



# What's Next for OpenShift

## Q1 2021 Update

OpenShift Product Management

March 18th, 2021

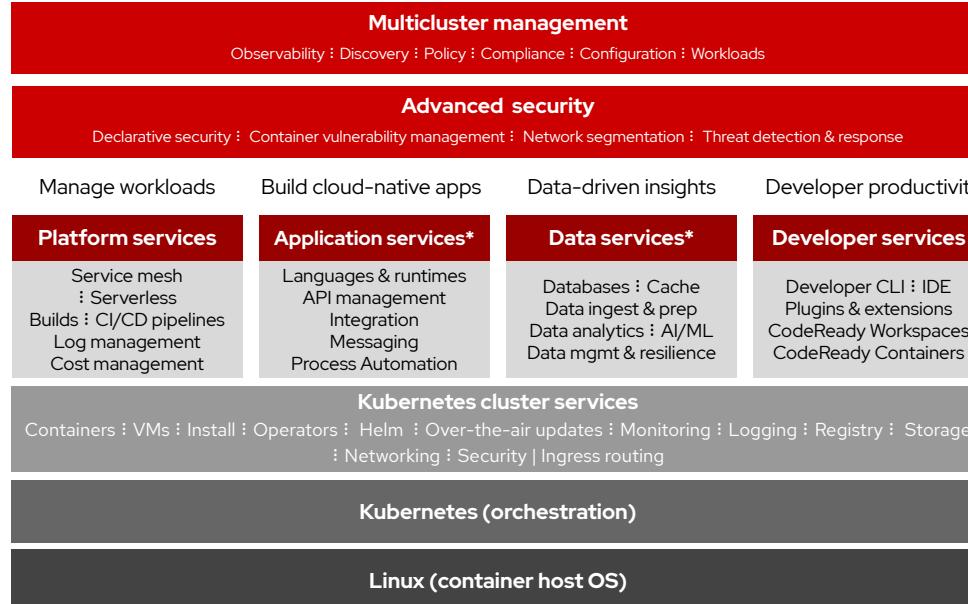
# Kubernetes powered Hybrid Cloud Platform from Red Hat

 **Red Hat**  
Advanced Cluster Management  
for Kubernetes

 **Red Hat**  
Advanced Cluster Security  
for Kubernetes

 **Red Hat**  
OpenShift  
Container Platform

 **Red Hat**  
OpenShift  
Kubernetes Engine



Physical



Virtual



Private cloud



Public cloud



Edge



\* OpenShift includes supported runtimes for popular languages/frameworks/databases. Additional capabilities listed are from Red Hat Application and Data Services

# OpenShift Roadmap

## Q2 2021

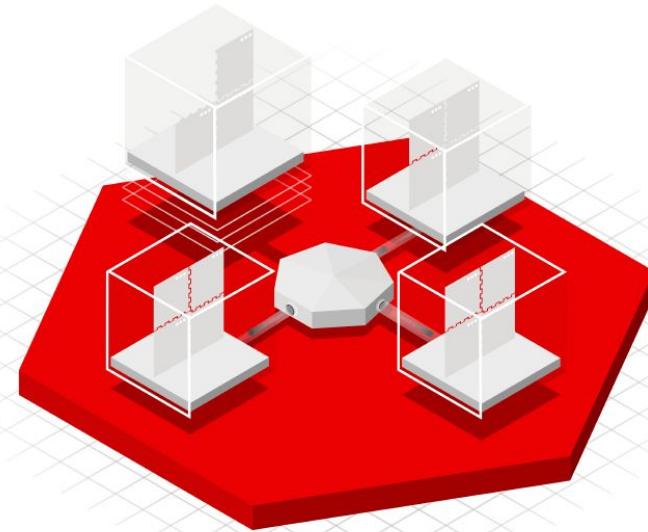
HOSTED	<ul style="list-style-type: none"> <li>• OSD consumption billing, autoscaling</li> <li>• Expanded ROSA and OSD Add-ons</li> <li>• ARO government region (MAG) support</li> <li>• Cost management for IBM and GCP</li> </ul>
PLATFORM	<ul style="list-style-type: none"> <li>• Windows BYOH</li> <li>• Vertical Pod Autoscaling</li> <li>• Pod Disruption Budget v1/beta to stable</li> <li>• Scheduling profiles</li> <li>• Windows BYOH</li> </ul>
APP	<ul style="list-style-type: none"> <li>• Azure Stack Hub</li> <li>• IPv6 (single/dual stack on control plane)</li> <li>• GA Userspace Interface API &amp; Library</li> <li>• Gateway API + Contour Tech Preview</li> <li>• External DNS Management</li> <li>• SmartNIC: OVS HW Offload</li> <li>• OVN Egress Router</li> <li>• HAProxy 2.2</li> <li>• ipfailover Support</li> <li>• SmartNIC Integrations</li> </ul>
DEV	<ul style="list-style-type: none"> <li>• OpenShift GitOps (Argo CD) GA</li> <li>• OpenShift Pipelines GA</li> <li>• OpenShift Builds v2 TP</li> <li>• Simplify access to RHEL subs in builds</li> <li>• OpenShift Serverless Functions TP</li> <li>• Console internationalization GA</li> <li>• Foundation for User Preferences</li> <li>• Better Operator version &amp; update mgmt</li> </ul>

## Q3 2021

HOSTED	<ul style="list-style-type: none"> <li>• Cost management forecasting and budgeting</li> <li>• Cert-manager operator</li> <li>• NetFlow/sFlow/IPFIX collector</li> <li>• Service Meshes federation, OCP Virt. VMs in Mesh</li> <li>• FIPS compliance for Kata Containers</li> <li>• Move to out-of-tree cloud providers</li> <li>• Subject claim URI scheme for OIDC IdPs</li> <li>• Windows with containerd runtime support</li> <li>• ACM scale to 2000 single node clusters</li> <li>• CoreOS dynamic first boot images for fast scaling</li> <li>• MetalLB Support (L2)</li> <li>• ACM scale to 2000 single node clusters</li> <li>• CoreOS dynamic first boot images for fast scaling</li> <li>• Windows with containerd runtime support</li> <li>• Subject claim URI scheme for OIDC IdPs</li> <li>• Move to out-of-tree cloud providers</li> <li>• FIPS compliance for Kata Containers</li> <li>• Service Meshes federation, OCP Virt. VMs in Mesh</li> <li>• NetFlow/sFlow/IPFIX collector</li> <li>• Cert-manager operator</li> <li>• Cost management forecasting and budgeting</li> </ul>
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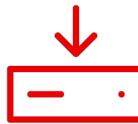
## 2021+

HOSTED	<ul style="list-style-type: none"> <li>• Jenkins Operator GA</li> <li>• OpenShift Builds v2 &amp; Buildpacks GA</li> <li>• Tekton Hub on OpenShift</li> <li>• Kata containers in Pipelines</li> <li>• OpenShift Serverless Functions GA</li> <li>• Global Operators Model &amp; new Operator API</li> <li>• Operator Maturity increase via SDK</li> <li>• Dynamic Plugins for the OCP Console</li> <li>• Azure China &amp; AWS China</li> <li>• Alibaba, AWS Outposts, Equinix Metal, &amp; Microsoft Hyper-V</li> <li>• Utilize cgroups v2</li> <li>• Enable user namespaces</li> <li>• Additional Windows Containers capabilities*</li> <li>• Gateway API + Contour</li> <li>• Network Topology and Analysis Tooling</li> <li>• SmartNIC Integrations</li> <li>• Network Policy v2</li> <li>• BGP Advertised Services (FRR)</li> <li>• OVN no-overlay option</li> </ul>
PLATFORM	<ul style="list-style-type: none"> <li>• Cost mgmt integration to Subs Watch, ACM</li> <li>• ROSA AWS console integration</li> <li>• Cluster Suspend / Resume</li> </ul>



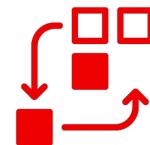
# CORE

# A Kubernetes core that ticks all the boxes



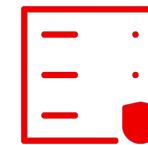
## Install, Run and Upgrade

Tools for increased automation “around” installation to fill out the experience tailored to each customer. Reduced complexity with increased flexibility of options and performance. APIs for full cluster lifecycle to help customers run OCP-aaS internally.



## Advanced Scheduling

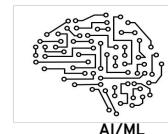
Taking workloads to the next level by combining Kubernetes extension points with OpenShift’s unique Node Feature Discovery. Only possible with the tight integration of the cluster with Node management that ties into the operating system.



## Security

Secure out of the box, with advanced options available to address your threat environment. New focus for 2021 on zero trust for workloads and addressing supply chain attacks at multiple layers.

