

Lenovo ThinkServer sd350 Product Guide

The Lenovo ThinkServer sd350 is an ultradense and economical two-socket server in a 0.5U rack form factor. With four sd350 servers installed in the ThinkServer n400 enclosure, you have an ideal high-density 2U four-node (2U4N) platform for enterprise and cloud workloads.

2U4N systems have gained popularity in a variety of data centers, from large enterprises to service providers, because their small footprint and inherent density make them ideal for building solution-based appliances at a low cost. The combination of the Lenovo ThinkServer sd350 and n400 Enclosure is built to deliver these types of solutions.

Suggested use: Cloud, MSP, CSP, HPC, hyperconverged solutions, branch office or remote office needs

The following figure shows the ThinkServer sd350 server.



Figure 1. The ThinkServer sd350 server

Did you know?

The sd350 supports two Intel Xeon E5-2600 v4 processors, each with up to 20 cores and a 135W TDP rating. This means you can fit 160 cores in 2U of rack space.

These servers are also fully managed systems with IPMI 2.0 support for remote management via a dedicated RJ45 port, xCAT support, planned Lenovo XClarity support, and an AMI BIOS and BMC code stack.

Key features

The ThinkServer sd350 dense offering fits four hot-pluggable sd350 servers into an n400 enclosure that takes up only 2U (0.5U per server) and includes room for plenty of internal storage. The overall design makes the solution extremely affordable, with a low total cost of ownership (TCO).

The n400 is a 2U enclosure that holds four servers at the back and 24x 2.5-inch hot-swap drives at the front. Six drive bays are connected to each server; the drives are not shared between the servers. The rear of the server houses the four sd350 servers and two power supplies. The power supplies provide power to the servers and the drives.

Scalability and performance

The sd350 server and n400 enclosure offer numerous features to boost performance, improve scalability, and reduce costs:

- Up to four nodes in a single 2U enclosure, each with two of the latest Xeon v4 processors, 16 DIMMs, and three PCIe slots. It is a highly dense, scalable, and price-optimized offering.
- The Intel Xeon processor E5-2600 v4 product family improves productivity by offering superior system performance, with 20-core processors, core speeds up to 2.6 GHz, L3 cache sizes up to 50 MB, DDR4 memory speeds up to 2400 MHz, and QPI interconnect links of up to 9.6 GTps.
- Two processors in each server, up to 40 cores total and 88 threads maximize the concurrent execution of multithreaded applications. With four nodes in the n400 enclosure, a total of 160 cores are available.
- Intelligent and adaptive system performance with Intel Turbo Boost Technology 2.0 allows CPU cores to run at maximum speeds during peak workloads by temporarily going beyond processor thermal design power (TDP).
- Intel Hyper-Threading Technology boosts performance for multithreaded applications by enabling simultaneous multithreading within each processor core, up to two threads per core.
- Intel Virtualization Technology integrates hardware-level virtualization hooks that allow operating system vendors to better use the hardware for virtualization workloads.
- Intel Advanced Vector Extensions 2 (AVX2) improve floating-point performance for compute-intensive technical and scientific applications.
- Sixteen DIMMs of registered 2400 MHz DDR4 ECC memory provide speed, high availability, and a memory capacity of up to 512 GB.
- Each sd350 server supports up to six 2.5-inch hot-swap drives (which are installed in the enclosure). The sd350 also supports a SATADOM (SATA Drive on Module) drive, which plugs directly into SATA port 1
- Supports HDDs up to 2 TB capacity and SSDs up to 480 GB. Therefore, each server can have up to 12 TB of storage capacity using six drives. 64GB SATADOM drive supported.
- The use of solid-state drives (SSDs) instead of, or along with, traditional hard disk drives (HDDs) can improve I/O performance. An SSD can support up to 100 times more I/O read operations per second (IOPS) than a typical HDD.
- Three PCIe slots internal to the sd350: One PCIe 3.0 x16 low-profile slot, one PCIe 3.0 x8 slot for an OCP form-factor adapter, and one PCIe 3.0 x8 mezzanine slot for a dedicated RAID adapter.
- Supports adapters designed for the Open Compute Project (OCP) form factor. OCP delivers efficient server, storage and data center hardware design for scalable computing. Hardware designed for OCP openly shares custom data center designs to improve both cost and energy efficiency across the industry.
- PCI Express 3.0 I/O expansion capabilities improve the theoretical maximum bandwidth by 60% compared with the previous generation of PCI Express 2.0.

- With Intel Integrated I/O Technology, the PCI Express 3.0 controller is integrated into the Intel Xeon processor E5 family, which reduces I/O latency and increases overall system performance.

Manageability and security

Powerful systems management features simplify local and remote management of the sd350:

- Supports Lenovo XClarity Administrator, providing auto-discovery, inventory tracking, monitoring, alerting and call home features.
- Supports ThinkServer EasyStartup, a graphical tool designed to make it easy to configure the server and install an operating system.
- Supports ThinkServer Diagnostics (Windows Edition, Linux Edition, Standalone Edition), based on Ultra-X QuickTech diagnostic software, for system diagnostics, information collection, and troubleshooting.
- Includes an integrated Thinkserver Management Module (TMM) to monitor server availability and perform remote management.
- Includes a standard RJ45 port for direct connection to the TMM for remote systems management (IPMI 2.0). Alternatively, if an optional Ethernet OCM card is installed, then port 1 of that card can be shared between the operating system and TMM for remote management.
- An integrated industry-standard Unified Extensible Firmware Interface (UEFI) enables improved setup, configuration, and updates, and simplifies error handling.
- Intel Trusted Execution Technology provides enhanced security through hardware-based resistance to malicious software attacks, allowing the application to run in its own isolated space, protected from all other software running on a system.
- The Intel Execute Disable Bit function can prevent certain classes of malicious buffer overflow attacks when combined with a supporting operating system.

Energy efficiency

The sd350 and n400 enclosure offer the following energy efficiency features to save energy, reduce operational costs, increase energy availability, and contribute to a green environment:

- ASHRAE A2 compliant system.
- Shared 80 PLUS Platinum-certified power supplies for energy efficiency.
- Five easy-swap 60mm fans for efficient air flow.
- The Intel Xeon processor E5-2600 v4 product family offers better performance per watt over the previous generation.
- Intel Intelligent Power Capability powers on and off individual processor elements as needed to reduce power draw.
- Low-voltage Intel Xeon processors draw less energy to satisfy the demands of power and thermally constrained data centers and telecommunication environments.
- Low-voltage 1.2 V DDR4 memory DIMMs consume up to 20% less energy than 1.35 V DDR3 DIMMs (and even less than 1.5 V DDR3).
- SSDs consume as much as 80% less power than traditional 2.5-inch HDDs.

Availability and serviceability

The sd350 server and n400 enclosure provide many features to simplify serviceability and increase system uptime:

- The n400 enclosure supports two 1600 W or 1200 W power supplies which are configured as a redundant pair to ensure greater system uptime.

- Hot-swap drives are all accessible from the front of the enclosure. Servers are removed from the rear of the enclosure and all server cabling is at the rear of the enclosure.
- Optional RAID arrays enable the server to keep operating if there is a failure of any one drive.
- SSDs offer better reliability than mechanical HDDs for greater uptime.
- The built-in ThinkServer Management Module (TMM) continuously monitors system parameters, triggers alerts, and performs recovery actions in case of failures, to minimize downtime.
- The TMM offers remote management capability to enable remote keyboard, video, and mouse (KVM) control of the server via third-party software.
- A three-year customer replaceable unit (CRU) / onsite limited warranty, with next business day 9x5 support. Optional service upgrades are available.

Locations of key components and connectors

The following figure shows the front of the n400 enclosure. The front view shows the 24 drive bays, 6 of which are connected to each of the 4 server bays.

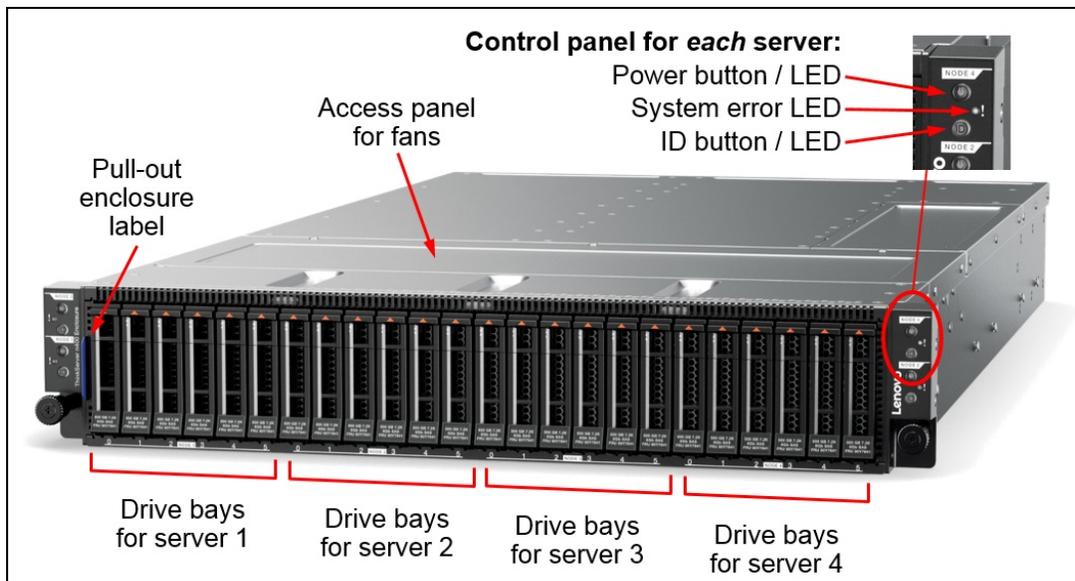


Figure 2. Front view of the ThinkServer n400 enclosure

The following figure shows the rear of the n400 enclosure where the four servers and two enclosure power supplies are installed.

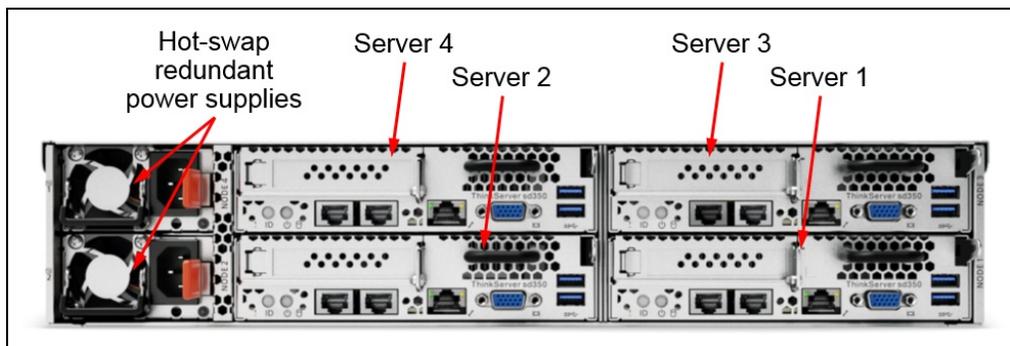


Figure 3. Rear view of the ThinkServer n400 enclosure

The following figure shows the front of the sd350 server.

