Red Hat
Advanced Cluster Management
for Kubernetes

Cluster Lifecycle

ACM Deep Dive

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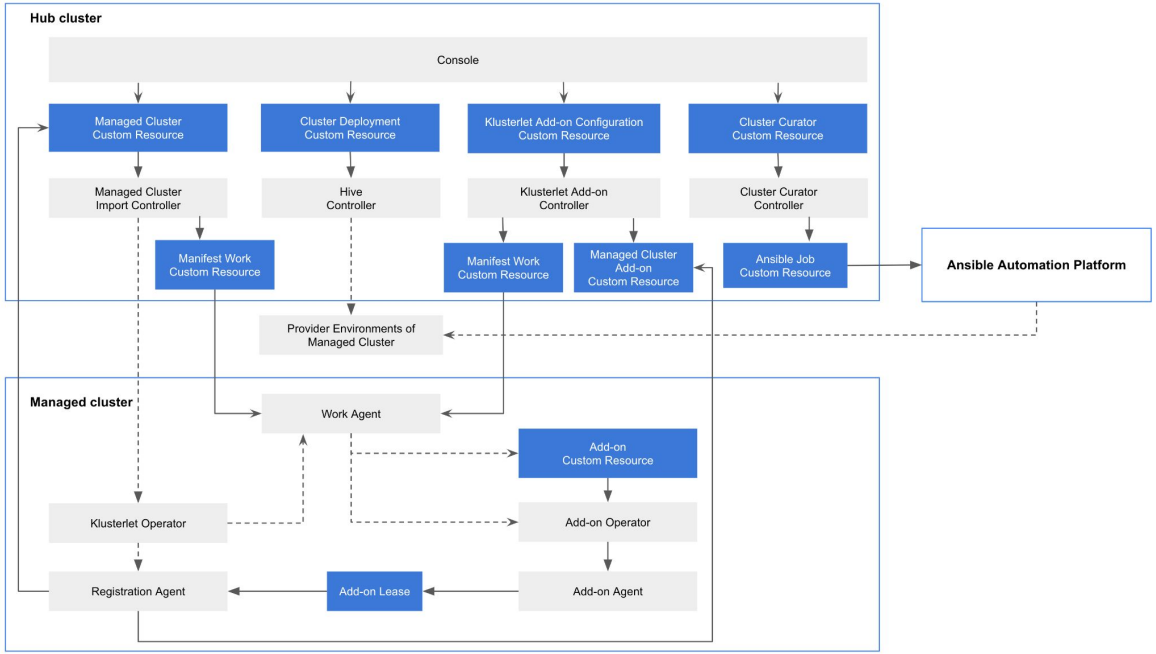
Architecture

Key features:

- Cluster lifecycle management
- Ansible automation



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Use case: OCP cluster lifecycle management

- Cluster provisioning/deprovisioning

Hive

Provision OCP cluster in the public cloud and on-premises.

Assisted Installer (AI)

Provision OCP cluster in a bare metal environment.

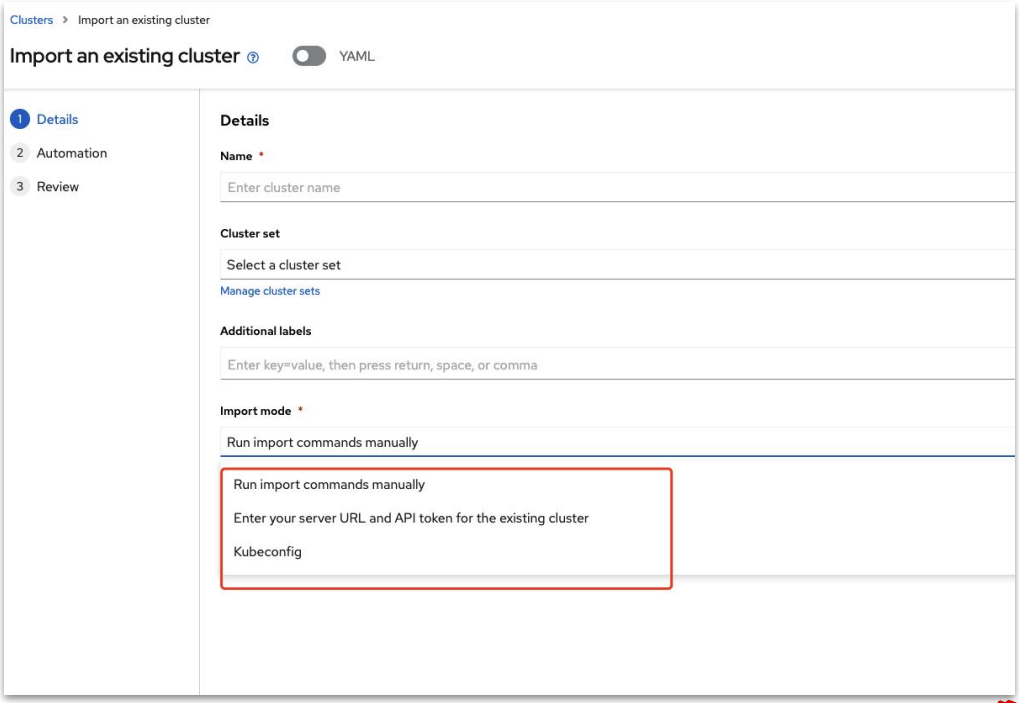
Hypershift

Provision HyperShift cluster

- Cluster upgrading

Use case: Importing an existing cluster

- Import mode
  - Manually
  - Automatically
- Also can import other K8s Clusters
  - *KS
  - ROSA
  - OSD



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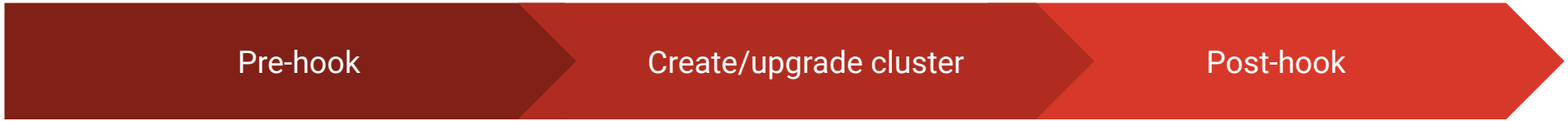
Use case: Running Ansible jobs on managed cluster

ACM is integrated with APP automation so that you can create prehook and posthook AnsibleJob instances that occur before or after creating or upgrading your clusters.



