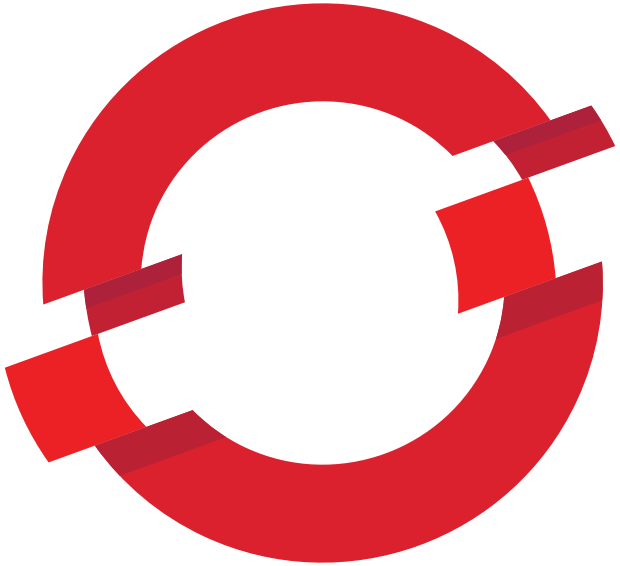
ATEA TECH TOUR



OPENSHIFT

Red Hat OpenShift Virtualization

Red Hat

ATEA TECH TOUR

Walther Barnett

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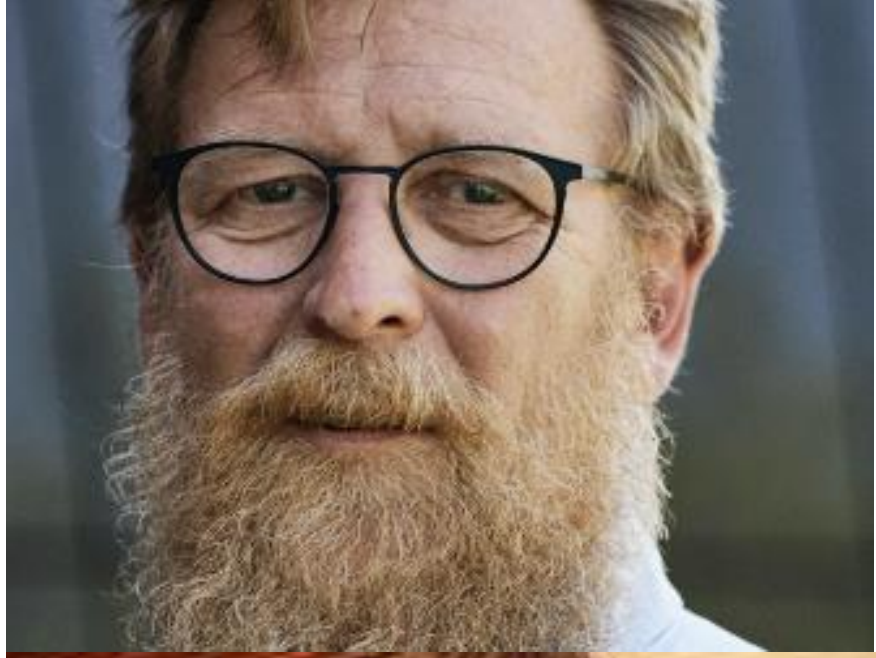


- Hvorfor OpenShift Virtualization?
- Hvad er OpenShift Virtualization?
- Use-Cases og arkitektur
- Hvad kræver det at komme i gang?
- Q&A og næste skridt

Hvorfor OpenShift Virtualization?

Companies are rethinking their current virtualization platforms

Common concerns include:

- Rising licensing costs
- Management complexity
- Vendor lock-in
- Low confidence in long-term support and innovation

"70% of organizations have recently moved VM workloads to a different or additional hypervisor—or are in the process of making a switch."

Source: Red Hat State of Virtualization Report: May 2025

Red Hat

What we hear from customers …

“I want to modernize”

- Wants to modernize to containers, but also run VMs in a more modern way
- Stand up a secondary virtualization platform for new workloads
- Legacy and next-gen virtualization platforms co-exist

“I need to migrate”

- Migrate off their current traditional virtualization platform completely, as quickly and as safely as possible
- Modernization is subordinate to migration; containers and Kubernetes are implementation details
- Willing to take calculated risk with their production workloads

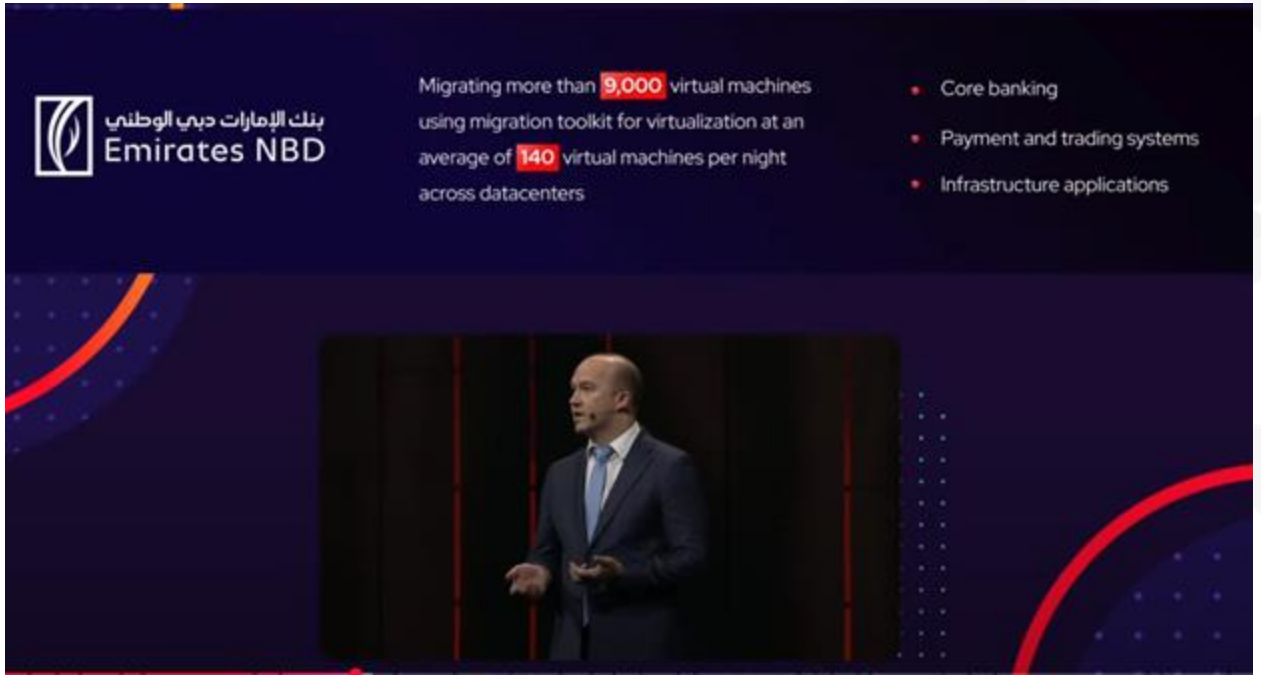
Emirates NBD

Highlights:

- Facing rising costs with their existing virtualization technology platform
- Seeking a unified platform to streamline operations for both container and virtual machine workloads
- The migration toolkit for virtualization eases migration of thousands of critical apps
- OpenShift Virtualization offers a unified platform for ease of management and a consistent technology stack across diverse environments

*"We are migrating **more than 9,000 virtual machines** using migration toolkit for virtualization at an **average of 140 virtual machines per night** across datacenters."*

- *Nick Grimm, Head of Cloud Compute, Emirates NBD*



Source: Red Hat Summit keynote 2025 [starting at 34:34]

Red Hat

Red Hat OpenShift

The strategic choice - platform for all your workloads

Trusted

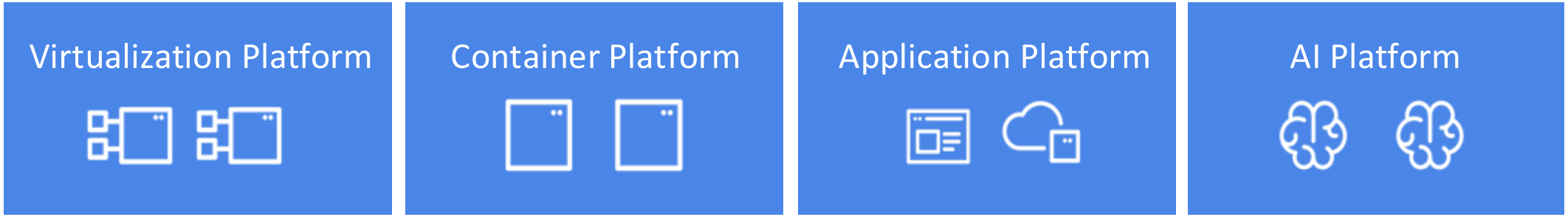
to reduce risk

Comprehensive

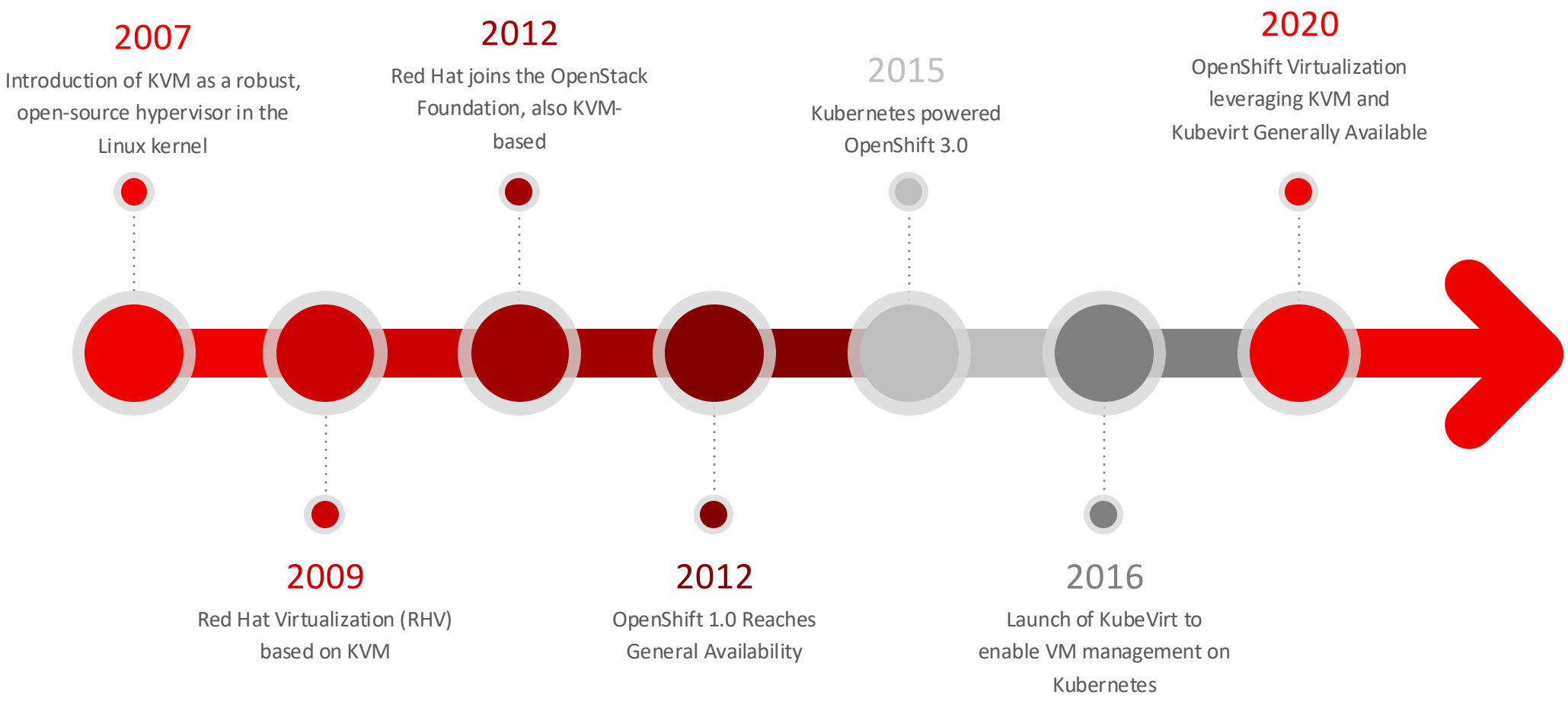
to improve productivity

Consistent

to increase flexibility

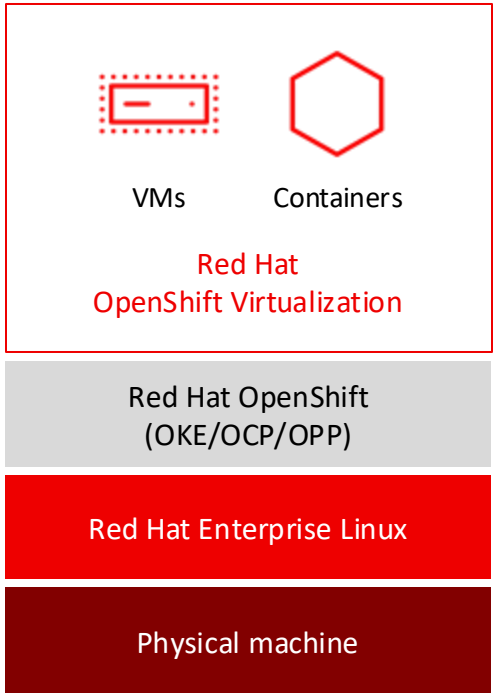


Red Hat has a long history with Virtualization



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
- **Diverse ecosystem**
  of Red Hat & partner operators
- **Included feature**
  of all OpenShift subscriptions (OVE/OKE/OCP/OPP)
- **Includes Red Hat Enterprise Linux**
  guest entitlements (OKE/OCP/OPP)
- **Supports Microsoft Windows**
  guests through Microsoft SVVP
- **Inbound guest migration**
  using Ansible Automation Platform + Migration Toolkit for Virtualization, Training and Consulting
- **Virt admin focused training** DO316, EX316

Red Hat

Bring traditional virtual machines into OpenShift

Traditional VM behavior in a modern platform

- Administrator concepts and actions
- Network connectivity
- Live migration

Use existing VM roles and responsibilities

- Migrate traditional VMs easily with a set of comprehensive tools
- Maintain application components that are business critical
- Modernize application workloads and skill sets over time

OpenShift Virtualization Engine

Opening the door to virtualization and modernization

Unlimited VMs

Run as many VMs as you need, maximizing the value of your hardware. Purchase RHEL subscriptions, virtualized OpenShift for container-based applications, or upgrade to other bare metal OpenShift editions if needed.

