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.
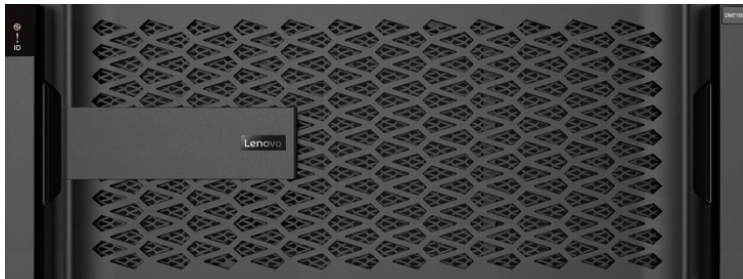

Figure 1. Lenovo ThinkSystem DM7100F

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 48 NVMe and 432 SAS SFF solid-state drives (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 48 NVMe and 432 SAS, 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

Components and connectors

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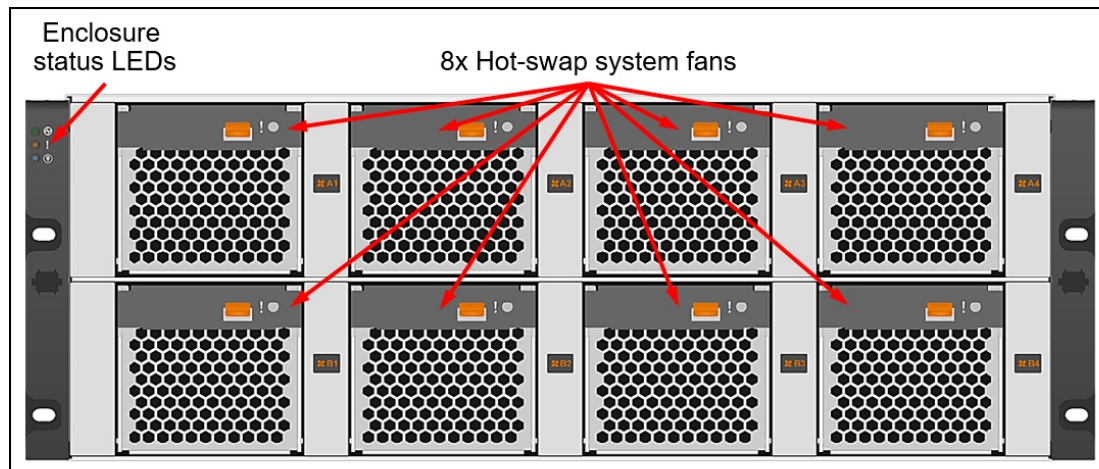

Figure 2. ThinkSystem DM7100F 4U controller enclosure front view

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

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

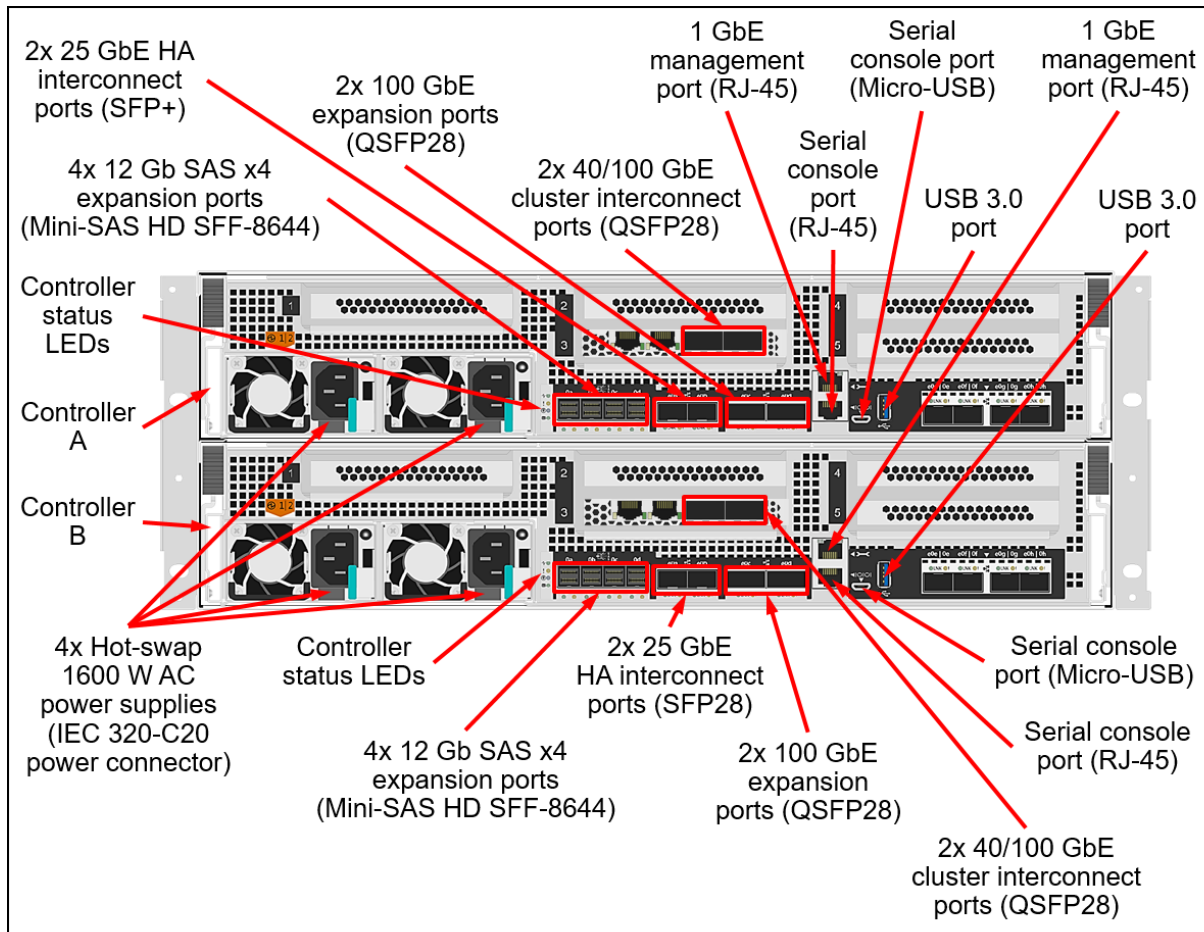The following figures show the rear of the ThinkSystem DM7100F 4U controller enclosure.

