

# RED HAT ENTERPRISE VIRTUALIZATION FEATURES GUIDE

TECHNOLOGY OVERVIEW

*“Serving Sears members is our top priority, and one way we do that is by keeping our online services at the forefront of innovation, ensuring that our platform is both highly scalable and functional. Transitioning to Red Hat Enterprise Virtualization enabled us to maintain that edge, while giving us the opportunity to replace our proprietary solution without sacrificing either the speed or efficiency of our operation.”*

YIANNI GEORGAKAS, DIRECTOR  
OF SYSTEMS ENGINEERING AND  
E-COMMERCE, SEARS HOLDINGS  
CORPORATION

## OVERVIEW

Red Hat® Enterprise Virtualization is a complete virtualization management solution for virtualized servers and workstations. Co-engineered with Red Hat Enterprise Linux®, it provides the performance advantages, including an integrated platform with your existing infrastructure, competitive pricing, and the trusted, stable environment you expect from Red Hat.

With Red Hat Enterprise Virtualization, you can:

- Confidently virtualize any mission critical application.
- Build and seamlessly manage an integrated cloud infrastructure.
- Standardize storage, infrastructure, and networking services.
- Gain workload performance efficiencies.
- Take advantage of existing people skills and investments.
- Decrease total cost of ownership (TCO) and accelerate return on investment (ROI).

## FEATURE CATEGORIES

## CAPABILITY

### RED HAT ENTERPRISE VIRTUALIZATION HYPERVISOR

High-performance, small-footprint, open source hypervisor based on the Red Hat Enterprise Linux kernel with the Kernel-based Virtual Machine (KVM) hypervisor technology.

Red Hat Enterprise Virtualization Hypervisor

- Image-based, small-footprint (<200MB) hypervisor with minimized security footprint
- Text-based user interface for enhanced manageability and easier installation

Scalability

- Host scalability: Supported limit of up to 160 logical CPUs and 4TB per host
- Guest scalability: Supports up to 160 vCPU and 4TB vRAM per virtual machine (VM) guest



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FEATURE CATEGORIES	CAPABILITY
Performance	<ul style="list-style-type: none"> <li>• KSM memory overcommitment: Allows users to define more RAM in their VMs than is present in a physical host</li> <li>• Non-uniform memory access (NUMA) support: Allows users to provision large guest workloads while minimizing physical memory access overhead on compatible hosts</li> <li>• NEW - using SR-IOV for your virtual machine network, you can increase network throughput while decreasing latency and CPU overhead for near bare-metal performance</li> <li>• NEW - Virtual Function I/O (vfio) capabilities introduced in RHEL 7 can assign PCI devices, including GPUs, directly to a guest operating system</li> </ul>
Security	<ul style="list-style-type: none"> <li>• Security model supports SELinux and sVirt capabilities, including mandatory access control (MAC) for enhanced VM and hypervisor security</li> </ul>
<p>RED HAT ENTERPRISE VIRTUALIZATION MANAGER</p>	
<p>Centralized enterprise-grade virtualization management engine with graphical administration console and programming interfaces.</p>	
Platform	<ul style="list-style-type: none"> <li>• Red Hat Enterprise Virtualization Manager platform is built on Red Hat Enterprise Linux and Red Hat JBoss® Enterprise Application Platform for superior performance and scalability</li> </ul>
Red Hat Enterprise Virtualization programming and API	<ul style="list-style-type: none"> <li>• Red Hat Enterprise Virtualization API exposes all Red Hat Enterprise Virtualization commands via an open source, community-driven RESTful API</li> <li>• A Python-based software developers' kit (SDK) simplifies customization programming</li> </ul>

