Red Hat OpenShift

What's new in OpenShift (4.12)

Red Hat

About me

Robert Bohne works as a **Principal Specialist Solution Architect** at Red Hat and a Subject-Matter Expert for **OpenShift** Container Platform. With over **10 years** of **middleware operating experience** from **automation** to **monitoring** and **more than 5 years of container** know-how, Robert primarily supports large German customers with their OpenShift adoption; starting with the introduction, **24x7 operations** up to the **migration** and **modernization** of complex **applications**.

Twitter
@RobertBohne

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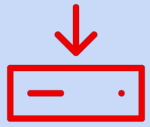
Red Hat

OpenShift 4.12

OPERATIONAL

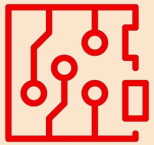


Hosted Control Planes

Agent-based Installer

24 month lifecycle for EUS

CORE



OVN is default
Network Observability
LVM Storage
Dynamic Plugins for Console
Kubernetes 1.25

SECURITY

ACS as a service

Security Profile Operator

EDGE

Red Hat Device Edge

AWS Local Zones, Outposts

Deploy and manage 3500 SNOs with RHACM

Red Hat

OpenShift 4.12

OPERATIONAL

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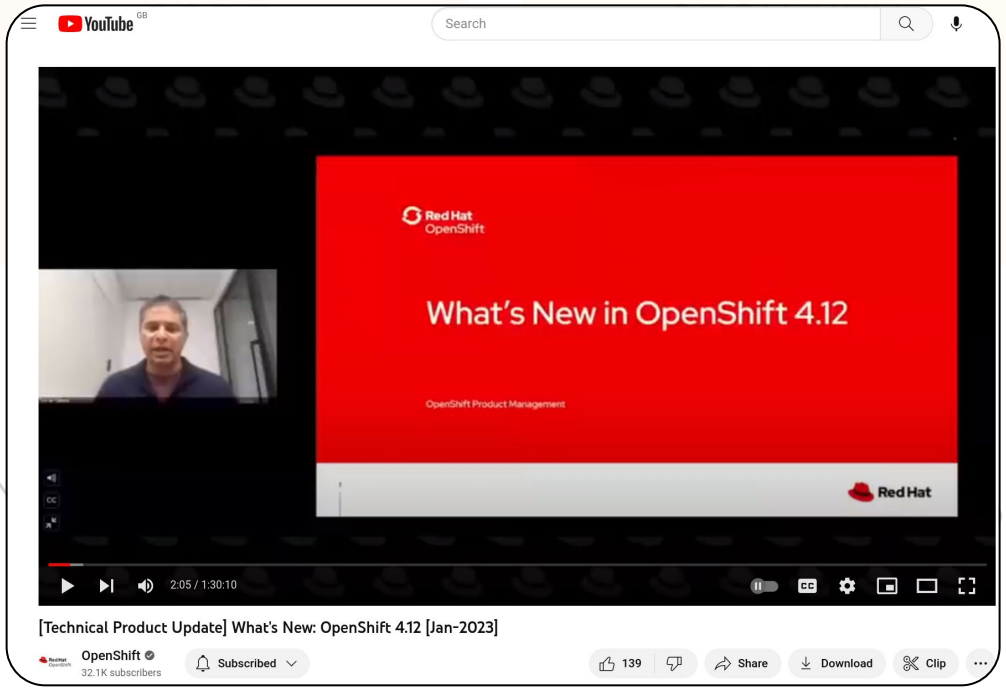


https://www.youtube.com/watch?v=IUpjgasPW5Y

Kubernetes 1.25

EDGE

Red Hat Device Edge

AWS Local Zones, Outposts

Deploy and manage 3500 SNOs with RHACM

Red Hat

Kubernetes 1.25

Major Themes and Features

- **ALPHA** support for user namespaces
- Checkpoints for forensic analysis
- Retriable and non-retriable Pod failures for Jobs
- Server Side Unknown Field Validation (beta)
- KMS v2 alpha1 API to add performance, rotation, and observability improvements
- CRD validation expression language (beta)
- DaemonSet Upgrade Without Downtime
- Improved Windows support

Significant list of other graduations to stable:

- Pod security admission
- Ephemeral containers
- Local Ephemeral Storage Capacity Isolation
- Core CSI migration
- CSI migration for AWS and GCE
- CSI ephemeral volume
- cgroup v2
- endPort in Network Policy
- And more...!

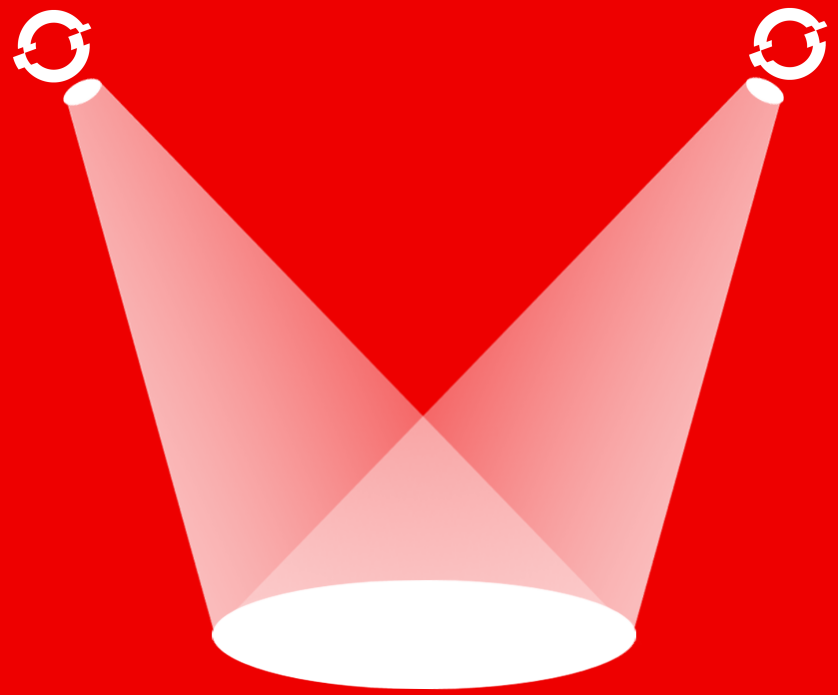
CRI-O 1.25  Kubernetes 1.25  OpenShift 4.12 

Release Announcement: https://kubernetes.io/blog/2022/08/23/kubernetes-v1-25-release/

OpenShift 4.12+ Lifecycle Changes

- **What:** An additional 6 month of Extended Update Support (EUS) phase on **even numbered** OpenShift (OKE, OCP, OPP) releases and a subset of layered operators
- **Who:** Those with **Premium subscriptions**, [or Standard subscriptions + an **add-on SKU**]
- **When:** Starting with **OpenShift 4.12** and applying to subsequent even numbered releases of OpenShift.
- **Why:**
  - Support customers and partners struggling to maintain pace with 4.y cadence
  - Align approach and offering rules of OCP EUS to RHEL's program rules
- **Note:**
  - EUS to EUS upgrades continue the same behaviour.
  - Layered operators/operands and products will continue to have their own lifecycle. Layered operator lifecycles are available on the OpenShift lifecycle page.

OpenShift 4.12 Spotlight Features



Red Hat

Introducing Red Hat Device Edge

Adding kubernetes to small form factor, field deployed edge devices

What's the news?

We are productizing MicroShift, bundled with Red Hat Enterprise Linux for Edge

What will be available?

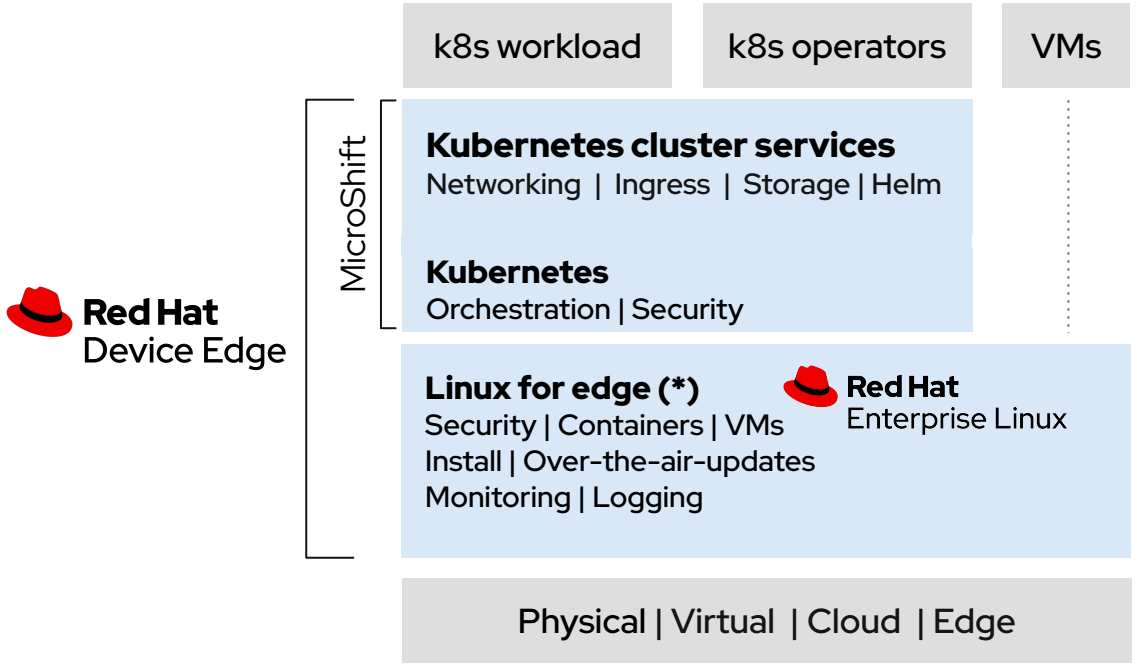
A new product **Red Hat Device Edge** that contains support for MicroShift, a low footprint k8s distribution derived from OpenShift

Why are we doing this?

To address the market demand for a consistent platform even on the smallest devices

Developer Preview with V4.12

Red Hat Device Edge Technical Overview



See the announcement for more details

* recommended for edge deployments: Red Hat Enterprise Linux for Edge Images, rpm-ostree, immutable, atomic upgrade, over the air flavour of Red Hat Enterprise Linux.

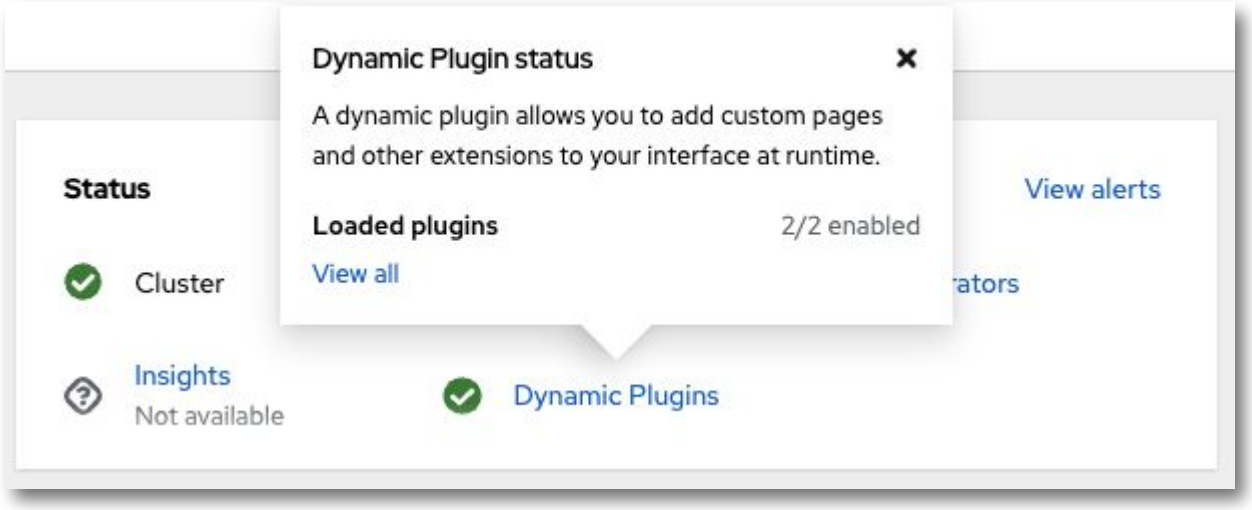
Red Hat

The sky's the limit

OCP Console Dynamic Plugins GA 4.12

Removing limits from Console Customization

- Dynamic Plugins enable partners & customers to build high quality, unique user experiences **natively** in the OCP Console
- Built with React, PatternFly 4, Webpack
- Supports 508 Compliance, Localization



Key features

- Add custom pages
- Add perspectives and update navigation items
- Add tabs and actions to resource pages
- Extend existing pages
- Plus more...

Important Links

- Official Docs
- Template for New Plugins (clone me!)
- Blog: Developing an OpenShift Console Plugin

(FIXME: link to blog post when published)

Red Hat OpenShift Networking's New Default CNI Plug-In: ovn-kubernetes

Based upon Open Virtual Network (OVN), the ovn-kubernetes CNI is now the default out-of-the-box networking plugin for new 4.12+ installations across all supported platforms[1] and topologies.

Supported since 4.6, it is already the default for some deployments:

- Hybrid Windows-Linux clusters
- Single Node OpenShift (SNO)
- Red Hat OpenShift Service on AWS (ROSA)
- Red Hat Device Edge (aka MicroShift)

Feature parity with the previous default CNI, openshift-sdn, but adds a wider array of features, including:

- IPv6 networking
- IPsec encryption for intra-cluster communication
- Hybrid networking
- Kubernetes Network Policy enhancements and logs
- Hardware offload (compatible NICs)

Migrations from openshift-sdn to ovn-kubernetes are supported.

- Live migrations targeting 4.13

What if I'm using the previously-default plug-in?

