Lenovo ThinkSystem DE4000H Hybrid Storage Array
Product Guide

Lenovo ThinkSystem DE4000H is a scalable, hybrid entry-level storage system that is designed to provide performance, simplicity, capacity, security, and high availability for medium to large businesses. It delivers enterprise-class storage management capabilities with a wide choice of host connectivity options, flexible drive configurations, and enhanced data management features. The ThinkSystem DE4000H is a perfect fit for a wide range of enterprise workloads, including big data and analytics, video surveillance, technical computing, backup and recovery, and other storage I/O-intensive applications.

ThinkSystem DE4000H models are available in a 2U rack form-factor with 24 small form-factor (2.5-inch SFF) drives (2U24 SFF), 12 large form-factor (3.5-inch LFF) drives (2U12 LFF), or a 4U rack form-factor with 60 LFF drives (4U60 LFF) and include two controllers, each with 8 GB or 32 GB memory for a system total of 16 GB or 64 GB. Host interface cards provide 12 Gb SAS, 10/25 Gb iSCSI, or 8/16/32 Gb FC connections.

The ThinkSystem DE4000H Storage Array scales up to 192 drives with the attachment of Lenovo ThinkSystem DE120S 2U12, DE240S 2U24 SFF, and DE600S 4U60 LFF Expansion Enclosures. It also offers flexible drive configurations with the choice of 2.5-inch (SFF) and 3.5-inch (LFF) form factors, 10 K rpm SAS and 7.2 K rpm NL SAS hard disk drives (HDDs), and SAS solid-state drives (SSDs).

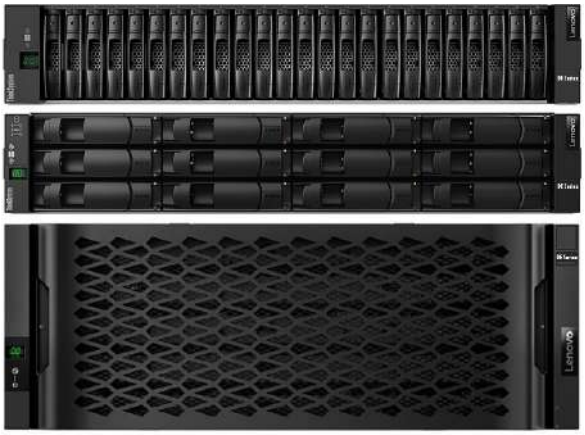

Figure 1. Lenovo ThinkSystem DE4000H 2U24 SFF (top), 2U12 LFF (middle), and 4U60 LFF (bottom)

Did you know?

The ThinkSystem DE4000H scales up to 3 PB of raw storage capacity, and it offers block storage connectivity with support for 1/10 Gb iSCSI or 4/8/16 Gb FC, and 12 Gb SAS, 10/25 Gb iSCSI, or 8/16/32 Gb FC.

Key features

The ThinkSystem DE4000H offers the following key features and benefits:

- Scalable entry-level hybrid storage with dual active/active controller configurations with 8 GB or 32 GB system memory per controller for high availability and performance.
- Improved performance and data protection with Dynamic Disk Pools (DDP) technology, as well as support for traditional RAID 0, 1, 3, 5, 6, and 10.
- Flexible host connectivity to match diverse client needs with support for 1/10 Gb iSCSI or 4/8/16 Gb FC, and 12 Gb SAS, 10/25 Gb iSCSI, or 8/16/32 Gb FC connectivity.
- 12 Gb SAS drive-side connectivity with support for up to 24x 2.5-inch small form factor (SFF) drives in the 2U24 SFF enclosures, up to 12x 3.5-inch large form factor (LFF) drives in the 2U12 LFF enclosures, or up to 60x 3.5-inch LFF drives in the 4U60 LFF enclosures.
- Scalability to up to 192 SFF or LFF drives with the attachment of the ThinkSystem DE240S 2U24 SFF, DE120S 2U12 LFF, or DE600S 4U60 LFF expansion enclosures to satisfy growing needs for storage capacity and performance.
- Rich set of standard storage management functions available at no extra cost, including Dynamic Disk Pools, SSD read cache, snapshots, volume copy, thin provisioning, and encryption (requires optional FIPS drives).
- Optional licensed functions, including higher number of snapshots for greater scalability and synchronous or asynchronous mirroring for continuous data availability.
- Intuitive, web-based GUI for easy system setup and management.
- Designed for 99.9999% availability with redundant hot-swap components, including controllers and I/O modules, power supplies, cooling modules (4U60 LFF enclosures only), proactive maintenance, and non-disruptive firmware upgrades.

The ThinkSystem DE4000H supports the complete range of data storage requirements, from highly used applications to high-capacity, low usage applications.

The following drives are supported in the 2U24 SFF enclosures:

- Capacity-optimized SSDs (1 drive write per day [DWD]): 3.84 TB, 7.68 TB, and 15.36 TB
- Performance-optimized, enterprise class HDDs: 1.2 TB and 1.8 TB 10K rpm
- Performance-optimized, enterprise class self-encrypting FIPS HDDs: 1.8 TB 10K rpm

The following drives are supported in the 2U12 LFF enclosures:

- High-capacity, archival-class nearline HDDs: 4 TB, 8 TB, 10 TB, 12 TB, and 16 TB 7.2K rpm
- High-capacity, archival-class nearline self-encrypting FIPS HDDs: 10 TB 7.2K rpm

The following drives are supported in the 4U60 LFF enclosures:

- High-capacity, archival-class nearline HDDs: 4 TB, 8 TB, 10 TB, 12 TB, and 16 TB 7.2K rpm
- High-capacity, archival-class nearline self-encrypting FIPS HDDs: 10 TB 7.2K rpm

All drives are dual-port and hot-swappable. Drives of the same form factor can be intermixed within the appropriate enclosure, which provides the flexibility to address performance and capacity needs within a single enclosure.

Up to three ThinkSystem DE240S 2U24 SFF, or up to three ThinkSystem DE600S 4U60 LFF, or up to seven ThinkSystem DE120S 2U12 LFF, or a combination of the ThinkSystem DE240S, DE120S, and DE600S expansion enclosures for a total of up to 192 drives per system (including controller and expansion enclosures) are supported by a single ThinkSystem DE4000H system.

Customers can intermix 2U24 SFF, 2U12 LFF, and 4U60 LFF expansion enclosures behind a 2U24 SFF, 2U12 LFF, or 4U60 LFF controller enclosure. This configuration delivers the added flexibility to mix 3.5-inch and 2.5-inch drives within a single system (but not within the enclosure).

More drives and expansion enclosures are designed to be dynamically added with virtually no downtime, which helps to quickly and seamlessly respond to ever-growing capacity demands.

The ThinkSystem DE4000H offers high levels of system and data availability with the following technologies:

- Dual-active controller modules with automatic load balancing and failover
- Mirrored data cache with flash backup (battery-backed destaging to flash)
- Dual-port SAS HDDs and SSDs with automatic drive failure detection and rebuild with global hot spares
- Redundant, hot-swappable and customer replaceable hardware components, including SFP/SFP+ transceivers, controller and I/O modules, power supplies, cooling modules (4U60 LFF only), and drives
- Automated path failover support for the data path between the host and the drives with multipathing software
- Non-disruptive controller and drive firmware upgrades

Components and connectors

The following figure shows the front of the ThinkSystem DE4000H and DE240S 2U SFF enclosures.

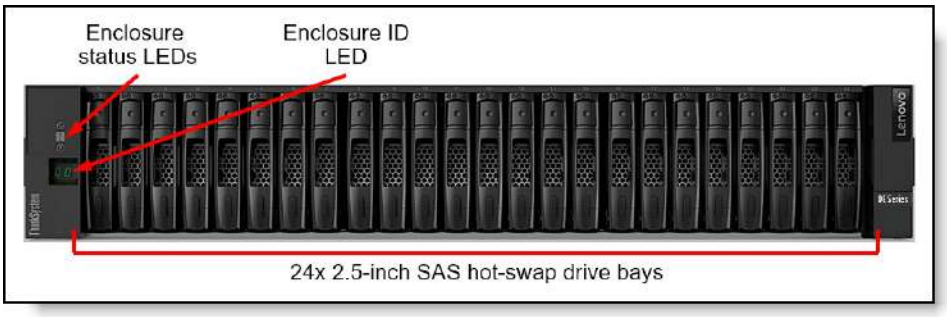

Figure 2. ThinkSystem DE4000H and DE240S 2U SFF enclosures front view

The front of the ThinkSystem DE4000H and DE240S 2U SFF enclosures includes the following components:

- 24 SFF hot-swap drive bays
- Enclosure status LEDs
- Enclosure ID LED

The following figure shows the front of the ThinkSystem DE4000H and DE120S 2U LFF enclosures.

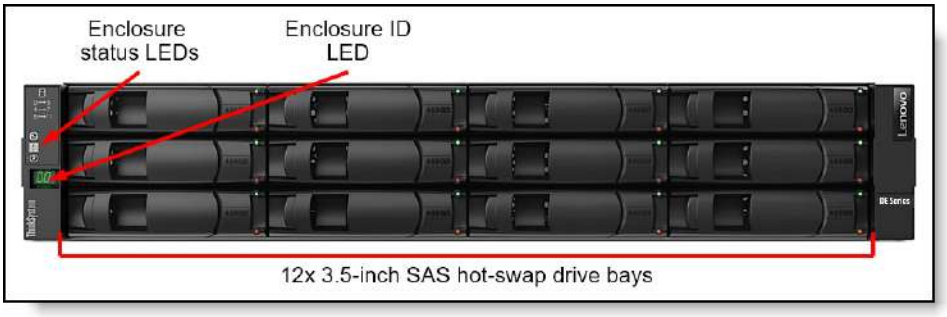

Figure 3. ThinkSystem DE4000H and DE120S 2U LFF enclosures front view

The front of the ThinkSystem DE4000H and DE120S 2U LFF enclosures includes the following components:

- 12 LFF hot-swap drive bays
- Enclosure status LEDs
- Enclosure ID LED

The following figure shows the rear of the ThinkSystem DE4000H 2U controller enclosure.

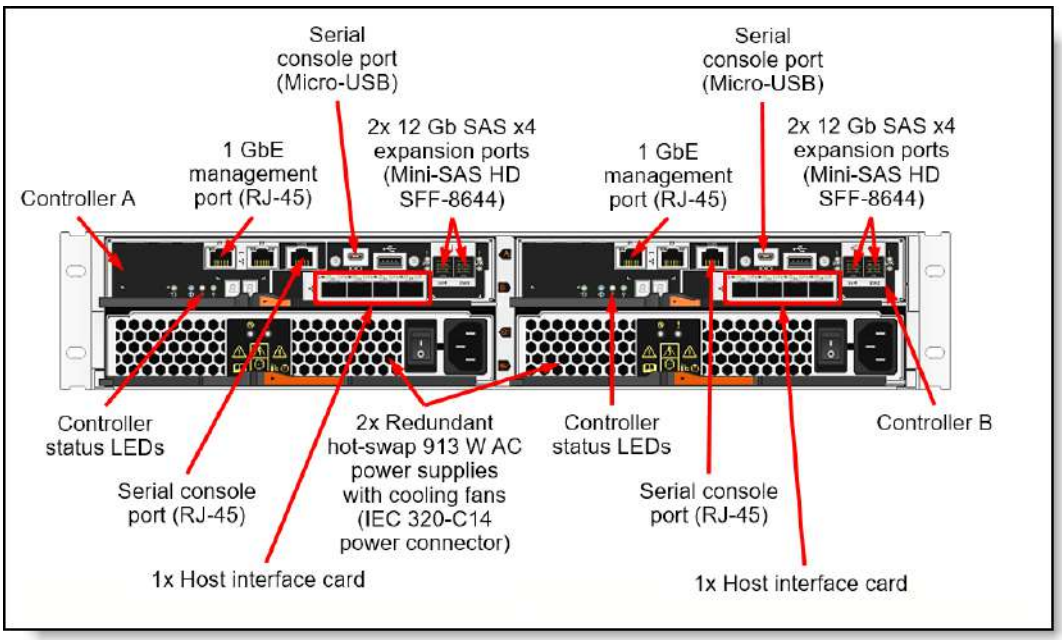

Figure 4. ThinkSystem DE4000H 2U controller enclosure rear view

The rear of the ThinkSystem DE4000H 2U controller enclosure includes the following components:

- Two redundant hot-swap controllers, each with the following ports:
  - One slot for a host interface card
    Note: The DE4000H Gen2 controllers no longer offers base ports
  - Two 12 Gb SAS x4 expansion ports (Mini-SAS HD SFF-8644) for connections to the expansion enclosures.
  - One RJ-45 10/100/1000 Mb Ethernet port for out-of-band management.
    Note: The Ethernet port (P2) next to the GbE management port is not available for use.
  - Two serial console ports (RJ-45 and Micro-USB) for another means to configure the system.
  - One USB Type A port (reserved for factory use)
- Two redundant hot-swap 913 W (100 - 240 V) AC power supplies (IEC 320-C14 power connector) with integrated cooling fans.

The following figure shows the rear of the ThinkSystem DE240S or DE120S 2U expansion enclosure.

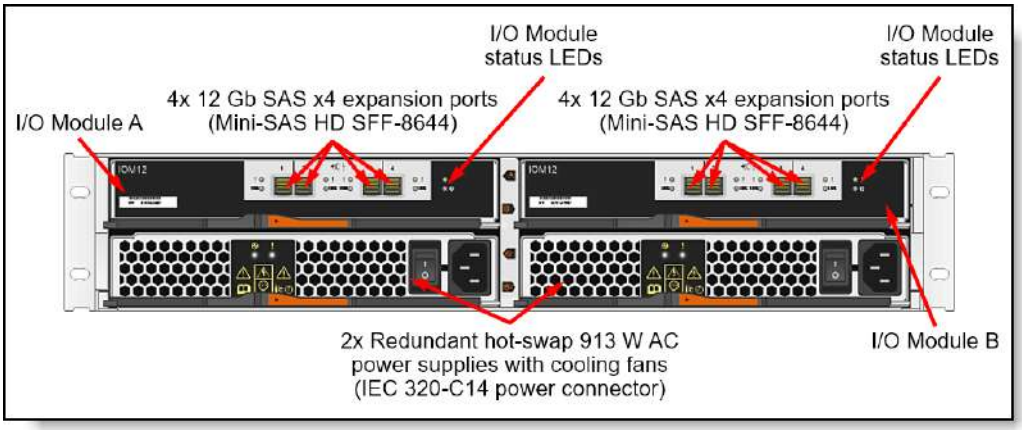

Figure 5. ThinkSystem DE240S or DE120S 2U expansion enclosure rear view

The rear of the ThinkSystem DE240S or DE120S 2U expansion enclosure includes the following components:

- Two redundant hot-swap I/O Modules; each I/O Module provides four 12 Gb SAS x4 expansion ports (Mini-SAS HD SFF-8644) for connections to the controller enclosures and for connecting the expansion enclosures between each other.
- Two redundant hot-swap 913 W (100 - 240 V) AC power supplies (IEC 320-C14 power connector) with integrated cooling fans.

