

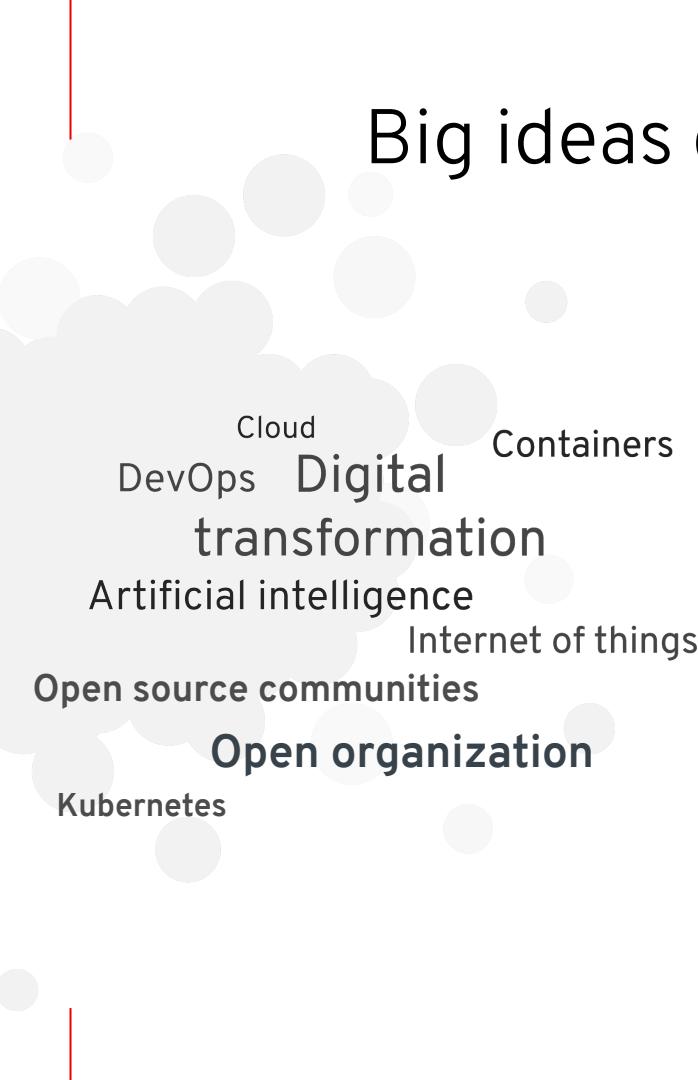


The Kubernetes platform

For big ideas

As part of the OpenShift Curriculum

# Big ideas drive business innovation



Cloud  
DevOps    **Digital transformation**    Containers

Artificial intelligence  
Internet of things

Open source communities

**Open organization**

Kubernetes

**Business innovation is all around us.**

Every organization in every geography and in every industry can innovate and create more customer value and differentiation with open source technologies and an open culture.

# Creating value depends on your ability to deliver applications faster

Cloud-native  
applications



AI & machine  
learning



Analytics



Internet of  
Things

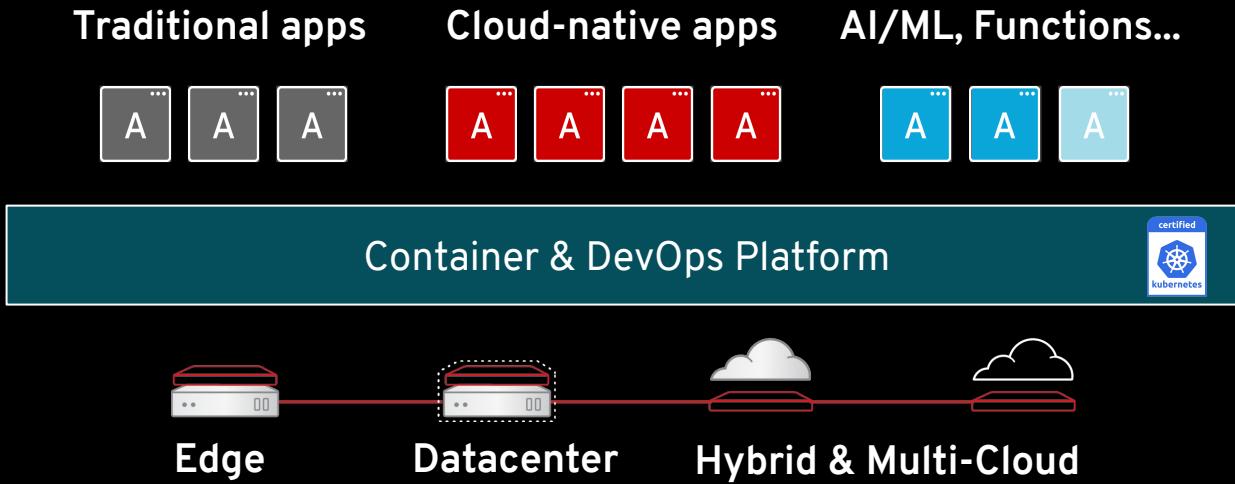


Innovation  
culture



Containers, Kubernetes, and hybrid cloud are key ingredients.  
OpenShift is the best platform to deliver container-based applications.

# With OpenShift you can deliver all your applications in a whole new way





“ ”

We got the idea to have all these tests we do with hardware on virtual test environments, and that's why we've come to OpenShift and containers.

