

Cisco Systems—Intelligent Storage Networking

Demand for storage capacity is growing rapidly. Keeping up with demand requires solutions that allow you to work smarter, enable you to scale easily and economically and manage more efficiently, and provide you with the peace of mind that comes with reliable business continuance operations. Cisco Systems® offers a comprehensive product portfolio that lets you simply and cost-effectively deploy storage networking solutions.

Whether you require ultra-high-availability solutions; cost-effective storage networking for enterprise data center, remote office, or workgroup applications; or high performance business continuance implementations in the MAN and WAN, Cisco® delivers the intelligent storage networking solutions you need.

Ultra-High-Availability
Data Center

Multilayer Directors and Fabric Switches Bring Intelligence to Today's Most Demanding Storage Environments

The Cisco MDS 9000 Family of multilayer directors and fabric switches (Figure 1) lowers the total cost of ownership (TCO) of

today's most demanding storage environments. By combining the industry's most robust and flexible hardware architecture with multiple layers of network and storage management intelligence, the Cisco MDS 9000 Series enables you to build highly available, scalable storage networks with advanced security and integrated management. The Cisco MDS 9000 Series delivers intelligent networking features such as multiprotocol support (Fibre Channel, Fibre Channel over IP [FCIP], and Internet Small Computer System Interface [iSCSI]), virtual SANs (VSANs), comprehensive security, embedded diagnostic tools (Fibre Channel ping, trace route, and protocol analysis), and integrated SAN management. In addition, the Cisco MDS 9000 Series provides an open platform for embedding intelligent storage services such as network-based volume management, replication, and backup. With its multilayer approach to network and storage intelligence, the Cisco MDS 9000 Series ushers in a new era in storage networking.

Figure 1
Cisco MDS 9000 Family
of Multilayer Directors
and Fabric Switches





Cisco MDS 9500 Series of Multilayer Directors

The Cisco MDS 9500 Series elevates the standard for director-class switches. Providing industry-leading availability, scalability, security, and management, the Cisco MDS 9500 Series allows you to deploy high-performance SANs with the lowest TCO. Layering a rich set of intelligent features onto a high-performance, protocol-agnostic switch fabric, the Cisco MDS 9500 Series addresses the stringent requirements of large data center storage environments. Available in 6-slot and 9-slot configurations, the Cisco MDS 9500 Series supports up to 224 autosensing 2/1-Gbps Fibre Channel ports in a single chassis and up to 768 Fibre Channel ports per rack. With an industry-leading 1.44 Tbps of system bandwidth, the Cisco MDS 9500 Series is 10 Gbps-ready, providing investment protection for future SAN connectivity options.

Cisco MDS 9216 Multilayer Fabric Switch

The Cisco MDS 9216 Multilayer Fabric Switch brings new functions and investment protection to the fabric switch market (Figure 2). Sharing the architecture of the Cisco MDS 9500 Series, the Cisco MDS 9216 combines multilayer intelligence with a modular chassis, making it the industry's most intelligent and flexible fabric switch. Starting with 16 autosensing 2/1-Gbps Fibre Channel ports, the Cisco MDS 9216 fabric switch's expansion slot allows for the addition of any Cisco MDS 9000 Series module for up to 48 total Fibre Channel ports. As the storage network expands further, Cisco MDS 9000 Series modules can be removed from Cisco MDS 9216 fabric switches and migrated to Cisco MDS 9500 Series multilayer directors, providing smooth migration, common sparing, and outstanding investment protection.

Figure 2
Cisco MDS 9216 Multilayer Fabric Switch



Cisco MDS 9100 Multilayer Fabric Switches

Consisting of the Cisco MDS 9120 and 9140 multilayer Fibre Channel fabric switches, the Cisco MDS 9100 Series elevates the standard for Fibre Channel fabric switches, bringing Cisco intelligent networking to small and medium-scale SANs and data-center edge applications. The Cisco MDS 9100 Series addresses the cost, performance, ease of management, and connectivity requirements of small and medium-scale storage environments with the same set of intelligent network services and integrated management tools available across the entire Cisco MDS 9000 Family. The Cisco MDS 9100 series are one rack unit (RU)-high, fixed-configuration switches supporting 2/1 Gbps auto-sensing Fibre Channel connectivity and available in 20- and 40-port models.

Cisco MDS 9000 Port Analyzer Adapter—Reducing Time to Problem Resolution

The Cisco MDS 9000 Port Analyzer Adapter enables effective, low-cost analysis of Fibre Channel traffic anywhere in the network at any time, simplifying debug of network problems and reducing time to problem resolution. The device is a “plug-and-play” accessory for the Cisco MDS 9000 Family that enables simple, transparent analysis of Fibre Channel traffic in a switched fabric, eliminating the need for expensive standalone protocol analyzers.



Midrange Storage Consolidation

Extending Networked Storage to a New Class of Applications

The benefits of migrating from direct-attached to networked storage includes ease of management, high availability, greatly simplified backup and restore, and disaster recovery. Until now, this level of service was reserved for high-end applications. The Cisco SN 5428-2 Storage Router allows a cost-effective extension of these benefits to applications hosted on lower-cost, lower-performance servers (Figure 3).

Figure 3
Cisco SN 5428-2 Storage Router for Cost-Effective Workgroup SANs



Cisco SN 5428-2 Storage Router

The Cisco SN 5428-2 is the industry's first storage networking platform to incorporate both IP and Fibre Channel switching technologies. It allows enterprise departments and workgroups, as well as small to medium-sized businesses, to cost-effectively migrate from direct-attached storage to SANs. The support for both IP and Fibre Channel in one platform simplifies the deployment and ongoing management of storage networks. Cisco is committed to delivering service-rich architectures built on a foundation of standards-based transport, and the Cisco SN 5428-2 provides support for Fibre Channel switching, iSCSI, and FCIP. The Cisco SN 5428-2 incorporates intelligent network services such as advanced security, virtual LANs (VLANs), and quality of service (QoS) to make your storage network more manageable and scalable.

