Red Hat OpenShift

OpenShift 4.1

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Red Hat

KUBERNETES is complicated

INSTALL

- Templating
- Validation
- OS Setup

DEPLOY

- Identity & Security Access
- App Monitoring & Alerts
- Storage & Persistence
- Egress, Ingress & Integration
- Host Container Images
- Build/Deploy Methodology

HARDEN

- Platform Monitoring & Alerts
- Metering & Chargeback
- Platform Security Hardening
- Image Hardening
- Security Certifications
- Network Policy
- Disaster Recovery
- Resource Segmentation

OPERATE

- OS Upgrade & Patch
- Platform Upgrade & Patch
- Image Upgrade & Patch
- App Upgrade & Patch
- Security Patches
- Continuous Security Scanning
- Multi-environment Rollout
- Enterprise Container Registry
- Cluster & App Elasticity
- Monitor, Alert, Remediate
- Log Aggregation

75%

of enterprise users identify complexity of implementation and operations as the top blocker to adoption

Source: The New Stack, The State of the Kubernetes Ecosystem, August 2017

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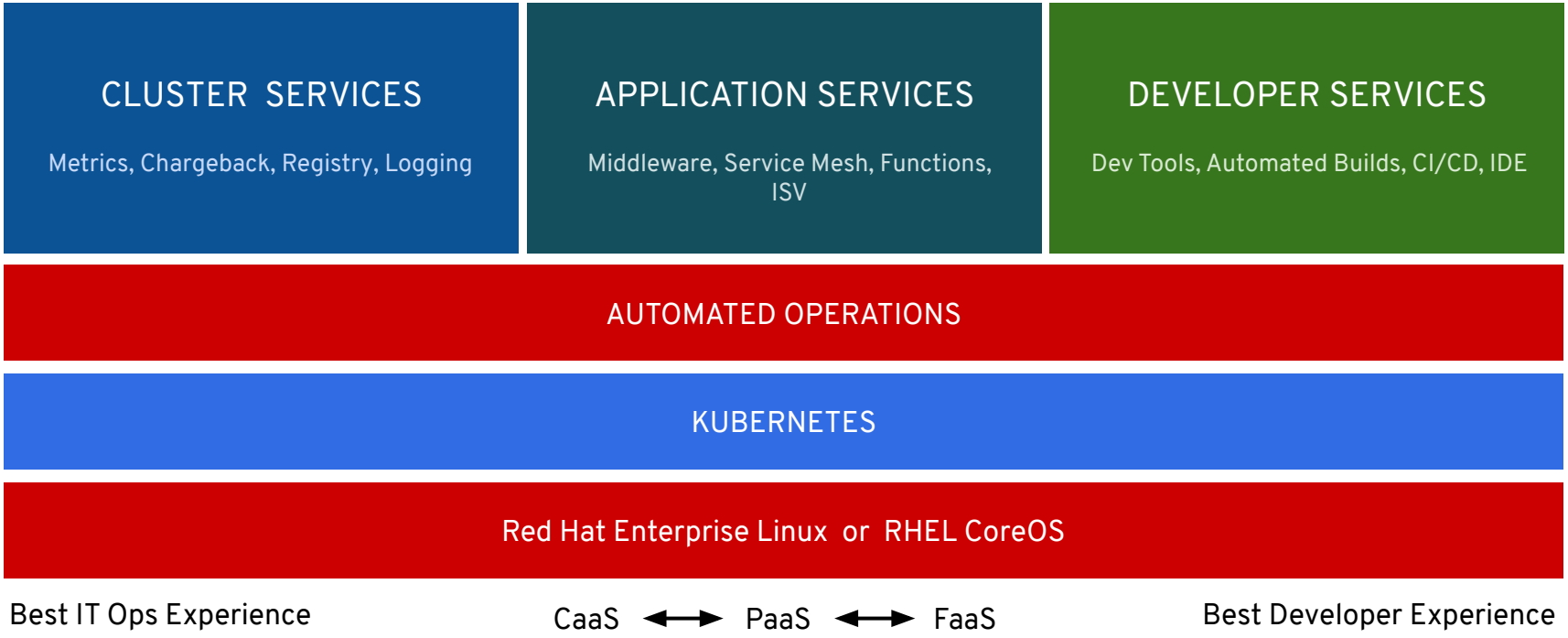
OpenShift 4 Platform



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The New Platform Boundary

OpenShift 4 is aware of the entire infrastructure and brings the Operating System under management

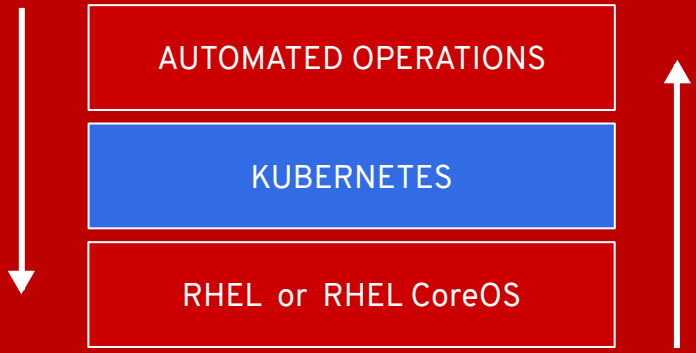
OpenShift & Kubernetes

certificates & security settings

container runtime config

allowed maintenance windows

software defined networking



kernel modules

device drivers

network interfaces

security groups

Nodes & Operating System

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OpenShift 4.1 Workstreams Lifecycle

