What's New in OpenShift

New Features

21 November 2024

Gokhan Goksu

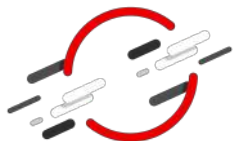Senior Solution Architect, App Platforms

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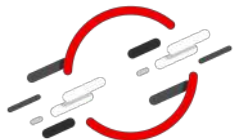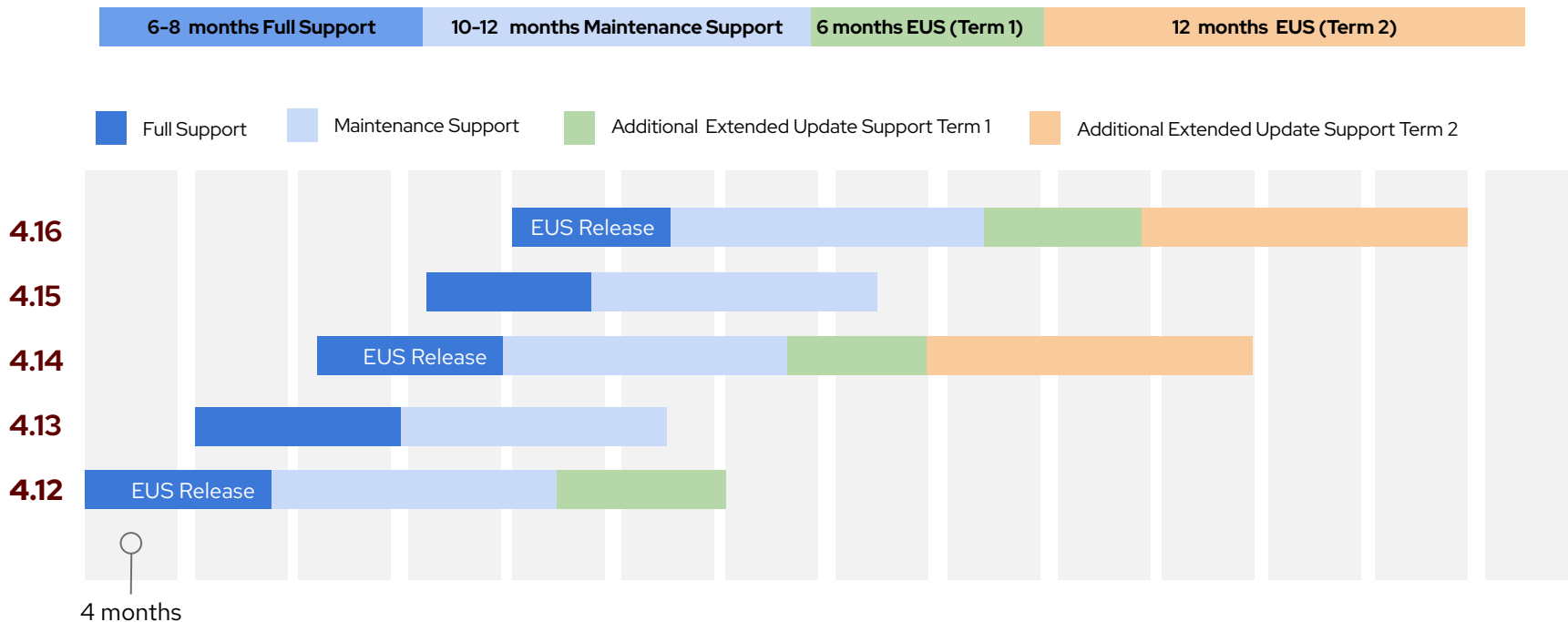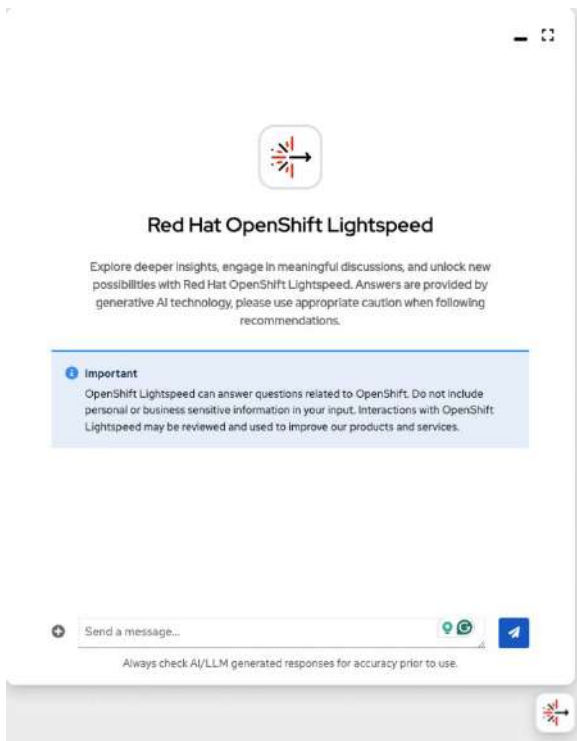| OpenShift		Kubernetes		CRI-O	
OpenShift 4.15		Kubernetes 1.28		CRI-O 1.28	
OpenShift 4.16		Kubernetes 1.29		CRI-O 1.29	
OpenShift 4.17		Kubernetes 1.30		CRI-O 1.30	
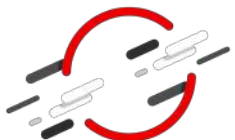
3 Year Lifecycle for EUS Releases

