OpenShift in 1h

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Why Red Hat OpenShift
CREATING VALUE DEPENDS ON YOUR ABILITY TO DELIVER APPLICATIONS FASTER

Containers, Kubernetes, and hybrid cloud are key ingredients. OpenShift is the best container platform to deliver innovative applications.
OPENSHIFT IS GAINING MOMENTUM
MORE THAN 1,000 CUSTOMERS WORLDWIDE
WHY CUSTOMERS CHOOSE OPENSHIFT

TRUSTED ENTERPRISE KUBERNETES

ONE PLATFORM ANY CLOUD

EMPOWERING DEVELOPERS

OPEN SOURCE INNOVATION
THE POWER OF THE OPENSHEIF ECOSYSTEM
IT’S ALL HERE—ON A CONSISTENT PLATFORM FOR DEVELOPERS & IT OPS

RED HAT PORTFOLIO
Optimized for Containers

ISV ECOSYSTEM
Certified Containers and Operations

CLOUD SERVICES

OperatorHub

Bare metal, vSphere, OpenStack, AWS, Azure, GCP
MORE THAN JUST A KUBERNETES PLATFORM

- **RED HAT® QUAY CONTAINER REGISTRY**: Enterprise image registry with geo-replication, time machine and security scanning.
- **RED HAT® OPENSSHIFT**: Container-optimized software-defined storage on OpenShift.
- **CONTAINER-NATIVE VIRTUALIZATION***: Single workflow for containers and virtual machines running on OpenShift.

* coming soon
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
- OpenShift Service Mesh (Istio)
- OpenShift Serverless (Knative)
- CodeReady Workspaces (Che)
Red Hat OpenShift in detail
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, VSPHERE, RHV, OPENSTACK, AWS, AZURE, GOOGLE
WHAT ARE CONTAINERS?

CONTAINER BENEFITS FOR MULTIPLE TEAMS

- CLOUD-NATIVE APPS
- SIMPLIFY PACKAGING
- SIMPLIFY TESTING
- CONSISTENT APP DEPLOYS
- AUTOMATED APP DEPLOYS
- IMPROVED APP PERFORMANCE
- MULTI-CLOUD CONSISTENCY
- ENABLE DEVOPS CULTURE
- ENABLE HYBRID CLOUD
- REDUCE VM LICENSING COSTS
- ACCELERATE APP-DEV CYCLES

CONTAINERS

- Package all app dependencies
- Integrated in Linux OS
- Fully Open Source
- Secure Isolation of Applications
- Eliminates need for VM Hypervisor
- Runs on Any Cloud Platform
CONTAINER INFRASTRUCTURE
WITH CONTAINERS, THE OS MATTERS MORE THAN EVER

CONTAINERS ARE LINUX

Red Hat Enterprise Linux is a leader in paid Linux

70% CY2016 paid Linux share

1 Linux OS host spans every container
2 Linux is in every single container
HOW OPENSШИFT ENABLES DEVELOPER PRODUCTIVITY

- Self-service Provisioning
- Consistent environments
- Automated build & deploy
- CI/CD pipelines
- Configuration management
- App logs & metrics

CODE → BUILD → TEST → DEPLOY → REVIEW → MONITOR

- SPRING & JAVA EE
- MICROSERVICES
- FUNCTIONS
- LANGUAGES
- DATABASES
- APPLICATION SERVICES

- LINUX
- WINDOWS*

* coming soon
Demo
BUILD AND DEPLOY CONTAINER IMAGES

DEPLOY YOUR SOURCE CODE

DEPLOY YOUR APP BINARY

DEPLOY YOUR CONTAINER IMAGE
DEPLOY SOURCE CODE WITH SOURCE-TO-IMAGE (S2I)

BUILD APP
(OpenShift)

BUILD IMAGE
(OpenShift)

DEPLOY
(OpenShift)

User/Tool Does  OpenShift Does
DEPLOY APP BINARY WITH SOURCE-TO-IMAGE (S2I)

BUILD APP
(Build Infra)

Application Binary
(e.g. WAR)

Existing Build Process

BUILD IMAGE
(OpenShift)

Source-to-Image
(S2I)

Builder Image

Image Registry

DEPLOY
(OpenShift)

