Red Hat OpenShift

Hosted Control Planes & KubeVirt, der neue Standard?

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Red Hat

OpenShift Virtualization - Hands-on Workshop

Mit OpenShift Virtualization können VM-Administratoren Virtuelle Maschinen in containerisierte Workflows einbinden, indem sie eine VM innerhalb eines Containers ausführen. Das ermöglicht Unternehmen die Vorteile einer modernen Anwendungsplattform zu nutzen - sowohl für ihre bestehenden Virtuelle Maschinen als auch für neue zumeist container-basierte Applikationen.

Was ist der Inhalt?

- OpenShift Virtualization Basics
- Customize Virtual Machines
- Windows Virtual Machines
- Bare Metal OpenShift Overview
- Network Management
- Storage Management
- Backup and Restore
- Migrating Virtual Machines

Wen könnte der Workshop interessieren?

- vSphere Admins
- IT-Architekten
- DevOps Engineers
- IT Operations

Datum:

Dienstag, 04.November 2025

Zeit: 13:00 - 17:00

Tech Requirements:

- Bring Your Own Device
- Nur Browser erforderlich (keine lokale Installation!)

Teilnahmegebühr:

keine

Ort:

Arrow Austria
Wienerbergstraße 11, 1100 Wien

Workshop Sprache:

- Dokumentation in englisch
- Rückfragen deutsch/englisch

Registrierung:

https://forms.gle/a5JMTSHkBZtqTZ876

Short Stories / Use-cases

It takes longer than expected for me to create a cluster

I don't want Workload admins/Developers to have access to control-planes

It takes alot of compute to host my control-plane

- CP as workloads
- Scael, monitor, log, secure,...

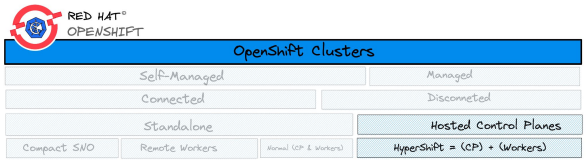
I have one large server, but It's too much to host just one cluster (Wasted resources)

Prevent CRD conflicts between tenants.

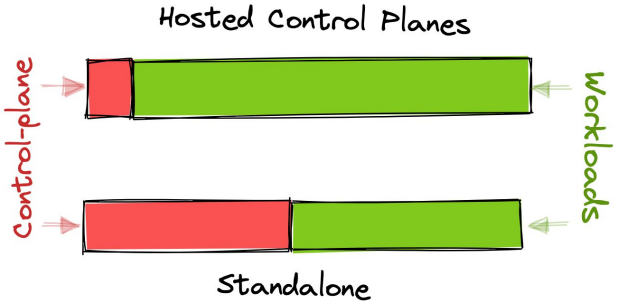
- Same operator, different version

I want more space for workloads on my cluster

Hosted Control Planes (HyperShift)



- An **OpenShift** Topology
- Service for **hosting OpenShift control planes** at **scale**
- Solves for **cost** and **time to provision**
- Portable **across clouds**
- Provides **strong separation of concerns** between management and workloads.



Costs savings with HCP Relative to Cluster Size

Large cluster	Medium cluster	Small cluster
~~3 Master nodes~~	~~3 Master nodes~~	~~3 Master nodes~~
100 Worker nodes	10 Worker nodes	3 Worker nodes
~ Saving : 2.3%	~ Saving : 23%	~ Saving : 50%

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HCP Architecture & Support

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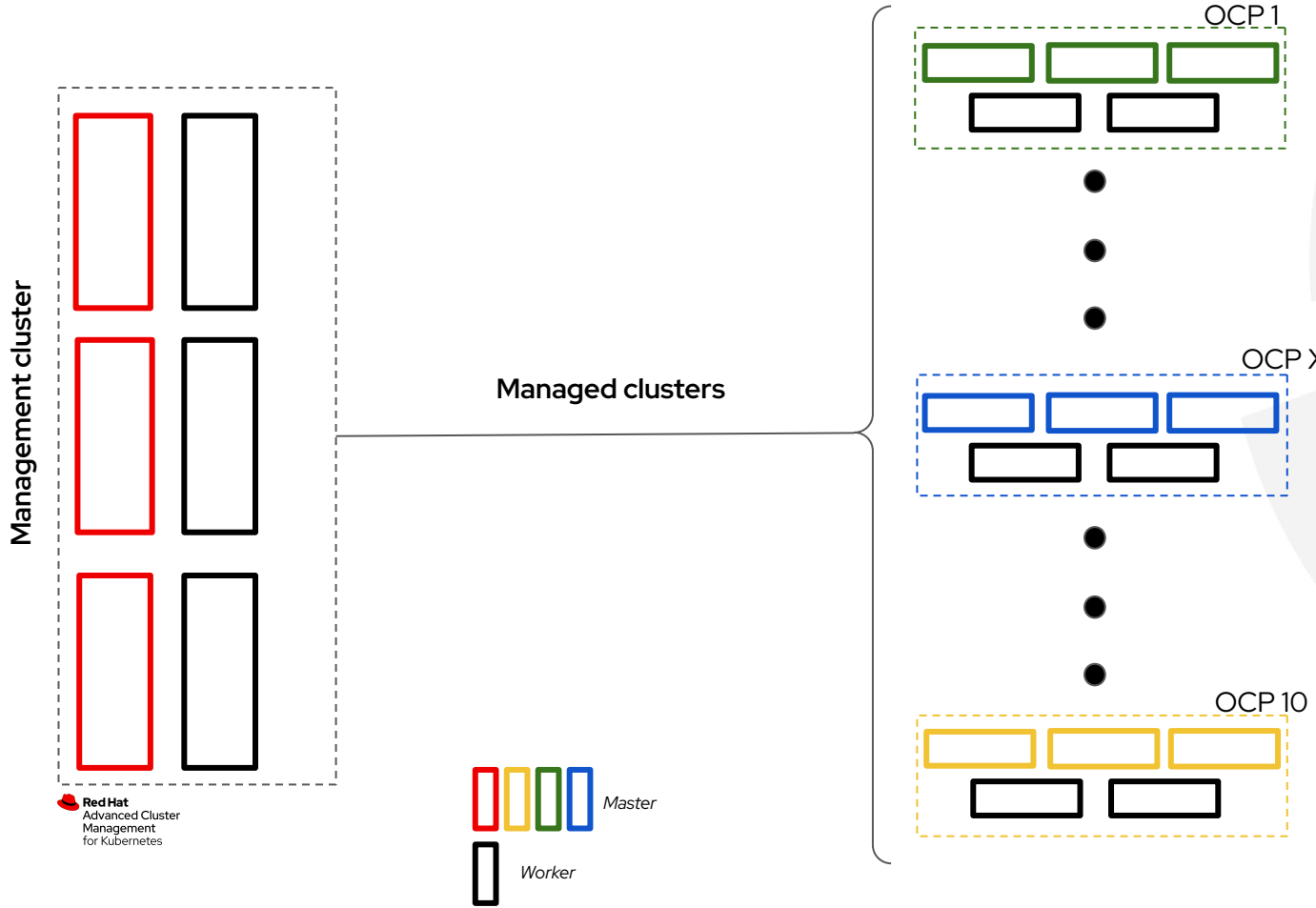
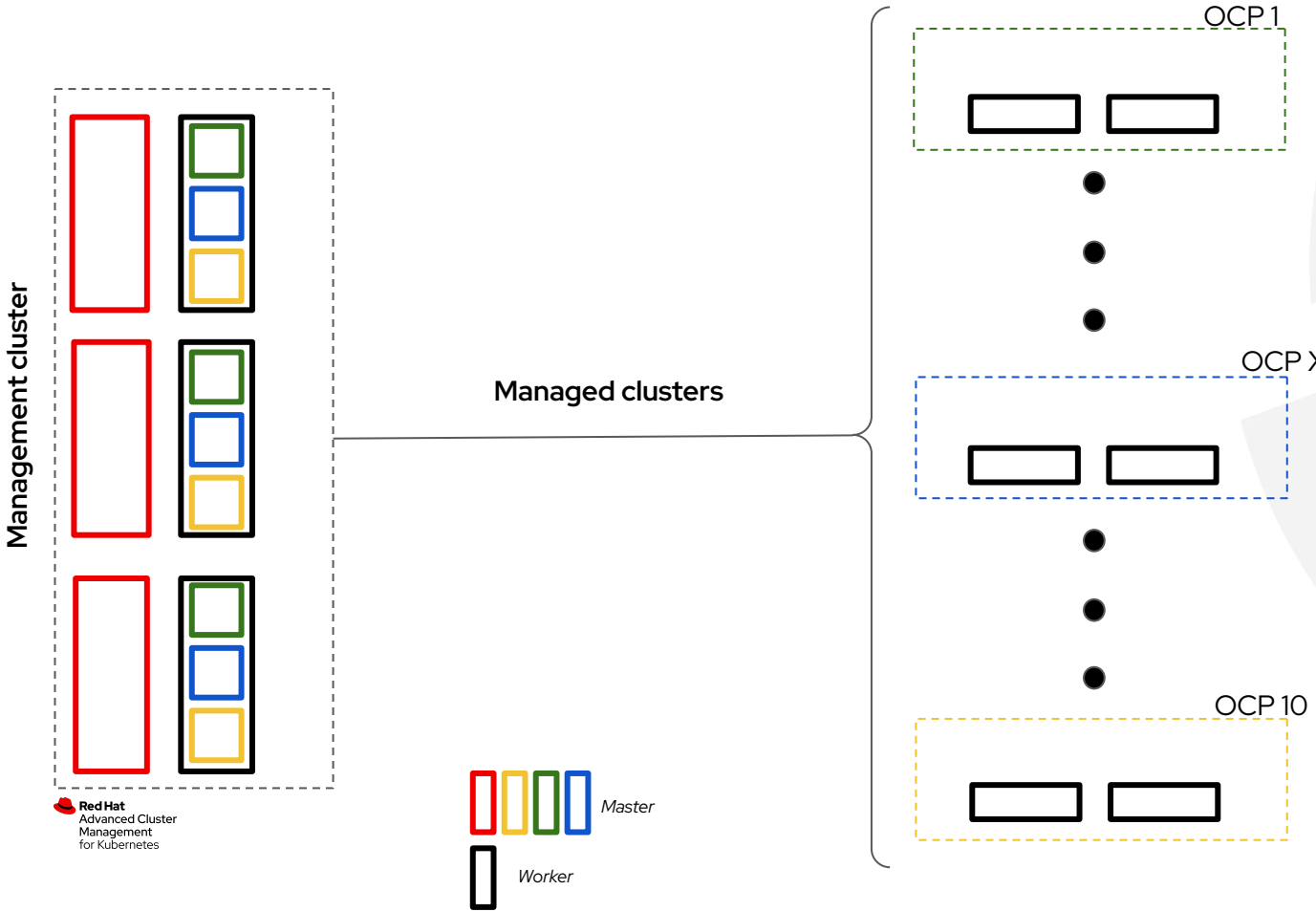
Without HCP



