Red Hat OpenShift

Advanced Cluster Management for Kubernetes

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PSA EMEA

Presenter's Name
Title

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Introducing Red Hat Advanced Cluster Management For Kubernetes

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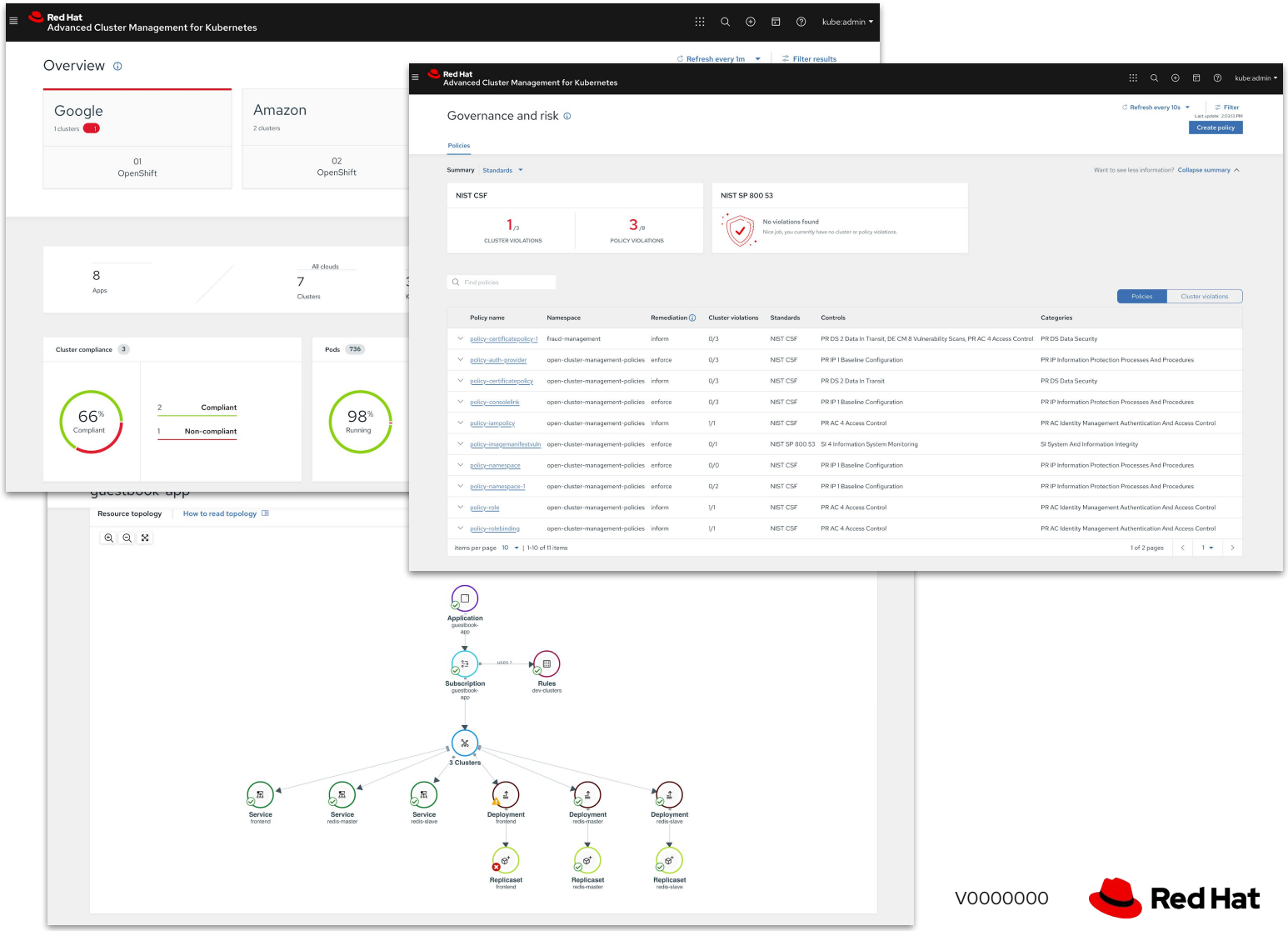
Robust. Proven. Award winning.

Multicluster lifecycle management

Policy driven governance, risk, and compliance

Advanced application lifecycle management



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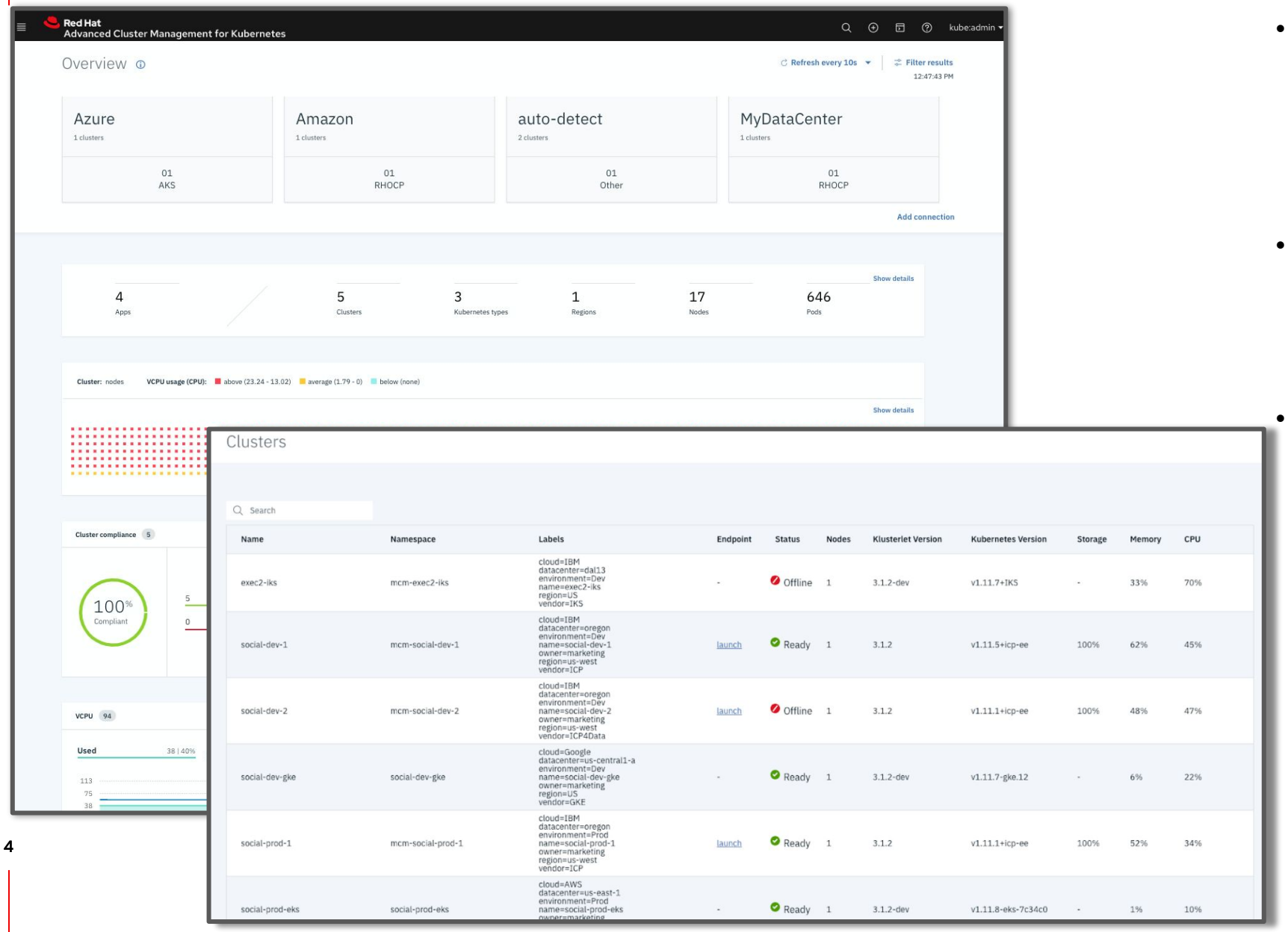
Unified Multi-Cluster Management

