Red Hat
Advanced Cluster Management
for Kubernetes

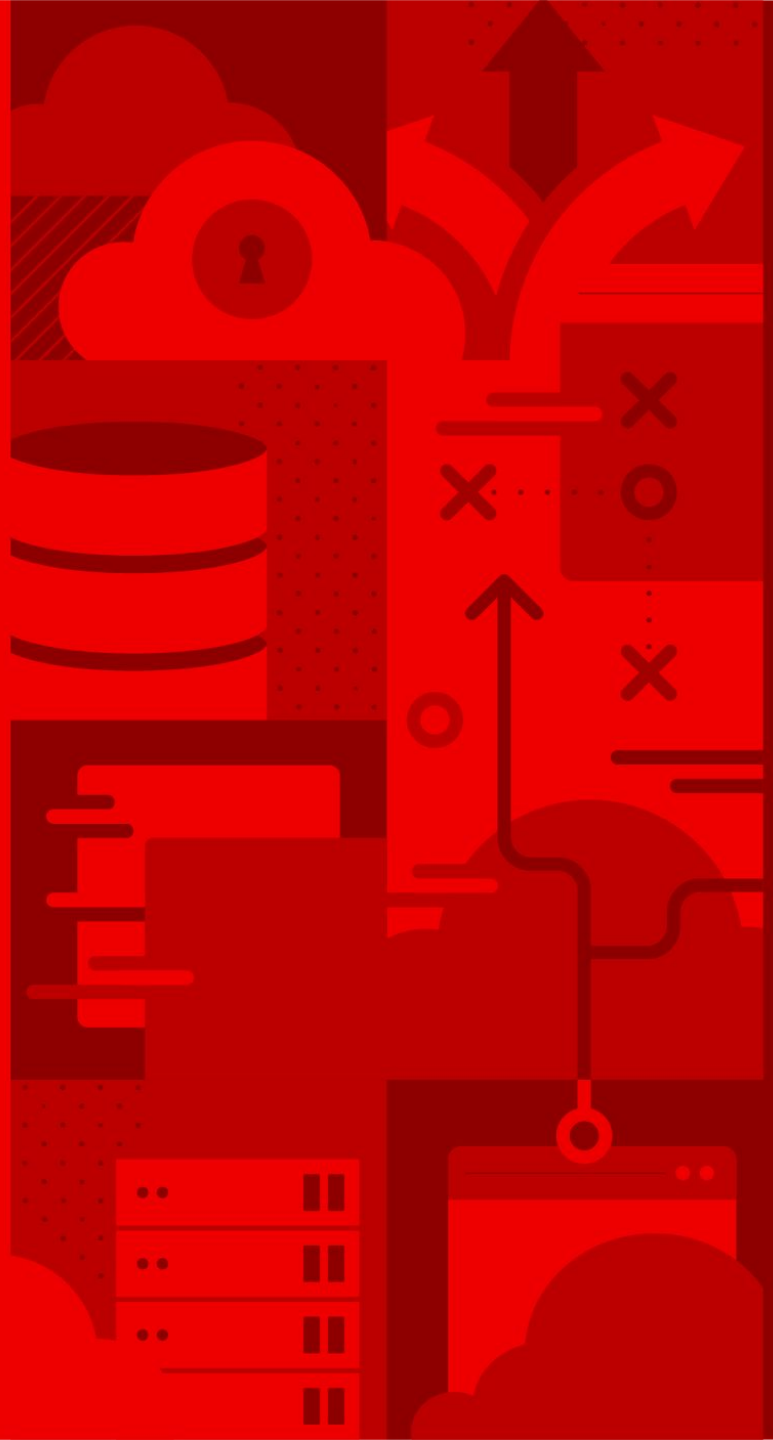
Red Hat Advanced Cluster Management for Kubernetes

Alfred Bach
PSA Red Hat EMEA

Red Hat

Agenda

- Market Trends and Challenges
- Key Personas
- Introducing Red Hat Advanced Cluster Management for Kubernetes
- Detailed Use Cases
- How ACM works with OpenShift
- What's new in RHACM 2.8
- Architecture and Installation Overview
- Customer Success Stories
- Resources and Next Steps



Market Trends and Challenges

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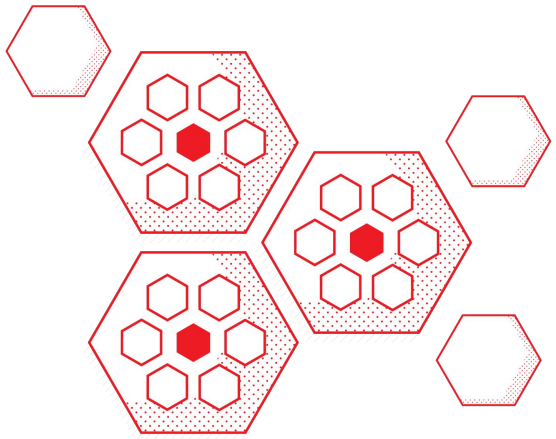
Kubernetes adoption leads to multicluster



"As Kubernetes gains adoption across the industry, scenarios are arising in which I&O teams are finding they must deploy and manage multiple clusters, either in a single region on-premises or in the cloud, or across multiple regions....for a number of reasons, including multi-tenancy, disaster recovery, and with hybrid, multicloud, or edge deployments."

Source:
Assessing Patterns for Deploying Distributed Kubernetes Clusters doc # G00465217, by Tony Iams

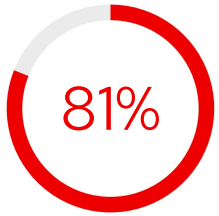
Hybrid multicloud management is really hard

As organizations deploy more across multiple clouds, new challenges arise.

- **Difficult and error prone** to manage at scale
- **Inconsistent security controls** across environments
- **Overwhelming to verify** components, configurations, policies, and compliance

IDC Survey of 200 US-based $1B companies actively using two or more "infrastructure clouds" for production applications

Using multiple infrastructure clouds*



Using multiple public clouds and one or more private/dedicated clouds*

Source:
IDC Multicloud Management Survey, 2019: Special Study, Doc # US45020919, April 2019
*IDC Survey of 200 US-based $1B companies actively using two or more "infrastructure clouds" for production applications

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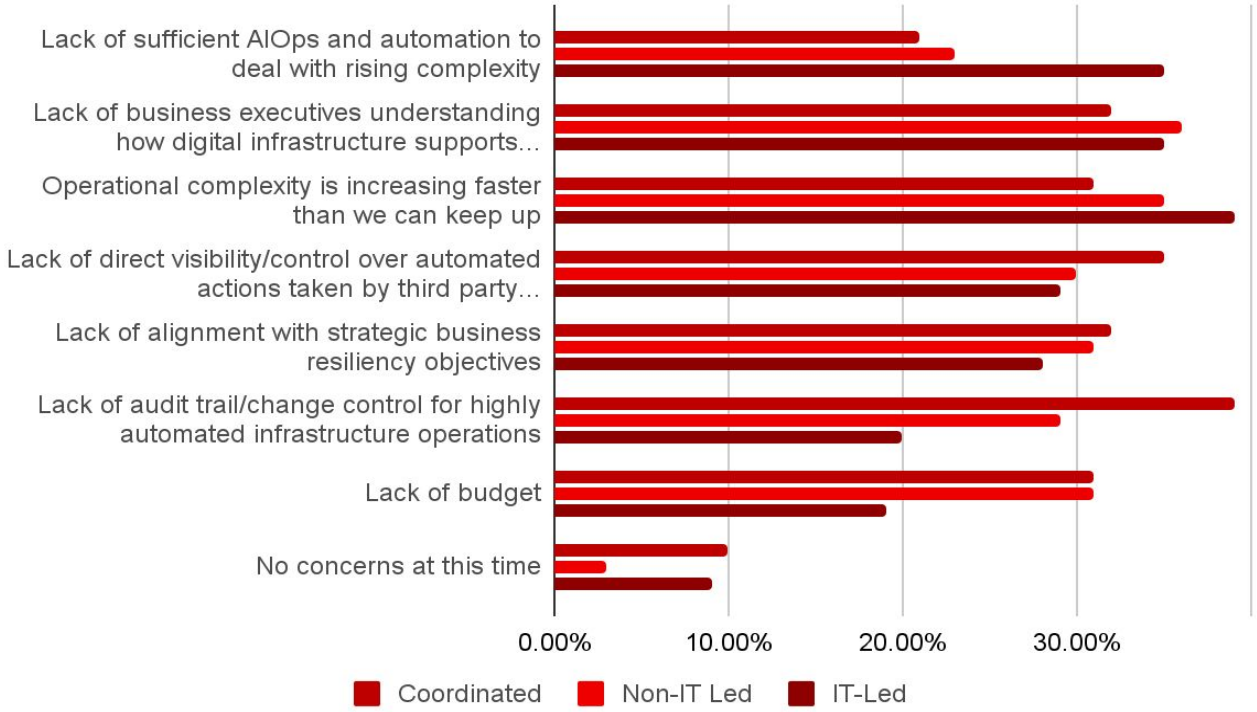
Digital infrastructure concerns are around automation

Smaller, IT-Led organizations are concerned about lack of automation and AIOps while larger, more collaborative organizations are more concerned about lack of change control and limited business executive understanding of how digital infrastructure supports business resiliency

What are the greatest concerns regarding organizations' overall digital infrastructure strategy being able to fully support business resiliency plans?



Source:
Future of Digital Infrastructure Agenda Q2 Survey 2021, IDC, June, 2021. n = 254 US decision makers.

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Remote container clusters are becoming modern-day LAN servers

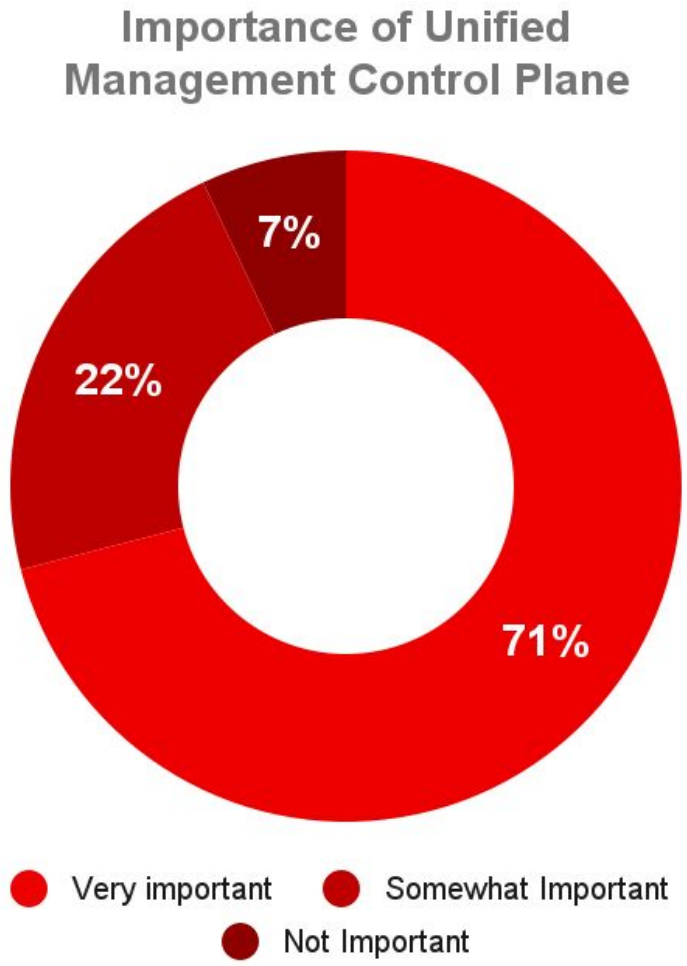
In many ways, remote container clusters are becoming modern-day LAN servers, which requires tooling for managing the distributed clusters.

Software and service providers are differentiating their offerings by providing more complete solutions, adding capabilities such as

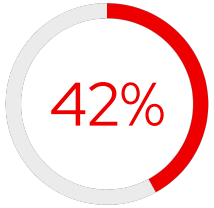
- **Distributed management of multiple clusters**
- **Application lifecycle integration**
- **Policy management**
- **Monitoring and security to the foundational container orchestration capabilities**

Source:
Market Guide for Container Management, Gartner, 2021.

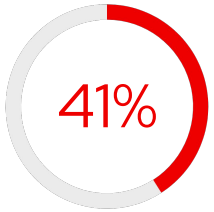
Unified, consistent, autonomous operations priorities



*Most important reasons organizations need a unified management control plane for all digital infrastructure resource is to



Improve data integration and data protection



Optimize infrastructure costs and usage

*Source:
Future of Digital Infrastructure Agenda Q2 Survey 2021, IDC, June, 2021. n = 254 US decision makers.

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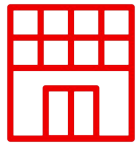
Where's the growth in cluster deployments?

Small Scale Dev Teams

- Managing and syncing across Dev/QE/Pre-Prod/Prod clusters can be difficult

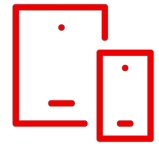


Medium Scaled Organizations

- Retail with small clusters across 100s of locations
- Organizations with plan for growth 10-15 clusters moving to 100s

Large scale

- Global organizations with 100s of clusters, hosting thousand of applications
- Large Retail with 1000s of stores



Edge scale / Telco

- 100s of zones, 1000s of clusters and nodes across complex and air-gapped topologies

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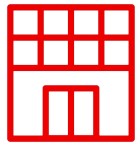

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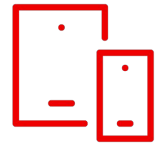


Edge scale / Telco

- 100s of zones, 1000s of clusters and nodes across complex and air-gapped topologies

Reasons for deploying clusters

Application availability

Reduced latency

Address industry standards

Geopolitical data residency guidelines

Disaster recovery

Edge deployments

CapEx cost reduction

Avoid vendor lock-in

Multicluster management challenges

How do I normalize and centralize key functions across environments?

Management requirements

Centralized operations

Build and deploy a containerized app

- Easy cluster provisioning
- Controlling cluster configuration drift
- Ensuring app deployment from development to production

DevOps

Develop, test, and produce clusters

- Consistent cluster provisioning
- Policy enforcement and governance across development, test, and production clusters
- Finding/modifying resources across clusters

Hybrid multicloud

Automated clusters deployed across public, private clouds, edge, in different geographies

- Automated cluster creation with zero touch provisioning
- Single pane of glass visibility
- Deploying and distributing applications at scale
- Auditing and compliance

Single cluster | Multicluster growth | Distributed Multicluster

Solving real customer challenges

DISCOVER

Enforced policies at scale across clusters using the governance and risk framework in RHACM

Automated deployment and ease of managing clusters and applications at scale

verizon

Seamless management and operations of the complete Kubernetes environment

vodafone Ziggo

End-to-end multi-cloud management, visibility, and compliance enforcement for multiple clusters at scale

ORANGELIFE

Transformed several applications to become cloud-native and prepared for a full migration to cloud

Telefónica

Increased observability and control for managing the Kubernetes environment

Red Hat

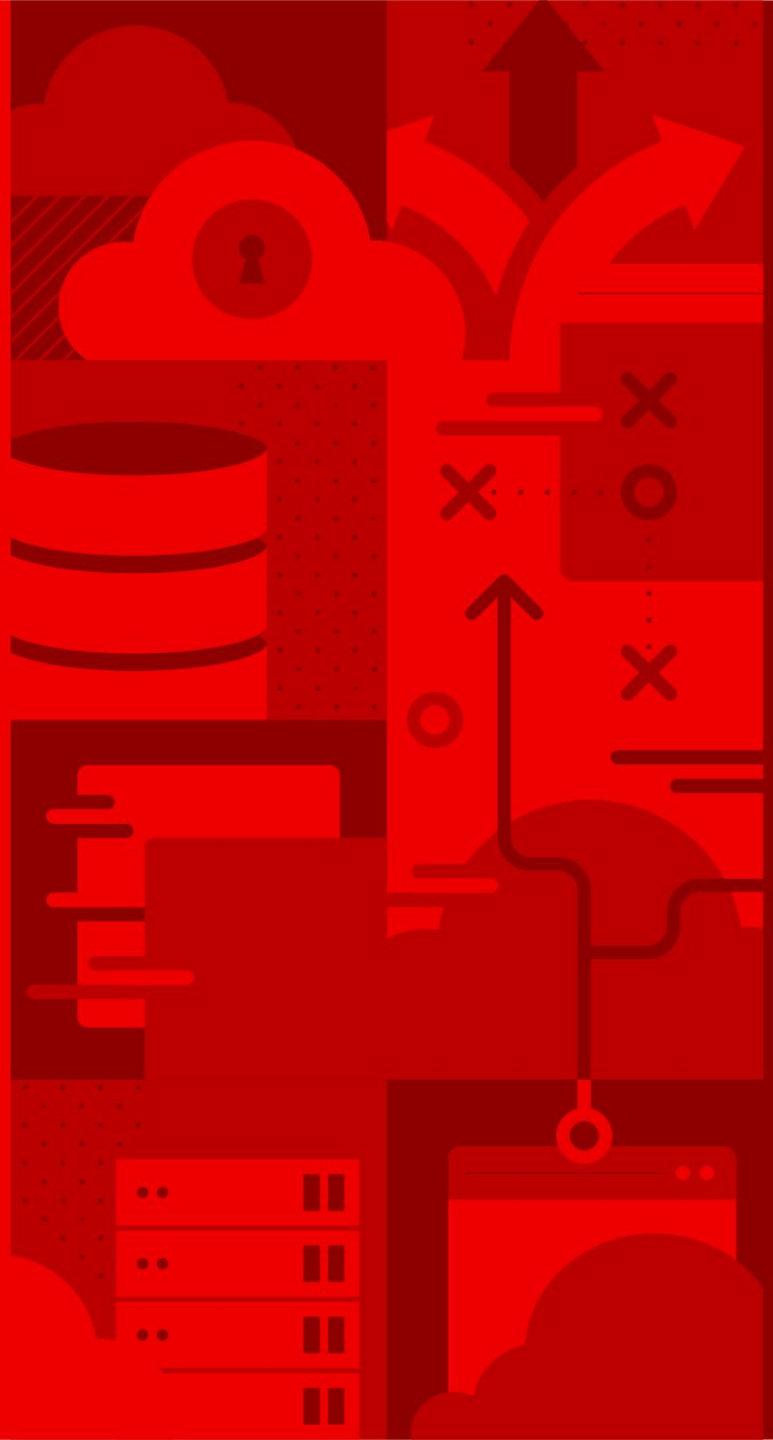
Our open hybrid cloud portfolio accelerates digital transformation

Red Hat Advanced Cluster Management for Kubernetes enables enterprises to build highly agile, scalable architectures with enhanced cluster security that can be deployed at any location.

Red Hat aims to scale automation across enterprise through a three-pronged strategy comprising: business-critical workload automation, Red Hat Ansible Automation for infrastructure and Red Hat Advanced Cluster Manager for container management.

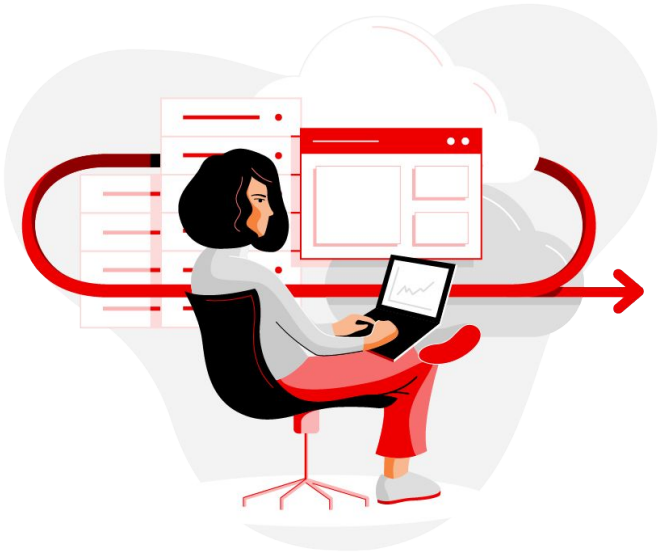
- **Innovative container management**
- **Deeper integration with Red Hat Ansible Automation Platform for container automation**

Source:
Red Hat's Open Hybrid Cloud Portfolio Can Accelerate Digital Transformation, Gartner, May, 2021.



Key Personas

IT Operations



"How can I manage the lifecycle of multiple clusters regardless of where they reside using a single control plane?"

"How can I quickly get to the root cause of failed components?"

"How do I monitor usage across multiple clouds?"

Louise Mar
Senior IT Ops, Acme Unlimited

SRE/DevOps

"How do I get a simplified understanding of my cluster health and the impact on my application availability?"

"How do I automate provisioning and destroying of my clusters, workload placement based on capacity and policies, and the pushing of application from dev to prod?"

Clete Liedl
Senior DevOps Engineer, Acme Unlimited

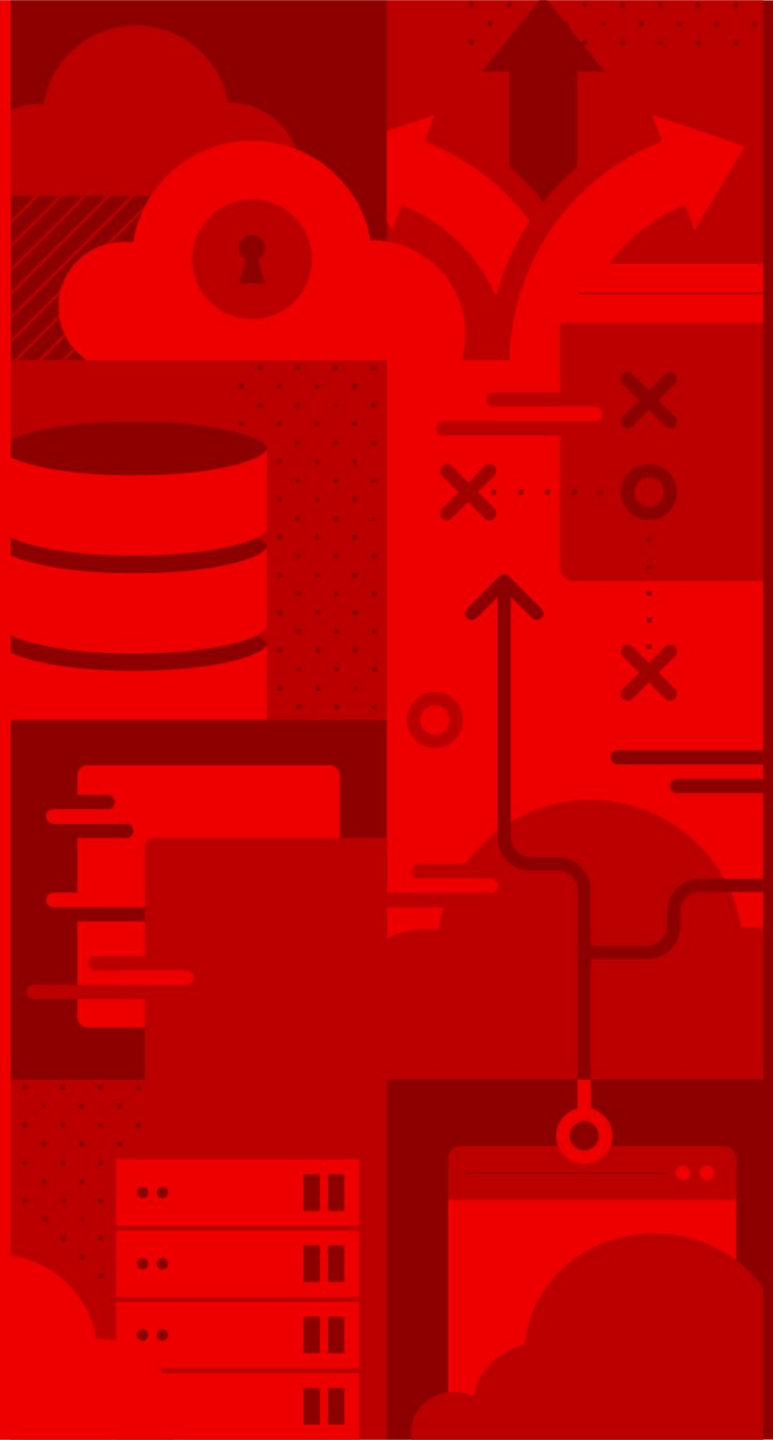
SecOps

"How do I ensure all my clusters are compliant with my defined policies?"

"How do I set consistent security policies across diverse environments and ensure enforcement?"

"How do I get alerted on any configuration drift and remediate it?"

Jay Schefter
Senior Security Engineer, Acme Unlimited



Introducing Red Hat Advanced Cluster Management

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Red Hat Advanced Cluster Management for Kubernetes

Simplified operation and maintenance

View, manage, operate and solve issues across your kubernetes fleet through a **single console**.