# Specialized workload scheduling framework



## Multi-Cluster Application Dispatcher

Job Queues : Quota : Priorities

## Open Data Hub

Prometheus: Grafana: SELDON: Spark: Jupyterhub: Ceph: Kafka: Argo

Specialized workload scheduler and NUMA aware



Specialized workload plugin

Gang scheduler for specialized workload: HPC : Deep Learning: Big Data

Scheduling Profiles/Plugin/Extension points

## Topology Aware Scheduling

Node Feature Discovery

## OpenShift

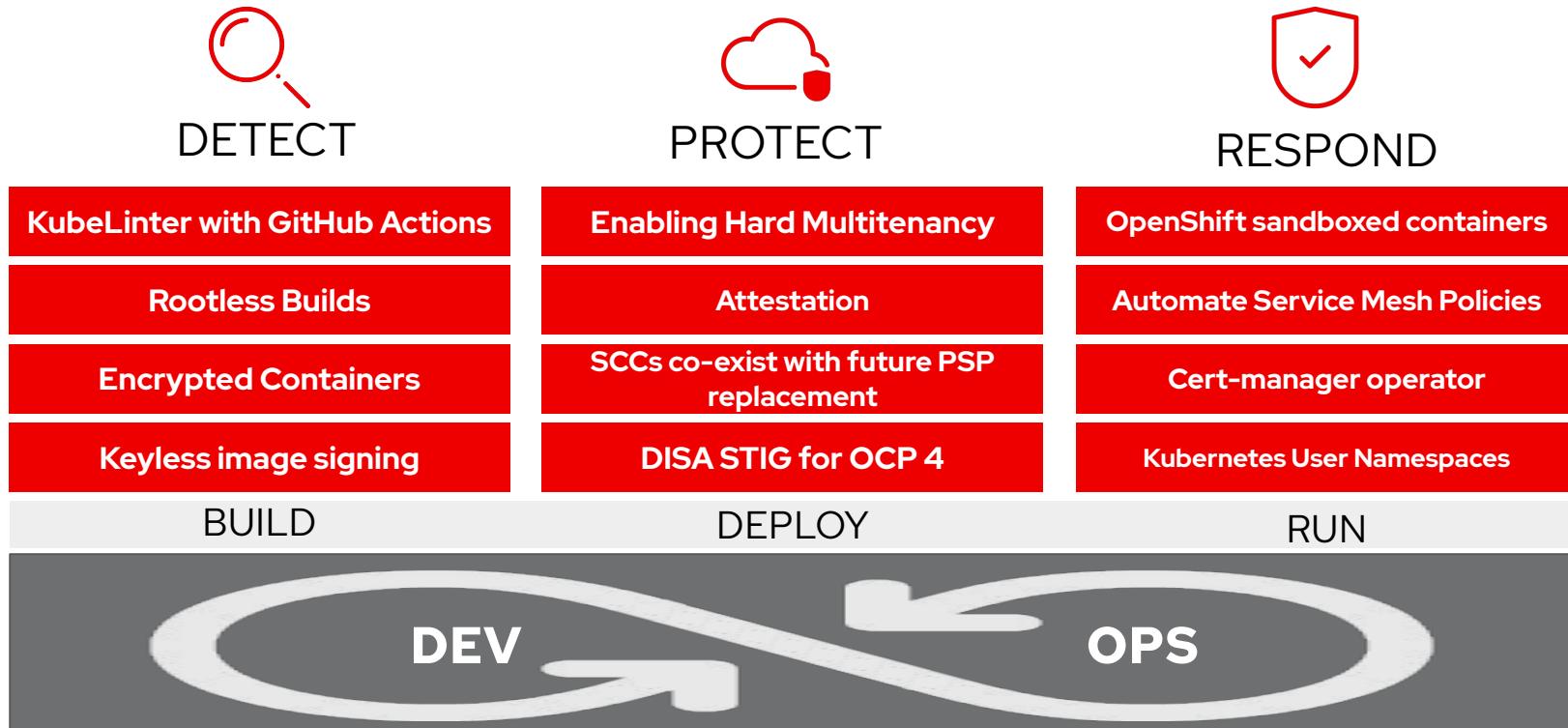
## **Red Hat Enterprise Linux & Red Hat Enterprise Linux CoreOS**



(Azure, AWS, GCP, IBM, Red Hat)

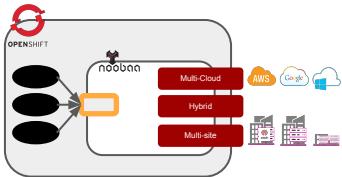


# Future of Security: Zero Trust



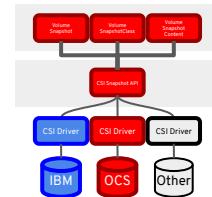
## CORE PLATFORM

# Storage Direction



## Secure Storage for all Infrastructures

- More choice by increasing the number of **platforms** that OCS can be deployed on
- Further secure your data centers with **encryption** for data at rest and in transit in OCS
- Use OCS to help mitigation of outages with WAN **DR** functionality



## Any Storage, Anytime

- Get new storage features faster, outside the standard release schedule
- More vendors, more storage options - select the right solution
- Make the move to CSI smoothly with limited impact, seamless transition

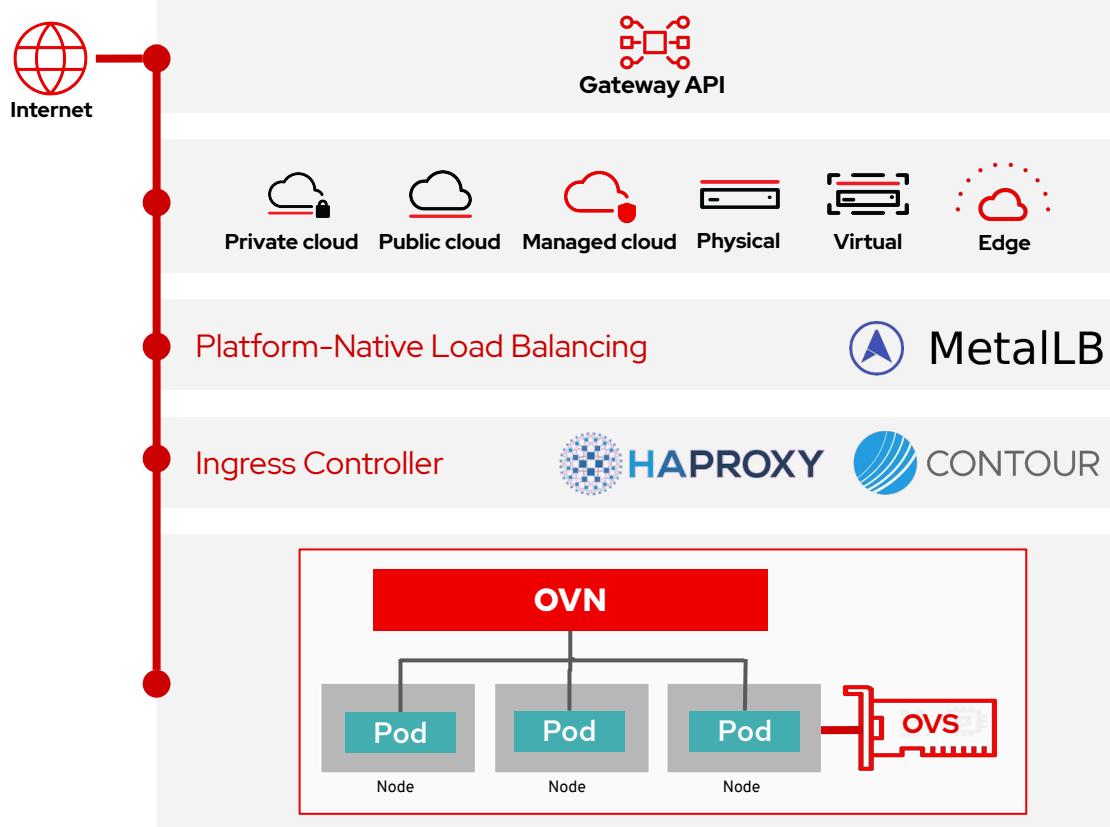


## Stay informed

- Monitor your storage at the node and the PV level
- Get the appropriate data points to make informed decisions ahead of time

## CORE PLATFORM

# OpenShift Networking supports your most advanced workloads



- ▶ Unified traffic handling so you configure all your traffic the same way
- ▶ Any supported platform – add or swap easily, hybrid scenarios
- ▶ Flexibility to use native traffic distribution for optimal performance
- ▶ Your traffic, your way: L4-L7, Envoy, by-pass
- ▶ OVN for advanced traffic workloads
- ▶ IPv6 single/dual for scale
- ▶ HW Offload (OVS, IPsec, ...) for performance
- ▶ Multi-NIC support to align host networking
- ▶ BGP-advertised services (FRR)
- ▶ Observability for improved understanding
- ▶ eBPF precision traffic control
- ▶ No-overlay option



