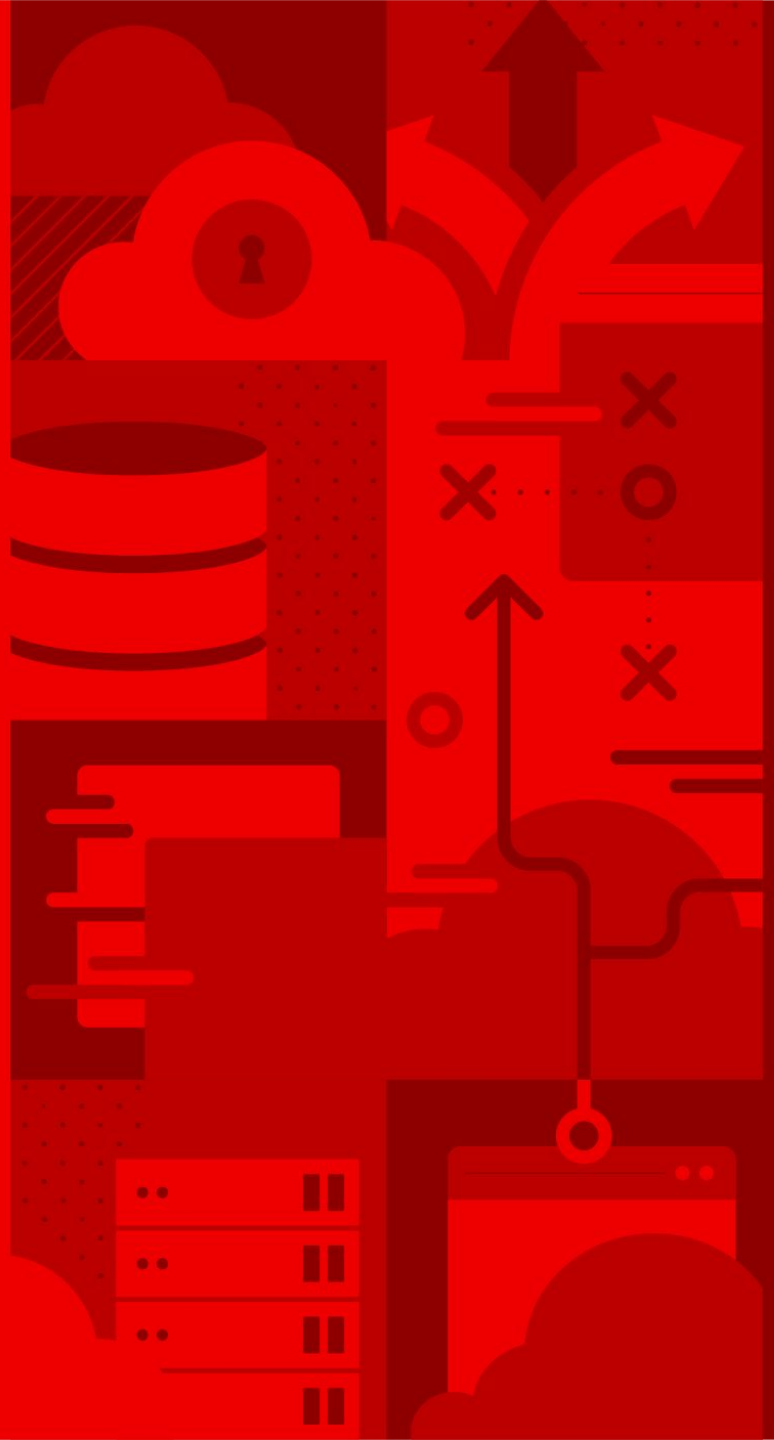
Red Hat OpenShift

OpenShift Architecture

As Part of OpenShift Architecture Workshop



OpenShift and Kubernetes core concepts

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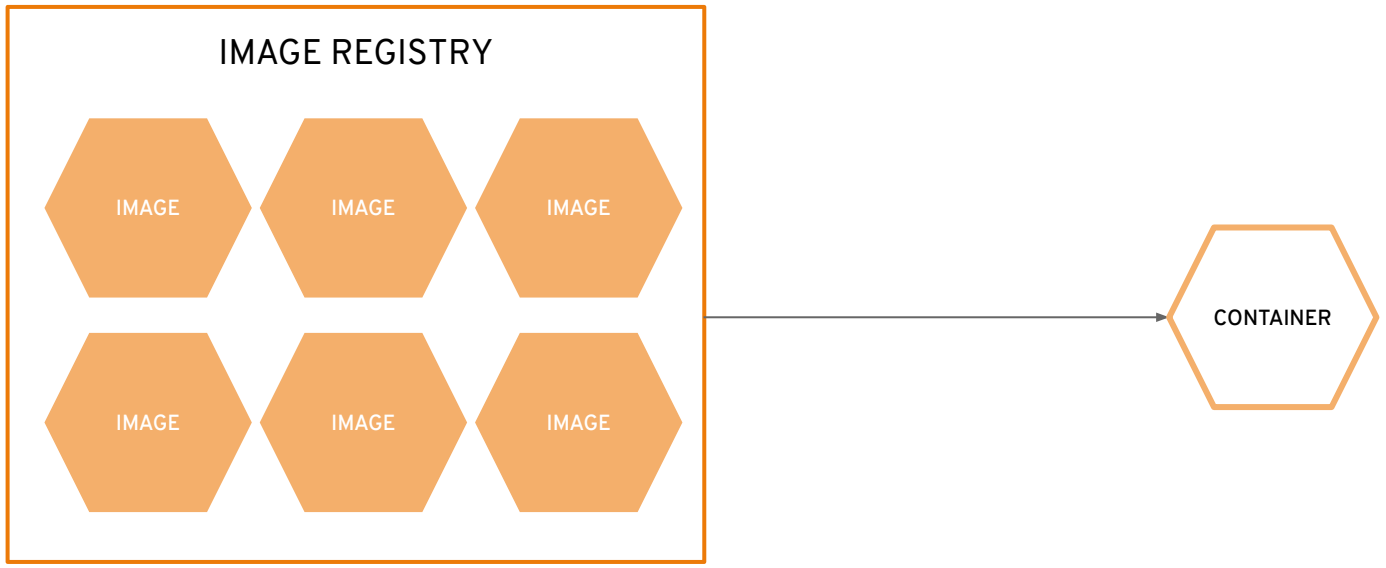
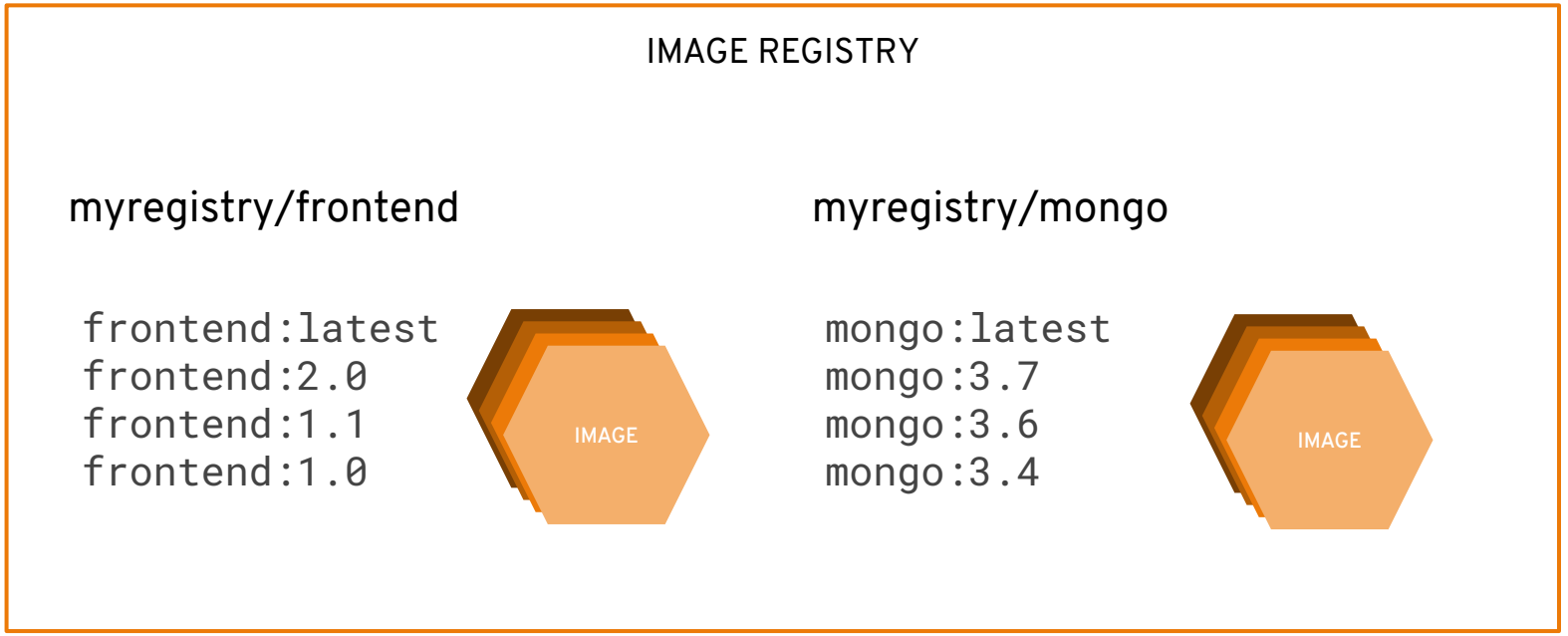
a container is the smallest compute unit

containers are created from container images

container images are stored in an image registry

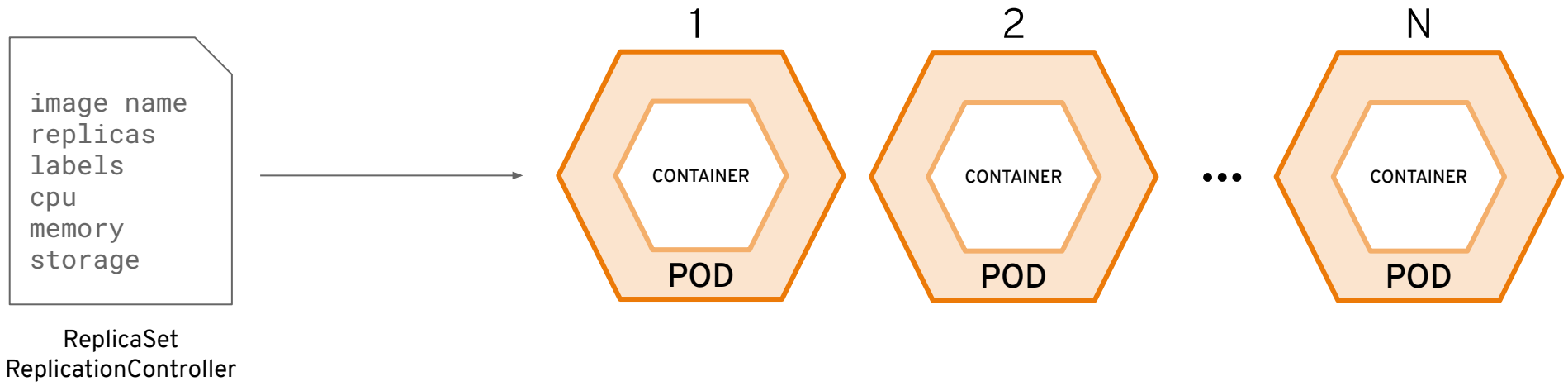


an image repository contains all versions of an image in the image registry

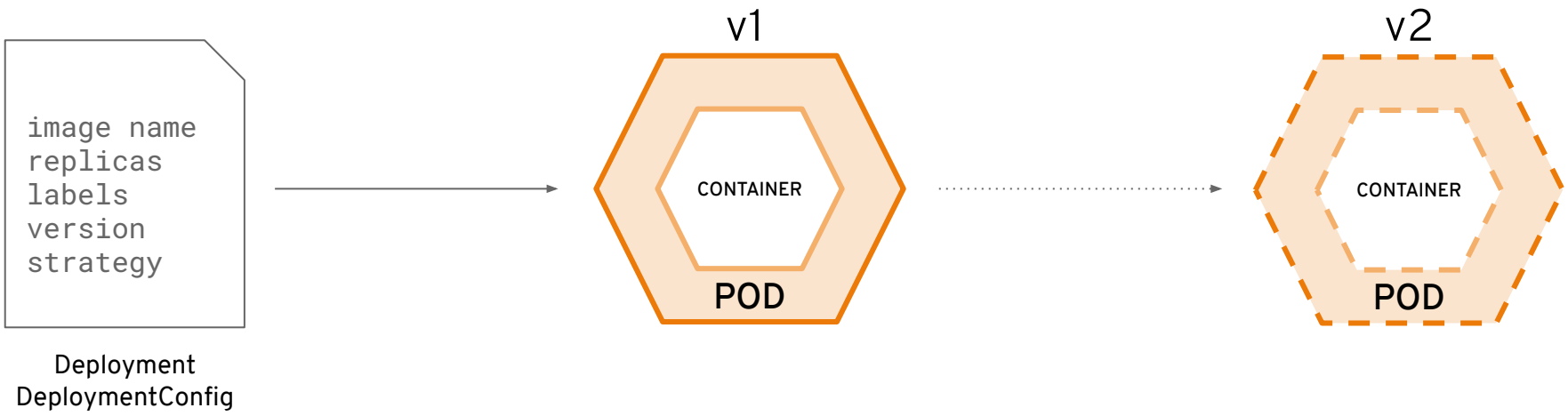


containers are wrapped in pods which are units of deployment and management

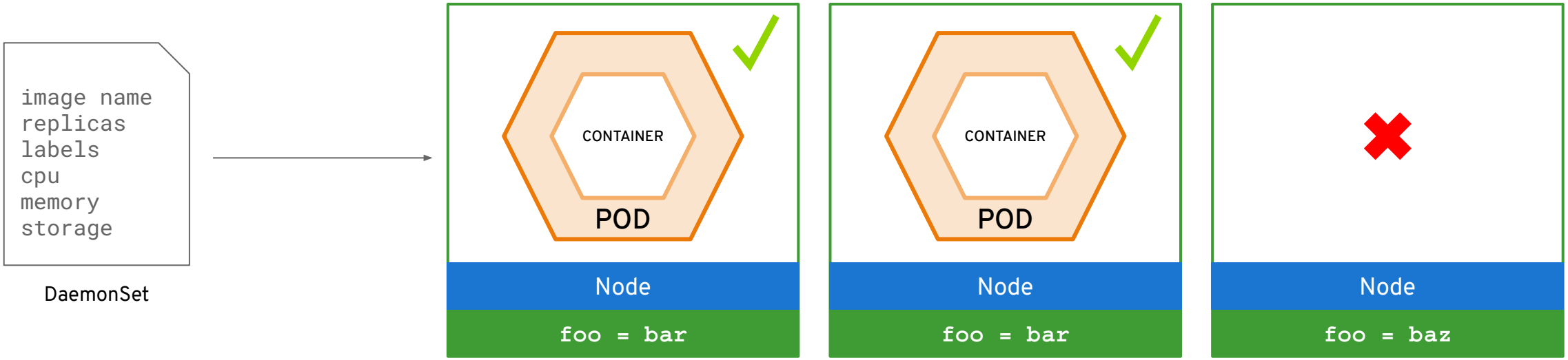
`ReplicationControllers` & `ReplicaSets` ensure a specified number of pods are running at any given time