Runs on OpenShift

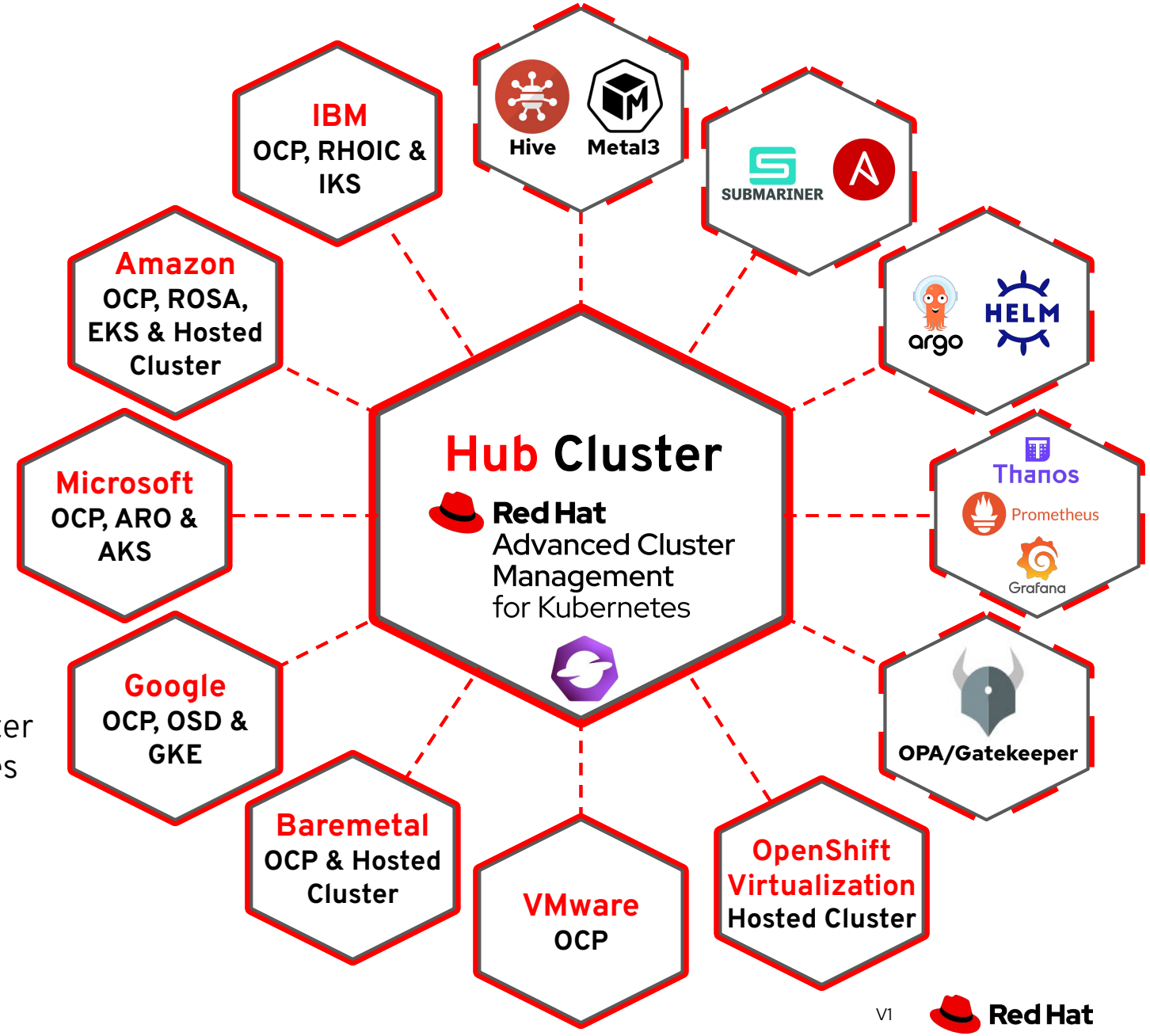
Like any other Kubernetes app, **easily run** and manage it on top of an OpenShift cluster.

Hub-Spoke architecture

Have all configurations managed by the **Hub** cluster component and seamlessly add **Spoke** Kubernetes clusters to the central hub.

Tight Integration

RHACM comes with a rich API, add-ons and it can **integrate** with some other key enterprise solutions and open source tools.



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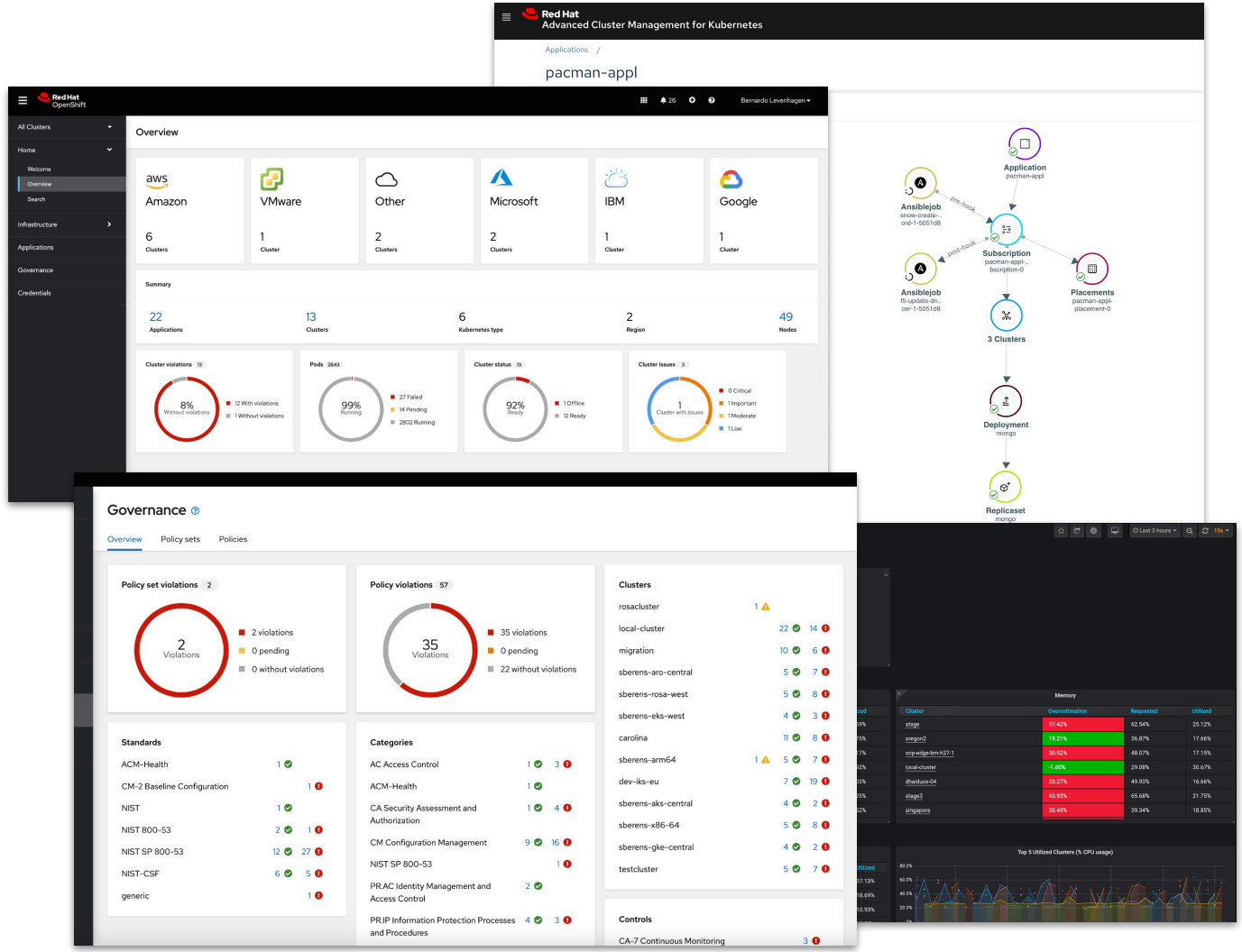
Robust & Proven

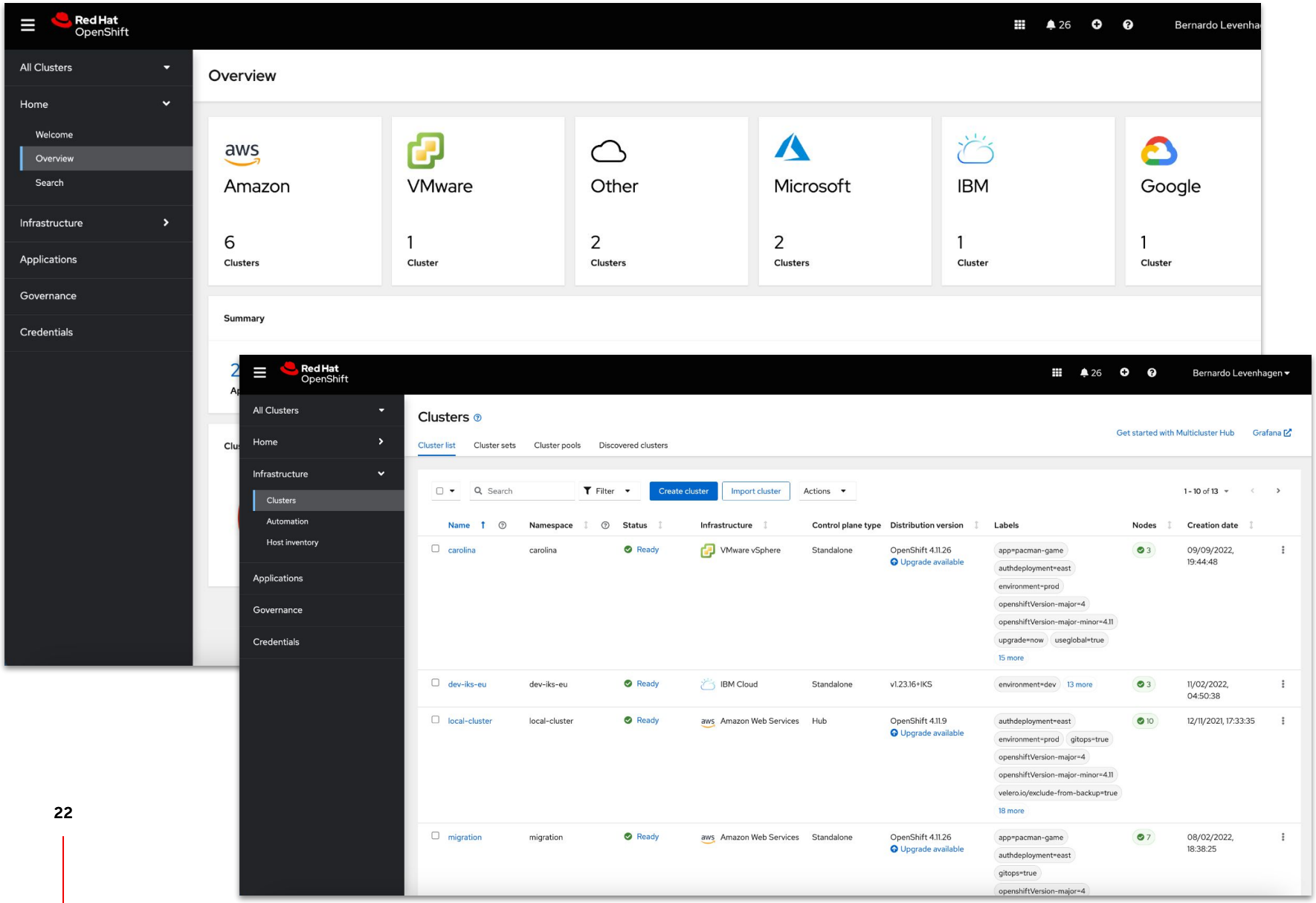
End-to-end automation with Red Hat Ansible Automation Platform integration

- Multicluster lifecycle management
- Policy driven governance, risk, and compliance
- Advanced application lifecycle management
- Multicluster Observability and Search for health and optimization
- Multicluster networking for interconnecting apps



Unified Multi Cluster Management

Single Management for all your Kubernetes Clusters



- **Centrally** create, update and delete Kubernetes clusters **across multiple** private and public clouds
- **Hibernate / resume** OCP Clusters across your domain
- **Configure ClusterSets & Cluster Pools** for simplified OCP cluster management
- Search, find and modify **any** kubernetes resource across the **entire** domain
- **Quickly** troubleshoot and resolve issues across your **federated** domain

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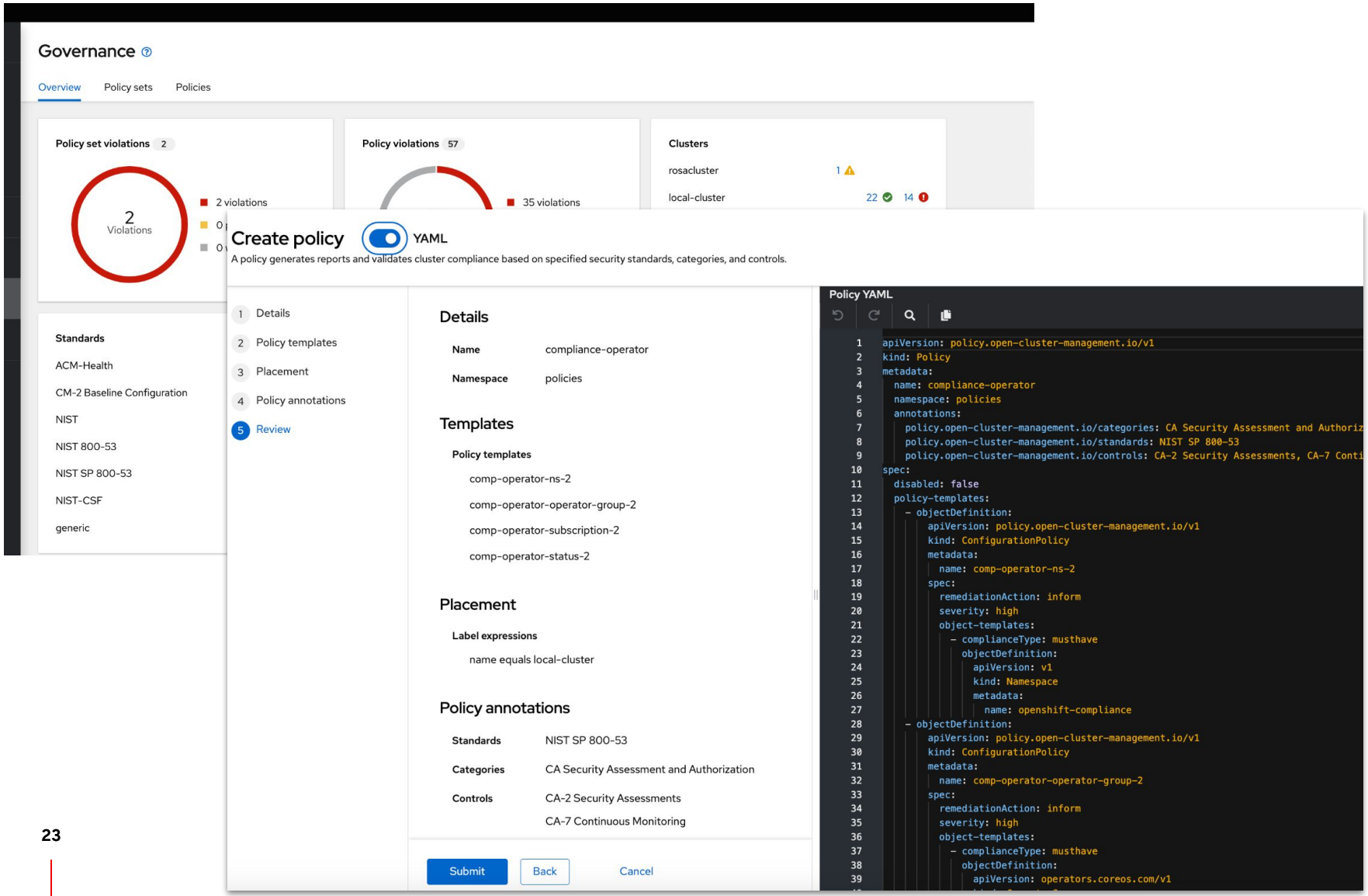
Policy based Governance, Risk, and Compliance

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
- Perform remediation actions by leveraging **Ansible Automation Platform** integration.
- Built-in **compliance policies** and audit checks, including **GitOps** integration.
- **Immediate** visibility into your compliance posture based on **your** defined standards

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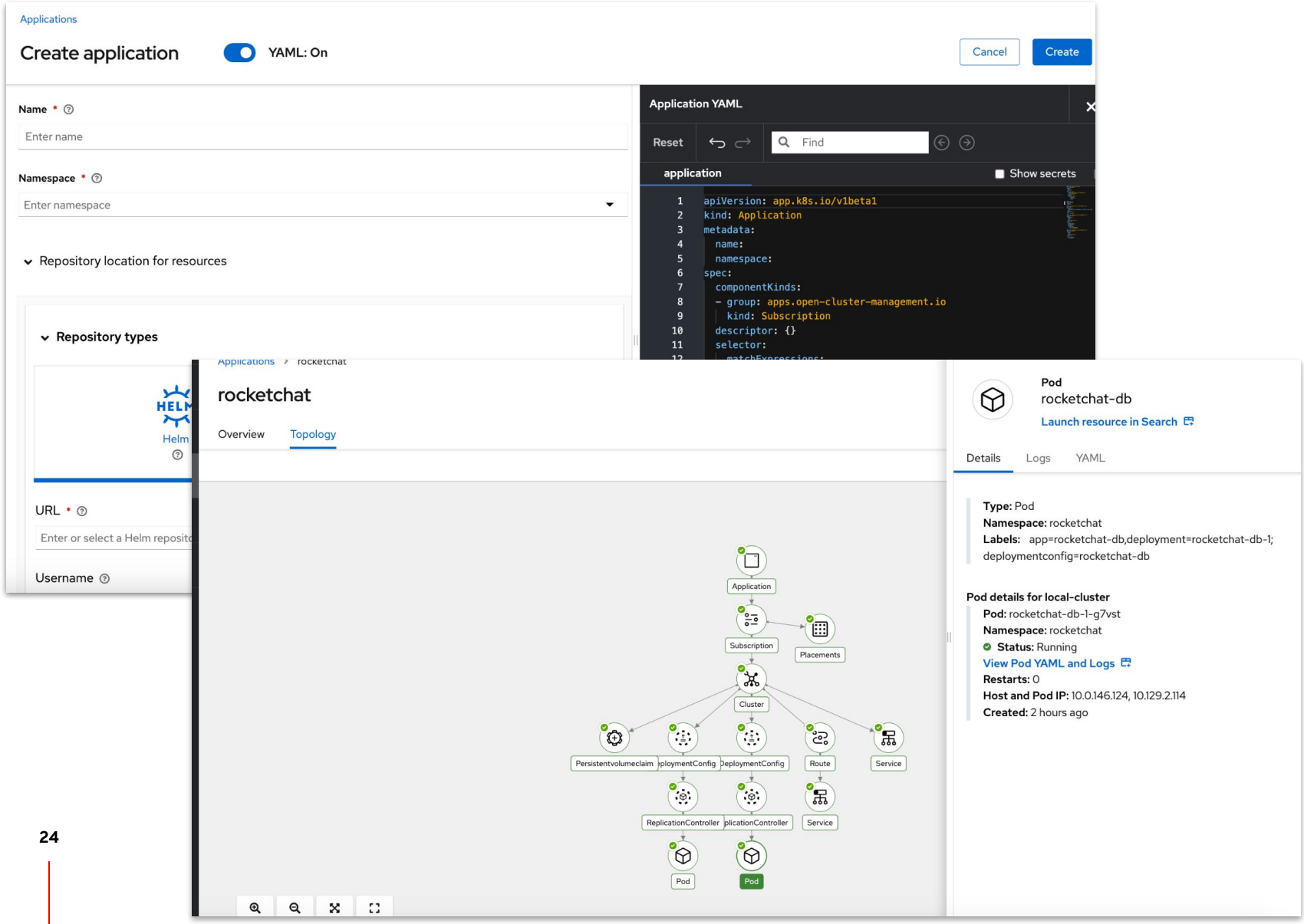
Advanced Application Lifecycle Management

Simplify your Application Lifecycle



- **Easily** deploy an Application using the **Application Builder** (Subscription)
- Deploy applications from **multiple** Sources (Git/Helm/Object Storage)
- Integrate with **OpenShift GitOps** (Argo CD).
- Automatically **detect and visualize Argo CD** Applications in RHACM
- Quickly **visualize** application relationships **across** clusters and those that **span** clusters

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Multicluster Observability

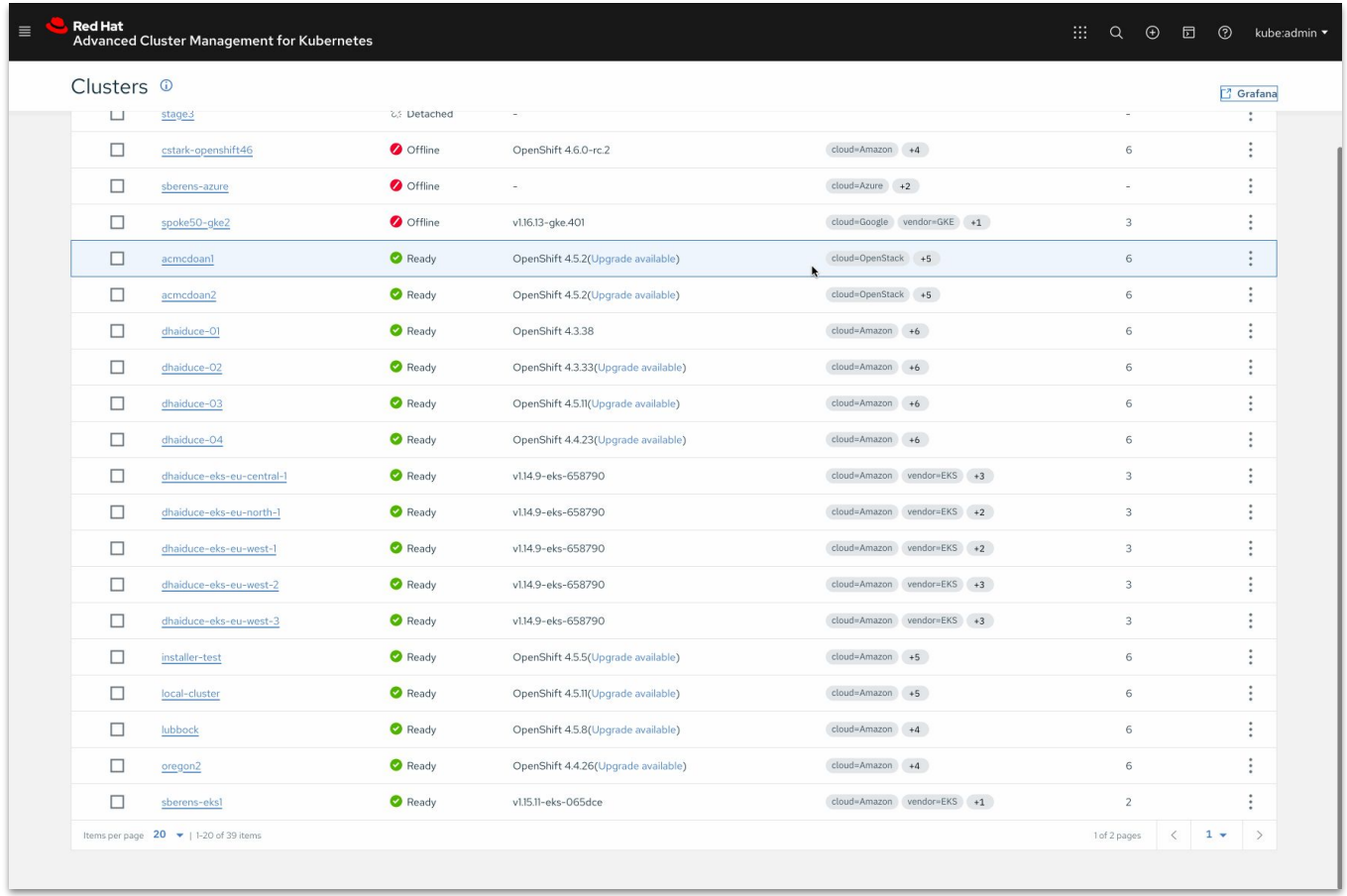
Overview

- Global Query view with **Grafana** for OCP Clusters
  - Out of the Box multi cluster health monitoring dashboards
  - PromQL compliant - Build your own queries

- **Centralize Alerts** and notifications on the **RHACM Hub**. Forward to 3rd Party Systems (PagerDuty / Slack)

- Centralized **Database**
  - Optimized set of metrics collected from managed clusters
  - Focused on Cluster Management

- Long Term **Data Retention**
  - Observe Metric trends
  - Set Alert Patterns
  - Supported Object Storage
    - AWS S3 (and compatible)
    - Ceph for on-premise
    - Google Cloud Storage
    - Azure Storage



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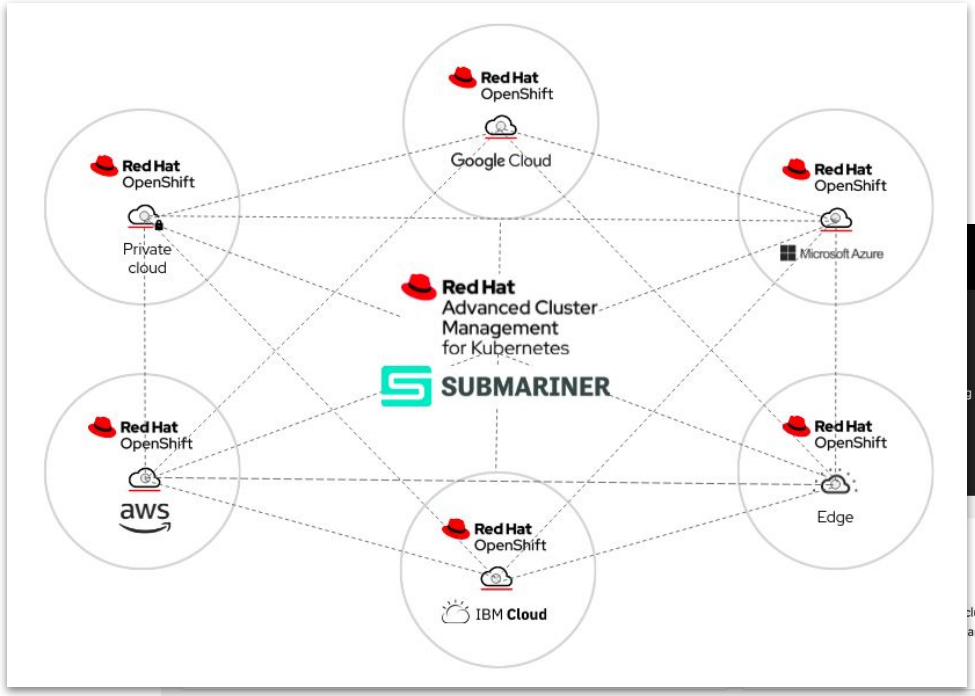
Multicluster Networking

MCN features overview & look ahead

- **ACM MCN, aka 5th pillar**
- Presenting **Submariner**: an CNCF open source project in the form of an **add-on** for RHACM, now generally available
- Enable **direct networking** between Pods in different Kubernetes clusters as well as **Service Discovery**, either on-premises or in the cloud
- Leverage **Cluster Sets** - All done via a group of clusters with a high degree of mutual trust that share services
- **Globalnet** - Support for interconnecting clusters with overlapping CIDRs
- **Future work (subject to change)**
  - ACM Red Hat OpenShift Service mesh integration
  - Discovery Deploy & Configure Federation
  - Custom - upstream Istio, Gloo...