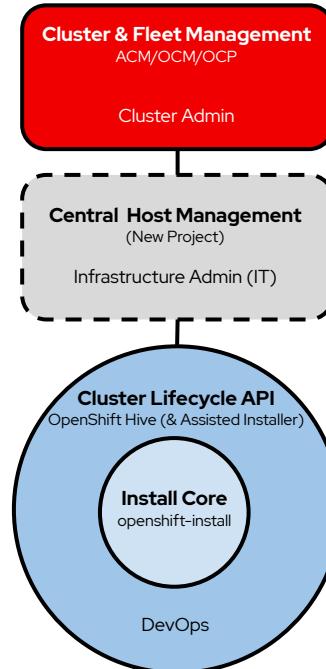
## CORE PLATFORM

Deploy OpenShift to even more platforms & RHEL 8 compute node support

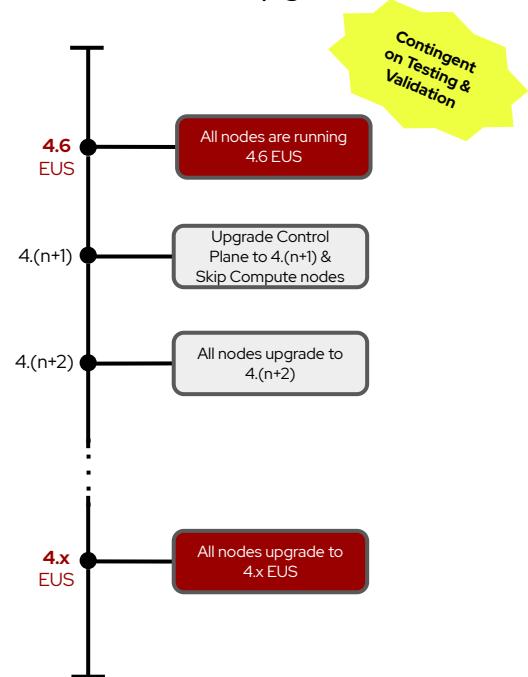


# Installation & Updates

## Unified Installation Experience



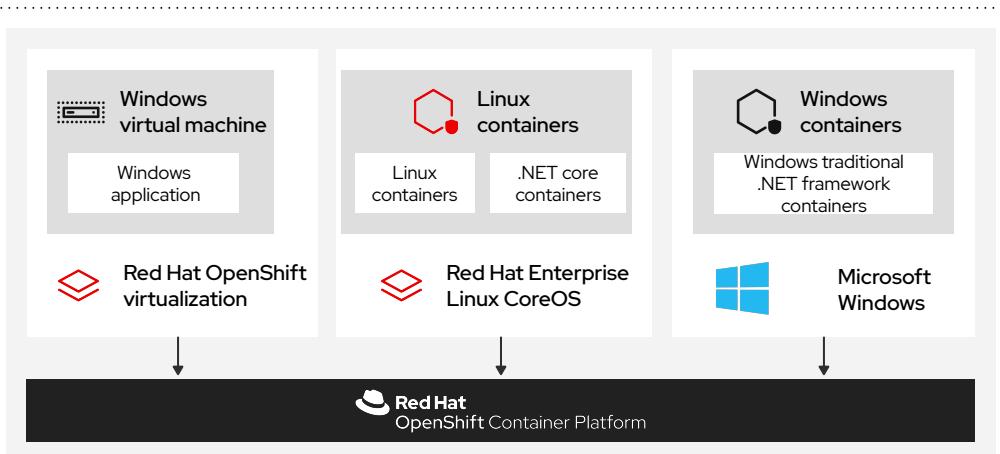
## EUS to EUS Upgrades



## CORE PLATFORM

# Windows Containers in OpenShift

## Mixed Windows and Linux workloads



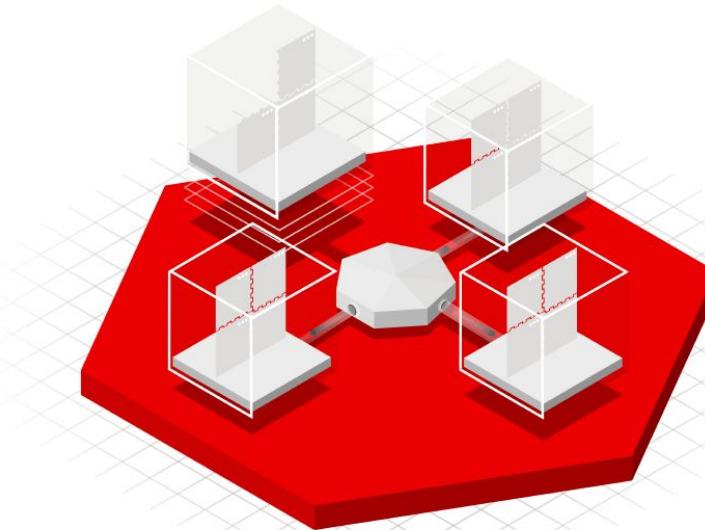
Deploy OpenShift with Windows Containers to even more platforms



## Installation Experience

### Bring your own Windows Hosts

Reuse "pet" Windows instances as OpenShift work nodes, run Windows workloads and gain similar benefits that their Linux workloads get when being managed by OpenShift



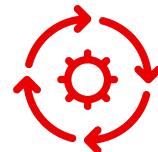
## BRIDGING SINGLE & MULTIPLE CLUSTERS

# Expansion from single to multi-cluster as you need it



## Networking

Provide a toolbox to secure, isolate, and connect both basic & specialized workloads.  
Orchestrate multi-cluster networking so your apps don't have to handle that complexity.



## Observability

Provide the hooks, extension points and query interfaces that allow teams to run apps across clusters.  
The platform is the correct place to standardize log config, container builds, monitoring metrics and troubleshooting dashboards.

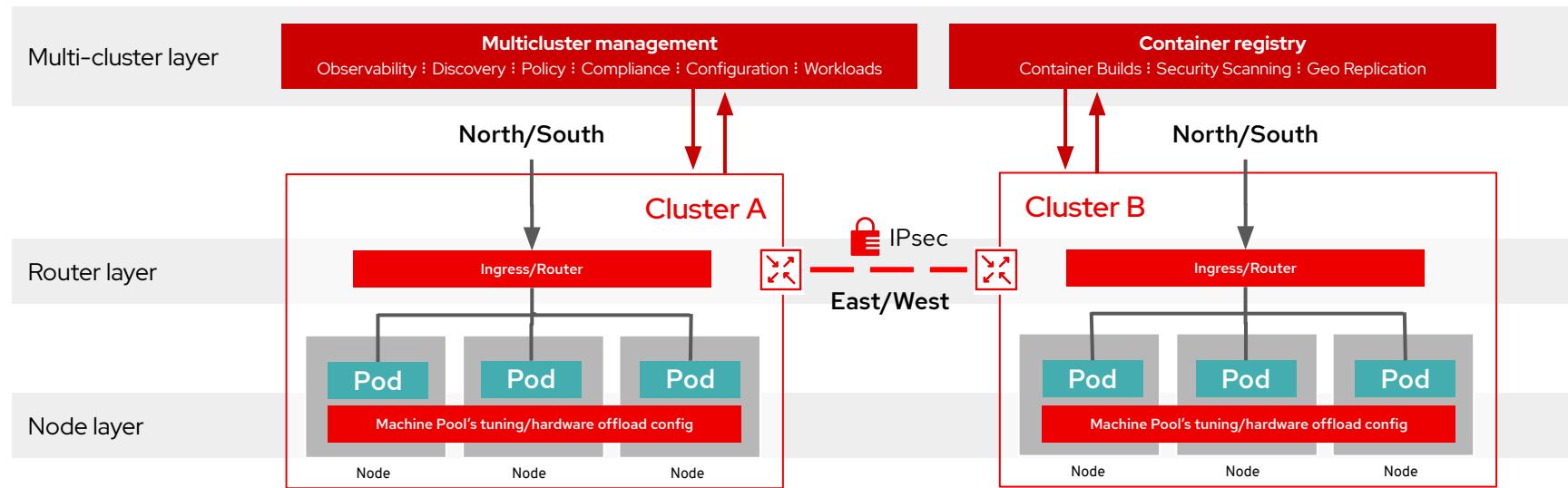


## DevSecOps/GitOps

DevOps is both technical and cultural. OpenShift provides technical tools across the gamut for devs and admins.  
Building on automated operations, provide fully programmatic install/management with admin-defined policy at each layer.

## BRIDGING SINGLE AND MULTIPLE CLUSTERS

# Standardized tools for your 1st and 100th cluster



## BRIDGING SINGLE AND MULTIPLE CLUSTERS

## Multi-cluster: Seamless networking mesh extends across cluster boundaries

Advanced Cluster Management (ACM) maintains East-West networking between all of your clusters using Submariner

Multi-cluster networking makes it dead simple to span your apps across failure domains and geographies.

- ▶ Provides IPsec tunnel cluster to cluster
- ▶ IPsec = CNCF Submariner
- ▶ Service Mesh = CNCF Istio with federation

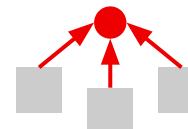
Better than stretched cluster



Easier HA apps across clusters



Securely access shared services



## Single Cluster: Foundation to gather info for cluster and every app on top

Capture critical telemetry data to create SLOs, be notified of any breach, and use them for resolving issues quickly and/or optimize the status quo.

### Monitoring

- ▶ Extend our out-of-the-box, platform-related SLOs with your own rules.
- ▶ Support non-administrators to individually configure where alert notifications will go.
- ▶ Allow administrators to push selected metrics to a centralized metrics aggregation system.
- ▶ Allow the use of custom metrics for HPA.

### Logging

- ▶ Allow processing and querying JSON logs.
- ▶ Adopting Loki as an alternative storage engine to Elasticsearch.
- ▶ View contextualized log information inside the OpenShift Console.
- ▶ Govern noisy applications which would otherwise overflow the logging system.

## BRIDGING SINGLE AND MULTIPLE CLUSTERS

# Multi-cluster: Observe your entire fleet from one location

Advanced Cluster Management (ACM) aggregates telemetry data from all your clusters

- ▶ CCX Insights data will be visible in the ACM hub
  - Avoid unplanned downtime and better manage the security risks of your entire fleet. Help pinpoint the risks and resolve them

The screenshot shows the Red Hat Advanced Cluster Management for Kubernetes web interface. The left sidebar has sections like Home, Getting started, Overview, Automate infrastructure (Cluster management, Bare metal assets, Provider connections), Manage applications, Govern risk, and Visual Web Terminal. The main content area shows a cluster named "aws-openshift-cluster". It displays basic information such as Infrastructure provider (Amazon Web Services), Cluster API address, Cluster ID, and Labels. A summary section says "10 identified issues" and includes a donut chart showing the total risk distribution. Below this is a table titled "Recommendations with remediation" listing three items with columns for Description, Category, and Total risk.

Description	Category	Total risk
Code injection risk or wrong pid altering when rhmda daemon file ...	Security	2 more
Cluster upgrade will fail when default SCC gets changed	Service Availability	1 more
Unable to set or reset the password during provisioning	Fault Tolerance	= Moderate

At the bottom, there are counts for Nodes (6), Applications (3), and a status indicator for the cluster.

