



Next Gen Container Orchestration

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Agenda

- How application portability, scalability and security have evolved
- Business drivers for adopting an enterprise Kubernetes platform
- Changes coming to Kubernetes
- Technical challenges with legacy container technology
- The new technology landscape and inherent benefits
- Introduction to the tooling: A short demo



About HighVail



PRACTICE AREAS

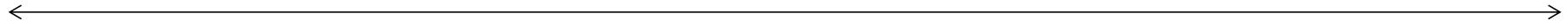
DevOps & DevSecOps
Data Management
Hybrid Multi-Cloud
Application Modernization

SERVICES

DevOps-as-a-Service
Backup-as-a-Service
Training & Enablement
Kubernetes & Cloud Native
Consulting

SOLUTIONS

Automation
Containers & Platform
Infrastructure-as-Code
Day 2 Ops



Who We Are

Toronto-based

More than **18 years** delivering Enterprise-class solutions
Client-focused, Outcomes-based, Committed to Value

Overview



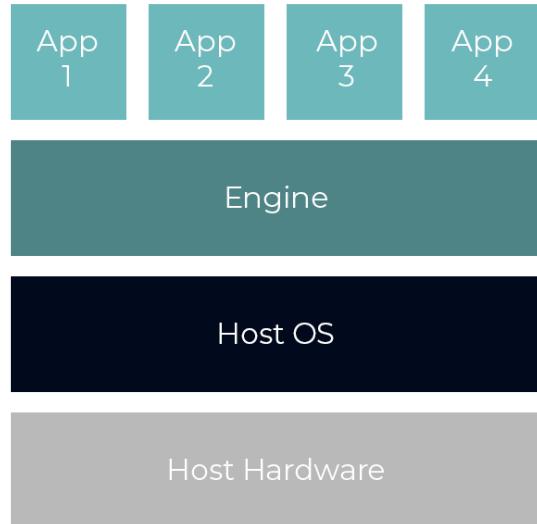
- A look at the future of Container Runtimes, Kubernetes and the diminishing role that Docker will provide
- The Container Runtime Interface and support tools
- A technical workshop around Podman, Buildah and Skopeo



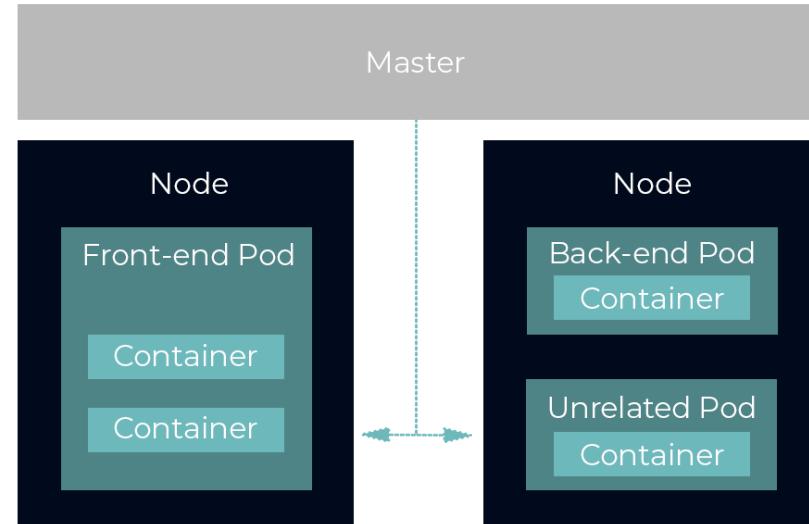
What Are Containers?



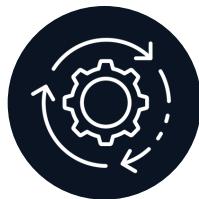
Container Software



Container Orchestration



Why Containerize Applications?



Efficiency

Utilize fewer resources than virtual machines, while delivering higher utilization of compute resources.



Portability

Write once, run anywhere.



Agility

Containerizing applications allows integration with an existing DevOps environment.



Speed of Delivery

Faster application start-up, faster deployment of upgrades & easier scaling.



Security

Improve security by isolating applications from the host system and from each other.

Why Kubernetes?



