Red Hat
OpenShift

Advanced Cluster Management for Kubernetes

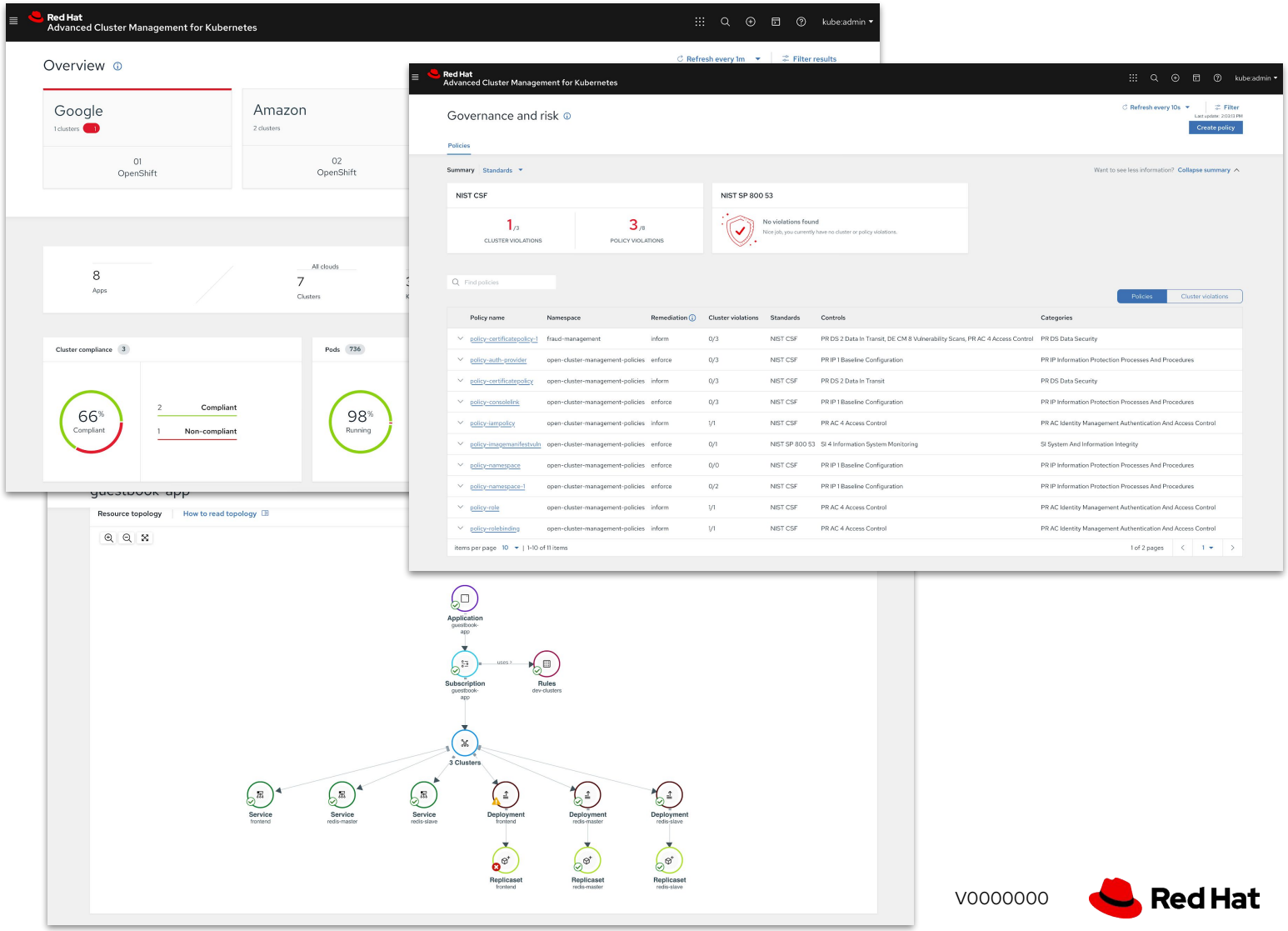
Alfred Bach
PSA EMEA

Robust. Proven. Award winning.

Multicluster lifecycle management

Policy driven governance, risk, and compliance

Advanced application lifecycle management



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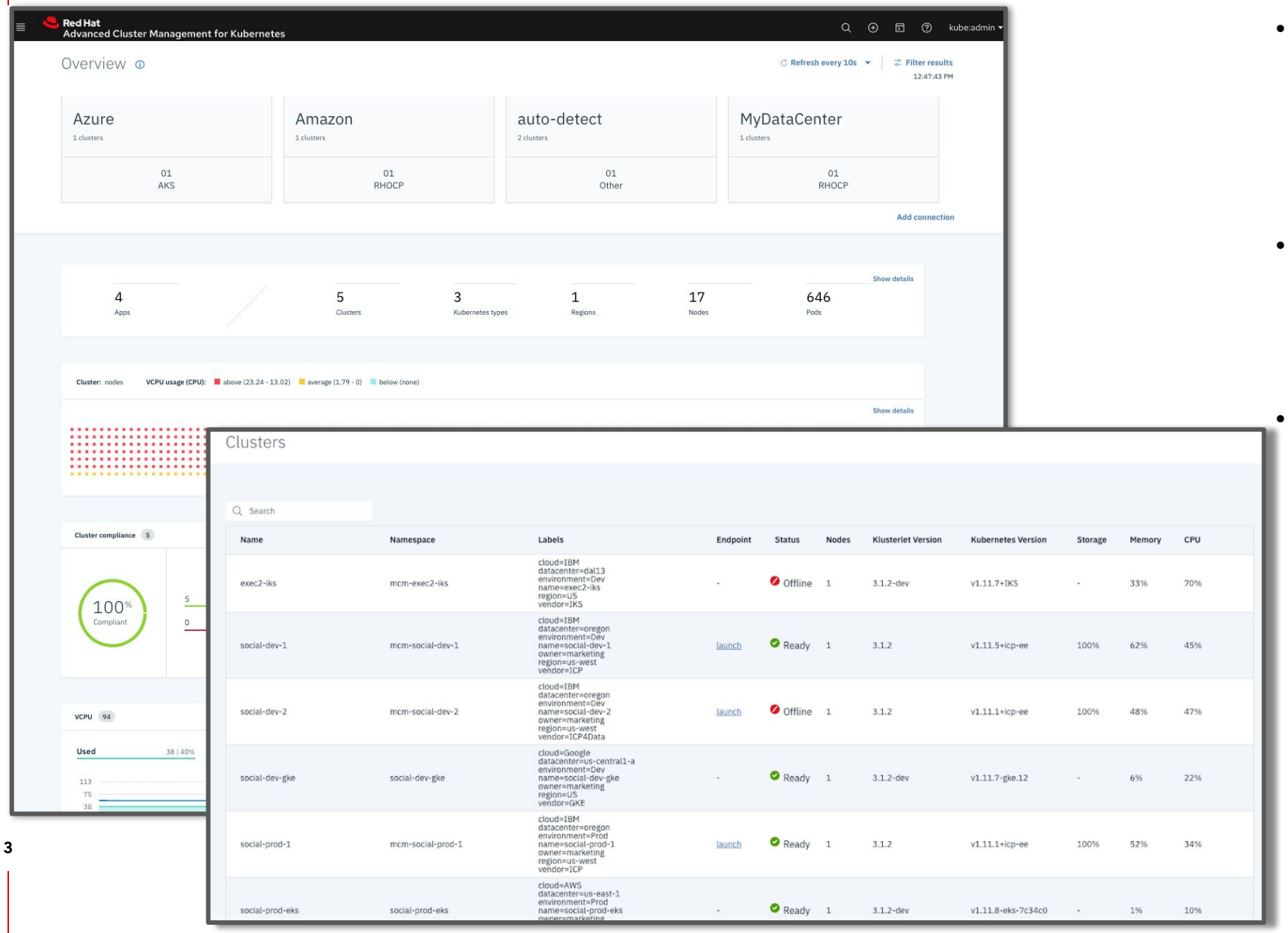
Unified Multi-Cluster Management