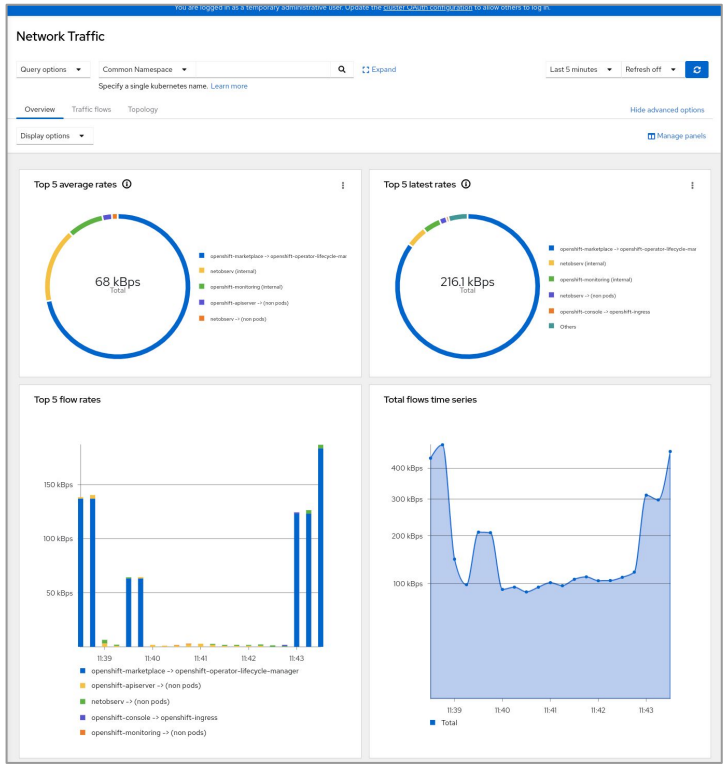
- Existing and future deployments using openshift-sdn will continue to be supported (no currently-planned deprecation)
- openshift-sdn remains the default on OpenShift versions earlier than 4.12
- At 4.12+ openshift-sdn will become a supported install-time **option**
- openshift-sdn remains feature frozen

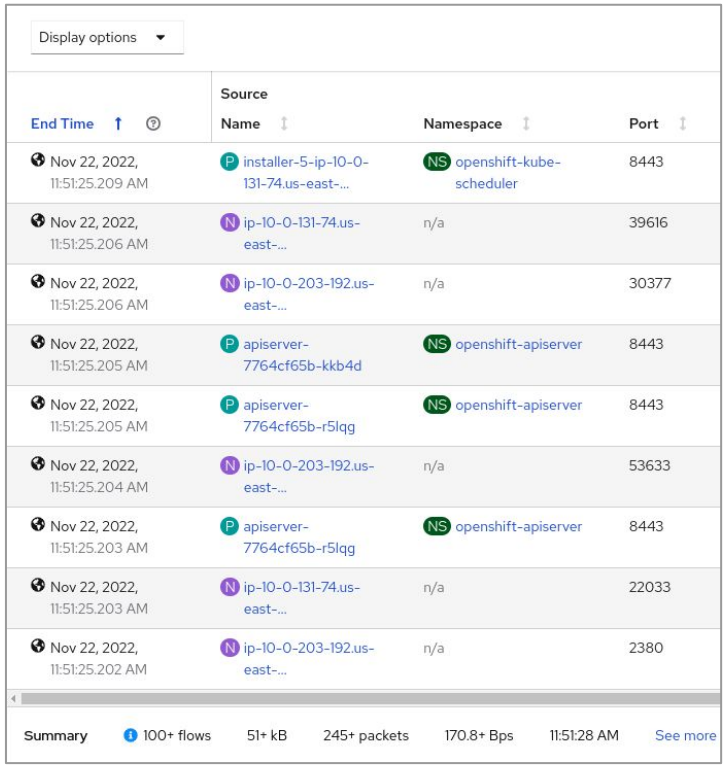
PM: Marc Curry, Deepthi Dharwar

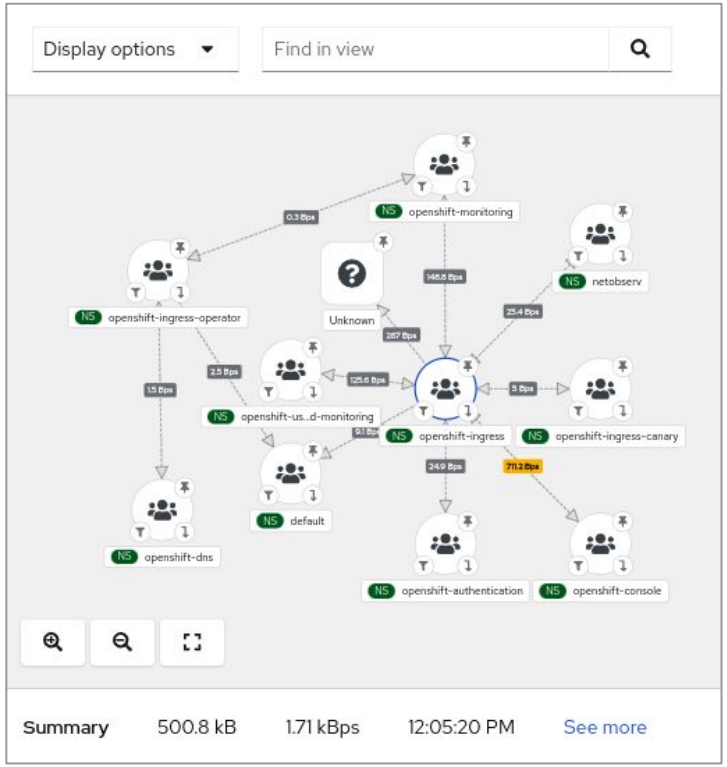
Network Observability

Network Observability GAs at 4.12 for all supported versions of OpenShift at 4.10 or newer

- Integrated with the larger Observability ecosystem, this optional Operator focuses on networking information for a single cluster
- Uses an **eBPF-based** agent on cluster nodes to collect metrics
- Provides observable network traffic metrics, flows, topology and tracing





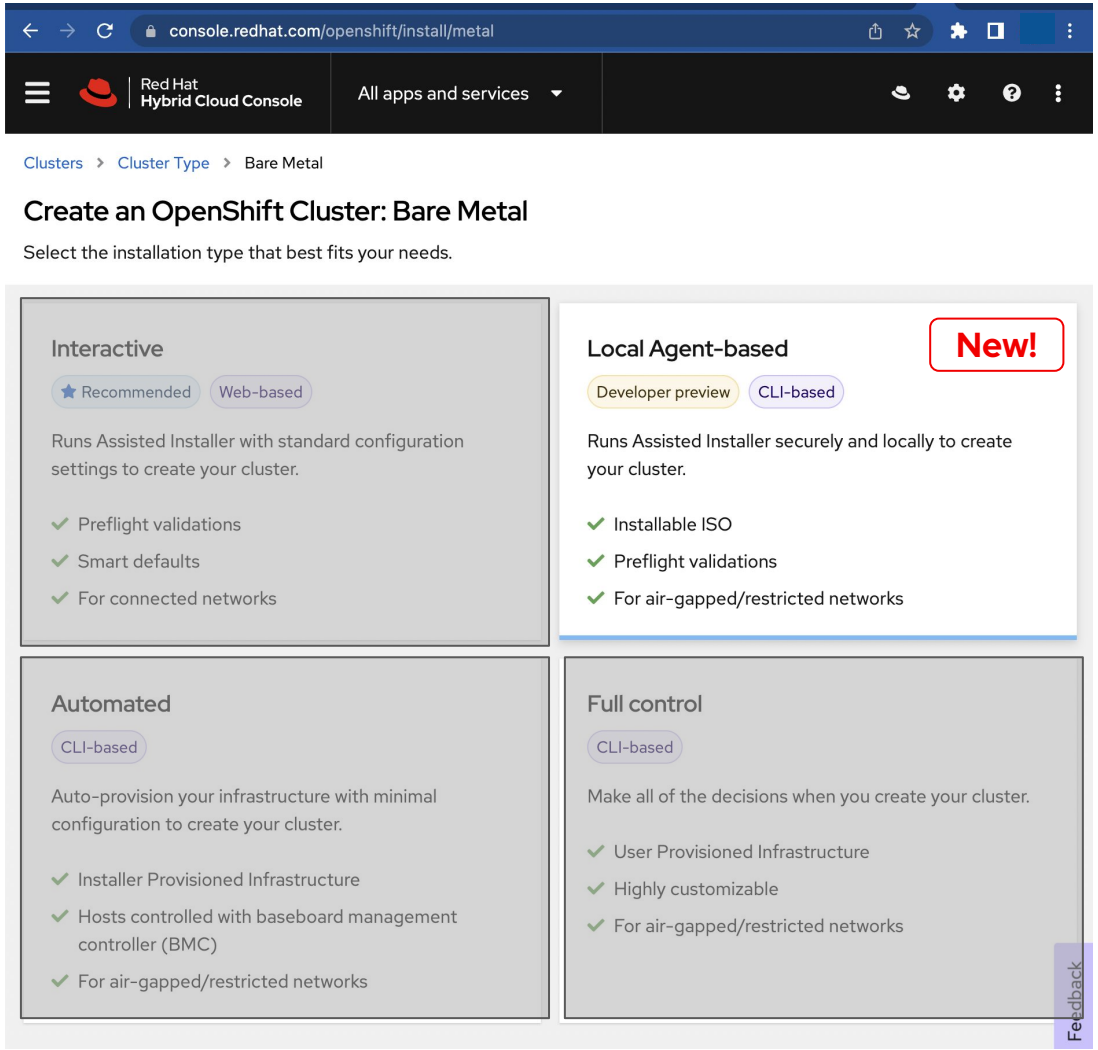


PM: Marc Curry, Deepthi Dharwar

Red Hat

Agent-Based Installer for Disconnected OpenShift Deployments

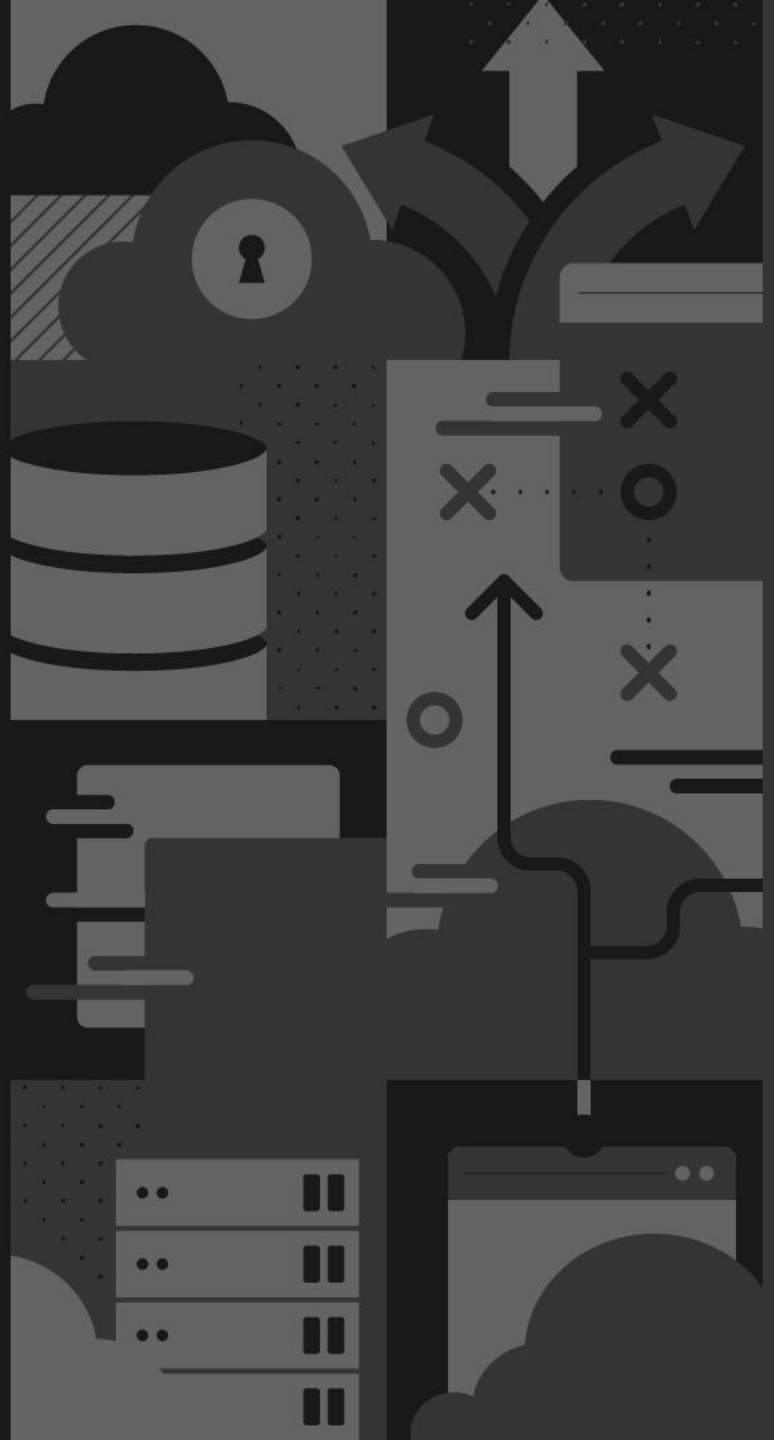
- A bootable image creates first OpenShift cluster
- Integrated in the `openshift-install` binary
- For bare metal, vSphere, and platform agnostic
- Fully disconnected / air-gapped deployments
- Uses mirrored local registry
- In-place bootstrap, no extra node required
- Supports single node OpenShift (SNO)
- Supports compact clusters (schedulable masters)
- Allows user-provided automation tooling
- Uses Assisted Service (Assisted Installer engine)



Product Manager: Ramon Acedo Rodriguez

Generally Available

Red Hat

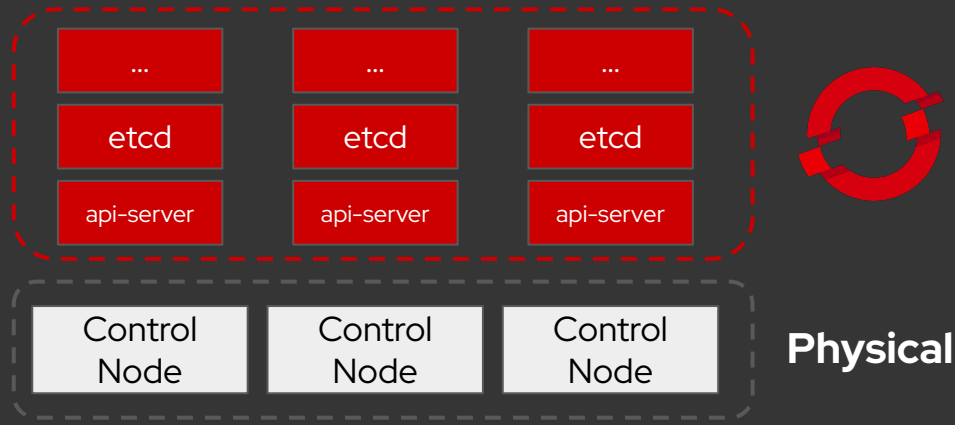


Hosted Control Plane

Red Hat

Standalone OpenShift

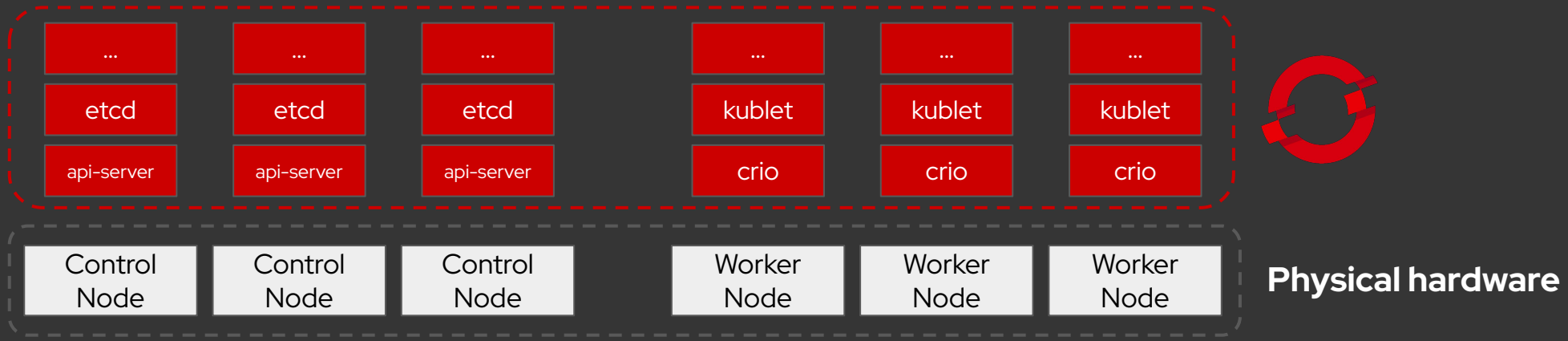
- Control Plane hosted across 3 machines



