

Lenovo ThinkSystem DM3000H Unified Hybrid Storage Array

Product Guide

Lenovo ThinkSystem DM3000H is a unified, hybrid storage system that is designed to provide performance, simplicity, capacity, security, and high availability for small enterprises and remote offices/branch offices of large enterprises. Powered by the ONTAP software, ThinkSystem DM3000H delivers enterprise-class storage management capabilities with a wide choice of host connectivity options, flexible drive configurations, and enhanced data management features.

The ThinkSystem DM3000H is a perfect fit for small offices and remote and branch offices of large enterprises that run a wide range of general purpose workloads, including file services, virtualization, Microsoft applications, backup and archiving, and other storage I/O-intensive applications.

ThinkSystem DM3000H models are 2U rack-mount controller enclosures that include two controllers, 64 GB RAM and 8 GB battery-backed NVRAM per system (32 GB RAM and 4 GB NVMRAM per controller), and 12 LFF hot-swap drive bays (2U12 form factor). Controllers provide universal 1/10 GbE NAS/iSCSI or 4/8/16 Gb Fibre Channel (FC) ports, or 1/10 GbE RJ-45 ports for host connectivity.

A single ThinkSystem DM3000H Storage Array scales up to 144 drives with the attachment of ThinkSystem DM120S 2U12 LFF, DM600S 4U60 LFF, and DM240S 2U24 SFF Expansion Enclosures.



Figure 1. Lenovo ThinkSystem DM3000H

Up to 12 DM3000H Storage Arrays can be combined into a clustered system in a NAS environment, or up to 6 DM3000H Storage Arrays can be combined into a clustered system in a SAN environment.

Did you know?

A single ThinkSystem DM3000H can scale up to 2.3 PB of raw storage capacity. A cluster of the DM3000H storage arrays can scale up to 27.6 PB for NAS or up to 13.8 PB for SAN environments.

The ThinkSystem DM3000H offers unified file and block storage connectivity with support for 1 GbE or 10 GbE NAS and iSCSI, and 8 Gb or 16 Gb Fibre Channel protocols at the same time.

Key features

The ThinkSystem DM3000H offers the following key features and benefits:

- Unified, hybrid 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 client needs with support for unified NAS and SAN storage protocols, including 1/10 GbE NAS and iSCSI, and 4/8/16 Gb Fibre Channel connectivity.
- 12 Gb SAS drive-side connectivity with multipathing with up to 12x 3.5-inch large form factor (LFF) drives in the 2U12 LFF enclosures, up to 60x 3.5-inch LFF drives in the 4U60 LFF expansion enclosures, or up to 24x 2.5-inch small form factor (SFF) drives in the 2U24 SFF expansion enclosures.
- Scalability to up to 144 LFF drives with the attachment of the ThinkSystem DM120S 2U12 LFF, DM600S 4U60 LFF, or DM240S 2U24 SFF expansion enclosures to satisfy growing needs for storage capacity.
- Flexibility in storing data on capacity-optimized SAS SSDs, performance-optimized enterprise SAS HDDs, or capacity-optimized enterprise NL SAS HDDs; mixing and matching drive types within a single system to perfectly meet performance and capacity requirements for various workloads.
- Acceleration of read-centric workloads with the high-speed, low-latency onboard NVMe SSD caching.
- A comprehensive set of advanced storage management features with the ONTAP software, including SSD read cache, hybrid storage pools, 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.
- A core set of storage management features with the ONTAP Fundamentals software, including SSD read cache, hybrid storage pools, snapshots, quality of service, thin provisioning, compression, deduplication, encryption, quick data recovery, asynchronous replication, and up to 84 drives.
- 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, cooling modules (4U60 LFF enclosures only), and non-disruptive firmware upgrades.
- Certified storage for Oracle VM.
- Certified storage for Citrix XenServer: http://hcl.xenserver.org/storage/910/Lenovo_DM_Series.

The ThinkSystem DM3000H supports the following drives:

- 2U12 LFF and 4U60 LFF high-capacity nearline HDDs: 4 TB, 8 TB, 10 TB, and 16 TB 7.2K rpm
- 2U24 SFF capacity-optimized SSDs: 960 GB, 3.84 TB, 7.68 TB, and 15.36 TB
- 2U24 SFF enterprise SAS HDDs: 900 GB, 1.2 TB, and 1.8 TB 10K rpm

All drives are dual-port and hot-swappable.

The ThinkSystem DM3000H supports attachment of the following ThinkSystem DM Series expansion enclosures:

- Up to 9x DM120S 2U12 LFF enclosures.
- Up to 2x DM600S 4U60 LFF enclosures.

- Up to 5x DM240S 2U24 SFF enclosures.
- A combination of the DM120S, DM600S, and DM240S enclosures for a maximum of 144 drives.

Customers can intermix 2U12 LFF, 4U60 LFF, and 2U24 SFF expansion enclosures behind a 2U12 LFF controller enclosure. This configuration delivers the added flexibility to mix 3.5-inch and 2.5-inch drives within a single system (but not within the enclosure).

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 DM3000H 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
- Dual-port SAS HDDs with automatic drive failure detection and rebuild
- Redundant, hot-swappable and customer replaceable hardware components, including SFP+ transceivers, controllers, I/O modules, power supplies, cooling modules (4U60 LFF only), 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 DM3000H or DM120S 2U12 LFF enclosure.

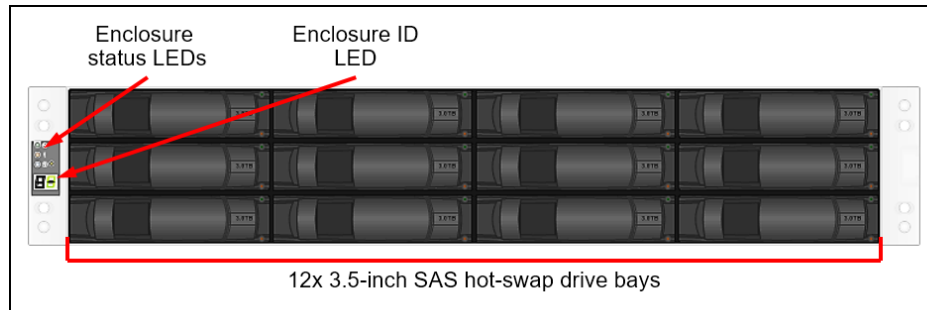


Figure 2. ThinkSystem DM3000H or DM120S 2U12 LFF enclosure front view

The front of the DM3000H or DM120S 2U LFF enclosure includes the following components:

- 12 LFF hot-swap drive bays
- Enclosure status LEDs
- Enclosure ID LED

The following figure shows the rear of the ThinkSystem DM3000H 2U controller enclosure with universal SFP+ host ports.

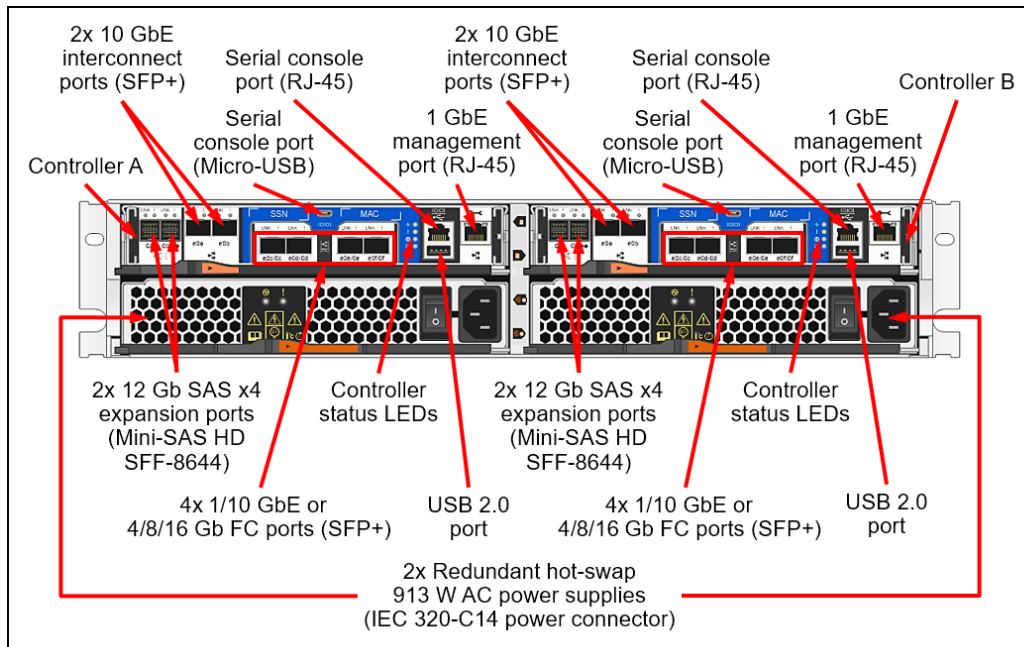


Figure 3. ThinkSystem DM3000H 2U controller enclosure rear view: Universal SFP+ host ports

The following figure shows the rear of the ThinkSystem DM3000H 2U controller enclosure with 10GBASE-T host ports.

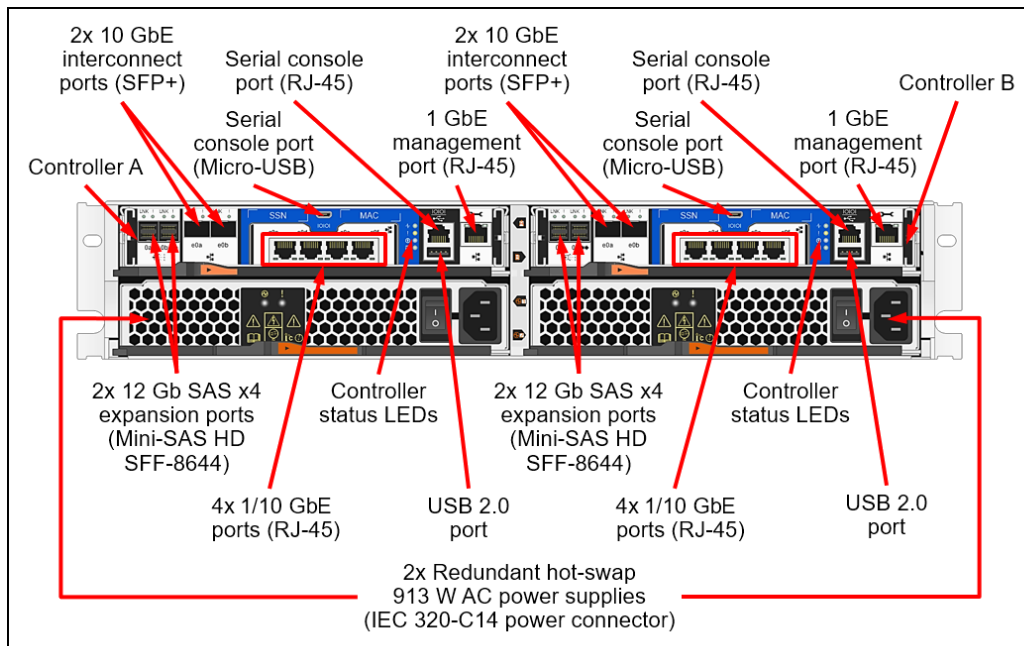


Figure 4. ThinkSystem DM3000H 2U controller enclosure rear view: 10GBASE-T host ports

The rear of the ThinkSystem DM3000H 2U controller enclosure includes the following components:

- Two redundant hot-swap controllers, each with the following ports:
 - Two SFP+ interconnect ports for direct-attach HA pair or switched cluster connections.
 - Four SFP+ host ports for 1/10 Gb GbE or 4/8/16 Gb FC connectivity, or four 1/10 GbE RJ-45 ports.
 - Two 12 Gb SAS x4 ports (Mini-SAS HD SFF-8644) for connections to the expansion enclosures.
 - 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 2.0 Type A port (for ONTAP software installation or booting)
- Two redundant hot-swap 913 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 DM240S 2U SFF expansion enclosure.

