

Lenovo ThinkSystem SR950 Server (Xeon SP Gen 1) Product Guide

Lenovo ThinkSystem SR950 is designed for your most demanding, mission-critical workloads, such as in-memory databases, large transactional databases, batch and real-time analytics, ERP, CRM, and virtualized server workloads. The powerful 4U ThinkSystem SR950 can grow from two to eight Intel Xeon Scalable Family processors, and with 96 DIMM sockets, supports up to 12 TB of high-speed memory. The modular design of SR950 speeds upgrades and servicing with easy front or rear access to all major subsystems to maximize server availability.

The SR950 packs numerous fault-tolerant and high-availability features into a high-density, 4U rack-optimized design that reduces the space needed to support massive network computing operations and simplify servicing.

The following figure shows the Lenovo ThinkSystem SR950.



Figure 1. Lenovo ThinkSystem SR950

Did you know?

The SR950 server supports up to eight processors in a single 4U chassis. You can upgrade from a 2-socket system to an 8-socket system without having to replace the server enclosure or upgrade to a physically larger design. The SR950 offers enterprise scalability and advanced RAS features to support the most demanding mission-critical applications that require 24x7 operations.

Key features

Lenovo ThinkSystem SR950 is designed for your most demanding, mission-critical workloads, such as in-memory databases, large transactional databases, batch and real-time analytics, ERP, CRM, and virtualized server workloads. The powerful 4U ThinkSystem SR950 can grow from two to eight Intel Xeon Processor Scalable Family CPUs, achieving up to 45% faster performance than the previous generation. The modular design of SR950 speeds upgrades and servicing with easy front and rear access to all major subsystems, to maximize server uptime.

Scalability and performance

The SR950 offers numerous features to boost performance, improve scalability, and reduce costs:

- Dense server offering where up to 8 processors and 96 DIMMs are housed in only 4U of rack space.
- Offers a simple upgrade path that enables the server to be initially configured with as few as two processors and then later be upgraded to up to eight processors simply by adding a compute tray and system boards.
- Supports the Gold and Platinum level processors in the Intel Xeon Processor Scalable Family, including the "top bin" highest-performing 205 W processors available from Intel.
- Up to eight processors, each with up to 28 cores and 56 threads (for a total of up to 448 threads) to maximize the concurrent execution of multithreaded applications.
- Intelligent and adaptive system performance with Intel Turbo Boost Technology 2.0 allows processor cores to run at maximum speeds during peak workloads by temporarily exceeding processor 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.
- Support for up to 96 TruDDR4 DIMMs operating at 2666 MHz means you have the fastest available memory subsystem and memory capacity of up to 12 TB using 96x 128 GB 3DS RDIMMs.
- Up to 24x 2.5-inch HDDs or SSDs provide a flexible and scalable all-in-one platform to meet your increasing demands.
- Of the 24x drive bays, support for up to 12 NVMe PCIe SSDs maximizes drive I/O performance, in terms of throughput, bandwidth, IOPS, and latency.
- The use of solid-state drives (SSDs) instead of, or along with, mechanical hard disk drives (HDDs), can improve I/O performance. An SSD can support up to 100 times more I/O operations per second (IOPS) than a typical HDD.
- New high-speed RAID controllers provide 12 Gb SAS connectivity to the drive backplanes. A variety of RAID adapters are available, with cache up to 4 GB and support for 12 drives on a single controller.
- Supports a new Lenovo-patented M.2 adapter design for convenient operating system boot functions. Available M.2 adapters support either one M.2 drive, or two M.2 drives in a RAID 1 configuration, for the boot drive performance and reliability.
- The server has a dedicated flexible LAN-on-motherboard (LOM) slot offering a variety of 10 GbE or Gigabit Ethernet adapters that do not occupy one of the standard PCIe slots.
- A total of up to 17 rear-accessible PCIe slots: 14 general-purpose PCIe 3.0 slots plus slots dedicated to the LOM adapter and two ML2 adapters. In addition, the server has two internal slots for RAID or HBA adapters.
- The server offers PCI Express 3.0 I/O expansion capabilities that improve the theoretical maximum bandwidth by almost 100% (8 GTps per link using 128b/130b encoding) compared to the previous generation of PCI Express 2.0 (5 GTps per link using 8b/10b encoding).

Availability and serviceability

The SR950 is based on a modular service model where all components and options can be removed from the front or rear of the system, even parts that are located in the center of the machine such as fans, memory DIMMs, and processors. The SR950 is designed for 99.99% availability.

Watch the following video to show how easy it is to service the SR950 server:

<https://lenovopress.com/lp0899-thinksystem-sr950-ease-of-service-video>

The SR950 provides many features to simplify serviceability and increase system uptime:

- The server offers Single Device Data Correction (SDDC, also known as Chipkill), Adaptive Double-Device Data Correction (ADDDC, also known as Redundant Bit Steering or RBS), memory mirroring, and memory rank sparing for redundancy in the event of a non-correctable memory failure.
- The server offers hot-swap drives, supporting RAID redundancy for data protection and greater system uptime.
- The Dual M.2 Boot Adapter uses RAID-1 so that the two M.2 drives installed are configured as a redundant pair.
- The server has up to four hot-swap N+N redundant power supplies to help keep the server operational in the event of a power supply or utility supply failure.
- Each compute tray has 6 hot-swap N+1 redundant fans (a total of 12 fans when two compute trays are installed) to maximize availability for business-critical applications.
- The power source-independent light path diagnostics functionality provides individual light path LEDs that lead the technician to failed (or failing) components, which simplifies servicing, speeds up problem resolution, and helps increase system availability.
- The included LCD system information display panel provides greater diagnostic function by listing all error messages and VPD data needed for a service call, thereby speeding problem resolution and increasing system uptime.
- Proactive Platform Alerts (including PFA and SMART alerts): Processors, voltage regulators, memory, internal storage (SAS/SATA HDDs and SSDs, NVMe SSDs, M.2 storage, and flash storage adapters), fans, power supplies, RAID controllers, ambient temperature, and subcomponent temperatures. Alerts can be surfaced through the XClarity Controller to managers such as Lenovo XClarity Administrator, VMware vCenter, and Microsoft System Center. These proactive alerts let you take appropriate actions in advance of possible failure, thereby increasing server uptime and application availability.
- Solid-state drives (SSDs) offer more reliability than mechanical HDDs for greater uptime.
- The built-in XClarity Controller continuously monitors system parameters, triggers alerts, and performs recovery actions in case of failures to minimize downtime.
- Built-in diagnostics in UEFI, using Lenovo XClarity Provisioning Manager, speed up troubleshooting tasks to reduce service time.
- Lenovo XClarity Provisioning Manager supports diagnostic functions and collects service data to USB key drive or remote CIFS share folder for troubleshooting, to reduce servicing time.
- Auto-restart in the event of a momentary loss of AC power (based on power policy setting in the XClarity Controller service processor).
- Support for the XClarity Administrator Mobile app running on a supported smartphone and connected to the server through the service-enabled USB port, enables additional local systems management functions.
- Three-year or one-year customer-replaceable unit and onsite limited warranty, 9 x 5 next business day. Optional service upgrades are available.

Manageability and security

Powerful systems management features simplify local and remote management of the SR950:

- The server includes an XClarity Controller (XCC) to monitor server availability and perform remote management. XCC Enterprise is included as standard, which enables remote KVM and remote media files (ISO and IMG image files), boot capture, and power capping.
- Lenovo XClarity Administrator offers comprehensive hardware management tools that help to increase uptime, reduce costs, and improve productivity through advanced server management capabilities.
- New UEFI-based Lenovo XClarity Provisioning Manager, accessible from F1 during boot, provides system inventory information, graphical UEFI Setup, platform update function, RAID Setup wizard, operating system installation function, and diagnostic functions.
- Support for Lenovo XClarity Energy Manager which captures real-time power and temperature data from the server, and provides automated controls to lower energy costs.
- Integrated Trusted Platform Module (TPM) 2.0 support enables advanced cryptographic functionality, such as digital signatures and remote attestation.
- Supports Secure Boot to ensure that only a digitally signed operating system can be used. Supported with HDDs and SSDs as well as M.2 drives in the M.2 Adapter.
- Industry-standard Advanced Encryption Standard (AES) NI support for faster, stronger encryption.
- Intel Execute Disable Bit functionality can prevent certain classes of malicious buffer overflow attacks when combined with a supported operating system.
- Intel Trusted Execution Technology provides enhanced security through hardware-based resistance to malicious software attacks, allowing an application to run in its own isolated space, protected from all other software running on a system.

Energy efficiency

The SR950 offers the following energy-efficiency features to save energy, reduce operational costs, and increase energy availability:

- The server can be used in environments up to ASHRAE A4 with ambient temperatures up to 45 °C.
- The server is Energy Star 2.1 compliant.
- Energy-efficient planar components help lower operational costs.
- High-efficiency power supplies with 80 PLUS Platinum certifications
- Intel Intelligent Power Capability powers individual processor elements on and off as needed, to reduce energy draw.
- Low-voltage 1.2 V DDR4 memory offers energy savings compared to 1.35 V and 1.5 V DDR3 DIMMs.
- Solid-state drives (SSDs) consume as much as 80% less power than mechanical 2.5-inch HDDs.
- The server uses hexagonal ventilation holes, which can be grouped more densely than round holes, providing more efficient airflow through the system.
- Optional Lenovo XClarity Energy Manager provide advanced data center power notification, analysis, and policy-based management to help achieve lower heat output and reduced cooling needs.

Components and connectors

The following figure shows the front of the SR950 server.

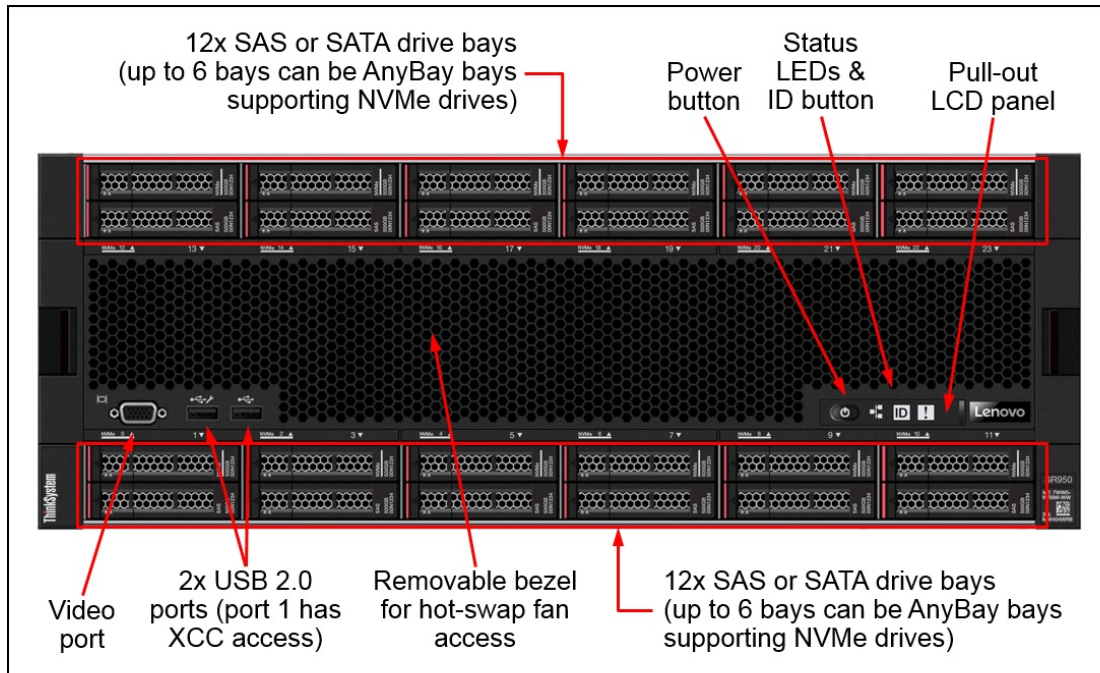


Figure 2. Front view of the Lenovo ThinkSystem SR950

The following figure shows the rear of the SR950 server. The server has up to 17 PCIe slots, depending on the riser cards selected, and the number of processors installed.

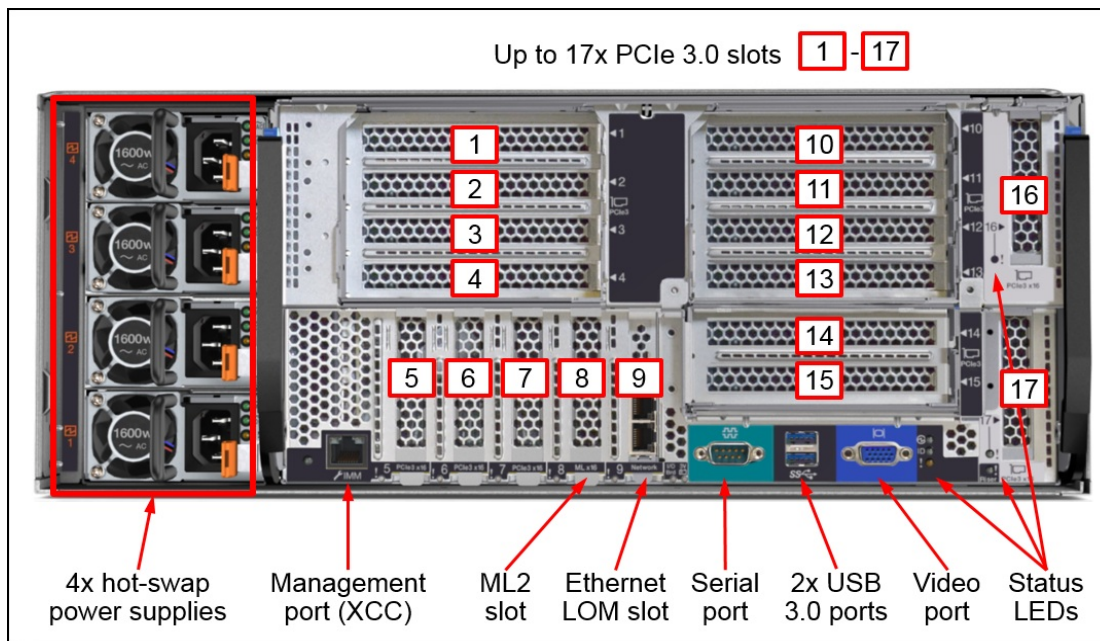


Figure 3. Rear view of the Lenovo ThinkSystem SR950

The processors and other components are located on compute trays, the Upper Compute Tray and the Lower Compute Tray. Each compute tray holds up to four processors on two system boards. The compute trays are accessible from the front of the server, as shown in the following figure.

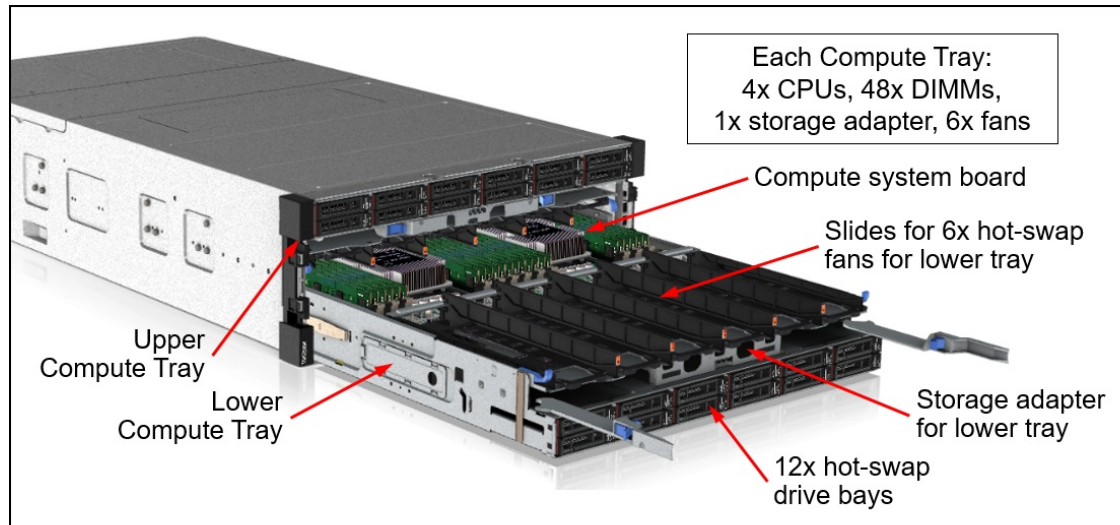


Figure 4. Lower Compute Tray partially removed

The server has one or two compute trays. Each compute tray contains:

- One or two compute system boards, each comprising:
 - Two processors
 - 24 DIMMs
- Six hot-swap fans, accessible even when the compute tray is installed
- 12x 2.5-inch hot-swap drive bays
- One PCIe slot reserved for a RAID adapter for internal SAS/SATA drives

The following figure shows the rear of the compute tray with its two compute system boards, one of them removed.

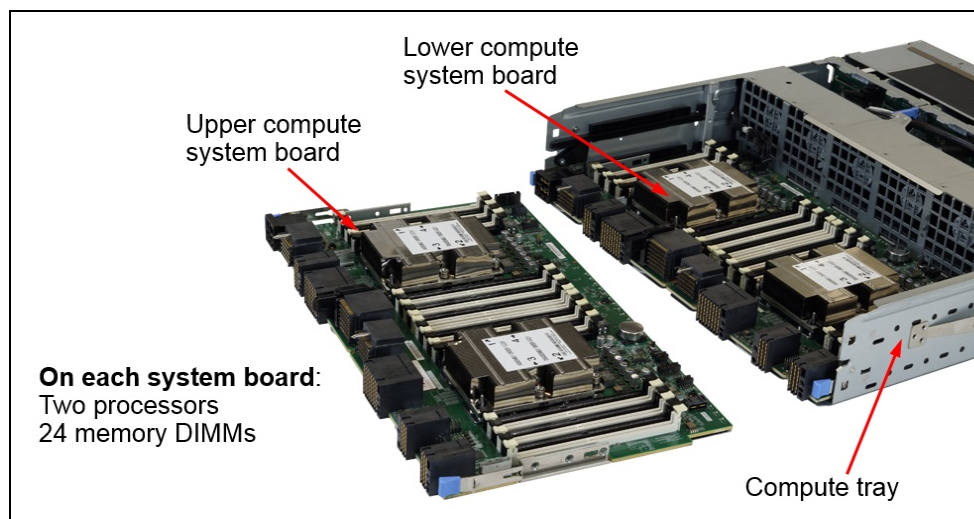


Figure 5. Compute tray with two compute system boards

The compute system board is shown in the following figure. Each system board holds two processors and 24 DIMM sockets, 12 per processor. The system board also has connections for the NVMe ports used to connect to the PCIe NVMe drive bays at the front of the server.

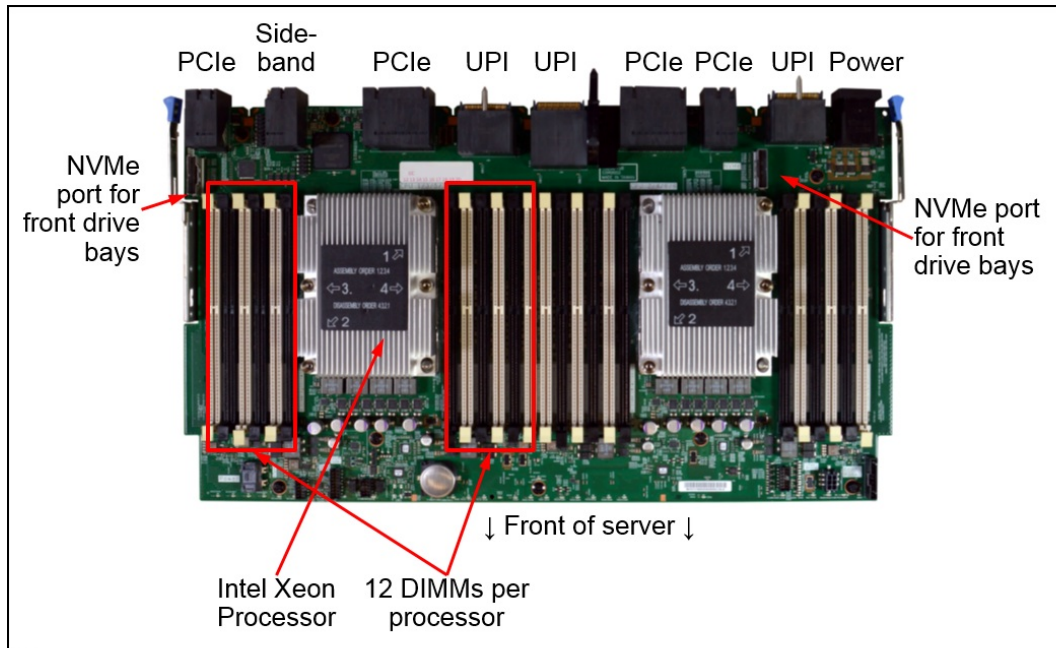


Figure 6. Compute system board

Processors installed in the compute system boards are numbered as shown in the following figure.

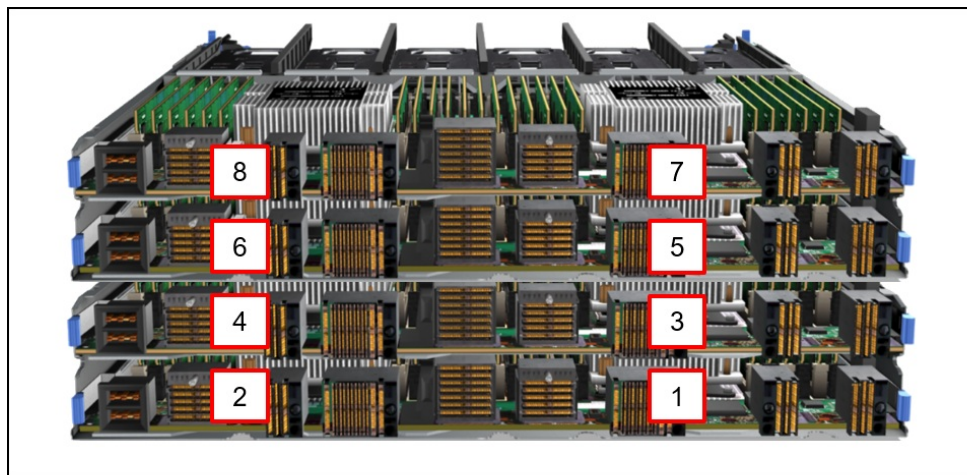


Figure 7. Processor numbering (viewed from the rear of the compute trays)

For some four-socket storage-rich configurations, a storage tray is used in the upper tray area instead of a compute tray. The following figure shows the key components of the storage tray.

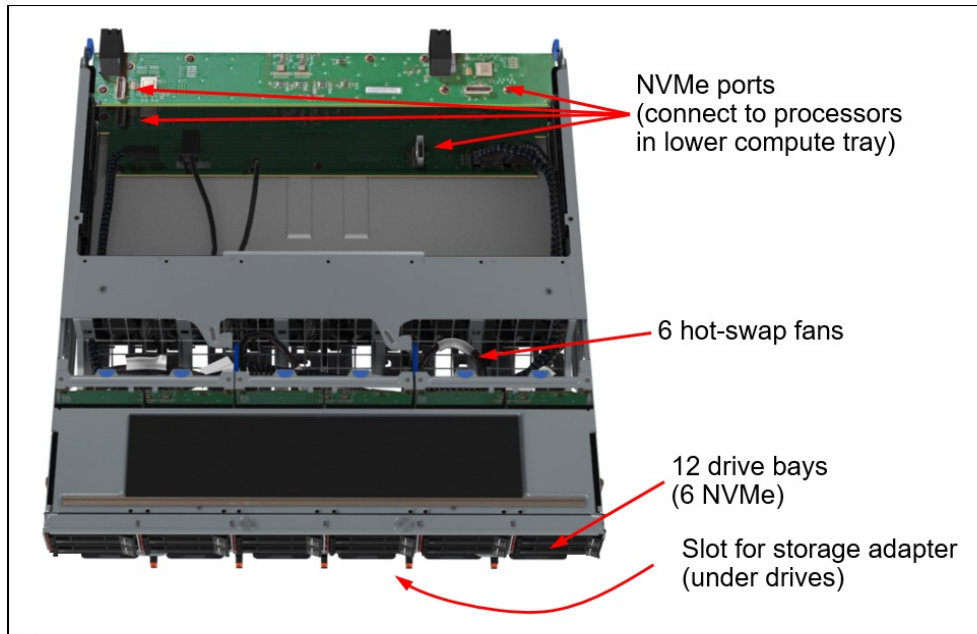


Figure 8. Storage tray

All slots and ports at the rear of the server are housed in the I/O tray as shown in the following figure.

