



The following documentation is an electronically-submitted vendor response to an advertised solicitation from the *West Virginia Purchasing Bulletin* within the Vendor Self-Service portal at ***wvOASIS.gov***. As part of the State of West Virginia's procurement process, and to maintain the transparency of the bid-opening process, this documentation submitted online is publicly posted by the West Virginia Purchasing Division at ***WVPurchasing.gov*** with any other vendor responses to this solicitation submitted to the Purchasing Division in hard copy format.

Header @ 4

List View

General Information Contact Default Values Discount Document Information Clarification Request

Procurement Folder: 1682980

Procurement Type: Central Purchase Order

Vendor ID: \VC000098899

Legal Name: POMEROY TECHNOLOGIES LLC

Alias/DBA:

Total Bid: \$92,287.64

Response Date: 05/30/2025

Response Time: 11:20

Responded By User ID: EricGarrett

First Name: Eric

Last Name: Garrett

Email: eric.garrett@pomeroy.com

Phone: 9376575537

SO Doc Code: CRFQ

SO Dept: 1400

SO Doc ID: AGR2500000022

Published Date: 5/22/25

Close Date: 6/3/25

Close Time: 13:30

Status: Closed

Solicitation Description: Dell Powerstore 500t or Equal

Total of Header Attachments: 4

Total of All Attachments: 4



Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Solicitation Response

Proc Folder: 1682980
Solicitation Description: Dell Powerstore 500t or Equal
Proc Type: Central Purchase Order

Solicitation Closes	Solicitation Response	Version
2025-06-03 13:30	SR 1400 ESR05292500000007361	1

VENDOR
VC0000098899
POMEROY TECHNOLOGIES LLC

Solicitation Number: CRFQ 1400 AGR2500000022
Total Bid: 92287.63999999999941792339086 **Response Date:** 2025-05-30 **Response Time:** 11:20:16

Comments: Pomeroy Technologies, LLC is pleased to submit our proposal in response to CRFQ 1400 AGR2500000022. Our total bid amount is \$92,287.64, which includes all specified hardware, associated services, and delivery as outlined in the solicitation. We are providing Lenovo ThinkSystem equipment per the technical requirements, and all pricing includes delivery and is compliant with the specifications provided. Our quote reflects a complete and competitive solution delivered by a trusted IT infrastructure provider.

FOR INFORMATION CONTACT THE BUYER
Larry D McDonnell
304-558-2063
larry.d.mcdonnell@wv.gov

Vendor Signature X **FEIN#** **DATE**

All offers subject to all terms and conditions contained in this solicitation

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
1	Dell Powerstore 500t or Equal	1.00000	EA	92287.640000	92287.64

Comm Code	Manufacturer	Specification	Model #
43210000			

Commodity Line Comments:

Extended Description:

Please see 3.1.1 in Specifications
See attached documentation for further details.

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
2	Dell Pro Support 24/7 ProSupport or equal	1.00000	EA	0.000000	0.00

Comm Code	Manufacturer	Specification	Model #
43210000			

Commodity Line Comments: Details attached.

Extended Description:

Please see section 3.1.1.11 in Specifications
See attached documentation for further details.

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
3	Dell Pro Support Next Business Day on-site service or Equal	1.00000	EA	0.000000	0.00

Comm Code	Manufacturer	Specification	Model #
43210000			

Commodity Line Comments: Details attached.

Extended Description:

Please see 3.1.1.12 in Specifications
See attached documentation for further details.



Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Centralized Request for Quote
Info Technology

Proc Folder: 1682980			Reason for Modification: To post Addendum no. 04
Doc Description: Dell Powerstore 500t or Equal			
Proc Type: Central Purchase Order			
Date Issued	Solicitation Closes	Solicitation No	Version
2025-05-22	2025-06-03 13:30	CRFQ 1400 AGR2500000022	5

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Customer Code: VC0000098899
Vendor Name : Pomeroy Technologies, LLC
Address : 1050
Street : Elijah Creek Rd
City : Hebron
State : KY **Country :** USA **Zip :** 41042
Principal Contact : Eric Garrett
Vendor Contact Phone: 937-657-5537 **Extension:**

FOR INFORMATION CONTACT THE BUYER

Larry D McDonnell
304-558-2063
larry.d.mcdonnell@wv.gov

Vendor
Signature X *Eric Garrett*

FEIN# 85-0862996

DATE 05/30/2025

All offers subject to all terms and conditions contained in this solicitation

ADDITIONAL INFORMATION
Addendum no. 04
To provide revision to specification and clarification (see attached).
Bid opening date has been extended from 05/27/2025 to 06/03/2025.
The bid opening time still remains at 1:30PM EST/EDT
No other changes

INVOICE TO	SHIP TO
AGRICULTURE DEPARTMENT OF ADMINISTRATIVE SERVICES 1900 KANAWHA BLVD E CHARLESTON WV US	AGRICULTURE DEPARTMENT OF INFORMATION TECHNOLOGY DIVISION 163 GUS R DOUGLAS LN, BLDG 1 CHARLESTON WV US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	Dell Powerstore 500t or Equal	1.00000	EA	\$92,287.64	\$92,287.64

Comm Code	Manufacturer	Specification	Model #
43210000			

Extended Description:
Please see 3.1.1 in Specifications

See attached documentation for further details.

INVOICE TO		SHIP TO	
AGRICULTURE DEPARTMENT OF ADMINISTRATIVE SERVICES 1900 KANAWHA BLVD E CHARLESTON WV US		AGRICULTURE DEPARTMENT OF INFORMATION TECHNOLOGY DIVISION 163 GUS R DOUGLAS LN, BLDG 1 CHARLESTON WV US	

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
2	Dell Pro Support 24/7 ProSupport or equal	1.00000	EA	Included	

Comm Code	Manufacturer	Specification	Model #
43210000			

Extended Description:
 Please see section 3.1.1.11 in Specifications

 See attached documentation for further details.

INVOICE TO		SHIP TO	
AGRICULTURE DEPARTMENT OF ADMINISTRATIVE SERVICES 1900 KANAWHA BLVD E CHARLESTON WV US		AGRICULTURE DEPARTMENT OF INFORMATION TECHNOLOGY DIVISION 163 GUS R DOUGLAS LN, BLDG 1 CHARLESTON WV US	

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
3	Dell Pro Support Next Business Day on-site service or Equal	1.00000	EA	Included	

Comm Code	Manufacturer	Specification	Model #
43210000			

Extended Description:
 Please see 3.1.1.12 in Specifications

 See attached documentation for further details.