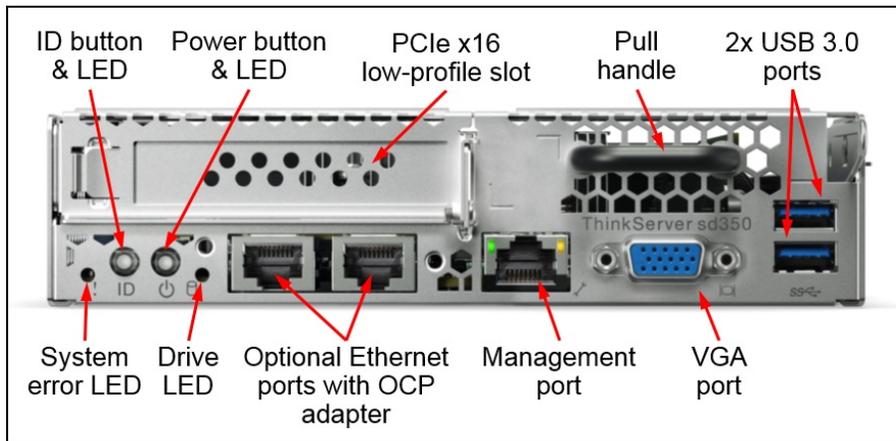


Figure 4. Front view of the ThinkServer sd350 server

The following figure shows the internals of the sd350 server identifying key components.

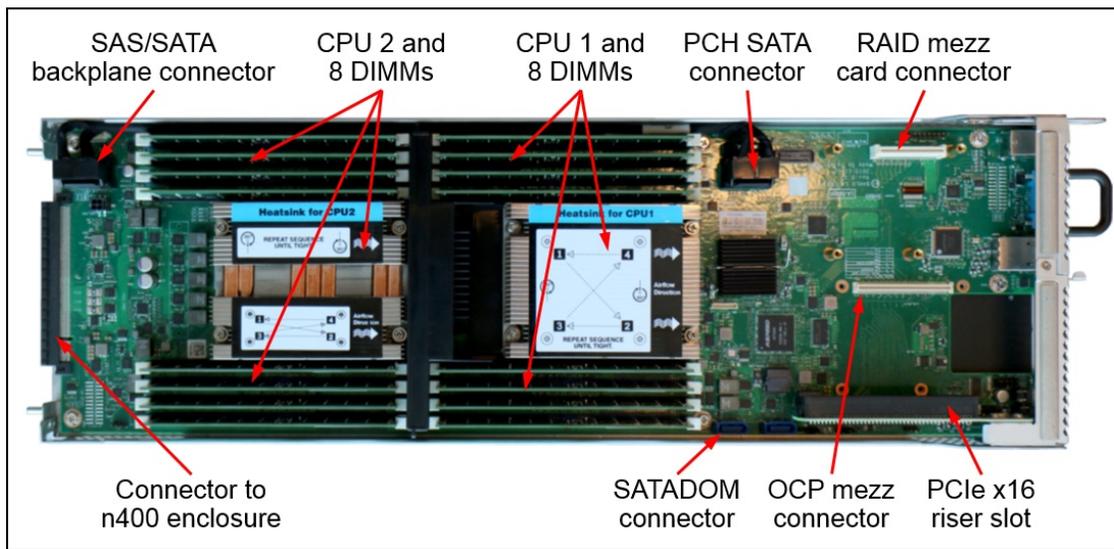


Figure 5. Internal view of the ThinkServer sd350 server

Standard specifications - sd350 server

The following table lists the standard specifications of the ThinkServer sd350.

Table 1. Standard specifications

Components	Specification
Machine type	5493
Form factor	Half-wide, 1U compute node.
Supported chassis	ThinkServer n400 enclosure, 2U high; up to 4 servers per chassis.

Components	Specification
Processor	Two Intel Xeon Processor E5-2600 v4 series processors; Supports processors up to 135W TDP rating. Available processors with between 4 cores and 20 cores, up to 50 MB L3 cache and up to 2.6 GHz core speed. QuickPath Interconnect (QPI) links speed up to 9.6 GTps. Hyper-Threading Technology and Turbo Boost Technology. Intel C612 chipset.
Memory	Up to 16 DIMM sockets (8 DIMMs per processor) supporting DDR4 DIMMs up to 2400 MHz memory speeds. Four memory channels per processor (two DIMMs per channel).
Memory maximums	RDIMMs: Up to 512 GB memory with 16x 32 GB RDIMMs and two processors.
Memory protection	Chipkill (x4 memory options only), ECC, mirroring, rank sparing
Storage bays	Up to six 2.5-inch hot-swap SAS/SATA drive bays per server. Drive bays are located in the n400 enclosure, outside the sd350 servers. Also supports one SATADOM flash drive internal to the sd350.
Maximum internal storage	Up to 12 TB per server using 6x 2TB NL SATA drives, or up to 2.8 TB per server using 6x 480 GB SSDs.
RAID support	Six 6 Gb SATA ports through onboard Intel C612 chipset (Intel RSTe) with RAID 0, 1, 10, 5 support standard. Supports SATA drives only. Optional 6 Gb Compal H701-L RAID controller installs in dedicated mezzanine adapter slot, supporting RAID 0, 1, 10. Based on the Avago SAS2308 ASIC. Supports SAS and SATA drives. The H701-L RAID controller requires the second processor.
Optical drive bays	No internal bays; use an external USB drive.
Tape drive bays	No internal bays. Use an external USB drive.
Network interfaces	Supports Ethernet ports on an OCP form-factor adapter installed in a dedicated mezzanine slot. Available adapters include either a two-port 1 GbE adapter or a two-port 10 GbE adapter. One RJ45 port standard for dedicated connectivity to the ThinkServer Management Module (TMM) for systems management support. Port 1 of the OCP network adapter can be configured as shared with the operating system for remote management using NC-SI.
PCI Expansion slots	Three PCIe slots internal to the sd350: <ul style="list-style-type: none"> • One PCIe 3.0 x16 low-profile slot • One PCIe 3.0 x8 slot for an OCP form-factor adapter • One PCIe 3.0 x8 mezzanine slot for a dedicated RAID adapter (requires second CPU)
Ports	<i>Front:</i> One VGA port, and two USB 3.0 ports for local connectivity. One GbE port for dedicated systems management support. Two 1 Gbps or 10 Gb Ethernet ports with RJ45 connectors, depending on the adapter selected. <i>Internal:</i> Support for a SATADOM flash drive for operating system boot.
Cooling	Supplied by the n400 enclosure.
Power supply	Supplied by the n400 enclosure.

Components	Specification
Systems management	<p>UEFI-based firmware. Dedicated systems management Ethernet port (RJ45) with IPMI 2.0 support, integrated ThinkServer Management Module (TMM) baseboard management controller (BMC) integrated in ASPEED AST2400 ASIC. Automatic Server Restart support. Remote presence (remote KVM & media) support standard. Serial over LAN support.</p> <p>Management software support:</p> <ul style="list-style-type: none"> • Lenovo XClarity Administrator • Intel Node Manager • Lenovo ThinkServer EasyStartup • Lenovo ThinkServer EasyUpdate • Lenovo ThinkServer partner pack for VMware vCenter • Lenovo ThinkServer partner pack for Microsoft System Center • Lenovo ThinkServer Power Planner • Lenovo ThinkServer Diagnostic
Video	16 MB DDR3 video memory, integrated into the service processor in the ASPEED AST2400 ASIC. Maximum resolution is up to 1920x1200 at 60 Hz and 1600x1200 at 60 Hz.
Security	Power-on and UEFI administrator passwords.
Operating systems supported	Microsoft Windows Server 2012 and 2012 R2, SUSE Linux Enterprise Server 11 and 12, Red Hat Enterprise Linux 6 and 7, VMware vSphere 5.5 and 6.0
Limited warranty	One-year customer-replaceable unit and onsite limited warranty with 9x5/NBD coverage.
Service and support	Optional service upgrades are available through Lenovo Services: 4-hour or 2-hour response time, 8-hour fix time, 1-year or 2-year warranty extension, remote technical support for hardware and some Lenovo and OEM software.
Temperature	<p>Operating air temperature:</p> <ul style="list-style-type: none"> • ASHRAE class A2 environment • 10°C - 35°C (50°F - 95°F) up to 950 mm (3,117ft) • Derate maximum allowable temperature 1°C/300 m above 950 m
Dimensions	Width: 216 mm (8.5 in.), height: 41 mm (1.6 in.), depth: 659 mm (25.9 in.)
Weight	Maximum weight: 6.17 kg (13.6 lb)

Standard specifications - n400 enclosure

The following table lists the standard specifications of the ThinkServer n400 enclosure.

Table 2. Standard specifications: ThinkServer n400

Components	Specification
Machine type	5495
Form factor	2U rack-mounted chassis.
Server support	Up to 4 servers per chassis.
Servers per 42U rack	Up to 84 servers in 21 enclosures
Ports	None. Connectivity and management is through each server.
I/O architecture	None integrated. Use top-of-rack networking and storage switches.
Controls and LEDs	Front of the enclosure: A power button, ID button, and System error LED for each of the four servers. Each HDD or SSD has status and activity LEDs. One bi-color LED in each power supply, indicating status and fault.
Systems management	Management is through each server.
Power supplies	Two hot-swap power supplies either 1200 W or 1600 W, functioning as a redundant pair. Power supplies must be both 1200 W or both 1600 W. Power supplies require a 200-240 V ac, 50 or 60 Hz supply. Power supplies are installed at the rear of the chassis. 80 PLUS Platinum certified. Built-in overload and surge protection.
Cooling	Five easy-swap 60 mm system fans, accessible via removable panel in the top cover of the enclosure.
Power consumption	Maximum: 1801 W (using 1600 W power supplies), 1345 W (using 1200 W power supplies)
Power cords	One AC power cord for each power supply, 2.8m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable
Limited warranty	One-year customer-replaceable unit and onsite limited warranty with 9x5/NBD coverage.
Dimensions	2U chassis. Height: 87 mm (3.43 inches), depth: 835 mm (32.9 inches), width: 442 mm (17.40 inches)
Weight	Minimum configuration (with one server): 22.4 kg (49 lbs) Maximum configuration (with four servers): 36.9 kg (81 lbs)

ThinkServer sd350 server - Standard models

The following table lists the standard models of the ThinkServer sd350 server.