Single Pane for all your Kubernetes Clusters



- **Centrally** create, update and delete Kubernetes clusters **across multiple** private and public clouds
- Search, find and modify **any** kubernetes resource across the **entire** domain.
- **Quickly** troubleshoot and resolve issues across your **federated** domain

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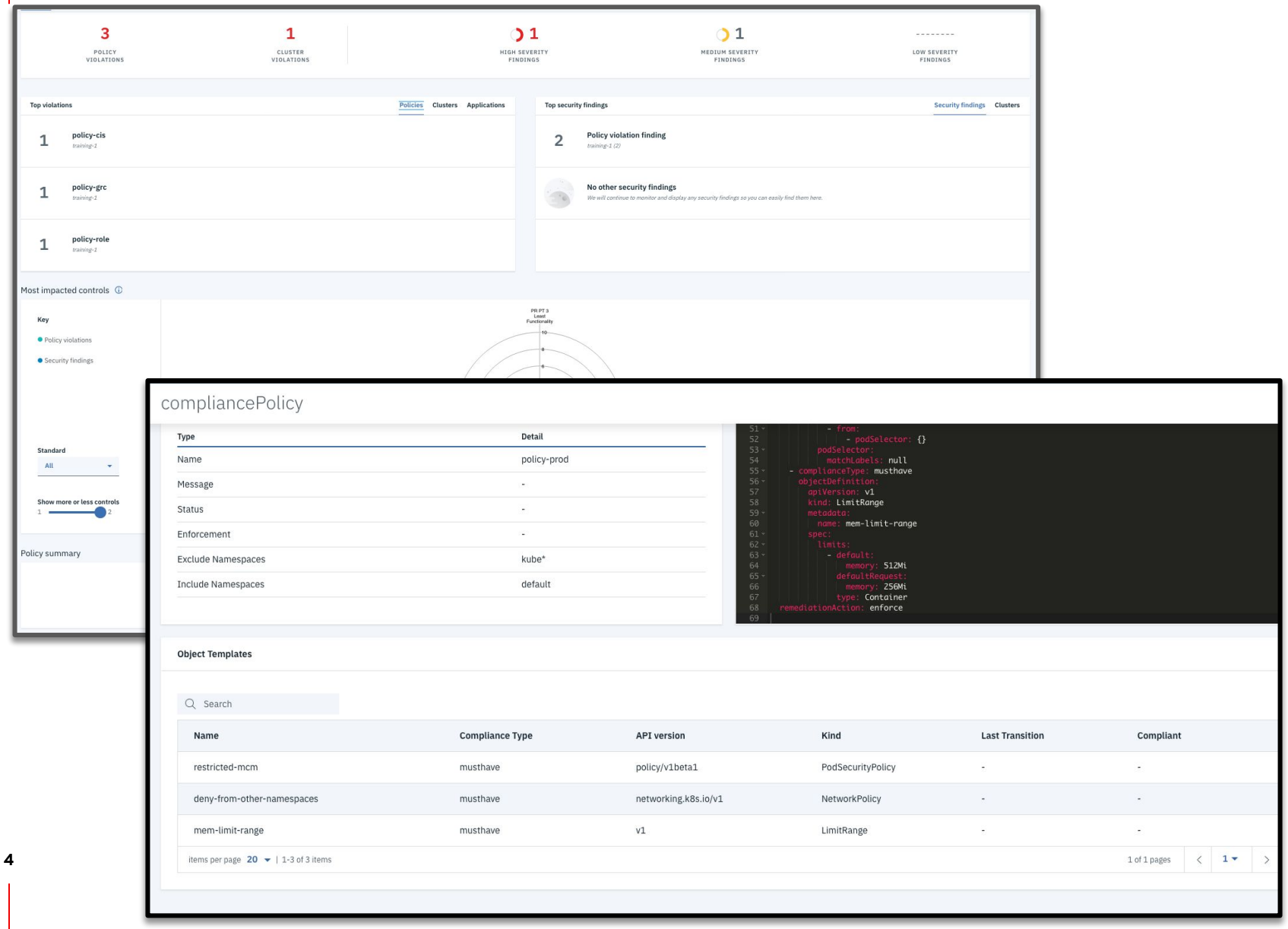
Policy based Governance, Risk and Compliance

Don’t wait for your security team to tap you on the shoulder



- **Centrally** set & enforce policies for security, applications, & infrastructure
- Quickly **visualize** detailed **auditing** on configuration of apps and clusters
- Built-in **CIS** compliance policies and audit checks
- **Immediate** visibility into your compliance posture based on **your** defined standards

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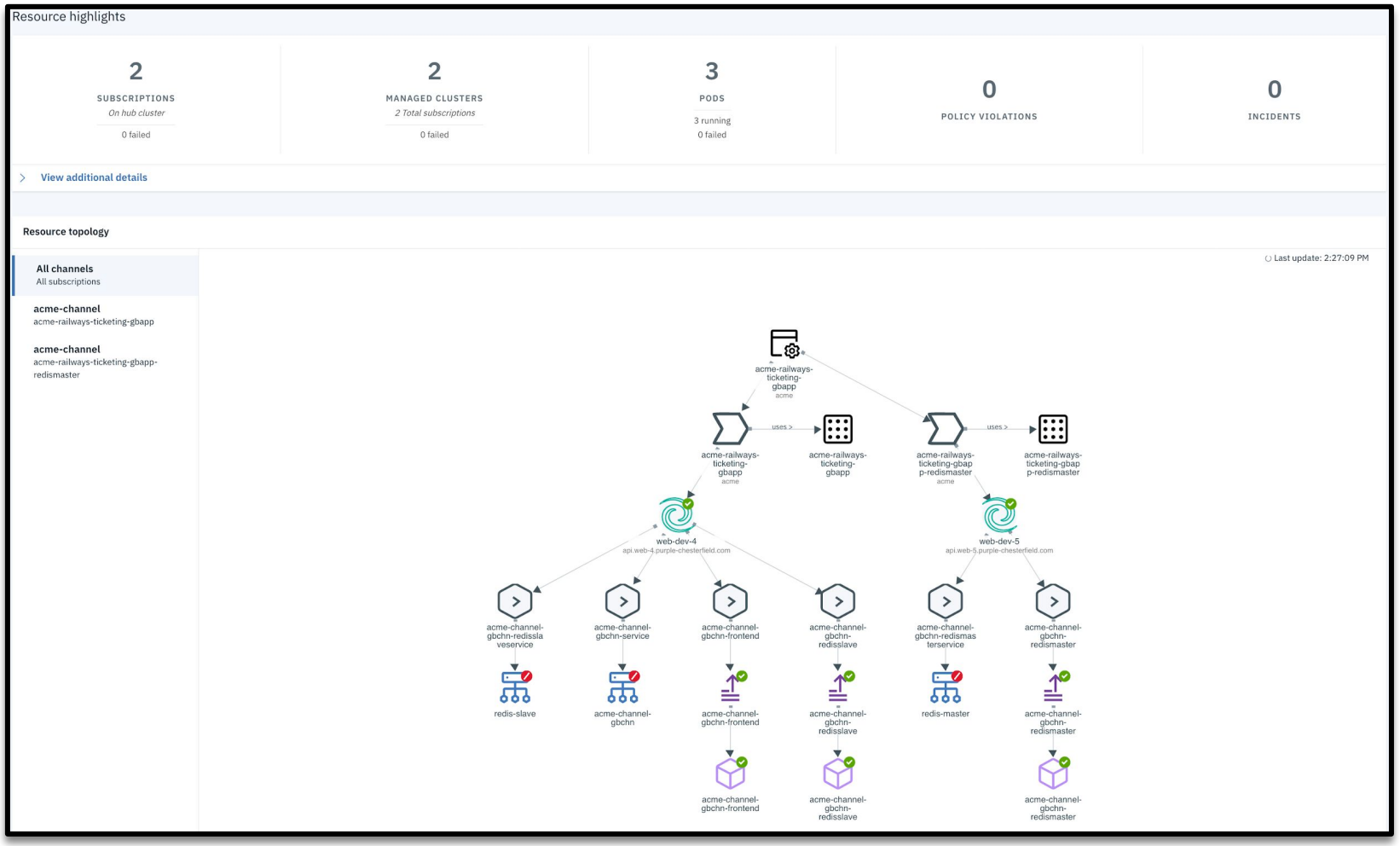
Advanced Application Lifecycle Management

Simplify your Application Lifecycle



- **Easily** Deploy Applications at **Scale**
- Deploy Applications from **Multiple** Sources
- Quickly **visualize** application relationships **across** clusters and those that **span** clusters

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Benefits

Red Hat OpenShift and Red Hat Advanced Cluster Management for Kubernetes

Accelerate development to production

Self-service provisioning allows app dev teams to request clusters directly from a catalog removing central IT as a bottleneck.