FEATURE CATEGORIES	CAPABILITY
OpenStack integration (Tech Preview)	<ul style="list-style-type: none"> <li>• OpenStack Glance integration includes:                             <ul style="list-style-type: none"> <li>• An advanced service engine for storage of VM templates and ISO images</li> <li>• The ability to use, export, and share templates and images with Red Hat Enterprise Linux OpenStack Platform (subscription not included)</li> </ul> </li> <li>• OpenStack Neutron integration includes:                             <ul style="list-style-type: none"> <li>• Advanced service engine for network configuration</li> <li>• Open vSwitch distributed virtual switching support</li> <li>• IP address management (IPAM) with Red Hat Enterprise Virtualization based on Neutron subnets</li> <li>• Neutron appliance that provides simplified provisioning and deployment functionality of Neutron services</li> <li>• Ability to centralize network configurations with Red Hat Enterprise Linux OpenStack Platform (subscription not included)</li> </ul> </li> <li>• OpenStack Ceph integration:                             <ul style="list-style-type: none"> <li>• Integrates storage using OpenStack Cinder</li> </ul> </li> </ul>
Red Hat Satellite integration	<ul style="list-style-type: none"> <li>• Adds the capability to provision and add hypervisors to Red Hat Enterprise Virtualization from bare metal</li> <li>• Pin individual VMs to a set of hosts</li> <li>• Host Update Manager - allows seamless updates to host hypervisor servers and querying of errata information for Red Hat Enterprise Virtualization Manager's OS, providing a complete view of critical updates for infrastructure lifecycle management</li> </ul>

FEATURE CATEGORIES	CAPABILITY
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RED HAT ENTERPRISE USER PORTAL

Centralized graphical management system for administrators to manage virtual machines, templates, desktops, storage, clusters, and datacenters.

Administrative portal	<ul style="list-style-type: none"> <li>User interface enhancements include:                             <ul style="list-style-type: none"> <li>TreeView for hierarchical management of the Red Hat Enterprise Virtualization environment</li> <li>Expanded tag and bookmark capabilities</li> <li>Enhanced query engine for searching for Red Hat Enterprise Virtualization objects</li> <li>Extensive event monitoring</li> <li>Enhanced dialog boxes, including a network bonding dialog box allowing easier configuration of multiple virtual networks</li> </ul> </li> </ul>
Advanced SLA manager	<ul style="list-style-type: none"> <li>The manager provides an enhanced quality of service configuration options</li> <li>Users can define VM policies for CPU, memory, and network, with policies guaranteeing service quality</li> </ul>
User portal	<ul style="list-style-type: none"> <li>The Red Hat Enterprise Virtualization user portal provides standard and power user access to the Red Hat Enterprise Virtualization environment</li> </ul>
Quotas	<ul style="list-style-type: none"> <li>Quotas provide a simple method of limiting the number of virtual guests, the quantity of storage used, CPU utilization, and the amount of memory on host servers</li> </ul>
Reports dashboard	<ul style="list-style-type: none"> <li>The Red Hat Enterprise Virtualization Reports dashboard provides a robust, historical reporting system based on an embedded Jasper Reports engine; numerous pre-built reports and dashboards are included, or users can define their own</li> </ul>

RED HAT ENTERPRISE VIRTUALIZATION ENTERPRISE FEATURES

These features enable VM administrators to efficiently automate virtualization tasks.

Self-hosted engine	<ul style="list-style-type: none"> <li>Deploys Red Hat Enterprise Virtualization Manager engine as a VM on the host and reduces hardware requirements</li> <li>Enables built-in high availability for Red Hat Enterprise Virtualization Manager</li> <li>Uses iSCSI storage for hosted engine data domain</li> </ul>
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FEATURE CATEGORIES	CAPABILITY
Enhanced disaster recovery	<ul style="list-style-type: none"> <li>• Fully supports third-party tools that offer backup, restore, and replication</li> <li>• Provides configuration support for adding/editing/deleting storage connections, which enables multi-pathing, hardware changes, simpler failover to remote sites, and array-based replication</li> </ul>
Live migration	<ul style="list-style-type: none"> <li>• Allows running VMs to be moved seamlessly from one host to another within a Red Hat Enterprise Virtualization cluster</li> <li>• Supports VM-level “Do Not Migrate” option and VM-host pinning</li> <li>• NEW - Live Migration Compression - Benefits VMs with large memory footprints by transferring compressed memory pages to the target host – minimizing the amount of data that travels during migration</li> <li>• NEW - Live Migration Auto Convergence - Temporarily throttles VMs with memory pages that update faster than can be transferred over the network – allowing time to complete and finalize the workload cutover to the destination host</li> </ul>
Storage live migration	<ul style="list-style-type: none"> <li>• Allows a single or multiple, concurrent running VM disks to be moved within the storage infrastructure, without interruption to users or the VM</li> </ul>
High availability	<ul style="list-style-type: none"> <li>• Allows critical VMs to be restarted on another host in the event of hardware failure with three levels of priority, taking into account resiliency policy</li> <li>• Resiliency policy controls high availability VMs at the cluster level</li> <li>• Supports application-level high availability with supported fencing agents for Red Hat Enterprise Linux guests using the Red Hat Enterprise Linux High Availability Add-On</li> </ul>
Snapshots	<ul style="list-style-type: none"> <li>• Allows for cold or live snapshots to preserve a VM’s current state</li> <li>• Live deletion of a snapshot – deletes virtual machine disk snapshots from running VMs</li> </ul>
Maintenance mode	<ul style="list-style-type: none"> <li>• Allows one-click VM migration to put a Red Hat Enterprise Virtualization Hypervisor host in maintenance mode for upgrade or hardware updates</li> </ul>