Red Hat

Standalone OpenShift

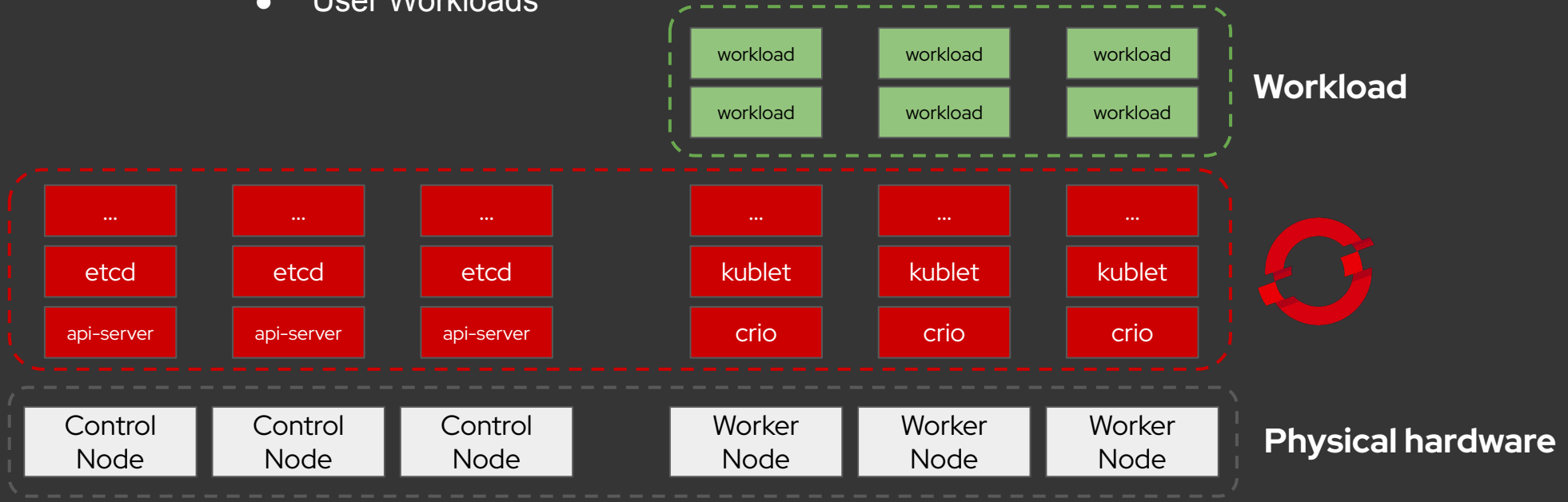
- Control Plane hosted across 3 machines
- Worker Nodes



Red Hat

Standalone OpenShift

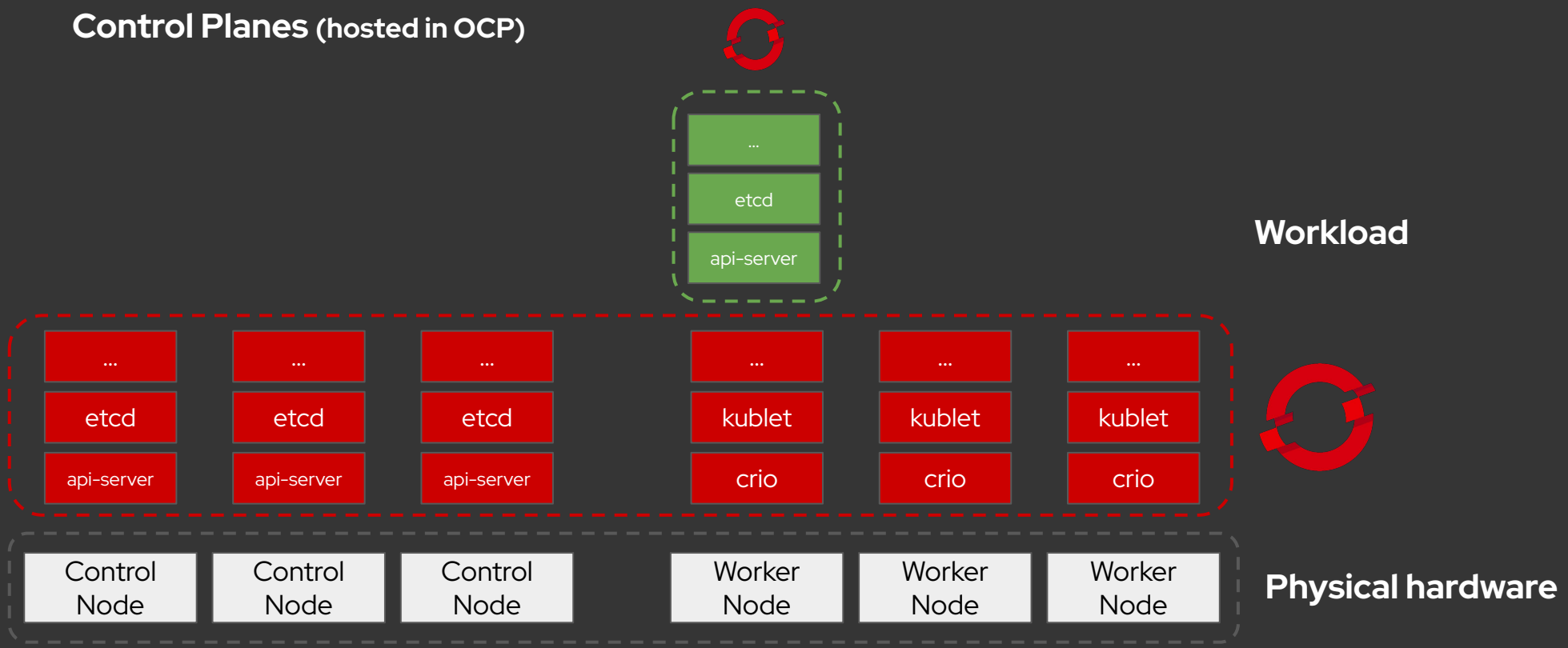
- Control Plane hosted across 3 machines
- Worker Nodes
- User Workloads



Red Hat

Standalone OpenShift + Hosted Control Plane

“Containerized”
Control Planes (hosted in OCP)



Red Hat

Standalone OpenShift + Hosted Control Plane

“Containerized”
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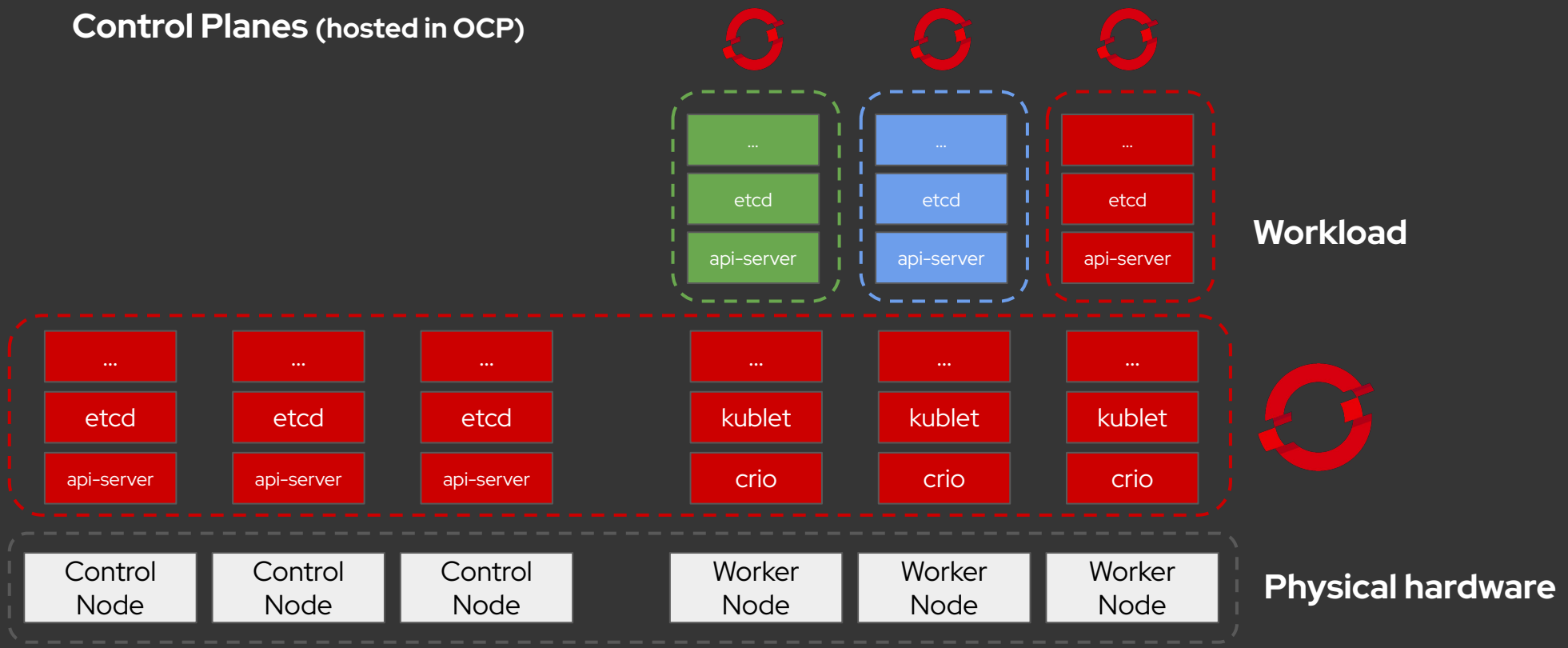

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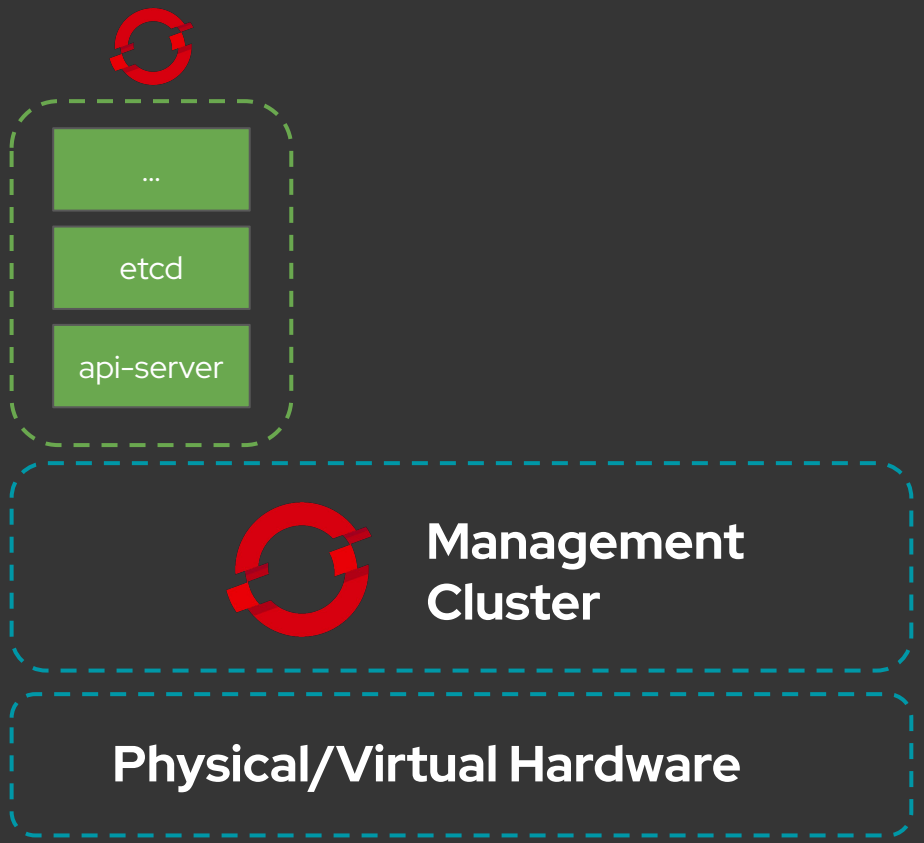
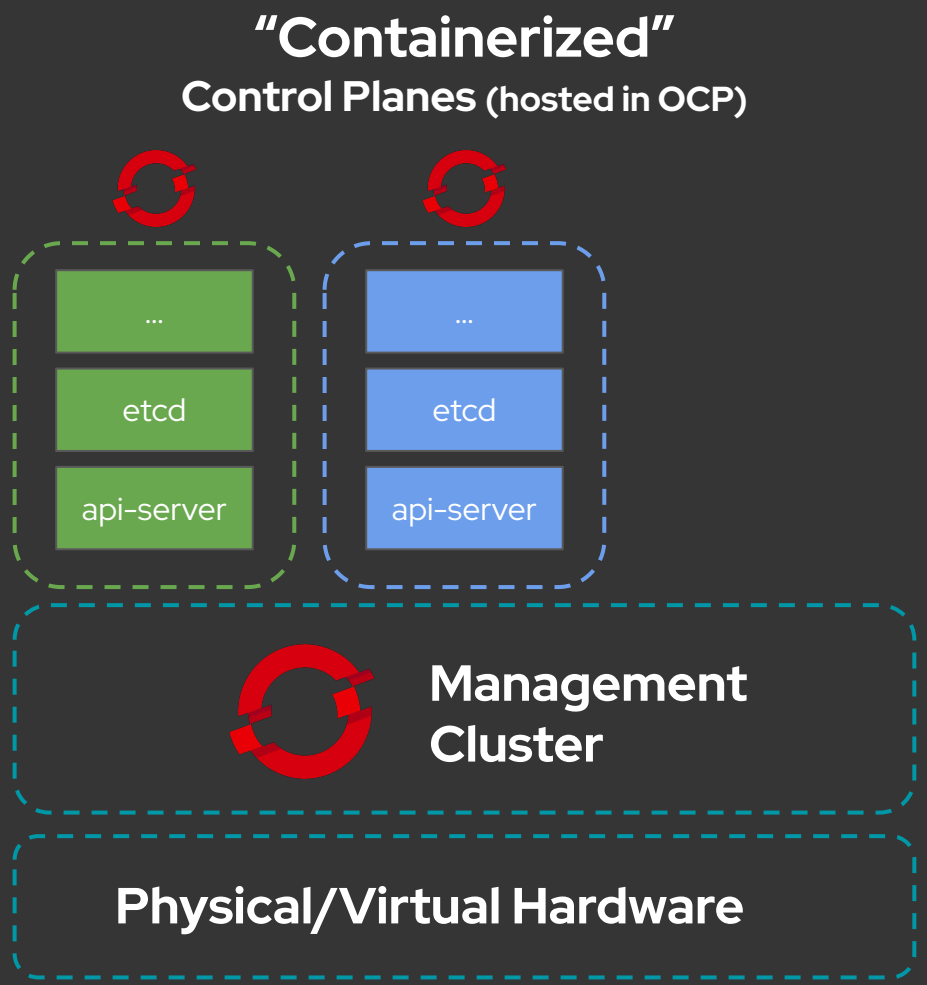
Hosted Control Plane

“Containerized”
Control Planes (hosted in OCP)



