

VMware vSphere 6 with Operations Management Features and Benefits Compared to Microsoft Windows Server 2012 R2 Hyper-V and Red Hat Enterprise Virtualization 3.5

VMware vSphere – The best platform for building private, public, and hybrid cloud infrastructures

1. Virtualization Platform

KEY FEATURES AND BENEFITS	VMWARE VSPHERE® WITH OPERATIONS MANAGEMENT™ 6	MICROSOFT WINDOWS SERVER 2012 R2 HYPER-V & SYSTEM CENTER 2012 R2	RED HAT ENTERPRISE VIRTUALIZATION 3.5
VMware, the industry's leading virtualization and cloud management platform			
<ul style="list-style-type: none"> • Bare-metal Architecture - VMware ESXi™ inserts a robust virtualization layer directly on the server hardware for near-native virtual machine performance, reliability and scalability. Less than 160MB, ESXi is a fraction of the size of a general-purpose operating system, offering unparalleled security and reliability. 	✓	Hyper-V requires components of Windows. Hyper-V with Server Core has a ~5 GB footprint. Most customers deploy full blown Windows Server which has a minimum footprint of 9.1 GB	RHEV Hypervisor excludes some Linux OS components ~ 496 MB
<ul style="list-style-type: none"> • Direct Driver Model - VMware ESXi uses a direct driver model that locates the device drivers that link virtual machines to physical devices directly in the hypervisor. This results in optimal performance as result of a shorter I/O path. 	✓	No	No
<ul style="list-style-type: none"> • Server Integration - VMware ESXi is available integrated into servers from leading OEM vendors for a simplified boot and deployment experience 	✓	Limited, OEM vendors can preinstall Windows Server 2012 R2, but additional configuration needed to enable Hyper-V role	No
<ul style="list-style-type: none"> • Guest Operating Systems Support - VMware vSphere 6 provides the most extensive guest operating system support, including Windows, Linux, Solaris, MAC OS X and more. When we list an operating system as supported it is fully supported for that version of vSphere, this is not always true for Hyper-V or RHEV. 	✓	Only 15 are fully supported, remainder require extensive configuration and still may lack comprehensive support for items such as dynamic memory	Limited, only 23 guest Operating Systems supported by GSS. Several guest Operating Systems don't support Spice
<ul style="list-style-type: none"> • Linux and Unix Operating System Support - VMware vSphere 6 provides industry best support for virtualizing Linux operating systems 	✓	Microsoft only supports some Linux guest operating systems, but lacks Unix support. Linux VMs that are supported will require extensive configuration and may not be supported for all features of Hyper-V	No Unix Support, limited Linux support
<ul style="list-style-type: none"> • Software Virtual Appliances - Run nearly 2000 available production software applications from hundreds of software vendors as easy to deploy virtual appliances, including the entire vRealize Suite 	✓	There are only a handful of appliances available with no momentum towards a marketplace like VMware's	No virtual appliance download center. Only one known virtual appliance
<ul style="list-style-type: none"> • Software Applications - Over 1400 ISV partners support over 5000 applications on vSphere Visit the VMware Solutions Exchange here 	✓	No requirements for ISVs to certify applications on Hyper-V	Not published
<ul style="list-style-type: none"> • Support for Microsoft® Clustering Services - Cluster virtual machines running the Microsoft® Windows operating system across physical hosts, with support failover clustering, SQL clustering, and AlwaysOn Availability Groups 	✓	Yes	No

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<ul style="list-style-type: none"> • Storage - VMware vSphere 6 is rigorously tested and certified on over 1500 storage arrays. This includes a wide range of storage systems from Dell, EMC, Fujitsu, Fujitsu Siemens, HP, Hitachi Data Systems, IBM, NEC, NetApp, StorageTek, Sun Microsystems, Pillar, Xiotech and others. 	✓	Supports arrays qualified for Windows Server 2012 R2	Supports limited subset of Red Hat Enterprise Linux certified storage arrays
<ul style="list-style-type: none"> • vShield Endpoint - Hypervisor layer anti-virus offload lets administrators manage anti-virus and anti-malware policies through the same management interfaces used to secure the physical infrastructure, without the need for in-guest agents. Use industry leading anti-virus solutions or leverage REST APIs for customized integration. 	✓	No	No
<ul style="list-style-type: none"> • Configuring USB Device Passthrough from an ESXi Host to a Virtual Machine - Virtual machines can use USB devices connected to an ESXi host where the virtual machine is running. The connection is maintained even if the virtual machine migrates using vMotion. 	✓	No	No
<ul style="list-style-type: none"> • ESXi Firewall - The ESXi management interface is protected by a service-oriented and stateless firewall, which you can configure using the vSphere Web Client or the command line 	✓	Configured at operating system level via Windows Firewall	Configured at operating system level via iptables
Advanced Memory Protection			
<ul style="list-style-type: none"> • Memory Fault Isolation - On supported platforms, ESXi detects and quarantines physical memory regions that exhibit frequent correctable errors. This preemptive action reduces the risk of uncorrectable errors that result in VM or host downtime. 	✓	No	No
<ul style="list-style-type: none"> • Reliable Memory Technology - Optimized placement of the VMkernel and other critical components to guard against memory errors that could affect system stability and availability 	✓	No	No
Advanced CPU Capabilities			
<ul style="list-style-type: none"> • CPU Capacity Prioritization - CPU capacity on a host is assigned to virtual machines on a "fair share" basis and CPU resource controls also allow an absolute minimum level of CPU capacity to be provided to critical virtual machines. View CPU assigned resource controls centrally and leverage resource pools to guarantee resources to the most critical resources. 	✓	Limited, Hyper-V lacks resource pools and top level management of resources	Limited CPU shares capability, disabled by default
<ul style="list-style-type: none"> • Virtualized CPU Counters - Performance counters for debugging, tuning, and troubleshooting 	✓	No	No
Advanced Memory Management			
<ul style="list-style-type: none"> • Transparent Page Sharing - Utilize available memory more efficiently by storing identical memory pages within the same virtual machine only once. Further increase your memory consolidation benefits by enabling salting to store similar pages across multiple virtual machines only once. For example, if several virtual machines are running the same operating system, they may have many identical memory pages. Transparent page sharing consolidates those identical pages into a single memory location. 	✓	No	Limited, Linux Kernel Samepage Merging allows limited over commitment

