Lenovo ThinkSystem DG5200 and DG7200 Unified Storage Arrays

Product Guide

Lenovo ThinkSystem DG5200 and DG7200 Unified Storage Arrays are an all-QLC flash storage system, available as unified, that is designed to provide performance, simplicity, capacity, security, and high availability for medium-sized enterprises. Powered by the ONTAP storage management software, the DG5200 and DG7200 deliver enterprise-class storage management capabilities with a wide choice of host connectivity options and enhanced data management features. The DG5200 and DG7200 are a perfect fit for a wide range of enterprise workloads, including artificial intelligence, big data and analytics.

Lenovo ThinkSystem DG5200 and DG7200 models are 2U rack-mount controller enclosures that include two controllers, 128 GB RAM and 16 GB battery-backed NVRAM (64 GB RAM and 8 GB NVRAM per controller), and 24 SFF hot-swap drive bays (2U24 form factor). Controllers provide universal 10/25/100 GbE NAS/iSCSI or 16/32/64 Gb Fibre Channel (FC) ports, or 10/25 GbE RJ-45 ports for host connectivity, depending on configuration.

A single ThinkSystem DG5200 Storage Array scales out to 72 QLC SSDs with the attachment of two Lenovo ThinkSystem DG242N 2U24 NVMe Expansion Enclosure. The DG7200 scales up to 120 QLC SSDs per Storage Array. Both systems can be combined with other DM and DG systems to create a clustered system.

Figure 1. Lenovo ThinkSystem DG7200 Storage Array

Did you know?

Lenovo ThinkSystem DG5200 and DG7200 Unified Storage Arrays offer end-to-end QLC (quad-level cell) Flash drive storage solution.

QLC increases flash storage density and reduces costs because it stores four bits per cell compared to Triple-level cell (TLC) drives which store three bits per cell.

QLC is ideal for replacing hard drive technology because it offers better performance, comparable cost, and better TCO due to increased density and lower power consumption.

The DG5200 is position for capacity and performance. The DG7200 is position for best QLC performance.

Key features

Lenovo ThinkSystem DG5200 and DG7200 Unified Storage Arrays offer the following key features and benefits:

- Available as a Unified storage (File, Block, Object) platform.
- Unified platform options are available with either the Essentials or Complete software feature offerings.
- Compact QLC Flash storage system delivering high-performance and low-latency at an affordable price point, enabling customers of all sizes to enhance their analytics and AI deployments and accelerate applications' access to data.
- All-flash array capabilities 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.
- All-flash storage with dual active/active controller configurations for high availability and performance.
- A rich set of storage management functions available, including snapshots, volume copy, quality of service, thin provisioning, compression, deduplication, encryption, disk-based backup, application- and virtual machine-aware backup, quick data recovery, clustering, synchronous replication, and asynchronous replication.
- Improved performance and data protection with RAID-DP and RAID-TEC, as well as support for traditional RAID 4.
- Flexible host connectivity to match diverse client needs with support for unified NAS and SAN storage protocols, including 10/25/40/100 GbE NAS and iSCSI and 16/32/64 Gb Fibre Channel connectivity.
- NVMe drive-side connectivity with multipathing with up to 24x 2.5-inch small form factor (SFF) drives in the controller enclosure and expansion enclosure.
- Optional licensed functions, object storage tiering (FabricPool).
- Scale-out clustering of up to 4 ThinkSystem DG Series and DM Series storage systems for NAS and SAN connectivity.
- 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, and non-disruptive firmware upgrades.

Lenovo ThinkSystem DG5200 and DG7200 support the 2.5-inch QLC SSDs and all drives are dual-port and hot-swappable. Also supporting DG242N 2U24 NVMe Expansion Enclosure and drives which are designed to be added dynamically, which helps to quickly and seamlessly respond to ever-growing capacity demands.

The DG5200 and DG7200 offer high levels of system and data availability with the following features and for the following workloads:

- Dual-active controllers (high availability pair) with automatic load balancing and failover
- Mirrored, battery-backed controller NVMEM, 8 GB per controller, 16 GB per system
- Dual-port QLC 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
- Automated failover for the data path between the host and the drives with multipathing
- Non-disruptive controller and drive firmware upgrades
- Scale-out clustering
- For workloads: ERP, Microsoft Exchange, Data lakes

Components and connectors

The following figure shows the front of the DG5200 and DG7200.

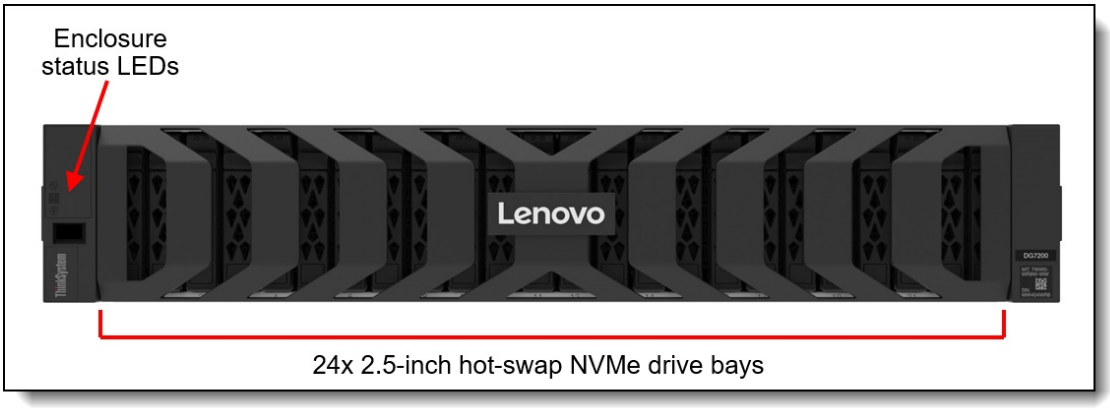

Figure 2. ThinkSystem DG7200 front view

The following figure shows the components of the controllers for DG5200 and DG7200.

