# Lenovo ThinkSystem DM5100F Unified and DM5100F SAN Flash Storage Array
## Product Guide

Lenovo ThinkSystem DM5100F is an all-NVMe flash storage system, available as either unified or SAN, that is designed to provide performance, simplicity, capacity, security, and high availability for medium-sized enterprises. Powered by the ONTAP storage management software, the DM5100F delivers enterprise-class storage management capabilities with a wide choice of host connectivity options and enhanced data management features. The DM5100F is a perfect fit for a wide range of enterprise workloads, including big data and analytics, artificial intelligence, engineering and design, enterprise applications, and other storage I/O-intensive applications.

ThinkSystem DM5100F models are 2U rack-mount controller enclosures that include two controllers, 128 GB RAM and 16 GB battery-backed NVRAM (64 GB RAM and 8 GB NVRAM per controller), and 24 SFF hot-swap drive bays (2U24 form factor). Controllers provide universal 1/10/25 GbE NAS/iSCSI or 8/16/32 Gb Fibre Channel (FC) ports, or 1/10/25 GbE RJ-45 ports for host connectivity, depending on configuration.

A single ThinkSystem DM5100F Storage Array scales out to 48 NVMe SSDs with the attachment of one Lenovo ThinkSystem DM240N 2U24 SFF Expansion Enclosure. Up to 12x DM5100F Storage Arrays can be combined into a clustered system in a NAS environment, or up to 6x DM5100F Storage Arrays can be combined into a clustered system in a SAN environment.



Figure 1. Lenovo ThinkSystem DM5100F Storage Array

## Did you know?

The ThinkSystem DM5100F 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 DM5100F scales up to 737 TB of raw storage capacity using 48x 15.36 TB drives. A cluster of DM5100F storage systems scales up to 8.8 PB for NAS (12 systems) or up to 4.4 PB for SAN environments (6 systems).

The DM5100F offers unified file and block storage connectivity with support for 1 GbE, 10 GbE or 25 GbE NAS and iSCSI, and 8 Gb, 16 Gb or 32 Gb Fibre Channel, and 32 Gb NVMe/FC protocols at the same time.

## Key features

The ThinkSystem DM5100F offers the following key features and benefits:

- Available as a Unified storage platform - allowing NAS, SAN, and Object workloads or as a SAN storage platform that serving only SAN workloads.
- Both platform options, Unified and SAN are available with either the Fundamentals or Premium software feature offerings which provide feature flexibility.
- Compact NVMe Flash storage system delivering high-performance and low-latency at an affordable price point, enabling customers of all sizes to enhance their analytics and AI deployments and accelerate applications' access to data.
- All-flash array capabilities to meet the demand for higher speed storage and provide higher IOPs and bandwidth with lower power usage and total cost of ownership than hybrid or HDD-based solutions.
- All-flash storage with dual active/active controller configurations for high availability and performance.
- A rich set of storage management functions available, including snapshots, volume copy, quality of service, thin provisioning, compression, deduplication, encryption, disk-based backup, application- and virtual machine-aware backup, quick data recovery, clustering, synchronous replication, and asynchronous replication.
- Simplify and automate the care and optimization of a ThinkSystem Storage environment using our cloud-based storage management platform that uses AIOPs, resulting in reduced risks and higher availability.
- Predict issues before they happen and provide prescriptive guidance via AI, to improve system health and availability.
- Improved performance and data protection with RAID-DP and RAID-TEC, as well as support for traditional RAID 4.
- Flexible host connectivity to match diverse client needs with support for unified NAS and SAN storage protocols, including 1/10/25 GbE NAS and iSCSI, 8/16/32 Gb Fibre Channel connectivity, and 32 Gb NVMe over Fibre Channel (NVMe/FC). (NVMe/FC is only available with either Unified Premium or SAN Premium offerings.)
- NVMe drive-side connectivity with multipathing with up to 24x 2.5-inch small form factor (SFF) drives in the controller enclosure and expansion enclosure.
- Optional licensed functions, including WORM (write once, read many) data protection (SnapLock) and object storage tiering (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, and non-disruptive firmware upgrades.
- Certified storage for Oracle VM.
- Certified storage for Citrix XenServer

The ThinkSystem DM5100F supports the 2.5-inch NVMe SSDs and all drives are dual-port and hot-swappable. The DM5100F supports attachment of one DM240N 2U24 SFF expansion enclosure and drives are designed to be added dynamically, which helps to quickly and seamlessly respond to ever-growing capacity demands.

The DM5100F offers high levels of system and data availability with the following features:

- Dual-active controllers (high availability pair) with automatic load balancing and failover
- Mirrored, battery-backed controller NVRAM using 8GB of available physical memory per controller
- Dual-port NVMe SSDs with automatic drive failure detection and rebuild
- Redundant, hot-swappable and customer replaceable hardware components, including SFP+ transceivers, controllers, I/O modules, power supplies, and drives
- Automated failover for the data path between the host and the drives with multipathing
- Non-disruptive controller and drive firmware upgrades
- Scale-out clustering