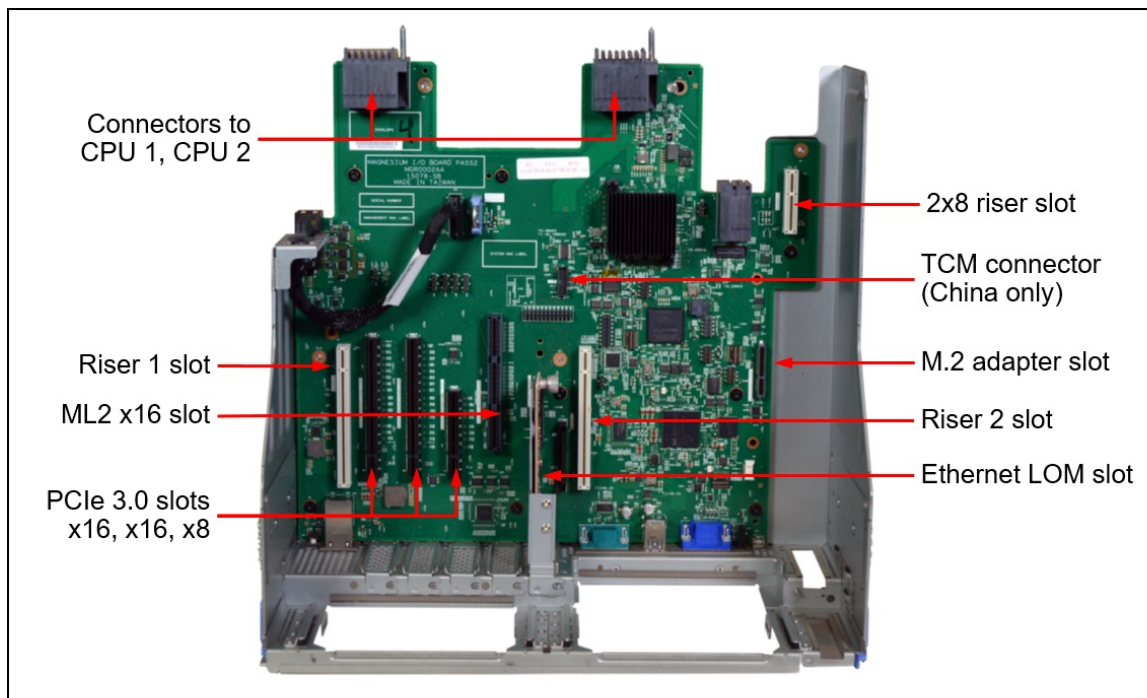


Figure 9. I/O tray

System architecture

The following figure shows the architecture of the SR950 at a high level. The system boards with processors and memory are installed in compute trays along with the drive bays and storage adapter. The I/O board houses all onboard PCIe slots as well as the slots for the riser cards the offer the remaining PCIe slots.

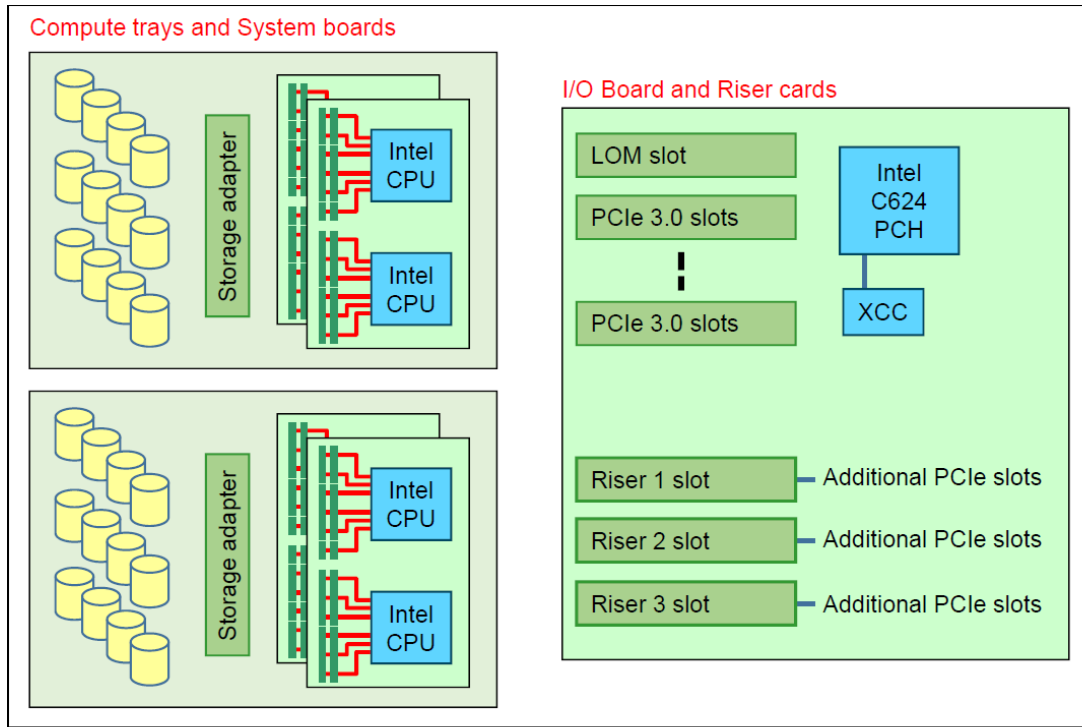


Figure 10. SR950 architecture

The specific connections between system boards, processors and PCIe slots are dependent on the server configuration. This is described in detail in the [Server configurations](#) section. Specific processor-slot connections based on each configuration are described in the [Slot availability by server configuration](#) section.

The following figure shows System board 1 where processors 1 and 2 are installed. The slots on the I/O board are connected directly to these processor (or indirectly through the Intel C624 Platform Controller Hub, PCH).

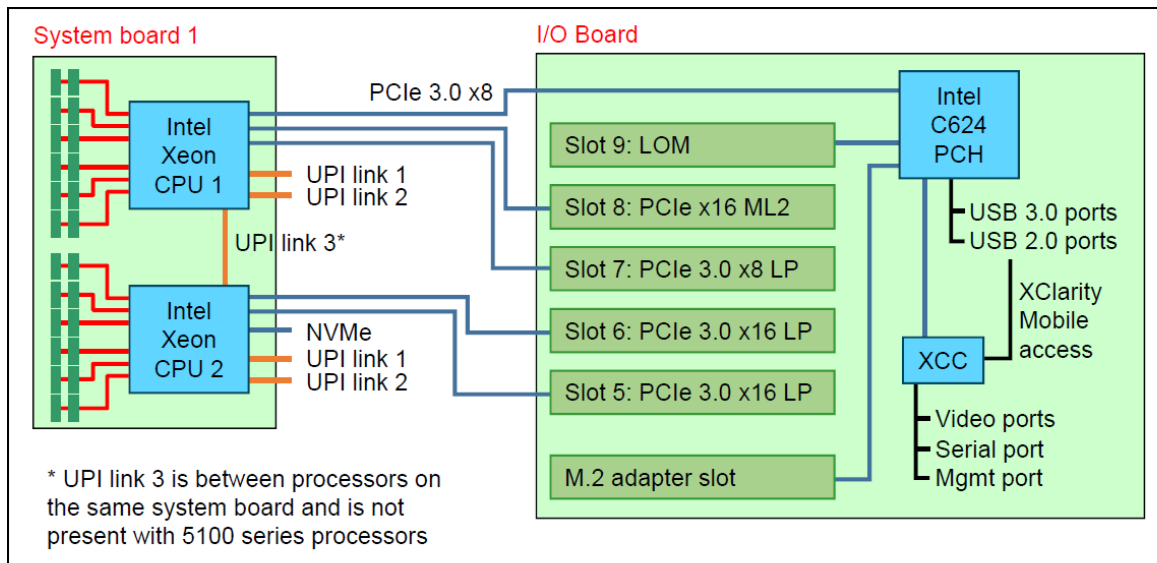


Figure 11. System board 1 connections to the I/O board

The processors within the chassis communicate via UltraPath Interconnect (UPI) ports. These ports allow high speed communication between the CPUs. UPI replaces the Intel QuickPath Interconnect (QPI). One UPI link connects the two processors on each system board (UPI 3) and the other two UPI links are used to connect the other processors in adjacent boards to form four-way and larger systems.

In four-processor configurations, the design of the UPI links is either in a mesh or a ring topology. When a processor has 3 UPI ports, it can be used in a 4-socket mesh configuration where all processors are directly connected to every other processor. 5100 Series processors only have 2 UPI ports (ports 1 and 2) and therefore do not support mesh topology. These two UPI configurations are shown in the following figure.

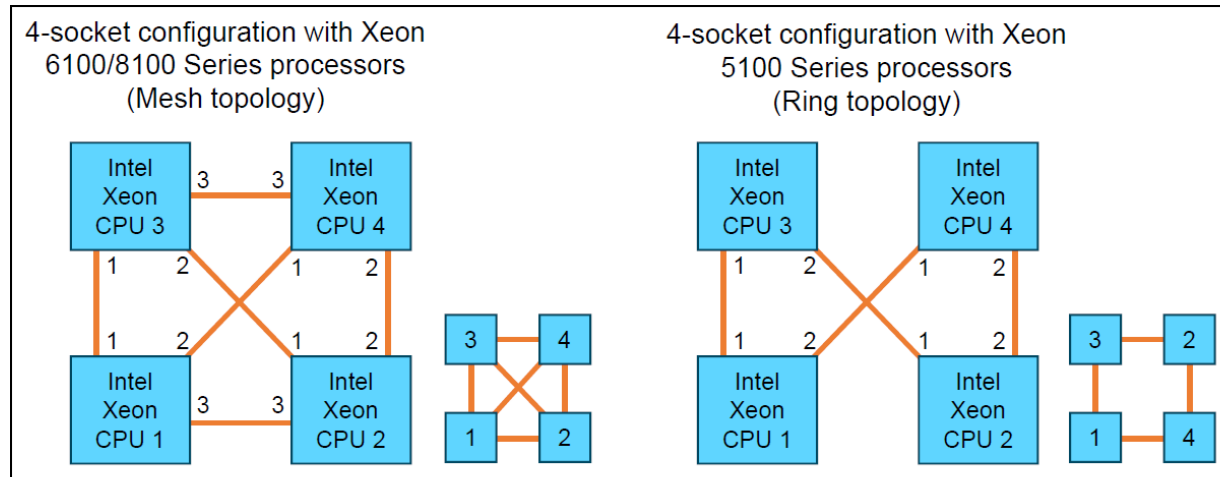


Figure 12. Mesh (left) and Ring (right) topologies for four-socket configurations

Ring topology with 8100 Series processors: As discussed in the [Server configurations](#) section, the “Four-Socket Upgradable / Storage Rich” configuration is a four-socket configuration that uses a Ring topology but uses 8100 Series processors.

The server supports an 8-socket configuration (8100 Series processors required). The following figure shows the UPI links used to connect eight processors.

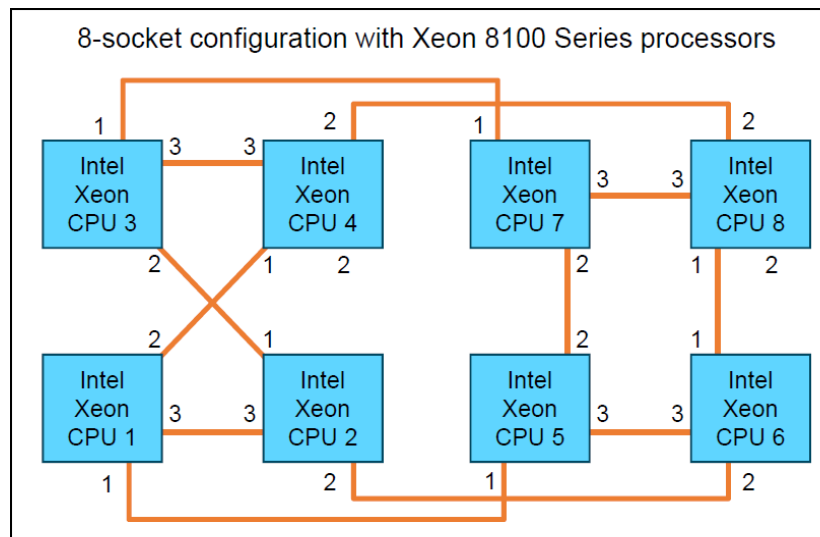


Figure 13. 8-socket topology

Refer to the [processor options table](#) for information on the number UPI links each processor option has for the SR950 system.

Server configurations

The SR950 supports five different configurations, depending on the desired number of processors, drive bays, PCIe slots, and upgradability to an 8-socket configuration.

Notes:

- The configurations listed here represent Lenovo's recommendations regarding the selection of compute system boards, I/O riser cards, and NVMe drive bays to maximize the available resources. You can select fewer drives and lower slot counts by using lower-slot-count riser cards to meet application requirements.
- The use of only two, three or six processors in configurations where supported will reduce the available I/O slots and NVMe drive bays. This is described in details in the [Internal storage](#) section and the [I/O expansion options](#) section.
- Configurations 1 and 2 support either two, three or four processors, however the use 5100 Series processors requires that four processors be selected. Two or three 5100 Series processors are not supported in these configurations due to the way the processors are connected.
- Configurations 3 and 4 are designed to be easily upgradable to 8 processors. As a result, 8100 Series processors are required.

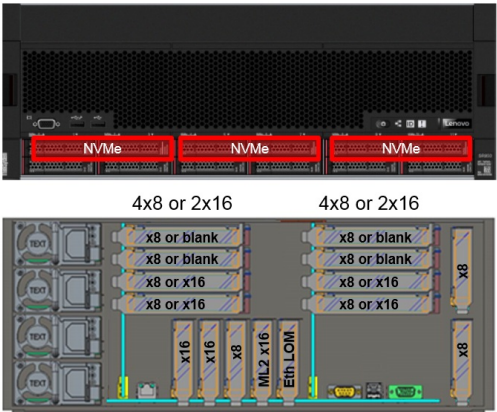
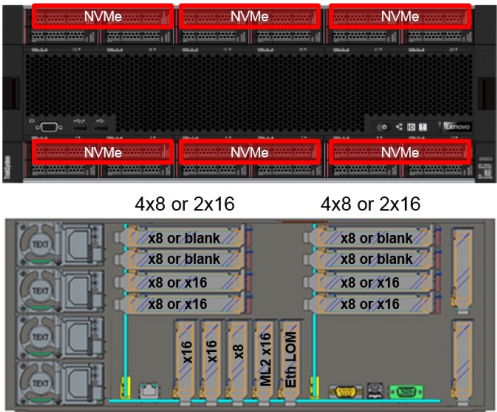
When building a server in the configurator, the feature codes in the following table are key to selecting the right configuration.

Table 1. Feature codes for selecting base server configurations

Part number	Feature code	Description
CTO only	AUNY	SR950 2S to 4S Base (Upgrade to 8S using the 4S Performance to 8S upgrade kit)
CTO only	AUKF	SR950 2S to 8S Base (Simple upgrade without needing the upgrade kit)
CTO only	AX3Y	12 Hard Drive Maximum System
CTO only	AX3Z	24 Hard Drive Maximum System

Upgrades: Configurations 1-4 can be upgraded to an 8-socket configuration (Configuration 5) as described in the [Server configuration upgrades](#) section.

Table 2. Server configurations

 <p>Filler tray</p> <p>Compute tray</p> <p>2x8 riser</p> <p>4x8 or 2x16</p> <p>4x8 or 2x16</p>	<p>Configuration 1. Four-Socket Performance</p> <p>The highest-performing 4-socket server, at the lowest cost, when up to 12 drives is enough, and without the need for a simple upgrade.</p> <ul style="list-style-type: none"> • Supports 2, 3 or 4 processors (if using 5100 Series processors, 4 processors must be selected). • 4 sockets configured in mesh topology for best performance. • 12 drive bays, 6 of which support NVMe drives (4 NVMe with 3 processors, and 2 NVMe with 2 processors). • 15 rear PCIe slots with 4 processors (10 rear slots with 3 processors, and 6 rear slots with 2 processors). • Filler installed in the upper tray area. • Can be upgraded to 8S but requires the 4S Performance to 8S Upgrade Kit, additional components, and Lenovo hardware installation. • Select feature codes AUNY and AX3Y.
 <p>Storage tray</p> <p>Compute tray</p> <p>No riser</p> <p>4x8 or 2x16</p> <p>4x8 or 2x16</p>	<p>Configuration 2. Four-Socket Performance/ Storage Rich</p> <p>The highest-performing 4-socket server, when needing more than 12 drives without the need for a simple upgrade.</p> <ul style="list-style-type: none"> • Supports 2, 3 or 4 processors (if using 5100 Series processors, 4 processors must be selected). • 4 processors configured in mesh topology for best performance. • 24 drives, 12 of which support NVMe drives (8 NVMe with 3 processors, and 4 NVMe with 2 processors). • 13 rear PCIe slots with 4 processors (9 rear slots with 3 processors, and 5 rear slots with 2 processors). • Storage tray installed in the upper tray area. • Can be upgraded to 8S but requires the 4S Performance to 8S Upgrade Kit, additional components, and Lenovo hardware installation. • Select feature codes AUNY and AX3Z.

<p>Filler tray</p> <p>Compute tray</p> <p>4x8 or 2x16 4x8 or 2x16</p> <p>2x8 riser</p>	<p>Configuration 3. Four-Socket Upgradable</p> <p>The lowest-cost 4-socket server capable of a simple upgrade to 8 socket, and when 12 drive bays with 4 processors is enough storage.</p> <ul style="list-style-type: none"> • 2 or 4 processors, must be 8100 Series processors. • 4 processors in a ring topology. • 12 drive bays including up to 6 NVMe (2 NVMe with 2 processors). • Up to 15 rear PCIe slots with 4 processors (6 rear slots with 2 processors). • Filler installed in the upper tray area. • Upgradable to 8-socket with an additional compute tray and two system boards. • Once upgraded, the system will have 24 drive bays. • Select feature codes AUKF and AX3Y.
<p>Compute tray</p> <p>Compute tray</p> <p>5x16+ML2 5x16+ML2</p> <p>2x8 riser</p>	<p>Configuration 4. Four-Socket Upgradable / Storage Rich</p> <p>4-socket server capable of a simple upgrade to 8-socket, and needing more than 12 drive bays with 4 processors.</p> <ul style="list-style-type: none"> • Requires 4 processors, must be 8100 Series. • 4 processors in a ring topology. • 24 drive bays (including up to 4 NVMe). • 10 rear PCIe slots. • Two compute trays, with one system board in each tray. • Upgradable to 8-socket with two additional system boards. • Once upgraded, the server will support 12 NVMe drives. • Select feature codes AUKF and AX3Z.
<p>Compute tray</p> <p>Compute tray</p> <p>5x16+ML2 5x16+ML2</p> <p>2x8 riser</p>	<p>Configuration 5. Eight-Socket Storage Rich</p> <p>Full featured 6- or 8-socket server with up to 24 drive bays, and the maximum number of PCIe x16 slots.</p> <ul style="list-style-type: none"> • Requires 6 or 8 processors, must be 8100 Series. • 24 drive bays, 12 of which support NVMe drives (8 NVMe with 6 processors). • 17 rear PCIe slots (13 rear slots with 6 processors installed). • Two compute trays each with two system boards. • Select feature codes AUKF and AX3Z.

The following table summarizes the configurations.

Table 3. SR950 server configurations

Configuration	Supported processors	Lower Tray	Upper Tray	Processor Topology	Maximum storage	Maximum PCIe slots	Upgrade to 8S?
4S Performance	2 or 4 Any processor†	Compute Tray	Filler	4S Mesh*	12 drives (6 NVMe)	15	Yes‡
4S Performance/ Storage Rich	4 Any processor	Compute Tray	Storage Tray	4S Mesh*	24 drives (12 NVMe)	13	Yes‡
4S Upgradable	2 or 4 8100 Series only	Compute Tray	Filler	4S Ring	12 drives (6 NVMe)	15	Yes**
4S Upgradable/ Storage Rich	4 8100 Series only	Compute Tray with 1 system board	Compute Tray with 1 system board	4S Ring	24 drives (4 NVMe)	10	Yes**
8S Storage Rich	8 8100 Series only	Compute Tray	Compute Tray	8S	24 drives (12 NVMe)	17	Not applicable

† If using 5100 Series processors, then 4 processors must be selected. Using two 5100 Series processors is not supported.

* Mesh topology requires a processor with 3 UPI connections; Processors such as the 5100 series with only 2 UPI connections will operate in Ring topology. See the table in the [Processor options](#) section.

‡ Upgrade requires the ThinkSystem SR950 4S Performance to 8S Upgrade Kit, 4TA7A10969. See the [Server configuration upgrades](#) section below.

** After upgrade, maximum storage will be 24 drives (12 NVMe), and up to 17 total PCIe slots available (may require replacement riser cards)

For details about PCIe slot availability based on each server configuration, see [Slot availability by server configuration](#).

Server configuration upgrades

This section describes the system upgrades you can perform in the field. The upgrades are based on the configurations that are described in the [Server configurations](#) section.

Key components in the upgrades are listed in the following table.

Table 4. System upgrades

Part number	Feature code	Description
4TA7A10969	Various	ThinkSystem SR950 4S Performance to 8S Upgrade Kit
7XG7A03955	AUN0	ThinkSystem SR950 2-CPU, 24 DIMM Compute System Board
7XG7A03956	Various	ThinkSystem SR950 Upper Compute Tray Kit

4S Performance to 8S Upgrade Kit, 4TA7A10969, includes the following components:

- 4 mid-plane UPI & sideband interconnects

The Compute System Board option, 7XG7A03955, includes the following components:

- One compute system board, without processors or memory

The Upper Compute Tray Kit, 7XG7A03956, includes the following components:

- 1x compute tray with 12 drive bays and 1 slot for storage adapter
- 1x compute system board
- 3x 4-bay drive bay fillers

Note: The Upper Compute Tray Kit does not include drive backplanes

The following table describes the before and after configurations and the components you will need to order to achieve the desired configuration.

Table 5. Upgrades to Server configurations (See [Server configurations](#) section for configuration definitions)

Initial configuration	Desired upgraded configuration	Parts to order and install
Configuration 1 (Four-Socket Performance) 2 processors installed	Configuration 1 (Four-Socket Performance) 4 processors installed	<ul style="list-style-type: none"> • 1x Compute System Board, 7XG7A03955 • 2x processor options (match installed) • Memory DIMMs (matching installed is recommended)
Configuration 1 (Four-Socket Performance) 3 processors installed	Configuration 1 (Four-Socket Performance) 4 processors installed	<ul style="list-style-type: none"> • 1x processor option (match installed) • Memory DIMMs (matching installed is recommended)
Configuration 1 (Four-Socket Performance) 4 processors installed (Includes SAP HANA models and configurations)	Configuration 5 (Eight-Socket Storage Rich) 8 processors installed	<ul style="list-style-type: none"> • 1x 4S Performance to 8S Upgrade Kit, 4TA7A10969 • 1x Upper Compute Tray Kit, 7XG7A03956* • 1x Compute System Board, 7XG7A03955 • 4x 81xx processor options (match installed)** • Memory DIMMs (matching installed is recommended) • Drive backplanes for upper compute tray • RAID adapter or HBA for upper compute tray • Drives for upper compute tray • Additional/replacement PCIe riser cards • Lenovo Basic Hardware Installation services
Configuration 2 (Four-Socket Performance/Storage Rich) 4 processors installed (Includes customized SAP HANA models)	Configuration 5 (Eight-Socket Storage Rich) 8 processors installed	
Configuration 2 (Four-Socket Performance/Storage Rich) 2 processors installed	Configuration 2 (Four-Socket Performance/Storage Rich) 4 processors installed	<ul style="list-style-type: none"> • 1x Compute System Board, 7XG7A03955 • 2x processor options (match installed) • Memory DIMMs (matching installed is recommended)
Configuration 2 (Four-Socket Performance/Storage Rich) 3 processors installed	Configuration 2 (Four-Socket Performance/Storage Rich) 4 processors installed	<ul style="list-style-type: none"> • 1x processor option (match installed) • Memory DIMMs (matching installed is recommended)
Configuration 3 (Four-Socket Upgradable) 2 processors installed	Configuration 3 (Four-Socket Upgradable) 4 processors installed	<ul style="list-style-type: none"> • 1x Compute System Board, 7XG7A03955 • 2x processor options (match installed) • Memory DIMMs (matching installed is recommended)

Initial configuration	Desired upgraded configuration	Parts to order and install
Configuration 3 (Four-Socket Upgradable) 4 processors installed	Configuration 5 (Eight-Socket Storage Rich) 8 processors installed	<ul style="list-style-type: none"> • 1x Upper Compute Tray Kit, 7XG7A03956* • 1x Compute System Board, 7XG7A03955 • 4x 81xx processor options (match installed)* • Memory DIMMs (matching installed is recommended) • Drive backplanes for upper compute tray • RAID adapter or HBA for upper compute tray • Drives for upper compute tray • Additional/replacement PCIe riser cards
Configuration 4 (Four-Socket Upgradable / Storage Rich) 4 processors installed	Configuration 5 (Eight-Socket Storage Rich) 8 processors installed	<ul style="list-style-type: none"> • 2x Compute System Board, 7XG7A03955 • 4x 81xx processor options (match installed)** • Memory DIMMs (matching installed is recommended) • Additional/replacement PCIe riser cards
Configuration 5 (Eight-Socket Storage Rich) 6 processors installed	Configuration 5 (Eight-Socket Storage Rich) 8 processors installed	<ul style="list-style-type: none"> • 2x processor option (match installed) • Memory DIMMs (matching installed is recommended)

* The Upper Compute Tray Kit includes 1x Compute System Board

** 8-socket configurations must use Intel Xeon Platinum (81xx) processors

Configuration notes:

- The added processors must match the processors already installed.
- When upgrading to Configuration 5 (8-socket configuration), Platinum-level (81xx) processors must be used, as listed in the [Processor options](#) section. Gold processors do not support 8-socket configurations.
- For best performance, each processor added should match the memory configuration of existing processors (number & size of DIMMs)
- The ThinkSystem SR950 4S Performance to 8S Upgrade Kit, 4TA7A10969, contains the mid-chassis interconnects needed for an 8-socket configuration, replacing the existing interconnects. Lenovo installation is highly recommended due to the complexity of this upgrade. Installation cost will vary depending on location and scope of work.