Run Ansible jobs before creating, importing or upgrading your cluster.

Run Ansible jobs after creating, importing or upgrading your cluster.

Introduction to ACM's multicluster engine for Kubernetes operator

Sho Weimer

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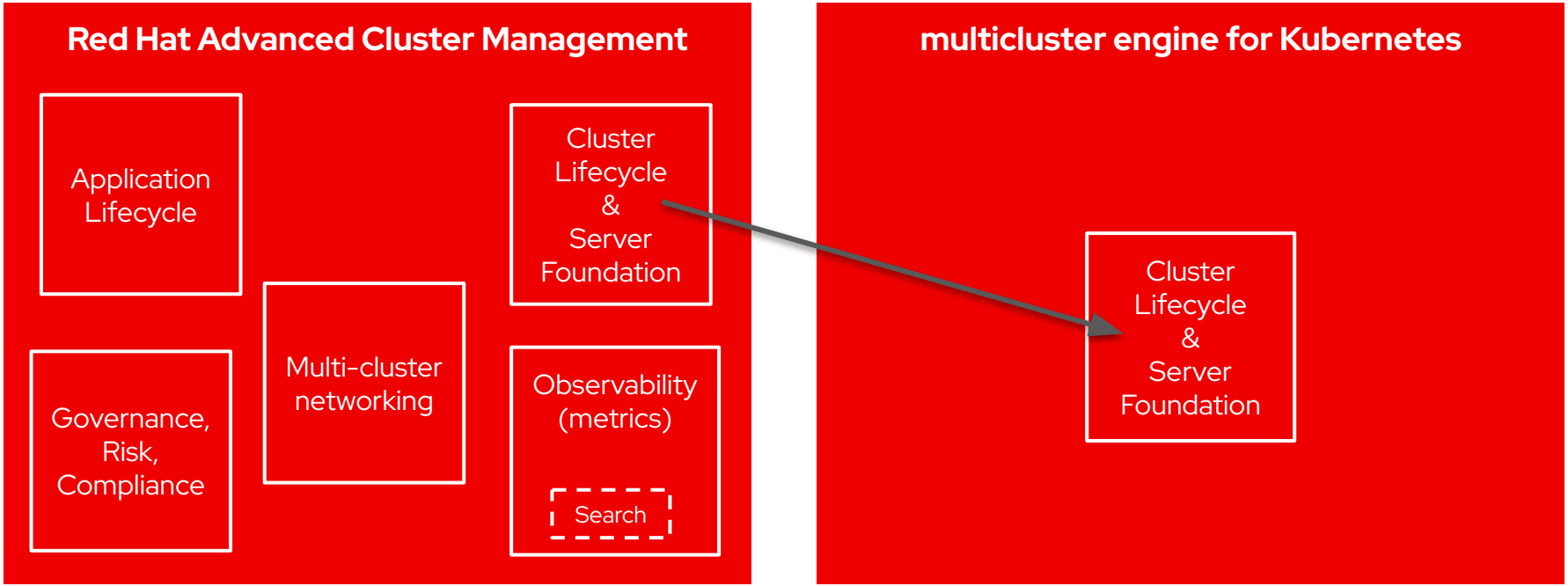
RHACM is packaging core multi-cluster functionality into a new operator

The new **multicluster engine for Kubernetes** operator will be entitled with OpenShift



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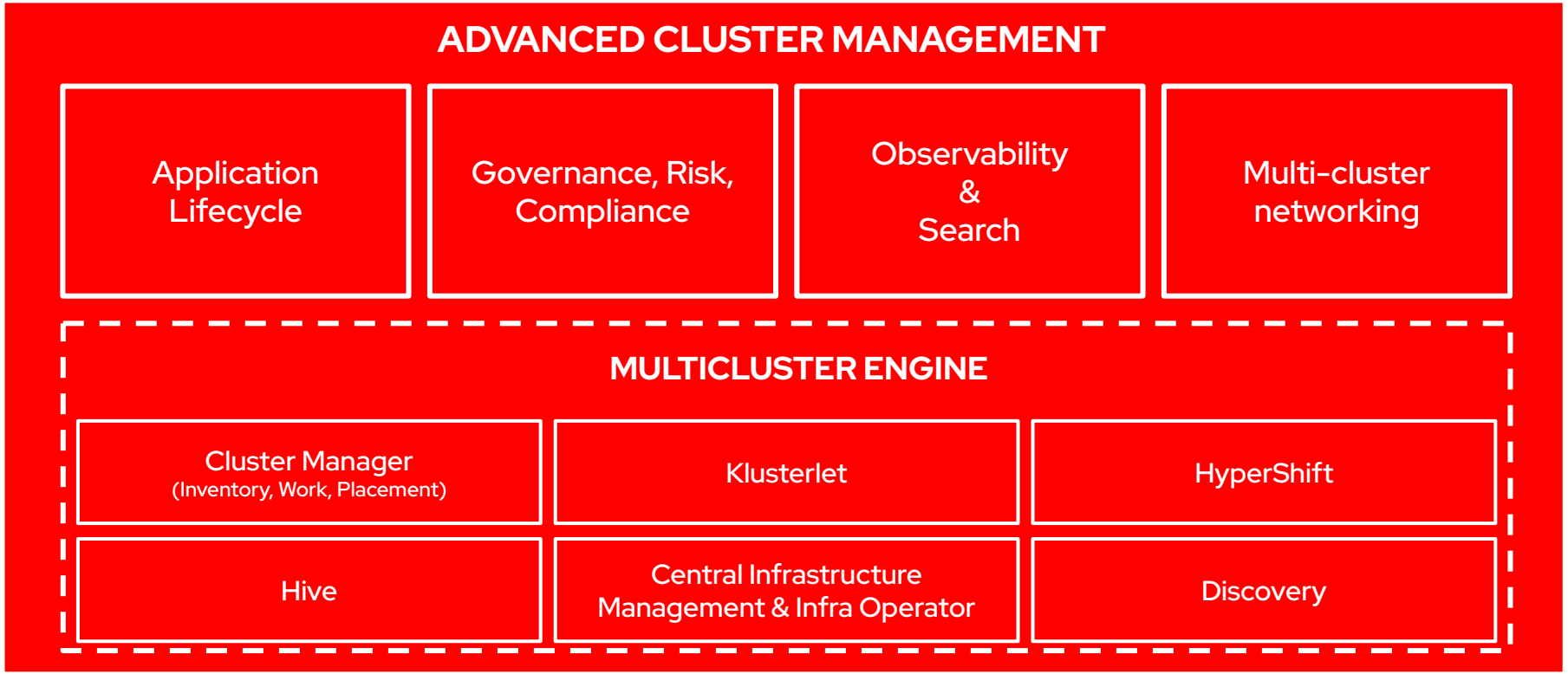
ACM Architecture

