



Red Hat OpenShift Infrastructure

Alfred Bach
PSA

Chapter 1 - Purpose & Overview

- ▶ Red Hat OpenShift - Overview
- ▶ Why Red Hat Enterprise Linux CoreOS?
- ▶ Red Hat OpenShift if CNCF Certified

Chapter 2 - Kubernetes Cluster Services

- ▶ OpenShift - Enterprise Containerization Installation and Updates
- ▶ Networking
- ▶ Storage Solutions and Windows Container Integration
- ▶ Observability
- ▶ Container Management and Security Essentials

Chapter 3 - Platform Services

- ▶ OpenShift: Empowering Applications with a Comprehensive Platform

Advanced Kubernetes Orchestration

- ▶ OpenShift Service Mesh with Istio
- ▶ Serverless with Knative

CI/CD Tooling for Containerized Applications

- ▶ Shipwright: Build images from code using S2I + other & integrate with Github Actions
- ▶ Tekton provides Kubernetes-Native CI/CD pipelines
- ▶ Argo CD for declarative GitOps continuous delivery
- ▶ Observability for Developers
- ▶ OpenShift - Cost Management

Chapter 4 - Application Services

- ▶ Application Services: Portfolio
- ▶ RHOAM - Red Hat OpenShift API Management
- ▶ RHOSAK - Red Hat OpenShift Streams for Apache Kafka
- ▶ RHOSR - Red Hat OpenShift Service Registry
- ▶ Develop and Connect Cloud Native Applications
- ▶ Red Hat Application Services: Overview
- ▶ Red Hat Application Services: Quarkus, APIs, and Integration Features

Chapter 5 - Data Services

- ▶ Data Services: Portfolio
- ▶ RHODA - Red Hat OpenShift Database Access
- ▶ RHOAI - Red Hat OpenShift AI
- ▶ RHODF - Red Hat OpenShift Data Foundation
- ▶ Red Hat Data Services: Data Management and Analytics

Chapter 6 - Developer Services

- ▶ Developer Services: Portfolio
- ▶ Overview: OpenShift Developer Console
- ▶ Red Hat OpenShift Dev Spaces
- ▶ OpenShift IDE plugins and other tooling

Chapter 7 - OpenShift Platform Plus

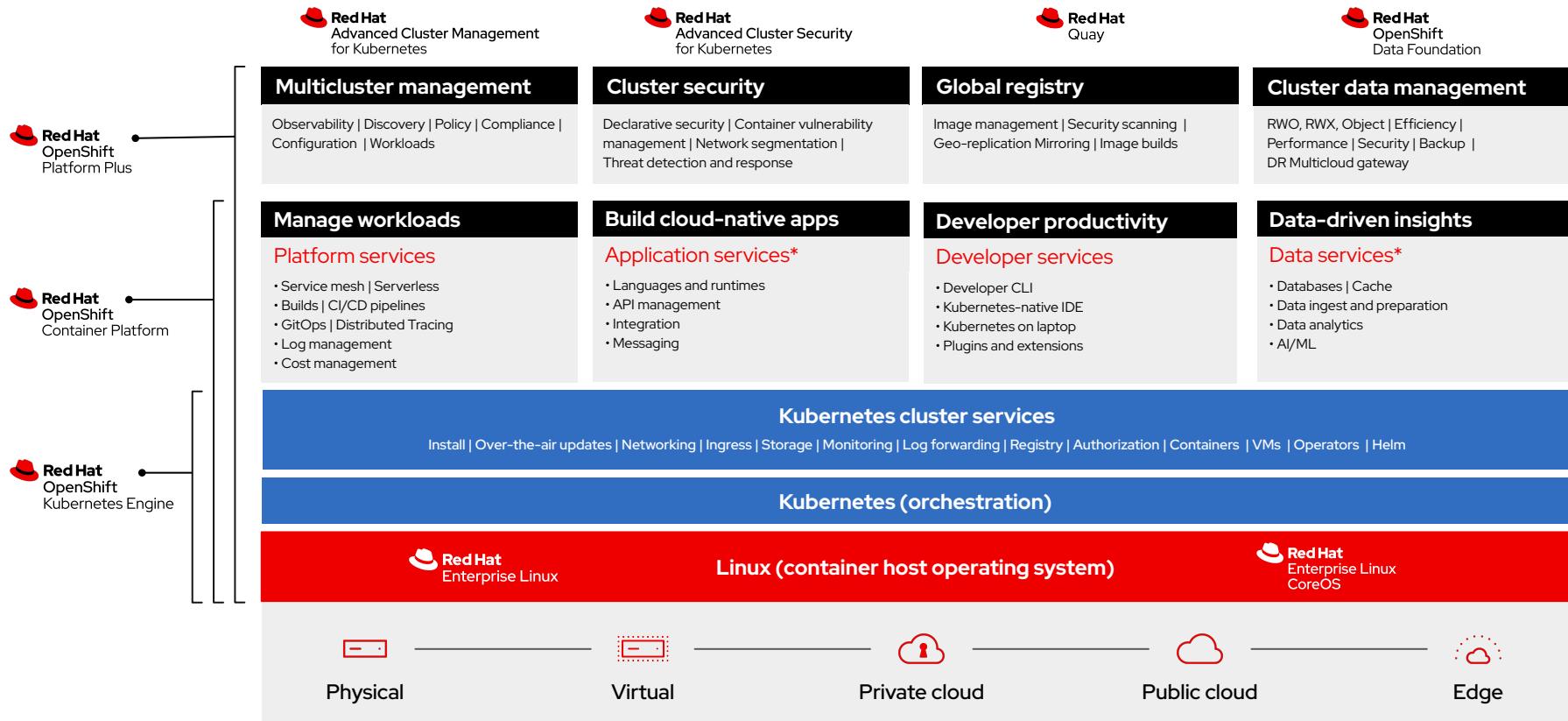
- ▶ Red Hat Advanced Cluster Management
- ▶ Red Hat Advanced Cluster Security
- ▶ Red Hat Quay Key Features
- ▶ Red Hat OpenShift Data Foundation

Chapter 1

Purpose & Overview



Red Hat OpenShift - Overview



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

** Disaster recovery, volume and multicloud encryption, key management service, and support for multiple clusters and off-cluster workloads requires OpenShift Data Foundation Advanced

Why Red Hat Enterprise Linux CoreOS?

- ▶ Automatic updates
 - No interaction for administrators
 - Staying up to date → security fixes applied
- ▶ Centrally configured infrastructure
 - Need a change? Update configs and re-provision.
- ▶ User software runs in containers
 - Host updates are more reliable



**RED HAT®
ENTERPRISE LINUX CoreOS**

An operating system for containers

- ▶ Container based packaging
- ▶ Kubernetes cluster based management
- ▶ Delivered and updated with OpenShift
- ▶ Industry standard RHEL security & compliance
- ▶ Certified Red Hat Container ISV ecosystem

Linux (container host OS)



Physical



Virtual



Private cloud

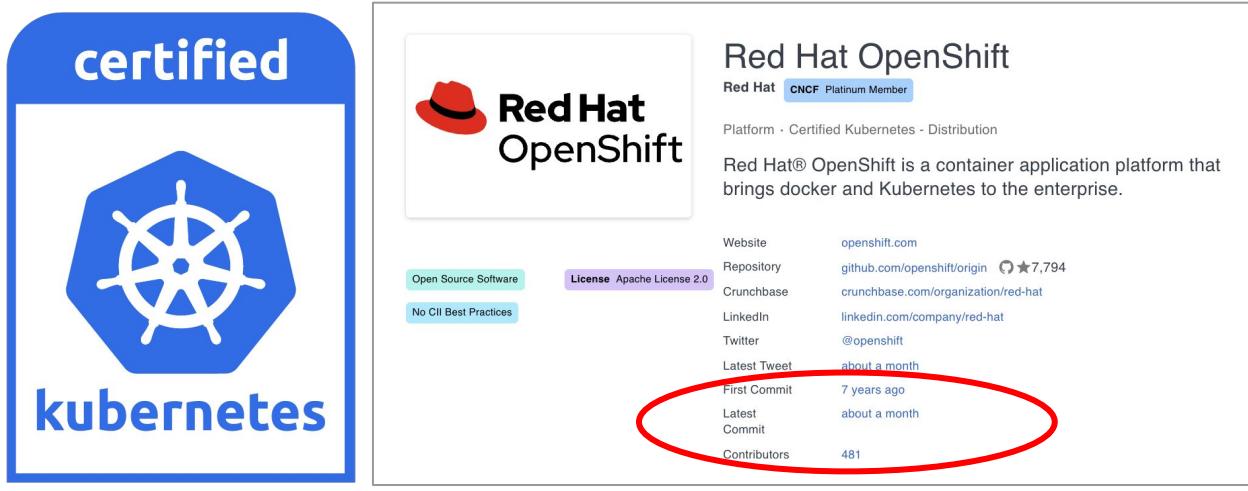


Public cloud



Edge

Kubernetes is the core of Red Hat OpenShift



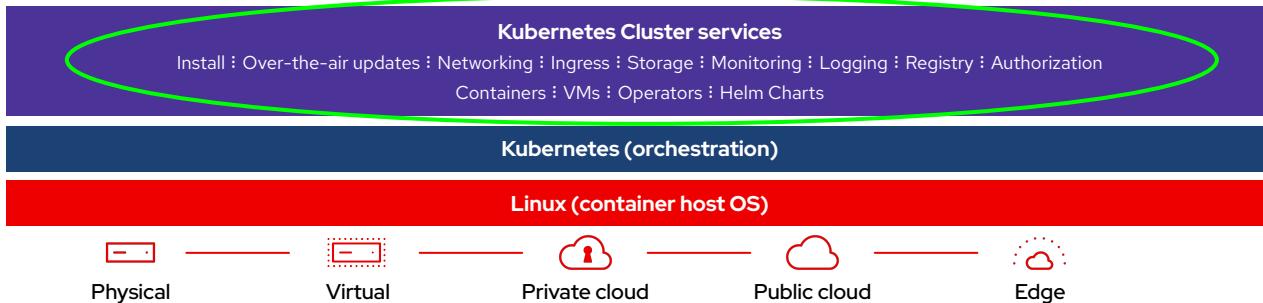
Chapter 2

Kubernetes Cluster Services



OpenShift - Enterprise Containerization

-  Fully automated OpenShift installer provisioned infrastructure
-  Immutable over the air or air gapped updates with telemetry
-  Integrated OpenShift SDN (OVS/OVN), ingress & CNI plugins
-  Kubernetes native storage (Ceph/Rook) & certified CSI plugins
-  Deploy and manage both Containers & VMs (Kubevirt)
-  Prometheus monitoring and alerts for to manage your clusters
-  Log collection & forwarding to external log management systems
-  Built in OpenShift Registry to securely manage container images
-  Integrated authentication, authorization & deployment policies
-  Leverage Kubernetes Operators & Helm Charts to manage deployments



OpenShift Installation Experiences



Microsoft Azure



Azure Stack Hub



Alibaba Cloud



Bare Metal



Google Cloud



vSphere*



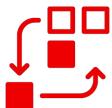
IBM Power Systems

IBM Z

NUTANIX

RED HAT[®]
OPENSTACK[®]
PLATFORM

RED HAT[®]
VIRTUALIZATION



Full Stack Automation

Installer Provisioned Infrastructure

- ▶ Auto-provisions infrastructure
- ▶ *KS like
- ▶ Enables self-service



Pre-existing Infrastructure

User Provisioned Infrastructure

- ▶ Bring your own hosts
- ▶ You choose infrastructure automation
- ▶ Full flexibility
- ▶ Integrate ISV solutions



Interactive – Connected

Assisted Installer

- ▶ Hosted web-based guided experience
- ▶ Agnostic, bare metal, and vSphere only
- ▶ ISO Driven



Interactive – Disconnected

Agent Installer (Dev Preview)

- ▶ Disconnected bare metal deployments
- ▶ Automated installations via CLI
- ▶ ISO driven

Installation and Updates

Chapter 2 - Kubernetes Cluster Services





Simplifying and automating the installation process

	Full Stack Automation	Pre-existing Infrastructure
Build Network	Installer	User
Setup Load Balancers	Installer	User
Configure DNS	Installer	User
Hardware/VM Provisioning	Installer	User
OS Installation	Installer	User
Generate Ignition Configs	Installer	Installer
OS Support	Installer: RHEL CoreOS User: RHEL Workers (on Day 2)	User: RHEL CoreOS User: RHEL Workers (on Day 2)
Node Provisioning / Autoscaling	Yes	Only for providers with OpenShift Machine API support
Customization & Provider Support	Best Practices: AWS, Azure, GCP, RHOSP, RHV, & vSphere	Yes: AWS, Azure, GCP, Bare Metal, RHOSP, & vSphere

Full Stack Automation (IPI)



Pre-existing Infrastructure (UPI)





OpenShift “Over-The-Air” Cluster Updates

The screenshot shows the 'Cluster Settings' page in the OpenShift Container Platform web interface. The left sidebar lists various cluster management options like 'Administrator', 'Logs', 'Metrics', 'Logs', 'Metrics', 'Operators', 'OperatorHub', 'Installed Operators', 'Jobs', 'Workloads', 'Services', 'Working', and 'Logs'. The main content area is titled 'Cluster Settings' and has tabs for 'Overview', 'Cluster Operators', and 'Global Configuration'. Under 'Overview', there's a summary card with 'Channel: stable-4.3', 'Current Version: 4.3.8', and an 'Update Status' section indicating 'Update available' with a blue button labeled 'Update now'. Below this, there's a note: 'View this cluster and manage subscription settings in OpenShift Cluster Manager'. Further down, there are sections for 'Cluster ID: ec0c0dd01-dd04-45d7-ae83-73f193f04815', 'Desired Release Image: quay.io/openshift-release-dev/ocp-release@sha256:a414f6308db72fb9e9d2e95018f0cc4db71c6b12b2ec0f44587488f0a16efc42', 'Cluster Version Configuration: CV version', and 'Cluster Autoscaler: Create Autoscaler'.

