# IBM Storwize V7000 for Lenovo
## Product Guide (withdrawn product)

IBM Storwize V7000 for Lenovo (Machine Type 6195) 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.

Storwize V7000 storage controller units 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 Gb (Model 524 only) or 16 Gb Fibre Channel (FC), 10 Gb iSCSI or Fibre Channel over Ethernet (FCoE), or 25 Gb iSCSI (Model HC1 only) connectivity.

Storwize V7000 offers both Large Form Factor (LFF) and Small Form Factor (SFF) 12 Gb SAS storage expansion units. LFF expansion unit supports up to 12 3.5-inch drives, while the SFF expansion unit supports up to 24 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 Storwize V7000 system.

A Storwize V7000 system scales up to 504 drives with the attachment of up to 20 Storwize V7000 expansion units. The Storwize V7000 Storage Controller Unit is shown in the following figure.

Figure 1. Storwize V7000 Storage Controller Unit

### Did you know?

A single Storwize 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.

Storwize V7000 offers hybrid block storage connectivity with support for 1 Gb iSCSI, 10 Gb iSCSI or FCoE, 25 Gb iSCSI (Model HC1 only), 8 Gb FC (Model 524 only), or 16 Gb FC connectivity.

Storwize V7000 systems can be clustered to help deliver greater performance, bandwidth, and scalability. A Storwize V7000 clustered system can contain up to four Storwize V7000 controller units and up to 2016 drives.

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

## Key features

The Storwize 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 (Model HC1 only) 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 (Model HC1 only), 8 Gb FC (Model 524 only), or 16 Gb FC connectivity.
- 12 Gb SAS expansion units 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 Storwize V7000 expansion units and up to 2016 drives in a four-way clustered configuration.
- Further scalability can be achieved with virtualization of external storage. When Storwize V7000 virtualizes an external disk system, capacity in the external system inherits the functional richness and ease of use of Storwize 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.
- Storwize V7000 combines various IBM 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/documentation
- 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.

Storwize 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: 200 GB, 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 3 TB, 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 Storwize V7000 expansion units are supported by a single Storwize V7000 controller unit. You can intermix 3.5-inch and 2.5-inch expansion units behind a 2.5-inch controller unit. This configuration

delivers the added flexibility to mix 3.5-inch and 2.5-inch drives within a single system.

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

The V7000 storage system 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

The Storwize 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 Storwize V7000 SFF enclosure.

Figure 2.

Front view of the Storwize V7000 SFF enclosure

The following figure shows the front of the Storwize V7000 LFF enclosure.

Figure 3.

Front view of the Storwize V7000 LFF enclosure

The following figure shows the rear of the Storwize V7000 Controller Unit.

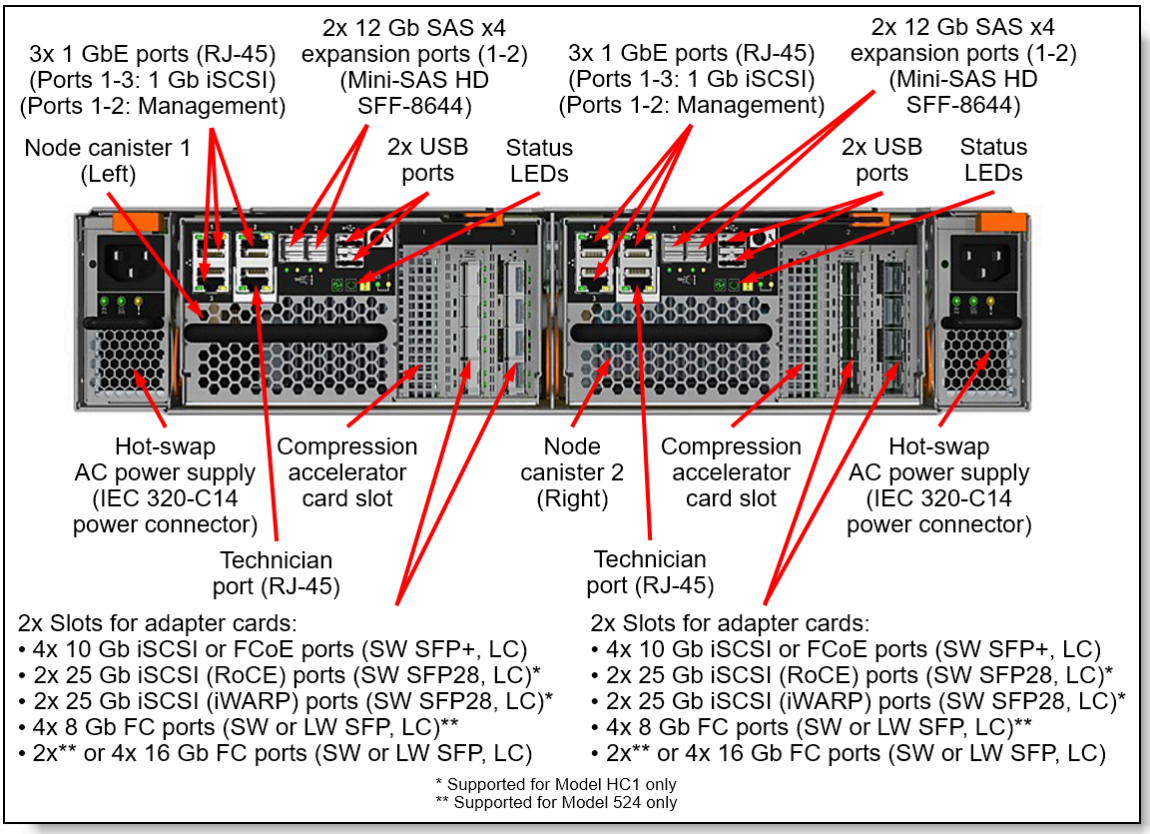


Figure 4. Rear view of the Storwize V7000 Controller Unit

The following figure shows the rear of the Storwize V7000 Expansion Unit.