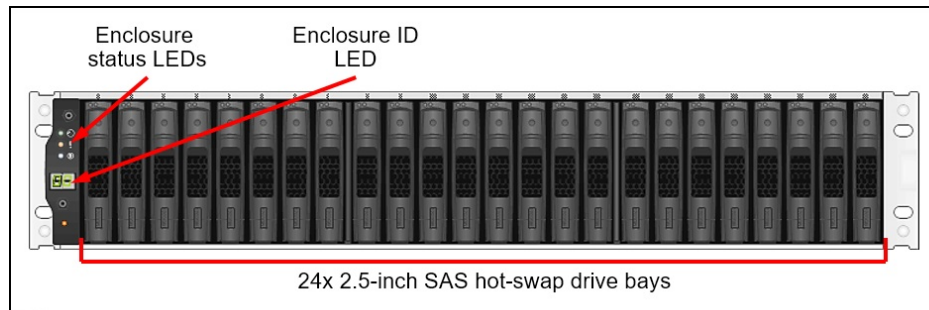


Figure 5. ThinkSystem DM240S expansion enclosure front view

The front of the ThinkSystem DM240S 2U SFF 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 DM120S and DM240S 2U expansion enclosure.

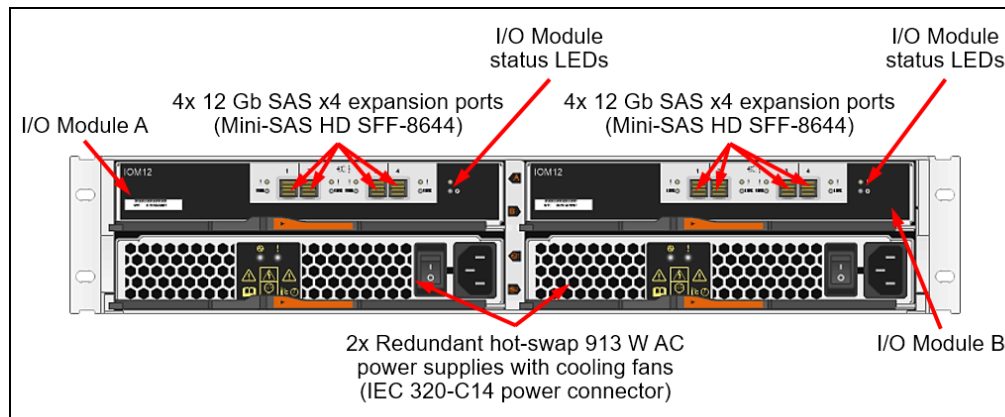


Figure 6. ThinkSystem DM120S or DM240S 2U expansion enclosure rear view

The rear of the DM120S and DM240S 2U 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.

The following figure shows the front of the ThinkSystem DM600S 4U LFF expansion enclosure.

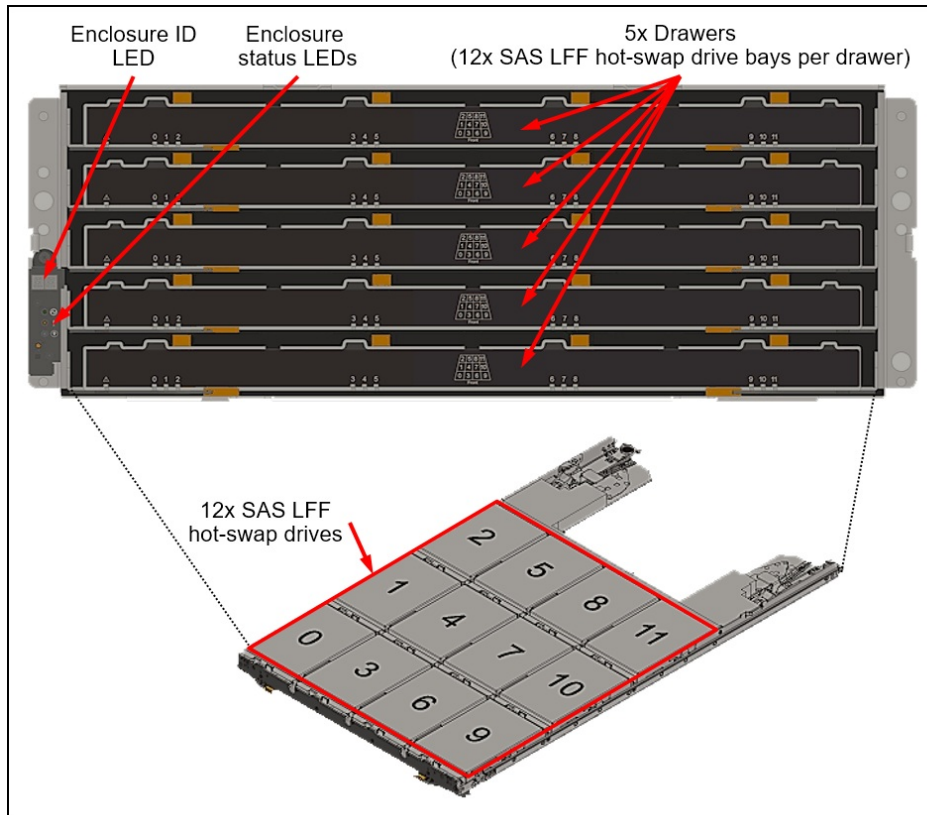


Figure 7. ThinkSystem DM600S 4U LFF expansion enclosure front view

The front of the ThinkSystem DM600S 4U LFF expansion enclosure includes the following components:

- Five drawers, each with 12 LFF hot-swap drive bays.
- Enclosure status LEDs.
- Enclosure ID LED.

The following figure shows the rear of the ThinkSystem DM600S 4U LFF expansion enclosure.

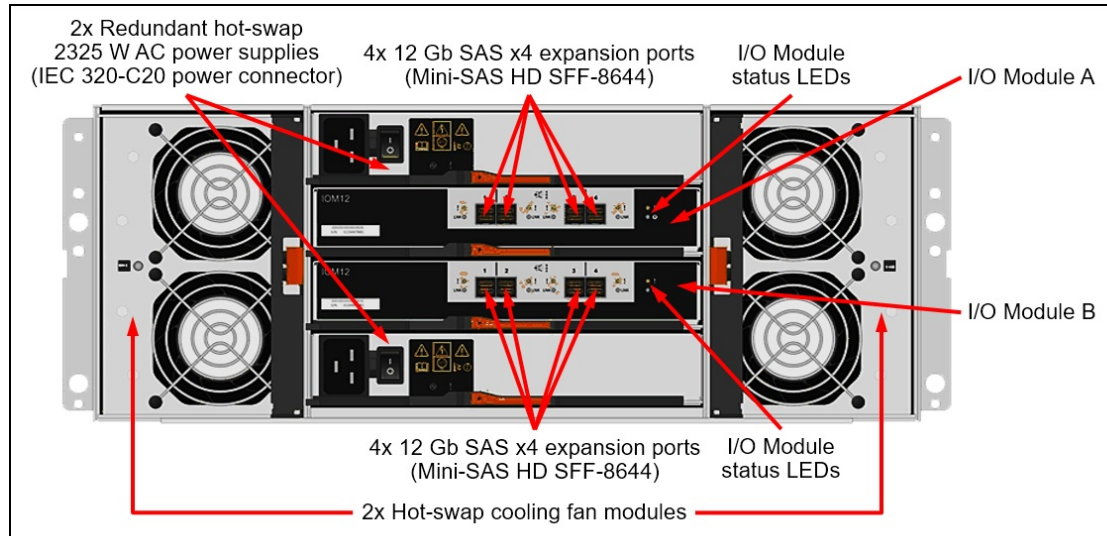


Figure 8. ThinkSystem DM600S 4U LFF expansion enclosure rear view

The rear of the ThinkSystem DM600S 4U LFF expansion enclosure includes the following components:

- Two redundant hot-swappable 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-swappable 2325 W (200 - 240 V) AC power supplies (IEC 320-C20 power connector)
- Two hot-swappable cooling fan modules; each module has two fans.
Note: The failed cooling module should be replaced as soon as possible.
- I/O Module status LEDs.

System specifications

The following table lists the ThinkSystem DM3000H 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 Release notes of the particular software release for the ThinkSystem DM3000H that can be found at:

<http://datacentersupport.lenovo.com>

Table 1. ThinkSystem DM3000H system specifications

| Attribute | Specification |
|------------------------------------|---|
| Form factor | <ul style="list-style-type: none"> • DM3000H controller enclosure (7Y42, 7D7U): 2U rack mount • DM120S 2U12 LFF expansion enclosure (7Y59, 7D7X): 2U rack mount • DM240S 2U24 SFF expansion enclosure (7Y58, 7D7Y): 2U rack mount • DM600S 4U60 LFF expansion enclosure (7Y43, 7D7Z): 4U 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. Note: The ONTAP Fundamentals software does not support clustering. |
| HA pair/cluster interconnect ports | 4x 10 GbE SFP+ ports (DAC cables or SW fiber optics [LC]) (2 ports per controller). |
| RAID levels | RAID-4, RAID-DP, RAID-TEC. |