- Intelligent OpenShift cluster updates - automated via the Operator paradigm
- Single update mechanism for the operating system and container platform
- Patches/updates available weekly
- Keep systems updated with the latest patches and features
- No waiting - access to updates when you need them
- Saves administrators significant time on cluster updates

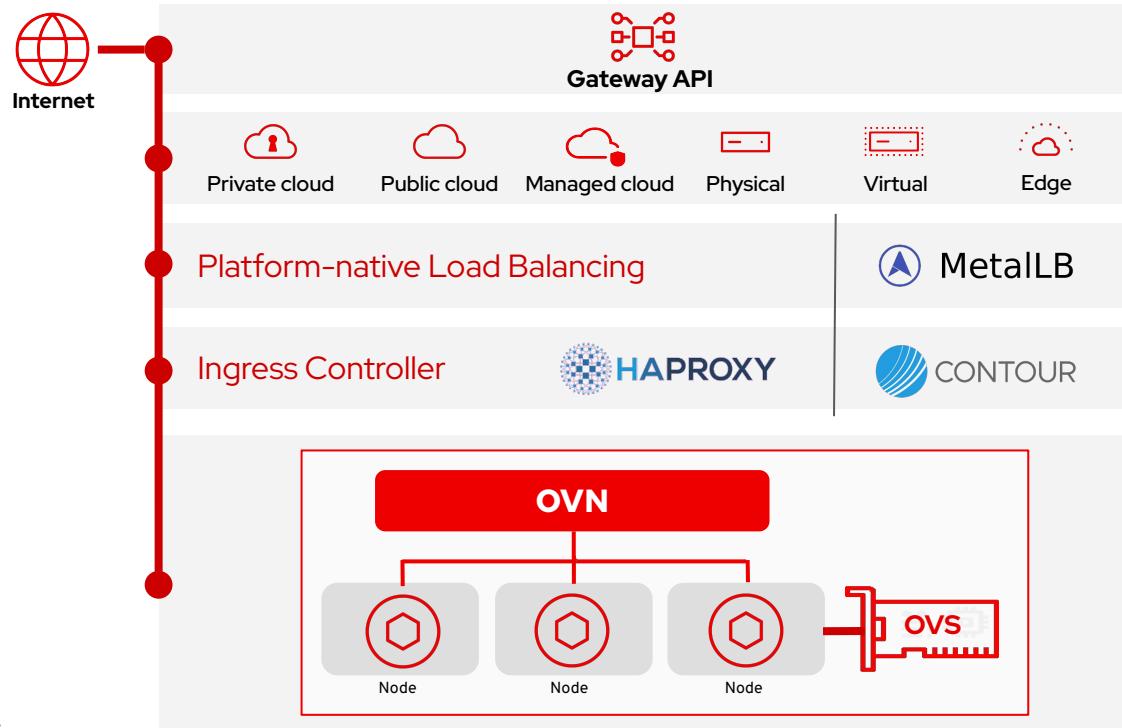
Networking

Chapter 2 - Kubernetes Cluster Services





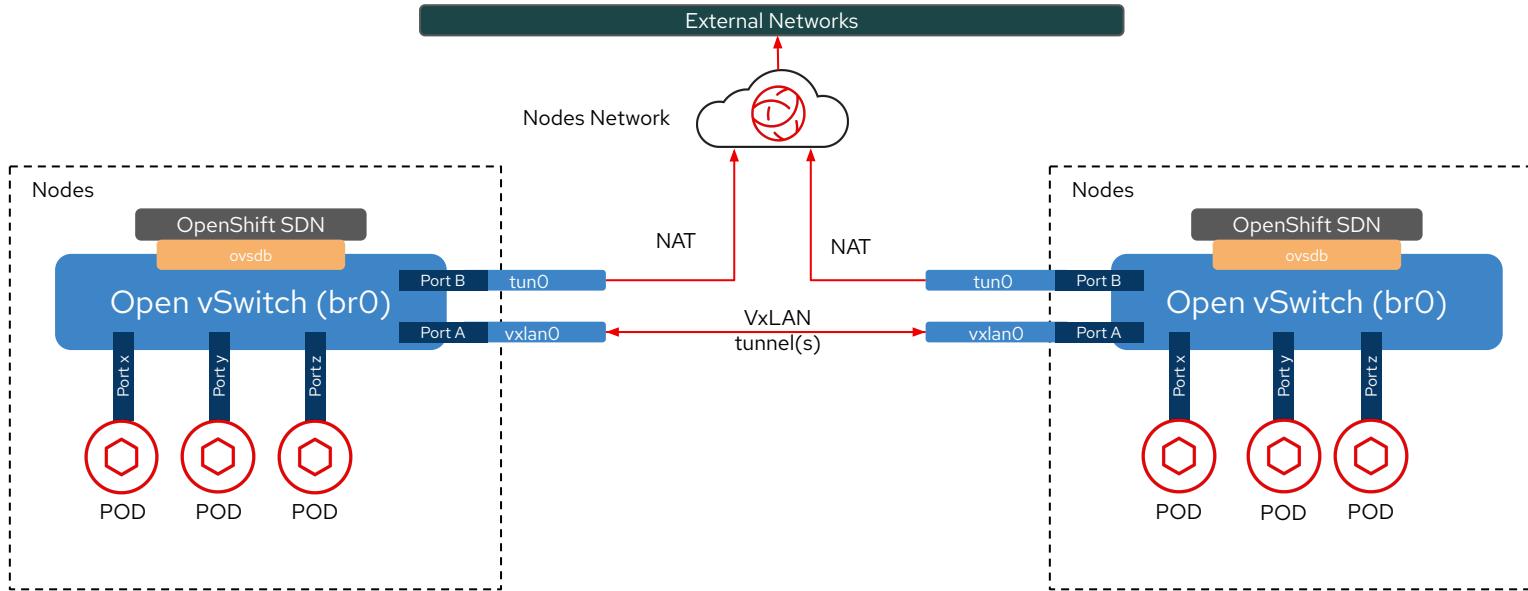
Integrated SDN (OVS/OVN), ingress & CNI plugin



- ▶ 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

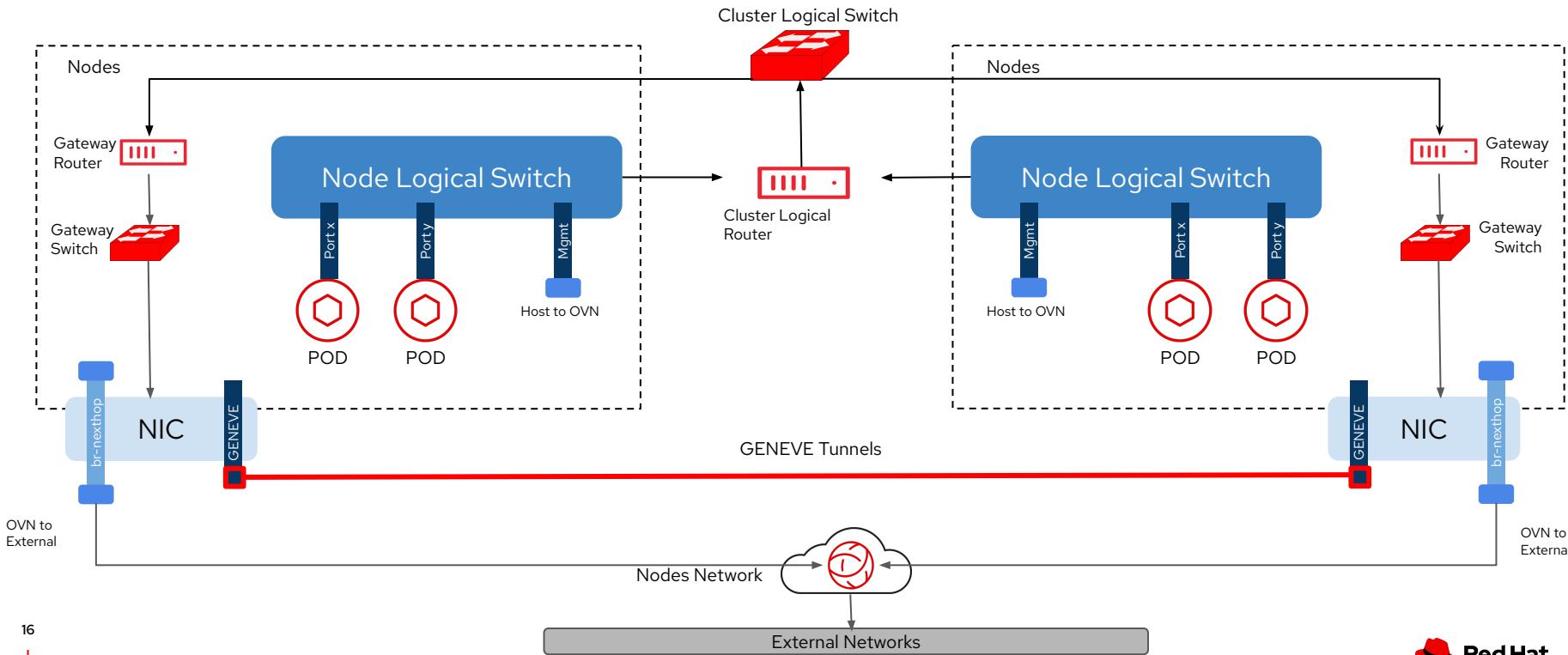


OpenShift SDN



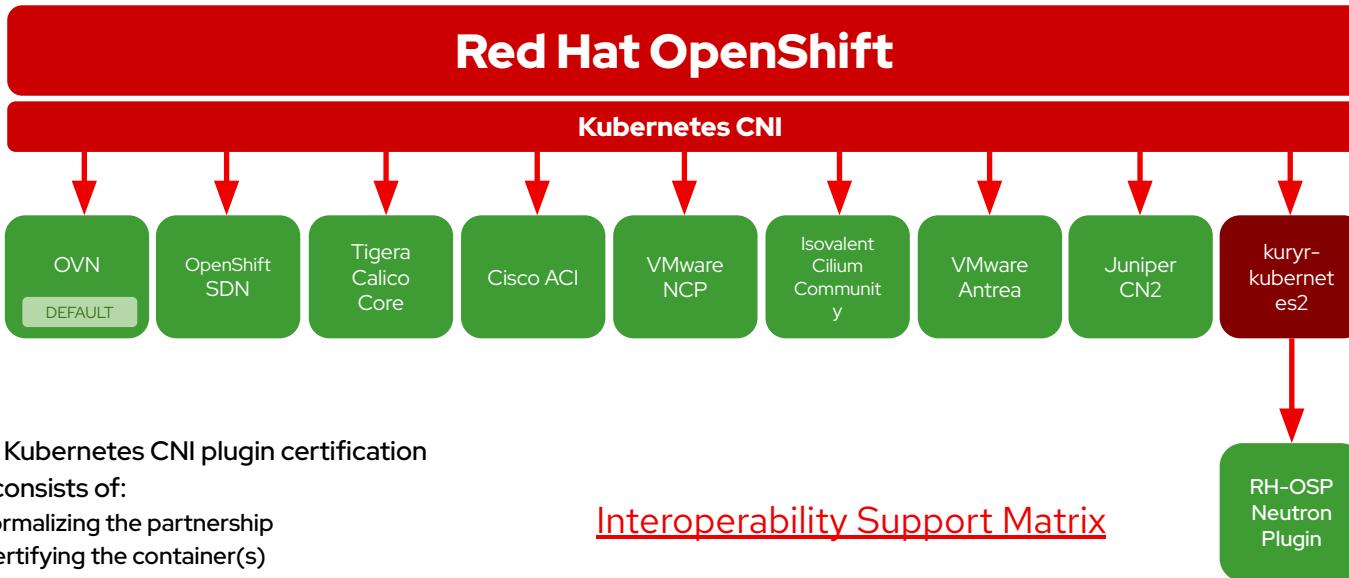


OVN Kubernetes (logical)





Red Hat OpenShift Networking Plug-ins



3rd-party Kubernetes CNI plugin certification primarily consists of:

1. Formalizing the partnership
2. Certifying the container(s)
3. Certifying the Operator
4. Successfully passing the same Kubernetes networking conformance tests that Red Hat OpenShift uses to validate its own SDN

Interoperability Support Matrix



Storage Solutions and Windows Container Integration

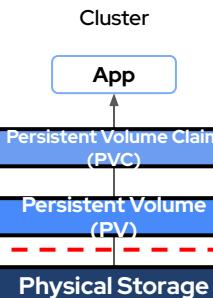
Chapter 2 - Kubernetes Cluster Services



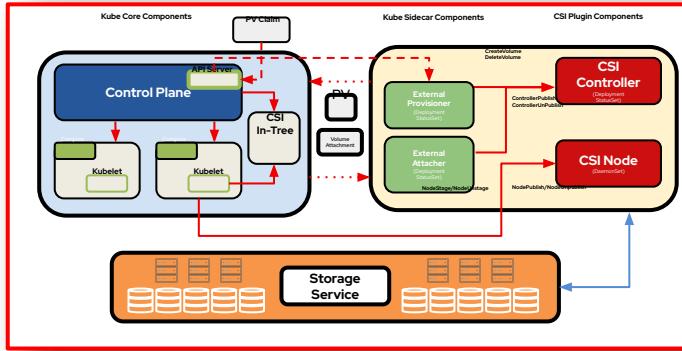


Kubernetes native storage & certified CSI plugins

	RWO	ROX	RWX
AWS Elastic Block	✓		
Azure Disk	✓		
Azure File	✓	✓	✓
Cinder	✓		
Fibre Channel	✓	✓	
GCE Persistent	✓		
hostPath	✓		
iSCSI	✓	✓	
Local volumes	✓		
NFS	✓	✓	✓
Red Hat OpenShift Data Foundation	✓	✓	✓
VmWare vSphere	✓		
OpenStack Manila			✓



Persistent Storage
RWO - ReadWriteOnce
ROX - ReadOnlyMany
RWX - ReadWriteMany

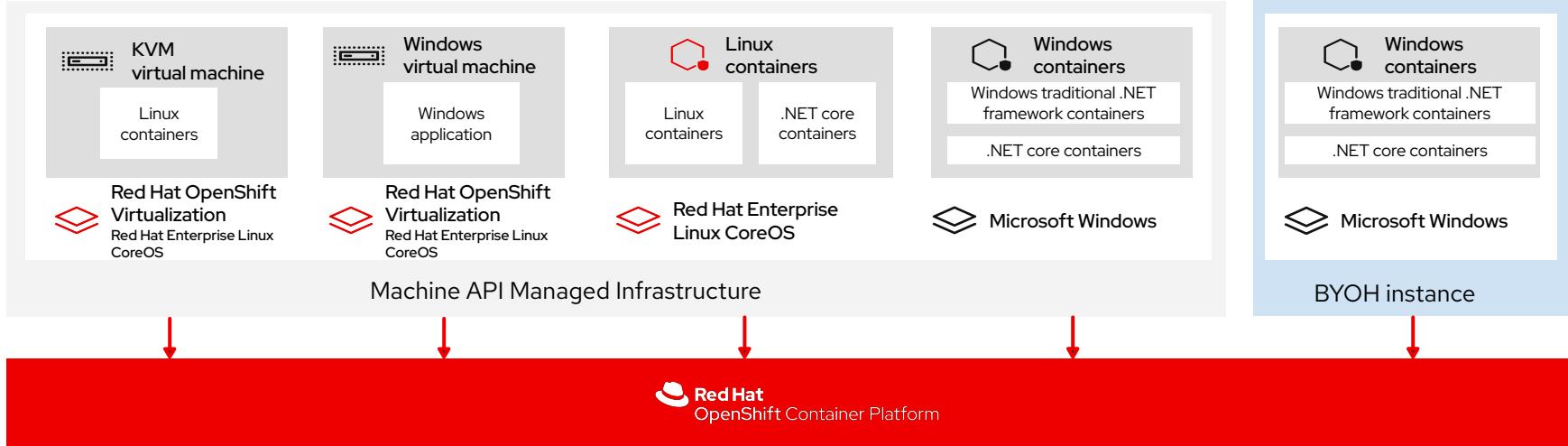


CSI driver	CSI Volume Snapshots	CSI Cloning	CSI Resize
AWS EBS (Tech Preview)	✓		✓
Google Cloud Platform (GCP) persistent disk (PD) (Tech Preview)	✓		✓
OpenStack Cinder	✓	✓	✓
OpenStack Manila	✓	✓	✓
Red Hat Virtualization (oVirt)			

we test and support the in-tree and select CSI provisioners, partners fill in the gaps for their storage, and we'll be (hopefully) seamlessly transitioning customers to CSI as in-tree drivers are removed.