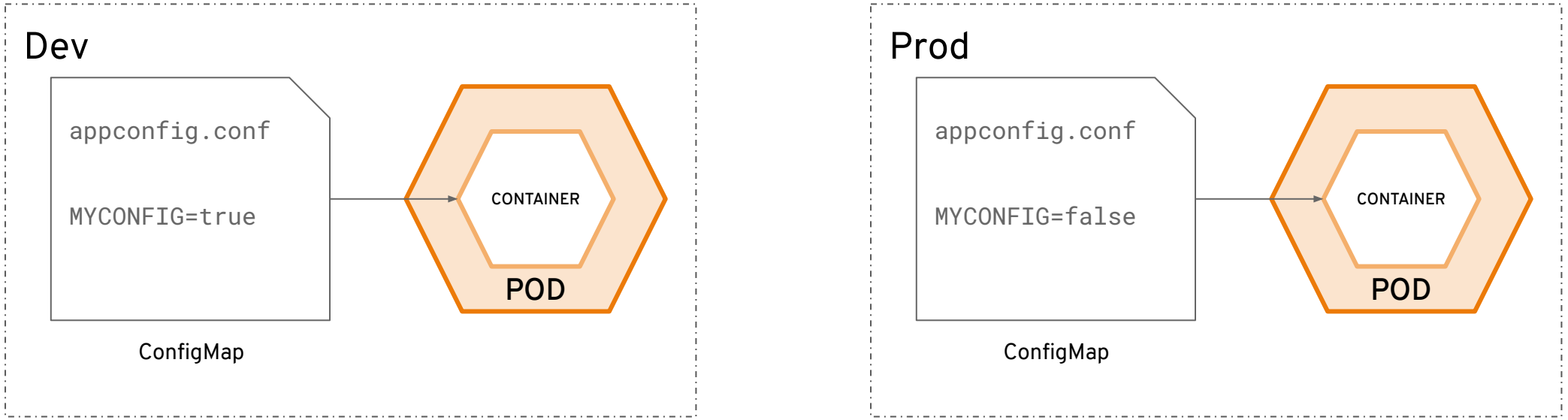
`Deployments` and `DeploymentConfigurations` define how to roll out new versions of Pods



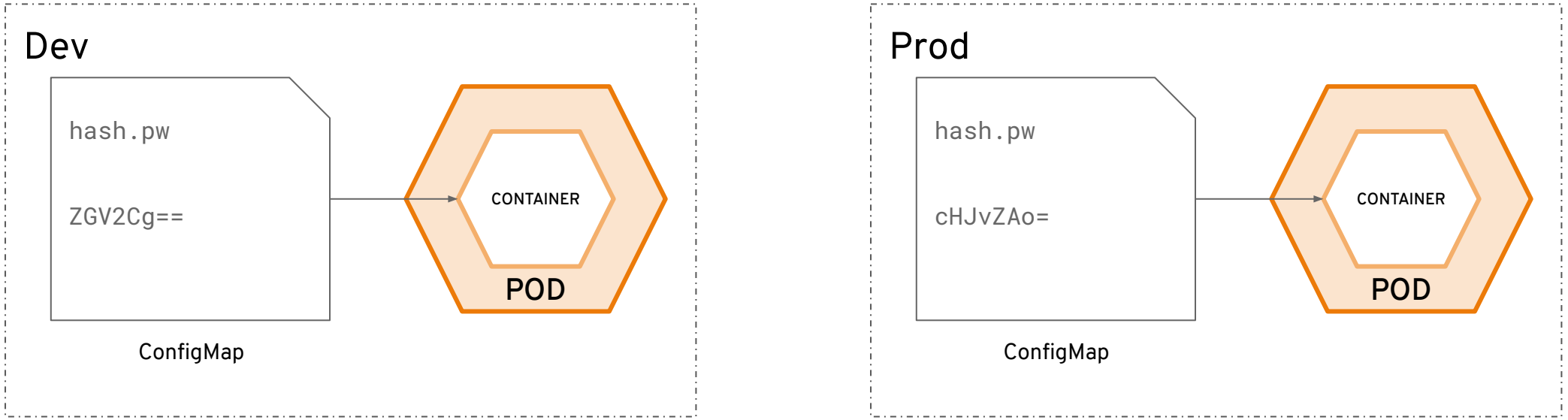
a `daemonset` ensures that all (or some) nodes run a copy of a pod



`configmaps` allow you to decouple configuration artifacts from image content



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



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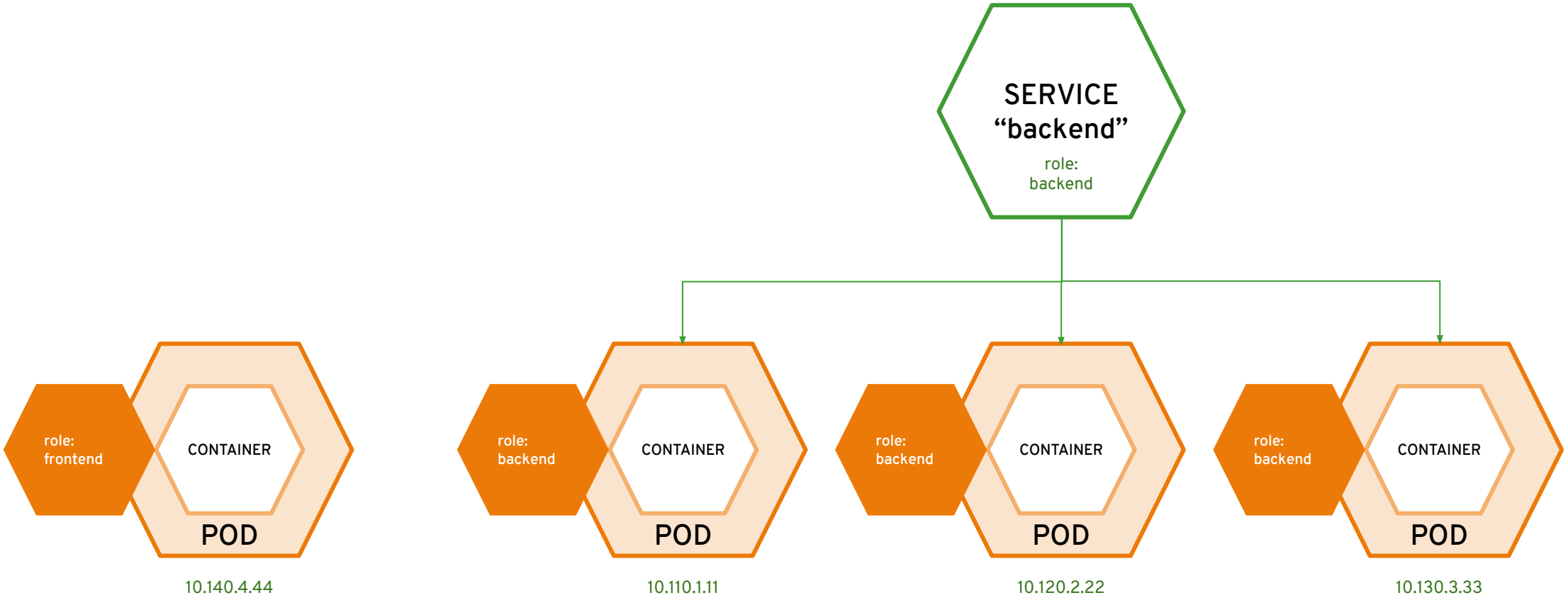
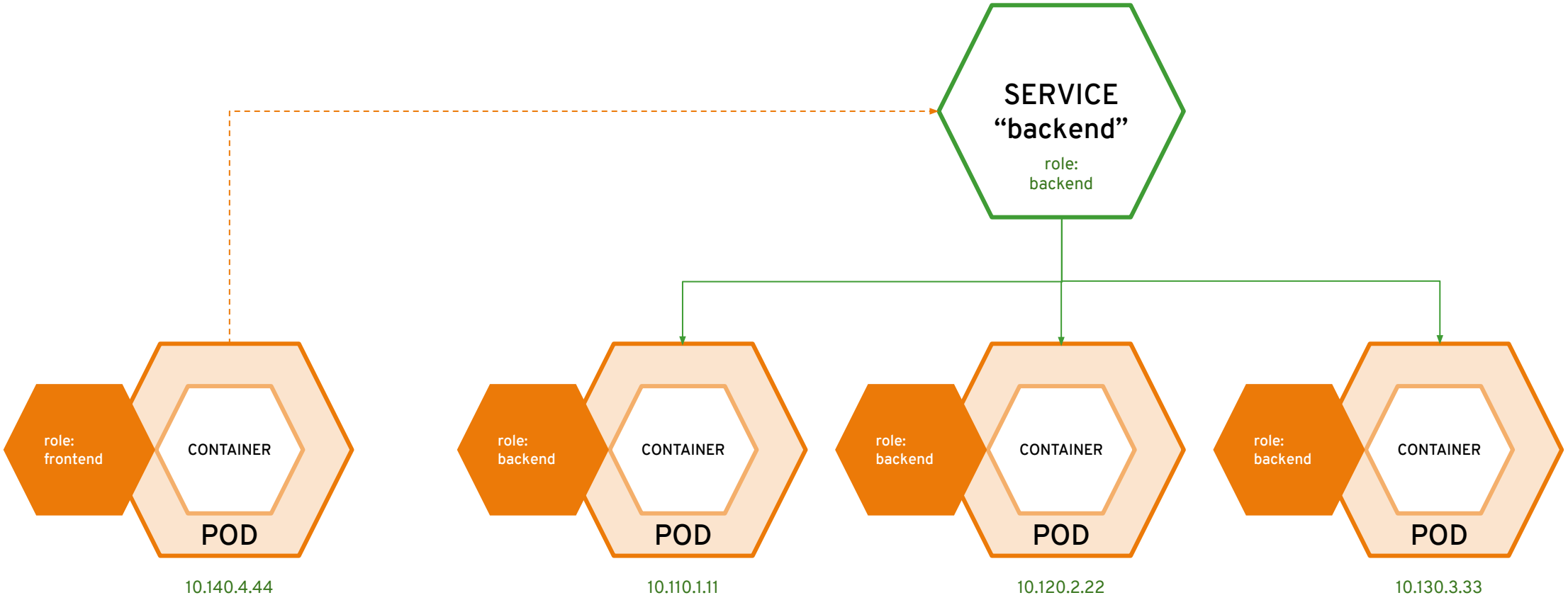
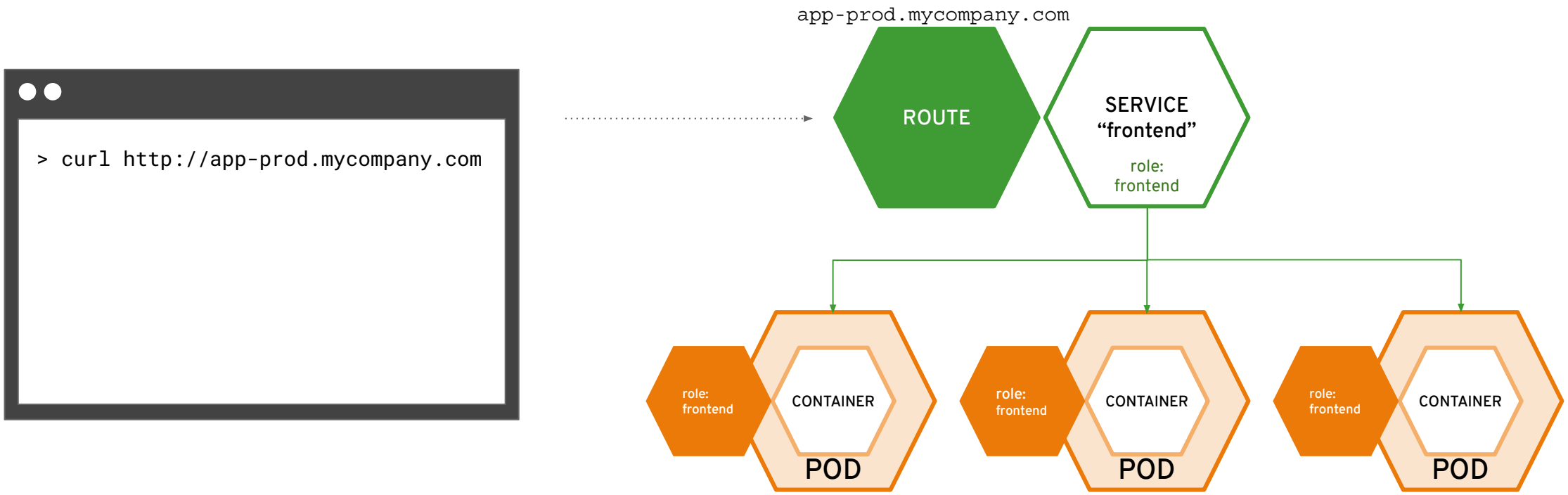
services provide internal load-balancing and service discovery across pods



apps can talk to each other via services



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



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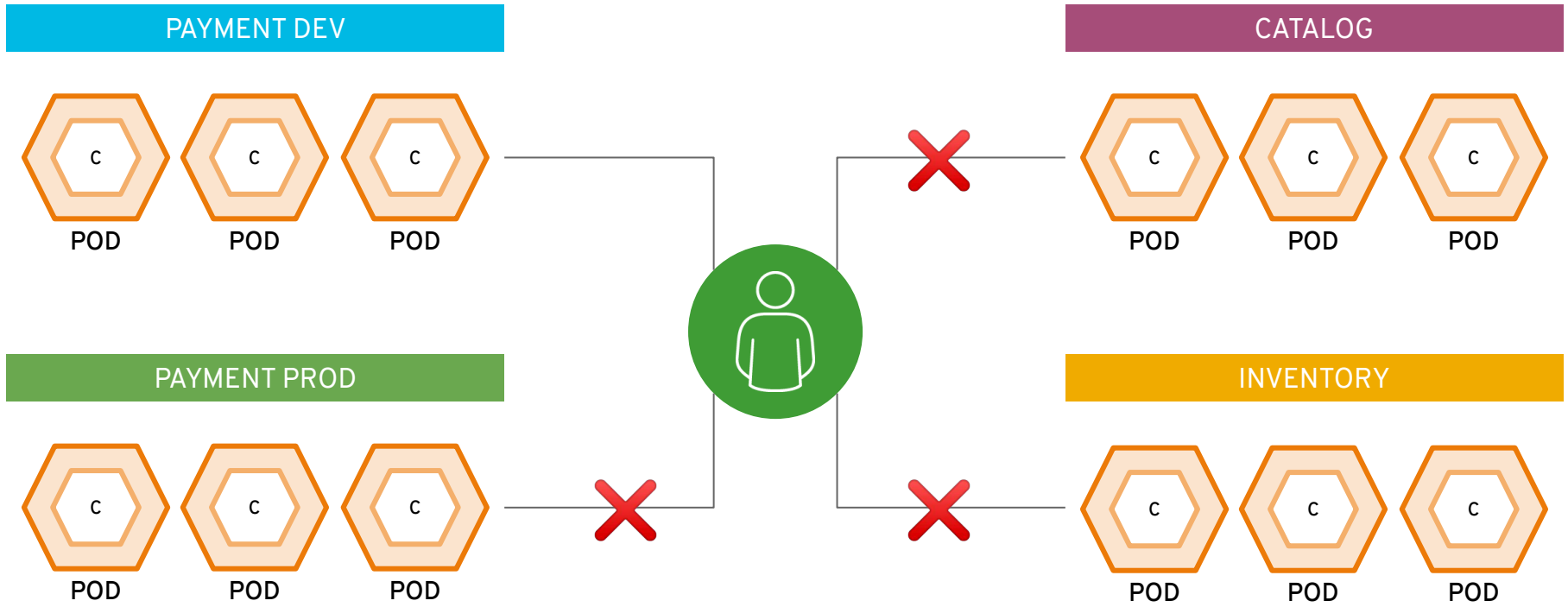
projects isolate apps across environments, teams, groups and departments



