Red Hat OpenShift

What's Next in OpenShift

Q3CY2021

OpenShift Product Management

Red Hat

Red Hat Open Hybrid Cloud

Enabling any application, on any infrastructure, in any location

Traditional N-Tier Apps

Cloud Native Microservices

Data, Analytics & AI/ML

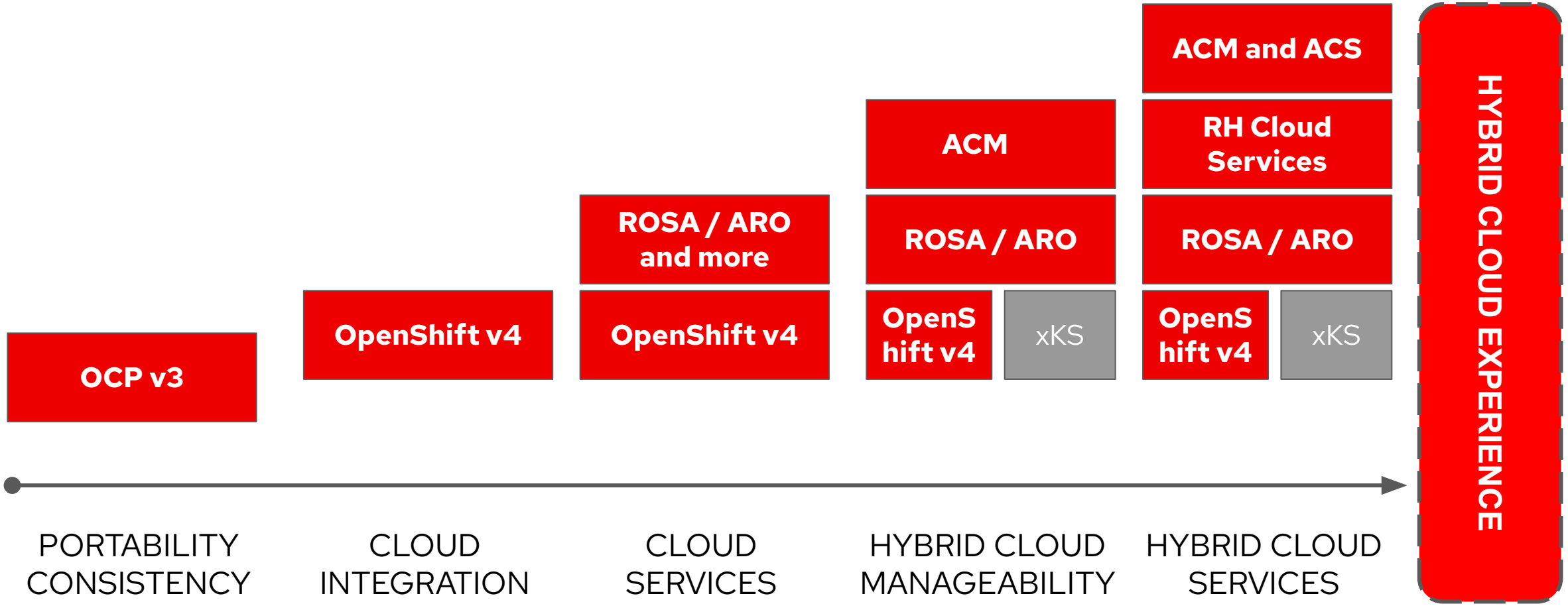
ISV Packaged Apps

Red Hat OpenShift

Red Hat Enterprise Linux

Red Hat

“Open Hybrid Cloud” has evolved over time…



Red Hat

Available as self-managed platform or fully managed cloud service

Start quickly, we manage it for you

Cloud managed

Managed Red Hat OpenShift services

aws	Azure	IBM Cloud	Google Cloud
Red Hat OpenShift service on Amazon Web Services[1]	Microsoft Azure Red Hat OpenShift	Red Hat OpenShift on IBM Cloud[1]	Red Hat OpenShift Dedicated[2]

You manage it, for control and flexibility

Customer managed

Self-managed Red Hat OpenShift

Red Hat OpenShift Platform Plus

Red Hat OpenShift Container Platform

Red Hat OpenShift Kubernetes Engine

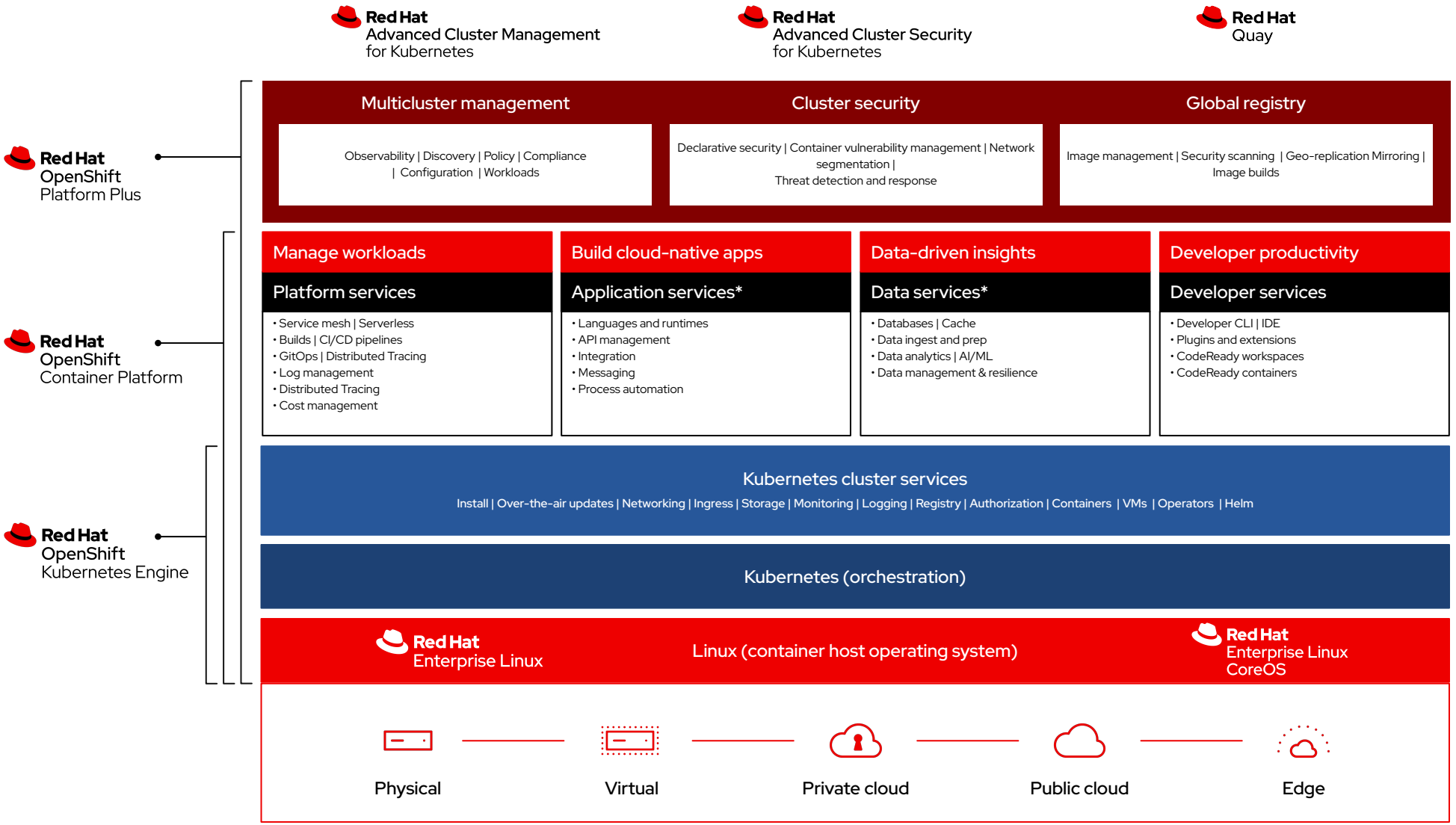
On public cloud, or on-premises on physical or virtual infrastructure[3]

4

Source:
1 In preview as of 1/1/2021. Also available as Red Hat OpenShift Dedicated managed service running on user-supplied AWS infrastructure.
2 Red Hat managed service running on user-supplied GCP infrastructure
3 See docs.openshift.com for supported infrastructure options and configurations

