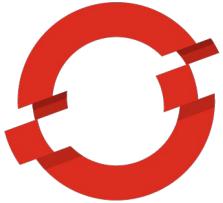




# Red Hat OpenShift 4 Release Update

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Daniel Messer  
Product Manager OpenShift



# Red Hat OpenShift 4



## Trusted enterprise Kubernetes

- Trusted Host, Content, Platform
- Full Stack Automated Install
- Over the Air Updates & Day 2 Mgt

## A cloud-like experience, everywhere

- Hybrid, Multi-Cluster Management
- Operator Framework
- Operator Hub & Certified ISVs

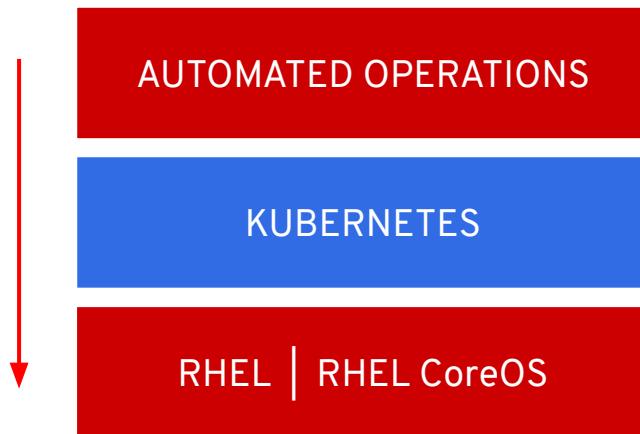
## Empowering developers to innovate

- Developer Tools
- Cloud-Native CI/CD
- Serverless
- Service Mesh

# The New Platform Boundary

OpenShift 4 is aware of the entire infrastructure and brings the Operating System under management

**OpenShift & Kubernetes**  
certificates & security settings  
container runtime config  
allowed maintenance windows  
software defined networking



kernel modules  
device drivers  
network interfaces  
security groups  
**Nodes & Operating System**

# Installation Experiences

## OPENShift CONTAINER PLATFORM

### Full Stack Automated

Simplified opinionated “Best Practices” for cluster provisioning

Fully automated installation and updates including host container OS.



**Red Hat**  
Enterprise Linux  
CoreOS

### Pre-existing Infrastructure

Customer managed resources & infrastructure provisioning

Plug into existing DNS and security boundaries



**Red Hat**  
Enterprise Linux  
CoreOS



**Red Hat**  
Enterprise  
Linux

## OPENShift DEDICATED

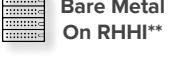
### Hosted By Red Hat

Get a powerful cluster with no maintenance required

Managed by Red Hat engineers

Free your team from the distraction of operations

# Provider Roadmap

	Full Stack Automation	Pre-existing Infrastructure
OPENSHIFT by Red Hat® 4.1*		  
OPENSHIFT by Red Hat® 4.2	   	
OPENSHIFT by Red Hat® 4.3 (tentative)	  	  

\* Requires Internet connectivity; support for cluster proxy & disconnected installation/updating not planned until 4.2