Contributor: David Martini



With HCP

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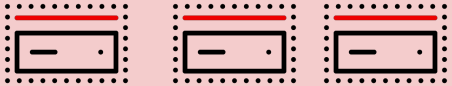
OpenShift on OpenShift - 10.000 feet view

Control plane only

Standalone - "Classic VM's"

Control plane as **Virtual Machines's**



Hosted control plane

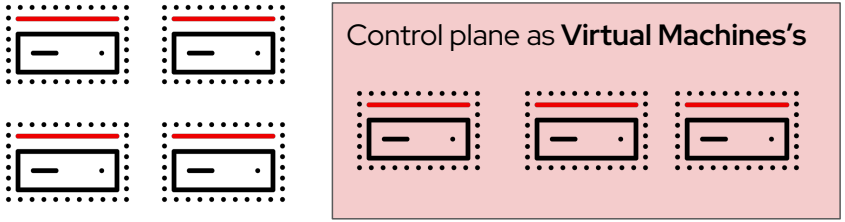
Control plane as **Pod's**

Bare-Metal OpenShift Cluster

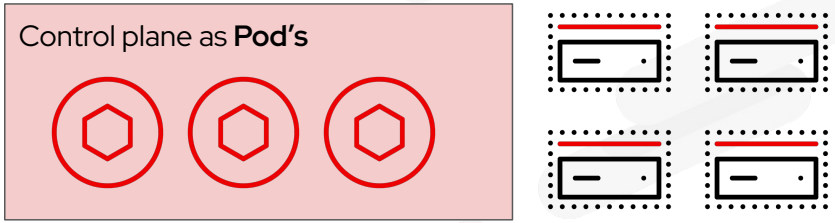
Worker nodes?

Virtual

Standalone - “Classic VM’s”



Hosted control plane



Bare-Metal OpenShift Cluster

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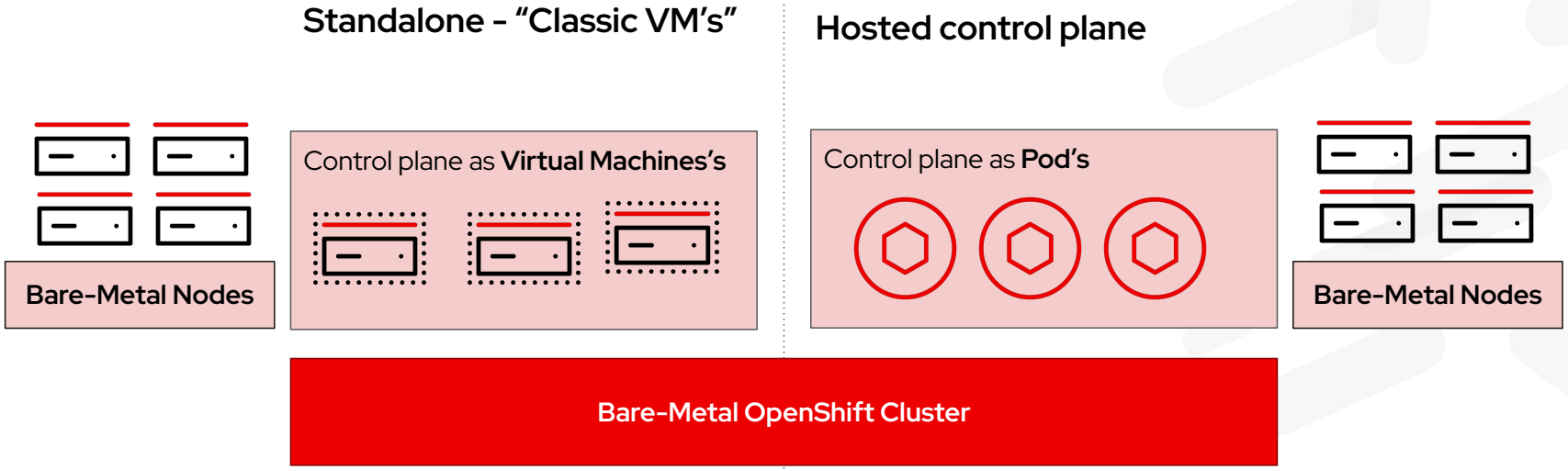
Worker nodes?