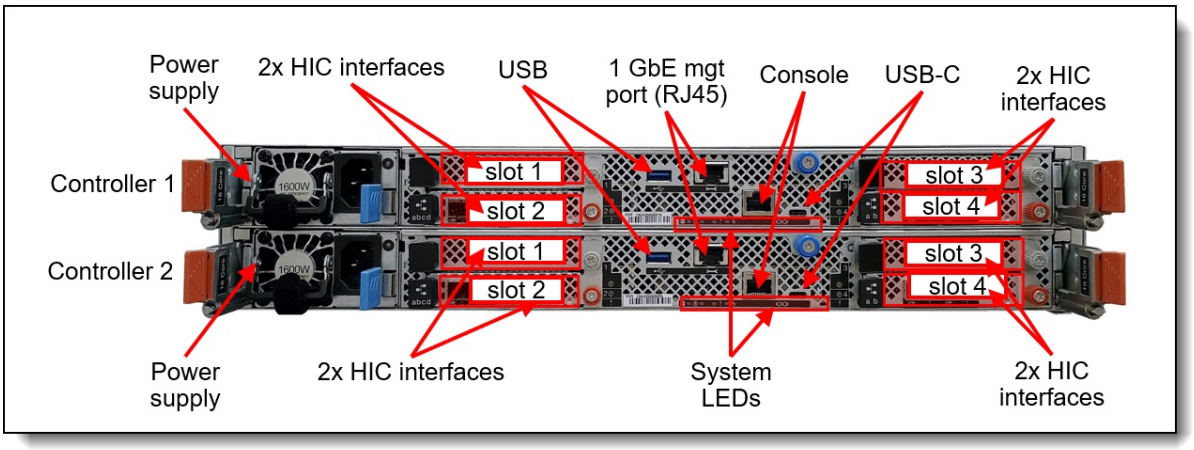

Figure 3. ThinkSystem DG5200 and DG7200 enclosure

The rear of a single DG5200 or a single DG7200 controller includes the following components:

- 1x 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 100gbe
- USB-C 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 10GBase-T RJ45 (10Gbs, 1Gbs, and 100Mbs)
- 2pt 10/25 GbE
- 4pt 10/25 GbE
- 2-port 100/40 GbE (and for expansion storage 2pt 100 GbE ports)
- 4-port, 64Gb Fiber Channel, SFP+ (64Gbs, 32Gbs, and 16 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

The following figure shows the front of the ThinkSystem DG242N 2U24 NVMe Expansion Enclosure.

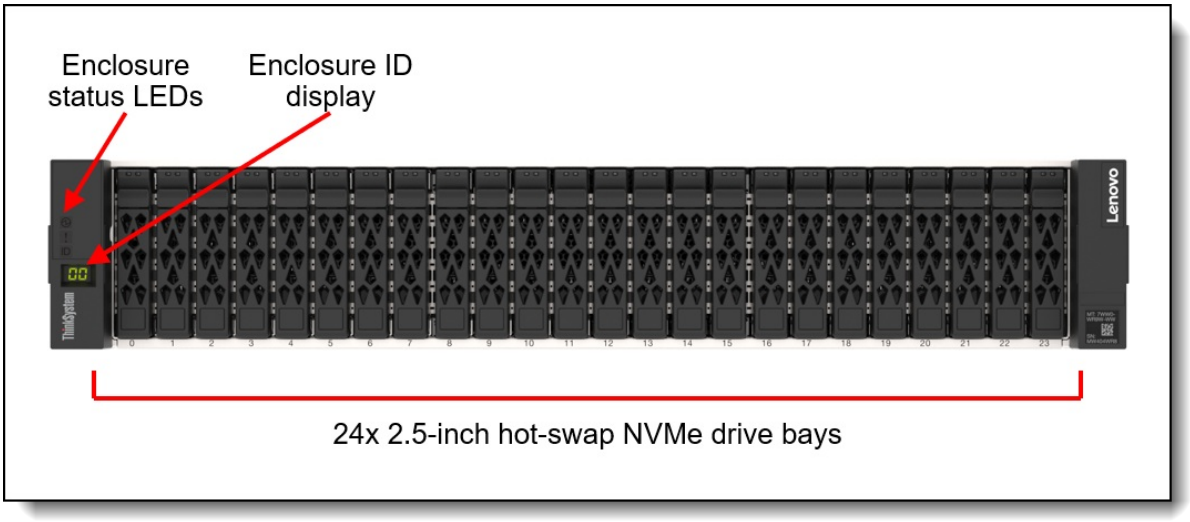

Figure 4. ThinkSystem DG242N 2U24 NVMe Expansion Enclosure front view

The following figure shows the rear of the DG242N expansion enclosure.

