



OpenShift 4.x Roadmap

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AGENDA

OpenShift 4 is Awesome (Themes and Roadmap)

Install & Upgrades

Day 2 & Multi-Cluster Management

Networking

Storage

Security

The Console

Enabling Developers

Cloud Native Development - Service Mesh, Serverless, Pipelines, CodeReady

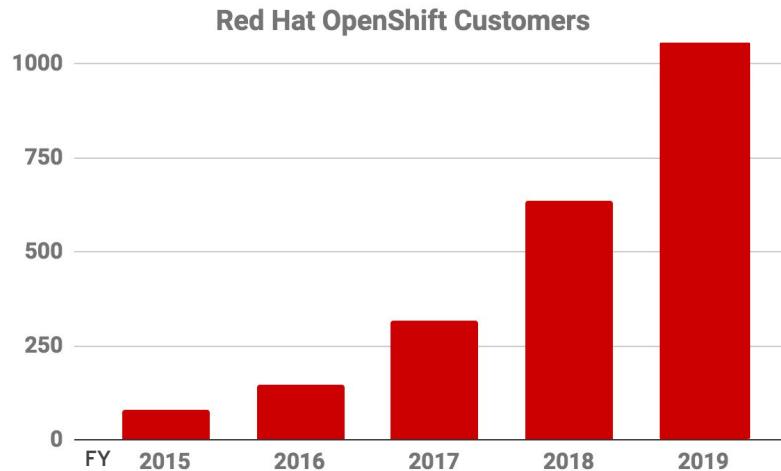
Quay

Container Native Virtualization

Migration Plans

OpenShift is gaining momentum

...with more than 1000 customers, worldwide



What OpenShift Does



531%
5-year ROI

66%

Faster development
life cycle

36%

More applications
per year

8 MONTHS

Payback
period

US\$1.29M

Average annual
benefits per
100 developers

The Business Value of Red Hat OpenShift, IDC #US41845816, October 2017,
<https://www.redhat.com/en/resources/The-Business-Value-of-Red-Hat-OpenShift>.

Customers are innovating with Openshift

...in every industry, worldwide.



FINANCIAL SERVICES



HEALTHCARE

DAIMLER



AUTOMOTIVE

KOHL'S



RETAIL

Lufthansa Technik



amADEUS



LOGISTICS



TRAVEL

Hilton

Marriott
HOTELS & RESORTS

HOSPITALITY

Disney

T-Mobile

sky

TELUS

MEDIA | TELCO

Red Hat

Customers use OpenShift for...



MODERNIZE APPS



WEB APPS



CLOUD NATIVE DEV



MULTI-CLOUD



MOBILE



BIG DATA | ANALYTICS



AI | ML



IOT





10x

Increased application development throughput from 20 to 200 changes a day

OpenShift on AWS & private cloud

The Hilton logo, featuring the word "Hilton" in a large, bold, serif font inside a black rectangular border.

Months → Days

Improved time to market by accelerating development time

OpenShift on AWS

50%

Reduction in development time for new services and APIs. Launched a new cloud platform in 10 days

OpenShift on AWS, Azure, & private cloud



Source:

Cathay Pacific: Red Hat press release, [Cathay Pacific Takes Customer Experiences to New Heights with Red Hat's Hybrid Cloud Technologies](#), May 2018.

Hilton: Red Hat case study, [Hilton enhances digital guest experience with Red Hat container and automation technology](#), October 2018.

Schiphol: Red Hat case study, [Amsterdam Airport Schiphol builds agile cloud with Red Hat](#), August 2017.



Value of OpenShift

Monitoring, Logging,
Registry, Router, Telemetry

Cluster Services

Service Mesh, Serverless,
Middleware/Runtimes, ISVs

Application Services

Dev Tools, CI/CD,
Automated Builds, IDE

Developer Services

Automated Operations

Kubernetes

Red Hat Enterprise Linux | RHEL CoreOS

Best IT Ops Experience

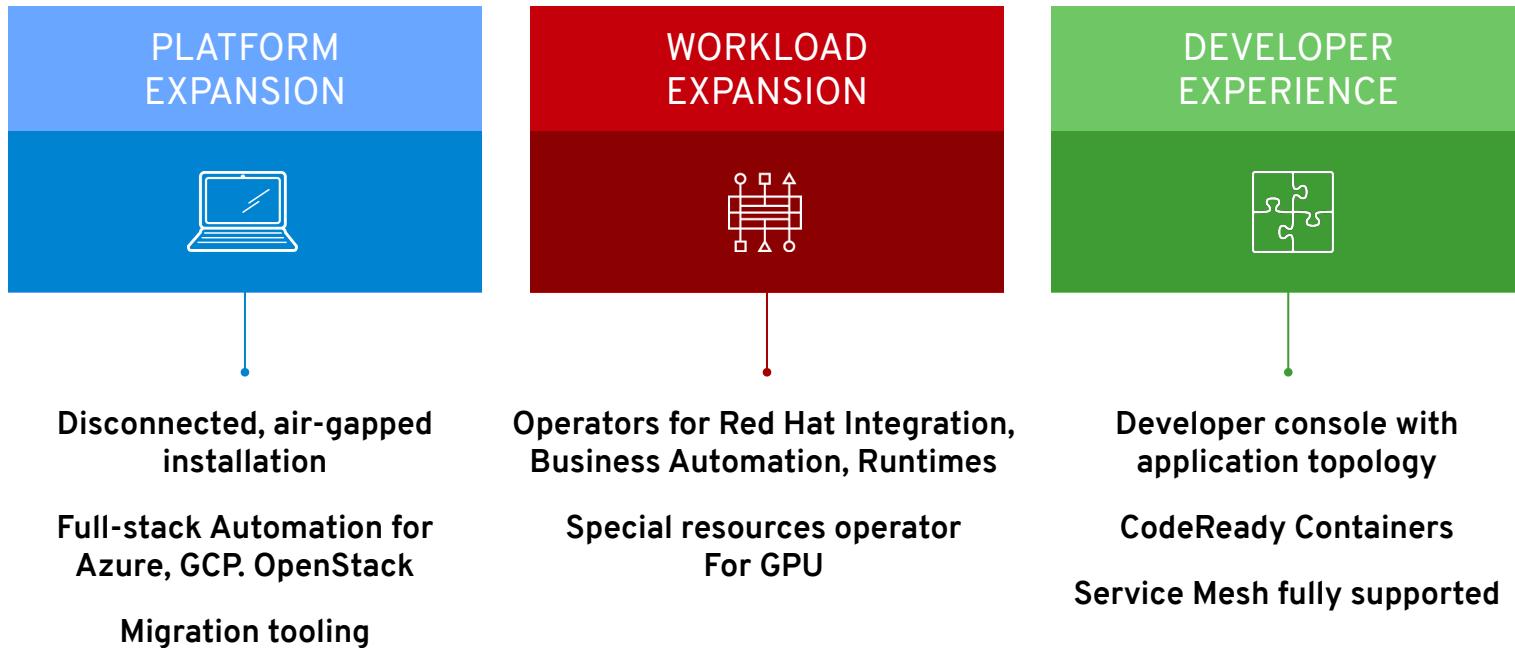
CaaS \longleftrightarrow PaaS \longleftrightarrow FaaS

Best Developer Experience

OPENSHIFT ROADMAP

Q3 CY2019 OpenShift 4.2		Q1 CY2020 OpenShift 4.3		CY2020 OpenShift 4.4+	
HOSTED	PLATFORM	HOSTED	PLATFORM	HOSTED	PLATFORM
HOSTED	PLATFORM	HOSTED	PLATFORM	HOSTED	PLATFORM
	<ul style="list-style-type: none">Developer Console GAOpenShift Serverless (Knative) - TPOpenShift Pipelines (Tekton) DP3CodeReady Containers GADeveloper CLI (odo) GA		<ul style="list-style-type: none">OpenShift Pipelines (Tekton) TPHelm 3 TP		<ul style="list-style-type: none">OpenShift Serverless (Knative) GAGuided application creationOpenShift Pipelines (Tekton) GAHelm 3 GA
	<ul style="list-style-type: none">OperatorHub EnhancementsOperator Deployment Field FormsApplication Migration Console		<ul style="list-style-type: none">Metering for ServicesWindows Containers (Planned)GPU MeteringApplication Operator Binding - DP		<ul style="list-style-type: none">Monitor application workloadsSimplify OLM interactionsImproving native developer console for monitoring and troubleshooting
	<ul style="list-style-type: none">Kubernetes 1.14 w/ CRI-O runtimeDisconnected Install and UpdateAutomated Installer for Azure, GCP, & OSPPre-existing Infra Installer for GCPCluster-wide Egress ProxyOVN Tech PreviewOpenShift Container Storage 4.2 (1 month after)		<ul style="list-style-type: none">Kubernetes 1.16 w/ CRI-O runtimePrivate/Internal Clusters support from the installerDeploy to pre-existing VPC & SubnetsFIPSPre-existing Infra Installer for Azure (4.3.z)OpenShift Container Storage 4.3		<ul style="list-style-type: none">OVN GA w/ Windows Networking Integration (Planned)Windows Containers GAMulti-cluster summary dashboardsCentralized cluster updatesCompliance operatorNode problem detectorIPv6 (single/dual on control plane)HTTP/2 SupportCSI certification suite
	<ul style="list-style-type: none">Insights OperatorAzure Red Hat OpenShift new features (monitoring, logging)		<ul style="list-style-type: none">Subscription Mgmt Improvements (cloud.redhat.com)Azure Red Hat OpenShift new features (private clusters)Azure Red Hat OpenShift preview of 4.xOSD on Google Cloud preview on 4.x		<ul style="list-style-type: none">Enhanced consumption buildingRegulatory complianceMachine autoscalingGoogle cloud platform

OpenShift 4.2



OpenShift 4.3



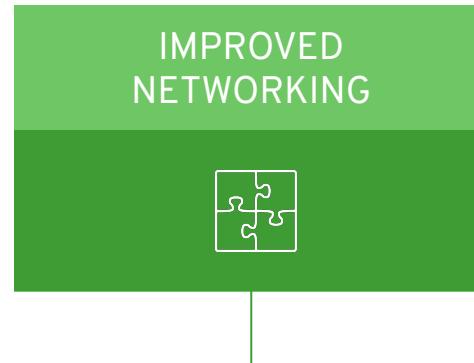
INSTALLER CUSTOMIZATION

- Improvements for disconnected Internal facing/private clusters
- Customer provisioned VPC/VNet/etc and subnets



SECURITY & COMPLIANCE

- FIPS validated crypto
- Disk encryption for RHCOS
- Encrypted etcd datastore
- Kubernetes 1.16



IMPROVED NETWORKING

- High performance multicast to clients outside cluster
- SR-IOV graduates to GA
- Additional monitoring for OVN

OpenShift 4.4

Initiatives



Telecom Edge



Multi-Cluster



Stabilize the platform



Drive Workload and Usage

Address needs of rapidly emerging Telco 5G Edge use cases, in a manner that can be leveraged for other Edge use cases in future.

Architectural components designed to work with MCM and other open source views into multiple clusters.

Fine tune delivering IaaS platforms. Create new deployment patterns that mix a hosted and on premise customer needs.

Deliver the best combination of next generation developer experiences on innovative open source technologies found in the cloud native ecosystem.

Install & Upgrades

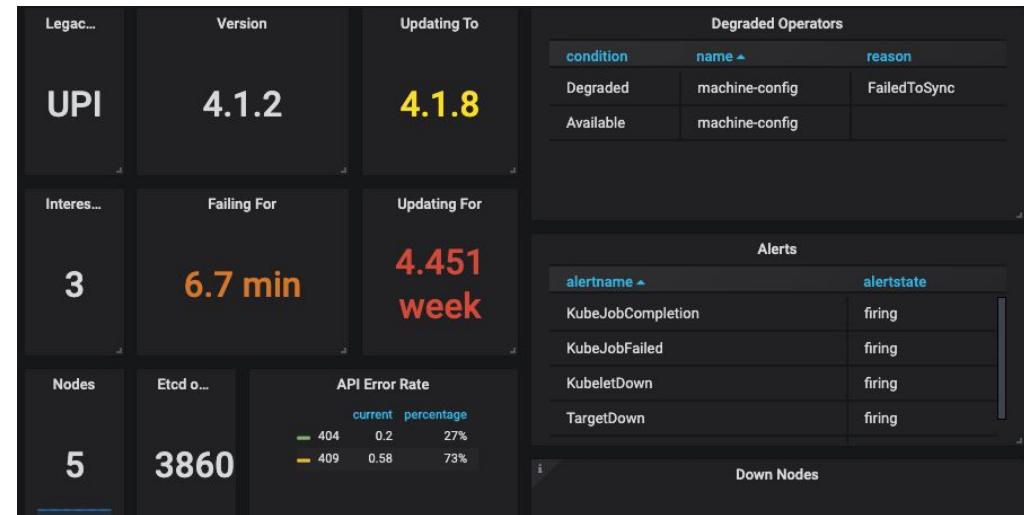
Connected Customer

Proactive support for customer issues

- Active upgrades
- Overall cluster health
- Firing alerts
- Node health

Driving a high quality product

- Monitor and improve upon the health of the customer base
- Prioritize engineering roadmap for platforms and prove they are improving over time
- Active monitoring of fast and stable channels



Provider Roadmap & Minimum Supported Version

Provider	Full Stack Automation (Installer provisioned infra)	Pre-existing Infrastructure (User provisioned infra)
 amazon web services	4.1	4.1
 Microsoft Azure	4.2	4.3+ (z-stream)
 Bare Metal	4.4*	4.1
 Google Cloud Platform	4.2	4.2
 RED HAT OPENSTACK PLATFORM	4.2	4.4
 RED HAT VIRTUALIZATION	4.4	4.5
 vmware vSphere	4.5	4.1
IBM Z	-	4.2+ (z-stream)
IBM Power Systems 	-	4.3+ (z-stream)
 Alibaba Cloud	4.6*	-

Smarter, Easier Upgrades

Maintenance window for entire cluster

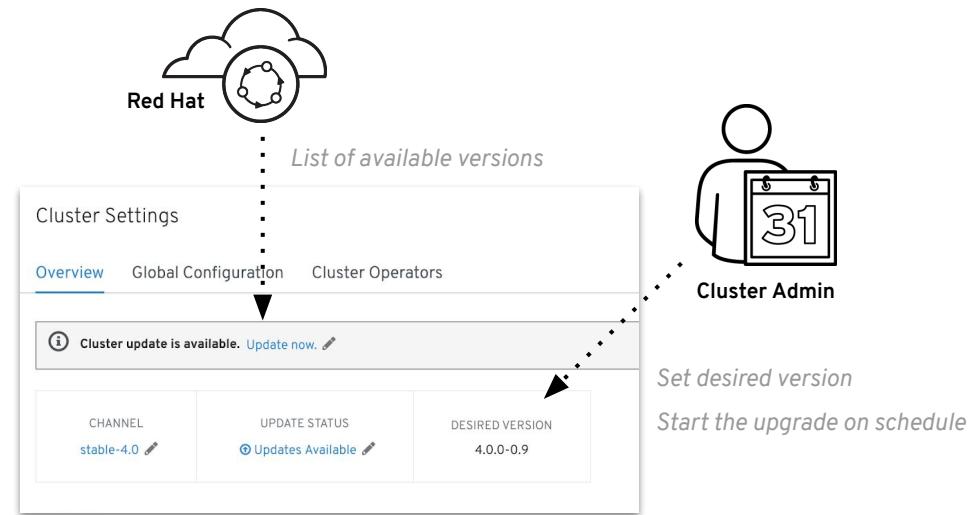
No need for separate windows for each component

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



Smarter, Easier Upgrades

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 upgrades

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

MCP master

Actions ▾

Overview YAML Machine Configs

Machine Config Pool Overview

TOTAL MACHINE COUNT	READY MACHINES	UPDATED COUNT	UNAVAILABLE COUNT
3 machines	3 machines	3 machines	0 machines

NAME
master

LABELS
`operator.machineconfiguration.openshift.io/required-for-upgrade`

ANNOTATIONS
0 Annotations

MACHINE CONFIG SELECTOR
`Q machineconfiguration.openshift.io/role=master`

MAX UNAVAILABLE MACHINES

CURRENT CONFIGURATION
`rendered-master-00f9f856e5d70de83181691a5711019a`

CURRENT CONFIGURATION SOURCE

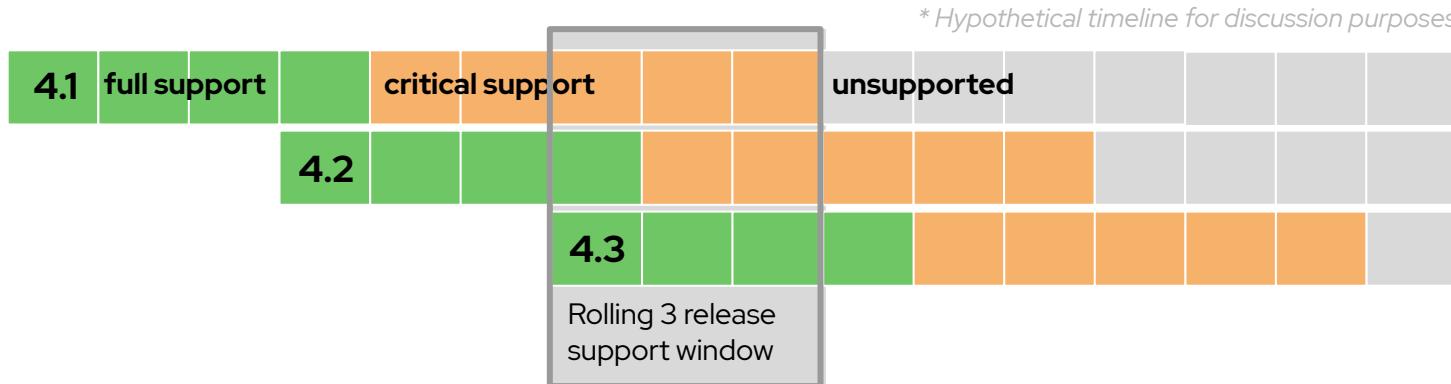
- `00-master`
- `01-master-container-runtime`
- `01-master-kubelet`
- `99-master-c3a87158-6aa3-11e9-9e74-06fb310be02-registries`
- `99-master-ssh`

Cluster Upgrades

OCP 4.3 includes three cluster upgrade channels:

- candidate-4.3
 - Should be used to test features coming up in new releases
 - Ideal for **test** environment
- fast-4.3
 - This channel will be updated with new 4.3 patch versions as soon as GA.
- stable-4.3
 - This channel will be updated with new 4.3 patch versions on a time delay by design. This allows Red Hat's SREs to receive feedback from connected environments. If issues are found, then upgrades to it are blocked in both stable and fast channels. New versions on both channels are updated as soon as fixes are in place.

