



Lenovo Storage V7000 Storage Array (PRC) User Guide

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Lenovo Storage V7000 Storage Array (PRC)



Lenovo Storage V7000 Storage Array (PRC)

Product Guide (withdrawn product)

Lenovo Storage V7000 (Machine Type 6538) is a virtualized, software-defined storage system that consolidates workloads into a single storage system for simplicity of management, reduced cost, highly scalable capacity, and high performance and availability.

Lenovo Storage V7000 control enclosures include two node canisters, each with 32 GB cache for a system total of 64 GB cache. Also available is an optional cache upgrade to 128 GB or 256 GB per system (64 GB or 128 GB per node canister). Standard is 1 Gb iSCSI connectivity, with an option for 8/16 Gb Fibre Channel (FC), 10 Gb iSCSI or Fibre Channel over Ethernet (FCoE) connectivity, or 25 Gb iSCSI connectivity.

Lenovo Storage V7000 offers both Large Form Factor (LFF) and Small Form Factor (SFF) 12 Gb SAS storage expansion enclosures. LFF expansion enclosure supports up to 12x 3.5-inch drives, while the SFF expansion enclosure supports up to 24x 2.5-inch drives. High-performance disk drives, high-capacity nearline disk drives, and flash (solid state) drives are supported. Drives of the same form factor can be intermixed within an enclosure, and LFF and SFF expansion enclosures can be intermixed within a Lenovo Storage V7000 system.

A Lenovo Storage V7000 system scales up to 504 drives with the attachment of up to 20 Lenovo Storage V7000 expansion enclosures.

The Lenovo Storage V7000 is shown in the following figure.



Figure 1. Lenovo Storage V7000 Control Enclosure

Did you know? A single Lenovo Storage V7000 system can be scaled up to 7.74 PB of raw storage capacity. With external virtualization, the system can manage in total up to 32 PB.

Lenovo Storage V7000 offers hybrid block storage connectivity with support for 1 Gb iSCSI, 10 Gb iSCSI or FCoE, 25 Gb iSCSI, or 8/16 Gb FC connectivity.

Lenovo Storage V7000 systems can be clustered to help deliver greater performance, bandwidth, and scalability. A Lenovo Storage V7000 clustered system can contain up to four Lenovo Storage V7000 control enclosures and up to 2016 drives.

Lenovo Storage V7000 includes three or five years of Software Subscription and Support (model dependent).

Key features

The Lenovo Storage V7000 storage system provides the following features:

- Scalable enterprise storage with dual active/active intelligent array node canisters with 32 GB cache each for high availability and performance.
- Optional upgrade to 128 GB or 256 GB cache per system for additional performance benefits for regular and compressed workloads.

Flexible host connectivity to match diverse client needs with support for 1 Gb iSCSI, 10 Gb iSCSI or FCoE, 25

Gb iSCSI, or 8/16 Gb FC connectivity. 12 Gb SAS expansion enclosures supporting 12x 3.5-inch LFF or 24x 2.5-inch SFF drives.

- Scaling for up to 504 drives per system with the attachment of 20 Lenovo Storage V7000 expansion enclosures and up to 2016 drives in a four-way clustered configuration.
Further scalability can be achieved with virtualization of external storage. When Lenovo Storage V7000 virtualizes an external disk system, capacity in the external system inherits the functional richness and ease of use of Lenovo Storage V7000.
- Flexibility in storing data on high-performance SAS solid-state drives (SSDs), performance-optimized enterprise SAS hard disk drives (HDDs), or capacity-optimized enterprise NL SAS HDDs; mixing and matching drive types and form factors within a single system to perfectly meet performance and capacity requirements for various workloads.
- Lenovo Storage V7000 combines various Spectrum Virtualize technologies, including thin provisioning, data reduction pools, deduplication, automated tiering, external and internal storage virtualization, clustering, replication, compression, and multiprotocol support.
- VMware vSphere Virtual Volumes (VVol) integration brings advanced storage management functions to the virtual machine level for finer VM storage service level control and policy-driven automation. Note: VVol integration feature requires Spectrum Connect that can be downloaded from <http://datacentersupport.lenovo.com/us/en/products/storage/storwize/v7000/6195/downloads>
Intuitive, web-based next-generation GUI for easy system set up and management.
- Extensive interoperability with support for most major server platforms and operating systems.

Lenovo Storage V7000 supports the complete range of data storage requirements, from highly used applications to high-capacity, low usage applications.

The following 2.5-inch drives are supported:

- High performance SSDs: 400 GB, 800 GB, 1.6 TB, and 3.2 TB SAS
- Read-optimized SSDs: 1.92 TB, 3.84 TB, 7.68 TB, and 15.36 TB SAS
- Performance-optimized, enterprise class disk drives:
 - 300 GB, 600 GB, and 900 GB 15K rpm SAS
 - 900 GB, 1.2 TB, 1.8 TB, and 2.4 TB 10K rpm SAS
- High-capacity, archival-class nearline disk drives: 2 TB 7.2K rpm NL SAS

High-capacity, archival-class nearline 4 TB, 6 TB, 8 TB, 10 TB, and 12 TB 7.2K rpm NL SAS 3.5-inch disk drives are supported.

All drives are dual-port and hot-swappable. Drives of the same form factor can be intermixed within the appropriate enclosure, which provides the flexibility to address performance and capacity needs within a single enclosure.

Up to 20 Lenovo Storage V7000 expansion enclosures are supported by a single Lenovo Storage V7000 control enclosure. You can intermix 3.5-inch and 2.5-inch expansion enclosures behind a 2.5-inch control enclosure. This configuration delivers the added flexibility to mix 3.5-inch and 2.5-inch drives within a single system.

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.

Lenovo Storage V7000 offers high levels of system and data availability with the following technologies:

- Dual-active intelligent node canisters with mirrored cache
- Dual-port drives with automatic drive failure detection and RAID rebuild with global hot spares Redundant hardware, including power supplies and fans

- Hot-swappable and customer replaceable components
- Automated path failover support for the data path between the host and the drives

Lenovo Storage V7000 supports the following management interfaces:

- Web-based graphical user interface (GUI) via HTTPS that 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
- Storage Management Initiative Specification (SMI-S)
- SNMP and email notifications

Components and connectors

The following figure shows the front of the Lenovo Storage V7000 SFF enclosure.

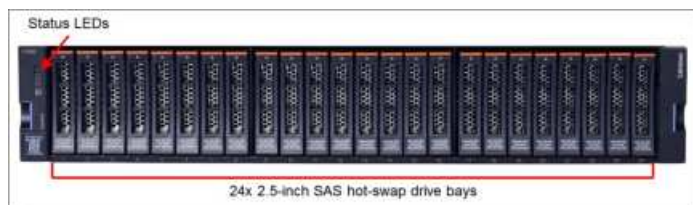


Figure 2. Front view of the Lenovo Storage V7000 SFF enclosure

The following figure shows the front of the Lenovo Storage V7000 LFF enclosure.



Figure 3. Front view of the Lenovo Storage V7000 LFF enclosure

The following figure shows the rear of the Lenovo Storage V7000 Control Enclosure.