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)
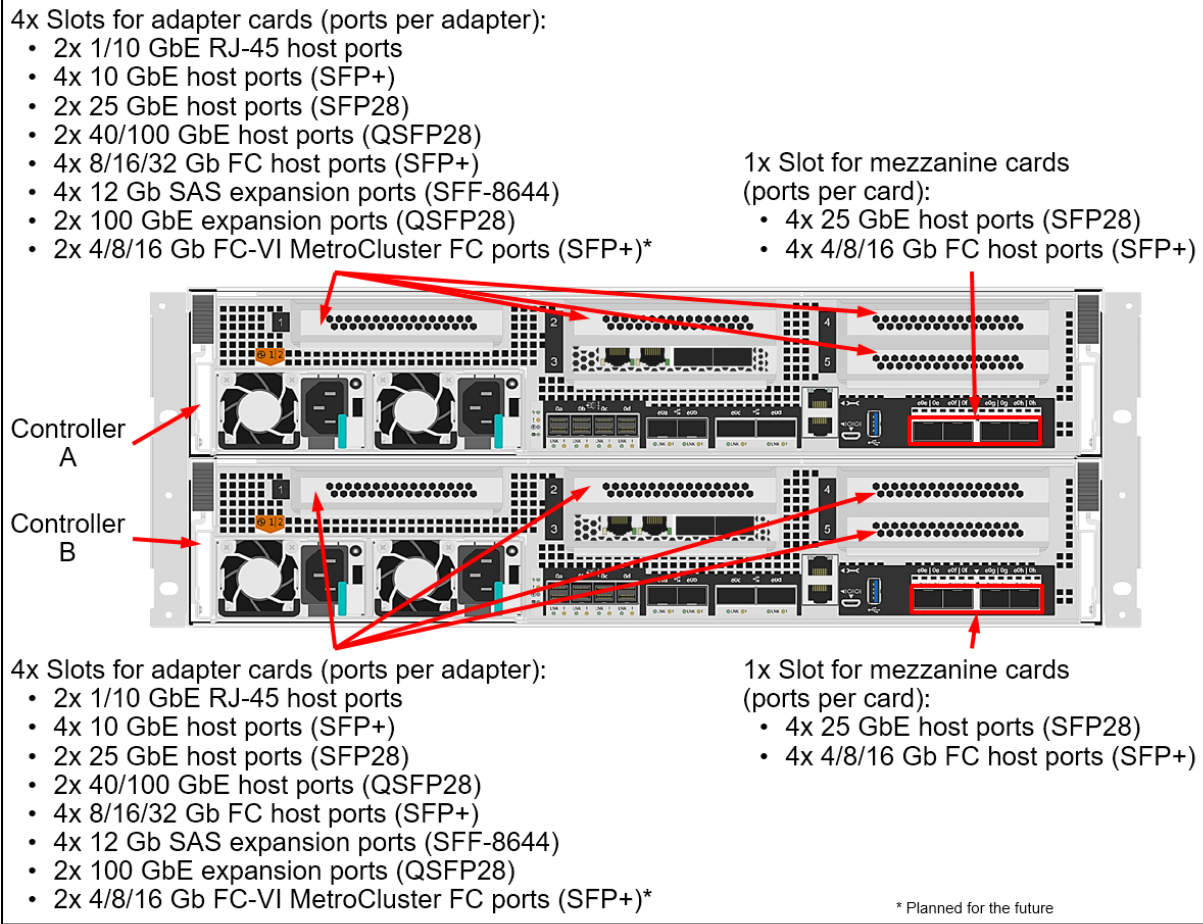- 4x 4/8/16 Gb FC host ports (SFP+)

* 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.
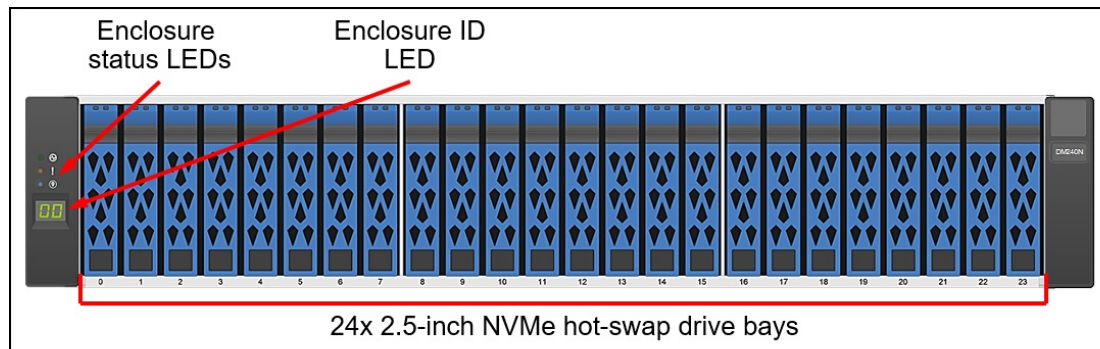

