



What's New in OpenShift 4.1

Robert Sedor

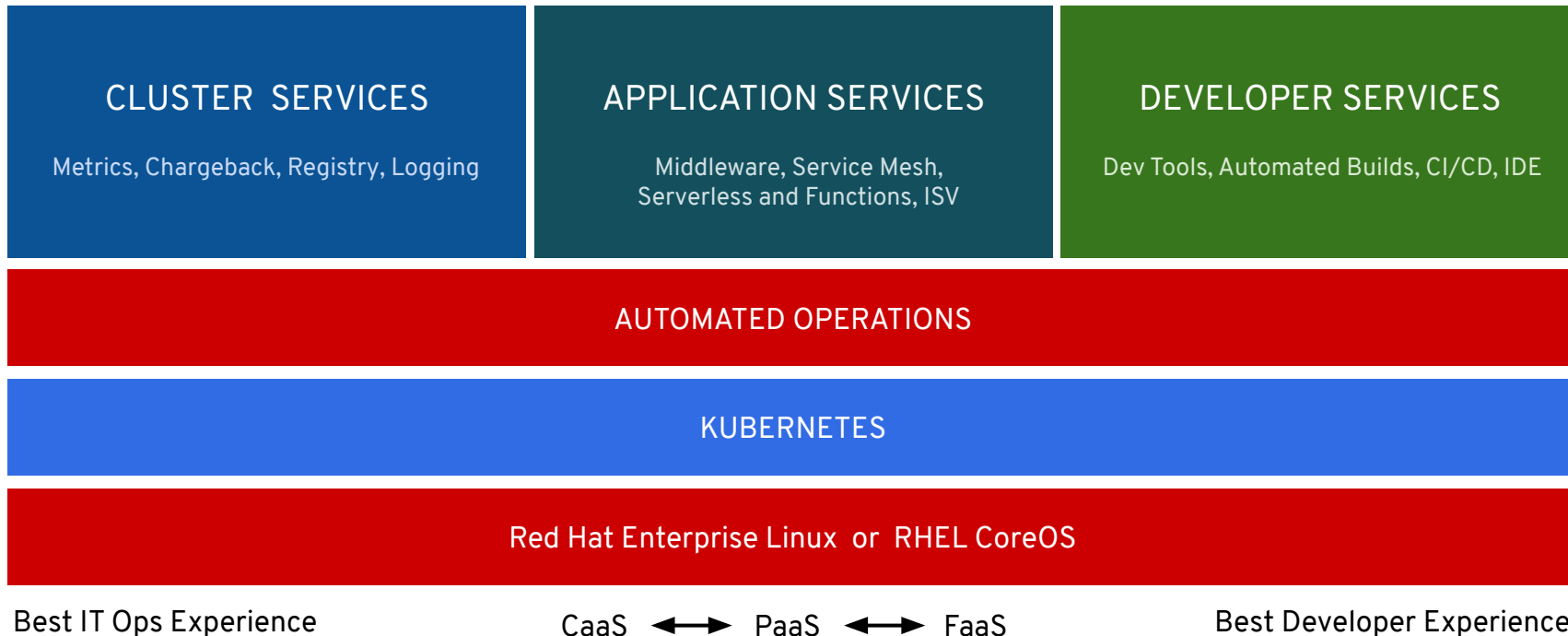
Senior Cloud Platform Architect

Amritpal Jhajj

Senior Solutions Architect

Principles of design and development

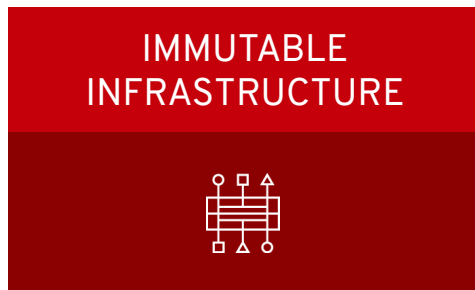
OpenShift 4 Platform



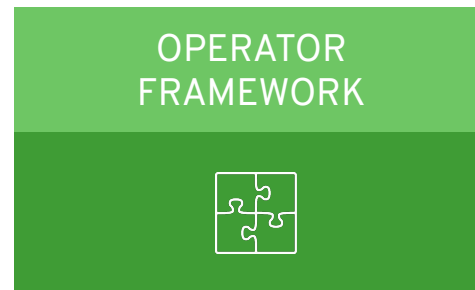
OpenShift 4.1 Workstreams Lifecycle



Installer + bootstrapping
Autoscale out of the box
MachineSet node pools



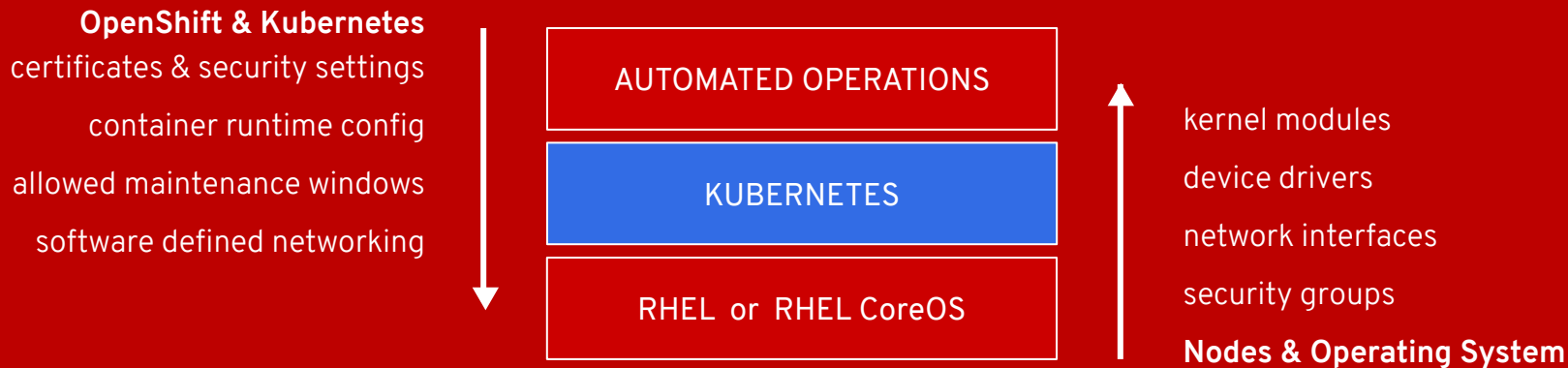
Red Hat Enterprise Linux CoreOS
Discourage SSH/node mutation
Ignition for Machine config



SDK & testing tools
OperatorHub for discovery
OLM delivers upper stack services

The New Platform Boundary

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



2019 Roadmap

Q2 CY2019 OpenShift 4.1	
DEV	<ul style="list-style-type: none">● OpenShift Serverless (Knative) - DP● OpenShift Pipelines (Tekton) - DP● CodeReady Workspaces - GA● CodeReady Containers - Alpha● Developer CLI (odo) - Beta
APP	<ul style="list-style-type: none">● OperatorHub● Operator Lifecycle Manager● Service Mesh (~2 month after)
PLATFORM	<ul style="list-style-type: none">● Kubernetes 1.13 with CRI-O runtime● RHEL CoreOS, RHEL7● Automated Installer for AWS● Pre-existing Infra Installer for Bare Metal, VMware, AWS● Automated, one-click updates● Multus (Kubernetes multi-network)● Quay v3
HOSTED	<ul style="list-style-type: none">● cloud.redhat.com - Multi-Cluster Mgmt● OCP Cluster Subscription Management● Azure Red Hat OpenShift● OpenShift Dedicated consumption pricing

Q3 CY2019 OpenShift 4.2	
DEV	<ul style="list-style-type: none">● Developer Console - GA● OpenShift Serverless (Knative) - TP● OpenShift Pipelines (Tekton) - TP● CodeReady Containers - GA● Developer CLI (odo) - GA
APP	<ul style="list-style-type: none">● GPU metering● OperatorHub Enhancements● Operator Deployment Field Forms● Application Binding with Operators● Application Migration Console
PLATFORM	<ul style="list-style-type: none">● Kubernetes 1.14 w/ CRI-O runtime● Disconnected Install and Update● Automated Installer for Azure, OSP, GCP● OVN Tech Preview● FIPS● Federation Workload API● Automated App cert rotation● OpenShift Container Storage 4.2
