Container-native Virtualization

The future of Virtualization!

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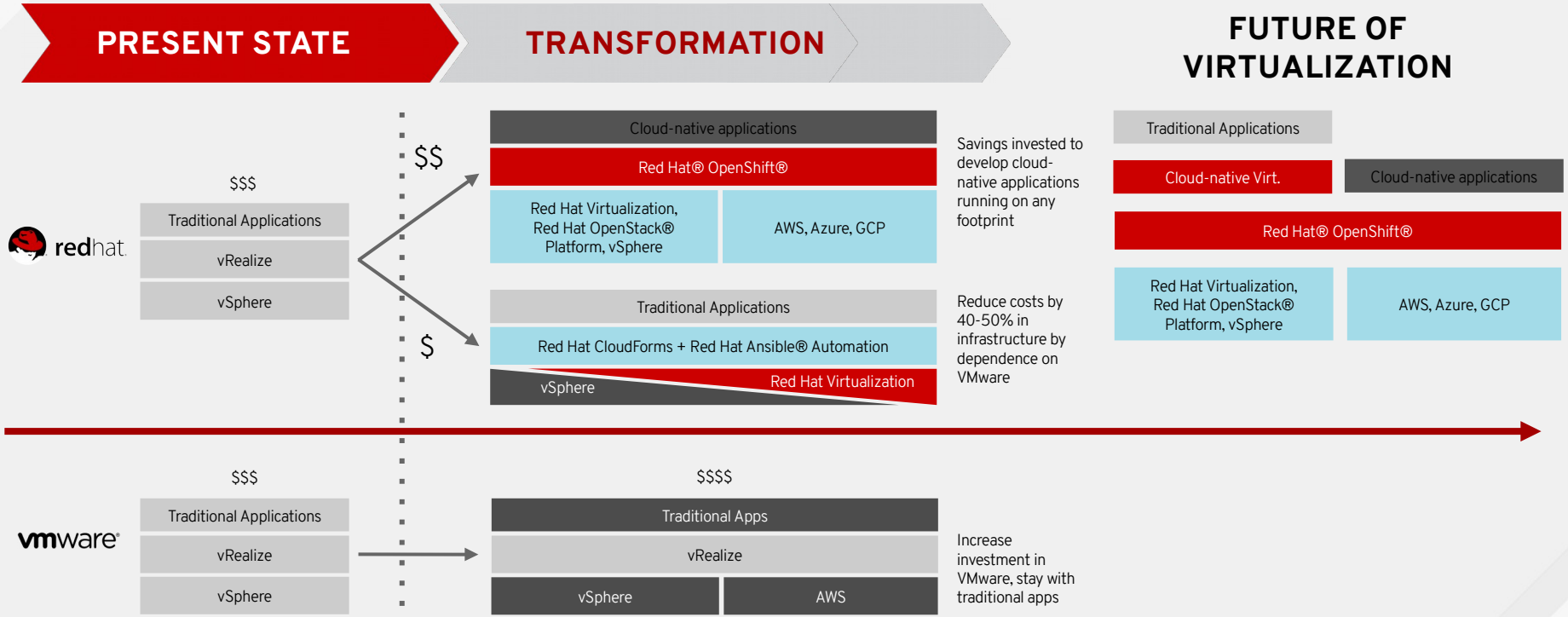
#RedHatOSD


PRESENT STATE
TRANSFORMATION
FUTURE OF VIRTUALIZATION
redhat.
$$$
Traditional Applications
vRealize
vSphere
$$
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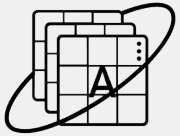
Cloud-native applications
Red Hat® OpenShift®
Red Hat Virtualization, Red Hat OpenStack® Platform, vSphere
AWS, Azure, GCP
Traditional Applications
Red Hat CloudForms + Red Hat Ansible® Automation
vSphere
Red Hat Virtualization
Savings invested to develop cloud-native applications running on any footprint
Reduce costs by 40-50% in infrastructure by dependence on VMware
Traditional Applications
Cloud-native Virt.
Cloud-native applications
Red Hat® OpenShift®
Red Hat Virtualization, Red Hat OpenStack® Platform, vSphere
AWS, Azure, GCP
vmware
$$$
Traditional Applications
vRealize
vSphere
$$$$
Traditional Apps
vRealize
vSphere
AWS
Increase investment in VMware, stay with traditional apps

CONTAINERS AND VIRTUAL MACHINES

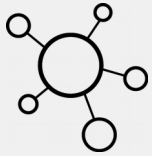


CONTAINER INFRASTRUCTURE AND ORCHESTRATION

Containerized applications and Kubernetes container orchestration as provided by OpenShift are becoming **the** standard for new applications.