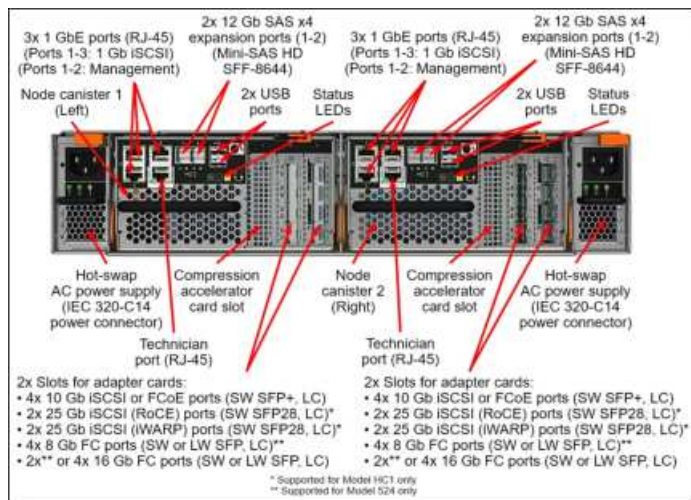


Figure 4. Rear view of the Lenovo Storage V7000 Control Enclosure

The following figure shows the rear of the Lenovo Storage V7000 Expansion Enclosure.

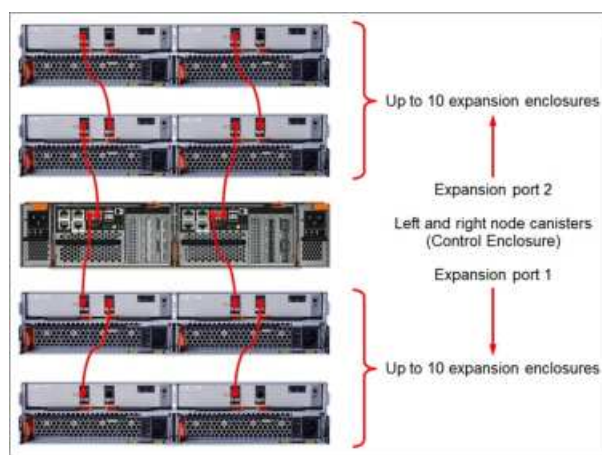


Figure 5. Rear view of the Lenovo Storage V7000 Expansion Enclosure

System specifications

The following table lists the Lenovo Storage V7000 system specifications.

Note: The supported hardware options and software features listed in this product guide are based on the Spectrum Virtualize software version 8.1.3. For details about specific Spectrum Virtualize software releases that introduced support for certain hardware options and software features, refer to the Release notes of the particular software release that can be found at:

<http://support.lenovo.com.cn/lenovo/wsi/Modules/DriverDownloadServer.aspx>

Table 1. System specifications

Attribute	Specification
Form factor	Lenovo Storage V7000 SFF Control Enclosure: 2U rack mount Lenovo Storage V7000 SFF or LFF Expansion Enclosure: 2U rack mount
Controller configuration	Dual controller (known as <i>node canister</i>) configuration per control enclosure. Two or four control enclosures can be combined into a Lenovo Storage V7000 clustered system (or cluster).
RAID levels	RAID 0, 1, 5, 6, and 10; Distributed RAID 5 and 6 (internal storage only)

Controller cache	64 GB per control enclosure (32 GB per node canister) upgradeable to 128 GB (64 GB per node canister) or 256 GB (128 GB per node canister). Up to 1 TB per cluster. Battery-backed cache protection.
Drive bays	<p>Up to 504 SFF drive bays per single system:</p> <p>24 SFF drive bays in the control enclosure</p> <p>24 SFF drive bays in the SFF expansion enclosure; up to 20 SFF expansion enclosures</p> <p>Up to 24 SFF and 240 LFF drive bays per single system: 24 SFF drive bays in the control enclosure</p> <p>12 LFF drive bays in the LFF expansion enclosure; up to 20 LFF expansion enclosures</p> <p>Intermix of SFF and LFF enclosures is supported.</p> <p>Up to 2016 SFF drives in a four-way clustered configuration.</p> <p>Up to 96 SFF drives and 960 LFF drives in a four-way clustered configuration.</p>
Drive technology	SAS and NL SAS HDDs and SAS SSDs. Intermix of HDDs and SSDs is supported.
Drive connectivity	<p>Dual-ported 12 Gb SAS drive attachment infrastructure.</p> <p>Control enclosure with two node canisters (ports per one node canister): 24x 12 Gb SAS internal drive ports</p> <p>2x 12 Gb SAS x4 (Mini-SAS HD SFF-8644) expansion ports for the attachment of the expansion enclosures</p> <p>Expansion enclosure with two expansion canisters (ports per one expansion canister): 24x 12 Gb SAS internal drive ports (SFF enclosure)</p> <p>12x 12 Gb SAS internal drive ports (LFF enclosure)</p> <p>2x 12 Gb SAS x4 (Mini-SAS HD SFF-8644) expansion ports (IN and OUT) for the daisy chained attachment of the expansion enclosures</p>

Drives	<p>SFF drives:</p> <p>400 GB, 800 GB, 1.6 TB, and 3.2 TB SAS SSDs</p> <p>1.92 TB, 3.84 TB, 7.68 TB, and 15.36 TB read-optimized SAS SSDs 300 GB, 600 GB, and 900 GB 15K rpm SAS HDDs</p> <p>900 GB, 1.2 TB, 1.8 TB, and 2.4 TB 10K rpm SAS HDDs</p> <p>2 TB 7.2K rpm NL SAS HDDs</p> <p>LFF drives: 4 TB, 6 TB, 8 TB, 10 TB, and 12 TB 7.2K rpm NL SAS HDDs</p>
Storage capacity	Up to 7.74 PB (504x 15.36 TB SFF SSDs) per one system Up to 30.96 PB (2016x 15.36 TB SFF SSDs) per cluster

^ The operating systems shown are for Lenovo servers. The V7000 might support other operating systems. For a full list of supported operating systems, refer to the Lenovo Storage V7000 Compatibility List:

<http://support1.lenovo.com.cn/lenovo/wsi/Modules/DriverDetailServer.aspx?ID=137381>.

* Internal performance measurements with SSDs.

** For a detailed list of configuration limits and restrictions for a specific version of the Lenovo Storage V7000 software, refer to the Lenovo PRC ISG support page:

<http://support.lenovo.com.cn/lenovo/wsi/Modules/DriverDownloadServer.aspx>

Control enclosures

The following table shows the ordering information for the Lenovo Storage V7000 Control Enclosure.

Table 2. Lenovo Storage V7000 SFF Control Enclosure

Description	Part number	Machine Type-Model	Feature codes*
Lenovo Storage V7000 SFF Control Enclosure/3YR PRC	6538R11	6538-HC1	AV64 / AV7A / AV79
Lenovo Storage V7000 SFF Control Enclosure/5YR PRC	6538R21	6538-HC1	AV65 / AV7A / AV7E

The part numbers for the Lenovo Storage V7000 control enclosure include the following items:

- One Lenovo Storage V7000 SFF control enclosure with two power supplies with cooling modules and with two node canisters
- Rack mount hardware kit
- Publications package

Note: Power cables are not included and must be ordered separately (for more information, see Power cables). The Lenovo Storage V7000 control enclosures ship with two node canisters. A node canister provides interfaces

for host connectivity, management, and internal drives, and it runs storage management and virtualization software. The Lenovo Storage V7000 node canisters use a 10-core processor with 2.2 GHz core speeds and DDR4 cache memory.

The Lenovo Storage V7000 control enclosures ship with the host connectivity interfaces that feature 6x Gb Ethernet (RJ-45) ports (3 ports per node canister) for 1 Gb iSCSI host connectivity and management (management uses one [primary] or two [primary/redundant] of these 3 ports per node canister).

