

Auf dem Weg in neue Dimensionen – Hyper-V in Windows Server 2012



Agenda

- Hyper-V Geschichte
- Hyper-V Technik und Grundlagen
- Was ist neu in Windows Server 2012 Hyper-V
- Hyper-V Betrieb
- Hyper-V Clustering
- Ausblick SCVMM 2012

Hyper-V Geschichte

- 2001 – Virtual PC 4.0 von Connectix
- Februar 2003 – Microsoft Virtual Server 2005
- Juli 2006 – Microsoft Virtual PC 2004
- Februar 2007 – Virtual PC 2007
- Windows Server 2008 – Microsoft Hyper-V Version 1 (Codename Viridian)
- Windows Server 2008 R2 – Microsoft Hyper-V Version 2
- Windows Server 2012 – Microsoft Hyper-V Version 3

Hyper-V Technologie und Grundlagen





- Hypervisor ist ein VMM (Virtual Machine Monitor) – **Groesse ca. 100 KB**
- Klassifizierung in Typ-1 und Typ2
- Typ1 – Hypervisor laeuft direkt auf der Hardware, Gast-Systeme laufen oberhalb des Hypervisor-Layer
- Typ2 – Hypervisor laeuft als Gast abgeschottet auf einem Wirtsystem. Gast-Systeme werden auf einem dritten Layer ausgefuehrt

Hyper-V Technologie und Grundlagen

– Wer kann das lesen? 😊

Hyper-V

Windows Server 2012 Hyper-V Component Architecture

Secure multi-tenancy  In Windows Server® 2012, Hyper-V® provides new security and multitenant isolation capabilities to keep virtual machines isolated—even when they are stored on the same physical server. You can expand this with a fully extensible virtual switch, which enables Microsoft partners to develop plug-ins for enhanced networking and security capabilities. These functionalities provide a solution that addresses the complex security requirements of virtual environments.	Flexible infrastructure  Flexible infrastructure, when and where you need it, is key to easily managing and accessing your virtualized network. With Hyper-V, you can scale beyond virtual local area networks (VLANs) using network virtualization and can place a virtual machine on any node, regardless of its IP address. You can migrate your virtual machines and virtual machine storage flexibly—this includes migrating outside a clustered environment and fully automating management tasks, which reduces the administrative overhead in your environment.	Scalability, performance, and density  Hyper-V provides support for up to 64 processors and 1 terabyte (TB) of memory for guest operating systems. It also offers a new virtual hard disk format with larger disk capacity that supports up to 64 TB per virtual disk, and provides additional resiliency to enable you to virtualize large-scale workloads. Other new functionalities include resource metering to measure and track consumption of physical resources, support for Offloaded Data Transfer, and improved Quality of Service (QoS) to enforce minimum bandwidth requirements (including network storage requirements).	High availability  Just being able to scale and perform is not enough—you need to ensure that your virtual machines are available when they are needed. Hyper-V provides a wide variety of high availability options. These include simple incremental backup support, enhancements in clustered environments to support up to 4000 virtual machines, parallel live migrations, and encryption with BitLocker® Drive Encryption. You can also use Hyper-V Replica, which replicates virtual machines to an offsite location and provides failover to that site if a failure at the primary site occurs.
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Hyper-V Replica

Virtual Machine Replication

Hyper-V Replica is a new Hyper-V virtualization technology that is included in Windows Server 2012. It is designed for business continuity and disaster recovery. It works with any network, or storage vendor. It does not require any shared storage. It enables you to replicate individual or multiple virtual machines (VMs) to a secondary site. Hyper-V Replica supports both synchronous and asynchronous replication. Asynchronous replication is the primary use case for Hyper-V Replica. The Replica server receives replicated traffic from the source primary server.

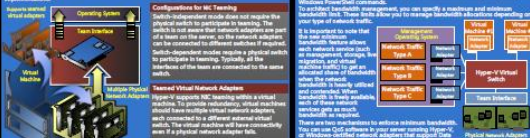


- Initial Replication Mode:** Before virtual machine replication can start, an initial copy of all virtual hard disks (VHDs) must be transferred to the Replica server. Hyper-V Replica supports three methods of replication of an initial copy:
 - Use a backup agent to transfer VHDs over the network to the Replica server.
 - Use a backup copy on the Replica server.
 - Use a backup copy on the primary server.
- After Initial Replication:** After the initial copy, you can create a new virtual machine on the Replica server. The new VM can copy selected VHDs to external media and deliver the external media to the Replica server.
- Replica Server Requirements:** The Replica server must be installed on Windows Server 2012. It must be on a different physical server than the Primary server. The Replica server must be on a different network than the Primary server. The Replica server must be on a different site than the Primary server.

