



SVC Product Overview

The *Cisco MDS 9000 Family SAN Volume Controller User Guide* provides information on how to set up and configure the SAN Volume Controller (SVC) storage software using a Cisco MDS 9000 Family Caching Services Module (CSM).

For more information about IBM TotalStorage™ SAN Volume Controller (SVC) Storage Software, refer to the *IBM TotalStorage SAN Volume Controller Storage Software for Cisco MDS 9000 Configuration Guide* or the *IBM TotalStorage SAN Volume Controller Storage Software for Cisco MDS 9000 Command-Line Interface User's Guide*.

This chapter describes the SVC and explains the supported features. It includes the following sections:

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About SVC

IBM and Cisco combine the IBM TotalStorage™ SAN Volume Controller (SVC) Storage Software with the Cisco MDS 9000 Caching Services Module (CSM) to reduce complexity and to reduce the cost of managing SAN-based storage. This solution implements a cache-based, clustered architecture and provides a highly available, scalable alternative that is necessary in today's demanding storage environments.

The combined SVC storage software along with the Cisco MDS 9000 Series CSM is delivered as a feature of the Cisco MDS 9000 Family. The SVC software runs on a clustered pair of CSMs within the switch.

Based on virtualization technology, this solution is designed to support a virtualized pool of storage from the storage subsystems attached to a SAN. It manages the combined storage volumes from a central point, avoids downtime for planned outages, increases capacity utilization, and implements copy services from a single license across multiple storage devices.

This storage pool helps tap unused storage capacity by increasing efficiency. It is designed as an integrated solution supporting high performance and continuous availability in open-system environments. Storage volumes are represented to applications as virtual disks (VDisks). These VDisks are created from the pool of managed disks residing behind the storage engines. Storage administrators can scale performance by adding storage engines and scale capacity by adding disks to the managed storage pool.

The IBM—Cisco SVC storage solution offers the following benefits and advantages:

- Reduces complexity
- Lowers the cost of managing SAN-based storage
- Creates a single pool of storage from disparate storage devices to increase capacity utilization
- Easier to manage
- Implementing a cache-based, clustered architecture to provide a highly available solution.
- Provides the scalability and performance required in today's demanding storage environments.
- Provides simple migration of storage.
- Provides a single set of copy services.

SVC Features

This section explains the features provided by the combined SVC storage software and the Cisco MDS 9000 Series CSM solution.

- A central point for volume management control

Through virtualization, the Cisco MDS 9000 Family's SAN-OS software helps create pools of managed disks spanning multiple storage subsystems. These managed disks are mapped to virtual disks used by server applications thus making better use of existing storage. This simple interface incorporates the Storage Management Initiative Specification (SMIS) application programming interface (API), and further demonstrates IBM's focus on open standards.

- Dynamic data migration

The Cisco MDS 9000 SAN-OS software includes a dynamic data-migration function that helps administrators migrate storage from one device to another, without taking it offline. This allows administrators to reallocate and scale storage capacity without disrupting applications. And the solution supports both local area network (LAN) free and server-free backups while a clustered configuration designed to support high availability allows for non-disruptive software upgrades. SVC for Cisco MDS 9000 also leverages the IBM TotalStorage Enterprise Storage Server™ multipathing software.

- Improved resource utilization

This solution enables more efficient use of personnel and technology resources. It helps increase administrator productivity by empowering central management of volumes under disparate storage controllers from a single user interface. It also increases the amount of available storage capacity by pooling storage across multiple devices. Designed to manage up to two petabytes (PB) of total usable storage capacity, SVC for Cisco MDS 9000 will support even higher performance by adding storage engine pairs. All storage engines within a cluster jointly manage the entire capacity of a storage pool.

- Advanced copy services

With conventional SAN disk arrays, copy operations are limited to in-box or like-box-to-like-box environments. But the SVC software moves copy services from individual storage controllers to the SAN. Administrators can apply copy services across disparate storage devices within the network. Advanced copy services —such as FlashCopy® and Peer-to-Peer Remote Copy (PPRC)— are supported across the managed storage.

