Cisco MDS 9148V 64-Gbps 48-Port Fibre Channel Switch

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Cisco MDS 9148V 64-Gbps 48-Port Fibre Channel switch brings the latest high-performance, low-latency Fibre Channel Storage Area Network (SAN) technology to market. Along with the higher bandwidth, the Cisco MDS 9148V switch supports ease of configuration and management, detailed and in-depth performance insights, and automation capabilities.



Figure 1.
Cisco MDS 9148V 64-Gbps 48-Port Fibre Channel

Product overview

The next-generation Cisco MDS 9148V 64-Gbps 48-Port Fibre Channel Switch (Figure 1) provides high-speed Fibre Channel connectivity for all-flash arrays and high-performance hosts. This switch offers state-of-the-art analytics and telemetry capabilities built into its next-generation Application-Specific Integrated Circuit (ASIC) chipset. This switch allows seamless transition to Fibre Channel Non-Volatile Memory Express (NVMe/FC) workloads whenever available without any hardware upgrade in the SAN. It empowers small, midsize, and large enterprises that are rapidly deploying cloud-scale applications using extremely dense virtualized servers, providing the benefits of greater bandwidth, scale, and consolidation. Some of the main benefits for a small-scale Storage Area Network (SAN) are automatic zoning, nonblocking forwarding, and smaller port groups of 24 ports. Benefits for a mid- to large-size SAN include higher scale for Fibre Channel control-plane functions, Virtual SANs, fabric login (FLOGI), device alias and name server scale, 48 ports of 64-Gbps non-oversubscribed line-rate ports, bidirectional airflow, and a fixed-form NVMe/FC-ready SAN switch with enhanced Buffer-to-Buffer (B2B) credits and capable of hardware-assisted Fibre Channel link encryption. Large-scale SAN architectures built with SAN core directors can expand 64-Gbps connectivity to the server rack using these switches configured in either switch mode or Network Port Virtualization (NPV) mode. Additionally, the switch supports enhanced diagnostic features such as Inter-Switch Link (ISL) and Host-Bus-Adapter (HBA) diagnostics, remote SFP (Read Diagnostic Parameter) diagnostics, remote port beaconing (Link Cable Beaconing) and advanced reliability features such as link level Forward Error Correction (FEC) with HBA ports.

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Main features and benefits

The main features of the Cisco MDS 9148V 64-Gbps 48-Port Fibre Channel Switch include:

- **High performance:** MDS 9148V architecture, with centralized nonblocking arbitration, provides consistent 64-Gbps low-latency performance across all traffic conditions for every Fibre Channel port on the switch.
- **Fully integrated SAN Analytics:** This feature-rich switch also offers state-of-the-art data traffic analytics and telemetry capabilities that have been built into this next-generation hardware platform. This new state-of-the-art technology couples the next-generation port ASIC with a fully dedicated Network Processing Unit (NPU). Information is extracted by the port ASIC from passing line rate traffic and used by the NPU to calculate performance data on board the switch in real time. Using an industry-leading open telemetry format, the data can be streamed to any analytics visualization platform.
- **Cisco Dynamic Ingress Rate Limiting (DIRL):** MDS 9148V supports the dynamic ingress rate limiting feature. Using DIRL, the MDS SAN can automatically detect any symptoms of congestion and then dynamically rate limits the congested and slow-drain devices so that adverse effects are not spread to other devices. DIRL dynamically adapts the rate-limiting to suit the traffic profile of the congestion or slow-drain device.
- **Capital Expenditures (CapEx) savings:** The 64-Gbps ports allow users to deploy them with existing 32- or 16-Gbps transceivers providing investment protection, with an option to upgrade to 64-Gbps transceivers and adapters whenever needed.
- **High availability:** MDS 9148V switches is designed to provide 99.999% availability. It provides such outstanding availability and reliability by providing redundancy on all major components, such as the power supply and cooling subsystems. Dual power supplies also facilitate redundant power grids. In addition, port-channel link members can be striped across two 24-port port groups, thus providing additional high availability.
- **Reliability:** As part of the standard 64-Gbps Fibre Channel specification, Cisco provides FEC between switch ports and HBA ports on all 64-Gbps Fibre Channel fixed switches. This feature helps ensure any error introduced in flight gets corrected at the receive side of the link. In addition, Cisco extends Buffer-to-Buffer State Change Notification (BBSCN) and buffer-to-buffer credit recovery, which is supported on all Cisco switches between ISL ports, to the fabric ports attached to any end device. Over time, the corruption of receiver-ready messages, known as R_RDY primitives, can lead to a loss of credits, which can eventually cause a link to stop transmitting in one direction. Buffer-to-buffer credit recovery provides for two attached ports to detect and correct this situation.
- **Next-generation ASIC:** The MDS 9148V Fibre Channel switch is powered by Cisco developed next-generation high-performance 64G ASICs.
- **Higher scalability:** Increased fabric scalability provides more flexibility for a variety of SAN architectures.
- **Telemetry[1]:** Fibre Channel and Small Computer System Interface (SCSI) or NVMe headers can be inspected without the need for any external taps or appliances. The resulting metrics can be analyzed on the switch and can additionally be exported using a dedicated 1Gbps Small Form-Factor Pluggable Plus (SFP+) port for telemetry and analytics purposes.

