

Red Hat Advanced Cluster Management for Kubernetes

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OpenShift Solutions Architects

AGENDA

- ▶ Brief What's New/Update in Openshift
- ▶ Hybrid Cloud Management Challenges
- ▶ RH Advanced Cluster Management (ACM)
- ▶ Detailed use cases
- ▶ ACM and OpenShift
- ▶ Architecture Overview
- ▶ MCM, ACM Offering/Sizing and Demo of ACM
- ▶ Appendix - More Sizing Details/Examples

A **new virtual** technical enablement series that provides the latest in the Red Hat product strategy and enablement on the newest features to our technical field associates

 **Red Hat** • • • —
Tech
Ready
— • • •

October & November 2020

- Integrated into the Red Hat OPEN training system
- More communications to come...



Hear the latest from Red Hat Business Unit and Engineering leaders on our product strategies and roadmaps



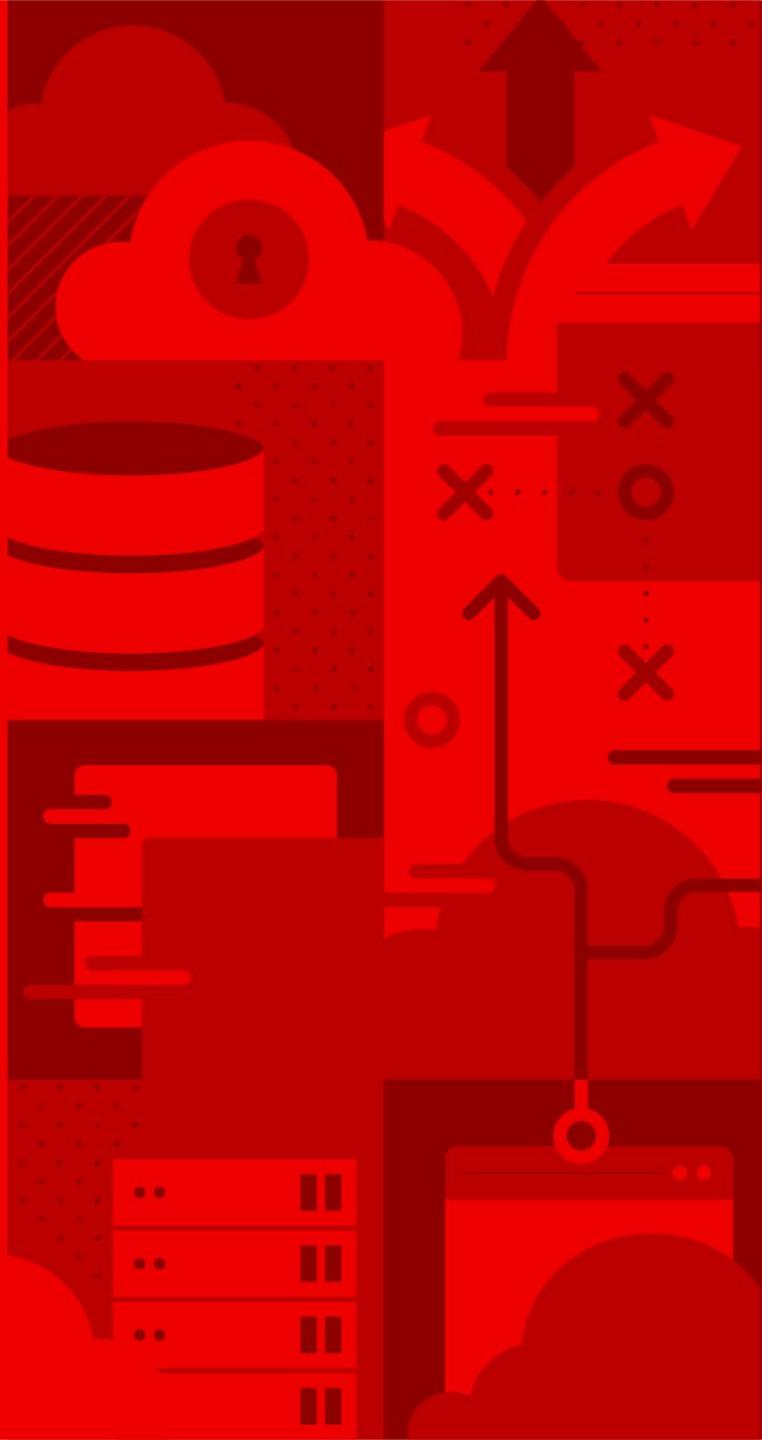
Gain hands-on experience with new product features through deep dive demos and labs



Session content dropped weekly on Monday's from October 19 through November 9



SmartPage on Red Hat Partner Content Hub for more information (Coming Soon)



Openshift Update

OpenShift Container Platform

Advanced Cluster Management

Multi-cluster Management

Discovery : Policy : Compliance : Configuration : Workloads

OpenShift Container Platform

Manage Workloads

Build Cloud-Native Apps

Developer Productivity

Platform Services

Service Mesh : Serverless Builds : CI/CD Pipelines Full Stack Logging Chargeback

Application Services

Databases : Languages Runtimes : Integration Business Automation 100+ ISV Services

Developer Services

Developer CLI : VS Code extensions : IDE Plugins Code Ready Workspaces CodeReady Containers

Cluster Services

Automated Ops : Over-The-Air Updates : Monitoring : Registry : Networking : Router : KubeVirt : OLM : Helm

Kubernetes

Red Hat Enterprise Linux & RHEL CoreOS



Edge



Physical



Virtual



Private cloud



Multi-Arch



Public cloud



Managed cloud
(Azure, AWS, IBM, Google)



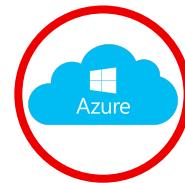
OpenShift offers the broadest set of hybrid cloud services

Developer Experience

Productivity

Enterprise Readiness

Red Hat OpenShift



Red Hat OpenShift
Dedicated or
Amazon Red Hat
OpenShift (AMRO)

Azure Red Hat
OpenShift

Red Hat OpenShift
Dedicated

Red Hat OpenShift
on IBM Cloud

OpenShift
Container Platform

Managed By Red Hat
or
OCP Customer Managed

Jointly Managed &
supported
or
OCP Customer Managed

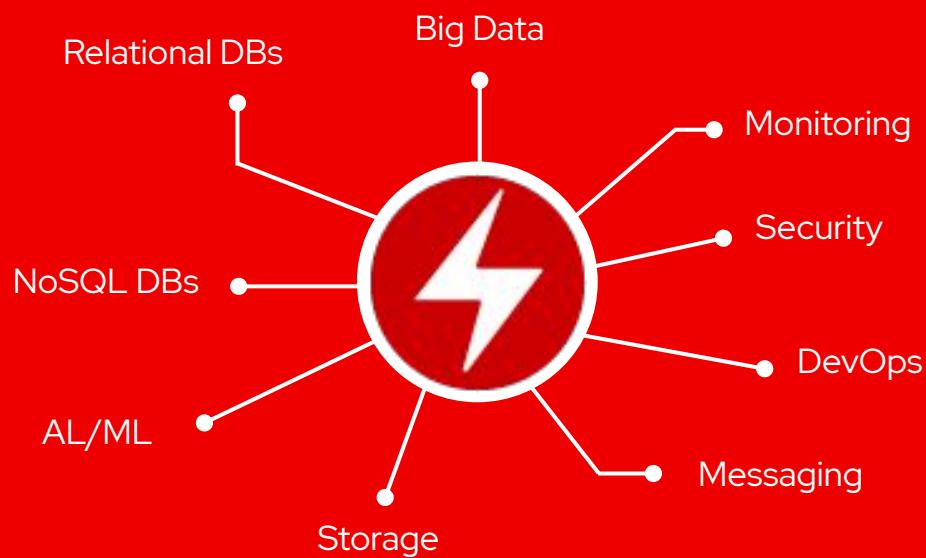
Managed By Red Hat
or
OCP Customer Managed