Hyper-V Networking

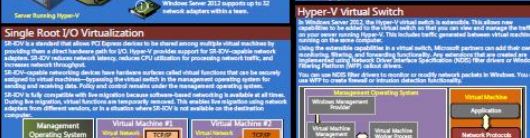
Quality of Service Bandwidth Management

Quality of Service (QoS) is a network feature that allows you to manage multiple types of network traffic, such as VoIP, video, and business-critical applications, to ensure that each type of traffic receives the bandwidth it needs. QoS is supported in Hyper-V virtual networks. You can specify a maximum and minimum bandwidth for each type of traffic. You can also specify a priority for each type of traffic.



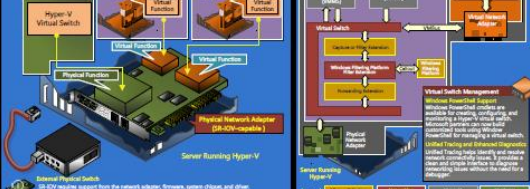
Load Balancing and Failover

Load balancing and failover are critical for ensuring high availability of your virtual machines. Hyper-V supports load balancing and failover for virtual machines. You can configure a virtual machine to be load balanced across multiple physical servers. You can also configure a virtual machine to failover to a secondary physical server if the primary physical server fails.



Single Root I/O Virtualization


Single Root I/O Virtualization (SR-IO) is a technology that allows virtual machines to bypass the virtual switch and access the physical network adapter directly. This can improve network performance and reduce latency. SR-IO is supported in Hyper-V virtual networks. You can configure a virtual machine to use SR-IO. SR-IO requires a compatible network adapter and a compatible operating system.



Hyper-V Virtual Machine Mobility

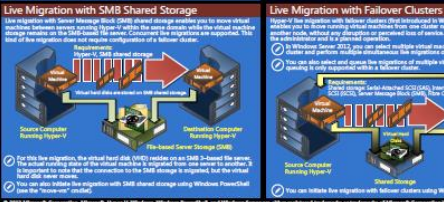
Live Migration Without Shared Storage

Live migration without shared storage allows you to move virtual machines between physical servers without the need for shared storage. This is supported in Hyper-V virtual networks. You can configure a virtual machine to be live migrated without shared storage. This requires a compatible network adapter and a compatible operating system.



Storage Migration

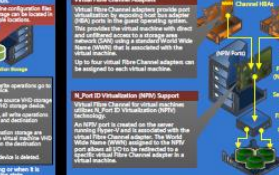
Storage migration allows you to move virtual machine storage between physical servers. This is supported in Hyper-V virtual networks. You can configure a virtual machine's storage to be migrated between physical servers. This requires a compatible network adapter and a compatible operating system.



Hyper-V Storage


Virtual Fibre Channel for Virtual Machines

Virtual Fibre Channel (vFC) is a technology that allows virtual machines to access Fibre Channel storage. This is supported in Hyper-V virtual networks. You can configure a virtual machine to use vFC. vFC requires a compatible network adapter and a compatible operating system.



New Virtual Hard Disk Format


The new virtual hard disk (VHD) format allows you to create virtual hard disks that are up to 64 TB in size. This is supported in Hyper-V virtual networks. You can create a new VHD using the new format. The new format provides larger disk capacity and improved performance.



Hyper-V and Failover Clustering

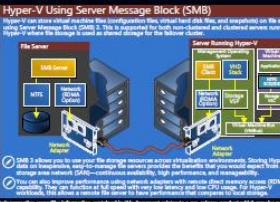
Clustered Virtual Machines for High Availability

Clustered virtual machines (VMs) for high availability allow you to run virtual machines on a failover cluster. This is supported in Hyper-V virtual networks. You can configure a virtual machine to be run on a failover cluster. This requires a compatible network adapter and a compatible operating system.



