

Lenovo ThinkSystem DE6000F All Flash Storage Array Product Guide

Lenovo ThinkSystem DE6000F is a scalable, all flash mid-range storage system that is designed to provide high performance, simplicity, capacity, security, and high availability for medium to large businesses. The ThinkSystem DE6000F delivers enterprise-class storage management capabilities in a performance-optimized system with a wide choice of host connectivity options and enhanced data management features. The ThinkSystem DE6000F is a perfect fit for a wide range of enterprise workloads, including big data and analytics, video surveillance, technical computing, and other storage I/O-intensive applications.

ThinkSystem DE6000F models are available in a 2U rack form-factor with 24 small form-factor (2.5-inch SFF) drives (2U24 SFF) and include two controllers, each with 64 GB memory for a system total of 128 GB. Host interface cards provide 12 Gb SAS, 10/25 Gb iSCSI, 8/16/32 Gb FC or NVMe/FC, or 25/40/100 Gb NVMe/RoCE host connections.

The ThinkSystem DE6000F Storage Array scales up to 120 solid-state drives (SSDs) with the attachment of Lenovo ThinkSystem DE240S 2U24 SFF Expansion Enclosures.

The Lenovo ThinkSystem DE6000F 2U24 SFF enclosure is shown in the following figure.



Figure 1. Lenovo ThinkSystem DE6000F 2U24 SFF enclosure

Did you know?

The ThinkSystem DE6000F scales up to 1.84 PB of raw storage capacity.

The ThinkSystem DE6000F supports multiple storage connectivity protocols with a choice of SAS, iSCSI, Fibre Channel, NVMe over Fibre Channel, or NVMe over RoCE.

For the ThinkSystem DE6000F, customers can change the host port protocol from FC to iSCSI or from iSCSI to FC for the SFP+ host ports built into the controller (base host ports).

Key features

The ThinkSystem DE6000F offers the following key features and benefits:

- All-flash array capabilities and NVMe over Fabrics to meet 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.
- Scalable, high performance mid-range storage with dual active/active controller configurations with 64 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 storage protocols to match diverse client needs with support for 10 Gb iSCSI or 4/8/16 Gb FC and 12 Gb SAS, 10/25 Gb iSCSI, or 8/16/32 Gb FC host connectivity, or 8/16/32 Gb NVMe/FC host connectivity, or 25/40/100 Gb NVMe/RoCE host 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.
- Scalability to up to 120 SFF drives with the attachment of up to four ThinkSystem DE240S 2U24 SFF expansion enclosures to satisfy growing needs for storage capacity and performance.
- Full set of storage management functions comes with the system, including Dynamic Disk Pools, snapshots, volume copy, thin provisioning, synchronous mirroring, and asynchronous mirroring.
- 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, proactive maintenance, and non-disruptive firmware upgrades.

The following solid-state 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

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 four ThinkSystem DE240S 2U24 SFF expansion enclosures are supported by a single ThinkSystem DE6000F system. 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 DE6000F 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 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, 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 DE6000F and DE240S 2U SFF enclosures.

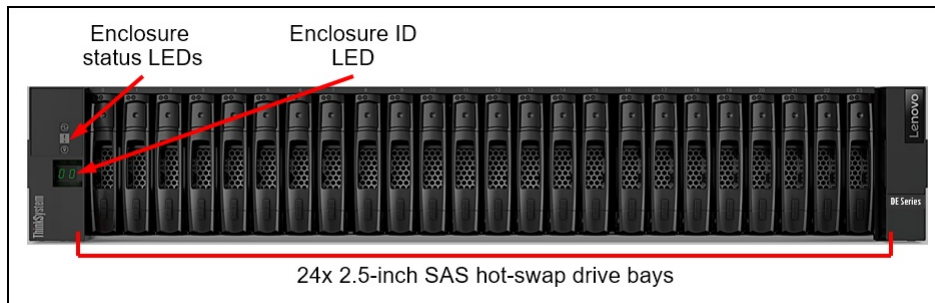


Figure 2. ThinkSystem DE6000F and DE240S 2U SFF enclosures front view

The front of the ThinkSystem DE6000F 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 rear of the ThinkSystem DE6000F 2U SFF controller enclosure.