Jointly Engineered

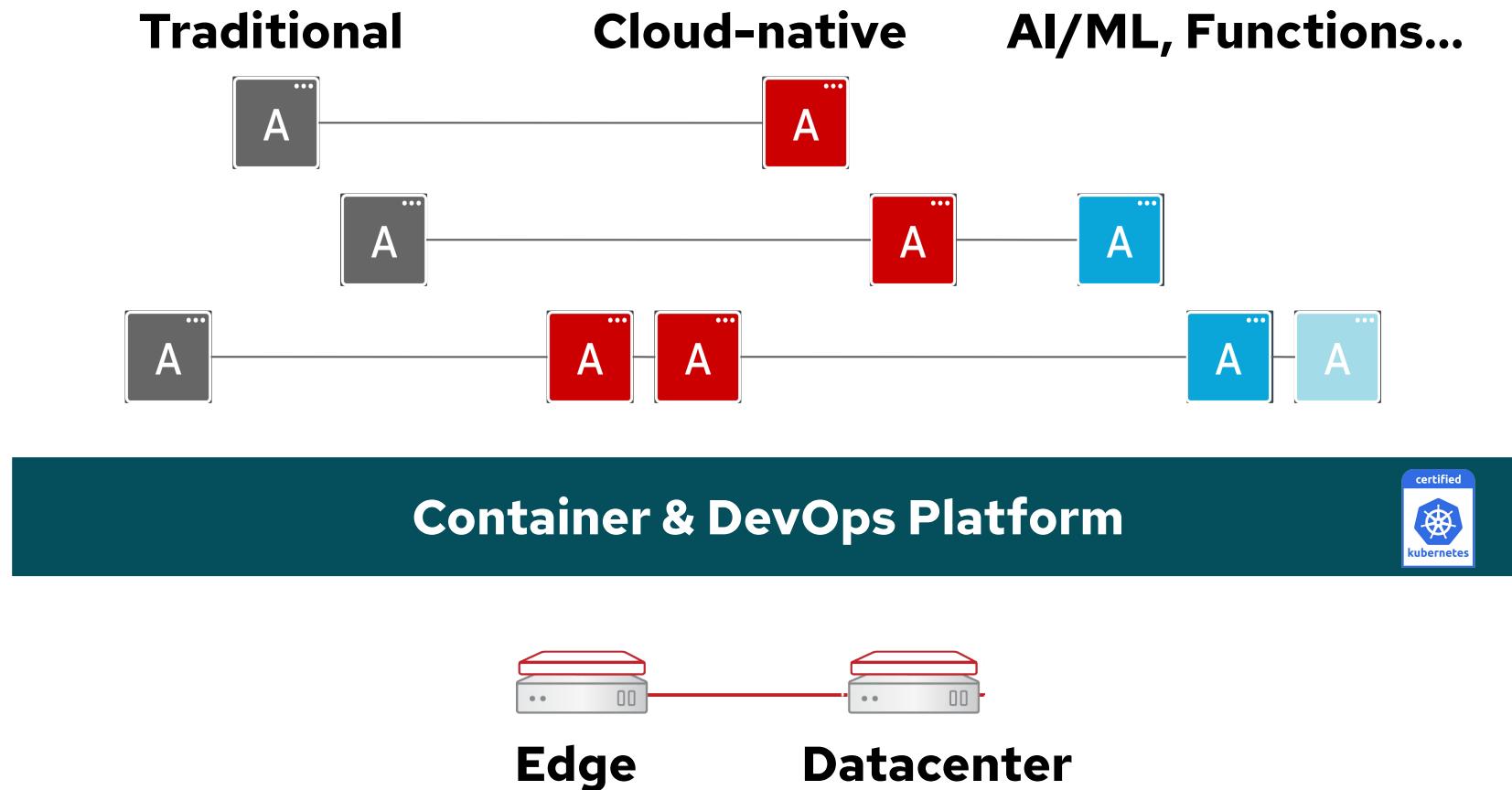
OCP Customer Managed

A broad ecosystem of workloads

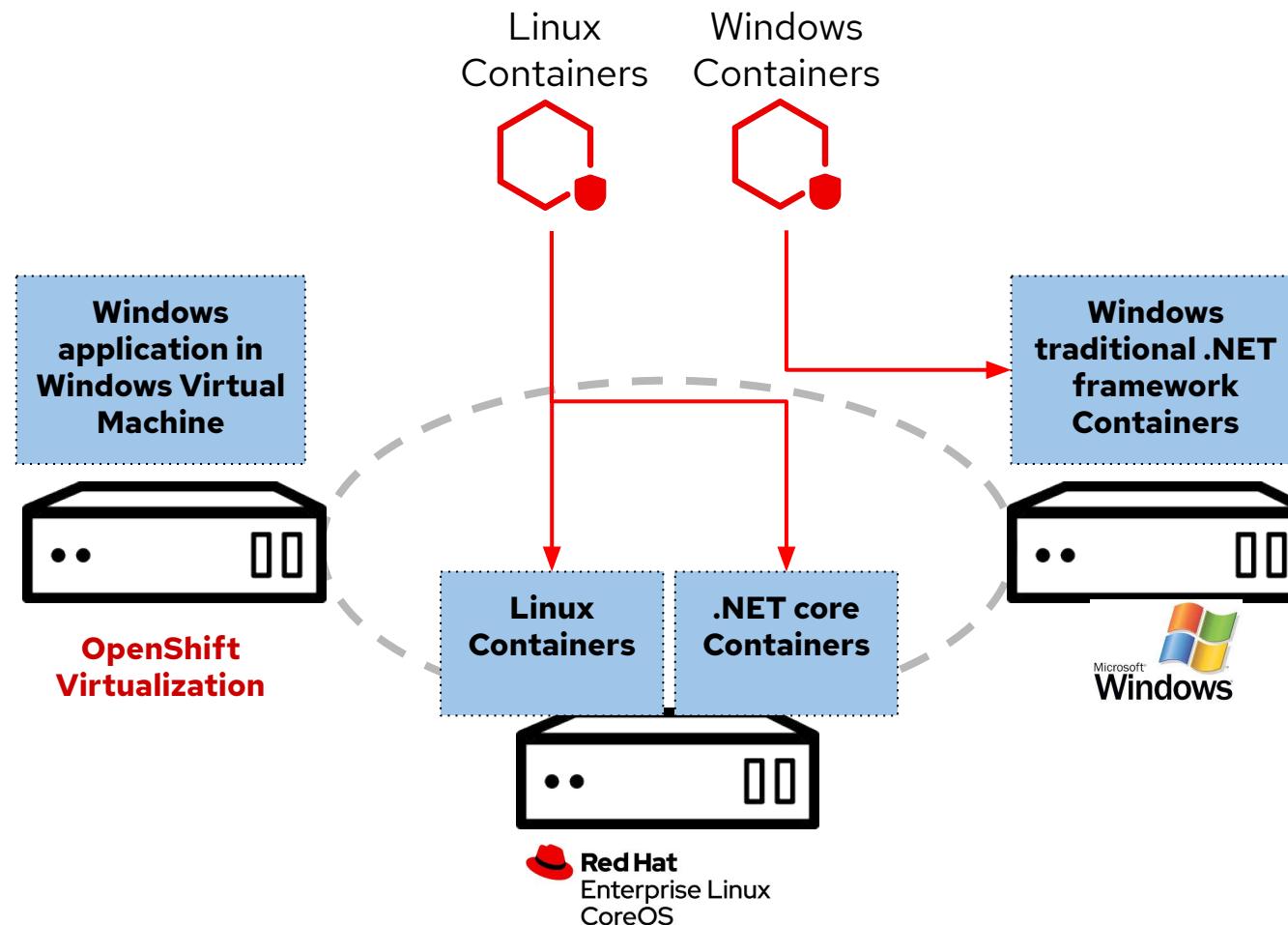
Operator-backed services allow for a
SaaS experience on your own infrastructure



With OpenShift virtualization you can accelerate delivery of mixed applications of VMs, containers, and serverless



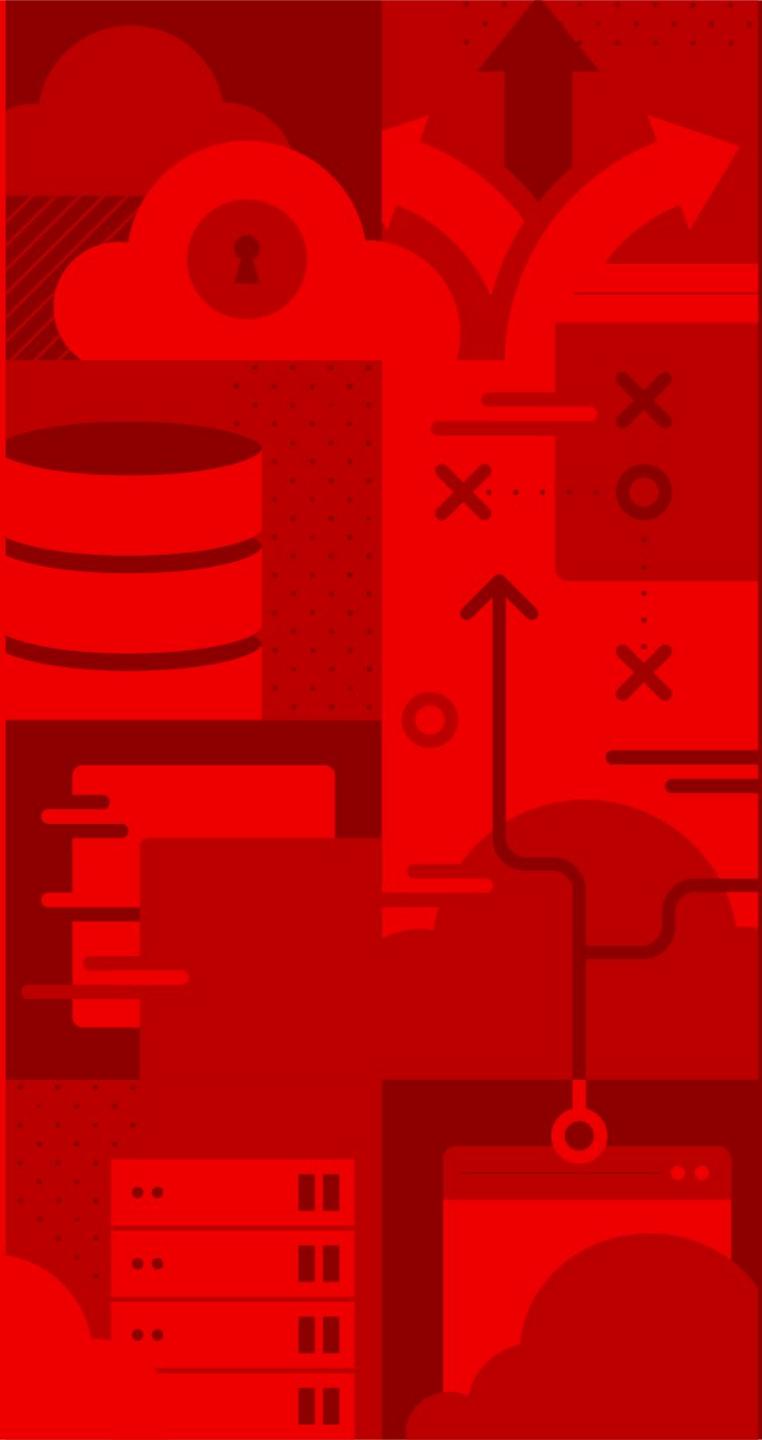
Mixed Windows and Linux Workloads



- Run Linux containers on RHEL
- Run .NET core containers on RHEL
- Run traditional **.NET framework containers on Windows**
- Run **Windows VMs with CNV** (Container Native Virtualization)
- All scheduled and managed by OpenShift

OpenShift Roadmap

Q2 2020 OpenShift 4.5		H2 2020 OpenShift 4.6		2021 OpenShift 4.7+	
HOSTED	PLATFORM	APP	PLATFORM	DEV	HOSTED
<ul style="list-style-type: none">Customize navigation in Dev ConsoleKnative event sources in Dev ConsoleForm-based chart values during installHelm Chart upgrade, rollback and uninstall <ul style="list-style-type: none">Build Operator catalogs in container imagesHelm workflows in ConsoleMonitor application workloads (TP) <ul style="list-style-type: none">OpenShift virtualization GAVMware vSphere (IPI) supportNode Terminal Access in the ConsoleCompact 3-node clusters for bare metalHTTP/2 and gRPC Support for RouterGraceful shutdown and recovery procedureLog forwarding GALogging update to Elasticsearch v6AWS Spot instance support & IAM IdentityMetering proxy supportCSI clone GAAir-gapped cluster update procedure <ul style="list-style-type: none">OSD on Google Cloud PlatformARO 20+ new deployment regionsOCM multi-cluster dashboard	<ul style="list-style-type: none">OpenShift Serverless Eventing GAOpenShift Pipelines (Tekton) GAJenkins Operator TPMonitor application workloads (GA)OPM tool for curating Operator catalogsOperator dependency tools v2 <ul style="list-style-type: none">OVN GA, OVN Egress Firewall/Router/IPIPv6 (single/dual stack on control plane)Bare metal (IPI) GARemote worker nodes for EdgeRealtime kernel (TP, RAN use-cases only)AWS support for GovCloud, C2S, and ChinaMicrosoft Azure Government (MAG) supportVMware vSphere 7.0 supportImproved cloud credential handlingDisconnected OpenShift Update ServiceGCP & Azure spot instancesCSI resize/snapshot GAWindows containers GAOAuth secure storage & inactivity timeoutEnhanced RHCOS static networking UXCompliance Operator <ul style="list-style-type: none">Red Hat OpenShift on AWS by AmazonOSD ISO 27001 cert & ARO gov region	<ul style="list-style-type: none">OpenShift Builds (v2) GAJenkins Operator GASchema based forms for Event Sources <ul style="list-style-type: none">Improvements to GitOps experienceImprovements to Operator managementHybrid Operators with Operator-SDKSimplify Operator Lifecycle interactions <ul style="list-style-type: none">Single node clusterEnable user space pod int & API LibraryUtilize cgroups v2Microsoft Hyper-V (UPI) supportAzure Stack Hub and HCIAlibaba Cloud supportNetwork Enhancements derived from OVNLocal storage support in OCSCVO↔OLM cluster upgrade dependencies...more to come <ul style="list-style-type: none">OpenShift Online Pro on OCP 4.X			
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Hybrid Cloud Management Challenges

But hybrid Multi-Cloud 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

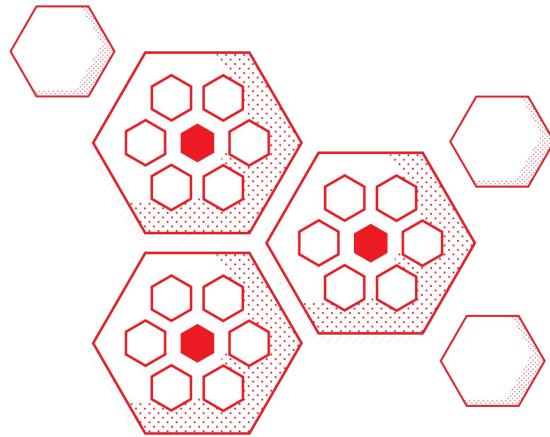


—
Using multiple infrastructure clouds*



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

Kubernetes adoption leads to multicloud



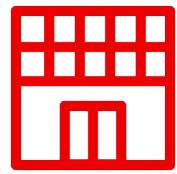
"As Kubernetes gains adoption across the industry, scenarios are arising in which I&O teams are finding **they must deploy and manage multiple clusters**, either in a single region on-premises or in the cloud, or across multiple regions....for a number of reasons, including multi-tenancy, disaster recovery,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

Where is the growth in cluster deployments?



