Lenovo ThinkSystem SR650 V2 Server
Product Guide

The Lenovo ThinkSystem SR650 V2 is an ideal 2-socket 2U rack server for small businesses up to large enterprises that need industry-leading reliability, management, and security, as well as maximizing performance and flexibility for future growth. The SR650 V2 is based on the new 3rd generation Intel Xeon Scalable processor family (formerly codenamed "Ice Lake") and the new Intel Optane Persistent Memory 200 Series.

The SR650 V2 is designed to handle a wide range of workloads, such as databases, virtualization and cloud computing, virtual desktop infrastructure (VDI), infrastructure security, systems management, enterprise applications, collaboration/email, streaming media, web, and HPC.

Figure 1. Lenovo ThinkSystem SR650 V2 with 2.5-inch front drive bays (3.5-inch drive configurations also available)

Did you know?

The SR650 V2 server has been designed to take advantage of the features of the 3rd generation Intel Xeon Scalable processors, such as the full performance of 270W 40-core processors, support for 3200 MHz memory and PCIe Gen 4.0 support. The SR650 V2 is a very configuration-rich offering, supporting 28 different drive bay configurations in the front, middle and rear of the server and 5 different slot configurations at the rear of the server. This level of flexibility ensures that you can configure the server to meet the needs of your workload.

Key features

Combining performance and flexibility, the SR650 V2 server is a great choice for enterprises of all sizes. The server offers a broad selection of drive and slot configurations and offers numerous high performance features. Outstanding reliability, availability, and serviceability (RAS) and high-efficiency design can improve your business environment and can help save operational costs.

Scalability and performance

The SR650 V2 offers numerous features to boost performance, improve scalability and reduce costs:

- Supports one or two third-generation Intel Xeon Processor Scalable processors
  - Up to 40 cores and 80 threads
  - Core speeds of up to 3.6 GHz
  - TDP ratings of up to 270W
- Support for up to 32 TruDDR4 memory DIMMs operating at up to 3200 MHz means you have the fastest available memory subsystem.
- Supports configurations of 2 DIMMs per channel to operate at the 3200 MHz rated speed of the memory DIMMs.
- Using 128GB 3DS RDIMMs, the server supports up to 4TB of system memory.
- Supports the new Intel Optane Persistent Memory 200 Series for advanced in-memory database applications, dense-virtualization; up to 16 PMem Modules can be installed in conjunction with regular system memory.
- Supports up to eight single-width GPUs or three double-wide GPUs, for substantial processing power in a 2U system.
- Supports up to 40x 2.5-inch hot-swap drive bays, by using combinations of front-accessible (up to 24 bays), mid bays (8 bays) and rear-accessible (8 bays).
- Supports 20x 3.5-inch drive bays for lower-cost high-capacity HDD storage. 2.5-inch and 3.5-inch drive bays can be mixed if desired.
- Supports 16x NVMe drives without oversubscription of PCIe lanes (1:1 connectivity), or up to 32 NVMe drives with a 1:2 oversubscription. The use of NVMe drives maximizes drive I/O performance, in terms of throughput and latency.
- Supports 12x SATA drives using the onboard SATA controller (no additional adapter needed), enabling lower cost, high capacity storage solution for cold or archival storage workloads.
- Supports high-speed RAID controllers from Broadcom providing 12 Gb SAS connectivity to the drive backplanes. A variety of PCIe 3.0 and PCIe 4.0 RAID adapters are available.
- Supports up to two externally accessible 7mm hot-swap drives with RAID functionality for operating system boot functions.
- Supports M.2 drives 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 performance and reliability.
- The server has a dedicated industry-standard OCP 3.0 small form factor (SFF) slot, with a PCIe 4.0 x16 interface, supporting a variety of Ethernet network adapters. A simple-swap mechanism with a thumbscrew and pull-tab enables tool-less installation and removal of the adapter. The adapter supports shared BMC network sideband connectivity to enable out-of-band systems management.
- The server offers PCI Express 4.0 I/O expansion capabilities that doubles the theoretical maximum bandwidth of PCIe 3.0 (16GT/s in each direction for PCIe 4.0, compared to 8 GT/s with PCIe 3.0). A PCIe 4.0 x16 slot provides 64 GB/s bandwidth, enough to support a 200GbE network connection.
- The server offers up to eight PCIe 4.0 slots, all with rear access, plus an internal bay for a cabled RAID adapter or HBA, plus a slot dedicated to the OCP adapter.

Availability and serviceability

The SR650 V2 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.
- Available M.2 RAID Boot Adapters support RAID-1 which can enable two SATA or two NVMe M.2 drives to be configured as a redundant pair.
- The server has up to two hot-swap redundant power supplies and up to six hot-swap redundant fans to provide availability for business-critical applications.
- The light path diagnostics feature uses LEDs to lead the technician to failed (or failing) components, which simplifies servicing, speeds up problem resolution, and helps improve system availability.
- Solid-state drives (SSDs) offer more reliability and performance than traditional mechanical HDDs for greater 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, flash storage adapters), fans, power supplies, RAID controllers, server ambient 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.
- 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 diagnostics and can save service data to a USB key drive or remote CIFS share folder for troubleshooting and reduce service time.
- Auto restart in the event of a momentary loss of AC power (based on power policy setting in the XClarity Controller service processor)
- Offers a diagnostics port on the front of the server to allow you to attach an external diagnostics handset for enhanced systems management capabilities.
- Support for the XClarity Administrator Mobile app running on a supported smartphone or tablet 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 (varies by geography), 9 x 5 next business day. Optional service upgrades are available.

Manageability and security

Systems management features simplify local and remote management of the SR650 V2:

- The server includes an XClarity Controller (XCC) to monitor server availability. Optional upgrade to XCC Advanced to provide remote control (keyboard video mouse) functions. Optional upgrade to XCC Enterprise enables the additional support for the mounting of 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.
- 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.
- An integrated industry-standard Unified Extensible Firmware Interface (UEFI) enables improved setup, configuration, and updates, and simplifies error handling.
- Support for industry standard management protocols, IPMI 2.0, SNMP 3.0, Redfish REST API, serial console via IPMI
- An integrated hardware Trusted Platform Module (TPM) supporting TPM 2.0 enables advanced cryptographic functionality, such as digital signatures and remote attestation.
- Administrator and power-on passwords help protect from unauthorized access to the server.
- Supports Secure Boot to ensure only a digitally signed operating system can be used. Supported with HDDs and SSDs, as well as 7mm and M.2 drives.
- 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.
- Additional physical security features are an available chassis intrusion switch and available lockable front bezel.

Energy efficiency

The SR650 V2 offers the following energy-efficiency features to save energy, reduce operational costs, and increase energy availability:

- Energy-efficient system board components help lower operational costs.
- High-efficiency power supplies with 80 PLUS Platinum and Titanium certifications
- Solid-state drives (SSDs) consume as much as 80% less power than traditional spinning 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 and thus keeping your system cooler.
- Optional Lenovo XClarity Energy Manager provides advanced data center power notification, analysis, and policy-based management to help achieve lower heat output and reduced cooling needs.

Comparing the SR650 V2 to the SR650

The ThinkSystem SR650 V2 improves on the previous generation SR650, as summarized in the following table.

Table 1. Comparing the ThinkSystem SR650 V2 to the previous generation SR650

Feature	SR650	SR650 V2	Benefits
Processor	• 2x 2nd Gen Intel Xeon Scalable Processor • Up to 28 cores & 205W per CPU • 48x PCIe 3.0 lanes per CPU	• 2x 3rd Gen Intel Xeon Scalable Processor • Up to 40 cores & 270W per CPU • 64x PCIe 4.0 lanes per CPU	• The latest high-performance processors from Intel • Greater computing performance with top bin CPUs • Faster PCIe connectivity • More PCIe lanes means more NVMe drives
Memory	• 6 channels per CPU • 24x TruDDR4 (R/LR/3DS) 2933 MHz DIMMs • Up to 2DPC @ 2933MHz • Max 3 TB with 24x 128 GB DIMMs • Intel Optane PMem 100 Series	• 8 channels per CPU • 32x TruDDR4 (RDIMM/3DS) 3200 MHz DIMMs • Up to 1DPC & 2DPC @ 3200MHz • Max 4 TB with 32x 128 GB DIMMs • Intel Optane PMem 200 Series	• Faster memory • Increased capacity • Support for new generation persistent memory
Disk	• Up to 26 total drives bays • Up to 12x 3.5-inch or 24x 2.5-inch front bays • 2x 3.5-inch rear SAS/SATA • Up to 24x 2.5-inch NVMe drives • 2x Internal M.2 with optional RAID 1	• Up to 40 total 2.5-inch drives bays • Up to 12x 3.5-inch or 24x 2.5-inch front bays • 4x 3.5-inch or 8x 2.5-inch mid drive bays • 2x 2.5-inch rear SAS/SATA/NVMe • Up to 32x 2.5-inch NVMe drives • 2x 7mm hot-swap rear SAS/SATA/NVMe for boot • 2x Internal M.2 with optional RAID 1	• More configuration choices • Larger number of NVMe drives • New 7mm HS drives for OS boot • New mid and rear drive bay choices • Higher maximum capacity • Support mixing 2.5"/3.5" HDD and NVMe drives

Feature	SR650	SR650 V2	Benefits
RAID	• 12Gb SAS/SATA/RAID support • PCIe 3.0 adapters • Onboard SATA support with RAID • Range of 8-, 16- and 24-port RAID adapters • 8- and 16-port HBAs • 4x Onboard NVMe ports • NVMe switch adapter support	• 12Gb SAS/SATA/RAID support • PCIe 3.0 and PCIe 4.0 adapters • Onboard SATA support with RAID • Onboard VROC NVMe support with RAID • Wider range of 8-, 16- and 32-port RAID adapters + SAS expander • 8- and 16-port HBAs • 12x Onboard NVMe ports • NVMe Retimer adapters for 16x NVMe	• New with Intel VROC for onboard SATA RAID and NVMe RAID • Featuring industry's latest PCIe Gen4 based RAID adapters • More onboard ports and NVMe Retimers lower the cost of NVMe support
Networking	• Selectable LOM, 1GbE or 10GbE • Optional ML2 and PCIe adapters • 1GbE dedicated management port	• Selectable OCP 3.0, 1GbE, 10GbE or 25GbE • Optional PCIe adapters • 1GbE dedicated management port	• Improved performance & flexibility • OCP slot supports 25GbE
PCIe	• Up to 6x PCIe 3.0 slots • 1x dedicated RAID slot	• Up to 8x PCIe 4.0 slots • 1x internal bay for cabled RAID/HBA	• New PCIe 4.0 support
GPU support	• Up to 5x NVIDIA T4 GPUs • Up to 2x double-wide 300W GPUs	• Up to 8x NVIDIA T4 GPUs • Up to 3x double-wide GPUs	• More GPUs means more processing power per 2U server
Management and security	• XClarity Controller with upgrades • Full XClarity software suite including XClarity Administrator • Optional lockable front bezel	• XClarity Controller with upgrades • Full XClarity software suite including XClarity Administrator • Optional lockable front bezel • Optional intrusion switch • Support for External Diagnostics Handset • Platform Firmware Resiliency (PFR) hardware Root of Trust	• Common management tools with prior generation • External Diagnostics Handset with LCD panel offers quick access to system status, firmware, network, and health information • Platform Firmware Resiliency is an advanced security solution with a silicon-based to guard against corruption and unauthorized firmware updates

Feature	SR650	SR650 V2	Benefits
Power supplies	• 2x Hot-swap PSUs up to 1100W, Platinum • 750W Hot-swap Titanium PSU • -48V DC power for Telco • 240V HVDC support in China	• 2x Hot-swap PSUs up to 1800W, Platinum • 750W Hot-swap Titanium PSU • -48V DC power for Telco • 240V HVDC support in China	• Expanded power supply portfolio for exact configuration required and sharing with rest of the 2-socket/4-socket ThinkSystem V2 servers

Components and connectors

The following figure shows the front of the SR650 V2. The server supports either 2.5-inch or 3.5-inch hot-swap drives at the front.

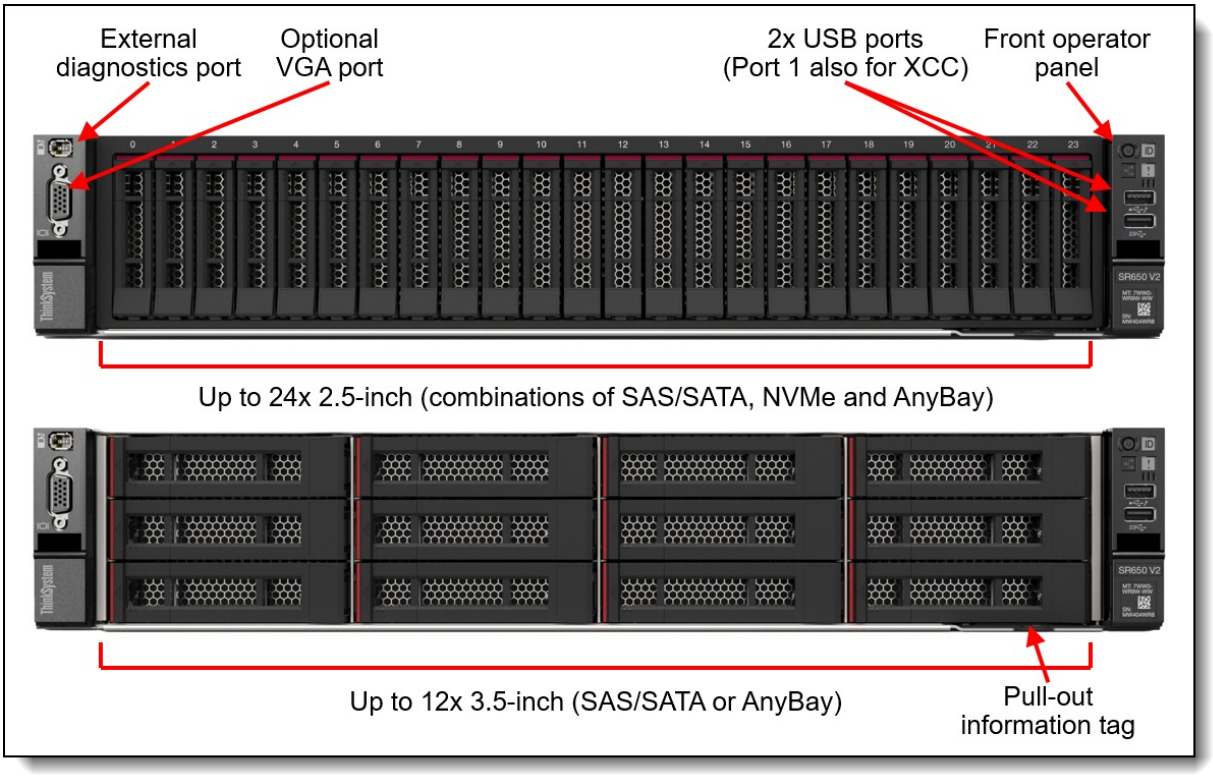

Figure 2. Front view of the ThinkSystem SR650 V2

The following figure shows the components visible from the rear of the server. The figure shows one configuration, with eight PCIe slots, however there are additional rear configurations which include 3.5-inch drive bays, 2.5-inch drive bays, or 7mm drive bays.

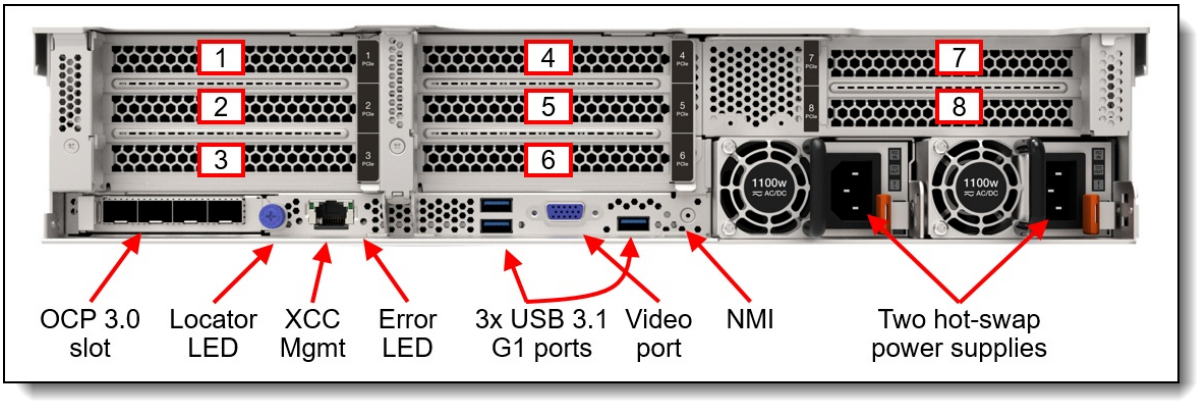

Figure 3. Rear view of the ThinkSystem SR650 V2 (configuration with eight PCIe slots)

The following figure shows the locations of key components inside the server.

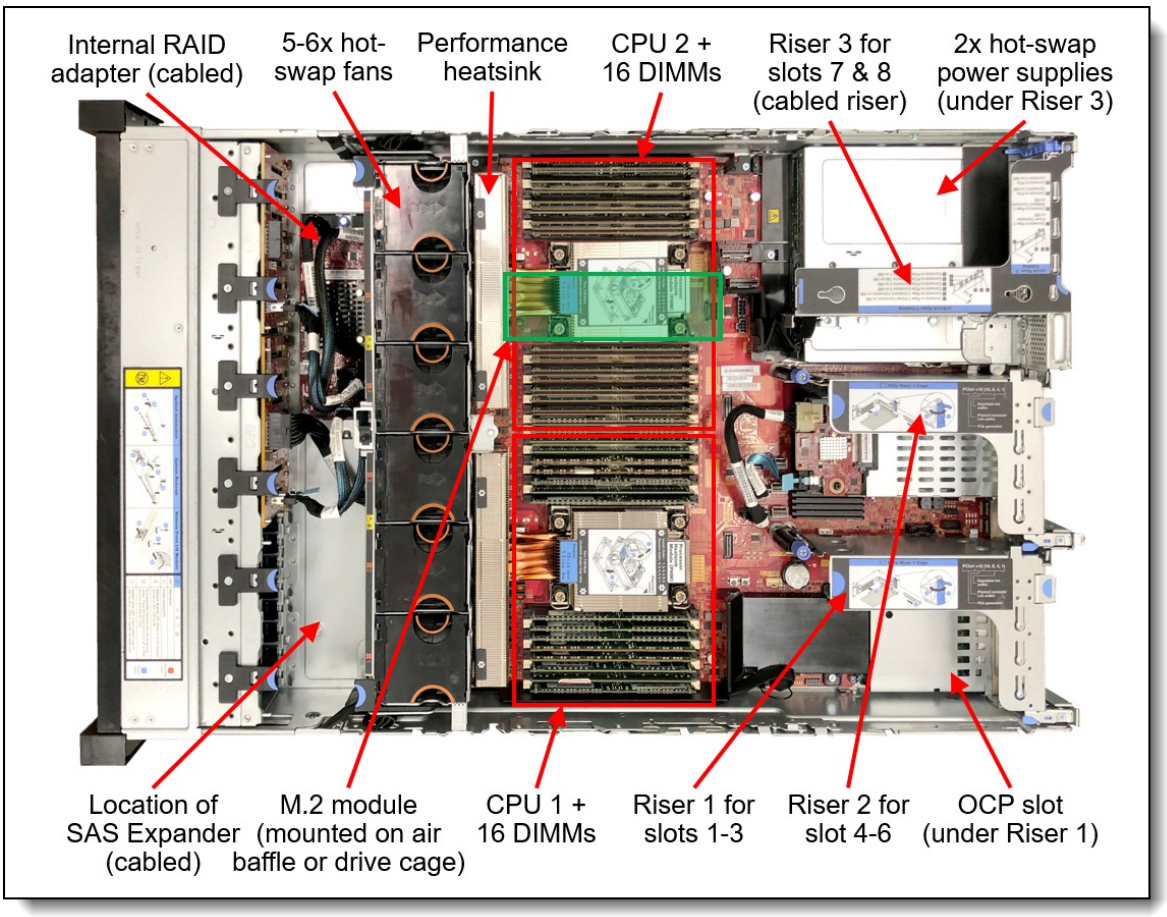

Figure 4. Internal view of the ThinkSystem SR650 V2

System architecture

The following figure shows the architectural block diagram of the SR650 V2, showing the major components and their connections.

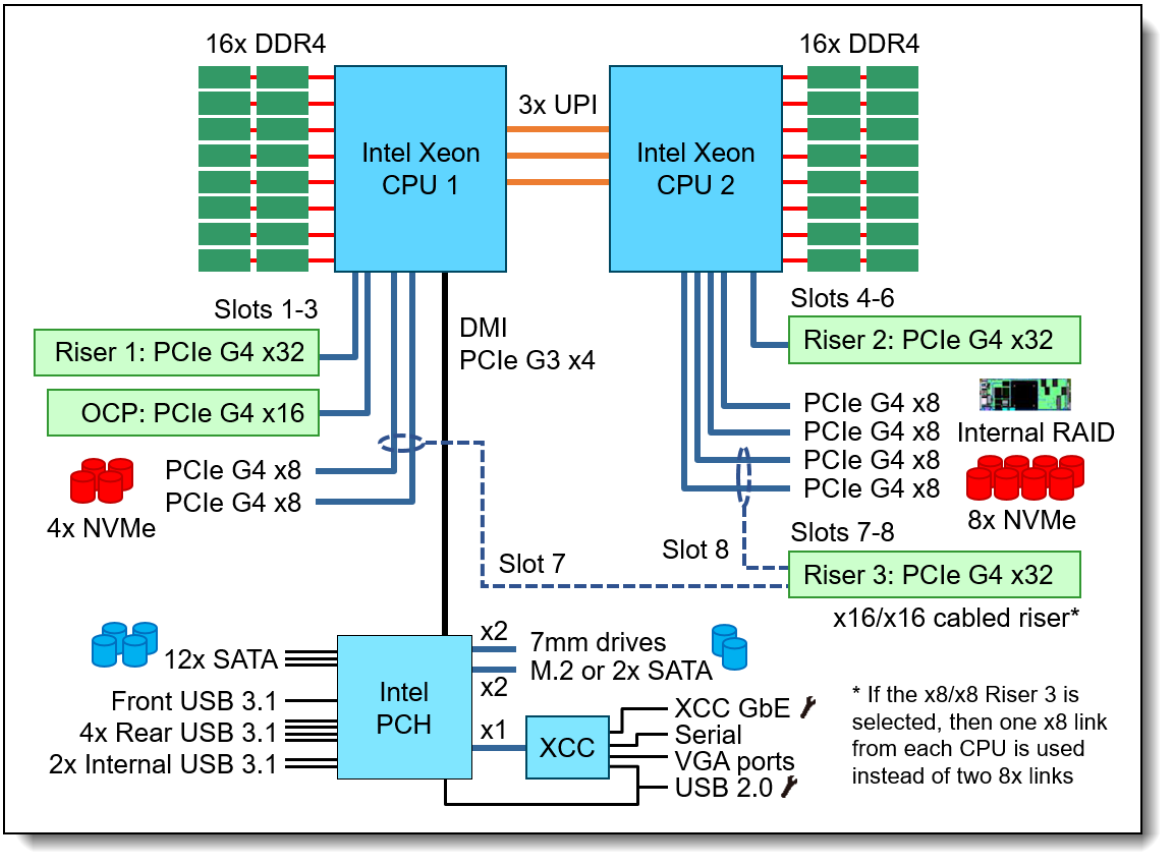

Figure 5. SR650 V2 system architectural block diagram

Standard specifications

The following table lists the standard specifications.

Table 2. Standard specifications

Components	Specification
Machine types	7Z72 - 1 year warranty 7Z73 - 3 year warranty
Form factor	2U rack.
Processor	One or two third-generation Intel Xeon Scalable processor (formerly codenamed "Ice Lake"). Supports processors up to 40 cores, core speeds of up to 3.6 GHz, and TDP ratings of up to 270W.
Chipset	Intel C621A "Lewisburg" chipset, part of the platform codenamed "Whitley"
Memory	32 DIMM slots with two processors (16 DIMM slots per processor). Each processor has 8 memory channels, with 2 DIMMs per channel (DPC). Lenovo TruDDR4 RDIMMs and 3DS RDIMMs are supported. DIMM slots are shared between standard system memory and persistent memory. DIMMs operate at up to 3200 MHz at 2 DPC.
Persistent memory	Supports up to 16x Intel Optane Persistent Memory 200 Series modules (8 per processor) installed in the DIMM slots. Persistent memory (Pmem) is installed in combination with system memory DIMMs.

Components	Specification
Memory maximum	With RDIMMs: Up to 4TB by using 32x 128GB 3DS RDIMMs With Persistent Memory: Up to 6TB by using 16x 128GB 3DS RDIMMs and 16x 256GB Pmem modules
Memory protection	ECC, SDDC (for x4-based memory DIMMs), ADDDC (for x4-based memory DIMMs, requires Platinum or Gold processors), and memory mirroring.
Disk drive bays	Up to 20x 3.5-inch or 40x 2.5-inch hot-swap drive bays: • Front bays can be 3.5-inch (8 or 12 bays) or 2.5-inch (8, 16 or 24 bays) • Middle bays can be 3.5-inch (4 bays) or 2.5-inch (8 bays) • Rear bays can be 3.5-inch (2 or 4 bays) or 2.5-inch (4 or 8 bays) • Combinations of SAS/SATA, NVMe, or AnyBay (supporting SAS, SATA or NVMe) are available The server also supports these drives for OS boot or drive storage: • Two 7mm drives at the rear of the server (in addition to any 2.5-inch or 3.5-inch drive bays) • Internal M.2 module supporting up to two M.2 drives See Supported drive bay combinations for details.
Maximum internal storage	• 2.5-inch drives: ◦ 307.2TB using 40x 7.68TB 2.5-inch SAS/SATA SSDs ◦ 491.52TB using 32x 15.36TB 2.5-inch NVMe SSDs ◦ 96TB using 40x 2.4TB 2.5-inch HDDs ◦ 1.92TB using 2x 0.96TB 7mm SSDs • 3.5-inch drives: ◦ 360TB using 20x 18TB 3.5-inch HDDs ◦ 153.6TB using 20x 7.68TB 3.5-inch SAS/SATA SSDs ◦ 92.16TB using 12x 7.68TB 3.5-inch NVMe SSDs
Storage controller	• 12x Onboard SATA ports (Intel VROC SATA RAID, formerly known as Intel RSTe RAID) • Up to 12x Onboard NVMe ports (includes Intel VROC NVMe RAID, with optional license for non-Intel NVMe SSDs) • NVMe Retimer Adapter (supports Intel VROC NVMe RAID) • 12 Gb SAS/SATA RAID adapters: ◦ RAID 530i-8i (cacheless) supports RAID 0, 1, 10, 5, 50 ◦ RAID 530i-16i (cacheless) supports RAID 0, 1, 10 ◦ 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 ◦ RAID 940-8i with 4GB or 8GB flash-backed cache supports RAID 0, 1, 10, 5, 50, 6, 60 ◦ RAID 940-16i with 8GB flash-backed cache supports RAID 0, 1, 10, 5, 50, 6, 60 ◦ RAID 940-32i with 8GB flash-backed cache supports RAID 0, 1, 10, 5, 50, 6, 60 • 12 Gb SAS/SATA non-RAID: 430-8i, 430-16i and 440-16i HBAs
Optical drive bays	No internal optical drive.
Tape drive bays	No internal backup drive.
Network interfaces	Dedicated OCP 3.0 SFF slot with PCIe 4.0 x16 host interface. Supports a variety of 2-port and 4-port adapters with 1GbE, 10GbE and 25GbE network connectivity. One port can optionally be shared with the XClarity Controller (XCC) management processor for Wake-on-LAN and NC-SI support.

Components	Specification
PCIe slots	Up to 8x PCIe 4.0 slots, all full height slots and with rear access, plus a slot dedicated to the OCP adapter. Slot availability is based on riser selection and rear drive bay selection. Slots 4-8 require two processors. Slots are configured using three riser cards. Riser 1 (slots 1-3) and Riser 2 (slots 4-6) are installed in slots in the system board, Riser 3 (slots 7-8) is cabled to ports on the system board. A variety of riser cards are available. See thel/O expansion for details. For 2.5-inch front drive configurations, the server supports the installation of a RAID adapter or HBA in a dedicated area that does not consume any of the PCIe slots.
GPU support	Supports up to 8x single-wide GPUs or up to 3x double-wide GPUs
Ports	Front: 1x USB 3.1 G1 (5 Gb/s) port, 1x USB 2.0 port (also for XCC local management), External diagnostics port, optional VGA port. Rear: 3x USB 3.1 G1 (5 Gb/s) ports, 1x VGA video port, 1x RJ-45 1GbE systems management port for XCC remote management. Optional DB-9 COM serial port (installs in slot 3). Internal: 1x USB 3.1 G1 connector for operating system or license key purposes
Cooling	6x (with two processors installed) or 5x (with one processor installed) single-rotor or dual-rotor hot swap 60 mm fans, configuration dependent. Fans are N+1 redundant, tolerating a single-rotor failure. One fan integrated in each power supply.
Power supply	Up to two hot-swap redundant AC power supplies, 80 PLUS Platinum or 80 PLUS Titanium certification. 500 W, 750 W, 1100 W and 1800 W AC options, supporting 220 V AC. 500 W, 750 W and 1100 W options also support 110V input supply. In China only, all power supply options support 240 V DC. Also available is a 1100W power supply with a -48V DC input.
Video	G200 graphics with 16 MB memory with 2D hardware accelerator, integrated into the XClarity Controller. Maximum resolution is 1920x1200 32bpp at 60Hz.
Hot-swap parts	Drives, power supplies, and fans.
Systems management	Operator panel with status LEDs. Optional External Diagnostics Handset with LCD display. Models with 8x or 16x 2.5-inch front drive bays can optionally support an Integrated Diagnostics Panel. XClarity Controller (XCC) embedded management, XClarity Administrator centralized infrastructure delivery, XClarity Integrator plugins, and XClarity Energy Manager centralized server power management. Optional XClarity Controller Advanced and Enterprise to enable remote control functions.
Security features	Chassis intrusion switch, Power-on password, administrator's password, Trusted Platform Module (TPM), supporting TPM 2.0. In China only, optional Nationz TPM 2.0. Optional lockable front security bezel.
Operating systems supported	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware ESXi. See the Operating system support section for specifics.
Limited warranty	Three-year or one-year (model dependent) customer-replaceable unit 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.
Dimensions	Width: 445 mm (17.5 in.), height: 87 mm (3.4 in.), depth: 764 mm (30.1 in.). SeePhysical and electrical specifications for details.
Weight	Maximum: 38.8 kg (85.5 lb)

Models

ThinkSystem SR650 V2 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 SR650 V2 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 SR650 V2, 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 SR650 V2 server.