Standard specifications

The following table lists the standard specifications.

Table 6. Standard specifications

Components	Specification
Machine type	7X11 - 1-year warranty 7X12 - 3-year warranty 7X13 - SAP HANA configurations with 3-year warranty
Form factor	4U rack

Components	Specification
Processor	<p>Up to eight first-generation Intel Xeon Platinum Scalable Processors or up to four first-generation Intel Xeon Gold Scalable Processors (formerly codename "Skylake"). Supports processors with up to 28 cores, core speeds up to 3.6 GHz, and TDP ratings up to 205W.</p> <p>Processors and memory are located on system boards installed in compute trays: 2 processors per system board, 2 system boards per compute tray, and 2 compute trays in the server.</p>
Chipset	Intel C624 chipset (formerly codename "Lewisburg")
Memory	Up to 96 DIMM sockets (12 DIMMs per processor, installed on each system board). Lenovo TruDDR4 RDIMMs, LRDIMMs and 3DS RDIMMs are supported. Each processor has 6 memory channels, with 2 DIMMs per channel
Memory maximums	<p>With RDIMMs: Up to 3 TB with 96x 32 GB RDIMMs and eight processors</p> <p>With LRDIMMs: Up to 6 TB with 96x 64 GB LRDIMMs and eight processors</p> <p>With 3DS RDIMMs: Up to 12 TB with 96x 128 GB 3DS RDIMMs and eight processors</p> <p>Note: Support of more than 768 GB per processor (more than 3 TB for a 4-processor system or 6 TB for an 8-processor system) requires M-suffix processors with 1.5 TB memory support. See the Processor options section for information.</p>
Memory protection	ECC, SDDC (for x4-based memory DIMMs), ADDDC (for x4-based memory DIMMs), memory mirroring, and memory sparing.
Disk drive bays	Up to 24x 2.5" hot-swap SAS/SATA drive bays. With AnyBay backplanes, 12 bays can be configured to support PCIe NVMe drives.
Maximum internal storage	<ul style="list-style-type: none"> ● 368.64TB using 24x 15.36TB 2.5-inch SAS SSDs ● 96TB using 12x 8TB 2.5-inch NVMe SSDs ● 57.6TB using 24x 2.4TB 2.5-inch HDDs
Storage controller	<ul style="list-style-type: none"> ● No embedded RAID ● 12 Gb SAS/SATA RAID adapters: <ul style="list-style-type: none"> ○ RAID 530i (cacheless) supports RAID 0, 1, 10, 5, 50 ○ RAID 730-8i with 1GB cache supports RAID 0, 1, 10, 5, 50 ○ RAID 730-8i with 2GB flash-backed cache supports RAID 0, 1, 10, 5, 50, 6, 60 ○ RAID 930-8i with 2GB flash-backed cache supports RAID 0, 1, 10, 5, 50, 6, 60 ○ RAID 930-16i with 4GB flash-backed cache supports RAID 0, 1, 10, 5, 50, 6, 60 ● 12 Gb SAS/SATA non-RAID: 430-8i and 430-16i HBAs
Optical and tape bays	No internal bays.
Network interfaces	Integrated 10Gb Ethernet controller, based on the Intel Ethernet Connection X722. The server supports 1 of 6 available LOM adapters, providing either 2- or 4-port Gigabit Ethernet, 2- or 4-port 10 GbE with SFP+ connections or 2- or 4-port 10 GbE with RJ45 connections. One port can optionally be shared with the XClarity Controller (XCC) management processor for Wake-on-LAN and NC-SI support. 1 or 2 ML2 adapter slots for additional network adapters.

Components	Specification
PCI Expansion slots	<p>Up to 17 PCIe 3.0 rear-accessible slots:</p> <ul style="list-style-type: none"> ● Slots 1-4 on a riser, one of: <ul style="list-style-type: none"> ○ Riser with 4x PCIe 3.0 x16 slots, all full-height half-length, all 75W ○ Riser with 2x PCIe 3.0 x16 slots, all full-height half-length, both 75W ○ Riser with 4x PCIe 3.0 x8 slots, full-height half-length, all 75W ● Slot 5: PCIe 3.0 x16, low-profile, 75W ● Slot 6: PCIe 3.0 x16, low-profile, 75W ● Slot 7: PCIe 3.0 x8, low-profile, 75W ● Slot 8: PCIe 3.0 x16 ML2, low-profile (supports NC-SI) ● Slot 9: PCIe 3.0 x8 LOM adapter slot, low-profile (supports NC-SI) ● Slots 10-15 on a riser, one of: <ul style="list-style-type: none"> ○ Riser 5x16+ML2: <ul style="list-style-type: none"> ■ Five PCIe 3.0 x16 slots, all full-height half-length, all 75W ■ One PCIe 3.0 x16 ML2 slot, full-height half-length, 30W (no NC-SI support) ○ Riser 2x16: Two PCIe 3.0 x16 slots, all full-height half-length, both 75W ○ Riser 4x8: Four PCIe 3.0 x8 slots, full-height half-length, all 75W ● Slot 16-17 on a riser: <ul style="list-style-type: none"> ○ PCIe 3.0 x8 low profile, 75W ○ PCIe 3.0 x8 low profile, 75W <p>Additional internal PCIe slots:</p> <ul style="list-style-type: none"> ● One or two PCIe 3.0 x8 slots for storage adapters ● M.2 adapter slot
Ports	<p>Front: Two USB 2.0 ports (one also for XCC local management), and one VGA video port. Rear: Two USB 3.0, one VGA video, one DB-9 serial, and one 1 GbE RJ-45 systems management. The serial port can be shared with the XCC for serial redirection functions. Only one VGA port can be used at a time.</p>
Cooling	Up to 12 redundant hot-swap single-rotor fans, 6 in each compute tray. Each tray has N+1 fan redundancy.
Power supply	Up to four redundant hot-swap 1100 W or 1600 W power supplies (80 PLUS Platinum certified), supporting 200-240 V AC input. The 1100 W power supply also supports 100-127V AC input supply with a reduced capacity of 1050 W. No support for 240 V DC.
Hot-swap parts	Drives, power supplies, and fans.
Video	G200 graphics with 16 MB memory with 2D hardware accelerator, integrated into the XClarity Controller. Maximum resolution is 1920x1200 32bpp at 60Hz.
Security features	Power-on password, administrator's password, Trusted Platform Module (TPM), supporting TPM 1.2 or TPM 2.0. In China only, optional Trusted Cryptographic Module (TCM).
Systems management	XClarity Controller embedded management, XClarity Administrator centralized infrastructure delivery, XClarity Integrator plugins, and XClarity Energy Manager centralized server power management. XClarity Controller Enterprise functionality standard with the SR950. Light path diagnostics for local failure detection and reporting, with LCD diagnostic pull-out panel.
Operating systems	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware ESXi. See the Operating system support section for specifics.
Limited warranty	One year or three-year (model dependent) customer-replaceable unit (CRU) and onsite limited warranty with 9x5 next business day (NBD).
Service and support	Optional service upgrades are available through Lenovo Services: 4-hour or 2-hour response time, 6-hour fix time, 1-year or 2-year warranty extension, software support for Lenovo hardware and some third-party applications.

Components	Specification
Dimensions	Width: 447 mm (17.6 in.), height: 176 mm (6.9 in.), depth: 851 mm (33.5 in.). See Physical and electrical specifications for details.
Weight	Minimum configuration: 32.6 kg (71.9 lb.), Maximum configuration: 58.7 kg (129.4 lb.)

The server is shipped with the following items:

- Rail kit
- Documentation flyer
- Power cords (model and region dependent)

Models

ThinkSystem SR950 models can be configured by using the [Lenovo Data Center Solution Configurator \(DCSC\)](#).

Configure-to-order (CTO) models are used to create models with factory-integrated server customizations. For CTO models, two base CTO models are available for the SR950 as listed in the following table, CTO1WW and CTOLWW:

- The CTO1WW base CTO model is for general business and is selectable by choosing **General Purpose** mode in DCSC.
- The CTOLWW base model is intended for High Performance Computing (HPC) and Artificial Intelligence (AI) configurations and solutions, including configurations for Lenovo Scalable Infrastructure (LeSI), and is enabled using either the **HPC & AI LeSI Solutions** mode or **HPC & AI ThinkSystem Hardware** mode in DCSC. CTOLWW configurations can also be built using [System x and Cluster Solutions Configurator \(x-config\)](#).

Preconfigured server models may also be available for the SR950, however these are region-specific; that is, each region may define their own server models, and not all server models are available in every region.

The following table lists the base CTO models of the ThinkSystem SR950 server.

Table 7. Base CTO models

Description	Machine Type/Model General purpose	Machine Type/Model for HPC and AI
ThinkSystem SR950 - 3 year Warranty	7X12CTO1WW	7X12CTOLWW
ThinkSystem SR950 - 1 year Warranty	7X11CTO1WW	7X11CTOLWW
ThinkSystem SR950 - SAP HANA configurations with 3-year warranty	7X13CTO1WW	None

Withdrawn models: All SR950 models with Intel Xeon SP Gen 1 processors are now withdrawn from marketing. For models with Gen 2 processors, see <https://lenovopress.com/lp1054>

SAP HANA configurations

The Lenovo SR950 solutions for SAP HANA provide optimal solutions for SAP BW/4HANA and SAP S/4HANA applications.

The following table lists the configurations available for SAP HANA (machine type 7X13).

System upgrades to 8 sockets: SAP HANA configurations described here can be upgraded to 4 or 8

sockets as described in the [Server configuration upgrades](#) section. Refer to the Configuration 1 and Configuration 2 rows in the table.

Table 8. SAP HANA configurations

Memory	Config identifier	Config	Intel Xeon Processor	Memory configuration	Drives	RAID	Storage capacity	Network
All-flash configurations - 2 socket - standalone server								
192 GB	2SKL192 SSDS	Single node	2x 8176	192 GB (12x 16 GB)	2x 400GB SSD 3x 3.84TB SSD	1x 930-16i	7.6 TB RAID-5 data/log	4x 10GbE 4x 1GigE
384 GB	2SKL384 SSDS	Single node	2x 8176	384 GB (24x 16 GB or 12x 32 GB)	2x 400GB SSD 3x 3.84TB SSD	1x 930-16i	7.6 TB RAID-5 data/log	4x 10GbE 4x 1GigE
576 GB	2SKL576 SSDS	Single node	2x 8176	576 GB (12x 16GB + 12x 32GB)	2x 400GB SSD 3x 3.84TB SSD	1x 930-16i	7.6 TB RAID-5 data/log	4x 10GbE 4x 1GigE
768 GB	2SKL768 SSDS	Single node	2x 8176	768 GB (24x 32 GB or 12x 64 GB)	2x 400GB SSD 3x 3.84TB SSD	1x 930-16i	7.6 TB RAID-5 data/log	4x 10GbE 4x 1GigE
1,536 GB	2SKL1536 SSDS	Single node	2x 8176	1,536 GB (24x 64 GB or 12x 128 GB)	2x 400GB SSD 3x 3.84TB SSD	1x 930-16i	7.6 TB RAID-5 data/log	4x 10GbE 4x 1GigE
3,072 GB*	2SKL3072 SSDS	Single node	2x 8176M	3,072 GB (24x 128 GB)	2x 400GB SSD 5x 3.84TB SSD	1x 930-16i	15.3 TB RAID-5 data/log	4x 10GbE 4x 1GigE
All-flash configurations - 4 socket - standalone								
384 GB	4SKL384 SSDS	Single node	4x 8176	384 GB (24x 16 GB)	2x 400GB SSD 3x 3.84TB SSD	1x 930-16i	7.6 TB RAID-5 data/log	4x 10GbE 4x 1GigE
768 GB	4SKL768 SSDS	Single node	4x 8176	768 GB (48x 16 GB or 24x 32 GB)	2x 400GB SSD 3x 3.84TB SSD	1x 930-16i	7.6 TB RAID-5 data/log	4x 10GbE 4x 1GigE
1,152 GB	4SKL1152 SSDS	Single node	4x 8176	1152 GB (24x 16GB + 24x 32GB)	2x 400GB SSD 3x 3.84TB SSD	1x 930-16i	7.6 TB RAID-5 data/log	4x 10GbE 4x 1GigE
1,536 GB	4SKL1536 SSDS	Single node	4x 8176	1,536 GB (48x 32 GB or 24x 64 GB)	2x 400GB SSD 3x 3.84TB SSD	1x 930-16i	7.6 TB RAID-5 data/log	4x 10GbE 4x 1GigE
3,072 GB	4SKL3072 SSDS	Single node	4x 8176	3,072 GB (48x 64 GB or 24x 128 GB)	2x 400GB SSD 5x 3.84TB SSD	1x 930-16i	15.3 TB RAID-5 data/log	4x 10GbE 4x 1GigE
6,144 GB*	4SKL6144 SSDS	Single node	4x 8176M	6,144 GB (48x 128 GB)	2x 400GB SSD 9x 3.84TB SSD	1x 930-16i	30.7 TB RAID-5 data/log	4x 10GbE 4x 1GigE
All-flash configurations - 8 socket - standalone								
768 GB	8SKL768 SSDS	Single node	8x 8176	768 GB (48x 16 GB)	2x 400GB SSD 3x 3.84TB SSD	1x 930-16i	7.6 TB RAID-5 data/log	4x 10GbE 4x 1GigE
1,536 GB	8SKL1536 SSDS	Single node	8x 8176	1,536 GB (96x 16 GB or 48x 32 GB)	2x 400GB SSD 3x 3.84TB SSD	1x 930-16i	7.6 TB RAID-5 data/log	4x 10GbE 4x 1GigE
2,304GB	8SKL2304 SSDS	Single node	8x 8176	2,304 G (48x 16GB + 48x 32GB)	2x 400GB SSD 3x 3.84TB SSD	1x 930-16i	7.6 TB RAID-5 data/log	4x 10GbE 4x 1GigE

Memory	Config identifier	Config	Intel Xeon Processor	Memory configuration	Drives	RAID	Storage capacity	Network
3,072 GB	8SKL3072 SSDS	Single node	8x 8176	3,072 GB (96x 32 GB or 48x 64 GB)	2x 400GB SSD 5x 3.84TB SSD	1x 930-16i	15.3 TB RAID-5 data/log	4x 10GbE 4x 1GigE
6,144 GB	8SKL6144 SSDS	Single node	8x 8176	6,144 GB (96x 64 GB or 48x 128 GB)	2x 400GB SSD 9x 3.84TB SSD	1x 930-16i	30.7 TB RAID-5 data/log	4x 10GbE 4x 1GigE
12,288 GB*	8SKL12288 SSDS	Single node	8x 8176M	12,288 GB (96x 128 GB)	2x 400GB SSD 18x 3.84TB SSD or 9x 7.68TB SSD	2x 930-16i†	61.4 TB RAID-5 data/log	4x 10GbE 4x 1GigE
All-flash configurations - 4 socket - scale out								
1,536 GB	4SKL1536 SSDG	Scale out to 94 nodes	4x 8176	1,536 GB (48x 32 GB or 24x 64 GB)	2x 400GB SSD 5x 3.84TB SSD	1x 930-16i	15.3 TB RAID-5 data/log	4x 10GbE 4x 1GigE
3,072 GB	4SKL3072 SSDG	Scale out to 94 nodes	4x 8176	3,072 GB (48x 64 GB or 24x 128 GB)	2x 400GB SSD 9x 3.84TB SSD	1x 930-16i	30.7 TB RAID-5 data/log	4x 10GbE 4x 1GigE
All-flash configurations - 8 socket - scale out								
3,072 GB	8SKL3072 SSDG	Scale out to 94 nodes	8x 8176	3,072 GB (96x 32 GB or 48x 64 GB)	2x 400GB SSD 9x 3.84TB SSD	1x 930-16i	30.7 TB RAID-5 data/log	4x 10GbE 4x 1GigE
6,144 GB**	8SKL6144 SSDG	Scale out to 94 nodes	8x 8176	6,144 GB (96x 64 GB or 48x 128 GB)	2x 400GB SSD 18x 3.84TB SSD or 9x 7.68TB SSD	2x 930-16i†	61.4 TB RAID-5 data/log	4x 10GbE 4x 1GigE
12,288 GB‡	8SKL12288 SSDG	Scale out to 4+1 node	8x 8176M	12,288 GB (96x 128 GB)	2x 400GB SSD 18x 7.68TB SSD	2x 930-16i	122.8 TB RAID-5 data/log	4x 10GbE 4x 1GigE

* For S/4HANA and Suite on HANA only (not for Datamart, BWoH and BW/4)

** Up to 4 nodes for S/4HANA (scale-out up to 94 nodes for Datamart, BWoH and BW/4H only)

‡ For S/4HANA only

† if 9x 7.68TB drives are used, then use 1x 930-16i RAID adapter

Each of these HANA configurations include the following components

- Processors:
 - Each configuration listed in the table uses either the Platinum 8176 or 8176M processors, depending on the amount of memory installed. The Platinum 8180 and 8180M can also be used if greater performance is desired.
 - An M-suffix processor is required for 8-socket configurations with 12TB of memory, for 4-socket configurations with 6TB of memory, or for 2-socket configurations with 3TB of memory.
- Networking:
 - Two or more Mellanox ConnectX-4 Lx 2x 25GbE Adapters with 10 GbE transceivers (SFP+ SR Transceiver, 46C3447)
 - One or more ThinkSystem Intel I350-T4 ML2 1Gb 4-Port RJ45 Ethernet Adapters
- Storage
 - ThinkSystem 2.5" 400GB Mainstream SAS 12Gb Hot Swap SSDs
 - ThinkSystem 2.5" 3.84TB Capacity SAS 12Gb Hot Swap SSDs
- RAID Adapter:
 - One or two ThinkSystem RAID 930-16i 4GB Flash PCIe 12Gb Adapter
 - Optional RAID 930-8e 4GB Flash PCIe 12Gb Adapters for external storage connectivity
- Lenovo solution for SAP HANA media

Note: The operating system software is *not* included with the SAP HANA models. Operating system selection must be a separate line item included in order: SLES for SAP with standard or priority support. The SAP HANA Software is included, but the license is sold separately by SAP or an SAP business partner. VMware Enterprise Plus license sold separately. IBM Spectrum Scale (GPFS) is available from Lenovo separately.

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

Processor options

The SR950 supports the Gold and Platinum level processors in the Intel Xeon Processor Scalable Family, including the "top bin" highest performing 205 W processors available from Intel.

The server supports up to four or eight processors, depending on the configuration selected, however processors are all installed within the 4U rack enclosure:

- The use of more than 4 processors requires a Platinum-level processor.
- For configurations that support up to eight processors, the server supports 2, 4, 6 or 8 processors.
- For configurations of up to four processors (lower cost configuration, no upgrade path to eight processors), the server supports 2, 3 or 4 processors.

As described in the [Components and connectors](#) section, processors and memory are located on compute system boards - two processors per board. Two system boards are installed in a compute tray, and there are two compute trays in the server.

For configurations with only one compute tray, you can upgrade to add a second compute tray. You can also add additional system boards as needed. The ordering information for these upgrades is listed in the following table.

Table 9. Compute tray and system board upgrades

Part number	Feature code	Description
7XG7A03955	AUN0	ThinkSystem SR950 2-CPU, 24 DIMM Compute System Board
7XG7A03956	Various	ThinkSystem SR950 Upper Compute Tray Kit

The Compute System Board option, 7XG7A03955, includes the following components:

- One compute system board, without processors or memory

The Upper Compute Tray Kit, 7XG7A03956, includes the following components:

- 1x compute tray with 12 drive bays and 1 slot for storage adapter
- 1x compute system board
- 3x 4-bay drive bay fillers

Note: The Upper Compute Tray Kit does not include drive backplanes

The table below lists the supported processors. The table indicates which processors support 8-socket configurations and whether the processors support memory capacities greater than 768 GB per processor.

All processors listed support:

- Hyper-Threading Technology
- Turbo Boost Technology 2.0

The table also lists the number of Intel Ultra Path Interconnect (UPI) ports each processor has. UPI ports are used to connect processors together for high-speed communications.

- When a processor has 3 UPI ports, it can be used in a 4-socket mesh configuration where all

processors are directly connected to every other processor. 5100 Series processors do not support mesh topology, since they only have 2 UPI ports.

- When a processor has only 2 UPI ports, it can only be used in a 4-socket ring configuration where all processors are connected to the 2 adjacent processors and the fourth processor is only connected indirectly via another processor.

The mesh and ring topologies are shown in the following figure.

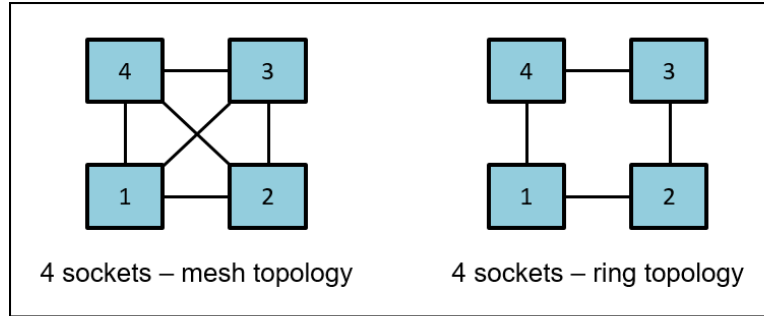


Figure 14. Mesh and ring processor topologies

Table 10. Processor options

Part number	Feature code	Intel Xeon processor	Suitable for 8-socket	Memory speed	Supports >768 GB per CPU	L3 cache	UPI links	AVX-512 units
4XG7A08857	AX8M	Gold 5115 10C 85W 2.4GHz	No	2400 MHz	No	13.75 MB	2	1
4XG7A09097	B20S	Gold 5117 14C 105W 2.0GHz	No	2400 MHz	No	19.25 MB	2	1
4XG7A08845	AX7D	Gold 5118 12C 105W 2.3GHz	No	2400 MHz	No	16.5 MB	2	1
4XG7A08864	AX7F	Gold 5119T 14C 85W 1.9GHz	No	2400 MHz	No	19.25 MB	2	1
4XG7A08832	AX7C	Gold 5120 14C 105W 2.2GHz	No	2400 MHz	No	19.25 MB	2	1
4XG7A08831	AX7E	Gold 5120T 14C 105W 2.2GHz	No	2400 MHz	No	19.25 MB	2	1
4XG7A08849	AX70	Gold 5122 4C 105W 3.6GHz	No	2666 MHz*	No	16.5 MB**	2	2*
4XG7A08835	AWEX	Gold 6126 12C 125W 2.6GHz	No	2666 MHz	No	19.25 MB**	3	2
4XG7A08853	AX73	Gold 6126T 12C 125W 2.6GHz	No	2666 MHz	No	19.25 MB**	3	2
4XG7A08846	AX6Z	Gold 6128 6C 115W 3.4GHz	No	2666 MHz	No	19.25 MB**	3	2
4XG7A08833	AX6D	Gold 6130 16C 125W 2.1GHz	No	2666 MHz	No	22 MB	3	2
4XG7A08851	AX72	Gold 6130T 16C 125W 2.1GHz	No	2666 MHz	No	22 MB	3	2
4XG7A08838	AX6U	Gold 6132 14C 140W 2.6GHz	No	2666 MHz	No	19.25 MB	3	2
4XG7A08847	AX6Y	Gold 6134 8C 130W 3.2GHz	No	2666 MHz	No	24.75 MB**	3	2
4XG7A08863	AX7A	Gold 6134M 8C 130W 3.2GHz	No	2666 MHz	Yes	24.75 MB**	3	2
4XG7A08848	AX6W	Gold 6136 12C 150W 3.0GHz	No	2666 MHz	No	24.75 MB**	3	2
4XG7A08834	AX6Q	Gold 6138 20C 125W 2.0GHz	No	2666 MHz	No	27.5 MB	3	2
4XG7A08852	AX71	Gold 6138T 20C 125W 2.0GHz	No	2666 MHz	No	27.5 MB	3	2
4XG7A08836	AX6R	Gold 6140 18C 140W 2.3GHz	No	2666 MHz	No	24.75 MB	3	2
4XG7A08858	AX79	Gold 6140M 18C 140W 2.3GHz	No	2666 MHz	Yes	24.75 MB	3	2
4XG7A08839	AX6E	Gold 6142 16C 150W 2.6GHz	No	2666 MHz	No	22 MB	3	2

Part number	Feature code	Intel Xeon processor	Suitable for 8-socket	Memory speed	Supports >768 GB per CPU	L3 cache	UPI links	AVX-512 units
4XG7A08859	AX78	Gold 6142M 16C 150W 2.6GHz	No	2666 MHz	Yes	22 MB	3	2
7XG7A05003	AX6X	Gold 6144 8C 150W 3.5GHz	No	2666 MHz	No	24.75 MB**	3	2
7XG7A05004	AX6V	Gold 6146 12C 165W 3.2GHz	No	2666 MHz	No	24.75 MB**	3	2
4XG7A08840	AWEW	Gold 6148 20C 150W 2.4GHz	No	2666 MHz	No	27.5 MB	3	2
7XG7A05005	AX6T	Gold 6150 18C 165W 2.7GHz	No	2666 MHz	No	24.75 MB	3	2
4XG7A08837	AX6P	Gold 6152 22C 140W 2.1GHz	No	2666 MHz	No	30.25 MB	3	2
7XG7A03957	AX6S	Gold 6154 18C 200W 3.0GHz	No	2666 MHz	No	24.75 MB	3	2
4XG7A08854	AX6L	Platinum 8153 16C 125W 2.0GHz	Yes	2666 MHz	No	22 MB	3	2
4XG7A08850	AWEV	Platinum 8156 4C 105W 3.6GHz	Yes	2666 MHz	No	16.5 MB**	3	2
4XG7A08855	AX7B	Platinum 8158 12C 150W 3.0GHz	Yes	2666 MHz	No	24.75 MB**	3	2
4XG7A08841	AWGJ	Platinum 8160 24C 150W 2.1GHz	Yes	2666 MHz	No	33 MB	3	2
4XG7A08860	AX77	Platinum 8160M 24C 150W 2.1GHz	Yes	2666 MHz	Yes	33 MB	3	2
4XG7A08856	AX6N	Platinum 8160T 24C 150W 2.1GHz	Yes	2666 MHz	No	33 MB	3	2
4XG7A08842	AX6K	Platinum 8164 26C 150W 2.0GHz	Yes	2666 MHz	No	35.75 MB	3	2
7XG7A03958	AX6M	Platinum 8168 24C 205W 2.7GHz	Yes	2666 MHz	No	33 MB	3	2
4XG7A08843	AX6J	Platinum 8170 26C 165W 2.1GHz	Yes	2666 MHz	No	35.75 MB	3	2
4XG7A08862	AX76	Platinum 8170M 26C 165W 2.1GHz	Yes	2666 MHz	Yes	35.75 MB	3	2
4XG7A08844	AX6H	Platinum 8176 28C 165W 2.1GHz	Yes	2666 MHz	No	38.5 MB	3	2
4XG7A08861	AX75	Platinum 8176M 28C 165W 2.1GHz	Yes	2666 MHz	Yes	38.5 MB	3	2
7XG7A03959	AX6G	Platinum 8180 28C 205W 2.5GHz	Yes	2666 MHz	No	38.5 MB	3	2
7XG7A03960	AX74	Platinum 8180M 28C 205W 2.5GHz	Yes	2666 MHz	Yes	38.5 MB	3	2

* All Gold 5000-level processors, except the 5122, support 2400 MHz memory speeds and have one AVX-512 512-bit FMA units. The 5122 processor supports 2666 MHz and has two FMA units

** L3 cache is 1.375 MB per core except with the processors indicated with **

Memory options

The SR950 uses Lenovo TruDDR4 memory operating at up to 2666 MHz. The server supports 12 DIMMs per processor, which corresponds to 48 DIMMs with four processors installed and 96 DIMMs when eight processors are installed. Each processor has six memory channels with two DIMMs per channel. With 128 GB 3DS RDIMMs installed, an 8-socket server supports a total of 12 TB of system memory.