VIRTUALIZED WORKLOADS

Virtualized workloads are not going anywhere fast! Business reasons (cost, time to market) and technical reasons (different or older operating system)



BARE-METAL RESURGENCE

Increasingly customers are pursuing bare-metal clusters for net new business functionality being built in containers.

As the technology mix changes, you will reach a tipping point where containers are the default but some workloads are still more suited to run as VMs

COMPONENTS OF CNV

- **KubeVirt**
  The virtual machine operator
  https://github.com/kubevirt/kubevirt/

- **Containerized Data Importer (CDI)**
  Importing disks
  https://github.com/kubevirt/containerized-data-importer

- **OpenShift Web Console**
  With UI extensions
  https://github.com/openshift/origin-web-console

- **Containerized Virt-v2v**
  Importing a whole virtual machine
  https://github.com/kubevirt/v2v-job

Leverages tried and trusted RHEL & RHV (KVM) virtualization capabilities.

Container-native Virtualization Demo

http://kubevirt.io/get_kubevirt/

Pre-requisites:

- kubectl
- minikube/minishift

Notes:

- Yes, we're running nested virt here - fine for getting started!
- Using upstream bits, for now, in product preview coming!

```
sgordon@:kubevirt-minishift-demo/ $> # Let's look at the new pods our KubeVirt CRDs are running in the kube-syste
m namespace.
sgordon@:kubevirt-minishift-demo/ $> oc get crds
NAME                                                    AGE
datavolumes.cdi.kubevirt.io                             3h
openshiftwebconsoleconfigs.webconsole.operator.openshift.io   3h
virtualmachineinstancepresets.kubevirt.io               3h
virtualmachineinstancereplicasets.kubevirt.io           3h
virtualmachineinstances.kubevirt.io                     3h
virtualmachines.kubevirt.io                             3h
sgordon@:kubevirt-minishift-demo/ $> # The CDI controller runs in the default namespace.
sgordon@:kubevirt-minishift-demo/ $> oc get pods -n default
NAME                        READY     STATUS      RESTARTS   AGE
cdi-deployment-767b445c45-wp7pb   1/1       Running     0          3h
docker-registry-1-2gqht     1/1       Running     0          3h
persistent-volume-setup-658qq     0/1       Completed   0          3h
router-1-nn7gx              1/1       Running     0          3h
sgordon@:kubevirt-minishift-demo/ $> # Our own namespace is as expected empty right now.
sgordon@:kubevirt-minishift-demo/ $> oc get pods
No resources found.
sgordon@:kubevirt-minishift-demo/ $> oc get all
No resources found.
sgordon@:kubevirt-minishift-demo/ $> # Lets look at a VM definition
sgordon@:kubevirt-minishift-demo/ $> vim fedora-vm.yaml
sgordon@:kubevirt-minishift-demo/ $> # Let's now create the VM
sgordon@:kubevirt-minishift-demo/ $> kubectl create -f fedora-vm.yaml
virtualmachine.kubevirt.io "fedora-vm" created
sgordon@:kubevirt-minishift-demo/ $> # The VirtualMachinne object is the persistent representation of our virtual
 machine.
```

https://youtu.be/0H5SbrpiH1Q

ROADMAP THEMES

(What's missing today?)

Supportability

- Simplify upgrade process
- Debug tooling support (sosreports, Insights)
- Broad provider support

Production Workloads

- Layer-2 Networking
- Live Migration
- Upload image as Template
- Guest agent introspection

Embrace the Platform

- Operators for all
- Integrated VM management
- Metrics and monitoring

Container-native Virtualization is **not** a drop-in replacement for traditional virtualization today.

Technology Preview access in an upcoming release of OpenShift.

OpenShift Container Platform 3.11

What's new?