Available as add-on for all platform-aligned operators included in OpenShift

6-8 months Full Support	10-12 months Maintenance Support	6 months EUS (Term 1)	12 months EUS (Term 2)

■ Full Support   ■ Maintenance Support   ■ Additional Extended Update Support Term 1   ■ Additional Extended Update Support Term 2

4.16 EUS Release

4.15

4.14 EUS Release

4.13

4.12 EUS Release

4 months

Red Hat

OpenShift Lightspeed (Technology Preview)

Generative AI based chat assistant

Help where you need it
Integrated directly into the Red Hat OpenShift
web console

Explain, investigate and learn more
Provides assistance with explaining and investigating
cluster resources

Generative AI
Powerful, pluggable LLMs combined with
the latest OpenShift documentation
- RHEL AI
- Red Hat OpenShift AI
- OpenAI
- Azure AI
- Watson X

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Podman AI Lab

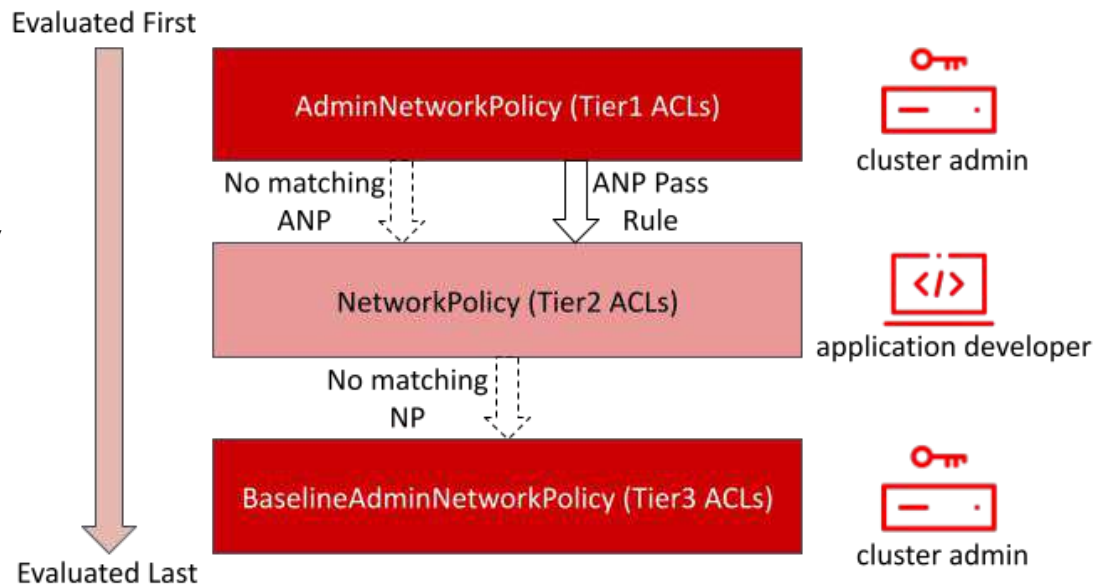## Your developer environment for working with GenAI

- Discover GenAI
  - Get inspired by AI use cases
  - Experiment with different compatible Models
- Model Catalog
  - Leverage a curated list of open source large language models available out of the box
  - Import your own models
- Run Models Locally with GPU support
  - Run models with an inference server running in UBI image
  - Use code snippets
- Playground Environment
  - Experiment with models and prompts
  - Test and validate prompt workflows before using in your application
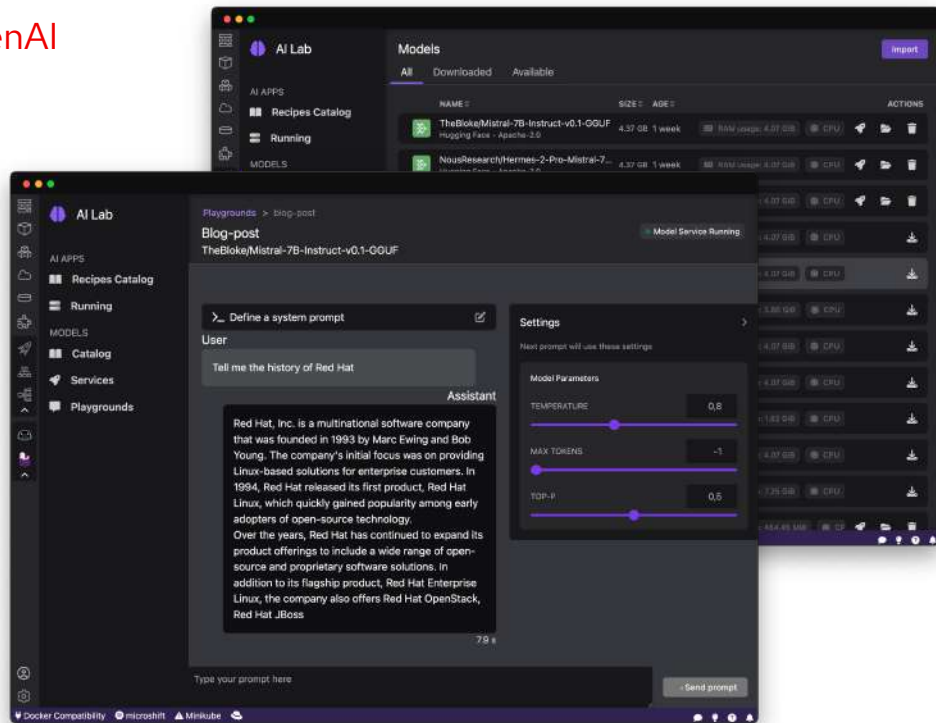
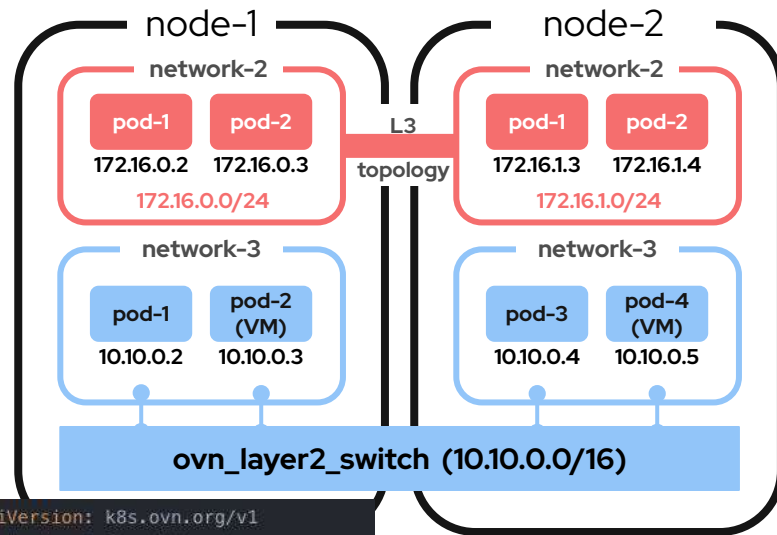# Admin (Global) Network Policy (Generally Available)

