Lenovo ThinkSystem DS3200, DS5200, DS7200 and DS5200C Flash Storage Array

Product Guide

The Lenovo ThinkSystem DS3200, DS5200, DS7200, and DS5200C are all-NVMe flash SAN storage systems designed to provide simplicity, performance, and security for medium-sized enterprises. Powered by a SAN optimized version of the ONTAP storage management software, the DS Series delivers enterprise-class storage management capabilities with all leading SAN protocols. The DS Series is a perfect fit for a wide range of enterprise workloads, including high-performance databases, virtualization, enterprise applications, financial services, and other I/O-intensive applications requiring the highest levels of data security.

A single ThinkSystem DS3200 Storage Array scales up to 48 NVMe SSDs per HA Pair with the attachment of one Lenovo ThinkSystem DS240N 2U24 SFF Expansion Enclosure. A single ThinkSystem DS5200 Storage Array scales up to 72 NVMe SSDs per HA pair with the attachment of two Lenovo ThinkSystem DS240N 2U24 SFF Expansion Enclosures. A single ThinkSystem DS7200 Storage Array scales up to 120 NVMe SSDs per HA Pair with the attachment of four Lenovo ThinkSystem DS240N 2U24 SFF Expansion Enclosures, four expansions will require a supported 100Gb capable switch. A single DS5200C Storage Array scales up to 48 high-capacity NVMe SSDs per HA Pair the attachment of single DS240N expansion enclosure.



Figure 1. Lenovo ThinkSystem DS7200 SAN Storage Arrays

360° View | Full 3D Tour

Did you know?

Lenovo ThinkSystem DS series Storage Arrays are an excellent choice for customers who are looking for the an end-to-end NVMe storage connectivity, advanced features and security of ONTAP software and wish to enable workloads using block storage protocols without the overhead of object storage.

Key features

The ThinkSystem DS series offers the following key features and benefits:

- Symmetric active-active for the highest levels of availability
- Inline and always-on storage efficiency to maximize the amount of data stored
- Support for all major SAN protocols, iSCSI, Fibre Channel (FC), NVMe/TCP, and NVMe/FC
- A single storage pool accessible to both controllers in an HA-pair to simplify provisioning
- Automatic storage balancing to maximize storage performance and minimize bottlenecks
- Autonomous ransomware protection to detect ransomware events in real-time
- SnapMirror active sync to enable zero data loss and zero downtime across sites for mission-critical workloads
- Simplified GUI for provisioning, management, data protection, and data security
- Tamper-proof SnapShots to provide immutable protection again ransomware and other unauthorize data changes
- Multi-admin verification to protect against unauthorized or accidental execution of sensitive operations
- Dual-active controllers (high availability pair) with automatic load balancing and failover
- Mirrored, battery-backed controller NVMEM
- Dual-port, SED, NVMe SSDs with automatic drive failure detection and rebuild
- Redundant, hot-swappable and customer replaceable hardware components, including transceivers, controllers, I/O modules, power supplies, and drives
- Non-disruptive controller and drive firmware upgrades
- Scale-out clustering, cluster any DS Series systems together
- Designed for 99.9999% availability with redundant hot-swap components, including controllers and I/O modules, power supplies, and non-disruptive firmware upgrades

Components and connectors

Front and rear view of the ThinkSystem DS series DS3200, DS5200, DS7200, and DS5200C units are identical.

The following figure shows the front of the DS5200

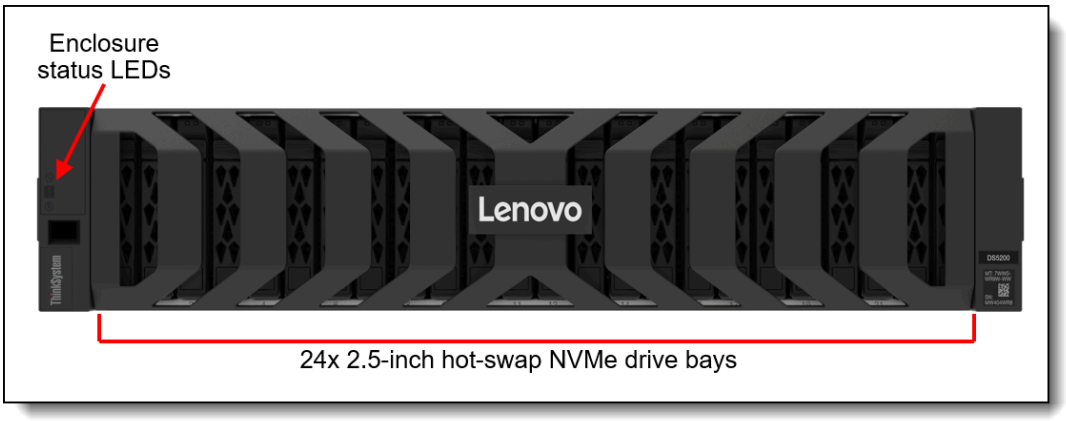


Figure 2. ThinkSystem DS5200 front view

The following figure shows the components of DS3200, DS5200, DS7200, and DS5200C controller enclosure

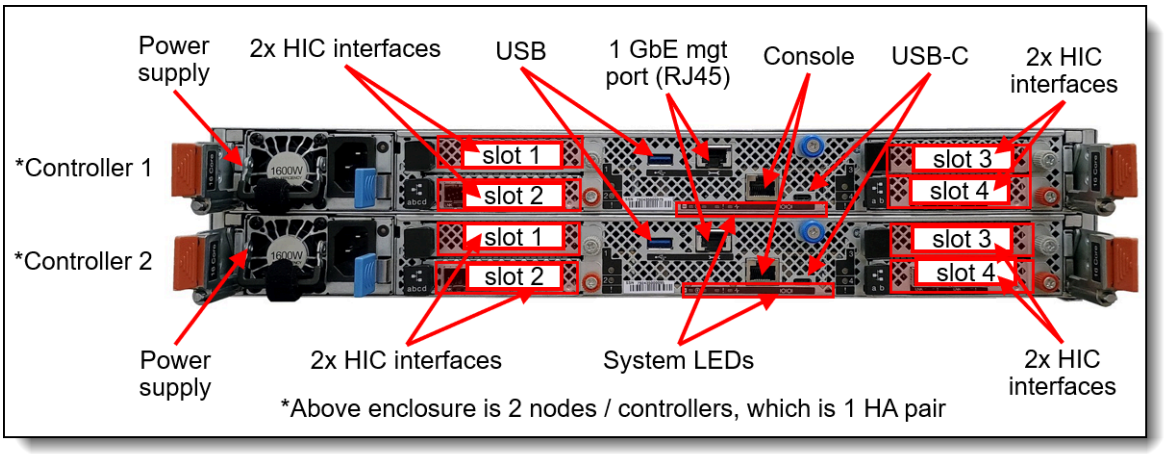


Figure 3. ThinkSystem DS3200, DS5200, DS7200, and DS5200C controller enclosure rear view

A single ThinkSystem DS3200, DS5200, DS7200, and DS5200C controller enclosure rear view controller includes the following components:

- 1 x redundant hot-swap power supply
- 4x Host Interface Card (HIC) slots:
  - Slot 1 for host connections and storage expansion
  - Slot 2 for host connections
  - Slot 3 host connections and storage expansion
  - Slot 4 for Cluster interconnect 25 GbE on the DS3200 and 100gbe on other models
- USB port
- 1GbE management port (RJ45)
- System LEDs
- Console port

Per controller, the four Host Interface Cards provide one of the following combinations of ports:

- 4-port 10Gb BaseT RJ45 (10Gbs, 1Gbs, and 100Mbs)
- 4-port 10/25 GbE
- 2-port 40/100 GbE (and for expansion storage 2pt 100 GbE ports)
- 2-port 40/100 GbE Crypto (TLS HW offload, for host connection only)
- 4-port, 64Gb Fiber Channel, SFP+ (16/32/64 Gbs)
  - All HICs require SFPs and optical cables or DAC cables and are configured separately
  - All ethernet SFPs run at posted speed only and do not support dual line rates

The following figure shows the front of the ThinkSystem DS240N 2U SFF NVMe expansion enclosure.

