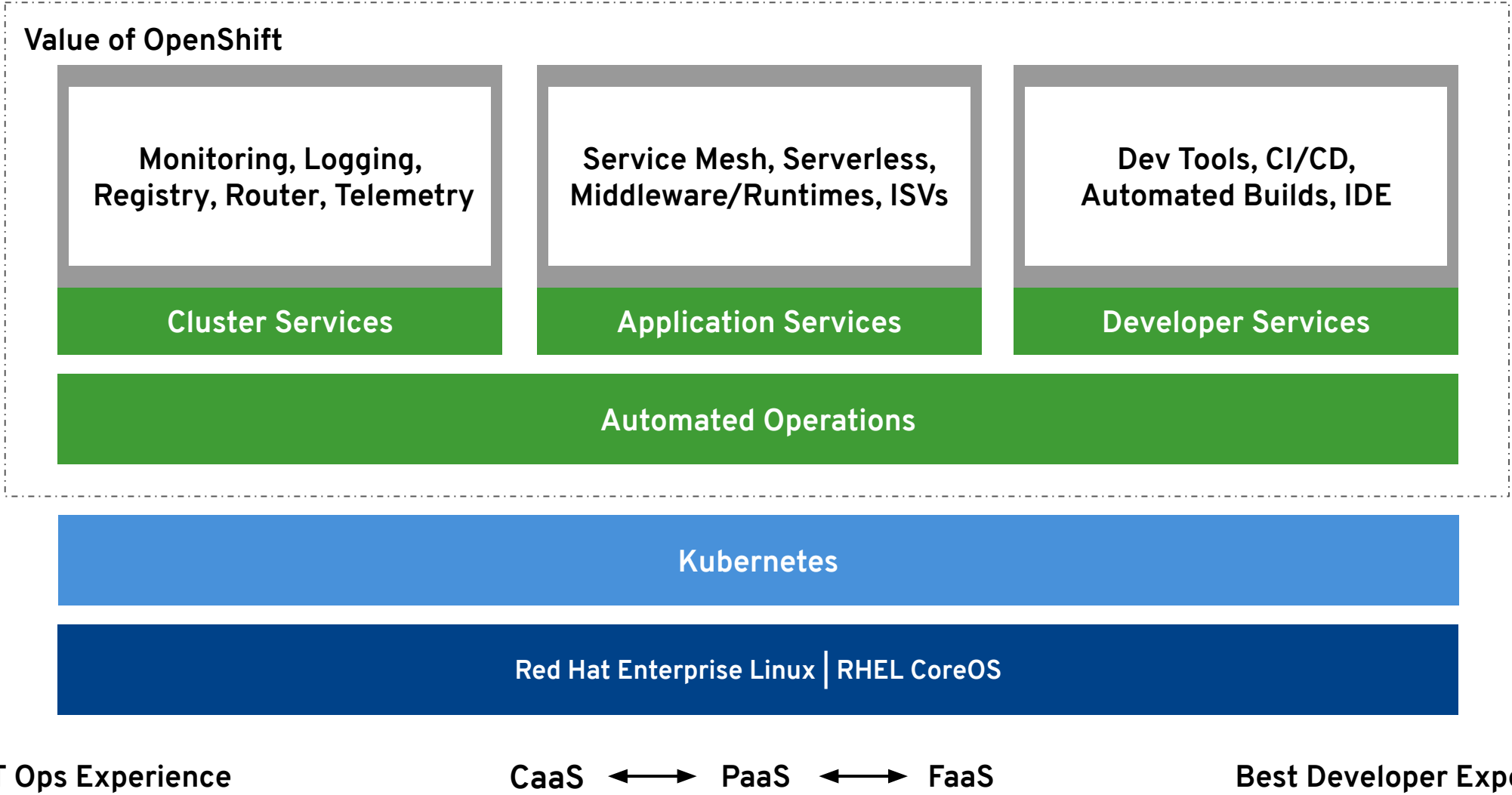




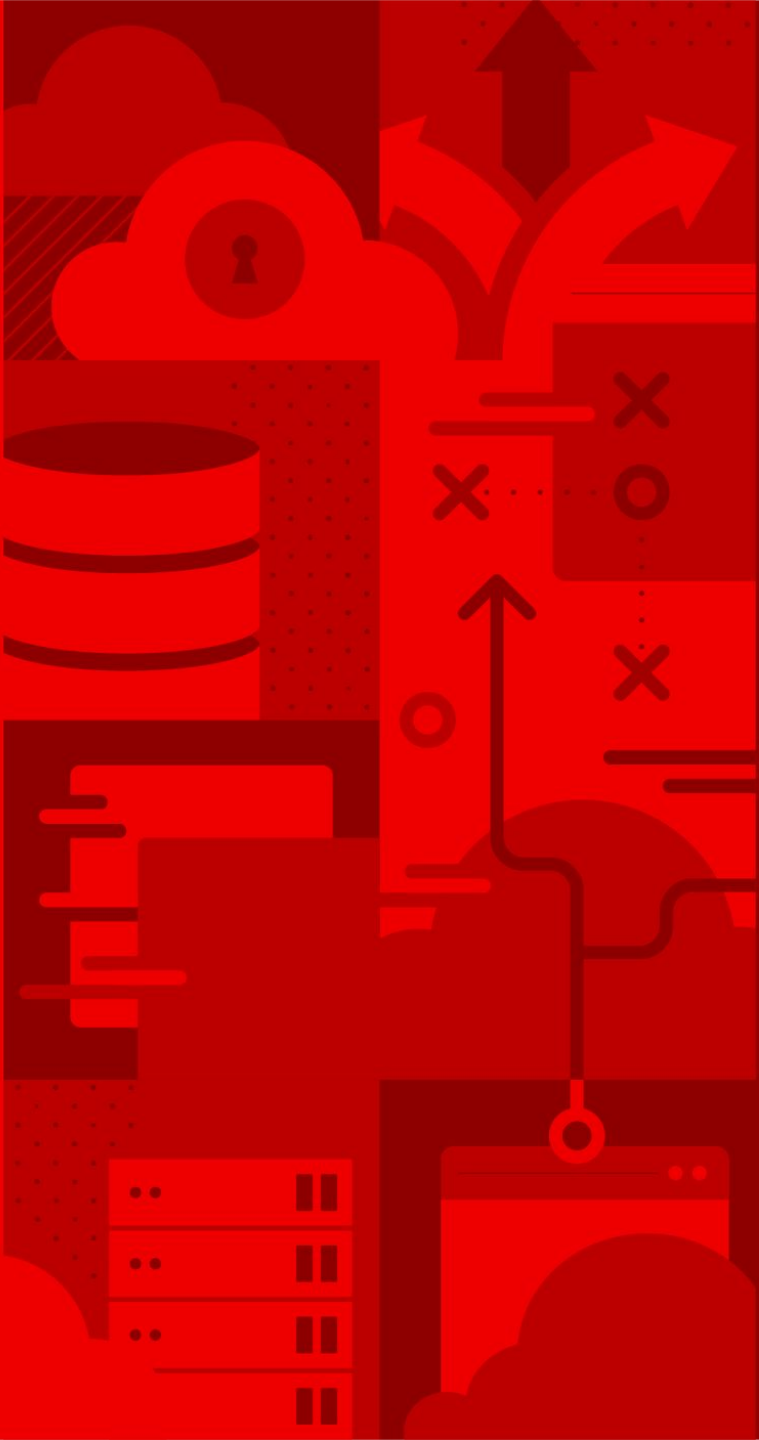
# OpenShift Architecture

As Part of OpenShift Architecture Workshop









# OpenShift and Kubernetes core concepts

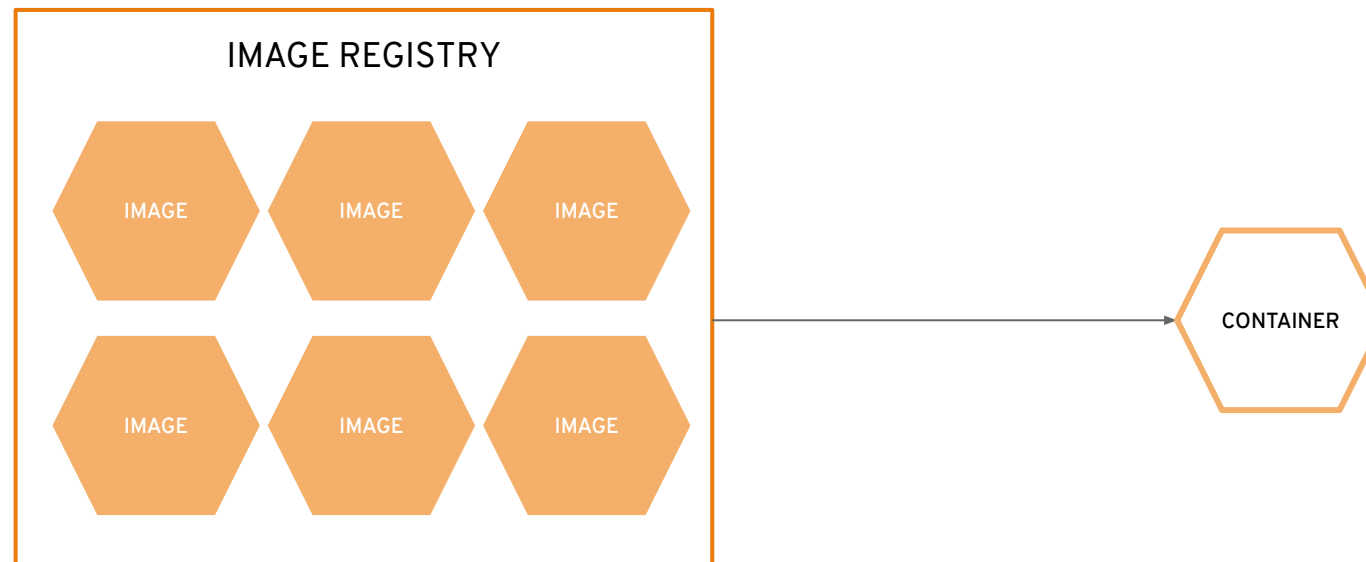
# a container is the smallest compute unit



# containers are created from container images

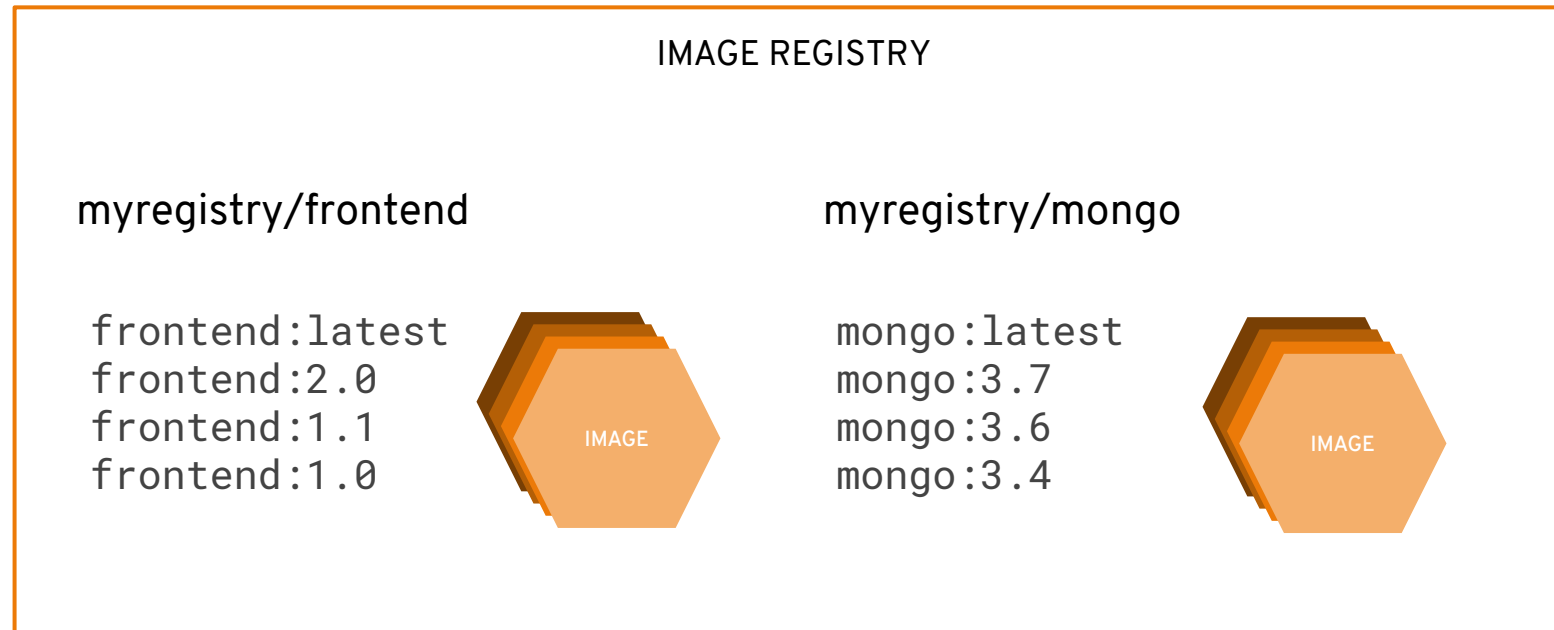


# container images are stored in an image registry

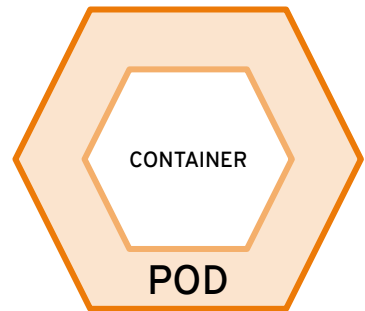




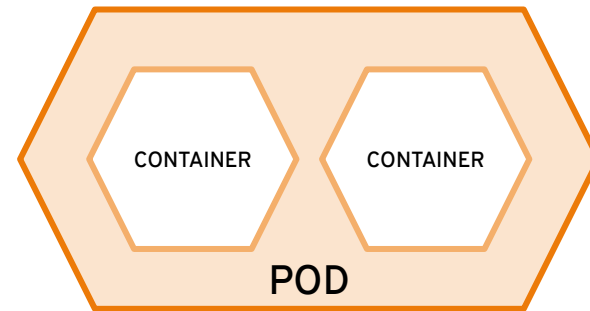
# an image repository contains all versions of an image in the image registry