Table 3. Base CTO models

Description	Machine Type/Model General purpose	Machine Type/Model for HPC and AI
ThinkSystem SR650 V2 - 3 year Warranty	7Z73CTO1WW	7Z73CTOLWW
ThinkSystem SR650 V2 - 1 year Warranty	7Z72CTO1WW	7Z72CTOLWW
ThinkSystem SR650 V2 - SAP HANA configurations with 3-year warranty	7D15CTO1WW	None

Models of the SR650 V2 are defined based on whether the server has 2.5-inch drive bays at the front (called the 2.5-inch chassis) or whether it has 3.5-inch drive bays at the front (called the 3.5-inch chassis). For models, the feature codes for these chassis bases are as listed in the following table.

Table 4. Chassis base feature codes

Feature code	Description
BH8G	ThinkSystem 2U 3.5" Chassis with 8 or 12 Bays
BH8H	ThinkSystem 2U 2.5" Chassis with 8, 16 or 24 Bays

The following tables list the available models, grouped by region.

- Models for Asia Pacific region
- Models for Australia and New Zealand
- Models for Brazil
- Models for EMEA region
- Models for Japan
- Models for Latin American countries (except Brazil)
- Models for USA and Canada

Refer to the Specifications section for information about standard features of the server.

Common to all models:

- All models indicated as having the 750W power supply are using the Platinum power supply
- All models include a Toolless Slide Rail Kit

Models for Asia Pacific region

The following table lists the models for the Asia Pacific region: Australia, Bangladesh, Brunei, Hong Kong, India, Japan, Korea, Sri Lanka, Malaysia, New Zealand, Philippines, Singapore, Thailand, Taiwan, Vietnam

Table 5. Models for Asia Pacific markets

Model	Intel Xeon Scalable processor†	Memory	RAID	Drive bays	OCP	Slots	Power supply	Front VGA	XCC	Fans
Standard models with a 3-year warranty (machine type 7Z73)										
7Z73A027AP	1x Silver 4309Y 8C 105W 2.8G	1x 16GB	930-16i 4GB	12x 3.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen4	1x 750W	Opt	Std	5x Perf
7Z73A02AAP	1x Silver 4309Y 8C 105W 2.8G	1x 16GB	930-8i	8x 3.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen4	1x 750W	Opt	Std	5x Std
7Z73A030AP	1x Silver 4309Y 8C 105W 2.8G	1x 16GB	930-8i	8x 2.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen3	1x 750W	Opt	Std	5x Std
7Z73A035AP	1x Silver 4309Y 8C 105W 2.8G	1x 16GB	930-8i	8x 3.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen3	1x 750W	Opt	Std	5x Std
7Z73A036AP	1x Silver 4309Y 8C 105W 2.8G	1x 16GB	930-8i	8x 2.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen4	1x 750W	Opt	Std	5x Std
7Z73A02CAP	1x Silver 4310 12C 120W 2.1G	1x 16GB	930-8i	8x 3.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen3	1x 750W	Opt	Std	5x Std
7Z73A03TAP	1x Silver 4310 12C 120W 2.1G	1x 16GB	930-8i	8x 2.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen3	1x 750W	Opt	Std	5x Std
7Z73A03YAP	1x Silver 4310 12C 120W 2.1G	1x 16GB	930-8i	8x 3.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen4	1x 750W	Opt	Std	5x Std
7Z73A045AP	1x Silver 4310 12C 120W 2.1G	1x 16GB	930-16i 4GB	12x 3.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen4	1x 750W	Opt	Std	5x Perf
7Z73A046AP	1x Silver 4310 12C 120W 2.1G	1x 16GB	930-8i	8x 2.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen4	1x 750W	Opt	Std	5x Std
7Z73A040AP	1x Silver 4314 16C 135W 2.4G	1x 16GB	930-16i 4GB	12x 3.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen4	1x 750W	Opt	Std	5x Perf
7Z73A042AP	1x Silver 4314 16C 135W 2.4G	1x 16GB	930-8i	8x 2.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen4	1x 750W	Opt	Std	5x Std
7Z73A044AP	1x Silver 4314 16C 135W 2.4G	1x 16GB	930-8i	8x 3.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen4	1x 750W	Opt	Std	5x Std
7Z73A02LAP	1x Silver 4316 20C 150W 2.3G	1x 16GB	930-8i	8x 3.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen3	1x 750W	Opt	Std	5x Std
7Z73A038AP	1x Silver 4316 20C 150W 2.3G	1x 16GB	930-8i	8x 2.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen3	1x 750W	Opt	Std	5x Std
7Z73A03ZAP	1x Silver 4316 20C 150W 2.3G	1x 16GB	930-16i 4GB	12x 3.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen4	1x 750W	Opt	Std	5x Perf
7Z73A041AP	1x Silver 4316 20C 150W 2.3G	1x 16GB	930-8i	8x 2.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen4	1x 750W	Opt	Std	5x Std
7Z73A043AP	1x Silver 4316 20C 150W 2.3G	1x 16GB	930-8i	8x 3.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen4	1x 750W	Opt	Std	5x Std
7Z73A03EAP	1x Gold 5315Y 8C 140W 3.2G	1x 16GB	930-8i	8x 3.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen3	1x 750W	Opt	Std	5x Std

Model	Intel Xeon Scalable processor†	Memory	RAID	Drive bays	OCP	Slots	Power supply	Front VGA	XCC	Fans
7Z73A03FAP	1x Gold 5315Y 8C 140W 3.2G	1x 16GB	930-8i	8x 2.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen3	1x 750W	Opt	Std	5x Std
7Z73A01TAP	1x Gold 5317 12C 150W 3.0G	1x 16GB	930-8i	8x 3.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen3	1x 750W	Opt	Std	5x Std
7Z73A02PAP	1x Gold 5317 12C 150W 3.0G	1x 16GB	930-8i	8x 2.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen3	1x 750W	Opt	Std	5x Std
7Z73A020AP	1x Gold 5318Y 24C 165W 2.1G	1x 16GB	930-8i	8x 2.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen3	1x 750W	Opt	Std	5x Std
7Z73A03HAP	1x Gold 5318Y 24C 165W 2.1G	1x 16GB	930-8i	8x 3.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen3	1x 750W	Opt	Std	5x Std
7Z73A01ZAP	1x Gold 6330 28C 205W 2.0G	1x 16GB	930-8i	8x 2.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen3	1x 750W	Opt	Std	5x Std
7Z73A03KAP	1x Gold 6330 28C 205W 2.0G	1x 16GB	930-8i	8x 3.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen3	1x 750W	Opt	Std	5x Std
7Z73A022AP	1x Gold 6336Y 24C 185W 2.4G	1x 16GB	930-8i	8x 3.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen3	1x 750W	Opt	Std	5x Std
7Z73A03JAP	1x Gold 6336Y 24C 185W 2.4G	1x 16GB	930-8i	8x 2.5" SAS Open bay	I350 1Gb	3 (x16, x8, x8) Gen3	1x 750W	Opt	Std	5x Std

† Processor description: Processor model, number of cores, thermal design power (TDP), core frequency

Models for Australia and New Zealand

AP models: Customers in Australia and New Zealand also have access to the Asia Pacific region models.

Table 6. Models for Australia and New Zealand

Model	Intel Xeon Scalable processor†	Memory	RAID	Drive bays	OCP	Slots	Power supply	Front VGA	XCC	Fans
TopSeller models with a 3-year warranty (machine type 7Z73)										
7Z73A03WAU	1x Silver 4309Y 8C 105W 2.8G	1x 16GB	Onboard SATA	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Yes	Ent	5x Std
7Z73A03XAU	1x Silver 4310 12C 120W 2.1G	1x 32GB 2Rx8	Onboard SATA	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Yes	Ent	5x Std
7Z73A03UAU	1x Silver 4314 16C 135W 2.4G	1x 32GB 2Rx8	Onboard SATA	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Yes	Ent	5x Std
7Z73A03RAU	1x Silver 4316 20C 150W 2.3G	1x 32GB 2Rx8	Onboard SATA	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Yes	Ent	5x Std
7Z73A03SAU	1x Gold 5318Y 24C 165W 2.1G	1x 32GB 2Rx8	Onboard SATA	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Yes	Ent	5x Std

† Processor description: Processor model, number of cores, thermal design power (TDP), core frequency

Models for Brazil

Table 7. Models for Brazil

Model	Intel Xeon Scalable processor†	Memory	RAID	Drive bays	OCP	Slots	Power supply	Front VGA	XCC	Fans
TopSeller models with a 3-year warranty (machine type 7Z73)										
7Z73A05QBR	1x Silver 4309Y 8C 105W 2.8G	1x 16GB	530-8i	8x 3.5" SAS Open bay	4x1Gb	3 (x16, x8, x8) Gen4	1x 750W	Yes	Std	5x Std
7Z73A05VBR	1x Silver 4309Y 8C 105W 2.8G	1x 16GB	530-8i	8x 3.5" SAS Open bay	4x1Gb	3 (x16, x8, x8) Gen4	1x 750W	Yes	Std	5x Std
7Z73A05TBR	1x Silver 4310 12C 120W 2.1G	1x 16GB	530-8i	8x 3.5" SAS Open bay	4x1Gb	3 (x16, x8, x8) Gen4	1x 750W	Yes	Std	5x Std
7Z73A05RBR	1x Gold 5318Y 24C 165W 2.1G	1x 32GB 2Rx4	930-8i	8x 2.5" SAS Open bay	2x10GbT	3 (x16, x8, x8) Gen4	2x 750W	Yes	Ent	5x Std

† Processor description: Processor model, number of cores, thermal design power (TDP), core frequency

Models for EMEA region

Table 8. Models for EMEA region

Model	Intel Xeon Scalable processor†	Memory	RAID	Drive bays	OCP	Slots	Power supply	Front VGA	XCC	Fans
Standard models with a 3-year warranty (machine type 7Z73)										
7Z73A01WEA	1x Silver 4309Y 8C 105W 2.8G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 750W	Opt	Ent	5x Perf
7Z73A02REA	1x Silver 4309Y 8C 105W 2.8G	1x 32GB 2Rx8	Onboard SATA	8x 3.5" SAS Open bay	Open	Open	1x 750W	Opt	Ent	5x Std
7Z73A03BEA	1x Silver 4309Y 8C 105W 2.8G	1x 32GB 2Rx8	930-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A03GEA	1x Silver 4309Y 8C 105W 2.8G	1x 32GB 2Rx8	940-8i 4GB	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A050EA	1x Silver 4309Y 8C 105W 2.8G	1x 32GB 2Rx8	9350-16i	16x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A05CEA	1x Silver 4309Y 8C 105W 2.8G	1x 32GB 2Rx8	9350-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A05LEA	1x Silver 4309Y 8C 105W 2.8G	1x 32GB 2Rx8	5350-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A01QEA	1x Silver 4310 12C 120W 2.1G	1x 32GB 2Rx8	930-16i 4GB	12x 3.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Perf
7Z73A01VEA	1x Silver 4310 12C 120W 2.1G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 750W	Opt	Ent	5x Perf
7Z73A026EA	1x Silver 4310 12C 120W 2.1G	1x 32GB 2Rx8	930-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A02JEA	1x Silver 4310 12C 120W 2.1G	1x 32GB 2Rx8	Onboard SATA	12x 3.5" SAS Open bay	Open	Open	1x 750W	Opt	Ent	5x Perf
7Z73A02NEA	1x Silver 4310 12C 120W 2.1G	1x 32GB 2Rx8	Onboard SATA	8x 3.5" SAS Open bay	Open	Open	1x 750W	Opt	Ent	5x Std
7Z73A03DEA	1x Silver 4310 12C 120W 2.1G	1x 32GB 2Rx8	940-8i 4GB	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A04WEA	1x Silver 4310 12C 120W 2.1G	1x 32GB 2Rx8	9350-16i	12x 3.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std

Model	Intel Xeon Scalable processor†	Memory	RAID	Drive bays	OCP	Slots	Power supply	Front VGA	XCC	Fans
7Z73A051EA	1x Silver 4310 12C 120W 2.1G	1x 32GB 2Rx8	9350-16i	16x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A05BEA	1x Silver 4310 12C 120W 2.1G	1x 32GB 2Rx8	9350-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A05KEA	1x Silver 4310 12C 120W 2.1G	1x 32GB 2Rx8	5350-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A028EA	1x Silver 4314 16C 135W 2.4G	1x 32GB 2Rx8	930-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A02EEA	1x Silver 4314 16C 135W 2.4G	1x 32GB 2Rx8	940-8i 4GB	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A02XEA	1x Silver 4314 16C 135W 2.4G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 750W	Opt	Ent	5x Perf
7Z73A032EA	1x Silver 4314 16C 135W 2.4G	1x 32GB 2Rx8	Onboard SATA	12x 3.5" SAS Open bay	Open	Open	1x 750W	Opt	Ent	5x Perf
7Z73A034EA	1x Silver 4314 16C 135W 2.4G	1x 32GB 2Rx8	930-16i 4GB	12x 3.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Perf
7Z73A04SEA	1x Silver 4314 16C 135W 2.4G	1x 32GB 2Rx8	940-8i 4GB	8x 2.5" SAS Open bay	E810 25Gb	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A04XEA	1x Silver 4314 16C 135W 2.4G	1x 32GB 2Rx8	9350-16i	12x 3.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A052EA	1x Silver 4314 16C 135W 2.4G	1x 32GB 2Rx8	9350-16i	16x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A05AEA	1x Silver 4314 16C 135W 2.4G	1x 32GB 2Rx8	9350-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A05JEA	1x Silver 4314 16C 135W 2.4G	1x 32GB 2Rx8	5350-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A01NEA	1x Silver 4316 20C 150W 2.3G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 750W	Opt	Ent	5x Perf
7Z73A01UEA	1x Gold 5315Y 8C 140W 3.2G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 750W	Opt	Ent	5x Perf
7Z73A02DEA	1x Gold 5315Y 8C 140W 3.2G	1x 32GB 2Rx8	940-8i 4GB	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A02FEA	1x Gold 5315Y 8C 140W 3.2G	1x 32GB 2Rx8	930-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A04QEA	1x Gold 5315Y 8C 140W 3.2G	1x 32GB 2Rx8	940-8i 4GB	8x 2.5" SAS Open bay	E810 25Gb	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A053EA	1x Gold 5315Y 8C 140W 3.2G	1x 32GB 2Rx8	9350-16i	16x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A059EA	1x Gold 5315Y 8C 140W 3.2G	1x 32GB 2Rx8	9350-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A05HEA	1x Gold 5315Y 8C 140W 3.2G	1x 32GB 2Rx8	5350-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A02BEA	1x Gold 5317 12C 150W 3.0G	1x 32GB 2Rx8	940-8i 4GB	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A02GEA	1x Gold 5317 12C 150W 3.0G	1x 32GB 2Rx8	930-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A03VEA	1x Gold 5317 12C 150W 3.0G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 750W	Opt	Ent	5x Perf
7Z73A04YEA	1x Gold 5317 12C 150W 3.0G	1x 32GB 2Rx8	9350-16i	12x 3.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A054EA	1x Gold 5317 12C 150W 3.0G	1x 32GB 2Rx8	9350-16i	16x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std

Model	Intel Xeon Scalable processor†	Memory	RAID	Drive bays	OCP	Slots	Power supply	Front VGA	XCC	Fans
7Z73A058EA	1x Gold 5317 12C 150W 3.0G	1x 32GB 2Rx8	9350-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A05GEA	1x Gold 5317 12C 150W 3.0G	1x 32GB 2Rx8	5350-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A01REA	1x Gold 5318Y 24C 165W 2.1G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 1100W	Opt	Ent	5x Perf
7Z73A04VEA	1x Gold 5318Y 24C 165W 2.1G	1x 32GB 2Rx8	940-8i 4GB	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A01PEA	1x Gold 5320 26C 185W 2.2G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 1100W	Opt	Ent	5x Perf
7Z73A02MEA	1x Gold 6326 16C 185W 2.9G	1x 32GB 2Rx8	930-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A02SEA	1x Gold 6326 16C 185W 2.9G	1x 32GB 2Rx8	940-8i 4GB	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A02UEA	1x Gold 6326 16C 185W 2.9G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 1100W	Opt	Ent	5x Perf
7Z73A02VEA	1x Gold 6326 16C 185W 2.9G	1x 32GB 2Rx8	Onboard SATA	12x 3.5" SAS Open bay	Open	Open	1x 750W	Opt	Ent	5x Perf
7Z73A031EA	1x Gold 6326 16C 185W 2.9G	1x 32GB 2Rx8	930-16i 4GB	12x 3.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Perf
7Z73A03PEA	2x Gold 6326 16C 185W 2.9G	4x 32GB 2Rx8	940-16i Int	8x 2.5" SAS 8x 2.5" Any Open bay	Open	Open	1x 1100W	Opt	Ent	6x Perf
7Z73A04REA	1x Gold 6326 16C 185W 2.9G	1x 32GB 2Rx8	940-8i 4GB	8x 2.5" SAS Open bay	E810 25Gb	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A04ZEA	1x Gold 6326 16C 185W 2.9G	1x 32GB 2Rx8	9350-16i	12x 3.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A056EA	1x Gold 6326 16C 185W 2.9G	1x 32GB 2Rx8	9350-16i	16x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A057EA	1x Gold 6326 16C 185W 2.9G	1x 32GB 2Rx8	9350-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A05FEA	1x Gold 6326 16C 185W 2.9G	1x 32GB 2Rx8	5350-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A01XEA	1x Gold 6330 28C 205W 2.0G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 1100W	Opt	Ent	5x Perf
7Z73A029EA	1x Gold 6330 28C 205W 2.0G	1x 32GB 2Rx8	940-8i 4GB	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A02KEA	1x Gold 6330 28C 205W 2.0G	1x 32GB 2Rx8	930-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A01YEA	1x Gold 6334 8C 165W 3.6G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 1100W	Opt	Ent	5x Perf
7Z73A02QEA	1x Gold 6336Y 24C 185W 2.4G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 1100W	Opt	Ent	5x Perf
7Z73A021EA	1x Gold 6342 24C 230W 2.8G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 1100W	Opt	Ent	5x Perf
7Z73A024EA	1x Gold 6346 16C 205W 3.1G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 1100W	Opt	Ent	5x Perf
7Z73A055EA	1x Gold 6346 16C 205W 3.1G	1x 32GB 2Rx8	9350-16i	16x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A05DEA	1x Gold 6346 16C 205W 3.1G	1x 32GB 2Rx8	9350-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std

Model	Intel Xeon Scalable processor†	Memory	RAID	Drive bays	OCP	Slots	Power supply	Front VGA	XCC	Fans
7Z73A05EEA	1x Gold 6346 16C 205W 3.1G	1x 32GB 2Rx8	5350-8i	8x 2.5" SAS Open bay	Open	3 (x16, x8, x8) Gen4	1x 750W	Opt	Ent	5x Std
7Z73A03CEA	1x Gold 6354 18C 205W 3.0G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 1100W	Opt	Ent	5x Perf
7Z73A039EA	1x Platinum 8352Y 32C 205W 2.2G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 1100W	Opt	Ent	5x Perf
7Z73A03AEA	1x Platinum 8358 32C 250W 2.6G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 1100W	Opt	Ent	5x Perf

† Processor description: Processor model, number of cores, thermal design power (TDP), core frequency

Models for Japan

AP models: Customers in Japan also have access to the Asia Pacific region models.

Table 9. Models for Japan

Model	Intel Xeon Scalable processor†	Memory	RAID	Drive bays	OCP	Slots	Power supply	Front VGA	XCC	Fans
TopSeller models with a 3-year warranty (machine type 7Z73)										
7Z73A025JP	1x Silver 4309Y 8C 105W 2.8G	1x 16GB	Option	Option 2.5" Open bay	I350 1Gb	Open	1x 750W	Opt	Adv	5x Perf
7Z73A02TJP	1x Silver 4309Y 8C 105W 2.8G	1x 16GB	Option	Option 3.5" Open bay	I350 1Gb	Open	1x 750W	Opt	Adv	5x Perf
7Z73A02HJP	1x Silver 4310 12C 120W 2.1G	1x 16GB	Option	Option 3.5" Open bay	I350 1Gb	Open	1x 750W	Opt	Adv	5x Perf
7Z73A02ZJP	1x Silver 4310 12C 120W 2.1G	1x 16GB	Option	Option 2.5" Open bay	I350 1Gb	Open	1x 750W	Opt	Adv	5x Perf
7Z73A02YJP	1x Silver 4314 16C 135W 2.4G	1x 16GB	Option	Option 3.5" Open bay	I350 1Gb	Open	1x 750W	Opt	Adv	5x Perf
7Z73A03MJP	1x Silver 4314 16C 135W 2.4G	1x 16GB	Option	Option 2.5" Open bay	I350 1Gb	Open	1x 750W	Opt	Adv	5x Perf
7Z73A01SJP	1x Silver 4316 20C 150W 2.3G	1x 16GB	Option	Option 2.5" Open bay	I350 1Gb	Open	1x 750W	Opt	Adv	5x Perf
7Z73A02WJP	1x Silver 4316 20C 150W 2.3G	1x 16GB	Option	Option 3.5" Open bay	I350 1Gb	Open	1x 750W	Opt	Adv	5x Perf
7Z73A033JP	1x Gold 6346 16C 205W 3.1G	1x 16GB	Option	Option 2.5" Open bay	I350 1Gb	Open	1x 1100W	Opt	Adv	5x Perf

† Processor description: Processor model, number of cores, thermal design power (TDP), core frequency

Models for Latin American countries (except Brazil)

Table 10. Models with a 3-year warranty for Latin American countries (except Brazil)

Model	Intel Xeon Scalable processor†	Memory	RAID	Drive bays	OCP	Slots	Power supply	Front VGA	XCC	Fans
TopSeller models with a 3-year warranty (machine type 7Z73)										
7Z73A05PLA	1x Silver 4309Y 8C 105W 2.8G	1x 16GB	530-8i	8x 3.5" SAS Open bay	4x1Gb	3 (x16, x8, x8) Gen4	1x 750W	Yes	Std	5x Std
7Z73A05ULA	1x Silver 4310 12C 120W 2.1G	1x 16GB	530-8i	8x 3.5" SAS Open bay	4x1Gb	3 (x16, x8, x8) Gen4	1x 750W	Yes	Std	5x Std
7Z73A05MLA	1x Silver 4314 16C 135W 2.4G	1x 32GB 2Rx4	930-8i	8x 2.5" SAS Open bay	4x1Gb	3 (x16, x8, x8) Gen4	1x 750W	Yes	Std	5x Std
7Z73A05SLA	1x Silver 4316 20C 150W 2.3G	1x 32GB 2Rx4	930-8i	8x 2.5" SAS Open bay	2x10GbT	3 (x16, x8, x8) Gen4	2x 750W	Yes	Ent	5x Std
7Z73A05NLA	1x Gold 5318Y 24C 165W 2.1G	1x 32GB 2Rx4	930-8i	8x 2.5" SAS Open bay	2x10GbT	3 (x16, x8, x8) Gen4	2x 750W	Yes	Ent	5x Std

† Processor description: Processor model, number of cores, thermal design power (TDP), core frequency

Models for USA and Canada

Table 11. Models for USA and Canada

Model	Intel Xeon Scalable processor†	Memory	RAID	Drive bays	OCP	Slots	Power supply	Front VGA	XCC	Fans
Standard models with a 3-year warranty (machine type 7Z73)										
7Z73A037NA	1x Silver 4309Y 8C 105W 2.8G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 750W	Yes	Ent	5x Perf
7Z73A03QNA	1x Silver 4309Y 8C 105W 2.8G	1x 32GB 2Rx8	Option	Option 3.5" Open bay	Open	Open	1x 750W	Yes	Ent	5x Perf
7Z73A03LNA	1x Silver 4310 12C 120W 2.1G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 750W	Yes	Ent	5x Perf
7Z73A03NNA	1x Silver 4314 16C 135W 2.4G	1x 32GB 2Rx8	Option	Option 2.5" Open bay	Open	Open	1x 750W	Yes	Ent	5x Perf

† Processor description: Processor model, number of cores, thermal design power (TDP), core frequency

Processor options

The SR650 V2 supports processors in the third-generation Intel Xeon Scalable Processor family. The server supports one or two processors.

Topics in this section:

- Processor options
- Processor features
- One-processor configurations
- Thermal requirements for processors

In the SR650 V2, processors either have a standard 1U heatsink, standard 2U heatsink, or a performance heatsink attached depending on the TDP of the processor and configuration of the server. Performance heatsinks include a large 2U-high copper radiator that connects to the main heatsink via heat pipes.

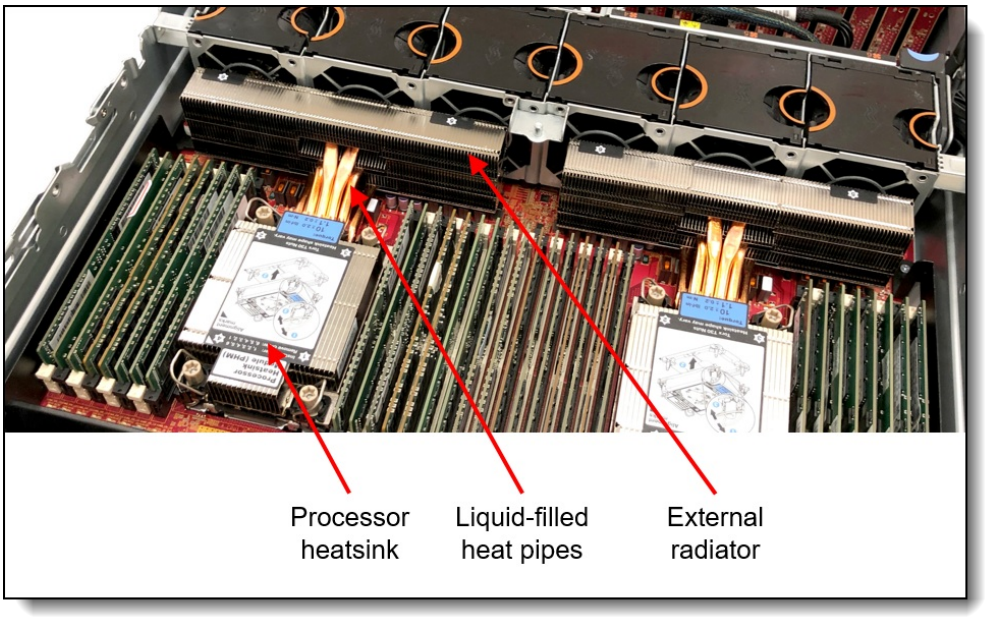

Figure 6. Performance heatsink in the SR650 V2

Processor options

The table below lists the processors that are supported.

Supported processors have the following features:

- Third-generation Intel Xeon Scalable processors (formerly codenamed "Ice Lake")
- 10 nm process technology
- 8x DDR4 memory channels
- 64x PCIe 4.0 I/O lanes available for PCIe and NVMe devices
- 1.25 MB L2 cache per core
- 1.5 MB or more L3 cache per core
- Intel Deep Learning Boost, which provides built-in Artificial Intelligence (AI) acceleration with the Vector Neural Network Instruction set (VNNI). DL Boost and VNNI are designed to deliver significant, more efficient Deep Learning (Inference) acceleration for high-performance AI workloads.
- Intel Hyper-Threading Technology, which boosts performance for multithreaded applications by enabling simultaneous multithreading within each processor core, up to two threads per core.

- Intel Turbo Boost Technology 2.0, which allows processor cores to run at maximum speeds during peak workloads by temporarily going beyond processor TDP.
- Intel Virtualization Technology (includes VT-x and VT-d), which integrates hardware-level virtualization hooks that allow operating system vendors to better use the hardware for virtualization workloads.
- Intel Speed Select Technology, supported on some processor models, enables increased core Turbo Boost frequency on specific individual cores to maximize application performance.
- Intel Advanced Vector Extensions 512 (AVX-512), to enable acceleration of enterprise-class workloads, including databases and enterprise resource planning (ERP).
- Up to two Intel AVX-512 Fused-Multiply Add (FMA) units
- Intel SGX (Software Guard Extensions) and Intel TME (Total Memory Encryption) security features
- Two or three Intel Ultra Path Interconnect (UPI) links at up to 11.2 GT/s, to maximize inter-processor communication

Some processors include a suffix letter in the processor model number:

- M: Media Processing optimized
- N: NFV optimized
- P: High frequency-optimized for IaaS virtualization customers
- Q: Optimized for liquid cooling
- S: Large (512GB) SGX Enclave size
- T: High Tcase
- U: Single socket
- V: High density/low power-optimized for SaaS virtualization customers
- Y: Speed Select

Memory tiers: All processors support up to 6TB of memory. There are no L or M suffix processors.

Options part numbers only for second processor : The option part numbers listed in the table are only for use when adding a second processor. It is not supported to upgrade any processors already installed.