Figure 5. ThinkSystem DM240N 2U SFF NVMe expansion enclosure front view

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.
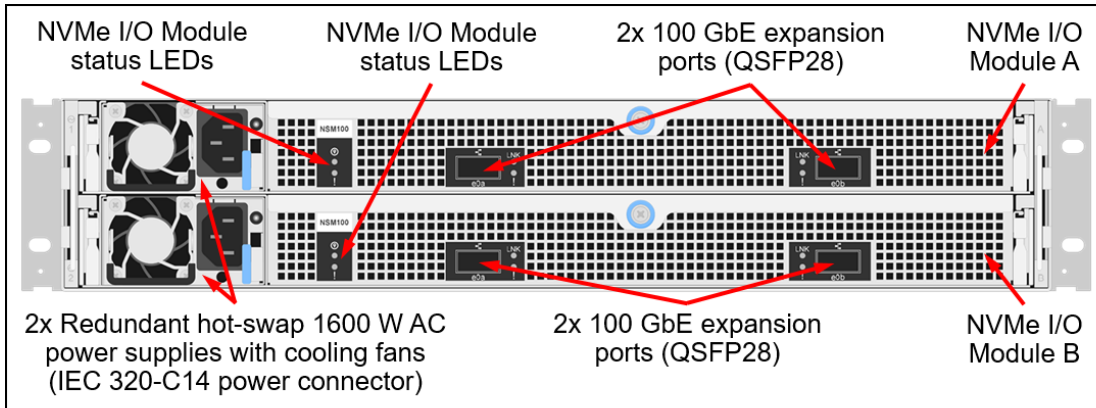

Figure 6. ThinkSystem DM240N 2U SFF NVMe expansion enclosure rear view

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.

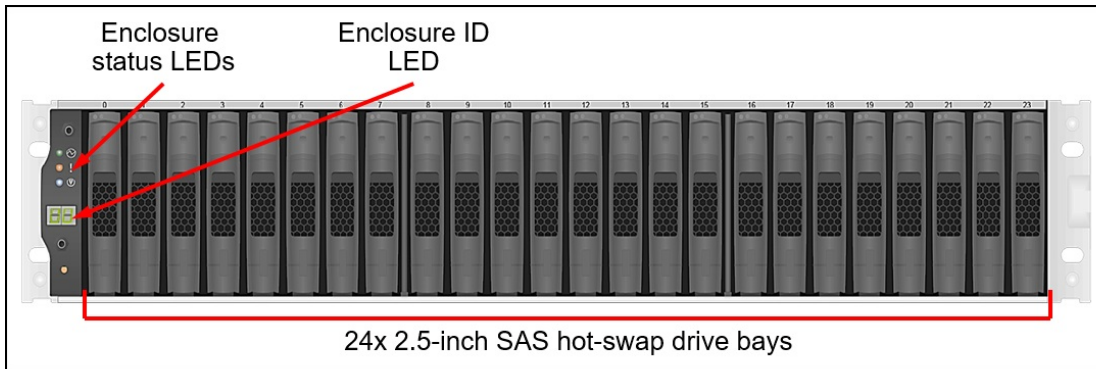The following figure shows the front of the ThinkSystem DM240S 2U SFF SAS expansion enclosure.

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.
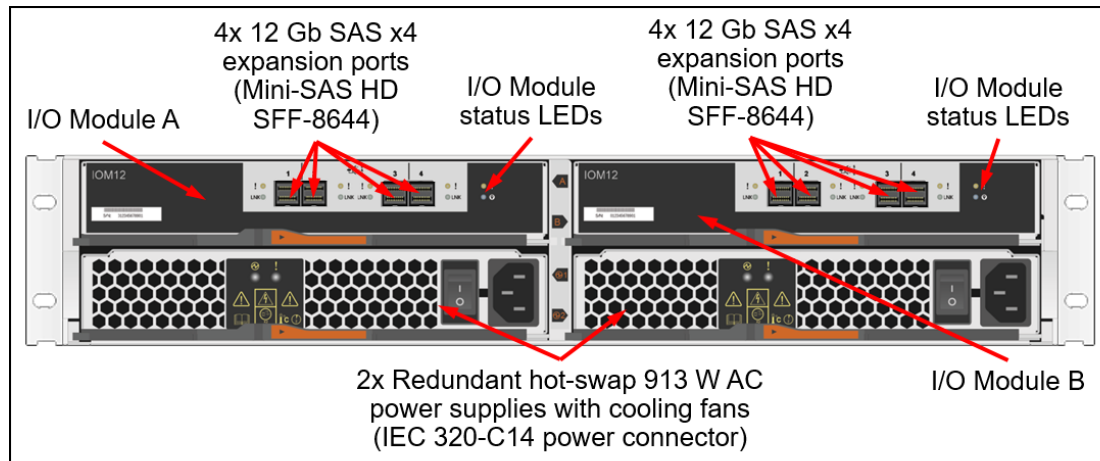

Figure 8. ThinkSystem DM240S 2U SFF SAS expansion enclosure rear view

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 Type 7Y58): 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).

Attribute	Specification
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).
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 48 NVMe and up to 432 SAS (Up to two 2U24 NVMe and up to 18 2U24 SAS expansion enclosures); or - Up to 480 SAS (Up to 20 2U24 SFF SAS expansion enclosures).
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).
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 (see Operating systems for specific version details).