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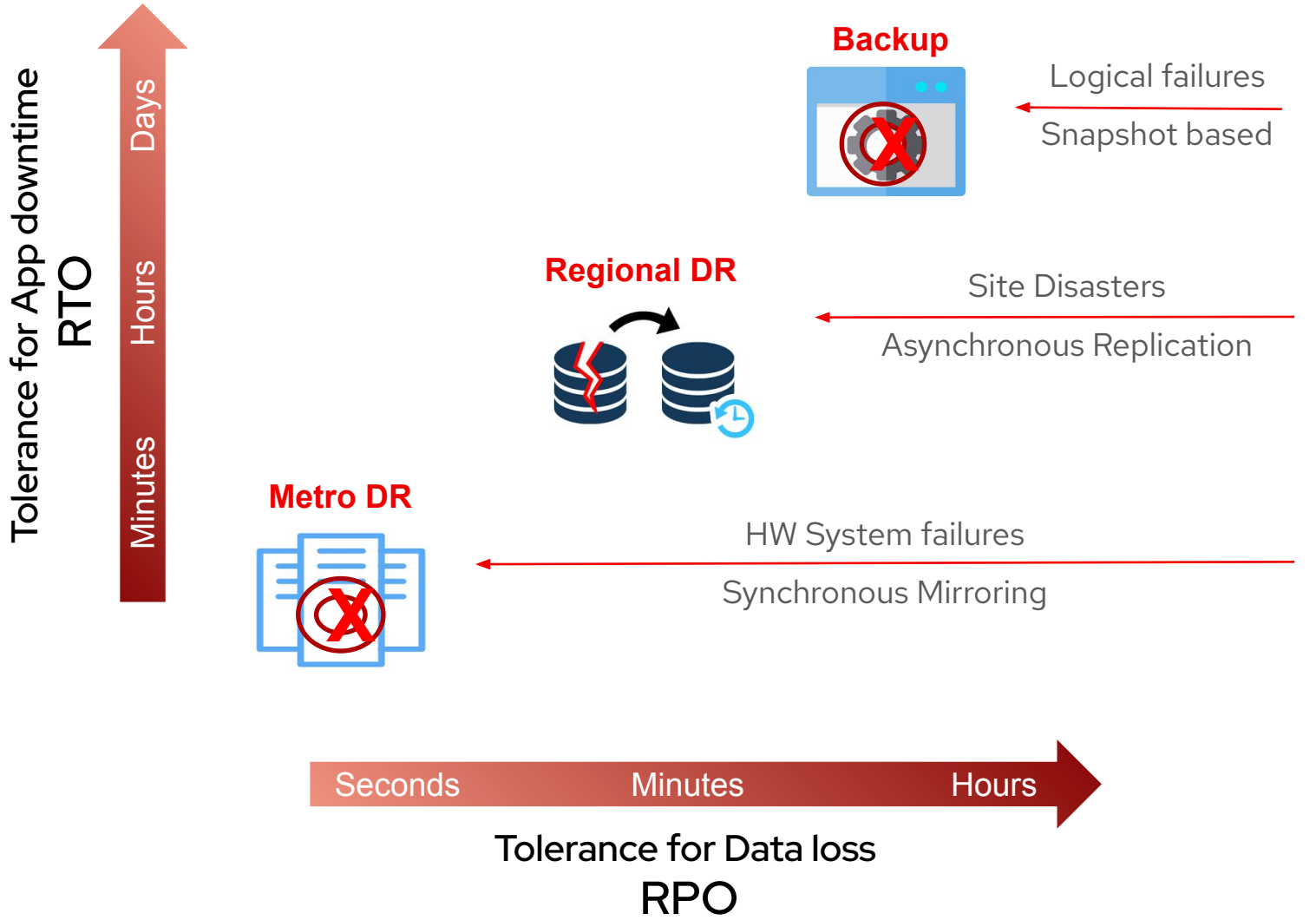
Ways to achieve **Business Continuity** with RHACM

Comprehensive protection solutions against wide spectrum of failures



- **OADP**(DataMover) & **Volsync** facilitates time-based copies of application state. Data replication can be applied to different storage types and vendors.
- **ACM** & **ODF** integrated stack offers **Regional-DR.** It ensures continuity during the unavailability accepting some loss of data in a predictable amount. In the public cloud these would be akin to protecting from a region failure.
- **ACM** & **ODF** integrated stack introduces **Metro-DR.** It ensures continuity during the unavailability with no data loss. In the public cloud these would be akin to protecting from an Availability Zone failure.

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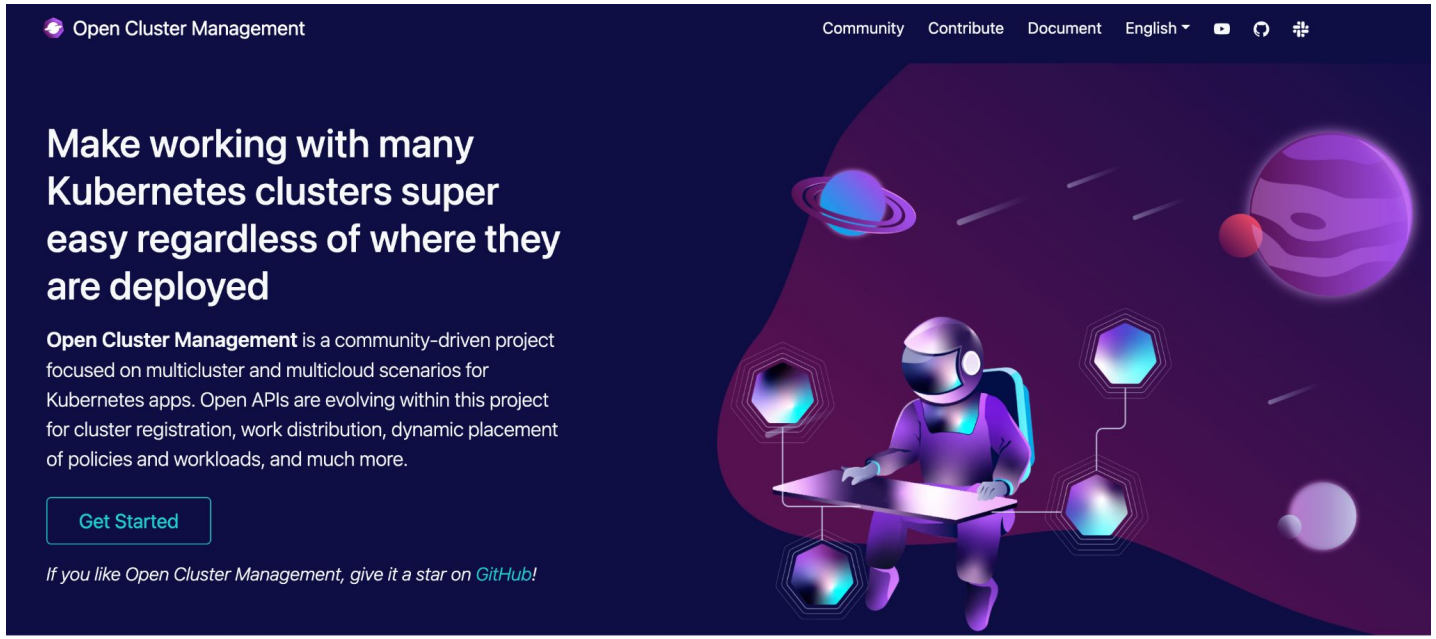
Open Source commitment – Upstream project

- **Open Cluster Management** has been accepted as a **CNCF Sandbox**
  - https://www.cncf.io/projects/open-cluster-management/
- Collaboration in key **Kubernetes Special Interest Groups (SIGs)**
  - Sig-MultiCluster
  - Sig-Application
  - Sig-Policy
- Growing together with support from partners and contributors
  - Ant Group
  - Alibaba
  - Tencent



Feature Overview

Cluster inventory
Registration of multiple clusters to a hub cluster to place them for management.

Work distribution
The work API that enables resources to be applied to managed clusters from a hub cluster.

Content placement
Dynamic placement of content and behavior across multiple clusters.

Vendor neutral APIs
Avoid vendor lock-in by using APIs that are not tied to any cloud providers or proprietary platforms.

https://open-cluster-management.io

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Strong open source community & ecosystem

OPA/Gatekeeper

Hive

metal3

Open Cluster
Management

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

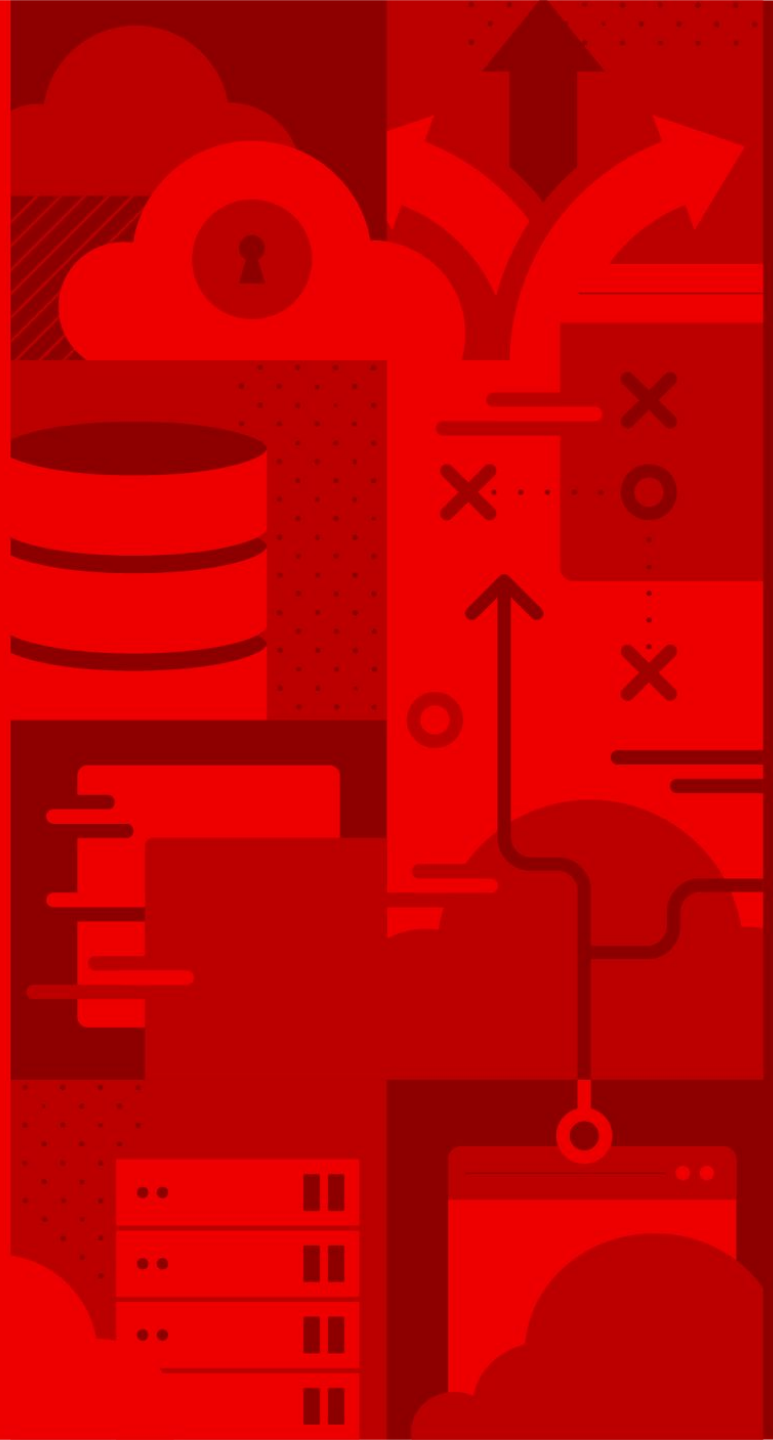
Placement rules can allow quick deployment of clusters across distributed locations for availability, capacity, and security reasons.

Reduce costs

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

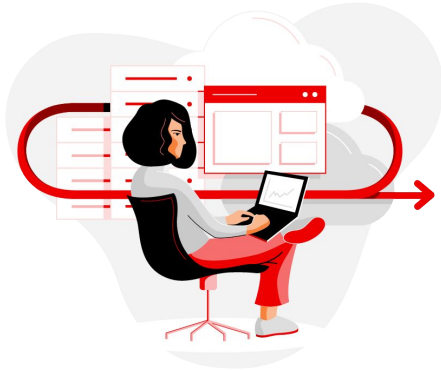
Ease Compliance

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



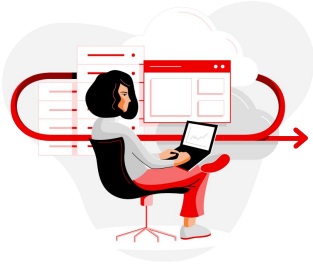
Detailed Use Cases

Multi-cluster Lifecycle Management

 IT Operations	How do I get a simplified understanding of my cluster health and the impact it may have on my application availability ? How do I automate provisioning and deprovisioning of my clusters?
 DevOps/SRE	How can I manage the life cycle of multiple applications regardless of where they reside (on-prem, across public clouds) using a single control plane?

Multi-cluster Lifecycle Management

Overview



IT Operations

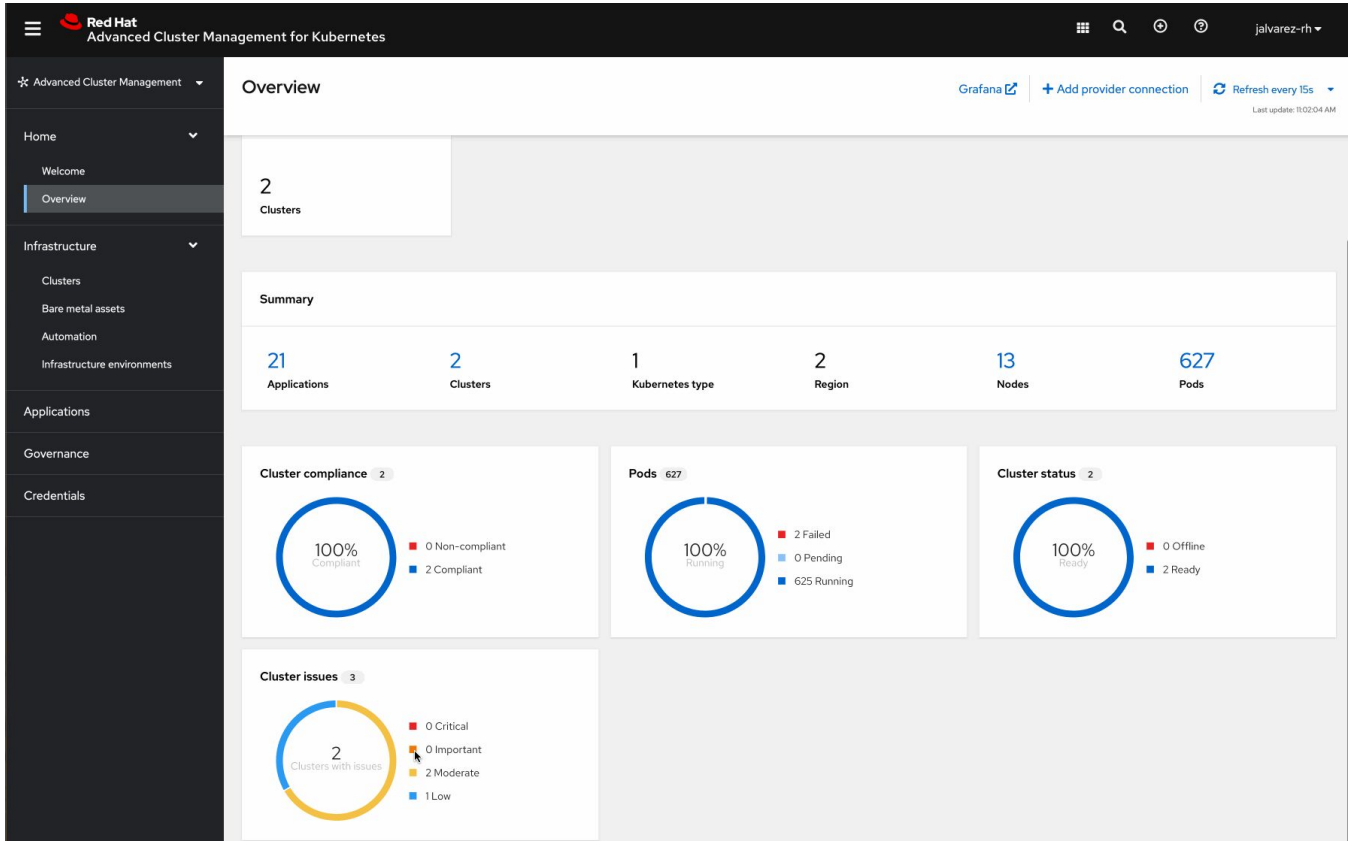
DevOps/SRE

- **Full Management of OCP Kubernetes**
  - Provision new OCP 4.10.x and above
  - Manage existing **OCP 3.11 (Limited Support)** 4.10.x and above
  - Support for OCP 4.10+ Single Node (SNO)

- **Public cloud managed kubernetes**: EKS, AKS, GKE, IKS, ROKS, ROSA, ARO, OSD.
  - Deploy Policies and Applications, 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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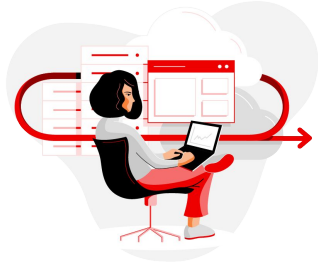
Multi-cluster Lifecycle Management

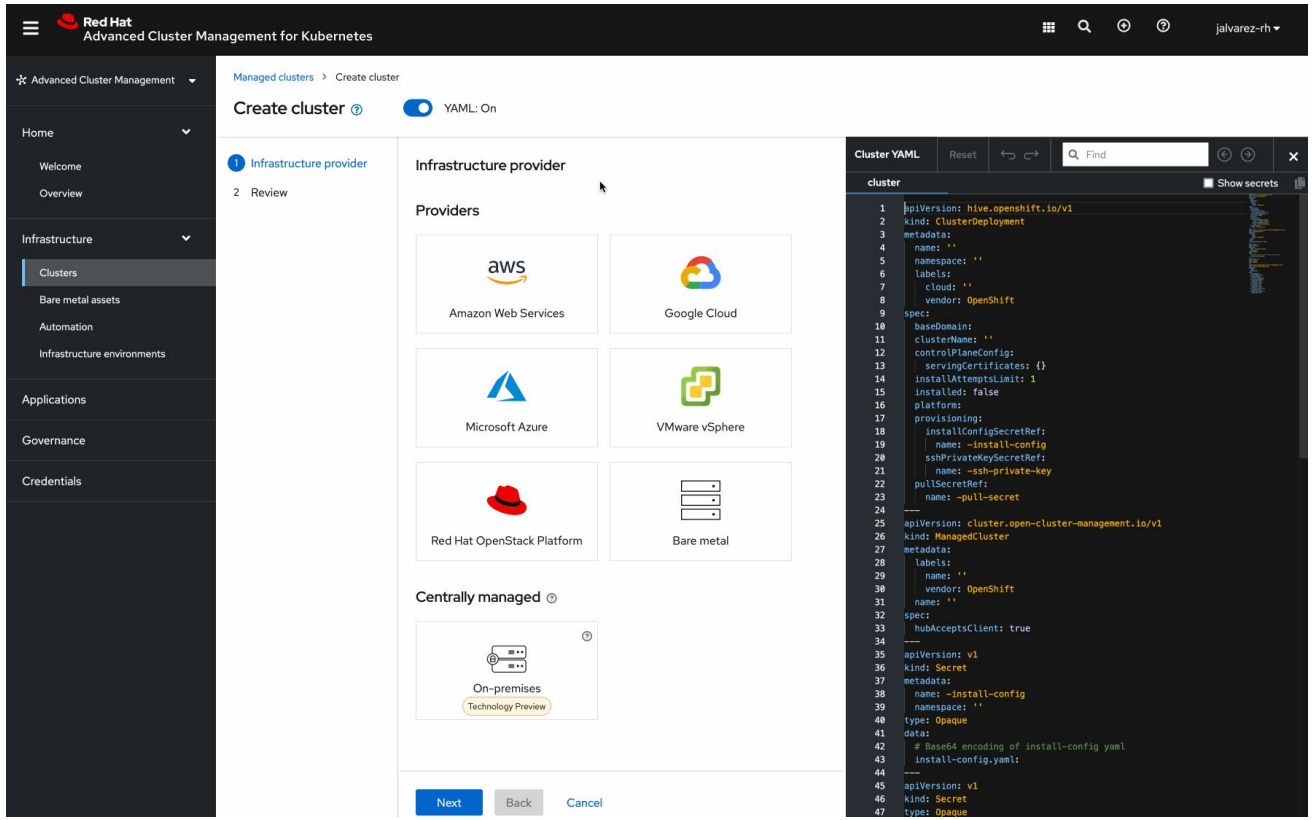
Creating & Importing clusters



IT Operations

DevOps/SRE

- **Create**, **Upgrade** and **Destroy** OCP clusters running on **vSphere**, **Bare-metal** as well as **Public cloud**.
- Import **OCP Clusters** that can be discovered from **OCM** (OpenShift Cluster Manager)
- 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 **kubeconfig**
- Integrate with Ansible Automation Platform
- Centrally Manage your On-Prem Infrastructure (CIM) / Host Inventory



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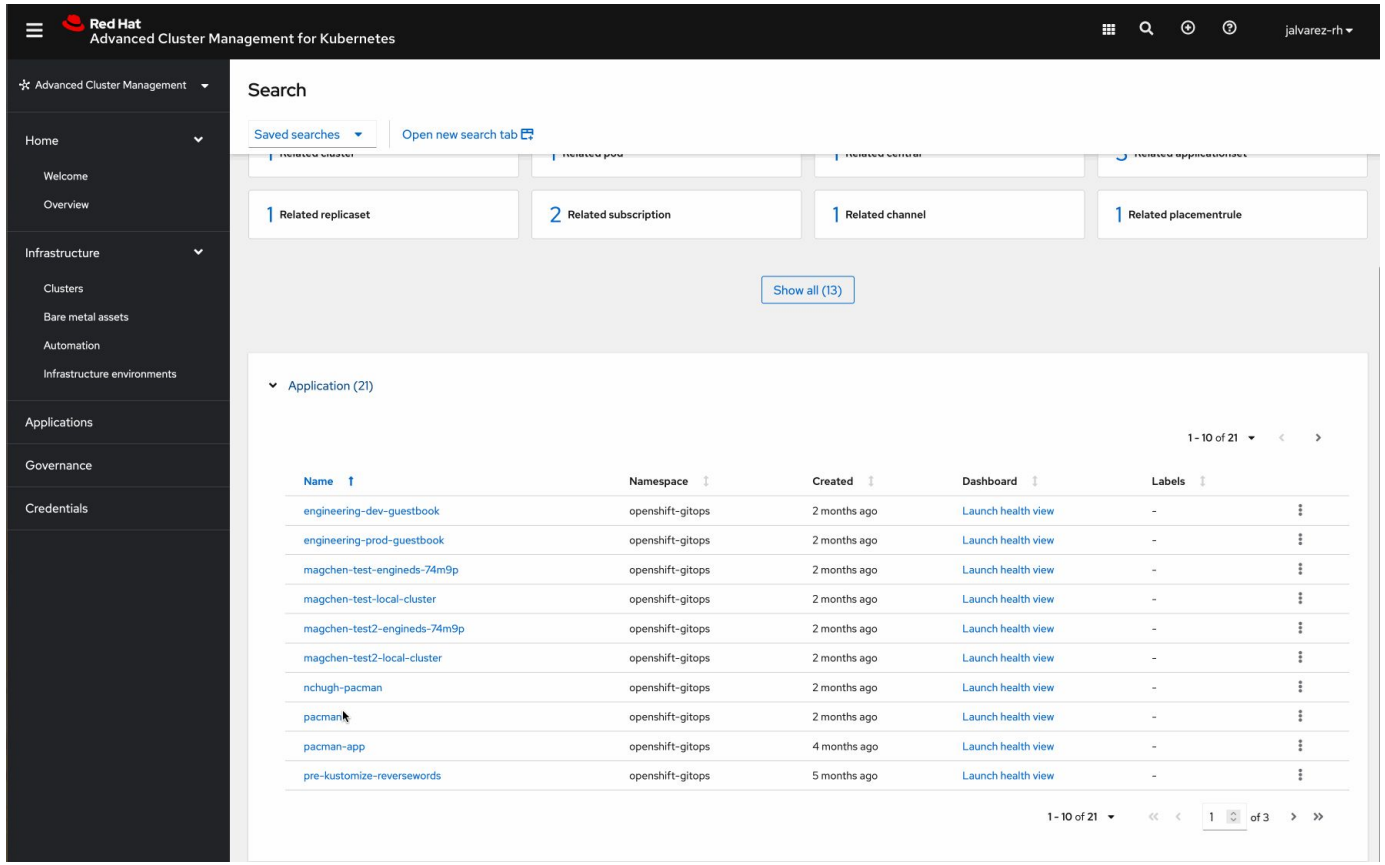
Multi-cluster Lifecycle Management

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 Observability

Overview

IT Operations

DevOps/SRE

- Enhanced Multi-cluster **OpenShift and non-OpenShift** metric aggregation with customized allowlist
  - Enhanced multi-cluster metric aggregation
  - Custom metrics and pre defined metrics

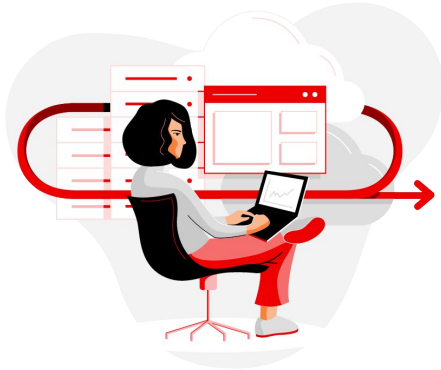
- **Customize** your own Grafana dashboards for fleet management
  - Optimized set of metrics collected from managed clusters
  - Focused on Cluster Management
  - Unlimited Data Retention
  - Set Alert patterns

Red Hat

Policy based Governance, Risk and Compliance

Security OPS

- How do I ensure all my clusters are compliant with standard and custom policies?
- How do I set consistent security policies across diverse environments and ensure enforcement?
- How do I get alerted on any configuration drift and remediate it?