## Components and connectors

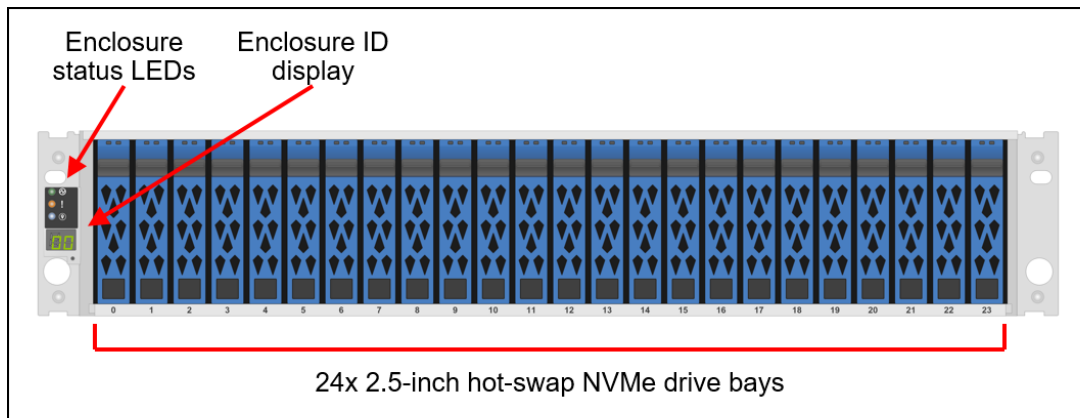The following figure shows the front of the DM5100F.



Figure 2. ThinkSystem DM5100F front view

The following figure shows the rear of the DM5100F with two hot-swap controllers and two hot-swap redundant power supplies.
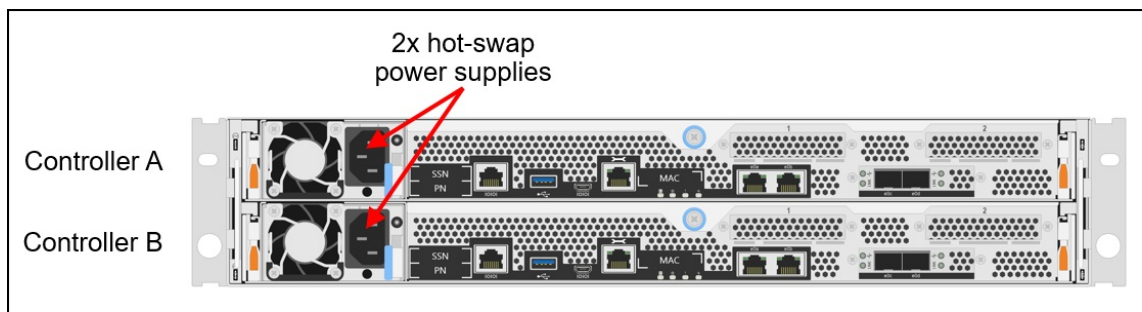


Figure 3. ThinkSystem DM5100F 2U enclosure rear view

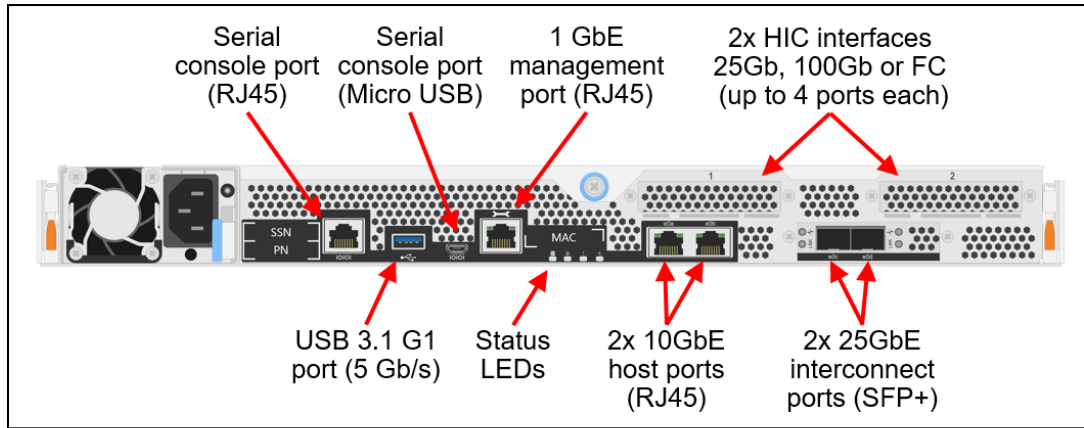The following figure shows the components of each of the controllers.



Figure 4. ThinkSystem DM5100F controller

The rear of the DM5100F includes the following components:

- Two redundant hot-swap controllers, each with the following ports:
  - 2x 25Gb Ethernet: HA and cluster interconnects
  - 2x 10GBASE-T: Host connectivity
  - 2x Mezzanine slots for I/O expansion
  - 1x Type micro-B USB console port: 115.2k baud rate
  - 1x Type-A USB port: Read-only for netboot and OS updates
- Two redundant hot-swap power supplies

The two Host Interface Cards provide one of the following combinations of ports:

- 8x 10/25 GbE ports
- 8x 32Gb FC ports
- 4x 10/25 GbE and 4x 32Gb FC ports
- 4x 10/25 GbE and 2x 100 GbE ports
- 4x 32Gb FC and 2x 100 GbE ports

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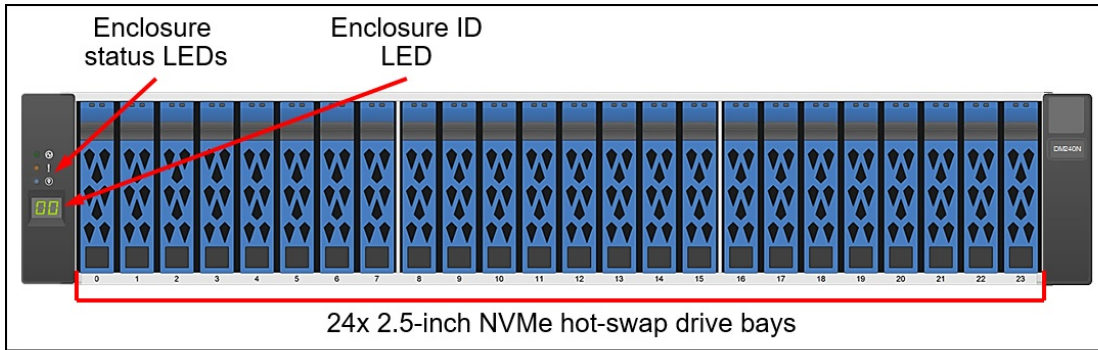