BareMetal



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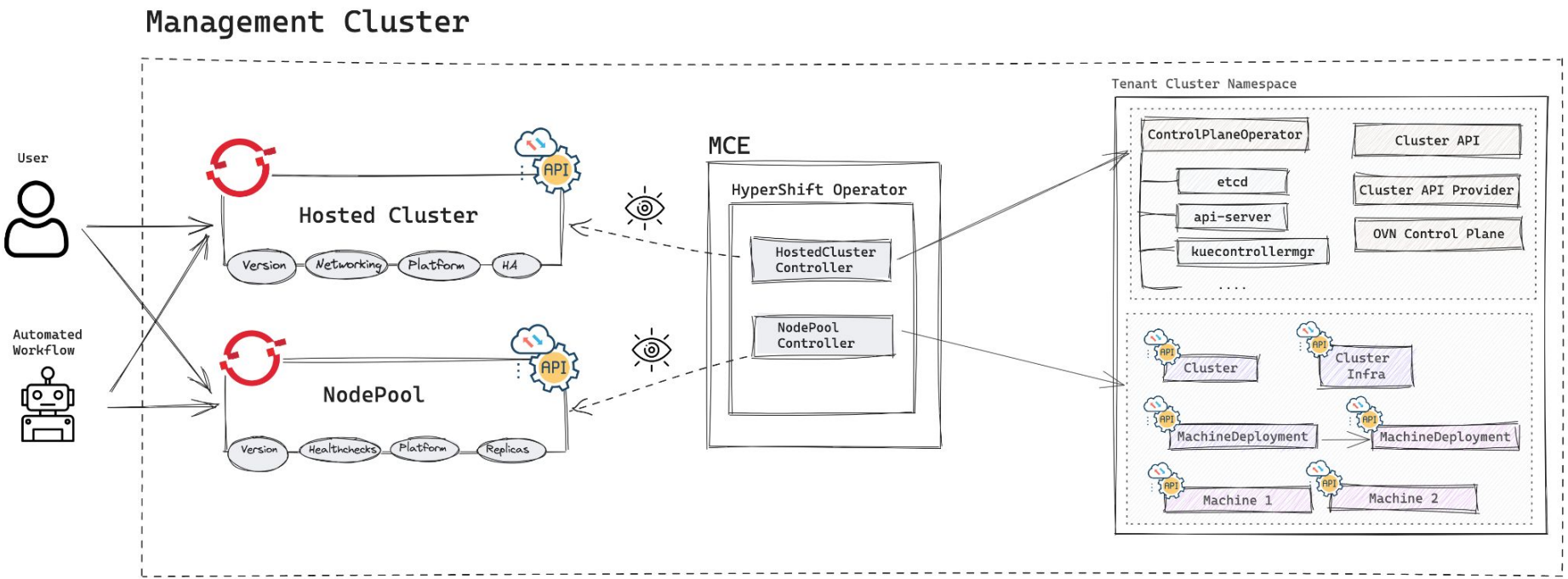
Hosted Control Planes APIs (Zoom-In to APIs)



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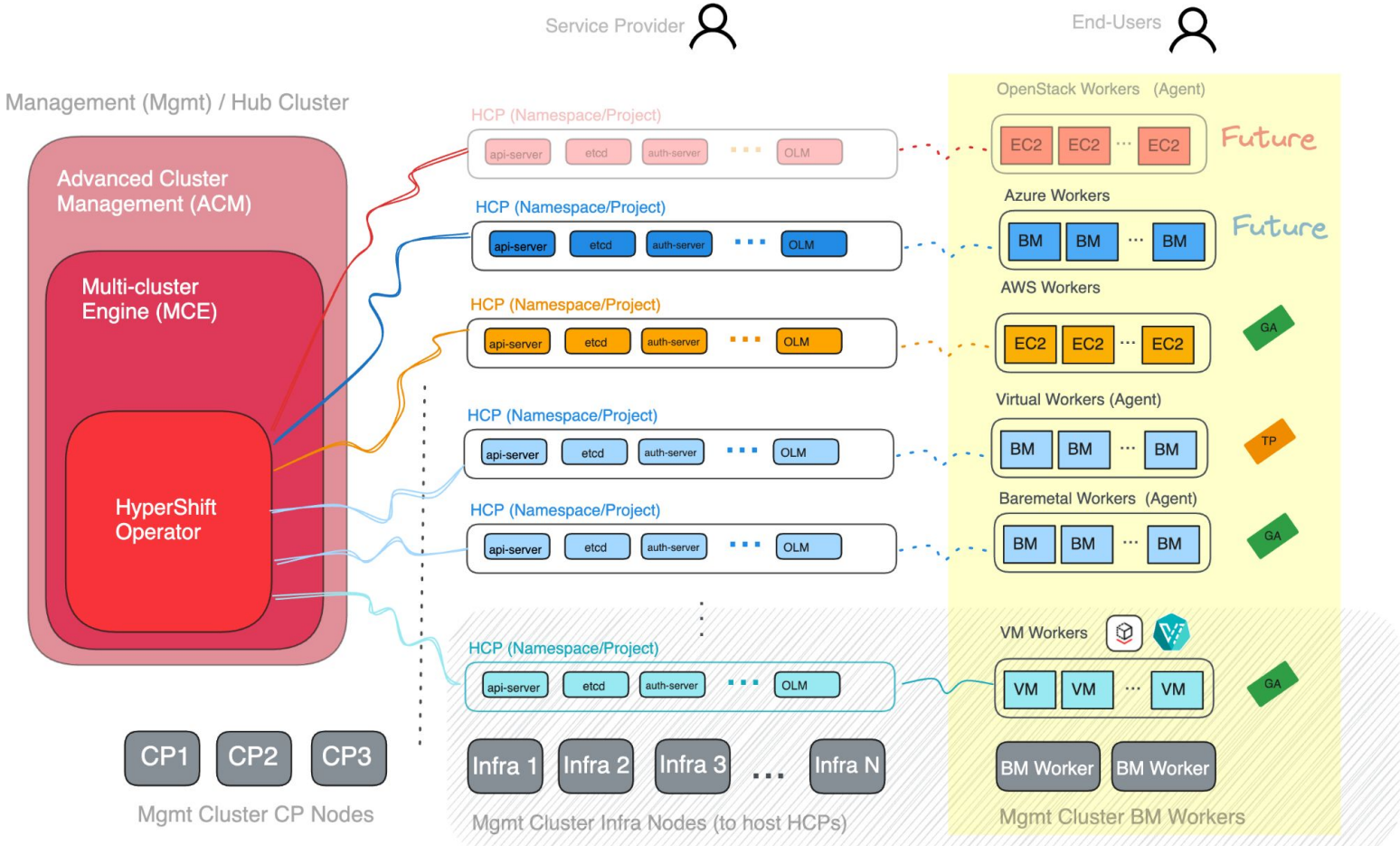
Architecture / Providers Overview