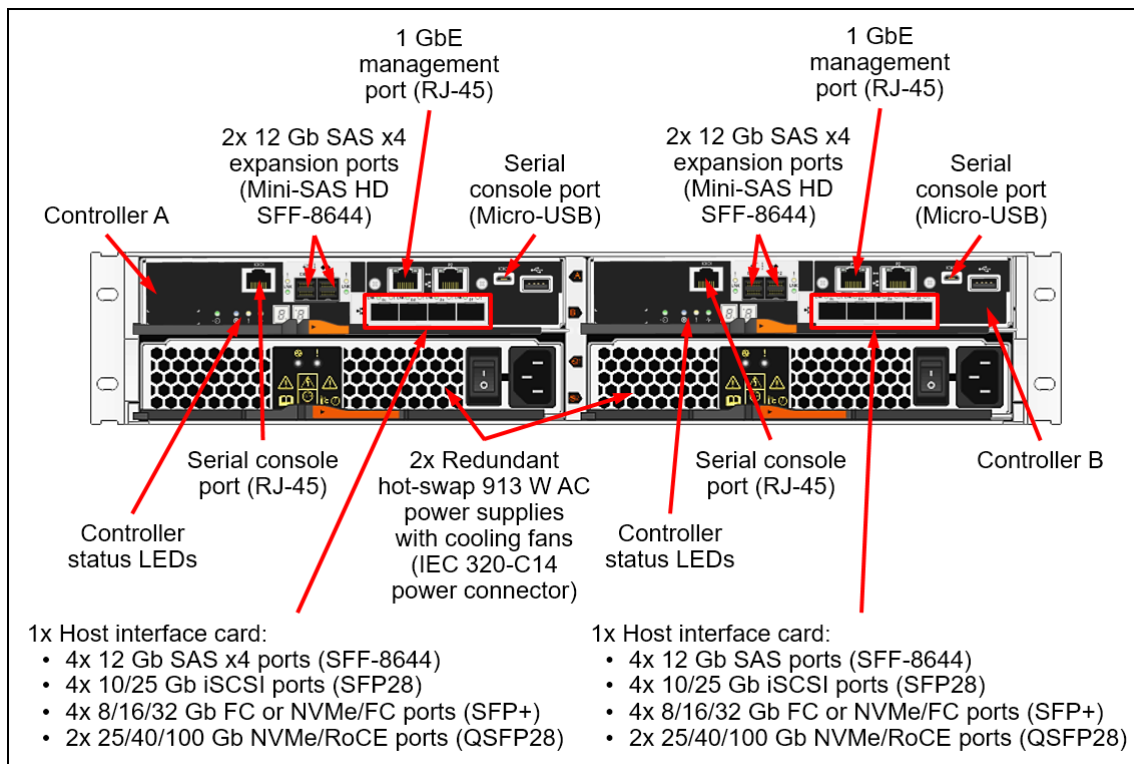


Figure 3. ThinkSystem DE6000F 2U SFF controller enclosure rear view

The rear of the ThinkSystem DE6000F 2U SFF controller enclosure includes the following components:

- Two redundant hot-swap controllers, each with the following ports:
 - One slot for the host interface card (a host interface card is required)
Note: The DE6000F 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 AC (100 - 240 V) power supplies (IEC 320-C14 power connector) with integrated cooling fans.

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

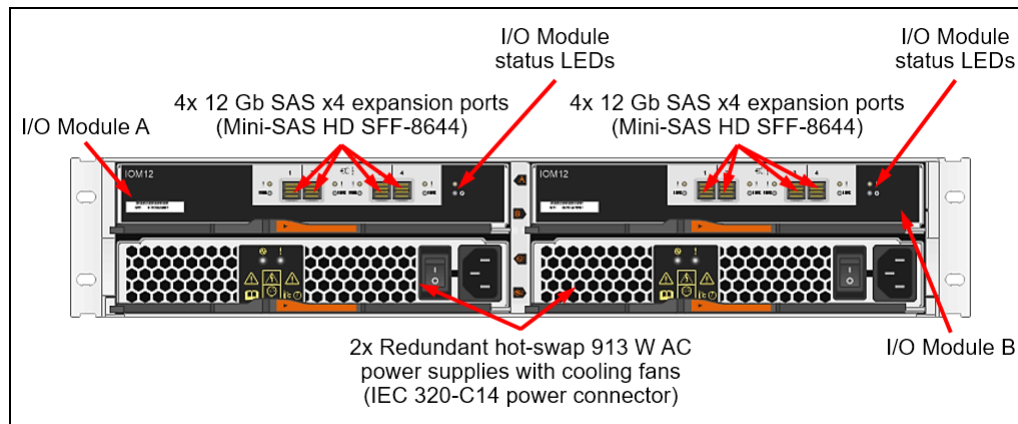


Figure 4. ThinkSystem DE240S 2U SFF expansion enclosure rear view

The rear of the ThinkSystem DE240S 2U SFF 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 AC (100 - 240 V) power supplies (IEC 320-C14 power connector) with integrated cooling fans.