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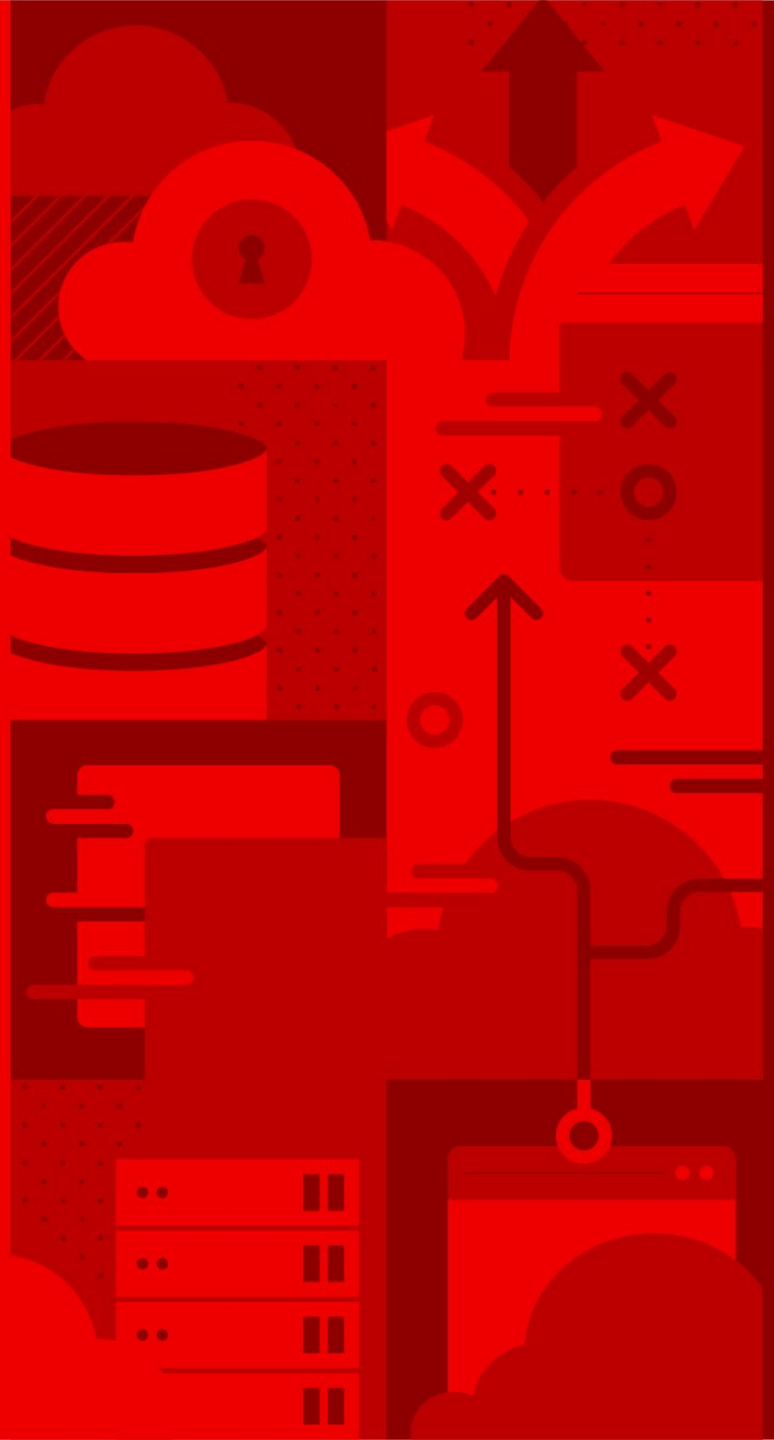


OpenShift 4 Architectur Weiter um 10:50

Red Hat

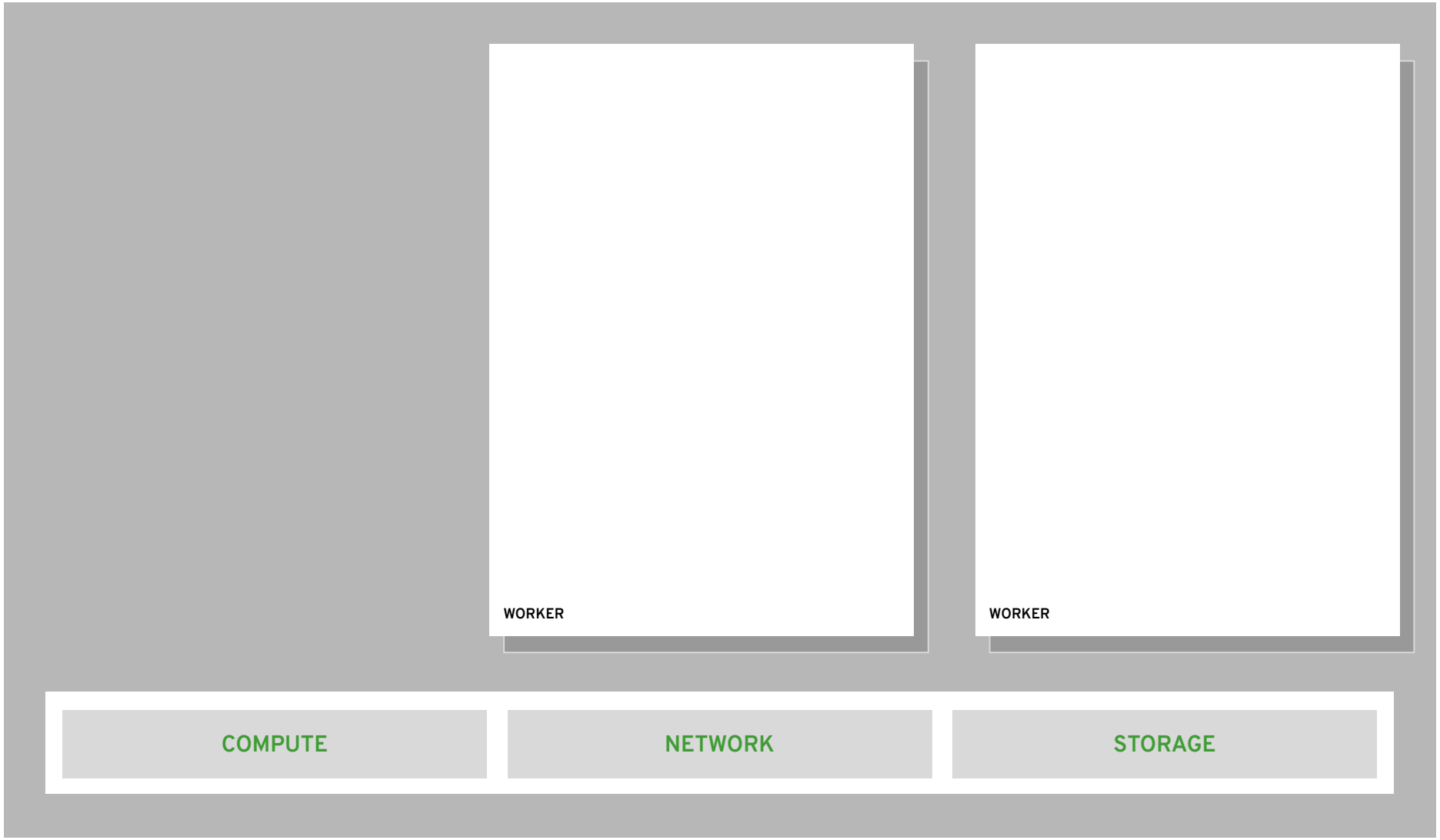
your choice of infrastructure

COMPUTE

NETWORK

STORAGE

workers run workloads



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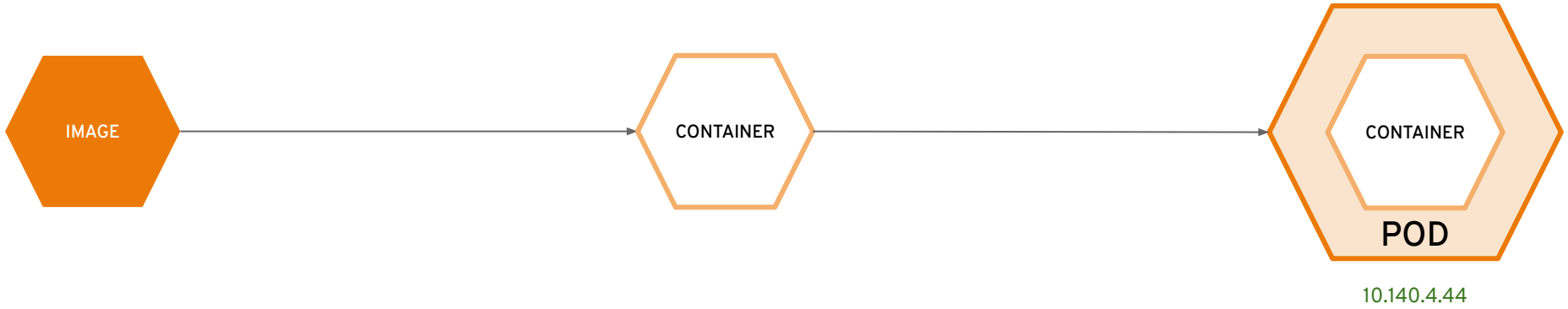
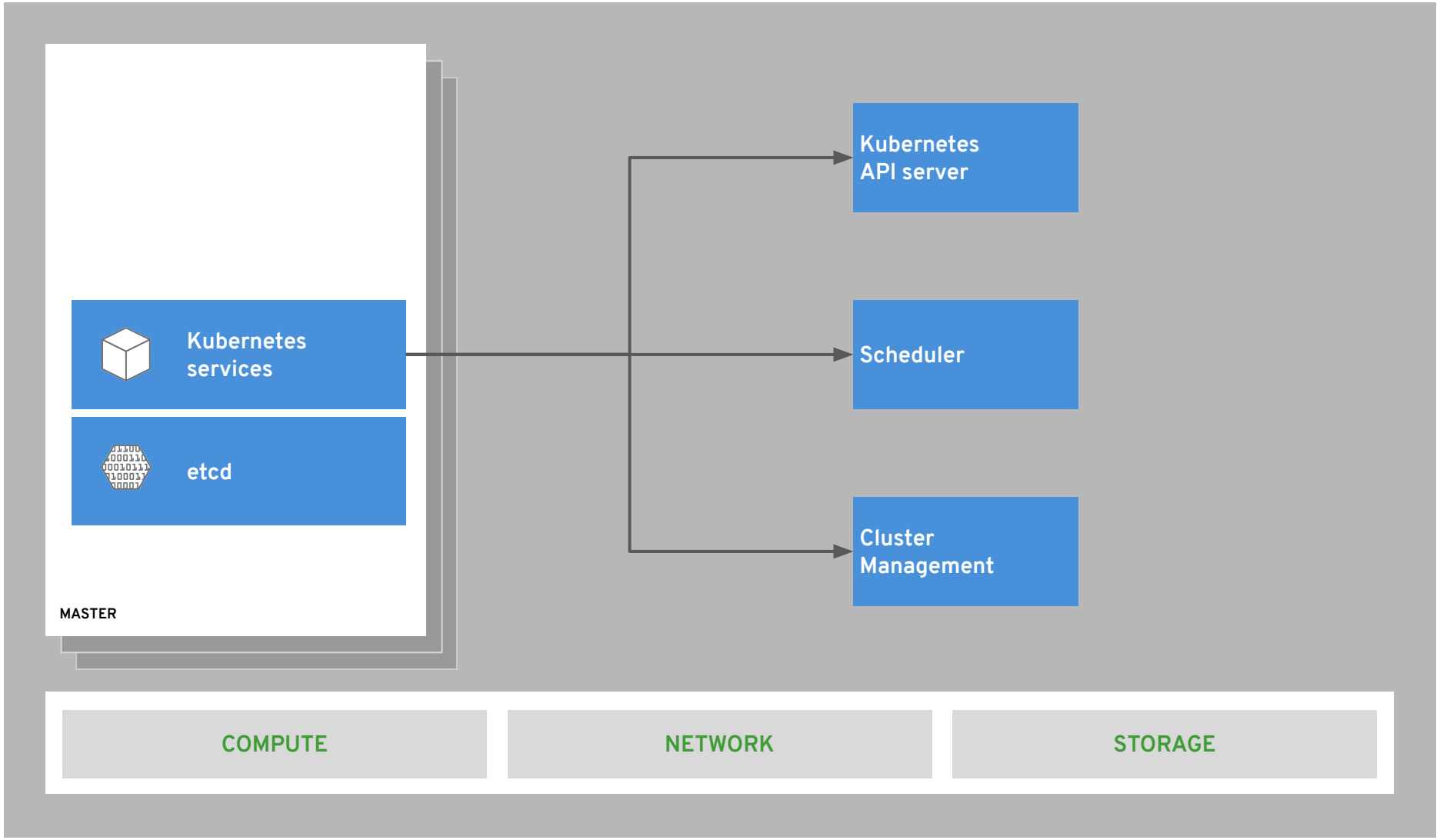
masters are the control plane