Deploy and manage both Containers & VMs



Red Hat OpenShift runs management and scheduling of:

- › Linux containers on Red Hat Enterprise Linux CoreOS
- › .NET core containers on Red Hat Enterprise Linux CoreOS or Windows
- › Traditional .NET framework containers on Windows
- › Windows virtual machines with OpenShift Virtualization

Bring your own Windows Hosts

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

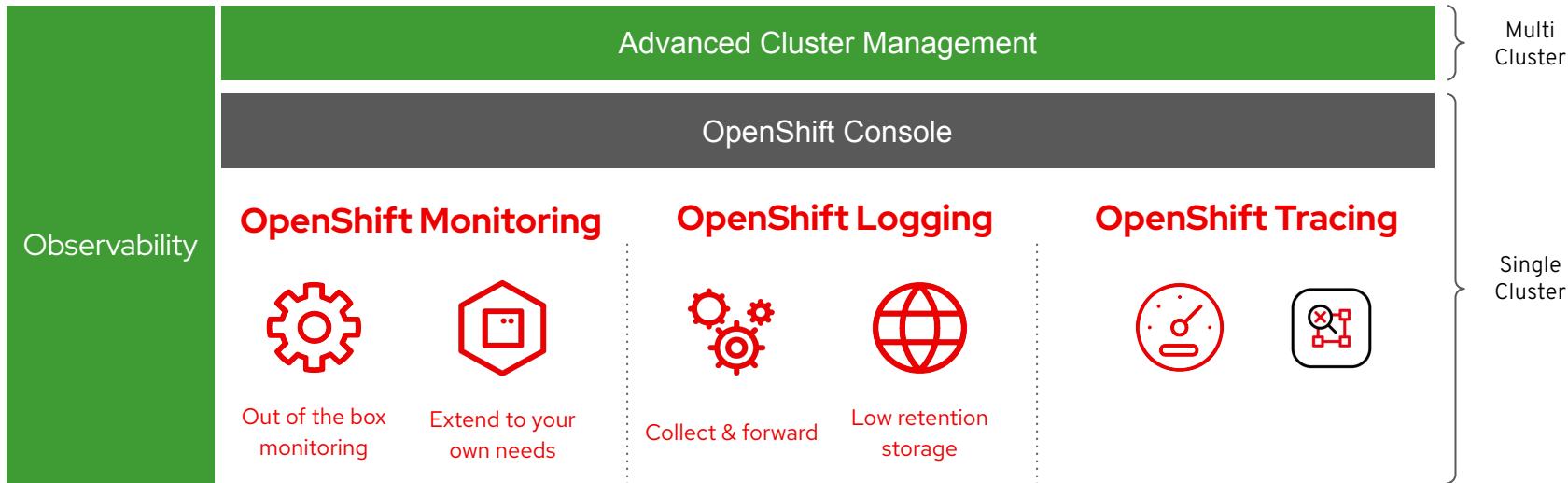
Observability

Chapter 2 - Kubernetes Cluster Services





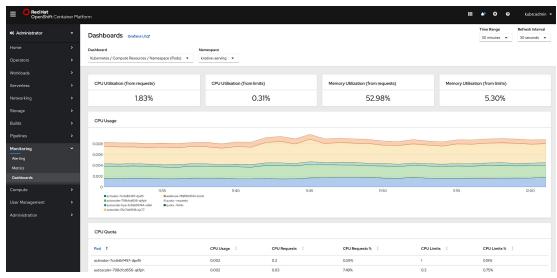
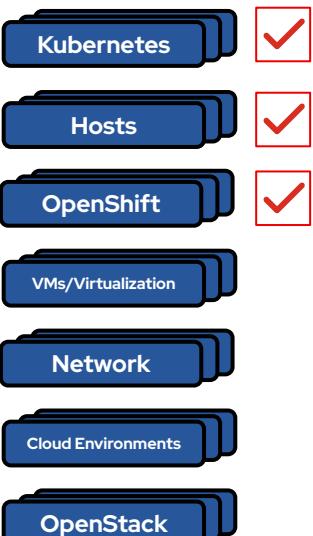
Log collection & Observability



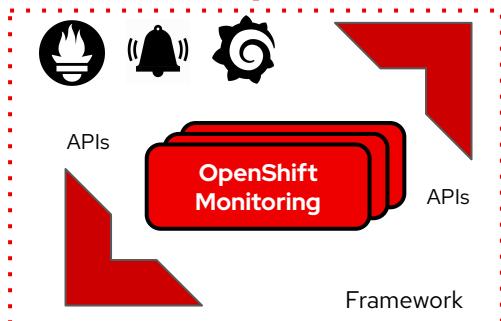


Monitor your clusters, infrastructure, and workloads

Low level infrastructure



Information is bubbled up into the console for further troubleshooting.



Top level workload



All user workload running on OpenShift exposing metrics can easily integrate those into the OpenShift Monitoring framework.

[Customize monitoring](#)

Metrics collection and storage via Prometheus, an open-source monitoring system time series database.

Alerting/notification via Prometheus' Alertmanager, an open-source tool that handles alerts send by Prometheus.

Metrics visualization via OpenShift Console and Grafana.

Networking Observability



**Unified
Experience**

Network Traffic Metrics and Tracing

Whether one cluster or one hundred, developers and cluster administrators require seamless connectivity across applications.



**Security
Everywhere**

Network Policy and Governance

Security and regulatory compliance requires governance of traffic in, around, and out of networks.



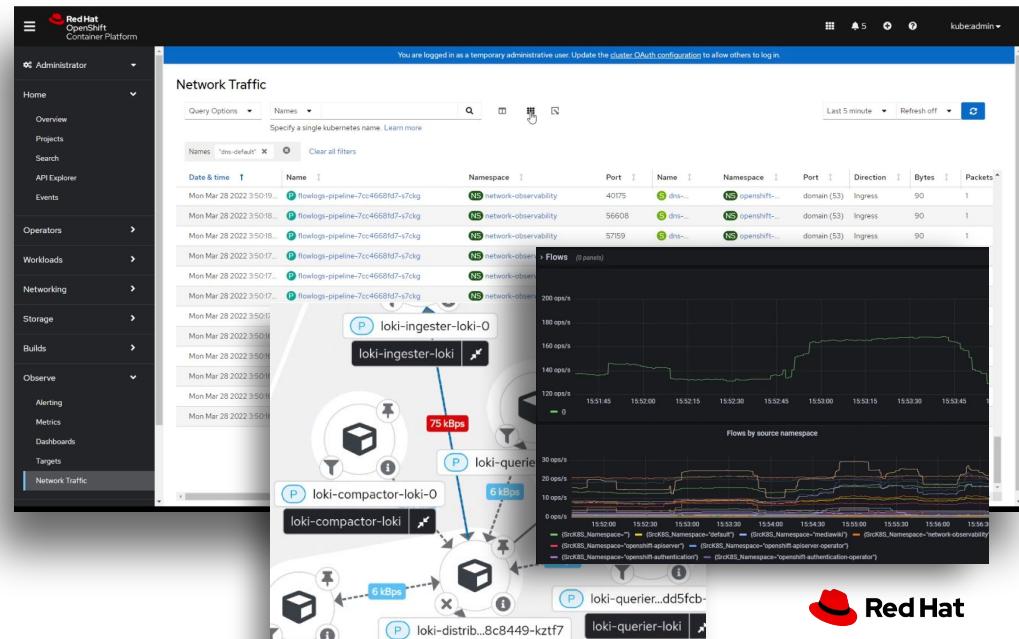
**Platform
Consistency**

Network Traffic Flow and Topology

Developers and administrators require a common understanding of their traffic within and across cluster boundaries.

Network Flow Data – New Insight & Presentation

Tabular Netflow data, NOC Dashboard, Pod/Service/Node-specific Topology, New Metrics, Export options



Container Management and Security Essentials

Chapter 2 - Kubernetes Cluster Services

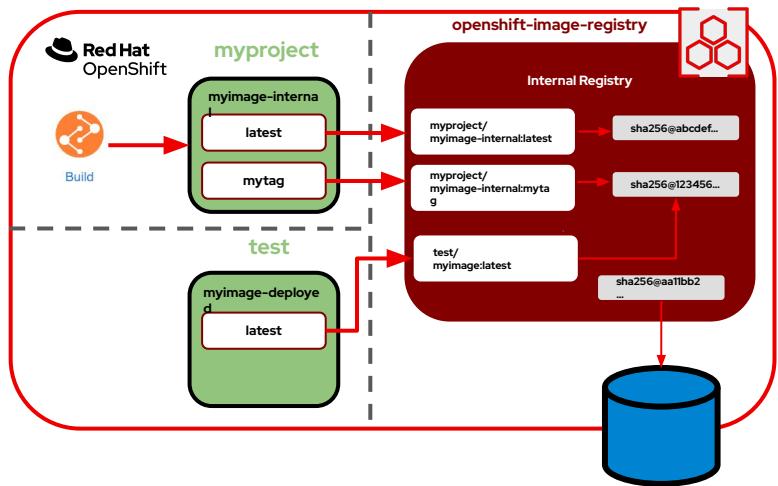




Securely manage your container images

The screenshot shows the Red Hat OpenShift Container Platform interface. The left sidebar is collapsed. The main content area shows the 'Namespaces' section. The 'openshift-image-registry' namespace is selected, and its details are displayed:

- Namespace Details**
- Name:** openshift-image-registry
- Status:** Active
- Labels:** olm.operatorgroup.uid/e29fad31-4915-4984-8f2e-553e7c321527, openshift.io/cluster-monitoring=true
- Annotations:** 4 Annotations
- Display Name:** No display name
- Description:** No description
- Created At:** May 16, 1:42 pm



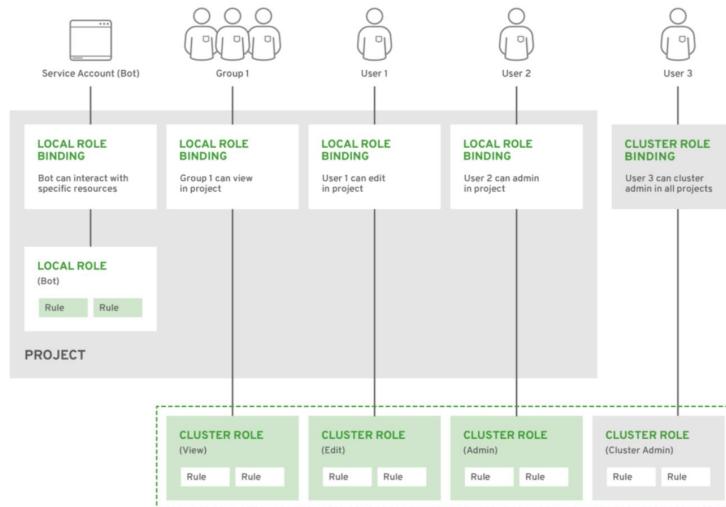
OpenShift provides a built-in container image registry managed by an infrastructure operator. The registry is typically used as a publication target for images built on the cluster, as well as being a source of images for workloads running on the cluster... for a more enterprise grade registry... i.e. Quay [go here](#)



Authentication, authorization & deployment policies

Authentication

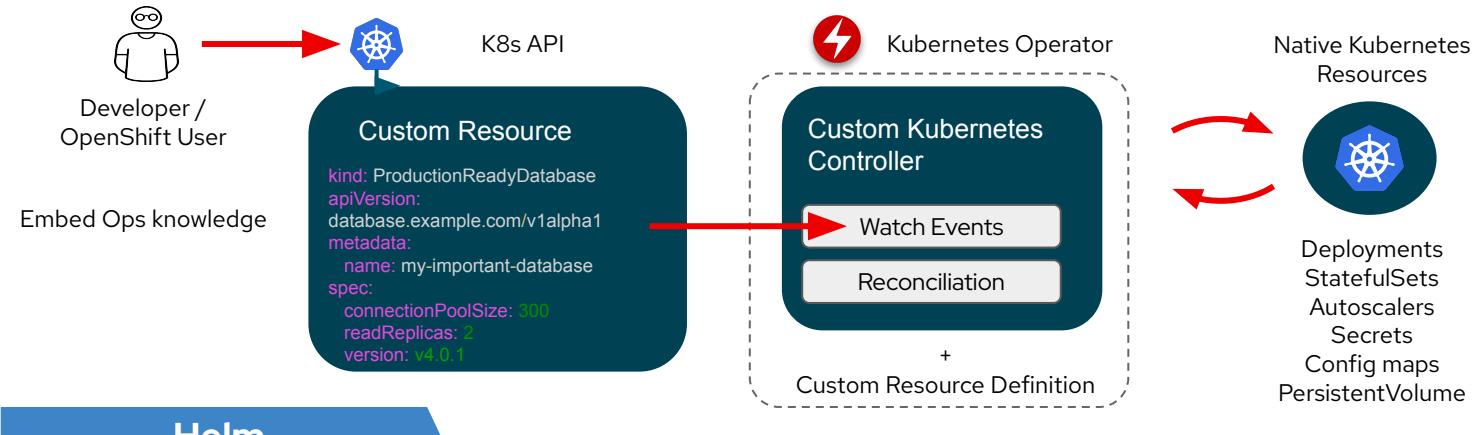
- ▶ Restrict user access through trusted identity providers
- ▶ Integrate with platform OAuth server to
- ▶ Connect to external identity provider -- 9 supported options



Role based authorization

- ▶ Project scope & cluster scope available
- ▶ Operator- and user-level roles are defined by default
- ▶ Custom roles are supported

Managing deployments



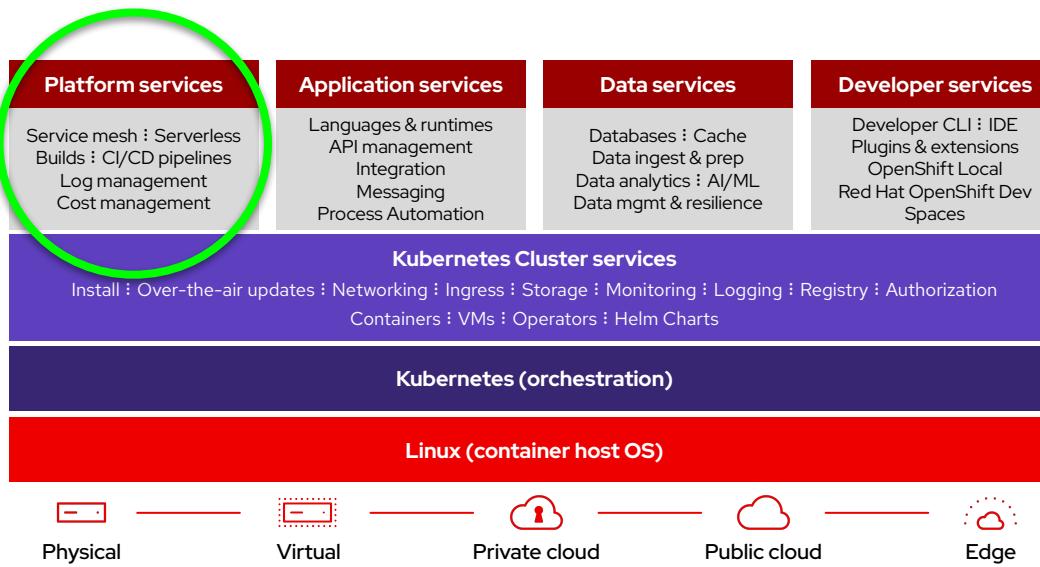
Chapter 3

Platform Services



Platform Services: Portfolio

OpenShift's Platform Services provide a unified solution for modern development. With Service Mesh and Serverless, streamline application delivery through efficient Builds, CI/CD pipelines, and effective Log Management. Ensure cost-effectiveness with integrated tools for precise Cost Management.