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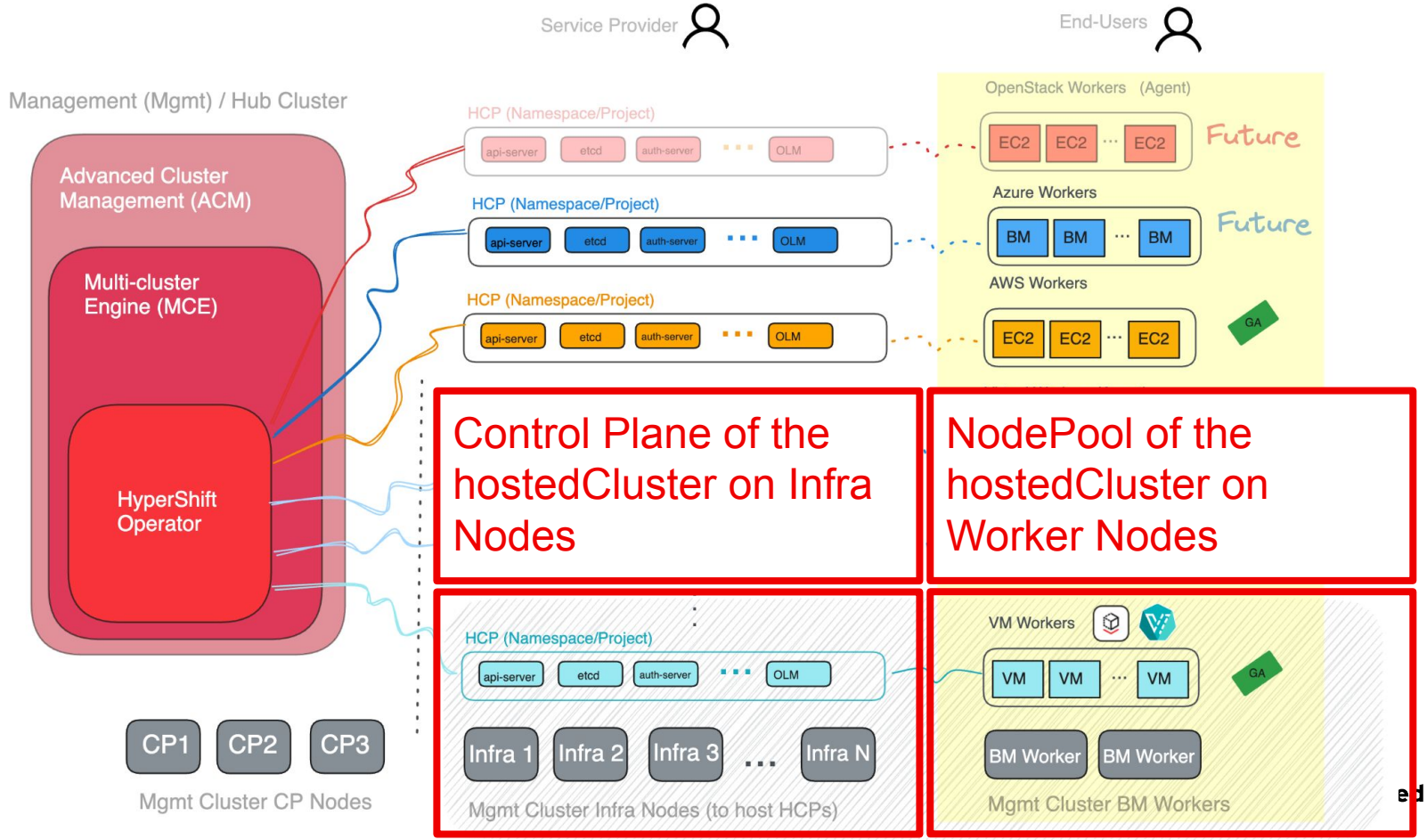
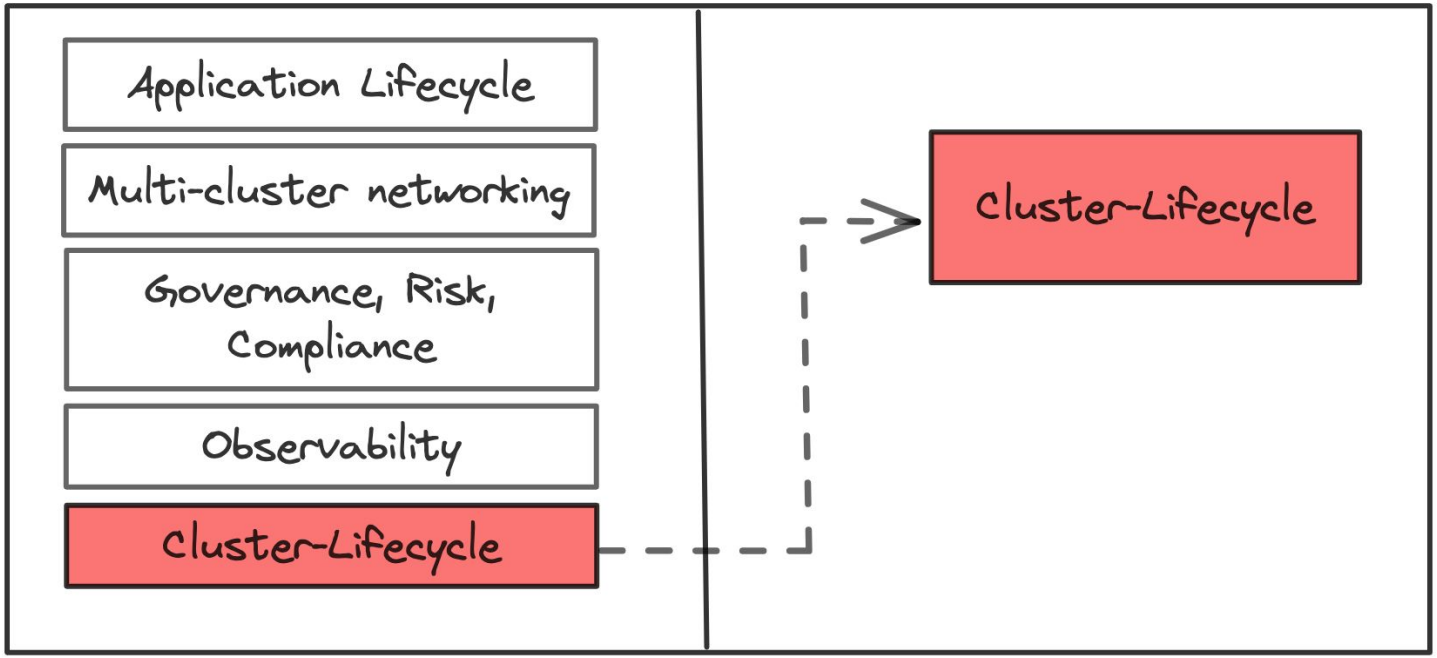


HCP is Available via ACM (MCE)

ACM vs. MCE



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Upgrades in HCP

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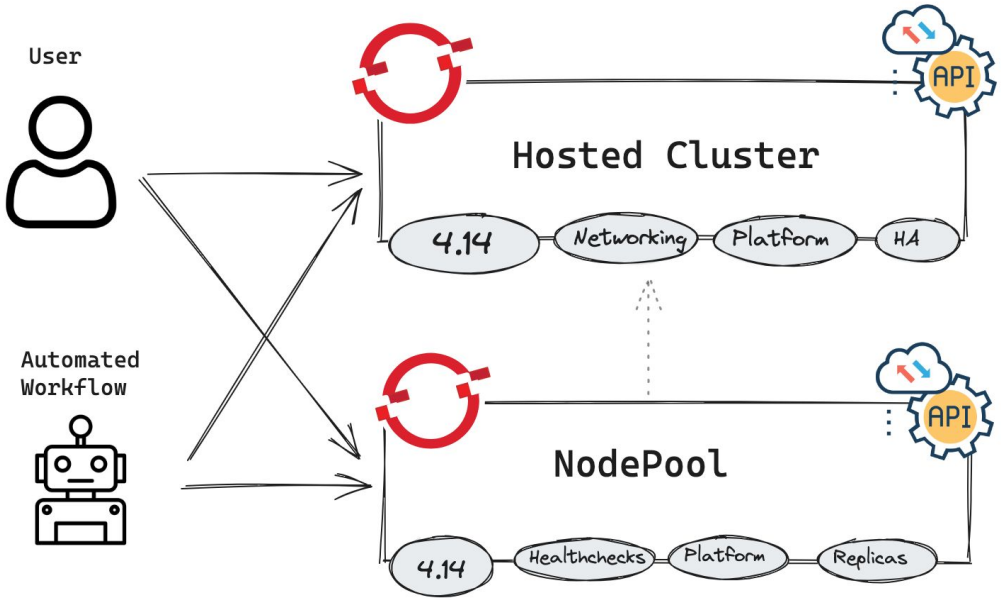
Hosted Control Planes Upgrades