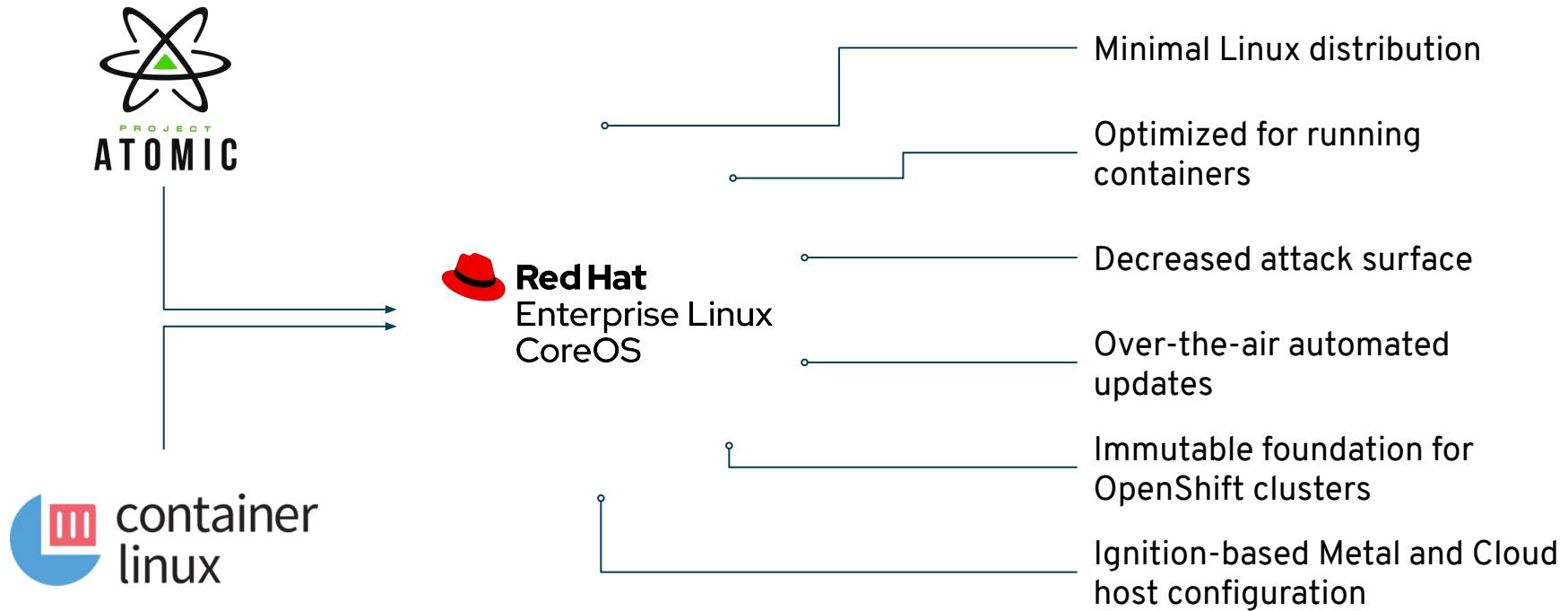
\*\* On qualified hardware stack

# Over-the-Air Updates

- Retrieves list of available updates
- Admin selects the target version
- OpenShift is updated over the air
- Auto-update support

The screenshot shows the Red Hat OpenShift web interface. The left sidebar has a dark theme with white text and includes links for Home, Catalog, Workloads, Networking, Storage, Builds, Monitoring, Administration (with a dropdown menu for Cluster Settings, Namespaces, and Nodes), and a kube:admin user icon. The main content area is titled 'Cluster Settings' and has tabs for Overview, Global Configuration, and Cluster Operators. Under 'Overview', there is a table with three columns: CHANNEL (fast), UPDATE STATUS (4.1.0-0.2), and CURRENT VERSION (4.0.0-0.2). Below the table, it says CLUSTER ID: 784ce289-02aa-4d32-8796-cd4a0619499c, CURRENT PAYLOAD: -, and CLUSTER AUTOSCALER: Create Autoscaler. A blue 'Update' button is located at the bottom right of this section.

# Red Hat Enterprise Linux CoreOS



# Kubernetes Machine API Operator

## Using Kubernetes To Provision Kubernetes Clusters

The image displays two side-by-side screenshots of the Red Hat OpenShift web console, both titled "console-openshift-console.apps.robszumski-0100.cloud.robszumski.com" and logged in as "kube:admin".

**Screenshot 1 (Left): Machines List**

- Project:** openshift-cluster-api
- Machines:**

NAME	NAMESPACE	REGION	AVAILABILITY ZONE
robszumski-0100-master-0	openshift-cluster-api	us-east-2	us-east-2a
robszumski-0100-master-1	openshift-cluster-api	us-east-2	us-east-2b
robszumski-0100-master-2	openshift-cluster-api	us-east-2	us-east-2c
robszumski-0100-worker-us-east-2a-86wfh	openshift-cluster-api	us-east-2	us-east-2a
robszumski-0100-worker-us-east-2b-sp8wx	openshift-cluster-api	us-east-2	us-east-2b
robszumski-0100-worker-us-east-2c-vjfwt	openshift-cluster-api	us-east-2	us-east-2c

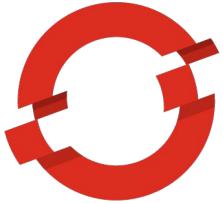
**Screenshot 2 (Right): Machine Set Details**

- Machine Set Details:** robszumski-0100-worker-us-east-2a
- Overview Tab (YAML View):**

```

spec:
  metadata:
    creationTimestamp: null
  providerSpec:
    value:
      userDataSecret:
        name: worker-user-data
      placement:
        availabilityZone: us-east-2a
      region: us-east-2
      keyName: null
      credentialSecret: null
      instanceType: m4.large
  metadata:
    creationTimestamp: null
    public: null
    securityGroups:
      - arn: null
      - filter:
          - name: 'tag:Name'
          values:
            - robszumski-0100_worker_sg
      id: null
      kind: AWSMachineProviderConfig
      loadBalancers: null
      tags:
        - name: openshiftClusterID

```
- Actions:** Save, Reload, Cancel, Download



# Red Hat OpenShift 4



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## Empowering developers to innovate

- Developer Tools
- Cloud-Native CI/CD
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- Service Mesh