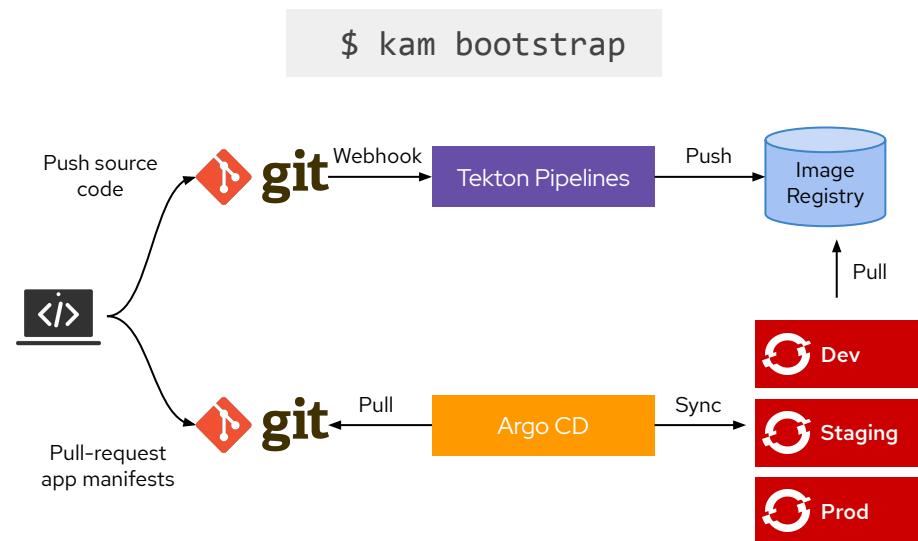
- ▶ SREs and DevOps teams
  - Improve and support SRE / DevOps practices with cluster health information and how that may impact application availability
- ▶ IT Operations / Cluster admins:
  - Aggregated data and metrics from "Regional" Hubs to a "Geographic" Hub .
- ▶ Cost Management
  - Help customers understand utilization and make cost adjustments via scale automatically
  - Leverage Cluster Pools (Claim and Hibernate) to mitigate cost associated to off hours and overnight spend.

# Multi-cluster: GitOps for the entire cluster and application lifecycle

Recommended repo layouts, workflows and our user interface make it easy for all teams to adopt GitOps

OpenShift provides a full set of tools enabling GitOps and DevSecOps workflows:

- ▶ 4.8: Builds v2 TP, Pipelines GA, GitOps GA
- ▶ Integrate with popular secret mgmt tools
- ▶ Promotion between different envs
- ▶ App delivery views coming to Dev Console
- ▶ kam CLI for bootstrapping GitOps workflows



# Multi-cluster: Unlock new DevSecOps capabilities with many clusters

Advanced Cluster Management (ACM) provides the distribution point for GitOps tools and best practices.

Use ACM's global view to augment each cluster:

- ▶ ACM installs GitOps Operator on clusters
- ▶ ACM managed clusters are added into OpenShift GitOps as target clusters
- ▶ Credential Management across clusters
- ▶ Deploy Advanced Cluster Security (ACS) on managed clusters

Integrate with Red Hat portfolio for multi-cluster workflows:



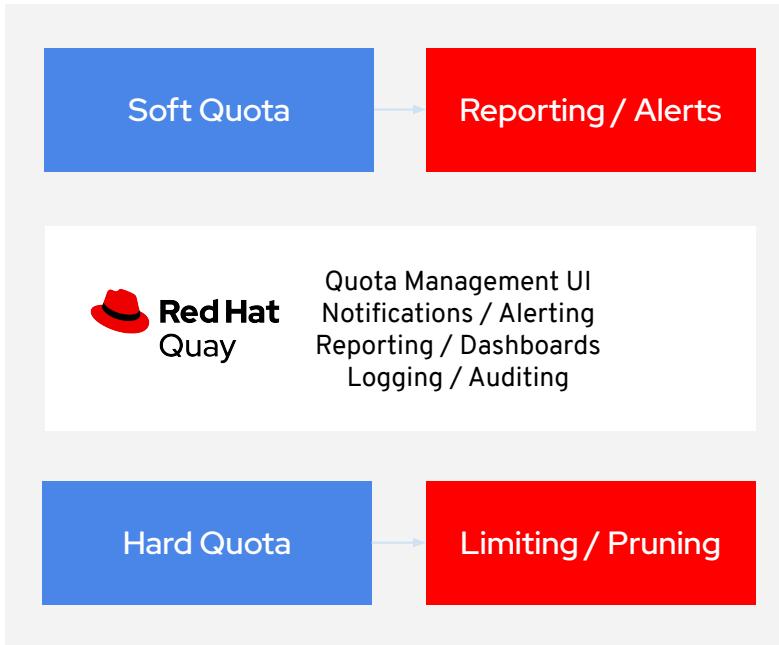
Cluster Lifecycle, Application Lifecycle and Governance, Risk and Compliance



Business Continuity: Integration for disaster recovery and continuity

# Multi-cluster: Registry Quota Management

Serving multiple organizations and multiple clusters with confidence



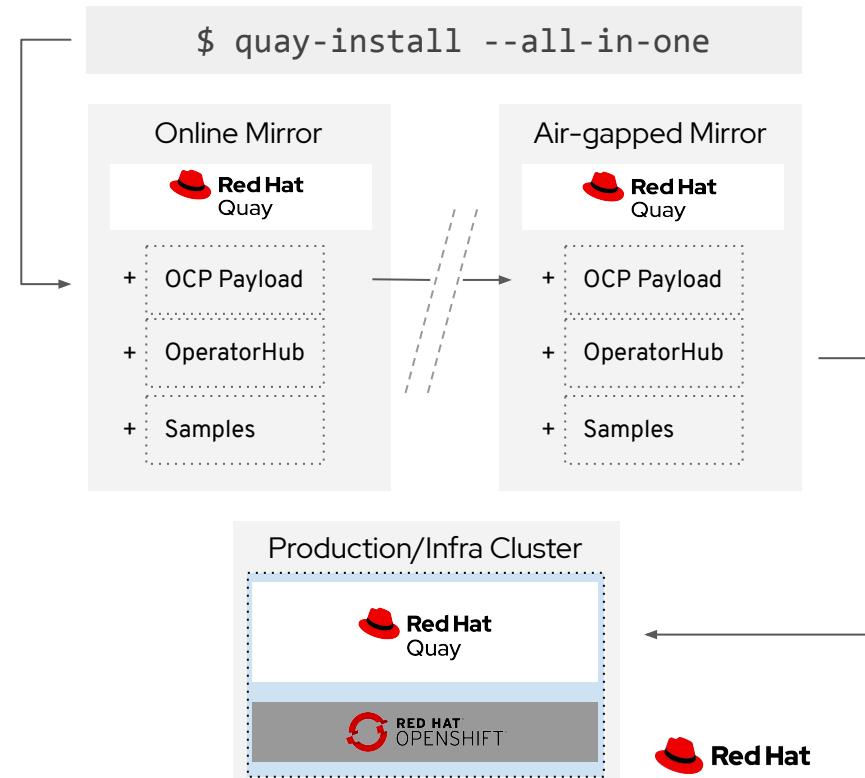
- ▶ Quota Management for various resources:
  - Image Storage consumption
  - Push / Pull operations
  - Network egress bandwidth (tbd)
- ▶ Important for customers with multiple clusters from different departments / businesses
- ▶ Allows to offer different service tiers in the registry (dev vs. production)

RED HAT QUAY

# Bootstrap registry for disconnected clusters

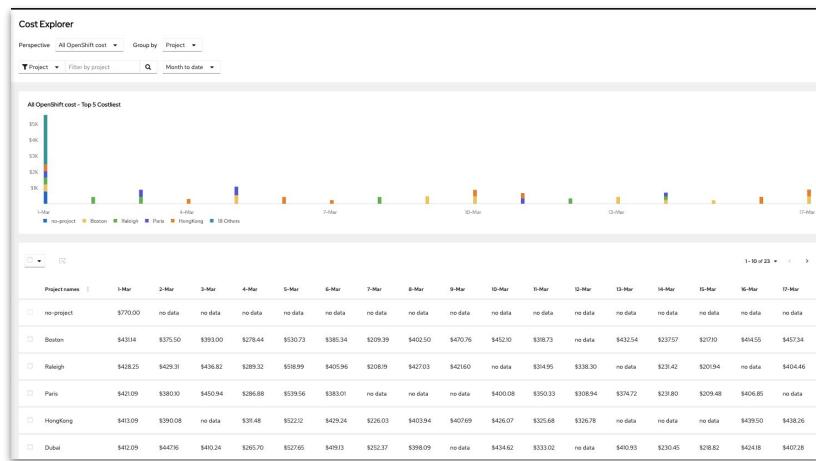
Solving the chicken-egg problem for mirroring OCP content

- ▶ Disconnected clusters and registries need their binaries mirrored into the air-gapped environment before deployment
- ▶ A quick install variant of Quay and automation to mirror OpenShift content helps customers in regulated environments to get up and running quickly and stay in sync over time
- ▶ Local all-in-one Quay instance provided at no additional cost\*



# Multi-cluster: Track expenditure with Red Hat Cost Management

- ▶ Cost Visualization and Modeling
  - Allow customers to represent tenant usage model via Tier rating and Currency Support
  - Drive behavior change in our customers
- ▶ Brand new Cost explorer view
  - Full time based view of tenant costs for historical context
- ▶ Additional support for customers using OCP on GCP and IBM Cloud