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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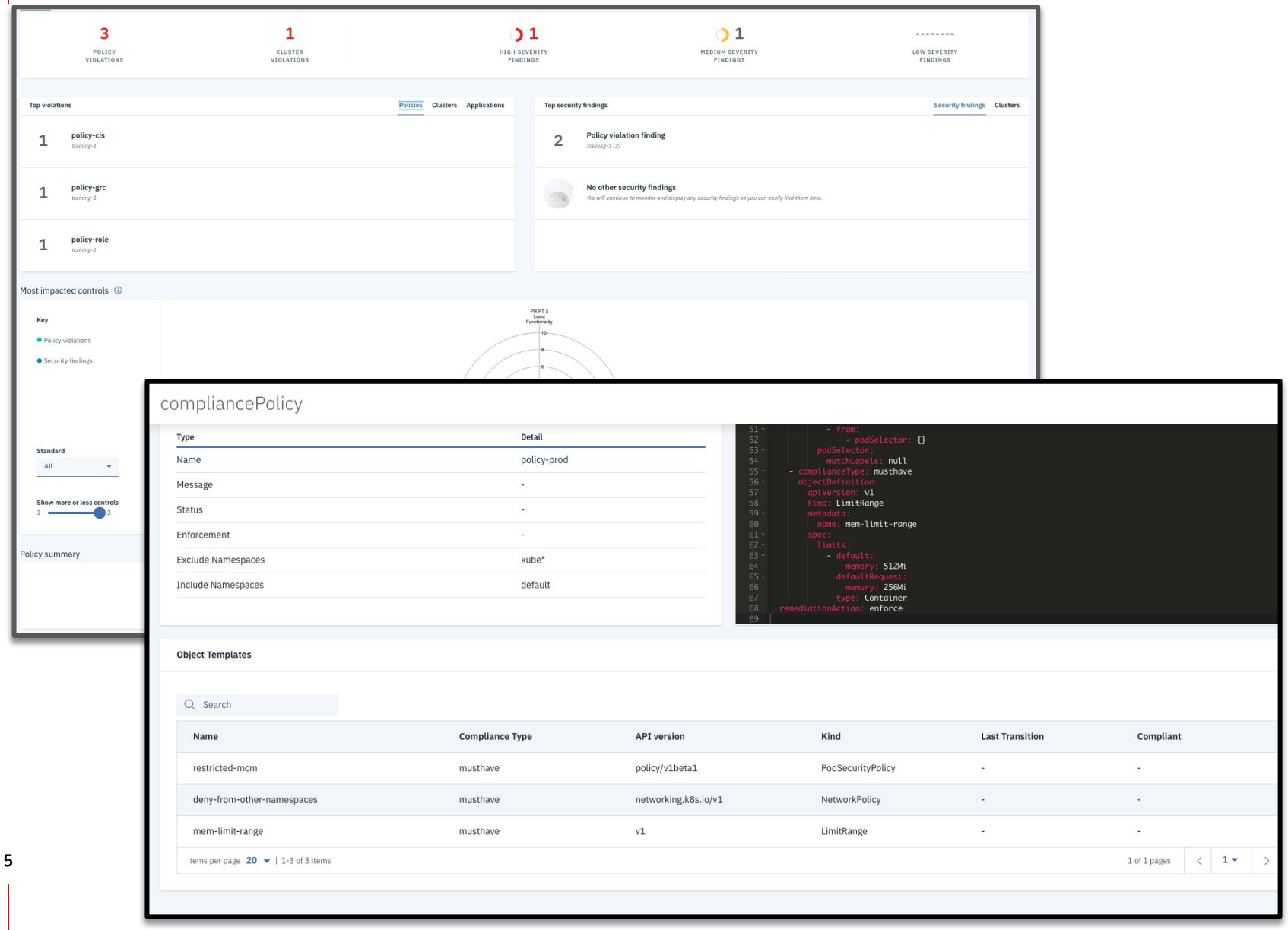
Policy based Governance, Risk and Compliance

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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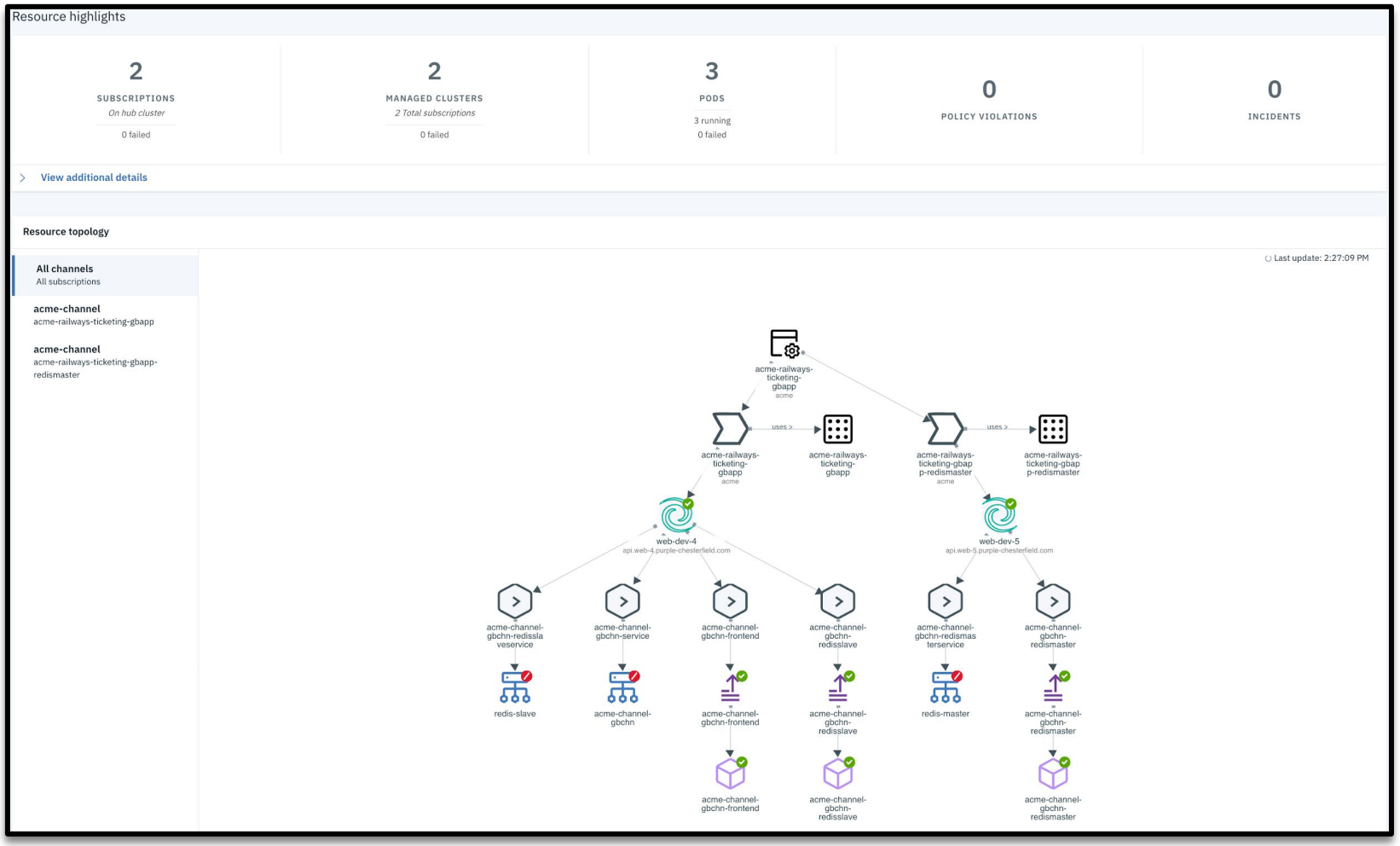
Advanced Application Lifecycle Management

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.