| Attribute | Specification |
|------------------------------|--|
| Controller memory | 64 GB RAM per system (32 GB per controller). 8 GB battery-backed NVRAM per system (4 GB per controller) mirrored between the controllers. |
| Controller cache | 2 TB NVMe-based Flash Cache (1 TB per controller). |
| Drive bays | <ul style="list-style-type: none"> Up to 144 LFF hot-swap drive bays (1x 2U12 controller enclosure + up to 11x 2U12 or up to 2x 4U60 LFF expansion enclosures). Up to 120 SFF and 24 LFF hot-swap drive bays (1x 2U12 controller enclosure + up to 5x 2U24 SFF and 1x 2U12 LFF expansion enclosures). <p>Intermix of 2U12 LFF, 4U60 LFF, and 2U24 SFF enclosures is supported. Note: ONTAP Fundamentals software supports up to 84 drives.</p> |
| Drive technology | 12 Gb NL SAS HDDs, 12 Gb SAS SSDs, 12 Gb SAS HDDs. |
| Drive expansion connectivity | <ul style="list-style-type: none"> 2x 12 Gb SAS x4 (Mini-SAS HD SFF-8644) expansion ports on each of two controllers in the controller enclosure for the attachment of the expansion enclosures. 4x 12 Gb SAS x4 (Mini-SAS HD SFF-8644) expansion ports on each of two I/O modules in the expansion enclosure for the attachment to the controller enclosure and daisy chaining of the expansion enclosures. |
| Drives | <ul style="list-style-type: none"> 2U12 LFF drives: 4 TB, 8 TB, 10 TB, and 16 TB 7.2K rpm NL SAS HDDs 4U60 LFF drives: 4 TB, 8 TB, 10 TB, and 16 TB 7.2K rpm NL SAS HDDs 2U24 SFF drives: <ul style="list-style-type: none"> 960 GB, 3.84 TB, 7.68 TB, and 15.36 TB SAS SSDs (1 DWD). 900 GB, 1.2 TB, and 1.8 TB 10K rpm SAS HDDs. |
| Storage capacity | Up to 2.3 PB (144x 16 TB LFF HDDs). |
| Storage protocols | <ul style="list-style-type: none"> NAS (File access): NFS and CIFS/SMB. SAN (Block access): iSCSI and FC. |
| Host connectivity | <p>Base ports (per controller enclosure):</p> <ul style="list-style-type: none"> 8x 1 GbE (RJ-45 UTP)/10 GbE (DAC cable or SW fiber optic cable, LC) or 4/8/16 Gb FC (SW fiber optic cable, LC) SFP+ host ports (4 ports per controller); or 8x 1/10 GbE RJ-45 UTP host ports (4 ports per controller). |
| Performance* | Up to 148 000 random read IOPS (8 KB blocks). |
| Configuration maximums** | <ul style="list-style-type: none"> Maximum raw storage capacity: 2.3 PB Maximum flash pool cache size: 24 TB Maximum aggregate size: 400 TB Maximum number of FlexVol volumes per controller: 1000 Maximum FlexVol volume size: 100 TB Maximum number of LUNs per controller: 8192 Maximum number of LUNs per FlexVol volume: 512 Maximum LUN size: 16 TB Maximum number of drives in a RAID group (data + parity drives): <ul style="list-style-type: none"> RAID 4: 14 (13 + 1 SAS SSDs) or 7 (6 + 1 NL SAS HDDs) RAID-DP: 28 (26 + 2 SAS SSDs) or 20 (18 + 2 NL SAS HDDs) RAID-TEC: 29 (26 + 3 SAS SSDs or NL SAS HDDs) Maximum number of initiators per controller: 2048 Maximum number of snapshots per FlexVol volume: 1023 |
| Cooling | Redundant cooling with two cooling modules (DM600S 4U LFF) or with the fans that are built into power supplies (DM3000H, DM120S 2U12 LFF, and DM240S 2U24 SFF). |
| Power supply | Two redundant hot-swap 913 W (100 - 240 V) (DM3000H, DM120S 2U12 LFF, and DM240S 2U24 SFF enclosures) or 2325 W (200 - 240 V) (DM600S 4U60 LFF enclosures) Platinum AC power supplies. |
| Hot-swap parts | Controllers, I/O modules, drives, power supplies, cooling modules (DM600S 4U60 LFF only), and SFP+ transceivers and DAC cables. |

| Attribute | Specification |
|-----------------------|--|
| Management ports | <ul style="list-style-type: none"> 1x 1 GbE port (UTP, RJ-45) per controller for out-of-band management. 2x Serial console ports (RJ-45 and Micro-USB) for system configuration. |
| Management interfaces | ThinkSystem Storage Manager web-based GUI; SSH CLI; Serial console CLI; SNMP, email, and syslog alerts; optional Lenovo XClarity. |
| Security features | Secure Socket Layer (SSL), Secure Shell (SSH), user level security, role-based access control (RBAC), LDAP authentication. |
| Warranty and support | 1-year or 3-year base warranty, 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 | Controller enclosure: <ul style="list-style-type: none"> Height: 87 mm (3.4 in.), width: 447 mm (17.6 in.), depth: 508 mm (20.0 in.) 2U12 LFF expansion enclosure: <ul style="list-style-type: none"> Height: 87 mm (3.4 in.), width: 447 mm (17.6 in.), depth: 505 mm (19.0 in.) 4U60 LFF expansion enclosure: <ul style="list-style-type: none"> Height: 174 mm (6.9 in.), width: 449 mm (17.7 in.), depth: 922 mm (36.3 in.) 2U24 SFF expansion enclosure: <ul style="list-style-type: none"> Height: 85 mm (3.4 in.), width: 449 mm (17.7 in.), depth: 484 mm (19.1 in.) |
| Weight | <ul style="list-style-type: none"> Controller enclosure (fully configured): 28.9 kg (63.7 lb) 2U12 LFF expansion enclosure (fully configured): 28.7 kg (63.3 lb) 4U60 LFF expansion enclosure (fully configured): 111.5 kg (245.8 lb) 2U24 SFF expansion enclosure (fully configured): 24.4 kg (53.8 lb) |

* 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 Support website:

<http://datacentersupport.lenovo.com>

Controller enclosures

Preconfigured and factory-integrated models of the ThinkSystem DM3000H Unified Hybrid Storage Array are configured by using the Lenovo Data Center Solution Configurator (DCSC), <http://dcsc.lenovo.com>

The following table lists the CTO base models of the ThinkSystem DM3000H.

Table 2. ThinkSystem DM3000H CTO base models

| Description | Machine Type/Model | Feature code |
|--|---------------------------|--------------|
| Lenovo ThinkSystem DM3000H (1-year warranty) | 7Y42CTO1WW | B38M |
| Lenovo ThinkSystem DM3000H (3-year warranty) | 7D7UCTO1WW 7D7UCTORWW* | BEY6 |

* CTORWW is for customers in Russia; CTO1WW is for all other markets

Configuration note:

- Two DM3000/DM5000 10GBASE-T controllers (feature code B39G) or two DM3000/DM5000 SFP+ controllers (feature code B39F) must be selected during the CTO configuration process, and both controllers must be of the same type (either 10GBASE-T or SFP+).

The following table lists the preconfigured models of the ThinkSystem DM3000H.

Table 3. Preconfigured models for NA

| Description | Part number |
|---|-------------|
| Relationship models - North America (NA) - 1 year warranty | |
| ThinkSystem DM3000H, 48TB (12x 4TB HDDs), 16Gb FC / 10GbE SFP+, 8x 10Gb iSCSI SFP+ optical modules, 2x 0.5m Passive DAC SFP+ cables, ONTAP 9.7 SW Fundamentals, Encryption (No support included*) | 7Y42A000NA |

* Support must be purchased with the storage system (See [Warranty and support](#) for details).

Table 4. Preconfigured models for EMEA

| Description | Model for EU countries | Models for non-EU countries |
|--|------------------------|-----------------------------|
| Relationship models - Europe, Middle East, and Africa (EMEA) - 1 year warranty | | |
| ThinkSystem DM3000H, 12x4TB HDD, Fundamentals Bundle 9.7, NVE, 10G BaseT | 7Y42100UEA | 7Y42100FEA |
| ThinkSystem DM3000H, 12x4TB HDD, Fundamentals Bundle 9.7, NVE, CNA | 7Y42100VEA | 7Y42100CEA |
| ThinkSystem DM3000H, 12x4TB HDD, Fundamentals Bundle 9.7, Non-NVE, CNA | 7Y42100XEA | 7Y42100DEA |
| ThinkSystem DM3000H, 12x4TB HDD, Fundamentals Bundle 9.7, Non-NVE, 10G BaseT | 7Y42100YEA | 7Y42100EEA |
| ThinkSystem DM3000H, 12x8TB HDD, Fundamentals Bundle 9.7, Non-NVE, CNA | 7Y421011EA | 7Y42100JEA |
| ThinkSystem DM3000H, 12x8TB HDD, Fundamentals Bundle 9.7, NVE, 10G BaseT | 7Y421012EA | 7Y42100GEA |
| ThinkSystem DM3000H, 12x8TB HDD, Fundamentals Bundle 9.7, NVE, CNA | 7Y421013EA | 7Y42100KEA |
| ThinkSystem DM3000H, 12x8TB HDD, Fundamentals Bundle 9.7, Non-NVE, 10G BaseT | 7Y421015EA | 7Y42100HEA |
| ThinkSystem DM3000H, 12x4TB HDD, Premium Bundle 9.7, NVE, 10G BaseT | 7Y42100WEA | 7Y42100PEA |
| ThinkSystem DM3000H, 12x4TB HDD, Premium Bundle 9.7, NVE, CNA | 7Y42100ZEA | 7Y42100LEA |
| ThinkSystem DM3000H, 12x4TB HDD, Premium Bundle 9.7, Non-NVE, 10G BaseT | 7Y421010EA | 7Y42100NEA |
| ThinkSystem DM3000H, 12x4TB HDD, Premium Bundle 9.7, Non-NVE, CNA | 7Y421014EA | 7Y42100MEA |
| ThinkSystem DM3000H, 12x8TB HDD, Premium Bundle 9.7, NVE, CNA | 7Y421016EA | 7Y42100TEA |
| ThinkSystem DM3000H, 12x8TB HDD, Premium Bundle 9.7, NVE, 10G BaseT | 7Y421017EA | 7Y42100QEA |
| ThinkSystem DM3000H, 12x8TB HDD, Premium Bundle 9.7, Non-NVE, CNA | 7Y421018EA | 7Y42100SEA |
| ThinkSystem DM3000H, 12x8TB HDD, Premium Bundle 9.7, Non-NVE, 10G BaseT | 7Y421019EA | 7Y42100REA |

The models of the ThinkSystem DM3000H ship with the following items:

- One chassis with the following components:
 - Two controllers with the configured software version (No Encryption or Encryption Capable)
 - Two power supplies
- Rack Mount Kit
- 2 m USB Cable (USB Type A to Micro-USB)
- *Electronic Publications Flyer*
- Two power cables:
 - CTO models: Two customer-configured power cables
 - Preconfigured models in Table 2: Two 2.8m 10A/100-250V, C13 to C14 Rack Power Cables
- Additional configured components (model-specific)

Controllers

The ThinkSystem DM3000H controller enclosures ship with two 10GBASE-T or SFP+ controllers. A controller provides interfaces for host connectivity, management, and internal drives, and it runs ONTAP storage management software. Each DM3000H controller enclosure provides 64 GB RAM, 8 GB NVRAM, and 2 TB NVMe SSD flash cache (32 GB RAM, 4 GB battery-backed NVRAM, and 1 TB NVMe SSD flash cache per controller).

The ThinkSystem DM3000H controller enclosures ship with four interconnect 10 GbE SFP+ ports (two ports per controller) to cable a directly-connected dual-controller HA pair or for switched cluster interconnect with multiple dual-controller HA pairs. 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.

The ThinkSystem DM3000H controller enclosures ship with one of the following interface types:

- 8x Universal SFP+ ports (four ports per controller) for 1/10 GbE NAS / iSCSI or 16 Gb FC host connectivity.
- 8x 1/10 GbE RJ-45 ports (four ports per controller) for 1/10 GbE NAS / iSCSI host connectivity.

Each DM3000H controller enclosure also provides four integrated 12 Gb SAS x4 expansion ports (Mini-SAS HD SFF-8644 connectors) (two ports per controller) for the attachment of the ThinkSystem DM Series expansion enclosures.

Configuration notes:

- Two controllers are required for selection. Both controllers must be of the same type (either 16 Gb FC / 10 GbE or 10GBASE-T, but not both types), and they must have matching configurations of the base ports (type and physical connections).
- A pair of the universal SFP+ base ports (e0c/0c and e0d/0d or e0e/0e and e0f/0f) in the system must have the same connectivity type (either Ethernet or Fibre Channel, but not both types) and the same type of physical connections; different pairs might have different types of connectivity.