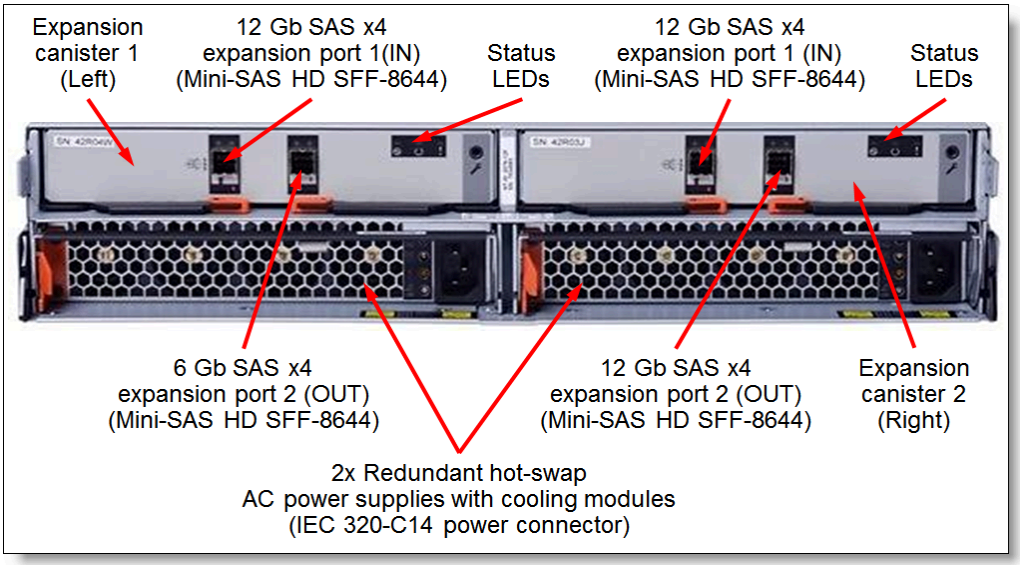


Figure 5. Rear view of the Storwize V7000 Expansion Unit

## System specifications

The following table lists the Storwize V7000 storage 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 (Model HC1) or 7.8.1.1 (Model 524). Model 524 does not support software versions 8.x onwards. 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://datacentersupport.lenovo.com/us/en/products/storage/storwize/v7000/downloads

Table 1. System specifications

| Components | Specification |
|---|---|
| Form factor | • Storwize V7000 Storage Controller Unit: 2U rack mount<br>• Storwize V7000 SFF or LFF Storage Expansion Unit: 2U rack mount |
| Controller configuration | Dual controller (known as *node canister*) configuration per controller unit. Two or four controller units can be combined into a Storwize 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 controller unit (32 GB per node canister) upgradeable to 128 GB (64 GB per node canister) or 256 GB (128 GB per node canister; supported by Model HC1 only). Up to 1 TB per cluster. Battery-backed cache protection. |
| Drive bays | Up to 504 SFF drive bays per single system:<br>• 24 SFF drive bays in the controller unit<br>• 24 SFF drive bays in the SFF expansion unit; up to 20x SFF expansion units<br><br>Up to 24 SFF and 240 LFF drive bays per single system:<br>• 24 SFF drive bays in the controller unit<br>• 12 LFF drive bays in the LFF expansion unit; up to 20x LFF expansion units<br><br>Intermix of SFF and LFF enclosures is supported.<br>Up to 2016 SFF drives in a four-way clustered configuration.<br>Up to 96 SFF drives and 960 LFF drives in a four-way clustered configuration. |
| Drive technology | SAS and NL SAS HDDs and SAS SSDs. Intermix of HDDs and SSDs is supported. |
| Drive connectivity | Dual-ported 12 Gb SAS drive attachment infrastructure.<br><br>Controller unit with two node canisters (ports per one node canister):<br>• 24x 12 Gb SAS internal drive ports<br>• 2x 12 Gb SAS x4 (Mini-SAS HD SFF-8644) expansion ports for the attachment of the expansion units<br><br>Expansion unit with two expansion canisters (ports per one expansion canister):<br>• 24x 12 Gb SAS internal drive ports (SFF unit)<br>• 12x 12 Gb SAS internal drive ports (LFF unit)<br>• 2x 12 Gb SAS x4 (Mini-SAS HD SFF-8644) expansion ports (IN and OUT) for the daisy chained attachment of the expansion units |
| Drives | SFF drives:<br>• 200 GB, 400 GB, 800 GB, 1.6 TB, and 3.2 TB SAS SSDs<br>• 1.92 TB, 3.84 TB, 7.68 TB, and 15.36 TB read-optimized SAS SSDs<br>• 300 GB, 600 GB, and 900 GB 15K rpm SAS HDDs<br>• 900 GB, 1.2 TB, 1.8 TB, and 2.4 TB 10K rpm SAS HDDs<br>• 2 TB 7.2K rpm NL SAS HDDs<br><br>LFF drives: 3 TB, 4 TB, 6 TB, 8 TB, 10 TB, and 12 TB 7.2K rpm NL SAS HDDs |

| Components | Specification |
|---|---|
| Storage capacity | • Up to 7.74 PB (504x 15.36 TB SFF SSDs) per one controller unit<br>• Up to 30.96 PB (2016x 15.36 TB SFF SSDs) per cluster |
| Host connectivity | Standard ports (per controller unit with two node canisters): 6x 1 Gb iSCSI (UTP, RJ-45) (3 ports per node canister).<br><br>Extra ports must be configured by selecting at least one of the following host port options, or a combination of one iSCSI or FCoE option and one of the FC options, or two FC options, or two iSCSI or FCoE options (Model HC1 only) (per controller unit with two node canisters):<br>• 8x 10 Gb iSCSI or FCoE SFP+ host ports (SW fiber optics, LC) (4 ports per node canister)<br>• 8x 8 Gb FC SFP host ports (SW or LW fiber optics, LC) (4 ports per node canister)*<br>• 4x 16 Gb FC SFP host ports (SW or LW fiber optics, LC) (2 ports per node canister)*<br>• 8x 16 Gb FC SFP host ports (SW or LW* fiber optics, LC) (4 ports per node canister)<br>• 4x 25 Gb iSCSI (RoCE) SFP28 host ports (SW fiber, LC) (2 ports per node canister)#<br>• 4x 25 Gb iSCSI (iWARP) SFP28 host ports (SW fiber, LC) (2 ports per node canister)# |
| Host operating systems^ | Microsoft Windows Server 2008 R2, 2012, 2012 R2, and 2016; Red Hat Enterprise Linux (RHEL) 5, 6, and 7; SUSE Linux Enterprise Server (SLES) 10, 11, and 12; VMware vSphere 5.0, 5.1, 5.5, 6.0, and 6.5. |
| Standard software features | Virtualization of internal storage, Thin provisioning, Data reduction pools, Deduplication, One-way data migration, Four-system clustering, HyperSwap (requires an optional Remote Mirroring license), Comprestimator. |
| Optional features | Easy Tier, FlashCopy, Remote Mirroring, Real-time Compression, Encryption, External Virtualization, Transparent Cloud Tiering. |
| Performance (single system)** | • Up to 1 250 000 cache read IOPS<br>• Up to 450 000 disk read IOPS<br>• Up to 110 000 disk write IOPS<br>• Up to 220 000 disk mixed (70% read/30% write) IOPS<br>• Up to 12 GBps sequential disk read throughput<br>• Up to 5.2 GBps sequential disk write throughput |
| Configuration maximums*** | Per one controller unit (I/O group) / cluster (if different):<br>• Maximum storage capacity (including virtualized external storage): 32 PB<br>• Maximum number of storage pools: 1024<br>• Maximum number of logical volumes: 10000<br>• Maximum number of compressed volumes: 512 / 2048 (requires an optional license)<br>• Maximum logical volume size: 256 TB<br>• Maximum number of drives in a RAID array: 16<br>• Maximum number of drives in a distributed RAID array: 128 (including up to 4 spares)<br>• Maximum number of RAID arrays: 128<br>• Maximum number of distributed RAID arrays: 10 / 32<br>• Maximum hot spare drives: No limit<br>• Maximum number of host ports: 2048 / 8192<br>• Maximum number of hosts: 512 / 2048<br>• Maximum number of host ports per one host: 32<br>• Maximum number of snapshots: 5000 (requires an optional license)<br>• Maximum number of remote mirroring relationships: 8192 (requires an optional license) |
| Cooling | Redundant cooling with the fan modules that are built into power supplies. |
| Power supply | • Controller Unit: Two redundant hot-swap 1200 W AC power supplies<br>• Expansion Unit: Two redundant hot-swap 800 W AC power supplies |
| Hot-swap parts | Node canisters, expansion canisters, SFP/SFP+ transceivers, drives, power supplies with fans. |
| Management interfaces | 2x 1 GbE ports (UTP, RJ-45) in a primary/redundant configuration.<br>Web-based GUI; SSH CLI; SMI-S; SNMP and email notifications. |
| Security features | Secure Socket Layer (SSL), Secure Shell (SSH), user level security, LDAP authentication |

