

Windows Server 2012 R2 Hyper-V Component Architecture

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You can get the free Windows 8 app, Server Posters, from the Windows Store

Live Migration

Improved Live Migration

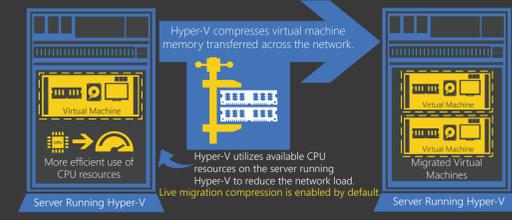
Windows Server 2012 R2 takes full advantage of your hardware to reduce the time required to live migrate virtual machines. It is now faster and easier to manage and maintain and your private cloud infrastructure. When maintenance or upgrades are required on your server running Hyper-V, live migration enables you to quickly migrate your virtual machines. This reduces the time it takes to monitor lengthy migration operations. You can also quickly and efficiently balance your virtual machine workloads.

In Windows Server 2012 R2, live migration provides three options to reduce the time required to live migrate your virtual machines. You can choose to use memory compression. Alternatively, you can choose to use Remote Direct Memory Access (RDMA) functionality (which requires RDMA-enabled adapters) or multichannel network adapters.

- These live migration options can support your private cloud infrastructure by:
- Increasing the efficiency of live migration when your hardware resources are constrained (memory compression).
 - Increasing the scalability of live migration when your hardware resources are not constrained (multi-channel and RDMA-enabled network adapters).

Faster Live Migration (less than 10 GB)

In environments where hardware and networking resources are constrained, live migration delivers performance improvements for migrating virtual machines by compressing the memory data before sending it across the network. This utilizes spare CPU capacity available in the server running Hyper-V. Hyper-V closely monitors the CPU requirements of the virtual machine and only consumes an appropriate amount of CPU resources to quickly move virtual machines from one server to the next.



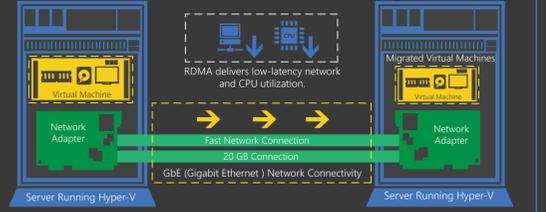
Upgrading Your Private Cloud

Live Migration

Hyper-V live migration in Windows Server 2012 R2 updates live migration with new capabilities that enable you to easily upgrade and manage your private cloud. You can now live migrate your virtual machines from Windows Server 2012 to Windows Server 2012 R2 in a simple, automated process that delivers zero downtime for your virtual machines.

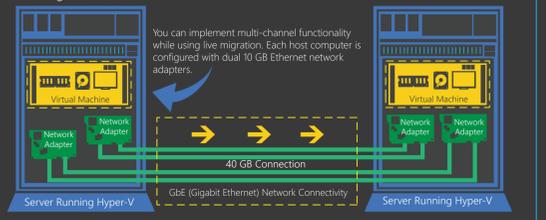
Simple Live Migration

You can migrate a virtual machine from Windows Server 2012 to Windows Server 2012 R2 with no downtime. Virtual machines remain up and active throughout the entire upgrade process. Available through the graphical user interface and Windows PowerShell. Zero downtime for virtual machines and end users.



Live Migration with Failover Clusters

You can now easily upgrade your private cloud infrastructure, which eliminates impact to your virtual machine workloads and helps you avoid the cost and inconvenience associated with unwanted downtime. Live migration delivers a more robust and automated upgrade path for large-scale environments and makes it easy to adapt to a faster upgrade cadence as different versions of Windows Server are released. It also makes it easier for you to manage and deliver on your service level agreements.



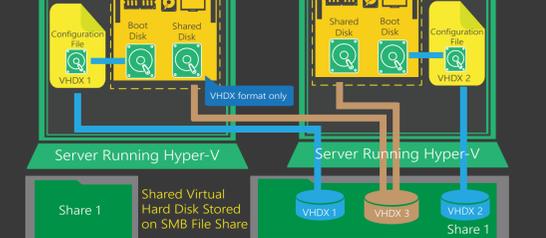
Live Migration with SMB Shared Storage

You can upgrade a virtual machine with SMB shared storage from Windows Server 2012 to Windows Server 2012 R2 with zero downtime. Live migration with Server Message Block (SMB) shared storage enables you to move virtual machines between servers running Hyper-V while the virtual machine storage remains on the SMB-based file server.