---

Michael Denecke  
Head of Test Technology  
Volkswagen AG

VOLKSWAGEN  
Autonomous Vehicle Testing

# More than 1,000 OpenShift customers



MODERNIZE APPS



WEB APPS



CLOUD NATIVE DEV



MULTI-CLOUD



MOBILE

BIG DATA | ANALYTICS



IOT



# Why customers choose Red Hat OpenShift

The diagram consists of four main sections, each enclosed in a dashed border:

- Trusted enterprise Kubernetes**: Features a server icon with a gear inside, representing a containerized environment.
- Cloud-like experience everywhere**: Features the OpenShift logo (a red circular arrow) above two clouds, one containing a network icon and the other a shield icon.
- Empowering developers to innovate**: Features developer-related icons: Spring (green leaf), Node.js (green hexagon with 'node'), Jenkins (blue hexagon with 'J'), Kafka (blue hexagon with 'kafka'), and a smartphone displaying various app icons.
- Open source innovation**: Shows logos for various open source projects: Helm (blue hexagon with a steering wheel), Docker (blue sailboat), Rook (red flame), CoreOS (red lightning bolt), Ceph (blue hexagon with a gear), etcd (blue hexagon with a gear and 'etcd' text), and Kubernetes (blue hexagon with a snowflake).

# CONTAINER CHALLENGES

## Container security

Image scanning, patching, and compliance

## Day 2 management

Installations, upgrades, and maintenance  
Integration of existing enterprise technology

## Application delivery

Monitoring, metering, and management  
Integration of existing developer tools



## Trusted enterprise Kubernetes

Continuous security, world-class support and services, and deep expertise to confidently run any application

## A cloud-like experience, everywhere

Full-stack automated operations on a consistent foundation across on-premises or hybrid cloud infrastructure

## Empowerment for developers to innovate

Ability to get applications to production sooner with a wide range of technologies and streamlined workflows

# Trusted enterprise Kubernetes



Trusted host, content,  
platform

Full-stack automated  
installation

Seamless updates

# Kubernetes done right is hard

## INSTALL

- Templating
- Validation
- OS setup

## DEPLOY

- Identity & security access
- App monitoring & alerts
- Storage & persistence
- Egress, ingress, & integration
- Host container images
- Build/Deploy methodology

## HARDEN

- Platform monitoring & alerts
- Metering & chargeback
- Platform security hardening
- Image hardening
- Security certifications
- Network policy
- Disaster recovery
- Resource segmentation

## OPERATE

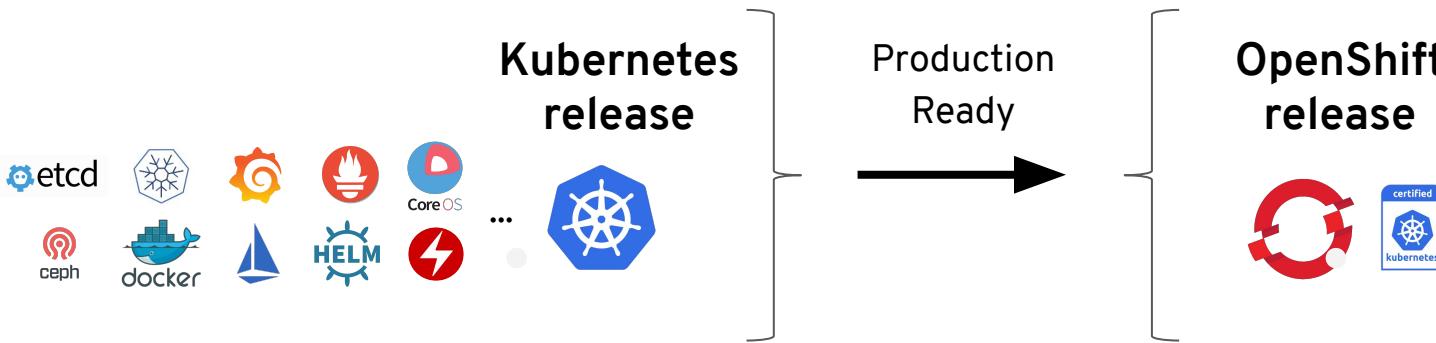
- OS upgrade & patch
- Platform upgrade & patch
- Image upgrade & patch
- App upgrade & patch
- Security patches
- Continuous security scanning
- Multi-environment rollout
- Enterprise container registry
- Cluster & app elasticity
- Monitor, alert, remediate
- Log aggregation



**75%**  
of enterprise users identify  
complexity of implementation and  
operations as the top blocker to adoption

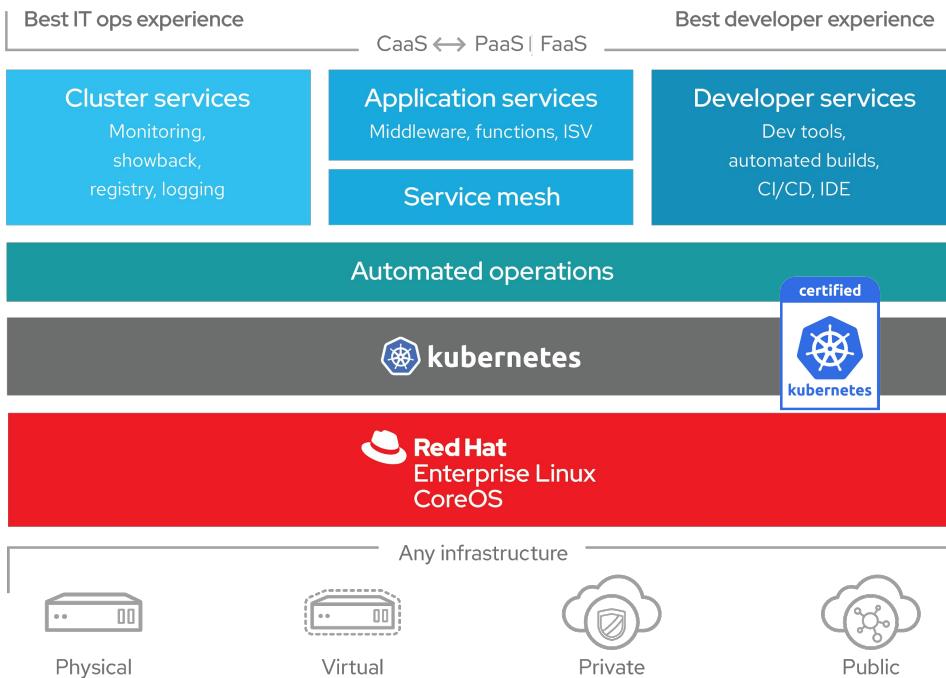
Source: The New Stack. *The State of the Kubernetes Ecosystem*, August 2017.