OpenShift 4 Lifecycle



New model

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

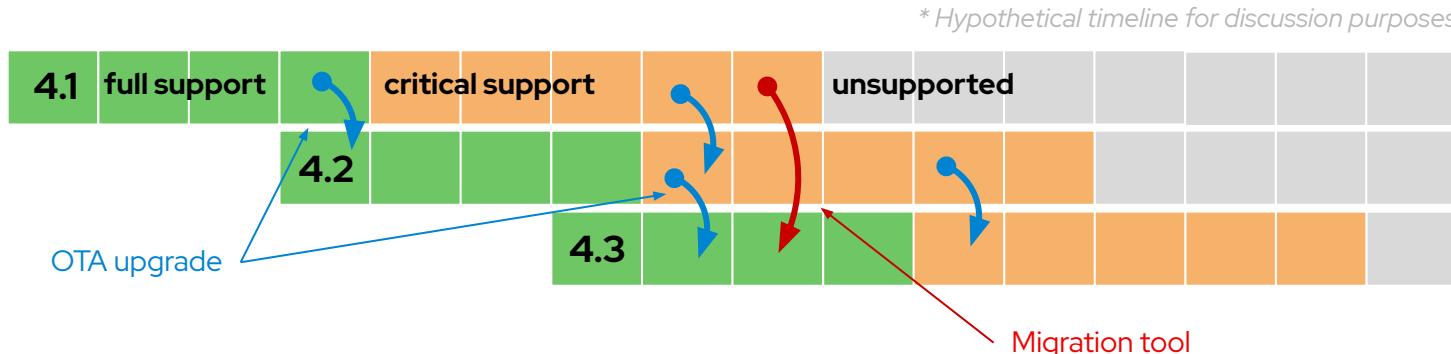
The overall 4 series will be supported for at least three years

- 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

OpenShift 4 Upgrades



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

Install / Upgrade Roadmap

GENERAL

Near Term (4.3)

- Internal/private facing clusters
- Pre-existing VPC/VNet & subnets

PROVIDERS

- Installer provisioned infrastructure:
 - IBM Power Systems (4.3.z)
- Support for additional AWS regions
 - *eu-north-1*(Stockholm)

Mid Term (4.4)

- MachineSet managed control plane
- Compact 3-node clusters
- Improvements to disconnected user experience

Long Term (4.5+)

- Installer appliance & graphical UI
- Improvements to user provisioned process
- Process for how updates get applied to multiple clusters in a disconnected environments

- Installer provisioned infrastructure:
 - RHV, Bare Metal
- Pre-existing infrastructure:
 - Azure, OpenStack (OSP)
- AWS GovCloud deployment guide

- Installer provisioned infrastructure:
 - Alibaba, VMware
- Pre-existing infrastructure:
 - RHV
- Support for AWS & Azure custom endpoints and additional regions

Day 2 & Multi-Cluster Management

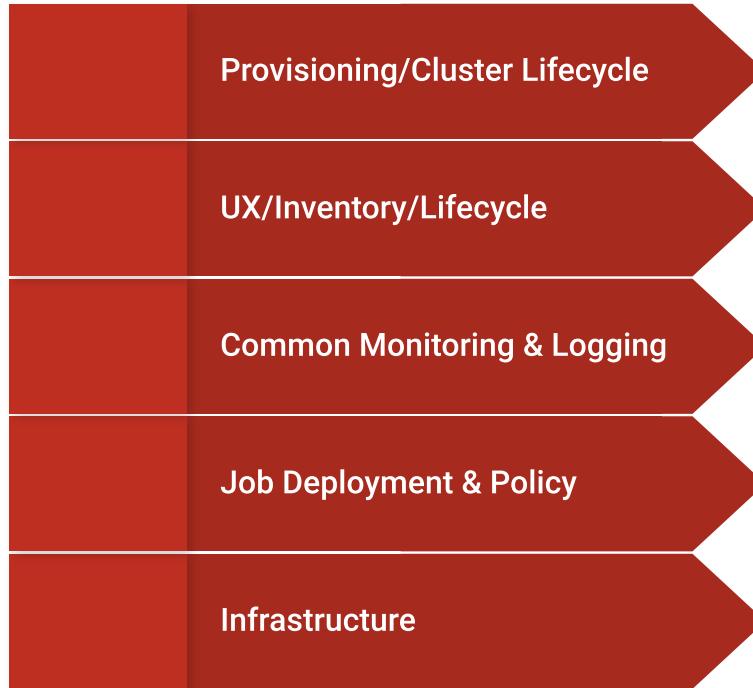


Machine Health Checking

- Machine Health Checking (aka Node Autorecovery) GA
 - Automatically repair damaged machines in a machine pool
 - Opt in i.e. you need to set this up
 - Can't apply to a Master node
- Setup via creating a machine health check resource
 - define the node conditions you want to monitor for
 - a specific pool of machines
 - the max unhealthy allowed.
- In Action
 - A Machine Health check fail means automatic deletion of the machine.
 - Draining and deletion of the backing node.
 - Recreation of a new machine.

```
apiVersion: machine.openshift.io/v1
kind: MachineHealthCheck
metadata:
  name: example
  namespace: openshift-machine-api
spec:
  selector:
    matchLabels:
      role: worker
  unhealthyConditions:
    - type: "Ready"
      status: "Unknown"
      timeout: "300s"
    - type: "Ready"
      status: "False"
      timeout: "300s"
      maxUnhealthy: "40%"
  status:
    currentHealthy: 5
    expectedMachines: 5
```

PATH TO MULTI-CLUSTER - FOCUS AREAS



GitOps with ArgoCD

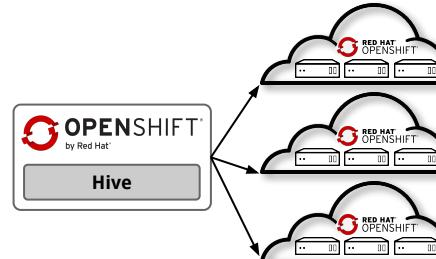
- OpenShift cluster configs with ArgoCD
 - Cluster config CRs (identify provider, registry, etc)
 - Operator installation via OLM
- Multiple clusters with single GitHub repo
 - Shared configs
 - Cluster-specific configs
- ArgoCD Operator



argo

OpenShift Hive

- API driven OpenShift 4 cluster provisioning and management
- Hive is an operator that runs on top of OpenShift
- Used to provision and perform initial configuration of OpenShift clusters
- Working code & documentation available upstream:
 - <https://github.com/openshift/hive>



OpenShift 4.4

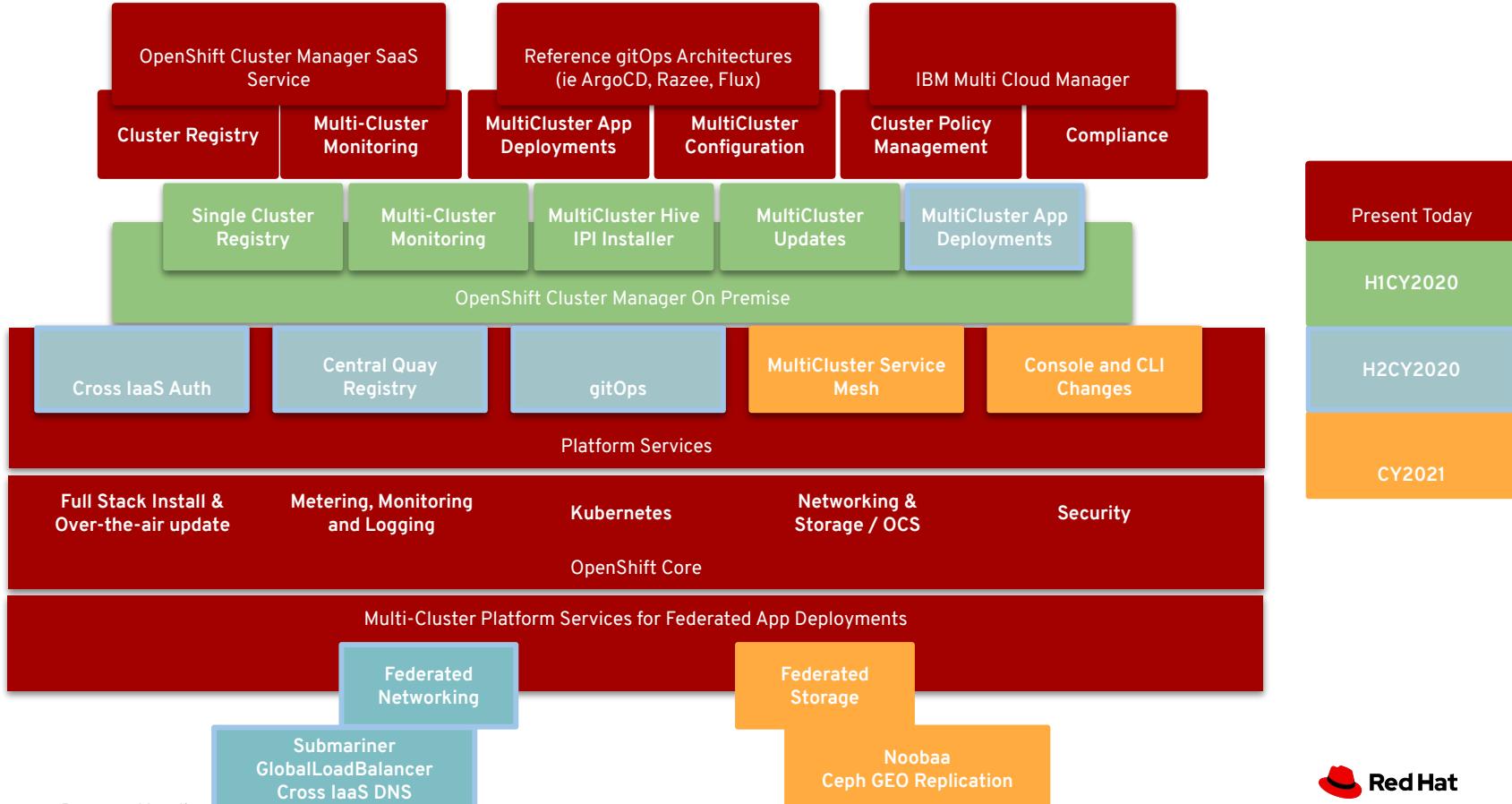
- Initial GA release
- Support for provisioning clusters on AWS, Azure, and GCP

OpenShift 4.5

- On-premise OpenShift Cluster Manager (OCM) front-end

```
80 - apiVersion: hive.openshift.io/v1alpha1
81 kind: ClusterDeployment
82 metadata:
83   labels:
84     controller-tools.k8s.io: "1.0"
85   annotations:
86     hive.openshift.io/delete-after: "8h"
87     hive.openshift.io/try-install-once: "${TRY_INSTALL_ONCE}"
88   name: ${CLUSTER_NAME}
89 spec:
90   platformSecrets:
91     aws:
92       credentials:
93         name: "${CLUSTER_NAME}-aws-creds"
94     images:
95       hiveImage: "${HIVE_IMAGE}"
96       hiveImagePullPolicy: "${HIVE_IMAGE_PULL_POLICY}"
97       installerImage: "${INSTALLER_IMAGE}"
98       installerImagePullPolicy: "${INSTALLER_IMAGE_PULL_POLICY}"
99       releaseImage: "${OPENSHIFT_RELEASE_IMAGE}"
100      sshKey:
101        name: "${CLUSTER_NAME}-ssh-key"
102      clusterName: ${CLUSTER_NAME}
103      baseDomain: ${BASE_DOMAIN}
104    networking:
105      type: OpenshiftSDN
106      serviceCIDR: "172.30.0.0/16"
107      machineCIDR: "10.0.0.0/16"
108      clusterNetworks:
109        - cidr: "10.128.0.0/14"
110          hostSubnetLength: 9
111    platform:
112      aws:
113        region: us-east-1
114      pullSecret:
115        name: "${CLUSTER_NAME}-pull-secret"
```

Multi-Cluster Platform Services



OpenShift Cluster Manager

Enablement for OpenShift Dedicated and Red Hat services

- OpenShift Dedicated support for add-on services (Service Mesh, CodeReady workspaces, and more), advanced network configuration, and bring your own cloud (BYOC)
- Data upload/import for disconnected OCP clusters
- Integration with cloud.redhat.com Cost Management service
- Core operator health status reported on monitoring tab

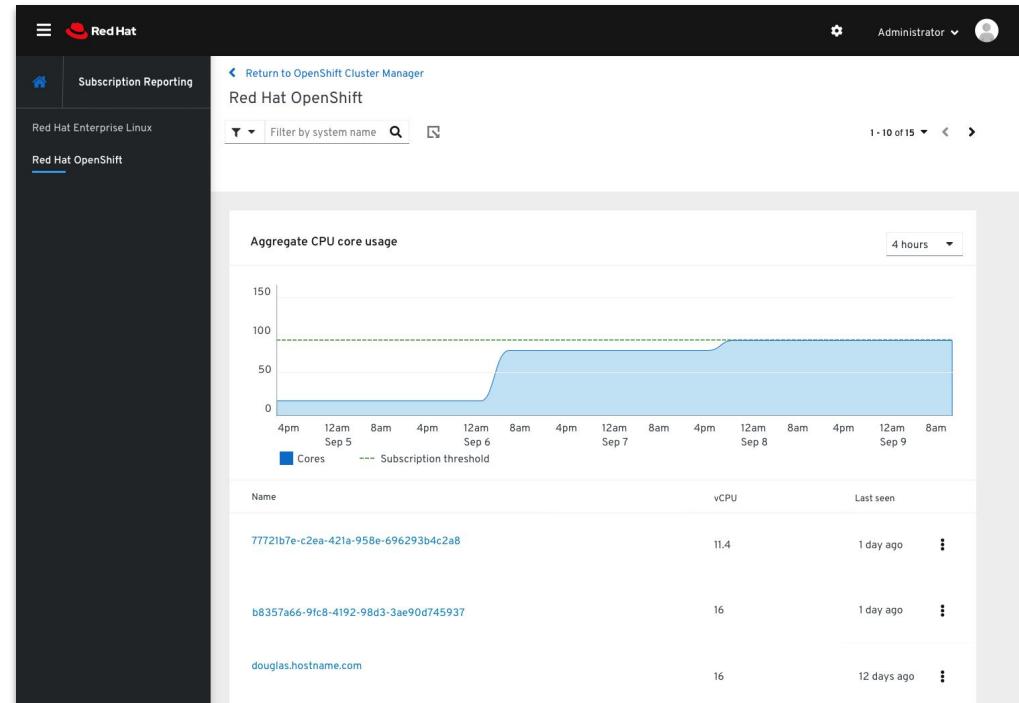
The screenshot shows the Red Hat OpenShift Cluster Manager web interface. At the top, there's a navigation bar with the Red Hat logo and a dropdown for 'Administrator'. Below the header, the main content area has a sidebar on the left with links for 'Clusters', 'Documentation', 'OperatorHub.io', 'Cluster Manager Feedback', and 'Report an OpenShift Bug'. The main panel displays a cluster named 'Lucky Managed (OSD)' which is marked as 'Healthy'. The 'Add-ons' tab is selected in the navigation bar. Three add-ons are listed:

- Red Hat Managed Integration**: Described as an opinionated installation of independent middleware services and tools into an OpenShift Dedicated cluster. It aims to streamline the end-user experience and is a single-tenant managed service for development teams.
- Red Hat CodeReady Workspaces**: Built on the open Eclipse Che project, it provides developer workspaces with all necessary tools and dependencies for coding, building, testing, running, and debugging applications.
- Red Hat OpenShift Service Mesh**: Based on the open-source Istio project, it provides an easy way to create a network of deployed services for discovery, load balancing, service-to-service authentication, failure recovery, metrics, and monitoring.