The Lenovo Storage V7000 control enclosure must be configured with at least one pair of the adapter cards that supply the following interfaces:

- 8x 10 GbE SFP+ ports (four ports per adapter card) with eight SW SFP+ optical transceivers (LC connectors) included for 10 Gb iSCSI or FCoE connectivity
- 8x 16 Gb FC SFP ports (four ports per adapter card) with eight SW SFP optical transceivers (LC connectors) included for FC connectivity (a pair of optional 16 Gb FC LW SFP transceivers is available for ordering as an option; it replaces a pair of the SW SFP transceivers that are included with the FC adapter card)
- 4x 25 GbE (RoCE) SFP28 ports (two ports per adapter card) with four SW SFP28 optical transceivers (LC connectors) installed (two transceivers per adapter card) for 25 GbE iSCSI connectivity with support for RDMA with RoCE v2
- 4x 25 GbE (iWARP) SFP28 ports (two ports per adapter card) with four SW SFP28 optical transceivers (LC connectors) installed (two transceivers per adapter card) for 25 GbE iSCSI connectivity with support for RDMA with iWARP

The Lenovo Storage V7000 control enclosure supports up to two pairs of the 16 Gb FC adapter cards, up to two pairs of the 10 Gb iSCSI or FCoE adapter cards, up to two pairs of the 25 GbE iSCSI adapter cards, or a combination of up to two adapter pairs of different connectivity type.

Configuration notes:

- At least one pair of the adapter cards must be ordered with the Lenovo Storage V7000 control enclosure.
- 25 Gb iSCSI adapter cards do not support FCoE.

The following table lists the available host port configurations for the Lenovo Storage V7000 control enclosure.

Table 3. Lenovo Storage V7000 control enclosure host port configurations

Port type and total number of ports				
1 Gb iSCSI	10 Gb iSCSI or FCoE	25 Gb iSCSI (RoCE)	25 Gb iSCSI (iWARP)	16 Gb FC
Standard ports	Extra ports on one or two pairs of adapter cards (required)			
6 (3 per node canister)	8 (4 per node canister)	–	–	–
6 (3 per node canister)	16 (8 per node canister)	–	–	–
6 (3 per node canister)	8 (4 per node canister)	4 (2 per node canister)	–	–
6 (3 per node canister)	8 (4 per node canister)	–	4 (2 per node canister)	–
6 (3 per node canister)	8 (4 per node canister)	–	–	8 (4 per node canister)
6 (3 per node canister)	–	4 (2 per node canister)	–	–
6 (3 per node canister)	–	8 (4 per node canister)	–	–
6 (3 per node canister)	–	4 (2 per node canister)	4 (2 per node canister)	–
6 (3 per node canister)	–	4 (2 per node canister)	–	8 (4 per node canister)
6 (3 per node canister)	–	–	4 (2 per node canister)	–
6 (3 per node canister)	–	–	8 (4 per node canister)	–
6 (3 per node canister)	–	–	4 (2 per node canister)	8 (4 per node canister)
6 (3 per node canister)	–	–	–	8 (4 per node canister)
6 (3 per node canister)	–	–	–	16 (8 per node canister)

The following table lists ordering information for the host connectivity options for the Lenovo Storage V7000 control enclosures.

Description	Part number	Feature code	Maximum quantity per one control enclosure
Host connectivity options			
Lenovo Storage V7000 10Gb Ethernet Adapter Pair PRC	01GV588	AV6B	2
Lenovo Storage V7000 16Gb FC Adapter Pair PRC	01GV584	AV6A	2
Lenovo Storage V7000 25GbE (RoCE) Adapter Pair PRC	00YK980	B2UN	2
Lenovo Storage V7000 25GbE (iWARP) Adapter Pair PRC	00YK983	B2UP	2
SFP transceiver options for FC adapter cards (replace the existing SW SFP transceivers)			
Lenovo Storage V7000 16Gb FC LW SFP Transceivers PRC (Pair)	01GV590	AV78	8
Cable options for 1 GbE iSCSI or management host connectivity			
0.6m Blue Cat5e Cable	40K5679	3801	6
0.6m Green Cat5e Cable	40K5563	3796	6
0.6m Yellow Cat5e Cable	40K8933	3791	6
1.5m Blue Cat5e Cable	40K8785	3802	6

1.5m Green Cat5e Cable	40K5643	3797	6
1.5m Yellow Cat5e Cable	40K8951	3792	6
3m Blue Cat5e Cable	40K5581	3803	6
3m Green Cat5e Cable	40K5793	3798	6
3m Yellow Cat5e Cable	40K8957	3793	6
10m Blue Cat5e Cable	40K8927	3804	6
10m Green Cat5e Cable	40K5794	3799	6
10m Yellow Cat5e Cable	40K8801	3794	6
25m Blue Cat5e Cable	40K8930	3805	6
25m Green Cat5e Cable	40K8869	3800	6
25m Yellow Cat5e Cable	40K8807	3795	6
Cable options for FC, 10Gb iSCSI or FCoE, and 25 GbE iSCSI host connectivity			
Lenovo Storage V7000 1m OM3 Fiber Cable (LC) PRC	01PG228	B2Y8	16
Lenovo Storage V7000 5m OM3 Fiber Cable (LC) PRC	01PG231	B2Y9	16

Lenovo Storage V7000 10m OM3 Fiber Cable (LC) PRC	01GV686	AV6G	8
Lenovo Storage V7000 25m OM3 Fiber Cable (LC) PRC	01PG234	B2YA	16
Cable options for FC host connectivity			
Lenovo Storage V7000 1m Fiber Cable (LC) PRC	01GV658	AV6D	16
Lenovo Storage V7000 5m Fiber Cable (LC) PRC	01GV580	AV6E	16
Lenovo Storage V7000 25m Fiber Cable (LC) PRC	01GV582	AV6F	16

Each Lenovo Storage V7000 control enclosure ships with 64 GB of battery-backed cache (32 GB per node canister). The control enclosures can be upgraded to 128 GB (64 GB per node canister) or 256 GB (128 GB per node canister) of cache. The following table lists cache upgrade options.

Table 5. Cache upgrade options

Description	Part number	Feature code	Maximum quantity per one control enclosure
Lenovo Storage V7000 64GB to 128GB Cache Upgrade PRC	01GV592	AV7D	1
Lenovo Storage V7000 64GB to 256GB Cache Upgrade PRC	4M27A08489	B0RH	1

Each node canister has a built-in compression acceleration card for the optional Real-time compression feature. Additional compression acceleration cards can be ordered, if needed (see the following table).

Table 6. Compression acceleration card option

Description	Part number	Feature code	Maximum quantity per one control enclosure
Lenovo Storage V7000 Compression Accelerator Cards Pair PRC	01GV586	AV6C	1*

* The installation of a pair of the compression accelerator cards requires a cache upgrade (01GV592 or 4M27A08489).

The Lenovo Storage V7000 control enclosure provides 12 Gb SAS internal dual-port drive connectivity, and each control enclosure also has four 12 Gb SAS x4 (Mini-SAS HD SFF-8644) ports (2 port per node canister) for 12 Gb SAS expansion enclosure connectivity.

Expansion enclosures

The Lenovo Storage V7000 supports attachment of up to 20 Lenovo Storage V7000 SFF or LFF Storage Expansion Enclosures. Intermix of SFF and LFF expansion enclosures is supported. The expansion enclosures can be added to the system non-disruptively.

The following table lists the models of the Lenovo Storage V7000 SFF and LFF expansion enclosures.

Table 7. Lenovo Storage V7000 expansion enclosure models

Description	Part number	Machine Type-Model	Feature codes*
Lenovo Storage V7000 SFF Expansion Enclosure/3YR PRC	6538R12	6538-HC3	AV67 / AV7G / AV7F
Lenovo Storage V7000 SFF Expansion Enclosure/5YR PRC	6538R22	6538-HC3	AV69 / AV7G / AV7H
Lenovo Storage V7000 LFF Expansion Enclosure/3YR PRC	6538R32	6538-HC2	AV66 / AV7G / AV7F
Lenovo Storage V7000 LFF Expansion Enclosure/5YR PRC	6538R42	6538-HC2	AV68 / AV7G / AV7H

* Feature codes for System unit base hardware / Base software / Software support and subscription.

