RED HAT FORUMS

Migrating from OCP3 to OCP4

Why - What's there to help you - How it works?

Håkan Hagerlund Nordic SA team 2019 October

Johnny Westerlund Nordic SA team 2019 October





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)

ticketmaster®

6699

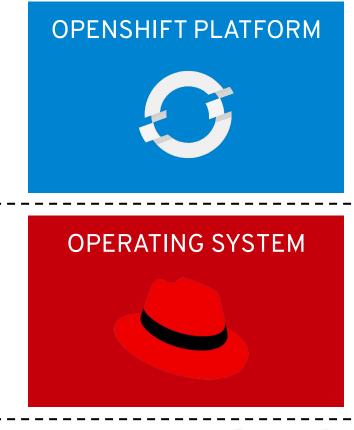
Using the Prometheus Operator, our dev teams are able to provision their own end-to-end monitoring. We could not hope to manage the 344 Prometheus instances without the domain knowledge the Operator encapsulates.

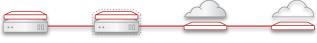
Michael Goodness Lead Systems Engineer Ticketmaster



Full-stack automated install

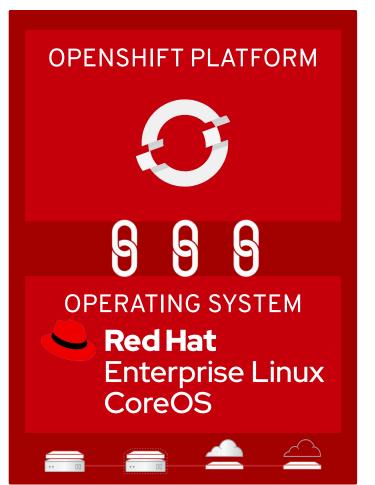
OPENSHIFT 3 & 4



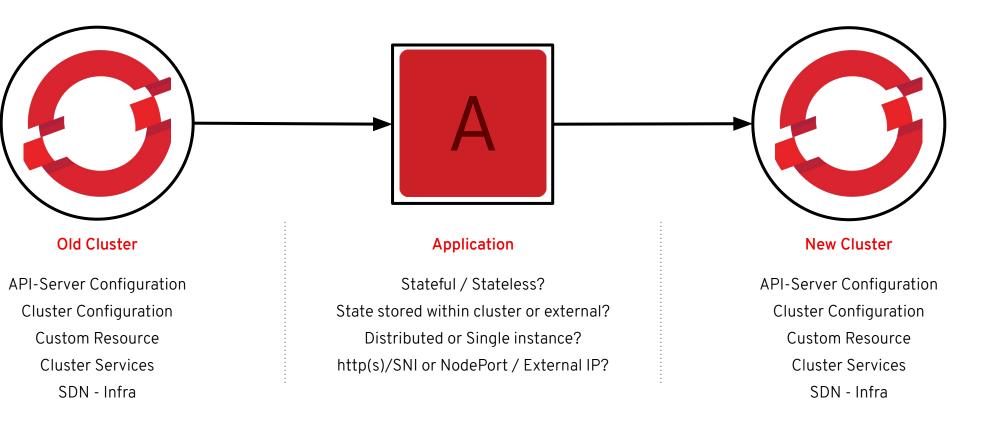


INFRASTRUCTURE

OPENSHIFT 4 (only)









USER OF APP

0 // i / / / ROUTING LAYER SERVICE LAYER PERSISTENT NODE NODE NODE MASTER STORAGE SCM (GIT) 2 С × ٢ (1) С **API/AUTHENTICATION** С С С CI/CD DEVELOPER RHEL RHEL RHEL SCHEDULER NODE NODE NODE REGISTRY EXISTING ٢ С С С С HEALTH/SCALING AUTOMATION þ TOOLSETS 19 С 2 R . **OPERATIONS RED HAT** Musqu **ENTERPRISE LINUX** RHEL RHEL RHEL ····· *L* 20 <u>.</u> PHYSICAL VIRTUAL PRIVATE PUBLIC HYBRID

EXAMPLE OCP ARCHITECTURE



Application Workloads



Cluster Application Migration (CAM)

Migrates stateful/stateless applications from source cluster to destination cluster.

