BES-53248 Ethernet Storage Switch for Lenovo
Product Guide

The BES-53248 Ethernet Storage Switch for Lenovo is an IP SAN storage switch that is designed and optimized to provide dedicated Ethernet storage fabric, including storage clustering in the data center and between the local and remote sites, and it offers 10/25/40/100 Gb Ethernet connectivity with "pay-as-you-grow" scalability. The switch delivers line-rate, high-bandwidth lossless switching that keeps storage data traffic moving without delays, while the hot-swap redundant power supplies and system fans (along with numerous high-availability software features) help provide high availability for business-critical traffic.

Running the Broadcom industry-leading Enterprise Fabric Operating System (EFOS), the BES-53248 Ethernet Storage Switches for Lenovo deliver production-ready networking software customized for IP storage solutions with advanced networking features and protocols required in the modern storage infrastructure for data center applications.

The BES-53248 Ethernet Storage Switch for Lenovo has 48x SFP28/SFP+ ports that support 10 GbE SFP+ and 25 GbE SFP28 optical transceivers and direct attach copper (DAC) cables. The switch also offers 8x QSFP28/QSFP+ ports that support 40 GbE QSFP+ and 100 GbE QSFP28 optical transceivers and DAC cables.

The BES-53248 Ethernet Storage Switches for Lenovo are ideally suited for enterprises of various sizes with all flash and NVMe IP Ethernet storage environments, as well as clustered storage deployments.

The BES-53248 Ethernet Storage Switch for Lenovo is shown in the following figure.

Figure 1. BES-53248 Ethernet Storage Switch for Lenovo

Did you know?

The BES-53248 Ethernet Storage Switches for Lenovo are certified for MetroCluster IP deployments of the Lenovo ThinkSystem DM Series storage arrays.

The BES-53248 Ethernet Storage Switches for Lenovo are optimized for quick and easy deployments by tightly integrating with the hardware.

The BES-53248 Ethernet Storage Switches for Lenovo undergo extensive quality assurance testing to verify functional and system performance to accommodate the ever-increasing demands on storage network devices.

Key features

The BES-53248 Ethernet Storage Switch for Lenovo offers the following features and benefits:

- Provides validated, certified network interconnect for deploying clustered storage and MetroCluster IP configurations with the Lenovo ThinkSystem DM Series storage arrays.
- Offers high scalability in a dense, 1U network switch with 48x SFP28/SFP+ ports and 8x QSFP28/QSFP+ ports to support IP storage clustering, iSCSI, NVMe over RoCE, and flash-based storage environments.
- Enables cost-effective "pay-as-you-grow" scalability from 18 to 56 ports with Ports On Demand (POD).
- Increases performance and flexibility for demanding storage workloads with a combination of ultra-low latency and non-blocking, line-rate switching and support for 10/25/40/100 Gbps Ethernet links.
- Accelerates communications with lower latency across clustered applications and storage arrays with RDMA over Converged Ethernet (RoCE) and iWARP.
- Optimizes IP storage fabric behavior and ensures sufficient bandwidth for mission-critical applications with congestion management and advanced traffic scheduling.
- Simplifies deployment of large-scale environments by enabling a switch to automatically provision itself using the resources available on the network, without manual intervention, with Zero Touch Provisioning (ZTP) and AutoInstall.
- Supplies a rich set of standard features at no extra cost, including scalability and performance, availability and redundancy, virtual local area networks, security, quality of service, IPv4/IPv6 routing and host management, virtualization, data center fabric, monitoring, and management.
- Runs Enterprise Fabric OS, which deliver production-ready networking software customized for IP storage solutions with advanced networking features and protocols required in the modern storage infrastructure for data center applications.
- Maximizes resiliency with redundant hot-swap system fans and power supplies, along with numerous high-availability software features.
- Allows switch management integration into third-party management applications by supporting the REpresentational State Transfer (REST) Application Program Interface (API).

Components and connectors

The following figure shows the front (port-side) panel of the BES-53248 Ethernet Storage Switch for Lenovo.
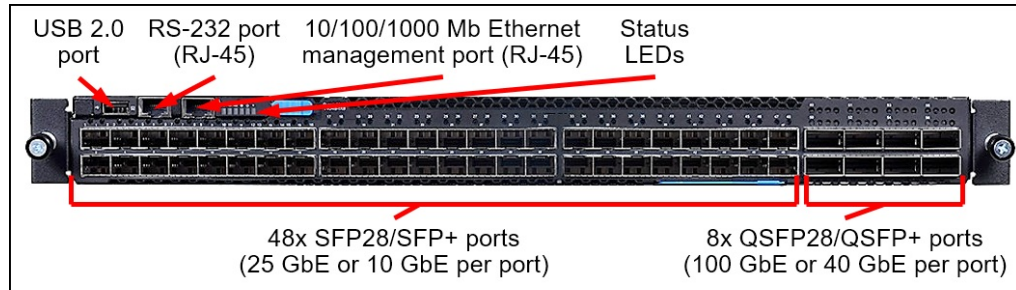

Figure 2. Front panel of the BES-53248 Ethernet Storage Switch for Lenovo

The front panel of the BES-53248 Ethernet Storage Switch for Lenovo includes the following components:

- 48x SFP28/SFP+ ports to attach SFP28/SFP+ transceivers or DAC cables for 25 Gb or 10 Gb Ethernet connections.
- 8x QSFP28/QSFP+ ports to attach QSFP28/QSFP+ transceivers or DAC cables for 100 Gb or 40 Gb Ethernet connections.
- One RJ-45 10/100/1000 Mb Ethernet port for out-of-band management.
- One RJ-45 RS-232 console port that provides another means to configure the switch.
- One USB 2.0 port for mass storage devices.
- LEDs that display the status of the switch and the network.

The following figure shows the rear (non-port-side) panel of the BES-53248 Ethernet Storage Switch for Lenovo.
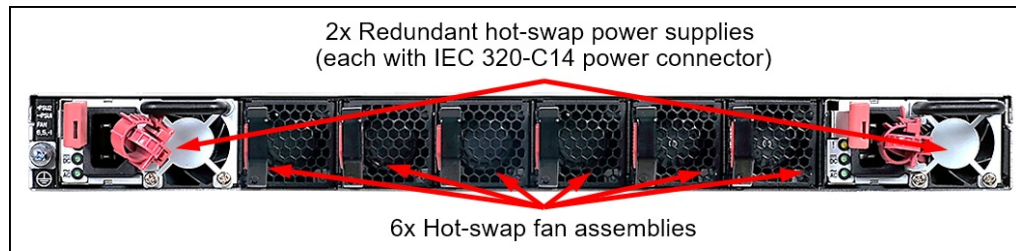

Figure 3. Rear panel of the BES-53248 Ethernet Storage Switch for Lenovo

The rear panel of the BES-53248 Ethernet Storage Switch for Lenovo includes the following components:

- Two redundant hot-swap 750 W AC power supplies (each with the IEC 320-C14 power connector).
- Six N+2 redundant hot-swap system fans.

