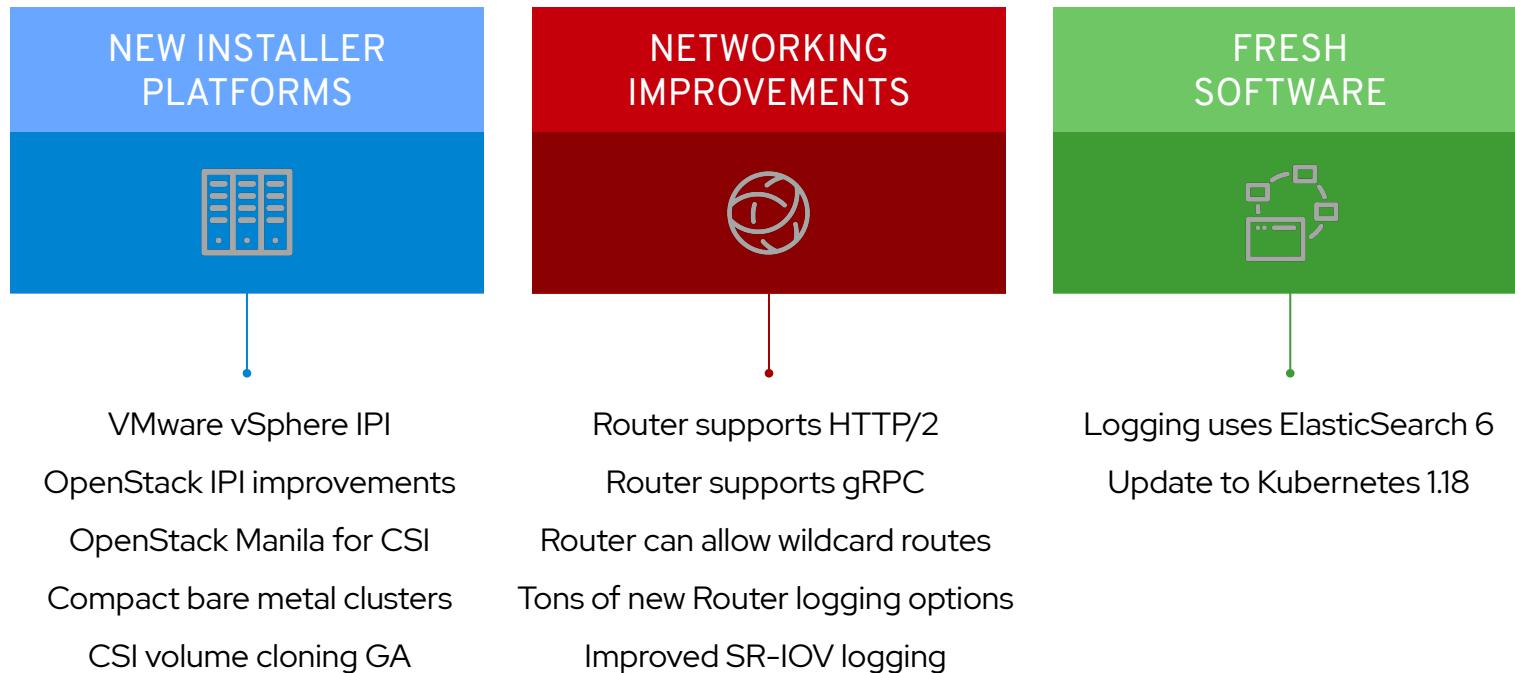




What's New in OpenShift 4.5

OpenShift Product Management

OpenShift 4.5



OpenShift Container Platform

Advanced Cluster Management

Multi-cluster Management

Discovery : Policy : Compliance : Configuration : Workloads

OpenShift Container Platform

Platform Services

Service Mesh : Serverless
Builds : CI/CD Pipelines
Full Stack Logging
Chargeback

Application Services

Databases : Languages
Runtimes : Integration
Business Automation
100+ ISV Services

Developer Services

Developer CLI : VS Code extensions : IDE Plugins
Code Ready Workspaces
CodeReady Containers

Cluster Services

Automated Ops : Over-The-Air Updates : Monitoring : Registry : Networking : Router : KubeVirt : OLM : Helm

Kubernetes

Red Hat Enterprise Linux & RHEL CoreOS



Physical



Virtual



Private cloud



Public cloud

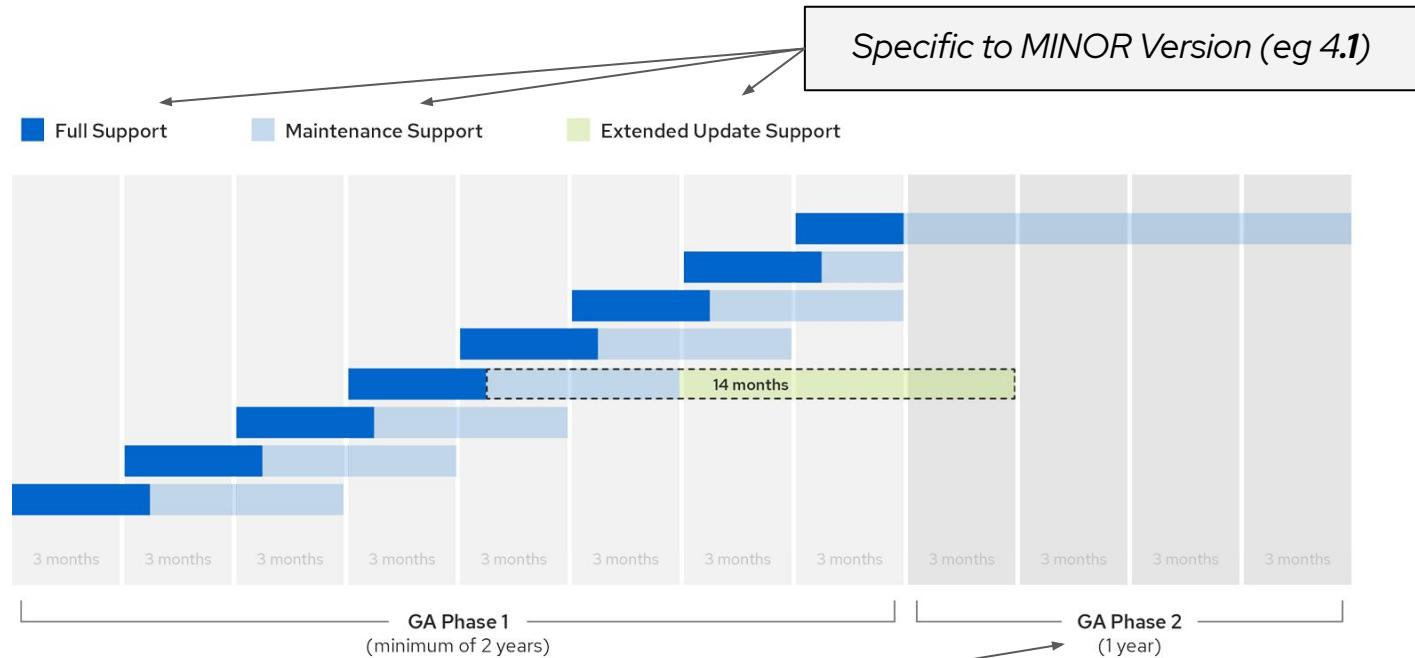


Managed cloud
(Azure, AWS, IBM, Red Hat)



OpenShift Life Cycle Reminder

- Release Driven – function of the next release
- 3 Minor Releases are in play at any given time. (4 if you count the EUS release)
- OCP 4.5 will bump OCP 4.2 out of support.
- OCP 4.1 = 11 months of support
- OCP 4.2 = 10 months of support



OpenShift_30_0619

4
Specific to MAJOR Version (eg 4)

<https://access.redhat.com/support/policy/updates/openshift>



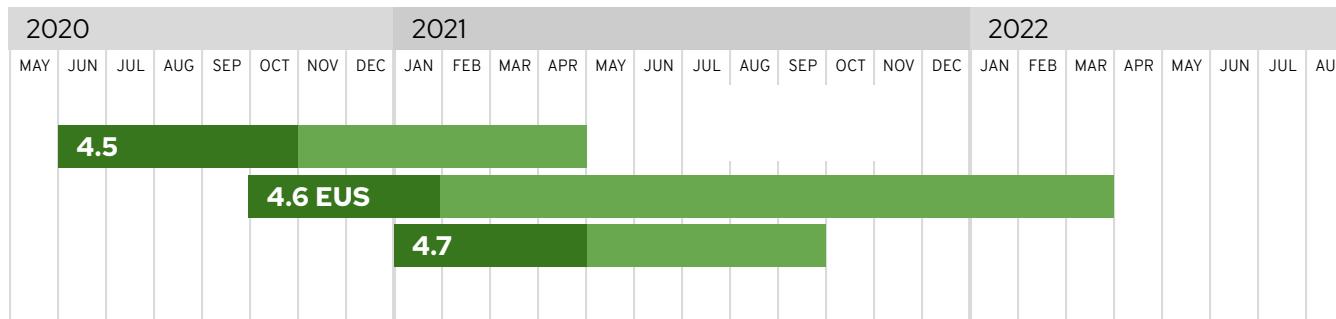
OpenShift 4.6 EUS

What is Extended Update Support (EUS) ?

- OCP with an extended timeframe for critical security and bug fixes
- Available to premium support customers
- Not available as an add-on for standard support

Goals for the 4.6 EUS

- Work within a customer's release management philosophies
- Provide an over-the-air pathway to update between EUS releases (currently serially)
 - Customer might align more to CAM or ACM
- Aligned with RHEL 8.2 EUS



■ N release

Full support, RFEs, bugfixes, security

■ N-2 release

OTA pathway to N release, critical bugs and security

Kubernetes 1.18

Compute

- Kubernetes Topology Manager is Beta
- Taint Based Eviction is stable
- Even pod spreading across failure domains
- startupProbe is Beta

Storage and Network

- CSI Block storage support to stable
- Skip attach for non-attachable CSI volumes
- PVC Cloning
- Ingress v1 moves to Beta

Misc

- new endpoint API moved to Beta

CRI-O
1.18



Kubernetes
1.18

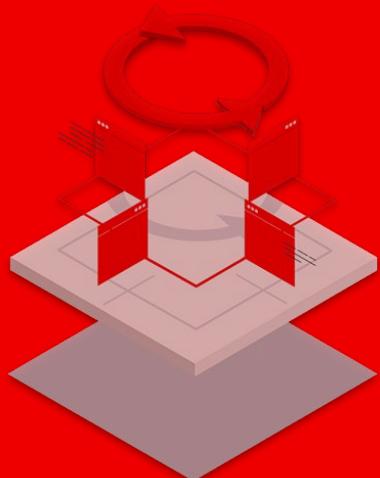


OpenShift
4.5



Cloud Native Development

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



Code

Serverless

**RED HAT®
MIDDLEWARE**

Pipelines

**Service
Mesh**

**IBM.
*Cloud Paks***

Red Hat Runtimes

- Quarkus GA - Supersonic, Subatomic Java.
Native support coming in Q3 via Mandrel.
- Red Hat SSO - Support for OpenShift secret Vaults, WebAuthn protocol.
- Data Grid 8.1 - Cross-site cluster support
- Z-Series support for Runtimes - Use existing Z & Cloud Pak investment with Runtimes & OpenShift.
- JBOSS EAP expansion pack for MicroProfile
- Spring Boot 2.2 - New AMQ Starters, GA of Reactive support and Kubernetes Java annotations.