SCHEDULE OF EVENTS		
Line	Event	Event Date
1	Vendor Questions due by 2:00PM EST/EDT	2025-05-06

	Document Phase	Document Description	Page 4
AGR2500000022	Final	Dell Powerstore 500t or Equal	

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions



POMEROY TECHNOLOGIES, LLC

1050 Elijah Creek Road,
Hebron, KY 41048
Phone: 859-657-2107

CRFQ 1400
AGR2500000022

Number: **92116259**

Date: **05/28/2025**

Bill To:
Larry McDonnell
WV Department of Agriculture Ref: 3977
1900 Kanawha Blvd E
Charleston, WV 25306
Phone: (304)558-2063
Email: larry.d.mcdonnell@wv.gov

Ship To:
Larry McDonnell
WV Department of Agriculture
163 Gus R Douglas Ln
Bldg 1
WV Department of Agriculture-IT Division
Charleston, WV 25312

Item #	Mfr. Part	Description	Price	Qty.	Extended
*1	7DJ2S01G00	Lenovo ThinkSystem DM5200F All Flash Array Mfr: Lenovo Group Limited	\$ 71,341.16	1	\$ 71,341.16
*2	5AS7C06722	HW Install ASP (Biz Hrs) DM5200F Mfr: Lenovo Group Limited	\$ 400.31	1	\$ 400.31
*3	5MS7A79862	ThinkSystem DM Remote Deployment Mfr: Lenovo Group Limited	\$ 3,724.07	1	\$ 3,724.07
*4	5WS7C06534	5Yr PESS (SMETAM+EM)24x7 4Hr Resp+KYD Mfr: Lenovo Group Limited	\$ 8,773.58	1	\$ 8,773.58
*5	5WS7C07261	5Yr Premier 24x7 4Hr Resp+KYD(0.1TB TLC) Mfr: Lenovo Group Limited	\$ 3.14	614	\$ 1,927.96
*6	5WS7C20892	4th & 5th Yr(61.44TB NVme TLC)Pack Unified Complete Mfr: Lenovo Group Limited	\$ 6,120.56	1	\$ 6,120.56
6 item(s)			Sub-Total		\$ 92,287.64
			Tax @ 0%		\$ 0.00
			Freight		\$ 0.00
			Total		\$ 92,287.64
(*) Tax exempted Part(s)					

Quote Valid Until: 06/27/2025

Payment Details

Pay by: Company PO
Payment Term 30 days

Shipping and Delivery Details

Shipping via: BEST GND

Terms and Conditions

Due to the unpredictable nature of tariffs, the quoted prices are subject to change. However, we will make every effort to honor the original pricing provided to you. This quotation has been prepared by Pomeroy based upon current product pricing and product availability as of the date of this quotation. The quotation provided hereon is subject to change if, after the issuance of this quotation, product pricing and/or product availability is affected as the direct result of a force majeure event or circumstance that is beyond Pomeroy's reasonable control.

For any questions regarding our returns policy please contact your Pomeroy sales associate or Click on the link below for a copy of our written policy.
[Returns Policy](#)

Prepared by: **Valerie Barger**

Email: **Valerie.Jagoda@Pomeroy.com**

Phone: **859-657-2107**

Lenovo ThinkSystem DM3200F, DM5200F and DM7200F Unified Storage Arrays

Product Guide

Lenovo ThinkSystem DM3200F, DM5200F and DM7200F are an all-NVMe flash unified storage systems are designed to provide performance, simplicity, capacity, security, and high availability for medium-sized enterprises. Powered by the ONTAP storage management software, the DM3200F, DM5200F and DM7200F deliver enterprise-class storage management capabilities with a wide choice of host connectivity options and enhanced data storage solutions. The DM3200F, DM5200F and DM7200F are a perfect fit for a wide range of enterprise workloads, including big data and analytics, artificial intelligence, engineering and design, enterprise applications, and other storage I/O-intensive applications.

ThinkSystem DM3200F, DM5200F and DM7200F models are 2U rack-mount enclosure that includes two controllers, with memory of up to: 256 GB RAM for DM7200F, 128 GB RAM for DM5200F, 128 GB RAM for DM3200F 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 configuration.

A single ThinkSystem DM3200F Storage Array scales up to 48 NVMe SSDs with the attachment of one Lenovo ThinkSystem DM242N 2U24 SFF Expansion Enclosure. A single ThinkSystem DM5200F Storage Array scales up to 72 NVMe SSDs with the attachment of two Lenovo ThinkSystem DM242N 2U24 SFF Expansion Enclosure. A single ThinkSystem DM7200F Storage Array scales up to 120 NVMe SSDs with the attachment of four Lenovo ThinkSystem DM242N 2U24 SFF Expansion Enclosure, 4 expansions will require a 100Gb capable switch.



Figure 1. Lenovo ThinkSystem DM7200F Unified Storage Arrays

Did you know?

Lenovo ThinkSystem DM3200F, DM5200F and DM7200F Unified Storage Arrays offer end-to-end NVMe storage connectivity.

- DM7200F offers optimized for price/performance and up to 139% faster than the DM7100F.
- DM5200F is designed for emerging workloads and up to 91% faster than the DM5100F.
- DM3200F offers affordable storage for ROBO and SMB businesses and up to 23% faster than the DM5000F.

Key features

The ThinkSystem DM3200F, DM5200F and DM7200F offer the following key features and benefits

- Available as a Unified storage platform - allowing NAS, SAN, and Object workloads.
- All systems are available with either the Essentials or Complete software feature offerings which provide feature flexibility.
- Compact NVMe 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 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 cloning, 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, SAN, and object storage protocols, including 10/25/40/100 GbE NAS and iSCSI, 8/16/32 Gb Fibre Channel connectivity, and 64 Gb NVMe over Fibre Channel (NVMe/FC).
- 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.
- Intuitive, web-based GUI for easy system setup and management.
- Lenovo XClarity support for centralized systems management of Lenovo x86 servers, switches, and storage, which provides automated agent-less discovery, inventory, monitoring, and additional platform-specific functions across multiple systems.
- Designed for 99.9999% availability with redundant hot-swap components, including controllers and I/O modules, power supplies, and non-disruptive firmware upgrades.

The DM3200F, DM5200F and DM7200F support the 2.5-inch NVMe SSDs and all drives are dual-port and hot-swappable. Base units support attachment of DM242N 2U24 SFF expansion enclosures and drives are designed to be added dynamically, which helps to quickly and seamlessly respond to ever-growing capacity demands.

The base units offer high levels of system and data availability with the following features:

- Dual-active controllers (high availability pair) with automatic load balancing and failover
- Mirrored, battery-backed controller NVMEM. 8GB per controller on the DM3200F and DM5200F and 16GB on the DM7200F
- Dual-port 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
- Automated failover for the data path between the host and the drives with multipathing
- Non-disruptive controller and drive firmware upgrades
- Scale-out clustering, cluster any DM and DG systems together

Components and connectors

Front and rear view of DM3200F, DM5200F and DM7200F units are identical.

The following figure shows the front of the DM5200F.