System specifications

The following table lists the BES-53248 Ethernet Storage Switch for Lenovo system specifications.

Note: The supported hardware options and software features listed in this product guide are based on the Enterprise Fabric Operating System (EFOS) version 3.4.4.6. For details about current and future EFOS software releases that introduce support for certain hardware options and software features, refer to the Release Notes for the particular software release.

Table 1. BES-53248 Ethernet Storage Switch for Lenovo system specifications

Attribute	Specification
Form factor	1U rack mount
Ports	48x SFP ports (SFP28/SFP+) 8x QSFP ports (QSFP28/QSFP+)
Media types	10 Gb Ethernet SFP+: 10 GbE short-range (SR) SFP+ transceivers 10 GbE long-range (LR) SFP+ transceivers 10 GbE SFP+ DAC cables 25 Gb Ethernet SFP28: 25 GbE SR SFP28 transceivers 25 GbE SFP28 DAC cables 40 Gb Ethernet QSFP+: 40 GbE short-range (eSR4) QSFP+ transceivers 40 GbE QSFP+ to QSFP+ DAC cables 100 Gb Ethernet QSFP28: 100 GbE short-range (SR4) QSFP28 transceivers 100 GbE QSFP28 to QSFP28 DAC cables
Port speeds	10 GbE SFP+ transceivers and DAC cables: 10 Gbps 25 GbE SFP28 transceivers and DAC cables: 25 Gbps 40 GbE QSFP+ eSR4 transceivers and DAC cables: 40 GbE 100 GbE QSFP28 SR4 transceivers and DAC cables: 100 Gbps **Note:** SFP28/SFP+ ports are combined into 12 consecutive 4-port groups: Ports 1-4, 5-8,9-12, 13-16, 17-20, 21-24, 25-28, 29-32, 33-36, 37-40, 41-44, and 45-48. The SFP28/SFP+ port speed should be the same (10 Gbps or 25 Gbps) across all ports in the 4-port group.
Switching method	Cut-through.
Data traffic types	Unicast, multicast, broadcast.
Software features	Enterprise Fabric Operating System (EFOS): Layer 2 switching, Layer 3 switching, virtual local area networks (VLANs), VLAN tagging, spanning tree protocol (STP), link aggregation (trunk) groups (LAGs), Virtual Port Channels (VPCs), link dependency, quality of service (QoS), IPv4/IPv6 management, IPv4 routing (OSPF v2, BGP v4), IPv6 routing (OSPF v3), equal cost multiple paths (ECMP), IPv4/IPv6 virtual router redundancy protocol (VRRP), IPv4/IPv6 policy-based routing (PBR), IPv4 Internet Group Management Protocol (IGMP) v2/v3, IPv6 Multicast Listener Discovery (MLD), IPv4/IPv6 protocol independent multicast (PIM), Virtual Routing and Forwarding (VRF) Lite, Data Center Virtual Private Network (DCVPN) Gateway, OpenFlow 1.0 and 1.3, Converged Enhanced Ethernet (CEE).
Performance	Non-blocking architecture with wire-speed forwarding of traffic: 100% line-rate performance - Up to 4 Tbps aggregated throughput - Up to 1000 Million packets per second (Mpps) - Up to 12 288-byte jumbo frames - Buffer size: 32 MB
Cooling	Six N+2 redundant hot-swap fans. Rear (non-port side) to front (port side) airflow.
Power supplies	Two load-sharing, redundant hot-swap 750 W AC (100 - 240 V) power supplies (each power supply has an IEC 320-C14 connector).

Attribute	Specification
Hot-swap parts	SFP28/SFP+/QSFP28/QSFP+ transceivers and DAC cables; power supplies; system fans.
Management ports	1x 10/100/1000 Mb Ethernet port (RJ-45); 1x RS-232 port (RJ-45); 1x USB 2.0 port (for mass storage devices).
Management interfaces	Industry standard command line interface (isCLI); SNMP v1, V2, and v3; NETCONF (XML); RESTCONF (HTTP); AutoInstall; Zero Touch Provisioning (ZTP); RESTful API.
Security features	Secure Shell (SSH); Secure Copy (SCP); Secure FTP (sFTP); user level security; RADIUS and TACACS+ authentication; access control lists (ACLs), port security; port-based network access control (IEEE 802.1x).
Warranty and support	One-year base warranty with 9x5 coverage and next business day parts delivered. Optional warranty service upgrades are available: 9x5 coverage with NBD onsite response (Foundation Service), 24x7 coverage with 4-hour onsite response (Essential Service). Software entitlement is included in the base warranty and warranty service upgrades for the duration of the warranty period. **Note:** Warranty service is provided by Broadcom and Tech Data.
Dimensions	Height: 43 mm (1.7 in.); width: 440 mm (17.3 in.); depth: 508 mm (20.0 in.).
Weight	9.7 kg (21.4 lb).

Models

Factory-integrated models of the BES-53248 are configured by using the Lenovo Data Center Solution Configurator (DCSC): http://dcsc.lenovo.com

The factory-integrated models of the switch and their components and options, which are all described in this product guide, use the Configure-to-Order (CTO) base model that is listed in the following table.

Table 2. CTO base model

Description	Machine Type/Model
BES-53248 Ethernet Storage Switch: 16x SFP ports and 2x QSFP ports active, 2 PS	7D2SCTO1WW

The following table lists the system unit bases for the BES-53248 Ethernet Storage Switches for Lenovo.

Table 3. System unit bases

Description	Feature code
BES-53248 Ethernet Storage Switch: 16x SFP and 2x QSFP Ports Active, 2 PS (North America)	BB4R
BES-53248 Ethernet Storage Switch: 16x SFP and 2x QSFP Ports Active, 2 PS	B7KP

The packaging for the BES-53248 Ethernet Storage Switch for Lenovo models include the following items:

- One switch unit with two power supplies and six system fans.
- Two customer-selected power cables.
- RJ-45 to DB-9 serial console cable.
- Statement paper.

Configuration notes:

- Power cables are not included and *must* be ordered together with the switch (see Power supplies and cables for details).