Live Migration Without Shared Storage

You can migrate a virtual machine without shared storage from Windows Server 2012 to Windows Server 2012 R2 with zero downtime. Live migration without shared storage (also known as 'shared nothing live migration') enables you to migrate virtual machines and their associated storage between servers running Hyper-V. This kind of live migration uses only an Ethernet connection.

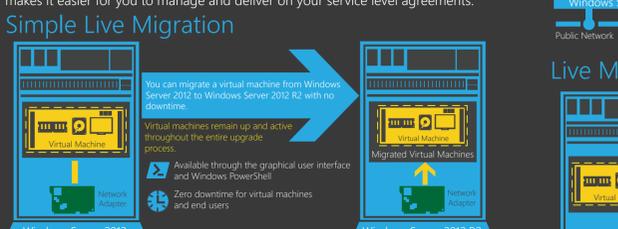


Hyper-V and Failover Clustering

Storage Failure Detection for Virtual Machines

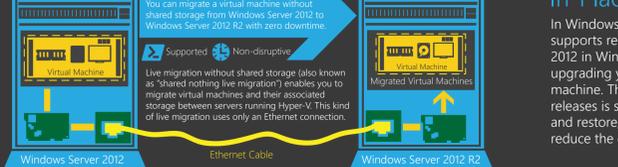
Windows Server has always allowed you to cluster your virtual machines using storage managed by the failover cluster. If a storage failure was detected, the failover cluster responded in an appropriate manner and ensured that your virtual machine maintained access to its storage. In Windows Server 2012 R2, Hyper-V and Failover Clustering have been enhanced to detect physical storage failures on storage devices that are not managed by the failover cluster (for example, SMB 3.0 shares).

Storage failure detection can detect the failure of a virtual machine boot disk or any secondary data disk associated with the virtual machine. If such an event occurs, Failover Clustering ensures that the virtual machine is relocated and restarted on another node in the cluster. This eliminates situations where unmanaged storage failures would not be detected and where virtual machines resources may become unavailable. For example, a SQL data store failing on a secondary drive is now detected.



Network Failure Detection for Virtual Machines

In previous releases, Failover Clustering has monitored and managed network connectivity among cluster nodes, and between clients and cluster nodes. It detects problems with a network adapter or other network device and takes appropriate action to ensure connectivity is uninterrupted. In Windows Server 2012 R2, Hyper-V and Failover Clustering have been enhanced to detect network connectivity issues for virtual machines. If the physical network assigned to the virtual machine suffers a failure—such as a faulty switch port, network adapter, or a disconnected network cable—then the failover cluster moves the virtual machine to another node in the failover cluster in order to restore network connectivity.



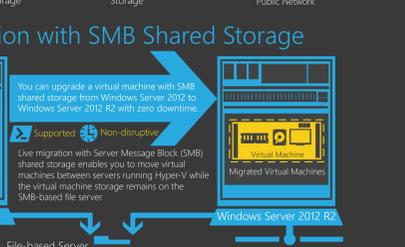
Hyper-V Storage

Hyper-V with Virtual Hard Disk Sharing

Windows Server 2012 R2 enables you to share a virtual hard disk file (VHDX format), which provides shared storage for a virtual machine failover cluster (also known as a guest cluster). By making shared storage available to virtual machines, you can easily use a virtual machine failover cluster to protect your application services (for example, SQL or file server services) running inside your virtual machines.

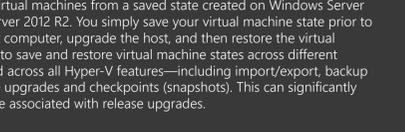
Virtual Machine Clustering Using Cluster Shared Volumes

One option for using virtual hard disk sharing is to use Cluster Shared Volumes.



Virtual Machine Clustering with SMB Storage in a Scale-Out File Server

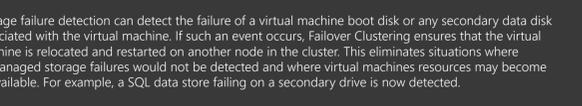
One option for using virtual hard disk sharing is to use a scale-out file server.



Session Modes

Basic Session Mode

Basic session mode provides a basic console view for the virtual machine, which allows you to send mouse and keyboard information and to view the graphics displayed by the virtual machine. This is analogous to plugging in a monitor to a physical computer.



