Red Hat Advanced Cluster Management for Kubernetes

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 multi-cluster 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 impact it may have on my application availability?
• How do I automate provisioning and deprovisioning of my clusters?
• How do I ensure that all of 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 security and compliance of your entire Kubernetes domain across multiple datacenters and public clouds.

It provides a single view to manage your Kubernetes clusters—from Red Hat OpenShift® deployed on premise and in public clouds, as well as clusters from public cloud providers like AWS, Microsoft Azure, Google, and IBM.

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 for Kubernetes provide the platform and capabilities that address common challenges faced by administrators and site reliability engineers (SREs) as they work across a range of environments, including multiple datacenters, private clouds, and public clouds that run Kubernetes clusters.
Features and benefits

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 1. Features and benefits of unified multicluster life-cycle management

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic search</td>
<td>Use the graphical console to identify, isolate, and resolve issues impacting distributed workloads using dynamic search.</td>
</tr>
<tr>
<td>Visual Web Terminal (Based on Kui)</td>
<td>Run operations directly from dashboards with a single command line interface for multicluster. Works with Helm, kubectl, oc, istioctl and allows the use of Bash and grep commands.</td>
</tr>
<tr>
<td>Multicluster endpoint agent</td>
<td>Asynchronous work request model aggregates information from multiple managed clusters to the centralized Red Hat Advanced Cluster Management for Kubernetes hub cluster.</td>
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</tbody>
</table>

Policy-based governance, risk, and compliance

Apply a policy-based governance approach to automatically monitor and ensure security and configuration controls are operated to industry compliance standards or self-imposed corporate standards.

Table 2. Features and benefits of policy-based governance, risk, and compliance

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<tr>
<td>Out-of-the-box policy templates for security and configuration controls</td>
<td>Use prebuilt security and configuration controllers to enforce policy on Kubernetes configuration, identity and access management (IAM), Center for Internet Security (CIS), and certificate management across your clusters.</td>
</tr>
<tr>
<td>Governance and risk dashboard</td>
<td>Use the governance and risk dashboard to view and manage the number of security risks and policy violations in all of your clusters and applications.</td>
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</table>
Advanced application life-cycle management

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

Table 3. Features and benefits of advanced application life-cycle management

<table>
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<tr>
<td>Application topology view</td>
<td>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.</td>
</tr>
<tr>
<td>Channels and subscriptions</td>
<td>Automatically deploy applications to specific clusters by subscribing to different workload (resource) channels, such as GitHub, Helm repository, ObjectStore, and resource templates.</td>
</tr>
<tr>
<td>Placement rules</td>
<td>Deploy workloads to clusters based on placement rule definitions to ensure that they only run on specific clusters with matching labels.</td>
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Technical specifications

Hub cluster

- Operator-based installation
- Available on OperatorHub.io
- Requires Red Hat OpenShift Container Platform 4.3.x or 4.4.x

Spoke clusters

- Full lifecycle management of OpenShift Container Platform 3.11, 4.1.x - 4.4.x
• Limited lifecycle support for 3rd party Kubernetes clusters:
  • Amazon Elastic Kubernetes Service (EKS)
  • Azure Kubernetes Service (AKS)
  • IBM Cloud Kubernetes Service (IKS)
  • Google Kubernetes Service (GKE)

• Red Hat Advanced Cluster Management provides observability, application and policy based management of imported managed clusters.

• In addition, Red Hat Advanced Cluster Management provides full cluster lifecycle management (create, upgrade, destroy) with additional security compliance capability for OpenShift Container Platform clusters.

**High availability**

• OpenShift Container Platform availability zone supported

• Limitation for search component based on RedisGraph

**Resource requirements**

• Test: 1 master, 3 infrastructure nodes, 4CPU and 16GB RAM

• Production: 3 masters and 3 infrastructure nodes 16CPU and 128GB RAM

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