# Unified Hybrid Cloud

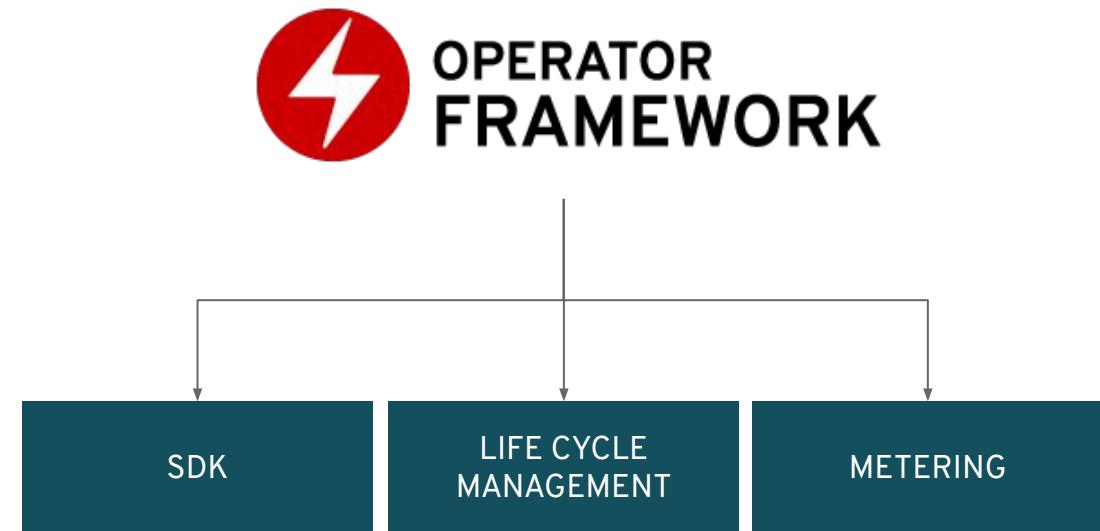
- Multi-cluster management
  - New clusters on AWS, Azure, GCP, vSphere, OpenStack, and bare metal
  - Register existing clusters
  - Including OpenShift Dedicated
- Management operations
  - Install new clusters
  - View all registered clusters
  - Update clusters

The image shows two parts illustrating the Unified Hybrid Cloud. The top part is a screenshot of the 'OpenShift Cluster Manager' web interface. It features a sidebar with 'Clusters', 'Subscriptions', 'Membership', and 'Administration'. The main area is titled 'Clusters' with a 'Create' button. A table lists 'OpenShift Clusters' with columns for 'CLUSTER NAME', 'PLATFORM', 'VERSION', and 'MESSAGE'. Two entries are shown: 'Production' (AWS, 4.0.158, 'Security upgrade available') and 'Cloud Staging' (AWS, 4.0.163, 'Up to date'). The bottom part is a diagram titled 'cloud.redhat.com' showing a central green box connected by arrows to four red boxes labeled 'AWS', 'GCP', 'Azure', and 'On-Prem', each featuring a white circular logo.

CLUSTER NAME	PLATFORM	VERSION	MESSAGE
Production	AWS	4.0.158	⚠️ Security upgrade available
Cloud Staging	AWS	4.0.163	Up to date

# Operator Framework

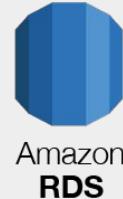
Operators codify operational knowledge and workflows to automate life cycle management of containerized applications with Kubernetes



# Evolution of Self-Service Backend Workloads



- Containerized



- Virtualized
- External to the cluster
- Cloud storage ready
- Replicated
- Backup
- Automated updates



- Containerized
- Container storage ready
- Replicated
- Backup
- Automated updates
- Enhanced observability
- Customization
- Local development
- Fully Open Source
- Any Kubernetes
- Certified on OpenShift

# OperatorHub.io Ecosystem

The screenshot shows the OperatorHub.io website. At the top, there's a search bar and a contribute button. Below it, a banner says "Welcome to OperatorHub.io" and "OperatorHub.io is a new home for the Kubernetes community to share Operators. Find an existing Operator or list your own today." On the left, there are three columns of filters: Categories (AI/Machine Learning, Big Data, Cloud Provider, Database, Integration & Delivery, Logging & Tracing, Monitoring, Networking, OpenShift Optional, Security, Storage, Streaming & Messaging), Provider (Amazon Web Services, Aqua Security, Banzai Cloud, CNCF, Couchbase), and Capability Level (Basic Install, Seamless Upgrades, Full Lifecycle, Deep Insights). The main area displays a grid of 37 operators, each with a logo, name, provider, and a brief description. Some examples include the AWS Service Operator, Camel K Operator, CockroachDB, Community Jaeger Operator, Couchbase Operator, Crunchy PostgreSQL Enterprise, Dynatrace OneAgent, etcd, Falco Operator, Federation, Federator.ai, Hazelcast Operator, Infinispan, Instana Agent Operator, and Istio.

The public registry for finding  
Kubernetes Operator backed  
services

# OperatorHub in OpenShift

The embedded registry for  
Community and Certified  
Operators from Red Hat and  
Partners, tested and verified on  
OpenShift 4

Project: default ▾

## OperatorHub

Discover Operators from the Kubernetes community and Red Hat partners, curated by Red Hat. Operators can be installed on your clusters to provide optional add-ons and shared services to your developers. Once installed appear in the [Developer Catalog](#), providing a self-service experience.