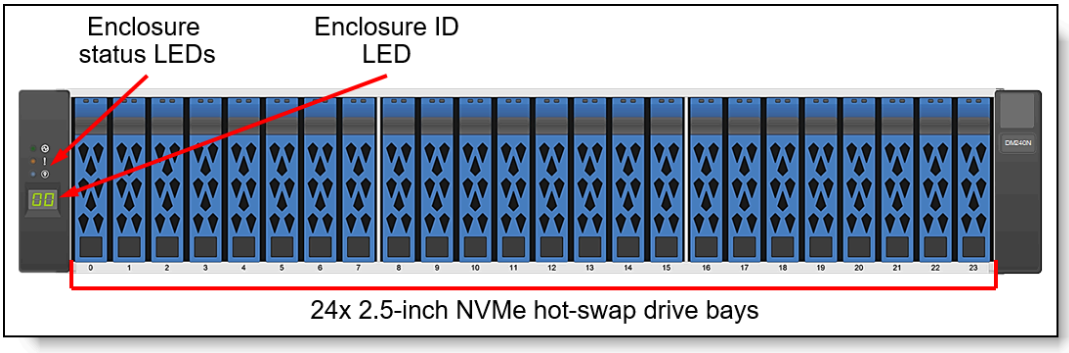


Figure 4. ThinkSystem DS240N 2U SFF NVMe expansion enclosure front view

The following figure shows the rear of the DS240N expansion enclosure.

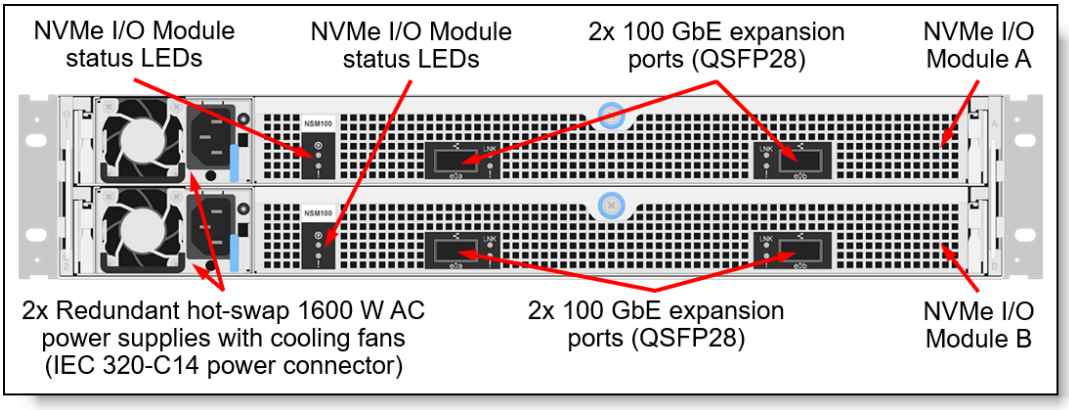


Figure 5. ThinkSystem DS240N 2U SFF NVMe expansion enclosure rear view

The rear of the ThinkSystem DS240N 2U SFF NVMe expansion enclosure includes the following components:

- Two redundant hot-swap NVMe I/O Modules; each with the following ports:
  - Two 100 GbE QSFP28 expansion ports for connections to the controller enclosure.
- Two redundant hot-swap power supplies

System specifications

The following table lists the ThinkSystem DS3200, DS5200, DS7200, and DS5200C storage system specifications.

Note: The supported hardware options, software features, and interoperability listed in this product guide are based on the ONTAP software version 9.17.1. 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 DS3200, DS5200, DS7200, and DS5200C that can be found at: http://datacentersupport.lenovo.com

Table 1. ThinkSystem DS3200, DS5200, DS7200, and DS5200C system specifications

Attribute	**Specification**			
Model	DS7200	DS5200	DS3200	DS5200C
Machine type	7DP4	7DP5	7DP6	7DP7
Form factor	2U rack mount			
System memory (per HA pair)	256 GB	128 GB	128 GB	128 GB
System NVMEM (per HA pair)	32 GB	16 GB	16 GB	16 GB
Cluster Scaling Limit SAN (HA pair)	6 HA pairs	4 HA pairs	3 HA pairs	4 HA pairs
Drive bays (per HA pair)	24	24	24	24
Max NVMe SSDs (per HA pair)	120	72	48	48
Drive Minimum (per HA pair)	8	8	8	8
Capacity Minimum (per HA pair)	68 TB	No minimum	No minimum	No minimum
Direct Connected Expansions (DS240N) (per HA pair)	2	2	1	1
Switch Connected Expansions (DS240N) (per HA pair)	4	2	0	0
Cluster Connected Expansions (DS240N) (per HA pair)	4x 100Gbe	4x 100Gbe	4x 25Gbe	4x 100Gbe

Attribute	Specification			
Host/Storage HIC options (per HA Pairs)†	Select up to (6) Host/Storage HICs. Ordered in pairs			

	• 2-port, 40/100Gb Ethernet, QSFP28 (RoCEv2)
	  ◦ RoCE is not supported for host connectivity
	• 2-port, 40/100GB Ethernet, Crypto (TLS HW offload, for host connection only)
	• 4-port, 64Gb Fiber Channel, SFP+ (16/32/64 Gb)
	• 4-port, 10/25Gb Ethernet, SFP28 (IPSec support)
	• 4-port, 10GBASE-T, RJ45 (100 Mbs/1 Gbs/10 Gbs)
	  ◦ All HICs require SFPs and optical cables or DAC cables
	  ◦ All ethernet SFPs run at posted speed only and do not support dual line rates			

RAID levels	RAID-DP			
Supported NVMe SSD capacities	1.92 TB, 3.84 TB, 7.68 TB, and 15.36 TB NVMe SED SSDs			15.36 TB, 30.72 TB NVMe SED SSDs
Storage Protocols	FC, iSCSI, NVMe/FC, NVMe/TCP			
Category 1 Host operating systems*	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware ESXi			
Category 2 Host operating systems**	Oracle Linux, Oracle VM, Citrix Hypervisor, CentOS, Ubuntu, Solaris. For version details, see the latest Category 2 Interoperability Matrix, available as a download from Lenovo Storage Interoperation Center (LSIC)			
Standard software features	RAID data protection, SnapShots, instant volume copy (FlexClone), storage quality of service (QoS), thin provisioning, compression, deduplication, compaction, encryption, disk-based backup (SnapVault), application-aware backup (SnapCenter), quick data recovery (SnapRestore), clustering, and asynchronous replication (SnapMirror)			
Cooling	Redundant cooling with built-in power supply fans			
Power Supply	Two redundant hot-swap 1600 W Titanium AC power supplies			
	200 to 240	200 to 240	100 to 120 200 to 240 Autosensing	200 to 240
Hot-swap parts	Controllers, I/O modules, drives, power supplies, and transceivers and DAC cables			
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			
Management interfaces	ThinkSystem Storage Manager web-based GUI; SSH CLI; Serial console CLI; SNMP, email, and syslog alerts.			
Security features	Secure Socket Layer (SSL), Secure Shell (SSH), user level security, role-based access control (RBAC), LDAP authentication. Multi-admin verification, Autonomous ransomware protection			
Warranty and support	Three-, four-, or five-year customer-replaceable unit and onsite limited warranty with selectable service levels: 9x5 service coverage next business day (NBD) onsite response (Foundation) or 24x7 service coverage with 4-hour onsite response (Essential). Premier Support is also available. Software support is included in the Foundation or Essential Service for the duration of the warranty period.			
Dimensions	• Height: 87 mm (3.4 in.) • Width with flange: 483 mm (19 in.) • Width without flange: 447 mm (17.6 in.) • Depth: 543 mm (21.4 in.)			
Weight (fully configured)	60.7 lb (27.5 kg)			

* For Category 1 operating system support information, see Lenovo Storage Interoperation Center (LSIC).