[1] Analytics is supported on Cisco MDS 9148V in MDS NX-OS 9.4(1) and later releases.

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- **Intelligent services:** Auto-zone, Smart Zoning, slow-drain detection and isolation, Virtual SAN (VSAN) and Inter-VSAN Routing (IVR), and fabric-wide Quality of Service (QoS) enable migration from SAN islands to enterprise-wide storage networks. Traffic encryption is available to meet stringent security requirements.
- **Sophisticated diagnostics:** The MDS 9148V provides intelligent diagnostics tools such as ISL diagnostics, HBA diagnostics, remote SFP-error collection, Switched Port Analyzer (SPAN), integrated Cisco Call Home capability, Slow Drain Monitoring and an Online Health Management System for greater reliability, faster problem resolution, and reduced service costs.
- **Virtual-machine awareness:** The MDS 9148V provides visibility into all virtual machines that are accessing storage LUNs or namespaces in the fabric. This feature is available through HBAs capable of priority tagging the Virtual Machine Identifier (VMID) on every Fibre Channel frame. Virtual-machine awareness can be extended to intelligent fabric services such as analytics to visualize performance of every flow originating from each virtual machine in the fabric.
- **Programmable fabric:** The MDS 9148V provides Cisco NX-API, a powerful RPC-style HTTP/HTTPS API to enable flexible and rapid programming of utilities for the SAN. This can be coupled with specific modules for Ansible and Python.
- **Secure-boot and anti-counterfeiting technology:** The MDS 9148V uses onboard hardware that protects the entire system from malicious attacks by securing access to critical components such as the bootloader, system image loader, and Joint Test Action Group (JTAG) interface.

SAN architecture benefits

The new 64-Gbps fabric switches address the requirement for highly scalable, virtualized, intelligent SAN infrastructure in current-generation data center environments. The industry is already poised to transition to 64-Gbps fixed switches with the availability of 64-Gbps HBAs and storage arrays from vendors. Additionally, as low-latency flash arrays and extremely dense virtualization deployments become more pervasive, fixed switches will be expected to provide 64-Gbps connectivity to the SAN core.

This solution offers several important benefits:

- **Server port consolidation:** The demand for 64-Gbps fabric switches will increase as hyperscale virtualization doubles the virtual machine density per rack, increasing the need for higher bandwidth HBA ports per rack of blade or standalone servers. Soon 64-Gbps HBA ports will consolidate the current 16-Gbps HBA installed base, with the need to increase the server capacity in the same rack. Hence, the MDS 9148V, with 48-port in a 1RU form factor, provides an excellent solution.
- **Simplification:** Through consolidation, the SAN administrator can reduce complexity and simplify management. With an MDS 9148V 64-Gbps 48-Port switch in N_Port ID Virtualization (NPIV) core mode and Fibre Channel switches connecting to it in N_Port Virtualization (NPV) mode, device ports can scale very cost-effectively over time without adding the burden of managing the NPV switches. Auto-zoning facilitates zero-touch automatic zoning without any need for configuring zoning on the 64-Gbps fixed switches that are deployed in SANs with single switch topology.