[What's New in Red Hat Runtimes \[Q2\]](#)

LAUNCH SERVICE

CLOUD-NATIVE RUNTIMES

Red Hat
JBoss Enterprise Application Platform

Red Hat
Data Grid

OpenJDK™

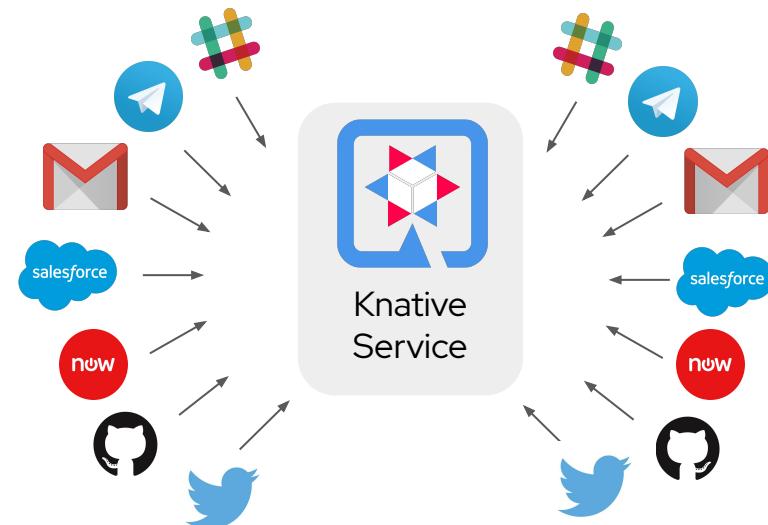
Red Hat
AMQ

RED HAT®
SSO

Red Hat
Application Migration Toolkit

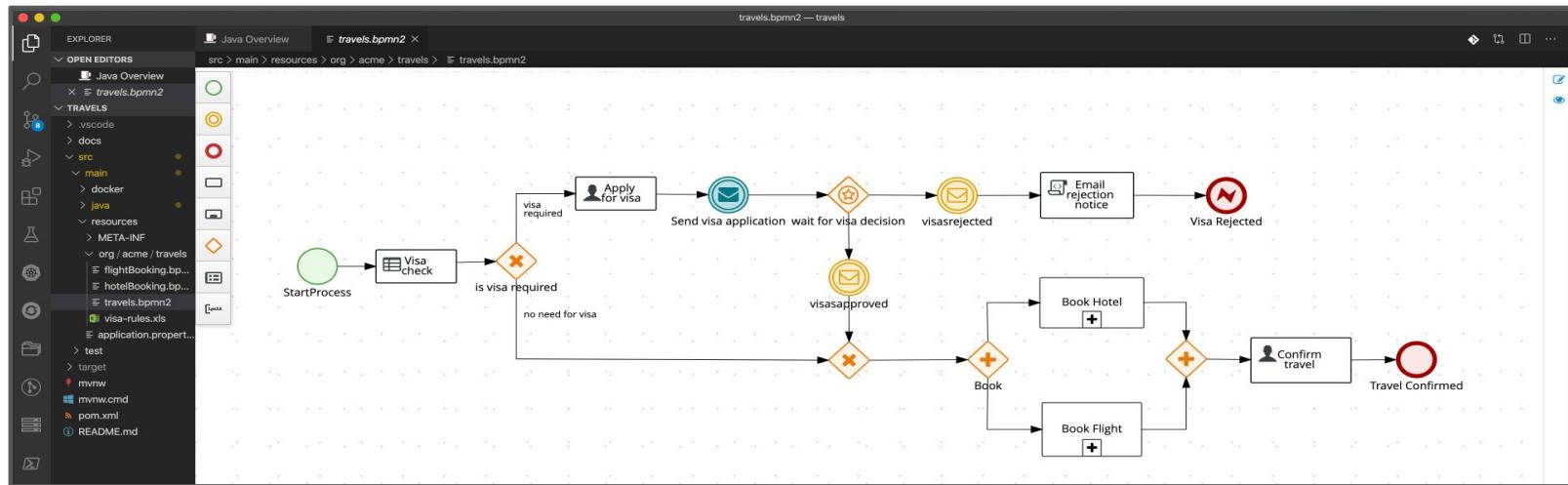
Red Hat Integration

- **Service Registry GA** - schema and API registry to support Kafka and API-based workloads on OpenShift.
- **Mirror Maker 2.0** - major evolution in data replication for Kafka on OpenShift now at full support in Strimzi
- **Camel K for Serverless (TP)** - leverage the huge Camel connector catalog to drive events into your OpenShift Serverless applications based on Camel K and Knative Eventing.



Red Hat Process Automation

- Kogito - moves to developer preview for next-gen business automation based on Quarkus
- Trusty AI - first MVP of Trusty AI in the next Kogito developer preview release. With runtime dashboards and metrics.
- Red Hat Business Automation Bundle - released in the [Visual Studio Code Marketplace](#) as Developer Preview



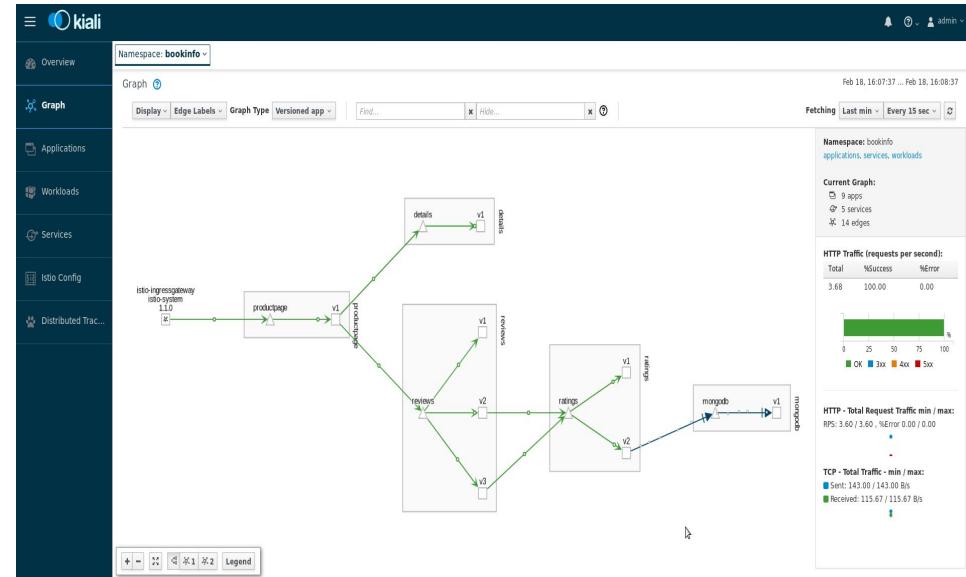
Service Mesh



OpenShift Service Mesh v1.1.x

Key Features & Updates

- Version 1.1.x available now
- Upgrade Istio to version 1.4
- Direct links from OCP Console
- Labeled HAProxy routes into the mesh
- Kiali has been updated to Patternfly4
- Jaeger streaming support via Kafka





OpenShift Service Mesh

Enhanced Application Flexibility through Istio, Kiali, and Jaeger



Enhanced gRPC support for efficient microservice development



Managed Updates to the Control Plane via Operator Driven Deployment



Enhanced Authorization Traffic Controls



Increased visibility with new Kiali and Jaeger functionality



Increased Traffic Management Capabilities



OpenShift Service Mesh

Introduction of supported disconnected installations

- Offline installation of Service Mesh is now possible without unsupported workarounds
- Uses the layered product functionality & OLM
- Users achieve this via standardized tooling: ("oc adm catalog build"/"oc adm catalog mirror")

Serverless

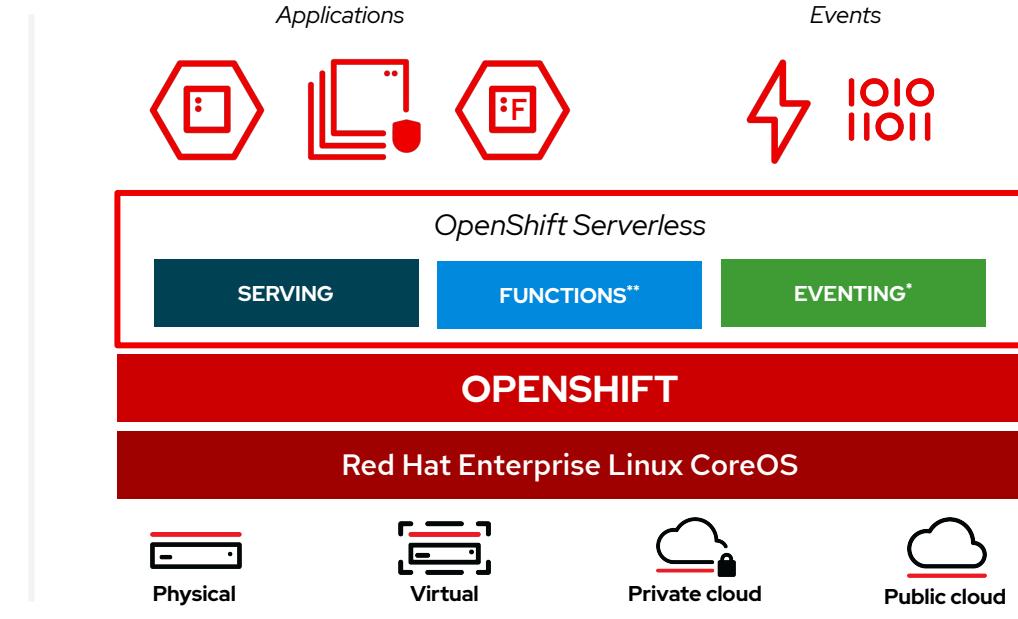


OpenShift Serverless

Event-driven serverless containers and functions

- 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

[Product briefing deck](#)