Each add-on entry includes a small icon, a brief description, and a blue 'Install' button.

Subscription Management

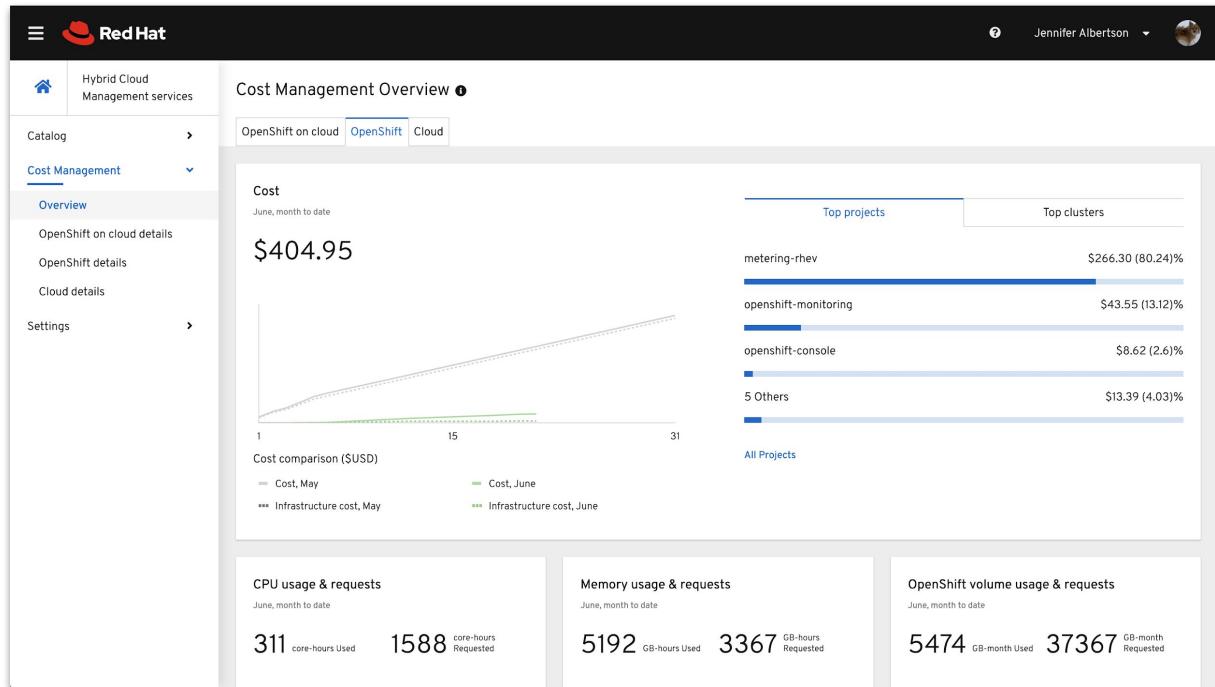
Delivering improvements to the current system, and transitioning to the new cloud.redhat.com Subscription Watch



Cost Management **Tech Preview**

See all of your OpenShift related costs across clouds and clusters

- Break down costs and usage based on projects, clusters, nodes, AWS accounts, or use your own custom tags
- Associate the costs of AWS services, like RDS databases, with your cluster
- Add markups or discounts to your cost models, create your own custom costs, use metadata to modify charges, and more
- *Optional install for OCP 4.3+, included with OpenShift subscription*



Node Management Roadmap

Next (4.3)

- Kube 1.16
- Node Topology Manager (TP)
- Machine Health Checks

Long Term (4.4+)

- Descheduler
- Vertical Pod Autoscaler
- Pod Density per Node Enhancements
- Masters are schedulable (GA)
- Limit number of pod restarts
- OOM Kills are monitored and logged
- Node problem detector
- GPUDirect
- CGroups V2
- FPGA

Networking

Networking Themes



Stability and Security

Operators
Traffic Isolation
Metrics, Alerting, Telemetry
Security Policy API Enhancements



Performance and Scale

SR-IOV
High-Performance Multicast
RDMA, GPUDirect
Multi-Cluster



New and Flexible Features

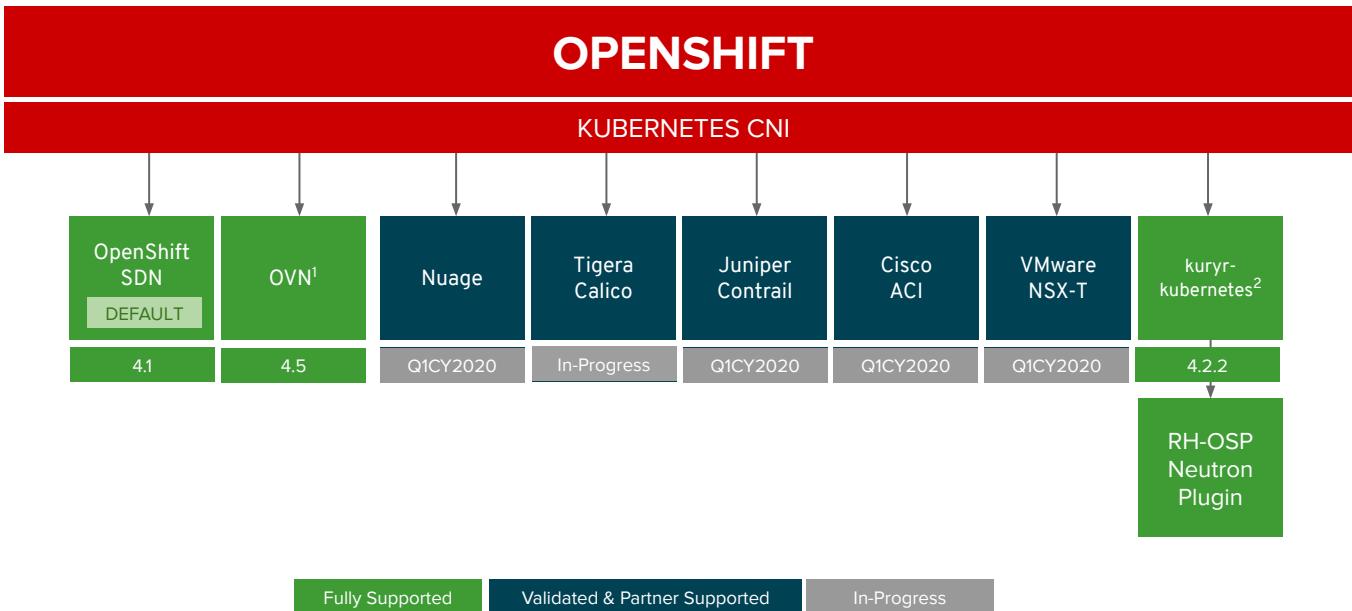
Multus Plug-ins
IPAM, IPv6, External DNS
Multi-Network
Platform Native Support



Telco Enablement

Foundational Capabilities
CNF Onboarding
Host features (e.g. PTP)
Platform integrations (e.g. OSP)

OPENShift 4 NETWORK PLUGINS



¹Targeting GA at OCP 4.3 (not default SDN)

²Available as an install-time option in 4.2.z (targeting 4.2.2)

Storage

OpenShift Container Storage 4.2

GA with OpenShift Container Platform 4.3



Portability

Seamless data placement and access across clouds

Multi Cloud Data Portability/Hybrid Cloud with S3

Consistent set of management tools across clouds

AWS (UPI + IPI), VMware (UPI)



Simplicity

Operator driven install, upgrade, expand through OLM

Integrated OCP + OCS monitoring and management

Dynamic provisioning of persistent volumes for RWX, RWO, S3 in Converged Mode



Scalability

Support Traditional and Emerging OCP Workloads

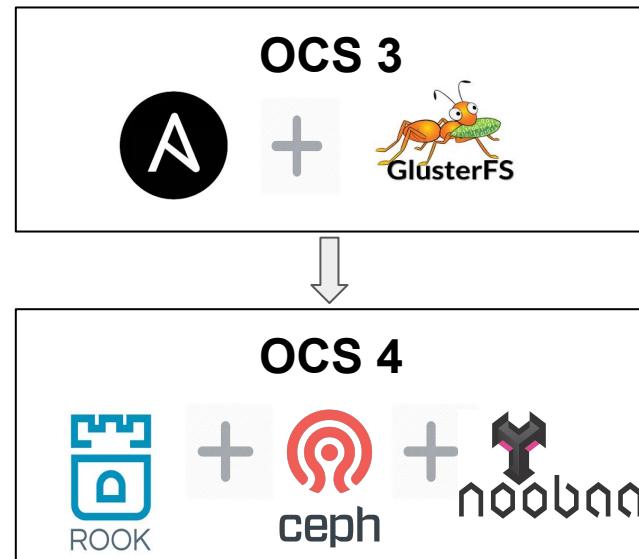
Easily share data across geo-locations and platforms

5,000 PV's in a 10 node setup

OCS 4.2: Change in Technology Stack

Goal to have complete storage for OCP whatever the needs

- **Need for scalable S3 object stack** (New apps, infra like chargeback, metering)
- **Red Hat Ceph** is scalable object stack with block and file
- **Recently acquired Noobaa** - consistent S3 interface over Ceph RGW, AWS S3, Azure Blob; Federation & multi-cloud capable
- **Rook** operator framework for simple install, manage, expand



Full integrated migration support from OCP +OCS 3.11 to OCP + OCS 4.2.

OCS - Deeper integration with OCP

- **Operator** driven - install, expand, manage,
- Integrated **monitoring** using OCP dashboard
- Integrated **management** - Operator driven expansion
- Integrated Prometheus metrics, telemetry, must-gather, alerts

The screenshot shows the Red Hat OpenShift Container Platform dashboard. On the left, there's a sidebar with various navigation options like Home, Dashboards, Projects, Search, Explore, Operators, Workloads, Serverless, Networking, Storage, Builds, Monitoring, Compute, and Administration. The Storage section is currently selected. The main content area has tabs for Dashboards, Overview, Persistent Storage, and Object Service. The Persistent Storage tab is active, showing details like Cluster ID (31a4c7d-0000-4549-8880-870aeef3cfed), AWS Provider Version (4.2.0-0.0-2019-08-20-173300), and Cluster Inventory (6 Nodes, 423 Pods, 6 PVCs, VMs, 3 Bare-Metal Hosts). The Object Service tab is also visible. A red oval highlights the 'Persistent Storage' tab, and another red oval highlights the 'Object Service' tab. The right side of the dashboard includes a Cluster Health section showing multiple errors and degraded health, and an Alerts section with several warning icons.

Also...

- Health
- Capacity Configuration
- Alerts

OpenShift Container Storage 4 Roadmap

Near Term (4.2+)

- GA - Converged Mode
- Operator driven install, upgrade, expand through OLM
- PV's backed by RWX, RWO, S3 for apps
- AWS (UPI + IPI), VMware (UPI)
- Multi Cloud Data Portability/Hybrid Cloud with S3
- OCP + OCS monitoring and management
- 5,000 PV's in a 10 node setup

Medium Term (4.3)

- Azure
- Bare Metal
- Data Portability/Hybrid Cloud
- 10,000 PV's in a 10 node setup
- Tech Preview: Snapshot and Clone
- Tech Preview: CephFS Snap, Clone, Restore
- Disconnected Environment

Long Term (4.4+)

- Google, IBM Cloud (TBC), RHV
- GA - Independent Mode, sharing OCS storage with an external OCP
- Support for local NVMe and standard PVs on VMware hypervisor nodes
- GA - Snapshot, Clone, Restore
- Multi-cluster data federation and data portability
- Active/Active and Active/Passive sharing of object stores
- CephFS GA -
 - Scale to 10,000 PV's
 - Metrics
 - Async and Sync replication
 - Stretch cluster
 - Snap, clone, restore

Roadmap is subject to change.



Security

Stronger Platform Security

Defense in Depth



CONTROL Application Security

- [Support for FIPS validated cryptography](#)
- [Encrypt etcd datastore](#)
- [RHEL CoreOS network bound disk encryption](#)
- [Private clusters with existing VPN / VPC](#)
- [Internal ingress controller](#)
- [Ingress Cipher & TLS Policy Configuration](#)
- [Log forwarding \(tech preview\)](#)



DEFEND Infrastructure



EXTEND

OpenShift 4 and Fips 140-2

FIPS ready Services

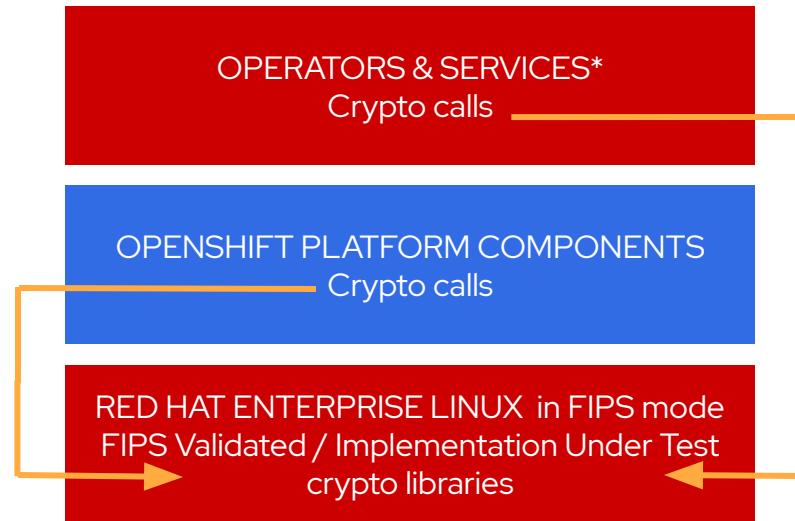
- When built with RHEL 7 base image

OpenShift calls FIPS validated crypto

- When running on RHEL 7.6 in FIPS mode, OpenShift components bypass go cryptographic routines and call into a RHEL FIPS 140-2 validated cryptographic library
- This feature is specific to binaries built with the RHEL go compiler and running on RHEL

RHEL CoreOS FIPS mode

- Configure at install to enforce use of FIPS Implementation Under Test* modules



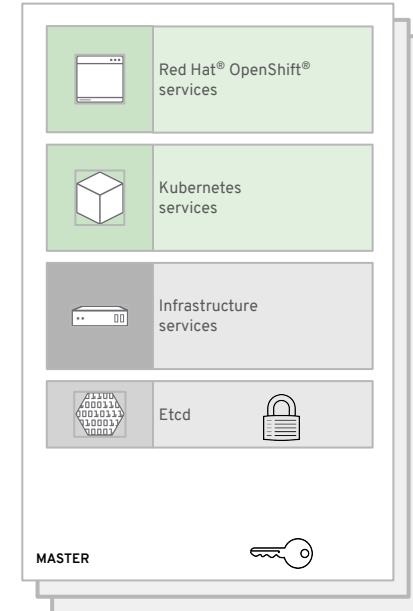
*When built with RHEL base images

[More about RHEL go and FIPS 140-2](#)

OpenShift 4 etcd Encryption

Encrypt secrets, config maps...

- Encryption of the etcd datastore is optional. Once enabled, encryption cannot be disabled.
- The aes-cbc cipher is used.
- Keys are created and automatically rotated by an operator and stored on the master node's file system.
- Keys are available as a secret via the kube API to a cluster admin.
- Assuming a healthy cluster: after enabling encryption, within a day, all relevant items in etcd are encrypted
- Backup: The etcd data store should be backed up separately from the file system with the key.
- Disaster recovery: a backup of both the encrypted etcd data and encryption keys must be available.