Portability

The ability to move workloads when needed



Flexibility

Grow and expand capacity and capabilities without dated investments in time, effort, and high costs



Accelerate Time to Value

Provides the ability to take advantage of numerous cloud providers to grow as rapidly as needed, without having to re-architect infrastructure



Security

Includes Role-Based Access Control (RBAC) and flexible update features (e.g. rolling start/stop updates)

3 Out of 4 Businesses Prefer Kubernetes to Alternatives

Customer Use Cases



Red Hat Enterprise Linux®
Red Hat OpenShift® Container Platform
Red Hat Ansible® Tower

- Streamlined customer experience, as well as maintained **flexible, agile and more secure** backend operations that could keep up with customer requests.



Red Hat OpenShift® Container Platform
Red Hat Ansible® / Ansible® Tower

- **Recovered** from serious bugs and issues, and are now running a healthy OCP cluster
- Stronger resource utilization and tightened security
- Provided a **self-healing** architecture and deployment



Red Hat OpenShift® Container Platform
Red Hat Ansible® Tower

- Designed and architected complete set of playbooks for OpenShift
- Allowed the customer to **build** and **re-build** the environment from scratch with our complete set of customized automation playbooks

Customer Use Cases



Red Hat OpenShift® Container Platform
Red Hat Ansible® Tower

- BP can now provision a new environment in **7 minutes, instead of 2-3 weeks**, allowing developers to innovate quickly and better support business goals.



Red Hat Enterprise Linux®
Red Hat OpenShift® Container Platform
Red Hat Ansible® Tower

- Deployment time has decreased from **2-3 weeks to about 4 hours**.
- By migrating to open source software, Intermountain has drastically reduced its IT costs—including licensing costs.



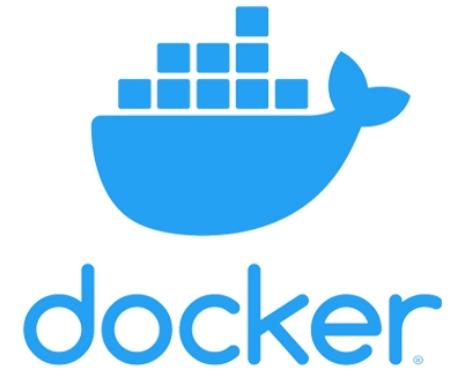
Red Hat OpenShift® Container Platform

- Improved productivity with standardized development environment and self-service provisioning.
- **Significantly reduced hardware costs** by running OpenShift on bare metal

The State of K8s With Docker



In late 2021, Kubernetes is targeted to release **v1.22**, which will drop all non-compliant container runtimes, including Docker.



Planning for Change



- Does this change affect you?
- Have your teams gone through the necessary transition planning?
- Red Hat addressed this issue with OpenShift years ago in version 4



Business Value

- Adopting a container platform brings significant cost saving benefits
- Agility to get application changes into production in a fraction of time with less friction
- Flexibility to run your applications anywhere, regardless of infrastructure



For more information about, or questions on **Kubernetes**, **Podman**, **Buildah**, **Red Hat Enterprise Linux** and **OpenShift**, or any of the topics below, please feel free to reach out to us at info@highvail.com!

At **HighVail**, we *really like*:

- Designing, Architecting and Deploying New **Infrastructure** and Application Platforms
- **Streamlining** Tooling, Workflow Processes and Applications
- Containers and **Container Orchestration**
- **Containerization** of New or Existing Applications
- **Automation** of Everything
- Troubleshooting and Technical Support
- **Day 2 Ops** and *Beyond*



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**CAUTION – TECHNICAL
INFORMATION AHEAD**



Kubernetes is Hard



kubernetes is hard

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[Kubernetes is Hard!. But, where there's Kuberne](#)

Well, 4.8 million people can't be wrong



... but **We** can make it less hard.

Let's see how.



Demonstration Guide

Go to **github.com/highvail/podman-workshop**

And grab the **Intro_to_Podman_v1.0.pdf** demonstration pdf

Oh, and the PPT and Dockerfile are there as well.



podman



Podman is an open source, daemon-less container engine for developing, managing, and running OCI compliant containers on any Linux platform.