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Detailed Use Cases

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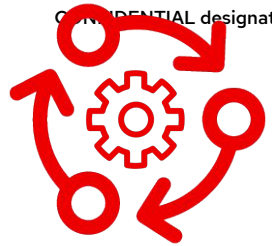
Multi-Cluster Lifecycle Management

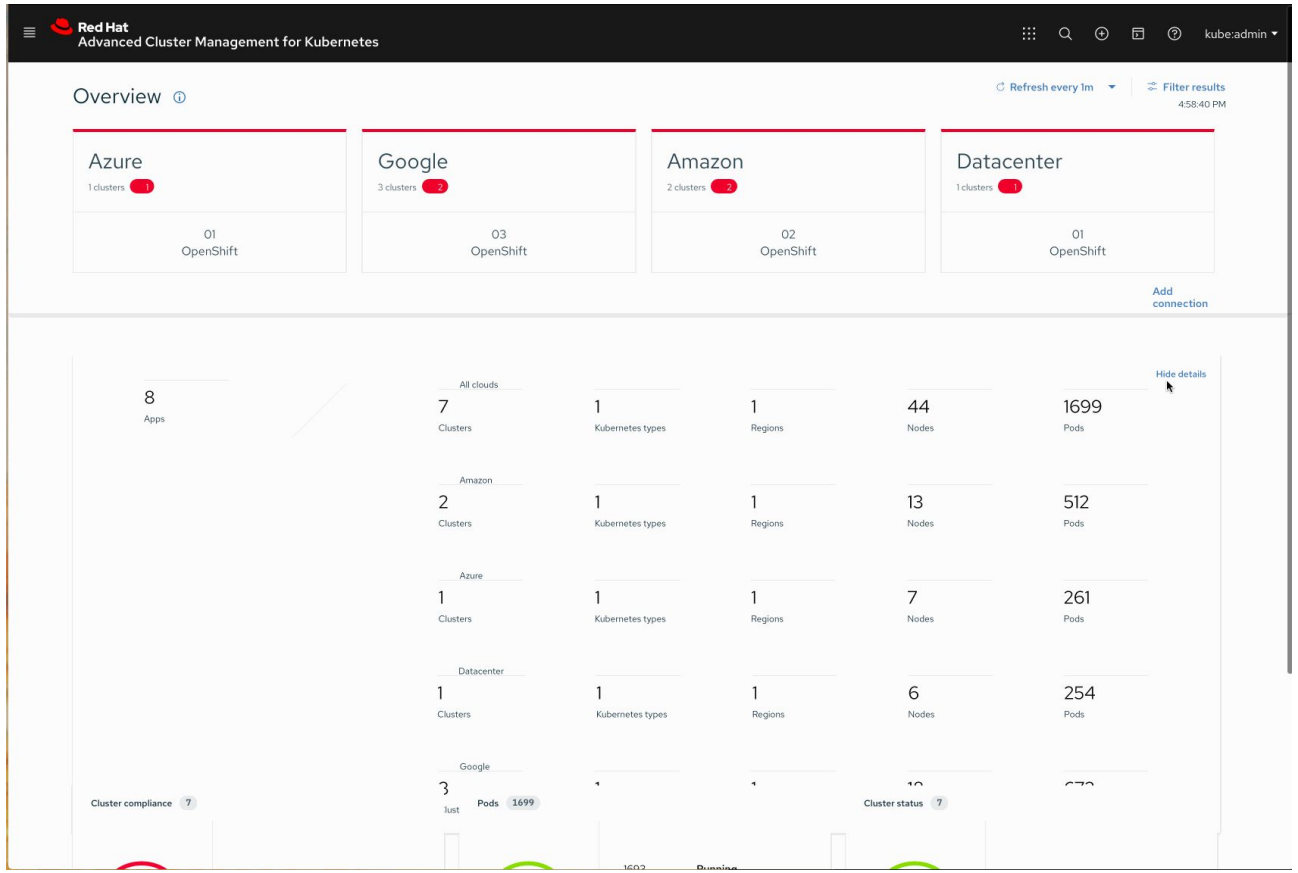
Overview

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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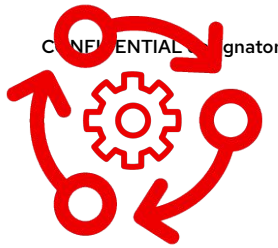
Multi-Cluster Lifecycle Management