Attribute	Specification
Standard software features	RAID data protection, snapshots, volume copy (FlexClone), storage quality of service (QoS), thin provisioning, compression, deduplication, encryption, disk-based backup (SnapVault), application-aware backup (SnapCenter), quick data recovery (SnapRestore), clustering, clustering with data mirroring (MetroCluster), and synchronous and asynchronous replication (SnapMirror).
Optional software features	WORM data protection (SnapLock), Object storage tiering (FabricPool).
Performance*	Up to 650 000 random read IOPS (8 KB blocks).
Configuration maximums**	- Maximum raw storage capacity: 7.37 PB - Maximum aggregate size: 800 TB - Maximum number of FlexVol volumes per HA pair: 5000 - Maximum FlexVol volume size: 100 TB - Maximum number of LUNs per HA pair: 24 576 - Maximum number of LUNs per FlexVol volume: 512 - Maximum LUN size: 16 TB - 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 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.

Attribute	Specification
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.)
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 DM Series 4U Chassis (4x PSUs, No controller modules)	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
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
Lenovo ThinkSystem DM Series 16Gb FC-VI 2 Port SFP+ Card	4XC7A60796	B94H	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
SFP28 transceivers for 25 GbE mezzanine cards and 25 GbE adapter cards			
25Gb Ethernet Optical SFP28 Shortwave Module 1 pack	4XF7A39597	B732	24
Lenovo 25GBase-SR SFP28 Transceiver	7G17A03537	AV1B	24
QSFP+/QSFP28 transceivers for 100 GbE adapter cards and SmartIO cards			
100Gb Ethernet Optical QSFP28 Shortwave Module 1 Pack	4XF7A39598	B733	20
Lenovo 100Gb SR4 QSFP28 Ethernet Transceiver	4M27A67042	BFH1	20
OM4 cables for 100 GbE QSFP28 transceivers			

Description	Part number	Feature code	Maximum quantity per controller enclosure
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
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

Description	Part number	Feature code	Maximum quantity per controller enclosure
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
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.

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 ThinkSystem DM Series expansion enclosures.

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

Description	Machine Type/Model	Feature code
Lenovo ThinkSystem Storage NVMe 2U24 Chassis (with 2x PSUs)	7Y62CTO1WW	B6W6
Lenovo ThinkSystem Storage 2U24 Chassis (with 2x PSUs)	7Y58CTO1WW	B38L

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.
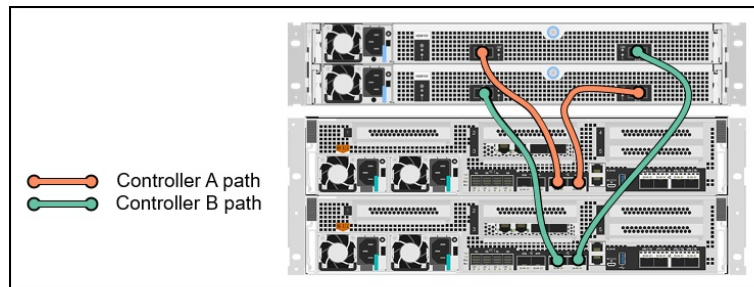

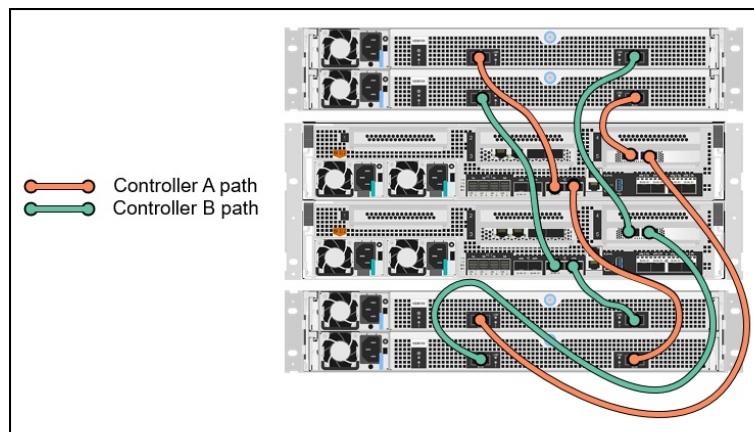Figure 9. DM7100F NVMe expansion connectivity topology: One enclosure