everything runs in pods

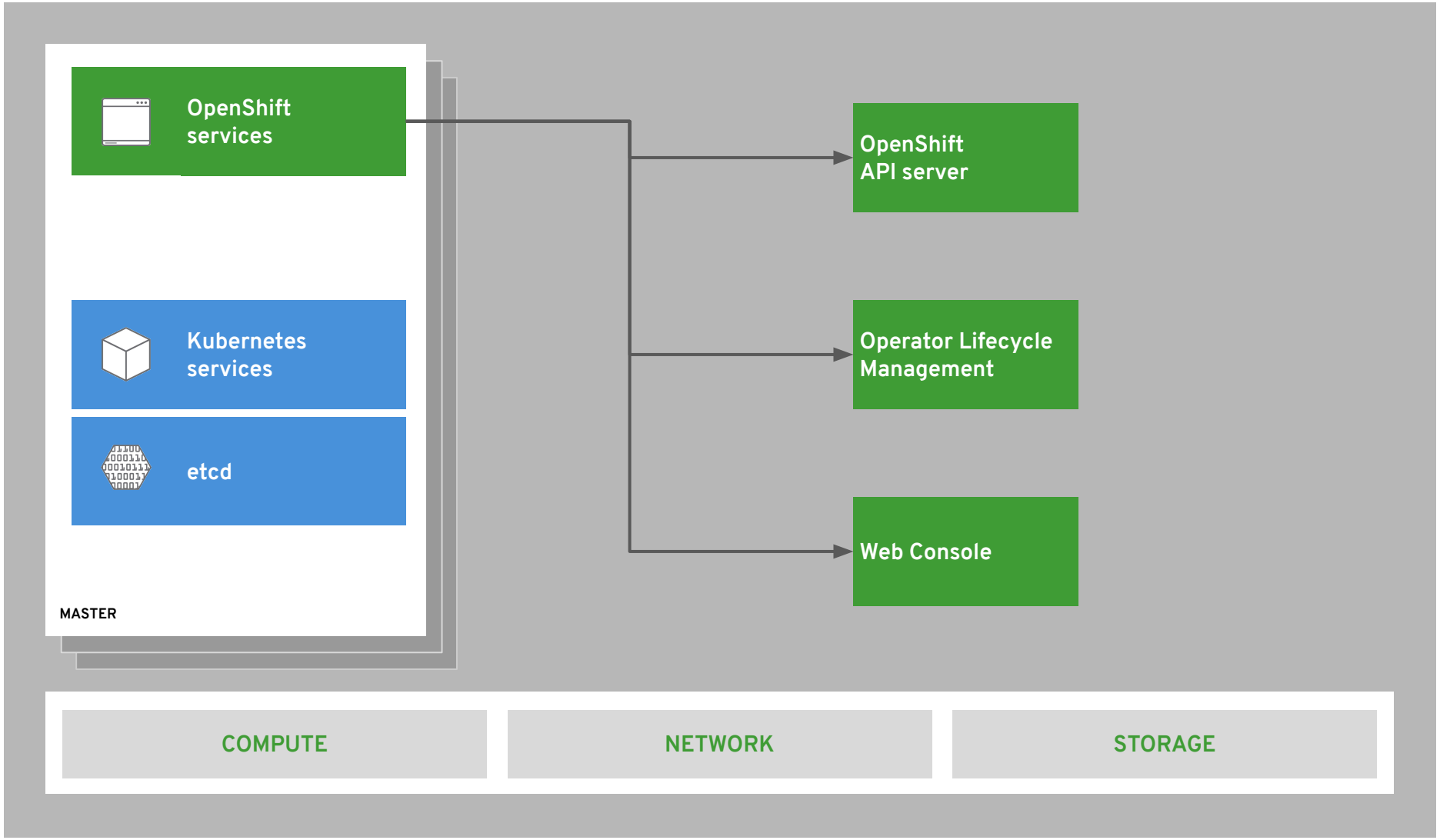


state of everything

core kubernetes components



core OpenShift components



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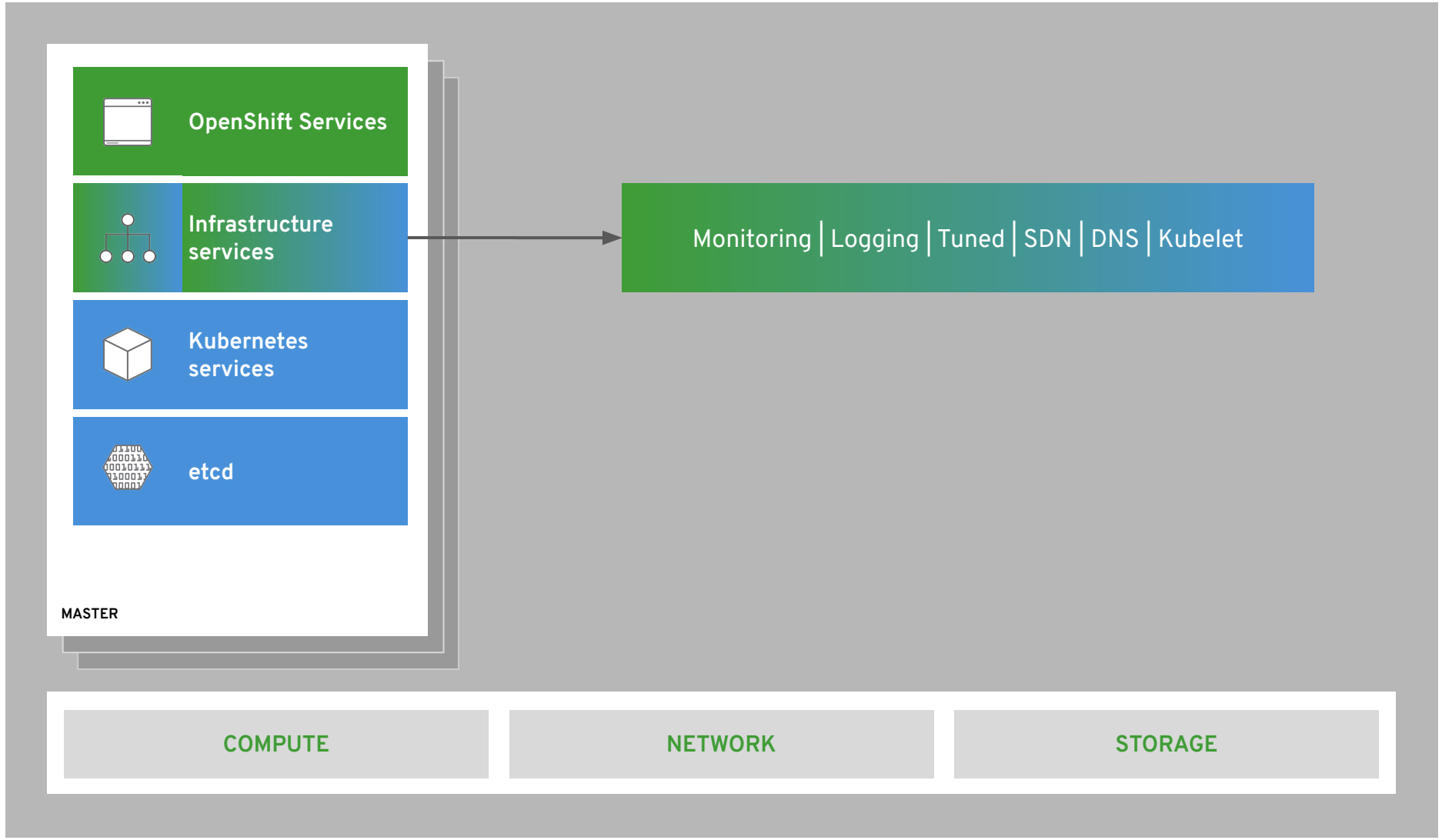
internal and support infrastructure services



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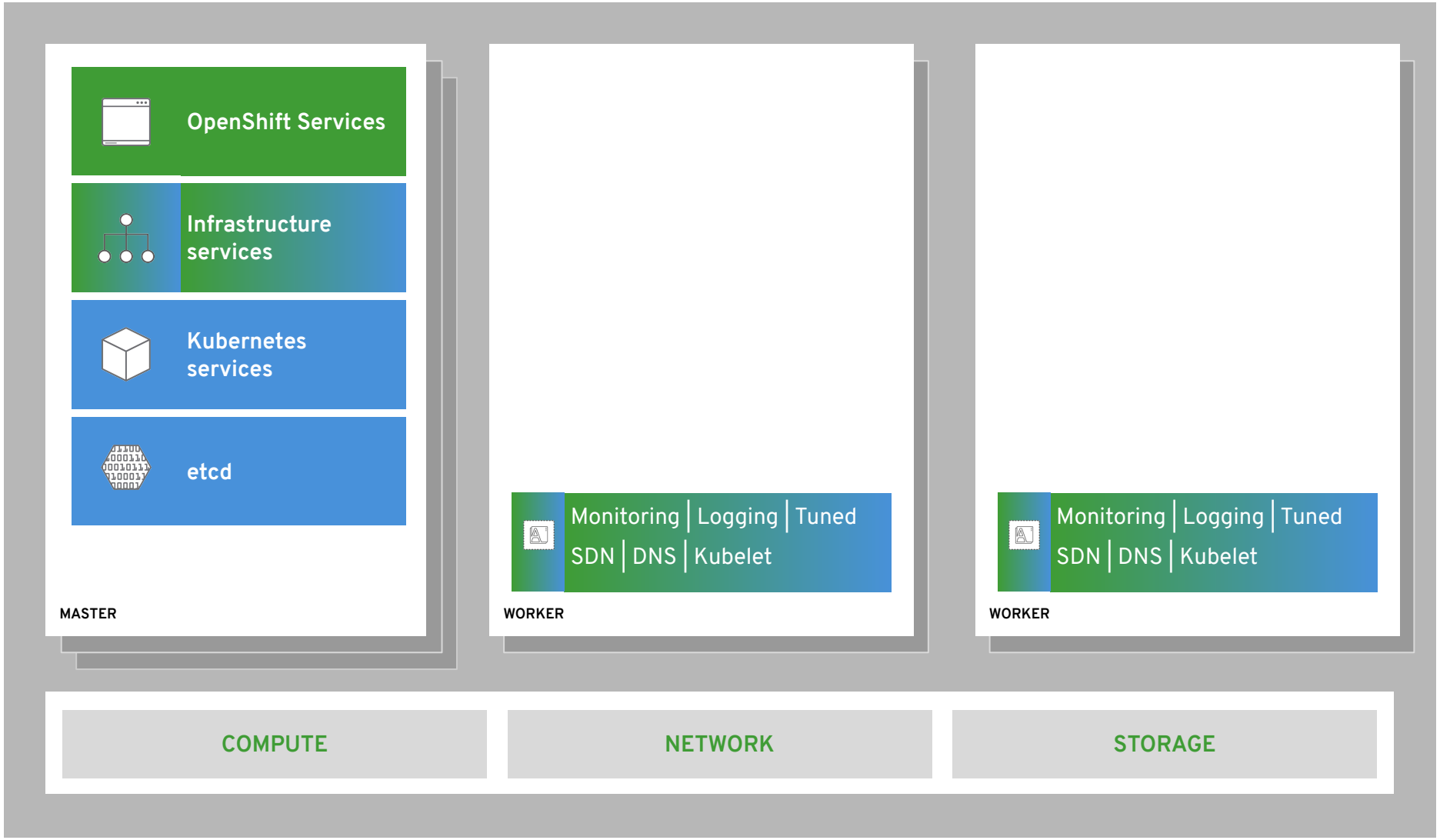
run on all hosts



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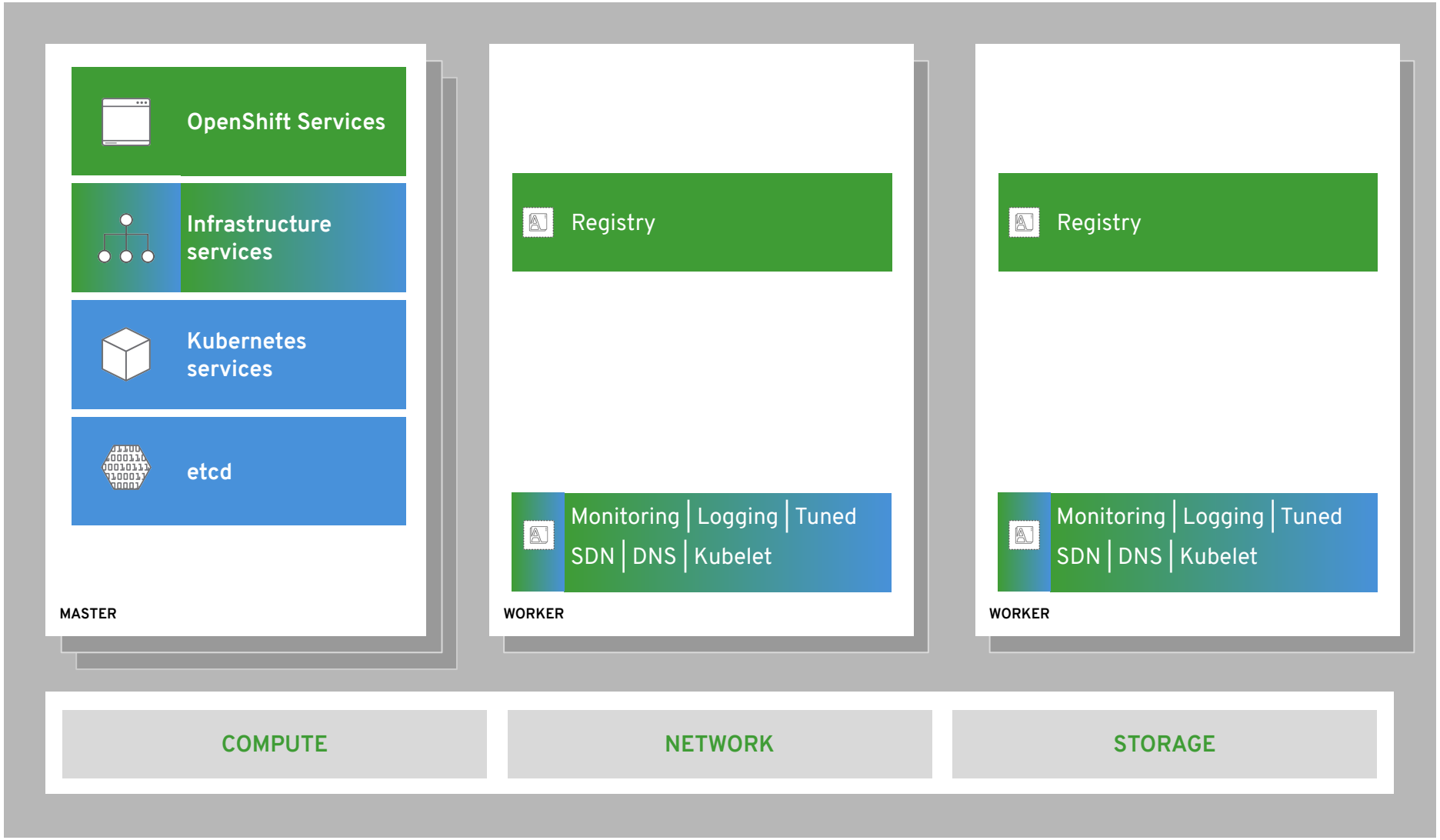
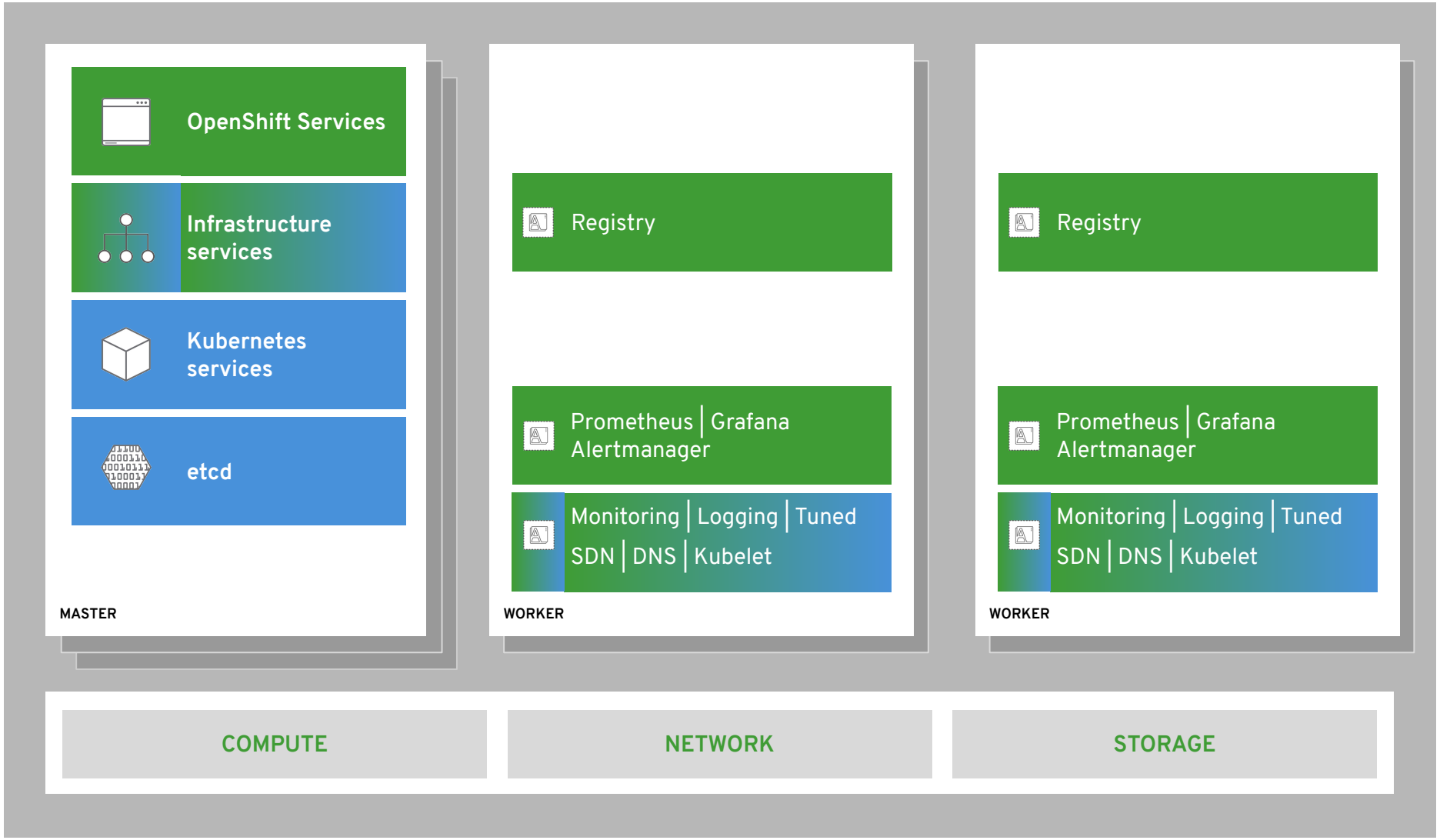
integrated image registry