The following table lists the controllers for the DM3000H storage array and supported connectivity options.

Table 5. DM3000H controllers and connectivity options

| Description | Part number | Feature code | Maximum quantity per controller enclosure |
|---|-------------|--------------|---|
| Controllers | | | |
| Lenovo ThinkSystem DM3000/DM5000 Controller, 10GBASE-T | None* | B39G | 2 |
| Lenovo ThinkSystem DM3000/DM5000 Controller, 16Gb FC / 10GbE | None* | B39F | 2 |
| SFP+ options for base ports | | | |
| 1Gb RJ-45 iSCSI SFP+ Module 1 pack | 4XF7A14917 | B4K7 | 8 |
| 8Gb Fibre Channel SFP+ Module 1 pack | 4XF7A14918 | B4K8 | 8 |
| 16Gb Fibre Channel SFP+ Module 1 pack | 4XF7A14920 | B4KA | 8 |
| SFP+ options for base ports and interconnect ports | | | |
| 10Gb SW Optical iSCSI SFP+ Module 1 pack | 4XF7A14919 | B4K9 | 12 |
| OM4 cable options for 8 Gb FC, 16 Gb FC, and 10 GbE SW SFP+ optical transceivers | | | |
| Lenovo 0.5m LC-LC OM4 MMF Cable | 4Z57A10845 | B2P9 | 12 |
| Lenovo 1m LC-LC OM4 MMF Cable | 4Z57A10846 | B2PA | 12 |
| Lenovo 3m LC-LC OM4 MMF Cable | 4Z57A10847 | B2PB | 12 |
| Lenovo 5m LC-LC OM4 MMF Cable | 4Z57A10848 | B2PC | 12 |
| Lenovo 10m LC-LC OM4 MMF Cable | 4Z57A10849 | B2PD | 12 |

| Description | Part number | Feature code | Maximum quantity per controller enclosure |
|---|-------------|--------------|---|
| Lenovo 15m LC-LC OM4 MMF Cable | 4Z57A10850 | B2PE | 12 |
| Lenovo 25m LC-LC OM4 MMF Cable | 4Z57A10851 | B2PF | 12 |
| Lenovo 30m LC-LC OM4 MMF Cable | 4Z57A10852 | B2PG | 12 |
| OM3 cable options for 8 Gb FC, 16 Gb FC, and 10 GbE SW SFP+ optical transceivers | | | |
| Lenovo 0.5m LC-LC OM3 MMF Cable | 00MN499 | ASR5 | 12 |
| Lenovo 1m LC-LC OM3 MMF Cable | 00MN502 | ASR6 | 12 |
| Lenovo 3m LC-LC OM3 MMF Cable | 00MN505 | ASR7 | 12 |
| Lenovo 5m LC-LC OM3 MMF Cable | 00MN508 | ASR8 | 12 |
| Lenovo 10m LC-LC OM3 MMF Cable | 00MN511 | ASR9 | 12 |
| Lenovo 15m LC-LC OM3 MMF Cable | 00MN514 | ASRA | 12 |
| Lenovo 25m LC-LC OM3 MMF Cable | 00MN517 | ASRB | 12 |
| Lenovo 30m LC-LC OM3 MMF Cable | 00MN520 | ASRC | 12 |
| DAC cable options for 10 GbE SFP+ connectivity (SFP+ base, adapter card, and interconnect ports) | | | |
| 0.5m Passive DAC SFP+ Cable | 00D6288 | A3RG | 12 |
| 1m Passive DAC SFP+ Cable | 90Y9427 | A1PH | 12 |
| 1.5m Passive DAC SFP+ Cable | 00AY764 | A51N | 12 |
| 2m Passive DAC SFP+ Cable | 00AY765 | A51P | 12 |
| 3m Passive DAC SFP+ Cable | 90Y9430 | A1PJ | 12 |
| 5m Passive DAC SFP+ Cable | 90Y9433 | A1PK | 12 |
| 7m Passive DAC SFP+ Cable | 00D6151 | A3RH | 12 |
| UTP Category 6 cables options for 1/10 GbE RJ-45 host connectivity and 1 GbE RJ-45 management ports | | | |
| 0.75m Green Cat6 Cable | 00WE123 | AVFW | 10 |
| 1.0m Green Cat6 Cable | 00WE127 | AVFX | 10 |
| 1.25m Green Cat6 Cable | 00WE131 | AVFY | 10 |
| 1.5m Green Cat6 Cable | 00WE135 | AVFZ | 10 |
| 3m Green Cat6 Cable | 00WE139 | AVG0 | 10 |
| 10m Green Cat6 Cable | 90Y3718 | A1MT | 10 |
| 25m Green Cat6 Cable | 90Y3727 | A1MW | 10 |

* Factory-installed only.

Expansion enclosures

The ThinkSystem DM3000H supports attachment of the following DM Series expansion enclosures:

- Up to 9x DM120S 2U12 LFF enclosures.
- Up to 2x DM600S 4U60 LFF enclosures.
- Up to 5x DM240S 2U24 SFF enclosures.
- A combination of the DM120S, DM600S, and DM240S enclosures for a total of up to 144 drives.
- **Note:** The ONTAP Fundamentals software supports up to 84 drives.

DM120S 2U12 LFF, DM600S 4U60 LFF, and DM240S 2U24 SFF expansion enclosures can be intermixed behind a 2U12 controller enclosure. The expansion enclosures 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

| Description | Machine Type/Model | Feature code |
|-------------------------------------|--------------------|--------------|
| 1-year warranty | | |
| DM120S 2U12 LFF Expansion Enclosure | 7Y59CTO1WW | BEY6 |
| DM240S 2U24 SFF Expansion Enclosure | 7Y58CTO1WW | BEY7 |
| DM600S 4U60 LFF Expansion Enclosure | 7Y43CTO1WW | BEY8 |
| 3-year warranty | | |
| DM120S 2U12 LFF Expansion Enclosure | 7D7XCTO1WW | BEY6 |
| DM240S 2U24 SFF Expansion Enclosure | 7D7YCTO1WW | BEY7 |
| DM600S 4U60 LFF Expansion Enclosure | 7D7ZCTO1WW | BEY8 |

Configuration note: Two I/O expansion modules (feature code B39J) are pre-selected by the configurator.

The models of the DM120S, DM240S and DM600S ship with the following items:

- One chassis with the following components:
 - Two I/O expansion modules
 - Two power supplies
 - Two cooling modules (4U60 LFF only)
- Rack Mount Kit
- Electronic Publications Flyer
- Two customer-configured power cables
- Additional configured components (model-specific)

Each ThinkSystem DM Series expansion enclosure ships with two SAS I/O expansion modules. Each *I/O expansion module* provides two external 12 Gb SAS x4 ports (Mini-SAS HD SFF-8644 connectors labelled Port 1-4) that are used for connections to the ThinkSystem DM3000H and for daisy chaining the expansion enclosures between each other.

The dual-path HA (high availability) connectivity topology for the enclosures is shown in the following figure.

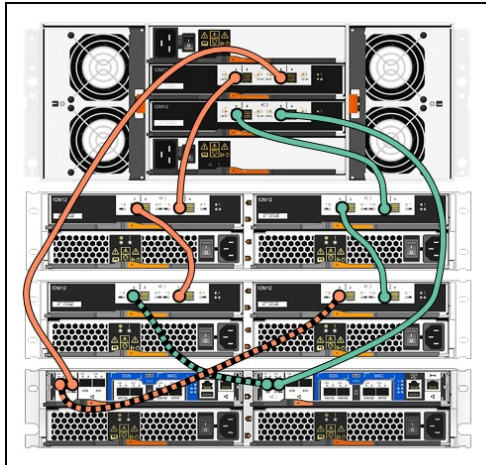


Figure 9. DM3000H expansion enclosure connectivity topology

Expansion cabling rules:

- Port 0b on the Controller 1 is the primary path that is connected to the Port 3 on the I/O Module A in the last expansion enclosure in a stack.
- Port 1 on the I/O Module A in the last expansion enclosure is connected to Port 3 on the I/O Module A in the adjacent expansion enclosure, and so on (until the first expansion enclosure in a stack is cabled).
- Port 0a on the Controller 1 is the secondary path that is connected to the Port 1 on the I/O Module B in the first expansion enclosure in a stack.
- Port 0b on the Controller 2 is the primary path that is connected to the Port 3 on the I/O Module B in the last expansion enclosure in a stack.
- Port 1 on the I/O Module B in the last expansion enclosure is connected to Port 3 on the I/O Module B in the adjacent expansion enclosure, and so on (until the first expansion enclosure in a stack is cabled).
- Port 0a on the Controller 2 is the secondary path that is connected to the Port 1 on the I/O Module A in the first expansion enclosure in a stack.

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

Table 7. 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 for the stack of the 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 2U12 enclosure to an adjacent 4U60 enclosure should be at least 1 meter.

Drives

The DM3000H and DM120S 2U12 LFF enclosures support up to 12 LFF hot-swap drives, the DM600S 4U60 LFF expansion enclosures support up to 60 LFF hot-swap drives, and the DM240S 2U24 SFF expansion enclosures support up to 24 SFF hot-swap drives.

Shipping requirement: 2U12 and 2U24 enclosures can be shipped with all drive bays populated, however the 4U60 enclosures must be shipped with drives removed.

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

Configuration notes:

- When ordering the systems, select the drives that match the ONTAP offering and bundle you are installing on the DM controller. Drive feature codes are specific to Unified or SAN Only offerings, and to Base, Fundamentals and Premium bundles. See the [Software](#) section for details.
- Drives are sold in packs. Supported quantities are as follows:
 - The DM3000H 2U12 LFF controller enclosure supports 12 LFF drives
 - The DM120S 2U12 LFF expansion enclosure support either 6 or 12 LFF drives
 - The DM600S 4U60 LFF expansion enclosures support either 30 or 60 LFF drives
 - The DM240S 2U24 SFF expansion enclosures support 6, 12, 18 or 24 SFF drives
- For factory-installed drive packs, all drives in the enclosure must be of the same type and capacity.