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<ul style="list-style-type: none"> • Memory Ballooning - Shift memory dynamically from idle virtual machines to active ones. Memory ballooning artificially induces memory pressure within idle virtual machines, forcing them to use their own paging areas and release memory for active virtual machines. 	✓	Dynamic Memory support is limited to specific guest operating systems and service pack levels and must be configured for each and every VM http://technet.microsoft.com/en-us/library/hh831766.aspx	Limited, ballooning is possible with Virtio but can interfere with KSM
<ul style="list-style-type: none"> • Memory Compression - ESXi will selectively compress memory pages to delay the need to swap to disk when under memory pressure. Compression operates significantly faster than swapping, so VM performance is maintained longer. 	✓	No	No
<ul style="list-style-type: none"> • Hypervisor Paging - When more memory is needed than can be provided by the above methods or an instant response is needed, ESXi will swap memory pages to disk 	✓	Limited, Hyper-V Smart Paging acts only when a VM is restarted and memory can be reclaimed from other VMs on the same host	Yes
<ul style="list-style-type: none"> • Guest Memory Resource Shares - Prioritize memory allocations to VMs by assignable shares. Leverage resource pools for comprehensive resource configuration management. Ensures critical VMs get memory needed to meet service level agreements. 	✓	Limited, Hyper-V's memory weight feature is simplistic and lacks enforcement. It's difficult to manage due to a lack of a logical resource pool management object	No, quotas only allow for limits to be placed on resources, there is no ability to assign shares or even reservations
<ul style="list-style-type: none"> • Swap to Host Cache - The VMkernel scheduler is modified to allow ESXi swap to extend to local or network SSD devices, which enables memory over commitment and minimizes performance impact. The VMkernel automatically recognizes and tags SSD devices that are local to ESXi or are on the network. 	✓	Limited w/Hyper-V Smart Paging	No
Hot Add virtual devices without downtime			
<ul style="list-style-type: none"> • Memory - Add virtual memory 	✓	Requires explicit guest operating support for Dynamic Memory. Note that you cannot enable dynamic memory, increase minimum RAM or decrease maximum RAM while online	No, including inability to change memory reservations hot
<ul style="list-style-type: none"> • Hard Disk - Add or remove virtual storage 			
<ul style="list-style-type: none"> - Hot-add virtual disks 	✓	Only possible for SCSI attached drives	Yes
<ul style="list-style-type: none"> - Hot-extend virtual disks 	✓	No ability to hot extend boot volumes for Gen 1 VMs	No
<ul style="list-style-type: none"> • CPU - Add or remove virtual processors 	✓	No	Yes
<ul style="list-style-type: none"> • NIC - Add or remove virtual networking devices 	✓	No	Yes

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Enhanced virtual machine support			
• Software Support for 3D Graphics - ESXi supports non-hardware accelerated 3D graphics to run Windows Aero and Basic 3D applications in virtual machines	✓	Requires use of RemoteFX	No
• Hardware Support for 3D Graphics - vGPU Graphic Offload provides support for hardware-accelerated 3D graphics inside a virtual machine. Offload can be configured so that hardware-acceleration will continue after a vMotion operation is requested if available.	✓	Requires use of RemoteFX	No
• UEFI virtual BIOS - Virtual machines running on ESXi 6 can boot from and use the Unified Extended Firmware Interface (UEFI)	✓	Only with Generation 2 Virtual Machines	No
• Linux Guest Graphic Acceleration - VMware has developed and provided a guest driver that accelerates the entire Graphics Stack for modern distributions, with VMware contributing 100 percent of the code back to open-source community	✓	No	No
New Configuration Maximums in vSphere 6 Provide Support for the Largest Virtual Machine Workloads			
• Up to 480 Logical processors per Host	✓	No (320)	No (160)
• Up to 12 TB of RAM per Host	✓	No (4 TB)	No (4 TB)
• Up to 1,000 Virtual Machines per Host	✓	Yes (1,024)	Undocumented
• Up to 64 Hosts in a Cluster	✓	Yes (64)	Yes(200)
• Up to 8,000 Virtual Machines in a Cluster	✓	Yes (8,000)	Undocumented
• Up to 128 Processors per Virtual Machine	✓	No (64)	Yes (160)
• Up to 4 TB of RAM per Virtual Machine	✓	No (1 TB)	Yes (4 TB)

2. Centralized Administration and Management

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Top Level Management and Integration			
<ul style="list-style-type: none"> • Centralized Control and Visibility - VMware vCenter Server™ is a platform that provides centralized control and visibility for your virtual infrastructure. Through vCenter, administrators can perform infrastructure upgrades and view operational metrics, alerts, and infrastructure diagrams. 	✓	Administrative experience is inconsistent. In some cases multiple tools are required to perform operations or retrieve information. In other cases it is possible to perform operations with one of several tools, making auditing and reporting difficult	Limited capabilities that require separate portals for users, administrators, and reporting
<ul style="list-style-type: none"> • vCenter Server Appliance - Quickly deploy vCenter Server and manage vSphere using a Linux-based virtual appliance 	✓	SCVMM requires a full Windows install and configuration of SCVMM	No, requires a RHEL host OS and manual addition of software through Red Hat Network/Subscription Manager
<ul style="list-style-type: none"> • Fine-grained Access Control - Secure the environment with configurable, tiered group definitions and fine-grained permissions 	✓	SCVMM roles require defining and management of separate SCVMM private clouds	Limited capabilities to set permissions to a subset of hosts or VMs
<ul style="list-style-type: none"> • vCenter Content Library - New in vCenter 6, share templates and source media across multiple vCenter Server instances. Publish libraries for external usage and allow other vCenter Server instances to subscribe and synchronize data, with advanced options for security and delivery of content on-demand. 	✓	No, SCVMM libraries do not allow synchronization of media across SCVMM instances	No
<ul style="list-style-type: none"> • Consistent Experience for Administrators - VMware's UI design provides for a consistent administrative experience, whether it be from an individual host or via vCenter Server 	✓	No, administrators will be required to use one of several tools, which are often inconsistent in their capabilities and UI design	Limited, requires extensive command line configuration and Linux knowledge for administration
<ul style="list-style-type: none"> • Centralized Licensing - Administer and manage all license keys centrally within the Platform Services Controller. License Reporting Manager generates reports on license keys and usage. 	✓	No	No, per host subscriptions that must be manually applied to each and every host in order to access updates
<ul style="list-style-type: none"> • Session Management - Discover and, if necessary, terminate vCenter Server user sessions 	✓	No	No
<ul style="list-style-type: none"> • Comprehensive Inventory Model - Manage the complete inventory of virtual machines, applications, resource pools and physical servers with greater visibility into object relationships. The inventory model provides the flexibility to organize objects into folders and create two separate hierarchical views. 	✓	SCVMM provides limited insight into object relationships from its various views. SCOM is required for additional visibility	No
<ul style="list-style-type: none"> • Interactive Topology Maps - Visualize the relationships between physical servers, virtual machines, networks and storage. Topology maps allow admins to easily verify correct configuration for distributed services such as vMotion, DRS and HA. 	✓	SCVMM topology maps are limited to basic network topologies only. SCOM is required for additional maps	No