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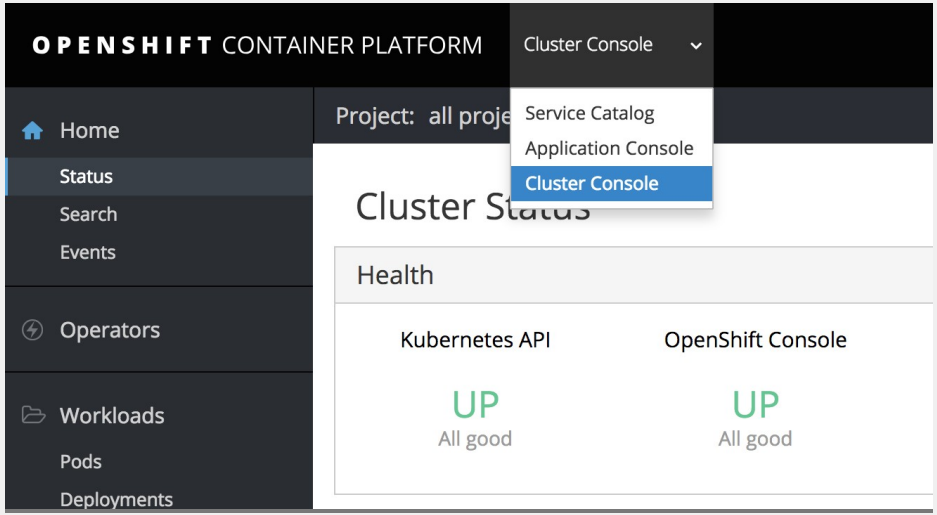
NEW ADMIN-FOCUSED CONSOLE

Users have a choice of experience based on their role or technical abilities

- Admin/CaaS experience with heavy exposure to Kubernetes
- AppDev/PaaS experience with standard OpenShift UX
- Sessions are not shared across the Consoles but credentials are
- Both hosted on cluster, in `openshift-console` and `openshift-webconsole` namespaces

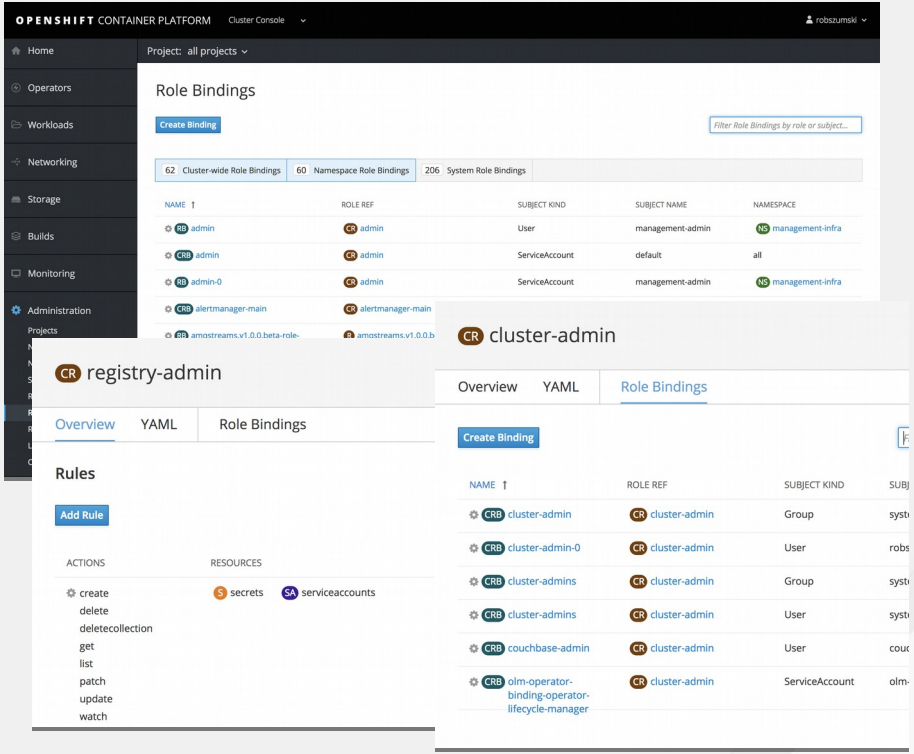


ACCESS CONTROL MANAGEMENT

Visual management of the cluster's RBAC Roles and RoleBindings

- Track down users and service accounts with a specific Role
- View cluster-wide or namespaced bindings
- Visually audit a Role's verbs and objects