** For Category 2 operating system support information, see the latest Category 2 Interoperability Matrix. Go to the Lenovo Storage Interoperation Center (LSIC) home page and scroll down to the Lenovo Information section and click the **Download Lenovo 3rd party of interop matrix** link.
† 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

Top Choice

Lenovo offers the “quick-ship” program **Top Choice Express (TCE)** to make it easy for our customers to get quick delivery of our products. With TCE, a Configure-to-Order (CTO) model contains a "best of" subset of components, which allows for customization while maintaining significantly faster lead times than standard CTO.

Top Choice Express (TCE) is the way to get custom configurations as quickly as possible. It allows DCSC configurator users to configure systems in **CTO Mode**, selecting the required hardware components while still benefiting from faster turnaround than traditional CTO. These configurations are built and fully integrated by Lenovo Manufacturing, with simple configuration steps, instant pricing, and quicker delivery.

To see which components are TCE, check the TCE column in the various component tables in this product guide. Green cells mean that the component is enabled for ordering with Top Choice Express in all regions world-wide. Orange cells with the ℹ symbol mean that the component is enable for Top Choice Express in only some regions. Mouse over or tap on the cell to see which regions have it enabled for TCE.

Notes:

- Top Choice Express is for configure-to-order builds only, not for standalone option part numbers.
- Ship dates are estimates only; actual ship times may vary based on platform and component availability, order processing, logistics, and external factors beyond Lenovo’s control. Lenovo is not liable for delays.

Controller enclosures

Preconfigured and factory-integrated models of the ThinkSystem DS Series SAN optimized Storage Arrays are configured by using the Lenovo Data Center Solution Configurator (DCSC): http://dcsc.lenovo.com

The following table lists the CTO base model for the ThinkSystem DS Series.

Table 2. ThinkSystem DS3200, DS5200, DS7200, and DS5200C CTO base models

Machine Type/Model	Feature code	Description	Top Choice Express
7DP4CTO1WW	BF3C	Lenovo ThinkSystem DS3200 Storage Array	Not TCE
7DP5CTO1WW	BF3C	Lenovo ThinkSystem DS5200 Storage Array	-
7DP6CTO1WW	BF3C	Lenovo ThinkSystem DS7200 Storage Array	-
7DP7CTO1WW	BF3C	Lenovo ThinkSystem DS5200C Storage Array	-

The models of the DS Series ship with the following items:

- One chassis with the following components:
  - Two controllers
  - Two power supplies
- Rack Mount Kit
- 2m USB Cable (USB Type A to Micro-USB)
- Documentation flyer
- Two customer-configured power cables

Controllers

The ThinkSystem DS Series enclosures ship with two NVMe controllers. A controller provides interfaces for host connectivity, management, and internal drives, and it runs ONTAP storage management software.

The ThinkSystem DS series models are 2U rack-mount enclosures that include two controllers, with 128GB of RAM per DS7200 controller and 64GB of RAM for other models.and 24x NVMe U.2 SFF drives. Each controller provides adapter support for 10/25 GbE, 40/100 GbE or 16/32/64 Gb Fibre Channel (FC) ports for host connectivity, depending on the configuration.

The following table lists the RAM and NVMEM per controller

Table 3. RAM and NVMEM per controller

	DS7200	**DS5200**	**DS3200**	**DS5200C**
NVMEM (per controller)	16 GB	8 GB	8 GB	8 GB
RAM (per controller)	128 GB	64 GB	64 GB	64 GB

Each DS Series controller requires two cluster interconnect ports cabled directly for a dual-controller HA pair/two-node switchless cluster or to a supported switch for a switched cluster interconnect with multiple dual-controller HA pairs. See system specifications for cluster limits.

Each DS Series controller also has the following host interfaces:

- 1x slot for Cluster interconnect (Configured in the Cluster Port Adapter section)
  - DS3200 2x 25 GbE ports using 4x 10/25 GbE card (C4AC)
  - DS5200 2x 100 GbE ports using 2x 40/100 GbE card (C4AA)
  - DS7200 2 x 100 GbE ports using 2x 40/100 GbE card (C4AA)
  - DS5200C 2 x 100 GbE ports using 2x 40/100 GbE card (C4AA)
- 3x slots for host interfaces using HIC adapters; choices of HIC adapters are:
  - 25GbE HIC, with 4x 10/25 GbE SFP28 (DAC cables or SW fiber optic cables, LC) (C4AC)
  - 100GbE HIC, with 2x 40/100 GbE QSFP28 (DAC cables or SW fiber optic cables, MPO) (C4AA)
  - 100GbE Ethernet Crypto, with 2x 40/100 GbE (TLS HW offload, for host connection only) (CEMG)
  - 10Gb BaseT, with 4x 100Mbs/1 Gbs/10Gbs RJ45 (C4A9)
  - Fibre Channel HIC, with 4x 16/32/64 Gb FC SFP+ host ports (SW fiber optic cables, LC)(C4A8)
    - All HICs require SFPs and optical cables or DAC cables
    - All ethernet SFPs run at posted speed only and do not support dual line rates

Two controllers are required for selection and must have the same HIC adapters installed. The use of a DS240N expansion enclosure requires a 100GbE HIC for connectivity installed in slot 1 in each controller.

The following table lists the controllers for the ThinkSystem DS Series Storage Arrays and supported connectivity options.

Tip: The Fibre Channel HIC does not include transceivers. Transceivers are selected separately.

Table 4. DS Series controllers and connectivity options

Part number	Feature code	Description	Top Choice Express	Maximum quantity per controller
Host Interface Cards - DS3200				
4XC7A97035	C4AC	Lenovo ThinkSystem Storage 10/25Gb 4 port Ethernet	Not TCE	4
4XC7A97031	C4A8	Lenovo ThinkSystem Storage 64/32Gb 4 Port Fiber Channel Adapter	Not TCE	3
4XC7A97032	C4A9	Lenovo ThinkSystem Storage 10Gb BaseT 4 Port Adapter (Host)	Not TCE	3
4XC7B12411	CEMG**	Lenovo ThinkSystem Storage 100Gb 2 Port Ethernet Crypto	Not TCE	3
4XC7A97033	C4AA	Lenovo ThinkSystem Storage 100Gb 2 port Ethernet	Not TCE	3
CTO Only	C4W5	Lenovo ThinkSystem Storage 100Gb 2 Port Ethernet, RoCE Adapter (NVMe Shelf)	Not TCE	1
Host Interface Cards - DS5200 & DS5200C				
4XC7A97035	C4AC	Lenovo ThinkSystem Storage 10/25Gb 4 port Ethernet	-	3
4XC7A97031	C4A8	Lenovo ThinkSystem Storage 64/32Gb 4 Port Fiber Channel Adapter	-	3
4XC7A97032	C4A9	Lenovo ThinkSystem Storage 10Gb BaseT 4 Port Adapter (Host)	-	3
4XC7B12411	CEMG**	Lenovo ThinkSystem Storage 100Gb 2 Port Ethernet Crypto	-	3
4XC7A97033	C4AA	Lenovo ThinkSystem Storage 100Gb 2 port Ethernet	-	4
CTO Only	C4W5	Lenovo ThinkSystem Storage 100Gb 2 Port Ethernet, RoCE Adapter (NVMe Shelf)	-	2
Host Interface Cards - DS7200				
4XC7A97035	C4AC	Lenovo ThinkSystem Storage 10/25Gb 4 port Ethernet	-	3
4XC7A97031	C4A8	Lenovo ThinkSystem Storage 64/32Gb 4 Port Fiber Channel Adapter	-	3
4XC7A97032	C4A9	Lenovo ThinkSystem Storage 10Gb BaseT 4 Port Adapter (Host)	-	3
4XC7B12411	CEMG**	Lenovo ThinkSystem Storage 100Gb 2 Port Ethernet Crypto	-	3
4XC7A97033	C4AA	Lenovo ThinkSystem Storage 100Gb 2 port Ethernet	-	4
CTO Only	C4W5	Lenovo ThinkSystem Storage 100Gb 2 Port Ethernet, RoCE Adapter (NVMe Shelf)	-	2
SFP+ and transceiver for 25Gb/100Gb optical cables				
4XF7A14919	B4K9	10G SW Optical iSCSI SFP+ Module 1 pack	Not TCE	12
4TC7A94751	C4K4*	Lenovo 25G SR SFP28 Amphenol Ethernet Transceiver	Not TCE	12 or 16
4M27A67042	BFH1	Lenovo 100Gb SR4 QSFP28 Ethernet Transceiver	Not TCE	6 or 8
Fiber SFP+ transceivers				
4TC7A97241	C4AF	Lenovo 64/32G Fiber Channel SFP+ SW Transceiver	Not TCE	12
4M17A13528	B4B3	Lenovo 32Gb FC SFP+ Transceiver	Not TCE	12