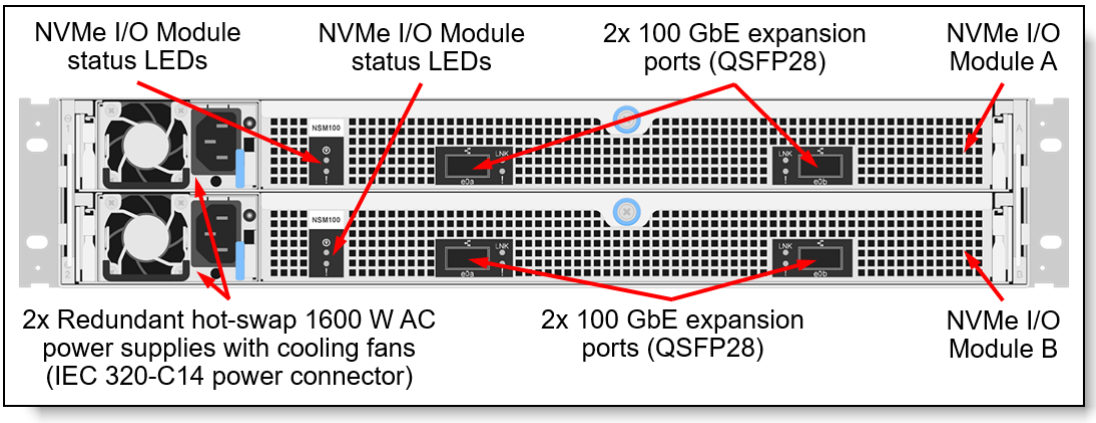

Figure 5. ThinkSystem DG242N 2U24 NVMe Expansion Enclosure rear view

The rear of the ThinkSystem DG242N 2U24 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 DG5200 and DG7200 storage systems specifications.

Note: The supported hardware options, software features, and interoperability listed in this product guide are based on the ONTAP software version 9.16.1 or later. 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 DG5200 and DG7200 that can be found at: http://datacentersupport.lenovo.com

Table 1. ThinkSystem DG5200 and DG7200 system specifications

Attribute	**Specification**		
Model	DG7200	DG5200	DG242N
Machine type	7DHZ	7DHY	7DJ9
Form factor	2U rack mount		
NAS Cluster limit	4 HA pairs	4 HA pairs	-
System memory (per HA pair)	128 GB	128 GB	-
System NVMEM (per HA pair)	16 GB	16 GB	-
Cluster Scaling Limit NAS (HA pair)	4 HA Pairs	4 HA Pairs	Not applicable
Cluster Scaling Limit SAN (HA pair)	4 HA Pairs	4 HA Pairs	Not applicable
Drive bays (per HA pair)	24	24	24
Max NVMe SSDs (per HA pair)	120	72	24
Drive Minimum (per HA pair)	8	8	-
Capacity Minimum (per HA pair)	245 TB	122 TB	Not applicable
Direct Connected Shelves (per HA pair)	2	2	-
Switch Connected Shelves (per HA pair)	4	2	-
Cluster Connected Shelves (per HA pair)	2x 100Gbe	2x 100Gbe	Not applicable
Host/Storage HIC options (per HA Pairs)†	Select up to (6) Host/Storage HICs. Ordered in pairs		

Attribute	Specification

	• 2-port, 40/100Gb Ethernet, QSFP28 (RoCEv2)
	  ◦ RoCE is not supported for host connectivity
	• 4-port, 64Gb Fiber Channel, SFP+
	• 2-port, 10/25Gb Ethernet, SFP28
	• 4-port, 10/25Gb Ethernet, SFP28 (IPSec support)
	• 4-port, 10GBASE-T, RJ45
	  ◦ 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-4, RAID-DP, RAID-TEC
Supported NVMe SSD capacities	• 15.36 TB, 30.72 TB and 61.44 TB NVMe SED SSDs • 61.44 TB QLC SSD on DG7200 only
Storage Protocols	FC, iSCSI, NVMe/FC, NVMe/TCP, NFS, NFSv4/RDMA, SMB, S3
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, volume copy (FlexClone), storage quality of service (QoS), thin provisioning, compression, deduplication, encryption, disk-based backup (SnapVault), application-aware backup (SnapCenter), quick data recovery (SnapRestore), clustering, clustering with data mirroring (MetroCluster IP), and synchronous and asynchronous replication (SnapMirror)
Optional software features	Object storage tiering (FabricPool). Tiering to other DM/DG systems require no additional licensing
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
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; 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-, 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.

Attribute	Specification	
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)	25.3 kg (55.8 lb)	30.2 kg (66.6 lb)

* 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

Controller enclosures

Preconfigured and factory-integrated models of the Lenovo ThinkSystem DG5200 and DG7200 Unified 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 DG5200 and DG7200.

Table 2. ThinkSystem DG5200 and DG7200 CTO base model

Machine Type/Model	Feature code	Description
7DHZCTO1WW	BF3C	Lenovo ThinkSystem DG7200
7DE4CTO1WW	BF3C	Lenovo ThinkSystem DG5200

The models of the ThinkSystem DG5200 and DG7200 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

The following table lists the feature codes for controller software. The selection here must match the software license selected as described in the Software section. DG Series controller software is available as a Unified offering, supporting SAN, NAS, and Object storage protocols, or as a DG

The following table lists the software options for the ThinkSystem DG5200 and DG7200.

Table 3. Controller software offerings

Machine Type/Model	Feature code	Description
CTO only	BWU9	Storage Essential Bundle Offering
CTO only	BWU8	Storage Complete Bundle Offering

Controllers

The ThinkSystem DG5200 and DG7200 enclosures ship with two 64GB NVMe controllers. A controller provides interfaces for host connectivity, management, and internal drives, and it runs ONTAP storage management software. Each DG5200 and DG7200 controller enclosure provides 128 GB RAM and 16 GB battery-backed NVMEM (64 GB RAM and 8 GB NVMEM per controller).