Table 12. Processor options

Part number	Feature code	Description	Maximum quantity†
4XG7A63443	BB2N	SR650 V2 Intel Xeon Silver 4309Y 8C 105W 2.8GHz Option Kit w/o Fan	2
4XG7A63468	BB3C	SR650 V2 Intel Xeon Silver 4310 12C 120W 2.1GHz Option Kit w/o Fan	2
4XG7A63459	BB34	SR650 V2 Intel Xeon Silver 4310T 10C 105W 2.3GHz Option Kit w/o Fan	2
4XG7A63455	BB2Z	SR650 V2 Intel Xeon Silver 4314 16C 135W 2.4GHz Option Kit w/o Fan	2
4XG7A63465	BB39	SR650 V2 Intel Xeon Silver 4316 20C 150W 2.3GHz Option Kit w/o Fan	2
4XG7A63477	BB3M	SR650 V2 Intel Xeon Gold 5315Y 8C 140W 3.2GHz Option Kit w/o Fan	2
4XG7A63456	BB30	SR650 V2 Intel Xeon Gold 5317 12C 150W 3.0GHz Option Kit w/o Fan	2
4XG7A63470	BB3E	SR650 V2 Intel Xeon Gold 5318N 24C 150W 2.1GHz Option Kit w/o Fan	2
4XG7A63442	BB2M	SR650 V2 Intel Xeon Gold 5318S 24C 165W 2.1GHz Option Kit w/o Fan	2
4XG7A63460	BB35	SR650 V2 Intel Xeon Gold 5318Y 24C 165W 2.1GHz Option Kit w/o Fan	2
4XG7A63581	BB2R	SR650 V2 Intel Xeon Gold 5320 26C 185W 2.2GHz Option Kit w/o Fan	2
4XG7A63454	BB2Y	SR650 V2 Intel Xeon Gold 5320T 20C 150W 2.3GHz Option Kit w/o Fan	2
CTO only	BB2K	Intel Xeon Gold 6312U 24C 185W 2.4GHz Processor	1*
CTO only	BB38	Intel Xeon Gold 6314U 32C 205W 2.3GHz Processor	1*

Part number	Feature code	Description	Maximum quantity†
4XG7A63446	BB4E	SR650 V2 Intel Xeon Gold 6326 16C 185W 2.9GHz Option Kit w/o Fan	2
4XG7A63473	BB3H	SR650 V2 Intel Xeon Gold 6330 28C 205W 2.0GHz Option Kit w/o Fan	2
4XG7A63478	BB3N	SR650 V2 Intel Xeon Gold 6330N 28C 165W 2.2GHz Option Kit w/o Fan	2
4XG7A63469	BB3D	SR650 V2 Intel Xeon Gold 6334 8C 165W 3.6GHz Option Kit w/o Fan	2
4XG7A63480	BB3S	SR650 V2 Intel Xeon Gold 6336Y 24C 185W 2.4GHz Option Kit w/o Fan	2
4XG7A63579	BB3P	SR650 V2 Intel Xeon Gold 6338 32C 205W 2.0GHz Option Kit w/o Fan	2
4XG7A63457	BB31	SR650 V2 Intel Xeon Gold 6338N 32C 185W 2.2GHz Option Kit w/o Fan	2
4XG7A63458	BB33	SR650 V2 Intel Xeon Gold 6338T 24C 165W 2.1GHz Option Kit w/o Fan	2
4XG7A63578	BB3B	SR650 V2 Intel Xeon Gold 6342 24C 230W 2.8GHz Option Kit w/o Fan	2
4XG7A63452	BB2W	SR650 V2 Intel Xeon Gold 6346 16C 205W 3.1GHz Option Kit w/o Fan	2
4XG7A63575	BB2L	SR650 V2 Intel Xeon Gold 6348 28C 235W 2.6GHz Option Kit w/o Fan	2
4XG7A63450	BB2U	SR650 V2 Intel Xeon Gold 6354 18C 205W 3.0GHz Option Kit w/o Fan	2
CTO only	BB3J	Intel Xeon Platinum 8351N 36C 225W 2.4GHz Processor	1*
4XG7A63655	BKDB	SR650 V2 Intel Xeon Platinum 8352M 32C 185W 2.3GHz Option Kit w/o Fan	2
4XG7A63580	BB3Q	SR650 V2 Intel Xeon Platinum 8352S 32C 205W 2.2GHz Option Kit w/o Fan	2
4XG7A63448	BB2S	SR650 V2 Intel Xeon Platinum 8352V 36C 195W 2.1GHz Option Kit w/o Fan	2
4XG7A63451	BB2V	SR650 V2 Intel Xeon Platinum 8352Y 32C 205W 2.2GHz Option Kit w/o Fan	2
4XG7A63479	BB3R	SR650 V2 Intel Xeon Platinum 8358 32C 250W 2.6GHz Option Kit w/o Fan	2
4XG7A63466	BB3A	SR650 V2 Intel Xeon Platinum 8358P 32C 240W 2.6GHz Option Kit w/o Fan	2
4XG7A63444	BB2P	SR650 V2 Intel Xeon Platinum 8360Y 36C 250W 2.4GHz Option Kit w/o Fan	2
4XG7A63656	BKDC	SR650 V2 Intel Xeon Platinum 8362 32C 265W 2.8GHz Option Kit w/o Fan	2
4XG7A63462	BB37	SR650 V2 Intel Xeon Platinum 8368 38C 270W 2.4GHz Option Kit w/o Fan	2
4XG7A63576	BB3G	SR650 V2 Intel Xeon Platinum 8380 40C 270W 2.3GHz Option Kit w/o Fan	2

* Processors with a U suffix and the 8351N processor are only supported one processor per server; as a result, there is no option part number for a second processor.
† The server supports two processors. In the configurator, you can select 1 or 2 processor feature codes. However for option part numbers, only 1 is supported per server. The option part numbers are only for use when adding a second processor. It is not supported to use the option part numbers to upgrade any processors already installed.

Processor features

The following table compares the features of the supported third-generation Intel Xeon processors.

Abbreviations used in the table:

- TB: Turbo Boost 2.0
- UPI: Ultra Path Interconnect
- TDP: Thermal Design Power
- SGX: Software Guard Extensions
- PMem: Persistent Memory support

Table 13. Processor features

CPU model	Cores/ threads	Core speed (Base / TB max)	L3 cache*	Max memory speed	UPI links & speed	TDP	SGX Enclave Size	Pmem
4309Y	8 / 16	2.8 GHz / 3.6 GHz	12 MB	2667 MHz	2 / 10.4 GT/s	105W	8 GB	No

CPU model	Cores/ threads	Core speed (Base / TB max)	L3 cache*	Max memory speed	UPI links & speed	TDP	SGX Enclave Size	Pmem
4310	12 / 24	2.1 GHz / 3.3 GHz	18 MB	2667 MHz	2 / 10.4 GT/s	120W	8 GB	No
4310T	10 / 20	2.3 GHz / 3.4 GHz	15 MB	2667 MHz	2 / 10.4 GT/s	105W	8 GB	No
4314	16 / 32	2.4 GHz / 3.4 GHz	24 MB	2667 MHz	2 / 10.4 GT/s	135W	8 GB	Yes
4316	20 / 40	2.3 GHz / 3.4 GHz	30 MB	2667 MHz	2 / 10.4 GT/s	150W	8 GB	No
5315Y	8 / 16	3.2 GHz / 3.6 GHz	12 MB	2933 MHz	3 / 11.2 GT/s	140W	64 GB	Yes
5317	12 / 24	3.0 GHz / 3.6 GHz	18 MB	2933 MHz	3 / 11.2 GT/s	150W	64 GB	Yes
5318N	24 / 48	2.1 GHz / 3.4 GHz	36 MB	2667 MHz	3 / 11.2 GT/s	150W	64 GB	Yes
5318S	24 / 48	2.1 GHz / 3.4 GHz	36 MB	2933 MHz	3 / 11.2 GT/s	165W	512 GB	Yes
5318Y	24 / 48	2.1 GHz / 3.4 GHz	36 MB	2933 MHz	3 / 11.2 GT/s	165W	64 GB	Yes
5320	26 / 52	2.2 GHz / 3.4 GHz	39 MB	2933 MHz	3 / 11.2 GT/s	185W	64 GB	Yes
5320T	20 / 40	2.3 GHz / 3.5 GHz	30 MB	2933 MHz	3 / 11.2 GT/s	150W	64 GB	Yes
6312U	24 / 48	2.4 GHz / 3.6 GHz	36 MB	3200 MHz	None	185W	64 GB	Yes
6314U	32 / 64	2.3 GHz / 3.4 GHz	48 MB	3200 MHz	None	205W	64 GB	Yes
6326	16 / 32	2.9 GHz / 3.5 GHz	24 MB	3200 MHz	3 / 11.2 GT/s	185W	64 GB	Yes
6330	28 / 56	2.0 GHz / 3.1 GHz	42 MB	2933 MHz	3 / 11.2 GT/s	205W	64 GB	Yes
6330N	28 / 56	2.2 GHz / 3.4 GHz	42 MB	2667 MHz	3 / 11.2 GT/s	165W	64 GB	Yes
6334	8 / 16	3.6 GHz / 3.7 GHz	18 MB*	3200 MHz	3 / 11.2 GT/s	165W	64 GB	Yes
6336Y	24 / 48	2.4 GHz / 3.6 GHz	36 MB	3200 MHz	3 / 11.2 GT/s	185W	64 GB	Yes
6338	32 / 64	2.0 GHz / 3.2 GHz	48 MB	3200 MHz	3 / 11.2 GT/s	205W	64 GB	Yes
6338N	32 / 64	2.2 GHz / 3.5 GHz	48 MB	2667 MHz	3 / 11.2 GT/s	185W	64 GB	Yes
6338T	24 / 48	2.1 GHz / 3.4 GHz	36 MB	3200 MHz	3 / 11.2 GT/s	165W	64 GB	Yes
6342	24 / 48	2.8 GHz / 3.5 GHz	36 MB	3200 MHz	3 / 11.2 GT/s	230W	64 GB	Yes
6346	16 / 32	3.1 GHz / 3.6 GHz	36 MB*	3200 MHz	3 / 11.2 GT/s	205W	64 GB	Yes
6348	28 / 56	2.6 GHz / 3.5 GHz	42 MB	3200 MHz	3 / 11.2 GT/s	235W	64 GB	Yes
6354	18 / 36	3.0 GHz / 3.6 GHz	39 MB*	3200 MHz	3 / 11.2 GT/s	205W	64 GB	Yes
8351N	36 / 72	2.4 GHz / 3.5 GHz	54 MB	2933 MHz	None	225W	64 GB	Yes
8352M	32 / 64	2.3 GHz / 3.5 GHz	48 MB	3200 MHz	3 / 11.2 GT/s	185W	64 GB	Yes
8352S	32 / 64	2.2 GHz / 3.4 GHz	48 MB	3200 MHz	3 / 11.2 GT/s	205W	512 GB	Yes
8352V	36 / 72	2.1 GHz / 3.5 GHz	54 MB	2933 MHz	3 / 11.2 GT/s	195W	8 GB	Yes
8352Y	32 / 64	2.2 GHz / 3.4 GHz	48 MB	3200 MHz	3 / 11.2 GT/s	205W	64 GB	Yes
8358	32 / 64	2.6 GHz / 3.4 GHz	48 MB	3200 MHz	3 / 11.2 GT/s	250W	64 GB	Yes
8358P	32 / 64	2.6 GHz / 3.4 GHz	48 MB	3200 MHz	3 / 11.2 GT/s	240W	8 GB	Yes
8360Y	36 / 72	2.4 GHz / 3.5 GHz	54 MB	3200 MHz	3 / 11.2 GT/s	250W	64 GB	Yes
8362	32 / 64	2.8 GHz / 3.6 GHz	48 MB	3200 MHz	3 / 11.2 GT/s	265W	64 GB	Yes
8368	38 / 76	2.4 GHz / 3.4 GHz	57 MB	3200 MHz	3 / 11.2 GT/s	270W	512 GB	Yes
8380	40 / 80	2.3 GHz / 3.4 GHz	60 MB	3200 MHz	3 / 11.2 GT/s	270W	512 GB	Yes

* L3 cache is 1.5 MB per core or larger. Processors with a larger L3 cache per core are marked with an *

One-processor configurations

The SR650 V2 can be used with only one processor installed. Most core functions of the server (including the XClarity Controller) are connected to processor 1 as shown in the System architecture section.

With only one processor, the server has the following capabilities:

- 16 memory DIMMs for a 2TB maximum
- Slot 1-3 are available; Slot 4-8 are not available

Drive support is as follows:

- Front SAS/SATA drives are supported - 8, 16, 24 drives (2.5-inch) or 8, 12 drives (3.5-inch)
- Front NVMe drives are supported - up to 8 drives (2.5-inch only)
- Rear SAS/SATA drives are supported - 4x 3.5-inch drives or up to 4x 2.5-inch drives
- M.2 drives are supported
- 7mm rear drives are supported

Controller support is as follows:

- 8x onboard SATA
- 8x NVMe (4x onboard + 1x 4-port switch adapter)
- RAID adapters/HBAs installed in slots 1-3

The following components are not supported:

- Front AnyBay drives are not supported
- Middle drive bays are not supported
- Internal RAID controller and HBA (CFF form factor) are currently not supported

Drives in the middle drive bays (2.5-inch or 3.5-inch) are not supported in 1-processor configurations because power for the mid-chassis drive backplanes come from Riser 2 and the use of Riser 2 requires the second processor.

Thermal requirements for processors

For thermal requirements for processors, see the Thermal Rules section in the Information Center for the SR650 V2:
https://thinksystem.lenovofiles.com/help/topic/SR650V2/thermal_rules.html?cp=4_11_7_2_1

Memory options

The SR650 V2 uses Lenovo TruDDR4 memory and supports 16 DIMMs per processor or 32 DIMMs with two processors installed. Each processor has eight memory channels with two DIMMs per channel. With 128 GB 3DS RDIMMs installed, the SR650 V2 supports a total of 4 TB of system memory.

The SR650 V2 also supports Intel Optane Persistent Memory 200 Series, as described in the Persistent Memory section.

Memory operates at up to 3200 MHz at two DIMMs per channel, depending on the processor model selected. If the processor selected has a lower memory bus speed, then all DIMMs will operate at that lower speed.

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

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 14. Memory options

Part number	Feature code	Description	Maximum supported
RDIMMs			
4X77A08632	B963	ThinkSystem 16GB TruDDR4 3200MHz (2Rx8 1.2V) RDIMM	32 (16 per processor)
4X77A08633	B964	ThinkSystem 32GB TruDDR4 3200MHz (2Rx4 1.2V) RDIMM	32 (16 per processor)
4X77A08634	B965	ThinkSystem 32GB TruDDR4 3200MHz (2Rx8 1.2V) RDIMM	32 (16 per processor)
4X77A08635	B966	ThinkSystem 64GB TruDDR4 3200MHz (2Rx4 1.2V) RDIMM	32 (16 per processor)
3DS RDIMMs			
4X77A08636	BA62	ThinkSystem 128GB TruDDR4 3200 MHz (2S2Rx4 1.2V) 3DS RDIMM	32 (16 per processor)

The following rules apply when selecting the memory configuration:

- The following DIMM quantities are supported per processor: 1, 2, 4, 6, 8, 12, and 16. Other quantities per processor are not supported.
- The server supports RDIMMs and 3DS RDIMMs; UDIMMs and LRDIMMs are not supported
- Mixing RDIMMs and 3DS RDIMMs is not supported
- Mixing x4 and x8 DIMMs is supported

For best performance, consider the following:

- Populate memory DIMMs in quantities of 8 or 16 per processor, so that all memory channels are used.
- 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

Note: Memory sparing is not supported

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. Memory rank sparing is not supported.

Persistent memory

The SR650 V2 server supports Intel Optane Persistent Memory 200 Series, a new class of memory and storage technology explicitly architected for data center usage. Persistent memory is an innovative technology that delivers a unique combination of affordable large memory capacity and persistence (non-volatility). It offers significantly lower latency than fetching data from SSDs, even NVMe SSDs, and offers higher capacities than system memory.

Persistent memory technology can help boost the performance of data-intensive applications such as in-memory analytics, databases, content delivery networks, and high performance computing (HPC), as well as deliver consistent service levels at scale with higher virtual machine and container density. When data is stored closer to the processor on nonvolatile media, applications can see significant overall improvement in performance.

The following table lists the ordering information for the supported persistent memory modules.

Table 15. Persistent memory module part numbers

Part number	Feature code	Description	Maximum supported
4ZC7A08732	B98B	ThinkSystem 128GB TruDDR4 3200MHz (1.2V) Intel Optane Persistent Memory	16 (8 per processor)
4ZC7A08734	B98A	ThinkSystem 256GB TruDDR4 3200MHz (1.2V) Intel Optane Persistent Memory	16 (8 per processor)

The following are the requirements when installing persistent memory (PMem) modules when installed in a two-socket server with third-generation Intel Xeon Scalable processors ("Ice Lake" processors):

- App Direct Mode and Memory Mode are supported. Mixed Mode is not supported.
- All PMem modules operate at 3200 MHz when the installed processor runs the memory bus at 3200 MHz.
- All installed PMem modules must be the same size. Mixing PMem modules of different capacities is not supported.
- Maximum 8 PMem modules per processor (install 1 in each memory channel).
- For each memory channel with both a PMem module and a memory DIMM installed, the PMem module is installed in channel slot 1 (DIMM1, closer to the processor) and the DIMM is installed in channel slot 0 (DIMM0).
- To maximize performance, balance all memory channels
- Both interleaved and non-interleaved modes are supported.
- Memory mirroring is not supported with PMem modules installed

For details, including App Direct Mode and Memory Mode configuration requirements, see the Intel Optane Persistent Memory 200 Series product guide, https://lenovopress.com/LP1380

Internal storage

The SR650 V2 has three drive bay zones and supports up to 20x 3.5-inch or 40x 2.5-inch hot-swap drive bays or a combination of drive bays, depending on the selected chassis and backplane configuration. The server also supports configurations without any drive bays if desired.

The three drive bay zones are as follows:

- Front:
  - Up to 12x 3.5-inch hot-swap bays, or
  - Up to 24x 2.5-inch hot-swap bays
- Middle:
  - 4x 3.5-inch hot-swap bays, or
  - 8x 2.5-inch hot-swap bays
- Rear:
  - Up to 4x 3.5-inch hot-swap bays, or
  - Up to 8x 2.5-inch hot-swap bays
  - Also supports 2x 7mm hot-swap drives bays

All drives are hot-swap and are accessible from the front, from the rear, or from drive bays that are located in the middle of the server (accessible when you remove the top cover of the server).

The server also supports one or two M.2 drives, installed in an M.2 adapter internal to the server.

In this section:

NVMe drive support

The SR650 V2 supports NVMe drives to maximize storage performance.

- Up to 24 NVMe drives without oversubscription (that is, each x4 drive has a full x4 (4 lanes) connection to the processor)
  - All installed in front bays
  - 12 drives connected to onboard NVMe ports, 12 connected to 3 retimer cards installed in PCIe x16 slots
- Up to 32 NVMe drives with a 2:1 oversubscription (that is, each x4 drive has a x2 connection (2 lanes) to the processor)
  - 24 NVMe drives in the front bays
  - 8 NVMe drives in the mid bays
  - All drives connected to 4 NVMe switch adapters (3 front, 1 mid)
- Up to 12 NVMe drives in a 3.5-inch drive configuration
  - All installed in front bays
  - All drives connected on onboard NVMe ports

Riser 3 support: The use of the onboard NVMe ports may be mutually exclusive with Riser 3, as these use the same PCIe connectors. See the System architecture section.

The specifics of these configurations are covered in the Supported drive bay combinations and Controller selections sections.

The tables in those sections indicate the number of NVMe drives in each configuration plus the subscription ratio. The subscription ratio is the number of PCIe lanes from the processor compared to the number of lanes to the drives. A ratio of 1:1 means all drives get the full number of lanes they need to maximize drive performance (currently 4 lanes per drive). A ratio of 1:2 means each drive only gets the half the bandwidth from the processor. NVMe drives connected to a RAID adapter with Tri-Mode support have a 1:4 effective ratio, since they only have a 1-lane connection to the RAID adapter.

In addition, the SR650 V2 supports two 7mm NVMe drives for use as boot drives. These two drives are connected via separate RAID controller connected to a single PCIe 3.0 x2 host interface. See the 7mm drives section for details.

Tri-Mode support

The RAID 940-8i and RAID 940-16i adapters also support NVMe through a feature named Tri-Mode support (or Trimode support). This feature enables the use of NVMe U.3 drives at the same time as SAS and SATA drives. Cabling of the controller to the backplanes is the same as with SAS/SATA drives, and the NVMe drives are connected via a PCIe x1 link to the controller.

NVMe drives connected using Tri-Mode support provide better performance than SAS or SATA drives: A SATA SSD has a data rate of 6Gbps, a SAS SSD has a data rate of 12Gbps, whereas an NVMe U.3 Gen 4 SSD with a PCIe x1 link will have a data rate of 16Gbps. NVMe drives typcially also have lower latency and higher IOPS compared to SAS and SATA drives. Tri-Mode is supported with U.3 NVMe drives in either 2.5-inch and 3.5-inch form factor and requires an AnyBay backplane.

Tri-Mode requires U.3 drives: Only NVMe drives with a U.3 interface are supported. U.2 drives are not supported. See the Internal drive options section for the U.3 drives supported by the server.

Front drive bays

The front drive bay zone supports the following configurations:

- 3.5-inch drive bays (all hot-swap)
  - No backplane and no drives (supports field upgrades)
  - 8x 3.5-inch SAS/SATA
  - 12x 3.5-inch SAS/SATA
  - 12x 3.5-inch AnyBay
- 2.5-inch drive bays (all hot-swap)
  - No backplane and no drives (supports field upgrades)
  - 8x SAS/SATA
  - 16x SAS/SATA
  - 24x SAS/SATA
  - 8x NVMe
  - 16x NVMe
  - 24x NVMe
  - 8x SAS/SATA + 8x NVMe
  - 16x SAS/SATA + 8x NVMe
  - 8x SAS/SATA + 16x NVMe
  - 8x AnyBay
  - 16x AnyBay
  - 24x AnyBay
  - 8x AnyBay + 8x NVMe
  - 8x SAS/SATA + 8x AnyBay
  - 8x SAS/SATA + 16x AnyBay
  - 16x SAS/SATA + 8x AnyBay

These configurations are shown in the following figure. The feature codes listed are the backplane feature codes when ordering CTO and correspond to the feature codes listed in the table below the figure.

Tip: Configurations with 8x or 16x total drive bays can be configured with or without an Integrated Diagnostics Panel with pull-out LCD display. With the Integrated Diagnostics Display, 8-bay configurations can be upgrade to 16 bays, however 16-bay configurations cannot be upgrade to 24 bays. See the Local management section for details.

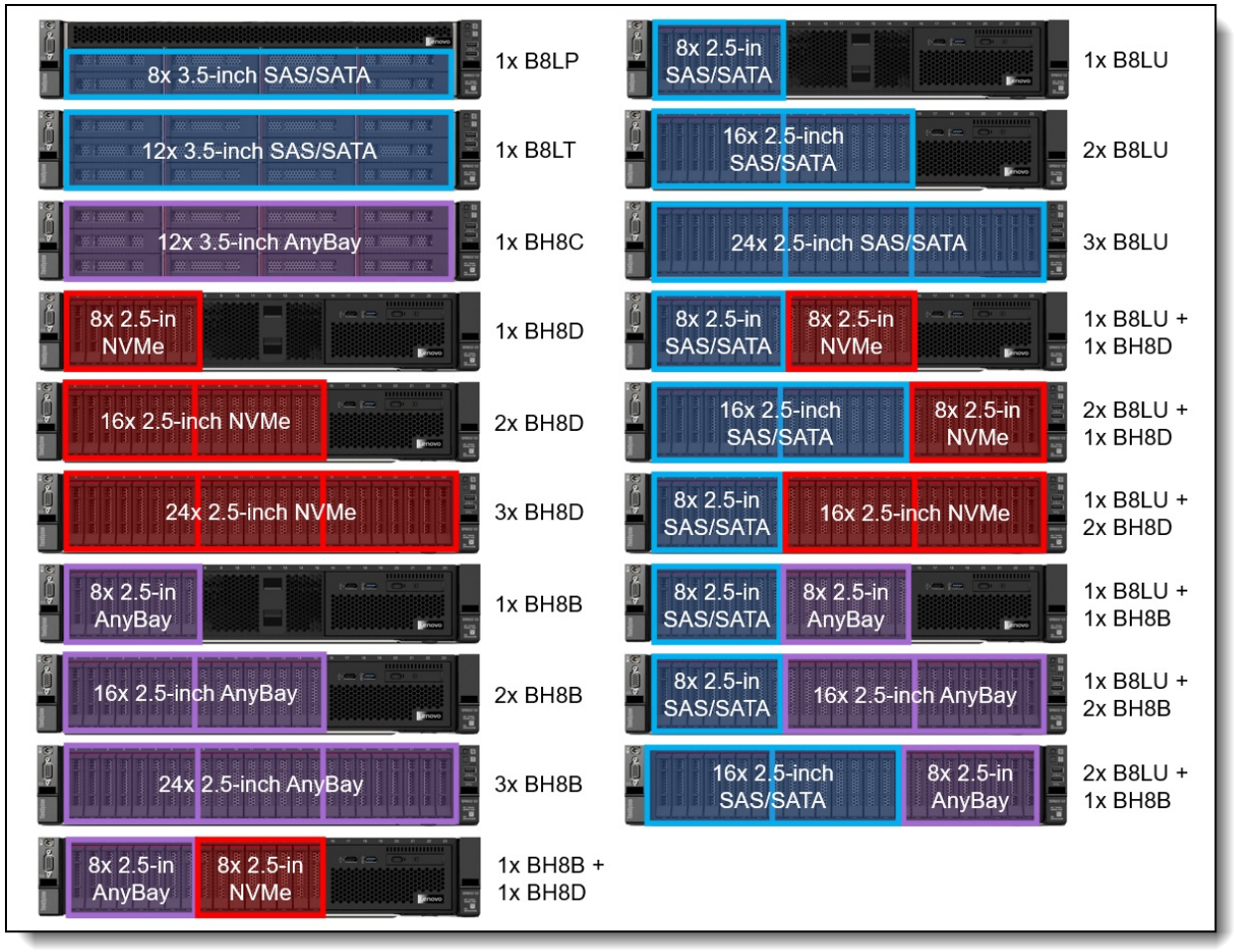

Figure 7. SR650 V2 front drive bay configurations

The backplanes used to provide these drive bays are listed in the following table.

Field upgrades: All front backplanes are available as part numbers for field upgrades, along with required cable option kits, as described in the Field upgrades section below.

Table 16. Backplanes for front drive bays

Feature code	Description	Maximum supported
Front 3.5-inch drive backplanes		
B8LP	ThinkSystem 2U 8x3.5" SAS/SATA Backplane	1
B8LT	ThinkSystem 2U 12x3.5" SAS/SATA Backplane	1
BH8C	ThinkSystem 2U 12x3.5" AnyBay Backplane	1
Front 2.5-inch drive backplanes		
B8LU	ThinkSystem 2U 8x2.5" SAS/SATA Backplane	3
BH8B	ThinkSystem 2U/4U 8x2.5" AnyBay Backplane	3
BH8D	ThinkSystem 2U/4U 8x2.5" NVMe Backplane	3
Integrated Diagnostics Panel (for 2.5-inch configurations with 8 or 16 bays only)		
B8MS	ThinkSystem 2U 16x2.5" Front Operator Panel	1

Common backplanes: Two of the 2.5-inch backplanes listed in the above table use the same physical circuit board. Feature codes BH8B and BH8D use a backplane with eight bays where each bay has both a SAS/SATA connection and an NVMe connection. The difference is which connectors on the backplane are cabled: NVMe and SAS/SATA or just NVMe. Both feature codes use backplane SBB7A29600.

The use of front drive bays has the following configuration rules:

- If 3.5-inch front drive bays are used, an internal RAID adapter or HBA is not supported as the adapter and bays occupy the same physical space
- Any 8x 2.5-inch and 16x 2.5-inch drive configuration (SAS/SATA, AnyBay, NVMe) can optionally be configured for use with the Integrated Diagnostics Panel. 3.5-inch drive configurations do not support the Integrated Diagnostics Panel.

Mid drive bays

The SR650 V2 supports hot-swap drives installed in the middle of the server chassis. The drive bays are accessible by removing the top lid of the server and levering the mid drive chassis up at the front.

The following configurations are supported:

- 4x 3.5-inch hot-swap SAS/SATA drive bays
- 8x 2.5-inch hot-swap SAS/SATA drive bays
- 8x 2.5-inch hot-swap NVMe drive bays

The drive bays in the open position are shown in the following figure.

M.2 support: When mid drive bays are configured, the M.2 adapter is installed on the mid drive bay mechanical as shown in the images.

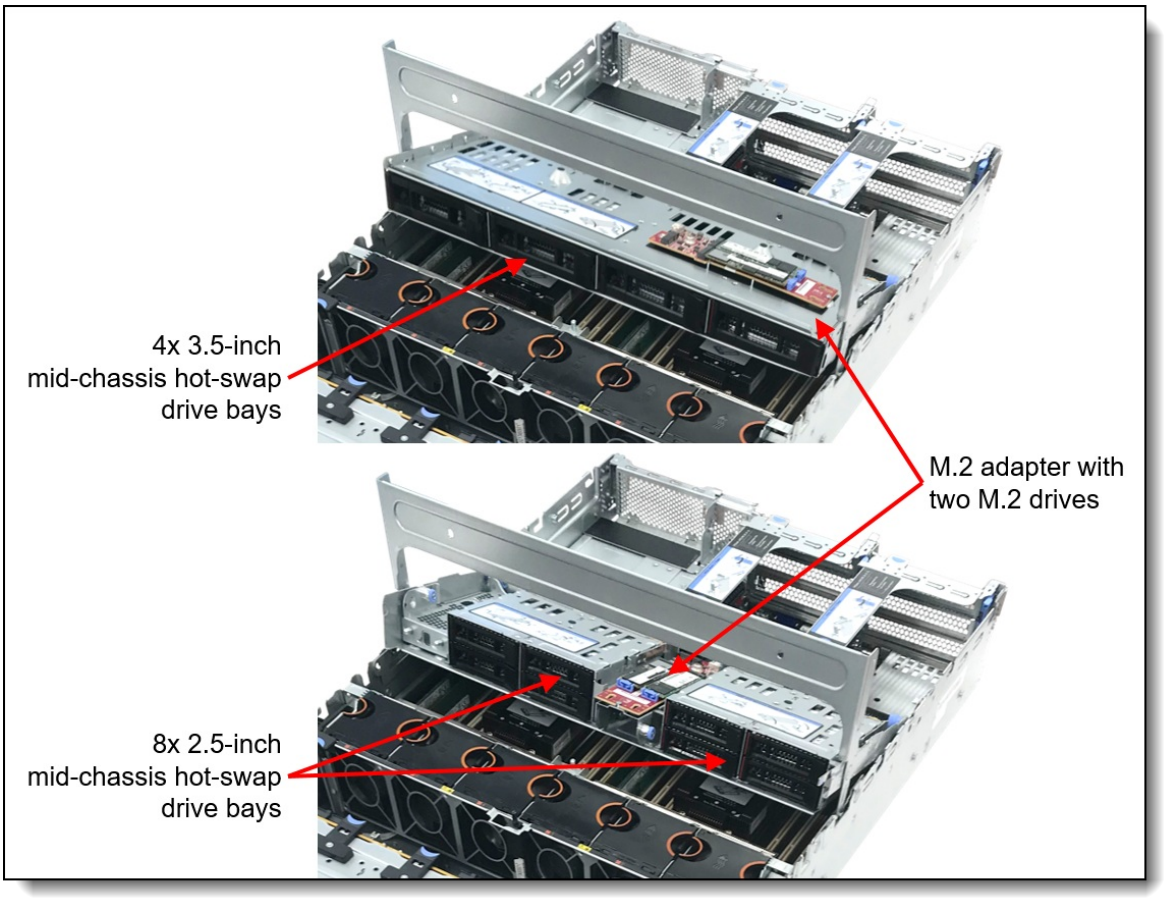

Figure 8. Mid-chassis drive bays

The backplanes used to provide these drive bays are listed in the following table.