Figure 5. ThinkSystem DM240N 2U SFF NVMe expansion enclosure front view

The following figure shows the rear of the DM240N expansion enclosure.
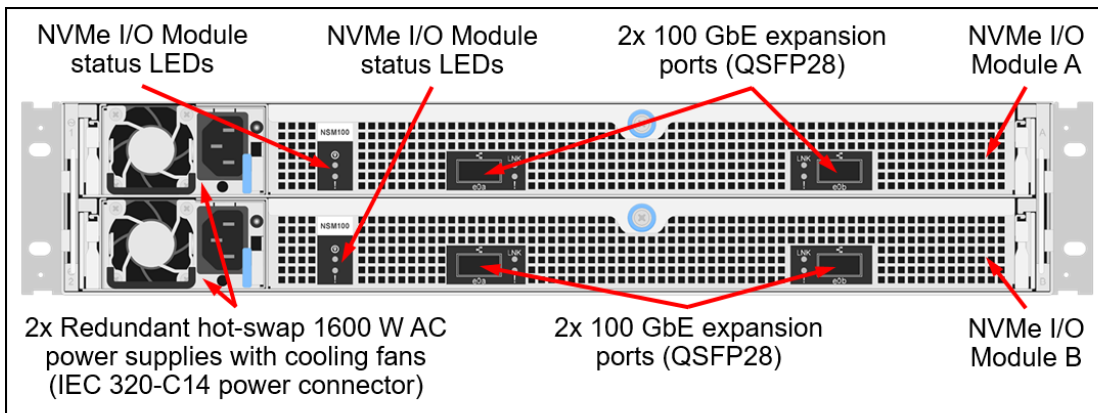


Figure 6. ThinkSystem DM240N 2U SFF NVMe expansion enclosure rear view

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

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

## System specifications

The following table lists the ThinkSystem DM5100F storage system specifications.

**Note:** The supported hardware options, software features, and interoperability listed in this product guide are based on the ONTAP software version 9.8. For details about specific software releases that introduced support for certain hardware options and software features, refer to the Release notes of the particular software release for the ThinkSystem DM5100F that can be found at:
http://datacentersupport.lenovo.com

Table 1. ThinkSystem DM5100F system specifications

| Attribute | Specification |
|---|---|
| Machine types | • DM5100F controller enclosure: 7D3K<br>• DM240N expansion enclosure: 7Y62 |
| Form factor | • DM5100F: 2U rack mount<br>• DM240N: 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/cluster interconnect ports | 4x 25 GbE SFP+ ports (DAC cables or SW fiber optics, LC). 2 ports per controller |
| RAID levels | RAID-4, RAID-DP, RAID-TEC |
| Controller memory | 128 GB RAM per system (64 GB per controller). 16 GB battery-backed NVRAM per system (8 GB per controller) mirrored between the controllers. |
| Drive bays | Up to 48 SFF hot-swap NVMe drive bays (1x 24-drive DM5100F controller enclosure + 1x 24-drive DM240N expansion enclosure) (Requires installation of a 100Gb Ethernet mezzanine card into slot 1) |
| Drive technology | NVMe SSDs |
| Drive expansion connectivity | Each DM5100F controller supports one 2-port 100GbE HIC for connectivity to a single DM240N expansion enclosure. |
| Drives | 1.92 TB, 3.84 TB, 7.68 TB, and 15.36 TB NVMe SSDs (1 DWD). |
| Storage capacity | Up to 737 TB by using 48x 15.36 TB drives |
| Storage protocols | • NAS (File access): NFS, CIFS/SMB.<br>• SAN (Block access): iSCSI, FC, NVMe/FC |

| Attribute | Specification |
|---|---|
| Host connectivity | Base ports (per controller enclosure):<br><br>• 2x 10GBASE-T ports<br><br>Optional ports via HIC adapters (2 per controller):<br><br>• 25GbE HIC, with 4x 10/25 GbE SFP28 ports (DAC cables or SW fiber optic cables, LC)<br>• 100GbE HIC, with 2x 100 GbE QSFP28 ports (DAC cables or SW fiber optic cables, MPO)<br>• Fibre Channel HIC, with 4x 8/16/32 Gb FC SFP+ host ports, 32Gb transceivers included (SW fiber optic cables, LC)<br><br>The following HIC combinations are supported in each controller:<br><br>• 25GbE + 25GbE<br>• 32Gb FC + 32Gb FC<br>• 25GbE + 32Gb FC<br>• 25GbE + 100GbE<br>• 32Gb FC + 100GbE<br><br>**Note**: The DM5100F is not supported direct-attach to a host. Host connectivity is only supported via an Ethernet or Fibre Channel switch |
| Category 1 Host operating systems* | Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware ESXi |
| Category 2 Host operating systems** | Oracle Linux, Oracle VM, Citrix Hypervisor, CentOS, Ubuntu, Solaris. For version details, see the latest Category 2 Interoperability Matrix, available as a download from Lenovo Storage Interoperation Center (LSIC). |
| Standard software features | RAID data protection, snapshots, volume copy (FlexClone), storage quality of service (QoS), thin provisioning, compression, deduplication, encryption, disk-based backup (SnapVault), application-aware backup (SnapCenter), quick data recovery (SnapRestore), clustering, clustering with data mirroring (MetroCluster IP), and synchronous and asynchronous replication (SnapMirror). |
| Optional software features | WORM data protection (SnapLock) and object storage tiering (FabricPool). |
| Performance† | Up to 440,000 random read IOPS (8 KB blocks). |
| Configuration maximums‡ | • Maximum raw storage capacity: 737 TB<br>• Maximum aggregate size: 400 TB<br>• Maximum number of FlexVol volumes per controller: 1000<br>• Maximum FlexVol volume size: 100 TB<br>• Maximum number of LUNs per controller: 8192<br>• Maximum number of LUNs per FlexVol volume: 512<br>• Maximum LUN size: 16 TB<br>• Maximum number of drives in a RAID group (data + parity drives):<br>   ○ RAID 4: 14 (13 + 1 NVMe SSDs)<br>   ○ RAID-DP: 28 (26 + 2 NVMe SSDs)<br>   ○ RAID-TEC: 29 (26 + 3 NVMe SSDs)<br>• Maximum number of initiators per controller: 2048<br>• Maximum number of snapshots per FlexVol volume: 1023 |
| Cooling | Redundant cooling with the fans that are built into power supplies (DM5100F and DM240N enclosures). |