All Items	All Items
AI/Machine Learning	43 items
Application Monitoring	
Big Data	
Database	
Developer Tools	
Integration & Delivery	
Logging & Tracing	
Monitoring	
Networking	
OpenShift Optional	
Security	
Security Policy Management	
Storage	
Streaming & Messaging	
Other	
<a href="#">Filter by keyword...</a>	
INSTALL STATE	
<input type="checkbox"/> Installed (3)	
<input type="checkbox"/> Not Installed (40)	
PARTNER TYPE	
<input type="checkbox"/> Red Hat (2)	
<input type="checkbox"/> Certified (16)	
<input type="checkbox"/> Community (25)	
PARTNER	
<input type="checkbox"/> Red Hat (13)	
<input type="checkbox"/> AppDynamics (1)	
<input type="checkbox"/> Aqua Security (1)	

AMQ Streams  
provided by Red Hat, Inc.  
Red Hat AMQ Streams is a massively scalable, distributed, and high performance data stream.

AppDynamics ClusterAgent  
provided by AppDynamics LLC  
End to end monitoring of applications on Kubernetes and OpenShift clusters with AppDynamics.

Aqua Security Operator  
provided by Aqua Security, Inc.  
The Aqua Security Operator runs within a OpenShift cluster and provides a means to deploy and manage Aqua Security products.

Automation Broker Operator  
provided by Red Hat, Inc.  
Automation Broker is an implementation of the Open Service Broker API managed by Red Hat.

Camel-K Operator  
provided by The Apache Software Foundation  
Apache Camel K (a.k.a. Camel) is a lightweight integration framework built from Apache Camel.

CockroachDB  
provided by Helm Community  
CockroachDB Operator based on the CockroachDB helm chart

Community Jaeger Operator  
provided by CNCF  
Provides tracing, monitoring and troubleshooting microservices-based

Couchbase Operator  
provided by Couchbase  
An operator to create and manage a Couchbase Cluster

Crunchy PostgreSQL Enterprise  
provided by Crunchy Data  
PostgreSQL is a powerful, open source object-relational database system with over 20 years of active development by the PostgreSQL Global Development Group.

Descheduler  
provided by Red Hat  
An operator to run the OpenShift descheduler, a scheduler to move running Pods according to policies

Elasticsearch Operator  
provided by Red Hat, Inc.  
The Elasticsearch Operator for OKD provides a means for configuring and managing an Elasticsearch cluster for OKD.

Federation  
provided by Red Hat  
Gain Hybrid Cloud capabilities between your clusters with Kubernetes Federation.

FederatorAI  
provided by ProphetStor Data Services, Inc.  
FederatorAI Operator provides easy configuration and management of AI-based

FederatorAI  
provided by ProphetStor Data Services, Inc.  
FederatorAI Operator provides easy configuration and management of AI-based

Hazelcast Operator  
provided by Hazelcast, Inc.  
Install Hazelcast Enterprise cluster.

operator

operator

operator

operator

operator

# Operators as a First-Class Citizen



# Operator Lifecycle Management

Operator Catalog

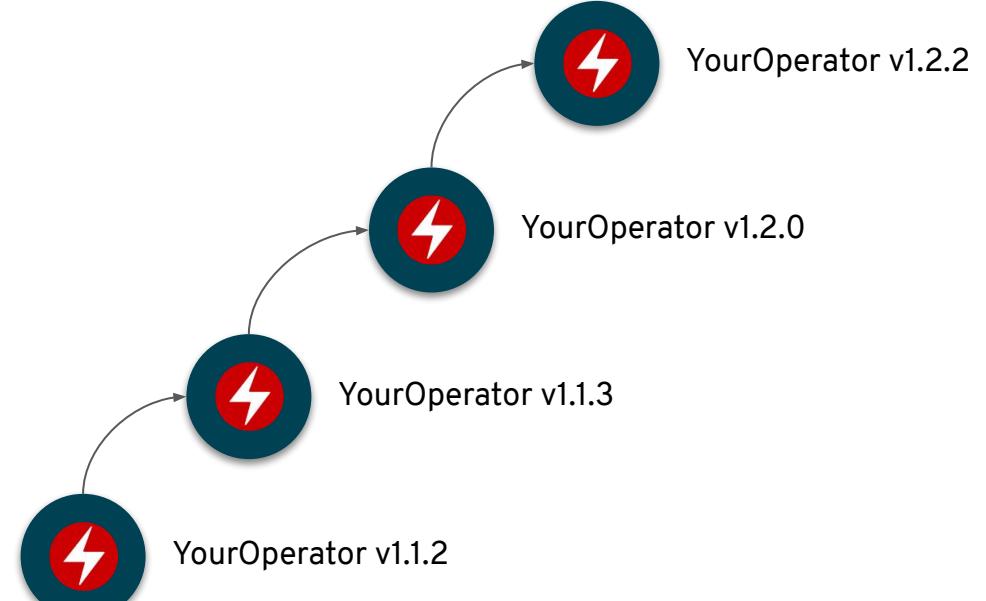


 **OPERATOR  
LIFECYCLE MANAGER**



Subscription for  
YourOperator

Version



# Services ready for your developers

## New Developer Catalog aggregates apps

- Blended view of Operators, Templates and Broker backed services
- Operators can expose multiple CRDs. Example:
  - MongoDBReplicaSet
  - MongoDBSharded Cluster
  - MongoDBStandalone
- Developers can't see any of the admin screens