# OpenShift is trusted enterprise Kubernetes



- Hundreds of defect and performance fixes
- 200+ validated integrations
- Certified container ecosystem
- 9-year enterprise life-cycle management
- Red Hat is a leading Kubernetes contributor since day 1

# OpenShift 4 - A smarter Kubernetes platform



**Automated, full-stack installation** from the container host to application services

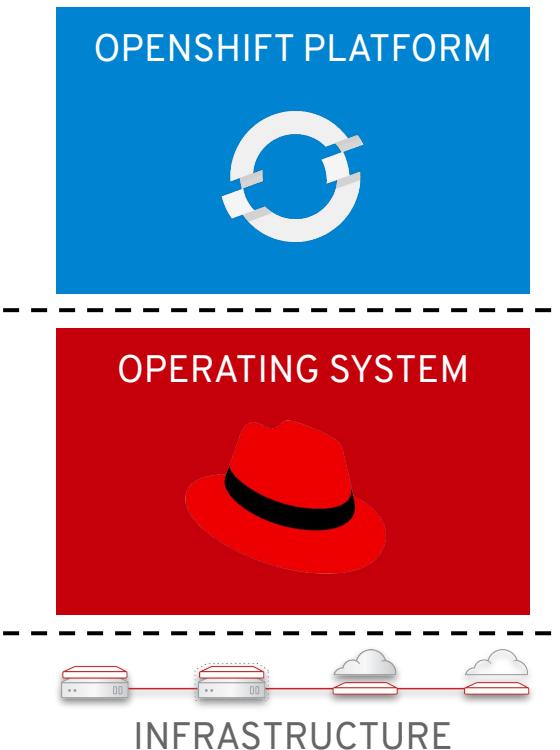
**Seamless Kubernetes deployment** to any cloud or on-premises environment

**Autoscaling** of cloud resources

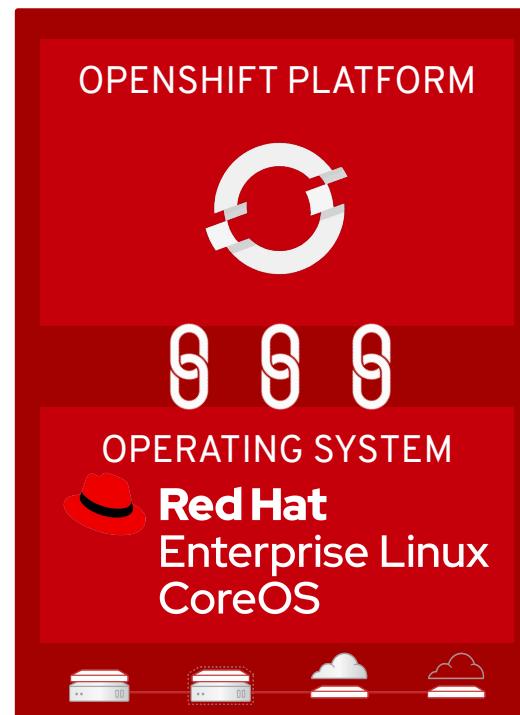
**One-click updates** for platform, services, and applications

# Full-stack automated install

OPENSHIFT 3 & 4



OPENSHIFT 4 (only)



# Seamless Updates

- OpenShift retrieves the 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 icons. The 'Administration' section is expanded, showing 'Cluster Settings' as the active item. The main content area is titled 'Cluster Settings' and displays the 'Overview' tab. It shows the following information:

CHANNEL	UPDATE STATUS	CURRENT VERSION
fast	4.1.0-0.2	4.0.0-0.2

Below this, there are sections for 'CLUSTER ID' (784ce289-02aa-4d32-8796-cd4a0619499c), 'CURRENT PAYLOAD' (empty), and 'CLUSTER AUTOSCALER' (with a 'Create Autoscaler' button). A blue 'Update' button is located on the right side of the main content area.

# Comprehensive container security



## CONTROL

Application security

Container content

CI/CD pipeline

Container registry

Deployment policies



## DEFEND

Infrastructure

Container platform

Container host multi-tenancy

Network isolation

Storage

Audit & logging

API management



## EXTEND

Security ecosystem

“”

We can localize clusters in different markets if we need to and therefore serve our customers on a worldwide scale.

---

**Dr. Alexander Lenk**  
Lead Architect Connected Vehicle, Digital Backend, Big Data, Blockchain  
**BMW Group**

**BMW**  
Connected Drive



# A cloud-like experience, everywhere



Operator Framework

Operator Hub &  
ISV ecosystem

Multicloud  
management

# A consistent container application platform

FROM YOUR DATACENTER TO THE CLOUD



Automated  
operations



Multi-tenant



Secure by  
default



Network  
traffic control



Over-the-air  
updates



Monitoring  
& chargeback



Pluggable  
architecture



Bare metal, VMware vSphere, Red Hat Virtualization, Red Hat OpenStack Platform,  
Amazon Web Services, Microsoft Azure, Google