HOSTED	<ul style="list-style-type: none">● cloud.redhat.com - Multi-Cluster Deployment● Proactive Support Operator

Q4 CY19/Q1 CY20 OpenShift 4.3	
DEV	<ul style="list-style-type: none">● OpenShift Serverless (Knative) - GA● OpenShift Pipelines (Tekton) - GA
APP	<ul style="list-style-type: none">● Metering for Services● Windows Containers
PLATFORM	<ul style="list-style-type: none">● Kubernetes 1.15 w/ CRI-O runtime● Automated Installer for IBM Cloud, Alibaba, RHV, Bare Metal Hardware Appliance● Pre-existing Infra Installer for Azure, OSP, GCP● OVN GA w/ Windows Networking Integration
HOSTED	<ul style="list-style-type: none">● cloud.redhat.com - Subscription Mgmt Consumption Improvements

Installation and deployment

Installation Experiences

OPENSIFT CONTAINER PLATFORM

Full Stack Automated

Simplified opinionated “Best Practices” for cluster provisioning

Fully automated installation and updates including host container OS.



Pre-existing Infrastructure

Customer managed resources & infrastructure provisioning

Plug into existing DNS and security boundaries



HOSTED OPENSIFT

Azure Red Hat OpenShift

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

OpenShift Dedicated

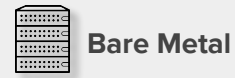
Get a powerful cluster, fully Managed by Red Hat engineers and support.

4.1 Supported Providers*

Full Stack Automated



Pre-existing Infrastructure



** Requires Internet connectivity; support for cluster-wide proxy & disconnected installation/updating tentatively planned for 4.2*

Red Hat Enterprise Linux

RED HAT® ENTERPRISE LINUX®

General Purpose OS

BENEFITS

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

WHEN TO USE

When customization and integration with additional solutions is required

RED HAT® ENTERPRISE LINUX CoreOS

Immutable container host

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

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.