Red Hat

Red Hat OpenShift



OpenShift Themes

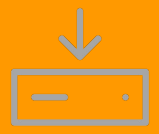
HYBRID CLOUD EXPERIENCE

CORE, PLATFORM and DEVELOPER TOOLS

Self-managed clusters and applications

Foundations for Managed Services and Telco and Edge

TELCO and EDGE



5G CORE and 5G RAN

Near edge and Far edge

From and to the edge

MANAGED SERVICES

OpenShift as a (SRE) Managed Service

Managed (SRE) Application, Data and Management Services

Applications in hybrid clouds and clusters

Hybrid cloud Governance, Compliance and Security

Hybrid cloud Management and Observability

Cloud.redhat.com experience

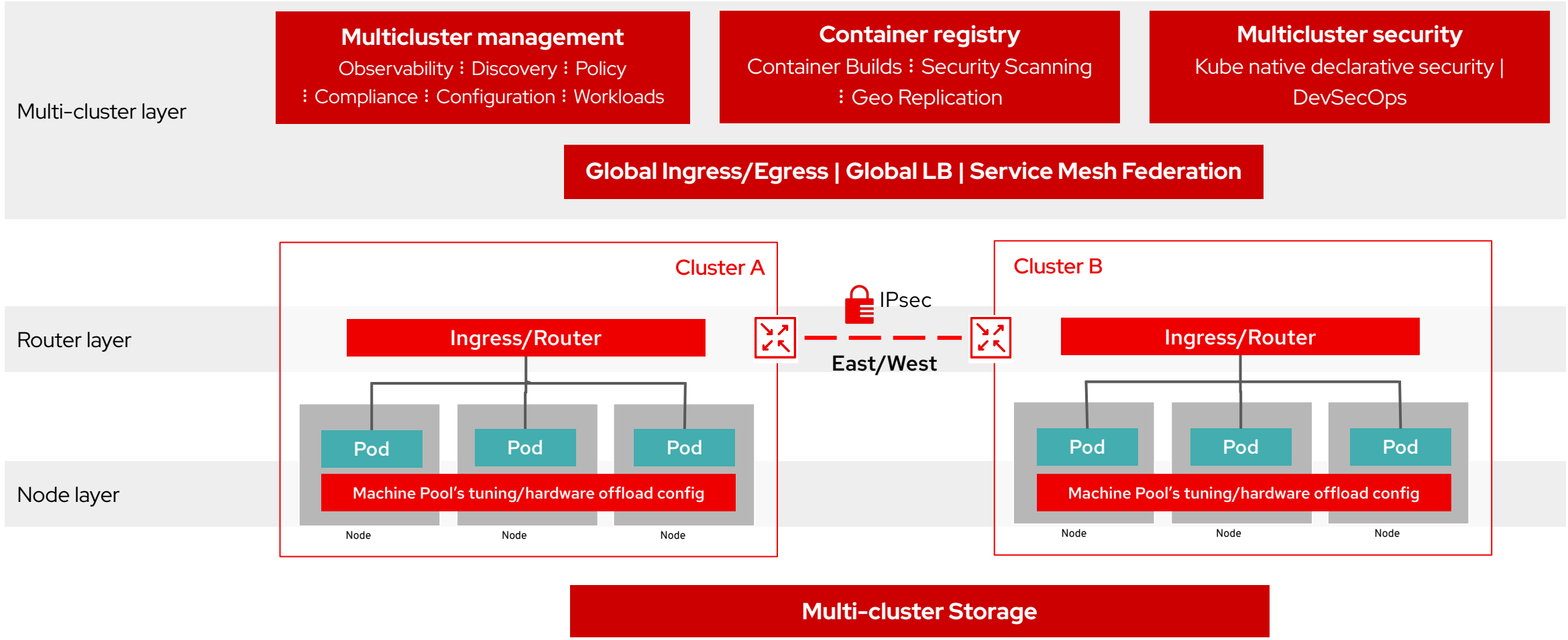
HYBRID CLOUD EXPERIENCE

+

OPENSHIFT PLATFORM PLUS

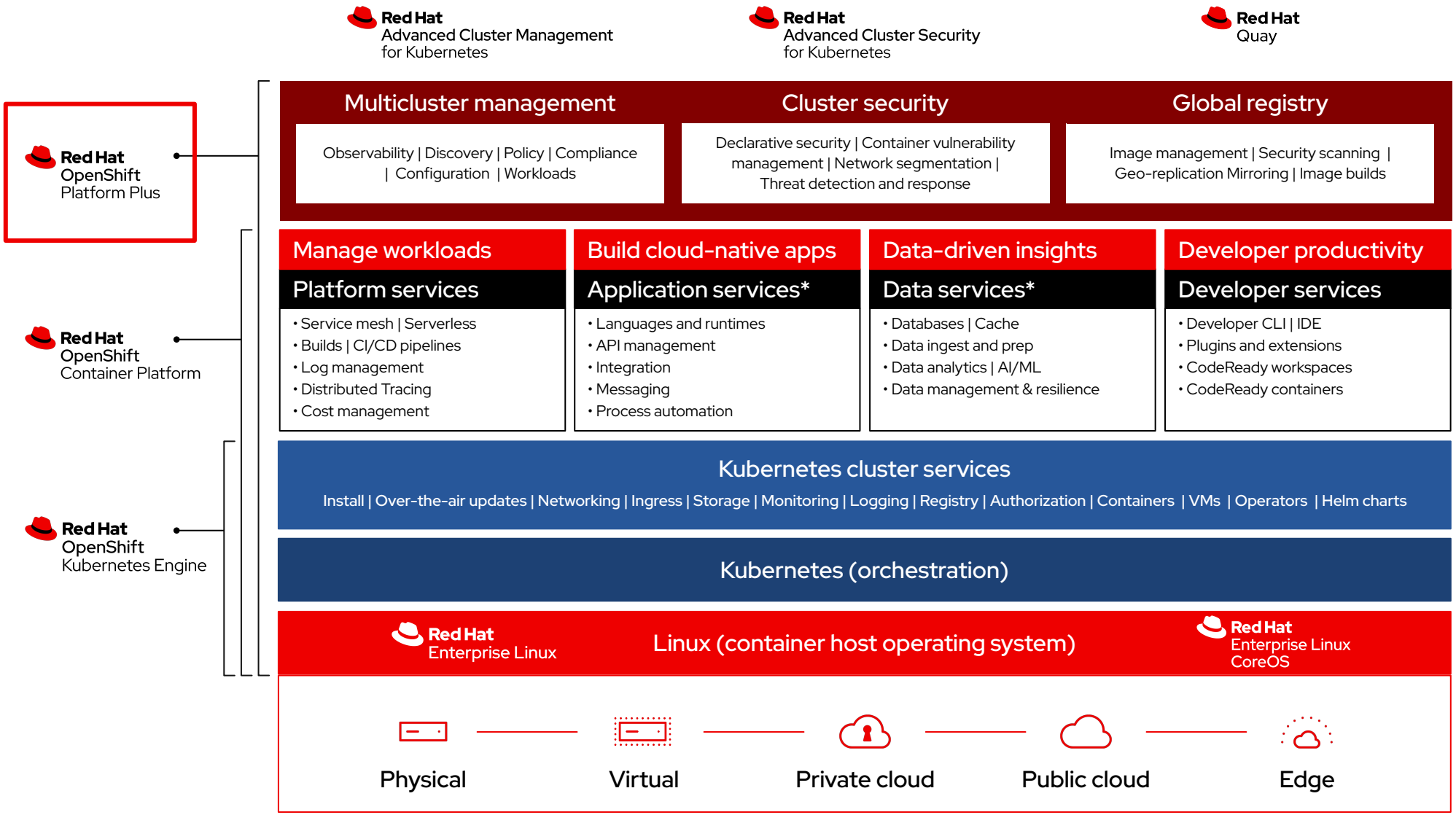
Red Hat

Standardized tools for your 1st and 100th cluster



Red Hat

Red Hat open hybrid cloud platform - OPENSHIFT PLATFORM PLUS (OCP + ACM + ACS + QUAY)



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

Multi-cluster: Seamless networking mesh extends across cluster boundaries

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

Overview

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 = Istio with federation

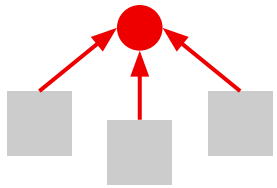
What's Next

- Support for inter-connecting clusters with overlapping IPs (aka Globalnet), and
- Multi-cluster NetworkPolicy

Better than stretched cluster

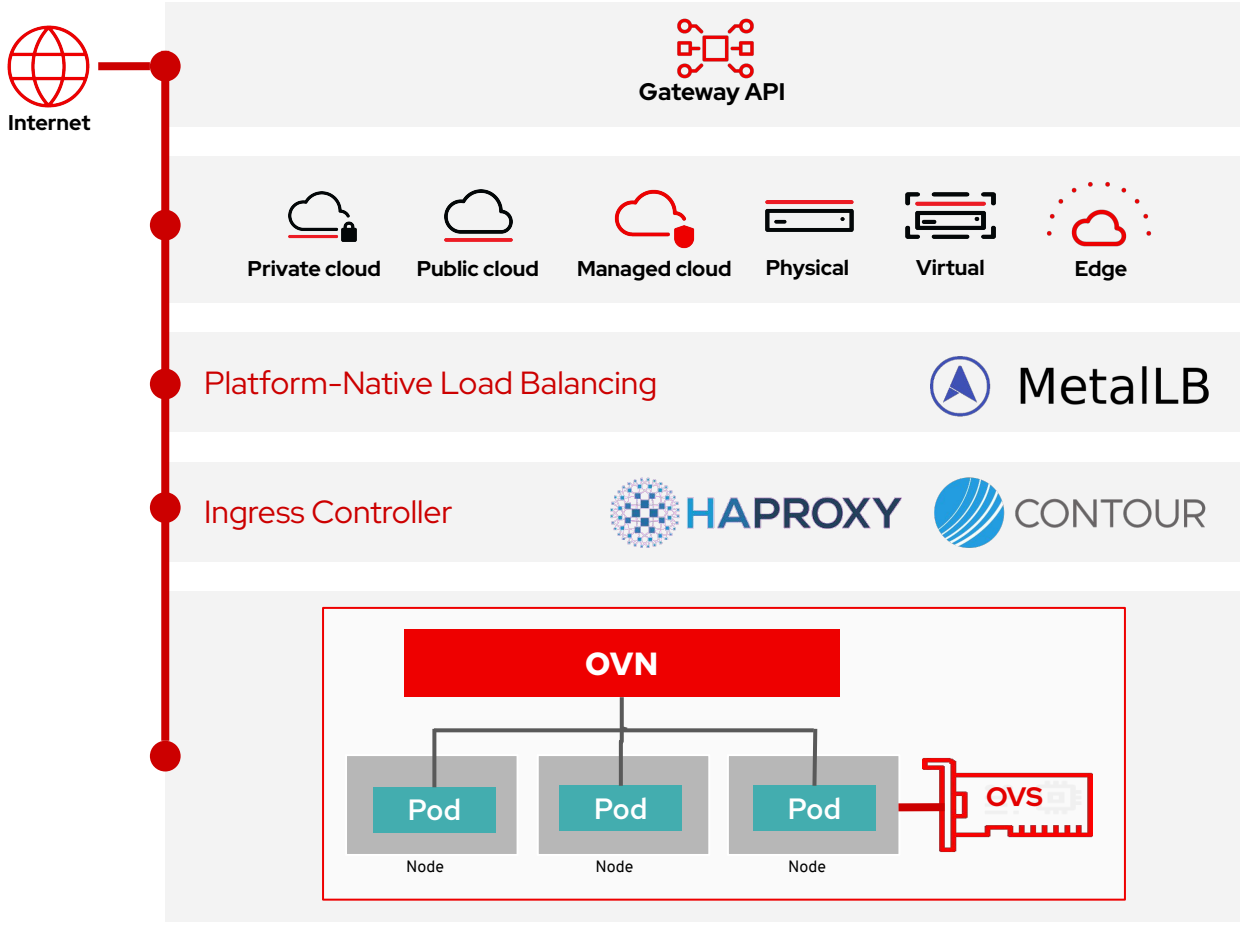
Easier HA apps across clusters

Securely access shared services



Red Hat

Multi-cluster Gateway for Ingress and Egress



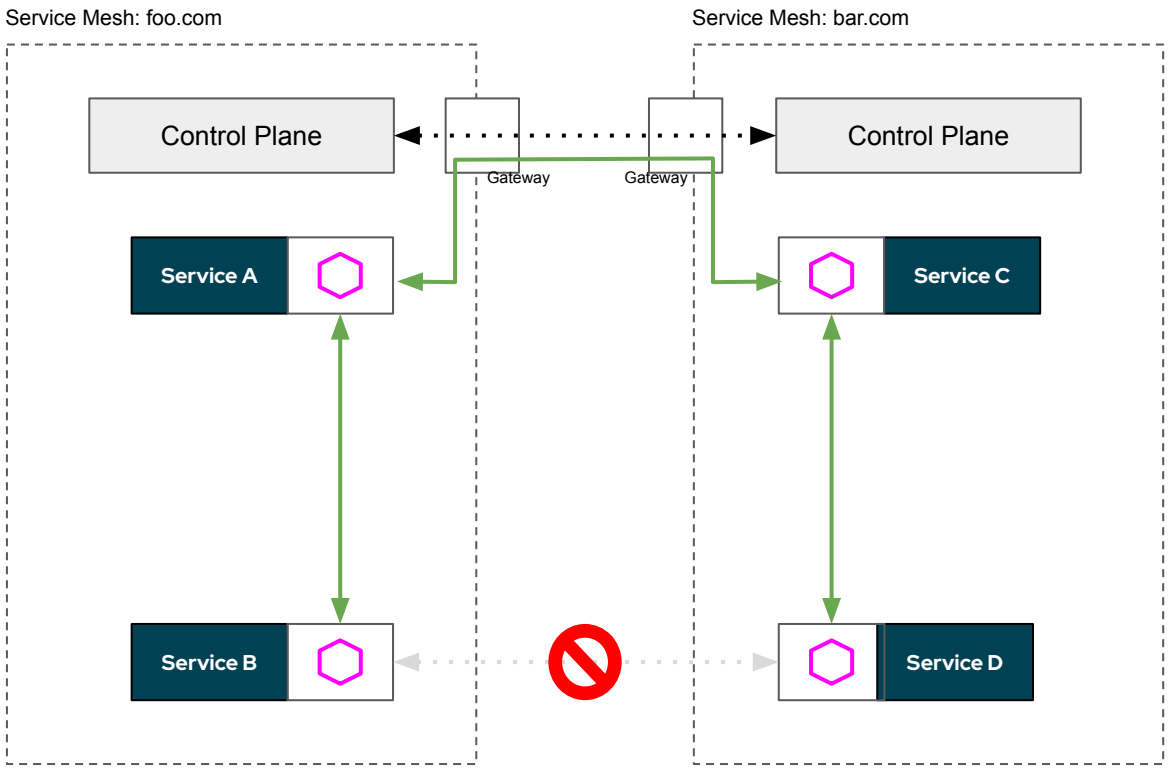
- Unified traffic handling so you configure all your traffic the same way
- Any supported platform – add or swap easily, hybrid scenarios
- Flexibility to use native traffic distribution and filtering (e.g. WAF) for optimal performance
- Your traffic, your way: L4-L7, Envoy, by-pass
- OVN for advanced 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
- Reduced traffic “friction” for Service Mesh, Virtualization