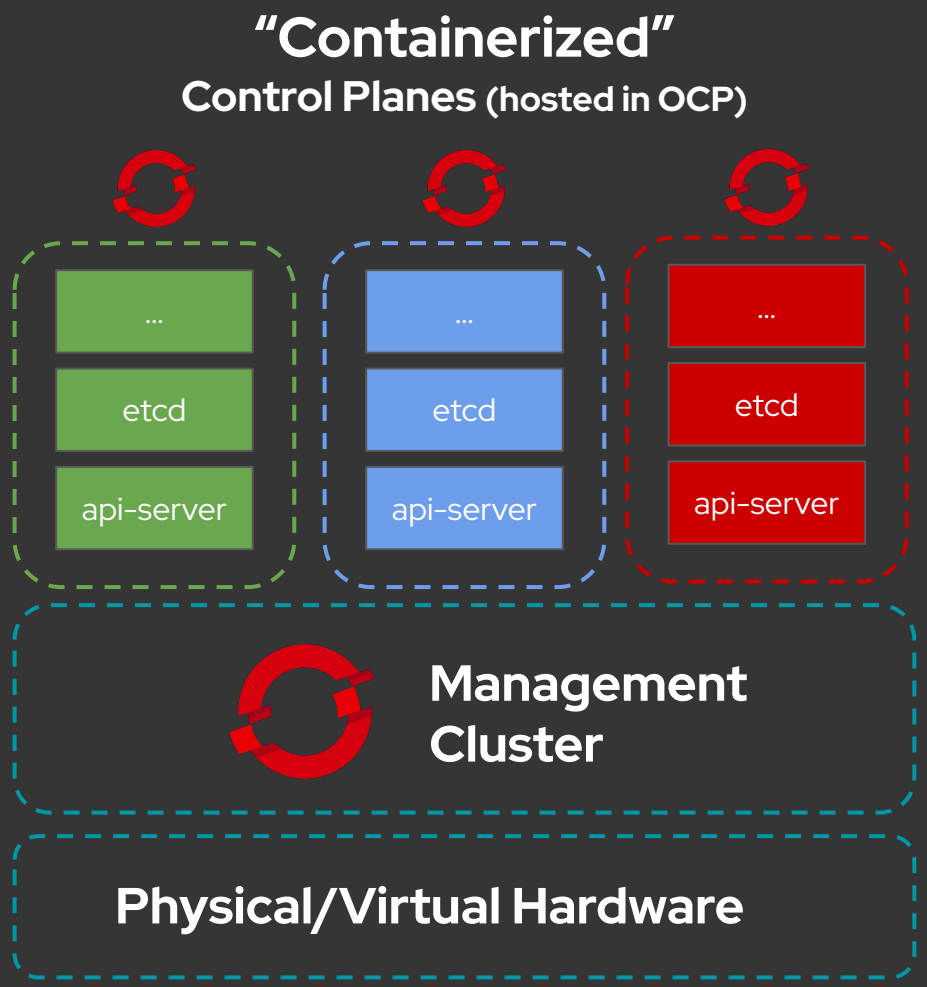
Red Hat

Hosted Control Planes (HCP)



Red Hat

Hosted Control Planes (HCP)



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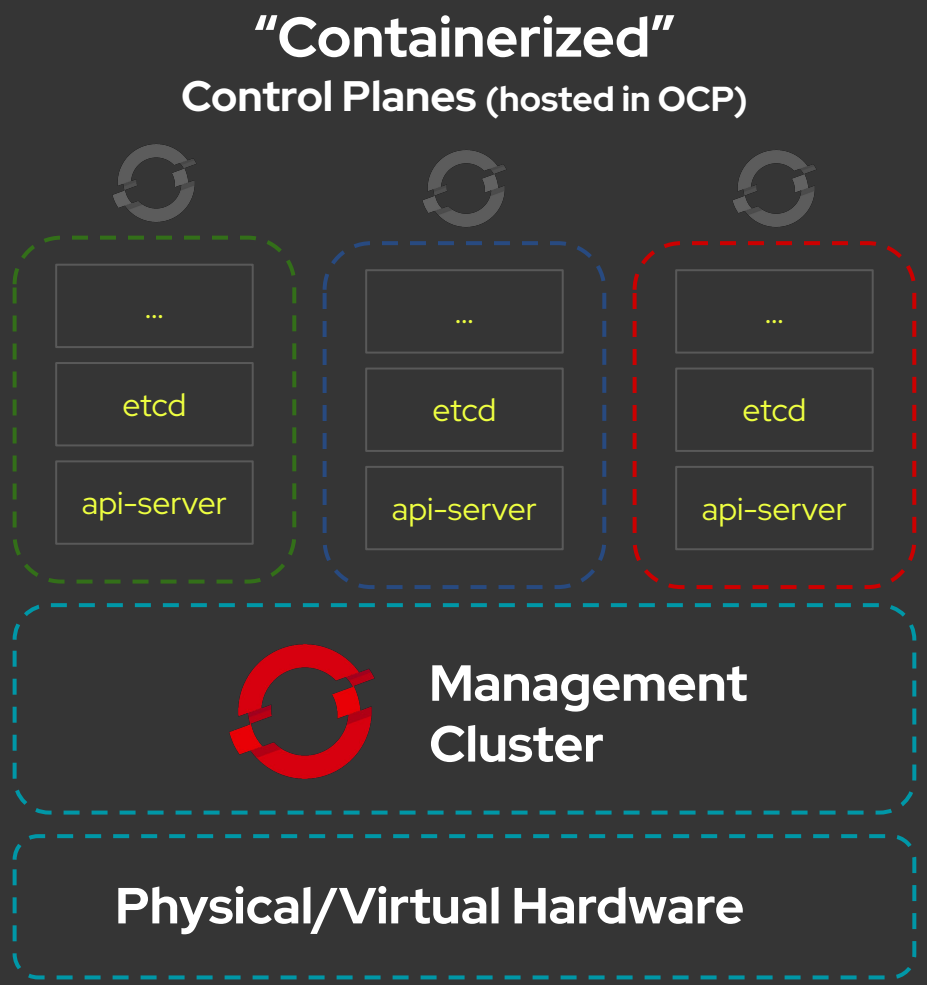
Worker nodes?



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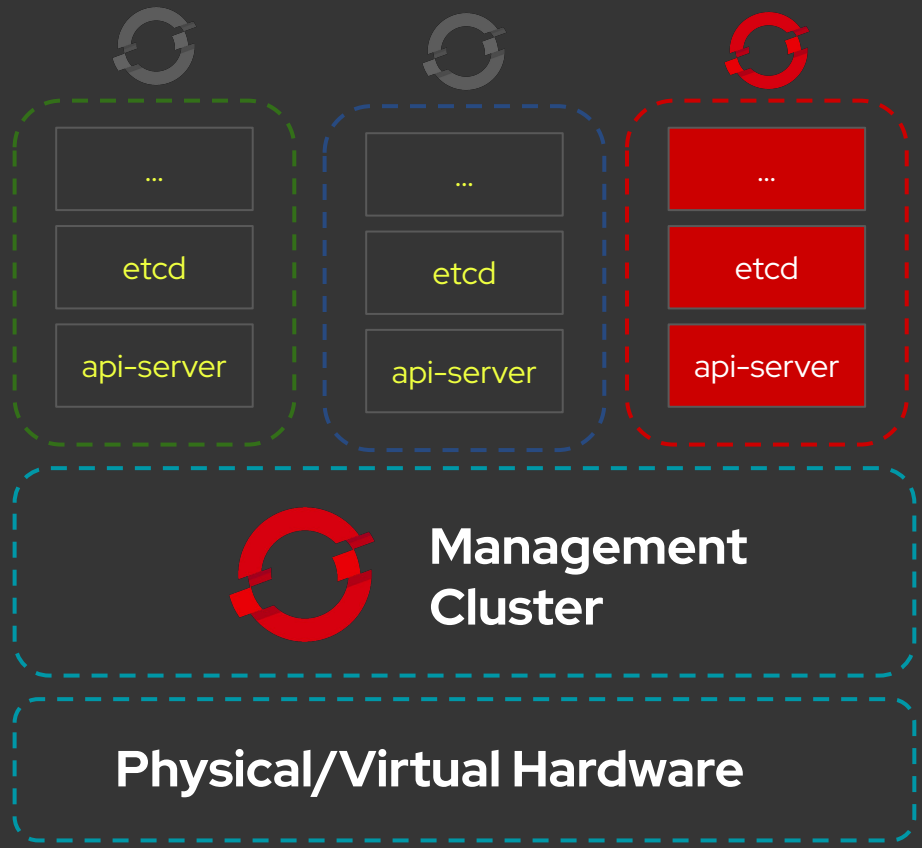
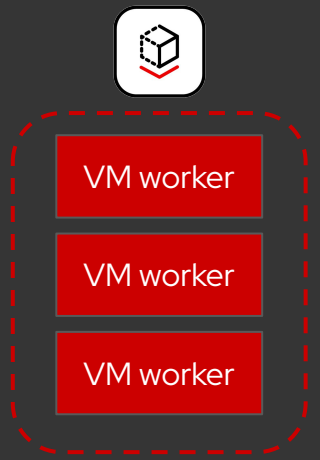
NodePool Assignment

“Containerized”
Control Planes (hosted in OCP)



“External”
Worker Nodes (hosted somewhere...)



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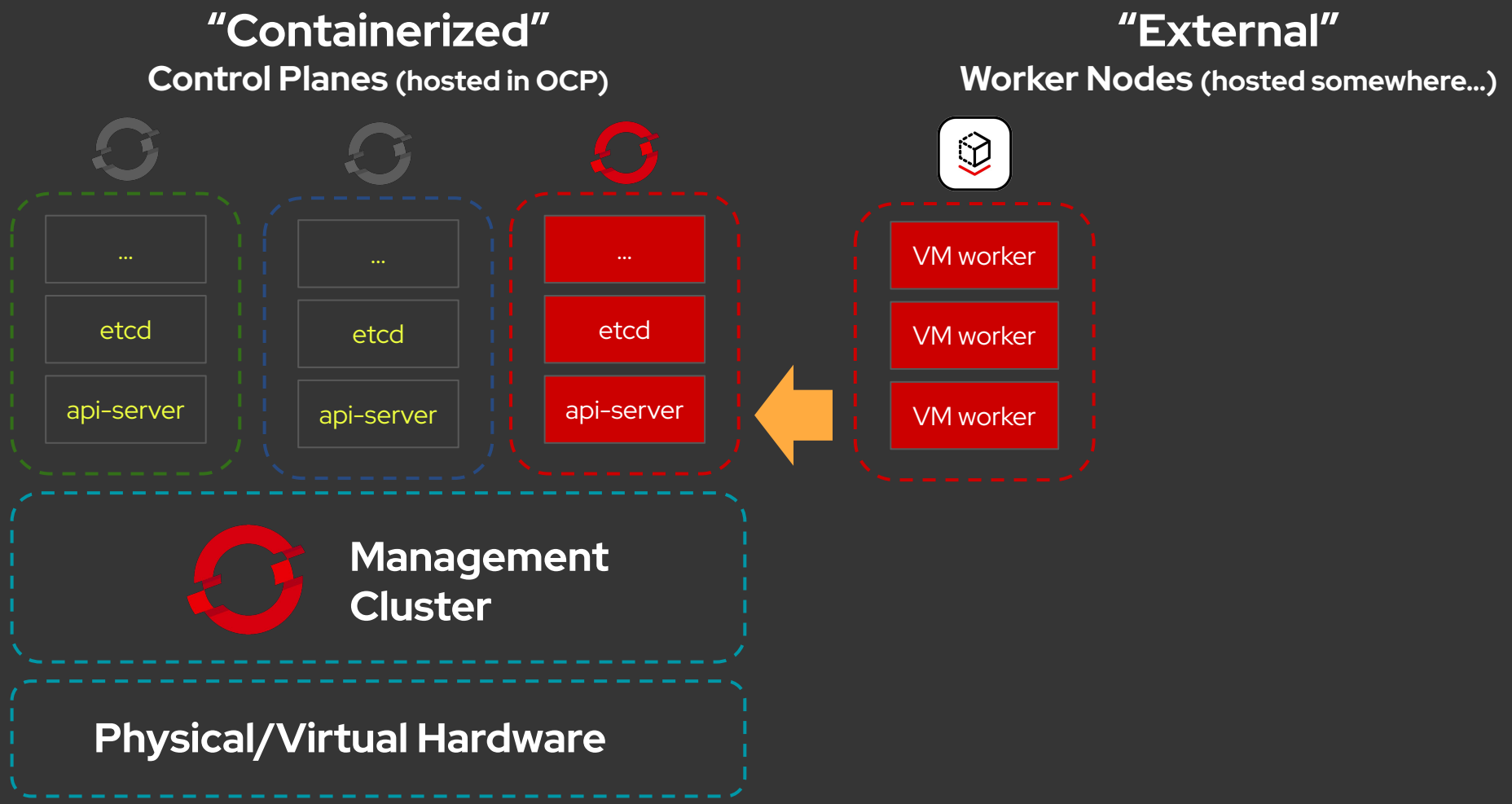
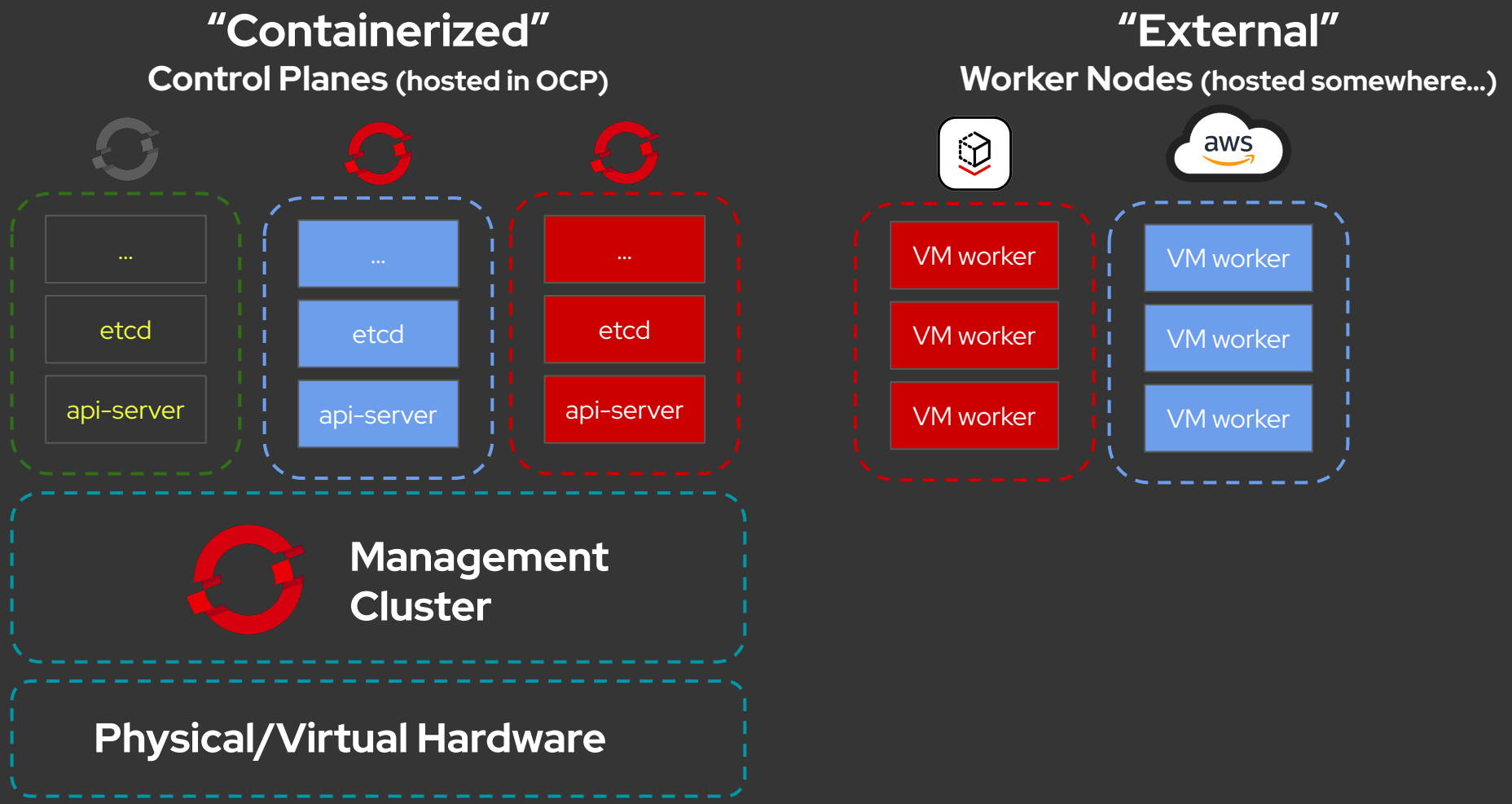
Nodes Register with HCP