A comprehensive cluster-wide network security solution for cluster administrators

- Kubernetes Network Policy enhancement

- Administrator-privileged network security policies, with a cluster-wide scope, that override policies created at the namespace-scope level by application owners.

Evaluated First

AdminNetworkPolicy (Tier1 ACLs)

cluster admin

No matching ANP   ANP Pass Rule

NetworkPolicy (Tier2 ACLs)

application developer

No matching NP

BaselineAdminNetworkPolicy (Tier3 ACLs)

cluster admin

Evaluated Last

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Red Hat

Native Network Isolation for Namespaces (Technology Preview)

- ▸ The default single L3 pod network is not flexible enough to cover a wide variety of use cases.

- ▸ User Defined Network (UDN) support in OVN-Kubernetes

- ▸ A default network for OVN-Kubernetes components + VRF support for additional isolated-by-default UDNs

- ▸ One or more namespaces in each UDN (tenant)

- ▸ Create a flat Layer-2 network as the primary network to migrate your VMs (pods) across nodes.

- ▸ Attach your VM/pod network to a provider network (specify VLAN ID to segment/mark/isolate traffic).

node-1

network-2

pod-1	pod-2
172.16.0.2	172.16.0.3

172.16.0.0/24

L3 topology

node-2

network-2

pod-1	pod-2
172.16.1.3	172.16.1.4

172.16.1.0/24

network-3

pod-1	pod-2 (VM)
10.10.0.2	10.10.0.3

network-3

pod-3	pod-4 (VM)
10.10.0.4	10.10.0.5

ovn_layer2_switch (10.10.0.0/16)

```
apiVersion: k8s.ovn.org/v1
kind: UserDefinedNetwork
metadata:
  name: udn-1
  namespace: <some_custom_namespace>
spec:
  topology: Layer2
  layer2:
    role: Primary
    subnets:
    - "10.0.0.0/24"
    - "2001:db8::/60"
```
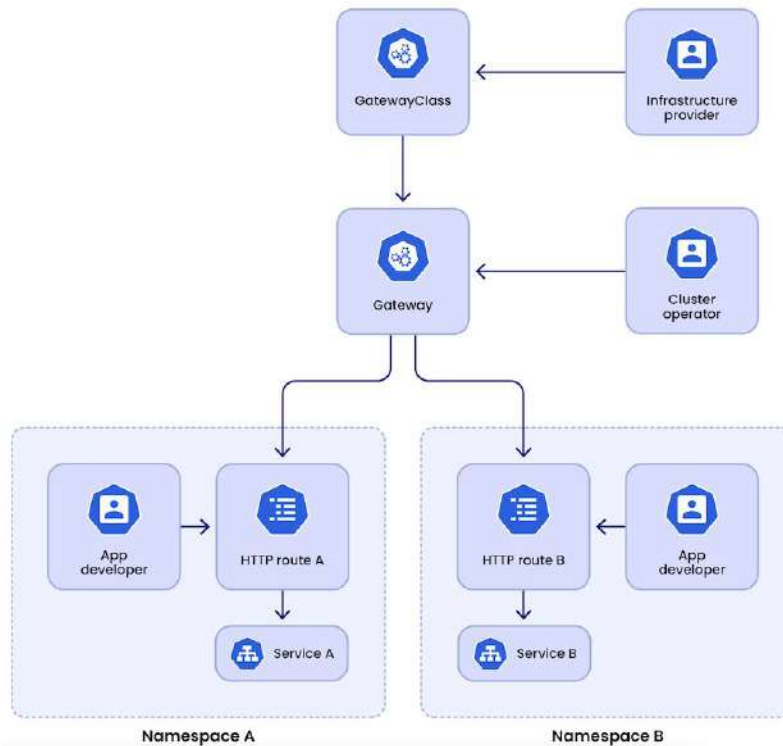
User Namespaces – Technology Preview

▸ **Enhanced Security for Containers:** User namespaces allow pods to run with distinct user IDs inside the container, while mapping them to different IDs on the host.

