Lenovo ThinkSystem DM7100F Unified All Flash Storage Array
Product Guide

Lenovo ThinkSystem DM7100F is a scalable, unified, all flash storage system that is designed to provide high performance, simplicity, capacity, security, and high availability for large enterprises. Powered by the ONTAP software, ThinkSystem DM7100F delivers enterprise-class storage management capabilities with a wide choice of host connectivity options, flexible drive configurations, and enhanced data management features, including end-to-end NVMe support (NVMe over Fabrics and NVMe drives). The DM7100F is a perfect fit for a wide range of enterprise workloads, including big data and analytics, artificial intelligence, engineering and design, hybrid clouds, and other storage I/O-intensive applications.

The ThinkSystem DM7100F 4U controller enclosure is shown in the following figure.
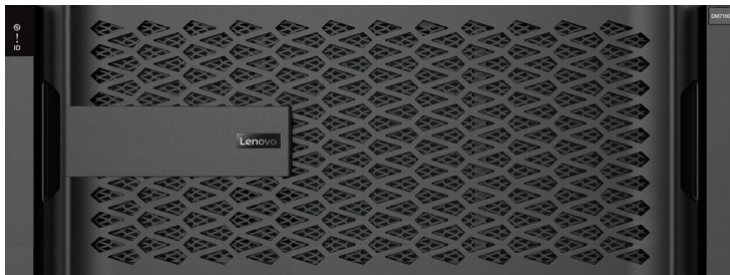

Figure 1. Lenovo ThinkSystem DM7100F

Up to 12 DM7100F Storage Arrays can be combined into a clustered system in a NAS environment, or up to 6 DM7100F Storage Arrays can be combined into a clustered system in a SAN environment.

Did you know?

The ThinkSystem DM7100F offers end-to-end NVMe storage connectivity with NVMe over Fabrics (NVMeOF) and NVMe drives by implementing NVMe/FC with 32 Gb Fibre Channel host interfaces.

A single ThinkSystem DM7100F scales up to 7.37 PB of raw storage capacity. A cluster of the DM7100F storage systems scales up to 88.4 PB for NAS or up to 44.2 PB for SAN environments.

The ThinkSystem DM7100F offers unified file and block storage connectivity, and it supports multiple storage protocols simultaneously with a choice of 1/10 GbE, 25 GbE, and 40/100 GbE NAS and iSCSI, 8/16/32 Gb Fibre Channel, and 32 Gb NVMe/FC.

Key features

A single ThinkSystem DM7100F Storage Array consists of the 4U rack-mount controller enclosure and one or more expansion enclosures. The controller enclosure includes two controllers, 256 GB RAM (128 GB RAM per controller), and 32 GB battery-backed NVRAM (16 GB NVRAM per controller). 25 GbE SFP28 NAS/iSCSI or 4/8/16 Gb Fibre Channel (FC) ports on the controller's mezzanine cards provide base host connectivity, with adapter card options for additional 1/10 GbE, 25 GbE, or 40/100 GbE NAS/iSCSI, 8/16/32 Gb FC, or 32 Gb NVMe/FC connections. The attachment of the Lenovo ThinkSystem DM240N 2U24 SFF and DM240S 2U24 SFF Expansion Enclosures to the controller enclosure provides scalability up to 96 NVMe SSDs or up to 480 SAS SSDs.

The ThinkSystem DM7100F Unified All Flash Array offers the following key features and benefits:

- All-flash array capabilities with end-to-end NVMe to meet the demand for higher storage performance at lower latency and provide higher IOPs and bandwidth with lower power usage and total cost of ownership than hybrid or HDD-based solutions.
- NVMe and SAS drive-side connectivity with up to 24x 2.5-inch small form factor (SFF) drives in the 2U24 SFF expansion enclosures.
- Scalability to up to 96 NVMe SSDs or 480 SAS SFF solid-state drives with the attachment of the ThinkSystem DM240N 2U24 SFF and DM240S 2U24 SFF expansion enclosures to satisfy growing needs for storage performance and capacity.
- Scalable, all flash storage with dual active/active controller configurations for high availability and performance.
- 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 customer needs with support for unified NAS and SAN storage protocols, including 1/10 GbE, 25 GbE, and 40/100 GbE NAS and iSCSI, 8/16/32 Gb Fibre Channel, and 32 Gb NVMe over Fibre Channel (NVMe/FC) connectivity.
- Rich set of standard storage management functions available at no extra cost, including snapshots, volume copy, quality of service, thin provisioning, compression, deduplication, encryption, disk-based backup, application- and virtual machine-aware backup, quick data recovery, clustering, synchronous replication, and asynchronous replication.
- Optional licensed functions, including WORM (write once, read many) data protection (SnapLock) and automated tiering of data from high-performance SSDs to object storage in public or private clouds (FabricPool).
- Scale-out clustering of up to 12 ThinkSystem DM Series storage systems for NAS connectivity or up to six DM Series storage systems for SAN connectivity.
- 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, system fans (4U controller enclosures), and non-disruptive firmware upgrades.
- Certified storage for Oracle VM
- Certified storage for Citrix XenServer

The DM7100F controller enclosure supports attachment of up to two ThinkSystem DM240N 2U24 SFF NVMe and up to 18 DM240S 2U24 SFF SAS expansion enclosures, or up to 20 DM240S 2U24 SFF SAS expansion enclosures. The following SFF drives are supported:

- 1.92 TB and 3.84 TB NVMe hot-swap SSDs.
- 1.92 TB, 3.84 TB, 7.68 TB, and 15.36 TB NVMe hot-swap SSD SEDs.
- 960 GB, 3.84 TB, 7.68 TB, and 15.36 TB 12 Gbps SAS hot-swap SSDs.

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

The ThinkSystem DM7100F Unified All Flash Array offers high levels of system and data availability with the following technologies:

- Dual-active controllers (high availability pair) with automatic load balancing and failover

- Mirrored, battery-backed controller NVRAM*

- Automatic drive failure detection and rebuild

- Redundant, hot-swappable and customer replaceable hardware components, including SFP+/QSFP+ transceivers, controller and I/O modules, power supplies, system fans (4U controller enclosure), 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

*NVRAM is battery-backed memory used to protect inbound writes as they arrive. This fact allows write operations to be safely acknowledged without having to wait for a disk operation to complete, greatly reducing write latency.

Components and connectors

The following figure shows the front of the ThinkSystem DM7100F 4U controller enclosure without a front bezel.
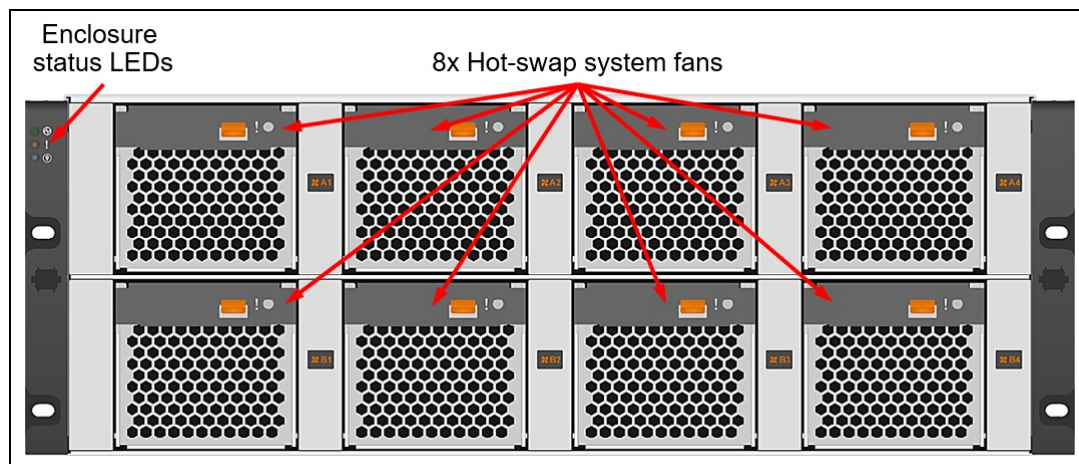

Figure 2. ThinkSystem DM7100F 4U controller enclosure front view

The front of the ThinkSystem DM7100F controller enclosure includes the following components:

- 8x Redundant hot-swap system fans.
- Enclosure status LEDs.