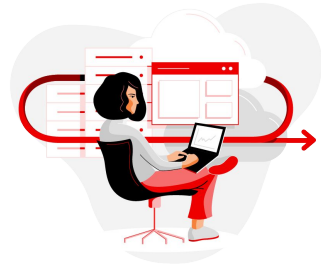
IT Operations

- How do I ensure 99.9 % Uptime?
- How do I drive more innovation at scale?

Policy based Governance, Risk and Compliance

Overview

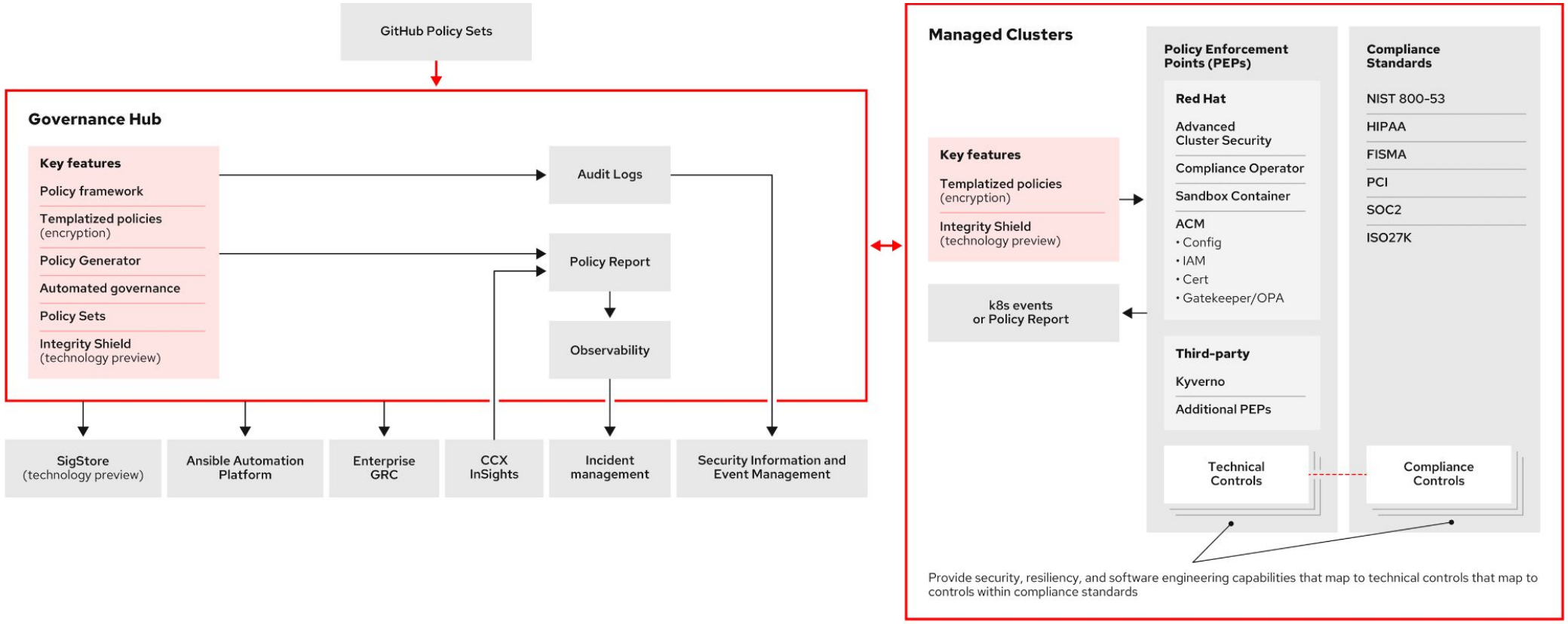
Security Ops



IT Operations

Managed Cluster and GRC Controllers

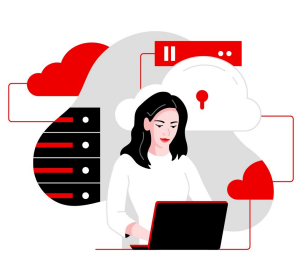
- Driven by Kubernetes CRDs and controllers
- Governance capability for managed clusters covering both security and configuration aspects.
- Out of box policies in GitHub and an extensible policy framework
- Community based policies in GitHub



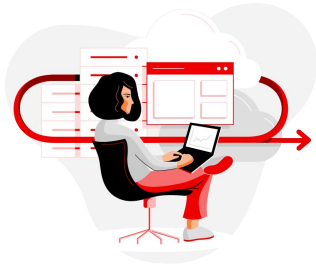
Red Hat

Policy based Governance, Risk and Compliance

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

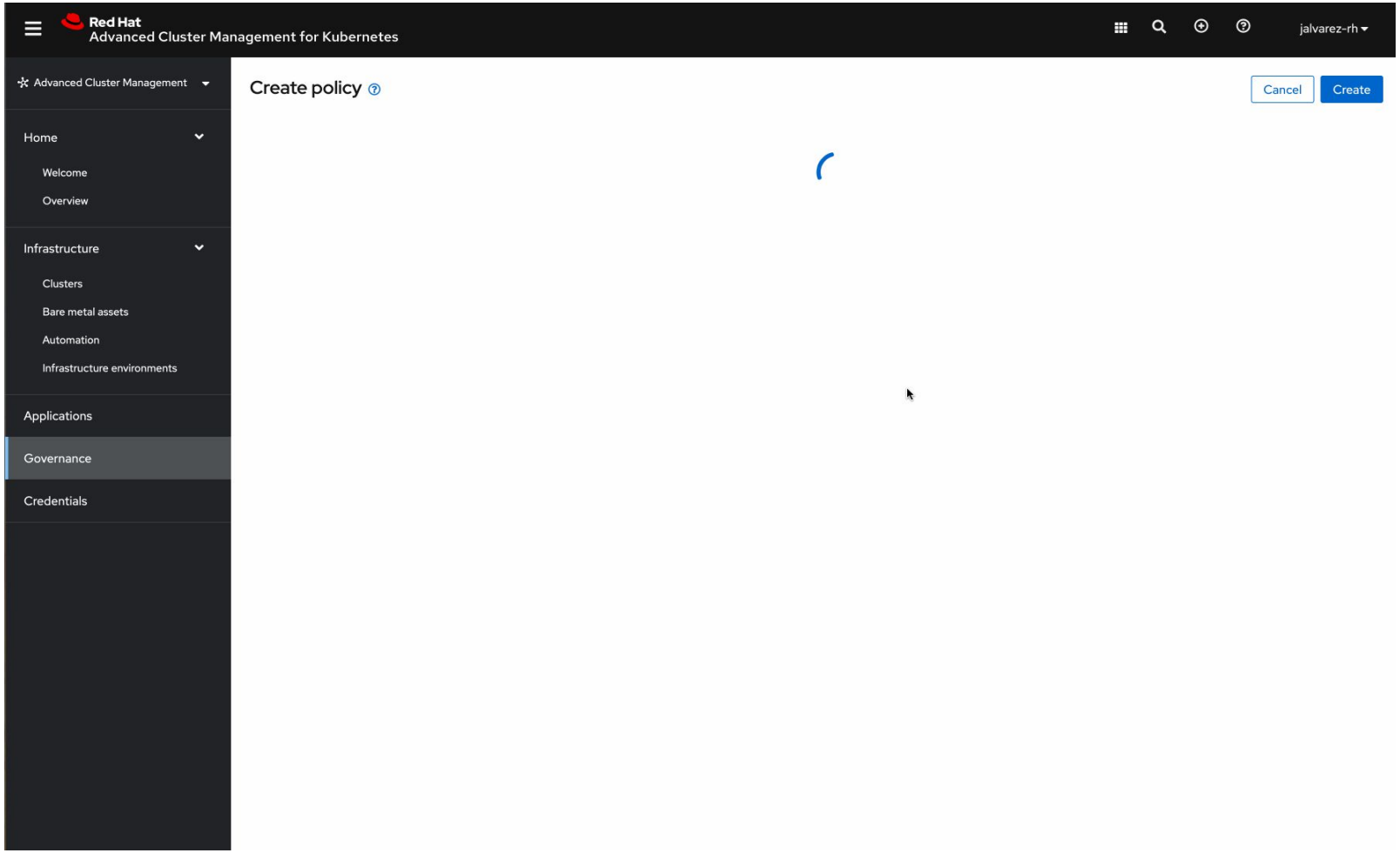


Security Ops



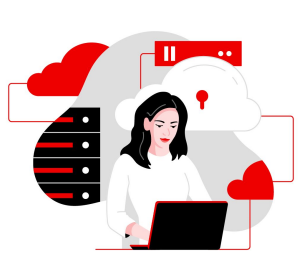
IT Operations

- Set and enforce policies for security, applications, & infrastructure
- Deep visibility for auditing configuration of apps and clusters
- Unique policy capabilities around compliance
- Categorize violations based on your standards for immediate visibility into your compliance posture
- Integrate with OPA / Gatekeeper & Compliance Operator
- Integrate with Ansible Automation Platform at the Policy Level

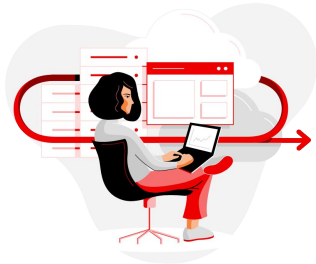


Policy based Governance, Risk and Compliance

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

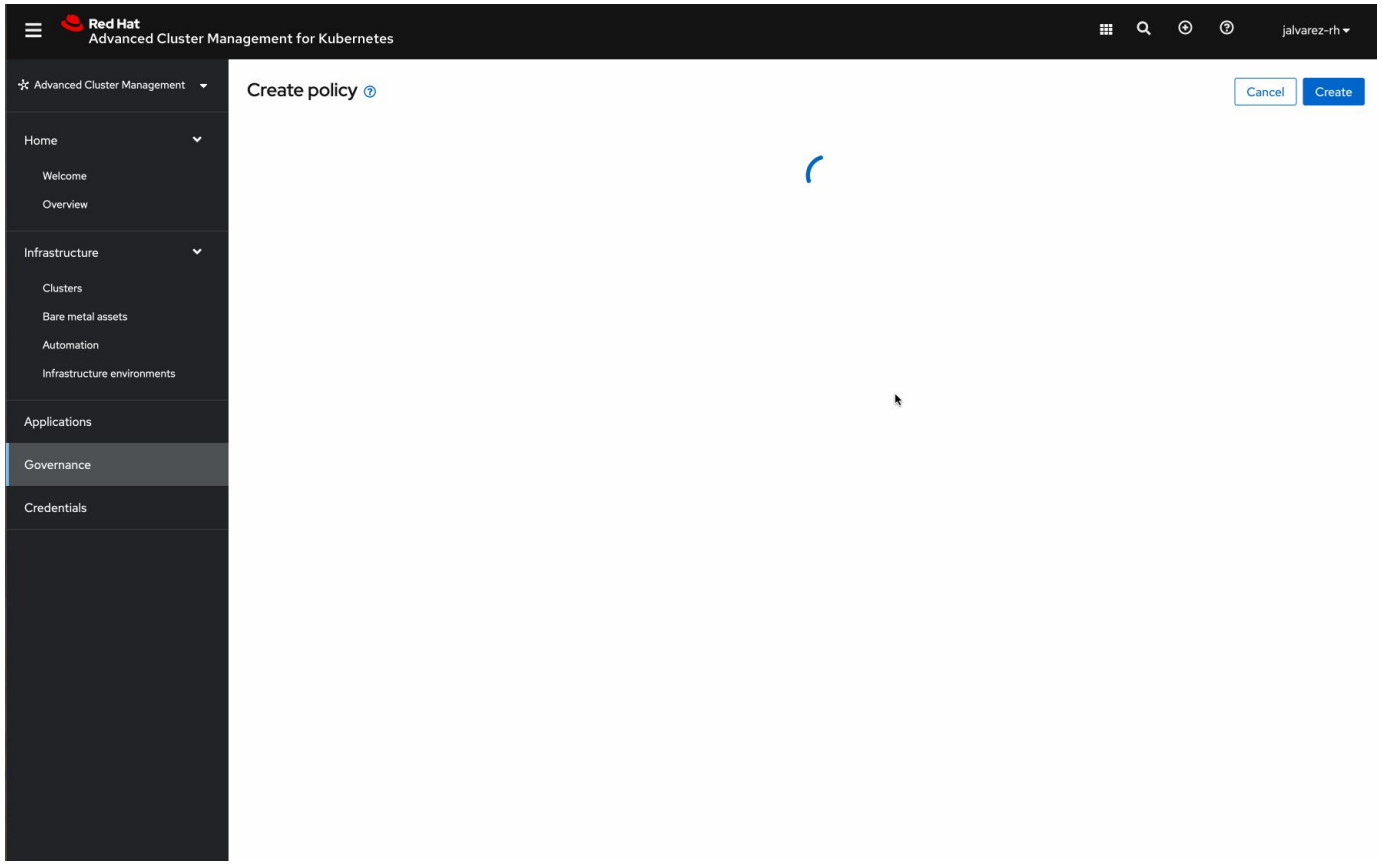


Security Ops



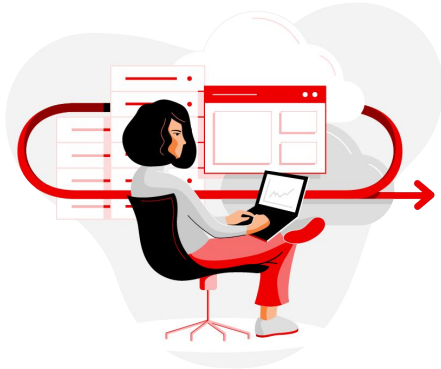
IT Operations

- 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



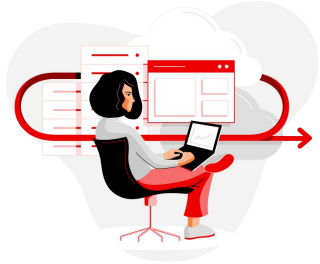
Red Hat

Advanced Application Lifecycle Management

 DevOps/SRE	• I want to quickly investigate application relationships with real time status, so that I can see where problems are. • With the Application Topology view, I can visually inspect application status labels and pod logs to understand if a part of the application is running or not, without having to connect to a cluster and gather any info.
 IT Operations	• I want new clusters to be deployed with a set of known configurations and required applications. • With the assignment of a label at cluster deploy time, the necessary configurations and applications will be automatically deployed and running without any additional manual effort.

Advanced Application Lifecycle Management

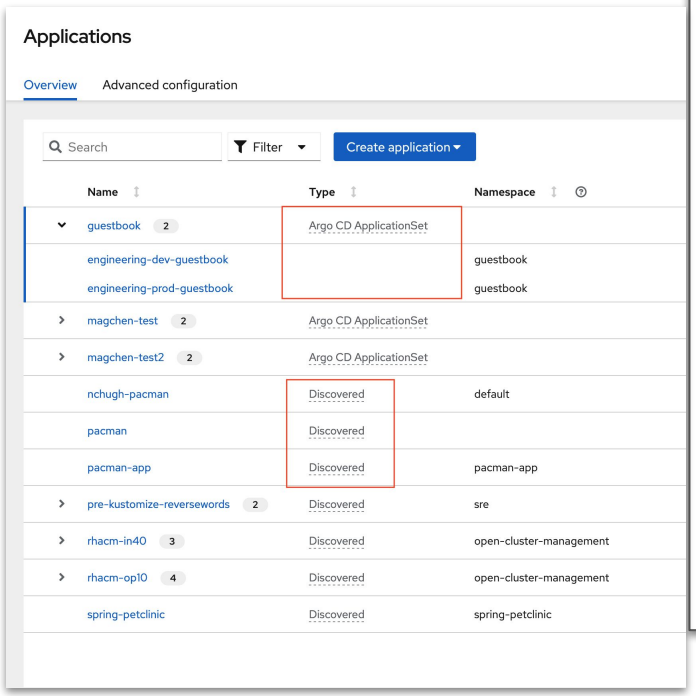
Simplify your Application Lifecycle

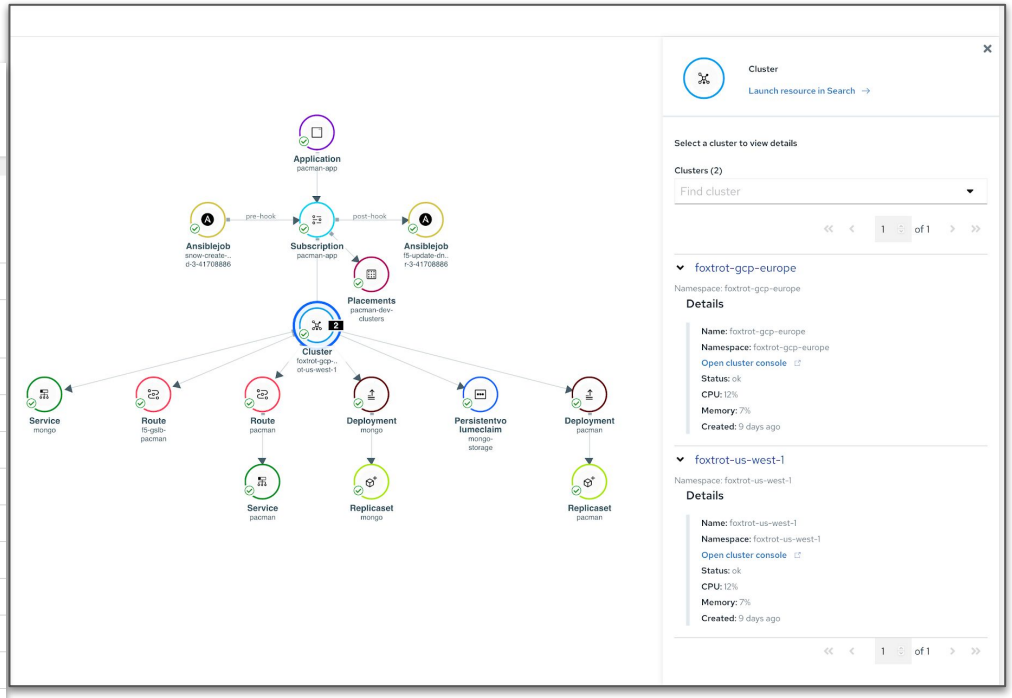


IT Operations

DevOps/SRE

- **Deploy** applications at scale
- Deploy applications from **multiple sources** (GitOps/Helm/OjectStorage)
- Quickly visualize application relationships
- Integrate with the Red Hat Ansible Automation Platform
- Visualize Argo CD Applications in RHACM (Local and Remote)
- Support for **ApplicationSets** (ArgoCD)



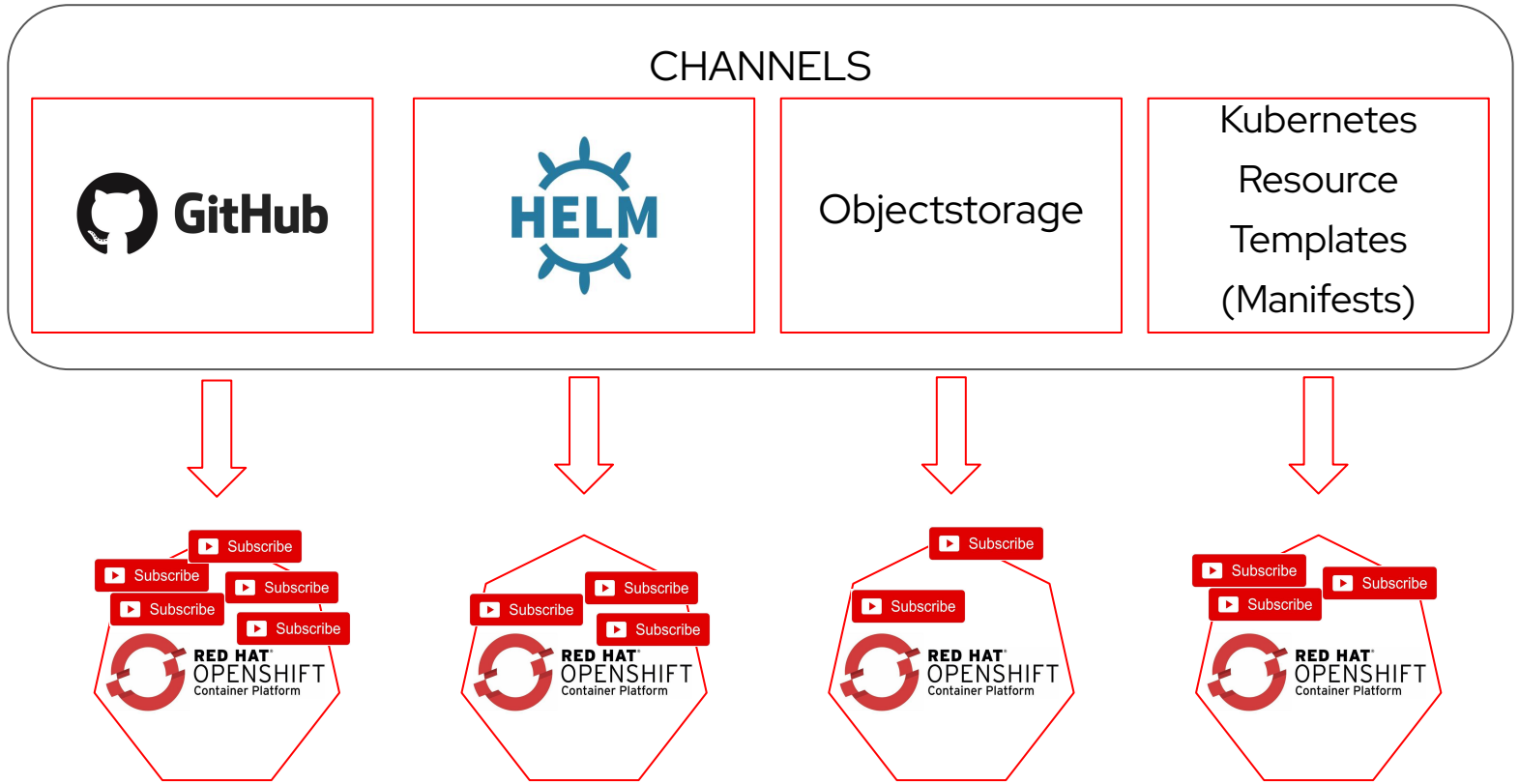


Red Hat

Advanced Application Lifecycle Management

Subscriptions bring enterprise to Kubernetes

- Extending the best of Enterprise into a desired state methodology
- Time Windows: New releases during your maintenance windows
- Orchestrate actions with the integration of Ansible Automation Platform



Red Hat

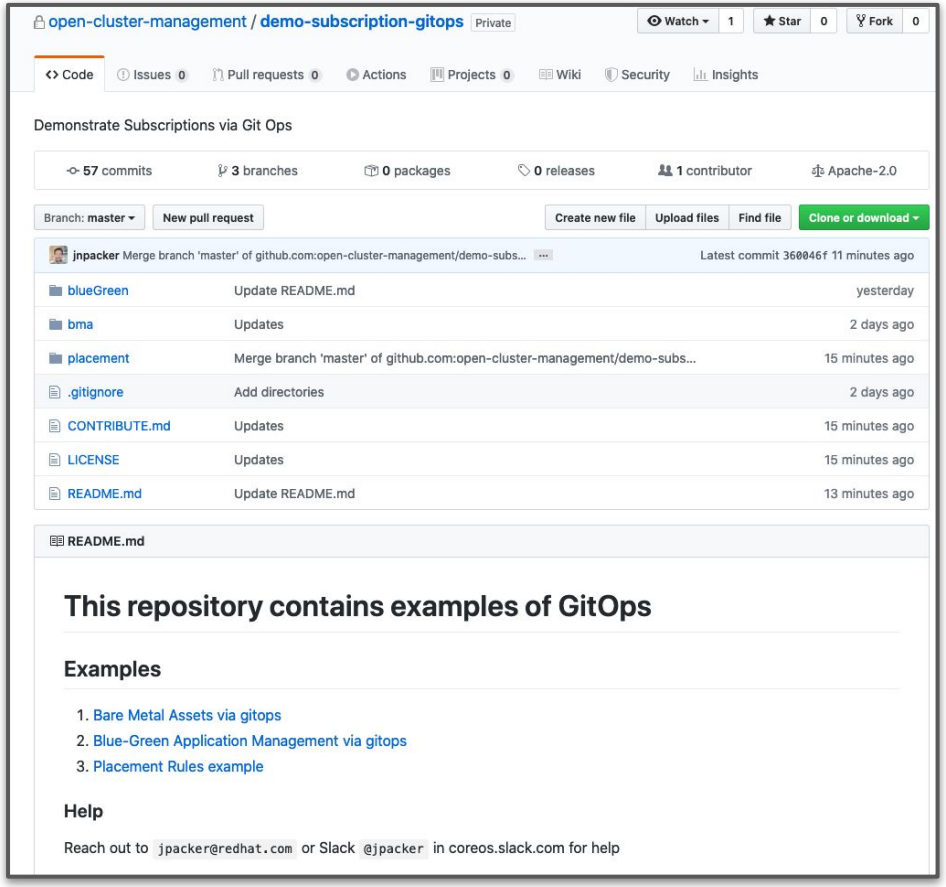
Advanced Application Lifecycle Management