Each ThinkSystem DG5200 and DG7200 controller has two interconnect 25 GbE SFP28 ports to cable a directly-connected dual-controller HA pair or for switched cluster interconnect with multiple dual-controller HA pairs. Up to six HA pairs can be combined into a single SAN cluster or up to 12 HA pairs can be combined into a single NAS cluster.

Each DG5200 or DG7200 controller also has the following host interfaces:

- 2x 10GBASE-T RJ-45 ports
- 2x slots for additional 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)
    - Fibre Channel HIC, with 4x 16/32/64 Gb FC SFP+ host ports (SW fiber optic cables, LC)
        - 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 DG242N expansion enclosure requires a 100GbE HIC for connectivity installed in port 1 in each controller.

The following table lists the controllers for the DG5200 and DG7200 Storage Array and supported connectivity options.

- RoCE is not supported for host connections

Table 4. DG5200 and DG7200 controllers and connectivity options

Part number	Feature code	Description	Maximum quantity per controller
Host Interface Cards - DG5200			
4XC7A97035	C4AC	Lenovo ThinkSystem Storage 25Gb 4 port Ethernet, RoCE Adapter (Host/Cluster)	3
4XC7A97034	C4AB	Lenovo ThinkSystem Storage 25Gb 2 port Ethernet, RoCE Adapter (Host)	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
4XC7A97033	C4AA	Lenovo ThinkSystem Storage 100Gb 2 port Ethernet, RoCE Adapter (Host/Cluster)	4
CTO Only	C4W5	Lenovo ThinkSystem Storage 100Gb 2 Port Ethernet, RoCE Adapter (NVMe Shelf)	2
Host Interface Cards - DG7200			
4XC7A97035	C4AC	Lenovo ThinkSystem Storage 25Gb 4 port Ethernet, RoCE Adapter (Host/Cluster)	3
4XC7A97034	C4AB	Lenovo ThinkSystem Storage 25Gb 2 port Ethernet, RoCE Adapter (Host)	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
4XC7A97033	C4AA	Lenovo ThinkSystem Storage 100Gb 2 port Ethernet, RoCE Adapter (Host/Cluster)	4
CTO Only	C4W5	Lenovo ThinkSystem Storage 100Gb 2 Port Ethernet, RoCE Adapter (NVMe Shelf)	2

Part number	Feature code	Description	Maximum quantity per controller
4XC7A97036	C4AD	Lenovo ThinkSystem Storage 100Gb iWARP 2 Port Ethernet Adapter (MCC-IP)	1
SFP+ and transceiver for 25Gb/100Gb optical cables			
4XF7A14919	B4K9	10G SW Optical iSCSI SFP+ Module 1 pack	12
4TC7A94751	C4K4*	Lenovo 25G SR SFP28 Amphenol Ethernet Transceiver	12
4M27A67042	BFH1	Lenovo 100Gb SR4 QSFP28 Ethernet Transceiver	8
Fiber SFP+ transceivers			
4TC7A97241	C4AF	Lenovo 64/32G Fiber Channel SFP+ SW Transceiver	12
4M17A13528	B4B3	Lenovo 32Gb FC SFP+ Transceiver	12

*25 Gbps transceivers are not auto-negotiating down to 10 Gbps

The following table lists the supported optical and copper cables.

Tip: The 100GbE cables used to connect the DG242N expansion enclosure are configured with the DG242N.

Table 5. Supported cables

Part number	Feature code	Description	Maximum quantity per controller
DAC breakout cable options for 100GbE			
7Z57A03564	AV22	Lenovo 1m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable	4 or 3
7Z57A03565	AV23	Lenovo 3m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable	4 or 3
7Z57A03566	AV24	Lenovo 5m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable	4 or 3
DAC cable options for 25 GbE SFP28 connectivity			
7Z57A03557	AV1W	Lenovo 1m Passive 25G SFP28 DAC Cable	16 or 12
7Z57A03558	AV1X	Lenovo 3m Passive 25G SFP28 DAC Cable	16 or 12
7Z57A03559	AV1Y	Lenovo 5m Passive 25G SFP28 DAC Cable	16 or 12
DAC cable options for 25GbE SFP28 and 10 GbE SFP+ connectivity (base ports and interconnect ports)			
00D6288	A3RG	0.5m Passive DAC SFP+ Cable	12
90Y9427	A1PH	1m Passive DAC SFP+ Cable	12
00AY764	A51N	1.5m Passive DAC SFP+ Cable	12
00AY765	A51P	2m Passive DAC SFP+ Cable	12
90Y9430	A1PJ	3m Passive DAC SFP+ Cable	12
90Y9433	A1PK	5m Passive DAC SFP+ Cable	12
OM3 cable options for 16/32 Gb FC and 25 GbE SW SFP28 optical transceivers			
00MN499	ASR5	Lenovo 0.5m LC-LC OM3 MMF Cable	16 or 12
00MN502	ASR6	Lenovo 1m LC-LC OM3 MMF Cable	16 or 12
00MN505	ASR7	Lenovo 3m LC-LC OM3 MMF Cable	16 or 12
00MN508	ASR8	Lenovo 5m LC-LC OM3 MMF Cable	16 or 12
00MN511	ASR9	Lenovo 10m LC-LC OM3 MMF Cable	16 or 12