As described in the [Components and connectors](#) section, the memory is installed on compute system boards and there are two system boards per compute tray and one or two compute trays per server, depending on the configuration.

All DIMMs operate at a speed of 2666 MHz, both at 1 DIMM per channel and 2 DIMMs per channel. However, if the processor selected has a lower memory bus speed (for example 2400 MHz), then all DIMMs will operate at that lower speed.

The following table lists the memory options that are available for SR950.

Lenovo TruDDR4 memory uses the highest quality components that are sourced from Tier 1 DRAM suppliers and only memory that meets the strict requirements of Lenovo is selected. It is compatibility tested and tuned to maximize performance and reliability. From a service and support standpoint, Lenovo TruDDR4 memory automatically assumes the system warranty, and Lenovo provides service and support worldwide.

Table 11. Memory options

Part number	Feature code	Description	Maximum supported
RDIMMs			
7X77A01302	AUNB	ThinkSystem 16GB TruDDR4 2666 MHz (1Rx4 1.2V) RDIMM	96 (12 per processor)
7X77A01303	AUNC	ThinkSystem 16GB TruDDR4 2666 MHz (2Rx8 1.2V) RDIMM	96 (12 per processor)
7X77A01304	AUND	ThinkSystem 32GB TruDDR4 2666 MHz (2Rx4 1.2V) RDIMM	96 (12 per processor)
LRDIMMs			
7X77A01305	AUNE	ThinkSystem 64GB TruDDR4 2666 MHz (4Rx4 1.2V) LRDIMM	96 (12 per processor)
3DS RDIMMs			
4ZC7A08716	AUW5	ThinkSystem 64GB TruDDR4 2666MHz (4Rx4, 1.2V) 3DS RDIMM	96 (12 per processor)
7X77A01307	AUNF	ThinkSystem 128GB TruDDR4 2666 MHz (8Rx4 1.2V) 3DS RDIMM	96 (12 per processor)

The following rules apply when selecting the memory configuration:

- The server supports RDIMMs, LRDIMMs and 3DS RDIMMs. UDIMMs are not supported.
- Mixing RDIMMs and LRDIMMs is not supported.
- Mixing 3DS RDIMMs with either RDIMMs or LRDIMMs is not supported.
- Mixing x4 and x8 DIMMs is supported.

For best performance, consider the following:

- Populate memory DIMMs in quantities of 6 or 12 per processor, so that all memory channels are used.
- When mixing 16 GB and 32 GB DIMMs in the same configuration, use 16GB 2Rx8 DIMMs instead of 16 GB 1Rx4 DIMMs for better performance.
- Populate memory channels so they all have the same total memory capacity.
- Ensure all memory controllers on a processor socket have the same DIMM configuration.
- All processor sockets on the same physical server should have the same DIMM configuration.

The following memory protection technologies are supported:

- ECC
- SDDC (for x4-based memory DIMMs; look for "x4" in the DIMM description)
- ADDDC (for x4-based memory DIMMs)
- Memory mirroring
- Memory rank sparing

If memory channel mirroring is used, then DIMMs must be installed in pairs or sets of three (minimum of one pair or set of three per processor), and all DIMMs in the pair or set of three must be identical in type and size. 50% of the installed capacity is available to the operating system.

If memory rank sparing is used, then a minimum of 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 largest rank in the channel will be automatically selected as the spare rank. The amount of memory available to the operating system depends on the number, capacity and rank counts of the DIMMs installed.

Internal storage

The SR950 offers up to 24x 2.5-inch drive bays, depending on the server configuration selected (as described in [Server configurations](#)). The server also supports either one or two M.2 drives, installed in an M.2 adapter.

In this section:

- [Backplanes and drive bays](#)
- [Adapters and cabling](#)
- [M.2 drives](#)
- [SED encryption key management with ISKLM](#)

Backplanes and drive bays

Drives are all located at the front of the server, 12 drives at the front of the upper tray and 12 at the front of the lower tray. Drives are connected to 4-drive backplanes in a 2-by-2 configuration, as shown in the following figure. All drive bays are 2.5-inch form factor.

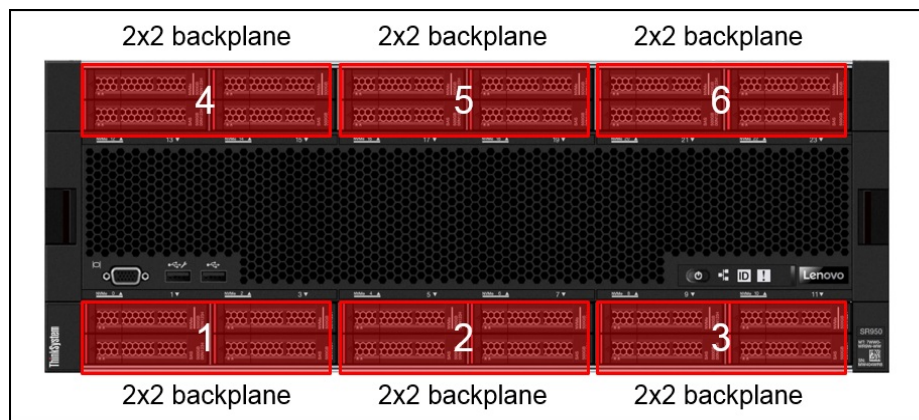


Figure 15. Location of backplanes

There are two different backplanes available for the SR950:

- SAS/SATA backplane: Supports 4 SAS or SATA drives
- AnyBay backplane:
 - Top two drives support SAS, SATA, or NVMe interface drives (Lenovo AnyBay)
 - Bottom two drive bays support SAS or SATA drives only

Regular 2.5-inch SAS/SATA drive bays support only SAS or SATA drives; however, the Lenovo AnyBay drive bay design allows a choice of SATA, SAS, or U.2 (NVMe) PCIe drives. This design enables the flexibility to configure some of the bays with high-performance PCIe SSDs while still using the other bays for high-capacity HDDs, which is an ideal solution for storage-tiering.

The part numbers in the following table include the cables needed for field upgrades. In CTO orders using the feature codes, the necessary cables will be derived.

Table 12. Drive backplanes

Part number	Feature code	Description	Maximum supported
7XB7A03966	AUN6	ThinkSystem 2.5" SAS/SATA 2x2 Bay Backplane Kit (Support for 4 SAS/SATA drives)	6
7XB7A03965	AUN5	ThinkSystem 2.5" SAS/SATA/NVMe 2x2 Bay Backplane Kit (Support for 2 AnyBay and 2 SAS/SATA drives)	6

If the server is configured with all AnyBay backplanes, then the server supports up to 12 NVMe drives, depending on the server configuration. The NVMe-capable drive bays are the even-numbered bays as shown in the following figure.

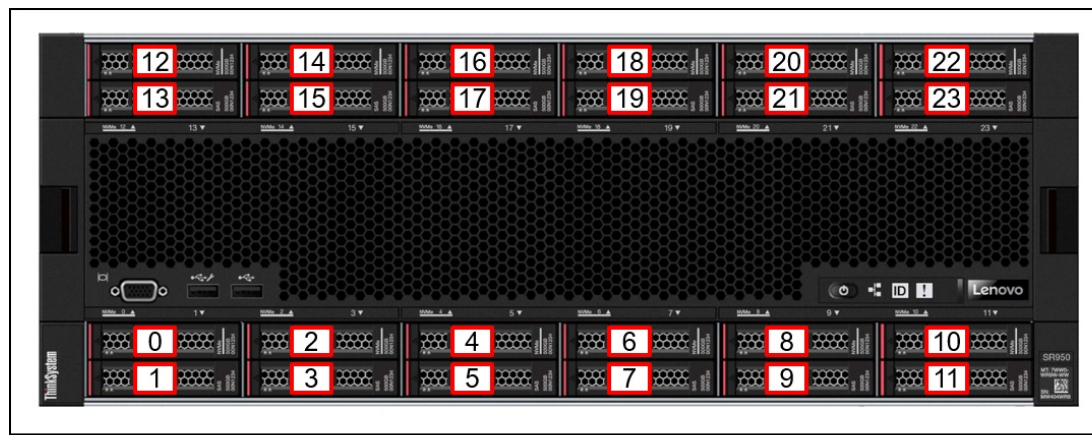


Figure 16. Drive bay numbering

The quantity and location of the AnyBay drive bays depends on the configuration, as listed in the following table.

See the [Server configurations](#) section for details about the five server configurations.

Table 13. Drive bays and NVMe support for each SR950 configuration

Configuration	Maximum storage	Location of NVMe drive bays (see previous figure for bay numbering)
Configuration 1. Four-Socket Performance		
2 processors installed	12 drives (2 NVMe)	Bays 8 and 10
3 processors installed	12 drives (4 NVMe)	Bays 4, 6, 8, 10
4 processors installed	12 drives (6 NVMe)	Bays 0, 2, 4, 6, 8, 10
Configuration 2. Four-Socket Performance/ Storage Rich		
2 processors installed	24 drives (4 NVMe)	Bays 8, 10 and 20, 22
3 processors installed	24 drives (8 NVMe)	Bays 4, 6, 8, 10, and 16, 18, 20, 22
4 processors installed	24 drives (12 NVMe)	Bays 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22
Configuration 3. Four-Socket Upgradable		
2 processors installed	12 drives (2 NVMe)	Bays 8 and 10
4 processors installed	12 drives (6 NVMe)	Bays 0, 2, 4, 6, 8, 10
Configuration 4. Four-Socket Upgradable / Storage Rich		
4 processors installed	24 drives (4 NVMe)	Bays 8, 10 and 20, 22
Configuration 5. Eight-Socket Storage Rich		
6 processors installed	24 drives (8 NVMe)	Bays 0, 2, 4, 6, 8, 10 and 12, 14
8 processors installed	24 drives (12 NVMe)	Bays 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22

Backplane connections are as follows:

- The 4-drive SAS/SATA backplane has one SAS/SATA connector and connects to a supported RAID controller or SAS HBA installed in the dedicated storage adapter slot.
- The 4-drive AnyBay backplane has one SAS/SATA connector and connects to a supported RAID controller or SAS HBA plus one NVMe connector to connect to NVMe ports on one of the system boards in a compute tray or directly on the storage tray.

The SAS/SATA backplane is shown in the following figure.

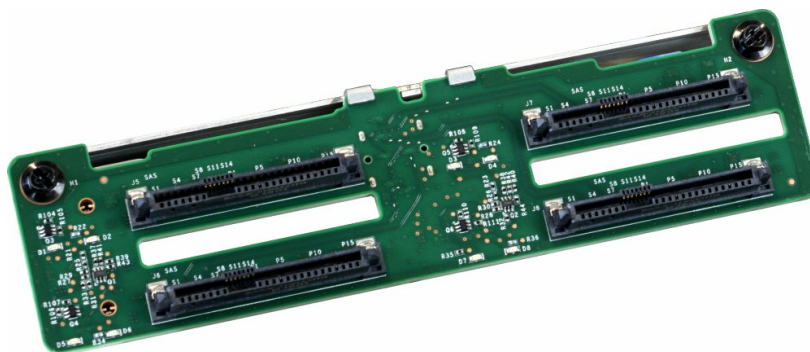


Figure 17. SAS/SATA backplane

Adapters and cabling

Each compute tray or storage tray includes one dedicated PCIe slot for a RAID adapter or SAS HBA.

Tip: The adapters are described in detail in the [Controllers for internal storage](#) section.

SAS/SATA backplanes are connected to the RAID adapter or HBA installed in the dedicated slot in that tray. AnyBay backplanes (NVMe support on 2 of the 4 drive bays) are connected to the RAID adapter or HBA or to an NVMe port adjacent to processor on a system board.

The following table lists which processor each SAS/SATA storage adapter and which NVMe port each backplane is connected to. Backplane numbering is shown in [Figure 11](#).

Processor numbering is shown in [Figure 7](#).

Table 14. Processor connectivity for storage adapters and NVMe ports

Configuration	Slot location	4S Performance	4S Performance/ Storage Rich	4S Upgradeable	4S Upgradeable/ Storage Rich	8S Storage Rich
Processors installed		2 (1,2) or 3 (1,2,4) or 4 (1,2,3,4)	2 (1,2) or 3 (1,2,4) or 4 (1,2,3,4)	2 (1,2) or 4 (1,2,3,4)	4 (1,2,5,6)	6 (1,2,3,4,5,7) or 8 (1-8)
Storage adapter slot	Upper tray	NC	1	NC	5	5
Storage adapter slot	Lower tray	1	1	1	1	1
NVMe on backplane 4	Upper tray	NC	3*	NC	NC	7
NVMe on backplane 5		NC	4*	NC	NC	8*
NVMe on backplane 6		NC	2	NC	6	6*
NVMe on backplane 1	Lower tray	3*	3*	3*	NC	3
NVMe on backplane 2		4*	4*	4*	NC	4
NVMe on backplane 3		2	2	2	2	2

* In 2, 3 and 6 processor configurations, the following backplanes cannot be AnyBay backplanes:

- In 2-processor configurations, processors 3 and 4 are not installed; this means drive backplanes 1 and 2 cannot be AnyBay backplanes.
- In 3-processor configurations, processor 3 is not installed; this means drive backplanes 1 and 4 cannot be AnyBay backplanes
- In 6-processor configurations, processors 6 & 8 are not installed; this means drive backplanes 5 and 6 cannot be AnyBay backplanes

M.2 drives

The server supports one or two M.2 form-factor SATA drives for use as an operating system boot solution. With two M.2 drives configured, the drives are configured by default as a RAID-1 mirrored pair for redundancy.

The M.2 drives install into an M.2 adapter which in turn is installed in a dedicated slot on the system board. See the internal view of the server in the [Components and connectors](#) section for the location of the M.2 slot.

There are two M.2 adapters supported, as listed in the following table.

Table 15. M.2 components

Part number	Feature code	Description	Maximum supported
7Y37A01092	AUMU	ThinkSystem M.2 Enablement Kit (contains the Single M.2 Boot Adapter; supports 1 drive)	1
7Y37A01093	AUMV	ThinkSystem M.2 with Mirroring Enablement Kit (contains the Dual M.2 Boot Adapter, supports 1 or 2 drives)	1

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

For details about M.2 components, see the *ThinkSystem M.2 Drives and M.2 Adapters* product guide: <https://lenovopress.com/lp0769-thinksystem-m2-drives-adapters>

SED encryption key management with ISKLM

The server supports self-encrypting drives (SEDs) as listed in the [Internal drive options](#) section. To effectively manage a large deployment of these drives in Lenovo servers, IBM Security Key Lifecycle Manager (SKLM) offers a centralized key management solution. A Lenovo Feature on Demand (FoD) upgrade is used to enable this SKLM support in the management processor of the server.

The following table lists the part numbers and feature codes for the upgrades.

Table 16. FoD upgrades for SKLM support

Part number	Feature code	Description
Security Key Lifecycle Manager - FoD (United States, Canada, Asia Pacific, and Japan)		
00D9998	A5U1	SKLM for System x/ThinkSystem w/SEDs - FoD per Install with 1 year S&S
00D9999	AS6C	SKLM for System x/ThinkSystem w/SEDs - FoD per Install with 3 year S&S
Security Key Lifecycle Manager - FoD (Latin America, Europe, Middle East, and Africa)		
00FP648	A5U1	SKLM for System x/ThinkSystem w/SEDs - FoD per Install with 1 year S&S
00FP649	AS6C	SKLM for System x/ThinkSystem w/SEDs - FoD per Install with 3 year S&S

Controllers for internal storage

The SR950 supports internal SAS and SATA drives with the addition of a RAID adapter or HBA. The adapter is installed in a dedicated slot in each compute tray. For NVMe support, the server uses NVMe ports that are on the compute system boards or on the storage tray if one is configured.

The following table lists the supported adapters.

Tip: Unlike System x RAID adapters, no upgrades are available for these RAID adapters. All supported functions are included with the base part numbers.

Table 17. Controllers for internal storage

Part number	Feature code	Description	Number of ports	Maximum supported
SAS/SATA HBA				
7Y37A01088	AUNL	ThinkSystem 430-8i SAS/SATA 12Gb HBA	8	2
7Y37A01089	AUNM	ThinkSystem 430-16i SAS/SATA 12Gb HBA	12**	2
RAID adapters				
7Y37A01082	AUNG	ThinkSystem RAID 530-8i PCIe 12Gb Adapter	8	2
7Y37A01083*	AUNH*	ThinkSystem RAID 730-8i 1GB Cache PCIe 12Gb Adapter	8	2
4Y37A09722	B4RQ	ThinkSystem RAID 730-8i 2GB Flash PCIe 12Gb Adapter	8	2
7Y37A01084	AUNJ	ThinkSystem RAID 930-8i 2GB Flash PCIe 12Gb Adapter	8	2
7Y37A01085	AUNK	ThinkSystem RAID 930-16i 4GB Flash PCIe 12Gb Adapter	12**	2
4Y37A09721	B31E	ThinkSystem RAID 930-16i 8GB Flash PCIe 12Gb Adapter	12**	2

* The RAID 730-8i 1GB Cache adapter is not available in USA and Canada.

** The 430-16i HBA and RAID 930-16i adapter support 12 drives when used in the SR950

The following table compares the functions of the storage adapters.

Table 18. Comparison of internal storage controllers

Feature	430-8i	430-16i	RAID 530-8i	RAID 730-8i 1GB†	RAID 730-8i 2GB	RAID 930-8i	RAID 930-16i
Adapter type	HBA	HBA	RAID controller	RAID controller	RAID controller	RAID controller	RAID controller
Part number	7Y37A01088	7Y37A01089	7Y37A01082	7Y37A01083	4Y37A09722	7Y37A01084	7Y37A01085 4Y37A09721
Form factor	PCIe low profile	PCIe low profile	PCIe HHHL	PCIe low profile	PCIe low profile	PCIe HHHL	PCIe HHHL
Controller chip	LSI SAS3408	LSI SAS3416	LSI SAS3408	LSI SAS3108	LSI SAS3108	LSI SAS3508	LSI SAS3516
Broadcom equivalent	HBA 9400-8i	HBA 9400-16i	MegaRAID 9440-8i	MegaRAID 9361-8i	MegaRAID 9361-8i	MegaRAID 9460-8i	MegaRAID 9460-16i
Host interface	PCIe 3.0x8	PCIe 3.0x8	PCIe 3.0x8	PCIe 3.0x8	PCIe 3.0x8	PCIe 3.0x8	PCIe 3.0x8
Port interface	12 Gb SAS	12 Gb SAS	12 Gb SAS	12 Gb SAS	12 Gb SAS	12 Gb SAS	12 Gb SAS
Number of ports	8	16	8	8	8	8	16
Port connectors	2x Mini-SAS HD x4 (SFF-8643)	4x Mini-SAS HD x4 (SFF-8643)	2x Mini-SAS HD x4 (SFF-8643)	2x Mini-SAS HD x4 (SFF-8643)	2x Mini-SAS HD x4 (SFF-8643)	2x Mini-SAS HD x4 (SFF-8643)	4x Mini-SAS HD x4 (SFF-8643)
Drive interface	SAS, SATA	SAS, SATA	SAS, SATA	SAS, SATA	SAS, SATA	SAS, SATA	SAS, SATA
Drive type	HDD, SSD, SED*	HDD, SSD, SED*	HDD, SED, SSD	HDD, SSD	HDD, SED, SSD	HDD, SED, SSD	HDD, SED, SSD
Hot-swap drives	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Max devices	8	12**	8	8	8	8	12**
RAID levels	No RAID	No RAID	0, 1, 10, 5, 50	0, 1, 10, 5, 50	0, 1, 10, 5, 50, 6, 60	0, 1, 10, 5, 50, 6, 60	0, 1, 10, 5, 50, 6, 60
JBOD mode	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cache	No	No	None	1GB (Standard)	2GB (Standard)	2GB (Standard)	4GB or 8GB (Standard)
CacheVault cache protection	No	No	No	No	Yes (Flash)	Yes (Flash)	Yes (Flash)
Performance Accelerator (FastPath)	No	No	Yes	No	Yes	Yes	Yes
SSD Caching (CacheCade Pro 2.0)	No	No	No	No	No	No	No
SED support*	Yes	Yes	Yes	No	Yes	Yes	Yes

† The RAID 730-8i 1GB Cache adapter is not available in USA and Canada.

* SED (self-encrypting drive) support of the SAS HBAs is by using software on the server (SED commands are passed through the HBA to the drives). SED support by RAID controllers is provided using the built-in MegaRAID SafeStore functionality of the adapter.

** With the SR950, the 430-16i HBA and RAID 930-16i support up to 12 drives.

Internal drive options

The following tables list the hard disk drive and solid-state drive options for the internal disk storage of the server.

2.5-inch hot-swap drives:

- [2.5-inch hot-swap 12 Gb SAS HDDs](#)
- [2.5-inch hot-swap 6 Gb SATA HDDs](#)
- [2.5-inch hot-swap 12 Gb SAS SSDs](#)
- [2.5-inch hot-swap 6 Gb SATA SSDs](#)
- [2.5-inch hot-swap PCIe 4.0 NVMe SSDs](#)
- [2.5-inch hot-swap PCIe 3.0 NVMe SSDs](#)

M.2 drives:

- [M.2 SATA drives](#)

M.2 drive support: The use of M.2 drives requires an additional adapter as described in the [M.2 drives](#) subsection.

PCIe 4.0 NVMe drive support: When installed in this server, PCIe 4.0 NVMe drives will operate at PCIe 3.0 speeds.