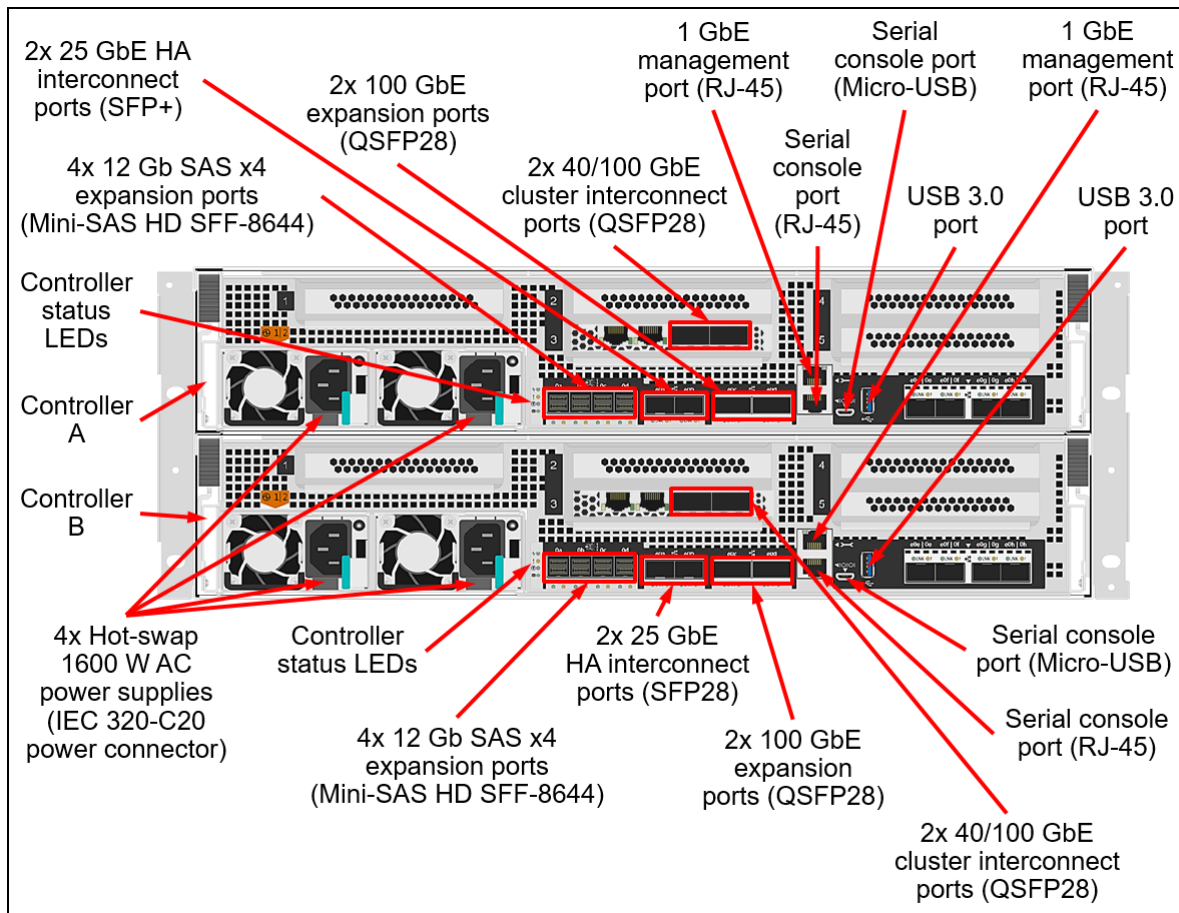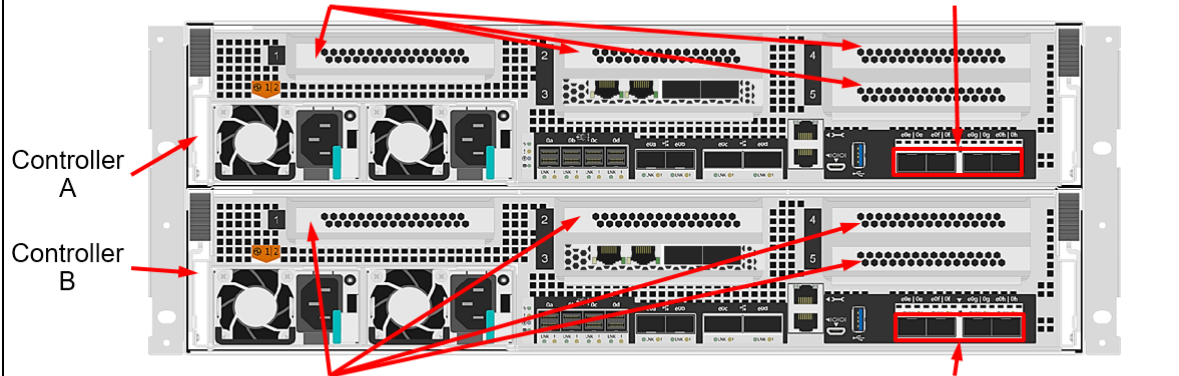The following figures show the rear of the ThinkSystem DM7100F 4U controller enclosure.

Figure 3. ThinkSystem DM7100F 4U controller enclosure rear view: Ports

4x Slots for adapter cards (ports per adapter):
- 2x 1/10 GbE RJ-45 host ports
- 4x 10 GbE host ports (SFP+)
- 2x 25 GbE host ports (SFP28)
- 2x 40/100 GbE host ports (QSFP28)
- 4x 8/16/32 Gb FC host ports (SFP+)
- 4x 12 Gb SAS expansion ports (SFF-8644)
- 2x 100 GbE expansion ports (QSFP28)
- 2x 4/8/16 Gb FC-VI MetroCluster FC ports (SFP+)*

1x Slot for mezzanine cards (ports per card):
- 4x 25 GbE host ports (SFP28)
- 4x 4/8/16 Gb FC host ports (SFP+)

Controller A

Controller B

4x Slots for adapter cards (ports per adapter):
- 2x 1/10 GbE RJ-45 host ports
- 4x 10 GbE host ports (SFP+)
- 2x 25 GbE host ports (SFP28)
- 2x 40/100 GbE host ports (QSFP28)
- 4x 8/16/32 Gb FC host ports (SFP+)
- 4x 12 Gb SAS expansion ports (SFF-8644)
- 2x 100 GbE expansion ports (QSFP28)
- 2x 4/8/16 Gb FC-VI MetroCluster FC ports (SFP+)*

1x Slot for mezzanine cards (ports per card):
- 4x 25 GbE host ports (SFP28)
- 4x 4/8/16 Gb FC host ports (SFP+)

* Planned for the future

Figure 4. ThinkSystem DM7100F 4U controller enclosure rear view: Slots

The rear of the ThinkSystem DM7100F 4U controller enclosure includes the following components:

- Two redundant hot-swap controllers, each with the following ports:
    - Two 25 GbE SFP28 ports for direct-attach HA pair interconnect.
    - Two 40/100 GbE QSFP28 onboard ports for connections to the NVMe expansion enclosures.
    - Two 40/100 GbE QSFP28 ports on the SmartIO adapter in Slot 3 for direct-attach or switched cluster interconnect.
    - Four 12 Gb SAS x4 ports (Mini-SAS HD SFF-8644) for connections to the SAS expansion enclosures.
    - A mezzanine slot for one of the following mezzanine cards (a mezzanine card is required):
        - Four 25 GbE SFP28 host ports (NAS or iSCSI).
        - Four 4/8/16 Gb FC SFP+ host ports (FC only).
    - Four slots for the following optional adapter cards (ports per adapter card):
        - Host ports:
            - Two 1/10 GbE RJ-45 host ports (NAS or iSCSI).
            - Four 10 GbE SFP+ host ports (NAS or iSCSI).
            - Two 25 GbE SFP28 host ports (NAS or iSCSI).
            - Two 40/100 GbE QSFP28 host ports (NAS or iSCSI).
            - Four 8/16/32 Gb FC SFP+ host ports (FC or 32Gb NVMe/FC).
        - Expansion ports:
            - Two 100 GbE QSFP28 expansion ports (NVMe/RoCE).
            - Four 12 Gb SAS x4 expansion ports (Mini-SAS HD SFF-8644).
        - MetroCluster ports:
            - Two 4/8/16 Gb FC SFP+ MetroCluster FC ports (planned for the future).
            - Two 40/100 GbE iWARP QSFP28 MetroCluster IP ports.
    - One RJ-45 10/100/1000 Mb Ethernet port for out-of-band management.
    - Two serial console ports (RJ-45 and Micro-USB) for another means to configure the system.
    - One USB Type A port (read-only) for software updates.
- Four redundant hot-swap 1600 W (100 - 240 V) AC power supplies (IEC 320-C14 power connector) with integrated cooling fans.
- Controller status LEDs.

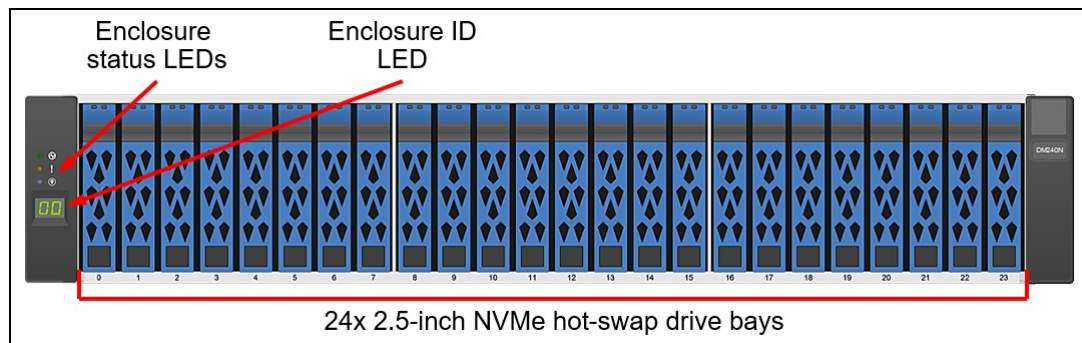The following figure shows the front of the ThinkSystem DM240N 2U SFF NVMe expansion enclosure.

Figure 5. ThinkSystem DM240N 2U SFF NVMe expansion enclosure front view

The front of the ThinkSystem DM240N 2U SFF NVMe expansion enclosure includes the following components:

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

The following figure shows the rear of the ThinkSystem DM240N 2U SFF NVMe expansion enclosure.

NVMe I/O Module status LEDs NVMe I/O Module status LEDs 2x 100 GbE expansion ports (QSFP28) NVMe I/O Module A

2x Redundant hot-swap 1600 W AC power supplies with cooling fans (IEC 320-C14 power connector) 2x 100 GbE expansion ports (QSFP28) NVMe I/O Module B
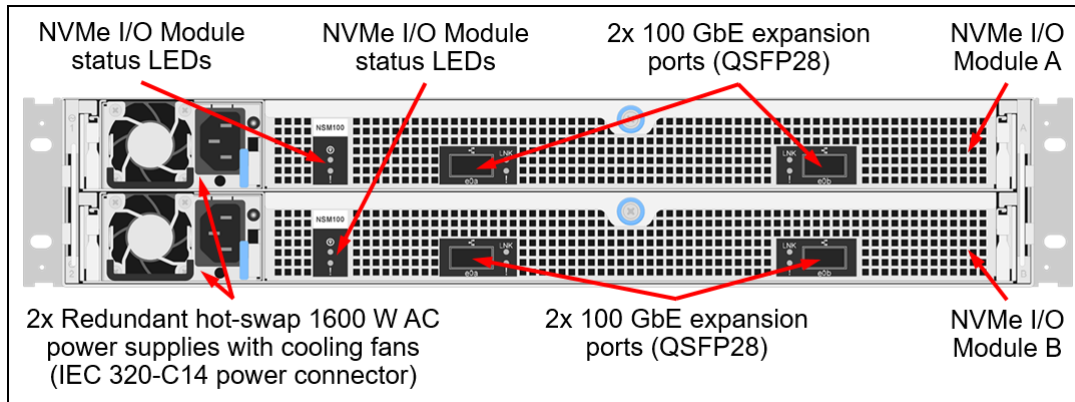
Figure 6. ThinkSystem DM240N 2U SFF NVMe expansion enclosure rear view

The rear of the ThinkSystem DM240N 2U SFF NVMe expansion enclosure includes the following components:

- Two redundant hot-swap NVMe I/O Modules; each NVMe I/O Module provides two 100 GbE QSFP28 expansion ports for connections to the controller enclosures.
- Two redundant hot-swap 1600 W (100 - 240 V) AC power supplies (IEC 320-C14 power connector) with integrated cooling fans.
- NVMe I/O Module status LEDs.

The following figure shows the front of the ThinkSystem DM240S 2U SFF SAS expansion enclosure.

