Digital Transformation
Requires an Evolution in...

**APPLICATIONS**
New ways of developing, delivering and integrating applications

**PROCESS**
More agile processes across both IT and the business

**INFRASTRUCTURE**
Modernize existing and build new cloud based infrastructure
Application Architecture

- Shift from monolithic applications to microservices
- Independently deployable and updatable, limited dependencies
- Optimized for agility & accelerated time to market
Development Process

- Shift to more agile development and deployment processes
- Increased collaboration between Development & Operations
- Move from Continuous Integration to Continuous Deployment
Platform Infrastructure

- Shift from virtualization to scale-out cloud infrastructure
- Rapid growth in public cloud usage for enterprises
- Hybrid cloud deployments span private & multiple public clouds
IT Must Evolve to Stay Ahead of These Trends

- **Application Architecture**
  - Monolithic
  - N-Tier
  - Microservices

- **Development Process**
  - Waterfall
  - Agile
  - DevOps

- **Application Infrastructure**
  - Datacenter
  - Hosted
  - Cloud
Containers - Transform Apps, Infrastructure & Process
What Are Containers?
It Depends on Who You Ask

- Sandboxed application processes on a shared Linux OS kernel
- Simpler, lighter, and denser than virtual machines
- Portable across different environments

- Package my application and all of its dependencies
- Deploy to any environment in seconds and enable CI/CD
- Easily access and share containerized components
Containers - An Evolution in Application Deployment

- Enable efficiency and automation for microservices, but also support traditional applications
- Enable faster and more consistent deployments from Development to Production
- Enable application portability across 4 infrastructure footprints: Physical, Virtual, Private & Public Cloud
Red Hat Container Stack & Tools

Red Hat Application Services (JBoss)

Red Hat OpenShift Container Platform (incl. CloudForms)

Red Hat Enterprise Linux & Atomic Host

Traditional, Stateful & Microservices-based Apps

- Business Automation
- Integration
- Data
- Web & Mobile
- 3rd party frameworks

- Container Infrastructure
  (Orchestration & Scheduling, Storage, Registry, Security, Networking)

- Lifecycle Automation
  (Self-service, CI/CD, Image Stream)

- Container Management
  (Monitoring, Capacity, Policies)

- Enterprise-Grade Container OS

- Physical
- Virtual
- Private
- Public

Red Hat Registry

CloudForms
Ansible
Storage
Satellite
Developer Studio
CDK
OpenShift Enables Dev and Ops

- Self-Service
- Multi-Language
- Automation
- Collaboration

Standards Based
Web Scale
Open Source
Enterprise Grade

by Red Hat®

#redhat #rhsummit
Built on Open Container Standards
Red Hat Driving These in the Community

docker

- Docker
- Independent
- Unknown
- Red Hat
- IBM
- Microsoft
- Huawei
- cloudControl
- Zenika

kubernetes

- Google
- Unknown
- Red Hat
- FathomDB
- Independent
- CoreOS
- Huawei
- Apache Software Foundation
- Amadeus
Trusted Container OS
Containers Depend on Linux
Container Runtime - Standards & Security

- Docker release updates & maintenance
- Standardization through OCI
- Multi-process containers with systemd

New in RHEL 7.3:
- Image scanning with Atomic Scan + OpenScap.
- Container image signing
- System Containers
Container Host - Lightweight & Container-Optimized

- RHEL Atomic Host - optimized for containers, minimal footprint & streamlined updates.
- Enhanced management with Cockpit for RHEL & RHEL Atomic Host
- SELinux support with OverlayFS (7.3.2)
- Package layering (Tech Preview)
- Containerized install of Kubernetes
- RHEL base image size optimization
Clustered Container Infrastructure
Applications Run Across Multiple Containers & Hosts
Container Orchestration - Scale & New Workloads

- Kubernetes 1.3 (OpenShift 3.3)
  - Scale to 1,000+ Node clusters
  - Workload eviction from Nodes
  - Routing control for A/B deployments

- Kubernetes 1.4 & 1.5
  - Federated clusters with Ubernetes
  - Expanded workload support with PetSets and related enhancements
Storage Plugins for Stateful Services

- iSCSI
- NFS
- Amazon EBS
- Google Persistent Disk
- GlusterFS
- Ceph RBD
- OpenStack Cinder
- Fibre Channel
Enterprise Registry

- Manage image content with new integrated registry capabilities
- Registry access and image management
- Visualization of image metadata and image layer details
- Standalone registry install option
# Enterprise Container Platform
Build, Deploy and Manage Containerized Apps

<table>
<thead>
<tr>
<th>CONTAINER</th>
<th>CONTAINER</th>
<th>CONTAINER</th>
<th>CONTAINER</th>
<th>CONTAINER</th>
</tr>
</thead>
<tbody>
<tr>
<td>SELF-SERVICE</td>
<td>SERVICE CATALOG (LANGUAGE RUNTIMES, MIDDLEWARE, DATABASES, …)</td>
<td>BUILD AUTOMATION</td>
<td>DEPLOYMENT AUTOMATION</td>
<td>APPLICATION LIFECYCLE MANAGEMENT (CI / CD)</td>
</tr>
<tr>
<td>CONTAINER ORCHESTRATION &amp; CLUSTER MANAGEMENT (KUBERNETES)</td>
<td>NETWORKING</td>
<td>STORAGE</td>
<td>REGISTRY</td>
<td>LOGS &amp; METRICS</td>
</tr>
<tr>
<td>INFRASTRUCTURE AUTOMATION &amp; COCKPIT</td>
<td>CONTAINER RUNTIME &amp; PACKAGING (DOCKER)</td>
<td>ATOMIC HOST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RED HAT ENTERPRISE LINUX</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#redhat #rhsummit
Build & Deployment Automation