128 core bare metal scale

Get bare metal scale with 128 cores per subscription - run more VMs on less hardware, optimizing your infrastructure efficiency.

Optional Advanced Cluster Management for Virtualization

Scale as big as you can; add Advanced Cluster Management for Virtualization to make management of thousands of nodes as easy as managing a single rack.

Workload monitoring and platform logging

Keep tabs on and track your environment with a preconfigured, preinstalled, and self-updating stack then stay in command with the included OpenShift GitOps operator to leverage Kubernetes-powered orchestration for VMs.

Self-managed OpenShift editions

	Red Hat OpenShift Virtualization Engine	Red Hat OpenShift Kubernetes Engine	Red Hat OpenShift Container Platform	Red Hat OpenShift Platform Plus
Virtual machine workloads Migrate, manage, and deploy virtual machines	✓	✓	✓	✓
Enterprise Kubernetes for container applications Build, deploy, and run containerized applications		✓	✓	✓
Comprehensive application platform Full set of operations and developer services and tools			✓	✓
Management and security at scale Complete platform for accelerating app development and app modernization				✓

Find a feature breakdown across all OpenShift editions in our subscription guide.

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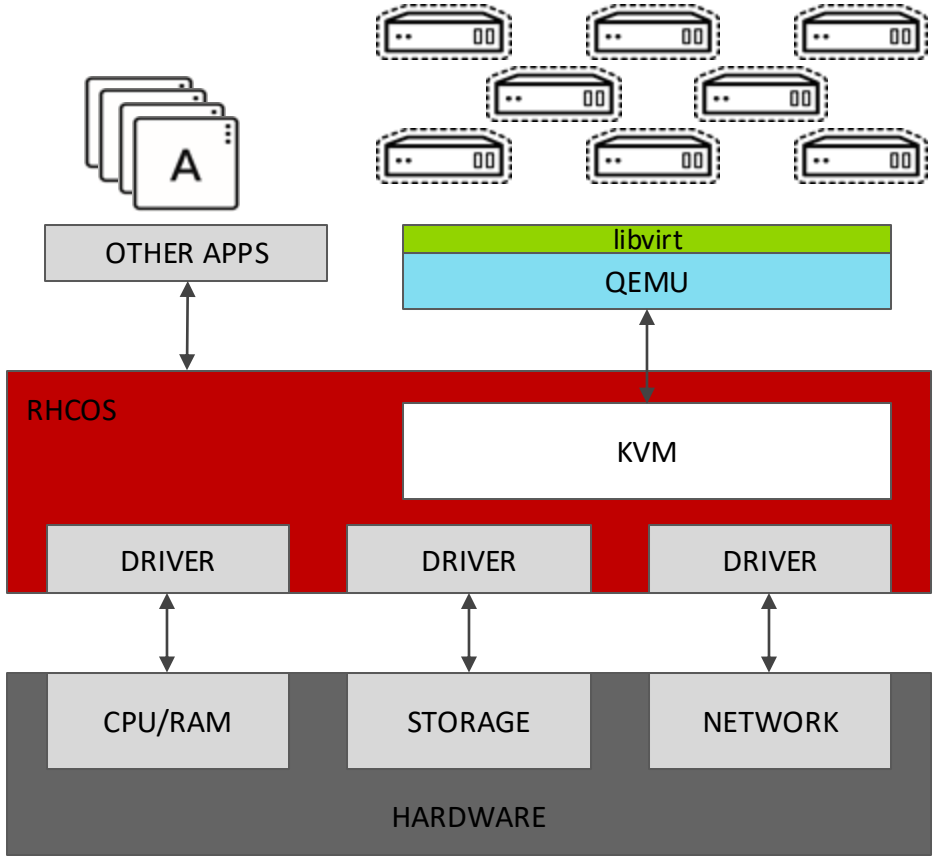
Hvad OpenShift Virtualization?

OpenShift Virtualization

- Virtual machines
  - Control plane 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