Table 17. Backplanes for mid drive bays

Feature code	Description	Maximum supported
Mid - 3.5-inch drive backplane		
BCQK	ThinkSystem 2U 4x3.5" SAS/SATA Middle Backplane	1
Mid - 2.5-inch drive backplane		
BCQL	ThinkSystem 2U 4x2.5" SAS/SATA Middle Backplane	2‡
BDY7	ThinkSystem 2U 4x2.5" Middle NVMe Backplane	2‡

‡ 2.5-inch drive backplanes for the mid-chassis area must be installed in pairs. NVMe and SAS/SATA cannot be mixed.

Field upgrades: Backplanes are available as part numbers for field upgrades along with require cable option kits, as described in the Field upgrades section below.

The use of drive bays in the mid-chassis area has the following configuration rules:

- All processors are supported. Higher TDP processors will require the performance heatsinks.
- Full-length adapter cards are not supported
- GPUs (including low profile GPUs such as the T4) are not supported

- Riser 1 and Riser 2 are required, since power for the mid bay backplanes comes from Riser 2, and Riser 2 requires Riser 1 be configured
- 2 CPUs are required, since the second processor is required for Riser 2.

Rear drive bays

The SR650 V2 supports hot-swap drives installed at the rear of the server chassis. Supported configurations are as follows:

- 3.5-inch hot-swap drives
  - 2x SAS/SATA drive bays
  - 4x SAS/SATA drive bays
- 2.5-inch hot-swap drives
  - 4x SAS/SATA drive bays
  - 8x SAS/SATA drive bays

The configurations are shown in the following figure.

Riser 3: Rear drive bays and Riser 3 are not supported together, since they occupy the same physical space.

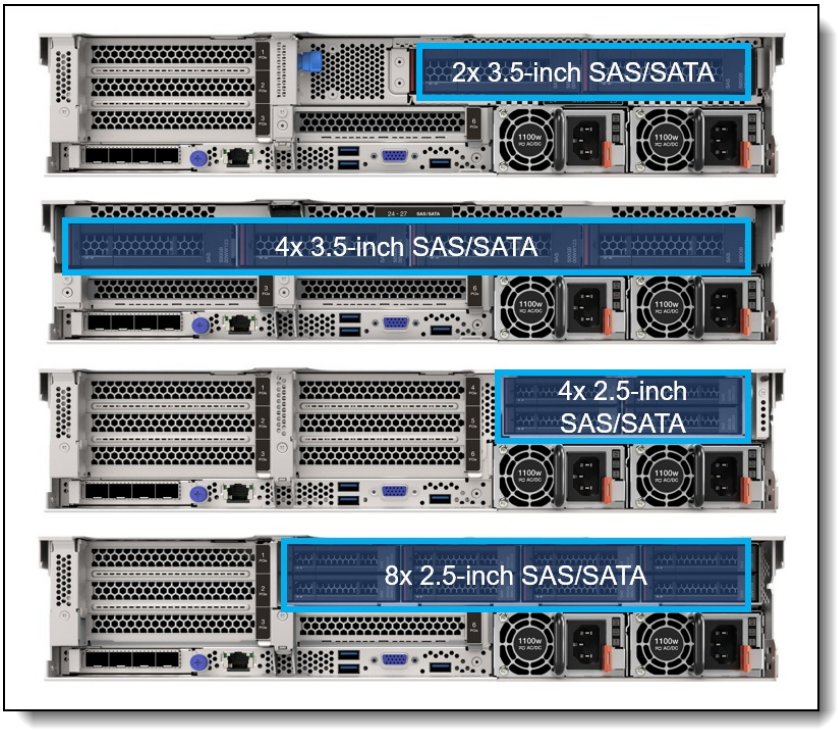

Figure 9. Rear 2.5-inch and 3.5-inch drive bay configurations

In addition, the server supports two 7mm-thickness SSDs which are installed in place of either slot 3 or slot 6 (not both). Supported 7mm drive bays are:

- 2x 7mm SAS/SATA hot-swap drive bays
- 2x 7mm NVMe hot-swap drive bays

These drives are shown in the following figure. See the 7mm drives section for more information.

Tip: These 7mm drives can be used in conjunction with any rear drive 2.5-inch or 3.5-inch bay combination. An exception to this is a configuration of 4x 3.5-inch rear drive bays + mid-chassis drive bays, since the mid-chassis drive bays require Riser 2 for power and, in such a configuration, the 7mm drive bays can only be installed in the same physical space as Riser 2 (slot 6).

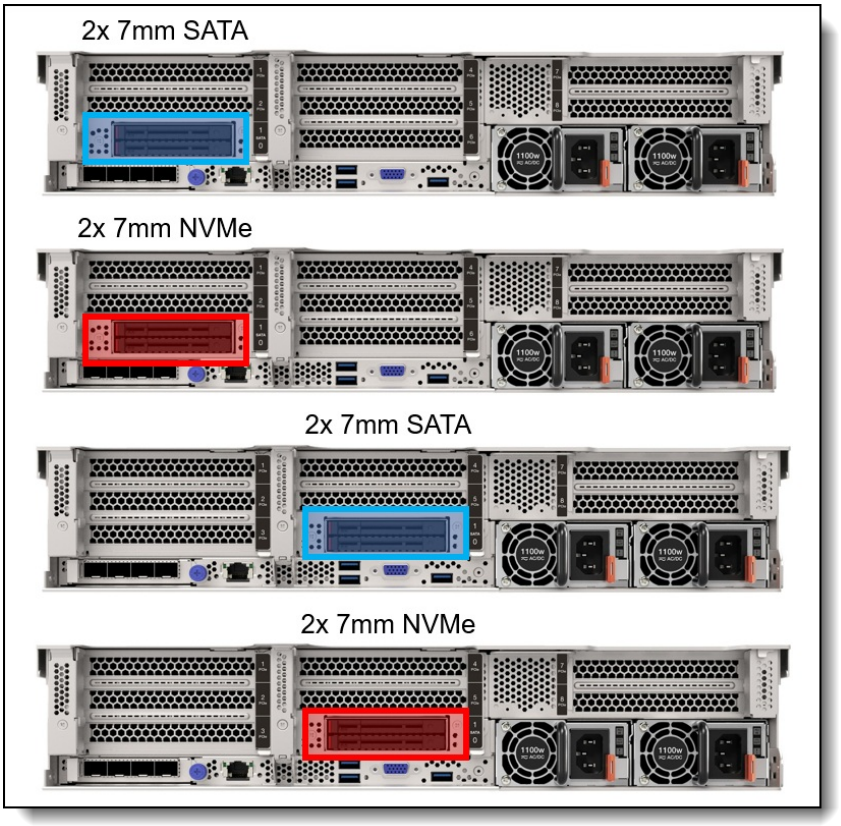

Figure 10. Rear 7mm drive bay configurations

The backplanes used to provide these drive bays are listed in the following table.

Table 18. Backplanes for rear drive bays

Feature code	Description	Maximum supported
Rear - 3.5-inch drive backplanes		
BAG7	ThinkSystem 2U 2x3.5" SAS/SATA Rear Backplane	1
B8L3	ThinkSystem 1U/2U 4x3.5" SAS/SATA Backplane	1
Rear - 2.5-inch drive backplanes		
B8LV	ThinkSystem 2U 4x2.5" SAS/SATA Backplane	1
B97X	ThinkSystem 2U 8x2.5" SAS/SATA Rear Backplane	1
Rear 7mm		
B8P2	ThinkSystem 2U 7mm Drive Kit w/ SATA RAID	1
B8P3	ThinkSystem 2U 7mm Drive Kit w/ NVMe RAID	1

Field upgrades: Backplanes are available as part numbers for field upgrades along with require cable option kits, as described in the Field upgrades section below.

The use of rear drive bays has the following configuration rules:

- Riser 3 is not supported since the rear drive bays occupy the space of this riser.
- The use of rear drive bays restricts the number of slots and the choice of risers that are supported. See the I/O expansion section for details.
- The use of rear drive bays requires Riser 1 be installed, since power for the rear backplane comes from Riser 1
- The 7mm rear drive kit is supported installed in either slot 3 or slot 6 but not both at the same time.
- The 7mm drive enclosure is connected to an onboard port and cannot be connected to any installed RAID adapter or HBA.

Supported drive bay combinations

This section describes the various combinations of 3.5-inch and 2.5-inch drives that the server supports. The drive bay combinations are grouped based on the drive type at the front of the server, 3.5-inch or 2.5-inch.

3.5-inch drive bay chassis

The following table shows the supported combinations when the server is configured with a 3.5-inch chassis (where the front drive bays are 3.5-inch). The table lists the front, middle and rear backplanes required for each drive bay combination. The choice of storage controller for each configuration is listed in the Controller selections section.

M.2 and 7mm drive support: All 3.5-inch configurations listed in the table supported both M.2 and 7mm drives, however some specific adapter combinations restrict the use of M.2 or 7mm as listed in the Controller selections section.

Table 19. Drive bay and backplane combinations with 3.5-inch chassis (Blue cells = SAS/SATA, Purple cells = AnyBay, Red cells = NVMe) (S/S = SAS/SATA, Any = AnyBay)

				Front bays (3.5")		Mid bays			Rear bays					
Cfg	CPUs	Total drives	NVMe drives§	S/S 3.5"	Any 3.5"	S/S 3.5"	S/S 2.5"	NVMe 2.5"	S/S 3.5"	S/S 2.5"	Front backplane	Mid backplane	Rear backplane	Riser 3 support
A	1 or 2	8	0	8	0	0	0	0	0	0	1x 8-S/S	None	None	Yes
B	1 or 2	12	0	12	0	0	0	0	0	0	1x 12-S/S	None	None	Yes
C	1 or 2	14	0	12	0	0	0	0	2	0	1x 12-S/S	None	1x 2-3.5	No
D	1 or 2	16	0	12	0	0	0	0	4	0	1x 12-S/S	None	1x 4-3.5	No
E	2	20	0	12	0	4	0	0	4	0	1x 12-S/S	1x 4-3.5	1x 4-3.5	No
F	1 or 2	16	0	12	0	0	0	0	0	4	1x 12-S/S	None	1x 4-2.5	No
G	2	20	0	12	0	4	0	0	0	4	1x 12-S/S	1x 4-3.5	1x 4-2.5	No
H	2	20	8 (1:1)	12	0	0	0	8	0	0	1x 12-S/S	2x NVMe	None	No
I	2	12	12 (1:1)	0	12	0	0	0	0	0	1x 12-Any	None	None	No
J	2	16	12 (1:1)	0	12	0	0	0	4	0	1x 12-Any	None	1x 4-3.5	No
K	2	20	12 (1:1)	0	12	4	0	0	4	0	1x 12-Any	1x 4-3.5	1x 4-3.5	No

§ The text in parenthesis refers to the subscription ratio. See the NVMe support section for details.

2.5-inch drive bay chassis

The following table shows the supported combinations when the server is configured with a 2.5-inch chassis (where the front drive bays are 2.5-inch). The table lists the front, middle and rear backplanes required for each drive bay combination. The choice of storage controller for each configuration is listed in the Controller selections section.

M.2 and 7mm drive support: All 2.5-inch configurations listed in the table supported both M.2 and 7mm drives.

Table 20. Drive bay and backplane combinations with 2.5-inch chassis (Blue cells = SAS/SATA, Red cells = NVMe, Purple cells = AnyBay) (S/S = SAS/SATA, Any = AnyBay)

Cfg	CPUs	Total drives	NVMe drives§	Front bays (2.5")			Mid bays			Rear bays		Front backplane	Mid backplane	Rear b'plane	Riser 3 support
				S/S 2.5"	Any 2.5"	NVMe 2.5"	S/S 3.5"	S/S 2.5"	NVMe 2.5"	S/S 3.5"	S/S 2.5"				
A	1 or 2	8	0	8	0	0	0	0	0	0	0	1x 8-S/S	None	None	Yes
B	1 or 2	16	0	16	0	0	0	0	0	0	0	2x 8-S/S	None	None	Yes
C	1 or 2	24	0	24	0	0	0	0	0	0	0	3x 8-S/S	None	None	Yes
D	1 or 2	28	0	24	0	0	0	0	0	0	4	3x 8-S/S	None	1x 4-2.5	No
E	2	36	0	24	0	0	0	8	0	0	4	3x 8-S/S	2x 4-2.5	1x 4-2.5	No
F	2	40	0	24	0	0	0	8	0	0	8	3x 8-S/S	2x 4-2.5	2x 4-2.5	No
G	1 or 2†	8	8 (1:1)	0	0	8	0	0	0	0	0	1x 8-NVMe	None	None	No
H	2	16	16 (1:1)	0	0	16	0	0	0	0	0	2x 8-NVMe	None	None	No
I	2	24	24 (1:1)	0	0	24	0	0	0	0	0	3x 8-NVMe	None	None	Yes*
J	2	32	32 (1:2)	0	0	24	0	0	8	0	0	3x 8-NVMe	2x 4-NVMe	None	Yes
K	1 or 2†	16	8 (1:1)	8	0	8	0	0	0	0	0	1x 8-S/S + 1x 8-NVMe	None	None	Yes*
L	1 or 2†	24	8 (1:1)	16	0	8	0	0	0	0	0	2x 8-S/S + 1x 8-NVMe	None	None	Yes*
M	1 or 2†	24	16 (1:1)	8	0	16	0	0	0	0	0	1x 8-S/S + 2x 8-NVMe	None	None	No
N	1 or 2†	8	8 (1:1)	0	8	0	0	0	0	0	0	1x 8-Any	None	None	Yes*
O	2	16	16 (1:1)	0	8	8	0	0	0	0	0	1x 8-Any + 1x 8-NVMe	None	None	No
P	1 or 2†	16	8 (1:1)	8	8	0	0	0	0	0	0	1x 8-S/S + 1x 8-Any	None	None	Yes*
Q	1 or 2†	24	8 (1:1)	16	8	0	0	0	0	0	0	2x 8-S/S + 1x 8-Any	None	None	Yes*
R	1 or 2†	28	8 (1:1)	16	8	0	0	0	0	0	4	2x 8-S/S + 1x 8-Any	None	1x 4-2.5	No
S	1 or 2	24	16 (1:4)	8	16	0	0	0	0	0	0	1x 8-S/S + 2x 8-Any	None	None	Yes
T	1 or 2	16	16 (1:4)	0	16	0	0	0	0	0	0	2x 8-Any	None	None	Yes
U	1 or 2	24	24 (1:4)	0	24	0	0	0	0	0	0	3x 8-Any	None	None	Yes

§ The text in parenthesis refers to the subscription ratio. See the NVMe support section for details.
† Only NVMe configs that use OB NVMe (4) + 1 retimer (4) or configs with a RAID Tri-Mode adapter are supported with 1 CPU. See the specifics in the Controller selections section.
* No support for Riser 3 if 8x OB NVMe or more ports are used. See the Controller selections section.

Controller selections

This section helps you determine with storage adapter are supported for your desired drive bay configuration.

In the tables, the controllers are grouped as follows:

- RAID 8i corresponds to any of the following:
  - ThinkSystem RAID 530-8i PCIe 12Gb Adapter, 7Y37A01082
  - ThinkSystem RAID 930-8i 2GB Flash PCIe 12Gb Adapter, 7Y37A01084
  - ThinkSystem RAID 940-8i 4GB Flash PCIe Gen4 12Gb Adapter, 4Y37A09728
  - ThinkSystem RAID 940-8i 8GB Flash PCIe Gen4 12Gb Adapter, 4Y37A09729
- RAID 5350/9350 8i corresponds to either of the following:
  - ThinkSystem RAID 5350-8i PCIe 12Gb Adapter
  - ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Adapter
- RAID 16i corresponds to any of the following:
  - ThinkSystem RAID 530-16i PCIe 12Gb Adapter, 4Y37A09727
  - ThinkSystem RAID 930-16i 4GB Flash PCIe 12Gb Adapter, 7Y37A01085
  - ThinkSystem RAID 940-16i 8GB Flash PCIe Gen4 12Gb Adapter, 4Y37A09730
- RAID 9350 16i corresponds to the following:
  - ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Adapter
- RAID 16i Int (also referred to as RAID 16i CFF, compact form factor) corresponds to the following:
  - ThinkSystem RAID 940-16i 8GB Flash PCIe Gen4 12Gb Internal Adapter, 4Y37A09735
- RAID 32i corresponds to the following:
  - ThinkSystem RAID 940-32i 8GB Flash PCIe Gen4 12Gb Adapter, 4Y37A09733
- RAID 940 Trimode-U.3 corresponds to the following feature codes (for CTO) for the equivalent adapter part number with the latest firmware:
  - ThinkSystem RAID 940-16i 8GB Flash PCIe Gen4 12Gb Adapter for U.3, BDY4
  - ThinkSystem RAID 940-8i 4GB Flash PCIe Gen4 12Gb Adapter for U.3, BGM1
  - ThinkSystem RAID 940-8i 8GB Flash PCIe Gen4 12Gb Adapter for U.3, BGM0
- HBA 8i corresponds to the following:
  - ThinkSystem 430-8i SAS/SATA 12Gb HBA, 7Y37A01088
- HBA 4350 8i corresponds to the following:
  - ThinkSystem 4350-8i SAS/SATA 12Gb HBA
- HBA 16i corresponds to the following:
  - ThinkSystem 430-16i SAS/SATA 12Gb HBA, 7Y37A01089
- HBA 4350 16i corresponds to the following:
  - ThinkSystem 4350-16i SAS/SATA 12Gb HBA
- HBA 16i Int (also referred to as HBA 16i CFF) corresponds to the following:
  - ThinkSystem 440-16i SAS/SATA PCIe Gen4 12Gb Internal HBA, 4Y37A09725
- OB SATA (onboard SATA) corresponds to the following in CTO orders:
  - On Board SATA Software RAID Mode, feature AVV0
- OB NVMe (onboard NVMe) corresponds to the following in CTO orders:
  - Non RAID NVMe, feature BC4V
  - Intel VROC (VMD NVMe RAID) Intel SSD Only, feature B9X7
  - Intel VROC (VMD NVMe RAID) Premium, feature B96G
- Retimer corresponds to the following:
  - ThinkSystem 4-Port PCIe Gen4 NVMe Retimer Adapter, 4C57A65446
- 1611-8P corresponds to the following:
  - ThinkSystem 1611-8P PCIe Gen4 Switch Adapter, 4Y37A09737

Many of the configurations also support the 7mm rear drive bays (which can can be either SATA or NVMe) and the M.2 adapter. Support is marked as "Opt" (short for Optional). "No" means no support for the respective drive type. Restrictions are noted as appropriate. See the 7mm drives and M.2 drives sections for details.

Many of the configurations also support Riser 3. The use of Riser 3 has the following requirements:

- Two processor installed
- No rear drive bays configured
- At most 4x onboard NVMe (OB NVMe) connections

Many of the NVMe configurations are supported with ony 1 processor. NVMe configuration with 1 processor have the following requirements:

- The use of only 4x OB NVMe is supported
- The use of a RAID adapter in Tri-Mode is supported
- The use of up to 3 PCIe adapters (not counting the OCP adapter) is supported
- The use of the internal SAS expander is supported
- No support of the internal cabled RAID adapter or HBA (RAID/HBA 16i Int in the tables)

3.5-inch chassis configurations

The following table lists the supported drive bay combinations for configurations with 3.5-inch front drive bays, plus the list of supported controller combinations supported by each of those drive bay combinations. Information about the controllers can be found in the Controllers for internal storage section.

Table 21. Drive bay combinations with 3.5-inch chassis (Blue cells = SAS/SATA, Purple = AnyBay, Red cells = NVMe)

Cfg	Front bays (3.5")		Mid bays			Rear bays		CPUs	Support			Controller combinations (drive count) (F=Front, M=Mid, R=Rear)
	S/S 3.5"	Any 3.5"	S/S 3.5"	S/S 2.5"	NVMe 2.5"	S/S 3.5"	S/S 2.5"		7mm	M.2	Ris 3*	
A	8	0	0	0	0	0	0	1 or 2	Yes	Yes	Yes	OB SATA (8) (F)
								1 or 2	Yes	Yes	Yes	1x RAID/HBA 8i (8) (F)
								1 or 2	Yes	Yes	Yes	1x RAID 5350/9350/HBA 4350 8i (8) (F)
B	12	0	0	0	0	0	0	1 or 2	Yes	Yes	Yes	OB SATA (12) (F)
								1 or 2	Yes	Yes	Yes	1x RAID/HBA 16i (12) (F)
								1 or 2	Yes	Yes	Yes	1x RAID 9350/HBA 4350 16i (12) (F)
C	12	0	0	0	0	2	0	1 or 2	Yes	No	No	OB SATA (14) (F+R)
								1 or 2	Yes	Yes	No	1x RAID/HBA 16i (14) (F+R)
								1 or 2	Yes	Yes	No	1x RAID 9350/HBA 4350 16i (14) (F+R)
								1 or 2	Yes	Yes	No	1x RAID/HBA 16i (12) (F) + 1x RAID 8i (2) (R)
								1 or 2	Yes	Yes	No	1x RAID/HBA 16i (12) (F) + OB SATA (2) (R)
D	12	0	0	0	0	4	0	1 or 2	Yes	Yes	No	1x RAID/HBA 16i (16) (F+R)
								1 or 2	Yes	Yes	No	1x RAID 9350/HBA 4350 16i (16) (F+R)
								1 or 2	No	Yes	No	1x RAID/HBA 16i (12) (F) + 1x RAID 8i (4) (R)
								1 or 2	Yes	Yes	No	1x RAID/HBA 16i (12) (F) + OB SATA (4) (R)
								1 or 2	Yes	Yes	No	OB SATA (12) (F) + 1x RAID/HBA 8i (4) (R)
E	12	0	4	0	0	4	0	2	No	Yes	No	OB SATA (12) (F) + HBA 8i (8) (M+R)
								2	No	Yes	No	1x RAID 32i (20) (F+M+R)
F	12	0	0	0	0	0	4	1 or 2	Yes	Yes	No	1x RAID/HBA 16i (16) (F+R)
								1 or 2	Yes	Yes	No	1x RAID/HBA 16i (12) (F) + RAID 8i (4) (R)
								1 or 2	Yes	Yes	No	1x RAID/HBA 16i (12) (F) + OB SATA (4) (R)
								1 or 2	Yes	Yes	No	OB SATA (12) (F) + 1x RAID/HBA 8i (4) (R)
G	12	0	4	0	0	0	4	2	Yes	Yes	No	1x RAID 32i (20) (F+M+R)
H	12	0	0	0	8	0	0	2	Yes	Yes	No	1x RAID/HBA 16i (12) (F) + OB NVMe (8) (M)
I	0	12	0	0	0	0	0	2	Yes	Yes	No	OB SATA (12) + OB NVMe (12) (F)
								2	Yes	Yes	No	1x RAID/HBA 16i (12) + OB NVMe (12) (F)
J	0	12	0	0	0	4	0	2	Yes	Yes	No	1x RAID/HBA 16i + OB NVMe (12) (F+R)
								2	No	Yes	No	1x RAID/HBA 16i (F) + OB NVMe (12)+ 1x RAID 8i (R)
K	0	12	4	0	0	4	0	2	No	Yes	No	1x RAID 32i (20) + OB NVMe (12) (F+M+R)

* The use of Riser 3 requires two processors

2.5-inch chassis configurations

The following table lists the supported drive bay combinations for configurations with 2.5-inch front drive bays, plus the list of supported controller combinations supported by each of those drive bay combinations. Information about the controllers can be found in the Controllers for internal storage section.

Table 22. Drive bay combinations with 2.5-inch chassis (Blue = SAS/SATA, Purple = AnyBay, Red = NVMe)

Cfg	Front bays (2.5")			Mid bays			Rear bays		CPUs	Support			Controller combinations (drive count) (F=Front, M=Mid, R=Rear)
	S/S 2.5"	Any 2.5"	NVMe 2.5"	S/S 3.5"	S/S 2.5"	NVMe 2.5"	S/S 3.5"	S/S 2.5"		7mm	M.2	Ris 3*	
A	8	0	0	0	0	0	0	0	1 or 2	Yes	Yes	Yes	OB SATA (8) (F)
									1 or 2	Yes	Yes	Yes	1x RAID/HBA 8i (8) (F)
									1 or 2	Yes	Yes	Yes	1x RAID 5350/9350/HBA 4350 8i (8) (F)
									1 or 2	Yes	Yes	Yes	1x RAID/HBA 16i (8) (F)
									2	Yes	Yes	Yes	1x RAID/HBA 16i Int (8) (F)
B	16	0	0	0	0	0	0	0	1 or 2	Yes	Yes	Yes	OB SATA (8) + 1x RAID/HBA 8i (8) (F)
									1 or 2	Yes	Yes	Yes	2x RAID/HBA 8i (16) (F)
									1 or 2	Yes	Yes	Yes	1x RAID/HBA 16i (16) (F)
									1 or 2	Yes	Yes	Yes	1x RAID 9350/HBA 4350 16i (16) (F)
									2	Yes	Yes	Yes	1x RAID/HBA 16i Int (16) (F)
									1 or 2	Yes	Yes	Yes	1x RAID 32i (16) (F)
C	24	0	0	0	0	0	0	0	1 or 2	Yes	Yes	Yes	3x RAID 8i (8+8+8) (F)
									1 or 2	Yes	Yes	Yes	1x RAID/HBA 8i + Exp Int (24) (F)
									2	Yes	Yes	Yes	1x RAID/HBA 16i Int + Exp Int (24) (F)
									1 or 2	Yes	Yes	Yes	1x RAID 32i (24) (F)
									1 or 2	Yes	Yes	Yes	1x HBA 16i (16) + 1x RAID 530-8i (8) (F)
									1 or 2	Yes	Yes	Yes	2x HBA 8i (8) + 1x RAID 530-8i (8) (F)
D	24	0	0	0	0	0	0	4	2	Yes	Yes	No	3x RAID 8i (8+8+8) (F) + 1x RAID 8i (4) (R)
									1 or 2	Yes	Yes	No	1x RAID/HBA 8i + Exp Int (28) (F+R)
									2	Yes	Yes	No	1x RAID/HBA 16i Int + Exp Int (28) (F+R)
									1 or 2	Yes	Yes	No	1x RAID 32i (28) (F+R)
E	24	0	0	0	8	0	0	4	2	Yes	Yes	No	1x RAID/HBA 8i Int + Exp Int (36) (F+M+R)
									2	Yes	Yes	No	1x RAID/HBA 16i Int + Exp Int (36) (F+M+R)
F	24	0	0	0	8	0	0	8	2	Yes	Yes	No	1x RAID 16i Int + Exp Int (40) (F+M+R)
									2	Yes	Yes	No	1x HBA 430-16i Int + Exp Int (40) (F+M+R)
G	0	0	8	0	0	0	0	0	2	Yes	Yes	No	OB NVMe (8) (F)
									1	Yes	Yes	No	OB NVMe (4) + 1x Retimer (4) (F)
H	0	0	16	0	0	0	0	0	2	Yes	Yes	No	OB NVMe (12) + 1x Retimer (4) (F)
I	0	0	24	0	0	0	0	0	2	Yes	Yes	No	OB NVMe (12) + 3x Retimer (4+4+4) (F)
J	0	0	24	0	0	8	0	0	2	Yes	Yes	Yes	3x 1611-8P (24) (F) + 1x 1611-8P (8) (M)
K	8	0	8	0	0	0	0	0	2	Yes	Yes	No	OB SATA (8) + OB NVMe (8) (F)
									2	Yes	Yes	No	1x RAID/HBA 8i (8) + OB NVMe (8) (F)
									2	Yes	Yes	No	1x RAID/HBA 16i (8) + OB NVMe (8) (F)
									2	Yes	Yes	No	1x RAID/HBA 16i Int (8) + OB NVMe (8) (F)

