

# Red Hat OpenShift Virtualization

## VMA WorkShop Day One

Alfred Bach

Principal Learning and Development Instructor

# AGENDA



- STRATEGY & FIELD POSITIONING
- TECHNICAL DISCOVERY & ASSESSMENT
- PLANNING & CUSTOMER ENGAGEMENT

# Agenda Day 1

**09:00 - 10:35**

- Welcome and Introductions
- Sales Motion and Getting the Technical Win (GTM Strategy)
- OpenShift Virt Overview
- OpenShift Virt - Storage
- OpenShift Virt - Networking

**10:45 - 12:00**

- Access to the Hands-On Lab
- LAB - OpenShift Virtualization Basics
- LAB - Network Management
- LAB - Storage Management

**12:00 - 13:00 Lunch**

**13:00 - 14:45**

- VMware vSphere Overview Presentation
- VMware to OpenShift Presentation

**14:45 - 15:00 BREAK**

**15:00 - 15:45**

- LAB - Migration from VMware to OpenShift

**15:45 - 17:00**

- Migration Factory
- Deep Dive on the Migration Factory offering



<https://github.com/RHEPDS/VMA-Partner-WS>

# Mentimeter



<https://www.menti.com/ala2jnwiypz>

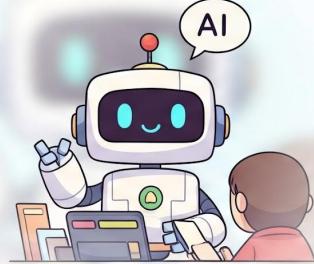
[Link to Mentimeter](#)

In our days ....

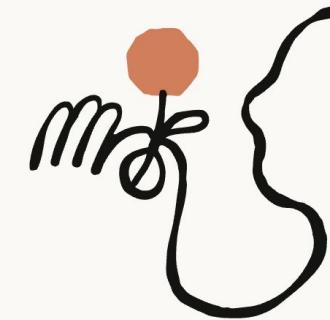
Let's use AI

<https://claude.ai/>

NotebookLM



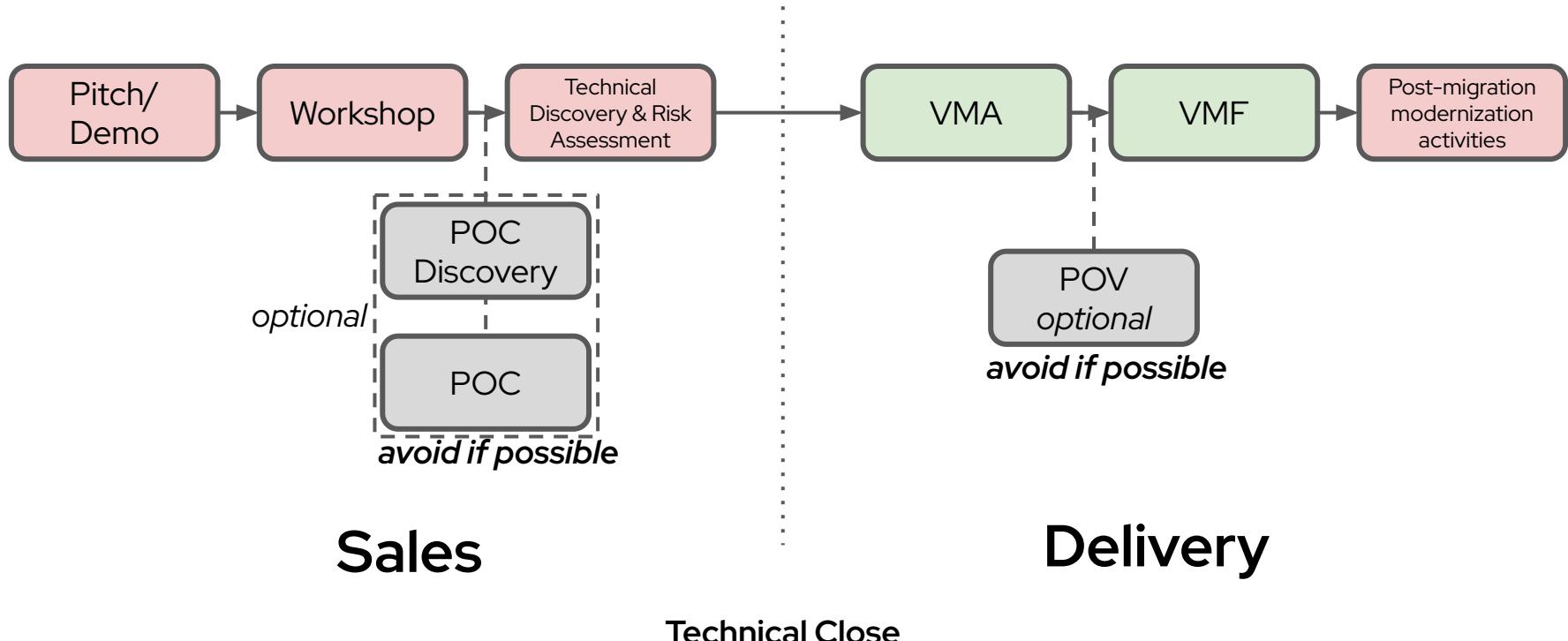
⟳ NotebookLM



Imagine you live here but the landlord



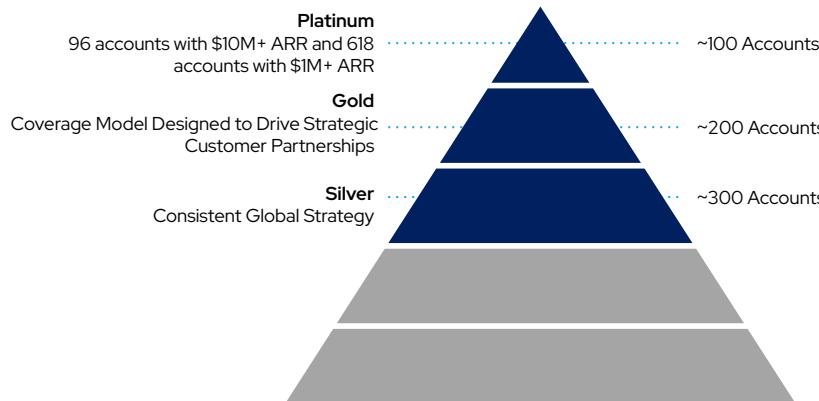
# Optimal Virt sales and delivery path



# The announcement of Broadcom to Acquire VMware has sparked concerns in the industry.

## Technology Risk

With the announcement of the new Go-to-Market Model by Broadcom to focus on the **top 600 accounts** globally leaves many enterprises in open.



**Increase of cost** of virtualization software and subscription<sup>#</sup>



**Reduction of enterprise support** for non-focus accounts

# De-Risking Your Virtualisation Technology Investment

## Future-Proof Your Virtualization Strategy

New and modern applications will be built on containers. They provide new levels of agility and empowers organisations to accelerate their digital capabilities.

However, **not all applications** can or are **ready** to be containerized and operate in microservices.

In most organizations, the **journey** will be a **multi-phased approach**, requiring IT operations to maintain and **coexist** workloads with both virtual machines and containers in their IT landscape.

1

**Rehosting** by “shifting” virtual machine workloads into the OpenShift platform

2

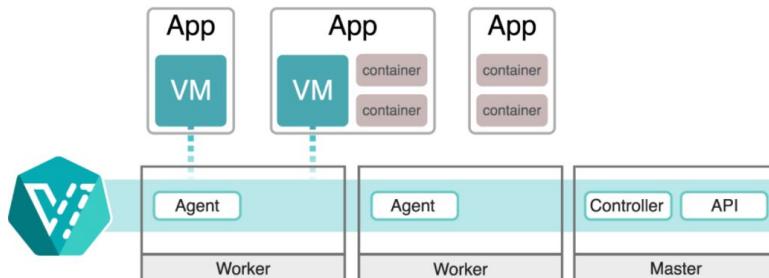
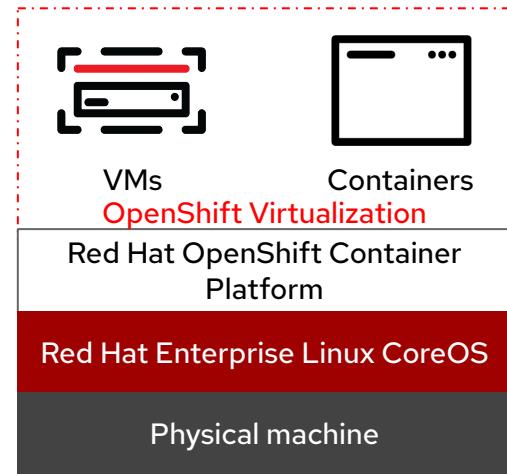
**Replatform** by “upgrading” the application into a container-based architecture

3

**Refactor** applications from monolithic to microservices

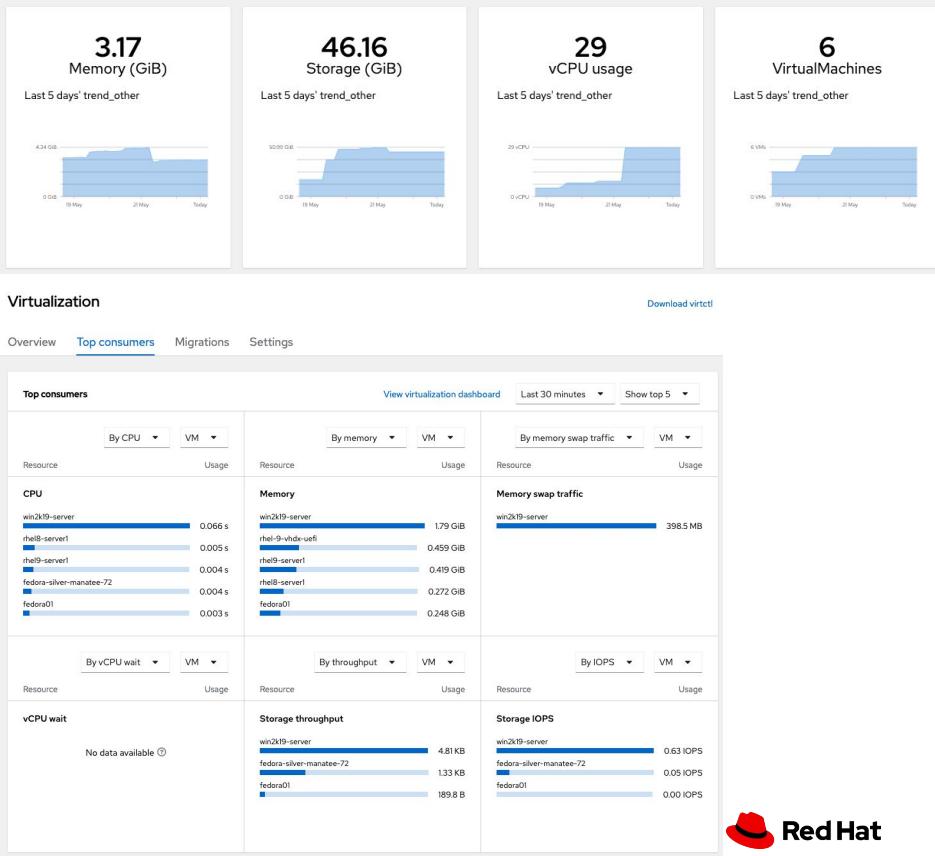
# What is OpenShift Virtualization?

- Unified platform for running VMs and Containers
- Include features of the OpenShift application platform
- Run VMs in OpenShift
- Performance, stability, scalability, and reliability of KVM, the Linux kernel-based hypervisor
- Manageability and ecosystem of OpenShift
- Supports Microsoft Windows guests – Microsoft Server Virtualization Validation Program (SVVP)



# OpenShift Virtualization Overview

- Virtual Machine
  - Provisioning, Deprovisioning
  - Life Cycle Management
  - Live Migration (vMotion equivalent)
- Platform
  - Storage
    - Software Defined (Block, File, NFS, Object Storage)
    - Traditional Storage with Container Storage Interface
      - Dell, EMC, HPE, Hitachi, IBM, Pure etc
  - Network
    - Software Defined (OpenShift OVN)
    - Multiple Networks with VLANs segregation (Multus)
  - Load Balancing
    - MetalLB, F5 etc
- Backup and Restore
  - OADP (Valero), Kasten, Portworx, NetApp, Veritas etc
- Migration to OpenShift
  - vSphere, ESXi, OVA
  - Red Hat Virtualization, OpenStack
  - Hyper-V and other KVM variants (Automate with Ansible)



# Hybrid cloud application platform



**Red Hat**  
OpenShift

## Advanced Management & Security

Multicluster Management | Cluster Security | Global Registry | Cluster Data Management | Compliance & Policy Automation

## Integrated DevOps Services

Service Mesh | Serverless | Builds | Pipelines | GitOps | Tracing | Log Management | Cost Management

## Containers

Image Registry | Container Runtime | Pod Autoscaling | Resource Quotas & Limits | Namespace Isolation | Container Networking

## VMs

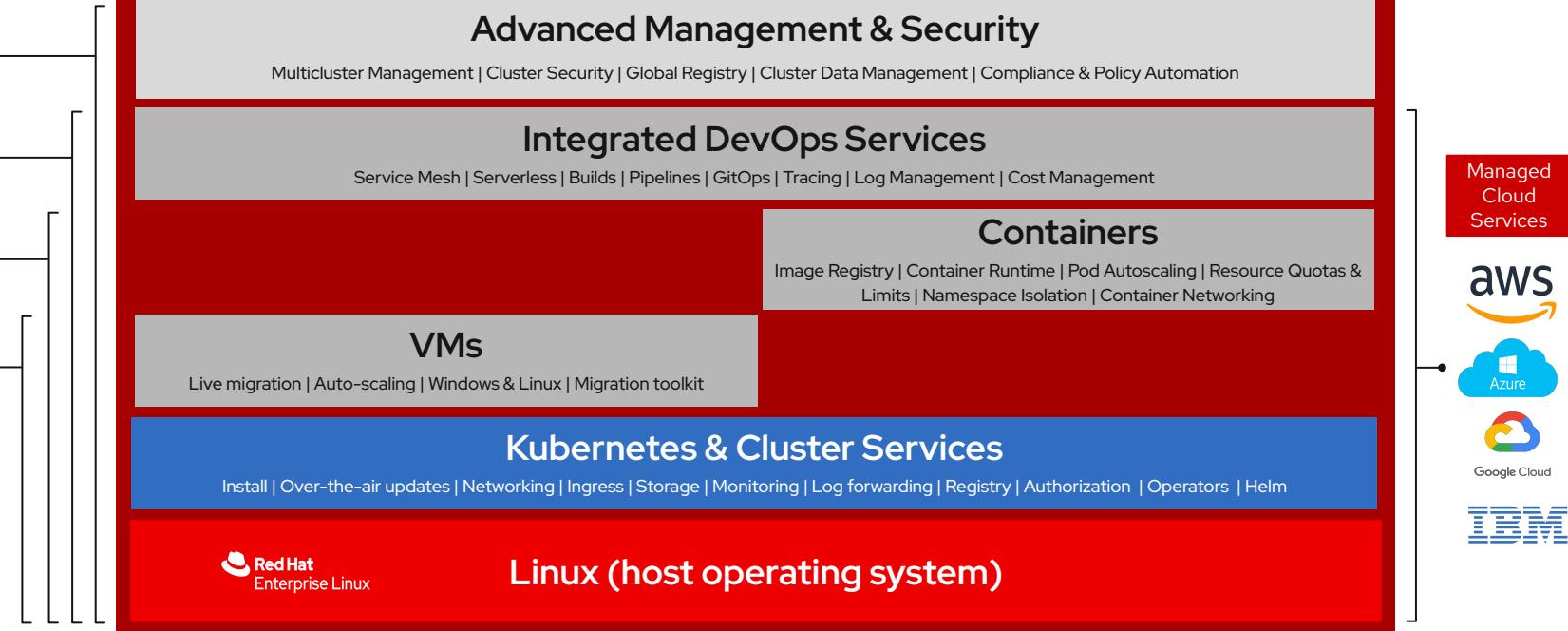
Live migration | Auto-scaling | Windows & Linux | Migration toolkit

## Kubernetes & Cluster Services

Install | Over-the-air updates | Networking | Ingress | Storage | Monitoring | Log forwarding | Registry | Authorization | Operators | Helm



## Linux (host operating system)



Physical

Virtual

Private cloud

Public cloud

Edge



# Migration Toolkit for Virtualization (MTV)



## Main Features:

- Easy to use UI
- Mass migration of VMs from VMware, Red Hat Virtualization, OpenStack to OpenShift and between OpenShift Clusters
- VM data pre-copied before shutdown (Warm Migration) for VMware and Red Hat Virtualization migrations
- VM validation service:
  - Runs checks on VM configuration to avoid migration issues
- Parallelized VM Conversion
  - Maximize Throughput
- Migration Network Selection
  - Avoid impact on other running workloads

The screenshot displays two main sections of the Red Hat OpenShift MTV interface:

**Providers** (Top Section):

Name	Status	Type	Endpoint	VMs	Netw.	Hosts
vSphere	Ready	VMware source	http://hv-node-05.rdu2.sclab.redhat.com/vdk	7736	2	5
rhv	Ready	oVirt source	https://hosted-engine-08.rdu2.sclab.redhat.com/ovirt-engine/api	8	2	3
exp	Ready	KubeVirt		5	1	1

**NetworkMaps** (Bottom Section):

Name	Source...	Target...	From	Status	To
vSphere-map	rhv	exp		Ready	Pod network

Both sections include a sidebar with navigation links: Home, Operators, Workloads, Migration (selected), and Virtualization.