Small Scale Dev teams

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



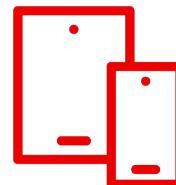
Medium Scale Organizations

- 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 topologies

Reasons for deploying clusters



Application availability



Reduced latency



Address industry standards



Geopolitical data residency guidelines



Disaster recovery



Edge deployments



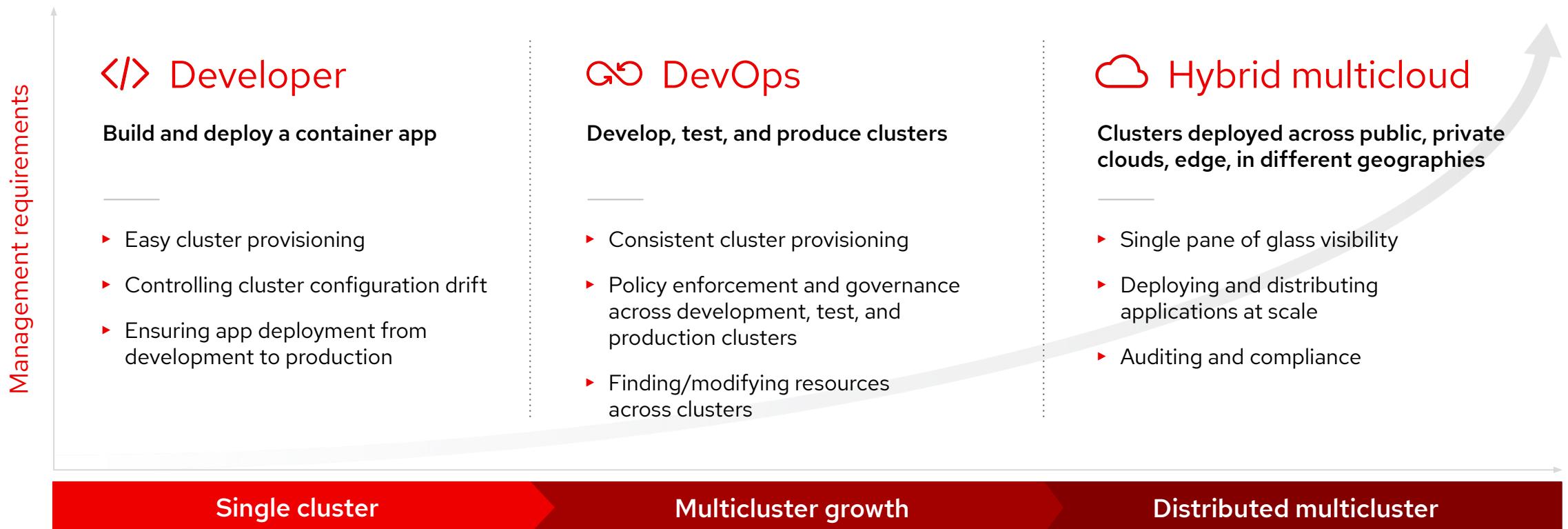
CapEx cost reduction



Avoid vendor lock-in

Multicloud management challenges

How do I normalize and centralize key functions across environments?



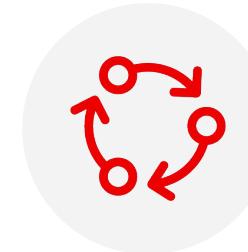


Red Hat Advanced Cluster Management For Kubernetes



Red Hat Advanced Cluster Management for Kubernetes

Robust. Proven. Award winning.



Multicloud lifecycle
management



Policy driven governance,
risk, and compliance



Advanced application
lifecycle management

Unified Multi-Cluster Management

Single Pane for all your Kubernetes Clusters

The screenshot shows the Red Hat Advanced Cluster Management for Kubernetes interface. At the top, there's a navigation bar with the Red Hat logo and the title "Advanced Cluster Management for Kubernetes". Below it is an "Overview" section with four cards: "Azure" (1 cluster, 01 AKS), "Amazon" (1 cluster, 01 RHCP), "auto-detect" (2 clusters, 01 Other), and "MyDataCenter" (1 cluster, 01 RHCP). A "Refresh every 10s" button and a "Filter results" dropdown are also present. Below the overview is a summary bar with metrics: 4 Apps, 5 Clusters, 3 Kubernetes types, 1 Regions, 17 Nodes, and 646 Pods. A "Show details" button is next to the pods count. At the bottom left, there are three cards: "Cluster: nodes" (5), "VCPUs usage (CPU)" (94), and "Used" (38 | 40%). On the right, a large table titled "Clusters" lists various clusters with columns for Name, Namespace, Labels, Endpoint, Status, Nodes, Klusterlet Version, Kubernetes Version, Storage, Memory, and CPU. The table includes entries like "exec2-iks", "social-dev-1", "social-dev-2", "social-dev-gke", "social-prod-1", and "social-prod-eks". Each entry provides specific details such as cloud provider, datacenter, environment, name, owner, region, and vendor.

- **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

Policy based Governance, Risk and Compliance

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

3
POLICY VIOLATIONS

1
CLUSTER VIOLATIONS

1
HIGH SEVERITY FINDINGS

1
MEDIUM SEVERITY FINDINGS

1
LOW SEVERITY FINDINGS

Top violations

Policies	Clusters	Applications
1 policy-cis training-2		
1 policy-grc training-2		
1 policy-role training-2		

Most impacted controls ⓘ

Key

- Policy violations
- Security findings

Standard

All

Show more or less controls 1 2

Policy summary

1 STANDARDS

compliancePolicy

Type

Name	Detail
policy-prod	
Message	-
Status	-
Enforcement	-
Exclude Namespaces	kube*
Include Namespaces	default

Detail

```
51 -   - from:
52 -     - podSelector: {}
53 -       matchLabels: null
54 -     - complianceType: musthave
55 -       objectDefinition:
56 -         opVersion: v1
57 -         kind: LimitRange
58 -         metadata:
59 -           name: mem-limit-range
60 -         spec:
61 -           limits:
62 -             default:
63 -               memory: 512Mi
64 -             defaultRequest:
65 -               memory: 256Mi
66 -             type: Container
67 -         remediationAction: enforce
68 |
69 |
```

Object Templates

Search

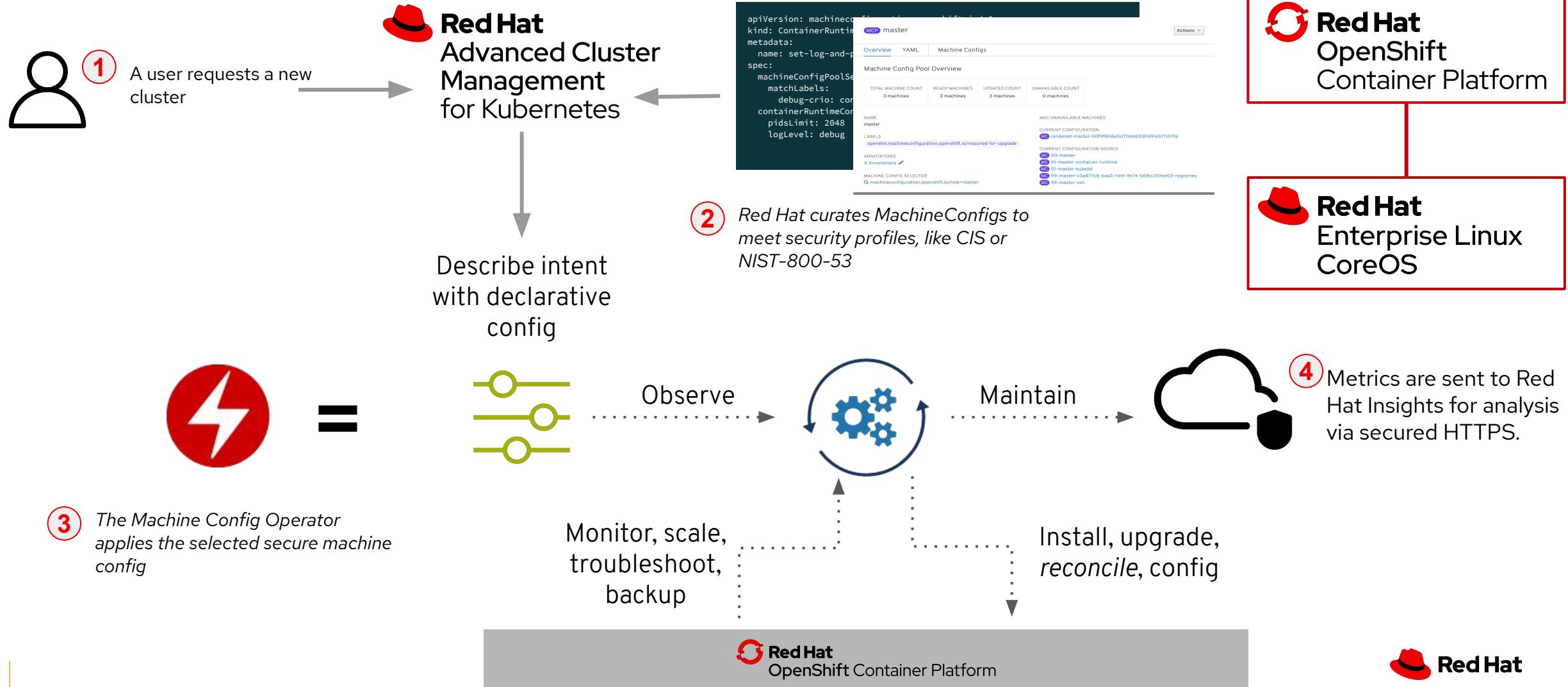
Name	Compliance Type	API version	Kind	Last Transition	Compliant
restricted-mcm	musthave	policy/v1beta1	PodSecurityPolicy	-	-
deny-from-other-namespaces	musthave	networking.k8s.io/v1	NetworkPolicy	-	-
mem-limit-range	musthave	v1	LimitRange	-	-

items per page 20 | 1-3 of 3 items

1 of 1 pages < 1 >

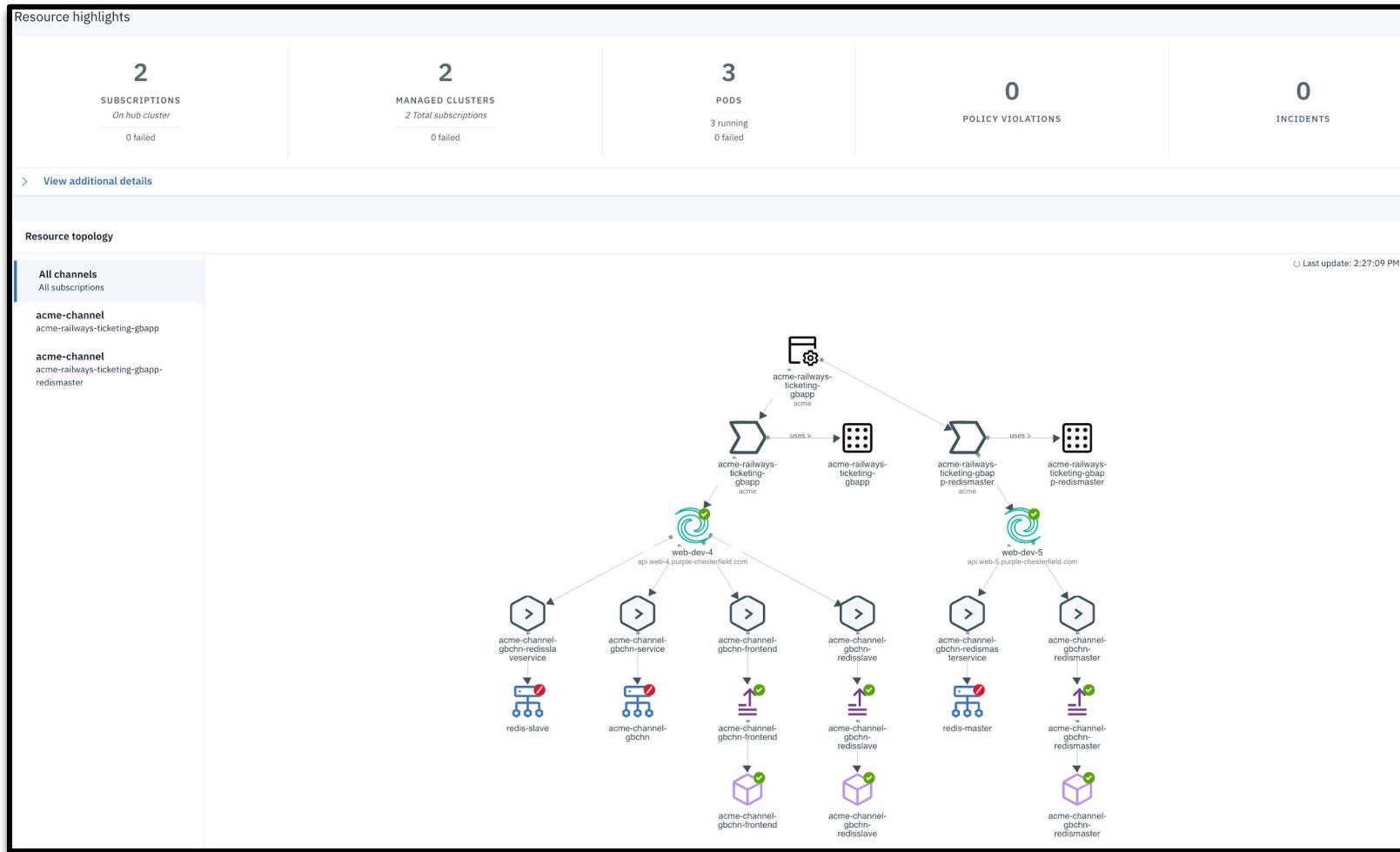
- **Centrally** set & enforce policies for security, applications, & infrastructure
 - Quickly **visualize** detailed **auditing** on configuration of apps and clusters
 - Built-in **CIS** compliance policies and audit checks
 - **Immediate** visibility into your compliance posture based on **your**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