# Kubernetes adoption phases

## 1. Stateless apps

ReplicaSets

Deployments

## 2. Stateful apps

StatefulSets

Storage/CSI

## 3. Distributed systems

Data rebalancing

Autoscaling

Seamless upgrades

# Automated container operations

FULLY AUTOMATED DAY-1 AND DAY-2 OPERATIONS

INSTALL

DEPLOY

HARDEN

OPERATE

## AUTOMATED OPERATIONS

Infra provisioning

Full-stack deployment

Secure defaults

Multicloud aware

Embedded OS

On-premises and cloud

Network isolation

Monitoring and alerts

Unified experience

Audit and logs

Full-stack patch & upgrade

Signing and policies

Zero-downtime upgrades

Vulnerability scanning

# Kubernetes-native day 2 management



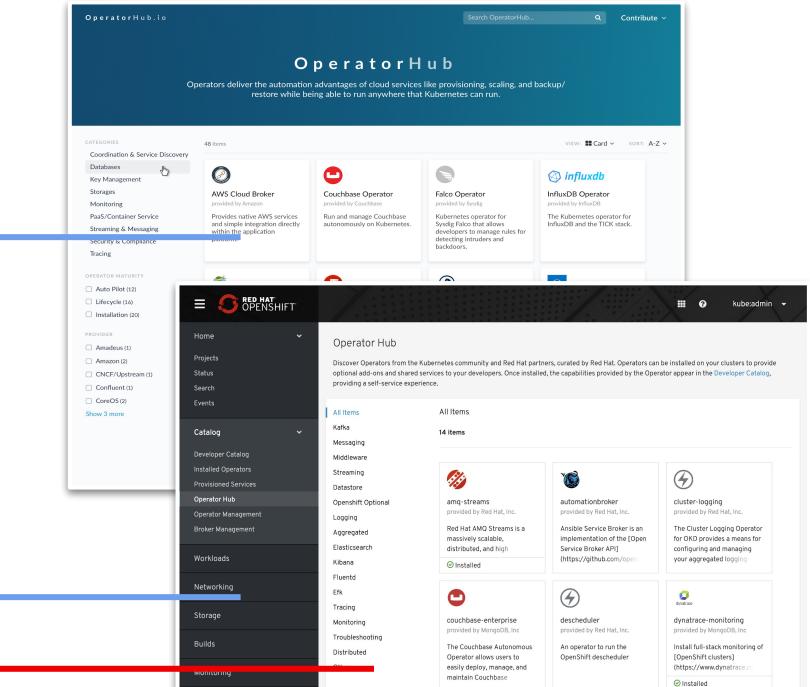
 A white icon consisting of four arrows pointing outwards from a central point, forming a cross shape.	Flexible app architectures	 A white icon containing mathematical symbols: a pi symbol, a square root of x+y, the number 42, a circle with a dot, the equation e=mc², infinity, and a percent sign.	No reinvention of core concepts
 A white icon showing a sequence of three boxes: a top box with a square arrow, a middle box with a checkmark, and a bottom box with a square arrow.	Uniform deploy and debug	 A white icon showing two overlapping circles, one solid and one dashed, representing a hybrid model.	Truly hybrid

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

# OperatorHub and certified Operators

- OperatorHub.io launched by Red Hat, AWS, Microsoft and Google
- OpenShift Operator Certification
- OperatorHub integrated into OpenShift 4

COMMUNITY OPERATORS  
OPENSHIFT CERTIFIED OPERATORS



# Full control for administrators

The screenshot shows the Red Hat OpenShift Container Platform interface. On the left, there's a navigation sidebar with sections like Home, Catalog (with OperatorHub selected), Workloads, and others. The main area displays the OperatorHub with a list of available operators. A modal window titled "Create Operator Subscription" is open, prompting the user to select an installation mode (All namespaces on the cluster or A specific namespace on the cluster), an update channel (preview), and an approval strategy (Automatic or Manual). The "Subscribe" button is at the bottom of the modal.

Project: all projects ▾

## OperatorHub

All Items 40 items

Category	Operator Name	Description	Status
AI/Machine Learning	AMQ Streams	Red Hat AMQ Streams is a massively scalable, distributed, and high	Installed
Application Monitoring	AppDynamics Cluster/	End to end monitoring of applications on Kubernetes and OpenShift clusters by AppDynamics.	Community
Big Data	Automation Broker Operator	provided by The Apache Software Foundation	Community
Database	Camel-K Operator	provided by Red Hat, Inc.	Community
Developer Tools	CloudBees Jenkins X	provided by CloudBees, Inc.	Community
Integration & Delivery	CloudBees Jenkins X	provided by CloudBees, Inc.	Community
Logging & Tracing	CloudBees Jenkins X	provided by CloudBees, Inc.	Community
Monitoring	CloudBees Jenkins X	provided by CloudBees, Inc.	Community
Networking	CloudBees Jenkins X	provided by CloudBees, Inc.	Community
OpenShift Optional	CloudBees Jenkins X	provided by CloudBees, Inc.	Community
Security	CloudBees Jenkins X	provided by CloudBees, Inc.	Community
Storage	CloudBees Jenkins X	provided by CloudBees, Inc.	Community
Streaming & Messaging	CloudBees Jenkins X	provided by CloudBees, Inc.	Community
Other	CloudBees Jenkins X	provided by CloudBees, Inc.	Community

### Create Operator Subscription

Keep your service up to date by selecting a channel and approval

**Installation Mode \***

All namespaces on the cluster (default)  
Operator will be available in all namespaces.

A specific namespace on the cluster  
Operator will be available in a single namespace only.

**Update Channel \***

preview

**Approval Strategy \***

Automatic

Manual

**Subscribe** **Cancel**

# Self-service for developers

The screenshot shows the Red Hat OpenShift web interface. On the left, the sidebar includes sections for Home, Projects, Status, Search, Events, Catalog (with Developer Catalog and Installed Operators selected), OperatorHub, Operator Management, Workloads (with Pods, Deployments, Deployment Configs, Stateful Sets, Secrets, Config Maps selected), Cron Jobs, Jobs, Daemon Sets, and Replica Sets. The main content area shows a project named 'production-api-backend' with a Kafka Details view for 'amqstreams.v1.1.0'. A modal window titled 'MongoDB Replica Set' is open, showing a 'Create' button, provider information (MongoDB, Inc), creation date (Apr 29, 2:50 pm), and a link to documentation. Below the modal, a large black box displays the YAML configuration for the MongoDB Replica Set:

```
apiVersion: mongodb.com/v1
kind: MongoDbReplicaSet
metadata:
  name: example
  namespace: production
spec:
  members: 3
  version: 4.0.2
  persistent: false
  project: example
  credentials: my-secret
```



“ ”

Using the Prometheus Operator,  
our dev teams are able to provision their  
own end-to-end monitoring.