Increase application availability

Placement rules can allow quick deployment of clusters across distributed locations for availability, capacity, and security reasons.

Reduce costs

Centralized management of clusters reduces operational cost, makes the environment consistent, and removes the need to manually manage individual clusters.

Ease compliance

Policies can be written by the security team and enforced at each cluster, allowing environments to conform to your policy.

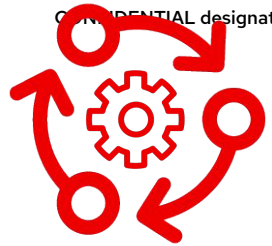
Detailed Use Cases

Multi-Cluster Lifecycle Management

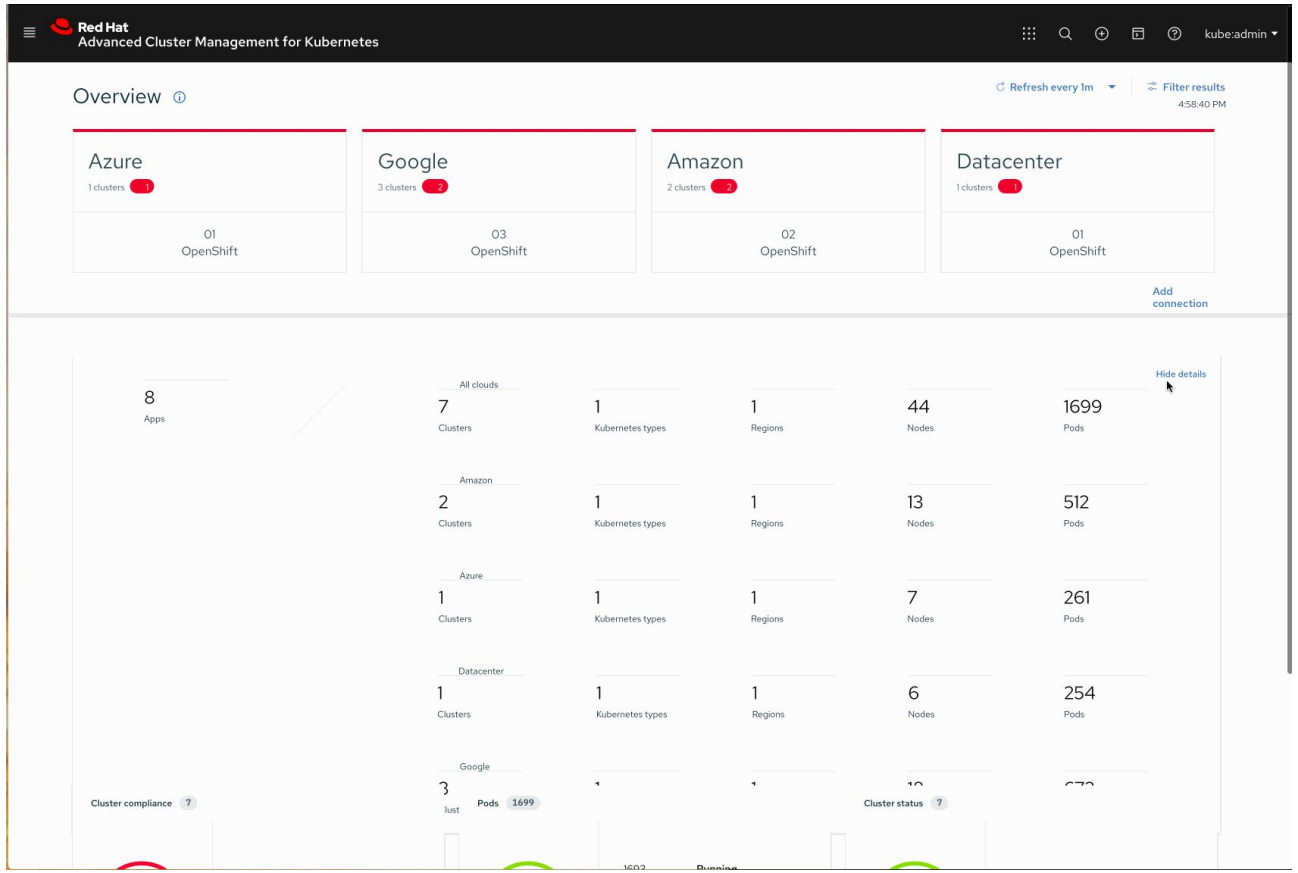
Overview

IT Operations

DevOps/SRE



- Full Management of OCP Kubernetes
  - OpenShift 3.11, 4.1.x - 4.5.x
  - Public cloud hosted: OCP
- Public cloud managed kubernetes: EKS, AKS, GKE, IKS
  - Search, find and modify kubernetes resources.
- See high level summaries across all clusters
  - Misconfiguration
  - Pod status
  - Resource capacity
- Troubleshoot and resolve issues across the federated domain
  - See in dashboard or via a list/table form
  - Table shows custom tagging
  - Regions
  - Business Purpose
  - Version



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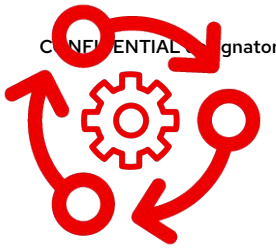
Multi-Cluster Lifecycle Management