Service Mesh Federation

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

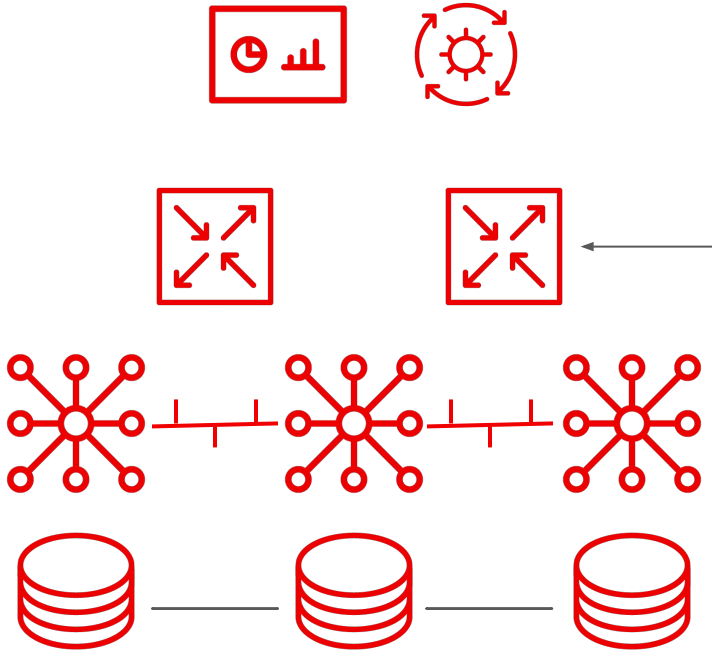
Service Mesh Federation will provided guided resources for sharing services across meshes in different clusters, while maintaining the secure multi-tenant separation that customers have come to expect from OpenShift Service Mesh.

- Manage service to service connectivity between meshes in different clusters.
- Configure load balancing and “highly available” of services across meshes in different clusters.



Red Hat

Multi-cluster Storage



Red Hat
Advanced Cluster Management
for Kubernetes

Multi Cloud Object Gateway

Red Hat
OpenShift
Container Platform

Red Hat
OpenShift
Data Foundation

Regional-DR protection across multiple clusters.

Asynchronous volume replication with low RPO targets

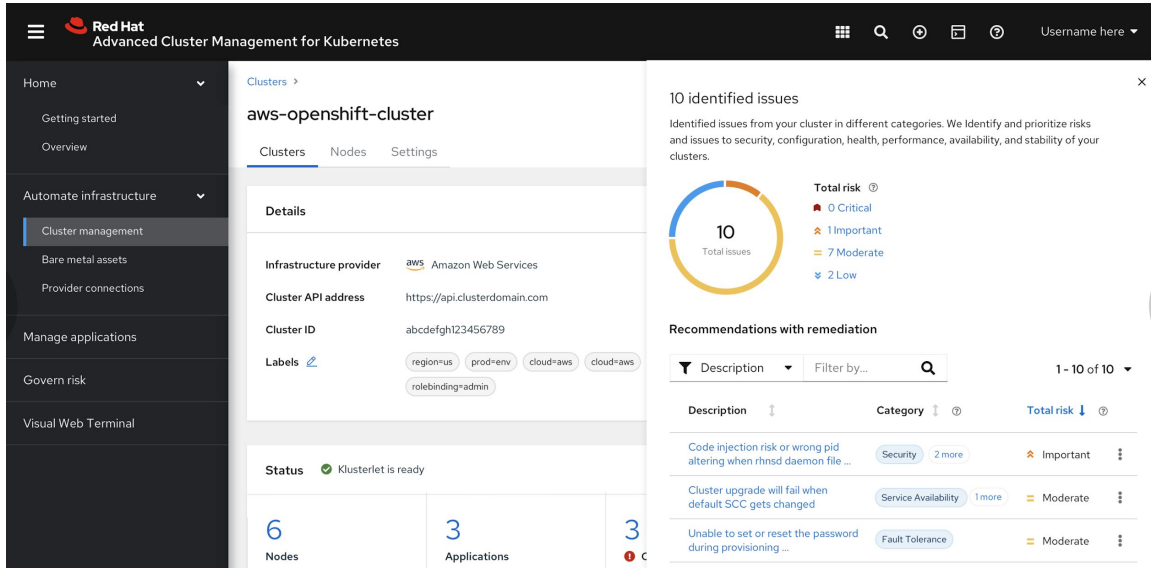
Automated cluster failover and fallback with low RTO

Red Hat

Multi-cluster: Observe your entire fleet from one location

Red Hat Advanced Cluster Management (RHACM) aggregates telemetry data from all your clusters

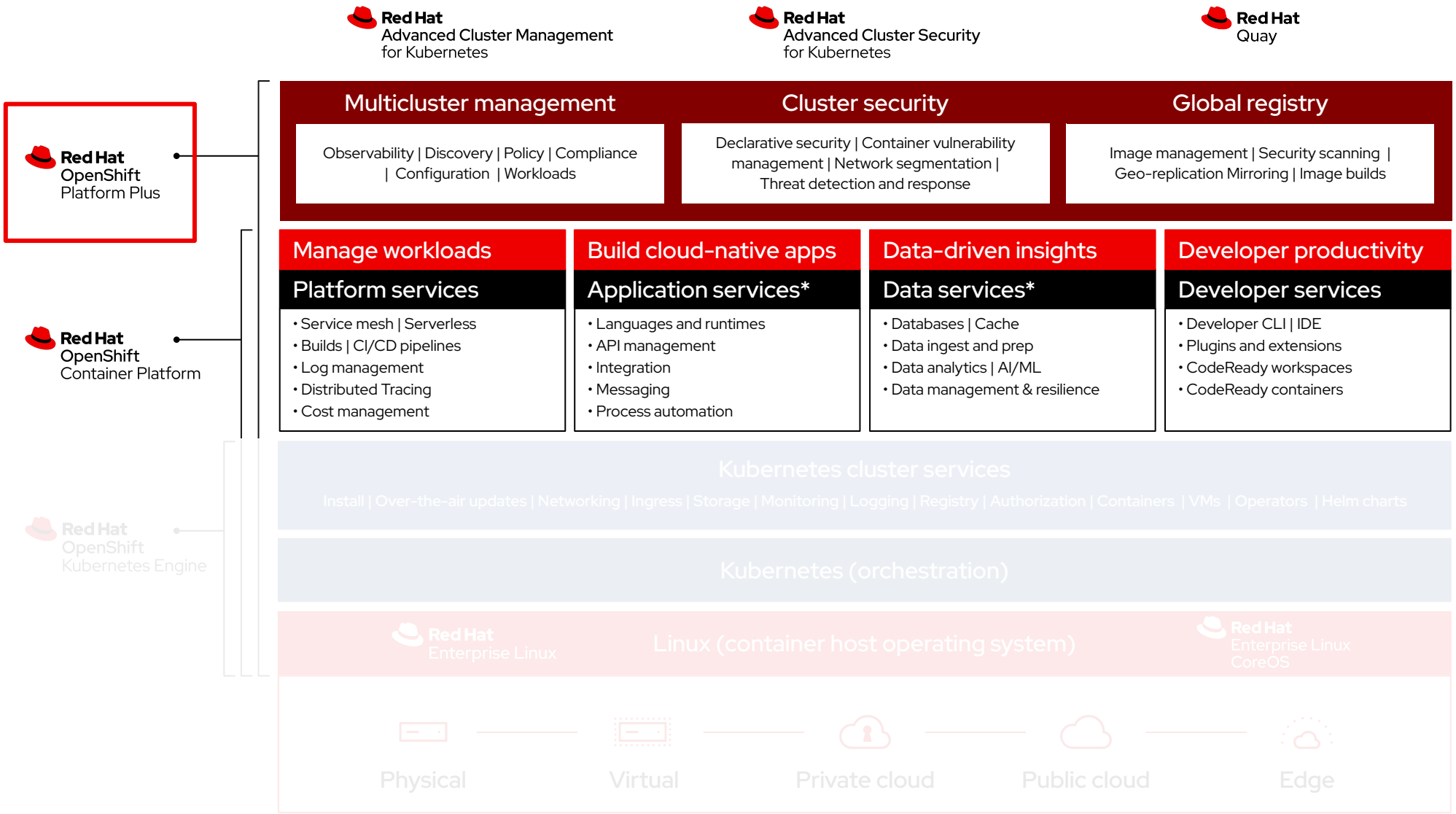
- CCX Insights data & remediations are now visible in the ACM hub, allowing centralized issue detection and alerting based on OpenShift fleet-wide analytics
  - Avoid unplanned downtime and better manage the security risks of your entire fleet.
  - Quickly pinpoint the risks and remediate them.
  - Improved remediation status, and user experience updates for a more consistent feel across ACM/OCM



- 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:
  - Centralized data and metrics from all of your ACM managed clusters into hub.
  - Alerts from the entire fleet, as well as Critical alerts from CCX Insights, all flowing into your preferred incident response tooling.
- Consumption and Usage
  - Help customers understand utilization and make adjustments via scale automatically
  - Leverage Cluster Pools (Claim and Hibernate) to mitigate cost associated to off hours and overnight spend.

Red Hat

Red Hat open hybrid cloud platform - OPENSHIFT PLATFORM PLUS (OCP + ACM + ACS + QUAY)



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

Red Hat Advanced Cluster Management: What's Next

Multicluster lifecycle management

- Quickly and consistently deploy clusters with desired state configuration to any cloud.
- Deploy hybrid and infrastructure agnostic clusters at scale.
- Deploy SRE-managed and self-managed clusters from a single source of truth.

Policy driven governance and compliance

- Deploy RHACS Central and Sensors directly from RHACM hub.
- Drive alerts and notifications from policy compliance status.
- Unified governance framework provides a single entry point for all security tools.