ACM is built with the multicluster engine operator



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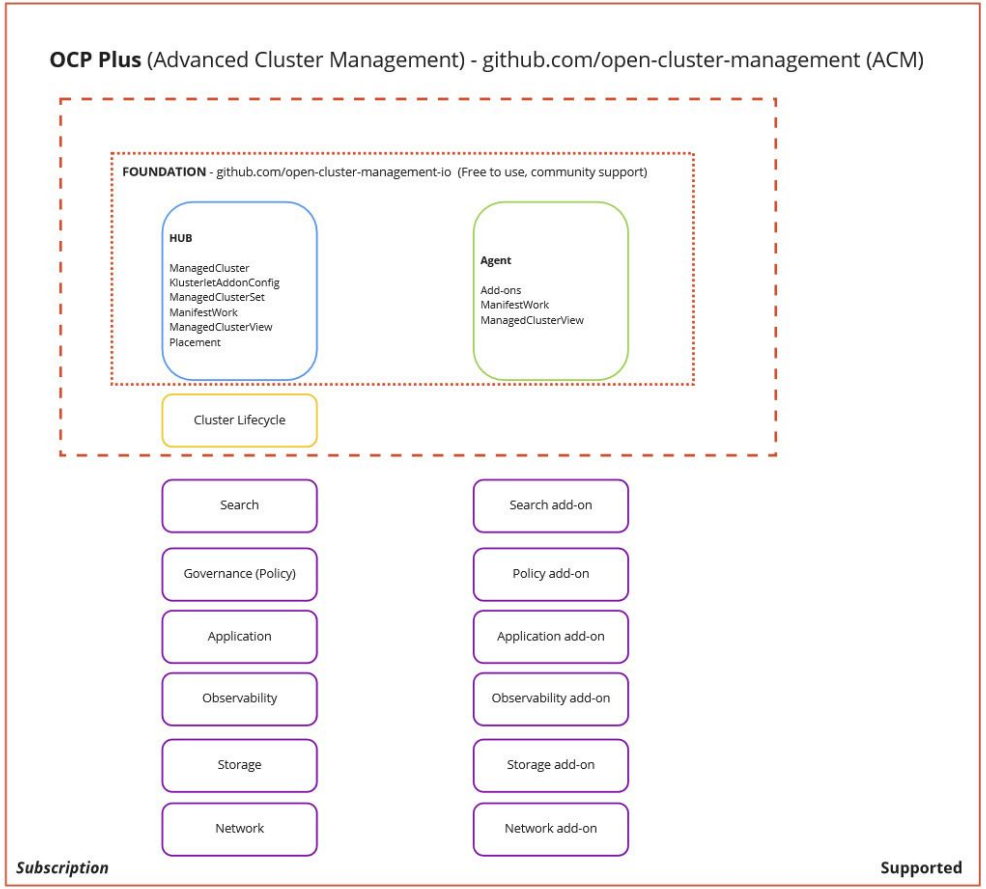
RHACM continues to be powered by the Multicluster Engine



The **multicluster engine for Kubernetes** operator is still part of the **ACM** install

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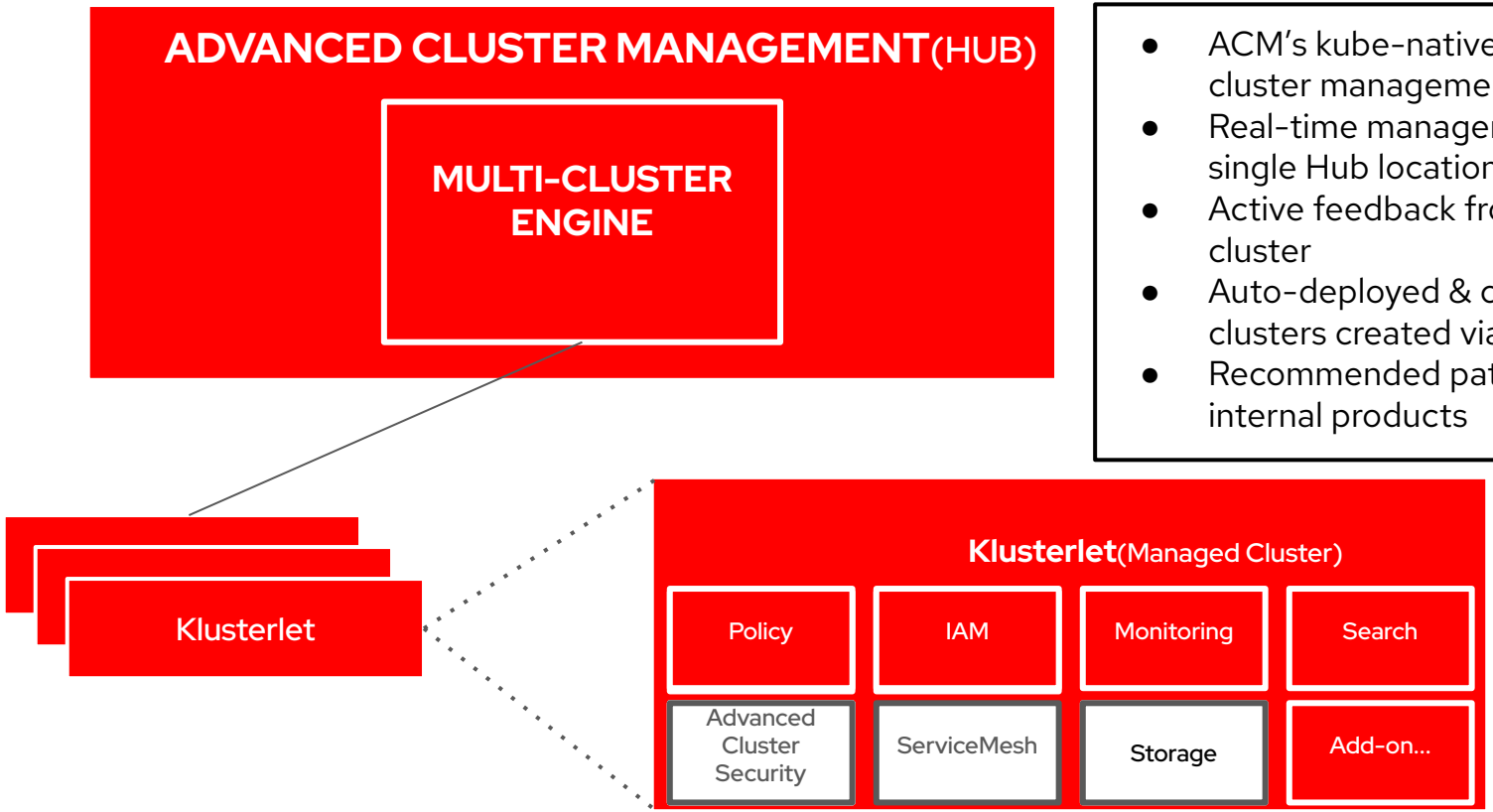
Klusterlet Pattern