Enhanced Session Mode

In enhanced session mode, VMConnect provides you with a high-fidelity experience when connecting to Hyper-V virtual machines. It delivers the ability to share a clipboard between the client computer and virtual machine—and supports redirected audio, redirected USB, multi-touch, multi-monitor, and the use of smartcards for logon authentication. Enhanced session mode provides similar capabilities to Remote Desktop Services without the need for a network connection to the virtual machine.



Generation 2 Virtual Machines

Understanding Generation 2 Virtual Machines

Generation 2 virtual machines in Windows Server 2012 R2 support the same Hyper-V features as generation 1 virtual machines in Windows Server 2012. These include checkpoints (snapshots), state transitions (for example Saved or Paused), import/export, backup/restore, failover replication, clustering and advanced networking features such as Quality of Service (QoS), Single-Root I/O Virtualization (SR-IOV) and virtual machine queuing. Generation 2 virtual machines do not support RemoteFX.

Generation 2 virtual machines use UEFI firmware instead of the BIOS.

Generation 2 virtual machines use software-based devices for video. They support the same video modes as generation 1 virtual machines.

Generation 2 virtual machines support the VHDX file format and support large boot volumes up to 64 TB. You can also use online resizing to expand or shrink your virtual hard disk files (VHDX). This includes the operating system (boot drive) and data volumes. Online resizing is only available for SCSI-attached VHDX files.

Generation 2 virtual machines support 64-bit versions of Windows 8 or Windows Server 2012 and Windows Server 2012 R2.

CD/DVD devices can be hot-added and hot-removed from a generation 2 virtual machine. No CD/DVD devices are present by default.

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Live Migration

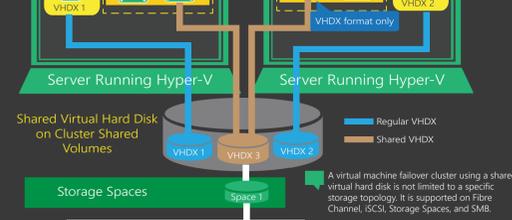
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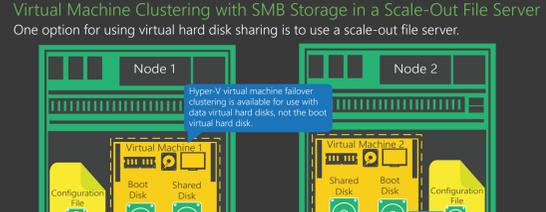
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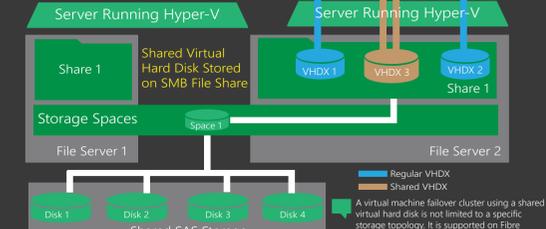
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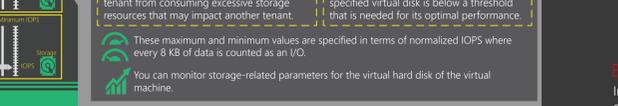
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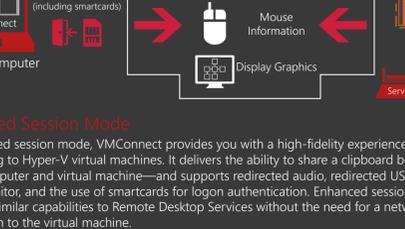
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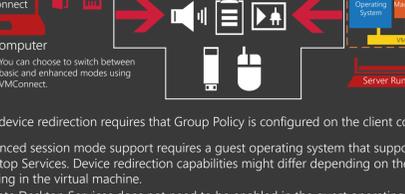
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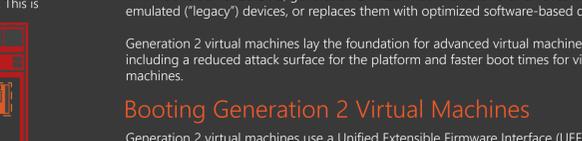
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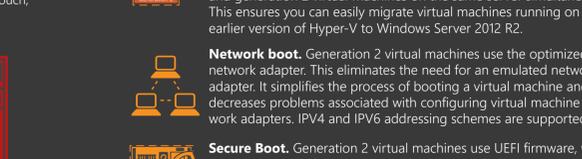
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