THE KUBERNETES PLATFORM FOR BIG IDEAS

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... so you want to do containers and Kubernetes?
But Why?
SPEED!
INNOVATION!
IT Must Evolve to Stay Ahead of Demands

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

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

- **Deployment & Packaging**
  - Physical Servers
  - Virtual Servers
  - Containers

- **Application Infrastructure**
  - Datacenter
  - Hosted
  - Cloud
What are containers?
WHAT ARE CONTAINERS?

CONTAINER BENEFITS FOR MULTIPLE TEAMS

DEVELOPERS
- CLOUD-NATIVE APPS
- SIMPLIFY PACKAGING
- SIMPLIFY TESTING

IT OPERATIONS
- CONSISTENT APP DEPLOYS
- AUTOMATED APP DEPLOYS
- IMPROVED APP PERFORMANCE
- MULTI-CLOUD CONSISTENCY

BUSINESS LEADERS
- 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
Containers package applications with dependencies and isolate the runtime

- Easy to deploy and portable across host systems
- Created from immutable, layered images
- Isolated from a host operating system.

In RHEL, this is done through:
- Control Groups (cgroups)
- Kernel namespaces
- SELinux, sVirt, iptables
- Docker
Containers provide high density and efficiency at the expense of isolation.
What is Kubernetes?
WHY DO CONTAINERS NEED KUBERNETES?

CONTAINERIZED APPLICATIONS

- Manage containers securely
- Manage containers at scale
- Integrate IT operations
- Enable hybrid cloud
KUBERNETES IS THE CONTAINER ORCHESTRATION STANDARD

2 YEARS AGO
*Fragmented landscape*

TODAY
*Kubernetes consolidation*

Red Hat bet early on Kubernetes. It has now become the dominant orchestration ecosystem.
WHAT IS KUBERNETES?

- Orchestration of large amounts of running containers spread across a lot of hosts.
- “Kubernetes is an open-source platform for automating deployment, scaling, and operations of application containers across clusters of hosts, providing container-centric infrastructure.” [1]
- Open Sourced by google
- Planet Scale
What is OpenShift?
made easy
made easy
made easy
WHAT COMES IN KUBERNETES
- Container Scheduling on Multiple Hosts
- Self-healing

WHAT OPENS SHIFT ADDS OVER KUBERNETES

Ops:
- Software Defined Network
- Persistent Storage
- Container Native Storage (CNS / SDS)
- Log Aggregation and Analysis
- Monitoring | Telemetry
- Capacity Management
- Egress Routing for Enterprise integration
- Router Sharding
- Full Stack Support
- System Certifications and Patching
- ...

Security:
- Role Based Access Control
- Container Security and Isolation
- Multi-tenancy

Dev:
- Automatically Triggered Deployments (CICD)
- Integrated Customizable Pipelines (CICD)
- Build and Deployment Configurations
- Weighted AB Testing
- Stateful Workloads (Storage, StatefulSets)
- Workload Containerization
- Self-service
- User Experience
- ...

- Scaling
- Service Discovery
- Rolling Deploys and Rollbacks

OPENSHIFT MAKES DOCKER UND KUBERNETES EASY TO USE
DON'T TRY THIS AT HOME!
OPENSHIFT IS KUBERNETES FOR THE ENTERPRISE

Security fixes
100s of defect and performance fixes
200+ validated integrations
Middleware integrations
(container images, storage, networking, cloud services, etc)
9 year enterprise lifecycle management
Certified Kubernetes
OpenShift Overview
Self-Service
Multi-language
Automation
Collaboration
Multi-tenant
Standards-based
Web-scale
Open Source
Enterprise Grade
Secure
OPENSHIFT CONTAINER PLATFORM

APPLICATION LIFECYCLE MANAGEMENT

CONTAINER ORCHESTRATION AND MANAGEMENT (KUBERNETES)

ENTERPRISE CONTAINER HOST

ANY CONTAINER

ANY INFRASTRUCTURE

Laptop  Datacenter  OpenStack  Amazon Web Services  Microsoft Azure  Google Cloud
APPLICATION PORTABILITY WITH CONTAINERS

RHEL Containers + RHEL Host = Guaranteed Portability Across Any Infrastructure
OPENSHIFT CONTAINER PLATFORM

Application Services
Middleware, Service Mesh, Functions, ISV

Cluster Services
Metrics, Chargeback, Registry, Logging

Developer Services
Dev Tools, Automated Builds, CI/CD, IDE

Automated Operations*

Kubernetes

Red Hat Enterprise Linux or Red Hat CoreOS

Best IT Ops Experience  CaaS  PaaS  Best Developer Experience

*coming soon
OPENSHIFT ARCHITECTURE

Existing automation toolsets

Git

Service layer

Master

API/Authentication

Data store

Scheduler

Health/scaling

Red Hat Enterprise Linux

Node

RHEL

Node

RHEL

Node

RHEL

Persistent storage

Registry

Physical

Virtual

Private

Public

Hybrid

Developers

Operations

CI/CD

SCM (Git)
The Kubernetes platform for developers
Developers want to be **productive and have choice**