| Components | Specification |
|---|---|
| Warranty | Three-year customer-replaceable unit and onsite warranty with 9x5 next business day terms. Optional warranty service upgrades are available through Lenovo: 24x7 coverage, 2-hour or 4-hour response time, 1-year or 2-year warranty extensions, YourDrive YourData. |
| Software maintenance | Three-year or five-year (model dependent) base software maintenance is included. |
| Dimensions | • Cntr. unit: Height: 87 mm (3.4 in.); width: 483 mm (19.0 in.), depth: 744 mm (29.3 in.)<br>• Exp. unit: Height: 87 mm (3.4 in.); width: 483 mm (19.0 in.); depth: 556 mm (21.9 in.) |
| Weight | • Controller Unit: Empty: 31.8 kg (70.0 lb); Fully configured: 36.7 kg (80.7 lb)<br>• SFF Expansion Unit: Empty: 16.7 kg (36.7 lb); Fully configured: 25.0 kg (55.2 lb)<br>• LFF Expansion Unit: Empty: 16.4 kg (36.1 lb); Fully configured: 26.7 kg (58.8 lb) |

* Supported for Model 524 only.
# Supported for Model HC1 only.
^ 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 System Storage Interoperation Center: http://ibm.com/systems/support/storage/ssic.
** Internal performance measurements for Model HC1 with SSDs.
*** For a detailed list of configuration limits and restrictions for a specific version of the Storwize V7000 software, see the following online document: http://www.ibm.com/support/docview.wss?uid=ssg1S1003741

## Controller units

**Product availability:** The Storwize V7000 controller units are withdrawn and no longer available for ordering.

The following table shows the ordering information for the Storwize V7000 Control Enclosure (Model HC1).

Table 2. Storwize V7000 SFF Control Enclosure (Model HC1)

| Description | Part number | Machine Type-Model | Feature codes* |
|---|---|---|---|
| Worldwide models (except Latin America) | | | |
| IBM Storwize V7000 SFF Control Enclosure, 3YR SWMA | 6195C32 | 6195-HC1 | AUDB / AV2J / AV2K |
| IBM Storwize V7000 SFF Control Enclosure, 5YR SWMA | 6195C52 | 6195-HC1 | AUK8 / AV2J / AV2L |
| Latin America models | | | |
| IBM Storwize V7000 SFF Control Enclosure, 3YR SWMA, LA | 6195C3L | 6195-HC1 | AUDB / AV2J / AV2K |
| IBM Storwize V7000 SFF Control Enclosure, 5YR SWMA, LA | 6195C5L | 6195-HC1 | AUK8 / AV2J / AV2L |

* Feature codes for System unit base hardware / Base software / Software maintenance (SWMA).

The following table shows the Storwize V7000 Controller Unit (Model 524).

Table 3. Storwize V7000 Controller Unit (Model 524)

| Description | Part number | Machine Type-Model | Feature codes* |
|---|---|---|---|
| Worldwide models (except Latin America) | | | |
| IBM Storwize V7000 2.5-inch Storage Controller Unit, w/3 Yr S&S | 6195SC5 | 6195-524 | ADL1 / ASHJ /ASHH |
| IBM Storwize V7000 2.5-inch Storage Controller Unit, w/5 Yr S&S | 61951F1 | 6195-524 | ADL1 / ASHJ / AU0R |
| Latin America models | | | |
| IBM Storwize V7000 2.5-inch Storage Controller Unit, w/3 Yr S&S | 6195SCL | 6195-524 | ADL1 / ASHJ / ASHH |
| IBM Storwize V7000 2.5-inch Storage Controller Unit, w/5 Yr S&S | 61951FL | 6195-524 | ADL1 / ASHJ / AU0R |

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

The part numbers for the Storwize V7000 controller unit include the following items:

- One Storwize V7000 SFF controller unit 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 Storwize V7000 controller units 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 Model HC1 node canisters use a 10-core processor with 2.2 GHz core speeds and DDR4 cache memory. The Model 524 node canisters use an 8-core processor with 1.9 core speeds and DDR3 cache memory.

The Storwize V7000 controller units ship with the host connectivity interfaces that features 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 Storwize V7000 controller unit 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 8 Gb FC SFP ports (four ports per adapter card; Model 524 only) with eight SW SFP optical transceivers (LC connectors) included for FC connectivity (a pair of optional 8 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 16 Gb FC SFP ports (two ports per adapter card; Model 524 only) with four 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)
- 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; Model HC1 only) 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; Model HC1 only) 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 Storwize V7000 controller unit supports up to two pairs of the 8 Gb FC or 16 Gb FC adapter cards, up to two pairs of the 10 Gb iSCSI or FCoE adapter cards (Model HC1 only; Model 524 supports up to one pair of the 10 Gb adapter cards), up to two pairs of the 25 GbE iSCSI adapter cards (Model HC1 only), 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 Storwize V7000 controller unit.
- For 1 Gb iSCSI and management connectivity, Storwize V7000 requires a Category 5 or Category 5E Ethernet cable that is terminated with an 8P8C modular connector (RJ-45 compatible connector). This cable is not supplied by Lenovo and must be supplied by the customer.
- 25 Gb iSCSI adapter cards do not support FCoE.

The following table lists the available host port configurations for the Storwize V7000 control enclosure model HC1.

Table 4. Storwize V7000 controller unit model HC1 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 the available host port configurations for the Storwize V7000 controller unit model 524.

Table 5. Storwize V7000 controller unit model 524 host port configurations

| **Port type and total number of ports** | | | |
|---|---|---|---|
| **1 Gb iSCSI** | **10 Gb iSCSI or FCoE** | **8 Gb FC** | **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) | 8 (4 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) | - |
| 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) | - | 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) | - | - | 12 (6 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 Storwize V7000 controller units.