Advanced application lifecycle management

- Consolidated application deployment approach across various dev tools.
- Quickly observe application health and status from any deployment source.
- Include cross-cluster PV replication for business critical workloads.

Multicluster observability for health and optimization

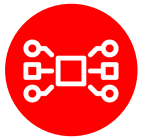
- Provide the complete fleet view for cluster health metrics.
- Enable operations teams to analyze metrics using preferred tooling.

Red Hat Advanced Cluster Security Vision

Security across the entire application lifecycle

Reduce security program costs

Enable teams to shift security left with our continued in improving vulnerability management and compliance workflows



Our commitment to open source

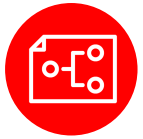
Creating an open source community focused on enabling Kubernetes security will enable us to tap into innovation pools not previously available

Enable effective prioritization workflows

Provide teams with the information to prioritize the issues that matter most in their environment

Advanced security workflows

Enable advanced incident response and hardening capabilities to enable the most mature risk management programs



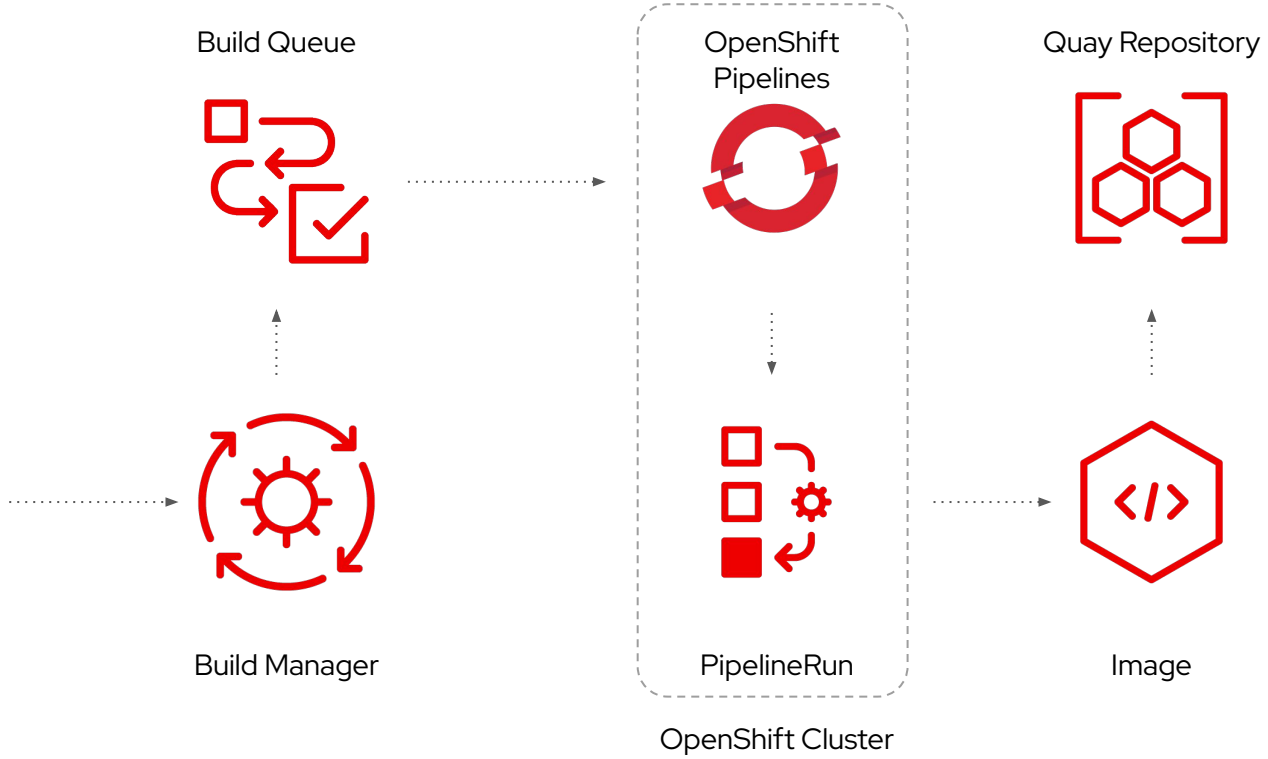
Best in class OpenShift support

First class support for the OpenShift platform across clouds and managed services and security use cases

Program Management

Improve cybersecurity programs by making recommendations that would have an outsized impact on an organization's security posture and exposing program metrics to showcase ROI

Quay Container-native builds



- Quay container builds trigger OpenShift Pipelines, build process containerized
- Builds execute on the same OCP cluster Quay is running on or a remote cluster, no VMs or bare-metal server/cluster required
- Automatically configured via the Quay Operator
- *Future*: multi-arch builds in OpenShift Pipelines

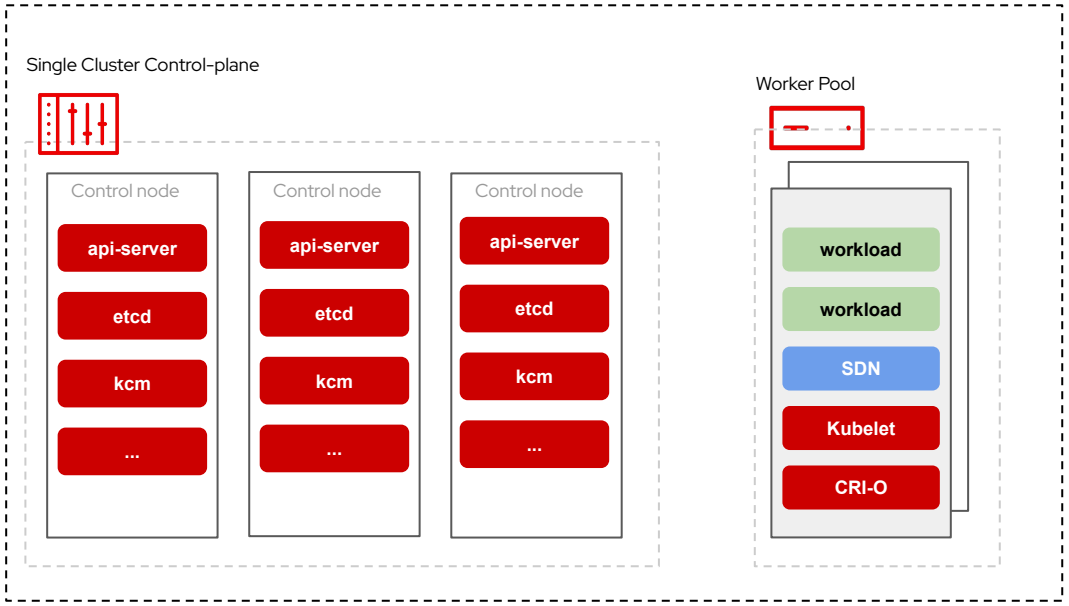
Red Hat

Hypershift Brings Externally Managed Control-Planes

Standalone OpenShift

Control-Plane (CP) + Workers

Standalone OpenShift **Cluster** (dedicated CP nodes)



Low CAPEX and OPEX costs
(bundling of CPs + CP as pods)

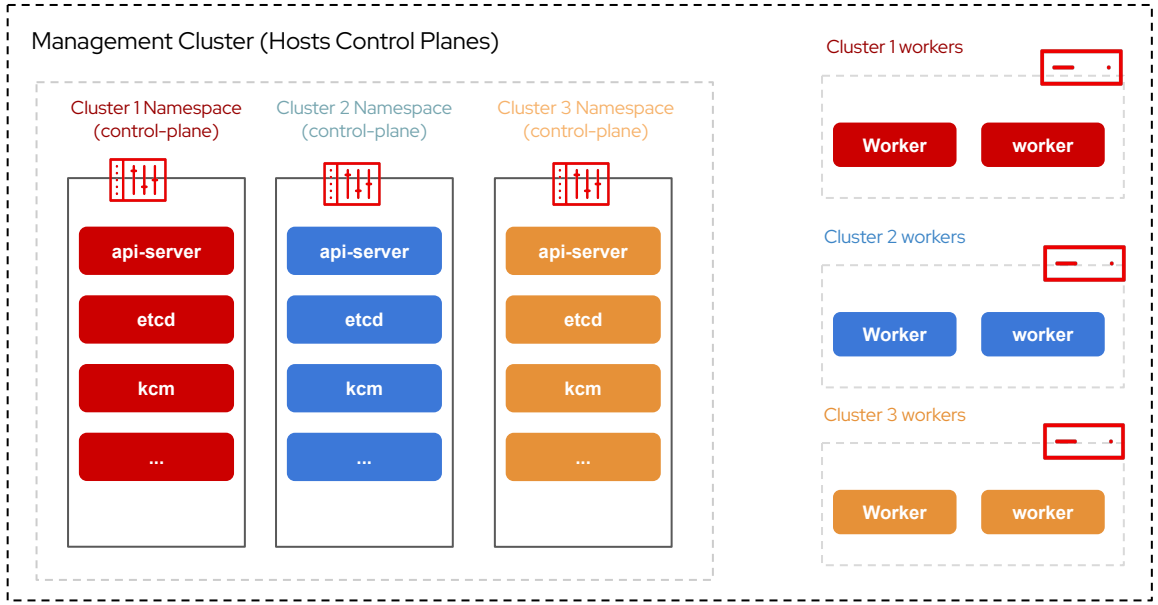
Central Management of CPs
(easy operation & maintenance)

Multi-arch support
(e.g. CP x86, workers ARM)

HyperShift

Control-Plane (CP) + **Workers**

HyperShift **Clusters** (decoupled CP and workers)