Cluster Shared Volumes


Cluster Shared Volumes (CSVs) are a technology that allows multiple nodes in a failover cluster to access the same storage. This is supported in Hyper-V virtual networks. You can configure a virtual machine to use CSV. CSV requires a compatible network adapter and a compatible operating system.



Hyper-V Scalability

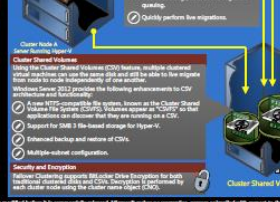
Physical Hardware and Virtual Machine Scalability

Physical hardware and virtual machine scalability allow you to scale your Hyper-V environment. This is supported in Hyper-V virtual networks. You can configure your Hyper-V environment to be scaled. This requires a compatible network adapter and a compatible operating system.



NUMA and Virtual Machines

NUMA (Non-Uniform Memory Access) is a memory architecture that allows you to scale your Hyper-V environment. This is supported in Hyper-V virtual networks. You can configure a virtual machine to use NUMA. NUMA requires a compatible network adapter and a compatible operating system.



Hyper-V Scalability

Virtual Machine Scalability

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Was ist neu in Windows Server 2012

Hyper-V

- 64 vCPU per VM
- 1.024 GB VM RAM
- New 64 TB VHDX format
- Hyper-V Replica
- Verbessertes VM Import
- Hyper-V Virtual FC
- Live storage migration
- Cluster Aware Updating
- Dynamic Memory enhancements
- Smart Paging
- More Concurrent live migration
- Support for up to 64 nodes per Cluster
- Support for 8.000 VMs per Cluster
- Hyper-V support for up to 4 TB RAM

Was ist neu in Windows Server 2012

Hyper-V

- Live VHD Merge
- CSV v2
- SMB 3 Support
- 150 Hyper-V PowerShell commands
- Hyper-V Extensible Switch
- VM Failover Prioritization
- VM Monitoring – Application health detection inside the virtual machine
- New Placement policies – Virtual Machine Priority and enhanced placement
- Virtual NUMA
- Dynamic Virtual Machine Queue
- RSS (Receive Side Scaling)
- RSC (Receive Segment Coalescing)
- Offloaded Data Transfer (ODX)

Hyper-V Neuerungen

Demo

Hyper-V Scalability

	Resource	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Improvement Factor
Host	Logical Processors	64	320	5×
	Physical Memory	1TB	4TB	4×
	Virtual CPUs per Host	512	2,048	4×
VM	Virtual CPUs per VM	4	64	16×
	Memory per VM	64GB	1TB	16×
	Active VMs per Host	384	1,024	2.7×
	Guest NUMA	No	Yes	-
Cluster	Maximum Nodes	16	64	4×
	Maximum VMs	1,000	8,000	8×

Hyper-V Betrieb

Demo – Hyper-V

Storage Migration

Windows Failover Clustering

- Failover Cluster
 - Max. 64 Node
 - Max. 4.000 VM pro Cluster
 - Max 1.024 active VM pro Cluster Node
 - CSV2 (Snapshot Integration, Bitlocker, SMB 3.0)
 - Scale Out Fileserver
 - Erweiterte Cluster Validation
 - Integriertes Cluster Aware Updating (CAU)
 - Integrierter Cluster Service Account
 - Task Scheduler Integration
 - VM Priority
 - VM Monitoring
 - Node Vote Weights
 - Dynamic Quorum
 - Node Drain
 - Erweiterter Powershell Support

SCVMM 2012

- P2V-Funktionen (Physical to Virtual)
- V2V-Funktionen (Virtual to Virtual), inklusive Vmware
- Zentrale Verwaltungskonsole fuer alle Microsoft Hyper-V Systeme und deren Gastsysteme sowie Xen Server und Vmware ESX / Vsphere
- Self Service Portal fuer das Provisioning virtueller Maschinen durch Nicht Administratoren
- Zentrale Library zur Ablage virtueller Maschinen und Templates
- Baremetal Provisioning
- Update und Compliance Management
- Fabric Management
- Storage Management
- Resource Optimization (DO – PO)