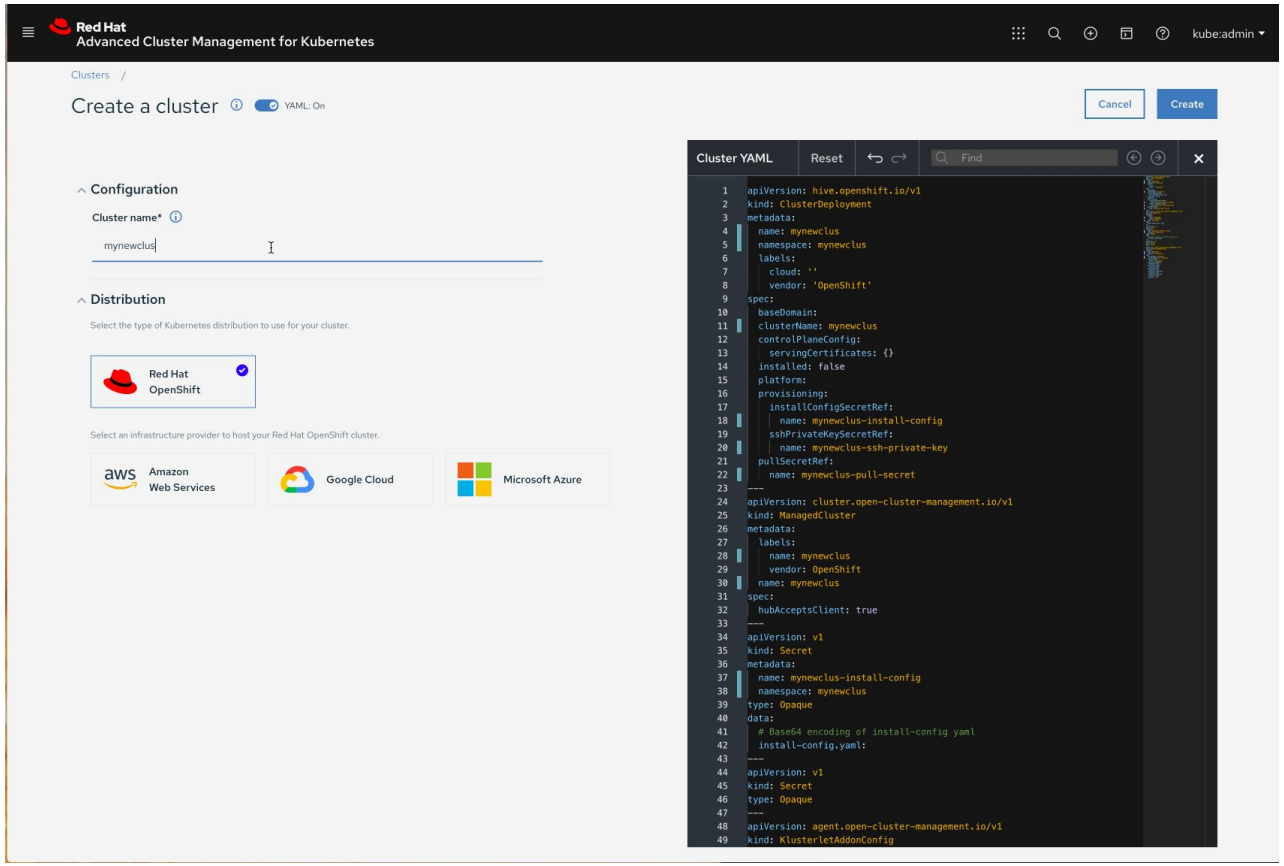
Creating & Importing Clusters

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



Multi-Cluster Lifecycle Management

Dynamic Search

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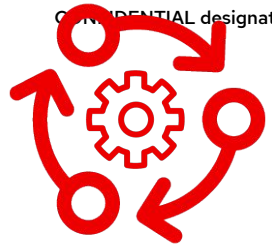
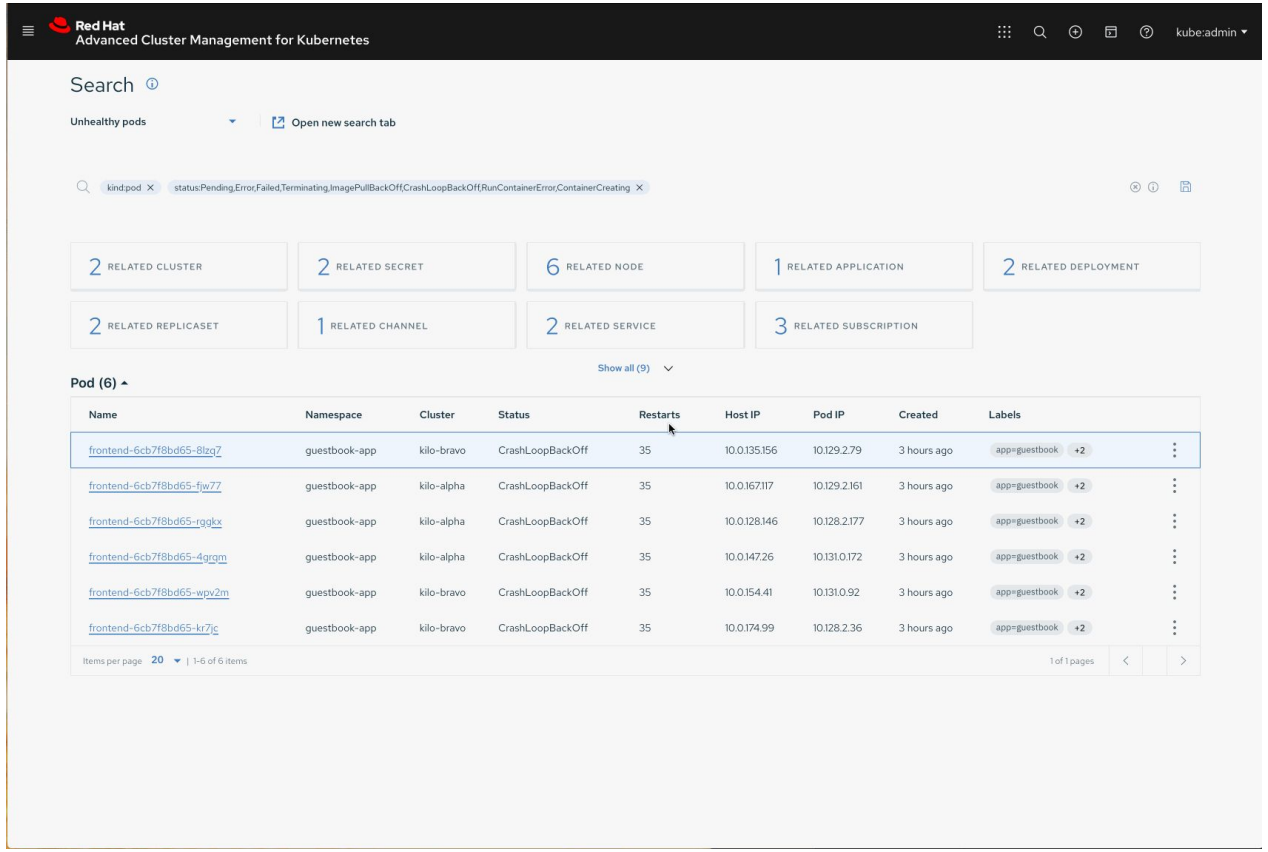
IT Operations

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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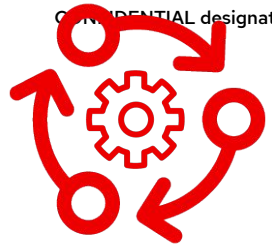
Multi-Cluster Lifecycle Management