The Future
is Open



More Secure



Simplified

Podman For Docker Users



- With Podman, there is no need to start or manage a daemon process such as the Docker daemon.
- Podman and Docker images are interchangeable.
- Podman does more than Docker for Kubernetes environments.
- Podman can generate Kubernetes manifests from running containers.

The commands in Docker work the same as for Podman!

CRI-O – Now it All Comes Together



CRI-O enables you to implement the Kubernetes CRI (*Container Runtime Interface*) to allow OCI (*Open Container Initiative*) compatible runtimes. It is a lightweight alternative to using Docker as the runtime for Kubernetes.



CRI-O is the new standard for open containers in a Kubernetes cluster environment such as ***Red Hat OpenShift Container Platform***.



buildah



How do we build container images based on CRI-O, Docker and others without a container runtime?

The answer is **Buildah**.

Buildah is an OCI-compliant, daemon-less tool for building and modifying OCI / Docker images.

*Buildah, is ‘builder’ with a Boston accent,
with the mascot being a Boston Terrier*



skopeo



Skopeo is a container image mover.

Podman pushes and pulls container images in the traditional Docker way. Skopeo can copy images between local and remote repositories, as well as remote to remote without needing escalated privileges. All this without an installed container runtime.



Podman Commands



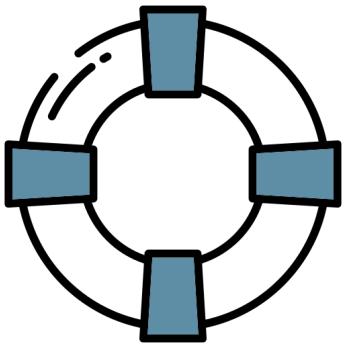
The goal of Podman was always to ensure Docker users could easily adapt. **All the familiar Docker commands exist within Podman.**

The claim is made that if you have existing scripts that run Docker, you can create a docker alias for podman and the scripts will work unmodified.

Podman Security



As Podman is **rootless**, it runs with **user permissions** like any application. It is not a system runtime like Docker.



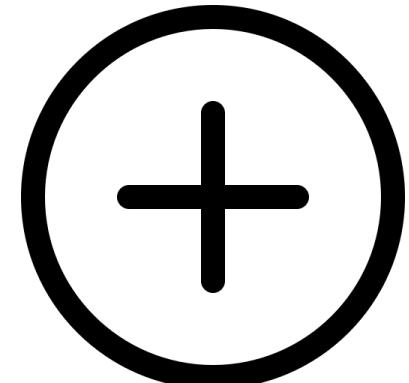
Podman uses a repository in the user's home directory, increasing **isolation and security**, thus ensuring that every user has separate sets of containers and images, and can **use Podman concurrently on the same host without interfering with others**.

Podman and Kubernetes

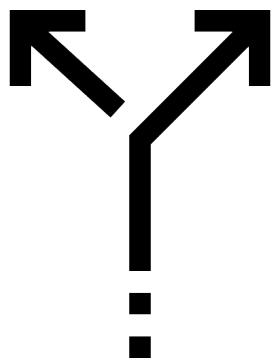


Podman provides extra features that aid developers and operators **working in, and transitioning to Kubernetes** environments, such as OpenShift.

Commands provided by Podman can **assist with K8s deployments**, such as the ability to **generate K8s manifests** based on a running container.



Container Concepts



Podman creates images with traditional Dockerfiles.

Buildah lets you perform image creation, and add content to those images (`FROM`, `RUN`, `EXPOSE`) directly from the command line.

Buildah is an efficient way to create OCI images while Podman allows you to manage and maintain those images.



The commands may be scripted, but they are run against live systems.

Why choose Red Hat?



RHEL Advantage

Every technology in your IT stack needs to work together. **Workloads need to be portable and scalable** across bare metal servers, virtual machines, containers, and private and public clouds.

With a standard OS underlying your workloads, you can easily move them across environments. Red Hat Enterprise Linux gives you a **consistent, stable** foundation across hybrid cloud deployments, along with built-in manageability and integration with the broader Red Hat management and automation portfolio.

Reference



01

openshift.com/blog

02

podman.io

03

buildah.io



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Thank You!

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