The following figure shows the front of the ThinkSystem DE4000H and DE600S 4U LFF enclosures without the front bezel.

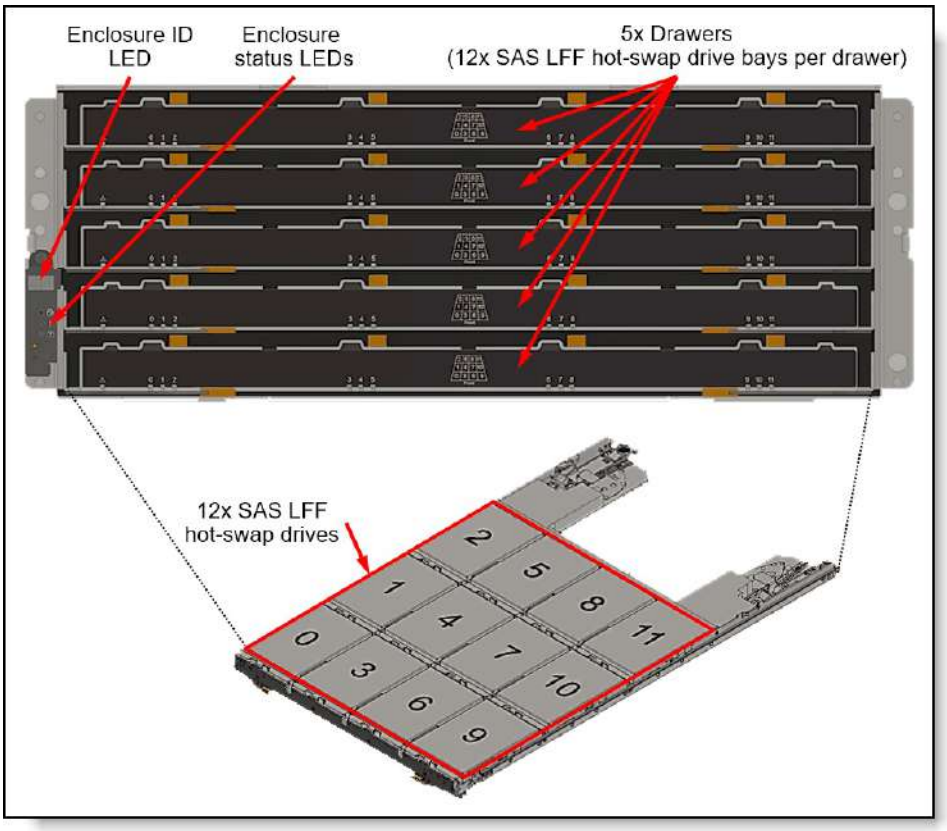

Figure 6. ThinkSystem DE4000H and DE600S 4U LFF enclosures front view (without the front bezel)

The front of the ThinkSystem DE4000H and DE600S 4U LFF enclosures includes the following components:

- Five drawers, each with 12 LFF hot-swap drive bays
- Enclosure ID LED
- Enclosure status LEDs

The following figure shows the rear of the ThinkSystem DE4000H 4U LFF controller enclosure.

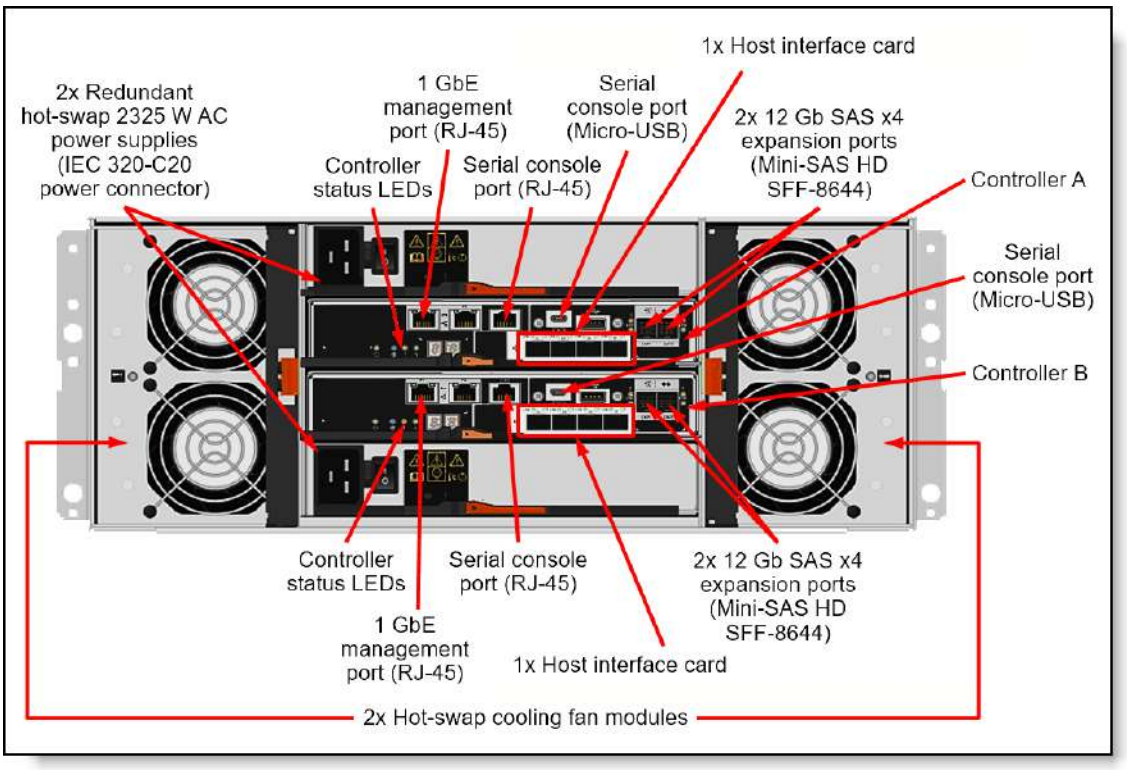

Figure 7. ThinkSystem DE4000H 4U LFF controller enclosure rear view

The rear of the ThinkSystem DE4000H 4U LFF controller enclosure includes the following components:

- Two redundant hot-swap controllers, each with the following ports:
  - One slot for a host interface card
    Note: The DE4000H Gen2 controllers no longer offers base ports
  - Two 12 Gb SAS x4 expansion ports (Mini-SAS HD SFF-8644) for connections to the expansion enclosures.
  - One RJ-45 10/100/1000 Mb Ethernet port for out-of-band management.
    Note: The Ethernet port (P2) next to the GbE management port is not available for use.
  - Two serial console ports (RJ-45 and Micro-USB) for another means to configure the system.
  - One USB Type A port (reserved for factory use)
- Two redundant hot-swap 2325 W (200 - 240 V) AC power supplies (IEC 320-C20 power connector)
- Two hot-swap cooling fan modules; each module has two fans.
  Note: The failed cooling module should be replaced as soon as possible.

The following figure shows the rear of the ThinkSystem DE600S 4U LFF expansion enclosure.

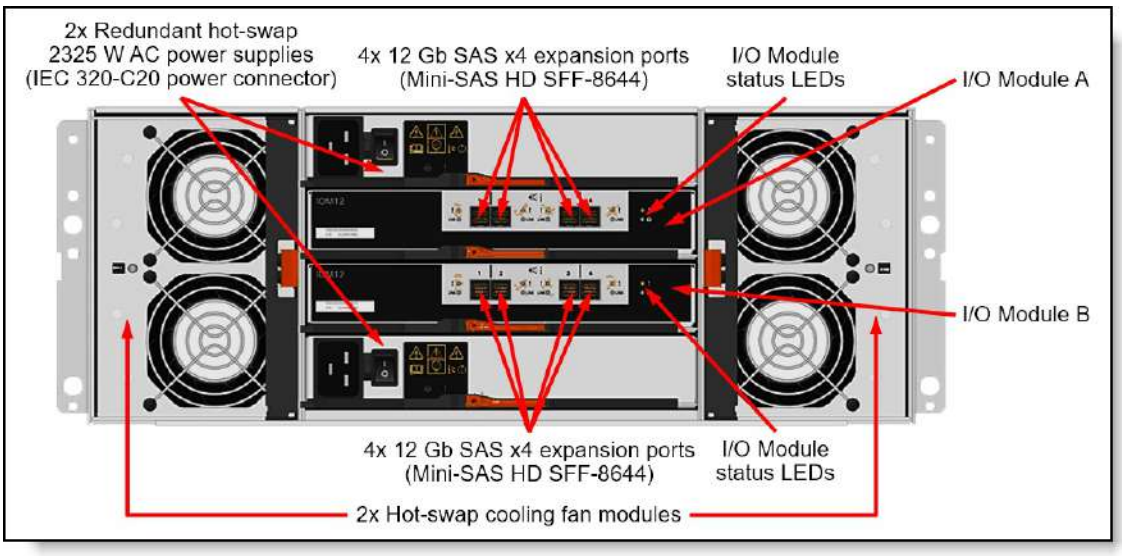

Figure 8. ThinkSystem DE600S 4U LFF expansion enclosure rear view

The rear of the ThinkSystem DE600S 4U LFF expansion enclosure includes the following components:

- Two redundant hot-swap I/O Modules; each I/O Module provides four 12 Gb SAS x4 expansion ports (Mini-SAS HD SFF-8644) for connections to the controller enclosures and for connecting the expansion enclosures between each other.
- Two redundant hot-swap 2325 W (200 - 240 V) AC power supplies (IEC 320-C20 power connector)
- Two hot-swap cooling fan modules; each module has two fans.
  Note: The failed cooling module should be replaced as soon as possible.

System specifications

The following table lists the ThinkSystem DE4000H storage system specifications.

Note: The supported hardware options, software features, and interoperability listed in this product guide are based on the software version 11.60. For details about specific software releases that introduced support for certain hardware options and software features, refer to the Release notes of the particular software release for the ThinkSystem DE4000H that can be found at:
http://datacentersupport.lenovo.com

Table 1. ThinkSystem DE4000H system specifications

Attribute	Specification

Form factor	• DE4000H 2U24 SFF controller enclosure (Machine Type 7Y75): 2U rack mount.
	• DE4000H 2U12 LFF controller enclosure (Machine Type 7Y74): 2U rack mount.
	• DE4000H 4U60 LFF controller enclosure (Machine Type 7Y77): 4U rack mount.
	  ◦ DE240S 2U24 SFF expansion enclosure (Machine Type 7Y68): 2U rack mount.
	  ◦ DE120S 2U12 LFF expansion enclosure (Machine Type 7Y63): 2U rack mount.
	  ◦ DE600S 4U60 LFF expansion enclosure (Machine Type 7Y69): 4U rack mount.

Controller configuration	Dual active-active controller configuration with automatic load balancing.
RAID levels	RAID 0, 1, 3, 5, 6, and 10; Dynamic Disk Pools. **Note:** RAID 3 can be configured only through the CLI.
Controller system memory	16 GB or 64 GB per system (8 GB or 32 GB per controller). Cache mirroring between the controllers. Flash-backed cache protection (includes battery for destaging to flash).

Attribute	Specification
Expansion enclosure support	• DE4000H 2U24 SFF controller: 3x DE120S, 3x DE240S or 2x DE600S • DE4000H 2U12 LFF controller: 7x DE120S, 3x DE240S or 3x DE600S • DE4000H 4U60 LFF controller: 3x DE120S, 3x DE240S or 2x DE600S • Expansion enclosures may be mixed up to a maximum of 7 expansion enclosures
Drive bays	DE4000H 2U24 SFF controller: • With 3x DE120S LFF expansion enclosures: 24 SFF + 36 LFF drive bays: (60 drives) • With 3x DE240S SFF expansion enclosures: 24 SFF + 72 SFF drive bays: (96 drives) • With 2x DE600S LFF expansion enclosures: 24 SFF + 120 LFF drive bays: (144 drives) DE4000H 2U12 LFF controller: • With 7x DE120S LFF expansion enclosures: 12 LFF + 84 LFF drive bays: (96 drives) • With 3x DE240S SFF expansion enclosures: 12 LFF + 72 SFF drive bays: (84 drives) • With 3x DE600S LFF expansion enclosures: 12 LFF + 180 LFF drive bays: (192 drives) DE4000H 4U60 LFF controller: • With 3x DE120S LFF expansion enclosures: 60 LFF + 36 LFF drive bays: (96 drives) • With 3x DE240S SFF expansion enclosures: 60 LFF + 72 SFF drive bays: (132 drives) • With 2x DE600S LFF expansion enclosures: 60 LFF + 120 LFF drive bays: (180 drives) Expansion enclosures may be mixed up to a maximum of 7 expansion enclosures
Drive technology	• 12 Gb SAS and NL SAS HDDs and FIPS HDDs, 12 Gb SAS SSDs and FIPS SSDs. • Intermix of HDDs and SSDs is supported within a system. • Intermix of HDDs and SSDs is *not* supported within a volume group or disk pool. • A maximum of 120 SAS SSDs is supported. • Intermix of FIPS drives and non-FIPS drives is supported within a system. • Intermix of FIPS drives and non-FIPS drives is *not* supported within a volume group or disk pool.
Drive expansion connectivity	• 2x 12 Gb SAS x4 (Mini-SAS HD SFF-8644) expansion ports on each of two controllers in the controller enclosure for the attachment of the expansion enclosures. • 4x 12 Gb SAS x4 (Mini-SAS HD SFF-8644) expansion ports on each of two I/O modules in the expansion enclosure for the attachment to the controller enclosure and daisy chaining of the expansion enclosures.
Drives	2U24 SFF drives: • 10K rpm SAS HDDs • 10K rpm SAS FIPS HDDs • SAS SSDs (1 DWD) • SAS SSDs (3 DWD) • SAS FIPS SSDs (3 DWD) 2U12 LFF drives: • 7.2K rpm NL SAS HDDs • 7.2K rpm NL SAS FIPS HDDs • SAS SSDs (3 DWD) • SAS FIPS SSDs (3 DWD) 4U60 LFF drives: • 7.2K rpm NL SAS HDDs • 7.2K rpm NL SAS FIPS HDDs • SAS SSDs (3 DWD) • SAS FIPS SSDs (3 DWD)
Storage capacity	Up to 3.375 PB (192x 18 TB LFF HDDs).