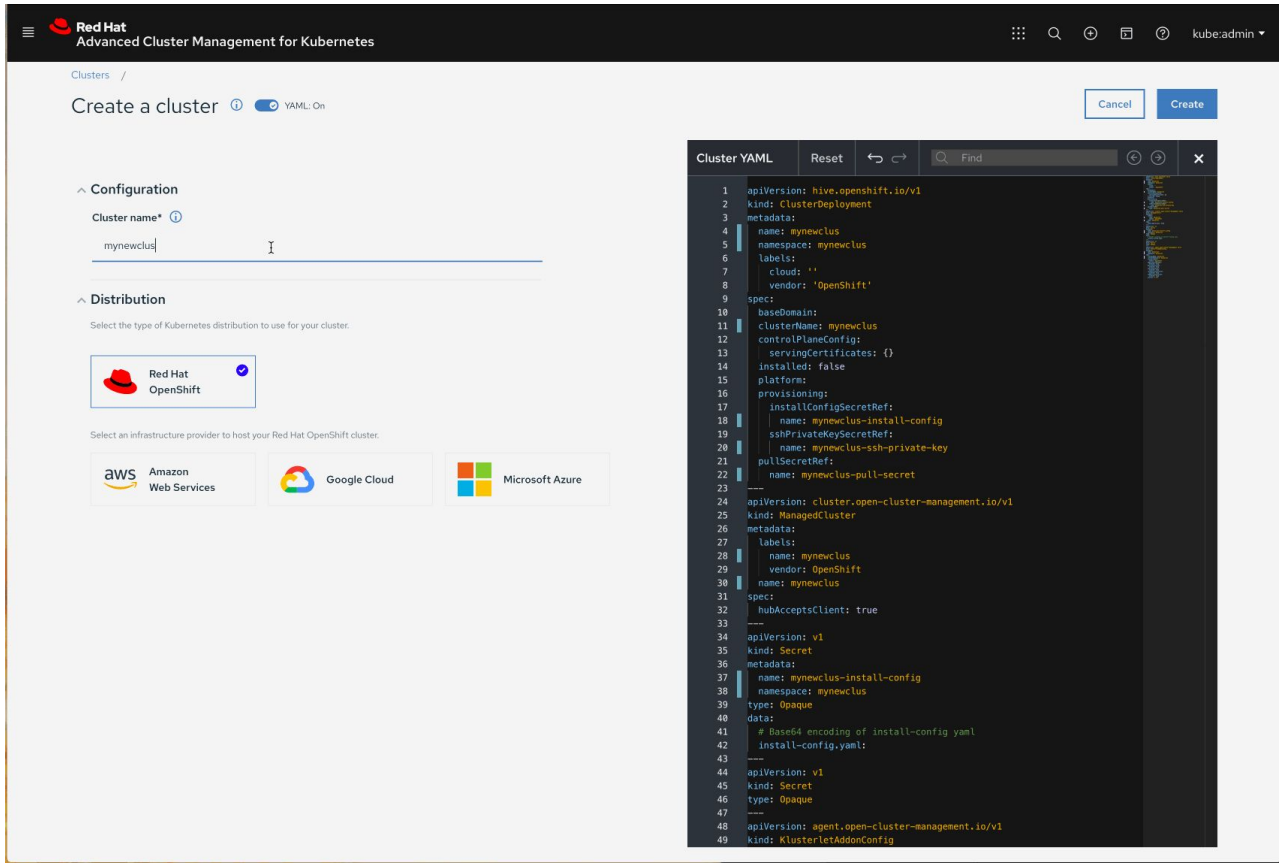
Creating & Importing Clusters

IT Operations

DevOps/SRE



- **Create**, **Upgrade** and **Destroy** OCP clusters running on **Bare-metal** as well as public cloud
- Leverage **Hive** API for OCP cluster deployment
- Wizard or YAML based create cluster flow
- Launch to an OCP Console from ACM
- Access cluster login credentials and download kubeadmin configuration



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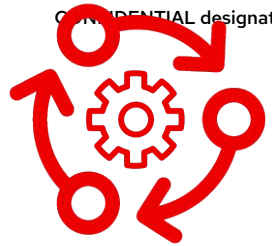
Multi-Cluster Lifecycle Management

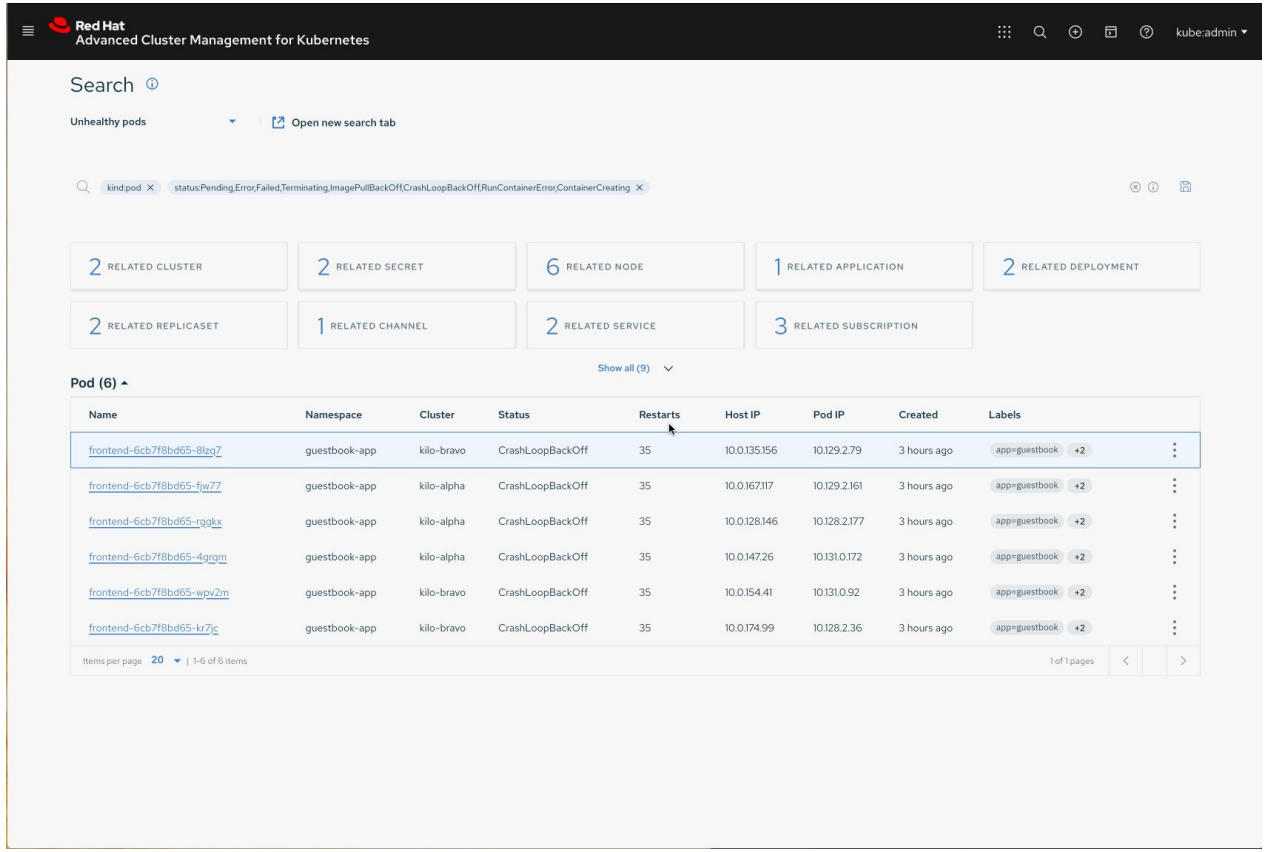
Dynamic Search

IT Operations

DevOps/SRE



- Troubleshooting across clusters via relationships
- See all **unhealthy** pods
- See related application models to those pods
- See related Persistent Volumes
- See related secrets
- See related ***any*** kube resource object category



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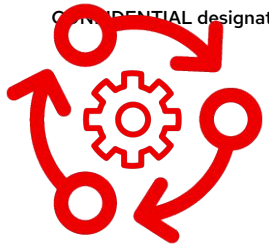
Multi-Cluster Lifecycle Management