▸ **Better protection against privilege escalation:** By enabling user namespaces, it becomes easier to run containers that require root privileges inside the container while being non-root on the host. This improves security by ensuring that any process that escapes a privileged container will not have privileges on the host.
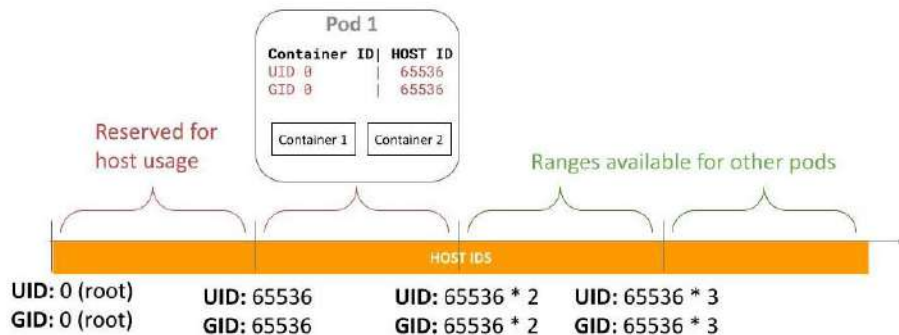
Gateway API (Generally Available)

Next generation ingress

4 or 5 Node HA Control-Plane (Bare Metal Only)

Failure Domain 1 | **Failure Domain 2**

| CP 1 | CP 2 | CP 3 |

| CP 4 | CP 5 |

| W | W | W |
| W | W | W |

| W | W | W |
| W | W | W |
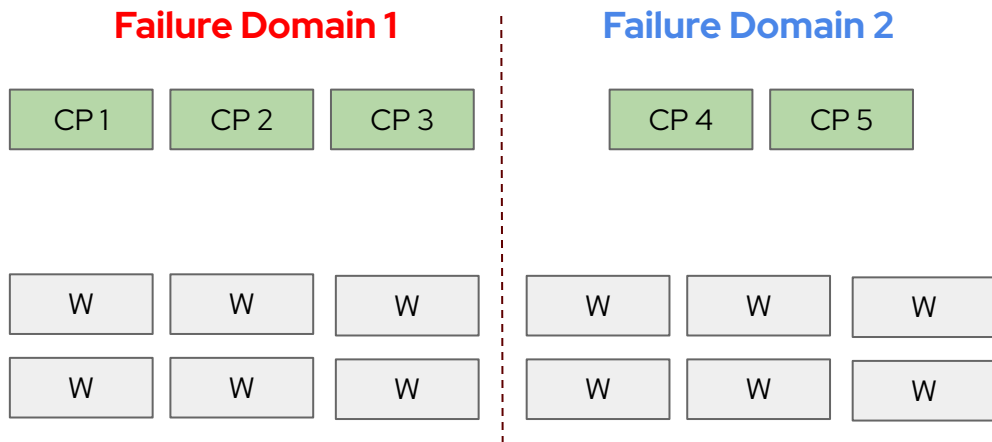
▶ Active-active deployments across two locations

▶ Designed for traditional applications like OpenShift Virtualization VMs

▶ Enhances resiliency with 2+2 or 3+2 configurations

▶ Supported on bare metal platform only

Red Hat

Red Hat Advanced Cluster Management for Kubernetes

Policy-based Governance


```
apiVersion: policy.open-cluster-management.io/v1beta1
kind: OperatorPolicy
metadata:
  name: install-operator
spec:
  remediationAction: enforce
  severity: critical
  complianceType: musthave
  subscription:
    name: quay
    channel: stable-3.8
    source: redhat-operators
    sourceNamespace: openshift-marketplace
  upgradeApproval: Automatic
  versions: []
```

- Expedited troubleshooting of Policy non-compliance reasons
- GitOps-ified operator management with OperatorPolicy (GA)

⚡ Operator Framework
Next Generation Operator Management Experience
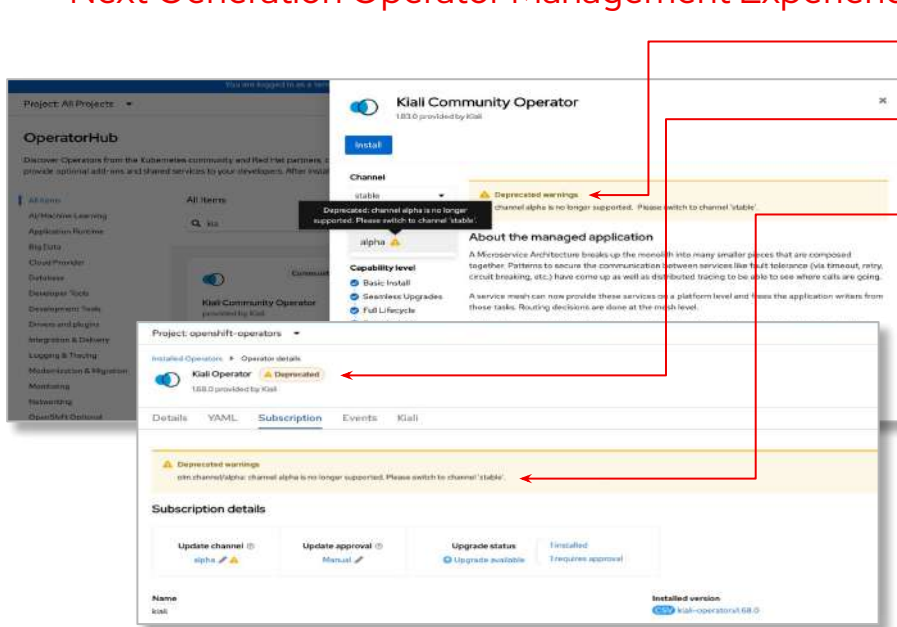
Pre-Installation warnings