DAY 2 OPERATIONS

Installer + bootstrapping

Autoscale out of the box

MachineSet node pools

IMMUTABLE INFRASTRUCTURE

Red Hat Enterprise Linux CoreOS

Discourage SSH/node mutation

Ignition for Machine config

OPERATOR FRAMEWORK

SDK & testing tools

OperatorHub for discovery

OLM delivers upper stack services

Red Hat

Installation Experiences

OPENSHIFT CONTAINER PLATFORM

Full Stack Automated

Simplified opinionated "Best Practices" for cluster provisioning

Fully automated installation and updates including host container OS.

Red Hat Enterprise Linux CoreOS

Pre-existing Infrastructure

Customer managed resources & infrastructure provisioning

Plug into existing DNS and security boundaries

Red Hat Enterprise Linux CoreOS

Red Hat Enterprise Linux

HOSTED OPENSHIFT

Azure Red Hat OpenShift

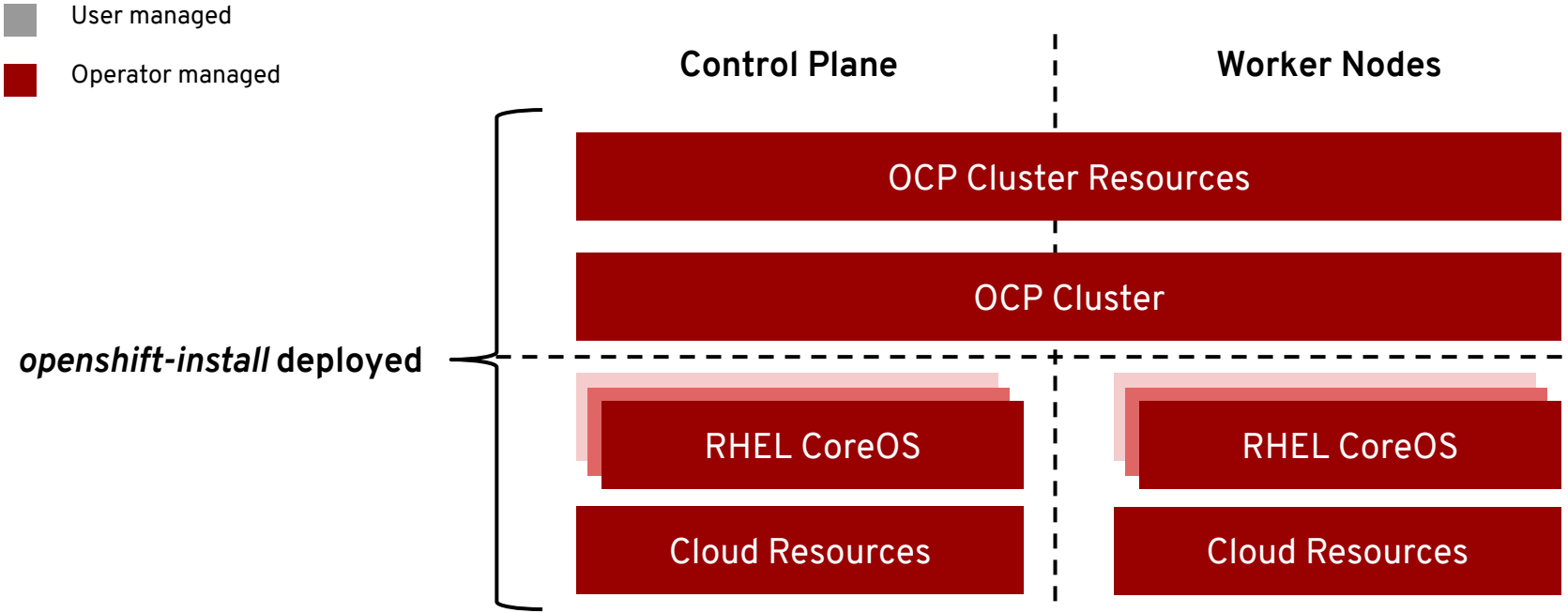
Deploy directly from the Azure console. Jointly managed by Red Hat and Microsoft Azure engineers.

OpenShift Dedicated

Get a powerful cluster, fully Managed by Red Hat engineers and support.