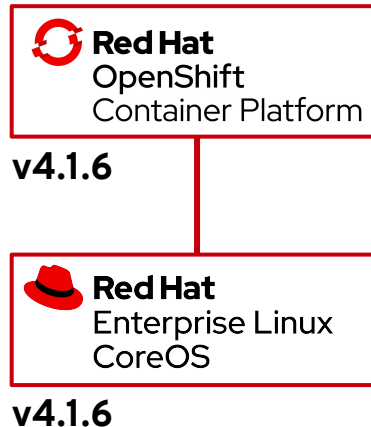
Red Hat Enterprise Linux CoreOS is managed by the cluster

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:

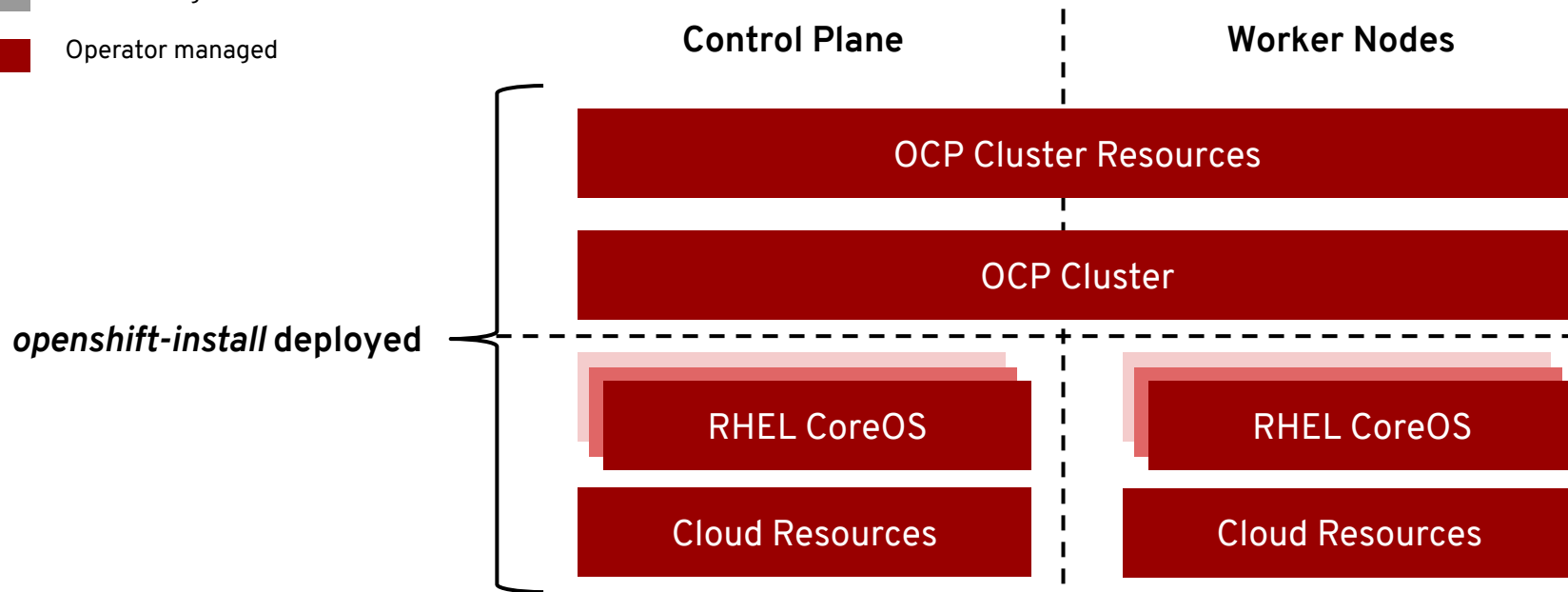
Nothing.