Post-installation visibility

Support boundary guidance

Terminology shift: Operators are now ClusterExtensions to reflect more accurate representation of their functionality

Safe CRD Upgrades: Prevent data loss by detecting CRD schema changes

Adding Nodes to Any Cluster

▸ Add Nodes to Any Cluster
  ▸ Any cluster, regardless of the installation method used.

▸ Simplified User Experience
  ▸ Create and boot an ISO image, that's it.

▸ Multi-platform
  ▸ Bare metal
  ▸ vSphere
  ▸ None

Adding a Single Node Using Command Flags

1. Run `oc adm node-image create --mac-address=<mac_address>`.
2. Boot the node with the generated ISO image.
3. Track progress with `oc adm node-image monitor <ip_address>`.
4. Approve CSRs with `oc adm certificate approve <csr_name>`.

Adding One or More Nodes Using a Configuration File

1. Create a `nodes-config.yaml` file with configurations for the nodes.
2. Run `oc adm node-image create nodes-config.yaml`.
3. Boot the nodes with the generated ISO image.
4. Track progress with `oc adm node-image monitor <ip_addresses>`.
5. Approve CSRs with `oc adm certificate approve <csr_name>`.
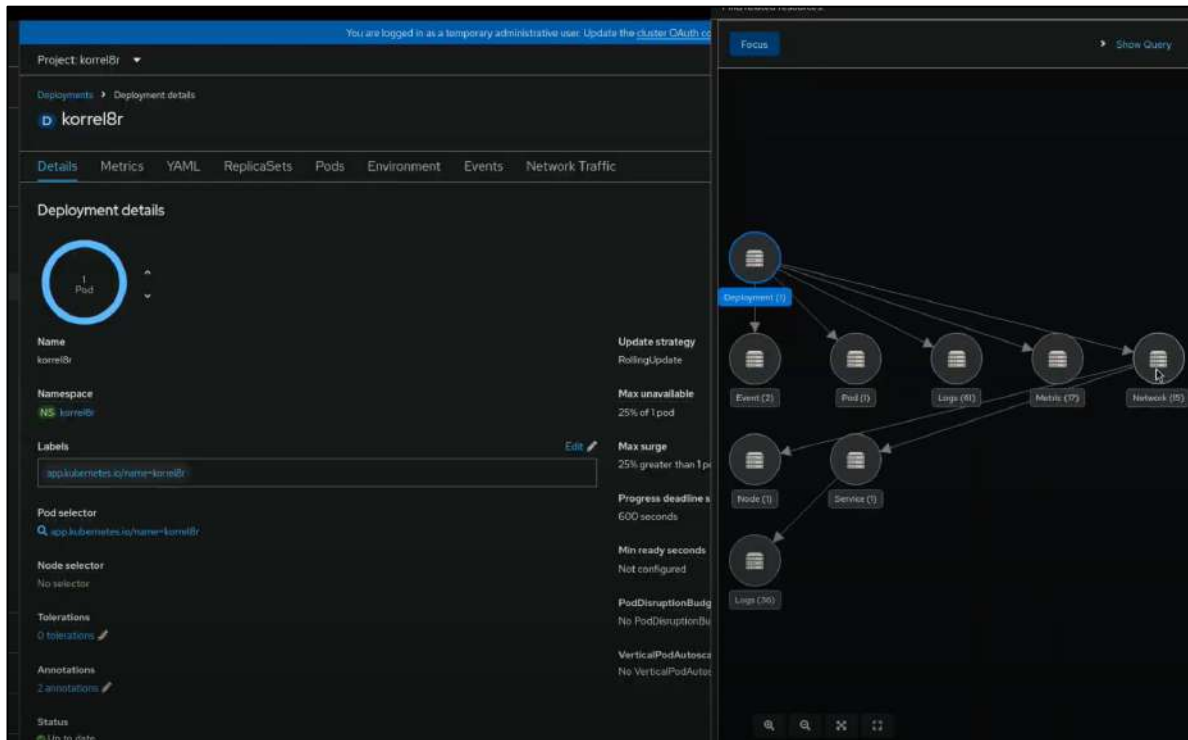
Multi-cluster VM observability with ACM
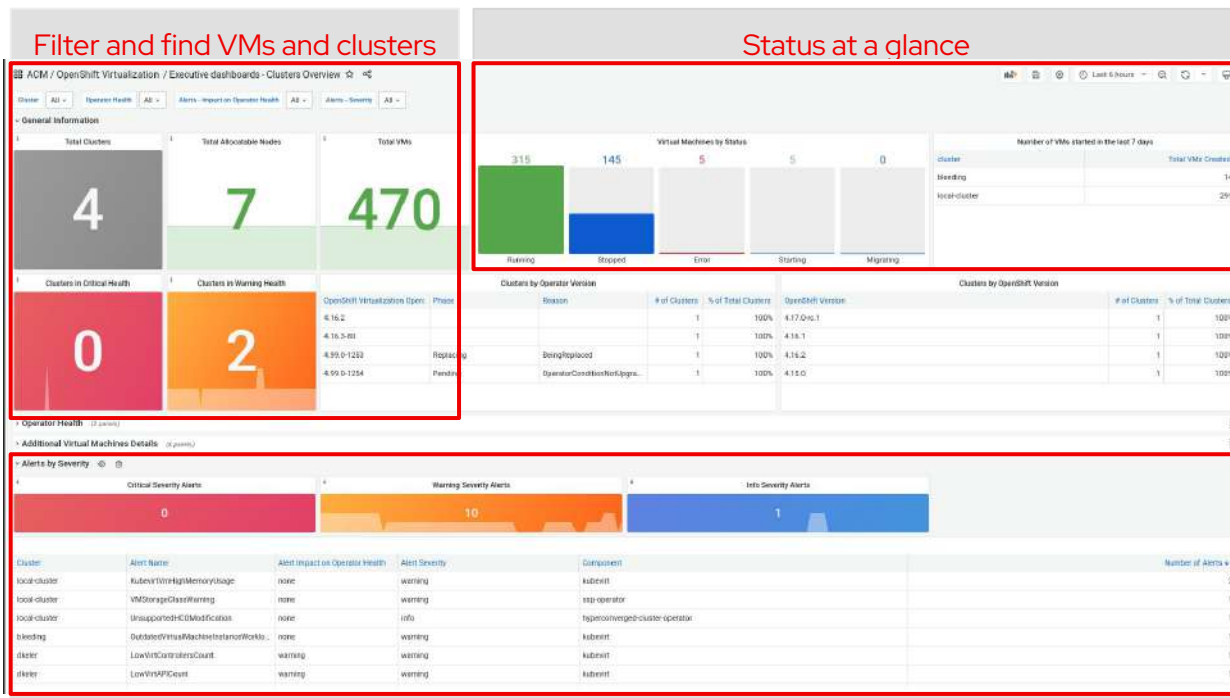
- Collect and quickly build reports for all virtual machines
- At an RHACM Hub, see all virtual machines across multiple OpenShift installations
- At a Global Hub using Global Hub Search, see all Virtual Machines across multiple hubs