Table 19. 2.5-inch hot-swap 12 Gb SAS HDDs

Part number	Feature	Description	Maximum supported
2.5-inch hot-swap HDDs - 12 Gb SAS 10K			
7XB7A00024	AULY	ThinkSystem 2.5" 300GB 10K SAS 12Gb Hot Swap 512n HDD	24
7XB7A00025	AULZ	ThinkSystem 2.5" 600GB 10K SAS 12Gb Hot Swap 512n HDD	24
7XB7A00026	AUM0	ThinkSystem 2.5" 900GB 10K SAS 12Gb Hot Swap 512n HDD	24
7XB7A00027	AUM1	ThinkSystem 2.5" 1.2TB 10K SAS 12Gb Hot Swap 512n HDD	24
7XB7A00028	AUM2	ThinkSystem 2.5" 1.8TB 10K SAS 12Gb Hot Swap 512e HDD	24
7XB7A00069	B0YS	ThinkSystem 2.5" 2.4TB 10K SAS 12Gb Hot Swap 512e HDD	24
2.5-inch hot-swap HDDs - 12 Gb SAS 15K			
7XB7A00021	AULV	ThinkSystem 2.5" 300GB 15K SAS 12Gb Hot Swap 512n HDD	24
7XB7A00022	AULW	ThinkSystem 2.5" 600GB 15K SAS 12Gb Hot Swap 512n HDD	24
7XB7A00023	AULX	ThinkSystem 2.5" 900GB 15K SAS 12Gb Hot Swap 512e HDD	24
2.5-inch hot-swap HDDs - 12 Gb NL SAS			
7XB7A00034	AUM6	ThinkSystem 2.5" 1TB 7.2K SAS 12Gb Hot Swap 512n HDD	24
7XB7A00035	AUM7	ThinkSystem 2.5" 2TB 7.2K SAS 12Gb Hot Swap 512n HDD	24
2.5-inch hot-swap SED HDDs - 12 Gb SAS 10K			
7XB7A00030	AUM4	ThinkSystem 2.5" 300GB 10K SAS 12Gb Hot Swap 512n HDD SED	24
7XB7A00031	AUM5	ThinkSystem 2.5" 600GB 10K SAS 12Gb Hot Swap 512n HDD SED	24
7XB7A00033	B0YX	ThinkSystem 2.5" 1.2TB 10K SAS 12Gb Hot Swap 512n HDD SED	24

Table 20. 2.5-inch hot-swap 6 Gb SATA HDDs

Part number	Feature	Description	Maximum supported
2.5-inch hot-swap HDDs - 6 Gb NL SATA			
7XB7A00036	AUUE	ThinkSystem 2.5" 1TB 7.2K SATA 6Gb Hot Swap 512n HDD	24
7XB7A00037	AUUJ	ThinkSystem 2.5" 2TB 7.2K SATA 6Gb Hot Swap 512e HDD	24

Table 21. 2.5-inch hot-swap 12 Gb SAS SSDs

Part number	Feature	Description	Maximum supported
2.5-inch hot-swap SSDs - 12 Gb SAS - Performance (10+ DWPD)			
4XB7A10219	B4Y4	ThinkSystem 2.5" SS530 400GB Performance SAS 12Gb Hot Swap SSD	24
4XB7A10230	B4Y5	ThinkSystem 2.5" SS530 800GB Performance SAS 12Gb Hot Swap SSD	24
4XB7A10231	B4Y6	ThinkSystem 2.5" SS530 1.6TB Performance SAS 12Gb Hot Swap SSD	24
4XB7A10232	B4Y7	ThinkSystem 2.5" SS530 3.2TB Performance SAS 12Gb Hot Swap SSD	24
2.5-inch hot-swap SSDs - 12 Gb SAS - Mainstream (3-5 DWPD)			
4XB7A17062	B8HU	ThinkSystem 2.5" PM1645a 800GB Mainstream SAS 12Gb Hot Swap SSD	24
4XB7A17063	B8J4	ThinkSystem 2.5" PM1645a 1.6TB Mainstream SAS 12Gb Hot Swap SSD	24
4XB7A17064	B8JD	ThinkSystem 2.5" PM1645a 3.2TB Mainstream SAS 12Gb Hot Swap SSD	24
4XB7A17065	B8JA	ThinkSystem 2.5" PM1645a 6.4TB Mainstream SAS 12Gb Hot Swap SSD	24
4XB7A13654	B4A1	ThinkSystem 2.5" PM1645 1.6TB Mainstream SAS 12Gb Hot Swap SSD	24
4XB7A13655	B4A2	ThinkSystem 2.5" PM1645 3.2TB Mainstream SAS 12Gb Hot Swap SSD	24
2.5-inch hot-swap SSDs - 12 Gb SAS - Entry / Capacity (<3 DWPD)			
4XB7A38175	B91A	ThinkSystem 2.5" PM1643a 960GB Entry SAS 12Gb Hot Swap SSD	24
4XB7A38176	B91B	ThinkSystem 2.5" PM1643a 1.92TB Entry SAS 12Gb Hot Swap SSD	24
4XB7A17054	B91C	ThinkSystem 2.5" PM1643a 3.84TB Entry SAS 12Gb Hot Swap SSD	24
4XB7A17055	B91D	ThinkSystem 2.5" PM1643a 7.68TB Entry SAS 12Gb Hot Swap SSD	24
4XB7A17056	BC4R	ThinkSystem 2.5" PM1643a 15.36TB Entry SAS 12Gb Hot Swap SSD	24
4XB7A13645	B4A7	ThinkSystem 2.5" PM1643 3.84TB Capacity SAS 12Gb Hot Swap SSD	24

Table 22. 2.5-inch hot-swap 6 Gb SATA SSDs

Part number	Feature	Description	Maximum supported
2.5-inch hot-swap SSDs - 6 Gb SATA - Mainstream (3-5 DWPD)			
4XB7A17087	B8J1	ThinkSystem 2.5" 5300 240GB Mainstream SATA 6Gb Hot Swap SSD	24
4XB7A17088	B8HY	ThinkSystem 2.5" 5300 480GB Mainstream SATA 6Gb Hot Swap SSD	24
4XB7A17089	B8J6	ThinkSystem 2.5" 5300 960GB Mainstream SATA 6Gb Hot Swap SSD	24
4XB7A17090	B8JE	ThinkSystem 2.5" 5300 1.92TB Mainstream SATA 6Gb Hot Swap SSD	24
4XB7A17091	B8J7	ThinkSystem 2.5" 5300 3.84TB Mainstream SATA 6Gb Hot Swap SSD	24
4XB7A13633	B49L	ThinkSystem 2.5" Intel S4610 240GB Mainstream SATA 6Gb Hot Swap SSD	24
4XB7A13634	B49M	ThinkSystem 2.5" Intel S4610 480GB Mainstream SATA 6Gb Hot Swap SSD	24

Part number	Feature	Description	Maximum supported
4XB7A13635	B49N	ThinkSystem 2.5" Intel S4610 960GB Mainstream SATA 6Gb Hot Swap SSD	24
4XB7A13636	B49P	ThinkSystem 2.5" Intel S4610 1.92TB Mainstream SATA 6Gb Hot Swap SSD	24
4XB7A13637	B49Q	ThinkSystem 2.5" Intel S4610 3.84TB Mainstream SATA 6Gb Hot Swap SSD	24
4XB7A10237	B488	ThinkSystem 2.5" 5200 240GB Mainstream SATA 6Gb Hot Swap SSD	24
4XB7A10239	B48A	ThinkSystem 2.5" 5200 960GB Mainstream SATA 6Gb Hot Swap SSD	24
4XB7A10240	B48B	ThinkSystem 2.5" 5200 1.92TB Mainstream SATA 6Gb Hot Swap SSD	24
4XB7A10241	B48C	ThinkSystem 2.5" 5200 3.84TB Mainstream SATA 6Gb Hot Swap SSD	24
2.5-inch hot-swap SSDs - 6 Gb SATA - Entry (<3 DWPD)			
4XB7A38271	BCTC	ThinkSystem 2.5" Multi Vendor 240GB Entry SATA 6Gb Hot Swap SSD	24
4XB7A38272	BCTD	ThinkSystem 2.5" Multi Vendor 480GB Entry SATA 6Gb Hot Swap SSD	24
4XB7A38273	BCTE	ThinkSystem 2.5" Multi Vendor 960GB Entry SATA 6Gb Hot Swap SSD	24
4XB7A38274	BCTF	ThinkSystem 2.5" Multi Vendor 1.92TB Entry SATA 6Gb Hot Swap SSD	24
4XB7A38275	BCTG	ThinkSystem 2.5" Multi Vendor 3.84TB Entry SATA 6Gb Hot Swap SSD	24
4XB7A17075	B8HV	ThinkSystem 2.5" 5300 240GB Entry SATA 6Gb Hot Swap SSD	24
4XB7A17076	B8JM	ThinkSystem 2.5" 5300 480GB Entry SATA 6Gb Hot Swap SSD	24
4XB7A17077	B8HP	ThinkSystem 2.5" 5300 960GB Entry SATA 6Gb Hot Swap SSD	24
4XB7A17078	B8J5	ThinkSystem 2.5" 5300 1.92TB Entry SATA 6Gb Hot Swap SSD	24
4XB7A17079	B8JP	ThinkSystem 2.5" 5300 3.84TB Entry SATA 6Gb Hot Swap SSD	24
4XB7A17080	B8J2	ThinkSystem 2.5" 5300 7.68TB Entry SATA 6Gb Hot Swap SSD	24
4XB7A38185	B9AC	ThinkSystem 2.5" 5210 960GB Entry SATA 6Gb Hot Swap QLC SSD	24
4XB7A38144	B7EW	ThinkSystem 2.5" 5210 1.92TB Entry SATA 6Gb Hot Swap QLC SSD	24
4XB7A38145	B7EX	ThinkSystem 2.5" 5210 3.84TB Entry SATA 6Gb Hot Swap QLC SSD	24
4XB7A38146	B7EY	ThinkSystem 2.5" 5210 7.68TB Entry SATA 6Gb Hot Swap QLC SSD	24
4XB7A10247	B498	ThinkSystem 2.5" Intel S4510 240GB Entry SATA 6Gb Hot Swap SSD	24
4XB7A10248	B499	ThinkSystem 2.5" Intel S4510 480GB Entry SATA 6Gb Hot Swap SSD	24
4XB7A10249	B49A	ThinkSystem 2.5" Intel S4510 960GB Entry SATA 6Gb Hot Swap SSD	24
4XB7A13622	B49B	ThinkSystem 2.5" Intel S4510 1.92TB Entry SATA 6Gb Hot Swap SSD	24
4XB7A13623	B49C	ThinkSystem 2.5" Intel S4510 3.84TB Entry SATA 6Gb Hot Swap SSD	24
4XB7A10195	B34H	ThinkSystem 2.5" PM883 240GB Entry SATA 6Gb Hot Swap SSD	24
4XB7A10196	B34J	ThinkSystem 2.5" PM883 480GB Entry SATA 6Gb Hot Swap SSD	24
4XB7A10197	B34K	ThinkSystem 2.5" PM883 960GB Entry SATA 6Gb Hot Swap SSD	24
4XB7A10198	B34L	ThinkSystem 2.5" PM883 1.92TB Entry SATA 6Gb Hot Swap SSD	24
4XB7A10199	B34M	ThinkSystem 2.5" PM883 3.84TB Entry SATA 6Gb Hot Swap SSD	24
4XB7A10200	B4D2	ThinkSystem 2.5" PM883 7.68TB Entry SATA 6Gb Hot Swap SSD	24
7SD7A05740	B0Z0	ThinkSystem 2.5" Intel S4500 960GB Entry SATA 6Gb Hot Swap SSD	24
4XB7A10155	B2X4	ThinkSystem 2.5" 5200 1.92TB Entry SATA 6Gb Hot Swap SSD	24
4XB7A10157	B2X6	ThinkSystem 2.5" 5200 7.68TB Entry SATA 6Gb Hot Swap SSD	24

Table 23. 2.5-inch hot-swap PCIe 4.0 NVMe SSDs (operate at PCIe 3.0 speeds in this server)

Part number	Feature	Description	Maximum supported
2.5-inch SSDs - PCIe 4.0 NVMe - Mainstream (3-5 DWPD)			
4XB7A17152	BCFV	ThinkSystem U.2 Intel P5600 1.6TB Mainstream NVMe PCIe 4.0 x4 Hot Swap SSD	12
4XB7A17153	BCFR	ThinkSystem U.2 Intel P5600 3.2TB Mainstream NVMe PCIe 4.0 x4 Hot Swap SSD	12
4XB7A17154	BCFS	ThinkSystem U.2 Intel P5600 6.4TB Mainstream NVMe PCIe 4.0 x4 Hot Swap SSD	12
4XB7A64175	BE03	ThinkSystem U.3 Kioxia CM6-V 800GB Mainstream NVMe PCIe 4.0 x4 Hot Swap SSD	12
4XB7A17112	B96Z	ThinkSystem U.3 Kioxia CM6-V 1.6TB Mainstream NVMe PCIe.4.0 x4 Hot Swap SSD	12
4XB7A17113	B96T	ThinkSystem U.3 Kioxia CM6-V 3.2TB Mainstream NVMe PCIe.4.0 x4 Hot Swap SSD	12
4XB7A17114	B96P	ThinkSystem U.3 Kioxia CM6-V 6.4TB Mainstream NVMe PCIe.4.0 x4 Hot Swap SSD	12
2.5-inch SSDs - PCIe 4.0 NVMe - Entry (<3 DWPD)			
4XB7A17145	BCFT	ThinkSystem U.2 Intel P5500 1.92TB Entry NVMe PCIe 4.0 x4 Hot Swap SSD	12
4XB7A17146	BCFW	ThinkSystem U.2 Intel P5500 3.84TB Entry NVMe PCIe 4.0 x4 Hot Swap SSD	12
4XB7A17147	BCFU	ThinkSystem U.2 Intel P5500 7.68TB Entry NVMe PCIe 4.0 x4 Hot Swap SSD	12

Table 24. 2.5-inch hot-swap PCIe 3.0 NVMe SSDs

Part number	Feature	Description	Maximum supported
2.5-inch SSDs - PCIe 3.0 NVMe - Performance (10+ DWPD)			
7N47A00081	AUMJ	ThinkSystem U.2 Intel Optane P4800X 375GB Performance NVMe PCIe 3.0 x4 Hot Swap SSD	12
7N47A00083	B2ZJ	ThinkSystem U.2 Intel Optane P4800X 750GB Performance NVMe PCIe 3.0 x4 Hot Swap SSD	12
2.5-inch SSDs - PCIe 3.0 NVMe - Mainstream (3-5 DWPD)			
4XB7A13936	B589	ThinkSystem U.2 Intel P4610 1.6TB Mainstream NVMe PCIe3.0 x4 Hot Swap SSD	12
4XB7A13937	B58A	ThinkSystem U.2 Intel P4610 3.2TB Mainstream NVMe PCIe3.0 x4 Hot Swap SSD	12
4XB7A13938	B58B	ThinkSystem U.2 Intel P4610 6.4TB Mainstream NVMe PCIe3.0 x4 Hot Swap SSD	12
4XB7A08516	B21W	ThinkSystem U.2 Toshiba CM5-V 800GB Mainstream NVMe PCIe 3.0 x4 Hot Swap SSD	12
4XB7A08517	B21X	ThinkSystem U.2 Toshiba CM5-V 1.6TB Mainstream NVMe PCIe 3.0 x4 Hot Swap SSD	12
4XB7A08518	B21Y	ThinkSystem U.2 Toshiba CM5-V 3.2TB Mainstream NVMe PCIe 3.0 x4 Hot Swap SSD	12
4XB7A08519	B2XJ	ThinkSystem U.2 Toshiba CM5-V 6.4TB Mainstream NVMe PCIe 3.0 x4 Hot Swap SSD	12
2.5-inch SSDs - PCIe 3.0 NVMe - Entry (<3 DWPD)			
4XB7A10202	B58F	ThinkSystem U.2 Intel P4510 1.0TB Entry NVMe PCIe3.0 x4 Hot Swap SSD	12
4XB7A10204	B58G	ThinkSystem U.2 Intel P4510 2.0TB Entry NVMe PCIe3.0 x4 Hot Swap SSD	12
4XB7A10205	B58H	ThinkSystem U.2 Intel P4510 4.0TB Entry NVMe PCIe3.0 x4 Hot Swap SSD	12
4XB7A08513	B58J	ThinkSystem U.2 Intel P4510 8.0TB Entry NVMe PCIe3.0 x4 Hot Swap SSD	12
4XB7A10175	B34N	ThinkSystem U.2 PM983 1.92TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	12
4XB7A10176	B34P	ThinkSystem U.2 PM983 3.84TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	12
4XB7A10177	B4D3	ThinkSystem U.2 PM983 7.68TB Entry NVMe PCIe3.0 x4 Hot Swap SSD	12
7SD7A05777	B11E	ThinkSystem U.2 Intel P4500 4.0TB Entry NVMe PCIe3.0 x4 Hot Swap SSD	12

Note: NVMe PCIe SSDs support surprise hot removal and hot insertion, provided the operating system supports PCIe SSD hot-swap.

Table 25. M.2 SATA drives

Part number	Feature	Description	Maximum supported
M.2 SSDs - 6 Gb SATA - Entry (<3 DWPD)			
7N47A00129	AUUL	ThinkSystem M.2 32GB SATA 6Gbps Non-Hot Swap SSD	2
7N47A00130	AUUV	ThinkSystem M.2 128GB SATA 6Gbps Non-Hot Swap SSD	2
7SD7A05703	B11V	ThinkSystem M.2 5100 480GB SATA 6Gbps Non-Hot Swap SSD	2
4XB7A17071	B8HS	ThinkSystem M.2 5300 240GB SATA 6Gbps Non-Hot Swap SSD	2
4XB7A17073	B919	ThinkSystem M.2 5300 480GB SATA 6Gbps Non-Hot Swap SSD	2

Internal backup units

The server does not support any internal backup units.

Optical drives

The server supports the external USB optical drive listed in the following table.

Table 26. External optical drive

Part number	Feature code	Description
7XA7A05926	AVV8	ThinkSystem External USB DVD RW Optical Disk Drive

The drive is based on the Lenovo Slim DVD Burner DB65 drive and supports the following formats: DVD-RAM, DVD-RW, DVD+RW, DVD+R, DVD-R, DVD-ROM, CD-RW, CD-R, CD-ROM.

I/O expansion options

The server supports the following PCIe slots, depending on the server configuration selected:

- Slots 1-17 are PCIe 3.0 slots accessible from the rear of the server
- One internal dedicated M.2 slot for an M.2 adapter located internally on the I/O tray
- Two internal dedicated PCIe 3.0 x8 slots for storage adapters, located internally in each compute tray or storage tray

The following figure shows the locations of the slots at the rear of the server.

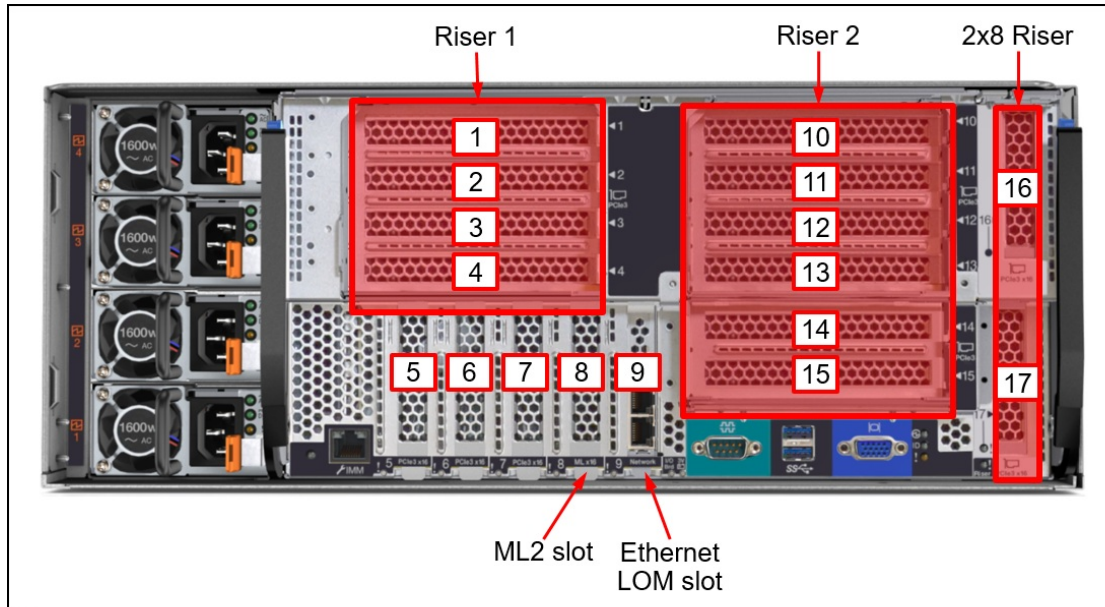


Figure 18. PCIe 3.0 slots at the rear of the server

The 17 PCIe 3.0 rear-accessible slots are as follows:

- Slots 1-4 are via Riser Slot 1, one riser card of:
 - Riser with 4x PCIe 3.0 x16 slots, all full-height half-length, all 75W
 - Riser with 2x PCIe 3.0 x16 slots, all full-height half-length, both 75W
 - Riser with 4x PCIe 3.0 x8 slots, full-height half-length, all 75W
- Slot 5: PCIe 3.0 x16, low profile, 75W
- Slot 6: PCIe 3.0 x16, low profile, 75W
- Slot 7: PCIe 3.0 x8, low profile, 75W
- Slot 8: PCIe 3.0 x16 ML2, low profile (supports NC-SI)
- Slot 9: PCIe 3.0 x8 LOM adapter slot, low profile (supports NC-SI)
- Slots 10-15 are via Riser Slot 2, one riser card of:
 - Riser 5x16+ML2
 - Five PCIe 3.0 x16 slots, all full-height half-length, all 75W
 - One PCIe 3.0 x16 ML2 slot, full-height half-length, 30W (no NC-SI support)
 - Riser 2x16: Two PCIe 3.0 x16 slots, all full-height half-length, both 75W
 - Riser 4x8: Four PCIe 3.0 x8 slots, full-height half-length, all 75W
- Slot 16-17 on a riser:
 - PCIe 3.0 x8 low profile, 75W
 - PCIe 3.0 x8 low profile, 75W

Additional internal PCIe slots:

- One or two PCIe 3.0 x8 slots for storage adapters, one in each compute tray
- M.2 adapter slot

NC-SI (Network Controller Sideband Interface or NCSI) support means the primary port on the adapter installed in that slot can be configured as shared between XCC out-of-band management traffic and production Ethernet traffic.

For riser slots 1 and 2, the server supports the following three riser cards. These are shown in the figure below.

- Riser 5x16+ML2:
 - Five PCIe 3.0 x16 slots, all full-height half-length, all 75W
 - One PCIe 3.0 x16 ML2 slot, full-height half-length, 30W (no NC-SI support)

Note: When the 5x16+ML2 riser is installed in riser slot 1, the bottom two slots (including the ML2) are not accessible and cannot be used.
- Riser 2x16: Two PCIe 3.0 x16 slots, all full-height half-length, both 75W
- Riser 4x8: Four PCIe 3.0 x8 slots, full-height half-length, all 75W

Note: The ML2 slot on the riser card does not support NC-SI.

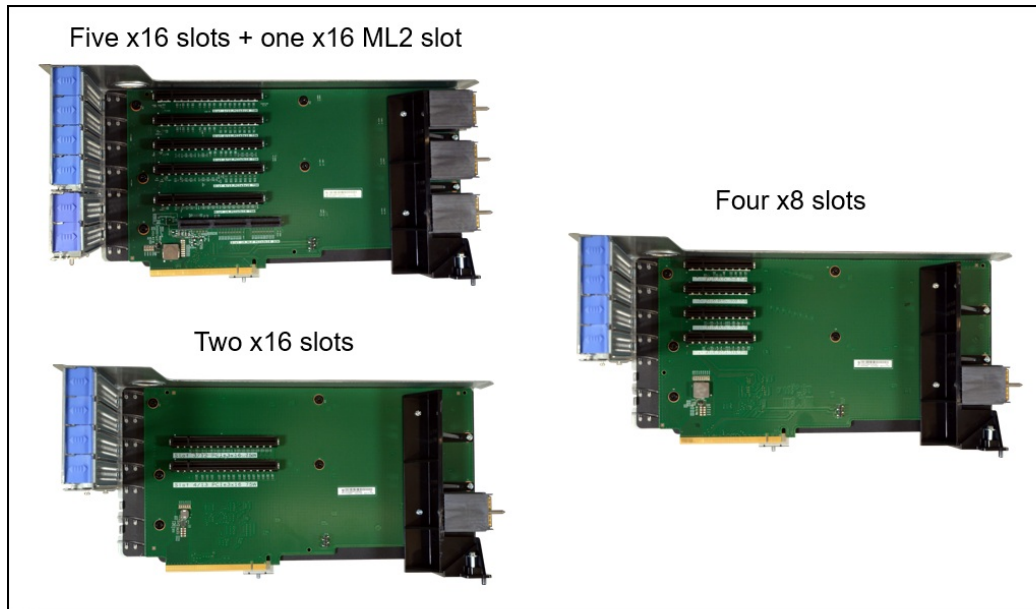


Figure 19. Riser cards for riser slots 1 and 2

Slot numbering is as follows:

- When installed in riser slot 1:
 - Riser 5x16+ML2 becomes slots 1-4 (bottom two slots inaccessible)
 - Riser 2x16 becomes slots 3-4
 - Riser 4x8 becomes slots 1-4
- When installed in riser slot 2:
 - Riser 5x16+ML2 becomes slots 10-15
 - Riser 2x16 becomes slots 12-13
 - Riser 4x8 becomes slots 10-13

Note: When the 5x16+ML2 riser card is used in Riser slot 1, only the top 4 slots (all x16) are accessible. The lower x16 and x16 ML2 slots cannot be physically be accessed or used.