Not available in US and Canada : These standard models are not available in the US and Canada. Use [TopSeller models](#) or CTO in those countries.

Table 3. ThinkServer sd350 standard models

Model	Intel Xeon Processor† (2 maximum)	Memory and speed	RAID controller	Drive bays	Disks	Network	Optical	PCIe slots (used / max)
5493-A2x	1x E5-2620 v4 8C 2.1GHz 20MB 2133MHz 85W	1x 8GB (1866 MHz)	Onboard SATA	6x 2.5-inch HS + SATADOM	Open	2x 1 Gb	None	1 / 3
5493-B2x	2x E5-2630 v4 10C 2.2GHz 25MB 2133MHz 85W	4x 16GB (2133 MHz)	H701-L adapter	6x 2.5-inch HS + SATADOM	Open	2x 10 Gb	None	2 / 3
5493-C2x	2x E5-2680 v4 14C 2.4GHz 35MB 2400MHz 120W	16x 32GB 2400 MHz	H701-L adapter	6x 2.5-inch HS + SATADOM	Open	2x 10 Gb	None	2 / 3

† Processor detail: Processor quantity and model, cores, core speed, L3 cache, memory speed, and power consumption.

For information about the standard features of the server, see the [Standard specifications](#) section.

ThinkServer sd350 server - TopSeller models

The following table lists the TopSeller models of the ThinkServer sd350 server.

Table 4. ThinkServer sd350 TopSeller models

Model	Intel Xeon Processor† (2 maximum)	Memory and speed	RAID controller	Drive bays	Disks	Network	Optical	PCIe slots (used / max)
TopSeller models available in the US and Canada								
5493-E1U	1x E5-2603 v4 6C 1.7GHz 15MB 1866MHz 85W	1x 16GB (1866 MHz)	Onboard SATA	6x 2.5-inch HS + SATADOM	Open	2x 10 Gb	None	1 / 3
5493-E2U	1x E5-2609 v4 8C 1.7GHz 20MB 1866MHz 85W	1x 16GB (1866 MHz)	Onboard SATA	6x 2.5-inch HS + SATADOM	Open	2x 10 Gb	None	1 / 3
5493-E3U	1x E5-2620 v4 8C 2.1GHz 20MB 2133MHz 85W	1x 16GB (2133 MHz)	Onboard SATA	6x 2.5-inch HS + SATADOM	Open	2x 10 Gb	None	1 / 3
5493-E4U	1x E5-2623 v4 4C 2.6GHz 10MB 2133MHz 85W	1x 16GB (2133 MHz)	Onboard SATA	6x 2.5-inch HS + SATADOM	Open	2x 10 Gb	None	1 / 3
5493-E5U	1x E5-2630 v4 10C 2.2GHz 25MB 2133MHz 85W	1x 16GB (2133 MHz)	Onboard SATA	6x 2.5-inch HS + SATADOM	Open	2x 10 Gb	None	1 / 3
5493-E6U	1x E5-2640 v4 10C 2.4GHz 25MB 2133MHz 90W	1x 16GB (2133 MHz)	Onboard SATA	6x 2.5-inch HS + SATADOM	Open	2x 10 Gb	None	1 / 3
5493-E7U	1x E5-2650 v4 12C 2.2GHz 30MB 2400MHz 105W	1x 16GB 2400 MHz	Onboard SATA	6x 2.5-inch HS + SATADOM	Open	2x 10 Gb	None	1 / 3
5493-E8U	1x E5-2660 v4 14C 2.0GHz 35MB 2400MHz 105W	1x 16GB 2400 MHz	Onboard SATA	6x 2.5-inch HS + SATADOM	Open	2x 10 Gb	None	1 / 3
5493-E9U	1x E5-2680 v4 14C 2.4GHz 35MB 2400MHz 120W	1x 16GB 2400 MHz	Onboard SATA	6x 2.5-inch HS + SATADOM	Open	2x 10 Gb	None	1 / 3
5493-EFU	1x E5-2690 v4 14C 2.6GHz 35MB 2400MHz 135W	1x 16GB 2400 MHz	Onboard SATA	6x 2.5-inch HS + SATADOM	Open	2x 10 Gb	None	1 / 3
5493-EGU	1x E5-2698 v4 20C 2.2GHz 50MB 2400MHz 135W	1x 16GB 2400 MHz	Onboard SATA	6x 2.5-inch HS + SATADOM	Open	2x 10 Gb	None	1 / 3
TopSeller models for Europe, Middle East, and Africa (EMEA)								
5493-EAG	2x E5-2620 v4 8C 2.1GHz 20MB 2133MHz 85W	2x 16GB 2400 MHz	H701-L adapter	6x 2.5-inch HS + SATADOM	Open	2x 10 Gb	None	2 / 3
5493-EBG	2x E5-2650 v4 12C 2.2GHz 30MB 2400MHz 105W	2x 16GB 2400 MHz	H701-L adapter	6x 2.5-inch HS + SATADOM	Open	2x 10 Gb	None	2 / 3
5493-ECG	2x E5-2680 v4 14C 2.4GHz 35MB 2400MHz 120W	2x 16GB 2400 MHz	H701-L adapter	6x 2.5-inch HS + SATADOM	Open	2x 10 Gb	None	2 / 3
5493-EDG	2x E5-2690 v4 14C 2.6GHz 35MB 2400MHz 135W	2x 16GB 2400 MHz	H701-L adapter	6x 2.5-inch HS + SATADOM	Open	2x 10 Gb	None	2 / 3
5493-EEG	2x E5-2698 v4 20C 2.2GHz 50MB 2400MHz 135W	2x 16GB 2400 MHz	H701-L adapter	6x 2.5-inch HS + SATADOM	Open	2x 10 Gb	None	2 / 3

† Processor detail: Processor quantity and model, cores, core speed, L3 cache, memory speed, and power consumption.

For information about the standard features of the server, see the [Standard specifications](#) section.

ThinkServer n400 Enclosure models

The sd350 server is supported in the n400 Enclosure. The n400 Enclosure models are listed in the following table.

Table 5. ThinkServer n400 Enclosure models

Model	Server bays	Power supplies	Fans
Standard models (not available in US and Canada)			
5495-B2x*	4 server bays	2x 1200 W hot-swap / 2	5x 60mm easy-swap / 5
5495-C2x	4 server bays	2x 1600 W hot-swap / 2	5x 60mm easy-swap / 5
TopSeller model (US and Canada only)			
5495-EAU	4 server bays	2x 1600 W hot-swap / 2	5x 60mm easy-swap / 5

* Server support is limited with 1200 W power supplies; see the [Power supplies](#) section.

Each of these enclosures ships with the following:

- Rail Kit for ThinkServer n400 Enclosure
- 2x line cords, 2.8m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable
- System Documentation

Processor options

The sd350 supports the processor options listed in the following table.

135 W processor limitation: When selecting the E5-2690 v4 or E5-2698 v4 processors, a maximum of 8 DIMMs can be installed per server.

Table 6. Processor options

Part number	Feature code*	Intel Xeon processors**	Where used
00YD514	ATQC / ATQP	Intel Xeon Processor E5-2603 v4 6C 1.7GHz 15MB 1866MHz 85W	E1x
00YD513	ATQB / ATQN	Intel Xeon Processor E5-2609 v4 8C 1.7GHz 20MB 1866MHz 85W	E2x
00YD511	ATQA / ATQM	Intel Xeon Processor E5-2620 v4 8C 2.1GHz 20MB 2133MHz 85W	A2x, E3x
00YD518	ATQD / ATQQ	Intel Xeon Processor E5-2623 v4 4C 2.6GHz 10MB 2133MHz 85W	E4x
00YD510	ATQ9 / ATQL	Intel Xeon Processor E5-2630 v4 10C 2.2GHz 25MB 2133MHz 85W	B2x, E5x
00YD509	ATQ8 / ATQK	Intel Xeon Processor E5-2640 v4 10C 2.4GHz 25MB 2133MHz 90W	E6x
00YD507	ATPQ / ATPR	Intel Xeon Processor E5-2650 v4 12C 2.2GHz 30MB 2400MHz 105W	E7x, EBx
00YD506	ATQ7 / ATQJ	Intel Xeon Processor E5-2660 v4 14C 2.0GHz 35MB 2400MHz 105W	E8x
00YD505	ATQ6 / ATQH	Intel Xeon Processor E5-2680 v4 14C 2.4GHz 35MB 2400MHz 120W	C2x, E9x, ECx
00YD504	ATQ5 / ATQG	Intel Xeon Processor E5-2690 v4 14C 2.6GHz 35MB 2400MHz 135W	EDx, EFx
00YD501	ATQ4 / ATQF	Intel Xeon Processor E5-2698 v4 20C 2.2GHz 50MB 2400MHz 135W	EEx, EGx

* The first feature code corresponds to the first processor; the second feature code corresponds to the second processor.

** Processor detail: Model, core count, core speed, L3 cache, memory speed, and TDP power.

Memory options

TruDDR4 Memory uses the highest quality components sourced from Tier 1 DRAM suppliers. Only memory that meets the strict requirements of Lenovo is selected. It is compatibility-tested and tuned on every server to maximize performance and reliability.

The ThinkServer sd350 supports up to eight DIMMs when one processor is installed and up to 16x DIMMs when two processors are installed. Each processor has four memory channels, and there are two DIMMs per memory channel (2 DPC). RDIMMs are supported. UDIMMs and LR-DIMMs are not supported.

135 W processor limitation: If the E5-2690 v4 or E5-2698 v4 processors are selected, a maximum of 8 DIMMs can be installed per server (a maximum of 4 per processor).

The following table lists the memory options that are available for the sd350 server.

Table 7. Memory options

Part number	Feature code	Description	Maximum supported*	Models where used
46W0821	ATC8	8GB TruDDR4 Memory (1Rx4, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	16	A2x
46W0829	ATCA	16GB TruDDR4 Memory (2Rx4, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	16	All other models
46W0833	ATCB	32GB TruDDR4 Memory (2Rx4, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	16	C2x

* Maximum 8 DIMMs supported when 135W processors are selected

In the sd350, the maximum memory speed of a configuration is the lower of the following two values:

- The memory speed of the processor
- The memory speed of the DIMM

The following table shows the maximum memory speeds that are achievable. The table also shows the maximum memory capacity at any speed that is supported by the DIMM and the maximum memory capacity at the rated DIMM speed.