Cfg	Front bays (2.5")			Mid bays			Rear bays		CPUs	Support			Controller combinations (drive count) (F=Front, M=Mid, R=Rear)
	S/S 2.5"	Any 2.5"	NVMe 2.5"	S/S 3.5"	S/S 2.5"	NVMe 2.5"	S/S 3.5"	S/S 2.5"		7mm	M.2	Ris 3*	
									1 or 2	Yes	Yes	Yes	OB SATA (8) + OB NVMe (4) + 1x Retimer (4) (F)
									1 or 2	Yes	Yes	Yes	1x RAID/HBA 8i (8) + OB NVMe (4) + 1x Retimer (4) (F)
									1 or 2	Yes	Yes	Yes	1x RAID/HBA 16i (8) + OB NVMe (4) + 1x Retimer (4) (F)
L	16	0	8	0	0	0	0	0	2	Yes	Yes	No	1x RAID/HBA 8i + Exp Int (16) + OB NVMe (8) (F)
									2	Yes	Yes	No	1x RAID/HBA 16i Int (16) + OB NVMe (8) (F)
									2	Yes	Yes	No	1x RAID 32i (16) + OB NVMe (8) (F)
									1 or 2	Yes	Yes	Yes	1x RAID 8i/HBA + Exp Int (16) + OB NVMe (4) + 1x Retimer (4) (F)
M	8	0	16	0	0	0	0	0	2	Yes	Yes	No	1x RAID/HBA 8i (8) + OB NVMe (12) + 1x Retimer (4) (F)
									2	Yes	Yes	No	1x RAID/HBA 16i (8) + OB NVMe (12) + 1x Retimer (4) (F)
N	0	8	0	0	0	0	0	0	2	Yes	Yes	No	1x RAID/HBA 8i (8) + OB NVMe (8) (F)
									2	Yes	Yes	No	1x RAID/HBA 16i (8) + OB NVMe (8) (F)
									2	Yes	Yes	No	1x RAID/HBA 16i Int (8) + OB NVMe (8) (F)
									1 or 2	Yes	Yes	No	1x RAID/HBA 8i (8) + OB NVMe (4) + 1x Retimer (4) (F)
									1 or 2	Yes	Yes	No	1x RAID/HBA 16i (8) + OB NVMe (4) + 1x Retimer (4) (F)
									1 or 2	Yes	Yes	Yes	1x RAID 940-8i Trimode-U.3 (8) (F)
O	0	8	8	0	0	0	0	0	2	Yes	Yes	No	1x RAID/HBA 8i (8) + OB NVMe (12) + 1x Retimer (4) (F)
									2	Yes	Yes	No	1x RAID/HBA 16i + OB NVMe (12) + 1x Retimer (4) (F)
P	8	8	0	0	0	0	0	0	2	Yes	Yes	No	2x RAID/HBA 8i (16) + OB NVMe (8) (F)
									2	Yes	Yes	No	1x RAID/HBA 16i (16) + OB NVMe (8) (F)
									2	Yes	Yes	No	1x RAID/HBA 16i Int (16) + OB NVMe (8) (F)
									2	Yes	Yes	No	1x RAID 32i (16) + OB NVMe (8) (F)
									1 or 2	Yes	Yes	Yes	2x RAID/HBA 8i (16) + OB NVMe (4) + 1x Retimer (4) (F)
									1 or 2	Yes	Yes	Yes	1x RAID/HBA 16i (16) + OB NVMe (4) + 1x Retimer (4) (F)
									1 or 2	Yes	Yes	No	OB SATA (8) + RAID 940-8i Trimode-U.3 (8) (F)
									1 or 2	Yes	Yes	No	1x RAID/HBA 8i (8) + RAID 940-8i Trimode-U.3 (8) (F)
									1 or 2	Yes	Yes	No	1x RAID/HBA 16i (8) + RAID 940-8i Trimode-U.3 (8) (F)
									2	Yes	Yes	No	1x RAID/HBA 16i Int (8) + RAID 940-8i Trimode-U.3 (8) (F)

Cfg	Front bays (2.5")		Mid bays			Rear bays			CPUs	Support			Controller combinations (drive count) (F=Front, M=Mid, R=Rear)
	S/S 2.5"	Any 2.5"	NVMe 2.5"	S/S 3.5"	S/S 2.5"	NVMe 2.5"	S/S 3.5"	S/S 2.5"		7mm	M.2	Ris 3*	
Q	16	8	0	0	0	0	0	0	2	Yes	Yes	No	3x RAID/HBA 8i (24) + OB NVMe (8) (F)
									2	Yes	Yes	No	1x RAID/HBA 8i + Exp Int (24) + OB NVMe (8) (F)
									2	Yes	Yes	No	1x RAID/HBA 16i Int + Exp Int (24) + OB NVMe (8) (F)
									2	Yes	Yes	No	1x RAID 32i (24) + OB NVMe (8) (F)
									1 or 2	Yes	Yes	Yes	1x RAID/HBA 8i + Exp Int (24) + OB NVMe (4) + 1x Retimer (4) (F)
									1 or 2	Yes	Yes	Yes	1x RAID 32i (24) + OB NVMe (4) + 1x Retimer (4) (F)
R	16	8	0	0	0	0	0	4	2	Yes	Yes	No	3x RAID 8i (24) + OB NVMe (8) (F) + 1x RAID 8i (4) (R)
									2	Yes	Yes	No	1x RAID/HBA 8i + Exp Int (28) + OB NVMe (8) (F+R)
									1 or 2	Yes	Yes	No	1x RAID/HBA 8i + Exp Int (28) + OB NVMe (4) + 1x Retimer (4) (F+R)
									2	Yes	Yes	No	1x RAID/HBA 16i Int + Exp Int (28) + OB NVMe (8) (F+R)
									2	Yes	Yes	No	1x RAID 32i (28) + OB NVMe (8) (F+R)
									1 or 2	Yes	Yes	No	1x RAID 32i (28) + OB NVMe (4) + 1x Retimer (4) (F+R)
S	8	16	0	0	0	0	0	0	1 or 2	Yes	Yes	Yes	1x RAID/HBA 8i (8) + RAID 940-16i Trimode-U.3 (16) (F)
									1 or 2	Yes	Yes	Yes	1x RAID/HBA 16i (8) + RAID 940-16i Trimode-U.3 (16) (F)
									1 or 2	Yes	Yes	Yes	1x RAID/HBA 8i (8) + 2x RAID 940-8i Trimode-U.3 (8+8) (F)
									1 or 2	Yes	Yes	Yes	1x RAID/HBA 16i (8) + 2x RAID 940-8i Trimode-U.3 (8+8) (F)
T	0	16	0	0	0	0	0	0	1 or 2	Yes	Yes	Yes	2x RAID 940-8i Trimode-U.3 (8+8) (F)
U	0	24	0	0	0	0	0	0	1 or 2	Yes	Yes	Yes	3x RAID 940-8i Trimode-U.3 (8+8+8) (F)

* The use of Riser 3 requires two processors

Field upgrades

The SR650 V2 is orderable without drive bays, allowing you to add a backplane, cabling and controllers as field upgrades. The server also supports upgrading some configurations by adding additional front drive bays (for example, upgrading from 8 to 16x 2.5-inch drive bays).

Upgrade path: The key criteria for upgrade support is to ensure that the target configuration is one of the supported drive bay configurations as listed in the Supported drive bay combinations section.

For example, if you are upgrading a 2.5-inch drive configuration from Config A to Config B, you will need these additional options:

- 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit
- 4X97A59811, ThinkSystem SR650 V2 2.5" Chassis Front BP2 SAS/SATA Cable Kit

To add drive bays you will need to order both drive backplanes and cable kits. Backplane kits do not include cables.

Topics in this section:

- 3.5-inch chassis drive bay upgrades
- 2.5-inch chassis drive bay upgrades
- Contents of cable kits

3.5-inch chassis drive bay upgrades

The table below lists the backplane kits and cable kits needed to build one of the supported 3.5-inch chassis configurations. The configurations each have a letter that matches the configurations listed in the Supported drive bay combinations and Controller selections sections.

Table 23. Drive bay field upgrade for the 3.5-inch chassis (Blue = SAS/SATA, Purple = AnyBay, Red = NVMe)

	Front bays (3.5")		Mid bays			Rear bays		
Cfg	S/S 3.5"	Any 3.5"	S/S 3.5"	S/S 2.5"	NVMe 2.5"	S/S 3.5"	S/S 2.5"	Backplane and cable kits required (all required)
A	8	0	0	0	0	0	0	• 4XH7A60932, ThinkSystem SR650 V2/SR665 8x3.5" SAS/SATA Backplane Option Kit • 4X97A59804, ThinkSystem SR650 V2 3.5" Chassis Front Backplane SAS/SATA Cable Kit
B	12	0	0	0	0	0	0	• 4XH7A60929, ThinkSystem SR650 V2/SR665 12x3.5" SAS/SATA Backplane Option Kit • 4X97A59804, ThinkSystem SR650 V2 3.5" Chassis Front Backplane SAS/SATA Cable Kit
C	12	0	0	0	0	2	0	• 4XH7A60929, ThinkSystem SR650 V2/SR665 12x3.5" SAS/SATA Backplane Option Kit • 4XH7A60940, ThinkSystem SR650 V2/SR665 Rear 2x3.5" SAS/SATA Backplane Option Kit • 4X97A59804, ThinkSystem SR650 V2 3.5" Chassis Front Backplane SAS/SATA Cable Kit • 4X97A59806, ThinkSystem SR650 V2 3.5" Chassis Rear Backplane SAS/SATA Cable Kit
D	12	0	0	0	0	4	0	• 4XH7A60929, ThinkSystem SR650 V2/SR665 12x3.5" SAS/SATA Backplane Option Kit • 4XH7A60939, ThinkSystem SR650 V2/SR665 Rear 4x3.5" SAS/SATA Backplane Option Kit • 4X97A59804, ThinkSystem SR650 V2 3.5" Chassis Front Backplane SAS/SATA Cable Kit • 4X97A59806, ThinkSystem SR650 V2 3.5" Chassis Rear Backplane SAS/SATA Cable Kit
E	12	0	4	0	0	4	0	• 4XH7A60929, ThinkSystem SR650 V2/SR665 12x3.5" SAS/SATA Backplane Option Kit • 4XH7A61053, ThinkSystem SR650 V2 Middle 4x3.5" SAS/SATA Backplane Option Kit • 4XH7A60939, ThinkSystem SR650 V2/SR665 Rear 4x3.5" SAS/SATA Backplane Option Kit • 4X97A59804, ThinkSystem SR650 V2 3.5" Chassis Front Backplane SAS/SATA Cable Kit • 4X97A59806, ThinkSystem SR650 V2 3.5" Chassis Rear Backplane SAS/SATA Cable Kit • 4X97A59807, ThinkSystem SR650 V2 3.5" Chassis Middle Backplane SAS/SATA Cable Kit

Cfg	Front bays (3.5")		Mid bays			Rear bays		Backplane and cable kits required (all required)
	S/S 3.5"	Any 3.5"	S/S 3.5"	S/S 2.5"	NVMe 2.5"	S/S 3.5"	S/S 2.5"	
F	12	0	0	0	0	0	4	• 4XH7A60929, ThinkSystem SR650 V2/SR665 12x3.5" SAS/SATA Backplane Option Kit • 4XH7A60938, ThinkSystem SR650 V2/SR665 Rear 4x2.5" SAS/SATA Backplane Option Kit • 4X97A59804, ThinkSystem SR650 V2 3.5" Chassis Front Backplane SAS/SATA Cable Kit • 4X97A59814, ThinkSystem SR650 V2 2.5" Chassis Rear Backplane SAS/SATA Cable Kit
G	12	0	4	0	0	0	4	• 4XH7A60929, ThinkSystem SR650 V2/SR665 12x3.5" SAS/SATA Backplane Option Kit • 4XH7A61053, ThinkSystem SR650 V2 Middle 4x3.5" SAS/SATA Backplane Option Kit • 4XH7A60938, ThinkSystem SR650 V2/SR665 Rear 4x2.5" SAS/SATA Backplane Option Kit • 4X97A59804, ThinkSystem SR650 V2 3.5" Chassis Front Backplane SAS/SATA Cable Kit • 4X97A59814, ThinkSystem SR650 V2 2.5" Chassis Rear Backplane SAS/SATA Cable Kit • 4X97A59807, ThinkSystem SR650 V2 3.5" Chassis Middle Backplane SAS/SATA Cable Kit
H	12	0	0	0	8	0	0	• 4XH7A60929, ThinkSystem SR650 V2/SR665 12x3.5" SAS/SATA Backplane Option Kit • 4XH7A61052, ThinkSystem SR650 V2 Middle 8x2.5" NVMe Backplane Option Kit • 4X97A59804, ThinkSystem SR650 V2 3.5" Chassis Front Backplane SAS/SATA Cable Kit • 4X97A59816, ThinkSystem SR650 V2 2.5" Chassis Middle Backplane NVMe Cable Kit
I	0	12	0	0	0	0	0	• 4XH7A61077, ThinkSystem SR650 V2 12x3.5" Anybay Backplane Option Kit • 4X97A59805, ThinkSystem SR650 V2 3.5" Chassis Front Backplane AnyBay Cable Kit
J	0	12	0	0	0	4	0	• 4XH7A61077, ThinkSystem SR650 V2 12x3.5" Anybay Backplane Option Kit • 4XH7A60939, ThinkSystem SR650 V2/SR665 Rear 4x3.5" SAS/SATA Backplane Option Kit • 4X97A59805, ThinkSystem SR650 V2 3.5" Chassis Front Backplane AnyBay Cable Kit • 4X97A59806, ThinkSystem SR650 V2 3.5" Chassis Rear Backplane SAS/SATA Cable Kit
K	0	12	4	0	0	4	0	• 4XH7A61077, ThinkSystem SR650 V2 12x3.5" Anybay Backplane Option Kit • 4XH7A61053, ThinkSystem SR650 V2 Middle 4x3.5" SAS/SATA Backplane Option Kit • 4XH7A60939, ThinkSystem SR650 V2/SR665 Rear 4x3.5" SAS/SATA Backplane Option Kit • 4X97A59805, ThinkSystem SR650 V2 3.5" Chassis Front Backplane AnyBay Cable Kit • 4X97A59806, ThinkSystem SR650 V2 3.5" Chassis Rear Backplane SAS/SATA Cable Kit • 4X97A59807, ThinkSystem SR650 V2 3.5" Chassis Middle Backplane SAS/SATA Cable Kit

2.5-inch chassis drive bay upgrades

The table below lists the backplane kits and cable kits needed to build one of the supported 2.5-inch chassis configurations. The configurations each have a letter that matches the configurations listed in the Supported drive bay combinations and Controller selections sections.

Note: Front drive cable kits are based on the location of the backplane in the server. The three backplane locations are BP1, BP2 and BP3 as shown in the following figure.

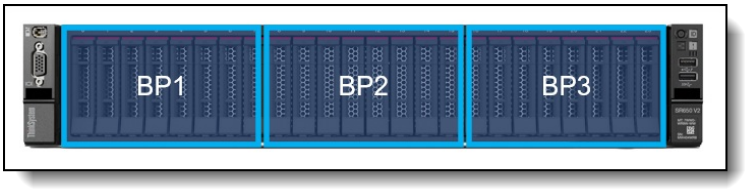

Figure 11. Backplane numbering

Table 24. Drive bay field upgrade for the 2.5-inch chassis (Blue = SAS/SATA, Purple = AnyBay, Red = NVMe)

	Front bays (2.5")			Mid bays		Rear bays	
Cfg	S/S 2.5"	Any 2.5"	NVMe 2.5"	S/S 2.5"	NVMe 2.5"	S/S 2.5"	Backplane and cable kits required (all required)
A	8	0	0	0	0	0	• 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4X97A59809, ThinkSystem SR650 V2 2.5" Chassis Front BP1 SAS/SATA Cable Kit
B	16	0	0	0	0	0	• 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4X97A59809, ThinkSystem SR650 V2 2.5" Chassis Front BP1 SAS/SATA Cable Kit • 4X97A59811, ThinkSystem SR650 V2 2.5" Chassis Front BP2 SAS/SATA Cable Kit
C	24	0	0	0	0	0	• 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4X97A59809, ThinkSystem SR650 V2 2.5" Chassis Front BP1 SAS/SATA Cable Kit • 4X97A59811, ThinkSystem SR650 V2 2.5" Chassis Front BP2 SAS/SATA Cable Kit • 4X97A59813, ThinkSystem SR650 V2 2.5" Chassis Front BP3 SAS/SATA Cable Kit

Cfg	Front bays (2.5")			Mid bays		Rear bays	Backplane and cable kits required (all required)
	S/S 2.5"	Any 2.5"	NVMe 2.5"	S/S 2.5"	NVMe 2.5"	S/S 2.5"	
D	24	0	0	0	0	4	• 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A60938, ThinkSystem SR650 V2/SR665 Rear 4x2.5" SAS/SATA Backplane Option Kit • 4X97A59809, ThinkSystem SR650 V2 2.5" Chassis Front BP1 SAS/SATA Cable Kit • 4X97A59811, ThinkSystem SR650 V2 2.5" Chassis Front BP2 SAS/SATA Cable Kit • 4X97A59813, ThinkSystem SR650 V2 2.5" Chassis Front BP3 SAS/SATA Cable Kit • 4X97A59814, ThinkSystem SR650 V2 2.5" Chassis Rear Backplane SAS/SATA Cable Kit
E	24	0	0	8	0	4	• 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A61051, ThinkSystem SR650 V2 Middle 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A60938, ThinkSystem SR650 V2/SR665 Rear 4x2.5" SAS/SATA Backplane Option Kit • 4X97A59809, ThinkSystem SR650 V2 2.5" Chassis Front BP1 SAS/SATA Cable Kit • 4X97A59811, ThinkSystem SR650 V2 2.5" Chassis Front BP2 SAS/SATA Cable Kit • 4X97A59813, ThinkSystem SR650 V2 2.5" Chassis Front BP3 SAS/SATA Cable Kit • 4X97A59814, ThinkSystem SR650 V2 2.5" Chassis Rear Backplane SAS/SATA Cable Kit • 4X97A59815, ThinkSystem SR650 V2 2.5" Chassis Middle Backplane SAS/SATA Cable Kit
F	24	0	0	8	0	8	• 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A61051, ThinkSystem SR650 V2 Middle 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A60941, ThinkSystem SR650 V2/SR665 Rear 8x2.5" SAS/SATA Backplane Option Kit • 4X97A59809, ThinkSystem SR650 V2 2.5" Chassis Front BP1 SAS/SATA Cable Kit • 4X97A59811, ThinkSystem SR650 V2 2.5" Chassis Front BP2 SAS/SATA Cable Kit • 4X97A59813, ThinkSystem SR650 V2 2.5" Chassis Front BP3 SAS/SATA Cable Kit • 4X97A59814, ThinkSystem SR650 V2 2.5" Chassis Rear Backplane SAS/SATA Cable Kit • 4X97A59815, ThinkSystem SR650 V2 2.5" Chassis Middle Backplane SAS/SATA Cable Kit

Cfg	Front bays (2.5")			Mid bays		Rear bays	Backplane and cable kits required (all required)
	S/S 2.5"	Any 2.5"	NVMe 2.5"	S/S 2.5"	NVMe 2.5"	S/S 2.5"	
G	0	0	8	0	0	0	• 4XH7A61076, ThinkSystem SR650 V2 8x2.5" NVMe Backplane Option Kit • 4X97A59808, ThinkSystem SR650 V2 2.5" Chassis Front BP1 NVMe Cable Kit
H	0	0	16	0	0	0	• 4XH7A61076, ThinkSystem SR650 V2 8x2.5" NVMe Backplane Option Kit • 4XH7A61076, ThinkSystem SR650 V2 8x2.5" NVMe Backplane Option Kit • 4X97A59808, ThinkSystem SR650 V2 2.5" Chassis Front BP1 NVMe Cable Kit • 4X97A59810, ThinkSystem SR650 V2 2.5" Chassis Front BP2 NVMe Cable Kit
I	0	0	24	0	0	0	• 4XH7A61076, ThinkSystem SR650 V2 8x2.5" NVMe Backplane Option Kit • 4XH7A61076, ThinkSystem SR650 V2 8x2.5" NVMe Backplane Option Kit • 4XH7A61076, ThinkSystem SR650 V2 8x2.5" NVMe Backplane Option Kit • 4X97A59818, ThinkSystem SR650 V2 2.5" Chassis 24x 2.5" NVMe Cable Kit
J	0	0	24	0	8	0	• 4XH7A61076, ThinkSystem SR650 V2 8x2.5" NVMe Backplane Option Kit • 4XH7A61076, ThinkSystem SR650 V2 8x2.5" NVMe Backplane Option Kit • 4XH7A61076, ThinkSystem SR650 V2 8x2.5" NVMe Backplane Option Kit • 4XH7A61052, ThinkSystem SR650 V2 Middle 8x2.5" NVMe Backplane Option Kit • 4X97A59819, ThinkSystem SR650 V2 2.5" Chassis 32x 2.5" NVMe Cable Kit
K	8	0	8	0	0	0	• 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A61076, ThinkSystem SR650 V2 8x2.5" NVMe Backplane Option Kit • 4X97A59809, ThinkSystem SR650 V2 2.5" Chassis Front BP1 SAS/SATA Cable Kit • 4X97A59810, ThinkSystem SR650 V2 2.5" Chassis Front BP2 NVMe Cable Kit
L	16	0	8	0	0	0	• 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A61076, ThinkSystem SR650 V2 8x2.5" NVMe Backplane Option Kit • 4X97A59809, ThinkSystem SR650 V2 2.5" Chassis Front BP1 SAS/SATA Cable Kit • 4X97A59811, ThinkSystem SR650 V2 2.5" Chassis Front BP2 SAS/SATA Cable Kit • 4X97A59812, ThinkSystem SR650 V2 2.5" Chassis Front BP3 NVMe Cable Kit
M	8	0	16	0	0	0	• 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A61076, ThinkSystem SR650 V2 8x2.5" NVMe Backplane Option Kit • 4XH7A61076, ThinkSystem SR650 V2 8x2.5" NVMe Backplane Option Kit • 4X97A59809, ThinkSystem SR650 V2 2.5" Chassis Front BP1 SAS/SATA Cable Kit • 4X97A59810, ThinkSystem SR650 V2 2.5" Chassis Front BP2 NVMe Cable Kit • 4X97A59812, ThinkSystem SR650 V2 2.5" Chassis Front BP3 NVMe Cable Kit
N	0	8	0	0	0	0	• 4XH7A61078, ThinkSystem SR650 V2 8x2.5" Anybay Backplane Option Kit • 4X97A59809, ThinkSystem SR650 V2 2.5" Chassis Front BP1 SAS/SATA Cable Kit • 4X97A59808, ThinkSystem SR650 V2 2.5" Chassis Front BP1 NVMe Cable Kit

Cfg	Front bays (2.5")			Mid bays		Rear bays	Backplane and cable kits required (all required)
	S/S 2.5"	Any 2.5"	NVMe 2.5"	S/S 2.5"	NVMe 2.5"	S/S 2.5"	
O	0	8	8	0	0	0	• 4XH7A61078, ThinkSystem SR650 V2 8x2.5" Anybay Backplane Option Kit • 4XH7A61076, ThinkSystem SR650 V2 8x2.5" NVMe Backplane Option Kit • 4X97A59809, ThinkSystem SR650 V2 2.5" Chassis Front BP1 SAS/SATA Cable Kit • 4X97A59808, ThinkSystem SR650 V2 2.5" Chassis Front BP1 NVMe Cable Kit • 4X97A59810, ThinkSystem SR650 V2 2.5" Chassis Front BP2 NVMe Cable Kit
P	8	8	0	0	0	0	• 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A61078, ThinkSystem SR650 V2 8x2.5" Anybay Backplane Option Kit • 4X97A59809, ThinkSystem SR650 V2 2.5" Chassis Front BP1 SAS/SATA Cable Kit • 4X97A59811, ThinkSystem SR650 V2 2.5" Chassis Front BP2 SAS/SATA Cable Kit • 4X97A59810, ThinkSystem SR650 V2 2.5" Chassis Front BP2 NVMe Cable Kit
Q	16	8	0	0	0	0	• 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A61078, ThinkSystem SR650 V2 8x2.5" Anybay Backplane Option Kit • 4X97A59809, ThinkSystem SR650 V2 2.5" Chassis Front BP1 SAS/SATA Cable Kit • 4X97A59811, ThinkSystem SR650 V2 2.5" Chassis Front BP2 SAS/SATA Cable Kit • 4X97A59813, ThinkSystem SR650 V2 2.5" Chassis Front BP3 SAS/SATA Cable Kit • 4X97A59812, ThinkSystem SR650 V2 2.5" Chassis Front BP3 NVMe Cable Kit
R	16	8	0	0	0	4	• 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A60930, ThinkSystem SR650 V2/SR665 8x2.5" SAS/SATA Backplane Option Kit • 4XH7A61078, ThinkSystem SR650 V2 8x2.5" Anybay Backplane Option Kit • 4XH7A60938, ThinkSystem SR650 V2/SR665 Rear 4x2.5" SAS/SATA Backplane Option Kit • 4X97A59809, ThinkSystem SR650 V2 2.5" Chassis Front BP1 SAS/SATA Cable Kit • 4X97A59811, ThinkSystem SR650 V2 2.5" Chassis Front BP2 SAS/SATA Cable Kit • 4X97A59813, ThinkSystem SR650 V2 2.5" Chassis Front BP3 SAS/SATA Cable Kit • 4X97A59812, ThinkSystem SR650 V2 2.5" Chassis Front BP3 NVMe Cable Kit • 4X97A59814, ThinkSystem SR650 V2 2.5" Chassis Rear Backplane SAS/SATA Cable Kit

If you have an existing configuration with an HBA or RAID adapter installed in one of the rear PCIe slots, and you wish to upgrade to one of the internal storage adapters (RAID 940-16i 8GB Flash PCIe Gen4 12Gb Internal Adapter or 440-16i SAS/SATA PCIe Gen4 12Gb Internal HBA) you will need to order an additional cable kit as listed in the following table. Contents of the kit is listed in the next section.

Table 25. Cable kit when upgrading to an Internal HBA/RAID adapter

Part number	Description
4X97A59817	ThinkSystem SR650 V2 Internal CFF Raid Adapter Cable Kit

Contents of cable kits

The following table lists the contents of each cable kits.

Table 26. Contents of the cable option kits

Part number	Description and contents
Cable option kits for 3.5-inch drive bays	
4X97A59804	ThinkSystem SR650 V2 3.5" Chassis Front Backplane SAS/SATA Cable Kit ● 1x SBB7A21670 - SAS/SATA MB to 3.5 HDD BP ● 1x SBB7A21671 - SAS/SATA MBto3.5/ HDD BP short ● 1x SBB7A21680 - Gen3 SAS Cable to Front BP ● 1x SBB7A40116 - Gen3 SAS Cable to Front BP ● 1x SBB7A21687 - Gen3 SAS Cable to F/R BP ● 1x SBB7A21696 - Gen4 SAS Cable to Front BP ● 1x SBB7A21697 - Gen4 SAS Cable to F/R BP ● 1x SBB7A23676 - Gen4 SAS Cable to Front BP ● 1x SBB7A24228 - SFF to HDD 4*2.5/2*3.5 ● 2x SBB7A23667 - Power MB to Front 3.5 BP
4X97A59805	ThinkSystem SR650 V2 3.5" Chassis Front Backplane AnyBay Cable Kit ● 1x SBB7A21670 - SAS/SATA MB to 3.5 HDD BP ● 1x SBB7A21671 - SAS/SATA MBto3.5/ HDD BP short ● 1x SBB7A21687 - Gen3 SAS Cable to F/R BP ● 1x SBB7A21697 - Gen4 SAS Cable to F/R BP ● 1x SBB7A24192 - Gen4 SAS Cable to Front BP ● 1x SBB7A24195 - Gen4 SAS Cable to Front BP ● 1x SBB7A24198 - Gen3 SAS Cable to Front BP ● 1x SBB7A24201 - Gen3 SAS Cable to Front BP ● 1x SBB7A32000 - PCIe from MB to Front 12x3.5 ● 1x SBB7A32001 - PCIe from MB to Front 12x3.5 ● 2x SBB7A23667 - Power MB to Front 3.5 BP
4X97A59806	ThinkSystem SR650 V2 3.5" Chassis Rear Backplane SAS/SATA Cable Kit ● 1x SBB7A21673 - SAS/SATA MB to Rear HDD BP ● 1x SBB7A21683 - Gen3 SAS Cable to rear BP ● 1x SBB7A21687 - Gen3 SAS Cable to F/R BP ● 1x SBB7A21697 - Gen4 SAS Cable to F/R BP ● 1x SBB7A23715 - Gen4 Rear 4X2.5/4X3.5 BP ● 1x SBB7A23943 - OB SATA Cable to Rear BP ● 1x SBB7A24228 - SFF to HDD 4*2.5/2*3.5 ● 1x SBB7A24237 - Gen3 SFF to RearBP (4*2.5/2*3.5) ● 1x SBB7A21685 - Power YRiser to Rear 4X3.5 BP ● 1x SBB7A21689 - Power YRiser to Middle 4X3.5 BP
4X97A59807	ThinkSystem SR650 V2 3.5" Chassis Middle Backplane SAS/SATA Cable Kit ● 1x SBB7A21682 - Gen3 SAS Cable to M/R BP ● 1x SBB7A24170 - Gen4 SAS Cable to M/R BP ● 1x SBB7A21685 - Power YRiser to Rear 4X3.5 BP

Part number	Description and contents
4X97A59814	ThinkSystem SR650 V2 2.5" Chassis Rear Backplane SAS/SATA Cable Kit ● 1x SBB7A21673 - SAS/SATAMB to Rear HDD BP ● 1x SBB7A21682 - Gen3 SAS Cable to M/R BP ● 1x SBB7A21683 - Gen3 SAS Cable to rear BP ● 1x SBB7A21685 - Power YRiser to Rear 4X3.5 BP ● 1x SBB7A21687 - Gen3 SAS Cable to F/R BP ● 1x SBB7A21689 - Power YRiser to Middle 4X3.5 BP ● 1x SBB7A21697 - Gen4 SAS Cable to F/R BP ● 1x SBB7A23688 - CFF Raid SAS Cable to rear BP ● 1x SBB7A23694 - CFF Raid SAS Cable to rear BP ● 1x SBB7A23715 - Gen4 Rear 4X2.5/4X3.5 BP ● 1x SBB7A23943 - OB SATA Cable to Rear BP ● 1x SBB7A24006 - Gen4 SAS Cable to rear BP ● 1x SBB7A24204 - Power Y-Cable to Rear BP ● 1x SBB7A24228 - SFF to HDD 4*2.5/2*3.5 ● 1x SBB7A24237 - Gen3 SFF to RearBP (4*2.5/2*3.5) ● 1x SBB7A28832 - Rear + MID HDD BP4+5 (x4)*2 ● 1x SBB7A31987 - 840mm,SAS/SATA ,signal cable ● 1x SBB7A31999 - Rear BP SAS1 C5 cable
4X97A59816	ThinkSystem SR650 V2 2.5" Chassis Middle Backplane NVMe Cable Kit ● 1x SBB7A21685 - Power YRiser to Rear 4X3.5 BP ● 1x SBB7A23664 - Power XRiser -Midd to Midd-Riser ● 1x SBB7A23916 - Switch NVMe Cable to Front BP ● 1x SBB7A24158 - Switch NVMe Cable to Front BP ● 1x SBB7A24213 - MB to Middle NVME BP
Cable option kits for 2.5-inch drive bays	
4X97A59808	ThinkSystem SR650 V2 2.5" Chassis Front BP1 NVMe Cable Kit ● 1x SBB7A40147 - PCIe from SFF to front BP ● 1x SBB7A32005 - 8x2.5 AnyBay PCIe MB to BP short ● 1x SBB7A32009 - Gen4 Slimline x8(2x) to MCIO x8(2x) ● 1x SBB7A32010 - RTM NVMe Cable to Front BP ● 1x SBB7A23679 - Power MB to Front 2.5 BP
4X97A59809	ThinkSystem SR650 V2 2.5" Chassis Front BP1 SAS/SATA Cable Kit ● 1x SBB7A21690 - SAS/SATA MB toBP ● 1x SBB7A24012 - Gen4 Dummy SAS Cable to Front BP ● 1x SBB7A24109 - Gen4 Slimline x8(2x) to MCIO x8 (2x) 760mm ● 1x SBB7A24239 - SAS/SATA SFF (Gen3) to 8X2.5 BP1 ● 1x SBB7A29304 - SFF C0 (RAID) to 8x2.5 BP1 ● 1x SBB7A23679 - Power MB to Front 2.5 BP
4X97A59810	ThinkSystem SR650 V2 2.5" Chassis Front BP2 NVMe Cable Kit ● 1x SBB7A40147 - PCIe from SFF to front BP ● 1x SBB7A24100 - Gen4 Slimline x8(2x) 2 MCIO x8(2x) 850mm ● 1x SBB7A24134 - Gen4 Slimline x8(2x) 2 MCIO x8(2x) 670mm ● 1x SBB7A32003 - Gen4 Slimline x8(2x) 2 MCIO x8(2x) ● 1x SBB7A32004 - Gen4 Slimline x8(2x) 2 MCIO x8(2x) ● 1x SBB7A32006 - 8x2.5 AnyBay PCIe MB to BP long ● 1x SBB7A32007 - 8x2.5 AnyBay PCIe MB to BP longest ● 1x SBB7A32008 - RTM NVMe Cable to Front BP ● 1x SBB7A23679 - Power MB to Front 2.5 BP
4X97A59811	ThinkSystem SR650 V2 2.5" Chassis Front BP2 SAS/SATA Cable Kit ● 1x SBB7A23679 - Power MB to Front 2.5 BP ● 1x SBB7A24243 - SAS/SATA SFF (Gen3) to 8X2.5 BP2 ● 1x SBB7A29305 - RAID to 8x2.5 BP2,CPP exp

