

# Cisco MDS 9148T 32-Gbps 48-Port Fibre Channel Switch

## Product Overview

The next-generation Cisco® MDS 9148T 32-Gbps 48-Port Fibre Channel Switch (Figure 1) provides high-speed Fibre Channel connectivity for All-Flash arrays. This switch offers state-of-the-art analytics and telemetry capability built into its next-generation Application-Specific Integrated Circuit (ASIC) platform. This switch allows seamless transition to Fibre Channel Non-Volatile Memory Express (FC-NVMe) 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 16 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 32-Gbps non-oversubscribed line-rate ports, bidirectional airflow, and a fixed-form FC-NVMe-ready SAN switch with enhanced Buffer-to-Buffer (B2B) credits connecting both storage and host ports and Fibre Channel link encryption. Large-scale SAN architectures built with SAN core directors can expand 32-Gbps connectivity to the server rack using these switches 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, read diagnostic parameter, link cable beacon,<sup>1</sup> and advanced reliability features such as Forward Error Correction (FEC) with HBA ports.

**Figure 1.** Cisco MDS 9148T 32-Gbps 48-Port Fibre Channel Switch



## Main features

The main features of the Cisco MDS 9148T 32-Gbps 48-Port Fibre Channel Switch include:

- High performance: MDS 9148T architecture, with centralized nonblocking arbitration, provides consistent 32-Gbps low-latency performance across all traffic conditions for every Fibre Channel port on the switch.
- Capital Expenditures (CapEx) savings: The 32-Gbps ports allow users to deploy them with existing 16- or 8-Gbps transceivers provide investment protection with an option to upgrade to 32-Gbps transceivers and adapters whenever needed.
- High availability: MDS 9148T switches continue to provide the same outstanding availability and reliability as the previous-generation Cisco MDS 9000 Family switches by providing redundancy on all major components such as the power supply and fan. Dual power supplies also facilitate redundant power grids. In addition, port-channel link members can be striped across the three 16-port port groups, thus providing additional high availability.

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- **Reliability:** As part of the standard 32-Gbps Fibre Channel specification, Cisco provides FEC between switch ports and HBA ports on all 32-Gbps Fibre Channel fixed switches. This feature helps ensure any error introduced in flight gets corrected before it reaches the device side. 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.
  - **Growth in small increments:** The MDS 9148T Fibre Channel switch provides an option to deploy as few as twenty-four 32-Gbps Fibre Channel ports in the entry-level variant, which can grow in increments of 8 ports to up to 48 ports. This setup allows four possible configurations of 24, 32, 40, and 48 ports.
  - **Next-generation ASIC:** The MDS 9148T Fibre Channel switch is powered by the same high-performance 32-Gbps Cisco ASIC that powers the Cisco MDS 32-Gbps Fibre Channel product portfolio.
  - **Higher scalability:** Increased fabric scalability provides more flexibility for a variety of SAN architectures.
  - **Telemetry:** Fibre Channel and Small Computer System Interface (SCSI) headers can be inspected without the need for any external taps or appliances. The resulting metrics can be analyzed on the switch and also exported using a dedicated 1- or 10-Gbps Small Form-Factor Pluggable Plus (SFP+) port for telemetry and analytics purposes<sup>#</sup>.
  - **Intelligent services:** Auto-zone, Smart Zoning, slow-drain detection and isolation, Virtual SAN (VSAN) and Inter-VSAN routing (IVR), and fabricwide Quality of Service (QoS) enable migration from SAN islands to enterprise-wide storage networks. Traffic encryption is optionally available to meet stringent security requirements.
  - **Sophisticated diagnostics:** The MDS 9148T provides intelligent diagnostics tools such as ISL diagnostics, HBA diagnostics, read diagnostic parameters, Switched Port Analyzer (SPAN), Integrated Cisco Call Home capability, and an Online Health Management System for greater reliability, faster problem resolution, and reduced service costs.
  - **Virtual-machine awareness:** The MDS 9148T provides visibility into all virtual machines that are accessing the storage LUNs 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<sup>1</sup> to visualize performance of every flow originating from each virtual machine in the fabric.
  - **Programmable fabric:** The MDS 9148T provides powerful Representational State Transfer (REST) and Cisco NX-API capabilities to enable flexible and rapid programming of utilities for the SAN.
  - **Single-pane management:** You can provision, manage, monitor, and troubleshoot the MDS 9148T using Cisco Data Center Network Manager (DCNM), which currently manages the entire suite of Cisco data center products.
  - **Secure-boot and anti-counterfeiting technology:** The MDS 9148T 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 architectural benefits