Enclosure status LEDs Enclosure ID LED
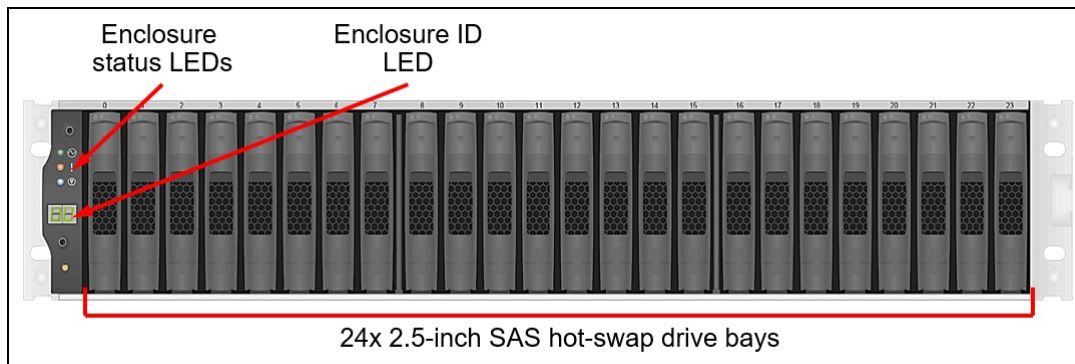
24x 2.5-inch SAS hot-swap drive bays

Figure 7. ThinkSystem DM240S 2U SFF SAS expansion enclosure front view

The front of the ThinkSystem DM240S 2U SFF SAS expansion enclosure includes the following components:

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

The following figure shows the rear of the ThinkSystem DM240S 2U SFF SAS expansion enclosure.
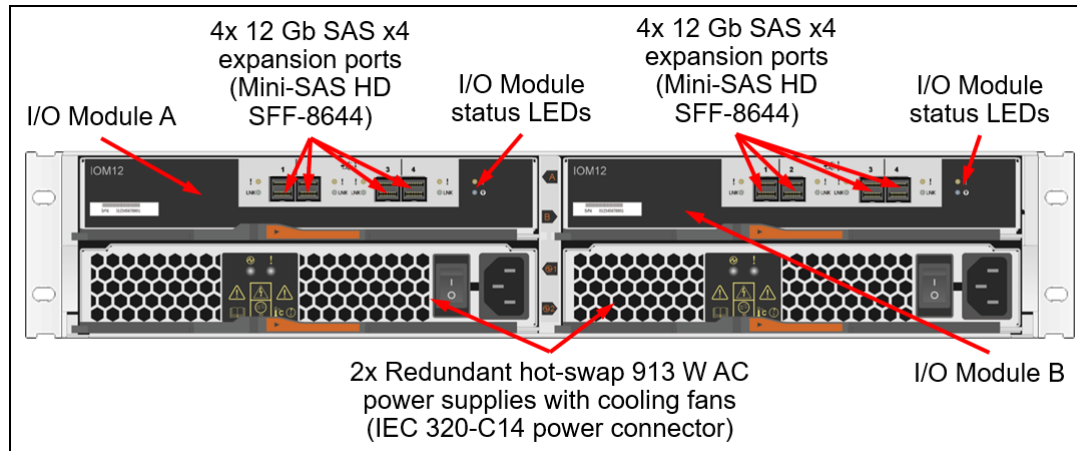

Figure 8. ThinkSystem DM240S 2U SFF SAS expansion enclosure rear view

The rear of the ThinkSystem DM240S 2U SFF SAS expansion enclosure includes the following components:

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

System specifications

The following table lists the ThinkSystem DM7100F Unified All Flash Array storage system specifications.

Note: The supported hardware options, software features, and interoperability listed in this product guide are based on the ONTAP software version 9.7. For details about specific software releases that introduced support for certain hardware options and software features, refer to the Change History for the particular software release for the ThinkSystem DM7100F Unified All Flash Array that can be found at: http://datacentersupport.lenovo.com

Table 1. ThinkSystem DM7100F system specifications

Attribute	Specification
Form factor	- DM7100F controller enclosure (machine type 7D25): 4U rack mount. - DM240N 2U24 SFF expansion enclosure (machine type 7Y62): 2U rack mount. - DM240S 2U24 SFF expansion enclosure (machine types 7Y58, 7D7Y): 2U rack mount.
Controller configuration	Dual active-active controller configuration (HA pair). Up to 6 HA pairs can be combined into a single SAN cluster, or up to 12 HA pairs can be combined into a single NAS cluster.
HA pair interconnect ports	4x 25 GbE SFP28 onboard ports (DAC cables) (2 ports per controller).
Cluster interconnect ports	4x 100 GbE QSFP28 ports (DAC cable or SW fiber optic cable, MPO) (2 ports per controller on the pre-installed SmartIO adapter cards).
MetroCluster connectivity	- MetroCluster IP: 4x 40/100 GbE QSFP28 ports (SW fiber optic cable, MPO) (2 ports per controller on the optional 100 GbE iWARP adapter cards). (requires ONTAP 9.8 or later) - MetroCluster FC: 4x 4/8/16 Gb FC SFP+ ports (SW fiber optic cable, LC) (2 ports per controller on the optional 16 Gb FC-VI adapter cards).

Attribute	Specification
RAID levels	RAID-4, RAID-DP, RAID-TEC. **Note:** RAID-4 can be configured only through the CLI.
Controller memory	256 GB RAM per system (128 GB per controller). 32 GB battery-backed NVRAM per system (16 GB per controller) mirrored between the controllers.

Drive bays	Up to 480 SFF hot-swap drive bays:
	● Up to 96 NVMe drives with up to 4x DM240N expansion enclosures.
	  ○ Up to 2x DM240N supported direct connected
	  ○ More than 2x DM240N or up to 4x DM240N requires 2 dedicated 100GbE SN2100 switches.
	● Up to 480 SAS SSDs with up to 20x DM240S expansion enclosures.
	  ○ Every DM240N reduces the maximum allowed DM240S by 1 and allowed SAS SSDs by 24.

Drive technology	NVMe SSDs, SAS SSDs.
Drive expansion connectivity	● 2x 100 GbE QSFP28 onboard expansion ports and 2x 100 GbE QSFP28 additional expansion ports with one 100 GbE adapter card on each of two controllers in the controller enclosure for the attachment of the NVMe expansion enclosures. ● 2x 100 GbE QSFP28 expansion ports on each of two NVMe I/O modules in the NVMe expansion enclosure for the attachment to the controller enclosure. ● 4x 12 Gb SAS x4 (Mini-SAS HD SFF-8644) base expansion ports and 4x or 8x 12 Gb SAS x4 (Mini-SAS HD SFF-8644) additional expansion ports with one or two SAS adapter cards on each of two controllers in the controller enclosure for the attachment of the SAS expansion enclosures. ● 4x 12 Gb SAS x4 (Mini-SAS HD SFF-8644) expansion ports on each of two SAS I/O modules in the SAS expansion enclosure for the attachment to the controller enclosure and daisy chaining of the expansion enclosures.
Drives	● 1.92 TB and 3.84 TB NVMe SSDs. ● 1.92 TB, 3.84 TB, 7.68 TB, and 15.36 TB NVMe SSD SEDs. ● 960 GB, 3.84 TB, 7.68 TB, and 15.36 TB SAS SSDs.
Storage capacity	Up to 7.37 PB (480x 15.36 TB SSDs).
Storage protocols	● NAS (File access): NFS and CIFS/SMB. ● SAN (Block access): iSCSI, FC, NVMe/FC.
Host connectivity	Base ports on the mezzanine cards (per controller enclosure): ● 8x 25 GbE SFP28 (DAC cable or SW fiber optic cable, LC) (4 ports per controller); or ● 8x 4/8/16 Gb FC SFP+ (SW fiber optic cable, LC) (4 ports per controller). Optional additional ports on up to four pairs of the adapter cards (up to four adapter cards per controller) with the following ports per adapter card: ● 2x 1/10 GbE RJ-45 (UTP Category 6/6a cables). ● 4x 10 GbE SFP+ (DAC cables). ● 2x 25 GbE SFP28 (DAC cables or SW fiber optic cables, LC). ● 2x 40/100 GbE QSFP28 (DAC cables or SW fiber optic cables, MPO). ● 4x 8/16/32 Gb FC SFP+ host ports (SW fiber optic cables, LC). **Note:** ONTAP does not support host direct attach for FC protocol.
Host operating systems	Microsoft Windows Server 2012 R2, 2016, and 2019; Red Hat Enterprise Linux (RHEL) 6, 7, and 8; SUSE Linux Enterprise Server (SLES) 11, 12, and 15; VMware vSphere 6.0, 6.5, 6.7, and 7.0. **Note:** NVMe/FC is supported with RHEL 8 and SLES 15 only (seeOperating systems for specific version details).
Performance*	Up to 650 000 random read IOPS (8 KB blocks).

Attribute	Specification

Configuration maximums**	- Maximum raw storage capacity: 7.37 PB
	- Maximum aggregate size: 800 TB
	- Maximum number of FlexVol volumes per HA pair: 5000
	- Maximum volume size: 100 TB (The maximum size will be increased up to 300TB in ONTAP 9.12.1P2 and later.)
	- Maximum number of LUNs per controller: 12,288
	- Maximum number of LUNs per FlexVol volume: 512
	- Maximum LUN size: 16 TB (The maximum size will be increased up to 128TB in ONTAP 9.12.1P2 and later.)
	- Maximum number of drives in a RAID group (data + parity drives):
	   ○ RAID 4: 14 (13 + 1 SAS SSDs or NVMe SSDs)
	   ○ RAID-DP: 28 (26 + 2 SAS SSDs or NVMe SSDs)
	   ○ RAID-TEC: 29 (26 + 3 SAS SSDs or NVMe SSDs)
	- Maximum number of initiators per HA pair: 8192
	- Maximum number of LUNs per HA pair: 24,576
	- Maximum number of snapshots per FlexVol volume: 1023

Cooling	Redundant cooling: - DM7100F 4U: Eight hot-swap system fans. - DM240N 2U24 SFF: Fans that are built into I/O modules and power supplies. - DM240S 2U24 SFF: Fans that are built into power supplies.
Power supply	Four 1600 W (100 - 240 V) (DM7100F 4U controller enclosure), or two 1600 W (100 - 240 V) (DM240N 2U24 SFF expansion enclosure), or two 913 W (100 - 240 V) (DM240S 2U24 SFF expansion enclosure) redundant hot-swap Platinum AC power supplies.
Hot-swap parts	Controllers, I/O modules, drives, system fans (DM7100 4U only), power supplies, and SFP+/SFP28/QSFP+/QSFP28 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. - 1x USB Type A port (read-only) for software updates.
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- or five-year customer-replaceable unit and onsite limited warranty with selectable service levels: 9x5 coverage with next business day (NBD) parts delivered (base warranty), 9x5 coverage with NBD onsite response (Foundation Service), 24x7 coverage with 4-hour onsite response (Essential Service), or 24x7 coverage with 2-hour onsite response or 6-hour committed repair (select areas) (Advanced Service). Premier Support is also available. Software support is included in the base warranty or Foundation, Essential, or Advanced Service for the duration of the warranty period.
Dimensions	4U controller enclosure: - Height: 175 mm (6.9 in.) - Width: 447 mm (17.6 in.) - Depth: 828 mm (32.6 in.) 2U24 SFF NVMe expansion enclosure: - Height: 87 mm (3.4 in.) - Width: 447 mm (17.6 in.) - Depth: 543 mm (21.4 in.) 2U24 SFF SAS expansion enclosure: - Height: 85 mm (3.4 in.) - Width: 449 mm (17.7 in.) - Depth: 484 mm (19.1 in.)