Slots 16 and 17 are mounted on a single 2x8 riser card and are as follows:

- Slot 16: PCIe 3.0 x8, full-height half-length, 75W
- Slot 17: PCIe 3.0 x8, full-height half-length, 75W

The 2x8 riser card is shown below.

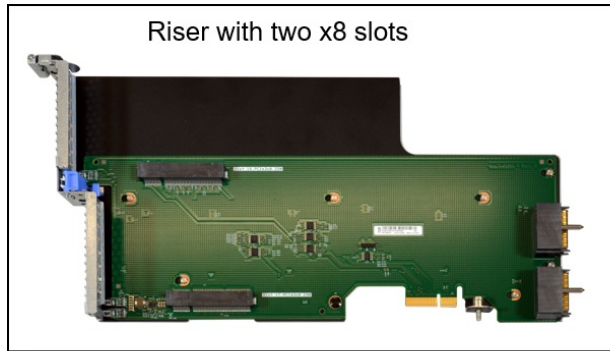


Figure 20. 2x8 riser card

Ordering information for the riser cards is listed in the following table.

Table 27. Riser card ordering information

Part number	Feature code	Description
Riser cards for riser slots 1 and 2		
7XC7A03963	AUN3	ThinkSystem SR950 up to (5) x16 + x16 ML2 PCIe Riser
7XC7A03961	AUN1	ThinkSystem SR950 (2) x16 PCIe Riser
7XC7A03962	AUN2	ThinkSystem SR950 (4) x8 PCIe Riser
Riser card for 2x8 riser slot		
7XC7A03964	AUN4	ThinkSystem SR950 (2) x8 PCIe Riser

Slot availability by server configuration

The riser cards required for each server configuration are listed in the following table. See the [Server configurations](#) section for details.

Table 28. Riser card requirements

Riser	4S Performance	4S Performance/ Storage Rich	4S Upgradeable	4S Upgradeable/ Storage Rich	8S Storage Rich
Riser 1	4x8 or 2x16	4x8 or 2x16	4x8 or 2x16	5x16+ML2*	5x16+ML2*
Riser 2	4x8 or 2x16	4x8 or 2x16	4x8 or 2x16	5x16+ML2*	5x16+ML2*
2x8 Riser	2x8	None	2x8	2x8	2x8

* If desired, the 4x8 or 2x16 riser cards can be used instead of the 5x16+ML2 riser, with reduced slot availability

Based on these riser card requirements, the available slots for each server configuration are highlighted with a grey background in the following table. The table also lists the processor that each PCIe slot is connected to, based on the server configuration selected. In the table, NC means not connected.

Processor numbering is shown in [Figure 7](#).

Table 29. Processor connectivity for PCIe slots (NC = not connected)

Configuration	Slot location	4S Performance	4S Performance/ Storage Rich	4S Upgradable	4S Upgradable/ Storage Rich	8S Storage Rich
Processors installed		2 (1,2) or 3 (1,2,4) or 4 (1,2,3,4)	2 (1,2) or 3 (1,2,4) or 4 (1,2,3,4)	2 (1,2) or 4 (1,2,3,4)	4 (1,2,5,6)	6 (1,2,3,4,5,7) or 8 (1-8)
Slot 1	Riser 1	4** (NC for 2x16)*	4** (NC for 2x16)*	4** (NC for 2x16)*	NC	8**
Slot 2		4** (NC for 2x16)*	4** (NC for 2x16)*	4** (NC for 2x16)*	NC	8**
Slot 3		4**	4**	4**	6	6**
Slot 4		4**	4**	4**	6	6**
Slot 5	I/O Tray	2	2	2	2	2
Slot 6	I/O Tray	2	2	2	2	2
Slot 7	I/O Tray	1	1	1	1	1
Slot 8 (ML2)	I/O Tray	1	1	1	1	1
Slot 9 (LOM)	I/O Tray	1 (PCH)	1 (PCH)	1 (PCH)	1 (PCH)	1 (PCH)
Slot 10	Riser 2	3**	3**	3**	NC	7
Slot 11		3**	3**	3**	NC	7
Slot 12		3**	3**	3**	5	5
Slot 13		3**	3**	3**	5	5
Slot 14		NC	NC	NC	NC	3
Slot 15 (ML2)		NC	NC	NC	NC	3
Slot 16	2x8 Riser	3**	NC	3**	NC	3
Slot 17		1	NC	1	1	1
M.2 slot	I/O Tray	1 (PCH)	1 (PCH)	1 (PCH)	1 (PCH)	1 (PCH)
Storage adapter slot	Upper tray	NC	1	NC	5	5
Storage adapter slot	Lower tray	1	1	1	1	1

* Slots 1 and 2 are not connected if the 2x16 riser card is used in riser slot 1

** In 2, 3 and 6 processor configurations, the following slots are not available:

- In 2-processor configurations, processors 3 and 4 are not installed; this means slots 1-4, slots 10-13, and slot 16 are not connected
- In 3-processor configurations, processor 3 is not installed; this means slots 10-13, and slot 16 are not connected
- In 6-processor configurations, processors 6 & 8 are not installed; this means slots 1-4 are not connected

Network adapters

The SR950 has an integrated 10Gb Ethernet controller, based on the Intel Ethernet Connection X722. The X722 has the following features:

- Integrated into the Intel PCH chipset
- Supports 1GbE or 10GbE connections, depending on the selected LOM Phy adapter
- Offers VXLAN/NVGRE hardware offloads
- Supports VMDq and SR-IOV for advanced virtualization
- Supports iWarp RDMA

To provide connectivity to the X722, the SR950 supports six different LOM (LAN on Motherboard) cards which provide the Ethernet PHY function. Only 1 LOM card can be installed. See [Figure 3](#) for the location of the LOM slot.

The LOM card supports NC-SI to allow the network connection to be shared between the operating system and the XClarity Controller (XCC) management module. The LOM also supports Wake-on-LAN (WOL).

For more information about the X722 controller, see the Lenovo Press product guide: <http://lenovopress.com/lp0654-intel-x722-integrated-controller>

The following table lists the supported LOM cards.

Note: None of the LOM cards listed in the table support speeds lower than 1 Gbps.

Table 30. Supported LOM adapters

Part number	Feature code	Description	Ports	Slots supported	Maximum supported
Gigabit Ethernet					
7ZT7A00544	AUKG	ThinkSystem 1Gb 2-port RJ45 LOM	2x RJ45	9	1
7ZT7A00545	AUKH	ThinkSystem 1Gb 4-port RJ45 LOM	4x RJ45	9	1
10 Gb Ethernet					
7ZT7A00546	AUKJ	ThinkSystem 10Gb 2-port SFP+ LOM	2x SFP+ bays	9	1
7ZT7A00547	AUKK	ThinkSystem 10Gb 4-port SFP+ LOM	4x SFP+ bays	9	1
7ZT7A00548	AUKL	ThinkSystem 10Gb 2-port Base-T LOM	2x RJ45 (10GBASE-T)	9	1
7ZT7A00549	AUKM	ThinkSystem 10Gb 4-port Base-T LOM	4x RJ45 (10GBASE-T)	9	1

The SR950 also support one ML2 card for 4-socket configurations (slot 8). For 8-socket servers using the 5x16 ML2 riser, the server has two ML2 slots - slot 8 and slot 15. See the [I/O expansion options section](#) for details.

The ML2 card in slot 8 supports NC-SI however the ML2 card in slot 15 does not support NC-SI.

The following table lists the supported ML2 adapters.

Table 31. Supported ML2 adapters

Part number	Feature code	Description	Bus width	Slots supported	Maximum supported†
Gigabit Ethernet					
7ZT7A00536	AUKW	ThinkSystem Intel I350-T4 ML2 1Gb 4-Port RJ45 Ethernet Adapter	PCIe 3.0 x8	8, 15	1 / 2
10 Gb Ethernet					
00JY940	ATRH	Intel X710-DA2 ML2 2x10GbE SFP+ Adapter	PCIe 3.0 x8	8, 15	1 / 2
7ZT7A00497	AUKQ	ThinkSystem Broadcom 57416 10GBASE-T 2-Port ML2 Ethernet Adapter	PCIe 3.0 x8	8, 15	1 / 2
00AG560*	AT7U	Emulex VFA5.2 ML2 Dual Port 10GbE SFP+ Adapter	PCIe 3.0 x8	8, 15	1 / 2
01CV770	AU7Z	Emulex VFA5.2 ML2 2x10 GbE SFP+ Adapter and FCoE/iSCSI SW	PCIe 3.0 x8	8, 15	1 / 2
25 Gb Ethernet					
7ZT7A00507	AUKU	ThinkSystem Mellanox ConnectX-4 Lx 10/25GbE SFP28 2-Port ML2 Ethernet Adapter	PCIe 3.0 x8	8, 15	1 / 2
00MN990	ATZR	Mellanox ConnectX-4 Lx 10/25GbE SFP28 1-port ML2 Adapter	PCIe 3.0 x8	8, 15	1 / 2
InfiniBand					
7ZT7A00501	AUKR	ThinkSystem Mellanox ConnectX-3 Pro ML2 FDR 2-Port QSFP VPI Adapter	PCIe 3.0 x8	8, 15	1 / 2

* ThinkSystem servers do not support Features on Demand, so the Emulex VFA5.2 ML2 Dual Port 10GbE SFP+ Adapter, 00AG560, cannot be upgraded to FCoE support. If you need FCoE or iSCSI support, use 01CV770 instead.

† Two ML2 adapters are supported with an 8-socket configuration if the 5x16+ML2 riser is installed in riser slot 2.

The following table lists additional supported network adapters that can be installed in the regular PCIe slots.

Table 32. Supported PCIe Network Adapters

Part number	Feature code	Description	Slots supported	Maximum supported
Gigabit Ethernet				
7ZT7A00482	AUZX	ThinkSystem Broadcom 5720 1GbE RJ45 2-Port PCIe Ethernet Adapter	1-7, 10-14, 16-17	14
7ZT7A00484	AUZV	ThinkSystem Broadcom 5719 1GbE RJ45 4-Port PCIe Ethernet Adapter	1-7, 10-14, 16-17	14
7ZT7A00533	AUZZ	ThinkSystem I350-F1 PCIe 1Gb 1-Port SFP Ethernet Adapter	1-7, 10-14, 16-17	14
7ZT7A00534	AUZY	ThinkSystem I350-T2 PCIe 1Gb 2-Port RJ45 Ethernet Adapter	1-7, 10-14, 16-17	14
7ZT7A00535	AUZW	ThinkSystem I350-T4 PCIe 1Gb 4-Port RJ45 Ethernet Adapter	1-7, 10-14, 16-17	14
10 Gb Ethernet - 10GBase-T				
7ZT7A00496	AUKP	ThinkSystem Broadcom 57416 10GBASE-T 2-Port PCIe Ethernet Adapter	1-7, 10-14, 16-17	14

Part number	Feature code	Description	Slots supported	Maximum supported
00MM860	ATPX	Intel X550-T2 Dual Port 10GBase-T Adapter	1-7, 10-14, 16-17	14
4XC7A08225	B31G	ThinkSystem QLogic QL41134 PCIe 10Gb 4-Port Base-T Ethernet Adapter	1-7, 10-14, 16-17	14
10 Gb Ethernet - SFP+				
7ZT7A00537	AUKX	ThinkSystem X710-DA2 PCIe 10Gb 2-Port SFP+ Ethernet Adapter	1-7, 10-14, 16-17	14
7ZT7A00493	AUKN	ThinkSystem Emulex OCe14104B-NX PCIe 10Gb 4-Port SFP+ Ethernet Adapter	1-4, 10-14	9
00AG570*	AT7S	Emulex VFA5.2 2x10 GbE SFP+ PCIe Adapter	1-7, 10-14, 16-17	14
00AG580	AT7T	Emulex VFA5.2 2x10 GbE SFP+ Adapter and FCoE/iSCSI SW	1-7, 10-14, 16-17	14
25 Gb Ethernet				
4XC7A08228	B21R	ThinkSystem QLogic QL41262 10/25GbE SFP28 2-Port PCIe Ethernet Adapter	1-7, 10-14, 16-17	14
7XC7A05523	B0WY	ThinkSystem Intel XXV710-DA2 10/25GbE SFP28 2-Port PCIe Ethernet Adapter	1-7, 10-14, 16-17	14
7ZT7A00505	AUKS	ThinkSystem Broadcom 57412 25GbE SFP28 1-Port PCIe Ethernet Adapter	1-7, 10-14, 16-17	14
4XC7A08238	B5T0	ThinkSystem Broadcom 57414 10/25GbE SFP28 2-port PCIe Ethernet Adapter	1-7, 10-14, 16-17	14
01GR250	AUAJ	Mellanox ConnectX-4 Lx 10/25GbE SFP28 2-port PCIe Ethernet Adapter	1-7, 10-14, 16-17	14
4XC7A08229	B31C	ThinkSystem Mellanox ConnectX-5 Ex 25/40GbE 2-port Low-Latency Adapter	1-6, 10-14	11
4XC7A16683	B5XZ	ThinkSystem Mellanox Innova-2 ConnectX-5 FPGA 25GbE 2-port Adapter	1-6, 10-14	11
40 Gb Ethernet				
00MM950	ATRN	Mellanox ConnectX-4 Lx 1x40GbE QSFP+ Adapter	1-7, 10-14, 16-17	14
4XC7A08229	B31C	ThinkSystem Mellanox ConnectX-5 Ex 25/40GbE 2-port Low-Latency Adapter	1-6, 10-14	11
100 Gb Ethernet				
00KH924	ASWQ	Mellanox ConnectX-4 1x100GbE/EDR IB QSFP28 VPI Adapter	1-6, 10-14	11
00MM960	ATRP	Mellanox ConnectX-4 2x100GbE/EDR IB QSFP28 VPI Adapter	1-6, 10-14	11
InfiniBand				
7ZT7A00500	AUVG	ThinkSystem Mellanox ConnectX-4 PCIe FDR 2-Port QSFP VPI Adapter	1-7, 10-14, 16-17	14
4C57A14177	B4R9	ThinkSystem Mellanox ConnectX-6 HDR100 QSFP56 1-port PCIe InfiniBand Adapter	1-7, 10-14, 16-17	14
4C57A14178	B4RA	ThinkSystem Mellanox ConnectX-6 HDR100 QSFP56 2-port PCIe InfiniBand Adapter	1-7, 10-14, 16-17	14

Part number	Feature code	Description	Slots supported	Maximum supported
4C57A15326	B4RC	ThinkSystem Mellanox ConnectX-6 HDR QSFP56 1-port PCIe 4 InfiniBand Adapter	3, 4	1
4C57A14179	B4RB	ThinkSystem Mellanox HDR/200GbE 2x PCIe Aux Kit (installs with 4C57A15326 to provide the additional PCIe 3.0 x16 needed for HDR)	1-6, 13, 14	1
Omni-Path Architecture				
00WE023	AU0A	Intel OPA 100 Series Single-port PCIe 3.0 x8 HFA	1-7, 10-14, 16-17	14
00WE027	AU0B	Intel OPA 100 Series Single-port PCIe 3.0 x16 HFA	1-6, 10-14	11

* ThinkSystem servers do not support Features on Demand, so the Emulex VFA5.2 2x10 GbE SFP+ PCIe Adapter, 00AG570, cannot be upgraded to FCoE support. If you need FCoE or iSCSI support, use 00AG580 instead.

For more information, including the transceivers and cables that each adapter supports, see the list of Lenovo Press Product Guides in the Networking adapters category:
<https://lenovopress.com/servers/options/ethernet>

Fibre Channel host bus adapters

The following table lists the Fibre Channel HBAs supported by SR950.

Table 33. Fibre Channel HBAs

Part number	Feature code	Description	Slots supported	Maximum supported
32 Gb Fibre Channel HBAs				
4XC7A08250	B5SX	ThinkSystem Emulex LPe35000 32Gb 1-port PCIe Fibre Channel Adapter	1-7, 10-14, 16-17	14
4XC7A08251	B5SY	ThinkSystem Emulex LPe35002 32Gb 2-port PCIe Fibre Channel Adapter	1-7, 10-14, 16-17	14
7ZT7A00516	AUNS	ThinkSystem QLogic QLE2740 PCIe 32Gb 1-Port SFP+ Fibre Channel Adapter	1-7, 10-14, 16-17	14
7ZT7A00518	AUNU	ThinkSystem QLogic QLE2742 PCIe 32Gb 2-Port SFP+ Fibre Channel Adapter	1-7, 10-14, 16-17	14
7ZT7A00519	AUNV	ThinkSystem Emulex LPe32002-M2-L PCIe 32Gb 2-Port SFP+ Fibre Channel Adapter	1-7, 10-14, 16-17	14
7ZT7A00517	AUNT	ThinkSystem Emulex LPe32000-M2-L PCIe 32Gb 1-Port SFP+ Fibre Channel Adapter	1-7, 10-14, 16-17	14
16 Gb Fibre Channel HBAs				
01CV750	ATZB	QLogic 16Gb Enhanced Gen5 FC Single-port HBA	1-7, 10-14, 16-17	14
01CV760	ATZC	QLogic 16Gb Enhanced Gen5 FC Dual-port HBA	1-7, 10-14, 16-17	14
01CV830	ATZU	Emulex 16Gb Gen6 FC Single-port HBA	1-7, 10-14, 16-17	14
01CV840	ATZV	Emulex 16Gb Gen6 FC Dual-port HBA	1-7, 10-14, 16-17	14

For more information, see the list of Lenovo Press Product Guides in the Host bus adapters category:
<https://lenovopress.com/servers/options/hba>

SAS adapters for external storage

The following table lists SAS HBAs and RAID adapters supported by SR950 server for use with external storage.

Table 34. Adapters for external storage

Part number	Feature code	Description	Slots supported	Maximum supported
SAS HBAs				
7Y37A01090	AUNR	ThinkSystem 430-8e SAS/SATA 12Gb HBA	1-7, 10-14, 16-17	14
7Y37A01091	AUNN	ThinkSystem 430-16e SAS/SATA 12Gb HBA	1-7, 10-14, 16-17	14
External RAID adapters				
7Y37A01087	AUNQ	ThinkSystem RAID 930-8e 4GB Flash PCIe 12Gb Adapter	1-7, 10-14, 16-17	Four*

* Maximum is 4 adapters because there are only 4 supercap holders in the server, mounted on the side of the two riser cards.

For more information, see the list of Lenovo Press Product Guides in the Host bus adapters and RAID adapters categories:

<https://lenovopress.com/servers/options/hba>

<https://lenovopress.com/servers/options/raid>

The following table compares the specifications of the external SAS HBAs and RAID adapters.

Table 35. Comparison of external storage adapters

Feature	430-8e	430-16e	930-8e
Adapter type	HBA	HBA	External RAID
Part number	7Y37A01090	7Y37A01091	7Y37A01087
Controller chip	LSI SAS3408	LSI SAS3416	LSI SAS3516
Broadcom equivalent	HBA 9400-8e	HBA 9400-16e	MegaRAID 9480-8e
Host interface	PCIe 3.0x8	PCIe 3.0x8	PCIe 3.0x8
Port interface	12 Gb SAS	12 Gb SAS	12 Gb SAS
Number of ports	8	16	8
Port connectors	2x Mini-SAS HD SFF8644	4x Mini-SAS HD SFF8644	2x Mini-SAS HD SFF8644
Drive interface	SAS/SATA	SAS/SATA	SAS,SATA
Drive type	HDD/SSD/SED*	HDD/SSD/SED*	HDD,SED,SSD
Hot-swap drives	Yes	Yes	Yes
Maximum devices	512 (planned: 1024)	512 (planned: 1024)	64 (planned: 216)
RAID levels	None	None	0/1/10/5/50/6/60
JBOD mode	Yes	Yes	Yes
Cache	None	None	4GB (Standard)
CacheVault cache protection	None	None	Yes (Flash)
Performance Accelerator (FastPath)	No	No	Yes
SSD Caching (CacheCade Pro 2.0)	No	No	No
SED support*	Yes	Yes	Yes

* SED support of the SAS HBAs is by using software on the server (SED commands are passed through the HBA to the drives). SED support by RAID controllers is provided using the built-in MegaRAID SafeStore functionality of the adapter.

Flash storage adapters

The server supports the PCIe Flash Storage adapters listed in the following table.

Table 36. Flash Storage adapters

Part number	Feature code	Description	Slots supported	Maximum supported
Mainstream NVMe PCIe Adapters - Optimized for mixed-intensive application workloads with an endurance of 3-5 DWPD.				
4XB7A14075	B8JH	ThinkSystem HHHH PM1735 1.6TB Mainstream NVMe PCIe4.0 x4 Flash Adapter	1-7, 10-14, 16-17	14
4XB7A14076	B8HW	ThinkSystem HHHH PM1735 3.2TB Mainstream NVMe PCIe4.0 x4 Flash Adapter	1-7, 10-14, 16-17	14
4XB7A14077	B96M	ThinkSystem HHHH PM1735 6.4TB Mainstream NVMe PCIe4.0 x4 Flash Adapter	1-7, 10-14, 16-17	14
4XB7A38234	BCGJ	ThinkSystem HHHH Kioxia CM5-V 1.6TB Mainstream NVMe PCIe3.0 x4 Flash Adapter	1-7, 10-14, 16-17	14
4XB7A38237	BCGK	ThinkSystem HHHH Kioxia CM5-V 3.2TB Mainstream NVMe PCIe3.0 x4 Flash Adapter	1-7, 10-14, 16-17	14
4XB7A38240	BCGL	ThinkSystem HHHH Kioxia CM5-V 6.4TB Mainstream NVMe PCIe3.0 x4 Flash Adapter	1-7, 10-14, 16-17	14
7SD7A05769	B11X	ThinkSystem HHHH Intel P4600 2.0TB Mainstream NVMe PCIe3.0 x4 Flash Adapter	1-7, 10-14, 16-17	14

For details about these adapters, see the Lenovo Press product guides in the Flash Adapters category: <https://lenovopress.com/servers/options/ssdadapter>

GPU adapters and coprocessors

Full-length adapter cards such as graphics processing units (GPUs) do not physically fit in the server and are not supported.

Cooling

The SR950 uses a set of 60mm hot-swap single-rotor fans for system-wide cooling. Each compute tray or storage tray houses 6 hot-swap fans. The 6 fans in the compute tray are N+1 redundant, meaning that a single fan failure is tolerated in each compute tray.

Fans are located internal to the server immediately in front of the compute system boards, but are accessible from the front of the server by the long handle attached to the fan. As the handle is pulled out, the attached fan rotates from vertical orientation to horizontal orientation, allowing the fan to be removed from the system using the handle, as shown below.

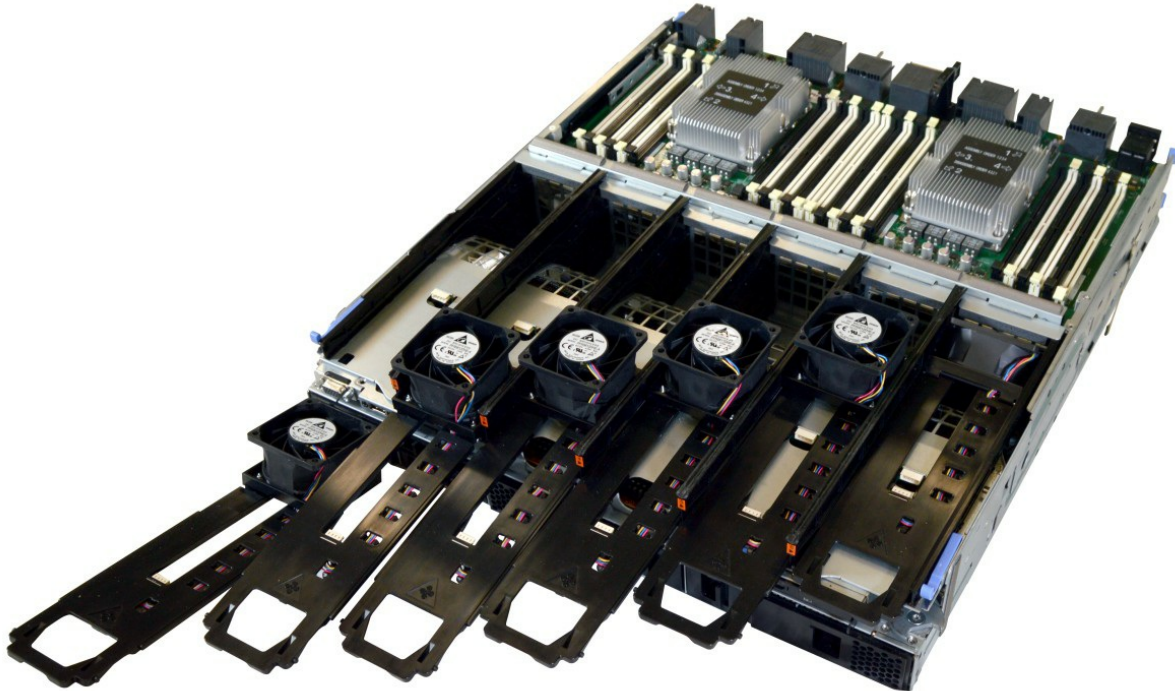


Figure 21. Six fans installed in each compute tray (lower compute tray shown)

Power supplies

The server supports up to four hot-swap power supplies. Power supplies are N+N redundant, which means that if the server has four power supplies installed, then the server can continue operation even with two failed power supplies, or if the utility service that feeds those two power supplies goes offline.

