

*Microsoft*

# Feature Comparison

Windows Server 2008 R2 Hyper-V and  
Windows Server 2012 Hyper-V

 Windows Server

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# Introduction

The following tables compare selected features of Windows Server 2008 R2 Hyper-V and Windows Server 2012 Hyper-V. The tables include comments about each version's performance, as well as a notation about how well each feature is supported. The legend for this notation is as follows:

## Level of Feature Support

	Feature is supported
	Feature is only partially supported
	Feature is not supported

# More Secure Multitenancy

Helps to ensure that each customer's data is completely separate and secure from other customers' information.

Feature	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Value Statement
<b>Multitenant security and isolation</b>			<p>Provides flexibility to restrict access to a virtual machine on any node while maintaining isolation of the network and storage traffic.</p> <p>Provides enhanced security and isolation of customers' networks from one another.</p>
	<p>Server virtualization provides isolation between virtual machines. However, the network layer of the datacenter is not fully isolated, and Layer 2 connectivity is implied between different workloads that are running over the same infrastructure.</p>	<p>Server virtualization provides a fully isolated network layer of the datacenter through programmatically managed and extensible capabilities. This enables connection to the network of virtual machines with policy enforcement for security and isolation.</p>	
<b>Private virtual local area network (LAN), or PVLAN</b>			<p>Increases virtual machine isolation in a multitenant environment, while not degrading access to public network resources.</p>
	<p>This feature is not supported.</p>	<p>PVLANS allow Hyper-V administrators to isolate virtual machines from each other (for example, virtual machines cannot contact other virtual machines over the network), while still maintaining external network connectivity for all virtual machines.</p>	

Feature	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Value Statement
<b>DHCP guard</b>			Protects against rogue DHCP servers.
	This feature is not supported.	DHCP guard drops server messages from unauthorized virtual machines that are acting as DHCP servers.  DHCP server traffic from other virtual switch ports is automatically dropped.	
<b>Router guard</b>			Provides better security and an authorization check for virtual machines.
	This feature is not supported.	Router guard drops router advertisement and redirection messages from unauthorized virtual machines that are acting as routers.	
<b>Hyper-V Extensible Switch</b>			Provides an open platform for partners' plug-ins. Unified management, easier support, and core services for extensions are provided without charge. For example, all extensions have live migration support by default, and no special coding for services is required.
	This feature is not supported.	The Hyper-V Extensible Switch is a Layer 2 virtual network switch that provides programmatically managed and extensible capabilities to connect virtual machines to the physical network. The Hyper-V Extensible Switch is an open platform that lets vendors provide extensions written to standard Windows application programming interface (API) frameworks.	

Feature	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Value Statement
<b>Extension monitoring</b>			Provides traffic visibility at different layers and enables statistical traffic data to be gathered.
	This feature is not supported.	Multiple monitoring and filtering extensions can be supported at the entrance and outlet portions of the Hyper-V Extensible Switch.	
<b>Extension uniqueness</b>			Provides enhanced security through a unique extension state.
	This feature is not supported.	Extension state/configuration is unique to each instance of a Hyper-V Extensible Switch on a machine.	
<b>Extensions that learn life cycle of virtual machines</b>			Optimizes the virtual network for greater performance.
	This feature is not supported.	These extensions can learn the flow of network traffic based on the workload life cycle of virtual machines.	
<b>Extensions that prohibit state changes</b>			Provides flexibility to improve performance, management, and diagnostics.
	This feature is not supported.	These extensions can better ensure security by identifying harmful state changes. The extensions can stop these state changes from being implemented, while allowing features for monitoring and security to be launched.	

Feature	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Value Statement
<b>Multiple extensions on same switch</b>			Provides a cost-effective solution with better manageability and security.
	This feature is not supported.	Multiple extensions can coexist on the same Hyper-V Extensible Switch.	

# Flexible Infrastructure

Makes it easier and faster to add and move servers.