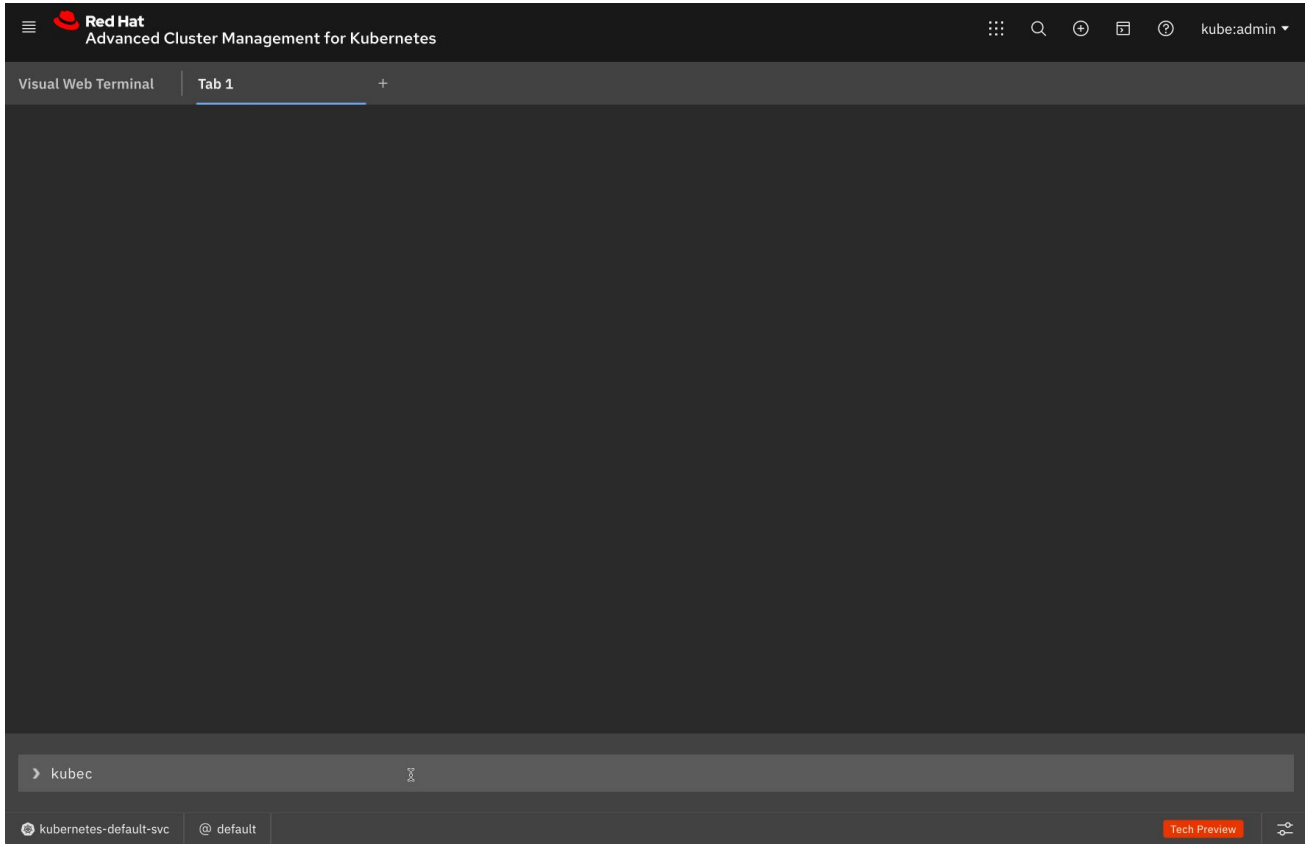
Visual Web Terminal **Tech-Preview**

IT Operations

DevOps/SRE



- Interactive terminal combines command input with visual output
- One **Terminal** for **all**
- Works with **helm**, **kubectl**, oc, **istioctl**
- Single interface for multi-cluster
- Drive ops directly from dashboards
- Bash commands allow for grep



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Policy Driven Governance Risk and Compliance

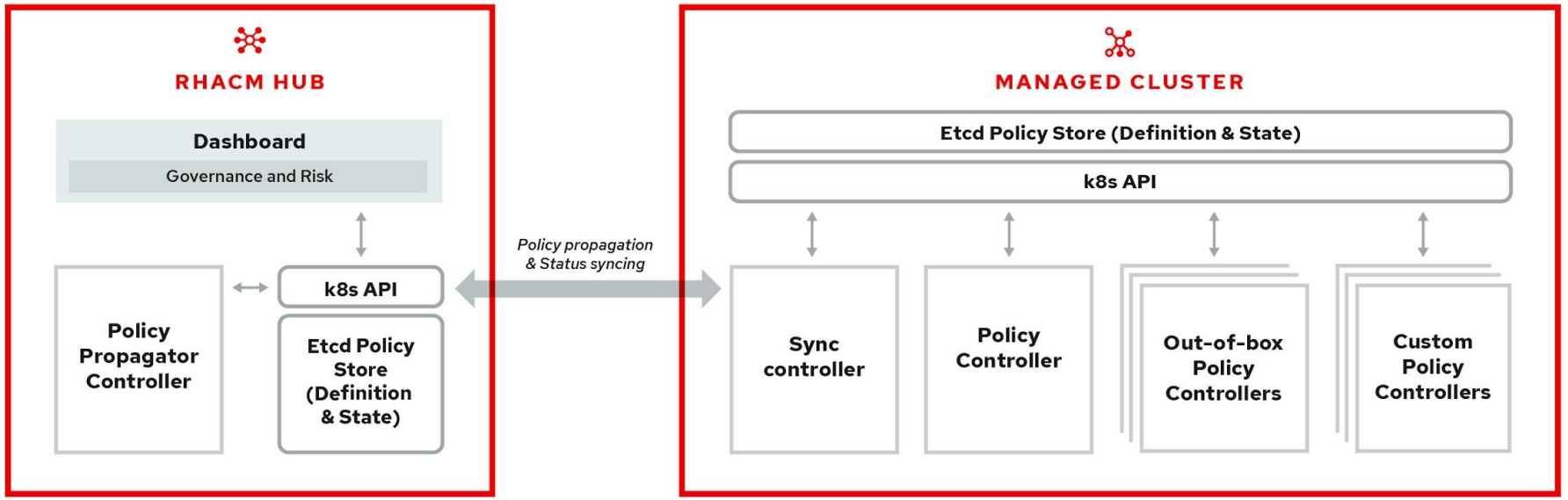
Architecture Overview

Security Ops

IT Operations

Managed Cluster and GRC Controllers

- Driven by Kubernetes CRDs and controllers
- Governance capability for managed clusters covering both security and configuration aspects.
- Out of box policies and an extensible policy framework



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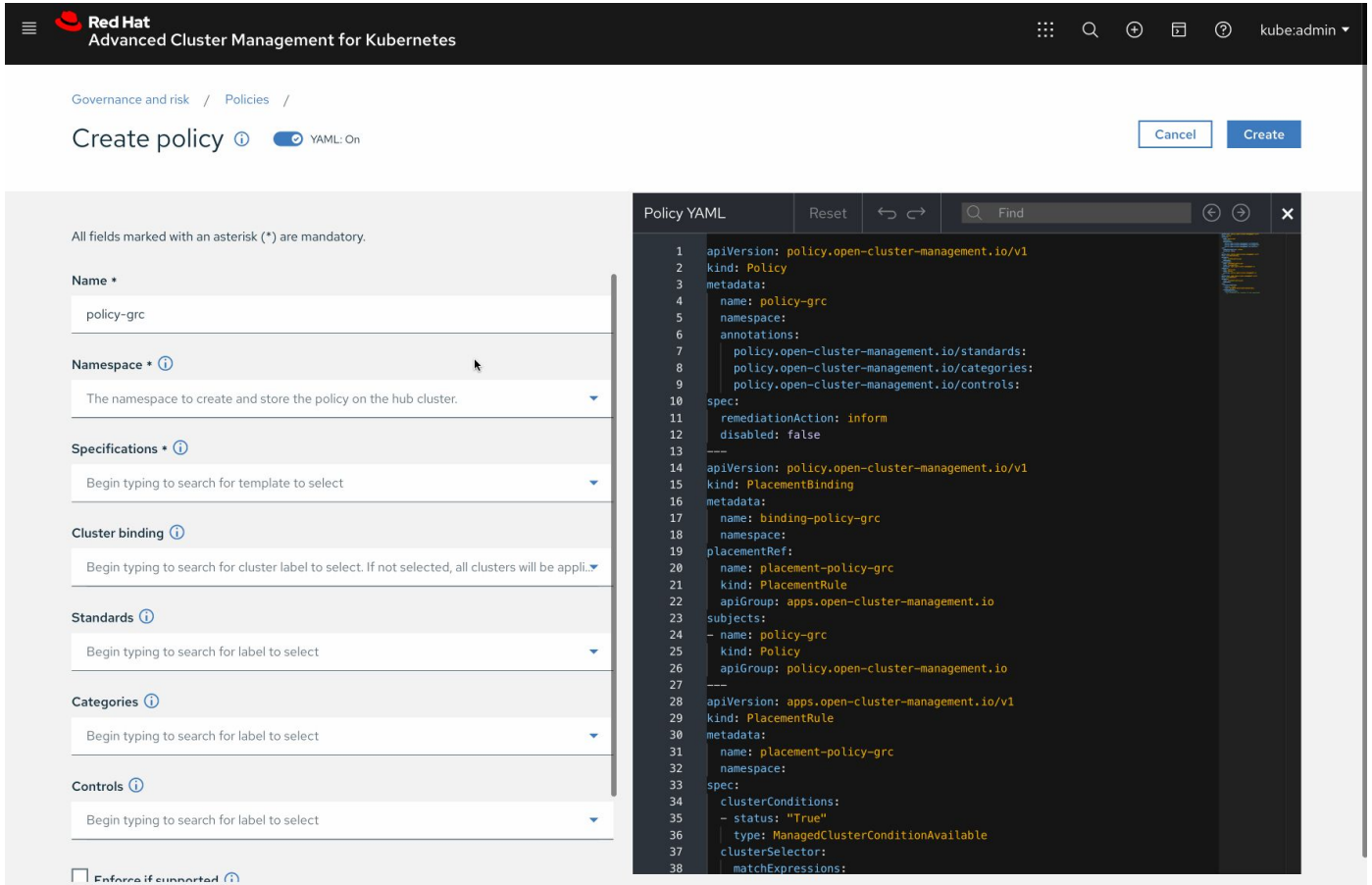
Policy based Governance, Risk and Compliance

