

# Red Hat Advanced Cluster Management for Kubernetes

## Benefits

**Accelerate development to production** with self-service provisioning.

**Free up IT departments** with self-service cluster deployment that automatically delivers applications.

**Increase application availability** with the ability to deploy legacy and cloud-native applications quickly across distributed clusters.

**Ease security compliance** with centralized policy enforcement across clusters.

**Reduce operational costs** with a unified management interface.

## Introduction

Applications are moving from a monolithic to a cloud-native approach—built with multiple components spanning multiple clusters and cloud providers. As application workloads move from development to production, IT often requires multiple fit-for-purpose Kubernetes clusters to support continuous integration/continuous delivery (CI/CD) of DevOps pipelines. Cluster sprawl continues with the addition of new clusters configured for specific purposes, such as edge deployments, faster response time, reduced latency, reduced capital expenditures (CapEx), and compliance with data residency requirements.

Whether your organization is just getting started with a single cluster or already operating in a multicluster environment, you likely face some difficult decisions:

- How can I manage the life cycle of multiple clusters regardless of where they reside, on-premise or across public clouds, using a single control plane?
- How do I get a simplified understanding of my cluster health and the effect it may have on my application availability?
- How do I automate provisioning and deprovisioning of my clusters?
- How do I ensure that all my clusters are compliant with standard and custom policies?
- How do I get alerted about configuration drift and remediate it?
- How can I automate the placement of workloads based on capacity and policy?

## Red Hat Advanced Cluster Management for Kubernetes

Red Hat® Advanced Cluster Management for Kubernetes offers end-to-end management visibility and control to manage your cluster and application life cycle, along with improved security and compliance of your entire Kubernetes domain—across multiple datacenters and public clouds.

Red Hat OpenShift® is the clear choice for container orchestration, offering a platform for deploying and managing containers in a standard, consistent control plane. Red Hat OpenShift and Red Hat Advanced Cluster Management provide the hybrid cloud management platform and capabilities that address common challenges faced by administrators and site reliability engineers (SREs) as they work across a range of environments such as multiple datacenters, private clouds, and public clouds that run Kubernetes clusters, including your remote edge sites. Certain industries such as public sector environments require strict compliance and United States' Federal Information Processing Standards (FIPS) mode support, which Red Hat Advanced Cluster Management provides.

Red Hat Advanced Cluster Management provides a single view to manage your Kubernetes clusters. Easily provision new Red Hat OpenShift clusters across: Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP), Microsoft Azure Government (MAG), bare metal, Red Hat OpenStack® Platform



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and VMware vSphere. In addition, existing Red Hat OpenShift clusters can be imported and managed such as Red Hat OpenShift on IBM Cloud, Microsoft Azure Red Hat OpenShift, Red Hat OpenShift Dedicated, Red Hat OpenShift on Red Hat OpenStack Platform, OpenShift on IBM Z, OpenShift on IBM Power, and Red Hat OpenShift on Amazon. Red Hat Advanced Cluster Management can also import and manage your existing public cloud Kubernetes clusters such as Amazon Elastic Kubernetes Service (Amazon EKS), IBM Cloud Kubernetes Service (IKS), Azure Kubernetes Service (AKS), and Google Kubernetes Engine (GKE).

## Features and benefits

### Multicluster observability for fleet health and optimization

Deliver an enhanced SRE experience with out-of-the box multicluster dashboards that have the ability to store long-term historical data and provide an overview of fleet health and optimization.

**Table 1.** Features and benefits of multicluster observability

Feature	Benefit
Fleet health monitoring	Sort, filter, and scan individual clusters, as well as aggregated multiclusters with Grafana. Use the open source <a href="#">Thanos</a> project for scalable metrics collection with long-term data retention. Get OpenShift cluster health metrics along with non-OpenShift clusters such as EKS, GKE, AKS, IKS in the Grafana dashboard.
Customized metrics and dashboards	Customize Grafana dashboards based on metrics you define, along with the predefined metrics. View what is important to you.
Dynamic search	Use the graphical console to identify, isolate, and resolve issues affecting distributed workloads.
Analytics through Red Hat Insights for Red Hat OpenShift	Gain actionable intelligence on your cluster health for your Red Hat Advanced Cluster Management managed fleet and take proactive and remediation actions based on the analytics being provided from Red Hat OpenShift-based telemetry and Red Hat expertise.
Automatic alert forwarding from managed clusters to Red Hat Advanced Cluster Management hub	Easily respond and troubleshoot by getting centralized alerts of cluster health metrics and all your policy violations into your third-party tools such as Slack and PagerDuty.

## Unified multicluster life cycle management

Create, upgrade, and destroy Kubernetes clusters reliably, consistently, and at scale, using an open source programming model that supports and encourages infrastructure as code (IaC) best practices and design principles.