The OpenShift Console

Extending the
Console

Improve
Observability

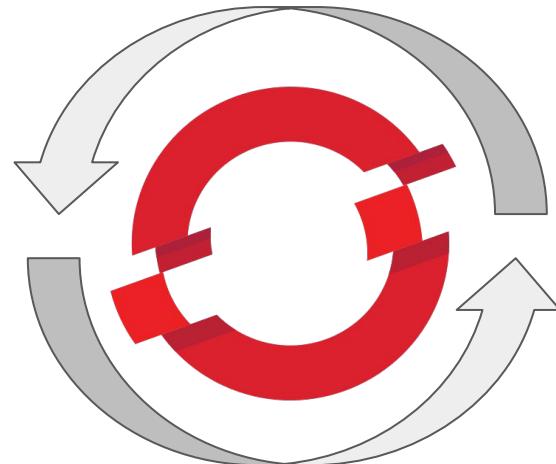
Administration
made easy

Developer
Focused

More Visibility for OpenShift Components

Our goal is to provide a 360° view for Openshift.

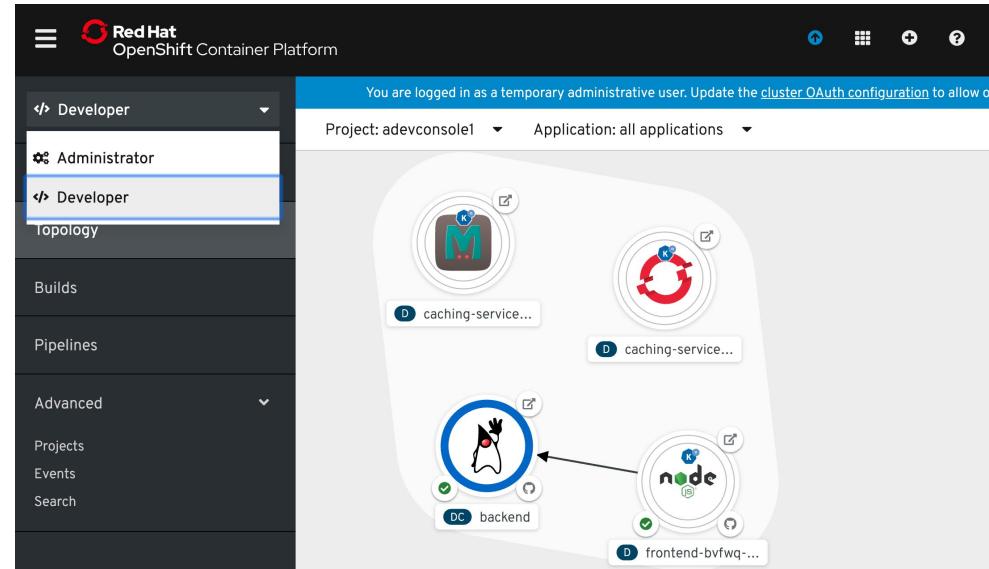
- In every release, we've increased the number of OpenShift components monitored out of the box.



Web Console - Developer Perspective

An alternative perspective in the OpenShift UI that will sit beside the admin console and focus on developer use cases.

All OpenShift developer tool UIs will be surfaced here...though some (like CodeReady Workspaces) will be links out to unique UIs.



Project Details & Access

Project Details

- Quick access to current project details
- View dashboard for status and resource utilization
- Actions for edit or delete

The screenshot shows a dark-themed interface. On the left is a sidebar with the following items: '+Add', 'Topology', 'Builds', 'Pipelines', 'Advanced' (which is underlined in blue), 'Project Details' (which is also underlined in blue), 'Project Access', and 'Metrics'. To the right of the sidebar, there's a header bar with the text 'You are logged in as a temporary administrative user.' and 'Project: steve'. Below the header is a user profile card for 'PR steve' with the status 'Active'. At the bottom of the sidebar, there are three tabs: 'Dashboard' (underlined in blue), 'Overview', and 'YAML'. The main content area contains a 'Status' section with the status 'Active'.

Project Access

- Simplify sharing projects
- Reduces to a simple set of Roles that developer frequently use

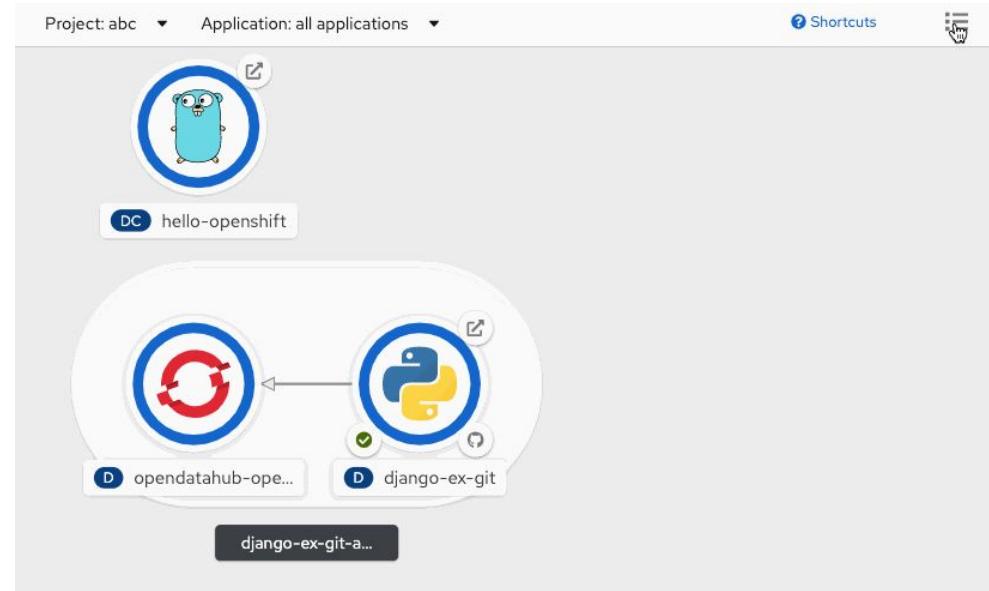
The screenshot shows a dark-themed interface. On the left is a sidebar with the following items: '+Add', 'Topology', 'Builds', 'Pipelines', 'Advanced' (which is underlined in blue), 'Project Details' (which is also underlined in blue), 'Project Access' (which is also underlined in blue), 'Metrics', 'Search', and 'Events'. To the right of the sidebar, there's a header bar with the text 'You are logged in as a temporary administrative user. Update the cluster OAuth configuration to allow others to...' and 'Project: steve'. Below the header is a section titled 'Project Access' with the sub-instruction 'Project Access allows you to add or remove a user's access to the project. More advanced management of role-based control appear in Roles and Role Bindings. For more information, see the role-based access control documentation'. The main content area displays a table of users and their roles:

Name	Role
kube-admin	Admin
pipeline	Edit
steve	Select a role

Below the table is a button labeled 'Add Access' with a dropdown menu showing 'Select a role' and options for 'Admin' and 'View'. A message at the bottom of the page says 'You made changes to this page. Click Save to save changes or Reload to cancel.' with 'Save' and 'Reload' buttons.

Application Topology streamlined flows

- Toggle between List and Topology views
- Easily group applications
- Connect/bind applications easily
- Contextual actions
- Quickly delete applications



Scaling Your Cluster with the Machine Autoscaler

Machine Autoscaler adjusts the number of Machines in the MachineSets being deployed in your cluster.

- Increase Machines when the cluster runs out of resources to support more deployments.
- Any changes such as the minimum or maximum number of instances, are immediately applied to the MachineSet that MachineAutoscalers target.

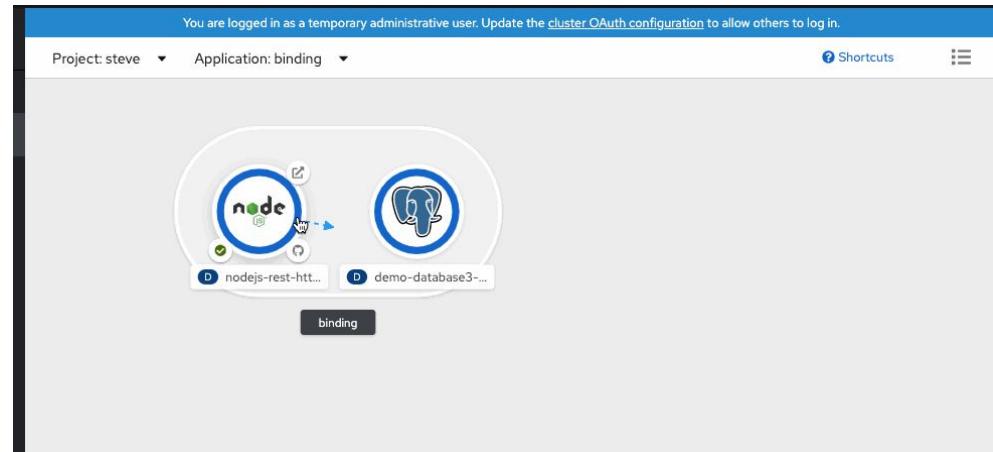
The screenshot shows the Red Hat OpenShift Container Platform web interface. The left sidebar has a dark theme with the Red Hat logo and 'OpenShift Container Platform'. It includes links for Projects, Search, Events, Operators, Workloads, Networking, Storage, Builds, Monitoring, Compute (with sub-links for Nodes, Machines, Machine Sets, and Machine Autoscalers), Machine Configs, and Machine Config Pools. The 'Machine Autoscalers' link is currently selected. The main content area has a light blue header bar with the message 'You are logged in as a temporary administrative user. Update the cluster OAuth configuration to allow others to log in.' Below this is a navigation bar with 'Project: openshift-metering' and a 'Import YAML' button. The main content area is titled 'Machine Autoscalers' and contains a 'Create Machine Autoscaler' button. A table lists one existing machine autoscaler: 'worker-us-east-1a' (Name), 'openshift-metering' (Namespace), 'worker' (Scale Target), '1' (Min), and '12' (Max). There is also a 'Filter by name...' input field and a three-dot menu icon.

Name	Namespace	Scale Target	Min	Max
MA worker-us-east-1a	NS openshift-metering	MS worker	1	12

Service Binding

easily connecting apps

- Leverages new ServiceBindingRequest and Operator to handle binding requests
- Easily create in Topology by dropping connector to valid drop target
- Injects config into source pod template as environment variables as a secret
- Pods are redeployed to pick up binding credentials



Learn more about service binding:
<https://github.com/redhat-developer/service-binding-operator>

Metering

ShowBack/ChargeBack Reports available from OperatorHub

- Base functionality on all providers
- Tie into cloud providers
- Some reports included, can also write custom reports
- Can be plugged into other reporting tools as needed

Name	Namespace	Labels	Created At
cluster-cpu-capacity	openshift-metering	operator-metering=true	7 minutes ago
cluster-cpu-capacity-raw	openshift-metering	operator-metering=true	7 minutes ago
cluster-cpu-usage	openshift-metering	operator-metering=true	7 minutes ago
cluster-cpu-usage-raw	openshift-metering	operator-metering=true	7 minutes ago
cluster-cpu-utilization	openshift-metering	operator-metering=true	7 minutes ago
cluster-memory-capacity	openshift-metering	operator-metering=true	7 minutes ago
cluster-memory-capacity-raw	openshift-metering	operator-metering=true	7 minutes ago
cluster-memory-usage	openshift-metering	operator-metering=true	7 minutes ago
cluster-memory-usage-raw	openshift-metering	operator-metering=true	7 minutes ago
cluster-memory-utilization	openshift-metering	operator-metering=true	7 minutes ago



Add YAML Samples for a specific resource

Educate your Users with an Easy Way to Understand Kubernetes Resources

- You can now add cluster-wide samples to any Kube Resource with **Console YAML Samples CRD**.
- Each team that manages kube resources owns their samples and should make it part of their Operator.
- Any Operators can add YAML samples including Third-Party ISVs

The screenshot shows the Red Hat OpenShift Container Platform interface. On the left, the navigation sidebar is open, showing categories like Operators, Workloads (Pods, Deployments, etc.), and Jobs. The 'Jobs' option is selected. The main content area shows a 'Create Job' form with a YAML editor containing a sample Job configuration. To the right, a modal window displays the 'consoleyamlsamples' CRD details, specifically the 'Samples' tab, which lists an example Job. The Red Hat logo is visible in the bottom right corner.

Create Job
Create by manually entering YAML or JSON definitions, or by dragging and dropping a file into the editor.

```

1: apiVersion: batch/v1
2: kind: Job
3: metadata:
4:   name: example
5:   namespace: brie
6: spec:
7:   selector: {}
8:   template:
9:     metadata:
10:       name: pi
11:     spec:
12:       containers:
13:         - name: pi
14:           image: perl
15:           command:
16:             - perl
17:             - "-Mbignum=bpi"
18:             - "-wle"
19:             - "print bpi(2000)"
20:       restartPolicy: Never

```

Job

Schema Samples

1. Example Job
An example Job YAML sample

Try it Download YAML

Custom Resource Definitions > Custom Resource Definition Details
CRD consoleyamlsamples.console.openshift.io

Overview YAML Instances

Create Console YAML Sample

Name Namespace Created

example None 2 minutes ago

View Security Vulnerabilities with the Quay Operator

See all your Container Vulnerabilities right from the Console Dashboard

- Link out to **Red Hat Quay** for more in depth information
- The Quay Operator supports both **On-premise and External Quay** Registries
- Currently uses **Clair for Security Scan**; Planning to expand to other Vendors(TwistLock, Aqua, e.g.)
- Only works for images managed by Quay

The screenshot shows the Red Hat OpenShift Container Platform dashboard with a temporary administrative user logged in. The main content area displays a 'Dashboards' section with an 'Overview' tab selected. It shows the Cluster API Address (https://api.sgoodwin2.devcluster.openshift.com:6443), Cluster ID (e75320a2-1f0-4f8f-af8c-281e12c7607), and Provider (OpenShift Cluster Manager). Below this, a circular 'Quay Security Scanner' chart indicates 61 vulnerabilities: 22% High-level, 23% Medium-level, and 54% Low-level. A table lists the top vulnerabilities:

CVE	SEVERITY	PACKAGE	CURRENT VERSION	FIXED IN VERSION	INTRODUCED IN LAYER
RHSA-2019-0710	High	python-lbs	2.7.5#4#7	0.2.2-5#7#7#7#_B	
RHSA-2019-1587	High	python-lbs	2.7.5#4#7	0.2.2-5#8#0#7#_B	
RHSA-2019-0368	High	systemd-lbs	219-57#7	0.219-62#7#7#_B.5	
RHSA-2019-0049	High	systemd-lbs	219-57#7	0.219-62#7#7#_B.2	
RHSA-2019-0679	High	libssh2	1.4.3-10#7#2.1	0.1.4.3-12#7#7#_B.2	
RHSA-2018-2285	High	yum-plugin-nol	1.1.31#4#7	0.1.1.31#4#6#7#_B	
RHSA-2018-7184	High	curl#0	7.0.23#4#7#2	0.7.0.23#4#7#_B	

To the right, a 'Security breakdown' panel shows 1 total vulnerability, with 1 High severity and 1 Fixable. A list of fixable vulnerabilities includes openssl-libs across 1 namespace, with successful assignments for various tests and operations.

New User Management Section with the Console

Allow cluster admins to easily see who has access to the cluster and how they are organized

1. **All user management** resources under **one navigation section**
2. **Dedicated pages** to view **Users** and **Groups** for the cluster have been added
3. Ability to **impersonate a user**; view exactly what they can see

The screenshot displays the Red Hat OpenShift console interface. On the left, a dark sidebar menu lists various cluster management sections: Dashboards, Projects, Search, Explore, Events, Operators, Workloads, Networking, Storage, Builds, Monitoring, Compute, User Management (which is expanded to show Users, Groups, Service Accounts, Roles, and Role Bindings), Administration, and Pipelines.

The main content area is divided into two tabs: "Groups" and "Users".

- Groups Tab:** Shows a table of groups with columns for Name and Users. It lists "admins" (2 users) and "app_devs" (2 users). A "Create Group" button is at the top.
- Users Tab:** Shows a table of users with columns for Name and Roles. It lists "developer" (User role) and "user" (User role). A message states: "You are logged in" and "Users are automatically added the first time they log in."

A right-click context menu is open over the "user" row in the Users table, listing options: "Impersonate User 'user'", "Edit Labels", "Edit Annotations", "Edit User", and "Delete User".

Be Informed with the Alert Receivers

Alerts are only useful if you know about them!