# containers are wrapped in pods which are units of deployment and management

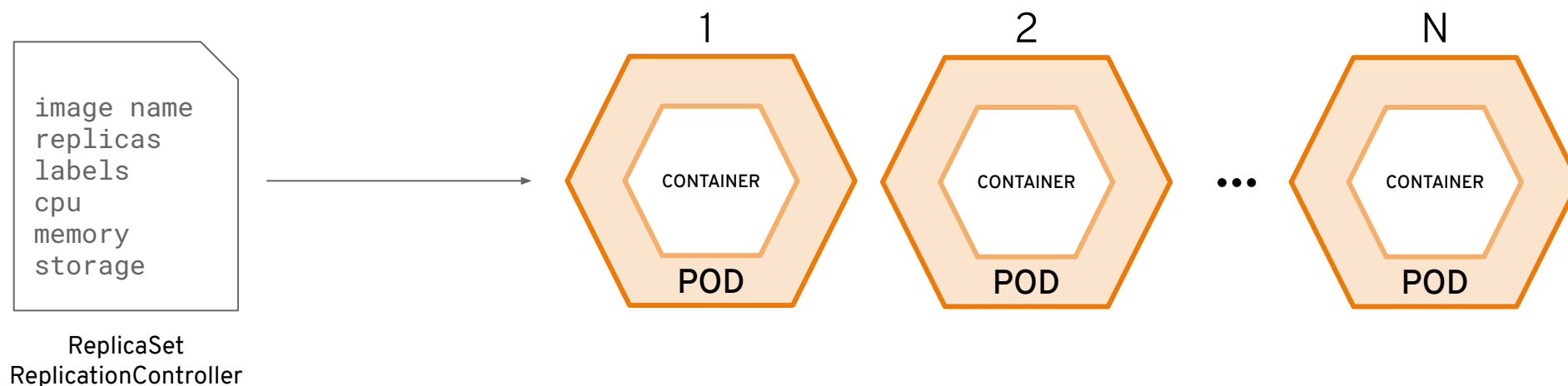


10.140.4.44

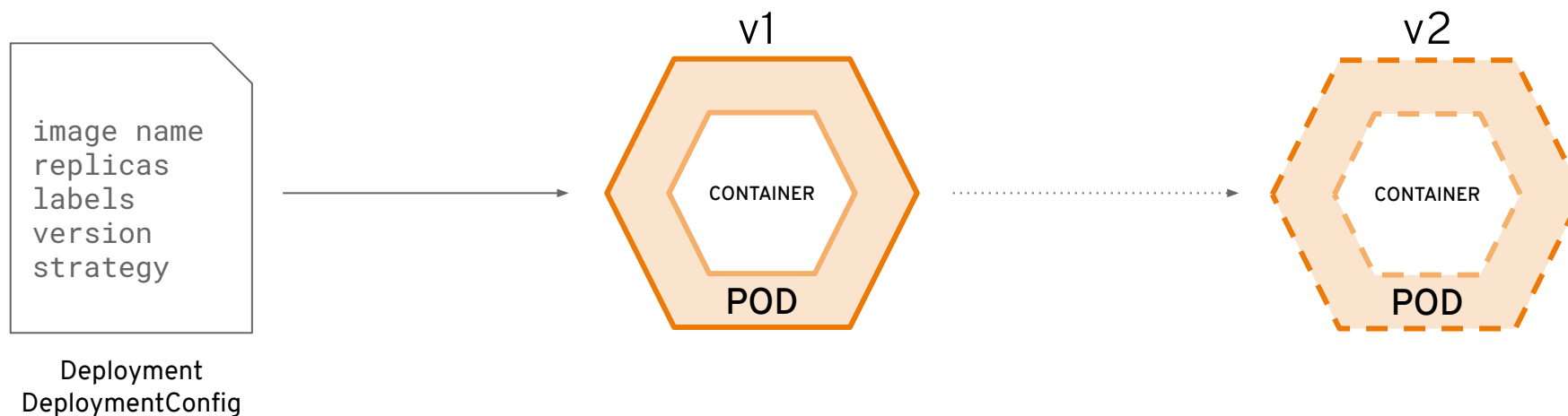


10.15.6.55

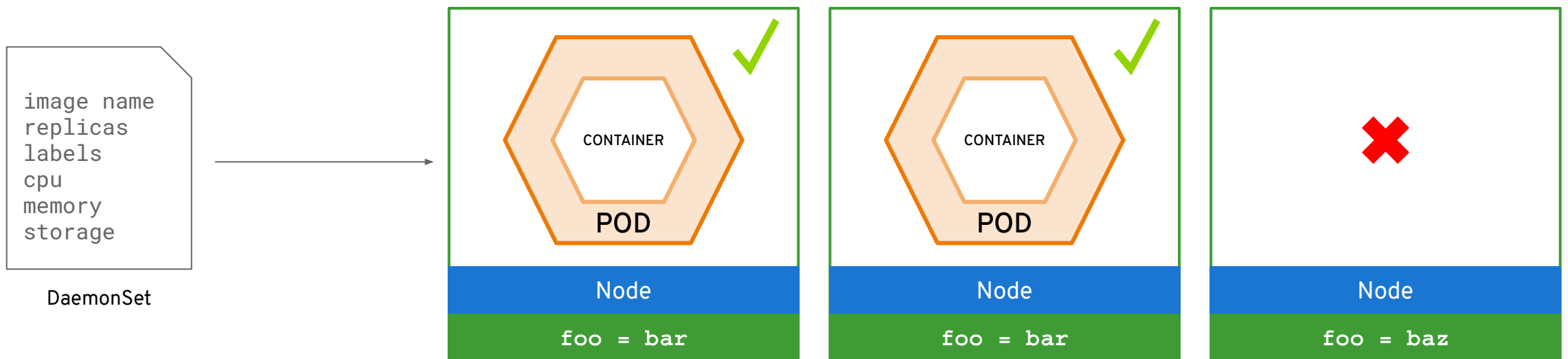
# ReplicationControllers & ReplicaSets ensure a specified number of pods are running at any given time



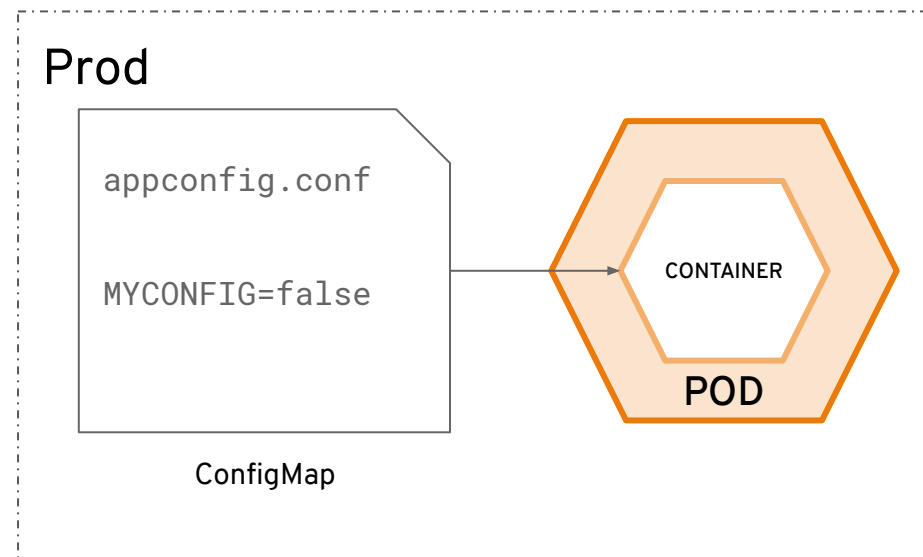
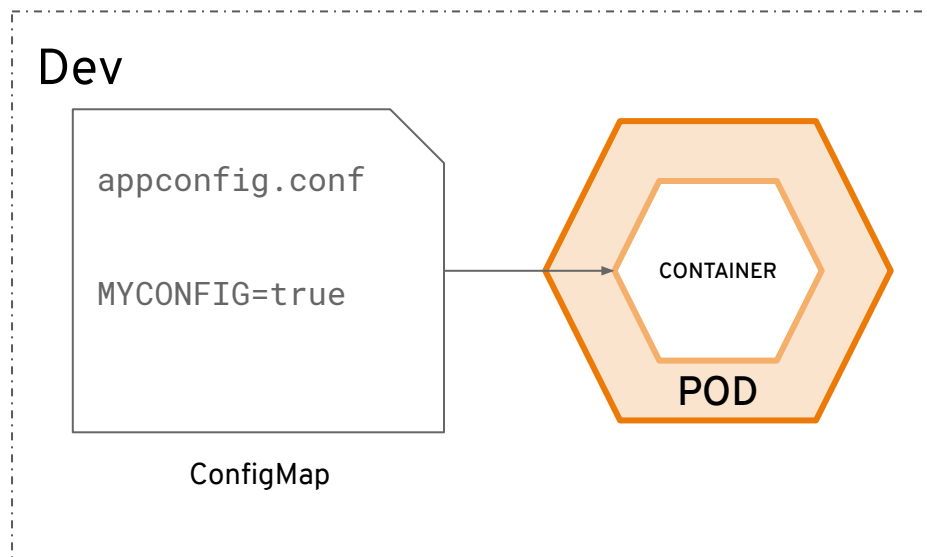
# Deployments and DeploymentConfigurations define how to roll out new versions of Pods



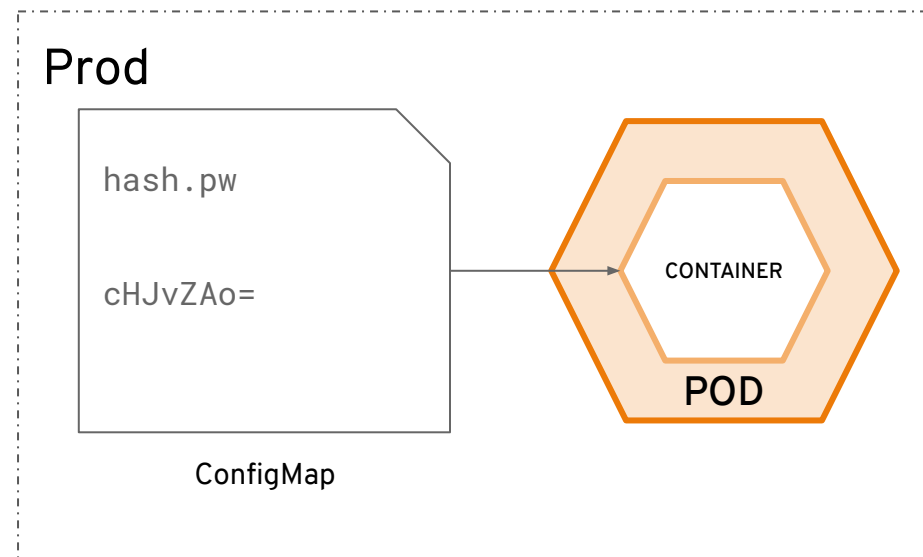
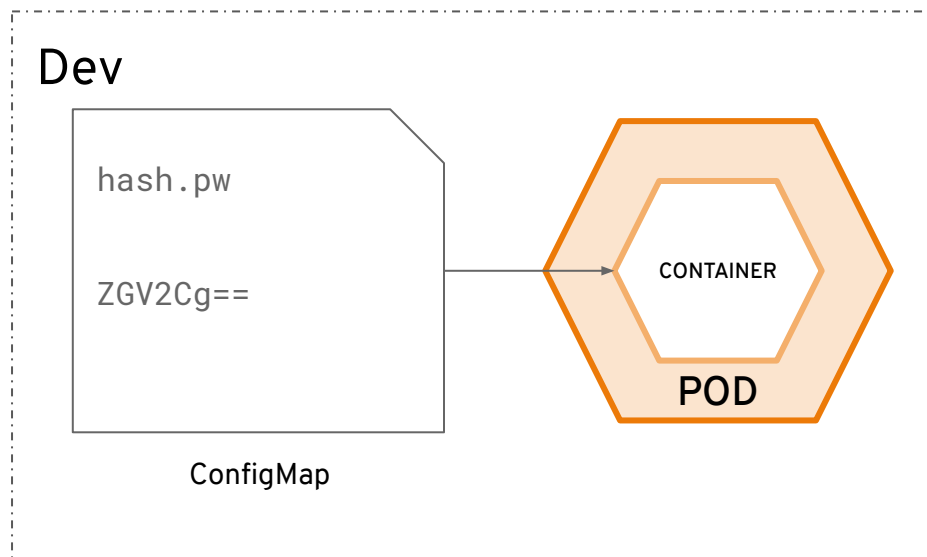
a daemonset ensures that all  
(or some) nodes run a copy of a pod



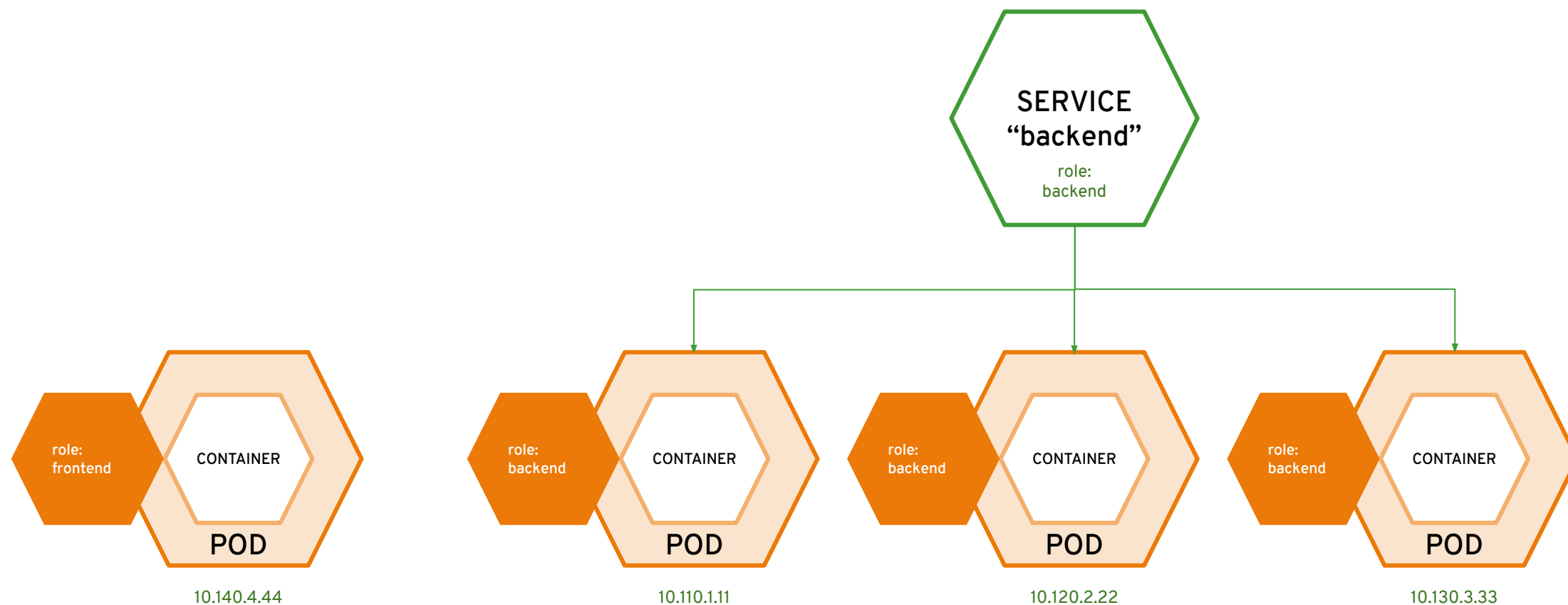
# configmaps allow you to decouple configuration artifacts from image content