**Table 2.** Features and benefits of unified multicluster life cycle management

Feature	Benefit
Cluster life cycle management	Gain Day 1 experience with cluster life cycle management using the open source <a href="#">Hive</a> application programming interface (API). Create and upgrade new Red Hat OpenShift Container Platform clusters, or import existing OpenShift Container Platform and managed Kubernetes clusters using Red Hat Advanced Cluster Management console.
Cloud providers supported	Red Hat Advanced Cluster Management supports the creation of OpenShift Container Platform clusters on AWS, Microsoft Azure, Google Cloud Platform, Microsoft Azure Government, bare metal, Red Hat OpenStack Platform, and VMware vSphere.
Enhanced cluster life cycle management (tech preview)	Take advantage of features such as: worker pool scaling with autoscale configuration, cluster hibernate and resume via cluster pools to help deploy clusters quickly, and cluster sets to define access controls to a group of clusters.
Red Hat Ansible® Automation Platform integration	Automate your Day 0 operations such as configuring cloud-defined storage and infrastructure prerequisites (e.g., static IP addresses). After cluster creation, automate Day 1 operations such as updating network components (e.g., firewalls and load balancers) to allow flexible configuration changes, scaling, etc., using Ansible Automation Platform integration with Red Hat Advanced Cluster Management for Kubernetes.
Multicluster networking with Submariner (tech preview)	Get rich multicluster networking capabilities with Submariner for application components deployed across multiple clusters. This will reduce the complexity of deploying application components and networking requirements across clusters.

## Policy-based governance, risk, and compliance

Apply a policy-based governance approach to automatically monitor and ensure desired best practices configuration state for controls related to security, resiliency, and software engineering so that these controls are operated to industry compliance standards or self-imposed corporate standards.

**Table 3.** Features and benefits of policy-based governance, risk, and compliance

Feature	Benefit
Out-of-the-box policy templates for security, resiliency, and configuration management	Use prebuilt policy templates to enforce policy on Kubernetes configuration (e.g., etcd encryption), identity and access management (IAM), certificate management, and deploy and configure operators such as Compliance Operator, Gatekeeper/Open Policy Agent (OPA), and Container Security Operator across your clusters. Implement policy-based governance via GitOps to meet internal and external standards using the open source <a href="#">policy collection repository</a> .
Governance and risk dashboard	Use the governance and risk dashboard to view and manage security risks and policy violations in all of your clusters and applications. Get details on violation history. Drill down into violation details by centrally accessing details from managed clusters from the ACM hub.
Customized policy violation views	Customize policies for various compliance standards, governance dashboard views, and views for most impacted controls for specific standards.
Open source extensible policy framework and policy collection repository	Develop custom policy controllers and policies and integrate them for centralized management into the governance and risk dashboard. Take advantage of the collaborative upstream policy contributions using the <a href="#">policy collection repository</a> .
Integration with Gatekeeper and Open Policy Agent (OPA)	Get a fully supported Gatekeeper and OPA operator that enables deployment of the Gatekeeper operator to your fleet using compliance policy. Initiate Gatekeeper controls across your fleet to enforce various OPA policies. Centrally view and drill down into violations for all your Gatekeeper and OPA policies.
Integration with OpenShift Compliance Operator	Deploy OpenShift Compliance Operator at scale across your fleet using Red Hat Advanced Cluster Management to enforce various security profiles for compliance standards such as the E8 Essential scan. Centrally view and drill down into violations for all of these security profiles.
Ansible Automation Platform integration	Use Ansible Automation Platform integration with Red Hat Advanced Cluster Management to automate remediation of noncompliant conditions and gather audit information about the clusters for analysis to promote proactive measures against policy violations detected by Red Hat Advanced Cluster Management.
Deploy Red Hat Advanced Cluster Security (Stackrox) Central via governance, risk, and compliance (GRC) policy (tech preview)	Get a consolidated experience by using Red Hat Advanced Cluster Management console to deploy Red Hat Advanced Cluster Security (Stackrox) Central server consistently across clusters through the ease of using a single policy.

Feature	Benefit
Policy generator	Allow policies to be auto-generated and deployed via GitOps from existing Kubernetes configuration and Gatekeeper and Kyverno policies.

### Advanced application life cycle management

Use open standards and deploy applications using placement rules that are integrated into existing continuous integration/continuous delivery (CI/CD) pipelines and governance controls.