- Transceivers and cables are not included and should be ordered for the switch (see Transceivers and cables for details).

- The switch *must* be ordered together with the tool-less slide rail kit (see Rack installation).

Port activation licenses

The BES-53248 Ethernet Storage Switch for Lenovo ships with 16x SFP and 2x QSFP licensed ports active (transceivers are not included). The remaining 32x SFP and 6x QSFP unlicensed ports can be activated by purchasing and installing the Ports on Demand (POD) licenses.

The following table lists the POD licenses for the BES-53248 Ethernet Storage Switch for Lenovo. You can use a combination of these part numbers to activate the ports you want to use. For example, consider the following scenarios:

- To activate all ports, purchase three 7S0C001HWW, plus one 7S0C001NWW license.
- To activate the SFP ports purchase 1-4 7S0C001NWW licenses.
- To activate the QSFP ports purchase a single 7S0C001MWW license.

Table 4. POD license option

Description	Part number	Feature code	Maximum quantity
BES-53248 SW License: 8x SFP ports (no transceivers)	7S0C001NWW	S5EJ	4*
BES-53248 SW License: 8x SFP and 2x QSFP ports (no transceivers) **	7S0C001HWW	S2QR	
BES-53248 SW License: 6x QSFP ports (no transceivers)***	7S0C001MWW	S5EH	1

Configuration note:

* Support a total of four of any mix of these licenses.

** For the first three POD licenses applied to the switch, each POD license activates 8x SFP and 2x QSFP ports. The fourth POD license applied to the switch activates the remaining 8x SFP ports.

*** A max of 6 additional QSFP+ ports can be activated when buying this license consider only pairing with the 7S0C001NWW.

Transceivers and cables

With the flexibility of the BES-53248 Ethernet Storage Switch for Lenovo, customers can choose the following connectivity technologies:

- For 10 GbE links, customers can use SFP ports with 10 GbE SFP+ direct-attached copper (DAC) cables for distances up to 5 meters. For longer distances, the 10GBASE-SR SFP+ transceivers can be used for up to 300 meters on OM3 or up to 400 meters on OM4 MMF cables, and the 10GBASE-LR SFP+ transceivers can support distances up to 10 kilometers on SMF cables.

- For 25 GbE links, customers can use SFP ports with 25 GbE SFP28 DAC cables for distances up to 5 meters. For longer distances, the 25GBASE-SR SFP28 transceivers can be used for up to 70 meters on OM3 or up to 100 meters on OM4 MMF cables.

- For 40 GbE links, customers can use QSFP ports with QSFP+ to QSFP+ DAC cables for distances up to 5 meters. For longer distances, customers can use the 40GBASE-eSR4 QSFP+ transceivers for distances up to 300 meters on OM3 or up to 400 meters on OM4 MMF cables.

- For 100 GbE links, customers can use QSFP ports with QSFP28 DAC cables for distances up to 5 meters. For longer distances, the 100GBASE-SR4 QSFP28 transceivers can be used for distances up to 70 meters on OM3 or up to 100 meters on OM4 MMF cables.

Note: SFP ports are combined into 12 consecutive 4-port groups: Ports 1-4, 5-8, 9-12, 13-16, 17-20, 21-24, 25-28, 29-32, 33-36, 37-40, 41-44, and 45-48. The SFP port speed should be the same (10 Gbps or 25 Gbps) across all ports in the 4-port group.

The following tables list the supported cables and transceivers:

- Optical transceivers and cables
- DAC cables
- UTP cables

Table 5. Optical transceivers and cables

Description	Part number	Feature code	Maximum quantity
Optical transceivers			
Lenovo 10Gb SFP+ SR Transceiver (10GBASE-SR)	46C3447	5053	48
Lenovo 10Gb SFP+ LR Transceiver (10GBASE-LR)	00FE331	B0RJ	48
25Gb Ethernet Optical SFP28 Shortwave Module 1 Pack	4XF7A39597	B732	48
Lenovo 25Gb SR SFP28 Ethernet Transceiver	4M27A67041	BFH2	48
Lenovo 40GBASE-eSR4 QSFP+ Transceiver	00FE325	A5U9	8
100Gb Ethernet Optical QSFP28 Shortwave Module 1 Pack	4XF7A39598	B733	8
Lenovo 100Gb SR4 QSFP28 Ethernet Transceiver	4M27A67042	BFH1	8
OM3 optical cables for 10 GbE SR SFP+ and 25 GbE SR SFP28 optical transceivers			
Lenovo 0.5m LC-LC OM3 MMF Cable	00MN499	ASR5	48
Lenovo 1m LC-LC OM3 MMF Cable	00MN502	ASR6	48
Lenovo 3m LC-LC OM3 MMF Cable	00MN505	ASR7	48
Lenovo 5m LC-LC OM3 MMF Cable	00MN508	ASR8	48
Lenovo 10m LC-LC OM3 MMF Cable	00MN511	ASR9	48
Lenovo 15m LC-LC OM3 MMF Cable	00MN514	ASRA	48
Lenovo 25m LC-LC OM3 MMF Cable	00MN517	ASRB	48
Lenovo 30m LC-LC OM3 MMF Cable	00MN520	ASRC	48
OM4 optical cables for 10 GbE SR SFP+ and 25 GbE SR SFP28 optical transceivers			
Lenovo 0.5m LC-LC OM4 MMF Cable	4Z57A10845	B2P9	48
Lenovo 1m LC-LC OM4 MMF Cable	4Z57A10846	B2PA	48
Lenovo 3m LC-LC OM4 MMF Cable	4Z57A10847	B2PB	48
Lenovo 5m LC-LC OM4 MMF Cable	4Z57A10848	B2PC	48
Lenovo 10m LC-LC OM4 MMF Cable	4Z57A10849	B2PD	48
Lenovo 15m LC-LC OM4 MMF Cable	4Z57A10850	B2PE	48
Lenovo 25m LC-LC OM4 MMF Cable	4Z57A10851	B2PF	48
Lenovo 30m LC-LC OM4 MMF Cable	4Z57A10852	B2PG	48
OM4 optical cables for 40 GbE QSFP+ and 100 GbE QSFP28 SR4 transceivers			
Lenovo 5m MPO-MPO OM4 MMF Cable	7Z57A03567	AV25	8
Lenovo 7m MPO-MPO OM4 MMF Cable	7Z57A03568	AV26	8
Lenovo 10m MPO-MPO OM4 MMF Cable	7Z57A03569	AV27	8
Lenovo 15m MPO-MPO OM4 MMF Cable	7Z57A03570	AV28	8
Lenovo 20m MPO-MPO OM4 MMF Cable	7Z57A03571	AV29	8
Lenovo 30m MPO-MPO OM4 MMF Cable	7Z57A03572	AV2A	8