OpenShift: Empowering Applications with a Comprehensive Platform

Platform services

Service mesh
Builds : CI/CD pipelines
Log management
Cost management



OpenShift Service Mesh with Istio to connect, secure and observe services



OpenShift Serverless with Knative to enable hybrid Serverless, FaaS & Event Driven Architectures



OpenShift Builds with Shipwright to build images from code using S2I + other & integrate with Github Actions



OpenShift Pipelines with Tekton to provide Kubernetes-Native CI/CD pipelines



OpenShift GitOps with ArgoCD to enable declarative GitOps based continuous delivery



Application level observability for developers to build and manage their apps



Log management of infrastructure, application, and audit logs + forwarding capabilities



Cost management visibility, mapping, and modeling across hybrid infrastructure in order to stay on budget

Kubernetes Cluster services

Kubernetes

Linux



Physical



Virtual



Private cloud



Public cloud



Edge

Advanced Kubernetes Orchestration

Chapter 3 - Platform Services





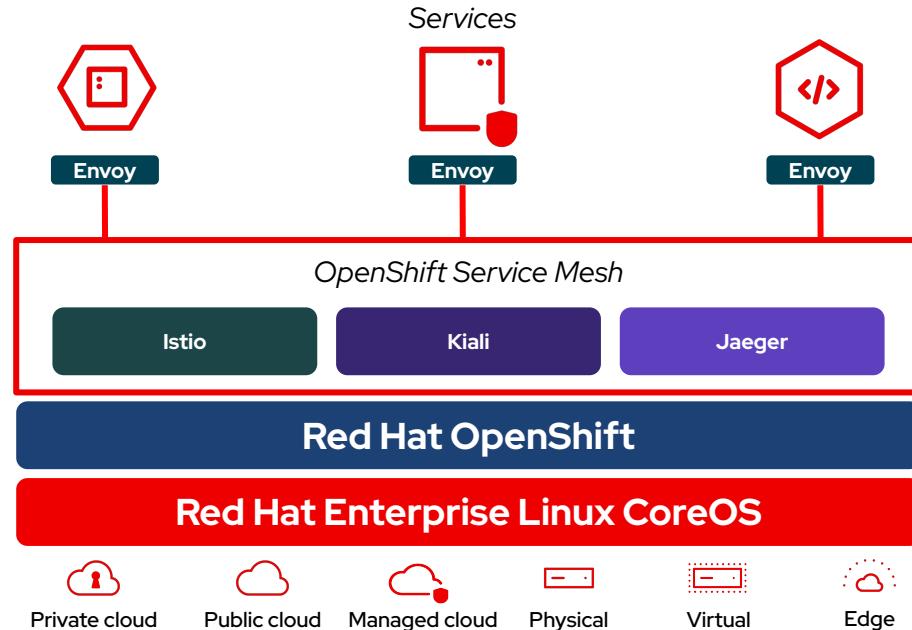
OpenShift Service Mesh with Istio

Connect, Secure, Control & Observe Services

- Connect services securely with zero-trust network policies.
- Automatically secure your services with managed authentication, authorization and encryption.
- Control traffic to safely manage deployments, A/B testing, chaos engineering and more.
- See what's happening with out of the box distributed tracing, metrics and logging.
- Manage OpenShift Service Mesh with the **Kiali** web console.



Product Briefing Deck



* Eventing is currently in Technology Preview

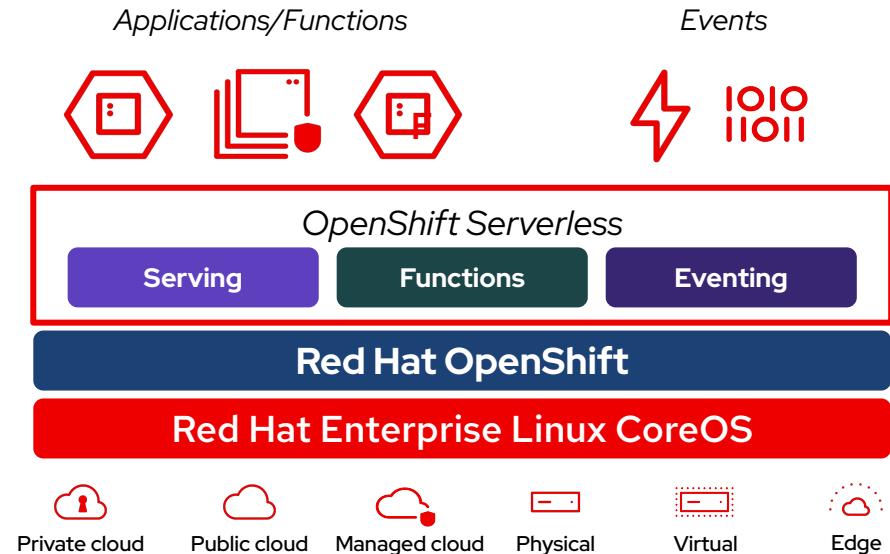
** Functions are currently a work in progress initiative



Red Hat OpenShift Serverless with Knative

Connect, Secure, Control & Observe Services

- Deploy and run **serverless containers**
- Use any programming language or runtime
- Modernize existing applications to run serverless
- Powered by a rich ecosystem of event sources
- Manage serverless apps natively in Kubernetes
- Based on open source project **Knative**
- Run anywhere OpenShift runs



CI/CD Tooling for Containerized Applications

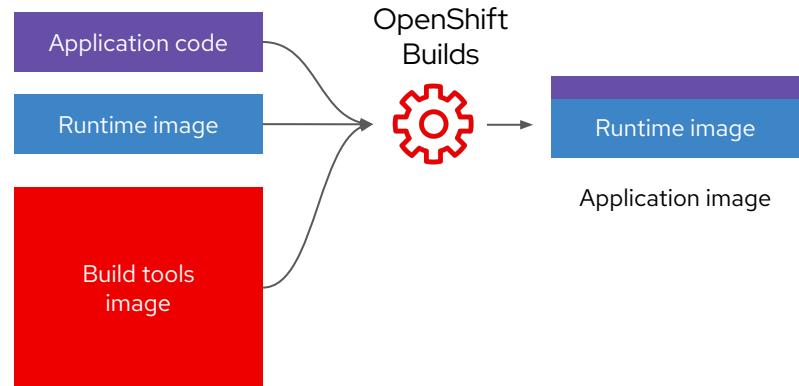
Chapter 3 - Platform Services





Build images from code using S2I + other & integrate with Github Actions

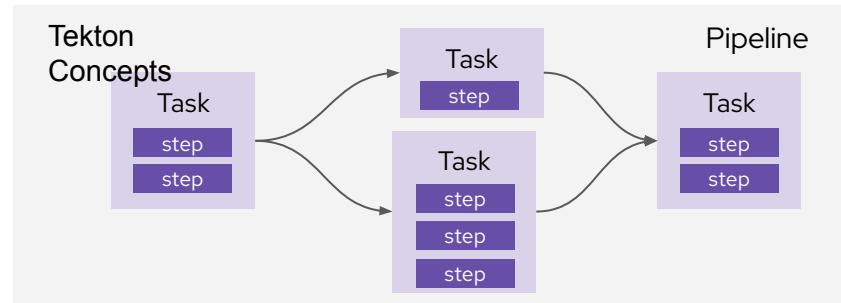
- Build images on OpenShift and Kubernetes
- Use Kubernetes build tools
 - Source-to-Image
 - Buildpacks
 - Buildah
 - Kaniko
 - ...more
- Create lean application images
- Extend with your own build tools
- Based on Shipwright open-source project





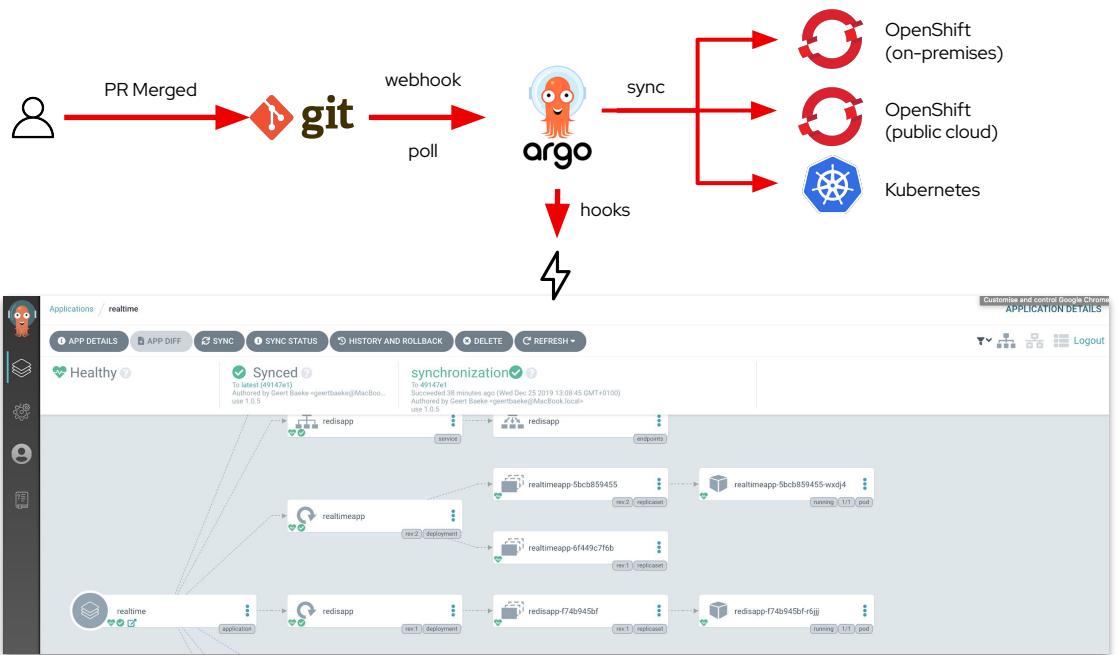
Tekton provides Kubernetes-Native CI/CD pipelines

- Based on Tekton Pipelines
- Kubernetes-native declarative CI/CD
- Pipelines run on-demand in isolated containers
- No central server to maintain! No plugin conflicts!
- Task library and integration with Tekton Hub
- Secure pipelines aligned with Kubernetes RBAC
- Visual and IDE-based pipeline authoring
- Pipeline templates when importing apps
- Automated install and upgrades via OperatorHub
- CLI, Web, VS Code and IntelliJ plugins



The screenshot shows the Red Hat OpenShift Container Platform interface. The left sidebar has sections for Developer, Topology, Builds, Pipelines, and Advanced. The main area shows a Pipeline Run Details page for project 'a1-cicd'. It displays an Overview of the pipeline run, which includes a sequence of steps: unit-tests, release-app, code-analysis, build-image, deploy, int-test, and perf-test. All steps are marked as succeeded.

Argo CD for declarative GitOps continuous delivery



- Configurations versioned in Git
- Automatically syncs configuration from Git
- Drift detection, visualization and correction
- Granular control over sync order
- Rollback and rollforward to any Git commit
- Manifest templating support (Helm, Kustomize, etc)
- Visual insight into sync status

Observability for Developers

Chapter 3 - Platform Services



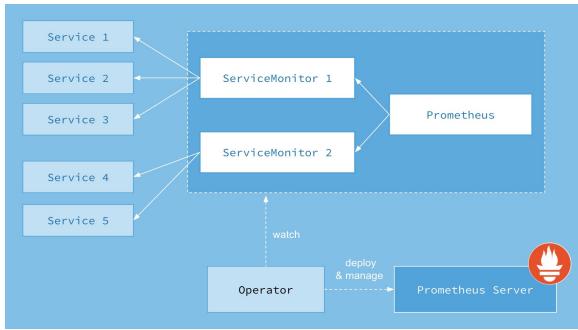


Observability for developers to build/manage apps

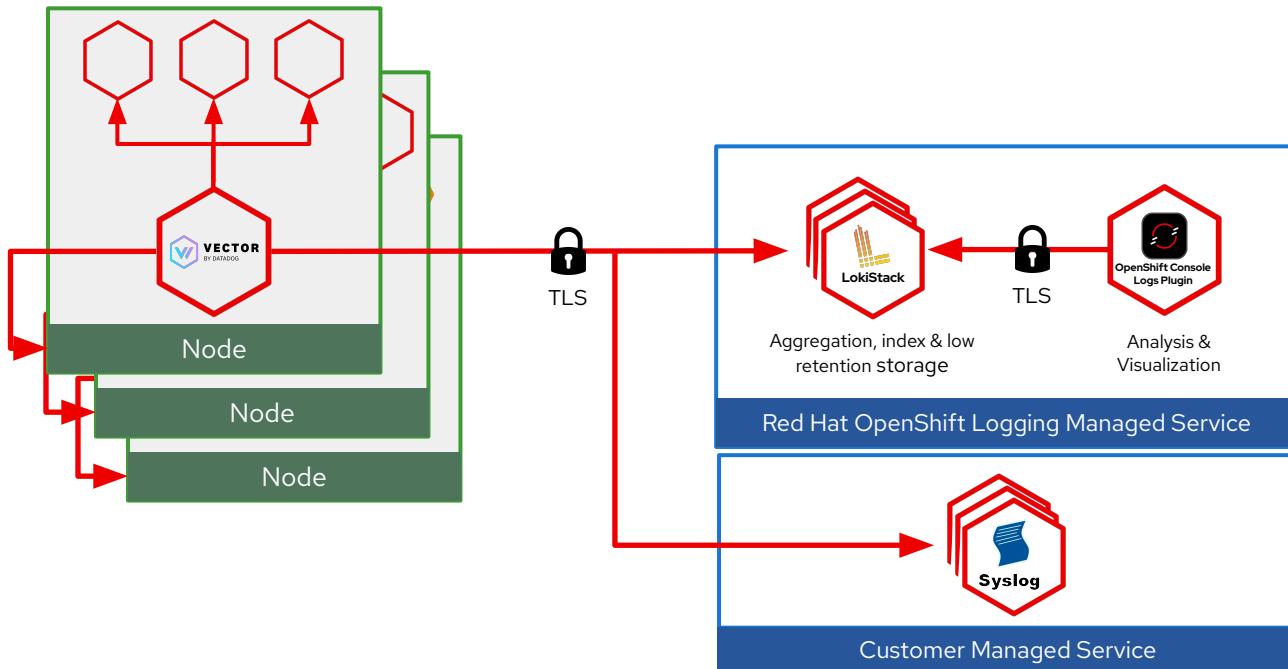
- Collect metrics from your own applications running in a user-defined namespace.
- Define your own alerting rules based on your own metrics and any other metrics available in the same namespace (e.g. CPU and Memory).
- Explore all metrics (your own or built-in) and alerting rules via the OpenShift Console in a multi-tenant fashion.