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.
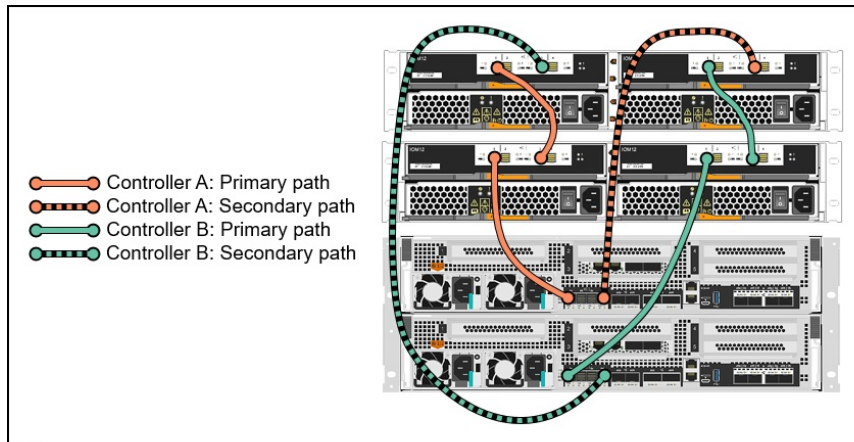
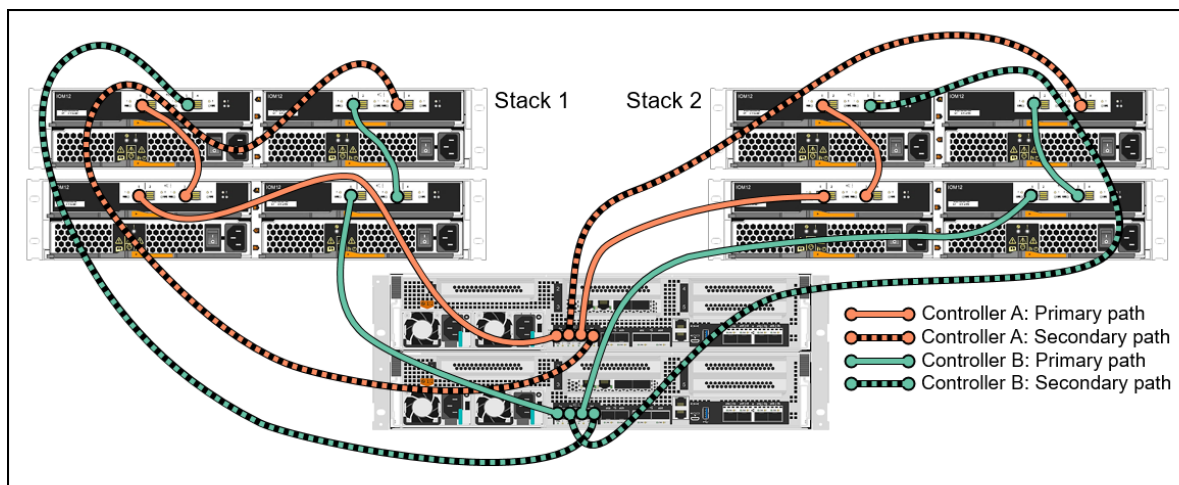Figure 11. DM7100F SAS expansion connectivity topology: One stack

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

The ThinkSystem DM240N 2U24 SFF expansion enclosures support up to 24 SFF NVMe hot-swap drives, and the DM240S 2U24 SFF expansion enclosures support up to 24 SFF SAS hot-swap drives.

The following table lists supported drive options for the DM240N 2U24 SFF expansion enclosures.

Table 7. DM240N 2U24 SFF drive options

Description	Part number	Feature code	Maximum quantity per 2U24 enclosure
2.5-inch NVMe hot-swap SSDs (non-SED)			
Lenovo ThinkSystem 11.5TB (6x 1.92TB NVMe Non-SED) Drive Pack	None*	BC81	4
Lenovo ThinkSystem 23TB (6x 3.84TB NVMe Non-SED) Drive Pack	None*	BC7W	4
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).

Configuration notes:

- The DM240N 2U24 SFF expansion enclosures support from 12 to 24 drives in increments of 6 drives. For factory-installed drive packs, all drives in the enclosure must be of the same type and capacity.

- The DM240S 2U24 SFF expansion enclosures support from 12 to 24 drives in increments of 6 drives. For factory-installed drive packs, all drives in the enclosure must be of the same type and capacity.

- DM7100F drive packs for field upgrades of the existing expansion enclosures that have not been fully populated with the factory-installed drive packs can be ordered via the CTO base 7D4FCTO1WW, DM7100 Drive Pack Upgrades.

Software

Controller software for the DM7100F is available in the following bundles of features:

- Unified Base (China only) (Feature B5RH)
- Unified Premium (Feature B5RJ)

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

Table 9. Comparison of software features for the DM7100F

Feature	Unified Base (PRC only)	Unified Premium
Controller software feature code	B5RH	B5RJ
RAID-4, RAID-DP, and RAID-TEC data protection	Included	Included
All Flash Array (AFA) capability	Included	Included
Thin provisioning	Included	Included
Compression	Included	Included
Compaction	Included	Included
Deduplication	Included	Included
Snapshots	Included	Included
Encryption*	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
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
FabricPool object storage tiering	Optional	Optional
SnapLock WORM data protection	No	Optional

* Requires the encryption version of ONTAP. See the ONTAP software section.

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 and country 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.

- **NVMe over FC Protocol**: Enables NVMe over FC

- **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)

- **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.

- **FlexGroup:** Enables a single volume to span across multiple clustered storage arrays to maximize storage capacity and automate load distribution.

- **SnapVault disk-based storage backup:** Enables data stored on multiple systems to be backed up to a central, secondary system quickly and efficiently as read-only snapshot copies.

- **SnapCenter:** Provides application- and virtual machine-aware backup and restoration of data by using the Snapshots technology and leverages the SnapMirror capabilities of storage systems to provide onsite or offsite backup set mirroring for disaster recovery.

- **SnapMirror synchronous and asynchronous 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) or asynchronous (at specified regular intervals) data transfers over IP communication links.

- **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.

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

- **FabricPool**: FabricPool is a hybrid storage solution that uses an all flash (all SSD) aggregate as the performance tier and an object store as the external capacity tier. Data in a FabricPool is stored in a tier based on whether it is frequently accessed or not. Using a FabricPool helps you reduce storage cost without compromising performance, efficiency, or protection.

- **SnapLock WORM data protection:** Creates 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

The following table lists the software selection options for the DM7100F. The table also indicates which markets each version is available in.