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<ul style="list-style-type: none"> • Distributed Switch (VDS) - Centralized network provisioning, administration, and monitoring using data center-wide network aggregation. Configure settings for uplinks or port groups with the choice to inherit configurations or over-ride configurations for more granular control. 	✓	Logical Networking in SCVMM is complex to configure and manage. Lacks inheritance and override capabilities like those provided by port groups in vSphere	No, logical networks act more like port groups, providing a single place to identify the networks that should be in a cluster. Hosts must be separately configured. You can only use a VLAN once for a specified datacenter. Lacks inheritance and override capabilities like those provided by port groups in vSphere
<ul style="list-style-type: none"> • vSphere Big Data Extensions (BDE) - Deploy and manage Hadoop clusters via the vSphere Web Client, allowing the creation and management of Hadoop clusters for multiple tenants 	✓	No	No
Profile Driven Storage			
<ul style="list-style-type: none"> • Storage Profiles - Classify datastores based on the service levels and required performance characteristics 	✓	Basic storage classifications with no array intelligence	Disk profiles allow application of QoS policies that only limit I/O and throughput.
<ul style="list-style-type: none"> • Datastore Clusters - A collection of datastores with shared resources and management that leverage Storage DRS™ capabilities 	✓	No	No
<ul style="list-style-type: none"> • vSphere APIs for Storage Awareness (VASA) - Gain deep insight into storage characteristics through integration with the vSphere APIs for Storage Awareness 	✓	Limited, storage provisioning capabilities are provided through SCVMM but lacks storage I/O intelligence	No
<ul style="list-style-type: none"> • Storage Profile Compliance - A single pane of glass to check compliance of all virtual machines and the associated virtual disks, ensuring that even administrators who don't necessarily have access to all the different layers can validate compliance 	✓	No	No
<ul style="list-style-type: none"> • View Storage Resources Holistically - Browse various levels of the infrastructure hierarchy and view statistics for datastore usage and VM disk allocation & usage 	✓	Limited storage views in SCVMM lack comprehensive management capabilities	Very Limited
Manage available host resources through the creation of elastic resource pools			
<ul style="list-style-type: none"> • Flexible Hierarchical Organization - Organize resource pools hierarchically to match available IT resources to the business organization. DRS ensures that resource utilization is maximized while business units retain control and autonomy of their infrastructure. Resource pools can be flexibly added, removed, or reorganized as business needs or organization change. 	✓	Lacks hierarchical resource pools or controls and the ability to guarantee resources amongst tenants	Lacks hierarchical resource pools or controls and the ability to guarantee memory and disk resources amongst tenants by only providing resource limits with limited reporting and insight at a top level
<ul style="list-style-type: none"> • Guarantee Resources and Isolation between Resource Pools and Tenants - Make allocation changes within a resource pool without impacting other unrelated resource pools. For example, any allocation changes in the resource pool dedicated to a given business unit do not impact other resource pools. 	✓	Lacks the ability to guarantee resources amongst tenants due to lack of hierarchical resource pools	Lacks the ability to guarantee resources amongst tenants due to lack of hierarchical resource pools

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Automated Resource Monitoring and Alignment			
<ul style="list-style-type: none"> • Align Computing Resources with Business Goals - Ensure flexibility and efficient utilization of hardware resources. VMware DRS continuously monitors utilization across resource pools and intelligently allocates available resources among virtual machines based on pre-defined rules and policies. VMware DRS dynamically responds to changing virtual machine requirements using VMware vMotion to move virtual machines non-disruptively between servers. 	✓	Limited, Hyper-V doesn't have resource pools	Limited capabilities provided by scheduler. Optimizer, a separate instance installed on top of RHEL, seeks to optimize memory balance but is in tech preview and it's not supported by GSS at this time. Optimizer only makes recommendations, which can conflict with other CPU scheduler recommendations.
<ul style="list-style-type: none"> • DRS Virtual Machine Host Affinity and Anti-Affinity Rules - Set constraints that restrict placement of a virtual machine to a subset of hosts in a cluster and keep virtual machines paired or separated. This feature is useful for enforcing host-based ISV licensing or keeping sets of virtual machines on different racks or systems for availability reasons. 	✓	Anti-Affinity support only. Affinity rules limited to pinning VMs to specific hosts, not VM pairing. Requires both SCVMM and Failover Cluster Manager	Limited, cannot set DRS affinity/anti-affinity groups or select subset of hosts for placement
<ul style="list-style-type: none"> • Virtual Disk Affinity and Anti-Affinity Rules - Restrict placement of virtual machine disks with Affinity/Anti-Affinity Rules for VMDKs 	✓	No	No
<ul style="list-style-type: none"> • Optimized Power Consumption - Easily configure vSphere's Distributed Power Management feature at the cluster and host level. Compare historical demand to place and bring hosts out of standby mode to meet the needs of the infrastructure while allowing for reduced power consumption and costs. 	✓	Power Management requires a minimum cluster size of five due to reliance on Windows Failover Clustering	Power management with RHEV is complex and must be configured at the host level. If you configure a power savings policy you cannot configure a load balancing policy, it is one or the other only
<ul style="list-style-type: none"> • Storage DRS - Automated load balancing uses storage characteristics to determine the best place for a given virtual machine's data to reside both when it is created and when it is used over time based on both storage space and storage I/O resources 	✓	No capabilities to balance storage workloads unless using SMB3/SCIFS/Storage Spaces	No
<ul style="list-style-type: none"> • Intelligent Initial Placement - Initially place workloads based on known storage environmental factors such as storage capacity and storage I/O utilization 	✓	No, VMM Intelligent Placement only considers free space when making placement decisions	No
<ul style="list-style-type: none"> • Storage I/O Control (SIOC) - Provides QoS capabilities for storage I/O in the form of I/O shares and limits that are enforced across all virtual machines accessing a datastore, regardless of which host they are running on and the type of storage used. Use Storage I/O Control to ensure that the most important virtual machines get adequate I/O resources even in times of congestion. 	✓	No, Hyper-V allows for configuration of virtual disk limits, but lacks comprehensive management of storage I/O. Disk limits only protect resources on the same host and lack storage awareness	No, there are no comparable capabilities to SIOC. The only thing you can do is place quotas on disk space used for objects of configure I/O limits which may unnecessarily restrict resources. Note-when quotas are enabled for a datacenter you must manually apply quotas for all objects of a datacenter, one at a time.