RH ACM and Compliance



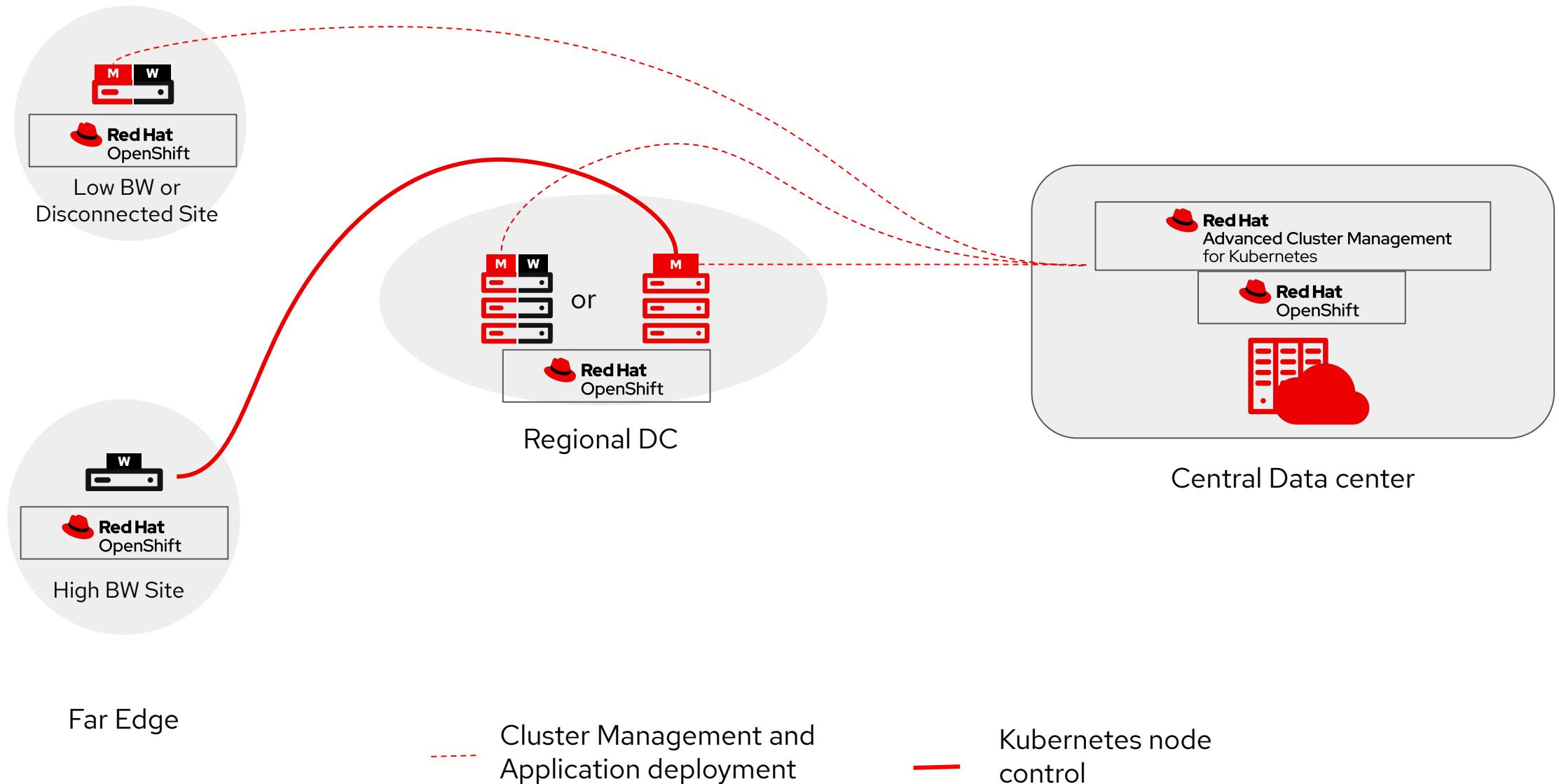
Advanced Application Lifecycle Management

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**

Edge deployments with OpenShift



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.



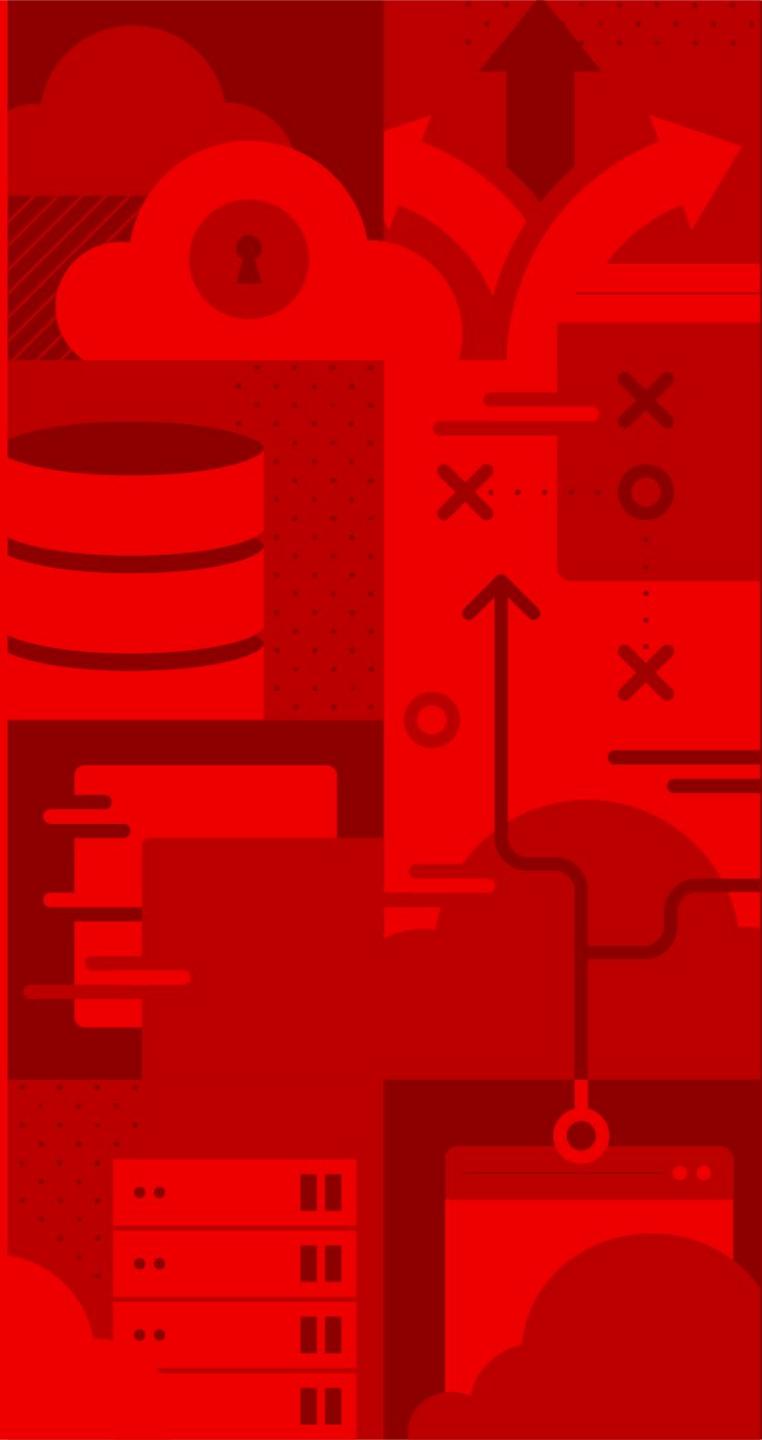
Reduce costs

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

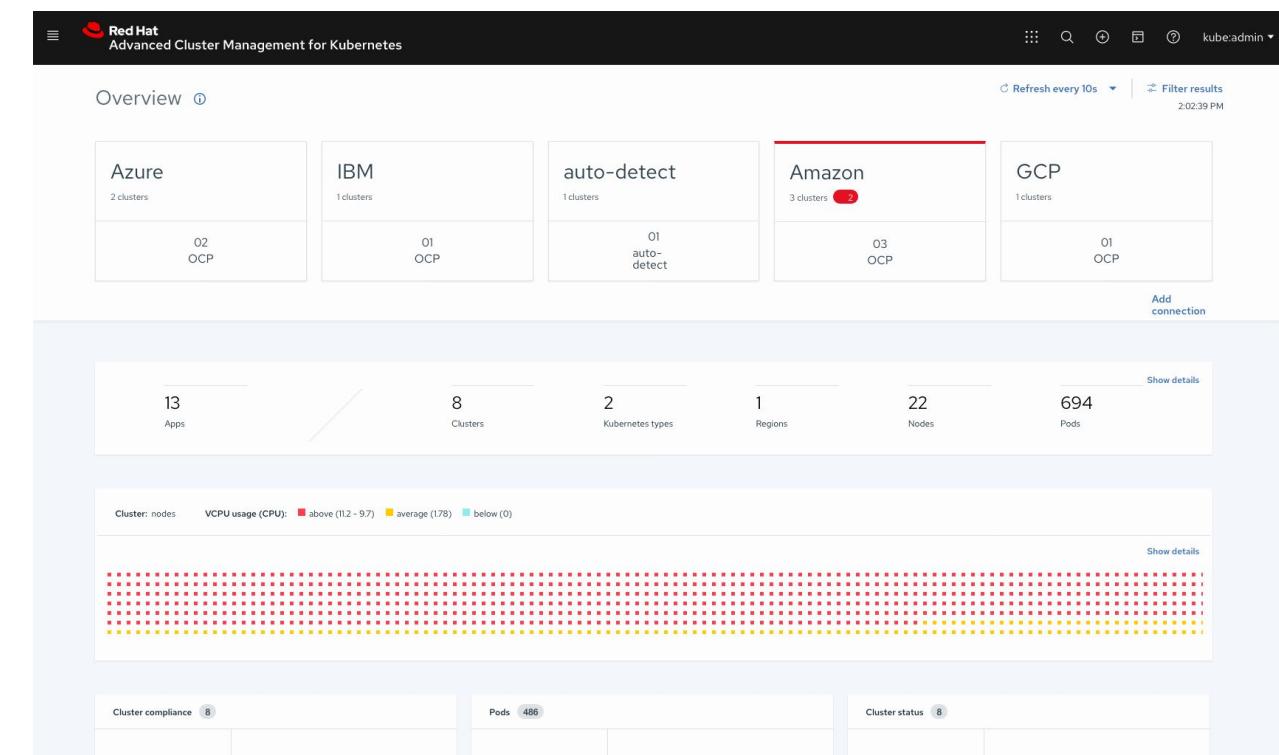
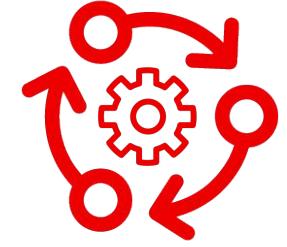
- Full Management of OCP Kubernetes
 - OpenShift 3.11, 4.1.x - 4.4.x
 - Public cloud hosted: OCP
- Public cloud managed kubernetes: EKS, AKS, GKE, IKS
 - Search, find and modify kubernetes resources.
- See high level summaries across all clusters
 - Misconfiguration
 - Pod status
 - Resource capacity
- 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



IT Operations



DevOps/SRE



Multi-Cluster Lifecycle Management

Creating & Importing Clusters

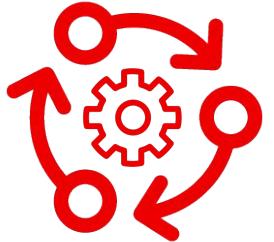
- **Create, Upgrade and Destroy** OCP clusters running on **Bare-metal** as well as public cloud
- Leverage [Hive API for OCP cluster deployment](#)
- Wizard or YAML based create cluster flow
- Launch to an OCP Console from ACM
- Access cluster login credentials and download kubeadmin configuration



IT Operations



DevOps/SRE



The screenshot displays the Red Hat Advanced Cluster Management for Kubernetes (ACM) interface. It shows the 'Clusters /' screen with a 'Create a cluster' button. The 'Configuration' section includes fields for 'Cluster name*' and 'Base DNS domain*'. The 'Distribution' section has 'Red Hat OpenShift' selected. Below this, there are buttons for 'Select an infrastructure platform' with options for AWS, Google Cloud, Microsoft Azure, and 'Bare Metal'. At the top right, there are 'Cancel' and 'Create' buttons, and a user 'kube:admin' is logged in.