GitOps - Git as source of truth

IT Operations

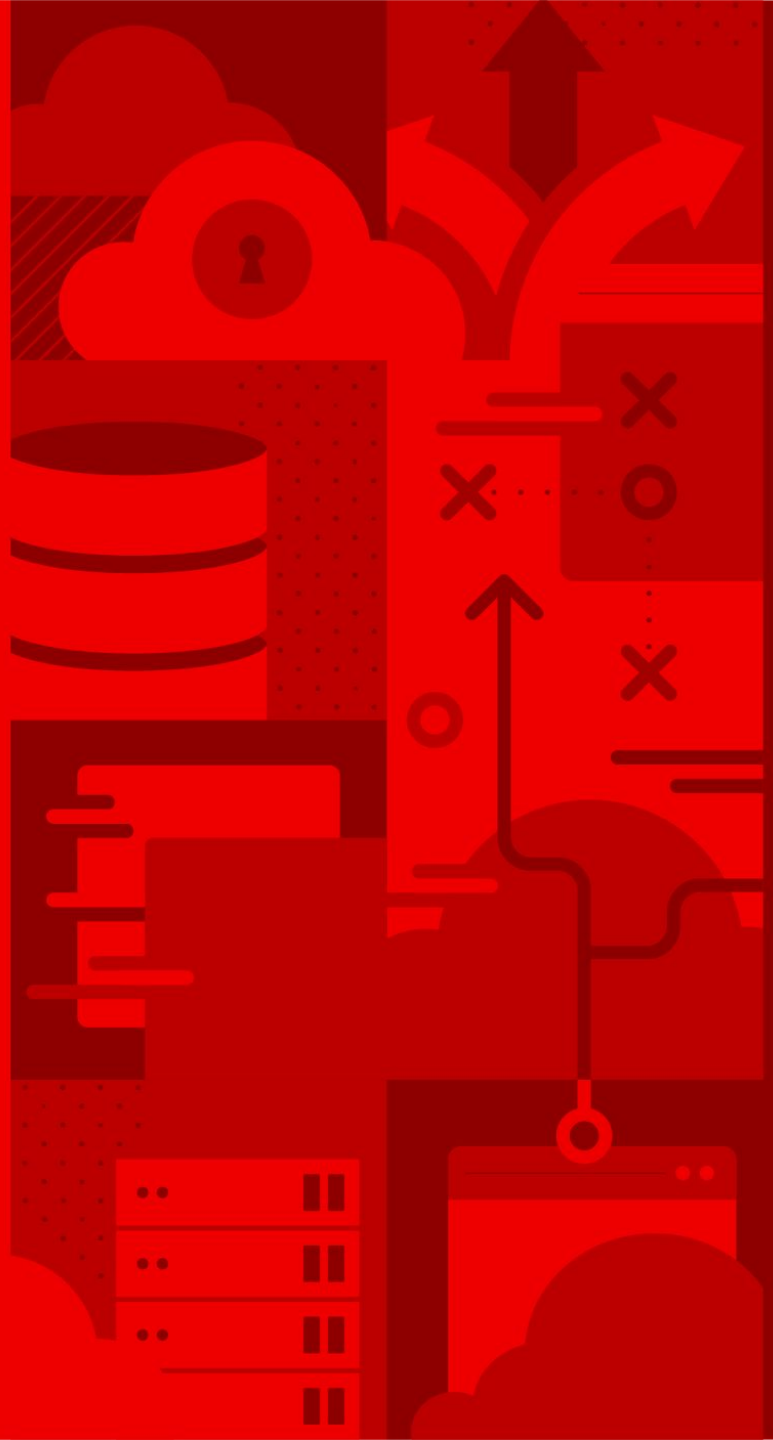
DevOps/SRE

- **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

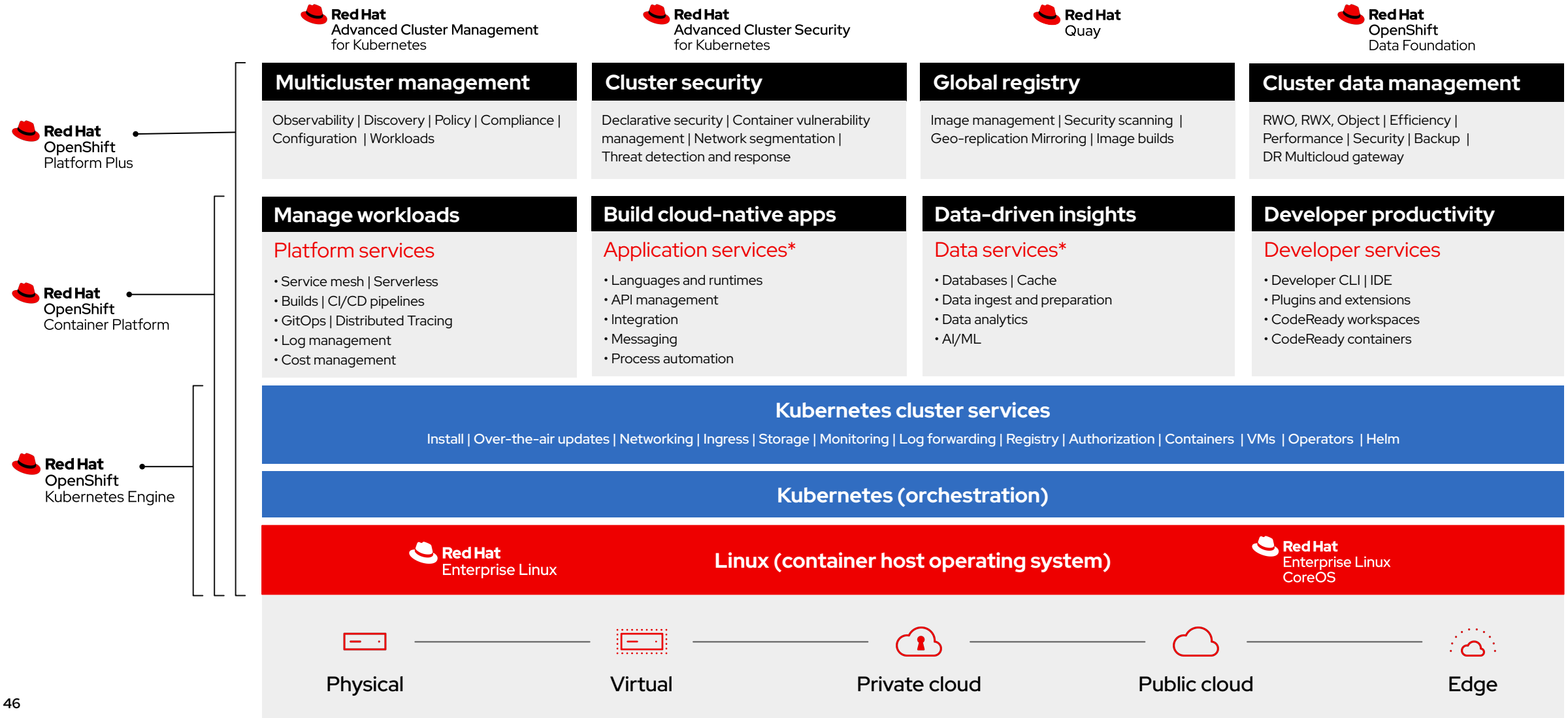
Red Hat



How ACM works with OpenShift

Red Hat

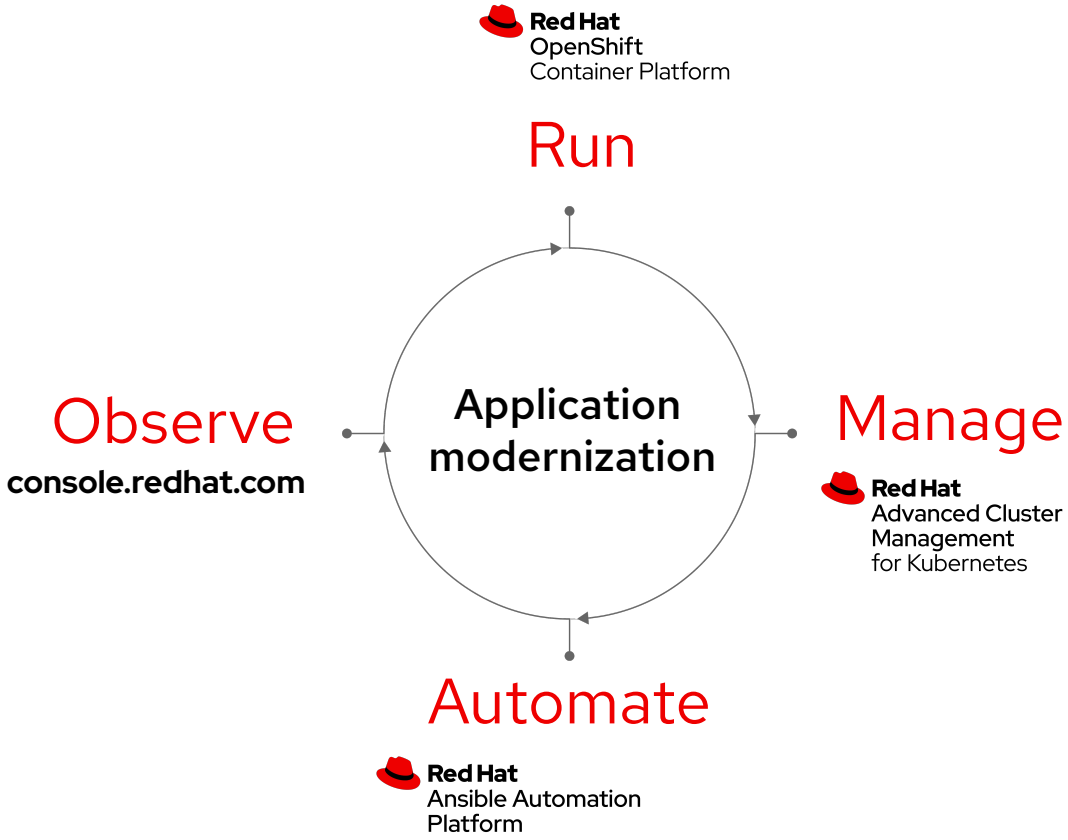
Bigger Picture: Red Hat Open Hybrid Cloud Platform



* Red Hat OpenShift® includes supported runtimes for popular languages/frameworks/databases. Additional capabilities listed are from the Red Hat Application Services and Red Hat Data Services portfolios.

** Disaster recovery, volume and multicloud encryption, key management service, and support for multiple clusters and off-cluster workloads requires OpenShift Data Foundation Advanced

Supporting application modernization



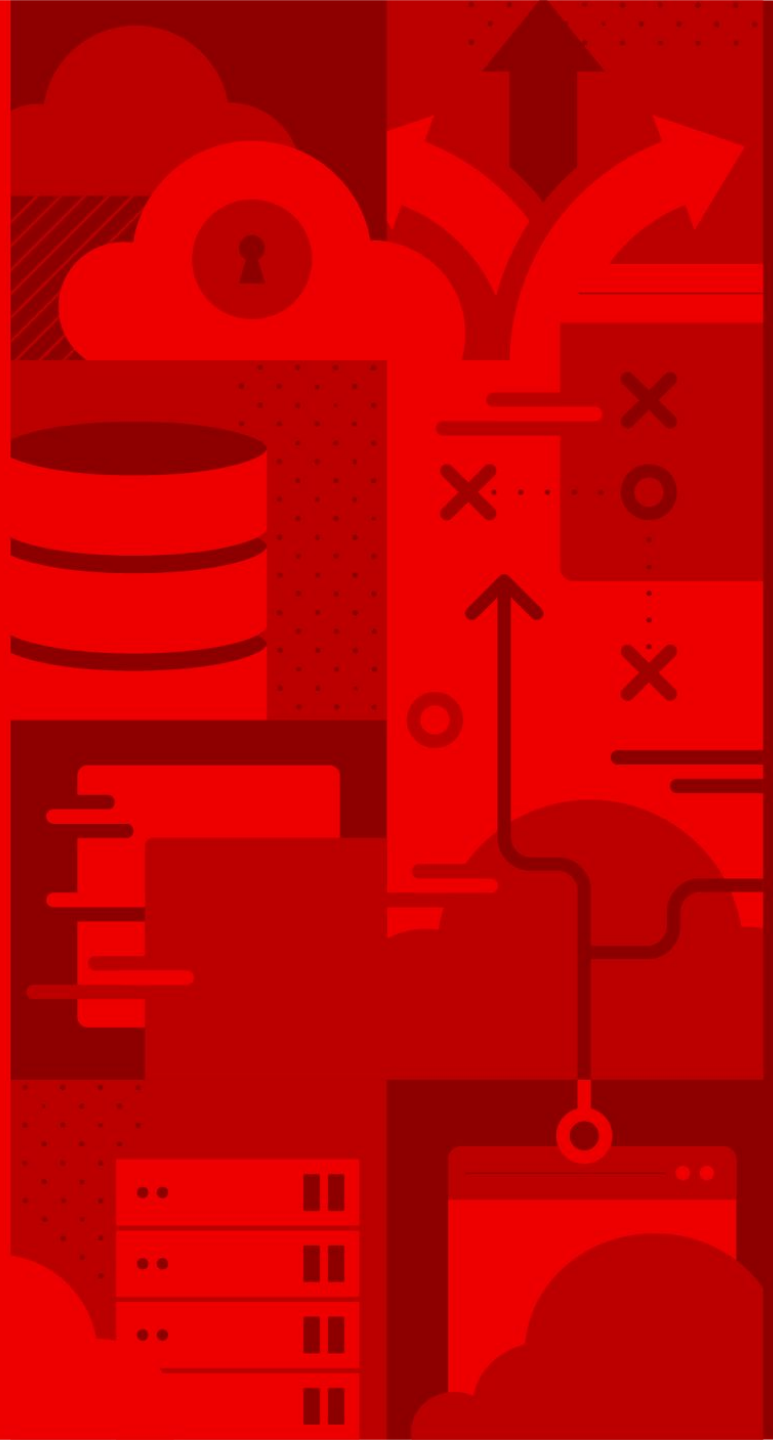
Run
- Cluster services: metrics, chargeback, registry, logging
- Advanced infrastructure functionality
- Dev services: dev tools, automated builds, CI/CD, IDE

Manage
- Multicluster and Kubernetes lifecycle management
- Policy-based governance, risk, and compliance
- Application lifecycle management
- ODF integration for Disaster Recovery of stateful apps

Automate
- Workflow orchestration
- Network and security automation
- Automation analytics
- Certified content
- Automation services catalog

Observe
- Red Hat Insights for OpenShift
- Connected customer experience
- Subscription watch
- Red Hat Cloud Services

Red Hat



What's new in RHACM 2.8

Demo Video

Red Hat

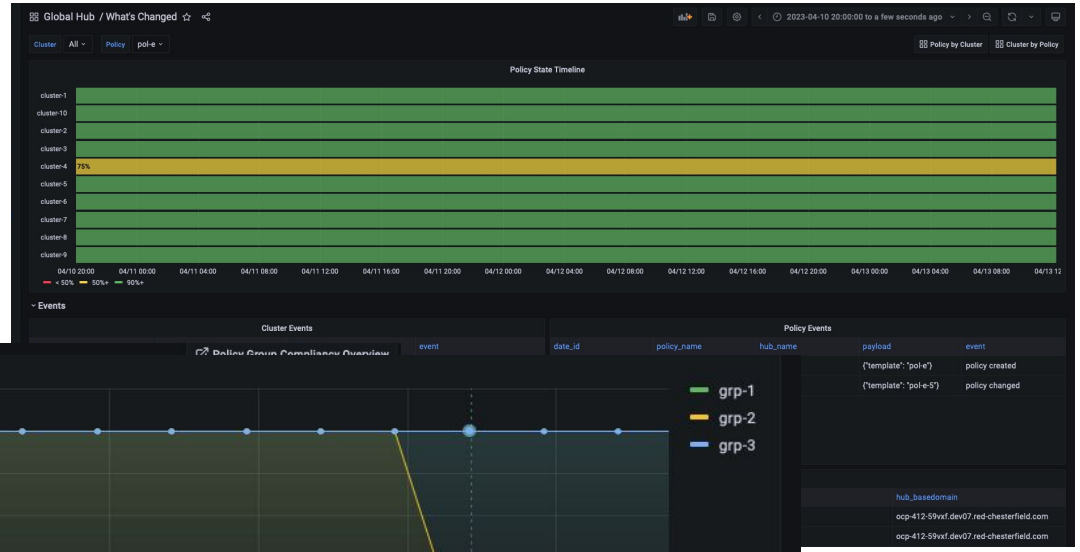
Red Hat Advanced Cluster Management for Kubernetes

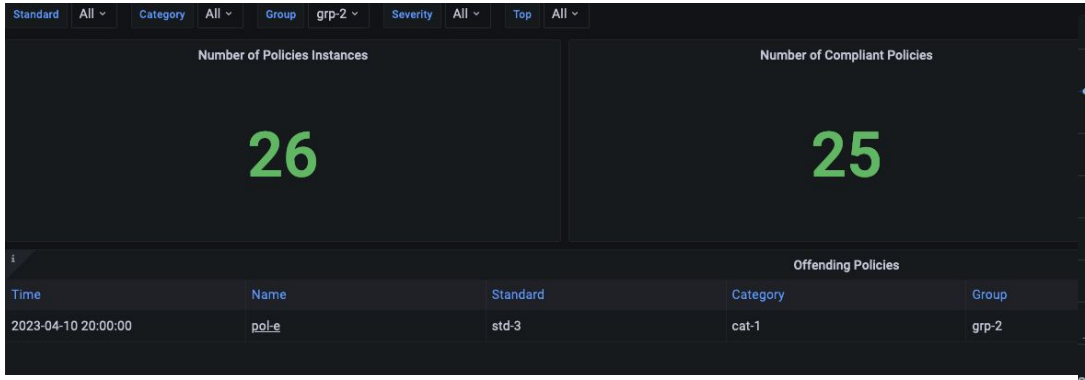
What's new in RHACM 2.8

Fleet Management

Expansion of management capabilities across the global fleet, providing solutions for data isolation boundaries and extremely high scale scenarios.

- **Global Hub phase 1: Policy compliance view (TP)**
  - **Policy Compliance Status and Trend (TP)**
  - Policy compliance state and policy trends across multiple RHACM Hubs
  - **Quickly Assess and Audit (TP)**
  - Report the count of compliance states across the last 30 days
  - Show the compliance for production clusters for the last 30 days





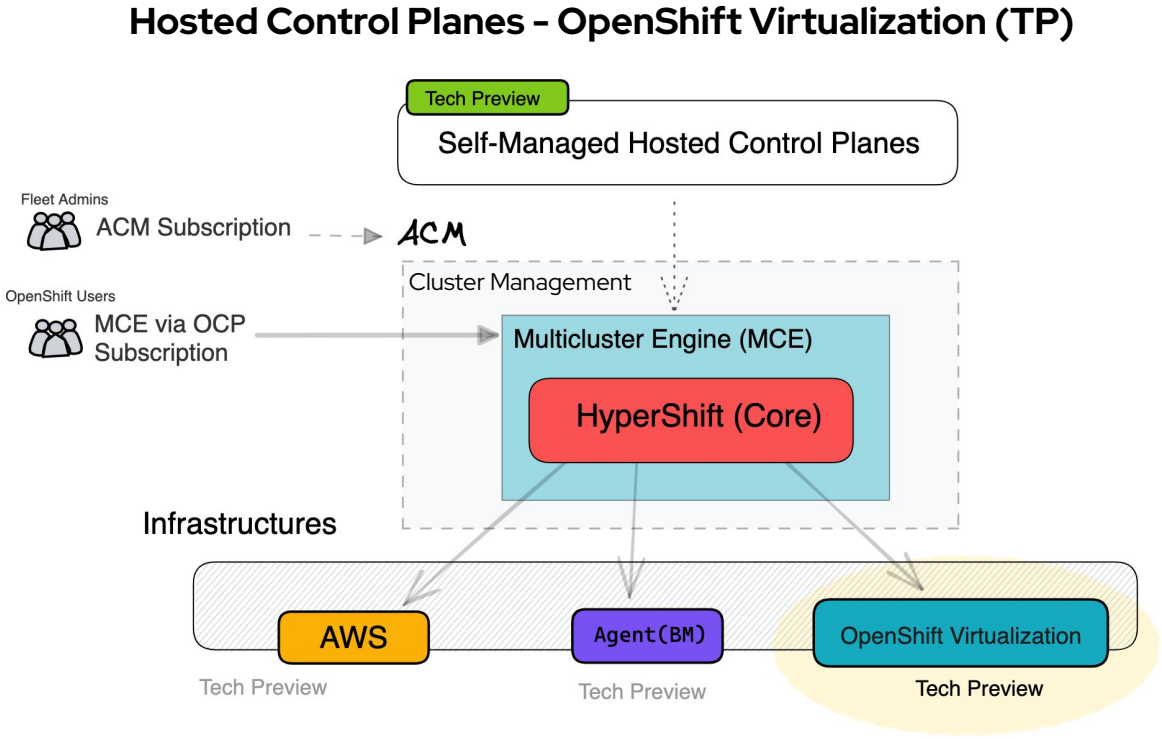
Red Hat

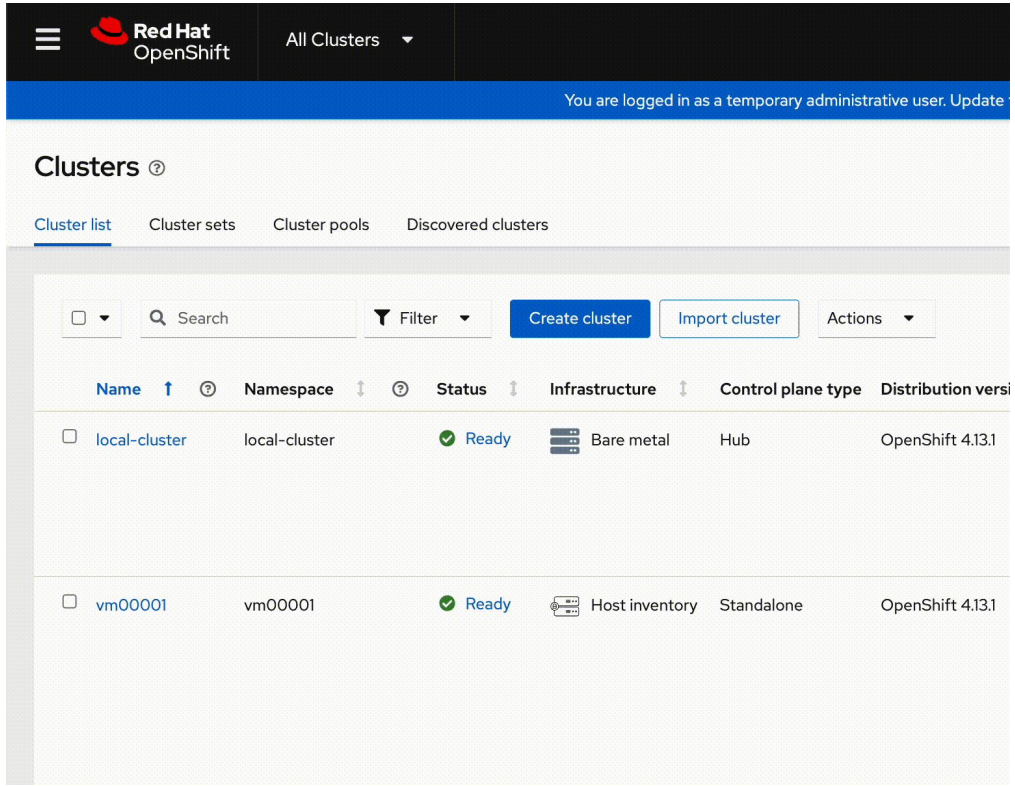
Red Hat Advanced Cluster Management for Kubernetes

What's new in RHACM 2.8

Fleet Management

Expansion of management capabilities across the global fleet, providing solutions for data isolation boundaries and extremely high scale scenarios.





Red Hat

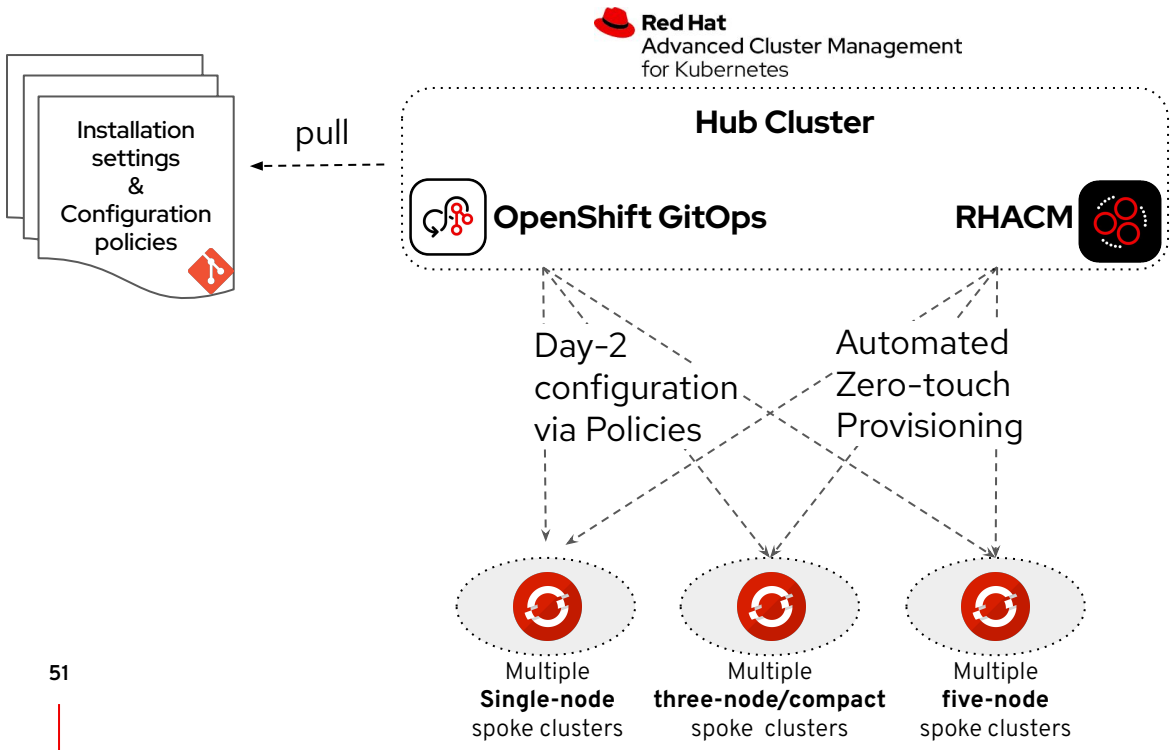
Red Hat Advanced Cluster Management for Kubernetes

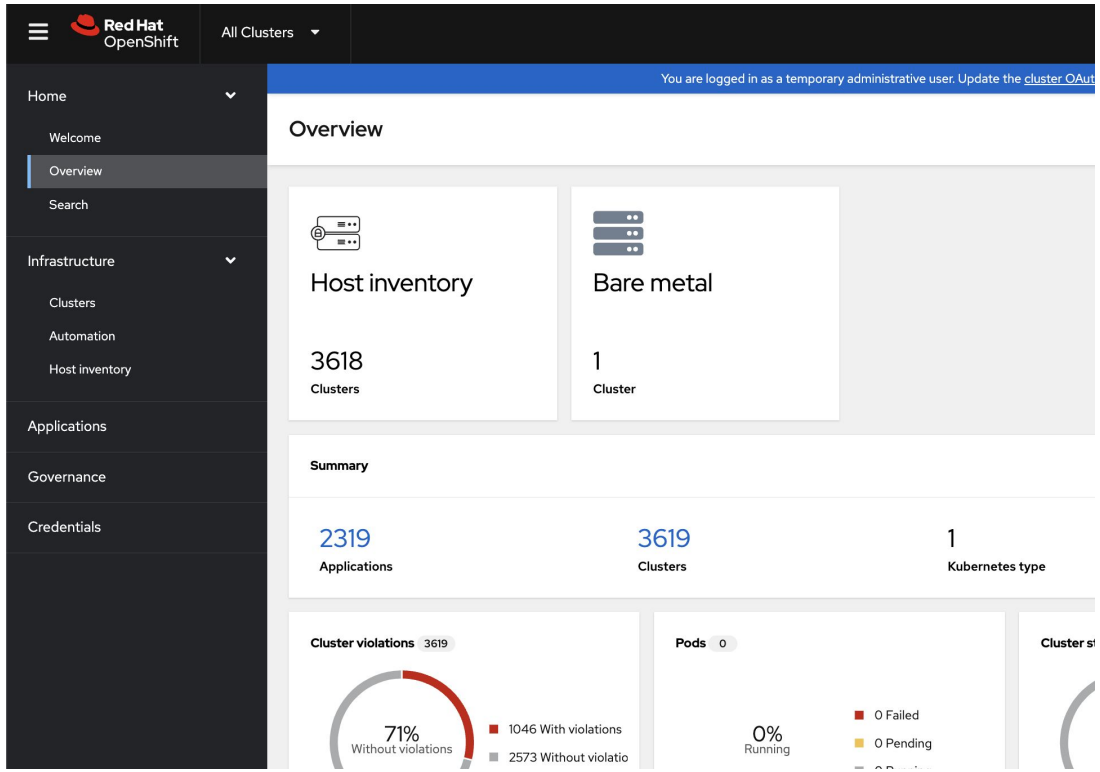
What's new in RHACM 2.8

Fleet Management

Expansion of management capabilities across the global fleet, providing solutions for data isolation boundaries and extremely high scale scenarios.