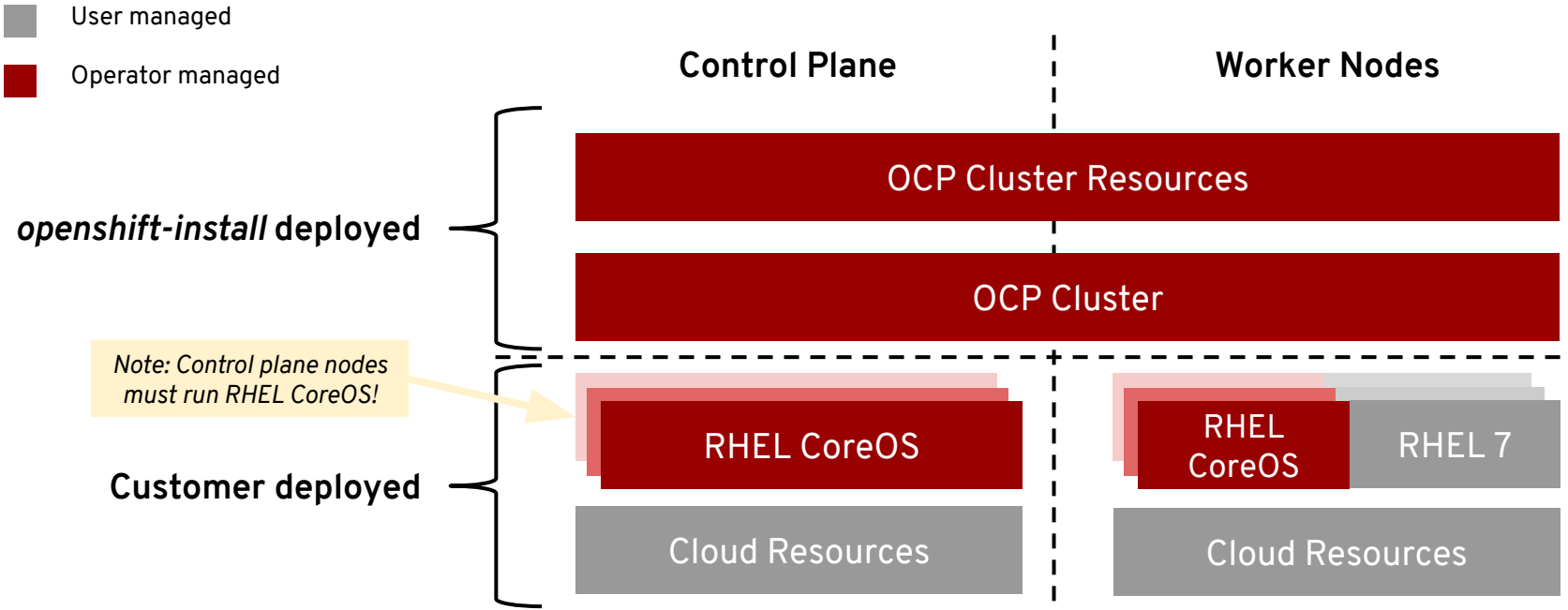
Full Stack Automated Deployments

Day 1: openshift-install - Day 2: Operators



Deploying to Pre-existing Infrastructure

Day 1: openshift-install - Day 2: Operators + Customer Managed Infra & Workers



Red Hat Enterprise Linux CoreOS

4.1 Image Availability:

- Amazon: AMIs
- vSphere: OVA
- Bare Metal: UEFI & BIOS

Installation Requirements:

- RHCOS image + ignition config (installer generated)

Bare Metal Installer (ISO or PXE):

```
coreos.inst=yes
coreos.inst.install_dev=sda
coreos.inst.image_url=http://10.10.10.1/rhcos-metal-uefi.raw.gz
coreos.inst.ignition_url=http://10.10.10.1/master.ign
```

RHCOS Details

- RHEL 8 bits (4.18 kernel)
- Includes all packages required for OpenShift
- Over-The-Air updates encompass OCP & RHCOS
- Transactional host updates
- Read-only OS binaries
- Preconfigured for most environments

Immutable Operating System

Red Hat Enterprise Linux CoreOS is versioned with OpenShift

CoreOS is tested and shipped in conjunction with the platform. Red Hat runs thousands of tests against these configurations.

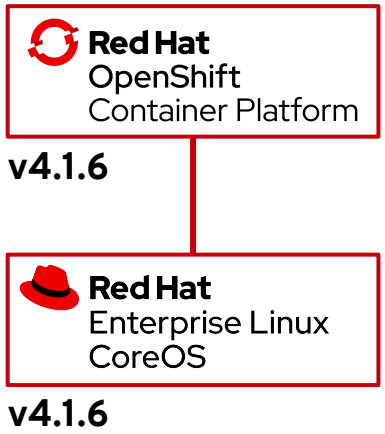
RHEL CoreOS admins are responsible for:

Nothing. 😀🙌

Red Hat Enterprise Linux CoreOS is managed by the cluster

The Operating system is operated as part of the cluster, with the config for components managed by Machine Config Operator:

- CRI-O config
- Kubelet config
- Authorized registries
- SSH config



CRI-O Support in OpenShift

CRI-O tracks and versions identical to Kubernetes, simplifying support permutations

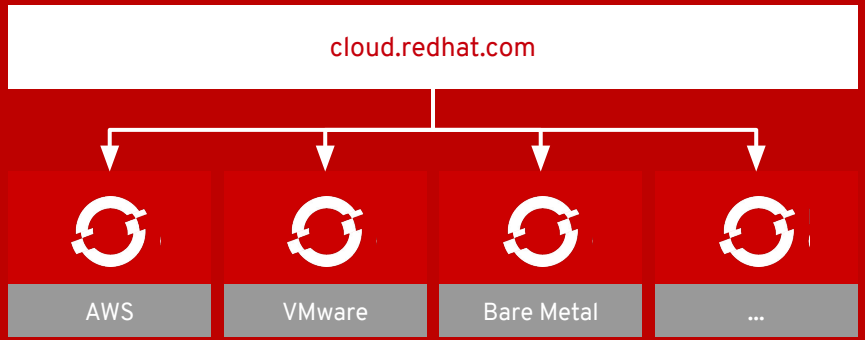
CRI-O 1.12  Kubernetes 1.12  OpenShift 4.0 