Table 6. Host connectivity options

| **Description** | **Part number** | **Feature code** | **Maximum quantity per one controller unit** |
|---|---|---|---|
| Host connectivity options | | | |
| 10 Gb Ethernet 4 Port Adapter Cards (Pair) | 00NC505 | AHB5 | 2* |
| 8 Gb FC 4 Port Adapter Cards (Pair) | 00NC503 | AHB1 | 2** |
| 16 Gb FC 2 Port Adapter Cards (Pair) | 00MN528 | ASTE | 2** |
| 16 Gb FC 4 Port Adapter Cards (Pair) | 00MM835 | ATQV | 2 |
| V7000 25GbE (RoCE) Adapter Pair | 00YK978 | B2UL | 2^ |
| V7000 25GbE (iWARP) Adapter Pair | 00YK981 | B2UM | 2^ |
| SFP transceiver options for FC adapter cards (replace the existing SW SFP transceivers) | | | |
| 8 Gb FC LW SFP Transceivers (Pair) | 00MJ105 | ACHT | 8** |
| 16 Gb FC LW SFP Transceivers (Pair) | 00MN530 | ASTH | 8 |
| Cable options for FC, 10Gb iSCSI or FCoE, or 25 GbE iSCSI host connectivity | | | |
| V7000 1m OM3 Fiber Cable (LC) | 01PG226 | B2Y5 | 16 |
| V7000 5m OM3 Fiber Cable (LC) | 01PG229 | B2Y6 | 16 |
| V7000 10m OM3 Fiber Cable (LC) | 01KP876 | AVVC | 16 |
| V7000 25m OM3 Fiber Cable (LC) | 01PG232 | B2Y7 | 16 |
| Cable options for FC host connectivity | | | |
| V7000 1m Fiber Cable (LC) | 01KP873 | AVV9 | 16 |

| Description | Part number | Feature code | Maximum quantity per one controller unit |
|---|---|---|---|
| V7000 5m Fiber Cable (LC) | 01KP874 | AVVA | 16 |
| V7000 25m Fiber Cable (LC) | 01KP875 | AVVB | 16 |

* Model HC1 supports up to two iSCSI/FCoE adapter card pairs per controller unit. Model 524 supports up to one iSCSI/FCoE card pair per controller unit.
** Supported for Model 524 only.
^ Supported for Model HC1 only.

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 7. Storwize V7000 controller unit hardware upgrades for Real-time compression

| Description | Part number | Feature code | Maximum quantity per one controller unit | Model HC1 | Model 524 |
|---|---|---|---|---|---|
| **Compression acceleration cards** | | | | | |
| Compression Accelerator Cards (Pair) | 00NC507 | AHC1 | 1* | Y | Y |
| **Cache upgrades** | | | | | |
| 64GB to 128GB Cache Upgrade (for Model HC1) | 01CX819 | AUDE | 1** | Y | N |
| Storwize V7000 64GB to 256GB Cache Upgrade | 01KP911 | None^ | 1** | Y | N |
| 64GB to 128GB Cache Upgrade (for Model 524) | 00NC509 | AHCB | 1 | N | Y |

* The installation of a pair of the compression accelerator cards requires a Cache Upgrade (01CX819, 01KP911, or 00NC509).
** 128GB and 256GB Cache Upgrades for Model HC1 are mutually exclusive.
^ Field upgrade only.

The Storwize V7000 controller units provide 12 Gb SAS internal dual-port drive connectivity, and each controller unit also has four 12 Gb SAS x4 (Mini-SAS HD SFF-8644) ports (2 port per node canister) for 12 Gb SAS expansion unit connectivity.

## Expansion units

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

The following table lists the models of the Storwize V7000 SFF and LFF expansion units.

Table 8. Part numbers and feature codes for ordering Storwize V7000 expansion enclosures

| Description | Part number | Machine Type-Model | Feature codes* |
|---|---|---|---|
| Currently available models | | | |
| IBM Storwize V7000 SFF Expansion w/ 3YR SWMA S&S | 6195N13 | 6195-24F | AXDE / AV2N / AV2P |
| IBM Storwize V7000 SFF Expansion w/ 5YR SWMA S&S | 6195N15 | 6195-24F | AUK9 / AV2N / AV2M |
| IBM Storwize V7000 LFF Expansion w/ 3YR SWMA S&S | 6195N43 | 6195-12F | AXDD / AV2N / AV2P |
| IBM Storwize V7000 LFF Expansion w/ 5YR SWMA S&S | 6195N45 | 6195-12F | AUKA / AV2N / AV2M |
| Withdrawn models (No longer available for ordering; for reference purposes only) | | | |
| IBM Storwize V7000 3.5-inch Storage Expansion Unit, w/3 Yr S&S | 6195LEF | 6195-12F | ADL2 / ASHL / ASHK |
| IBM Storwize V7000 3.5-inch Storage Expansion Unit, w/3 Yr S&S | 6195LEL | 6195-12F | ADL2 / ASHL / ASHK |
| IBM Storwize V7000 3.5-inch Storage Expansion Unit, w/5 Yr S&S | 61951G1 | 6195-12F | ADL2 / ASHL / AU0S |
| IBM Storwize V7000 3.5-inch Storage Expansion Unit, w/5 Yr S&S | 61951GL | 6195-12F | ADL2 / ASHL / AU0S |
| IBM Storwize V7000 2.5-inch Storage Expansion Unit, w/3 Yr S&S | 6195SEF | 6195-24F | ADL3 / ASHL / ASHK |
| IBM Storwize V7000 2.5-inch Storage Expansion Unit, w/3 Yr S&S | 6195SEL | 6195-24F | ADL3 / ASHL / ASHK |
| IBM Storwize V7000 2.5-inch Storage Expansion Unit, w/5 Yr S&S | 61951H1 | 6195-24F | ADL3 / ASHL / AU0S |
| IBM Storwize V7000 2.5-inch Storage Expansion Unit, w/5 Yr S&S | 61951HL | 6195-24F | ADL3 / ASHL / AU0S |

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

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

- One Storwize V7000 LFF or SFF expansion unit 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 Table 13).

Each Storwize V7000 expansion unit 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 Storwize V7000 node canisters and for connecting the expansion units 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 units can be connected to Port 1 or Port 2 in a daisy-chained manner for a total of up to 20 expansion units per one controller unit.