Field upgrades: Drive packs for field upgrades can be ordered via the CTO base 7D4FCTO4WW, ThinkSystem DM Drive Pack Upgrades. These are for use in existing expansion enclosures that have not been fully populated with the factory-installed drive packs

Table 8. DM3000H and DM120S 2U12 LFF drive packs for ONTAP

| Description | Part number | Feature code | Maximum quantity per 2U12 enclosure |
|--|-------------|--------------|-------------------------------------|
| 3.5-inch 12 Gbps NL SAS hot-swap HDDs | | | |
| ThinkSystem 24TB (6x 4TB NL SAS HDDs) 2U12 Drive Pack for DM3000H | 4XB7A16960 | B66B | 2 |
| ThinkSystem 48TB (6x 8TB NL SAS HDDs) 2U12 Drive Pack for DM3000H | 4XB7A16962 | B66D | 2 |
| ThinkSystem 60TB (6x 10TB NL SAS HDDs) 2U12 Drive Pack for DM3000H | 4XB7A16964 | B66F | 2 |
| ThinkSystem 96TB (6x 16TB NL SAS HDDs) 2U12 Drive Pack for DM3000H | 4XB7A65397 | BCV4 | 2 |

Table 9. DM3000H and DM120S 2U12 LFF drive packs for ONTAP Fundamentals

| Description | Part number | Feature code | Maximum quantity per 2U12 enclosure |
|---|-------------|--------------|-------------------------------------|
| 3.5-inch 12 Gbps NL SAS hot-swap HDDs | | | |
| 24TB (6x 4TB NL SAS HDDs) 2U12 Drive Pack for DM3000H - Fundamentals | 4XB7A39373 | B72R | 2 |
| 48TB (6x 8TB NL SAS HDDs) 2U12 Drive Pack for DM3000H - Fundamentals | 4XB7A39374 | B72S | 2 |
| 60TB (6x 10TB NL SAS HDDs) 2U12 Drive Pack for DM3000H - Fundamentals | 4XB7A39375 | B72T | 2 |

| Description | Part number | Feature code | Maximum quantity per 2U12 enclosure |
|---|-------------|--------------|-------------------------------------|
| 96TB (6x 16TB NL SAS HDDs) 2U12 Drive Pack for DM3000H - Fundamentals | 4XB7A65399 | BCV6 | 2 |

The following table lists supported drive packs for the DM600S 4U60 LFF expansion enclosures.

Table 10. DM600S 4U60 LFF drive packs for ONTAP

| Description | Part number | Feature code | Maximum quantity per 4U60 enclosure |
|--|-------------|--------------|-------------------------------------|
| 3.5-inch 12 Gbps NL SAS hot-swap HDDs | | | |
| ThinkSystem 120TB (30x 4TB NL SAS HDDs) 4U60 Drive Pack for DM3000H | 4XB7A14684 | B3X3 | 2 |
| ThinkSystem 240TB (30x 8TB NL SAS HDDs) 4U60 Drive Pack for DM3000H | 4XB7A14685 | B3WZ | 2 |
| ThinkSystem 300TB (30x 10TB NL SAS HDDs) 4U60 Drive Pack for DM3000H | 4XB7A14686 | B3X1 | 2 |
| ThinkSystem 480TB (30x 16TB NL SAS HDDs) 4U60 Drive Pack for DM3000H | 4XB7A65405 | BCVC | 2 |

Table 11. DM600S 4U60 LFF drive packs for ONTAP Fundamentals

| Description | Part number | Feature code | Maximum quantity per 4U60 enclosure |
|---|-------------|--------------|-------------------------------------|
| 3.5-inch 12 Gbps NL SAS hot-swap HDDs | | | |
| 120TB (30x 4TB NL SAS HDDs) 4U60 Drive Pack for DM3000H - Fundamentals | 4XB7A39389 | B73Q | 2 |
| 240TB (30x 8TB NL SAS HDDs) 4U60 Drive Pack for DM3000H - Fundamentals | 4XB7A39390 | B73R | 2 |
| 300TB (30x 10TB NL SAS HDDs) 4U60 Drive Pack for DM3000H - Fundamentals | 4XB7A39391 | B73S | 2 |
| 480TB (30x 16TB NL SAS HDDs) 4U60 Drive Pack for DM3000H - Fundamentals | 4XB7A65404 | BCVB | 2 |

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

Table 12. DM240S 2U24 SFF drive packs for ONTAP

| Description | Part number | Feature code | Maximum quantity per 2U24 enclosure |
|--|-------------|--------------|-------------------------------------|
| 2.5-inch 12 Gbps SAS hot-swap SSDs (1 Drive Write per Day) | | | |
| ThinkSystem 5.76TB (6x 960GB SAS SSDs) 2U24 Drive Pack for DM3000H | 4XB7A16999 | B677 | 4 |
| ThinkSystem 23.04TB (6x 3.84TB SAS SSDs) 2U24 Drive Pack for DM3000H | 4XB7A17001 | B679 | 4 |
| ThinkSystem 46.08TB (6x 7.68TB SAS SSDs) 2U24 Drive Pack for DM3000H | 4XB7A17003 | B67B | 4 |
| ThinkSystem 92.16TB (6x 15.36TB SAS SSDs) 2U24 Drive Pack for DM3000H | 4XB7A17005 | B67D | 4 |
| 2.5-inch 12 Gbps SAS hot-swap HDDs | | | |
| ThinkSystem 5.4TB (6x 900GB SAS 10K HDDs) 2U24 Drive Pack for DM3000H | 4XB7A17007 | B67F | 4 |
| ThinkSystem 7.2TB (6x 1.2TB SAS 10K HDDs) 2U24 Drive Pack for DM3000H | 4XB7A17009 | B67H | 4 |
| ThinkSystem 10.8TB (6x 1.8TB SAS 10K HDDs) 2U24 Drive Pack for DM3000H | 4XB7A17011 | B67K | 4 |

Table 13. DM240S 2U24 SFF drive packs for ONTAP Fundamentals

| Description | Part number | Feature code | Maximum quantity per 2U24 enclosure |
|---|-------------|--------------|-------------------------------------|
| 2.5-inch 12 Gbps SAS hot-swap SSDs (1 Drive Write per Day) | | | |
| 5.76TB (6x 960GB SAS SSDs) 2U24 Drive Pack for DM3000H - Fundamentals | 4XB7A39376 | B73B | 4 |
| 23.04TB (6x 3.84TB SAS SSDs) 2U24 Drive Pack for DM3000H - Fundamentals | 4XB7A39377 | B73C | 4 |
| 46.08TB (6x 7.68TB SAS SSDs) 2U24 Drive Pack for DM3000H - Fundamentals | 4XB7A39378 | B73D | 4 |
| 92.16TB (6x 15.36TB SAS SSDs) 2U24 Drive Pack for DM3000H - Fundamentals | 4XB7A39379 | B73E | 4 |
| 2.5-inch 12 Gbps SAS hot-swap HDDs | | | |
| 5.4TB (6x 900GB SAS 10K HDDs) 2U24 Drive Pack for DM3000H - Fundamentals | 4XB7A39380 | B73F | 4 |
| 7.2TB (6x 1.2TB SAS 10K HDDs) 2U24 Drive Pack for DM3000H - Fundamentals | 4XB7A39381 | B73G | 4 |
| 10.8TB (6x 1.8TB SAS 10K HDDs) 2U24 Drive Pack for DM3000H - Fundamentals | 4XB7A39382 | B73H | 4 |

Software

In this section:

- [Feature bundles](#)
- [ONTAP software versions](#)
- [Extended ONTAP features](#)
- [Upgrading to Unified Premium ONTAP](#)
- [Ansible playbooks for DM Series](#)

Feature bundles

Controller software for the DM3000H is available in the following bundles of features:

- SAN Base (China only) (Feature BKKC) (only available with 3-year models, machine type 7D7U)
- SAN Premium (Feature BKKE) (China only, and only available with 3-year models, machine type 7D7U)
- Unified Fundamentals (All markets except China) (Feature B72U)
- Unified Base (China only) (Feature B5RH)
- Unified Premium (Feature B5RJ)

The following table summarizes the features in each bundle for the DM3000H.

Table 14. Comparison of software features for the DM3000H

| Feature | SAN Base (PRC only) | SAN Premium (PRC only)† | Unified Fundamentals | Unified Base (PRC only) | Unified Premium |
|---|---------------------|-------------------------|----------------------|-------------------------|-----------------|
| Controller software feature code | BKKC | BKKE | B72U | B5RH | B5RJ |
| RAID-4, RAID-DP, and RAID-TEC data protection | Included | Included | Included | Included | Included |
| Thin provisioning | Included | Included | Included | Included | Included |
| Compression | Included | Included | Included | Included | Included |

| Feature | SAN Base (PRC only) | SAN Premium (PRC only)† | Unified Fundamentals | Unified Base (PRC only) | Unified Premium |
|--|---------------------|-------------------------|----------------------|-------------------------|-----------------|
| Deduplication | Included | Included | Included | Included | Included |
| Snapshots | Included | Included | Included | Included | Included |
| Encryption* | No | Included* | Included* | No | Included* |
| Balanced placement | Included | Included | Included | Included | Included |
| Dynamic capacity expansion | Included | Included | Included | Included | Included |
| Adaptive Quality of Service | Included | Included | Included | Included | Included |
| SnapRestore | Included | Included | Included | Included | Included |
| FlexClone | Included | Included | Included | Included | Included |
| FlexVol | Included | Included | Included | Included | Included |
| FlexCache | No | No | Included | Included | Included |
| SnapMirror asynchronous replication | No | Included | Included | No | Included |
| SyncMirror data protection | Included | Included | Included | Included | Included |
| Trusted Platform Module (TPM) support | No | Included | Included | No | Included |
| MetroCluster IP | No | No | No | No | No |
| NVMe over FC Protocol | No | No | No | No | No |
| NVMe over TCP Protocol | Included | Included | Included | Included | Included |
| SnapMirror synchronous replication | No | Included | No | No | Included |
| FlexGroup | No | No | Included | Included | Included |
| SnapVault disk-based storage backup | No | No | No | No | Included |
| SnapCenter | No | Included | No | No | Included |
| ONTAP S3 | No | No | Included | Included | Included |
| ONTAP S3 SnapMirror | No | No | No | No | Optional |
| FabricPool object storage tiering | Optional | Optional | Optional | Optional | Optional |
| SnapLock data protection | No | No | Optional | No | Optional |
| Security and Compliance Bundle (Anti-ransomware, MTKM, SnapLock) | No | No | Optional | No | Optional |
| Hybrid Cloud Bundle (FabricPool, SnapMirror Cloud) | Optional** | Optional** | Optional** | Optional** | Optional |

* Requires the encryption version of ONTAP. See the [ONTAP software](#) section.

† For the DM3000H, SAN Premium is only available in PRC

** When used with bundles other than Unified Premium, Hybrid Cloud Bundle only adds FabricPool. The use of SnapMirror Cloud requires Unified Premium.

The features are summarized as follows:

- **RAID-4, RAID-DP, and RAID-TEC data protection** : Provides the flexibility to choose the level of data protection required and helps improve performance and availability with built-in spare capacity and by distributing data across all physical drives in the aggregate, sustaining to up to one (RAID-4), two (RAID-DP), or three (RAID-TEC) concurrent drive failures.
- **Thin provisioning**: Optimizes efficiency by allocating storage space based on the minimum space required by each application at any given time, so that applications consume only the space they are actually using, not the total space that has been allocated to them, which allows customers to purchase storage they need today and add more as application requirements grow.
- **Compression**: Provides transparent inline and post-process data compression to reduce the amount of storage that customers need to purchase and manage.