System specifications

The following table lists the ThinkSystem DE6000F 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 DE6000F that can be found at:

<http://datacentersupport.lenovo.com>

Table 1. ThinkSystem DE6000F system specifications

Attribute	Specification
Form factor	<ul style="list-style-type: none"> DE6000F 2U24 SFF controller enclosure (Machine Type 7Y79): 2U rack mount. DE240S 2U24 SFF expansion enclosure (Machine Type 7Y68): 2U 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	128 GB per system (64 GB per controller). Cache mirroring between the controllers. Flash-backed cache protection (includes battery for destaging to flash).
Drive bays	Up to 120 hot-swap drive bays with up to five 2U24 SFF enclosures per system (Controller unit with up to four expansion units).
Drive technology	<ul style="list-style-type: none"> 12 Gb SAS SSDs and FIPS SSDs. Intermix of FIPS drives and non-FIPS drives is supported within a system. Intermix of FIPS drives and non-FIPS drives is <i>not</i> supported within a volume group or disk pool.
Drive expansion connectivity	<ul style="list-style-type: none"> 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	SFF drives: <ul style="list-style-type: none"> SAS SSDs (1 DWD) SAS SSDs (3 DWD) SAS FIPS SSDs (3 DWD)
Storage capacity	Up to 1.84 PB (120x 15.36 TB SAS SSDs).
Storage protocols	SAN (Block access): SAS, iSCSI, FC, NVMe/FC, NVMe/RoCE.
Host connectivity	<p>Host connectivity ports provided using host interface cards (HICs) (per controller enclosure with two controllers)</p> <ul style="list-style-type: none"> 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) 4x 25/40/100 Gb NVMe/RoCE QSFP28 host ports (DAC cable or SW fiber optics, MPO) (2 ports per controller) <p>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.</p>
Host operating systems	<p>Microsoft Windows Server; Red Hat Enterprise Linux (RHEL); SUSE Linux Enterprise Server (SLES); VMware vSphere.</p> <p>Note: NVMe/FC is supported by RHEL, SLES, VMware ESXi, and NVMe/RoCE is supported by RHEL, SLES (refer to LSIC for specific Operating System version details).</p>

Attribute	Specification
Standard software features	Dynamic Disk Pools, snapshots (up to 2048 targets), volume copy, thin provisioning (DDP only), data assurance, synchronous mirroring, and asynchronous mirroring.
Performance*	<ul style="list-style-type: none"> Up to 1 000 000 random read IOPS (4 KB blocks). Up to 390 000 random write IOPS (4 KB blocks). Up to 21 GBps sequential read throughput (64 KB blocks). Up to 7 GBps sequential write throughput (64 KB blocks).
Configuration maximums**	<ul style="list-style-type: none"> Maximum storage capacity: 1.84 PB Maximum number of logical volumes: 2048 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: <ul style="list-style-type: none"> RAID 0, 1/10: 120 RAID 3, 5, 6: 30 Maximum number of DDP arrays: 20 Maximum number of drives in a DDP array: 120 (11 drives minimum) Maximum number of hosts: 512 Maximum number of snapshots: 2048 Maximum number of mirroring pairs: 128
Cooling	Redundant cooling with the fan modules that are built into power supplies.
Power supply	Two redundant hot-swap 913 W (100 - 240 V) AC Platinum power supplies.
Hot-swap parts	Controllers, I/O modules, drives, power supplies, and SFP+/SFP28/QSFP28 transceivers.
Management ports	<ul style="list-style-type: none"> 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.
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	<ul style="list-style-type: none"> Height: 85 mm (3.4 in.) Width: 449 mm (17.7 in.) Depth: 553 mm (21.8 in.)
Weight	<ul style="list-style-type: none"> DE6000F 2U24 SFF controller enclosure (7Y79): 23.47 kg (51.7 lb) DE240S 2U24 SFF expansion enclosure (7Y68): 27.44 kg (60.5 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 DE6000F.

Table 2. ThinkSystem DE6000F CTO base models

Machine Type/Model	Base feature	Description
7Y79CTO2WW	BEY7	Lenovo ThinkSystem Storage 2U24 Chassis (with Gen2 controllers and 2x PSUs)

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

Table 3. Preconfigured models

Model	Market availability	Included HICs
DE6000F - 2U24 - 2x Gen2 64GB controllers		
7Y79A00FWW	All markets	2x 12Gb SAS 4-port HICs
7Y79A00GWW	All markets	2x 32Gb FC 4-port HICs
7Y79A00HWW	All markets	2x 10/25Gb iSCSI 4-port HICs
7Y79A00FBR	Brazil	2x 12Gb SAS 4-port HICs
7Y79A00GBR	Brazil	2x 32Gb FC 4-port HICs
7Y79A00HBR	Brazil	2x 10/25Gb iSCSI 4-port HICs
7Y79A00FCN	PRC	2x 12Gb SAS 4-port HICs
7Y79A00GCN	PRC	2x 32Gb FC 4-port HICs
7Y79A00HCN	PRC	2x 10/25Gb iSCSI 4-port HICs
7Y79A00FJP	Japan	2x 12Gb SAS 4-port HICs
7Y79A00GJP	Japan	2x 32Gb FC 4-port HICs
7Y79A00HJP	Japan	2x 10/25Gb iSCSI 4-port HICs
7Y79A00FLA	Latin America markets	2x 12Gb SAS 4-port HICs
7Y79A00GLA	Latin America markets	2x 32Gb FC 4-port HICs
7Y79A00HLA	Latin America markets	2x 10/25Gb iSCSI 4-port HICs

Configuration notes:

- For preconfigured models, two DE6000 64GB controllers (feature code BQA1) are included in the model configuration.
- For CTO models, two DE6000 64GB controllers (feature code BQA1) are selected by default in the configurator, and the selection cannot be changed.

