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OpenShift 4.1

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KUBERNETES is complicated

INSTALL	DEPLOY	HARDEN	OPERATE
TemplatingValidationOS Setup	 Identity & Security Access App Monitoring & Alerts Storage & Persistence Egress, Ingress & Integration 	 Platform Monitoring & Alerts Metering & Chargeback Platform Security Hardening Image Hardening Security Cartifications 	 OS Upgrade & Patch Platform Upgrade & Patch Image Upgrade & Patch App Upgrade & Patch Security Patchese
▲75%	 Host Container Images Build/Deploy Methodology 	 Security Certifications Network Policy Disaster Recovery Resource Segmentation 	 Security Patches Continuous Security Scanning Multi-environment Rollout Enterprise Container Registry
of enterprise users	s identify		Cluster & App ElasticityMonitor, Alert, Remediate

• Log Aggregation



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 4 Platform





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

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



OpenShift 4.1 Workstreams Lifecycle





OPENSHIFT PLATFORM

Installation Experiences

OPENSHIFT CONTAINER PLATFORM

- HOSTED OPENSHIFT

Full Stack Automated

Simplified opinionated "Best Practices" for cluster provisioning

Fully automated installation and updates including host container OS.



Pre-existing Infrastructure

Customer managed resources & infrastructure provisioning

Plug into existing DNS and security boundaries

Red Hat Enterprise Linux CoreOS Red Hat Enterprise Linux

Azure Red Hat OpenShift

Deploy directly from the Azure console. Jointly managed by Red Hat and Microsoft Azure engineers.

OpenShift Dedicated

Get a powerful cluster, fully Managed by Red Hat engineers and support.





OPENSHIFT PLATFORM

Full Stack Automated Deployments

Day 1: openshift-install - Day 2: Operators



Generally Available



OPENSHIFT PLATFORM

Deploying to Pre-existing Infrastructure

Day 1: openshift-install - Day 2: Operators + Customer Managed Infra & Workers



Generally Available



Red Hat Enterprise Linux CoreOS

4.1 Image Availability:

- Amazon: AMIs
- vSphere: OVA
- Bare Metal: UEFI & BIOS

Installation Requirements:

• RHCOS image + ignition config (installer generated)

RHCOS Details

- RHEL 8 bits (4.18 kernel)
- Includes all packages required for OpenShift
- Over-The-Air updates encompass OCP & RHCOS

Bare Metal Installer (ISO or PXE):



- Transactional host updates
- Read-only OS binaries
- Preconfigured for most environments



Immutable Operating System

Red Hat Enterprise Linux CoreOS is versioned with OpenShift

CoreOS is tested and shipped in conjunction with the platform. Red Hat runs thousands of tests against these configurations.

Red Hat Enterprise Linux CoreOS is managed by the cluster

The Operating system is operated as part of the cluster, with the config for components managed by Machine Config Operator:

- CRI-O config
- Kubelet config
- Authorized registries
- SSH config







CRI-O Support in OpenShift

CRI-O tracks and versions identical to Kubernetes, simplifying support permutations



Generally Available

Cloud-like Simplicity, Everywhere

Full-stack automated operations across any on-premises, cloud, or hybrid infrastructure





OpenShift Cluster Manager on cloud.redhat.com

Automatic registration of OpenShift clusters

View cluster versions and capacity in one place, no matter what infrastructure you are running on. Integrated with RHSM.

OpenShift Dedicated cluster management

Self-service cluster deployment, scaling, and management for OpenShift Dedicated coming soon.

Azure Red Hat OpenShift

Information about these clusters will be coming at a later date.

Hosted in the United States

Other geographies may come later. You can <u>opt-out</u> too.

Product Manager: Jake Lucky

Generally Available



Automated Container Operations

Fully automated day-1 and day-2 operations

INSTALL	DEPLOY	HARDEN	OPERATE			
AUTOMATED OPERATIONS						
Infra provisioning	Full-stack deployment	Secure defaults	Multi-cluster 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			



Smarter Software Updates

No downtime for well behaving apps

Applications with multiple replicas, using liveness probes, health checks and taints/tolerations

Node Pools with more than one worker and slack resources

Maintenance window for entire cluster

No need for separate windows for each component

Upgrade runs completely on the cluster

No more long running processes on a workstation

Constant health checking from each Operator

Operators are constantly looking for incompatibilities and issues that might arise



Rolling Machine Updates

Single-click updates

- RHEL CoreOS version & config
- Kubernetes core components
- OpenShift cluster components

Configure how many machines can be unavailable

Set the "maxUnavailable" setting in the MachineConfigPool to maintain high availability while rolling out updates. The default is 1.

Machine Config Operator (MCO) controls updates

This is a DaemonSet that runs on all Nodes in the cluster. When you upgrade with **oc adm upgrade**, the MCO executes these

changes.