Performance & Scale: +3600 clusters in a mixed fleet





Red Hat

Red Hat Advanced Cluster Management for Kubernetes

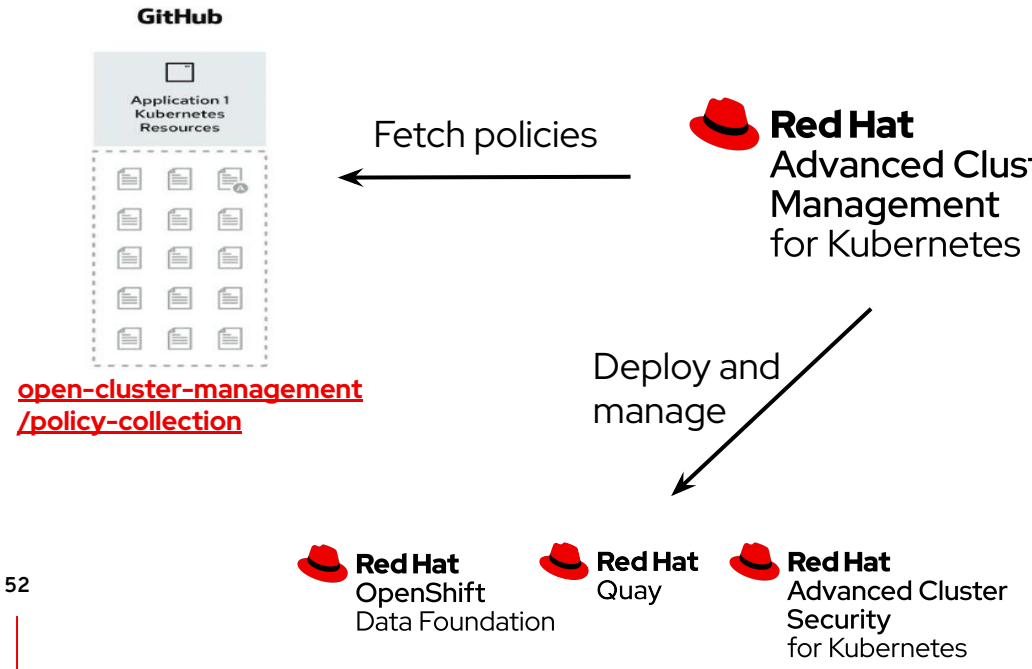
What's new in RHACM 2.8

Better together

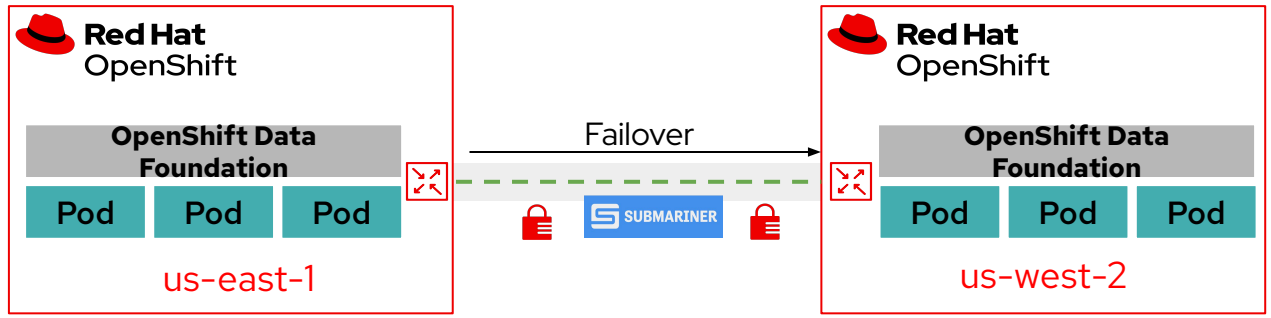
As the Red Hat Hybrid Cloud portfolio grows, we continue to provide crisp alignment across the Openshift Layered products

Red Hat OpenShift Platform Plus

OpenShift Platform Plus PolicySet: Easy and supported way to deploy and manage OpenShift Platform Plus using ACM Policies



Regional DR with **OpenShift Data Foundation** & **Advanced Cluster Management:** Provides applications and persistent data replication across sites that are geographically dispersed.



*** Requires a compatible ODF Advanced release

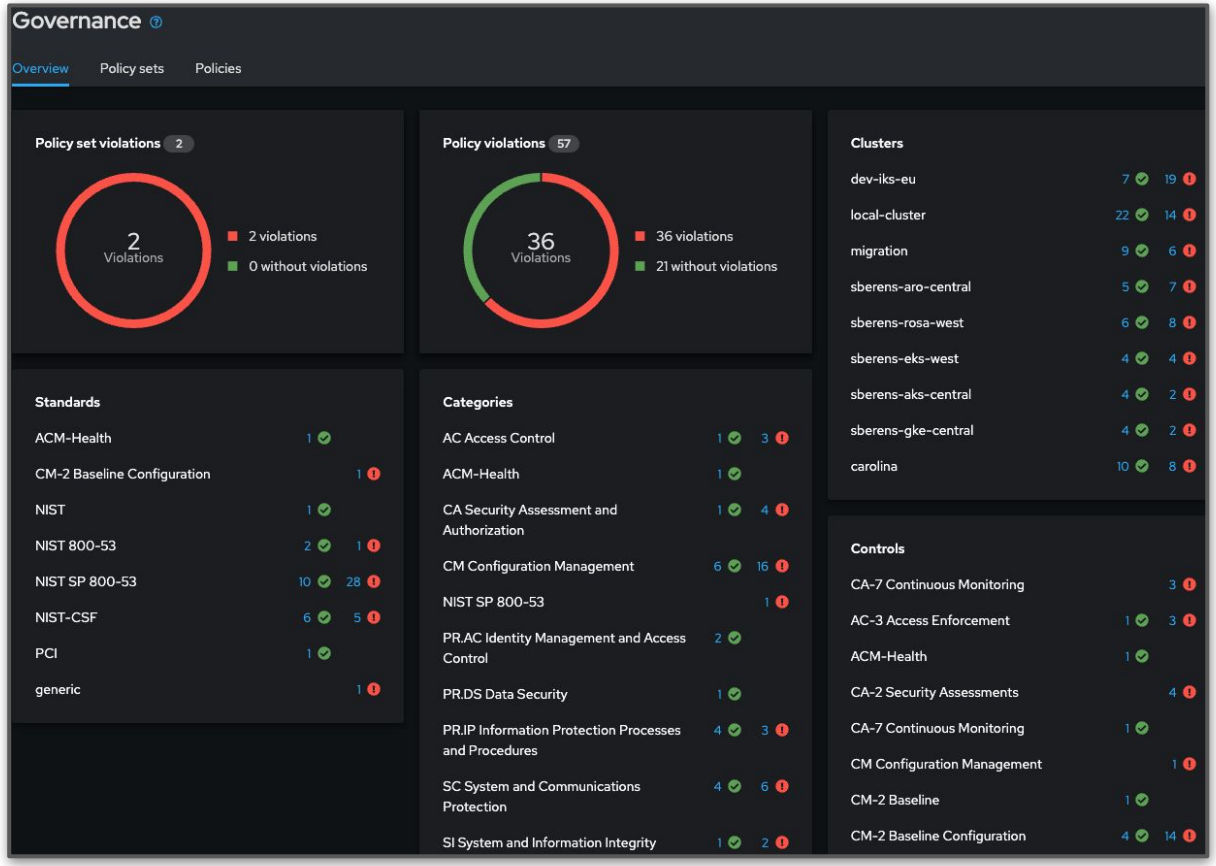
Red Hat

Red Hat Advanced Cluster Management for Kubernetes

What's new in RHACM 2.8

Governance & Security

RHACM ongoing efforts are reinforcing the foundational principles of Red Hat Advanced Cluster Management to provide enhanced governance and security across all architectural pillars.



- **ACM Templatized Policies: add support for ranges for policy simplification**
  - As a policy user, I would like to use ranges in my policy templates to avoid duplication in my object-templates definition.
  - As a policy user, I would like to use conditionals around arrays and objects so that I can avoid duplicating policies for different environments.
- **Improve the RHACM policy experience with Gatekeeper constraints**
  - Support Gatekeeper constraints natively in RHACM policies.
  - Make adoption of Gatekeeper easier

Red Hat

Red Hat Advanced Cluster Management for Kubernetes

What's new in RHACM 2.8

Governance & Security

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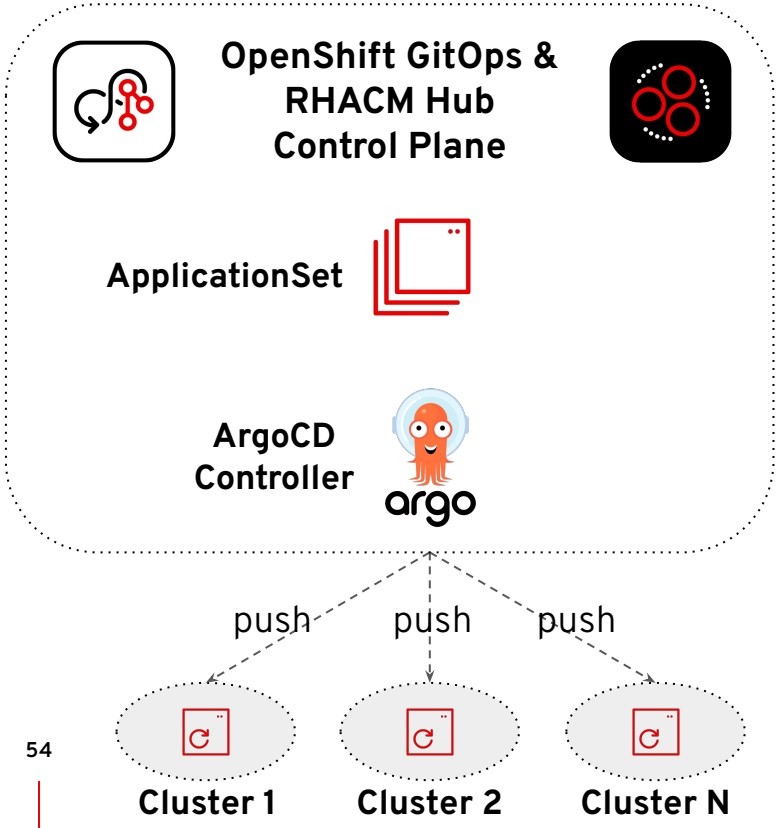
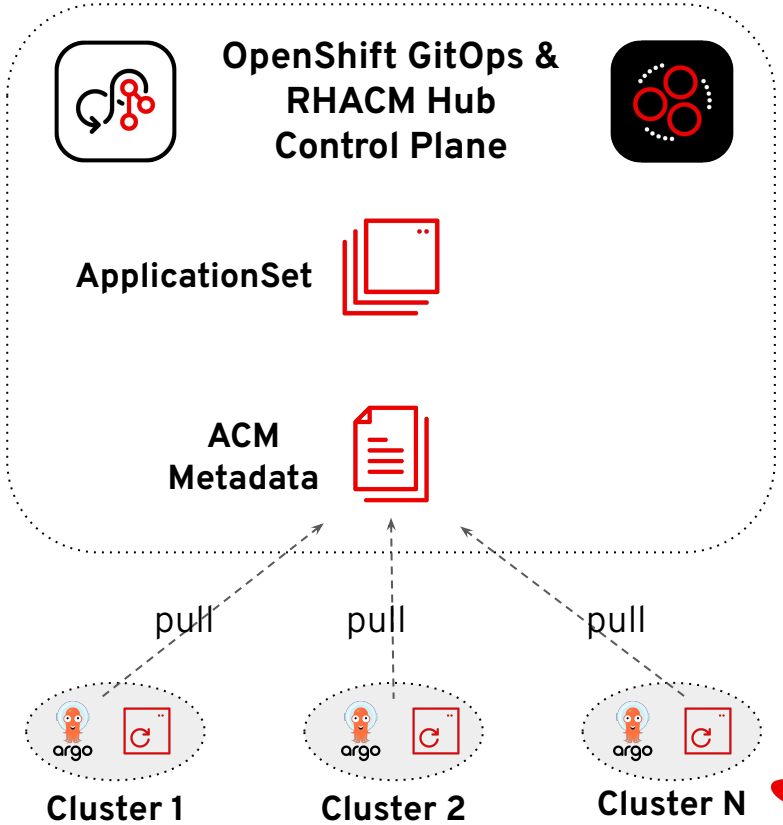
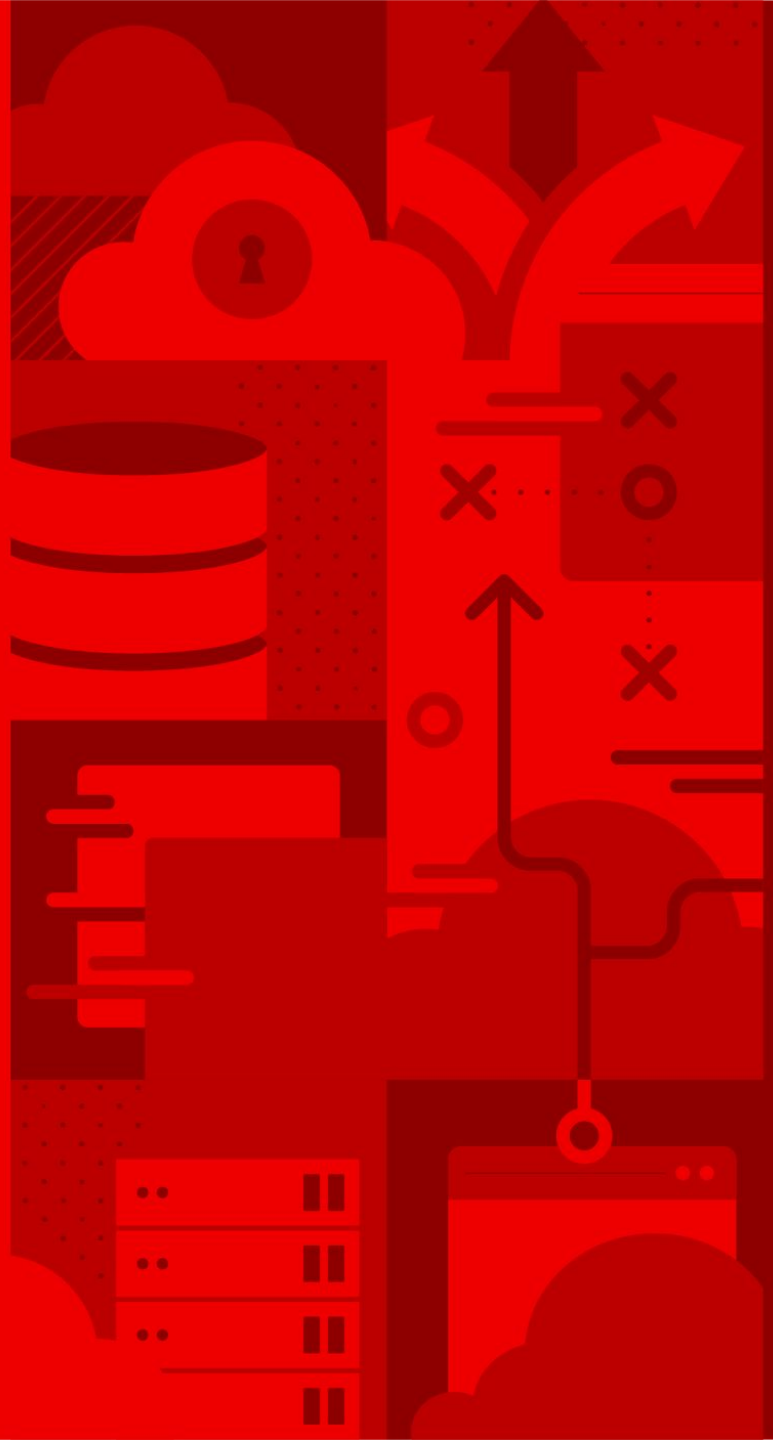


ApplicationSet pull model (Tech Preview)

- **Decentralized** GitOps
- Fits better to RHACM architecture (**Hub-Spoke**)
- Enhanced **Security**
- Better **Scalability**



Red Hat

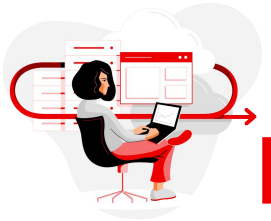


Architecture

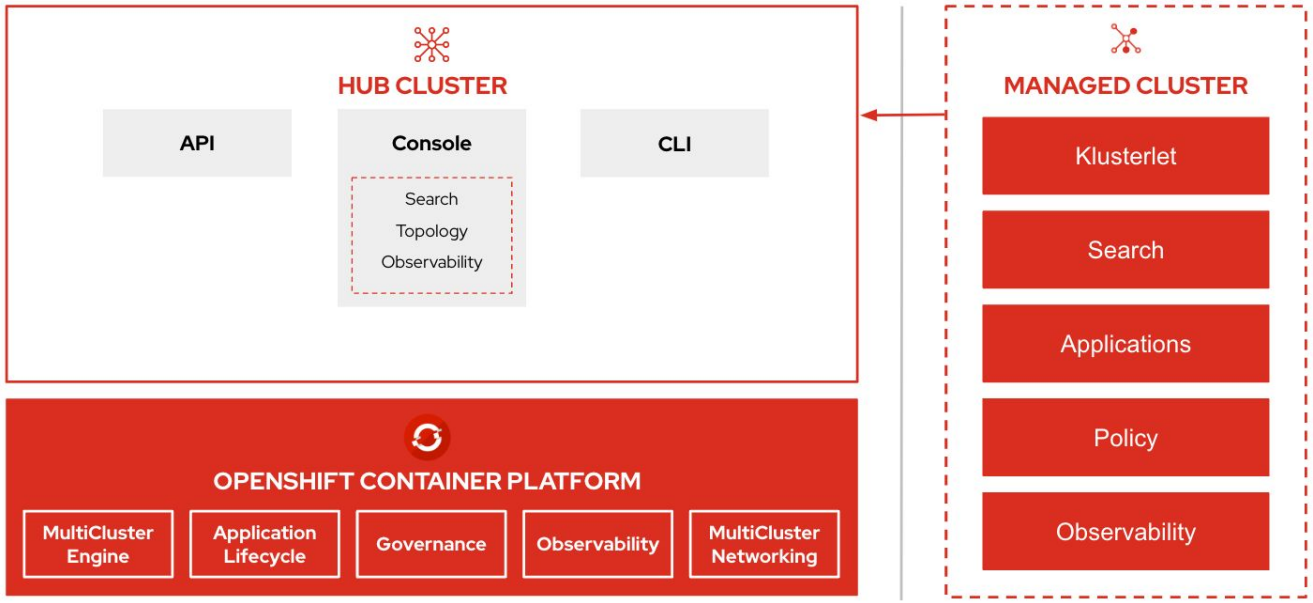
Red Hat

Architecture Overview

Components



IT Operations



Hub architecture and components

Red Hat Advanced Cluster Management uses the **multiclusterhub-operator** and other operator and runs in the **open-cluster-management** namespace

Managed cluster architecture and components

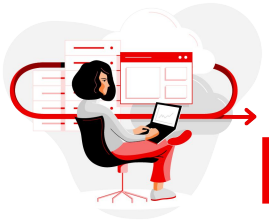
Red Hat Advanced Cluster Management managed clusters use the **klusterlet** operator which runs in the **open-cluster-management-agent** namespace

* Multicluster Engine is the cluster lifecycle operator that provides cluster management capabilities for OpenShift Container Platform and Red Hat Advanced Cluster Management hub clusters. MCE, for short, is entitled within OCP subscriptions and is installed automatically along with an ACM operator deployment.

Red Hat

Architecture Overview

Operator install for managed cluster



IT Operations

Managed cluster

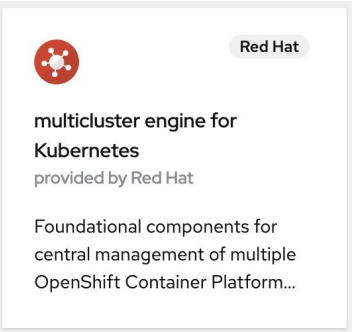
The **klusterlet** operator controls the deployment of components on the managed cluster.

List of included components:

- Application manager
- Certificate controller
- Policy controller
- Registration agent
- Observability controller
- Search collector
- Cluster proxy
- IAM policy controller
- Work manager

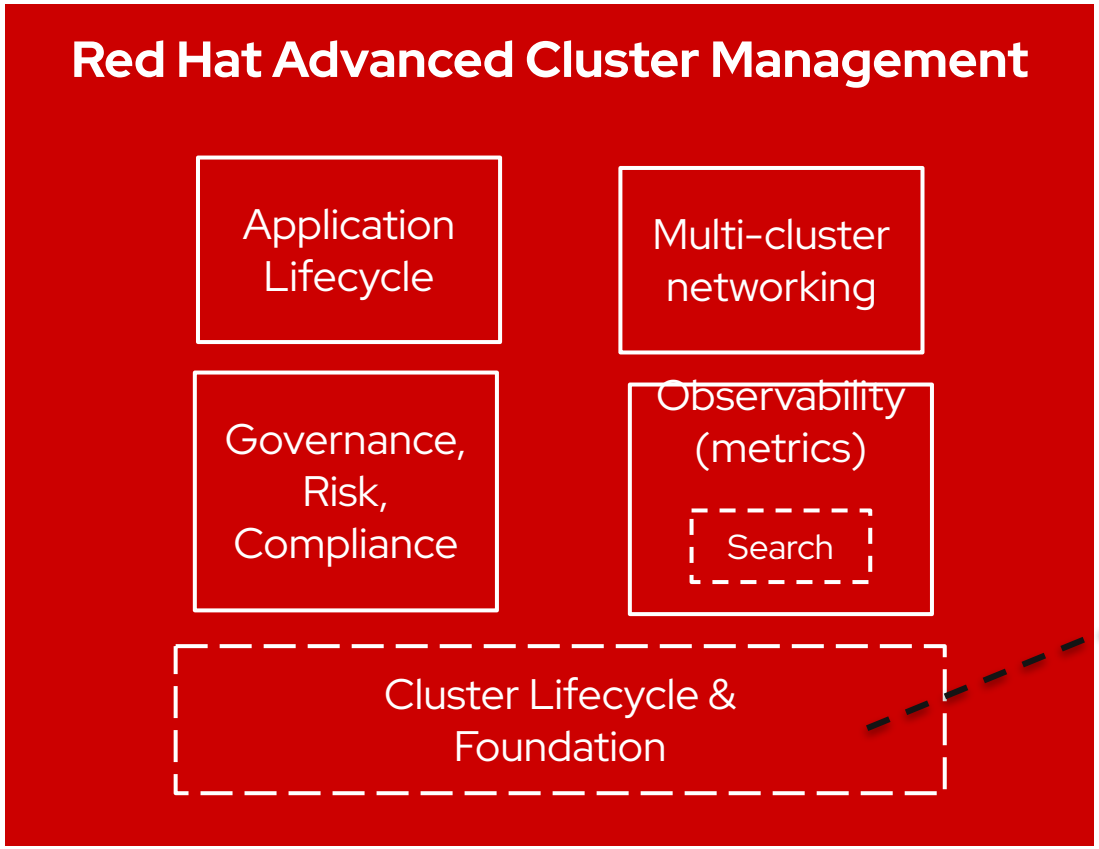
Red Hat

With MCE, ACM has re- packaged core multi-cluster functionality into a new operator

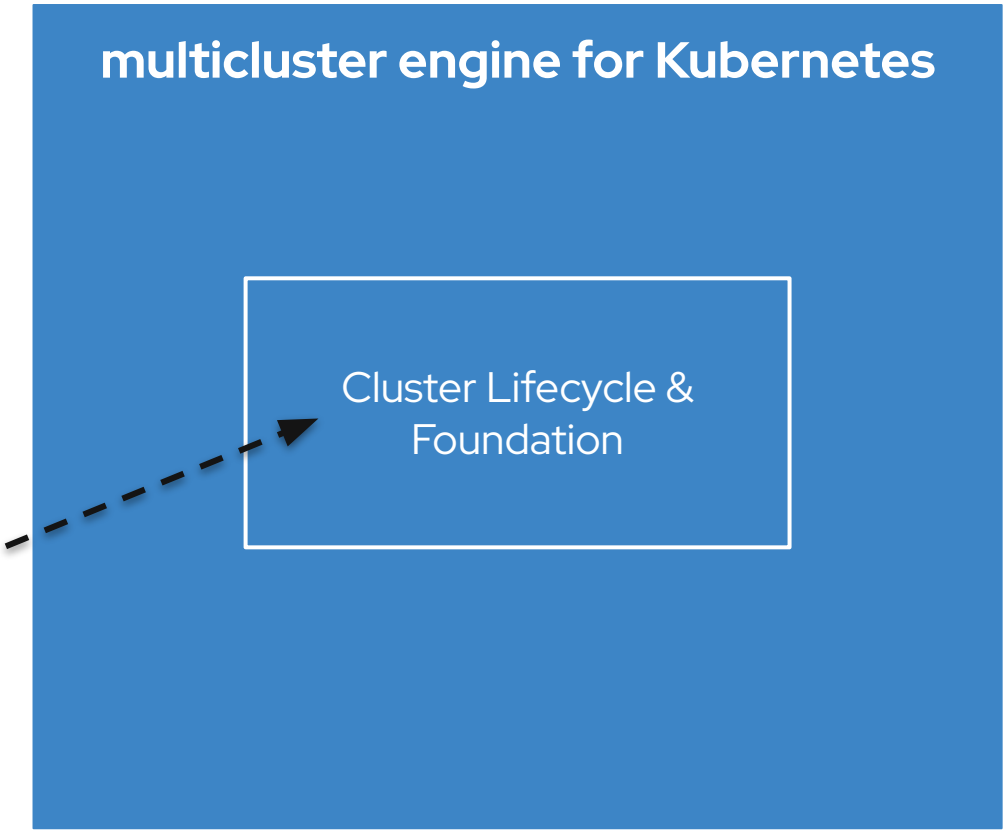


The **multicluster engine for Kubernetes** operator is entitled with OpenShift and it's installed automatically during a RHACM install.