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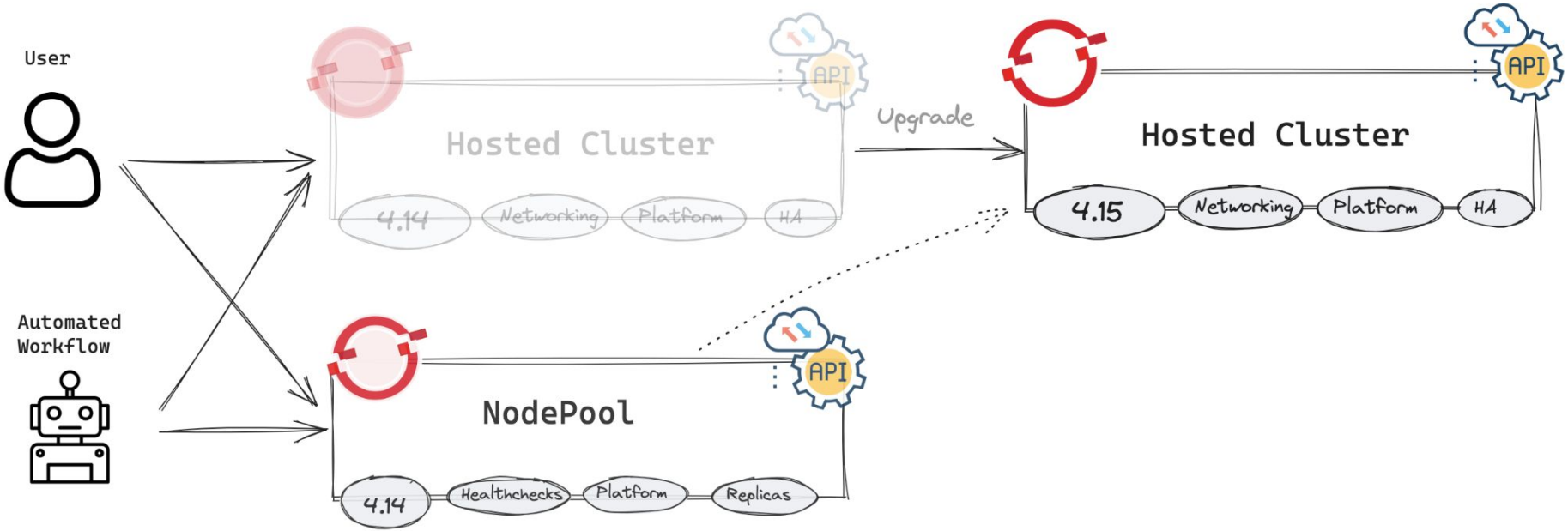
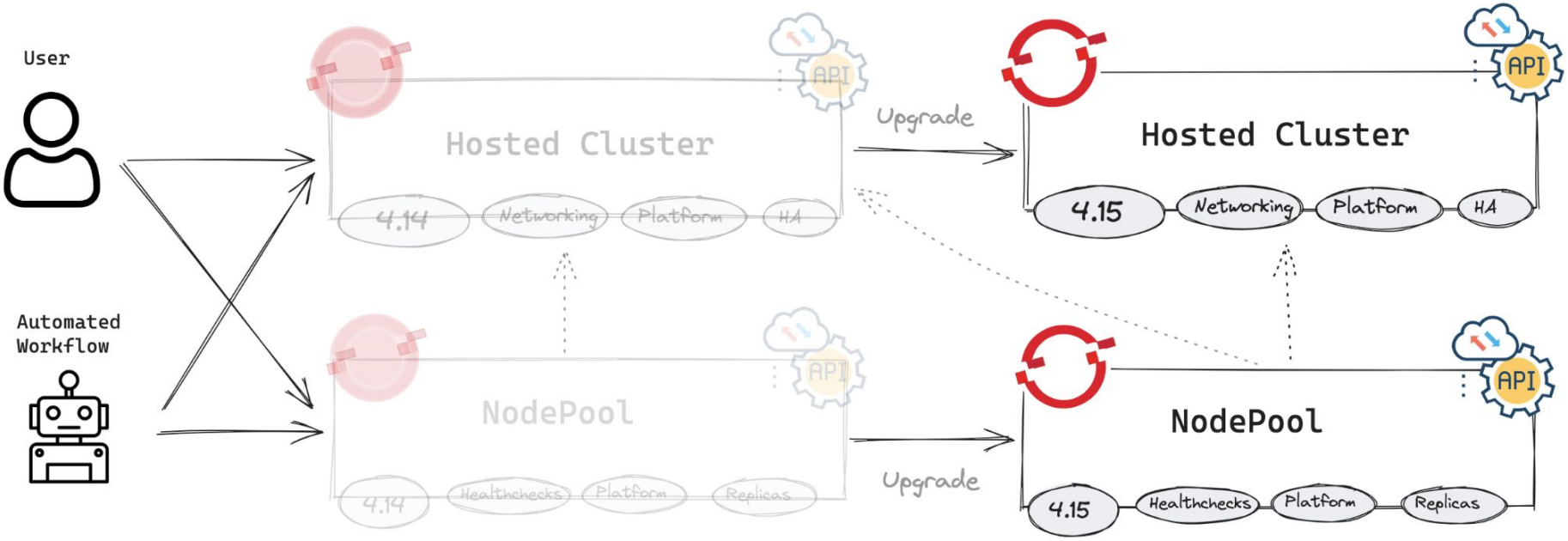
Hosted Control Planes Upgrades



Hosted Control Planes Upgrades



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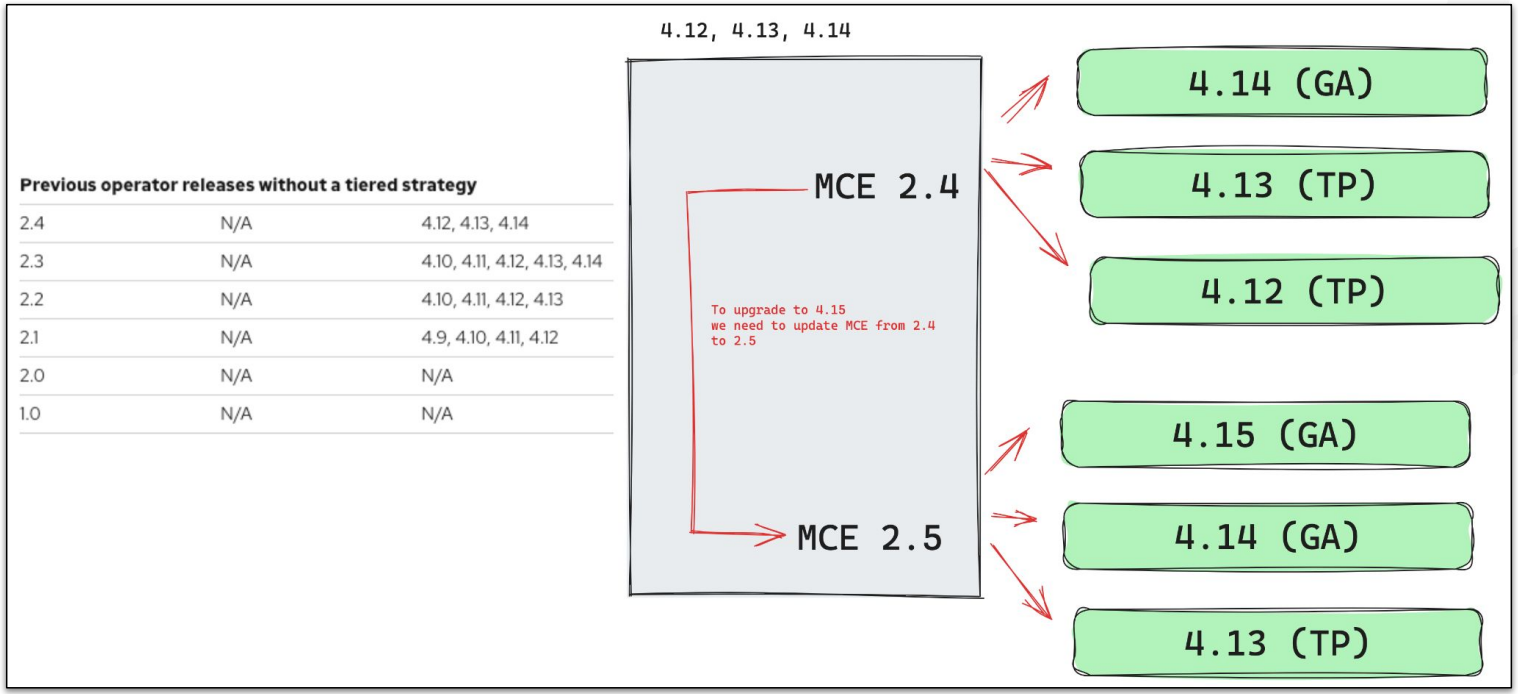
Hosted Control Planes Upgrades