The screenshot shows the Red Hat OpenShift Container Platform console. The left sidebar has a 'Developer' section with options like '+Add', 'Topology', 'Monitoring' (which is selected), 'Search', 'Builds', 'Pipelines', 'Helm', and 'Project'. The main area is titled 'Monitoring' and includes tabs for 'Dashboard', 'Metrics' (which is selected), 'Alerts', and 'Events'. A 'Custom Query' dropdown is open, showing 'http' and a list of metrics: 'Metrics' (http_requests_total, http_request_duration_seconds_sum, http_request_duration_seconds_count, http_request_duration_seconds_bucket) and 'Logs' (http). The top navigation bar shows 'Project: metrical' and the user 'admin'.

The screenshot shows the 'Metrics' tab in the 'Monitoring' section of the Red Hat OpenShift Container Platform console. The top navigation bar shows 'Project: metrical' and the user 'admin'. The main area has tabs for 'Dashboard', 'Metrics' (selected), 'Alerts', and 'Events'. A 'Custom Query' dropdown is open, showing 'http' and a query 'http_requests_total'. Below it is a line chart for '30m' showing a step increase from approximately 50 to 150 at 18:55. At the bottom is a table with columns: Name, code, container, endpoint, instance, job, method, namespace, pod. One row is highlighted: http_requests_total, 200, metrics-app, 8080/tcp, 10.12.2.49:8080, metrics-app, get, metrical, metrics-app-deployment-goyk. The bottom navigation bar shows '1 / 1'.

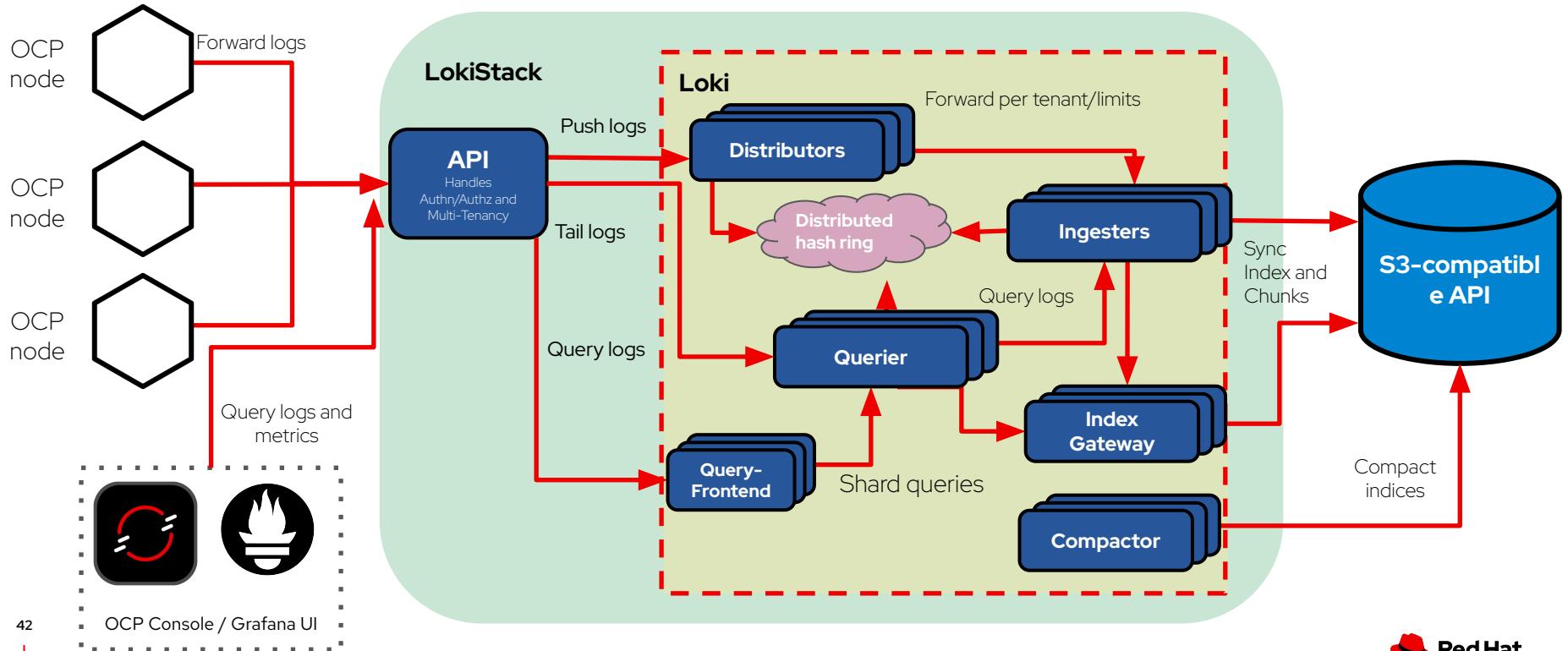


Red Hat OpenShift Log Management



- Log forwarding to various supported systems.
- An **opinionated** collector and normalizer of application, infrastructure and audit logs
- Optional, low retention, managed centralized storage

OpenShift Logging LokiStack



OpenShift - Cost Management

Chapter 3 - Platform Services





OpenShift - Cost Management

- **Certified Operator**
 - Install both in parallel to upgrade
- **Improvements in performance**
 - New big data processing for better UX
- **Integration to OpenShift Cluster Manager**
 - Now you can see your cluster costs in OCM
- **New navigation**
 - Cost management is now accessible from OCM
- **Google Cloud as a new source**
 - Add your GCP sources to cost management
 - OCP on GCP still being developed
- **New view (cost explorer)**
 - View your data grouped by different concepts, in time
 - Line items for the reports readily available
- **Child accounts in AWS**
 - No need to provide the parent account for cost management, if your account can provide CUR files
 - Refine what data is shared with cost management



Cost Management Metrics Operator
provided by Red Hat

A GoLang-based OpenShift Operator that generates and uploads OpenShift usage metric...

Cost breakdown

Total cost \$4,457.84



	Certified Operator	Koku metrics operator
Naming	Cost management metrics operator	Cost management metrics operator
Support	Supported by Red Hat	Upstream (community support)
Location	In Cluster Operator Hub	In Cluster Operator Hub
Availability	Today	Today

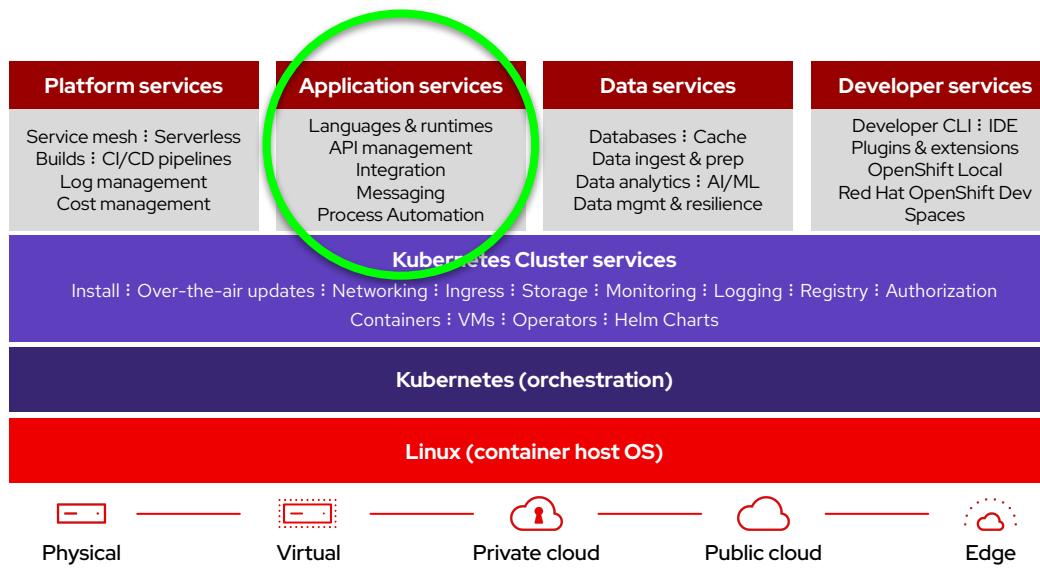
Chapter 4

Application Services



Application Services: Portfolio

Create a unified environment for application development, delivery, integration, and automation. It is comprised of comprehensive frameworks, integration solutions, process automation, runtimes, and programming languages



RHOAM - Red Hat OpenShift API Management

- Centralized control of API program
- Enable API lifecycle management
- Ensure API quality and usability
- Report and monitor APIs
- Control access and usage of APIs

Customer
ISV
software

ISV Cloud
Services

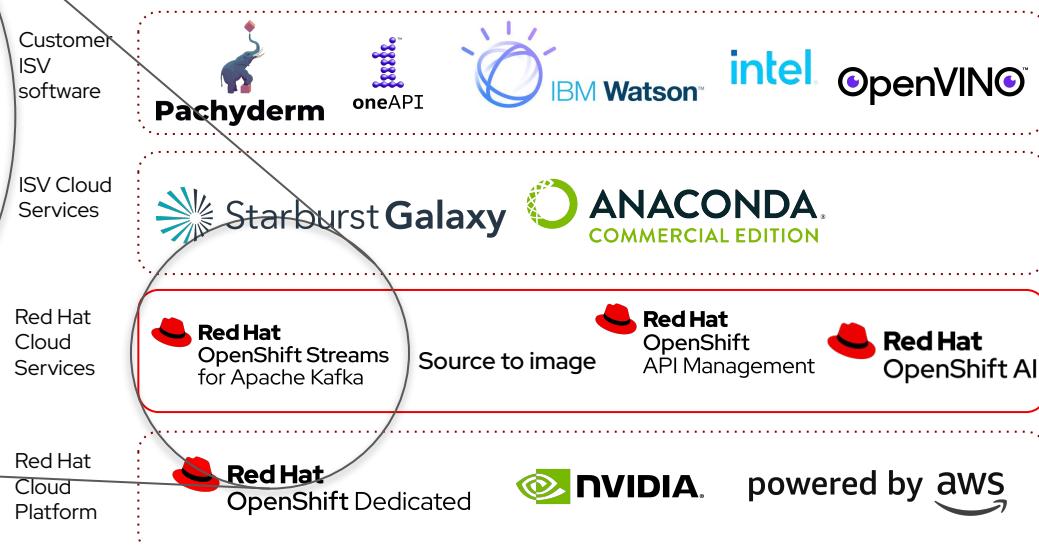
Red Hat
Cloud
Services

Red Hat
Cloud
Platform

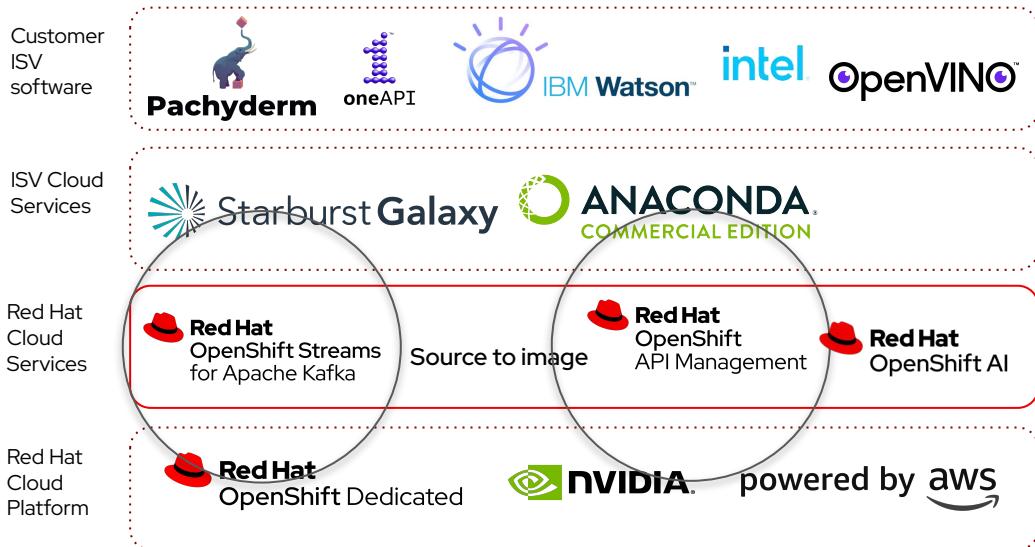


RHOSAK - Red Hat OpenShift Streams for Apache Kafka

- Fully hosted + managed Kafka service for stream-based applications
- Reduces operational cost and complexity of application delivery
- Connects applications across clouds, both private and public

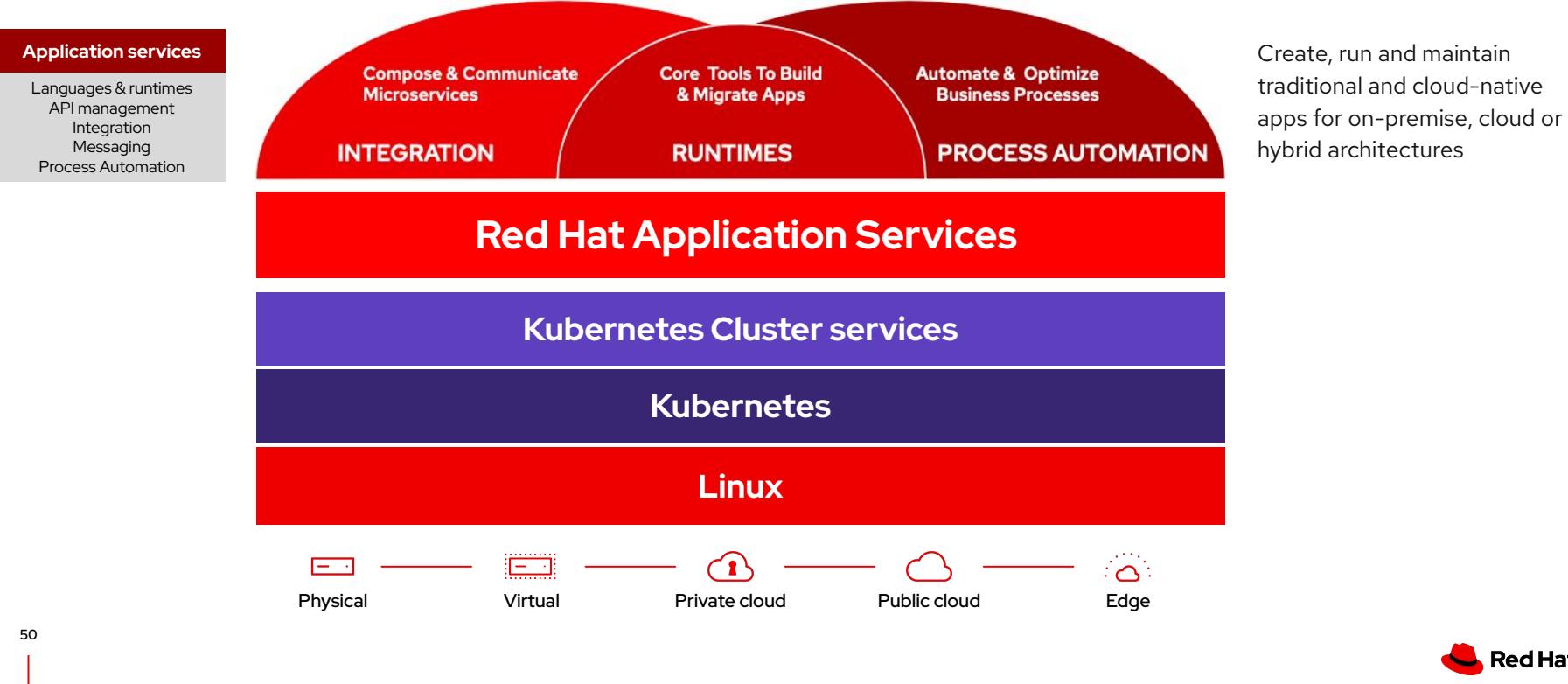


RHOSR - Red Hat OpenShift Service Registry



- RHOSR functions with other application services, RHOAM and RHOSAK
- Stores and manages schemas with RHOSAK
- Stores and manages API definitions with RHOAM