The part number for the Lenovo Storage V7000 expansion enclosures includes the following items:

- One Lenovo Storage V7000 LFF or SFF expansion enclosure with two power supplies with cooling modules and with two expansion canisters
- Rack mount hardware kit
- Publications package

Note: Power cables are not included and must be ordered separately (for more information, see Power cables). Each Lenovo Storage V7000 expansion enclosure ships with two expansion canisters. Each expansion canister provides 12 Gb SAS connectivity to the internal drives and two external 12 Gb SAS x4 ports (Mini-SAS HD SFF-8644 connectors labelled Port 1 and Port 2) that are used for connections to the Lenovo Storage V7000 node canisters and for connecting the expansion enclosures between each other. One of the SAS expansion ports (Port 1 or Port 2) on the node canister is connected to the Port 1 on the expansion canister. The Port 2 on the expansion canister is connected to the Port 1 on the expansion canister in the adjacent enclosure, and so on.

Note: Up to 10 expansion enclosures can be connected to Port 1 or Port 2 in a daisy-chained manner for a total of up to 20 expansion enclosures per one control enclosure.

The expansion enclosure connectivity topology is shown in the following figure.

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

Table 8. Expansion enclosure connectivity options

Description	Part number	Machine Type-Model	Feature codes*
Lenovo Storage V7000 SFF Expansion Enclosure/3YR PRC	6538R12	6538-HC3	AV67 / AV7G / AV7F
Lenovo Storage V7000 SFF Expansion Enclosure/5YR PRC	6538R22	6538-HC3	AV69 / AV7G / AV7H
Lenovo Storage V7000 LFF Expansion Enclosure/3YR PRC	6538R32	6538-HC2	AV66 / AV7G / AV7F
Lenovo Storage V7000 LFF Expansion Enclosure/5YR PRC	6538R42	6538-HC2	AV68 / AV7G / AV7H

Drives

The Lenovo Storage V7000 SFF control and expansion enclosures support up to 24 SFF hot-swap drives. The Lenovo Storage V7000 LFF expansion enclosure supports up to 12 LFF hot-swap drives. The following tables list supported drive options for the Lenovo Storage V7000 SFF and LFF enclosures.

Table 9. SFF drive options

Description	Part number	Feature code	Maximum quantity per one SFF enclosure
2.5-inch SAS hot-swap SSDs			
Lenovo Storage V7000 400GB 2.5" Flash Drive PRC	01GV612	AV6V	24
Lenovo Storage V7000 800GB 2.5" Flash Drive PRC	01GV614	AV6W	24
Lenovo Storage V7000 1.6TB 2.5" Flash Drive PRC	01GV616	AV6Y	24
Lenovo Storage V7000 3.2TB 2.5" Flash Drive PRC	01GV618	AV6Z	24
2.5-inch SAS hot-swap SSDs – Read Intensive (RI)			

Lenovo Storage V7000 1.92TB 2.5" RI Flash Drive PRC	01GV620	AV70	24
Lenovo Storage V7000 3.84TB 2.5" RI Flash Drive PRC	01GV622	AV71	24
Lenovo Storage V7000 7.68TB 2.5" RI Flash Drive PRC	01GV694	AVJR	24
Lenovo Storage V7000 15.36TB 2.5" RI Flash Drive PRC	01GV696	AVJS	24
2.5-inch SAS hot-swap HDDs			
Lenovo Storage V7000 300GB 15K rpm 2.5" HDD PRC	01GV600	AV6Q	24
Lenovo Storage V7000 600GB 15K rpm 2.5" HDD PRC	01GV602	AV6R	24
Lenovo Storage V7000 900GB 10K rpm 2.5" HDD PRC	01GV604	AV6S	24
Lenovo Storage V7000 900GB 15K RPM 2.5" HDD PRC	4H27A0848 1	B0R9	24
Lenovo Storage V7000 1.2TB 10K rpm 2.5" HDD PRC	01GV606	AV6T	24
Lenovo Storage V7000 1.8TB 10K rpm 2.5" HDD PRC	01GV608	AV6U	24
Lenovo Storage V7000 2.4TB 2.5" 10K HDD PRC	01KP964	B1JQ	24
2.5-inch NL SAS hot-swap HDDs			
Lenovo Storage V7000 2TB 7.2K rpm 2.5" HDD PRC	01GV610	AV6X	24

Table 10. LFF drive options

Description	Part number	Feature code	Maximum quantity per on e LFF enclosure
3.5-inch NL SAS hot-swap HDDs			
Lenovo Storage V7000 4TB 7.2K rpm 3.5" HDD PRC	01GV594	AV6N	12
Lenovo Storage V7000 6TB 7.2K rpm 3.5" HDD PRC	01GV596	AV6M	12
Lenovo Storage V7000 8TB 7.2K rpm 3.5" HDD PRC	01GV598	AV6P	12
Lenovo Storage V7000 10TB 7.2K rpm 3.5" HDD PRC	01GV698	AVJT	12
Lenovo Storage V7000 12TB 7.2K rpm 3.5" HDD PRC	01PG411	B3SC	12

Software

The following functions are included with every Lenovo Storage V7000:

- RAID levels 0, 1, 5, 6, and 10

Provides the flexibility to choose the level of data protection that is required.

-

- Distributed RAID 5 and 6 for internal storage

Helps improve performance and availability with significantly faster rebuild time by allowing data to be distributed across more physical drives that are used simultaneously.

- Four-system clustering

Lenovo Storage V7000 systems can be clustered to help deliver greater performance, bandwidth, and scalability. A Lenovo Storage V7000 clustered system can contain up to four Lenovo Storage V7000 systems and up to 1056 drives.

HyperSwap for Spectrum Virtualize

Provides dual-site, active-active access to a volume for high availability and disaster recovery configurations.

With active-active relationships between the volume copies at each site, HyperSwap configurations can be used to maintain access to data on the system when site-wide failures or outages occur, using a flexible choice of host multipathing drivers.

Note: HyperSwap feature requires a Remote Mirroring license and a third site to host an FC- or IP-based quorum device for an automatic tie-break in the event of a potential link failure between the two main sites.

Virtualization of internal storage

Enables rapid, flexible provisioning and simple configuration changes.

- Thin provisioning

Optimizes efficiency by allocating drive storage space in a flexible manner among multiple applications that is based on the minimum space that is required by each application at any time. With thin provisioning, applications use only the space they are actually using (not the total space that was allocated to them), which allows clients to purchase storage they need today and add storage as application requirements grow.

Data Reduction Pools

Help deliver consistent performance from compressed volumes and increase existing capacity utilization by automatically de-allocating and reclaiming capacity of thin-provisioned volumes containing deleted data and enabling this reclaimed capacity to be reused by other volumes.

- Deduplication

Increases the efficiency of storage usage by utilizing pointers in duplicate blocks rather than keeping multiple copies of the blocks.

- One-way data migration

Enables easy and nondisruptive moves of volumes from another storage system onto the Lenovo Storage V7000 Storage System by using FC connectivity.

- Embedded GUI

Intuitive, web-based next-generation GUI for easy system set up and management.

- Integrated Comprestimator

The Comprestimator is the key sizing tool for Real-time Compression to estimate how much capacity savings the customer can expect. The Comprestimator can analyze the patterns of the actual customer data and estimate the compressibility of data per volume. The integration of the Comprestimator into a Spectrum Virtualize software helps ease the process of estimating Real-time Compression capacity savings from a central console.

The Lenovo Storage V7000 capabilities can be expanded with optional licensed functions. Each optional Lenovo Storage V7000 software license is required for each control enclosure, expansion enclosure, and externally virtualized storage enclosures.