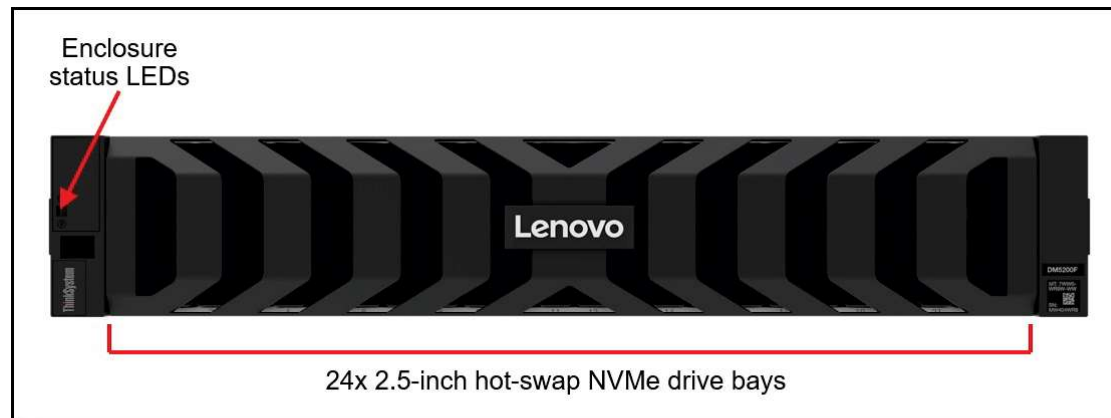


Figure 2. ThinkSystem DM5200F front view

The following figure shows the components of both controllers for DM3200F, DM5200F and DM7200F

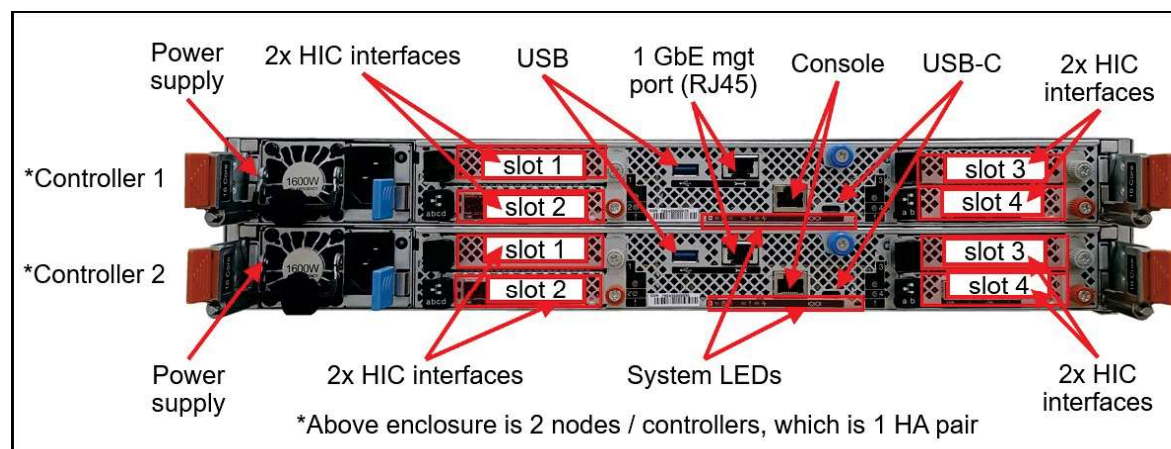


Figure 3. ThinkSystem DM3200F, DM5200F and DM7200F enclosure rear view

A single DM3200F, DM5200F and DM7200F 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 DM3200F and 100gbe On the DM5200F and DM7200F
- 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 10GBase-T RJ45 (10Gbs, 1Gbs, and 100Mbs)
- 2-port 25/10 GbE
- 4-port 25/10 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 DM242N 2U SFF NVMe expansion enclosure.

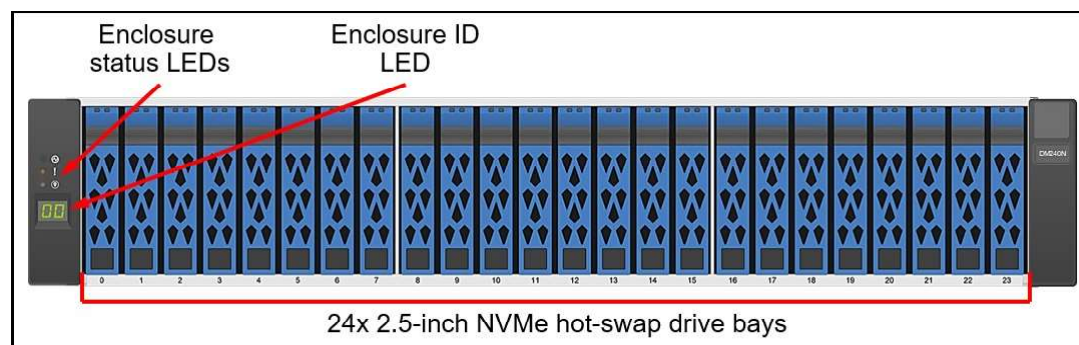


Figure 4. ThinkSystem DM242N 2U SFF NVMe expansion enclosure front view

The following figure shows the rear of the DM242N expansion enclosure.

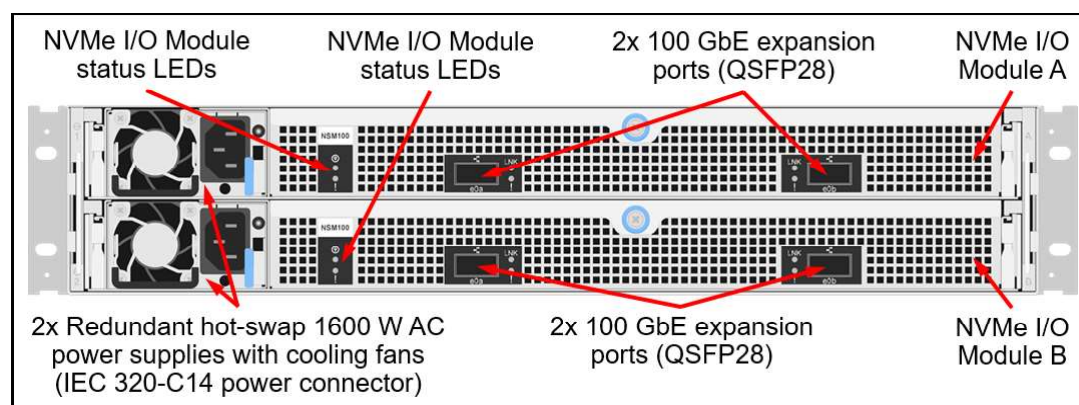


Figure 5. ThinkSystem DM242N 2U SFF NVMe expansion enclosure rear view

The rear of the ThinkSystem DM242N 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 DM3200F, DM5200F and DM7200F storage system specifications.