ACM 2.4 (and earlier)



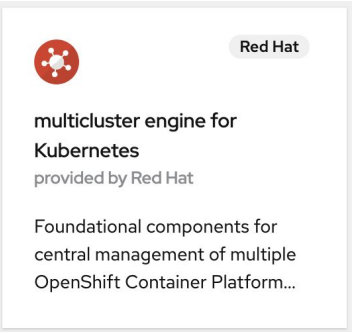
MCE 1.0 (and later)



Red Hat

ACM v2.5 is “Consumer One” of MCE

RHACM is built on top of the **multicluster engine operator**.



ACM 2.5, 2.6, 2.7, 2.8

ADVANCED CLUSTER MANAGEMENT

- Application Lifecycle
- Governance, Risk, Compliance
- Observability & Search
- Multi-cluster networking

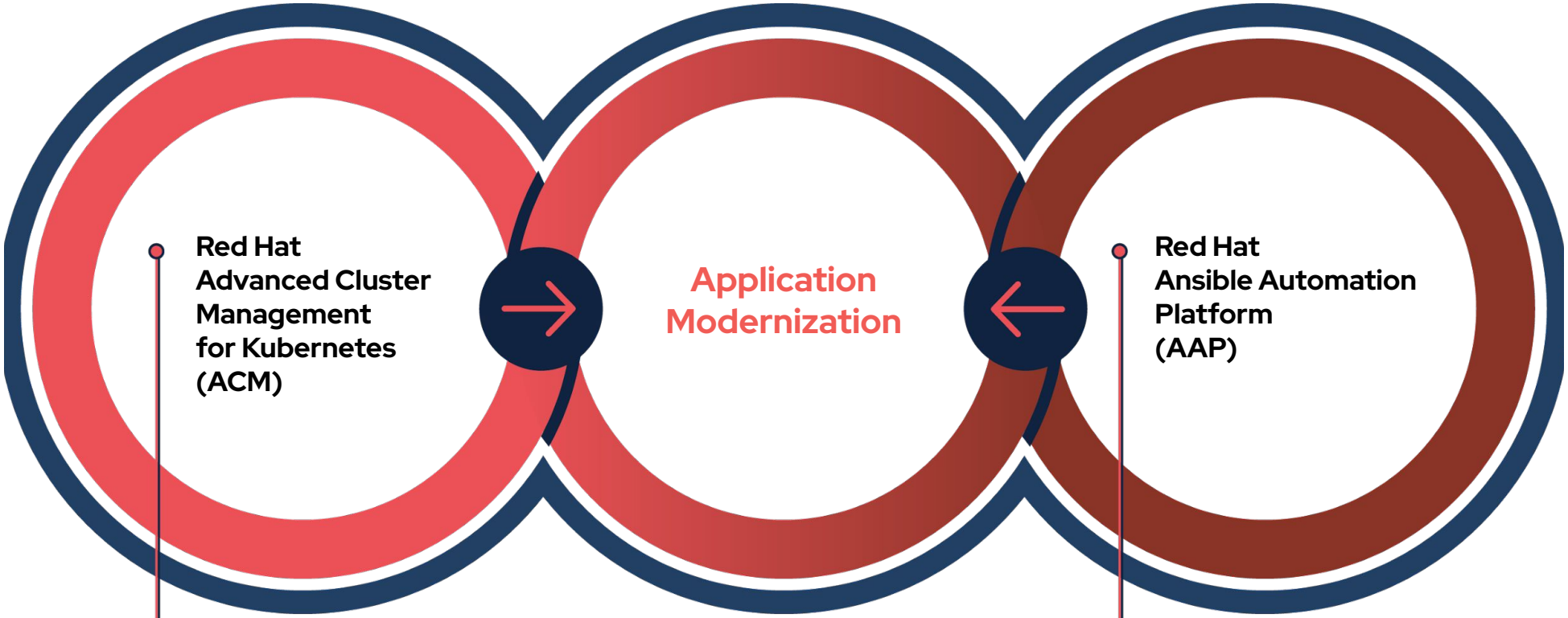
MCE 2.0, 2.1, 2.2, 2.3

MULTICLUSTER ENGINE

- Cluster Manager (Inventory, Work, Placement)
- Hive
- Klusterlet
- Central Infrastructure Management & Infra Operator
- Discovery
- Hosted Control Planes

Red Hat

Application modernization driven by automation of Kubernetes and beyond....



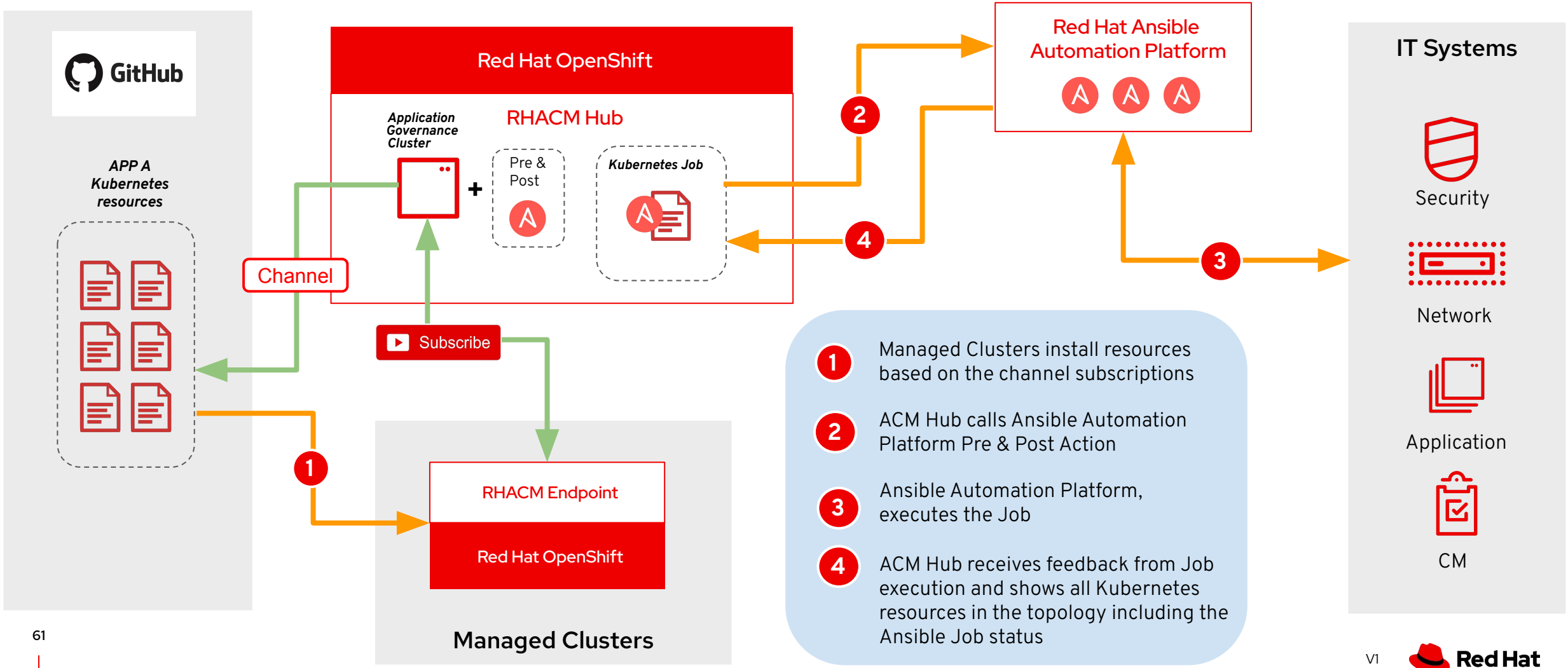
Automate the deployment and management of OpenShift cluster, applications, control policy compliance, and enforcement

Automating everything else outside of Kubernetes: Configuration of networking, databases, load balancers, storage, etc.

Red Hat

Complete Automation Platform

ACM – Ansible Automation Platform Integration through all the use-cases

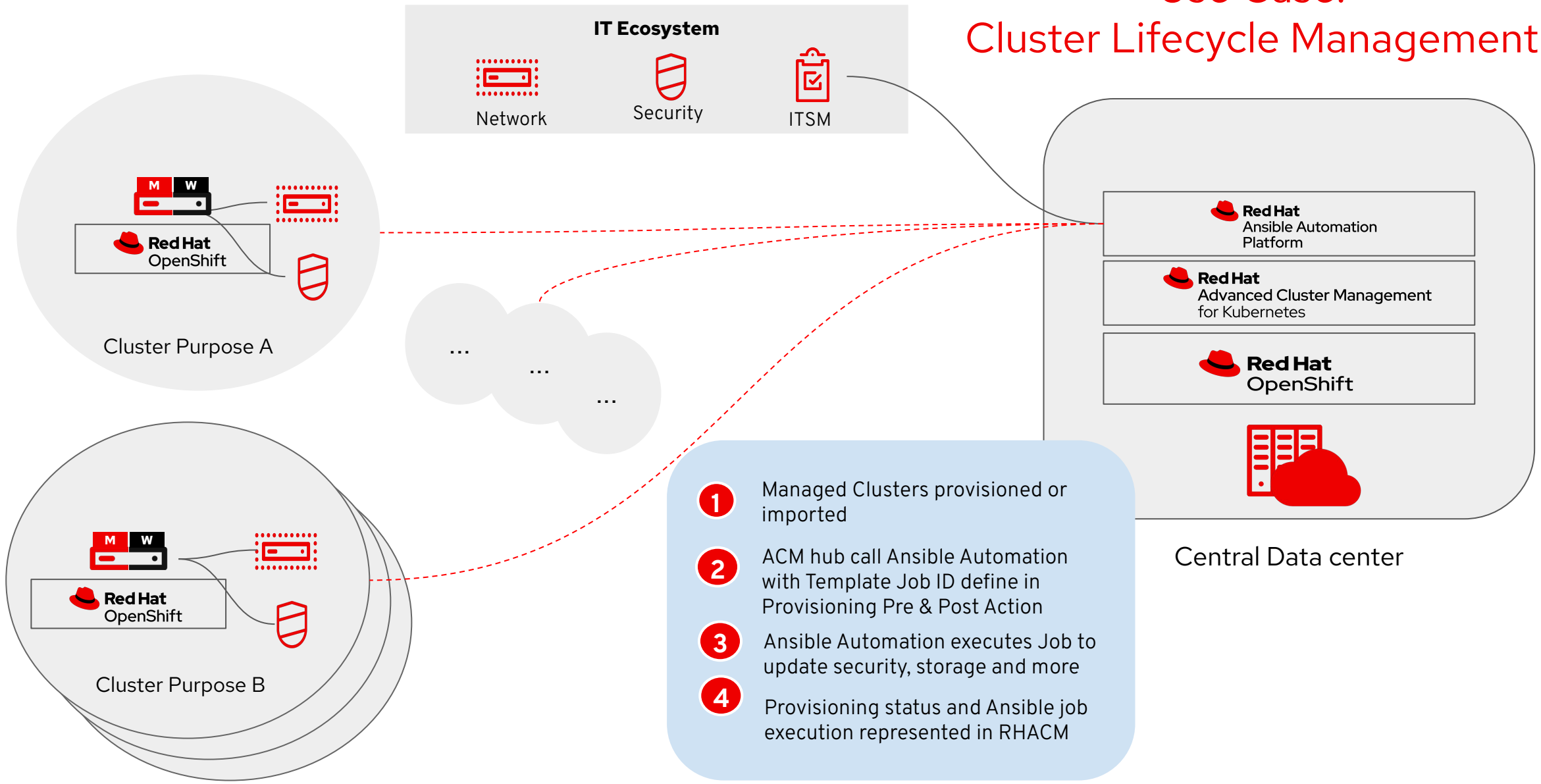


1. Managed Clusters install resources based on the channel subscriptions
2. ACM Hub calls Ansible Automation Platform Pre & Post Action
3. Ansible Automation Platform, executes the Job
4. ACM Hub receives feedback from Job execution and shows all Kubernetes resources in the topology including the Ansible Job status

Red Hat

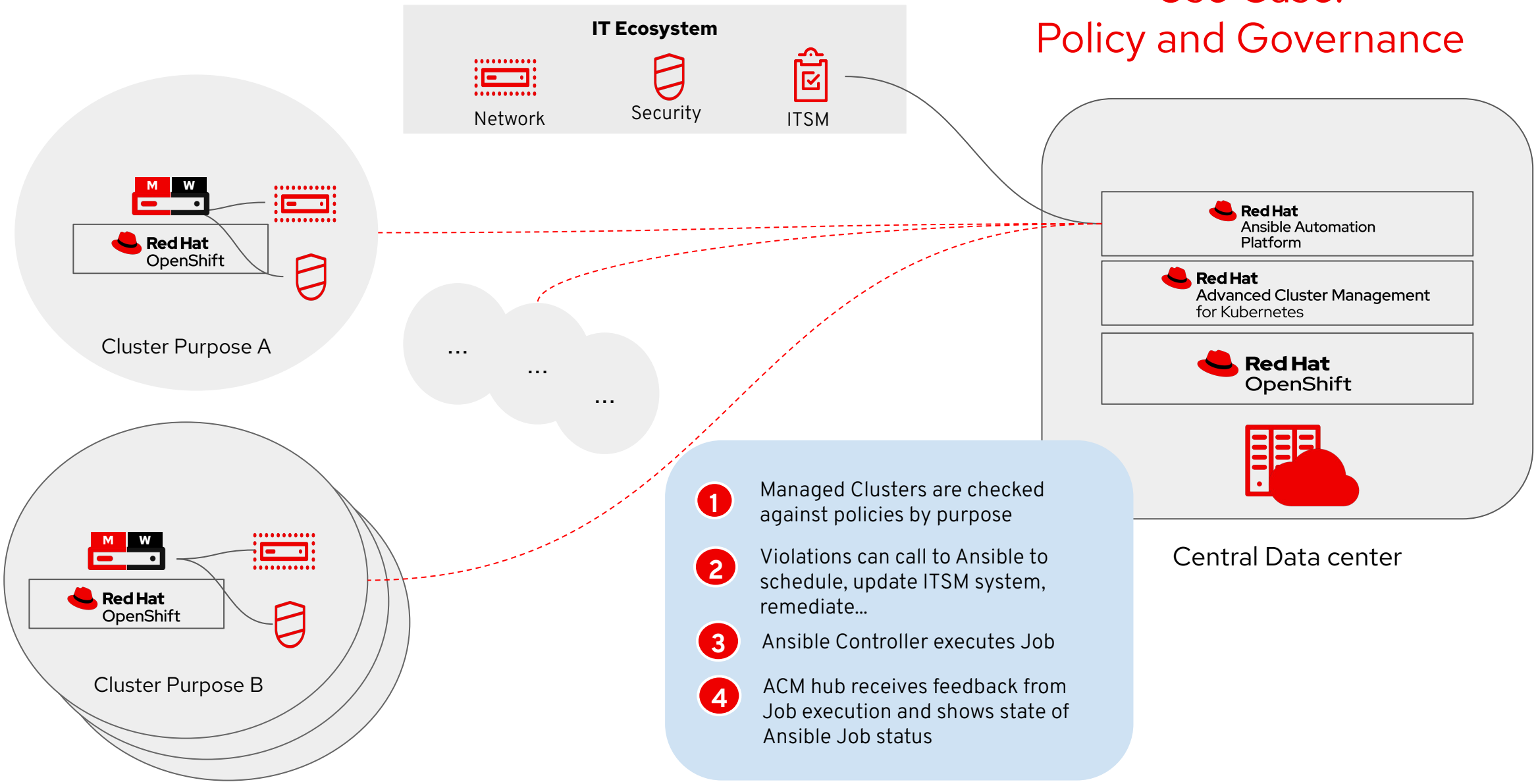
Complete Automation Platform

Use Case: Cluster Lifecycle Management



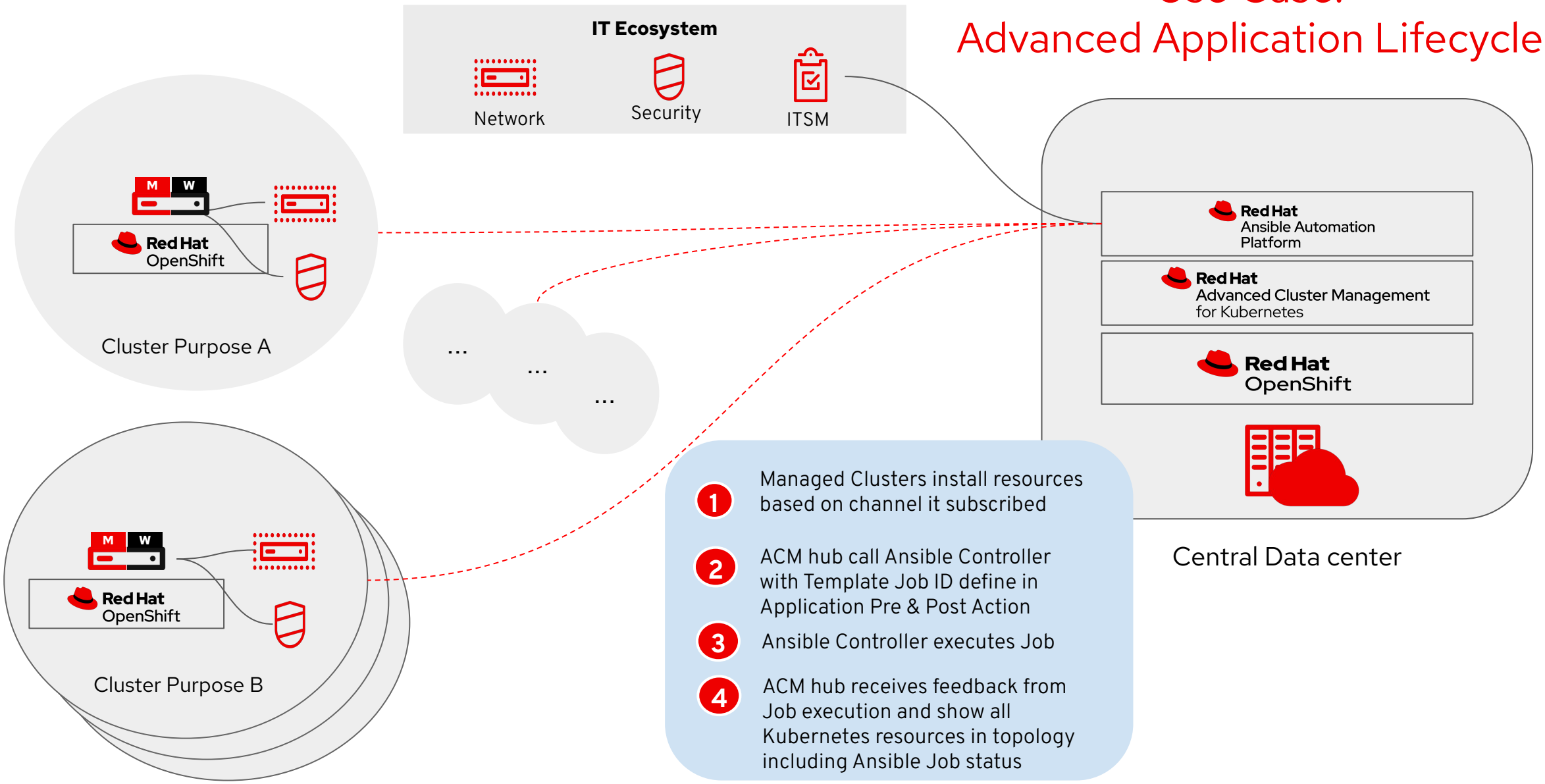
Complete Automation Platform

Use Case: Policy and Governance

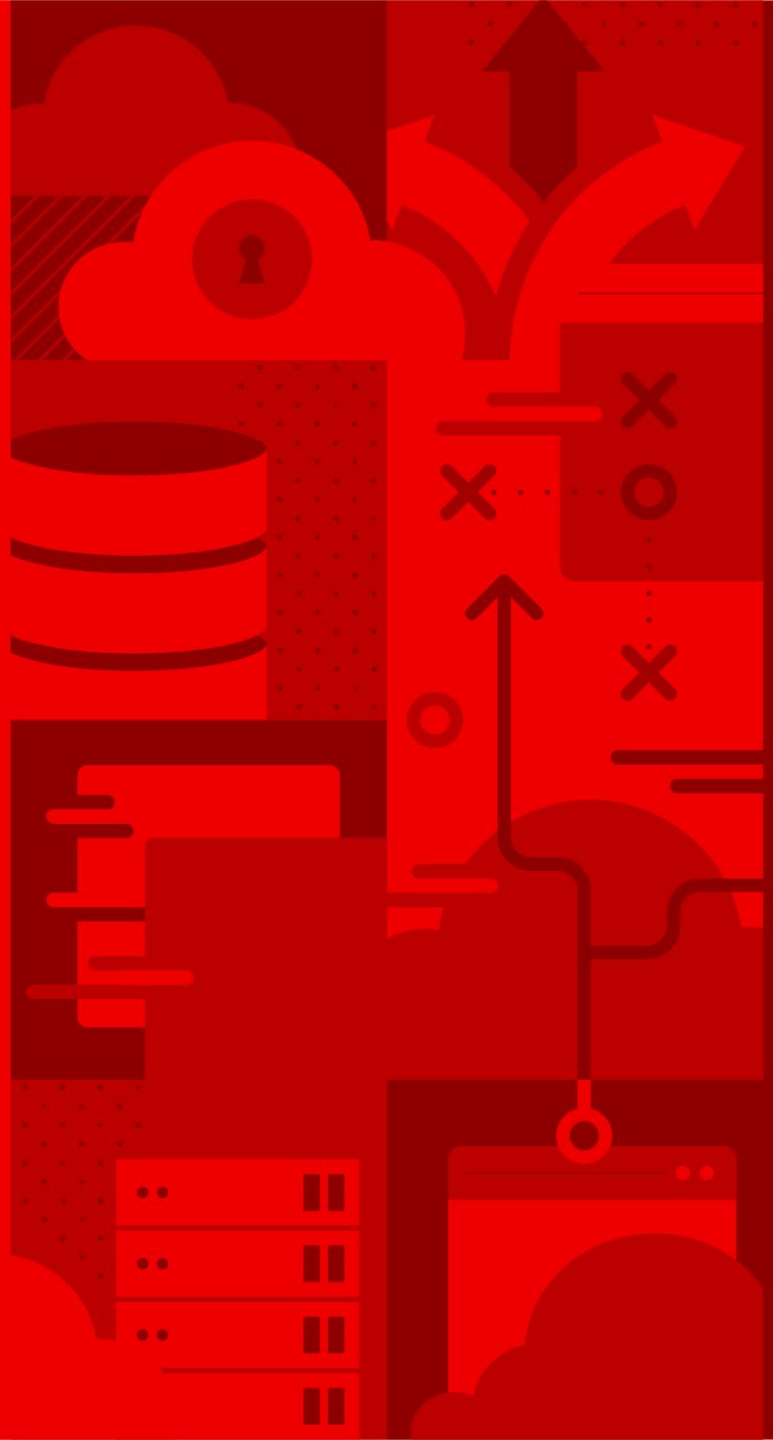


Complete Automation Platform

Use Case: Advanced Application Lifecycle



Red Hat



Installation

Installation and Foundation

Operator-based installation for Hub cluster

IT Operations

Hub Cluster

- Operator-based installation
- Available on OperatorHub
- Requires OCP 4.10.x - **Latest**

Full Lifecycle Management of OCP clusters

- Deploy OpenShift 4.10.x - **Latest**

Import and Management of OCP clusters

- OpenShift 3.11*, OpenShift 4.10.x - **Latest**
- Cloud hosted OCP: ROSA / OSD / ARO / RHOIC

Import and Limited Management for cloud Kubernetes

- EKS, AKS, GKE, IKS

High Availability

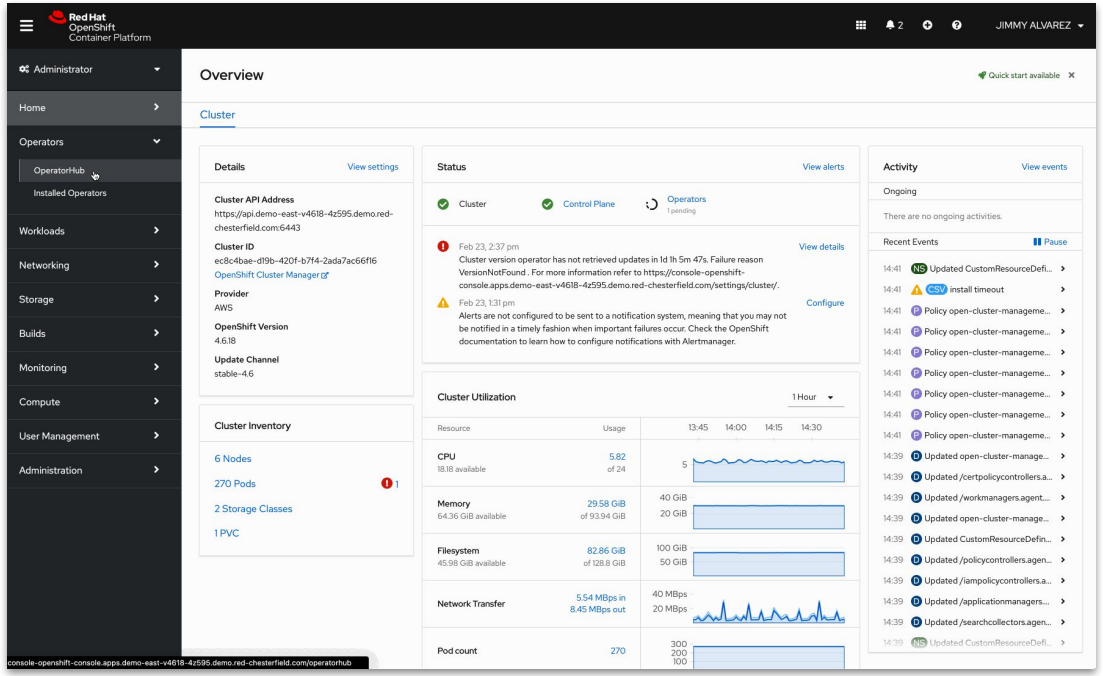
- Supports OCP Availability Zone

Resource Requirements

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

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

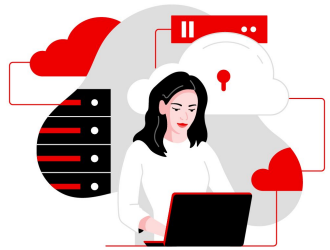
  * vCPU/RAM Numbers are per node.