The following optional licensed functions are available:

- Easy Tier

Easy Tier provides a mechanism to seamlessly migrate frequently accessed data between three tiers of storage (Flash drives, SAS, and NL SAS). This migration can be to different tiers of internal drives or to external storage systems that are virtualized by Lenovo Storage V7000.

- FlashCopy

FlashCopy enables creating copies of data for backup, parallel processing, testing, and development and have the copies available almost immediately.

- Real-time Compression

Real-time Compression enables storing up to five times as much data in the same physical disk space by compressing data as much as 80% (based on lab measurements). Real-time Compression uses hardware acceleration. It is designed to be used with active primary data, such as production databases and email systems, which dramatically expands the range of candidate data that can benefit from compression. Real-time Compression operates immediately as data is written to disk, meaning that no space is wasted storing uncompressed data awaiting post-processing.

- Remote mirroring

This feature provides storage system-based data replication by using synchronous or asynchronous data transfers over IP, FC, or FCoE communication links. The following mirroring options are available:

- Metro Mirror maintains a fully synchronized copy at metropolitan distances (up to 300 km) Global Mirror operates asynchronously and helps maintain a copy at greater distances (up to 8000 km)

For ultimate flexibility, Lenovo Storage V7000 remote mirroring interoperates with any Lenovo Storage V

Series, Storwize for Lenovo, or IBM Storwize family system, including Storwize V3700, Storwize V7000, Storwize V5000, and SAN Volume Controller.

The remote mirroring licenses must be acquired for the primary (local) and secondary (remote) systems. If Lenovo Storage V7000 is mirrored to a system other than Lenovo Storage V7000, the other system must have the appropriate and applicable licenses for remote mirroring.

- External Virtualization

This feature helps consolidate storage systems from various vendors that are connected into single FC networking. Storage administrator can manage and provision storage to applications from a single user interface and use a common set of advanced functions across all the storage systems under the control of Lenovo Storage V7000.

- Transparent Cloud Tiering

Transparent cloud tiering enables volume data to be copied and transferred to cloud storage. The system supports creating connections to cloud service providers (OpenStack Swift, Amazon S3, and IBM SoftLayer) to store point-in-time copies (snapshots) of volume data in private or public cloud storage and restore data from the cloud.

The following table lists ordering information for optional software features for Lenovo Storage V7000 control enclosures.

Table 11. Software licenses for Lenovo Storage V7000 control enclosures

Description	Part number	Max qty per one control enclosure
Software licenses for models with 3-year software maintenance		
Lenovo Storage V7000 Controller V7 – Bundle w/3Yr S&S PRC only*	01GU823	1
Lenovo Storage V7000 Controller V7 – Easy Tier w/3Yr S&S PRC only	01GU824	1
Lenovo Storage V7000 Controller V7 – FlashCopy w/3Yr S&S PRC only	01GU825	1
Lenovo Storage V7000 Controller V7 – Rmt Mirror w/3Yr S&S PRC only	01GU826	1
Lenovo Storage V7000 Controller V7 – Compression w/3Yr S&S PRC only	01GU827	1
Lenovo Storage V7000 Controller V7 – TrnspCldTier w/3Yr S&S PRC only	01GU952	1
Software licenses for models with 5-year software maintenance		
Lenovo Storage V7000 Controller V7 – Bundle w/5Yr S&S PRC only*	01GU839	1
Lenovo Storage V7000 Controller V7 – Easy Tier w/5Yr S&S PRC only	01GU840	1
Lenovo Storage V7000 Controller V7 – FlashCopy w/5Yr S&S PRC only	01GU841	1
Lenovo Storage V7000 Controller V7 – Rmt Mirror w/5Yr S&S PRC only	01GU842	1
Lenovo Storage V7000 Controller V7 – Compression w/5Yr S&S PRC only	01GU843	1
Lenovo Storage V7000 Controller V7 – TrnspCldTier w/5Yr S&S PRC only	01GU953	1

* The bundle option includes Easy Tier, FlashCopy, Remote Mirroring, and Real-time Compression licenses. The following table lists ordering information for optional software features for Lenovo Storage V7000 expansion enclosures.

Table 12. Software licenses for Lenovo Storage V7000 expansion enclosures

Description	Part number	Max qty per one expansion enclosure
Software licenses for models with 3-year software maintenance		
Lenovo Storage V7000 Expansion V7 – Bundle w/3Yr S&S PRC only*	01GU828	1
Lenovo Storage V7000 Expansion V7 – Easy Tier w/3Yr S&S PRC only	01GU829	1
Lenovo Storage V7000 Expansion V7 – FlashCopy w/3Yr S&S PRC only	01GU830	1
Lenovo Storage V7000 Expansion V7 – Rmt Mirror w/3Yr S&S PRC only	01GU831	1
Lenovo Storage V7000 Expansion V7 – Compression w/3Yr S&S PRC only	01GU832	1
Software licenses for models with 5-year software maintenance		
Lenovo Storage V7000 Expansion V7 – Bundle w/5Yr S&S PRC only*	01GU844	1
Lenovo Storage V7000 Expansion V7 – Easy Tier w/5Yr S&S PRC only	01GU845	1
Lenovo Storage V7000 Expansion V7 – FlashCopy w/5Yr S&S PRC only	01GU846	1
Lenovo Storage V7000 Expansion V7 – Rmt Mirror w/5Yr S&S PRC only	01GU847	1
Lenovo Storage V7000 Expansion V7 – Compression w/5Yr S&S PRC only	01GU848	1

* The bundle option includes Easy Tier, FlashCopy, Remote Mirroring, and Real-time Compression licenses. The following table lists ordering information for optional external virtualization features for Lenovo Storage V7000.

Table 13. External virtualization licenses for Lenovo Storage V7000

Description	Part number	Max qty per one external enclosure
Software licenses for models with 3-year software maintenance		
Lenovo Storage V7000 Ext Virt V7 – Base w/3Yr S&S PRC only	01GU833	1**
Lenovo Storage V7000 Ext Virt V7 – Bundle w/3Yr S&S PRC only*	01GU834	1**
Lenovo Storage V7000 Ext Virt V7 – Easy Tier w/3Yr S&S PRC only	01GU835	1**
Lenovo Storage V7000 Ext Virt V7 – FlashCopy w/3Yr S&S PRC only	01GU836	1**
Lenovo Storage V7000 Ext Virt V7 – Rmt Mirror w/3Yr S&S PRC only	01GU837	1**
Lenovo Storage V7000 Ext Virt V7 – Compression w/3Yr S&S PRC only	01GU838	1**
Software licenses for models with 5-year software maintenance		
Lenovo Storage V7000 Ext Virt V7 – Base w/5Yr S&S PRC only PRC only	01GU849	1**
Lenovo Storage V7000 Ext Virt V7 – Bundle w/5Yr S&S PRC only*	01GU850	1**
Lenovo Storage V7000 Ext Virt V7 – Easy Tier w/5Yr S&S PRC only	01GU851	1**
Lenovo Storage V7000 Ext Virt V7 – FlashCopy w/5Yr S&S PRC only	01GU852	1**
Lenovo Storage V7000 Ext Virt V7 – Rmt Mirror w/5Yr S&S PRC only	01GU853	1**
Lenovo Storage V7000 Ext Virt V7 – Compression w/5Yr S&S PRC only	01GU854	1**

* The bundle option includes Easy Tier, FlashCopy, Remote Mirroring, and Real-time Compression licenses.

** One license for each storage enclosure that is attached to, and externally managed by, Lenovo Storage V7000.

Note: A storage enclosure that is externally managed by the Lenovo Storage V7000 is defined as an independently powered, channel-attached device that stores data on magnetic disks or SSDs, such as disk controllers and their respective expansion enclosures, each of which constitutes separate enclosures. Therefore, an enclosure can be the main controller housing disk or SSDs, or the expansion chassis that houses extra disk or SSDs for the purpose of expanding the total capacity of the storage system.