We could not hope to manage the 344  
Prometheus instances without the domain  
knowledge the Operator encapsulates.

---

Michael Goodness  
Lead Systems Engineer  
Ticketmaster

# Why OpenShift for hybrid and multi-cloud deployments?

## IDC Research: The Business Value of OpenShift on AWS

“”

**Our developers say that OpenShift on AWS is very easy to use, and they are definitely more productive as a result ... seeing 60-70 percent increases in productivity levels.**

---

Financial Services

“”

**We have a multi-cloud environment and OpenShift on AWS has features that make it easier to be agile.**

---

Pharmaceutical

“”

**OpenShift on AWS has really helped us improve our reservation system and contributed to up to 15 percent more revenue, worth tens of millions of dollars per year.**

---

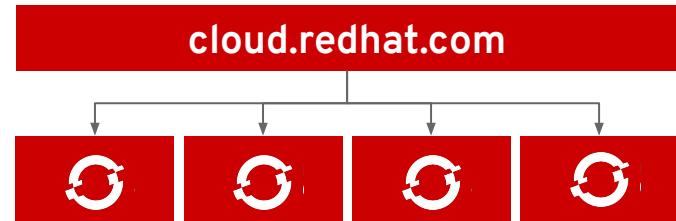
Hospitality

# Delivering Kubernetes everywhere

- Manage multiple OpenShift clusters, across multiple cloud and on-premises environments
- Install and update OpenShift across all your cloud environments
- Centrally manage policy and deployments

The screenshot shows the 'Clusters' page of the OpenShift Cluster Manager. On the left is a sidebar with 'Clusters' selected, along with 'Subscriptions', 'Membership', and 'Administration'. The main area is titled 'OpenShift Clusters' with 'Register cluster' and 'Download Installer' buttons. It lists two clusters: 'Production' (AWS, 4.0.158, Security upgrade available) and 'Cloud Staging' (AWS, 4.0.163, Up to date). The table has columns for CLUSTER NAME, PLATFORM, VERSION, and MESSAGE.

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





“

Red Hat OpenShift Container Platform lets us move applications seamlessly and easily across multiple providers with no downtime. We can also use public cloud to scale up or down as demand requires.

---

Kerry Peirse

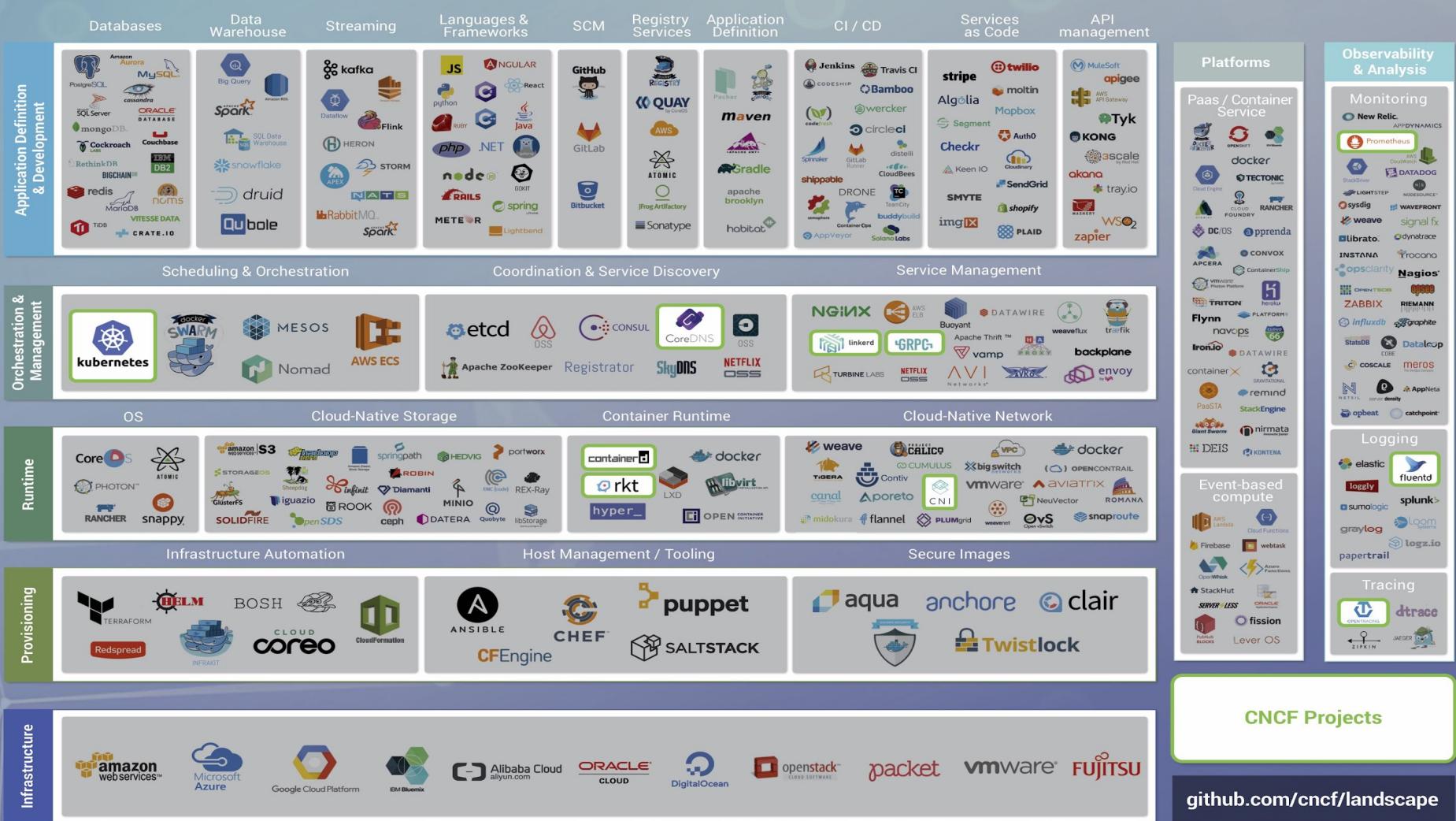
General Manager, IT Infrastructure and Operations  
Cathay Pacific Airways Limited