Note: The supported hardware options, software features, and interoperability listed in this product guide are based on the ONTAP software version 9.16.1. 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 DM3200F, DM5200F and DM7200F that can be found at:

<http://datacentersupport.lenovo.com>

Table 1. ThinkSystem DM3200F, DM5200F and DM7200F system specifications

Attribute	Specification			
Model	DM7200F	DM5200F	DM3200F	DM242N expansion
Machine type	7DJ3	7DJ2	7DJ0	7DJ8
Form factor	2U rack mount			
System memory (per HA pair)	256 GB	128 GB	128 GB	-
System NVMEM (per HA pair)	32 GB	16 GB	16 GB	-
Cluster Scaling Limit NAS (HA pair)	12 HA pairs	4 HA pairs	3 HA pairs	-
Cluster Scaling Limit SAN (HA pair)	6 HA pairs	4 HA pairs	3 HA pairs	-
Drive bays (per HA pair)	24	24	24	24
Max NVMe SSDs (per HA pair)	120	72	48	24
Drive Minimum (per HA pair)	8	8	8	-
Capacity Minimum (per HA pair)	68 TB	No minimum	No minimum	-
Direct Connected Expansions (DM242N) (per HA pair)	2	2	1	-
Switch Connected Expansions (DM242N) (per HA pair)	4	2	0	-
Cluster Connected Expansions (DM242N) (per HA pair)	4x 100Gbe	4x 100Gbe	4x 25Gbe	-
Host/Storage HIC options (per HA Pairs)†	Select up to (6) Host/Storage HICs. Ordered in pairs			

Attribute	Specification			
	<ul style="list-style-type: none"> 2-port, 40/100Gb Ethernet, QSFP28 (RoCEv2) <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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	1.92 TB, 3.84 TB, 7.68 TB, and 15.36 TB NVMe SED SSDs			
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	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.			
Dimensions	<ul style="list-style-type: none"> 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.) 			

Attribute	Specification	
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 ThinkSystem DM3200F, DM5200F and DM7200F Unified Flash Storage Array 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 DM3200F, DM5200F and DM7200F.

Table 2. ThinkSystem DM3200F, DM5200F and DM7200F CTO base models

Machine Type/Model	Feature code	Description
7DJ0CTO1WW	BF3C	Lenovo ThinkSystem DM3200F
7DJ2CTO1WW	BF3C	Lenovo ThinkSystem DM5200F
7DJ3CTO1WW	BF3C	Lenovo ThinkSystem DM7200F

The models of the ThinkSystem DM3200F, DM5200F and DM7200F 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 DM3200F, DM5200F and DM7200F enclosures ship with two NVMe controllers. A controller provides interfaces for host connectivity, management, and internal drives, and it runs ONTAP storage management software. Each DM3200F, DM5200F and DM7200F enclosure provides 64 GB / 64 GB / 128 GB RAM and 16 GB battery-backed NVRAM (64 GB RAM and 8 GB NVRAM per controller).

Each DM3200F, DM5200F and DM7200F controller has two interconnect 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.

- DM3200F 2x 25 GbE ports
- DM5200F 2x 100 GbE ports
- DM7200F 2x 100 GbE ports

Each DMxx00F controller also has the following host interfaces:

- 4x 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)
- 100GbE HIC, with 2x 100 GbE QSFP28 (DAC cables or SW fiber optic cables, MPO)
- 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 DM242N expansion enclosure requires a 100GbE HIC for connectivity installed in port 1 in each controller.

The following table lists the controllers for the DMxx00F Storage Array and supported connectivity options.

Tip: The Fibre Channel HIC do not include 32/64 Gb transceivers. Need select transceivers separately.

Table 3. DMxx00F controllers and connectivity options

Part number	Feature code	Description	Maximum quantity per controller
Host Interface Cards - DM3200F			
4XC7A97035	C4AC	Lenovo ThinkSystem Storage 25Gb 4 port Ethernet, RoCE Adapter (Host/Cluster)	4
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)	3
CTO Only	C4W5	Lenovo ThinkSystem Storage 100Gb 2 Port Ethernet, RoCE Adapter (NVMe Shelf)	2
Host Interface Cards - DM5200F			
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
4XC7A97036	C4AD	Lenovo ThinkSystem Storage 100Gb iWARP 2 Port Ethernet Adapter (MCC-IP)	1
Host Interface Cards - DM7200F			
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

Part number	Feature code	Description	Maximum quantity per controller
CTO Only	C4W5	Lenovo ThinkSystem Storage 100Gb 2 Port Ethernet, RoCE Adapter (NVMe Shelf)	2
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 or 16
4M27A67042	BFH1	Lenovo 100Gb SR4 QSFP28 Ethernet Transceiver	6 or 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 DM242N expansion enclosure are configure with the DM242N.

Table 4. 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

Part number	Feature code	Description	Maximum quantity per controller
00MN508	ASR8	Lenovo 5m LC-LC OM3 MMF Cable	16 or 12
00MN511	ASR9	Lenovo 10m LC-LC OM3 MMF Cable	16 or 12
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 ThinkSystem DMxx00F supports attachment of ThinkSystem DM242N 2U24 expansions. The expansion enclosure can be added to the system non-disruptively.

Note: Only two DM242N expansion units supported via direct attach or switch attach. More than 2x expansion units require a storage switch (SN2100, Cisco C9336C). 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 DM Series expansion enclosures.

Table 5. CTO base models for the ThinkSystem DM Series expansion enclosures

Description	Machine Type/Model	Feature code
Lenovo ThinkSystem DM242N 2U24 NVMe Expansion Enclosure (with 2x PSUs)	7DJ8CTO1WW	C496

The ThinkSystem DM242N 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 DMxx00F enclosure.

ThinkSystem DM3200F, DM5200F and DM7200F enclosures support the following expansions:

- DM3200F direct connected 1x DM242N - 48 NVMe SSDs
- DM5200F direct connected 2x DM242N - 72 NVMe SSDs
- DM7200F direct connected 2x DM242N - 72 NVMe SSDs (Switch connected: 4x DM242N - 120 NVMe SSDs)

Configuration notes:

- 100GbE adapter (C4W5) required to support DM242N expansion.
- For example to attach 1x DM242N, 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 DM242N 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 following table lists ordering information for the NVMe expansion enclosure connectivity options.

Table 6. 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

Drives

The ThinkSystem DMxx00F base enclosure and DM242N expansion 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 DM controller. Drive feature codes are specific to Unified or SAN Only offerings, and to Base, Fundamentals and Premium bundles. See the [Software](#) section for details.
- Drives are sold in packs. Supported quantities are as follows:
 - The DMxx00F 2U24 SFF controller enclosure supports only 12, 18 or 24 SFF drives
 - The DM242N 2U24 SFF expansion enclosure supports only 12, 18 or 24 SFF drives
- For factory-installed drive packs, all drives in the enclosure must be of the same type and capacity

The ThinkSystem DMxx00F and DM242N enclosures each support up to 24 SFF hot-swap drives, in packs of 2 drives. The following tables list the supported drive options. Note that the feature code varies, based on the software license (Base, Fundamentals or Premium) and the protocol license (Unified or SAN only).