Network & Trust
segmentation

Mixed Iaas For CP and
Workers

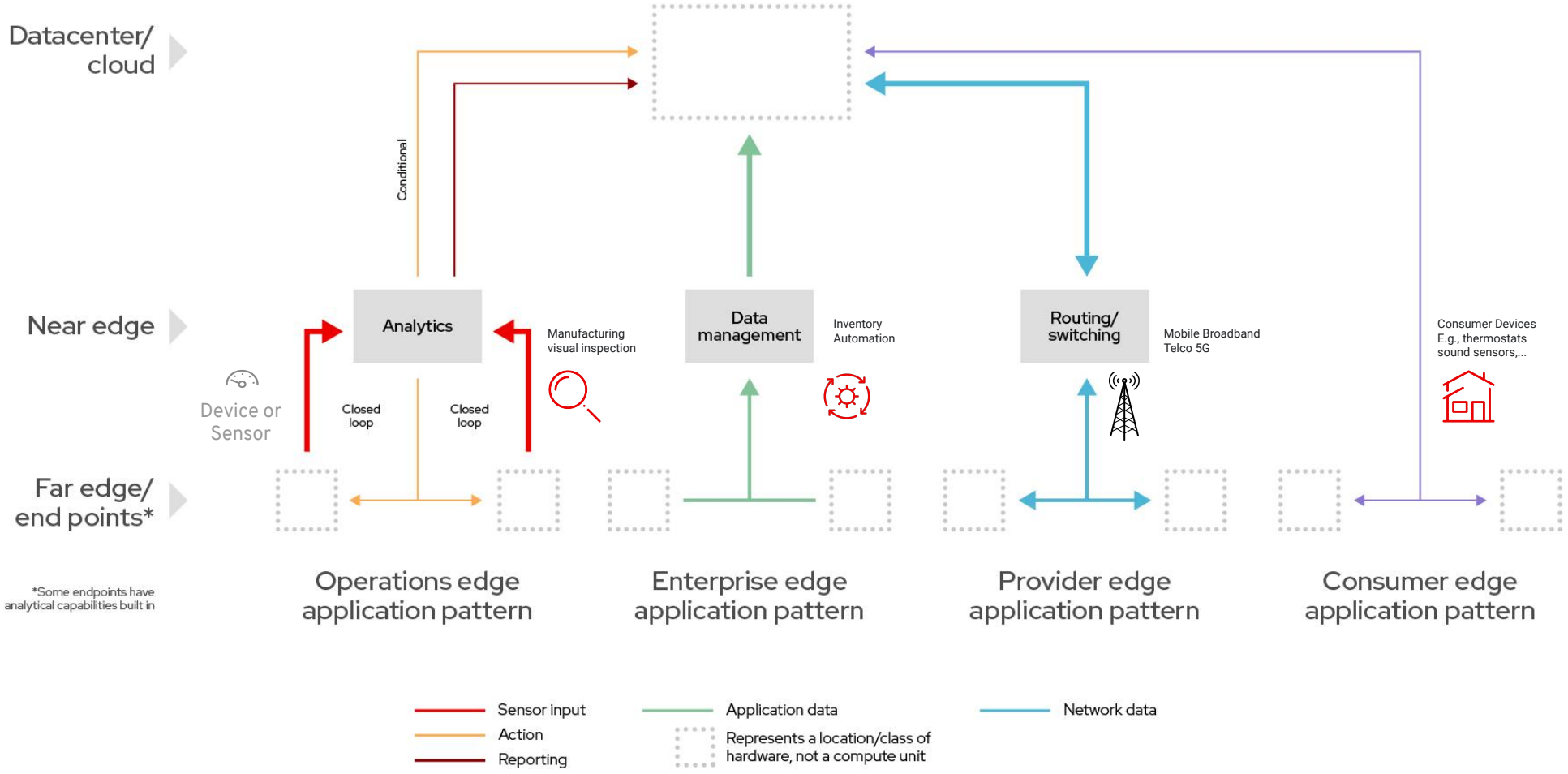
Fast cluster bootstrapping
(CP as Pods)

Product Manager: Adel Zaalouk

Red Hat

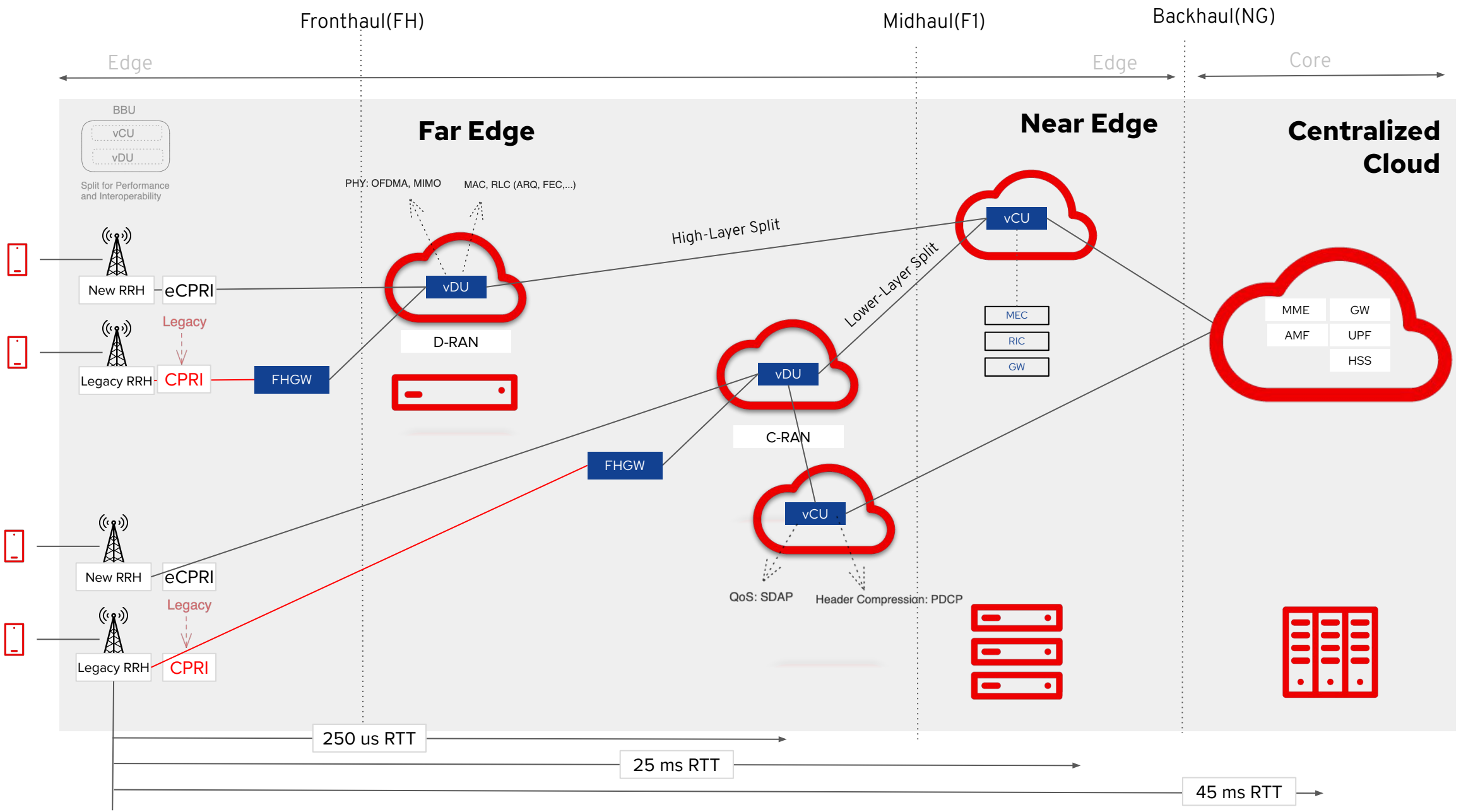
TELCO AND EDGE

From and To The Edge?



Decentralization of data flow is the norm everywhere but in consumer edge

Red Hat


Fronthaul(FH)
Midhaul(F1)
Backhaul(NG)
Edge
Edge
Core
BBU
vCU
vDU
Split for Performance and Interoperability
Far Edge
Near Edge
Centralized Cloud
PHY: OFDMA, MIMO
MAC, RLC (ARQ, FEC,...)
High-Layer Split
Lower-Layer Split
New RRH
eCPRI
Legacy
Legacy RRH
CPRI
FHGW
vDU
D-RAN
vCU
MEC
RIC
GW
MME
GW
AMF
UPF
HSS
vDU
C-RAN
FHGW
vCU
QoS: SDAP
Header Compression: PDCP
New RRH
eCPRI
Legacy
Legacy RRH
CPRI
250 us RTT
25 ms RTT
45 ms RTT

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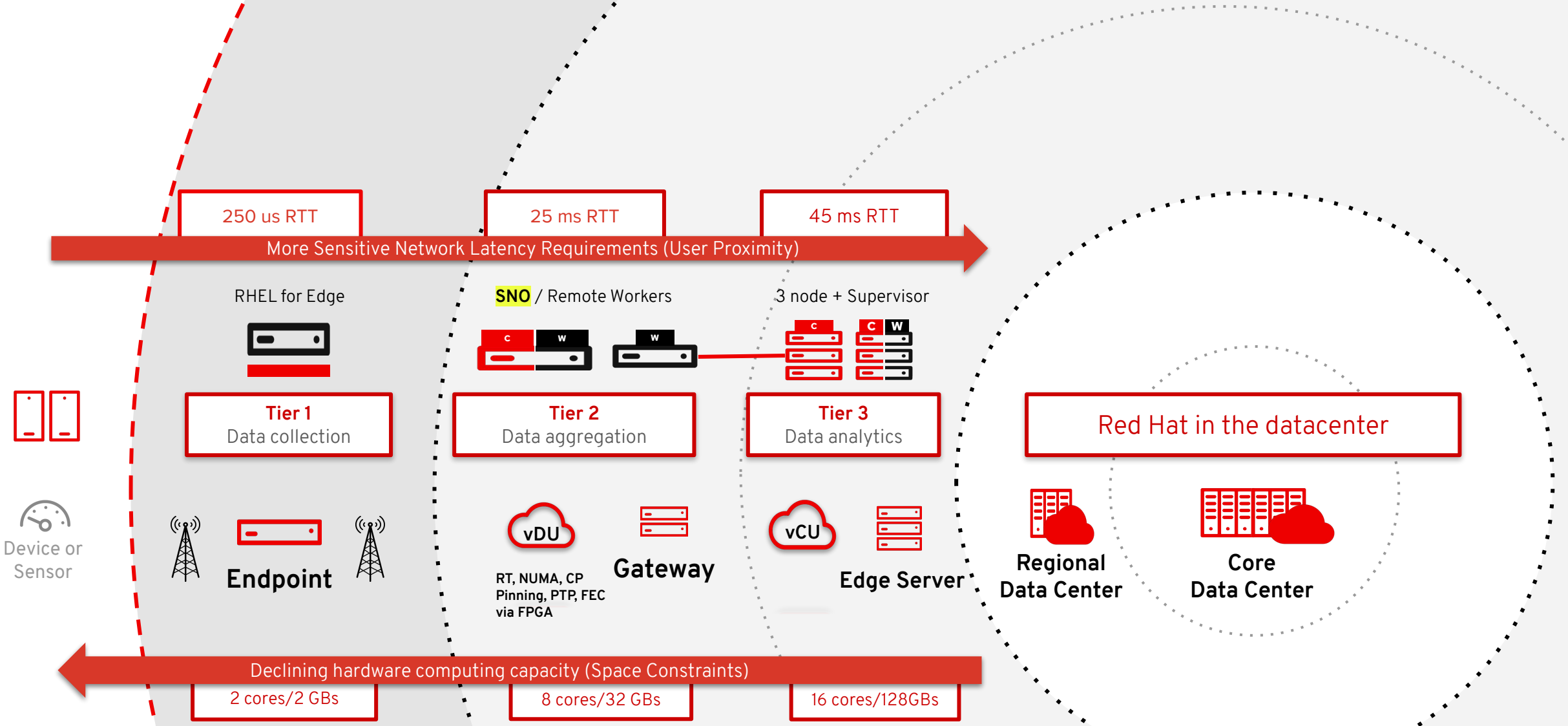

250 us RTT
25 ms RTT
45 ms RTT
More Sensitive Network Latency Requirements (User Proximity)
RHEL for Edge
SNO / Remote Workers
3 node + Supervisor
C
W
Tier 1
Data collection
Tier 2
Data aggregation
Tier 3
Data analytics
Red Hat in the datacenter
Device or
Sensor
Endpoint
vDU
RT, NUMA, CP
Pinning, PTP, FEC
via FPGA
Gateway
vCU
Edge Server
Regional
Data Center
Core
Data Center
Declining hardware computing capacity (Space Constraints)
2 cores/2 GBs
8 cores/32 GBs
16 cores/128GBs