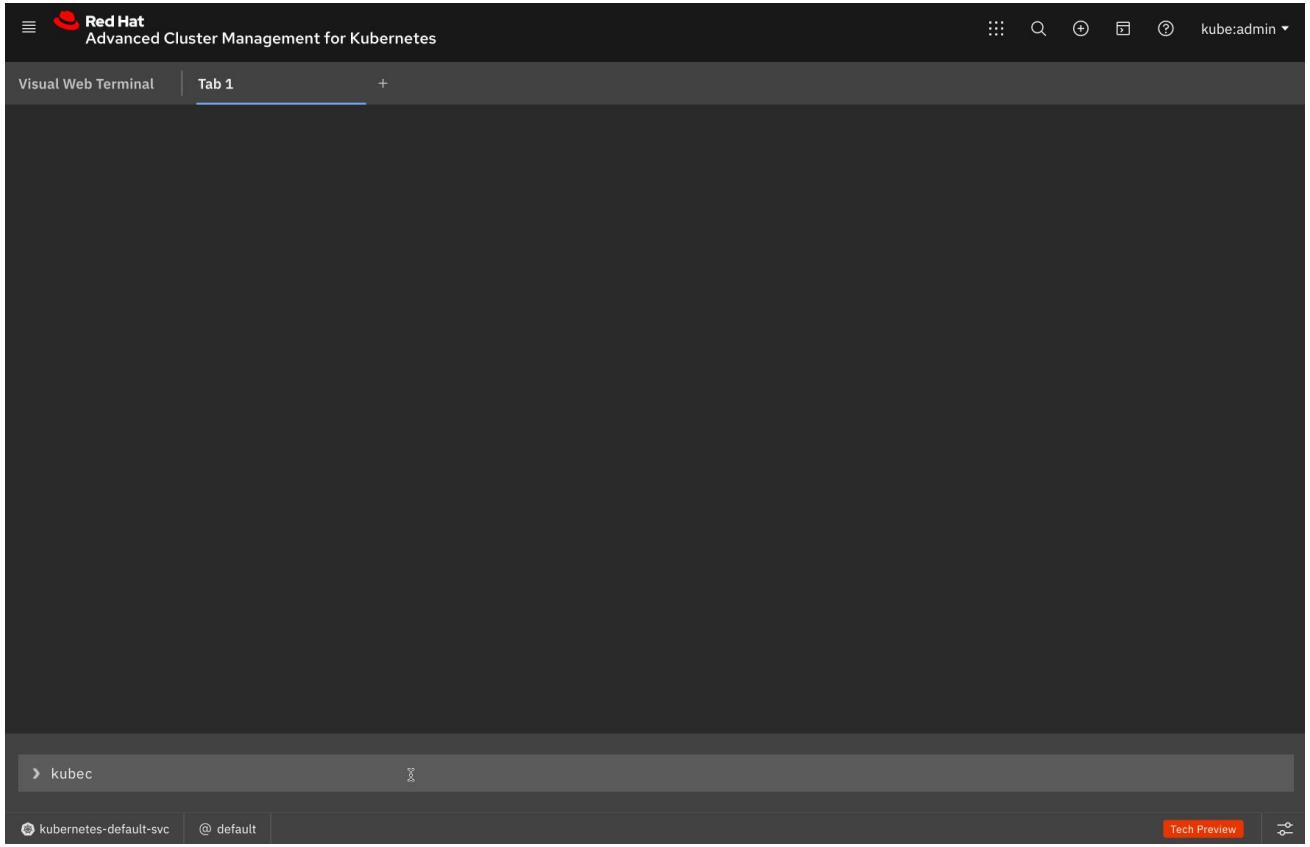
Visual Web Terminal **Tech-Preview**

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

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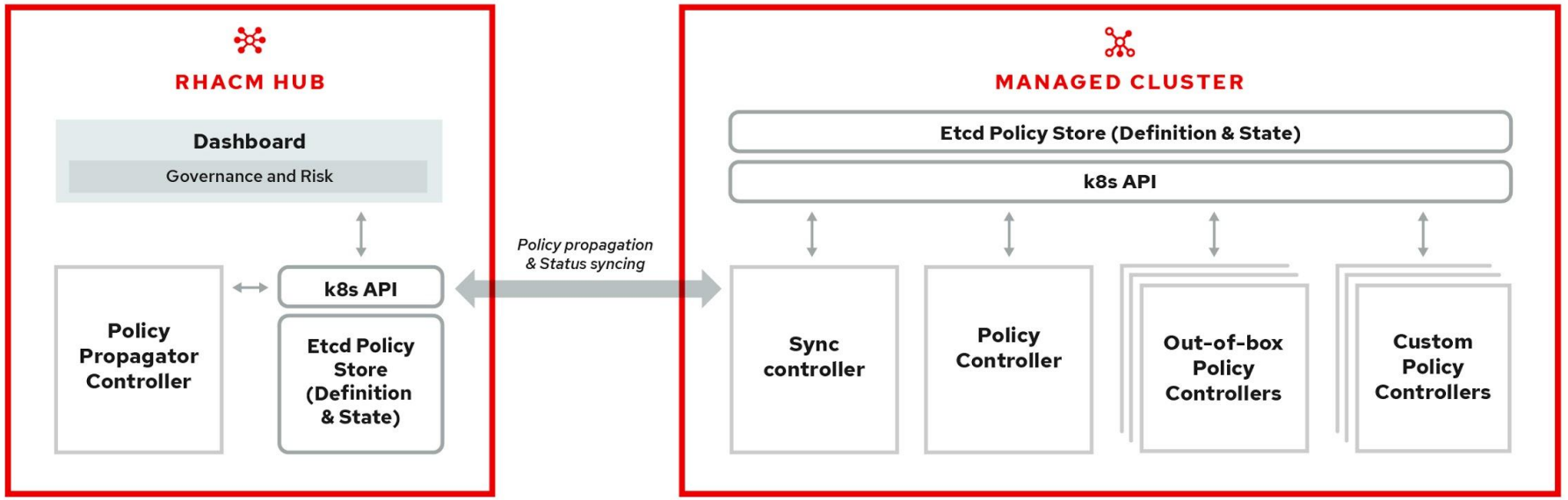
Security Ops

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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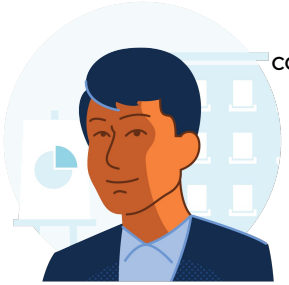
Policy based Governance, Risk and Compliance

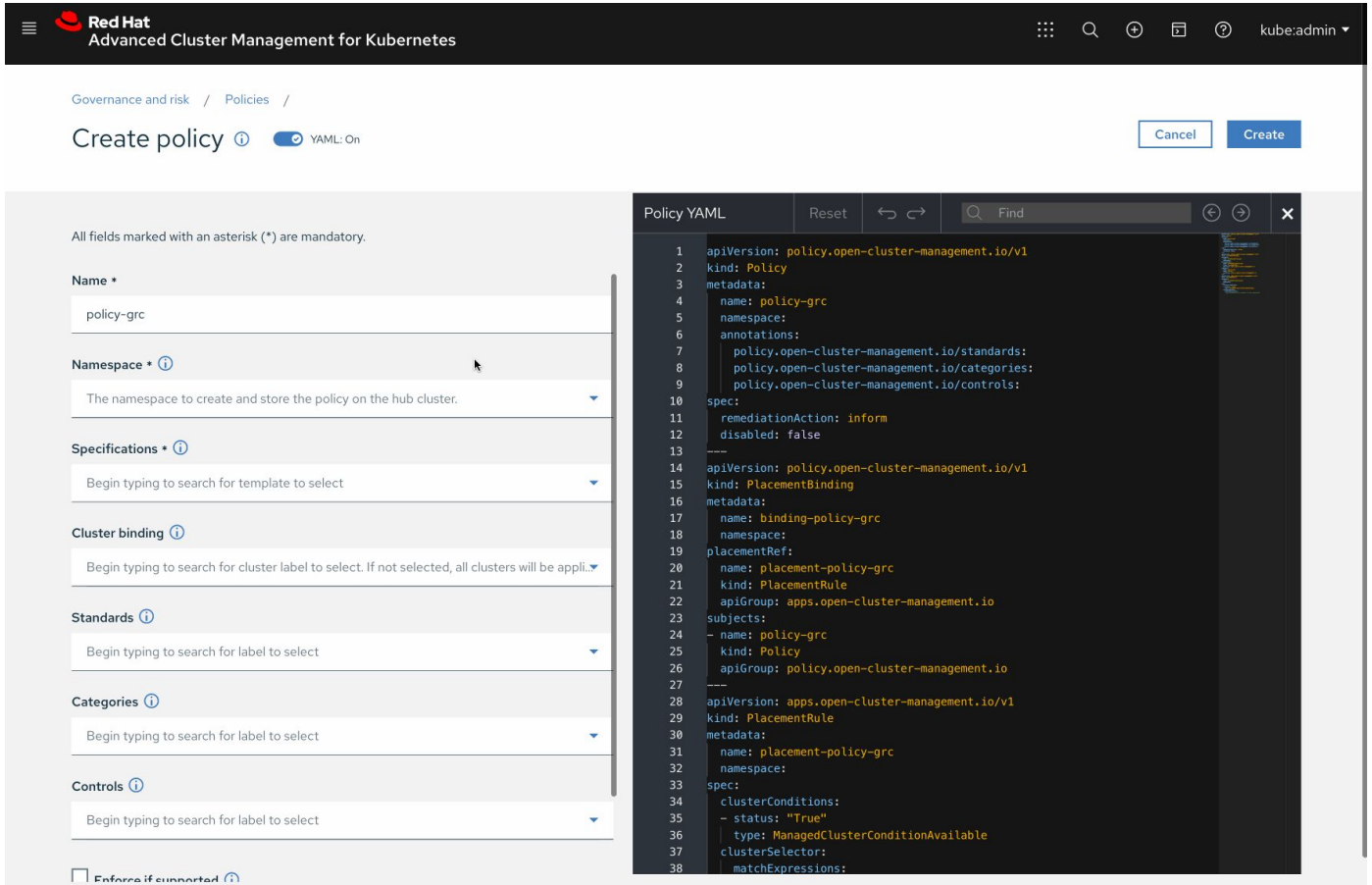
Don’t wait for your security team to tap you on the shoulder

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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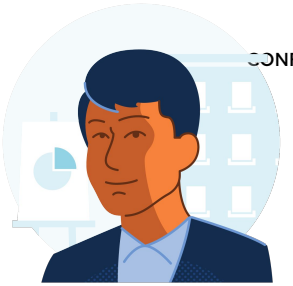
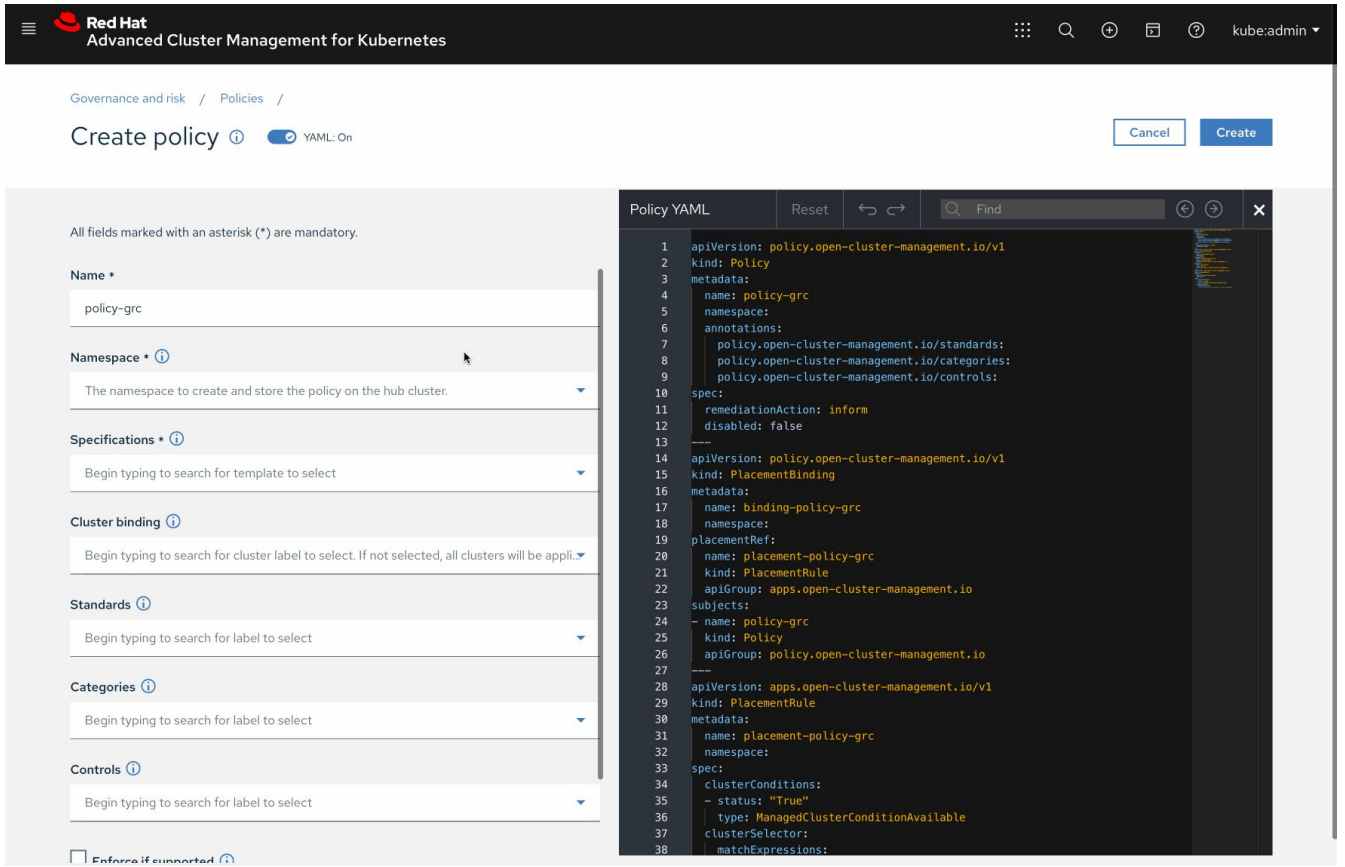
Security Ops