`secrets` provide a mechanism to hold sensitive information such as passwords

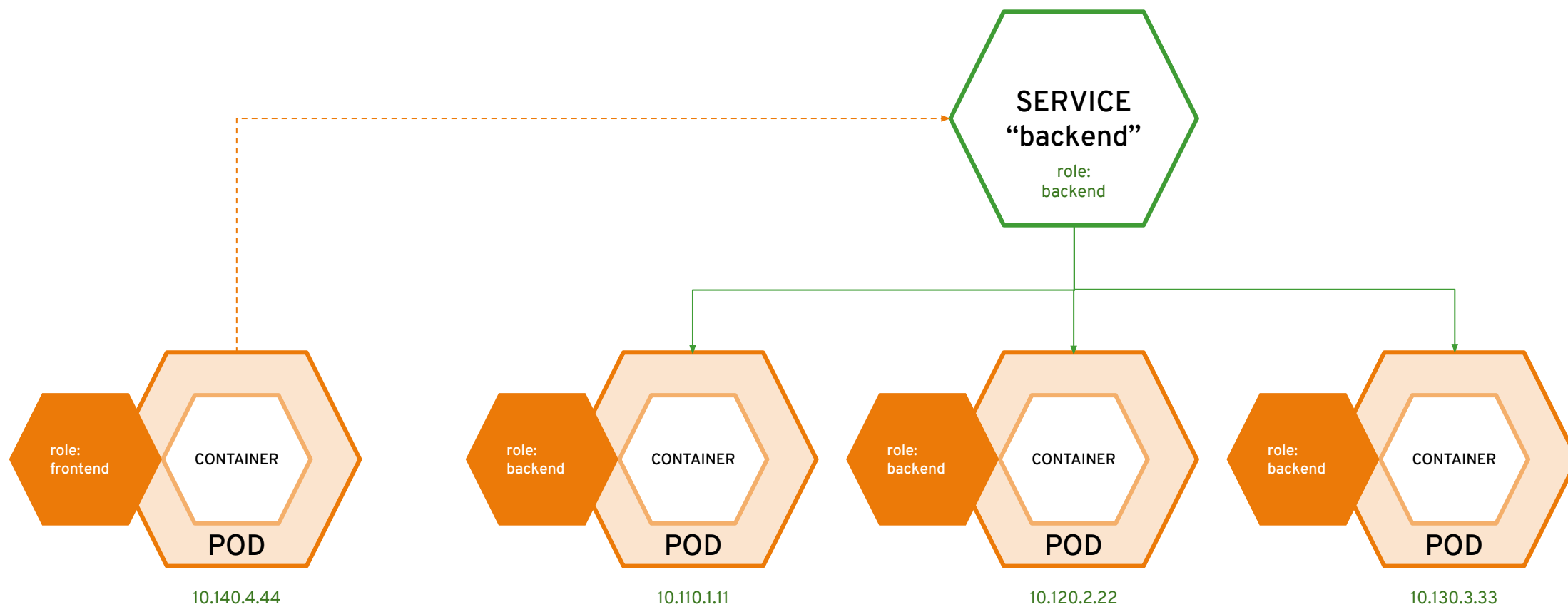


# services provide internal load-balancing and service discovery across pods

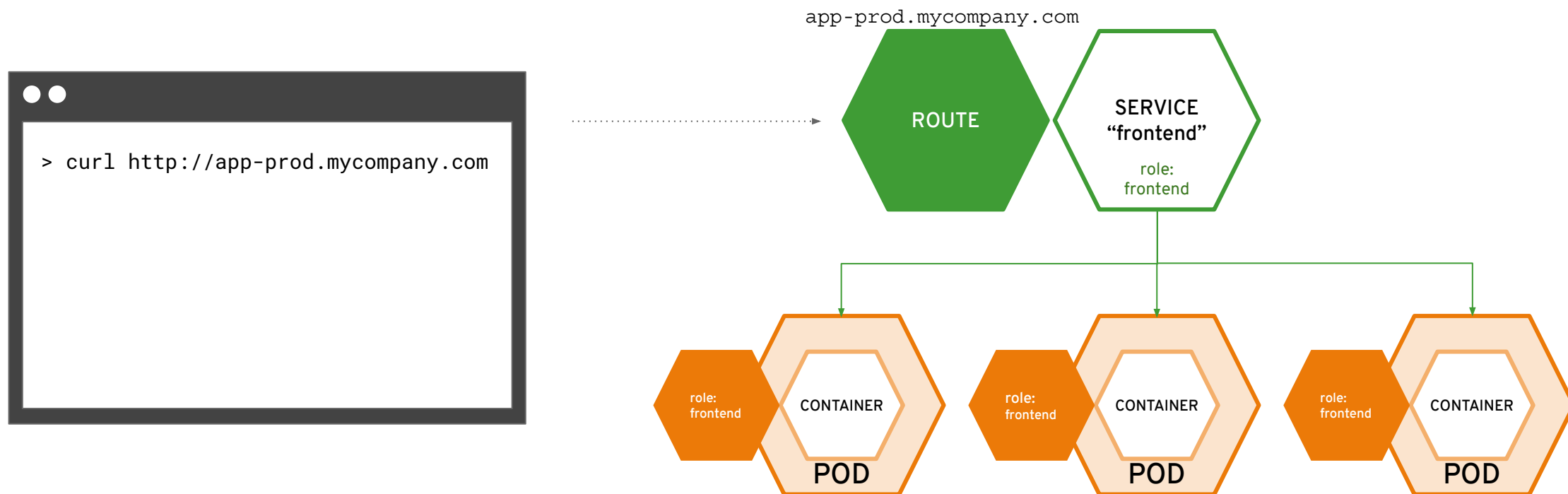




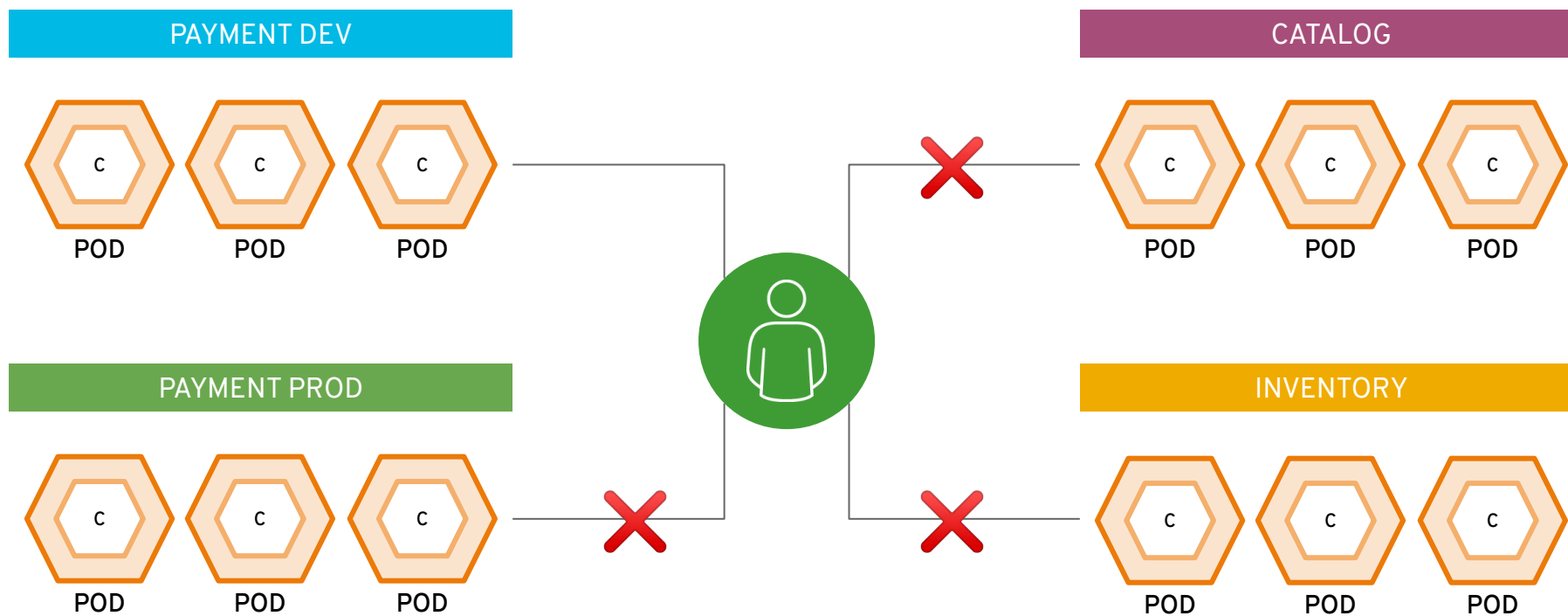
# apps can talk to each other via services