Don’t wait for your security team to tap you on the shoulder

Security Ops

IT Operations

- Set and enforce policies for security, applications, & infrastructure
- Deep visibility for auditing configuration of apps and clusters
- Unique policy capabilities around CIS compliance
- Categorize violations based on your standards for immediate visibility into your compliance posture



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Policy based Governance, Risk and Compliance

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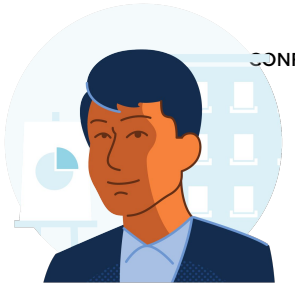
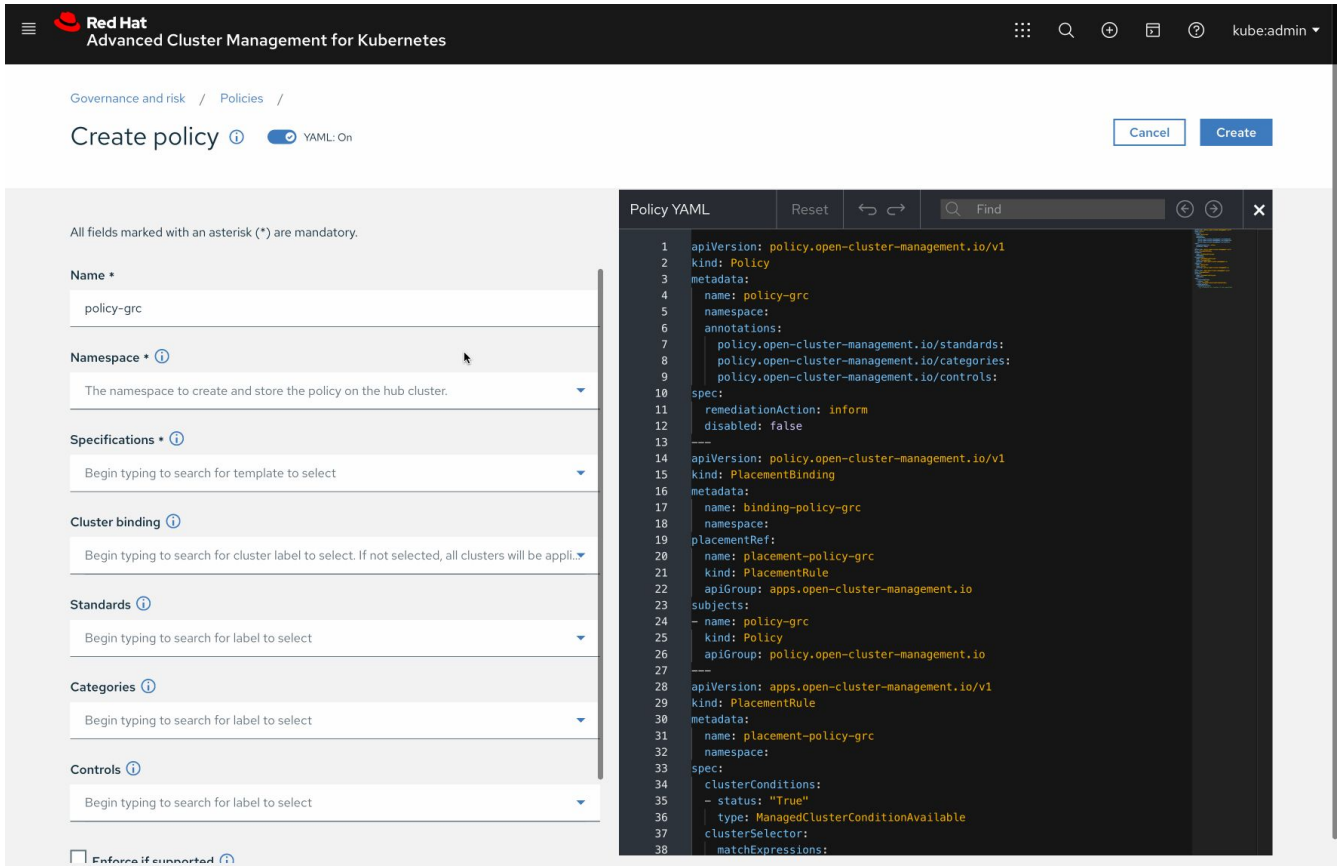
Security Ops



IT Operations

- Standard Policies out of the box
  - FISMA
  - HIPAA
  - NIST
  - PCI
- Leverage Different Categories to Represent more standards (if Needed)
- Use Labels to enforce policies against clusters
- Use **inform** to view policy violations
- Use **enforce** to view violations and automatically remediate



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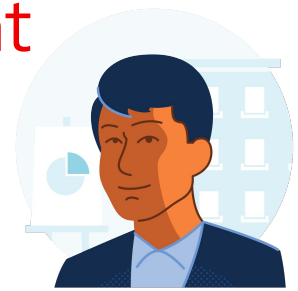
Advanced Application Lifecycle Management