Attribute	Specification
Weight	- Controller enclosure (fully configured): 49.2 kg (108.5 lb) 2U24 SFF NVMe expansion enclosure (fully configured): 30.2 kg (66.7 lb) 2U24 SFF SAS expansion enclosure (fully configured): 24.4 kg (53.8 lb)

* Estimated theoretical performance based on the capacity planning for specific configurations and workloads.

** 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

Factory-integrated models of the ThinkSystem DM7100F Unified All Flash Array are configured by using the Lenovo Data Center Solution Configurator (DCSC):

http://dcsc.lenovo.com

The following table lists the CTO base models for the ThinkSystem DM7100F Unified All Flash Array.

Table 2. ThinkSystem DM7100F CTO base models

Description	Machine Type/Model	Feature code
Lenovo ThinkSystem DM7100F	7D25CTO1WW	B94E

Configuration note: Two DM7100 controllers (feature code B94T) are pre-selected in the configurator.

The models of the ThinkSystem DM7100F ship with the following items:

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

Controllers

The ThinkSystem DM7100F controller enclosure ships with two DM7100 controllers. A *controller* provides interfaces for host connectivity, management, and internal drives, and it runs ONTAP storage management software. Each ThinkSystem DM7100 controller enclosure provides 256 GB RAM and 32 GB battery-backed NVRAM (128 GB RAM and 32 GB NVRAM per controller).

The ThinkSystem DM7100F controller enclosures ship with four HA interconnect 25 GbE SFP28 ports (two ports per controller) to cable a directly-connected dual-controller HA pair, and four cluster interconnect 100 GbE QSFP28 ports (two ports on the 100 GbE SmartIO adapter card [feature code BAZ1] installed in the Slot 3 on each of the DM7100 controllers) to cable a directly connected (one HA pair) or switched (multiple HA pairs) cluster. 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.

The ThinkSystem DM7100F controller enclosure provides four QSFP28 ports for 100 GbE NVMe expansion connectivity, and it also has two mezzanine slots (one slot per controller) for mezzanine cards and eight available expansion slots (four slots per controller) for adapter cards.

The ThinkSystem DM7100F controller enclosure also provides eight integrated 12 Gb SAS x4 expansion ports (Mini-SAS HD SFF-8644 connectors) (four ports per controller) for the attachment of the DM240S 2U24 SFF SAS expansion enclosures.

The ThinkSystem DM7100F controller enclosure provides a choice of the following interfaces on the mezzanine cards for base host connectivity (ports per mezzanine card):

- 4x 25 GbE SFP28 ports for NAS or iSCSI connectivity (require optical transceivers or DAC cables that should be purchased for the mezzanine card).
- 4x 4/8/16 Gb FC SFP+ ports for FC connectivity (require SFP+ SW optical transceivers that should be purchased for the mezzanine card).

The following interfaces can be added to the ThinkSystem DM7100F controller enclosures with optional adapter cards (ports per adapter card):

- Host interfaces
  - 2x 1/10 GbE RJ-45 ports for NAS or iSCSI connectivity (require RJ-45 UTP Category 6 cables that should be purchased for the adapter card).
  - 4x 10 GbE SFP+ ports for NAS or iSCSI connectivity (require DAC cables that should be purchased for the adapter card).
  - 2x 25 GbE SFP28 ports for NAS or iSCSI connectivity (require optical transceivers or DAC cables that should be purchased for the adapter card).
  - 2x 40/100 GbE QSFP28 ports for NAS or iSCSI connectivity (require optical transceivers or DAC cables that should be purchased for the adapter card).
  - 4x 8/16/32 Gb FC SFP+ ports for FC connectivity, or NVMe/FC with 32 Gb ports (SW SFP+ transceivers with LC connectors included).
- Expansion interfaces:
  - 2x 100 GbE RoCE QSFP28 ports for NVMe/RoCE expansion connectivity.
  - 4x 12 Gb SAS x4 ports (Mini-SAS HD SFF-8644) for SAS expansion connectivity.
- MetroCluster interfaces:
  - 2x 40/100 GbE iWARP QSFP28 ports for MetroCluster IP connectivity (require optical transceivers that should be purchased for the adapter card).
  - 2x 4/8/16 Gb FC SFP+ ports for MetroCluster FC connectivity (require SFP+ SW optical transceivers that should be purchased for the adapter card) (planned for the future).

Configuration notes:

- A pair of the mezzanine cards is required for selection.
- The optional adapter cards should be installed in pairs: Up to four pairs of the adapter cards are supported per controller enclosure (up to four adapter cards per controller), including a combination of the adapter card pairs.
- Both controllers must have matching configurations of the mezzanine ports (type and physical connections) and adapter cards (type, quantity, slot location, and physical connections).
- The optional adapter cards should be installed in the controller's expansion slots in the following order: Slot 2, Slot 4, Slot 1, Slot 5.
  Note: In the configurations with two DM240N expansion enclosures, a pair of additional 100 GbE RoCE adapter cards is required for dual HA direct connectivity to the expansion enclosures, and these cards must be installed in the Slot 5 of the DM7100 controllers.

The following table lists the controller for the ThinkSystem DM7100F Unified All Flash Array and supported connectivity options.

Table 3. DM7100F controller and connectivity options

Description	Part number	Feature code	Maximum quantity per controller enclosure
Controllers			
Lenovo ThinkSystem DM7100 NVMe Controller	None*	B94T	2

Description	Part number	Feature code	Maximum quantity per controller enclosure
Mezzanine cards: Base host interfaces			
Lenovo ThinkSystem DM Series 25Gb 4 Port Ethernet Mezz Card	4XC7A60826	B94J	2
Lenovo ThinkSystem DM Series 16Gb 4 Port Fibre Channel Mezz Card	4XC7A60827	B94K	2
Adapter cards: Additional host interfaces			
Lenovo ThinkSystem DM Series 10Gb BaseT 2 port Ethernet Card	4XC7A60794	B94F	8
Lenovo ThinkSystem DM Series 10Gb 4 port Ethernet Card	4XC7A38329	B730	8
Lenovo ThinkSystem DM Series 25Gb 2 port Ethernet Card †	4XC7A38328	B72Z	6
Lenovo ThinkSystem DM Series 100Gb 2 port Ethernet Card	4XC7A38327	B72Y	6
Lenovo ThinkSystem DM Series 32Gb 4 port Fibre Channel Card	4XC7A38326	B72X	6
Adapter cards: Additional expansion interfaces			
Lenovo ThinkSystem DM Series 100Gb 2 port Ethernet Card	4XC7A38327	B72Y	2
Lenovo ThinkSystem DM Series 12Gb SAS 4 Port Card	4Y37A60797	B94X	6
Adapter cards: MetroCluster interfaces			
Lenovo ThinkSystem DM Series 100Gb iWARP 2 Port Ethernet Card (requires ONTAP 9.8 or later)	4XC7A60795	B94G	2
SFP+ transceivers for 10Gb 4 port Ethernet Card (4XC7A38329)			
Intel 10G Ethernet SFP+ SR Optics Module	4TC7A69986	B4SY	32
SFP+ transceivers for 16 Gb FC-VI MetroCluster adapter cards			
16Gb Fibre Channel SFP+ Module 1 pack	4TC7A69990	BF5V	12
SFP+ transceivers for 16 Gb FC mezzanine cards			
16Gb Fibre Channel SFP+ Module 1 pack	4XF7A14920	B4KA	12
SFP+ and SFP28 transceivers for 25 GbE mezzanine cards and 25 GbE adapter cards †			
10Gb SW Optical iSCSI SFP+ Module 1 pack	4XF7A14919	B4K9	24
25Gb SR SFP28 ethernet transceivers			
Lenovo 25G SR SFP28 Amphenol Ethernet Transceiver	4TC7A94751	C4K4	24
40Gb SR SFP28 ethernet transceivers			
40G Ethernet SR Transceiver	4TC7A81809	BQBL	24
QSFP+/QSFP28 transceivers for 100 GbE adapter cards and SmartIO cards			
100Gb Ethernet Optical QSFP28 Shortwave Module 1 Pack	4XF7A39598	B733	24
Lenovo 100Gb SR4 QSFP28 Ethernet Transceiver	4M27A67042	BFH1	32
OM4 cables for 100 GbE QSFP28 transceivers			
Lenovo 5m MPO-MPO OM4 MMF Cable	7Z57A03567	AV25	20
Lenovo 7m MPO-MPO OM4 MMF Cable	7Z57A03568	AV26	20
Lenovo 10m MPO-MPO OM4 MMF Cable	7Z57A03569	AV27	20
Lenovo 15m MPO-MPO OM4 MMF Cable	7Z57A03570	AV28	20
Lenovo 20m MPO-MPO OM4 MMF Cable	7Z57A03571	AV29	20
Lenovo 30m MPO-MPO OM4 MMF Cable	7Z57A03572	AV2A	20
OM4 cables for 16/32 Gb FC and 25 GbE SFP28 optical transceivers			
Lenovo 0.5m LC-LC OM4 MMF Cable	4Z57A10845	B2P9	32
Lenovo 1m LC-LC OM4 MMF Cable	4Z57A10846	B2PA	32

