

IBM TotalStorage™ SAN Volume Controller on the Cisco MDS 9000 Caching Services Module

Q. What is the Cisco® and IBM® Virtualization Solution?

A. The Cisco MDS 9000 Family is an open platform for network-hosted storage applications. Cisco MDS 9000 multilayer directors and switches with IBM TotalStorage™ SAN Volume Controller storage software provide a solution that offers customers the ability to securely “virtualize” their storage, anywhere in the storage network.

Q. What are the business benefits of this solution?

A. The Cisco and IBM solution delivers the following business value to customers:

- Provides a central point of volume management for on demand provisioning of storage capacity, based on the Storage Management Initiative Specification (SMIS) API to enable customer flexibility, vendor choice, and investment protection.
- Combines autonomic capabilities to virtually eliminate downtime for planned outages, maintenance, and backups. The highly available design provides continuous access to data, enables dynamic data migration between devices, and facilitates nondisruptive software upgrades and maintenance.
- Improves utilization of storage and administrative resources by creating a single pool of storage across multiple storage controllers, enabling lower-cost storage to be used for appropriate applications and functions.
- Provides a single set of advanced copy services across multiple storage devices. Using a single methodology, volumes can be copied across storage controllers for enhanced disaster recovery, and point-in-time copies can be created. This can all be done from a single license of the copy services software, using the appropriate class of storage for the target data even if it is different from the storage class of the source data.
- A network-based cache improves overall throughput and performance, while reducing the latency for writes and read cache hits. It also enables the use of lower-cost (small cache) disk systems for greater flexibility.

Q. What are the components of the solution?

A. This solution requires the following hardware and software components:

Cisco MDS 9216 or 9500 Fibre Channel switches	Hardware
Cisco MDS 9000 Caching Services Module (CSM)	Hardware
IBM TotalStorage SAN Volume Controller storage software for Cisco MDS 9000	Software
Windows-based server hosting a GUI using xmlCIM (software is part of the SAN Volume Controller solution)	Hardware



Cisco MDS 9000 Fibre Channel directors and switches house the Cisco Caching Services Module (CSM). Each CSM performs the storage virtualization functions of IBM TotalStorage SAN Volume Controller.

Q. What are the primary virtualization features of the solution?

A. The Cisco and IBM solution offers the following features:

- Abstraction of physical logical unit numbers (LUNs) via slicing, striping, and concatenation
- Creation of virtual fabrics
- Provisioning of virtual disks to heterogeneous servers
- Seamless migration of physical storage
- Image Mode, which provides a direct mapping of extents on the managed disk and on the virtual disk, to ease migration from existing SAN storage
- IBM FlashCopy® (point-in-time copy)
- Synchronous Peer-to-Peer Remote Copy (PPRC) replication
- Packaged with IBM software subsystem device driver (SDD), providing multipath access between host and virtual disks
- Multipathing between IBM TotalStorage SAN Volume Controller and storage
- Tested for interoperability with storage resource management and backup products from IBM and other vendors

Q. How is the solution configured and managed?

A. The solution comes with three methods of management and configuration: xmlCIM API, GUI, and command line interface (CLI). Users select the interface of their choice and can execute storage management instructions from any of them. There is an IBM CLI and a Cisco CLI; either can be used, depending on customer management preference. IBM Tivoli SAN Manager and Cisco MDS 9000 Fabric Manager provide easy-to-use GUIs for configuring all aspects of the Cisco MDS 9000 SAN environment.

Q. What are the benefits of a solution that is integrated with the Cisco MDS 9000 Family?

A. By simply inserting Cisco CSMs into open slots in one or more Cisco MDS 9000 multilayer directors and switches, the network-hosted storage application adopts the highly available characteristics and intelligence built into the platform. Some of the main characteristics and intelligence that are essential in a virtualized environment are:

- Multiprotocol—Enables customers to remotely replicate or extend their storage through Fibre Channel over IP (FCIP), as well as providing transparent iSCSI host access to virtualization services.
- Security—Secure Shell (SSH) Protocol, RADIUS, Simple Network Management Protocol Version 3 (SNMPv3), and role-based access control are employed to guard against unauthorized management access with a single login point. Additionally, virtual SANs (VSANs), LUN zoning, port security, fabric binding, read-only zones, and host-to-switch and switch-to-switch authentication isolate port-level access and guard against denial-of-service (DoS) attacks.
- Traffic management—PortChannels and quality of service (QoS) features such as Fibre Channel Congestion Control and multiple prioritized queues maximize efficiency and prioritization of control and data traffic.
- Diagnostics—Includes call-home capabilities for hardware and software errors, Fibre Channel Traceroute for detailing the exact path and timing of flows, and Switched Port Analyzer (SPAN) to efficiently capture network traffic.



- High availability—The Cisco CSM is hot-swappable, redundantly configured, and fully integrates into the Cisco MDS 9000 Family's high-availability architecture.
- VSANs—Ability to isolate SAN services enables flexible partitioning of ports and simplifies configuration.

Q. What are the high-availability attributes of the solution?

A. Built on industry-proven Cisco storage hardware, this solution is designed for enterprise environments and offers complete hardware failover capabilities. The Cisco MDS 9500 Series combines nondisruptive software upgrades, stateful process restart and failover, and full redundancy of all major components, for a new standard in director-class availability. Fabric-level availability via Cisco PortChannel capability allows users to aggregate up to 16 physical links into one logical bundle. The bundle can consist of any port in the chassis, helping to ensure that the bundle remains active in the event of a port, application-specific integrated circuit (ASIC), or module failure.

The Cisco CSM is comprised of dual batteries and dual disks to preserve data integrity in the event of a power failure. IBM TotalStorage SAN Volume Controller storage software clusters the CSMs, so that any failure in one CSM, switch, or path does not affect the host's access to data.

Q. How might Cisco VSANs help in network-hosted virtualization?

A. You can achieve higher security and greater stability in Fibre Channel fabrics by using VSANs. They provide isolation among devices that are physically connected to the same fabric. With VSANs, you can create multiple logical SANs over a common physical infrastructure, offering the following advantages:

- Security—Isolation of fabric services enforces traffic to be contained within a single VSAN. Events that cause disruptions are contained within that VSAN and not propagated to other VSANs.
- Scalability—Ability to add or move individual ports to a VSAN, taking advantage of the physical infrastructure environment.
- Role-based access—Role-based permissions for switch configuration or administration are assigned to users on a per-VSAN basis.
- Host VSANs and disk VSANs—Disks that are put into a pool to be virtualized are contained in their own VSANs. Similarly, multiple VSANs can be created for managing tiered storage. The virtualized LUNs are exposed to the hosts in host VSANs. This limits the scope for potential configuration errors when adding hosts or storage to an environment.

IBM TotalStorage SAN Volume Controller Software, running on the CSM inside the Cisco MDS 9000, can virtualize the storage in each of multiple VSANs simultaneously, providing the best synergy between VSANs and virtual storage.

Q. What are the supported devices and configurations?

A. A wide variety of hosts, operating systems, host-bus adaptors (HBAs), storage arrays, and software applications are supported. For the latest supported configuration and interoperability matrix, please contact your local IBM sales representative:

<http://www.ibm.com/storage/support/2062-2300>

Q. What are the supported configurations in conjunction with Cisco “extended fabric”?

A. IBM TotalStorage SAN Volume Controller storage software intends to support IETF standard iSCSI protocol over Ethernet and FCIP, using the Cisco MDS 9000 platform. Integration of IBM TotalStorage SAN Volume Controller with the Cisco MDS 9000 Family’s IP Services Module enables customers to remotely replicate or extend their storage through FCIP, as well as providing transparent iSCSI host access to virtualization services.

Q. How do I receive support for this solution?

A. IBM is reselling not only the Cisco MDS 9000, but the CSM feature as well. IBM TotalStorage SAN Volume Controller storage software is an IBM Licensed Software product. IBM will provide support for all associated software and hardware issues. To ensure high service quality, Cisco and IBM have put in place a cooperative support agreement to resolve any backend issues, helping to ensure a smooth experience for our customers.

Q. How do I purchase this solution?

A. Contact your local IBM and Cisco sales representatives.



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