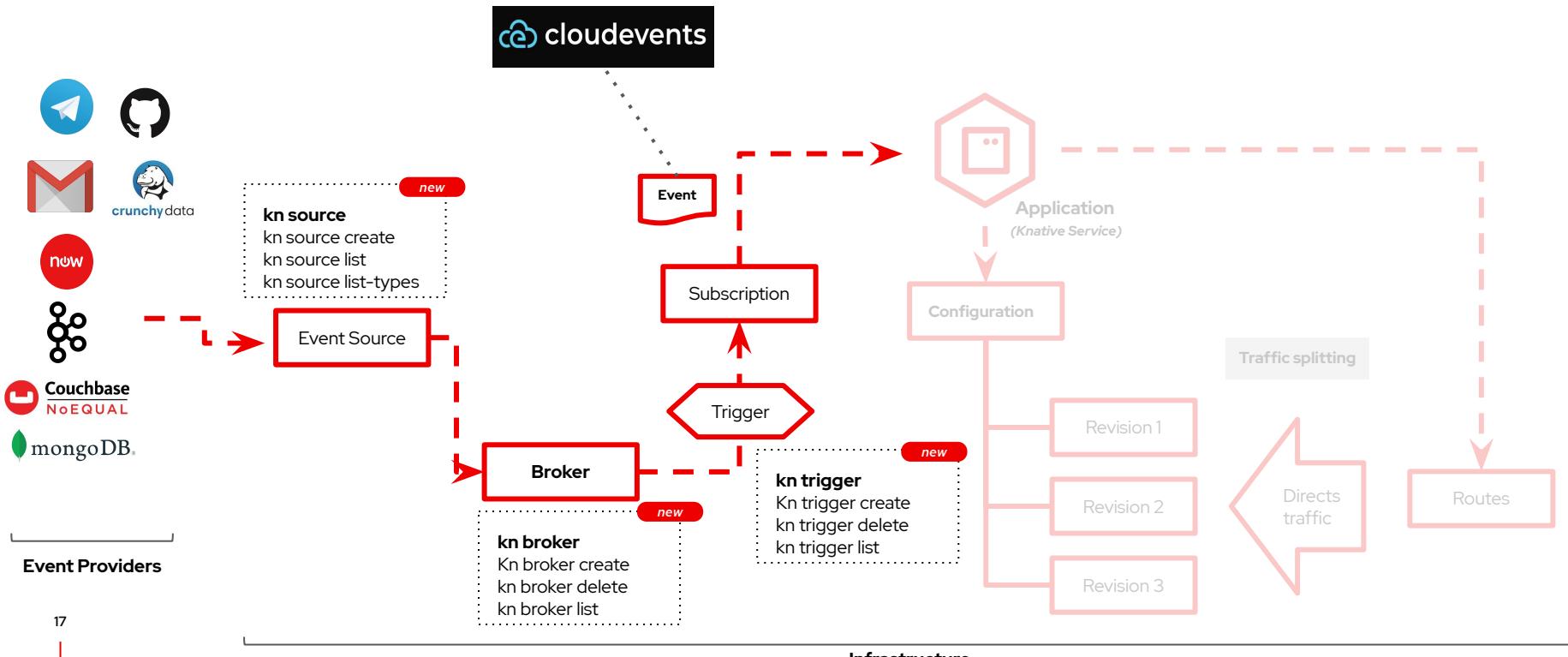
* Eventing is currently in Technology Preview

** Functions are currently a work in progress initiative



Eventing

Technology Preview





Event Sources in Developer Console

You are logged in as a temporary administrative user. Update the cluster OAuth configuration to allow others to log in.

Project: stest2 Application: all applications

Add

No workloads found
To add content to your project, create an application, component or service using one of these options.

 From Git
Import code from your git repository to be built and deployed

 Container Image
Deploy an existing image from an image registry or image stream tag

 From Dockerfile
Import your Dockerfile from your git repo 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
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 Chart
Browse the catalog to discover and install Helm Charts

<https://console-openshift-console.apps.viraj01006.devcluster.openshift.com/im...>



Pipelines

OpenShift Pipelines



Kubernetes-native
declarative
Pipelines with
Tekton



Serverless CI/CD
with no single
server to share and
maintain



Run pipelines in
isolated containers
with all required
dependencies



Standard and
portable to any
Kubernetes
platform



Web, CLI, and
Visual Studio
Code and IDE
plugins

OpenShift Pipelines

Tech Preview



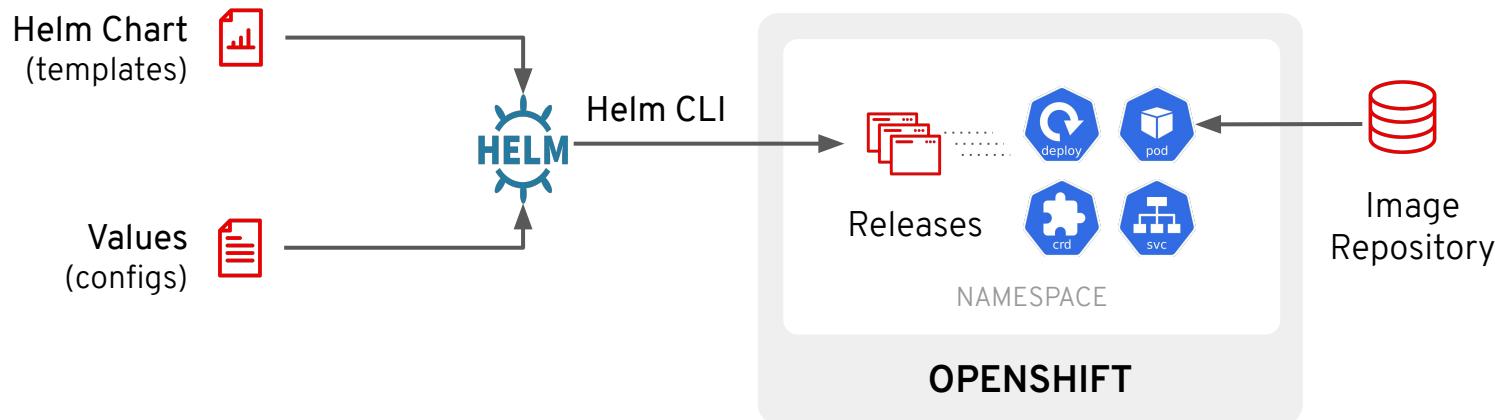
- Trigger (webhook) support
- Mount volumes as workspaces when starting a pipeline
- Credential management for Git repositories and image registries

The screenshot shows the OpenShift Pipeline interface. On the left, a sidebar lists 'Red Hat OpenShift Container Platform', 'Pipelines', 'Triggers', 'Logs', 'Annotations', and 'Last Run Time'. A modal window is open, divided into two sections: 'Add Trigger' (left) and 'Start Pipeline' (right).
Add Trigger: Under 'Webhook', 'Git Provider Type' is set to 'gogs-triggerbinding'. It shows variables: 'gitrevision' and 'gitrepository'.
Start Pipeline: Under 'Image Resources', 'app-image' is selected from a dropdown. Under 'Workspaces', 'local-maven-repo' is set to 'PVC' and 'PVC gogs-data' is selected. Under 'Advanced Options', it shows secrets: 'gogs-credentials' and a link to 'Add Secret'. At the bottom right of the modal are 'Cancel' and 'Start' buttons.

Helm

Helm 3 on OpenShift

Helm is a package manager for Kubernetes applications and helps to define, install and update apps



Helm 3 on OpenShift

GA

- Helm 3.2 GA
- Chart docs and metadata in Developer Catalog
- Select Chart version on Install
- Helm Release upgrade, uninstall and rollback

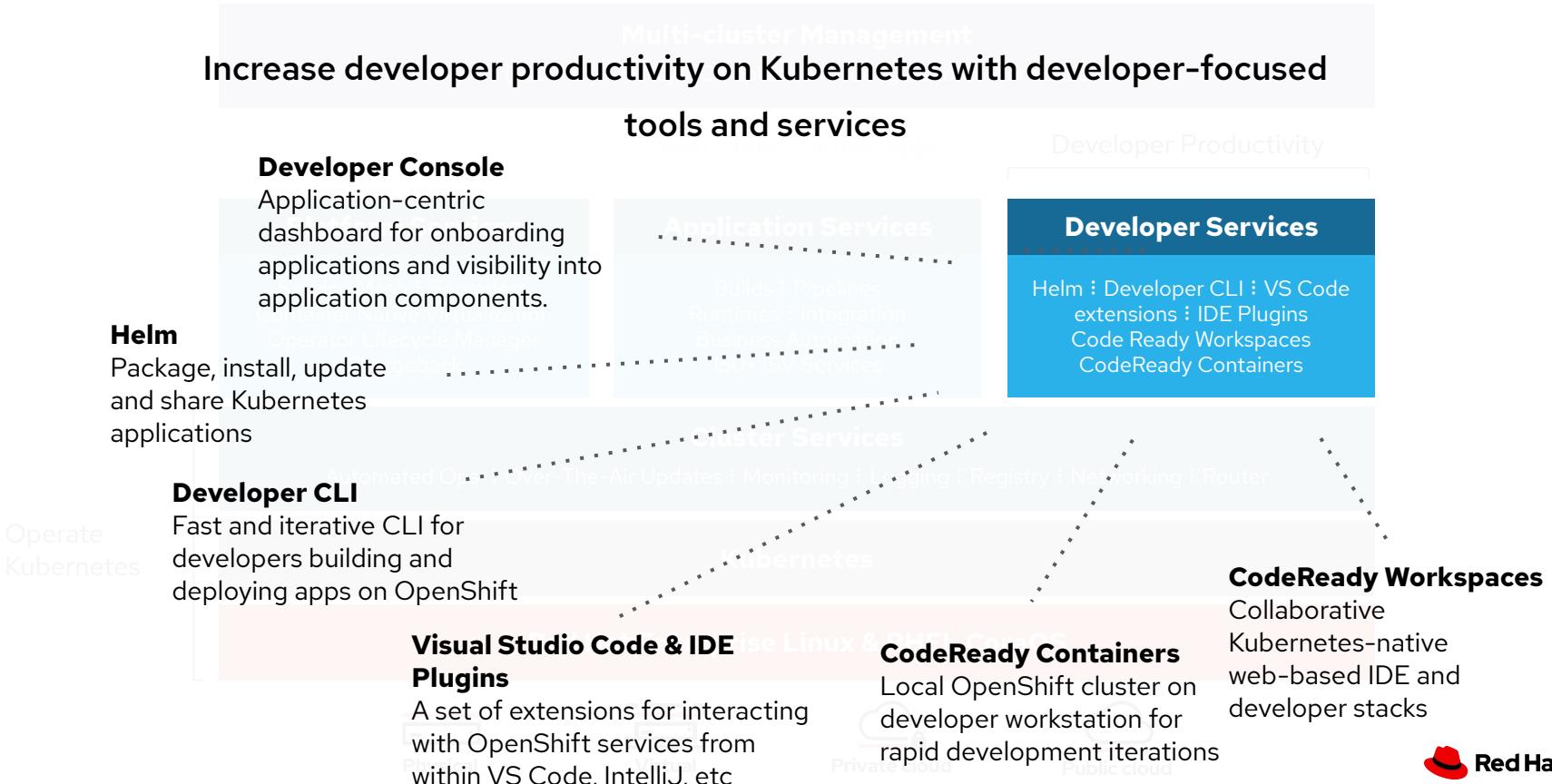
The screenshot shows the OpenShift Helm interface. On the left, a sidebar displays various charts available in the catalog. In the center, a modal window titled "Install Helm Chart" is open, showing the configuration for installing the "ibm-object-storage" chart. The "Release Name" field is set to "nodejs-ex-k". The "Chart Version" dropdown is set to "0.1 / App Version 1.16.0". Below the modal, the "Helm Releases" table lists the installed release "nodejs-ex-k" with revision 1, updated on Jun 17, 9:23 am, in a deployed status. The table includes columns for Name, Revision, Updated, Status, Chart Name, Chart Version, and App Version.