Previous operator releases without a tiered strategy

2.4	N/A	4.12, 4.13, 4.14
2.3	N/A	4.10, 4.11, 4.12, 4.13, 4.14
2.2	N/A	4.10, 4.11, 4.12, 4.13
2.1	N/A	4.9, 4.10, 4.11, 4.12
2.0	N/A	N/A
1.0	N/A	N/A



https://access.redhat.com/support/policy/updates/openshift_operators

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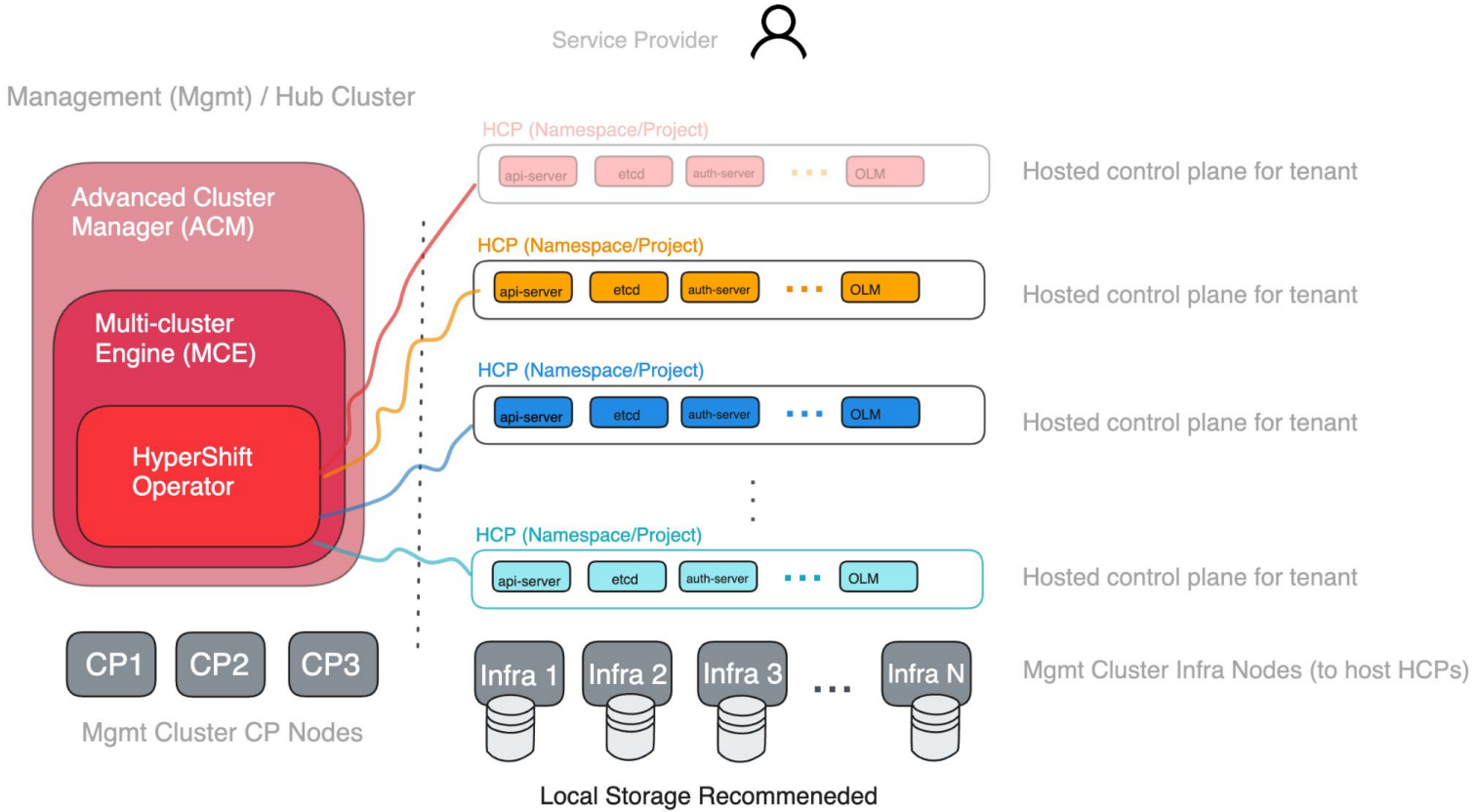
Storage

Storage for etcd pods

PersistantVolume, PersistantVolumeClaim, StorageClass

Storage / Operator	Latency	Dynamic Provisioning	Consolidation	Portability
OpenShift Data Foundation	High	Yes	Yes	Yes
Local Storage	Low	No	No	No
LVM Storage	Low	Yes	Yes	No

→ Want LVM storage for etcd
→ Storage for VMs can be from a different source, e.g. OpenShift Data Foundation


Service Provider
Management (Mgmt) / Hub Cluster
Advanced Cluster Manager (ACM)
Multi-cluster Engine (MCE)
HyperShift Operator
HCP (Namespace/Project)
api-server
etcd
auth-server
OLM
Hosted control plane for tenant
HCP (Namespace/Project)
api-server
etcd
auth-server
OLM
Hosted control plane for tenant
HCP (Namespace/Project)
api-server
etcd
auth-server
OLM
Hosted control plane for tenant
HCP (Namespace/Project)
api-server
etcd
auth-server
OLM
Hosted control plane for tenant
CP1
CP2
CP3
Mgmt Cluster CP Nodes
Infra 1
Infra 2
Infra 3
Infra N
Mgmt Cluster Infra Nodes (to host HCPs)
Local Storage Recommeneded

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Standalone - OpenShift on OpenShift

There is no access and automation to get access to the FC Storage

OpenShift Worker Node VM

POD

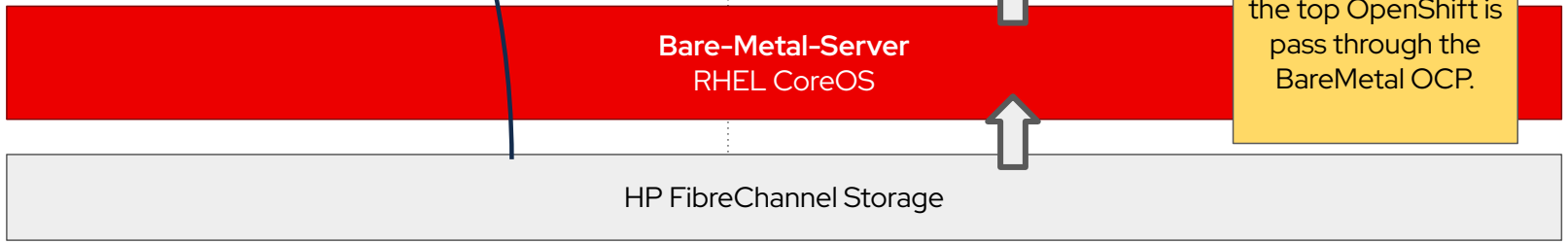
Hosted Control Plane on OpenShift

KubeVirt CSI is only supported and available w/ HostedControlPlane

OpenShift Worker Node VM

POD

With KubeVirt CSI the PV/PVC from the top OpenShift is pass through the BareMetal OCP.