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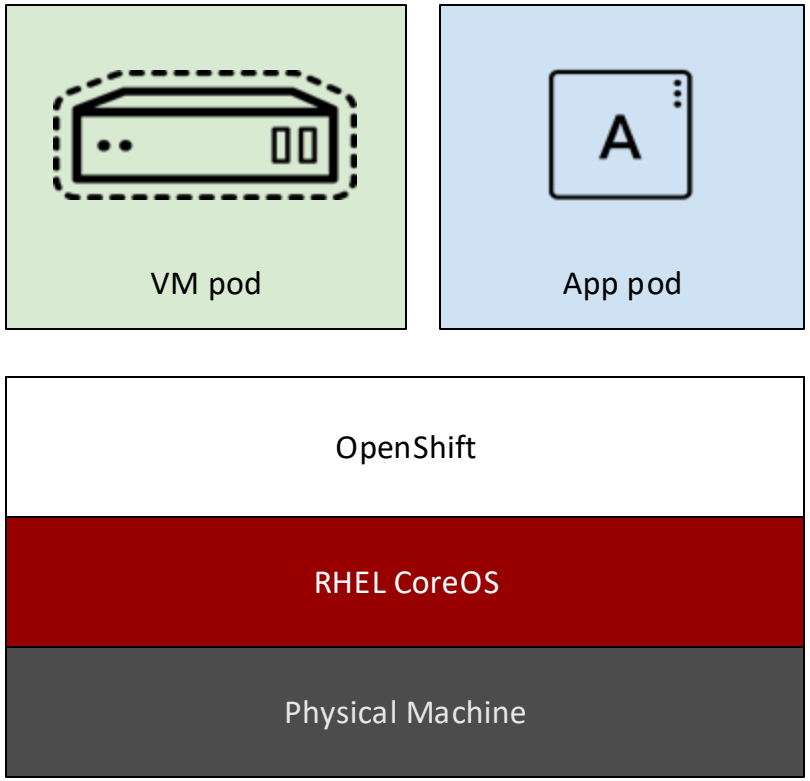
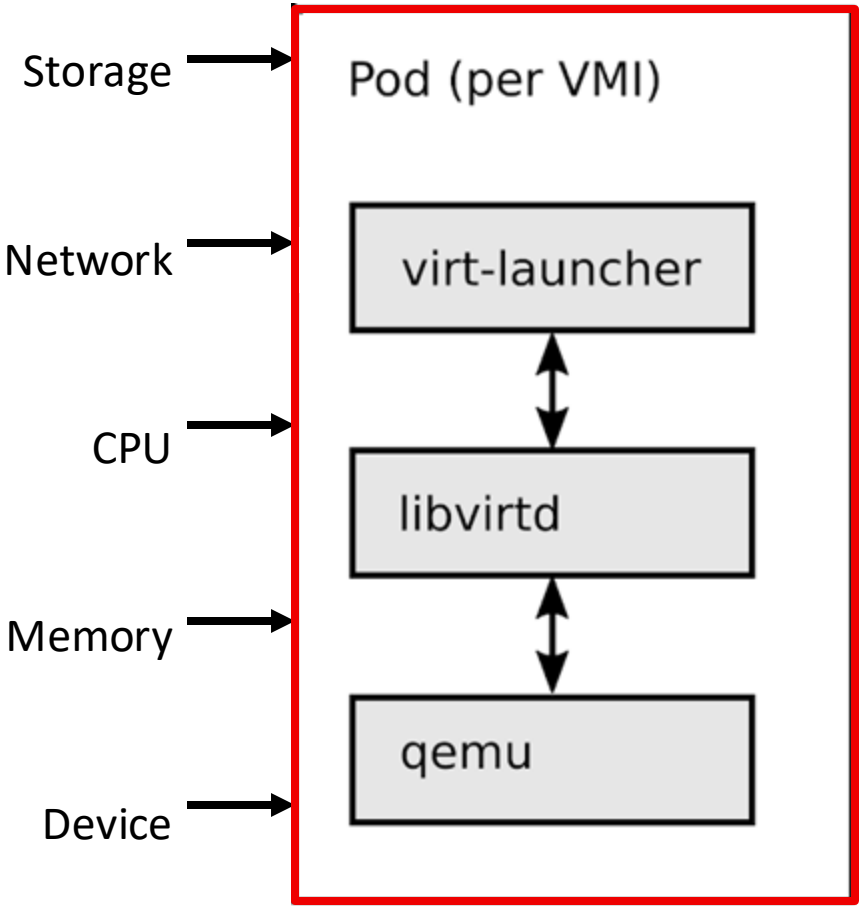
Virtual machines in a container world

- Provides a way to transition application components which can't be directly containerized into a Kubernetes system
  - Integrates directly into existing k8s clusters
  - Follows Kubernetes paradigms:
    - Container Networking Interface (CNI)
    - Container Storage Interface (CSI)
    - Custom Resource Definitions (CRD, CR)
- Schedule, connect, and consume VM resources as container-native



Containerized virtual machines



Kubernetes resources

- Every VM runs in a launcher pod. The launcher process will supervise, using libvirt, and provide pod integration.

Red Hat Enterprise Linux

- libvirt and qemu from RHEL are mature, have high performance, provide stable abstractions, and have a minimal overhead.

Security - Defense in depth

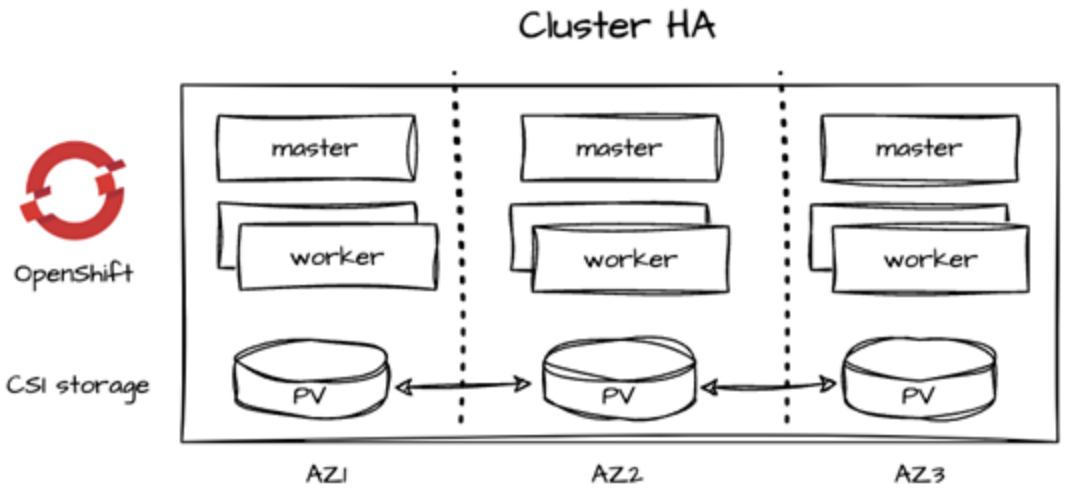
- RHCOS has controlled configuration by default, SELinux MCS, plus KVM isolation - inherited from the Red Hat portfolio stack

