

Microsoft System Center 2012 R2



Managing Fibre Channel in System Center 2012 R2 Virtual Machine Manager

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Applies To

System Center 2012 R2 Virtual Machine Manager

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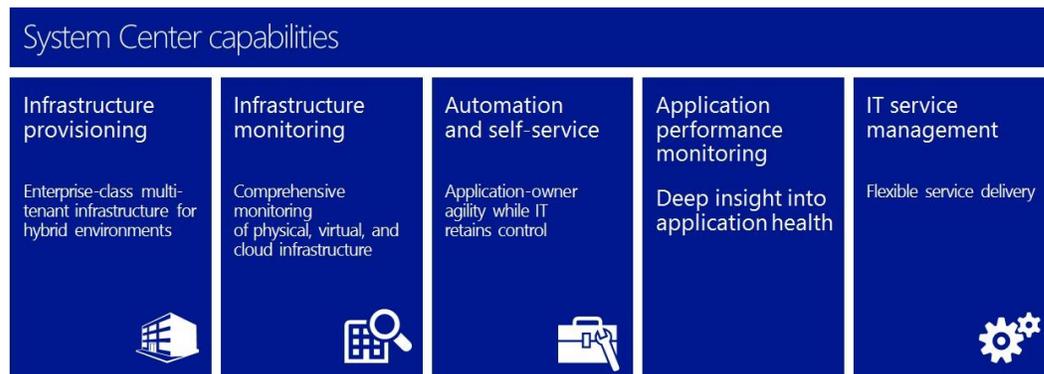
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Managing Fibre Channel Fabrics in System Center 2012 R2 Virtual Machine Manager

System Center 2012 R2 Virtual Machine Manager (VMM) is a management solution for the virtualized data center, enabling organizations to configure and manage virtualization host, networking, and storage resources to create and deploy virtual machines and services to private clouds.



With this release, VMM manages Fibre Channel (FC) storage arrays, FC fabrics and switches, Hyper-V FC virtual SAN, and VMs with FC virtual HBAs. End to end fabric and storage provisioning is now possible from a single management platform. Therefore, applications and workloads that require direct access to SAN Storage can be virtualized. Multiple VMs can share fibre channel SAN storage to create Failover Clusters.

This guide will help organizations configure and manage Brocade® Fibre Channel switches with VMM. In addition, Virtual Fibre Channel features enabled in VMM are explained.

This white paper is intended for customers and partners who are considering using Brocade Fibre Channel switch with VMM. Users should be familiar with storage area network, Fibre Channel concepts, System Center 2012 R2, and Windows Server® 2012 R2.

SC2012 R2 VMM Storage Feature Information

With the new feature introduced in this release, VMM is able to support management of Fibre Channel fabrics and the automated provisioning of virtual machines with connectivity to storage over Fibre Channels fabrics. This includes the management of the Fibre Channel switch zones. For more information on the overall VMM features, please refer to [Virtual Machine Manager](#).

Brocade Switch Product Information

With the release of Windows Server 2012, Microsoft has, for the first time, enabled Fibre Channel access directly from guest virtual machines. Combined with Brocade Fibre Channel SAN infrastructure, this capability simplifies connectivity between Fibre Channel SAN storage and Hyper-V applications and offers unprecedented levels of availability, scalability and operational efficiency for virtualized workloads and cloud architectures. For Hyper-V environments, virtual machines can now match the scalability and connectivity of physical servers and actually exceed the capabilities of a physical machine by leveraging the abstraction and mobility that virtualization provides.

For VMM to manage Brocade's FC fabrics and switches, an SMI-S provider is required. An SMI-S provider is a software component produced by or for a particular storage product or family of products. It implements an HTTP server, it can parse XML requests, and it knows how to control those specific devices which usually have their own unique management interfaces. For more information, please check out the Microsoft blog article "Introduction to SMI-S at: [SMI-S provider](#).