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<ul style="list-style-type: none"> • Network I/O Control (NIOC) - Leverage network I/O control to define priority access to network resources according to established business rules. NIOC monitors the network for congestion and automatically shifts resources to your highest-priority applications. New in vSphere 6 is the ability to guarantee service levels by using the provided capabilities to preserve bandwidth. 	✓	Limited, no built-in detection of known network types such as those in VMware's Network Resource Pools	No, this is not comparable to NIOC. There are no guarantees. Individual vNIC profiles can be configured to limit bandwidth, and Scheduler can move entire workloads to other hosts, but no methods exist for automated and policy-based network resource management
Provisioning			
<ul style="list-style-type: none"> • Host Profiles and Auto Deploy - Gain the advantage of rapid server deployment with centralized image management. Eliminate configuration drift by applying host profiles and centrally manage compliance through vCenter Server 	✓	Bare-metal deployments through SCVMM lack profile compliance and the ability to address configuration drift	Not included with base offering, requires purchase of additional components of Red Hat Satellite
<ul style="list-style-type: none"> – Provision Stateless - vSphere hosts in Memory 	✓	No	No
<ul style="list-style-type: none"> – Stateless Caching - Ensure availability in stateless environments 	✓	No	No
<ul style="list-style-type: none"> – Stateful Install Mode - Leverage Auto Deploy's infrastructure to deploy vSphere to non-stateless instances 	✓	No	No
Automated Infrastructure Upgrades and Updates			
<ul style="list-style-type: none"> • Simple Upgrades Without Downtime - Maintain system uptime and leverage the capabilities of vMotion and support for mixed cluster configurations to upgrade between versions, without the need for downtime or the purchase and configuration of hardware for a new cluster 	✓	No, upgrade involves requirement for additional servers due to lack of support for mixed version nodes in the same cluster	Upgrades to RHEV-M remove high availability and live migration from the environment. Must ensure the storage pool manager role properly transfers over to another host in the cluster
<ul style="list-style-type: none"> • Virtual Hardware Management - Upgrade virtual hardware and tools with a single click or orchestrate and schedule upgrades via vCenter Update Manager 	✓	No, lacks automation for integration service upgrades. Further, System Center doesn't support upgrading gen 1 to modern gen 2 virtual machines	N/A, RHEV only has one type of virtual machine
Host Patch Management			
<ul style="list-style-type: none"> • Integration with VMware DRS - Enable zero downtime ESXi host patching with maintenance mode, leveraging vMotion and DRS to move running workloads to other hosts in the cluster 	✓	Possible with multiple tools including SCVMM, SCCM, and Cluster-Aware Updating. Multiple tools make auditing and reporting difficult to manage	No
<ul style="list-style-type: none"> • Recalled Patch Management - View a list of recalled patches through Update Manager and setup automated email notifications for recalled patches. Update Manager will mark hosts with recalled patches as non-compliant and delete the patches from its repository to prevent any future installation. Upon release of fixed updates, Update Manager will notify the users of new patches and provide details on resolving potential issues from recalled patches. 	✓	No built-in capabilities to notify and automatically remove recalled patches. Software removal package must be created and targeted for deployment to systems with bad patch via SCCM	No

VMware vSphere 6 with Operations Management Key Features and Benefits Comparison

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<ul style="list-style-type: none"> • Patch Compliance - Get a data center wide actionable patch compliance dashboard in vCenter that enables compliance to baselines through automated scanning and patching. Patching is available for hosts, virtual appliances, virtual hardware, and VMware tools . 	✓	Possible through setup of WSUS and integration with SCVMM or SCCM	No, limited views exist only in certain parts of RHEV Manager. Requires purchase of Red Hat Satellite, a separate component and point of management at an additional cost
Virtual Machine Management			
<ul style="list-style-type: none"> • Improved vSphere Web Client - Use a single web-based console to access vCenter Server and manage the entire infrastructure, including hosts, virtual machines, resource pools, and more. Enable IT administrators and application owners to manage the essential functions of vSphere from Firefox, Chrome, or Internet Explorer with full support for Mac OS X. 	✓	No, multiple clients required to administer the environment, for example, Hyper-V Manager, Failover Cluster Manager, SCVMM, SCOM. Web based management possible w/ App Controller in conjunction with Silverlight, but only supported for Windows	No, separate portals exist for users, administrators, and reporting. RHEV Manager provides limited capabilities and requires setup and use of SPICE/VNC/RDP integrations and plugins
<ul style="list-style-type: none"> • Remote devices - Install software in a virtual machine running on a server from the CD-ROM of a desktop without leaving your desk 	✓	No	No, VMs can only mount ISOs that have been imported through a specific process requiring users to setup an ISO storage domain and manually import the ISOs through the Linux CLI
<ul style="list-style-type: none"> • USB 3.0 support - ESXi features support for USB 3.0 devices in virtual machines with Linux guest operating systems. USB 3.0 devices attached to the client computer running the vSphere Web Client can be connected to a virtual machine and accessed in it. 	✓	No Linux support. Requires RemoteFX	No, only supported for virtual desktops
<ul style="list-style-type: none"> • Access Virtual Machine Serial Ports Over the Network - Redirect virtual machine serial ports over a standard network link in vSphere 6 natively 	✓	No, requires setup of named pipes mapped to physical serial ports	No
<ul style="list-style-type: none"> • Physical to Virtual Machine Conversion - Manage multiple simultaneous conversions of virtual machines using vCenter Converter. Convert running physical machines to VMs for a multitude of operating systems ranging from Windows Server 2003 to Windows 2012 R2, and several Linux distributions including Red Hat, SUSE, and Ubuntu. 	✓	MVMC does not support P2V for any Linux operating systems and missing support for some legacy Windows operating systems	Based on virt-v2v support which has limited operating system support, including lack of support for Windows 2012/2012 R2 and Windows 8/8.1