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

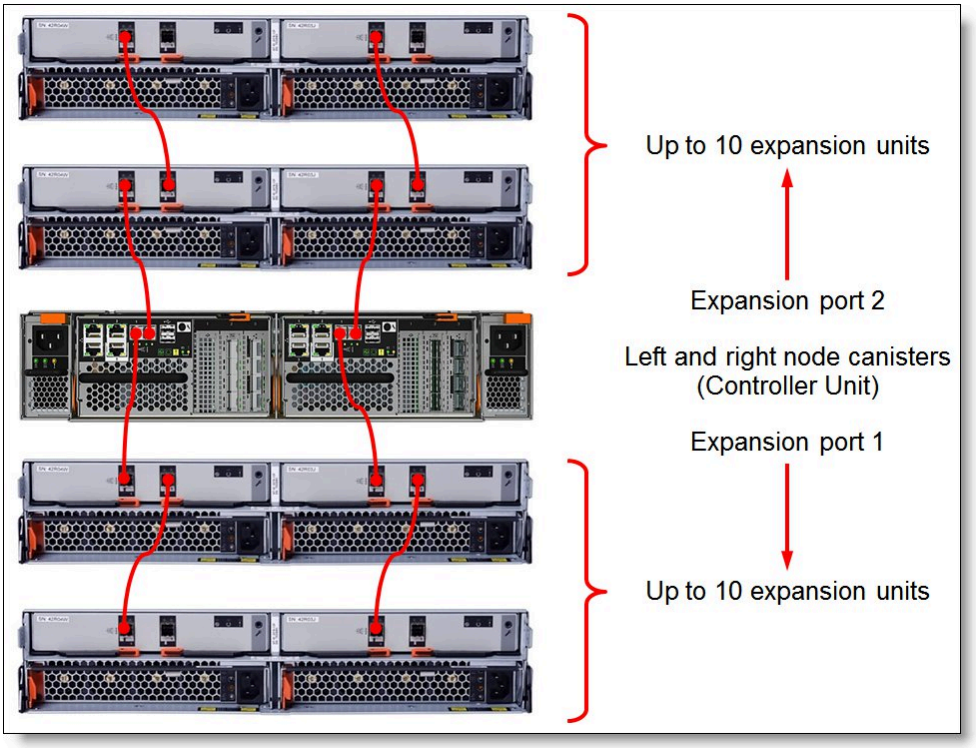


Figure 6. Expansion unit connectivity topology

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

Table 9. Expansion unit connectivity options

| Description | Part number | Feature code | Quantity per one expansion unit |
|---|---|---|---|
| 0.6m 12 Gb SAS Cable (mSAS HD to mSAS HD) | 00NC539 | ACUA | 2 |
| 1.5m 12 Gb SAS Cable (mSAS HD to mSAS HD) | 00NC541 | ACUB | 2 |
| 3m 12 Gb SAS Cable (mSAS HD to mSAS HD) | 00NC543 | ACUC | 2 |
| 6m 12 Gb SAS Cable (mSAS HD to mSAS HD) | 00NC545 | ACUD | 2 |

## Drives

The Storwize V7000 SFF controller and expansion units support up to 24 SFF hot-swap drives. The Storwize V7000 LFF expansion unit supports up to 12 LFF hot-swap drives. The following tables list drive options for the Storwize V7000 SFF and LFF units.

Table 10. SFF drive options

| Description | Part number | Feature code | Maximum quantity per one SFF unit |
|---|---|---|---|
| 2.5-inch SAS hot-swap SSDs | | | |
| 200 GB 12 Gb SAS 2.5 Inch Flash Drive | 00NC531 | AHH1 | 24 |
| 400 GB 12 Gb SAS 2.5 Inch Flash Drive | 00NC533 | AHH2 | 24 |
| 800 GB 12 Gb SAS 2.5 Inch Flash Drive | 00NC535 | AHH3 | 24 |
| 1.6 TB 12 Gb SAS 2.5 Inch Flash Drive | 00WC016 | AT11 | 24 |
| 3.2 TB 12 Gb SAS 2.5 Inch Flash Drive | 00MM834 | ATQU | 24 |
| 2.5-inch SAS hot-swap SSDs - Read Intensive (RI) | | | |
| 1.92TB 2.5 Inch Read Intensive Flash Drive | 01CX807 | AUDC | 24 |
| 3.84TB 2.5 Inch Read Intensive Flash Drive | 01CX809 | AUDD | 24 |
| V7000 7.68TB 2.5" RI Flash Drive | 01KP490 | AVVX | 24 |
| V7000 15.36TB 2.5" RI Flash Drive | 01KP491 | AVVY | 24 |
| 2.5-inch SAS hot-swap HDDs | | | |
| 300 GB 15,000 rpm 12 Gb SAS 2.5 Inch HDD | 00NC519 | AHE1 | 24 |
| 600 GB 10,000 rpm 6 Gb SAS 2.5 Inch HDD | 00NC523 | AHF1 | 24 |
| 600 GB 15,000 rpm 12 Gb SAS 2.5 Inch HDD | 00NC521 | AHE2 | 24 |
| 900 GB 10,000 rpm 12 Gb SAS 2.5 Inch HDD | 00NC525 | AHF2 | 24 |
| Storwize V7000 900GB 15K RPM 2.5" HDD | 01KP910 | B0R8 | 24 |
| 1.2 TB 10,000 rpm 6 Gb SAS 2.5 Inch HDD | 00NC527 | AHF3 | 24 |
| 1.8 TB 10,000 rpm 12 Gb SAS 2.5 Inch HDD | 00MN534 | ASTQ | 24 |
| Storwize V7000 2.4TB 2.5" 10K HDD | 01KP963 | B1JP | 24 |
| 2.5-inch NL SAS hot-swap HDDs | | | |
| 2 TB 7,200 rpm 12 Gb NL SAS 2.5 Inch HDD | 00WC013 | AT0Y | 24 |

Table 11. LFF drive options

| Description | Part number | Feature code | Maximum quantity per one LFF unit |
|---|---|---|---|
| 3.5-inch NL SAS hot-swap HDDs | | | |
| 3 TB 7,200 rpm 6 Gb NL SAS 3.5 Inch HDD | 00NC515 | AHD2 | 12 |
| 4 TB 7,200 rpm 6 Gb NL SAS 3.5 Inch HDD | 00NC517 | AHD3 | 12 |
| 6 TB 7,200 rpm 12 Gb NL SAS 3.5 Inch HDD | 00MN532 | ASTP | 12 |
| 8 TB 7,200 rpm 12 Gb NL SAS 3.5 Inch HDD | 00WC010 | AT0V | 12 |
| V7000 10TB 7.2K 3.5" HDD | 01KP828 | AVW5 | 12 |

| Description | Part number | Feature code | Maximum quantity per one LFF unit |
|---|---|---|---|
| V7000 12TB 7.2K 3.5" HDD | 01PG410 | B3SB | 12 |

## Software

The following functions are included with every Storwize 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
  Storwize V7000 systems can be clustered to help deliver greater performance, bandwidth, and scalability. A Storwize V7000 clustered system can contain up to four Storwize V7000 systems and up to 1,056 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 Storwize 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 Storwize V7000 storage capabilities can be expanded with optional licensed functions. Each optional Storwize V7000 software license is required for each controller unit, expansion unit, and externally virtualized storage units.

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 Storwize 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 IBM 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.
- Encryption
  This feature provides encryption for data at rest for enhanced data security. Encryption is performed by the Storwize V7000 control enclosure for data that is stored within the Storwize V7000 system (the control enclosure and all attached expansion enclosures) and externally virtualized storage capacities. Encryption feature does not require self-encrypting drives (SEDs); it works with traditional drives. Encryption is enabled on the entire Storwize V7000 system (Storwize control enclosure and all attached Storwize V7000 expansion enclosures) and externally virtualized storage under its control.
- 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, Storwize V7000 remote mirroring interoperates with any other Storwize family system, including Storwize V5000, Storwize V3700, and SAN Volume Controller.

  The remote mirroring licenses must be acquired for the primary (local) and secondary (remote) systems. If Storwize V7000 is mirrored to a system other than Storwize 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 Storwize 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 tables list ordering information for optional software features for Storwize V7000 controller units.