Power cables

The Lenovo Storage V7000 control and expansion enclosures ship standard without power cables. The part numbers and feature codes to order the power cables (one part number or feature code includes two power cords) are listed in the following table.

Table 14. Power cable options

Description	Part number	Feature code
Lenovo Storage V7K 2.0m 10A/100-250V C13/IEC 320-C14 2x Rack Power Cables PRC	01GV690	AV75
Lenovo Storage V7K 2.8m 10A/220V C13 to GB 2099.1 (CN) 2x Line Cords PRC	01GV688	AV74

Physical specifications

The Lenovo Storage V7000 control and expansion enclosures have the following dimensions and weight (approximate):

- Height: 87 mm (3.4 in.)
- Width: 483 mm (19.0 in.)
- Depth:
 - Control enclosure: 744 mm (29.3 in.) Expansion enclosure: 556 mm (21.9 in.) Weight:
- Control enclosure:
 - Empty: 31.8 kg (70.0 lb)
 - Fully configured: 36.7 kg (80.7 lb) LFF expansion enclosure:
 - Empty: 16.4 kg (36.1 lb)
 - Fully configured: 26.7 kg (58.8 lb)
- SFF expansion enclosure:
 - Empty: 16.7 kg (36.7 lb)
 - Fully configured: 25.0 kg (55.2 lb)

Operating environment

The Lenovo Storage V7000 enclosures are supported in the following environment:

- Air temperature:
 - Operating: 5 °C – 40 °C up to 950 m above sea level; above 950 m, de-rate maximum air temperature by 1 °C per 175 m
 - Non-operating: 1 °C – 60 °C
 - Maximum altitude: 3048 m
- Humidity:
 - Operating: 8% – 85%
 - Non-operating: 8% – 85%
- Electrical power:
 - Control enclosure: 541 watts
 - Expansion enclosure: 304 watts
- Acoustical noise emission:
 - Control enclosure:

- 6.5 bels (idling)
- 6.5 bels (operating)
- Expansion enclosure:
 - 6.3 bels (idling)
 - 6.3 bels (operating)

Warranty

The Lenovo Storage V7000 has a three-year Customer Replaceable Unit (CRU) and onsite limited warranty with 9×5/next business day (NBD) terms.

Note: When purchasing the system that includes 5-year software maintenance, additional two years of hardware support are required.

For 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.

Also available are Lenovo Services warranty upgrades and post-warranty maintenance agreements, with a well-defined scope of services, including service hours, response time, term of service, and service agreement terms and conditions.

For information about Lenovo warranty service upgrade offerings that are available in your area, refer to the following resources:

- Service part numbers in Lenovo Enterprise Solutions Configurator (LESC): <http://lesc.lenovo.com/ss>
- Lenovo Services Availability Locator <http://lenovolocator.com/>

In general, the following warranty service upgrades are available for the Lenovo Storage V7000:

- 3-year 24×7 service coverage with same day onsite response 1-year or 2-year post-warranty extensions:
 - 9×5 service coverage with next business day response
 - 24×7 service coverage with same day onsite response
- YourDrive YourData

Lenovo's YourDrive YourData service (also known as Hard Disk Drive Retention or HDDR) 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 system. 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 warranty upgrade can be purchased for models with the base warranty and with the post-warranty extensions.

For service definitions, details, and 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>

Regulatory compliance

The Lenovo Storage V7000 conforms to the following regulations:

- FCC – Verified to comply with Part 15 of the FCC Rules, Class A Canada ICES-003, Class A
- Australia and New Zealand Class A statement
- European Union Council Directive 2004/108/EC
- EN 55022, Class A
- Japan VCCI Class A statement
- People's Republic of China Class A statement
- Taiwan Class A compliance statement
- Korea KCC Class A statement
- Russia EMI Class A statement

Interoperability

Lenovo provides end-to-end storage compatibility testing to deliver interoperability throughout the network. The Lenovo Storage V7000 supports attachment to Lenovo servers by using iSCSI, FC, or FCoE storage connectivity protocols. Hybrid storage connectivity also is supported.

Note: Tables that are provided in this section are for ordering reference purposes only. End-to-end storage configuration support must be verified through the Lenovo Storage V7000 compatibility list:

<http://support1.lenovo.com.cn/lenovo/wsi/Modules/DriverDetailServer.aspx?ID=137381>

FCoE or iSCSI connectivity

Lenovo Storage V7000 supports end-to-end 10 Gb FCoE connectivity with native FCoE ports or FCoE connectivity via FCoE/FC gateways with native Fibre Channel ports. Lenovo RackSwitch, Brocade, and Cisco converged switches can be used to provide FCoE connectivity with the Lenovo Storage V7000 FC storage. Lenovo Storage V7000 also supports iSCSI attachments via standard 1 Gb, 10 Gb, or 25 Gb Ethernet network. Any compatible Ethernet switch, including Lenovo RackSwitch top of rack (TOR) switches and integrated Flex System Ethernet I/O modules, can be used to provide iSCSI connectivity with the Lenovo Storage V7000 iSCSI storage.

With software iSCSI initiators, any supported 1 Gb, 10 Gb, or 25 Gb Ethernet adapter for Lenovo servers is compatible with the Lenovo Storage V7000 iSCSI storage.

Currently available converged FCoE/iSCSI adapters for Lenovo servers that are compatible with Lenovo Storage V7000 are listed in the following table. Other HBAs also might be supported (see the compatibility list for details).

Table 15. Converged FCoE/iSCSI adapters

Description	Part number
System x converged adapters	
Emulex VFA5 2x10 GbE SFP+ PCIe Adapter (Requires 00JY824)	00JY820
QLogic 8200 Dual Port 10GbE SFP+ VFA (Requires 00Y5624)	90Y4600
System x FoD upgrades required for FCoE/iSCSI support	
Emulex VFA5 FCoE/iSCSI SW for PCIe Adapter (FoD) (Required for 00JY820)	00JY824
QLogic 8200 VFA FCoE/iSCSI License (FoD) (Required for 90Y4600)	00Y5624
Flex System converged adapters	
Flex System CN4022 2-port 10Gb Converged Adapter	88Y5920
Flex System CN4058S 8-port 10Gb Virtual Fabric Adapter (Requires 94Y5164)	94Y5160
Flex System FoD upgrades required for FCoE/iSCSI support	
Flex System CN4058S Virtual Fabric Adapter SW Upgrade (FoD) (Required for 94Y5160)	94Y5164

Fibre Channel connectivity

Lenovo Storage V7000 supports direct FC attachments and FC switch-based attachments. Brocade and QLogic SAN switches can be used to provide FC connectivity with the Lenovo Storage V7000 FC storage.

Currently available FC adapters for Lenovo servers that are compatible with the Lenovo Storage V7000 FC storage are listed in the following table. Other FC adapters also might be supported (see the compatibility list for details).