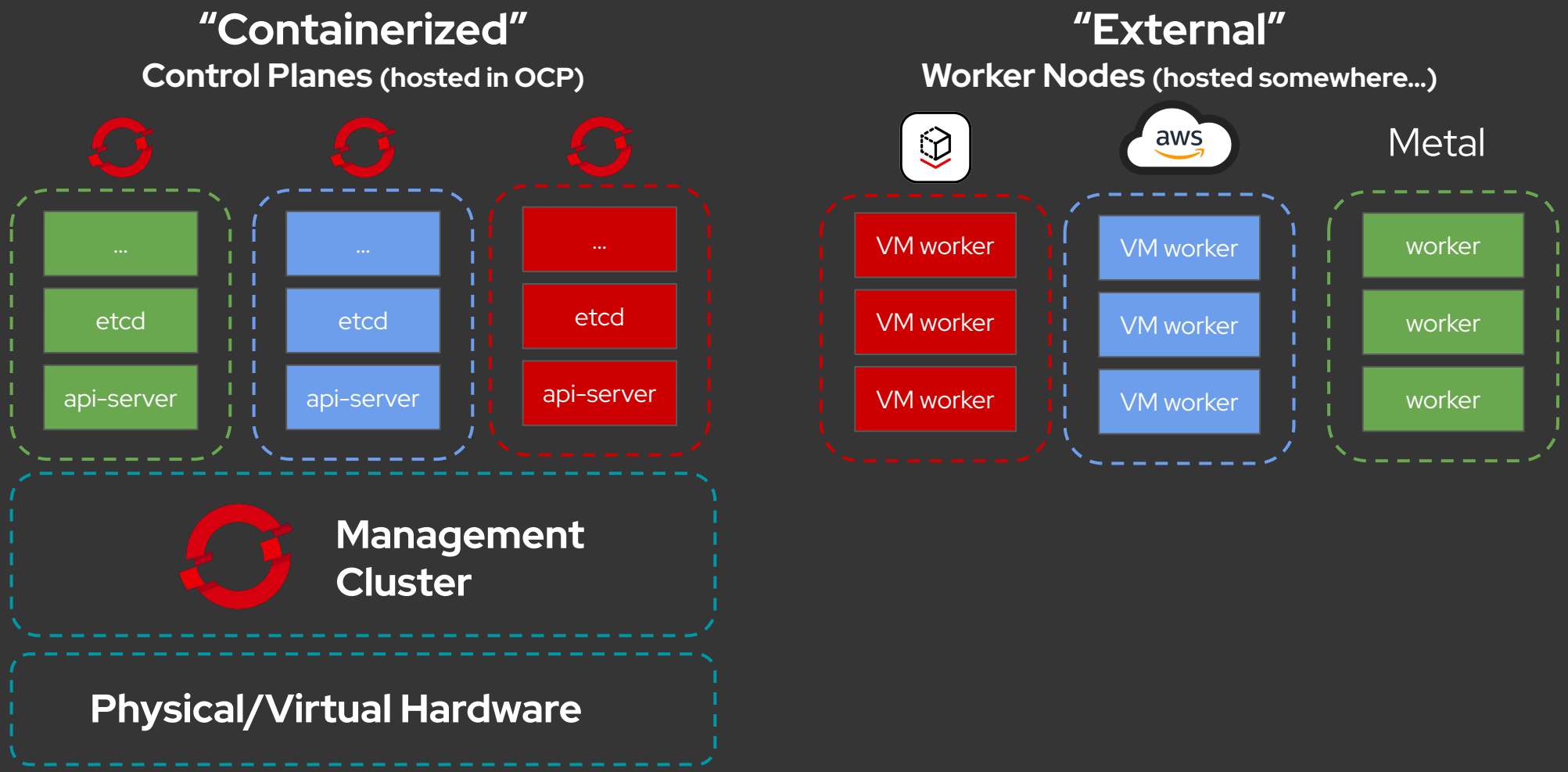
Red Hat

Hosted Control Plane



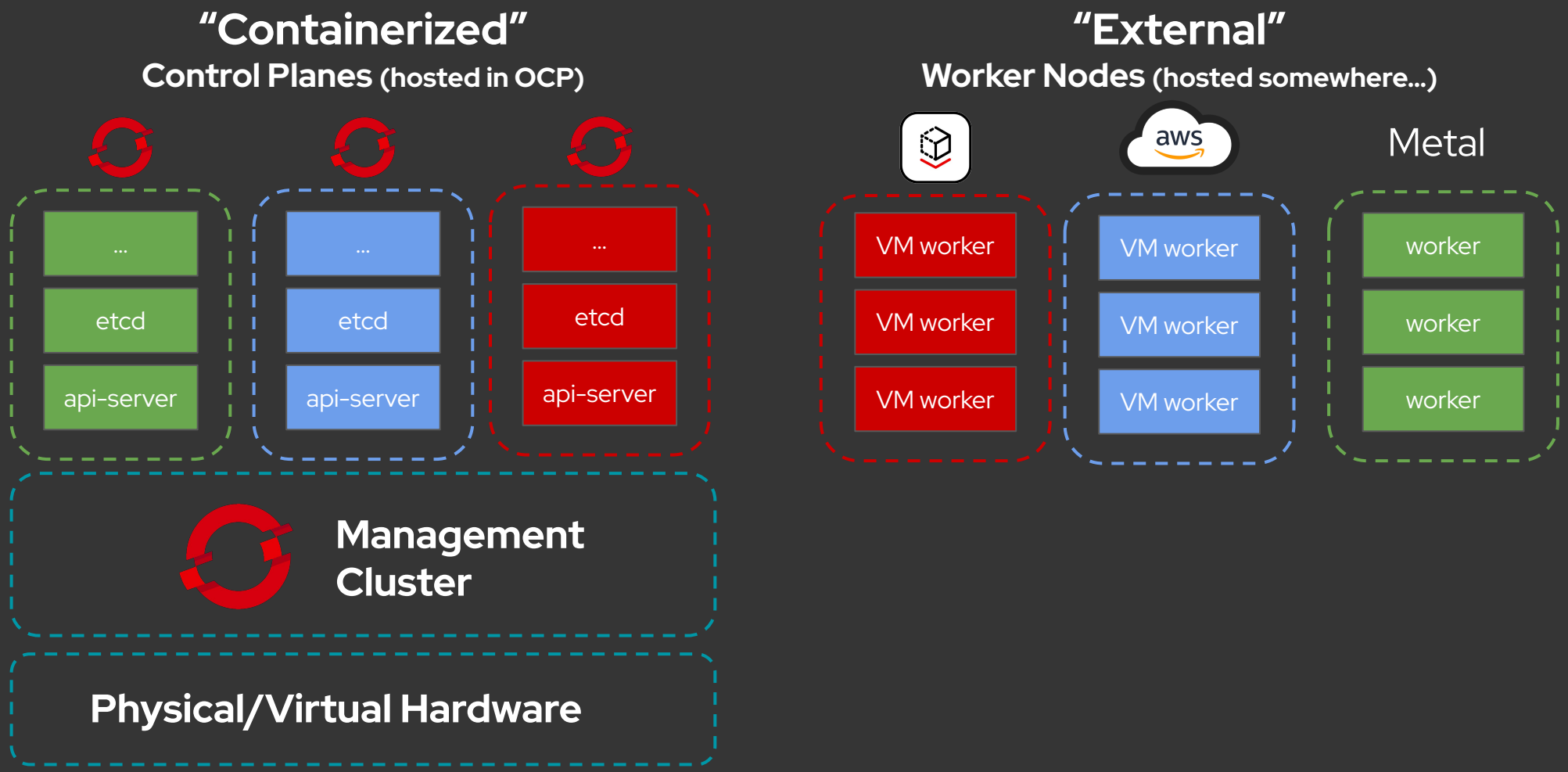
Red Hat

Hosted Control Plane



Red Hat

Hosted Control Plane



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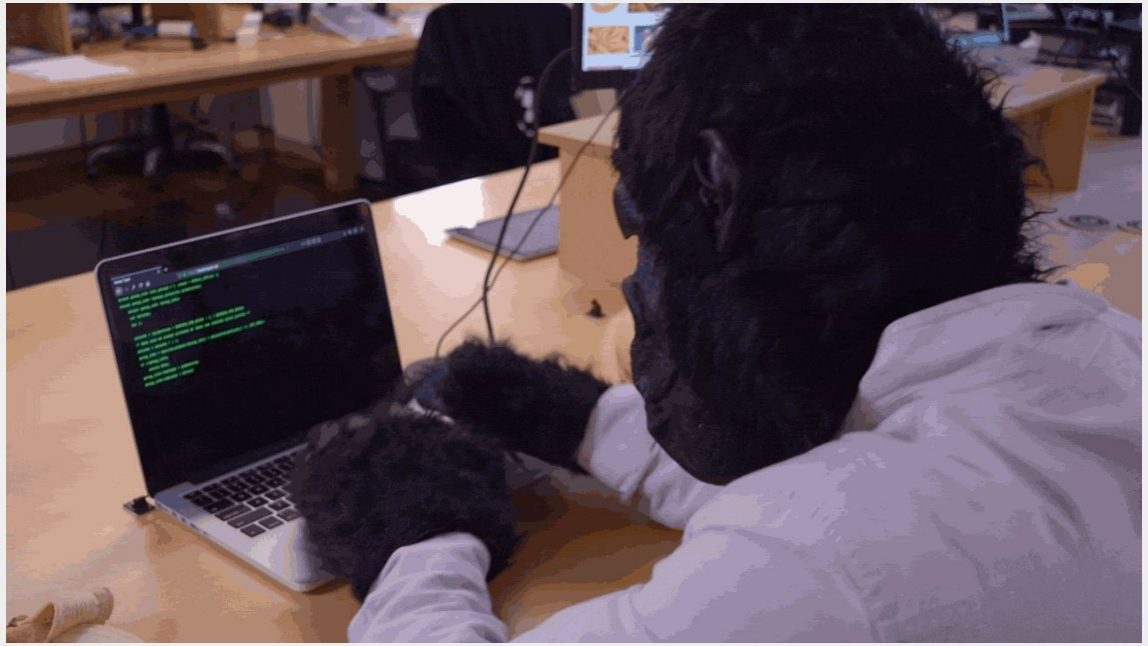
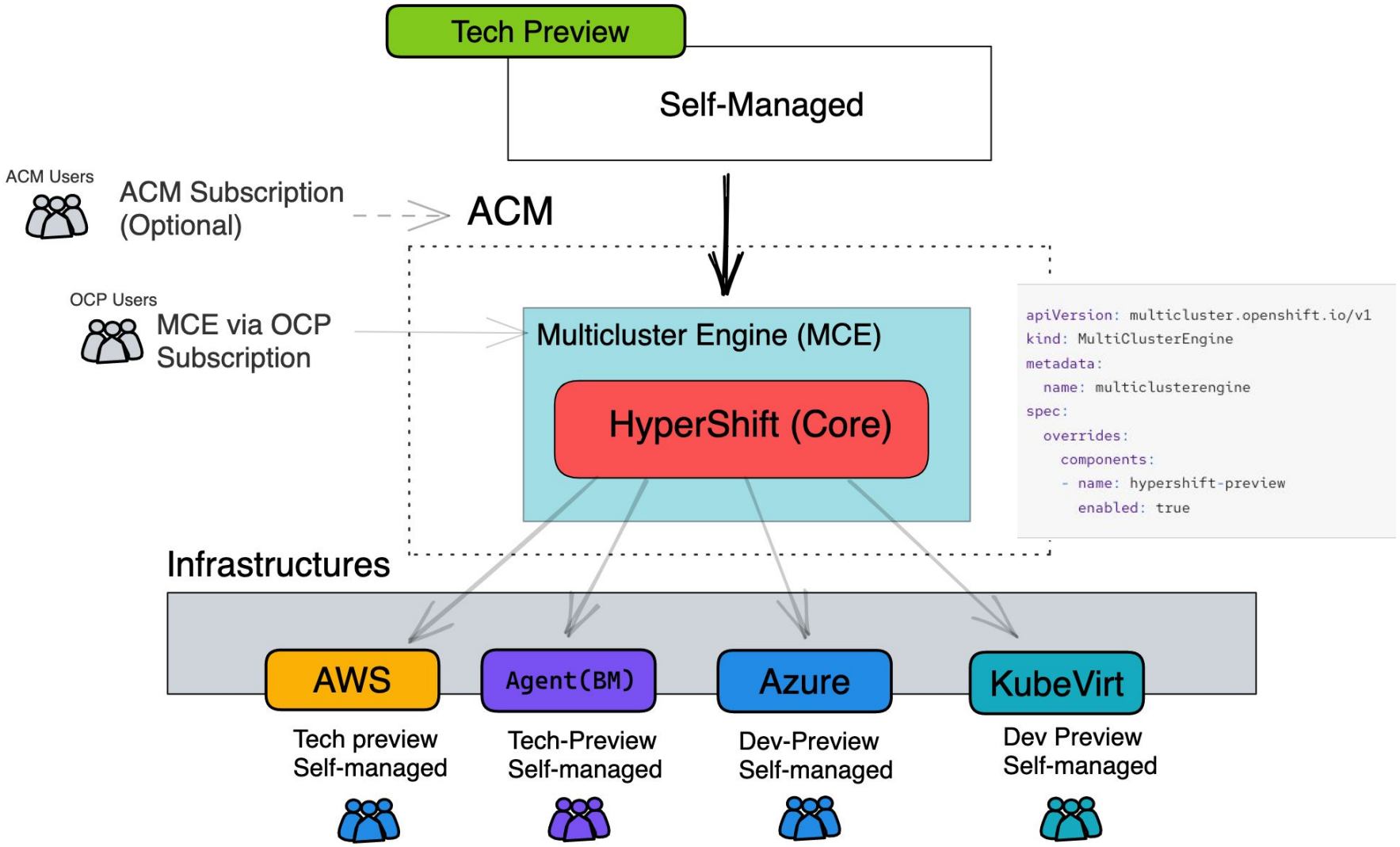
Demo