**Red Hat  
Insights**



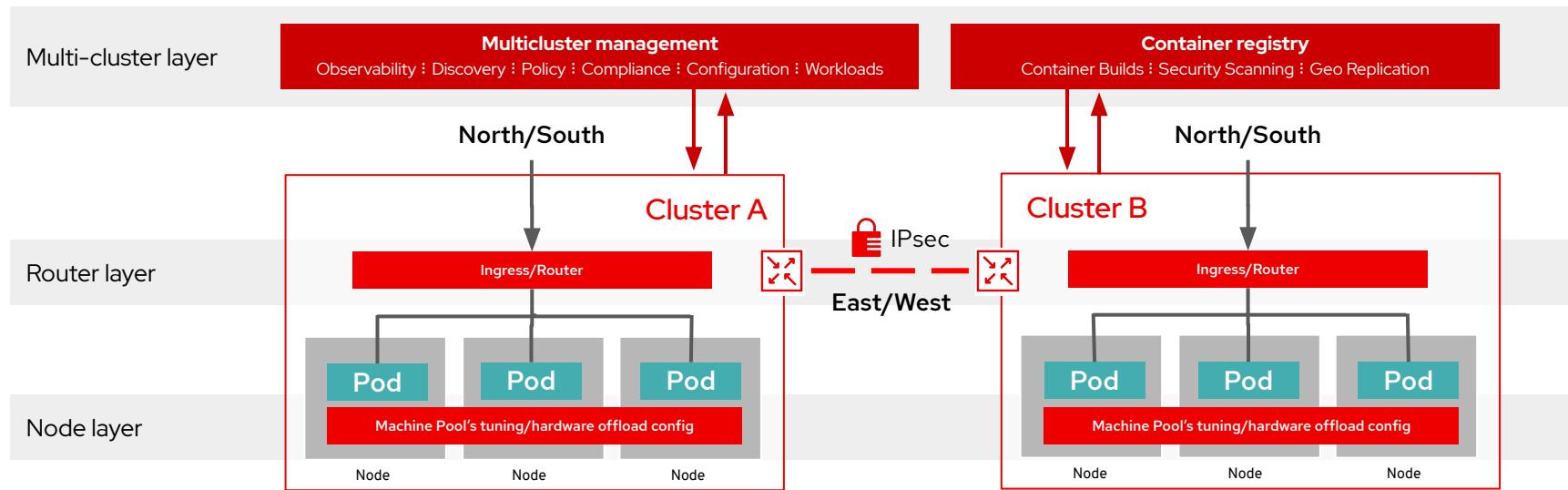
**Red Hat  
Advanced Cluster  
Management  
for Kubernetes**

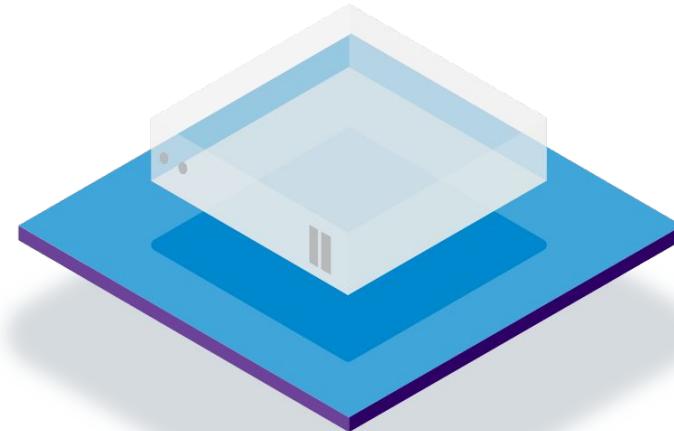


**Red Hat  
Marketplace  
Operated by IBM**



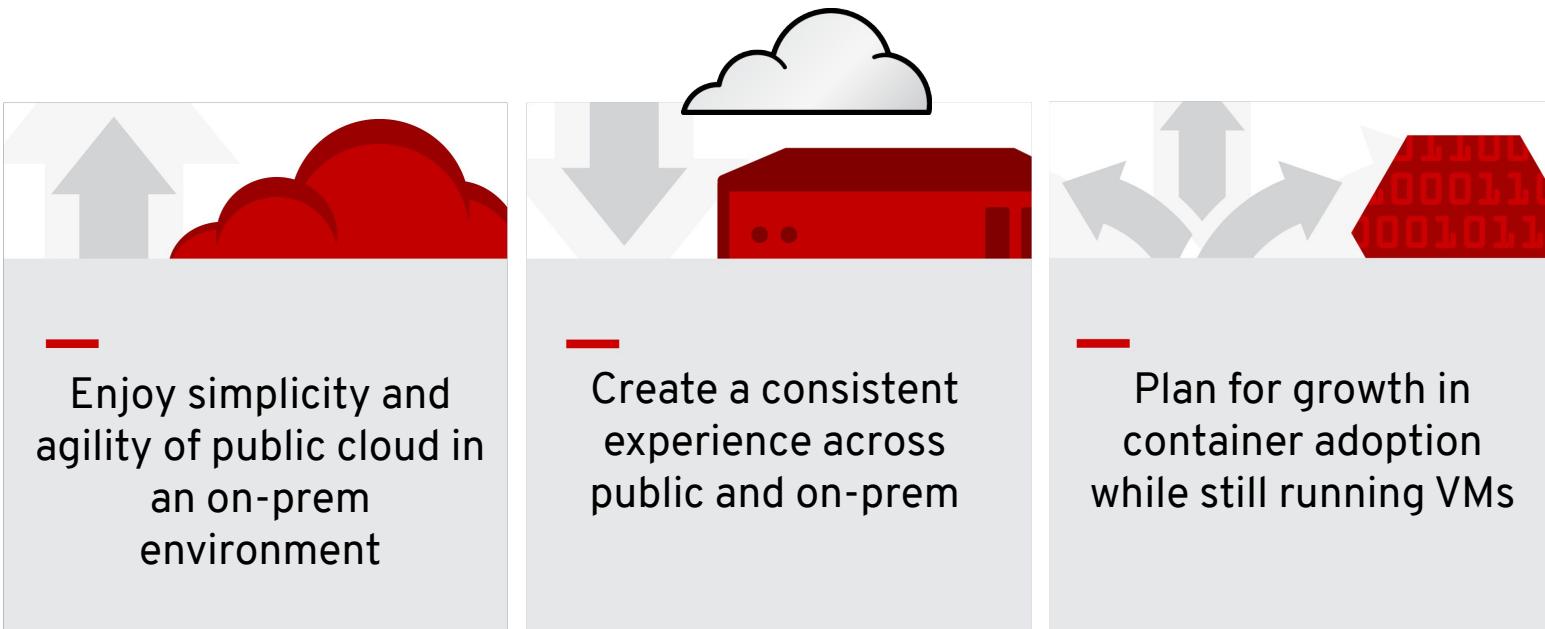
# Standardized tools for your 1st and 100th cluster





## Kubernetes-native Infrastructure

## Kubernetes-native Infrastructure



# OpenShift on Bare Metal

## What's Coming Next?

### Centralized Bare Metal Provisioning

Powered by Metal<sup>3</sup> and the Assisted Installer, manage bare metal hosts for other clusters

### Schedule Pods Based on BIOS Settings

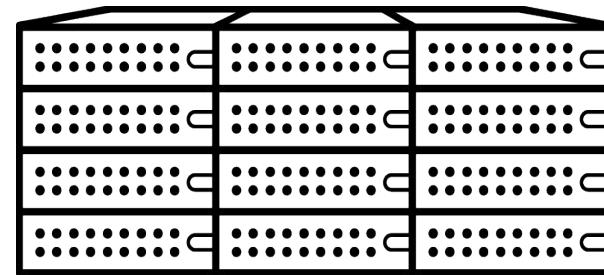
Take advantage of specific hardware attributes in your workloads

### Assisted Installer meets Metal<sup>3</sup>

Manage bare metal nodes of clusters deployed with the Assisted Installer

### Advanced Host Network Configuration

Using Kubernetes NMState, configure hosts deployed by IPI, Assisted Installer or existing cluster nodes



# What's next for OpenShift Virtualization



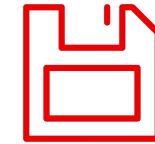
## Simplified configuration

Reduce complexity for admins when configuring VM storage & networking



## Developer friendly

Developers access VM services and data in a natural way with Service Mesh and developer pipelines

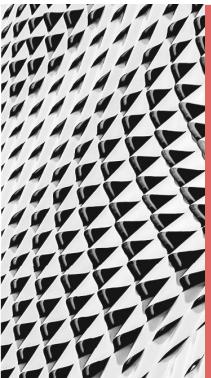


## Data protection

Extend OpenShift data protection to backup and restore VMs alongside apps in a namespace or cluster.

# Simplified configuration and deployment

Move infrastructure forward without leaving apps behind



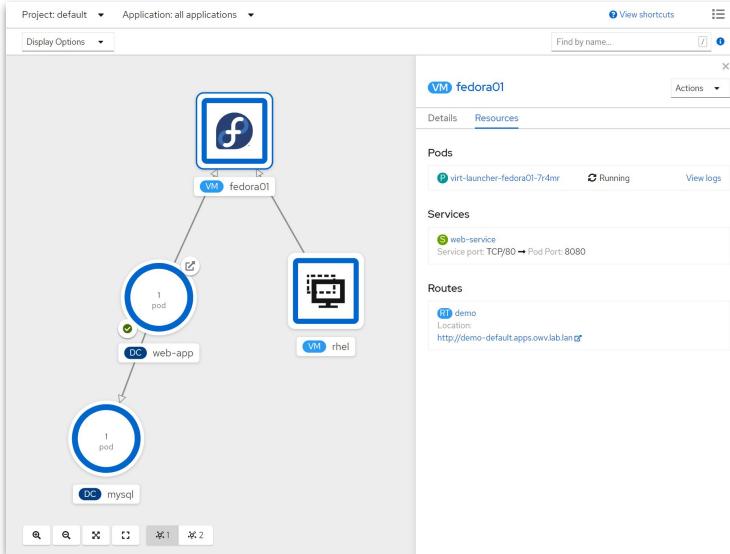
*"In the aerospace industry, IT solutions should be innovative and streamlined to rapidly deliver applications. ... OpenShift Virtualization has enabled us to move our virtualized workloads onto containers, giving us the ability to continue to support those workloads from a single management plane with Red Hat OpenShift. "*

Matt Wittstock, Cloud Architect  
Lockheed Martin

Reduce complexity for administrators to properly configure VM storage and networking

- ▶ Storage profiles automatically configure storage classes with proper defaults.
- ▶ Accelerate AI / ML compute workloads with GPU passthrough
- ▶ Consistent infrastructure with node network configuration rollout

# Unified developer tools, process and pipelines for all apps



- ▶ Improved integration between VMs and modernized apps
- ▶ Ensure a seamless transition as you modernize VM apps to microservices with service mesh.
- ▶ Improve build and test quality with VMs and containers in a developer pipeline

# Migration Toolkit for Virtualization

The screenshot shows the Migration Toolkit for Virtualization interface. The left sidebar has navigation links: Providers, Migration Plans, Mappings (Network, Storage), and a dropdown menu. The main area shows a "Migration plans > test-plan" view titled "Migration details by VM". It lists one item: "miguel-rhel8" with a start time of "04 Mar 2021, 16:20:..." and data copied at "3 / 9 GB". Below this, a table shows migration steps: "Transfer disks" (Elapsed time: 00:06:32) and "Convert image to kubevirt" (Elapsed time: 00:00:00). The status for both steps is "Transfer".