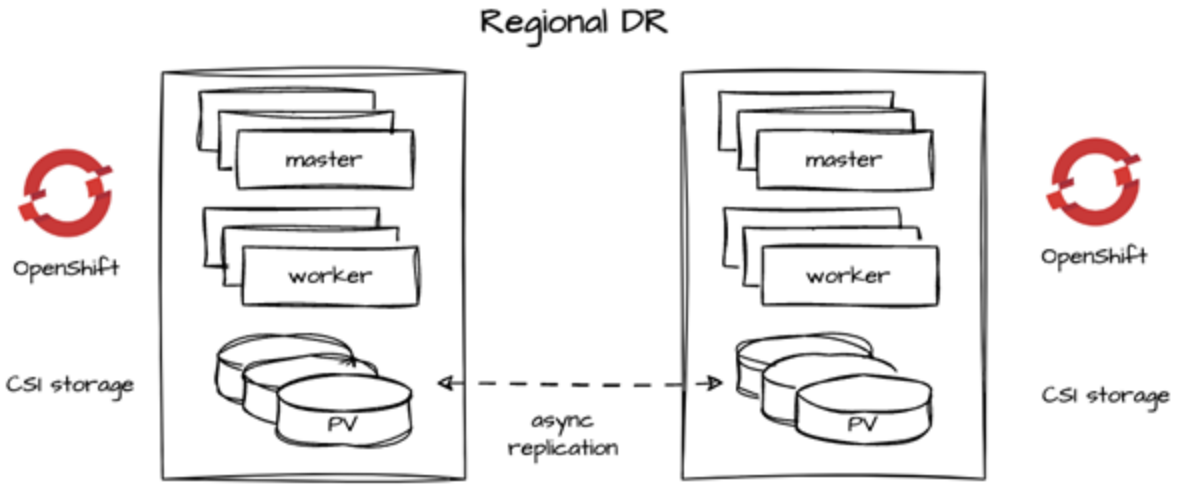
Terminology comparison

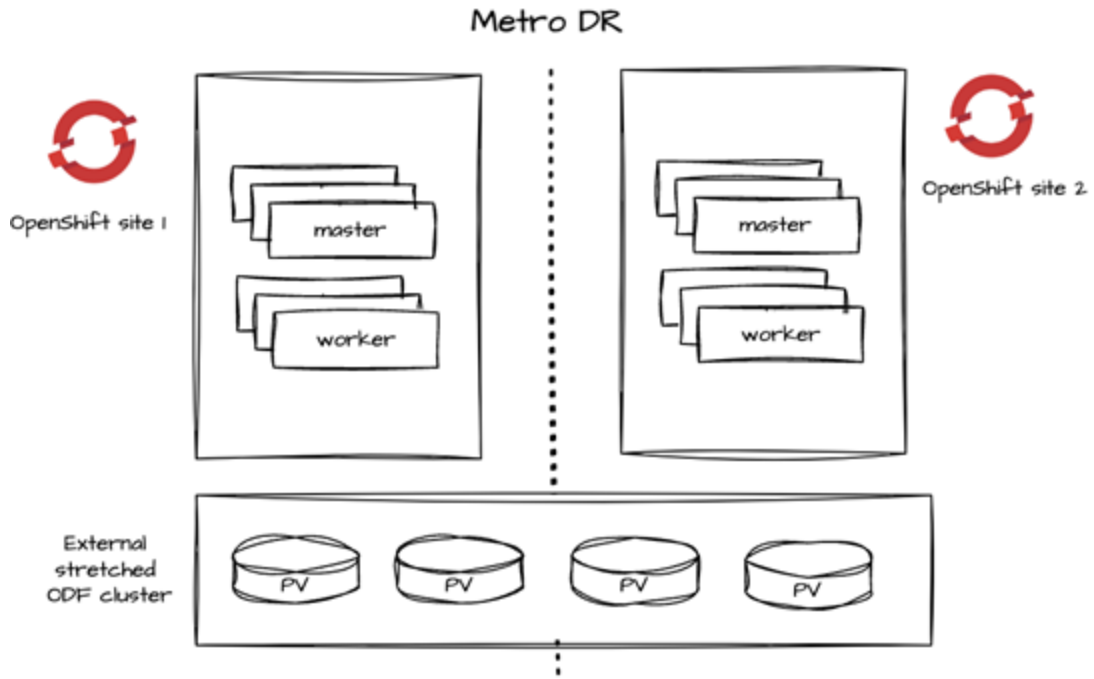
Feature	OpenShift Virtualization	vSphere
Where VM disks are stored	PVC	datastore
Policy based storage	StorageClass	SPBM
Non-disruptive VM migration	Live migration	vMotion
Non-disruptive VM storage migration	Live migration	Storage vMotion
Active resource balancing	Pod eviction policy + descheduler	Dynamic Resource Scheduling (DRS)
Physical network configuration	NMstate Operator, Multus	vSwitch / DvSwitch
Overlay network configuration	OVN-Kubernetes, ecosystem	NSX
Host / VM metrics	OpenShift Metrics, health checks	vCenter, vROps

Use-Cases
og arkitektur

HA / DR - infrastructure







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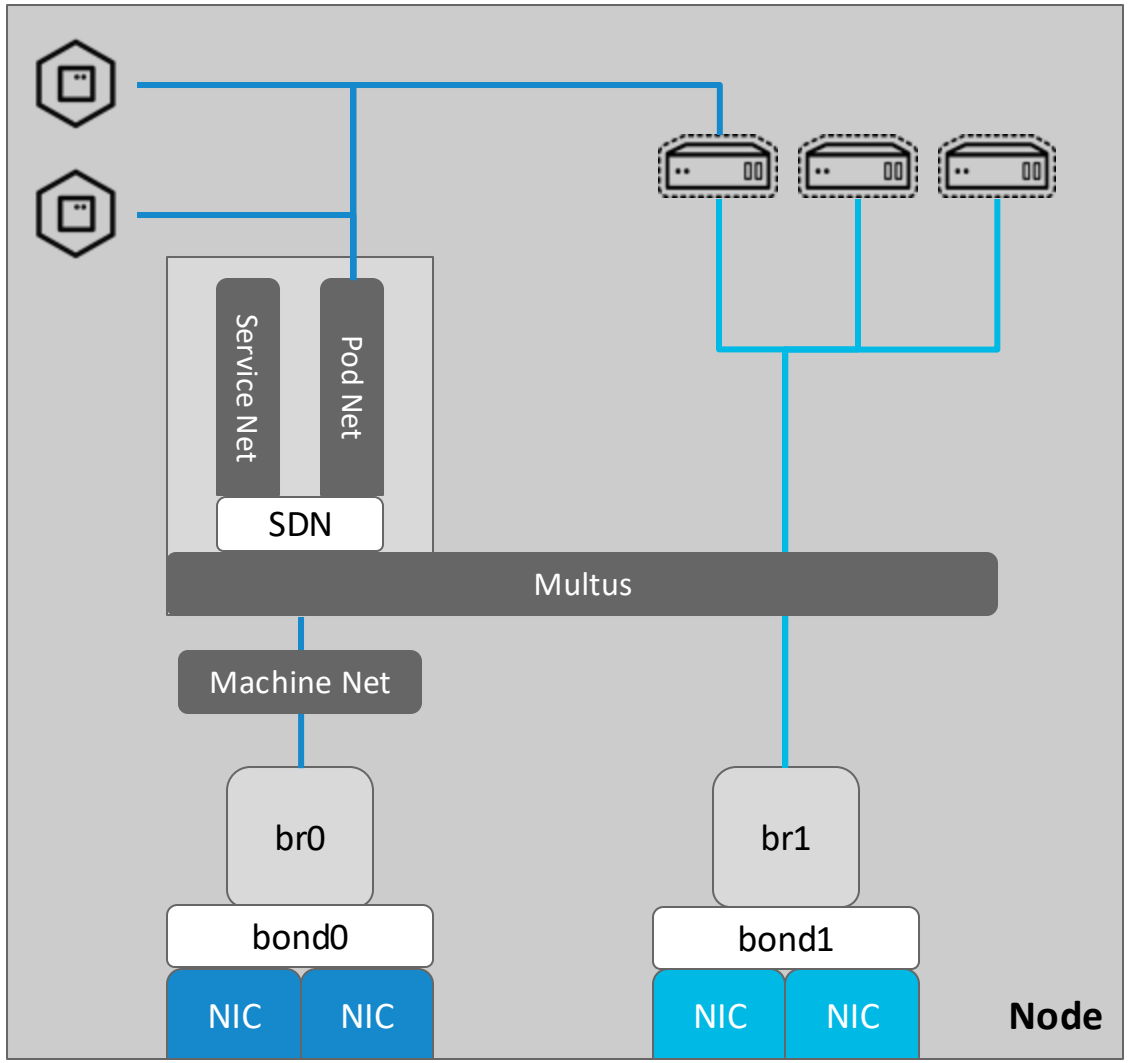
Host Network Configuration