Name	Revision	Updated	Status	Chart Name	Chart Version	App Version
nodejs-ex-k	1	Jun 17, 9:23 am	Deployed	nodejs-ex-k	0.2.0	1.16.0

Helm 3 Overview Slides

CodeReady / Dev Tools

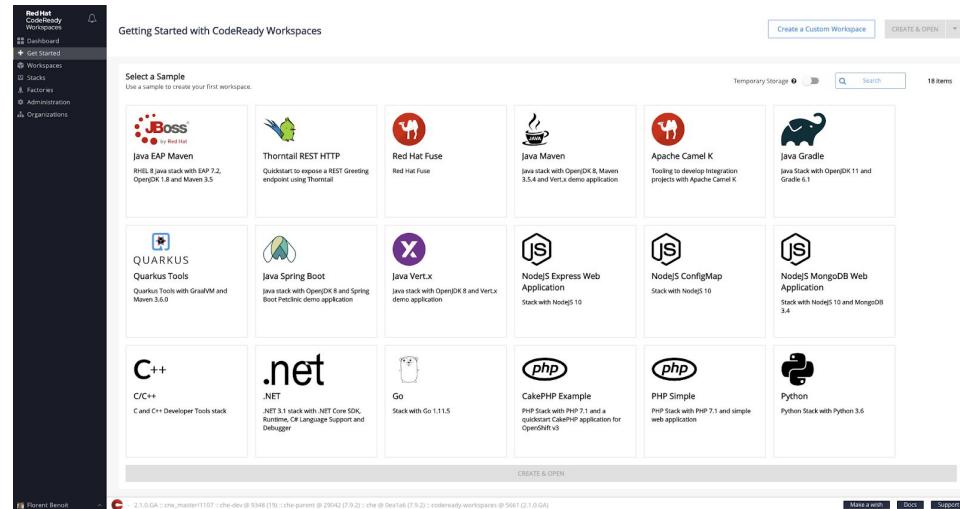
OpenShift Container Platform



CodeReady Workspaces 2.2

Targeted for July 1

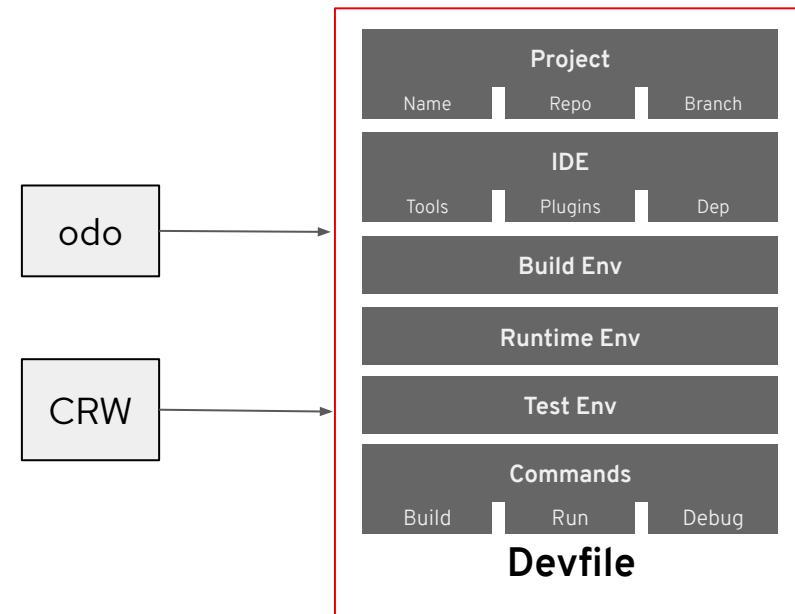
- **Faster workspace loading** - new k8s image puller operator
- **Plugin limits** - ability to tune by setting CPU limits
- **Improved admin** - run workspaces in debug mode and provide metrics via LogWatchers
- **Multiple registries** for customer-curated devfiles
- Update to UBI 8.2, EAP 7.3.1, SSO 7.4, mongodb 3.6, maven 3.6



odo 2.0 - OpenShift's Dev-Focused CLI

Due out July 29th

- **Open runtime/platform**
model - shared devfiles with
CodeReady Workspaces
- **Core language support** -
OpenJDK, Quarkus, NodeJS,
Python
- Creation of operands
- Binding of services



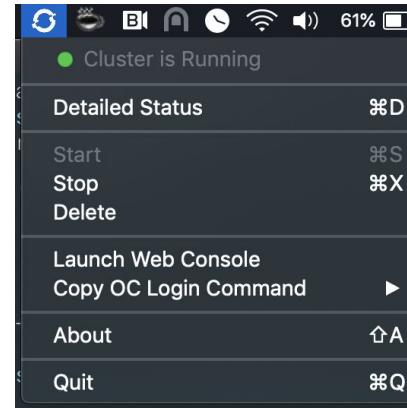
CodeReady Containers: OpenShift on your Laptop

OCP 4.5 update - July 14

- Regular releases to pick up 4.4 z-streams and fresh certs
- **Resource requirements** - no changes for 4.5, worked on future improvements
- **podman** - docker build/run on MacOS and Windows
- **System tray** - access key actions and status from familiar toolbar

```
$ eval $(crc podman-env)
Setup environment to run podman

$ podman run hello-openshift
Trying to pull quay.io/library/hello-openshift...
Pulling hello-openshift...
Hello OpenShift World!
```



OpenShift Console

OpenShift = Kubernetes

**Extending
Kubernetes**

**Managing
Kubernetes**

Debugging Nodes made easy!

At-a-glance views for your nodes right from the OpenShift Console.

- Key node data surfaced in the **List view**
- Offers a **new Overview** to provide **insights into critical data** back to you
 - Role/Type/Zone/Address
 - Status/Health Checks
 - Resource Utilizations
 - CPU/Memory/Filesystem
- Directly access to your node with a new **Terminal** view right in the console
 - Act as **root** on the node
 - Access Node Logs (`journald`)

The screenshot displays the Red Hat OpenShift Container Platform interface. On the left, a dark sidebar menu includes options like Home, Operators, Workloads, Serverless, Networking, and Storage. The main area shows a "Nodes" list with two entries:

Name	Status	Role	Pods	Memory	CPU	Filesystem	Created
ip-10-0-131-66.us-east-2.compute.internal	Ready	worker	55	2.74 GiB / 7.78 GiB	0.674 cores	64.36 GiB / 486.2 GiB	May 7, 5:17 am
ip-10-0-132-71.us-east-	Not Ready	worker	-	-	-	-	May 7, 6:53 am

A red arrow points from the text "At-a-glance views for your nodes right from the OpenShift Console." to the "Nodes" list. Below the list, a modal window titled "Node Details" is open for the first node. It has tabs for Overview, Details, YAML, Pods, Events, and Terminal. The Overview tab is selected. It shows the node's status as "Ready", its utilization over the last hour, and a "Health Checks" section indicating "Not configured". A red arrow points from the text "Offers a new Overview to provide insights into critical data back to you" to this section. Another red arrow points from the text "Directly access to your node with a new Terminal view right in the console" to the Terminal tab, which is also highlighted in blue. The Terminal tab shows a black terminal window with the prompt "sh-4.2#".

Enhanced “Create Operand Form” for Operator-backed services

Now default to the “Form View”, but you can always switch back to the YAML editor like a Pro

- Reduces friction when deploying operator backed services
- All data is stored when switching between the “Form” and “YAML” view

Auto generated form now supports nested schema

- Deeply nested structures are generated based on CRD's structural schema
- Exclude “non user facing” schema properties from the auto generated form with a new “hidden” OLM descriptor

The screenshot illustrates the enhanced "Create Operand Form" for operator-backed services in Red Hat OpenShift. On the left, the navigation sidebar shows the "Operators" section selected. The main content area is titled "Create CouchbaseCluster". It features two tabs: "Form View" (selected) and "YAML View". The "Form View" tab displays a configuration interface with sections for "TLS" (Static, Member), "Operator TLS Secret", and "Admin" (logR, adminConsoleServiceType). The "YAML View" tab shows the underlying YAML code for the CouchbaseCluster resource:

```

1  apiVersion: couchbase.com/v1
2  kind: CouchbaseCluster
3  metadata:
4    name: cb-example
5    labels: {}
6    namespace: tw
7  spec:
8    adminConsoleServices:
9      - data
10   adminConsoleServiceType: NodePort
11   buckets:
12     - conflictResolution: set
13     enableFlush: true
14     enableIndexReplica: false
15     evictionPolicy: fullEviction
16     ioPriority: high
17     memoryQuota: 128
18     name: default
19     replicas: 1
20     type: couchbase
21     compressionMode: passThrough
22     baseImage: registry.connectors/couchbase:4.1.0
23     antiAffinity: false
24     exposeAdminConsole: true
25     paused: false
26     servers:
27       - name: all_services

```

The "YAML View" tab also includes "Create" and "Cancel" buttons at the bottom.

Managing Operators at ease Improved Installed Operators view

A concise list that surfaces key data to help understand your installed Operators better.

- **Namespace:** The namespaces where the Operators are installed.
- **Managed Namespaces:**
 - Operands in these Namespace(s) are managed by the Operator.
 - Easily see which Operators are “Global Operators” (available and managing “All Namespaces”)
- **Last Updated:** The timestamps when the Operators are installed/upgraded.