Part number	Description and contents
4X97A59812	ThinkSystem SR650 V2 2.5" Chassis Front BP3 NVMe Cable Kit ● 1x SBB7A40147 - PCIe from SFF to front BP ● 1x SBB7A24070 - Gen4 Slimline x8(2x) to MCIO x8(2x) 700mm ● 1x SBB7A24103 - Gen4 Slimline x8(2x) to MCIO x8(2x) 150mm ● 1x SBB7A24140 - Gen4 Slimline x8(2x) to MCIO x8(2x) 460mm ● 1x SBB7A29306 - PCIe5/6 to 8x2.5 AnyBay BP3 NVME 4-7 ● 1x SBB7A32002 - Gen4 Slimline x8(2x) to MCIO x8(2x) ● 1x SBB7A32011 - SATA Gen4 Slimline x8 to Slimline x4 signal cable ● 1x SBB7A34212 - 600mm,PCIe Gen4 signal cable ● 1x SBB7A23679 - Power MB to Front 2.5 BP
4X97A59813	ThinkSystem SR650 V2 2.5" Chassis Front BP3 SAS/SATA Cable Kit ● 1x SBB7A24177 - Gen4 SAS Cable to Front BP ● 1x SBB7A24180 - Gen3 SAS Cable to Front BP ● 1x SBB7A23679 - Power MB to Front 2.5 BP
4X97A59814	ThinkSystem SR650 V2 2.5" Chassis Rear Backplane SAS/SATA Cable Kit ● 1x SBB7A21673 - SAS/SATA MB to Rear HDD BP ● 1x SBB7A21682 - Gen3 SAS Cable to M/R BP ● 1x SBB7A21683 - Gen3 SAS Cable to rear BP ● 1x SBB7A21687 - Gen3 SAS Cable to F/R BP ● 1x SBB7A21697 - Gen4 SAS Cable to F/R BP ● 1x SBB7A23688 - CFF RAID SAS Cable to rear BP ● 1x SBB7A23694 - CFF RAID SAS Cable to rear BP ● 1x SBB7A23715 - Gen4 Rear 4X2.5/4X3.5 BP ● 1x SBB7A23943 - OB SATA Cable to Rear BP ● 1x SBB7A24006 - Gen4 SAS Cable to rear BP ● 1x SBB7A24228 - SFF to HDD 4*2.5/2*3.5 ● 1x SBB7A24237 - Gen3 SFF to RearBP (4*2.5/2*3.5) ● 1x SBB7A28832 - Rear + MID HDD BP4+5 (x4)*2 ● 1x SBB7A31987 - 840mm,SAS/SATA,signal cable ● 1x SBB7A31999 - Rear BP SAS1 C5 cable ● 1x SBB7A21685 - Power YRiser to Rear 4X3.5 BP ● 1x SBB7A21689 - Power YRiser to Middle 4X3.5 BP ● 1x SBB7A24204 - Power Y-Cable to Rear BP
4X97A59815	ThinkSystem SR650 V2 2.5" Chassis Middle Backplane SAS/SATA Cable Kit ● 1x SBB7A21682 - Gen3 SAS Cable to M/R BP ● 1x SBB7A23712 - EXP SAS Cable to Rear BP ● 1x SBB7A23721 - EXP SAS Cable to Middle BP ● 1x SBB7A24170 - Gen4 SAS Cable to M/R BP ● 1x SBB7A28832 - Rear + MID HDD BP4+5 (x4)*2 ● 1x SBB7A21685 - Power YRiser to Rear 4X3.5 BP ● 1x SBB7A23664 - Power XRiser -Midd to Midd-Riser
4X97A59816	ThinkSystem SR650 V2 2.5" Chassis Middle Backplane NVMe Cable Kit ● 1x SBB7A21666 - PCIe MB to middle NVMe ● 1x SBB7A23916 - Switch NVMe Cable to Front BP ● 1x SBB7A24158 - Switch NVMe Cable to Front BP ● 1x SBB7A24213 - MB to Middle NVME BP ● 1x SBB7A21685 - Power YRiser to Rear 4X3.5 BP ● 1x SBB7A23664 - Power XRiser -Mid to Mid-Riser

Part number	Description and contents
4X97A59818	ThinkSystem SR650 V2 2.5" Chassis 24x 2.5" NVMe Cable Kit • 1x SBB7A24134 - Gen4 Slimline x8(2x) to MCIO x8(2x) 670mm • 1x SBB7A24140 - Gen4 Slimline x8(2x) to MCIO x8(2x) 460mm • 1x SBB7A32004 - Gen4 Slimline x8(2x) to MCIO x8(2x) • 1x SBB7A32009 - Gen4 Slimline x8(2x) to MCIO x8(2x) • 1x SBB7A32010 - RTM NVMe Cable to Front BP • 1x SBB7A32011 - SATA Gen4 Slimline x8 to Gen4 Slimline x4 signal CBL • 3x SBB7A23679 - Power MB to Front 2.5 BP
Cable option kit for CFF HBA/RAID Adapter	
4X97A59817	ThinkSystem SR650 V2 Internal HBA/RAID Adapter Cable Kit • 1x SBB7A21674 - SAS/SATA MB to CFF RAID • 1x SBB7A23685 - SAS/SATA MB to CFF RAID • 1x SBB7A23688 - CFF RAID SAS Cable to rear BP • 1x SBB7A23694 - CFF RAID SAS Cable to rear BP • 1x SBB7A23706 - CFF RAID SAS Cable to Front BP • 1x SBB7A23712 - EXP SAS Cable to Rear BP • 1x SBB7A23721 - EXP SAS Cable to Middle BP • 1x SBB7A23724 - CFF RAID SAS Cable to EXP • 1x SBB7A23733 - EXP SAS Cable to Front BP • 1x SBB7A23924 - EXP SAS Cable to Rear BP • 1x SBB7A24161 - EXP SAS Cable to Front BP • 1x SBB7A28832 - Rear + MID HDD BP4+5 (x4)*2 • 1x SBB7A29305 - RAID to 8x2.5 BP2,CPP exp • 1x SBB7A21693 - Power MB to CFF / Exp

When adding drive bays, you will also need to add the appropriate storage controller(s). Consult the tables in the Controller selections section to determine what controller sections are supported and what additional controllers you will need. Controllers are described in the Controllers for internal storage section.

RAID flash power module (supercap) support

If you plan to add one of the RAID adapters that includes a RAID flash power module (supercap) as a field upgrade, then you may also need to order a Supercap installation kit for the supercap, depending on the location where the supercap will be installed. For CTO orders, the components needed are automatically derived when you select the RAID adapter. The adapters that this applies to are as follows:

- ThinkSystem RAID 930-8i 2GB Flash PCIe 12Gb Adapter
- ThinkSystem RAID 930-16i 4GB Flash PCIe 12Gb Adapter
- ThinkSystem RAID 940-8i 4GB Flash PCIe Gen4 12Gb Adapter
- ThinkSystem RAID 940-8i 8GB Flash PCIe Gen4 12Gb Adapter
- ThinkSystem RAID 940-16i 8GB Flash PCIe Gen4 12Gb Adapter
- ThinkSystem RAID 940-16i 8GB Flash PCIe Gen4 12Gb Internal Adapter

The location of the supercaps depends on the mid-chassis drive cage used in the server, as shown in the following table.

Table 27. Supercap support

Mid drive cage	Supercaps supported	Location of supercaps	Supercap holder
No mid drive cage	4	Mounted on the air baffle	Not needed
2.5-inch drives	2	Mounted on the left side of the mid drive cage	Included with mid drive cage
3.5-inch drives	2	Mounted under the system fan cage	Order separately for field upgrades (see following table)

When adding a RAID 930 or 940 adapter as a field upgrade to a configuration with 3.5-inch mid drive bays, order one supercap holder. Ordering information is in the following table.

Table 28. Supercap holder for 3.5-inch mid drive bay config

Part number	Feature	Description	Maximum supported
4M17A61230	B8MQ	ThinkSystem 2U Supercap Holder Kit	1 (holds 2 supercaps)

M.2 drives

The SR650 V2 supports one or two M.2 form-factor SATA or NVMe drives for use as an operating system boot solution or as additional storage.

The M.2 drives install into an M.2 module which is mounted horizontally in the server:

- In servers without mid-chassis drives, the M.2 module is mounted on the air baffle
- With a mid-chassis drive cage (2.5-inch or 3.5-inch), the M.2 module is mounted on the drive cage, as shown in the Mid drive bays section.

There are three different M.2 modules supported, as listed in the following table.

Table 29. M.2 modules

Part number	Feature code	Description	SATA drives	NVMe drives	RAID	Maximum supported
4Y37A09739	B5XH	ThinkSystem M.2 SATA 2-Bay RAID Enablement Kit	Yes	No	Yes	1
4Y37A09750	B8P9	ThinkSystem M.2 NVMe 2-Bay RAID Enablement Kit	No	Yes	Yes	1
4Y37A09738	B5XJ	ThinkSystem M.2 SATA/NVMe 2-Bay Enablement Kit	Yes	Yes	No	1

Configurations with 14x 3.5-inch SATA drives: An M.2 adapter is supported in all configurations except when the server is configured 12x front 3.5-inch drives + 2x rear 3.5-inch drives using the onboard SATA controller. This is because the two rear drives are connected to the same onboard port as the M.2 adapter. For M.2 support with 14 or more 3.5-inch SATA drives, use a RAID adapter or SAS HBA.

Supported drives are listed in the Internal drive options section.

The M.2 SATA 2-Bay RAID Enablement Kit has the following features:

- Supports one or two SATA M.2 drives
- Support 42mm, 60mm, 80mm and 110mm drive form factors (2242, 2260, 2280 and 22110)
- RAID support via an onboard Marvell 88SE9230 SATA RAID Controller
- Support JBOD, RAID-0 and RAID-1 (RAID support requires two M.2 drives)
- PCIe 2.0 x2 host interface; 6Gbps SATA connection to the drives
- Management and configuration support via UEFI and OS-based tools
- Supports monitoring and reporting of events and temperature through I2C
- Firmware update via Lenovo firmware update tools

The M.2 NVMe 2-Bay RAID Enablement Kit has the following features:

- Supports one or two NVMe M.2 drives
- Support 42mm, 60mm, 80mm and 110mm drive form factors (2242, 2260, 2280 and 22110)
- RAID support via an onboard Marvell 88NR2241 NVMe RAID Controller
- With 1 drive, supports single-drive RAID-0
- With 2 drives, supports 2-drive RAID-0, 2-drive RAID-1, or two single-drive RAID-0 arrays
- PCIe 3.0 x2 host interface; PCIe 3.0 x1 connection to each drive
- Management and configuration support via UEFI and OS-based tools
- Supports monitoring and reporting of events and temperature through I2C
- Firmware update via Lenovo firmware update tools

The M.2 SATA/NVMe 2-Bay Enablement Kit has the following features:

- Supports one or two M.2 drives, either SATA or NVMe
- When two drives installed, they must be either both SATA or both NVMe
- Support 42mm, 60mm, 80mm and 110mm drive form factors (2242, 2260, 2280 and 22110)
- JBOD native support; no built-in RAID support (RAID can be enabled via Intel VROC)
- Either 6Gbps SATA or PCIe 3.0 x1 interface to the drives depending on the drives installed
- Supports monitoring and reporting of events and temperature through I2C
- Firmware update via Lenovo firmware update tools

For field upgrades, the SR650 V2 also requires an additional M.2 cable kit. Ordering information is listed in the following table.

Table 30. M.2 Cable for field upgrades

Part number	Description
4X97A59825	ThinkSystem SR650 V2/SR665 M.2 Cable Kit • 330mm signal cable

For further 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

7mm drives

The SR650 V2 supports two 7mm drives, either both SATA or both NVMe, at the rear of the server. These drives go in place of either PCIe slot 3 or PCIe slot 6 as shown in the following figure.

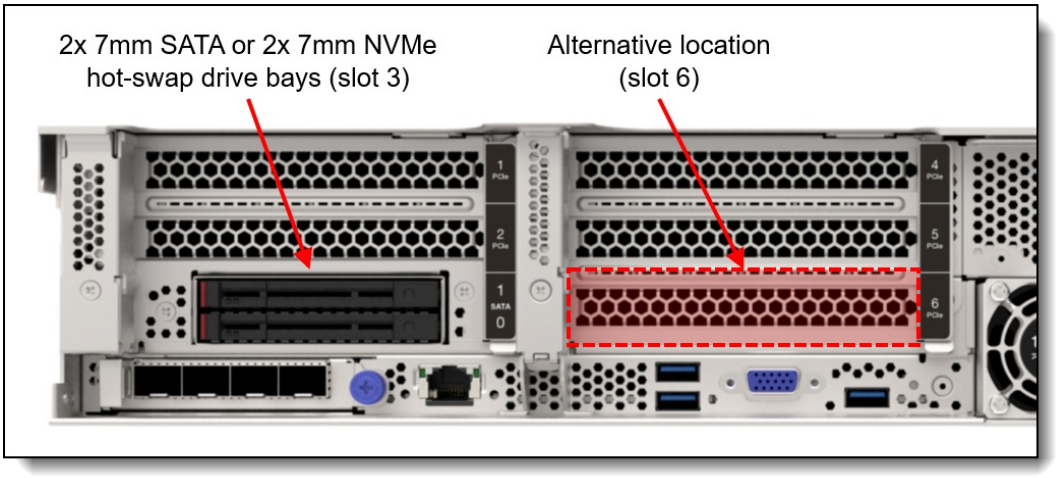

Figure 12. 7mm drive bays

For CTO orders, use the ordering information in the following table for the 7mm drive bays. In the DCSC configurator, you specify which PCIe riser the 7mm drives should be installed in (Riser 1 for slot 3 or Riser 2 for slot 6) by specifying riser feature code B8LQ either for Riser 1 or for Riser 2.

Table 31. 7mm rear drive bays (CTO)

Feature code	Description	Maximum supported
7mm drive bays		
B8P2	ThinkSystem 2U 7mm Drive Kit w/ SATA RAID	1
B8P3	ThinkSystem 2U 7mm Drive Kit w/ NVMe RAID	1
Riser needed for 7mm drive support (used in Riser 1 or Riser 2)		
BFK1	ThinkSystem 2U MS 2FH+7mm SSD Riser1 Cage	1
BFPC	ThinkSystem 2U MS 2FH+7mm SSD Riser2 Cage	1
BABW	ThinkSystem 2U MS 7mm SSD Riser2 Cage	1

Configuration rules for 7mm drives:

- For server models with 8x PCIe slots or a 4x 2.5-inch rear drives, a 2FH+7mm SSD drive cage (BFK1 or BFPC) can be installed on slot 3 or slot 6, but not both at the same time.
- For server models with a 8x 2.5-inch or 2x 3.5-inch rear drive cage, one of the 7mm drive cages can be installed:
  - 2FH+7mm SSD drive cage: slot 3 (BFK1)
  - 7mm SSD drive cage: slot 6 (BABW)
- For server models with a 4x 3.5-inch rear drive cage or with a GPU installed, a 7mm drive cage can be installed only on slot 6 (BABW). The 7mm drives are not supported in slot 3 due to cabling restrictions.
- For server models with a 4x 3.5-inch rear drive cage + mid-chassis drive bays, 7mm drives are not supported. This is because the mid-chassis backplane requires Riser 2 for power so slot 6 cannot be used for 7mm drives, and the 7mm drives are not supported in slot 3 due to cabling restrictions when 4x 3.5-inch rear drives are selected. This means that neither slot 3 nor slot 6 can be used for the

7mm drives; therefore 7mm drives are not supported.

For field upgrades, using the following ordering information. The kits include two cages for use depending on your PCIe slot configuration. The cages are for either Riser 1 or Riser 2.

Table 32. 7mm rear drive bays (field upgrades)

Part number	Description
4XH7A61057	ThinkSystem SR650 V2 Rear 2x7mm SATA RAID Enablement Kit • 2-bay SATA RAID hot-swap drive enclosure • 2FH+7mm SSD Riser Cage (with 2 FH slots) • 7mm SSD Riser Cage (without slots) • 2x 7mm drive bay fillers • Signal and power cables
4XH7A61058	ThinkSystem SR650 V2 Rear 2x7mm NVMe RAID Enablement Kit • 2-bay NVMe RAID hot-swap drive enclosure • 2FH+7mm SSD Riser Cage (with 2 FH slots) • 7mm SSD Riser Cage (without slots) • 2x 7mm drive bay fillers • Signal and power cables

Each drive enclosure includes an integrated controller providing RAID functions.

The 7mm SATA RAID Drive Kit has the following features:

- Supports 1 or 2 SATA hot-swap drives; drives are 7mm high and 2.5-inches wide
- Integrated controller based on the Marvell 88SE9230 SATA RAID Controller
- PCIe 2.0 x2 host interface to the server system board
- Provides 6 Gbps SATA connectivity to the drives
- Supports JBOD, RAID-0 and RAID-1
- Management and configuration support via UEFI and OS-based tools
- Supports monitoring and reporting of events and temperature through I2C
- Firmware update via Lenovo firmware update tools

The 7mm NVMe RAID Drive Kit has the following features:

- Supports 1 or 2 NVMe hot-swap drives; drives are 7mm high and 2.5-inches wide
- Integrated controller based on the Marvell 88NR2241 NVMe RAID Controller
- PCIe 3.0 x2 host interface to the server system board
- Provides PCIe 3.0 x1 connectivity to each drive
- With 1 drive, supports single-drive RAID-0
- With 2 drives, supports 2-drive RAID-0, 2-drive RAID-1, or two single-drive RAID-0 arrays
- Management and configuration support via UEFI and OS-based tools
- Supports monitoring and reporting of events and temperature through I2C
- Firmware update via Lenovo firmware update tools

The following figure shows the 7mm NVMe RAID Drive enclosure installed in the 2FH+7mm SSD Riser Cage.

Figure 13. 7mm NVMe RAID Drive enclosure installed in the 2FH+7mm SSD Riser Cage

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 33. 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 SR650 V2 offers a variety of controller options for internal drives:

- For 2.5-inch and 3.5-inch drives:
  - Onboard SATA ports with software RAID support (Intel VROC SATA RAID, formerly known as Intel RSTe)
  - Onboard NVMe ports with software RAID support (Intel VROC NVMe RAID)

    - RAID adapters and HBAs for SAS/SATA drives (PCIe slot-based)
    - RAID adapters and HBAs for SAS/SATA drives (cabled in a dedicated space)
- For 7mm drive bays in the rear of the server (see the 7mm drives section)
    - SATA controller integrated into the 7mm drive bay enclosure
    - NVMe controller integrated into the 7mm drive bay enclosure
- For M.2 drives internal to the server (see M.2 drives section)
    - SATA controller integrated on the M.2 SATA 2-Bay RAID Enablement Kit
    - NVMe controller integrated on the M.2 NVMe 2-Bay RAID Enablement Kit

As well as supporting RAID adapters and HBAs that install in a PCIe slot, the SR650 V2 with 2.5-inch front drive bays supports a custom adapter that is mounted in the server and cabled to one of the onboard NVMe ports. The HBA 440-16i Internal Adapter and RAID 940-16i Internal Adapter are mounted behind the front 2.5-inch drive bays. These Internal Adapters are not supported with 3.5-inch front drives due to a lack of physical space.

The following table lists the adapters used for the internal storage of the server.

Table 34. Internal Storage adapter support

Part number	Feature code	Description	Power module (supercap)	Maximum supported	Slots supported
Onboard SATA - up to 14 drives - Intel VROC SATA RAID (Intel RSTe)					
None	AVV0	On Board SATA Software RAID Mode	No	1	Not applicable
Onboard NVMe - up to 32 drives - Intel VROC NVMe RAID					
None	B9X7	Intel VROC (VMD NVMe RAID) Intel SSD Only (Standard)	No	1	Not applicable
4L47A39164	B96G	Intel VROC (VMD NVMe RAID) Premium (license upgrade - to enable RAID support for non-Intel NVMe SSDs)	No	1	Not applicable
SAS/SATA RAID - PCIe 3.0 adapters					
7Y37A01082	AUNG	ThinkSystem RAID 530-8i PCIe 12Gb Adapter	No	4	1,2,3,4,5,6
4Y37A72482	BJHK	ThinkSystem RAID 5350-8i PCIe 12Gb Adapter	No	1	1,2,3,4,5,6
4Y37A09727	BFY5	ThinkSystem RAID 530-16i PCIe 12Gb Adapter	No	1	1,2,3,4,5,6
7Y37A01084	AUNJ	ThinkSystem RAID 930-8i 2GB Flash PCIe 12Gb Adapter	Included	4	1,2,3,4,5,6
4Y37A72483	BJHL	ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Adapter	Included	1	1,2,3,4,5,6
7Y37A01085	AUNK	ThinkSystem RAID 930-16i 4GB Flash PCIe 12Gb Adapter	Included	1	1,2,3,4,5,6
4Y37A72485	BJHN	ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Adapter	Included	1	1,2,3,4,5,6
SAS/SATA RAID - PCIe 4.0 adapters					
4Y37A09728	B8NY	ThinkSystem RAID 940-8i 4GB Flash PCIe Gen4 12Gb Adapter	Included	4	1,2,3,4,5,6
4Y37A09729	B8NW	ThinkSystem RAID 940-8i 8GB Flash PCIe Gen4 12Gb Adapter	Included	4	1,2,3,4,5,6
4Y37A09735	B8P0	ThinkSystem RAID 940-16i 8GB Flash PCIe Gen4 12Gb Internal Adapter	Included	1*	Internal‡

Part number	Feature code	Description	Power module (supercap)	Maximum supported	Slots supported
4Y37A09730†	B8NZ	ThinkSystem RAID 940-16i 8GB Flash PCIe Gen4 12Gb Adapter	Included	1	1,2,3,4,5,6
4Y37A09733	B8P8	ThinkSystem RAID 940-32i 8GB Flash PCIe Gen4 12Gb Adapter	Included	1	1,2,3,4,5,6
SAS Expander					
4Y37A09736	B8P6	ThinkSystem 48 port 12Gb Internal Expander	No	1	Internal‡
SAS/SATA HBA					
7Y37A01088	AUNL	ThinkSystem 430-8i SAS/SATA 12Gb HBA	No	3	1,2,3,4,5,6
4Y37A72480	BJHH	ThinkSystem 4350-8i SAS/SATA 12Gb HBA	No	1§	1,2,3,4,5,6
4Y37A72481	BJHJ	ThinkSystem 4350-16i SAS/SATA 12Gb HBA	No	1	1,2,3,4,5,6
7Y37A01089	AUNM	ThinkSystem 430-16i SAS/SATA 12Gb HBA	No	1	1,2,3,4,5,6
4Y37A09725	B8P1	ThinkSystem 440-16i SAS/SATA PCIe Gen4 12Gb Internal HBA	No	1*	Internal‡
NVMe adapters					
4C57A65446	B98C	ThinkSystem 4-Port PCIe Gen4 NVMe Retimer Adapter	No	3	Any rear slots
4Y37A09737	B8P5	ThinkSystem 1611-8P PCIe Gen4 Switch Adapter	No	4	1,2,4,5
4Y37A09728†	BGM1	ThinkSystem RAID 940-8i 4GB Flash PCIe Gen4 12Gb Adapter for U.3 (Tri-Mode support)	Included	3	1,2,3,4,5,6
4Y37A09729†	BGM0	ThinkSystem RAID 940-8i 8GB Flash PCIe Gen4 12Gb Adapter for U.3 (Tri-Mode support)	Included	3	1,2,3,4,5,6
4Y37A09730†	BDY4	ThinkSystem RAID 940-16i 8GB Flash PCIe Gen4 12Gb Adapter for U.3 (Tri-Mode support)	Included	1	1,2,3,4,5,6

* Only supported with 2.5-inch front drive bays. Not supported in configurations with 3.5-inch front drive bays.
† Adapter also supports PCIe 4.0 x1 connectivity to NVMe drives (requires NVMe drives with U.3 interface)
‡ Internal adapters (CFF) do not occupy any of the rear slots. Two processors are required for these adapters.
§ The 4350-8i SAS/SATA 12Gb HBA is currently not supported with the Intel E810-DA2 10/25GbE SFP28 2-Port PCIe Ethernet Adapter, 4XC7A08295

Configuration notes:

- **Supercap support limits the number of RAID adapters installable** : The table lists whether the adapter includes a power module (supercap) to power the flash memory. The server supports between 1 and 4 supercaps depending on the server configuration as described in the RAID flash power module (supercap) support section. The number of supercaps supported also determines the maximum number of RAID adapters with flash that can be installed in the server.
- **Field upgrades**: If you are adding a RAID adapter with supercap to the server as a field upgrade, you may need a supercap holder as described in the RAID flash power module (supercap) support section.
- **7mm drive support**: The storage adapters listed in the table below do *not* provide connectivity to the 7mm drive bays that are optionally available at the rear of the server. The 7mm drives have their own independent RAID controller. See the 7mm drives section for details.

The RAID 940-8i and RAID 940-16i adapters also support NVMe through a feature named Tri-Mode support (or Trimode support). This feature enables the use of NVMe U.3 drives at the same time as SAS and SATA drives. Cabling of the controller to the backplanes is the same as with SAS/SATA drives, and the NVMe drives are connected via a PCIe x1 link to the controller.

NVMe drives connected using Tri-Mode support provide better performance than SAS or SATA drives: A SATA SSD has a data rate of 6Gbps, a SAS SSD has a data rate of 12Gbps, whereas an NVMe U.3 Gen 4 SSD with a PCIe x1 link will have a data rate of 16Gbps. NVMe drives typcially also have lower latency and higher IOPS compared to SAS and SATA drives. Tri-Mode is supported with U.3 NVMe drives in either 2.5-inch and 3.5-inch form factor and requires an AnyBay backplane.

Tri-Mode requires U.3 drives: Only NVMe drives with a U.3 interface are supported. U.2 drives are not supported. See the Internal drive options section for the U.3 drives supported by the server.

The onboard SATA controller has the following features:

- Controller integrated into the Intel PCH
- 6 Gbps SATA host interface
- Supports up to 14 SATA drives
- Supports RAID-0, 1, 5, 10 (Intel VROC SATA RAID, previously known as RSTe)
- Supports JBOD
- Supports HDDs and SSDs; can be mixed

The onboard NVMe support has the following features:

- Controller integrated into the Intel processor
- Supports up to 12 NVMe drives direct connected to onboard ports; additional drives through retimer/switch adapters
- Each drive has PCIe 4.0 x4 host interface
- Supports JBOD - Intel and non-Intel NVMe SSDs - no license required
- Supports RAID-0, 1, 5, 10 (Intel VROC NVMe RAID) - Intel NVMe SSDs only unless VROC Premium license is installed
- VROC Premium also extends to any drives connected via an NVMe Adapter (switch or retimer)

Intel VROC onboard SATA and NVMe RAID

Intel VROC (Virtual RAID on CPU) is a feature of the Intel processor that enables RAID support. There are two separate functions of VROC:

- Intel VROC SATA RAID, formerly known as Intel RSTe
- Intel VROC NVMe RAID

VROC SATA RAID (RSTe) is available and supported with all SATA drives, both SATA SSDs and SATA HDDs. If offers a 6 Gb/s connection to each drive and on the SR650 V2 implements RAID levels 0, 1, 5, and 10.

VROC NVMe RAID offers RAID support for any NVMe drives directly connected to the ports on the server's system board or via adapters such as NVMe retimers or NVMe switch adapters. On the SR650 V2, it implements RAID levels 0, 1, 5, and 10.

Performance tip: For best performance with VROC NVMe RAID, the drives in an array should all be connected to the same processor. Spanning processors is possible however performance will be unpredictable and should be evaluated based on your workload.

By default, VROC NVMe RAID support is limited to use with only Intel-branded NVMe drives (feature B9X7). If you wish to enable RAID support for non-Intel NVMe SSDs, select the VROC Premium license using the ordering information in the following table. VROC Premium is fulfilled as a Feature on Demand (FoD) license and is activated via the XCC management processor user interface.