In the table, cells that are highlighted in gray indicate when the specific combination of DIMM voltage and number of DIMMs per channel still allows the DIMMs to operate at the rated speed.

Table 8. Maximum memory speeds

Specification	RDIMMs	
	Single rank	Dual rank
Rank	Single rank	Dual rank
Part numbers	46W0821 (8 GB)	46W0829 (16 GB) 46W0833 (32 GB)
Rated speed	2400 MHz	2400 MHz
Rated voltage	1.2 V	1.2 V
Operating voltage	1.2 V	1.2 V
Maximum quantity*	16	16
Largest DIMM	8 GB	32 GB
Max memory capacity	128 GB	512 GB
Max memory at rated speed	64 GB	256 GB
Maximum operating speed (MHz)		
One DIMM per channel	2400 MHz	2400 MHz
Two DIMMs per channel	2133 MHz	2133 MHz

* The maximum quantity that is supported is shown for two processors that are installed. When one processor is installed, the maximum quantity that is supported is half of that shown.

The following memory protection technologies are supported:

- ECC
- Memory mirroring
- Memory sparing

If memory mirroring is used, DIMMs must be installed in pairs (minimum of one pair per CPU), and both DIMMs in a pair must be identical in type and size.

If memory rank sparing is used, a minimum of one quad-rank DIMM or two single-rank or dual-rank DIMMs must be installed per populated channel (the DIMMs do not need to be identical). In rank sparing mode, one rank of a DIMM in each populated channel is reserved as spare memory. The size of a rank varies depending on the DIMMs that are installed.

Internal storage

Each sd350 is connected to six 2.5-inch hot-swap drive bays. The 24 drive bays (six for each server) are physically located at the front of the n400 enclosure and are routed to each server via SAS/SATA cables connected to the drive backplane.

The following figure shows the drive bays.

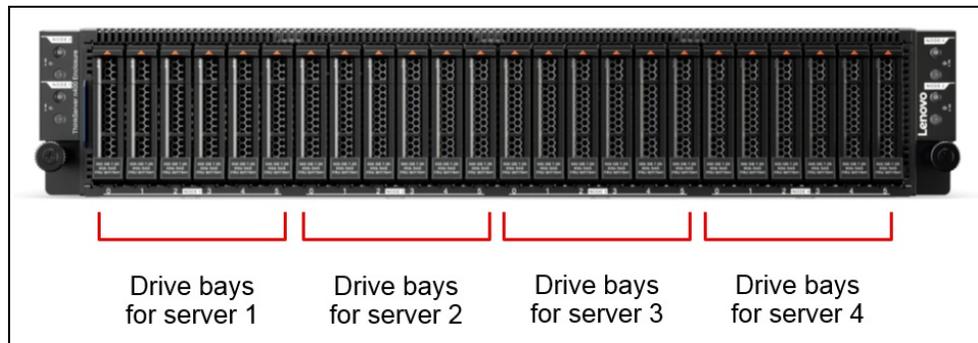


Figure 6. Front view of the ThinkServer n400 enclosure

The sd350 also supports a SATADOM flash drive, which is installed in SATA port 1 on the system board. See the photo of the internals of the sd350 in the [Locations of key components and connectors](#) section for the location of the port.

The following figure shows where the SATADOM drive is installed.

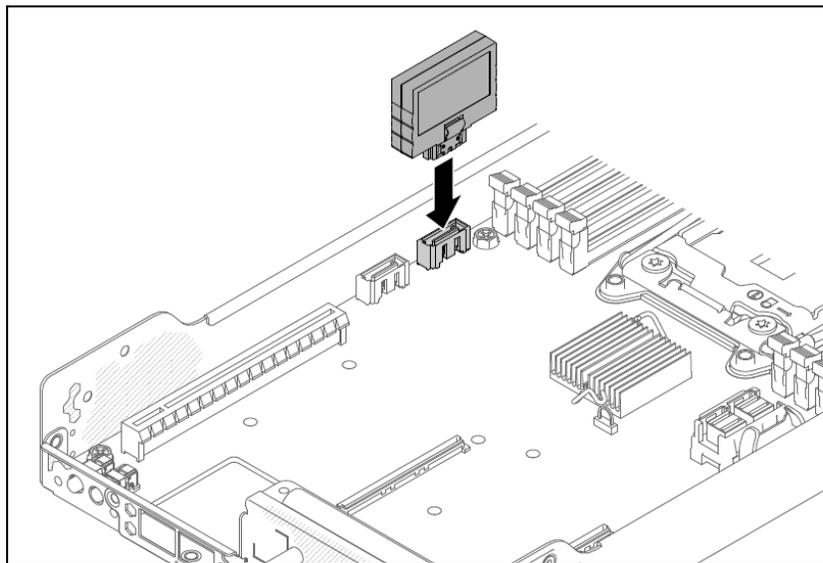


Figure 7. SATADOM flash drive installation.

SATADOM options are listed in the [Internal drive options](#) section.

Controllers for internal storage

The onboard SATA controller in the sd350 (integrated into the Intel C612 chipset) implements Intel Rapid Storage Technology enterprise (RSTe) and supports SATA drives installed in the 6 drive bays. The onboard controller supports a minimum of 1 drive and a maximum of 6 drives.

Alternatively, the sd350 also supports an H701-L RAID adapter installed in a dedicated mezzanine slot in the sd350. The H701-L RAID adapter supports a minimum of 2 drives and a maximum of 6 drives. The following figure shows the H701-L adapter (with the attached air baffle removed).

Second processor required: The use of the H701-L RAID adapter requires the second processor be installed.



Figure 8. H701-L RAID adapter (air baffle removed)

The following figure shows how the adapter is installed into the server and the SAS cables routed to SAS connector.

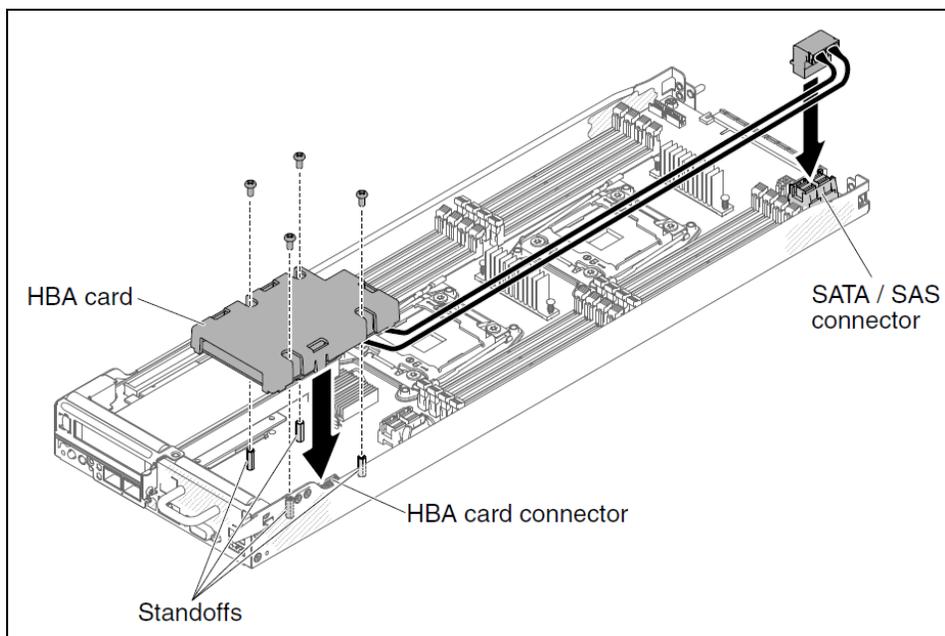


Figure 9. Installing the H701-L RAID mezz card

Ordering information for this adapter is listed in the following table. The option part number includes the SAS cable needed to route the SAS signals to the drives.

Table 9. Ordering information

Part number	Feature code	Description
00YD430	ATPS	H701-L 6Gb HBA mezz card for ThinkServer sd350

The following table compares the two controllers.

Table 10. Supported controllers

Feature	Onboard SATA	H701-L adapter
Part number	None	00YD430
Form factor	Embedded	Mezz card
Controller chip	Intel PCH	Avago SAS2308
Host interface	Not applicable	PCIe 3.0 x8
Port interface	6 Gbps SATA	6 Gbps SAS
Drive interface	SATA	SAS or SATA
Includes SAS expander	No	No
Drive type	HDD, SSD	HDD, SSD
Minimum number of drives	1	2
Maximum number of drives	6	6
RAID levels	0, 1, 10, 5	0, 1, 10
JBOD mode	Yes	Yes
Flash-backed cache (CacheVault)	None	None
FastPath	No	No
CacheCade 2.0	No	No

Internal drive options

The following table lists the supported drives.

Notes:

- The supported controllers operate at 6 Gbps speeds. This means that any 12 Gbps drives installed will also operate at 6 Gbps.
- SAS drives require the use of the H701-L adapter (which in turn, requires the second processor).
- The H701-L adapter requires a minimum of 2 drives installed

Table 11. Internal drive options

Part number	Feature code	Description	Maximum supported
2.5-inch hot-swap 12 Gb SAS/SATA HDDs			
00WG660	AT84	300GB 15K 12Gbps SAS 2.5" G3HS HDD	6
00WG665	AT85	600GB 15K 12Gbps SAS 2.5" G3HS HDD	6
00WG685	AT89	300GB 10K 12Gbps SAS 2.5" G3HS HDD	6
00WG690	AT8A	600GB 10K 12Gbps SAS 2.5" G3HS HDD	6
00WG695	AT8B	900GB 10K 12Gbps SAS 2.5" G3HS HDD	6
00WG700	AT8C	1.2TB 10K 12Gbps SAS 2.5" G3HS HDD	6
00NA491	AT7Z	1TB 7.2K 12Gbps NL SAS 2.5" G3HS HDD	6
2.5-inch hot-swap 6 Gb SAS/SATA HDDs			
00NA526	AT81	2TB 7.2K 6Gbps NL SATA 2.5" G3HS 512e HDD	6
00AJ141	A4TX	1TB 7.2K 6Gbps NL SATA 2.5" G3HS HDD	6
2.5-inch hot-swap 12 Gb SAS/SATA SSDs			
00FN379	AS7C	200GB 12G SAS 2.5" MLC G3HS Enterprise SSD	6
00FN389	AS7E	400GB 12G SAS 2.5" MLC G3HS Enterprise SSD	6
2.5-inch hot-swap 6 Gb SAS/SATA SSDs			
00YC325	AT9D	Intel S3710 400GB Enterprise Performance SATA G3HS 2.5" SSD	6
00WG620	AT93	Intel S3510 120GB Enterprise Entry SATA G3HS 2.5" SSD	6
00WG625	AT94	Intel S3510 240GB Enterprise Entry SATA G3HS 2.5" SSD	6
00WG630	AT95	Intel S3510 480GB Enterprise Entry SATA G3HS 2.5" SSD	6
SATADOM flash drive			
00YK206	ATZD	SATADOM-SL 3ME3 64GB for ThinkServer sd350	1

Internal tape drives

The server does not support internal tape drive options.