Name	Namespace	Managed Namespaces	Status	Last Updated	Provided APIs
OpenShift Pipelines Operator	openshift-operators	All Namespaces	Succeeded Up to date	Jun 15, 10:16 am	-
Red Hat Integration - AMQ Streams	marketing	marketing	Succeeded Up to date	Jun 15, 11:07 am	Kafka Kafka Connect
Portworx Enterprise	pre-prod	-	-	-	-
Argo CD	testing	-	-	-	-
MongoDB	tw	-	-	-	-

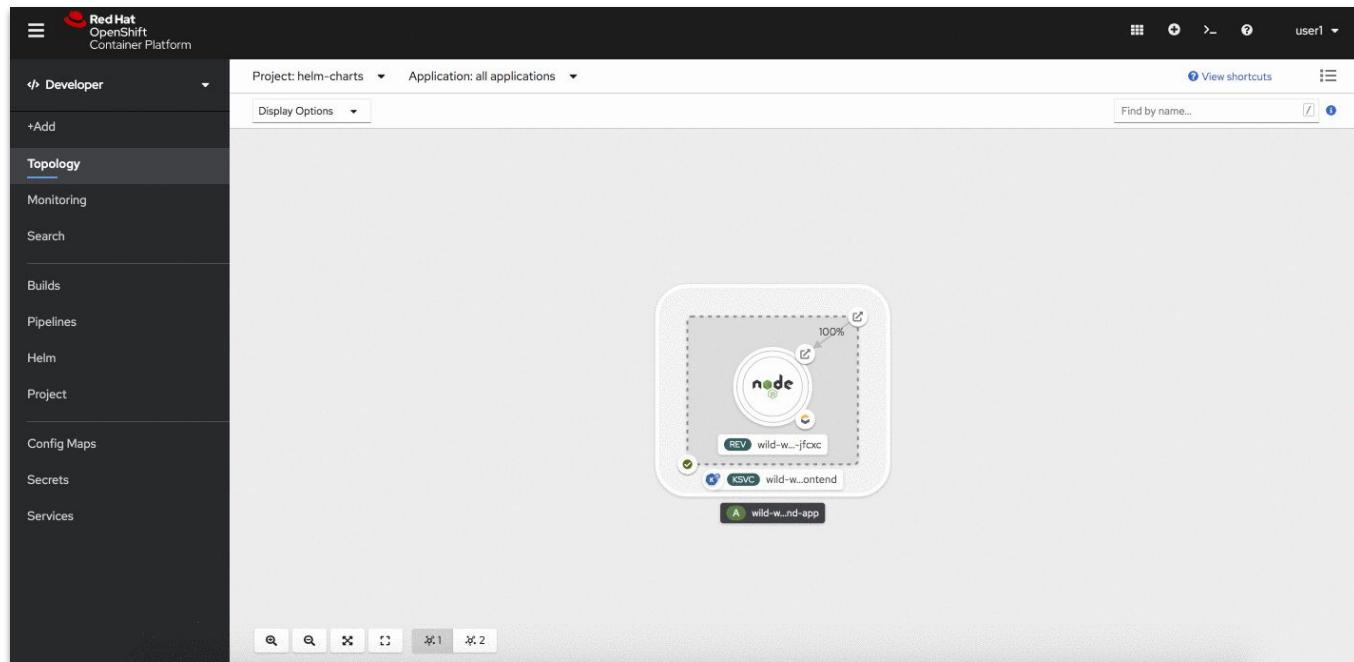
Name	Managed Namespaces	Status	Last Updated
MongoDB	tw	Succeeded Up to date	Jun 15, 10:16 am
OpenShift Pipelines Operator	All Namespaces	Succeeded Up to date	less than a minute

Easy access to Web Terminal

Tech Preview

Use CLIs direct from web console, and fully authenticated when you need them.

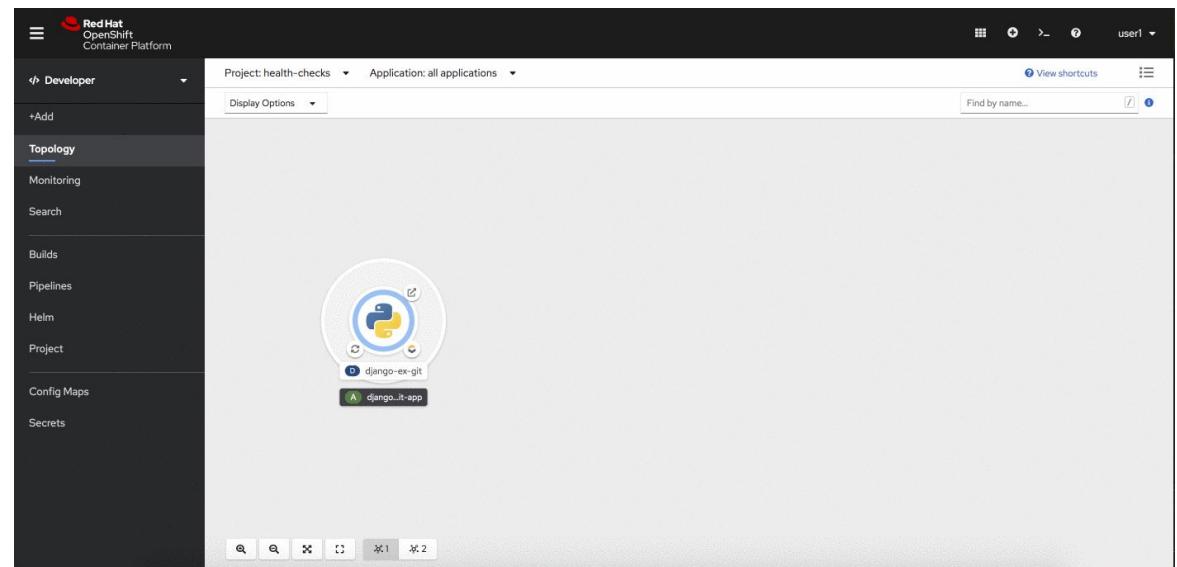
- oc, odo, kubectl
- Terminal can be minimized and opened in new tab
- History is not retained between sessions
- Not supported for cluster admins
- Operator enabled
- Available in first z stream



Health Check support

Provide an easy way to add and edit health checks to my application.

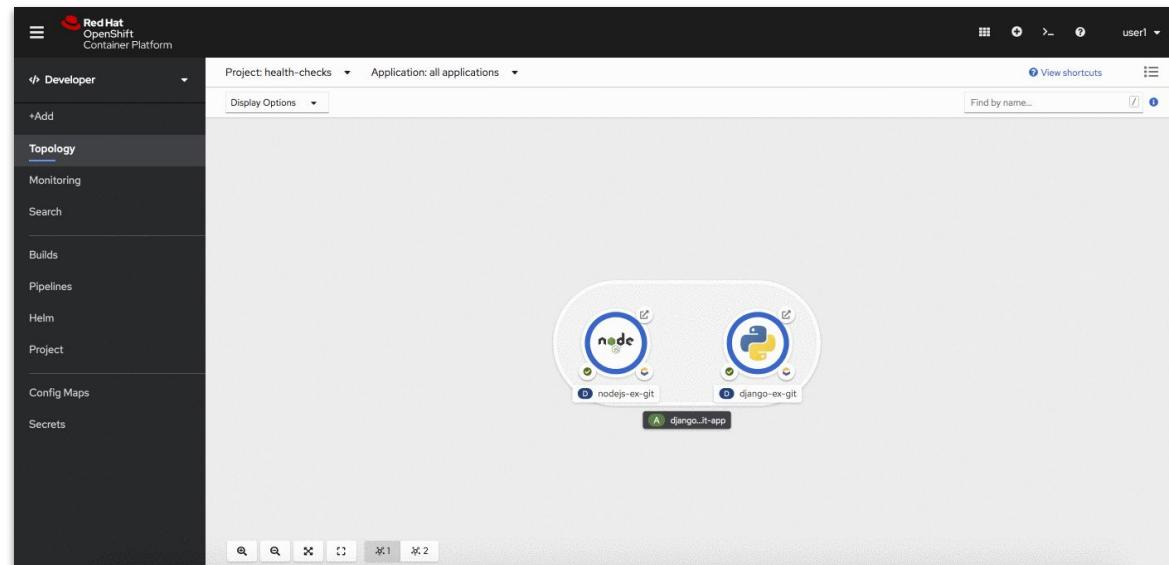
- Health Checks **Advanced Option** during creation
- Notification in topology for workloads which do not have configured Health Checks
- Ability to **Add** and **Edit Health Checks**
- Health checks include **liveliness**, **readiness** and **startup** probes



Improved navigation Custom navigation items

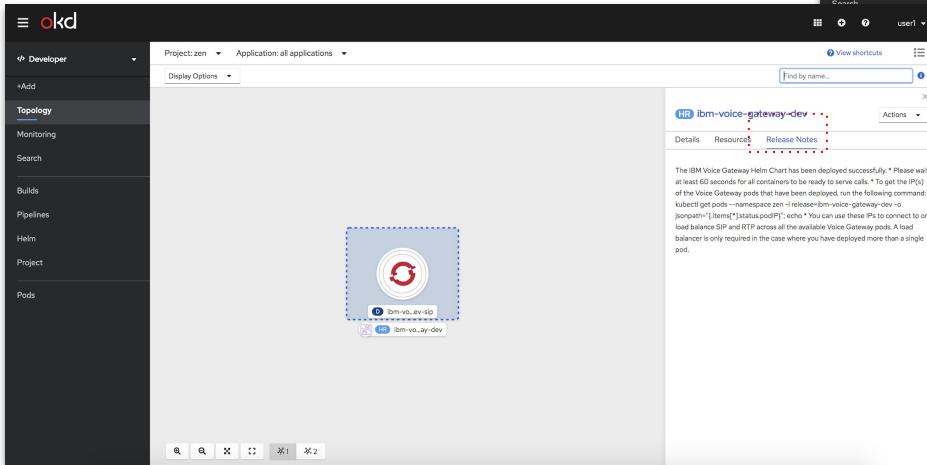
Custom navigation items in the main navigation to enable quick and easy access to resource types that are not available in the main navigation.

- **Streamlined navigation** based on user research
- Users can add items to their main navigation
- User can remove items that they have added to their main navigation
- **Config Maps** and **Secrets** are added by default



Enhanced Helm Support Access to Notes

Instant access to Release Notes immediately after installation, and on demand as needed from the details page.

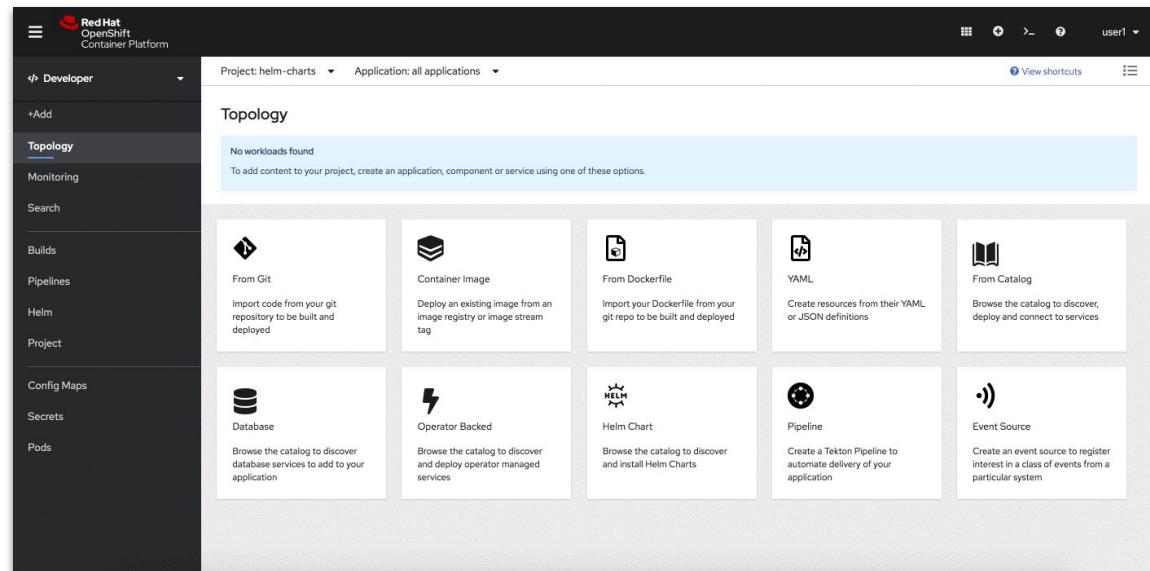


The IBM Voice Gateway Helm Chart has been deployed successfully. * Please wait at least 60 seconds for all containers to be ready to serve calls. * To get the IP(s) of the Voice Gateway pods that have been deployed, run the following command:
`kubectl get pods --namespace zen -lrelease=ibm-voice-gateway-dev -o jsonpath='{.items[*].status.podIP}'; echo *` You can use these IPs to connect to or load balance to all IP addresses of the Voice Gateway pods. A load balancer is only required in the case where you have deployed more than a single pod.