*25 Gbps transceivers are not auto-negotiating down to 10 Gbps
**The Lenovo ThinkSystem Storage 100Gb 2 port Ethernet Crypto Card (CEMG) requires ONTAP 9.17.1 or greater

The following table lists the supported optical and copper cables.

Tip: The 100GbE cables used to connect the DS240N expansion enclosure are configure with the DS240N.

Table 5. Supported cables

Part number	Feature code	Description	Top Choice Express	Maximum quantity per controller
DAC cable options for 100GbE				
7Z57A03561	AV1Z	Lenovo 1m Passive 100G QSFP28 DAC Cable	Not TCE	6 or 8
7Z57A03562	AV20	Lenovo 3m Passive 100G QSFP28 DAC Cable	Not TCE	6 or 8
7Z57A03563	AV21	Lenovo 5m Passive 100G QSFP28 DAC Cable	Not TCE	6 or 8
DAC breakout cable options for 100GbE				
7Z57A03564	AV22	Lenovo 1m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable	Not TCE	4 or 3
7Z57A03565	AV23	Lenovo 3m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable	Not TCE	4 or 3
7Z57A03566	AV24	Lenovo 5m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable	Not TCE	4 or 3
DAC cable options for 25 GbE SFP28 connectivity				
7Z57A03557	AV1W	Lenovo 1m Passive 25G SFP28 DAC Cable	Not TCE	16 or 12
7Z57A03558	AV1X	Lenovo 3m Passive 25G SFP28 DAC Cable	Not TCE	16 or 12
7Z57A03559	AV1Y	Lenovo 5m Passive 25G SFP28 DAC Cable	Not TCE	16 or 12
00D6288	A3RG	0.5m Passive DAC SFP+ Cable	Not TCE	12
90Y9427	A1PH	1m Passive DAC SFP+ Cable	Not TCE	12
00AY764	A51N	1.5m Passive DAC SFP+ Cable	Not TCE	12
00AY765	A51P	2m Passive DAC SFP+ Cable	Not TCE	12
90Y9430	A1PJ	3m Passive DAC SFP+ Cable	Not TCE	12
90Y9433	A1PK	5m Passive DAC SFP+ Cable	Not TCE	12
00MN499	ASR5	Lenovo 0.5m LC-LC OM3 MMF Cable	Not TCE	16 or 12
00MN502	ASR6	Lenovo 1m LC-LC OM3 MMF Cable	Not TCE	16 or 12
00MN505	ASR7	Lenovo 3m LC-LC OM3 MMF Cable	Not TCE	16 or 12
00MN508	ASR8	Lenovo 5m LC-LC OM3 MMF Cable	Not TCE	16 or 12
00MN511	ASR9	Lenovo 10m LC-LC OM3 MMF Cable	Not TCE	16 or 12
00MN514	ASRA	Lenovo 15m LC-LC OM3 MMF Cable	Not TCE	16 or 12
00MN517	ASRB	Lenovo 25m LC-LC OM3 MMF Cable	Not TCE	16 or 12
00MN520	ASRC	Lenovo 30m LC-LC OM3 MMF Cable	Not TCE	16 or 12
OM4 cable options for 16/32 Gb FC and 25 GbE SFP28 optical transceivers				
4Z57A10845	B2P9	Lenovo 0.5m LC-LC OM4 MMF Cable	Not TCE	16 or 12
4Z57A10846	B2PA	Lenovo 1m LC-LC OM4 MMF Cable	Not TCE	16 or 12
4Z57A10847	B2PB	Lenovo 3m LC-LC OM4 MMF Cable	Not TCE	16 or 12
4Z57A10848	B2PC	Lenovo 5m LC-LC OM4 MMF Cable	Not TCE	16 or 12
4Z57A10849	B2PD	Lenovo 10m LC-LC OM4 MMF Cable	Not TCE	16 or 12
4Z57A10850	B2PE	Lenovo 15m LC-LC OM4 MMF Cable	Not TCE	16 or 12
4Z57A10851	B2PF	Lenovo 25m LC-LC OM4 MMF Cable	Not TCE	16 or 12
4Z57A10852	B2PG	Lenovo 30m LC-LC OM4 MMF Cable	Not TCE	16 or 12
OM4 cables for 100 GbE QSFP28 transceivers				
7Z57A03567	AV25	Lenovo 5m MPO-MPO OM4 MMF Cable	Not TCE	8 or 6

Part number	Feature code	Description	Top Choice Express	Maximum quantity per controller
7Z57A03568	AV26	Lenovo 7m MPO-MPO OM4 MMF Cable	Not TCE	8 or 6
7Z57A03569	AV27	Lenovo 10m MPO-MPO OM4 MMF Cable	Not TCE	8 or 6
7Z57A03570	AV28	Lenovo 15m MPO-MPO OM4 MMF Cable	Not TCE	8 or 6
7Z57A03571	AV29	Lenovo 20m MPO-MPO OM4 MMF Cable	Not TCE	8 or 6
7Z57A03572	AV2A	Lenovo 30m MPO-MPO OM4 MMF Cable	Not TCE	8 or 6
UTP Category 6 cables for 1/10 GbE RJ-45 adapter cards and 1 GbE RJ-45 management ports				
00WE123	AVFW	0.75m Green Cat6 Cable	Not TCE	13
00WE127	AVFX	1.0m Green Cat6 Cable	Not TCE	13
00WE131	AVFY	1.25m Green Cat6 Cable	Not TCE	13
00WE135	AVFZ	1.5m Green Cat6 Cable	Not TCE	13
00WE139	AVG0	3m Green Cat6 Cable	Not TCE	13

Expansion enclosures

The ThinkSystem DS Series support attachment of ThinkSystem DS240N 2U24 expansions. The expansion enclosure can be added to the system non-disruptively.

Note: A maximum of two DS240N expansion units are supported via direct attach. More than 2x expansion units require a storage switch (SN2100, Cisco C9336C-FX2). A switch can be used to connect from one up to the maximum number of supported expansions. If a switch is used all expansions will be connected through the switch.

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

Table 6. CTO base models for the ThinkSystem DS Series expansion enclosures

Machine Type/Model	Feature code	Description	Top Choice Express
7DPBCTO1WW	B6W6	Lenovo ThinkSystem DS240N 2U24 NVMe Expansion Enclosure	-

The ThinkSystem DS240N expansion enclosure ships with two NVMe I/O expansion modules. Each NVMe I/O expansion module provides two external 100 GbE QSFP28 ports (labeled Ports A and B) that are used for direct-attach connections to the ThinkSystem DS Series enclosure.