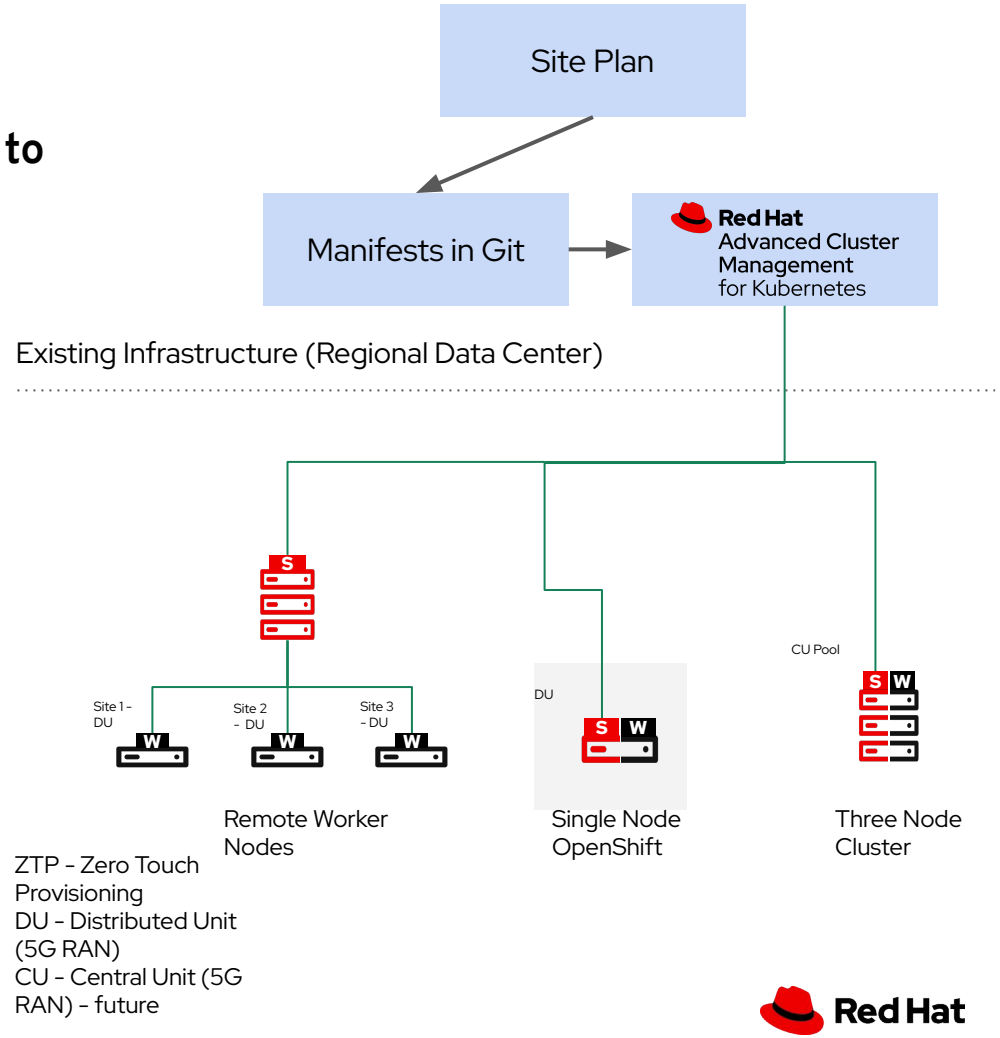
Zero Touch Provisioning

Technology-Preview in Advanced Cluster Management 2.4

Aimed at **regional distributed on-prem deployment.**

Enabling customer's **automated** path from **uninstalled infrastructure to application running on an OpenShift cluster.**

- **Integrates and leverages existing technology stack -** RHACM/Hive/Metal3/Assisted Installer
- **Minimal prerequisites**- Enables untrained technician installation flow (Barcode scan to trigger install).
- **Highly customized deployment** - Fits Connected/Disconnected, IPv4/IPv6, DHCP/Static, UPI/IPI deployment topologies
- **Edge focused** - no additional bootstrap node or external services needed for deployment.
- **GitOps enabled** - managed with kube-native declarative API
- **Late binding** - decoupling compute management and cluster provisioning. Enabling dynamic allocation of hosts to cluster deployments



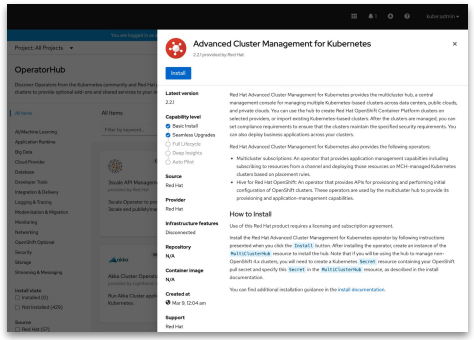
PM: Moran Goldboim

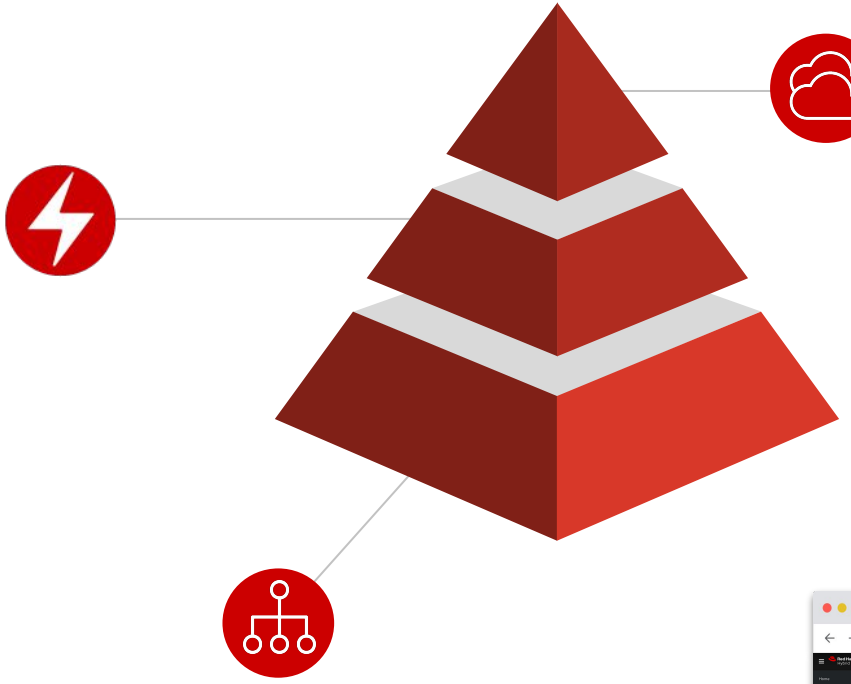
CORE, PLATFORM AND DEVELOPER TOOLS

What's next for the OpenShift Console?

Dynamic Plugins

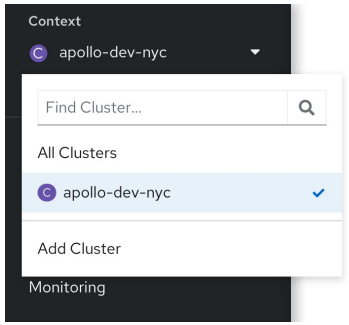
Enable teams to rapidly build high quality, easy to use, consistent user experiences via Operators. Operators become multi-cluster aware.





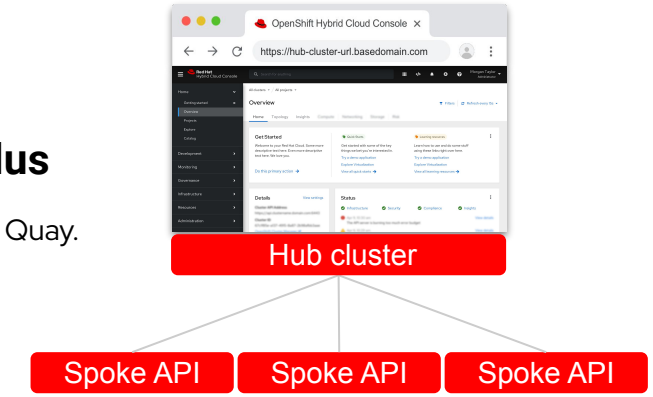
OpenShift Hybrid Console

One place to see your entire fleet. Multi-cluster first. Application or administration oriented, users can customize to fit their needs.



OpenShift Platform Plus

Unification of OCP, ACM, ACS & Quay. Hub & spoke model, seamlessly integrated via SSO.

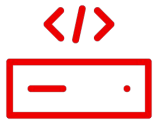


Red Hat

OpenShift Serverless Future/Vision

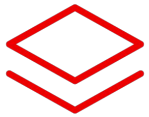
Serverless Ecosystem

Event sources to cover the breadth of applicability, community leadership, security by default, scaling performance



User Serverless Experience

Intuitive hybrid developer experience with full stack integration with platform services , elevated Serverless function experience for local and remote. SandBox enablement for all Serverless functionalities



Serverless Platform

Serverless as the **default** deployment strategy for all **workloads**.

Serverless, **fundamental** part of the OpenShift delivered in cloud form, service form, or self-managed form, **clusters itself running in Serverless fashion**

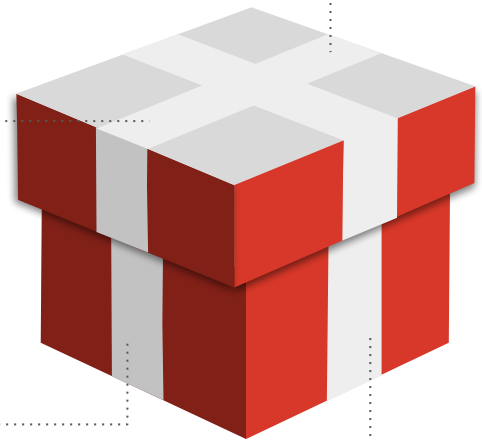
Centralized Hybrid Cloud

Multi-cloud developer & operator experience for creation and management of applications on a centralized hybrid cloud for a “cluster agnostic” environment

What's next for Operators?

Java-based Operators

Leverage existing developer experience and cloud-native tooling (Quarkus) to write mature Operators



Cloud-native Bundles

An API to install and distribute cloud-native content on the cluster. Priming OLM to natively support other package managers, e.g. Helm.

Granular Permissions

Install Operators cluster-wide and apply fine-grained rules about which tenants can see and use them.

Catalog files

Publish and maintain Operator catalogs, update graphs and channels with a git-based and automation friendly approach using a single file.

What's Next for Helm on OpenShift

Simplified and integrated application development

Enrich Helm Charts ecosystem

Developer catalog with more Helm Charts coming from trusted Partners with tested and certified Charts.