Intended initially for addressing OCP 3.7+ to OCP 4.2+ upgrade scenarios

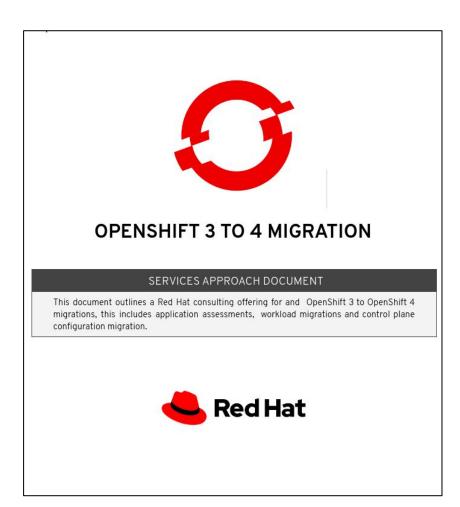
Control Plane Migration Assistance (CPMA)

Helps configure a OCP 4.x cluster to match, when possible, settings in an OCP 3.x cluster.

Not all 3.x settings are available in 4.x.

Control Plane Config for 4.x







Architecture and Design, deployment of migration tool



API Server Configuration Migration

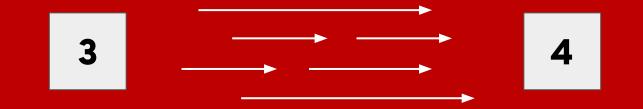


Application Assessment and Migration



Migrating to OpenShift 4

Tooling and advice for moving from OpenShift 3.x to 4.x





Cluster Migration Objectives

- 1. Provide a way for you to deploy a **replication of your applications** from one OpenShift cluster to a different OpenShift cluster
- 2. Enable you to determine what **cluster** specific **configuration** from OpenShift 3 will work on an OpenShift 4 cluster
- 3. Offer documentation as to how to handle common network, storage, and machine/node **re-use scenarios** between OpenShift 3 and OpenShift 4 clusters



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Machine Config Operator (MCO)

Example with CRI-O:

- Simplified management across entire cluster
- Container Runtime Config (CRC) is specialized Machine Config (MC) for CRI-O
- Container Runtime Config for CRI-O exposes configuration knobs

Leverages

- Custom Resource Definitions
- Machine Config Pools
- Machine Config Pool Selector
- Machine Configs
- Container Runtime Config (specialized MC)

apiVersion: machineconfiguration.openshift.io/v1
kind: ContainerRuntimeConfig
metadata:
 name: set-log-and-pid
spec:
 machineConfigPoolSelector:
 matchLabels:
 debug-crio: config-log-and-pid
 containerRuntimeConfig:
 pidsLimit: 2048
 logLevel: debug

\$ oc get ContainerRuntimeConfig
NAME AGE
set-log-and-pid 22h



Machine Config Operator (MCO)

Example with CRI-O:

Cluster services are in pods. Service config get's managed easily and scalable way using config resources. apiVersion: machineconfiguration.openshift.io/v1
kind: ContainerRuntimeConfig
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spec:
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Network Configuration

Example #1: Operator-Assisted Ingress Ctrlr "Sharding"

In 4.1, the way you create a router to work with a shard is different (API call versus 'oc adm' command). A simple config (example to right) acted upon by the ingress operator automatically integrates sharding with the external (front-end) DNS/LB configured at install-time,.

Example #2: Create a Second Router

Ingress controller configuration is now a first-class object, meaning additional Ingress controllers can be created by making multiple Ingress objects. This is the preferred method for giving teams their own subdomains, replacing the 'oc adm' method (see right).

```
apiVersion: operator.openshift.io/v1
kind: IngressController
metadata:
    namespace: openshift-ingress-operator
    name: internal-apps
spec:
    domain: internal-apps.dmace.devcluster.openshift.com
    routeSelector:
        matchLabels:
        environment: internal
```

```
$ cat <<EOF | oc create -f -
apiVersion: operator.openshift.io/v1
kind: IngressController
metadata:
   namespace: openshift-ingress-operator
   name: finance-apps
spec:
   domain: finance-apps.openshift.example.com
EOF</pre>
```