| Attribute | Specification |
|---|---|
| Power supply | DM5100F: Two redundant hot-swap 1600 W Platinum AC power supplies. 200-240V supply.<br>DM240N: Two redundant hot-swap 1600 W Platinum AC power supplies. 200-240V supply. |
| Hot-swap parts | Controllers, I/O modules, drives, power supplies, and SFP+ transceivers and DAC cables. |
| Management ports | • 1x 1 GbE port (UTP, RJ-45) per controller for out-of-band management.<br>• 2x Serial console ports (RJ-45 and Micro-USB) for system configuration. |
| Management interfaces | ThinkSystem Storage Manager web-based GUI; SSH CLI; Serial console CLI; SNMP, email, and syslog alerts; optional Lenovo XClarity. |
| Security features | Secure Socket Layer (SSL), Secure Shell (SSH), user level security, role-based access control (RBAC), LDAP authentication. |
| Warranty and support | Three-, four-, or five-year customer-replaceable unit and onsite limited warranty with selectable service levels: 9x5 service coverage next business day (NBD) onsite response (Foundation) or 24x7 service coverage with 4-hour onsite response (Essential). Premier Support is also available. Software support is included in the Foundation or Essential Service for the duration of the warranty period. |
| Dimensions | DM5100F enclosure:<br>• Height: 87 mm (3.4 in.)<br>• Width with flange: 483 mm (19 in.)<br>• Width without flange: 447 mm (17.6 in.)<br>• Depth: 543 mm (21.4 in.)<br><br>DM240N expansion enclosure:<br>• Height: 87 mm (3.4 in.)<br>• Width with flange: 483 mm (19 in.)<br>• Width without flange: 447 mm (17.6 in.)<br>• Depth: 543 mm (21.4 in.) |
| Weight | • DM5100F enclosure: (fully configured): 24.6 kg (54.3 lb)<br>• DM240N expansion enclosure (fully configured): 30.2 kg (66.6 lb) |

* For Category 1 operating system support information, see  Lenovo Storage Interoperation Center  (LSIC).
** For Category 2 operating system support information, see the latest Category 2 Interoperability Matrix.
Go to the Lenovo Storage Interoperation Center (LSIC) home page and scroll down to the Lenovo
Information section and click the **Download Lenovo 3rd party of interop matrix**  link.
† Estimated performance based on internal measurements.
‡ For a detailed list of configuration limits and restrictions for a specific version of the software, refer to the
Lenovo Data Center Support website:
http://datacentersupport.lenovo.com

## Controller enclosures

Preconfigured and factory-integrated models of the ThinkSystem DM5100F Unified Flash Storage Array are
configured by using the Lenovo Data Center Solution Configurator (DCSC), http://dcsc.lenovo.com

The following table lists the CTO base model for the ThinkSystem DM5100F.

Table 2. ThinkSystem DM5100F CTO base model

| Machine Type/Model | Feature code | Description |
|---|---|---|
| 7D3KCTO1WW | BF3C | Lenovo ThinkSystem DM Series 2U NVMe Chassis |

The models of the ThinkSystem DM5100F ship with the following items:

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

The following table lists the feature codes for controller software. The selection here must match the software license selected as described in the Software section.

DM Series controller software is available as a Unified offering, supporting SAN, NAS and Object storage protocols, or as a SAN offering, supporting only SAN protocols. Within each of these is Premium (available world-wide), Fundamentals (available world-wide except China), and Base (for China) that include specific features. See the Software section for details.

Table 3. Controller software selection

| Feature code | Description | Offering availability | |
| --- | --- | --- | --- |
| | | China only | All other markets |
| Unified offering (SAN, NAS, Object storage protocols) | | | |
| B5RJ | DM Series Premium Offering | Yes | Yes |
| B72U | DM Series Fundamentals Offering | No | Yes |
| B5RH | DM Series Base Offering | Yes | No |
| SAN offering (SAN storage protocols only) | | | |
| BKKE | DM Series Premium - SAN Only Offering | Yes | Yes |
| BKKD | DM Series Fundamental - SAN Only Offering | No | Yes |
| BKKC | DM Series Base - SAN Only Offering | Yes | No |

## Controllers

The ThinkSystem DM5100F controller enclosures ship with two DM5100F 64GB NVMe controllers. A controller provides interfaces for host connectivity, management, and internal drives, and it runs ONTAP storage management software. Each DM5100F controller enclosure provides 128 GB RAM and 16 GB battery-backed NVRAM (64 GB RAM and 8 GB NVRAM per controller).