# Modernize at your own pace

## Legacy Virtualization

Apps in VMs

Slow evolution  
⌚

Increasing costs  
💲



Developer toil

## Infrastructure Modernization

Apps in VMs



Cloud elasticity + scalability



Reduced cost



Increase IT efficiency +  
reliability

Migration  
Toolkit for  
VMs

## DevOps & Infrastructure Modernization

Apps in VMs or Containers



Innovate at speed



Higher annual revenue



Increased developer output

Cloud  
Native

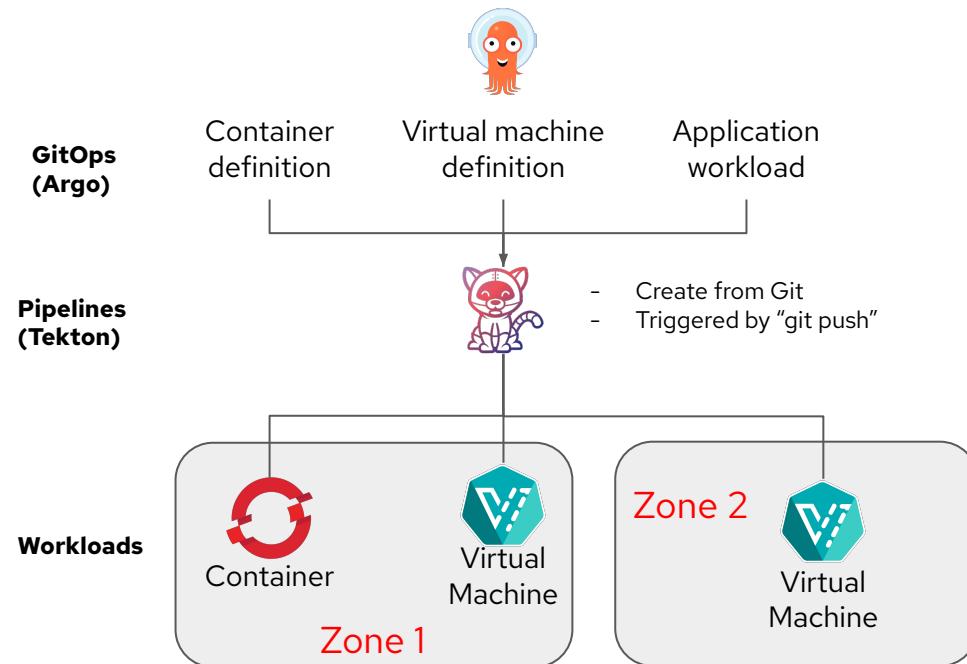
Direct path to cloud native

Speed of Infrastructure Deployment  
Speed of Application Development



# OpenShift Virtualization: Build Cloud-native VMs

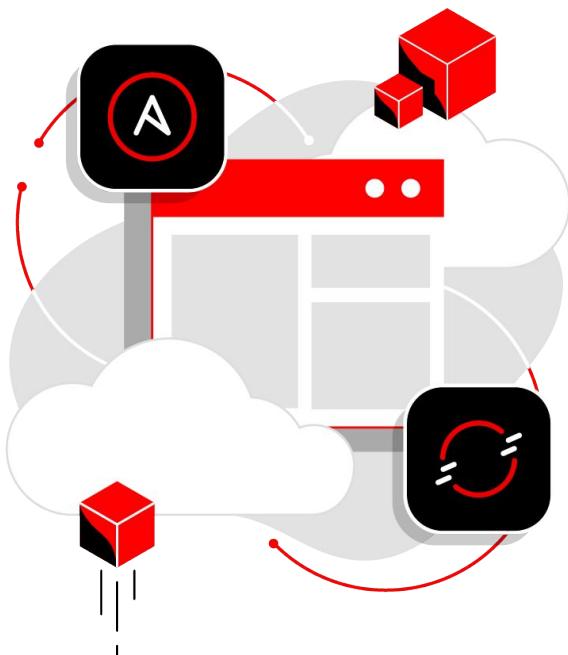
Deploy VMs as Code with CI/CD



Integrate legacy VMs with a modern GitOps framework

- ▶ Deploy different security zones to run both composite applications of pods/VMs as well as traditional VM workloads
- ▶ Deploy and automate Virtual Machines as Code with GitOps

# Creating Mission Critical Virtualization with AAP



## Virtualization Operations

### Automate daily activities (remediation)

- ▶ Application deployments and CI/CD pipelines
- ▶ Life cycle management and enforcement
- ▶ OS patching (Windows and Linux) and maintenance
- ▶ Event Driven Remediation



## Deployment and retirement

### Provision, configure and teardown virtual instances

- ▶ Create turn key deployments for infrastructure teams
- ▶ Govern instance creation and enforce retirements
- ▶ Create service catalog items for ordering environments

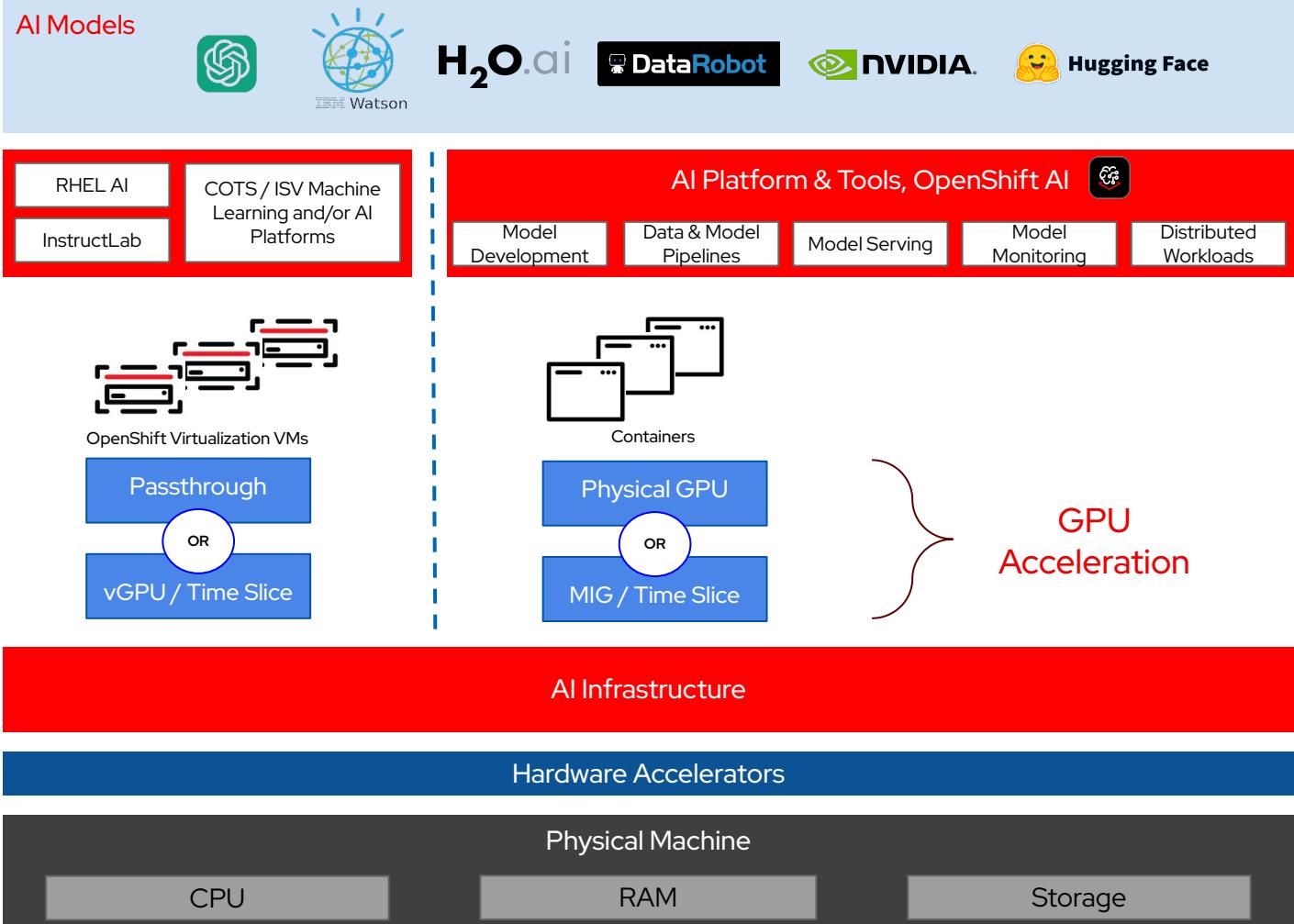


## Virtual Machine migration

### Move workloads to OpenShift safely

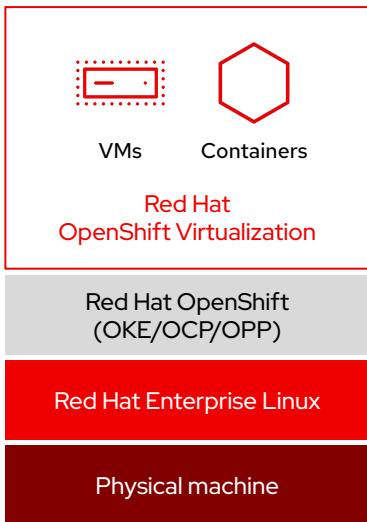
- ▶ Pre and Post processing for VM Migration from vSphere
- ▶ Last mile configuration checks

# OpenShift Virtualization for AI

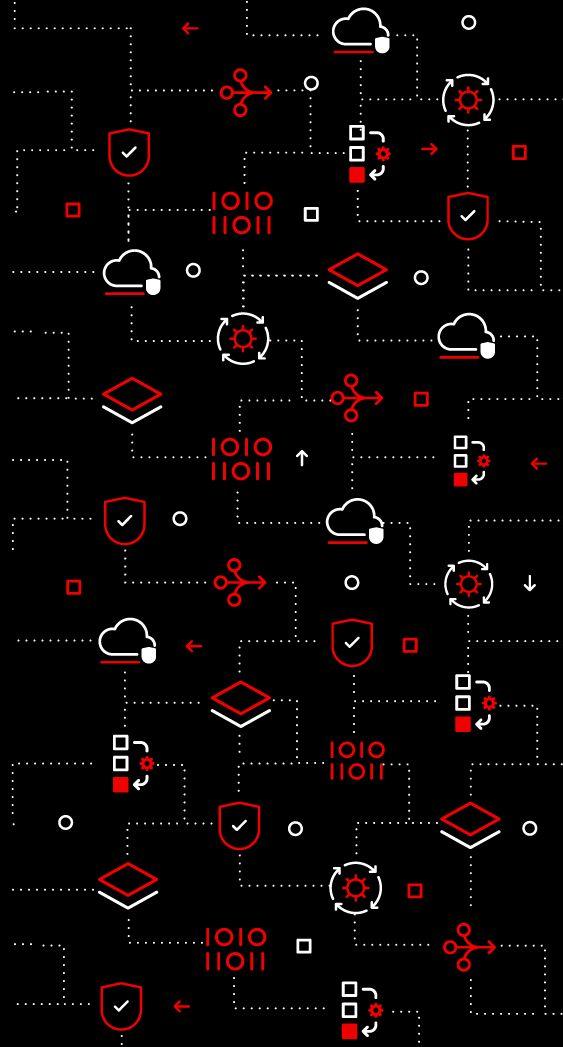


# Red Hat OpenShift Virtualization

The modern option for general purpose virtualization



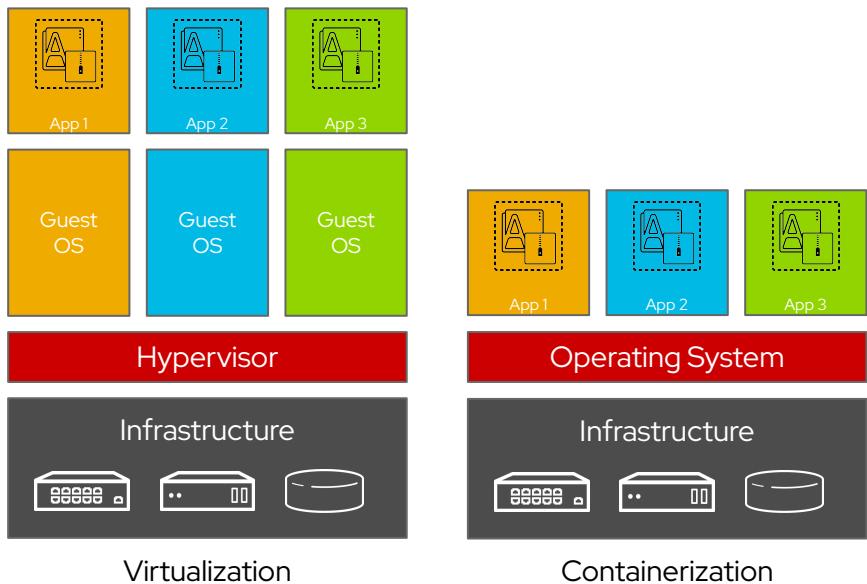
- ▶ **Unified platform**  
for virtual machines and containers
- ▶ **Consistent management**  
tools, interfaces, and APIs incl. ACM and AAP integrations
- ▶ **Performance and stability**  
of Linux, KVM, and qemu
- ▶ **Healthy open source community**  
the KubeVirt project is a top 10 CNCF active project, with 200+ contributing companies
- ▶ **Supports Microsoft Windows**  
guests through Microsoft SVVP
- ▶ **Inbound guest migration**  
using Ansible Automation Platform + Migration Toolkit for Virtualization, Training and Consulting
- ▶ **Diverse ecosystem**  
of Red Hat & partner operators



# Deeper Dive into the Technology

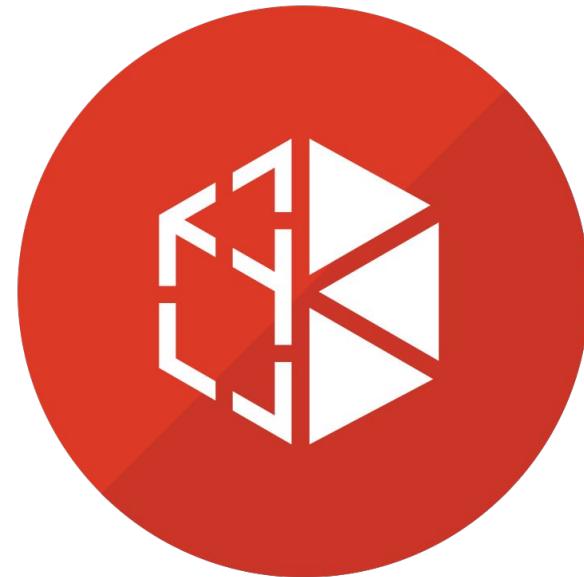
# Containers are not Virtual Machines

- Containers are process isolation
- Kernel namespaces provide isolation and cgroups provide resource controls
- No hypervisor needed for containers
- Contain only binaries, libraries, and tools which are needed by the application
- Ephemeral



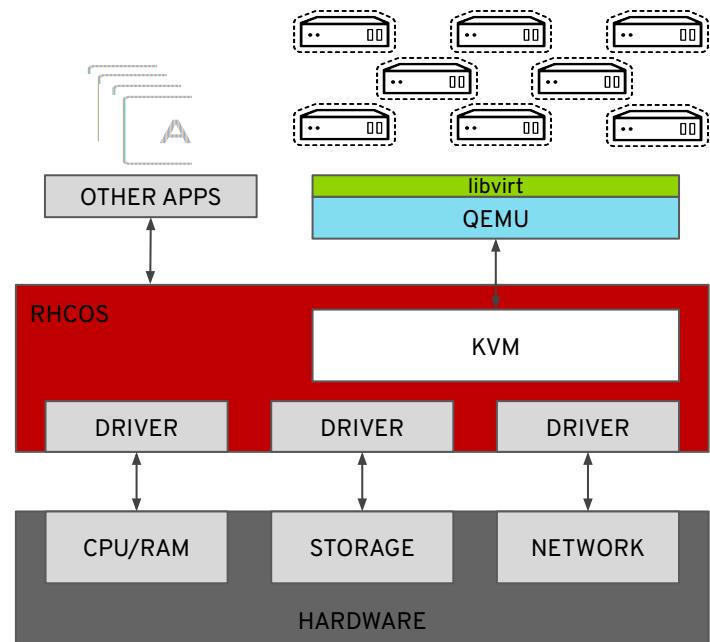
# OpenShift Virtualization

- Virtual machines
  - Running in containers, managed as Pods
  - Using the KVM hypervisor
- Scheduled, deployed, and managed by Kubernetes
- Integrated with container orchestrator resources and services
  - Traditional Pod-like SDN connectivity and/or connectivity to external VLAN and other networks via multus
  - Persistent storage paradigm (PVC, PV, StorageClass)