- Reduce your **Mean Time To Resolution** (MTTR)
- Create alerts receivers for:
 - **Pager Duty**
 - **Webhooks**
- **More receivers** to come in **future releases**
- Send alerts to the teams that need them; **Reduce the noise** for teams that don't
- Default receiver in place as a **catch all**

The screenshot displays the Red Hat OpenShift Container Platform interface. On the left, there's a sidebar with navigation links like Home, Operators, Workloads, Networking, Storage, Builds, Monitoring, Compute, User Management, Administration (which is expanded to show Cluster Settings, Namespaces, Resource Quotas, Limit Ranges, and Custom Resource Definitions), Console, DNS, and FeatureGate.

The main content area shows two tabs: Cluster Settings (selected) and Global Configuration. Below these are sections for Configuration Resources (APIServer, Alertmanager, Authentication, Build, ClusterVersion, Console, DNS, FeatureGate) and Alert Routing (Group By job, Group Wait 30s).

A modal window titled "Create Receiver" is open on the right. It has fields for "Receiver Name" (set to "my-new-receiver") and "Receiver Type" (set to "PagerDuty"). Under "PagerDuty Configuration", there are options for "Integration Type" (Events API v2 is selected), "Routing Key" (set to "thisis sometextthatwillblurverysoon"), and "PagerDuty integration key".

The "Receivers" section lists existing receivers and allows for creating a new one. A table shows a single entry for "severity" with "warning" as the value. There are buttons for "Create" and "Cancel".

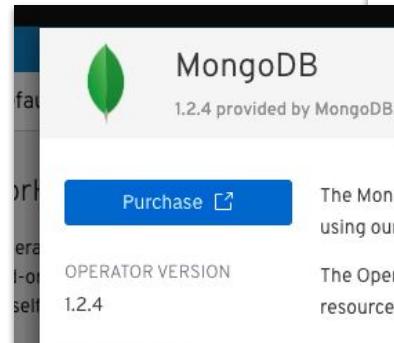
Open Marketplace in collaboration with IBM

New ability to sell ISV software

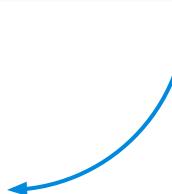
Builds on our Operator certification program to allow customers to purchase enterprise licenses from partners

- Jointly developed with IBM
- IBM will handle L1-L3 support
- Multi-cluster workflow
- Quotas, approval flow and more
- Developers access installed apps through Dev Catalog

Jump from OCP to Marketplace for transaction



A screenshot of the Red Hat Open Marketplace homepage. The header includes the Red Hat logo, "Marketplace", "Workspace", "Support", and "About". Below the header, the text "Open Marketplace" is displayed, followed by "Quickly find, buy and deploy software to any cloud". A note below states "OPERATED BY IBM".



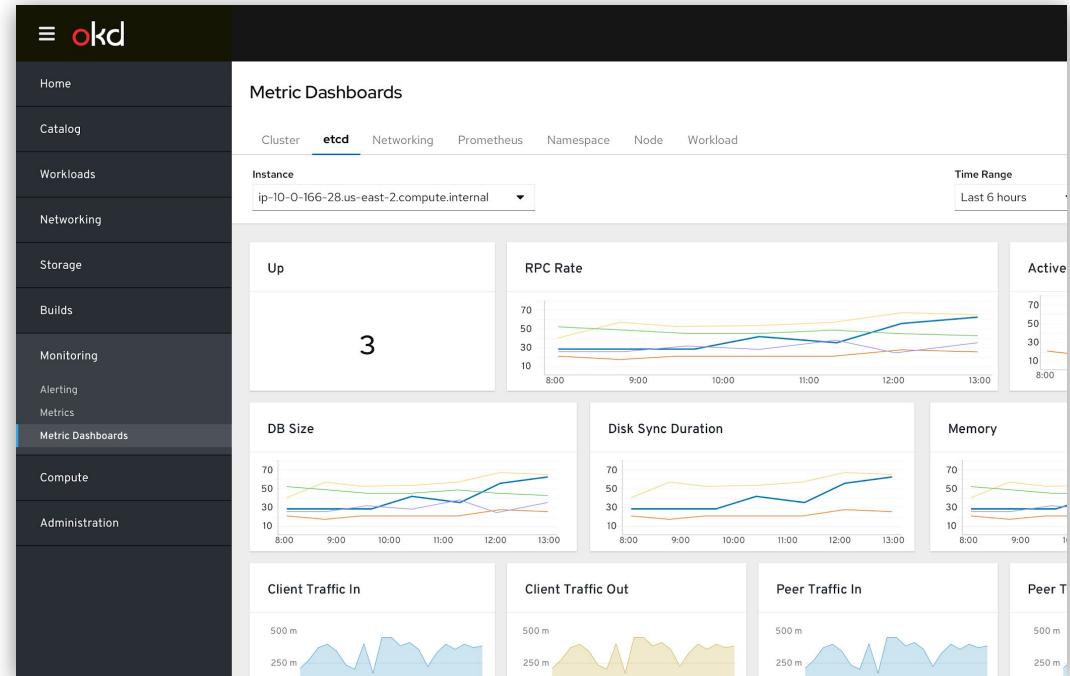
Marketplace installs app on desired clusters, plus metering of usage

Custom Metrics Dashboards with Console Dashboard Rendering Framework

Dashboards customized to use-case

OpenShift adapts to standard use-cases like Edge, which requires deeper machine management and visibility

Customers have their own needs and can curate/share their own dashboards across clusters



Enabling Developers

Deploy Applications

streamlining flows

Deploy Image from Internal Registry

- Allow for rapidly deploying with alternate paths
- No need to repush/pull images

Auto-detect builder image

- Recommends builder images based on detected language by git provider

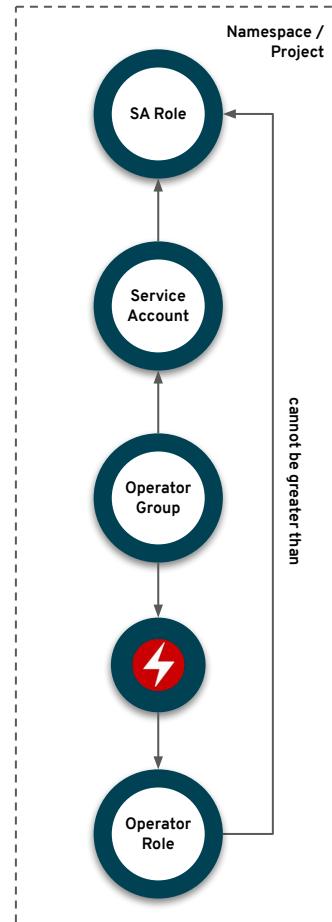
Deploy Applications alternate deployment targets

- Default to Kubernetes Deployments
- Alternately can use OpenShift's DeploymentConfigs or Knative Service (tech preview) objects
- Advanced options changes accordingly

The screenshot shows the Red Hat OpenShift Container Platform developer interface. The left sidebar has a dark theme with white text and includes links for Developer, +Add, Topology, Builds, Pipelines, Advanced (with dropdowns for Project Details, Project Access, Metrics, Search, and Events), Resources, and Events. The main content area has a light blue header bar with the text "You are logged in as a temporary administrative user. Update the cluster OAuth configuration to allow others to". Below this, it shows "Project: abc" and "Application: all applications". A message box states "There are no pipeline templates available for this runtime." Under the "Resources" section, there is a heading "Select the resource type to generate" and three radio button options: "Deployment" (selected), "Deployment Config", and "Knative Service". The "Deployment" option is described as enabling declarative updates for Pods and ReplicaSets. The "Deployment Config" option is described as defining the template for a pod and managing deploying new images or configuration changes. The "Knative Service" option is marked with a "Tech Preview" badge and is described as enabling scaling to zero when idle.

Allow regular users to install Operators

- In 4.1: only users carrying cluster-admin roles are allowed to install Operators
- In 4.2: administrators can delegate installation to other users
 - cluster-admin can choose projects where project admins can install operators
 - cluster-admin can also define a ServiceAccount in projects
 - all installed Operators in this project get equal or lower permissions of this ServiceAccount



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

Self-service is key for productivity

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

Project: production-api-backend ▾ Add ▾

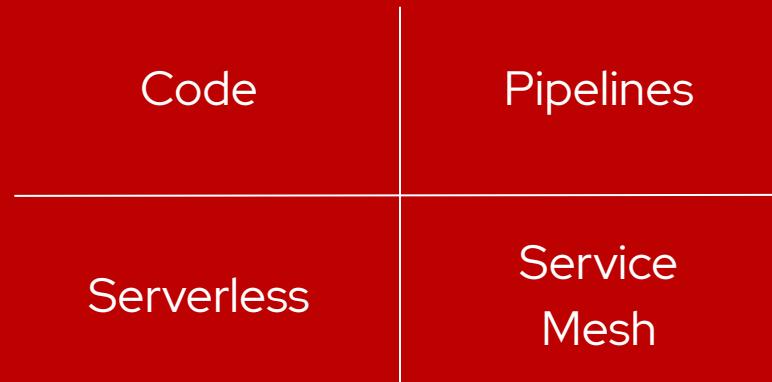
Developer Catalog

Add shared apps, services, or source-to-image builders to your project from the Developer Catalog. Cluster admins can install additional apps which will show up here automatically.

All Items	All Items
Languages	23 items
Databases	
Middleware	
Other	
<input type="text"/> Filter by keyword...	
TYPE	
<input type="checkbox"/> Service Class (0)	
<input type="checkbox"/> Source-to-Image (10)	
<input type="checkbox"/> Installed Operators (13)	
<hr/>	
.NET	
	.NET Core Build and run .NET Core 2.2 applications on RHEL 7. For more information about using this builder image, including OpenShift
	Apache HTTP Server (httpd) Build and serve static content via Apache HTTP Server (httpd) 2.4.0 on RHEL 7. For more information about using this builder
	Kafka provided by Red Hat, Inc. Represents a Kafka cluster
	Kafka Connect provided by Red Hat, Inc. Represents a Kafka Connect cluster
<hr/>	
Kafka Connect S2I	
	Kafka Connect S2I provided by Red Hat, Inc. Represents a Kafka Connect cluster with Source 2 Image support
	Kafka MirrorMaker provided by Red Hat, Inc. Represents a Kafka MirrorMaker cluster
	Kafka Topic provided by Red Hat, Inc. Represents a topic inside a Kafka cluster
	Kafka User provided by Red Hat, Inc. Represents a user inside a Kafka cluster
<hr/>	
MongoDB Replica Set	
	MongoDB Replica Set provided by MongoDB, Inc. MongoDB Replica Set Deployment
	MongoDB Sharded Cluster provided by MongoDB, Inc. MongoDB Sharded Cluster Deployment
	MongoDB Standalone provided by MongoDB, Inc. MongoDB Deployment consisting of only one host. No replication of data.
	Nginx Nginx HTTP server and a reverse proxy (nginx) Build and serve static content via Nginx HTTP server and a reverse proxy

Cloud Native Development

OpenShift has all of the latest **tools** and **services**
to make your devs more productive.

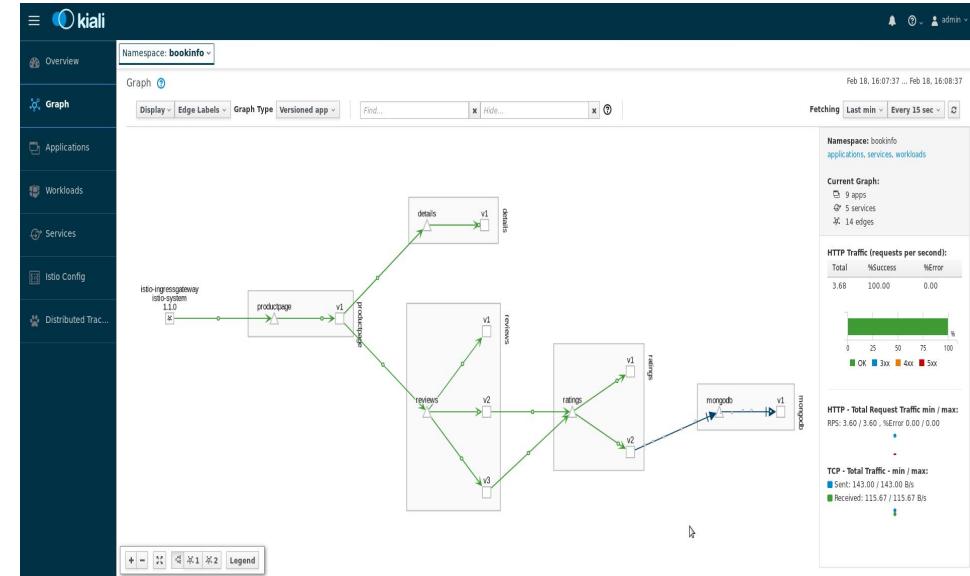


Service Mesh

OpenShift Service Mesh

Key Features & Updates

- Version 1.1 coming mid-February
- Upgrade Istio to version 1.4
- Direct links from OCP Console
- Labeled HAProxy routes into the mesh
- Kiali has been updated to Patternfly4
- Jaeger streaming support via Kafka
- Allow Jaeger to be used with an external Elasticsearch instance



Guided Configuration of Traffic Policies

Create Weighted Routing

WORKLOAD	TRAFFIC WEIGHT
 reviews-v1	<input type="range" value="5"/> 5%
 reviews-v2	<input type="range" value="80"/> 80%
 reviews-v3	<input type="range" value="15"/> 15%

[▼ Hide Advanced Options](#)

VirtualService Hosts The destination hosts to which traffic is being sent. Enter one or more hosts separated by comma.



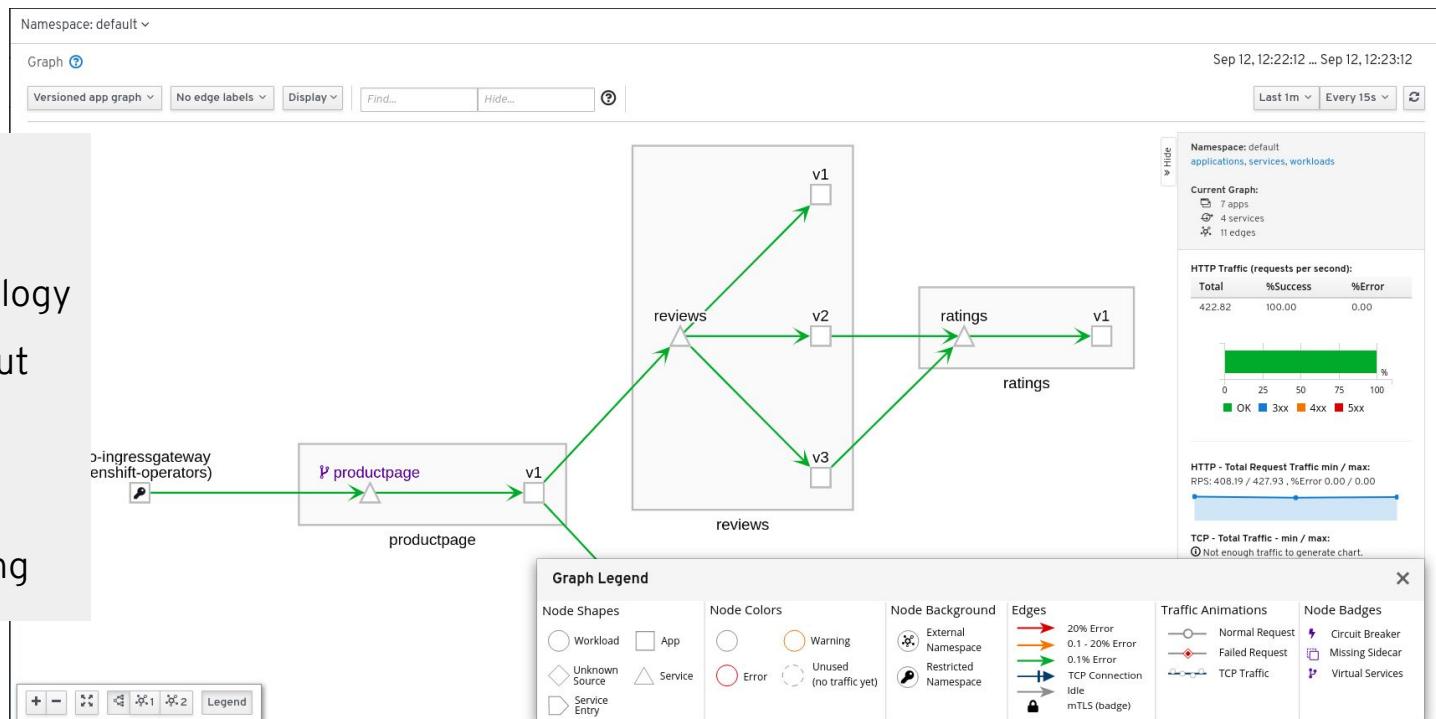
Add LoadBalancer

Add Gateway

Enhanced Visualization of Cluster Traffic With Kiali

Visualization of what
Matters most:

- Application Topology
- Traffic throughput
- Error Rates
- Service Latency
- Service Versioning



Convenient Overviews of Individual Services

Services > Namespace: default > Service: reviews

reviews (Show on graph)

Overview Traffic Inbound Metrics

Last 1m ▾ Actions ▾

Labels

app reviews service reviews

Selectors

app reviews

Type ClusterIP

IP 172.30.17.223

Created at 9/12/2019, 12:06:32 PM

Resource Version 5094640

Ports

TCP http (9080)

Endpoints

10.128.2.27 : reviews-v1-989d5ffdf-w8gmn
10.128.2.28 : reviews-v3-757c4f7849-rs7sw
10.131.0.35 : reviews-v2-6ff8648d69-tlqhn

Health

Healthy

Error Rate over last 1m: 0.00%

Workloads (3)

Virtual Services (0)

Destination Rules (0)

Name	Type	Labels	Created at	Resource version
reviews-v1	Deployment	app reviews version v1	9/12/2019, 12:06:32 PM	5095051
reviews-v2	Deployment	app reviews version v2	9/12/2019, 12:06:32 PM	5094998
reviews-v3	Deployment	app reviews version v3	9/12/2019, 12:06:32 PM	5095043

Management of URI Matching for Virtual Services

Istio Config > Namespace: default > Istio Object Type: virtualservices > Istio Object: bookinfo

[Overview](#) [YAML](#)

VirtualService: bookinfo

Created at: 9/12/2019, 12:06:46 PM

Resource Version: 5094784

Hosts

*

Gateways

[bookinfo-gateway](#)

HTTP Route

Match

Uri

[Exact] /productpage

Uri

[Exact] /login

Uri

[Exact] /logout

Uri

[Prefix] /api/v1/products

Status	Destination			Weights
	Host	Subset	Port	
	productpage ↗	-	9080	-

Serverless

OpenShift Serverless in 4.3

Key features and updates

- **Serverless Operator v1.3.0**
- **Knative v0.10**
- **OLM dependency resolution for Service Mesh**
- Dropped support for Kubernetes 1.14 (OCP 4.1)

Learn more

<https://openshift.com/learn/topics/serverless>

[Knative Tutorial](#)

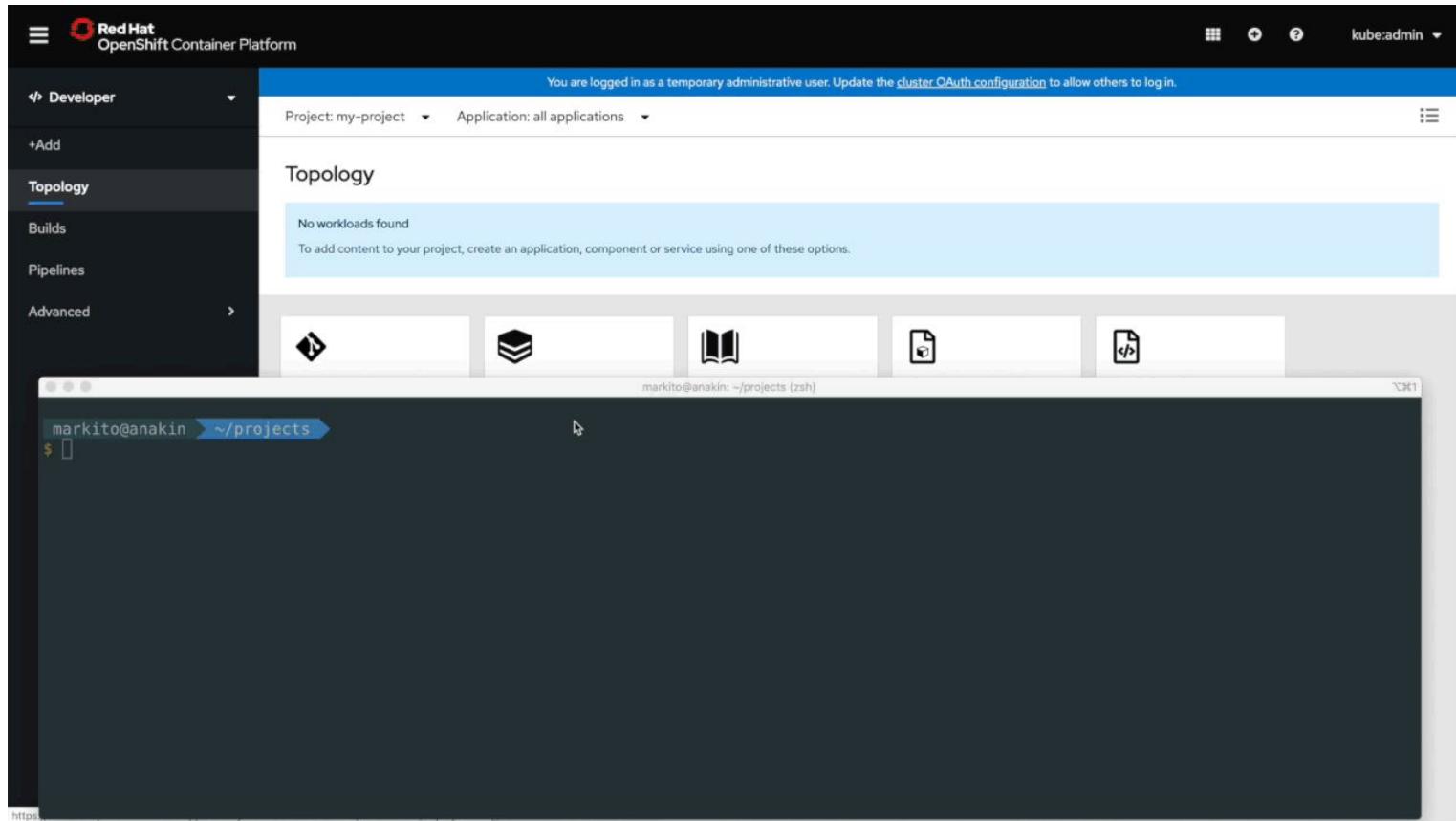
The screenshot shows the OpenShift web console interface. At the top, there's a header for 'Installed Operators > Operator Details' for the 'OpenShift Serverless Operator' version 1.3.0. Below this, there are tabs for 'Overview', 'YAML', 'Events', and 'Knative Serving'. The 'Overview' tab is selected. In the main content area, there's a sidebar with 'Developer' and 'Topology' sections, and a main panel showing a diagram of a 'Wild-West' architecture with multiple nodes. To the right, a detailed view of a Knative service named 'spring-petclinic-bchpw-deployment' is shown, including its status (4 scaling to 10), update strategy (RollingUpdate), namespace (markito-rht), labels, and max surge. A progress bar indicates 25% greater than 10 pods, and a note says 'Not Configured' for min ready seconds.

OpenShift Serverless in 4.3

Traffic Split for Revisions

The screenshot illustrates the OpenShift Serverless interface for managing application revisions. On the left, a main panel displays a blue box labeled "store-app" containing two circular icons representing different revision versions. Dashed arrows above the box indicate a 50% traffic split between the two revisions. Below the box, the revision names are shown: "store-app-lcvcb..." and "store-app-bbgc...". At the bottom of the main panel are search and filter icons. On the right, a detailed view for the "store-app" service shows the "Resources" tab selected. Under the "Revisions" section, two revisions are listed with their respective traffic percentages: "store-app-bbgc-1" at 50% and "store-app-lcvcb-2" at 50%. A "Set Traffic Distribution" button is located in the top right corner of this section. Below the revisions, the "Routes" section is partially visible.

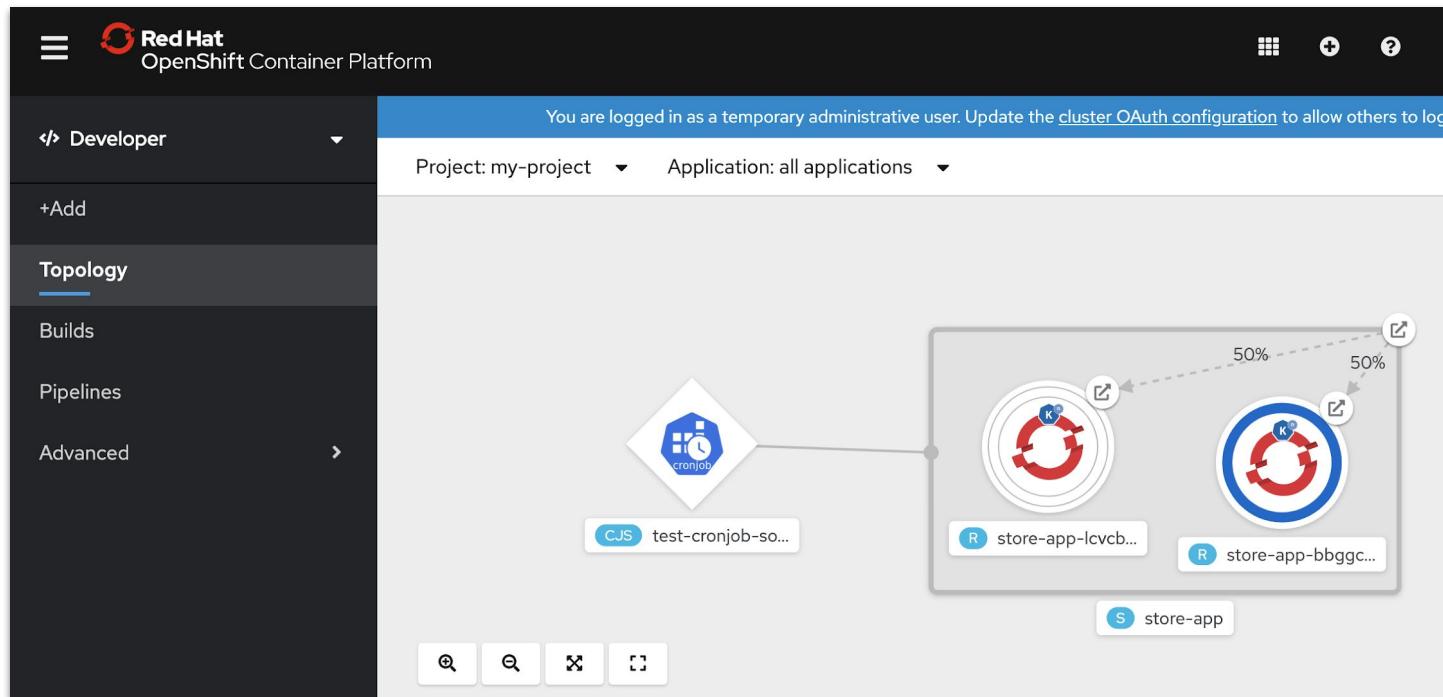
Revision	Traffic Distribution (%)
R store-app-bbgc-1	50%
R store-app-lcvcb-2	50%



OpenShift Serverless in 4.3

Event Sources

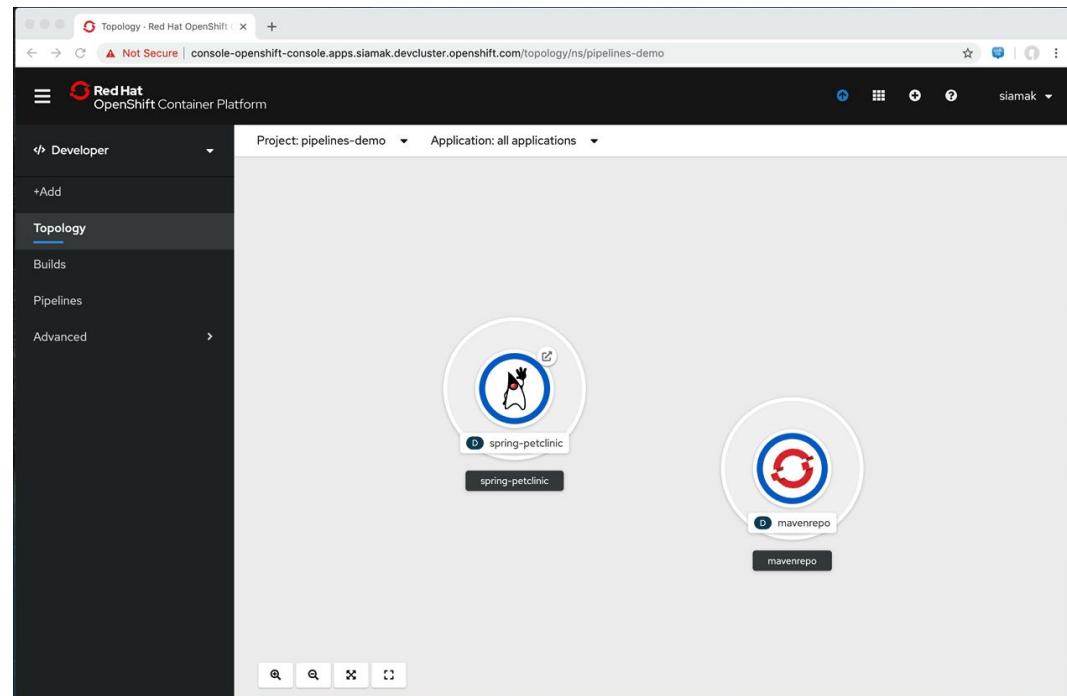
- KafkaSource
- CamelSource
- CronJobSource
- ContainerSource
- ApiServerSource



Pipelines and Jenkins

Cloud-native CI/CD with OpenShift Pipelines

- Based on Tekton Pipelines
- Runs serverless (no CI engine!)
- Containers as building blocks
- Build images with Kubernetes tools
(s2i, buildah, kaniko, jib, buildpack, etc)
- Pipelines portable to any Kubernetes
- Available in OperatorHub
- Tekton CLI



OpenShift Pipelines in OCP 4.3

- Git triggers (webhook)
- Automated RBAC setup
- Default curated tasks
- Pipeline metrics in Prometheus
- Pipeline samples and Task ref snippets in YAML editor

The screenshot shows the Red Hat OpenShift Container Platform web interface. On the left, a sidebar menu includes 'Developer', '+Add', 'Topology', 'Builds', 'Pipelines' (which is selected), and 'Advanced'. The main area is titled 'Create Pipeline' with the sub-instruction 'Create by manually entering YAML or JSON definitions, or by dragging and dropping a file into the editor.' A 'Dev Preview' button is visible in the top right of this area. Below this, a large code editor displays the following YAML configuration:

```
1  apiVersion: tekton.dev/v1alpha1
2  kind: Pipeline
3  metadata:
4    name: docker-build-and-deploy
5  spec:
6    params:
7      - name: IMAGE_NAME
8      | type: string
9    resources:
10      - name: app-source
11      | type: git
12      - name: app-image
13      | type: image
14    tasks:
15      - name: build
16        taskRef:
17          name: buildah
18          kind: ClusterTask
19        resources:
20          inputs:
21            - name: source
22            | resource: app-source
23          outputs:
24            - name: image
25            | resource: app-image
26  params:
```

To the right of the code editor, a sidebar titled 'Pipeline' has tabs for 'Samples' and 'Snippets'. The 'Snippets' tab is active, showing a snippet for an 'S2I-Java-8 Task'. The snippet description states: 'An S2I task to build java 8 based source. Source-to-Image (S2I) is a toolkit and workflow for building reproducible container images from source code. S2I produces images by injecting source code into a base S2I container image and letting the container prepare that source code for execution. The base S2I container images contains the language runtime and build tools needed for building and running the source code.' Below the description are buttons for 'Insert Snippet' and 'Show YAML >'. The top right corner of the interface shows the user's name, 'siamak'.