Feature	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Value Statement
<b>Network virtualization</b>			Helps to achieve maximum performance with no new hardware (servers, switches, or appliances).
	Virtual LANs (VLANs) are used to isolate networks, but they are very complex to manage on a large scale.	Hyper-V Network Virtualization helps to isolate network traffic on a shared infrastructure without the need to use VLANs. It also allows users to move virtual machines, as needed, within a virtual infrastructure while preserving virtual network assignments.  Network Virtualization eliminates hierarchical IP address assignments across virtual machines.  A virtual machine can be placed on any node, regardless of IP address, even across the cloud.	
<b>IP address rewrite</b>			Eliminates the need to upgrade network adapters, switches, or appliances.
	This feature is not supported.	Each virtual machine customer address (CA) is mapped to a unique host provider address (PA). Hyper-V Network Virtualization uses IP address rewrite to map the CA to the PA.	

Feature	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Value Statement
<b>Generic Routing Encapsulation</b>			Enables better performance by reducing the burden on the switches.
	This feature is not supported.	Hyper-V Network Virtualization uses Generic Routing Encapsulation (GRE) IP packets to map a virtual network to a physical network. It can use as few as one IP address per host.	
<b>Live migration</b>			Provides faster and simultaneous migration. Provides dynamic mobility of virtual machines across the datacenter.
	Windows Server 2008 R2 introduced the Live Migration feature, which permits users to move a running virtual machine from one physical computer to another with no downtime—assuming that the virtual machine is clustered.	Windows Server 2012 Hyper-V provides the ability to migrate virtual machines, with support for simultaneous live migrations. That is, users can move several virtual machines at the same time.  Live migrations are not limited to a cluster. Virtual machines can be migrated across cluster boundaries, and between stand-alone servers that are not part of a cluster.	

Feature	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Value Statement
<b>Live storage migration</b>			<p>Provides better flexibility and control while managing storage in a cloud environment.</p> <p>Provides flexibility to move virtual hard disks without downtime.</p>
	A virtual machine's storage can be moved only while the virtual machine is shut down.	<p>Live storage migration allows users to move virtual hard disks that are attached to a running virtual machine.</p> <p>Users can transfer virtual hard disks to a new location for upgrading or migrating storage, performing back-end storage maintenance, or redistributing the storage load.</p>	
<b>Importing virtual machines</b>			<p>Provides a simpler, more streamlined way to import or copy virtual machines.</p>
	A virtual machine's files that are to be imported can be duplicated and imported at another time.	<p>With the Import Wizard, users can quickly and reliably import virtual machines from one server to another. The Import Wizard detects and fixes problems and does not require a virtual machine to be exported.</p>	
<b>Merging snapshots</b>			<p>Provides flexibility to manage snapshots while a virtual machine is running.</p> <p>Minimizes use of space for virtual machines with snapshots.</p>
	In Hyper-V 2008 R2, merging a snapshot into a parent virtual machine requires the virtual machine to be turned off for the entirety of the merge operation.	The Hyper-V Live Merge feature allows users to merge snapshots back into the virtual machine while it continues to run.	

Feature	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Value Statement
<b>Automation support for Hyper-V</b>			Eliminates the need for development skills to perform automation support tasks.
	Writing scripts for Hyper-V with in-box tools requires Windows Management Instrumentation (WMI) knowledge. That is, development skills are needed.	Automation support consists of more than 150 built-in Hyper-V cmdlets for Microsoft Windows PowerShell. With these cmdlets, users can perform all available tasks in Hyper-V Manager, as well as several tasks exclusively in Windows PowerShell.	

# Scale, Performance, and Density

Increases the scalability of the datacenter and uses fewer servers to run more virtual machine workloads.

Feature	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Value Statement
<b>Hyper-V host and workload support</b>			Improves performance and maximizes the use of processors and memory.
	Users can configure up to 64 logical processors on hardware, 1 TB of physical memory, 4 virtual processors, and up to 64 GB of memory on a virtual machine. Up to 16 nodes and 1,000 virtual machines in a cluster also can be supported.	Users can configure up to 320 logical processors on hardware, 4 TB of physical memory, 64 virtual processors, and up to 1 TB of memory on a virtual machine. Up to 64 nodes and 8,000 virtual machines in a cluster also can be supported.	
<b>Non-Uniform Memory Access (NUMA) support inside virtual machines</b>			Provides enhanced performance on large virtual machines by enabling the guest operation system and applications to access local memory faster than remote memory.
	This feature is not supported.	A NUMA topology can be projected onto a virtual machine, and guest operating systems and applications can make intelligent NUMA decisions.	