Brocade platforms with Brocade Gen 5 Fibre Channel –including the Brocade DCX[®] 8510 Backbone and Brocade 6520, 6510, and 6505 Switches –unleash the full potential of high-density server virtualization, cloud architectures and flash storage. Brocade Gen 5 Fibre Channel platforms deliver many unique capabilities and advantages to meet the evolving requirements of today's data center:

- Brocade UltraScale chassis connectivity for Brocade DCX 8510 Backbones enables higher density and simpler fabrics, dramatically reducing network complexity and cost
- Brocade Fabric Vision technology—an extension of Brocade Gen 5 Fibre Channel—provides innovative diagnostic, monitoring, and management capabilities to help administrators avoid problems, maximize application performance, and reduce operational costs
- Brocade ClearLink Diagnostics—part of Brocade Fabric Vision technology—leverages Brocade ClearLink Diagnostic Port (D_Port) capabilities to ensure optical and signal integrity for Gen 5 Fibre Channel optics and cables, simplifying deployment and support of high-performance fabrics
- Low latency and high IOPS performance maximize the number of virtual hosts per physical server
- Tested and proven architectures minimize risk and fault domains of high-density server virtualization
- Non-stop networking and automated management minimizes operational cost and complexity
- Integrated advanced diagnostics, monitoring and RAS capabilities simplify management and increase resiliency
- Integrated ISL data compression and encryption optimize bandwidth and protect data
- Backward-compatible with existing infrastructure
- Low overhead and low latency eliminate I/O bottlenecks and unleash the full performance of Flash, SSD and 16 Gbps-capable storage

The Brocade Gen 5 Fibre Channel switch platforms include:

- Brocade DCX 8510 Backbone
- Brocade 6520 Switch
- Brocade 6510 Switch
- Brocade 6505 Switch

Brocade switch details are available at the [Brocade Website](#).

Supported Scenarios

The following scenarios are supported:

1. Single storage array connected a single fabric (comprised of single or multiple switches) connected to a single virtual SAN (vSAN).
2. Multiple storage arrays connected to a single fabric (comprised of single or multiple switches) connected to a single vSAN.
3. Multiple storage arrays connected to multiple fabrics (comprised of single or multiple switches per fabric) connected to multiple vSANs. This scenario is common in that it provides dual-redundant paths to storage arrays.

Prerequisites for the Scenarios

The following prerequisites must be met in order to successfully deploy Virtual Fibre Channel in your network environment:

1. VMM must be installed. For step by step installation of Virtual Machine Manager, please refer to Getting Started with System Center 2012 - Virtual Machine Manager.
2. Ensure that the latest storage vendor firmware and drivers are installed for storage arrays, switches and HBAs.
3. A Host with one or more Fibre Channel HBAs with HBA driver support for Virtual Fibre Channel.
4. Ensure that storage arrays can present logical units (LUs).
5. Enable NPIV on Fibre Channel switches and HBAs.
6. Host computers must be running Windows Server 2012 or newer release.
7. Ensure that an [SMI-S provider](#) is installed. VMM manages Fibre Channel fabrics and SAN devices using the [SMI-S provider](#).
8. Ensure that [BNA \(Brocade Network Advisor\)](#) 12.0.2 and above is installed
9. For step by step to Configure SAN storage using VMM please refer to [Configuring Storage in VMM](#).

Deploying Virtual Fibre Channel

The following is a list of steps you need to take to deploy Virtual Fibre Channel in your environment. The links in these steps takes you to the appropriate VMM topics on TechNet. It is assumed that the requisites VMs have already been created for each host.

1. Discover Fibre Channel fabrics and assign classifications to each fabric. For step-by-step instructions, see [Adding and Classifying Fibre Channel Fabrics](#).
2. For each host computer that is managed, create vSANs by grouping host HBA ports. For step-by-step instructions, see [Managing Virtual SANs](#).
3. Create zones and activate any inactive zone sets. Zones connect each host or VM vHBA to a storage array. For step-by-step instructions, see [Managing Virtual Fibre Channel Zones](#).
4. Create storage array LUNs and register (unmask) them for a VM, host, or computer service tier as needed. For step-by-step instructions, see [Managing Storage LUNs for Virtual Fibre Channel](#).
5. Create a VM template, and for each virtual Fibre Channel adapter (vHBA) that is created, specify dynamic or static WWN assignments and select the fabric classification. The fabric classification is used to connect an vHBA to a storage fabric. For more information, see [Creating a VM for Virtual Fibre Channel](#).
6. Create a VM, select the destination host to deploy the VM to, zone a Fibre Channel array to the VM, add a disk to the VM, create a LUN, and then register (unmask) the LUN to the VM. For more information, see [Creating a VM for Virtual Fibre Channel](#).
7. Create a service template by, add VM templates to it, and for each virtual Fibre Channel adapter (vHBA) that is created, specify dynamic or static WWN assignments and select the fabric classification. For more information, see [Creating a Service Tier for Virtual Fibre Channel](#).
8. Create and deploy the service tier, zone a Fibre Channel array to the service tier, add a disk to the service tier, create a LUN, and register (unmask) the LUN to the service tier. For more information, see [Creating a Service Tier for Virtual Fibre Channel](#).