Each ThinkSystem DM5100F controller has two interconnect 25 GbE SFP+ ports to cable a directly-connected dual-controller HA pair or for switched cluster interconnect with multiple dual-controller HA pairs. Up to six HA pairs can be combined into a single SAN cluster or up to 12 HA pairs can be combined into a single NAS cluster.

Each DM5100F controller also has the following host interfaces:

- 2x 10GBASE-T RJ-45 ports

- 2x slots for additional host interfaces using HIC adapters; choices of HIC adapters are:
    - 25GbE HIC, with 4x 10/25 GbE SFP28 (DAC cables or SW fiber optic cables, LC)
    - 100GbE HIC, with 2x 100 GbE QSFP28 (DAC cables or SW fiber optic cables, MPO)
    - Fibre Channel HIC, with 4x 8/16/32 Gb FC SFP+ host ports, 32Gb transceivers included (SW fiber optic cables, LC)

Two controllers are required for selection and must have the same HIC adapters installed. The use of a DM240N expansion enclosure requires a 100GbE HIC for connectivity.

The following table lists the controllers for the DM5100F Storage Array and supported connectivity options.

**Tip**: The Fibre Channel HIC includes 32Gb transceivers

Table 4. DM5100F controllers and connectivity options

| Part number | Feature code | Description | Maximum quantity per controller enclosure |
|---|---|---|---|
| Controller | | | |
| None* | BEVS | Lenovo ThinkSystem DM5100F NVMe Controller, 64GB | 2 |
| Host Interface Cards | | | |
| 4C57A67134 | BEVR | Lenovo ThinkSystem DM Series HIC, 2x100Gb NVMe-RoCE,2-ports | 2 |
| 4C57A67132 | BEVQ | Lenovo ThinkSystem DM Series HIC, 10/25Gb iSCSI,4-ports | 4 |
| 4C57A67133 | BEVP | Lenovo ThinkSystem DM Series HIC, 16/32Gb FC,4-ports | 4 |
| SFP28 transceiver for 25GbE optical cables | | | |
| 4XF7A39597 | B732 | 25Gb Ethernet Optical SFP28 Shortwave Module 1 Pack | 20 |

* Factory-installed only.

The following table lists the supported optical and copper cables.

**Tip**: The 100GbE cables used to connect the DM240N expansion enclosure are configure with the DM240N.

Table 5. Supported cables

| Part number | Feature code | Description | Maximum quantity per controller enclosure |
|---|---|---|---|
| DAC breakout cable options for 100GbE | | | |
| 7Z57A03564 | AV22 | Lenovo 1m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable | 4 |
| 7Z57A03565 | AV23 | Lenovo 3m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable | 4 |
| 7Z57A03566 | AV24 | Lenovo 5m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable | 4 |
| DAC cable options for 25 GbE SFP28 connectivity | | | |
| 7Z57A03557 | AV1W | Lenovo 1m Passive 25G SFP28 DAC Cable | 20 |
| 7Z57A03558 | AV1X | Lenovo 3m Passive 25G SFP28 DAC Cable | 20 |
| 7Z57A03559 | AV1Y | Lenovo 5m Passive 25G SFP28 DAC Cable | 20 |
| DAC cable options for 40 GbE QSFP+ to 4x 10 GbE SFP+ host connectivity | | | |
| 49Y7886 | A1DL | Lenovo 1m Passive QSFP+ to SFP+ Breakout DAC Cable | 16 |
| 49Y7887 | A1DM | Lenovo 3m Passive QSFP+ to SFP+ Breakout DAC Cable | 16 |
| 49Y7888 | A1DN | Lenovo 5m Passive QSFP+ to SFP+ Breakout DAC Cable | 16 |
| DAC cable options for 25GbE and 10 GbE SFP+ connectivity (SFP+ base ports and interconnect ports) | | | |
| 00D6288 | A3RG | 0.5m Passive DAC SFP+ Cable | 16 |
| 90Y9427 | A1PH | 1m Passive DAC SFP+ Cable | 16 |