Table 16. FC adapters

Description	Part number
ThinkSystem HBAs: 32 Gb FC	
ThinkSystem Emulex LPe32000-M2-L PCIe 32Gb 1-Port SFP+ Fibre Channel Adapter	7ZT7A00517
ThinkSystem Emulex LPe32002-M2-L PCIe 32Gb 2-Port SFP+ Fibre Channel Adapter	7ZT7A00519
ThinkSystem QLogic QLE2740 PCIe 32Gb 1-Port SFP+ Fibre Channel Adapter	7ZT7A00516
ThinkSystem QLogic QLE2742 PCIe 32Gb 2-Port SFP+ Fibre Channel Adapter	7ZT7A00518
System x HBAs: 16 Gb FC	
Emulex 16Gb Gen6 FC Single-port HBA (LPe31000)	01CV830
Emulex 16Gb Gen6 FC Dual-port HBA (LPe31002)	01CV840
Emulex 16Gb FC Single-port HBA (LPe16000)	81Y1655
Emulex 16Gb FC Dual-port HBA (LPe16002)	81Y1662
QLogic 16Gb Enhanced Gen5 FC Single-port HBA (QLE2690)	01CV750

QLogic 16Gb Enhanced Gen5 FC Dual-port HBA (QLE2692)	01CV760
QLogic 16Gb FC Single-port HBA (QLE2660)	00Y3337
QLogic 16Gb FC Dual-port HBA (QLE2662)	00Y3341
System x HBAs: 8 Gb FC	
Emulex 8Gb FC Single-port HBA (LPe12000)	42D0485
Emulex 8Gb FC Dual-port HBA (LPe12002)	42D0494
QLogic 8Gb FC Single-port HBA (QLE2560)	42D0501
QLogic 8Gb FC Dual-port HBA (QLE2562)	42D0510
ThinkServer HBAs: 16 Gb FC	
ThinkServer QLE2672 PCIe 16Gb 2 Port FC Adapter by QLogic	4XC0F28745
ThinkServer LPe16000B Single Port 16Gb FC HBA by Emulex	4XB0F28653
ThinkServer LPe16002B Dual Port 16Gb Fiber Channel HBA by Emulex	4XB0F28650
ThinkServer LPe16002B-M6-L PCIe 16Gb 2 Port FC HBA by Emulex	4XB0F28705
ThinkServer LPe16004B-M6-L PCIe 16Gb 4 Port FC HBA by Emulex	4XB0F28681
ThinkServer LPM16002-M6-L AnyFabric 16Gb 2 Port FC HBA by Emulex	4XB0F28706
ThinkServer HBAs: 8 Gb FC	
ThinkServer QLE2562 Dual Port 8Gb Fibre Channel HBA by QLogic	0C19482
ThinkServer LPe16002B-M8-L PCIe 8Gb 2 Port FC HBA by Emulex	4XB0F28704
Flex System HBAs: 8 Gb FC	
Flex System FC3052 2-port 8Gb FC Adapter	95Y2375
Flex System FC3172 2-port 8Gb FC Adapter	69Y1938
Flex System HBAs: 16 Gb FC	
Flex System FC5052 2-port 16Gb FC Adapter	95Y2386
Flex System FC5054 4-port 16Gb FC Adapter	95Y2391
Flex System FC5172 2-port 16Gb FC Adapter	69Y1942

Networking switches

The following table lists currently available Ethernet and FC rack-mount switches that are offered by Lenovo that can be used with Lenovo Storage V7000 in IT solutions.

Table 17. Ethernet and FC rack-mount switches

Description	Part number
1 Gb Ethernet (iSCSI connectivity)	
Lenovo RackSwitch G7028 (Rear to Front)	7159BAX

Lenovo RackSwitch G7052 (Rear to Front)	7159CAX
Lenovo RackSwitch G8052 (Rear to Front)	7159G52
10 Gb Ethernet (iSCSI connectivity)	
Lenovo ThinkSystem NE1032 RackSwitch (Rear to Front)	7159A1X
Lenovo ThinkSystem NE1032T RackSwitch (Rear to Front)	7159B1X
Lenovo ThinkSystem NE1072T RackSwitch (Rear to Front)	7159C1X
10 Gb Ethernet (iSCSI connectivity, FCoE transit switch)	
Lenovo RackSwitch G8124E (Rear to Front)	7159BR6
Lenovo RackSwitch G8264 (Rear to Front)	7159G64
Lenovo RackSwitch G8272 (Rear to Front)	7159CR W
Lenovo RackSwitch G8296 (Rear to Front)	7159GR6
25 Gb Ethernet (iSCSI connectivity)	
Lenovo ThinkSystem NE2572 RackSwitch (Rear to Front)	7159E1X
100 Gb Ethernet (4x 25 Gb Ethernet breakout connectivity out of a 100 Gb port; iSCSI connectivity)	
Lenovo ThinkSystem NE10032 RackSwitch (Rear to Front)	7159D1X
Converged 10 GbE and 8 Gb FC (iSCSI connectivity, FCoE/FC gateway, end-to-end FCoE)	
Lenovo RackSwitch G8264CS (Rear to Front)	7159DR X
8 Gb FC	
Lenovo B300, 8 ports activated, 8x 8Gb SWL SFPs, 1 PS, Rail Kit	3873AR3
Lenovo B300, E_Port License included, 8 ports activated, 8x 8Gb SWL SFPs, 1 PS, Rail Kit	3873AR6
16 Gb FC	
Lenovo ThinkSystem DB610S, 8 ports activated, 8x 16Gb SWL SFPs, 1 PS, Rail Kit	6559D2Y
Lenovo ThinkSystem DB610S, 24 ports activated, 24x 16Gb SWL SFP, Enterprise SW, 1 PS, Rail Kit	6559D1Y
Lenovo B6505, 12 ports activated w/ 16Gb SWL SFPs, 1 PS, Rail Kit	3873AR5

Lenovo B6510, 24 ports activated w/ 16Gb SWL SFPs, 2 PS, Rail Kit	3873BR3
32 Gb FC	
Lenovo ThinkSystem DB610S, 8 ports activated, 1 PS, Rail Kit	6559D3Y
Lenovo ThinkSystem DB620S, 24 ports activated, No SFPs, 2 PS, Rail Kit	6415G3A
Lenovo ThinkSystem DB620S, 24 Ports Activated, 24x 32Gb SWL SFPs, 2 PS, Rail Kit	6415G11
Lenovo ThinkSystem DB620S, 48 Ports Activated, 48x 32Gb SWL SFPs, 2 PS, Rail Kit	6415G2A
Lenovo ThinkSystem DB400D 32Gb FC Director, Up to 192 ports, 8U, Enterprise SW	6684B2A
Lenovo ThinkSystem DB800D 32Gb FC Director, Up to 384 ports, 14U, Enterprise SW	6682B1A

For more information, see the list of Product Guides in the following categories:

- Top-of-rack Switches: <http://lenovopress.com/servers/options/switches#rt=product-guide>
- Rack SAN Switches: <http://lenovopress.com/storage/switches/rack#rt=product-guide>

The following table lists currently available Ethernet and FC embedded switches and pass-thru modules for Flex System that can be used with Lenovo Storage V7000 in IT solutions.

Table 18. Ethernet and FC embedded switches for Flex System

Description	Part number
1 Gb Ethernet (iSCSI connectivity)	
Lenovo Flex System EN2092 1Gb Ethernet Scalable Switch	49Y4294
10 Gb Ethernet (iSCSI connectivity, FCoE transit switch)	
Lenovo Flex System Fabric EN4093R 10Gb Scalable Switch	00FM514
Lenovo Flex System SI4091 10Gb System Interconnect Module	00FE327
Lenovo Flex System Fabric SI4093 System Interconnect Module	00FM518
Cisco Nexus B22 Fabric Extender for Flex System*	94Y5350
Cisco Nexus B22 Fabric Extender with FET bundle for Flex System*	94Y5355
25 Gb Ethernet (iSCSI connectivity)	
Lenovo ThinkSystem NE2552E Flex Switch	4SG7A08868
Converged 10 GbE and 8 Gb FC (iSCSI connectivity, FCoE/FC gateways, end-to-end FCoE)	
Lenovo Flex System Fabric CN4093 10Gb Converged Scalable Switch	00FM510
8 Gb FC	
Lenovo Flex System FC3171 8Gb SAN Switch	69Y1930
16 Gb FC	
Lenovo Flex System FC5022 16Gb SAN Scalable Switch	88Y6374
Lenovo Flex System FC5022 24-port 16Gb SAN Scalable Switch (includes two 16 Gb SFPs)	00Y3324
Lenovo Flex System FC5022 24-port 16Gb ESB SAN Scalable Switch	90Y9356
Pass-thru modules (require a compatible external switch)	
Lenovo Flex System EN4091 10Gb Ethernet Pass-thru	88Y6043
Lenovo Flex System FC3171 8Gb SAN Pass-thru	69Y1934