Full Stack Automated Deployments

Day 1: openshift-install - Day 2: Operators

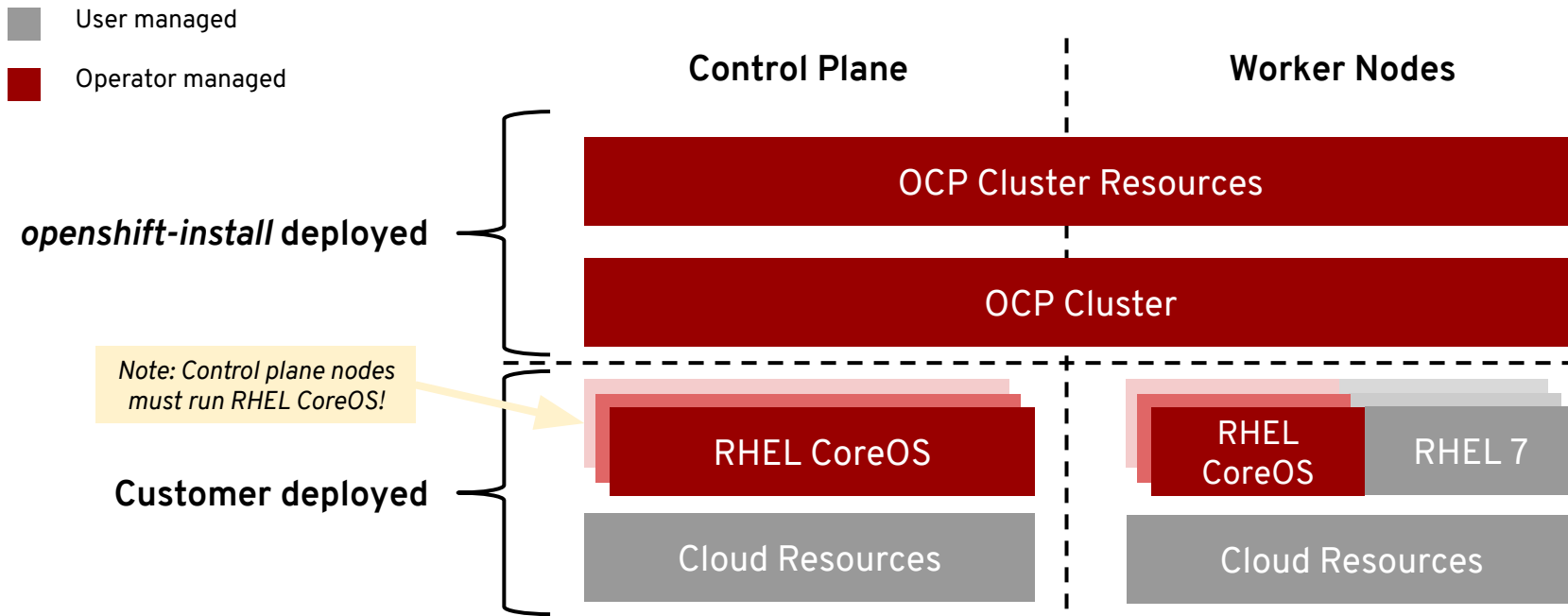
- User managed
- Operator managed



Generally Available

Deploying to Pre-existing Infrastructure

Day 1: openshift-install - Day 2: Operators + admin managed infra & workers



Deployment Comparison

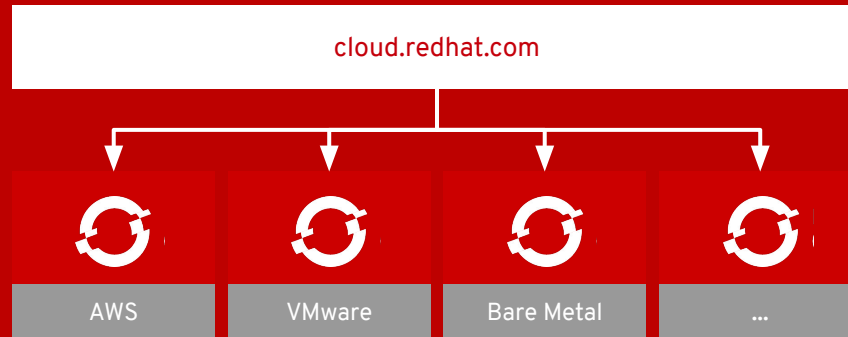
	Full Stack Automation	Pre-existing Infrastructure
Build Network	Installer	User
Setup Load Balancers	Installer	User
Configure DNS	Installer	User
Hardware/VM Provisioning	Installer	User
OS Installation	Installer	User
Generate Ignition Configs	Installer	Installer
OS Support	RHEL CoreOS	RHEL CoreOS + RHEL 7
Node Provisioning / Autoscaling	Yes	Only for providers with OpenShift Machine API support
Customization & Provider Support	AWS	AWS, Bare Metal, VMware

Generally Available

Management and administration

Cloud-like Simplicity, Everywhere

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



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

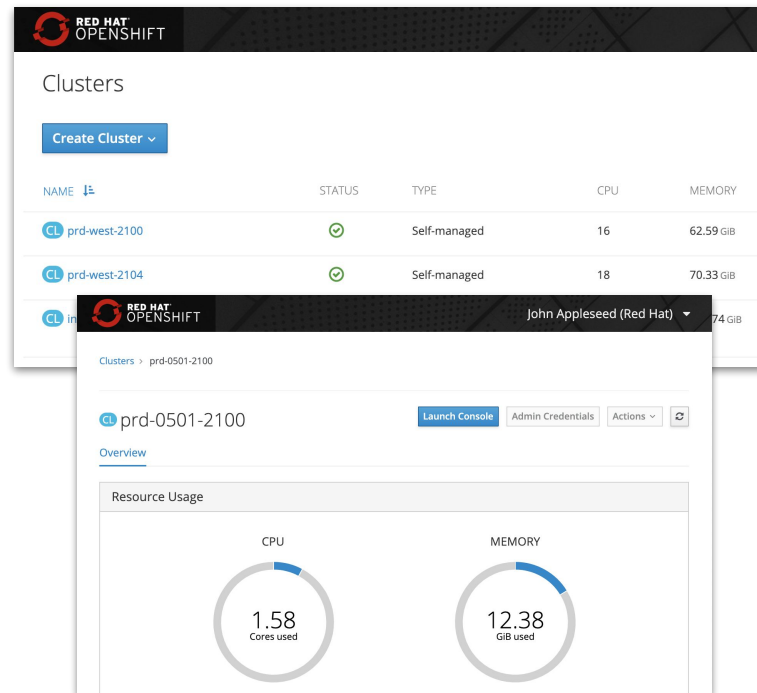
Self-service cluster deployment, scaling, and management for OpenShift Dedicated coming soon.