Develop and Connect Cloud Native Applications



Red Hat Application Services: Overview



Red Hat
Integration

Red Hat
Fuse

Red Hat
AMQ

Red Hat
3scale API Management

Red Hat
OpenShift
Application Runtimes

Red Hat
Data Grid

Red Hat
AMQ

OpenJDK



Red Hat
Runtimes



Red Hat
Runtimes

Red Hat
JBoss Enterprise
Application Platform

OpenJDK™

RED HAT®
SSO

VERT.X

Open
Liberty



Red Hat
Application
Migration Toolkit

* node
JS



Red Hat
Process Automation



Red Hat
Process Automation
Manager



Red Hat
Decision
Manager

Red Hat
OpenShift
Application Runtimes

Red Hat
Data Grid

Red Hat
AMQ

OpenJDK



Red Hat
Runtimes

Red Hat Application Services: Quarkus, APIs, and Integration Features

Red Hat Runtimes

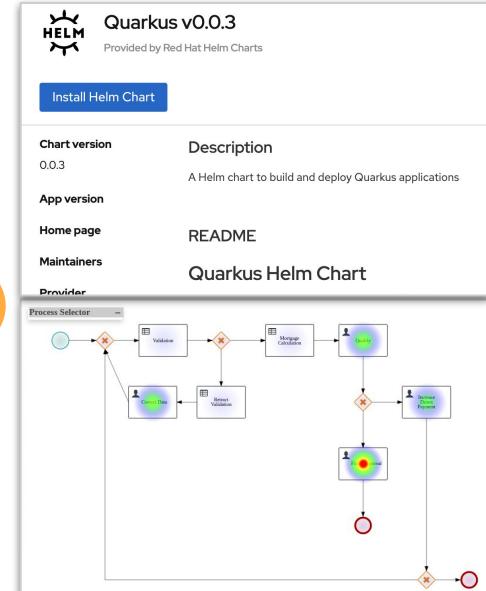
- **Quarkus** - Quick Starts, Example Helm Chart, Integration with Serverless Functions (DP)
- **EAP** - Azure App Service (GA), Azure Marketplace, EAP XP 2.0 (Runnable JARs)
- **Spring Boot 2.3** - Support for UBI for Java 8 and 11, Security Starter, Dekorate Build Hooks (TP)

Red Hat Integration

- **APIs** - OSD Add-On: Managed API Service (GA), 3scale Manageability Enhancements
- **Messaging** - AMQ Broker/Online, Interconnect LTS, AMQ Interconnect 2.0 (DP)
- **Streaming** - Kafka 2.7 support in AMQ Streams, Service Registry 2.0 (TP)

Red Hat Process Automation

- **Dashboard Builder** - Heat Map component



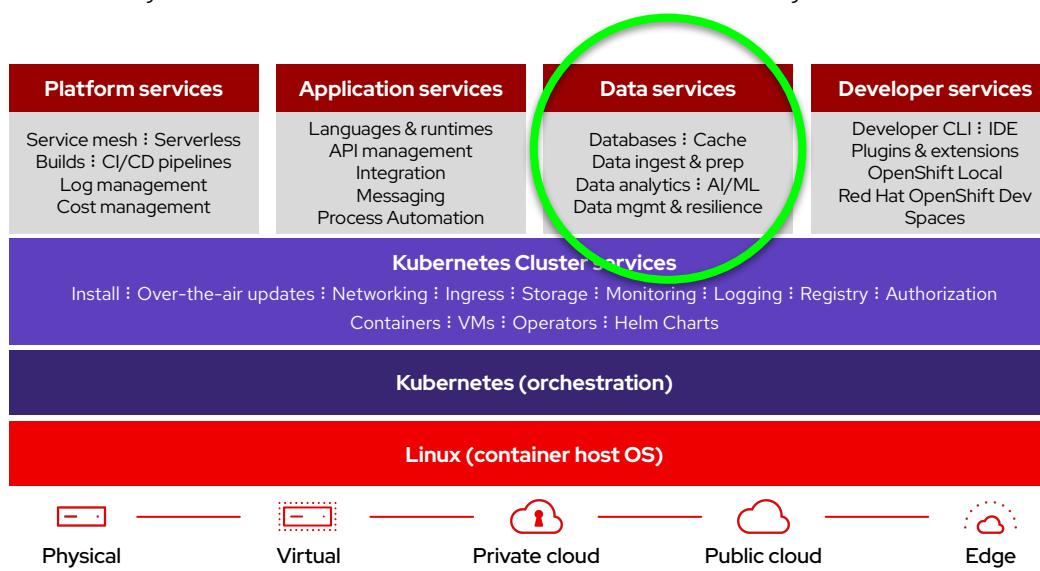
Chapter 5

Data Services



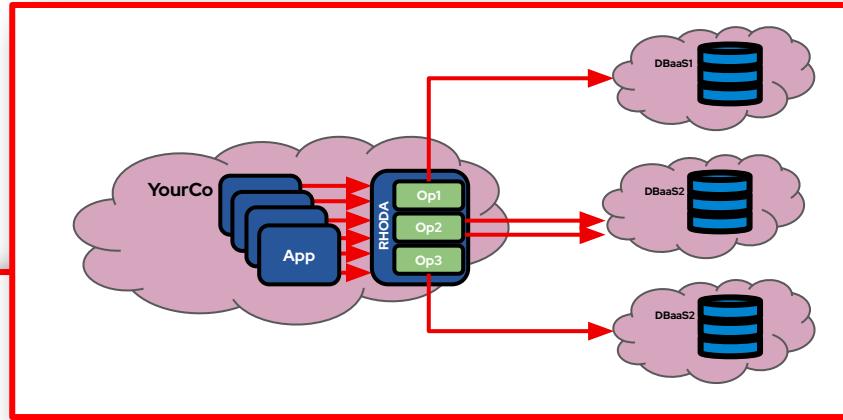
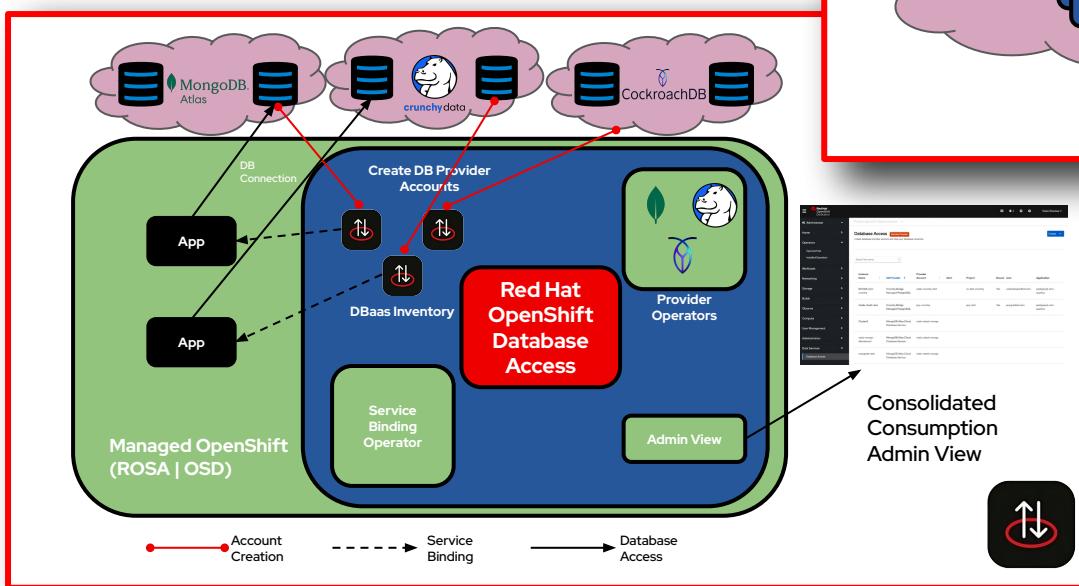
Data Services: Portfolio

Applications often are processes which involve data, they either consume or produce data that needs to be served, transported or stored. The business value of the ecosystem is not just the container orchestration environment nor the storage system being used but most of the value comes from the data that is being handled.



RHODA - Red Hat OpenShift Database Access

- Installed on Managed OpenShift Cluster
- Efficient database utilization
- Centralized monitoring with Admin View



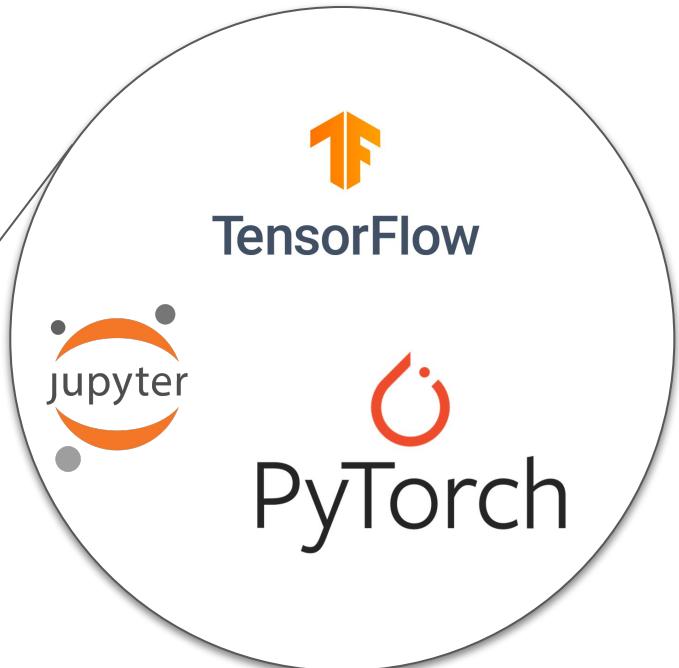
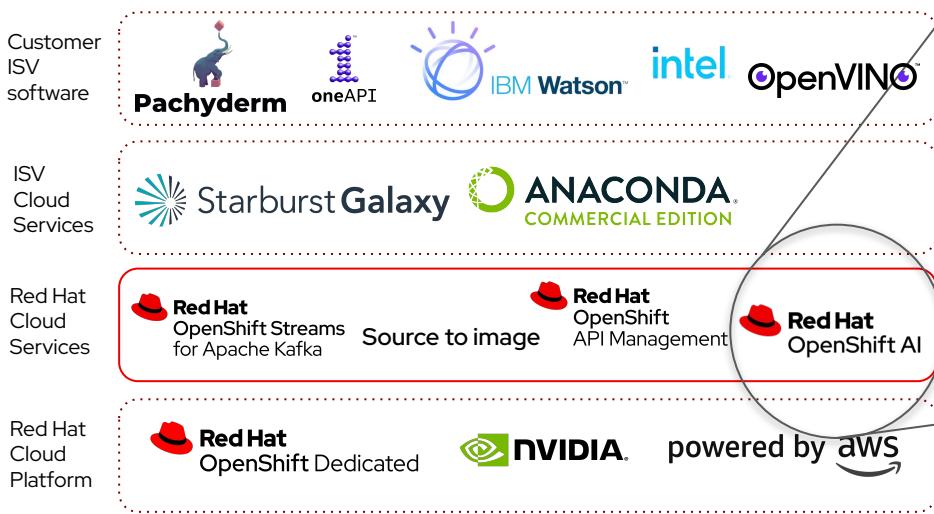
Supported database operators





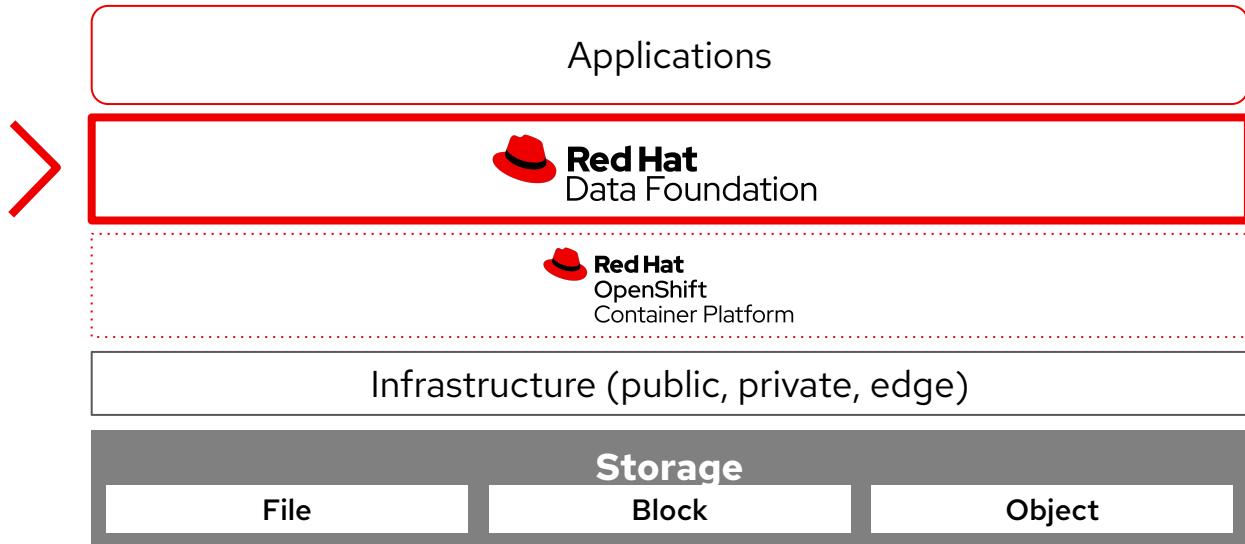
RHOAI - Red Hat OpenShift AI

- Red Hat managed cloud service
- Built on top of OpenShift Dedicated cloud platform
- Good for AI/ML use cases