The ThinkSystem DS Series enclosures support the following expansions:

- DS3200 direct connected 1x DS240N - 48 NVMe SSDs
- DS5200 direct connected 2x DS240N - 72 NVMe SSDs
- DS7200 direct connected 2x DS240N - 72 NVMe SSDs (Switch connected: 4x DS240N - 120 NVMe SSDs)
- DS5200C direct connected 1x DS240N - 48 NVMe SSDs

Configuration notes:

- 100GbE adapter (C4W5) required to support DS240N expansion.
- For example to attach 1x DS240N, requires four 100G QSFP28 DAC cables per expansion for directly connecting the expansion to the base enclosure (two from each controller).

The models of the ThinkSystem DS240N ship with the following items:

- One chassis with the following components:
  - Two NVMe I/O modules
  - Two power supplies
- Rack Mount Kit
- Publications Flyer
- Two customer-configured power cables
- Four customer-configured 100G QSFP28 Passive DAC cables

The GEO specific models of the ThinkSystem DS240N (I/O module (IOM)) are:

- B73A - ThinkSystem Storage NVMe Expansion IOM
  - (ANZ, ASEAN, Brazil, HTK, INDIA, JAPAN, LA, NA, PRC) GEO
- BQHL - Lenovo ThinkSystem Storage NVMe Expansion IOM
  - (EET, MEA, RUCIS, WE) GEO

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

Table 7. NVMe expansion enclosure connectivity options

Part number	Feature code	Description	Top Choice Express	Required quantity
7Z57A03561	AV1Z	Lenovo 1m Passive 100G QSFP28 DAC Cable	Not TCE	4
7Z57A03562	AV20	Lenovo 3m Passive 100G QSFP28 DAC Cable	Not TCE	4
7Z57A03563	AV21	Lenovo 5m Passive 100G QSFP28 DAC Cable	Not TCE	4

Drives

The ThinkSystem DS Series base enclosures and DS240N expansion enclosures each support up to 24 SFF hot-swap drives, in packs of 2 drives.

- All non-FIPS drives are Self-Encrypting Drives (SED)
- FIPS and non-FIPS drives CAN NOT be mixed in the same system
- All systems require a minimum of 8-drives (4-drive packs)
- For factory-installed drive packs, all drives in the enclosure must be of the same type and capacity
- Expansion enclosures require a minimum of 4-drives (2-drive packs)

The following tables list the drive options for internal storage for each base enclosure and expansions.

The Lenovo ThinkSystem DS Series enclosures:

- DS3200, DS5200, and DS7200 CTO base models 2U24
- DS5200C CTO base model 2U24

The Lenovo ThinkSystem Expansion enclosures:

- ThinkSystem DS240N 2U24 Exp

Table 8. DS3200, DS5200 and DS7200 CTO base models

Part number	Feature code	Description	Top Choice Express	Max Qty
SED drives				
CTO only	C3XP	Lenovo ThinkSystem 3.84TB (2x 1.9TB NVMe SED) Drive Pack	Not TCE	12
CTO only	C3XN	Lenovo ThinkSystem 7.68TB (2x 3.84TB NVMe SED) Drive Pack	Not TCE	12
CTO only	C3XL	Lenovo ThinkSystem 15.4TB (2x 7.68TB NVMe SED) Drive Pack	Not TCE	12
CTO only	C3XK	Lenovo ThinkSystem 30.7TB (2x 15.36TB NVMe SED) Drive Pack	Not TCE	12
SED FIPS drives				
CTO only	C3XM	Lenovo ThinkSystem 7.68TB (2x 3.84TB NVMe SED FIPS) Drive Pack	Not TCE	12

Table 9. Lenovo ThinkSystem DS5200C CTO base model

Part number	Feature code	Description	Top Choice Express	Max Qty
QLC NVMe SED drives				
CTO only	C5RG	Lenovo ThinkSystem 30.7TB (2x 15.36TB QLC NVMe SED) Drive Pack	Not TCE	12
CTO only	C5RH	Lenovo ThinkSystem 61.4TB (2x 30.72TB QLC NVMe SED) Drive Pack	Not TCE	12

Table 10. ThinkSystem DS240N 2U24 Expansion (7DPB)

Part number	Feature code	Description	Top Choice Express	Max Qty
SED drives				
CTO only	C3XP	Lenovo ThinkSystem 3.84TB (2x 1.9TB NVMe SED) Drive Pack	Not TCE	12

Part number	Feature code	Description	Top Choice Express	Max Qty
CTO only	C3XN	Lenovo ThinkSystem 7.68TB (2x 3.84TB NVMe SED) Drive Pack	Not TCE	12
CTO only	C3XL	Lenovo ThinkSystem 15.4TB (2x 7.68TB NVMe SED) Drive Pack	Not TCE	12
CTO only	C3XK	Lenovo ThinkSystem 30.7TB (2x 15.36TB NVMe SED) Drive Pack	Not TCE	12
QLC NVMe SED drives				
CTO only	C5RG	Lenovo ThinkSystem 30.7TB (2x 15.36TB QLC NVMe SED) Drive Pack	Not TCE	12
CTO only	C5RH	Lenovo ThinkSystem 61.4TB (2x 30.72TB QLC NVMe SED) Drive Pack	Not TCE	12
SED FIPS drives				
CTO only	C3XM	Lenovo ThinkSystem 7.68TB (2x 3.84TB NVMe SED FIPS) Drive Pack	Not TCE	12

Software

In this section:

- Feature bundles
- ONTAP software versions

Feature bundles

Controller software for the Lenovo ThinkSystem DS Series is only available in a single bundle:

- Storage All SAN Complete Bundle Offering (Feature CCQ9)

The following table summarizes the features in each bundle for the DS3200, DS5200, DS7200 and DS5200C.

Table 11. Software selection

Feature	All SAN Complete Bundle (WW)
RAID-DP data protection	Included
SAN (Block access): iSCSI, FC, NVMe/FC, NVMe/TCP	Included
All Flash Array (AFA) capability	Included
Thin provisioning	Included
Compression	Included
Compaction	Included
Deduplication	Included
Snapshots	Included
Encryption*	Included*
Balanced placement	Included
Dynamic capacity expansion	Included
Adaptive Quality of Service	Included
SnapRestore	Included
FlexClone	Included
FlexVol	Included
Trusted Platform Module (TPM) support	Included†
SnapLock data protection	Included
Multitenant Key Magement	Included
Autonomous Ransomware Protection (ARP)	Included
SnapMirror Cloud	Included
SnapMirror active sync	Included
SnapMirror asynchronous replication	Included
SnapCenter	Included

* Requires the encryption version of ONTAP. See the ONTAP software section
† Not available in PRC

The features are summarized as follows:

- **RAID-DP data protection**: Provides the flexibility to choose the level of data protection required and helps improve performance and availability with built-in spare capacity and by distributing data across all physical drives in the aggregate, sustaining to up to two (RAID-DP) concurrent drive failures.