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.




OpenShift Subscription Management

Moves from node management to cluster management

Entitle clusters and not nodes. Nodes too dynamic. We do not block on usage. Requires telemeter Opt-In.

Dynamically adds and removes nodes

UHC will dynamically add and remove nodes from your subscription allocations to the cluster in 24 hour intervals. This will move to instantaneous across the next several releases.

 **This cluster is overcommitting resources.**
Please check the [Red Hat Customer Portal](#) to make sure all clusters are covered by subscriptions and [contact sales](#) if required.
Last checked: 5/19/2019, 2:20:00 AM

Connected to the same backend as Subscription Portal and Satellite


Allocation numbers you see at cloud.redhat.com for OCP can be also seen on the subscription portal at access.redhat.com

Removes OCP Infrastructure from the count

UHC will figure out which pods are your OCP infra pods and subtract out their usage from your core count so you are not charged.

Systems

Below is a list of systems for this account.

	Name
<input type="checkbox"/>	 ebl21bfl-aa59-422a-a417-2e5fca7ffd4

Show entries

Graphical Re-configuration

Global Configuration

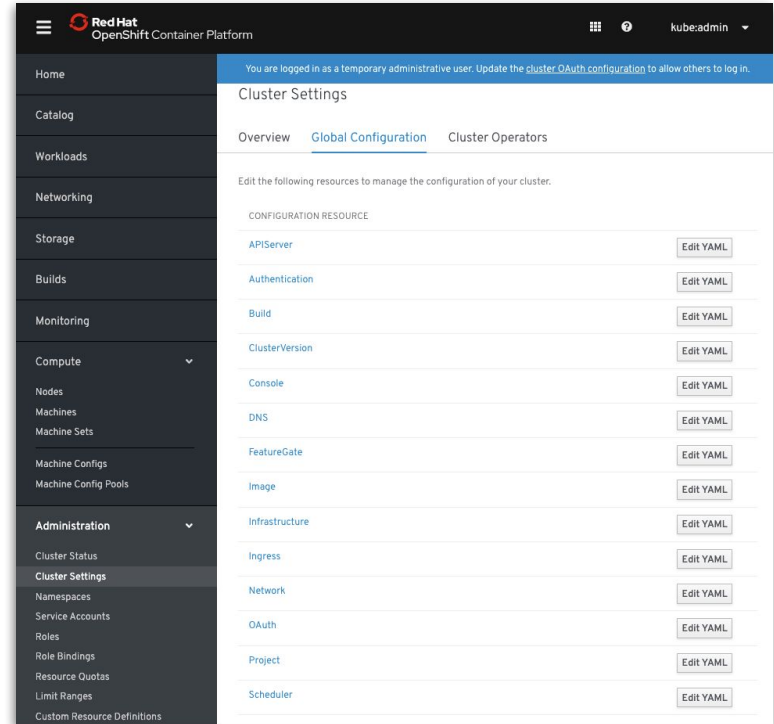
You complete most of the cluster configuration and customization after you deploy your OpenShift Container Platform cluster.

Change via Cluster Settings screen

Once you have discovered your desired settings, changes can be made via console or CLI.

Operators apply these updates

One or more Operators are responsible for propagating these settings through the infrastructure



Network Configuration

Example #1: Operator-Assisted Ingress Sharding

In 4.1, the way you create a sharded router is different (API call versus `oc adm` command). A simple config (example to right), implemented by the ingress operator, automatically integrates sharding with the external (front-end) DNS/LB configured at install-time.

```
apiVersion: operator.openshift.io/v1
kind: IngressController
metadata:
  namespace: openshift-ingress-operator
  name: internal-apps
spec:
  domain: internal-apps.dmace.devcluster.openshift.com
  routeSelector:
    matchLabels:
      environment: internal
```

Example #2: Create a Second Router

Ingress controller configuration is now a first-class object, meaning additional Ingress controllers can be created by making multiple Ingress objects. This is the preferred method for giving teams their own subdomains, replacing the `oc adm` method (see right).

```
$ cat <<EOF | oc create -f -
apiVersion: operator.openshift.io/v1
kind: IngressController
metadata:
  namespace: openshift-ingress-operator
  name: finance-apps
spec:
  domain: finance-apps.openshift.example.com
EOF
```

Configuring an Identity Provider

The Cluster Authentication Operator

- Use the *cluster-authentication-operator* to configure an Identity Provider. The configuration is stored in the *oauth/cluster* custom resource object inside the cluster.
- Once that's done, you may choose to remove *kubeadmin* (warning: there's no way to add it back).
- All the identity providers supported in 3.11 are supported in 4.1: LDAP, GitHub, GitHub Enterprise, GitLab, Google; OpenID Connect, HTTP request headers (for SSO), Keystone, Basic authentication.
- For more information:
[Understanding identity provider configuration cluster-authentication-operator](#)