Table 6. DAC cables

Description	Part number	Feature code	Maximum quantity
SFP+ passive direct-attach copper cables - 10 GbE			
Lenovo 0.5m Passive SFP+ DAC Cable	00D6288	A3RG	48
Lenovo 1m Passive SFP+ DAC Cable	90Y9427	A1PH	48
Lenovo 1.5m Passive SFP+ DAC Cable	00AY764	A51N	48
Lenovo 2m Passive SFP+ DAC Cable	00AY765	A51P	48
Lenovo 3m Passive SFP+ DAC Cable	90Y9430	A1PJ	48
Lenovo 5m Passive SFP+ DAC Cable	90Y9433	A1PK	48
SFP28 passive direct-attach copper cables - 25 GbE			
Lenovo 1m Passive 25G SFP28 DAC Cable	7Z57A03557	AV1W	48
Lenovo 3m Passive 25G SFP28 DAC Cable	7Z57A03558	AV1X	48
Lenovo 5m Passive 25G SFP28 DAC Cable	7Z57A03559	AV1Y	48
QSFP+ passive direct-attach copper cables - 40 GbE			
Lenovo 1m Passive QSFP+ DAC Cable	49Y7890	A1DP	8
Lenovo 3m Passive QSFP+ DAC Cable	49Y7891	A1DQ	8
Lenovo 5m Passive QSFP+ DAC Cable	00D5810	A2X8	8
QSFP28 direct attach copper cables - 100 GbE			
Lenovo 1m Passive 100G QSFP28 DAC Cable	7Z57A03561	AV1Z	8
Lenovo 3m Passive 100G QSFP28 DAC Cable	7Z57A03562	AV20	8
Lenovo 5m Passive 100G QSFP28 DAC Cable	7Z57A03563	AV21	8

Table 7. UTP cables for 1 GbE management port

Description	Part number	Feature code	Maximum quantity
0.6m Blue Cat5e Cable	40K5679	3801	1
1.5m Blue Cat5e Cable	40K8785	3802	1
3m Blue Cat5e Cable	40K5581	3803	1
10m Blue Cat5e Cable	40K8927	3804	1
25m Blue Cat5e Cable	40K8930	3805	1

The network cables that can be used with the switch are listed in the following table.

Table 8. BES-53248 Ethernet Storage Switch for Lenovo network cabling requirements

Transceiver	Standard	Cable	Connector
10 Gb Ethernet			
10Gb SR SFP+ (46C3447)	10GBASE-SR	Up to 30 m with fiber optic cables supplied by Lenovo (see Table 5); up to 300 m with OM3 or up to 400 m with OM4 multimode fiber optic cables.	LC
10Gb LR SFP+ (00FE331)	10GBASE-LR	1310 nm single-mode fiber optic cable up to 10 km.	LC
Direct attach copper cable	10GSFP+Cu	SFP+ to SFP+ DAC cables up to 5 m (see Table 6).	SFP+
25 Gb Ethernet			

Transceiver	Standard	Cable	Connector
25Gb SR SFP28 (4XF7A39597)	25GBASE-SR	Up to 30 m with fiber optic cables supplied by Lenovo (see Table 5); up to 70 m with OM3 or up to 100 m with OM4 multimode fiber optic cables.	LC
Direct attach copper cable	25GBASE-CR	SFP28 DAC cables up to 5 m (see Table 6).	SFP28
40 Gb Ethernet			
40Gb eSR4 QSFP+ (00FE325)	40GBASE-SR4	Up to 30 m with MPO-MPO fiber optic cables supplied by Lenovo (see Table 5); up to 300 m with OM3 or up to 400 m with OM4 multimode fiber optic cables.	MPO
Direct attach copper cable	40GBASE-CR4	QSFP+ to QSFP+ DAC cables up to 5 m (see Table 6).	QSFP+
100 Gb Ethernet			
100Gb SR4 QSFP28 (4XF7A39598)	100GBASE-SR4	Up to 30 m with MPO-MPO fiber optic cables supplied by Lenovo (see Table 5); up to 70 m with OM3 or up to 100 m with OM4 multimode fiber optic cables.	MPO
Direct attach copper cable	100GBASE-CR4	QSFP28 to QSFP28 DAC cables up to 5 m (see Table 6).	QSFP28
Management ports			
1 GbE port	1000BASE-T	Up to 25 m with UTP Category 5E cables supplied by Lenovo (see Table 7); UTP Category 5, 5E, or 6 cables up to 100 m.	RJ-45
RJ-45 serial port	RS-232	DB-9 to RJ-45 cable (comes with the switch).	RJ-45

Software

The BES-53248 Ethernet Storage Switch for Lenovo with offers the following software features (more information can be found in documentation at on the BES-Switch Global Support: http://www.broadcom.com/support/bes-switch):

- Scalability and performance:
    - Media access control (MAC) address learning with automatic updates
    - Static and 802.3ad Link Aggregation Control Protocol (LACP) link aggregation groups (LAGs)
    - Configurable load balancing over LAGs (source or destination MAC, VLAN, or IP)
    - Broadcast, multicast, and unicast storm recovery
    - IPv4 IGMP/IPv6 MLD snooping and querier to limit flooding of IP multicast traffic

- Availability and redundancy:
    - 802.1D Spanning Tree Protocol (STP) for providing Layer 2 (L2) redundancy
    - 802.1s Multiple STP (MSTP) for topology optimization
    - 802.1w Rapid STP (RSTP) for rapid convergence for delay-sensitive traffic, such as voice
    - Per-VLAN STP (PVSTP) and Rapid PVST (RPVSTP) enhancements
    - Unidirectional Link Detection (UDLD) protocol
    - Link dependency to support active/standby NIC configurations on the connected nodes
    - L2 Loop Protection to detect loops in downstream switches that do not run STP
    - Forward Error Correction (FEC) on ports operating at 25 Gbps and 100 Gbps speeds

- Virtual Local Area Networks (VLANs):
    - Up to 4094 VLANs
    - Port-based, MAC-based, and protocol-based VLANs
    - 802.1Q VLANs and VLAN tagging on all ports
    - 802.1Q-in-Q VLAN tunneling (Double VLAN [DVLAN])
    - Private VLANs
    - Multicast VLAN Registration (MVR)