The new 32-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 32-Gbps fixed switches with the availability of 32-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 32-Gbps connectivity to the SAN core.

This solution offers several important benefits:

- **Server port consolidation:** The demand for 32-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 32-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 9148T, with 48-port density, provides an excellent solution, and the flexibility to grow from a 24-port base to 48 ports is an added advantage.
- **Simplification:** Through consolidation, the SAN administrator can reduce complexity and simplify management. An MDS 9148T 32-Gbps 48-Port switch in N\_Port ID Virtualization (NPIV) core mode with fibre channel switches connecting to it in N\_Port Virtualization (NPV) mode, device ports can scale very cost-effectively with 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 32-Gbps fixed switches that are deployed in standalone SANs.
- **Multiprotocol convergence:** 32-Gbps links benefit from lower-latency when compared to lower-bandwidth links, bringing better-performing storage workloads to your storage array. 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 co-exist 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.

## Platform compatibility

For detailed information about hardware and software compatibility as well as product interoperability, please refer to the **MDS 9000 Series switch interoperability matrix**.

## Product specifications

Table 1 lists the specifications for the MDS 9148T 32-Gbps 48-Port Fibre Channel Switch.

**Table 1.** Product specifications

<b>Protocols</b>	<ul style="list-style-type: none"><li>• Fibre Channel standards</li><li>• FC-PH, Revision 4.3 (ANSI INCITS 230-1994)</li><li>• FC-PH, Amendment 1 (ANSI INCITS 230-1994/AM1-1996)</li><li>• FC-PH, Amendment 2 (ANSI INCITS 230-1994/AM2-1999)</li><li>• FC-PH-2, Revision 7.4 (ANSI INCITS 297-1997)</li><li>• FC-PH-3, Revision 9.4 (ANSI INCITS 303-1998)</li><li>• FC-PI, Revision 13 (ANSI INCITS 352-2002)</li><li>• FC-PI-2, Revision 10 (ANSI INCITS 404-2006)</li></ul>
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- 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-PI-6 (ANSI INCITS 512-2015)
- FC-FS, Revision 1.9 (ANSI INCITS 373-2003)
- FC-FS-2, Revision 1.01 (ANSI INCITS 424-2007)
- FC-FS-2, Amendment 1 (ANSI INCITS 424-2007/AM1-2007)
- FC-FS-3, Revision 1.11 (ANSI INCITS 470-2011)
- FC-FS-4
- FC-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
- 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-6, Revision 2.00 (ANSI INCITS 509-2014)
- 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-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, F, and B
- Fibre Channel enhanced port types: SD, ST, and TE
- FC-NVMe
- 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, Simple Network Management Protocol Version 3 (SNMPv3), and Remote Monitoring (RMON) MIBs