Table 12. Software licenses for Storwize V7000 controller units: North America, Asia Pacific

| Description | Part number | Max qty per one controller unit |
|---|---|---|
| Software licenses for models with 3-year software maintenance | | |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - Bundle, Per Storage Dev, w/3 Yr S&S* | 00KE025 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - Easy Tier, Per Storage Dev, w/3 Yr S&S | 00KE026 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - FlashCopy, Per Storage Dev, w/3 Yr S&S | 00KE027 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - Rmt Mir, Per Storage Dev, w/3 Yr S&S | 00KE028 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - Real-Tm Cmp, Per Storage Dev, w/3Yr S&S | 00KE029 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - TrnspCldTier, Per Storage Dev, w/3 Yr S&S | 01GU950 | 1 |
| Software licenses for models with 5-year software maintenance | | |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - Bundle, Per Storage Dev, w/5 Yr S&S* | 01DA167 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - Easy Tier, Per Storage Dev, w/5 Yr S&S | 01DA168 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - FlashCopy, Per Storage Dev, w/5 Yr S&S | 01DA169 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - Rmt Mir, Per Storage Dev, w/5 Yr S&S | 01DA170 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - Real-Tm Cmp, Per Storage Dev, w/5 Yr S&S | 01DA171 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - TrnspCldTier, Per Storage Dev, w/5 Yr S&S | 01GU951 | 1 |

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

Table 13. Software licenses for Storwize V7000 controller units: Latin America, EMEA

| Description | Part number | Max qty per one controller unit |
|---|---|---|
| Software licenses for models with 3-year software maintenance | | |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - Bundle Per Storage Dev, w/3 Yr S&S* | 00KE180 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - Easy Tier Per Storage Dev, w/3 Yr S&S | 00KE181 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - FlashCopy Per Storage Dev, w/3 Yr S&S | 00KE182 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - Rmt Mir Per Storage Dev, w/3 Yr S&S | 00KE183 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - Real-Tm Cmp Per Storage Dev, w/3Yr S&S | 00KE184 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - TrnspCldTier, Per Storage Dev, w/3 Yr S&S | 01GU950 | 1 |
| Software licenses for models with 5-year software maintenance | | |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - Bundle, Per Storage Dev, w/5 Yr S&S* | 01DA196 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - Easy Tier, Per Storage Dev, w/5 Yr S&S | 01DA197 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - FlashCopy, Per Storage Dev, w/5 Yr S&S | 01DA198 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - Rmt Mir, Per Storage Dev, w/5 Yr S&S | 01DA199 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - Real-Tm Cmp, Per Storage Dev, w/5 Yr S&S | 01DA200 | 1 |
| IBM Storwize Family for Strwz V7000 Cntlr V7 - TrnspCldTier, Per Storage Dev, w/5 Yr S&S | 01GU951 | 1 |

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

The following tables list ordering information for optional software features for Storwize V7000 expansion enclosures.

Table 14. Software licenses for Storwize V7000 expansion units: North America, Asia Pacific

| Description | Part number | Max qty per one exp. unit |
|---|---|---|
| Software licenses for models with 3-year software maintenance | | |
| IBM Storwize Family for Strwz V7000 Expan V7 - Bundle Per Storage Dev, w/3 Yr S&S* | 00KE050 | 1 |
| IBM Storwize Family for Strwz V7000 Expan V7 - Easy Tier Per Storage Dev, w/3 Yr S&S | 00KE051 | 1 |
| IBM Storwize Family for Strwz V7000 Expan V7 - FlashCopy Per Storage Dev, w/3 Yr S&S | 00KE052 | 1 |
| IBM Storwize Family for Strwz V7000 Expan V7 - Rmt Mir Per Storage Dev, w/3 Yr S&S | 00KE053 | 1 |
| IBM Storwize Family for Strwz V7000 Expan V7 - Real-Tm Cmp Per Storage Dev, w/3Yr S&S | 00KE054 | 1 |
| Software licenses for models with 5-year software maintenance | | |
| IBM Storwize Family for Strwz V7000 Expan V7 - Bundle, Per Storage Dev, w/5 Yr S&S* | 01DA172 | 1 |
| IBM Storwize Family for Strwz V7000 Expan V7 - Easy Tier, Per Storage Dev, w/5 Yr S&S | 01DA173 | 1 |
| IBM Storwize Family for Strwz V7000 Expan V7 - FlashCopy, Per Storage Dev, w/5 Yr S&S | 01DA174 | 1 |
| IBM Storwize Family for Strwz V7000 Expan V7 - Rmt Mir, Per Storage Dev, w/5 Yr S&S | 01DA175 | 1 |
| IBM Storwize Family for Strwz V7000 Expan V7 - Real-Tm Cmp, Per Storage Dev, w/5 Yr S&S | 01DA176 | 1 |

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

Table 15. Software licenses for Storwize V7000 expansion units: Latin America, EMEA

| Description | Part number | Max qty per one exp. unit |
|---|---|---|
| Software licenses for models with 3-year software maintenance | | |
| IBM Storwize Family for Strwz V7000 Expan V7 - Bundle Per Storage Dev, w/3 Yr S&S* | 00KE205 | 1 |
| IBM Storwize Family for Strwz V7000 Expan V7 - Easy Tier Per Storage Dev, w/3 Yr S&S | 00KE206 | 1 |
| IBM Storwize Family for Strwz V7000 Expan V7 - FlashCopy Per Storage Dev, w/3 Yr S&S | 00KE207 | 1 |
| IBM Storwize Family for Strwz V7000 Expan V7 - Rmt Mir Per Storage Dev, w/3 Yr S&S | 00KE208 | 1 |
| IBM Storwize Family for Strwz V7000 Expan V7 - Real-Tm Cmp, Per Storage Dev, w/3Yr S&S | 00KE209 | 1 |
| Software licenses for models with 5-year software maintenance | | |
| IBM Storwize Family for Strwz V7000 Expan V7 - Bundle, Per Storage Dev, w/5 Yr S&S* | 01DA201 | 1 |
| IBM Storwize Family for Strwz V7000 Expan V7 - Easy Tier, Per Storage Dev, w/5 Yr S&S | 01DA202 | 1 |
| IBM Storwize Family for Strwz V7000 Expan V7 - FlashCopy, Per Storage Dev, w/5 Yr S&S | 01DA203 | 1 |
| IBM Storwize Family for Strwz V7000 Expan V7 - Rmt Mir, Per Storage Dev, w/5 Yr S&S | 01DA204 | 1 |
| IBM Storwize Family for Strwz V7000 Expan V7 - Real-Tm Cmp, Per Storage Dev, w/5 Yr S&S | 01DA205 | 1 |

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

The following tables list ordering information for optional external virtualization features for Storwize V7000.