Application Container

deploy

User/Tool Does
OpenShift Does
DEPLOY DOCKER IMAGE

**BUILD IMAGE**
(Build Infra)

**PUSH**
(Build Infra)

**DEPLOY**
(Openshift)

**User/Tool Does**

**OpenShift Does**
CONTINUOUS DELIVERY WITH CONTAINERS

- dev
- source repository
- CI/CD engine
- container
- physical
- virtual
- private cloud
- public cloud
OPENSHIFT LOVES CI/CD

JENKINS-AS-A SERVICE ON OPENSHIFT

HYBRID JENKINS INFRA WITH OPENSHIFT

EXISTING CI/CD DEPLOY TO OPENSHIFT
OPENS authToken CONCEPTS
OVERVIEW
A container is the smallest compute unit
containers are created from container images
container images are stored in an image registry
an image repository contains all versions of an image in the image registry
containers are wrapped in pods which are units of deployment and management
pods configuration is defined in a deployment
services provide internal load-balancing and service discovery across pods
apps can talk to each other via services
routes add services to the external load-balancer and provide readable urls for the app

> curl http://app-prod.mycompany.com
projects isolate apps across environments, teams, groups and departments
OPENSHEET ARCHITECTURE
YOUR CHOICE OF INFRASTRUCTURE

- Physical
- Virtual
- Private
- Public
- Hybrid
NODES RHEL INSTANCES WHERE APPS RUN
APPS RUN IN CONTAINERS

Container Image

Container

Pod
PODS ARE THE UNIT OF ORCHESTRATION
MASTERS ARE THE CONTROL PLANE
API AND AUTHENTICATION
INTEGRATED CONTAINER REGISTRY
ORCHESTRATION AND SCHEDULING
PLACEMENT BY POLICY
AUTOSCALING PODS
SERVICE DISCOVERY
PERSISTENT DATA IN CONTAINERS
ROUTING AND LOAD-BALANCING
ACCESS VIA WEB, CLI, IDE AND API
MONITORING APPLICATION HEALTH
AUTO-HEALING FAILED CONTAINERS
AUTO-HEALING FAILED CONTAINERS

- **API/AUTHENTICATION**
- **DATA STORE**
- **SCHEDULER**
- **HEALTH/SCALING**

**RED HAT ENTERPRISE LINUX**
AUTO-HEALING FAILED CONTAINERS
AUTO-HEALING FAILED CONTAINERS
PERSISTENT STORAGE
### Persistent Storage

- Persistent Volume (PV) is tied to a piece of network storage
- Provisioned by an administrator (static or dynamically)
- Allows admins to describe storage and users to request storage
- Assigned to pods based on the requested size, access mode, labels and type

<table>
<thead>
<tr>
<th>Container Storage Interface (CSI)</th>
<th>NetApp Trident*</th>
<th>OpenStack Cinder</th>
<th>NFS</th>
<th>iSCSI</th>
<th>Ceph RBD</th>
<th>GlusterFS</th>
<th>AWS EBS</th>
<th>Azure Disk</th>
<th>Azure File</th>
<th>GCE Persistent Disk</th>
<th>FlexVolume</th>
<th>VMWare vSphere VMDK</th>
</tr>
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</table>

* Shipped and supported by NetApp via TSANet
** Tech Preview
PERSISTENT STORAGE

Admin

User

register PV

create claim

POOL OF PERSISTENT VOLUMES

ISCSI PV

Ceph RBD PV

GlusterFS PV

NFSP V

NFSP V

NFSP V

PROJECT

Pod

claim

Pod

claim

Pod

claim
DYNAMIC VOLUME PROVISIONING

Admin

define StorageClass

create claim: Fastest

User

create claim: Fastest

OpenShift PV Controller

Provision

Slow Azure-Disk

Fast AWS-SSD

Fastest NetApp-Flash

Azure Provisioner

AWS Provisioner

NetApp Provisioner

PV

Pod

bound

claim
OPENSHIFT CONTAINER STORAGE

- Containerized Red Hat Gluster Storage
- Native integration with OpenShift
- Unified Orchestration using Kubernetes for applications and storage
- Greater control & ease of use for developers
- Lower TCO through convergence
- Single vendor Support