SCVMM 2012 Investments

Deployment

Infrastructure Enhancements

HA VMM Server

Upgrade

Custom properties

Powershell

Fabric

Fabric Management

Hyper-V Bare Metal Provisioning

Hyper-V, VMware, Citrix XenServer

Network Management

Storage Management

Update Management

Dynamic Optimization

Power Management

Cluster Management

Cloud

Cloud Management

Application Owner Usage

Capacity and Capability

Delegation and Quota

Services

Service Management

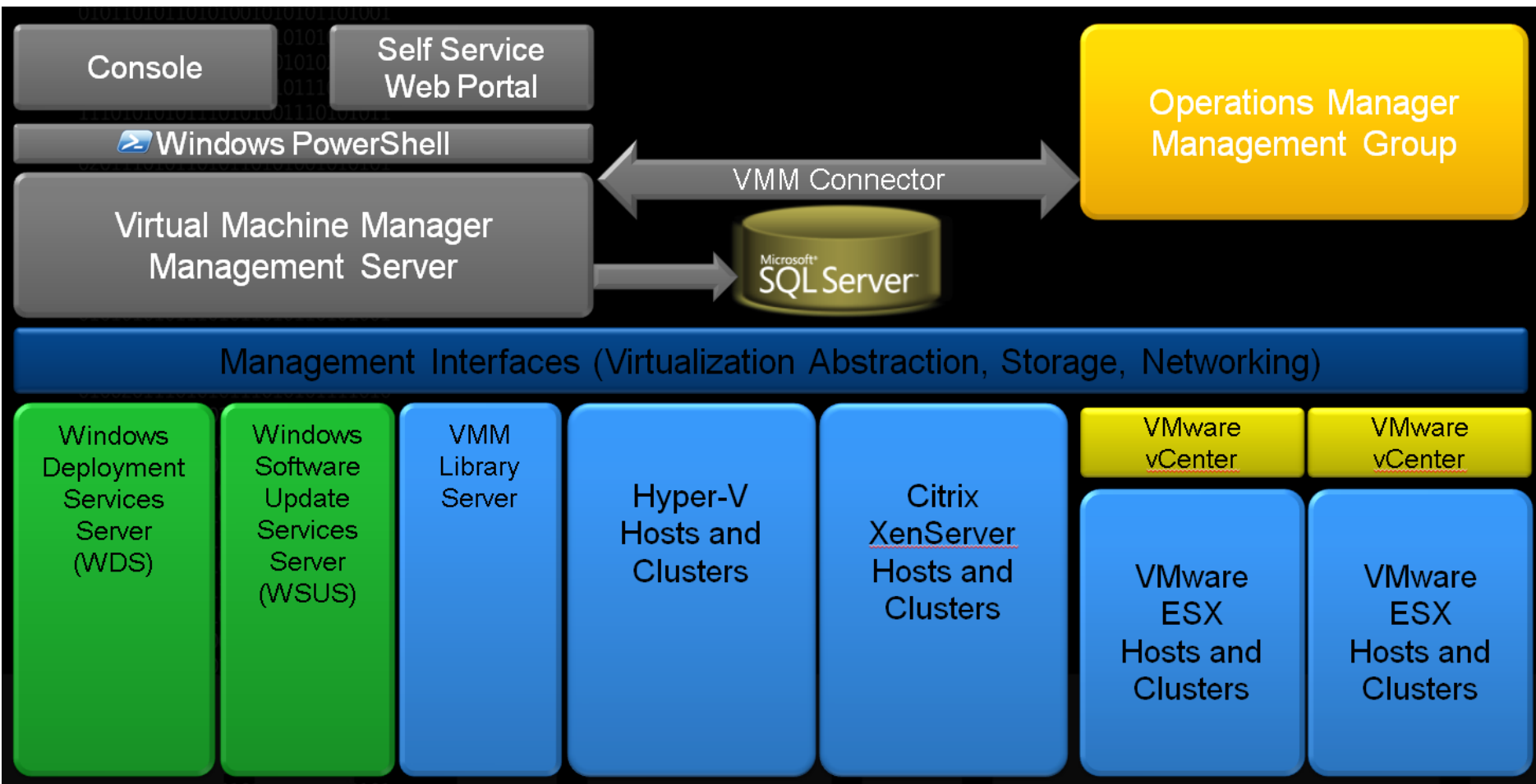
Service Templates

Application Deployment

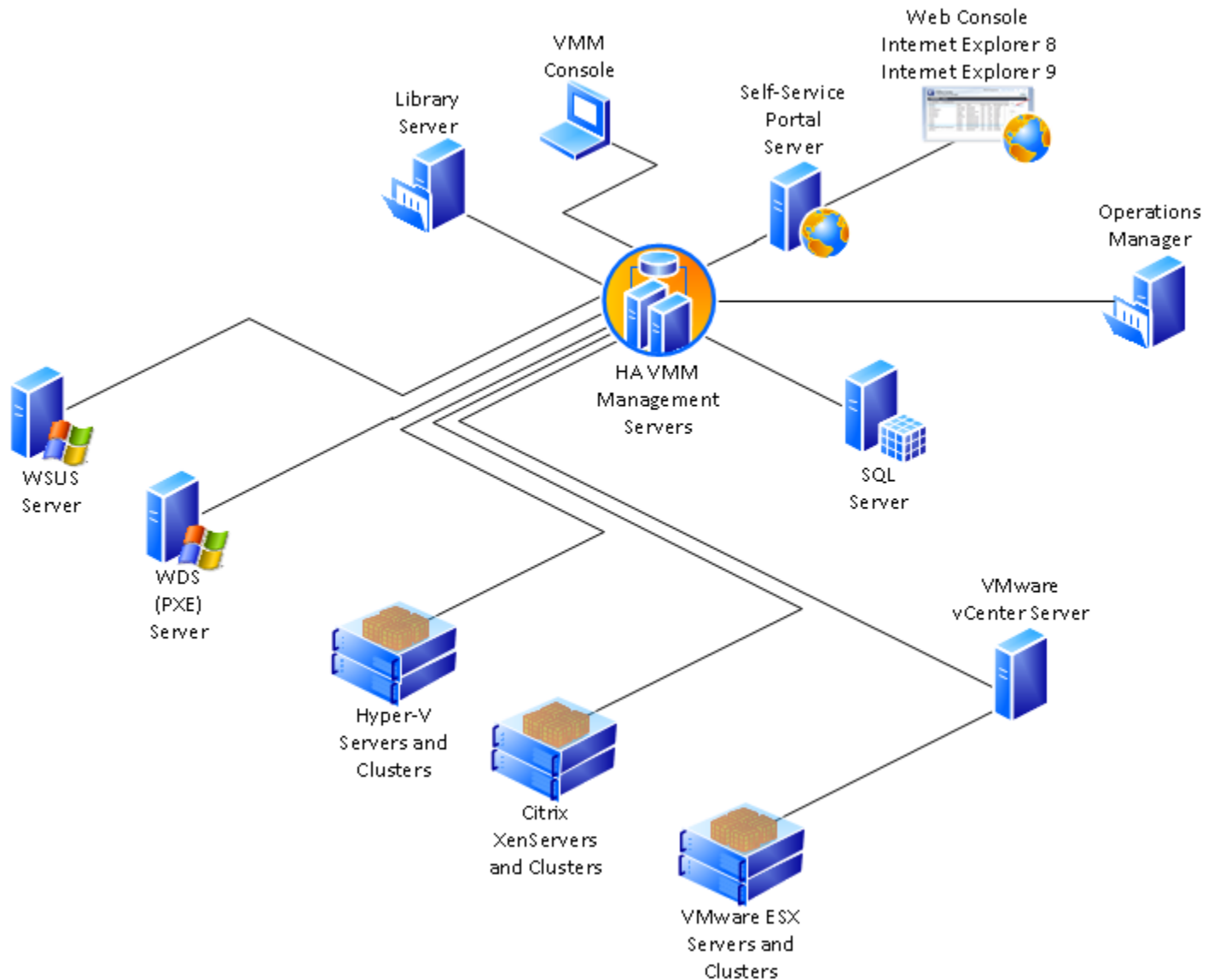
Custom Command Execution

Image Based Servicing

SCVMM 2012 Architecture



SCVMM Topology



SCVMM

Demo

Das Ende

- Vielen Dank fuer Ihre Aufmerksamkeit