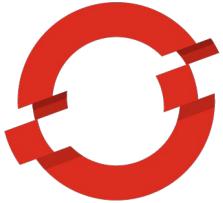
## Self-service is key for productivity

- Developers with access can change settings and test out new services at any time

The screenshot shows the Red Hat Developer Catalog interface. At the top, it says "Project: production-api-backend". Below that is the title "Developer Catalog" with a subtitle: "Add shared apps, services, or source-to-image builders to your project from the Developer Catalog. Cluster admins can install additional apps which will show up here automatically." On the left, there's a sidebar with categories: "All Items" (selected), "Languages", "Databases", "Middleware", and "Other". Under "All Items", there's a search bar "Filter by keyword..." and a section for "TYPE" with options: "Service Class (0)", "Source-to-Image (10)", and "Installed Operators (13)". To the right, the catalog is displayed in a grid of cards. The cards include:

Category	Icon	Description
.NET	Icon	.NET Core
	Icon	Apache HTTP Server (httpd)
	Icon	Kafka
Kafka	Icon	Kafka Connect
	Icon	Apache HTTP Server (httpd)
	Icon	Build and serve static content via Apache HTTP Server (httpd) 2.4 on RHEL 7. For more information about using this builder image, including OpenShift.
Kafka Connect	Icon	Kafka Connect S2I
	Icon	Kafka MirrorMaker
	Icon	Kafka Topic
MongoDB	Icon	MongoDB Replica Set
	Icon	MongoDB Sharded Cluster
	Icon	MongoDB Standalone
Nginx	Icon	Nginx
	Icon	Build and serve static content via Nginx HTTP server and a reverse proxy (nginx)
	Icon	Build and serve static content via Nginx HTTP server and a reverse proxy

Generally Available



# Red Hat OpenShift 4



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- Operator Hub & Certified ISVs

## Empowering developers to innovate

- Developer Tools
- Cloud-Native CI/CD
- Serverless
- Service Mesh

A developer-focused command-line tool for rapid development iterations on OpenShift

`$ odo create`

Create app from supported runtimes

`$ odo push`

Build and deploy app from current directory

`$ odo watch`

Sync local changes to running pods on OpenShift

# Developer Web Console

The screenshot shows the Red Hat OpenShift Developer Web Console interface. The left sidebar includes options for '+Add', 'Topology', 'Builds', 'Pipelines', and 'Advanced'. The main area displays a 'Topology' diagram for the 'sspeiche1' project, featuring three nodes: 'MySQL' (payment), 'node' (backend), and 'njs' (app2). The 'node' and 'njs' nodes are connected to the 'MySQL' node. A tooltip for 'app1' points to the 'node' node. The right side shows a detailed view for the 'njs' pod, with tabs for 'Overview' and 'Resources'. The 'Overview' tab displays metrics: DESIRED COUNT (3 pods), UP-TO-DATE COUNT (3 pods), and MATCHING PODS (3 pods). It also lists 1 available pod and 2 unavailable pods. The 'Resources' tab provides information about the pod's latest version (1), namespace (sspeiche1), reason for update (config change), update strategy (Rolling), and timeout (600 seconds).