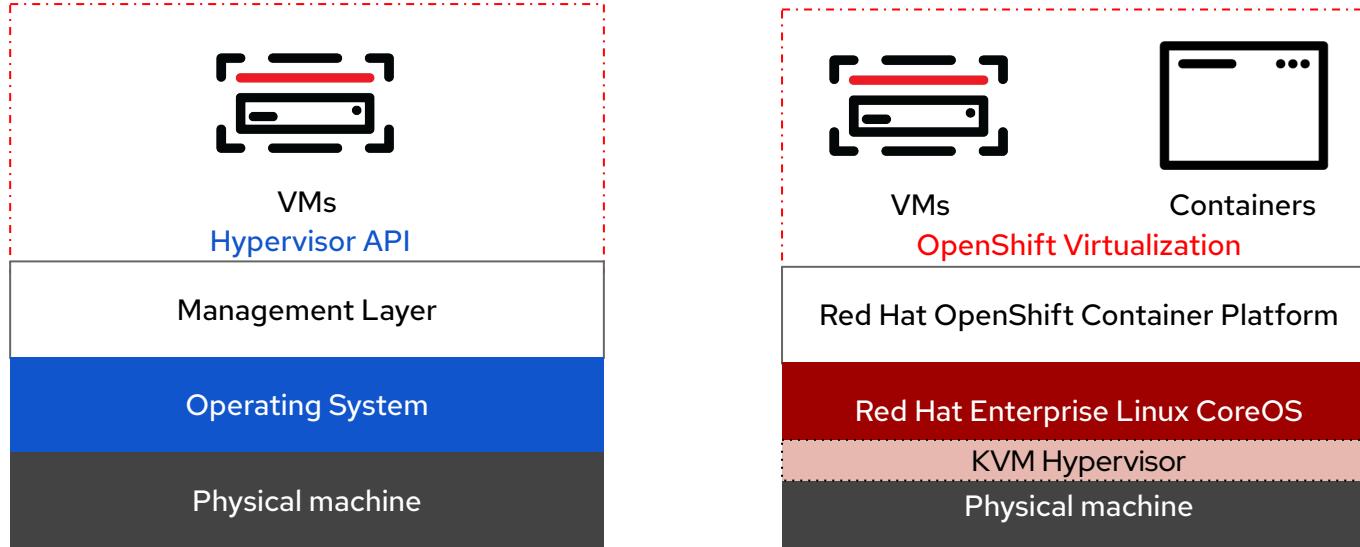


# OpenShift Virtualization uses KVM

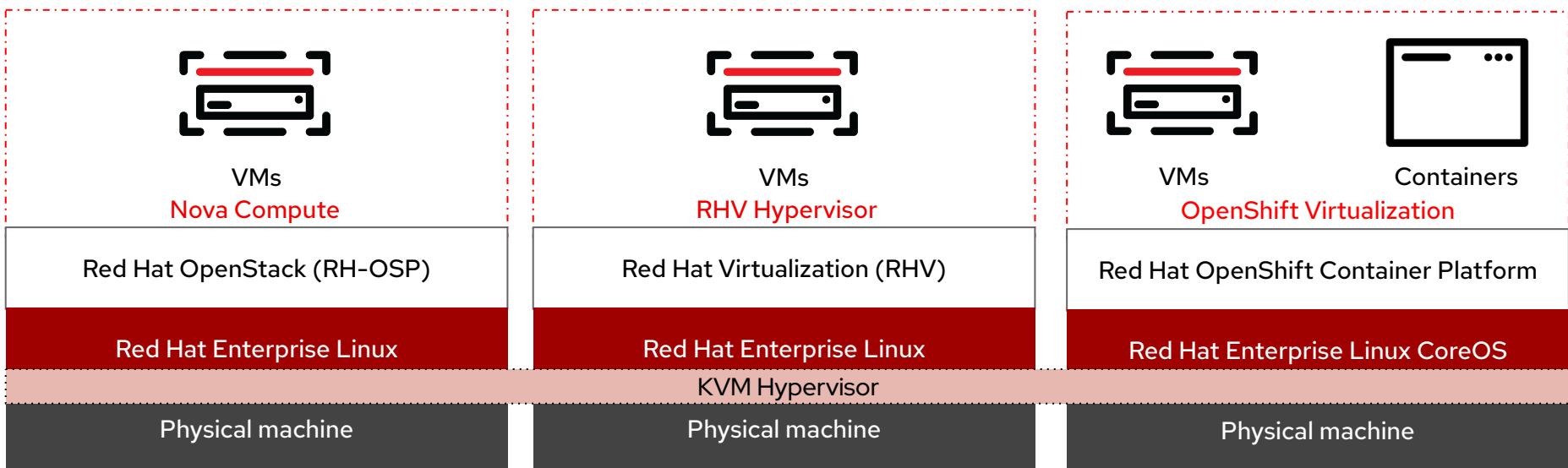
- OpenShift Virtualization uses KVM, the Linux kernel hypervisor
- KVM is a core component of the Red Hat Enterprise Linux kernel
  - KVM has 10+ years of production use: Red Hat Virtualization, Red Hat OpenStack Platform, and RHEL all leverage KVM, QEMU, and libvirt
- QEMU uses KVM to execute virtual machines
- libvirt provides a management abstraction layer
- Currently supported on x86 bare metal
- For other platforms contact Product Management for roadmap



# Traditional Type 1 Hypervisor vs OpenShift Virtualization

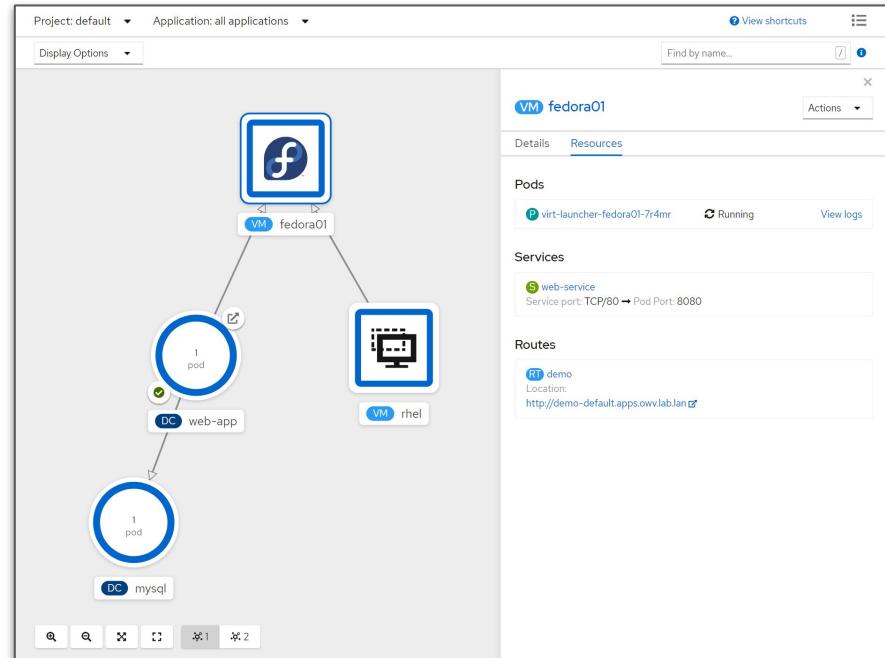


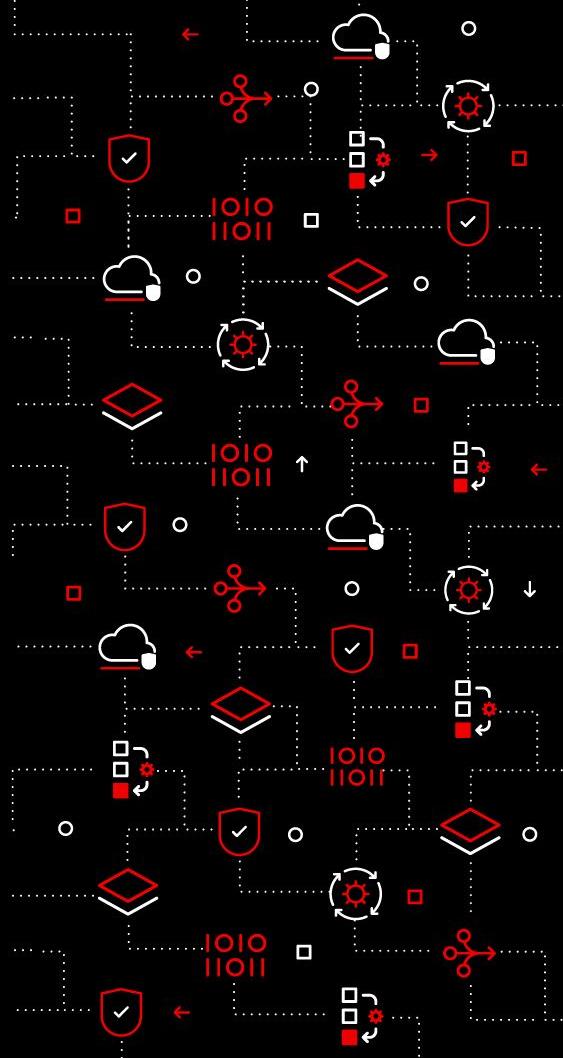
# OpenStack vs RHV vs OpenShift Virtualization



# Using VMs and Containers Together

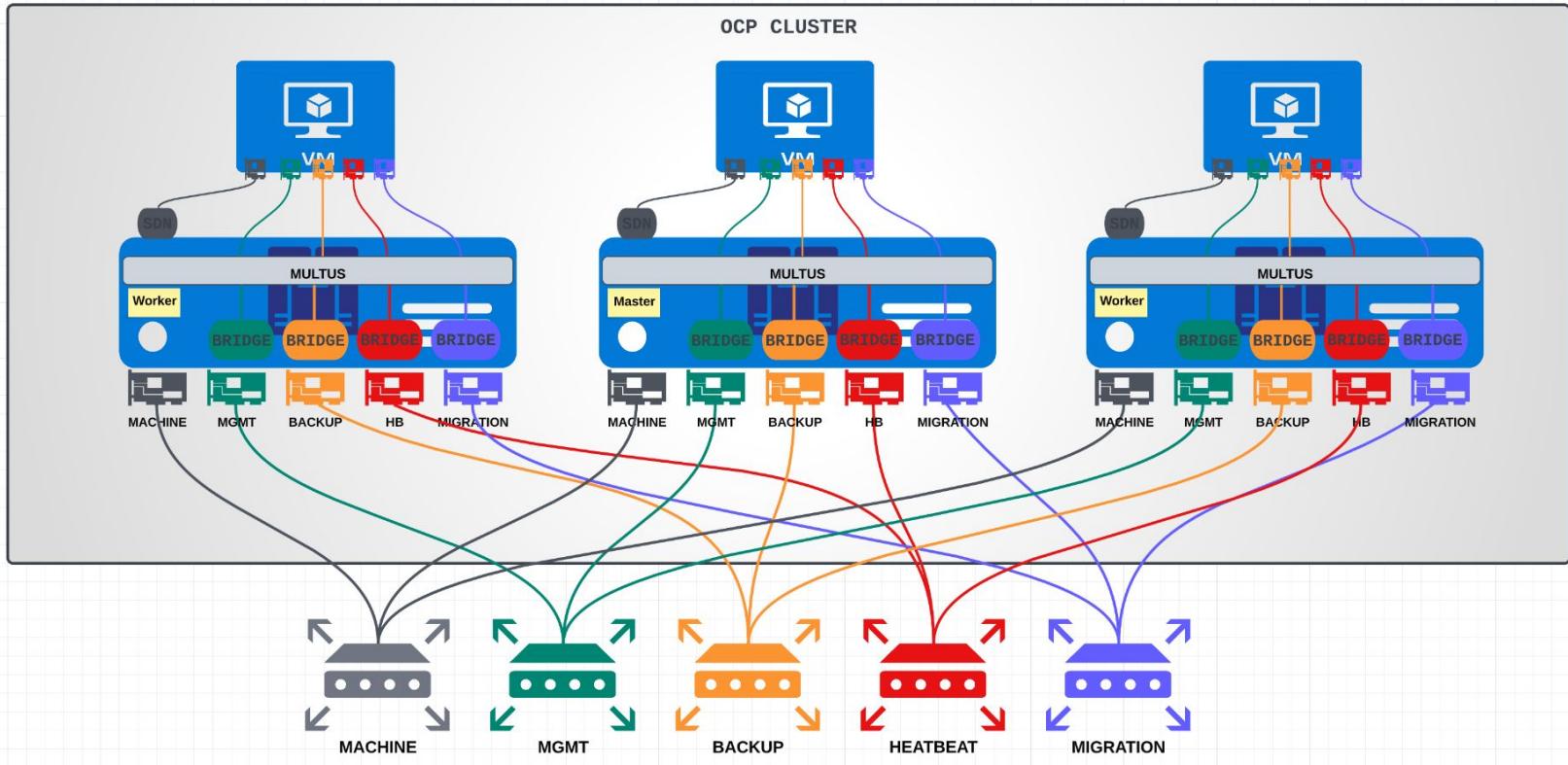
- Virtual machines connected to pod networks are accessible using standard Kubernetes methods:
  - Service
  - Route
  - Ingress
- Network policies apply to VM pods the same as application pods
- VM-to-pod, and vice-versa, communication happens over SDN or ingress depending on network connectivity





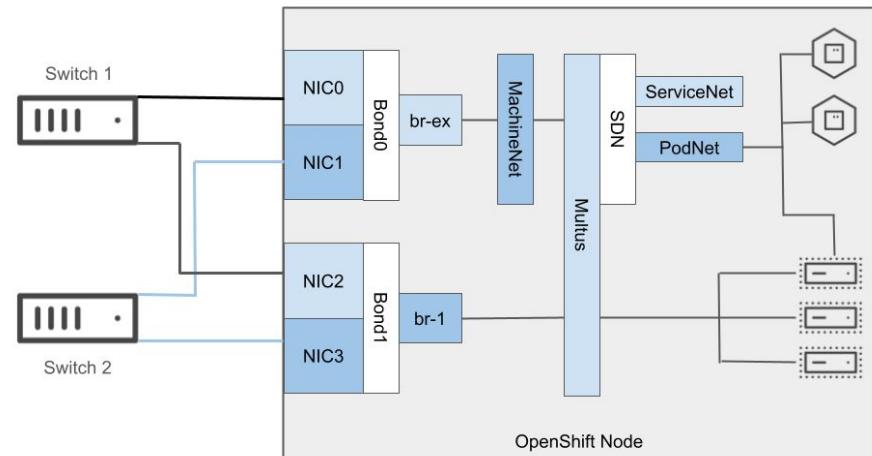
# Networking

# VM Multi-NIC High Level Architecture

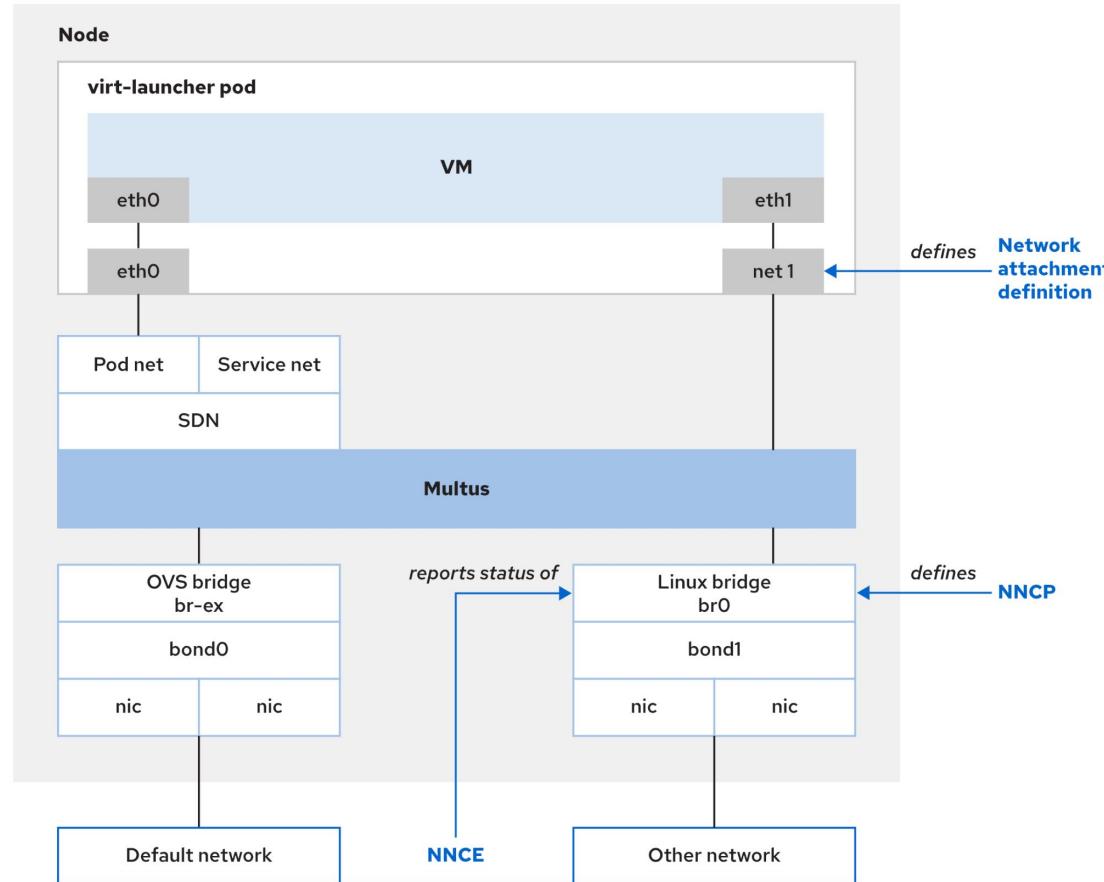


# Physical Host Configuration, VM Connectivity

- Virtual machines optionally connect to the standard pod network
  - OVN-Kubernetes or partners (Tigera Calico/F5)
- Additional network interfaces accessible via Multus:
  - Bridge, SR-IOV, OVN secondary networks
  - VLAN and other networks
- NMstate applies declarative host network configuration to all machines which match the selector
  - Bond, bridge, OVS
- Node firewall and ingress/egress rules apply



# Linux Bridge Node Networking with Multus and Kubernetes NMState

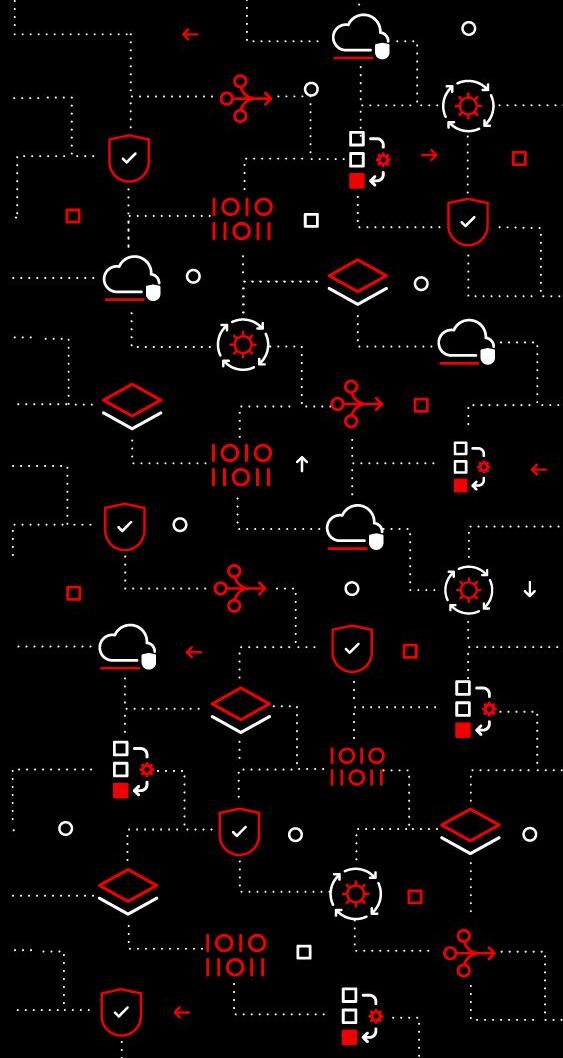


# VM Networking in OpenShift Virtualization

- VMs connected to the SDN have the same functionality as Pods
  - Service-based discoverability and (internal) load balancing
  - Route-based external access
  - Ingress/egress throughput control
  - MetalLB for externally accessible load balanced connections
  - NetworkPolicy for microsegmentation
  - Service Mesh features and functions
- VMs connected to an OVN-K secondary network inherit functionality of OVN/OVS
  - MultiNetworkPolicy for microsegmentation
  - L2 topology for east-west isolated networks
  - Localnet topology for external access, including VLANs