3. Operations Management

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<ul style="list-style-type: none"> • Comprehensive Visibility - Central point of operational visibility through vCenter Server with integrated badges and detailed metrics from vRealize Operations. View deep operational insights into the health, risk and efficiency of your infrastructure and applications with operational badges and sub-badges to quickly show current and future risks to your environment. 	✓	Limited capabilities from a central administration point in SCVMM. Requires separate management and extensive configuration and customization of SCOM	Very limited capabilities from central administration point in RHEV Manager. RHEV Reporting, a separate component based on open source reporting tools, adds limited historical reporting and dashboards

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<ul style="list-style-type: none"> • Object Relationships – In vCenter easily navigate and explore object relationships for virtual machines, with hosts, storage, and networking. Integrated topology maps provide a visual representation of relationships. 	✓	Requires SCOM, SCVMM provides limited insight into object relationships from many of its views	No
<ul style="list-style-type: none"> • Topology Maps – Integrated topology maps provide a visual representation of relationships 	✓	Requires SCOM, SCVMM is limited to network relationships only	No
<ul style="list-style-type: none"> • Intelligent Operations Groups – Create custom intelligent operations groups based on business needs, applications, service levels, location, or departments. Automatically add new members with Dynamic Membership. 	✓	Dynamic groups involving applications and systems running Linux or Unix require management pack authoring	No
<ul style="list-style-type: none"> • Proactive Smart Alerts – Instead of simple monitoring based on static performance thresholds, proactively identify performance problems in your environment dynamically. Uses patented analytical algorithms to learn behavior of the environment and dynamically create thresholds. 	✓	SCOM's self-tuning thresholds are difficult to administer. They are flawed with an architecture that allows for a reset of the learning period whenever the health service is started. This results in a reset of historical analytics and the repetition of unnecessary alarms. Administrators will often resort to using static thresholds instead	No
<ul style="list-style-type: none"> • Performance Monitoring Charts with Real Time and Historical Data – Troubleshoot performance issues and view comprehensive real-time data for multiple objects in vCenter Server. <ul style="list-style-type: none"> – Monitor and analyze virtual machines, resource pools and server utilization and availability with detailed performance graphs – Performance metrics can be defined with several levels of granularity and can be viewed in real time, or across a specified time interval through the same interface – Aggregated charts show high-level summaries of resource distribution that is useful to identify the top consumers, with the ability to drill-down to more granular data – Thumbnail views of hosts, resource pools, clusters, and datastores allow for easy navigation to the individual charts 	✓	SCVMM lacks comprehensive real time monitoring. Administrators seeking these same capabilities provided in vCenter will need to use a combination of Microsoft tools with no centralized dashboard and limited built-in metrics	RHEV Reporting is a separate component and only includes basic historical performance monitoring and lacks real-time data collection
<ul style="list-style-type: none"> • Root Cause Analysis - Automated root-cause analysis and recommended remediation actions help you identify and eliminate potential bottlenecks. Automated remediation through orchestration workflows. 	✓	Requires extensive setup and customization in SCOM	No
<ul style="list-style-type: none"> • Capacity Optimization and Forecasting – Identify capacity shortfalls and over-provisioning. Reclaim resources from powered-off and idle virtual machines so you can right-size virtual machines and increase consolidation ratios. 	✓	Requires extensive setup and customization of views and reports in SCOM	No
<ul style="list-style-type: none"> • Reporting – Built-in reports allow for easy setup and notification of common operational issues. Schedule and run on demand reports that can be easily configured with email notifications to individuals or groups at a specified interval. Easily export data from vCenter to HTML and Excel formats for quick detailed performance and configuration metrics. 	✓	There is no ability to easily export data from SCVMM. Reporting requires extensive setup and customization of views and reports in SCOM	RHEV Reporting, a separate component based on open source reporting tools, adds limited historical reporting and dashboards

4. Availability and Business Continuity

KEY FEATURES AND BENEFITS	VMWARE VSPHERE® WITH OPERATIONS MANAGEMENT™ 6	MICROSOFT WINDOWS SERVER 2012 R2 HYPER-V & SYSTEM CENTER 2012 R2	RED HAT ENTERPRISE VIRTUALIZATION 3.5
High Availability – Minimize downtime resulting from server and operating system failures			
<ul style="list-style-type: none"> • Simple HA Configuration - Availability solutions tied to operating systems or applications require complex setup and configuration. In contrast, configure HA with a single click from within vCenter. 	✓	No, Microsoft implements HA through Setup of Windows Failover Clustering. Enabled per-VM	No, requires the setup of power management for each host and manual per-VM configurations for HA with no top level tool or visibility into configuration of the status of individual VM's HA
<ul style="list-style-type: none"> • No Single Point of Failure or External Dependencies - VMware vSphere HA ensures virtual machines restart even if vCenter Server is unavailable, without a dependency on DNS 	✓	Yes, but requires cluster members to be members of an active directory domain	No, VMs won't restart if RHEV Manager is down
<ul style="list-style-type: none"> • Resource Checks - Ensure that capacity is always available in order to restart all virtual machines affected by server failure. HA continuously monitors capacity utilization and "reserves" spare capacity to be able to restart virtual machines. 	✓	Limited, cluster reserve state will suggest placement not occur, but won't prevent administrators from manually overriding a placement recommendation	No
<ul style="list-style-type: none"> • VM Restart Priority - Ensure the most critical virtual machines are restarted first by setting virtual machine restart priorities. Easily select multiple virtual machines to establish resources priorities for an entire cluster. 	✓	Requires per-VM configuration. Implementing high priority restart policy can impact availability of VMs with default restart policy, putting them into save state if enough resources aren't available in the cluster	Must be configured at the virtual machine level for each and every VM. It is not possible to order the startup order of the virtual machines and provide granular recovery options, you can only set VMs individually to Low, Medium, or High
<ul style="list-style-type: none"> • VM Component Protection - Protect virtual machines against storage failures where permanent device loss occurs or all paths are down for block (FC,iSCSI,FCoE) and file (NFS) storage 	✓	No configurable parameters or capabilities exist to protect against permanent device loss or issues where all paths are down	No configurable parameters or capabilities exist to protect against permanent device loss or issues where all paths are down
<ul style="list-style-type: none"> • VMware HA Health Check and Cluster Operational Status - View a dashboard in the vSphere Web Client that displays the current VMware HA operational status, including the specific status and errors for each host in the VMware HA cluster 	✓	Limited, requires Windows Failover Clustering for full operational status	Very limited, RHEV-M provides no insight into HA in a dashboard or granular views into individual VM settings without drilling down into each and every virtual machine
<ul style="list-style-type: none"> • Multi-Processor Fault Tolerance (FT) - Provide zero downtime, zero data loss continuous availability against physical server failures through a seamless stateful failover. Single click configuration, with automatic secondary virtual machine creation in the event of a failure, ensuring continuous protection. Fault tolerance is offered without any dependency on the guest operating system. 	✓	No	No