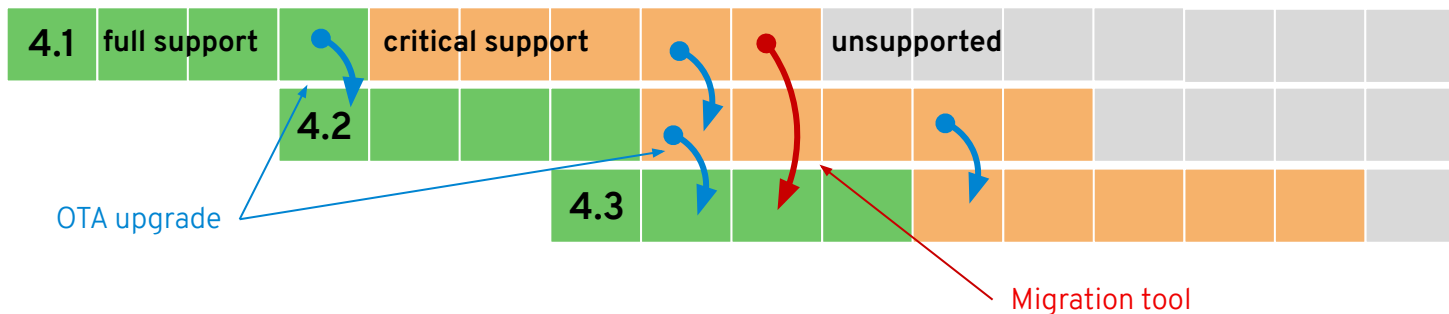
Sample identity provider CR

```
apiVersion: config.openshift.io/v1
kind: OAuth
metadata:
  name: cluster
spec:
  identityProviders:
  - name: my_identity_provider 1
    mappingMethod: claim 2
    type: HTPasswd
    htpasswd:
      fileData:
        name: htpass-secret 3
```

- 1 This provider name is prefixed to provider user names to form an identity name.
- 2 Controls how mappings are established between this provider's identities and user objects.
- 3 An existing secret containing a file generated using [htpasswd](#).

OpenShift 4 Upgrades

** Hypothetical timeline for discussion purposes*



OTA Upgrades

Works between two minor releases in a serial manner.

Happy path = migrate through each version

On a regular cadence, migrate to the next supported version.

Optional path = migration tooling

If you fall more than two releases behind, you must use the application migration tooling to move to a new cluster.

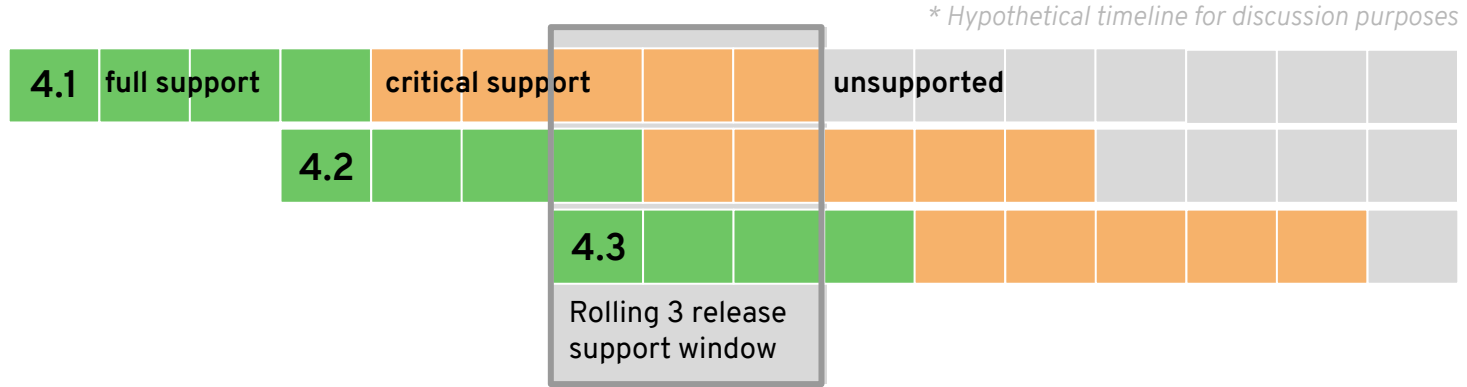
Current minor release

Full support for all bugs and security issues
1 month full support overlap with next release to aid migrations

Previous minor release

Fixes for critical bugs and security issues for 5 months

OpenShift 4 Lifecycle



New model

Release based, not date based. Rolling three release window for support.