Configuration changed

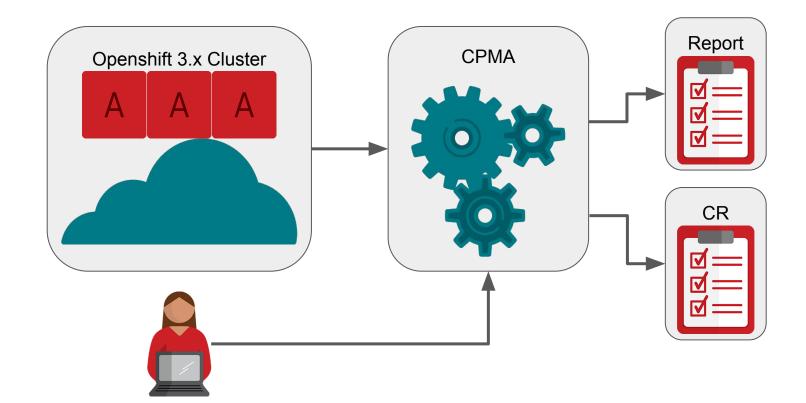
Example #1: Operator-Assisted Ingress Ctrlr "Sharding"	Example #2: Create a Second Router		
<pre>apiVersion: operator.openshift.io/v1 kind: IngressController metadata: namespace: openshift-ingress-operator name: internal-apps spec: domain: internal-apps.dmace.devcluster.openshift.com routeSelector: matchLabels: environment: internal</pre>	<pre>\$ cat <<eof -="" -f="" apiversion:="" create="" domain:="" eof<="" finance-apps="" finance-apps.openshift.example.com="" ingresscontroller="" kind:="" metadata:="" name:="" namespace:="" oc="" openshift-ingress-operator="" operator.openshift.io="" pre="" spec:="" v1="" =""></eof></pre>		



Control Plane Migration Assistance

Assists with:

- <u>Report</u>
 - What has been customized on 3.x control plane?
 - Can we help to translate to 4.x?
 - High confidence
 - Medium confidence
 - No confidence
 - not possible/supported in OCP 4.x
- Custom Resources (CR)
 - CRs to configure cluster for a component's behavior in OCP 4.x





Application Workloads

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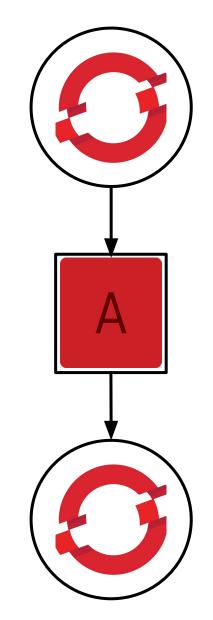


Limitations

- Migration is at scope of a Namespace.
 - Future will allow selecting resources inside of a Namespace

Cluster Scoped Resources are not handled

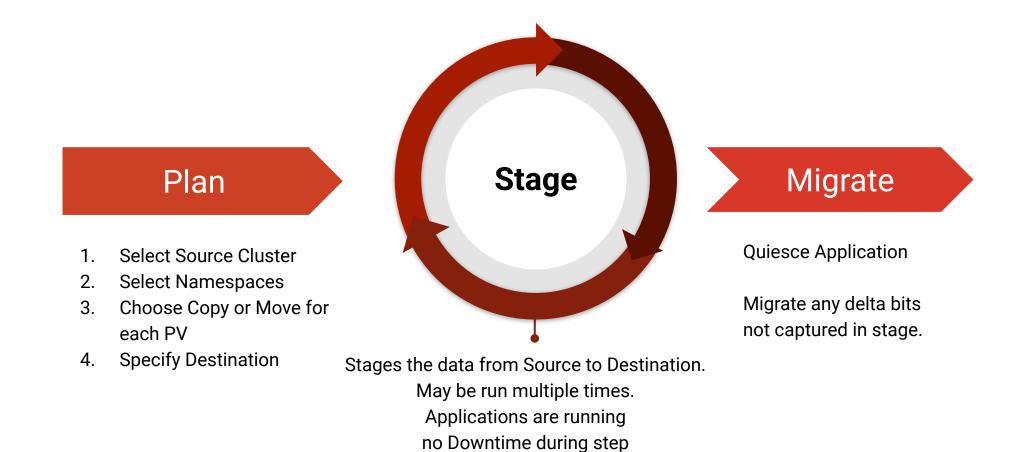
- Cluster Role Bindings, SCCs, etc are not handled with migration.
- Expectation is that cluster admin handles cluster scoped resources ahead of running a Migration.
- 'cluster-admin' required for initial release targeting OCP 4.2
 - Future plans to allow end user to migrate what they own post OCP 4.2+