CRI-O 1.13  Kubernetes 1.13  OpenShift 4.1 

CRI-O 1.14  Kubernetes 1.14  OpenShift 4.2 

Cloud-like Simplicity, Everywhere

Full-stack automated operations across any on-premises, cloud, or hybrid infrastructure



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OpenShift Cluster Manager on cloud.redhat.com

Automatic registration of OpenShift clusters

View cluster versions and capacity in one place, no matter what infrastructure you are running on. Integrated with RHSM.

OpenShift Dedicated cluster management

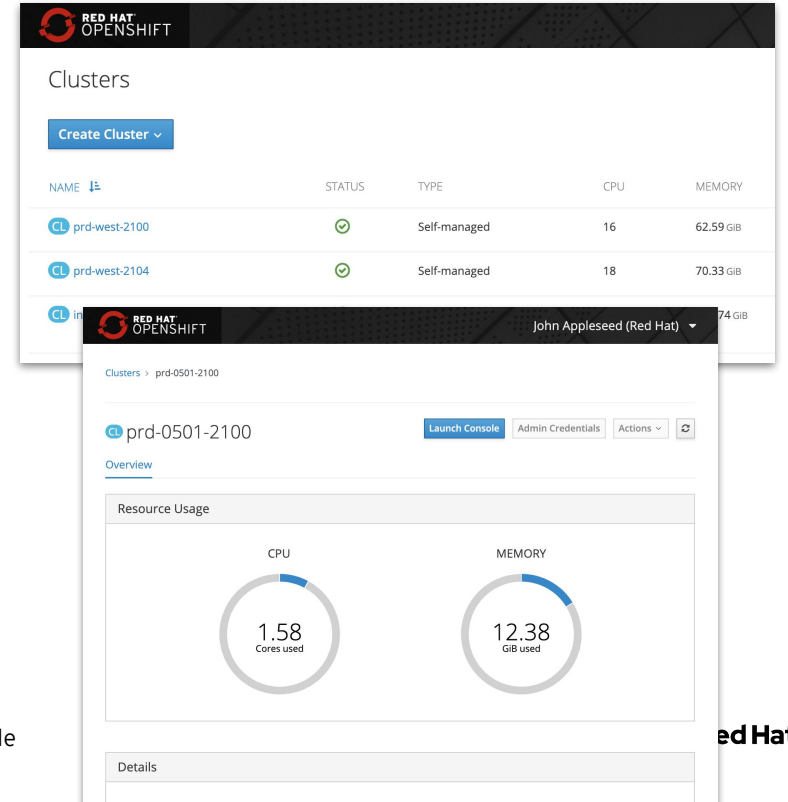
Self-service cluster deployment, scaling, and management for OpenShift Dedicated coming soon.

Azure Red Hat OpenShift

Information about these clusters will be coming at a later date.

Hosted in the United States

Other geographies may come later. You can opt-out too.



Automated Container Operations

Fully automated day-1 and day-2 operations

INSTALL	DEPLOY	HARDEN	OPERATE
AUTOMATED OPERATIONS			
Infra provisioning	Full-stack deployment	Secure defaults	Multi-cluster aware
Embedded OS	On-premises and cloud	Network isolation	Monitoring and alerts
	Unified experience	Audit and logs	Full-stack patch & upgrade
		Signing and policies	Zero downtime upgrades
			Vulnerability scanning

Smarter Software Updates

No downtime for well behaving apps

Applications with multiple replicas, using liveness probes, health checks and taints/tolerations

Node Pools with more than one worker and slack resources

Maintenance window for entire cluster

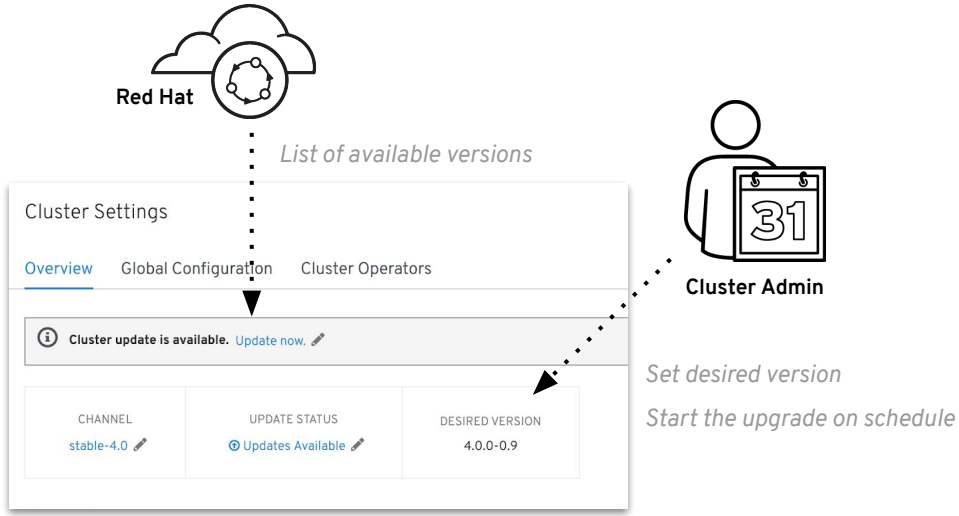
No need for separate windows for each component