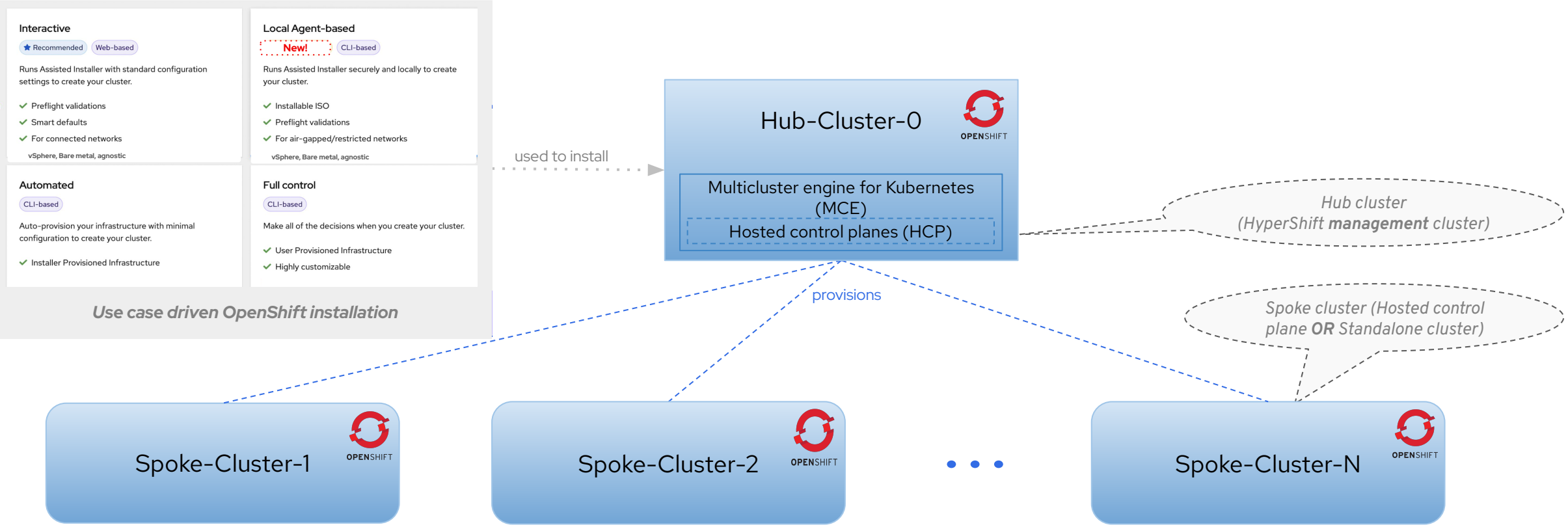
Red Hat

Hosted Control Planes (Tech Preview)



PM: Adel Zaalouk

The Big Picture



- Create an OpenShift cluster using ***Interactive | Automated | Full-control | local-agent (new)***
- **Turn into a hub cluster** with Multicluster engine for Kubernetes (MCE)
- **Create a spoke cluster** – OpenShift spoke clusters are either **standalone or hosted clusters (HyperShift)**
- Optionally, manage the fleet of clusters and **enforce policies at scale** with Red Hat Advanced Cluster Management

Red Hat

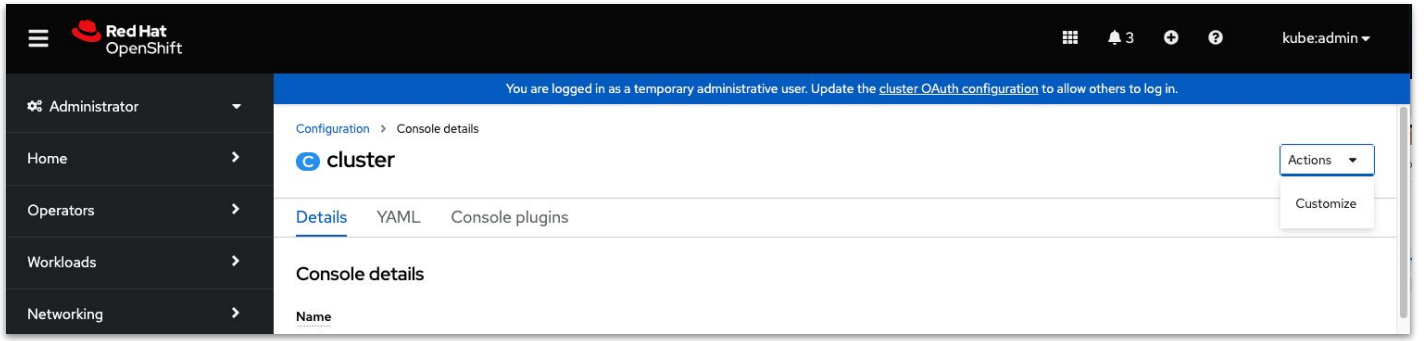
Product Manager(s): Marcos Entenza (AWS*, Azure*, Ramon Acedo (BM, VMware), Peter Lauterbach (OpenShift Virtualization), Adel Zaalouk (Hosted Control Planes)

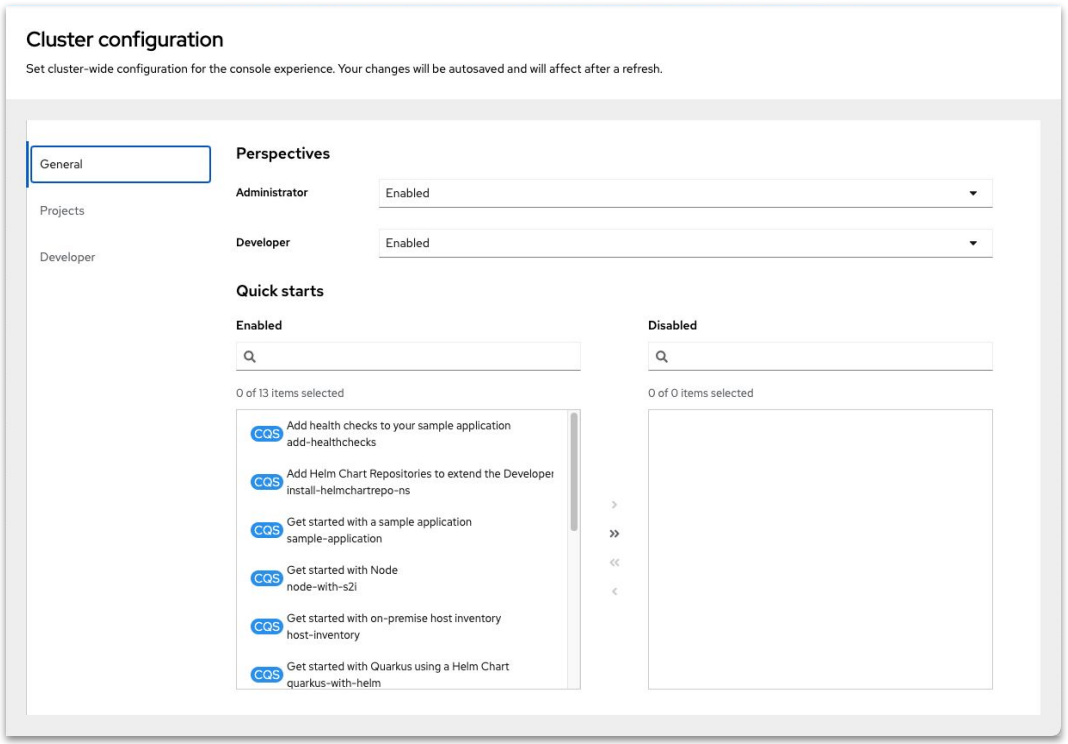
Console

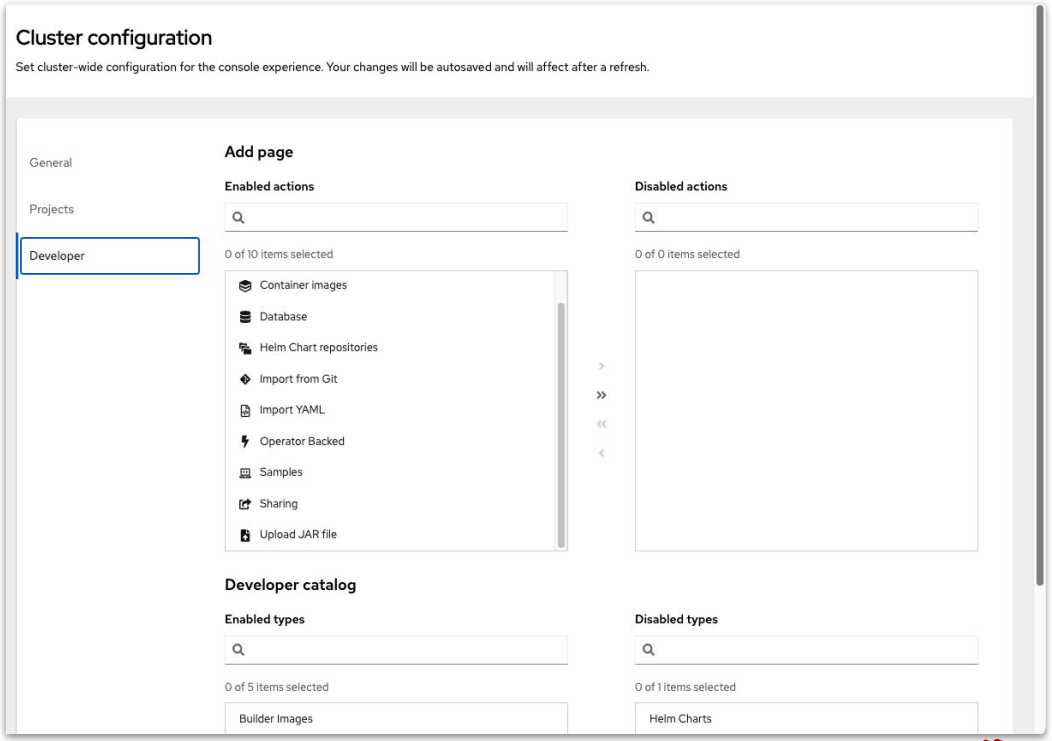
Console Configuration

Form based methods to configuring the console

- Easily hide a Perspective!
  - Developer Catalog content
  - Features on the Add page for devs
  - Quick Starts!
- Configure the list of ClusterRoles roles shown in Project Access in the developer console







Red Hat

Developer Experience

Developer Sandbox

✅ Will be upgraded to 4.12 in Feb

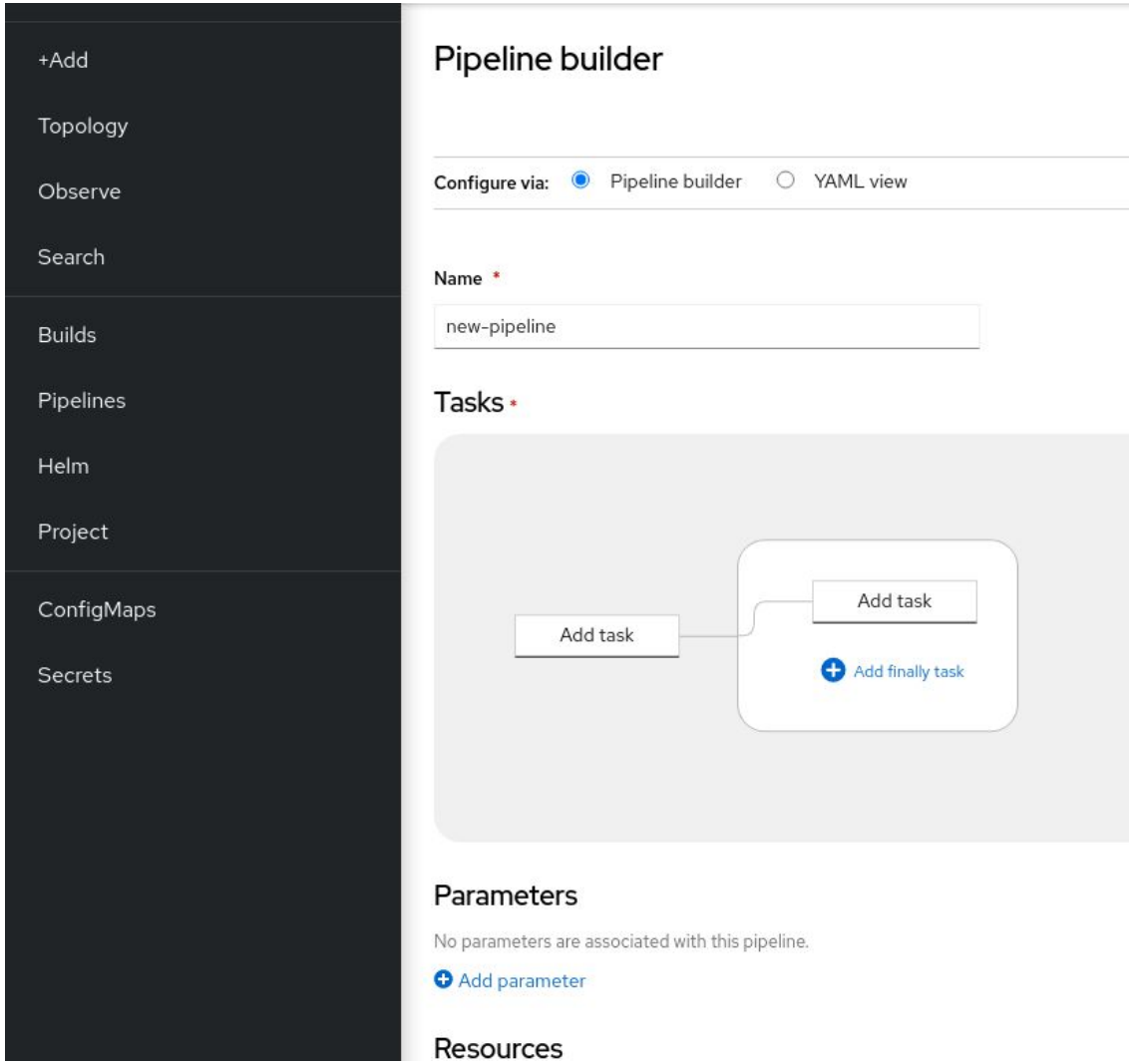
Operators recently added

- Pipelines
- Updated RHODA with AWS Controller for Kubernetes - RDS

Key deliverables

- Add proxy for IDE integration
- Added 3rd Cluster

https://developers.redhat.com/developer-sandbox



Red Hat

Podman Desktop

Containers and Kubernetes for Application Developers

Podman and Kubernetes/OpenShift Local

- Install and run anywhere: Windows, Mac and Linux
- Keep it up-to-date

Containers and Pods

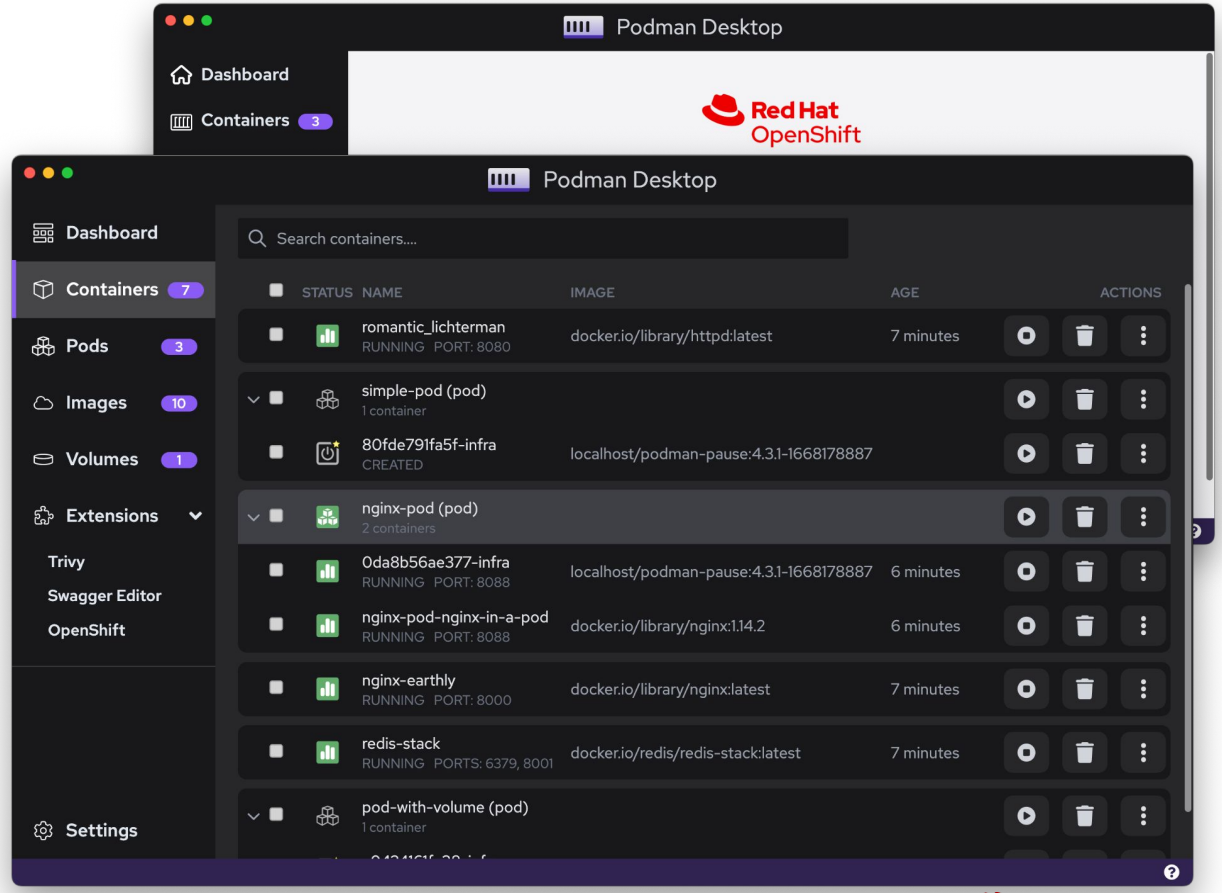
- Build, run, manage and debug Containers and Pods
- Run Pods with or without Kubernetes
- Podifying capabilities
- Manage multiple container Engines