# OpenShift Virtualization Prior to 4.17+

- VMs connected to the SDN have the same functionality as Pods
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  - Route-based external access
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  - MetallLB for externally accessible load balanced connections
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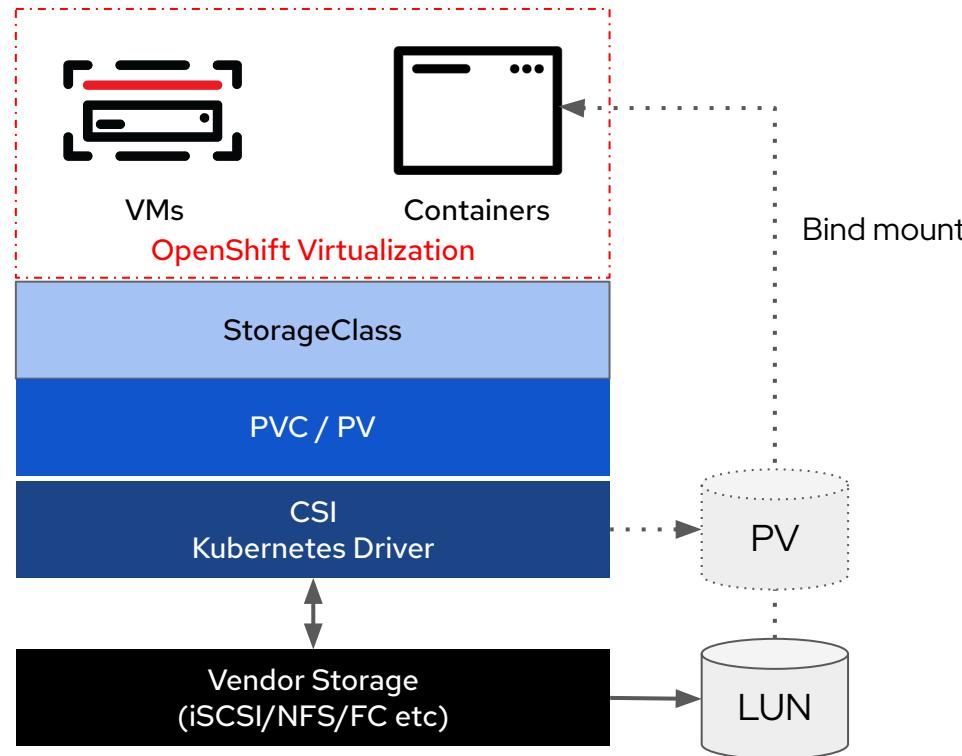


# Storage

# Policy Based Storage

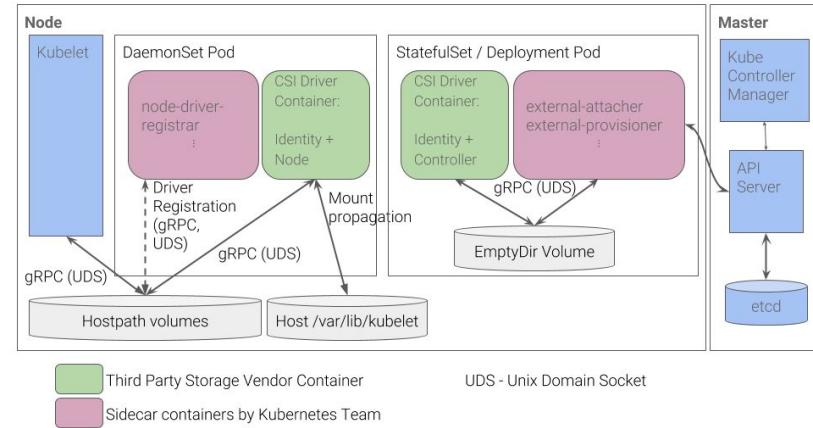
**Type:** Block, File or Object  
Gold, Silver or Bronze

**Request:** Block, 10GB  
Read-Write Many



# Container Storage Interface (CSI)

- Container Storage Interface (CSI) was proposed as a solution to problems faced by in-tree volume plugins
- CSI Specification defined APIs (RPCs) to enable:
  - Dynamic provisioning and deprovisioning of a volume
  - Attaching/detaching a volume from a node
  - Mounting/unmounting a volume from a node
  - Consumption of both block and mountable volumes
  - Creating and deleting a snapshot
  - Provisioning a new volume from a snapshot
- Storage vendors now had to develop only a single CSI Driver and it would work across a number of container orchestration (CO) systems.

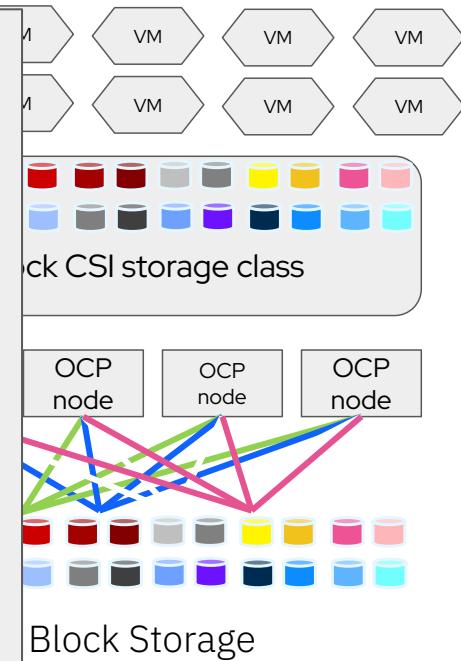


CONTAINER  
STORAGE  
INTERFACE

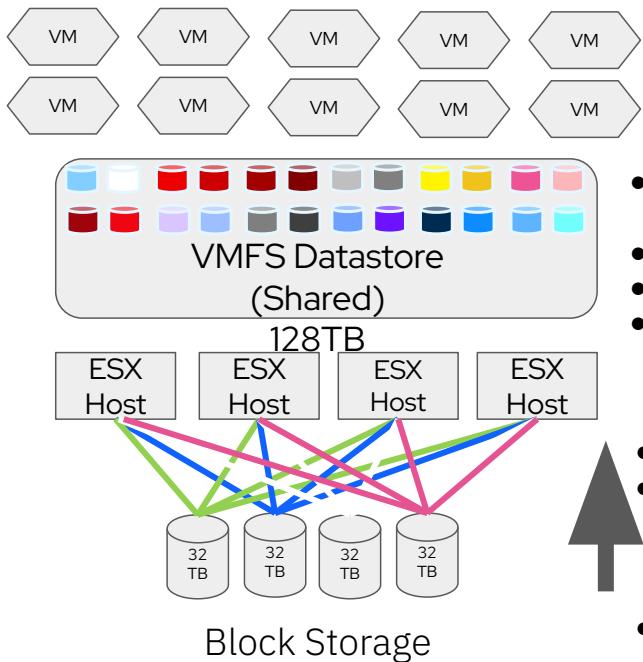
## VMWare VMFS

1. Older array does not expect to have LUN CRUDs driven by VM activity.
2. Hosts expect storage to be segmented to the Fiber Channel network with nothing going over TCP/IP.
3. Storage admin is exposed to all the activity instead of throwing single large LUNs over to the Virtualization admin. OpenShift admins need creds to CRUD things on the array.

## OpenShift Virtualization with block CSI

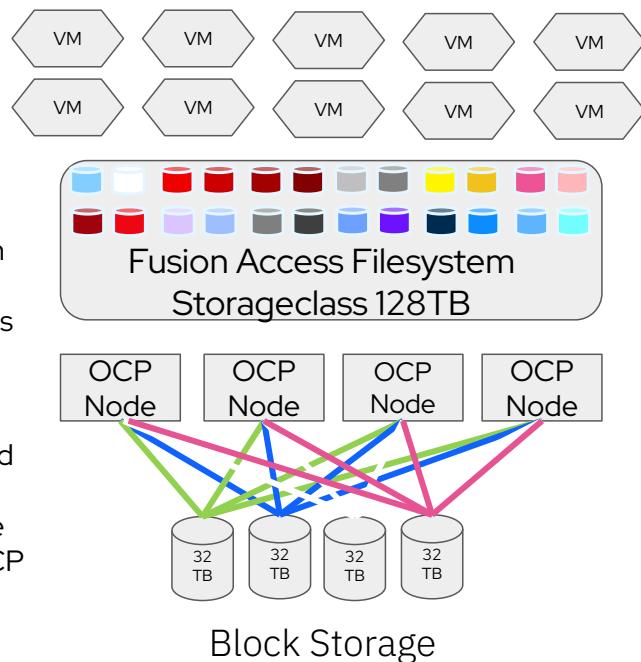


## VMWare VMFS



## Same architecture

## OpenShift Virtualization with Fusion Access



# CSI vs SDS vs Fusion Access

CSI

SDS

Fusion Access

OpenShift

- ODF Operator
- Automation
  - Self-healing
  - Replication

**Fusion Access  
Operator**

- Automation
- Self-healing
- Replication

Storage vendor  
CSI

Storage vendor  
CSI

Fusion Access  
CSI

Your pre-existing storage



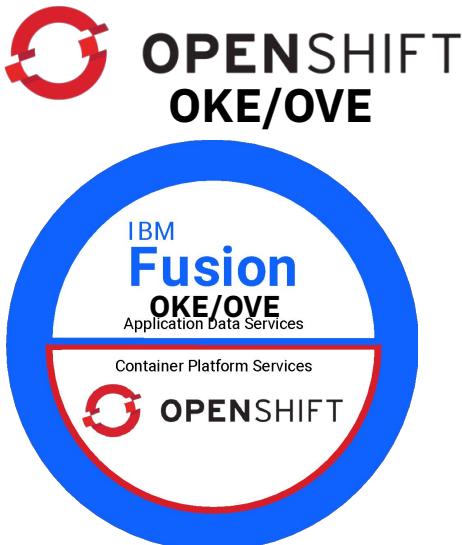
# Fusion Essentials for Virtualization

## Features

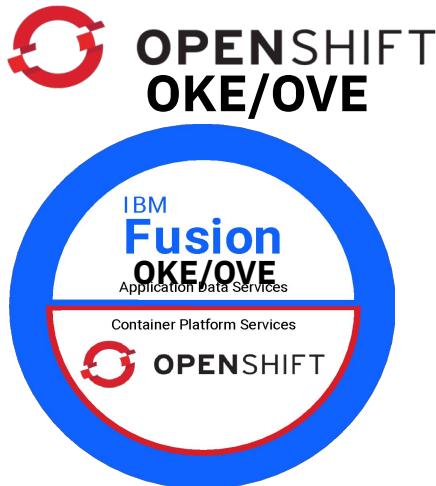
- ✓ Block, File, Object via Data Foundation
- ✓ Fusion Access for SAN\*\*

## Limitations and exclusions

- Virtualization workloads only
- No Control Tower multi cluster, DR, or stretch cluster
- No Backup and restore
- No Cataloging or Advanced encryption
- No Content Aware Storage (CAS)
- Subscription only
- 8TB per 128 core node
- Capacity units may be added using existing capacity parts



# Fusion Advanced for Virtualization



## Features

- ✓ Block, File, Object via Data Foundation
- ✓ Fusion Access for SAN\*\*
- ✓ Fusion Control Tower for multi cluster management
- ✓ Metadata tagging and catalog
- ✓ Disaster recovery
- ✓ Advanced encryption with KMS

## Limitations and exclusions

- Virtualization workloads only
- VM-only backup, no container backup
- No Content Aware Storage (CAS)
- Subscription only
- 8TB per 128 core node
- Capacity units may be added using existing capacity parts

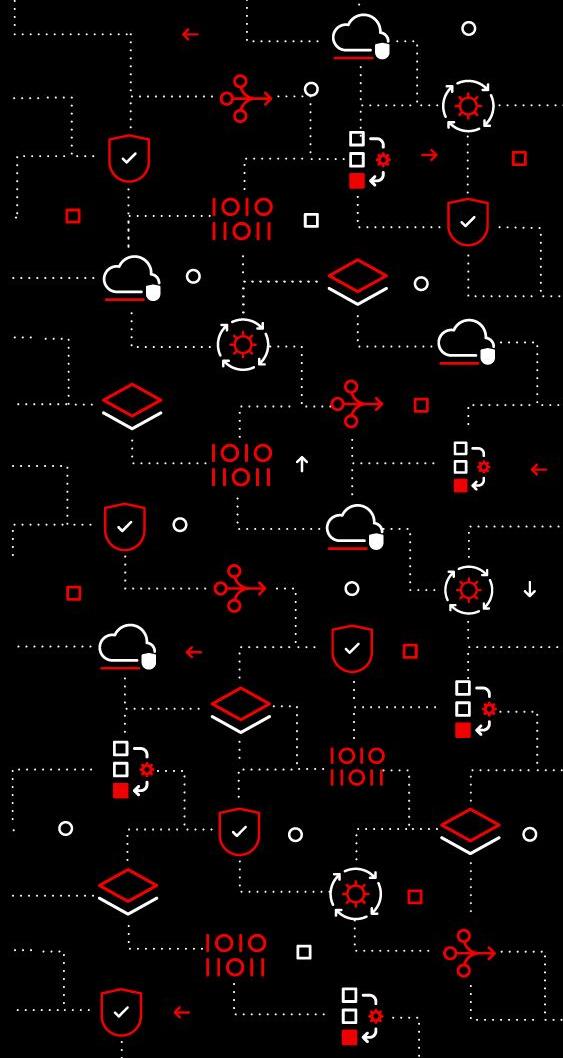
# Fusion parts overview

	for VM-only workloads	for mix of VM and Container workloads	
	Fusion Essentials for Virtualization	Fusion Advanced for Virtualization	Fusion Advanced Managed Server
Licensing metric	Up to 128 cores	Up to 128 cores	Up to 64 cores
Storage capacity	8TB per server	8TB per server	12TB per cluster
Backup capacity	None	8TB per server	12TB per cluster
Intent	Lowest cost part for opportunities in low feature count use cases.	Enterprise platform with governance and resiliency. Up to 128 cores matches the Red Hat parts for licensing simplicity.	Original Fusion bare metal part. Adds Ceph storage provisioning Adds Scale storage provisioning Adds Content Aware Storage

## **DOZQWZX - IBM Fusion Advanced for Virtualization per Managed Server Subscription License**

DOZR0ZX - IBM Fusion Essentials for Virtualization per Managed Server Subscription License

DOZQVZX - IBM Fusion Advanced for Virtualization per Managed Server Subscription License Upgrade

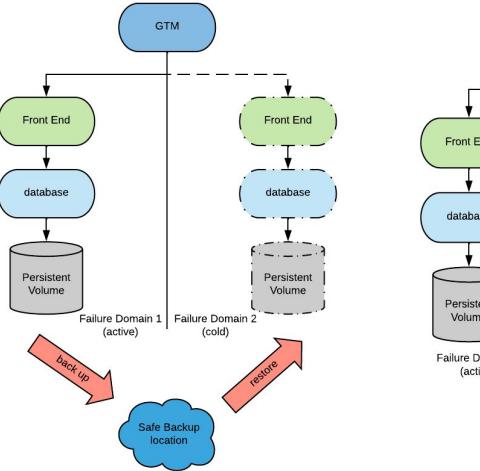


# DR / HA

# High-level DR Approaches

Failure Domain is either a data center or a cloud region

## Active/Passive



### Backup / Restore

RPO ~= frequency of backup  
RTO ~= hours

### Storage-layer Replication

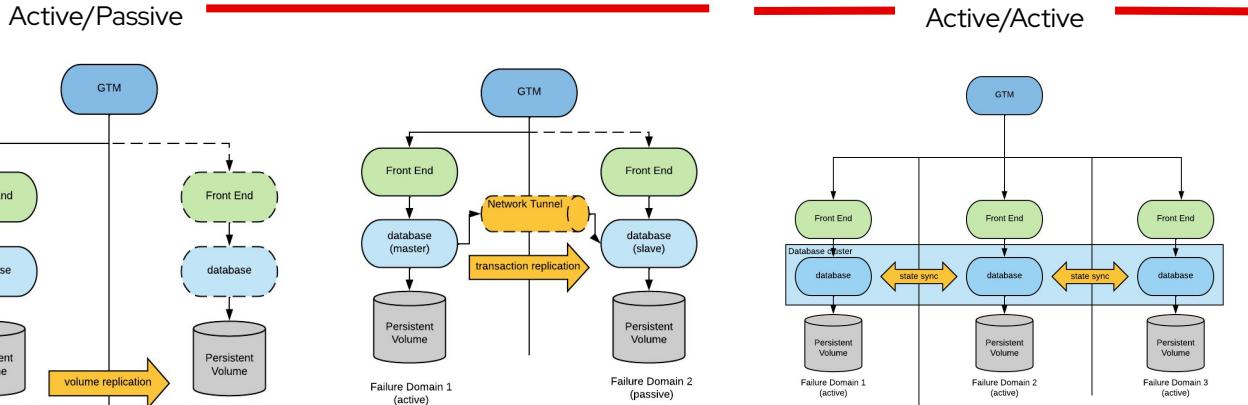
- Asynchronous:
  - RPO ~= unbounded (typically ms)
  - RTO ~= typically minutes \*
- Synchronous:
  - RPO = 0
  - RTO ~= typically minutes\*

### Application-layer Replication

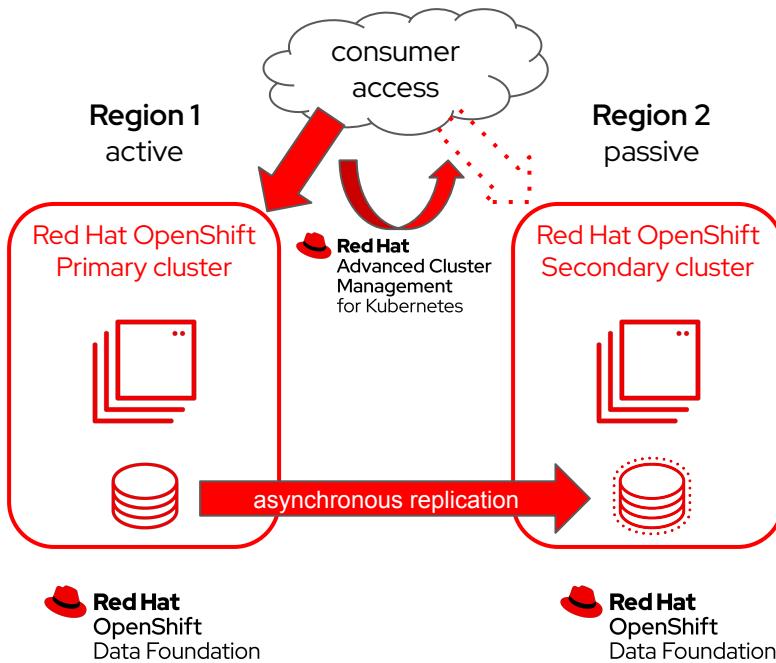
- Asynchronous:
  - RPO ~= unbounded (typically ms)
  - RTO ~= typically minutes \*
- Synchronous:
  - RPO = 0
  - RTO ~= typically minutes\*