| Part number | Feature code | Description | Maximum quantity per controller enclosure |
|---|---|---|---|
| 00AY764 | A51N | 1.5m Passive DAC SFP+ Cable | 16 |
| 00AY765 | A51P | 2m Passive DAC SFP+ Cable | 16 |
| 90Y9430 | A1PJ | 3m Passive DAC SFP+ Cable | 16 |
| 90Y9433 | A1PK | 5m Passive DAC SFP+ Cable | 16 |
| OM3 cable options for 16/32 Gb FC and 25 GbE SW SFP28 optical transceivers | | | |
| 00MN499 | ASR5 | Lenovo 0.5m LC-LC OM3 MMF Cable | 16 |
| 00MN502 | ASR6 | Lenovo 1m LC-LC OM3 MMF Cable | 16 |
| 00MN505 | ASR7 | Lenovo 3m LC-LC OM3 MMF Cable | 16 |
| 00MN508 | ASR8 | Lenovo 5m LC-LC OM3 MMF Cable | 16 |
| 00MN511 | ASR9 | Lenovo 10m LC-LC OM3 MMF Cable | 16 |
| 00MN514 | ASRA | Lenovo 15m LC-LC OM3 MMF Cable | 16 |
| 00MN517 | ASRB | Lenovo 25m LC-LC OM3 MMF Cable | 16 |
| 00MN520 | ASRC | Lenovo 30m LC-LC OM3 MMF Cable | 16 |
| OM4 cable options for 16/32 Gb FC and 25 GbE SFP28 optical transceivers | | | |
| 4Z57A10845 | B2P9 | Lenovo 0.5m LC-LC OM4 MMF Cable | 16 |
| 4Z57A10846 | B2PA | Lenovo 1m LC-LC OM4 MMF Cable | 16 |
| 4Z57A10847 | B2PB | Lenovo 3m LC-LC OM4 MMF Cable | 16 |
| 4Z57A10848 | B2PC | Lenovo 5m LC-LC OM4 MMF Cable | 16 |
| 4Z57A10849 | B2PD | Lenovo 10m LC-LC OM4 MMF Cable | 16 |
| 4Z57A10850 | B2PE | Lenovo 15m LC-LC OM4 MMF Cable | 16 |
| 4Z57A10851 | B2PF | Lenovo 25m LC-LC OM4 MMF Cable | 16 |
| 4Z57A10852 | B2PG | Lenovo 30m LC-LC OM4 MMF Cable | 16 |
| UTP Category 6 cables for 1/10 GbE RJ-45 adapter cards and 1 GbE RJ-45 management ports | | | |
| 00WE123 | AVFW | 0.75m Green Cat6 Cable | 6 |
| 00WE127 | AVFX | 1.0m Green Cat6 Cable | 6 |
| 00WE131 | AVFY | 1.25m Green Cat6 Cable | 6 |
| 00WE135 | AVFZ | 1.5m Green Cat6 Cable | 6 |
| 00WE139 | AVG0 | 3m Green Cat6 Cable | 6 |

## Expansion enclosures

The ThinkSystem DM5100F supports attachment of one ThinkSystem DM240N 2U24 enclosure. The expansion enclosure can be added to the system non-disruptively.

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

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

| Machine Type/Model | Feature code | Description |
|---|---|---|
| 7Y62CTO1WW | B6W6 | Lenovo ThinkSystem DM240N 2U24 NVMe Expansion Enclosure (with 2x PSUs) |

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

The models of the ThinkSystem DM240N ship with the following items:

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

The ThinkSystem DM240N expansion enclosure ships with two NVMe I/O expansion modules. Each NVMe I/O expansion module provides two external 100 GbE QSFP28 ports (labeled Ports A and B) that are used for direct-attach connections to the DM5100F enclosure.

The DM5100F controller enclosure supports direct attachment of one DM240N NVMe expansion enclosure for a total of up to 48 NVMe drives. To connect the DM240N, a 100 GbE HIC adapter card (4C57A67134) is required to be installed in the DM5100F.

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

Table 7. NVMe expansion enclosure connectivity options

| Part number | Feature code | Description | Required quantity |
|---|---|---|---|
| 7Z57A03561 | AV1Z | Lenovo 1m Passive 100G QSFP28 DAC Cable | 4 |
| 7Z57A03562 | AV20 | Lenovo 3m Passive 100G QSFP28 DAC Cable | 4 |
| 7Z57A03563 | AV21 | Lenovo 5m Passive 100G QSFP28 DAC Cable | 4 |

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

## Drives

The ThinkSystem DM5100F and DM240N enclosures each support up to 24 SFF hot-swap drives, in packs of 6 drives. The following tables list the supported drive options. Note that the feature code varies, based on the software license (Base, Fundamentals or Premium) and the protocol license (Unified or SAN only).

**Field upgrades**: DM5100F 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, ThinkSystem DM Drive Pack Upgrades.

Table 8. Drive option feature codes

| Drive Pack (6 drives each) | Unified | | | SAN only | | | Max Qty |
|---|---|---|---|---|---|---|---|
| | Base* | Funda-mentals† | Premium | Base* | Funda-mentals† | Premium | |
| Non-SED drives | | | | | | | |
| Lenovo ThinkSystem 12TB (6x 1.9TB NVMe Non-SED) Drive Pack for DM5100F | BEVZ | BK1Q | BEW2 | BKJ2 | BKJ5 | BKJC | 4 |
| Lenovo ThinkSystem 23TB (6x 3.8TB NVMe Non-SED) Drive Pack for DM5100F | BEW0 | BK1T | BEW5 | BKJ3 | BKJ8 | BKJF | 4 |
| SED drives (Available worldwide except China and RUCIS markets) | | | | | | | |
| Lenovo ThinkSystem 12TB (6x 1.9TB NVMe SED) Drive Pack for DM5100F | - | BK1P | BEW1 | - | BKJ4 | BKJB | 4 |
| Lenovo ThinkSystem 23TB (6x 3.8TB NVMe SED) Drive Pack for DM5100F | - | BK1R | BEW3 | - | BKJ6 | BKJD | 4 |
| Lenovo ThinkSystem 46TB (6x 7.6TB NVMe SED) Drive Pack for DM5100F | - | BK1U | BEW6 | - | BKJ9 | BKJG | 4 |
| Lenovo ThinkSystem 92TB (6x 15.3TB NVMe SED) Drive Pack for DM5100F | - | BK1V | BEW7 | - | BKJA | BKJH | 4 |
| SED FIPS drives (Available worldwide except China and RUCIS markets) | | | | | | | |
| Lenovo ThinkSystem 23TB (6x 3.8TB NVMe SED FIPS) Drive Pack for DM5100F | - | BK1S | BEW4 | - | BKJ7 | BKJE | 4 |

\* China only
† Available world-wide except China

**Configuration notes:**

- The DM5100F enclosure supports 12-24 drives in increments of 6 drives, and all drives in the enclosure must be of the same type and capacity.