Red Hat

cluster monitoring



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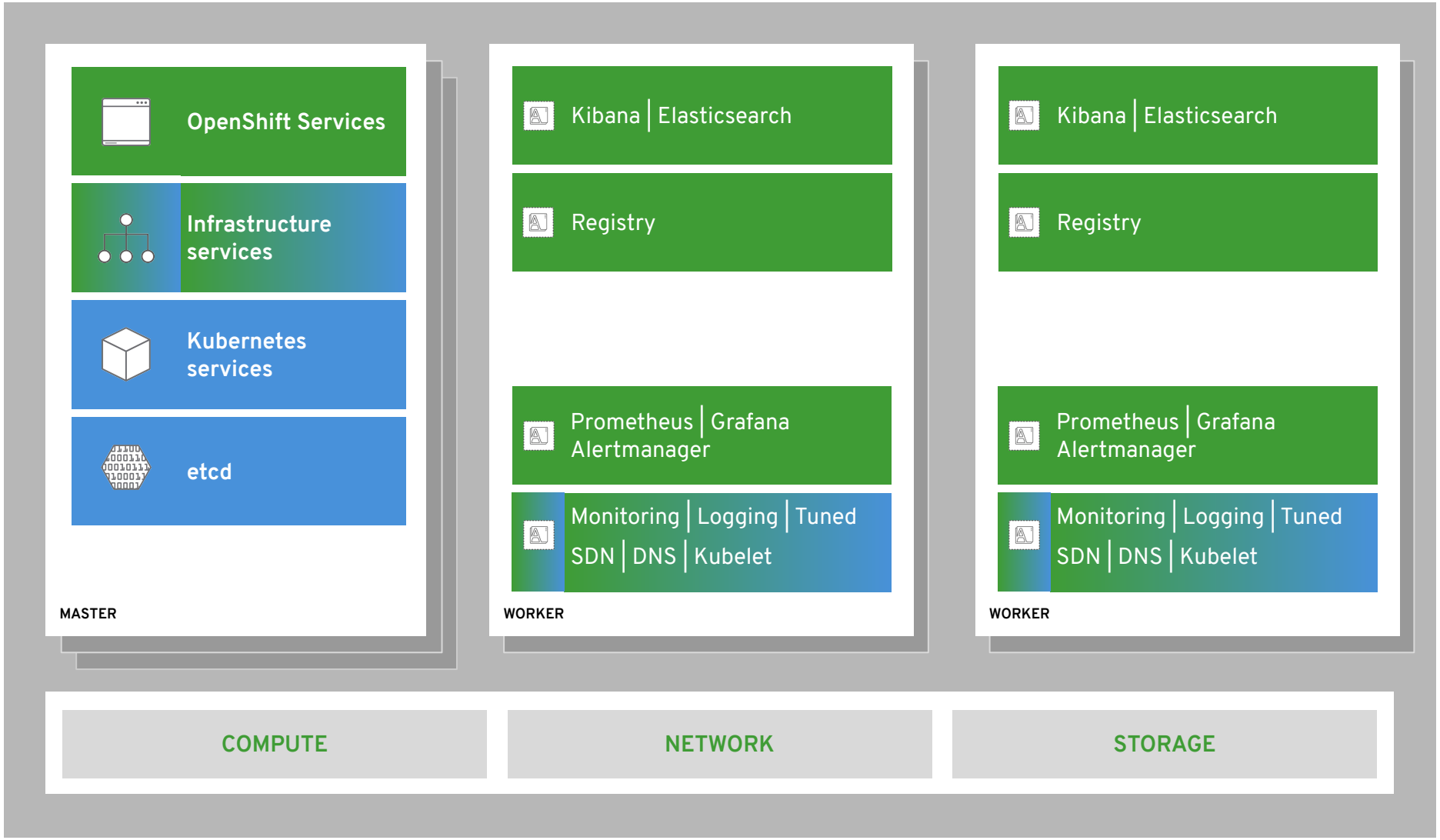
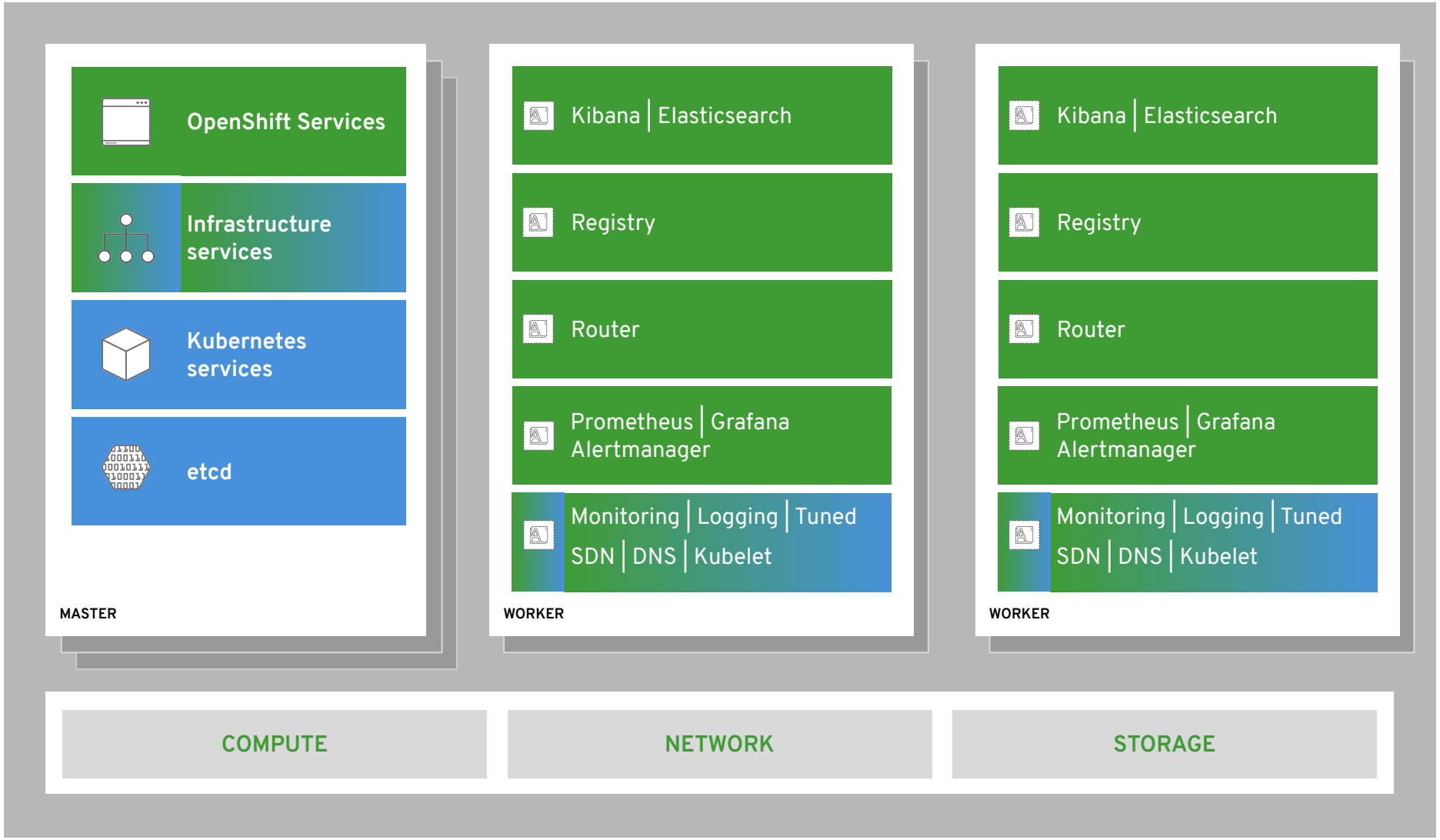
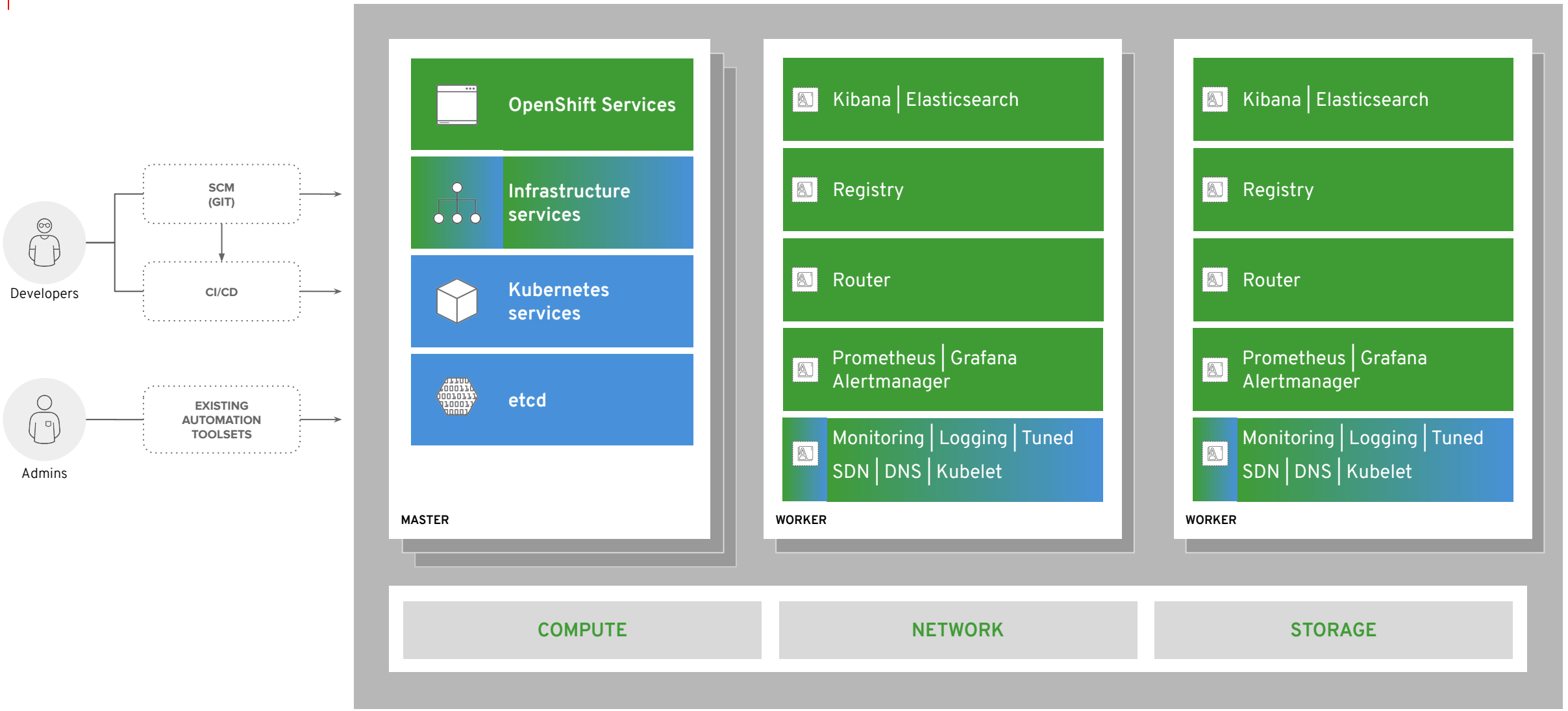
log aggregation



integrated routing



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



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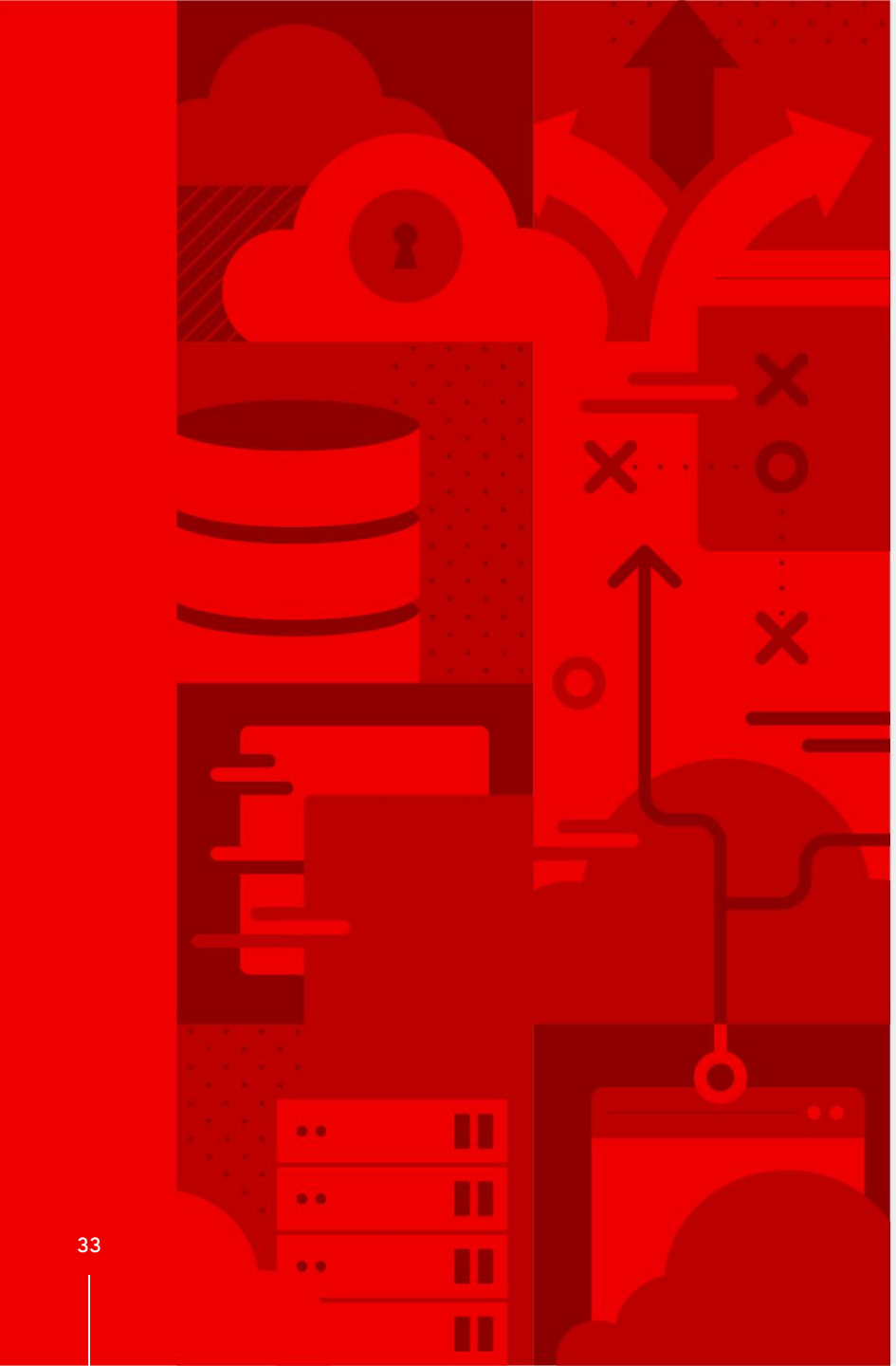
Need a Break ?