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- **Multiprotocol convergence:** 64-Gbps links benefit from lower latency when compared to lower bandwidth links, bringing better network throughput to your storage array workloads. Greater bandwidth also helps ensure less ISL congestion for the newer storage protocols that are expected to be available on externally attached storage arrays: for instance, NVMe over Fibre channel can coexist on the same link as existing SCSI workloads.
- **Scale and performance:** This fixed form-factor switch supports the performance and scale required to deploy a dedicated and standalone Fibre Channel SAN connecting both initiators and targets without requiring any other switching infrastructure.

VSAN

VSANs are ideal for efficient, secure SAN consolidation, enabling more efficient storage network utilization by creating hardware-based isolated environments with a single physical SAN fabric or switch. Each VSAN can be zoned as a typical SAN and maintains its own fabric services for added scalability and resilience. VSANs allow the cost of SAN infrastructure to be shared among more users, while helping ensure complete segregation of traffic and retaining independent control of configuration on a VSAN-by-VSAN basis.

IVR

In another step toward deploying efficient, cost effective, consolidated storage networks, the Cisco MDS 9148V supports IVR, the industry's first routing function for Fibre Channel. IVR allows selective transfer of data between initiators and targets on different VSANs while maintaining isolation of control plane traffic within each VSAN. With IVR, data can transit VSAN boundaries while maintaining control plane isolation, thereby maintaining fabric stability and availability. IVR is one of the feature enhancements requiring a license and eliminates the need for external routing appliances, greatly increasing routing scalability while delivering line rate routing performance, simplifying management, and eliminating the challenges associated with maintaining separate systems. Under the right circumstances, deploying IVR means lower total cost of SAN ownership.

Comprehensive solution for Robust Network Security

To address the need for enhanced security in storage networks, the Cisco MDS 9148V includes as standard an extensive security framework to protect highly sensitive data crossing today's enterprise networks:

- Smart Zoning: When the Smart Zoning feature is enabled, Cisco MDS 9000 Family fabrics provision the hardware access control entries specified by the zone set more efficiently, avoiding the superfluous entries that would allow servers (initiators) to communicate to other servers, or allow storage devices (targets) to communicate to other storage devices. This feature makes larger zones with multiple initiators and multiple targets feasible without excessive consumption of hardware resources. Thus, smart zones can correspond to applications, application clusters, hypervisor clusters, or other data center entities, saving the time that administrators previously spent creating many small zones, and enabling the automation of zoning tasks.
- Intelligent packet inspection is provided at the port level, including the application of ACLs for hardware enforcement of zones, VSANs, and advanced port security features.
- Switch-to-switch and host-to-switch authentication helps eliminate disruptions that may occur because of unauthorized devices connecting to a large enterprise fabric.
- FC-SP ESP payload encryption, which supports encrypted data to flow through the switch, is supported.

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- Port security locks down the mapping of an entity to a switch port to help ensure that SAN security is not compromised by the connection of unauthorized devices to a switch port.
- VSAN-based access control allows customers to define roles in which the scope of the roles is limited to certain VSANs.
- FC-SP provides switch-switch and host-switch Diffie-Hellman Challenge Handshake Authentication Protocol (DH-CHAP) authentication, supporting RADIUS and TACACS+, to help ensure that only authorized devices access protected storage networks.
- Digital certificates are issued by a trusted third party and are used as electronic passports to prove the identity of certificate owners.

Ease of management

To meet the needs of all users, the Cisco MDS 9148V provides three principal modes of management: the Cisco MDS 9000 Family CLI and integration with third-party storage management tools.

The Cisco MDS 9148V presents a consistent, logical CLI. Adhering to the syntax of the widely known Cisco NX-OS® Software CLI, the Cisco MDS 9000 Family CLI is easy to learn and delivers broad management capabilities. The Cisco MDS 9000 Family CLI is an extremely efficient and direct interface designed to provide optimal capabilities to administrators in enterprise environments.

Cisco MDS Smart Licensing

The Cisco MDS 9148V supports the Cisco Smart Licensing Using Policy (SLP) licensing model. With this licensing model, it is easier to buy, use, and manage Cisco MDS software and port expansion licenses for MDS 9148V. The licenses are in digital form and, once ordered on Cisco Commerce, are credited instantly to the customer's Cisco Smart Account or partner holding account. The software licenses are not tied to a serial number, so a customer can allocate the software licenses on different switches of the same model as required. Through the Cisco Smart Account on Cisco Smart Software Manager (CSSM), a customer can easily manage all its Cisco licenses from one single place.