RHODF - Red Hat OpenShift Data Foundation

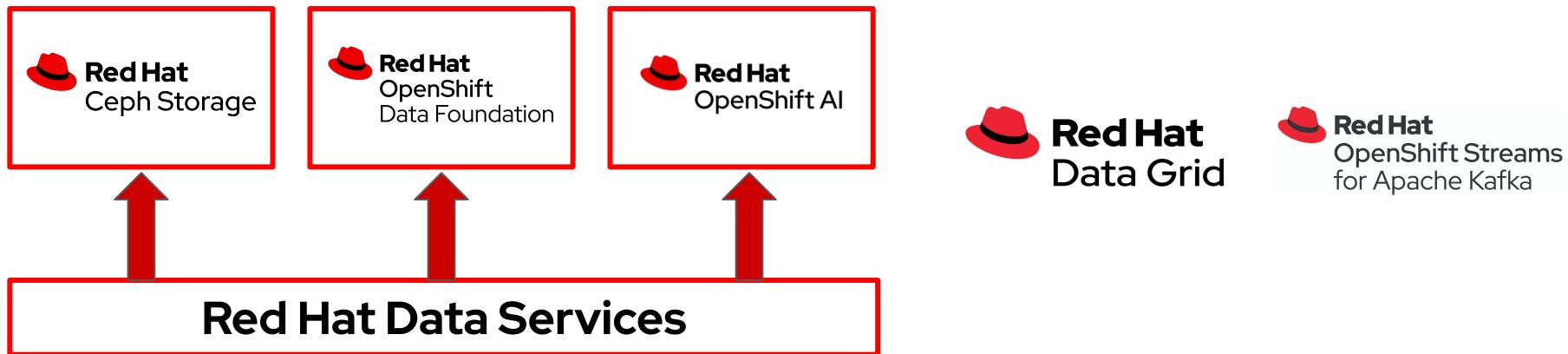
- Unified user experience on any infrastructure
- Managed by OpenShift
- Offers data protection and resilience
- Provides all storage services (block, file, object)
- Built on OpenShift - scalable



Data services

Databases : Cache
Data ingest & prep
Data analytics : AI/ML
Data mgmt & resilience

Red Hat Data Services: A Complete Solution for Data Management and Analytics



Chapter 6

Developer Services



Developer Services: Portfolio



OpenShift Developer Console & CLI enhancements to improve dev experience



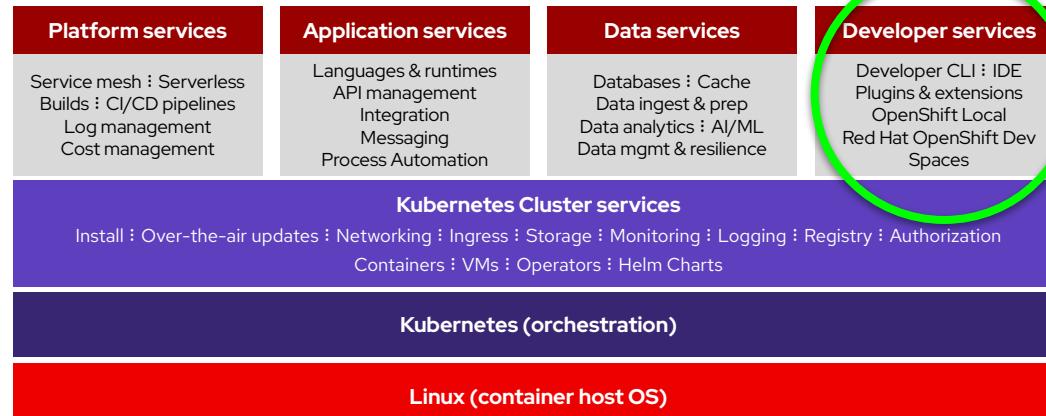
OpenShift IDE plugin integrations to meet the developer where they are



Red Hat OpenShift Dev Spaces: cloud dev environments on OpenShift with web-based IDEs.



OpenShift developer sandbox and local cluster enhancements to improve access



Physical



Virtual



Private cloud



Public cloud



Edge



Overview: OpenShift Developer Console

The screenshot shows the 'Add' screen of the OpenShift Developer Console. At the top, it displays the project 'mschmitt-redhat-dev' and the application filter 'all applications'. The left sidebar contains navigation links for 'Developer', '+Add', 'Topology', 'Monitoring', 'Search', 'Builds', 'Helm', 'Project', 'ConfigMaps', and 'Secrets'. The main content area is titled 'Add' and instructs the user to 'Select a way to create an Application, component or service from one of the options'. It lists ten creation methods arranged in three rows:

Category	Option	Description
Quick Starts	Samples	Create an Application from a code sample
	From Git	Import code from your Git repository to be built and deployed
	From Devfile	Import your Devfile from your Git repository to be built and deployed
From Dockerfile	From Dockerfile	Import your Dockerfile from your Git repository to be built and deployed
	YAML	Create resources from their YAML or JSON definitions
	From Catalog	Browse the catalog to discover, deploy and connect to services
Database	Database	Browse the catalog to discover database services to add to your Application
	Operator Backed	Browse the catalog to discover and deploy operator managed services
Helm	Helm Chart	Browse the catalog to discover and install Helm Charts



Overview: OpenShift Developer Console

The screenshot shows the Red Hat OpenShift Developer Console interface for the project `mschmitt-redhat-dev`. The left sidebar includes options like Developer, Topology, Monitoring, Search, Builds, Helm, Project (selected), ConfigMaps, and Secrets. The main content area displays the `mschmitt-redhat-dev` project details, status, utilization metrics (CPU, Memory, Filesystem, Network transfer, Pod count), and activity log.

Project: mschmitt-redhat-dev

Overview

Details

- Name: mschmitt-redhat-dev
- Requester: mschmitt-redhat
- Labels:
 - name=mschmitt-redhat-dev
 - toolchain.dev.openshift.com/owner=mschmitt-redhat
 - toolchain.dev.openshift.com/provider=codeready-toolchain
- [View all](#)
- Description: mschmitt-redhat-dev

Inventory

- 2 Deployments
- 0 DeploymentConfigs
- 0 StatefulSets
- 5 Pods
- 2 PVCs
- 3 Services
- 2 Routes
- 4 ConfigMaps
- 18 Secrets
- 0 VolumeSnapshots

Status

Active

Utilization

1 hour

Resource	Usage	12:36 PM	12:38 PM	12:40 PM	12:42 PM	12:44 PM
CPU	47.39m	50m				
Memory	179.4 MiB	200 MiB	100 MiB			
Filesystem	40 KB	40 KB	20 KB			
Network transfer	399.4 Kbps in 103.3 Kbps out	400 Kbps	200 Kbps			
Pod count	5	5				

ResourceQuotas

No resource quotas

Activity

View events

Ongoing

There are no ongoing activities.

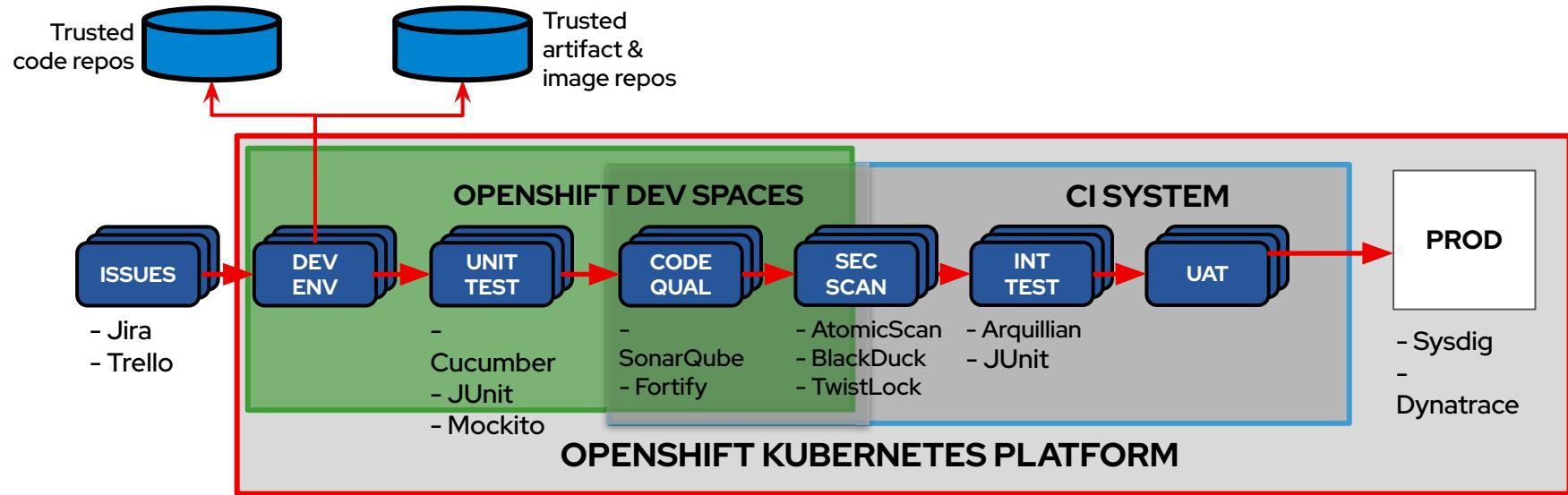
Recent events

Paused

Event	Action	Timestamp	Details
Created container nginx-sample	Created	12:44 PM	>
Started container nginx-sample	Started	12:44 PM	>
Pulling image "image-registry.openshift-l...	Pulling	12:44 PM	>
Successfully pulled image "image-registry...	Success	12:44 PM	>
Started container sti-build	Started	12:44 PM	>
Add eth0 [10.129.6.194/23]	Added	12:44 PM	>
Created container sti-build	Created	12:44 PM	>
Container image "quay.io/openshift-releas...	Container	12:44 PM	>
Created pod: nginx-sample-776f6b8fb8...	Created	12:44 PM	>
Scaled up replica set nginx-sample-776f6...	Scaled up	12:44 PM	>
Successfully assigned mschmitt-redhat-d...	Assigned	12:44 PM	>
Created container manage-dockerfile	Created	12:44 PM	>
Started container manage-dockerfile	Started	12:44 PM	>
Container image "quay.io/openshift-releas...	Container	12:44 PM	>
Build mschmitt-redhat-dev/nginx-sample...	Build	12:44 PM	>
Started container git-clone	Started	12:44 PM	>
Created container git-clone	Created	12:44 PM	>
Container image "quay.io/openshift-releas...	Container	12:44 PM	>

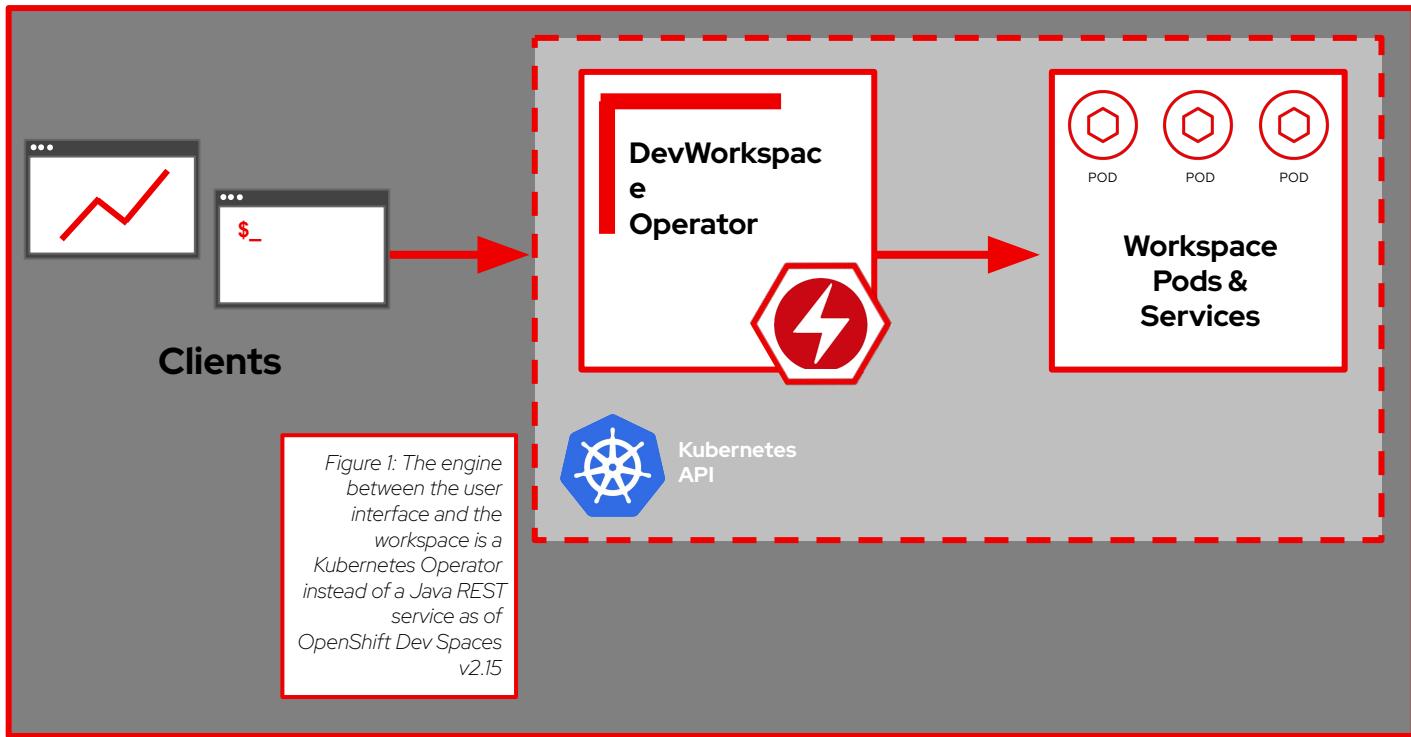


Red Hat OpenShift Dev Spaces





OpenShift Dev Spaces v3.11 is based on **Eclipse Che**. It runs on RHEL 8 and OpenShift, and offers a limited but supported set of devfiles and plug-ins.





Red Hat OpenShift Dev Spaces

Devfile Open Format



Use your favorite IDE



OpenShift integration



Inject dev configs



Git Services integration



Air Gap Support



For more detailed slides on Dev Spaces please see [here](#).

Pair Programming



Try Dev Spaces Workspaces for free on the Developer Sandbox [here](#)

The screenshot shows the Red Hat OpenShift Container Platform OperatorHub interface. On the left, a sidebar lists various operators like Application Learning, Application Runtime, and Data. The main area shows the 'Red Hat OpenShift Dev Spaces' operator by Red Hat, version 3.0.0, is installed. A modal window for the operator details is open, showing its description as a collaborative Kubernetes-native development solution and its compatibility with OpenShift workspaces and browser IDEs for rapid cloud application development. It also mentions the operator installs PostgreSQL, Plugin and Devfile registries, Dashboard, Gateway and the Red Hat OpenShift Dev Spaces service, as well as configures all these services. The 'Create New Cluster' button is visible.