Optical drives

The server does not support an internal optical drive option, however, you can connect an external USB optical drive. The following table lists the available USB optical drives.

Table 12. External optical drives

Part number	Description
4XA0E97775	ThinkPad UltraSlim USB DVD Burner
888015471	Lenovo Slim DVD Burner DB65

I/O expansion options

The sd350 server has three PCIe slots:

- One PCIe 3.0 x16 low-profile slot
- One PCIe 3.0 x8 slot for an OCP form-factor adapter
- One PCIe 3.0 x8 mezzanine slot for a dedicated RAID adapter for internal drives

Note: The use of the RAID adapter slot requires that the second processor be installed.

The following figure shows the RAID mezz card installed (attached to the black air baffle) and the Intel X520 OCP mezz adapter. Below the OCP adapter is the riser slot for the PCIe x16 low-profile adapter.

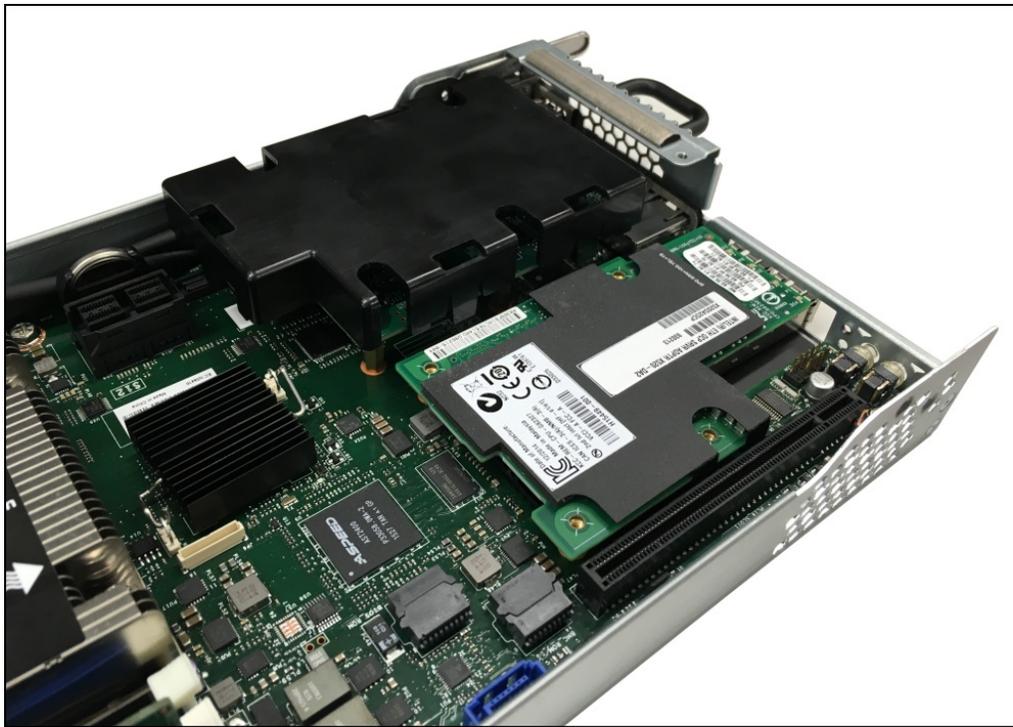


Figure 10. Adapters installed in the sd350

Network adapters

The sd350 has a dedicated Open Compute Project (OCP) mezzanine slot for a network adapter. In addition the server supports a network adapter in the PCIe x16 low-profile adapter slot. The following table lists the supported network adapters.

Table 13. Supported network adapters

Part number	Feature code	Description	Maximum supported
OCP adapters			
00YJ081	ATRB	I350AM2 OCP Mezz 2 Port 1GbE RJ-45 for ThinkServer sd350	1
00MM880	ATPH	Intel X520 Dual Port 10GbE SFP+ OCP Mezz*	1
PCIe adapters - 1 Gb Ethernet			
00AG510	A56L	Intel I350-T2 2xGbE BaseT Adapter	1
00AG520	A56M	Intel I350-T4 4xGbE BaseT Adapter	1
PCIe adapters - 10 Gb Ethernet			
00JY820	A5UT	Emulex VFA5 2x10 GbE SFP+ PCIe Adapter*	1
00MM860	ATPX	Intel X550-T2 Dual Port 10GBase-T Adapter	1
81Y3520	AS73	Intel X710 2x10GbE SFP+ Adapter*	1
PCIe adapters - 40 Gb Ethernet / InfiniBand			
00D9550	A3PN	Mellanox ConnectX-3 40GbE / FDR IB VPI Adapter*	1

* Requires SFP+ transceivers, one per port. See the following tables for part numbers.

The following table lists the supported 10Gb Ethernet SFP+ optical transceivers and DAC cables.

Table 14. Supported optical transceivers and DAC cables - 10 Gb Ethernet

Part number	Feature code	Description	Maximum supported
10 GbE SFP+ transceivers (for 10 GbE SFP+ adapters)			
46C3447	5053	Lenovo 10GBASE-SR SFP+ Transceiver	Per adapter port*
49Y4216	0069	Brocade 10Gb SFP+ SR Optical Transceiver	Per adapter port*
49Y4218	0064	QLogic 10Gb SFP+ SR Optical Transceiver	Per adapter port*
10 GbE SFP+ DAC cables (for 10 GbE SFP+ adapters)			
00D6288	A3RG	Lenovo 0.5m Passive SFP+ DAC Cable	Per adapter port*
90Y9427	A1PH	Lenovo 1m Passive SFP+ DAC Cable	Per adapter port*
00AY764	A51N	Lenovo 1.5m Passive SFP+ DAC Cable	Per adapter port*
00AY765	A51P	Lenovo 2m Passive SFP+ DAC Cable	Per adapter port*
90Y9430	A1PJ	Lenovo 3m Passive SFP+ DAC Cable	Per adapter port*
90Y9433	A1PK	Lenovo 5m Passive SFP+ DAC Cable	Per adapter port*
00D6151	A3RH	Lenovo 7m Passive SFP+ DAC Cable	Per adapter port*

* One transceiver or cable is supported per adapter port. All adapter ports must have the same type of transceiver or DAC cable selected.

The following table lists the optical transceivers and DAC cables that can be used with the supported 40Gb Ethernet adapters listed.

Table 15. Supported optical transceivers and DAC cables - 40 Gb Ethernet

Part number	Feature code	Description	Maximum supported
40 GbE QSFP+ transceivers (for 40 GbE QSFP+ adapters)			
49Y7884	A1DR	Lenovo 40GBASE-SR4 QSFP+ Transceiver	Per adapter port*
40 GbE QSFP+ DAC cables (for 40 GbE QSFP+ adapters)			
49Y7890	A1DP	Lenovo 1m Passive QSFP+ DAC Cable	Per adapter port*
49Y7891	A1DQ	Lenovo 3m Passive QSFP+ DAC Cable	Per adapter port*

* One transceiver or cable is supported per adapter port. All adapter ports must have the same type of transceiver or DAC cable selected.

Storage host bus adapters

The sd350 does not support any Fibre Channel or SAS HBAs for external storage.

PCIe Flash Storage adapters

The sd350 does not support PCIe flash storage adapters.

GPU and coprocessor adapters

The sd350 does not support GPUs or coprocessors.

Power supplies

The n400 Enclosure supports one or two hot-plug power supplies. If two power supplies are installed they act as a redundant pair ensuring that the enclosure remains powered even if one power supply fails or is disconnected. These AC power supplies are 80 PLUS Platinum certified to allow for the best efficiency values of your data center. The following table lists the supported power supply options.

Table 16. Power supply options

Part number	Feature code	Description	Model where used
00YD448	ATP6	1200W power supply for ThinkServer n400 Enclosure	B2x
00YD449	AT6F	1600W power supply for ThinkServer n400 Enclosure	C2x, EAx

The power supply options have the following features:

- Full redundancy when two power supplies installed
- Integrated 2500 RPM fan
- 80 PLUS Platinum certified
- Built-in overload and surge protection
- Support high-range voltage only: 200 - 240 V, 50 or 60 Hz
- Current maximums: 7.08 A (1200 W power supply), 9.48 A (1600 W power supply)

The chassis supports 4 servers with either power supply, however the use of 1200 W power supplies limits which processors and memory can be installed in each of the servers:

- 1600 W power supplies:
 - 4 servers
 - All supported processor and memory configurations
- 1200 W power supplies:
 - 4 servers
 - 2 processors up to 85 W TDP rating (up to E5-2630 v4)
 - Up to 4 DIMMs per server (2 DIMMs per processor)

Cooling

The n400 Enclosure has 5 easy-swap fans which are used to cool all four servers and all hard drives. In addition, each power supply has its own integrated fan.

The five system fans have the following specifications:

- 60mm x 38mm
- Easy-swap (non-hot-swap) - no cables to disconnect
- Accessible via a removable panel in the top cover of the enclosure
- Tachometer output
- Pulse width modulation control

Note: If any fan fails and the ambient temperature is above 27 °C, system performance may be degraded. Such performance throttling will be logged in the event log.

Integrated virtualization

The sd350 offers an optional SATADOM (SATA Disk on Module) offering for operating systems. See the [Internal storage](#) and [Internal drive options](#) sections for information.

Operating systems

The server supports the following operating systems:

- Supported and Certified:
 - Windows Server 2012
 - Windows Server 2012 R2
 - SUSE Linux Enterprise Server 11 64-bit SP4
 - SUSE Linux Enterprise Server 11 64-bit with Xen SP4
 - SUSE Linux Enterprise Server 12 U1 64-bit
 - SUSE Linux Enterprise Server 12 U1 64-bit with Xen
 - Red Hat Enterprise Linux 6.7 (64-bit) including KVM
 - Red Hat Enterprise Linux 7.2 (64-bit) including KVM
 - VMware ESXi 5.5 U3
 - VMware ESXi 6.0 U1
- Tested and certified:
 - Canonical Ubuntu
- Tested:
 - CentOS 6.7 (64-bit)
 - CentOS 7.2 (64-bit)

For the latest information on operating system support, see the Lenovo Operating System Interoperability Guide, available from <http://lenovopress.com/osig>

Systems management

The sd350 has a dedicated systems management Ethernet port (RJ45) for remote management. Alternatively, port 1 of the OCP network card can be used for systems management, shared with the operating system.