# routes make services accessible to clients outside the environment via real-world urls



# projects isolate apps across environments, teams, groups and departments



# Need a Break ?



# Welcome back !



# OpenShift 4 Architecture

# your choice of infrastructure

COMPUTE

NETWORK

STORAGE

# workers run workloads

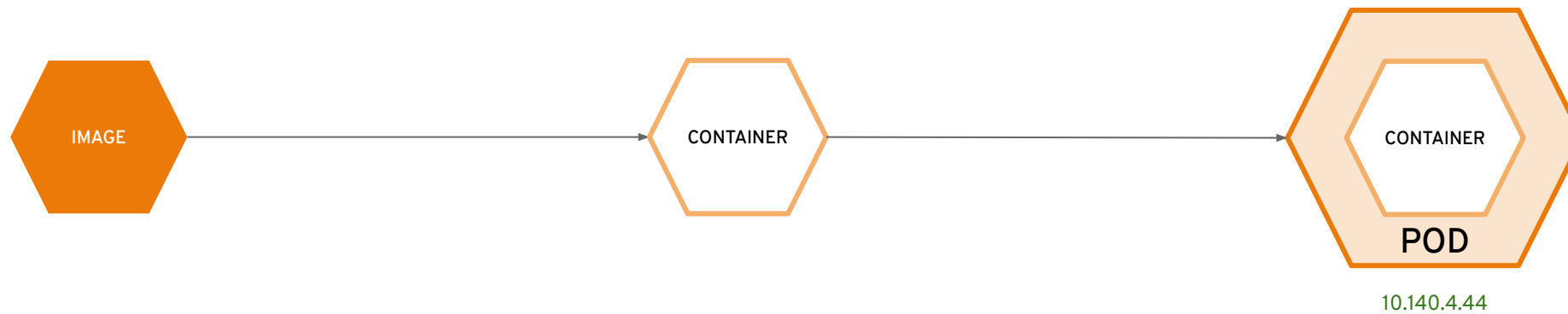




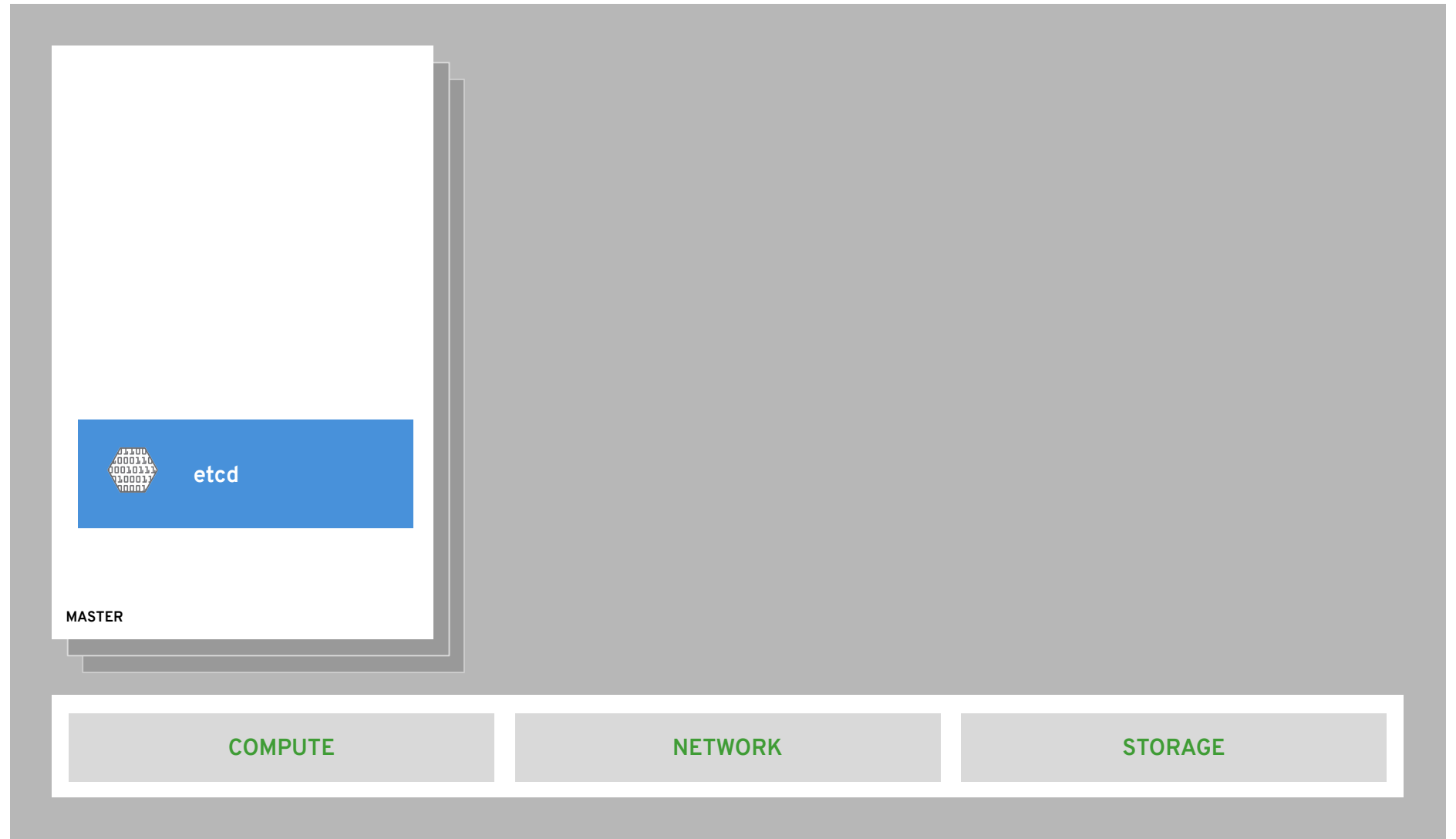
# masters are the control plane



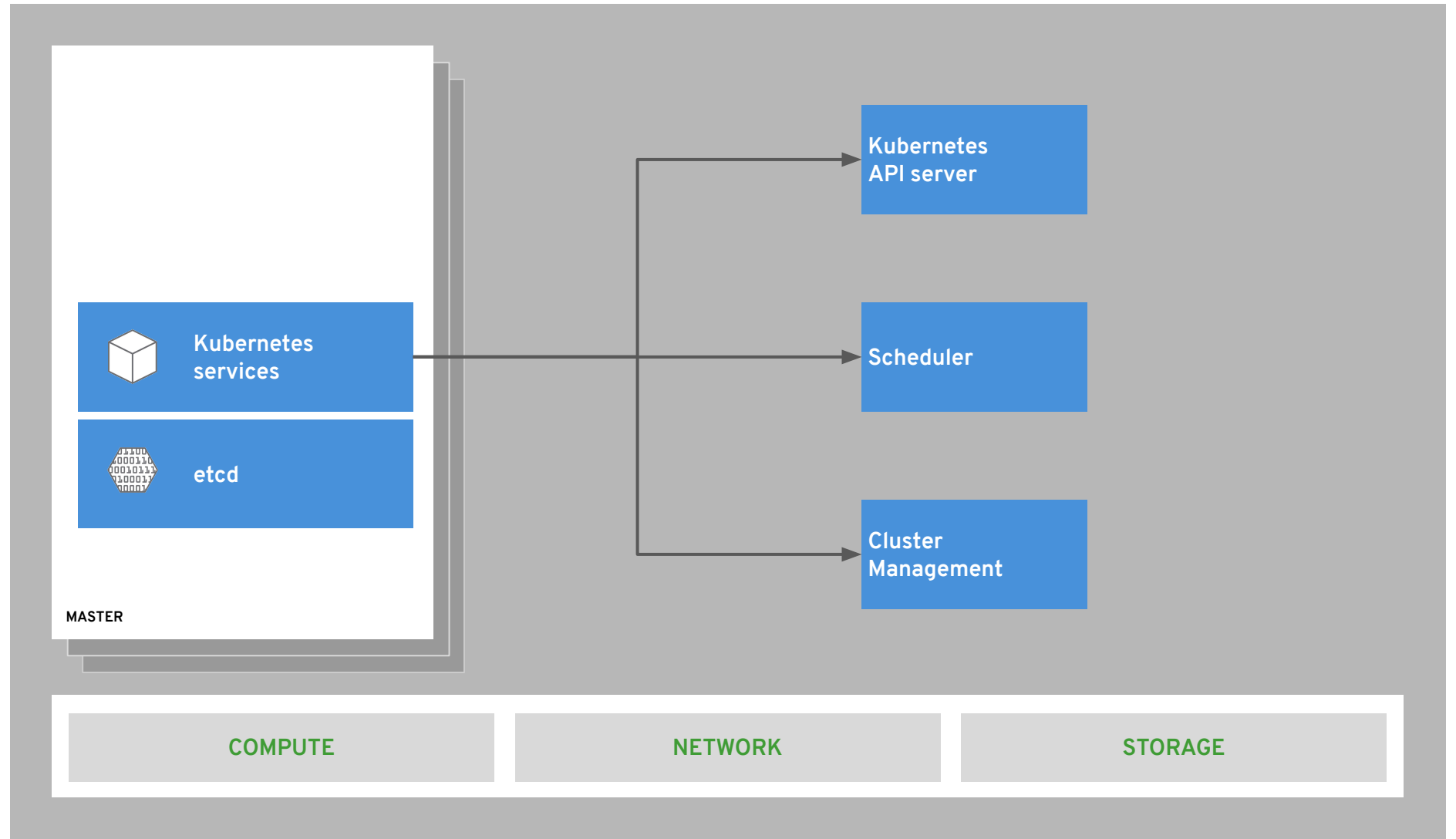
# everything runs in pods



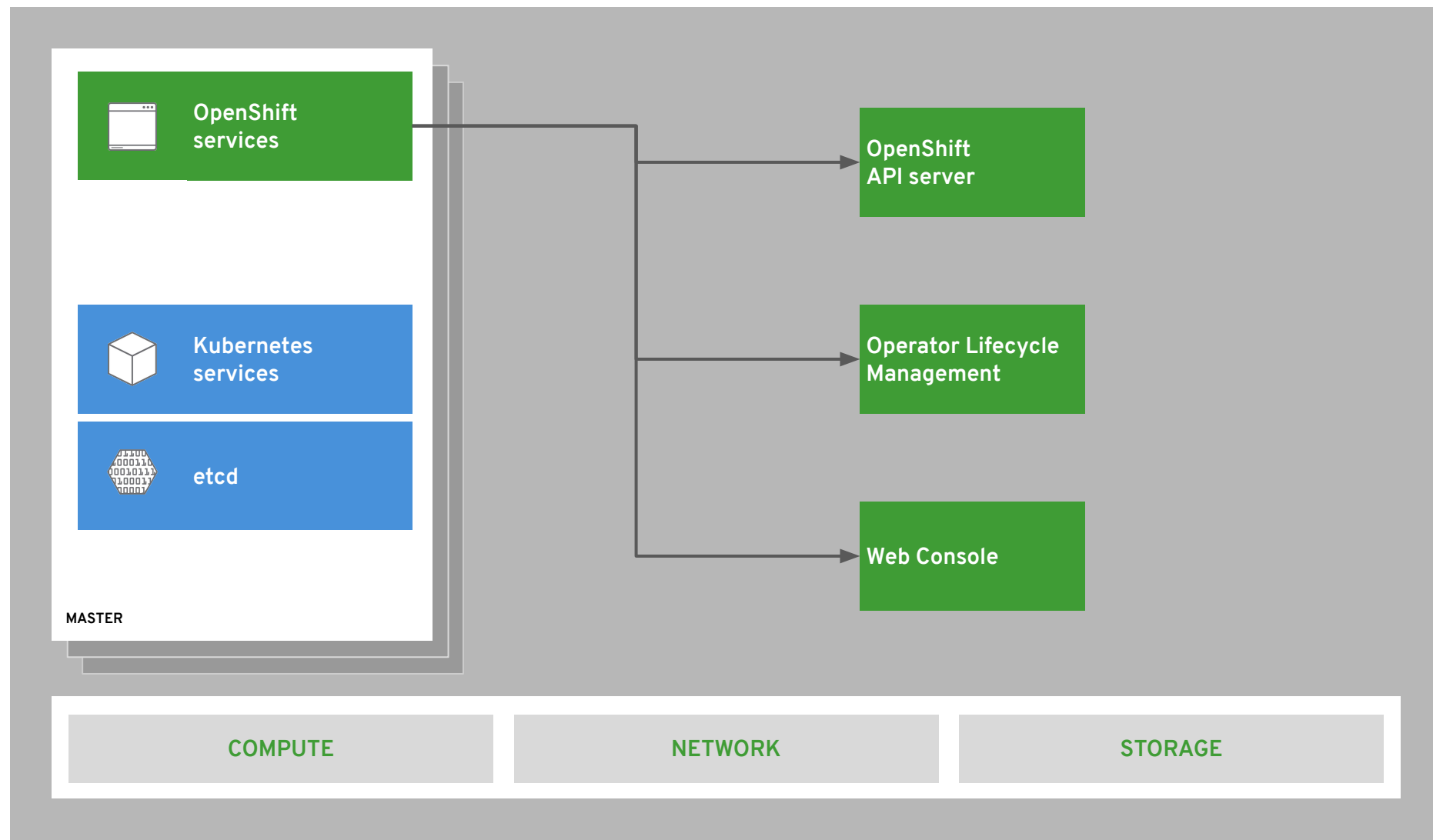
# state of everything



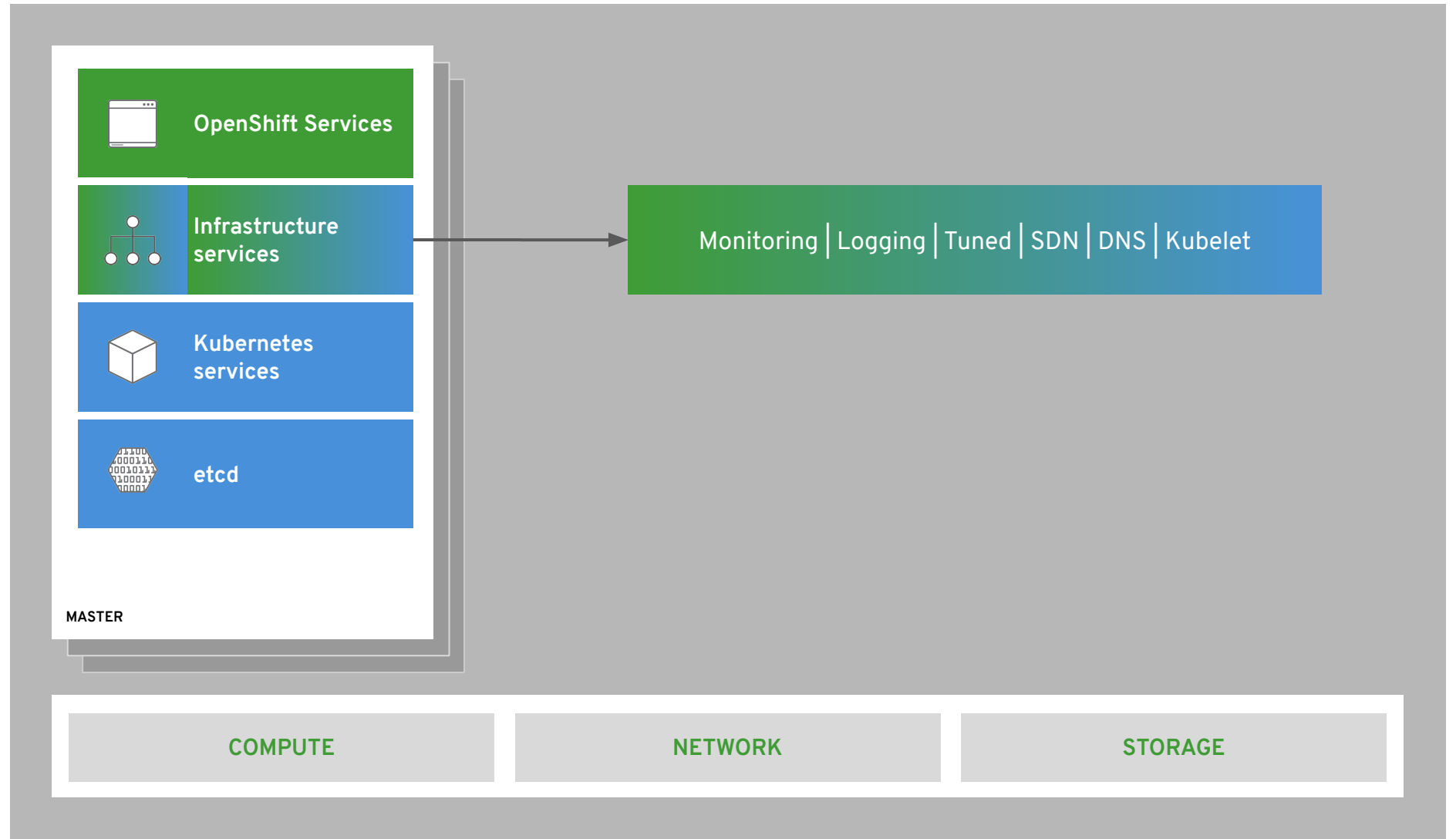
# core kubernetes components



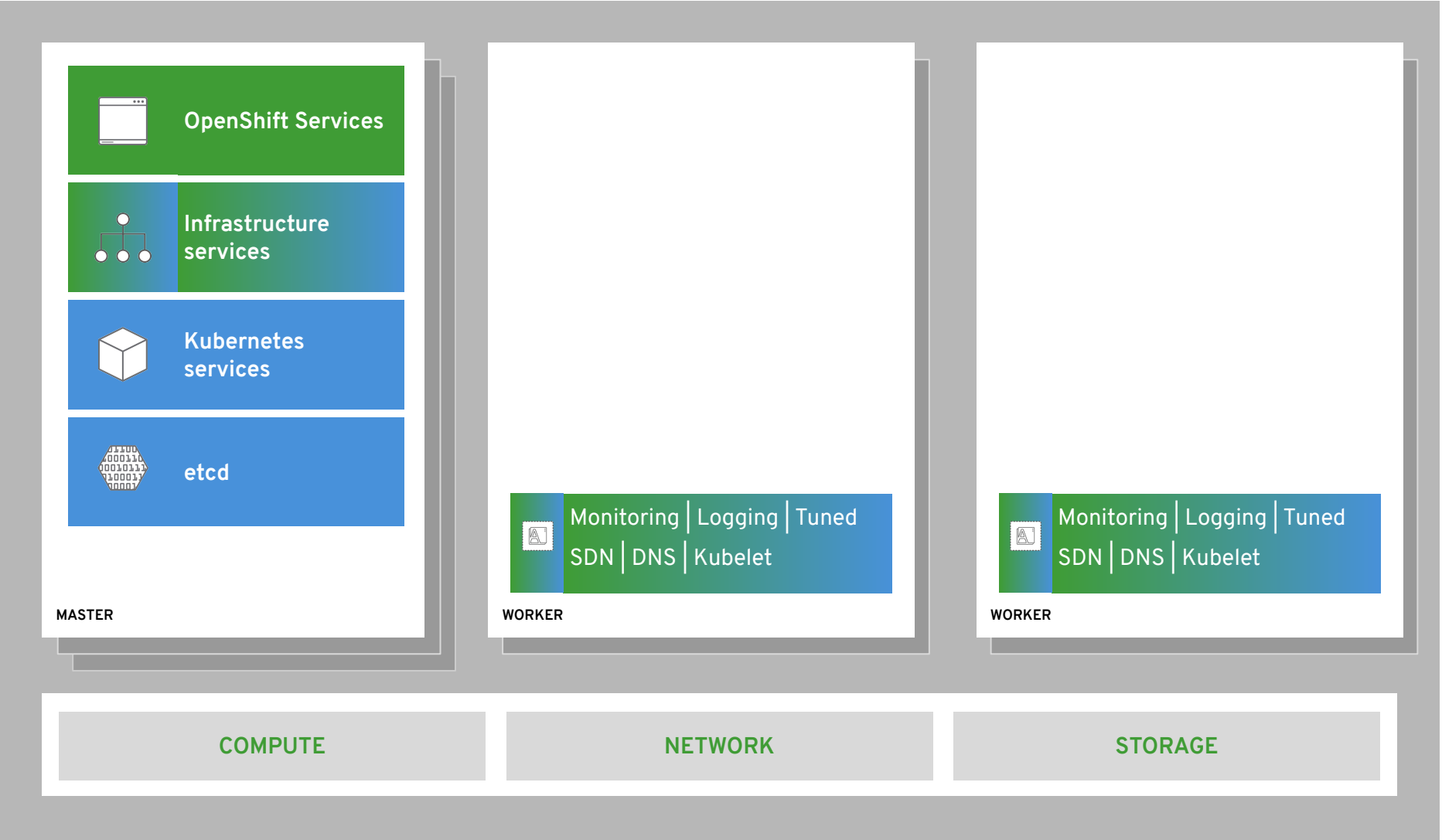
# core OpenShift components



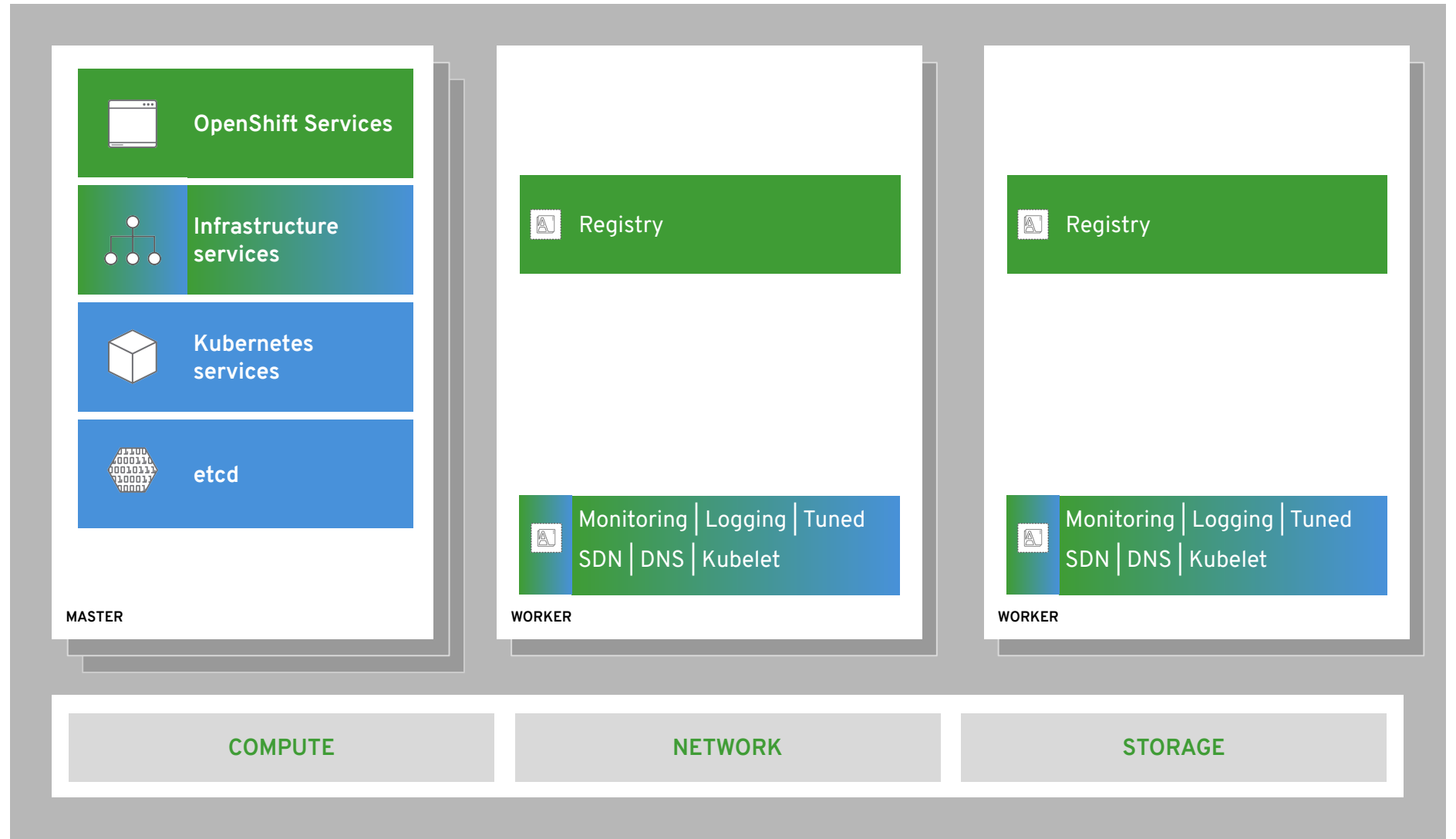
# internal and support infrastructure services