Enhanced Helm Support New actions

Upgrade, Rollback and Uninstall actions for Helm Releases installed from Helm Charts in the Developer Catalog.

- Upgrade, Rollback & Uninstall actions
- Revisions tab
- Release Notes



Topology VM Support

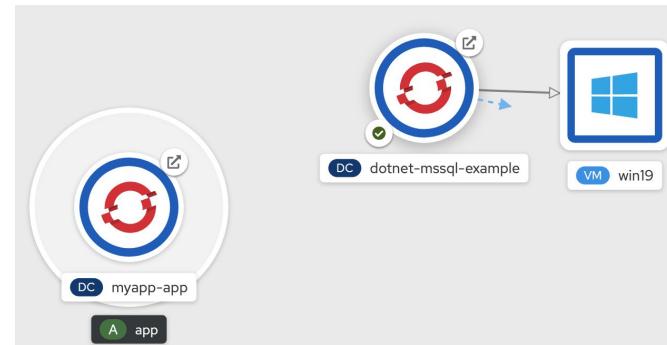
**Unified experience for VMs,
alongside your containers**

- **Import VMs** launch traditional workloads easily
- **VMs in topology** easily understand all the workload components, which are VMs (squares)
- **VM actions** suspend, terminate and access VMs as developers would normally expect

From Git	Container Image	From Dockerfile	YAML
Import code from your git repository to be built and deployed	Deploy an existing image from an image registry or image stream tag	Import your Dockerfile from your git repo to be built and deployed	Create or JSO

From Catalog	Database	Operator Backed	Helm
Browse the catalog to discover, deploy and connect to services	Browse the catalog to discover database services to add to your application	Browse the catalog to discover and deploy operator managed services	Browse and ins

Pipeline	Event Source	Import Virtual Machine
Create a Tekton Pipeline to automate delivery of your application	Create an event source to register interest in a class of events from a particular system	Import a virtual machine from external hypervisor

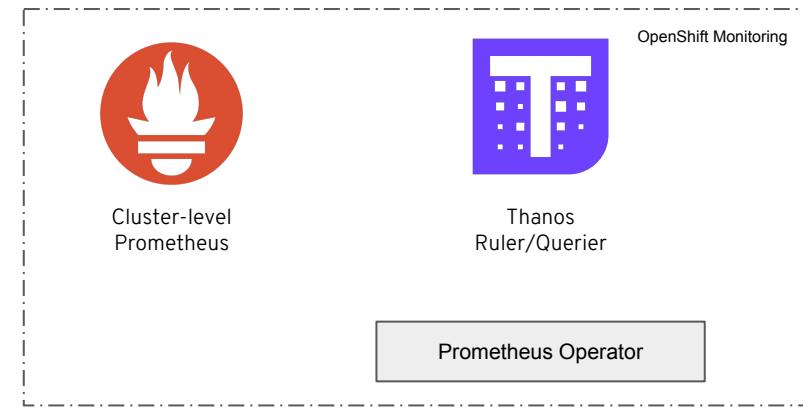


Observability

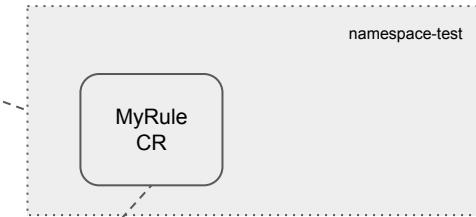
Expose cluster-related metrics for alerting

Provide cluster-related metrics available to a single user namespace for creating alerting rules.

- Create *PrometheusRule* CRs based on metrics we collect within the cluster-level Prometheus and available to a specific namespace (e.g. CPU and Memory for your user namespace "namespace-test").
 - Due to OpenShift's tenant model based on namespaces/projects, the only metrics available are the ones exposed in the same namespace you created the alerting rule.
 - **Note:** Viewing and managing your rules/alerts are not yet integrated this into the Console UI. This is planned for 4.6. An administrator can use the Thanos Ruler/Alertmanager UI instead. Access Thanos Ruler through the Route exposed inside the *openshift-user-workload-monitoring* namespace.
 - **Note:** This excludes metrics available in a *openshift-** namespaces since those namespaces



Deploy a custom rule into
your own namespace



Separate rules and fired alerts

Provide dedicated views for showing rules vs fired alerts.

- Instead of mixing rules and firing/pending alerts into a single page, we now have two separate pages to give administrators an enhanced experience finding the right information.
- **Alerts view** - easily see and filter your actual alerts
 - Click on one to see details about the firing/pending alert.
- **Alerting Rules view** - see a list of all alerting rules configured for your cluster
 - Click on one to better understand a particular rule and see how many alerts are actually firing/pending for it.

Name	Severity	Description
AL AlertmanagerReceiversNotConfigured	Warning	Alerts are not configured to be sent to a node or endpoint when failures occur. Check the OpenShift documentation for more information.
AL Watchdog	Critical	This is an alert meant to ensure that the endpoint for the Alertmanager and always fire against a redacted URL.
AP AggregatedAPIDown	Warning	
AP AggregatedAPIErrors	Warning	
AP AlertmanagerConfigInconsistent	Critical	
AP AlertmanagerFailedReload	Warning	
AP AlertmanagerMembersInconsistent	Critical	
AP AlertmanagerReceiversNotConfigured	Warning	
AP CertifiedOperatorConnectionErrors	Warning	

Upgrade to Elasticsearch 6

Provide a newer version of Elasticsearch and Kibana, and its components

- Major upgrade to Elasticsearch and Kibana 6.x.
- Introduce OpenDistro for more community support and better multi-tenancy support.
 - Replaces SearchGuard and OpenShift Elasticsearch Plugin.
 - Introduces a new permission model.
- New data model to follow Elastic.co best practices (next slide).
- Kibana instance will be created by the Elasticsearch Operator (Cluster Logging Operator creates the Kibana CR).
- Data curation using Elasticsearch rollover and delete APIs.
- Deprecation of curator (in favour for the new rollover API) and removed in 4.6.

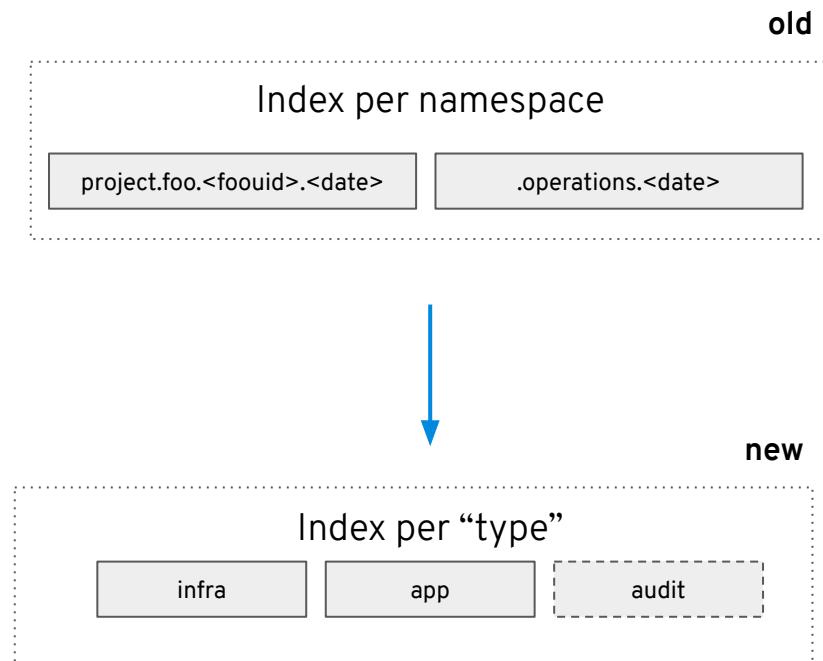
What about upgrades?

- Steps to upgrade are no different to prior versions (changing release channel, etc.).
 - **Note:** We do not automagically upgrade custom queries, dashboards, etc. created in Kibana.
- Old indices will be curated off according to the curator schedule to enable seamless transition.
- Old indices will be aliased so that you can still query them as long as they are present.
- After upgrade, everything should work and you should see:
 - Old indices and aliases defined for them.
 - New indices based on the new data model.
 - Kibana with a fresh look and feel + accessing it for the first time, you need to create a new index pattern.

Introducing a new data model

Update the current Elasticsearch data model to follow Elastic.co best-practices.