Multi-Cluster Lifecycle Management

Dynamic Search

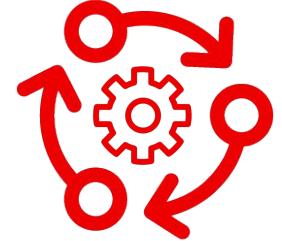
- Troubleshooting across clusters via relationships
- See all **unhealthy** pods
- See related application models to those pods
- See related Persistent Volumes
- See related secrets
- See related ***any*** kube resource object category



IT Operations



DevOps/SRE



A screenshot of a web-based search interface titled "Search - 1 (Unsaved)". It shows two saved searches: "Test Mcm" (414 results) and "Shell Test" (516 results). Below them are three suggested search templates: "Workloads" (990 results), "Unhealthy Pods" (13 unhealthy), and "Created Last Hour" (16 results).

Multi-Cluster Lifecycle Management

Visual Web Terminal

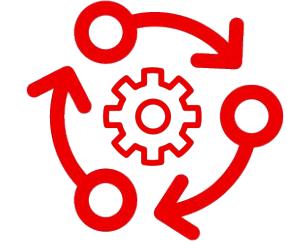
- Interactive terminal combines command input with visual output
- One **Terminal** for all
- Works with **helm**, **kubectl**, **oc**, **istioctl**
- Single interface for multi-cluster
- Drive ops directly from dashboards
- Bash commands allow for grep



IT Operations



DevOps/SRE



Welcome, let's get started.

Red Hat Advanced Cluster Management for Kubernetes provides the tools and capabilities to address various challenges with managing multiple clusters and consoles, distributed business applications, and inconsistent security controls across Kubernetes clusters that are deployed on-premises, or across public clouds.

End-to-end visibility
System alerts and access to critical application metrics and overall system health. Providing an operational dashboard for SREs to search, identify, and resolve issues impacting distributed workloads.
[Go to Overview](#)

Cluster lifecycle
Create, update, scale, and remove clusters reliably, consistently using an open source programming model that supports and encourages Infrastructure as Code best practices and design principles.
[Go to Clusters](#)

Application lifecycle Technology Preview
Define a business application using open standards and deploy the applications using placement policies that are integrated into existing CI/CD pipelines and governance controls.
[Go to Applications](#)

Governance, Risk, and Compliance
Use policies to automatically configure and maintain consistency of security controls required by industry or other corporate standards. Prevent unintentional or malicious configuration drift that might expose unwanted and unnecessary threat vectors.
[Go to Governance and risk](#)

Easy to use and simple to understand, Red Hat Advanced Cluster Management for Kubernetes provides the following mission critical capabilities based on open source projects:

Easy, simple,
and secure.

<https://multicloud-console.apps.hotel.demo.red-chesterfield.com/kui>

Kubernetes

Policies

Cluster landscape

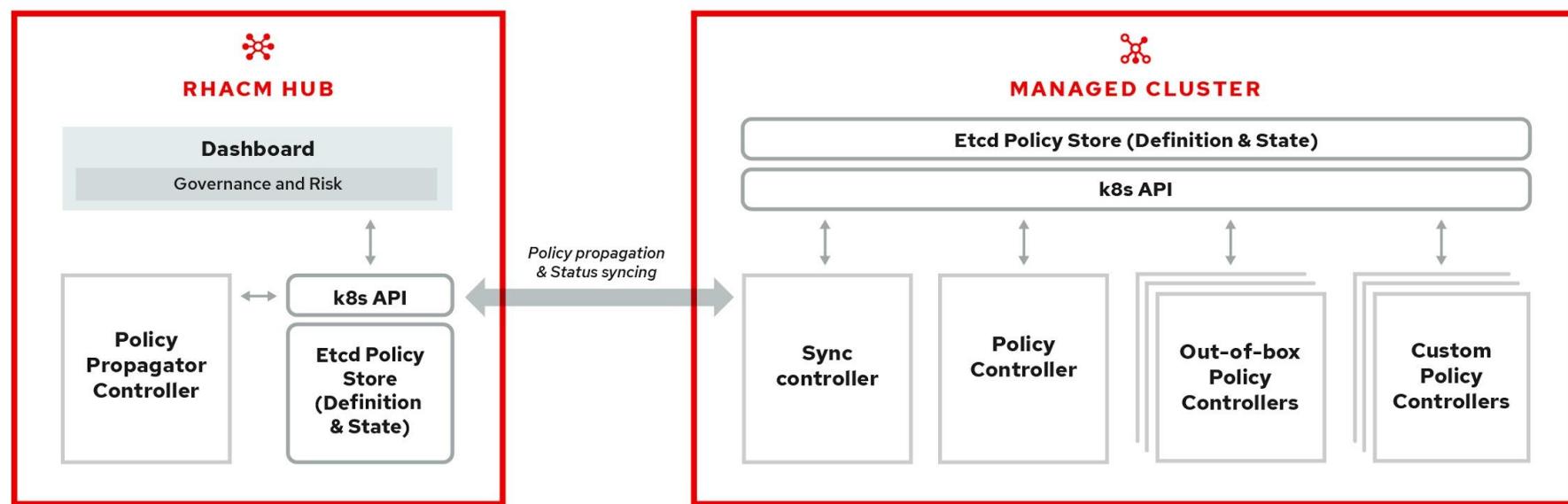
Policy Driven Governance Risk and Compliance

Architecture Overview



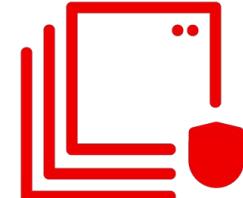
Managed Cluster and GRC Controllers

- 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

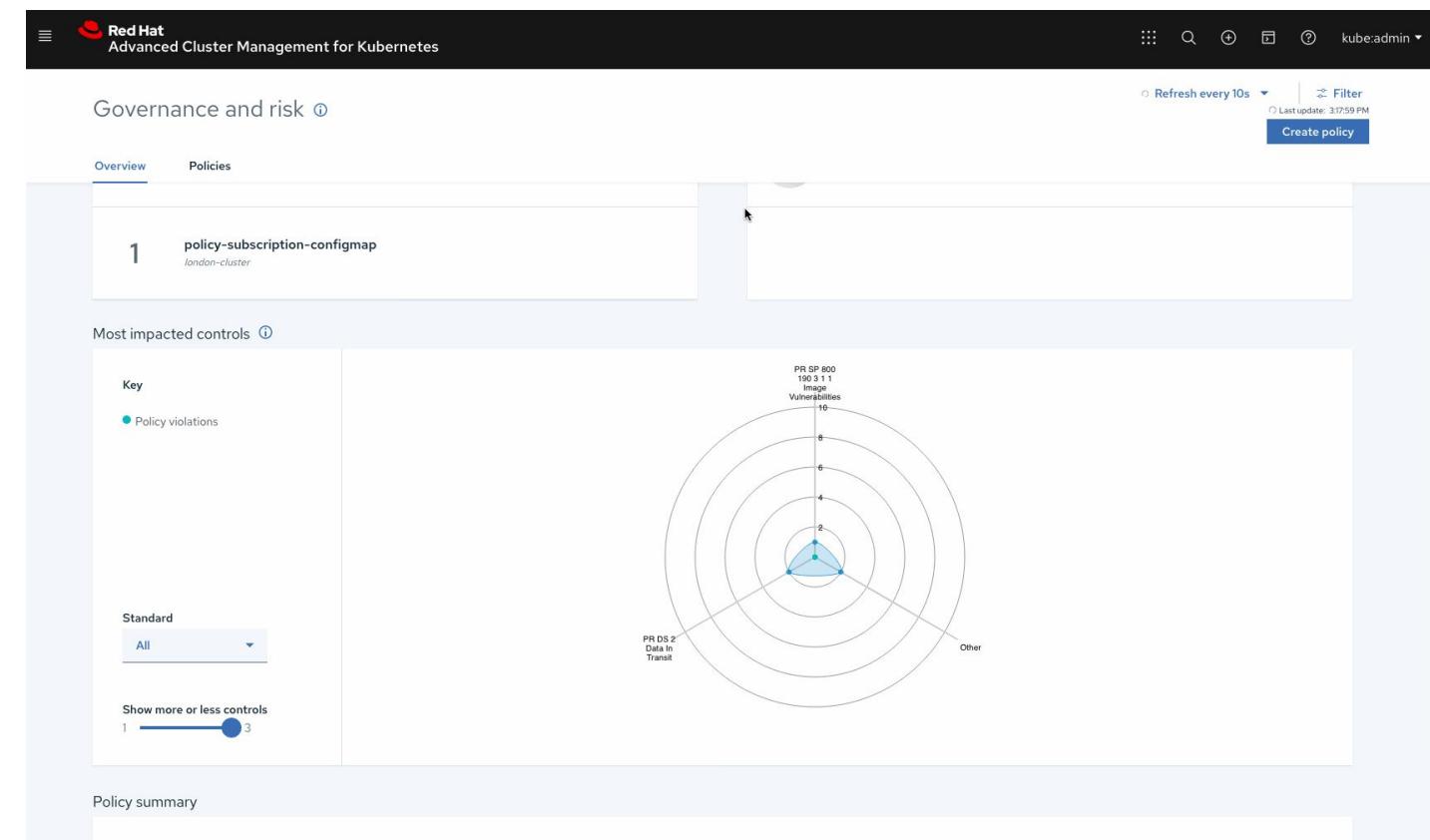


Policy based Governance, Risk and Compliance

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



- 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



Policy based Governance, Risk and Compliance

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

- 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



Security Ops



IT Operations



The screenshot shows the Red Hat Advanced Cluster Management for Kubernetes interface. The top navigation bar includes the Red Hat logo and the text "Advanced Cluster Management for Kubernetes". The main content area has two sections: "Governance and risk" and "Most impacted controls".

Governance and risk

- Policies** (selected tab):
 - 1 **policy-container-security** (london-cluster)
 - 1 **policy-game-frontend-subscription** (san-francisco-cluster)
 - 1 **policy-subscription-configmap** (london-cluster)
- san-francisco-cluster**:
 - 3 **policy-container-security, policy-subscription-configmap, policy-certificatepolicy**
- No other policy violations**:

We will continue to monitor and display any policy violations so you can easily find them here.

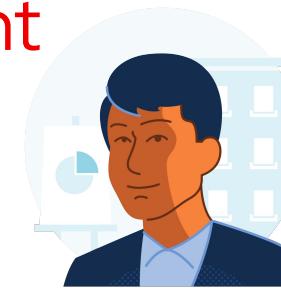
Most impacted controls

- Key**:
 - Policy violations
- Standard**:
 - PR SP 800 190 3 1 1
 - PR DS 2
 - VulnerabilitiesA circular radar chart with concentric rings and lines representing different categories. A small blue triangle is positioned in the center.