**CATHAY PACIFIC**  
Taking customer experience to new heights

# Empowering developers to innovate



Service mesh  
Serverless  
Red Hat CodeReady  
Workspaces &  
developer tooling



## Databases

## Data Warehouse

## Streaming

## Languages &amp; Frameworks

## SCM

## Registry Services

## Application Definition

## CI / CD

## Services as Code

## API management



# THE CLOUD-NATIVE APP DEV CHALLENGE

## Infrastructure Automation



## Host Management / Tooling



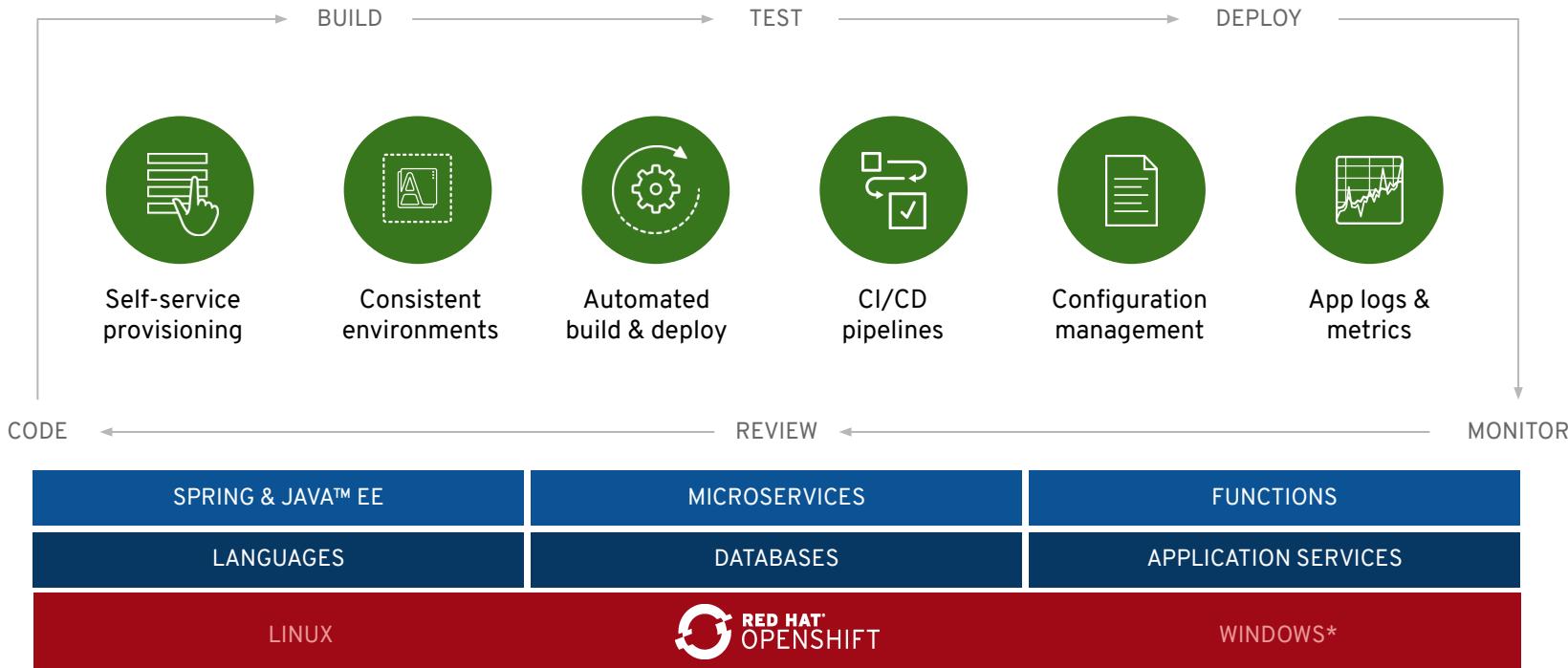
## Secure Images



## CNCF Projects

[github.com/cncf/landscape](https://github.com/cncf/landscape)

# OpenShift enables developer productivity



\* coming soon



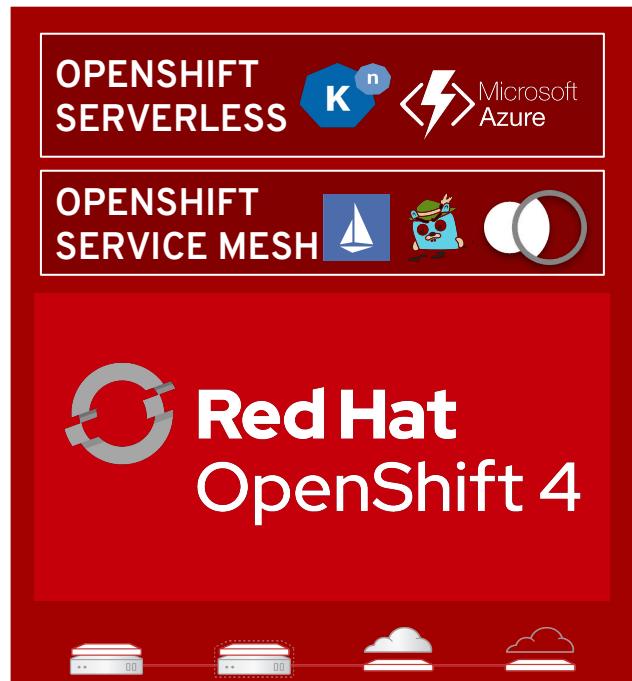
# Building next-gen applications

## OpenShift Service Mesh

- Integrated Service Mesh for enhanced security and network segmentation of microservices applications. Combines Istio, Kiali (UI), and Jaeger (Tracing) projects.