- Security:
    - MAC-, IPv4-, and IPv6-based access control lists (ACLs)
    - Management access control and administration list (MACAL)
    - 802.1x port-based network access control

- Protected ports
- Port security
- Multiple user IDs and passwords
- Privilege-based user access control
- Authentication and authorization through local user database, RADIUS, or TACACS+
- Protection from Denial of Service (DoS) attacks
- DHCP snooping (IPv4/IPv6)
- IP Source Guard (IPv4/IPv6)

- Quality of Service (QoS):
  - IEEE 802.1p, IP ToS/DSCP, DiffServ, and ACL-based traffic classification and processing
  - Multiple Class of Service (COS) queues per port for processing qualified traffic
  - Tail dropping, Weighted Random Early Discard (WRED), or strict priority queue scheduling
  - Traffic shaping and re-marking based on defined policies
  - IPv4/IPv6 ACL metering

- IP v4 Layer 3 functions:
  - Host management
  - Routed ports (Switch ports as Layer 3 interfaces)
  - Address Resolution Protocol (ARP) and Proxy ARP
  - IP forwarding
  - IP filtering with ACLs
  - Static routes
  - Dynamic routing protocols:
    - Routing Information Protocol (RIP) v1/v2
    - Open Shortest Path First (OSPF) v2
    - Border Gateway Protocol (BGP) v4
    - Distance Vector Multicast Routing Protocol (DVMRP)
  - Equal Cost Multiple Paths (ECMP)
  - Virtual Router Redundancy Protocol (VRRP) v3
  - Policy-based routing (PBR)
  - Dynamic Host Configuration Protocol (DHCP) server, client, and relay operations
  - Internet Group Management Protocol (IGMP) v2/v3
  - Protocol Independent Multicast (PIM) in Sparse Mode (PIM-SM) and Dense Mode (PIM-DM)
  - Domain Name System (DNS) client

- IPv6 Layer 3 functions:
  - IPv6 host management
  - Routed ports (Switch ports as Layer 3 interfaces)
  - Neighbor Discovery
  - IPv6 forwarding
  - IPv6 filtering with ACLs
  - Static routes
  - Dynamic routing protocol: OSPF v3
  - ECMP
  - VRRP v3
  - PBR
  - DHCP server, client, and relay operations
  - Multicast Listener Discovery (MLD)
  - PIM-SM and PIM-DM
  - DNS client

- Virtualization:
  - Virtual Port Channels (VPCs): Two peer switches form a single virtual entity for link aggregation (MLAG)
  - Virtual Routing and Forwarding (VRF) Lite: Multiple routing domains on the same switch
  - Data Center Virtual Private Network (DCVPN) Gateway: VXLAN/NVGRE communications with another network
  - Software Defined Networking (SDN): OpenFlow 1.0 and 1.3

- Converged Enhanced Ethernet:
    - Priority-Based Flow Control (PFC): Pausing traffic based on priority to eliminate frame loss due to congestion on a link
    - Enhanced Transmission Selection (ETS): Allocating link bandwidth based on priority
    - Congestion Notification (CN): Congestion management for loss- or latency-sensitive network data flows
    - Data Center Bridging Capability Exchange Protocol (DCBX): Exchanging configuration information with directly connected peers
- Monitoring:
    - Switch LEDs for port status and switch status indication
    - Port mirroring (Switched Port Analyzer [SPAN] / Remote SPAN [RSPAN] / Encapsulated RSPAN [ERSPAN])
    - Remote Monitoring (RMON) agent to collect statistics and monitor switch performance
    - Buffered log, console log, and syslog for change tracking and logging
    - Email alerts
    - sFlow agent for monitoring traffic in data networks (an sFlow analyzer required elsewhere)
- Manageability:
    - Command line interface (CLI)
        - Serial interface
        - Telnet
        - Secure Shell (SSH) v2
    - Scriptable CLI
    - Simple Network Management Protocol (SNMP V1, V2, and V3)
    - NETCONF (XML)
    - RESTCONF (HTTP)
    - AutoInstall and Zero Touch Provisioning (ZTP) for automated switch software image upgrade and configuration
    - HTTP, HTTPS, TFTP, FTP, Secure FTP (sFTP), and Secure Copy (SCP) file transfer protocols
    - Industry Standard Discovery Protocol (ISDP) for discovering Cisco devices running CDP
    - Link Layer Discovery Protocol (LLDP) for discovering network devices
    - Dual firmware images
    - Simple Network Time Protocol (SNTP) and Precision Time Protocol (PTP) for switch clock synchronization
    - RESTful API

Ethernet standards

The BES-53248 Ethernet Storage Switch for Lenovo supports the following IEEE Ethernet standards:

- IEEE 802.1Q VLANs
- IEEE 802.3ac VLAN Tagging
- IEEE 802.1v Protocol-based VLANs
- IEEE 802.1D Spanning Tree Protocol (STP)
- IEEE 802.1s Multiple STP (MSTP)
- IEEE 802.1w Rapid STP (RSTP)
- IEEE 802.3ad Link Aggregation Control Protocol
- IEEE 802.1p Class of Service (CoS) prioritization
- IEEE 802.3x Full-duplex Flow Control
- IEEE 802.1Qau Congestion Notification (CN)
- IEEE 802.1Qaz Enhanced Transmission Selection (ETS)
- IEEE 802.1Qbb Priority-Based Flow Control (PFC)
- IEEE 802.3bj-CL91: Forward Error Correction (FEC)
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- IEEE 802.1AB Data Center Bridging Capability Exchange Protocol (DCBX) (LLDP extension)
- IEEE 802.3ae 10GBASE-SR short range fiber optics 10 Gb Ethernet
- IEEE 802.3ae 10GBASE-LR long range fiber optics 10 Gb Ethernet
- IEEE 802.3by 25GBASE-CR copper 25 Gb Ethernet
- IEEE 802.3by 25GBASE-SR short range fiber optics 25 Gb Ethernet
- IEEE 802.3ba 40GBASE-CR4 copper 40 Gb Ethernet

- IEEE 802.3ba 40GBASE-SR4 short range fiber optics 40 Gb Ethernet
- IEEE 802.3bj 100GBASE-CR4 copper 100 Gb Ethernet
- IEEE 802.3bm 100GBASE-SR4 short range fiber optics 100 Gb Ethernet
- IEEE 802.3 10BASE-T Ethernet (Ethernet management port only)
- IEEE 802.3u 100BASE-TX Fast Ethernet (Ethernet management port only)
- IEEE 802.3ab 1000BASE-T copper twisted pair Gigabit Ethernet (Ethernet management port only)

Cooling

The BES-53248 Ethernet Storage Switch for Lenovo provides rear-to-front airflow with six variable-speed, hot-swap system fans with N+2 cooling redundancy.