The models of the ThinkSystem DE6000F ship with the following items:

- One chassis with the following components:
 - Two controllers
 - Two power supplies
 - 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 models listed in this section: 1.5 m, 10A/100-250V, C13 to IEC 320-C14 rack power cables
 - CTO models: Customer-configured power cables

Note: The preconfigured models of the ThinkSystem DE6000F ship without optical transceivers, DAC cables, or SAS cables; they should be purchased for the system (see [Controllers](#) for details).

Controllers

The ThinkSystem DE6000F controller enclosures ship with two DE6000 64GB controllers. A *controller* provides interfaces for host connectivity, management, and internal drives, and it runs storage management software. Each DE6000 controller ships with 64 GB memory for a system total of 128 GB.

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

The following host interfaces can be added to the ThinkSystem DE6000F 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 8/16/32 Gb FC SFP+ ports (4 ports per HIC) for FC or NVMe/FC connectivity (require optical transceivers that should be purchased for the HICs).
- 4x 25/40/100 GbE RoCE QSFP28 ports (2 ports per HIC) for NVMe/RoCE connectivity (require optical transceivers or DAC cables that should be purchased for the HIC).

Each DE6000 64GB 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:

- Two host interface cards are required for selection (one per controller).

The following table lists the DE6000F controller and supported connectivity options.

Table 4. DE6000F controller and connectivity options

Description	Part number	Feature code	Maximum quantity per controller enclosure
Controllers			
Lenovo ThinkSystem DE6000F Controller 64GB	None*	BBCV	2
Host interface cards			
Lenovo ThinkSystem DE6000 12Gb SAS 4-ports HIC	4C57A14372	B4J9	2
Lenovo ThinkSystem DE6000 10/25Gb iSCSI 4-ports HIC	4C57A14371	B4J8	2
Lenovo ThinkSystem DE6000 32Gb FC 4-ports HIC	4C57A14370	B4J7	2
Lenovo ThinkSystem DE6000 100Gb NVMe-RoCE 2-port HIC	4C57A14373	B6KW	2
Transceiver options			
Lenovo 10Gb iSCSI/16Gb FC Universal SFP+ Module	4M17A13527	B4B2	4
Lenovo 10/25GbE iSCSI SFP28 Module (for 10/25 Gb iSCSI HIC ports)	4M17A13529	B4B4	8
Lenovo 32Gb FC SFP+ Transceiver (for 32 Gb FC HIC ports)	4M17A13528	B4B3	8
OM4 optical cables for 16/32 Gb FC and 10/25 Gb iSCSI SW SFP+/SFP28 optical transceivers			
Lenovo 0.5m LC-LC OM4 MMF Cable	4Z57A10845	B2P9	12
Lenovo 1m LC-LC OM4 MMF Cable	4Z57A10846	B2PA	12
Lenovo 3m LC-LC OM4 MMF Cable	4Z57A10847	B2PB	12
Lenovo 5m LC-LC OM4 MMF Cable	4Z57A10848	B2PC	12
Lenovo 10m LC-LC OM4 MMF Cable	4Z57A10849	B2PD	12
Lenovo 15m LC-LC OM4 MMF Cable	4Z57A10850	B2PE	12
Lenovo 25m LC-LC OM4 MMF Cable	4Z57A10851	B2PF	12