Upgrade runs completely on the cluster

No more long running processes on a workstation

Constant health checking from each Operator

Operators are constantly looking for incompatibilities and issues that might arise



Rolling Machine Updates

Single-click updates

- RHEL CoreOS version & config
- Kubernetes core components
- OpenShift cluster components

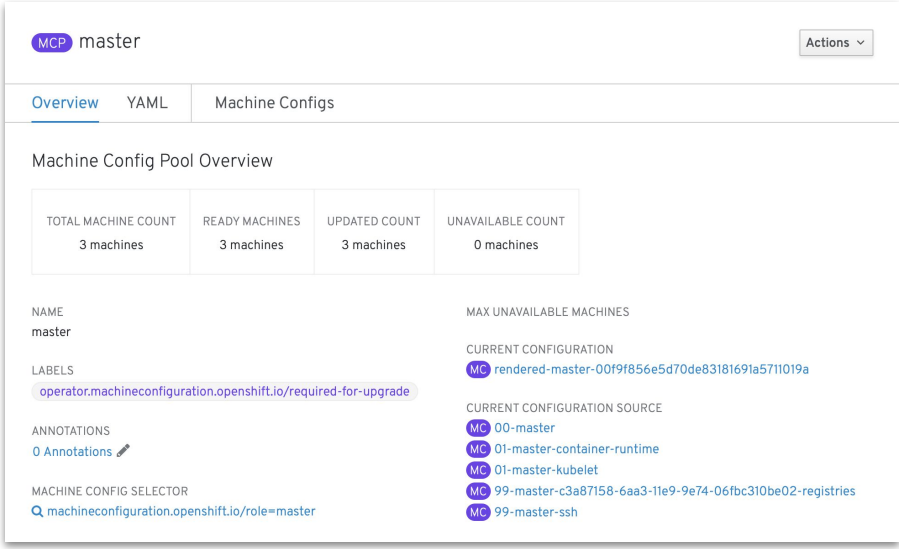
Configure how many machines can be unavailable

Set the “maxUnavailable” setting in the MachineConfigPool to maintain high availability while rolling out updates.

The default is 1.

Machine Config Operator (MCO) controls updates

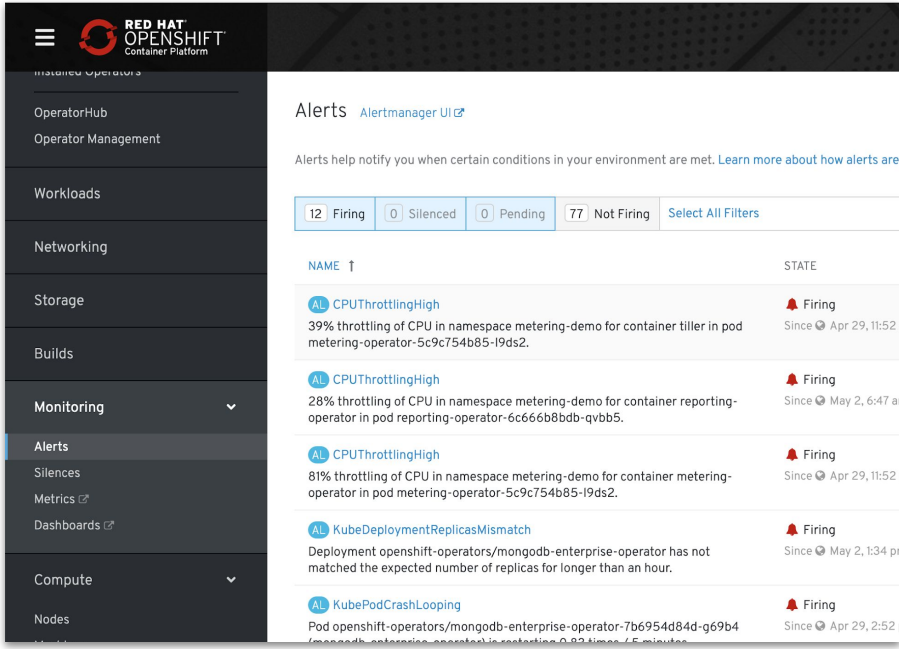
This is a DaemonSet that runs on all Nodes in the cluster. When you upgrade with `oc adm upgrade`, the MCO executes these changes.