Cluster Observability Operator (Technology Preview)

- **Observability Signal Correlation** for Red Hat OpenShift

- Troubleshooting panel

Application Observability

<div style="text-align: center">

Red Hat Build of Open Telemetry

</div>

- OpenTelemetry collector **dashboards**

- OTLP Logs are now **native** to OpenShift

- **New components:** Metrics transform processor, Group by attributes processor, Routing connector and Prometheus Remote Write exporter.

<div style="text-align: center">

Distributed Tracing

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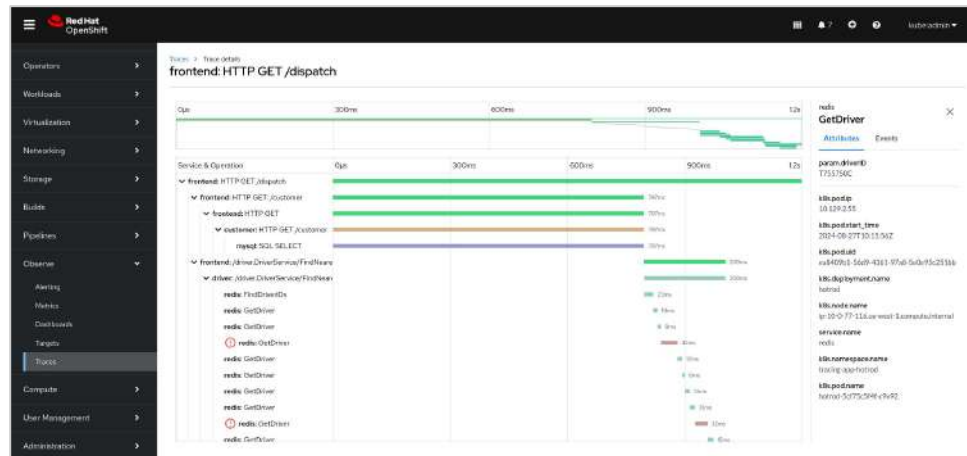
OpenShift Virtualization

Performance and Scale

- Memory Oversubscription for workload density
- Memory hotplug for non-disruptive scale-up of VM performance
- GPU workload on hosted clusters. (Tech Preview)
- Live Migration optimizations for busy workloads

Improved infrastructure optimization

- Automatic VM workload balancing with descheduler
- Easily deploy disconnected hosted clusters
- VM storage live migration between storage classes (Tech Preview)

Simplified VM Management

- Virtualization Admin focused view
- MTV 2.7 preserves static IPs and drive letters for warm migration