**Table 4.** Features and benefits of advanced application life cycle management

Feature	Benefit
Application topology view	Quickly view the health of service endpoints and pods associated with your application topology with all the connected dependencies like image versions, associated placement rules, Kubernetes resources, and ConfigMaps.
Channels and subscriptions	Automatically deploy applications to specific clusters by subscribing to different workload (resource) channels such as GitHub, Helm repository, and ObjectStore types.
Placement rules	Rapidly deploy workloads across your fleet, or only to specific clusters, based on placement rule definitions and time windows to control when and where your applications are being deployed.
Ansible Automation Platform integration	Automate everything outside of Kubernetes with your application deployments. For example, automate and configure networking, databases, load balancers, and firewalls with Ansible Automation Platform integration.
Application builder	Intuitive application creation experience using a form-based input with contextual help to guide you in defining your application components without dealing directly with YAML.
Argo CD integration	Use Red Hat Advanced Cluster Management to allow Argo CD to automatically deliver content as clusters come online or get imported. Red Hat Advanced Cluster Management policies work in tandem with Argo CD to ensure compliance and configuration are managed and maintained at scale for tighter CI/CD alignment. View and troubleshoot applications deployed by Argo CD in the Advanced Cluster Management application topology view. Create application set objects for your clusters that are registered within Argo, directly from Red Hat Advanced Cluster Management console.

## Edge management at scale

With single-node OpenShift and Red Hat Advanced Cluster Management, continuously scale while enabling availability in high-latency, low-bandwidth edge use cases.

**Table 5.** Features and benefits of edge management at scale

Feature	Benefit
Ease of scalability	The number of single-node OpenShift clusters managed by a single ACM hub is approaching 2,000. Additionally, the IPV6 dual stack support simplifies the management of a scaled out edge architecture. These features ensure scalability in low-bandwidth high latency-connections and disconnected sites.
Zero touch provisioning (tech preview)	Use Red Hat Advanced Cluster Management with Assisted Installer on-premise for high-scale cluster deployment serving telco and edge scenarios.
Single-node OpenShift management	Get full management capabilities for your single-node OpenShift clusters essential for your edge use cases.
Hub-side policy templating	Reduce the number of policies for high-scale management scenarios by allowing them to refer to data from resources on the hub.

## Business continuity

Use Red Hat Advanced Cluster Management along with the broader Red Hat portfolio to ensure the apps and stateful applications your business relies on are always up and running.

**Table 6.** Features and benefits of business continuity

Feature	Benefit
Red Hat Advanced Cluster Management Hub backup and restore	Back up your managed cluster configurations more securely and restore them in a different hub cluster, using a backup solution based on OpenShift API for Data Protection.
Red Hat OpenShift Data Foundation (formerly Red Hat OpenShift Container Storage) for disaster recovery (DR) strategy (tech preview)	A robust multisite, multicluster disaster recovery strategy for your stateful apps using OpenShift Data Foundation and Red Hat Advanced Cluster Management. OpenShift Data Foundation ensures your application data volumes and persistent volumes (PVs) are consistently and frequently replicated. DR operators that are set up with Red Hat Advanced Cluster Management can automate the DR fail-over and fail-back processes.

Feature	Benefit
PV replication using volSync (formerly Scribe) (tech preview)	Ensure resilience for the stateful apps your business relies on by providing a planned application migration strategy across your clusters. You can also use volSync to create your own DR solution when working with alternative vendors' storage or heterogeneous storage products.

## Technical specifications

### Hub cluster

- Operator-based installation
- Available on OperatorHub.io
- Requires Red Hat OpenShift Container Platform 4.6.x, 4.8.x, and above

### Managed clusters (Learn more at [Support Matrix](#))

- Full life cycle management: Red Hat OpenShift Container Platform 4.6.x, 4.8.x and above:
  - Red Hat OpenShift on AWS, Microsoft Azure, Google Cloud Platform, Microsoft Azure Government (MAG), VMware vSphere, Red Hat OpenStack Platform, and bare metal
- Import and manage:
  - Red Hat OpenShift Container Platform 3.11
  - [Red Hat OpenShift on IBM Power](#)
  - [Red Hat OpenShift on IBM Z](#)
  - [Red Hat OpenShift on IBM Cloud](#)
  - [Red Hat OpenShift on Amazon](#)
  - [Microsoft Azure Red Hat OpenShift](#)
  - [Red Hat OpenShift Dedicated](#)
- Limited life cycle support for managed Kubernetes clusters:
  - Amazon Elastic Kubernetes Service (Amazon EKS)
  - Azure Kubernetes Service (AKS)
  - IBM Cloud Kubernetes Service (IKS)
  - Google Kubernetes Engine (GKE)

- Red Hat Advanced Cluster Management provides observability, application life cycle management, and policy-based management of imported clusters.
- Red Hat Advanced Cluster Management provides full cluster life cycle management (create, upgrade, destroy) with additional security compliance capability for Red Hat OpenShift Container Platform clusters.

### High availability

- Red Hat OpenShift Container Platform availability zone supported
- Limitation for search component based on RedisGraph

### Resource requirements

- 3 masters, 3 infrastructure nodes, 6 vCPU and 16GB RAM

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