Enterprise Readiness

- VPN and Proxies configuration
- Image registry management

Bridge between local and remote

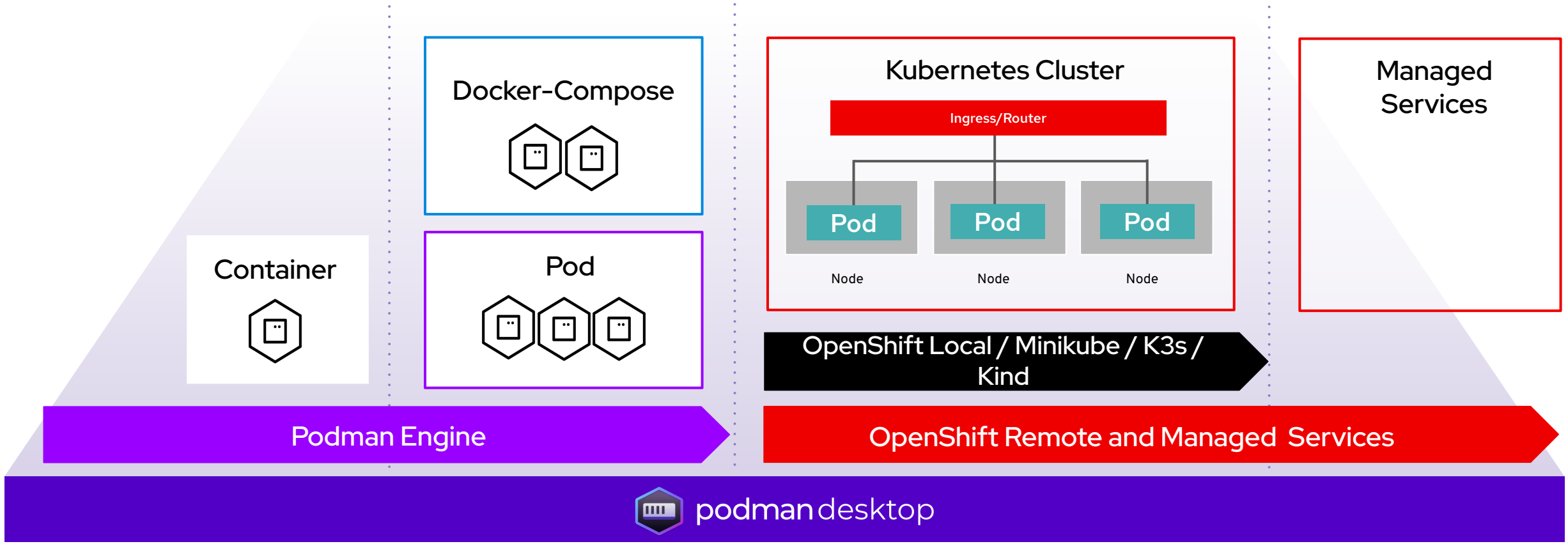
- Connect and deploy to remote OpenShift clusters
- Enable remote managed services locally



Red Hat

Podman Desktop covers the full spectrum

Offering a smooth transition from containers to pods and to Kubernetes

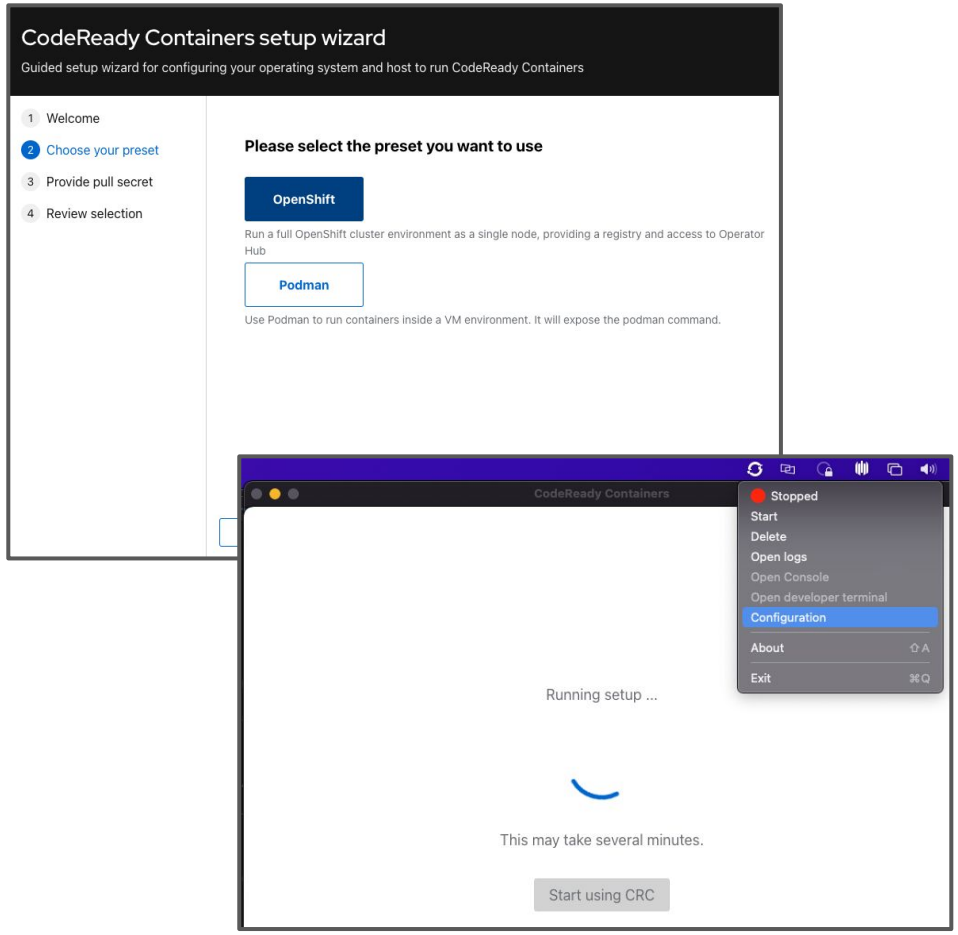


Red Hat

OpenShift Local (formerly CodeReady Containers)

- **Renamed OpenShift Local (no longer CodeReady Containers)**
- **Smaller download** - bundle will be downloaded as part of the setup process.
- **4 different presets are provided**
  - **OpenShift** based on OCP with the latest 4.12 bits
  - **OpenShift** based on OKD with the latest upstream bits
  - **podman** with 4.2.x
  - Experimental microshift

- Support M1 for all presets.

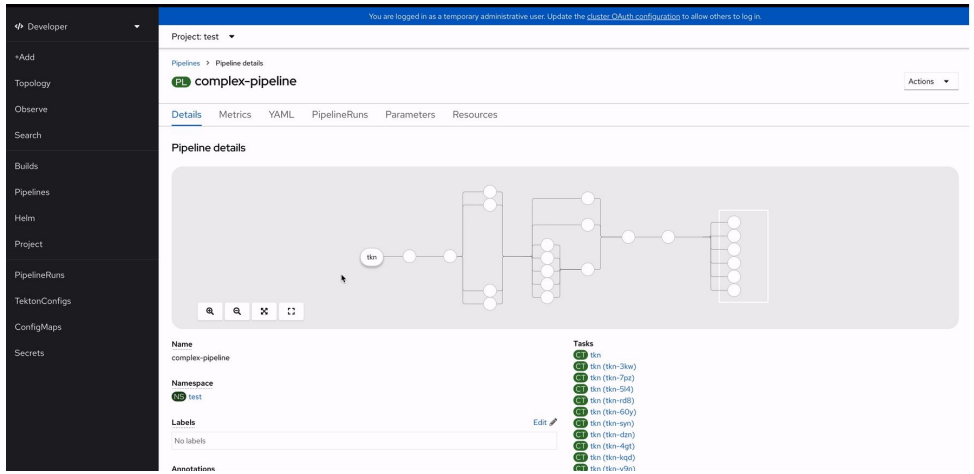


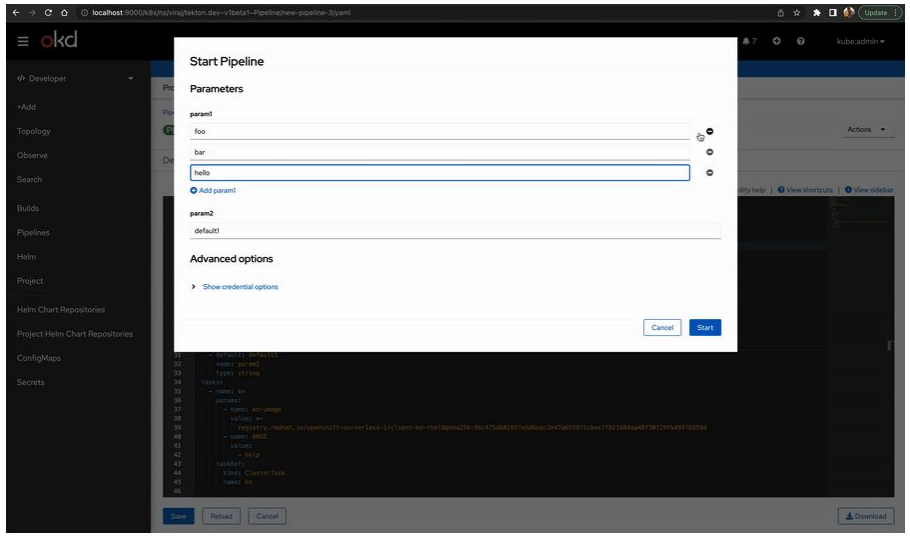
Product Manager: Stevan Le Meur

Platform Services

OpenShift Pipelines

- OpenShift Pipelines 1.9
- Reference pipelines/tasks in Git, TektonHub, ArtifactHub, etc (Tech Preview)
- Pipelines as code GA
  - PAC concurrency control
  - Support for advanced event matching on filepath/PR title
  - Ability to enable pac for all [new] repos in a GitHub org
  - Better errors tooling in Pipelines as Code CLI
  - Rich PipelineRun details in GitHub Checks UI
- Support for CSI and projected volume for workspace
- New CLI: Openshift Pipelines CLI (opc) - Tech Preview
- Pipelines on Dev Sandbox
- Dev Console UX improvements : Pipeline topology view, Support of array in Param



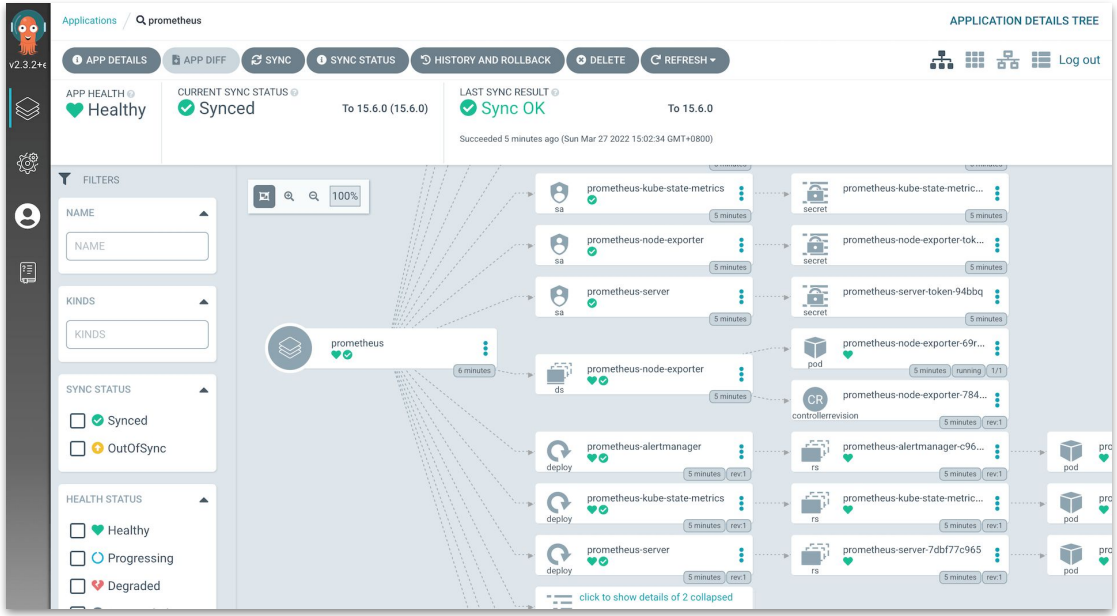


PM: Koustav Saha

Red Hat

OpenShift GitOps

- OpenShift GitOps 1.7
- Includes Argo CD 2.6
- Patching existing resources with Server Side Apply
- Applications in non-control plane namespaces (TP)
- Operator improvements:
  - Custom node selectors
  - RBAC match mode ‘regex’
  - Sub-keys for resource customizations
  - Enable/Disable cluster Argo CD console link



PM: Harriet Lawrence

Red Hat

Early Stage

Project Janus / Backstage

Red Hat joined the Backstage.io community in October 2022

Project Janus - our midstream offering based on Backstage

Helm Chart for Backstage

- Available here → github.com/janus-idp/helm-backstage

2 new Backstage plugins

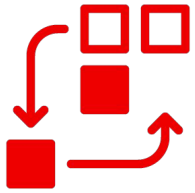
- Keycloak plugin
- MultiCluster Engine plugin
- Available here → github.com/janus-idp/backstage-plugins

Installer Flexibility

OpenShift 4.12 Supported Providers

Installation Experiences

aws Outposts
AWS Local Zones
Azure
Azure Stack Hub
Alibaba Cloud
Bare Metal
Google Cloud
vmware vSphere
IBM Cloud
IBM Power Systems
IBM Z and IBM LinuxONE
NUTANIX
RED HAT OPENSTACK PLATFORM
RED HAT VIRTUALIZATION



Automated

Installer Provisioned Infrastructure

- Auto-provisions infrastructure
- *KS like
- Enables self-service

Full Control

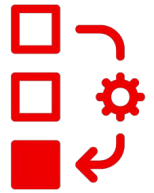
User Provisioned Infrastructure

- Bring your own hosts
- You choose infrastructure automation
- Full flexibility
- Integrate ISV solutions