- ACM's kube-native way of cluster management
- Real-time management from single Hub location
- Active feedback from managed cluster
- Auto-deployed & configured to clusters created via ACM
- Recommended pattern for internal products

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What’s in the multicluster engine operator?

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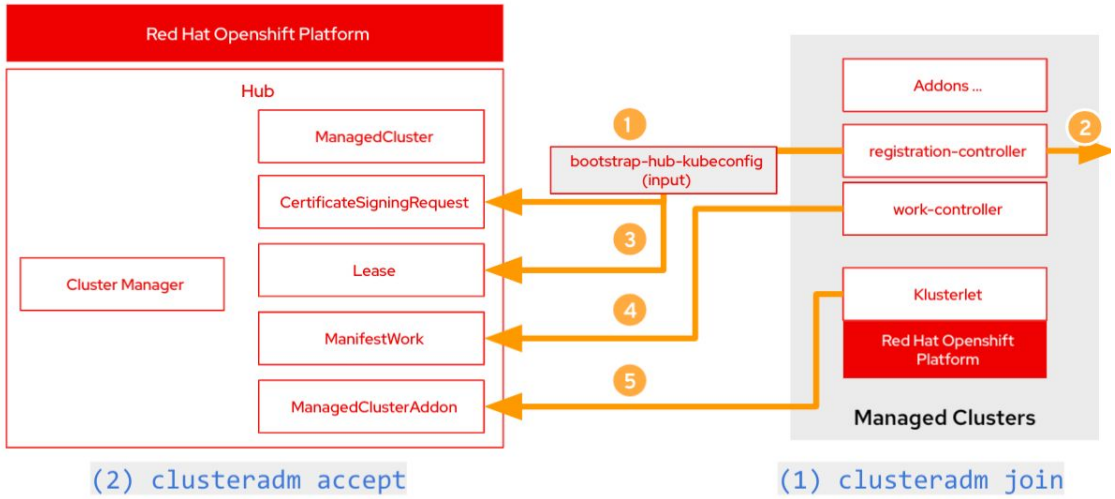
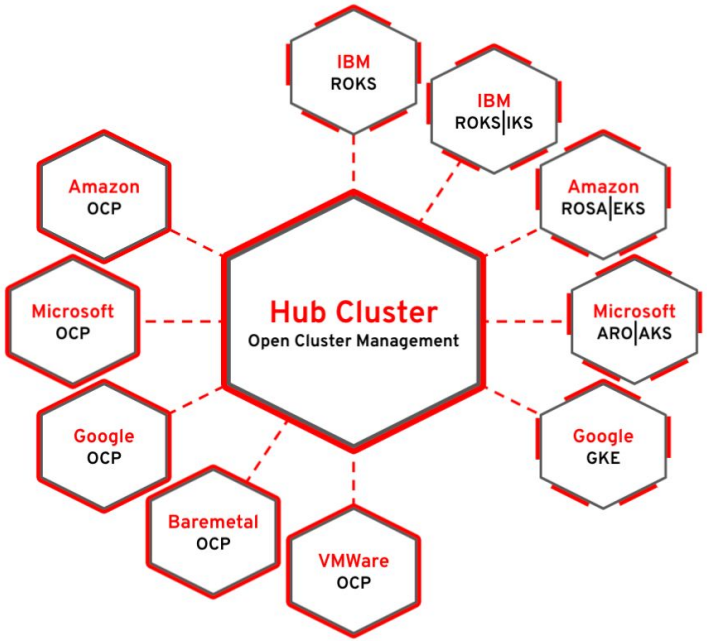
Cluster Manager & Klusterlet

Open Cluster Management
upstream community APIs





This is what makes the Hub-Spoke model possible

Hub - Cluster Manager (Control Plane)
Spoke (ManagedCluster) - Klusterlet (Agent)

Source: Introduction to Open Cluster Management

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Cluster Manager & Klusterlet

This is the foundation needed to make any operator multi-cluster aware

Making Kubernetes services multi-cluster aware

The service must have an API to discover the inventory of available clusters.

ManagedCluster

The service must have a way to schedule and assign Kubernetes API manifests to a selected set of clusters.

Placement

The service must have a way to deliver desired Kubernetes API manifests to a selected set of clusters.

ManifestWork

The service must have a way to govern how users access available clusters or groups of clusters in the fleet.

