

Cheat sheet

Red Hat OpenShift Virtualization for VMware administrators

[Red Hat OpenShift Virtualization](#) is the core virtualization functionality of [Red Hat OpenShift](#), enabling organizations to run and deploy virtual machines (VMs) on a hybrid cloud application platform. It is included with all OpenShift editions, offering a host of tools to manage and run VMs alongside containerized applications.

This cheat sheet guides VMware vSphere users to access commonly used features and concepts with Red Hat OpenShift and OpenShift Virtualization. It covers mappings for:

- Storage management
- Networking
- Compute resources
- Observability
- Virtual machine components

Note: OpenShift is conceptually different in select areas from VMware to achieve the same or similar outcomes. This cheat sheet is based on Red Hat OpenShift 4.18 and VMware vSphere 8.0. Refer to the [Red Hat OpenShift](#) and [VMware documentation](#) for the most up-to-date information.

Storage

Understanding storage differences is crucial when moving from VMware to OpenShift. This section maps common VMware storage features to their OpenShift counterparts and explains the OpenShift Virtualization storage menu options.

Storage feature mapping

Feature	VMware	OpenShift
Where VM disks are stored	Datastore	PersistentVolumeClaim (PVC)/PersistentVolume (PV)
Policy-based storage management	vSphere Virtual Volumes (vVols), Storage-Policy Based Management (SPBM)	Storage classes
Non-disruptive VM storage migration	Storage vMotion	Storage live migration
Storage availability	vSAN (vVols), NFS, SAN (Fiber Channel or iSCSi), Raw Device Mapping	PersistentVolume and PersistentVolumeClaim paradigms to manage storage for VMs Container Storage Interface (CSI) paradigm to allow for seamless integration with various storage back ends or software-defined storage solutions
Accessing legacy storage arrays	Compatible with all major storage vendors	All major storage vendors have a CSI compliant driver
Storage accelerated cloning	Yes, via vStorage APIs for Array Integration (VAAI)	Yes, via CSI driver
Disk resizing	Yes	Yes

Feature	VMware	OpenShift
Disk/VM snapshots	Yes	Yes. Backup and restore by using VM snapshots.
Storage Distributed Resource Scheduler (Storage DRS)	Yes	N/A

Storage menu mapping

OpenShift Virtualization menu item	VMware comparable	Explanation
Storage - Data Foundation <i>(requires OpenShift Data Foundation storage and its console plug-in)</i>	vSAN or local RAID disk set up as a VMFS filesystem	Entry point in the web console to manage OpenShift Data Foundation storage
Storage - Object Storage <i>(requires OpenShift Data Foundation storage and its console plug-in)</i>	N/A	Configure and manage Object storage, including policies, buckets, claims, or replication.
Storage - PersistentVolumes	List of vVols or VMDKs	Manage and troubleshoot statically or dynamically provisioned file and block-based PVs. Each PersistentVolume represents a single storage volume that is backed by one of the existing storage providers.

OpenShift Virtualization menu item	VMware comparable	Explanation
Storage - PersistentVolumesClaims	N/A	Manage and troubleshoot storage requests, their binding to PersistentVolumes, and their allocation to workloads (containers and VMs). PVCs also define characteristics of how PVs are bounded and their life cycle.
Storage - StorageClasses	Storage Policies	Manage the classes of storage providers integrated in your cluster. Each storage class is a profile that maps dynamic storage requests to a storage provider and defines provisioning properties determined by the cluster administrators.
Storage - VolumeSnapshot	Virtual Machine Storage Snapshot	Manage and troubleshoot volume snapshot and restore requests.
Storage - VolumeSnapshotClasses	N/A	Manage the classes of snapshot providers integrated in your cluster. Each snapshot class is a profile that maps snapshot requests to a snapshot provider and defines snapshot configuration properties determined by the cluster administrators.
Storage - VolumeSnapshotContents	N/A	Manage and troubleshoot existing volume snapshots. Each snapshot is backed by an integrated snapshot provider. It is similar to a PersistentVolume.

Networking

This section maps common VMware vSphere networking features to their OpenShift equivalents for deploying and managing VMs.