Advanced Application Lifecycle Management

Simplify your Application Lifecycle

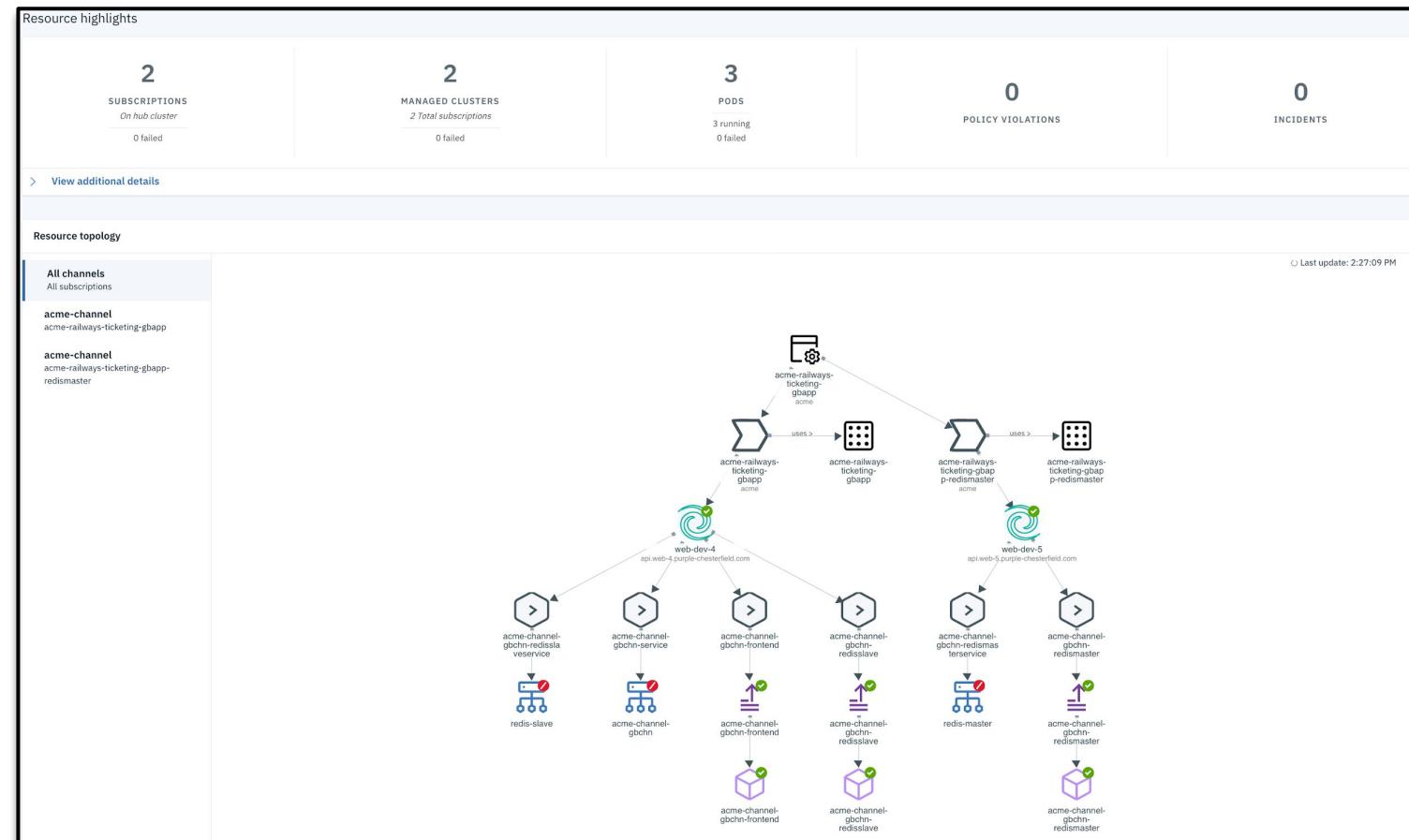
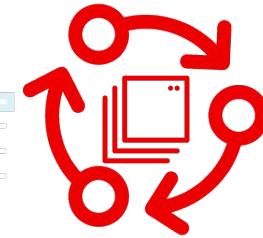
- Deploy Applications at Scale
- Deploy Applications from Multiple Sources and Clusters
- Quickly Visualize Application Relationships
- Using the subscription & channel model, the latest application revisions are delivered to appropriate clusters, automatically.



IT Operations



DevOps/SRE



Advanced Application Lifecycle Management

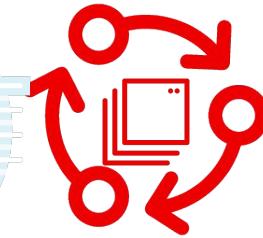
Subscriptions Bring Enterprise to Kubernetes



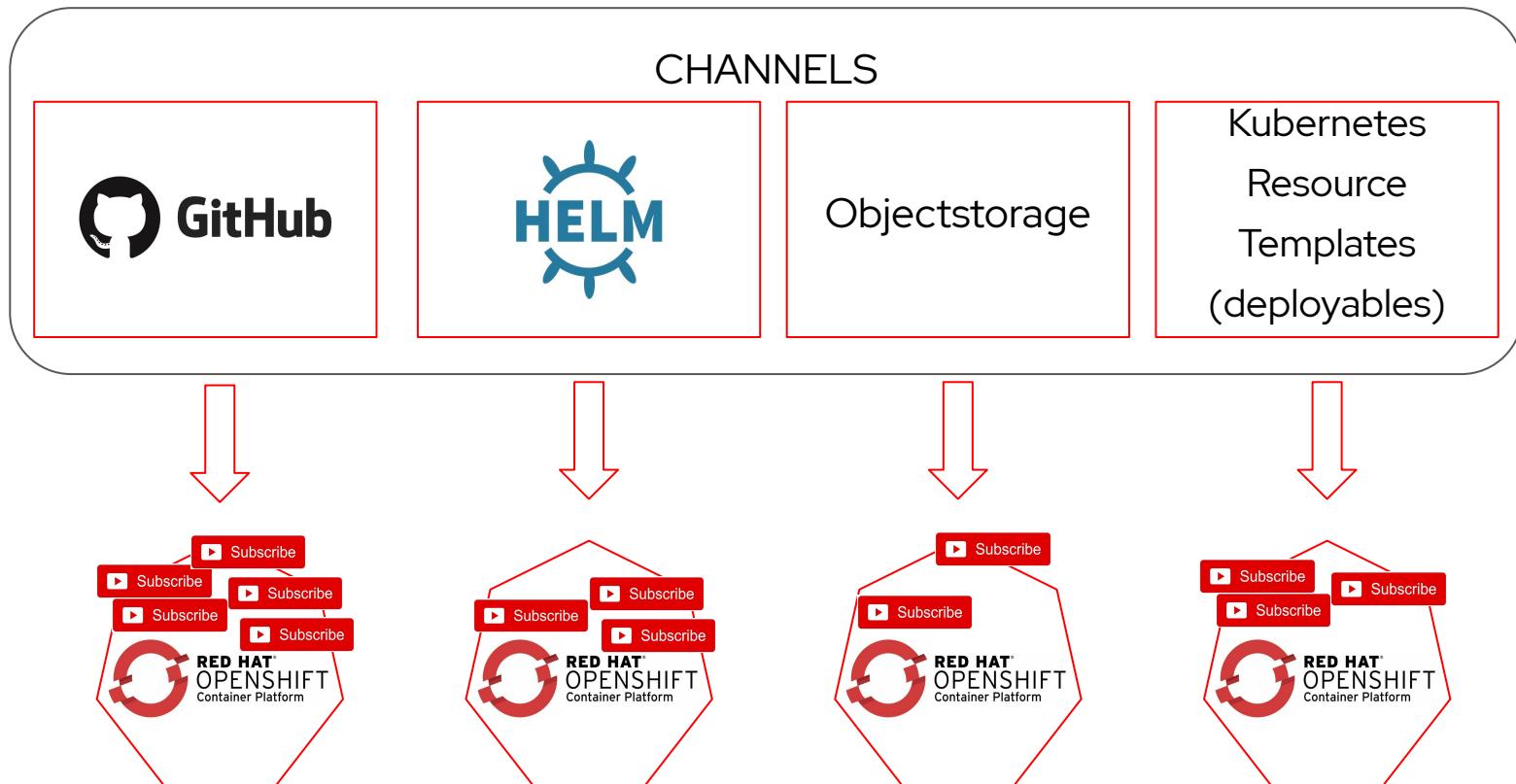
IT Operations



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



Advanced Application Lifecycle Management

GitOps as the source of truth

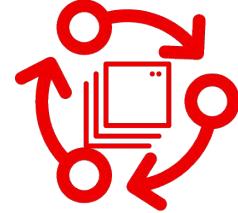
- Create, modify & delete, just as you would any source code. Git becomes your source of truth controlling your data center.
- Have a record of who, what & when for every change precipitated in your environments
- Through code Reviews & Approvals, take full control of all changes to your data center(s)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