ManagedClusterSet

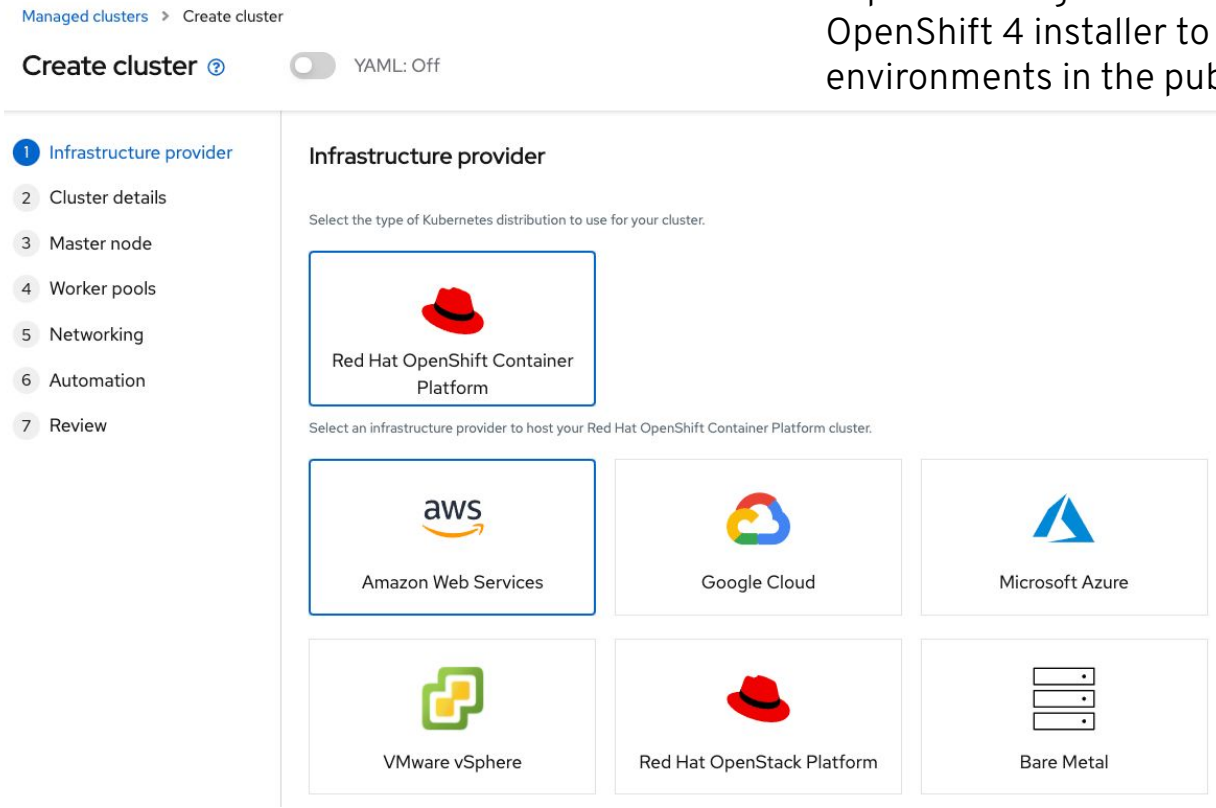
The service may need to extend the mgmt agent with additional built-in controllers that run on managed clusters.

ManagedClusterAddon

Source: [Introduction to Open Cluster Management]

Provisioning (Hive)

Kubernetes API driven OCP provisioning, reshaping, deprovisioning and configuration at scale. It leverages the OpenShift 4 installer to deploy clusters across different environments in the public cloud and on-premises.



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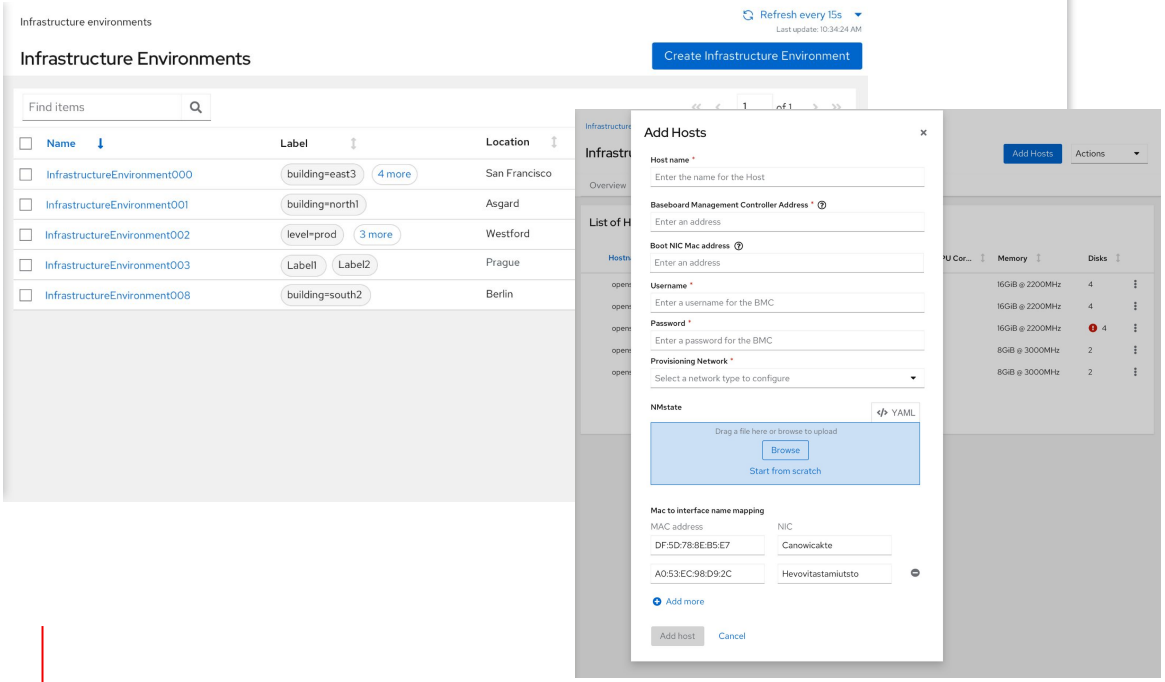
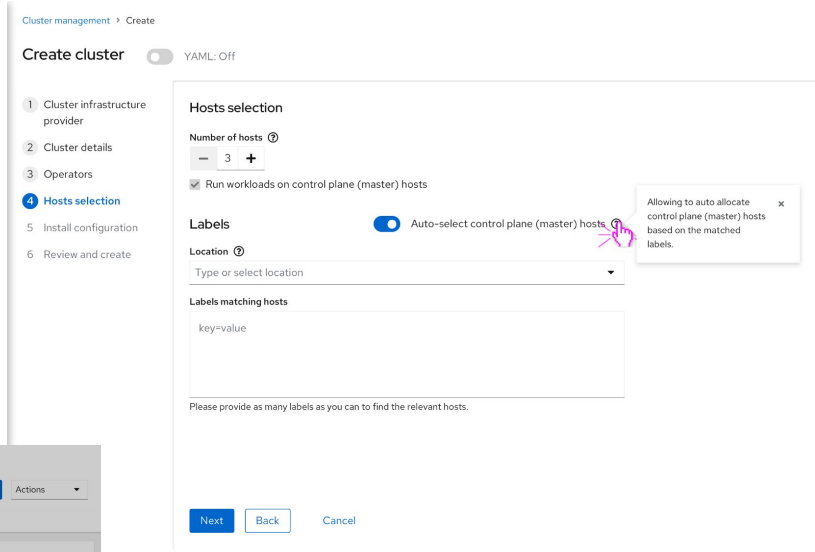
Central Infrastructure Management & Assisted Installer