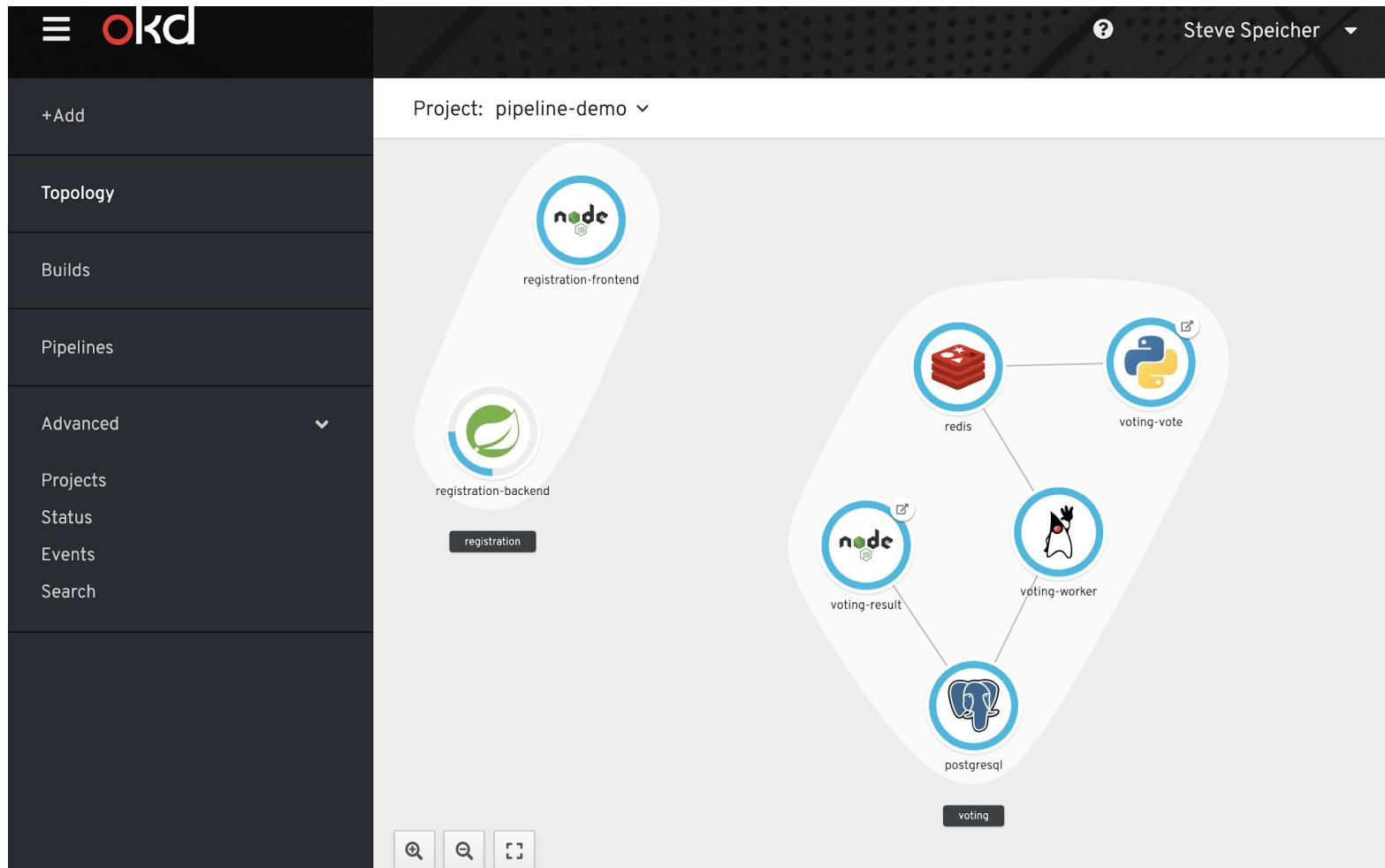
NAME	LATEST VERSION
njs	1

NAMESPACE	REASON
sspeiche1	config change

LABELS	UPDATE STRATEGY
app=njs app.kubernetes.io/name=openjdk app.kubernetes.io/part-of=app2	Rolling

TIMEOUT
600 seconds

# Developer Web Console



# Developer Web Console

The screenshot shows the Red Hat OpenShift Developer Web Console interface. The left sidebar has a dark theme with the 'okd' logo and navigation links: +Add, Topology, Builds, Pipelines, Advanced (with dropdown for Projects, Status, Events, Search), and a bottom row of search and filter icons.

The main area displays the 'registration-frontend' application under the 'pipeline-demo' project. It shows two pods: one for 'nodejs' (labeled 'registration-frontend') and one for 'nodejs' (labeled 'registration-backend'). A large button labeled 'registration' is visible at the bottom of the application section.

The right side shows the 'DC registration-frontend' details:

Overview		Resources	
DESIRED COUNT	1 pod	UP-TO-DATE COUNT	1 pod
		MATCHING PODS	1 available 0 unavailable

Deployment Configuration details:

NAME	registration-frontend	LATEST VERSION	1
NAMESPACE	NS pipeline-demo	REASON	config change
LABELS	app=registration-frontend app.kubernetes.io/name=nodejs app.kubernetes.io/part-of=registration	UPDATE STRATEGY	Rolling
POD SELECTOR		TIMEOUT	600 seconds
		UPDATE PERIOD	



# Cloud-native CI/CD with OpenShift Pipelines

- Based on Tekton Pipelines
- Built for cloud-native apps
- Containers as building blocks
- Deploy to multiple platforms
- Available in OperatorHub

The screenshot shows the Red Hat OpenShift Pipelines interface. On the left, there is a sidebar with options: Developer (selected), Topology, Builds, Pipelines (selected), and Advanced. The main area is titled 'Pipelines' and shows a table of pipeline runs. The table has columns: NAME, LAST PIPELINE RUN, LAST RUN STATUS, TASK COMPLETED, and LAST RUN STARTED. There are five rows in the table:

NAME	LAST PIPELINE RUN	LAST RUN STATUS	TASK COMPLETED	LAST RUN STARTED
P Pipeline-a	PR Pipeline-run-a-1	Running	2 of 4	3 seconds ago
P Pipeline-B	PR Pipeline-run12	Running	3 of 5	2 minutes ago
P Pipeline-C	PR Pipeline-run23	Succeeded	3 of 3	4 minutes ago
P Pipeline-D	PR Pipeline-run4	Failed	2 of 4	6 minutes ago
P Pipeline-E	PR Pipeline-run34	Succeeded	2 of 2	8 minutes ago



# OpenShift Serverless

- Familiar to Kubernetes users. Native
- Scale to 0 or to N based on demand
- Applications, functions and containers
- Powerful eventing model
- Multiple event sources
- No vendor lock in
- Available in OperatorHub

The screenshot shows the Red Hat OpenShift Container Platform interface. The top navigation bar includes the Red Hat logo and the text "Red Hat OpenShift Container Platform". The left sidebar has sections for Home, Projects, Status, Search, Events, Catalog (selected), Developer Catalog, Installed Operators, OperatorHub (selected), Operator Management, Workloads, Networking, Storage, Builds, and Monitoring. The main content area is titled "Project: openshift-operators". It displays a grid of operator cards. A message at the top right says, "You are logged in as a temporary administrative user. Update the cluster OAuth configuration to allow...".