Part number	Feature code	Description	Maximum quantity per controller
00MN514	ASRA	Lenovo 15m LC-LC OM3 MMF Cable	16 or 12
00MN517	ASRB	Lenovo 25m LC-LC OM3 MMF Cable	16 or 12
00MN520	ASRC	Lenovo 30m LC-LC OM3 MMF Cable	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	16 or 12
4Z57A10846	B2PA	Lenovo 1m LC-LC OM4 MMF Cable	16 or 12
4Z57A10847	B2PB	Lenovo 3m LC-LC OM4 MMF Cable	16 or 12
4Z57A10848	B2PC	Lenovo 5m LC-LC OM4 MMF Cable	16 or 12
4Z57A10849	B2PD	Lenovo 10m LC-LC OM4 MMF Cable	16 or 12
4Z57A10850	B2PE	Lenovo 15m LC-LC OM4 MMF Cable	16 or 12
4Z57A10851	B2PF	Lenovo 25m LC-LC OM4 MMF Cable	16 or 12
4Z57A10852	B2PG	Lenovo 30m LC-LC OM4 MMF Cable	16 or 12
OM4 cables for 100 GbE QSFP28 transceivers			
7Z57A03567	AV25	Lenovo 5m MPO-MPO OM4 MMF Cable	8 or 6
7Z57A03568	AV26	Lenovo 7m MPO-MPO OM4 MMF Cable	8 or 6
7Z57A03569	AV27	Lenovo 10m MPO-MPO OM4 MMF Cable	8 or 6
7Z57A03570	AV28	Lenovo 15m MPO-MPO OM4 MMF Cable	8 or 6
7Z57A03571	AV29	Lenovo 20m MPO-MPO OM4 MMF Cable	8 or 6
7Z57A03572	AV2A	Lenovo 30m MPO-MPO OM4 MMF Cable	8 or 6
25Gb SR SFP28 ethernet transceivers			
4TC7A94751	C4K4	Lenovo 25G SR SFP28 Amphenol Ethernet Transceiver	16 or 12
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	13
00WE127	AVFX	1.0m Green Cat6 Cable	13
00WE131	AVFY	1.25m Green Cat6 Cable	13
00WE135	AVFZ	1.5m Green Cat6 Cable	13
00WE139	AVG0	3m Green Cat6 Cable	13

Expansion enclosures

The Lenovo ThinkSystem DG5200 and DG7200 support attachments of ThinkSystem DG242N 2U24 expansion enclosures. The expansion enclosures can be added to the system non-disruptively.

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

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

Description	Machine Type/Model	Feature code
Lenovo ThinkSystem DG242N 2U24 NVMe Expansion Enclosure (with 2x PSUs)	7DJ9CTO1WW	BF3C

Configuration note: Two NVMe I/O expansion modules (feature code B73A) are pre-selected by the configurator.

The models of the ThinkSystem DG242N 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 ThinkSystem DG242N 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 DG base enclosures.

The DG5200 and DG7200 enclosure support direct attachment of one DG242N NVMe expansion enclosure for a total of up to 48 NVMe drives. To connect the DG242N, a 100 GbE HIC (4XC7A97033) in port 1 is required to be installed in each controller for either DG5200 or DG7200 units.

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	Required quantity
7Z57A03561	AV1Z	Lenovo 1m Passive 100G QSFP28 DAC Cable	4
7Z57A03562	AV20	Lenovo 3m Passive 100G QSFP28 DAC Cable	4
7Z57A03563	AV21	Lenovo 5m Passive 100G QSFP28 DAC Cable	4

Configuration note: Four 100G QSFP28 DAC cables are needed per expansion enclosure for directly connecting the expansion enclosure to the controller enclosure (two from each controller)

Drives

The ThinkSystem DG5200 and DG7200 and DG242N enclosures each support up to 24 SFF hot-swap drives, in packs of 2 drives.

The following table lists supported drive packs for the controller and expansion enclosures.

Configuration notes:

- When ordering the systems, select the drives that match the ONTAP offering and bundle you are installing on the DG controller. Drive feature codes are specific to Unified Essentials and Unified Complete bundles. See the Software section for details.
- Drives are sold in packs. Supported quantities are as follows:
  - The DG5200 2U24 SFF controller enclosure supports only 8, 10, 12, 14, 16, 18, 20, 22 or 24 SFF drives
  - The DG7200 2U24 SFF controller enclosure supports only 8, 10, 12, 14, 16, 18, 20, 22 or 24 SFF drives
  - The DG242N 2U24 SFF expansion enclosure supports only 4, 6, 8, 10, 12, 14, 16, 18, 20, 22 or 24 SFF drives
  - A minimum number of drive packs is 8. (4 packs of 2 drives is required)
- For factory-installed drive packs, all drives in the enclosure must be of the same type and capacity.
- In DCSC, use "guided mode" to configure controller and add expansion accordingly. DCSC will auto display supported drives based on selected software bundle: unified complete or unified essential.

Note that the feature code varies, based on the software license Unified Essentials or Unified Complete with Unified.

Table 8. DG5200 and DG7200 enclosure drive pack options

Part number	Feature code	Description	Maximum quantity per 2U enclosure
QLC NVMe SSD			
CTO only	C7RX	Lenovo ThinkSystem 122.9TB (2x 61.44TB QLC NVMe SED) Drive Pack for DG5200/DG7200	12
CTO only	C5RH	Lenovo ThinkSystem 61.4TB (2x 30.72TB QLC NVMe SED) Drive Pack for DG5200/DG7200	12
CTO only	C5RG	Lenovo ThinkSystem 30.7TB (2x 15.36TB QLC NVMe SED) Drive Pack for DG5200/DG7200	12

The following table lists supported drive pack options for the DG242N Enclosure.