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Snapshots and Data Protection			
<ul style="list-style-type: none"> • Virtual Machine Snapshots - Increase application availability while reducing backup windows using virtual machine snapshots. Create a point-in-time copy of virtual machine data that can be used for testing, backup, and recovery operations. 	✓	Yes	As of the initial release of RHEV 3.5, you still cannot remove snapshots while a virtual machine is powered on
<ul style="list-style-type: none"> • vSphere Data Protection - Enable quick, simple and complete data protection and deduplication for virtual machines or leverage one of our many third party offerings to provide a solution that best meets your organization's needs. <p>New with vSphere 6 - VDP now includes all the previous features found in the advanced edition, including agent support for Microsoft SQL Server, Exchange, and SharePoint. Further enhancements include the ability to replicate backups between virtual appliances.</p>	✓	Limited, DPM lacks ability to deduplicate data. Limited Linux guest OS support and no capabilities for file level restore with Linux guests	No backup capabilities included, very limited ecosystem of third party products and solutions
– Deduplication – Based on EMC's Avamar technology, vSphere Data Protection (VDP) can provide the industry's highest average rates of deduplication, 99 percent for file systems and 96 percent for databases	✓	No	No
– Appliance Based Deployment – Deploy the vSphere Data Protection virtual appliance to quickly protect your environment before a restore is needed	✓	No	No
– Agentless Virtual Machine Backup	✓	No	No
– Automated Backup Verification - Create jobs to restore virtual machines on a scheduled basis in order to validate the integrity of virtual machine backup data	✓	No	No
– Guest Quiescing - Support for Microsoft Volume Shadow Copy Service (VSS) and Linux file system quiescing to improve reliability of replicated virtual machines	✓	Limited, only file consistent backups are supported for Linux using DPM	No, Red Hat does not include a backup offering and 3rd party solutions only offer support for VSS
vSphere Replication™, the only hypervisor-based replication solution that operates at the individual virtual machine disk level			
<ul style="list-style-type: none"> • Per Virtual Disk Granularity – Configure replication at the virtual machine disk level, allowing the specification of custom RPOs for individual disks 	✓	Limited, RPO can only be set per virtual machine	No replication capabilities included, very limited ecosystem of third party products and solutions
– Inter and Intra Cluster Replication – Replicate to a cluster in a remote data center or locally within the same cluster	✓	No intra cluster replication	No
– Granular RPO Settings - Adjustable RPO allows you to easily choose a value between 15 min and 24 hours	✓	No, only 3 options for RPO and no ability to set above 15 MINUTES	No
– Multiple Point-in-Time Restore	✓	Yes	No
– Centralized Management – Manage and configure replication centrally from vCenter Server	✓	No, SCVMM cannot manage Hyper-V Replication	No

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• End-to-End Compression - Reduce the amount of time required to replicate a virtual machine by reducing the amount of bandwidth required to replicate your virtual machines. New in vSphere 6 Replication, End-to-end compression can help reduce the amount of data transmitted by 35-55% typically.	✓	No, will require a third party solution at an additional cost	No
• Guest Quiescing - Support for Microsoft Volume Shadow Copy Service (VSS) and Linux file system quiescing to improve reliability of replicated virtual machines	✓	Limited, no support for Linux file system quiescing	No, RHEV does not include replication capabilities
vMotion® and Storage vMotion®			
• Concurrent vMotion Support - Support for four to eight simultaneous vMotion migrations per host, depending on the vMotion network adapter	✓	Unlimited based on your architecture, with no guidance from MS on sizing recommendations	Five maximum per host by default. Traffic is pinned to management network and cannot be specified explicitly elsewhere
• Scheduled Migrations - Specify predefined times for migrations	✓	No	No
• Enhanced vMotion Compatibility - Automatically configure servers whose CPUs feature Intel FlexMigration and AMD-V Extended Migration technologies to be vMotion-compatible with servers that use older CPUs	✓	Limited, Hyper-V CPU Compatibility Mode must be configured for every VM in a mixed CPU infrastructure	Yes, but difficult to make changes to compatibility mode without virtual machine downtime
• Long Distance vMotion - Ability to use vMotion to move a running virtual machine when the source and destination ESXi hosts are located in different geographic regions. The maximum supported round trip time latency between the two hosts is now 100ms.	✓	undocumented	undocumented
• vMotion across vCenter Server Instances - Migrate a virtual machine across vCenter Server instances, preserving virtual machine settings and statistics, including historical auditing via event and task history, and settings for configurations such as HA, DRS, and affinity/anti-affinity.	✓	No, not possible without manually removing a virtual machine by disabling high availability.	No
• vMotion across switches - Migrate a virtual machine across switches, preserving virtual machine settings and statistics, including historical auditing via event and task history.	✓	No	No ability to change network location during a live migration or without individually drilling down into a virtual machine