Choice of architectures  
Choice of programming languages  
Choice of databases  
Choice of application services  
Choice of development tools  
Choice of build and deploy workflows

They don’t want to have to worry about the infrastructure.
THE POWER OF THE OPENSHIFT ECOSYSTEM

RED HAT PORTFOLIO
Optimized for Containers

RED HAT OPENSHIFT
Application Runtime
RED HAT JBOSS
WEB SERVER
RED HAT JBOSS
ENTERPRISE APPLICATION PLATFORM
RED HAT DATA GRID
RED HAT AMQ
RED HAT FUSE
RED HAT MOBILE
RED HAT ANSIBLE
RED HAT DUMMY CONTAINER REGISTRY
RED HAT DECISION MANAGER
RED HAT PROCESS AUTOMATION MANAGER
RED HAT 3SCALE API MANAGEMENT

THIRD-PARTY ISV
Red Hat Container Catalog (100s certified)

Open Service Broker

CLOUD SERVICES

RED HAT ENTERPRISE LINUX ECOSYSTEM
Hardware, Virtualization, Cloud and Service Provider Certifications
HOW OPENSSHIFT ENABLES DEVELOPER PRODUCTIVITY

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

**CODE**

<table>
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<tr>
<th>SPARING &amp; JAVA EE</th>
<th>MICROSERVICES</th>
<th>FUNCTIONS</th>
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<td>LANGUAGES</td>
<td>DATABASES</td>
<td>APPLICATION SERVICES</td>
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**REVIEW**

**MONITOR**

- **LINUX**
- **WINDOWS**

* coming soon
The Kubernetes platform for IT Operations
IT Operations needs secure, efficient and controlled processes

Automated* provisioning
Automated installations
Automated security scanning
Automated upgrades
Automated backups

And it needs to integrate with what you already have.

*coming soon
AUTOMATED CONTAINER OPERATIONS

Fully automated day-1 and day-2 operations

INSTALL
- Infra provisioning
- Embedded OS

DEPLOY
- Full-stack deployment
- On-premises and cloud
- Unified experience

HARDEN
- Secure defaults
- Network isolation
- Audit and logs
- Signing and policies

OPERATE
- Multi-cluster aware
- Monitoring and alerts
- Full-stack patch & upgrade
- Zero downtime upgrades
- Vulnerability scanning

AUTOMATED OPERATIONS
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
COMPREHENSIVE CONTAINER SECURITY

CONTROL
Application Security
- Container Content
- Container Registry
- CI/CD Pipeline
- Deployment Policies

DEFEND
Infrastructure
- Container Platform
- Network Isolation
- Container Host Multi-tenancy
- Storage
- Audit & Logging
- API Management

EXTEND
- Security Ecosystem
KUBERNETES OPERATOR FRAMEWORK
AN INNOVATIVE, MORE EFFICIENT WAY TO MANAGE CONTAINERIZED APPLICATIONS AT SCALE

AUTOMATED LIFECYCLE MANAGEMENT

Installation  Upgrade  Backup  Failure recovery  Metrics & insights  Tuning

Operators codify operational knowledge and workflows to automate lifecycle management of containerized applications with Kubernetes
MORE THAN JUST A KUBERNETES PLATFORM

**RED HAT® QUAY**
Container Registry
Enterprise image registry with geo-replication, time machine and security scanning

**RED HAT® OPENSHIFT**
Container Storage
Container-optimized software-defined storage on OpenShift

**CONTAINER-NATIVE VIRTUALIZATION**
Single workflow for containers and virtual machines running on OpenShift

* coming soon
ONE PLATFORM
FLEXIBLE CONSUMPTION MODELS

SaaS offering to build, deploy, and scale container applications in the cloud

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

Manage your own secure, enterprise-grade Kubernetes platform

* announced for general availability in late 2018
Great! I am hooked! How do I proceed?
Interactive Learning Scenarios provide you with a pre-configured OpenShift instance, accessible from your browser without any downloads or configuration.
RED HAT SERVICES FOR OPENS SHIFT 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.

RED HAT CONTAINER ADOPTION PROGRAM

FRAMEWORK FOR SUCCESSFUL CONTAINER ADOPTION AND IT TRANSFORMATION:

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

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

ESTIMATED PAYBACK TIME: 17 months [1]
TOTAL THREE-YEAR BENEFITS NPV: $10.1 M (USD) [1]

THANK YOU