<b>Fibre Channel ports</b>	<ul style="list-style-type: none"> <li>• Fixed-switch form factor with 48 SFP+ ports base</li> <li>• Entry-level 24-port preactivated base model with flexibility to turn on any 24 ports</li> <li>• Incremental ports <ul style="list-style-type: none"> <li>◦ 8-ports upgrade license offers the option of upgrading to 32, 40, and 48 ports</li> </ul> </li> </ul>
<b>Security</b>	<ul style="list-style-type: none"> <li>• VSAN fabric isolation</li> <li>• Intelligent packet inspection at port level</li> <li>• Hardware zoning by Access Control Lists (ACLs)</li> <li>• Fibre Channel Security Protocol (FC-SP) switch-to-switch authentication</li> <li>• FC-SP host-to-switch authentication</li> <li>• Role-based access control (RBAC) using RADIUS, TACACS+, or Lightweight Directory Access Protocol (LDAP) authentication, authorization, and accounting (AAA) functions</li> <li>• Secure FTP (SFTP)</li> <li>• Secure Shell Protocol Version 2 (SSHv2)</li> <li>• Simple Network Management Protocol Version 3 (SNMPv3) implementing Advanced Encryption Standard (AES)</li> <li>• Control-plane security</li> <li>• Cisco TrustSec<sup>®</sup> payload encryption</li> <li>• Secure Boot and Anti-counterfeit technology</li> </ul>
<b>Performance</b>	<ul style="list-style-type: none"> <li>• Port speed: 4-, 8-, 16-, and 32-Gbps autosensing with 32 Gbps of dedicated bandwidth per port</li> <li>• Aggregate bandwidth of 1.5-Tbps end-to-end full duplex</li> <li>• Buffer credits: Up to 8300 for a group of 16 ports, with a default of 500 buffer credits per port and a maximum of 8270 buffer credits for a single port in the group</li> <li>• Port groups: 3 port groups of 16 ports each</li> <li>• Port channel: Up to 16 load-balanced physical links grouped in one port channel</li> </ul>
<b>Diagnostics</b>	<ul style="list-style-type: none"> <li>• Power-On-Self-Test (POST) diagnostics</li> <li>• Online Health Management System (OHMS) diagnostics</li> <li>• Internal loopbacks</li> <li>• SPAN</li> <li>• Fibre Channel traceroute</li> <li>• Fibre Channel ping</li> <li>• Fibre Channel debug</li> <li>• Cisco Fabric Analyzer</li> <li>• Syslog</li> <li>• Port-level statistics</li> <li>• Link diagnostics (E-port and F-port links)</li> <li>• Read Diagnostic Parameter</li> </ul>
<b>Serviceability</b>	<ul style="list-style-type: none"> <li>• Configuration file management</li> <li>• Call Home</li> <li>• Port beaconing</li> <li>• Link cable beacon</li> <li>• System LEDs</li> <li>• SNMP traps for alerts</li> </ul>
<b>Reliability and availability</b>	<ul style="list-style-type: none"> <li>• Cisco In-Service Software Upgrade (ISSU)</li> <li>• Hot-swappable, dual redundant power supplies</li> <li>• Hot-swappable fan tray with switch integrated temperature and power management</li> <li>• Hot-swappable SFP+ optics</li> <li>• Stateful process restart</li> <li>• Any port configuration for port channels</li> <li>• Fabric-based multipathing</li> <li>• Per-VSAN fabric services</li> <li>• Port tracking</li> <li>• Virtual Router Redundancy Protocol (VRRP) for management IP interface</li> <li>• FEC with HBA ports</li> <li>• Buffer-to-buffer state change notification with HBA ports</li> </ul>