Table 10. Software selection

Feature code	Description	Availability
ONTAP 9.7		
BAYJ	Lenovo ThinkSystem DM Series ONTAP 9.7 SW Base NonEncryption	China only
BAYL	Lenovo ThinkSystem DM Series ONTAP 9.7 Software Encryption	All markets
BAYK	Lenovo ThinkSystem DM Series ONTAP 9.7 Software NonEncryption	All markets
ONTAP 9.8		
BF5S	Lenovo ThinkSystem DM Series ONTAP 9.8 Software Base NonEncryption	China only
BF5Q	Lenovo ThinkSystem DM Series ONTAP 9.8 Software Encryption	All markets except China
BF5R	Lenovo ThinkSystem DM Series ONTAP 9.8 Software NonEncryption	All markets
ONTAP 9.9		
BKF7	Lenovo ThinkSystem DM Series ONTAP 9.9 Software Base NonEncryption	China only
BKFB	Lenovo ThinkSystem DM Series ONTAP 9.9 Software Encryption	All markets
BKFA	Lenovo ThinkSystem DM Series ONTAP 9.9 Software NonEncryption	All markets

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

Extended ONTAP features

FabricPool and SnapLock WORM data protection are optional extended features. To obtain these feature licenses, order the part numbers as listed in the following table. Upgrades are supported in specific bundles as listed in the Comparison of software features table.

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

Table 11. Optional software features

Part number*	Description	Quantity
4P47A16547	DM Series SnapLock License	1 per system (contains two licenses)
4P47A37057	DM Series FabricPool – 1TB Increment – 3 years	1 per TB of storage capacity
4P47A37288	DM Series FabricPool – 1TB Increment – 5 years	1 per TB of storage capacity
4P47A64860	10TB Free FabricPool License – 3yr Svcs	1**
4P47A64861	10TB Free FabricPool License – 5yr Svcs	1**

* Field upgrade only; no factory installation.
** Includes the capacity-based FabricPool license for 10 TB free-of-charge and software support services for the additional cost.

Configuration notes:

- The SnapLock feature is licensed on a per-controller basis; that is, two licenses are needed per system, and these two licenses are contained in a single orderable part number. These licenses also include 5-year software support entitlement.
- The FabricPool feature is a cluster-wide, capacity-based license that is available for 3-year or 5-year subscription terms.

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 12. 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

Description	Part number	Feature code
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
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 13. 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 14. 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 15. 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 and support

The ThinkSystem DM Series enclosures and drive packs can be configured with a three- or five-year Customer Replaceable Unit (CRU) and onsite limited warranty with various levels of coverage with a well-defined scope of services, including service hours, response time, term of service, and service agreement terms and conditions.

The base warranty provides 9x5 Next Business Day response with parts delivered. Lenovo's additional support services provide a sophisticated, unified support structure for a customer's data center, with an experience consistently ranked number one in customer satisfaction worldwide.

The following additional Lenovo support services are available:

- **Premier Support** provides a Lenovo-owned customer experience and delivers direct access to technicians skilled in hardware, software, and advanced troubleshooting, in addition to the following capabilities:
    - Direct technician-to-technician access through a dedicated phone line.
    - 24x7x365 remote support.
    - Single point of contact service.
    - End to end case management.
    - 3rd Party collaborative software support.
    - Online case tools and live chat support.
    - On-demand remote system analysis.

- **Warranty Service Levels (Preconfigured Support)** are available to meet the on-site response time targets that match the criticality of customer's systems:
    - 3 or 5 years of service coverage.
    - **Foundation Service:** 9x5 service coverage with next business day onsite response.
    - **Essential Service:** 24x7 service coverage with 4-hour onsite response.
    - **Advanced Service:** 24x7 service coverage with 2-hour onsite response or 6-hour committed repair (available only in select regions).

    Note: Foundation, Essential, or Advanced Service should be purchased for all components of the storage system (controller enclosures, expansion enclosures, and drive packs).

- **Managed Services**
  Lenovo Managed Services provide continuous 24x7 remote monitoring (plus 24x7 call center availability) and proactive management of a customer's data center using state of the art tools, systems, and practices by a team of highly skilled and experienced Lenovo services professionals. Quarterly reviews check error logs, verify firmware and operating system device driver levels, and software as needed. Lenovo will also maintain records of latest patches, critical updates, and firmware levels, to ensure customer's systems are providing business value through optimized performance.

- **Technical Account Management (TAM)**
  A Lenovo Technical Account Manager helps customers optimize operations of their data centers based on a deep understanding of customer's business. Customers gain direct access to a Lenovo TAM, who serves as their single point of contact to expedite service requests, provide status updates, and furnish reports to track incidents over time. Also, a TAM helps proactively make service recommendations and manage service relationship with Lenovo to make certain that customer's needs are met.

- **Health Check**
  Having a trusted partner who can perform regular and detailed health checks is central to maintaining efficiency and ensuring that customer systems and business are always running at their best. Health Check supports Lenovo-branded server, storage, and networking devices, as well as select Lenovo-supported products from other vendors that are sold by Lenovo or a Lenovo-Authorized Reseller.

Some regions might have different warranty terms and conditions than the standard warranty. This is due to local business practices or laws in the specific region. Local service teams can assist in explaining region-specific terms when needed. Examples of region-specific warranty terms are second or longer business day parts delivery or parts-only base warranty.

If warranty terms and conditions include onsite labor for repair or replacement of parts, Lenovo will dispatch a service technician to the customer site to perform the replacement. Onsite labor under base warranty is limited to labor for replacement of parts that have been determined to be field-replaceable units (FRUs). Parts that are determined to be customer-replaceable units (CRUs) do not include onsite labor under base warranty.