Cisco MDS 9148V implements a simplified licensing model with two subscription software licenses – Premier and Advantage – available with 1-, 3-, 5-, and 7-year options for direct sale and for sale to OSM partners. The Premier subscription license includes Enterprise, NDFC and SAN Analytics licenses, and the Advantage subscription license incudes Enterprise and NDFC licenses. Customers can buy the subscription licenses as required, so they pay as they use.

To use Smart Licensing, you must first set up a Smart Account on **Cisco License Central**. For a more detailed overview on Cisco Licensing, visit the Licensing Hub.

Table 1. Software subscription licenses

Subscription Software Licenses	Included or Optional
Cisco MDS Premier Subscription License	Optional
Cisco MDS Advantage Subscription License	Optional

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Product specifications

Table 2. Product specifications

Feature	Description
Product compatibility	Cisco MDS 9000 Family
Software compatibility	Cisco MDS 9000 NX-OS Release 9.3(1) or later
Protocols	• Fibre Channel standards • FC-PI-6 (INCITS 512-2015) • FC-PI-7 (INCITS 543-2019) • FC-FS-4 (INCITS 488-2016) • FC-FS-5 (INCITS 545-2019) • FC-GS-7 (INCITS 510-2017) • FC-GS-8 (INCITS 548-2020) • FC-LS-3 (INCITS 487-2018) • FC-LS-4 (INCITS 553-2020) • FC-SW-6 (INCITS 511-2016) • FC-SW-7 (INCITS 547-2020) • NVMe/FC (INCITS 540-2018) • NVMe/FC-2 (INCITS 556-2020) • FC-PH, Revision 4.3 (ANSI INCITS 230-1994) • FC-PH, Amendment 1 (ANSI INCITS 230-1994/AM1-1996) • FC-PH, Amendment 2 (ANSI INCITS 230-1994/AM2-1999) • FC-PH-2, Revision 7.4 (ANSI INCITS 297-1997) • FC-PH-3, Revision 9.4 (ANSI INCITS 303-1998) • FC-PI, Revision 13 (ANSI INCITS 352-2002) • FC-PI-2, Revision 10 (ANSI INCITS 404-2006) • FC-PI-3, Revision 4 (ANSI INCITS 460-2011) • FC-PI-4, Revision 8 (ANSI INCITS 450-2008) • FC-PI-5, Revision 6 (ANSI INCITS 479-2011) • FC-FS, Revision 1.9 (ANSI INCITS 373-2003) • FC-FS-2, Revision 1.01 (ANSI INCITS 424-2007) • FC-FS-2, Amendement 1 (ANSI INCITS 424-2007/AM1-2007) • FC-FS-3, Revision 1.11 (ANSI INCITS 470-2011) • FC-FS-4 • F-LS, Revision 1.62 (ANSI INCITS 433-2007) • FC-LS-2, Revision 2.21 (ANSI INCITS 477-2011) • FC-LS-3, Includes revision 3.53 • FC-SW-2, Revision 5.3 (ANSI INCITS 355-2001) • FC-SW-3, Revision 6.6 (ANSI INCITS 384-2004) • FC-SW-4, Revision 7.5 (ANSI INCITS 418-2006) • FC-SW-5, Revision 8.5 (ANSI INCITS 461-2010) • FC-SW-6