Description	Part number	Feature code	Maximum quantity per controller enclosure
Lenovo 3m LC-LC OM4 MMF Cable	4Z57A10847	B2PB	32
Lenovo 5m LC-LC OM4 MMF Cable	4Z57A10848	B2PC	32
Lenovo 10m LC-LC OM4 MMF Cable	4Z57A10849	B2PD	32
Lenovo 15m LC-LC OM4 MMF Cable	4Z57A10850	B2PE	32
Lenovo 25m LC-LC OM4 MMF Cable	4Z57A10851	B2PF	32
Lenovo 30m LC-LC OM4 MMF Cable	4Z57A10852	B2PG	32
OM3 cables for 16/32 Gb FC and 25 GbE SFP28 optical transceivers			
Lenovo 0.5m LC-LC OM3 MMF Cable	00MN499	ASR5	32
Lenovo 1m LC-LC OM3 MMF Cable	00MN502	ASR6	32
Lenovo 3m LC-LC OM3 MMF Cable	00MN505	ASR7	32
Lenovo 5m LC-LC OM3 MMF Cable	00MN508	ASR8	32
Lenovo 10m LC-LC OM3 MMF Cable	00MN511	ASR9	32
Lenovo 15m LC-LC OM3 MMF Cable	00MN514	ASRA	32
Lenovo 25m LC-LC OM3 MMF Cable	00MN517	ASRB	32
Lenovo 30m LC-LC OM3 MMF Cable	00MN520	ASRC	32
SFP+ DAC cables for 10 GbE SFP+ adapter cards			
0.5m Passive DAC SFP+ Cable	00D6288	A3RG	32
1m Passive DAC SFP+ Cable	90Y9427	A1PH	32
1.5m Passive DAC SFP+ Cable	00AY764	A51N	32
2m Passive DAC SFP+ Cable	00AY765	A51P	32
3m Passive DAC SFP+ Cable	90Y9430	A1PJ	32
5m Passive DAC SFP+ Cable	90Y9433	A1PK	32
SFP28 DAC cables for 25 GbE onboard ports, mezzanine cards, and adapter cards			
Lenovo 1m Passive 25G SFP28 DAC Cable	7Z57A03557	AV1W	26
Lenovo 3m Passive 25G SFP28 DAC Cable	7Z57A03558	AV1X	26
Lenovo 5m Passive 25G SFP28 DAC Cable	7Z57A03559	AV1Y	26
QSFP+ DAC cables for 100 GbE adapter cards and SmartIO cards (operating at 40 Gbps)			
Lenovo 1m Passive QSFP+ DAC Cable	49Y7890	A1DP	20
Lenovo 3m Passive QSFP+ DAC Cable	49Y7891	A1DQ	20
Lenovo 5m Passive QSFP+ DAC Cable	00D5810	A2X8	20
QSFP28 DAC cables for 100 GbE adapter cards and SmartIO cards (operating at 100 Gbps)			
Lenovo 1m Passive 100G QSFP28 DAC Cable	7Z57A03561	AV1Z	20
Lenovo 3m Passive 100G QSFP28 DAC Cable	7Z57A03562	AV20	20
Lenovo 5m Passive 100G QSFP28 DAC Cable	7Z57A03563	AV21	20
UTP Category 6 cables for 1/10 GbE RJ-45 adapter cards and 1 GbE RJ-45 management ports			
0.75m Green Cat6 Cable	00WE123	AVFW	18
1.0m Green Cat6 Cable	00WE127	AVFX	18
1.25m Green Cat6 Cable	00WE131	AVFY	18
1.5m Green Cat6 Cable	00WE135	AVFZ	18
3m Green Cat6 Cable	00WE139	AVG0	18

Description	Part number	Feature code	Maximum quantity per controller enclosure
10m Cat6 Blue Cable	90Y3721	A1MU	18
10m Cat6 Green Cable	90Y3718	A1MT	18
10m Cat6 Yellow Cable	90Y3715	A1MS	18
25m Cat6 Blue Cable	90Y3730	A1MX	18
25m Cat6 Green Cable	90Y3727	A1MW	18
25m Cat6 Yellow Cable	90Y3724	A1MV	18

* Factory-installed only.

† For 25G leverage: 4M27A67041, BFH2 Lenovo 25Gb SR SFP28 Ethernet Transceiver

Expansion enclosures

The ThinkSystem DM7100F controller enclosure supports attachment of up to two ThinkSystem DM240N 2U24 SFF NVMe and up to eight DM240S 2U24 SFF SAS expansion enclosures. The expansion enclosures can be added to the system non-disruptively.

Note: The addition of the second DM240N NVMe expansion enclosure to the storage arrays that were previously configured with one DM240N NVMe expansion enclosure requires planned system downtime.

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

Table 4. CTO base models for the ThinkSystem DM Series expansion enclosures

Description	Machine Type/Model	Feature code
DM240S 2U24 SFF Expansion Enclosure (1-year warranty)	7Y58CTO1WW	BEY7
DM240S 2U24 SFF Expansion Enclosure (3-year warranty)	7D7YCTO1WW	BEY7
DM240N NVMe 2U24 SFF Expansion Enclosure (3-year warranty)	7Y62CTO1WW	B6W6

Configuration notes:

- Two NVMe I/O expansion modules (feature code B73A) are pre-selected in the configurator for the DM240N 2U24 SFF expansion enclosures.
- Two SAS I/O expansion modules (feature code B39J) are pre-selected in the configurator for the DM240S 2U24 SFF expansion enclosures.

The models of the ThinkSystem DM240N and DM240S 2U24 SFF expansion enclosures ship with the following items:

- One chassis with the following components:
    - Two I/O modules (NVMe or SAS)
    - Two power supplies
- Rack Mount Kit
- *Electronic Publications Flyer*
- Two customer-configured power cables

The following expansion connectivity topologies are supported:

- NVMe expansion connectivity
- SAS expansion connectivity

NVMe expansion topology

Each ThinkSystem DM240N expansion enclosure ships with two NVMe I/O expansion modules. Each *NVMe I/O expansion module* provides two external 100 GbE QSFP28 ports (labelled Ports A and B) that are used for direct-attach connections to the ThinkSystem DM7100F controller enclosures.

The ThinkSystem DM7100F controller enclosure supports direct attachment of up to two DM240N NVMe expansion enclosures for a total of up to 48 NVMe drives. For one NVMe expansion enclosure, the integrated 100 GbE QSFP28 ports on the DM7100 controller can be used. For two NVMe expansion enclosures, an additional 2-port 100 GbE QSFP28 adapter card is required for the DM7100 controller.

The example expansion connectivity topologies for one and two enclosures with dual-path HA (high availability) are shown in the following figures.
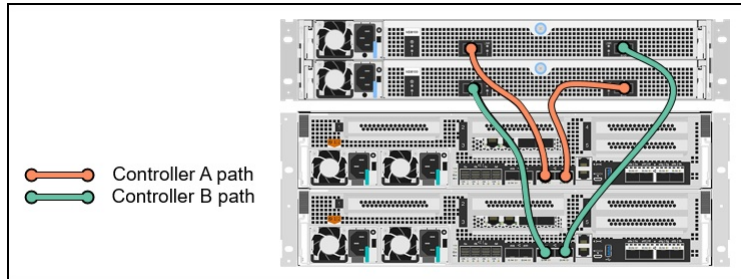

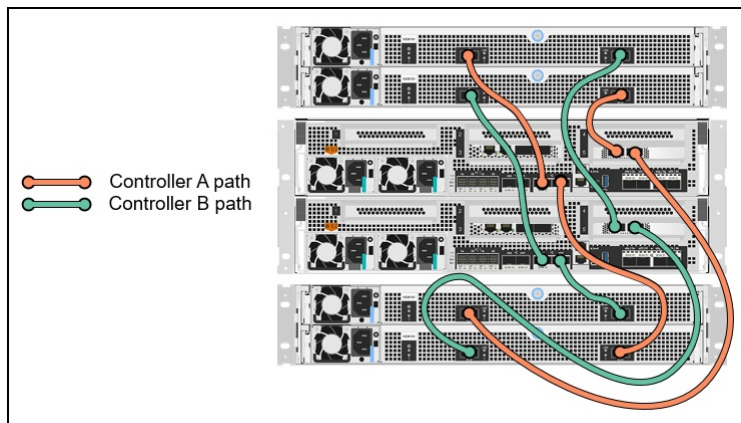Figure 9. DM7100F NVMe expansion connectivity topology: One enclosure

Figure 10. DM7100F NVMe expansion connectivity topology: Two enclosures

NVMe expansion cabling rules:

- On the Controller A, the integrated 100 GbE Port C is connected to the Port A on the NVMe I/O Module A in the first expansion enclosure, and the integrated 100 GbE Port D is connected to the Port B in the NVMe I/O Module B in the same (in case of only one expansion enclosure) or second expansion enclosure.

- On the Controller B, the integrated 100 GbE Port C is connected to the Port A on the NVMe I/O Module B in the first expansion enclosure, and the integrated 100 GbE Port D is connected to the Port B in the NVMe I/O Module A in the same (in case of only one expansion enclosure) or second expansion enclosure.

- On the Controller A, the Port 1 on the 100 GbE adapter card is connected to the Port A on the NVMe I/O Module A in the second expansion enclosure, and the Port 2 on the 100 GbE adapter card is connected to the Port B in the NVMe I/O Module B in the first expansion enclosure.

- On the Controller B, the Port 1 on the 100 GbE adapter card is connected to the Port A on the NVMe I/O Module B in the second expansion enclosure, and the Port 2 on the 100 GbE adapter card is connected to the Port B in the NVMe I/O Module A in the first expansion enclosure.

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

Table 5. NVMe expansion enclosure connectivity options

Description	Part number	Feature code	Maximum quantity per one expansion enclosure
Lenovo 1m Passive 100G QSFP28 DAC Cable	7Z57A03561	AV1Z	4
Lenovo 3m Passive 100G QSFP28 DAC Cable	7Z57A03562	AV20	4
Lenovo 5m Passive 100G QSFP28 DAC Cable	7Z57A03563	AV21	4

Configuration note: Four 100G QSFP28 DAC cables are needed per expansion enclosure for directly connecting the expansion enclosure to the controller enclosure.

SAS expansion topology

Each ThinkSystem DM240S expansion enclosure ships with two SAS I/O expansion modules. Each *I/O expansion module* provides four external 12 Gb SAS x4 ports (Mini-SAS HD SFF-8644 connectors labelled Port 1-4) that are used for connections to the ThinkSystem DM7100F controller enclosure and for daisy chaining the expansion enclosures between each other.

The ThinkSystem DM7100F controller enclosure supports up to six SAS expansion enclosure stacks with up to four enclosures in each stack for a total of up to 480 SAS SSDs. For one or two stacks, the integrated SAS expansion ports on the DM7100 controller can be used. For three or four stacks, an additional 4-port SAS adapter card is required for the DM7100 controller. For five or six stacks, two additional 4-port SAS adapter cards are required for the DM7100 controller.