Wide-Area Storage Network Connectivity

Extending the Storage Network Across the WAN

Figure 4
Fibre Channel Port Adapter for Cisco 7200 Series and Cisco 7400 Series Routers





Fibre Channel Port Adapter for Cisco 7200 Series and Cisco 7400 Series Routers

The Fibre Channel port adapter (PA-FC-1G) for Cisco 7200 and 7400 series routers delivers a SAN extension solution for customers using data replication applications over an IP WAN network infrastructure (Figure 4). Because the port adapter is installed within a Cisco 7200 or 7400 series router, customers can deploy business continuance or disaster recovery solutions across numerous WAN port adapter solutions, up to speeds of OC-3 (155 Mbps). The Fibre Channel port adapter is ideal for enterprise branch office deployment, data center business continuance over long distances (>60 km), or service provider SAN extension offerings.

Optical Solutions for Storage Network Connectivity

Extending the Storage Network within the Campus with Low-Cost CWDM Connectivity

The Cisco Coarse-Wavelength Division Multiplexing (CWDM) Small-Form-Factor Pluggable (SFP) solution offers a convenient and cost-effective solution for optimizing installed fiber within a campus by providing up to eight 2-Gbps Fibre Channel connections over one single-mode fiber. The Cisco CWDM SFP solution has two main components: a set of eight different Cisco CWDM SFPs (one for each of the eight “colors” or wavelengths), and a set of different Cisco CWDM optical add-drop modules (OADMs). The CWDM SFPs are supported on any Cisco MDS 9000 Series Fibre Channel port (Figure 5).

Figure 5
CWDM Optics



Extending the Storage Network Across the MAN

Cisco Complete Optical Multiservice Edge and Transport (Cisco COMET) offers a comprehensive portfolio of optical networking solutions to extend your network infrastructure across the LAN, MAN, and WAN with innovative technologies that enable data, voice, video, and storage applications. Cisco COMET enables storage networking applications such as business continuance, disaster recovery, data replication, storage consolidation, storage outsourcing, and SAN interconnect through a high-speed, low-latency optical infrastructure. The Cisco ONS 15540 and Cisco ONS 15530 Dense Wave Division Multiplex platforms offer the highest density of storage and Gigabit Ethernet service interfaces:

- 256 channels of 1 Gigabit Fibre Channel /FICON/Ethernet
- 32 channels of 2 Gigabit Fibre Channel
- 1280 channels of ESCON

compared to any standalone Metro DWDM platform in the industry. Key partner certifications include IBM, EMC, HP, and Hitachi Data Systems.



Additionally, next-generation SONET/SDH platforms, such as the Cisco ONS 15454 Multiservice Provisioning Platform (MSPP) provide optical transport for storage applications across metropolitan carrier networks.

Figure 6
Cisco ONS 15540 and the Cisco ONS 15530 DWDM Platform



Figure 7
Cisco ONS 15454 Multiservice Provisioning Platform



Partnering for Success

Cisco Storage Networking Solutions are designed to deliver an open standards-based infrastructure that allows companies to better utilize and share storage resources, improve business continuance, and lower the cost of ownership for storage. The solutions are developed from comprehensive combinations of technologies, products, and partnerships. Cisco's storage networking solutions encompass the following array of solution areas: Storage Consolidation in the Data Center, Mid-Range and Small/Medium Enterprises and Departmental Servers, and Business Continuance Solutions.

Cisco offers a breadth of solutions covering the SAN as well as the LAN, MAN, and WAN, providing one-stop-shopping, enabling customers to deploy the storage networking solution that best meets their needs for storage consolidation and business continuance. Furthermore, close integration between products ensures solutions with leading functionality, consistent feature set and a uniform look and feel.

In addition to its broad solution set, Cisco is partnering with leading storage companies to bring considerable resources to a customer's storage networking deployment. From design to deployment to service and support, Cisco and our storage partners are able to provide extensive professional services allowing customers to build the most scalable and highly available storage networks.

Services for Cisco Storage Networking

Partner planning, design, and implementation services—Cisco storage partners can help you assess, plan, and design a complete storage solution and migration strategy, and implement and test your storage network.

Technical support services—Cisco storage partners provide global, 24x 7 technical support and technology investment protection critical to your storage solution operations, and are backed by Cisco storage networking technical expertise.

Advanced services—Cisco provides expert engineering consulting support for large storage networks that require ongoing planning, design, implementation, operations, and optimization support.

For More Information

For information about Cisco storage networking, go to:

<http://www.cisco.com/go/storagenetworking>

For information about the Cisco partner program, go to:

<http://www.cisco.com/go/ciscoavvid>

For more information on Cisco optical networks, go to:

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Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

European Headquarters
Cisco Systems International BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: 31 0 20 357 1000
Fax: 31 0 20 357 1100

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-7660
Fax: 408 527-0883

Asia Pacific Headquarters
Cisco Systems, Inc.
Capital Tower
168 Robinson Road
#22-01 to #29-01
Singapore 068912
www.cisco.com
Tel: +65 6317 7777
Fax: +65 6317 7799

Cisco Systems has more than 200 offices in the following countries and regions. Addresses, phone numbers, and fax numbers are listed on the

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Argentina • Australia • Austria • Belgium • Brazil • Bulgaria • Canada • Chile • China PRC • Colombia • Costa Rica • Croatia
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