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Feature	Description
	• FC-GS-3, Revision 7.01 (ANSI INCITS 348-2001) • FC-GS-4, Revision 7.91 (ANSI INCITS 387-2004) • FC-GS-5, Revision 8.51 (ANSI INCITS 427-2007) • FC-GS-6, Revision 9.4 (ANSI INCITS 463-2010) • FC-GS-7, Includes revision 10.8 • FCP, Revision 12 (ANSI INCITS 269-1996) • FCP-2, Revision 8 (ANSI INCITS 350-2003) • FCP-3, Revision 4 (ANSI INCITS 416-2006) • FCP-4, Revision 2b (ANSI INCITS 481-2011) • FC-SB-2, Revision 2.1 (ANSI INCITS 349-2001) • FC-SB-3, Revision 1.6 (ANSI INCITS 374-2003) • FC-SB-3, Amendment 1 (ANSI INCITS 374-2003/AM1-2007) • FC-SB-4, Revision 3.0 (ANSI INCITS 466-2011) • FC-SB-5, Revision 2.00 (ANSI INCITS 485-2014) • FC-BB-2, Revision 6.0 (ANSI INCITS 372-2003) • FC-BB-3, Revision 6.8 (ANSI INCITS 414-2006) • FC-BB-4, Revision 2.7 (ANSI INCITS 419-2008) • FC-BB-5, Revision 2.0 (ANSI INCITS 462-2010) • FC-BB-6, Revision 2.00 (ANSI INCITS 509-2014) • FC-VI, Revision 1.84 (ANSI INCITS 357-2002) • FC-SP, Revision 1.8 (ANSI INCITS 426-2007) • FC-SP-2, Revision 2.71 (ANSI INCITS 496-2012) • FAIS, Revision 1.03 (ANSI INCITS 432-2007) • FAIS-2, Revision 2.23 (ANSI INCITS 449-2008) • FC-IFR, Revision 1.06 (ANSI INCITS 475-2011) • FC-FLA, Revision 2.7 (INCITS TR-20-1998) • FC-PLDA, Revision 2.1 (INCITS TR-19-1998) • FC-Tape, Revision 1.17 (INCITS TR-24-1999) • FC-MI, Revision 1.92 (INCITS TR-30-2002) • FC-MI-2, Revision 2.6 (INCITS TR-39-2005) • FC-MI-3, Revision 1.03 (INCITS TR-48-2012) • FC-DA, Revision 3.1 (INCITS TR-36-2004) • FC-DA-2, Revision 1.06 (INCITS TR-49-2012) • FC-MSQS, Revision 3.2 (INCITS TR-46-2011) • Fibre Channel classes of service: Class 2, Class 3, and Class F • Fibre Channel standard port types: E and F • Fibre Channel enhanced port types: SD, ST, NP and TE • NVMe/FC • In-band management using IP over Fibre Channel (RFC 2625) • IPv6, IPv4, and Address Resolution Protocol (ARP) over Fibre Channel (RFC 4338) • Extensive IETF-standards based TCP/IP, SNMPv3, and remote monitoring (RMON) MIBs

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Feature	Description
Fibre Channel ports	• Fixed-switch form factor with 48 SFP+ ports base
Security	• VSAN fabric isolation • Intelligent packet inspection at port level • Hardware zoning by Access Control Lists (ACLs) • Fibre Channel Security Protocol (FC-SP) switch-to-switch authentication • FC-SP host-to-switch authentication • Role-Based Access Control (RBAC) using RADIUS, TACACS+, or Lightweight Directory Access Protocol (LDAP) authentication, authorization, and accounting (AAA) functions • Secure FTP (SFTP) • Secure Shell Protocol Version 2 (SSHv2) • Simple Network Management Protocol Version 3 (SNMPv3) implementing Advanced Encryption Standard (AES) • Control-plane security • Cisco TrustSec® payload encryption • Secure Boot and Anti-counterfeit technology
Performance	• Port speed: 8-, 16-, 32 and 64-Gbps autosensing with 64 Gbps of dedicated bandwidth per port • Aggregate bandwidth of 3-Tbps end-to-end full duplex • Buffer credits: Up to 24,000 for a group of 24 ports, with a default of 1000 buffer credits per port and a maximum of 16,000 buffer credits for a single port in the group • Port groups: 2 port groups of 24 ports each • Port channel: Up to 24 load-balanced physical links grouped in one port channel
Diagnostics	• Power-On-Self-Test (POST) diagnostics • Online Health Management System (OHMS) diagnostics • Internal loopbacks • SPAN • Fibre Channel traceroute • Fibre Channel ping • Fibre Channel debug • Cisco Fabric Analyzer • Syslog • Port-level statistics • Link diagnostics (E-port and F-port links) • Read Diagnostic Parameter