Power supplies and cables

The BES-53248 Ethernet Storage Switch for Lenovo ships with two load-sharing, redundant hot-swap 750 W AC power supplies.

The BES-53248 Ethernet Storage Switch for Lenovo ships with two customer-selected power cables. The following table lists power cables that are available for selection (two power cables are required per switch).

Table 9. Power cable options

Description	Part number	Feature code
Rack power cables		
1.0m, 10A/125-250V, C13 to IEC 320-C14 Rack Power Cable	00Y3043	A4VP
1.0m, 13A/100-250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08367	B0N5
1.2m, 16A/100-250V, 2 Short C13s to Short C20 Rack Power Cable	47C2491	A3SW
1.5m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	39Y7937	6201
1.5m, 13A/100-250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08368	B0N6
2.0m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08365	B0N4
2.0m, 13A/125V-10A/250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08369	6570
2.5m, 16A/100-250V, 2 Long C13s to Short C20 Rack Power Cable	47C2492	A3SX
2.8m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08366	6311
2.8m, 13A/125V-10A/250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08370	6400
2.8m, 10A/100-250V, C13 to IEC 320-C20 Rack Power Cable	39Y7938	6204
2.8m, 16A/100-250V, 2 Short C13s to Long C20 Rack Power Cable	47C2493	A3SY
4.1m, 16A/100-250V, 2 Long C13s to Long C20 Rack Power Cable	47C2494	A3SZ
4.3m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	39Y7932	6263
4.3m, 13A/125V-10A/250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08371	6583
Line cords		
2.8m, 10A/250V, C13 to AS/NZS 3112 Line Cord	39Y7924	6211
2.8m, 10A/250V, C13 to BS 1363/A Line Cord	39Y7923	6215
2.8m, 10A/250V, C13 to CEE7-VII Line Cord	39Y7917	6212
2.8m, 10A/250V, C13 to CEI 23-16 Line Cord	39Y7921	6217
2.8m, 10A/250V, C13 to CNS 10917-3 Line Cord	81Y2375	6317
2.8m, 10A/250V, C13 to DK2-5a Line Cord	39Y7918	6213
2.8m, 10A/250V, C13 to GB 2099.1 Line Cord	39Y7928	6210
2.8m, 10A/250V, C13 to IRAM 2073 Line Cord	39Y7930	6222
2.8m, 10A/250V, C13 to IS 6538 Line Cord	39Y7927	6269
2.8m, 10A/250V, C13 to NBR 14136 Line Cord	69Y1988	6532

Description	Part number	Feature code
2.8m, 10A/250V, C13 to NEMA 6-15P Line Cord	46M2592	A1RF
2.8m, 10A/250V, C13 to SABS 164 Line Cord	39Y7922	6214
2.8m, 10A/250V, C13 to SEV 1011-S24507 Line Cord	39Y7919	6216
2.8m, 10A/250V, C13 to SI 32 Line Cord	39Y7920	6218
2.8m, 12A/125V, C13 to JIS C-8303 Line cord	46M2593	A1RE
2.8m, 12A/250V, C13 to JIS C-8303 Line Cord	4L67A08357	6533
2.8m, 12A/250V, C13 to KS C8305 Line Cord	39Y7925	6219
2.8m, 10A/125V, C13 to NEMA 5-15P Line Cord	90Y3016	6313
2.8m, 13A/125V, C13 to NEMA 5-15P Line Cord	00WH545	6401
2.8m, 15A/125V, C13 to CNS 10917-3 Line Cord	81Y2374	6402
4.3m, 10A/250V, C13 to AS/NZS 3112 Line Cord	81Y2383	6574
4.3m, 10A/250V, C13 to BS 1363/A Line Cord	81Y2377	6577
4.3m, 10A/250V, C13 to CEE7-VII Line Cord	81Y2376	6572
4.3m, 10A/250V, C13 to CEI 23-16 Line Cord	81Y2380	6493
4.3m, 10A/250V, C13 to CNS 10917-3 Line Cord	81Y2389	6531
4.3m, 10A/250V, C13 to DK2-5a Line Cord	81Y2382	6575
4.3m, 10A/250V, C13 to GB 2099.1 Line Cord	81Y2378	6580
4.3m, 10A/250V, C13 to IRAM 2073 Line Cord	81Y2384	6492
4.3m, 10A/250V, C13 to IS 6538 Line Cord	81Y2386	6567
4.3m, 10A/250V, C13 to NBR 14136 Line Cord	81Y2387	6404
4.3m, 10A/250V, C13 to NEMA 6-15P Line Cord	4L67A08361	6373
4.3m, 10A/250V, C13 to SABS 164 Line Cord	81Y2379	6576
4.3m, 10A/250V, C13 to SEV 1011-S24507 Line Cord	81Y2390	6578
4.3m, 10A/250V, C13 to SI 32 Line Cord	81Y2381	6579
4.3m, 12A/125V, C13 to JIS C-8303 Line Cord	39Y7926	6335
4.3m, 12A/250V, C13 to JIS C-8303 Line Cord	4L67A08362	6495
4.3m, 12A/250V, C13 to KS C8305 Line Cord	81Y2385	6494
4.3m, 10A/125V, C13 to NEMA 5-15P Line Cord	4L67A08359	6370
4.3m, 13A/125V, C13 to NEMA 5-15P Line Cord	4L67A08360	AX8A
4.3m, 15A/125V, C13 to CNS 10917-3 Line Cord	81Y2388	6530

Rack installation

The BES-53248 Ethernet Storage Switch for Lenovo *must* be ordered together the tool-less slide rail kit. The tool-less slide rail kit is used for installing the switch in a 4-post, IEC standard-compliant rack cabinet with square or round mounting holes and distance between front and rear mounting flanges from 685.8 mm (27 in.) to 812.8 mm (32 in.).

The following table lists the tool-less slide rail kit.

Table 10. Tool-less slide rail kit

Description	Part number	Feature code	Quantity
BES Standard 4-post 19" Rack Mount Rail Kit	4M17A60883	None*	1

* Field upgrade only; ships in a separate box.

Configuration note: The switch *must* be ordered together with the BES Standard 4-post 19" Rack Mount Rail Kit.