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

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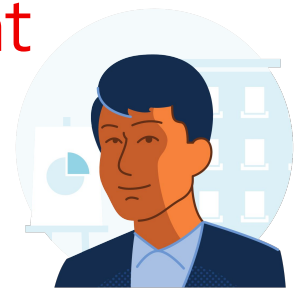
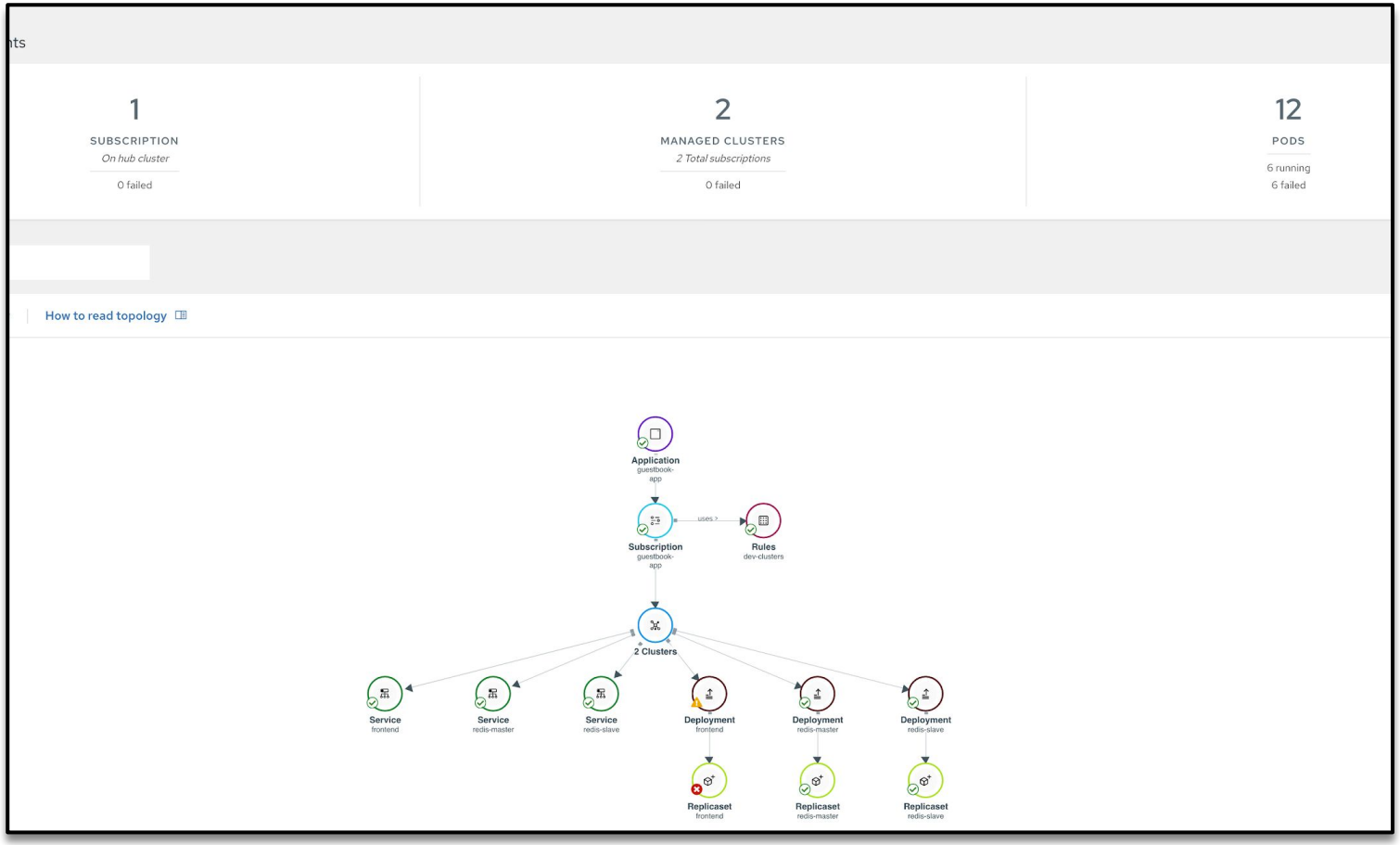


IT Operations

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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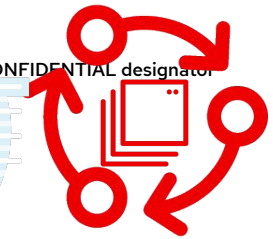
Advanced Application Lifecycle Management