Table 35. VROC upgrade

Part number	Feature code	Description
4L47A39164	B96G	Intel VROC (VMD NVMe RAID) Premium

VROC Premium is only needed for non-Intel NVMe drives in a RAID configuration. You do not need the VROC Premium license upgrade under any of the following conditions:

- If you have SATA drives connected to the onboard SATA ports, you do not need VROC Premium
- If you have Intel NVMe drives connected to the onboard NVMe ports, you do not need VROC Premium
- If you have non-Intel NVMe drives connected to the onboard NVMe ports, but you don't want RAID support, you do not need VROC Premium

Virtualization support: Virtualization support for Intel VROC is as follows:

- **VROC SATA RAID (RSTe)**: VROC SATA RAID is not supported by virtualization hypervisors such as ESXi, KVM, Xen, and Hyper-V. Virtualization is only supported on the onboard SATA ports in AHCI (non-RAID) mode.
- **VROC (VMD) NVMe RAID**: VROC (VMD) NVMe RAID is supported by ESXi, KVM, Xen, and Hyper-V. ESXi support is limited to RAID 1 only; other RAID levels are not supported. Windows and Linux OSes support VROC RAID NVMe, both for host boot functions and for guest OS function, and RAID-0, 1, 5, and 10 are supported.

For specifications about the RAID adapters and HBAs supported by the SR650 V2, see the ThinkSystem RAID Adapter and HBA Comparison, available from: https://lenovopress.com/lp1288-lenovo-thinksystem-raid-adapter-and-hba-reference#sr650-v2-support=SR650%2520V2

For details about these adapters, see the relevant product guide:

- SAS HBAs: https://lenovopress.com/servers/options/hba
- RAID adapters: https://lenovopress.com/servers/options/raid

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

2.5-inch 7mm hot-swap drives:

- 7mm 2.5-inch hot-swap 6 Gb SATA SSDs
- 7mm 2.5-inch hot-swap PCIe 3.0 NVMe SSDs

3.5-inch hot-swap drives:

- 3.5-inch hot-swap 12 Gb SAS HDDs
- 3.5-inch hot-swap 6 Gb SATA HDDs
- 3.5-inch hot-swap 12 Gb SAS SSDs
- 3.5-inch hot-swap 6 Gb SATA SSDs
- 3.5-inch hot-swap PCIe 4.0 NVMe SSDs
- 3.5-inch hot-swap PCIe 3.0 NVMe SSDs

M.2 drives:

- M.2 SATA drives
- M.2 NVMe drives

M.2 drive support: The use of M.2 drives requires an additional adapter as described in the M.2 drives subsection.

Table 36. 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	40
7XB7A00025	AULZ	ThinkSystem 2.5" 600GB 10K SAS 12Gb Hot Swap 512n HDD	40
7XB7A00027	AUM1	ThinkSystem 2.5" 1.2TB 10K SAS 12Gb Hot Swap 512n HDD	40
7XB7A00028	AUM2	ThinkSystem 2.5" 1.8TB 10K SAS 12Gb Hot Swap 512e HDD	40
7XB7A00069	B0YS	ThinkSystem 2.5" 2.4TB 10K SAS 12Gb Hot Swap 512e HDD	40
2.5-inch hot-swap HDDs - 12 Gb SAS 15K			
7XB7A00021	AULV	ThinkSystem 2.5" 300GB 15K SAS 12Gb Hot Swap 512n HDD	40
7XB7A00022	AULW	ThinkSystem 2.5" 600GB 15K SAS 12Gb Hot Swap 512n HDD	40
7XB7A00023	AULX	ThinkSystem 2.5" 900GB 15K SAS 12Gb Hot Swap 512e HDD	40
2.5-inch hot-swap HDDs - 12 Gb NL SAS			
7XB7A00034	AUM6	ThinkSystem 2.5" 1TB 7.2K SAS 12Gb Hot Swap 512n HDD	40
7XB7A00035	AUM7	ThinkSystem 2.5" 2TB 7.2K SAS 12Gb Hot Swap 512n HDD	40
2.5-inch hot-swap SED HDDs - 12 Gb SAS 10K			
7XB7A00031	AUM5	ThinkSystem 2.5" 600GB 10K SAS 12Gb Hot Swap 512n HDD SED	40
7XB7A00033	B0YX	ThinkSystem 2.5" 1.2TB 10K SAS 12Gb Hot Swap 512n HDD SED	40
7XB7A00070	B0YV	ThinkSystem 2.5" 2.4TB 10K SAS 12Gb Hot Swap 512e HDD FIPS	40

Table 37. 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	40
7XB7A00037	AUUJ	ThinkSystem 2.5" 2TB 7.2K SATA 6Gb Hot Swap 512e HDD	40

Table 38. 2.5-inch hot-swap 12 Gb SAS SSDs

Part number	Feature	Description	Maximum supported
2.5-inch hot-swap SSDs - 12 Gb SAS - Mixed Use/Mainstream (3-5 DWPD)			
4XB7A17062	B8HU	ThinkSystem 2.5" PM1645a 800GB Mainstream SAS 12Gb Hot Swap SSD	40
4XB7A17063	B8J4	ThinkSystem 2.5" PM1645a 1.6TB Mainstream SAS 12Gb Hot Swap SSD	40
4XB7A17064	B8JD	ThinkSystem 2.5" PM1645a 3.2TB Mainstream SAS 12Gb Hot Swap SSD	40
4XB7A17065	B8JA	ThinkSystem 2.5" PM1645a 6.4TB Mainstream SAS 12Gb Hot Swap SSD	40
2.5-inch hot-swap SSDs - 12 Gb SAS - Read Intensive/Entry/Capacity (<3 DWPD)			
4XB7A38175	B91A	ThinkSystem 2.5" PM1643a 960GB Entry SAS 12Gb Hot Swap SSD	40
4XB7A38176	B91B	ThinkSystem 2.5" PM1643a 1.92TB Entry SAS 12Gb Hot Swap SSD	40
4XB7A17054	B91C	ThinkSystem 2.5" PM1643a 3.84TB Entry SAS 12Gb Hot Swap SSD	40
4XB7A17055	B91D	ThinkSystem 2.5" PM1643a 7.68TB Entry SAS 12Gb Hot Swap SSD	40

Table 39. 2.5-inch hot-swap 6 Gb SATA SSDs

Part number	Feature	Description	Maximum supported
2.5-inch hot-swap SSDs - 6 Gb SATA - Mixed Use/Mainstream (3-5 DWPD)			
4XB7A17087	B8J1	ThinkSystem 2.5" 5300 240GB Mainstream SATA 6Gb Hot Swap SSD	40
4XB7A17088	B8HY	ThinkSystem 2.5" 5300 480GB Mainstream SATA 6Gb Hot Swap SSD	40
4XB7A17089	B8J6	ThinkSystem 2.5" 5300 960GB Mainstream SATA 6Gb Hot Swap SSD	40
4XB7A17090	B8JE	ThinkSystem 2.5" 5300 1.92TB Mainstream SATA 6Gb Hot Swap SSD	40
4XB7A17091	B8J7	ThinkSystem 2.5" 5300 3.84TB Mainstream SATA 6Gb Hot Swap SSD	40
4XB7A13633	B49L	ThinkSystem 2.5" Intel S4610 240GB Mainstream SATA 6Gb Hot Swap SSD	40
4XB7A13634	B49M	ThinkSystem 2.5" Intel S4610 480GB Mainstream SATA 6Gb Hot Swap SSD	40
4XB7A13635	B49N	ThinkSystem 2.5" Intel S4610 960GB Mainstream SATA 6Gb Hot Swap SSD	40
4XB7A13636	B49P	ThinkSystem 2.5" Intel S4610 1.92TB Mainstream SATA 6Gb Hot Swap SSD	40
4XB7A13637	B49Q	ThinkSystem 2.5" Intel S4610 3.84TB Mainstream SATA 6Gb Hot Swap SSD	40
4XB7A13638	BB9R	ThinkSystem 2.5" Intel S4610 7.68TB Mainstream SATA 6Gb Hot Swap SSD	40
2.5-inch hot-swap SSDs - 6 Gb SATA - Read Intensive/Entry (<3 DWPD)			
4XB7A38271	BCTC	ThinkSystem 2.5" Multi Vendor 240GB Entry SATA 6Gb Hot Swap SSD	40
4XB7A38272	BCTD	ThinkSystem 2.5" Multi Vendor 480GB Entry SATA 6Gb Hot Swap SSD	40
4XB7A38273	BCTE	ThinkSystem 2.5" Multi Vendor 960GB Entry SATA 6Gb Hot Swap SSD	40
4XB7A38274	BCTF	ThinkSystem 2.5" Multi Vendor 1.92TB Entry SATA 6Gb Hot Swap SSD	40
4XB7A38275	BCTG	ThinkSystem 2.5" Multi Vendor 3.84TB Entry SATA 6Gb Hot Swap SSD	40
4XB7A17075	B8HV	ThinkSystem 2.5" 5300 240GB Entry SATA 6Gb Hot Swap SSD	40
4XB7A17076	B8JM	ThinkSystem 2.5" 5300 480GB Entry SATA 6Gb Hot Swap SSD	40
4XB7A17077	B8HP	ThinkSystem 2.5" 5300 960GB Entry SATA 6Gb Hot Swap SSD	40
4XB7A17078	B8J5	ThinkSystem 2.5" 5300 1.92TB Entry SATA 6Gb Hot Swap SSD	40
4XB7A17079	B8JP	ThinkSystem 2.5" 5300 3.84TB Entry SATA 6Gb Hot Swap SSD	40
4XB7A17080	B8J2	ThinkSystem 2.5" 5300 7.68TB Entry SATA 6Gb Hot Swap SSD	40
4XB7A10247	B498	ThinkSystem 2.5" Intel S4510 240GB Entry SATA 6Gb Hot Swap SSD	40
4XB7A10248	B499	ThinkSystem 2.5" Intel S4510 480GB Entry SATA 6Gb Hot Swap SSD	40
4XB7A10249	B49A	ThinkSystem 2.5" Intel S4510 960GB Entry SATA 6Gb Hot Swap SSD	40
4XB7A13622	B49B	ThinkSystem 2.5" Intel S4510 1.92TB Entry SATA 6Gb Hot Swap SSD	40
4XB7A13623	B49C	ThinkSystem 2.5" Intel S4510 3.84TB Entry SATA 6Gb Hot Swap SSD	40
4XB7A13624	B96X	ThinkSystem 2.5" Intel S4510 7.68TB Entry SATA 6Gb Hot Swap SSD	40

Table 40. 2.5-inch hot-swap PCIe 4.0 NVMe SSDs

Part number	Feature	Description	Maximum supported
2.5-inch SSDs - U.2 PCIe 4.0 NVMe - Write Intensive/Performance (10+ DWPD)			
4XB7A17158	BKKY	ThinkSystem 2.5" U.2 P5800X 400GB Write Intensive NVMe PCIe 4.0 x4 HS SSD	32
4XB7A17159	BKKZ	ThinkSystem 2.5" U.2 P5800X 800GB Write Intensive NVMe PCIe 4.0 x4 HS SSD	32
2.5-inch SSDs - U.2 PCIe 4.0 NVMe - Mixed Use/Mainstream (3-5 DWPD)			
4XB7A17152	BCFV	ThinkSystem U.2 Intel P5600 1.6TB Mainstream NVMe PCIe 4.0 x4 Hot Swap SSD	32
4XB7A17153	BCFR	ThinkSystem U.2 Intel P5600 3.2TB Mainstream NVMe PCIe 4.0 x4 Hot Swap SSD	32
4XB7A17154	BCFS	ThinkSystem U.2 Intel P5600 6.4TB Mainstream NVMe PCIe 4.0 x4 Hot Swap SSD	32
2.5-inch SSDs - U.3 PCIe 4.0 NVMe - Mixed Use/Mainstream (3-5 DWPD)			
4XB7A64175	BE03	ThinkSystem U.3 Kioxia CM6-V 800GB Mainstream NVMe PCIe 4.0 x4 Hot Swap SSD	32
4XB7A17112	B96Z	ThinkSystem U.3 Kioxia CM6-V 1.6TB Mainstream NVMe PCIe4.0 x4 Hot Swap SSD	32
4XB7A17113	B96T	ThinkSystem U.3 Kioxia CM6-V 3.2TB Mainstream NVMe PCIe4.0 x4 Hot Swap SSD	32
4XB7A17114	B96P	ThinkSystem U.3 Kioxia CM6-V 6.4TB Mainstream NVMe PCIe4.0 x4 Hot Swap SSD	32
2.5-inch SSDs - U.2 PCIe 4.0 NVMe - Read Intensive/Entry (<3 DWPD)			
4XB7A17145	BCFT	ThinkSystem U.2 Intel P5500 1.92TB Entry NVMe PCIe 4.0 x4 Hot Swap SSD	32
4XB7A17146	BCFW	ThinkSystem U.2 Intel P5500 3.84TB Entry NVMe PCIe 4.0 x4 Hot Swap SSD	32
4XB7A17147	BCFU	ThinkSystem U.2 Intel P5500 7.68TB Entry NVMe PCIe 4.0 x4 Hot Swap SSD	32
4XB7A38196	BC4Y	ThinkSystem U.2 PM1733 1.92TB Entry NVMe PCIe 4.0 x4 Hot Swap SSD	32
4XB7A38197	BC4Z	ThinkSystem U.2 PM1733 3.84TB Entry NVMe PCIe 4.0 x4 Hot Swap SSD	32
4XB7A38283	BE2E	ThinkSystem U.2 PM1733 7.68TB Entry NVMe PCIe 4.0 x4 Hot Swap SSD	32
4XB7A38284	BE2F	ThinkSystem U.2 PM1733 15.36TB Entry NVMe PCIe 4.0 x4 Hot Swap SSD	32

Table 41. 2.5-inch hot-swap PCIe 3.0 NVMe SSDs

Part number	Feature	Description	Maximum supported
2.5-inch SSDs - U.2 PCIe 3.0 NVMe - Write Intensive/Performance (10+ DWPD)			
4XB7A38159	B972	ThinkSystem U.2 Intel Optane P4800X 375GB Performance NVMe PCIe 3.0 x4 Hot Swap SSD 60DWPD	32
4XB7A38160	B973	ThinkSystem U.2 Intel Optane P4800X 750GB Performance NVMe PCIe 3.0 x4 Hot Swap SSD 60DWPD	32
4XB7A17163	B96L	ThinkSystem U.2 Intel Optane P4800X 1.5TB Performance NVMe PCIe 3.0 x4 Hot Swap SSD 60DWPD	32
2.5-inch SSDs - U.2 PCIe 3.0 NVMe - Read Intensive/Entry (<3 DWPD)			
4XB7A17070	B6TJ	ThinkSystem U.2 PM983 960GB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	32
4XB7A10175	B34N	ThinkSystem U.2 PM983 1.92TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	32
4XB7A10176	B34P	ThinkSystem U.2 PM983 3.84TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	32
4XB7A10177	B4D3	ThinkSystem U.2 PM983 7.68TB Entry NVMe PCIe3.0 x4 Hot Swap SSD	32

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

Table 42. 7mm 2.5-inch hot-swap 6 Gb SATA SSDs

Part number	Feature	Description	Maximum supported
7mm 2.5-inch hot-swap SSDs - 6 Gb SATA - Read Intensive/Entry (<3 DWPD)			
4XB7A38181	B8JQ	ThinkSystem 7mm 5300 240GB Entry SATA 6Gb SSD	2
4XB7A38182	B8JT	ThinkSystem 7mm 5300 480GB Entry SATA 6Gb SSD	2
4XB7A38183	B8JS	ThinkSystem 7mm 5300 960GB Entry SATA 6Gb SSD	2
4XB7A38152	B96Q	ThinkSystem 7mm Intel S4510 240GB Entry SATA 6Gb Hot Swap SSD	2
4XB7A38153	B96S	ThinkSystem 7mm Intel S4510 480GB Entry SATA 6Gb Hot Swap SSD	2
4XB7A38154	B96R	ThinkSystem 7mm Intel S4510 960GB Entry SATA 6Gb Hot Swap SSD	2

Table 43. 7mm 2.5-inch hot-swap PCIe 3.0 NVMe SSDs

Part number	Feature	Description	Maximum supported
7mm 2.5-inch hot-swap SSDs - PCIe 3.0 NVMe - Read Intensive/Entry (<3 DWPD)			
4XB7A38216	BB63	ThinkSystem 7mm PM983 960GB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	2

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

Table 44. 3.5-inch hot-swap 12 Gb SAS HDDs

Part number	Feature	Description	Maximum supported
3.5-inch hot-swap HDDs - 12 Gb SAS 15K			
7XB7A00038	AUU2	ThinkSystem 3.5" 300GB 15K SAS 12Gb Hot Swap 512n HDD	20
7XB7A00039	AUU3	ThinkSystem 3.5" 600GB 15K SAS 12Gb Hot Swap 512n HDD	20
7XB7A00040	AUUC	ThinkSystem 3.5" 900GB 15K SAS 12Gb Hot Swap 512e HDD	20
3.5-inch hot-swap HDDs - 12 Gb NL SAS			
7XB7A00042	AUU5	ThinkSystem 3.5" 2TB 7.2K SAS 12Gb Hot Swap 512n HDD	20
7XB7A00043	AUU6	ThinkSystem 3.5" 4TB 7.2K SAS 12Gb Hot Swap 512n HDD	20
7XB7A00044	AUU7	ThinkSystem 3.5" 6TB 7.2K SAS 12Gb Hot Swap 512e HDD	20
7XB7A00045	B0YR	ThinkSystem 3.5" 8TB 7.2K SAS 12Gb Hot Swap 512e HDD	20
7XB7A00046	AUUG	ThinkSystem 3.5" 10TB 7.2K SAS 12Gb Hot Swap 512e HDD	20
7XB7A00067	B117	ThinkSystem 3.5" 12TB 7.2K SAS 12Gb Hot Swap 512e HDD	20
4XB7A13906	B496	ThinkSystem 3.5" 14TB 7.2K SAS 12Gb Hot Swap 512e HDD	20
4XB7A13911	B7EZ	ThinkSystem 3.5" 16TB 7.2K SAS 12Gb Hot Swap 512e HDD	20
4XB7A38266	BCFP	ThinkSystem 3.5" 18TB 7.2K SAS 12Gb Hot Swap 512e HDD	20
3.5-inch hot-swap SED HDDs - 12 Gb NL SAS			
7XB7A00066	B0YQ	ThinkSystem 3.5" 8TB 7.2K SAS 12Gb Hot Swap 512e HDD FIPS	20

Table 45. 3.5-inch hot-swap 6 Gb SATA HDDs

Part number	Feature	Description	Maximum supported
3.5-inch hot-swap HDDs - 6 Gb NL SATA			
7XB7A00049	AUUF	ThinkSystem 3.5" 1TB 7.2K SATA 6Gb Hot Swap 512n HDD	20
7XB7A00050	AUUD	ThinkSystem 3.5" 2TB 7.2K SATA 6Gb Hot Swap 512n HDD	20
7XB7A00051	AUU8	ThinkSystem 3.5" 4TB 7.2K SATA 6Gb Hot Swap 512n HDD	20
7XB7A00052	AUUA	ThinkSystem 3.5" 6TB 7.2K SATA 6Gb Hot Swap 512e HDD	20
7XB7A00053	AUU9	ThinkSystem 3.5" 8TB 7.2K SATA 6Gb Hot Swap 512e HDD	20
7XB7A00054	AUUB	ThinkSystem 3.5" 10TB 7.2K SATA 6Gb Hot Swap 512e HDD	20
7XB7A00068	B118	ThinkSystem 3.5" 12TB 7.2K SATA 6Gb Hot Swap 512e HDD	20
4XB7A13907	B497	ThinkSystem 3.5" 14TB 7.2K SATA 6Gb Hot Swap 512e HDD	20
4XB7A13914	B7F0	ThinkSystem 3.5" 16TB 7.2K SATA 6Gb Hot Swap 512e HDD	20
4XB7A38130	BCFH	ThinkSystem 3.5" 18TB 7.2K SATA 6Gb Hot Swap 512e HDD	20

Table 46. 3.5-inch hot-swap 12 Gb SAS SSDs

Part number	Feature	Description	Maximum supported
3.5-inch hot-swap SSDs - 12 Gb SAS - Mixed Use/Mainstream (3-5 DWPD)			
4XB7A17066	B8HT	ThinkSystem 3.5" PM1645a 800GB Mainstream SAS 12Gb Hot Swap SSD	20
4XB7A17043	B8JN	ThinkSystem 3.5" PM1645a 1.6TB Mainstream SAS 12Gb Hot Swap SSD	20
4XB7A17067	B8JK	ThinkSystem 3.5" PM1645a 3.2TB Mainstream SAS 12Gb Hot Swap SSD	20
4XB7A17068	B8JG	ThinkSystem 3.5" PM1645a 6.4TB Mainstream SAS 12Gb Hot Swap SSD	20
3.5-inch hot-swap SSDs - 12 Gb SAS - Read Intensive/Entry/Capacity (<3 DWPD)			
4XB7A77115	BKKV	ThinkSystem 3.5" PM1643a 960GB Entry SAS 12Gb Hot Swap SSD	20
4XB7A77116	BKKU	ThinkSystem 3.5" PM1643a 1.92TB Entry SAS 12Gb Hot Swap SSD	20
4XB7A17058	B91E	ThinkSystem 3.5" PM1643a 3.84TB Entry SAS 12Gb Hot Swap SSD	20
4XB7A17059	BEVK	ThinkSystem 3.5" PM1643a 7.68TB Entry SAS 12Gb Hot Swap SSD	20

Table 47. 3.5-inch hot-swap 6 Gb SATA SSDs

Part number	Feature	Description	Maximum supported
3.5-inch hot-swap SSDs - 6 Gb SATA - Mixed Use/Mainstream (3-5 DWPD)			
4XB7A17096	B8JL	ThinkSystem 3.5" 5300 240GB Mainstream SATA 6Gb Hot Swap SSD	20
4XB7A17097	B8JF	ThinkSystem 3.5" 5300 480GB Mainstream SATA 6Gb Hot Swap SSD	20
4XB7A17098	B8J0	ThinkSystem 3.5" 5300 960GB Mainstream SATA 6Gb Hot Swap SSD	20
4XB7A17099	B8HR	ThinkSystem 3.5" 5300 1.92TB Mainstream SATA 6Gb Hot Swap SSD	20
4XB7A17100	B8HX	ThinkSystem 3.5" 5300 3.84TB Mainstream SATA 6Gb Hot Swap SSD	20
4XB7A13639	B49R	ThinkSystem 3.5" Intel S4610 240GB Mainstream SATA 6Gb Hot Swap SSD	20
4XB7A13640	B49S	ThinkSystem 3.5" Intel S4610 480GB Mainstream SATA 6Gb Hot Swap SSD	20
4XB7A13641	B49T	ThinkSystem 3.5" Intel S4610 960GB Mainstream SATA 6Gb Hot Swap SSD	20
4XB7A13642	B49U	ThinkSystem 3.5" Intel S4610 1.92TB Mainstream SATA 6Gb Hot Swap SSD	20
4XB7A13643	B49V	ThinkSystem 3.5" Intel S4610 3.84TB Mainstream SATA 6Gb Hot Swap SSD	20
4XB7A13644	B96J	ThinkSystem 3.5" Intel S4610 7.68TB Mainstream SATA 6Gb Hot Swap SSD	20
3.5-inch hot-swap SSDs - 6 Gb SATA - Read Intensive/Entry (<3 DWPD)			
4XB7A38276	BCTH	ThinkSystem 3.5" Multi Vendor 240GB Entry SATA 6Gb Hot Swap SSD	20
4XB7A38277	BCTJ	ThinkSystem 3.5" Multi Vendor 480GB Entry SATA 6Gb Hot Swap SSD	20
4XB7A38278	BCTK	ThinkSystem 3.5" Multi Vendor 960GB Entry SATA 6Gb Hot Swap SSD	20
4XB7A38279	BCTL	ThinkSystem 3.5" Multi Vendor 1.92TB Entry SATA 6Gb Hot Swap SSD	20
4XB7A38281	BCTM	ThinkSystem 3.5" Multi Vendor 3.84TB Entry SATA 6Gb Hot Swap SSD	20
4XB7A17081	B8JB	ThinkSystem 3.5" 5300 240GB Entry SATA 6Gb Hot Swap SSD	20
4XB7A17082	B8J9	ThinkSystem 3.5" 5300 480GB Entry SATA 6Gb Hot Swap SSD	20
4XB7A17083	B8JC	ThinkSystem 3.5" 5300 960GB Entry SATA 6Gb Hot Swap SSD	20
4XB7A17084	B8HZ	ThinkSystem 3.5" 5300 1.92TB Entry SATA 6Gb Hot Swap SSD	20
4XB7A17085	B8HQ	ThinkSystem 3.5" 5300 3.84TB Entry SATA 6Gb Hot Swap SSD	20
4XB7A17086	B8J3	ThinkSystem 3.5" 5300 7.68TB Entry SATA 6Gb Hot Swap SSD	20
4XB7A13625	B49D	ThinkSystem 3.5" Intel S4510 240GB Entry SATA 6Gb Hot Swap SSD	20
4XB7A13626	B49E	ThinkSystem 3.5" Intel S4510 480GB Entry SATA 6Gb Hot Swap SSD	20
4XB7A13627	B49F	ThinkSystem 3.5" Intel S4510 960GB Entry SATA 6Gb Hot Swap SSD	20
4XB7A13628	B49G	ThinkSystem 3.5" Intel S4510 1.92TB Entry SATA 6Gb Hot Swap SSD	20
4XB7A13629	B49H	ThinkSystem 3.5" Intel S4510 3.84TB Entry SATA 6Gb Hot Swap SSD	20
4XB7A13630	B96N	ThinkSystem 3.5" Intel S4510 7.68TB Entry SATA 6Gb Hot Swap SSD	20

Table 48. 3.5-inch hot-swap PCIe 4.0 NVMe SSDs

Part number	Feature	Description	Maximum supported
3.5-inch SSDs - U.2 PCIe 4.0 NVMe - Mixed Use/Mainstream (3-5 DWPD)			
4XB7A17155	BCFM	ThinkSystem 3.5" Intel P5600 1.6TB Mainstream NVMe PCIe 4.0 x4 Hot Swap SSD	12
4XB7A17156	BCFJ	ThinkSystem 3.5" Intel P5600 3.2TB Mainstream NVMe PCIe 4.0 x4 Hot Swap SSD	12
4XB7A17157	BCFQ	ThinkSystem 3.5" Intel P5600 6.4TB Mainstream NVMe PCIe 4.0 x4 Hot Swap SSD	12
3.5-inch SSDs - U.3 PCIe 4.0 NVMe - Mixed Use/Mainstream (3-5 DWPD)			
4XB7A64176	BE04	ThinkSystem 3.5" Kioxia CM6-V 800GB Mainstream NVMe PCIe 4.0 x4 Hot Swap SSD	12
4XB7A17115	B96V	ThinkSystem 3.5" Kioxia CM6-V 1.6TB Mainstream NVMe PCIe4.0 x4 Hot Swap SSD	12
4XB7A17116	B96K	ThinkSystem 3.5" Kioxia CM6-V 3.2TB Mainstream NVMe PCIe4.0 x4 Hot Swap SSD	12
4XB7A17117	B96W	ThinkSystem 3.5" Kioxia CM6-V 6.4TB Mainstream NVMe PCIe4.0 x4 Hot Swap SSD	12
3.5-inch SSDs - U.2 PCIe 4.0 NVMe - Read Intensive/Entry (<3 DWPD)			
4XB7A17149	BCFN	ThinkSystem 3.5" Intel P5500 1.92TB Entry NVMe PCIe 4.0 x4 Hot Swap SSD	12
4XB7A17150	BCFL	ThinkSystem 3.5" Intel P5500 3.84TB Entry NVMe PCIe 4.0 x4 Hot Swap SSD	12
4XB7A17151	BCFK	ThinkSystem 3.5" Intel P5500 7.68TB Entry NVMe PCIe 4.0 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 49. 3.5-inch hot-swap PCIe 3.0 NVMe SSDs

Part number	Feature	Description	Maximum supported
3.5-inch SSDs - U.2 PCIe 3.0 NVMe - Write Intensive/Performance (10+ DWPD)			
4XB7A38162	B971	ThinkSystem 3.5" Intel Optane P4800X 375GB Performance NVMe PCIe 3.0 x4 Hot Swap SSD 60DWPD	12
4XB7A38163	B970	ThinkSystem 3.5" Intel Optane P4800X 750GB Performance NVMe PCIe 3.0 x4 Hot Swap SSD 60DWPD	12
4XB7A38164	B974	ThinkSystem 3.5" Intel Optane P4800X 1.5TB Performance NVMe PCIe 3.0 x4 Hot Swap SSD 60DWPD	12
3.5-inch SSDs - U.2 PCIe 3.0 NVMe - Read Intensive/Entry (<3 DWPD)			
4XB7A10178	B34Q	ThinkSystem 3.5" PM983 1.92TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	12
4XB7A10179	B34R	ThinkSystem 3.5" PM983 3.84TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	12
4XB7A10180	B4D4	ThinkSystem 3.5" PM983 7.68TB 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 50. M.2 SATA drives

Part number	Feature	Description	Maximum supported
M.2 SSDs - 6 Gb SATA - Read Intensive/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
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
4XB7A17074	B8JJ	ThinkSystem M.2 5300 960GB SATA 6Gbps Non-Hot Swap SSD	2

Table 51. M.2 NVMe drives

Part number	Feature	Description	Maximum supported
M.2 SSDs - NVMe - Read Intensive/Entry (<3 DWPD)			
4XB7A38177	B8JR	ThinkSystem M.2 PM983 960GB NVMe PCIe 3.0 x4 Non-Hot Swap SSD	2

USB memory key

For general portable storage needs, the server also supports the USB memory key option that is listed in the following table.

Table 52. USB memory key

Part number	Feature	Description
4X77A08621	B8NV	ThinkSystem 32GB USB Flash Drive

Internal backup units

The server does not supports any internal backup units, such as tape drives or RDX drives. External backup units are available as described in the External backup units section.

Optical drives

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

Table 53. 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, DVD-R DL, CD-RW, CD-R, CD-ROM.

I/O expansion

The SR650 V2 supports a total of up to 8 PCIe 4.0 slots, all full-height and all with rear access, plus a dedicated OCP 3.0 SFF slot for networking. Slot availability is based on riser selection. The use of slots 4-8 requires that both processors be installed.

The slots are provided by riser cards:

- Riser 1: Slots 1, 2 and 3 (CPU 1)
- Riser 2: Slots 4, 5, and 6 (CPU 2)
- Riser 3: Slot 7 (CPU 1), and Slot 8 (CPU 2)

The slots in each riser are either PCIe 4.0 x16 or PCIe 4.0 x8 depending on the riser card selected as listed in the table below. All x8 slots are physically x16 slots. Riser 1 and Riser 2 are also available with PCIe 3.0 adapter slots, using a lower-cost PCIe 3.0 riser, if desired.