- Pod, service, and machine network are configured by OpenShift automatically
  - Use kernel parameters (dracut) for configuration at install - `bond0` in the example to the right
- Use the NMstate Operator to configure additional host network interfaces
  - `bond1` and `br1` in the example to the right
- VMs and Pods connect to one or more networks simultaneously

The following slides show an example of how this setup is configured



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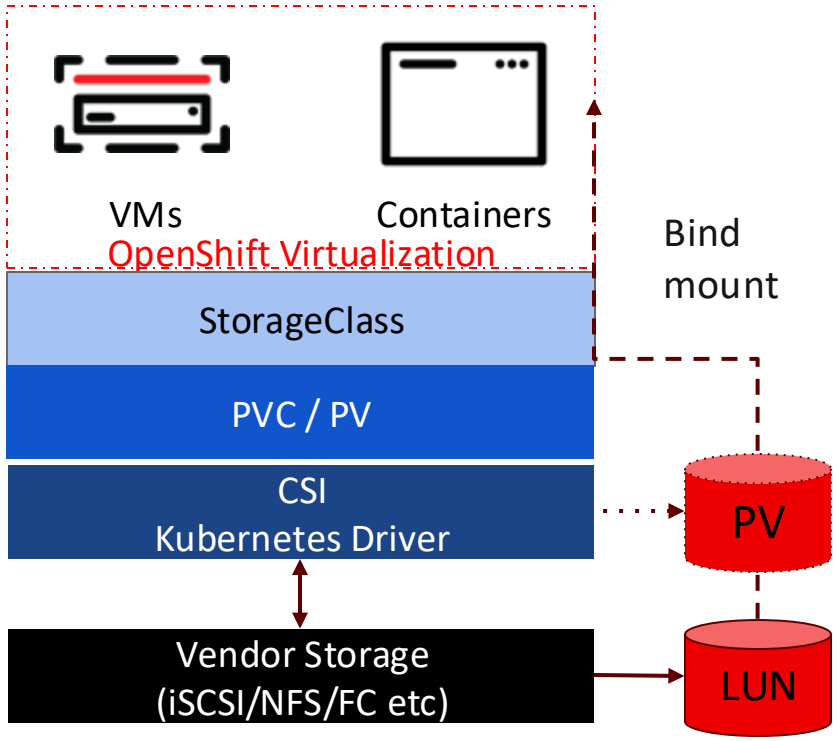
OpenShift Virtualization VM Storage

- VM storage in VMware generally involves creating VMDK image files in a large shared VMFS/NFS Datastore. All the storage is mounted to each hypervisor.
- The closest analogy in OpenShift is the VMware vVol model. VMs directly map their own volumes (PVs) created on the storage device. There isn't one large chunk of storage attached to the hypervisor, but individual disks for each VM. These disks are mounted dynamically as needed.
- In OpenShift we abstract these as PersistentVolumeClaims, StorageClasses, PersistentVolumes, and the CSI Provider.



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OpenShift Virtualization VM Storage

PersistentVolumeClaim (PVC)

- References the Storage Class, not a PV directly.
- Requests specific volume parameters: Size, RW(O/X), etc

==>>

StorageClass (SC)

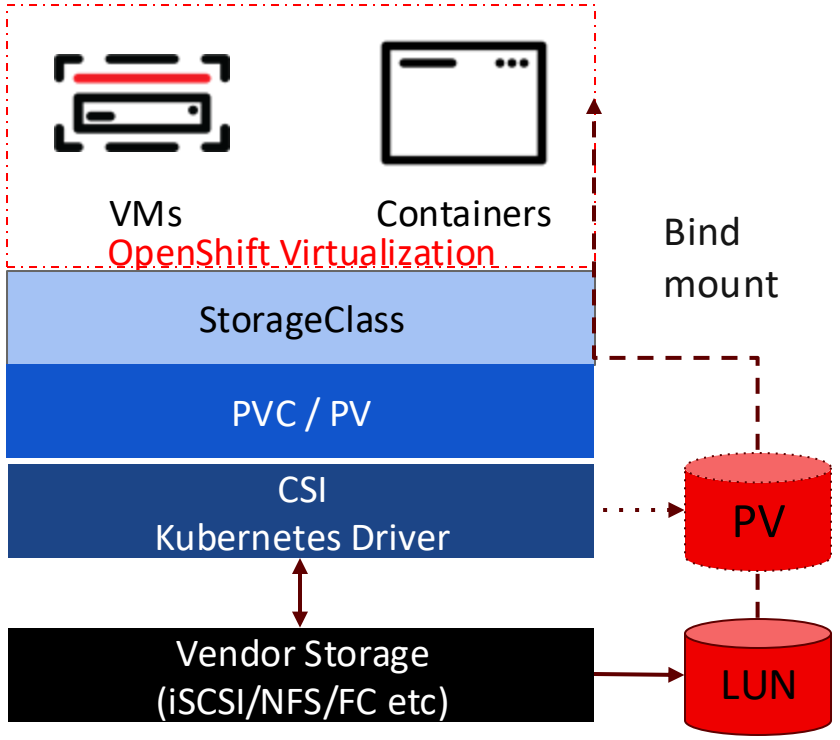
- Abstracts the CSI provisioner & available functionality/configuration
- Abstracts the back-end storage system
- Dynamic creating/binding PV via the CSI driver

Type: Block, File or Object
Gold, Silver or Bronze
Request: Block, 10GB
Read-Write Many (RWX)

==>>

PersistentVolume (PV)

- The underlying storage volume created by the Vendor Storage.