The server has an integrated ThinkServer Management Module (TMM) baseboard management controller (BMC) for configuration, systems management, and remote control.

The remote presence (remote KVM & media) and blue-screen capture features are standard functions of the TMM. The remote presence feature provides the following functions:

- Remotely viewing video with graphics resolutions up to 1024 x 768, regardless of the system state
- Remotely accessing the server, using the keyboard and mouse from a remote client
- Mapping the CD or DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the server
- Uploading a diskette image to the TMM memory and mapping it to the server as a virtual drive

The blue-screen capture feature captures the video display contents before the TMM restarts the server when the TMM detects an operating-system hang condition. A system administrator can use the blue-screen capture feature to assist in determining the cause of the hang condition.

The sd350 also supports IPMI 2.0 for out-of-band management. Management can be done through the dedicated RJ45 systems management port or through port 1 of the OCP network card installed in the server. The latter connection is shared with the operating system.

Supported interfaces include:

- Command-line interface (IPMI Shell)
The command-line interface provides direct access to server management functions through the IPMI 2.0 protocol. Use the command-line interface to issue commands to control the server power, view system information, and identify the server. You can also save one or more commands as a text file and run the file as a script.

- Serial over LAN
Establish a Serial over LAN (SOL) connection to manage servers from a remote location. You can remotely view and change the UEFI settings, restart the server, identify the server, and perform other management functions. Any standard Telnet client application can access the SOL connection.

The sd350 is also supported with Lenovo XClarity Administrator. Lenovo XClarity Administrator is a centralized resource management solution designed to reduce complexity, speed response, and enhance the availability of Lenovo systems and solutions.

Lenovo XClarity Administrator provides agent-free hardware management for ThinkServer, System x, and Flex System servers. The administration dashboard, shown in the following figure, is based on HTML 5 and allows fast location of resources, so tasks can be run quickly.

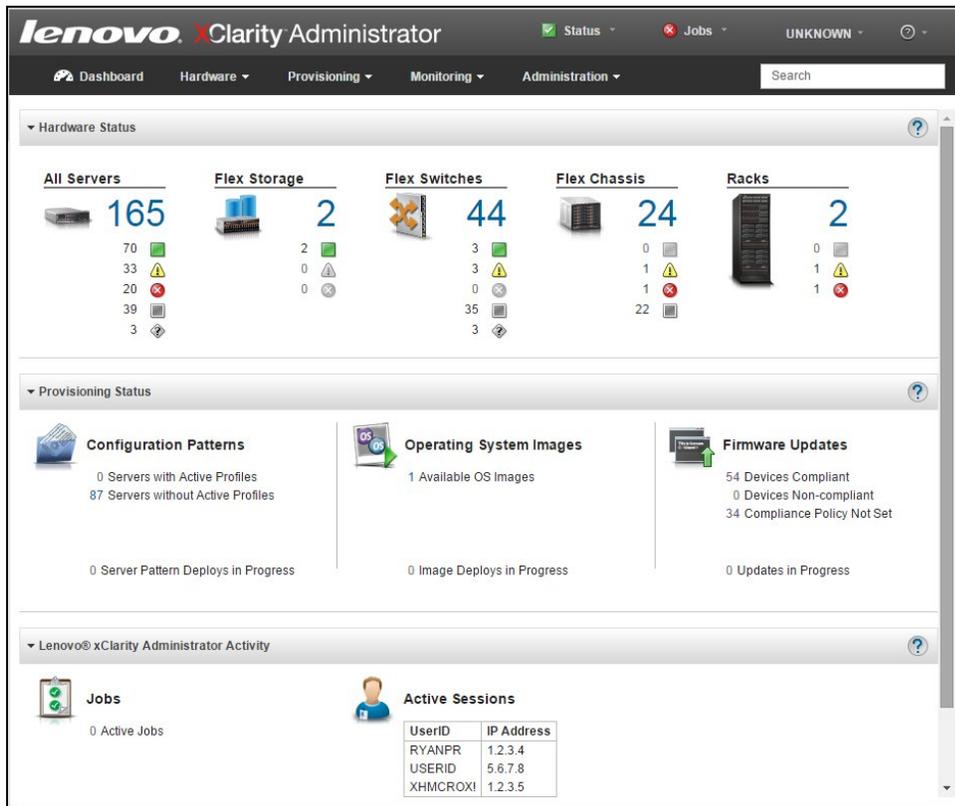


Figure 11. Lenovo XClarity Administrator dashboard

Because Lenovo XClarity Administrator does not require any agent software to be installed on the managed endpoints, there are no CPU cycles spent on agent execution and no memory is used. This means that up to 1GB of RAM and 1 - 2% CPU usage is saved, compared to a typical managed system where an agent is required.

Lenovo XClarity Administrator supports the following functions with the ThinkServer sd350:

- Discovery
- Inventory
- Monitoring and alerting
- Call home

Functions that are not currently supported are:

- Centralized user management
- Cryptography modes, server certificates, and encapsulation

- Configuration patterns
- Operating system deployment
- Firmware updates
- Rack view for tower-based servers

For more information about Lenovo XClarity Administrator, including ordering part numbers, see the Lenovo XClarity Administrator Product Guide:

<https://lenovopress.com/tips1200-lenovo-xclarity-administrator>

Rack installation

The ThinkServer n400 Enclosure can be installed in a 19-inch rack cabinet using the rail kit listed in the following table. The rail kit is included with standard models of the n400, as listed in the [ThinkServer n400 Enclosure models](#) section.

Table 17. ThinkServer n400 Rail Kit

Part number	Feature code	Description
00YD487	AT6D	Rail Kit for ThinkServer n400 Enclosure

The following figure shows the rail kit.

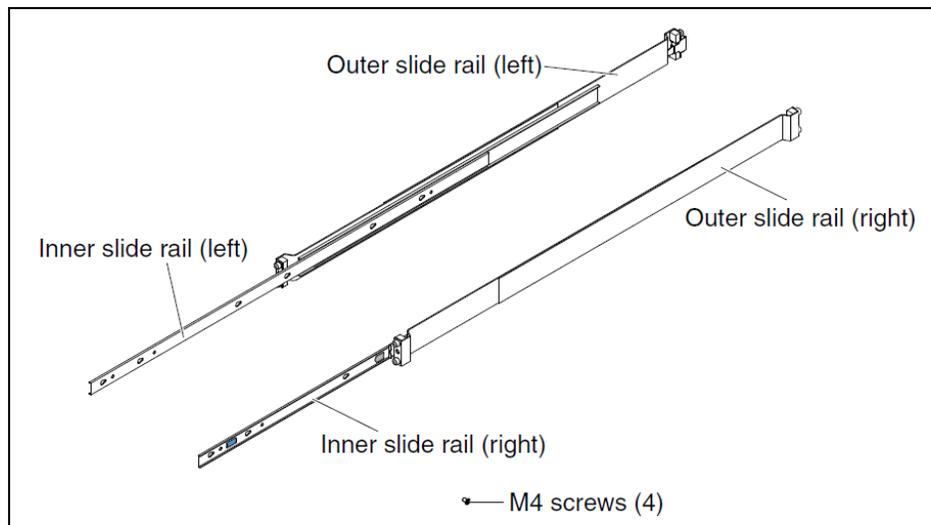


Figure 12. Contents of the ThinkServer n400 Rail Kit

Racking requirements for the rail kit are as follows:

- Install the server only in a rack cabinet with perforated doors.
- Supports a standard EIA square and round hole rack, with thread hole (M5, M6, 10-32, 12-24)
- Minimum depth of 70 mm (2.76 in.) between the front mounting flange and inside of the front door.
- Minimum depth of 150 mm (5.9 in.) between the rear mounting flange and inside of the rear door.
- Minimum depth of 711.2 mm (28 in.) and maximum depth of 914.4 mm (36 in.) between the front and rear mounting flanges.
- The rail kit supports travel movement of the n400 enclosure of up to 440 mm (17.3 in.)

Note: There is no compatible cable management arm (CMA) for this system.

Supported Lenovo racks are listed in the [Rack cabinets](#) section.

Physical specifications

The sd350 server has the following dimensions & weight:

- Width: 216 mm (8.5 in.)
- Height: 41 mm (1.6 in.)
- Depth: 659 mm (25.9 in.)
- Maximum weight: 6.17 kg (13.6 lb)

The n400 enclosure has the following dimensions & weight:

- Width: 442 mm (17.40 inches)
- Height: 2 rack units, 87 mm (3.43 inches)
- Depth: 835 mm (32.9 inches)
- Weight - minimum configuration (with one server): 22.4 kg (49 lbs)
- Weight - Maximum configuration (with four servers): 36.9 kg (81 lbs)

Operating environment

The ThinkServer sd350 Server complies with ASHRAE class A2 specifications. Temperature, humidity and dew point support is as follows:

- Power on:
 - Temperature: 10°C - 35°C (50°F - 95°F) up to 950 m (3,117ft). Above 950m, de-rated maximum air temperature 1°C / 300m
 - Humidity, non-condensing: 20% - 80% relative humidity
 - Maximum dew point: 21°C (70°F)
 - Maximum altitude: 3050 m (10,000 ft) & 10°C - 28°C (50°F - 82°F)
 - Maximum rate of temperature change: 20°C/hr (68°F/hr) for HDDs
- Power off (out of shipping container):
 - Temperature: 5°C to 45°C (41°F - 113°F)
 - Relative humidity: 8% - 80%
 - Maximum dew point: 27°C (80.6°F)
- Storage (non-operating)::
 - Temperature: 1°C to 60°C (33.8°F - 140°F)
 - Altitude: 3050 m (10,000 ft)
 - Relative humidity: 5% - 80%
 - Maximum dew point: 29°C (84.2°F)
- Shipment (non-operating)
 - Temperature: -40°C to 60°C (-40°F - 140°F)
 - Altitude: 10700 m (35105 ft)
 - Relative humidity: 5% - 100%
 - Maximum dew point: 29°C (84.2°F)

Acoustical noise emissions

With the maximum configuration of two processors installed, full memory installed, full hard disk drives installed, and two power supplies installed:

- Operation: 6.8 bels
- Idle: 6.2 bels

Heat output

Approximate heat output, based on the use of 1600 W power supplies:

- Minimum configuration: 604.1 BTU per hour (177 watts)
- Maximum configuration: 6051.3 BTU per hour (1773 watts)

Electrical input

- Sine-wave input (50-60 Hz) required
- Input voltage high range:
 - Minimum: 200 V AC
 - Maximum: 240 V AC
- Input kilovolt-amperes (kVA), approximately:
 - Minimum: 0.153 kVA
 - Maximum: 1.544 kVA

Regulatory compliance

The ThinkServer sd350 server conforms to the following international standards:

- Energy Star 2.0
- UL Green Guard, UL2819
- China CELP certificate, HJ 2507-2011
- FCC - Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 6, Class A
- UL/IEC 60950-1
- CSA C22.2 No. 60950-1
- Japan VCCI, Class A
- IEC 60950-1 (CB Certificate and CB Test Report)
- Taiwan BSMI CNS13438, Class A; CNS14336-1
- Australia/New Zealand AS/NZS CISPR 32, Class A; AS/NZS 60950.1
- Korea KN32, Class A, KN35
- CE Mark (EN55022 Class A, EN60950-1, EN55024, and EN61000-3-2, EN61000-3-3)
- CISPR 22, Class A

The ThinkServer n400 enclosure conforms to the following international standards:

- Energy Star 2.0
- UL Green Guard, UL2819
- China CELP certificate, HJ 2507-2011
- FCC - Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 6, Class A
- UL/IEC 60950-1
- CSA C22.2 No. 60950-1
- NOM-019
- Argentina IEC60950-1
- Japan VCCI, Class A
- IEC 60950-1 (CB Certificate and CB Test Report)
- China CCC GB4943.1, GB9254, Class A, and GB17625.1
- Australia/New Zealand AS/NZS CISPR 32, Class A; AS/NZS 60950.1
- Korea KN32, Class A, KN35
- Russia, Belorussia and Kazakhstan, EAC: TP TC 004/2011(for Safety); TP TC 020/2011(for EMC).
- CE Mark (EN55022 Class A, EN60950-1, EN55024, and EN61000-3-2, EN61000-3-3)
- CISPR 22, Class A
- TUV-GS (EN60950-1/IEC 60950-1, and EK1-ITB2000)

Warranty options

The sd350 server and n400 enclosure have a one-year warranty with 24x7 standard call center support and 9x5 next business day onsite coverage. Lenovo offers services warranty maintenance upgrades and post-warranty maintenance agreements with a well-defined scope of services, including service hours, response time, and length of service coverage.

The Lenovo QuickPick tool helps locate compatible accessories and services and warranty information. Services offered may vary by geographic location. Access the tool via the following URL:
<http://lenovoquickpick.com>

The following table explains warranty service definitions in more detail.

Table 18. Warranty service definitions

Term	Description
On-site service	A service technician will go to the client's location for equipment service.
24x7x4 hour	A service technician is scheduled to arrive at the client's location within four hours after remote problem determination is completed. Lenovo provides service around the clock, every day, including Lenovo holidays.
24x7x8 hour	A service technician is scheduled to arrive at the client's location within eight hours after remote problem determination is completed. Lenovo provides service around the clock, every day, including Lenovo holidays.
9x5x4 hour	A service technician is scheduled to arrive at the client's location within four business hours after remote problem determination is completed. Lenovo provides service 8:00 am - 5:00 pm in the client's local time zone, Monday-Friday, excluding Lenovo holidays. For example, if a customer reports an incident at 3:00 pm on Friday, the technician will arrive by 10:00 am the following Monday.
9x5 next business day	A service technician is scheduled to arrive at the client's location on the business day after remote problem determination is completed. Lenovo provides service 8:00 am - 5:00 pm in the client's local time zone, Monday - Friday, excluding Lenovo holidays. Calls received after 4:00 pm local time require an extra business day for service dispatch.

The following Lenovo warranty service upgrades are available:

- Warranty and maintenance service upgrades:
 - Three, four, or five years of 9x5 or 24x7 service coverage
 - Onsite response time from next business day to 4 hour same-day
 - Warranty extension of up to 5 years
 - Post warranty extensions offered in 1-year increments
- Priority Technical Support
Lenovo's Priority Support Offering enhances our award-winning call center support to provide top priority queue assignment to specialized Lenovo technicians. Priority support accelerates call center troubleshooting to get your problems resolved quickly, and includes other value-added support for Lenovo provided software tools. Priority support can be purchased stand alone to match the base warranty of your system or in convenient bundles with our same-day response services.
- Keep Your Drive Multi-Drive
Lenovo's Keep Your Drive Multi-Drive service is a multi-drive hard drive retention offering that ensures your data is always under your control, regardless of the number of hard drives that are installed in your Lenovo server. In the unlikely event of a hard drive failure, you retain possession of your hard drive while Lenovo replaces the failed drive part. Your data stays safely on your premises, in your hands. Keep Your Drive Multi-Drive covers multiple drives and multiple failures with one service offering at one value price. This service can be purchased stand-alone to match the base warranty of your system or in convenient bundles with our same-day response services.

Rack cabinets

The following table lists the supported rack cabinets.

Table 19. Rack cabinets

Part number	Description
201886X	11U Rack Office Enablement Kit
93072RX	25U S2 Standard Rack
93072PX	25U Static S2 Standard Rack
93074RX	42U S2 Standard Rack
93634PX	42U 1100mm Enterprise V2 Dynamic Rack
93634EX	42U 1100mm Enterprise V2 Dynamic Expansion Rack
93604PX	42U 1200mm Deep Dynamic Rack
93614PX	42U 1200mm Deep Static Rack
93084PX	42U Enterprise Rack
93084EX	42U Enterprise Expansion Rack

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

KVM switches and consoles

The following table lists the supported KVM console, keyboards and KVM switches.

Table 20. Console keyboards

Part number	Description
Consoles	
17238BX	1U 18.5" Standard Console (without keyboard)
Console keyboards	
00MW310	Lenovo UltraNav Keyboard USB - US Eng
46W6713	Keyboard w/ Int. Pointing Device USB - Arabic 253 RoHS v2
46W6714	Keyboard w/ Int. Pointing Device USB - Belg/UK 120 RoHS v2
46W6715	Keyboard w/ Int. Pointing Device USB - Chinese/US 467 RoHS v2
46W6716	Keyboard w/ Int. Pointing Device USB - Czech 489 RoHS v2
46W6717	Keyboard w/ Int. Pointing Device USB - Danish 159 RoHS v2
46W6718	Keyboard w/ Int. Pointing Device USB - Dutch 143 RoHS v2
46W6719	Keyboard w/ Int. Pointing Device USB - French 189 RoHS v2
46W6720	Keyboard w/ Int. Pointing Device USB - Fr/Canada 445 RoHS v2
46W6721	Keyboard w/ Int. Pointing Device USB - German 129 RoHS v2
46W6722	Keyboard w/ Int. Pointing Device USB - Greek 219 RoHS v2
46W6723	Keyboard w/ Int. Pointing Device USB - Hebrew 212 RoHS v2
46W6724	Keyboard w/ Int. Pointing Device USB - Hungarian 208 RoHS v2
46W6725	Keyboard w/ Int. Pointing Device USB - Italian 141 RoHS v2
46W6726	Keyboard w/ Int. Pointing Device USB - Japanese 194 RoHS v2

Part number	Description
46W6727	Keyboard w/ Int. Pointing Device USB - Korean 413 RoHS v2
46W6728	Keyboard w/ Int. Pointing Device USB - LA Span 171 RoHS v2
46W6729	Keyboard w/ Int. Pointing Device USB - Norwegian 155 RoHS v2
46W6730	Keyboard w/ Int. Pointing Device USB - Polish 214 RoHS v2
46W6731	Keyboard w/ Int. Pointing Device USB - Portugese 163 RoHS v2
46W6732	Keyboard w/ Int. Pointing Device USB - Russian 441 RoHS v2
46W6733	Keyboard w/ Int. Pointing Device USB - Slovak 245 RoHS v2
46W6734	Keyboard w/ Int. Pointing Device USB - Spanish 172 RoHS v2
46W6735	Keyboard w/ Int. Pointing Device USB - Swed/Finn 153 RoHS v2
46W6736	Keyboard w/ Int. Pointing Device USB - Swiss F/G 150 RoHS v2
46W6737	Keyboard w/ Int. Pointing Device USB - Thai 191 RoHS v2
46W6738	Keyboard w/ Int. Pointing Device USB - Turkish 179 RoHS v2
46W6739	Keyboard w/ Int. Pointing Device USB - UK Eng 166 RoHS v2
46W6740	Keyboard w/ Int. Pointing Device USB - US Euro 103P RoHS v2
46W6741	Keyboard w/ Int. Pointing Device USB - Slovenian 234 RoHS v2
Console switches	
1754D2X	Global 4x2x32 Console Manager (GCM32)
1754D1X	Global 2x2x16 Console Manager (GCM16)
1754A2X	Local 2x16 Console Manager (LCM16)
1754A1X	Local 1x8 Console Manager (LCM8)
Console switch cables	
43V6147	Single Cable USB Conversion Option (UCO)
39M2895	USB Conversion Option (4 Pack UCO)
46M5383	Virtual Media Conversion Option Gen2 (VCO2)
46M5382	Serial Conversion Option (SCO)

For more information, see the list of Product Guides in the KVM Switches and Consoles category:
<http://lenovopress.com/servers/options/kvm>

External storage system

The server can be attached to external NAS storage via 1 Gb or 10 Gb Ethernet, or SAN storage systems via 1 Gb or 10 Gb iSCSI with an iSCSI software initiator in the operating system. The following table lists the external storage systems that are offered by Lenovo and support 1 Gb or 10 Gb Ethernet NAS, or 1 Gb or 10 Gb iSCSI connectivity.