- Cisco MDS 9000 CSM

The CSM integrates two high performance processing nodes which, when combined with the Cisco MDS 9000 SAN-OS software, delivers network hosted virtualization and replication services. Each CSM includes 8 GB of local cache used to hold recently accessed data blocks. On-board dual redundant batteries and hard disk drives protect cached data in the event of a power failure. To further ensure data availability and integrity, nodes are paired with nodes on other CSMs in high availability clusters.

- Distributed cache-based virtualization

The Cisco MDS 9000 CSM virtualization architecture overcomes the inherent bottlenecks associated with other virtualization architectures. Virtualization performance can be easily scaled to the level required by adding CSMs. Application I/O response time is improved over other virtualization architectures through the use of local caching of disk blocks. Because Cisco MDS 9000 virtualization is switch-based, any host can access any virtual volume from anywhere in the fabric, independent of the host's attachment point in the SAN. In addition to virtualization and replication services, the Cisco MDS 9000 CSM leverages all of the advanced SAN-OS features available on the Cisco MDS 9000 platform, simplifying security, diagnostics and management.

- Fabric-based virtualization using intelligent networking services

Cisco MDS 9000 fabric-based virtualization provides a level of integration with intelligent SAN services unavailable to host or virtualization appliance-based solutions. The Cisco MDS 9000 platform with integrated CSM delivers the intelligence and advanced features required to make multilayer intelligent storage area networks a reality including hardware-enabled innovations designed to dramatically improve scalability, availability, security, and manageability of storage networks, resulting in increased utility and lower total cost of ownership (TCO).

- Virtual SAN

Virtual SANs (VSANs) allow more efficient SAN utilization by creating hardware-based isolated environments within a single SAN fabric. Each VSAN maintains its own fabric services for added scalability and resilience. Zoning within a SAN allows additional configuration flexibility. VSANs allow the cost of SAN infrastructure to be shared among more users, while assuring absolute segregation and security of traffic and retaining independent control of configuration on a VSAN-by-VSAN basis. VSANs provide a protective barrier between application hosts and physical storage, enhancing data integrity in a virtualized storage environment.

- Comprehensive security

The Cisco CSM and the SAN-OS software integrate seamlessly to apply extensive security measures at all possible points of attack. SSH, RADIUS, SNMPv3, and role-based access control are used to block unauthorized access. To guard against compromising control traffic, Fibre Channel Security Protocol (FC-SP) provides confidentiality, data origin authentication, and connectionless integrity across the fabric. Data plane traffic is secured with VSANs, guaranteeing segregation of traffic across shared fabrics, and with zoning to satisfy traffic segregation requirements within a VSAN. Hardware-based ACLs provide further granularity for advanced security options.

- High availability

Like all other Cisco MDS 9000 Family modules, the CSM is hot-swappable and fully integrates into the Cisco MDS 9000 high availability architecture. The Cisco MDS 9000 SAN-OS software architecture offers an unparalleled level of availability including automatic restart of failed supervisor processes and fabric level availability via Cisco PortChannel capability which allows 16 physical links to be aggregated into one logical interface. The logical interface remains active in the event of a port, ASIC, or module failure, and can sustain the failure of any physical link without causing a reset. Additionally, Fabric Shortest Path First (FSPF) multipathing provides the

intelligence to load balance across up to 16 equal cost paths and, in the event of a switch failure, to dynamically reroute traffic. When deployed in clustered pairs and combined with SAN-OS software, availability is extended to the volume level ensuring maximum uptime.

- Management options

The Cisco MDS 9000 Family CSM provides three principal modes of management of your virtual storage environment: Cisco MDS 9000 Family Command Line Interface (CLI), IBM's SVC for Cisco MDS 9000 CLI, and IBM's ICAT management GUI. For users who prefer a common interface for both SAN and Volume management, the Cisco SAN-OS CLI includes the full suite of capabilities necessary to manage your virtual storage environment from the SAN-OS command line.