Table 9. DG242N expansion enclosure drive pack options

Part number	Feature code	Description	Maximum quantity per 2U enclosure
QLC NVMe SSD			
CTO only	C7RX	Lenovo ThinkSystem 122.9TB (2x 61.44TB QLC NVMe SED) Drive Pack for DG5200/DG7200	12
CTO only	C5RH	Lenovo ThinkSystem 61.4TB (2x 30.72TB QLC NVMe SED) Drive Pack for DG5200/DG7200	12
CTO only	C5RG	Lenovo ThinkSystem 30.7TB (2x 15.36TB QLC NVMe SED) Drive Pack for DG5200/DG7200	12

Software

In this section:

ONTAP software unifies data management across flash, disk, and cloud to simplify the Lenovo DG/DM storage environment. It builds the foundation for a Data Fabric, making it easy to move the data where it is needed across flash, disk, and cloud resources.

Feature bundles

Controller software for the DG5200 and DG7200 is available in the following bundles of features:

Table 10. Software features and specifications summary

Attribute	Unified Essential	Unified Complete
Controller software feature code	BWU9	BWU8
RAID-4, RAID-DP, and RAID-TEC data protection	Included	Included
SAN (Block access): iSCSI, FC, NVMe/FC	Included	Included

Attribute	Unified Essential	Unified Complete
NAS (File access): NFS, CIFS/SMB	Included	Included
All Flash Array (AFA) capability	Included	Included
Thin provisioning	Included	Included
Compression	Included	Included
Compaction	Included	Included
Deduplication	Included	Included
Snapshots	Included	Included
Encryption*	Included*	Included*
Balanced placement	Included	Included
Dynamic capacity expansion	Included	Included
Adaptive Quality of Service	Included	Included
SnapRestore	Included	Included
FlexClone	Included	Included
FlexVol	Included	Included
FlexCache	Included	Included
SnapMirror asynchronous replication	No	Included
SyncMirror data protection	Included	Included
Trusted Platform Module (TPM) support	Included**	Included**
MetroCluster IP	Included	Included
NVMe over FC Protocol	Included	Included
NVMe over TCP Protocol	Included	Included
SnapMirror Business Continuity (SMBC)	No	Included
SnapMirror synchronous replication	No	Included
FlexGroup	Included	Included
SnapVault disk-based storage backup	No	Included
SnapCenter	No	Included
ONTAP S3	Included	Included
Autonomous Anti-ransomware Protection	No	Included
Multitenant Key Management	No	Included
SnapLock	No	Included
SnapMirror Cloud	No	Included
SnapMirror S3	No	Included
FarbricPool	Optional	Optional

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

The features are summarized as follows:

- **RAID-4, RAID-DP, and RAID-TEC 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 one (RAID-4), two (RAID-DP), or three (RAID-TEC) concurrent drive failures.
- **Thin provisioning**: Optimizes 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.
- **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.
- **FlexVol:** Provides abstraction layer between the logical volume and its physical location in the storage array.
- **FlexCache:** Speeds up access to data and offloads traffic from heavily accessed volumes for read-intensive workloads by placing frequently used data in cache locally or remotely (closer to the point of client access) and serving the data to the clients directly from cache without accessing the data source.
- **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.
- **MetroCluster IP:** Provides storage system-based clustering with online, real-time data mirroring between the local and remote sites by using synchronous data transfers over IP communication links to deliver continuous availability with zero RPO and near-zero RTO. All storage systems in a MetroCluster IP configuration must be of the same model. New to ONTAP 9.11: MetroCluster with Storage Virtual Machine Disaster Recovery (SVM-DR) can now use a third site for the SVM-DR
- **NVMe over TCP Protocol**: Enables NVMe over TCP
- **Data Protection Optimized (DPO)**: Increases the amount of concurrent SnapMirror sessions per node, as well as improving SnapMirror performance to the cluster.
- **SnapMirror synchronous replication:** Provides storage system-based data replication between the storage systems containing source (local) and destination (remote) volumes by using synchronous (as soon as the data is written to the source volume)
- **FlexGroup:** Enables a single volume to span across multiple clustered storage arrays to maximize storage capacity and automate load distribution. New to ONTAP 9.11: FlexGroups can now be created as SnapLock volumes.
- **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.
- **ONTAP S3**: Expands the DG/DM Series unified story and allows customers to manage, block, file, and object data from one interface. Customers can now natively store data in S3 buckets onboard the DG/DM Series.
- **SnapMirror S3** : Enables you to protect buckets in ONTAP S3 object stores using familiar SnapMirror mirroring and backup functionality. Requires ONTAP 9.11 or later on both source and destination clusters. Requires the Unified Premium Bundle.
- **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.
- **Anti-ransomware**: Uses workload analysis in NAS (NFS and SMB) environments 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.

Optional Extended features also available via Feature on Demand (FoD) (see the Extended ONTAP features section)

- **FabricPool**: FabricPool is a hybrid storage solution that uses an all flash (all SSD) aggregate as the performance tier and an object store as the external capacity tier. Data in a FabricPool is stored in a tier based on whether it is frequently accessed or not. Using a FabricPool helps you reduce storage cost without compromising performance, efficiency, or protection.
- No license is required when tiering to StorageGRID or ONTAP S3.

ONTAP software versions

The following table lists the software selection options for the DG5200 and DG7200. The table also indicates which markets each version is available in.