All power supplies installed in a server must have the same capacity (for example all 1600W).

Table 37. Power supply options

Part number	Feature code	Description	Maximum supported	110V AC	220V AC	240V DC China only
7N67A00885	AVNV	1100W Platinum (230V/115V) Power Supply	4	Yes	Yes	Yes
7N67A00886	AUPJ	1600W Platinum Power Supply (200-240VAC only)	4	No	Yes	Yes
7N67A00887	B5KD	2000W Platinum Power Supply (200-240VAC only)	4	No	Yes	No

The 1100W power supply is auto-sensing and supports both 110V AC (100-127V 50/60 Hz) and 220V AC (200-240V 50/60 Hz) power. The 1600 W power supply only supports 220V AC power. 240V DC is not supported.

Note: At 100-127 V AC input, the 1100W power supply is limited to 1050W.

Power supply options do not include a power cord. For models of the SR950, the inclusion of a power cords is model dependent. Configure-to-order models can be configured without a power cord if desired.

Tip: Use Lenovo Capacity Planner to determine exactly what power your server needs:
<https://datacentersupport.lenovo.com/us/en/products/solutions-and-software/software/lenovo-capacity-planner/solutions/ht504651>

Power cords

Line cords and rack power cables with C13 connectors can be ordered as listed in the following table.

110V customers: If you plan to use the ThinkSystem 1100W power supply with a 110V power source, select a power cable that is rated above 10A. Power cables that are rated at 10A or below are not supported with 110V power.

Table 38. Power cords

Part number	Feature code	Description
Rack cables		
00Y3043	A4VP	1.0m, 10A/100-250V, C13 to C14 Jumper Cord
39Y7937	6201	1.5m, 10A/100-250V, C13 to C14 Jumper Cord
4L67A08369	6570	2.0m, 13A/100-250V, C13 to C14 Jumper Cord
4L67A08366	6311	2.8m, 10A/100-250V, C13 to C14 Jumper Cord
4L67A08370	6400	2.8m, 13A/100-250V, C13 to C14 Jumper Cord
39Y7932	6263	4.3m, 10A/100-250V, C13 to C14 Jumper Cord
4L67A08371	6583	4.3m, 13A/100-250V, C13 to C14 Jumper Cord
Line cords		
39Y7930	6222	2.8m, 10A/250V, C13 to IRAM 2073 (Argentina) Line Cord
81Y2384	6492	4.3m, 10A/250V, C13 to IRAM 2073 (Argentina) Line Cord
39Y7924	6211	2.8m, 10A/250V, C13 to AS/NZS 3112 (Australia/NZ) Line Cord
81Y2383	6574	4.3m, 10A/250V, C13 to AS/NZS 3112 (Australia/NZ) Line Cord
69Y1988	6532	2.8m, 10A/250V, C13 to NBR 14136 (Brazil) Line Cord
81Y2387	6404	4.3m, 10A/250V, C13 to NBR 14136 (Brazil) Line Cord
39Y7928	6210	2.8m, 10A/220V, C13 to GB 2099.1 (China) Line Cord
81Y2378	6580	4.3m, 10A/250V, C13 to GB 2099.1 (China) Line Cord
39Y7918	6213	2.8m, 10A/250V, C13 to DK2-5a (Denmark) Line Cord
81Y2382	6575	4.3m, 10A/250V, C13 to DK2-5a (Denmark) Line Cord
39Y7917	6212	2.8m, 10A/250V, C13 to CEE 7/7 (Europe) Line Cord
81Y2376	6572	4.3m, 10A/250V, C13 to CEE 7/7 (Europe) Line Cord
39Y7927	6269	2.8m, 10A/250V, C13 to IS 6538 (India) Line Cord
81Y2386	6567	4.3m, 10A/250V, C13 to IS 6538 (India) Line Cord
39Y7920	6218	2.8m, 10A/250V, C13 to SI 32 (Israel) Line Cord

Part number	Feature code	Description
81Y2381	6579	4.3m, 10A/250V, C13 to SI 32 (Israel) Line Cord
39Y7921	6217	2.8m, 10A/250V, C13 to CEI 23-16 (Italy) Line Cord
81Y2380	6493	4.3m, 10A/250V, C13 to CEI 23-16 (Italy) Line Cord
4L67A08362	6495	4.3m, 12A/200V, C13 to JIS C-8303 (Japan) Line Cord
39Y7922	6214	2.8m, 10A/250V, C13 to SABS 164-1 (South Africa) Line Cord
81Y2379	6576	4.3m, 10A/250V, C13 to SANS 164-1 (South Africa) Line Cord
39Y7926	6335	4.3m, 12A/100V, C13 to JIS C-8303 (Japan) Line Cord
39Y7925	6219	2.8m, 12A/220V, C13 to KSC 8305 (S. Korea) Line Cord
81Y2385	6494	4.3m, 12A/250V, C13 to KSC 8305 (S. Korea) Line Cord
39Y7919	6216	2.8m, 10A/250V, C13 to SEV 1011-S24507 (Swiss) Line Cord
81Y2390	6578	4.3m, 10A/250V, C13 to SEV 1011-S24507 (Swiss) Line Cord
23R7158	6386	2.8m, 10A/125V, C13 to CNS 10917 (Taiwan) Line Cord
81Y2375	6317	2.8m, 10A/250V, C13 to CNS 10917 (Taiwan) Line Cord
81Y2374	6402	2.8m, 13A/125V, C13 to CNS 10917 (Taiwan) Line Cord
4L67A08363	AX8B	4.3m, 10A/125V, C13 to CNS 10917 (Taiwan) Line Cord
81Y2389	6531	4.3m, 10A/250V, C13 to CNS 10917 (Taiwan) Line Cord
81Y2388	6530	4.3m, 13A/125V, C13 to CNS 10917 (Taiwan) Line Cord
39Y7923	6215	2.8m, 10A/250V, C13 to BS 1363/A (UK) Line Cord
81Y2377	6577	4.3m, 10A/250V, C13 to BS 1363/A (UK) Line Cord
90Y3016	6313	2.8M, 10A/125V, C13 to NEMA 5-15P (US) Line Cord
46M2592	A1RF	2.8m, 10A/250V, C13 to NEMA 6-15P (US) Line Cord
00WH545	6401	2.8M, 13A/125V, C13 to NEMA 5-15P (US) Line Cord
4L67A08359	6370	4.3m, 10A/125V, C13 to NEMA 5-15P (US) Line Cord
4L67A08361	6373	4.3m, 10A/250V, C13 to NEMA 6-15P (US) Line Cord
4L67A08360	AX8A	4.3m, 13A/125V, C13 to NEMA 5-15P (US) Line Cord

Integrated virtualization

The server supports booting from an operating system or hypervisor installed on an M.2 solid-state drive. See the [M.2 drives section](#) for details and the list of available options.

You can download supported VMware vSphere hypervisor images from the following web page and load it on the M.2 drive using the instructions provided:

https://vmware.lenovo.com/content/custom_iso/

Systems management

The server contains an integrated service processor, XClarity Controller (XCC), which provides advanced service-processor control, monitoring, and alerting functions. The XCC is based on the Pilot4 XE401 baseboard management controller (BMC) using a dual-core ARM Cortex A9 service processor.

Local management

The SR950 offers the front operator panel showing key LED status indicators, as shown in the following figure.

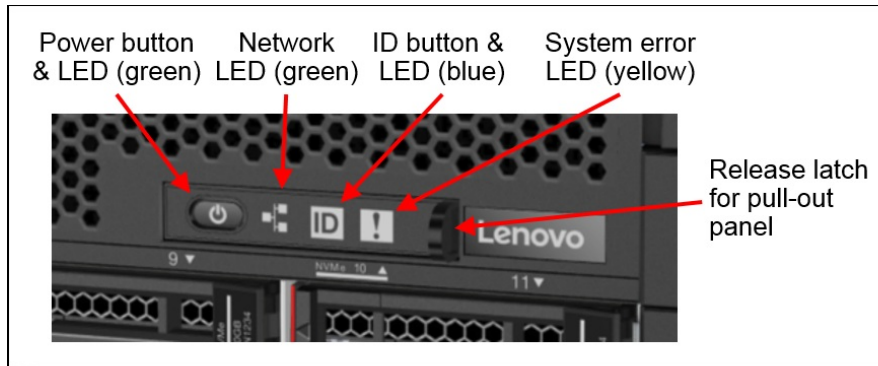


Figure 22. Front operator panel (LCD display panel closed)

The front operator panel pulls out (see the release latch in the above figure) to show an LCD display panel and buttons, as shown in the following figure. The LCD display panel allows quick access to system status, firmware, network, and health information.



Figure 23. LCD display panel

The LCD display and the function buttons give you access to the following information:

- Error messages
- System VPD: machine type & mode, serial number, UUID string
- System firmware levels: UEFI and XCC firmware
- XCC network information: hostname, MAC address, IP address, DNS addresses
- Environmental data: Ambient temperature, CPU temperature, AC input voltage, estimated power consumption
- System reset action

If an environmental condition exceeds a threshold or if a system component fails, XCC illuminates LEDs inside the server to help you diagnose the problem and find the failing part. The SR950 has fault LEDs next to the following components:


- Each processor
- Each memory DIMM
- Each system fan
- Each power supply
- Each rear-facing PCIe slot
- Each drive bay

For local console use, the SR950 has both a front and rear VGA port. Only one can be active at a time. If displays are connected to both VGA ports, the front VGA port takes precedence.

System status with XClarity Mobile

The XClarity Mobile app includes a tethering function where you can connect your Android or iOS device to the server via USB to see the status of the server.

The steps to connect the mobile device are as follows:

1. Enable USB Management on the server, by holding down the ID button for 3 seconds (or pressing the dedicated USB management button if one is present)
2. Connect the mobile device via a USB cable to the server's USB port with the management symbol 
3. In iOS or Android settings, enable Personal Hotspot or USB Tethering
4. Launch the Lenovo XClarity Mobile app

Once connected you can see the following information:

- Server status including error logs (read only, no login required)
- Server management functions (XClarity login credentials required)

Remote management

The server offers a dedicated RJ45 port at the rear of the server for remote management via the XClarity Controller management processor. The port supports 10/100/1000 Mbps speeds.

Remote server management is provided through industry-standard interfaces:

- Intelligent Platform Management Interface (IPMI) Version 2.0
- Simple Network Management Protocol (SNMP) Version 3 (no SET commands; no SMNP v1)
- Common Information Model (CIM-XML)
- Representational State Transfer (REST) support
- Redfish support (DMTF compliant)
- Web browser - HTML 5-based browser interface with NLS support and using a responsive design that is suitable for all devices. Java and ActiveX are not required.

IPMI via the Ethernet port (IPMI over LAN) is supported, however it is disabled by default. For CTO orders you can specify whether you want the feature enabled or disabled in the factory, using the feature codes listed in the following table.

Table 39. IPMI-over-LAN settings

Part number	Feature code	Description
CTO only	B7XZ	Disable IPMI-over-LAN (default)
CTO only	B7Y0	Enable IPMI-over-LAN

A virtual presence (remote control and remote media) capability also comes standard in the server for remote server management.

The remote control functions include the following:

- Remotely viewing video with graphics resolutions up to 1600x1200 at 75 Hz with up to 23 bits per pixel, regardless of the system state

- Remotely accessing the server using the keyboard and mouse from a remote client
- Capturing blue-screen errors
- International keyboard mapping support
- LDAP-based authentication
- Boot Capture
- Remote mounting of ISO and IMG files
- Virtual console collaboration - Ability for up to 6 remote users to be log into the remote session simultaneously
- Power capping
- License for XClarity Energy Manager

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 ThinkSystem servers, in addition to ThinkServer, System x, and Flex System servers. The administration dashboard is based on HTML 5 and allows fast location of resources so tasks can be run quickly.

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, which 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 provides full management function to ThinkSystem servers, including the following:

- Discovery
- Inventory
- Monitoring and alerting
- Call home
- Centralized user management
- Cryptography modes, server certificates, and encapsulation
- Configuration patterns
- Operating system deployment
- Firmware updates

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>

Lenovo XClarity Integrators

Lenovo also offers software plug-in modules, Lenovo XClarity Integrators, to manage physical infrastructure from leading external virtualization management software tools including those from Microsoft and VMware.

These integrators are offered at no charge, however if software support is required, a Lenovo XClarity Pro software subscription license should be ordered.

Lenovo XClarity Integrators offer the following additional features:

- Ability to discover, manage, and monitor Lenovo server hardware from VMware vCenter or Microsoft System Center
- Deployment of firmware updates and configuration patterns to Lenovo x86 rack servers and Flex System from the virtualization management tool
- Non-disruptive server maintenance in clustered environments that reduces workload downtime by dynamically migrating workloads from affected hosts during rolling server updates or reboots
- Greater service level uptime and assurance in clustered environments during unplanned hardware events by dynamically triggering workload migration from impacted hosts when impending hardware failures are predicted

For more information about all the available Lenovo XClarity Integrators, see the Lenovo XClarity Administrator Product Guide: <https://lenovopress.com/tips1200-lenovo-xclarity-administrator>

Lenovo XClarity Essentials

Lenovo offers the following XClarity Essentials software tools that can help you set up, use, and maintain the server at no additional cost:

- **Lenovo Essentials OneCLI**
OneCLI is a collection of server management tools that uses a command line interface program to manage firmware, hardware, and operating systems. It provides functions to collect full system health information (including health status), configure system settings, and update system firmware and drivers.
- **Lenovo Essentials UpdateXpress**
The UpdateXpress tool is a standalone GUI application for firmware and device driver updates that enables you to maintain your server firmware and device drivers up-to-date and help you avoid unnecessary server outages. The tool acquires and deploys individual updates and UpdateXpress System Packs (UXSPs) which are integration-tested bundles.
- **Lenovo Essentials Bootable Media Creator**
The Bootable Media Creator (BOMC) tool is used to create bootable media for offline firmware update.

For more information and downloads, visit the Lenovo XClarity Essentials web page: <http://support.lenovo.com/us/en/documents/LNVO-center>

Lenovo XClarity Energy Manager

Lenovo XClarity Energy Manager is a power and temperature management solution for data centers. It is an agent-free, web-based console that enables you to monitor and manage power consumption and temperature in your data center through the management console. It enables server density and data center capacity to be increased through the use of power capping.

Lenovo XClarity Energy Manager is a licensed product. A single-node XClarity Energy Manager license is included with the XClarity Controller Enterprise (XCC Enterprise) upgrade as described in the [Remote Management](#) section. If your server does not have the XCC Enterprise upgrade, Energy Manager licenses can be ordered as shown in the following table.

Table 40. Lenovo XClarity Energy Manager

Description	Part number
4L40E51621	Lenovo XClarity Energy Manager Node License (1 license needed per server)

For more information about XClarity Energy Manager, see the following resources:

- Lenovo Support page:
<https://datacentersupport.lenovo.com/us/en/solutions/Invo-lxem>
- Lenovo Information Center:
https://sysmgt.lenovofiles.com/help/topic/LXEM/lxem_overview.html?cp=4

Security

The server offers the following security features:

- Administrator and power-on password
- Trusted Platform Module (TPM) supporting both TPM 1.2 and TPM 2.0
- Optional Trusted Cryptographic Module (TCM) or Nationz TPM, available only in China
- Self-encrypting drives with support for IBM Security Key Lifecycle Manager

The plugin TCM and NationZ TPM modules, available only for China customers, are installed in a dedicated socket on the I/O tray, as shown in [Figure 9](#). Ordering information is shown in the following table.

Table 41. Security features

Part number	Feature code	Description
None*	AVKE	ThinkSystem Trusted Cryptographic Module (China customers only)
None*	B22N	ThinkSystem Nationz Trusted Platform Module v2.0

* The component is CTO on pre-configured models only. Not available as a field upgrade.

For SED drives and IBM Security Key Lifecycle Manager support see the [SED encryption key management with ISKLM](#) section.

Rack installation

All models of the SR950 include a rail kit for installation in a 19-inch rack cabinet. The contents of the kits are shown in the following figure.

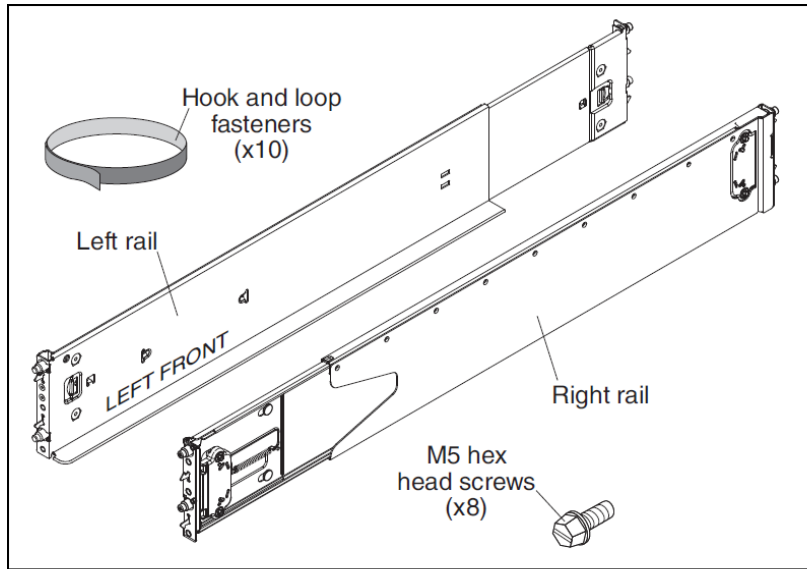


Figure 24. SR950 rail kit

Optionally available is the SR950 shipping bracket kit, which is used when the server is installed in a rack and the complete rack is then shipped to the client.

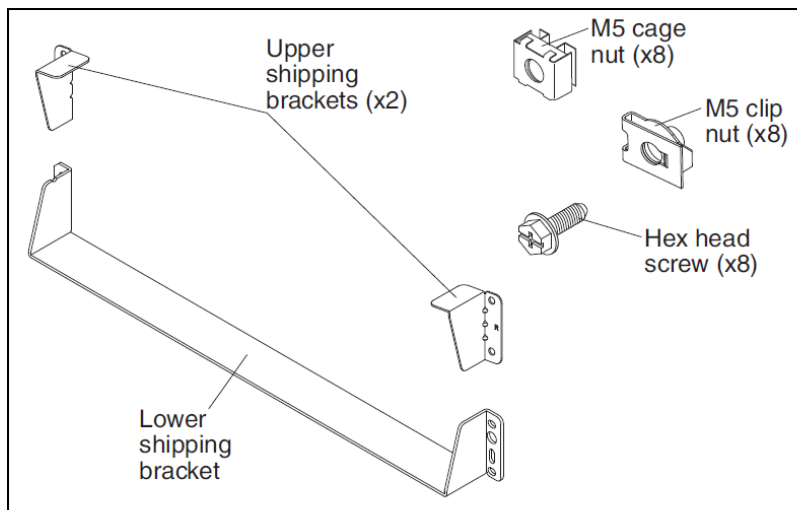


Figure 25. SR950 shipping bracket kit

Table 42. Shipping bracket kit

Part number	Feature code	Description
7XF7A03967	AUL5	ThinkSystem SR950 Shipping Bracket

Operating system support

The SR950 supports the following operating systems:

- Microsoft Windows Server 2012 R2
- Microsoft Windows Server 2016
- Microsoft Windows Server 2019
- Microsoft Windows Server, version 1709

- Microsoft Windows Server, version 1803
- Red Hat Enterprise Linux 6.10 x64
- Red Hat Enterprise Linux 6.9 x64
- Red Hat Enterprise Linux 7.3
- Red Hat Enterprise Linux 7.4
- Red Hat Enterprise Linux 7.5
- Red Hat Enterprise Linux 7.6
- Red Hat Enterprise Linux 7.7
- Red Hat Enterprise Linux 7.8
- Red Hat Enterprise Linux 7.9
- Red Hat Enterprise Linux 8.0
- Red Hat Enterprise Linux 8.1
- Red Hat Enterprise Linux 8.2
- Red Hat Enterprise Linux 8.3
- SUSE Linux Enterprise Server 11 x64 SP4
- SUSE Linux Enterprise Server 12 SP2
- SUSE Linux Enterprise Server 12 SP3
- SUSE Linux Enterprise Server 12 SP4
- SUSE Linux Enterprise Server 12 SP5
- SUSE Linux Enterprise Server 12 Xen SP4
- SUSE Linux Enterprise Server 12 Xen SP5
- SUSE Linux Enterprise Server 15
- SUSE Linux Enterprise Server 15 SP1
- SUSE Linux Enterprise Server 15 SP2
- SUSE Linux Enterprise Server 15 Xen
- SUSE Linux Enterprise Server 15 Xen SP1
- SUSE Linux Enterprise Server 15 Xen SP2
- VMware ESXi 6.0 U3
- VMware ESXi 6.5
- VMware ESXi 6.5 U1
- VMware ESXi 6.5 U2
- VMware ESXi 6.5 U3
- VMware ESXi 6.7
- VMware ESXi 6.7 U1
- VMware ESXi 6.7 U2
- VMware ESXi 6.7 U3
- VMware ESXi 7.0
- VMware ESXi 7.0 U1

Note: Support for RHEL 6.9 on the SR950 is limited to up to 4 processors. Configurations greater than 4 processors are not supported.

For a complete list of supported, certified and tested operating systems, plus additional details and links to relevant web sites, see the Operating System Interoperability Guide:

<https://lenovopress.com/osig#servers=sr950-7x11-7x12-7x13>

For configure-to-order configurations, the server can be preloaded with VMware ESXi installed on M.2 cards. Ordering information is listed in the following table.

Table 43. VMware ESXi preload

Part number	Feature code	Description
CTO only	AXFS	VMware ESXi 6.0 U3 (factory installed)
CTO only	AXFT	VMware ESXi 6.5 U1 (factory installed)
CTO only	B3VW	VMware ESXi 6.5 U2 (Factory Installed)
CTO only	B6U0	VMware ESXi 6.5 U3 (factory installed)
CTO only	B3VX	VMware ESXi 6.7 (Factory Installed)
CTO only	B4XA	VMware ESXi 6.7 U1 (Factory Installed)
CTO only	B6U1	VMware ESXi 6.7 U2 (factory installed)
CTO only	B88T	VMware ESXi 6.7 U3 (factory installed)
CTO only	BBZG	VMware ESXi 7.0 (Factory Installed)
CTO only	BE5E	VMware ESXi 7.0 U1 (Factory Installed)

Physical and electrical specifications

The SR950 has the following overall physical dimensions, excluding components that extend outside the standard chassis, such as EIA flanges, front security bezel (if any), and power supply handles:

- Width: 447 mm (17.6 inches)
- Height: 176 mm (6.9 inches)
- Depth: 851 mm (33.5 inches)

The following table lists the detailed dimensions. See the figure below for the definition of each dimension.