### Distributed Stateful Workloads

- Strong Consistency:
  - RPO = 0
  - RTO ~= seconds
- Eventual Consistency (\*\*)
  - RPO ~= 0
  - RTO ~= seconds



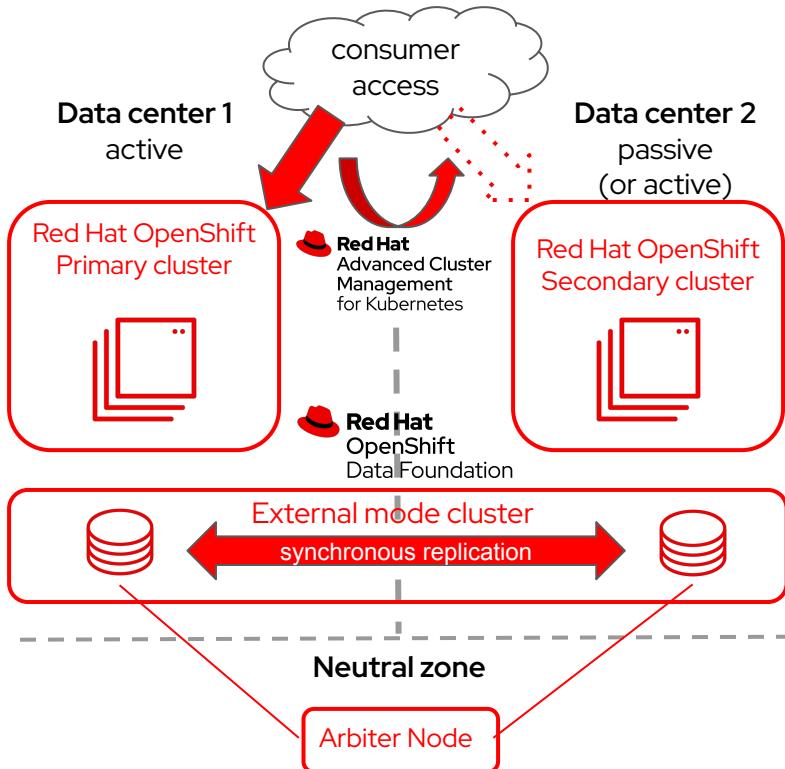
# Red Hat OpenShift-Regional Disaster Recovery



Protection against geographic scale disasters

- ▶ OpenShift Data Foundation enables cross cluster replication of data volumes
- ▶ Storage operators synchronize both volume persistent data and kubernetes metadata
- ▶ Enables failover and fallback automation at application granularity, orchestrated by Red Hat Advanced Cluster Management

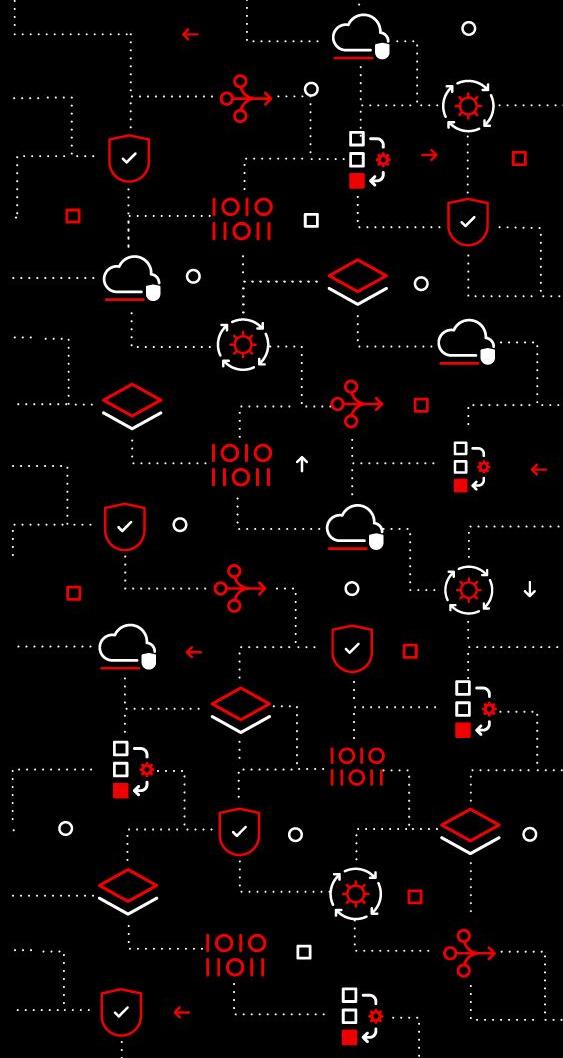
# Red Hat OpenShift-Metropolitan Disaster Recovery



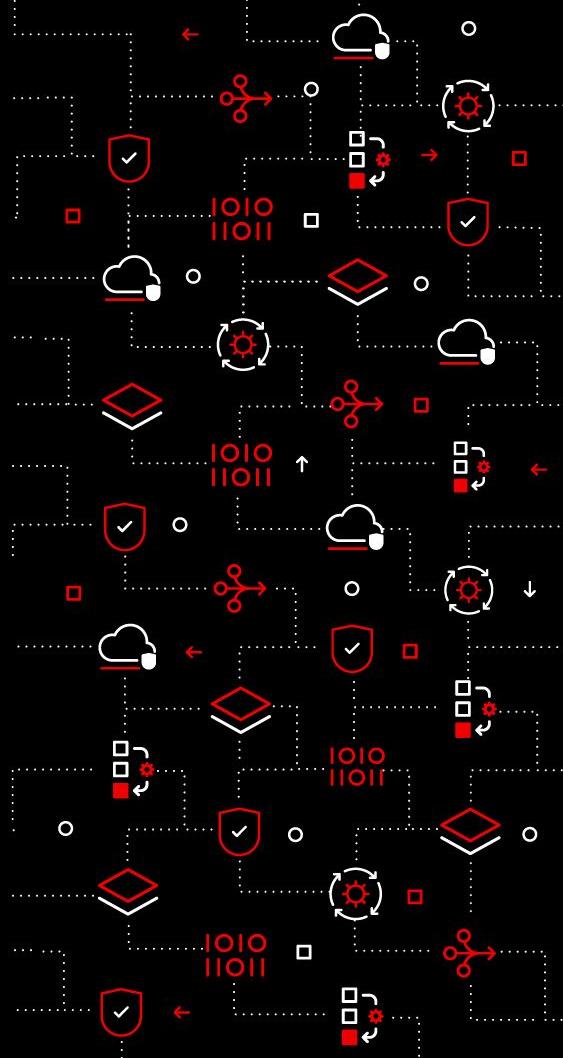
Protection against data loss across multiple clusters with Metropolitan disaster recovery

- ▶ Clusters deployed in different datacenters provide a fault isolated configuration
- ▶ External mode OpenShift Data Foundation cluster provides synchronous replicated volumes across the datacenters
- ▶ Enables failover and fallback automation at application granularity, orchestrated by Red Hat Advanced Cluster Management





BREAK  
till 11:15



# Hands-On Lab 1



## Experience OpenShift Virtualization

Introduction

### Virtual Machine Management

Switch to the Virtualization Persona

Exploring OpenShift Virtualization

Create a New Project

Create a Linux Virtual Machine

Administering Virtual Machines

Controlling Virtual Machine State

Live Migrate a Virtual Machine

### Migrating Existing Virtual Machines

### Storage Management

### Backup and Recovery for Virtual Machines

### Template and InstanceType Management

### Working with Virtual Machines and Applications

### Network Management for Virtual Machines

### Conclusion

Experience OpenShift Virtualization / Virtual Machine Management

# Virtual Machine Management

## Introduction

The beginning section of this lab will introduce you to the basics of creating and managing VMs in OpenShift Virtualization. Starting with OpenShift 4.18 there is a new Virtualization persona and a tree view for virtual machines that make it easier to visualize and manage your virtualization-based assets. After exploring the UI changes, you will see how the web console guides you through the whole process of creating a virtual machine from a pre-defined template. We will then review the properties of that VM, do some basic customizations, and perform actions like live migration, that are often expected of virtual machine administrators.

## Goals

- Create a new virtual machine
- Review and modify resources for virtual machines
- Understand how VM power states are managed using the OpenShift console
- Live migrate a VM between two hosts

As a reminder, here are your credentials for the OpenShift Console:

Your OpenShift cluster console is available [here](#).

Your login is available with:

- User: user3
- Password: KXxg4klOWI9C3PHu

## Contents

Introduction

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Live Migrate a Virtual Machine

Summary



## Experience OpenShift Virtualization

### Introduction

#### [Virtual Machine Management](#)

Migrating Existing Virtual Machines

Storage Management

Backup and Recovery for Virtual Machines

Template and InstanceType Management

Working with Virtual Machines and Applications

#### [Network Management for Virtual Machines](#)

Review Environment

Create Network Attachment Definition

Attach Virtual Machine to Network

User Defined Networks

Conclusion

# Network Management for Virtual Machines

## Introduction

As mentioned in the previous section, all virtual machines are attached to the OpenShift software-defined network (SDN) by default, which enables access from other workloads on the OpenShift cluster, including other VMs and any OpenShift native applications, and for the virtual machines and the applications they host to be managed in a more modernized workflow.

- The SDN provides additional features for abstracting, connecting, and exposing applications in a controlled manner, whether deployed as VMs or Pods in the cluster. These include the **Service** and **Route** features of OpenShift.
- OpenShift's network policy engine allows the VM user or administrator to create rules which allow or deny network traffic to and from individual VMs or entire projects/namespaces.

However, it is also possible for virtual machines to connect directly to one or more physical networks, such as untagged network or VLANs, when needed. This is in addition to the SDN, which means that, for example, the administrator can connect to the VM from an external IP address and VMs can connect directly using a Layer2 network.

At a high level, this is done by configuring the host networking, such as a Linux bridge. This workshop segment will walk through the next step in that process, creating a network attachment definition to allow VMs to connect to that bridge and, therefore, directly to the physical network.

### NOTE

The OpenShift environment has already been configured with a Linux Bridge on each compute node your virtual machines will connect to, thus allowing for easy connectivity with/from outside network resources.

## Contents

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Review environment

Create Network Attachment Definition

Attach Virtual Machine to Network

User Defined Networks

User Defined Networks with OpenShift Virtualization

Working with User Defined Networks

Summary

Experience OpenShift  
Virtualization

- Introduction
- ▶ Virtual Machine Management
- ▶ Migrating Existing Virtual Machines
- ▶ Storage Management
- ▶ Backup and Recovery for Virtual Machines
- ▶ Template and InstanceType Management
- ▼ Working with Virtual Machines and Applications
  - Exposing an Application with a Service/Route
  - ▶ Network Management for Virtual Machines
  - ▶ Conclusion

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# Working with Virtual Machines and Applications

## Introduction

This section of our lab is dedicated to the Day-2 operations that many administrators would need to perform when working with virtual machines in their OpenShift Virtualization environment. We will make use of the understanding we have developed throughout this roadshow of how VMs operate in an OpenShift environment, and use those skills to complete the tasks in this section. In this particular case, we are going to work with the three virtual machines that we imported from VMware vSphere earlier in this roadshow, and we are going to make some minor configuration changes to enable the applications hosted on those servers to be accessed as they now run in OpenShift Virtualization. To accomplish this, we will expose our applications using the service/route method that is the default when making use of the OpenShift SDN pod network so that the application is reachable from outside of the cluster. Doing so provides a more modernized approach to virtual machine management by directly exposing the applications that reside on the VMs.

## Exposing an Application with a Service/Route

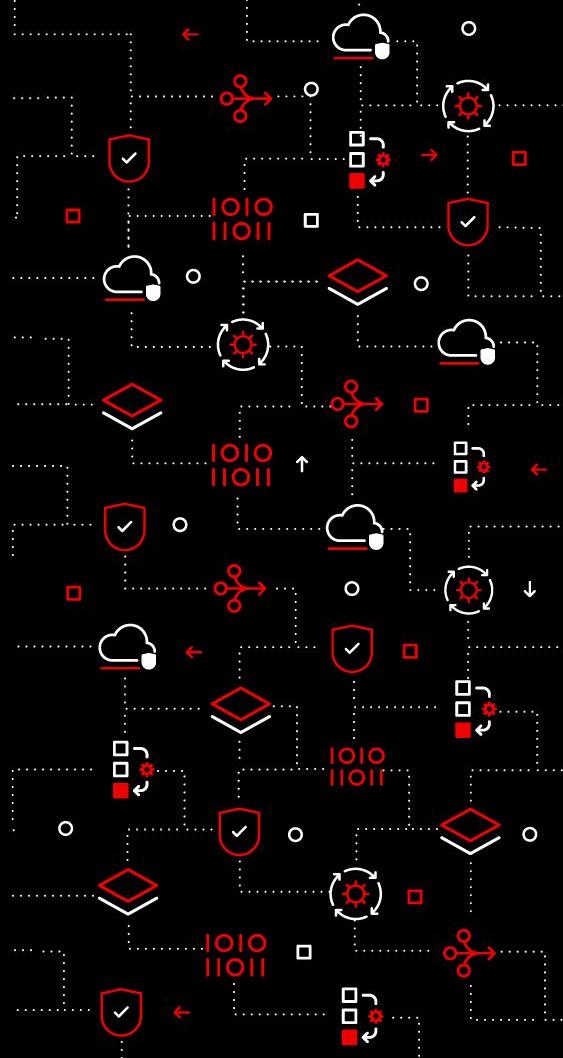
By default, virtual machines are connected to the SDN, which is a convenient and easy way to give them access to the rest of the network. However, it can be challenging for the virtual machines, and other pods in the OpenShift cluster, to find and connect to the virtualized applications. To solve this, we will use a **Service** to balance connections across the two Windows-based web servers, and create a DNS entry for each service discovery, then create a **Route** to allow external clients to access the application hosted within the virtual machines.

**IMPORTANT**

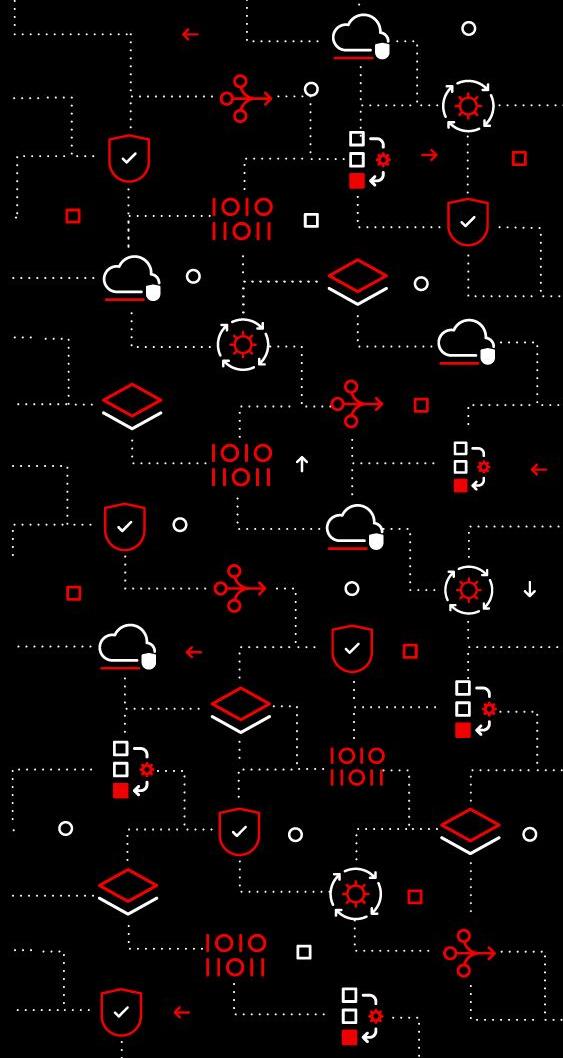
If you have not completed the module *Migrating Existing Virtual Machines*, it is recommended that you...

**Contents**

- Introduction
- Exposing an Application with a Service/Route
  - Introduction to Services
  - Label the Virtual Machines
  - Create the Service
  - Create the Route
- Summary



Lunch Break  
Till 1:00 PM



# Migration from VMware

# Terminology Comparison

Feature	OpenShift Virtualization	vSphere
<b>Where VM disks are stored</b>	<a href="#">PVC / PV</a> (Persistent Volume/Persistent Volume Claim)	Datastore
<b>Policy based storage</b>	<a href="#">StorageClass</a>	Storage Policy Based Management (SPBM)
<b>Non-disruptive VM migration</b>	<a href="#">Live migration</a>	vMotion
<b>Non-disruptive VM storage migration</b>	N/A (See <a href="#">Slide 11</a> & <a href="#">Slide 12</a> )	Storage vMotion
<b>Active resource balancing</b>	<a href="#">Pod eviction policy</a> , <a href="#">descheduler</a>	Dynamic Resource Scheduling (DRS)
<b>Physical network configuration</b>	<a href="#">NMstate Operator</a> , <a href="#">Multus</a>	vSwitch / DvSwitch
<b>Overlay network configuration</b>	<a href="#">OVN-Kubernetes</a> , <a href="#">CNI partners</a> , Multus	NSX-T
<b>Host / VM metrics</b>	<a href="#">OpenShift Metrics and Monitoring</a>	vCenter, vRealize Operations

# How do I manage virtual machines?

## VMware

- vCenter provides GUI-based VM management for both devs/app teams and virtualization admins
- Multiple ways to access vCenter API: Ansible/SaltStack/etc., PowerCLI, Python/Java/etc. SDKs

## OpenShift Virtualization

- The OpenShift console for GUI-based access for creating and managing VMs
- The developer and admin consoles both provide access to VM-centric management features
- The OpenShift/Kubernetes API includes the ability to create and manage VMs using standard methodologies. This includes any scripting language or SDK which can use a REST API
- In addition to `kubectl` and `oc` CLI tools, the `virtctl` command simplifies VM management

# How do I manage the virtualization environment?

## VMware

- Install ESXi to hypervisor nodes and configure basic network connectivity, then use vCenter to join the nodes and configure additional properties
- Configuration can be done manually, semi-automated using DvSwitches and host profiles, and otherwise automated using traditional tools (Ansible, PowerCLI, etc.)