FEATURE CATEGORIES	CAPABILITY
System scheduler	<ul style="list-style-type: none"> <li>• System scheduler policies for load balancing, which automatically balances the VM load among hosts in a cluster, and power saver mode, which consolidates VM loads onto fewer hosts during non-peak hours</li> <li>• Integrates with oVirt optimizer to provide better cluster optimization logic to existing clusters and while placing new VM workloads</li> </ul>
Integrated desktop management (VDI)	<ul style="list-style-type: none"> <li>• Red Hat Enterprise Virtualization User Portal connects users to their VMs</li> <li>• SPICE open source remote rendering protocol allows desktop environment to support thin clients and PCs</li> <li>• Enhances network performance for desktop virtualization – including new dynamic and variable compression algorithms for higher latency, lower bandwidth WAN environments</li> <li>• Enhanced Linux desktop support enables auto-resizing, guest agent reporting, and single sign-on (for Red Hat Enterprise Linux desktop guests)</li> <li>• Enhancements to user experience include higher supported screen resolutions and dynamic copy-and-paste</li> <li>• Desktop pooling allows deployment of multiple desktop VMs from templates</li> <li>• Native USB redirection provides support within the SPICE protocol, including USB support for Linux guests</li> <li>• SmartCard CAC supports two-factor authentication</li> </ul>

FEATURE CATEGORIES	CAPABILITY
Storage management	<ul style="list-style-type: none"> <li>• SLA for storage I/O bandwidth lets administrators define bandwidth I/O limits to efficiently enhance VM I/O operations</li> <li>• Advanced snapshot overview capabilities lets users select storage consumption details on a disk or snapshot level for an easier removal process</li> <li>• Supports migration of storage domains among different datacenters or deployments</li> <li>• Supports iSCSI, FC, and NFS shared storage infrastructures</li> <li>• Supports transparent block alignment for better performance of virtual disk files on shared and local storage</li> <li>• Supports local physical disks and locally attached SAN or other storage supported by standard mpio drivers</li> <li>• Supports pre-allocated – or thick-provisioned – disks for optimal performance and thin-provisioned disks for optimal storage usage</li> <li>• Supports POSIX shared file systems such as Red Hat Storage and IBM GPFS</li> <li>• Provides native support for Red Hat Gluster Storage, including a built-in GlusterFS storage domain and datacenter types that use Gluster as their storage back end</li> <li>• virtio-blk data plane provides significant storage throughput improvements by applying I/O thread scaling</li> </ul>
CPU Hot plug or unplug	<ul style="list-style-type: none"> <li>• Dynamically allocates virtual CPUs without restarting the VM, which requires operating system support</li> </ul>
Hot Plug Memory	<ul style="list-style-type: none"> <li>• Allows users to scale-up CPU, memory, disk, and network for any workload without restarting the VM</li> </ul>
User and group-based authentication and security	<ul style="list-style-type: none"> <li>• NEW - Allows a choice of generic LDAP providers to authenticate users</li> <li>• Supports Red Hat Identity Management (LDAP) or Microsoft Active Directory for user and administrator authentication to Red Hat Enterprise Virtualization Manager</li> <li>• Allots granular, inheritable, multi-level administration security roles to all actions and objects in Red Hat Enterprise Virtualization</li> </ul>
Migration tools	<ul style="list-style-type: none"> <li>• NEW - An advanced virt2-virt interface enables the seamless migration of workloads from VMware vSphere directly into Red Hat Enterprise Virtualization</li> </ul>