- **Deduplication:** Performs general-purpose deduplication for removal of redundant data to reduce the amount of storage that customers need to purchase and manage.
- **Snapshots:** Enables creation of read-only copies of data for backup, parallel processing, testing, and development, and have the copies available almost immediately.
- **Encryption:** Provides software-based encryption for data at rest for enhanced data security with the traditional drives and embedded key management (requires the encryption-capable version of the ONTAP software).
- **Balanced placement:** Provides automated workload distribution across the cluster to help increase utilization and performance.
- **Dynamic capacity expansion:** Allows the capacity of a volume or aggregate to be expanded by adding new physical drives.
- **Adaptive Quality of Service:** Simplifies operations and maintains consistent workload performance by defining QoS policies and automatically adjusting storage resources to respond to workload changes.
- **SnapRestore:** Enables quick recovery of data by reverting a local volume or file to its previous state from a particular snapshot copy stored on the file system.
- **FlexClone:** References snapshot metadata to create writable point-in-time copies of a volume.
- **FlexVol:** Provides abstraction layer between the logical volume and its physical location in the storage array.
- **FlexCache:** Speeds up access to data and offloads traffic from heavily accessed volumes for read-intensive workloads by placing frequently used data in cache locally or remotely (closer to the point of client access) and serving the data to the clients directly from cache without accessing the data source.
- **SnapMirror asynchronous replication:** Provides storage system-based data replication between the storage systems containing source (local) and destination (remote) volumes by using asynchronous (at specified regular intervals) data transfers over IP communication links.
- **SyncMirror data protection:** Adds extra level of data protection and availability by mirroring a pair of RAID aggregates.
- **Trusted Platform Module (TPM):** For encryption enabled 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 TCP Protocol:** Enables NVMe over TCP
- **Data Protection Optimized (DPO):** Increases the amount of concurrent SnapMirror sessions per node, as well as improving SnapMirror performance to the cluster.
- **SnapMirror synchronous replication:** Provides storage system-based data replication between the storage systems containing source (local) and destination (remote) volumes by using synchronous (as soon as the data is written to the source volume)
- **FlexGroup:** Enables a single volume to span across multiple clustered storage arrays to maximize storage capacity and automate load distribution.
- **SnapVault disk-based storage backup:** Enables data stored on multiple systems to be backed up to a central, secondary system quickly and efficiently as read-only snapshot copies.
- **SnapCenter:** Provides application- and virtual machine-aware backup and restoration of data by using the Snapshots technology and leverages the SnapMirror capabilities of storage systems to provide onsite or offsite backup set mirroring for disaster recovery.
- **ONTAP S3:** Expands the DM Series unified story and allows customers to manage, block, file, and object data from one interface. Customers can now natively store data in S3 buckets onboard the DM Series.

- **ONTAP S3 SnapMirror** (New to ONTAP 9.10): Enables you to protect buckets in ONTAP S3 object stores using familiar SnapMirror mirroring and backup functionality. Requires ONTAP 9.10.1 or later on both source and destination clusters. Requires the Unified Premium Bundle.
- **SnapMirror Cloud**: A backup and recovery technology designed for ONTAP users who want to transition their data protection workflows to the cloud. SnapMirror Cloud is an extension to the family of SnapMirror replication technologies. While SnapMirror is frequently used for ONTAP-to-ONTAP backups, SnapMirror Cloud uses the same replication engine to transfer Snapshot copies for ONTAP to S3-compliant object storage backups.
- **Multitenant Key Management (MTKM)**: Provides the ability for individual tenants or storage virtual machines (SVMs) to maintain their own keys through KMIP for NVE. With multitenant external key management, you can centralize your organization's key management functions by department or tenant while inherently confirming that keys are not stored near the assets. This approach decreases the possibility of compromise.
- **Anti-ransomware**: Uses workload analysis in NAS (NFS and SMB) environments to proactively detect and warn about abnormal activity that might indicate a ransomware attack. When an attack is suspected, anti-ransomware also creates new Snapshot backups, in addition to existing protection from scheduled Snapshot copies.

Add-on feature bundles:

- **Security and Compliance Bundle**: Licensed per 2-node HA Pair, the Security and Compliance Bundle provides built-in protection from ransomware and while also providing the ability to meet regulatory compliance and organizational data retention requirements.
 - Includes: Anti-ransomware feature with Multitenant Key Management (MTKM) and SnapLock
- **Hybrid Cloud Bundle**: Licensed per TB (3 Year & 5 Year Offerings) the Hybrid Cloud Bundle provides the ability to use S3 SnapMirror from ONTAP to the Public Cloud (AWS S3) and/or SnapMirror Cloud with participating ISV Backup providers.
 - Includes SnapMirror Cloud and FabricPool

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

- **FabricPool**: FabricPool is a hybrid storage solution that uses an all flash (all SSD) aggregate as the performance tier and an object store as the external capacity tier. Data in a FabricPool is stored in a tier based on whether it is frequently accessed or not. Using a FabricPool helps you reduce storage cost without compromising performance, efficiency, or protection.
- **SnapLock data protection**: Creates Write-Once-Read-Many (WORM) non-rewritable, non-erasable data on hard disk drives to prevent files from being altered or deleted until a predetermined or default retention date.

ONTAP software versions

The following table lists the software selection options for the DM3000H. The table also indicates which markets each version is available in.

Table 15. 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 |
| BAYH | Lenovo ThinkSystem DM Series ONTAP 9.7 SW Fundamentals Encryption | All markets except China |
| BAYG | Lenovo ThinkSystem DM Series ONTAP 9.7 SW Fundamentals 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 |
| BF5T | Lenovo ThinkSystem DM Series ONTAP 9.8 Software Fundamentals Encryption | All markets except China |
| BF5U | Lenovo ThinkSystem DM Series ONTAP 9.8 Software Fundamentals 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 |
| BKF9 | Lenovo ThinkSystem DM Series ONTAP 9.9 Software Fundamentals Encryption | All markets except China |
| BKF8 | Lenovo ThinkSystem DM Series ONTAP 9.9 Software Fundamentals NonEncryption | All markets |
| ONTAP 9.10 | | |
| BNLY | Lenovo ThinkSystem DM Series ONTAP 9.10 Software Base NonEncryption | China only |
| BNM2 | Lenovo ThinkSystem DM Series ONTAP 9.10 Software Encryption | All markets except China |
| BNM1 | Lenovo ThinkSystem DM Series ONTAP 9.10 Software NonEncryption | All markets |
| BNM0 | Lenovo ThinkSystem DM Series ONTAP 9.10 Software Fundamentals Encryption | All markets except China |
| BNLZ | Lenovo ThinkSystem DM Series ONTAP 9.10 Software Fundamentals NonEncryption | All markets |

Software maintenance is included in the DM3000H 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 16. Optional software features

| Part number | Feature code | Description | Quantity |
|-------------|--------------|--|--------------------------------------|
| 4P47A16547 | None* | DM Series SnapLock License | 1 per system (contains two licenses) |
| 4P47A37057 | None* | DM Series FabricPool – 1TB Increment – 3 years | 1 per TB of storage capacity |
| 4P47A37288 | None* | DM Series FabricPool – 1TB Increment – 5 years | 1 per TB of storage capacity |
| 4P47A82668 | BPQ6 | Security and Compliance Bundle | 1 per system (contains two licenses) |
| 4P47A83121 | BQ8X | Hybrid Cloud Bundle 3 year per TB License | 1 per TB of storage capacity |
| 4P47A83123 | BQ8W | Hybrid Cloud Bundle 5 year per TB License | 1 per TB of storage capacity |

* Field upgrade only; no factory installation.

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.

Upgrading to Unified Premium ONTAP

To upgrade your existing ONTAP installation to Unified Premium ONTAP, use DCSC to specify the storage you already have installed, since the upgrade license is based on your existing configuration.

<https://dcsc.lenovo.com/#/configuration/cto/7D4FCTO2WW?hardwareType=storage>

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

Table 17. Feature codes for ONTAP upgrades (MTM 7D4FCTO2WW)

| Feature code | Description |
|--------------|--|
| BNDK | Unified Fundamental to Unified Premium ONTAP Upgrade Selection |
| BNDJ | All SAN Premium to Unified Premium ONTAP Upgrade Selection |
| BNDH | All SAN Fundamental to Unified Premium ONTAP Upgrade Selection |
| BNKP | All SAN Base to Unified Premium CFC Selection (PRC only) |
| BNKN | Unified Base to Unified Premium CFC Selection (PRC only) |

Ansible playbooks for DM Series

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

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

- Provisioning
- Configuring

To access the Ansible Playbooks for Lenovo ThinkSystem DM Series storage systems, go to the following page:

<https://github.com/lenovo/ansible-dm-series-ontap>

Management

The ThinkSystem DM3000H 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 DM3000H, DM120S 2U12 LFF, and DM240S 2U24 LFF enclosures ship with two redundant hot-swap 913 W (100 - 240 V) Platinum AC power supplies, each with an IEC 320-C14 connector.

The ThinkSystem DM600S 4U60 LFF expansion enclosures ship with two redundant hot-swap 2325 W (200 - 240 V) Platinum AC power supplies, each with an IEC 320-C20 connector.

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

The following table lists the rack power cable and line cord options that can be ordered for the DM3000H, DM120S 2U12 LFF, and DM240S 2U24 SFF enclosures (two power cords per enclosure).

Table 18. Power cables for DM3000H, DM120S 2U12 LFF, and DM240S 2U24 SFF enclosures

| Description | Part number | Feature code |
|--|-------------|--------------|
| Rack power cables | | |
| 1.0m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable | 00Y3043 | A4VP |
| 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, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable | 39Y7937 | 6201 |
| 1.5m, 13A/100-250V, C13 to IEC 320-C14 Rack Power Cable | 4L67A08368 | B0N6 |
| 2.0m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable | 4L67A08365 | B0N4 |
| 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, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable | 4L67A08366 | 6311 |
| 2.8m, 13A/125V-10A/250V, C13 to IEC 320-C14 Rack Power Cable | 4L67A08370 | 6400 |
| 2.8m, 10A/100-250V, C13 to IEC 320-C20 Rack Power Cable | 39Y7938 | 6204 |
| 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, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable | 39Y7932 | 6263 |
| 4.3m, 13A/125V-10A/250V, C13 to IEC 320-C14 Rack Power Cable | 4L67A08371 | 6583 |
| Line cords | | |
| Argentina 2.8m, 10A/250V, C13 to IRAM 2073 Line Cord | 39Y7930 | 6222 |
| Argentina 4.3m, 10A/250V, C13 to IRAM 2073 Line Cord | 81Y2384 | 6492 |
| Australia/New Zealand 2.8m, 10A/250V, C13 to AS/NZS 3112 Line Cord | 39Y7924 | 6211 |
| Australia/New Zealand 4.3m, 10A/250V, C13 to AS/NZS 3112 Line Cord | 81Y2383 | 6574 |
| Brazil 2.8m, 10A/250V, C13 to NBR 14136 Line Cord | 69Y1988 | 6532 |