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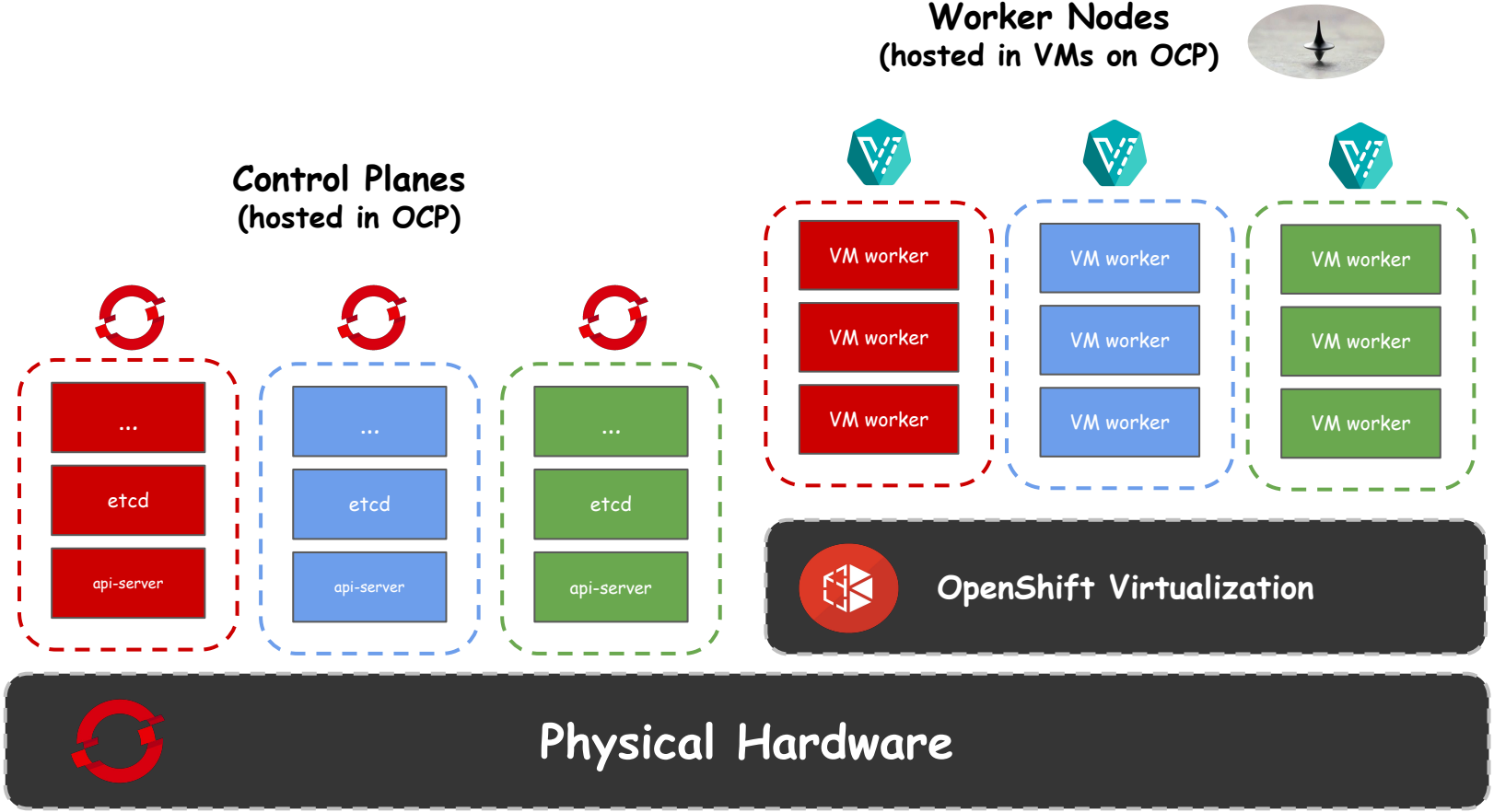
The OpenShift Virtualization (KubeVirt) Provider


Worker Nodes
(hosted in VMs on OCP)
Control Planes
(hosted in OCP)
...
etcd
api-server
...
etcd
api-server
...
etcd
api-server
VM worker
VM worker
VM worker
VM worker
VM worker
VM worker
VM worker
VM worker
VM worker
OpenShift Virtualization
Physical Hardware

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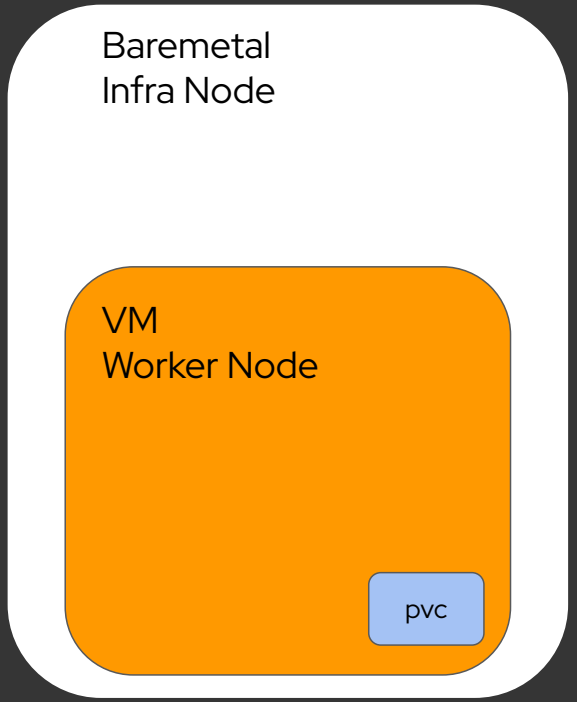
KubeVirt CSI Driver

- Extends infra StorageClass into the guest clusters hosted by KubeVirt
- Utilizes HotPlug to make infra PVCs available within guest clusters
- Flow example...

KubeVirt CSI Driver



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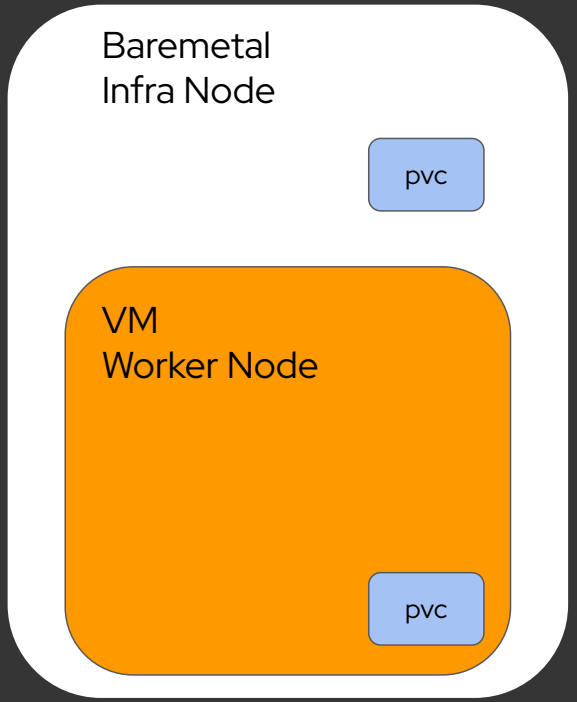

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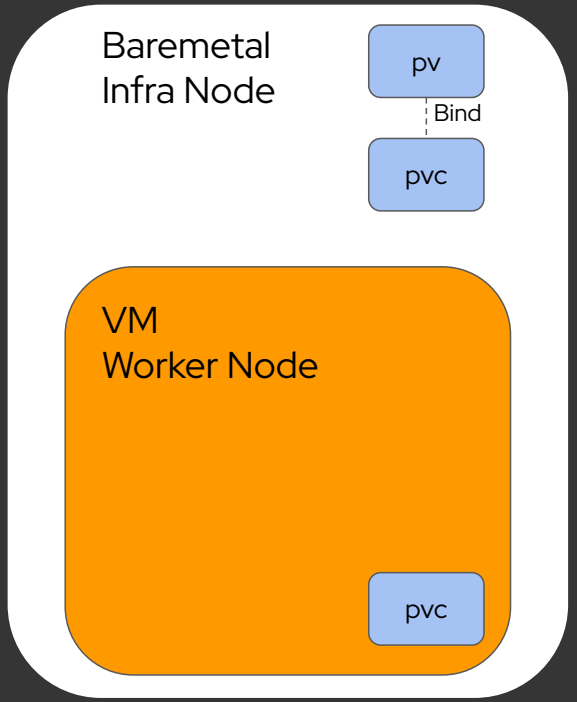