Red Hat

Role-Based Access Control

How to control user access

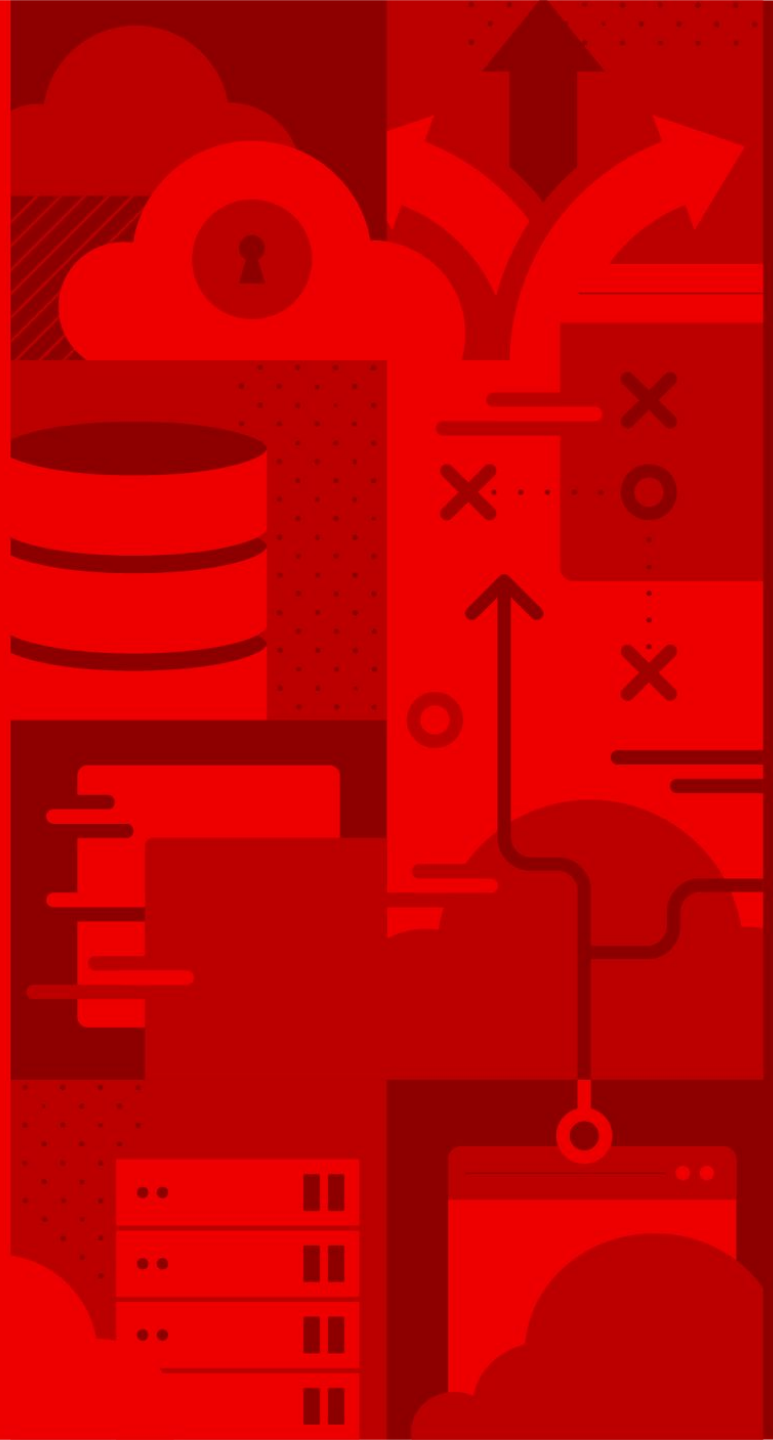


- RBAC in RHACM is based on kubernetes concepts and is enforced through Openshift.
- Cluster-Admin Role is an Openshift super-user role and can perform all actions cluster-wide.
- Additional Roles are available out of the box to assign users Admin, Edit or View level access to RHACM artifacts, for more please see the documentation. See some examples below:

Role	Description
open-cluster-management:cluster-manager-admin	A user with cluster-wide binding to this role, is an RHACM super user can perform any action on RHACM resources
open-cluster-management:admin:managed-cluster-x	A user with cluster binding to this role, has admin access to ManagedCluster “X” resource
open-cluster-management:view:managed-cluster-x	A user with cluster-wide binding to this role, has view access to ManagedCluster “X” resource
OCP Default admin / edit / view roles	A user with namespace binding to these roles has access to resources like policies, applications etc in that namespace or ManagedCluster. A user with cluster-wide binding to these roles has access to resources like policies, applications etc in all namespaces or for all ManagedClusters.

Red Hat

Red Hat Advanced Cluster Management for Kubernetes



ACM Services/ Consulting

Red Hat

Advanced Cluster Management

Empower business transformation with highly scalable container and application management, orchestration and a culture of collaboration.

DEFINE YOUR JOURNEY

Strategy

Chart a journey map from foundational use case to target state with measurable business outcomes.

Foundation

Empower a cross-functional team to automate and operate an initial set of workflows in an initial automation framework.

Adoption

Expand skills, integrations, and orchestrated workflows in increments with measurable value.

Technology

Establish container management framework, tooling, and techniques that empower process evolution and business-driven workflows.

Process

Adopt open practices to quickly develop, validate, and launch new services and workflows in response to changing demands.

Culture

Spark innovation and agility with new approaches to increase collaboration, and communities that empower and inspire the organization.

A KUBERNETES MANAGEMENT TEAM

Our Red Hat-led Kubernetes management projects integrate you and our experts into a joint management team. With a constant feedback loop maintained through our agile development processes, we actively and collaboratively move development forward.

COLLABORATIVE

IDEATE | **DESIGN** | **BUILD & ITERATE** | **LAUNCH**

DISCOVERY SESSION
1 Day

NAVIGATE TO KUBERNETES MANAGEMENT

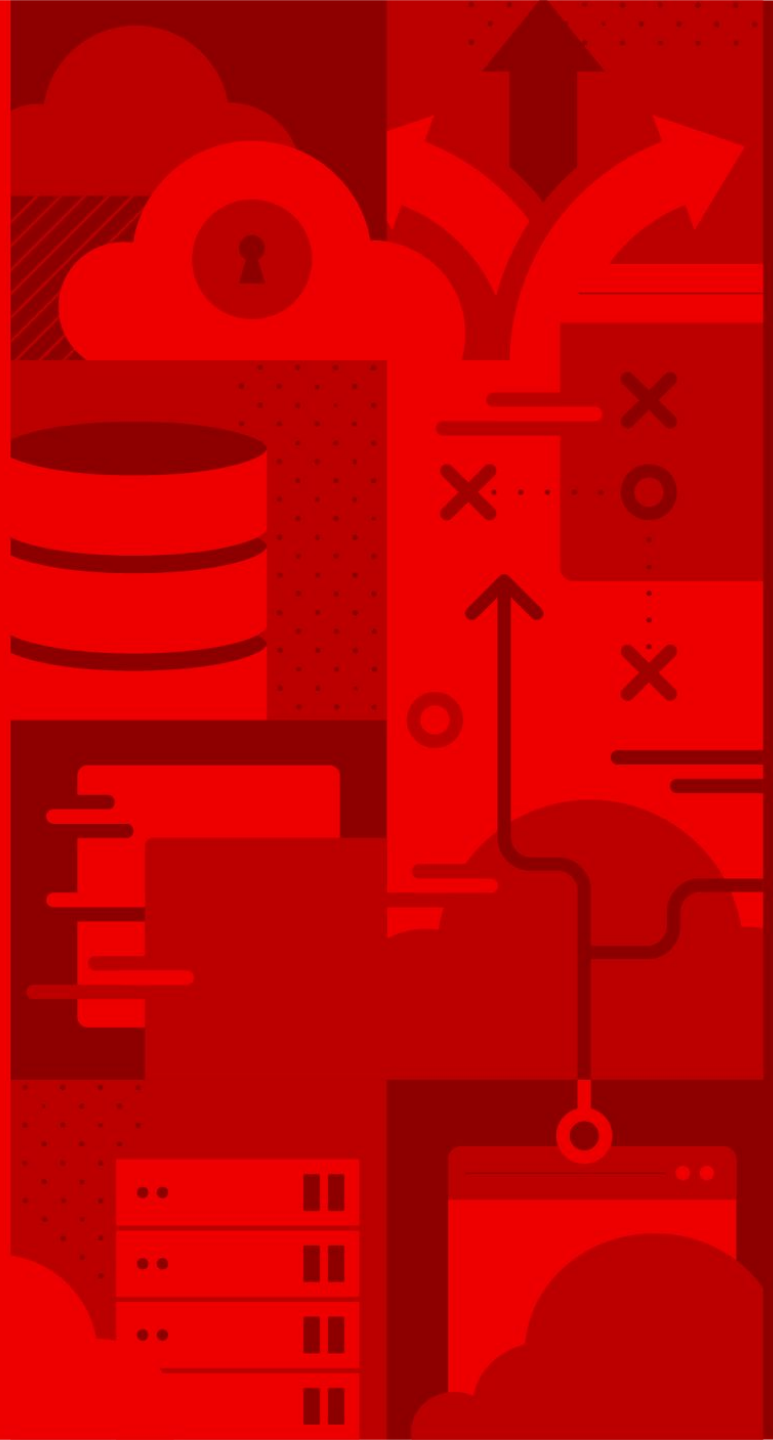
MINIMUM VIABLE PRODUCT
4 - 8 weeks

SCALED DELIVERY
Varies By Customer

RED HAT LEADS

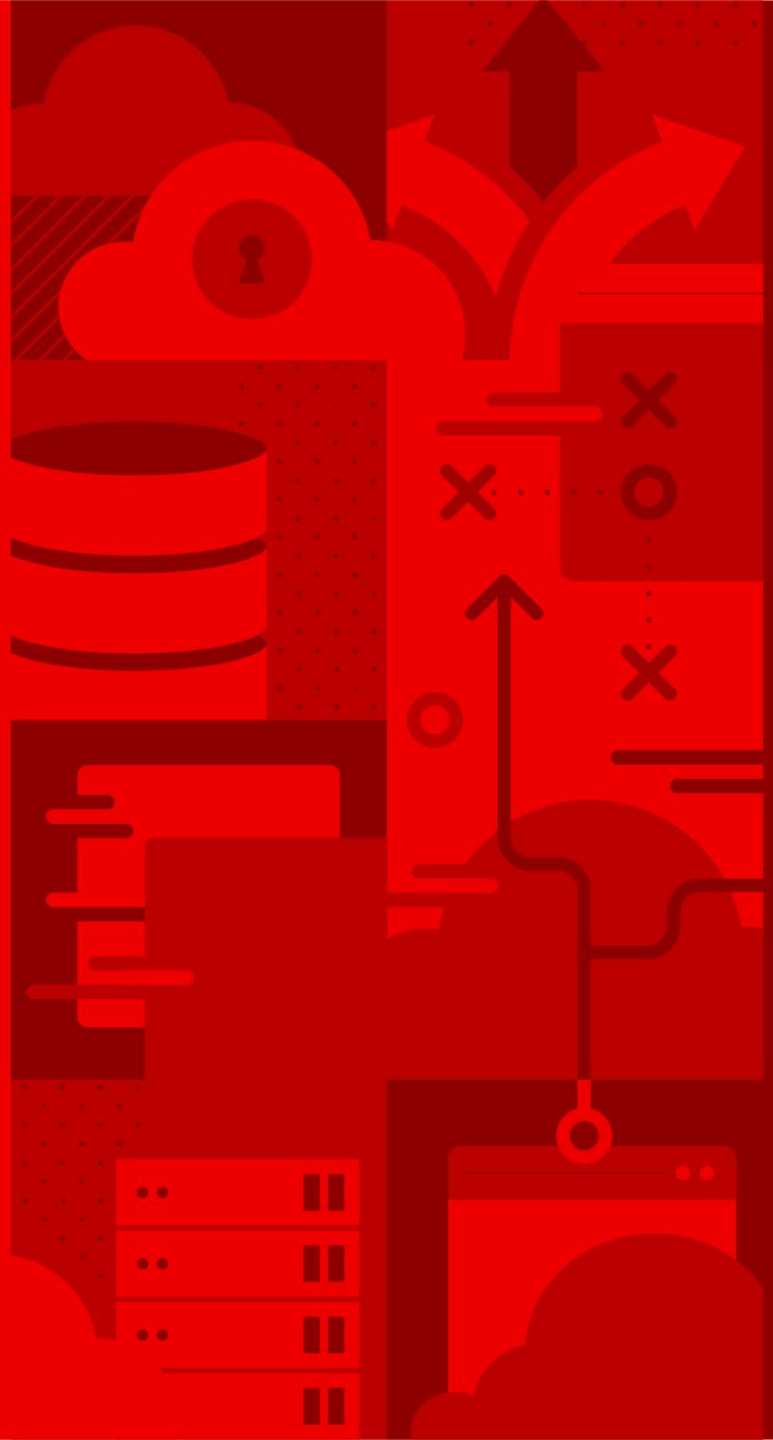
YOU LEAD

Red Hat



Demo

Red Hat



Customer Success Stories

Full Deck

Red Hat

Red Hat Advanced Cluster Management customers

Financial services: North America

DISCOVER®

"We wanted to have an active inventory of clusters, manage the state of the clusters from a centralised point, and execute the workflows multiple times to reach that stage. We have really a huge number of clusters, and it's actually growing again. We needed to establish GitOps for OpenShift Cluster Management, and Red Hat helped us do that."

Sriram Mageswaran
Principal Systems Architect, Discover

Challenge

Discover needed a way to improve cluster management in their Red Hat® OpenShift environments. Discover was facing cluster sprawl across different countries. Managing these cluster versions, keeping them in sync, and operationalizing them using a single pane was challenging.

Solution

Discover used Red Hat Advanced Cluster Management to manage multiple clusters and enforce policies across different clouds, and manage applications in a GitOps methodology. Red Hat Advanced Cluster Management provides end-to-end visibility and control of the Kubernetes clusters from a central console.

Why Red Hat

Red Hat Advanced Cluster Management provides cluster lifecycle management and policy-based governance which help ensure consistent, reliable and secure Red Hat OpenShift environments for Discover's high demand workloads.

Results

- Sped up application development
- Increased application availability
- Simplified management and compliance

Products and services

Red Hat OpenShift
Red Hat Advanced Cluster Management

Red Hat

Source: Red Hat Summit presentation. "The power of advanced cluster management for Kubernetes: Working with Discover to normalize their Kubernetes deployments," June 2021

ORANGELIFE

"The new platform will also be the foundation for our business growth as it can easily cope with increasing workloads or scale on-demand in future."

Sangwook Han
Vice President and Head of IT Group,
Orange Life

Challenge

Transform complex, high-maintenance Unix operating system and three-tier architecture to support agile methodology and greater automation.

Solution

With support from Red Hat® technology and Red Hat Consulting the company transformed several applications to become cloud-native and prepared for a full migration to cloud in the future.

Why Red Hat

Red Hat delivered strong support services and cloud-native expertise.

Results

- Reduced IT spend on hardware and software by 50%
- 10 times more applications running per node
- Sped innovation and increased agility

Products and services

Red Hat Consulting
Red Hat Enterprise Linux®
Red Hat OpenShift®
Red Hat Quay
Red Hat Advanced Cluster Management for Kubernetes

Source: Red Hat press release. "National Information Resources Service Daegu Center and Orange Life Named Winners of the Red Hat APAC Innovation Awards 2020 for Korea," Oct. 2020.

Red Hat

vodafone Ziggo

"We trusted in Red Hat's well established set of partnerships to provide supplier independence."

André Beijen
Director, Mobile Network,
VodafoneZiggo

Challenge

With ongoing growth in demand for data-intensive services and new digital experiences, VodafoneZiggo needed to modernize its network and IT systems to increase agility, manage complexities, and encourage efficiencies. The provider was looking for supplier-agnostic technology to enable its multivendor infrastructure.

Solution

VodafoneZiggo selected Red Hat® OpenShift® as its foundation for cloud-native applications across both the network and the business, with its new 5G Core network as its first deployment. Red Hat Advanced Cluster Management provides cloud management and compliance enforcement for the OpenShift clusters at scale.

Why Red Hat

VodafoneZiggo ran a successful proof of concept with OpenShift. Also, the provider had already been using Red Hat OpenStack® Platform for its 4G mobile core and several business applications.

Results

- Better consistency across development and operations teams, such as moving ideas more quickly from development to production
- Increased security features, such as implementing a continuous systems security approach for network and container isolation and data access control
- Increased scalability across multiple clouds and to the edge

Red Hat

Source: Red Hat VodafoneZiggo press release. Oct. 2021.

"5G has the potential to support thousands of use cases and applications for consumers and enterprises in all industries. Our collaboration will not only help us to harness the potential of 5G, but also prepare for the future through a hybrid-cloud led technology and business transformation."

Javier Gutierrez, Director of Strategy, Network, and IT Development, Telefónica

Opportunity

As communication service providers prepare for the benefits 5G and edge will bring to core network functions, Telefónica plans to have an open, secured, intelligent, and highly automated network that can power transformation for consumer and enterprise customers across all industries.

Solution

Telefónica is implementing UNICA Next, the company's first cloud-native, 5G core network platform. The platform is planned to be a new open-standard, open-networking technology compliant platform that will be deployed across multiple central, regional, and distributed datacenters offering low latency and high bandwidth, while able to deliver services in a fully automated fashion.

Why Red Hat, IBM and Juniper

Pairing the IBM network automation and Red Hat® container platform and management solutions presents Telefónica with an environment designed for increased observability and control for managing the UNICA Next environment while driving 5G and edge innovation more quickly and with less complexity.

Products and services

Red Hat OpenShift®
Red Hat Advanced Cluster Management
IBM Cloud Pak for Network Automation
Juniper SDN and Fabric

Partners

IBM, Red Hat, Juniper

Source: Press release. "Telefónica Chooses IBM To Implement Its First-Ever Cloud-Native 5G Core Network Platform," Sept. 2021.

IBM | Red Hat

Government: EMEA

"Stability is the most important thing when dealing with life-saving projects. We chose Red Hat OpenShift after previous successes on other projects with Red Hat."

Israel Defense Forces (IDF)
lieutenant colonel
Head of Edge Cloud Platform R&D, Center of Computing and Information Systems (Mamram), C4i and Cyber Defense Directorate

Challenge

Mamram, the cloud service provider to the the Israel Defense Forces (IDF), wanted to achieve consistent throughput with legacy infrastructure when deploying new edge solutions, while maintaining the highest levels of security.

Solution

With the support of Red Hat® Consulting, Mamram incorporated Red Hat OpenShift® into its cloudlet platform. The use of cloudlets allowed Mamram to create a cloud datacenter responsible for managing IT for edge computing, as well as core technology, networking, and connecting core data centers across the country. Red Hat Advanced Cluster Management supports OpenShift with multicluster life cycle management at scale, and Red Hat Ansible helps the unit's cloudlet group automate key life cycle actions and development tasks, such as provisioning and upgrades.

Why Red Hat

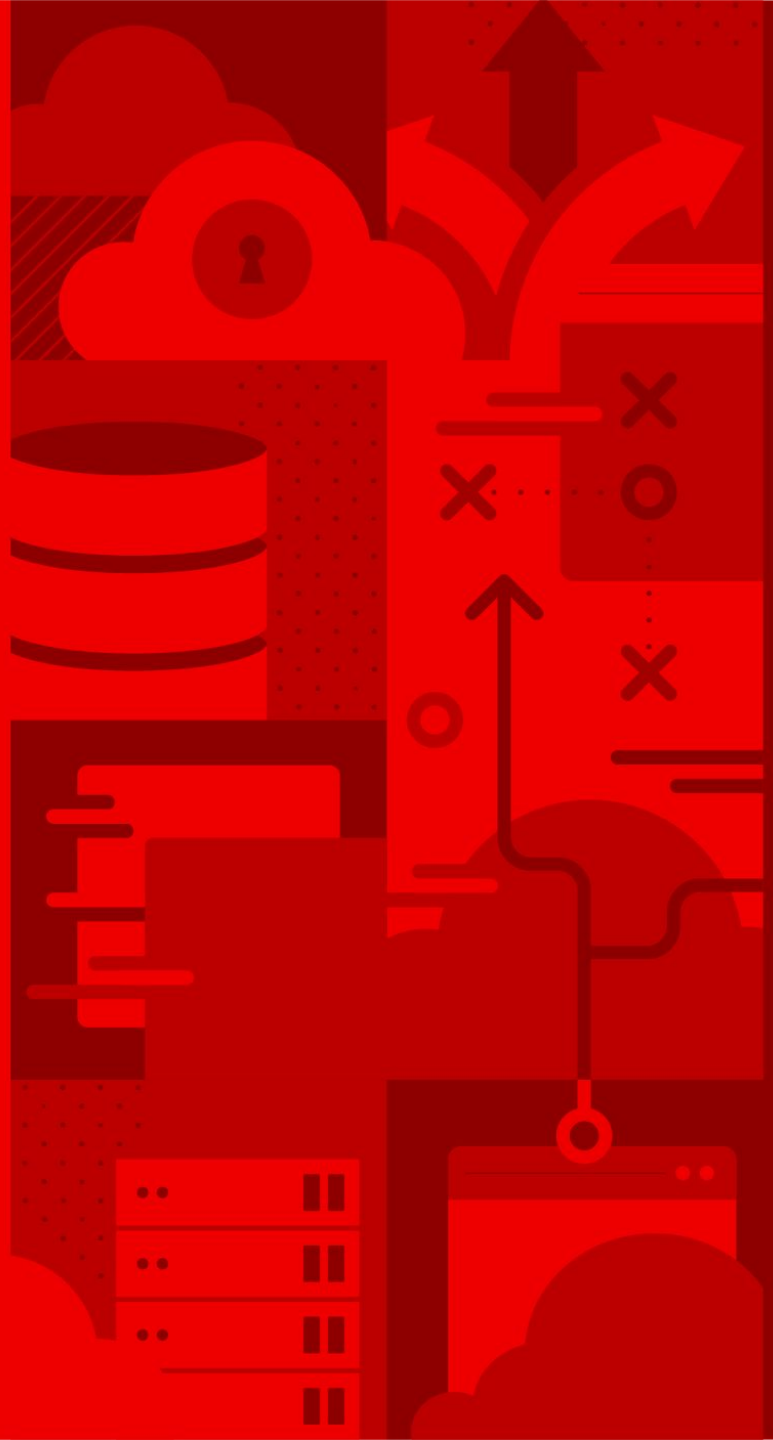
Red Hat already delivered a number of key successes for IDF, and extensive research into Red Hat's roadmap to edge computing helped Mamram decide that Red Hat would be an ideal partner.

Results

- Extended its center cloud to the edge, providing the same functionality to IDF units as central cloud, saving time and increasing flexibility
- Deployed infrastructure services in three to six hours from weeks previously
- Established artificial intelligence and machine learning (AI/ML) processes that previously didn't exist

Red Hat

Source: Red Hat web success story, "Edge computing flexibility enables critical defense and security advantages," May 2022.



Resources and Next Steps

Red Hat

Resources

External Resources

Webpage

YouTube Playlist

Datasheet

Twitch Playlist

Infographic

Red Hat Content Center - RHACM (New!)

Ebook: Managing your Kubernetes clusters for Dummies'

Checklist: 5 considerations for managing your Kubernetes clusters

IDC paper: Digital business success depends on effective multicluster Kubernetes management

Thank you

Red Hat is the world's leading provider of enterprise open source software solutions. Award-winning support, training, and consulting services make Red Hat a trusted adviser to the Fortune 500.

- Stay Connected

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