IT Operations

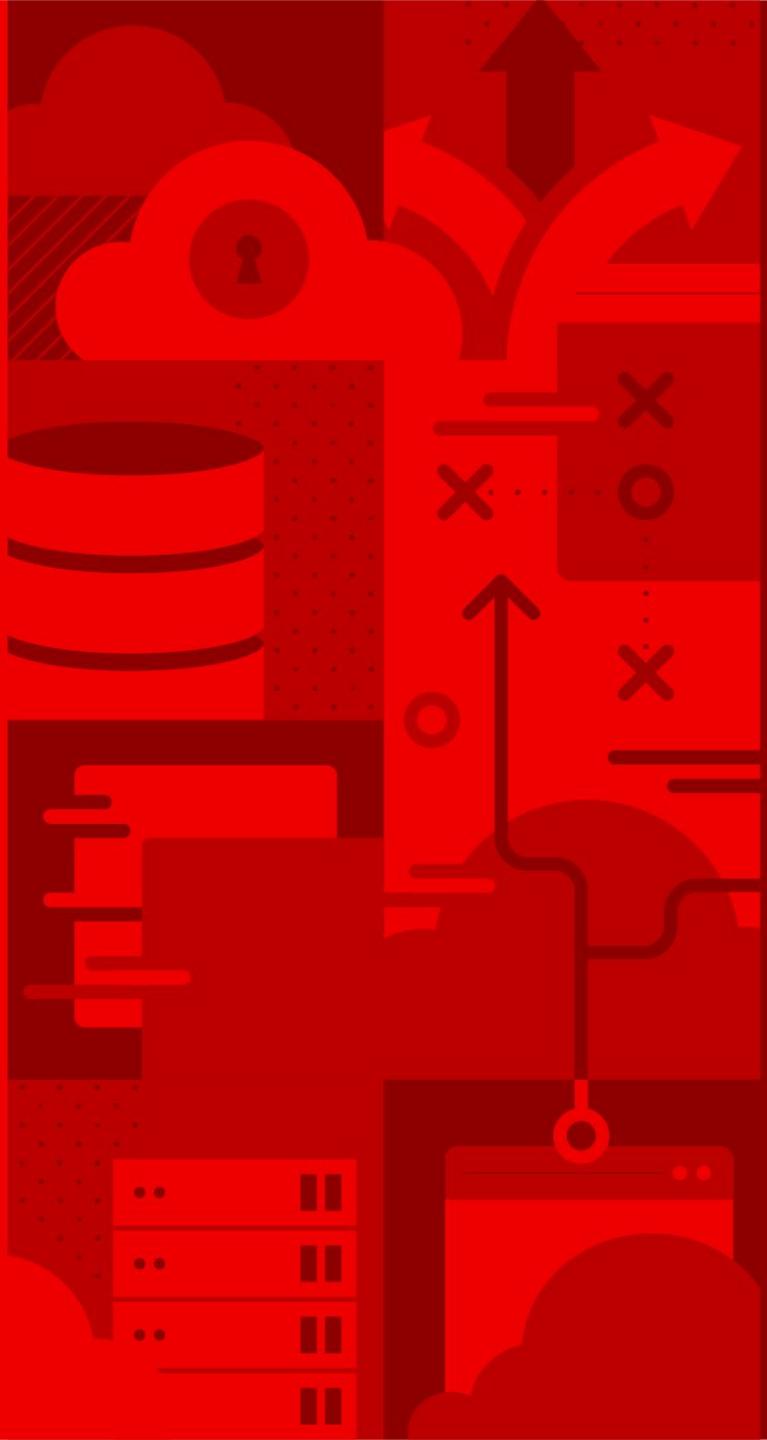


DevOps/SRE



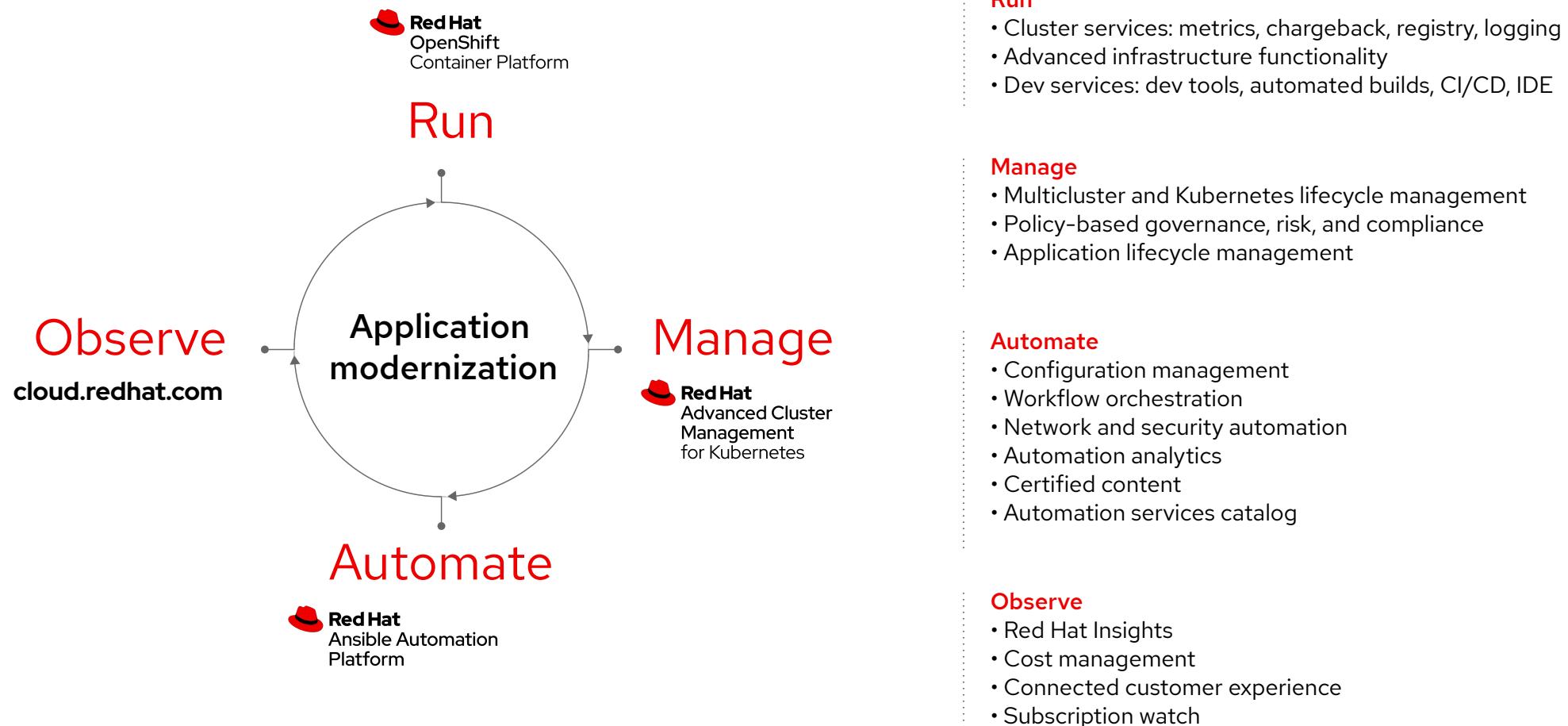
The screenshot shows a GitHub repository page for 'open-cluster-management / demo-subscription-gitops'. The repository has 57 commits, 3 branches, 0 packages, 0 releases, and 1 contributor (jnpacker). The commit history lists several updates from users like jnpacker, blueGreen, bma, placement, .gitignore, CONTRIBUTE.md, LICENSE, and README.md, with timestamps ranging from 11 minutes ago to yesterday. Below the commit history, a section titled 'This repository contains examples of GitOps' provides links to 'Bare Metal Assets via gitops', 'Blue-Green Application Management via gitops', and 'Placement Rules example'. At the bottom, there is a 'Help' section with contact information: 'Reach out to jnpacker@redhat.com or Slack [@jnpacker](#) in [coreos.slack.com](#) for help'.

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



How it works with OpenShift

Supporting application modernization



Draw Me a Picture!

Advanced Cluster Management

Multi-cluster Management

Creation : Discovery : Policy : Compliance : Configuration : Workloads

OpenShift Container Platform

Manage Workloads

Build Cloud-Native Apps

Developer Productivity

Platform Services

Service Mesh : Serverless Builds : CI/CD Pipelines
Full Stack Logging
Cost Mgmt
Chargeback

Application Services

Databases : Languages
Runtimes : Integration
Business Automation
100+ ISV Services

Developer Services

Developer CLI : VS Code extensions : IDE Plugins
Code Ready Workspaces
CodeReady Containers

OpenShift Kubernetes Engine

Cluster Services

Automated Ops : Over-The-Air Updates : Monitoring : Registry : Networking : Router : KubeVirt : OLM : Helm

Kubernetes

Red Hat Enterprise Linux & RHEL CoreOS



Physical



Virtual



Private cloud

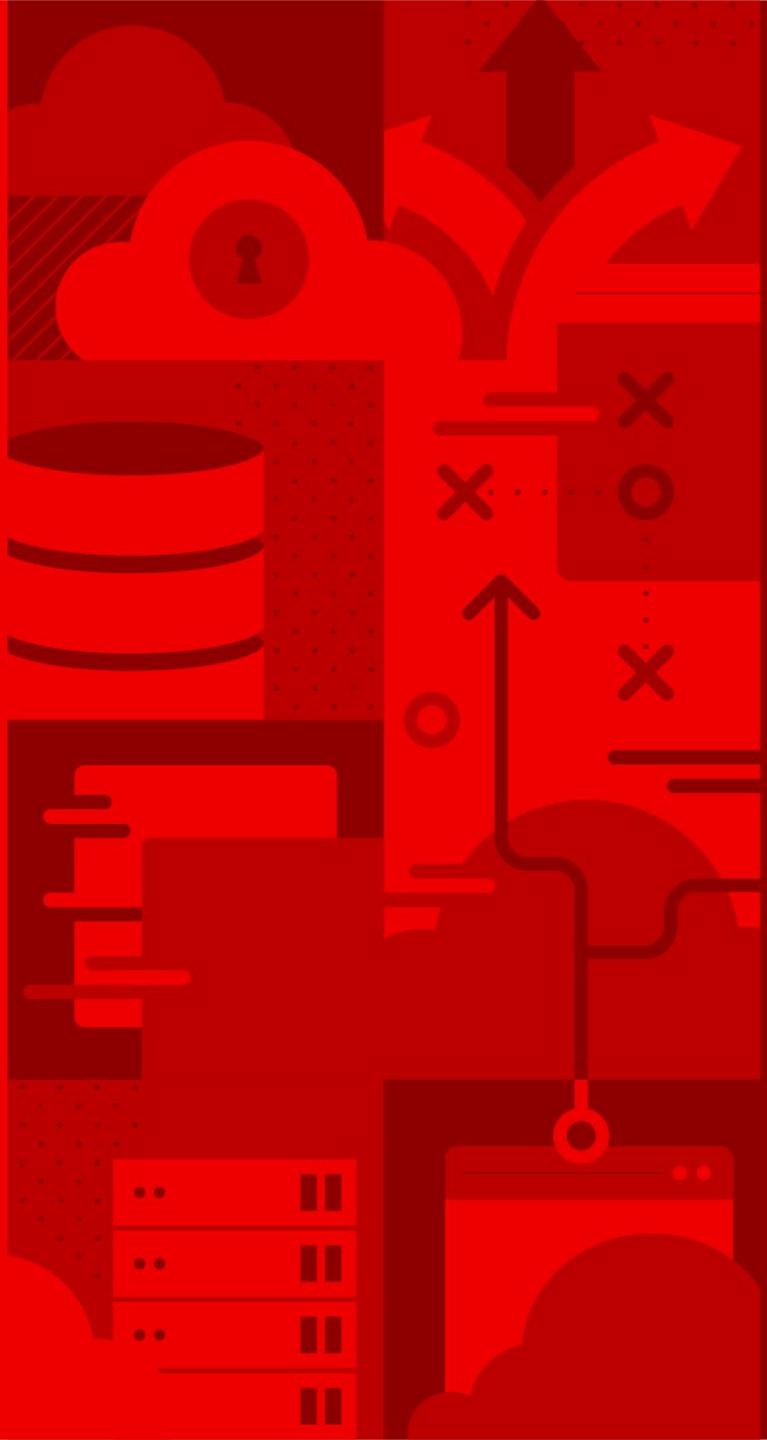


Public cloud



Managed cloud
(Azure, AWS, IBM, Red Hat)