Table 44. Detailed dimensions

Dimension	Description
483 mm	X_a = Width, to the outsides of the front EIA flanges
447 mm	X_b = Width, to the rack rail mating surfaces
447 mm	X_c = Width, to the outer most chassis body feature
176 mm	Y_a = Height, from the bottom of chassis to the top of the chassis
780 mm	Z_a = Depth, from the rack flange mating surface to the rearmost I/O port surface
815 mm	Z_b = Depth, from the rack flange mating surface to the rearmost feature of the chassis body
817 mm	Z_c = Depth, from the rack flange mating surface to the rearmost feature such as power supply handle
36 mm	Z_d = Depth, from the forwardmost feature on front of EIA flange to the rack flange mating surface
46 mm	Z_e = Depth, from the front of security bezel (if applicable) or forwardmost feature to the rack flange mating surface

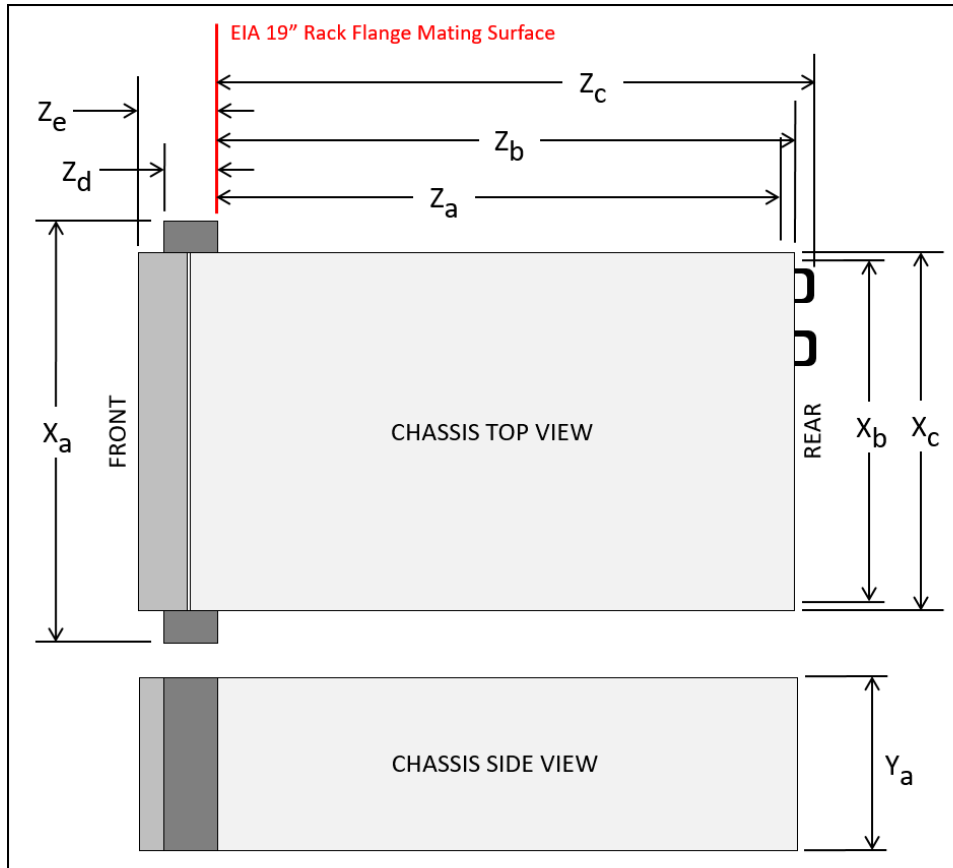


Figure 26. Server dimensions

The shipping dimensions (cardboard packaging) are as follows:

- Width: 610 mm (24.0 inches)
- Height: 557 mm (21.9 inches)
- Depth: 1016 mm (40.0 inches)

The server has the following weight:

- Minimum configuration: 32.6 kg (71.9 lb)
- Maximum configuration: 58.7 kg (129.4 lb)

The server has the following electrical specifications:

- Models with 1600 W AC power supplies:
 - 200 - 240 (nominal) V AC; 50 Hz or 60 Hz; 8.7 A
- Models with 1100 W AC power supplies:
 - 100 - 127 (nominal) V AC; 50 Hz or 60 Hz; 12.0 A
 - 200 - 240 (nominal) V AC; 50 Hz or 60 Hz; 6.2 A

Operating environment

The ThinkSystem SR950 server is designed to ensure thermal compliance to ASHRAE A4 ambient environments, however certain processor models and other components will limit support to only ASHRAE A2 conditions, as shown in the following table. Further, some high-end processors (as indicated with an * in the table) when used in an eight-socket configuration may experience a slight drop in performance under extreme workloads when the ambient temperature is above 30°C.

The following restrictions also apply regarding ASHRAE A3 and A4 support:

- NVMe drives and adapters are supported up to 35°C only

Table 45. ASHRAE support by processor

Processor	ASHRAE A2 support	ASHRAE A3 support	ASHRAE A4 support
Intel Xeon Gold 5115 10C 85W 2.4GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 5117 14C 105W 2.0GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 5118 12C 105W 2.3GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 5119T 14C 85W 1.8GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 5120 14C 105W 2.2GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 5120T 14C 105W 2.2GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 5122 4C 105W 3.6GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 6126 12C 125W 2.6GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 6126T 12C 125W 2.6GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 6128 6C 115W 3.4GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 6130 16C 125W 2.1GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 6130T 16C 125W 2.1GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 6132 14C 140W 2.6GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 6134 8C 130W 3.2GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 6134M 8C 130W 3.2GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 6136 12C 150W 3.0GHz Processor	Yes	No	No
Intel Xeon Gold 6138 20C 125W 2.0GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 6138T 20C 125W 2.0GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 6140 18C 140W 2.3GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 6140M 18C 140W 2.3GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 6142 16C 150W 2.6GHz Processor	Yes	No	No
Intel Xeon Gold 6142M 16C 150W 2.6GHz Processor	Yes	No	No
Intel Xeon Gold 6144 8C 145W 3.5GHz Processor	Yes	No	No
Intel Xeon Gold 6146 12C 165W 3.2GHz Processor	Yes	No	No
Intel Xeon Gold 6148 20C 150W 2.4GHz Processor	Yes	No	No
Intel Xeon Gold 6150 18C 165W 2.7GHz Processor	Yes	No	No
Intel Xeon Gold 6152 22C 140W 2.1GHz Processor	Yes	Yes	Yes
Intel Xeon Gold 6154 18C 200W 3.0GHz Processor	Yes	No	No
Intel Xeon Platinum 8153 16C 125W 2.0GHz Processor	Yes	Yes	Yes
Intel Xeon Platinum 8156 4C 105W 3.6GHz Processor	Yes	Yes	Yes
Intel Xeon Platinum 8158 12C 150W 3.0GHz Processor	Yes	No	No
Intel Xeon Platinum 8160 24C 150W 2.1GHz Processor	Yes	No	No
Intel Xeon Platinum 8160M 24C 150W 2.1GHz Processor	Yes	No	No
Intel Xeon Platinum 8160T 24C 150W 2.1GHz Processor	Yes	No	No
Intel Xeon Platinum 8164 26C 150W 2.0GHz Processor	Yes	No	No
Intel Xeon Platinum 8168 24C 205W 2.7GHz Processor	Yes*	No	No
Intel Xeon Platinum 8170 26C 165W 2.1GHz Processor	Yes	No	No

Processor	ASHRAE A2 support	ASHRAE A3 support	ASHRAE A4 support
Intel Xeon Platinum 8170M 26C 165W 2.1GHz Processor	Yes	No	No
Intel Xeon Platinum 8176 28C 165W 2.1GHz Processor	Yes	No	No
Intel Xeon Platinum 8176M 28C 165W 2.1GHz Processor	Yes	No	No
Intel Xeon Platinum 8180 28C 205W 2.5GHz Processor	Yes*	No	No
Intel Xeon Platinum 8180M 28C 205W 2.5GHz Processor	Yes*	No	No

* These processors when used in an eight-socket configuration may experience a slight drop in performance under extreme workloads when the ambient temperature is above 30°C.

The server is supported operating in the following environments:

- ASHRAE A2:
 - Temperature: 10°C to 35°C
 - Humidity: 8% to 80%
 - Altitude 0-3000 m (10,000 ft), derated 1°C per 300 m above 950 m
- ASHRAE A3:
 - Temperature: 5°C to 40°C
 - Humidity: 8% to 85%
 - Altitude 0-3000 m (10,000 ft), derated 1°C per 175 m above 950 m
- ASHRAE A4:
 - Temperature: 5°C to 45°C
 - Humidity: 8% to 90%
 - Altitude 0-3000 m (10,000 ft), derated 1°C per 125 m above 950 m

Non-operating environment support:

- Without packaging:
 - Temperature: -10 °C to 60 °C
 - Humidity: 8 to 90%
- Storage with packaging:
 - Temperature: -40 °C to 70 °C
 - Humidity: 8 to 90%

The server generates the following heat:

- Thermal/heat output:
 - Minimum configuration: 938 BTU/hr, 275 W
 - Typical configuration: 3412 BTU/hr, 1000 W
 - Full configuration: 21,838 BTU/hr, 6400 W

The server has the following vibration and shock limits:

- Vibration:
 - Operating: 0.21 G rms at 5 Hz to 500 Hz for 15 minutes across 3 axes
 - Non-operating: 1.04 G rms at 2 Hz to 200 Hz for 15 minutes across 6 surfaces
- Shock:
 - Operating: 15 G for 3 milliseconds in each direction (positive and negative X, Y, and Z axes)
 - Non-operating:
 - 12 kg - 22 kg: 50 G for 152 in./sec velocity change across 6 surfaces
 - 23 kg - 31 kg: 35 G for 152 in./sec velocity change across 6 surfaces

Warranty and Support

The ThinkSystem SR950 server has the following choice of warranties:

- Machine type 7X11: 1-year warranty
- Machine type 7X12: 3-year warranty
- Machine type 7X13: 3-year warranty

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

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

- **Premier Support**

Premier Support provides a Lenovo-owned customer experience and delivers direct access to technicians skilled in hardware, software, and advanced troubleshooting, in addition to the following:

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

- **Warranty Upgrade (Preconfigured Support)**

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

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

- **Managed Services**

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

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

- **Technical Account Management (TAM)**

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

- **Enterprise Server Software Support**

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

- **YourDrive YourData**

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

- **Health Check**

Having a trusted partner who can perform regular and detailed health checks is central to maintaining efficiency and ensuring that your systems and business are always running at their best. Health Check supports Lenovo-branded server, storage, and networking devices, as well as select Lenovo-supported products from other vendors that are sold by Lenovo or a Lenovo-Authorized Reseller.

Examples of region-specific warranty terms are second or longer business day parts delivery or parts-only base warranty.

If warranty terms and conditions include onsite labor for repair or replacement of parts, Lenovo will dispatch a service technician to the customer site to perform the replacement. Onsite labor under base warranty is limited to labor for replacement of parts that have been determined to be field-replaceable units (FRUs). Parts that are determined to be customer-replaceable units (CRUs) do not include onsite labor under base warranty.

If warranty terms include parts-only base warranty, Lenovo is responsible for delivering only replacement parts that are under base warranty (including FRUs) that will be sent to a requested location for self-service. Parts-only service does not include a service technician being dispatched onsite. Parts must be changed at customer's own cost and labor and defective parts must be returned following the instructions supplied with the spare parts.

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

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

For service definitions, region-specific details, and service limitations, please refer to the following documents:

- Lenovo Statement of Limited Warranty for Data Center Group (DCG) Servers and System Storage
<http://pcsupport.lenovo.com/us/en/solutions/ht503310>
- Lenovo Data Center Services Agreement
<http://support.lenovo.com/us/en/solutions/ht116628>

Services

Lenovo Services is a dedicated partner to your success. Our goal is to reduce your capital outlays, mitigate your IT risks, and accelerate your time to productivity.

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

- **Asset Recovery Services**

Asset Recovery Services (ARS) helps customers recover the maximum value from their end-of-life equipment in a cost-effective and secure way. On top of simplifying the transition from old to new equipment, ARS mitigates environmental and data security risks associated with data center equipment disposal. Lenovo ARS is a cash-back solution for equipment based on its remaining market value, yielding maximum value from aging assets and lowering total cost of ownership for your customers. For more information, see the ARS page, <https://lenovopress.com/lp1266-reduce-e-waste-and-grow-your-bottom-line-with-lenovo-ars>.

- **Assessment Services**

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

- **Design Services**

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

- **Basic Hardware Installation**

Lenovo experts can seamlessly manage the physical installation of your server, storage, or networking hardware. Working at a time convenient for you (business hours or off shift), the technician will unpack and inspect the systems on your site, install options, mount in a rack cabinet, connect to power and network, check and update firmware to the latest levels, verify operation, and dispose of the packaging, allowing your team to focus on other priorities.

- **Deployment Services**

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

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

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

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

Regulatory compliance

The SR950 server conforms to the following regulations:

- 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
- IEC 62368-1 2014(CB Certificate and CB Test Report)
- NOM-019
- Argentina IEC60950-1
- Japan VCCI, Class A
- Australia/New Zealand AS/NZS CISPR 32, Class A; AS/NZS 60950.1
- China CCC GB4943.1, GB9254 Class A, GB17625.1
- Taiwan BSMI CNS13438, Class A; CNS14336-1 CNS15663
- Korea KN32, Class A; KN35
- Russia, Belorussia and Kazakhstan, TR CU 020/2011 (for EMC) and TR CU 004/2011 (for safety)
- IEC 60950-1 (CB Certificate and CB Test Report)
- CE Mark (EN55032 Class A, EN60950-1, EN55024, EN61000-3-2, EN61000-3-3)
- CISPR 32, Class A
- TUV-GS (EN60950-1, IEC60950-1, EK1-ITB2000)
- RoHS Directive
- Energy Star 2.1
- ErP lot3
- JESL

External drive enclosures

The server supports attachment to external drive enclosures using a RAID controller with external ports or a SAS host bus adapter. Adapters supported by the server are listed in the [SAS adapters for external storage](#) section.

Note: Information provided in this section is for ordering reference purposes only. For the operating system and adapter support details, refer to the interoperability matrix for a particular storage enclosure that can be found on the Lenovo Data Center Support web site:
<http://datacentersupport.lenovo.com>

Table 46. External drive enclosures

Description	Part number		
	Worldwide	Japan	PRC
Lenovo Storage D1212 LFF Disk Expansion with Dual SAS IO Modules	4587A11	4587A1J	4587A1C
Lenovo Storage D1224 SFF Disk Expansion with Dual SAS IO Modules	4587A31	4587A3J	4587A3C
Lenovo Storage D3284 4TB x 84 HD Expansion Enclosure	641311F		
Lenovo Storage D3284 6TB x 84 HD Expansion Enclosure	641312F		
Lenovo Storage D3284 8TB x 84 HD Expansion Enclosure	641313F		
Lenovo Storage D3284 10TB x 84 HD Expansion Enclosure	641314F		

For details about supported drives, adapters, and cables, see the following Lenovo Press Product Guides:

- Lenovo Storage D1212 and D1224
<http://lenovopress.com/lp0512>
- Lenovo Storage D3284
<http://lenovopress.com/lp0513>

External storage systems

Lenovo offers the ThinkSystem DE Series and ThinkSystem DM Series external storage systems for high-performance storage. See the DE Series and DM Series product guides for specific controller models, expansion enclosures and configuration options:

- ThinkSystem DE Series Storage
<https://lenovopress.com/storage/thinksystem/de-series#rt=product-guide>
- ThinkSystem DM Series Storage
<https://lenovopress.com/storage/thinksystem/dm-series#rt=product-guide>

External backup units

The server supports both USB-attached RDX backup units and SAS-attached tape drives.

The following table lists the available external SAS tape backup options.

Tip: Verify the end-to-end support of an IBM tape backup solution through the IBM System Storage Interoperation Center (SSIC): <http://www.ibm.com/systems/support/storage/ssic>

Table 47. External SAS backup options

Part number	Description
External SAS tape backup drives	
6160S6E	IBM TS2260 Tape Drive Model H6S
6160S7E	IBM TS2270 Tape Drive Model H7S
6160S8E	IBM TS2280 Tape Drive Model H8S
External SAS tape backup autoloaders	
6171S6R	IBM TS2900 Tape Autoloader w/LTO6 HH SAS
6171S7R	IBM TS2900 Tape Autoloader w/LTO7 HH SAS
6171S8R	IBM TS2900 Tape Autoloader w/LTO8 HH SAS
External tape backup libraries	
6741A1F	IBM TS4300 3U Tape Library-Base Unit
SAS backup drives for TS4300 Tape Library	
01KP934	LTO 6 HH SAS Drive
01KP937	LTO 7 HH SAS Drive
01KP953	LTO 8 HH SAS Drive

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

The following table lists the external RDX backup options available.

Table 48. External RDX dock and cartridges

Part number	Feature code	Description
External RDX docks		
4T27A10725	B32R	ThinkSystem RDX External USB 3.0 Dock (No cartridge included with the drive)
Cartridges		
7TP7A01601	AVF8	ThinkSystem RDX 500GB Cartridge
7TP7A01602	AVF1	ThinkSystem RDX 1TB Cartridge
7TP7A01603	AVF0	ThinkSystem RDX 2TB Cartridge
7TP7A04318	AXD1	ThinkSystem RDX 4TB Cartridge

For more information, see the Lenovo RDX USB 3.0 Disk Backup Solution product guide:
<https://lenovopress.com/tips0894-rdx-usb-30>

Fibre Channel SAN switches

Lenovo offers the ThinkSystem DB Series of Fibre Channel SAN switches and directors for high-performance storage expansion. See the DB Series product guides for models and configuration options:

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

Uninterruptible power supply units

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

Table 49. Uninterruptible power supply units

Part number	Description
55941AX	RT1.5kVA 2U Rack or Tower UPS (100-125VAC)
55941KX	RT1.5kVA 2U Rack or Tower UPS (200-240VAC)
55942AX	RT2.2kVA 2U Rack or Tower UPS (100-125VAC)
55942KX	RT2.2kVA 2U Rack or Tower UPS (200-240VAC)
55943AX	RT3kVA 2U Rack or Tower UPS (100-125VAC)
55943KX	RT3kVA 2U Rack or Tower UPS (200-240VAC)
55945KX	RT5kVA 3U Rack or Tower UPS (200-240VAC)
55946KX	RT6kVA 3U Rack or Tower UPS (200-240VAC)
55948KX	RT8kVA 6U Rack or Tower UPS (200-240VAC)
55949KX	RT11kVA 6U Rack or Tower UPS (200-240VAC)
55948PX	RT8kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)
55949PX	RT11kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)
55943KT†	ThinkSystem RT3kVA 2U Standard UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets)
55943LT†	ThinkSystem RT3kVA 2U Long Backup UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets)
55946KT†	ThinkSystem RT6kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output)
5594XKT†	ThinkSystem RT10kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output)

† Only available in China and countries in the Asia Pacific region.

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

<https://lenovopress.com/servers/options/ups>

Power distribution units

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

Table 50. 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

Part number	Description
00YJ779	0U 21 C13/12 C19 48A/200-240V 3 Phase PDU with IEC60309 460P9 line cord
Switched and Monitored PDUs	
00YJ780	0U 20 C13/4 C19 Switched and Monitored 32A/200-240V/1Ph PDU w/ IEC60309 332P6 line cord
00YJ781	0U 20 C13/4 C19 Switched and Monitored 24A/200-240V/1Ph PDU w/ NEMA L6-30P line cord
00YJ782	0U 18 C13/6 C19 Switched / Monitored 32A/200-240V/346-415V/3Ph PDU w/ IEC60309 532P6 cord
00YJ783	0U 12 C13/12 C19 Switched and Monitored 48A/200-240V/3Ph PDU w/ IEC60309 460P9 line cord
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
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
40K9618	DPI Korean 8305 Line Cord

* Not available in USA and Canada

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

Rack cabinets

The racks supported by the server are listed in the following table.

Table 51. Rack cabinets

Part number	Description	Maximum supported
Rack cabinets currently available		
9308-4EX	42U Enterprise Expansion Rack	10
9308-4PX	42U Enterprise Rack	10
9360-4PX	42U 1200mm Deep Dynamic Rack	10
9361-4PX	42U 1200mm Deep Static Rack	10
9363-4PX	42U 1100mm Dynamic Rack	10
9363-4EX	42U 1100mm Dynamic Expansion Rack	10
Withdrawn rack cabinets		
9360-4EX	42U 1200mm Deep Dynamic Expansion Rack	10
9361-4EX	42U 1200mm Deep Static Expansion Rack	10
9362-4PX	47U 1200mm Deep Static Rack	11
9362-4EX	47U 1200mm Deep Static Expansion Rack	11
9363-4CX	PureFlex System 42U Rack	10
9363-4DX	PureFlex System 42U Expansion Rack	10

For information about these racks, see the Lenovo Rack Cabinet Reference:

<https://lenovopress.com/lp0658-lenovo-rack-cabinet-reference>

KVM console options

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

Table 52. Console keyboards

Part number	Description
Consoles	
17238BX	1U 18.5" Standard Console (without keyboard)
Console keyboards	
7ZB7A05469	ThinkSystem Keyboard w/ Int. Pointing Device USB - Arabic 253 RoHS v2
7ZB7A05468	ThinkSystem Keyboard w/ Int. Pointing Device USB - Belg/UK 120 RoHS v2
7ZB7A05206	ThinkSystem Keyboard w/ Int. Pointing Device USB - Czech 489 RoHS v2
7ZB7A05207	ThinkSystem Keyboard w/ Int. Pointing Device USB - Danish 159 RoHS v2
7ZB7A05208	ThinkSystem Keyboard w/ Int. Pointing Device USB - Dutch 143 RoHS v2
7ZB7A05210	ThinkSystem Keyboard w/ Int. Pointing Device USB - Fr/Canada 445 RoHS v2
7ZB7A05209	ThinkSystem Keyboard w/ Int. Pointing Device USB - French 189 RoHS v2
7ZB7A05211	ThinkSystem Keyboard w/ Int. Pointing Device USB - German 129 RoHS v2
7ZB7A05212	ThinkSystem Keyboard w/ Int. Pointing Device USB - Greek 219 RoHS v2
7ZB7A05213	ThinkSystem Keyboard w/ Int. Pointing Device USB - Hebrew 212 RoHS v2
7ZB7A05214	ThinkSystem Keyboard w/ Int. Pointing Device USB - Hungarian 208 RoHS v2

Part number	Description
7ZB7A05215	ThinkSystem Keyboard w/ Int. Pointing Device USB - Italian 141 RoHS v2
7ZB7A05216	ThinkSystem Keyboard w/ Int. Pointing Device USB - Japanese 194 RoHS v2
7ZB7A05217	ThinkSystem Keyboard w/ Int. Pointing Device USB - Korean 413 RoHS v2
7ZB7A05218	ThinkSystem Keyboard w/ Int. Pointing Device USB - LA Span 171 RoHS v2
7ZB7A05219	ThinkSystem Keyboard w/ Int. Pointing Device USB - Norwegian 155 RoHS v2
7ZB7A05220	ThinkSystem Keyboard w/ Int. Pointing Device USB - Polish 214 RoHS v2
7ZB7A05221	ThinkSystem Keyboard w/ Int. Pointing Device USB - Portuguese 163 RoHS v2
7ZB7A05222	ThinkSystem Keyboard w/ Int. Pointing Device USB - Russian 441 RoHS v2
7ZB7A05223	ThinkSystem Keyboard w/ Int. Pointing Device USB - Slovak 245 RoHS v2
7ZB7A05231	ThinkSystem Keyboard w/ Int. Pointing Device USB - Slovenian 234 RoHS v2
7ZB7A05224	ThinkSystem Keyboard w/ Int. Pointing Device USB - Spanish 172 RoHS v2
7ZB7A05225	ThinkSystem Keyboard w/ Int. Pointing Device USB - Swed/Finn 153 RoHS v2
7ZB7A05226	ThinkSystem Keyboard w/ Int. Pointing Device USB - Swiss F/G 150 RoHS v2
7ZB7A05227	ThinkSystem Keyboard w/ Int. Pointing Device USB - Thai 191 RoHS v2
7ZB7A05467	ThinkSystem Keyboard w/ Int. Pointing Device USB - Trad Chinese/US 467 RoHS v2
7ZB7A05228	ThinkSystem Keyboard w/ Int. Pointing Device USB - Turkish 179 RoHS v2
7ZB7A05229	ThinkSystem Keyboard w/ Int. Pointing Device USB - UK Eng 166 RoHS v2
7ZB7A05470	ThinkSystem Keyboard w/ Int. Pointing Device USB - US Eng 103P RoHS v2
7ZB7A05230	ThinkSystem Keyboard w/ Int. Pointing Device USB - US Euro 103P RoHS v2
ThinkSystem Digital and Analog KVM Console switches and cables	
1754D1T	ThinkSystem Digital 2x1x16 KVM Switch (DVI video output port)
1754A1T	ThinkSystem Analog 1x8 KVM Switch (DVI video output port)
4X97A11108	ThinkSystem VGA to DVI Conversion Cable
4X97A11109	ThinkSystem Single-USB Conversion Cable for Digital KVM
4X97A11107	ThinkSystem Dual-USB Conversion Cable for Digital KVM
4X97A11106	ThinkSystem USB Conversion Cable for Analog KVM
GCM and LCM Console switches and cables	
1754D2X	Global 4x2x32 Console Manager (GCM32)
1754D1X	Global 2x2x16 Console Manager (GCM16)
1754A2X	Local 2x16 Console Manager (LCM16)
1754A1X	Local 1x8 Console Manager (LCM8)
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>

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

Related publications and links

Videos on the ThinkSystem SR950:

- ThinkSystem SR950 Walkthrough:
<https://lenovopress.com/lp0702-thinksystem-sr950-server-video-walkthrough>
- ThinkSystem SR950 Ease of Service
<https://lenovopress.com/lp0899-thinksystem-sr950-ease-of-service-video>
- Lenovo Engineer discusses the ThinkSystem SR950 Server
<https://www.youtube.com/watch?v=2F5UD0Xr50Q>

For more information, see these useful resources:

- Lenovo ThinkSystem SR950 product page:
<https://www.lenovo.com/us/en/data-center/servers/mission-critical/Lenovo-ThinkSystem-SR950/p/77XX7HSSR95>
- Interactive 3D Tour of the ThinkSystem SR950:
<http://lenovopress.com/LP0674>
- ThinkSystem SR950 drivers and support
<http://datacentersupport.lenovo.com/products/servers/thinksystem/sr950/7x11/downloads>
- Lenovo ThinkSystem SR950 product publications:
<http://thinksystem.lenovofiles.com/help/index.jsp>
 - Quick Start
 - Rack Installation Guide
 - Setup Guide
 - Hardware Maintenance Manual
 - Messages and Codes Reference
 - Memory Population Reference
- Lenovo Hardware Installation & Removal Videos on the ThinkSystem SR950:
 - YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-DbSYJFY74PoKmph7vgrkKH>
 - Youku: https://list.youku.com/albumlist/show/id_50952215
- ServerProven hardware compatibility:
<http://www.lenovo.com/us/en/serverproven>

Related product families

Product families related to this document are the following:

- [Mission-Critical Rack Servers](#)
- [ThinkSystem SR950 Server](#)
- [4-Socket Rack Servers](#)
- [8-Socket Rack Servers](#)

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This document, LP0647, was created or updated on December 8, 2020.

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