The overall 4 series will be supported for at least three years

- Minimum two years full support (likely more)
- One year maintenance past the end of full support

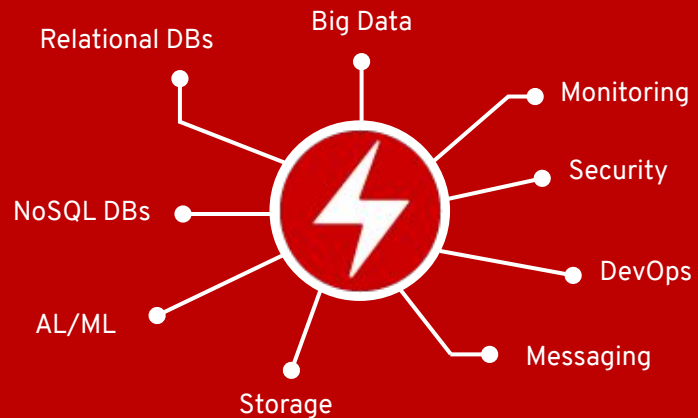
EUS release planned

Supported for 14 months of critical bug and critical security fixes instead of the normal 5 months. If you stay on the EUS for its entire life, you must use the application migration tooling to move to a new cluster

Deploying applications

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



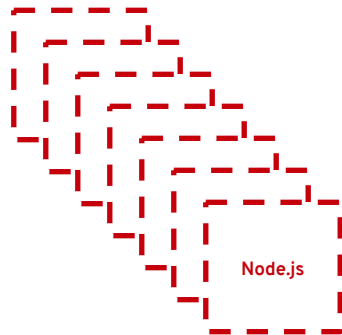
STORAGE



Red Hat Universal Base Image



Base Images

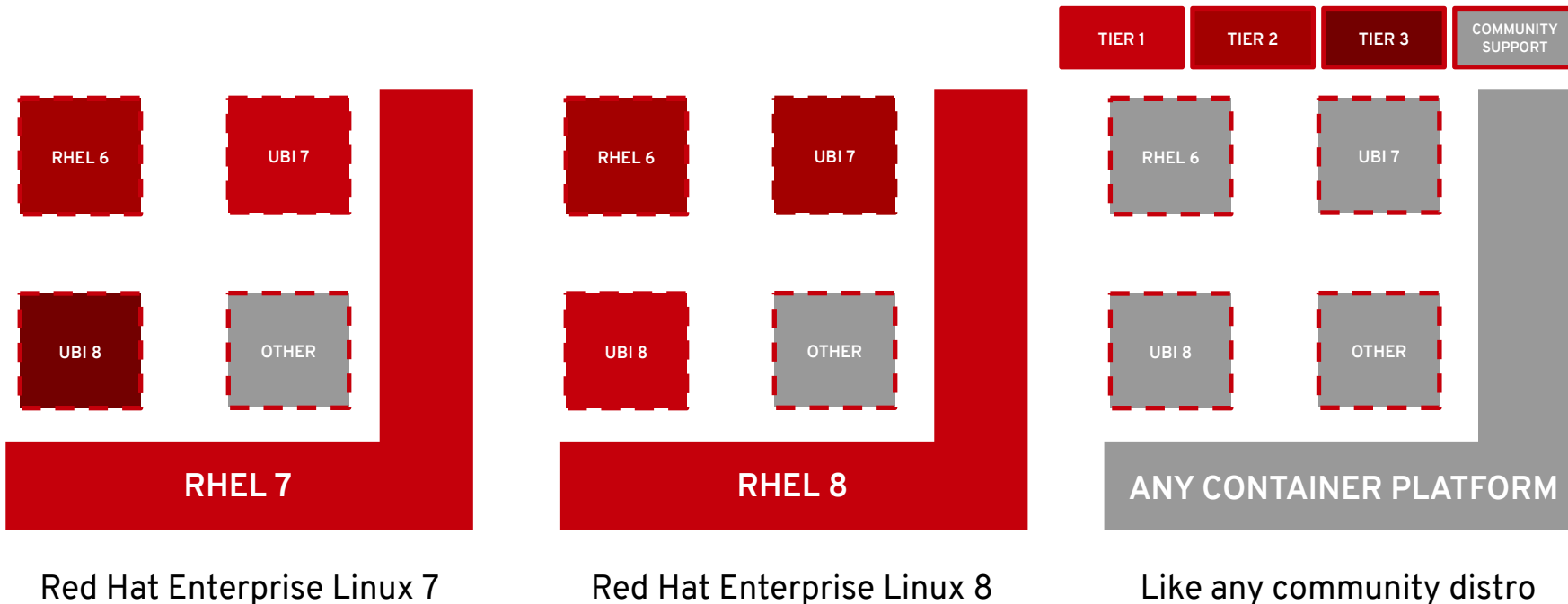


Pre-Built Language Images



Package Subset

Universal Base Image Compatibility and Support

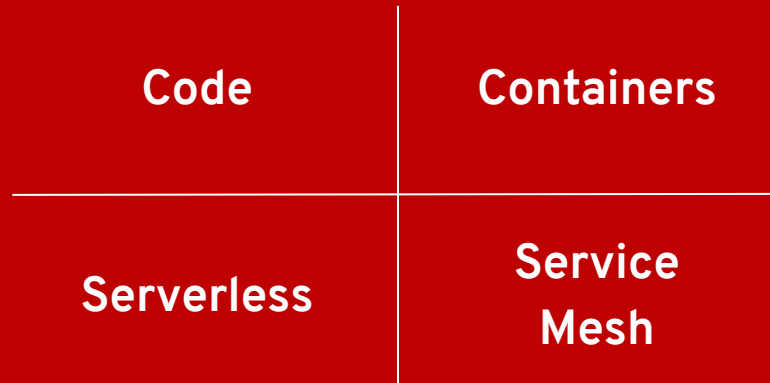


Generally Available

Developer and application tools

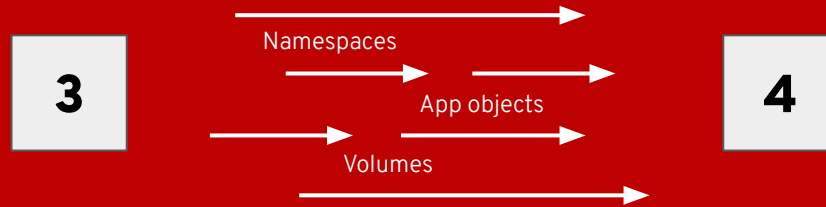
Next wave of developer tools*

OpenShift has all of the latest tools to make
your devs more productive



Migrating to OpenShift 4

Tooling and advice for moving from OpenShift 3.x to 4.x



App migration experience

Open source tooling based on Velero

What's moved during a migration

- Namespaces
- Persistent Volumes (move or copy)
- All important resource objects (Deployments, StatefulSets, etc)

Available in OpenShift 4.2

Customers are anxious to get their hands on this, but we want to get it right. We would love to receive sample application workloads to test.

The screenshot displays the 'Migration Plan Wizard' interface. The top section is titled 'Migration Plan Wizard' with the subtitle 'Create a migration plan'. Below this, there is a progress indicator with five steps: 1. General, 2. Migration Source (highlighted), 3. Persistent Volumes, 4. Migration Targets, and 5. Results. The 'Migration Source' step shows a 'Source Cluster' dropdown menu set to 'Summit Demo Source Cluster'. Below this, there is a section 'Select projects to be migrated:' with a table listing