- The DM240N expansion enclosure supports 6-24 drives in increments of 6 drives, and all drives in the enclosure must be of the same type and capacity.

## Software

Controller software for the DM5100F is available in the following bundles of features:

- SAN Fundamentals (All markets except China)
- SAN Base (China only)
- SAN Premium
- Unified Fundamentals (All markets except China)
- Unified Base (China only)
- Unified Premium

The following table summarizes the features in each bundle.

Table 9. Comparison of software features

| Feature | SAN Fundamentals | SAN Base (PRC only) | SAN Premium | Unified Fundamentals | Unified Base (PRC only) | Unified Premium |
|---|---|---|---|---|---|---|
| Controller software feature code | BKKD | BKKC | BKKE | B72U | B5RH | B5RJ |
| RAID-4, RAID-DP, and RAID-TEC data protection | Included | Included | Included | Included | Included | Included |
| All Flash Array (AFA) capability | Included | Included | Included | Included | Included | Included |
| Thin provisioning | Included | Included | Included | Included | Included | Included |
| Compression | Included | Included | Included | Included | Included | Included |
| Compaction | Included | Included | Included | Included | Included | Included |
| Deduplication | Included | Included | Included | Included | Included | Included |
| Snapshots | Included | Included | Included | Included | Included | Included |
| Encryption* | Included* | No | Included* | Included* | No | Included* |
| Balanced placement | Included | Included | Included | Included | Included | Included |
| Dynamic capacity expansion | Included | Included | Included | Included | Included | Included |
| Adaptive Quality of Service | Included | Included | Included | Included | Included | Included |
| SnapRestore | Included | Included | Included | Included | Included | Included |
| FlexClone | Included | Included | Included | Included | Included | Included |
| FlexVol | Included | Included | Included | Included | Included | Included |
| FlexCache | Included | Included | Included | Included | Included | Included |
| SnapMirror asynchronous replication | Included | No | Included | Included | No | Included |
| SyncMirror data protection | Included | Included | Included | Included | Included | Included |
| Trusted Platform Module (TPM) support | Included | No | Included | Included | No | Included |
| MetroCluster IP | Included | Included | Included | Included | Included | Included |
| NVMe over FC Protocol | Included | Included | Included | Included | Included | Included |
| Data Protection Optimized (DPO) | No | No | Included | No | No | Included |
| SnapMirror Business Continuity | No | No | Included | No | No | Included |
| SnapMirror synchronous replication | No | No | Included | No | No | Included |
| FlexCache | No | No | No | Included | No | Included |
| FlexGroup | No | No | No | No | No | Included |
| SnapVault disk-based storage backup | No | No | No | No | No | Included |

| Feature | SAN Fundamentals | SAN Base (PRC only) | SAN Premium | Unified Fundamentals | Unified Base (PRC only) | Unified Premium |
|---|---|---|---|---|---|---|
| SnapCenter | No | No | Included | No | No | Included |
| ONTAP S3 | No | No | No | No | No | Included |
| FabricPool object storage tiering | Optional | Optional | Optional | Optional | Optional | Optional |
| SnapLock WORM data protection | No | No | No | Optional | No | Optional |

\* Requires the encryption verson of ONTAP. See the Software selection table.

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:** 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 Optional software feature table):

- **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.

The following table lists the software selection options for the DM5100F.

Table 10. Software selection

| Feature code | Description |
|---|---|
| BF5S | Lenovo ThinkSystem DM Series ONTAP 9.8 Software Base NonEncryption (China only) |
| BF5Q | Lenovo ThinkSystem DM Series ONTAP 9.8 Software Encryption* |
| BF5R | Lenovo ThinkSystem DM Series ONTAP 9.8 Software NonEncryption |
| BF5T | Lenovo ThinkSystem DM Series ONTAP 9.8 Software Fundamentals Encryption* |
| BF5U | Lenovo ThinkSystem DM Series ONTAP 9.8 Software Fundamentals NonEncryption |

* Software with encryption is not available for customers in PRC

Software maintenance is included in the DM5100F warranty and support (see Warranty and support for details).

The following table lists the Feature on Demand (FoD) upgrades for the DM5100F to enable optional software features. Upgrades are supported in specific bundles as listed in the Comparison of software features table.

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- or 5-year subscription terms.

## Management

The ThinkSystem DM5100F 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 DM5100 and DM240N 2U24 SFF enclosures ship with two redundant hot-swap 1600 W (200-240 V) Platinum AC power supplies, each with an IEC 320-C14 connector.

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

**Note**: A 110V power source is not supported

## Rack installation

The individually shipped ThinkSystem DM5100F and DM240N enclosures come with the ThinkSystem Storage Rack Mount Kit 2U24/4U60 listed in the following table.

Table 12. 4-post rack mount kit

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

When the ThinkSystem DM Series enclosures are factory-integrated and shipped installed in a rack cabinet, the rack mount kits that support Ship-in-Rack (SIR) capabilities are derived by the configurator. The SIR-capable rack mount kits are listed in the following table.