Table 21. External storage systems

Part number	Description
Lenovo N Series (NAS connectivity)	
70FX / 70FY*	Lenovo Storage N3310
70G0 / 70G1*	Lenovo Storage N4610
Lenovo Storage S2200	
64114B1	Lenovo Storage S2200 LFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD
64114B2	Lenovo Storage S2200 LFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD
64114B3	Lenovo Storage S2200 SFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD
64114B4	Lenovo Storage S2200 SFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD
Lenovo Storage S3200	
64116B1	Lenovo Storage S3200 LFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD
64116B2	Lenovo Storage S3200 LFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD
64116B3	Lenovo Storage S3200 SFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD
64116B4	Lenovo Storage S3200 SFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD
IBM Storwize	
6096CU2	IBM Storwize V3500 3.5-inch Dual Control Storage Controller Unit
6096CU3	IBM Storwize V3500 2.5-inch Dual Control Storage Controller Unit
6099L2C	IBM Storwize V3700 3.5-inch Storage Controller Unit
6099S2C	IBM Storwize V3700 2.5-inch Storage Controller Unit
6099T2C	IBM Storwize V3700 2.5-inch DC Storage Controller Unit
6194L2C	IBM Storwize V5000 LFF Control Enclosure
6194S2C	IBM Storwize V5000 SFF Control Enclosure
6195SC5	IBM Storwize V7000 2.5-inch Storage Controller Unit

* Machine Type; see the respective Product Guide in the NAS Storage category for available models: <http://lenovopress.com/storage/nas>

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

- Lenovo N Series storage: <http://lenovopress.com/storage/nas>
- Lenovo S Series storage: <http://lenovopress.com/storage/san/lenovo>
- IBM storage: <http://lenovopress.com/storage/san/ibm>

External backup units

The sd350 can be connected to an external RDX backup unit via USB. The following table lists ordering information for the RDX backup unit and RDX cartridges.

The following table lists the external backup options that are offered by Lenovo.

Table 22. External backup options

Part number	Description
External tape enclosures	
61901UX	IBM Multimedia Backup Enclosure
Backup drives for IBM Multimedia Backup Enclosure 61901UX	
00NV406	6190 RDX 3.0 Dock/320GB Cartridge Bundle
00NV407	6190 RDX 3.0 Dock/500GB Cartridge Bundle
00NV408	6190 RDX 3.0 Dock/1.0TB Cartridge Bundle
00NV455	6190 RDX 3.0 Dock/2.0TB Cartridge Bundle
External RDX USB drives	
362532Y	RDX External USB 3.0 Dock with 320GB Cartridge
362550Y	RDX External USB 3.0 Dock with 500GB Cartridge
36251TY	RDX External USB 3.0 Dock with 1TB Cartridge
Cartridges	
46C5367	RDX 320 GB Cartridge
46C5368	RDX 500 GB Cartridge
81Y3647	RDX 1 TB Cartridge
00KC506	RDX 2.0 TB Cartridge

For more information, see the list of Product Guides in the Backup units category:
<https://lenovopress.com/servers/options/backup>

Top-of-rack Ethernet switches

The following table lists the top-of-rack Ethernet switches that are offered by Lenovo.

Table 23. Top-of-rack Ethernet switches

Part number	Description
1 Gb Ethernet top-of-rack switches	
7159BAX	Lenovo RackSwitch G7028 (Rear to Front)
7159CAX	Lenovo RackSwitch G7052 (Rear to Front)
7159G52	Lenovo RackSwitch G8052 (Rear to Front)
10 Gb Ethernet top-of-rack switches	
7159BR6	Lenovo RackSwitch G8124E (Rear to Front)
7159G64	Lenovo RackSwitch G8264 (Rear to Front)
7159DRX	Lenovo RackSwitch G8264CS (Rear to Front)
7159CRW	Lenovo RackSwitch G8272 (Rear to Front)
7159GR6	Lenovo RackSwitch G8296 (Rear to Front)
40 Gb Ethernet top-of-rack switches	
7159BRX	Lenovo RackSwitch G8332 (Rear to Front)

For more information, see the list of Product Guides in the Top-of-rack switches categories:

- 1 Gb Ethernet switches: <http://lenovopress.com/networking/tor/1gb?rt=product-guide>
- 10 Gb Ethernet switches: <http://lenovopress.com/networking/tor/10gb?rt=product-guide>
- 40 Gb Ethernet switches: <http://lenovopress.com/networking/tor/40gb?rt=product-guide>

Uninterruptible power supply units

The following table lists the uninterruptible power supply (UPS) units that are offered by Lenovo.

Table 24. Uninterruptible power supply units

Part number	Description
55941AX	RT1.5kVA 2U Rack or Tower UPS (100-125VAC)
55941KX	RT1.5kVA 2U Rack or Tower UPS (200-240VAC)
55942AX	RT2.2kVA 2U Rack or Tower UPS (100-125VAC)
55942KX	RT2.2kVA 2U Rack or Tower UPS (200-240VAC)
55943AX	RT3kVA 2U Rack or Tower UPS (100-125VAC)
55943KX	RT3kVA 2U Rack or Tower UPS (200-240VAC)
55945KX	RT5kVA 3U Rack or Tower UPS (200-240VAC)
55946KX	RT6kVA 3U Rack or Tower UPS (200-240VAC)
55948KX	RT8kVA 6U Rack or Tower UPS (200-240VAC)
55949KX	RT11kVA 6U Rack or Tower UPS (200-240VAC)
55948PX	RT8kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)
55949PX	RT11kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)

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

Power distribution units

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

Table 25. Power distribution units

Part number	Description
0U Basic PDUs	
00YJ776	0U 36 C13/6 C19 24A/200-240V 1 Phase PDU with NEMA L6-30P line cord
00YJ777	0U 36 C13/6 C19 32A/200-240V 1 Phase PDU with IEC60309 332P6 line cord
00YJ778	0U 21 C13/12 C19 32A/200-240V/346-415V 3 Phase PDU with IEC60309 532P6 line cord
00YJ779	0U 21 C13/12 C19 48A/200-240V 3 Phase PDU with IEC60309 460P9 line cord
46M4143	0U 12 C19/12 C13 32A 3 Phase PDU with IEC 309 3P+N+Gnd line cord
Switched and Monitored PDUs	
00YJ781	0U 20 C13/4 C19 Switched and Monitored 24A/200-240V/1Ph PDU w/ NEMA L6-30P line cord
00YJ780	0U 20 C13/4 C19 Switched and Monitored 32A/200-240V/1Ph PDU w/ IEC60309 332P6 line cord
00YJ782	0U 18 C13/6 C19 Switched / Monitored 32A/200-240V/346-415V/3Ph PDU w/ IEC60309 532P6 cord
00YJ783	0U 12 C13/12 C19 Switched and Monitored 48A/200-240V/3Ph PDU w/ IEC60309 460P9 line cord
46M4116	0U 24 C13 Switched and Monitored 30A PDU with NEMA L6-30P line cord
46M4137	0U 12 C19/12 C13 Switched and Monitored 32A 3 Phase PDU with IEC 309 3P+N+Gnd cord
46M4134	0U 12 C19/12 C13 Switched and Monitored 50A 3 Phase PDU with CS8365L 3P+Gnd cord
46M4002	1U 9 C19/3 C13 Switched and Monitored DPI PDU (without line cord)
46M4003	1U 9 C19/3 C13 Switched and Monitored 60A 3 Phase PDU with IEC 309 3P+Gnd line cord
46M4004	1U 12 C13 Switched and Monitored DPI PDU (without line cord)
46M4005	1U 12 C13 Switched and Monitored 60A 3 Phase PDU with IEC 309 3P+Gnd line cord
Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets)	
71762NX	Ultra Density Enterprise C19/C13 PDU Module (without line cord)
71763NU	Ultra Density Enterprise C19/C13 PDU 60A/208V/3ph with IEC 309 3P+Gnd line cord
C13 Enterprise PDUs (12x IEC 320 C13 outlets)	
39M2816	DPI C13 Enterprise PDU+ (without line cord)
39Y8941	DPI Single Phase C13 Enterprise PDU (without line cord)
C19 Enterprise PDUs (6x IEC 320 C19 outlets)	
39Y8948	DPI Single Phase C19 Enterprise PDU (without line cord)
39Y8923	DPI 60A 3 Phase C19 Enterprise PDU with IEC 309 3P+G (208 V) fixed line cord
Front-end PDUs (3x IEC 320 C19 outlets)	
39Y8938	DPI 30amp/125V Front-end PDU with NEMA L5-30P line cord
39Y8939	DPI 30amp/250V Front-end PDU with NEMA L6-30P line cord
39Y8934	DPI 32amp/250V Front-end PDU with IEC 309 2P+Gnd line cord
39Y8940	DPI 60amp/250V Front-end PDU with IEC 309 2P+Gnd line cord
39Y8935	DPI 63amp/250V Front-end PDU with IEC 309 2P+Gnd line cord
Universal PDUs (7x IEC 320 C13 outlets)	
39Y8951	DPI Universal Rack PDU with US LV and HV line cords
39Y8952	DPI Universal Rack PDU with CEE7-VII Europe line cord

Part number	Description
39Y8953	DPI Universal Rack PDU with Denmark line cord
39Y8954	DPI Universal Rack PDU with Israel line cord
39Y8955	DPI Universal Rack PDU with Italy line cord
39Y8956	DPI Universal Rack PDU with South Africa line cord
39Y8957	DPI Universal Rack PDU with UK line cord
39Y8958	DPI Universal Rack PDU with AS/NZ line cord
39Y8959	DPI Universal Rack PDU with China line cord
39Y8962	DPI Universal Rack PDU (Argentina)
39Y8960	DPI Universal Rack PDU (Brazil)
39Y8961	DPI Universal Rack PDU (India)
NEMA PDUs (6x NEMA 5-15R outlets)	
39Y8905	DPI 100-127V PDU with Fixed NEMA L5-15P line cord
Line cords for PDUs that ship without a line cord	
40K9611	DPI 32a Line Cord (IEC 309 3P+N+G)
40K9612	DPI 32a Line Cord (IEC 309 P+N+G)
40K9613	DPI 63a Cord (IEC 309 P+N+G)
40K9614	DPI 30a Line Cord (NEMA L6-30P)
40K9615	DPI 60a Cord (IEC 309 2P+G)
40K9617	DPI Australian/NZ 3112 Line Cord

For more information, see the Lenovo Press documents in the PDU category:
<https://lenovopress.com/servers/options/pdu>

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Related publications and links

For more information, see these resources:

- ThinkServer sd350 product page
<http://shop.lenovo.com/us/en/systems/servers/high-density/sd350/>
- ThinkServer sd350 datasheet
http://www.lenovo.com/images/products/system-x/pdfs/datasheets/sd350_ds.pdf
- Lenovo ThinkServer sd350 Server Type 5493, Lenovo ThinkServer n400 Enclosure Type 5495 Installation and Service Guide
<http://support.lenovo.com>
- Rack Installation Instructions for ThinkServer n400 Chassis
<http://support.lenovo.com>
- Power Configurator
<https://support.lenovo.com/documents/Invo-pwrconf>
- Configuration and Option Guide
<https://support.lenovo.com/us/en/documents/SCOD-3ZVQ5W>
- xREF - System x Reference
<http://lenovopress.com/xref>

Related product families

Product families related to this document are the following:

- [High Density Servers](#)

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