Table 11. Software selection

Feature code	Description	Availability
ONTAP 9.1x		
C4AG	Lenovo ThinkSystem Storage ONTAP 9.16 Software Encryption - IPAv2	All markets
C4AH	Lenovo ThinkSystem Storage ONTAP 9.16 Software NonEncryption - IPAv2	All markets

Software maintenance is included in the DG5200 and DG7200 warranty and support (see Warranty and support for details).

Extended ONTAP features

FabricPool is an optional extended feature. To obtain this feature license, order the part numbers as listed in the following table.

Note: Extended features are only available as field upgrades and are not orderable as part of a CTO configuration.

Table 12. Optional software features

Part number	Feature code	Description	Quantity
4P47A37057	None*	DM Series FabricPool – 1TB Increment – 3 years	1 per TB of storage capacity
4P47A37288	None*	DM Series FabricPool – 1TB Increment – 5 years	1 per TB of storage capacity

* Field upgrade only; no factory installation.

Configuration notes:

- The FabricPool feature is a cluster-wide, capacity-based license that is available for 3-year or 5-year subscription terms.
- No license is required when tiering to StorageGRID or ONTAP S3.

Ansible playbooks for DM/DG Series

Ansible Playbooks give customers the ability to quickly deploy and use DM/DG Series storage systems using a standard open source deployment tool. Each playbook executes a set of tasks to achieve a configuration/provisioning goal.

Lenovo has created playbooks that can be used with DM/DG Series storage systems to help with:

- Provisioning
- Configuring

To access the Ansible Playbooks for Lenovo ThinkSystem DM/DG Series storage systems, go to the following page:
https://github.com/lenovo/ansible-dm-series-ontap

Management

The ThinkSystem DG5200 and DG7200 support 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 Lenovo ThinkSystem DG5200 and DG7200 Unified Storage Arrays and DG242N 2U24 SFF enclosures ship with two redundant hot-swap 1600 W (200-240 V) Platinum AC power supplies, each with an IEC 320-C14 connector.

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

Note: A 110V power source is supported; however, the system is limited to a single IO card per controller when using 110V power

Rack installation

The individually shipped ThinkSystem DG5200, DG7200, and DG242N 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 DM 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**	**2U24 SIR**
Feature code	B38Y	B6TH
Enclosure support	DG5200, DG7200. DG242N	DG5200, DG7200, DG242N
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 Lenovo ThinkSystem DG5200 and DG7200 Unified Storage Arrays controller enclosure has the following dimensions and weight:

- 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): 24.6 kg (54.3 lb)

The ThinkSystem DG242N 2U24 SFF enclosure has the following dimensions and weight:

- 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): 30.2 kg (66.6 lb)

Operating environment

The ThinkSystem DG5200, DG7200 and DG242N 2U24 SFF enclosures are supported in the following environment:

- Air temperature:
  - Operating: 10 to 35 °C (50 to 95 °F)
  - Non-operating: -40 °C to +70 °C (-40 °F to 158 °F)
  - Maximum altitude: 3050 m (10,000 ft)
- Relative humidity:
  - Operating: 8% to 80% (non-condensing)
  - Non-operating: 10% to 95% (non-condensing)
- Electrical power:
  - DG5200 / DG7200:
    - 200 to 240 (nominal) V AC; 50 Hz or 60 Hz; 5.40 A
    - Power load = 1079W (maximum), 826.9W (typical)
  - DG242N:
    - 100 to 127 (nominal) V AC; 50 Hz or 60 Hz; 4.11 A
    - 200 to 240 (nominal) V AC; 50 Hz or 60 Hz; 2.05 A
    - Maximum system power load: 390 W
- Heat dissipation:
  - DG5200 / DG7200: 4667 BTU/Hr (maximum), 3037 BTU/Hr (typical)
  - DG242N: 1331 BTU/hour
- Acoustical noise emission:
  - DG5200 / DG7200: 8.0 bels
  - DG242N: 6.4 bels

Warranty upgrades and post-warranty support

The DG5200 and DG7200 and expansion enclosure have a 3-year warranty based on the machine type of the system:

- Lenovo ThinkSystem DG5200 enclosure: 7DHY (3-year warranty)
- Lenovo ThinkSystem DG7200 enclosure: 7DHZ (3-year warranty)
- DG242N expansion enclosure: 7DJ9 (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 Enhanced Storage Support 24x7 4-Hour Response** – Best choice for storage systems where maximum uptime is critical.

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

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 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.

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 DG 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 DG5200 and DG7200 Unified Flash Storage Array supports attachment to Lenovo servers by using NVMe over Fibre Channel (NVMe/FC), NAS (NFS and CIFS/SMB), 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 lists the Ethernet storage switches that can be used with the ThinkSystem DG5200 and DG7200 for cluster interconnect and MetroCluster IP configurations.

- BES-53248
- Nvidia SN2100
- Cisco 9336C-FX2 (Preferred Switch)

For more information, see the NVIDIA SN2100 16-port 100Gb Ethernet Storage Switch Article: https://lenovopress.lenovo.com/lp1756-nvidia-sn2100-100gb-ethernet-storage-switch

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
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

Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
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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Why wait to obtain the technology you need now? No payments for 90 days and predictable, low monthly payments make it easy to budget for your Lenovo solution.