Manage the infrastructure (physical or virtual) on which OCP clusters will be provisioned independently of cluster provisioning itself.





Enable a persona without administrator permissions (cluster creator) to easily self service deploy clusters based on capacity and location requirements on infrastructure prepared and managed by an administrator (infra owner).

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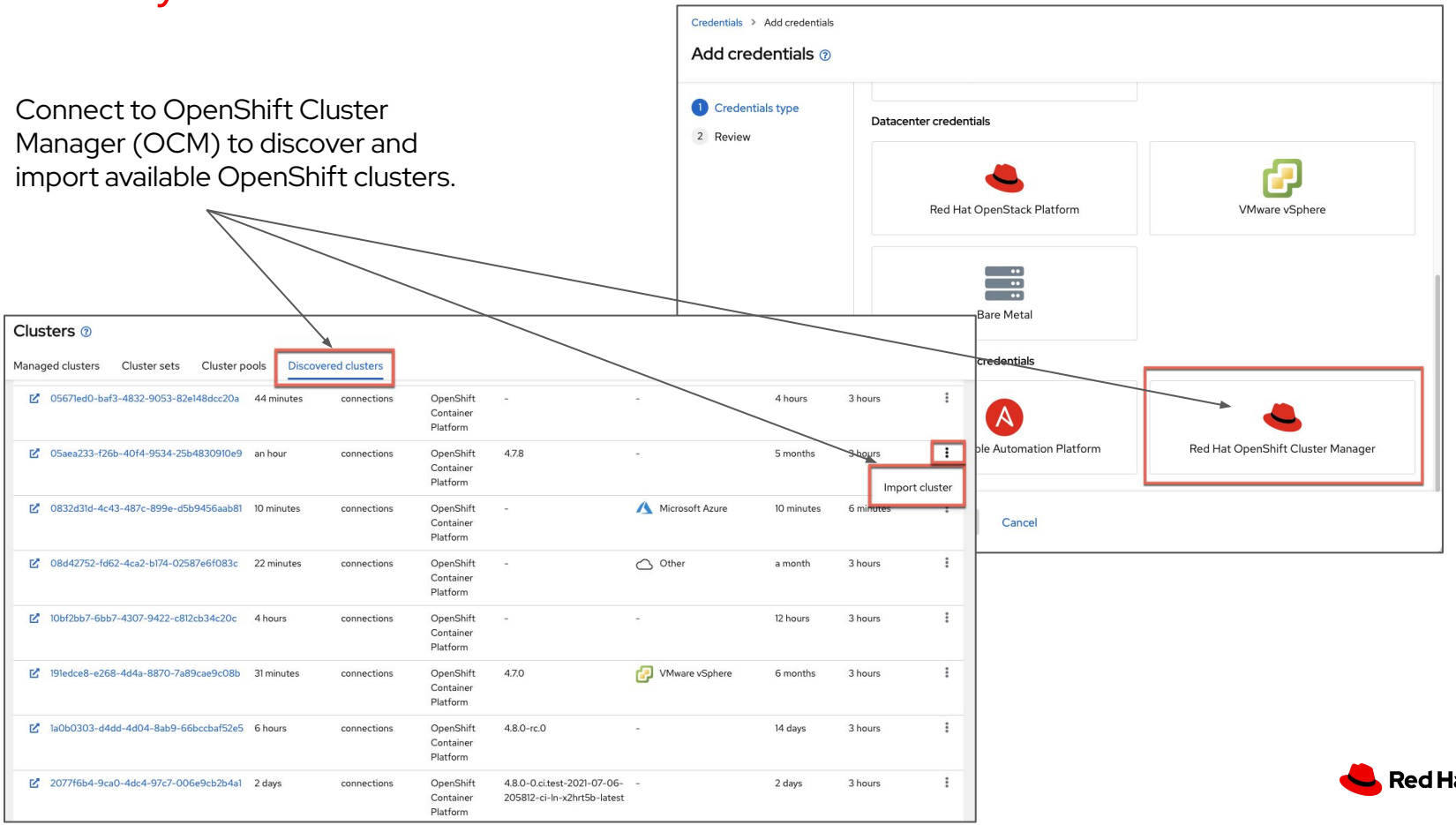
Discovery

Connect to OpenShift Cluster Manager (OCM) to discover and import available OpenShift clusters.



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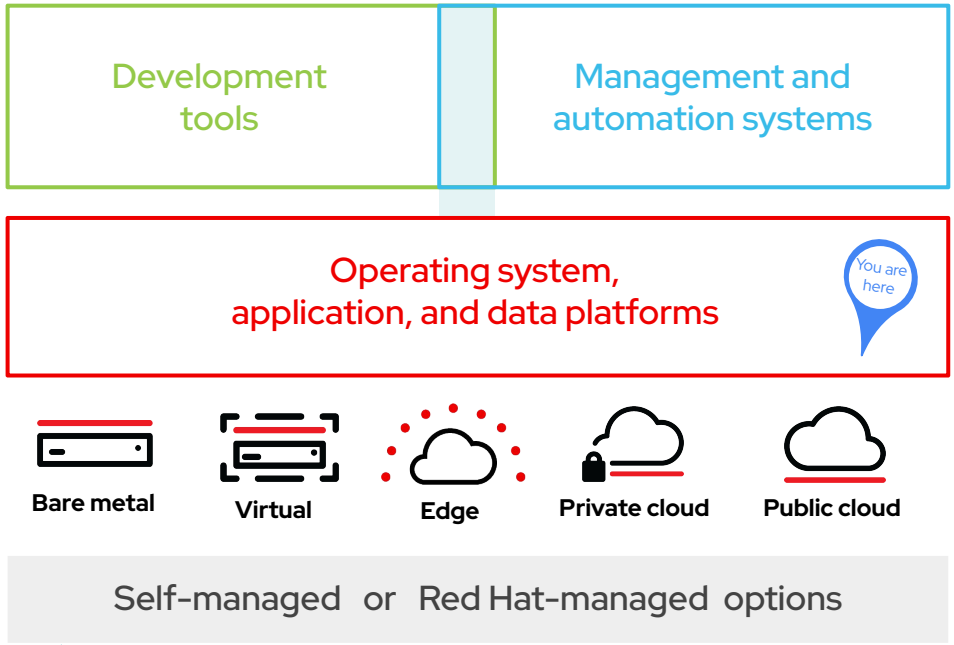
Why are we doing this?