run on all hosts

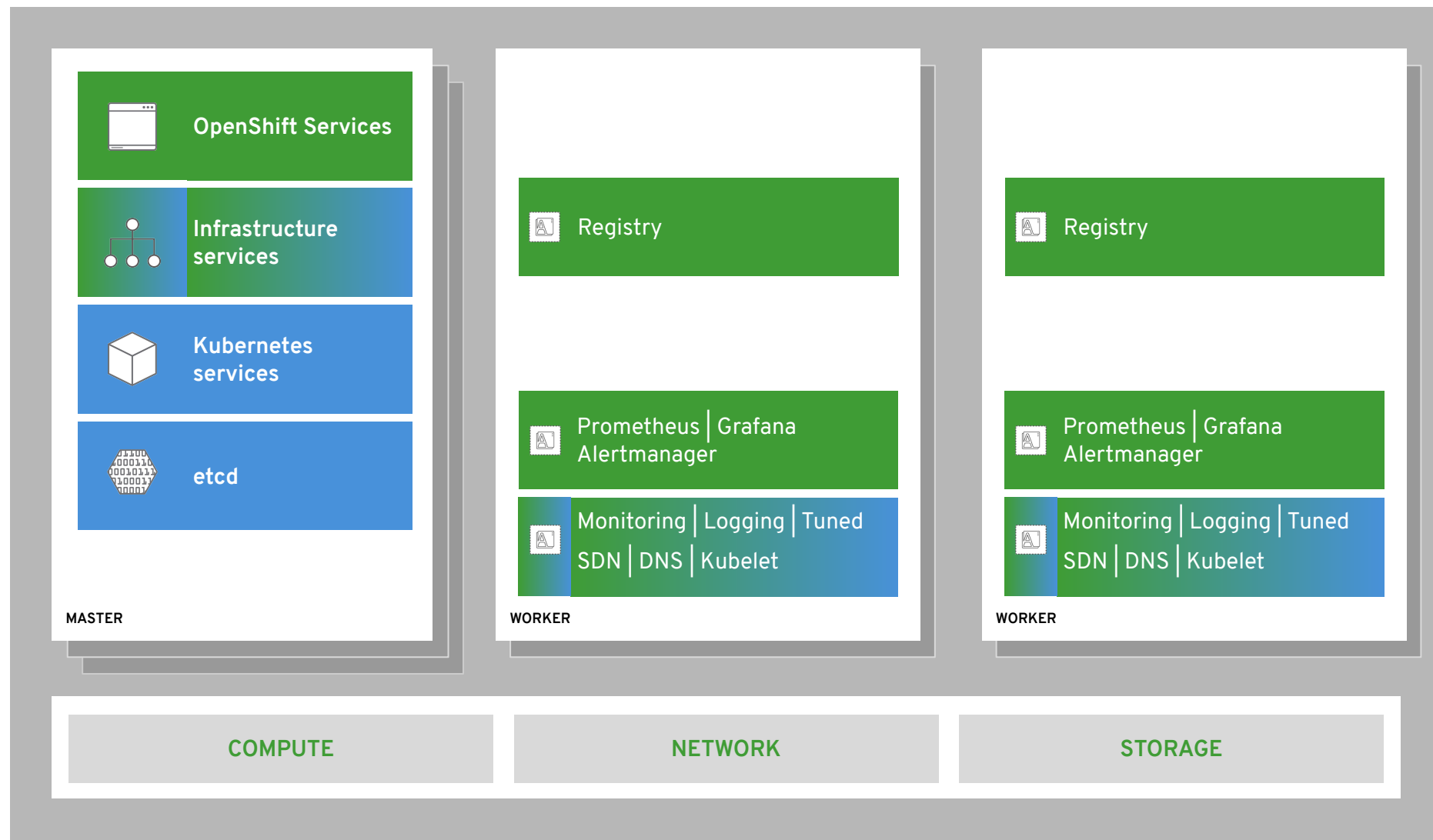


# integrated image registry

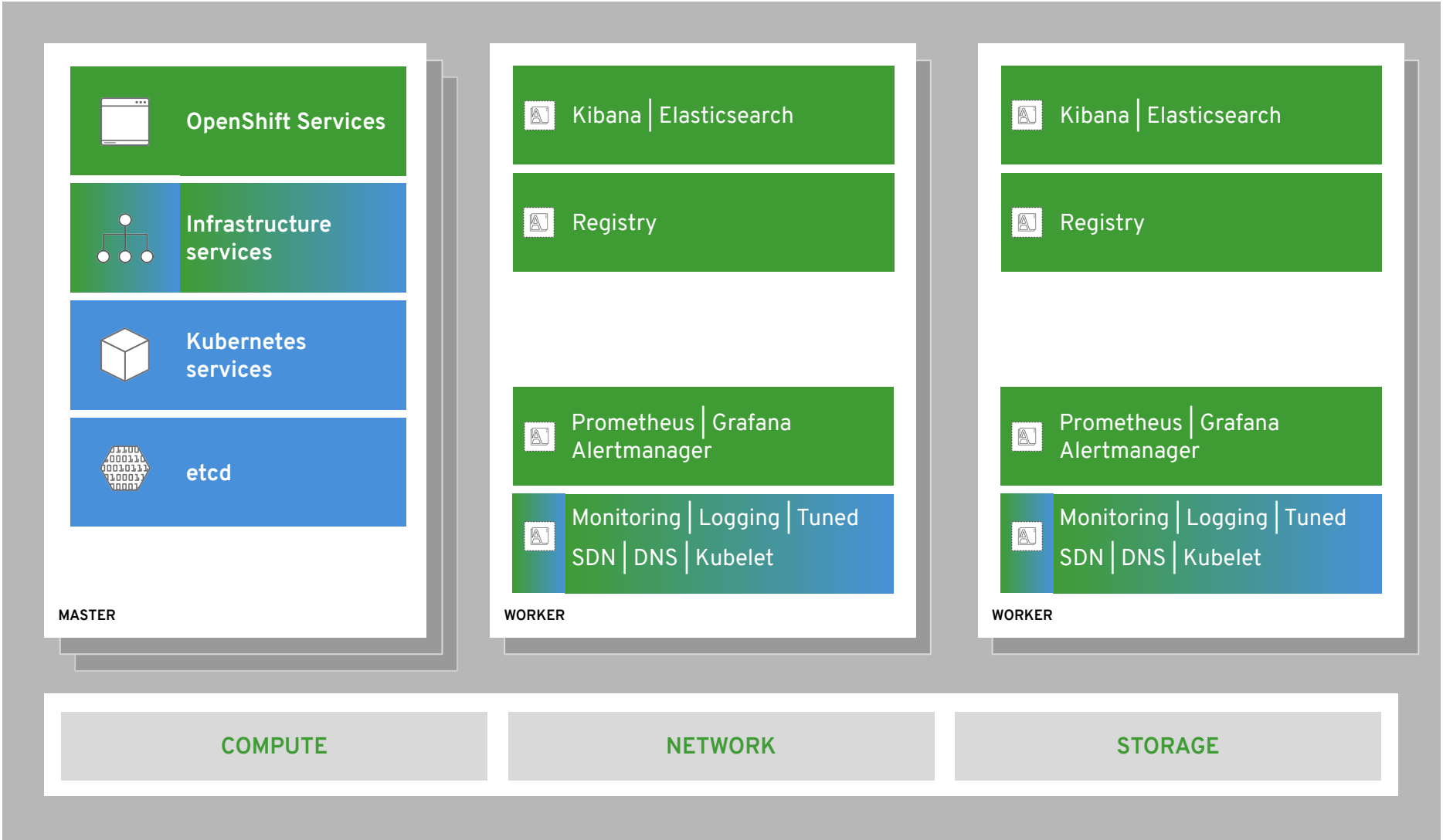




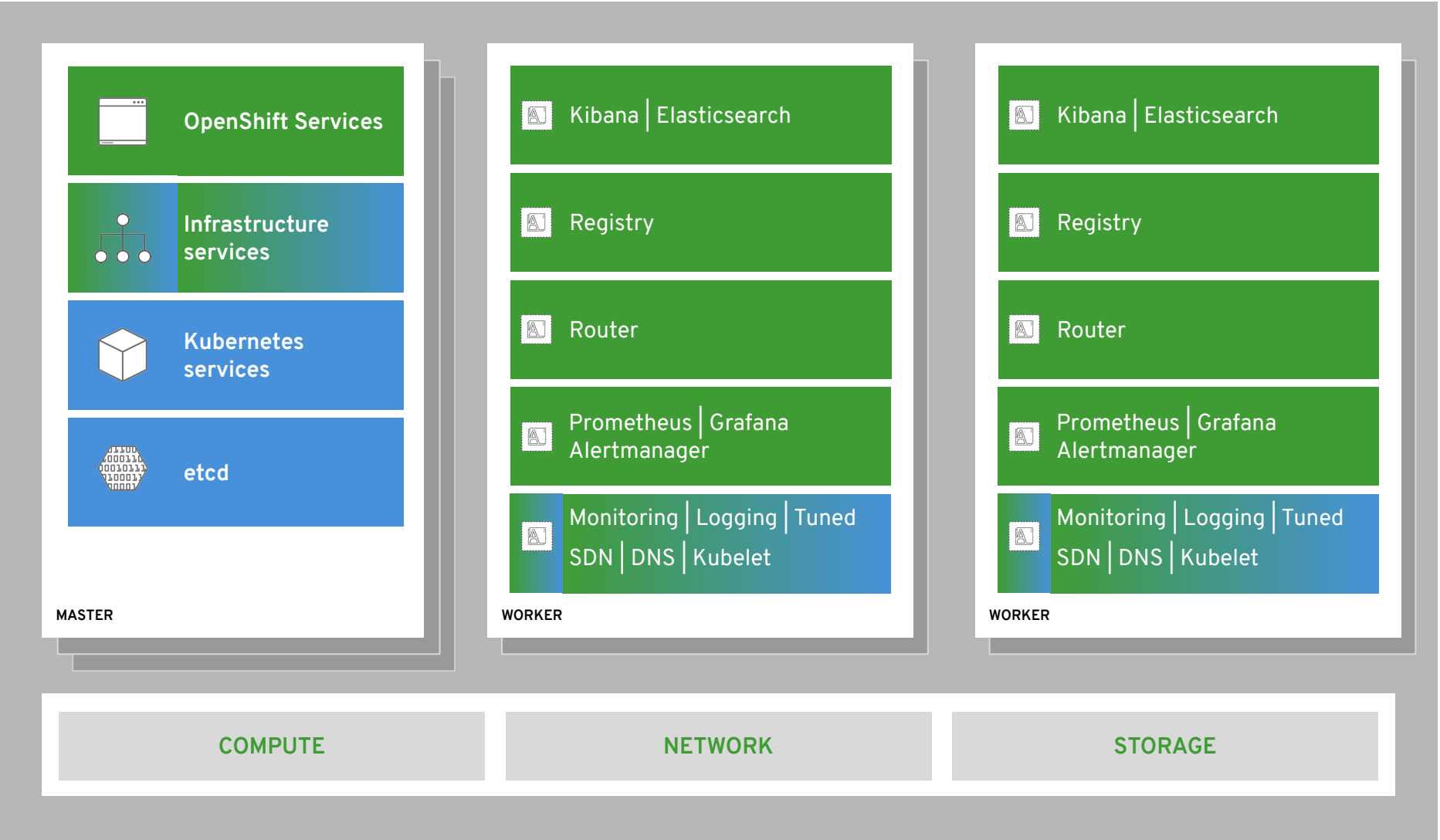
# cluster monitoring



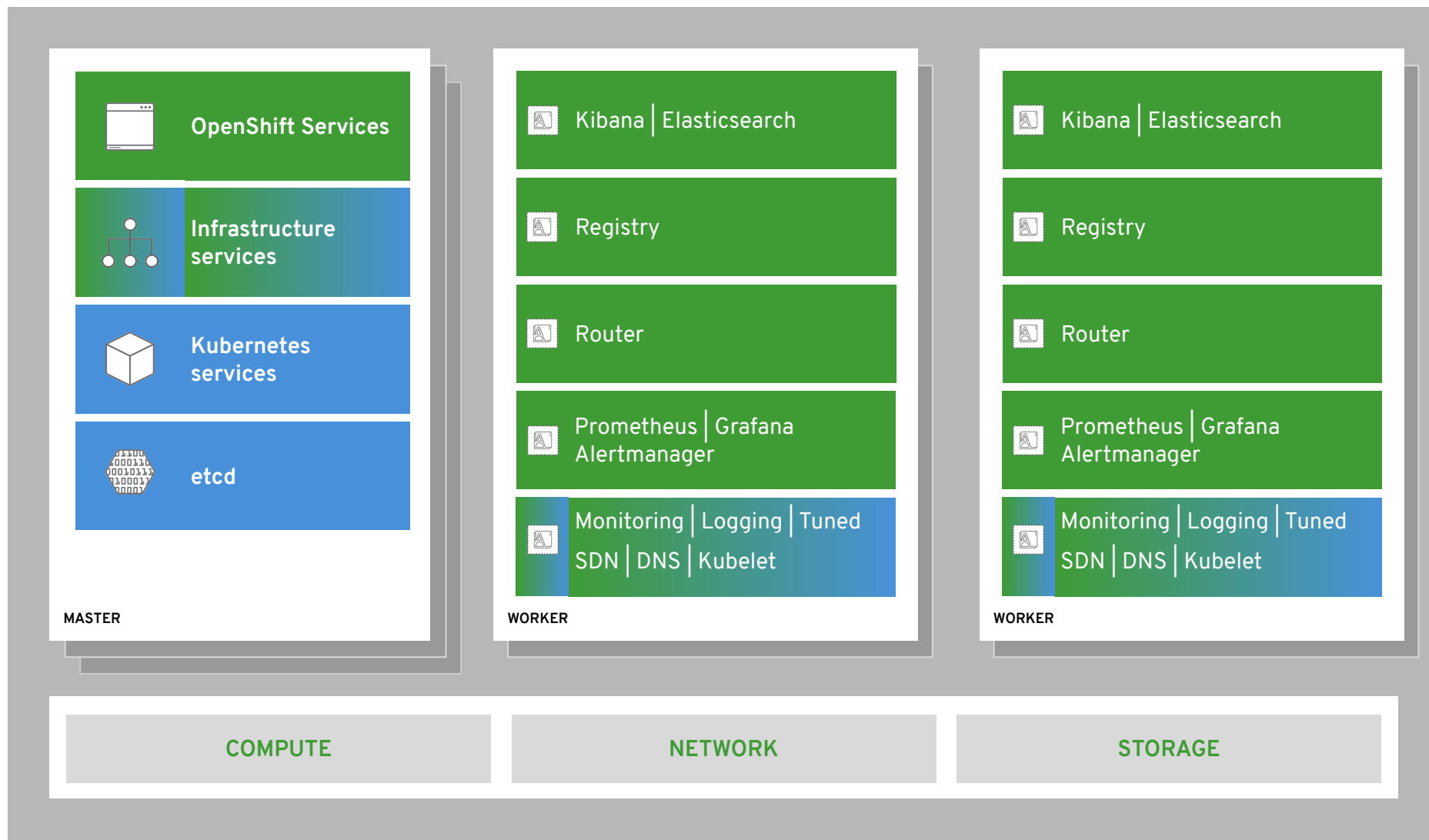
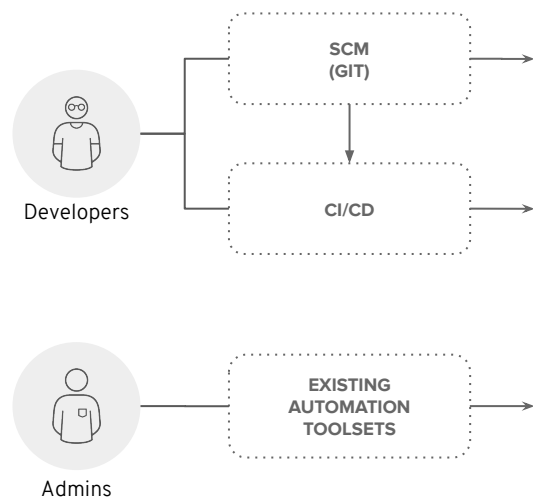
# log aggregation