Enable Red Hat Portfolio

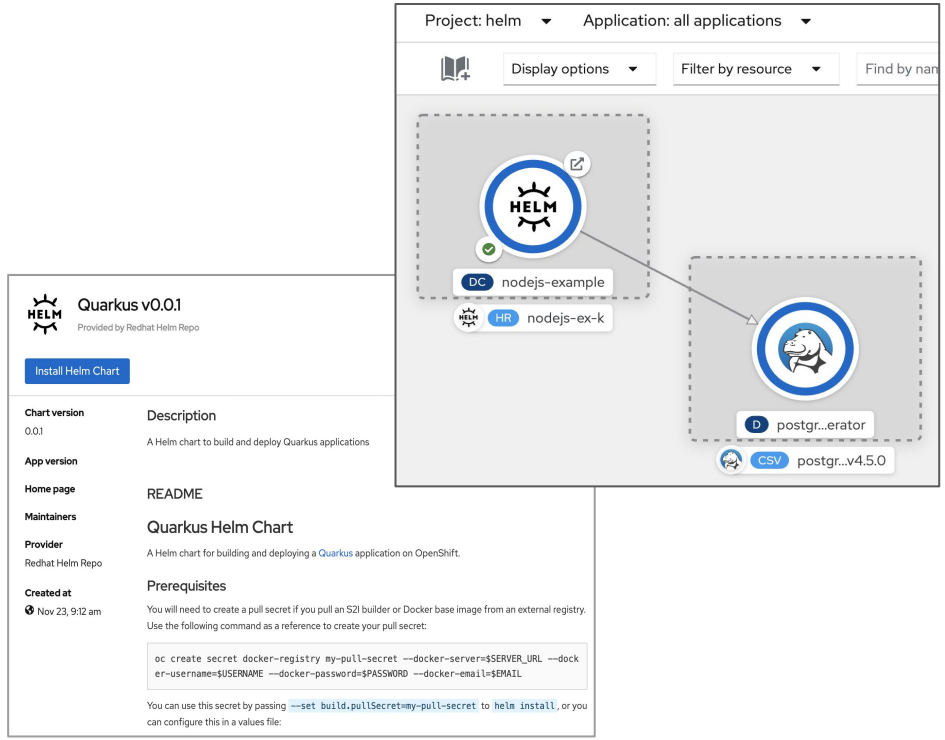
Engage and enable Red Hat product teams to build and showcase Helm Charts for OpenShift developers' use.

Best Practises for Helm Charts

Documentation and tooling to help developers creating Helm Charts following security best practises and misconfiguration issues.

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.



Red Hat

What's Next for OpenShift Virtualization

Hybrid Cloud and Edge

Optimize for smaller deployments: Single Node OpenShift, and Compact Cluster

Support for Public Cloud Bare metal instances

Workloads

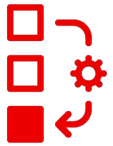
Workload acceleration with virtual GPU

Interface with AI / ML operators

Enterprise Scale

Enhance partner ecosystem and certifications

Validation for SAP HANA



Migration at Scale

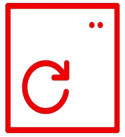
Modernize application workflows with warm migration from Red Hat Virtualization

Red Hat

OpenShift sandboxed containers

FIPS Compliance

Now you can run the OpenShift sandboxed containers operator on a FIPS enabled cluster without worrying about tainting its state. Our Operator, and Kata Containers are FIPS Validated.

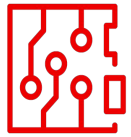


Updates & Upgrades

You can now seamlessly upgrade a cluster, as well as the operator and it's artifacts (Kata Containers + QEMU extensions).

Must Gather

An initial version of must-gather will be available in this release. This will help automate data-collection for you to get better support.



Disconnected Mode

Our operator now works in disconnected mode.

Health Metrics

Dashboard for health-metrics and Insights on Kata Containers specific components.

OpenShift on Bare Metal

What's Coming Next?

Advanced Host Network Configuration

Configure bonds, VLANs and static IPs, on your hosts at installation time and for installed hosts

Run the Bare Metal Operator Anywhere

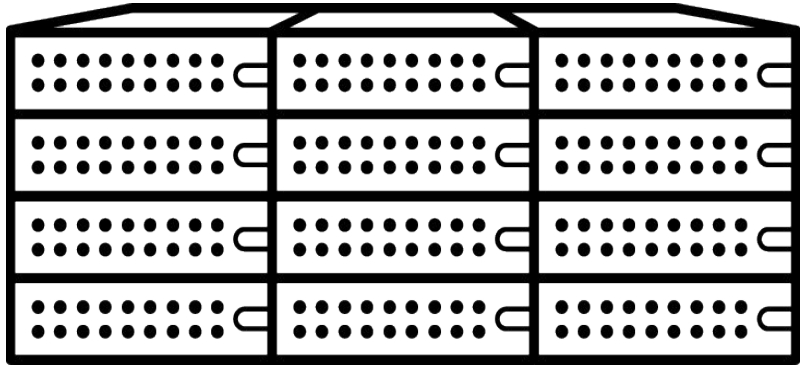
Provision and manage bare metal hosts from clusters running on VMs on non-bare metal platforms

Node Health Checks and Remediation

Protect your workloads on bare metal clusters from host failure, including OpenShift Virtualization clusters and Single Node OpenShift

Hardware Management and Observability

Set BIOS attributes and place workloads in nodes with the desired attributes. See your nodes' hardware information from the console

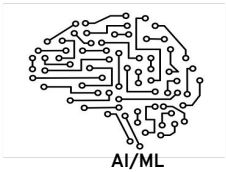


Metal^3

CORE PLATFORM

Specialized workload scheduling framework


Genome Sequencing


AI/ML


Self Driving

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

Red Hat Specialized workload scheduler operator for Openshift	**Customer developed Specialized workload scheduler operator for Openshift**
Gang scheduler for specialized workload: AI/ML, HPC	**Customized workload with specialized scheduler requirements**

Scheduling Profiles/Plugin/Extension points

Openshift

Red Hat Enterprise Linux & Red Hat Enterprise Linux CoreOS

Physical | Virtual | Private cloud | Public cloud | Managed cloud (Azure, AWS, GCP, IBM, Red Hat) | Edge cloud