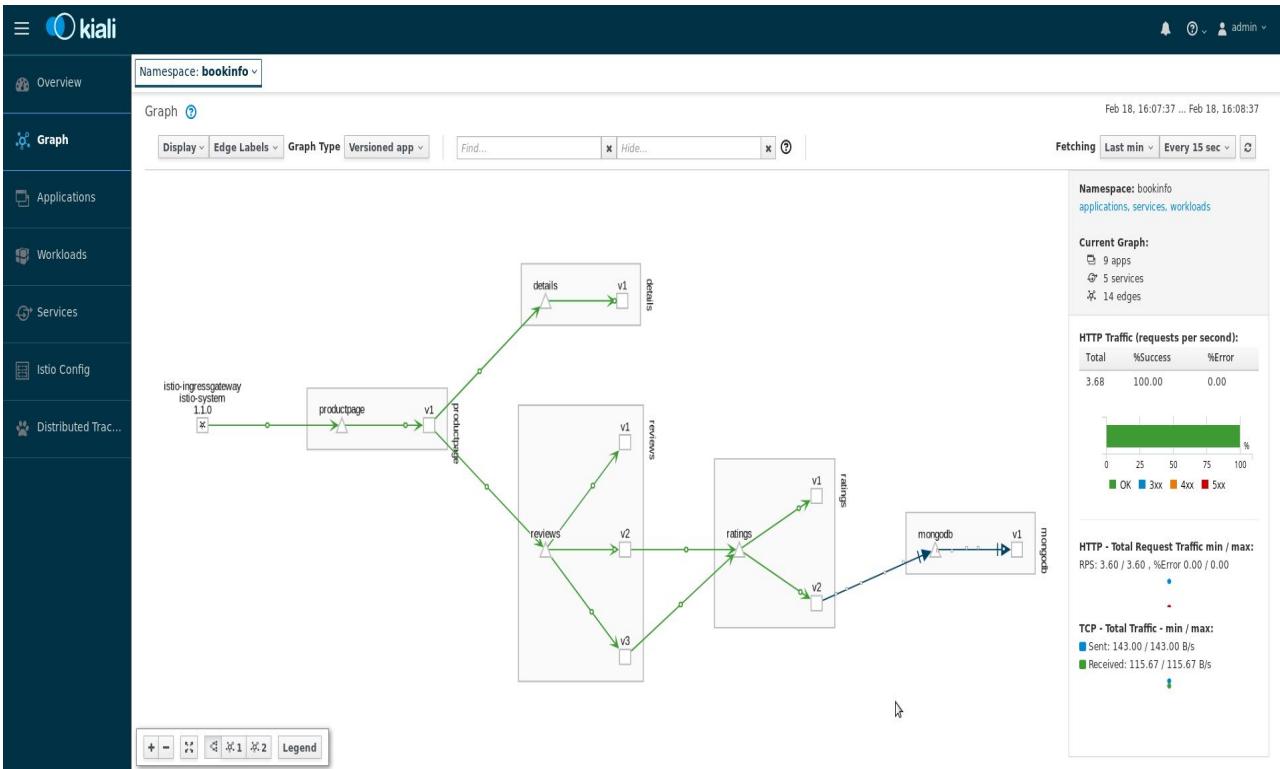
Cloud Provider	AMQ Streams	Business Automation	Descheduler
Database	provided by Red Hat, Inc. Red Hat AMQ Streams is a massively scalable, distributed, and high performance data stream.	provided by Red Hat, Inc. Business Automation Operator can deploy RHPAM/RHDM environments in the form of KieApp objects.	provided by Red Hat An operator to run the OpenShift descheduler, a scheduler to move running Pods according to policies.
Developer Tools			
Integration & Delivery			
Logging & Tracing			
Monitoring			
Networking			
OpenShift Optional			
Security			
Security Policy Management			
Storage			
Streaming & Messaging			
<b>Filter by keyword...</b>			
INSTALL STATE			
<input type="checkbox"/> Installed (1)			
<input type="checkbox"/> Not Installed (54)			
PROVIDER TYPE			
<input checked="" type="checkbox"/> Red Hat (3)			
<input type="checkbox"/> Certified (26)			

Operator Cards:

- AMQ Streams: provided by Red Hat, Inc. (Community)
- Business Automation: provided by Red Hat, Inc. (Community)
- Descheduler: provided by Red Hat (Community)
- Knative Serving Operator: provided by Red Hat (Community)
- Metering: provided by Red Hat (Community)
- Node Network Operator: provided by Red Hat, Inc. (Community)
- OpenShift Pipelines Operator: provided by Red Hat (Community)
- Prometheus Operator: provided by Red Hat (Community)
- Red Hat CodeReady Workspaces: provided by Red Hat (Community)