OpenShift IDE plugins and other tooling

OpenShift Connector

OpenShift/Kubernetes extension for IDEs

- Enables rapid development and deployment of code
- Provides local OpenShift cluster creation using Red Hat OpenShift Local in VS Code extension
- Easily view projects, applications and more



odo

Developer CLI for OpenShift & Kubernetes

- Easily start with project from runtime sample
- Quickly iterate on code changes without full container rebuilds
- Consistency on experience regardless of language

```
$ odo create nodejs --starter
```

Red Hat OpenShift Dev Spaces

Cloud Development Platform

- Accelerates projects and onboarding; from 0 to coding in 2 minutes
- Familiar VSCode-like experience in the browser, with plugin extensibility
- Reproducible and consistent developer environments defined in a file in git

Dependency Analytics

Shift Left Security

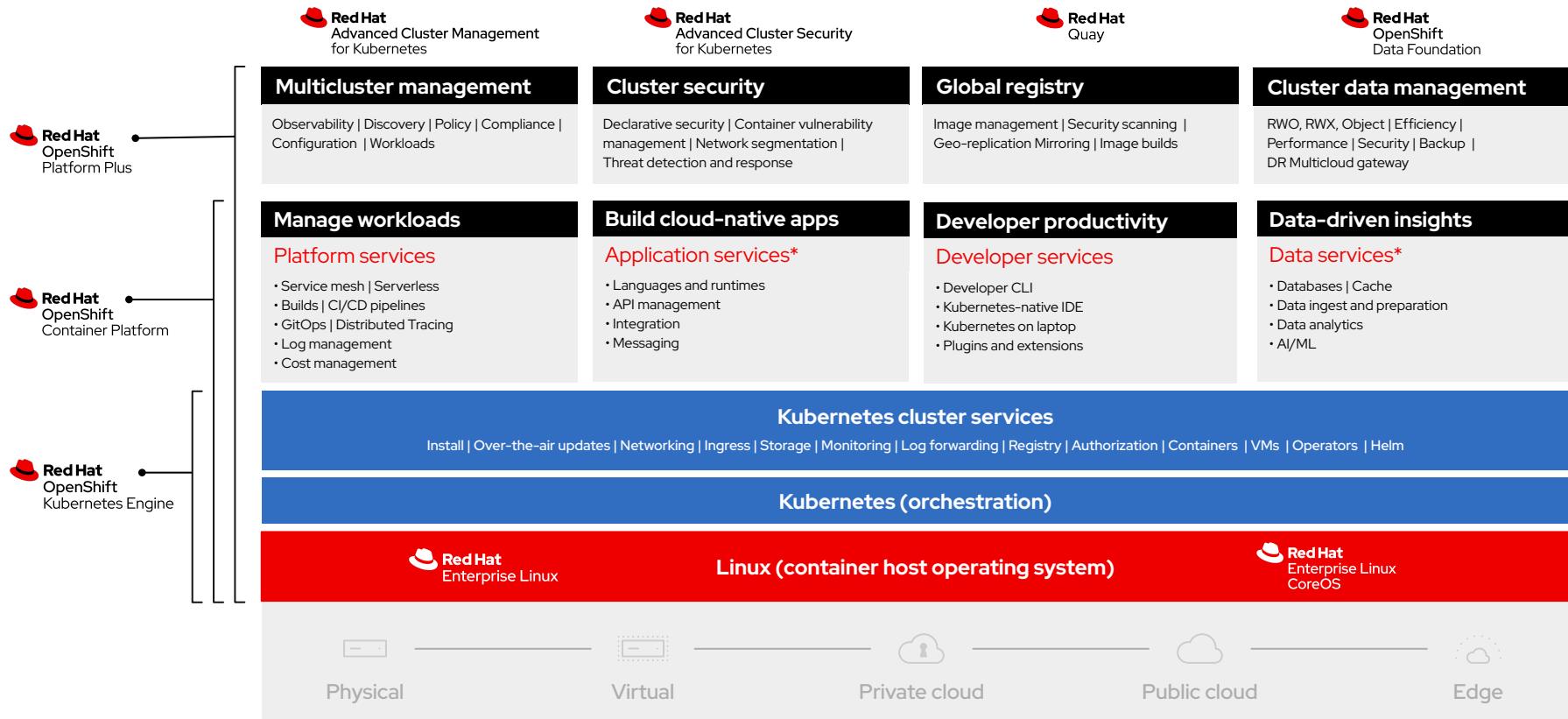
- Find & remedy issues faster from within an editor
- Scans for vulnerabilities, licenses & more
- Powered by industry-leading vulnerability database - Snyk Intel

Chapter 7

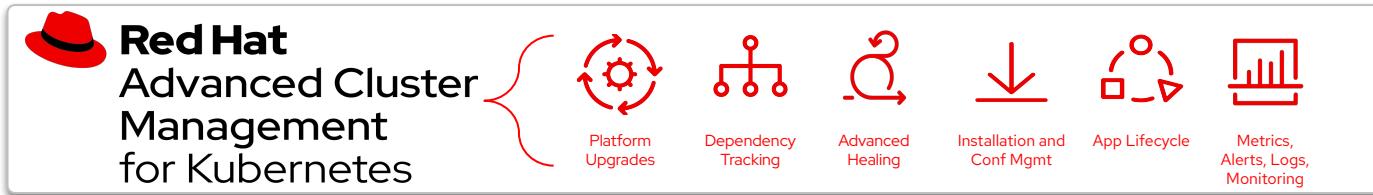
OpenShift Platform Plus



Red Hat OpenShift - Overview

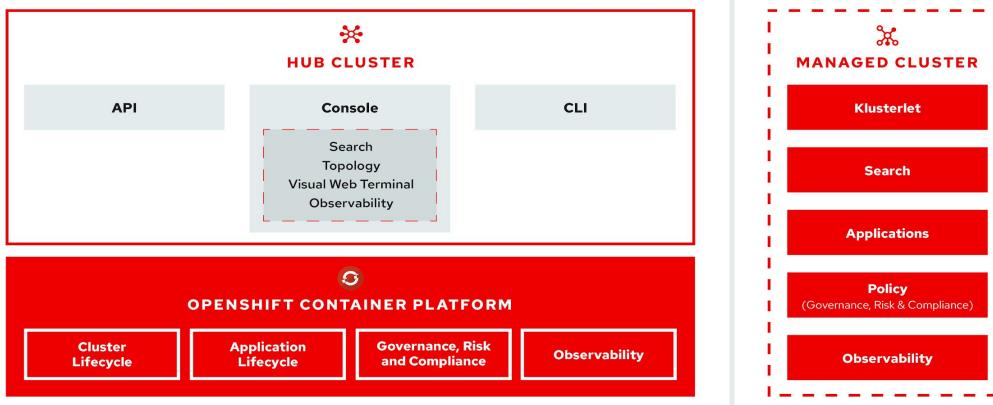


Red Hat Advanced Cluster Management



Multicloud Management

Observability : Discovery : Policy
Compliance : Configuration : Workloads



Hub architecture and components

Red Hat Advanced Cluster Management uses the **multicloud-hub** operator and runs in the **open-cluster-management** namespace

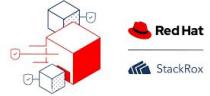
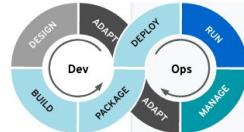
Managed cluster architecture and components

Red Hat Advanced Cluster Management managed clusters use the **multicloud-endpoint** operator which runs in the **open-cluster-management** namespace

Cluster Security

Declarative security :
Container vulnerability
management : Network
segmentation : Threat
detection & response

Red Hat Advanced Cluster Security



Red Hat Advanced Cluster Security for Kubernetes

Build

Secure supply chain

Deploy

Secure infrastructure

Run

Secure workloads

Policy engine**API****Image scanning**

anchore clair
QUAY Tenable

Registries

Amazon ECR Nexus docker
Azure Registry Red Hat Container Registry
Artifactory Red Hat Content Registry

CI/CD tools

Jenkins GitHub GitLab
circleci Travis CI

DevOps notification

Jira Software slack Microsoft Teams
pagerduty envelope

SIEM

splunk sumo logic
AWS Security Hub
Cloud Security Command Center



Physical



Virtual



Private cloud



Public cloud



Edge



Red Hat Quay Key Features

- Massive Scale Testing
- Quay.io
- Real Time Garbage Collection
- Automated Squashing

SCALABILITY

- Seamless Git Integration
- Build Workers
- Webhooks

BUILD AUTOMATION

- Extensible API
- Webhooks
- OAuth
- Robot Accounts

INTEGRATION

REGISTRY

- High Availability
- Full Standards / Spec Support
- Long-Term Protocol Support
- OCI compatibility
- Enterprise Grade Support
- Regular Updates

SECURITY

- Vulnerability Scanning
- Logging & Auditing
- Notifications & Alerting

CONTENT DISTRIBUTION

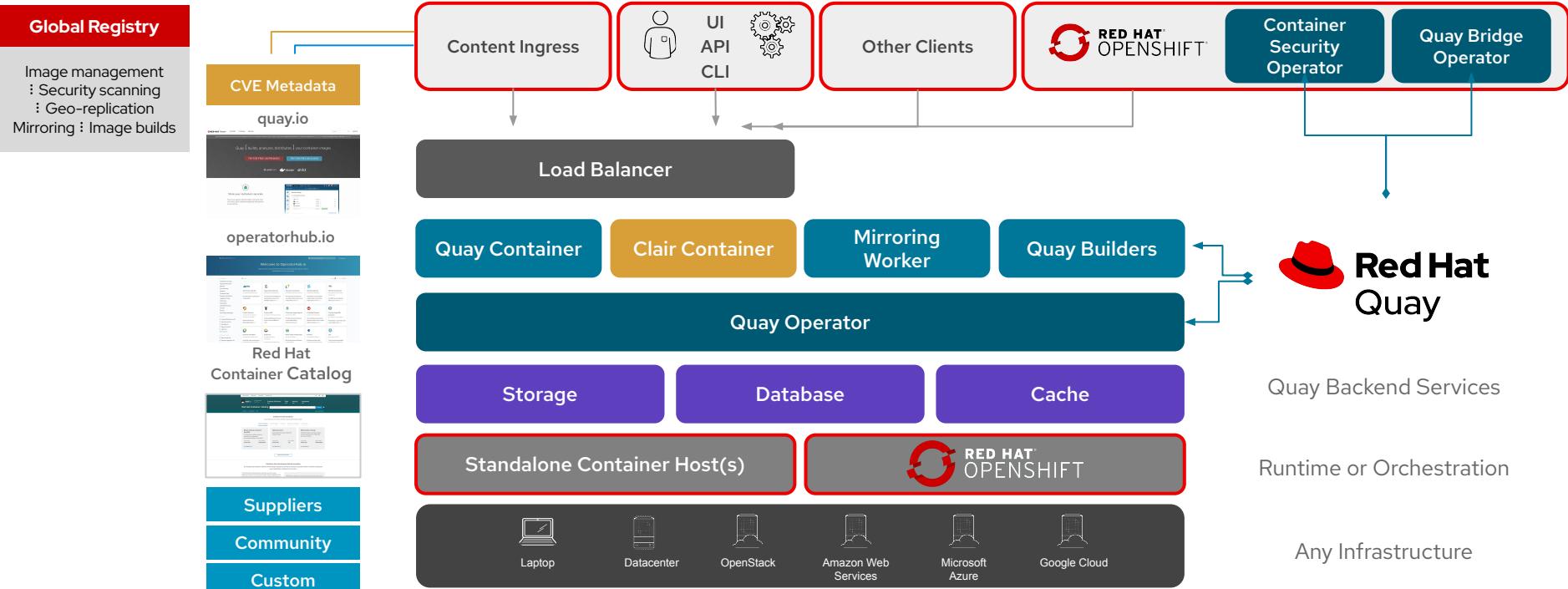
- Geo-Replication
- Repository Mirroring
- Air-Gapped Environments

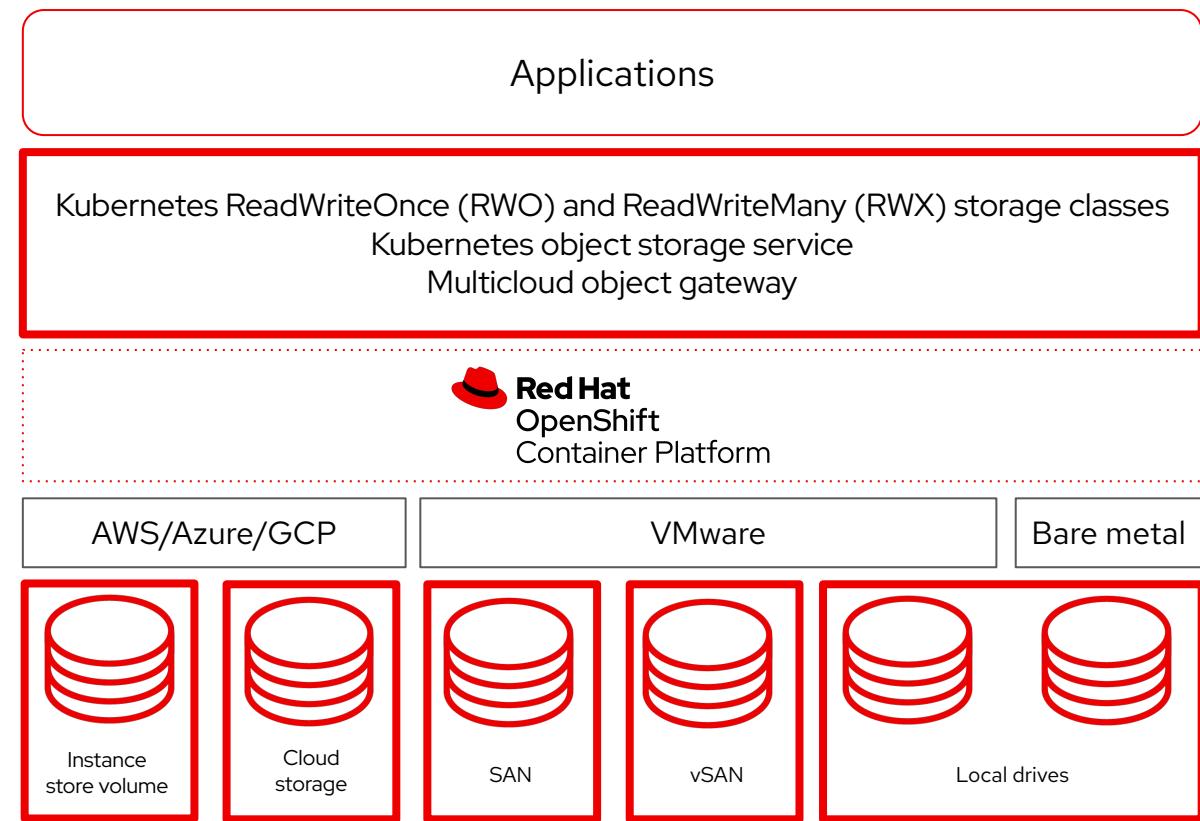
ACCESS CONTROL

- Authentication Providers
- Fine-Grained RBAC
- Organizations & Teams



Enterprise grade registry...



**Storage**

Thank you

Red Hat is the world's leading provider of enterprise open source software solutions. Award-winning support, training, and consulting services make Red Hat a trusted adviser to the Fortune 500.



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



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



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



twitter.com/RedHat