The example expansion connectivity topology for one or two enclosure stacks with dual-path HA (high availability) are shown in the following figures.
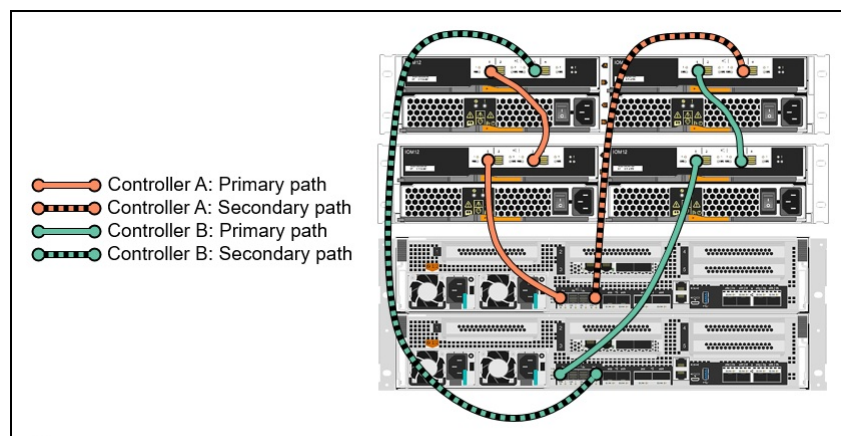

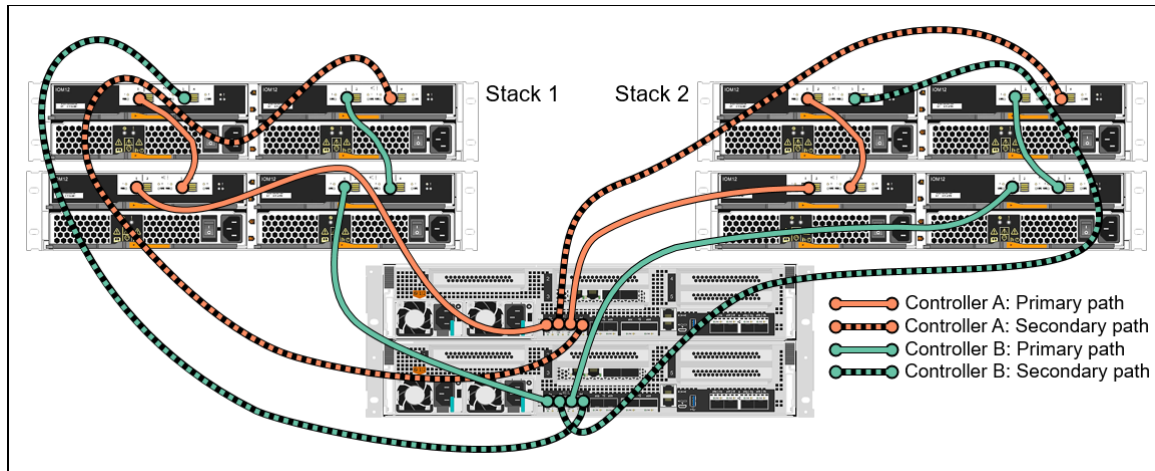Figure 11. DM7100F SAS expansion connectivity topology: One stack

Figure 12. DM7100F SAS expansion connectivity topology: Two stacks

SAS expansion cabling rules:

- Ports A and C (integrated and on the SAS adapter cards) on the Controller 1 are primary paths to separate stacks; each port is connected to the Port 1 on the I/O Module A in the first expansion enclosure in the stack.

- Ports A and C (integrated and on the SAS adapter cards) on the Controller 2 are primary paths to separate stacks; each port is connected to the Port 1 on the I/O Module B in the first expansion enclosure in the stack.

- Ports A at the same location (either integrated or on the SAS adapter cards) on both controllers are connected to the same stack; Ports C at the same location (either integrated or on the SAS adapter cards) on both controllers are connected to the same stack.

- Ports B and D (integrated and on the SAS adapter cards) on the Controller 1 are secondary paths to separate stacks; each port is connected to the Port 3 on the I/O Module B in the last expansion enclosure in the stack.

- Ports B and D (integrated and on the SAS adapter cards) on the Controller 2 are secondary paths to separate stacks; each port is connected to the Port 3 on the I/O Module A in the last expansion enclosure in the stack.

- Ports B at the same location (either integrated or on the SAS adapter cards) on both controllers are connected to the same stack; Ports D at the same location (either integrated or on the SAS adapter cards) on both controllers are connected to the same stack.

- Port 3 on the I/O Module A in the first expansion enclosure in a stack is connected to Port 1 on the I/O Module A in the adjacent expansion enclosure in the same stack, and so on (until the last expansion enclosure in the stack is cabled).

- Port 3 on the I/O Module B in the first expansion enclosure in a stack is connected to Port 1 on the I/O Module B in the adjacent expansion enclosure in the same stack, and so on (until the last expansion enclosure in the stack is cabled).

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

Table 6. SAS expansion enclosure connectivity options

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

Configuration notes:

- The following quantities of SAS cables are needed per stack of the SAS expansion enclosures:
  - Two SAS cables per expansion enclosure in the stack for connecting the first expansion enclosure in the stack to the controller enclosure and for connections to the adjacent expansion enclosures.
  - Two additional SAS cables for connecting the last expansion enclosure in the stack to the controller enclosure.
- The length of the SAS cables that connect a 2U24 SAS enclosure to an adjacent 4U controller enclosure should be at least 1 meter.

Drives

With the DM7100F, the drives are installed in the expansion enclosures. The ThinkSystem DM240N 2U24 SFF expansion enclosures support up to 24 SFF NVMe hot-swap SSDs, and the DM240S 2U24 SFF expansion enclosures support up to 24 SFF SAS/SATA hot-swap SSDs.

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 DM240N 2U24 SFF expansion enclosure supports 12, 18 or 24 NVMe drives (4 packs of 6 drives)
  - The DM240S 2U24 SFF expansion enclosure supports 12, 18 or 24 SAS/SATA drives (4 packs of 6 drives)
  - A minimum of 2 drive packs is required.
- For factory-installed drive packs, all drives in the enclosure must be of the same type and capacity.

Field upgrades: Drive packs for field upgrades can be ordered via the CTO base 7D4FCTO1WW, ThinkSystem DM Drive Pack Upgrades for DM7100. These are for use in existing expansion enclosures that have not been fully populated with the factory-installed drive packs

Table 7. DM240N 2U24 SFF drive options

Description	Part number	Feature code	Maximum quantity per 2U24 enclosure
2.5-inch NVMe hot-swap SSD SEDs**			
Lenovo ThinkSystem 11.5TB (6x 1.92TB NVMe SED) Drive Pack	None*	BC7Z	4
Lenovo ThinkSystem 23TB (6x 3.84TB NVMe SED) Drive Pack	None*	BC7U	4
Lenovo ThinkSystem 23TB (6x 3.84TB NVMe SED FIPS) Drive Pack	None*	BC7V	4
Lenovo ThinkSystem 46TB (6x 7.68TB NVMe SED) Drive Pack	None*	BC7Y	4
Lenovo ThinkSystem 92TB (6x 15.36TB NVMe SED) Drive Pack	None*	BC80	4

* Drive packs for field upgrades can be ordered via the CTO base 7D4FCTO1WW (refer to the configuration note).
** Available worldwide except PRC and RUCIS markets

The following table lists supported drive options for the DM240S 2U24 SFF expansion enclosures.

Table 8. DM240S 2U24 SFF drive options: 2.5-inch SAS hot-swap SSDs

Description	Part number	Feature code	Maximum quantity per 2U24 enclosure
ThinkSystem 5.76TB (6x 960GB, 2.5", SSD) Drive Pack for DM7100F	None*	BC7L	4
ThinkSystem 23TB (6x 3.84TB, 2.5", SSD) Drive Pack for DM7100F	None*	BC7M	4
ThinkSystem 46TB (6x 7.68TB, 2.5", SSD) Drive Pack for DM7100F	None*	BC7Q	4
ThinkSystem 92TB (6x 15.36TB, 2.5", SSD) Drive Pack for DM7100F	None*	BC7S	4

* Drive packs for field upgrades can be ordered via the CTO base 7D4FCTO1WW (refer to the configuration note).

The following table lists supported drive options for the DM240N NVMe 2U24 SFF Expansion Enclosure.

Table 9. DM240N NVMe 2U24 SFF two drive packs

Description	Part number	Feature code	Maximum quantity per 2U24 enclosure
Essential Bundle			
Lenovo ThinkSystem 3.84TB (2x 1.9TB NVMe SED) Drive Pack for DM7100F	None	C3X2*	12
Lenovo ThinkSystem 7.68TB (2x 3.84TB NVMe SED) Drive Pack for DM7100F	None	C3XX*	12
Lenovo ThinkSystem 15.4TB (2x 7.68TB NVMe SED) Drive Pack for DM7100F	None	C3XW*	12
Lenovo ThinkSystem 30.7TB (2x 15.36TB NVMe SED) Drive Pack for DM7100F	None	C3XV*	12
Complete Bundle			
Lenovo ThinkSystem 3.84TB (2x 1.9TB NVMe SED) Drive Pack for DM7100F	None	C3XU	12
Lenovo ThinkSystem 7.68TB (2x 3.84TB NVMe SED) Drive Pack for DM7100F	None	C3XT	12
Lenovo ThinkSystem 15.4TB (2x 7.68TB NVMe SED) Drive Pack for DM7100F	None	C3XR	12
Lenovo ThinkSystem 30.7TB (2x 15.36TB NVMe SED) Drive Pack for DM7100F	None	C3XQ	12
NVMe SED FIPS Complete Bundle			
Lenovo ThinkSystem 7.68TB (2x 3.84TB NVMe SED FIPS) Drive Pack for DM7100F	None	C3XS†	12

* China only
† Available world-wide except China

Software

In this section:

- Feature bundles
- ONTAP software versions
- Extended ONTAP features
- Upgrading to Unified Premium ONTAP
- Ansible playbooks for DM Series

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 DM7100F is available in the following bundles of features:

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

The following table summarizes the features in each bundle for the DM7100F.

Table 10. Comparison of software features for the DM7100F

Feature	Unified Essentials (PRC only)	Unified Complete (WW)
Controller software feature code	BWU9	BWU8

Feature	Unified Essentials (PRC only)	Unified Complete (WW)
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
Thin provisioning	Included	Included
Compression	Included	Included
Deduplication	Included	Included
Snapshots	Included	Included
Encryption*	No	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	No	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 Management	No	Included
Autonomous Ransomware Protection (ARP)	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.