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 DM controller. Drive feature codes are specific to Unified or SAN Only offerings, and to Base, Fundamentals and Premium bundles. See the [Software](#) section for details.
- Drives are sold in packs. Supported quantities are as follows:
 - The DMxx00F 2U24 SFF controller enclosure supports only 12, 18 or 24 SFF drives (12 packs of 2 drives)
 - The DM242N 2U24 SFF expansion enclosure supports only 12, 18 or 24 SFF drives (12 packs of 2 drives)
 - A minimum of 8 drives is required.
- For factory-installed drive packs, all drives in the enclosure must be of the same type and capacity

Table 7. Two drive option feature codes

Drive Pack (2 drives each)	Feature code	Max Qty
SED drives		
Lenovo ThinkSystem 3.84TB (2x 1.9TB NVMe SED) Drive Pack	C3XP	12
Lenovo ThinkSystem 7.68TB (2x 3.84TB NVMe SED) Drive Pack	C3XN	12
Lenovo ThinkSystem 15.4TB (2x 7.68TB NVMe SED) Drive Pack	C3XL	12
Lenovo ThinkSystem 30.7TB (2x 15.36TB NVMe SED) Drive Pack	C3XK	12
SED FIPS drives		
Lenovo ThinkSystem 7.68TB (2x 3.84TB NVMe SED FIPS) Drive Pack	C3XM	12

Software

In this section:

- [Feature bundles](#)
- [ONTAP software versions](#)

ONTAP software unifies data management across flash, disk, and cloud to simplify the Lenovo 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 DM5100F is available in the following bundles of features:

- Unified Essentials (Feature BWU9)
- Unified Complete (Feature BWU8)

The following table summarizes the features in each bundle for the DM3200F, DM5200F and DM7200F.

Table 8. Software selection

Feature	Unified Essentials (WW)	Unified Complete (WW)
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
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
ONTAP S3 SnapMirror	No	Included
SnapLock data protection	No	Included
Multitenant Key Magement	No	Included
Anti-ransomware Protection	No	Included
SnapMirror Cloud	No	Included
FabricPool object storage tiering	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.

- **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**: 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.
- **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.
- **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 FC Protocol:** Enables NVMe over FC
- **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 Business Continuity (SMBC):** Non-disruptive failover active-active cross site clusters. Based on existing SnapMirror Synchronous Replication. Offers Zero data loss, zero downtime. You do not have to failover the application. If there is a failure the application will continue to run and there will be no need to restart.
- **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 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 DM Series.
- **ONTAP S3 SnapMirror :** 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.
- **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.
- **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 DM3200F, DM5200F and DM7200F. The table also indicates which markets each version is available in.

Table 9. Software selection

Feature code	Description	Availability
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 DM3200F, DM5200F and DM7200F warranty and support (see [Warranty and support](#) for details).

Management

The ThinkSystem DM3200F, DM5200F and DM7200F 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.
- Optional Lenovo XClarity for discovery, inventory, monitoring, and alerts.

Power supplies and cables

The ThinkSystem DM3200F, DM5200F, DM7200F base enclosures and DM242N 2U24 SFF expansion 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 DM Series enclosure requires the selection of two power cables.

Note: A 110V power source is only supported on the DM3200F.

Rack installation

The individually shipped ThinkSystem DM3200F, DM5200F or DM7200F and DM242N enclosures come with the ThinkSystem Storage Rack Mount Kit 2U24/4U60 listed in the following table.

Table 10. 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 11. 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 12. Rack mount kit features and specifications summary

Attribute	Screw-in fixed rail with adjustable depth	
	2U24 NVMe	2U24 NVMe SIR
Feature code	B6Y6	B6Y7
Enclosure support	DMxx00F, DM242N	DMxx00F, DM242N
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 DMxx00F 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: 560 mm (21.4 in.)
- Weight (fully configured): 27.5 kg (60.7 lb)

The ThinkSystem DM242N 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 DMxx00F and DM242N 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:
 - DM3200F:
 - Also supports 100 to 120 (nominal) V AC; 50 Hz or 60 Hz; 6.43 A
 - DMxx00F:
 - 200 to 240 (nominal) V AC; 50 Hz or 60 Hz; 5.40 A
 - Power load = 1079W (maximum), 826.9W (typical)
 - DM242N:
 - 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:
 - DMxx00F: 3682.79 BTU/Hr (maximum), 2822.13 BUT/Hr (typical)
 - DM242N: 1331 BTU/hour
- Acoustical noise emission:
 - DMxx00F: 7.2 bels
 - DM242N: 6.4 bels

Warranty upgrades and post-warranty support

The DM3200F, DM5200F and DM7200F and expansion enclosure have a 3-year warranty based on the machine type of the system:

- DM3200F controller enclosure: 7DJ0 (3-year warranty)
- DM5200F controller enclosure: 7DJ2 (3-year warranty)
- DM7200F controller enclosure: 7DJ3 (3-year warranty)
- DM242N expansion enclosure: 7DJ8 (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://lenovocator.com/>. For information about Lenovo service upgrade offerings that are available in your region, contact your local Lenovo sales representative or business partner.

In this section:

- [Lenovo Advisory Services](#)
- [Lenovo Plan & Design Services](#)
- [Lenovo Deployment, Migration, and Configuration Services](#)
- [Lenovo Support Services](#)
- [Lenovo Managed Services](#)
- [Lenovo Sustainability Services](#)

Lenovo Advisory Services

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

- **Assessment Services**

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

- **Design Services**

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

Lenovo Plan & Design Services

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

Lenovo Deployment, Migration, and Configuration Services

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

- **Deployment Services for Storage and ThinkAgile**

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

- **Hardware Installation Services**

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

- **DM/DG File Migration Services**

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

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

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

- **Factory Integrated Services**

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

Lenovo Support Services

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

- **Premier Support for Data Centers**

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

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

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

- **Committed Service Repair (CSR)**

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

- **Multivendor Support Services (MVS)**

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

- **Keep Your Drive (KYD)**

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

- **Technical Account Manager (TAM)**

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

- **Enterprise Software Support (ESS)**

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

For more information, consult the brochure [Lenovo Operational Support Services for Data Centers](#).

Lenovo Managed Services

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

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

Quarterly reviews check error logs, verify firmware & OS device driver levels, and software as needed. We'll also maintain records of latest patches, critical updates, and firmware levels, to ensure your 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 DM 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 DMxx00F 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/lxic>

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

Cluster interconnect

The following table lists the Ethernet storage switch that can be used with the ThinkSystem DM3200F, DM5200F and DM7200F for cluster interconnect configurations.

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

Table 13. Ethernet storage switch

Description	Part number
Mellanox SN2100 16 Port, QSFP28, 100GbE Switch, Rear to Front (PSE) Exhaust**	7DBUCTO1WW
Mellanox SN2100 16 port, QSFP28, 100GbE Switch, Front to Rear (oPSE) Exhaust**	7DBUCTO2WW

**The SN2100 switch can be used with the ThinkSystem DM3200F, DM5200F and DM7200F for cluster interconnect.

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>

For more information, see the Cisco Nexus 9300 Series Network Switches Product Guide: <https://lenovopress.lenovo.com/lp2034-cisco-nexus-9300-series-network-switches>

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 14. 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 15. 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
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

Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
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
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 16. Uninterruptible power supply units

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

† Only available in China and the Asia Pacific market.