Description	Part number	Feature code	Maximum quantity per controller enclosure
Lenovo 30m LC-LC OM4 MMF Cable	4Z57A10852	B2PG	12
OM3 optical cables for 16/32 Gb FC and 10/25 Gb iSCSI SW SFP+/SFP28 optical transceivers			
Lenovo 0.5m LC-LC OM3 MMF Cable	00MN499	ASR5	12
Lenovo 1m LC-LC OM3 MMF Cable	00MN502	ASR6	12
Lenovo 3m LC-LC OM3 MMF Cable	00MN505	ASR7	12
Lenovo 5m LC-LC OM3 MMF Cable	00MN508	ASR8	12
Lenovo 10m LC-LC OM3 MMF Cable	00MN511	ASR9	12
Lenovo 15m LC-LC OM3 MMF Cable	00MN514	ASRA	12
Lenovo 25m LC-LC OM3 MMF Cable	00MN517	ASRB	12
Lenovo 30m LC-LC OM3 MMF Cable	00MN520	ASRC	12
Active optical cables for 100 Gb NVMe/RoCE QSFP28 HIC ports			
Lenovo 3m 100G QSFP28 Active Optical Cable	7Z57A03546	AV1L	4
Lenovo 5m 100G QSFP28 Active Optical Cable	7Z57A03547	AV1M	4
Lenovo 10m 100G QSFP28 Active Optical Cable	7Z57A03548	AV1N	4
Lenovo 15m 100G QSFP28 Active Optical Cable	7Z57A03549	AV1P	4
Lenovo 20m 100G QSFP28 Active Optical Cable	7Z57A03550	AV1Q	4
DAC cables for iSCSI HIC ports			
0.5m Passive DAC SFP+ Cable	00D6288	A3RG	12
1m Passive DAC SFP+ Cable	90Y9427	A1PH	12
1.5m Passive DAC SFP+ Cable	00AY764	A51N	12
2m Passive DAC SFP+ Cable	00AY765	A51P	12
3m Passive DAC SFP+ Cable	90Y9430	A1PJ	12
5m Passive DAC SFP+ Cable	90Y9433	A1PK	12
7m Passive DAC SFP+ Cable	00D6151	A3RH	12
DAC cables for 25 Gb iSCSI SFP28 HIC ports			
Lenovo 1m Passive 25G SFP28 DAC Cable	7Z57A03557	AV1W	8
Lenovo 3m Passive 25G SFP28 DAC Cable	7Z57A03558	AV1X	8
DAC cables for 100 Gb NVMe/RoCE QSFP28 HIC ports			
Lenovo 1m Passive 100G QSFP28 DAC Cable	7Z57A03561	AV1Z	4
Lenovo 3m Passive 100G QSFP28 DAC Cable	7Z57A03562	AV20	4
Lenovo 5m Passive 100G QSFP28 DAC Cable	7Z57A03563	AV21	4
SAS host connectivity cables: Mini-SAS HD (controller) to Mini-SAS HD (host)			
0.5m External MiniSAS HD 8644/MiniSAS HD 8644 Cable	00YL847	AU16	8
1m External MiniSAS HD 8644/MiniSAS HD 8644 Cable	00YL848	AU17	8
2m External MiniSAS HD 8644/MiniSAS HD 8644 Cable	00YL849	AU18	8
3m External MiniSAS HD 8644/MiniSAS HD 8644 Cable	00YL850	AU19	8
1 GbE management ports			
0.75m Green Cat6 Cable	00WE123	AVFW	2
1.0m Green Cat6 Cable	00WE127	AVFX	2
1.25m Green Cat6 Cable	00WE131	AVFY	2

Description	Part number	Feature code	Maximum quantity per controller enclosure
1.5m Green Cat6 Cable	00WE135	AVFZ	2
3m Green Cat6 Cable	00WE139	AVG0	2
10m Green Cat6 Cable	90Y3718	A1MT	2
25m Green Cat6 Cable	90Y3727	A1MW	2

* Factory-installed only.

Expansion enclosures

The ThinkSystem DE6000F supports attachment of up to four ThinkSystem DE240S 2U24 SFF expansion enclosures. The expansion enclosures can be added to the system non-disruptively.

The following table lists the relationship models of the supported ThinkSystem DE240S expansion enclosures.

Table 5. ThinkSystem DE240S relationship models

Description	Part number		
	European Union	Japan	Other markets worldwide
Lenovo ThinkSystem DE240S 2U24 SFF Expansion Enclosure	7Y68A004EA	7Y681001JP	7Y68A000WW

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

Table 6. ThinkSystem DE240S TopSeller models: Brazil and Latin America

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

The following table lists the CTO base models for the ThinkSystem DE240S expansion enclosures.

Table 7. ThinkSystem DE240S CTO base models

Description	Machine Type/Model	Feature code	
		European Union	Other markets
Lenovo ThinkSystem Storage 2U24 Chassis (with 2x PSUs)	7Y68CTO1WW	BEY7	B38L

Configuration notes:

- For Relationship 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 ship with the following items:

- One chassis with the following components:
 - Two I/O modules
 - Two power supplies
- Four 1 m MiniSAS HD 8644/MiniSAS HD 8644 cables (Relationship models listed in this section)
- Rack Mount Kit
- *Quick Installation Guide*
- *Electronic Publications Flyer*
- Two power cables:
 - Models listed in Tables 6 and 7: 1.5 m, 10A/100-250V, C13 to C14 rack power cables
 - CTO models: Customer-configured power cables

Note: The Relationship and TopSeller models of the ThinkSystem DE240S 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 DE6000F 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.