- **Autonomous Ransomware Protection (ARP)**: ARP improves cyber resiliency by adopting a machine-learning model for anti-ransomware analytics that detects constantly evolving forms of ransomware with 99% accuracy and zero false. ARP's machine-learning model is pre-trained on a large dataset of files both before and after a simulated ransomware attack. This resource-intensive training is done outside ONTAP, but the learning from this training is used for the model inside ONTAP.

- **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 DM7100F. The table also indicates which markets each version is available in.

Table 11. Software selection

Feature code	Description	Availability
ONTAP 9.14		
C0S6	Lenovo ThinkSystem Storage ONTAP 9.14 Software Encryption - IPAv2	All markets
C0S7	Lenovo ThinkSystem Storage ONTAP 9.14 Software NonEncryption - IPAv2	All markets
ONTAP 9.15		
C4K5	Lenovo ThinkSystem Storage ONTAP 9.15 Software Encryption - IPAv2	All markets
C4K6	Lenovo ThinkSystem Storage ONTAP 9.15 Software NonEncryption - IPAv2	All markets

Software maintenance is included in the DM7100F warranty and support (see Warranty and support for details).

Upgrading to Unified Premium ONTAP

PRC only: This section only applies to customers in China who are using the Unified Base offering.

To upgrade your existing ONTAP installation to Unified Premium ONTAP, use DCSC to specify the storage you already have installed, since the upgrade license is based on your existing configuration.
https://dcsc.lenovo.com/#/configuration/cto/7D4FCTO2WW?hardwareType=storage

The software license for field upgrades is ordered via the CTO base 7D4FCTO2WW, as listed in the following table.

Table 13. Feature codes for ONTAP upgrades (MTM 7D4FCTO2WW)

Feature code	Description
BNKN	Unified Base to Unified Premium CFC Selection (PRC only)

Ansible playbooks for DM Series

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

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

- Provisioning
- Configuring

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

Management

The ThinkSystem DM7100F Unified All Flash Array supports the following management interfaces:

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

Power supplies and cables

The ThinkSystem DM7100F 4U controller enclosure ships with four redundant hot-swap 1600 W (100 - 240 V) Platinum AC power supplies, each with an IEC 320-C14 connector.

The ThinkSystem DM240N 2U24 SFF expansion enclosures ship with two redundant hot-swap 1600 W (100 - 240 V) Platinum AC power supplies, each with an IEC 320-C14 connector.

The ThinkSystem DM240S 2U24 SFF expansion enclosures ship with two redundant hot-swap 913 W (100 - 240 V) Platinum AC power supplies, each with an IEC 320-C14 connector.

Each ThinkSystem DM Series enclosure requires the selection of two or four power cables, depending on the quantity of the power supplies in the enclosure.

The following table lists the rack power cable and line cord options that can be ordered for the DM7100F 4U, DM240N 2U24 SFF, and DM240S 2U24 SFF enclosures (two or four power cords per enclosure).

Table 14. Power cables for DM7100F 4U, DM240N 2U24 SFF, and DM240S 2U24 SFF enclosures

Description	Part number	Feature code
Rack power cables		
1.0m, 13A/100-250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08367	B0N5
1.2m, 16A/100-250V, 2 Short C13s to Short C20 Rack Power Cable	47C2491	A3SW
1.5m, 13A/100-250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08368	B0N6
2.0m, 13A/125V-10A/250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08369	6570
2.5m, 16A/100-250V, 2 Long C13s to Short C20 Rack Power Cable	47C2492	A3SX
2.8m, 13A/125V-10A/250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08370	6400
2.8m, 16A/100-250V, 2 Short C13s to Long C20 Rack Power Cable	47C2493	A3SY
4.1m, 16A/100-250V, 2 Long C13s to Long C20 Rack Power Cable	47C2494	A3SZ
4.3m, 13A/125V-10A/250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08371	6583
Line cords		
2.8m, 10A/250V, C13 to AS/NZS 3112 Line Cord	39Y7924	6211
2.8m, 10A/250V, C13 to BS 1363/A Line Cord	39Y7923	6215
2.8m, 10A/250V, C13 to CEE7-VII Line Cord	39Y7917	6212
2.8m, 10A/250V, C13 to CEI 23-16 Line Cord	39Y7921	6217
2.8m, 10A/250V, C13 to CNS 10917-3 Line Cord	81Y2375	6317
2.8m, 10A/250V, C13 to DK2-5a Line Cord	39Y7918	6213
2.8m, 10A/250V, C13 to GB 2099.1 Line Cord	39Y7928	6210
2.8m, 10A/250V, C13 to IRAM 2073 Line Cord	39Y7930	6222

Description	Part number	Feature code
2.8m, 10A/250V, C13 to IS 6538 Line Cord	39Y7927	6269
2.8m, 10A/250V, C13 to NBR 14136 Line Cord	69Y1988	6532
2.8m, 10A/250V, C13 to NEMA 6-15P Line Cord	46M2592	A1RF
2.8m, 10A/250V, C13 to SABS 164 Line Cord	39Y7922	6214
2.8m, 10A/250V, C13 to SEV 1011-S24507 Line Cord	39Y7919	6216
2.8m, 10A/250V, C13 to SI 32 Line Cord	39Y7920	6218
2.8m, 12A/125V, C13 to JIS C-8303 Line cord	46M2593	A1RE
2.8m, 12A/250V, C13 to JIS C-8303 Line Cord	4L67A08357	6533
2.8m, 12A/250V, C13 to KS C8305 Line Cord	39Y7925	6219
2.8m, 13A/125V, C13 to NEMA 5-15P Line Cord	00WH545	6401
2.8m, 15A/125V, C13 to CNS 10917-3 Line Cord	81Y2374	6402
4.3m, 10A/250V, C13 to AS/NZS 3112 Line Cord	81Y2383	6574
4.3m, 10A/250V, C13 to BS 1363/A Line Cord	81Y2377	6577
4.3m, 10A/250V, C13 to CEE7-VII Line Cord	81Y2376	6572
4.3m, 10A/250V, C13 to CEI 23-16 Line Cord	81Y2380	6493
4.3m, 10A/250V, C13 to CNS 10917-3 Line Cord	81Y2389	6531
4.3m, 10A/250V, C13 to DK2-5a Line Cord	81Y2382	6575
4.3m, 10A/250V, C13 to GB 2099.1 Line Cord	81Y2378	6580
4.3m, 10A/250V, C13 to IRAM 2073 Line Cord	81Y2384	6492
4.3m, 10A/250V, C13 to IS 6538 Line Cord	81Y2386	6567
4.3m, 10A/250V, C13 to NBR 14136 Line Cord	81Y2387	6404
4.3m, 10A/250V, C13 to NEMA 6-15P Line Cord	4L67A08361	6373
4.3m, 10A/250V, C13 to SABS 164 Line Cord	81Y2379	6576
4.3m, 10A/250V, C13 to SEV 1011-S24507 Line Cord	81Y2390	6578
4.3m, 10A/250V, C13 to SI 32 Line Cord	81Y2381	6579
4.3m, 12A/125V, C13 to JIS C-8303 Line Cord	39Y7926	6335
4.3m, 12A/250V, C13 to JIS C-8303 Line Cord	4L67A08362	6495
4.3m, 12A/250V, C13 to KS C8305 Line Cord	81Y2385	6494
4.3m, 13A/125V, C13 to NEMA 5-15P Line Cord	4L67A08360	AX8A
4.3m, 15A/125V, C13 to CNS 10917-3 Line Cord	81Y2388	6530

Rack installation

The individually shipped ThinkSystem DM Series enclosures come with the following rail kits:

- DM7100F: ThinkSystem Storage Rail Kit 4U60
- DM240N 2U24 SFF: ThinkSystem NVMe Rail Kit 4 post
- DM240S 2U24 SFF: ThinkSystem Storage Rack Mount Kit 2U24/4U60

The rack mount kits are listed in the following table.

Table 15. 4-post rack mount kit

Description	Feature code	Quantity
Lenovo ThinkSystem Storage Rail Kit 4U60	BE28	1
Lenovo ThinkSystem NVMe Rail Kit 4 post	B6Y6	1
Lenovo ThinkSystem Storage Rack Mount Kit 2U24/4U60	B38Y	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 16. 4-post SIR rack mount kits

Description	Feature code	Quantity
Lenovo ThinkSystem Storage Rail Kit 4U60	BE28	1
Lenovo ThinkSystem NVMe Adjustable Rail Kit (SIR)	B6Y7	1
Lenovo ThinkSystem Storage SIR Rack Mount Kit (for 2U24 SAS enclosures)	B6TH	1

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

Table 17. Rack mount kit features and specifications summary

| Attribute | Screw-in fixed rail with adjustable depth | | | | |
	2U24 NVMe	2U24 SAS	2U24 NVMe SIR	2U24 SAS SIR	4U60
Feature code	B6Y6	B38Y	B6Y7	B6TH	BE28
Enclosure support	DM240N	DM240S	DM240N	DM240S	DM7100F
Rail type	Fixed (static) with adjustable depth	Fixed (static) with adjustable depth	Fixed (static) with adjustable depth	Fixed (static) with adjustable depth	Fixed (static) with adjustable depth
Tool-less installation	No	No	No	No	No
In-rack maintenance	Yes*	Yes*	Yes*	Yes*	Yes*
Ship-in-rack (SIR)	No	No	Yes	Yes	Yes
1U PDU support	Yes	Yes	Yes	Yes	Yes
0U PDU support	Limited**	Limited**	Limited**	Limited**	Limited**
Rack type	IBM or Lenovo 4-post, IEC standard-compliant				
Mounting holes	Square or round	Square or round	Square or round	Square or round	Square or round
Mounting flange thickness	2 mm (0.08 in.) – 3.3 mm (0.13 in.)	2 mm (0.08 in.) – 3.3 mm (0.13 in.)	2 mm (0.08 in.) – 3.3 mm (0.13 in.)	2 mm (0.08 in.) – 3.3 mm (0.13 in.)	2 mm (0.08 in.) – 3.3 mm (0.13 in.)
Distance between front and rear mounting flanges^	605 mm (23.8 in.) – 812.8 mm (32 in.)	605 mm (23.8 in.) – 812.8 mm (32 in.)	605 mm (23.8 in.) – 812.8 mm (32 in.)	605 mm (23.8 in.) – 812.8 mm (32 in.)	605 mm (23.8 in.) – 812.8 mm (32 in.)