| Description | Part number | Feature code |
|--|--------------------|---------------------|
| Brazil 4.3m, 10A/250V, C13 to NBR14136 Line Cord | 81Y2387 | 6404 |
| China 2.8m, 10A/250V, C13 to GB 2099.1 Line Cord | 39Y7928 | 6210 |
| China 4.3m, 10A/250V, C13 to GB 2099.1 Line Cord | 81Y2378 | 6580 |
| Denmark 2.8m, 10A/250V, C13 to DK2-5a Line Cord | 39Y7918 | 6213 |
| Denmark 4.3m, 10A/250V, C13 to DK2-5a Line Cord | 81Y2382 | 6575 |
| Europe 2.8m, 10A/250V, C13 to CEE7-VII Line Cord | 39Y7917 | 6212 |
| Europe 4.3m, 10A/250V, C13 to CEE7-VII Line Cord | 81Y2376 | 6572 |
| India 2.8m, 10A/250V, C13 to IS 6538 Line Cord | 39Y7927 | 6269 |
| India 4.3m, 10A/250V, C13 to IS 6538 Line Cord | 81Y2386 | 6567 |
| Israel 2.8m, 10A/250V, C13 to SI 32 Line Cord | 39Y7920 | 6218 |
| Israel 4.3m, 10A/250V, C13 to SI 32 Line Cord | 81Y2381 | 6579 |
| Italy 2.8m, 10A/250V, C13 to CEI 23-16 Line Cord | 39Y7921 | 6217 |
| Italy 4.3m, 10A/250V, C13 to CEI 23-16 Line Cord | 81Y2380 | 6493 |
| Japan 2.8m, 12A/125V, C13 to JIS C-8303 Line cord | 46M2593 | A1RE |
| Japan 2.8m, 12A/250V, C13 to JIS C-8303 Line Cord | 4L67A08357 | 6533 |
| Japan 4.3m, 12A/125V, C13 to JIS C-8303 Line Cord | 39Y7926 | 6335 |
| Japan 4.3m, 12A/250V, C13 to JIS C-8303 Line Cord | 4L67A08362 | 6495 |
| Korea 2.8m, 12A/250V, C13 to KS C8305 Line Cord | 39Y7925 | 6219 |
| Korea 4.3m, 12A/250V, C13 to KS C8305 Line Cord | 81Y2385 | 6494 |
| South Africa 2.8m, 10A/250V, C13 to SABS 164 Line Cord | 39Y7922 | 6214 |
| South Africa 4.3m, 10A/250V, C13 to SABS 164 Line Cord | 81Y2379 | 6576 |
| Switzerland 2.8m, 10A/250V, C13 to SEV 1011-S24507 Line Cord | 39Y7919 | 6216 |
| Switzerland 4.3m, 10A/250V, C13 to SEV 1011-S24507 Line Cord | 81Y2390 | 6578 |
| Taiwan 2.8m, 10A/250V, C13 to CNS 10917-3 Line Cord | 81Y2375 | 6317 |
| Taiwan 2.8m, 15A/125V, C13 to CNS 10917-3 Line Cord | 81Y2374 | 6402 |
| Taiwan 4.3m, 10A/250V, C13 to CNS 10917-3 Line Cord | 81Y2389 | 6531 |
| Taiwan 4.3m, 15A/125V, C13 to CNS 10917-3 Line Cord | 81Y2388 | 6530 |
| United Kingdom 2.8m, 10A/250V, C13 to BS 1363/A Line Cord | 39Y7923 | 6215 |
| United Kingdom 4.3m, 10A/250V, C13 to BS 1363/A Line Cord | 81Y2377 | 6577 |
| United States 2.8m, 10A/125V, C13 to NEMA 5-15P Line Cord | 90Y3016 | 6313 |
| United States 2.8m, 10A/250V, C13 to NEMA 6-15P Line Cord | 46M2592 | A1RF |
| United States 2.8m, 13A/125V, C13 to NEMA 5-15P Line Cord | 00WH545 | 6401 |
| United States 4.3m, 10A/125V, C13 to NEMA 5-15P Line Cord | 4L67A08359 | 6370 |
| United States 4.3m, 10A/250V, C13 to NEMA 6-15P Line Cord | 4L67A08361 | 6373 |
| United States 4.3m, 13A/125V, C13 to NEMA 5-15P Line Cord | 4L67A08360 | AX8A |

The following table lists the rack power cable and line cord options that can be ordered for the DM600S 4U60 LFF expansion enclosures (two power cords per enclosure).

Table 19. Power cables for DM600S 4U60 enclosures

| Description | Part number | Feature code |
|--------------------|--------------------|---------------------|
|--------------------|--------------------|---------------------|

| Description | Part number | Feature code |
|--|-------------|--------------|
| Rack power cables | | |
| 2.5m, 16A/100-250V, C19 to IEC 320-C20 Rack Power Cable | 39Y7916 | 6252 |
| Line cords | | |
| Argentina 4.3m, 16A/250V, C19 to IRAM 2073 Line Cord | 40K9777 | 6276 |
| Australia/New Zealand 4.3m, 15A/250V, C19 to AS/NZS 3112 Line Cord | 40K9773 | 6284 |
| Brazil 4.3m, 16A/250V, C19 to NBR 14136 Line Cord | 40K9775 | 6277 |
| China 4.3m, 16A/250V, C19 to GB2099.1 Line Cord | 40K9774 | 6288 |
| Denmark/Switzerland 4.3m, 16A/250V, C19 to IEC 309 P+N+G Line Cord | 40K9769 | 6283 |
| Europe 4.3m, 16A/250V, C19 to CEE7-VII Line Cord | 40K9766 | 6279 |
| India 4.3m, 16A/250V, C19 to IS6538 Line Cord | 40K9776 | 6285 |
| Israel 4.3m, 16A/250V, C19 to SI 32 Line Cord | 40K9771 | 6282 |
| Italy 4.3m, 16A/250V, C19 to CEI 23-16 Line Cord | 40K9768 | 6281 |
| Japan 4.3m, 15A/200V, C19 to JIS C-8303 Line Cord | 41Y9233 | 6291 |
| Korea 4.3m, 15A/250V, C19 to KSC 8305 Line Cord | 41Y9231 | 6289 |
| South Africa 4.3m, 16A/250V, C19 to SABS 164 Line Cord | 40K9770 | 6280 |
| Switzerland 4.3m, 16A/250V, C19 to SEV 1011 Line Cord | 81Y2391 | 6549 |
| Taiwan 4.3m, 16A/250V, C19 to CNS 10917-3 Line Cord | 41Y9230 | 6287 |
| United Kingdom 4.3m, 13A/250V, C19 to BS 1363/A Line Cord | 40K9767 | 6278 |
| United States 4.3m, 15A/250V, C19 to NEMA 6-15P Line Cord | 00D7197 | A1NV |
| United States 4.3m, 18A/250V, C19 to NEMA L6-20P Line Cord | 40K9772 | 6275 |

Rack installation

The individually shipped DM3000H and DM120S enclosures come with the ThinkSystem Storage Rack Mount Kit 2U12, and the individually shipped DM600S and DM240S enclosures come with the ThinkSystem Storage Rack Mount Kit 2U24/4U60. The rack mount kits are listed in the following table.

Table 20. 4-post rack mount kits

| Description | Feature code | Quantity |
|--|--------------|----------|
| ThinkSystem Storage Rack Mount Kit 2U12 | B38X | 1 |
| 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 21. 4-post SIR rack mount kits

| Description | Feature code | Quantity |
|---|--------------|----------|
| Lenovo ThinkSystem Storage Rack Mount Kit 2U12 | B38X | 1 |
| Lenovo ThinkSystem Storage SIR Rack Mount Kit (for 2U24 enclosures) | B6TH | 1 |
| DM/DE 4U Adjustable Rail Kit (SIR) | B742 | 1 |

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

Table 22. Rack mount kit features and specifications summary

| Attribute | Screw-in fixed rail with adjustable depth | | | |
|---|--|--|--|--|
| | 2U12 | 2U24/4U60 | 2U24 SIR | 4U SIR |
| Feature code | B38X | B38Y | B6TH | B742 |
| Enclosure support | DM3000H DM120S | DM240S DM600S‡ | DM240S | DM600S‡ |
| Rail type | 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 |
| In-rack maintenance | Yes* | Yes* | Yes* | Yes* |
| Ship-in-rack (SIR) support | Yes | No | Yes | Yes |
| 1U PDU support | Yes | Yes | Yes | Yes |
| 0U PDU support | Limited** | Limited** | Limited** | Limited** |
| Rack type | IBM or Lenovo 4-post, IEC standard-compliant | IBM or Lenovo 4-post, IEC standard-compliant | IBM or Lenovo 4-post, IEC standard-compliant | IBM or Lenovo 4-post, IEC standard-compliant |
| Mounting holes | 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.) |
| 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.) |

‡ The rack cabinet must be at least 1100 mm (43.31 in.) deep for 4U60 enclosures.

* 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 2U12 and 2U24 enclosures, or at least 1200 mm (47.24 in.) deep for 4U60 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 DM3000H controller enclosure has the following dimensions and weight (approximate):

- Height: 87 mm (3.4 in.)
- Width: 447 mm (17.6 in.)
- Depth: 508 mm (20.0 in.)
- Weight (fully configured): 28.9 kg (63.7 lb)

The DM120S 2U12 LFF enclosures have the following dimensions and weight (approximate):

- Height: 87 mm (3.4 in.)
- Width: 447 mm (17.6 in.)
- Depth: 505 mm (19.0 in.)
- Weight (fully configured): 28.7 kg (63.3 lb)

The DM600S 4U60 LFF enclosures have the following dimensions and weight (approximate):

- Height: 174 mm (6.9 in.)
- Width: 449 mm (17.7 in.)
- Depth: 922 mm (36.3 in.)
- Weight (fully configured): 111.5 kg (245.8 lb)

The 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 DM3000H, DM120S 2U12 LFF, and DM600S 4U60 LFF enclosures are supported in the following environment:

- Air temperature:
 - Operating:
 - DM3000H and DM240S 2U24 SFF: 5 °C - 45 °C (41 °F - 113 °F)
 - DM120S 2U12 LFF and DM600S 4U60 LFF: 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:
 - Operating: 8% - 90% (non-condensing)
 - Non-operating: 10% - 95% (non-condensing)
- Electrical power:
 - DM3000H
 - 100 to 127 (nominal) V AC; 50 Hz or 60 Hz; 4.31 A
 - 200 to 240 (nominal) V AC; 50 Hz or 60 Hz; 2.15 A
 - Maximum system power load: 409 W
 - DM120S 2U12 LFF
 - 100 to 127 (nominal) V AC; 50 Hz or 60 Hz; 3.56 A
 - 200 to 240 (nominal) V AC; 50 Hz or 60 Hz; 1.78 A
 - Maximum system power load: 338 W
 - DM600S 4U60 LFF
 - 200 to 240 (nominal) V AC; 50 Hz or 60 Hz; 8.11 A
 - Maximum system power load: 1541 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:
 - DM3000H: 1396 BTU/hour
 - DM120S 2U12 LFF: 1153 BTU/hour
 - DM600S 4U60 LFF: 5258 BTU/hour
 - DM240S 2U24 SFF: 1331 BTU/hour
- Acoustical noise emission:
 - DM3000H: 6.9 bels
 - DM120S 2U12 LFF: 6.3 bels
 - DM600S 4U60 SFF: 7.2 bels
 - DM240S 2U24 SFF: 6.9 bels

Warranty and support

The DM3000H and expansion enclosures have a 1-year or 3-year warranty based on the machine type of the system, as listed in the following table.

Table 23. Duration of standard warranty

| System | Machine type 1 year warranty | Machine type 3 year warranty |
|-------------------------------------|---------------------------------|---------------------------------|
| DM3000H Controller Enclosure | 7Y42 | 7D7U |
| DM120S 2U12 LFF Expansion Enclosure | 7Y59 | 7D7X |
| DM240S 2U24 SFF Expansion Enclosure | 7Y58 | 7D7Y |
| DM600S 4U60 LFF Expansion Enclosure | 7Y43 | 7D7Z |

The standard warranty terms are customer-replaceable unit (CRU) and onsite (for field-replaceable units FRUs only) with standard call center support during normal business hours and 9x5 Next Business Day Parts Delivered.