<b>Network management</b>	<ul style="list-style-type: none"> <li>• Management access through 2 out-of-band Ethernet ports <ul style="list-style-type: none"> <li>◦ mgmt0: 10/100/1000BASE-T port</li> <li>◦ mgmt1: 1/10G SFP+ port<sup>#</sup></li> </ul> </li> <li>• RS-232 serial console port</li> <li>• USB power-on auto-provision port</li> <li>• Access protocols</li> <li>• Command-Line Interface (CLI) using the console and Ethernet port</li> <li>• SNMPv3 using the Ethernet port and in-band IP over Fibre Channel access</li> <li>• Storage Networking Industry Association (SNIA) Storage Management Initiative Specification (SMI-S)</li> <li>• NX-API for REST</li> <li>• full access through HTTPS REST</li> <li>• Distributed device alias service</li> <li>• Network security</li> <li>• Per-VSAN RBAC using LDAP, RADIUS, and TACACS+-based AAA functions</li> <li>• Simple File Transfer Protocol (SFTP)</li> <li>• SSHv2 implementing AES</li> <li>• SNMPv3 implementing AES</li> <li>• Cisco Data Center Network Manager (DCNM)</li> </ul>
<b>Programming interfaces</b>	<ul style="list-style-type: none"> <li>• Scriptable CLI</li> <li>• Cisco Prime<sup>®</sup> DCNM web services API</li> <li>• NX-API RESTful interfaces</li> <li>• Onboard Python interpreter</li> <li>• Cisco Embedded Event Manager (EEM)</li> <li>• Cisco NX-OS Software scheduler</li> </ul>
<b>Physical dimensions (H x W x D) and weight</b>	<ul style="list-style-type: none"> <li>• 1 Rack Unit (1RU) (1.72 x 17.3 x 22.3 in. [4.37 x 43/9 x 56.6 cm]) excluding Power Supply Unit (PSU) and fan-tray handles</li> <li>• 16.7 lb. (8.5 kg)</li> </ul>
<b>Power</b>	<ul style="list-style-type: none"> <li>• 80 Plus Platinum certified power supplies</li> <li>• Power supply options <ul style="list-style-type: none"> <li>◦ 650W AC in base model, port-side exhaust variant (2 per switch)</li> <li>◦ 650W AC in base model, port-side intake variant (2 per switch)</li> </ul> </li> <li>• Power cord <ul style="list-style-type: none"> <li>◦ IEC60320 C14 plug on 650W power supply connecting to a notched C15 socket connector (check Table 6 later in this document for power cords specific to regions)</li> </ul> </li> <li>• AC input: 100 to 240 VAC (10% range)</li> <li>• Frequency: 50 to 60 Hz (nominal)</li> <li>• Typical power consumption <ul style="list-style-type: none"> <li>◦ 217W for Idle 48-Port switch without optics modules</li> <li>◦ 251W for 48-Port switch with 24 32G SW optics modules under typical conditions</li> <li>◦ 297W for 48-Port switch with 48 32G SW optics modules under typical conditions</li> </ul> </li> <li>• Airflow <ul style="list-style-type: none"> <li>◦ Back to front (toward ports) using port-side exhaust fans</li> <li>◦ Front to back (inward from ports) using port-side intake fans</li> <li>◦ 50 Cubic Feet per Minute (CFM) through system fan assembly at 77°F (25°C)</li> <li>◦ 100 CFM maximum</li> </ul> </li> </ul>
<b>Temperature range</b>	<ul style="list-style-type: none"> <li>• Temperature, ambient operating: <ul style="list-style-type: none"> <li>◦ 32 to 104°F (0 to 40°C) with port-side exhaust and intake airflow variants</li> </ul> </li> <li>• Temperature, ambient nonoperating and storage: –40 to 158°F (–40 to 70°C)</li> <li>• Relative humidity, ambient (noncondensing) operating: 10 to 90%</li> <li>• Relative humidity, ambient (noncondensing) nonoperating and storage: 10 to 95%</li> <li>• Altitude, operating: –197 to 6500 ft (–60 to 2000m)</li> </ul>