Feature	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Value Statement
<b>Support for Single Root I/O Virtualization (SR-IOV) networking devices</b>			Reduces network latency and host CPU overhead (for processing network traffic); increases network throughput.
	This feature is not supported.	Windows Server 2012 Hyper-V enables support for SR-IOV-capable network devices and allows the SR-IOV virtual function of a physical network adapter to be assigned directly to a virtual machine.	
<b>Dynamic Memory, startup memory, and minimum memory</b>			Enables the consolidation of more virtual machines, especially in Virtual Desktop Infrastructure (VDI) environments.
	Virtual machines are assigned extra memory because Hyper-V cannot reclaim the memory from them after startup.	Windows Server 2012 Hyper-V can reclaim the unused memory from virtual machines with a minimum memory value lower than their startup value.	
<b>Hyper-V smart paging</b>			Provides a reliable way to keep virtual machines running when there is not enough physical memory available.
	This feature is not supported.	If a virtual machine is configured with a lower minimum memory than its startup memory and Hyper-V needs additional memory to restart it, Hyper-V smart paging is used to bridge the gap between minimum and startup memory.	

Feature	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Value Statement
<b>Runtime memory configuration</b>			Provides flexibility to use Dynamic Memory as needed, without affecting other virtual machines.
	This feature is not supported.	Users can make configuration changes to Dynamic Memory (increase maximum memory or decrease minimum memory) when a virtual machine is running.	
<b>Resource Metering in Hyper-V</b>			Enables users to track the use of virtual machines.
	This feature is not supported.	<p>Resource Metering allows users to track how many CPU, memory, storage, and network resources are consumed by a virtual machine over time. This information is gathered automatically (without the need to constantly collect data from the virtual machine) and persists with the virtual machine through live migration/other mobility operations.</p> <p>Windows Server 2012 Hyper-V can track and report the amount of data transferred per IP address or virtual machine.</p>	

Feature	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Value Statement
<b>Virtual hard disk format (VHDX)</b>			Helps to ensure high-quality performance on large-sector disks.
	This feature is not supported.	VHDX supports up to 64 TB of storage. It helps to provide protection from corruption due to power failures by logging updates to the VHDX metadata structures. It also helps to prevent performance degradation on large-sector physical disks by optimizing structure alignment.	
<b>Offloaded data transfer support</b>			Allows the CPU to concentrate on the processing needs of an application.  Provides rapid provisioning and migration of virtual machines.
	This feature is not supported.	Windows Server 2012 Hyper-V uses SAN copy offload to copy large amounts of data from one location to another.	
<b>Data Center Bridging (DCB)</b>			Helps to reduce the cost and complexity of maintaining separate traffic for network, management, live migration, and storage.  Makes it easy to change allocations to different traffic flows.
	This feature is not supported.	Windows Server 2012 Hyper-V uses DCB-capable hardware to converge multiple types of network traffic onto a single network adapter, with a maximum level of service to each.	

Feature	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Value Statement
<b>Virtual Fibre Channel in Hyper-V</b>			Enables Fibre Channel to connect directly from within virtual machines.
	This feature is not supported.	Virtual Fibre Channel in Hyper-V provides Fibre Channel ports within the guest operating system.	
<b>Multipath I/O (MPIO) functionality for Fibre Channel storage within a virtual machine</b>			Helps to ensure highly available connectivity.
	This feature is not supported.	Windows Server 2012 Hyper-V uses MPIO functionality for proper connectivity to Fibre Channel storage within a virtual machine.	
<b>Support for 4 KB disk sectors in Hyper-V virtual hard disks</b>			Uses emerging innovation in storage hardware to increase capacity and reliability.
	This feature is not supported.	Windows Server 2012 Hyper-V supports 4 KB disk sectors. This reduces the impact of 512e disks on the virtual hard disk stack.	
<b>Quality of Service (QoS) minimum bandwidth</b>			Enables hosting providers and enterprises to deliver services with predictable network performance to virtual machines on servers running Hyper-V.  Reduces the need for expensive network adapters.
	This feature is not supported.	Windows Server 2012 Hyper-V uses minimum bandwidth to assign specific bandwidth for each type of traffic and to ensure fair sharing during congestion.	