## OpenShift Virtualization Getting Started

- Deploying OpenShift to physical servers using [full stack automation](#) (IPI), [Assisted Installer](#), or UPI
- [Install OpenShift Virtualization Operator](#)
- Configure with standard OpenShift methodologies
  - [Machine Config](#), [NMstate](#), [Low Latency tuning](#), [Node Tuning Operator](#), etc.

# Alternate View: How do I connect VMs and containers/k8s?

## VMware

- Kubernetes is deployed in VMs to the vSphere environment
- When using standard networking, e.g. (D)vSwitches, for VM connectivity, Pod-to-VM traffic traverses the k8s ingress/egress stack
- When using NSX-T as the SDN, VMs and containers can be connected to the same logical network
- Additional functionality, e.g. microsegmentation, for Pods relies on NSX-T

## OpenShift Virtualization

- OpenShift Virtualization uses the same SDN for both Pods and VMs, they are native peers.
- VMs access the same SDN features as Pods, including network policies, Service Mesh, Service and Route abstractions, etc.
- VMs can also connect directly to external L2 network, e.g. VLAN, or other networks defined using Multus

# Capability Mapping

Leverage the document repositories

# Summary

	<b>OpenShift Virtualization</b>	<b>VMware</b>
<b>Infrastructure Automation</b>	<a href="#">RHACM</a> , <a href="#">Ansible</a> , and <a href="#">GitOps</a>	Aria Automation Config (SaltStack) and PowerShell
<b>Application Automation</b>	<a href="#">RHACM</a> , <a href="#">Ansible</a> , <a href="#">Pipelines</a> , and <a href="#">GitOps</a>	Aria Automation Orchestrator (vRealize Orchestrator) and Aria Automation (vRealize Automation)
<b>Networking</b>	Multus / OVN-Kubernetes / <a href="#">Third party CNI</a>	NSX
<b>Storage</b>	<a href="#">ODF</a> , <a href="#">Optimizing Storage</a> and <a href="#">partner ecosystem for CSI</a>	vSAN, Partner Ecosystem
<b>Observability</b>	<a href="#">RHACM</a> , OpenShift <a href="#">Logging &amp; Metrics</a> , <a href="#">Service Mesh</a> , <a href="#">Distributed Tracing</a>	Wavefront
<b>Data Protection</b>	<a href="#">OpenShift API for Data Protection (OADP)</a> <a href="#">Partner ecosystem</a>	vSphere Replication, partner ecosystem  <b>Red Hat</b>

# Automation

	<b>OpenShift</b>	<b>VMware</b>
<b>Declarative infrastructure (platform)</b>	OpenShift supports infrastructure as code for both OpenShift-hosted workloads <b>and</b> OpenShift infrastructure itself.	Third party solutions
<b>Declarative configuration</b>	OpenShift GitOps (Argo CD) included. Governance enforcement using RHACM	Terraform and other ecosystem partners
<b>CI/CD</b>	Automate build and configuration of VMs with included OpenShift pipelines (Tekton)	Aria Automation (vRealize Automation)
<b>Multi-cluster management</b>	Red Hat ACM (includes Submariner)	Aria Automation & Aria Automation Orchestrator (vRealize Orchestrator)

## Storage - the bigger story

- OpenShift Virtualization uses Kubernetes CSI abstractions for VM storage
  - In vSphere, static pools of capacity are given to the hypervisor (datastore), each VM disk is one or more file(s). Each datastore holds one or many VM disks. The virtualization admin is responsible for storage capacity management.
  - OpenShift / k8s uses dynamic PV/PVC provisioning of a CSI compliant storage provider. Each PV holds one VM disk. The storage admin is responsible for storage capacity management
- Local storage - maximize host resource utilization via [LocalStorageOperator](#), [TopoLVM](#) to provide PVs to VMs, Pods, or hosted storage solutions
- Both vSphere and OpenShift have converged hypervisor and storage offerings
  - Use [OpenShift Data Foundation](#), or a partner offering with a CSI provider, e.g. Portworx, to host VMs in a converged storage + OpenShift deployment
  - VMware has VSAN and multiple ecosystem partners offering hyperconverged features, e.g. Nutanix

# Storage - Core feature/capability matrix

	OpenShift	VMware
<b>Accessing legacy storage arrays</b>	<u>All major storage vendors have a CSI compliant driver</u>	Compatible with all major storage vendors
<b>Storage accelerated cloning</b>	Yes, depending on CSI driver	Yes, via VAAI
<b>Disk resizing</b>	Yes	Yes
<b>Policy based storage management</b>	Implicit to the platform (StorageClasses)	vVols, SPBM
<b>Disk / VM snapshots</b>	Yes	Yes
<b>Non-disruptive storage migration</b>	*[see speaker notes]	Storage vMotion

# Data Protection and Disaster Recovery

	OpenShift	VMware
Backup / restore	<p><a href="#">OpenShift API for Data Protection (OADP)</a>            EX: <a href="#">Kasten K10 by Veeam</a> supports VMs.            Additionally working with Dell, IBM, Veritas, Trilio, Storware to support.</p> <ul style="list-style-type: none"> <li>• <a href="#">Kasten K10 by VEEAM</a></li> <li>• <a href="#">Trilio for Kubernetes</a></li> <li>• <a href="#">Storware Backup and Recovery</a></li> <li>• <a href="#">Portworx PX-Backup and Metro-DR</a></li> </ul> <p>Search for additional vendors here  <a href="https://marketplace.redhat.com/en-us">https://marketplace.redhat.com/en-us</a></p>	Strong ecosystem of backup partners.
<u>Disaster Recovery - Regional (async)</u>	GitOps, Infrastructure-as-Code, RHACM + ODF Future - other storage providers	Site Recovery Manager (SRM) vSphere Replication
<u>Disaster Recovery - Metro (sync)</u>	RHACM + ODF - Tech Preview OCP 4.15 Future - other storage providers	Stretched clusters Fault Tolerance

# Networking

	OpenShift	VMware
<b>Host network configuration and management</b>	Kubernetes-native configuration management using the <a href="#">NMstate Operator</a> and <a href="#">Multus</a>	Per-host configuration via vSwitch or single point management via Distributed Virtual Switch (DvSwitch)
<b>Software-defined networking: protect/limit/control VM-to-VM communication</b>	Network policies using any SDN provide {Pod VM}-to-{Pod VM} traffic control. Multiple distinct SDNs are possible using the partner ecosystem, e.g. <a href="#">the Tigera Calico Operator</a> .	Multiple capabilities here, e.g. QinQ, but this is most often referring to NSX's microsegmentation, a.k.a. distributed firewall
<b>Disaster Recovery - Metro (sync)</b>	VMs are connected to one or more L2 (VLAN) networks using Multus and/or connected to the <a href="#">cluster SDN</a>	VMs are connected to one or more L2 (VLAN) networks using (D)vSwitches and/or NSX

# Networking

	OpenShift	VMware
<b>Pod-to-VM and VM-to-Pod connectivity</b>	VMs and Pods are native peers <u>when connected to the SDN</u> , with all of the features and capabilities equally available to both	Traffic between Pods and VMs must traverse through the Kubernetes ingress or similar mechanism, e.g. NodePort unless NST-T is being used for the SDN
<b>Application observability</b>	<u>Service Mesh</u> provides robust abilities to ingest and analyze network flows and application level data to assist with debugging, performance troubleshooting, and more for both containerized and virtualized application components in the same cluster	NSX traffic analysis for security purposes, no - or little - native visibility without NSX

# VM Administration

	OpenShift	VMware
<b>Template Management</b>	Can use OVAs and VM (template) Library with performance tuned VM templates. <a href="#">Two-click VM creation wizard flow</a>	Template VMs, OVA/OVF deployment, and content libraries offer the ability to provision VMs using a simplified process
<b>VM lifecycle management</b>	Utilize <a href="#">sysprep</a> and <a href="#">cloud-init</a>	Guest OS customization is an abstraction for sysprep/cloud-init
<b>VM Export/Import</b>	Import OVA using <a href="#">Migration Toolkit for Virtualization</a>	Import and export VMs using the OVF and OVA formats

# VM Optimization

	OpenShift	VMware
<b>High Performance VMs</b>	<a href="#">NUMA aware node scheduling</a> for best performance, huge pages for data warehousing and in-memory databases, reserve/protect resources using standard Kubernetes mechanisms	NUMA awareness, large/huge pages, latency sensitivity, resource reservations, SIOC, NIOC, and shares mechanism for fairness during contention
<b>Compute Acceleration</b>	<a href="#">GPU passthrough supported</a> , (NVIDIA) vGPU supported	PCI passthrough for GPUs, vGPU supported
<b>Dynamic reconfiguration</b>	Supports <a href="#">storage</a> , <a href="#">SR-IOV</a> and <a href="#">Bridge Network</a> hot-plug CPU hot-plug became available in 4.16, and memory in 4.17	CPU, memory, disk, network adapter, and some additional hardware is supported for hot add/remove and reconfiguration

# High Availability

	OpenShift	VMware
<b>Infrastructure HA Node Failure</b>	Supported through <a href="#">fencing agents</a> for IPI and non-IPI environments. See <a href="#">KCS</a> for HA configuration.	Node failure detection and VM rescheduling happens within 15-30 seconds, even without vCenter
<b>Application level HA</b>	RHEL HA ( <a href="#">pacemaker</a> ) and Windows Server Failover Clustering (WSFC) are supported.	RHEL HA ( <a href="#">pacemaker</a> ) and Windows Server Failover Clustering (WSFC) are supported.

# Resource Management and Optimization

	OpenShift	VMware
<b>Compute live migration</b>	Yes, " <a href="#">Live Migration</a> "	Yes, "vMotion"
<b>Adaptive resource scheduling / resource rebalancing</b>	<a href="#">Descheduler</a> and eviction policies, (anti)affinity rules for VMs, Pods, and hosts	Dynamic Resource Scheduling (DRS), (anti)affinity rules for VMs to VMs and VMs to hosts
<b>Memory overcommitment</b>	KSM and free page reporting supported 4.15, CPU & Memory hot swap as of 4.16 & 4.17	Ballooning and Transparent Page Sharing (TPS)
<b>CPU overcommitment</b>	Yes	Yes

# Hosted Kubernetes Integration

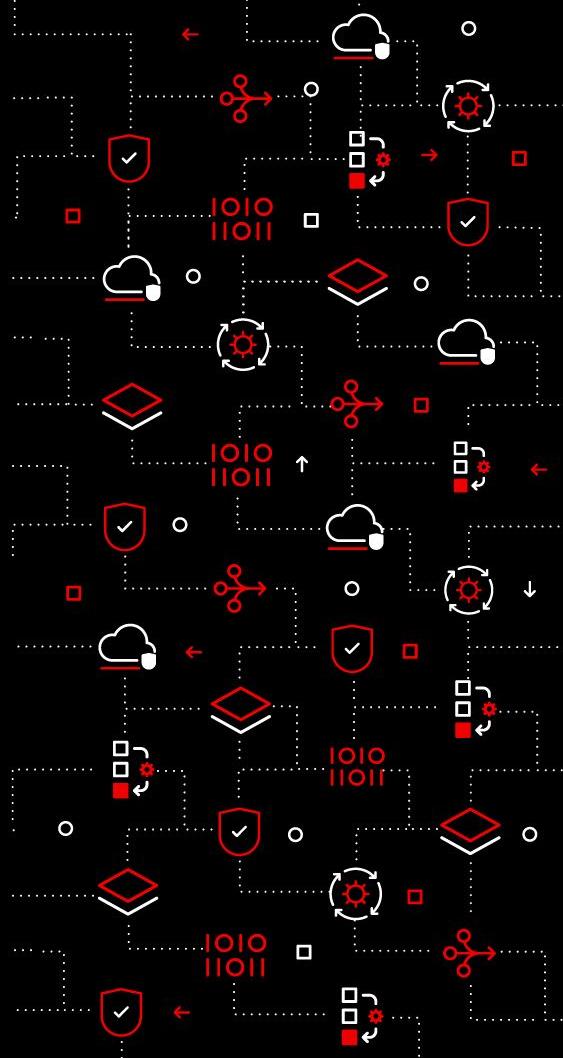
	OpenShift	VMware
<b>Hosting pods on hypervisor nodes</b>	<p>Pods and VMs are native peers, there is no difference between them with OpenShift Virtualization</p>	<p>vSphere with Kubernetes allows “native” Pods to be deployed against the cluster, however they are still running using a VM shim</p>
<b>Efficient cluster provisioning</b>	<p><a href="#">Hosted Control Planes</a> enable rapid creation of tenant OpenShift clusters with cloud provider integration using the KubeVirt provider.</p>	<p>Tanzu Kubernetes Grid abstracts provisioning Kubernetes clusters using Cluster API</p>

# Access Control

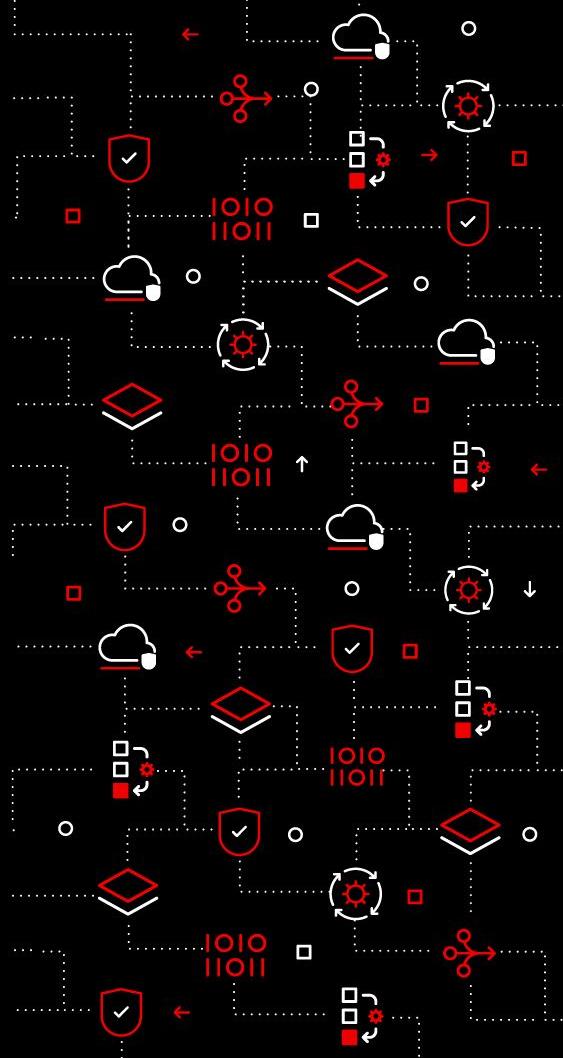
	OpenShift	VMware
Resource Scoping	Top-level organization starts at the cluster level. Organizing VMs in folders can be represented by <a href="#">namespaces</a> . Resources such as network, storage, VM templates are stored within namespaces and can be isolated via <a href="#">network policies</a> .	Scoped access to resources: datacenters, clusters, folders, networks, storage, templates, content.
Action Permissions	Provides <a href="#">three default roles</a> : cluster admin, admin by namespace, and view. <a href="#">Custom RBAC</a> can be mimic any existing roles or permissions down to the Kubernetes object level.	Roles and Permissions structure for different user/group archetypes.

# Monitoring, Alerts/Events, Logs

	OpenShift	VMware
Notification/Alarm on Triggers	<p><a href="#">Prometheus and Alertmanager</a> provide rules definition on all cluster objects including VMs. Severity levels can be set and have discrete actions for each level.</p>	Custom Alarm provides rules definition on event, condition, or state triggers. Severity levels can be set.
Variety of Notification Targets	<p><a href="#">Alertmanager</a> provides default handlers for email, webhook, and several 3rd party apps including Slack, PagerDuty, and MSTeams (See Notes for full list)</p>	Custom Alarm provides for emails and SNMP traps configuration as well as script execution
VM Event Logging	<p><a href="#">Vector/Loki/Logging Console plugin</a> has replaced the traditional Elasticsearch/Fluentd/Kibana stack to provide greater insights and better observability</p>	Provides a per-VM advanced option to Enable logging to a log file called vmware-n.log
Log Shipping	<p>Vector <a href="#">multi log forwarder</a> feature supports multiple Red Hat and 3rd party logging applications</p>	Host logs can be shipped from vCenter to alternate locations/3rd party logging apps



BREAK  
till 15:00



# Hands-On Lab 2

## Migration from VMware



## Experience OpenShift Virtualization

- ▶ Introduction
- ▶ Virtual Machine Management
- ◀ **Migrating Existing Virtual Machines**
- ▶ Prerequisites for Migrations
- ▶ Migrating Virtual Machines from VMware
- ▶ Storage Management
- ▶ Backup and Recovery for Virtual Machines
- ▶ Template and InstanceType Management
- ▶ Working with Virtual Machines and Applications
- ▶ Network Management for Virtual Machines
- ▶ Conclusion

# Migrating Existing Virtual Machines

## Introduction

This portion of our lab uses the [Migration Toolkit for Virtualization](#) (MTV) to import virtual machines from VMware vSphere to OpenShift. The migration toolkit supports two "modes" of import:

- Cold migration turns off the source virtual machine before starting the migration. This is the default migration type.
- Warm migration copies data while the source virtual machine continues to run. Once the bulk of data has been migrated, the VM is shutdown and the final data is copied to the destination. The new VM can then be started, resulting in a much shorter period of downtime for the VM-hosted application.

**NOTE**

The migration toolkit has already been deployed to your cluster using the Operator available in OperatorHub.

Documentation for how to install and configure the Operator can be found [here](#).