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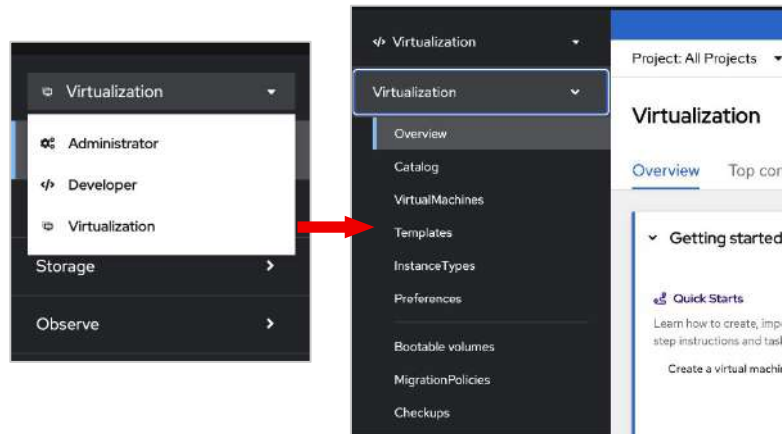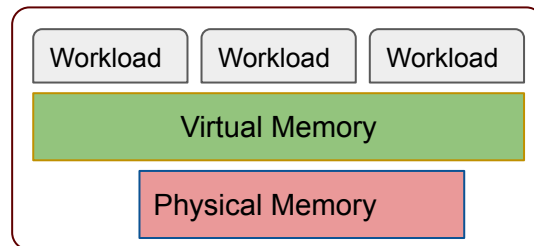
Hosted Control Planes

Enhanced **Reliability**

Backup & restore for the entire hosted cluster artifacts with OpenShift APIs for Data Protection (OADP)

Optimize your deployments cost and time savings but do it responsibly at the same time.

Platform Improvements

OpenShift Virtualization provider NVIDIA GPU (Tech Preview)

- Run AI workloads on the OpenShift Virtualization Provider Hosted Cluster Workers

Multi-architecture configurations

- **Arm control-plane** with **x86 data-plane** on **AWS**
- **x86 control-plane** with **Arm data-plane** on **AWS** (Self-Managed)
- x86 control-plane with **Z data-plane**
- x86 control-plane with **Power data-plane**

Single Pane of Glass to Manage the Fleet of Hosted Clusters

Discover multicluster engine operator hosted clusters in Red Hat Advanced Cluster Management

Importing Hosted Clusters from other management clusters managed by Advanced Cluster Management (ACM) and Multi-Cluster Engine (MCE)

OpenShift Service Mesh 3.0 (Technology Preview)

- ▸ Managed by a new operator based on community Istio Sail Operator

- ▸ New included features:

  - ▸ Istio's multi–cluster topologies
 - ▸ Canary control plane upgrades
  - ▸ Istioctl command line utility
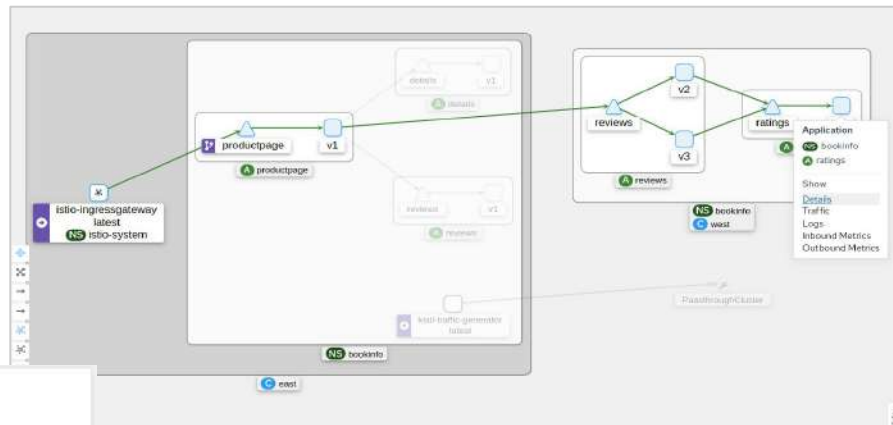
Red Hat OpenShift Service Mesh 3
provided by Red Hat, Inc.

The OpenShift Service Mesh Operator enables you to install, configure, and manage an...

OpenShift Pipelines

- Red Hat Tekton Catalog GA

- Manual Approval workflow in Tekton (TP)

- ChatOps Support in Pipelines As Code (TP)

- StepActions (GA)

- Tekton Results – index and query execution history

- Tekton Chains – sign and store metadata
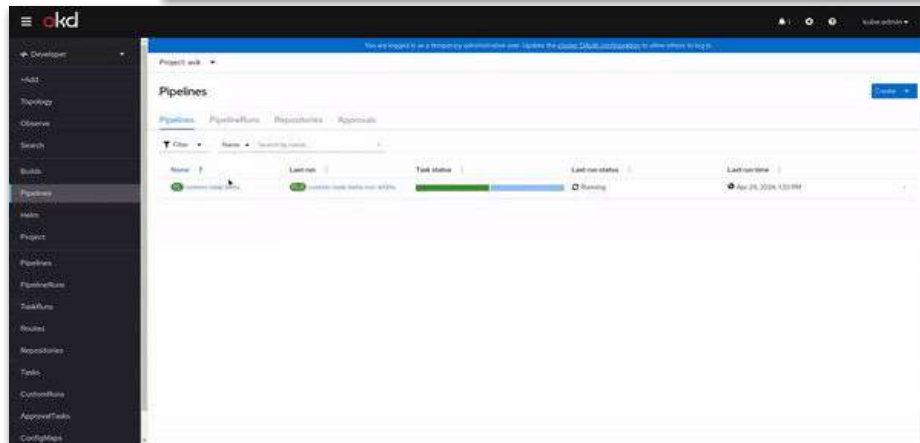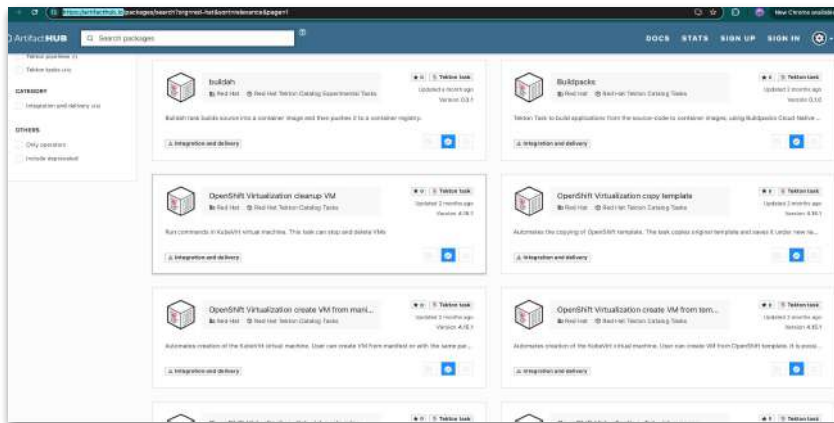
Migration Toolkit for Applications