Networking feature mapping

Feature	VMware	OpenShift
Host network configuration and management	Per-host configuration via vSwitch or single point management via VMware Distributed Switch (VDS)	NMstate Operator and Multus
Software-defined networking: protect/limit/control VM-to-VM communication	Multiple capabilities here (e.g., QinQ), but this is most often referring to NSX's microsegmentation, aka distributed firewall.	<p>OpenShift SDN provides a robust networking solution with OVN (Open Virtual Networking). Overlay-based networking uses Generic Network Virtualization Encapsulation (Geneve), which tunnels to enable VM-to-VM communication.</p> <p>IP address management (IPAM) allocation</p> <p>Expose services through load balancers</p> <p>Network Policies through OVN access control lists (ACLs)</p> <p>Supports IPv4/IPv6 dual-stack clusters</p> <p>Fine-grained cluster egress traffic controls</p> <p>Advanced networking features such as hardware offload, microsegmentation, secondary networks, IP multicast using OVN IGMP snooping and relays.</p>

Feature	VMware	OpenShift
Pod-to-VM and VM-to-Pod connectivity	Traffic between Pods and VMs must traverse through the Kubernetes ingress or similar mechanism, e.g. NodePort.	VMs and Pods are native peers when connected to the SDN or the same UDN, with all of the features and capabilities equally available to both.
Network observability	vSwitch port mirroring to third-party solutions and NSX traffic analysis for security purposes.	Network Observability Operator

Networking menu mapping

OpenShift Virtualization menu item	VMware comparable	Explanation
NodeNetworkConfigurationPolicy	vSwitch/DvSwitch	Desired network configuration on cluster nodes.
NodeNetworkState	Similar to v/DvSwitch view at ESX/vCenter	Network status on nodes.
Service	N/A	Layer 4 load balancing configurations with self-discovery and automatic DNS internal to the SDN. Combined with ingress LB solutions such as MetalLB or cloud-provided load balancing, it allows you to expose services outside the cluster.

OpenShift Virtualization menu item	VMware comparable	Explanation
Routes and Ingresses	NSX Load Balancer	<p>Routes: Application load balancing configurations to expose web services outside the cluster.</p> <p>Ingresses: Accessing application with unique hostname.</p>
NetworkPolicy	NSX-T Firewall (microsegmentation rules)	Manage application-centric network policies.
NetworkAttachmentDefinitions	Port groups	Virtual machine connectivity to networks (e.g., VLANs, private networks, etc.)
UserDefinedNetwork	NSX-T Overlay Segments	Create and manage overlay network segments.

Compute options

Monitoring, migration, and resource balancing are several compute options that go into any tool for managing your infrastructure.

Compute feature mapping

Feature	VMware	OpenShift
Resource balancing	Dynamic resource scheduling (DRS)	Descheduler pod eviction policy
Host / VM metrics	vCenter, Aria Operations	OpenShift Metrics and Monitoring, Red Hat Advanced Cluster Management

Feature	VMware	OpenShift
Compute Live migration	vMotion	Live Migration
CPU overcommitment	Yes	Yes
Memory overcommitment methods	Ballooning and transparent page sharing (TPS), Swap	KSM and free page reporting
(Co)scheduling constraints	Affinity rules for VMs-to-VMs and VMs-to-hosts	(Anti-)affinity rules for VMs, Pods, and hosts
Node failure	Node failure detection and VM rescheduling happens within 15-30 seconds, even without vCenter.	Supported through fencing agents' environments . See KCS for HA configuration.
Dynamic reconfiguration	CPU, memory, disk, network and some additional hardware is supported for hot add/remove and reconfiguration.	Hot add supports storage , CPU , SR-IOV and Bridge Network , and memory .
Compute acceleration	PCI passthrough for CPUs, vGPU supported.	GPU, generic PCI passthrough, and CPU passthrough supported, (NVIDIA) vGPU supported.

Feature	VMware	OpenShift
Template management	Template VMs, OVA/OVF deployment, and content libraries offer the ability to provision VMs using a simplified process.	Catalog to manage boot sources, VM templates, and instance types. VMs can be created from VM templates, instance types, or declarative raw VM definitions when associated with a specific boot source.
VM export/import	Import and export VMs using the OVF and OVA formats.	Import and export OVA/VMs using migration toolkit for virtualization (export example).