Till 12:00 am CEST

Red Hat



Welcome back !

Red Hat

Persistent Storage

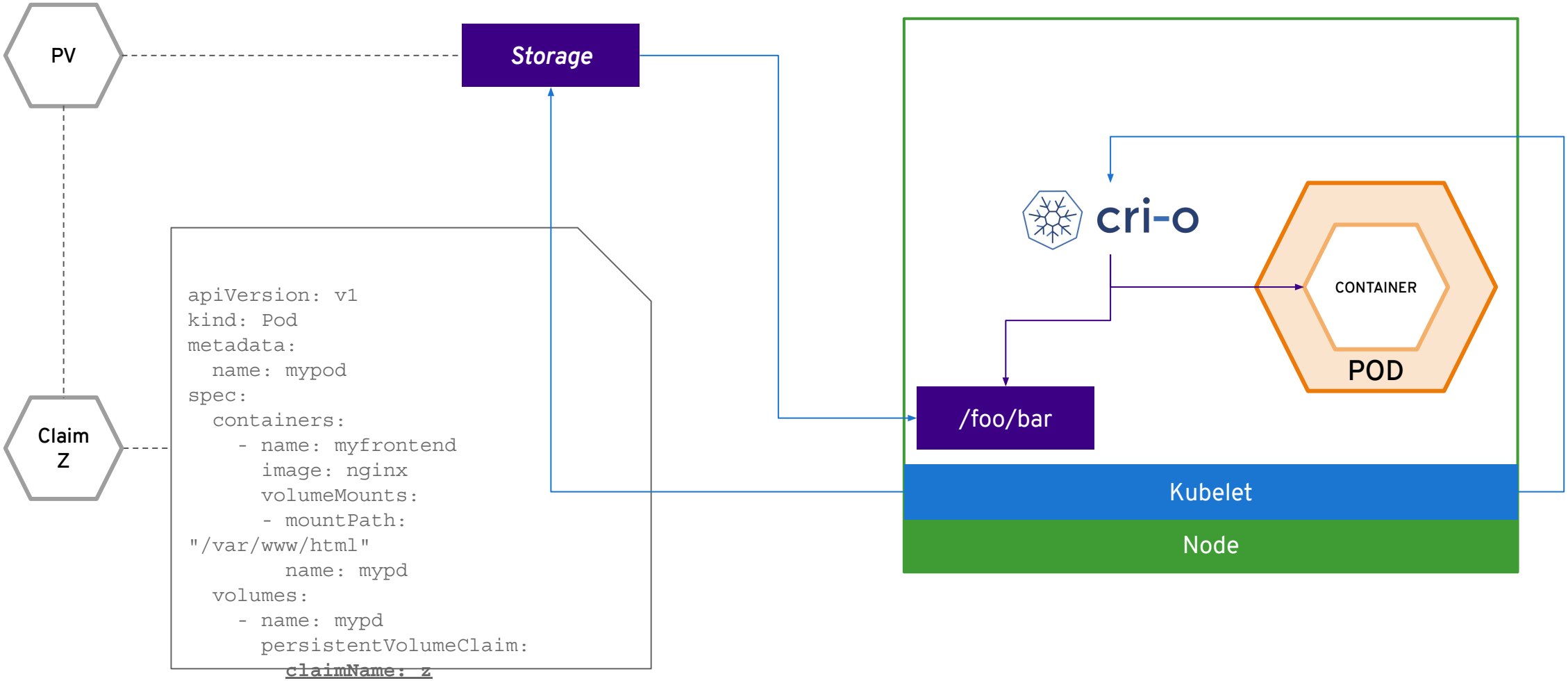
Connecting real-world storage to your containers to enable stateful applications

Red Hat

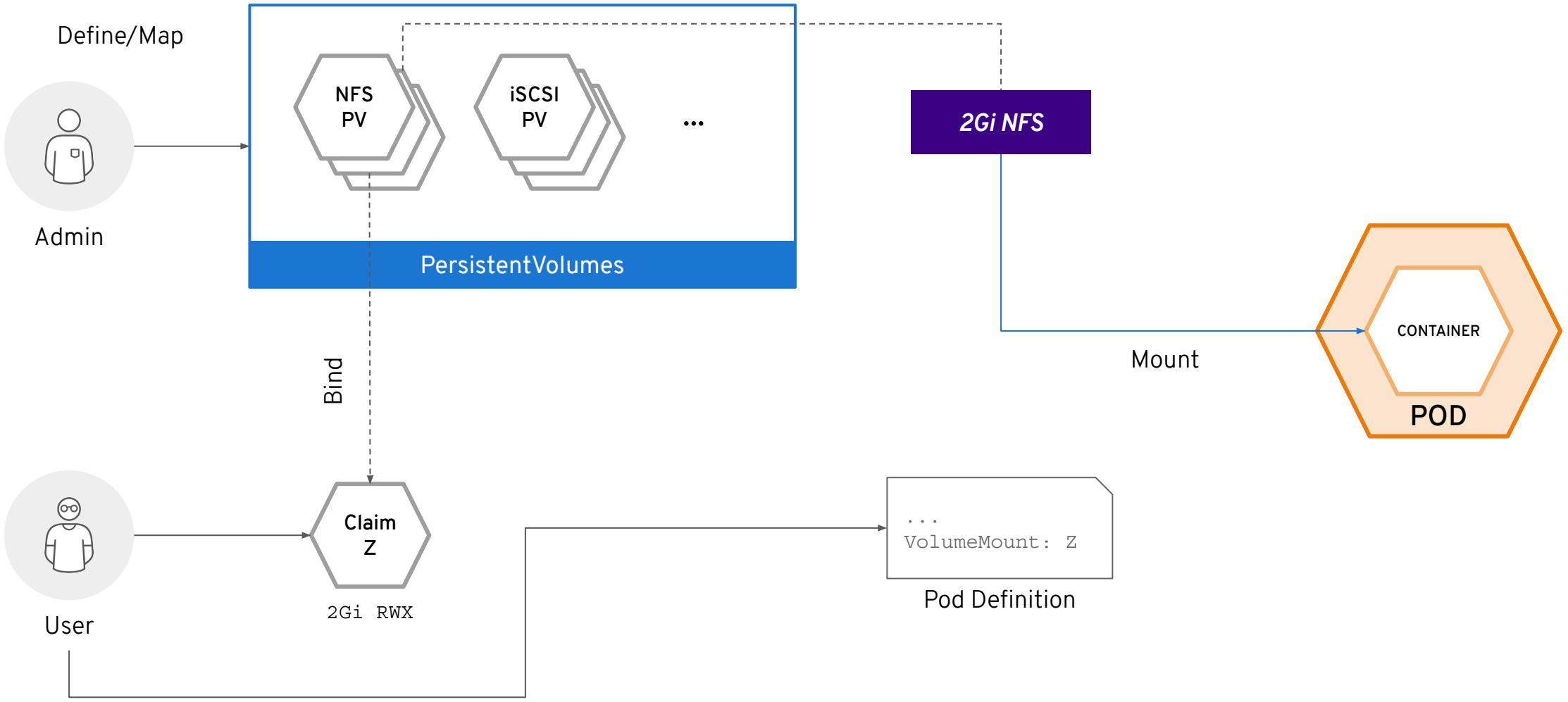
A broad spectrum of static and dynamic storage endpoints

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)**		

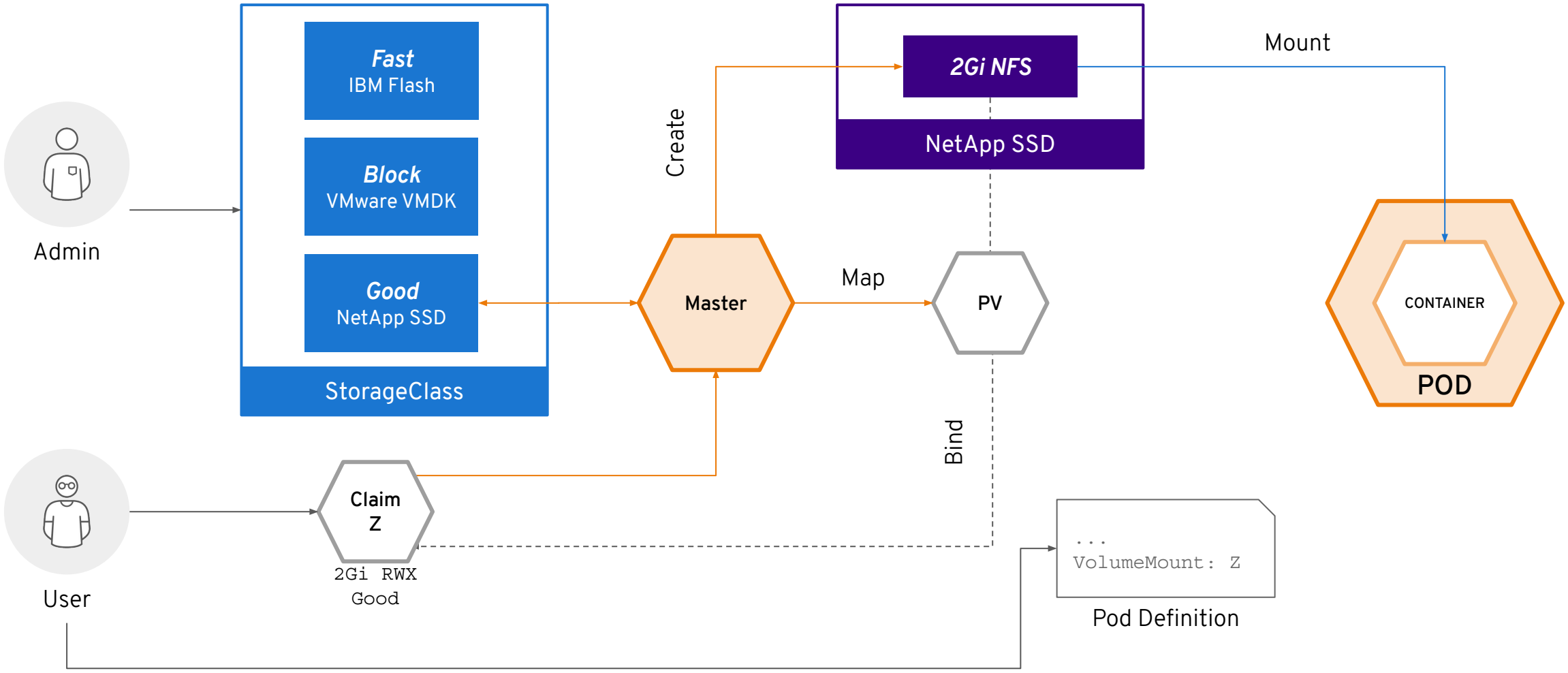
PV Consumption



Static Storage Provisioning



Dynamic Storage Provisioning



Red Hat

RED HAT®
OPENSHIFT
Container Storage

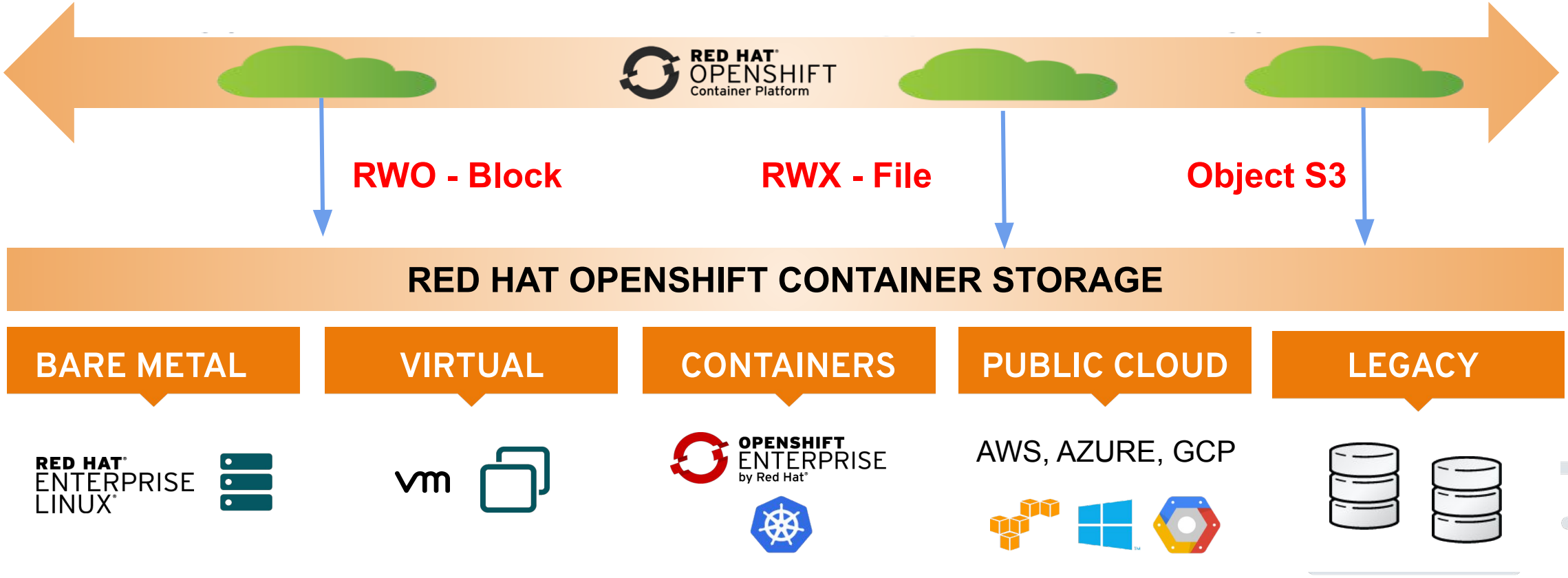
What is it?