Name	Start time	End time	Data copied	Status
miguel-rhel8	04 Mar 2021, 16:20:...		3 / 9 GB	Transfer

Step	Elapsed time	State
Transfer disks	00:06:32	Transfer
Convert image to kubevirt	00:00:00	Transfer

## Automation for bringing VMs to OpenShift

Mass migrate VMs from VMware vSphere 6.5+ to OpenShift Virtualization..

## Reducing VM downtime

Concentrating on reducing migration related downtime for the tool's GA

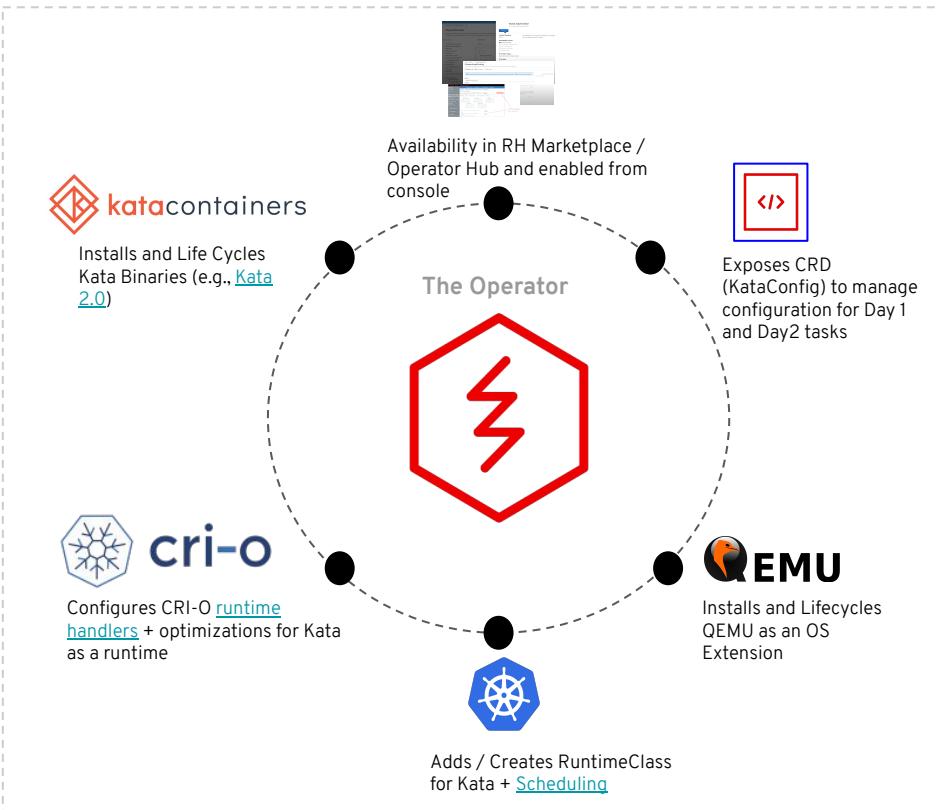
## Executing pre-migration checks

Save customers from time wasted if a migration is going to fail or is not a good fit as currently configured.

## Progressing from beta to GA

# OpenShift sandboxed containers (Kata) Operator

Kata Containers as a Service (Operator machinery)



Usage Manual

Admin creates KataConfig (optionally selects nodes that will have Kata enabled)

```
apiVersion: kataconfiguration.openshift.io/v1
kind: KataConfig
metadata:
  name: example-kataconfig
spec:
  kataConfigPoolSelector:
    matchLabels:
      custom-kata1: test
```

Operator automatically enables Kata on the nodes and creates the RuntimeClass

```
apiVersion: node.k8s.io/v2
kind: RuntimeClass
metadata:
  name: my-kata-class
Handler: kata-qemu
```

Developer

```
apiVersion: v1
kind: Pod
metadata:
  name: mypod
spec:
  runtimeClassName: kata-qemu
```

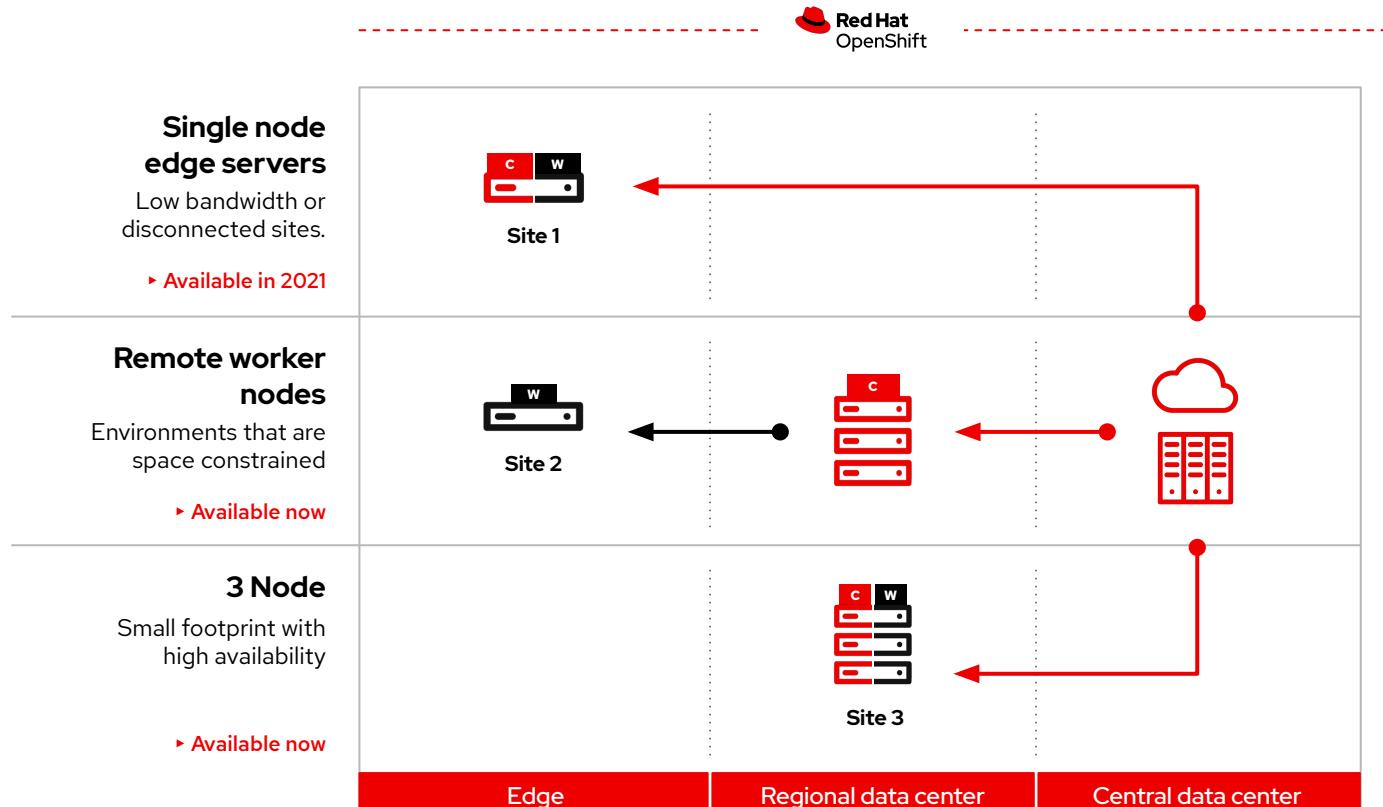
Cluster Admin



The Operator



# OpenShift for Edge



**Red Hat**  
Advanced Cluster Management for Kubernetes



Cluster management and application deployment

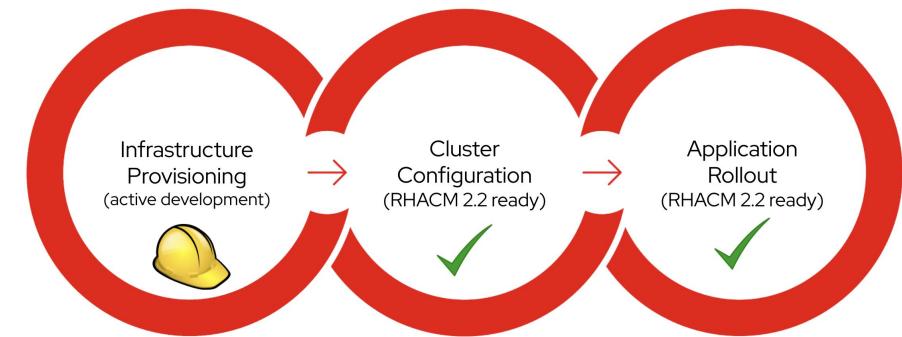


Kubernetes node control

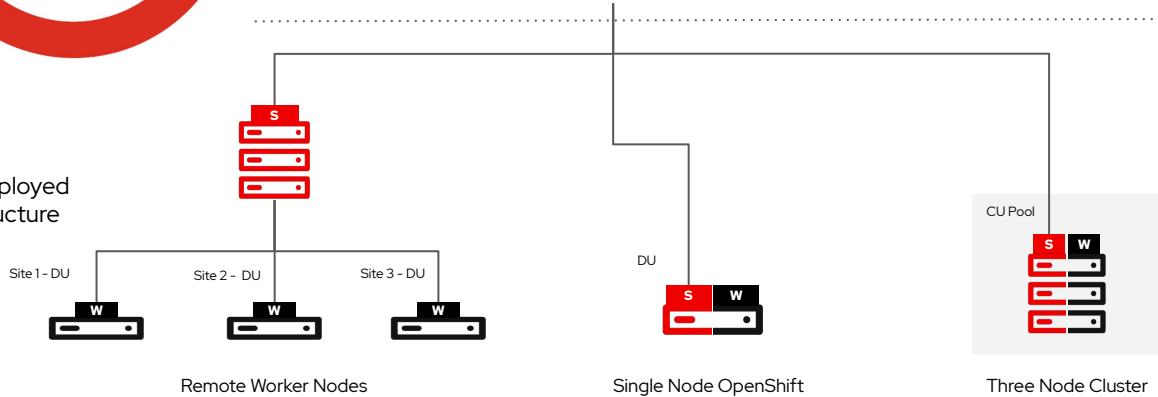
**Legend:**  
**C:** Control nodes  
**W:** Worker nodes

