



Red Hat
OpenShift

CoreOS and CRI-O &
Operator Framework



Core OS

Red Hat Enterprise Linux

RED HAT® ENTERPRISE LINUX®

General Purpose OS

RED HAT® ENTERPRISE LINUX CoreOS

Immutable container host

BENEFITS

- 10+ year enterprise life cycle
- Industry standard security
- High performance on any infrastructure
- Customizable and compatible with wide ecosystem of partner solutions

- Self-managing, over-the-air updates
- Immutable and tightly integrated with OpenShift
- Host isolation is enforced via Containers
- Optimized performance on popular infrastructure

WHEN TO USE

When customization and integration with additional solutions is required

When cloud-native, hands-free operations are a top priority

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.

Red Hat Enterprise Linux CoreOS is managed by the cluster

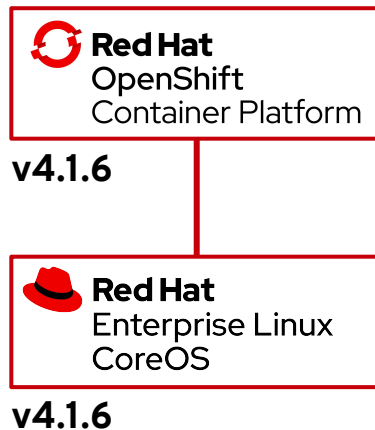
The Operating system is operated as part of the cluster, with the config for components managed by Machine Config

Operator:

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

RHEL CoreOS admins are responsible for:

Nothing. 😊 🙌





A lightweight, OCI-compliant container runtime

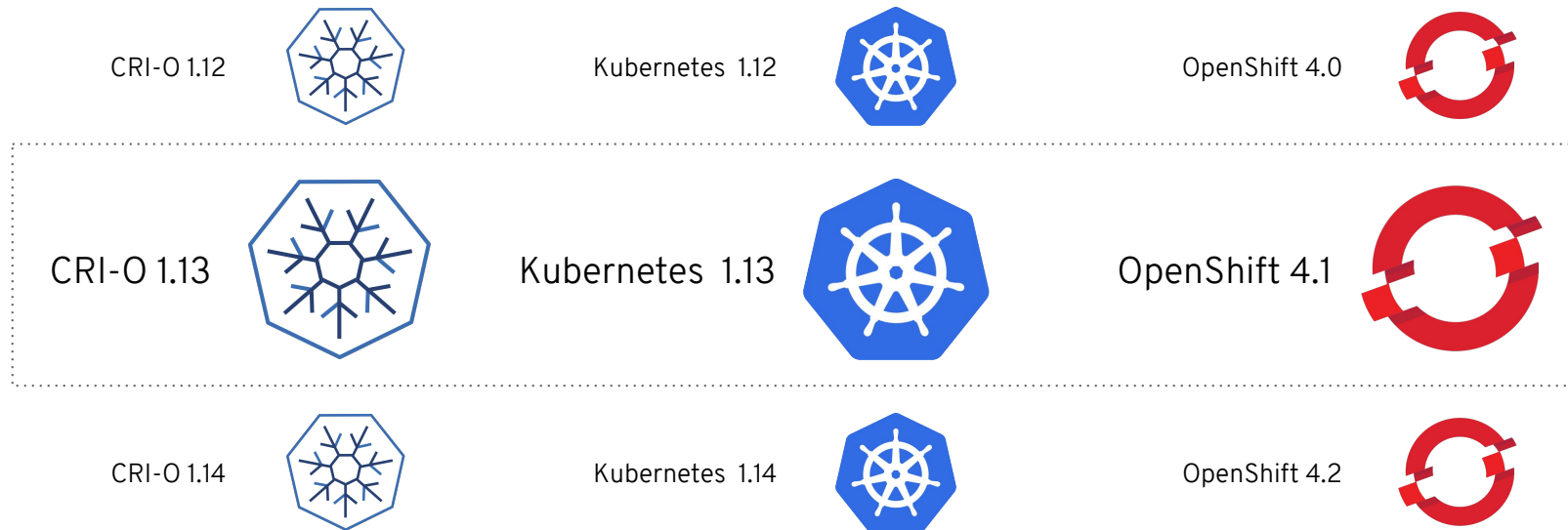
Minimal and Secure
Architecture

Optimized for
Kubernetes

Runs any
OCI-compliant image
(including docker)

CRI-O Support in OpenShift

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



podman



A docker-compatible CLI
for containers

- Remote
management API
via Varlink
- Image/container
tagging
- Advanced
namespace
isolation

buildah



buildah

Secure & flexible OCI container builds

- Integrated into OCP build pods
- Performance improvements for knative enablement
- Image signing improvements

HandsOn Part two

“Build an app with Buildah”

Welcome!