- Organized to better adhere to Elastic.co recommended performance and scalability guidelines.
- Co-located data by log type.
- Breaking changes:
 - Physically siloed by "type" only: infrastructure, application, audit (impacts mostly anything created in Kibana).
 - Curation by "type" only (project log curation not supported at the moment)

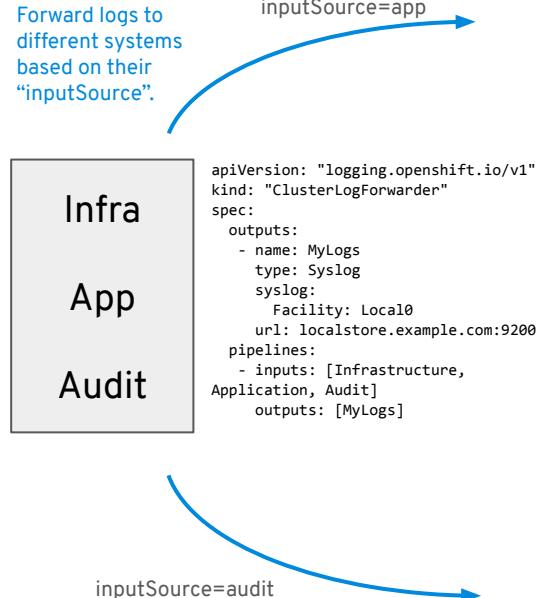


Introduce new log forwarding API

Planned for 4.5.z

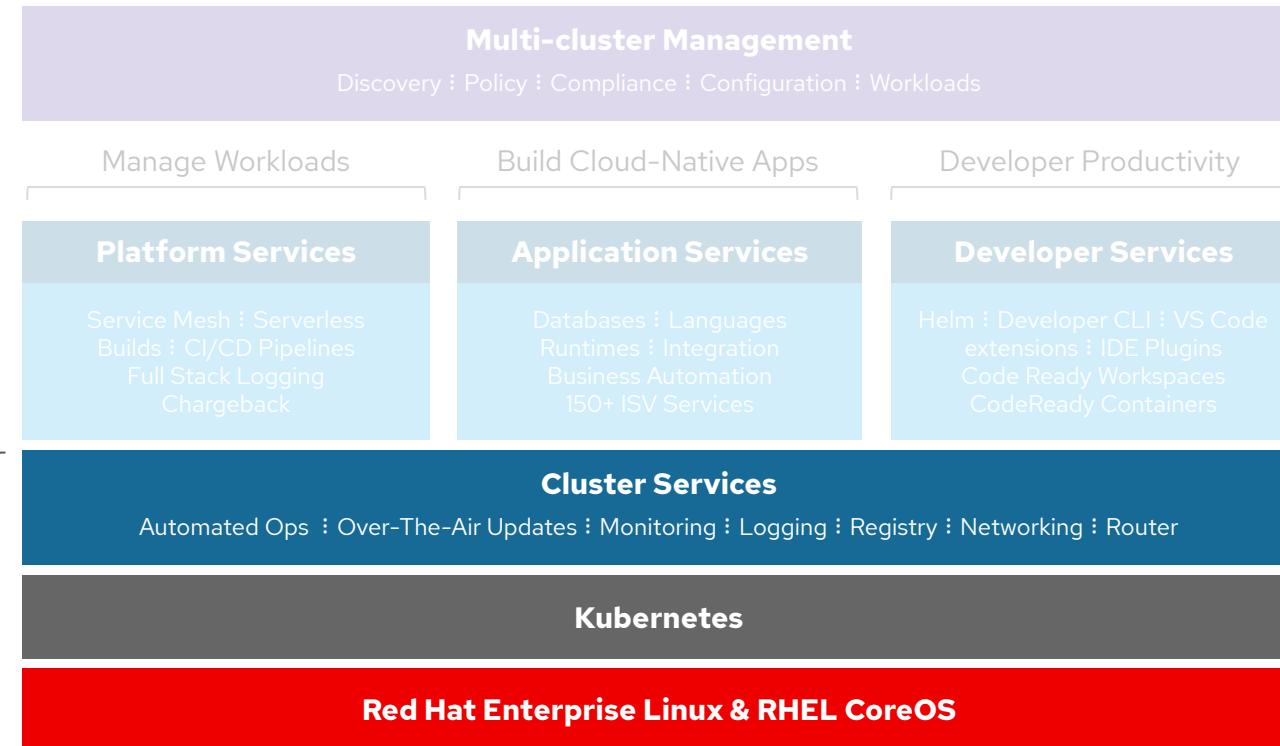
Abstract Fluentd configuration by introduce new log forwarding API to improve support and experience for customers.

- Introduce a new, cluster-wide *ClusterLogForwarder* CRD (API) that replaces needs to configure log forwarding via Fluentd ConfigMap.
- The API helps to reduce probability to misconfigure Fluentd and helps bringing in more stability into the Logging stack.
- Route logs based on their source type (infra, app or audit logs) and filter them further by namespaces.
- Collecting and forwarding audit logs
- With the API, we also introduce the following endpoint improvements to bring more value on to the table:
 - Improved syslog support adding TLS for secure communication + support for the newest standard (RFC5424).
 - Kafka support.



Core Platform

OpenShift Container Platform



Physical



Virtual



Private cloud



Public cloud



Install & Upgrades

4.5 Supported Providers

Full Stack Automation (IPI)



Pre-existing Infrastructure (UPI)



Compact 3-node Clusters on Bare Metal (only)

Compact clusters for the Edge

- Allows minimal footprint clusters to be used for developer and Edge deployments
 - Reduces hardware costs and power requirements
- Comprised of just [3 control plane nodes](#) without the need for any additional worker nodes
 - Application workloads are schedulable on the control plane nodes
 - Control plane remains highly available supporting upgrades
- Requires:
 - Setting worker replicas to 0 in install-config will configure master nodes as workers as well (any other value will set them as masters)
 - Temporary bootstrap node for initial cluster bring-up
 - External DNS and LB services
 - HAProxy for *.apps needs to be reconfigured to target masters (ensure health checks are enabled)
- Minimum system resource requirements for each control plane node are cumulative of master and worker requirements:
 - 6 vCPU, 24GB RAM, 200GB Storage
- Additional workers nodes can be added on Day 2

```
# Edit 'install-config.yaml' and ensure worker node replicas is set to '0':
compute:
  name: worker
  platform: {}
  replicas: 0

$ ./openshift-install create ignition-configs --dir=<installation_directory>

INFO Consuming Install Config from target directory
WARNING Making control-plane schedulable by setting MastersSchedulable to true
for Scheduler cluster settings

# Install using documented workflow
```

Deploy OpenShift to VMware vSphere

Simplified OpenShift cluster creation on VMware vSphere

- Easily provision “best practices” OpenShift cluster on VMware vSphere 6.5 & 6.7
- CLI-based guided workflow requires only minimal input to provision underlying Infrastructure significantly reducing complexity & deployment time
- Installer handles downloading RHEL CoreOS image and uploading it to vSphere for connected environments
- Machine API support for automated machine provisioning using MachineSets or node autoscaler
- Installer connects to the vCenter API to provide selection options and choices with only one option are selected by default.
- Installation requires:
 - Access to the vCenter API, so root CA certificates must be added to the system trust before connecting to the API
 - Two user-provisioned static IP addresses for cluster API and ingress traffic
 - User account requires privileges to read and create the necessary infrastructure resources



```
$ ./openshift-install create cluster --dir ./demo
? SSH Public Key /home/user_id/.ssh/id_rsa.pub
? Platform vsphere
? vCenter vcsa.vmware.example.com
? Username user@e2e.local
? Password [? for help] *****
INFO Connecting to vCenter vcsa.vmware.example.com
? Datacenter example-datacenter
? Cluster example-cluster
? Default Datastore example-datastore
? Network example-network
? Virtual IP Address for API 123.123.12.1
? Virtual IP Address for Ingress 123.123.12.2
? Base Domain example.com
? Cluster Name mycluster
? Pull Secret [? for help] *****
INFO Consuming Install Config from target directory
INFO Creating infrastructure resources...
INFO Waiting up to 30m0s for the Kubernetes API at https://api.mycluster.example.com:6443...
INFO API v1.18.2 up
INFO Waiting up to 30m0s for bootstrapping to complete...
INFO Destroying the bootstrap resources...
INFO Waiting up to 30m0s for the cluster at https://api.mycluster.example.com:6443 to initialize...
INFO Waiting up to 10m0s for the openshift-console route to be created...
INFO Install complete!
INFO To access the cluster as the system:admin user when using 'oc', run 'export KUBECONFIG=/home/user/auth/kubeconfig'
INFO Access the OpenShift web-console here:
https://console-openshift-console.apps.mycluster.example.com
INFO Login to the console with user: kubeadmin, password: 5char-5char-5char-5char
```

Generally Available



Control Plane

etcd Improvements



- **etcd bump to 3.4** - etcd 3.4 focuses on stability, performance and ease of operation
 - Better storage backend
 - Non blocking reads which improves long-running read transaction performance.
 - Fully concurrent backend read transaction resulting in improved write throughput and lower write latency
 - Improved Raft Voting Process
 - Pre-voting - improves the robustness of leader election in general
 - Non voting learner - better availability and operational safety (*ref diagram*)
 - New Client Load balancer
 - Guarantee correctness of etcd client and high availability under faulty conditions
 - Own credential bundle to fix balancer failover against secure endpoints.
- **fsync controller** - fsync controller runs client queries against prometheus metrics and events p99 for `etcd_disk_wal_fsync_duration_seconds_bucket` metrics if leader elections increase over the past 5 mins.

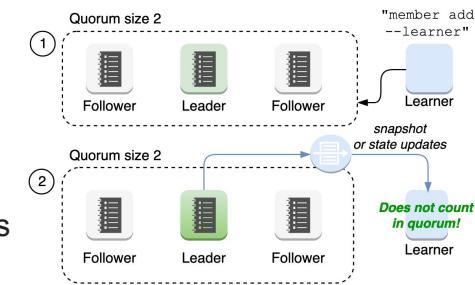


Figure 3. Add a learner node as a non-voting member. Wait until learner node catches up to leader's logs. Until then, learner node neither votes nor counts towards quorum.

OpenShift Cluster Infrastructure

- Spot Instances (AWS)
 - Access "cheap" resources from cloud provider
 - Other vendors coming in future releases with a consistent interface
 - Very easy to use: only one (or maybe two) lines to add to MachineSet YAML file
 - Will fail if can't schedule, use Machine Health Checker or Autoscaler to deal with this (if you want)
 - Advice is not to use maxPrice
- Autoscale to/from zero
 - More efficiently scale your resources (you had to have at least one node previously)
 - Available for vSphere in a later release
- vSphere Machine API support
 - Including the autoscaler

MachineSet

```
apiVersion: machine.openshift.io/v1beta1
spec:
  metadata:
    creationTimestamp: null
  providerSpec:
    spotMarketOptions:
      maxPrice: "0.06"
```

The screenshot shows the AWS EC2 Dashboard with the 'Request Spot Instances' tab selected. A table lists 84 pending requests. One specific request is highlighted:

Request Id	sr-3at1jwak
Description	
Tags	
Request type	instance
Created	4/15/2020, 4:06:18 PM
Status	fulfilled
Instance type	m4.large
AMI ID	ami-0489bb0be0d3fc0
Product description	Linux/UNIX
Availability Zone	us-east-1d
Max price	\$0.1
Persistence	one-time
Key pair name	-
IAM role	jipseed-test-dvcm-worker-profile
EBS-optimized	no
Monitoring	no
Tenancy	default
Interruption behavior	terminate
Request valid from	-
Request valid until	-

Networking and Routing

HTTP/2 and gRPC Support

- OCP 4.5 enables transparent end-to-end HTTP/2 ("h2") support in HAProxy for application owners to make use of its protocol capabilities, including single connection, header compression, binary streams (e.g. gRPC servers), et al.
- HTTP/2 is available for **re-encrypt** and **passthrough** routes
 - Hard requirement for a custom certificate on the route¹
 - Application Level Protocol Negotiation is added for routes with custom certs ("ALPN h2,http/1.1")
 - Without a custom certificate the client/server won't get the ALPN specification, and won't be able to negotiate/upgrade to HTTP/2
- *Limitation:* No HTTP/2 support for edge terminated TLS routes in 4.5
- gRPC requires an HTTP/2 transport, so it requires one of either re-encrypt or passthrough routes