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Feature	Description
Serviceability	• Configuration file management • Call Home • Port beaconing • Link cable beacon • System LEDs • SNMP traps for alerts
Reliability and availability	• Cisco In-Service Software Upgrade (ISSU) • Hot-swappable, dual redundant power supplies • Hot-swappable fan tray with switch integrated temperature and power management • Hot-swappable SFP+ optics • Stateful process restart • Any port configuration for port channels • Fabric-based multipathing • Per-VSAN fabric services • Port tracking • FEC with HBA ports • Buffer-to-buffer state change notification with HBA ports
Network management	• Management access through the following out-of-band Ethernet ports ◦ mgmt0: 10/100/1000BASE-T port • RS-232 serial console port • USB power-on auto-provision port • Access protocols • Command-Line Interface (CLI) using the console and Ethernet port • SNMPv3 using the Ethernet port and in-band IP over Fibre Channel access • Storage Networking Industry Association (SNIA) Storage Management Initiative Specification (SMI-S) • NX-API for HTTP/HTTPS full programmability • Distributed device alias service • Network security • Per-VSAN RBAC using LDAP, RADIUS, and TACACS+-based AAA functions • Simple File Transfer Protocol (SFTP) • SSHv2 implementing AES • SNMPv3 implementing AES
Programming interfaces	• Scriptable CLI • Cisco DCNM/NDFC web services API • NX-API HTTP/HTTPS interfaces • Onboard Python interpreter • Cisco Embedded Event Manager (EEM) • Cisco NX-OS Software scheduler

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Feature	Description
Physical dimensions (H x W x D) and weight	• 1 Rack Unit (1RU) (1.72 x 17.299 x 18 in. [4.37 x 43.94 x 45.72 cm]) excluding Power Supply Unit (PSU) and fan-tray handles • 21.8 lb. (9.9 kg)
Power	• 80 Plus Platinum certified power supplies • Power supply options ◦ 500W AC in base model, port-side exhaust variant (2 per switch) ◦ 500W AC in base model, port-side intake variant (2 per switch) ◦ 1200W AC/ HVAC/ HVDC in base model, Bidirectional airflow (2 per switch) • Power cord ◦ Notched C15 socket connector connecting to C16 plug on the power supply receptacle for 500W Power Supply ◦ Standard CAB-HVAC-C14-2M IEC C14 to Saf-d-grid connector on the power supply receptacle for 1200W Power Supply ◦ Check Ordering Information table in this document for power cords specific to regions • 500W PSU AC input: 100 to 240 VAC (10% range) • 1200W PSU AC input: 90V to 305V • 1200W PSU DC input: 192V to 400V • Frequency: 50 to 60 Hz (nominal) • Typical power consumption ◦ 174W for 48-Port switch in idle status with no optics modules ◦ 228W for 48-Port switch with 24 64G SW optics modules under 50% line rate ◦ 286W for 48-Port switch with 48 64G SW optics modules under 50% line rate • Airflow ◦ Back to front (toward ports) using port-side exhaust fans ◦ Front to back (inward from ports) using port-side intake fans ◦ 50 Cubic Feet per Minute (CFM) through system fan assembly at 77°F (25°C) • 100 CFM maximum
Temperature range	• Temperature, ambient operating: ◦ 32 to 104°F (0 to 40°C) with port-side exhaust and intake airflow variants • Temperature, ambient nonoperating and storage: -40° to 158°F (-40° to 70°C) • Relative humidity, ambient (noncondensing) operating: 10% to 90% • Relative humidity, ambient (noncondensing) nonoperating and storage: 10% to 95% • Altitude, operating: -197 to 6500 ft (-60 to 2000m)

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Feature	Description
Approvals and compliance	• Safety compliance • CE Marking • UL 60950 • CAN/CSA-C22.2 No. 60950 • EN 60950 • IEC 60950 • TS 001 • AS/NZS 3260 • IEC60825 • EN60825 • 21 CFR 1040 • EMC compliance • FCC Part 15 (CFR 47) Class A • ICES-003 Class A • EN 55022 Class A • CISPR 22 Class A • AS/NZS 3548 Class A • VCCI Class A • EN 55024 • EN 50082-1 • EN 61000-6-1 • EN 61000-3-2 • EN 61000-3-3
Fabric services	• Name server • Registered State Change Notification (RSCN) • Login services • Fabric Configuration Server (FCS) • Broadcast • In-order delivery
Advanced functions	• VSAN • IVR • NPV • Port Channel with multipath load balancing • Flow- and zone-based QoS
Supported Cisco optics, media, and transmission distances	• For detailed information about all supported transceivers, refer to Cisco MDS 9000 Family pluggable transceivers documentation.