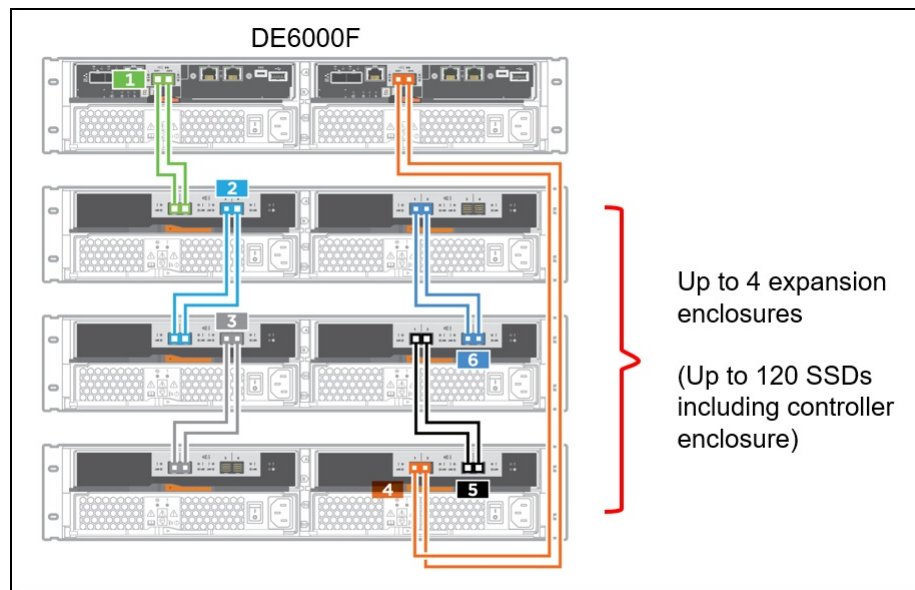


Figure 5. DE Series expansion enclosure connectivity topology

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

Table 8. 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 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.

Drives

The ThinkSystem DE Series 2U24 SFF enclosures support up to 24 SFF hot-swap drives.

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

Table 9. 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 SED 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 (SED SSDs) (1 Drive Writes per Day)			
4XB7A88466	BW2B	Lenovo ThinkSystem DE Series 15.36TB 1DWD 2.5" SSD SED 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
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
4XB7A88469	BWCJ	Lenovo ThinkSystem DE Series 3.84TB 1DWD 2.5" SSD FIPS 2U24	24

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

Table 10. 2U24 SFF drive pack options

Part number	Feature code	Description	Maximum quantity per 2U24 SFF enclosure
2.5-inch 12 Gbps SAS hot-swap SSD packs (3 DWPD)			
4XB7A14241	B4SB	Lenovo ThinkSystem DE6000F 19.2TB SSD Pack (12x 1.6TB SSDs)	2
2.5-inch 12 Gbps SAS hot-swap SSD packs (1 DWPD)			
4XB7A74950	BKUS	Lenovo ThinkSystem DE6000F 11.52TB Pack (12x 960GB SSD)	2
4XB7A74953	BKUV	Lenovo ThinkSystem DE6000F 23.04TB Pack (12x 1.92TB SSD)	2
4XB7A74957	BKUM	Lenovo ThinkSystem DE6000F 46.08TB Pack (12x 3.84TB SSD)	2
4XB7A14239	B4S0	Lenovo ThinkSystem DE6000F 92.16TB Pack (12x 7.68TB SSDs)	2
2.5-inch 12 Gbps SAS hot-swap (SSDs)			
4XB7A74949	BKUR	Lenovo ThinkSystem DE Series 11.52TB Pack (12x 960GB SSD)	2
4XB7A74952	BKUU	Lenovo ThinkSystem DE Series 23.04TB Pack (12x 1.92TB SSD)	2
4XB7A74956	BKUL	Lenovo ThinkSystem DE Series 46.08TB Pack (12x 3.84TB SSD)	2

Part number	Feature code	Description	Maximum quantity per 2U24 SFF enclosure
4XB7A14238	B4RW	Lenovo ThinkSystem DE Series 92TB SSD Pack (12x 7.68TB SSD)	2
2.5-inch 12 Gbps SAS hot-swap (SED SSDs)			
4XB7A88468	BW2D	Lenovo ThinkSystem DE6000F 184.3TB Pack (12x 15.36TB SED SSD)	2
4XB7A88467	BW2C	Lenovo ThinkSystem DE Series 184.3TB Pack (12x 15.36TB SED SSD)	2
2.5-inch 12 Gbps SAS hot-swap FIPS SSDs (SED SSDs)			
4XB7A88471	BWCL	Lenovo ThinkSystem DE6000F 46TB FIPS Pack (12x 3.84TB FIPS SSDs)	2
4XB7A88470	BWCK	Lenovo ThinkSystem DE Series 46TB FIPS Pack (12x 3.84TB FIPS SSDs)	2

Configuration notes:

- 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 DE6000F:

- **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.
- **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 (up to 2048 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.