Attribute	Specification
Host connectivity	Host connectivity ports provided using host interface cards (HICs) (per controller enclosure with two controllers): • 8x 12 Gb SAS host ports (Mini-SAS HD, SFF-8644) (4 ports per controller) • 8x 10/25 Gb iSCSI SFP28 host ports (DAC or SW fiber optics [LC]) (4 ports per controller) • 8x 8/16/32 Gb FC SFP+ host ports (SW fiber optics [LC]) (4 ports per controller) • 8x 1/10 Gb iSCSI (RJ-45 [1 Gb iSCSI only],DAC, or SW fiber optics [LC]) or 4/8/16 Gb FC (SW fiber optics [LC]) SFP+ host ports (4 ports per controller) • 4x 1/10 Gb iSCSI RJ-45 host ports (2 ports per controller; 2U12 LFF and 2U24 SFF only) **Note:** Two host interface cards are required for selection (one per controller). The controllers no longer offers base ports. Host connectivity is provided via the HICs. • Supported protocols: FC: 32 Gbps, 16 Gbps, 8 Gbps, 4 Gbps
Host operating systems	Microsoft Windows Server; Red Hat Enterprise Linux (RHEL); SUSE Linux Enterprise Server (SLES); VMware vSphere.
Standard software features	Dynamic Disk Pools, SSD read cache, snapshots (up to 128 targets), volume copy, thin provisioning (DDP only), encryption (requires optional FIPS drives), and data assurance.
Optional software features	Snapshots (up to 512 targets), synchronous mirroring, and asynchronous mirroring.
Performance*	• Up to 300 000 random read IOPS (4 KB blocks). • Up to 109 000 random write IOPS (4 KB blocks). • Up to 9.2 GBps sequential read throughput (64 KB blocks). • Up to 2.7 GBps sequential write throughput (64 KB blocks).

Configuration maximums**	• Maximum storage capacity: 3.07 PB
	• Maximum number of logical volumes: 512
	• Maximum logical volume size: 4 PB
	• Maximum thin-provisioned logical volume size (DDP only): 256 TB
	• Maximum number of drives in a RAID volume group:
	  ◦ RAID 0, 1/10: 192
	  ◦ RAID 3, 5, 6: 30
	• Maximum number of DDP arrays: 20
	• Maximum number of drives in a DDP array: 192 (11 drives minimum)
	• Maximum SSD read cache size:
	  ◦ DE4000 8GB Controller: 4 TB SSD read cache
	  ◦ DE4000 32GB Controller: 5 TB SSD read cache
	• Maximum number of hosts: 256
	• Maximum number of snapshots: 512 (requires an optional license)
	• Maximum number of mirroring pairs: 32 (requires an optional license)

Cooling	Redundant cooling with two cooling modules (4U60 LFF) or with the fans that are built into power supplies (2U24 SFF and 2U12 LFF).
Power supply	Two redundant hot-swap 913 W (100 - 240 V) (2U24 and 2U12 enclosures) or 2325 W (200 - 240 V) (4U60 enclosures) Platinum AC power supplies.
Hot-swap parts	Controllers, I/O modules, drives, power supplies, cooling modules (4U60 LFF only), and SFP+/SFP28 transceivers.
Management ports	• 1x 1 GbE port (UTP, RJ-45) per controller for out-of-band management. • 2x Serial console ports (RJ-45 and Micro-USB) for system configuration. • In-band management via I/O path.
Management interfaces	System Manager web-based GUI; SAN Manager standalone GUI; SSH CLI; Serial console CLI; SNMP, email, and syslog alerts; optional Lenovo XClarity.
Security features	Secure Socket Layer (SSL), Secure Shell (SSH), user level security, role-based access control (RBAC), LDAP authentication.

Attribute	Specification
Warranty and support	Three-year customer-replaceable unit and onsite limited warranty with 9x5 next business day (NBD) parts delivered. Also available are 9x5 NBD onsite response, 24x7 coverage with 2-hour or 4-hour onsite response, or 6-hour or 24-hour committed repair (select areas), YourDrive YourData, Premier Support, and 1-year or 2-year post-warranty extensions.
Software maintenance	Included in the base warranty and any Lenovo warranty extensions.
Dimensions	2U24 SFF enclosure: • Height: 85 mm (3.4 in.) • Width: 449 mm (17.7 in.) • Depth: 553 mm (21.8 in.) 2U12 LFF enclosure: • Height: 85 mm (3.4 in.) • Width: 447 mm (17.6 in.) • Depth: 483 mm (19.0 in.) 4U60 LFF enclosure: • Height: 174 mm (6.9 in.) • Width: 449 mm (17.7 in.) • Depth: 922 mm (36.3 in.)
Weight	• DE4000H 2U24 SFF controller enclosure (7Y75): 24.59 kg (54.2 lb) • DE4000H 2U12 LFF controller enclosure (7Y74): 28.78 kg (63.4 lb) • DE4000H 4U60 LFF controller enclosure (7Y77): 108.07 kg (238.3 lb) • DE240S 2U24 SFF expansion enclosure (7Y68): 27.44 kg (60.5 lb) • DE120S 2U12 LFF expansion enclosure (7Y63): 27.12 kg (59.8 lb) • DE600S 4U60 LFF expansion enclosure (7Y69): 112.2 kg (247.4 lb)

* Estimated performance based on internal measurements.
** For a detailed list of configuration limits and restrictions for a specific version of the software, refer to the Lenovo Data Center Support website:
http://datacentersupport.lenovo.com

Controller enclosures

The following table lists the CTO base models for the ThinkSystem DE4000H.

Table 2. ThinkSystem DE4000H CTO base models

Machine Type/Model	Base feature	Description
7Y74CTO2WW	BEY6	Lenovo ThinkSystem Storage 2U12 Chassis (with Gen2 controllers and 2x PSUs)
7Y75CTO2WW	BEY7	Lenovo ThinkSystem Storage 2U24 Chassis (with Gen2 controllers and 2x PSUs)
7Y77CTO2WW	BQ9W	Lenovo ThinkSystem Storage 4U60 Chassis (with Gen2 controllers and 2x PSUs)

The following table lists the preconfigured models wih Gen 2 controllers, available by market.

Table 3. Preconfigured models

Model	Market availability	Controller
DE4000H - 2U12 - 2x Gen2 controllers		
7Y74A00QWW	All markets	32GB controller
7Y74A00TWW	All markets	8GB controller
7Y74A00QBR	Brazil	32GB controller
7Y74A00UBR	Brazil	8GB controller

Model	Market availability	Controller
7Y74A00QJP	Japan	32GB controller
7Y74A00XJP	Japan	8GB controller
7Y74A00QLA	Latin America markets	32GB controller
7Y74A00WLA	Latin America markets	8GB controller
7Y74100ALA	Latin America markets	8GB controller
7Y741009NA	North America markets	8GB controller
7Y74A00QCN	PRC	32GB controller
7Y74A00VCN	PRC	8GB controller
DE4000H - 2U24 - 2x Gen2 controllers		
7Y75A00TWW	All markets	32GB controller
7Y75A00SWW	All markets	8GB controller
7Y75A00TBR	Brazil	32GB controller
7Y75A00SBR	Brazil	8GB controller
7Y75A00TJP	Japan	32GB controller
7Y75A00SJP	Japan	8GB controller
7Y75A00TLA	Latin America markets	32GB controller
7Y75A00XLA	Latin America markets	32GB controller
7Y75A00SLA	Latin America markets	8GB controller
7Y75100ALA	Latin America markets	8GB controller
7Y75A00WLA	Latin America markets	8GB controller (topseller)
7Y751009NA	North America markets	8GB controller
7Y75A00TCN	PRC	32GB controller
7Y75A00SCN	PRC	8GB controller
DE4000H - 4U60 - 2x Gen2 controllers		
7Y77A00BWW	All markets	32GB controller
7Y77A00EWW	All markets	8GB controller
7Y77A00BBR	Brazil	32GB controller
7Y77A00EBR	Brazil	8GB controller
7Y77A00BJP	Japan	32GB controller
7Y77A00EJP	Japan	8GB controller
7Y77A00BLA	Latin America markets	32GB controller
7Y77A00ELA	Latin America markets	8GB controller
7Y77A00BCN	PRC	32GB controller
7Y77A00ECN	PRC	8GB controller

Configuration notes:

- For preconfigured models, two DE4000 controllers (feature code BQ9Z or BQA0) are included in the model configuration.
- For CTO models, two DE4000 controllers (feature code BQ9Z or BQA0) are selected by default in the configurator, and the selection cannot be changed.

The models of the ThinkSystem DE4000H ship with the following items:

- One chassis with the following components:
  - Two controllers
  - Two power supplies
  - Two cooling modules (4U60 LFF only)
  - Two host interface cards
- Rack Mount Kit
- 2 m USB Cable (USB Type A to Micro-USB)
- *Quick Installation Guide*
- *Electronic Publications Flyer*
- Two power cables
  - Relationship and TopSeller models listed in this section:
    - 2U24 SFF, 2U12 LFF: 1.5 m, 10A/100-250V, C13 to IEC 320-C14 rack power cables
    - 4U60 LFF: 2.5 m, 16A/100-240V, C19 to IEC 320-C20 rack power cables
  - CTO models: Customer-configured power cables

Note: Some models of the ThinkSystem DE4000H ship with SFP+ transceivers and cables. For models that ship without transceivers and cables, the supported SFP+ transceivers, DAC cables, SAS cables, or RJ-45 UTP cables should be purchased for the system (see Controllers for details).

Controllers

The ThinkSystem DE4000H controller enclosures ship with two DE4000 controllers. A *controller* provides interfaces for host connectivity, management, and internal drives, and it runs storage management software. Each DE4000 controller ships with 8 GB or 32 GB memory for a system total of 16 GB or 64 GB.

Each controller has one expansion slot for a host interface card (HIC).

The following host interfaces can be added to the ThinkSystem DE4000H controller enclosures with HICs:

- 8x 12 Gb SAS x4 (Mini-SAS HD SFF-8644) ports (4 ports per HIC) for SAS connectivity
- 8x 10/25 GbE SFP28 ports (4 ports per HIC) for 10/25 Gb iSCSI connectivity (require optical transceivers or DAC cables that should be purchased for the HICs)
- 8x 1/10 Gb iSCSI or 4/8/16 Gb FC SFP+ ports (4 ports per HIC) for iSCSI or FC connectivity (require transceivers or DAC cables [10 Gb iSCSI only] that should be purchased for the HICs)
- 8x 8/16/32 Gb FC SFP+ ports (4 ports per HIC for FC connectivity require optical transceivers that should be purchased for the HICs)
- 4x 1/10 Gb iSCSI RJ-45 ports (2 ports per HIC) for iSCSI connectivity (2U12 LFF and 2U24 SFF controller enclosures only)

Each DE4000 controller also provide two 12 Gb SAS x4 expansion ports (Mini-SAS HD SFF-8644 connectors) for the attachment of the ThinkSystem DE Series expansion units.

Configuration notes:

- Both controllers must have the same system memory size: 8 GB or 32 GB.
- Two host interface cards are required for selection (one per controller).
- Both controllers must have the same type of the host interface card installed (12 Gb SAS SFF-8644, 10 Gb iSCSI / 16 Gb FC SFP+, 10/25 Gb iSCSI SFP28, 32 Gb FC SFP+, or 1/10 Gb iSCSI RJ-45, and both cards must have SFP+/SFP28 media of the same type (either optical transceivers or DAC cables, but not both types).

The following table lists the DE4000H controller and supported connectivity options.

Table 4. DE4000H controller and connectivity options

Part number	Feature code	Description	Maximum quantity per controller enclosure
Controllers			
None*	BQ9Z	Lenovo ThinkSystem DE4000 Controller 8GB Gen2	
None*	BQA0	Lenovo ThinkSystem DE4000 Controller 32GB Gen2	
Host interface cards			
4C57A14367	B4B8	Lenovo ThinkSystem DE4000 HIC, 12Gb SAS, 4 ports	2
4C57A14369	B4BA	Lenovo ThinkSystem DE4000 HIC, 10/25GbE iSCSI, 4 ports	2
4C57A14366	B4B7	Lenovo ThinkSystem DE4000 HIC, 16Gb FC/10GbE, 4 ports	2
4C57A14368	B4B9	Lenovo ThinkSystem DE4000 HIC, 32Gb FC, 4 ports	2
4C57A14376	B4B1	Lenovo ThinkSystem DE2000/DE4000 HIC 10GBASE-T 2-Ports	2
SFP+ options for 10 Gb iSCSI / 16 Gb FC host interface card / 32 Gb FC host interface card			
4M17A13527	B4B2	Lenovo 10Gb iSCSI/16Gb FC Universal SFP+ Module	8
SFP28 options for 10/25 Gb iSCSI host interface card			
4M17A13529	B4B4	Lenovo 10/25GbE iSCSI SFP28 Module	8
SFP+ options for 32 Gb FC host interface card			