## OpenShift Serverless

- Integrated serverless, enabling scale-to-zero FaaS services and event sources - built on the Knative framework.
- Support for Azure Functions
- Integrated with Camel-k for rich set of initial event sources: HTTP, Kafka, AMQP



# Enabling greater developer productivity

## CodeReady Workspaces

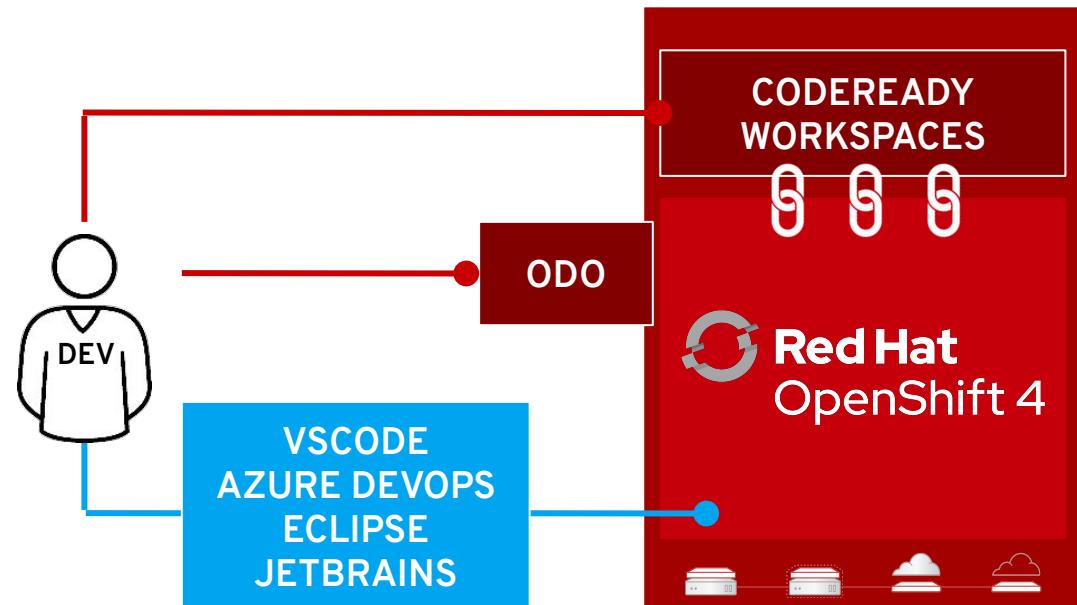
Web-Based IDE (Eclipse Che),  
Collaborative Development,  
integrated with CI/CD.

## OpenShift ODO

Advanced developer CLI

## OpenShift Plugins

Integration plugins - VScode, Azure DevOps, Eclipse IDE, JetBrains



# CodeReady Workspaces

**The collaborative OpenShift-Native IDE.** Free for any customer of OpenShift Dedicated or OpenShift Container Platform.

## Container Workspaces



Workspace replicas to end “works on my machine” and enable team collaboration.

## DevOps Integrations



Reference developer workspaces from any issue, failed build, or git notification.

## Protect Source Code



Full access to source code without any of it landing on hard-to-secure laptops.

Based on the open Eclipse Che project

Red Hat Linux and Application Infrastructure

Plugin model for extensibility

Serverless support (coming soon)

**Use It To:** Replace VDI for devs, and enable true container-based DevOps.

# EMIRATES NBD

Chat Banking

Banking is just a WhatsApp away 

Chatting with your bank is now just as easy as chatting with your friends.

Introducing Emirates NBD Chat Banking via WhatsApp, a **24/7 secure and simple way** to get your banking needs on the go.



**Subscribe through SMS**  
SMS WhatsApp to 4456 with  
your registered mobile number



**Subscribe through  
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Log into your Mobile or Online  
Banking and click on the  
[Subscribe now](#) button

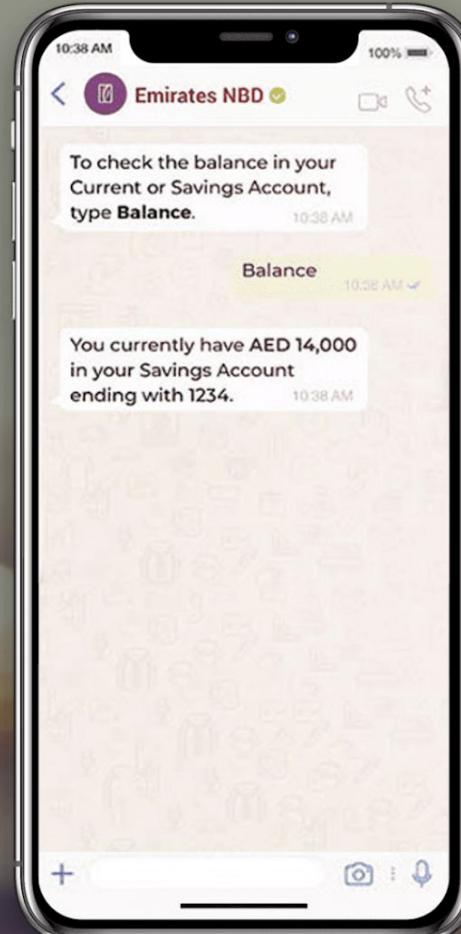


**Chat securely**  
You will never be asked to share  
your personal information, only  
the last 4 digits of your Card or  
Account number may  
be required



**Check for the green badge**  
Check for the green badge next  
to Emirates NBD's name and  
start chatting

[Click here](#) for Digital Banking Services Terms and Conditions





Lufthansa Technik

# The Kubernetes platform for your business

“The moment we have an idea, we can start building the product.”