5. Storage

KEY FEATURES AND BENEFITS	VMWARE VSPHERE® WITH OPERATIONS MANAGEMENT™ 6	MICROSOFT WINDOWS SERVER 2012 R2 HYPER-V & SYSTEM CENTER 2012 R2	RED HAT ENTERPRISE VIRTUALIZATION 3.5
Leverage VMware's APIs for integrated storage capabilities that provide advanced storage intelligence and performance improvements with storage assisted offload			
• Storage APIs for Array Integration (VAAI) - ESXi can offload specific storage operations to compliant storage hardware. With storage hardware assistance, ESXi performs these operations faster and consumes less CPU, memory, and storage fabric bandwidth.	✓	Limited, ODX is a limited subset of VAAI that's comparable to the VAAI Copy Primitive only	No

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<ul style="list-style-type: none"> • VMware API for Storage Awareness (VASA) - Allow storage arrays to integrate with vCenter for management functionality via server-side plug-ins or vendor providers. Allows a vCenter administrator to be aware of the topology, capabilities, and state of the physical storage devices available to the cluster. 	✓	Possible through SCVMM and limited 3rd party plugins	Very limited ecosystem and availability of third party plugins
<ul style="list-style-type: none"> • vSphere APIs for Multi-pathing - Support for 3rd party multi-pathing plug-in extension modules from vendors such as EMC, Dell/Equallogic and others to enhance high availability and load balancing for critical applications 	✓	Vendor support for only a subset of the vendors plugins when compared to VMware	No evidence of any third party integrations for multi-pathing. Limited built in capabilities.
Deep Storage Intelligence			
<ul style="list-style-type: none"> • Storage I/O Control (SIOC) - Provides QoS capabilities for storage I/O in the form of I/O shares and limits that are enforced across all virtual machines accessing a datastore, regardless of which host they are running on and the type of storage used. Use Storage I/O Control to ensure that the most important virtual machines get adequate I/O resources even in times of congestion. 	✓	No, Hyper-V allows for configuration of virtual disk limits, but lacks comprehensive management of storage I/O. Disk limits only protect resources on the same host and lack storage awareness	No, quotas and QoS capabilities provided by RHEV cannot guarantee resources and are only limits that may unnecessarily restrict VMs from using storage I/O resources when they are needed.
<ul style="list-style-type: none"> • Intelligent Initial Placement - Initially place workloads based on known storage environmental factors such as storage capacity and storage I/O utilization 	✓	No, VMM Intelligent Placement only considers free space when making placement decisions	No
<ul style="list-style-type: none"> • Storage DRS - Automated load balancing uses storage characteristics to determine the best place for a given virtual machine's data to reside based on both storage space and storage I/O resources. Also includes Affinity/Anti-Affinity Rules for VMs and VMDKs 	✓	No capabilities to balance storage unless using SMB3,SOFS, & Storage Spaces	No
Comprehensive configuration, management, and reporting management of storage with ability to specify granular controls			
<ul style="list-style-type: none"> • Unified Hierarchical Namespace - Manage all available physical disks, logical volumes, and VMFS volumes with a consistent namespace that eliminates potential conflicts 	✓	No	No
<ul style="list-style-type: none"> • Customizable Reports and Topology Maps - Increase visibility into vSphere storage space utilization with per-VM, per-datastore and other reports. Resolve configuration related issues with storage specific topology maps. 	✓	No direct integration with Hyper-V and System Center, limited capabilities provided by using SCOM	Limited reporting capabilities provided through RHEV reporting, a separate component that is not integrated directly with RHEV-M
<ul style="list-style-type: none"> • Centralized Datastore Management - Create, configure, organize and secure datastores centrally for more granular control over storage in vSphere environments 	✓	No, several tools are required with basic capabilities only	Very basic capabilities only
<ul style="list-style-type: none"> • Consumption Based Monitoring and Alerting - Set alerts to notify administrators when they need to procure more storage or rebalance virtual machines across the available storage with Storage vMotion 	✓	No monitoring tools for thin disks	No monitoring tools for thin disks
<ul style="list-style-type: none"> • Virtual Disk Files - Simplify virtual machine storage management. Virtual machines see their own private virtual disk files. However, outside the virtual machine, the virtual disks are simply large files that can be copied, moved, archived and backed up as easily as any other file. 	✓	Yes	Each virtual disk or snapshot is a logical volume on a volume group

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• Boot from SAN - Run multiple instances of VMware ESXi on diskless servers by booting from FC, FCoE (Software & Hardware) or iSCSI SANs. Simplify backups and disaster recovery by eliminating the need to separately backup local attached server disks.	✓	Yes, but booting from Software FCoE is not supported	Yes, but limited to FC only
• Extended file and volume size limits - Run even the most data intensive production applications such as databases, ERP and CRM in virtual machines	✓	Yes	Unlimited File 16 TB Block
• Integrated Software FCoE	✓	No	No
• vSphere Flash Read Cache™ (vFRC) - Pool multiple SSD devices into a single consumable vSphere Flash resource for virtual machines with VMware based technology that is built into the core hypervisor. A software-defined solution that allows configuration at the virtual disk level, regardless of the type of physical storage used.	✓	No, CSV Cache allows the use of memory as a read cache but lacks hypervisor integration and granular configuration	No, FS-Cache is limited to use with network based storage protocols and lacks hypervisor integration and granular configuration
VMware Virtual SAN™ (VSAN)- an easy to manage, hypervisor integrated, and software-defined solution that pools compute and direct-attached storage. (Note: VSAN is purchased separately from VMware vSphere with Operations Management 6)			
• Software-Defined Storage with integrated Storage Management through vCenter - Leverage the same portal for management as your virtual machines to define and configure VSAN policies.	✓	No, Storage Spaces is a SAN replacement add-on requiring dedicated infrastructure and complex management using Windows Servers as the Storage Processors	No, Red Hat Storage Server (GlusterFS) is not a hypervisor converged solution and introduces additional complexity through separate management interfaces
• Converge compute and storage platforms for reduced latency and costs associated with physical footprint and additional hardware	✓	No, Microsoft does not support or recommend converging computer and storage	No, this isn't possible with RHEV. May be possible with a layered installation of RHEL + KVM, but even then Red Hat states this is not available for all customers
• JBOD Support for blade architectures	✓	Yes	No
• Fault Domains - New in vSphere 6, configure fault domains so virtual machine placement is rack aware, ensuring components of VSAN objects are placed in different fault domains via automated policy	✓	No	No
Virtual Volumes™ (VVOLs) - A new integration and management framework that virtualizes the presentation of SAN and NAS arrays, enabling operational efficiency via the presentation of array-based data service to virtualization administrators			
• Apply and enforce policy including automated placement based on policy, leveraging the Storage Policy-Based Management Framework	✓	Nothing Comparable	Nothing Comparable
• Expose native array - based data services to administrators via the vSphere client	✓	Nothing Comparable	Nothing Comparable
• VM level control of array - based data services such as compression, deduplication, and encryption	✓	Nothing Comparable	Nothing Comparable