# OpenShift Service Mesh

- A dedicated network for service to service communications
- Observability and distributed tracing
- Policy-driven security
- Routing rules & chaos engineering
- Powerful visualization & monitoring
- Available in OperatorHub





# CodeReady Workspaces

- Web-based Eclipse Che IDE
- Developer workspaces in pods
- Bundled development stacks
- Available in OperatorHub

The screenshot shows the Eclipse Che IDE interface within a web browser. The workspace contains a Java project named "web-java-spring (master)". The code editor displays the "GreetingController.java" file:

```
1 package org.eclipse.che.examples;
2
3 import org.springframework.web.servlet.ModelAndView;
4 import org.springframework.web.servlet.mvc.Controller;
5
6 import javax.servlet.http.HttpServletRequest;
7 import javax.servlet.http.HttpServletResponse;
8
9 public class GreetingController implements Controller
10 {
11
12     @Override
13     public ModelAndView handleRequest(HttpServletRequest request, HttpServletResponse response)
14     {
15         String userName = request.getParameter("user");
16         String result;
17         if (userName == null)
18             result = org.eclipse.che.examples.GreetingController.handleRequest(HttpServletRequest,
19         }
20     }
21 }
```

The terminal window below shows system monitoring output:

```
top - 21:28:41 up 133 days, 7:17, 0 users, load average: 13.88, 6.37, 3.86
Tasks: 10 total, 1 running, 9 sleeping, 0 stopped, 0 zombie
%Cpu(s): 65.4 us, 30.3 sy, 0.2 ni, 1.0 id, 0.0 wa, 0.0 hi, 2.9 si, 0.3 st
KiB Mem : 32779896 total, 3926416 free, 6193528 used, 22659952 buff/cache
KiB Swap: 0 total, 0 free, 0 used. 24871796 avail Mem

PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
267 user 20 0 4240912 217728 14088 S 0.3 0.7 0:20.81 java
1 user 20 0 5972 620 524 S 0.0 0.0 0:00.03 tail
128 user 20 0 10812 7148 2712 S 0.0 0.0 0:00.10 bootstrapper
```

# 2019 Roadmap

Q2 CY2019 OpenShift 4.1		Q3 CY2019 OpenShift 4.2		Q4 CY2019 OpenShift 4.3	
HOSTED	PLATFORM	APP	DEV	APP	HOSTED
<ul style="list-style-type: none"><li>• Serverless w/ Knative Dev Preview</li><li>• OpenShift Pipelines (Tekton) Dev Preview</li><li>• CodeReady Workspaces</li><li>• CodeReady Containers Alpha</li><li>• Developer CLI (odo) Beta</li></ul>	<ul style="list-style-type: none"><li>• Kubernetes 1.12 with CRI-O runtime</li><li>• RHEL CoreOS, RHEL7</li><li>• Automated Installer for AWS</li><li>• Pre-existing Infra Installer for Bare Metal, VMware, AWS</li><li>• Automated, one-click updates</li><li>• Multus (Kubernetes multi-network)</li><li>• Quay v3</li></ul>	<ul style="list-style-type: none"><li>• OperatorHub</li><li>• Operator Lifecycle Manager</li><li>• Service Mesh (~2 month after)</li></ul>	<ul style="list-style-type: none"><li>• Developer Console GA</li><li>• Serverless w/ Knative Tech Preview</li><li>• OpenShift Pipelines (Tekton) Tech Preview</li><li>• CodeReady Containers GA</li><li>• Developer CLI (odo) GA</li></ul>	<ul style="list-style-type: none"><li>• GPU metering</li><li>• OperatorHub Enhancements</li><li>• Operator Deployment Field Forms</li><li>• Application Binding with Operators</li><li>• Application Migration Console</li></ul>	<ul style="list-style-type: none"><li>• Kubernetes 1.15 w/ CRI-O runtime</li><li>• Automated Installer for IBM Cloud, Alibaba, RHV, Bare Metal Hardware Appliance</li><li>• Pre-existing Infra Installer for Azure, OSP, GCP</li><li>• OVN GA w/ Windows Networking Integration</li></ul>
<ul style="list-style-type: none"><li>• Universal Hybrid Cloud (UHC)</li><li>• OCP Cluster Subscription Management</li><li>• OpenShift on Azure by MSFT and RHT</li><li>• OpenShift Dedicated consumption pricing</li></ul>			<ul style="list-style-type: none"><li>• Kubernetes 1.14 w/ CRI-O runtime</li><li>• Disconnected Install and Update</li><li>• Automated Installer for Azure, OSP, GCP</li><li>• OVN Tech Preview</li><li>• FIPS</li><li>• Federation Workload API</li><li>• Automated App cert rotation</li><li>• OpenShift Container Storage 4.2</li></ul>	<ul style="list-style-type: none"><li>• UHC Multi-Cluster deployment</li><li>• Proactive Support Operator</li></ul>	<ul style="list-style-type: none"><li>• UHC Subscription Mgmt Consumption Improvements</li></ul>

# 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.



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