- **All Flash Array (AFA) capability**: Meets the demand for higher speed, lower latency storage and provides higher IOPS and bandwidth with lower power usage and total cost of ownership than hybrid or HDD-based solutions.
- **Thin provisioning**: All capacity is thin provisioned to optimize efficiency 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.
- **Compression:** Provides transparent inline and post-process data compression to reduce the amount of storage that customers need to purchase and manage.
- **Compaction:** Enhances compression to further reduce the amount of storage that customers need to purchase and manage.
- **Deduplication:** Performs general-purpose deduplication for removal of redundant data to reduce the amount of storage that customers need to purchase and manage.
- **Snapshots**: Enables creation of read-only copies of data for backup, parallel processing, testing, and development, and have the copies available almost immediately.
- **Encryption:** Provides software-based encryption for data at rest for enhanced data security with the traditional drives and embedded key management (requires the encryption-capable version of the ONTAP software).
- **Balanced placement:** Provides automated workload distribution across the cluster to help increase utilization and performance.
- **Dynamic capacity expansion:** Allows the capacity of a volume or aggregate to be expanded by adding new physical drives.
- **Adaptive Quality of Service:** Simplifies operations and maintains consistent workload performance by defining QoS policies and automatically adjusting storage resources to respond to workload changes.
- **SnapRestore:** Enables quick recovery of data by reverting a local volume or file to its previous state from a particular snapshot copy stored on the file system.
- **FlexClone:** References snapshot metadata to create writable point-in-time copies of a volume.
- **SnapMirror asynchronous replication:** Provides storage system-based data replication between the storage systems containing source (local) and destination (remote) volumes by using asynchronous (at specified regular intervals) data transfers over IP communication links.
- **SyncMirror data protection:** Adds extra level of data protection and availability by mirroring a pair of RAID aggregates.
- **Trusted Platform Module (TPM)**: For encryption enabled systems. The encryption keys for the onboard key manager (OKM) are no longer stored in the boot device, but instead are stored in the physical TPM for systems so equipped, offering greater security and protection. Moving to the TPM is a nondisruptive process.
- **Data Protection Optimized (DPO)**: Increases the amount of concurrent SnapMirror sessions per node, as well as improving SnapMirror performance to the cluster.
- **SnapVault disk-based storage backup:** Enables data stored on multiple systems to be backed up to a central, secondary system quickly and efficiently as read-only snapshot copies.
- **SnapCenter:** Provides application- and virtual machine-aware backup and restoration of data by using the Snapshots technology and leverages the SnapMirror capabilities of storage systems to provide onsite or offsite backup set mirroring for disaster recovery.
- **SnapMirror Cloud**: A backup and recovery technology designed for ONTAP users who want to transition their data protection workflows to the cloud. SnapMirror Cloud is an extension to the family of SnapMirror replication technologies. While SnapMirror is frequently used for ONTAP-to-ONTAP

backups, SnapMirror Cloud uses the same replication engine to transfer Snapshot copies for ONTAP to S3-compliant object storage backups.

- **Multitenant Key Management (MTKM)**: Provides the ability for individual tenants or storage virtual machines (SVMs) to maintain their own keys through KMIP for NVE. With multitenant external key management, you can centralize your organization's key management functions by department or tenant while inherently confirming that keys are not stored near the assets. This approach decreases the possibility of compromise.
- **Autonomous Ransomware Protection (ARP)**: Uses workload analysis in to proactively detect and warn about abnormal activity that might indicate a ransomware attack. When an attack is suspected, anti-ransomware also creates new Snapshot backups, in addition to existing protection from scheduled Snapshot copies. New to ONTAP 9.11: Optional multi-admin verification to approve administration functions that could result in data loss.
- **SnapLock data protection:** Creates Write-Once-Read-Many (WORM) non-rewritable, non-erasable data on hard disk drives to prevent files from being altered or deleted until a predetermined or default retention date.

ONTAP software versions

The following table lists the software selection options for the DS3200, DS5200, DS7200 and DS5200C. The table also indicates which markets each version is available in.

Table 12. Software selection

Part number	Feature code	Description	Top Choice Express	Availability
CTO only	CCWL	Lenovo ThinkSystem Storage ONTAP 9.17 Software Encryption	Not TCE	All markets
CTO only	CCWM	Lenovo ThinkSystem Storage ONTAP 9.17 Software NonEncryption	Not TCE	All markets
CTO only	CF4S	Lenovo ThinkSystem Storage ONTAP 9.18 Software Encryption	Not TCE	All markets
CTO only	CF4T	Lenovo ThinkSystem Storage ONTAP 9.18 Software NonEncryption	Not TCE	All markets

Software maintenance is included in the DS3200 warranty and support (see Warranty and support for details).

Management

The ThinkSystem DS Series supports the following management interfaces:

- Lenovo ThinkSystem Storage Manager, a web-based interface via HTTPS for single-system management or centralized management of the cluster of systems, that runs on the storage system itself and requires only a supported browser (Microsoft Internet Explorer, Google Chrome, or Mozilla Firefox), so there is no need for a separate console or plug-in.
- Command line interface (CLI) via SSH or through serial console.
- Syslog, SNMP, and e-mail notifications.

Power supplies and cables

The ThinkSystem DS Series base enclosures ship with two redundant hot-swap 1600 W (200-240 V) Titanium AC power supplies, each with an IEC 320-C14 connector.

The ThinkSystem DS240N 2U24 SFF expansion enclosures with feature code B73A IOMs ships with two redundant hot-swap 1600 W (200-240 V) Platinum AC power supplies, each with an IEC 320-C14 connector. With feature code BQHL IOMs ship with two redundant hot-swap 1600 W (200-240 V) Titanium AC power supplies, each with an IEC 320-C14 connector.

See IOM GEO details under Expansion enclosures section.

Each ThinkSystem DS Series enclosure requires the selection of two power cables.

Note: A 110V power source is only supported on the DS3200. Included power supply is auto-sensing.

Rack installation

The individually shipped ThinkSystem DS Series and DS240N enclosures come with the ThinkSystem Storage Rack Mount Kit 2U24 listed in the following table.

Table 13. 4-post rack mount kit

Feature code	Description	Quantity
B6Y6	Lenovo ThinkSystem NVMe Rail Kit 4 post	1

When the ThinkSystem DS 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 14. 4-post SIR rack mount kits

Feature code	Description	Quantity
B6Y7	ThinkSystem NVMe Adjustable Rail Kit	1

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

Table 15. Rack mount kit features and specifications summary

	Screw-in fixed rail with adjustable depth	
Attribute	**2U24 NVMe**	**2U24 NVMe SIR**
Feature code	B6Y6	B6Y7
Enclosure support	DSxx00, DS240N	DSxx00, DS240N
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	2.0 - 3.3 mm (0.08 - 0.13 in.)	2.0 - 3.3 mm (0.08 - 0.13 in.)
Distance between front and rear mounting flanges^	605 - 813 mm (23.8 - 32 in.)	605 - 813 mm (23.8 - 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 DS Series physical specifications are in the following table:

Table 16. Physical specifications per system

Physical Characteristics	DS3200	DS5200	DS7200	DS5200C
Rack Units	2	2	2	2
Chassis Height	3.43" (8.7 cm)	3.43" (8.7 cm)	3.43" (8.7 cm)	3.43" (8.7 cm)
Chassis Width with Mounting Flanges	19.02" (48.3 cm)	19.02" (48.3 cm)	19.02" (48.3 cm)	19.02" (48.3 cm)
Chassis Width without Mounting Flanges	17.6" (44.7 cm)	17.6" (44.7 cm)	17.6" (44.7 cm)	17.6" (44.7 cm)
Chassis Depth without Cable Mgmt	22.05" (56 cm)	22.05" (56 cm)	22.05" (56 cm)	22.05" (56 cm)
Chassis Weight	60.7 lb (27.5 kg)	60.7 lb (27.5 kg)	60.7 lb (27.5 kg)	60.7 lb (27.5 kg)
Front Clearance (Cooling)	6.03" (15.3 cm)	6.03" (15.3 cm)	6.03" (15.3 cm)	6.03" (15.3 cm)
Front Clearance (Maintenance)	24.03" (61 cm)	24.03" (61 cm)	24.03" (61 cm)	24.03" (61 cm)
Rear Clearance (Cooling)	6.03" (15.3 cm)	6.03" (15.3 cm)	6.03" (15.3 cm)	6.03" (15.3 cm)
Rear Clearance (Maintenance)	16.94" (43 cm)	16.94" (43 cm)	16.94" (43 cm)	16.94" (43 cm)

The ThinkSystem DS240N expansion specifications are in the following table:

Table 17. DS240N expansion physical specification

Physical Characteristics	DS240N
Rack Units	2
Chassis Height	3.43" (8.7 cm)
Chassis Width with Mounting Flanges	19.02" (48.3 cm)
Chassis Width without Mounting Flanges	17.6" (44.7 cm)
Chassis Depth without Cable Mgmt	22.05" (56 cm)
Chassis Weight	56.7 lb (25.7 kg)
Front Clearance (Cooling)	6.02'' (15.3 cm)
Front Clearance (Maintenance)	24.02'' (61 cm)
Rear Clearance (Cooling)	6.02'' (15.3 cm)
Rear Clearance (Maintenance)	16.93'' (43 cm)

Operating environment

The ThinkSystem DS Series enclosures are supported in the following environment:

Table 18. Environment specifications per system

Environmental Requirements	**DS3200**	**DS5200**	**DS7200**	**DS5200C**
Operating Temperature Range	50 to 95 deg F; 10 to 35 deg C	51 to 95 deg F; 10 to 35 deg C	52 to 95 deg F; 10 to 35 deg C	53 to 95 deg F; 10 to 35 deg C
Storage Temperature Range	-40 to 158 deg F; -40 to 70 deg C	-40 to 158 deg F; -40 to 70 deg C	-40 to 158 deg F; -40 to 70 deg C	-40 to 158 deg F; -40 to 70 deg C
Transit Temperature Range	-40 to 158 deg F; -40 to 70 deg C	-40 to 158 deg F; -40 to 70 deg C	-40 to 158 deg F; -40 to 70 deg C	-40 to 158 deg F; -40 to 70 deg C
Operating Relative Humidity	8 to 80 %	8 to 80 %	8 to 80 %	8 to 80 %
Storage Relative Humidity	10 to 95 %	10 to 95 %	10 to 95 %	10 to 95 %
Transit Relative Humidity	10 to 95 %	10 to 95 %	10 to 95 %	10 to 95 %
Operating Altitude Range	Up to 10000.0 ft; Up to 3048.0 m	Up to 10000.0 ft; Up to 3048.0 m	Up to 10000.0 ft; Up to 3048.0 m	Up to 10000.0 ft; Up to 3048.0 m
Storage Altitude Range	Up to 40000.0 ft; Up to 12192.0 m	Up to 40000.0 ft; Up to 12192.0 m	Up to 40000.0 ft; Up to 12192.0 m	Up to 40000.0 ft; Up to 12192.0 m
Transit Altitude Range	Up to 39989.8 ft; Up to 12192 m	Up to 39989.8 ft; Up to 12192 m	Up to 39989.8 ft; Up to 12192 m	Up to 39989.8 ft; Up to 12192 m
Acoustic Noise - Sound Power	8 Bels	8 Bels	8 Bels	8 Bels
Acoustic Noise - Sound Pressure	70.5 dBA	70.5 dBA	70.5 dBA	70.5 dBA
Input Power Voltage	40 to 48; 100 to 120; 200 to 240	40 to 48; 200 to 240	40 to 48; 200 to 240	40 to 48; 200 to 240

The ThinkSystem DS240N expansion supports in the following environment:

Table 19. DS240N Environment specifications

Environmental Requirement	**DS240N**
Operating Temperature Range	50 to 95 deg F 10 to 35 deg C
Storage Temperature Range	-40 to 158 deg F; -40 to 70 deg C
Transit Temperature Range	-40 to 158 deg F; -40 to 70 deg C
Operating Relative Humidity	8 to 80 %
Storage Relative Humidity	10 to 95 %
Transit Relative Humidity	10 to 95 %
Operating Altitude Range	Up to 9997.44 ft; Up to 3048.0 m
Storage Altitude Range	Up to 39989.76 ft; Up to 12192.0 m
Transit Altitude Range	Up to 39989.8 ft; Up to 12192 m
Acoustic Noise - Sound Power	7.6 Bels
Acoustic Noise - Sound Pressure	62.6 dBA
Input Power Voltage	100 to 120; 200 to 240

Warranty and support

The DS3200, DS5200, DS7200, DS5200C and DS240N expansion enclosures have a 3-year warranty.

Our global network of regional support centers offers consistent, local-language support enabling you to vary response times and level of service to match the criticality of your support needs:

- **Standard Next Business Day** – Best choice for non-essential systems requiring simple maintenance.
- **Premier Next Business Day** – Best choice for essential systems requiring technical expertise from senior-level Lenovo Engineers.
- **Premier 24x7 4-Hour Response** – Best choice for systems where maximum uptime is critical.
- **Premier Support Plus 24x7 4-Hour Response** – Best choice for systems where maximum uptime is critical.

For more information, consult our Lenovo Operational Support Services for Data Centers Services Brochure.

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

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/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.

Lenovo TruScale

Lenovo TruScale XaaS is your set of flexible IT services that makes everything easier. Streamline IT procurement, simplify infrastructure and device management, and pay only for what you use – so your business is free to grow and go anywhere.

Lenovo TruScale is the unified solution that gives you simplified access to:

- The industry's broadest portfolio – from pocket to cloud – all delivered as a service
- A single-contract framework for full visibility and accountability
- The global scale to rapidly and securely build teams from anywhere
- Flexible fixed and metered pay-as-you-go models with minimal upfront cost
- The growth-driving combination of hardware, software, infrastructure, and solutions – all from one single provider with one point of accountability.

For information about Lenovo TruScale offerings that are available in your region, contact your local Lenovo sales representative or business partner.

Regulatory compliance

The ThinkSystem DS Series enclosures conform to the following regulations:

- United States: FCC Part 15, Class A; UL 60950-1
- Canada: ICES-003, Class A; CAN/CSA-C22.2 60950-1
- Mexico NOM
- European Union: CE Mark (EN55032 Class A, EN55024, IEC/EN60950-1); ROHS Directive 2011/65/EU
- Russia, Kazakhstan, Belarus: EAC
- China: CCC GB 4943.1, GB 17625.1, GB 9254 Class A; CELP; CECP
- 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 DS Series all-Flash SAN Storage Array supports attachment to Lenovo servers by using NVMe over Fibre Channel (NVMe/FC), iSCSI, and Fibre Channel storage connectivity.

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.

Cluster interconnect

The following Ethernet storage switch can be used with the ThinkSystem DS3200, DS5200, DS7200 and DS5200C for cluster interconnect configurations.

- Cisco 9336C-FX2 (preferred switch)
- BES-53248 (withdrawn; still supported for existing installations)
- NVIDIA SN2100 (withdrawn; still supported for existing installations)

For more information, see the following

- Cisco Nexus 9300 Series Network Switches Product Guide: https://lenovopress.lenovo.com/lp2034-cisco-nexus-9300-series-network-switches
- NVIDIA SN2100 16-port 100Gb Ethernet Storage Switch Article: https://lenovopress.lenovo.com/lp1756-nvidia-sn2100-100gb-ethernet-storage-switch
- BES-53248 Ethernet Storage Switch: https://lenovopress.lenovo.com/lp1226-bes-53248-ethernet-storage-switch-lenovo

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#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)
93074RX	42U Standard Rack (1000mm)
93604PX	42U 1200mm Deep Dynamic Rack
93614PX	42U 1200mm Deep Static Rack
93634PX	42U 1100mm Dynamic Rack
93634EX	42U 1100mm Dynamic Expansion Rack