OpenShift Pipelines in OCP 4.3

- Default pipeline on app import (+Add) in Dev Console
- Pipeline objects in Admin Console
- New Tekton CLI commands
 - Start pipelines
 - Start tasks
 - Create resources

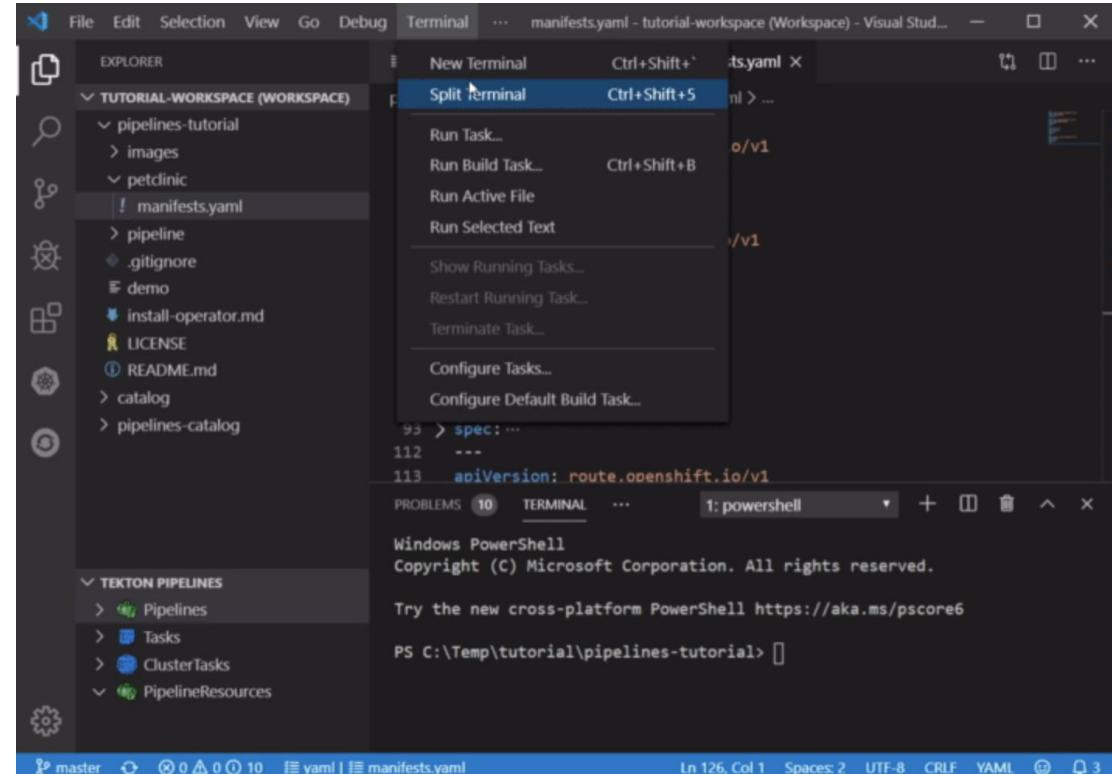
The screenshot displays two side-by-side views of the Red Hat OpenShift Container Platform interface.

Left View (Admin Console): Shows the navigation menu for an administrator. The "Pipelines" section is expanded, showing sub-options: Pipelines, Pipeline Runs, Pipeline Resources, Tasks, Task Runs, Cluster Tasks, and Monitoring.

Right View (Dev Console): Shows the developer interface for a project named "pipelines-demo". It lists an application named "Red Hat OpenJDK 11" (Builder Java OpenJDK II). Below the application list, there are sections for "General" (Application dropdown set to "Triggers", Name input field), "Pipelines" (Dev Preview button, Add pipeline checkbox checked, Hide pipeline visualization dropdown), and a diagram showing a sequence of "build" and "deploy" steps connected by arrows.

Tekton Pipelines VSCode Extension

Create, triggers and manage
Tekton Pipelines on OpenShift
and Kubernetes from Visual
Studio Code



Jenkins

- Jenkins server on JDK 8 & 11
- Jenkins agents
 - JDK 11
 - Node.js 10
- Official Jenkins Operator
 - github.com/jenkinsci/kubernetes-operator
 - Available in OperatorHub.io
 - Developer Preview on OCP 4.3
 - Collaboration upstream

The screenshot shows the Jenkins Operator page on OperatorHub.io. At the top, there's a header with the OperatorHub logo, a search bar, and a 'Contribute' button. Below the header, the title 'Jenkins Operator' is displayed next to a small owl icon. A sub-header states: 'Kubernetes native operator which fully manages Jenkins on Kubernetes.' Below this, a breadcrumb navigation shows 'Home > Jenkins Operator'. The main content area has a heading 'Jenkins Operator' and a large 'Install' button. To the right, there are sections for 'CHANNEL' (set to 'alpha'), 'VERSION' (set to '0.2.0 (Current)'), 'CAPABILITY LEVEL' (with 'Basic Install' selected), and 'PROVIDER' (set to 'VirtusLab'). The central text area contains descriptions of what the operator does, its integration with Kubernetes pipelines, and some developer notes.

Pipelines Roadmap

Near Term (4.3)

- Dev Metrics
- Git triggers
- Curated tasks
- Task catalog
- Knative tasks
- Disconnected install

Mid Term (4.4)

- Knative triggers
- Admin Metrics
- Pipeline-as-code
- Grafana dashboard
- Imagestream support
- More common tasks
- VSCode Tekton Plugin

Long Term (4.5+)

- Notifications
- Caching artifacts
- Pull-request workflow
- Task & pipeline marketplace
- VSCode Tekton code assist
- GitOps use-cases
- Multi-cluster integrations

CONSOLE

- Pipeline editor
- Sample pipelines
- Pipeline in topology
- CLI download link

- Visual pipeline builder
- Open code in Che
- Task catalog integration

- Pipeline metrics
- Editor code assist
- Curated pipelines
- Task & Pipeline catalogs

Jenkins Roadmap

Near Term (4.3)

- Jenkins Operator (Dev Preview)
- Jenkins with JDK 11
- Maven agent with JDK 11
- Node.js 10 agent

Mid Term (4.4)

- Jenkins Operator (Tech Preview)
- Plugin improvements

Long Term (4.5+)

- Jenkins Operator (GA)
- Plugin improvements

CodeReady/Other Dev Tools

odo - OpenShift's Dev-Focused CLI

Focus on additional stability & customer usage (46 issues fixed)

Improve output when showing list of components

Focus on R&D/spike for new use cases: Knative, other runtimes, devfile support, etc

```
$ odo create wildfly backend
Component 'backend' was created.

$ odo push
Pushing changes to component: backend

$ odo create php frontend
Component 'frontend' was created.
To push source code to the component run 'odo push'

$ odo push
Pushing changes to component: frontend

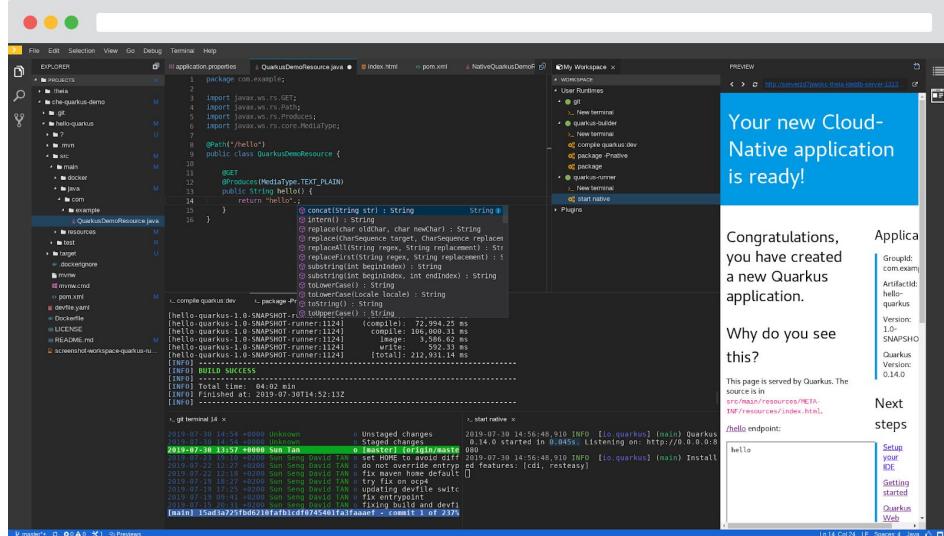
$ odo url create
frontend - http://frontend-myapp.192.168.99.100.nip.io

$ odo watch
Waiting for something to change in /dev/frontend
```

CodeReady Workspaces 2.0

Based on Eclipse Che 7

- Kubernetes-based developer workspaces:** Fully containerized developer workspaces allowing to bring your K8S application runtime easily in your dev environment.
- New Editor:** New default web-based editor provides a VSCode like experience in the browser.
- Devfile:** Configure a devfile for your project and get reproducible and portable developer environments.
- VSCode plug-ins compatibility**
- Swappable Editor**
- OpenShift VSCode Plug-in**
- Easier to Monitor and Administrate:** Prometheus and Grafana dashboards.



CodeReady Containers: OpenShift on your Laptop

New in 4.3:

- Automatic certificate rotation for internal node<->master communication
- 4.3 embedded GA version targeted for February 4th
- Ongoing updates with 4.2 z-stream updates
- Deprecated: removed VirtualBox support
- crc version outputs embedded OCP version number
- Many stability fixes around host networking

Provides a pre-built development environment based on **Red Hat Enterprise Linux** and **OpenShift** for quick container-based application development. Use with OpenShift on-premises or cloud.

```
$ crc setup  
Prepare your machine for running OpenShift  
  
$ crc start  
Start with the Hyperkit 4.3 bundle  
  
$ crc status  
Get the status of the cluster
```

CodeReady Containers: OpenShift on your Laptop

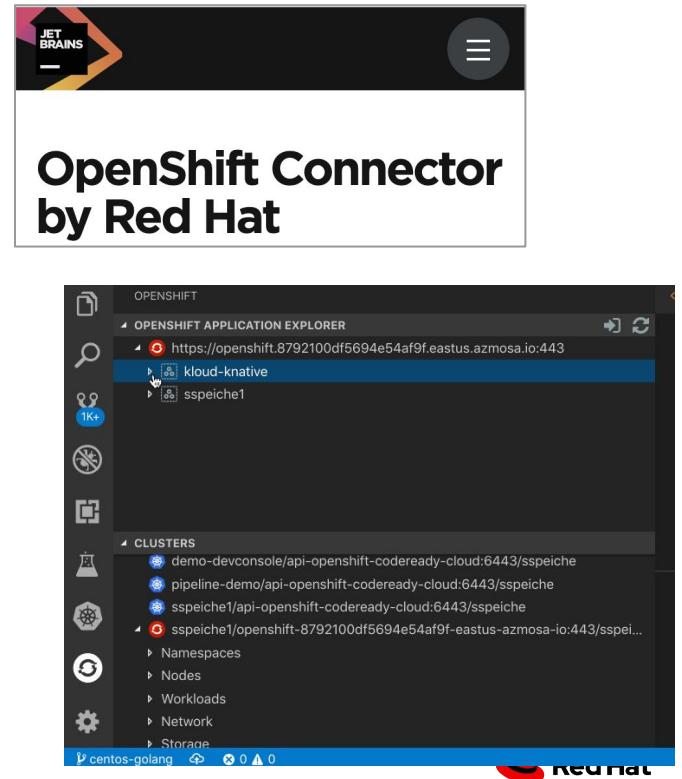
```
$ crc setup  
Prepare your machine for running OpenShift  
  
$ crc start  
Start with the Hyperkit bundle  
  
$ crc status  
Get the status of the cluster
```

- Node cert expiration handling
- Focus on minimizing resource consumption
- Ease of upgrade
- Overall usability
- System tray

OpenShift Deploy Plugin

Evolve Red Hat created plugins to simplify development and deployment to OpenShift from popular IDEs and DevOps Toolchains:

- Azure DevOps
- VS Code
- JetBrains IDEs (e.g. IntelliJ)
- CodeReady Workspaces
- CodeReady Studio
- Eclipse IDE



Code Ready / Dev Tools Roadmap

[More details](#)

	4.3: 1Q CY20	4.4: 2Q CY20	4.5+: 2H CY20
odo	Alignment with:IBM & Possible sharing with skaffold	Knative Serving support Alternate builder support	Transition to outloop App import/export
Dev Perspective	Operator app deployment Pipeline authoring	Additional integrations Monitoring and alerting	More monitoring Guided app creation
Containers	Cert expiration improvements Reduce resource needs	Insecure registry System tray	Upgrade OKD & other machine support
Workspaces	Stabilization and feedbacks from CRW 2.0	Workspaces CRD Guided Flows	Integration with Pipelines, Serverless Live Collaboration
IDE Adapters	Expand odo usage	Expanded language support	More focus on plugins over IDE

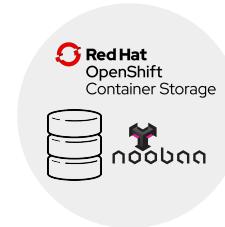
Quay

Red Hat Quay v3.2



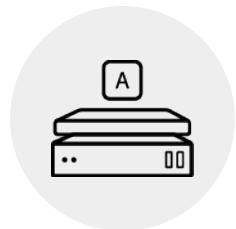
Container Security Operator

enables cluster administrators to monitor known container image vulnerabilities in pods running on their Kubernetes cluster
vulnerability information is shown inside the OpenShift Console (4.3+).



Support for RHOCS 4

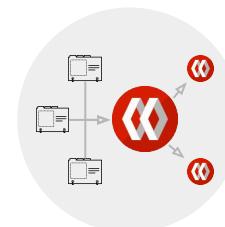
Support for most recent version 4 of Red Hat OpenShift Container Storage leveraging the NooBaa Multi-Cloud Object Gateway Operator



Quay Setup Operator (GA)

Automates the initial deployment of Quay and Clair and simplifies updates & day 2 ops

Configures all relevant OpenShift objects (routes, secrets, etc.)



Repository Mirroring (GA)

Allows to continually synchronize image repositories are a subset of those from external source registries into Quay (content ingress point / content whitelists)

Learn more: <https://www.redhat.com/en/blog/red-hat-quay-32-welcome-container-security-operator>

Security Scan Results through the UI

Image Security
1 vulnerabilities

s/v1beta2 API that will be

s/v1beta2 API that will be

s/v1beta1 API that will be

s/v1beta1 API that will be

View details

View details

View details

View details

16:00 Successfully assigned test...
16:00 Successfully assigned ope...
16:00 Successfully assigned test...
16:00 Successfully assigned brie...

Security breakdown

Quay analyzes container images to identify vulnerabilities.

Severity Fixable

1 High 1 🛡️

1 total

Fixable Vulnerabilities

openssl-libs 1 namespaces

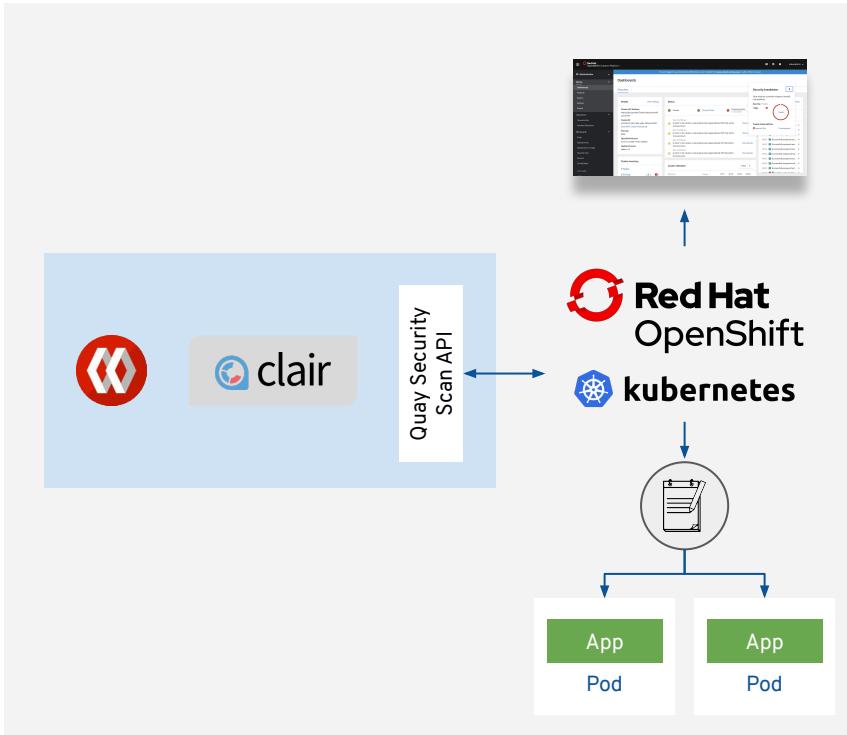
...

...

...

...