Building Container Images with Buildah

★ Difficulty: **Beginner**

🕒 Estimated Time: **10 minutes**



buildah

Buildah - a tool that facilitates building OCI container images

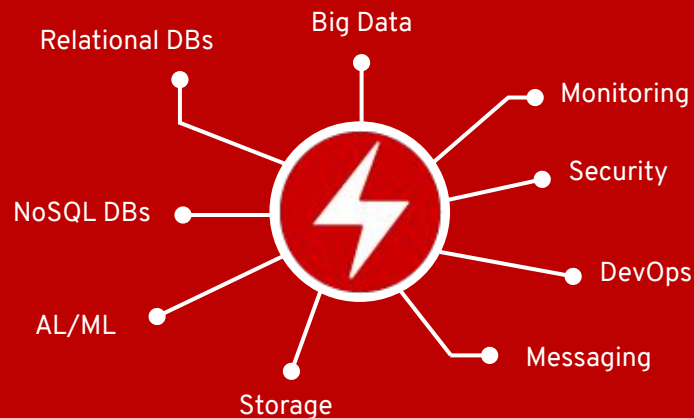
Buildah creates OCI container images without requiring a Docker Daemon.

In this scenario you will learn how to build images based on existing Dockerfiles using Buildah. You will also learn how to build images from bash scripts allowing for different syntax and approaches to image creation.

The scenario also introduces skopeo, a tool for inspecting images and container registries

A broad ecosystem of workloads

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



Red Hat Certified Operators

DEVOPS



APM



DATA SERVICES



DATABASE



SECURITY



STORAGE



OperatorHub data sources

Requires an online cluster

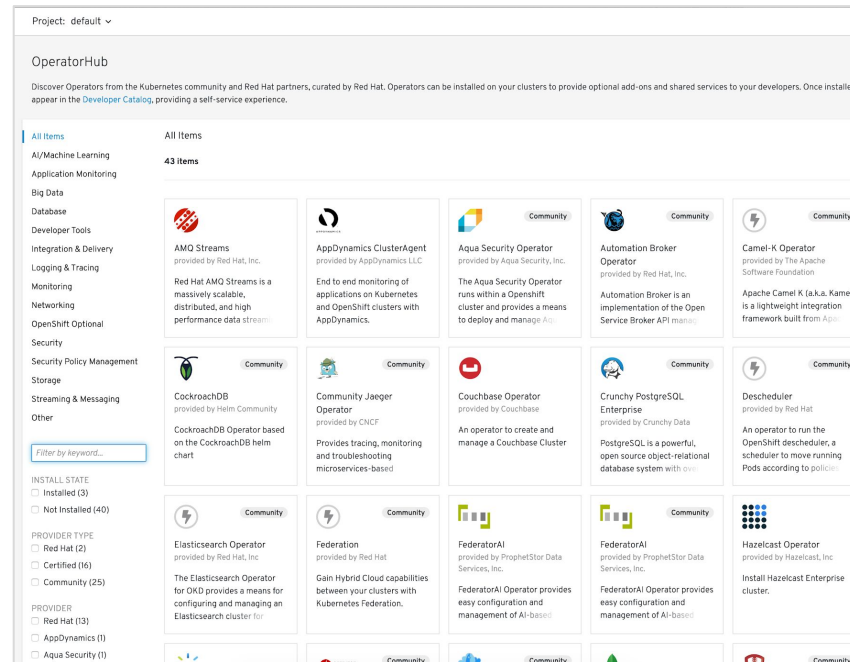
- For 4.1, the cluster must have connectivity to the internet
- Later 4.x releases will add offline capabilities