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

EASE OF USE

HYBRID CLOUD
& DATA SERVICES

kubernetes

STORAGE
ENHANCEMENTS

Red Hat

Presenter's Name

Title

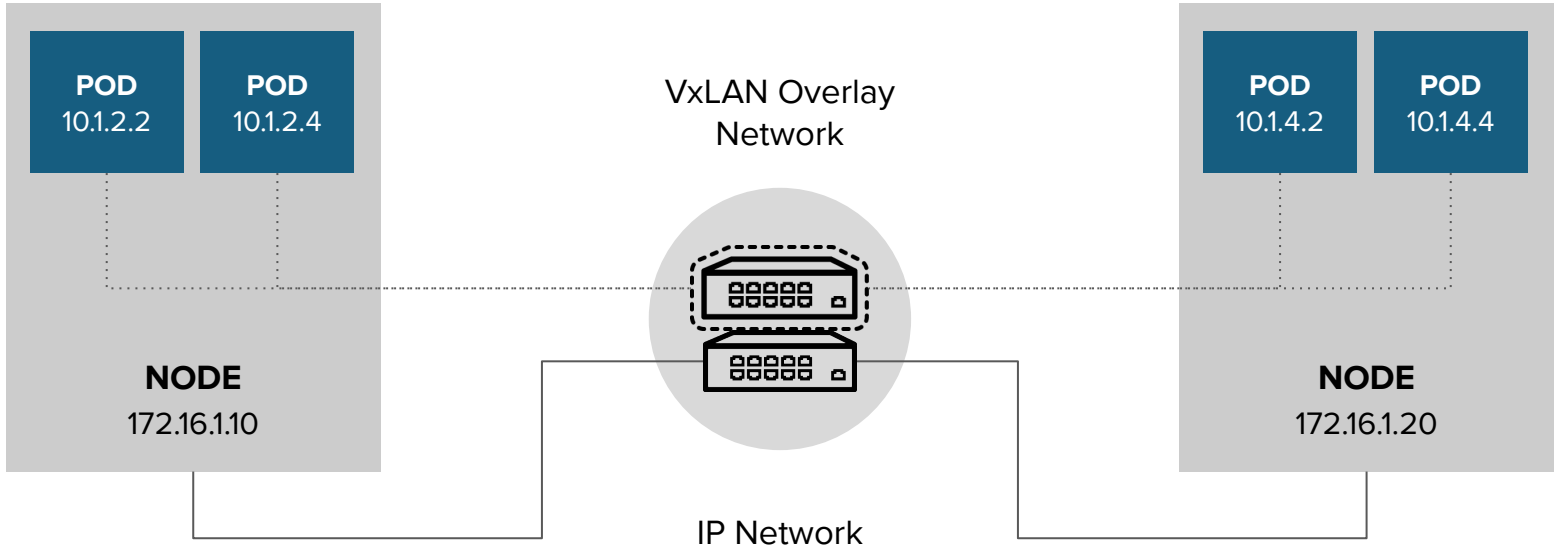
OpenShift Networking

Presenter's Name

Title

Red Hat

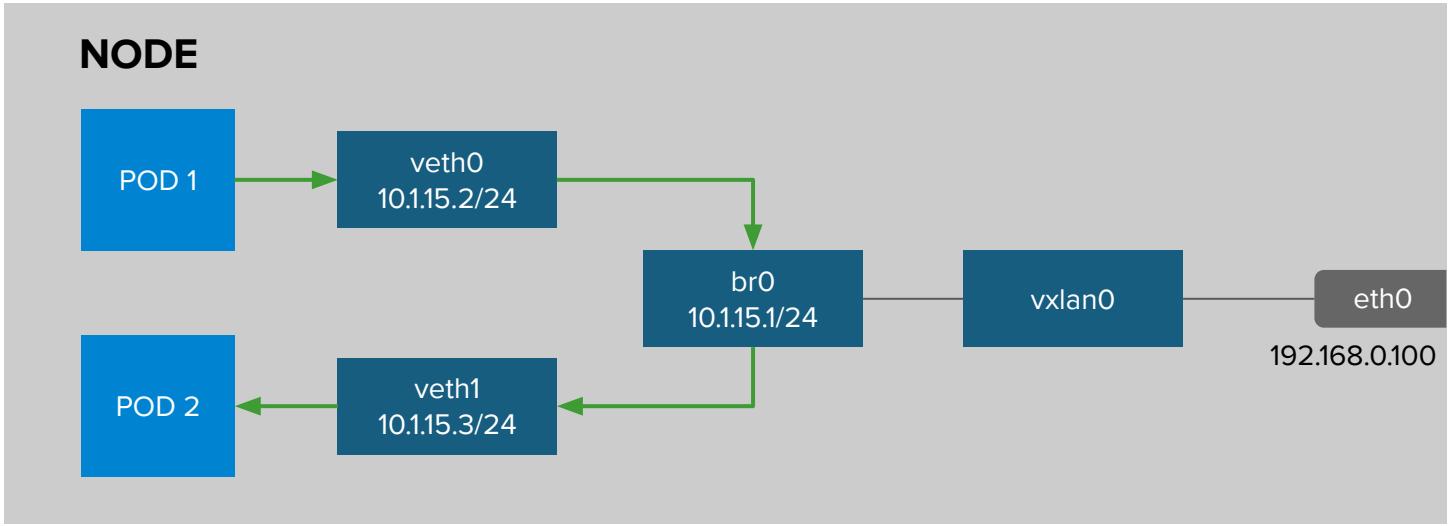
OPENSHIFT NETWORKING



Red Hat

OPENSHIFT SDN - OVS PACKET FLOW

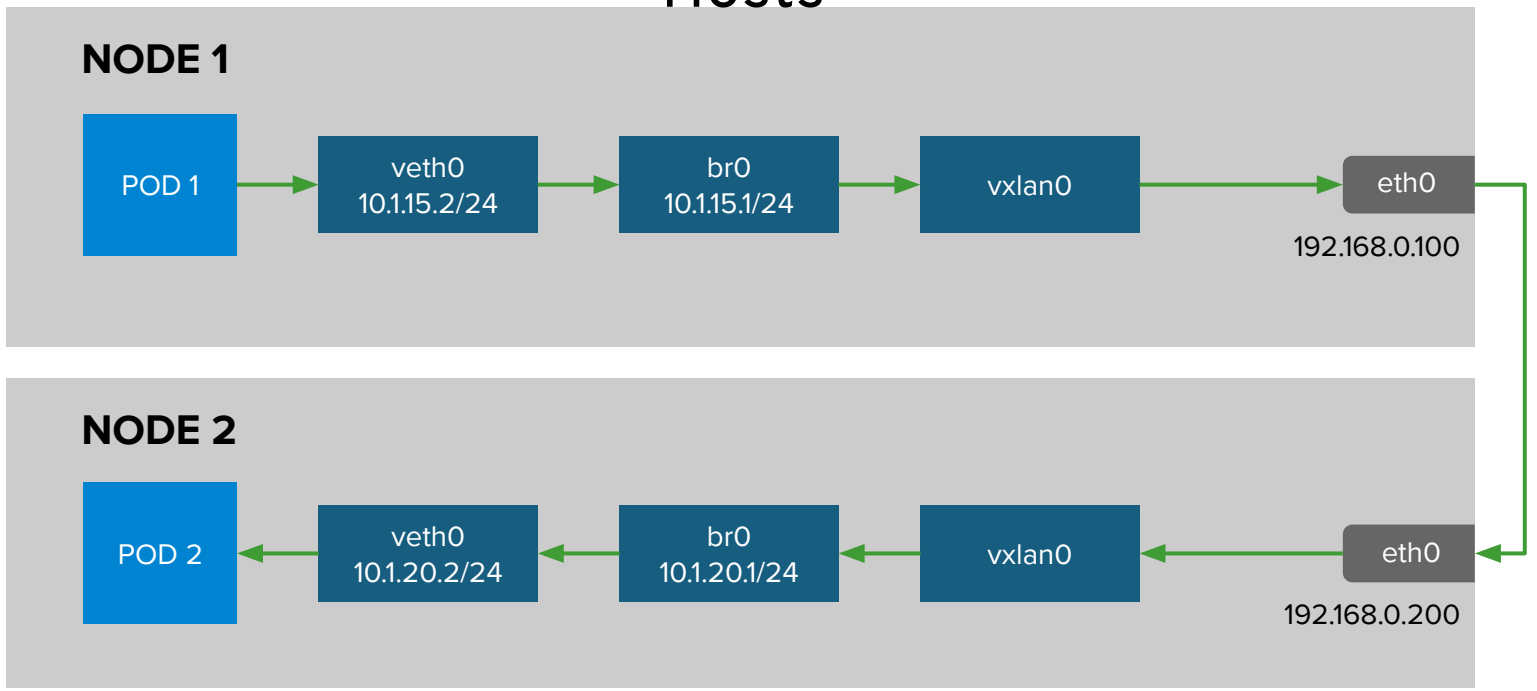
Container to Container on the Same Host



Red Hat

OPENSHIFT SDN - OVS PACKET FLOW

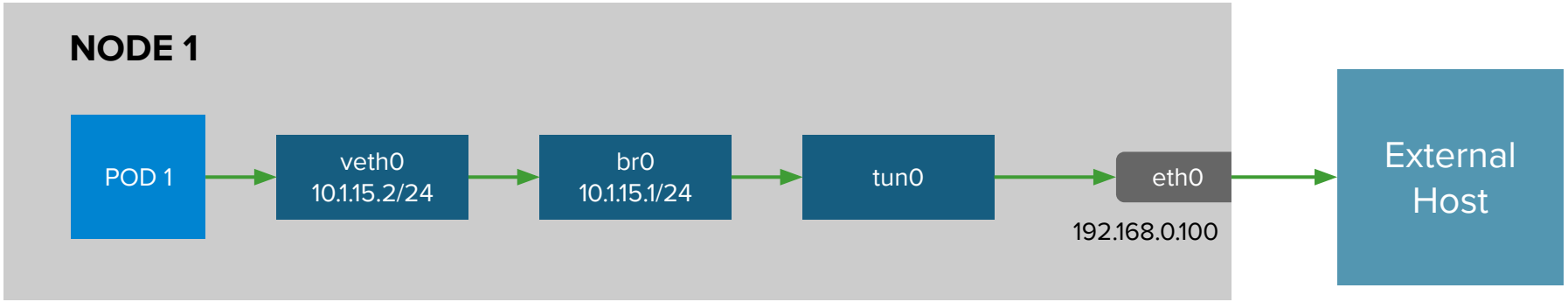
Container to Container on the Different Hosts



Red Hat

OPENSHIFT SDN - OVS PACKET FLOW

Container Connects to External Host



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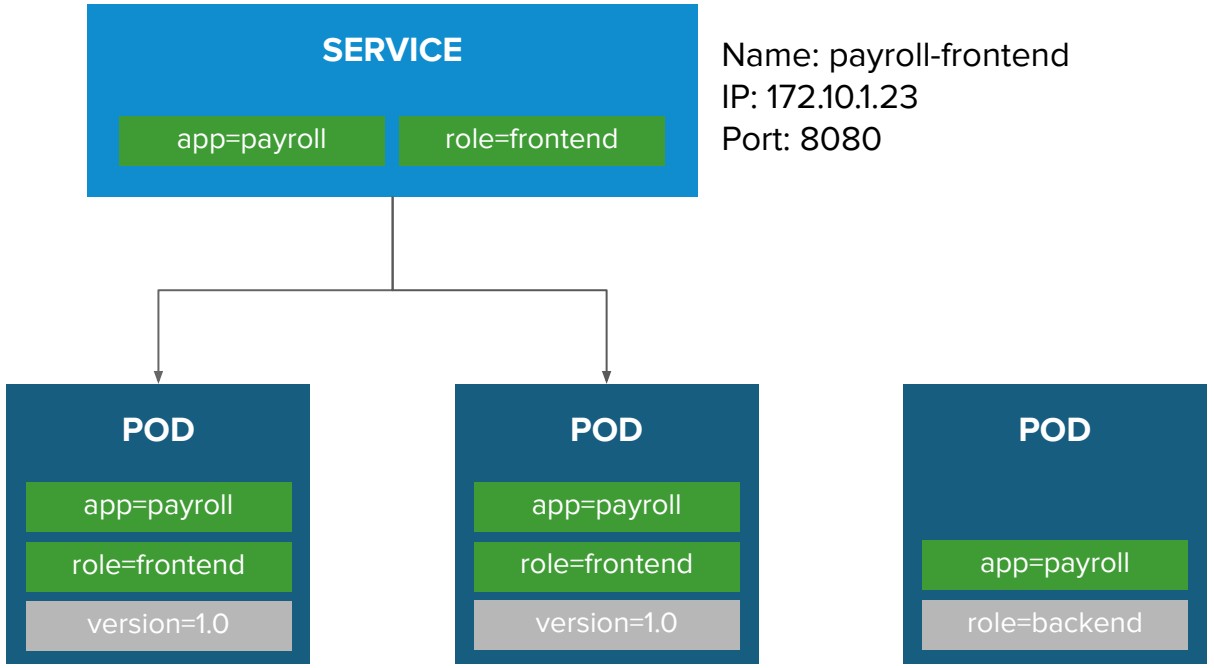
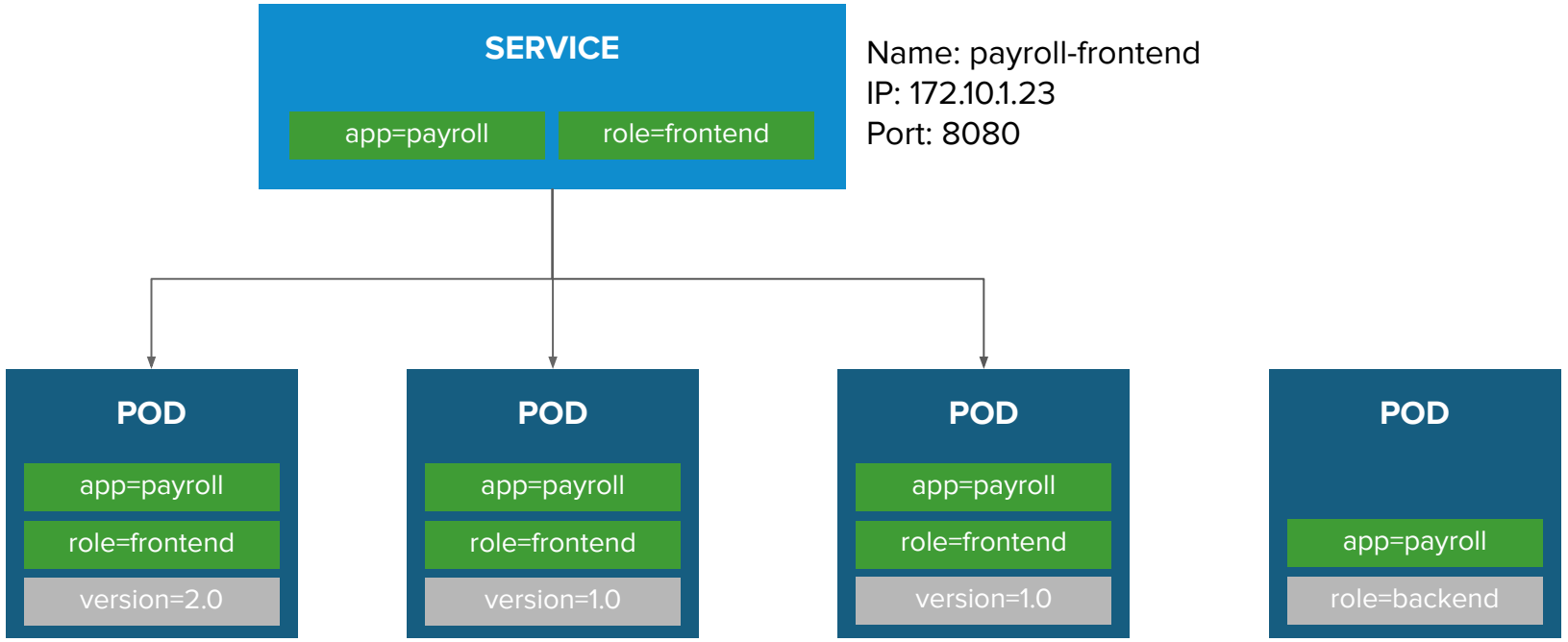
BUILT-IN SERVICE DISCOVERY
INTERNAL LOAD-BALANCING