Part number	Feature code	Description	Maximum quantity per controller enclosure
4M17A13528	B4B3	Lenovo 32Gb FC SFP+ Transceiver	8
OM4 cable options for 16/32 Gb FC and 10/25 Gb iSCSI SW SFP+/SFP28 optical transceivers			
4Z57A10845	B2P9	Lenovo 0.5m LC-LC OM4 MMF Cable	8
4Z57A10846	B2PA	Lenovo 1m LC-LC OM4 MMF Cable	8
4Z57A10847	B2PB	Lenovo 3m LC-LC OM4 MMF Cable	8
4Z57A10848	B2PC	Lenovo 5m LC-LC OM4 MMF Cable	8
4Z57A10849	B2PD	Lenovo 10m LC-LC OM4 MMF Cable	8
4Z57A10850	B2PE	Lenovo 15m LC-LC OM4 MMF Cable	8
4Z57A10851	B2PF	Lenovo 25m LC-LC OM4 MMF Cable	8
4Z57A10852	B2PG	Lenovo 30m LC-LC OM4 MMF Cable	8
OM3 cable options for 16/32 Gb FC and 10/25 Gb iSCSI SW SFP+/SFP28 optical transceivers			
00MN499	ASR5	Lenovo 0.5m LC-LC OM3 MMF Cable	8
00MN502	ASR6	Lenovo 1m LC-LC OM3 MMF Cable	8
00MN505	ASR7	Lenovo 3m LC-LC OM3 MMF Cable	8
00MN508	ASR8	Lenovo 5m LC-LC OM3 MMF Cable	8
00MN511	ASR9	Lenovo 10m LC-LC OM3 MMF Cable	8
00MN514	ASRA	Lenovo 15m LC-LC OM3 MMF Cable	8
00MN517	ASRB	Lenovo 25m LC-LC OM3 MMF Cable	8
00MN520	ASRC	Lenovo 30m LC-LC OM3 MMF Cable	8
DAC cable options for 10 Gb iSCSI SFP+ host connectivity (iSCSI HICs)			
00D6288	A3RG	0.5m Passive DAC SFP+ Cable	8
90Y9427	A1PH	1m Passive DAC SFP+ Cable	8
00AY764	A51N	1.5m Passive DAC SFP+ Cable	8
00AY765	A51P	2m Passive DAC SFP+ Cable	8
90Y9430	A1PJ	3m Passive DAC SFP+ Cable	8
90Y9433	A1PK	5m Passive DAC SFP+ Cable	8
00D6151	A3RH	7m Passive DAC SFP+ Cable	8
DAC cable options for 25 Gb iSCSI SFP28 host connectivity (iSCSI HICs)			
7Z57A03557	AV1W	Lenovo 1m Passive 25G SFP28 DAC Cable	8
7Z57A03558	AV1X	Lenovo 3m Passive 25G SFP28 DAC Cable	8
SAS host connectivity cables: Mini-SAS HD (controller) to Mini-SAS HD (host)			
00YL847	AU16	0.5m External MiniSAS HD 8644/MiniSAS HD 8644 Cable	8
00YL848	AU17	1m External MiniSAS HD 8644/MiniSAS HD 8644 Cable	8
00YL849	AU18	2m External MiniSAS HD 8644/MiniSAS HD 8644 Cable	8
00YL850	AU19	3m External MiniSAS HD 8644/MiniSAS HD 8644 Cable	8
UTP Category 6 cables for 1/10 Gb iSCSI RJ-45 connectivity and 1 GbE management ports			
00WE123	AVFW	0.75m Green Cat6 Cable	6
00WE127	AVFX	1.0m Green Cat6 Cable	6
00WE131	AVFY	1.25m Green Cat6 Cable	6
00WE135	AVFZ	1.5m Green Cat6 Cable	6

Part number	Feature code	Description	Maximum quantity per controller enclosure
00WE139	AVG0	3m Green Cat6 Cable	6
90Y3718	A1MT	10m Green Cat6 Cable	6
90Y3727	A1MW	25m Green Cat6 Cable	6

* Factory-installed only

Expansion enclosures

The ThinkSystem DE4000H supports attachment of DE120S 2U12 LFF, DE240S 2U24 SFF or DE600S 4U60 LFF expansion enclosures for a total of up to 192 drives per system (including controller and expansion enclosures).

The supported expansion types and quantities are dependent on the controller enclosure type, as listed in the following table.

Table 5. Maximum number of expansion enclosures by DE4000H Controller enclosure type

	DE120S 2U12 LFF Quantity	DE240S 2U24 SFF Quantity	DE600S 4U60 LFF Quantity
DE4000H 2U24 SFF (7Y75)	3	3	2
DE4000H 2U12 LFF (7Y74)	7	3	3
DE4000H 4U60 LFF (7Y77)	3	3	2

Intermix of 2U24 SFF, 2U12 LFF, and 4U60 LFF expansion enclosures behind a 2U24 SFF, 2U12 LFF, or 4U60 LFF controller enclosure is supported. The expansion enclosures can be added to the system non-disruptively.

The following table lists the relationship models of the supported ThinkSystem DE Series expansion enclosures.

Table 6. ThinkSystem DE240S, DE120S, and DE600S relationship models

				Part number		
Description	Brazil	Latin America	China	European Union	Japan	Other markets worldwide
Lenovo ThinkSystem DE240S 2U24 SFF Expansion Enclosure	-	-	-	7Y68A004EA	7Y681001JP	7Y68A000WW
Lenovo ThinkSystem DE120S 2U12 LFF Expansion Enclosure	-	-	-	7Y63A003EA	7Y631000JP	7Y63A000WW
Lenovo ThinkSystem DE600S 4U60 LFF Expansion Enclosure Gen2	7Y69A004BR	7Y69A004LA	7Y69A004CN	-	7Y69A005JP	7Y69A004WW

The following table lists the TopSeller models of the supported ThinkSystem DE Series expansion enclosures.

Table 7. ThinkSystem DE240S and DE120S TopSeller models: Brazil and Latin America

Description	Part number	
	Latin America	Brazil
Lenovo ThinkSystem DE240S 2U24 SFF Expansion Enclosure (TopSeller)	7Y681002LA	7Y681002BR
Lenovo ThinkSystem DE120S 2U12 LFF Expansion Enclosure (TopSeller)	7Y631001LA	7Y631001BR

The following table lists the CTO base models for the ThinkSystem DE Series expansion enclosures.

Table 8. ThinkSystem DE240S, DE120S, and DE600S CTO base models

Description	Machine Type/Model	Feature code		
		European Union	Other markets	World Wide
Lenovo ThinkSystem Storage 2U24 Chassis (with 2x PSUs)	7Y68CTO1WW	BEY7	B38L	-
Lenovo ThinkSystem Storage 2U12 Chassis (with 2x PSUs)	7Y63CTO1WW	BEY6	B38M	-
Lenovo ThinkSystem Storage 4U60 Chassis (with 2x PSUs)	7Y69CTO2WW	-	-	BQ9W

Configuration notes:

- For Relationship and TopSeller models, two I/O expansion modules (feature code B4BS) are included in the model configuration.
- For CTO models, two I/O expansion modules (feature code B4BS) are selected by default in the configurator, and the selection cannot be changed.

The models of the ThinkSystem DE240S, DE120S, and DE600S ship with the following items:

- One chassis with the following components:
  - Two I/O modules
  - Two power supplies
  - Two cooling modules (4U60 LFF only)
- Four 1 m MiniSAS HD 8644/MiniSAS HD 8644 cables (Models listed in Tables 8 and 9)
- Rack Mount Kit
- *Quick Installation Guide*
- *Electronic Publications Flyer*
- Two power cables:
  - Models listed in Tables 8 and 9:
    - 2U24 SFF, 2U12 LFF: 1.5 m, 10A/100-250V, C13 to C14 rack power cables
    - 4U60 LFF: 2.5 m, 16A/100-240V, C19 to C20 rack power cables
  - CTO models: Customer-configured power cables

Note: The Relationship and TopSeller models of the ThinkSystem DE240S, DE120S, and DE600S listed in this section ship with four 1 m SAS cables; additional SAS cables that are listed in this section can be purchased for the system, if needed.

Each ThinkSystem DE Series expansion enclosure ships with two SAS I/O expansion modules. Each *I/O expansion module* provides four external 12 Gb SAS x4 ports (Mini-SAS HD SFF-8644 connectors labelled Port 1-4) that are used for connections to the ThinkSystem DE4000H and for daisy chaining the expansion enclosures between each other.

Two expansion ports on the Controller A are connected to the Ports 1 and 2 on the I/O Module A in the first expansion enclosure in the chain, and the Ports 3 and 4 on the I/O Module A in the first expansion enclosure are connected to the Ports 1 and 2 on the I/O Module A in the adjacent expansion enclosure, and so on.

Two expansion ports on the Controller B are connected to the Ports 1 and 2 on the I/O Module B in the last expansion enclosure in the chain, and the Ports 3 and 4 on the I/O Module B in the expansion enclosure are connected to the Ports 1 and 2 on the I/O Module B in the adjacent expansion enclosure, and so on.

The connectivity topology for the DE Series expansion enclosures is shown in the following figure.

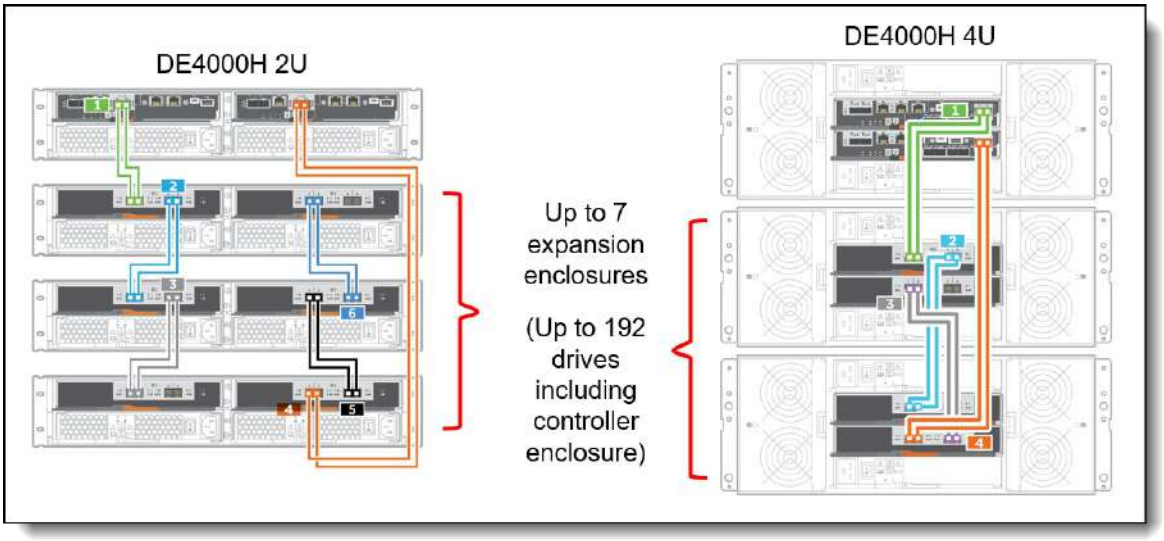

Figure 9. DE Series expansion enclosure connectivity topology

The following table lists ordering information for the supported expansion enclosure connectivity options.

Table 9. Expansion unit connectivity options

Description	Part number	Feature code	Quantity per one expansion enclosure
External MiniSAS HD 8644/MiniSAS HD 8644 0.5M Cable	00YL847	AU16	4
External MiniSAS HD 8644/MiniSAS HD 8644 1M Cable	00YL848	AU17	4
External MiniSAS HD 8644/MiniSAS HD 8644 2M Cable	00YL849	AU18	4
External MiniSAS HD 8644/MiniSAS HD 8644 3M Cable	00YL850	AU19	4

Configuration notes:

- The Relationship and TopSeller models of the ThinkSystem DE240S, DE120S, and DE600S listed in this section ship with four 1 m SAS cables.
- Four SAS cables are needed per each expansion enclosure (two SAS cables per I/O Module) for connections to the controller enclosure and for daisy chaining of the expansion enclosures.
- The length of the SAS cables that connect a 2U12 or 2U24 enclosure to an adjacent 4U60 enclosure should be at least 1 meter.

Drives

The ThinkSystem DE Series 2U24 SFF enclosures support up to 24 SFF hot-swap drives, the 2U12 LFF enclosures support up to 12 LFF hot-swap drives, and the 4U60 LFF enclosures support up to 60 LFF hot-swap drives.

Shipping requirement: 2U12 and 2U24 enclosures can be shipped with all drive bays populated, however the 4U60 enclosures must be shipped with drives removed.

The following table lists supported drive options for the 2U24 SFF controller and expansion enclosures.

Table 10. 2U24 SFF drive options

Part number	Feature code	Description	Maximum quantity per 2U24 SFF enclosure
2.5-inch 12 Gbps SAS hot-swap HDDs			
4XB7A14112	B4BY	Lenovo ThinkSystem DE Series 1.2TB 10K 2.5" HDD 2U24	24
4XB7A14113	B4BZ	Lenovo ThinkSystem DE Series 1.8TB 10K 2.5" HDD 2U24	24
4XB7A88046	BW12	Lenovo ThinkSystem DE Series 2.4TB 10K 2.5" HDD 2U24	24
2.5-inch 12 Gbps SAS hot-swap FIPS HDDs (SED HDDs)			
4XB7A14114	B4C0	Lenovo ThinkSystem DE Series 1.8TB 10K 2.5" HDD FIPS 2U24	24
4XB7A88048	BW13	Lenovo ThinkSystem DE Series 2.4TB 10K 2.5" HDD FIPS 2U24	24
2.5-inch 12 Gbps SAS hot-swap SSDs (1 DWPD)			
4XB7A14176	B4RY	Lenovo ThinkSystem DE Series 7.68TB 1DWD 2.5" SSD 2U24	24
4XB7A14110	B4CD	Lenovo ThinkSystem DE Series 15.36TB 1DWD 2.5" SSD 2U24	24
2.5-inch 12 Gbps SAS hot-swap SSDs (1 DWPD and 3 DWPD)			
4XB7A74948	BKUQ	Lenovo ThinkSystem DE Series 960GB 1DWD 2.5" SSD 2U24	24
4XB7A74951	BKUT	Lenovo ThinkSystem DE Series 1.92TB 1DWD 2.5" SSD 2U24	24
4XB7A74955	BKUK	Lenovo ThinkSystem DE Series 3.84TB 1DWD 2.5" SSD 2U24	24
2.5-inch 12 Gbps SAS hot-swap FIPS SSDs (1 DWPD)			
4XB7A88469	BWCJ	Lenovo ThinkSystem DE Series 3.84TB 1DWD 2.5" SSD FIPS 2U24	24

The following table lists supported drive options for the 2U12 LFF controller and expansion enclosures.

Table 11. 2U12 LFF drive options

Part number	Feature code	Description	Maximum quantity per 2U12 LFF enclosure
3.5-inch 12 Gbps NL SAS hot-swap HDDs			
4XB7A14099	B4C3	Lenovo ThinkSystem DE Series 4TB 7.2K 3.5" HDD 2U12	12
4XB7A14101	B4C5	Lenovo ThinkSystem DE Series 8TB 7.2K 3.5" HDD 2U12	12
4XB7A14104	B4C8	Lenovo ThinkSystem DE Series 12TB 7.2K 3.5" HDD 2U12	12
4XB7A74942	BHDP	Lenovo ThinkSystem DE Series 18TB 7.2K 3.5" HDD 2U12	12
4XB7A88027	BW1W	Lenovo ThinkSystem DE Series 22TB 7.2K 3.5" HDD 2U12	12
3.5-inch 12 Gbps NL SAS hot-swap FIPS HDDs (SED HDDs)			
4XB7A14103	B4C7	Lenovo ThinkSystem DE Series 10TB 7.2K 3.5" HDD FIPS 2U12	12
3.5-inch 12 Gbps SAS hot-swap SSDs (1 DWPD and 3 DWPD)			
4XB7A74946	BKUN	Lenovo ThinkSystem DE Series 960GB 1DWD 2.5" SSD 2U12	12
4XB7A74947	BKUP	Lenovo ThinkSystem DE Series 1.92TB 1DWD 2.5" SSD 2U12	12
4XB7A74954	BKUJ	Lenovo ThinkSystem DE Series 3.84TB 1DWD 2.5" SSD 2U12	12

Part number	Feature code	Description	Maximum quantity per 2U12 LFF enclosure
3.5-inch 12 Gbps SAS hot-swap FIPS SSDs (1 DWPD) (2.5" drive in a 3.5" tray)			
4XB7A88501	BWCI	Lenovo ThinkSystem DE Series 3.84TB 1DWD 2.5" SSD FIPS 2U12	12

The following table lists supported drive options for the 4U60 LFF controller and expansion enclosures.