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



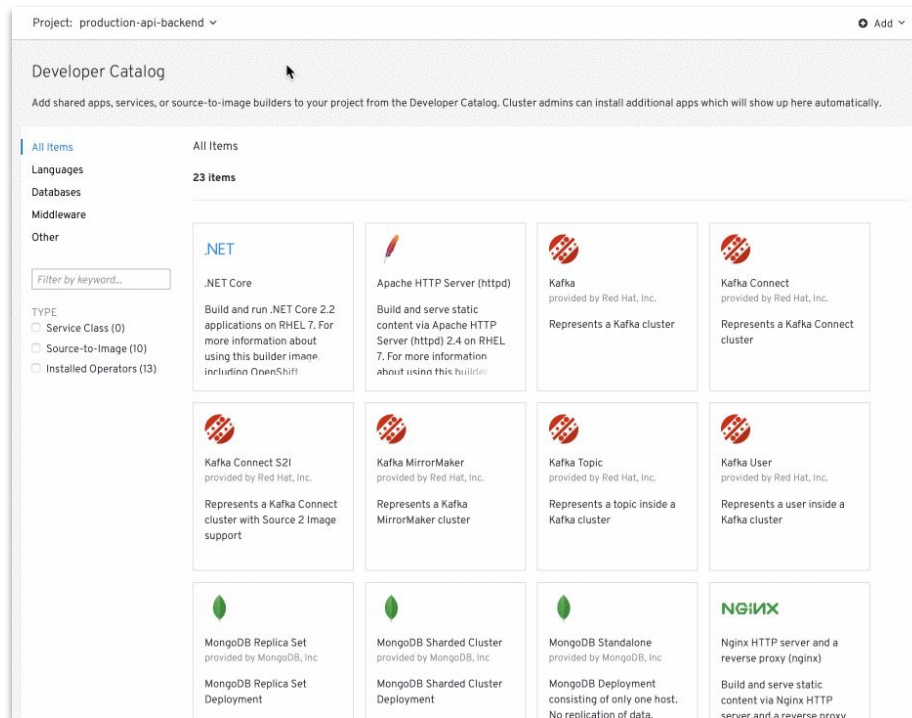
Services ready for your developers

New Developer Catalog aggregates apps

- Blended view of Operators, Templates and Broker backed services
- Operators can expose multiple CRDs. Example:
 - MongoDBReplicaSet
 - MongoDBSharded Cluster
 - MongoDBStandalone
- Developers can't see any of the admin screens

Self-service is key for productivity

- Developers with access can change settings and test out new services at any time



Operators as a First-Class Citizen

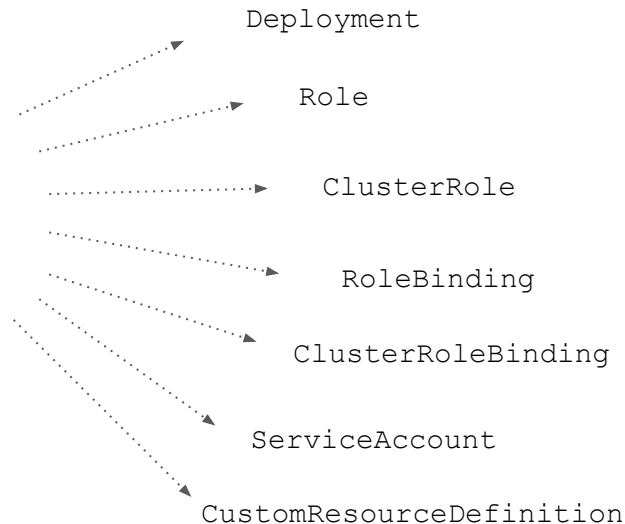


YourOperator v1.1.2
Bundle



**OPERATOR
LIFECYCLE MANAGER**

Operator Deployment
Custom Resource
Definitions
RBAC
API Dependencies
Update Path
Metadata



Operator Lifecycle Management

Operator Catalog



**OPERATOR
LIFECYCLE MANAGER**



Subscription for
YourOperator



Version



YourOperator v1.1.2

YourOperator v1.1.3

YourOperator v1.2.0

YourOperator v1.2.2

Time

Operator Lifecycle Management

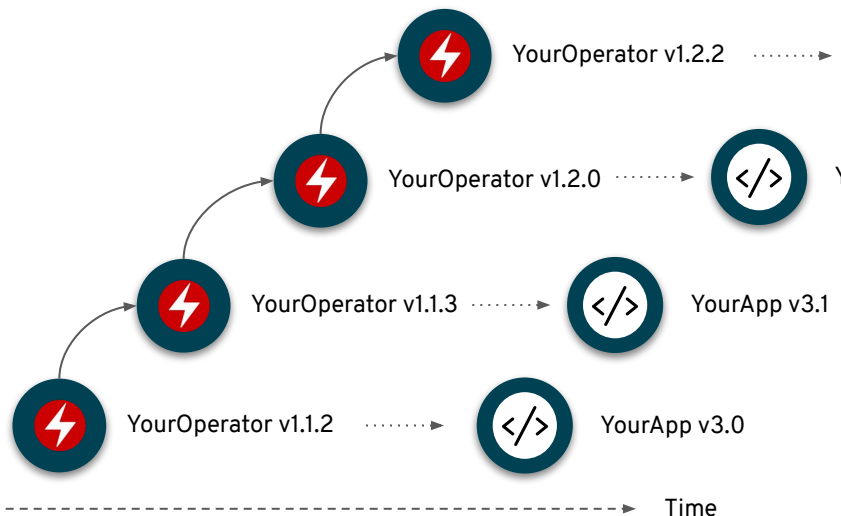
Operator Catalog



Subscription for
YourOperator



Version



Operator Upgrade in Detail

OperatorHub facilitates upgrades of installed Operators

- Manual or automatic modes can be chosen per Operator
- The Operator itself is upgraded by OLM via Deployment and a regular rolling upgrade
- The objects managed by the Operator use built in mechanisms to maintain HA
 - Deployments/StatefulSets
 - affinity/anti-affinity
 - taints/tolerations
 - PodDisruptionBudgets
- Behavior is dependent on the maturity of the Operator
- Optional cluster components like Cluster Logging are well behaved during upgrades