<b>Approvals and compliance</b>	<ul style="list-style-type: none"> <li>• Safety compliance</li> <li>• CE Marking</li> <li>• UL 60950</li> <li>• CAN/CSA-C22.2 No. 60950</li> <li>• EN 60950</li> <li>• IEC 60950</li> <li>• TS 001</li> <li>• AS/NZS 3260</li> <li>• IEC60825</li> <li>• EN60825</li> <li>• 21 CFR 1040</li> <li>• EMC compliance</li> <li>• FCC Part 15 (CFR 47) Class A</li> <li>• ICES-003 Class A</li> <li>• EN 55022 Class A</li> <li>• CISPR 22 Class A</li> <li>• AS/NZS 3548 Class A</li> <li>• VCCI Class A</li> <li>• EN 55024</li> <li>• EN 50082-1</li> <li>• EN 61000-6-1</li> <li>• EN 61000-3-2</li> <li>• EN 61000-3-3</li> </ul>
<b>Fabric services</b>	<ul style="list-style-type: none"> <li>• Name server</li> <li>• Registered State Change Notification (RSCN)</li> <li>• Login services</li> <li>• Fabric Configuration Server (FCS)</li> <li>• Broadcast</li> <li>• In-order delivery</li> </ul>
<b>Advanced functions</b>	<ul style="list-style-type: none"> <li>• VSAN</li> <li>• IVR</li> <li>• Port Channel with multipath load balancing</li> <li>• Flow- and zone-based QoS</li> </ul>
<b>Supported Cisco optics, media, and transmission distances</b>	<ul style="list-style-type: none"> <li>• For detailed information about all supported transceivers, refer to <a href="#">Cisco MDS 9000 Family pluggable transceivers documentation</a></li> </ul>

#Feature available in a future software upgrade.

## Ordering information

Table 2 provides optional licenses that can be configured to enable additional features and capabilities on the Cisco MDS 9148T.

Table 3 provides ordering information for the MDS 9148T 32-Gbps 48-Port switch base modules.

Table 4 provides ordering information for the MDS 9148T switch spares orderable separately.

Table 5 provides ordering information for the MDS 9148T switch bundles.

Table 6 provides ordering information for the supported power cords.

Table 7 provides ordering information for the supported transceivers.

Table 8 provides ordering information for the minimum required software versions.

Table 9 provides ordering information for the accessory kits.

**Table 2.** Optional licenses

License type	Description	Part number
<b>Cisco MDS 9100 SAN Insights Package<sup>#</sup></b>	A 3 year term based SAN Insights switch license for on-board telemetry, streaming telemetry and SAN insights on Data center network manager	L-D-M91S-AXK9=
<b>Cisco MDS 9000 Family Enterprise Package</b>	Includes advanced traffic-engineering and network security features such as IVR, QoS and zone-based QoS, Fibre Channel Security Protocol (FC-SP), port security, traffic encryption, VSAN-based access control, and fabric binding for open systems. Licensed per switch for all the ports on the switch	M9100ENT1K9=, L-M9100ENT1K9=
<b>Cisco Prime™ DCNM for SAN Advanced Edition for Cisco MDS 9100 Series</b>	Includes advanced management capabilities such as VMware vCenter integration, performance trending, advanced provisioning, backup, reports and dashboards. Licensed per switch for all the ports on the switch. Host the licenses on either switch or server. The switch based licenses are denoted with an 'X' in the SKU	DCNM-SAN-M91-K9=, L-DCNM-S-M91-K9=, DCNM-S-M91XK9=, L-DCNM-S-M91XK9=
<b>Cisco MDS 9148T 8-Port On-Demand Activation</b>	Enables 8 additional Fibre Channel ports on demand to grow from the 24-Port base to up to 48-Ports	M9148T-PL8, M9148T-PL8=

<sup>#</sup>Feature available in a future software upgrade. License available to order for the MDS 9132T switch.

**Table 3.** Base modules

Description	Part number
<b>MDS 9148T 32G 1 RU FC switch, w/ 24 active FC ports, 4 Fans, 2 PSU, Port Side Exhaust</b>	DS-C9148T-24EK9
<b>MDS 9148T 32G 1 RU FC switch, w/ 24 active FC ports, 4 Fans, 2 PSU, Port Side Intake</b>	DS-C9148T-24IK9
<b>MDS 9148T 32G FC switch 8 Port Activation License for Base</b>	M9148T-PL8, M9148T-PL8=