If warranty terms include parts-only base warranty, Lenovo is responsible for delivering only replacement parts that are under base warranty (including FRUs) that will be sent to a requested location for self-service. Parts-only service does not include a service technician being dispatched onsite. Parts must be changed at customer's own cost and labor and defective parts must be returned following the instructions supplied with the spare parts.

Lenovo support services are region-specific. Not all support services are available in every region. For information about Lenovo support services that are available in a specific region, refer to the following resources:

- Service part numbers in Data Center Solution Configurator (DCSC):
  http://dcsc.lenovo.com/#/services
- Lenovo Services Availability Locator
  https://lenovolocator.com/

For service definitions, region-specific details, and service limitations, refer to the following documents:

- Lenovo Statement of Limited Warranty for Infrastructure Solutions Group (ISG) Servers and System Storage
  http://pcsupport.lenovo.com/us/en/solutions/ht503310
- Lenovo Data Center Services Agreement
  http://support.lenovo.com/us/en/solutions/ht116628

Services

Lenovo Services is a dedicated partner to customer success. Lenovo's goal for customers is to reduce capital outlays, mitigate IT risks, and accelerate time to productivity.

Here is a more in-depth look at what Lenovo can do for their customers:

- **Asset Recovery Services**
  Asset Recovery Services (ARS) helps customers recover the maximum value from their end-of-life equipment in a cost-effective and secure way. On top of simplifying the transition from old to new equipment, ARS mitigates environmental and data security risks associated with data center equipment disposal. Lenovo ARS is a cash-back solution for equipment based on its remaining market value, yielding maximum value from aging assets and lowering total cost of ownership for customers. For more information, see the ARS page, http://lenovopress.com/lp1266.

- **Assessment Services**
  An assessment helps solve customer IT challenges through an onsite, multi-day session with a Lenovo technology expert. Lenovo performs 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, no matter how large or small, get a better return on their IT investment and overcome challenges in the ever-changing technology landscape.

- **Design Services**
  Professional Services consultants perform infrastructure design and implementation planning to support customer's 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.

- **Basic Hardware Installation**
  Lenovo experts can seamlessly manage the physical installation of customer's server, storage, or networking hardware. Working at a time convenient for the customer (business hours or off shift), the technician will unpack and inspect the systems on customer site, install options, mount in a rack cabinet, connect to power and network, check and update firmware to the latest levels, verify operation, and dispose of the packaging, allowing customers to focus on other priorities.

- **Deployment Services**
  When investing in new IT infrastructures, customers need to ensure that their business will see quick time to value with little to no disruption. Lenovo deployments are designed by development and engineering teams who know Lenovo products and solutions better than anyone else, and Lenovo technicians own the process from delivery to completion. Lenovo will conduct remote preparation and planning, configure and integrate systems, validate systems, verify and update appliance firmware, train on administrative tasks, and provide post-deployment documentation. Customer's IT teams leverage Lenovo skills to enable IT staff to transform with higher level roles and tasks.

- **Integration, Migration, and Expansion Services**
  Integration, Migration, and Expansion Services allow to move existing physical and virtual workloads easily, or to determine technical requirements to support increased workloads while maximizing performance. These services include tuning, validation, and documenting ongoing run processes, and they leverage migration assessment planning documents to perform necessary migrations.

Some service options may not be available in every region. For more information about Lenovo service offerings that are available in a specific region, contact a 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 and MetroCluster IP configurations.

Table 16. Ethernet storage switch

Description	Part number
BES-53248 Ethernet Storage Switch: 16x SFP ports and 2x QSFP ports active, 2 PS (CTO only)	7D2SCTO1WW

For more information, see the BES-53248 Ethernet Storage Switch for Lenovo Product Guide:
http://lenovopress.com/lp1226

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 17. Rack cabinets

Part number	Description
93072RX	25U Standard Rack
93072PX	25U Static S2 Standard Rack
93634PX	42U 1100mm Dynamic Rack
93634EX	42U 1100mm Dynamic Expansion Rack
93604PX	42U 1200mm Deep Dynamic Rack
93614PX	42U 1200mm Deep Static Rack
93084EX	42U Enterprise Expansion Rack
93084PX	42U Enterprise Rack
93074RX	42U Standard Rack

For specifications about these racks, see the Lenovo Rack Cabinet Reference, available from:
https://lenovopress.com/lp1287-lenovo-rack-cabinet-reference

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

Power distribution units

The following table lists the power distribution units (PDUs) that are offered by Lenovo.