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	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	C0D9	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 Monitored PDUs															
4PU7B08150	CD17	0U 3 C13 and 18 C19 Monitored 80A 3 Phase WYE PDU	N	N	N	N	N	N	N	N	N	N	N	Y	N
4PU7B08148	CD15	0U 3 C13 and 18 C19 Monitored 48A 3 Phase WYE PDU	N	N	N	N	N	N	N	N	N	N	N	Y	N
4PU7B08149	CD16	0U 3 C13 and 18 C19 Monitored 63A 3 Phase WYE PDU	N	N	N	Y	N	N	Y	Y	N	N	N	N	N
4PU7B08151	CD18	0U 21 Saf-D-Grid 300 Monitored 80A 3 Phase WYE High Voltage PDU	N	N	N	N	N	N	N	N	N	N	N	Y	N
0U Switched and Monitored PDUs															
4PU7A93181	C0D5	0U 21 C13/C15 and 21 C13/C15/C19 Switched and Monitored 60A 3 Phase Delta PDU v2	N	Y	N	N	Y	N	N	Y	N	Y	N	Y	N
4PU7A93178	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	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	Y	Y	Y	Y
4PU7A93180	C0D6	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	C0D7	0U 16 C13/C15 and 16 C13/C15/C19 Switched and Monitored 30A 1 Phase PDU v2	N	Y	N	N	N	N	N	Y	N	Y	Y	Y	N
4PU7B08152	CD19	0U 21 Saf-D-Grid 300 Switched and Monitored 80A 3 Phase WYE High Voltage PDU	N	N	N	N	N	N	N	N	N	N	N	Y	N
1U Basic PDUs															
4PU7B12339	CE6L	1U Basic 16A 1 Phase PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
1U Switched and Monitored PDUs															
4PU7B13376	CJVY	1U 18 C19/C13 Switched and Monitored 48A 3 Phase WYE PDU v3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
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	Y	N	N	N	N	Y	N	Y	Y	Y	N
Line cords for 1U PDUs that ship without a line cord															

Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
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 - 200-240VAC	
7DD5A002WW	RT1.5kVA 2U Rack or Tower UPS-G2 (200-240VAC)
7DD5A005WW	RT3kVA 2U Rack or Tower UPS-G2 (200-240VAC)

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

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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. **Data Storage Solutions Primer**
   2026-07-30 | 45 minutes | Employees Only

   This course is part of the Lenovo ISG (Infrastructure Solutions Group) Primer Series - a learning program designed to help Client Managers build foundational knowledge, strengthen customer conversations, and recognize opportunities with greater confidence.

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

   - Understand how storage connects to modern IT and business outcomes
   - Explain the importance of storage in data-centric environments
   - Identify opportunities and align storage solutions to customer needs

   Last Update: July 30, 2026

   Published: 2026-07-30
   Length: 45 minutes

   Start the training:
   Employee link: Grow@Lenovo

   Course code: DSTOO104

2. **Lenovoデータセンター技術認定試験学習ガイド（LENU-322C-SG-AJP)**
   2026-07-13 | 10 minutes | Employees and Partners

   このガイドには、受験者がLenovoデータセンター技術実技試験および認定試験の準備と登録を行う際に役立つ情報が含まれています。

   Tags: Data Center

   Published: 2026-07-13
   Length: 10 minutes

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

   Course code: LENU-322C-SG-AJP

3. **Lenovoデータセンターセールス認定試験学習ガイド**
   2026-07-13 | 10 minutes | Employees and Partners

   このガイドには、データセンターセールスの実技試験および認定試験の準備と登録に役立つ情報が含まれています。

   Tags: Data Center

   Published: 2026-07-13
   Length: 10 minutes

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

   Course code: LENU-122C-SG-AJP
4. **Guide d'étude pour l'examen de certification des ventes de Lenovo Data Center**
   2026-07-13 | 10 minutes | Employees and Partners

   Ce guide contient des informations destinées à aider les candidats à se préparer et à s'inscrire aux examens pratiques et de certification en vente de centres de données.

   Tags: Cloud

   Published: 2026-07-13
   Length: 10 minutes

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

   Course code: LENU-122C-SG-FR
5. **Guide d'étude pour l'examen de certification technique Lenovo Data Center**
   2026-07-13 | 10 minutes | Employees and Partners

   Ce guide contient des informations pour aider les candidats à se préparer et à s'inscrire aux examens pratiques et de certification Data Center Technical.

   Tags: Data Center

   Published: 2026-07-13
   Length: 10 minutes

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

   Course code: LENU-322C-SG-FR

6. **Partner Technical Webinar - Data Protection - Ransomware**
   2026-05-04 | 60 minutes | Employees and Partners

   In this 60 minute replay, Dan Beins, Lenovo Storage Architect, provided an in-depth overview of Lenovo ransomware defenses across ThinkSystem DS, DG, and DM.

   Published: 2026-05-04
   Length: 60 minutes

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

   Course code: MAY0126

7. **Partner Technical Webinar - Storage 101**
   2026-04-30 | 60 minutes | Employees and Partners

   In this 60 minute replay, Dan Beins, Lenovo Storage Architect, took us “back to basics” with a Storage Portfolio Overview 101.

   Published: 2026-04-30
   Length: 60 minutes

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

   Course code: APR2426

8. **Family Portfolio: Storage**
   2026-02-13 | 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: 2026-02-13
   Length: 50 minutes

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

   Course code: SXSW1201r18

9. **VTT Data Storage Solutions - ThinkSystem DS series full Feature SAN Storage - December 2025**
   2025-12-10 | 60 minutes | Employees and Partners

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

   - Understand the ThinkSystem DS Series and its key features.
   - Explain the positioning of the DS Series within Lenovo's storage portfolio.
   - Differentiate the DS Series from other Lenovo ThinkSystem storage solutions, highlighting unique capabilities and use cases.

   Tags: Data Management

   Published: 2025-12-10
   Length: 60 minutes

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

   Course code: DVDAT220

10. **FY26Q3 Solutions Launch Data Management Quick Hit**
    2025-12-08 | 12 minutes | Employees and Partners

    This FY26Q3 Quick Hit introduces the Lenovo announcement of new data storage solutions and new data management services. The data storage solutions include an exciting new product line, the Lenovo ThinkSystem DS Series storage systems. Two other storage product lines are updated with new offerings: the ThinkAgile HCI family lineup, and new storage infrastructure offerings: Gen 8 FC directors and a Gen 8 FC switch.

    In addition, new data management services help your customers achieve better business outcomes with AI.

    Tags: Data Management, Nutanix, Services Lifecyle, ThinkAgile,ThinkSystem

    Published: 2025-12-08
    Length: 12 minutes

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

    Course code: DSTOQ100

11. **Partner Technical Webinar - ARS & DS Storage**
2025-11-21 | 60 minutes | Employees and Partners

In this 60-minute replay, Nadia Mosqueira, Sustainability Services Sr. Product Manager, guided us through ARS (Asset Recovery Services). Afterward, Roger Yarosh, Senior Product Manager for Storage, provided insights on the new DS storage.

Tags: Data Management, Storage, Sustainability

Published: 2025-11-21
Length: 60 minutes

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

Course code: NOV1425

12. **Lenovo ThinkSystem DS Series Overview**
2025-11-14 | 20 minutes | Employees and Partners

This course is designed to help you gain a comprehensive understanding of the Lenovo ThinkSystem DS Series. You will learn about its key functionalities and understand their importance and value for customers. By the end of this course, you will be equipped with the knowledge to effectively utilize the ThinkSystem DS Series.

Tags: ThinkSystem, VMware

Published: 2025-11-14
Length: 20 minutes

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

Course code: DSTOO103

Related publications and links

For more information, see the following resources:

- Lenovo Data Center Unified Storage product page
https://www.lenovo.com/us/en/c/data-center/storage/unified-storage
- Lenovo Data Center Solution Configurator
http://dcsc.lenovo.com
- ThinkSystem DS Series Datasheet
https://lenovopress.lenovo.com/datasheet/ds0201-lenovo-thinksystem-ds-series-all-flash-array
- ThinkSystem DS Interactive 3D Tour
https://lenovopress.lenovo.com/lp2333-3d-tour-ds-series-storage
- ONTAP Ransomware Protection
https://datacentersupport.lenovo.com/us/en/storagepubs/ontap/ontap-security-hardening/autonomous-ransomware-protection
- Lenovo Data Center Support - ThinkSystem DSxx00
https://datacentersupport.lenovo.com/us/en/products/storage/lenovo-storage/

Related product families

Product families related to this document are the following:

- DS Series Storage
- Lenovo SAN Storage

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