- **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 DE6000F interoperate with other ThinkSystem DE Series storage arrays.

Software maintenance is included in the ThinkSystem DE6000F 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 DE6000F 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 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 models of the ThinkSystem DE6000F 2U24 SFF and DE240S 2U24 SFF 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 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 enclosures (two power cords per enclosure).

Table 11. Power cables for DE Series 2U24 SFF 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

Description	Part number	Feature code
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
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

Description	Part number	Feature code
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

Rack installation

The individually shipped ThinkSystem DE Series 2U24 enclosures ship with the ThinkSystem Storage Rack Mount Kit 2U24/4U60 listed in the following table.

Table 12. 4-post rack mount kit

Description	Feature code	Quantity
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 13. 4-post SIR rack mount kits

Description	Feature code	Quantity
Lenovo ThinkSystem Storage SIR Rack Mount Kit (for 2U24 enclosures)	B6TH	1

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

Table 14. Rack mount kit features and specifications summary

Attribute	Screw-in fixed rail with adjustable depth	
	2U24/4U60	2U24 SIR
Feature code	B38Y	B6TH
Enclosure support	DE6000F DE240S	DE6000F DE240S
Rail type	Fixed (static) with adjustable depth	Fixed (static) with adjustable depth
Tool-less installation	No	No
In-rack maintenance	Yes*	Yes*
Ship-in-rack (SIR) support	No	Yes
1U PDU support	Yes	Yes
0U PDU support	Limited**	Limited**
Rack type	IBM or Lenovo 4-post, IEC standard-compliant	IBM or Lenovo 4-post, IEC standard-compliant
Mounting holes	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.)
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.)

* 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 2U24 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.)

Weight (fully configured):

- DE6000F 2U24 SFF controller enclosure (7Y79): 23.47 kg (51.7 lb)
- DE240S 2U24 SFF expansion enclosure (7Y68): 27.44 kg (60.5 lb)

Operating environment

The ThinkSystem DE Series 2U24 SFF enclosures are supported in the following environment:

- Air temperature:
 - Operating: 5 °C - 45 °C (41 °F - 113 °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
 - 200 to 240 V AC (nominal); 50 Hz / 60 Hz
- Heat dissipation:
 - DE6000F 2U24 SFF: 1396 BTU/hour
 - DE240S 2U24 SFF: 1331 BTU/hour
- Acoustical noise emission:
 - DE6000F 2U24 SFF: 7.2 bels
 - DE240S 2U24 SFF: 6.6 bels

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

Table 15. Enclosure power load, inlet current, and heat output

Enclosure	Source voltage (nominal)	Maximum power load	Current per inlet	Heat output
DE6000F 2U24 SFF	100 - 127 V AC	738 W	7.77 A	2276 BTU/hour
	200 - 240 V AC	702 W	3.7 A	1973 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

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://lenovocator.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://lenovocator.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 DE6000F All Flash Storage Array supports attachment to Lenovo ThinkSystem, System x, and Flex System hosts by using SAS, iSCSI, Fibre Channel, NVMe over Fibre Channel (NVMe/FC), or NVMe over RoCE (RDMA over Converged Ethernet) (NVMe/RoCE) storage connectivity protocols.

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

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 16. 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 17. 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
4PU7A93170	C0D9	0U 24 C13/C15 and 24 C13/C15/C19 Basic 32A 3 Phase WYE PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	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
4PU7A93174	C0D5	0U 21 C13/C15 and 21 C13/C15/C19 Switched and Monitored 48A 3 Phase Delta PDU (60A derated)	N	Y	N	N	N	N	N	Y	N	N	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

Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
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
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
4PU7A93173	C0D6	0U 18 C13/C15 and 18 C13/C15/C19 Switched and Monitored 32A 3 Phase WYE PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	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
4PU7A93172	C0D7	0U 16 C13/C15 and 16 C13/C15/C19 Switched and Monitored 24A 1 Phase PDU(30A derated)	N	Y	N	N	N	N	N	Y	N	N	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
4PU7A81118	BNDW	1U 18 C19/C13 switched and monitored 48A 3P WYE PDU – 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
4PU7A77467	BLC4	1U 18 C19/C13 Switched and Monitored 80A 3P Delta PDU	N	N	N	N	N	N	N	N	N	Y	N	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
4PU7A77469	BLC6	1U 12 C19/C13 switched and monitored 60A 3P Delta PDU	N	N	N	N	N	N	N	N	N	N	N	Y	N
71763NU	6051	Ultra Density Enterprise C19/C13 PDU 60A/208V/3PH	N	N	Y	N	N	N	N	N	N	Y	Y	Y	N
71762NX	6091	Ultra Density Enterprise C19/C13 PDU Module	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Line cords for 1U PDUs that ship without a line cord															
40K9611	6504	DPI 32a Cord (IEC 309 3P+N+G)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9612	6502	DPI 32a Cord (IEC 309 P+N+G)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9613	6503	DPI 63a Cord (IEC 309 P+N+G)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9614	6500	DPI 30a Cord (NEMA L6-30P)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9615	6501	DPI 60a Cord (IEC 309 2P+G)	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 18. 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>

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Seller training courses

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

1. **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

Published: 2025-02-07

Length: 15 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DSVC134r4

2. **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.