Cluster Monitoring

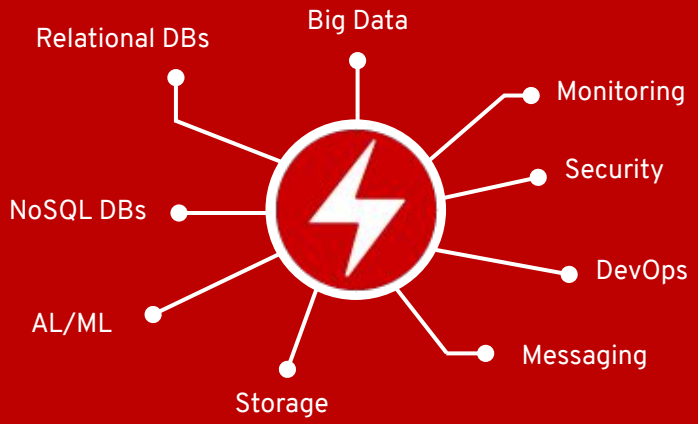
Cluster monitoring is installed by default

- Exposes resource metrics for Horizontal Pod Autoscaling (HPA) by default
  - HPA based on custom metric is tech preview
- No manual etcd monitoring configuration anymore
- New screens for managing Alerts & Silences
- More metrics available for troubleshooting purposes (e.g. HAproxy)
- Configuration via ConfigMaps and Secrets



A broad ecosystem of workloads

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



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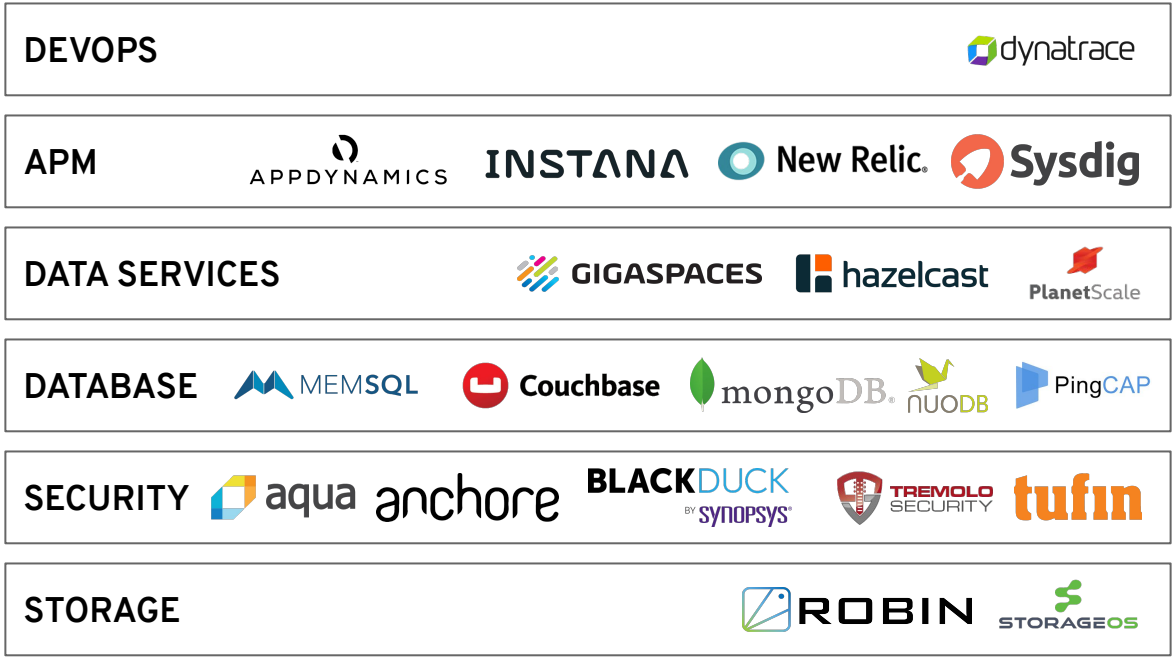
Red Hat Certified Operators



OperatorHub data sources

Requires an online cluster

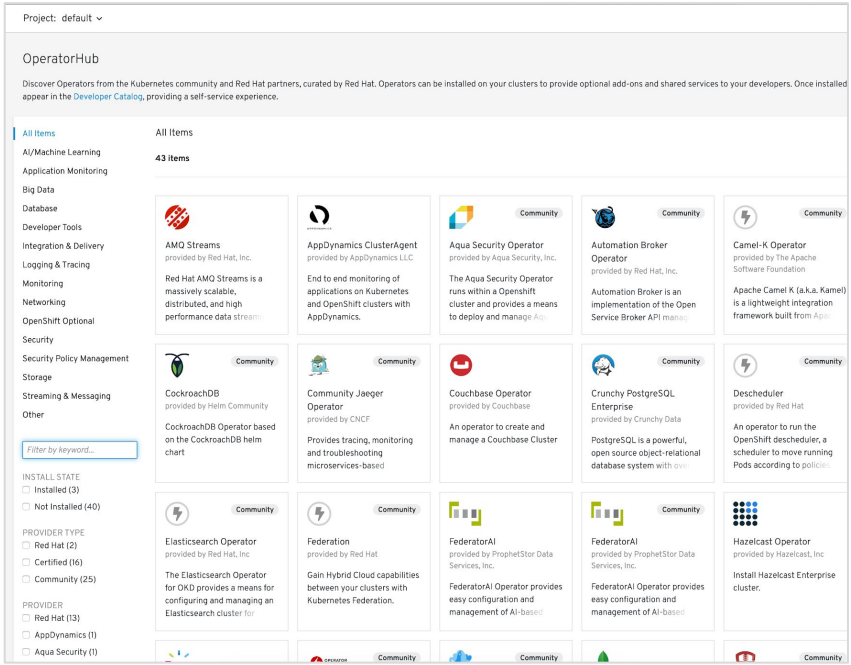
- For 4.1, the cluster must have connectivity to the internet
- Later 4.x releases will add offline capabilities