**Table 4.** Spare modules

Description	Part number
<b>MDS 9148T 32G 1 RU FC switch, w/ 24 active FC ports, 4 Fans, 2 PSU, Port Side Exhaust, spare</b>	DS-C9148T-24EK9=
<b>MDS 9148T 32G 1 RU FC switch, w/ 24 active FC ports, 4 Fans, 2 PSU, Port Side Intake, spare</b>	DS-C9148T-24IK9=
<b>AC PSU Port side Exhaust, spare</b>	DS-CAC-650W-E=
<b>AC PSU Port side Intake, spare</b>	DS-CAC-650W-I=
<b>MDS 9148T FAN tray, port side Exhaust, spare</b>	DS-C32S-FAN-E=
<b>MDS 9148T FAN tray, port side Intake, spare</b>	DS-C32S-FAN-I=

**Table 5.** Bundled configurations

Description	Part number
<b>MDS 9148T 32G FC switch, w/ 24 active ports + 24x32G SW Optics, 4 Fans, 2 PSUs, Port Side Exhaust</b>	DS-C9148T-24PETK9
<b>MDS 9148T 32G FC switch, w/ 24 active ports + 24x32G SW Optics, 4 Fans, 2 PSUs, Port Side Intake</b>	DS-C9148T-24PITK9
<b>MDS 9148T 32G FC switch, w/ 48 active ports + 48x32G SW Optics, 4 Fans, 2 PSUs, Port Side Exhaust</b>	DS-C9148T-48PETK9
<b>MDS 9148T 32G FC switch, w/ 48 active ports + 48x32G SW Optics, 4 Fans, 2 PSUs, Port Side Intake</b>	DS-C9148T-48PITK9
<b>MDS 9148T 32G FC switch 8 Port Activation license + 8 X 32G SW optics, spare</b>	M9148T-PL8T=
<b>MDS 9148T 32G FC switch 8 Port Activation license + 8 X 32G SW optics</b>	M9148T-PL8T

**Table 6.** Power cords

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

**Table 7.** Transceivers

Description	Part number
32G FC Shortwave Optics	DS-SFP-FC32G-SW <sup>*</sup>
32G FC Longwave Optics	DS-SFP-FC32G-LW= <sup>*</sup>
16G FC Shortwave Optics	DS-SFP-FC16G-SW <sup>*</sup>
16G FC Longwave Optics	DS-SFP-FC16G-LW= <sup>*</sup>
8G FC Shortwave Optics	DS-SFP-FC8G-SW= <sup>*</sup>
8G FC Longwave Optics	DS-SFP-FC8G-LW= <sup>*</sup>

<sup>\*</sup> For detailed information about all supported transceivers, refer to the Cisco MDS 9000 Family pluggable transceivers documentation.

**Table 8.** System requirements

Item	Requirement
Cisco NX-OS Software for switch	Cisco MDS NX-OS 8.3(1) or later
Cisco Data Center Network Manager	Cisco DCNM 11(0) or later

**Table 9.** Accessories

Description	Part number
MDS 9148T Accessory Kit for Cisco <sup>®</sup>	DS-9148T-KIT-CSCO
MDS 9148T Accessory Kit for Cisco, spare	DS-9148T-KIT-CSCO=
MDS 9148T Accessory Kit for Dell/EMC	DS-9148T-KIT-EM
MDS 9148T Accessory Kit for HDS	DS-9148T-KIT-HDS

<sup>®</sup>Cisco specific Accessory KIT is shipped as standard. Partner specific accessories also available in our ordering tool.

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## Service and support

Cisco does not recommend the removal of its products batteries due to safety reasons. Please utilize the Cisco Takeback and Recycle Program.

Using the Cisco Lifecycle Services approach, Cisco and our partners provide a broad portfolio of end-to-end services and support that can help increase the business value and ROI of your network. This approach defines the minimum set of activities needed, by technology and by network complexity, to help you successfully deploy and operate Cisco technologies and optimize their performance throughout the lifecycle of your network.

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## For more information

For more information about the Cisco MDS 9148T Fibre Channel Switch, visit <https://www.cisco.com/go/storage> or contact your local Cisco account representative.




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