# High Availability

Increases customers' resilience to failures in the datacenter.

Feature	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Value Statement
<b>Backup capability</b>			Reduces backup size and cost.
	<p>Data can be preserved by performing full-file backups. There are two methods for this:</p> <ul style="list-style-type: none"> <li>• Back up the virtual machine and snapshots as flat files when offline.</li> <li>• Use Windows Server or third-party tools to back up the virtual machine itself, with a normal backup of the operating system and data.</li> </ul>	<p>Windows Server 2012 Hyper-V supports incremental backup of virtual hard disks while the virtual machine is running:</p> <ul style="list-style-type: none"> <li>• During each incremental backup, only the differences are backed up.</li> </ul>	Saves network bandwidth and disk space.

Feature	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Value Statement
<b>Disaster recovery</b>			<p>Offers an affordable, in-box business continuity and disaster recovery solution.</p> <p>Provides the ability to quickly recover business functions during downtime, with minimal or no data loss.</p> <p>Delivers failure recovery in minutes.</p>
	<p>Support is provided for disaster recovery within IT environments and across datacenters, using geographically dispersed clustering capabilities.</p> <p>Failover clustering is used with hardware-based SAN replication across datacenters. This approach is used to prevent the outage of an entire datacenter, but it is typically expensive.</p>	<p>Asynchronous replication of virtual machines occurs over a network link from one Hyper-V host at a primary site to another Hyper-V host at a replica site. It also can restore the system from an unplanned shutdown.</p> <p>In the event of failure (power outage, fire, or natural disaster) at the primary site, administrators can manually fail over production virtual machines to the Hyper-V server at the recovery site.</p> <p>During failover, virtual machines are brought back to a consistent point in time, and they can be accessed by the rest of the network within minutes.</p> <p>This version of Hyper-V is an affordable, reliable business continuity solution that can help to restore data at a remote site.</p>	

Feature	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Value Statement
<b>Network Interface Card (NIC) Teaming for load balancing and failover (LBFO)</b>			Provides higher reliability against network failure.
	Hyper-V 2008 R2 uses network adapter teaming, a third-party technology that provides fault tolerance for multiple network adapters.	Windows Server 2012 Hyper-V provides built-in support for NIC Teaming: A virtual machine can have virtual network adapters that are connected to more than one virtual switch. If a network adapter under that virtual switch is disconnected, it still has connectivity. NIC Teaming supports up to 32 network adapters in a team.	
<b>Hyper-V clustering</b>			Increases availability and enables access to server-based applications during planned and unplanned downtime.
	Hyper-V 2008 R2 has specific features, like failover clustering and clustered live migration, that are related to Hyper-V clustering. These features are described later in this table.	Windows Server 2012 Hyper-V provides protection against application and service failure, and system and hardware failure.	
<b>Guest clustering</b>			Provides the ability to connect Fibre Channel directly from within virtual machines.
	Guest clustering is supported by using iSCSI.	Workloads can be virtualized by directly accessing cluster guest operating systems and storage over Fibre Channel or through iSCSI.	

Feature	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Value Statement
<b>live migration</b>			Provides quicker migration by using higher network bandwidth.
	The Live Migration feature requires the Failover Clustering feature to be added and configured on servers running Hyper-V. Hyper-V and failover clustering can be used together to make a virtual machine highly available.	Live migrations in a clustered environment can use higher network bandwidths (up to 10 GB). Administrators can perform multiple simultaneous live migrations.	
<b>Encrypted cluster volumes</b>			Enhances physical security for deployment outside the secure datacenter.
	This feature is not supported.	Microsoft BitLocker-encrypted cluster disks provide security for deployment outside the secure datacenter. They also provide a safeguard for the cloud.	
<b>Cluster Shared Volume (CSV) 2.0</b>			Simplifies the configuration and operation of virtual machines.  Provides greater security and enhanced performance.
	This feature is not supported.	Windows Server 2012 Hyper-V can integrate with storage arrays for replication and hardware snapshots out of the box.	