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- Flow example...
  - User within guest cluster creates a PVC
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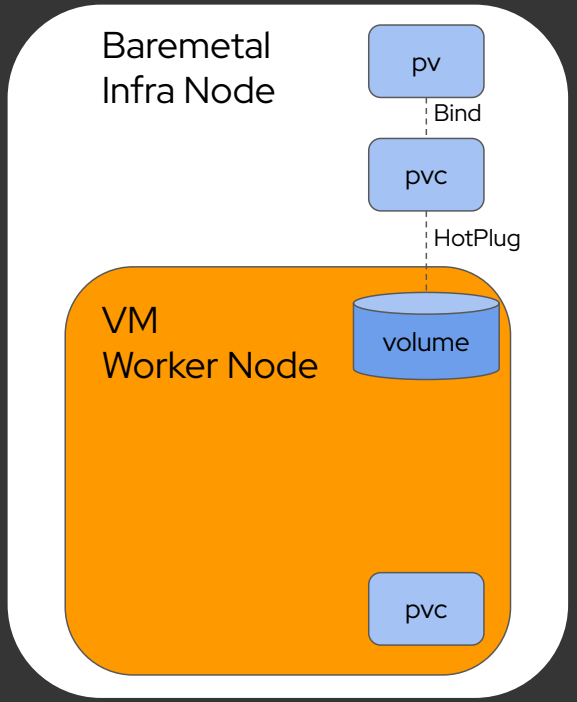
  - Infra cluster's dynamic storage provisioner creates the PV and binds it to PVC

KubeVirt CSI Driver



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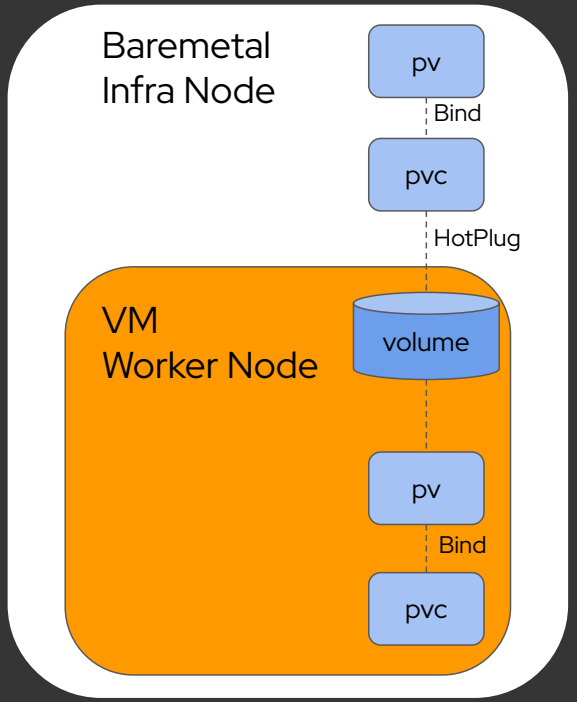
  - KubeVirt CSI HotPlugs the PVC to the VM

KubeVirt CSI Driver



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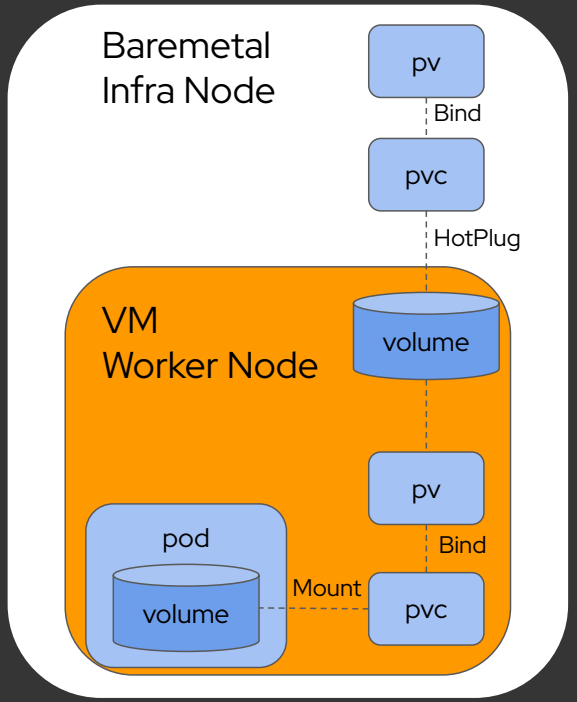
KubeVirt CSI Driver



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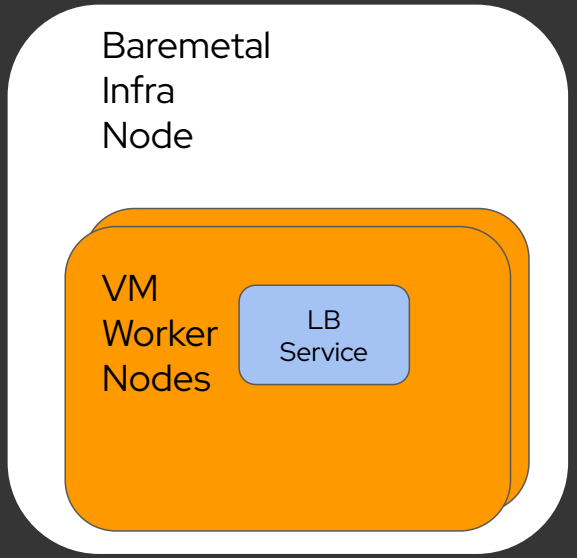
  - Volume becomes a PV and is bound to PVC within Guest Cluster
  - Guest PVC is attached to a pod workload

Cloud Provider KubeVirt

- Provides Load Balancer support to KubeVirt guest clusters
- Similar to KubeVirt CSI in that it is mirroring infra capabilities to guest clusters.
- Flow example...

Cloud Provider KubeVirt



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  - User within guest cluster creates a LoadBalancer service

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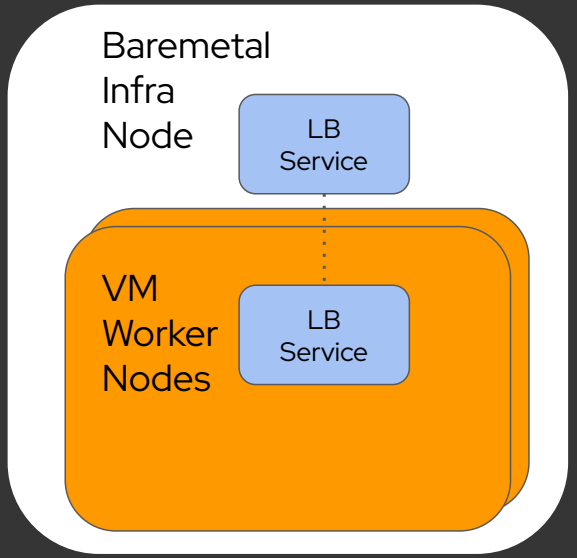

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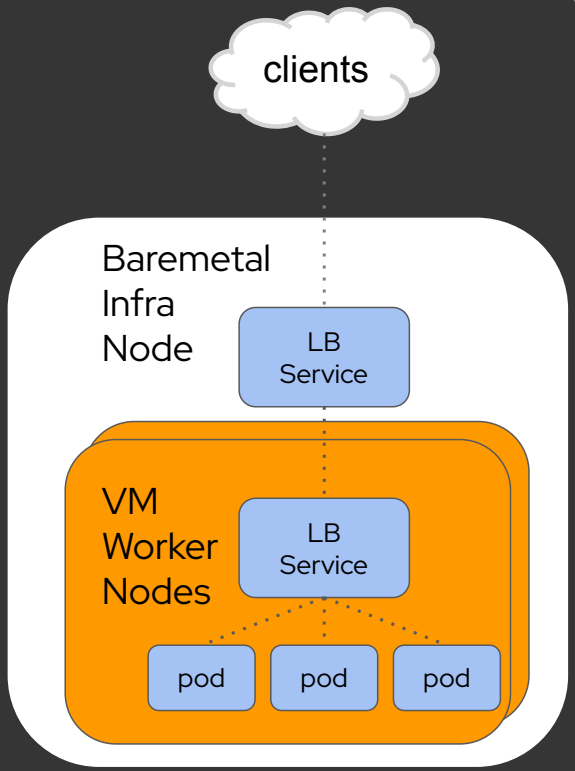

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  - Infa LB maps to guest cluster VM pods to pass traffic to guest cluster LB

Demo