Container Security Operator (CSO)



- Container Security Operator (CSO) runs on OpenShift and watches pod objects
- Pod object changes triggering a data fetch from Quay/Clair and stores vulnerability information in CRs (by image manifest ID)
- CRs gets deleted if pod gets deleted
- Configurable interval to update vulnerability data from Quay / Clair (default: 5min)
- Data available via k8s CLI / APIs
- Supposed to be used by partner security products as well (consistent data ingress)

Red Hat Quay / Quay.io / Quay Dedicated Roadmap

	Near Term (3.2)	Mid Term (3.3)	Long Term (3.4+)
QUAY	<ul style="list-style-type: none">• Quay Setup Operator GA• RHOCS4 support• Repo Mirroring GA• Early upstream releases of future features	<ul style="list-style-type: none">• Quay - OpenShift integration operator• LDAP filters / bindings• Quota Showback/ Reporting• Repo mirroring enhancem.	<ul style="list-style-type: none">• Better air-gapped env support• Deeper integration into OCP• Quay Builder redesign• Content type Enhancements• App registry redesign
CLAIR	<ul style="list-style-type: none">• Container Security Operator (CSO)• Vulnerability data in OCP Console (via CSO)	<ul style="list-style-type: none">• Application content scanning (Clair v4)• Clair air-gapped & multi-arch support	<ul style="list-style-type: none">• 3rd party scanner plugged into Quay via Clair• Enhanced content coverage• Container Health Index

Container Native Virtualization



- CNV 1.3 Tech Preview (now)
- CNV 1.4 Tech Preview (soon)
 - Basic live migration
 - Containerized data importer
 - Progress reporting
 - Disk expansion
 - Blank disks
 - Operators for KubeVirt,
Containerized data importer
 - UI Enhancements
 - RDP, Serial, VNC, consoles
 - CRUD Disks, VM templates

The screenshot shows the CNV 1.3 user interface. On the left is a sidebar with a dark background and white text, listing various workloads: Home, Workloads (selected), Virtual Machines (highlighted in blue), Virtual Machine Templates, Pods, Deployments, Deployment Configs, Stateful Sets, Secrets, Config Maps, Cron Jobs, Jobs, Daemon Sets, Replica Sets, Replication Controllers, and HPAs. Below the sidebar is a main content area titled "Virtual Machines". At the top of this area is a "Create Virtual Machine" button. Below it is a filter bar with three buttons: "Running" (2), "Off" (1), and "Other" (0), followed by a "Select All Filters" link. The main list displays three virtual machines: "fedora-vm" (Running, Namespace: kubevirt-demo), "rhel-vm" (Off, Namespace: kubevirt-demo), and "windows-vm" (Running, Namespace: kubevirt-demo). The columns for the list are NAME, NAMESPACE, and STATE.

NAME ↑	NAMESPACE	STATE
fedora-vm	kubevirt-demo	Running
rhel-vm	kubevirt-demo	Off
windows-vm	kubevirt-demo	Running

Container-native virtualization roadmap



Near Term (CNV 2.1 / OCP 4.2)

- **Tech Preview**
- Live-migration with shared OpenShift Container Storage 4.2 (when available), to enable mobility of virtual machines for load balancing or maintenance reasons.
- Integration of Container-native Virtualization logs into must-gather, to assist with support case triage and resolution.
- Automated MAC address allocation for secondary NICs.
- Now installable via marketplace.

Medium Term (CNV 2.2 / OCP 4.3)

- **Tech Preview**
- Hostpath-provisioner support.
- Forensic VM capture (pause and capture disk/memory).
- Support CNV 2.x on RHEL 7 workers.

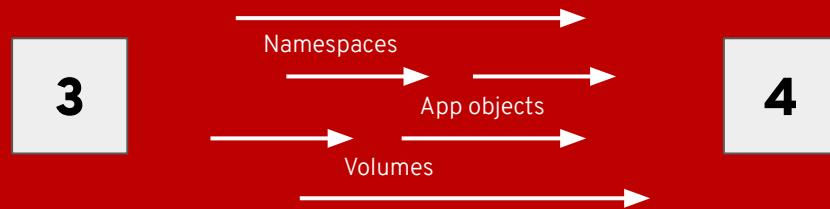
Central focus on enabling current technology preview consumers and improving our ability to deliver shortly after or in parallel to OCP releases.

Long Term (CNV 2.3 / 4.4+)

- **Tech Preview**
- Windows SVVP certification.
- Ensure VM/PV locality when using local storage.
- CPU pinning.
- NUMA locality.

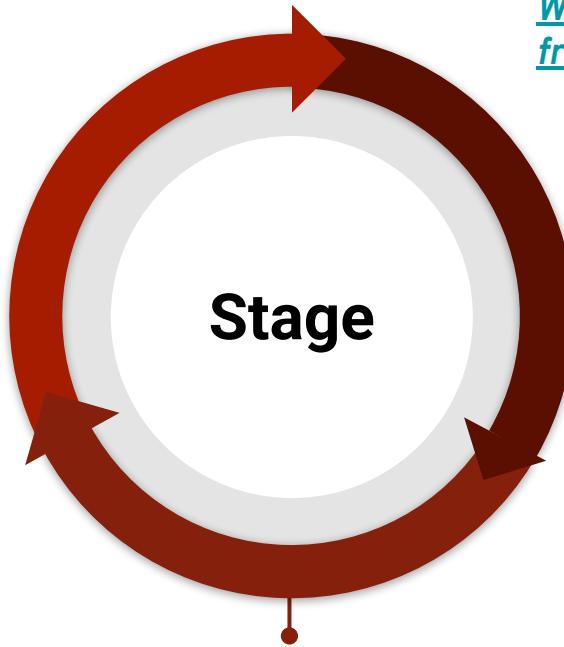
Continue to analyse and address gaps compared to traditional virtualization, while balancing against feedback from technology preview consumers.

Migrating to OpenShift 4



Plan

1. Select Source Cluster
2. Select Namespaces
3. Choose Copy or Move for each PV
4. Specify Destination



Stages the data from Source to Destination.

May be run multiple times.

Applications are running
no Downtime during step

[Watch a migration of MS-SQL Server from OCP 3.11 to OCP 4.1!](#)

Migrate

Quiesce Application

Migrate any delta bits not captured in stage.

Why did we choose this migration strategy?

Reducing risk

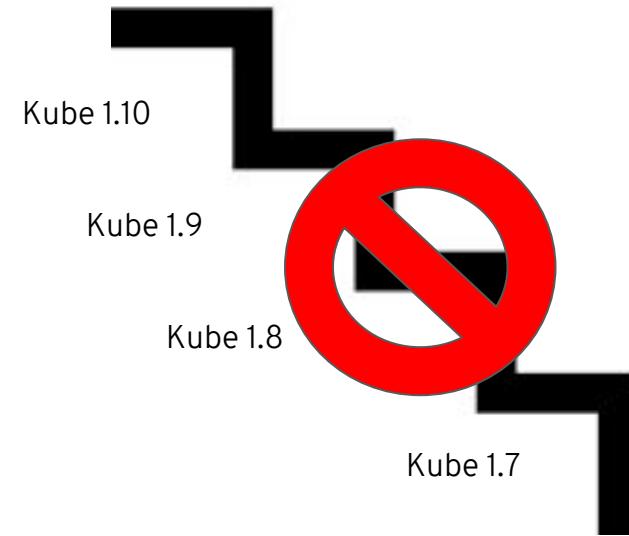
A ton of innovation went into OpenShift 4, and an in-place upgrade would have risk of failure in which there is no forwards or backwards remediation. It allows you to skip from 3.7/3.9/3.10/3.11 to 4.x. Skipping the need to install each one.

Useful for 4-to-4 migrations

A general migration tool is frequently requested and a better long term investment. Helps you build a foundation towards making your cluster investments less fragile.

Allows for staging

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



Granularity of Namespace(s) & ‘cluster-admin’ required

- Migration is at scope of a Namespace.
 - *Future will allow selecting resources inside of a Namespace*
- Cluster Scoped Resources are not handled
 - Cluster Role Bindings, SCCs, etc are not handled with migration.
 - Expectation is that cluster admin handles cluster scoped resources ahead of running a Migration.
- ‘cluster-admin’ required for initial release targeting OCP 4.2
 - Future plans to allow end user to migrate what they own post OCP 4.2+

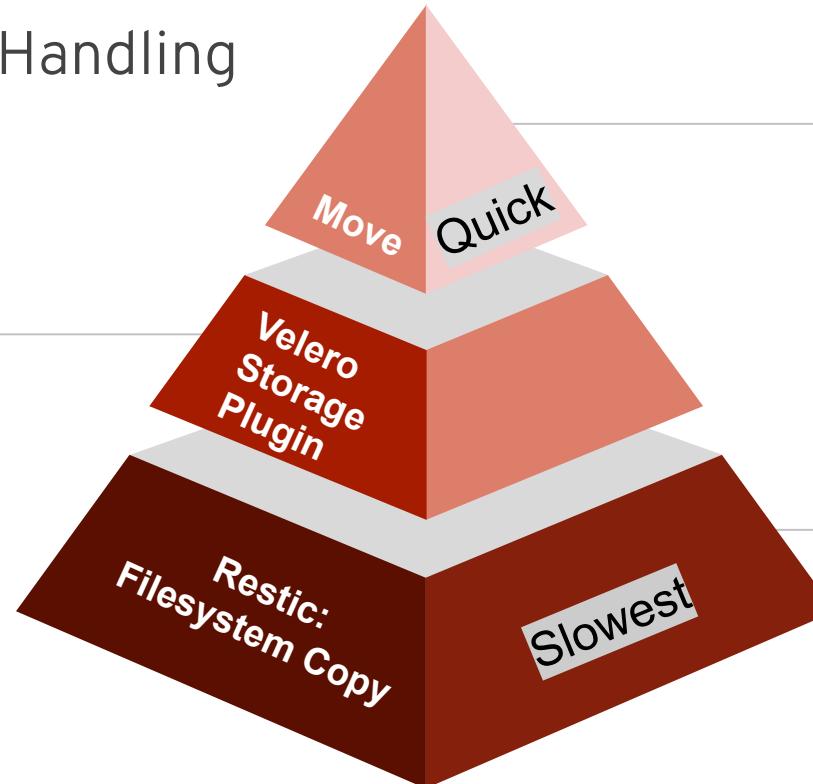
Persistent Volume Handling

Copy: Storage Provider Plugin

(AWS EBS, Google, Azure)

2

Leverage snapshot support from the storage provider such as Amazon EBS snapshots..

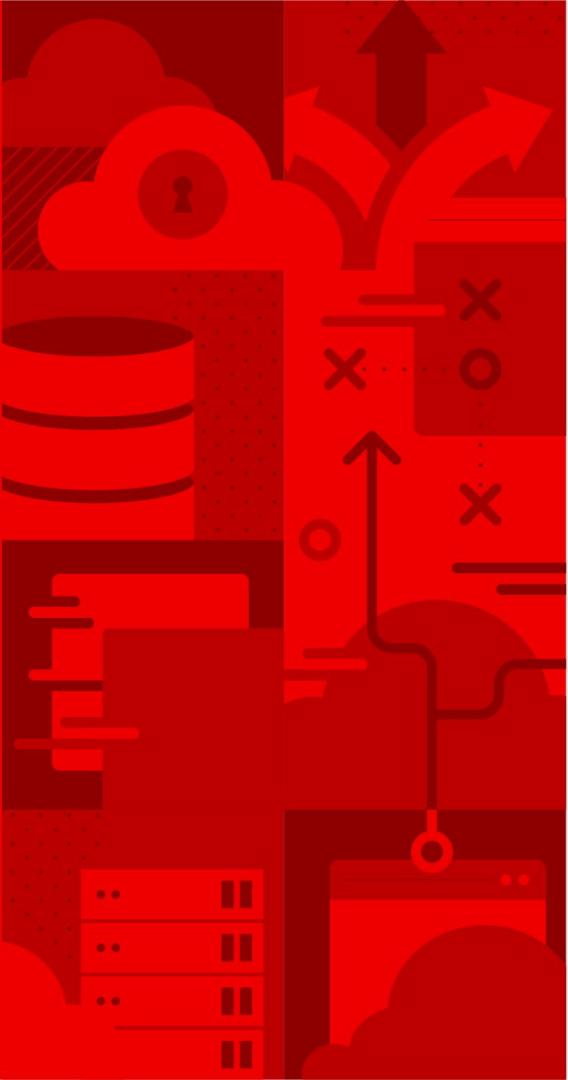


Move “Swing the PV”

The data remains where it is in the volume. The definition of the volume is essentially ‘swung’ from the source cluster to the destination cluster. Quickest migration strategy as it involves no processing of the data. No rollback capability, recommended to ensure a backup exists prior to moving.

Copy: Restic Filesystem level copy

Catchall, if no other plugins exist fall through to a filesystem level copy of the data on a PV. Most flexible approach, yet likely not as performant as other methods.



Questions?

 [linkedin.com/company/red-hat](https://www.linkedin.com/company/red-hat)

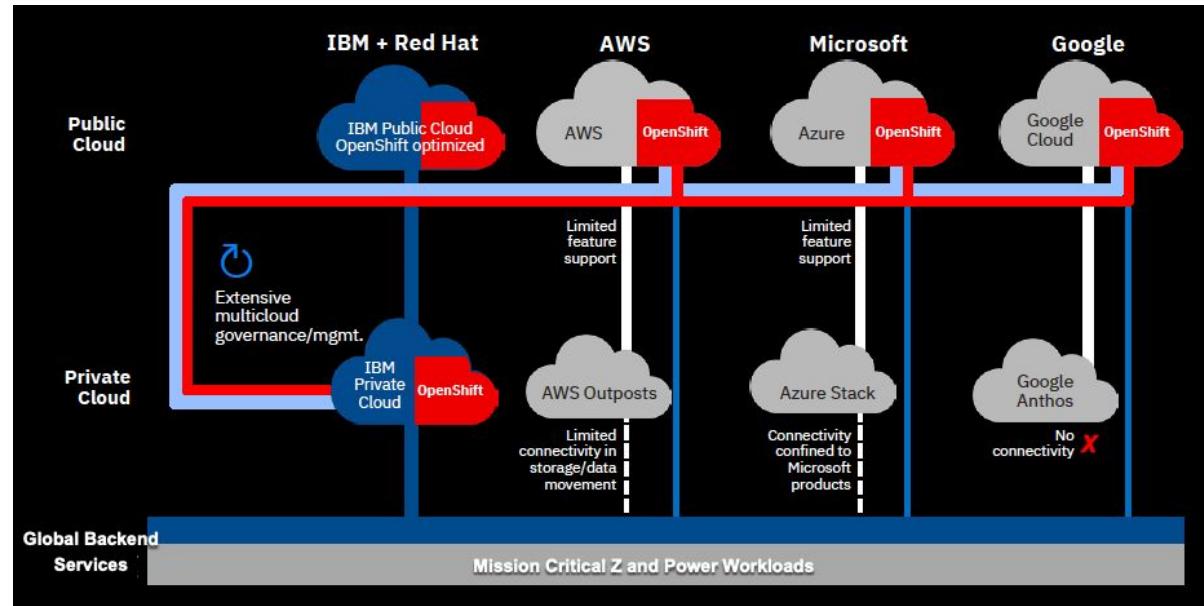
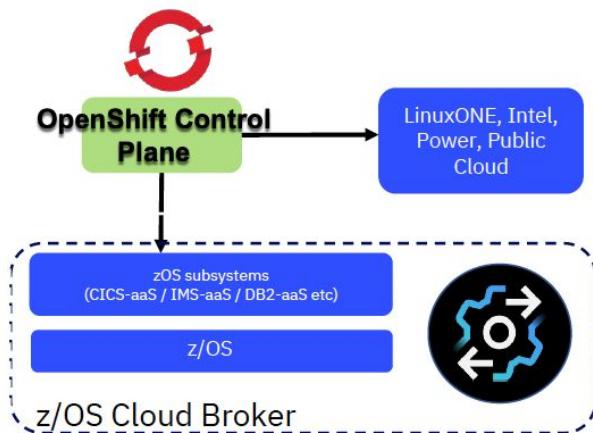
 [facebook.com/redhatinc](https://www.facebook.com/redhatinc)

 [youtube.com/user/RedHatVideos](https://www.youtube.com/user/RedHatVideos)

 twitter.com/RedHat

Multi-Arch

OpenShift 4 on IBM Z and Power Deliver the Industry's Only True Hybrid Multi-Cloud Platform for all Datacenter Services



OpenShift 4 on IBM Z and Power

First releases in 2020 will focus on CaaS functionality.

Three Primary Use Cases

1. **Data-gravity** -- apps connect via ultra-low-latency, ultra-secure and highly resilient network into legacy system-of-record (eg. Service Broker to zOS instances)
2. **Security/Compliance** -- apps can be deployed un-modified into zero-trust enclaves with strong data-governance and/or have strong-affinity to highly certified HSM-services (eg. core-banking, blockchain, crypto wallet, digital assets, quantum proof etc)
3. **Cloud-in-a-box** -- instant capacity on-demand with scale-up/out in a single footprint for space and power constrained data-centers

Releases will trail x86 by 1 until the middle of 2020 and then come in sync on 4.5.