**Code**
- Can configure different deployment strategies like A/B, Rolling upgrade, Automated base updates, and more.

**Build**
- Can configure triggers for automated deployments, builds, and more.
- Source 2 image
- Language
- Builder Image
- Container Image

**Deploy**
- Can configure different deployment strategies like A/B, Rolling upgrade, Automated base updates, and more.
Continuous Deployment Pipelines

Define and manage the whole application lifecycle

- Build/Deploy workflows from Dev to Production
- Integrated Jenkins 2 Pipeline extensibility
- Real time status and integrated metrics
JBoss Middleware Services on OpenShift

- **Java EE Application Server**
  By JBoss EAP

- **Integration Services**
  By JBoss Fuse

- **Real time Decision Service**
  By JBoss BRMS

- **In Memory Data Grid**
  By JBoss Data Grid

- **Messaging Services**
  By JBoss A-MQ

- **Intelligent Process Server**
  By JBoss BPM Suite

- **Tomcat**
  By JBoss Web Server

- **Single Sign On**
  By RH SSO

- **Data Services**
  By JBoss Data Virtualization

- **3SCALE**
  API Management
CloudForms Container Management

Manage containers and OpenShift across a hybrid cloud environment

- Reports, metrics & alerts
- Container chargeback
- Vulnerability Scanning
THANK YOU

plus.google.com/+RedHat
linkedin.com/company/red-hat
facebook.com/redhatinc
twitter.com/RedHatNews
youtube.com/user/RedHatVideos
Managing Containers Today

- **Support** - OpenShift and Atomic Host as container providers
- **Dedicated dashboard** - Topology mapping for containers, nodes, pods and registries
- **Configuration management** - Drift analysis of container image packages
- **Performance monitoring** - CPU & memory utilization

---

- **Introspection** - Agent-less container content analysis for security and compliance assessment
- **Policy automation** - Kubernetes events in policy definition
- **Performance monitoring** - Networking & storage utilization
- **Chargeback**

---

- **Container Deployment** - Integrate container deployment in lifecycle workflow
- **Lifecycle management** - Atomic Host: provision, patch and update, retire
OpenShift on OpenStack - Current

- Networking via Neutron networks.
- Load Balancing via Neutron LBaaS V1
- Block Storage via Cinder volumes.
- Compute via Nova virtual machines.
- Orchestration via Heat templates.
- Reference architecture to be published “real soon now”
OpenShift on OpenStack - Future

- Load Balancing via Octavia (LBaaS V2)
- DNS via Designate
- File Storage via Manila
- Re-validate architecture on bare-metal using Ironic
OpenShift Online - “The Next Generation”

Public cloud-based, multitenant container platform

- Automatically build and deploy container workloads in the cloud
- Superior developer experience
- Built-in operations management

OpenShift Online DevPreview available at OpenShift.com

Live demos and promotion at DockerCon, Seattle, June 19-21, 2016
# OpenShift - Use Case Based Segmentation

<table>
<thead>
<tr>
<th>ADOPT</th>
<th>ON-PREMISE</th>
<th>PUBLIC CLOUD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[NEW] Red Hat OpenShift Container Local</td>
<td>[NEXT-GEN] Red Hat OpenShift Online</td>
</tr>
<tr>
<td>EXPAND</td>
<td>[NEW] Red Hat OpenShift Container Lab*</td>
<td>Red Hat OpenShift Dedicated</td>
</tr>
<tr>
<td>COMMIT</td>
<td>[NEW NAME] Red Hat OpenShift Container Platform*</td>
<td>Red Hat OpenShift Dedicated</td>
</tr>
<tr>
<td>TRANSFORM</td>
<td>Red Hat Cloud Suite</td>
<td>* Also available as RHEL Add-On [NEW]</td>
</tr>
</tbody>
</table>

#redhat #rhsummit
OpenShift Primed

What is it?

● Technical readiness program for OpenShift ISV partners
● Applies to any variant of OpenShift including upstream
● Designated logo and awareness through OpenShift online properties
● First step in journey towards Red Hat corporate level certification
● 20+ “Primed” Partners since program launched at Red Hat Summit 2016
Host Level Security

- **Namespaces**
  - Mount, PID, IPC, UTS, Network, User
- **Cgroups**
  - Constraints, but also restrict access to device nodes
- **Capabilities**
  - 38 distinct sets
- **Selinux**
  - Type Enforcement
  - Multi Category Security
- **Seccomp**
  - Disabling SYS_CALLS
- **Rlimits**
  - RLIMIT_NOFILE, RLIMIT_NPROC
Platform Level Security

- Container Level Separation
  - Docker layer ownership via S2I
- OpenShift API Authentication
  - X509 CERT, OAuth Access Token, SAML
- OpenShift Identity Integrations
  - Roles, LDAP, AD
- OpenShift Service Accounts
  - Platform driven actions
- OpenShift Security Contexts
  - Pod Security Policies
- OpenShift Secrets
  - Encrypted variable values
- OpenShift Image Builds
  - Control Priv, dockerfile, build strategies