Lenovo's additional support services provide a sophisticated, unified support structure for your data center, with an experience consistently ranked number one in customer satisfaction worldwide. Available offerings include:

- **Premier Support**

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:

- Direct technician-to-technician access through a dedicated phone line
- 24x7x365 remote support
- Single point of contact service
- End to end case management
- Third-party collaborative software support
- Online case tools and live chat support
- On-demand remote system analysis

- **Warranty Upgrade (Preconfigured Support)**

Services are available to meet the on-site response time targets that match the criticality of your systems.

- 3, 4, or 5 years of service coverage
- 1-year or 2-year post-warranty extensions
- **Foundation Service:** 9x5 service coverage with next business day onsite response. YourDrive YourData is an optional extra (see below).
- **Essential Service:** 24x7 service coverage with 4-hour onsite response or 24-hour committed repair (available only in select markets). Bundled with YourDrive YourData.
- **Advanced Service:** 24x7 service coverage with 2-hour onsite response or 6-hour committed repair (available only in select markets). Bundled with YourDrive YourData.

- **Managed Services**

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

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

- **Technical Account Management (TAM)**

A Lenovo Technical Account Manager helps you optimize the operation of your data center based on a deep understanding of your business. You gain direct access to your Lenovo TAM, who serves as your single point of contact to expedite service requests, provide status updates, and furnish reports to track incidents over time. In addition, your TAM will help proactively make service recommendations and manage your service relationship with Lenovo to make certain your needs are met.

- **Enterprise Server Software Support**

Enterprise Software Support is an additional support service providing customers with software support on Microsoft, Red Hat, SUSE, and VMware applications and systems. Around the clock availability for critical problems plus unlimited calls and incidents helps customers address challenges fast, without incremental costs. Support staff can answer troubleshooting and diagnostic questions, address product comparability and interoperability issues, isolate causes of problems, report defects to software vendors, and more.

- **YourDrive YourData**

Lenovo's YourDrive YourData is a multi-drive retention offering that ensures your data is always under your control, regardless of the number of drives that are installed in your Lenovo server. In the unlikely event of a drive failure, you retain possession of your drive while Lenovo replaces the failed drive part. Your data stays safely on your premises, in your hands. The YourDrive YourData service can be purchased in convenient bundles and is optional with Foundation Service. It is bundled with Essential Service and Advanced Service.

- **Health Check**

Having a trusted partner who can perform regular and detailed health checks is central to maintaining efficiency and ensuring that your 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.

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 Service offerings are region-specific. Not all preconfigured support and upgrade options are available in every region. For information about Lenovo service upgrade offerings that are available in your region, refer to the following resources:

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

For service definitions, region-specific details, and service limitations, please 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 your success. Our goal is to reduce your capital outlays, mitigate your IT risks, and accelerate your time to productivity.

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

Here's a more in-depth look at what we can do for you:

- **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 your customers. For more information, see the ARS page, <https://lenovopress.com/lp1266-reduce-e-waste-and-grow-your-bottom-line-with-lenovo-ars>.

- **Assessment Services**

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

- **Design Services**

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

- **Basic Hardware Installation**

Lenovo experts can seamlessly manage the physical installation of your server, storage, or networking hardware. Working at a time convenient for you (business hours or off shift), the technician will unpack and inspect the systems on your 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 your team to focus on other priorities.

- **Deployment Services**

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

- **Integration, Migration, and Expansion Services**

Move existing physical & virtual workloads easily, or determine technical requirements to support increased workloads while maximizing performance. Includes tuning, validation, and documenting ongoing run processes. Leverage migration assessment planning documents to perform necessary migrations.

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 DM3000H Unified Hybrid Storage Array supports attachment to Lenovo servers by using 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/lxic>

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

Cluster interconnect

The following table lists the Ethernet storage switch that can be used with the ThinkSystem DM3000H Unified Hybrid Storage Array for cluster interconnect configurations.

Table 24. 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 25. Rack cabinets

| Part number | Description |
|-------------|--|
| 93072RX | 25U Standard Rack (1000mm) |
| 93072PX | 25U Static S2 Standard Rack (1000mm) |
| 7D6DA007WW | ThinkSystem 42U Onyx Primary Heavy Duty Rack Cabinet (1200mm) |
| 7D6DA008WW | ThinkSystem 42U Pearl Primary Heavy Duty Rack Cabinet (1200mm) |
| 93604PX | 42U 1200mm Deep Dynamic Rack |
| 93614PX | 42U 1200mm Deep Static Rack |
| 93634PX | 42U 1100mm Dynamic Rack |
| 93634EX | 42U 1100mm Dynamic Expansion Rack |
| 93074RX | 42U Standard Rack (1000mm) |
| 7D6EA009WW | ThinkSystem 48U Onyx Primary Heavy Duty Rack Cabinet (1200mm) |
| 7D6EA00AWW | ThinkSystem 48U Pearl Primary Heavy Duty Rack Cabinet (1200mm) |

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 26. Power distribution units

| Part number | Feature code | Description | ANZ | ASEAN | Brazil | EET | MEA | RUCIS | WE | HTK | INDIA | JAPAN | LA | NA | PRC |
|---|--------------|---|-----|-------|--------|-----|-----|-------|----|-----|-------|-------|----|----|-----|
| 0U Basic PDUs | | | | | | | | | | | | | | | |
| 00YJ776 | ATZY | 0U 36 C13/6 C19 24A 1 Phase PDU | N | Y | Y | N | N | N | N | N | N | Y | Y | Y | N |
| 00YJ779 | ATZX | 0U 21 C13/12 C19 48A 3 Phase PDU | N | N | Y | N | N | N | Y | N | N | Y | Y | Y | N |
| 00YJ777 | ATZZ | 0U 36 C13/6 C19 32A 1 Phase PDU | Y | Y | N | Y | Y | Y | Y | Y | Y | N | N | Y | Y |
| 00YJ778 | AU00 | 0U 21 C13/12 C19 32A 3 Phase PDU | Y | Y | N | Y | Y | Y | Y | Y | Y | N | N | Y | Y |
| 0U Switched and Monitored PDUs | | | | | | | | | | | | | | | |
| 00YJ783 | AU04 | 0U 12 C13/12 C19 Switched and Monitored 48A 3 Phase PDU | N | N | Y | N | N | N | Y | N | N | Y | Y | Y | N |
| 00YJ781 | AU03 | 0U 20 C13/4 C19 Switched and Monitored 24A 1 Phase PDU | N | N | Y | N | Y | N | Y | N | N | Y | Y | Y | N |
| 00YJ782 | AU02 | 0U 18 C13/6 C19 Switched and Monitored 32A 3 Phase PDU | Y | Y | Y | Y | Y | Y | Y | Y | Y | N | Y | N | Y |
| 00YJ780 | AU01 | 0U 20 C13/4 C19 Switched and Monitored 32A 1 Phase PDU | Y | Y | Y | Y | Y | Y | Y | Y | Y | N | Y | N | Y |
| 1U Switched and Monitored PDUs | | | | | | | | | | | | | | | |
| 4PU7A81117 | BNDV | 1U 18 C19/C13 switched and monitored 48A 3P WYE PDU - ETL | N | N | N | N | N | N | N | N | N | N | N | Y | N |
| 4PU7A77467 | BLC4 | 1U 18 C19/C13 Switched and Monitored 80A 3P Delta PDU | N | N | N | N | N | N | N | N | N | Y | N | Y | N |
| 1U Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets) | | | | | | | | | | | | | | | |
| 71763NU | 6051 | Ultra Density Enterprise C19/C13 PDU 60A/208V/3PH | N | N | Y | N | N | N | N | N | N | Y | Y | Y | N |
| 71762NX | 6091 | Ultra Density Enterprise C19/C13 PDU Module | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 1U C13 Enterprise PDUs (12x IEC 320 C13 outlets) | | | | | | | | | | | | | | | |
| 39M2816 | 6030 | DPI C13 Enterprise PDU Plus Module (WW) | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 39Y8941 | 6010 | DPI C13 Enterprise PDU Module (WW) | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 1U C19 Enterprise PDUs (6x IEC 320 C19 outlets) | | | | | | | | | | | | | | | |
| 39Y8948 | 6060 | DPI C19 Enterprise PDU Module (WW) | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 39Y8923 | 6061 | DPI Three-phase 60A/208V C19 Enterprise PDU (US) | N | N | Y | N | N | N | Y | N | N | N | Y | Y | N |
| 1U Front-end PDUs (3x IEC 320 C19 outlets) | | | | | | | | | | | | | | | |
| 39Y8938 | 6002 | DPI Single-phase 30A/120V Front-end PDU (US) | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 39Y8939 | 6003 | DPI Single-phase 30A/208V Front-end PDU (US) | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 39Y8934 | 6005 | DPI Single-phase 32A/230V Front-end PDU (International) | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 39Y8940 | 6004 | DPI Single-phase 60A/208V Front-end PDU (US) | Y | N | Y | Y | Y | Y | Y | N | N | Y | Y | Y | N |
| 39Y8935 | 6006 | DPI Single-phase 63A/230V Front-end PDU (International) | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 1U NEMA PDUs (6x NEMA 5-15R outlets) | | | | | | | | | | | | | | | |
| 39Y8905 | 5900 | DPI 100-127V NEMA PDU | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Line cords for 1U PDUs that ship without a line cord | | | | | | | | | | | | | | | |

| Part number | Feature code | Description | ANZ | ASEAN | Brazil | EET | MEA | RUCIS | WE | HTK | INDIA | JAPAN | LA | NA | PRC |
|-------------|--------------|---|-----|-------|--------|-----|-----|-------|----|-----|-------|-------|----|----|-----|
| 40K9611 | 6504 | 4.3m, 32A/380-415V, EPDU/IEC 309 3P+N+G 3ph wye (non-US) Line Cord | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 40K9612 | 6502 | 4.3m, 32A/230V, EPDU to IEC 309 P+N+G (non-US) Line Cord | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 40K9613 | 6503 | 4.3m, 63A/230V, EPDU to IEC 309 P+N+G (non-US) Line Cord | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 40K9614 | 6500 | 4.3m, 30A/208V, EPDU to NEMA L6-30P (US) Line Cord | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 40K9615 | 6501 | 4.3m, 60A/208V, EPDU to IEC 309 2P+G (US) Line Cord | N | N | Y | N | N | N | Y | N | N | Y | Y | Y | N |
| 40K9617 | 6505 | 4.3m, 32A/230V, Souriau UTG Female to AS/NZ 3112 (Aus/NZ) Line Cord | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 40K9618 | 6506 | 4.3m, 32A/250V, Souriau UTG Female to KSC 8305 (S. Korea) Line Cord | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |

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 27. 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>

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

Related publications and links

For more information, see the following resources:

- Lenovo Data Center Unified Storage product page
<https://www.lenovo.com/us/en/c/data-center/storage/unified-storage>
- Lenovo Data Center Solution Configurator
<http://dcsc.lenovo.com>
- ThinkSystem DM Series documentation
http://thinksystem.lenovofiles.com/storage/help/topic/ontap_software/overview.html
- Lenovo Data Center Support - ThinkSystem DM3000H
<http://datacentersupport.lenovo.com/us/en/products/storage/lenovo-storage/thinksystem-dm3000h>

Related product families

Product families related to this document are the following:

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

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This document, LP0884, was created or updated on May 17, 2022.

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