FEATURE CATEGORIES	CAPABILITY
Affinity/anti-affinity workload grouping	<ul style="list-style-type: none"> <li>• Defines workload affinity policies regarding whether VMs run together on the same host or separately on different hosts</li> </ul>
System requirements	
Guest support	<p>Fully supported server operating systems:</p> <ul style="list-style-type: none"> <li>• Red Hat Enterprise Linux 6, and 7; 32- and 64-bit</li> <li>• Windows Server 2003, 2003 R2, 2008, 2008 R2, and 2012; 32- and 64-bit</li> <li>• SUSE Linux Enterprise Server 10,11, and 12 (vendor support)</li> </ul> <p>Fully supported desktop operating systems:</p> <ul style="list-style-type: none"> <li>• Red Hat Enterprise Linux Desktop 6 and later, 32- and 64-bit</li> <li>• Windows XP 32-bit; Windows 8 and later versions, 32- and 64-bit</li> </ul>
Red Hat Enterprise Virtualization Manager requirements	<p>Red Hat Enterprise Virtualization Manager can be run as a VM guest. However, if users choose to deploy Red Hat Enterprise Virtualization Manager on physical hardware, the recommended hardware is:</p> <ul style="list-style-type: none"> <li>• Intel 64 or AMD64 server with one quad-core CPU or multiple dual-core CPUs, 16GB RAM, 50GB available local storage, 1Gb Ethernet NIC</li> </ul> <p>Required operating system (not included):</p> <ul style="list-style-type: none"> <li>• Red Hat Enterprise Linux 6, 32- and 64-bit</li> </ul>
Red Hat Enterprise Virtualization Hypervisor requirements	<p>Server with:</p> <ul style="list-style-type: none"> <li>• Intel 64 or AMD64 CPU extensions</li> <li>• Intel VT or AMD-V hardware virtualization extensions</li> <li>• Minimum 2GB RAM</li> <li>• Minimum 10GB local storage</li> <li>• Minimum 1Gb Ethernet NIC (recommended 2GB or more total bandwidth per server)</li> </ul> <p>Required operating system (not included):</p> <ul style="list-style-type: none"> <li>• Red Hat Enterprise Linux 7.2+</li> </ul>



**FEATURE CATEGORIES**

**CAPABILITY**

Red Hat Enterprise Virtualization administrative client

Operating systems supported:

- Windows 8 (x86, AMD64, or Intel 64)
- Windows 2008/R2, 2012 (x86, AMD64, or Intel 64)
- Red Hat Enterprise Linux 6 and higher (i386, AMD64, or Intel 64)
- Vendor support for SUSE Linux Enterprise Server 10, 11, and 12

Browser required:

- Internet Explorer 9 and higher or Firefox 17 ESR or higher

Red Hat Enterprise Virtualization user portal client

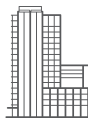
Operating system/client:

- Red Hat Enterprise Linux 6 and higher (i386, AMD64, or Intel 64)
- Windows 2008 and later versions (x86, AMD64, or Intel 64)
- Red Hat Enterprise Virtualization certified Linux-based thin clients
- Vendor support for SUSE Linux Enterprise Server 10, 11, and 12

Browser:

Internet Explorer 9 and higher on Windows platforms, with the SPICE ActiveX control installed

- Mozilla Firefox 17 and higher on Red Hat Enterprise Linux, with the SPICE plug-in installed



**ABOUT RED HAT**

Red Hat is the world's leading provider of open source software solutions, using a community-powered approach to reliable and high-performing cloud, Linux, middleware, storage, and virtualization technologies. Red Hat also offers award-winning support, training, and consulting services. As a connective hub in a global network of enterprises, partners, and open source communities, Red Hat helps create relevant, innovative technologies that liberate resources for growth and prepare customers for the future of IT



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