The screenshot displays the Red Hat OpenShift Operator Management console. The left sidebar shows the navigation menu with 'Operator Management' selected. The main panel shows a table of installed operators with columns for Name, Namespace, Status, Channel, and Approval Strategy. A modal window is open, showing a detailed view of the operator's status.

NAME	NAMESPACE	STATUS	CHANNEL	APPROVAL STRATEGY
amq-streams	openshift-operators	Up to date	stable	Automatic
cockroachdb	openshift-operators	Up to date	stable	Automatic
codeready-workspaces	codeready	Up to date	final	Automatic
couchbase-enterprise-certified	robszumski-api-backend	Up to date	preview	Automatic

Modal window details:

STATUS	CHANNEL	APPROVAL STRATEGY
Up to date	stable	Automatic
Up to date	stable	Automatic

Build Operators for your apps

Helm Chart



Helm SDK



Build operators from
Helm chart, without any
coding

Ansible Playbooks
APBs



Ansible SDK



Build operators from
Ansible playbooks and
APBs

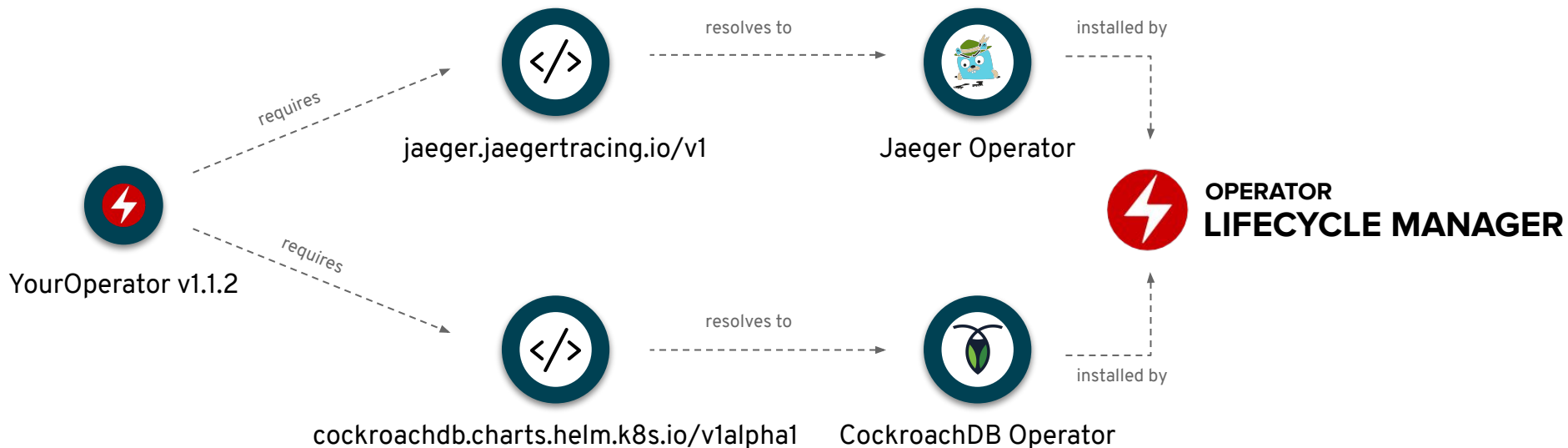
Go SDK



Build advanced operators
for full lifecycle
management

Depend on other Operators

Operator Framework Dependency Graphs



Red Hat Middleware

Same experience as 3.x for developers

- Admins install Service Brokers via OperatorHub
- Devs consume via Developer Catalog

Transitioning to Operators

- First Operators are out
 - AMQ Streams (Kafka)
 - Fuse Online
 - CodeReady Workspaces
 - Business Automation (Tech Preview)
 - Data Grid
- More to follow in 2019
 - Red Hat Integration - July:
 - AMQ Interconnect, AMQ Broker
 - 3scale API Management
 - Apicurio API Designer
 - Business Automation - July (GA)
 - Red Hat Application Runtimes
 - MW Component Operator - July



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