For more information, see the list of Product Guides in the UPS category:

<https://lenovopress.com/servers/options/ups>

Lenovo Financial Services

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

- **Flexible**

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

- **100% Solution Financing**

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

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

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

- **24/7 Asset management**

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

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

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

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

Seller training courses

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

1. **Family Portfolio: Storage**

2025-04-30 | 50 minutes | Employees and Partners

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

Tags: Storage, ThinkSystem

Published: 2025-04-30

Length: 50 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: SXSW1201r17

2. **Partner Technical Webinar - Storage Announcements**

2025-04-29 | 60 minutes | Employees and Partners

In this 60-minute replay, the April 23 Storage Announcement was presented. Adam Mandelbloom, Lenovo Technical Marketing Manager, presented the ThinkAgile announcements. Next, Roger Yarosh, Senior Storage Product Manager, presented the DG and DM announcements.

Tags: Data Management, ThinkAgile

Published: 2025-04-29

Length: 60 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: 042525

3. **How to Order DM and DE Services Through DCSC**

2025-02-07 | 15 minutes | Employees and Partners

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

Learning Objectives:

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

Tags: Services

Published: 2025-02-07

Length: 15 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DSVC134r4

4. **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

5. How to Attach Services for ThinkSystem DM Using DCSC

2024-12-23 | 20 minutes | Employees and Partners

The goal of this training is to review services for ThinkSystem DM products, professional and support services, support levels, and recommended options. By the end of this course, you will be able to summarize the professional services for ThinkSystem DM, identify the levels of maintenance support for the DM series, and recognize the steps required to attach services to DM products.

Tags: Services, ThinkSystem

Published: 2024-12-23

Length: 20 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DSVC122r4

6. ThinkSystem DM and DE Series Technical Overview

2024-10-15 | 30 minutes | Employees and Partners

This course provides a technical overview of the ThinkSystem DM and DE series products. Course DDMO101 – Lenovo ThinkSystem DM & DE Series Overview is recommended prior to this course.

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

- Describe the Lenovo portfolio for the DM and DE storage systems
- Explain features of the DM series ONTAP software
- Explain features of the ThinkSystem SAN Manager

Tags: Data Management, Storage

Published: 2024-10-15

Length: 30 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DDMT100r2

7. 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

8. **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

9. **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

10. **Lenovo Data Backup and Recovery Solution Overview**

2024-03-25 | 40 minutes | Employees and Partners

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

Tags: Data Management

Published: 2024-03-25

Length: 40 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DSOLO200

11. **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

12. **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

13. **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

14. **Selling ONTAP**
2024-03-06 | 22 minutes | Employees and Partners

In this course, you learn how ONTAP software helps your customers simplify data management, access and protect their data across clouds, and future-proof their environments.

Learning objectives:

- Explain the value of ONTAP data-management software
- Describe the features and benefits of ONTAP 9 software
- Effectively position ONTAP software to your customers

Tags: Data Management, Storage, Technical Sales, ThinkSystem

Published: 2024-03-06

Length: 22 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DDMO102

15. **Competing with ONTAP Fundamentals**
2024-02-01 | 16 minutes | Employees and Partners

Competing with ONTAP Fundamentals is intended to help sellers and partners be able to discuss the ONTAP Fundamentals license and how to position DM Series Storage with ONTAP Fundamentals versus competition.

Objectives:

Identify How to Position DM Series Storage with ONTAP Fundamentals Vs. Competition

Discuss the ONTAP Fundamentals License

Tags: Sales, Storage

Published: 2024-02-01

Length: 16 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DSTOC100

16. **ONTAP Data Protection Fundamentals**

2023-11-02 | 76 minutes | Employees and Partners

In this course, we discuss the integrated data protection features in ONTAP data-management software. We also discuss the tools and software that you use to manage and monitor the data protection features. You learn about cluster peering, storage virtual machine (or SVM) peering, and data protection relationships. You also learn about the architecture and functionality of the Snapshot, SnapMirror, SnapVault, and SyncMirror technologies.

Course DDMT203 – ONTAP SAN Fundamentals is a prerequisite.

Course Objectives:

- Describe the integrated data protection features in ONTAP data-management software
- Identify the tools and software that you use to manage and monitor ONTAP data protection features
- Describe cluster peering, storage virtual machine (SVM) peering, and data protection relationships
- Explain the architecture and functionality of the Snapshot, SnapMirror, SnapVault, and SyncMirror technologies

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

Published: 2023-11-02

Length: 76 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DDMT204r2

17. **Lenovo DM Series Data Efficiency Guarantee**

2023-10-09 | 10 minutes | Employees Only

The Data Efficiency Guarantee offers Lenovo customers an agreed amount of capacity savings. If the Lenovo solution does not meet the terms agreed to in the Guarantee, Lenovo will remediate.

Course Objectives:

- Define the Lenovo DM Series Data Efficiency Guarantee
- Understand how the guarantee works
- Describe the sales process for delivering and tracking the guarantee

Tags: Sales, Storage, ThinkSystem

Published: 2023-10-09

Length: 10 minutes

Start the training:

Employee link: Grow@Lenovo

Course code: DDMC100

18. ThinkSystem DM Series Technical 200 - ONTAP Data Management Fundamentals
2023-10-03 | 90 minutes | Employees and Partners

This course focuses on enabling you to manage and provision ONTAP systems and it is part of the ISG Sales education supporting our ThinkSystem DM and DE Series education. Before taking this course, you should have completed the ThinkSystem DM and DE Series Overview as well as the ThinkSystem DM and DE Series Technical Overview 100. 200 level technical knowledge is provided separately for the DM and DE Series products.

This course focuses on enabling you to do the following:

- Describe the consumers of resources and management requirements
- Describe the user and administrative roles that manage resources
- List the various data management products you can use to manage ONTAP systems
- Define the resources that are commonly provisioned
- Describe various methods and tools that can be used to provision resources

Tags: Storage

Published: 2023-10-03

Length: 90 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DDMT205

19. ThinkSystem DM Series Technical 200 - ONTAP Cluster Fundamentals
2023-10-02 | 135 minutes | Employees and Partners

This course identifies and describes the components that make up a cluster. It also describes the supported cluster configurations and details the steps that are required to create and configure a cluster as well as discusses the physical storage components and the Write Anywhere File Layout file system, also known as the WAFL file system. Course DDMT200 – ONTAP Technical Positioning is a prerequisite.

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

- Identify the components that make up a cluster
- Describe the cluster configurations that are supported
- Create and configure a cluster
- Describe the physical storage components
- Describe the Write Anywhere File Layout (WAFL) file system

Tags: Storage

Published: 2023-10-02

Length: 135 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DDMT201

20. **Assessment for Lenovo ThinkSystem DM and DE Series Technical Overview 100**

2023-10-02 | 30 minutes | Partners Only

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

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

Tags: Technical Sales

Published: 2023-10-02

Length: 30 minutes

Start the training:

Partner link: [Lenovo Partner Learning](#)

Course code: DDMT101

21. **ThinkSystem DM Series Technical 200 Assessment**

2023-09-28 | 15 minutes | Employees and Partners

This is the assessment for the DM Series Technical 200 training

Tags: Sales, Storage, ThinkSystem

Published: 2023-09-28

Length: 15 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DDMT206

22. **VEEAM Solutions Sales Training**

2023-09-27 | 20 minutes | Employees and Partners

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

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

Identify and explain the core products and solutions offered by Veeam.

Explain the key benefits and value propositions of integrating Veeam solutions with Lenovo products.