Table 16. External virtualization licenses for Storwize V7000: North America, Asia Pacific

| Description | Part number | Max qty per one external enclosure |
|---|---|---|
| Software licenses for models with 3-year software maintenance | | |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Base Per Storage Dev, w/3 Yr S&S | 00KH163 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Bundle Per Storage Dev, w/3 Yr S&S* | 00KE075 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Easy Tier Per Storage Dev, w/3 Yr S&S | 00KE076 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - FlashCopy Per Storage Dev, w/3 Yr S&S | 00KE077 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Rmt Mir Per Storage Dev, w/3 Yr S&S | 00KE078 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Real-Tm Cmp, Per Storage Dev, w/3Yr S&S | 00KE079 | 1** |
| Software licenses for models with 5-year software maintenance | | |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Base, Per Storage Dev, w/5 Yr S&S | 01DA177 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Bundle, Per Storage Dev, w/5 Yr S&S* | 01DA178 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Easy Tier, Per Storage Dev, w/5 Yr S&S | 01DA179 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - FlashCopy, Per Storage Dev, w/5 Yr S&S | 01DA180 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Rmt Mir, Per Storage Dev, w/5 Yr S&S | 01DA181 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Real-Tm Cmp, Per Storage Dev, w/5 Yr S&S | 01DA182 | 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, the Storwize V7000.

Table 17. External virtualization licenses for Storwize V7000: Latin America, EMEA

| Description | Part number | Max qty per one external enclosure |
|---|---|---|
| Software licenses for models with 3-year software maintenance | | |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Base Per Storage Dev, w/3 Yr S&S | 00KH165 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Bundle Per Storage Dev, w/3 Yr S&S* | 00KE230 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Easy Tier Per Storage Dev, w/3 Yr S&S | 00KE231 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - FlashCopy Per Storage Dev, w/3 Yr S&S | 00KE232 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Rmt Mir Per Storage Dev, w/3 Yr S&S | 00KE233 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Real-Tm Cmp, Per Storage Dev, w/3Yr S&S | 00KE234 | 1** |
| Software licenses for models with 5-year software maintenance | | |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Base, Per Storage Dev, w/5 Yr S&S | 01DA206 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Bundle, Per Storage Dev, w/5 Yr S&S* | 01DA207 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Easy Tier, Per Storage Dev, w/5 Yr S&S | 01DA208 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - FlashCopy, Per Storage Dev, w/5 Yr S&S | 01DA209 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Rmt Mir, Per Storage Dev, w/5 Yr S&S | 01DA210 | 1** |
| IBM Storwize Family for Strwz V7000 ExtVirt V7 - Real-Tm Cmp, Per Storage Dev, w/5 Yr S&S | 01DA211 | 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, the Storwize V7000.

**Note:** A storage enclosure that is externally managed by the Storwize 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 units, 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.

**Encryption**

Storwize V7000 supports encryption for data at rest. Encryption is performed by the Storwize V7000 control enclosure for data stored within the Storwize V7000 system (the control enclosure and all attached expansion enclosures) and externally virtualized storage capacities. Encryption is enabled on Storwize V7000 through the acquisition of the Encryption Enablement feature. This feature enables encryption on the entire Storwize V7000 system (Storwize control enclosure and all attached Storwize V7000 expansion enclosures) and externally virtualized storage under its control.

The Encryption USB Flash Drives (Four Pack) feature is required when the Encryption Enablement feature is acquired. This feature provides four USB flash drives for storing the encryption master access key. This feature can also be ordered if more USB flash drives are needed.

The following table lists ordering information for the encryption options.

Table 18. Part numbers and feature codes for ordering Storwize V7000 encryption options

| Description | Part number | Feature code | Maximum quantity per one controller unit |
|---|---|---|---|
| Encryption Enablement | 00MT543 | ASTF | 1 |
| Encryption USB Drive Pack | 00MT545 | ASTG | 1 |

**Note:** The Storwize V7000 Encryption Enablement feature and the Encryption USB Drive Pack feature (machine type and feature numbers) are not available in the following countries:

- Belarus
- Kazakhstan
- People's Republic of China
- Russia

## Power cables

The Storwize V7000 control and expansion units 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 19. Part numbers and feature codes for ordering power cables

| Description | Part number | Feature code |
|---|---|---|
| Rack power cables | | |
| 2.0m, 10A/100-250V, C13 to IEC 320-C14 2x Rack Power Cables | 00NC547 | AS26 |
| Line cords | | |
| V7000 1.8m, 10A/120V, C13 to NEMA 5-15P (US/Chicago) 2x Line Cords | 01KP893 | AVVV |
| V7000 2.8m, 10A/110V, C13 to CNS 10917-3 (Taiwan) 2x Line Cords | 01KP888 | AVVQ |
| V7000 2.8m, 10A/120V, C13 to NEMA 5-15P (US) 2x Line Cords | 01KP887 | AVVP |
| V7000 2.8m, 10A/220V, C13 to GB 2099.1 (China) 2x Line Cords | 01KP886 | AVVN |
| V7000 2.8m, 10A/220V, C13 to IRAM 2073 (Argentina) 2x Line Cords | 01KP885 | AVVM |

| Description | Part number | Feature code |
|---|---|---|
| V7000 2.8m, 10A/220V, C13 to NBR 6147 (Brazil) 2x Line Cords | 01KP889 | AVVR |
| V7000 2.8m, 10A/230V, C13 to AS/NZS 3112 (Aus/NZ) 2x Line Cords | 01KP878 | AVVE |
| V7000 2.8m, 10A/230V, C13 to BS 1363/A (UK) 2x Line Cords | 01KP877 | AVVD |
| V7000 2.8m, 10A/230V, C13 to CEE7-VII (Europe) 2x Line Cords | 01KP879 | AVVF |
| V7000 2.8m, 10A/230V, C13 to CEI 23-16 (Italy) 2x Line Cords | 01KP883 | AVVK |
| V7000 2.8m, 10A/230V, C13 to DK2-5a (Denmark) 2x Line Cords | 01KP880 | AVVG |
| V7000 2.8m, 10A/230V, C13 to SABS 164 (South Africa) 2x Line Cords | 01KP881 | AVVH |
| V7000 2.8m, 10A/230V, C13 to SEV 1011-S24507 (Sws) 2x Line Cords | 01KP882 | AVVJ |
| V7000 2.8m, 10A/230V, C13 to SI 32 (Israel) 2x Line Cords | 01KP884 | AVVL |
| V7000 2.8m, 10A/240V, C13 to IS 6538 (India) 2x Line Cords | 01KP890 | AVVS |
| V7000 2.8m, 12A/220V, C13 to KSC 8305 (S. Korea) 2x Line Cords | 01KP892 | AVVU |
| V7000 4.3m, 12A/100V, C13 to JIS C-8303 (Japan) 2x Line Cords | 01KP891 | AVVT |

## Physical specifications

The Storwize V7000 storage controller and expansion units have the following dimensions and weight (approximate):

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

## Operating environment

The Storwize V7000 units are supported in the following environment:

- Air temperature:
  - Operating: 5 °C - 40 °C (41 °F - 104 °F) up to 950 m (3,117 ft) above sea level; above 950 m (3,117 ft), de-rate maximum air temperature by 1 °C per 175 m
  - Non-operating: 1 °C - 60 °C (33.8 °F - 140 °F)
  - Maximum altitude: 3,048 m (10,000 ft)
- Humidity:
  - Operating: 8% - 85%
  - Non-operating: 8% - 85%

- Electrical power:
    - Voltage range: 100 V AC - 240 V AC
    - Frequency: 50 Hz - 60 Hz
    - Power:
        - Controller unit: 541 watts
        - Expansion unit: 304 watts
- Heat dissipation (BTU per hour):
    - Controller unit: 1,846
    - Expansion unit: 1,037
- Acoustical noise emission:
    - Controller unit:
        - 6.5 bels (idling)
        - 6.5 bels (operating)
    - Expansion unit:
        - 6.3 bels (idling)
        - 6.3 bels (operating)

## Warranty services and upgrades

The Storwize V7000 has a three-year Customer Replaceable Unit (CRU) and onsite warranty with 9x5/next business day (NBD) terms.