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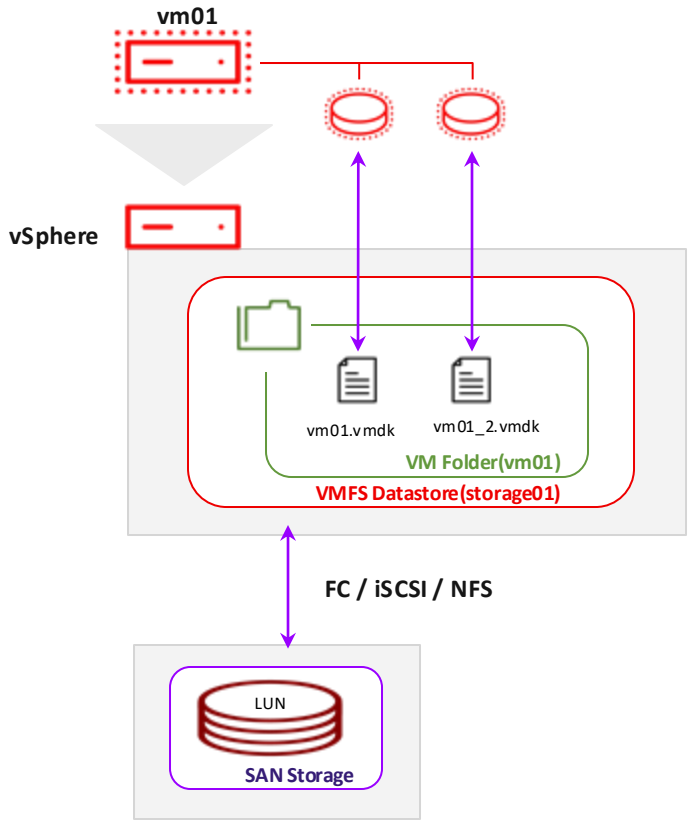
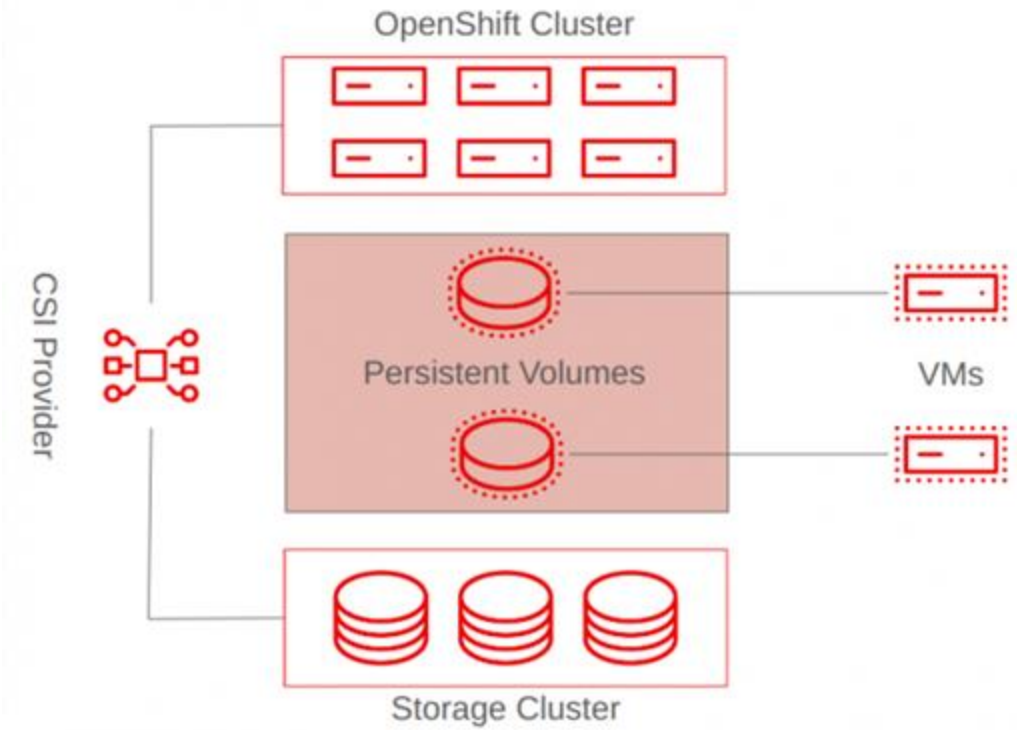
OpenShift Virtualization VM Storage

- Storage in OpenShift Virtualization is similar to vVols/RDMs in vSphere, not the legacy Datastore/VMFS paradigm.
- API calls to the CSI driver (via a PVC referencing a StorageClass) offloads the storage provisioning (PV creation) to the storage provider. These PVs are then presented directly to the VMs.
- PVs are usually their own volumes on the storage system, and benefit from functionality provided by that storage system like dedup, CoW snapshots, rapid cloning, etc.
- Enables live migration (vMotion), by having the volumes on a storage cluster instead of hypervisor local disk.





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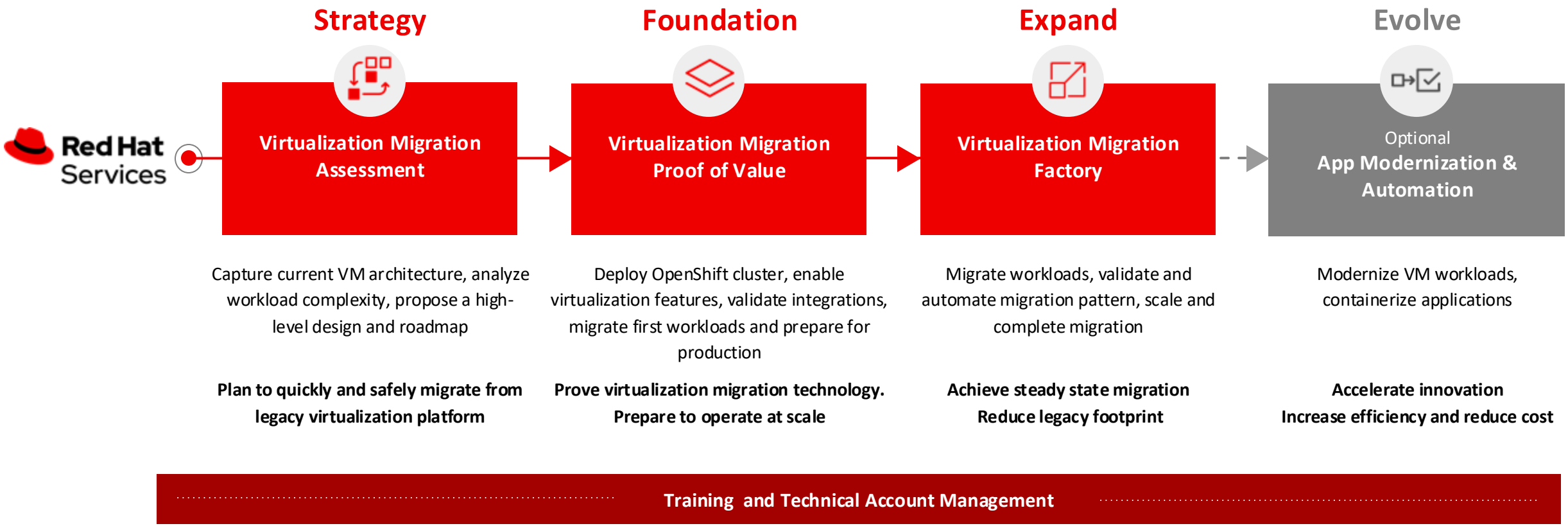
Hvad kræver det at komme i gang?