Table 12. 4U60 LFF drive options

Part number	Feature code	Description	Maximum quantity per 4U60 LFF enclosure
3.5-inch 12 Gbps NL SAS hot-swap HDDs			
4XB7A14124	B4GG	Lenovo ThinkSystem DE Series 4TB 7.2K 3.5" HDD 4U60	60
4XB7A14125	B4GH	Lenovo ThinkSystem DE Series 8TB 7.2K 3.5" HDD 4U60	60
4XB7A14126	B4GJ	Lenovo ThinkSystem DE Series 10TB 7.2K 3.5" HDD 4U60	60
4XB7A14128	B4GL	Lenovo ThinkSystem DE Series 12TB 7.2K 3.5" HDD 4U60	60
4XB7A64876	BCUC	Lenovo ThinkSystem DE Series 16TB 7.2K 3.5" HDD 4U60	60
4XB7A74943	BHDQ	Lenovo ThinkSystem DE Series 18TB 7.2K 3.5" HDD 4U60	60
4XB7A88038	BW1Y	Lenovo ThinkSystem DE Series 22TB 7.2K 3.5" HDD 4U60	60
3.5-inch 12 Gbps NL SAS hot-swap FIPS HDDs (SED HDDs)			
4XB7A14127	B4GK	Lenovo ThinkSystem DE Series 10TB 7.2K 3.5" HDD FIPS 4U60	60
3.5-inch 12 Gbps SAS hot-swap SSDs (1 DWPD) (2.5" drive in a 3.5" tray)			
4XB7A86719	BUC8	Lenovo Lenovo ThinkSystem DE Series 1.92TB 1DWD SAS SSD 4U60	60
3.5-inch 12 Gbps SAS hot-swap FIPS SSDs (1 DWPD) (2.5" drive in a 3.5" tray)			
4XB7A88506	BWCM	Lenovo ThinkSystem DE Series 3.84TB 1DWD 2.5" SSD FIPS 4U60	60

The following table lists supported drive pack options for the 4U60 LFF controller and expansion enclosures.

Table 13. 4U60 LFF drive pack options

Part number	Feature code	Description	Maximum quantity per 4U60 LFF enclosure
3.5-inch 12 Gbps NL SAS hot-swap HDD packs			
4XB7A14163	B4GN	Lenovo ThinkSystem DE4000H 80TB HDD Pack (20x 4TB HDDs)	3
4XB7A14165	B4GP	Lenovo ThinkSystem DE4000H 160TB HDD Pack (20x 8TB HDDs)	3
4XB7A14167	B4GQ	Lenovo ThinkSystem DE4000H 200TB HDD Pack (20x 10TB HDDs)	3
4XB7A14171	B4GS	Lenovo ThinkSystem DE4000H 240TB HDD Pack (20x 12TB HDDs)	3
4XB7A64877	BCUD	Lenovo ThinkSystem DE4000H 320TB HDD Pack (20x 16TB HDDs)	3
4XB7A74944	BHDR	Lenovo ThinkSystem DE4000H 360TB HDD Pack (20x 18TB HDDs)	3
4XB7A88042	BW1K	Lenovo ThinkSystem DE4000H 440TB HDD Pack (20x 22TB)	3
3.5-inch 12 Gbps NL SAS hot-swap FIPS HDD packs (SED HDD packs)			
4XB7A14169	B4GR	Lenovo ThinkSystem DE4000H 200TB HDD FIPS Pack (20x 10TB FIPS HDDs)	3

Part number	Feature code	Description	Maximum quantity per 4U60 LFF enclosure
3.5-inch 12 Gbps SAS hot-swap SSD packs (1 DWPD) (2.5" drive in a 3.5" tray)			
4XB7A86720	BUC9	Lenovo ThinkSystem DE4000H 38.4TB Pack (20x 1.92TB SAS SSDs)	3
3.5-inch 12 Gbps SAS hot-swap SSD packs (3 DWPD) (2.5" drive in a 3.5" tray)			
4XB7A14161	B4GM	Lenovo ThinkSystem DE4000H 32TB SSD Pack (20x 1.6TB SSDs)	3
FIPS SSDs			
4XB7A88507	BWCN	Lenovo ThinkSystem DE4000H 76.8TB FIPS Pack (20x 3.84TB FIPS SSDs)	3

Configuration notes:

- For hybrid (HDDs and SSDs) and all flash (SSDs only) storage configurations, a single ThinkSystem DE4000H storage system can support a maximum of 120 SSDs.
- A minimum of 20 drives is required for each 4U60 LFF enclosure (the front row of each drawer must be populated with four drives).
- Intermix of FIPS drives and non-FIPS drives is supported within the system.
- FIPS drives are not available in the following countries:
  - Belarus
  - Kazakhstan
  - People's Republic of China
  - Russia

Software

The following functions are included with every ThinkSystem DE4000H:

- **RAID levels 0, 1, 3, 5, 6, and 10** : Provide the flexibility to choose the level of performance and data protection required.
- **Dynamic Disk Pools (DDP) technology**: Helps improve performance and availability with significantly faster rebuild time and reduced exposure to multiple drive failures by allowing data and built-in spare capacity to be distributed across all physical drives in the storage pool.
- **All Flash Array (AFA) capability** : Meets the demand for higher speed storage and provide higher IOPS and bandwidth with lower power usage and total cost of ownership than hybrid or HDD-based solutions.
- **SSD Read Cache** : Helps accelerate performance of read-centric workloads.
- **Thin provisioning**: Optimizes efficiency of Dynamic Disk Pools by allocating storage space based on the minimum space required by each application at any given time, so that applications consume only the space they are actually using, not the total space that has been allocated to them, which allows customers to purchase storage they need today and add more as application requirements grow.
- **Snapshots**: Enables creation of copies of data for backup, parallel processing, testing, and development, and have the copies available almost immediately. Base software supports up to 128 snapshot targets per system.
- **Encryption:** Provides encryption for data at rest for enhanced data security with the optional FIPS 140-2 Level 2 drives and embedded key management (AES-256) or an external key management server.
- **Automatic load balancing:** Provides automated I/O workload balancing of I/O traffic from the hosts across both controllers.
- **Data assurance:** Ensures industry-standard T10-PI end-to-end data integrity in the storage system (from the host ports to the drives).
- **Dynamic volume and capacity expansion:** Allows the capacity of a volume to be expanded by adding

new physical drives or making use of unused space on existing drives.

The ThinkSystem DE4000H capabilities can be expanded with optional licensed functions. Optional licensed functions include:

- **Snapshots upgrade**: Increase the supported number of snapshot targets to 512.
- **Synchronous mirroring:** Provides storage system-based online, real-time data replication between the storage systems containing primary (local) and secondary (remote) volumes by using synchronous data transfers over Fibre Channel communication links (both storage systems must have licenses for synchronous mirroring).
- **Asynchronous mirroring:** Provides storage system-based data replication between the storage systems containing primary (local) and secondary (remote) volumes by using asynchronous data transfers over iSCSI or Fibre Channel communication links at set intervals (both storage systems must have licenses for asynchronous mirroring).

Note: The synchronous and asynchronous mirroring features of the ThinkSystem DE4000H interoperate with other ThinkSystem DE Series storage arrays.

The following table lists the Feature on Demand (FoD) upgrades for the ThinkSystem DE4000H to enable optional software features. Each optional DE4000H function is licensed on a per-system basis and covers both controller enclosure and all attached expansion enclosures.

Table 14. Optional software features

Description	Part number	Feature code
Lenovo ThinkSystem DE4000H Snapshot Upgrade 512	4ZN7A14708	B4QL
Lenovo ThinkSystem DE4000 Synchronous Mirroring	4ZN7A16002	B598
Lenovo ThinkSystem DE4000H Asynchronous Mirroring	4ZN7A14709	B4QM

Software maintenance is included in the ThinkSystem DE4000H base warranty and optional warranty extensions, which provides 3-year software support with the option to extend it up to 5 years in 1-year or 2-year increments (see Warranty and support for details).

Management

The DE4000H supports the following management interfaces:

- ThinkSystem System Manager, a web-based interface via HTTPS for single-system management, that runs on the storage system itself and requires only a supported browser, so there is no need for a separate console or plug-in. For more information, see the System Manager Online Help.
- ThinkSystem SAN Manager, a host-installed GUI-based application, for centralized management of multiple storage systems. For more information, see the SAN Manager Online Help.
- ThinkSystem DE Series Storage Plugin for vCenter. For more information, see the DE Series vCenter Plugin Online Help.
- Command line interface (CLI) via SSH or through serial console. For more information, see the CLI Online Help.
- Syslog, SNMP, and e-mail notifications.
- Optional Lenovo XClarity Administrator support for discovery, inventory, and monitoring.

Power supplies and cables

The ThinkSystem DE Series 2U24 SFF and 2U12 LFF enclosures ship with two redundant hot-swap 913 W (100 - 240 V) Platinum AC power supplies, each with an IEC 320-C14 connector. The Relationship and TopSeller models of the ThinkSystem DE4000H 2U24 SFF and 2U12 LFF, DE240S 2U24 SFF, and DE120S LFF enclosures listed in Controller enclosures and Expansion enclosures ship with two 1.5 m, 10A/100-250V, C13 to IEC 320-C14 rack power cables.

The ThinkSystem DE Series 4U60 LFF enclosures ship with two redundant hot-swap 2325 W (200 - 240 V) Platinum AC power supplies, each with an IEC 320-C20 connector. The Relationship models of the ThinkSystem DE4000H 4U60 LFF and DE600S 4U60 LFF enclosures listed in Controller enclosures and Expansion enclosures ship with two 2.5 m, 16A/100-240V, C19 to IEC 320-C20 rack power cables.

The CTO models require the selection of two power cables.

The following table lists the rack power cable and line cord options that can be ordered for the DE Series 2U24 SFF and 2U12 LFF enclosures (two power cords per enclosure).

Table 15. Power cables for DE Series 2U24 SFF and 2U12 LFF enclosures

Description	Part number	Feature code
Rack power cables		
1.0m, 10A/100-250V, 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
1.5m, 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
2.8m, 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
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		
Argentina 2.8m, 10A/250V, C13 to IRAM 2073 Line Cord	39Y7930	6222
Argentina 4.3m, 10A/250V, C13 to IRAM 2073 Line Cord	81Y2384	6492
Australia/New Zealand 2.8m, 10A/250V, C13 to AS/NZS 3112 Line Cord	39Y7924	6211
Australia/New Zealand 4.3m, 10A/250V, C13 to AS/NZS 3112 Line Cord	81Y2383	6574
Brazil 2.8m, 10A/250V, C13 to NBR 14136 Line Cord	69Y1988	6532
Brazil 4.3m, 10A/250V, C13 to NBR14136 Line Cord	81Y2387	6404
China 2.8m, 10A/250V, C13 to GB 2099.1 Line Cord	39Y7928	6210
China 4.3m, 10A/250V, C13 to GB 2099.1 Line Cord	81Y2378	6580
Denmark 2.8m, 10A/250V, C13 to DK2-5a Line Cord	39Y7918	6213
Denmark 4.3m, 10A/250V, C13 to DK2-5a Line Cord	81Y2382	6575
Europe 2.8m, 10A/250V, C13 to CEE7-VII Line Cord	39Y7917	6212
Europe 4.3m, 10A/250V, C13 to CEE7-VII Line Cord	81Y2376	6572
India 2.8m, 10A/250V, C13 to IS 6538 Line Cord	39Y7927	6269
India 4.3m, 10A/250V, C13 to IS 6538 Line Cord	81Y2386	6567
Israel 2.8m, 10A/250V, C13 to SI 32 Line Cord	39Y7920	6218

Description	Part number	Feature code
Israel 4.3m, 10A/250V, C13 to SI 32 Line Cord	81Y2381	6579
Italy 2.8m, 10A/250V, C13 to CEI 23-16 Line Cord	39Y7921	6217
Italy 4.3m, 10A/250V, C13 to CEI 23-16 Line Cord	81Y2380	6493
Japan 2.8m, 12A/125V, C13 to JIS C-8303 Line cord	46M2593	A1RE
Japan 2.8m, 12A/250V, C13 to JIS C-8303 Line Cord	4L67A08357	6533
Japan 4.3m, 12A/125V, C13 to JIS C-8303 Line Cord	39Y7926	6335
Japan 4.3m, 12A/250V, C13 to JIS C-8303 Line Cord	4L67A08362	6495
Korea 2.8m, 12A/250V, C13 to KS C8305 Line Cord	39Y7925	6219
Korea 4.3m, 12A/250V, C13 to KS C8305 Line Cord	81Y2385	6494
South Africa 2.8m, 10A/250V, C13 to SABS 164 Line Cord	39Y7922	6214
South Africa 4.3m, 10A/250V, C13 to SABS 164 Line Cord	81Y2379	6576
Switzerland 2.8m, 10A/250V, C13 to SEV 1011-S24507 Line Cord	39Y7919	6216
Switzerland 4.3m, 10A/250V, C13 to SEV 1011-S24507 Line Cord	81Y2390	6578
Taiwan 2.8m, 10A/125V, C13 to CNS 10917-3 Line Cord	23R7158	6386
Taiwan 2.8m, 10A/250V, C13 to CNS 10917-3 Line Cord	81Y2375	6317
Taiwan 2.8m, 15A/125V, C13 to CNS 10917-3 Line Cord	81Y2374	6402
Taiwan 4.3m, 10A/125V, C13 to CNS 10917-3 Line Cord	4L67A08363	AX8B
Taiwan 4.3m, 10A/250V, C13 to CNS 10917-3 Line Cord	81Y2389	6531
Taiwan 4.3m, 15A/125V, C13 to CNS 10917-3 Line Cord	81Y2388	6530
United Kingdom 2.8m, 10A/250V, C13 to BS 1363/A Line Cord	39Y7923	6215
United Kingdom 4.3m, 10A/250V, C13 to BS 1363/A Line Cord	81Y2377	6577
United States 2.8m, 10A/125V, C13 to NEMA 5-15P Line Cord	90Y3016	6313
United States 2.8m, 10A/250V, C13 to NEMA 6-15P Line Cord	46M2592	A1RF
United States 2.8m, 13A/125V, C13 to NEMA 5-15P Line Cord	00WH545	6401
United States 4.3m, 10A/125V, C13 to NEMA 5-15P Line Cord	4L67A08359	6370
United States 4.3m, 10A/250V, C13 to NEMA 6-15P Line Cord	4L67A08361	6373
United States 4.3m, 13A/125V, C13 to NEMA 5-15P Line Cord	4L67A08360	AX8A

The following table lists the rack power cable and line cord options that can be ordered for the DE Series 4U60 LFF enclosures (two power cords per enclosure).