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Ordering information

Table 3. Ordering information

Part #	Product Description
DS-C9148V-24EK9	MDS 9148V 64G 1RU FC switch, w/ 24 active ports, 4 Fans, 2 PSUs, exhaust
DS-C9148V-24IK9	MDS 9148V 64G 1RU FC switch, w/ 24 active ports, 4 Fans, 2 PSUs, intake
M9148V-PL8	MDS 9148V 64G FC switch 8-port upgrade license
M9148V-PL8=	MDS 9148V 64G FC switch 8-port upgrade license, spare
DS-C9148V-24EK9=	MDS 9148V 64G 1RU FC switch, w/ 24 active ports, 4 Fans, 2 PSUs, exhaust, spare
DS-C9148V-24IK9=	MDS 9148V 64G 1RU FC switch, w/ 24 active ports, 4 Fans, 2 PSUs, intake, spare
DS-C9148V-24PEVK9	MDS 9148V 64G FC switch, w/ 24 active ports + 24x64G SW Optics, 4 Fans, 2 PSUs, exhaust
DS-C9148V-24PIVK9	MDS 9148V 64G FC switch, w/ 24 active ports + 24x64G SW Optics, 4 Fans, 2 PSUs, intake
DS-C9148V-24PETK9	MDS 9148V 64G FC switch, w/ 24 active ports + 24x32G SW Optics, 4 Fans, 2 PSUs, exhaust
DS-C9148V-24PITK9	MDS 9148V 64G FC switch, w/ 24 active ports + 24x32G SW Optics, 4 Fans, 2 PSUs, intake
DS-C9148V-48PEVK9	MDS 9148V 64G FC switch, w/ 48 active ports + 48x64G SW Optics, 4 Fans, 2 PSUs, exhaust
DS-C9148V-48PIVK9	MDS 9148V 64G FC switch, w/ 48 active ports + 48x64G SW Optics, 4 Fans, 2 PSUs, intake
DS-C9148V-48PETK9	MDS 9148V 64G FC switch, w/ 48 active ports + 48x32G SW Optics, 4 Fans, 2 PSUs, exhaust
DS-C9148V-48PITK9	MDS 9148V 64G FC switch, w/ 48 active ports + 48x32G SW Optics, 4 Fans, 2 PSUs, intake

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Part #	Accessories Description
DS-9148V-KIT-CSCO(=)	MDS 9148V Accessory Kit for Cisco (Spare)
DS-9148V-KIT-EM(=)	MDS 9148V Accessory Kit for Dell EMC (Spare)
DS-9148V-KIT-HDS(=)	MDS 9148V Accessory Kit for HDS (Spare)
DS-CAC-500W-E=	MDS 9100 500W port-side exhaust PSU (works with MDS 9148V switch) (Spare)
DS-CAC-500W-I=	MDS 9100 500W port-side intake PSU (works with MDS 9148V switch) (Spare)
DS-CAC-1200W=	AC PSU Bidirectional airflow, spare
DS-C32S-FAN-E=	MDS Switch FAN tray port-side Exhaust (works with MDS 9148V switch) (Spare)
DS-C32S-FAN-I=	MDS Switch FAN tray, port-side intake (works with MDS 9148V switch) (Spare)

Part #	Power Cords Description
CAB-9K10A-AR	Power Cord, 250VAC 10A IRAM 2073 Plug, Argentina
CAB-9K10A-AU	Power Cord, 250VAC 10A 3112 Plug, Australia
CAB-9K10A-CH	Power Cord, 250VAC 10A GB1002 Plug, China
CAB-9K10A-EU	Power Cord, 250VAC 10A CEE 7/7 Plug, EU
CAB-9K10A-ISR	Power Cord, 250VAC 10A SI16S3 Plug, Israel
CAB-9K10A-IT	Power Cord, 250VAC 10A CEI 23-16/VII Plug, Italy
CAB-9K10A-KOR	Power Cord, 125VAC 13A KSC8305 Plug, Korea
CAB-9K10A-SA	Power Cord, 250VAC 10A SABS 164/1 Plug, South Africa
CAB-9K10A-SW	Power Cord, 250VAC 10A, Straight C15, MP232 Plug, SWITZ
CAB-9K10A-TWN	Power Cord, 125VAC 15A CNS10917-2, Taiwan
CAB-9K10A-UK	Power Cord, 250VAC 10A BS1363 Plug (13 A fuse), UK
CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America
CAB-250V-10A-BR	Power Cord, 250VAC 10A, Brazil
CAB-C15-CBN	Cabinet Jumper Power Cord, 250 VAC 13A, C14-C15 Connectors
CAB-C15-CBN-CK	Cabinet Jumper Power Cord, 250 VAC 13A, C14-C15 Connectors, China, Republic of Korea
CAB-C15-CBN-EURA	Cabinet Jumper Power Cord, 250 VAC 13A, C14-C15 Connectors, EU, Russian Federation, Belarus, Kazakhstan, and Australia