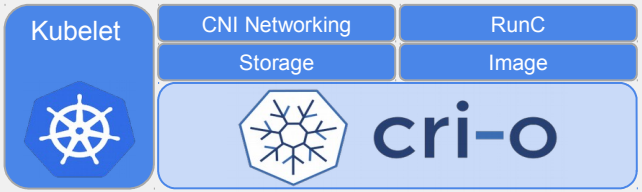
Project admins can self-manage roles and bindings scoped to their namespace



CRI-O / BUILDAH / PODMAN

cri-o

- Becoming the default for partners
- Crictl for node debugging and troubleshooting
- Podman for image tagging & management
- Continues to mature with OpenShift online, customer, and community deployments



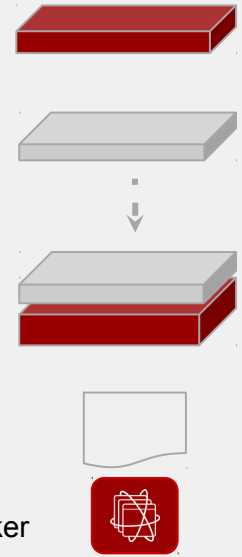
buildah

Start from an existing image or from scratch

Generate new layers and/or run commands on existing layers

Commit storage and generate the image manifest

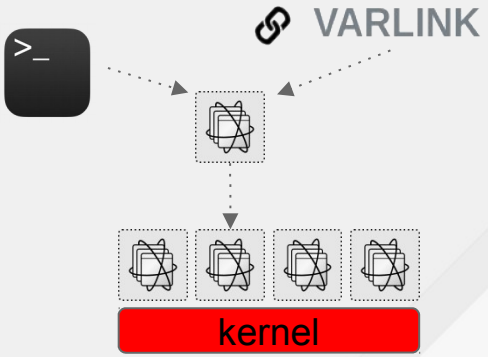
Deliver image to a local store or remote OCI / docker registry



podman

Podman is planned to GA with RHEL 7.6.

A daemon-less CLI/API for running, managing, and debugging OCI containers and pods



REFERENCE ARCHITECTURE GUIDES

Release: ocpsupplemental-3.11 (in 4-6 weeks after 3.11 GA)

Since 3.10, Reference Architecture Implementation guides are now part of the OpenShift product documentation (https://docs.openshift.com).

Documentation for deploying OCP 3.11 on: *(not live yet)*

- OpenShift 3.11 on Red Hat OpenStack Platform (RHOSP)
- OpenShift 3.11 on Amazon Web Services (AWS)
- OpenShift 3.11 on Microsoft Azure
- OpenShift 3.11 on VMware vSphere
- OpenShift 3.11 on Google Cloud Platform (GCP)
- OpenShift 3.9 on Red Hat Virtualization 4 (RHV) *(update in progress)*

LOCAL DEVELOPMENT

CDK 3.6

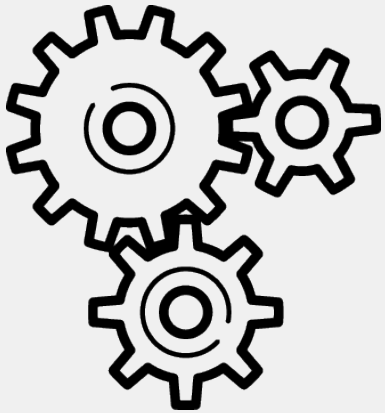
- OpenShift Container Platform v3.10.45 (and update to 3.11)
- Based on Minishift 1.24

Minishift 1.24

- Configuration used to start a profile is not saved
- Provide a way to modify the kube-apiserver config same as openshift-apiserver.
- Do not apply templates in xpaas addon one by one
- Local proxy server to handle proxy issues. (technology preview)

kubectl

- We always shipped kubectl for Linux on the master's file system, but now we will offer it in the oc client downloads




... so you want to do
containers and Kubernetes?
Contract


When faced with two or more alternatives that deliver roughly the same value:
Take the path that makes future changes easier.
Dave Thomas
Author of Manifesto for
Agile Software Development
Contract

GRAZIE PER L'ATTENZIONE

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