6. Networking

KEY FEATURES AND BENEFITS	VMWARE VSPHERE® WITH OPERATIONS MANAGEMENT™ 6	MICROSOFT WINDOWS SERVER 2012 R2 HYPER-V & SYSTEM CENTER 2012 R2	RED HAT ENTERPRISE VIRTUALIZATION 3.5
Distributed virtual networking with centralized provisioning, administration, and monitoring using data center-wide network aggregation			
<ul style="list-style-type: none"> • Centralized Virtual Network Management - Simplify provisioning and administration of virtual networking through a centralized interface. Create and manage a single distributed switch with distributed virtual port groups that span the hosts of a data center. 	✓	SCVMM provides a central point of management for logical networking, however setup is complex and lengthy series of steps that must be done sequentially	No, logical networks act more like port groups, providing a single place to identify the networks that should be in a cluster. Hosts must be separately configured. You can only use a VLAN once for a specified datacenter. Lacks inheritance and override capabilities like those provided by port groups in vSphere
<ul style="list-style-type: none"> • Network Health Check - Easily backup and restore distributed networking configurations with rollback and recovery options 	✓	No	No
<ul style="list-style-type: none"> • Support for Private VLANs - Segment network traffic easily in shared environments 	✓	Yes	No
<ul style="list-style-type: none"> • Consistent Management Experience - Whether managing networking on a host directly or via vCenter Server, administrators experience a consistent management experience 	✓	No	No
<ul style="list-style-type: none"> • Expanded port configuration policies - Simplify port configuration by utilizing Port Groups that allow for the inheritance of configurations and settings from the vSwitch or override inheritance to specify specific settings or NIC teaming policies for a given port group 	✓	No, port profiles don't offer the same capabilities for inheritance and overriding of inheritance for settings	Logical Networks have very limited capabilities and don't offer same capabilities for inheritance and overriding of inheritance for settings
NIC Teaming			
<ul style="list-style-type: none"> • Enhanced NIC Teaming - Give each virtual machine built-in NIC failover and load balancing, enabling greater hardware availability and fault tolerance. Load based teaming allows dynamic balancing of the load across physical adapters on the VDS. 	✓	Limited, Windows Server NIC Teaming can only be configured at the uplink level, without the ability to override port profile settings	Limited with only basic configurable options
<ul style="list-style-type: none"> • NIC Teaming Policies - Allow users to configure multiple active and standby adapters. Alternate active and standby adapters amongst multiple port groups to decrease required host port count while maintaining high levels of availability. 	✓	Standby adapters must be dedicated requiring additional physical NICs and network port count	No
<ul style="list-style-type: none"> • Granular Configuration - Teaming configuration may vary per port group on the same virtual switch and uplinks 	✓	No	No
Automated Network Resource Management with Network I/O Control (NIOC) - Define priority access to network resources according to established business rules			
<ul style="list-style-type: none"> • Network Shares - Set network resource priorities through the use of shares 	✓	Yes	No

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• Network Resource Pools - Built-in resource pools are appropriately configured out-of-the-box to guarantee a minimal level of protection for virtual machine resources in the event of contention	✓	SCVMM port profiles are not directly associated to known traffic types, requiring extensive configuration	No
• Automatic Traffic Type Detection - Network Resource Pools automatically detect known traffic types such as Management, vMotion, Virtual Machine, Fault Tolerance, vSphere Replication, NFS, iSCSI, and VSAN	✓	No	No
• Network Resource Management - View network pools through vCenter's graphical user interface to see the current state and impact of potential changes across your environment for various traffic types. Apply QoS tagging to network resource pools.	✓	No	No
Network Policy and Quality of Service			
• Bidirectional Network Traffic Shaper - Enhance virtual machine traffic prioritization and management and allow configuration for filtering ingress and egress traffic	✓	No, egress only	No, ability to limit ingress/egress traffic only
• QoS Tagging - Apply QoS Tagging to network resource pools or DVS Port Groups for proper handling of outbound packets by the physical network	✓	No	No
- Apply 802.1P Class of Service (COS) tagging for layer 2 Ethernet packets	✓	No	No
- Differentiated Service Code Point (DSCP) tagging for layer 3 IP packets	✓	No	No
Troubleshooting and Network Traffic Collection			
• Cisco Discovery Protocol (CDP) Support - Discover and advertise physical and virtual network configurations for better debugging and monitoring of Cisco-based environments from vSphere or vCenter Server	✓	No	No
• Port Mirroring (SPAN) - Capture and send traffic amongst virtual machines on the same host when troubleshooting network issues. With the distributed switch port mirroring can be configured with a destination that is either a virtual machine, vmknic, or an uplink port.	✓	Limited, only supported when virtual machines reside on the same host	Limited, only supported when virtual machines reside on the same host and requires use of vNIC profiles
• Remote Span (RSPAN) - Capture and send traffic to a remote analyzer using a dedicated VLAN	✓	No	No
• Encapsulated Remote Span (ERSPAN) - Remote port mirroring independent of network location utilizing generic routing encapsulation	✓	No	No
• Netflow - vSphere Distributed Switch natively collects IP traffic information as records and sends them to third party collectors. Helps measure application performance and monitor IO/network resources.	✓	No	No
• Enhanced Host-Level Packet Capture - Available through host CLI, packets can be captured at the uplink, vSwitch, or vNIC level, including the capability to capture dropped packets and trace with time stamp details. Traffic can be captured for both the VDS or VSS.	✓	Limited to switch level granularity	Linux utility tcpdump