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Part #	Optics Description
DS-SFP-FC64G-SW=*	64G FC Shortwave Optics
DS-SFP-FC64G-LW=*	64G FC Longwave Optics
DS-SFP-FC32G-SW=*	32G FC Shortwave Optics
DS-SFP-FC32G-LW=*	32G FC Longwave Optics
DS-SFP-FC32G-ELW=*	32 Gbps Fibre Channel Extended LW SFP+
DS-SFP-FC16G-SW=*	16G FC Shortwave Optics
DS-SFP-FC16G-LW=*	16G FC Longwave Optics
DS-SFP-FC16GELW=*	16 Gbps Fibre Channel Extended LW SFP+

*For detailed information about all supported transceivers, refer to the Cisco MDS 9000 Family pluggable transceivers documentation.

Part #	Optional Licenses
M91VXK9-P-1Y	Cisco MDS Premier Subscription License for 1 years for direct sale
M91VXK9-P-3Y	Cisco MDS Premier Subscription License for 3 years for direct sale
M91VXK9-P-5Y	Cisco MDS Premier Subscription License for 5 years for direct sale
M91VXK9-P-7Y	Cisco MDS Premier Subscription License for 7 years for direct sale
M91VXK9-P-1Y-OSM	Cisco MDS Premier Subscription License for 1 year for sale via OSM partners
M91VXK9-P-3Y-OSM	Cisco MDS Premier Subscription License for 3 years for sale via OSM partners
M91VXK9-P-5Y-OSM	Cisco MDS Premier Subscription License for 5 years for sale via OSM partners
M91VXK9-P-7Y-OSM	Cisco MDS Premier Subscription License for 7 years for sale via OSM partners
M91VXK9-A-1Y	Cisco MDS Advantage Subscription License for 1 year for direct sale
M91VXK9-A-3Y	Cisco MDS Advantage Subscription License for 3 years for direct sale
M91VXK9-A-5Y	Cisco MDS Advantage Subscription License for 5 years for direct sale
M91VXK9-P-7Y	Cisco MDS Advantage Subscription License for 7 years for direct sale
M91VXK9-A-1Y-OSM	Cisco MDS Advantage Subscription License for 1 year for sale via OSM partners
M91VXK9-A-3Y-OSM	Cisco MDS Advantage Subscription License for 3 years for sale via OSM partners
M91VXK9-A-5Y-OSM	Cisco MDS Advantage Subscription License for 5 years for sale via OSM partners
M91VXK9-A-7Y-OSM	Cisco MDS Advantage Subscription License for 7 years for sale via OSM partners

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Product sustainability

Information about Cisco's Environmental, Social and Governance (ESG) initiatives and performance is provided in Cisco's CSR and sustainability reporting.

Table 4. Product sustainability

Sustainability Topic	Reference
General	
Information on product-material-content laws and regulations	Materials
Information on electronic waste laws and regulations, including our products, batteries and packaging	WEEE Compliance
Information on product takeback and reuse program	Cisco Takeback and Reuse Program
Sustainability Inquiries	Contact: csr_inquiries@cisco.com
Material	
Product packaging, weight and materials	Contact: environment@cisco.com
Size and Weights	Table 2: Product specifications

Cisco makes the packaging data available for informational purposes only. It may not reflect the most current legal developments, and Cisco does not represent, warrant, or guarantee that it is complete, accurate, or up to date. This information is subject to change without notice.

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Document history

New or Revised Topic	Described In	Date
Analytics support	Footnote	April 25, 2024
New data sheet for Cisco MDS 9148V 64-Gbps 48-Port Fibre Channel Switch		June 14, 2022
Updating optics ordering information	Ordering information	March 20, 2025

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