Table 16. Power cables for DE Series 4U60 enclosures

Description	Part number	Feature code
Rack power cables		
2.0m, 16A/100-250V, C19 to IEC 320-C20 Rack Power Cable	None*	B4L2
2.5m, 16A/100-250V, C19 to IEC 320-C20 Rack Power Cable	39Y7916	6252
Line cords		
Argentina 4.3m, 16A/250V, C19 to IRAM 2073 Line Cord	40K9777	6276
Australia/New Zealand 4.3m, 15A/250V, C19 to AS/NZS 3112 Line Cord	40K9773	6284
Brazil 4.3m, 16A/250V, C19 to NBR 14136 Line Cord	40K9775	6277
China 4.3m, 16A/250V, C19 to GB2099.1 Line Cord	40K9774	6288
Denmark/Switzerland 4.3m, 16A/250V, C19 to IEC 309 P+N+G Line Cord	40K9769	6283
Europe 4.3m, 16A/250V, C19 to CEE7-VII Line Cord	40K9766	6279
India 4.3m, 16A/250V, C19 to IS6538 Line Cord	40K9776	6285
Israel 4.3m, 16A/250V, C19 to SI 32 Line Cord	40K9771	6282
Italy 4.3m, 16A/250V, C19 to CEI 23-16 Line Cord	40K9768	6281
Japan 4.3m, 15A/200V, C19 to JIS C-8303 Line Cord	41Y9233	6291
Korea 4.3m, 15A/250V, C19 to KSC 8305 Line Cord	41Y9231	6289
South Africa 4.3m, 16A/250V, C19 to SABS 164 Line Cord	40K9770	6280
Switzerland 4.3m, 16A/250V, C19 to SEV 1011 Line Cord	81Y2391	6549
Taiwan 4.3m, 16A/250V, C19 to CNS 10917-3 Line Cord	41Y9230	6287
United Kingdom 4.3m, 13A/250V, C19 to BS 1363/A Line Cord	40K9767	6278
United States 4.3m, 15A/250V, C19 to NEMA 6-15P Line Cord	00D7197	A1NV
United States 4.3m, 18A/250V, C19 to NEMA L6-20P Line Cord	40K9772	6275

* CTO only.

Rack installation

The individually shipped ThinkSystem DE Series 2U12 enclosures come with the ThinkSystem Storage Rack Mount Kit 2U12, and the individually shipped ThinkSystem DE Series 2U24 and 4U60 enclosures come with the ThinkSystem Storage Rack Mount Kit 2U24/4U60. These rack mount kits are listed in the following table.

Table 17. 4-post rack mount kits

Description	Feature code	Quantity
Lenovo ThinkSystem Storage Rack Mount Kit 2U12	B38X	1
Lenovo ThinkSystem Storage Rack Mount Kit 2U24/4U60	B38Y	1

When the ThinkSystem DE Series enclosures are factory-integrated and shipped installed in a rack cabinet, the rack mount kits that support Ship-in-Rack (SIR) capabilities are derived by the configurator. The SIR-capable rack mount kits are listed in the following table.

Table 18. 4-post SIR rack mount kits

Description	Feature code	Quantity
Lenovo ThinkSystem Storage Rack Mount Kit 2U12	B38X	1
Lenovo ThinkSystem Storage SIR Rack Mount Kit (for 2U24 enclosures)	B6TH	1
DM/DE 4U Adjustable Rail Kit (SIR)	B742	1

The following table summarizes the rack mount kit features and specifications.

Table 19. Rack mount kit features and specifications summary

	Screw-in fixed rail with adjustable depth			
Attribute	**2U12**	**2U24/4U60**	**2U24 SIR**	**4U SIR**
Feature code	B38X	B38Y	B6TH	B742
Enclosure support	DE4000H 2U LFF DE120S	DE4000H 2U SFF DE4000H 4U‡ DE240S DE600S‡	DE4000H 2U SFF DE240S	DE4000H 4U‡ DE600S‡
Rail type	Fixed (static) with adjustable depth	Fixed (static) with adjustable depth	Fixed (static) with adjustable depth	Fixed (static) with adjustable depth
Tool-less installation	No	No	No	No
In-rack maintenance	Yes*	Yes*	Yes*	Yes*
Ship-in-rack (SIR) support	Yes	No	Yes	Yes
1U PDU support	Yes	Yes	Yes	Yes
0U PDU support	Limited**	Limited**	Limited**	Limited**
Rack type	IBM or Lenovo 4-post, IEC standard-compliant	IBM or Lenovo 4-post, IEC standard-compliant	IBM or Lenovo 4-post, IEC standard-compliant	IBM or Lenovo 4-post, IEC standard-compliant
Mounting holes	Square or round	Square or round	Square or round	Square or round
Mounting flange thickness	2 mm (0.08 in.) – 3.3 mm (0.13 in.)	2 mm (0.08 in.) – 3.3 mm (0.13 in.)	2 mm (0.08 in.) – 3.3 mm (0.13 in.)	2 mm (0.08 in.) – 3.3 mm (0.13 in.)
Distance between front and rear mounting flanges^	605 mm (23.8 in.) – 812.8 mm (32 in.)	605 mm (23.8 in.) – 812.8 mm (32 in.)	605 mm (23.8 in.) – 812.8 mm (32 in.)	605 mm (23.8 in.) – 812.8 mm (32 in.)

‡ The rack cabinet must be at least 1100 mm (43.31 in.) deep for 4U60 enclosures.
* The majority of the enclosure components can be serviced from the front or rear of the enclosure, which does not require the removal of the enclosure from the rack cabinet.
** If a 0U PDU is used, the rack cabinet must be at least 1000 mm (39.37 in.) deep for 2U12 and 2U24 enclosures, or at least 1200 mm (47.24 in.) deep for 4U60 enclosures.
^ Measured when mounted on the rack, from the front surface of the front mounting flange to the rear most point of the rail.

Physical specifications

The ThinkSystem DE Series 2U24 SFF enclosures have the following dimensions:

- Height: 85 mm (3.4 in.)
- Width: 449 mm (17.7 in.)
- Depth: 553 mm (21.8 in.)

The ThinkSystem DE Series 2U12 LFF enclosures have the following dimensions:

- Height: 85 mm (3.4 in.)
- Width: 447 mm (17.6 in.)
- Depth: 483 mm (19.0 in.)

The ThinkSystem DE Series 4U60 LFF enclosures have the following dimensions:

- Height: 174 mm (6.9 in.)
- Width: 449 mm (17.7 in.)
- Depth: 922 mm (36.3 in.)

Weights (fully configured):

- DE4000H 2U24 SFF controller enclosure (7Y75): 24.59 kg (54.2 lb)
- DE4000H 2U12 LFF controller enclosure (7Y74): 28.78 kg (63.4 lb)
- DE4000H 4U60 LFF controller enclosure (7Y77): 108.07 kg (238.3 lb)
- DE240S 2U24 SFF expansion enclosure (7Y68): 27.44 kg (60.5 lb)
- DE120S 2U12 LFF expansion enclosure (7Y63): 27.12 kg (59.8 lb)
- DE600S 4U60 LFF expansion enclosure (7Y69): 112.2 kg (247.4 lb)

Operating environment

The ThinkSystem DE Series 2U24 SFF, 2U12 LFF, and 4U60 LFF enclosures are supported in the following environment:

- Air temperature:
  - Operating:
    - DE4000H and DE240S 2U24 SFF: 5 °C - 45 °C (41 °F - 113 °F)
    - DE4000H and DE120S 2U12 LFF: 10 °C - 40 °C (50 °F - 104 °F)
    - DE4000H and DE600S 4U60 LFF: 10 °C - 40 °C (50 °F - 104 °F)
  - Non-operating: -10 °C - +50 °C (14 °F - 122 °F)
  - Maximum altitude: 3050 m (10,000 ft)
- Relative humidity:
  - Operating: 8% - 90% (non-condensing)
  - Non-operating: 10% - 90% (non-condensing)
- Electrical power:
  - 100 to 127 V AC (nominal); 50 Hz / 60 Hz (except 4U60 LFF enclosures)
  - 200 to 240 V AC (nominal); 50 Hz / 60 Hz
- Acoustical noise emission:
  - DE4000H 2U24 SFF and DE120S 2U12 LFF: 6.8 bels
  - DE4000H 2U12 LFF and DE240S 2U24 SFF: 6.6 bels
  - DE4000H and DE600S 4U60 SFF: 7.2 bels

The following table lists the maximum enclosure power load, inlet current, and heat output based on the source voltage.

Table 20. Enclosure power load, inlet current, and heat output

Enclosure	Source voltage (nominal)	Maximum power load	Current per inlet	Heat output
DE4000H 2U24 SFF	100 - 127 V AC	667 W	7.03 A	2276 BTU/hour
	200 - 240 V AC	578 W	3.05 A	1973 BTU/hour
DE4000H 2U12 LFF	100 - 127 V AC	570 W	6 A	1945 BTU/hour
	200 - 240 V AC	508 W	2.68 A	1734 BTU/hour
DE4000H 4U60 LFF	200 - 240 V AC	1512 W	7.96 A	5159 BTU/hour
DE240S 2U24 SFF	100 - 127 V AC	389 W	4.1 A	1328 BTU/hour
	200 - 240 V AC	382 W	2.02 A	1304 BTU/hour
DE120S 2U12 LFF	100 - 127 V AC	306 W	3.3 A	1045 BTU/hour
	200 - 240 V AC	300 W	1.58 A	1024 BTU/hour
DE600S 4U60 LFF	200 - 240 V AC	1446 W	7.62 A	4934 BTU/hour

Warranty and support

The ThinkSystem DE Series enclosures have a three-year customer-replaceable unit (CRU) and onsite limited (for field-replaceable units [FRUs] only) warranty with standard call center support during normal business hours and 9x5 Next Business Day Parts Delivered.

Lenovo's additional support services provide a sophisticated, unified support structure for a customer's data center, with an experience consistently ranked number one in customer satisfaction worldwide.

The following Lenovo support services are available:

- **Premier Support** provides a Lenovo-owned customer experience and delivers direct access to technicians skilled in hardware, software, and advanced troubleshooting, in addition to the following capabilities:
  - Direct technician-to-technician access through a dedicated phone line.
  - 24x7x365 remote support.
  - Single point of contact service.
  - End to end case management.
  - 3rd Party collaborative software support.
  - Online case tools and live chat support.
  - On-demand remote system analysis.
- **Warranty Upgrades (Preconfigured Support)** are available to meet the on-site response time targets that match the criticality of customer's systems:
  - 3, 4, or 5 years of service coverage.
  - 1-year or 2-year post-warranty extensions.
  - **Foundation Service:** 9x5 service coverage with next business day onsite response, with optional YourDrive YourData.
  - **Essential Service:** 24x7 service coverage with 4-hour onsite response or 24-hour committed repair (available only in select regions), with optional YourDrive YourData.
  - **Advanced Service:** 24x7 service coverage with 2-hour onsite response or 6-hour committed repair (available only in select regions), with optional YourDrive YourData.

- **Managed Services**
  Lenovo Managed Services provide continuous 24x7 remote monitoring (plus 24x7 call center availability) and proactive management of a customer's data center using state of the art tools, systems, and practices by a team of highly skilled and experienced Lenovo services professionals.

  Quarterly reviews check error logs, verify firmware and operating system device driver levels, and software as needed. Lenovo will also maintain records of latest patches, critical updates, and firmware levels, to ensure customer's systems are providing business value through optimized performance.

- **Technical Account Management (TAM)**
  A Lenovo Technical Account Manager helps customers optimize operations of their data centers based on a deep understanding of customer's business. Customers gain direct access to a Lenovo TAM, who serves as their single point of contact to expedite service requests, provide status updates, and furnish reports to track incidents over time. Also, a TAM helps proactively make service recommendations and manage service relationship with Lenovo to make certain that customer's needs are met.

- **YourDrive YourData**
  Lenovo's YourDrive YourData service is a multi-drive retention offering that ensures that customer's data is always under their control, regardless of the number of drives that are installed in their Lenovo system. In the unlikely event of a drive failure, customers retain possession of their drive while Lenovo replaces the failed drive part. Customer's data stays safely on customer premises, in their hands. The YourDrive YourData service can be purchased in convenient bundles with Foundation, Essential, or Advanced Service upgrades and extensions.

- **Health Check**
  Having a trusted partner who can perform regular and detailed health checks is central to maintaining efficiency and ensuring that customer systems and business are always running at their best. Health Check supports Lenovo-branded server, storage, and networking devices, as well as select Lenovo-supported products from other vendors that are sold by Lenovo or a Lenovo-Authorized Reseller.

Some regions might have different warranty terms and conditions than the standard warranty. This is due to local business practices or laws in the specific region. Local service teams 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 base warranty.

If warranty terms and conditions include onsite labor for repair or replacement of parts, Lenovo will dispatch a service technician to the customer site to perform the replacement. Onsite labor under base warranty is limited to labor for replacement of parts that have been determined to be field-replaceable units (FRUs). Parts that are determined to be customer-replaceable units (CRUs) do not include onsite labor under base warranty.

If warranty terms include parts-only base warranty, Lenovo is responsible for delivering only replacement parts that are under base warranty (including FRUs) that 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.

Lenovo support services are region-specific. Not all support services are available in every region. For information about Lenovo support services that are available in a specific region, refer to the following resources:

- Service part numbers in Data Center Solution Configurator (DCSC):
  http://dcsc.lenovo.com/#/services
- Lenovo Services Availability Locator
  https://lenovolocator.com/

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

- Lenovo Statement of Limited Warranty for Infrastructure Solutions Group (ISG) Servers and System Storage
  http://pcsupport.lenovo.com/us/en/solutions/ht503310
- Lenovo Data Center Services Agreement

http://support.lenovo.com/us/en/solutions/ht116628

Services

Lenovo Data Center Services empower you at every stage of your IT lifecycle. From expert advisory and strategic planning to seamless deployment and ongoing support, we ensure your infrastructure is built for success. Our comprehensive services accelerate time to value, minimize downtime, and free your IT staff to focus on driving innovation and business growth.