# integrated routing



# dev and ops via web, cli, API, and IDE



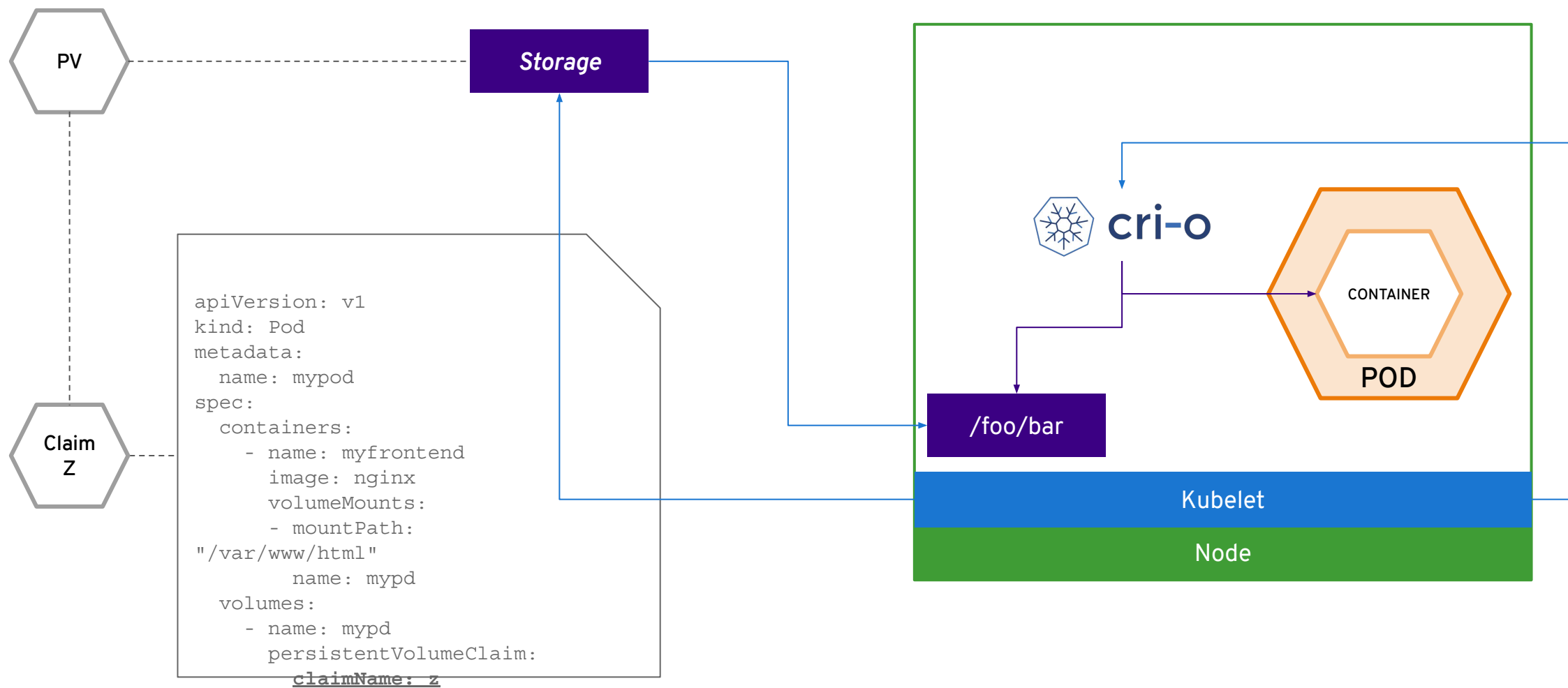
# Persistent Storage

Connecting real-world  
storage to your  
containers to enable  
stateful applications

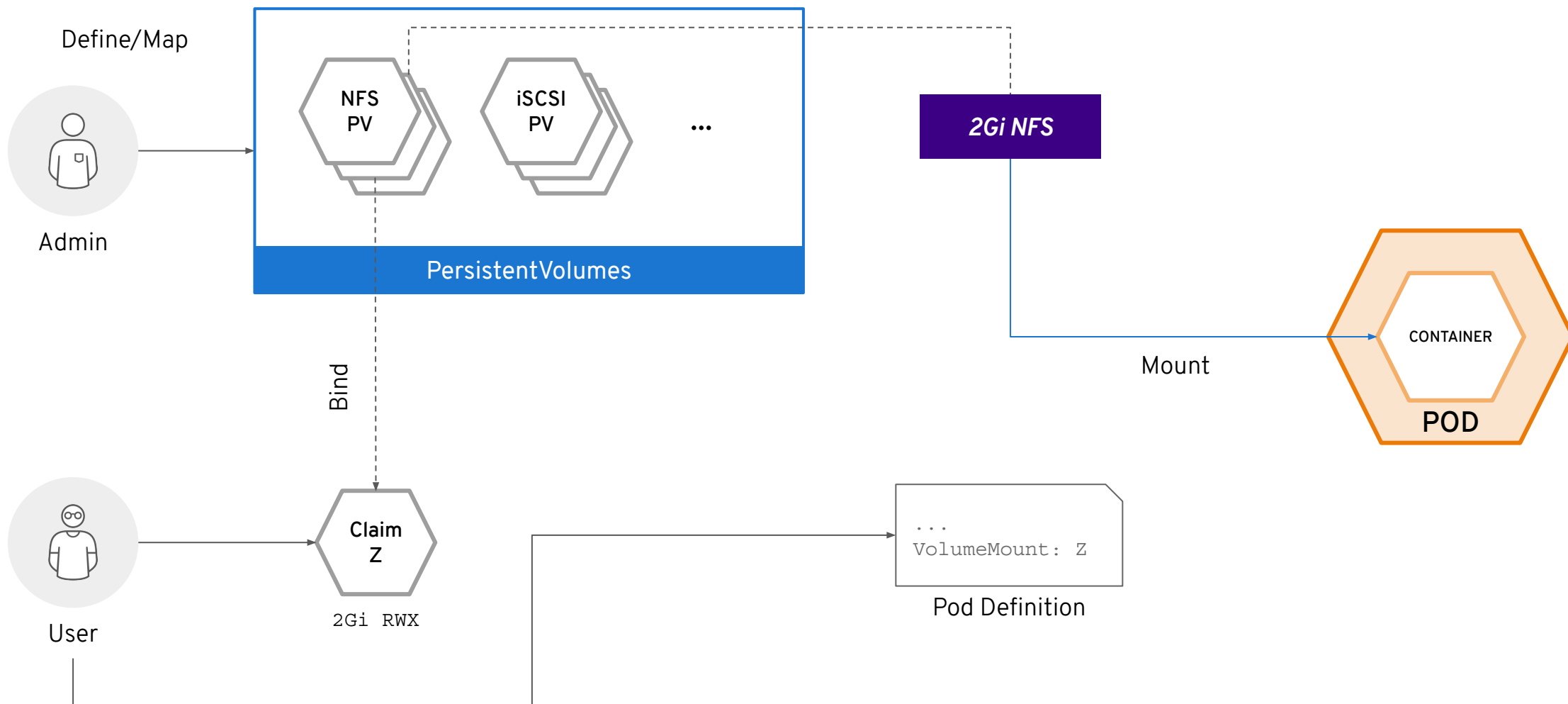
## A broad spectrum of static and dynamic storage endpoints

NFS	OpenStack Cinder	iSCSI	Azure Disk	AWS EBS	FlexVolume
GlusterFS	Ceph RBD	Fiber Channel	Azure File	GCE Persistent Disk	VMWare vSphere VMDK
		NetApp Trident*	Container Storage Interface (CSI)**		

# PV Consumption

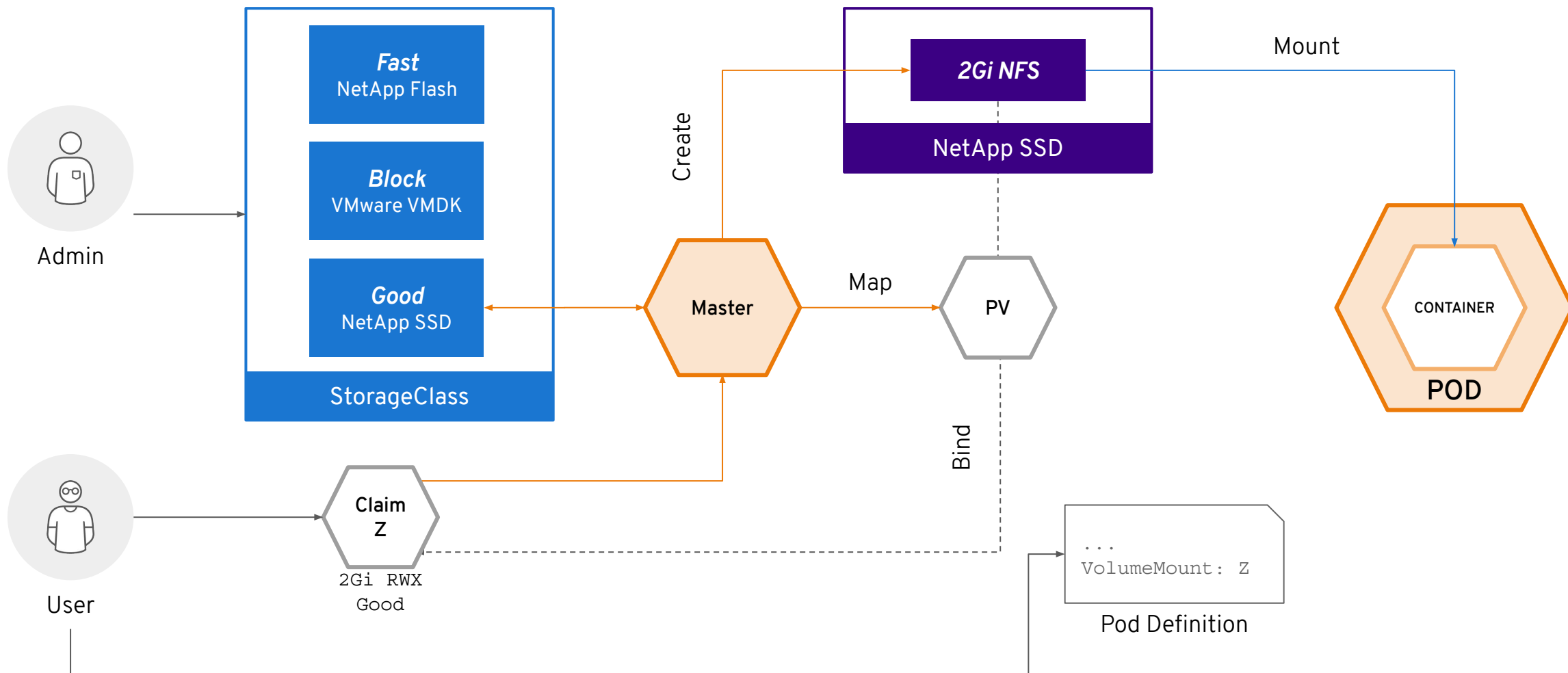


# Static Storage Provisioning





# Dynamic Storage Provisioning



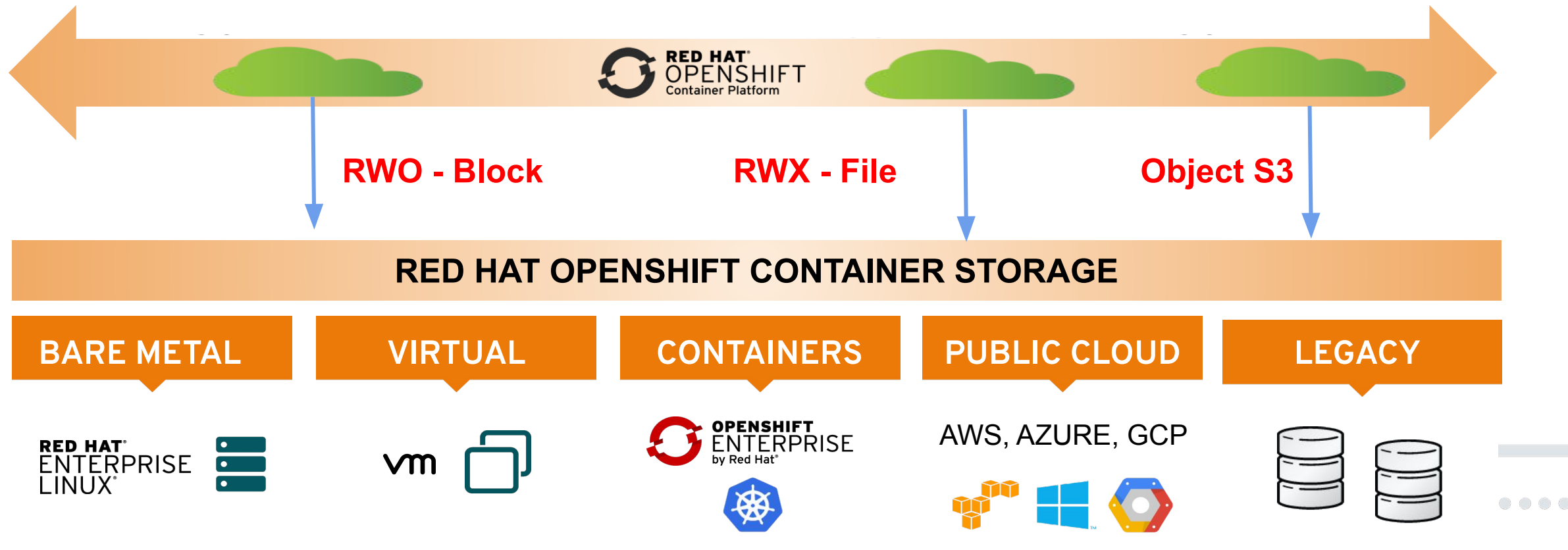
# What is it?