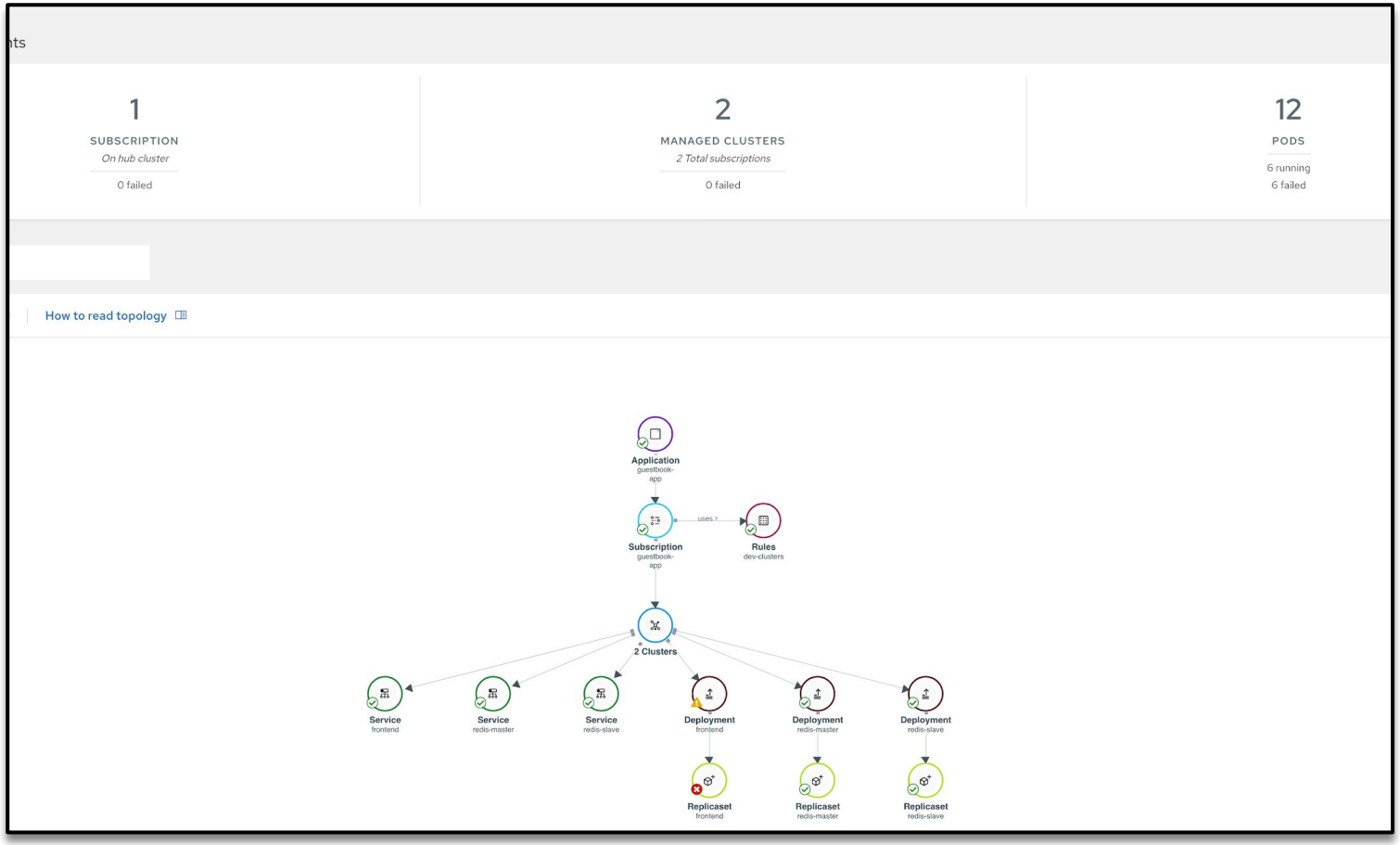
Simplify your Application Lifecycle



IT Operations

DevOps/SRE

- Deploy Applications at Scale
- Deploy Applications from Multiple Sources and Clusters
- Quickly Visualize Application Relationships
- Using the subscription & channel model, the latest application revisions are delivered to appropriate clusters, automatically.



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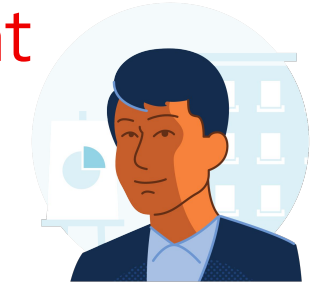
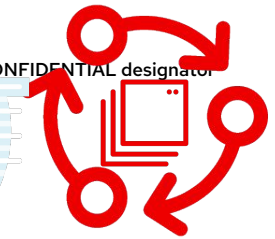
Advanced Application Lifecycle Management

Subscriptions Bring Enterprise to Kubernetes

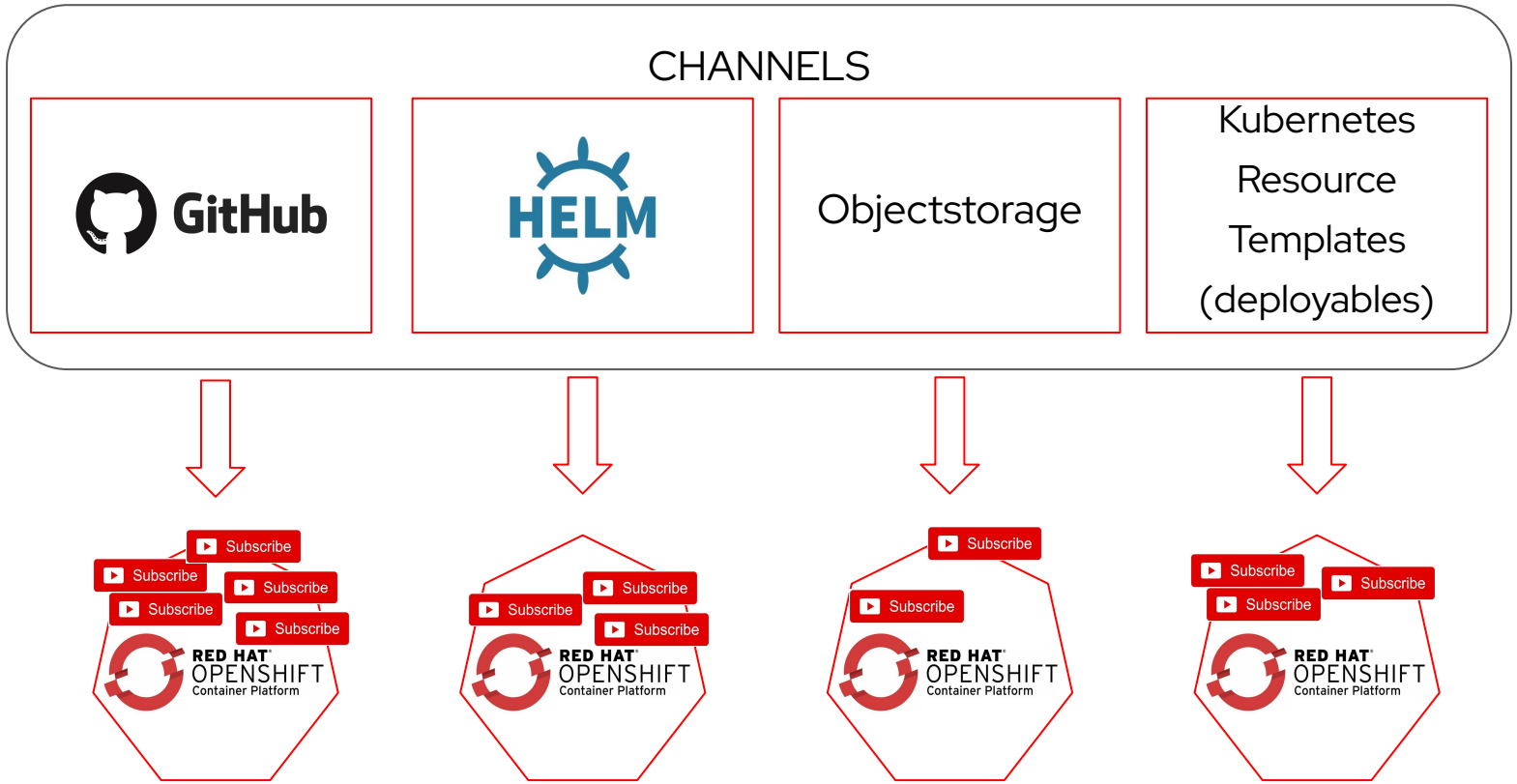


IT Operations

DevOps/SRE



- Extending the best of Enterprise into a desired state methodology
- Time Windows: New releases during your maintenance windows
- Rolling Updates: Control the rate and load on your growing infrastructure



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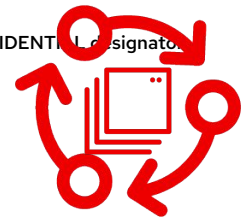
Advanced Application Lifecycle Management