Product Manager: Ben Breard





Cluster Monitoring

Cluster monitoring is installed by default

- Exposes resource metrics for Horizontal Pod Autoscaling (HPA) by default
 - HPA based on custom metric is tech preview
- No manual etcd monitoring configuration anymore
- New screens for managing Alerts & Silences
- More metrics available for troubleshooting purposes (e.g. HAproxy)
- Configuration via ConfigMaps and Secrets

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OperatorHub	Alerts Alertmanager UI 🖉	
Operator Management	Alerts help notify you when certain conditions in your environment are met. Learn mo	ore about how alerts ar
Workloads	12 Firing O Silenced O Pending 77 Not Firing Select All Filters	
Networking	NAME T	STATE
Storage	CPUThrottlingHigh 20% throttling of CPU is appropriate material, down for container tiller is and	Firing
Builds	metering-operator-5c9c754b85-19ds2.	Since 🥁 Apr 29, 11:52
Monitoring 🗸	CPUThrottlingHigh 28% throttling of CPU in namespace metering-demo for container reporting- operator in pod reporting-operator-6c666b8bdb-qvbb5.	▲ Firing Since ❷ May 2, 6:47 a
Alerts	AL CPUThrottlingHigh	A Firing
Silences Metrics ⊠*	81% throttling of CPU in namespace metering-demo for container metering- operator in pod metering-operator-5c9c754b85-19ds2.	Since @ Apr 29, 11:52
Dashboards 🗷	AL KubeDeploymentReplicasMismatch	🜲 Firing
Compute 🗸	Deployment openshift-operators/mongodb-enterprise-operator has not matched the expected number of replicas for longer than an hour.	Since 🎯 May 2, 1:34 p
	AL KubePodCrashLooping	🌲 Firing
Nodes	Pod openshift-operators/mongodb-enterprise-operator-7b6954d84d-g69b4	Since @ Apr 29, 2:52



A broad ecosystem of workloads

Operator-backed services allow for a SaaS experience on your own infrastructure





Red Hat Certified Operators



OperatorHub data sources

Requires an online cluster

- For 4.1, the cluster must have connectivity to the internet
- Later 4.x releases will add offline capabilities

Operator Metadata

- Stored in quay.io
- Fetches channels and available versions for each Operator

Container Images

- Red Hat products and certified partners come from RHCC
- Community content comes from a variety of registries

DperatorHub Discover Operators from the Kut ppear in the Developer Catalog	pernetes community and Red Hat partne , providing a self-service experience.	rs, curated by Red Hat. Operators can	be installed on your clusters to provide	e optional add-ons and shared services	to your developers. Once installed
ul Items u/Machine Learning upplication Monitoring	All Items 43 items				
ig Data Jatabase Jeveloper Tools tegration & Delivery agging & Tracing Monitoring Jetworking penShift Optional	AMO Streams provided by Red Hat, Inc. Red Hat AMO Streams is a massively scabable, distributed, and high performance data stream	AppDynamics ClusterAgent provided by AppDynamics LLC End to end monitoring of applications on Kubernets and OpenShift clusters with AppDynamics.	Community Aqua Security Operator provided by Aqua Security, Inc. The Aqua Security Operator runs within a Operahitt cluster and provides a means to deploy and manage Acc	Community Automation Broker Operator provided by Red Hat, Inc. Automation Broker is an implementation of the Open Service Broker API mana	Community Camel-K Operator provided by The Apache Software Foundation Apache Camel K (a.k.a. Kamel) is a lightweight Integration framework built from Apac
ecurity Policy Management itorage itreaming & Messaging Ither <i>Filter by keyword</i> NSTALL STATE	CockroachDB provided by Helm Community CockroachDB Operator based on the CockroachDB helm chart	Community Jacquer Operator provided by CACE Provides to CACE Provides tracing, monitoring and troubleshooting microservices-based	Couchbase Operator provided by Couchbase An operator to create and manage a Couchbase Cluster	Community Crunchy PostgreSOL Enterprise provided by Crunchy Data PostgreSOL is a powerful, open source object-relational database system with out	Community Descheduler provided by Red Hat An operator to run the OpenShift descheduler, a scheduler to move running Pods according to policie
Installed (3) Not Installed (40) ROVIDER TYPE Ted H4t (2) Certified (16) Community (25) ROVIDER ROVIDER	Community Elasticsearch Operator provided by Red Hal, Inc The Elasticsearch Operator for OKD provides a means for configuring and managing an Elasticsearch cluster for	Community Federation provided by Red Hat Gain Hybrid Cloud capabilities between your clusters with Kubernetes Federation.	FederatorAl provided by ProphetStor Data Services, inc. FederatorAl Operator provides easy configuration and management of Al-based	Community FederatorAl provided by ProphetStor Data services, inc: FederatorAl Operator provides easy configuration for Al-based	Hazelcast Operator provided by Hazelcast, Inc Install Hazelcast Enterprise cluster.



Operators as a First-Class Citizen



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Red Hat Universal Base Image

Enable an ecosystem of freely distributable operators for Kubernetes/OpenShift





BROAD ECOSYSTEM OF WORKLOADS

UBI and Host interactions







NEXT WAVE OF DEVELOPER TOOLS

Red Hat Service Mesh

Key Features

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





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Questions?



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