Table 18. Power distribution units

Part number	Description
0U Basic PDUs	
00YJ776	0U 36 C13/6 C19 24A/200-240V 1 Phase PDU with NEMA L6-30P line cord
00YJ777	0U 36 C13/6 C19 32A/200-240V 1 Phase PDU with IEC60309 332P6 line cord
00YJ778	0U 21 C13/12 C19 32A/200-240V/346-415V 3 Phase PDU with IEC60309 532P6 line cord
00YJ779	0U 21 C13/12 C19 48A/200-240V 3 Phase PDU with IEC60309 460P9 line cord
Switched and Monitored PDUs	
00YJ780	0U 20 C13/4 C19 Switched and Monitored 32A/200-240V/1Ph PDU w/ IEC60309 332P6 line cord
00YJ781	0U 20 C13/4 C19 Switched and Monitored 24A/200-240V/1Ph PDU w/ NEMA L6-30P line cord
00YJ782	0U 18 C13/6 C19 Switched / Monitored 32A/200-240V/346-415V/3Ph PDU w/ IEC60309 532P6 cord
00YJ783	0U 12 C13/12 C19 Switched and Monitored 48A/200-240V/3Ph PDU w/ IEC60309 460P9 line cord
46M4003	1U 9 C19/3 C13 Switched and Monitored 60A 3 Phase PDU with IEC 309 3P+Gnd line cord
46M4004	1U 12 C13 Switched and Monitored DPI PDU (without line cord)
46M4005	1U 12 C13 Switched and Monitored 60A 3 Phase PDU with IEC 309 3P+Gnd line cord
Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets)	
71762NX	Ultra Density Enterprise C19/C13 PDU Module (without line cord)
71763NU	Ultra Density Enterprise C19/C13 PDU 60A/208V/3ph with IEC 309 3P+Gnd line cord
C13 Enterprise PDUs (12x IEC 320 C13 outlets)	
39M2816	DPI C13 Enterprise PDU+ (without line cord)
39Y8941	DPI Single Phase C13 Enterprise PDU (without line cord)
C19 Enterprise PDUs (6x IEC 320 C19 outlets)	
39Y8948	DPI Single Phase C19 Enterprise PDU (without line cord)
39Y8923	DPI 60A 3 Phase C19 Enterprise PDU with IEC 309 3P+G (208 V) fixed line cord
Front-end PDUs (3x IEC 320 C19 outlets)	
39Y8938	DPI 30amp/125V Front-end PDU with NEMA L5-30P line cord
39Y8939	DPI 30amp/250V Front-end PDU with NEMA L6-30P line cord
39Y8934	DPI 32amp/250V Front-end PDU with IEC 309 2P+Gnd line cord
39Y8940	DPI 60amp/250V Front-end PDU with IEC 309 2P+Gnd line cord
39Y8935	DPI 63amp/250V Front-end PDU with IEC 309 2P+Gnd line cord
NEMA PDUs (6x NEMA 5-15R outlets)	
39Y8905	DPI 100-127V PDU with Fixed NEMA L5-15P line cord
Line cords for PDUs that ship without a line cord	
40K9611	DPI 32a Line Cord (IEC 309 3P+N+G)
40K9612	DPI 32a Line Cord (IEC 309 P+N+G)
40K9613	DPI 63a Cord (IEC 309 P+N+G)
40K9614	DPI 30a Line Cord (NEMA L6-30P)
40K9615	DPI 60a Cord (IEC 309 2P+G)
40K9617	DPI Australian/NZ 3112 Line Cord
40K9618	DPI Korean 8305 Line Cord

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 19. Uninterruptible power supply units

Part number	Description
55941AX	RT1.5kVA 2U Rack or Tower UPS (100-125VAC)
55941KX	RT1.5kVA 2U Rack or Tower UPS (200-240VAC)
55942AX	RT2.2kVA 2U Rack or Tower UPS (100-125VAC)
55942KX	RT2.2kVA 2U Rack or Tower UPS (200-240VAC)
55943AX	RT3kVA 2U Rack or Tower UPS (100-125VAC)
55943KX	RT3kVA 2U Rack or Tower UPS (200-240VAC)
55945KX	RT5kVA 3U Rack or Tower UPS (200-240VAC)
55946KX	RT6kVA 3U Rack or Tower UPS (200-240VAC)
55948KX	RT8kVA 6U Rack or Tower UPS (200-240VAC)
55949KX	RT11kVA 6U Rack or Tower UPS (200-240VAC)
55948PX	RT8kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)
55949PX	RT11kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)
55943KT†	ThinkSystem RT3kVA 2U Standard UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets)
55943LT†	ThinkSystem RT3kVA 2U Long Backup UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets)
55946KT†	ThinkSystem RT6kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output)
5594XKT†	ThinkSystem RT10kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output)

† Only available in China and countries in the Asia Pacific region.

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

Lenovo Financial Services

Lenovo Financial Services reinforces Lenovo's commitment to deliver pioneering products and services that are recognized for their quality, excellence, and trustworthiness. Lenovo Financial Services offers financing solutions and services that complement your technology solution anywhere in the world.

We are dedicated to delivering a positive finance experience for customers like you who want to maximize your purchase power by obtaining the technology you need today, protect against technology obsolescence, and preserve your capital for other uses.

We work with businesses, non-profit organizations, governments and educational institutions to finance their entire technology solution. We focus on making it easy to do business with us. Our highly experienced team of finance professionals operates in a work culture that emphasizes the importance of providing outstanding customer service. Our systems, processes and flexible policies support our goal of providing customers with a positive experience.

We finance your entire solution. Unlike others, we allow you to bundle everything you need from hardware and software to service contracts, installation costs, training fees, and sales tax. If you decide weeks or months later to add to your solution, we can consolidate everything into a single invoice.

Our Premier Client services provide large accounts with special handling services to ensure these complex transactions are serviced properly. As a premier client, you have a dedicated finance specialist who manages your account through its life, from first invoice through asset return or purchase. This specialist develops an in-depth understanding of your invoice and payment requirements. For you, this dedication provides a high-quality, easy, and positive financing experience.

For your region-specific offers, please ask your Lenovo sales representative or your technology provider about the use of Lenovo Financial Services. For more information, see the following Lenovo website:

https://www.lenovo.com/us/en/landingpage/lenovo-financial-services/

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
- ThinkSystem DM Series Installation Videos and Video Tutorials
  https://www.youtube.com/playlist?list=PLLQcIfVNrqzcBW55-7IAe7_Our6nMQxak
- Lenovo Data Center Support
  http://datacentersupport.lenovo.com

Related product families

Product families related to this document are the following:

- DM Series Storage
- Lenovo Storage
- External Storage

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