Tags: Sales

Published: 2023-09-27

Length: 20 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DSTOO100

23. **ONTAP SAN Fundamentals**

2023-09-26 | 60 minutes | Employees and Partners

In this course, you learn how ONTAP provides block access to a host by using SAN protocols. You learn about LUNs and how to map them to a host to enable read and write access. You also learn about multipathing techniques that can improve availability and performance.

The course objectives are:

1. Describe how ONTAP provides block access to a host
2. Explain how SANs use the iSCSI, FC, and FCoE protocols to transport data between a host and storage system
3. List the steps that are required to access a LUN in a storage virtual machine (SVM) from the host
4. Describe multipathing between the host and a cluster

Tags: Sales, Storage, ThinkSystem

Published: 2023-09-26

Length: 60 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DDMT203

24. **ONTAP NAS Fundamentals**

2023-09-25 | 45 minutes | Employees and Partners

This course describes how ONTAP provides file access to clients. The course also explains how you use the NFS and SMB protocols to access files, how you access files over a network, and how you use load-balancing techniques to improve performance.

Course objectives:

1. Describe how ONTAP provides file access to clients
2. Use the NFS protocol to access files
3. Use the SMB protocol to access files
4. Access files over a network and use the load-balancing features of ONTAP

Tags: Sales, Storage, ThinkSystem

Published: 2023-09-25

Length: 45 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DDMT202

25. **VEEAM Hyper-Availability Integration with ThinkSystem DM Series**

2023-09-20 | 20 minutes | Employees and Partners

In this course you will learn about VEEAM Hyper-Availability for ThinkSystem DM Series

Tags: ThinkSystem

Published: 2023-09-20

Length: 20 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DSTOO300

26. **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

27. **Storage Masters - Unified Storage on DM Series**

2023-07-28 | 14 minutes | Employees and Partners

Storage Masters is a multi-module education series. It is intended to help sellers and partners be able to discuss various storage topics that you will encounter in the field and how to position the valuable features of the DM Series within these conversations.

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

- Describe the business challenges resolved by the unified storage for the ThinkSystem DM series.
- Learn about the technology implemented on the DM series of storage arrays.
- Find out what are the benefits of the technology and positioning.

Tags: Data Management, Storage

Published: 2023-07-28

Length: 14 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DSTOT2006

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

In this session, we cover:

- What Next for SAP Clients?
- Lenovo Opportunity
- Lenovo Portfolio for SAP Solutions
- RISE with SAP

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

Published: 2023-07-14

Length: 60 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Course code: DVDAT202

29. **Storage Masters - DM Series - Data Security**
2023-06-30 | 14 minutes | Employees and Partners

Storage Masters is a multi-module education series. It is intended to help sellers and partners be able to discuss various storage topics that you will encounter in the field and how to position the valuable features of the DM Series within these conversations.

Tags: Data Management, Storage

Published: 2023-06-30

Length: 14 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DSTOT2005

30. **Benefits and the positioning of Lenovo ThinkSystem file offerings with WEKA, DSS, and DM+ONTAP**
2023-05-08 | 10 minutes | Employees and Partners

Course objectives:

1. Learn about file storage
2. Understand the different types of storage
3. Recognize the Lenovo data management portfolio

Tags: Artificial Intelligence (AI), Storage, Technical Sales

Published: 2023-05-08

Length: 10 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DSOLS207

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

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

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

The main objectives are:

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

Tags: Sales, Storage, ThinkSystem

Published: 2023-02-15

Length: 25 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DDMO101r5

32. **Storage Masters - DM Series Performance**

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

Storage Masters is a multi-module education series. It is intended to help sellers and partners be able to discuss various storage topics that you will encounter in the field and how to position the valuable features of the DM Series within these conversations.

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

- Understand the key business challenges that companies face with their data storage solutions
- Describe DM Series features
- Explain the benefit of DM Series features to customers

Tags: Data Management, Storage, ThinkSystem

Published: 2023-02-15

Length: 15 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DSTOT2004r3

33. **Storage Masters - Hybrid Cloud for DM Series**
2023-02-01 | 30 minutes | Employees and Partners

Storage Masters is a multi-module education series. It is intended to help sellers and partners be able to discuss various storage topics that you will encounter in the field and how to position the valuable features of the DM Series within these conversations.

Tags: Storage

Published: 2023-02-01

Length: 30 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DSTOT2003

34. **ONTAP Fundamentals Bundle**
2023-02-01 | 15 minutes | Employees and Partners

ONTAP Fundamentals is intended to help sellers and partners be able to discuss the ONTAP Fundamentals license. By the end of this training, you should be able to position ONTAP Fundamentals within the marketplace; describe the ONTAP bundle; identify when to use the ONTAP Bundle in an opportunity; and determine when to use ONTAP Premium in an opportunity.

Tags: DataCenter Products, Storage

Published: 2023-02-01

Length: 15 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DSTOF200

35. **Lenovo DM Storage Series - Hybrid Cloud Solutions**
2022-11-04 | 15 minutes | Employees Only

This course focuses on enabling you to:

- Identify DM Series Hybrid Cloud Solutions
- Describe features of the DM Series FabricPool capability
- Describe features of the DM Series Cloud Volumes ONTAP capability.

Tags: Cloud, Storage, Technology solutions

Published: 2022-11-04

Length: 15 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Course code: DDM201

36. Data Infrastructure Management - DM Series Storage

2022-10-28 | 25 minutes | Employees Only

This course provides a technical overview of the ThinkSystem DM series products. Course DDMO101 – Lenovo ThinkSystem DM & DE Series Overview is recommended prior to this course.

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

- Recognize the components of the Lenovo Data Management portfolio
- Discuss the features of the Lenovo Data Management components
- Describe the features of the SnapCenter software components

Tags: Sales, Storage, Technical Sales, ThinkSystem

Published: 2022-10-28

Length: 25 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Course code: DDM200

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 DM Series documentation
http://thinksystem.lenovofiles.com/storage/help/topic/ontap_software/overview.html
- ONTAP Ransomware Protection
https://thinksystem.lenovofiles.com/storage/help/topic/ontap_anti-ransomware/anti-ransomware.pdf
- Lenovo Data Center Support - ThinkSystem DMxx00F
<https://datacentersupport.lenovo.com/us/en/products/storage/lenovo-storage/>

Related product families

Product families related to this document are the following:

- [DM Series Storage](#)
- [External Storage](#)
- [Lenovo SAN Storage](#)

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Lenovo Solution Technical Report

Manually Designed Solution

Report Generated

30-May-2025

Project ID

232ae76

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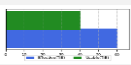
1 Business Requirements

[Use this section to document the customer's high-level business requirements]

2 Solution Summary

2.1 Proposed Solution Summary

This is a summary of what the proposed solution will deliver.