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

Some countries might have different warranty terms and conditions than the standard warranty. This is due to local business practices or laws in the specific country. Local service teams can assist in explaining country-specific terms when needed. Examples of country-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 spares parts.

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.

Lenovo warranty service upgrade offerings are country-specific. Not all warranty service upgrades are available in every country. For information about Lenovo warranty service upgrade offerings that are available in your country or area, 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://lenovolocator.com/

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

- Warranty and maintenance service upgrades:
  - 3, 4, or 5 years of warranty service coverage
  - 1-year or 2-year post-warranty extensions
  - Foundation Service: 9x5 service coverage with next business day onsite response
  - Essential Service: 24x7 service coverage with 4-hour onsite response or 24-hour committed repair (available only in select countries)
  - Advanced Service: 24x7 service coverage with 2-hour onsite response or 6-hour committed repair (available only in select countries)
- YourDrive YourData
  Lenovo's YourDrive YourData service (where applicable) 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 service can be purchased in convenient bundles with Foundation, Essential, or Advanced Service upgrades and extensions.
- Remote Technical Support
  Remote Technical Support (RTS) provides comprehensive technical call center support for 1 or 3 years. RTS can reduce problem resolution time, which helps decrease the cost to address technical problems and increase uptime.
- Hardware Installation Services
  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.

For service definitions, country-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

## Regulatory compliance

The Storwize 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 Storwize V7000 supports attachment to Lenovo System x®, ThinkServer®, and Flex System™ hosts 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.

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

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

### FCoE or iSCSI connectivity

The Storwize 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 Storwize V7000 FC storage.

The Storwize 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 Storwize V7000 iSCSI storage.

With software iSCSI initiators, any supported 1 Gb, 10 Gb, or 25 Gb Ethernet adapter for System x, ThinkServer, or Flex System is compatible with the Storwize V7000 iSCSI storage.

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

Table 20. 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

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

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

Table 21. 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 in Storwize V7000 storage solutions.

Table 22. 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) | 7159CRW |
| 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) | 7159DRX |
| 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 in Storwize V7000 storage solutions.

Table 23. 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 |

* Requires a supported Cisco Nexus top of rack switch.

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

## Rack cabinets

The following table lists the rack cabinets that are offered by Lenovo that can be used in Storwize V7000 storage solutions.

Table 24. Rack cabinets

| Description | Part number |
|---|---|
| 25U S2 Standard Rack | 93072RX |
| 25U Static S2 Standard Rack | 93072PX |
| 42U S2 Standard Rack | 93074RX |
| 42U 1100mm Enterprise V2 Dynamic Rack | 93634PX |
| 42U 1100mm Enterprise V2 Dynamic Expansion Rack | 93634EX |
| 42U 1200mm Deep Dynamic Rack | 93604PX |
| 42U 1200mm Deep Static Rack | 93614PX |
| 42U Enterprise Rack | 93084PX |
| 42U Enterprise Expansion Rack | 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 in Storwize V7000 storage solutions.

Table 25. Power distribution units

| Description | Part number |
|---|---|
| 0U Basic PDUs | |
| 0U 36 C13/6 C19 24A/200-240V 1 Phase PDU with NEMA L6-30P line cord | 00YJ776 |
| 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 24A/200-240V/1Ph PDU w/ NEMA L6-30P line cord | 00YJ781 |
| 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 |

| Description | Part number |
|---|---|
| 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 |
| DPI Single Phase C13 Enterprise PDU (without line cord) | 39Y8941 |
| C19 Enterprise PDUs (6x IEC 320 C19 outlets) | |
| DPI Single Phase C19 Enterprise PDU (without line cord) | 39Y8948 |
| DPI 60A 3 Phase C19 Enterprise PDU with IEC 309 3P+G (208 V) fixed line cord | 39Y8923 |
| Front-end PDUs (3x IEC 320 C19 outlets) | |
| DPI 30amp/125V Front-end PDU with NEMA L5-30P line cord | 39Y8938 |
| DPI 30amp/250V Front-end PDU with NEMA L6-30P line cord | 39Y8939 |
| DPI 32amp/250V Front-end PDU with IEC 309 2P+Gnd line cord | 39Y8934 |
| DPI 60amp/250V Front-end PDU with IEC 309 2P+Gnd line cord | 39Y8940 |
| DPI 63amp/250V Front-end PDU with IEC 309 2P+Gnd line cord | 39Y8935 |
| Universal PDUs (7x IEC 320 C13 outlets) | |
| DPI Universal 7 C13 PDU (with 2 m IEC 320-C19 to C20 rack power cord) | 00YE443 |
| NEMA PDUs (6x NEMA 5-15R outlets) | |
| DPI 100-127V PDU with fixed NEMA L5-15P line cord | 39Y8905 |
| Line cords for PDUs that ship without a line cord | |
| DPI 30a Line Cord (NEMA L6-30P) | 40K9614 |
| DPI 32a Line Cord (IEC 309 P+N+G) | 40K9612 |
| DPI 32a Line Cord (IEC 309 3P+N+G) | 40K9611 |
| DPI 60a Cord (IEC 309 2P+G) | 40K9615 |
| DPI 63a Cord (IEC 309 P+N+G) | 40K9613 |
| DPI Australian/NZ 3112 Line Cord (32A) | 40K9617 |
| DPI Korean 8305 Line Cord (30A) | 40K9618 |

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 in Storwize V7000 storage solutions.

Table 26. 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 product page:
  http://www.lenovo.com/systems/storage
- IBM Spectrum Virtualize Software for Storwize V7000 for Lenovo (Machine Type 6195):
  http://datacentersupport.lenovo.com/us/en/products/storage/storwize/v7000/6195/downloads
- Storwize V7000 for Lenovo Documentation
  http://datacentersupport.lenovo.com/us/en/products/storage/storwize/v7000/6195/documentation
- Storwize V7000 for Lenovo Support
  http://datacentersupport.lenovo.com/us/en/products/storage/storwize/v7000/6195
- Lenovo Enterprise Solutions Configurator (LESC):
  http://lesc.lenovo.com
- System Storage Interoperation Center (SSIC):
  http://ibm.com/systems/support/storage/ssic

## Related product families

Product families related to this document are the following:

- IBM Alliance

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