▸ **Support for .NET analysis (Dev Preview)**, including rules for the .NET Framework to .NET migration path.

▸ **Automatic language and technology discovery for applications** to speed up association with Archetypes.

▸ **Gradle support (Tech Preview)** for Java applications analysis.
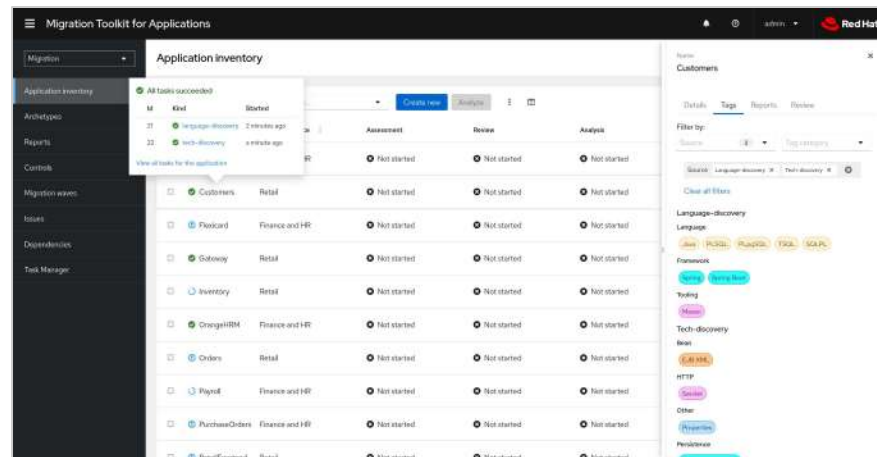
OpenShift GitOps

- OpenShift GitOps release, includes **Argo CD** and **Argo Rollouts**

- Multi–source applications in Argo CD Dashboard with rollback

- Consistent sharding algorithm to assign clusters to shards

- Reduced cluster reshuffling on sharding config changes

- Project-scoped repository credentials
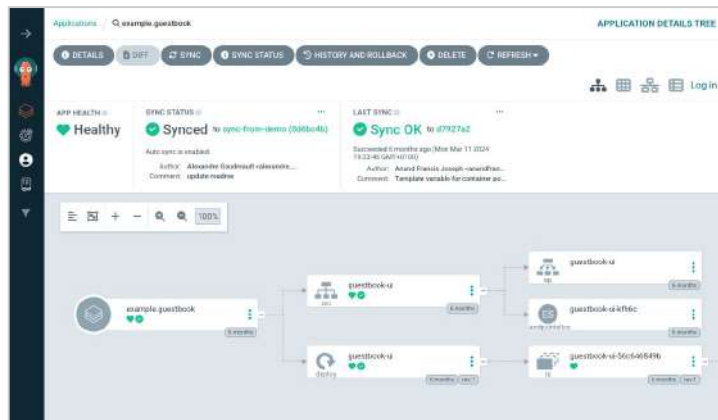
OpenShift Serverless

- Serverless functions

  - Quarkus, NodeJS, Typescript, Python (GA)
  - Golang functions (Tech Preview)

- Autoscaling of Knative Kafka Triggers using KEDA/CMA

- Serverless Logic (GA)

  - Management Console (Tech Preview)

Red Hat Developer Hub (IDP for OpenShift Platform)

Setting Development Teams up for success!

- Customize your Theme through Dynamic plug-ins
- Dynamic plugins Developer Guide
- Software template to create a new Frontend/Backend plug-in
- Visualize your VMs from the Topology plug-in
- [Software Template library](#)
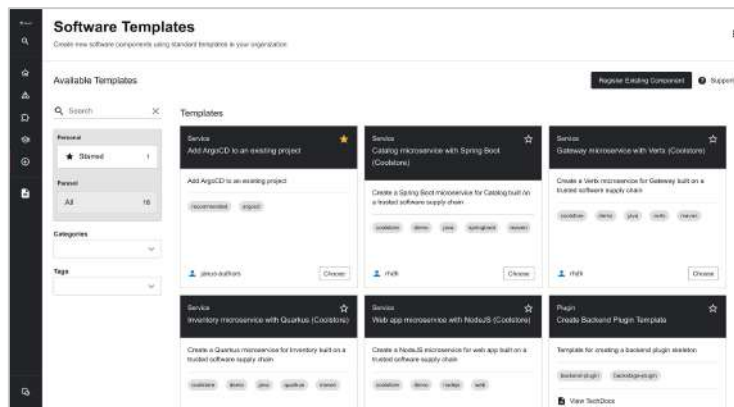
Red Hat Summit

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