Red Hat's Open Hybrid Cloud

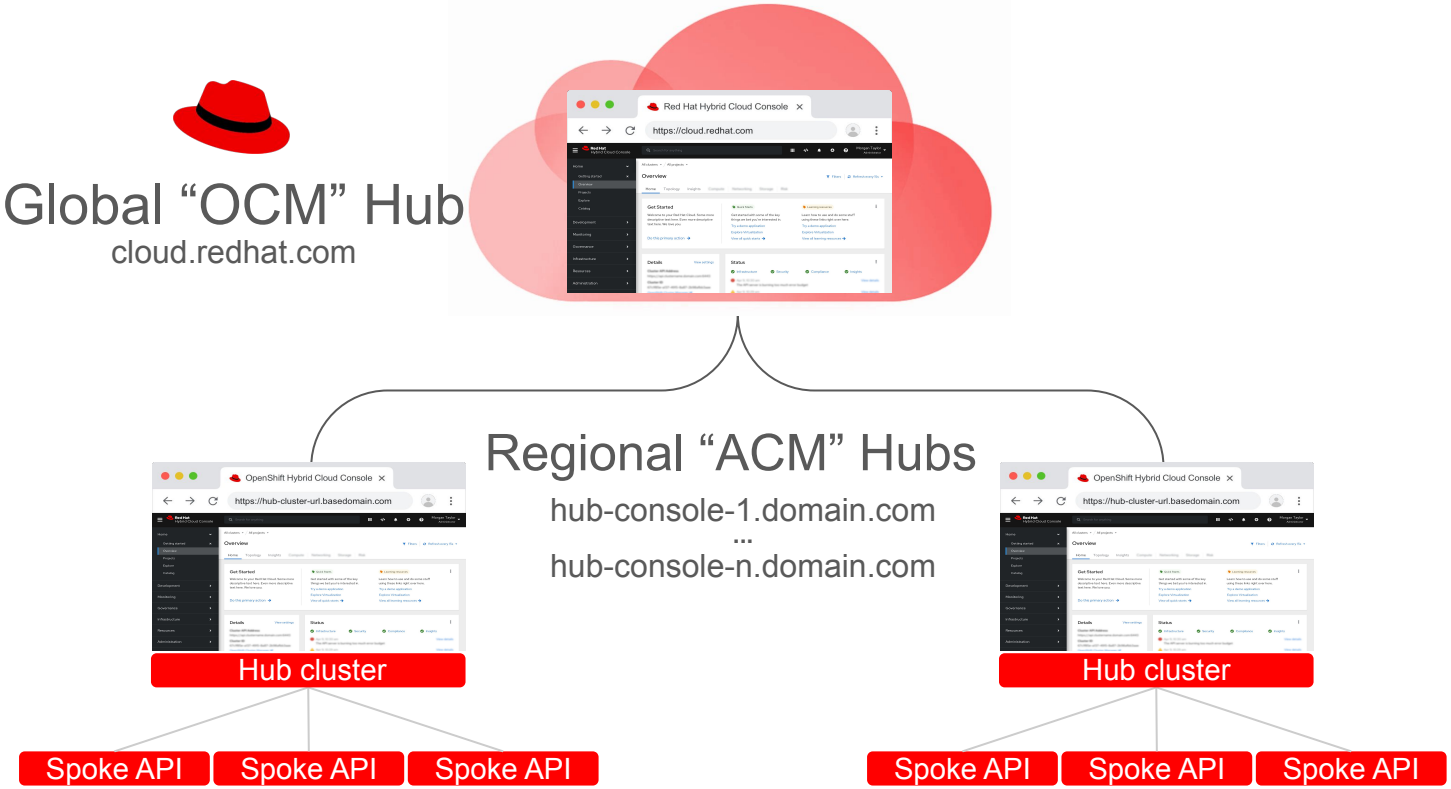
Open hybrid cloud is Red Hat's strategy for **architecting**, **developing**, and **operating** a hybrid mix of applications, delivering a **truly flexible** cloud experience with the speed, stability, scale, and **support** required for digital business transformation.