projects: 'robot-shop' (checked) and 'sandbox' (unchecked). The bottom part of the screenshot shows a table of 'Migration Plans' with columns: Name, Migrations, Source, Target, Repository, Persistent Volumes, and Last Status. Two plans are listed: 'demo plan' and 'demo2', both with 2 migrations, source 'Summit Demo Source Cluster', target 'Target cluster', repository 'mydemobucket', and status 'Migrated Success'.

Name	Migrations	Source	Target	Repository	Persistent Volumes	Last Status
demo plan	2	Summit Demo Source Cluster	Target cluster	mydemobucket	2	Migrated Success
demo2	2	Summit Demo Source Cluster	Target cluster	mydemobucket	2	Migrated Success

Why did we choose this migration strategy?

Reducing risk

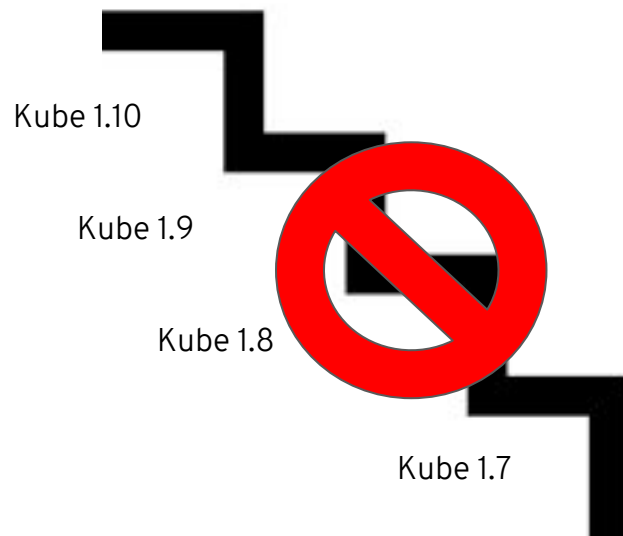
A ton of innovation went into OpenShift 4, and an in-place upgrade would have risk of failure in which there is no forwards or backwards remediation. It allows you to skip from 3.7/3.9/3.10/3.11 to 4.x.

Useful for 4-to-4 migrations

A general migration tool is frequently requested and a better long term investment. Build a foundation towards making your clusters less fragile.

Allows for staging

Stage a mock migration before doing it live, on a Project by Project basis. Extremely useful for preparing to succeed.



Hosted OpenShift

Get the best of OpenShift without being on call



Hosted OpenShift Benefits

OPENS SHIFT CONTAINER PLATFORM

Full Stack Automated	Pre-existing Infrastructure
Skip the on-call rotation	
Red Hat engineers keep you up to date	
Expand capacity without hassle	

HOSTED OPENS SHIFT

Azure Red Hat OpenShift	OpenShift Dedicated
Deploy directly from the Azure console	Powerful cluster, no maintenance needed
Jointly managed by Red Hat and Azure engineers	Managed by Red Hat engineers and support
Free your team from the distraction of ops	Free your team from the distraction of ops

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.



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