THROUGHPUT	RAW CAPACITY	STORAGE EFFICIENCY***
10,000 IOPS / 78.13 MB/s	61.44 TB	1.5x
AVERAGE UTILIZATION	USABLE CAPACITY	EFFECTIVE CAPACITY***
4%	40.44 TiB	60.6578 TiB
MAXIMUM THROUGHPUT*	RAW CAPACITY HEADROOM**	USABLE VS EFFECTIVE
308,786 IOPS / 2,412.39 MB/s	215.04 TB	 40.44 TiB 60.6578 TiB
*assumes best practice configuration of aggregates and workload to aggregate mapping	**assumes future expansion using drives of same capacity	***assumes use of storage efficiency technologies like compression and deduplication Lowest efficiencies have been applied to unused capacity within the cluster.

Note: Usable and effective capacity is calculated and reported in base-2 format which aligns with values reported in ONTAP CLI, Storage Manager, and Unified Manager. It should be noted that ONTAP CLI displays base-2 capacity values, but labels these values using base-10 descriptors (e.g. GB/TB/PB).

CONFIGURATION				ENVIRONMENTAL	
Model:	DM5200-4HA	Onboard Ethernet Ports:	0	Rack Units:	2 U
Nodes:	2	Onboard UTA2 Ports:	0	System Weight:	52.00 lbs
Total Drives:	16	Onboard SAS Ports:	4	AC Power:	786.53 W
Drive Type:	3.84 TB NVMe SSD	Expansion Slots:	4	Current Draw:	3.99 A
Cluster Switches:	N/A	Stge Switches:	N/A	BTU/hr:	2684.35

3 Solution Details

3.1 System Details

For rack elevation, please refer to the Storage Solution SVG Diagram

cluster1: lenovo1/lenovo2

Bill Of Materials				Total
	Description		Part Number	Qty
Systems				
	DM5200□-HA □/ 16□3.84TB NVMe SSD SED	9.16.1 ONTAP		1
	Grand Total			1
Storage				
	Grand Total			0
Ada□ter Cards/ □ash Cache				
	Grand Total			0

3.2 Environmental Details

Line Voltage: 220

System Components	Qty	Rack Units	Current (Amps)		AC Power (Watts)		AC Power (VA)		Thermal Rating (BTU/hr)		Power (kWh/year)	
			Typical	Worst	Typical	Worst	Typical	Worst	Typical	Worst	Typical	Worst
DM5200□-HA □/ 16□3.84 TB NVMe SSD.2□Contro llers, 1□Chassis□	1	2	3.99	6.3	786.53	1,241. 58	827.93	1,306.93	2,684.35	4,237.4	6,894.57	10,883.46
Total	1	2	3.99	6.3	786.53	1,241. 58	827.93	1,306.93	2,684.35	4,237.4	6,894.57	10,883.46

3.3 Aggregate Details: lenovo1/lenovo2

This configuration leverages the Root-Data-Data partitioning which creates one small root partition (P3) for the root aggregates and two larger equally sized partitions (P1 and P2) for data aggregates. Up to 48 drives are partitioned in this format when ONTAP first initializes. The partition sizes and number of partitions are dependent on the number of drives installed when ONTAP first initializes.

Root-Data-Data (RD2) Partition Format	SSD Drives			
	1	2	3	4
P1 Data Partition	P1	P1	P1	P1
P2 Data Partition	P2	P2	P2	P2
P3 Root Partition	P3	P3	P3	P3

Root-Data (RD) Partition Format	HDD or SSD Drives			
	1	2	3	4
P1 Data Partition	P1	P1	P1	P1
P2 Root Partition	P2	P2	P2	P2

Storage Pool Partition Format	SSD Drives			
	1	2	3	4
P1 Cache Partition	P1	P1	P1	P1
P2 Cache Partition	P2	P2	P2	P2
P3 Cache Partition	P3	P3	P3	P3
P4 Cache Partition	P4	P4	P4	P4

Root Aggrs	Node	Devices	Total	Data	Parity	RAID/Size	Reserve (TiB)	WAFL (TiB)	Parity (TiB)	Root (TiB)
lenovo1_root	lenovo1	37.42 GiB P3 Partition	7	5	2	RAID_DP/7	0.0000	0.0183	0.0730	0.1644
lenovo2_root	lenovo2	37.42 GiB P3 Partition	7	5	2	RAID_DP/7	0.0000	0.0183	0.0730	0.1644
			14	10	4	Totals	0.0000	0.0366	0.1460	0.3288

Data Aggrs	Node	Devices	Total	Data	Parity	RAID/Size	Reserve (TiB)	WAFL (TiB)	Parity (TiB)	Usable (TiB)
lenovo1_aggr1	lenovo1	1.73 TiB P1 Partition	15	13	2	RAID_DP/15	0.0000	2.2466	3.4563	20.2193
lenovo2_aggr1	lenovo2	1.73 TiB P2 Partition	15	13	2	RAID_DP/15	0.0000	2.2466	3.4563	20.2193
			30	26	4	Totals	0.0000	4.4932	6.9126	40.4386

Spares	Devices	Total	Capacity (TiB)
Root	37.42 GiB P3 Partition	2	0.0731
Data	1769.64 GiB P1 Partition	1	1.7282
Data	1769.64 GiB P2 Partition	1	1.7282
Total			3.5295

	Capacity (TiB)	Allocation
Drive Formatting	0.0051	0.01%
Root	0.3288	0.59%
Parity	7.0586	12.63%
WAFL	4.5298	8.10%
Reserve	0.0000	0%
Spare	3.5295	6.32%
Usable	40.4386	72.35%
Total	55.8904	100.0%

3.4 Drive Calculation Summary

Node	Drives (Qty) (#Partitions, #Non-Partitioned)	Flash Pool Drives (Qty) (#Partitions, #Non- Partitioned)	Aggregates (Qty)	Space Utilization
lenovo1	(22, 0)	(0, 0)	2	59.49%
lenovo2	(22, 0)	(0, 0)	2	59.49%

3.5 Workload Descriptions

						IO Percentages				IO Block Sizes (KB)				
Workload Name	Workload Type	Throughput	Effective Capacity (TiB)	Protocol	Read Latency (MS)	Rand Read	Rand Write	Seq Read	Seq Write	Rand Read	Rand Write	Seq Read	Seq Write	Working Set%
iSCSI	Custom	2,500.00 IOPS	9.09	iSCSI	1	20	80	0	0	8	8	32	32	5
iSCSI - clone	Custom	2,500.00 IOPS	9.09	iSCSI	1	20	80	0	0	8	8	32	32	5
iSCSI - clone	Custom	2,500.00 IOPS	9.09	iSCSI	1	20	80	0	0	8	8	32	32	5
iSCSI - clone	Custom	2,500.00 IOPS	9.09	iSCSI	1	20	80	0	0	8	8	32	32	5
iSCSI - clone	Custom	2,500.00 IOPS	9.09	iSCSI	1	20	80	0	0	8	8	32	32	5

3.6 Workload Aggregate Assignments

Node	Aggregate	Workload	Workload Type
lenovo1	lenovo1_aggr1	iSCSI - clone	custom
lenovo2	lenovo2_aggr1	iSCSI - clone	custom
lenovo1	lenovo1_aggr1	iSCSI - clone	custom
lenovo2	lenovo2_aggr1	iSCSI - clone	custom

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