Interactive – Connected

Assisted Installer

- Hosted web-based guided experience
- Agnostic, bare metal, vSphere and Nutanix only
- ISO Driven



Local – Disconnected

Agent-based Installer

- Disconnected bare metal deployments
- Automated installations via CLI
- ISO driven

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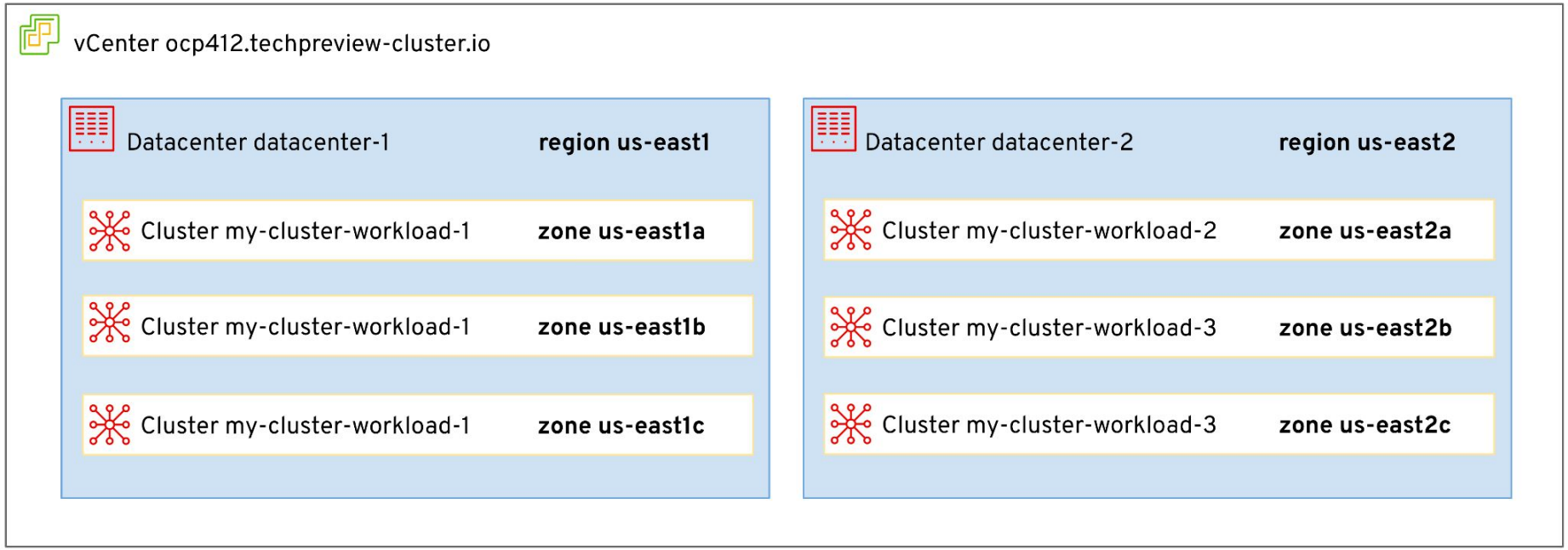
Product Manager(s): Marcos Entenza (AWS*, Azure*, GCP, IBM Cloud, Nutanix), Gaurav Singh (Alibaba), Ramon Acedo (BM, VMware), Peter Lauterbach (RHV & OCP Virtualization), Gil Rosenberg (OpenStack), & Duncan Hardie (IBM Z & Power)

OpenShift in vSphere is Zone Aware

- Create highly-available OpenShift clusters in vSphere with installer provisioned infrastructure (IPI)
- Applies zonal tags (regions and zones) to multiple vCenter datacenters and clusters in a single vCenter
- Excludes User Provisioned infrastructure (UPI) deployments



Technology Preview

Product Manager: Ramon Acedo Rodriguez, Ju Lim

Flexible OpenShift Installation

Disable/enable operators from installation

- Exclude one or more optional operators during installation
- Option to enable a previously excluded operator after cluster is installed
- Optional operators you can exclude:
  - console operator
  - Insights operator
  - storage operator
  - csi-snapshot-controller operator
  - (in addition to baremetal operator, marketplace operator, and openshift-samples operator)
- Disable by setting **baselineCapabilitySet** and **additionalEnabledCapabilities** parameters in the **install-config.yaml** configuration file prior to installation

Product Manager: Ju Lim

Deploy OpenShift on IBM Cloud VPC

IBM Cloud

Installing a cluster using installer-provisioned infrastructure (IPI) on IBM Cloud

- Allows an OpenShift cluster to be deployed using **installer-provisioned infrastructure** on **IBM Cloud VPC infrastructure**
- Support covers public, **private, and restricted (disconnected) network** deployments as well deployments **into an existing VPC**

```
apiVersion: v1
baseDomain: example.com
...
...
metadata:
 name: my-new-cluster
networking:
 clusterNetwork:
 - cidr: 10.128.0.0/14
   hostPrefix: 23
 machineNetwork:
 - cidr: 10.0.0.0/16
 networkType: OVNKubernetes
 serviceNetwork:
 - 172.30.0.0/16
platform:
 ibmcloud:
   region: us-south
   resourceGroupName: eu-gb-example-network-rg
    vpcName: eu-gb-example-network-1
    controlPlaneSubnets:
      - eu-gb-example-network-1-cp-eu-gb-1
      - eu-gb-example-network-1-cp-eu-gb-2
      - eu-gb-example-network-1-cp-eu-gb-3
    computeSubnets:
      - eu-gb-example-network-1-compute-eu-gb-1
      - eu-gb-example-network-1-compute-eu-gb-2
      - eu-gb-example-network-1-compute-eu-gb-3
credentialsMode: Manual
publish: External
pullSecret: '{"auths": ...}'
fips: false
sshKey: ssh-ed25519 AAAA...
```


Generally Available

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Product Manager: Marcos Entenza

Systems Enablement

Multi-architecture Compute

- Allow more flexibility in a clusters by mixing compute node architectures (aka Heterogeneous Compute)

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- Azure offering remains in Tech preview for now
- Multi-arch payload there but only for above
- No upgrade yet though you can --force

OpenShift on Arm

- Run OpenShift on highly efficient, high performance per watt architectures

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- **OCP for Arm on Azure IPI**
- AWS Graviton 3 support

IBM Power and zSystems

- Run OpenShift on highly available, highly secure, scalable hardware

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- **IBM Power:**
  - Working on IPI for PowerVS
- **IBM zSystems:**
  - Secure Execution TP
- Notification of deprecated systems

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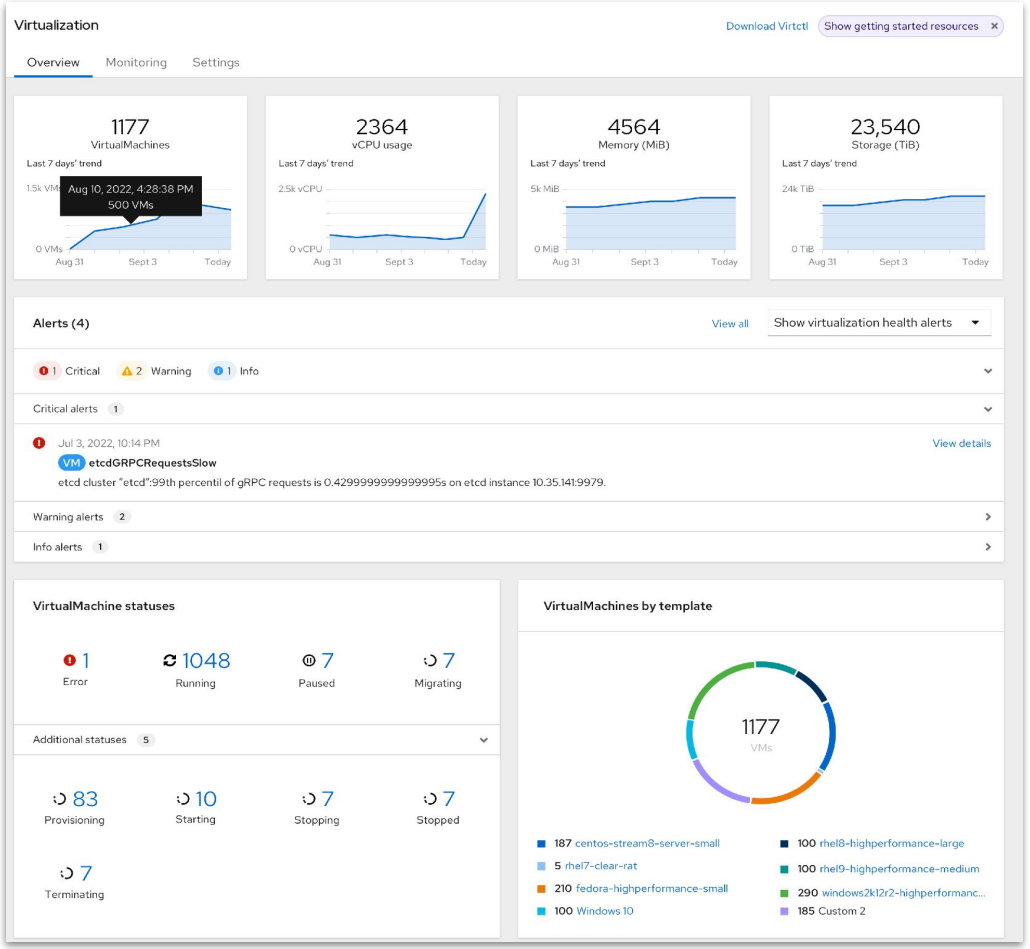
OpenShift Virtualization

Modernize workloads, bring VMs to Kubernetes

- Data Protection
  - Share and transfer VMs between clusters with raw VM export
- Administrator workflow improvements
  - At a Glance Status for Virtualization Overview
  - Tunnel SSH over the API
- Observability
  - Cluster and VM health monitoring enhancements
  - Reducing false alerts during upgrades
  - Easier configuration & monitoring with Live Migration page
- Load balancing through MetalLB
- Microsoft Windows Server 2022 and Windows 11 guest support
- Tekton Reference Pipeline for VMs (TP)
- CIDR-based network filtering CNI
- Better cluster density with OpenShift on OpenShift
  - Hosted Control Plane and KubeVirt provider (Dev Preview)
- Run Sandboxed containers on all footprints
  - Dev Preview of AWS



PM: Peter Lauterbach

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LVM Storage – Storage for Single Node OpenShift

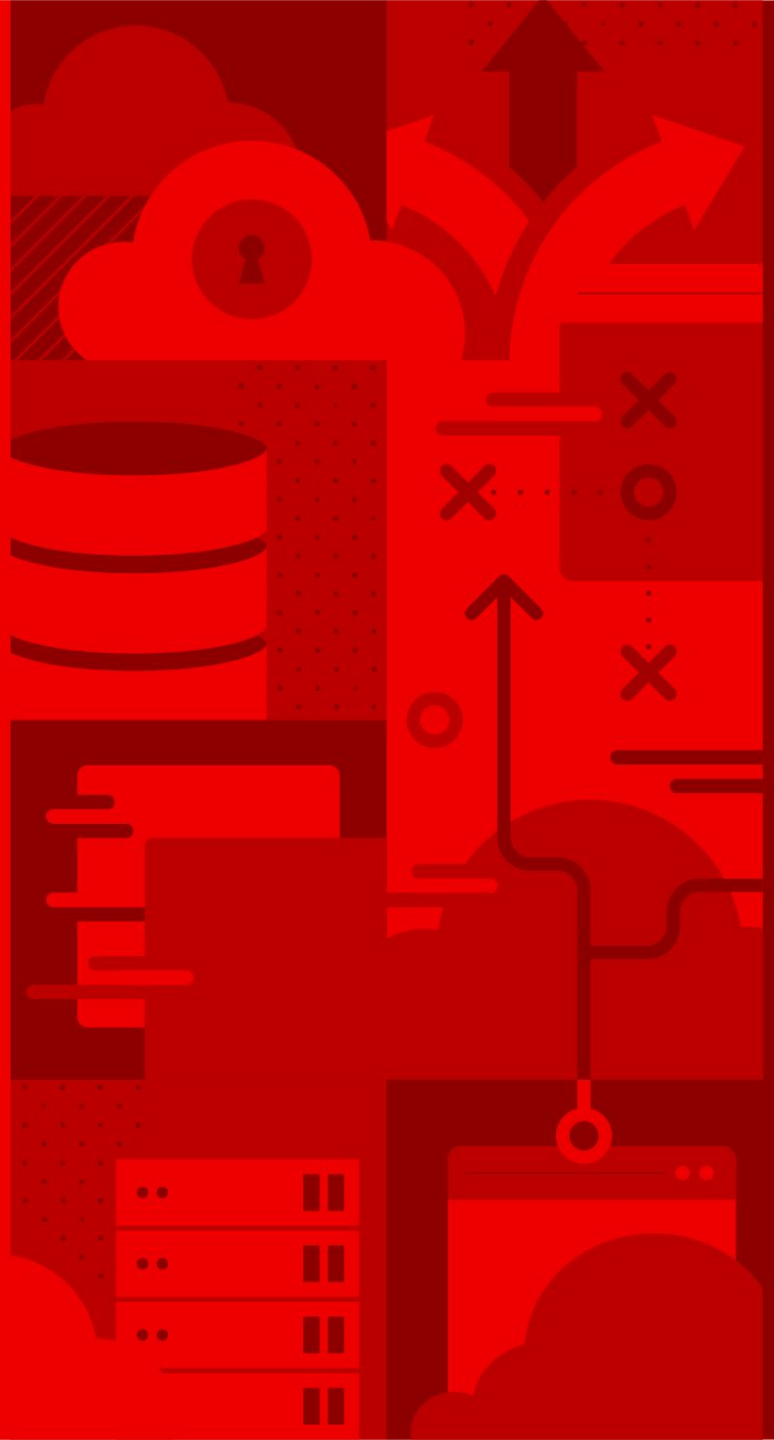
GA on Single Node OpenShift with V4.12

- Logical Volume Manager Storage - LVM Storage - LVMS
- thin provisioning, snapshots and clone, backed by LVM logical volumes.
- Block and File storage
- Install via ACM or Operator Hub
- GA with V4.12 for Single Node OpenShift
- Old pre-GA Name: ODF-LVM, LVMO (**new install necessary, no upgrade path from ODF-LVM**).

```
# oc get pv
NAME                                       CAPACITY   ACCESS MODES   RECLAIM POLICY   STATUS   CLAIM               STORAGECLASS          REASON   AGE
pvc-8e290380-81e9-470c-853c-c3bc79b0d982   1Gi        RWO            Delete           Bound    default/my-lv-pvc   lvms-vg1                       15s
```

```
# lvs
  LV                                   VG  Attr       LSize Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert
  6ba8c776-3ec2-49d4-b125-1a8000cb28e5 vg1 -wi-ao---- 1.00g

sh-4.4# lsblk
NAME          MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
sda             8:0    0   120G  0 disk
|-sda1          8:1    0     1M  0 part
|-sda2          8:2    0   127M  0 part
|-sda3          8:3    0   384M  0 part /boot
`-sda4          8:4    0 119.5G  0 part /sysroot
sdc             8:32   0    50G  0 disk
`-vg1-6ba8c776--3ec2--49d4--b125--1a8000cb28e5
              253:0    0     1G  0 lvm
/var/lib/kubelet/pods/4d2f39c2-75bc-4a09-b226-4937a7357913/volumes/kubernetes.io~csi/pvc-8e290380-81e9-470c-853c-c3bc79b0d982/mount
```



Thank you

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