Note: Some service options may not be available in all markets or regions. For more information, go to https://lenovolocator.com/. For information about Lenovo service upgrade offerings that are available in your region, contact your local Lenovo sales representative or business partner.

In this section:

- Lenovo Advisory Services
- Lenovo Plan & Design Services
- Lenovo Deployment, Migration, and Configuration Services
- Lenovo Support Services
- Lenovo Managed Services
- Lenovo Sustainability Services

Lenovo Advisory Services

Lenovo Advisory Services simplify the planning process, enabling customers to build future-proofed strategies in as little as six weeks. Consultants provide guidance on projects including VM migration, storage, backup and recovery, and cost management to accelerate time to value, improve cost efficiency, and build a flexibly scalable foundation.

- **Assessment Services**

  An Assessment helps solve your IT challenges through an onsite, multi-day session with a Lenovo technology expert. We perform a tools-based assessment which provides a comprehensive and thorough review of a company's environment and technology systems. In addition to the technology based functional requirements, the consultant also discusses and records the non-functional business requirements, challenges, and constraints. Assessments help organizations like yours, no matter how large or small, get a better return on your IT investment and overcome challenges in the ever-changing technology landscape.

- **Design Services**

  Professional Services consultants perform infrastructure design and implementation planning to support your strategy. The high-level architectures provided by the assessment service are turned into low level designs and wiring diagrams, which are reviewed and approved prior to implementation. The implementation plan will demonstrate an outcome-based proposal to provide business capabilities through infrastructure with a risk-mitigated project plan.

Lenovo Plan & Design Services

Unlock faster time to market with our tailored, strategic design workshops to align solution approaches with your business goals and technical requirements. Leverage our deep solution expertise and end-to-end delivery partnership to meet your goals efficiently and effectively.

Lenovo Deployment, Migration, and Configuration Services

Optimize your IT operations by shifting labor-intensive functions to Lenovo's skilled technicians for seamless on-site or remote deployment, configuration, and migration. Enjoy peace of mind, faster time to value, and comprehensive knowledge sharing with your IT staff, backed by our best-practice methodology.

- **Deployment Services for Storage and ThinkAgile**

  A comprehensive range of remote and onsite options tailored specifically for your business needs to ensure your storage and ThinkAgile hardware are fully operational from the start.

- **Hardware Installation Services**

  A full-range, comprehensive setup for your hardware, including unpacking, inspecting, and positioning components to ensure your equipment is operational and error-free for the most seamless and efficient installation experience, so you can quickly benefit from your investments.

- **DM/DG File Migration Services**

  Take the burden of file migration from your IT's shoulders. Our experts will align your requirements and business objectives to the migration plans while coordinating with your team to plan and safely execute the data migration to your storage platforms.

- **DM/DG/DE Health Check Services**

  Our experts perform proactive checks of your Firmware and system health to ensure your machines are operating at peak and optimal efficiency to maximize up-time, avoid system failures, ensure the security of IT solutions and simplify maintenance.

- **Factory Integrated Services**

  A suite of value-added offerings provided during the manufacturing phase of a server or storage system that reduces time to value. These services aim at improving your hardware deployment experience and enhance the quality of a standard configuration before it arrives at your facility.

Lenovo Support Services

In addition to response time options for hardware parts, repairs, and labor, Lenovo offers a wide array of additional support services to ensure your business is positioned for success and longevity. Our goal is to reduce your capital outlays, mitigate your IT risks, and accelerate your time to productivity.

- **Premier Support for Data Centers**

  Your direct line to the solution that promises the best, most comprehensive level of support to help you fully unlock the potential of your data center.

- **Premier Enhanced Storage Support (PESS)**

  Gain all the benefits of Premier Support for Data Centers, adding dedicated storage specialists and resources to elevate your storage support experience to the next level.

- **Committed Service Repair (CSR)**

  Our commitment to ensuring the fastest, most seamless resolution times for mission-critical systems that require immediate attention to ensure minimal downtime and risk for your business. This service is only available for machines under the Premier 4-Hour Response SLA.

- **Multivendor Support Services (MVS)**

  Your single point of accountability for resolution support across vast range of leading Server, Storage, and Networking OEMs, allowing you to manage all your supported infrastructure devices seamlessly from a single source.

- **Keep Your Drive (KYD)**

  Protect sensitive data and maintain compliance with corporate retention and disposal policies to ensure your data is always under your control, regardless of the number of drives that are installed in your Lenovo server.

- **Technical Account Manager (TAM)**

  Your single point of contact to expedite service requests, provide status updates, and furnish reports to track incidents over time, ensuring smooth operations and optimized performance as your business grows.

- **Enterprise Software Support (ESS)**

  Gain comprehensive, single-source, and global support for a wide range of server operating systems and Microsoft server applications.

For more information, consult the brochure Lenovo Operational Support Services for Data Centers.

Lenovo Managed Services

Achieve peak efficiency, high security, and minimal disruption with Lenovo's always-on Managed Services. Our real-time monitoring, 24x7 incident response, and problem resolution ensure your infrastructure operates seamlessly. With quarterly health checks for ongoing optimization and innovation, Lenovo's remote active monitoring boosts end-user experience and productivity by keeping your data center's hardware performing at its best.

Lenovo Managed Services provides continuous 24x7 remote monitoring (plus 24x7 call center availability) and proactive management of your data center using state-of-the-art tools, systems, and practices by a team of highly skilled and experienced Lenovo services professionals.

Quarterly reviews check error logs, verify firmware & OS device driver levels, and software as needed. We'll also maintain records of latest patches, critical updates, and firmware levels, to ensure you systems are providing business value through optimized performance.

Lenovo Sustainability Services

- **Asset Recovery Services**

  Lenovo Asset Recovery Services (ARS) provides a secure, seamless solution for managing end-of-life IT assets, ensuring data is safely sanitized while contributing to a more circular IT lifecycle. By maximizing the reuse or responsible recycling of devices, ARS helps businesses meet sustainability goals while recovering potential value from their retired equipment. For more information, see the Asset Recovery Services offering page.

- **CO2 Offset Services**

  Lenovo's CO2 Offset Services offer a simple and transparent way for businesses to take tangible action on their IT footprint. By integrating CO2 offsets directly into device purchases, customers can easily support verified climate projects and track their contributions, making meaningful progress toward their sustainability goals without added complexity.

- **Lenovo Certified Refurbished**

  Lenovo Certified Refurbished offers a cost-effective way to support IT circularity without compromising on quality and performance. Each device undergoes rigorous testing and certification, ensuring reliable performance and extending its lifecycle. With Lenovo's trusted certification, you gain peace of mind while making a more sustainable IT choice.

Regulatory compliance

The ThinkSystem DE Series enclosures conform to the following regulations:

- United States: FCC Part 15, Class A; UL 60950-1 and 62368-1
- Canada: ICES-003, Class A; CAN/CSA-C22.2 60950-1 and 62368-1
- Argentina: IEC60950-1
- Mexico NOM
- European Union: CE Mark (EN55032 Class A, EN55024, IEC/EN60950-1 and 62368-1); ROHS Directive 2011/65/EU
- Russia, Kazakhstan, Belarus: EAC
- China: CCC GB 4943.1, GB 17625.1, GB 9254 Class A; CELP; CECP
- India: BIS
- Japan: VCCI, Class A
- Taiwan: BSMI CNS 13438, Class A; CNS 14336-1
- Korea KN32/35, Class A
- Australia/New Zealand: AS/NZS CISPR 22 Class A

Interoperability

Lenovo provides end-to-end storage compatibility testing to deliver interoperability throughout the network. The ThinkSystem DE4000H Hybrid Storage Array supports attachment to Lenovo ThinkSystem, System x, and Flex System hosts by using SAS, iSCSI, or Fibre Channel storage connectivity protocols.

For end-to-end storage configuration support, refer to the Lenovo Storage Interoperation Center (LSIC): https://datacentersupport.lenovo.com/us/en/lsic

Use the LSIC to select the known components of your configuration and then get a list all other supported combinations, with details about supported hardware, firmware, operating systems, and drivers, plus any additional configuration notes. View results on screen or export them to Excel.

Fibre Channel SAN switches

Lenovo offers the ThinkSystem DB Series of Fibre Channel SAN switches for high-performance storage expansion. See the DB Series product guides for models and configuration options:

- ThinkSystem DB Series SAN Switches: https://lenovopress.com/storage/switches/rack#rt=product-guide

Rack cabinets

The following table lists the supported rack cabinets.

Table 21. Rack cabinets (D)

Model	Description
7D6DA007WW	ThinkSystem 42U Onyx Primary Heavy Duty Rack Cabinet (1200mm)
7D6DA008WW	ThinkSystem 42U Pearl Primary Heavy Duty Rack Cabinet (1200mm)
7D6EA009WW	ThinkSystem 48U Onyx Primary Heavy Duty Rack Cabinet (1200mm)
7D6EA00AWW	ThinkSystem 48U Pearl Primary Heavy Duty Rack Cabinet (1200mm)
93604PX	42U 1200mm Deep Dynamic Rack
93614PX	42U 1200mm Deep Static Rack
93634PX	42U 1100mm Dynamic Rack
93634EX	42U 1100mm Dynamic Expansion Rack
93074RX	42U Standard Rack (1000mm)

For specifications about these racks, see the Lenovo Rack Cabinet Reference, available from:
https://lenovopress.com/lp1287-lenovo-rack-cabinet-reference

For more information, see the list of Product Guides in the Rack cabinets category:
https://lenovopress.com/servers/options/racks

Power distribution units

The following table lists the power distribution units (PDUs) that are offered by Lenovo.

Table 22. Power distribution units

Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
0U Basic PDUs															
4PU7A93176	C0QH	0U 36 C13 and 6 C19 Basic 32A 1 Phase PDU v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4PU7A93169	C0DA	0U 36 C13 and 6 C19 Basic 32A 1 Phase PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4PU7A93177	C0QJ	0U 24 C13/C15 and 24 C13/C15/C19 Basic 32A 3 Phase WYE PDU v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
0U Switched and Monitored PDUs															
4PU7A93181	C0QN	0U 21 C13/C15 and 21 C13/C15/C19 Switched and Monitored 48A 3 Phase Delta PDU v2 (60A derated)	N	Y	N	N	N	N	N	Y	N	Y	N	Y	N
4PU7A93178	C0QK	0U 20 C13 and 4 C19 Switched and Monitored 32A 1 Phase PDU v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4PU7A93171	C0D8	0U 20 C13 and 4 C19 Switched and Monitored 32A 1 Phase PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4PU7A93182	C0QP	0U 18 C13/C15 and 18 C13/C15/C19 Switched and Monitored 63A 3 Phase WYE PDU v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4PU7A93175	C0CS	0U 18 C13/C15 and 18 C13/C15/C19 Switched and Monitored 63A 3 Phase WYE PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y

Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
4PU7A93180	C0QM	0U 18 C13/C15 and 18 C13/C15/C19 Switched and Monitored 32A 3 Phase WYE PDU v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4PU7A93179	C0QL	0U 16 C13/C15 and 16 C13/C15/C19 Switched and Monitored 24A 1 Phase PDU v2 (30A derated)	N	Y	N	N	N	N	N	Y	N	Y	N	Y	N
1U Switched and Monitored PDUs															
4PU7A90808	C0D4	1U 18 C19/C13 Switched and monitored 48A 3P WYE PDU V2 ETL	N	N	N	N	N	N	N	Y	N	Y	Y	Y	N
4PU7A81117	BNDV	1U 18 C19/C13 switched and monitored 48A 3P WYE PDU - ETL	N	N	N	N	N	N	N	N	N	N	N	Y	N
4PU7A90809	C0DE	1U 18 C19/C13 Switched and monitored 48A 3P WYE PDU V2 CE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
4PU7A90810	C0DD	1U 18 C19/C13 Switched and monitored 80A 3P Delta PDU V2	N	N	N	N	N	N	N	Y	N	Y	Y	Y	N
4PU7A90811	C0DC	1U 12 C19/C13 Switched and monitored 32A 3P WYE PDU V2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4PU7A90812	C0DB	1U 12 C19/C13 Switched and monitored 60A 3P Delta PDU V2	N	N	N	N	N	N	N	Y	N	Y	Y	Y	N
Line cords for 1U PDUs that ship without a line cord															
40K9611	6504	4.3m, 32A/380-415V, EPDU/IEC 309 3P+N+G 3ph wye (non-US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9612	6502	4.3m, 32A/230V, EPDU to IEC 309 P+N+G (non-US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9613	6503	4.3m, 63A/230V, EPDU to IEC 309 P+N+G (non-US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9614	6500	4.3m, 30A/208V, EPDU to NEMA L6-30P (US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9615	6501	4.3m, 60A/208V, EPDU to IEC 309 2P+G (US) Line Cord	N	N	Y	N	N	N	Y	N	N	Y	Y	Y	N

For more information, see the Lenovo Press documents in the PDU category:
https://lenovopress.com/servers/options/pdu

Uninterruptible power supply units

The following table lists the uninterruptible power supply (UPS) units that are offered by Lenovo.

Table 23. Uninterruptible power supply units

Part number	Description
Rack-mounted or tower UPS units - 100-125VAC	
7DD5A001WW	RT1.5kVA 2U Rack or Tower UPS-G2 (100-125VAC)
7DD5A003WW	RT3kVA 2U Rack or Tower UPS-G2 (100-125VAC)
Rack-mounted or tower UPS units - 200-240VAC	
7DD5A002WW	RT1.5kVA 2U Rack or Tower UPS-G2 (200-240VAC)
7DD5A005WW	RT3kVA 2U Rack or Tower UPS-G2 (200-240VAC)
7DD5A007WW	RT5kVA 3U Rack or Tower UPS-G2 (200-240VAC)
7DD5A008WW	RT6kVA 3U Rack or Tower UPS-G2 (200-240VAC)
7DD5A00AWW	RT11kVA 6U Rack or Tower UPS-G2 (200-240VAC)

† Only available in China and the Asia Pacific market.

For more information, see the list of Product Guides in the UPS category:
https://lenovopress.com/servers/options/ups

Lenovo Financial Services

Why wait to obtain the technology you need now? No payments for 90 days and predictable, low monthly payments make it easy to budget for your Lenovo solution.

- **Flexible**

  Our in-depth knowledge of the products, services and various market segments allows us to offer greater flexibility in structures, documentation and end of lease options.

- **100% Solution Financing**

  Financing your entire solution including hardware, software, and services, ensures more predictability in your project planning with fixed, manageable payments and low monthly payments.

- **Device as a Service (DaaS)**

  Leverage latest technology to advance your business. Customized solutions aligned to your needs. Flexibility to add equipment to support growth. Protect your technology with Lenovo's Premier Support service.