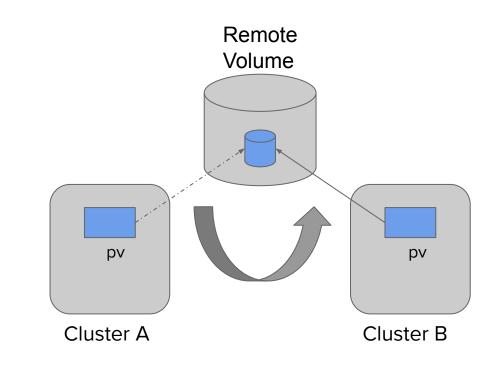




Application Migration

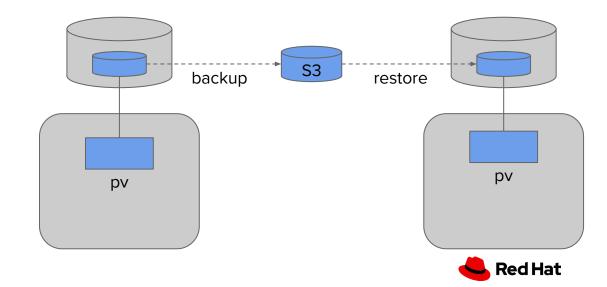






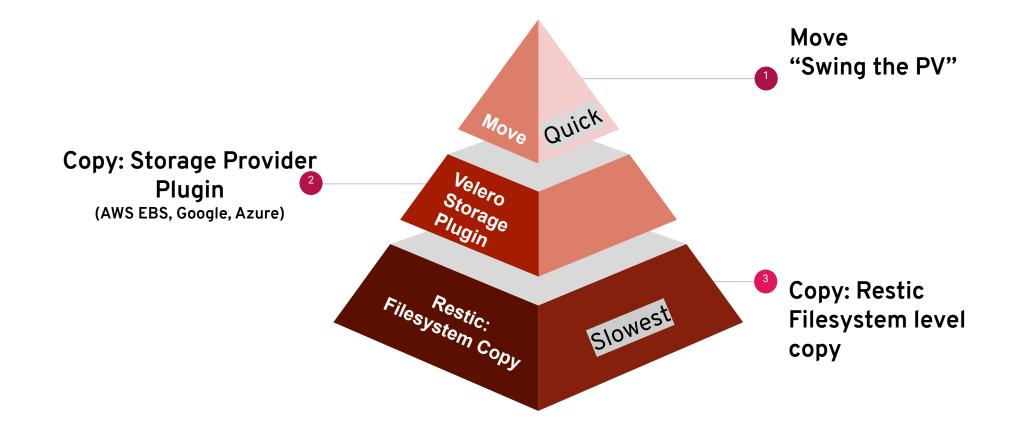


'Move' or 'Swing the PV'



'Copy'

Persistent Volume Handling





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THANK YOU



linkedin.com/company/Red-Hat



youtube.com/user/RedHatVideos





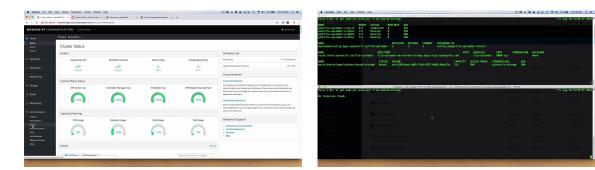
twitter.com/RedHat



Demo

clusters

terminal before



setup assistant

setup migration

terminal during

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