Red Hat

BUILT-IN SERVICE DISCOVERY
INTERNAL LOAD-BALANCING



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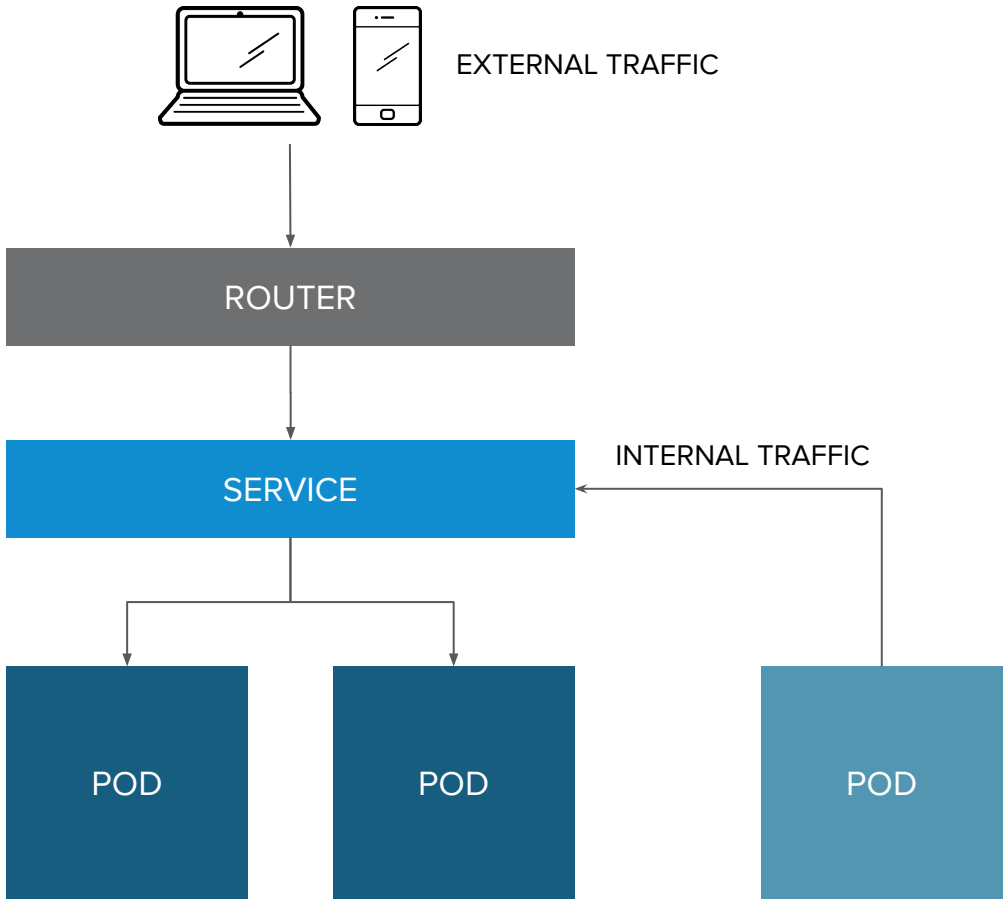
ROUTE EXPOSES SERVICES EXTERNALLY



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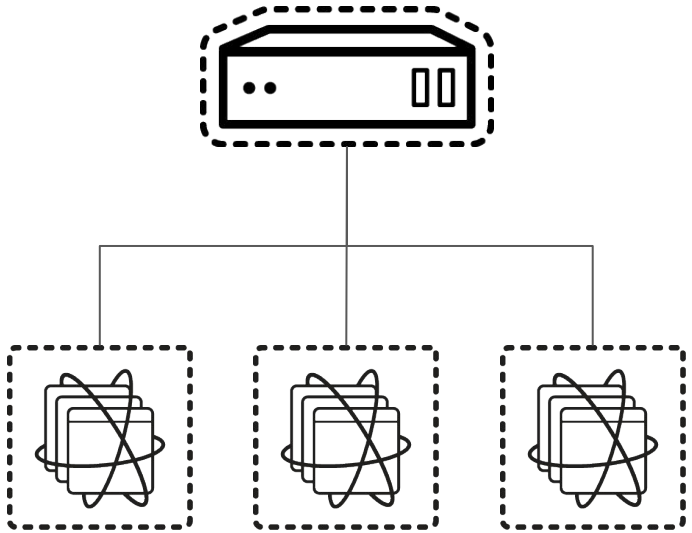
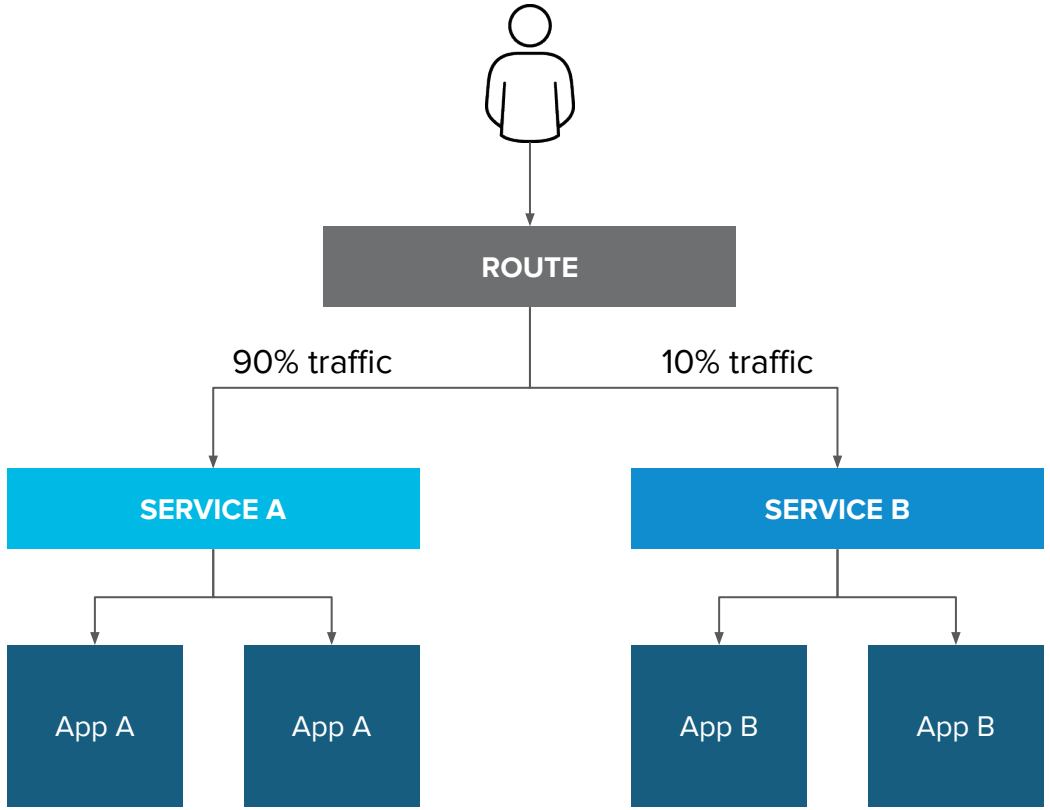
ROUTING AND EXTERNAL LOAD-BALANCING

- 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



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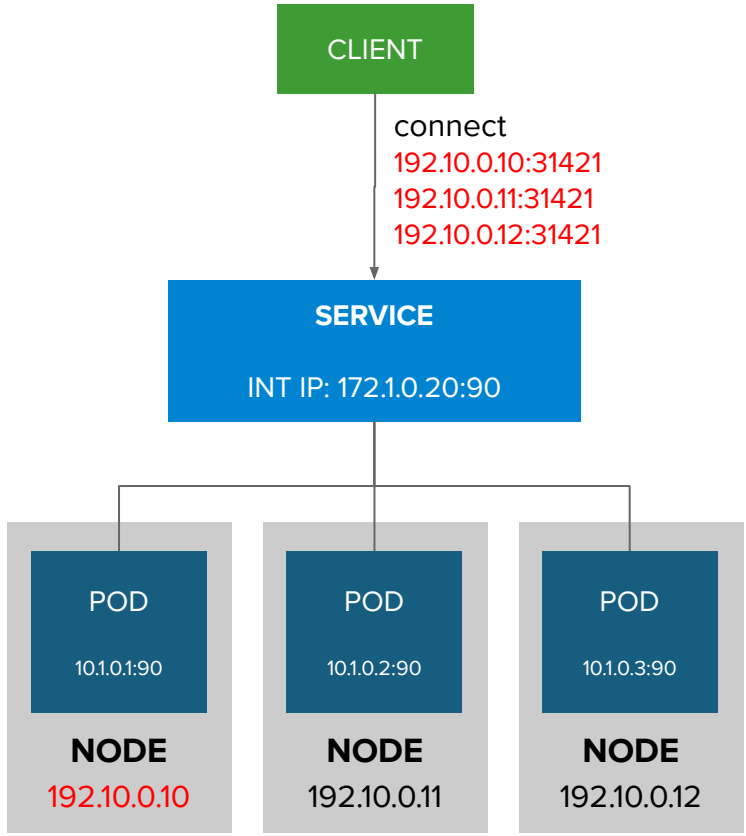
EXTERNAL TRAFFIC TO A SERVICE ON A RANDOM PORT WITH NODEPORT

- 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



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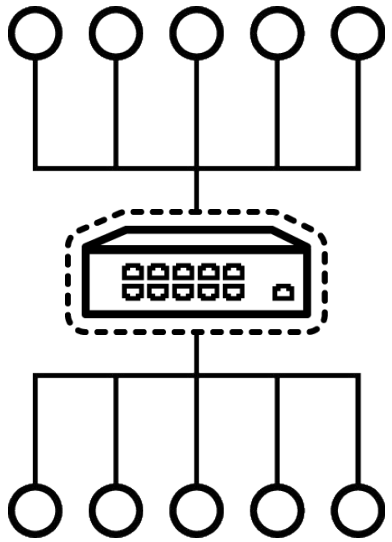
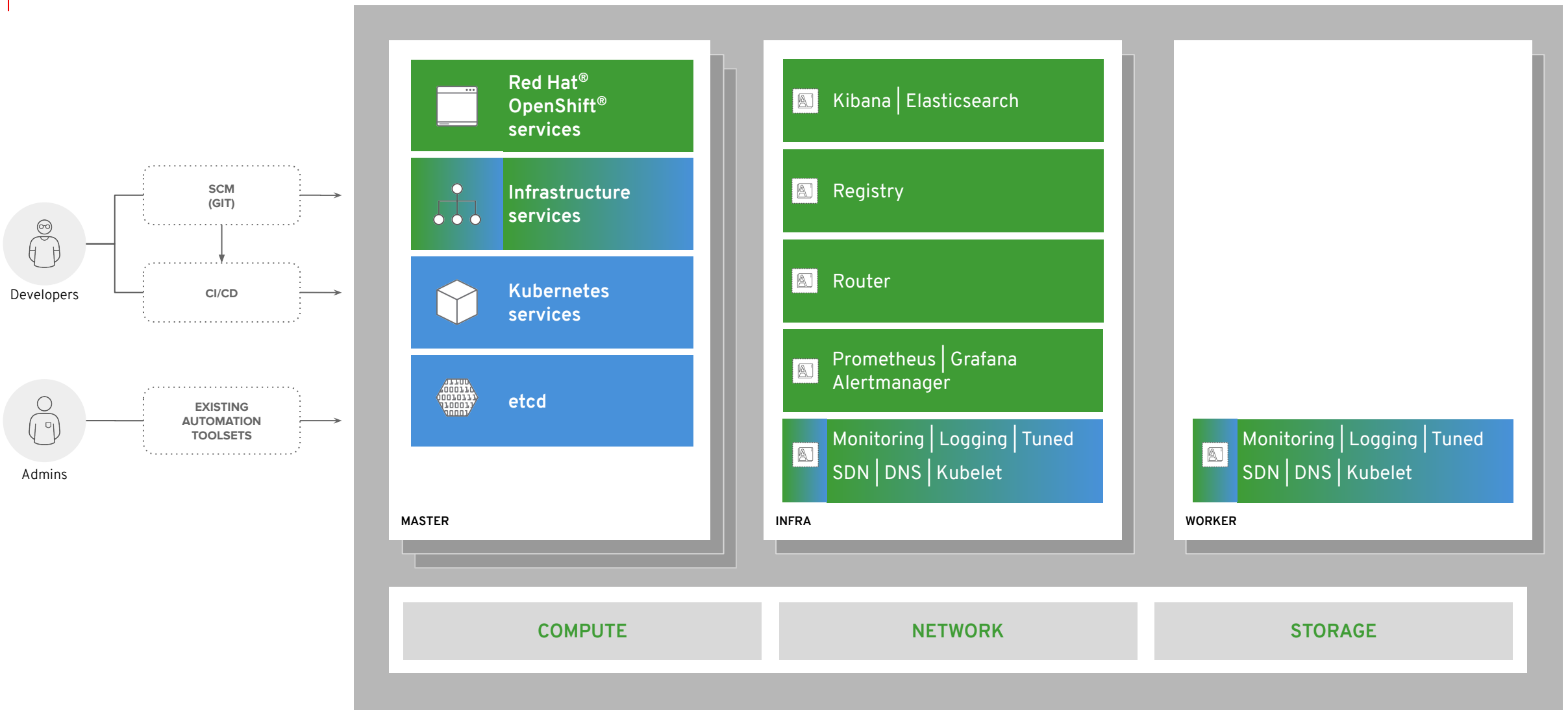
OPENSHIFT NETWORKING

- 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




SCM
(GIT)
CI/CD
Developers
EXISTING
AUTOMATION
TOOLSETS
Admins
Red Hat®
OpenShift®
services
Infrastructure
services
Kubernetes
services
etcd
MASTER
Kibana | Elasticsearch
Registry
Router
Prometheus | Grafana
Alertmanager
Monitoring | Logging | Tuned
SDN | DNS | Kubelet
INFRA
Monitoring | Logging | Tuned
SDN | DNS | Kubelet
WORKER
COMPUTE
NETWORK
STORAGE

Red Hat

Thank you

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