Red Hat

Installation & Updates

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

Alibaba Cloud

Microsoft Hyper-V

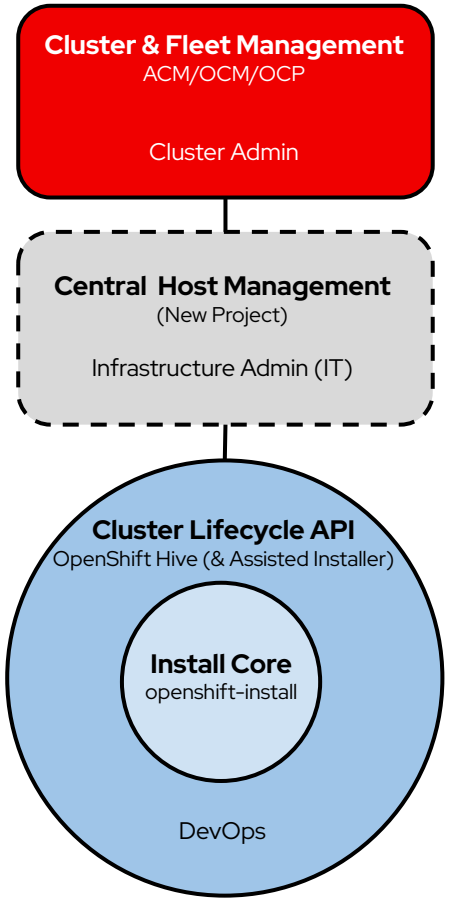
Azure Stack Hub

EQUINIX | METAL

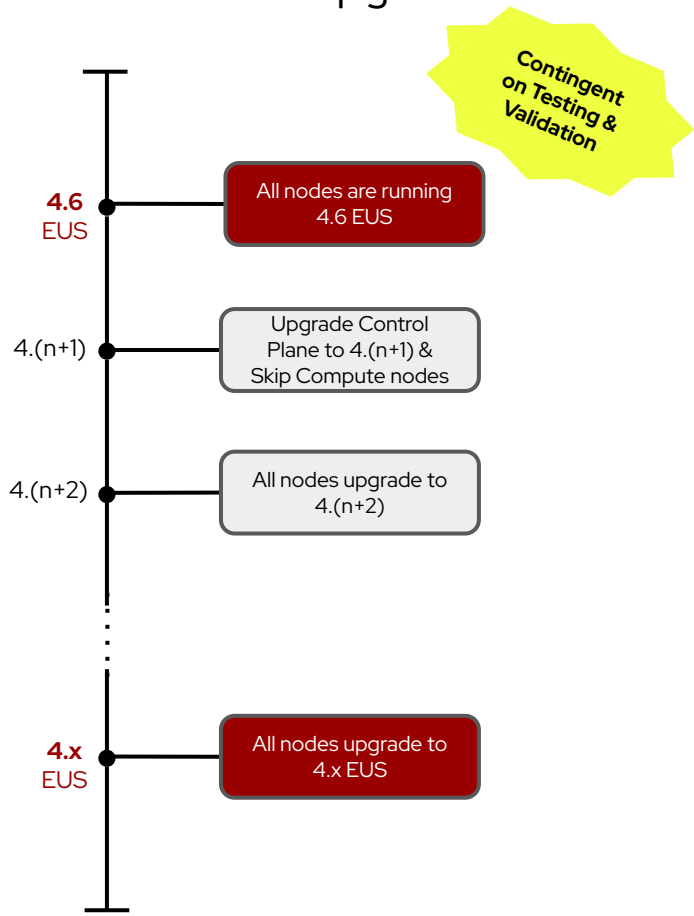
IBM Cloud

Red Hat Enterprise Linux 8

Unified Installation Experience



EUS to EUS Upgrades

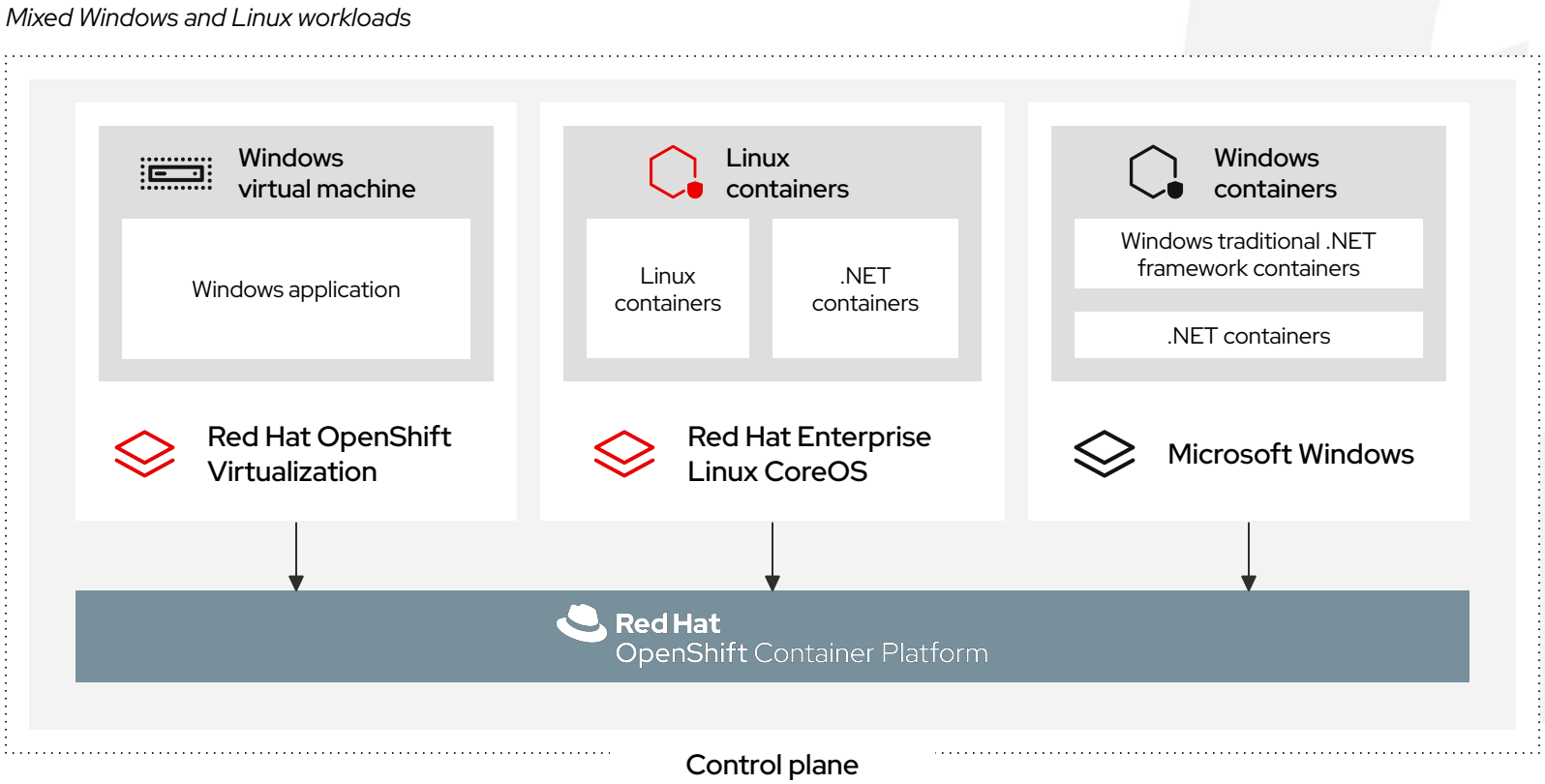


Red Hat

Bring your own Windows Server host

Goals

- Allow a customer to add an existing Windows instance running a variant of Windows Server 2019 (1809, 1909, 20H2 etc).
- WMCO will then perform all the required steps within the VM for it to be added to the cluster as an OpenShift worker node and removed from it.
- Handle upgrades of all components installed by WMCO.



Red Hat OpenShift

Preview of cert-manager in OpenShift

Automate certificate management in cloud native environments

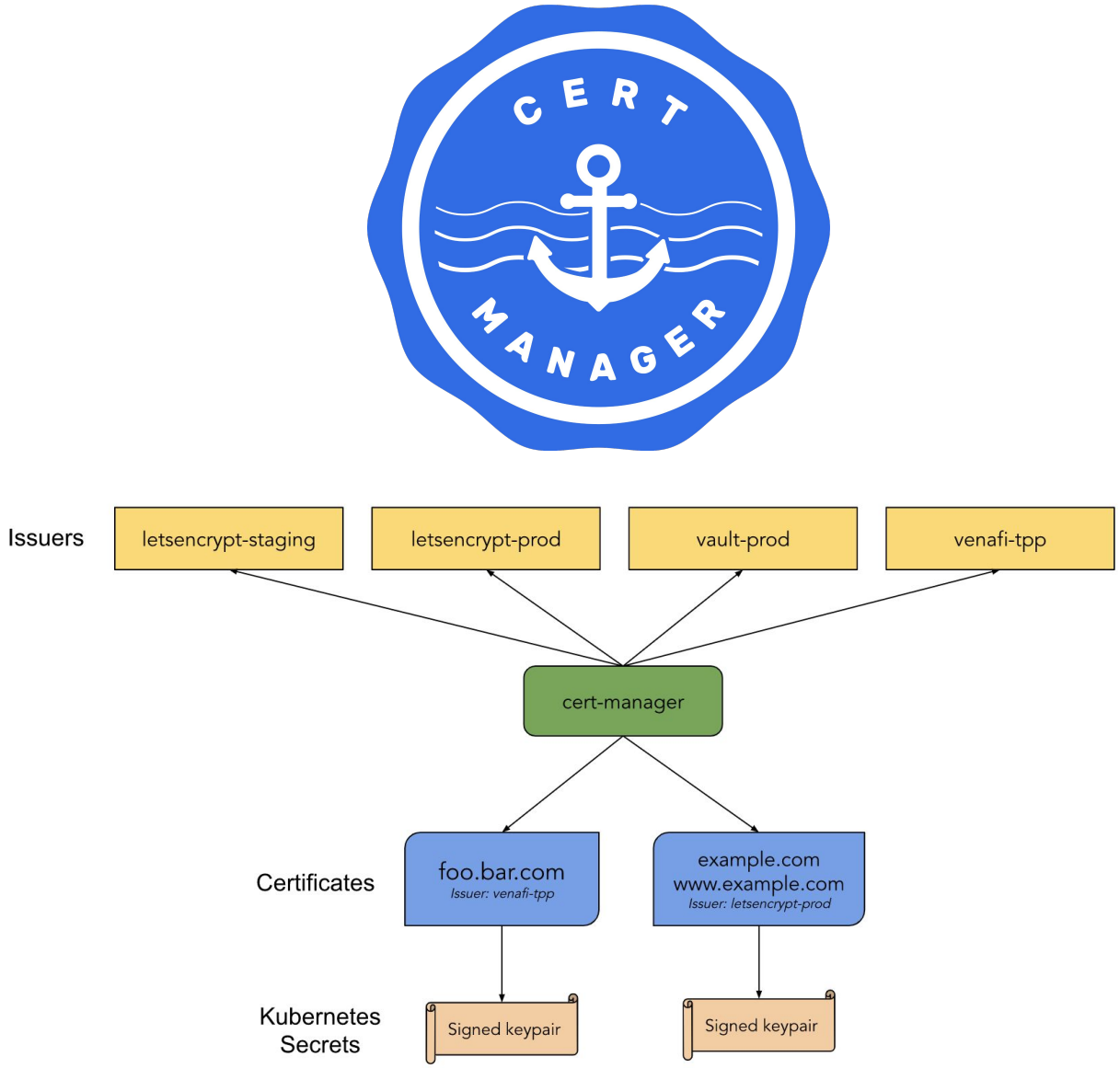
cert-manager builds on top of Kubernetes, introducing certificate authorities and certificates as first-class resource types in the Kubernetes API. This makes it possible to provide 'certificates as a service' to developers working within your Kubernetes cluster.

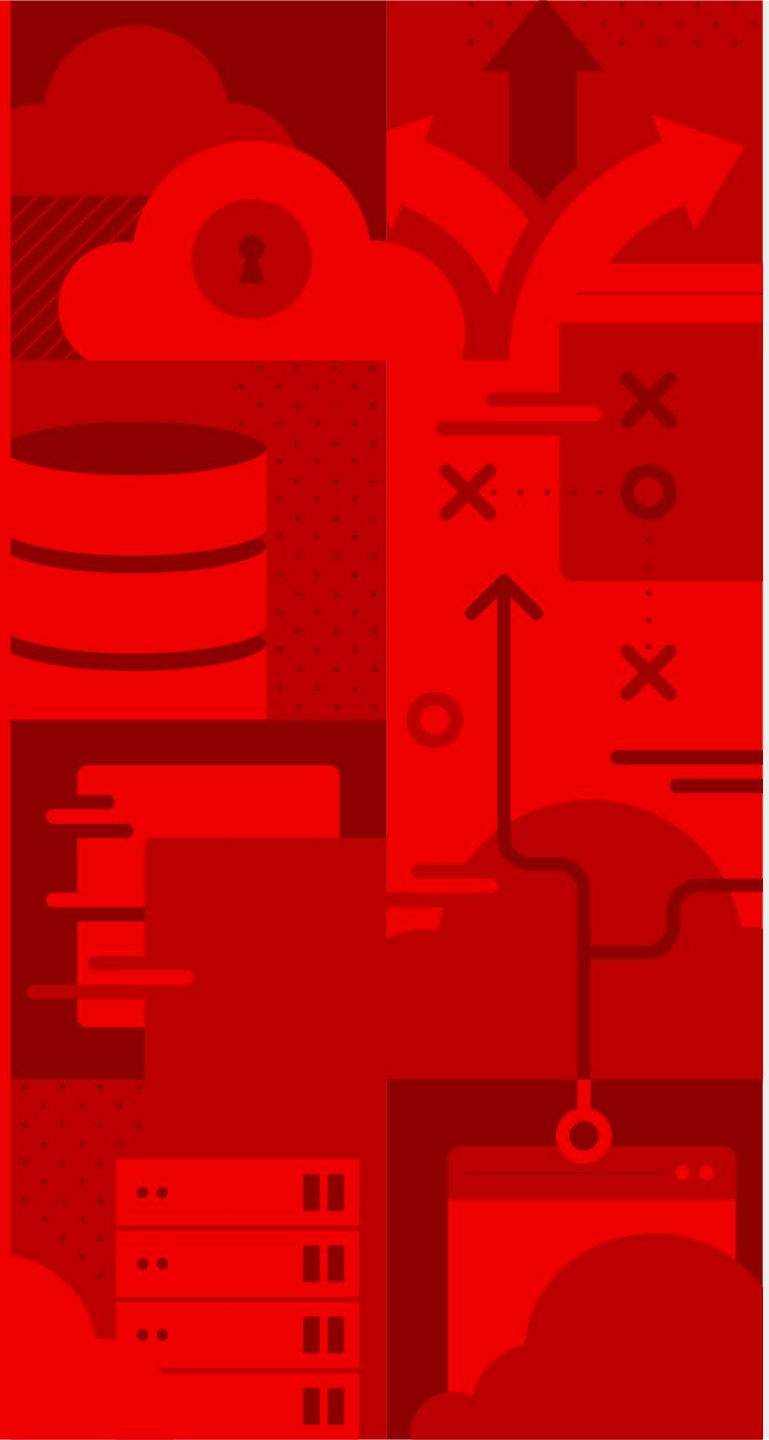
Use Cases

- Provide easy to use tools to manage certificates.
- A standardised API for interacting with multiple certificate authorities (CAs).
- Gives security teams the confidence to allow developers to self-serve certificates.
- Support for ACME (Let's Encrypt), HashiCorp Vault, Venafi, self signed and internal certificate authorities.
- Extensible to support custom, internal or otherwise unsupported CAs.**Latest Release** (v1.3): https://github.com/jetstack/cert-manager/releases/tag/v1.3.0

This service would be available to all workloads running in OpenShift (except bootstrap components that need certificates before operators exist), including:

- out-of-the box operators that are support day 2 configuration
- OLM-installed operators
- Applications managed by the above operators
- Middleware software from the Red Hat portfolio
- Applications deployed by the customer





Thank you

linkedin.com/company/red-hat

youtube.com/user/RedHatVideos

Red Hat is here to help

Responding to COVID-19 requires collaboration, transparency, and the free exchange of expertise.

Ways to contact us

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