Physical specifications

The BES-53248 Ethernet Storage Switch for Lenovo has the following dimensions and weight (approximate):

- Height: 43 mm (1.7 in.)
- Width: 440 mm (17.3 in.)
- Depth: 508 mm (20.0 in.)
- Weight (maximum): 9.7 kg (21.4 lb)

Operating environment

The BES-53248 Ethernet Storage Switch for Lenovo is supported in the following operating environment:

- Temperature: 0 - 45 ºC (32 - 113 ºF).
- Relative humidity: 10 - 90% (Non-condensing)
- Altitude: Up to 900 m (2,952 feet)
- Acoustic noise: Less than 70 dB
- Electrical input:
    - 100 - 240 V AC auto-switching, 50 / 60 Hz
    - 3.3 A max (100 V AC), 1.65 A max (200 V AC)
- Power consumption
    - Typical: 229 W
    - Maximum: 330 W
- Heat dissipation
    - Typical: 782 BTU/hour
    - Maximum: 1127 BTU/hour

Warranty and support

The warranty service for the BES-53248 Ethernet Storage Switch for Lenovo is provided by Broadcom and Tech Data. Customers should submit service tickets for switch-related issues through the support portal or by calling one of the dedicated numbers found here:
http://servicesbytechdata.force.com/BESSwitch/s/login/

In the environments with the BES-53248 Ethernet Storage Switches for Lenovo and Lenovo ThinkSystem DM Series, customers may submit service tickets to Lenovo. Lenovo will perform problem determination and resolution for DM Series-related issues and escalate to Tech Data, on behalf of the customer, for switch-related problem determination. Broadcom or Tech Data will contact the customer and will own the switch-related problem resolution until closure.

The BES-53248 Ethernet Storage Switch for Lenovo comes with a 1-year base warranty with 9x5 Next Business Day (NBD) parts delivered and includes entitlement to code fixes and updates over that period. Also available are warranty service upgrades, with a well-defined scope of services, including service hours, response time, term of service, and service agreement terms and conditions.

The following warranty service upgrades are available for the BES-53248 Ethernet Storage Switch for Lenovo:

- 3 or 5 years of warranty service coverage
- Foundation Service: 9x5 service coverage with next business day onsite response
- Essential Service: 24x7 service coverage with 4-hour onsite response

Notes:

- The options installed in the switch assume the switch's base warranty and any warranty service upgrade for the switch. Any cable- or transceiver-specific issues will be transferred to Lenovo for resolution.

- Warranty service upgrades include entitlement to code fixes and updates over the duration of the selected service coverage period.

The following table lists warranty service upgrades that are available for the BES-53248 Ethernet Storage Switch for Lenovo.

Table 11. Warranty service upgrades

Description	Part number	Feature code
BES-53248 Foundation Service - 3Yr 9X5 Next Business Day Response	7S0C001DWW	S2CN
BES-53248 Foundation Service - 5Yr 9X5 Next Business Day Response	7S0C001EWW	S2CP
BES-53248 Essential Service - 3Yr 24x7x365 4Hr Response	7S0C001FWW	S2CQ
BES-53248 Essential Service - 5Yr 24x7x365 4Hr Response	7S0C001GWW	S2CR

Lenovo warranty service upgrade offerings are region-specific. Not all warranty service upgrades are available in every region. For information about Lenovo warranty service upgrade offerings that are available in your region, refer to the following resource:

- Service upgrade part numbers for the BES-53248 Ethernet Storage Switch for Lenovo in the DCSC: https://dcsc.lenovo.com/#/software?id=STG%40Software%40Other%20SW%40BES53248

Contact a local Lenovo representative for details on region-specific support and details on response times.

Some regions might have different warranty terms and conditions than the standard warranty. Local Lenovo sales representatives can assist in explaining region-specific terms when needed. Examples of region-specific warranty terms are second or longer business day parts delivery or parts-only warranty.

If warranty terms and conditions include onsite labor for repair or replacement of parts, a service technician is dispatched to the customer site to perform the replacement.

If warranty terms include parts-only warranty, only replacement parts that are under warranty will be sent to a requested location for self-service. Parts-only service does not include a service technician being dispatched onsite. Parts must be changed at customer's own cost and labor and defective parts must be returned following the instructions supplied with the spare parts.

For service definitions, region-specific details, and service limitations, please refer to the following resources:

- BES-Switch Support and Services User Guide
http://docs.broadcom.com/doc/bes-switch-end-user-support-user-guide

- BES-Switch Contact Switch Support
http://servicesbytechdata.force.com/BESSwitch

Note: These resources might contain additional SLA options that are not offered by Lenovo. Please contact a local Lenovo sales representative in your region for any specific questions.

Regulatory compliance

The BES-53248 Ethernet Storage Switch for Lenovo conforms to the following regulations:

- Safety:
    - UL
    - cUL
    - CB
    - CCC
    - BSMI

- Electromagnetic compatibility (EMC):
    - FCC
    - CE
    - VCCI
    - CCC
    - BSMI

- Environmental: Reduction of Hazardous Substances (ROHS) 6

Storage connectivity

The following table lists the external storage systems that are currently offered by Lenovo that can be used with the BES-53248 Ethernet Storage Switches for Lenovo for storage clustering and MetroCluster IP configurations.