**Red Hat**

## Zero Touch Provisioning



ZTP Deployed Infrastructure



ZTP - Zero Touch Provisioning  
DU - Distributed Unit (5G RAN)  
CU - Central Unit (5G RAN) - future

## Example deployment Overview

Existing Infrastructure  
Regional Data Center

 Red Hat Advanced Cluster Management for Kubernetes

# Telco 5G Roadmap

1H 2021

2H 2021

2022

## 5G Core

- IPv4 and IPv6 dual stack networking
- Performance profile setup helper

- NUMA aware memory management
- Hyperthreading aware scheduling
- Gatekeeper: labels and annotations update

- NUMA aware scheduler to minimize need for workload rescheduling up front
- Load Balancer for bare-metal
- Additional SmartNIC enablement

## 5G RAN Centralized Unit and (CU) Distributed Unit (DU)

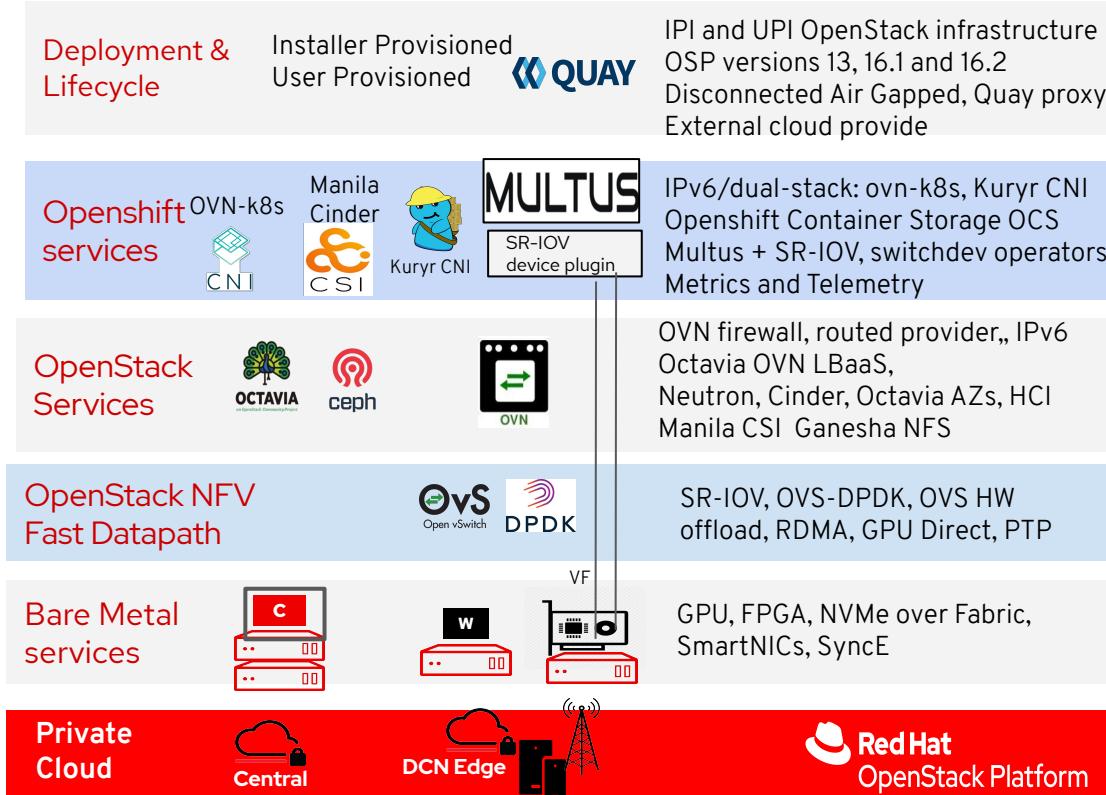
- Real-Time and Low Latency Kernel tuning
- Reduced platform core utilization for DU profile
- Zero Touch Provisioning (ZTP) of a DU
- Forward Error Correction via FPGA accelerators

- Single Node OpenShift
- Forward Error Correction via eASIC devices
- DU Lifecycle Management enhancements

- ZTP of additional infrastructure components (CU, Hub Cluster)
- Advanced Precision Time Protocol (PTP) Functionality (BC, GMC, SyncE)

# OpenShift on OpenStack for Enterprise, Telco and Edge

Flexibility and performance with OpenStack managing the infrastructure



- ▶ Flexibility of Telco/NFV & Edge deployments
  - IPI for SR-IOV, OVS-DPDK, HW offload
  - UPI customization for edge HW
  - Routed Provider networks
- ▶ NFV high performance - OpenStack Fast datapath (OVS-DPDK, SR-IOV, OVS HW offload) interfaces available as SR-IOV PCIe devices (vNIC) to pods using multus SR-IOV operator
- ▶ Mixed deployment of bare-metal remote workers and virtualized control-plane with OpenStack management of hardware (SmartNIC, GPU, FPGA, Timing)
- ▶ OpenStack services at DCN edge sites - OVN routed networks, Octavia LBaaS, Storage using Availability zones and HCI
- ▶ More Storage, SDN and Telemetry
  - Provider networks for primary CNI
  - Storage: Manila CSI with Ganesha, OCS



## DEVELOPER & PLATFORM SERVICES

# OpenShift: The platform of platforms

## Extending Kubernetes has never been so simple



### Developer-friendly Console

Extensible and customizable Kubernetes web UI designed to empower users of all levels.



### Serverless & Service Mesh

Improved user experience, day 2 operations across multiple clusters and security enhancements.



### Operators

Offer managed services on all your clusters for a cloud-like experience wherever you run OCP.



### DevOps & GitOps

Automate delivery with a cloud-native CI/CD platform and drive operations via GitOps principles.



### Helm

Developer-friendly quick start templates of popular applications and tools.



### Developer tools

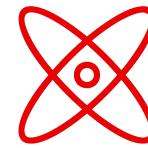
Making our Kubernetes platform more available and easy to use for developers.

# What's next for Console



## Extending the Platform

Customize and extend the OCP Console to meet your needs. Build native solutions with our pluggable platform



## Developers First

Focus on getting developers productive now!



## Making Kube Easy

Educate users on the vast everchanging Kubernetes ecosystem. Quickly discover what is new and learn best practices

# Frictionless, Cohesive, Pluggable Platform

Customize and extend the OCP Console

Teach users about available apps and services, provide custom dashboards, integrate services natively, or build full blown solutions on top of the OCP Console.

- ▶ Enhanced Quick Starts, Metrics Dashboard CRD, Dynamic Plugins
- ▶ As the platform capabilities grow so does the UI (Operator Powered)  
e.g., Pipelines UI is delivered and enabled with the Pipelines Operator, Admins can create Quick Starts, Users can create custom dashboards, ISVs can create custom solutions.

*Least to Most Flexible*

Console Configs

Console Extensions (CRDs)

OLM Descriptors

Dynamic Plugins

# Allow everyone to get up to speed quickly!

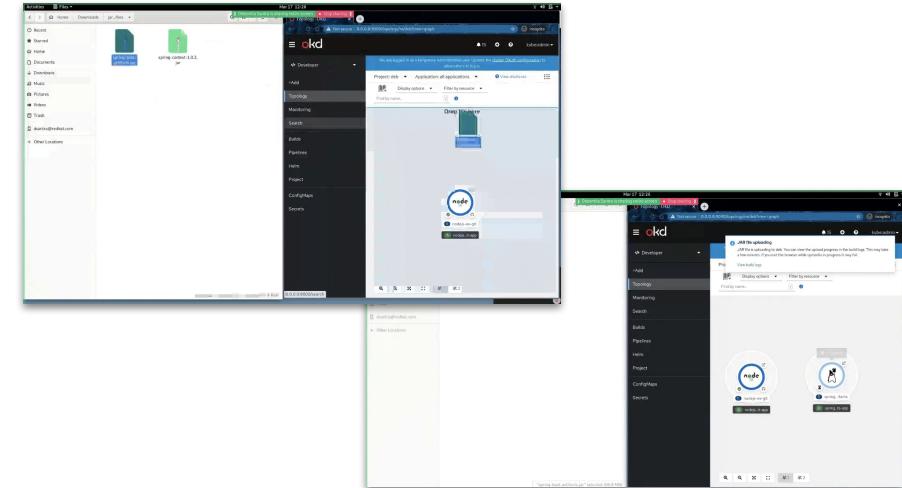
## In-Cluster Learning

Never be in the dark again... The new getting started card will provide you with the latest features, samples and guides!