Notes

Keep the following notes in mind when working with Virtual Fibre Channel in VMM.

1. VMM has been tested with Brocade Network Advisor (BNA) versions 12.1, 12.1.1, and 12.1.2. From a performance standpoint, we recommend using BNA version 12.1.2.
2. The [Brocade Network Advisor Installation and Migration Guide](#) provides installation and configuration details for Brocade Network Advisor SMI Agent.
3. The [Brocade Network Advisor SMI Agent Developer's Guide](#) provides an overview of all supported profiles in Brocade Network Advisor SMI Agent.
4. If a fabric is discovered by one server with 'X' version of BNA, and the same fabric is discovered by another server with 'Y' version of BNA, then only one of the SMI-S providers (whichever is added first) will be added successfully. The other SMI-S provider will not get added even though BNA versions are different. This occurs as the application supports management of the fabrics only through one SMI-S provider.

5. If a fabric with more than 2 MB of zone db fabric is added with 512 kb zone db (normal size), then the fabric with normal size db will also not be able manage in VMM.

 **Note**

Enumeration of more than 2 MB of zone MB is not recommended in the SMI-S provider, rather to get the 2 MB of zone db, association calls have to be used.

6. BNA 12.0 and 12.0.1 SMI-S providers can't be managed in VMM.

Troubleshooting

For troubleshooting information see the Microsoft wiki at:

<http://social.technet.microsoft.com/wiki/contents/articles/18698.hyper-v-virtual-fibre-channel-troubleshooting-guide.aspx>

Glossary of Terms

The following terms represent the most important elements of a Virtual Fibre Channel environment:

Fabric A fabric is one or more Fibre Channel switches that are connected together through Fibre Channel cables, sometimes referred to as an Inter-Switch Link (ISL). Although the term fabric is generally used to indicate multiple switches, a fabric can be comprised of a single switch.

Switch A Fibre Channel switch is a network switch comprised of multiple ports and that supports the Fibre Channel (FC) transport protocol.

HBA Host Bus Adapters (HBAs) are network cards installed in host computers and are used to provide connectivity to Fibre Channel devices. Every HBA card is assigned a World Wide Name (WWN), which is shared among each optical port on an HBA. In turn, each HBA port is assigned a World Wide Port Name (WWPN). HBA ports are referred to as initiator ports.

NPIV N_Port ID Virtualization (NPIV) is a standard used to map virtual Fibre Channel HBA ports to physical Fibre Channel N_ports.

vHBA A virtualized HBA uses NPIV to address a VM's WWN within a host HBA. Multiple vHBAs can be mapped to a single HBA.

vSAN A virtual SAN defines a group of physical Fibre Channel ports that are connected to a physical SAN array.

WWN World Wide Name (WWN) is a globally unique number assigned to a Fibre Channel switch, HBA card, storage drive or other hardware device.

WWPN World Wide Port Number (WWPN) is a globally unique number assigned to a Fibre Channel port, similar to that of an Ethernet MAC address. The WWPN allows the storage fabric to recognize a particular HBA port.

Zone alias A zone alias is composed of several zone members that are grouped together and designated with a friendly name.

Zone members A zone member is any device with a WWNN that is attached to a storage fabric and belongs to a zone.

Zone set A zone set is a database of zone definitions that fabrics use to determine traffic routes. All Fibre Channel switches keep a copy of the zone set. An active zone set refers to all the zones that are available to the fabric. An inactive zone set refers to those zones whose information has not yet been propagated to the fabric and hence are not available to the fabric. Zone information is always changed or updated in an inactive zone set first; such information cannot be changed in an active zone set.