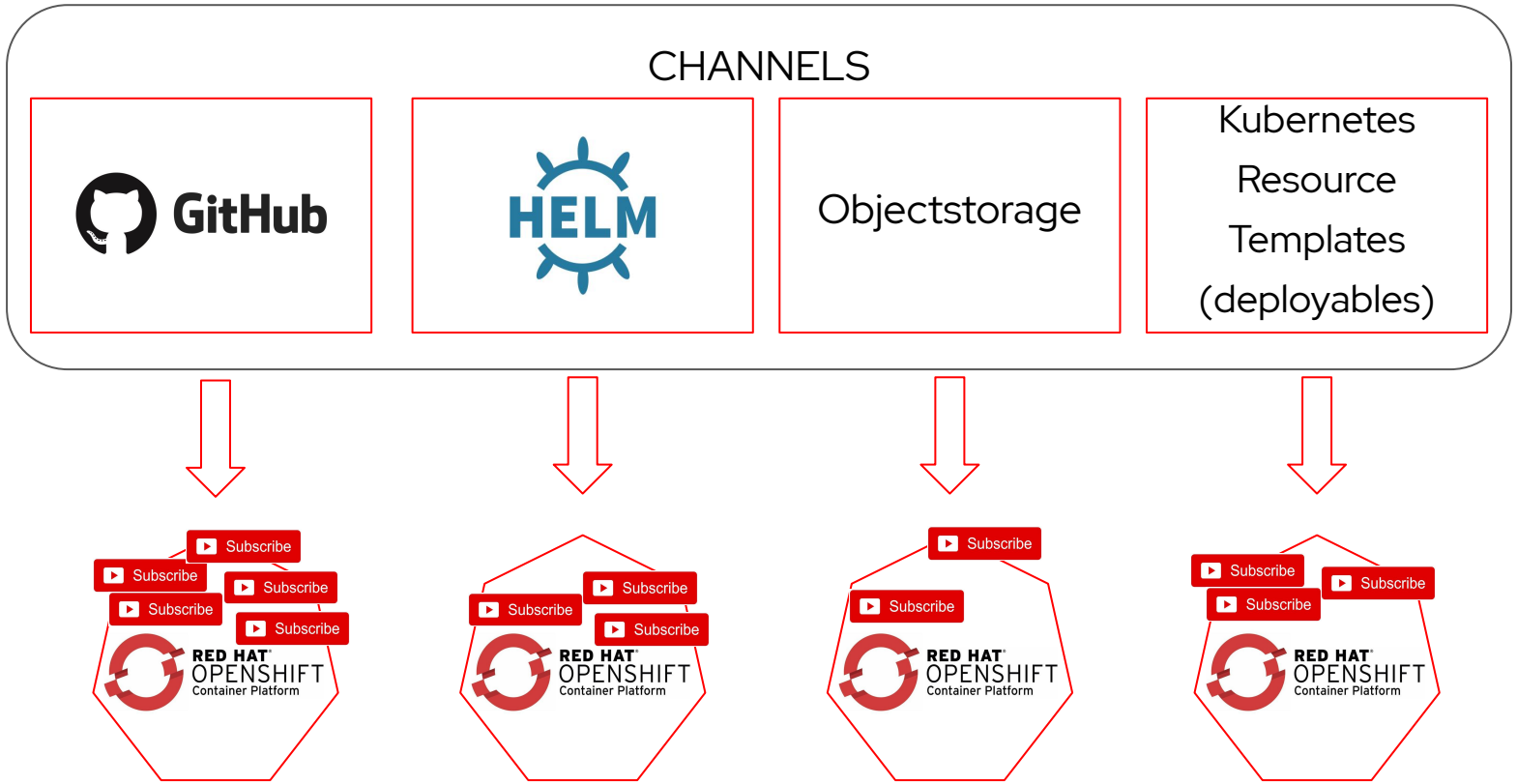
Subscriptions Bring Enterprise to Kubernetes

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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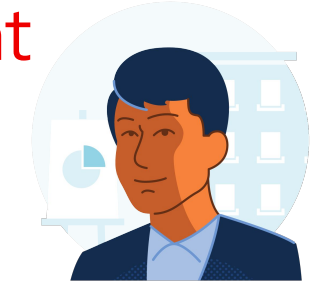
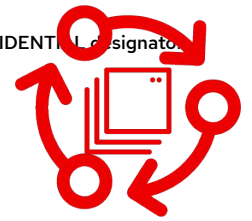
Advanced Application Lifecycle Management

GitOps as the source of truth

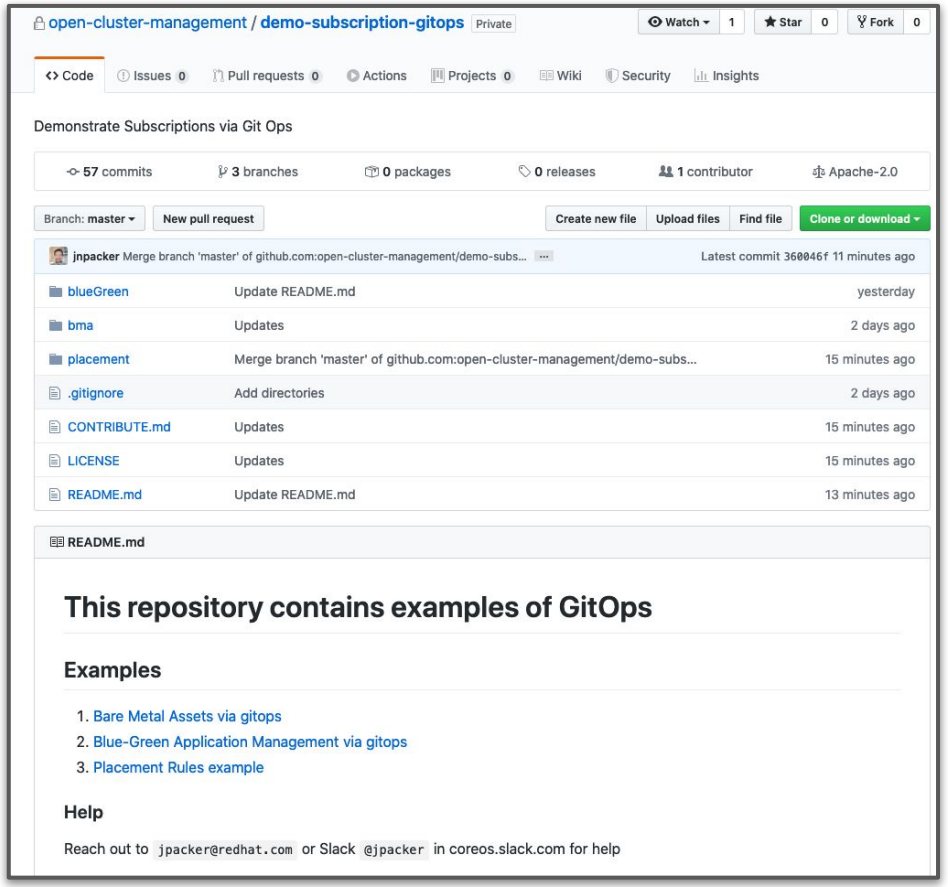


IT Operations

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

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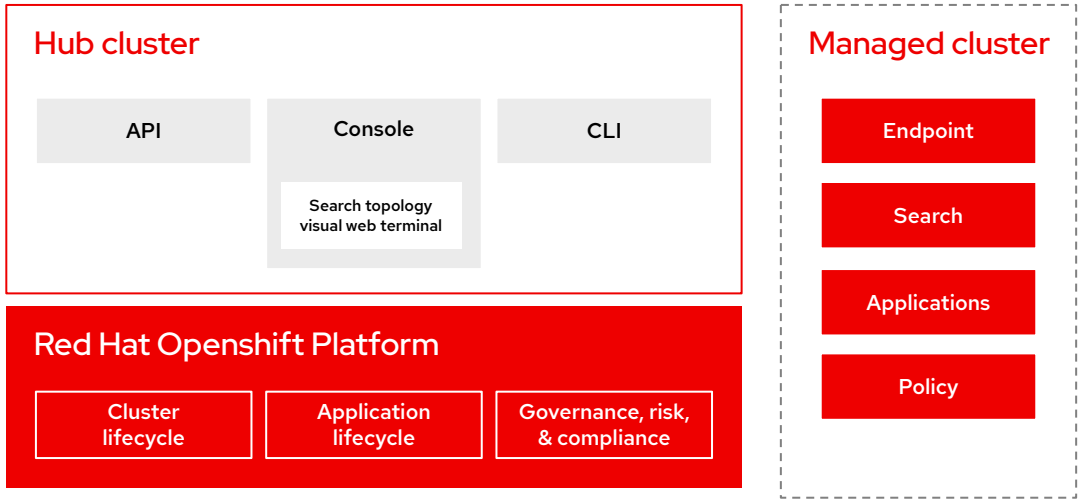
Architecture overview

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

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Installation and Foundation

Operator Install for Hub

Hub Cluster

- Operator based installation
- Available on OperatorHub
- Requires OCP 4.3.x - 4.5.x