* The majority of the enclosure components can be serviced from the front or rear of the enclosure, which does not require the removal of the enclosure from the rack cabinet.
** If a 0U PDU is used, the rack cabinet must be at least 1000 mm (39.37 in.) deep for 2U24 enclosures, or at least 1200 mm (47.24 in.) deep for 4U 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 DM7100F controller enclosure has the following dimensions and weight (approximate):

- Height: 175 mm (6.9 in.)
- Width: 447 mm (17.6 in.)
- Depth: 828 mm (32.6 in.)
- Weight (fully configured): 49.2 kg (108.5 lb)

The ThinkSystem DM240N 2U24 SFF enclosures have the following dimensions and weight (approximate):

- Height: 87 mm (3.4 in.)
- Width: 447 mm (17.6 in.)
- Depth: 543 mm (21.4 in.)
- Weight (fully configured): 30.2 kg (66.7 lb)

The ThinkSystem DM240S 2U24 SFF enclosures have the following dimensions and weight (approximate):

- Height: 85 mm (3.4 in.)
- Width: 449 mm (17.7 in.)
- Depth: 484 mm (19.1 in.)
- Weight (fully configured): 24.4 kg (53.8 lb)

Operating environment

The ThinkSystem DM7100F, DM240N 2U24 SFF, and DM240S 2U24 SFF enclosures are supported in the following environment:

- Air temperature:
    - Operating:
        - DM7100F: 10 °C - 35 °C (50 °F - 95 °F)
        - DM240N 2U24 SFF: 5 °C - 45 °C (41 °F - 113 °F)
        - DM240S 2U24 SFF: 10 °C - 40 °C (50 °F - 104 °F)
    - Non-operating: -40 °C - +70 °C (-40 °F - 158 °F)
    - Maximum altitude: 3050 m (10,000 ft)
- Relative humidity (non-condensing):
    - Operating:
        - DM7100F: 8% - 80%
        - DM240N 2U24 SFF: 8% - 90%
        - DM240S 2U24 SFF: 20% - 80%
    - Non-operating: 10% - 95%
- Electrical power:
    - DM7100F
        - 100 to 127 (nominal) V AC; 50 Hz or 60 Hz; 16.12 A
        - 200 to 240 (nominal) V AC; 50 Hz or 60 Hz; 8.06 A
        - Maximum system power load: 1579 W
    - DM240N 2U24 SFF
        - 100 to 127 (nominal) V AC; 50 Hz or 60 Hz; 8.66 A
        - 200 to 240 (nominal) V AC; 50 Hz or 60 Hz; 4.33 A
        - Maximum system power load: 848 W
    - DM240S 2U24 SFF
        - 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:
    - DM7100F: 5388 BTU/hour
    - DM240N 2U24 SFF: 2894 BTU/hour
    - DM240S 2U24 SFF: 1331 BTU/hour
- Acoustical noise emission:
    - DM7100F: 8.5 bels
    - DM240N 2U24 SFF: 6.4 bels
    - DM240S 2U24 SFF: 6.9 bels

Warranty upgrades and post-warranty support

The DM7100F and DM240N enclosure have a 3-year warranty and the DM240S enclosure has a 1-year or 3-year warranty based on the machine type of the system, as listed in the following table.

Table 18. Duration of standard warranty

System	Machine type 1 year warranty	Machine type 3 year warranty
DM7100F Controller Enclosure	-	7D25
DM240N 2U24 SFF Expansion Enclosure	-	7Y62
DM240S 2U24 SFF Expansion Enclosure	7Y58	7D7Y

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

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

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

Services

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

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

In this section:

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

Lenovo Advisory Services

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

- **Assessment Services**

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

- **Design Services**

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

Lenovo Plan & Design Services

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

Lenovo Deployment, Migration, and Configuration Services

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

- **Deployment Services for Storage and ThinkAgile**

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

- **Hardware Installation Services**

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

- **DM/DG File Migration Services**

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

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

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

- **Factory Integrated Services**

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

Lenovo Support Services

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

- **Premier Support for Data Centers**

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

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

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

- **Committed Service Repair (CSR)**

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

- **Multivendor Support Services (MVS)**

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

- **Keep Your Drive (KYD)**

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

- **Technical Account Manager (TAM)**

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

- **Enterprise Software Support (ESS)**

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

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

Lenovo Managed Services

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

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

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

Lenovo Sustainability Services

- **Asset Recovery Services**

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

- **CO2 Offset Services**

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

- **Lenovo Certified Refurbished**

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

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:

- FCC Part 15, Class A; UL 60950-1
- ICES-003, Class A; CAN/CSA-C22.2 60950-1
- NOM
- CE Mark (EN55032 Class A, EN55024, IEC/EN60950-1, IEC/EN62368-1); ROHS Directive 2011/65/EU
- EAC
- CCC GB 4943.1, GB 17625.1, GB 9254 Class A; CELP; CECP
- VCCI, Class A
- CNS 13438, Class A; CNS 14336-1
- KN32/35, Class A
- AS/NZS CISPR 22 Class A

Interoperability

Lenovo provides end-to-end storage compatibility testing to deliver interoperability throughout the network. The ThinkSystem DM7100F Unified All Flash 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 protocols.

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

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

Cluster interconnect

The following table lists the Ethernet storage switch that can be used with the ThinkSystem DM7100F Unified All Flash Array for cluster interconnect configurations.

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

Table 19. 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 DM7100F Unified All Flash Array 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 20. 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 21. Power distribution units

Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
0U Basic PDUs															
4PU7A93176	C0QH	0U 36 C13 and 6 C19 Basic 32A 1 Phase PDU v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4PU7A93169	C0DA	0U 36 C13 and 6 C19 Basic 32A 1 Phase PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4PU7A93177	C0QJ	0U 24 C13/C15 and 24 C13/C15/C19 Basic 32A 3 Phase WYE PDU v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4PU7A93170	C0D9	0U 24 C13/C15 and 24 C13/C15/C19 Basic 32A 3 Phase WYE PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
0U Switched and Monitored PDUs															
4PU7A93181	C0QN	0U 21 C13/C15 and 21 C13/C15/C19 Switched and Monitored 48A 3 Phase Delta PDU v2 (60A derated)	N	Y	N	N	N	N	N	Y	N	Y	N	Y	N
4PU7A93174	C0D5	0U 21 C13/C15 and 21 C13/C15/C19 Switched and Monitored 48A 3 Phase Delta PDU (60A derated)	N	Y	N	N	N	N	N	Y	N	N	N	Y	N
4PU7A93178	C0QK	0U 20 C13 and 4 C19 Switched and Monitored 32A 1 Phase PDU v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4PU7A93171	C0D8	0U 20 C13 and 4 C19 Switched and Monitored 32A 1 Phase PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y

Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
4PU7A93182	C0QP	0U 18 C13/C15 and 18 C13/C15/C19 Switched and Monitored 63A 3 Phase WYE PDU v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4PU7A93175	C0CS	0U 18 C13/C15 and 18 C13/C15/C19 Switched and Monitored 63A 3 Phase WYE PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4PU7A93180	C0QM	0U 18 C13/C15 and 18 C13/C15/C19 Switched and Monitored 32A 3 Phase WYE PDU v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4PU7A93173	C0D6	0U 18 C13/C15 and 18 C13/C15/C19 Switched and Monitored 32A 3 Phase WYE PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4PU7A93179	C0QL	0U 16 C13/C15 and 16 C13/C15/C19 Switched and Monitored 24A 1 Phase PDU v2 (30A derated)	N	Y	N	N	N	N	N	Y	N	Y	N	Y	N
4PU7A93172	C0D7	0U 16 C13/C15 and 16 C13/C15/C19 Switched and Monitored 24A 1 Phase PDU(30A derated)	N	Y	N	N	N	N	N	Y	N	N	N	Y	N
1U Switched and Monitored PDUs															
4PU7A90808	C0D4	1U 18 C19/C13 Switched and monitored 48A 3P WYE PDU V2 ETL	N	N	N	N	N	N	N	Y	N	Y	Y	Y	N
4PU7A81117	BNDV	1U 18 C19/C13 switched and monitored 48A 3P WYE PDU - ETL	N	N	N	N	N	N	N	N	N	N	N	Y	N
4PU7A90809	C0DE	1U 18 C19/C13 Switched and monitored 48A 3P WYE PDU V2 CE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
4PU7A90810	C0DD	1U 18 C19/C13 Switched and monitored 80A 3P Delta PDU V2	N	N	N	N	N	N	N	Y	N	Y	Y	Y	N
4PU7A90811	C0DC	1U 12 C19/C13 Switched and monitored 32A 3P WYE PDU V2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4PU7A90812	C0DB	1U 12 C19/C13 Switched and monitored 60A 3P Delta PDU V2	N	N	N	N	N	N	N	Y	N	Y	Y	Y	N
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 22. 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. **Lenovo Client Virtualization Solutions**
   2024-11-22 | 20 minutes | Employees and Partners

   This training provides tech sellers and partners with the details of the customer challenges and needs that make the case for the Lenovo client virtualization solutions.

   By the end of this course you will:
   • Learn the components that makeup our solutions
   • Cover the details of the three LCV (Lenovo Client Virtualization) offerings
   • Discover when they are used and how they benefit customers

   Tags: Client Virtualization, Cloud

   Published: 2024-11-22
   Length: 20 minutes

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

   Course code: DCV213r2

7. **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

8. **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

9. **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

10. **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

11. **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

12. **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

13. **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

14. **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

15. **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

16. **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

17. **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

18. **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

19. **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

20. **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

21. **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

22. **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

23. **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

24. **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

25. **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

26. **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

27. **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

28. **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

29. **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

30. **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

31. **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

32. **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

33. **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

34. **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

35. **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

36. **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

37. **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

38. **Benefits of All-Flash Arrays**
2022-05-03 | 10 minutes | Employees and Partners

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

Tags: ThinkSystem, Storage

Published: 2022-05-03
Length: 10 minutes

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

Course code: SXXW1232

Related publications and links

For more information, see the following resources:

- Lenovo ThinkSystem DM Series product page
  https://www.lenovo.com/us/en/c/data-center/storage/unified-storage

- Lenovo Data Center Solution Configurator
  http://dcsc.lenovo.com

- ThinkSystem DM Series documentation
  http://thinksystem.lenovofiles.com/help/topic/ontap_software/overview.html

- ONTAP Ransomware Protection
  https://thinksystem.lenovofiles.com/storage/help/topic/ontap_anti-ransomware/anti-ransomware.pdf

- ThinkSystem DM Series Installation Videos and Video Tutorials
  https://www.youtube.com/playlist?list=PLLQclfVNrqzcBW55-7IAe7_Our6nMQxak

- Lenovo Data Center Support
  http://datacentersupport.lenovo.com

Related product families

Product families related to this document are the following:

- DM Series Storage
- External Storage
- Lenovo SAN Storage

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