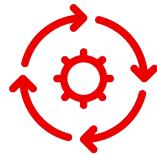
The screenshot shows the 'Overview' page of the OpenShift console. On the left, there's a 'Getting Started' card with several sections: 'Set up your cluster' (with links to 'Add identity providers' and 'Configure alert receivers'), 'Build with guided documentation' (with links to 'Monitor your sample application', 'Get started with Quarkus using a Helm chart', and 'View all quick starts'), and 'Explore new admin features' (with links to 'API Explorer', 'Console customizations', and 'See what's new in OpenShift 4.8'). Below this is a 'Status' section showing 'Cluster' (green), 'Control plane' (green), and 'Operators' (green). It also displays 'Insights' with '2 issues found' and a recent event about stopping a container registry.

## Get your local app up and running on OpenShift!

Now developers can drag and drop their fat JAR from their desktop into topology.



# What's next for Operators



## Operator Maturity

Provide better tooling and abstractions to let developers focus on Operator features and maturity

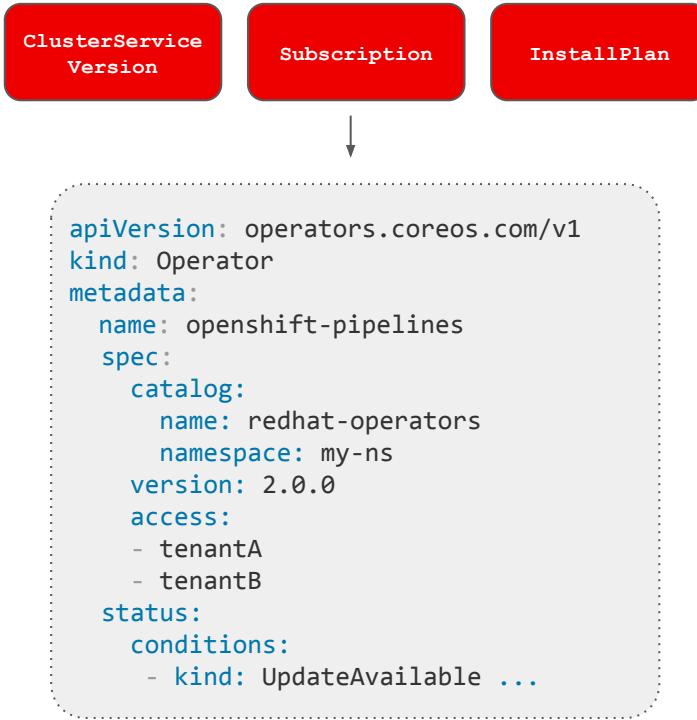
## Better Management

Cluster-wide operator model for improved installs, visibility into provided application versions and dependencies.

## Managed Service Support

Gitops-style management and fleet deployments in multi-tenant clusters

# New Operator API



Converging 3 interfaces into one to drive simplicity and improve the admin UX:

- ▶ Customers using GitOps can now install and update to specific versions
- ▶ Multi-tenant cluster providers get discrete controls on who can access which Operator
- ▶ Developers can install an Operator without asking an admin to drive velocity

**HELM ON OPENSHIFT**

# What's Next for Helm on OpenShift

## Simplified and integrated application development

**Deliver Helm Certification Program**

Deliver first class components with tested and certified Helm Charts from Partners reducing time-to-value as well as runtime failures and security risks.

**Enable Red Hat Portfolio**

Engage and enable Red Hat product teams to build and showcase Helm Charts for OpenShift developers' use.

**Enrich Developer Catalog**

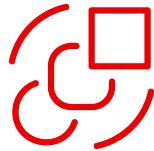
Pre-populate the catalog from popular services available out-of-the-box.

**Improve Developer Experience**

Improve experience in ODC and tools enabling a self-service developer experience that minimizes the need to interact with a cluster operator.

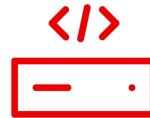
The screenshot shows the Red Hat OpenShift web console interface. At the top, it displays 'Project: helm' and 'Application: all applications'. Below this, there is a search bar and a 'Display options' dropdown. The main area features a 'Quarkus v0.0.1' Helm chart card. The card includes a 'Install Helm Chart' button, chart version (0.0.1), app version (0.0.1), provider (Redhat Helm Repo), maintainer (Redhat Helm Repo), creation date (Nov 23, 9:12 am), and a detailed description: 'A Helm chart to build and deploy Quarkus applications'. To the right of the card is a deployment diagram. The diagram shows a central 'HELM' node connected to two pods: 'nodejs-example' and 'nodejs-ex-k'. These pods are also connected to a 'postgr...erator' pod, which is further connected to a 'postgr...v4.5.0' database pod. The entire diagram is contained within a dashed box. A legend at the bottom right identifies the icons: a blue square for 'HELM', a green square for 'DC', a yellow square for 'HR', a red square for 'postgr...', and a blue circle for 'CSV'.

# What's next for Serverless and Service Mesh



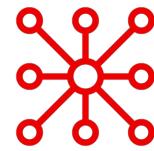
## Better Together

Further integrations across the OpenShift platform and ecosystem.



## User Experience

Enhancing the admin and developer experiences for Day 0, Day 2 and workload deployments.



## Scaling Services

Scale platform and application resources quickly and efficiently.



## Security

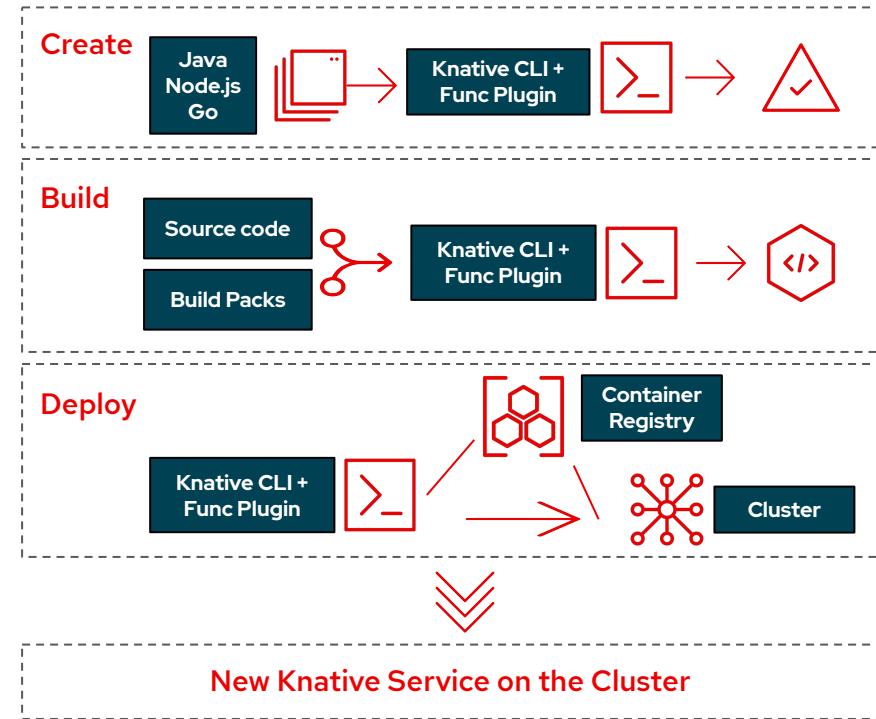
Secure by default at every level to manage risk as well as achieve and maintain compliance.

# OpenShift Serverless Functions Tech Preview

Create, Build, and Deploy Applications Quickly

OpenShift Serverless Functions allows users to consume events via functions based APIs and provide a simplified programming model for developers and data scientists alike.

- ▶ Simplified deployments
- ▶ Reduced programming complexity
- ▶ Secure, consistent programming models

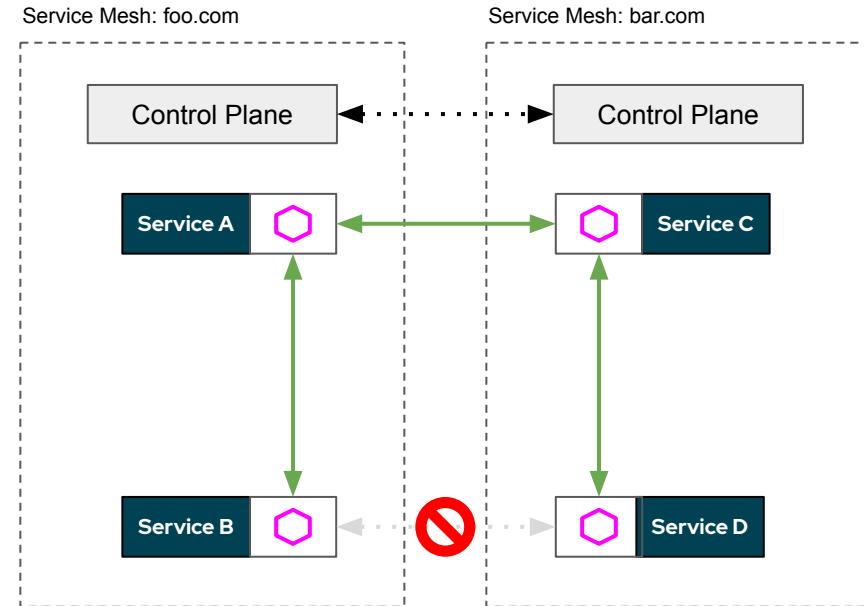


# Service Mesh Federation

Adding scalability and high-availability to multi-tenant service mesh

Service Mesh Federation will provide guided resources for sharing services across meshes in different clusters, while maintaining the secure multi-tenant separation that customers have come to expect from OpenShift Service Mesh.

- ▶ Manage service to service connectivity between meshes in different clusters.
- ▶ Configure services to be “highly available” across meshes in different clusters.



# Thank you

Red Hat is the world's leading provider of enterprise open source software solutions.

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