Published: 2025-01-14

Length: 60 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: 011025

3. **ThinkSystem DE Series: Hardware Specifications**

2024-12-30 | 25 minutes | Employees and Partners

This course also explores the unique data management features of the ThinkSystem SAN Manager. Course DDET200 Positioning ThinkSystem DE Series is recommended prior to this course.

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

- Identify the controller and expansion models of the Lenovo DE Series portfolio
- Explain the connectivity options, expansion paths, and cabling for the DE Series storage system
- Describe the data management features of Lenovo ThinkSystem SAN Manager

Published: 2024-12-30

Length: 25 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DDET201r3

4. **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

Published: 2024-10-15

Length: 30 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DDMT100r2

5. **Lenovo Data Center Product Portfolio**

2024-05-29 | 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.

Published: 2024-05-29

Length: 20 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: SXXW1110r7

6. **VTT Data Management How to sell storage - April 2024**

2024-04-10 | 60 minutes | Employees Only

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?

Published: 2024-04-10

Length: 60 minutes

Start the training:

Employee link: Grow@Lenovo

Course code: DVDAT209

7. **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.

Published: 2024-03-25

Length: 40 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DSOLO200

8. **ThinkSystem DE Series Portfolio Overview**

2024-03-14 | 30 minutes | Employees and Partners

This course builds on the Data Management Overview (DSTOO201) course by introducing you to the DE Series Portfolio.

Course Objectives:

By the end of 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
- Use the qualifying questions to identify customer needs during conversations

Published: 2024-03-14

Length: 30 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DDEO201

9. **Data management Overview**

2024-03-14 | 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 management portfolio
3. Find out how data drives business value

Published: 2024-03-14

Length: 25 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DSTOO201

10. **Family Portfolio: Storage**
2024-02-02 | 15 minutes | Employees and Partners

This course covers products in the Lenovo storage portfolio, from storage servers to direct-access storage through storage systems.

After completing this course about the Storage family, the learner will be able to identify products within the family, describe the features of this product family, and recognize when a specific product should be selected.

Published: 2024-02-02

Length: 15 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: SXSW1201r16

11. **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

Published: 2024-02-01

Length: 12 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DDET200r2

12. **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.

Published: 2023-10-03

Length: 10 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DSTOO200

13. **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%.

Published: 2023-10-02

Length: 30 minutes

Start the training:

Partner link: [Lenovo Partner Learning](#)

Course code: DDMT101

14. **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.

Published: 2023-09-28

Length: 10 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DDET207

15. **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

Published: 2023-09-28

Length: 23 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DDET202

16. **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

Published: 2023-09-28

Length: 15 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DDET203

17. **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.

Published: 2023-09-27

Length: 20 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DSTOO100

18. **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.

Published: 2023-09-21

Length: 28 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DDET204

19. **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

Published: 2023-07-14

Length: 60 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Course code: DVDAT202

20. **Lenovo ThinkSystem DM and DE Series Overview**

2023-02-15 | 25 minutes | Employees and Partners

This course focuses on enabling you to identify current business and technology challenges for your customers and position the ThinkSystem DM and DE series products, based on the needs of your customers.

The main objectives are:

- Identify current business and technology challenges for your customers
- Position the Lenovo ThinkSystem DM and DE Series products based on the needs of your customers

Published: 2023-02-15

Length: 25 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DDMO101r5

21. **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

Published: 2022-09-15

Length: 15 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DDET206r2

22. Benefits of All-Flash Arrays

2022-05-03 | 10 minutes | Employees and Partners

This course starts by comparing and contrasting HDDs and SSDs, and lists the advantages of SSDs in all-flash arrays. Specific advanced features made possible by SSDs in AFAs are discussed, and workloads that are well-suited to AFAs are described.

Published: 2022-05-03

Length: 10 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: SXXW1232

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 All Flash Array interactive 3D Tour](https://lenovopress.com/lp0956-thinksystem-de-all-flash-interactive-3d-tour)
- [ThinkSystem DE All-Flash Array datasheet](https://lenovopress.com/ds0051-lenovo-thinksystem-de-series-all-flash-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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