Add-On for OpenShift for running stateful apps

## Highly scalable, production-grade persistent storage

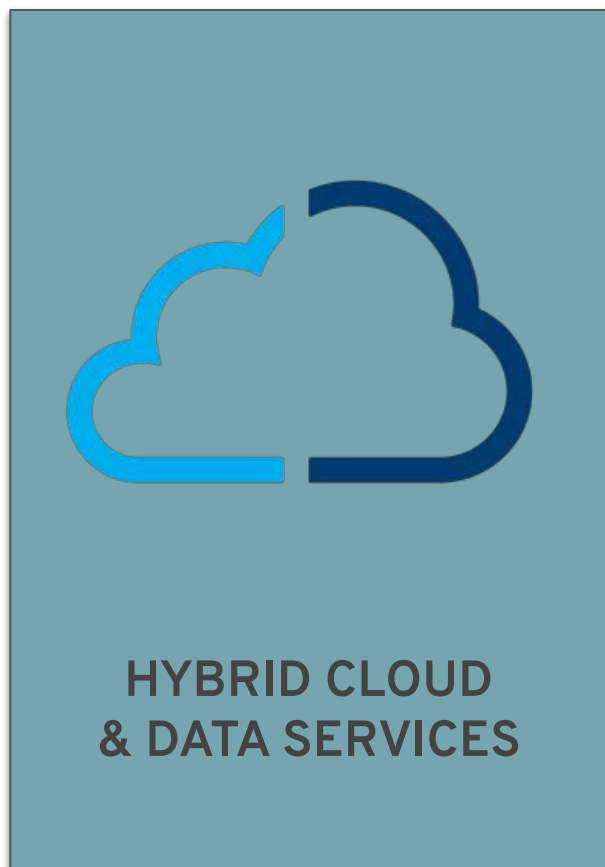
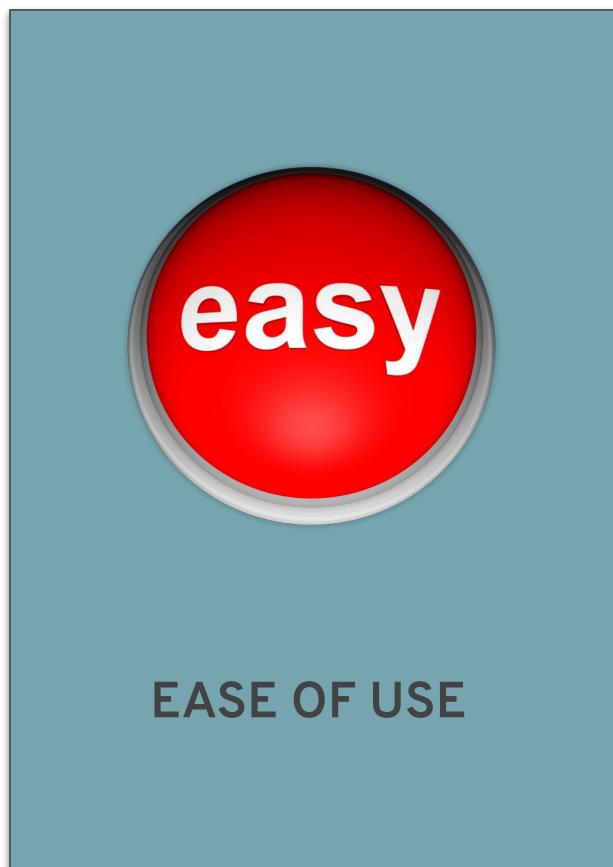
- For **stateful applications** running in Red Hat® OpenShift
- Optimized for Red Hat **OpenShift Infrastructure services**
- Developed, released and deployed in synch with Red Hat OpenShift
- Supported via a single contract with Red Hat OpenShift
- Complete persistent storage fabric across hybrid cloud for OCP

# Complete Storage for Container Platform



Provides Storage for All Apps and infrastructure Services  
in their native interfaces

# OCS 4.X - Focus Areas



Presenter's Name

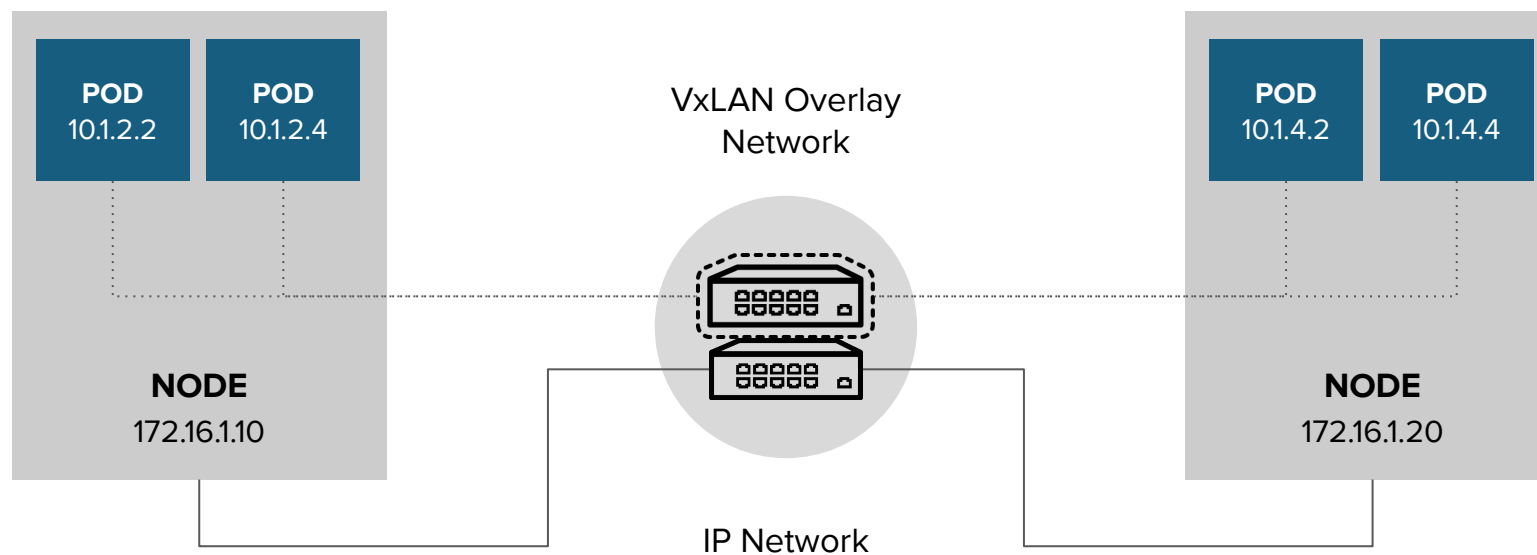
Title

# OpenShift Networking

Presenter's  
Name

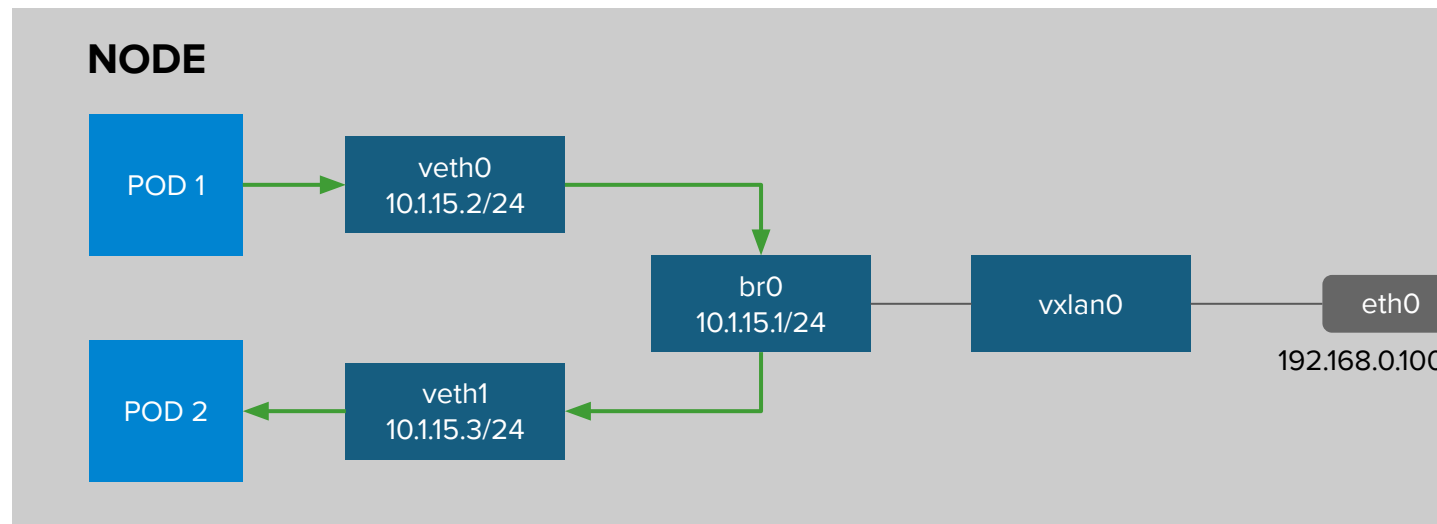
Title

# OPENSIFT NETWORKING



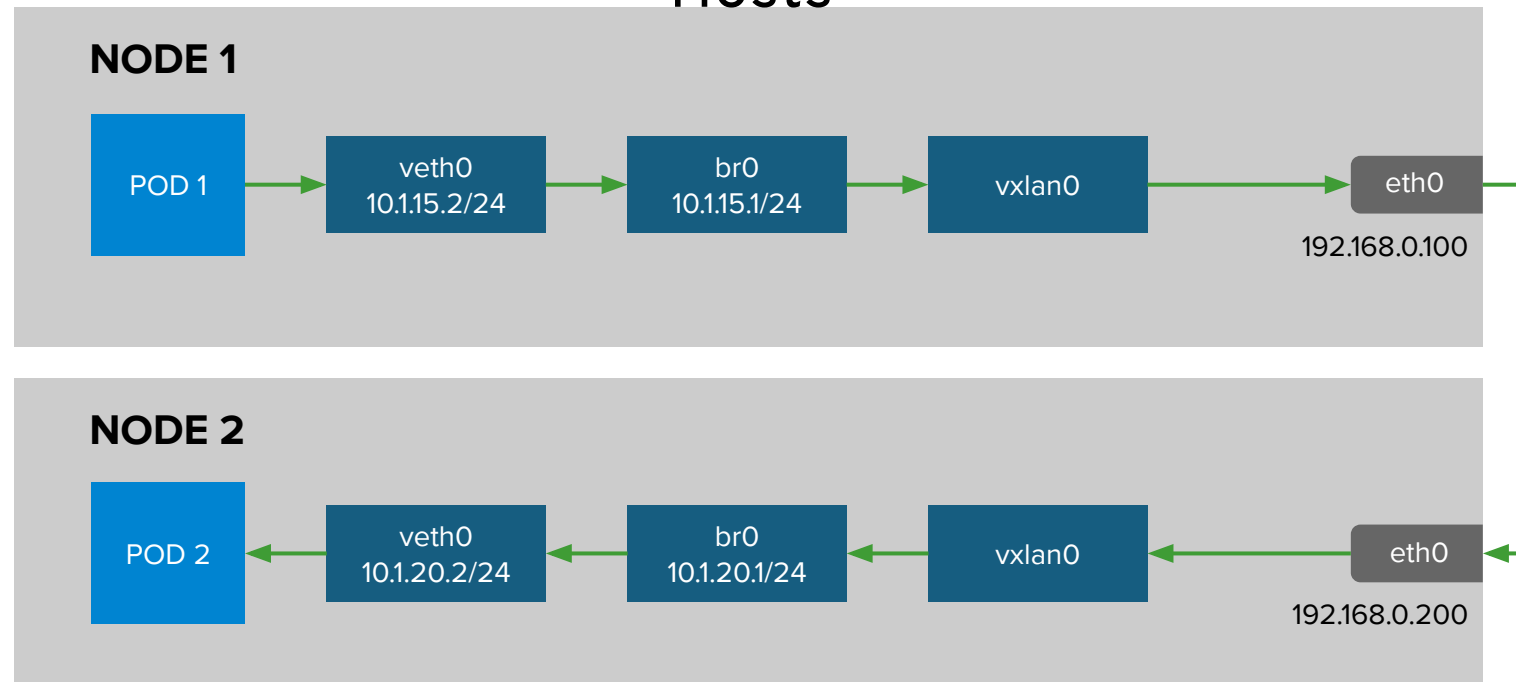
# OPENSIFT SDN - OVS PACKET FLOW

## Container to Container on the Same Host



# OPENSIFT SDN - OVS PACKET FLOW

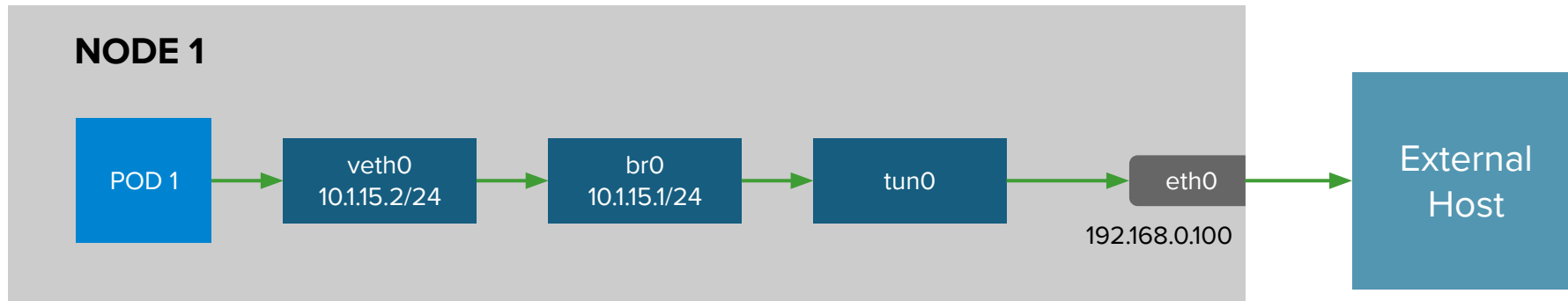
## Container to Container on the Different Hosts