Table 12. External storage systems: DM Series

Description	Part number
Lenovo ThinkSystem DM Series Storage (NAS or iSCSI connectivity)	
ThinkSystem DM3000H, 48TB (12x 4TB HDDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y421003EA*
ThinkSystem DM3000H, 48TB (12x 4TB HDDs), 10GBASE-T, ONTAP 9.5	7Y421007EA*
ThinkSystem DM3000H, 96TB (12x 8TB HDDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y421005EA*
ThinkSystem DM3000H, 96TB (12x 8TB HDDs), 10GBASE-T, ONTAP 9.5	7Y421001EA*
ThinkSystem DM5000H, 11.5TB (12x 960GB SSDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y571004EA*
ThinkSystem DM5000H, 11.5TB (12x 960GB SSDs), 10GBASE-T, ONTAP 9.5	7Y57100LEA*
ThinkSystem DM5000H, 14.4TB (12x 1.2TB HDDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y57100CEA*
ThinkSystem DM5000H, 21.6TB (12x 1.8TB HDDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y57100GEA*
ThinkSystem DM5000H, 23TB (24x 960GB SSDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y571006EA*
ThinkSystem DM5000H, 23TB (24x 960GB SSDs), 10GBASE-T, ONTAP 9.5	7Y57100NEA*
ThinkSystem DM5000H, 28.8TB (24x 1.2TB HDDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y57100EEA*
ThinkSystem DM5000H, 28.8TB (24x 1.2TB HDDs), 10GBASE-T, ONTAP 9.5	7Y57100VEA*
ThinkSystem DM5000H, 43.2TB (24x 1.8TB HDDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y57100JEA*
ThinkSystem DM5000H, 43.2TB (24x 1.8TB HDDs), 10GBASE-T, ONTAP 9.5	7Y571002EA*
ThinkSystem DM5000H, 46TB (12x 3.84TB SSDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y571008EA*
ThinkSystem DM5000H, 46TB (12x 3.84TB SSDs), 10GBASE-T, ONTAP 9.5	7Y57100QEA*
ThinkSystem DM5000H, 92TB (24x 3.84TB SSDs), 10GBASE-T, ONTAP 9.5 Fundamentals	7Y57100AEA*
ThinkSystem DM5000H, 92TB (24x 3.84TB SSDs), 10GBASE-T, ONTAP 9.5	7Y57100REA*
ThinkSystem DM5000F, 11.5TB (12x 960GB SSDs), 10GBASE-T, ONTAP 9.5	7Y411002EA*
ThinkSystem DM5000F, 23TB (24x 960GB SSDs), 10GBASE-T, ONTAP 9.5	7Y411004EA*
ThinkSystem DM5000F, 46TB (12x 3.84TB SSDs), 10GBASE-T, ONTAP 9.5	7Y411006EA*
ThinkSystem DM5000F, 92TB (24x 3.84TB SSDs), 10GBASE-T, ONTAP 9.5	7Y411007EA*
Lenovo ThinkSystem DM Series Storage (NAS, iSCSI, or FC connectivity)	
ThinkSystem DM3000H Hybrid Storage Array (2U12 LFF, CTO only)	7Y42CTO1WW

Description	Part number
ThinkSystem DM3000H, 48TB (12x 4TB HDDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5 Fundamentals	7Y421009NA*
ThinkSystem DM3000H, 48TB (12x 4TB HDDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5 Fundamentals	7Y421002EA*
ThinkSystem DM3000H, 48TB (12x 4TB HDDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5	7Y421006EA*
ThinkSystem DM3000H, 96TB (12x 8TB HDDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5 Fundamentals	7Y421004EA*
ThinkSystem DM3000H, 96TB (12x 8TB HDDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5	7Y421008EA*
ThinkSystem DM5000H Hybrid Storage Array (2U24 SFF, CTO only)	7Y57CTO1WW
ThinkSystem DM5000H, 11.5TB (12x 960GB SSDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5 Fundamentals	7Y571011NA*
ThinkSystem DM5000H, 11.5TB (12x 960GB SSDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5 Fundamentals	7Y571003EA*
ThinkSystem DM5000H, 11.5TB (12x 960GB SSDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5	7Y57100KEA*
ThinkSystem DM5000H, 14.4TB (12x 1.2TB HDDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5 Fundamentals	7Y57100BEA*
ThinkSystem DM5000H, 21.6TB (12x 1.8TB HDDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5 Fundamentals	7Y57100FEA*
ThinkSystem DM5000H, 23TB (24x 960GB SSDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5 Fundamentals	7Y571005EA*
ThinkSystem DM5000H, 23TB (24x 960GB SSDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5	7Y57100MEA*
ThinkSystem DM5000H, 28.8TB (24x 1.2TB HDDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5 Fundamentals	7Y57100DEA*
ThinkSystem DM5000H, 43.2TB (24x 1.8TB HDDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5 Fundamentals	7Y571010NA*
ThinkSystem DM5000H, 43.2TB (24x 1.8TB HDDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5 Fundamentals	7Y57100HEA*
ThinkSystem DM5000H, 43.2TB (24x 1.8TB HDDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5	7Y57100ZEA*
ThinkSystem DM5000H, 46TB (12x 3.84TB SSDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5 Fundamentals	7Y571007EA*
ThinkSystem DM5000H, 46TB (12x 3.84TB SSDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5	7Y57100PEA*
ThinkSystem DM5000H, 92TB (24x 3.84TB SSDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5 Fundamentals	7Y571009EA*
ThinkSystem DM5000H, 92TB (24x 3.84TB SSDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5	7Y57100SEA*
ThinkSystem DM5000F Flash Storage Array (2U24 SFF, CTO only)	7Y41CTO1WW
ThinkSystem DM5000F, 11.5TB (12x 960GB SSDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5	7Y411001EA*
ThinkSystem DM5000F, 23TB (24x 960GB SSDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5	7Y411003EA*
ThinkSystem DM5000F, 46TB (12x 3.84TB SSDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5	7Y411005EA*
ThinkSystem DM5000F, 92TB (24x 3.84TB SSDs), 16Gb FC / 10GbE SFP+, ONTAP 9.5	7Y411000EA*
ThinkSystem DM7000H Hybrid Storage Array (3U, CTO only)	7Y56CTO1WW
ThinkSystem DM7000F Flash Storage Array (3U, CTO only)	7Y40CTO1WW
ThinkSystem DM7100H Hybrid Storage Array (4U, CTO only)	7D26CTO1WW
ThinkSystem DM7100F Flash Storage Array (4U, CTO only)	7D25CTO1WW

* Preconfigured models that are available only in North America (part numbers that have NA at the end) or EMEA (part numbers that have EA at the end) and require Preconfigured support to be purchased with the storage system (See the respective product guide for details).

For more information, see the list of Product Guides in the Lenovo Storage category:
http://lenovopress.com/storage/san/lenovo#rt=product-guide

Related publications and links

For more information, see the following resources:

- BES-53248 Switch Lenovo Welcome Letter
  https://download.lenovo.com/storage/bes_switch_lenovo_welcome_letter_july_2021.pdf
- BES-53248 MetroCluster IP Configuration
  http://thinksystem.lenovofiles.com/storage/help/topic/MCC-
  MetroCluster_IP_Installation_and_Configuration_Guide/5F52B0DD-3DE1-4D0C-BBE2-
  FDA96EC47E68_.html
- Lenovo Data Center Networking product page
  https://www.lenovo.com/us/en/c/data-center/storage/storage-area-network
- Lenovo Data Center Solution Configurator
  http://dcsc.lenovo.com
- BES-Switch Global Support: http://www.broadcom.com/support/bes-switch
  - Port License Redemption
  - Download the latest EFOS releases
  - Product documentation
  - Support Access guides in multiple languages
  - Contact switch support

Related product families

Product families related to this document are the following:

- Rack SAN Switches

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