Operator Metadata

- Stored in quay.io
- Fetches channels and available versions for each Operator

Container Images

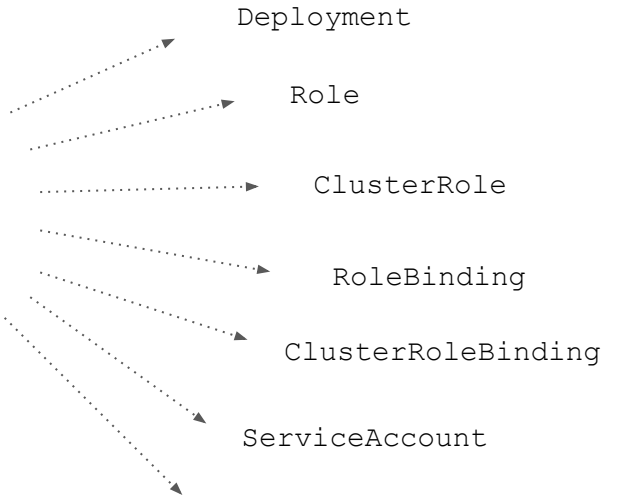
- Red Hat products and certified partners come from RHCC
- Community content comes from a variety of registries



Operators as a First-Class Citizen

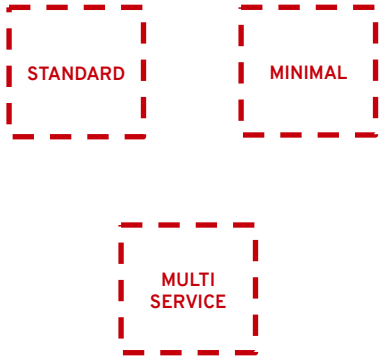
YourOperator v1.1.2
Bundle

Operator Deployment
Custom Resource
Definitions
RBAC
API Dependencies
Update Path
Metadata