Source: Introduction to OpenShift and UXD Roadmap

The new OpenShift Hybrid Console: Breadth meets Depth

Your whole “cloud” fleet at a glance; ***scale as needed***

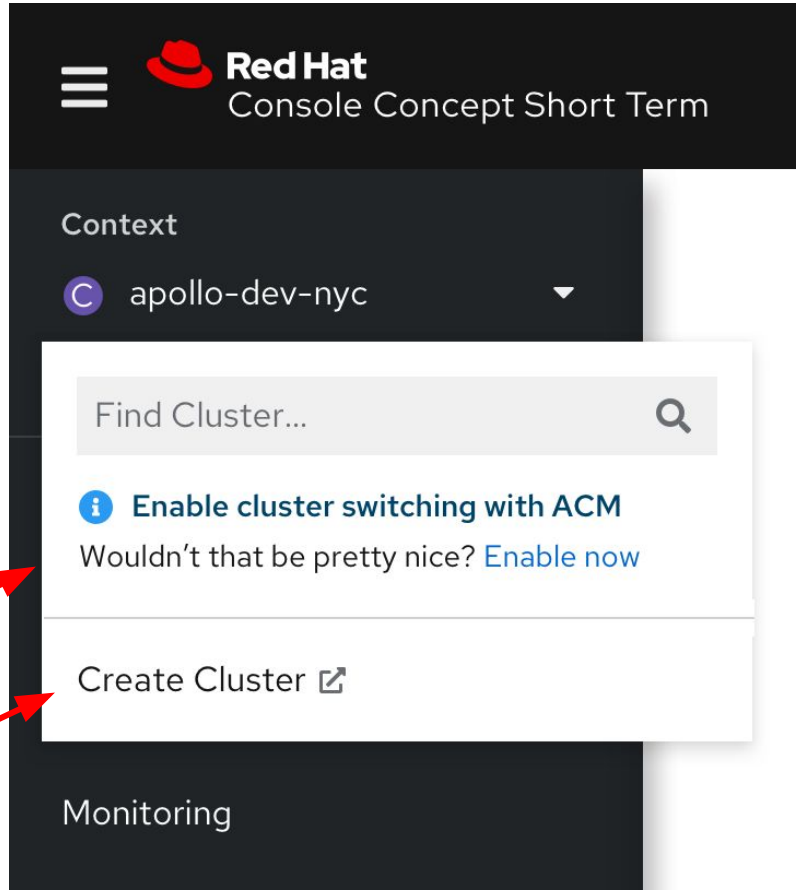


Source: [OpenShift Hybrid Console Roadmap]

Guide users from single cluster to a fleet management experience

Reduce the friction from starting with a single cluster to expanding into management of a fleet of clusters.

Create a more guided, gradual discovery process for users to become aware of how to transform a cluster into a hub and then how to simplify providing access to new clusters or offer more self service options for cluster creation from their team or other teams.



Takes Admin to OperatorHub to install the multi-cluster engine operator

Easy cluster creation in OCM is a great transition into needing multi-cluster engine and then ACM

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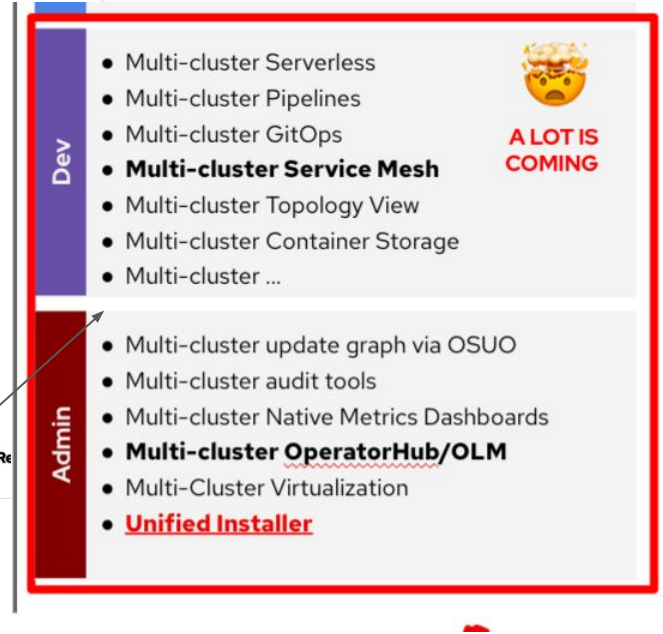
Multi-cluster all of the “things”

OpenShift must become multi-cluster aware.
Every screen must be multi-cluster aware.

This is a big shift in thinking:
Every admin or developer flow now starts at the fleet-level.
You no longer log into a single cluster.
You start from **one** URL – your Hub.
You get a **single pane of glass**.



OpenShift needs to level up to multi-cluster

Source: OpenShift Hybrid Console Roadmap

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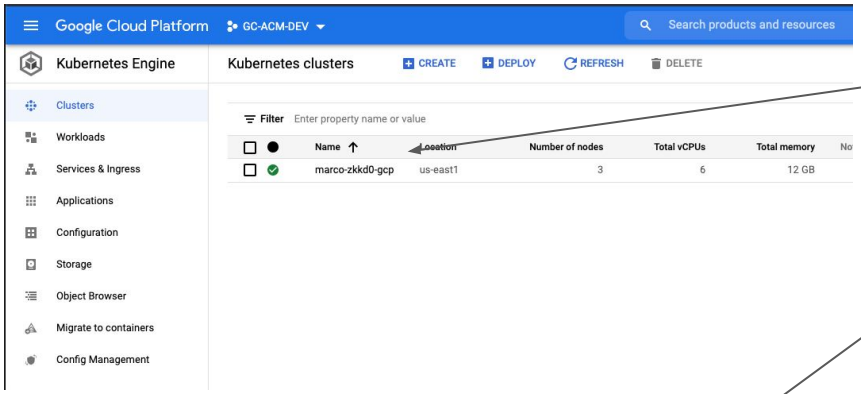
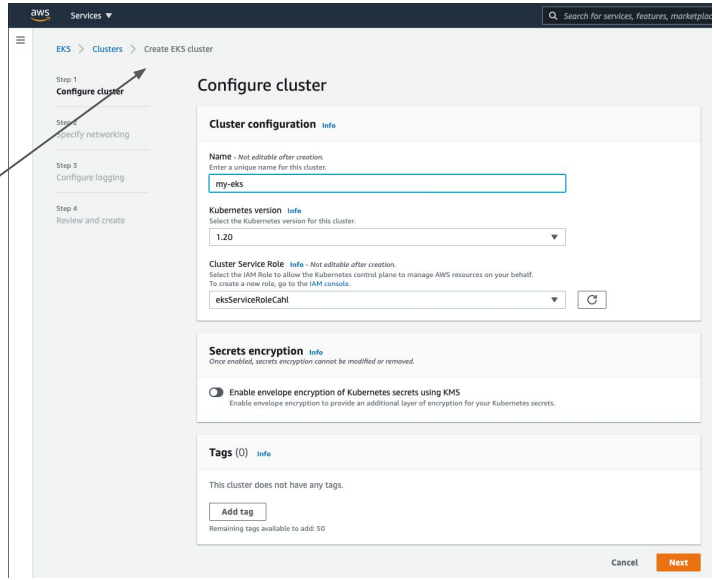
Hyperscalers already offer a slice of the multi-cluster experience



Cluster list on Google Cloud Platform for GKE clusters

Creation of EKS clusters on Amazon Web Services



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