Feature	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Value Statement
<b>Application monitoring</b>			<p>Provides monitoring for services and event logs inside virtual machines.</p> <p>Reduces the risk and impact of various issues.</p>
	This feature is not supported.	The health of key services provided by virtual machines can be monitored. If an issue is detected, automatic corrective action can be initiated. Such action includes restarting a virtual machine or moving it to a different Hyper-V server. This provides higher availability to workloads that do not support clustering.	
<b>In-box live migration queuing</b>			<p>For administrators, helps to save time and improve efficiency.</p>
	This feature is not supported.	Administrators can perform large, multiselect actions to queue live migrations of multiple virtual machines.	
<b>Virtual machine failover prioritization</b>			<p>Ensures the availability of critical virtual machines.</p> <p>Provides optimum resource use by ensuring resource availability for high-priority virtual machines.</p>
	Administrators can configure the preference for node order on failover.	Administrators can configure priorities to control the order of virtual machine failover. Lower priority virtual machines automatically release resources if they are needed for higher priority virtual machines.	

Feature	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Value Statement
<b>Affinity virtual machine rules</b>			Migrates partnered virtual machines at failover.
	Administrators can configure a preference that attempts to keep a designated virtual machine off the same node as similar virtual machines.	Administrators can configure partnered virtual machines to migrate simultaneously at failover.	
<b>Anti-affinity virtual machine rules</b>			Ensures selected migrated virtual machines do not reside on the same node in a failover.
	This feature is not supported.	Administrators can specify that two virtual machines cannot coexist on the same node in a failover scenario.	

# Processor and Memory Support

Processor/Memory Feature	Windows Server 2008 R2	Windows Server 2012
<b>Logical processors on hardware</b>	64	320
<b>Physical memory</b>	1 TB	4 TB
<b>Virtual processors per host</b>	512	2,048
<b>Virtual processors per virtual machine</b>	4	64
<b>Memory per virtual machine</b>	64 GB	1 TB
<b>Active virtual machines</b>	384	1,024
<b>Maximum cluster nodes</b>	16	64
<b>Maximum cluster virtual machines</b>	1,000	8,000

# Network

Network Feature	Windows Server 2008 R2	Windows Server 2012
<b>NIC Teaming</b>	Yes, through partners	Yes, Windows NIC Teaming in box
<b>VLAN Tagging</b>	Yes	Yes
<b>MAC spoofing protection</b>	Yes, with R2 SP1	Yes
<b>ARP spoofing protection</b>	Yes, with R2 SP1	Yes
<b>SR-IOV networking</b>	No	Yes
<b>Network QoS</b>	No	Yes
<b>Network metering</b>	No	Yes
<b>Network monitor modes</b>	No	Yes
<b>IPsec task offload</b>	No	Yes
<b>VM Trunk Mode</b>	No	Yes

# Storage

Storage Feature	Windows Server 2008 R2	Windows Server 2012
<b>Live storage migration</b>	No, quick storage migration through System Center Virtual Machine Manager	Yes, with no limits (as many as the hardware will allow)
<b>Virtual machines on file storage</b>	No	Yes, Server Message Block 3.0 (SMB3)
<b>Guest Fibre Channel</b>	No	Yes
<b>Virtual disk format</b>	VHD up to 2 TB	VHD up to 2 TB VHDX up to 64 TB
<b>Virtual machine guest clustering</b>	Yes, through iSCSI	Yes, through iSCSI, Fibre Channel, or Fibre Channel over Ethernet (FCoE)
<b>Native 4 KB disk support</b>	No	Yes
<b>Live virtual hard disk merge</b>	No, offline	Yes
<b>Live new parent</b>	No	Yes
<b>Secure offloaded data transfer</b>	No	Yes

# Manageability

Manageability Feature	Windows Server 2008 R2	Windows Server 2012
<b>Hyper-V PowerShell</b>	No	Yes
<b>Network PowerShell</b>	No	Yes
<b>Storage PowerShell</b>	No	Yes
<b>REST APIs</b>	No	Yes
<b>SCONFIG</b>	Yes	Yes
<b>Enable/Disable shell</b>	No, server core at operating system setup	Yes
<b>VMConnect support for RemoteFX</b>	No	Yes