A bird's eye view into your Virtualization journey

A customizable approach based on your business needs and current environment



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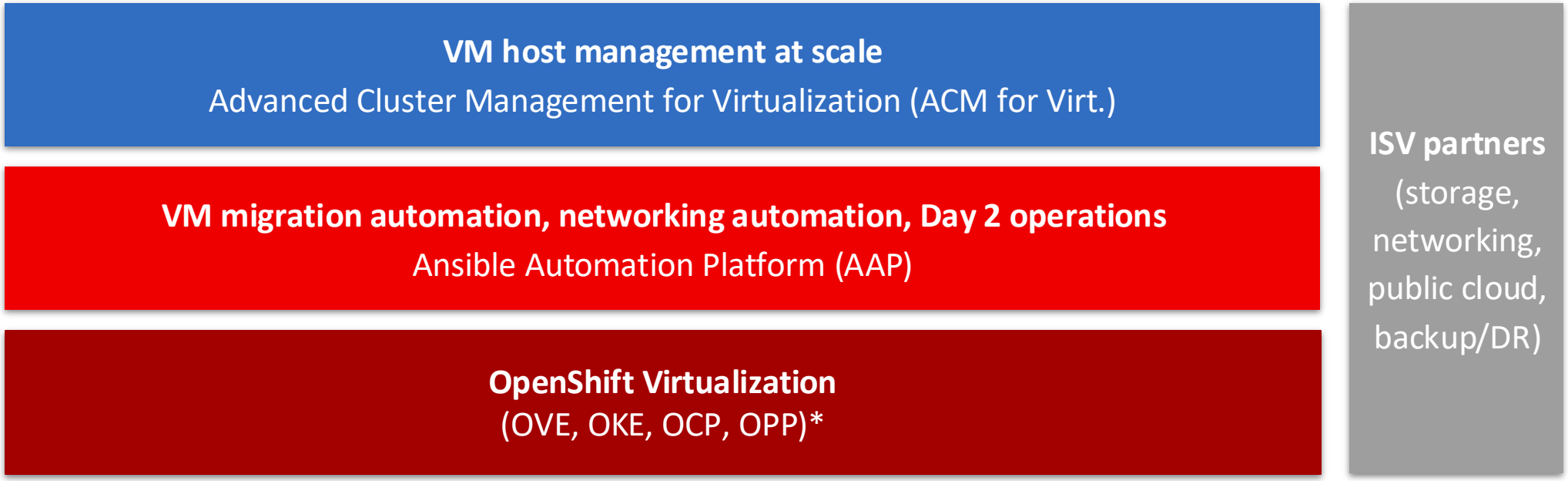
Red Hat's validated approach for an open virtualization infrastructure



* At a minimum, OVE is required but **all other OpenShift offerings (ie: OKE, OCP, OPP) ARE acceptable** if the subscription already exists

Red Hat

Complete the platform…

Storage

- portworx by Pure Storage
- Dell Technologies
- IBM
- Hitachi Inspire the Next
- INFINIDAT
- Red Hat OpenShift Data Foundation
- NetApp
- Hewlett Packard Enterprise
- lightbits

Backup & Disaster Recovery

- COHESITY
- Dell Technologies
- veeam Kasten
- rubrik
- TRILIOVAULT
- portworx by Pure Storage
- VERITAS
- NetApp
- IBM
- ot
- storware BACKUP AND RECOVERY

Networking

- CISCO
- ISOVALENT
- TIGERA
- f5

Virtual Desktops

- citrix

Compute Hardware

- Dell Technologies
- Lenovo
- Hewlett Packard Enterprise
- CISCO
- IBM

Cloud Providers

- aws
- Microsoft Azure *Public Preview
- ORACLE Cloud Infrastructure *Tech Preview
- IBM
- Google Cloud *Tech Preview

…with your existing technology partners

This is not an exhaustive list of ISV partners, with new partners being added all the time.

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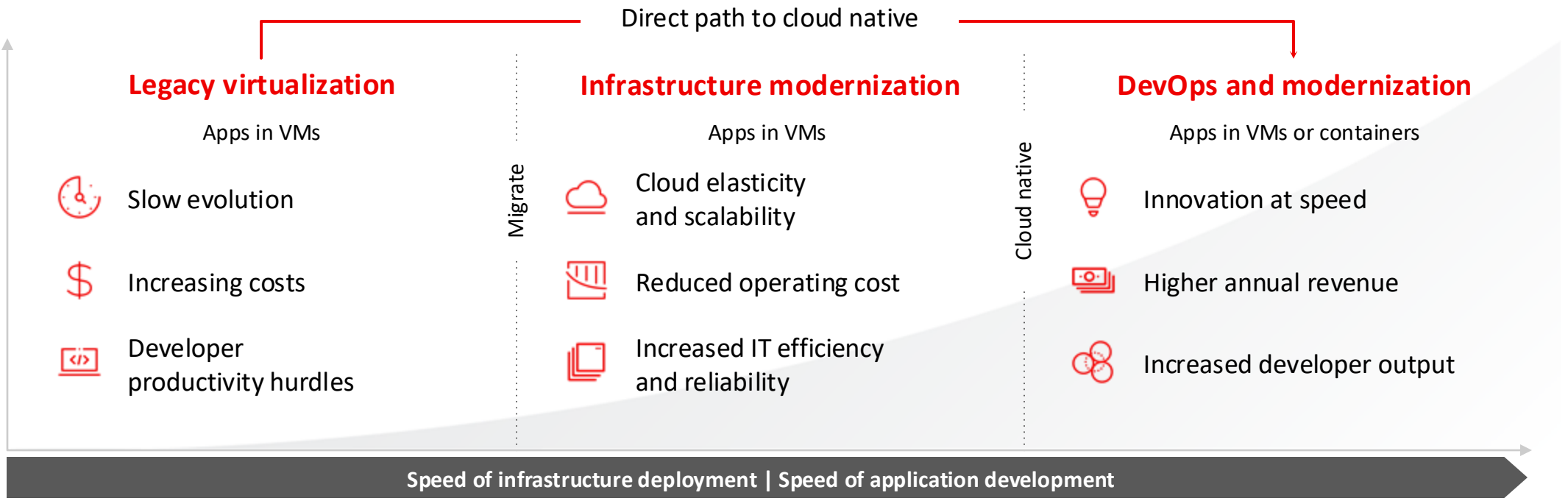
Modernize at your own pace



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Q&A og næste skridt

Virtualization Migration Assessment

Two-week onsite interactive workshop and follow-on report

Want to migrate VMs quickly and safely to a mature platform? Kick off with a Virtualization Migration Assessment for your quickest path to migration

Next Steps →

1

Gather representatives from your infrastructure, networking and security teams

Experienced Red Hat Architects run a short series of onsite workshops to develop your migration journey

2

Know where you are going and how your going to get there

We provide a completed architecture design and prioritized roadmap for integrated migration factory solution

3

We will follow up with a tailored proposal for your complete migration off your current virtualization solution

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Get Hands-On with OpenShift Virtualization

OpenShift Virtualization Roadshow

A premier hands-on experience for VM admins

- Start the day with an overview of OpenShift Virtualization and then dive into a 4-hour lab with modules that cover: **environment review, VM creation and use, customization, management, live migration, networking, storage, migration tool kit, external load balancer, and backup and restore**

- Ask for a roadshow to be ran at your company.

Red Hat

eBooks & White Papers & Cheat Sheet

- The state of virtualization report
- Business value overview - Gain business value with Red Hat OpenShift Virtualization
- 101 level ebook - 15 reasons to adopt Red Hat OpenShiftVirtualization
- Virt on ROSA ebook - 15 reasons to adopt Red Hat OpenShift Virtualization on ROSA
- The value of Red Hat OpenShift's partner ecosystem

For virtualization administrators/practitioners:

- 201 level ebook - Get started with Red Hat OpenShift Virtualization (Day 2 Operations)
- 201 level ebook - Migrate your virtual machines: A virtualization administrator's guide

OpenShift Virtualization for VMware administrators cheat sheet

ATEA TECH TOUR

Tak for jeres opmærksomhed

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