If you would like to learn more about how to configure the Migration Toolkit for Virtualization for your own needs, please see the documentation at the following links for:

- [OpenStack](#)
- [Red Hat Virtualization](#)
- [VMware vSphere](#)

**Goals****Contents**

- ▶ Introduction
- ▶ Prerequisites for Migrations
- ▶ Migrating Virtual Machines from VMware
  - ▶ Review the VMware environment
  - ▶ Review the VMware provider to the migration toolkit
  - ▶ Create a Migration Plan
- ▶ Summary

Red Hat OpenShift

Administrator

Home >

Operators >

Workloads >

Virtualization >

Migration >

Providers for virtualization

Plans for virtualization

StorageMaps for virtualization

NetworkMaps for virtualization

Networking >

Storage >

PersistentVolumeClaims

StorageClasses

VolumeSnapshots

VolumeSnapshotClasses

Object Storage

Builds >

User Management >

Administration >

Project: mtv-user3

Providers > Provider Details

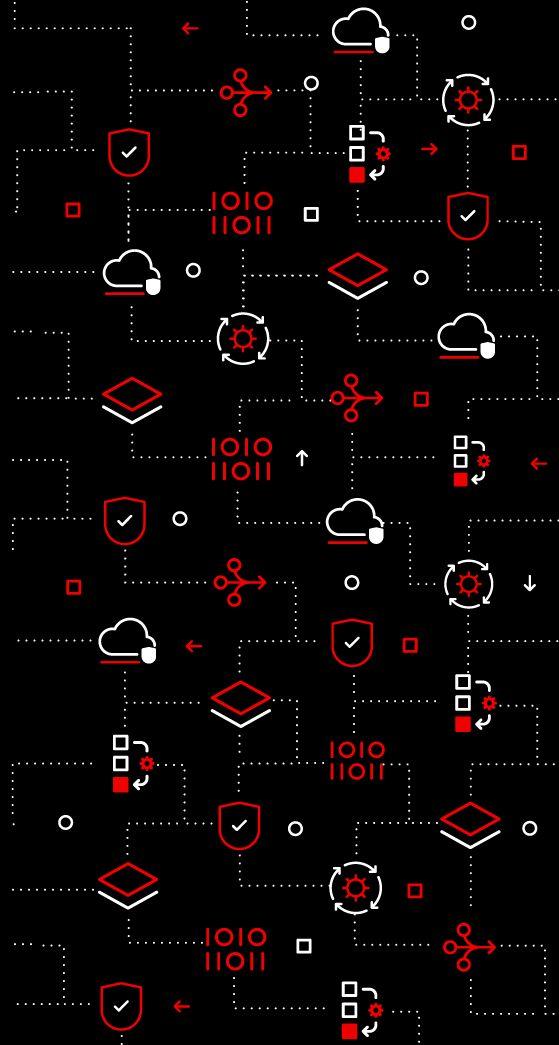
PR VMware Ready

Details YAML Credentials Virtual Machines Hosts

How to create a migration plan  
To migrate virtual machines from **vmware** provider, select the virtual machines to migrate from the list of available virtual machines and click the **Create migration plan** button.

### Virtual Machines

Concerns	Name	Concerns	Template	Host	Folder
> □	database-user3	(1) (4)	false	esxi-02002.infra.demo.redhat.com	Roadshow
> □	etx-rhel9-trouble-template	(1) (3)	true	esxi-02001.infra.demo.redhat.com	ETX-Templates
> □	etx-rhel86-template	(1) (3)	true	esxi-02001.infra.demo.redhat.com	ETX-Templates
> □	etx-rhel93-template	(1) (3)	true	esxi-02000.infra.demo.redhat.com	ETX-Templates
> □	etx-win2019-template	(1) (3)	true	esxi-02000.infra.demo.redhat.com	ETX-Templates
> □	haproxy-user3	(1) (3)	false	esxi-02001.infra.demo.redhat.com	Roadshow
> □	rhel9-tpl	(1) (3)	true	esxi-02001.infra.demo.redhat.com	RHEL
> □	rhel86-tpl	(1) (3)	true	esxi-02001.infra.demo.redhat.com	RHEL
> □	rhel93-tpl	(1) (3)	true	esxi-02001.infra.demo.redhat.com	RHEL
> □	roadshow-tpl-database	(1) (4)	true	esxi-02001.infra.demo.redhat.com	OcpVirtRoadShow

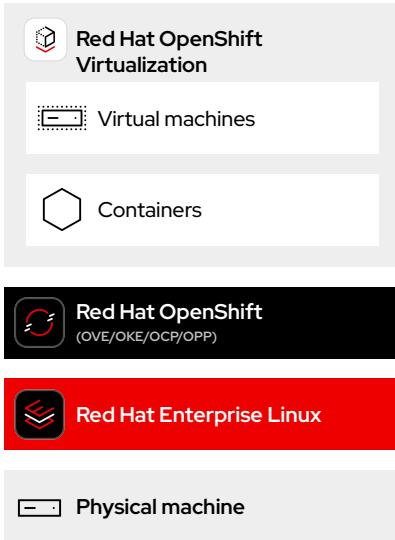


# OpenShift Virtualization and virtual desktop infrastructure

Red Hat and Citrix

# Red Hat OpenShift Virtualization

The modern option for general purpose virtualization



- ▶ **Unified platform**

for virtual machines and containers\*

- ▶ **Consistent management**

tools, interfaces, and APIs including Red Hat Advanced Cluster Management (ACM) and Red Hat Ansible Automation Platform (AAP) integrations

- ▶ **Performance and stability**

of Linux, kernel-based virtual machine, and QEMU

- ▶ **Healthy open source community**

the KubeVirt project is a top 10 Cloud Native Computing Foundation (CNCF) active project with 200+ contributing companies

- ▶ **Diverse ecosystem**

of Red Hat and partner operators

- ▶ **Included feature**

of all OpenShift subscriptions (OVE/OKE/OCP/OPP)

- ▶ **Includes Red Hat Enterprise Linux**

guest entitlements\*

- ▶ **Supports Microsoft Windows**

guests through Microsoft Server Virtualization Validation Program (SVVP)

- ▶ **Inbound guest migration**

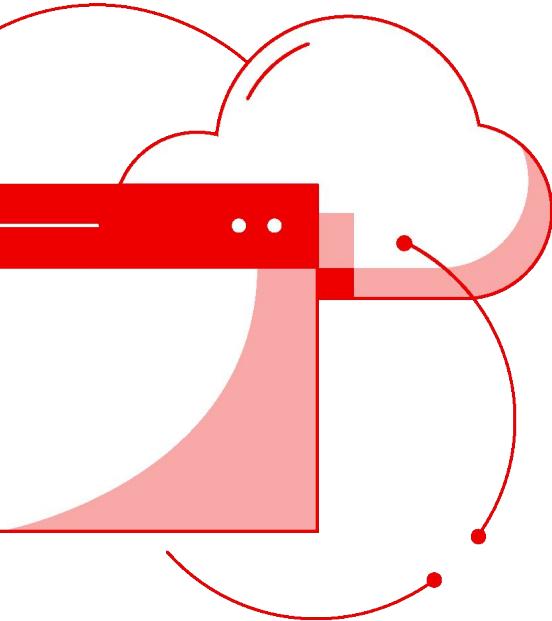
using Ansible Automation Platform, Migration Toolkit for Virtualization, and Red Hat Training and Consulting

- ▶ **Virtual admin focused training**

[DO316](#), [EX316](#)

\*Excluding OVE which is virtual machines only and includes no RHEL guest entitlements

# Why move VDI to Red Hat OpenShift Virtualization?



## Exposure management

Diversify your virtualization to avoid costly legacy hypervisor lock-in.



## Tool reduction and consolidation

Run virtual machines and containers together on one platform with Red Hat OpenShift Container Platform.



## Modernization

Bridge the gap from monolithic applications to containers and microservices.

# Citrix DaaS



## Experience

High-definition user experience  
on any device, at any location



## Security

Contextual, containerized,  
and embedded—at rest and in transit

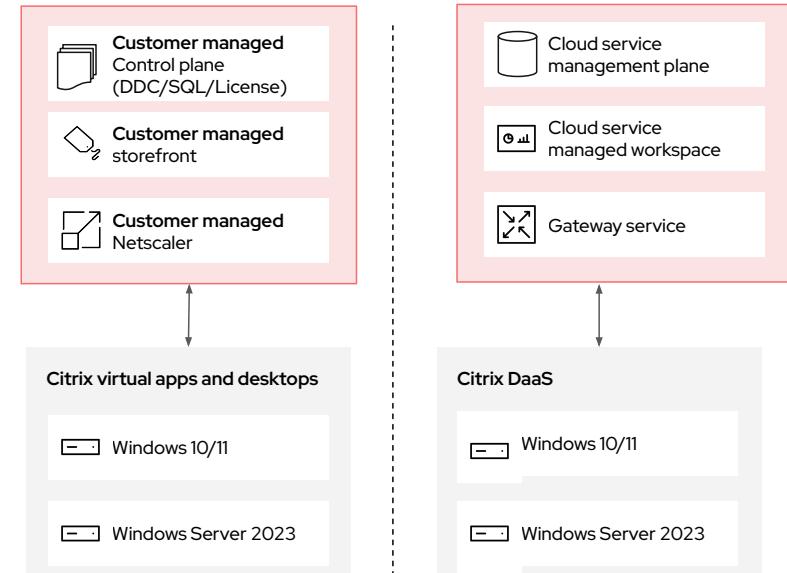


## Choice

Access, manage, and support  
any device, app, and cloud

# Benefits of transition to cloud services

- ▶ Evergreen and always up-to-date
- ▶ Reduced management overhead
- ▶ Hybrid rights
- ▶ Accelerated user onboarding
- ▶ Hybrid cloud flexibility
- ▶ Autoscale
- ▶ Analytics



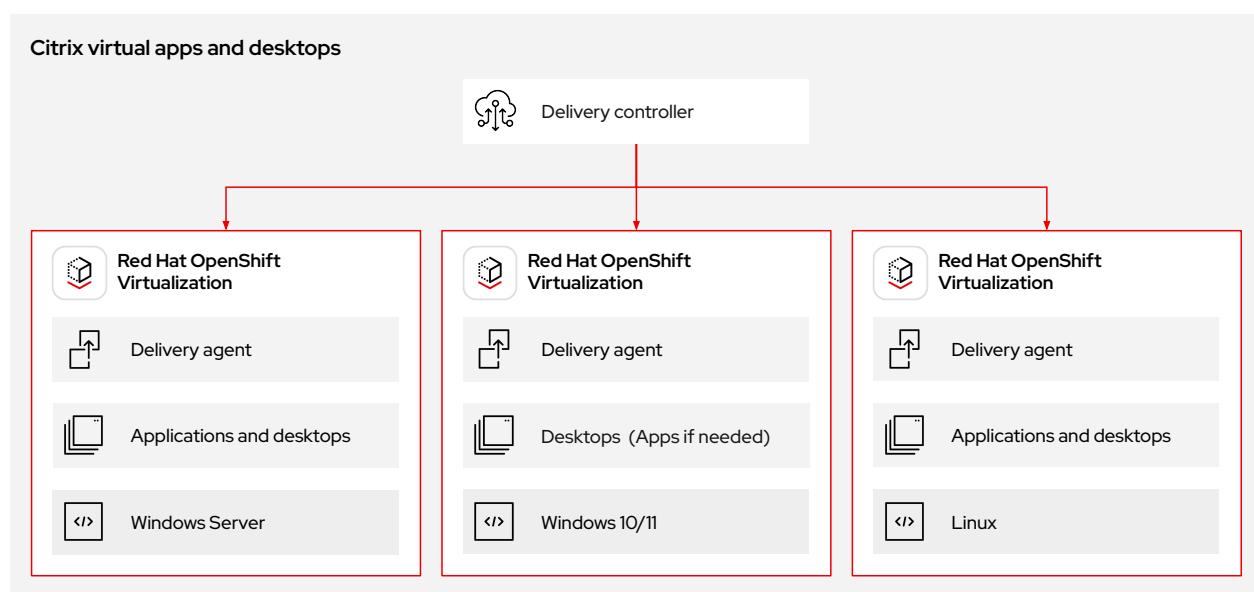
# Citrix virtual applications and desktops overview

**One architecture** for apps  
and desktops

**Built-in** monitoring and  
support tools

**One site** can support  
multiple operating  
systems

**Quick and simple**  
upgrades to new versions

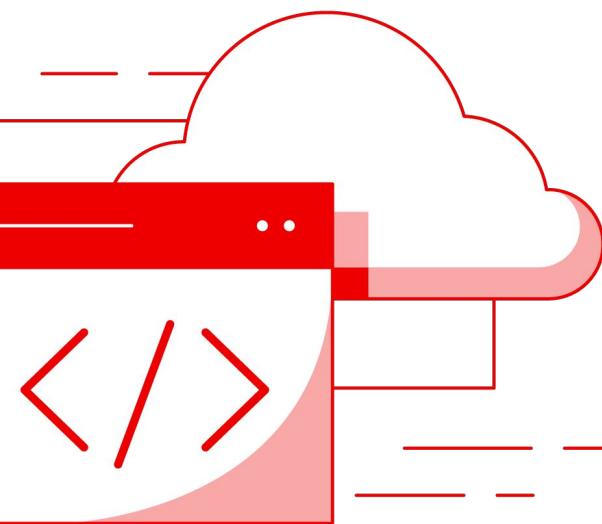


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# Machine Creation Services

Citrix full provisioning overview

# Image management



01

## Virtualize

Capturing operating system  
and apps into a virtual image



02

## Store

Store the virtual image



03

## Deliver

Deliver the virtual image to  
multiple target devices

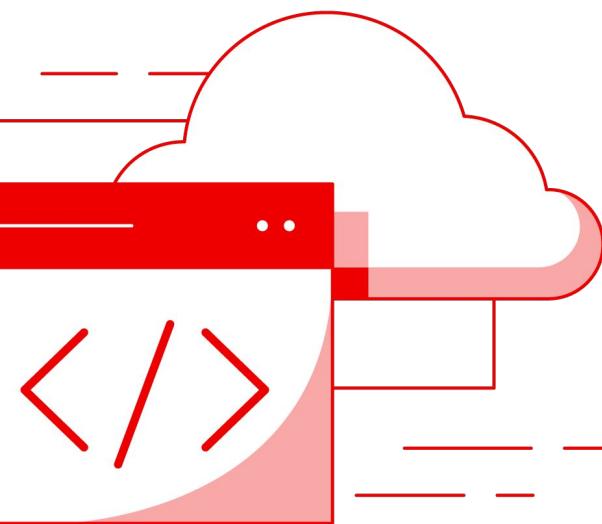


04

## Monitor

Review usage of current  
image and/or contents

# Image management



01

## Prepare

Prepare master image



02

## Update

Update prepared image



03

## Clone

Clone prepared image to  
virtual machines



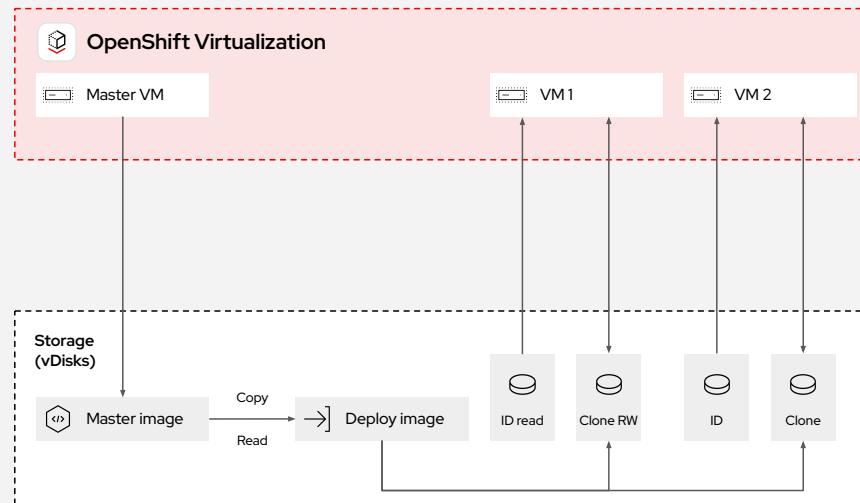
04

## Monitor

Review usage of current  
image and/or contents

# Machine Creation Services

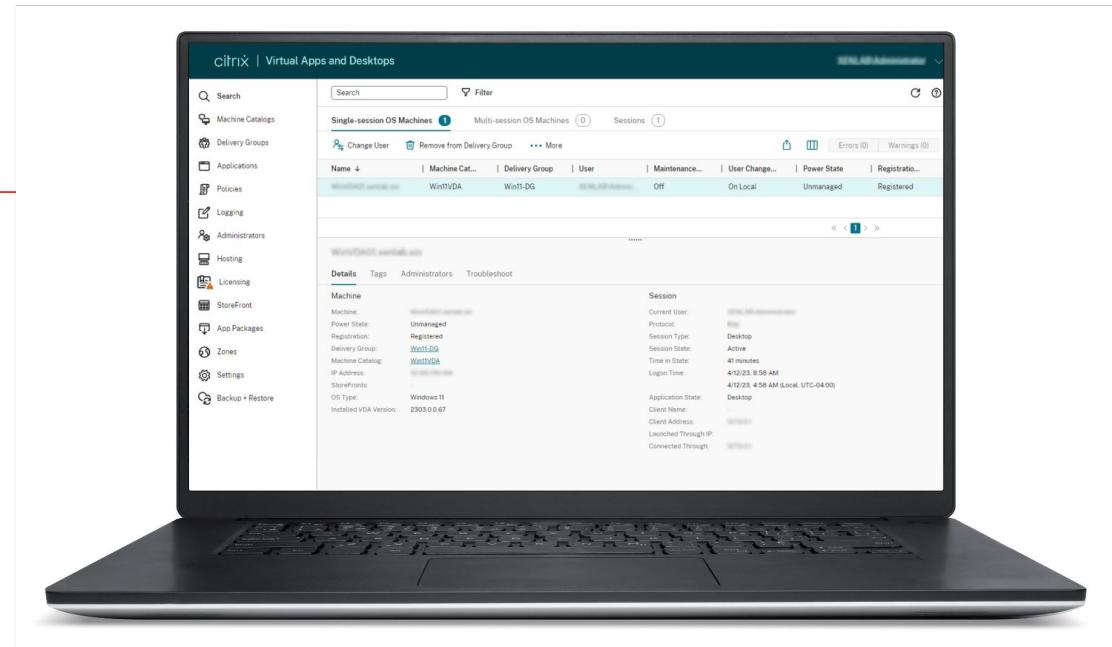
Citrix machine creation services high-level VM and disk architecture



# citrix

## Citrix Virtual Apps and Desktops

### Web Studio



## XITRIX Pulg In DEMO

The screenshot shows a Microsoft Edge browser window with multiple tabs open. The active tab is 'Citrix | Virtual Apps and Desktops' at 'haanddc1017.serenity.local/citrix/studio/hosting'. The left sidebar has a dark teal theme with various navigation options: Home, Search, Machine catalogs, Delivery groups, Applications, Images, Policies, Logging, Administrators, and Hosting (which is selected). Below these are Licensing, StoreFront, App packages, Zones, Settings, and Backup and restore. A 'Collapse' button is at the bottom of the sidebar. The main content area displays a table titled 'Add Connection and Resources' with columns: Name, Type, Address, and State. It lists four entries: 'AzureConn' (Microsoft® Azure), 'openshift-net' (OpenShift), 'OpenShiftConn' (OpenShift), and 'serenity-mcs'. At the bottom of the main content, it says 'Click an item to view the details.' On the right side of the screen, there is an 'Activate Windows' message with a link to 'Go to Settings to activate Windows' and a purple circular icon with a white 'i' and a red notification badge. The taskbar at the bottom shows several pinned icons: File Explorer, OneDrive, Microsoft Edge, Google Chrome, Task View, File History, Task Scheduler, and Settings. The system tray shows the date and time as '10:39 AM 3/17/2025'.