Create a passthrough route to a HTTP/2-capable pod and test:

```
$ oc new-project marcproject --display-name="Sandbox"
$ oc create -f https://<path>/pod_test.json
$ oc create -f https://<path>/service_secure.json
$ oc create route passthrough --service=service-secure
test-pt
$ oc get routes
NAME      HOST/PORT
PATH    SERVICES          PORT   TERMINATION   WILDCARD
test-pt
test-pt-marcproject.apps.ci-ln-j58wzw2-d5d6b.origin-ci-in
t-aws.dev.rhcloud.com           service-secure  https
passthrough  None
...
$ curl https://test-pt-marcproject.apps.<domain> -k -I
HTTP/2 200
...
```

Ingress Access Logging

- There is a new API field on the IngressController resource to configure it:
 - Ability to enable access logs
 - Choice of logging to a pod container or to a Syslog server
 - Options to configure HTTP log format and Syslog facility
 - *Limitation:* Syslog endpoint must be UDP
- Log the hostname of a node from which the log message originated
(send-log-hostname) enabled



**HAProxy
2.0**

Log to Sidecar Container

```
$ oc -n openshift-ingress-operator patch ingresscontroller/default --type=merge
--patch='{"spec":{"logging":{"access":{"destination":{"type":"Container"}}}}}'
```

Log to a "facility" on a Syslog server

```
$ oc -n openshift-ingress-operator patch ingresscontroller/default --type=merge
--patch='{"spec":{"logging":{"access":{"destination":{"type":"Syslog","syslog":{"address":"1.2.3.4","port":10514,"facility":"audit"}}}}}'
```

View the Logs

```
$ oc -n openshift-ingress logs deploy/router-default -c logs --tail=10 --follow
```

Improved Router Reload Performance

- HAProxy was updated to 2.0.14 in OpenShift 4.5 to add a router reload performance improvement
- This optimization benefits those customers with thousands of routes
- Example data realized with the performance enhancement:



#Routes	2.0.13 reload	2.0.14 reload
300	1.7s	0.2s
13000	33.0s	0.8s

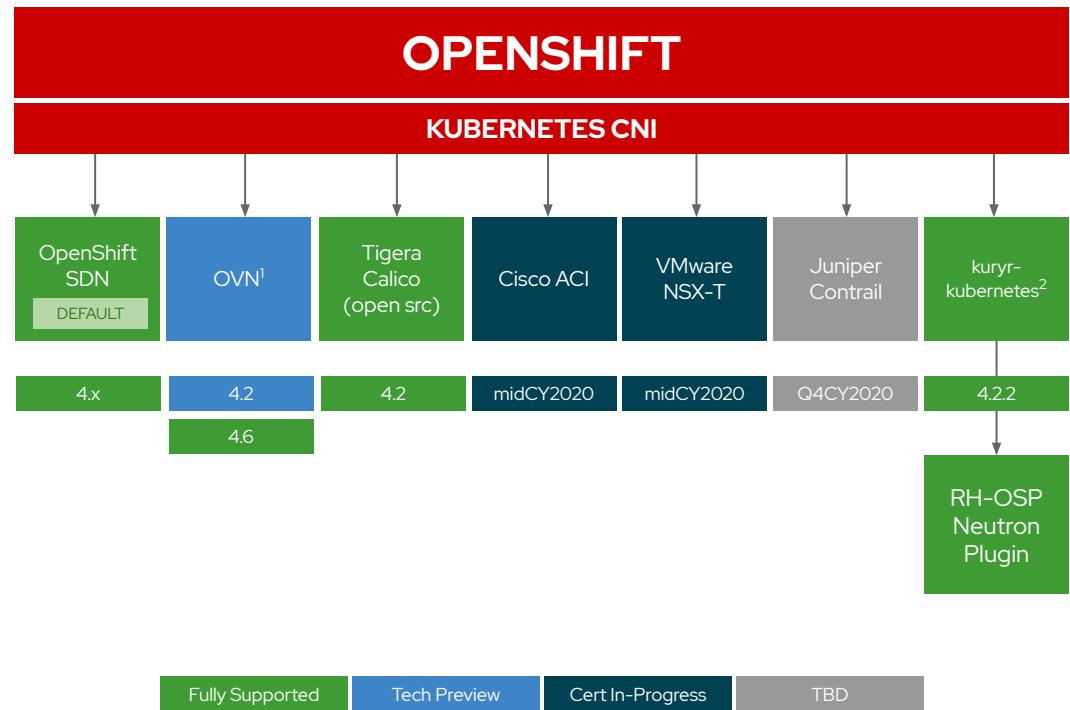
3rd-Party CNI Plug-in Certification Update

The following 3rd-party Kubernetes CNI plug-ins have begun the OpenShift certification process and are at varying stages of progress:

-  Cisco ACI
-  VMware NSX-T

The certification process 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 OpenShift uses to validate its own SDN



Generally Available

Storage

OpenShift Storage

- No change on support for intree drivers
- CSI Operators
 - CSI Manila GA
 - CSI AWS EBS (Tech Preview)
- CSI Capabilities
 - Inline/Ephemeral Volumes (Tech Preview)
 - Cloning GA
 - CSI Driver (Upstream)

OCP Supported	
AWS EBS	Fibre Channel
Azure File & Disk	HostPath
GCE PD	Local Volume
VMware vSphere Disk	Raw Block
NFS	iSCSI
Supported via OCS	
File , Block, Raw Block, Object	
Supported via OSP	
Cinder	

OpenShift Container Storage 4.5

Release in August, will support OCP 4.4 & OCP 4.5

GA

- Disconnected Environment
- Proxy environments
- FIPS validated cryptography
- External Mode supporting multiple OCS clusters sharing a centralized RHCS cluster for elasticity and collaboration between clusters.

Tech Preview

- PV Expansion

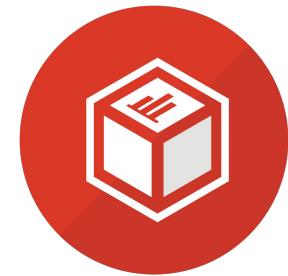
* This is an uncommitted roadmap and Red Hat reserves the right to change it.

62

Operator Metering

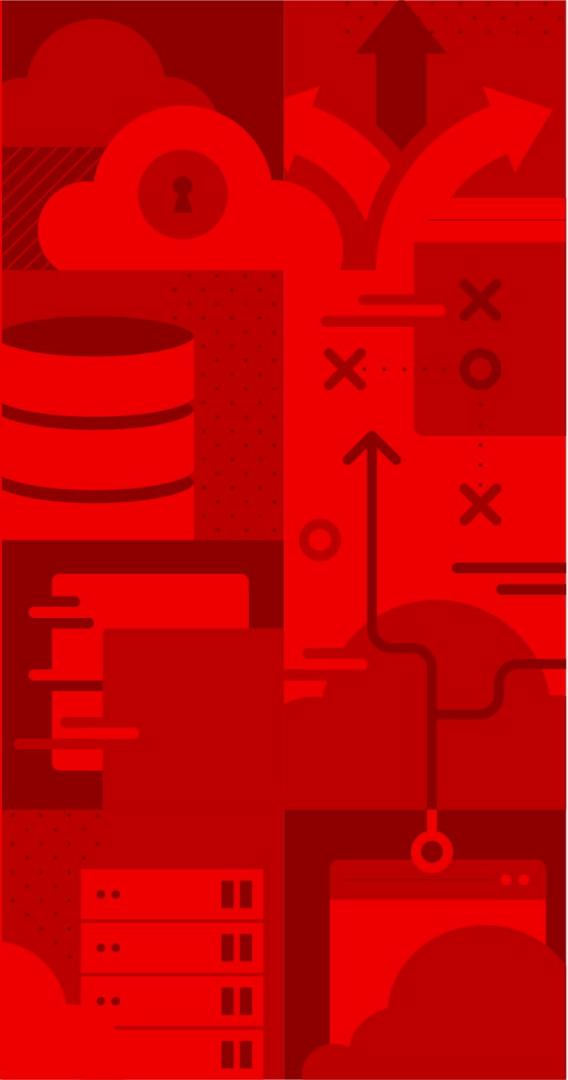
Operator Metering

- Now you can upgrade a Metering Operator from 4.2 to 4.5, instead of needing to reinstall the operator
- Operator Metering now can be configured to use the cluster-wide proxy configuration.
- The upstream repository has changed from the operator framework to its own organization
<https://github.com/kube-reporting/>
- New logo



OpenShift Roadmap

Q2 2020 OpenShift 4.5		H2 2020 OpenShift 4.6		2021 OpenShift 4.7+	
HOSTED	PLATFORM	APP	PLATFORM	DEV	HOSTED
<ul style="list-style-type: none">Customize navigation in Dev ConsoleKnative event sources in Dev ConsoleForm-based chart values during installHelm Chart upgrade, rollback and uninstall		<ul style="list-style-type: none">Build Operator catalogs in container imagesHelm workflows in ConsoleMonitor application workloads (TP)	<ul style="list-style-type: none">OVN GA, OVN Egress Firewall/Router/IPIPv6 (single/dual stack on control plane)Bare metal (IPI) GARemote worker nodes for EdgeRealtime kernel (TP, RAN use-cases only)AWS support for GovCloud, C2S, and ChinaMicrosoft Azure Government (MAG) supportVMware vSphere 7.0 supportImproved cloud credential handlingDisconnected OpenShift Update ServiceGCP & Azure spot instancesCSI resize/snapshot GAWindows containers GAEtcdr improvementsOAuth secure storage & inactivity timeoutEnhanced RHCOS static networking UXOSD ISO 27001 certificationARO government region support	<ul style="list-style-type: none">Improved getting started experience for devsOpenShift Serverless Eventing GAOpenShift Pipelines (Tekton) GAJenkins Operator TPMonitor application workloads (GA)OPM tool for curating Operator catalogsOperator dependency tools v2OpenShift Builds (v2) TP	<ul style="list-style-type: none">Single node clusterEnable user namespacesUtilize cgroups v2Microsoft Hyper-V (UPI) supportAzure Stack Hub and HCIAlibaba Cloud supportNetwork Enhancements derived from OVNLocal storage support in OCSCVO↔OLM cluster upgrade dependencies ...more to come <ul style="list-style-type: none">Red Hat OpenShift on AWS by AmazonOpenShift Online Pro on OCP 4.X
<ul style="list-style-type: none">OpenShift virtualization GAVMware vSphere (IPI) supportNode Terminal Access in the ConsoleCompact 3-node clusters for bare metalCompliance OperatorHTTP/2 and gRPC Support for RouterGraceful shutdown and recovery procedureLog forwarding GALogging update to Elasticsearch v6AWS Spot instance support & IAM IdentityMetering proxy supportCSI clone GAAir-gapped cluster update procedure		<ul style="list-style-type: none">OSD on Google Cloud PlatformARO 20+ new deployment regionsOCM multi-cluster dashboard			



Thank you



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



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