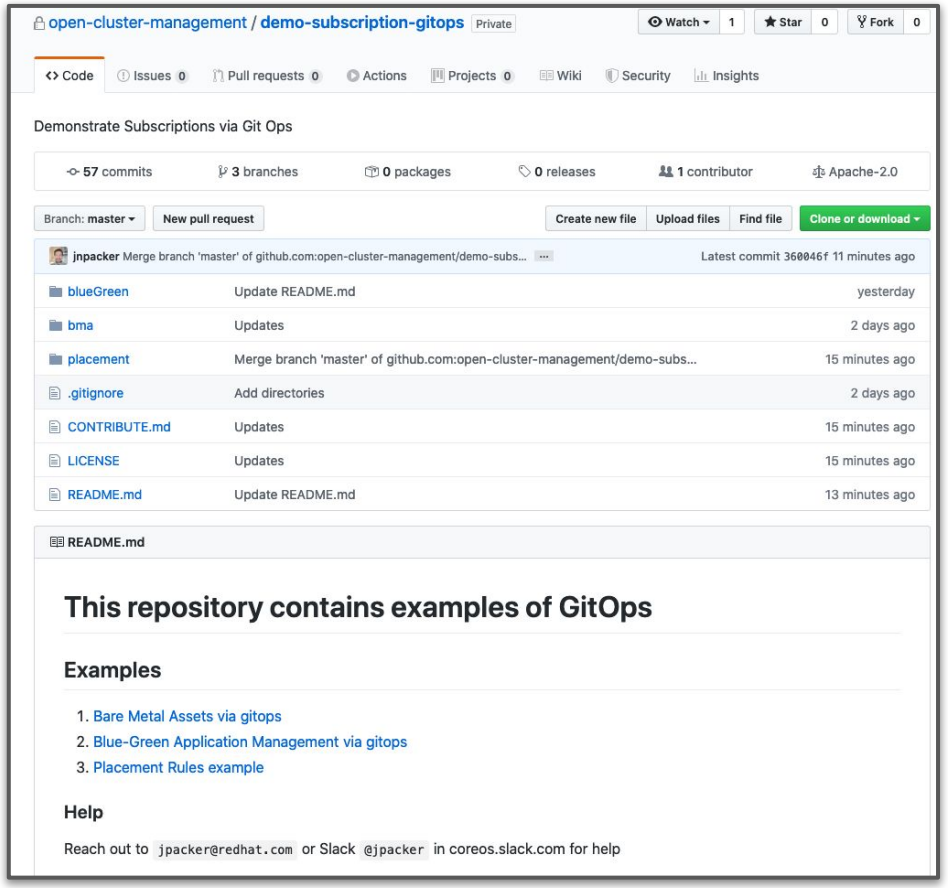
GitOps as the source of truth

IT Operations

DevOps/SRE



- Create, modify & delete, just as you would any source code. Git becomes your source of truth controlling your data center.
- Have a record of who, what & when for every change precipitated in your environments
- Through code Reviews & Approvals, take full control of all changes to your data center(s)
- Restore your environment, via the Git commit history (system of record)



https://github.com/open-cluster-management/demo-subscription-gitops

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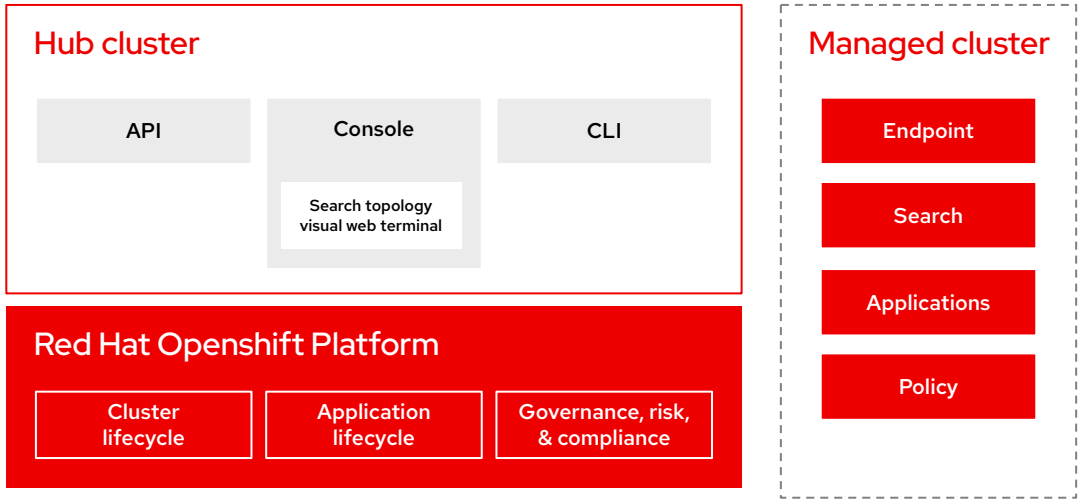
Architecture

Red Hat Advanced Cluster Management For Kubernetes

Architecture overview

IT Operations



Hub architecture and components

Red Hat Advanced Cluster Management uses the multicluster-hub operator and runs in the open-cluster-management namespace

Managed cluster architecture and components

Red Hat Advanced Cluster Management managed clusters use the multicluster-endpoint operator which runs in the multicluster-endpoint namespace

Installation

Advanced Cluster Management For Kubernetes

Installation and Foundation

Operator Install for Hub

Hub Cluster

- Operator based installation
- Available on OperatorHub
- Requires OCP 4.3.x ->

Full Management of OCP clusters

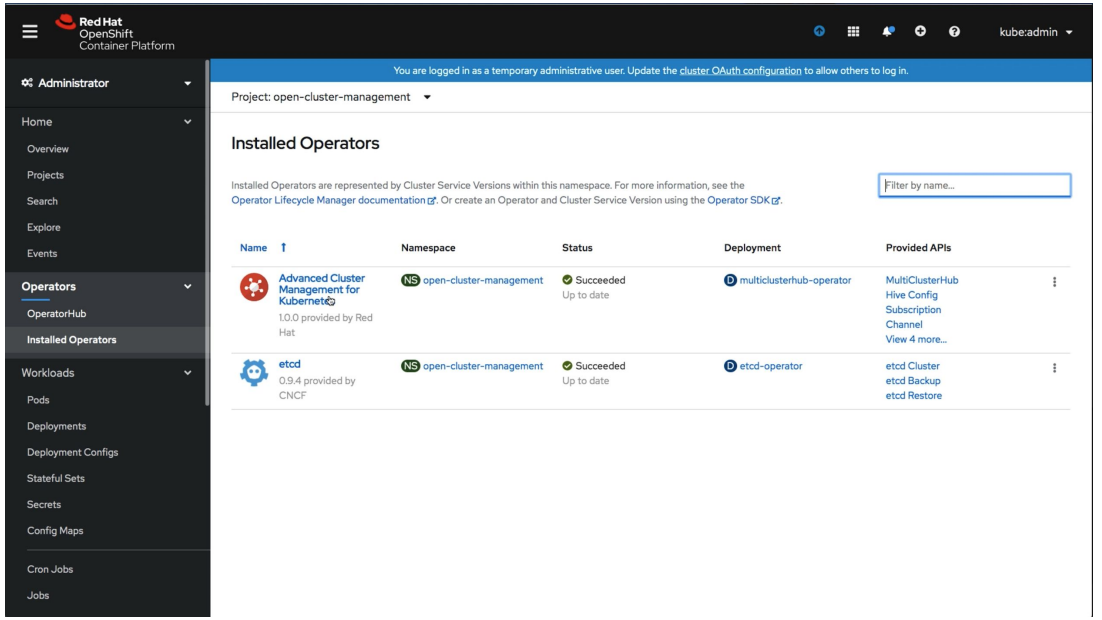
- OpenShift 3.11, 4.1.x ->
- Public cloud hosted: OCP

Limited Support for Public cloud managed Kubernetes

- EKS, AKS, GKE, IKS

High Availability

- Supports OCP Availability Zone
- Limitation for Search component based on RedisGraph



Resource Requirements

- **Test**: 3 master, 3 workers, 6 v CPU and 16GB RAM
- **Production**: 3 masters, 3 workers, 16vCPU and 24GB RAM*

  * Production requirements vary based on number of clusters in the management domain and types of workloads being run.

  * vCPU/RAM Numbers are per node.

Installation and foundation

Operator install for managed cluster

IT Operations

Managed cluster

The multicluster-endpoint operator controls the deployment of components on the managed cluster.

List of included components:

- Application manager
- Connection manager
- Work manager
- Policy controller
- Search collector
- Service registry
- IAM policy controller
- Certificate policy controller
- CIS policy controller

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