Name	Type	Address	State
AzureConn	Microsoft® Azure	https://management.azure.com/	Enabled
openshift-net	-	-	-
OpenShiftConn	OpenShift	https://api.serenity-openshift08.serenity.local:6443	Enabled
serenity-mcs	-	-	-

Activate Windows  
Go to Settings to activate Windows

10:39 AM 3/17/2025

# Joint value

## Red Hat OpenShift Virtualization



### Unified user experience

Operate your virtual desktops on-premises with the same user experience.

- ▶ No additional upgrade from Citrix, but would require OVE or OCP for OpenShift Virtualization access



### Virtual desktops at scale

Citrix VDI delivers virtual desktops at scale across all these environments regardless of where your data and applications live.

- ▶ On premise, Azure, AWS as a resource location for Citrix
- ▶ On premise and ROSA as an option for running OpenShift Virtualization



### Flexible use cases

Red Hat delivers OpenShift platform in disconnected or air-gapped environments that allow for Citrix VDI capabilities.

- ▶ Citrix on premise (for air-gapped only)
- ▶ Hosted, shared desktops
- ▶ Persistent desktops
- ▶ Linux and Windows machines

# Joint value

## Security



### Compliance and accessibility

Citrix Virtual Apps and Desktops is WCAG Section 508, FIPS and Common Criteria accredited and CMMC compliant for both admin consoles and user interfaces.



### Secure sign-on

Citrix VDI integrates with multi-factor authentication, including tokens, smart cards and OTP, to provide a more seamless single sign-on user experience.



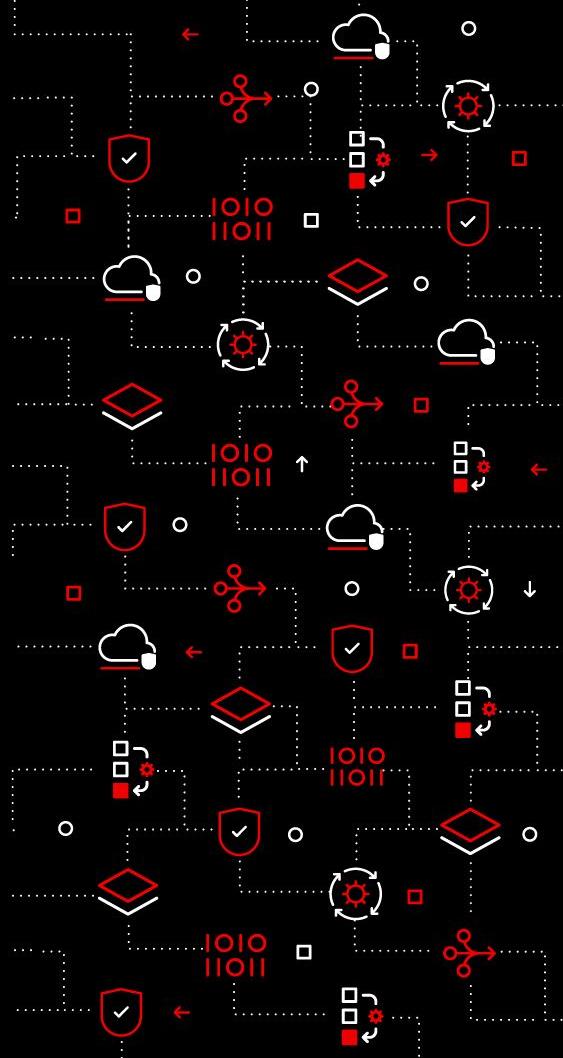
### FIPS 140-3 Level 2

Coupled with NetScaler ADC, a Citrix VDI environment can be rated up to FIPS 140-3 Level 2.



### Granular permissions

Citrix VDI provides microgranularity of permissions and policies for both end users and administrators, along with contextual access and an end-to-end zero-trust architecture.



# Migration Factory

# Virtualization Migration Factory

Migrate virtual machines at scale

Strategy

Foundation

**Expand**

Evolve



**Evaluate** your workload portfolio, **plan and prioritize** to **migrate and modernize at scale**



**Create** iterative migration of batches of workloads



**Reduce** IT management effort to increase productivity



**Prepare teams** for scaled app operations and production readiness



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# Accelerating Migrations at Scale with AAP

## A Migration factory from Day-0 to Day-2 with Ansible automation

### 0 Evaluate and scope

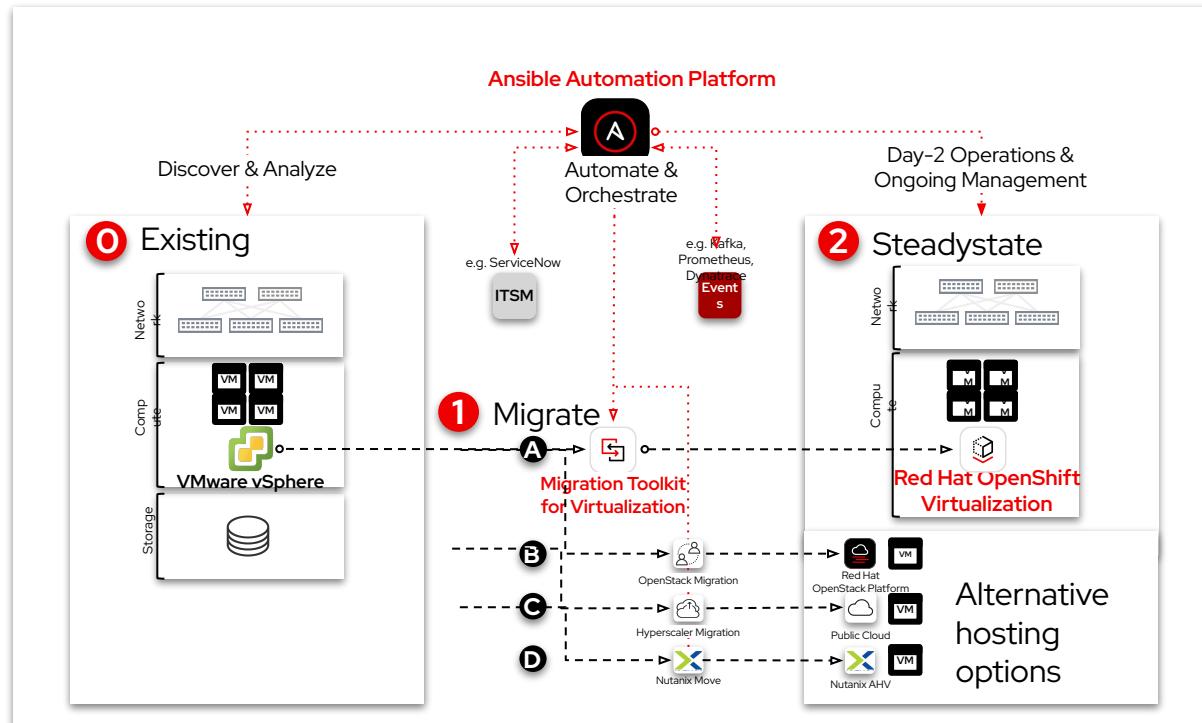
Evaluate the existing data center setup

### 1 Migrate

Use MTV to migrate virtual machines to OpenShift Virtualization. Ansible helps automate orchestrate as needed.

### Red Hat Steadystate

2 VMs are now hosted on OpenShift Virtualization alongside container workloads. Ansible Automation Platform handle day two operations.



# Maximizing Value with the Ansible for OpenShift Virtualization Migration

0

## Pre-Migration Configuration - Made Easy!



Accelerate your migration journey with streamlined, automated pre-configuration. Our solution simplifies the discovery and setup process, ensuring your infrastructure is ready for seamless transformation.

## Bootstrapping Environments.



Whether you're starting from scratch or building on existing infrastructure, our Environment Bootstrap process sets the foundation for a successful migration.

- AAP Deployment on OpenShift
- Deploy and configure OpenShift Virtualization and the Migration Toolkit for Virtualization (MTV) to power your migration efforts
- Accelerate your migration factory setup with a fully configured, operator-driven OpenShift environment—designed for automation, scalability, and ease of use.

1

## Migration & Inventory: Smarter, Faster, Scalable



\* **Quickly assess the existing environment.** Gather information about the VM inventory to create recommendations on what and how to migrate—fast and without missing anything.

\* **Automate at-scale migrations.** Migrate multiple VMs in one playbook run. Streamline tasks like VM migration, network or load balancer connection, and security tool enrollment.

\* **Streamline post-migration operations,** with automated management for provisioning new VMs, patching, drift remediation, security, and decommissioning unused VMs.

2

## Steadystate Day 2 Operations: Take the control Beyond Migration.



The journey doesn't stop at migration—and neither does our automation. With a full suite of Day 2 Operations, manage and optimize virtual machines with confidence, flexibility, and ease.



# Squad Model

## Red Hat Consulting, Training, and TAM

Advise on patterns, architecture,  
and enablement

Design reference  
architectures



Enable teams with OpenShift  
Virtualization



Deploy automation

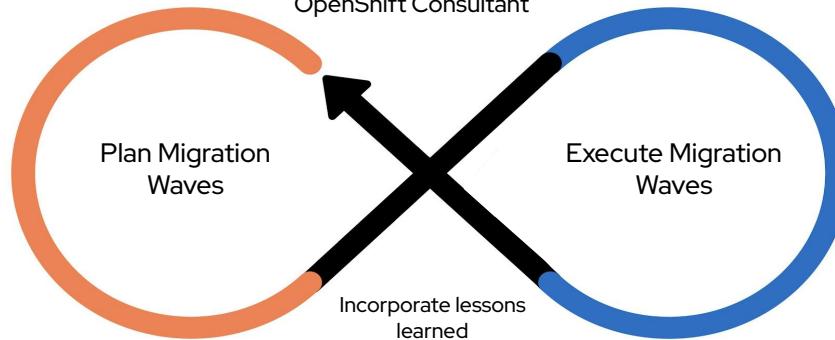


Evolve process



## Migration Squad

VM Batch Customer Stakeholders +  
OpenShift Consultant



Build the knowledge base  
Minimize downtime and failover



Evolve a repeatable approach  
to migration waves



Accelerate migration rate  
Complete migration

Core Migration Team  
Customer Infrastructure Lead +  
TAM, Architect, and Automation Consultant

## Customer Infrastructure teams and VM owners

Advise on requirements,  
processes, and challenges



Define requirements



Support migration wave



Navigate internal  
processes



Validate migration



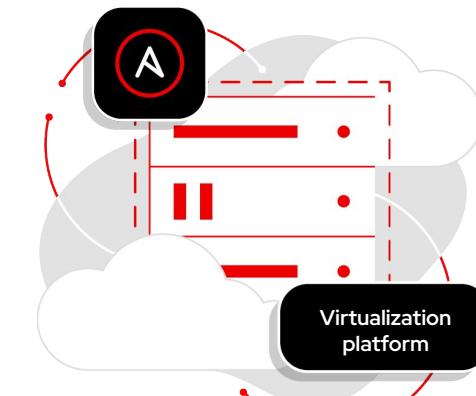
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# Collection Overview

## Accelerating Engagement with the Ansible for OpenShift Virtualization Migration Content Collection

Red Hat Services supports customers at every stage of their [\*\*Virtualization Migration journey\*\*](#). Helping organizations in managing costs and minimizing risks by prioritizing, planning, migrating, and ultimately retiring legacy virtual machine (VM) workloads. This approach lays the groundwork for accelerated application modernization in the future.

**Ansible for OpenShift Virtualization Migration Content Collection** accelerates this process by leveraging the power and flexibility of Ansible automation. Developed by Red Hat Consultants, **automates key steps**, from assessment to execution and Day 2 operation in line with the [\*\*Virtualization Migration Factory \(VMF\)\*\*](#) Solution.



This collection will first be **deployed in pilot consulting engagements**, followed by a robust launch in early Q3 of 2025 for partners eager to provide their own migration services. Customers are strongly encouraged to utilize Red Hat and partner migration services as the recommended starting point for their migration journey.

# How Services Leverage the Collection

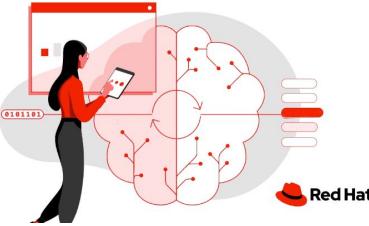
## Pilot Resources



A new content collection for OpenShift Virtualization Migration is [now available](#) in the Automation Hub. Currently **in pilot**, it is meant for **targeted consulting engagements with specific customers**. This collection enhances the Ansible Automation Platform and OpenShift Virtualization subscriptions through a services-led approach. (Internal use only).

You can find the download link for collection, along with key resources such as documentation and relevant information, on the solution's Source page.

[https://source.redhat.com/projects\\_and\\_programs/ansible\\_for\\_openshift\\_virtualization\\_migration](https://source.redhat.com/projects_and_programs/ansible_for_openshift_virtualization_migration)



# Ready to Migrate, Ready to Scale

## Virtualization Migration Assessment (VMA) First!!

### VMA Comes First – Understand Before You Automate

The VMA is the discovery and scoping phase. It helps identify:

- What workloads are being migrated
- The source/target infrastructure details
- Application dependencies, complexity, and risks
- This phase produces the insights needed to plan and design the migration properly.

### The Collection is Leveraged for Migration Tasks

Once the migration is scoped and planned via the VMA, the Ansible Collection is used to:

- Automate migration steps (e.g., VM export/import, network/storage configuration)
- Ensure repeatable, reliable processes across large-scale environments
- Support both Red Hat Consulting and partner-led migrations

### Controlled Usage – Not for Self-Service

The collection is **validated (not certified)**, meaning:

- It works as tested but is not officially supported by Red Hat Support
- It is **highly recommended to be used by trained consultants/partners – not end customers directly.**
- Messaging around the collection always points back to using Red Hat Consulting or certified partners



# Red Hat Training for VMware Migration

What training does Red Hat recommend for customers who are migrating from VMware?



## Essentials

- [OpenShift Virtualization Technical Overview](#)
- [OpenShift Technical Overview](#)
- Ansible Technical Overview D007 (Update Coming Q1 CY25)
- ACM Technical Overview (Coming Q2 CY25)



## Day 1

- DO346: Migrating Virtual Machines to Red Hat OpenShift Virtualization with Ansible Automation Platform (Coming Q2 CY25)
- [DO316: Managing Virtual Machines with Red Hat OpenShift Virtualization](#)



## Day 2

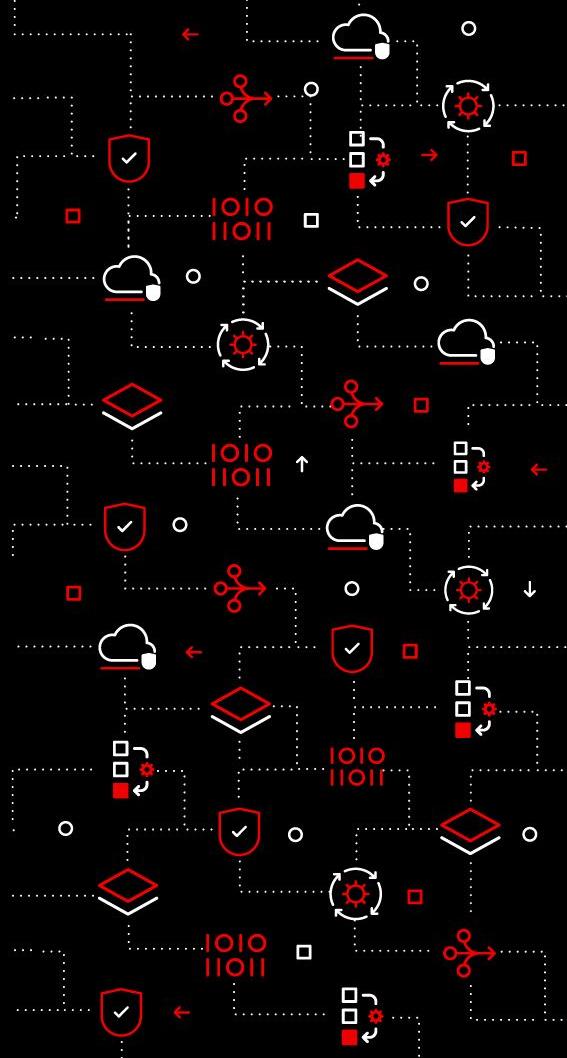
- DO336: Automate and Manage Red Hat OpenShift Virtualization with Ansible (Coming Q2 CY25)
- DO432: Red Hat Advanced Cluster Management for Kubernetes (Update Coming Q1 CY25)



## Prerequisites for Day 1

- [DO180: Red Hat OpenShift Administration I: Operating a Production Cluster](#)
- [DO280: Red Hat OpenShift Administration II: Configuring a Production Cluster](#)





# End of Day One

# Thank you

Red Hat is the world's leading provider of enterprise open source software solutions.

Award-winning support, training, and consulting services make

Red Hat a trusted adviser to the Fortune 500.



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