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- **24/7 Asset management**

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

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

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

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

Seller training courses

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

1. **Partner Technical Webinar - Cost Effective Storage Solutions**
   2025-01-14 | 60 minutes | Employees and Partners

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

   Tags: Data Management

   Published: 2025-01-14
   Length: 60 minutes

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

   Course code: 011025

2. **Lenovo ThinSystem DG/DM Storage Series Portfolio Overview**
   2024-09-10 | 60 minutes | Employees and Partners

   This course builds on what you've learned in the Data Management Overview course. The course will help position the Lenovo ThinkSystem DG and DM series storage products. Completing this course will help you:
   - understand the advantages of each product line and
   - understand the key features and relate them to a range of customer business needs, whether small-scale or enterprise-level storage needs

   Tags: Data Management, Storage, ThinkSystem

   Published: 2024-09-10
   Length: 60 minutes

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

   Course code: DDMO103
3. **Partner Technical Webinar - Commvault Data Protection and Resiliency**
   2024-06-25 | 60 minutes | Employees and Partners

   In this 60-minute replay, Nate Saunders, Commvault Solution Director for Global Partners, reviewed the Commvault solutions for Data Protection and Resiliency and the Lenovo ThinkSystem offerings that support those solutions.

   Tags: Data Management

   Published: 2024-06-25
   Length: 60 minutes

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

   Course code: 062124
4. **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.

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

   Published: 2024-05-29
   Length: 20 minutes

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

   Course code: SXXW1110r7

5. **Partner Technical Webinar - Fibre Channel and DG Updates**
   2024-04-23 | 60 minutes | Employees and Partners

   In this 60-minute replay, Mike Easterly, Broadcom, reviewed Lenovo solutions for Fibre Channel (FC) including Emulex FC Adapters and Brocade FC switches. Next, Mark Clayton, Lenovo Storage Architect, reviewed the lasted on the Data Management portfolio with updates on DG, HS350x Ready Nodes and Data Protection.

   Tags: Data Management

   Published: 2024-04-23
   Length: 60 minutes

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

   Course code: 041924

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?

   Tags: Data Management, Storage

   Published: 2024-04-10
   Length: 60 minutes

   Start the training:
   Employee link: Grow@Lenovo

   Course code: DVDAT209

7. **ONTAP Technical Positioning**
   2024-03-14 | 45 minutes | Employees and Partners

   This course focuses on enabling you to interpret the technical market trends and challenges that ONTAP customers face. You also learn to ask qualifying questions that identify which industries, companies, and customer contacts are appropriate targets for ONTAP software. Module two covers explaining ONTAP features and functionality and enabling you to strengthen ONTAP marketing claims with technical details.
   Learning Objectives:
   •Interpret the technical market trends and challenges that ONTAP customers face
   •Ask qualifying questions that identify which industries, companies, and customer contacts are appropriate targets for ONTAP software
   •Explain ONTAP features and functionality
   •Strengthen ONTAP marketing claims with technical details

   Tags: Data Management, Sales, Storage, Technical Sales, ThinkSystem

   Published: 2024-03-14
   Length: 45 minutes

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

   Course code: DDMT200r2

8. **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

   Tags: Data Management, Storage, ThinkSystem

   Published: 2024-03-14
   Length: 25 minutes

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

   Course code: DSTOO201

9. **VTT ONTAP 9.14.1 and Bundle Change Update - February 2024**
   2024-03-07 | 25 minutes | Employees and Partners

   In this course, you will know more about:
   - The new Features of ONTAP 9.14.1 update
   - ONTAP Bundle Update

   Tags: Data Management, Storage

   Published: 2024-03-07
   Length: 25 minutes

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

   Course code: DVDAT207

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.

    Tags: DataCenter Products, Storage, ThinkSystem

    Published: 2024-02-02
    Length: 15 minutes

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

    Course code: SXSW1201r16

11. **VTT The Benefits of Scale Out Clustering with DM/DG - September 2023**
    2023-09-12 | 60 minutes | Employees Only

    In this course, you will know more about:
    - What is scale out?
    - Hardware benefits
    - Administrative benefits
    - Scale out Features

    Tags: Data Management, ThinkSystem

    Published: 2023-09-12
    Length: 60 minutes

    Start the training:
    Employee link: Grow@Lenovo

    Course code: DVDAT204

12. **VTT The new ThinkSystem DG storage product - August 2023**
2023-08-16 | 60 minutes | Employees Only

    Introduce and explore the new ThinkSystem DG storage product based on the NetApp DM. This product features QLC SSDs focused on improved sustainability standards and workload consolidation.

    Tags: Data Management, Storage, ThinkSystem

    Published: 2023-08-16
    Length: 60 minutes

    Start the training:
    Employee link: Grow@Lenovo

    Course code: DVDAT203

Related publications and links

For more information, see the following resources:

- Lenovo ThinkSystem DG and DM Series product page
https://www.lenovo.com/us/en/c/data-center/storage/unified-storage
- Lenovo Data Center Solution Configurator
http://dcsc.lenovo.com
- ThinkSystem DG and DM Series documentation
http://thinksystem.lenovofiles.com/help/topic/ontap_software/overview.html
- ThinkSystem DG Series datasheet
https://lenovopress.lenovo.com/datasheet/ds0170-thinksystem-dg-series
- ONTAP Ransomware Protection
https://thinksystem.lenovofiles.com/storage/help/topic/ontap_anti-ransomware/anti-ransomware.pdf
- ThinkSystem DM Series Installation Videos and Video Tutorials
https://www.youtube.com/playlist?list=PLLQcIfVNrqzcBW55-7IAe7_Our6nMQxak
- Lenovo Data Center Support
http://datacentersupport.lenovo.com

Related product families

Product families related to this document are the following:

- DG Series Storage
- External Storage
- Lenovo SAN Storage

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