- **24/7 Asset management**

  Manage your financed solutions with electronic access to your lease documents, payment histories, invoices and asset information.

- **Fair Market Value (FMV) and $1 Purchase Option Leases**

  Maximize your purchasing power with our lowest cost option. An FMV lease offers lower monthly payments than loans or lease-to-own financing. Think of an FMV lease as a rental. You have the flexibility at the end of the lease term to return the equipment, continue leasing it, or purchase it for the fair market value. In a $1 Out Purchase Option lease, you own the equipment. It is a good option when you are confident you will use the equipment for an extended period beyond the finance term. Both lease types have merits depending on your needs. We can help you determine which option will best meet your technological and budgetary goals.

Ask your Lenovo Financial Services representative about this promotion and how to submit a credit application. For the majority of credit applicants, we have enough information to deliver an instant decision and send a notification within minutes.

Seller training courses

The following sales training courses are offered for employees and partners (login required). Courses are listed in date order.

1. **Partner Technical Webinar - Commvault**
   2025-08-11 | 60 minutes | Employees and Partners

   In this 60-minute replay, Commvault provided an in-depth look into Hyperscale X, Bundles, IntelliSnap and licensing.

   Tags: Data Management

   Published: 2025-08-11
   Length: 60 minutes

   Start the training:
   Employee link: Grow@Lenovo
   Partner link: Lenovo 360 Learning Center

   Course code: AUG0825
2. **ThinkSystem DE Series Portfolio Overview**
   2025-06-20 | 30 minutes | Employees and Partners

   This course builds on the Data Storage Solutions Overview (DSTOO102) course by introducing you to the DE Series Portfolio. After completing this course, you will be able to position the Lenovo ThinkSystem DE Series products and features based on the needs of your customers, correlate the Lenovo ThinkSystem DE Series Portfolio with Lenovo's comprehensive Data Management Portfolio, and use the qualifying questions to identify customer needs during conversations.

   Tags: Data Management, Storage, ThinkSystem

   Published: 2025-06-20
   Length: 30 minutes

   Start the training:
   Employee link: Grow@Lenovo
   Partner link: Lenovo 360 Learning Center

   Course code: DDEO101
3. **Data Storage Solutions Overview**
   2025-06-18 | 25 minutes | Employees and Partners

   After completing this course you will be able to:
   1. Know more about the data management trends and challenges
   2. Understand the data storage solutions portfolio
   3. Find out how data drives business value

   Tags: Storage

   Published: 2025-06-18
   Length: 25 minutes

   Start the training:
   Employee link: Grow@Lenovo
   Partner link: Lenovo 360 Learning Center

   Course code: DSTOO102

4. **Lenovo Storage Sales Certification Exam Study Guide**
   2025-06-18 | 10 minutes | Employees and Partners

   This guide includes information to help candidates prepare and register for the Lenovo Storage Sales Certification Exam (LENU-123C).

   Tags: Storage

   Published: 2025-06-18
   Length: 10 minutes

   Start the training:
   Employee link: Grow@Lenovo
   Partner link: Lenovo 360 Learning Center

   Course code: LENU-123C-SG

5. **Lenovo Data Center Product Portfolio**
   2025-06-11 | 20 minutes | Employees and Partners

   This course introduces the Lenovo data center portfolio, and covers servers, storage, storage networking, and software-defined infrastructure products. After completing this course about Lenovo data center products, you will be able to identify product types within each data center family, describe Lenovo innovations that this product family or category uses, and recognize when a specific product should be selected.

   Course objectives:
   1.Identify product types within each data center family
   2.Describe the features of the product family or category
   3.Recognize when a specific product should be selected

   Tags: Advanced DataCenter, DataCenter Products, Server, ThinkAgile, ThinkEdge, ThinkSystem

   Published: 2025-06-11
   Length: 20 minutes

   Start the training:
   Employee link: Grow@Lenovo
   Partner link: Lenovo 360 Learning Center

   Course code: SXXW1110r8

6. **Partner Technical Webinar - DB710S & DE Announcements**
   2025-05-13 | 60 minutes | Employees and Partners

   This 60-minute replay concludes the storage announcement series update with DE and DB710S. During this session, we covered the latest advancements in storage technology, discussed the performance improvements and new features of DE, and explored the capabilities and benefits of the updated DB710S.

   Tags: DataCenter Products, Storage

   Published: 2025-05-13
   Length: 60 minutes

   Start the training:
   Employee link: Grow@Lenovo
   Partner link: Lenovo 360 Learning Center

   Course code: MAY0925

7. **Family Portfolio: Storage**
   2025-04-30 | 50 minutes | Employees and Partners

   This course covers the Lenovo storage portfolio, from tape drives used for backups and archiving all the way through high-performance storage systems. After completing this course about the Storage family, the learner will be able to identify products and features within the family, describe the features of this Product Family, and recognize when a specific product should be selected.

   Tags: Storage, ThinkSystem

   Published: 2025-04-30
   Length: 50 minutes

   Start the training:
   Employee link: Grow@Lenovo
   Partner link: Lenovo 360 Learning Center

   Course code: SXSW1201r17
8. **How to Order DM and DE Services Through DCSC**
   2025-02-07 | 15 minutes | Employees and Partners

   The goal of this training is to provide Lenovo sellers and business partners with an overview of the available services for ThinkSystem DM and DE.

   Learning Objectives:

   - Review what is included in each service
   - Describe the benefits of each service
   - Demonstrate how to order
   - Discover where to go for more details

   Tags: Services

   Published: 2025-02-07
   Length: 15 minutes

   Start the training:
   Employee link: Grow@Lenovo
   Partner link: Lenovo 360 Learning Center

   Course code: DSVC134r4
9. **Partner Technical Webinar - Cost Effective Storage Solutions**
   2025-01-14 | 60 minutes | Employees and Partners

   In this 60-minute replay, Lenovo Storage Architect, Dan Beins presented Lenovo's strategy, capabilities, and portfolio for Data Management. Dan did a super job going beyond the product feature / function and talking about where our products bring value to our customer's Data Management.

   Tags: Data Management

   Published: 2025-01-14
   Length: 60 minutes

   Start the training:
   Employee link: Grow@Lenovo
   Partner link: Lenovo 360 Learning Center

   Course code: 011025

10. **ThinkSystem DM and DE Series Technical Overview**
    2024-10-15 | 30 minutes | Employees and Partners

    This course provides a technical overview of the ThinkSystem DM and DE series products. Course DDMO101 – Lenovo ThinkSystem DM & DE Series Overview is recommended prior to this course. By the end of this course, you should be able to:
    - Describe the Lenovo portfolio for the DM and DE storage systems
    - Explain features of the DM series ONTAP software
    - Explain features of the ThinkSystem SAN Manager

    Tags: Data Management, Storage

    Published: 2024-10-15
    Length: 30 minutes

    Start the training:
    Employee link: Grow@Lenovo
    Partner link: Lenovo 360 Learning Center

    Course code: DDMT100r2

11. **VTT Data Management How to sell storage - April 2024**
    2024-04-10 | 60 minutes | Employees and Partners

    In this course, you will know:

    - Why do we sell storage?
    - What are the basics you need to get an opportunity rolling?
    - Why Lenovo for Storage?
    - What is happening in the market today?
    - How to determine traction?

    Tags: Data Management, Storage

    Published: 2024-04-10
    Length: 60 minutes

    Start the training:
    Employee link: Grow@Lenovo
    Partner link: Lenovo 360 Learning Center

    Course code: DVDAT209

12. **Lenovo Data Backup and Recovery Solution Overview**
    2024-03-25 | 40 minutes | Employees and Partners

    The goal of this course is to give Lenovo sellers and business partners an overview of the Data Backup and Recovery solution. This course includes general information about backup, archive, disaster, nomenclature and key terms for back and recovery, and Lenovo features and alliance partners software.

    Tags: Data Management

    Published: 2024-03-25
    Length: 40 minutes

    Start the training:
    Employee link: Grow@Lenovo
    Partner link: Lenovo 360 Learning Center

    Course code: DSOLO200

13. **Positioning ThinkSystem DE Series**
2024-02-01 | 12 minutes | Employees and Partners

This course provides details on how to position DE series storage systems. Course DDMO101 – Lenovo ThinkSystem DM & DE Series Overview is a prerequisite.

This course focuses on enabling you to:
• Describe the features and business value of DE Series products
• Identify customer problems that DE Series products can solve
• Position the appropriate DE Series product for each customer

Tags: Storage, ThinkSystem

Published: 2024-02-01
Length: 12 minutes

Start the training:
Employee link: Grow@Lenovo
Partner link: Lenovo 360 Learning Center

Course code: DDET200r2

14. **Using VEEAM with ThinkSystem DE Series**
2023-10-03 | 10 minutes | Employees and Partners

In this course you will learn about VEEAM Availability Suite for ThinkSystem DE Series. By the end of this course, you will identify the advantages of using Veeam Availability Suite and Lenovo DE Series, describe the Veeam Cloud Connect Backup with Lenovo DE Series, and explain how to use Veeam's capabilities to provide deduplication and Compression with DE Series. Last updated on September, 29th, 2023.

Tags: ThinkSystem

Published: 2023-10-03
Length: 10 minutes

Start the training:
Employee link: Grow@Lenovo
Partner link: Lenovo 360 Learning Center

Course code: DSTOO200

15. **Assessment for Lenovo ThinkSystem DM and DE Series Technical Overview 100**
2023-10-02 | 30 minutes | Partners Only

This is the online assessment for the virtual-live course Lenovo ThinkSystem DM and DE Series Technical Overview 100 (DDMT100).

Your objective for this assessment is to complete the 15-question quiz with the minimum passing score of 80%.

Tags: Technical Sales

Published: 2023-10-02
Length: 30 minutes

Start the training:
Partner link: Lenovo 360 Learning Center

Course code: DDMT101

16. **ThinkSystem DE Series: Technical Overview Assessment 200**
2023-09-28 | 10 minutes | Employees and Partners

This document contains assessment questions that focus on ThinkSystem DE Series technology. The questions are based on the Lenovo ThinkSystem DE Series Technical Overview curriculum.

Tags: Sales, Storage, Technical Sales, ThinkSystem

Published: 2023-09-28
Length: 10 minutes

Start the training:
Employee link: Grow@Lenovo
Partner link: Lenovo 360 Learning Center

Course code: DDET207

17. **ThinkSystem DE Series: Storage System Configuration**
2023-09-28 | 23 minutes | Employees and Partners

This course describes the differences between the Volume Groups and Dynamic Disk Pools technologies, as well as the benefits and tradeoffs of using each. Course DDET201 ThinkSystem DE Series: Hardware Specifications is a prerequisite.

Upon completion of this training, you will be able to:
• Distinguish volume groups from dynamic disk pools
• Determine when to use volume groups and when to use Dynamic Disk Pools (DDP) technology
• Describe DDP technology and its benefits
• Describe volume groups and their benefits
• Explain how the thin-provisioning feature provides value

Tags: Data Management, Storage, Technical Sales, ThinkSystem

Published: 2023-09-28
Length: 23 minutes

Start the training:
Employee link: Grow@Lenovo
Partner link: Lenovo 360 Learning Center

Course code: DDET202

18. **ThinkSystem DE Series: SSD Cache**
2023-09-28 | 15 minutes | Employees and Partners

This course describes the SSD Cache feature and how SSD Cache helps to optimize read operations. Course DDET202 ThinkSystem DE Series: Storage System Configuration is a prerequisite.

Upon completion of this training, you will be able to:
• Describe the SSD Cache feature
• Explain how SSD Cache helps you optimize solid-state disk (SSD) read cache in a DE Series storage system

Tags: Data Management, Storage, Technical Sales, ThinkSystem

Published: 2023-09-28
Length: 15 minutes

Start the training:
Employee link: Grow@Lenovo
Partner link: Lenovo 360 Learning Center

Course code: DDET203

19. **VEEAM Solutions Sales Training**
2023-09-27 | 20 minutes | Employees and Partners

In this course you will learn about Hyper-availability for the Always-On Enterprise.

By the end of this training, you should be able to:

Identify and explain the core products and solutions offered by Veeam.
Explain the key benefits and value propositions of integrating Veeam solutions with Lenovo products.

Tags: Sales

Published: 2023-09-27
Length: 20 minutes

Start the training:
Employee link: Grow@Lenovo
Partner link: Lenovo 360 Learning Center

Course code: DSTOO100

20. **ThinkSystem DE Series: Disaster Recovery**
2023-09-21 | 28 minutes | Employees and Partners

This course describes technologies for disaster recovery and how DE series features can contribute in substantial ways to any disaster-recovery plan for storage.

Tags: ThinkSystem

Published: 2023-09-21
Length: 28 minutes

Start the training:
Employee link: Grow@Lenovo
Partner link: Lenovo 360 Learning Center

Course code: DDET204

21. **VTT: SAP HANA Transition and Refresh Opportunity - July 2023**
    2023-07-14 | 60 minutes | Employees Only

    In this session, we cover:
    - What Next for SAP Clients?
    - Lenovo Opportunity
    - Lenovo Portfolio for SAP Solutions
    - RISE with SAP

    Tags: Data Management, SAP, ThinkAgile, ThinkEdge, ThinkSystem

    Published: 2023-07-14
    Length: 60 minutes

    Start the training:
    Employee link: Grow@Lenovo

    Course code: DVDAT202

22. **Selling ThinkSystem DE Series**
    2022-09-15 | 15 minutes | Employees and Partners

    This course discusses common selling scenarios that describe where and how to sell Thinksystem DE series storage systems.
    This course focuses on enabling you to:
    •Discuss storage configurations and the advantages of each configuration
    •Review use cases to identify what customers need from storage systems
    •Suggest storage configurations that meet customer needs

    Tags: Sales, Storage, Technical Sales, ThinkSystem

    Published: 2022-09-15
    Length: 15 minutes

    Start the training:
    Employee link: Grow@Lenovo
    Partner link: Lenovo 360 Learning Center

    Course code: DDET206r2

Related publications and links

For more information, see the following resources:

- Lenovo SAN Storage product page
  https://www.lenovo.com/us/en/c/data-center/storage/storage-area-network
- ThinkSystem DE Hybrid Storage interactive 3D Tour
  https://lenovopress.com/lp0957-thinksystem-de-hybrid-interactive-3d-tour
- ThinkSystem DE Hybrid Storage datasheet
  https://lenovopress.com/ds0049-lenovo-thinksystem-de-series-hybrid-array
- Lenovo Data Center Solution Configurator
  http://dcsc.lenovo.com
- Lenovo Data Center Support
  http://datacentersupport.lenovo.com

Related product families

Product families related to this document are the following:

- DE Series Storage
- External Storage
- Lenovo SAN Storage

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