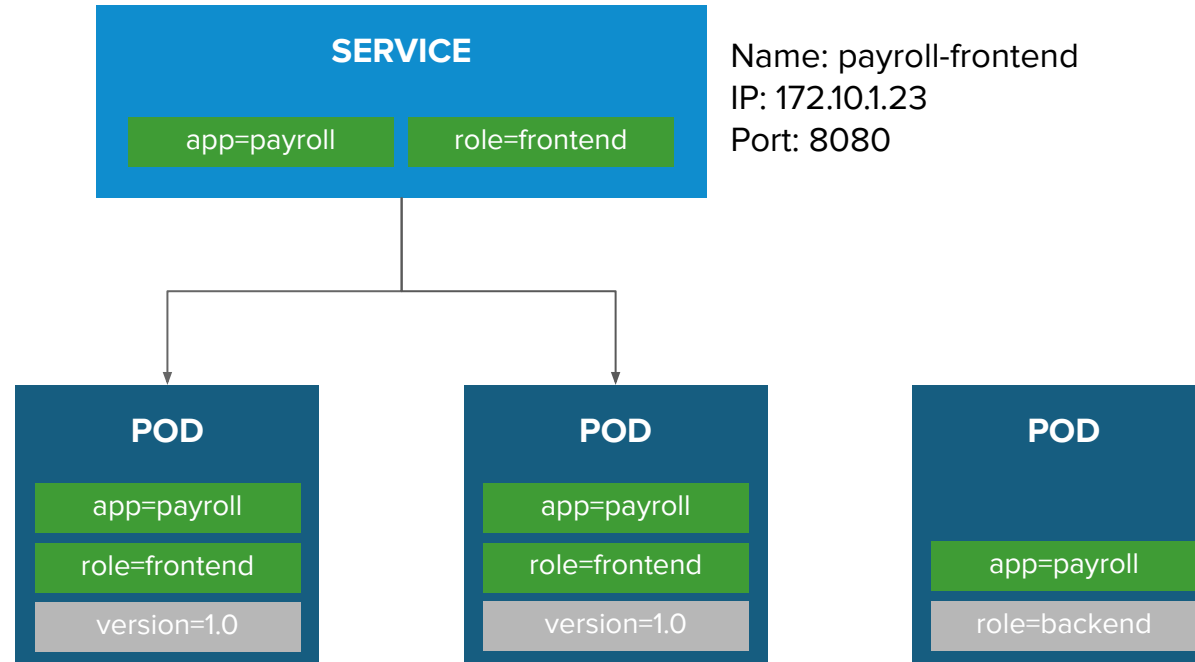


# OPENSIFT SDN - OVS PACKET FLOW

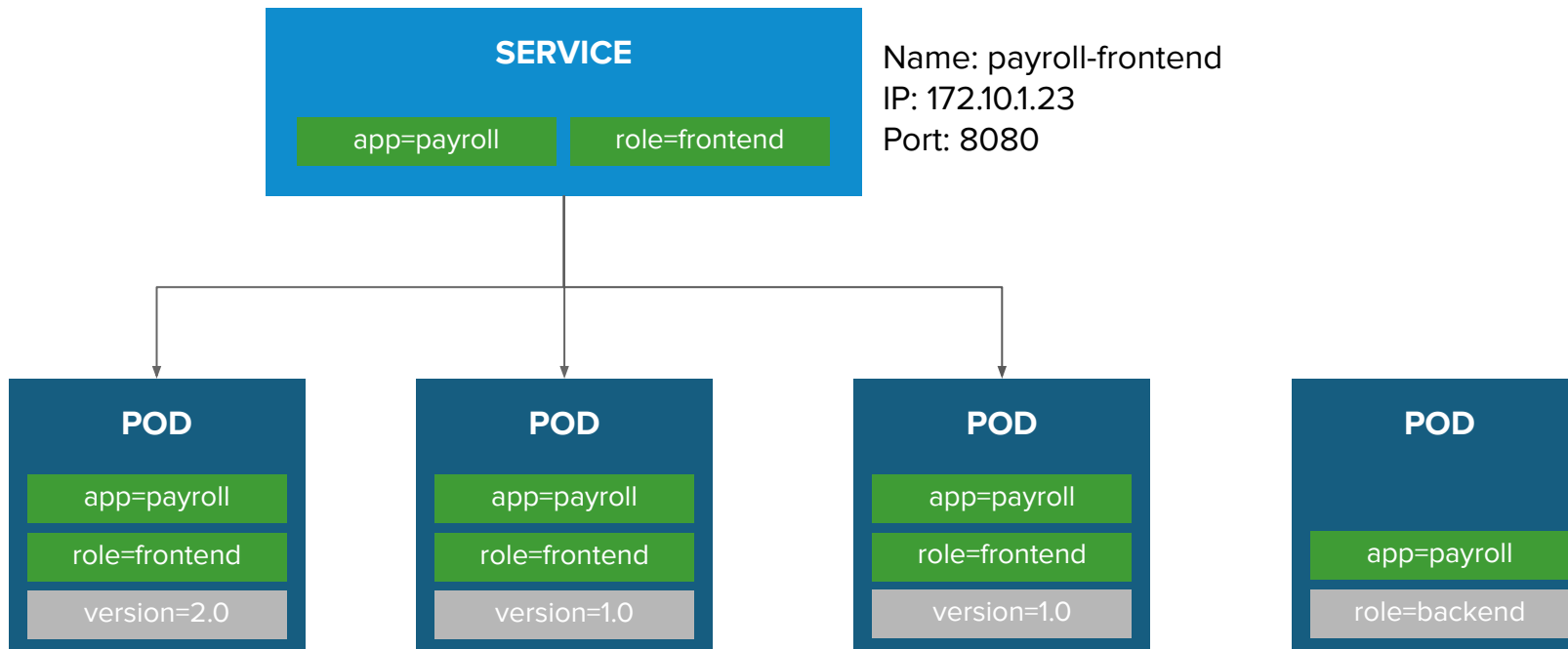
## Container Connects to External Host



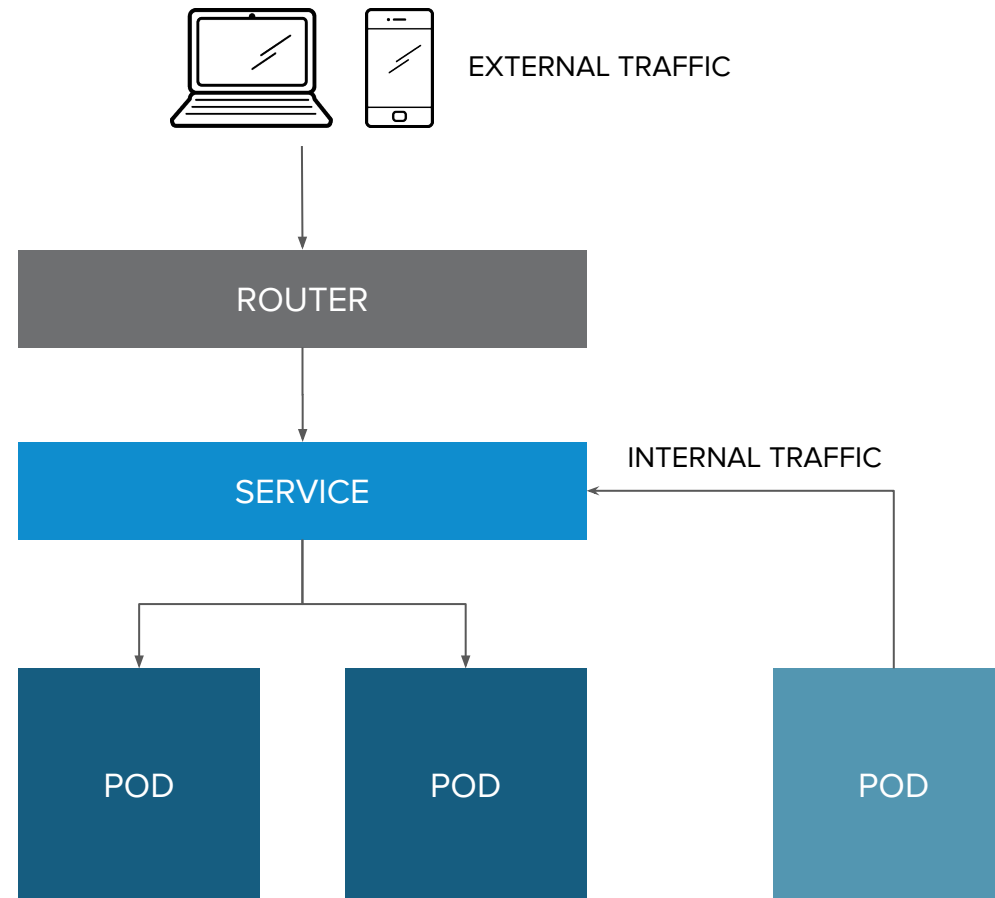
# BUILT-IN SERVICE DISCOVERY INTERNAL LOAD-BALANCING



# BUILT-IN SERVICE DISCOVERY INTERNAL LOAD-BALANCING

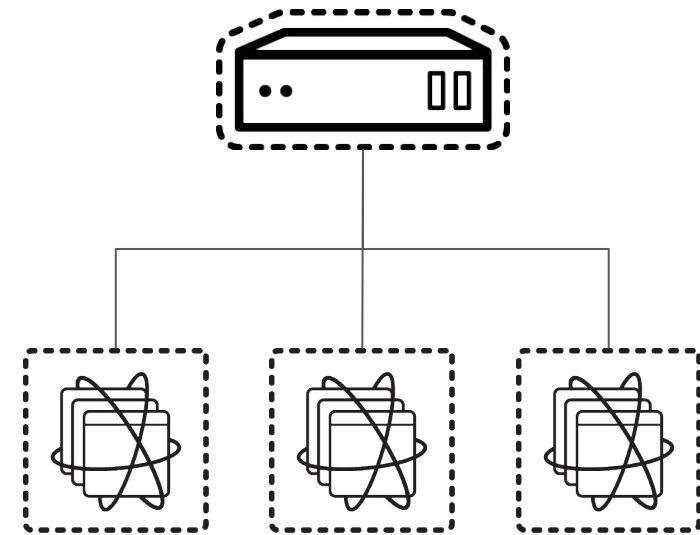


# ROUTE EXPOSES SERVICES EXTERNALLY



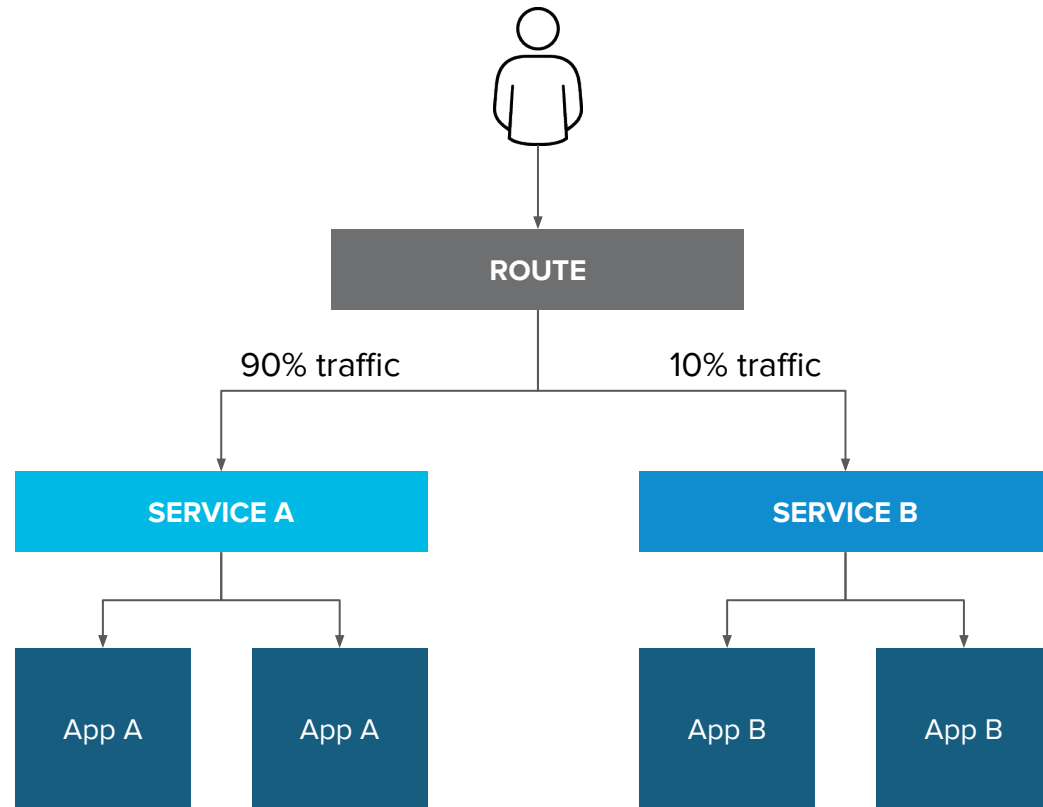
# ROUTING AND EXTERNAL LOAD-BALANCING

- Pluggable routing architecture
  - HAProxy Router
  - F5 Router
- Multiple-routers with traffic sharding
- Router supported protocols
  - HTTP/HTTPS
  - WebSockets
  - TLS with SNI
- Non-standard ports via cloud load-balancers, external IP, and NodePort



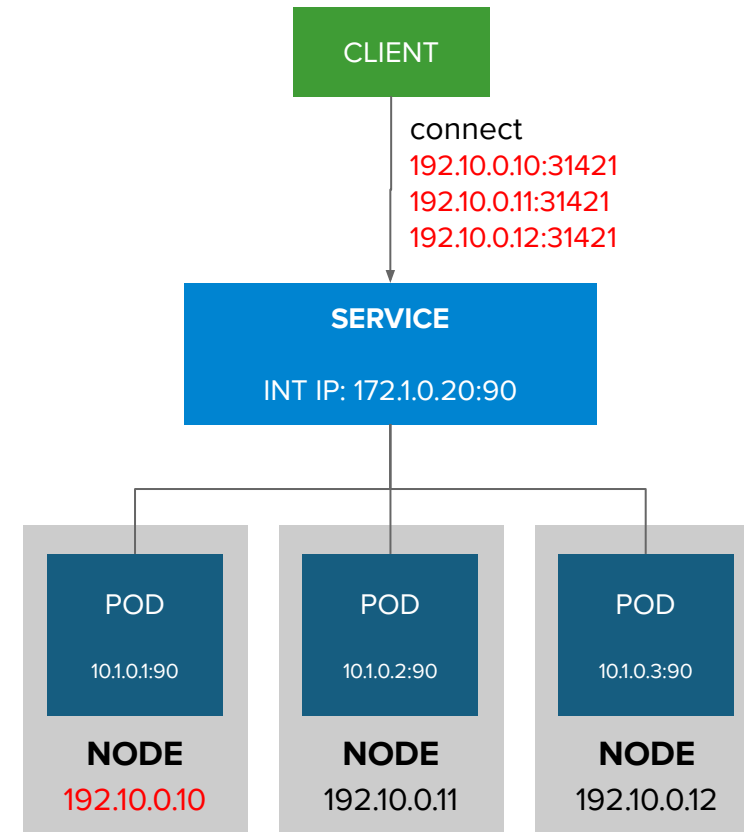
# ROUTE SPLIT TRAFFIC

Split Traffic Between Multiple Services For A/B Testing, Blue/Green and Canary Deployments



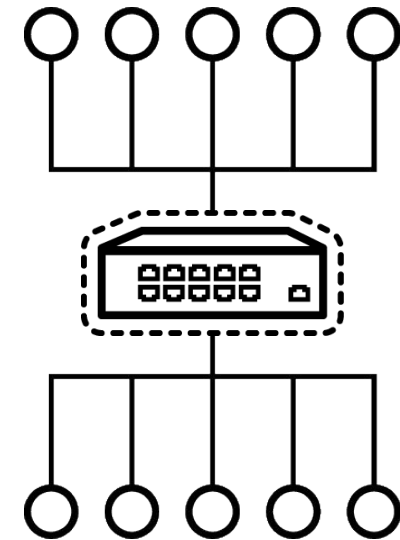
# EXTERNAL TRAFFIC TO A SERVICE ON A RANDOM PORT WITH NODEPORT

- NodePort binds a service to a unique port on all the nodes
- Traffic received on any node redirects to a node with the running service
- Ports in 30K-60K range which usually differs from the service
- Firewall rules must allow traffic to all nodes on the specific port



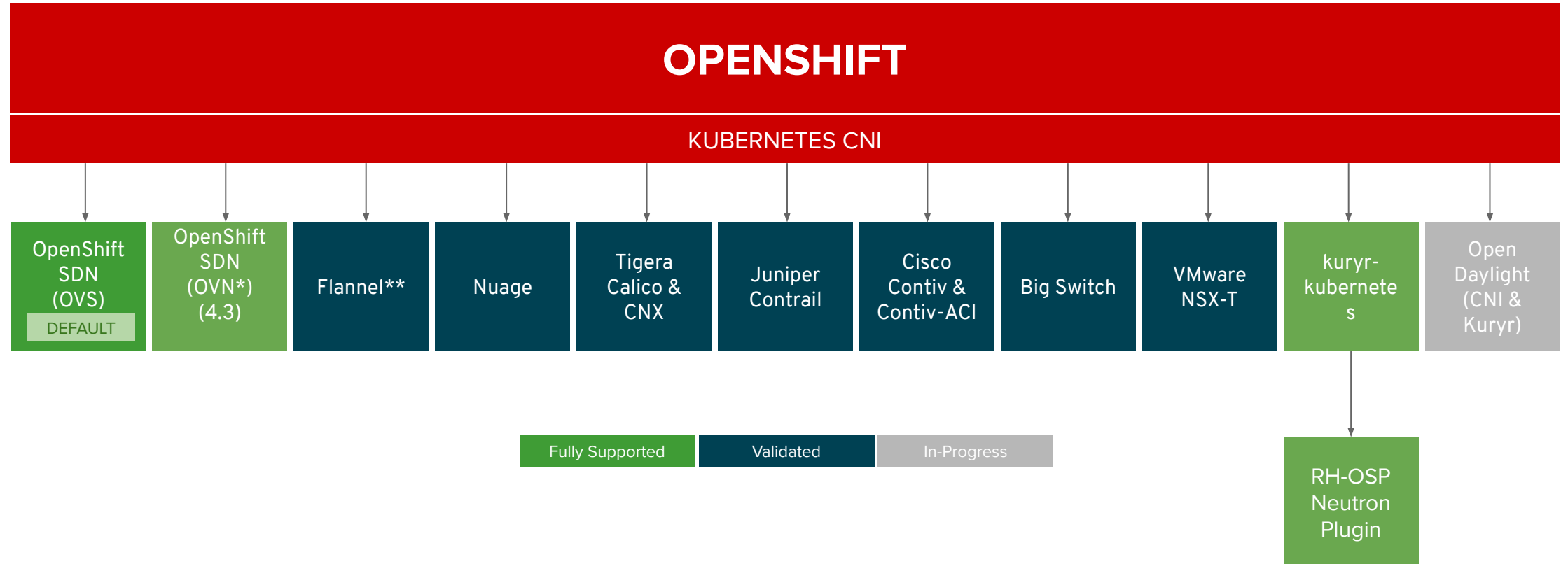
# OPENSHIFT NETWORKING

- Built-in internal DNS to reach services by name
- Split DNS is supported via CoreDNS
  - Master answers DNS queries for internal services
  - Other name servers serve the rest of the queries
- Software Defined Networking (SDN) for a unified cluster network to enable pod-to-pod communication
- OpenShift follows the Kubernetes Container Networking Interface (CNI) plug-in model





# OPENSHIFT NETWORK PLUGINS



\* Coming as default in OCP 4.4

\*\* Flannel is minimally verified and is supported only and exactly as deployed in the OpenShift on OpenStack reference architecture



# Thank you

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