Tobias Mohr, Head of Technology and Infrastructure, Lufthansa Technik

# Red Hat OpenShift business value



**531%**  
5-year ROI

**66%**

Faster development  
life cycle

**36%**

More applications  
per year

**8 MONTHS**

Payback  
period

**US\$1.29M**

Average annual  
benefits per  
100 developers

The Business Value of Red Hat OpenShift, IDC #US41845816, October 2017,  
<https://www.redhat.com/en/resources/The-Business-Value-of-Red-Hat-OpenShift>.



**10x**

Increased application development throughput from 20 to 200 changes a day

**OpenShift on AWS & private cloud**

The Hilton logo, which consists of the word "Hilton" in a large, bold, serif font inside a black rectangular border.

**Months → Days**

Improved time to market by accelerating development time

**OpenShift on AWS**



**50%**

Reduction in development time for new services and APIs. Launched a new cloud platform in 10 days

**OpenShift on AWS, Azure, & private cloud**

Source:

Cathay Pacific: Red Hat press release, [Cathay Pacific Takes Customer Experiences to New Heights with Red Hat's Hybrid Cloud Technologies](#), May 2018.

Hilton: Red Hat case study, [Hilton enhances digital guest experience with Red Hat container and automation technology](#), October 2018.

Schiphol: Red Hat case study, [Amsterdam Airport Schiphol builds agile cloud with Red Hat](#), August 2017.



# One platform, flexible consumption models



**Red Hat**  
OpenShift  
Dedicated



**Red Hat**



**Microsoft**

Azure  
Red Hat  
OpenShift



**Red Hat**  
OpenShift  
Container Platform

Managed service offering on  
your choice of AWS, Azure, or  
Google

Joint engineering, operation,  
and integrated support by  
Microsoft and Red Hat

Enterprise-grade Kubernetes  
platform that you manage

---

HOSTED SERVICES

---

SELF-MANAGED

# Red Hat Services for OpenShift adoption

## RED HAT OPEN INNOVATION LABS



### EXPERIMENT

Rapidly build prototypes, do DevOps, and be agile.



### CATALYZE INNOVATION

Bring modern application development back to your team.

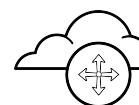


### IMMERSE YOUR TEAM

Work side by side with experts in a residency-style engagement.

TO SHOW YOUR TEAMS HOW OPENSIFT AND MODERN DEVELOPMENT PRACTICES CAN DRIVE INNOVATION: START WITH A 4- TO 12-WEEK LABS RESIDENCY

## RED HAT CONTAINER ADOPTION PROGRAM



### FRAMEWORK FOR SUCCESSFUL CONTAINER ADOPTION AND I.T. TRANSFORMATION:

Mentoring, training, and side-by-side collaboration to:

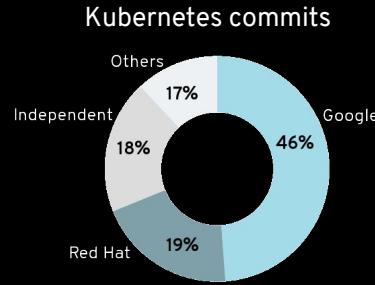
- Create a production platform and team to run it
- Create end-to-end container-driven deployment automation
- Scale application onboarding expertise
- Guide new Kubernetes-native development
- Align business with IT through included Red Hat Open Innovation Labs

TO BEGIN A COMPREHENSIVE PROGRAM (INCLUDING OPEN INNOVATION LABS): START WITH THE 12-WEEK RED HAT CONSULTING CONTAINER PLATFORM PILOT

# Why is Red Hat the best choice?

## THE 4 C's

### CODE



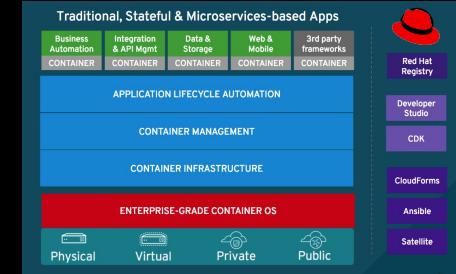
### CUSTOMERS



### CLOUD



### COMPREHENSIVE



Red Hat is a leading Kubernetes developer & contributor with Google<sup>1</sup>.

We make container development easy, reliable, & more secure.

1,000+ customers<sup>2</sup>

We have years of experience running OpenShift Online & OpenShift Dedicated services.

We have strong partnerships with cloud providers, ISVs, & CCSPs.

We have an extensive container catalog of certified partner images.

Our comprehensive portfolio of container products and services includes developer tools, security, application services, storage, & management.

Source: [1] Stackalytics, [Contribution by Companies](#). (Release: All, Project type: Kubernetes, Module: kubernetes, Metric: Commits)

Retrieved: March 2, 2018. [2] [More Than 1,000 Enterprises Across the Globe Adopt Red Hat OpenShift Container Platform to Power Business Applications](#)



**Red Hat**  
**OpenShift 4**

### **Trusted enterprise Kubernetes**

- Trusted host, content, platform
- Full-stack automated install
- Seamless updates & day 2 management

### **A cloud-like experience, everywhere**

- Operator Framework
- Operator Hub & certified ISVs
- Hybrid, multicloud management

### **Empowering developers to innovate**

- OpenShift service mesh / Istio
- OpenShift serverless / Knative
- CodeReady Workspaces / Che

# Thank You



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