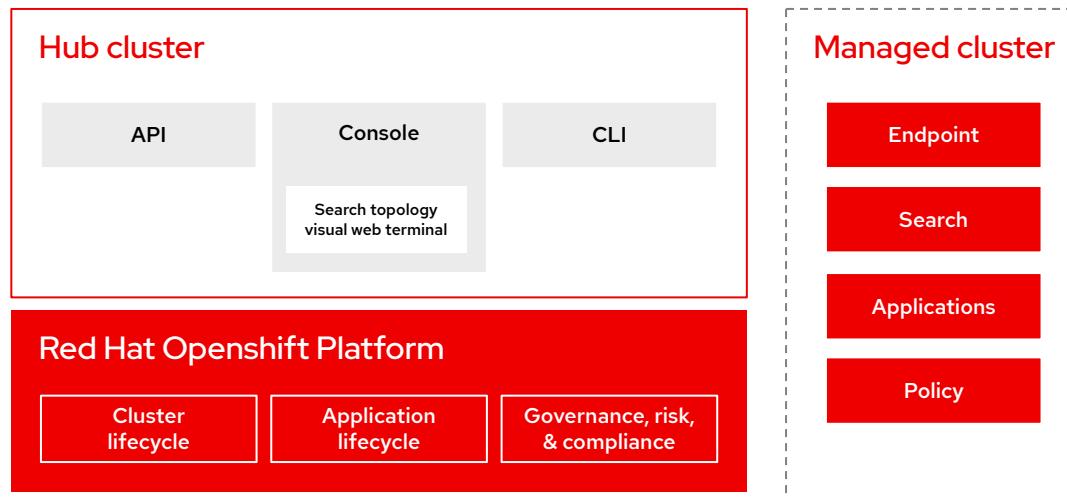
Architecture

Red Hat Advanced Cluster Management For
Kubernetes

Architecture overview



IT Operations

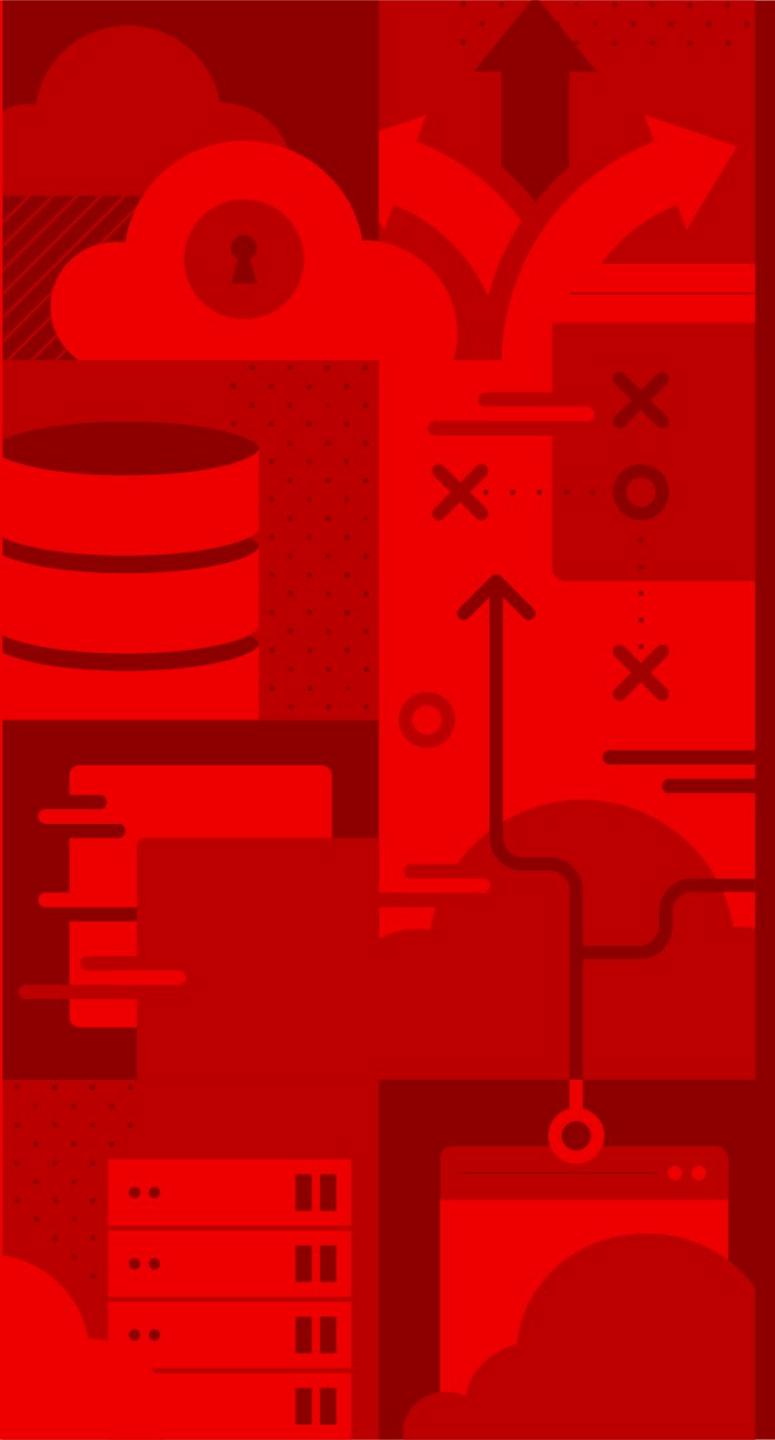


Hub architecture and components

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

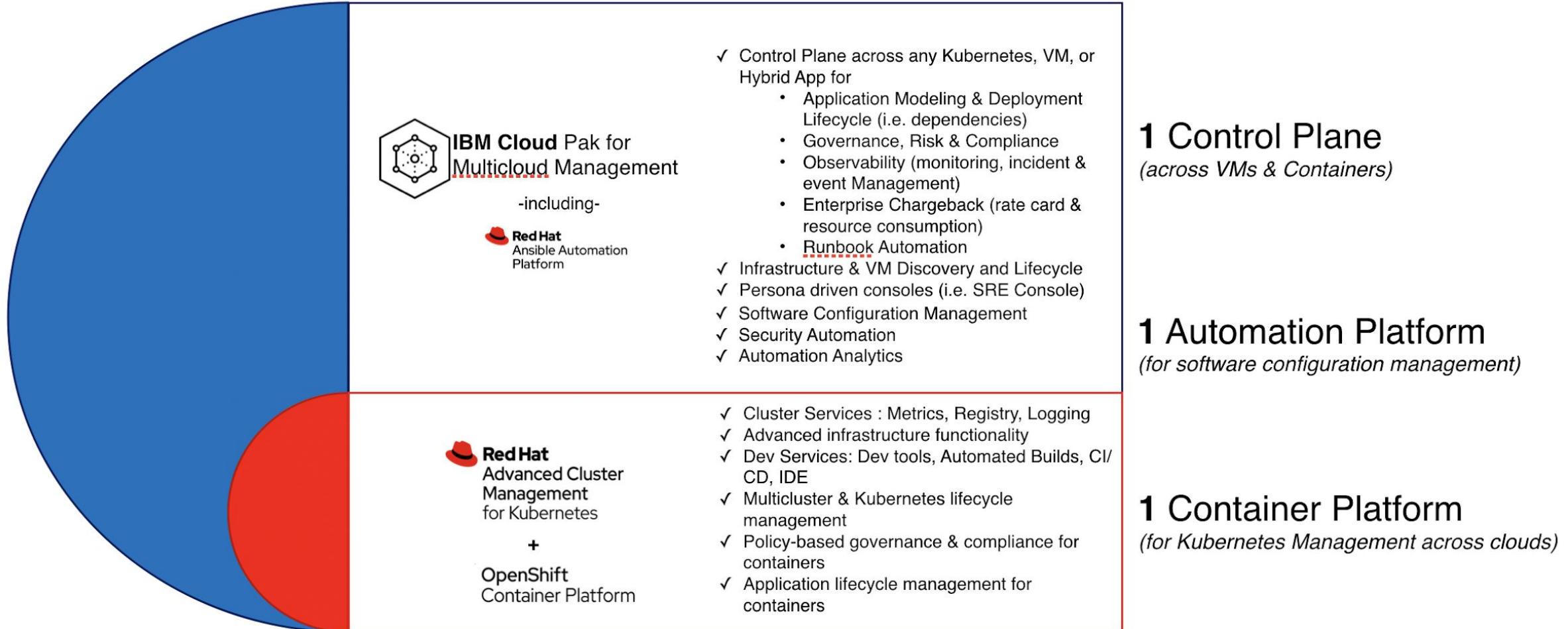
Managed cluster architecture and components

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



ACM, IBM MCM, and Offerings

IBM + Red Hat: Driving simplicity out of complexity



ACM Offering

- Advanced Cluster Management - 2 Core
- Standard or Premium support
- GA is available NOW, but ...
 - **SKU / Pricebook Availability** - 1QCY21 in the Pricebooks
 - Until then, RH must facilitate a BU Guidance ticket to obtain the offering to sell to Customers.

Where can I run the Red Hat ACM Hub?

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>
- Other *KS
 - **TBD**
- For more information on tested platforms: [RHACM 2.0 Support Matrix](#)

ACM Sizing of Deals

- **How to Count the Cores**
 - All logical Cores on Nodes of k8s clusters to be managed (Openshift or Otherwise)
 - so called “Managed Clusters”
- **Counting Rules**
 - **Cannot split 2-core Sub**
 - Managed Clusters consume in 2-core units
 - Ex: if counting needs 3 cores, two 2-core subscriptions would be consumed.
 - **No (DR)/cold backup type of Sub**
 - Any cluster with ACM installed, powered-on or powered-off, running workload or not, requires an active subscription.

Survey

THANK YOU for attending!

- Please complete the survey to be entered into a raffle to receive a limited amount of \$25 eGift Cards
- Link [here](#)

Demo Time!

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.



[linkedin.com/company/red-hat](https://www.linkedin.com/company/red-hat)



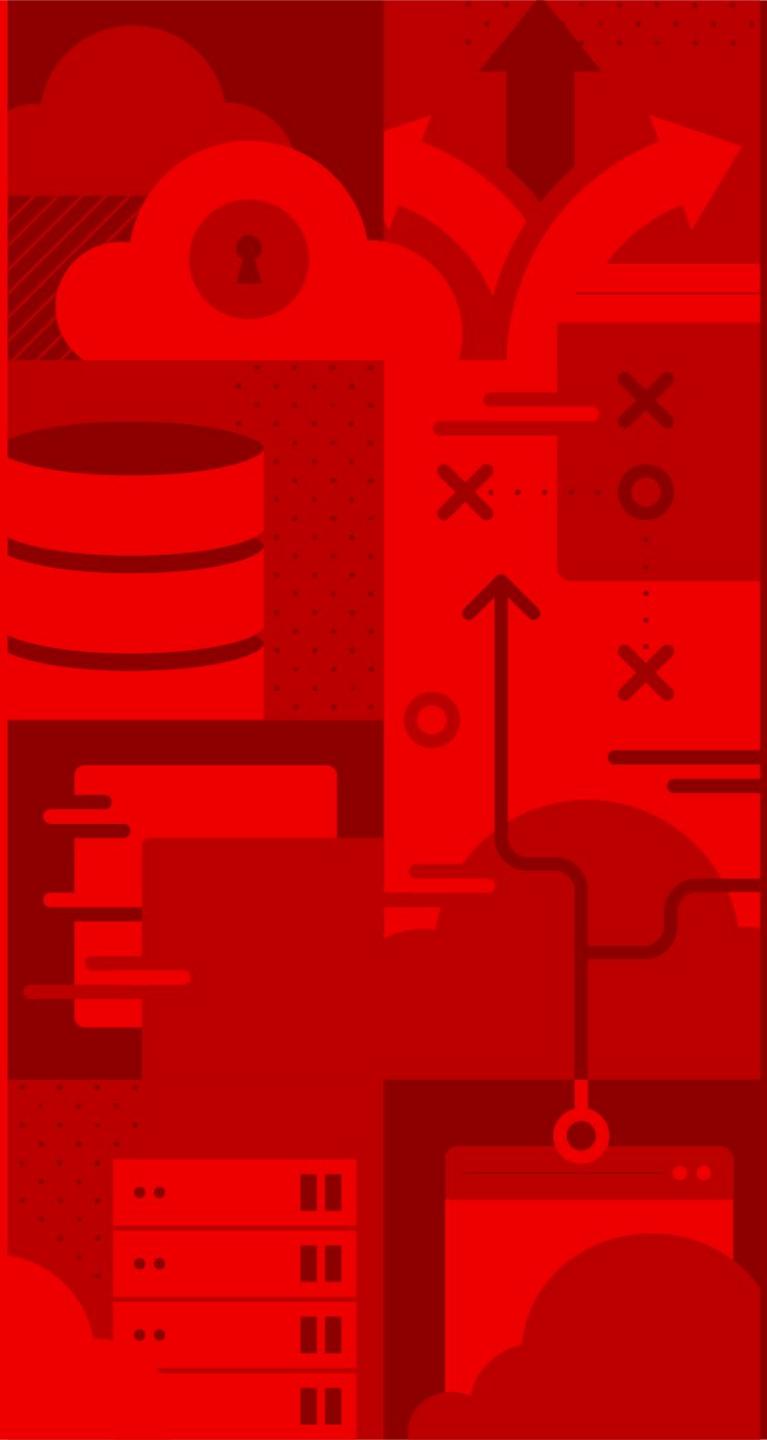
[youtube.com/user/RedHatVideos](https://www.youtube.com/user/RedHatVideos)



[facebook.com/redhatinc](https://www.facebook.com/redhatinc)



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Appendix - Details on Sizing and Subscription

Details on ACM Sizing

Notes and Background

- Terminology:
 - Applications are packaged in container images
 - Containers are grouped in Pods
 - Pods run on Nodes
 - Nodes are managed by a Master
 - The Master handles scheduling the Nodes in a Cluster.
 - Clusters are managed by the ACM Hub and are called “Managed Clusters”
- ACM can “create” OCP clusters and “import” both OCP and non-OCP Kubernetes clusters. The Nodes in the imported clusters must be licensed for ACM.
- Wherever an OCP subscription is required, an ACM subscription is required to manage the cluster.
- All nodes in non-OCP Clusters managed by ACM require an ACM license.
- ACM can be installed on OCP Infrastructure Nodes included with an OCP Subscription. That is, in an OCP environment, additional OCP Subscriptions to run ACM are not required. If a customer does NOT have OCP Subscriptions, meaning OCP is only being used to support ACM, then entitlement to OCP is required.

Further information on ACM Sizing

2 Simple Questions

1. To size ACM for managing OCP clusters, how many core-pairs of OCP are present? For new OCP accounts, see the [OpenShift Subscription and Sizing Guide](#)
2. For non-OCP Kubernetes clusters to be managed, calculate the sum of the core-pairs or vCPU dedicated to the Nodes in the clusters.
 - o Sum of VMs or hardware size in the clusters
 - o Remember a core pair is equivalent to 4 vCPU.

Example on Cluster Sizing

Calculate totals

Using the examples from previous steps:

Sizing

- **4 VM cores per Node** (hyperthreading used, 2 effective virtual cores)

Subscription calculation

- **Nodes in Kubernetes clusters = 59 nodes**
- **Total cores = 59 nodes required * 2 cores per node = 118 total cores**
- **Total subscriptions = 118 total cores / 2 cores per subscription = 59 subscriptions**