Full Management of OCP clusters

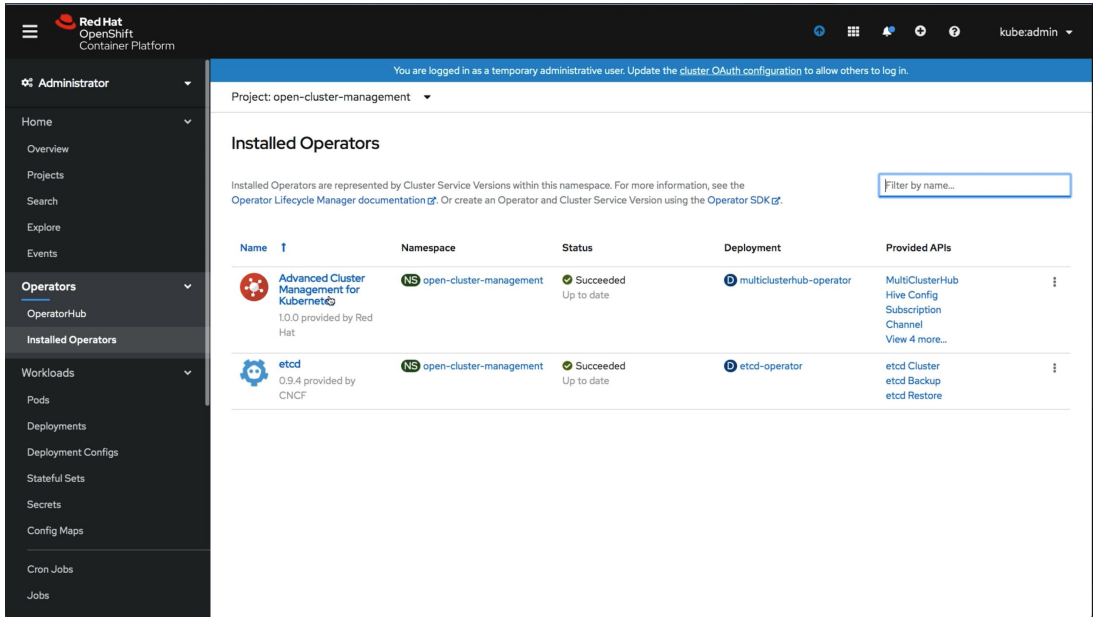
- OpenShift 3.11, 4.1.x - 4.5.x
- Public cloud hosted: OCP

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

Role-Based Access Control

How to control User access

Security OPS

- There are no RHACM specific Roles or Personas, we rely on the default roles included in OCP
  - **Cluster Admin** - Super User can perform all actions
  - **Admin** - Can perform some actions
  - **Edit** - Read access
  - **View-** Read access
- Default User after installation is Kube Admin

UI Panel	Cluster Admin	Admin	Edit	View
Home Page	Read	Read	Read	Read
Overview Page	Read	Read	Read	Read
Topology View	Read	Read	Read	Read
Cluster View	CRUD*	Read	Read	Read
Manage Applications	CRUD*	CRUD*	Read	Read
Manage Policies	CRUD*	CRUD*	No Access	No Access

*Create / Read / Update /Delete

Pricing and Packaging

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ACM SKUs

ALL ACM SKUs will be in the Private Pricebook until 1QCY21

- Ordering from the Private Pricebook requires a BU Guidance ticket
- Primary SKUs:

SKU	Offering Name	List Price (USD)
MCT3946	Red Hat Advanced Cluster Management for Kubernetes, Standard (2 Core or 4 vCPU)	$675.00
MCT3945	Red Hat Advanced Cluster Management for Kubernetes, Premium (2 Core or 4 vCPU)	$1,000.00

- Other SKUs are available, including SKUs for Telco, CSS, Cloud Suite add-ons, etc. but are not in the Private Pricebook until 4QCY20. Contact Greg Bowman for information and assistance. gbowman@redhat.com.

Refer to the subscription and sizing guide for details

Production SKUs

New SKU#	Existing SKUs Description
MCT3945	Red Hat Advanced Cluster Management for Kubernetes, Premium (2 Core or 4 vCPU)
MCT3946	Red Hat Advanced Cluster Management for Kubernetes, Standard (2 Core or 4 vCPU)
SER0599	60 Day Evaluation of Red Hat Advanced Cluster Management for Kubernetes, Self-Support (2 Cores or 4vCPU)
SER0600	60 Day Evaluation of Red Hat Advanced Cluster Management for Kubernetes, Standard (2 Cores or 4vCPU)
SER0601	Red Hat Advanced Cluster Management for Kubernetes, Self-Support (2 Cores or 4vCPUs, NFR, Partner Only)
SER0602	Red Hat Advanced Cluster Management for Kubernetes, Standard (2 Cores or 4vCPUs, NFR, Partner Only)

ACM Subscription Types

- **ACM Subscriptions are only based on the number of logical cores in the Kubernetes clusters to be managed, so called *Managed Clusters*.**
  - No cost per application managed
- **One base subscription type:**
  - Advanced Cluster Management - 2 Core
  - Available with Standard or Premium support
- **Stackable** (can be combined to cover “bigger” hosts/VMs)
- **Cannot split 2-core subscription**
  - Systems, when registered and subscribed in a managed cluster, consume in 2-core units
  - There is no way at present to consume one core from a subscription
  - If a system only effectively needs 3 cores, two 2-core subscriptions would be consumed.
- **Red Hat does not offer disaster recovery (DR)/cold backup type of subscription**
  - Any system with ACM installed, powered-on or powered-off, running workload or not, requires an active subscription.
- **ACM has Supported and Self-supported Evals as well as NFR SKUs.**
  - Supported Evals are available through the **Sales Assisted Eval** page
  - Self Supported Evals are available through the main product page

Cores vs. vCPUs and hyperthreading

- Virtual machines use virtualized CPUs.
- For hyperthreaded systems
  - To determine whether a particular system supports hyperthreading, visit https://access.redhat.com/solutions/7714
  - You can see two vCPU per underlying physical core
  - Red Hat calculates cores with a ratio of 2 core = 4 vCPUs
  - In other words, a 2-core subscription covers 4 virtual CPUs in a VM

Example: An 8 vCPU VM has 4 effective “cores”, and would need two (2) 2 core subscriptions.

- For non-hyperthreaded systems
  - You can see one vCPU per underlying physical core
  - Red Hat calculates cores with a ratio of 2 cores = 2 vCPUs
  - In other words, a 2-core of a subscription covers 2 virtual CPUs in a VM on a non-hyperthreaded system

Example: An 4 vCPU VM has 4 effective “cores”, and would need two (2) 2 core subscriptions.

Where can I run Red Hat ACM?

Anywhere OCP x86 is supported and tested:

- Bare metal (Tech Preview in RHACM 2.0)
- Virtual
  - VMware vSphere
  - Hyper-V
  - Red Hat Virtualization
- Private cloud
  - Red Hat OpenStack Platform
- Any OCP-certified public cloud
  - Amazon Web Services, Google Cloud Platform, Microsoft Azure, etc.
  - Cloud Access subscription transfer is required
  - https://www.redhat.com/en/technologies/cloud-computing/cloud-access
- For more information on tested platforms: RHACM 2.0 Support Matrix

Red Hat Advanced Cluster Management for Kubernetes

Roadmap :: 2020 And Beyond

Technical Preview 1.0

→Create, upgrade & delete OCP clusters with **Hive**
→Import and manage existing OCP, IKS, ROKS, EKS, AKS, GKE clusters
→Security compliance configuration, IAM, and certificate policies out of the box
→Multi-cluster application delivery with subscription and channel
→Disconnected installation for hub and managed clusters

May 2020

July 2020

General Availability 2.0

→Upstream strategic elements of the ACM control plane
→Application topology status improvements for SRE
→Validate upstream projects including **Cincinnati** (disconnected upgrades), and **Observatorium** (multi-cluster monitoring)
→Serviceability alignment with **Telemetry** and **Insights**
→*Tech Preview* Bare Metal Cluster Lifecycle with **Hive**

General Availability 2.1

→GA Bare Metal, vSphere, RHV, OpenStack IPI using **Hive**
→Discover and import OpenShift from cloud.redhat.com
→GitOps Collaboration with **ArgoCD** community
→GA Multi-cluster monitoring with Observatorium/**Thanos**
→Integrate **Ansible** into key ACM Lifecycle events.
→Improve the SRE user experience with Visual Web Terminal
→Compliance as code (**Compliance Operator**) Phase 1

Oct 2020

Beyond

→Cluster Lifecycle for ARO, OSD, MOA
→Lifecycle and portability for Stateful Applications HA/DR/Migration use cases
→Multi-cluster network configuration with **Service Mesh** and **Submariner**
→Management for OpenShift **Virtualization**
→Integrate **Cost Management** from OCM for Chargeback and App Placement use cases

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Thank you

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