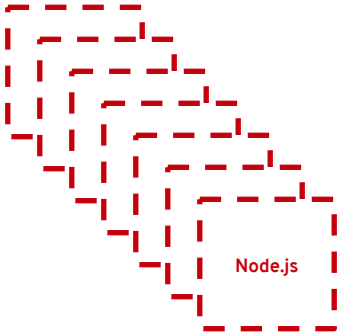


Red Hat Universal Base Image

Enable an ecosystem of freely distributable operators for Kubernetes/OpenShift



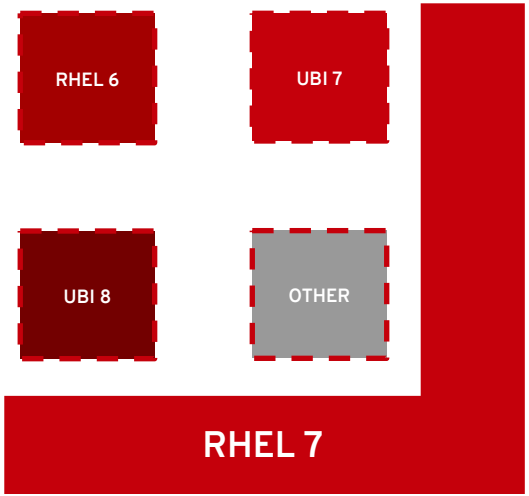
Base Images



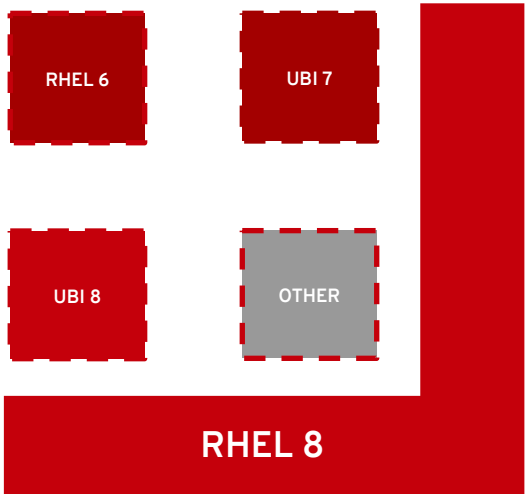
Pre-Built Language Images

Package Subset

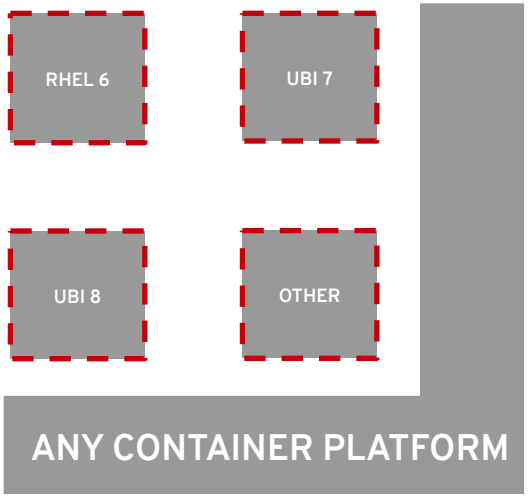
UBI and Host interactions



Red Hat Enterprise Linux 7



Red Hat Enterprise Linux 8

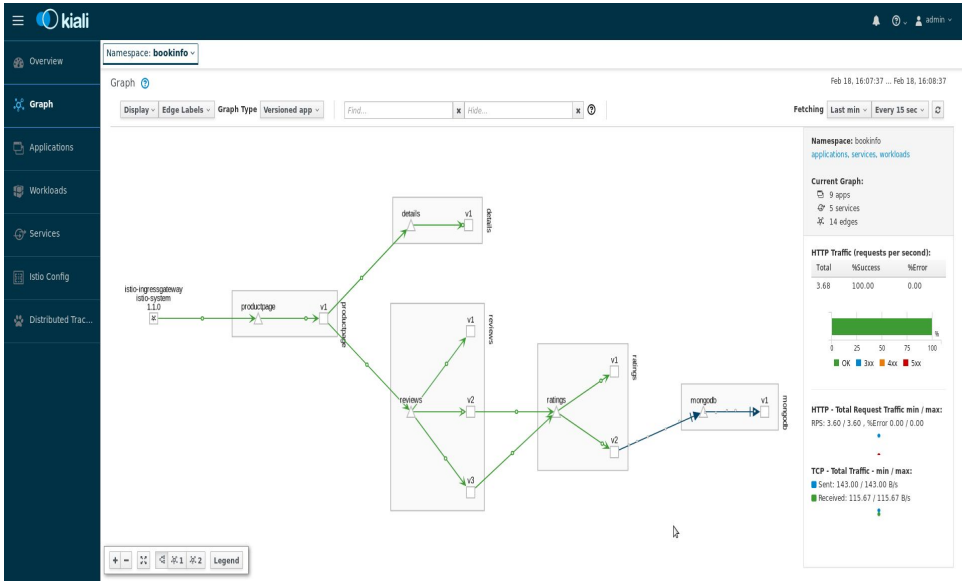


Like any community distro

Red Hat Service Mesh

Key Features

- A dedicated network for service to service communications
- Observability and distributed tracing
- Policy-driven security
- Routing rules & chaos engineering
- Powerful visualization & monitoring
- Will be available via OperatorHub



Product Manager: Brian 'redbeard' Harrington

Generally Available in July

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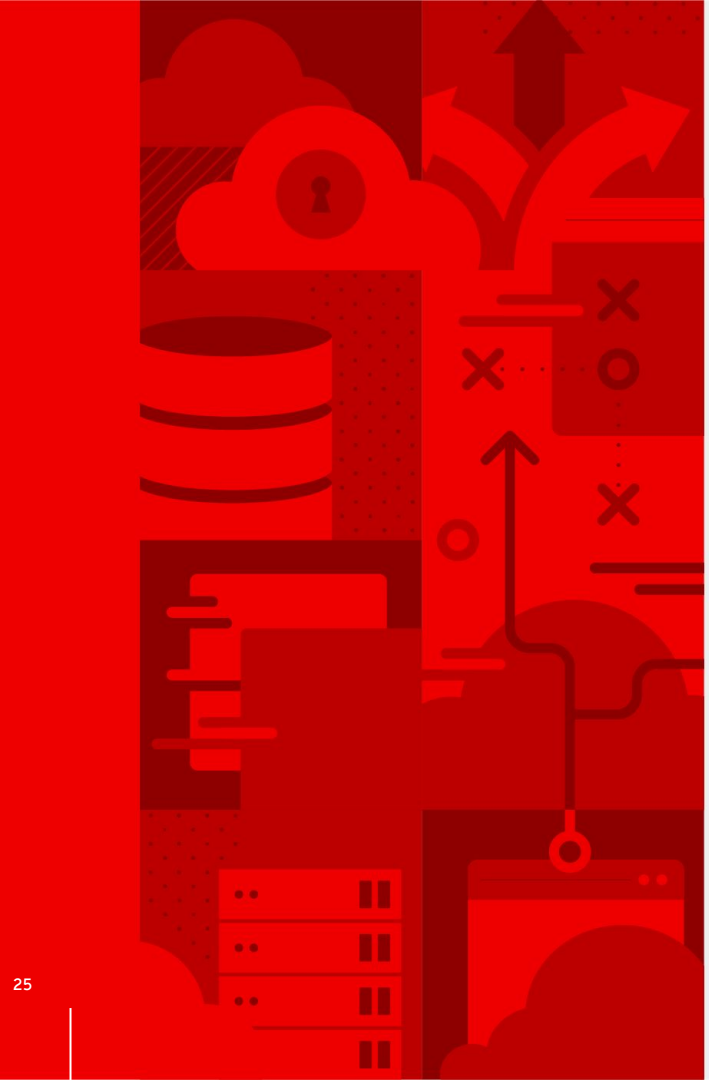

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