Table 13. 4-post SIR rack mount kits

| Feature code | Description | Quantity |
|---|---|---|
| B6Y7 | ThinkSystem NVMe Adjustable Rail Kit | 1 |

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

Table 14. Rack mount kit features and specifications summary

| Attribute | Screw-in fixed rail with adjustable depth | |
|---|---|---|
| | 2U24 | 2U24 SIR |
| Feature code | B38Y | B6TH |
| Enclosure support | DM5100F, DM240N | DM5100F, DM240N |
| Rail type | Fixed (static) with adjustable depth | Fixed (static) with adjustable depth |
| Tool-less installation | No | No |
| In-rack maintenance | Yes* | Yes* |
| Ship-in-rack (SIR) support | No | Yes |
| 1U PDU support | Yes | Yes |
| 0U PDU support | Limited** | Limited** |
| Rack type | IBM or Lenovo 4-post, IEC standard-compliant | IBM or Lenovo 4-post, IEC standard-compliant |
| Mounting holes | Square or round | Square or round |
| Mounting flange thickness | 2.0 - 3.3 mm (0.08 - 0.13 in.) | 2.0 - 3.3 mm (0.08 - 0.13 in.) |
| Distance between front and rear mounting flanges^ | 605 - 813 mm (23.8 - 32 in.) | 605 - 813 mm (23.8 - 32 in.) |

* The majority of the enclosure components can be serviced from the front or rear of the enclosure, which does not require the removal of the enclosure from the rack cabinet.
** If a 0U PDU is used, the rack cabinet must be at least 1000 mm (39.37 in.) deep for 2U24 enclosures.
^ Measured when mounted on the rack, from the front surface of the front mounting flange to the rear most point of the rail.

## Physical specifications

The ThinkSystem DM5100F controller enclosure has the following dimensions and weight:

- Height: 87 mm (3.4 in.)
- Width with flange: 483 mm (19 in.)
- Width without flange: 447 mm (17.6 in.)
- Depth: 543 mm (21.4 in.)
- Weight (fully configured): 24.6 kg (54.3 lb)

The ThinkSystem DM240N 2U24 SFF enclosure has the following dimensions and weight:

- Height: 87 mm (3.4 in.)
- Width with flange: 483 mm (19 in.)
- Width without flange: 447 mm (17.6 in.)
- Depth: 543 mm (21.4 in.)
- Weight (fully configured): 30.2 kg (66.6 lb)

## Operating environment

The ThinkSystem DM5100F and DM240N 2U24 SFF enclosures are supported in the following environment:

- Air temperature:
    - Operating: 10 to 35 °C (50 to 95 °F)
    - Non-operating: -40 °C to +70 °C (-40 °F to 158 °F)
    - Maximum altitude: 3050 m (10,000 ft)
- Relative humidity:
    - Operating: 8% to 80% (non-condensing)
    - Non-operating: 10% to 95% (non-condensing)
- Electrical power:
    - DM5100F:
        - 200 to 240 (nominal) V AC; 50 Hz or 60 Hz; 5.40 A
        - Power load = 1079W (maximum), 826.9W (typical)
    - DM240N:
        - 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:
    - DM5100F: 3682.79 BTU/Hr (maximum), 2822.13 BUT/Hr (typical)
    - DM240N: 1331 BTU/hour
- Acoustical noise emission:
    - DM5100F: 7.2 bels
    - DM240N: 6.4 bels

# Warranty and support

The ThinkSystem DM Series enclosures can be configured with a three-, four, 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.

Lenovo's 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 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, 4, 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.
    **Note:** Either Foundation or Essential Service *must* be purchased with the storage system (for 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 Data Center Group (DCG) 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

## Regulatory compliance

The ThinkSystem DM Series enclosures conform to the following regulations:

- United States: FCC Part 15, Class A; UL 60950-1
- Canada: ICES-003, Class A; CAN/CSA-C22.2 60950-1
- Mexico NOM
- European Union: CE Mark (EN55032 Class A, EN55024, IEC/EN60950-1); ROHS Directive 2011/65/EU
- Russia, Kazakhstan, Belarus: EAC
- China: CCC GB 4943.1, GB 17625.1, GB 9254 Class A; CELP; CECP
- Japan: VCCI, Class A
- Taiwan: BSMI CNS 13438, Class A; CNS 14336-1
- Korea KN32/35, Class A
- Australia/New Zealand: AS/NZS CISPR 22 Class A

## Interoperability

Lenovo provides end-to-end storage compatibility testing to deliver interoperability throughout the network. The ThinkSystem DM5100F Unified Flash Storage Array supports attachment to Lenovo servers by using NVMe over Fibre Channel (NVMe/FC), NAS (NFS and CIFS/SMB), iSCSI, and Fibre Channel storage connectivity.

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

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

## Cluster interconnect

The following table lists the Ethernet storage switch that can be used with the ThinkSystem DM5100F All Flash Storage Array for cluster interconnect and MetroCluster IP configurations.

Table 15. 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 and directors for high-performance storage expansion. See the DB Series product guides for models and configuration options:

- ThinkSystem DB Series SAN Switches and Directors:
  https://lenovopress.com/storage/switches/rack#rt=product-guide

## Rack cabinets

The following table lists the supported rack cabinets.

Table 16. 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 17. 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) | |
| 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 |
| 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 18. Uninterruptible power supply units

| Part number | Description |
|---|---|
| 55941KX | RT1.5kVA 2U Rack or Tower UPS (200-240VAC) |
| 55942KX | RT2.2kVA 2U Rack or Tower UPS (200-240VAC) |
| 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.

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## Related publications and links

For more information, see the following resources:

- Lenovo Data Center SAN Storage product page
  http://www.lenovo.com/us/en/c/storage-area-network
- Lenovo Data Center Solution Configurator
  http://dcsc.lenovo.com
- ThinkSystem DM Series documentation
  http://thinksystem.lenovofiles.com/storage/help/topic/ontap_software/overview.html
- Lenovo Data Center Support - ThinkSystem DM5100F
  http://datacentersupport.lenovo.com/products/storage/lenovo-storage/thinksystem-dm5100f

## Related product families

Product families related to this document are the following:

- DM Series Storage
- Lenovo Storage
- External Storage

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