For more information, see the list of Product Guides in the following categories:

- Blade Network Modules: <http://lenovopress.com/servers/blades/networkmodule#rt=product-guide>
- Blade Storage Modules: <http://lenovopress.com/servers/blades/storagemodule#rt=product-guide>

Operating systems

The Lenovo Storage V7000 supports host attachments to the Lenovo servers with the following operating systems:

- Microsoft:
 - Microsoft Windows Server 2016
 - Microsoft Windows Server 2012 R2
 - Microsoft Windows Server 2012 R2 (Hyper-V)
 - Microsoft Windows Server 2012
 - Microsoft Windows Server 2012 (Hyper-V)
 - Microsoft Windows Server 2008 R2
 - Microsoft Windows Server 2008 R2 (Hyper-V)
 - Microsoft Windows Server 2008
- Red Hat:
 - Red Hat Enterprise Linux 7
 - Red Hat Enterprise Linux 6
 - Red Hat Enterprise Linux 5
 - SUSE Linux Enterprise Server 12 SUSE Linux Enterprise Server 11 SUSE Linux Enterprise Server 10
- VMware:
 - VMware vSphere 6.5
 - VMware vSphere 6.0
 - VMware vSphere 5.5
 - VMware vSphere 5.1
 - VMware vSphere 5.0

Note: The operating systems shown are for Lenovo servers. The V7000 might support other operating systems. For a full list of supported operating systems, refer to the Lenovo Storage V7000 Compatibility List:

<http://support1.lenovo.com.cn/lenovo/wsi/Modules/DriverDetailServer.aspx?ID=137381>

Rack cabinets

The following table lists the rack cabinets that are offered by Lenovo that can be used with Lenovo Storage V7000 in IT solutions.

Table 19. Rack cabinets

Description	Part number
25U S2 Standard Rack (1000 mm deep; 2 sidewall compartments)	93072RX
25U Static S2 Standard Rack (1000 mm deep; 2 sidewall compartments)	93072PX
42U S2 Standard Rack (1000 mm deep; 6 sidewall compartments)	93074RX
42U 1100mm Enterprise V2 Dynamic Rack (6 sidewall compartments)	93634PX
42U 1100mm Enterprise V2 Dynamic Expansion Rack (6 sidewall compartments)	93634EX
42U 1200mm Deep Dynamic Rack (6 sidewall compartments)	93604PX
42U 1200mm Deep Static Rack (6 sidewall compartments)	93614PX
42U Enterprise Rack (1105 mm deep; 4 sidewall compartments)	93084PX
42U Enterprise Expansion Rack (1105 mm deep; 4 sidewall compartments)	93084EX

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

<http://lenovopress.com/servers/options/racks>

Power distribution units

The following table lists the power distribution units (PDUs) that are offered by Lenovo that can be used with Lenovo Storage V7000 in IT solutions.

Table 20. Power distribution units

Description	Part number
0U Basic PDUs	
0U 36 C13/6 C19 32A/200-240V 1 Phase PDU with IEC60309 332P6 line cord	00YJ777
0U 21 C13/12 C19 32A/200-240V/346-415V 3 Phase PDU with IEC60309 532P6 line cord	00YJ778
0U 21 C13/12 C19 48A/200-240V 3 Phase PDU with IEC60309 460P9 line cord	00YJ779
Switched and Monitored PDUs	
0U 20 C13/4 C19 Switched and Monitored 32A/200-240V/1Ph PDU w/ IEC60309 332P6 line cord	00YJ780
0U 18 C13/6 C19 Switched / Monitored 32A/200-240V/346-415V/3Ph PDU w/ IEC60309 532P6 cord	00YJ782
0U 12 C13/12 C19 Switched and Monitored 48A/200-240V/3Ph PDU w/ IEC60309 460P9 line cord	00YJ783
1U 9 C19/3 C13 Switched and Monitored DPI PDU (without line cord)	46M4002
1U 9 C19/3 C13 Switched and Monitored 60A 3Ph PDU with IEC 309 3P+Gnd cord	46M4003
1U 12 C13 Switched and Monitored DPI PDU (without line cord)	46M4004
1U 12 C13 Switched and Monitored 60A 3 Phase PDU with IEC 309 3P+Gnd line cord	46M4005
Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets)	
Ultra Density Enterprise C19/C13 PDU Module (without line cord)	71762NX
Ultra Density Enterprise C19/C13 PDU 60A/208V/3ph with IEC 309 3P+Gnd line cord	71763NU
C13 Enterprise PDUs (12x IEC 320 C13 outlets)	
DPI C13 Enterprise PDU+ (without line cord)	39M2816

For more information, see the list of Product Guides in the Power Distribution Units category:
<http://lenovopress.com/servers/options/pdu>

Uninterruptible power supply units

The following table list the uninterruptible power supply (UPS) units that are offered by Lenovo that can be used with Lenovo Storage V7000 in IT solutions.

Table 21. Uninterruptible power supply units

Description	Part number
Worldwide models	
RT1.5kVA 2U Rack or Tower UPS (100-125VAC) (8x NEMA 5-15R 12A outlets)	55941AX
RT1.5kVA 2U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A outlets)	55941KX
RT2.2kVA 2U Rack or Tower UPS (100-125VAC) (8x NEMA 5-20R 16A outlets)	55942AX
RT2.2kVA 2U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 1x IEC 320 C19 16A outlets)	55942KX
RT3kVA 2U Rack or Tower UPS (100-125VAC) (6x NEMA 5-20R 16A, 1x NEMA L5-30R 24A outlets)	55943AX
RT3kVA 2U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 1x IEC 320 C19 16A outlets)	55943KX
RT5kVA 3U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 2x IEC 320 C19 16A outlets)	55945KX
RT6kVA 3U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 2x IEC 320 C19 16A outlets)	55946KX
RT8kVA 6U Rack or Tower UPS (200-240VAC) (4x IEC 320-C19 16A outlets)	55948KX
RT11kVA 6U Rack or Tower UPS (200-240VAC) (4x IEC 320-C19 16A outlets)	55949KX
RT8kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC) (4x IEC 320-C19 16A outlets)	55948PX
RT11kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC) (4x IEC 320-C19 16A outlets)	55949PX
ASEAN, HTK, INDIA, and PRC models	
ThinkSystem RT3kVA 2U Standard UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets)	55943KT
ThinkSystem RT3kVA 2U Long Backup UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets)	55943LT
ThinkSystem RT6kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output)	55946KT
ThinkSystem RT10kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output)	5594XKT

For more information, see the list of Product Guides in the Uninterruptible Power Supply Units category:
<http://lenovopress.com/servers/options/ups#rt=product-guide>

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Related publications and links

For more information, see the following resources:

- Lenovo Storage V7000 product page (PRC):
<http://b2b.lenovo.com.cn/product/storage/v7000>
- Lenovo Data Center Support (PRC)
<http://support.lenovo.com.cn/lenovo/wsi/Modules/DriverDownloadServer.aspx>
- Lenovo Enterprise Solutions Configurator (LESC):
<http://lesc.lenovo.com>

Related product families

Product families related to this document are the following:

- Lenovo Storage
- External Storage

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Storage V7000 Storage Array PRC, Storage V7000, Storage Array PRC, Array PRC

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