Compute menu mapping

OpenShift Virtualization menu item	VMware comparable	Explanation
Nodes	Host and Cluster > Host	List and troubleshoot current nodes in the cluster and their configuration and runtime details.
NodeHealthChecks	Config > vSphere DRS	Configure remediation actions for different node states. There is a range of remediation operators that go from soft rebooting a node that is in Not Ready or Unknown state, hard rebooting it from the BMC APIs or forcing a reinstallation of the node after unsuccessful reboot remediations.
Machines (automation)	N/A	List and troubleshoot the metadata of nodes installed and automated through the OpenShift Machine API operator using manual or automatic scaling.

OpenShift Virtualization menu item	VMware comparable	Explanation
MachineSet (automation)	N/A	List and troubleshoot the metadata of nodes installed and automated through the OpenShift Machine API operator using manual or automatic scaling.
MachineSet (automation)	Host profiles	Configure automation profiles to manually or automatically scale infrastructure. A scaled MachineSet will create a Machine object to allocate an available bare metal host and trigger the installation and configuration defined in the MachineSet.
MachineAutoscalers (automation)	N/A	Define autoscaling rules to scale a MachineSet.
MachineHealthChecks	N/A	Alternative mechanism to NodeHealthChecks when the desired remediation is to delete a Machine, which triggers a fresh installation of the node. In cloud providers, it causes the deletion of the node and the creation of a new bare metal node.
Bare Metal Host (automation)	N/A	List and operate bare metal servers added to the cluster. Bare metal hosts include manually installed servers and servers made available for and installed by MachineSet scaling. Integrated with BMC APIs, it enables full server life cycle.

OpenShift Virtualization menu item	VMware comparable	Explanation
MachineConfigs (automation)	Host profiles	Manage declarative host configurations to ensure consistent groups of configurations per machine pools and avoid configuration drifts.
MachineConfigPools (automation)	Host profiles	Manage different host configuration pools allocating MachineConfig objects to nodes based on roles. MachineConfigPools also allow you to segment nodes and define different HA policies when rolling platform updates/upgrades.
Hardware devices	N/A	N/A (specialty hardware enablement)

Observability

Once your infrastructure is finally up and running, it's time to keep it running smoothly. This section addresses commonly used observability features in VMware and how they map to deploying, managing, and maintaining virtual machines in OpenShift.

Observability feature menu mapping

Feature	VMware	OpenShift
Notification/alarm on triggers	Custom alarm provides rules definition on events, condition or state triggers, severity levels can be set.	OpenShift Observability provides rules definition. Severity levels can be set and have discrete actions for each level.

Feature	VMware	OpenShift
Variety of notification targets	Custom Alarm provides for emails and SNMP traps configuration as well as script execution.	Alertmanager provides default handlers for email, webhooks, and several third-party applications, including Slack, PagerDuty, and Microsoft Teams.
Event logging	Provides a per-VM advanced option to Enable logging to a log file called <code>vmware-n.log</code> .	Vector/Loki/Logging Console plug-in has replaced the traditional Elasticsearch/Fluentd/Kibana stack to provide greater insights and better observability.
Log shipping	Host logs can be shipped from vCenter to alternate locations/third-party logging applications.	Vector multi log forwarder feature supports multiple Red Hat and third-party logging applications.

Observability menu mapping

OpenShift Virtualization menu item	VMware comparable	Explanation
Alerting	Task and Events	Shows list of events
Metrics	Task and Events	Show performance data for VMI/pods
Dashboards	Performance > Overview/Advance	Performance dashboards
Target	Integration access with account/passwords	List of services that can be monitored

Virtual machine components

This section covers the individual components and settings included within virtual machines (VM) as it relates to both Red Hat OpenShift and VMware vSphere.

As virtual machine components in OpenShift can be found within the virtual machines themselves, there is no menu mapping chart for this comparison.

Virtual machine feature mapping

Feature	VMware	OpenShift
Guest agent	VMware Tools	QEMU guest agent
VM dumping	Right-click VM → Snapshot and check the Snapshot Virtual machine memory box.	virtctl
VM cloning	Yes	Yes
Tags and custom attributes	Tags and custom attributes	Labels
VM NIC	E1000, e1000e, VMXNET 2 (Enhanced), VMXNET 3, Flexible, Vlan, PVRDMA, SR-IOV passthrough	VirtIO or e1000e
SCSI controller	LSI Logic SAS, BUSLogic Parallel, LSI Logic SAS, VMware Paravirtual SCSI	SCSI , VirtIO , SATA