The use of Riser 3 has the following requirements:

- Two processor installed
- No rear drive bays configured
- At most 4x onboard NVMe (OB NVMe) connections

As discussed in the Internal storage section, the server supports drive bays in the rear of the server. Depending on the drive bays selected, the number of slots available for adapters is reduced. The figure below shows the supported combinations of slots and drive bays.

Tip: For configurations with 2.5-inch front drive bays, an internal RAID adapter or HBA can be installed in a dedicated space and cabled to a PCIe 4.0 x8 connector, thereby freeing up a slot for other purposes.

The following figure shows the locations of the rear-accessible slots for each configuration selection. The OCP slot in located in the lower-left corner.

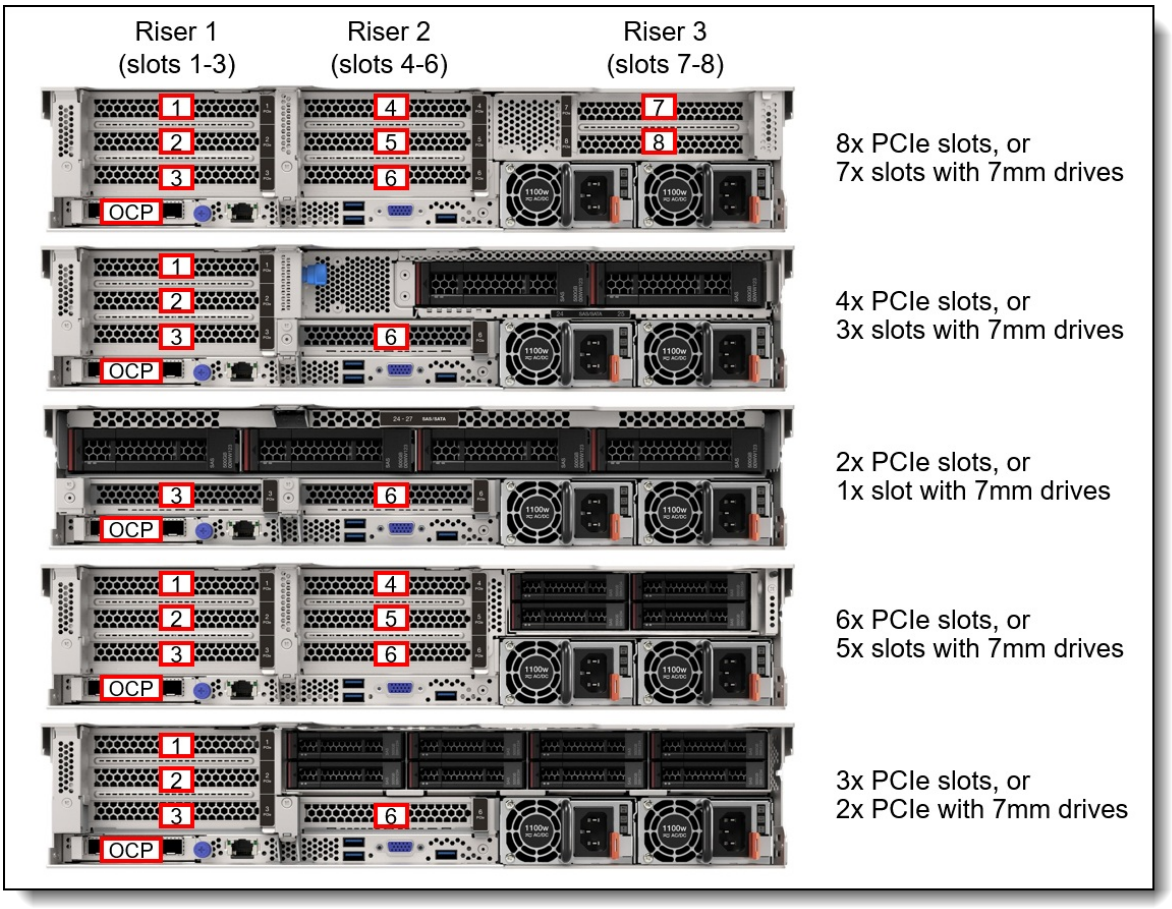

Figure 14. SR650 V2 slot configurations

The following table lists the riser slots available for CTO builds.

Tip: It is also possible to not have any slot selections, in which case slot fillers will be derived in the configurator. Slots can be added later as field upgrades using option part numbers as listed in the Field upgrades table.

Table 54. Riser card feature codes for CTO builds

Part number	Feat. code	Description	Slot configuration*			Purpose
Riser 1			**Slot 1**	**Slot 2**	**Slot 3**	
4XH7A61079	B8LJ	x16/x8/x8 PCIe G4 Riser 1/2 Option Kit v2	Gen4 x16	Gen4 x8	Gen4 x8	3 slots PCIe 4.0
4XH7A61080	B8LL	x16/x8/x8 PCIe G3 Riser 1/2 Option Kit v2	Gen3 x16	Gen3 x8	Gen3 x8	3 slots PCIe 3.0
4XH7A61081	B8LQ	x16/x16/E PCIe G4 Riser 1/2 Option Kit v2	Gen4 x16	Gen4 x16	No slot	COM port or 7mm drives in slot 3
4XH7A61082	B8LR	E/x16/x16 PCIe G4 Riser 1/2 Option Kit v2	No slot	Gen4 x16	Gen4 x16	Double-wide GPU in slot 2
4XH7A09880	B8LS	x16 PCIe G4 Riser 1/2 Option Kit	No slot	No slot	Gen4 x16	For 4x 3.5-inch drives
Riser 2 (requires CPU 2)			**Slot 4**	**Slot 5**	**Slot 6**	
4XH7A61079	B8LJ	x16/x8/x8 PCIe G4 Riser 1/2 Option Kit v2	Gen4 x16	Gen4 x8	Gen4 x8	3 slots PCIe 4.0
4XH7A61080	B8LL	x16/x8/x8 PCIe G3 Riser 1/2 Option Kit v2	Gen3 x16	Gen3 x8	Gen3 x8	3 slots PCIe 3.0
4XH7A61081	B8LQ	x16/x16/E PCIe G4 Riser 1/2 Option Kit v2	Gen4 x16	Gen4 x16	No slot	COM port or 7mm drives in slot 6
4XH7A61082	B8LR	E/x16/x16 PCIe G4 Riser 1/2 Option Kit v2	No slot	Gen4 x16	Gen4 x16	Double-wide GPU in slot 5
4XH7A09880	B8LS	x16 PCIe G4 Riser 1/2 Option Kit	No slot	No slot	Gen4 x16	For 2x or 4x 3.5-inch drives
Riser 3 (requires CPU 2)			**Slot 7**	**Slot 8**		
4XH7A61049	BHZY	x16/x16 PCIe G4 Riser3 Option Kit	Gen4 x16	Gen4 x16		2x PCIe 4.0 x16 slots
4XH7A61048	BHZX	x8/x8 PCIe G4 Riser3 Option Kit	Gen4 x8	Gen4 x8		2x PCIe 4.0 x8 slots

* All PCIe x8 slots are physically x16 slots

Serial port

The SR650 V2 optionally supports a RS-232 serial port by adding a COM port bracket to either slot 3 or slot 6. Ordering information is shown in the following table.

Table 55. Serial port

Part number	Feature code	Description
7Z17A02577	AUSL	ThinkSystem COM Port Upgrade Kit

The bracket is shown in the following figure.

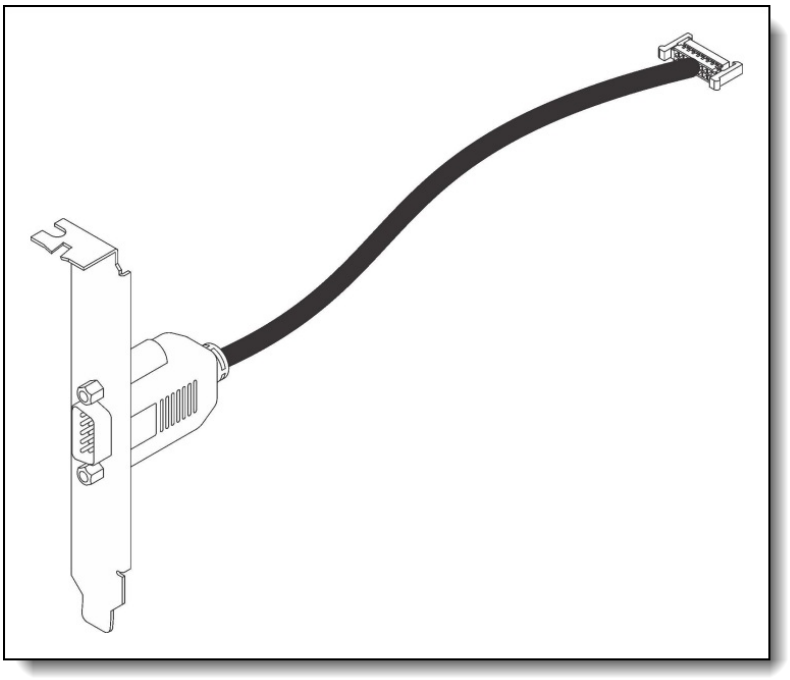

Figure 15. ThinkSystem COM Port Upgrade Kit

Serial port configuration rules:

- For server models with 8x PCIe slots or a 4x 2.5-inch rear drive cage:
  - If both riser 1 and riser 2 use the x16/x16/E riser card and a 7mm drive cage is installed on slot 3, then a serial port module can be installed on slot 6.
  - If only one of riser 1 and riser 2 (not both) uses the x16/x16/E riser card, a 7mm drive cage and a serial port module cannot be installed at the same time. If no 7mm drive cage is installed, then a serial port module can be installed on slot 3 or slot 6.
  - If neither of riser 1 and riser 2 use the x16/x16/E riser card, no serial port module is supported.
- For server models with a 8 x 2.5-inch/2 x 3.5-inch rear drive cage:
  - If riser 1 uses the x16/x16/E riser card, a serial port module can be installed on slot 3 and a 7mm SSD cage can be installed on slot 6.
  - If riser 1 does not use the x16/x16/E riser card, a 7mm drive cage and a serial port module cannot be installed at the same time. If no 7mm drive cage is installed, then a serial port module can be installed on slot 6.
- For server models with a 4 x 3.5-inch rear drive cage, a 7mm drive cage and a serial port module cannot be installed at the same time. If no 7mm drive cage is installed, then a serial port module can be installed on slot 3 or slot 6.

Field upgrades

Slot configurations can also be ordered as field upgrades using option part numbers, as listed in the following table.

Tip: If you want to add both a 7mm drive enclosure plus PCIe slots in slot 4 and 5, you will need to order the 7mm drive option (either 4XH7A61057 or 4XH7A61058) plus the x16/x16/E PCIe G4 Riser 1/2 Kit, 4XH7A61081. The latter part number provides the 2-slot riser card.

Table 56. Field upgrades for PCIe slots

Part number	Description and contents	Maximum Supported
Riser 1 & 2 field upgrades (also see the Riser card feature codes for CTO builds table)		
4XH7A61079	ThinkSystem SR650 V2/SR665 x16/x8/x8 PCIe G4 Riser1/2 Option Kit v2 • 3-Slot Riser Cage (full-height slots) • 3-Slot PCIe 4.0 (x16+x8+x8) Riser Card	2
4XH7A61080	ThinkSystem SR650 V2/SR665 x16/x8/x8 PCIe G3 Riser 1/2 Option Kit v2 • 3-Slot Riser Cage (full-height slots) • 3-Slot PCIe 3.0 (x16+x8+x8) Riser Card	2
4XH7A61081	ThinkSystem SR650 V2/SR665 x16/x16/E PCIe G4 Riser 1/2 Option Kit v2 • 3-Slot Riser Cage (full-height slots) • 2-Slot PCIe 4.0 (x16+x16+Empty) Riser Card	2
4XH7A61082	ThinkSystem SR650 V2/SR665 E/x16/x16 PCIe G4 Riser 1/2 Option Kit v2 • 3-Slot Riser Cage (full-height slots) • 2-Slot PCIe 4.0 (Empty+x16+x16) Riser Card	2
4XH7A09880	ThinkSystem SR650 V2/SR665 x16 PCIe G4 Riser 1/2 Option Kit • 1-Slot Riser Cage (full-height slot) • 1-Slot PCIe 4.0 x16 Riser Card	2
Riser 2 with 7mm drive bay field upgrades		
4XH7A61057	ThinkSystem SR650 V2 Rear 2x7mm SATA RAID Enablement Kit • 2-bay SATA RAID HS drive enclosure with cables • Riser Cage for 7mm drive + 2 full-height slots* • Riser Cage for 7mm drives without slots • 2x 7mm drive bay fillers	1
4XH7A61058	ThinkSystem SR650 V2 Rear 2x7mm NVMe RAID Enablement Kit • 2-bay NVMe RAID HS drive enclosure with cables • Riser Cage for 7mm drive + 2 full-height slots* • Riser Cage for 7mm drives without slots • 2x 7mm drive bay fillers	1
Riser 3 field upgrades (also see the Riser card feature codes for CTO builds table)		
4XH7A61048	ThinkSystem SR650 V2 x8/x8 PCIe G4 Riser3 Option Kit • 2-Slot Riser Cage (full-height slots) • 2-Slot PCIe 4.0 (x8+x8) Riser Card • Rear wall bracket • Signal/power cable set (4 cables)	1
4XH7A61049	ThinkSystem SR650 V2 x16/x16 PCIe G4 Riser3 Option Kit • 2-Slot Riser Cage (full-height slots) • 2-Slot PCIe 4.0 (x16+x16) Riser Card • Rear wall bracket • Signal/power cable set (6 cables)	1

* To add two x16 slots, you will need to also order a riser card using option 4XH7A61081

Network adapters

The server has a dedicated OCP 3.0 SFF slot with PCIe 4.0 x16 host interface. See Figure 3 for the locatior of the OCP slot.

The following table lists the supported OCP adapters. One port can optionally be shared with the XCC management processor for Wake-on-LAN and NC-SI support. Only 1 OCP card can be installed in the server.

Table 57. Supported OCP adapters

Part number	Feature code	Description	Maximum supported
Gigabit			
4XC7A08235	B5T1	ThinkSystem Broadcom 5719 1GbE RJ45 4-port OCP Ethernet Adapter	1
4XC7A08277	B93E	ThinkSystem Intel I350 1GbE RJ45 4-port OCP Ethernet Adapter	1
Combo Gigabit + 10 GbE			
4XC7A08239	B5SS	ThinkSystem Broadcom 57416 10GBASE-T 2-port + 5720 1GbE 2-port OCP Ethernet Adapter	1
10 GbE			
4XC7A08236	B5ST	ThinkSystem Broadcom 57416 10GBASE-T 2-port OCP Ethernet Adapter	1
4XC7A08240	B5T4	ThinkSystem Broadcom 57454 10GBASE-T 4-port OCP Ethernet Adapter	1
4XC7A08278	BCD5	ThinkSystem Intel X710-T2L 10GBASE-T 2-port OCP Ethernet Adapter	1
4XC7A08310	BB8U	ThinkSystem Marvell QL41132 10GBASE-T 2-port OCP Ethernet Adapter	1
25 GbE			
4XC7A08237	B5SZ	ThinkSystem Broadcom 57414 10/25GbE SFP28 2-port OCP Ethernet Adapter	1
4XC7A08242	B5SV	ThinkSystem Broadcom 57454 10/25GbE SFP28 4-port OCP Ethernet Adapter	1
4XC7A08294	BCD4	ThinkSystem Intel E810-DA2 10/25GbE SFP28 2-Port OCP Ethernet Adapter	1
4XC7A08264	B5SW	ThinkSystem Marvell QL41232 10/25GbE SFP28 2-Port OCP Ethernet Adapter	1
4XC7A08246	B5T2	ThinkSystem Mellanox ConnectX-4 Lx 10/25GbE SFP28 2-port OCP Ethernet Adapter	1
4XC7A62582	BE4T	ThinkSystem Mellanox ConnectX-6 Lx 10/25GbE SFP28 2-Port OCP Ethernet Adapter	1

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

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

Table 58. Supported PCIe Network Adapters

Part number	Feature code	Description	PCIe	Maximum supported	Slots supported
Gigabit Ethernet					
7ZT7A00482	AUZX	ThinkSystem Broadcom 5720 1GbE RJ45 2-Port PCIe Ethernet Adapter	x8	8	All slots

Part number	Feature code	Description	PCIe	Maximum supported	Slots supported
7ZT7A00484	AUZV	ThinkSystem Broadcom 5719 1GbE RJ45 4-Port PCIe Ethernet Adapter	x8	8	All slots
7ZT7A00533	AUZZ	ThinkSystem I350-F1 PCIe 1Gb 1-Port SFP Ethernet Adapter	x4	8	All slots
7ZT7A00534	AUZY	ThinkSystem I350-T2 PCIe 1Gb 2-Port RJ45 Ethernet Adapter	x4	8	All slots
7ZT7A00535	AUZW	ThinkSystem I350-T4 PCIe 1Gb 4-Port RJ45 Ethernet Adapter	x4	8	All slots
10 Gb Ethernet SFP+					
7ZT7A00537	AUKX	ThinkSystem Intel X710-DA2 PCIe 10Gb 2-Port SFP+ Ethernet Adapter	x8	8	All slots
10GBASE-T Ethernet					
7ZT7A00496	AUKP	ThinkSystem Broadcom 57416 10GBASE-T 2-Port PCIe Ethernet Adapter	x8	8	All slots
4XC7A08245	B5SU	ThinkSystem Broadcom 57454 10GBASE-T 4-port PCIe Ethernet Adapter	x8	8	All slots
00MM860	ATPX	Intel X550-T2 Dual Port 10GBase-T Adapter	x8	8	All slots
4XC7A08225	B31G	ThinkSystem QLogic QL41134 PCIe 10Gb 4-Port Base-T Ethernet Adapter	x8	8	All slots
25 Gb Ethernet					
4XC7A08238	B5T0	ThinkSystem Broadcom 57414 10/25GbE SFP28 2-port PCIe Ethernet Adapter	x8	8	All slots
4XC7A08316	BD49	ThinkSystem Broadcom 57454 10/25GbE SFP28 4-port PCIe Ethernet Adapter V2	x16	6	Any 6 slots
4XC7A08295	BCD6	ThinkSystem Intel E810-DA2 10/25GbE SFP28 2-Port PCIe Ethernet Adapter	x8	8§	All slots
4XC7A08270	B652	ThinkSystem Marvell QL41232 10/25GbE SFP28 2-Port PCIe Ethernet Adapter	x8	8	All slots
4XC7A08249	B653	ThinkSystem Mellanox ConnectX-4 Lx 10/25GbE SFP28 2-port PCIe Ethernet Adapter	x8	8	All slots
4XC7A62580	BE4U	ThinkSystem Mellanox ConnectX-6 Lx 10/25GbE SFP28 2-Port PCIe Ethernet Adapter	x8	8	All slots
100 Gb Ethernet					
4XC7A08297	B96F	ThinkSystem Broadcom 57508 100GbE QSFP56 2-port PCIe 4 Ethernet Adapter	x16	6	1,2,4,5,7,8
4XC7A08248	B8PP	ThinkSystem Mellanox ConnectX-6 Dx 100GbE QSFP56 2-port PCIe Ethernet Adapter	x16	6	Any 6 slots
100 Gb Ethernet / InfiniBand HDR100					
4C57A14177	B4R9	ThinkSystem Mellanox ConnectX-6 HDR100/100GbE QSFP56 1-port PCIe VPI Adapter	x16	6	Any 6 slots
4C57A14178	B4RA	ThinkSystem Mellanox ConnectX-6 HDR100/100GbE QSFP56 2-port PCIe VPI Adapter	x16	6	Any 6 slots
200 Gb Ethernet / InfiniBand HDR					
4C57A15326	B4RC	ThinkSystem Mellanox ConnectX-6 HDR/200GbE QSFP56 1-port PCIe 4 VPI Adapter	x16	3*	1,2,7

Part number	Feature code	Description	PCIe	Maximum supported	Slots supported
4C57A14179	B4RB	ThinkSystem Mellanox HDR/200GbE 2x PCIe Aux Kit	x16	3	4,5,6,8

* See below
§ The E810-DA2 PCIe adapter is currently not supported with the 4350-8i SAS/SATA 12Gb HBA, 4Y37A72480

Use of the Mellanox HDR PCIe Aux Kit : The HDR Aux Kit (4C57A14179) enables a Socket Direct connection which allows the HDR adapter (4C57A15326) to have direct access to each of the two processors. Such a configuration ensures extremely low latency and CPU utilization in addition to higher network throughput. Socket Direct also maximizes AI and ML application performance, as it enables native GPU-Direct Technologies.

* For the Mellanox ConnectX-6 HDR/200GbE VPI adapter:

- Performance fans are required
- When the adapter is used with active optical cables (AOC) in the 12x 3.5-inch or 24x 2.5-inch configuration, ensure that the ambient temperature must be limited to 30°C or lower. This configuration might lead to high acoustic noise and is recommended to be placed in industrial data center, not office environment.
- When the adapter and GPU adapters are used at the same time, follow the thermal rules for GPU adapters.

See the Thermal Rules section in the Information Center for the SR650 V2 for requirements:
https://thinksystem.lenovofiles.com/help/topic/SR650V2/thermal_rules.html?cp=4_11_7_2_1

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 the SR650 V2.

Not supported: The following adapters are not supported due to problems with firmware updates:

- ThinkSystem Emulex LPe35000 32Gb 1-port PCIe Fibre Channel Adapter, 4XC7A08250
- ThinkSystem Emulex LPe35002 32Gb 2-port PCIe Fibre Channel Adapter, 4XC7A08251

Table 59. Fibre Channel HBAs

Part number	Feature code	Description	Maximum supported	Slots supported
32 Gb Fibre Channel HBAs				
4XC7A76498	BJ3G	ThinkSystem Emulex LPe35000 32Gb 1-port PCIe Fibre Channel Adapter v2	8	All slots
4XC7A76525	BJ3H	ThinkSystem Emulex LPe35002 32Gb 2-port PCIe Fibre Channel Adapter v2	8	All slots
4XC7A08279	BA1G	ThinkSystem QLogic QLE2770 32Gb 1-Port PCIe Fibre Channel Adapter	8	All slots
4XC7A08276	BA1F	ThinkSystem QLogic QLE2772 32Gb 2-Port PCIe Fibre Channel Adapter	8	All slots
16 Gb Fibre Channel HBAs				
01CV830	ATZU	Emulex 16Gb Gen6 FC Single-port HBA	8	All slots
01CV840	ATZV	Emulex 16Gb Gen6 FC Dual-port HBA	8	All slots
01CV750	ATZB	QLogic 16Gb Enhanced Gen5 FC Single-port HBA	8	All slots
01CV760	ATZC	QLogic 16Gb Enhanced Gen5 FC Dual-port HBA	8	All slots

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 SR650 V2 server for use with external storage.

Table 60. Adapters for external storage

Part number	Feature code	Description	Maximum supported	Slots supported
SAS HBAs				
7Y37A01090	AUNR	ThinkSystem 430-8e SAS/SATA 12Gb HBA	8	All slots
7Y37A01091	AUNN	ThinkSystem 430-16e SAS/SATA 12Gb HBA	8	All slots
4Y37A09724	B8P7	ThinkSystem 440-16e SAS/SATA PCIe Gen4 12Gb HBA	8	All slots
External RAID adapters				
7Y37A01087	AUNQ	ThinkSystem RAID 930-8e 4GB Flash PCIe 12Gb Adapter	4*	Any 4 slots

* See below regarding supercap requirements

The RAID 930-8e uses a flash power module (supercap), which can be installed in one of up to four locations in the server depending on the server configuration. See the RAID flash power module (supercap) support section for details. The number of 930-8e RAID adapters supported is based on how many supercaps can be installed in the server. If an internal 930i RAID adapter with flash power modules is installed, the maximum number of 930-8e adapters supported is reduced by 1.

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 61. Comparison of external storage adapters

Feature	**430-8e**	**430-16e**	**440-16e**	**930-8e**
Adapter type	HBA	HBA	HBA	External RAID
Part number	7Y37A01090	7Y37A01091	4Y37A09724	7Y37A01087
Controller chip	LSI SAS3408	LSI SAS3416	Broadcom SAS3816	LSI SAS3516
Broadcom equivalent	HBA 9400-8e	HBA 9400-16e	HBA 9500-16e	MegaRAID 9480-8e
Host interface	PCIe 3.0x8	PCIe 3.0x8	PCIe 4.0 x8	PCIe 3.0x8
Port interface	12 Gb SAS	12 Gb SAS	12 Gb SAS	12 Gb SAS
Number of ports	8	16	16	8
Port connectors	2x Mini-SAS HD SFF8644	4x Mini-SAS HD SFF8644	4x Mini-SAS HD SFF8644	2x Mini-SAS HD SFF8644
Drive interface	SAS/SATA	SAS/SATA	SAS/SATA	SAS,SATA
Drive type	HDD/SSD/SED*	HDD/SSD/SED*	HDD/SSD/SED*	HDD, SED, SSD
Hot-swap drives	Yes	Yes	Yes	Yes
Max devices	1024	1024	1024	216
RAID levels	None	None	None	0, 1, 10, 5, 50, 6, 60
JBOD mode	Yes	Yes	Yes	Yes
Cache	None	None	None	4GB (Standard)
CacheVault cache protection	None	None	None	Yes (Flash)
Performance Accelerator (FastPath)	No	No	No	Yes
SSD Caching (CacheCade Pro 2.0)	No	No	No	No
SED support	Yes*	Yes*	Yes*	Yes (Safestore)

* SAS HBAs support SEDs (self-encrypting drives) by using software on the server and simply passing SED commands 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 SR650 V2 supports the PCIe Flash Storage adapters listed in the following table.

Table 62. Flash Storage Adapters

Part number	Feature code	Description	Maximum supported	Slots supported
Mainstream NVMe PCIe Adapters - Optimized for mixed-intensive application workloads with an endurance of 3-5 DWPD.				
4XB7A14075	B8JH	ThinkSystem HHHL PM1735 1.6TB Mainstream NVMe PCIe 4.0 x8 Flash Adapter	8	All slots
4XB7A14076	B8HW	ThinkSystem HHHL PM1735 3.2TB Mainstream NVMe PCIe 4.0 x8 Flash Adapter	8	All slots
4XB7A14077	B96M	ThinkSystem HHHL PM1735 6.4TB Mainstream NVMe PCIe4.0 x4 Flash Adapter	8	All slots

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

Configuration rules

The following configuration requirements must be met when installing flash storage adapters:

- GPU adapters are not supported

GPU adapters

The SR650 V2 supports the following graphics processing units (GPUs). All GPUs installed must be identical.

Table 63. Supported GPUs

Part number	Feature code	Description	Power	Max.	Slots supported
Double-wide GPUs					
4X67A13135	BEL5	ThinkSystem NVIDIA A100 40GB PCIe Gen4 Passive GPU	250W	3	2,5,7*
4X67A72593	BEL4	ThinkSystem NVIDIA A40 48GB PCIe Gen4 Passive GPU	300W	3	2,5,7*
4X67A13124	BB2E†	ThinkSystem NVIDIA Tesla V100S 32GB PCIe Passive GPU	250W	3	2,5,7*
4X67A13125	BB2D	ThinkSystem NVIDIA Quadro RTX 6000 24GB PCIe Passive GPU	250W	3	2,5,7*
Single-wide GPUs					
4X67A71311	BFTZ	ThinkSystem NVIDIA A10 24GB PCIe Gen4 Passive GPU	150W	4	1,2,5,7,8 (see below)
4X67A14926	B4YB	ThinkSystem NVIDIA T4 16GB PCIe Passive GPU	75W	8	All slots
4X67A11584	B31D	ThinkSystem NVIDIA Quadro P620 2GB PCIe Active GPU	40W	8	All slots

* When a double-wide GPU is installed in slot 2, 5 or 7, the adjacent slot 1, 4 and 8 respectively is not available
† Tesla V100S only supported with base model 7Z73CTOLWW (HPC & AI) - see the Models section for details

For information about these GPUs, see the ThinkSystem GPU Summary, available at:
https://lenovopress.com/lp0768-thinksystem-thinkagile-gpu-summary

General GPU requirements

All GPUs installed must be identical.

The quantity of GPUs supported depends on the following factors:

- The power of the GPU as listed in the table above.
- The choice of front drive bays
- The choice of processor
- The fans installed (standard or performance)
- The ambient temperature

For details, see the Thermal Rules section in the Information Center for the SR650 V2:
https://thinksystem.lenovofiles.com/help/topic/SR650V2/thermal_rules.html?cp=4_11_7_2_1

Riser selections for double-wide GPUs

When a double-wide GPU is installed in slot 2, 5 or 7, the adjacent slot 1, 4 and 8 respectively is not available. The riser cards listed in the following table are used with double-wide GPUs.

Table 64. Risers needed for double-wide GPUs

Riser	Part number	Feature code	Description
Riser 1 (GPU in slot 2)	4XH7A61082	B8LR	ThinkSystem SR650 V2/SR665 E/x16/x16 PCIe G4 Riser 1/2 Option Kit v2
Riser 2 (GPU in slot 5)	4XH7A61082	B8LR	ThinkSystem SR650 V2/SR665 E/x16/x16 PCIe G4 Riser 1/2 Option Kit v2
Riser 3 (GPU in slot 7)	4XH7A61049	BHZY	ThinkSystem SR650 V2 x16/x16 PCIe G4 Riser3 Option Kit

NVIDIA A10 requirements

Slot selection for the NVIDIA A10 GPU is as follows:

- With 1 processor installed, up to 2x A10 GPUs can be installed in slots 1 and 2:
  - 1x A10 GPU: Install in slot 1; slot 2 can support any adapter except a 100GbE adapter
  - 2x A10 GPUs: Install in slots 1 and 2
- With 2 processors installed, up to 4x A10 GPUs can be installed in slots 1, 2, 5, 7, or 8, as follows:
  - 1x A10 GPU: Install in slot 1; slot 2 can support any adapter except a 100GbE adapter*
  - 2x A10 GPUs: Install in slots 1 and 4; slots 2 and 5 can support any adapter except a 100GbE adapter*
  - 3x A10 GPUs: Install in slots 1, 4, 5; slot 2 can support any adapter except a 100GbE adapter*
  - 4x A10 GPUs: Install in slots 1, 4, 7, 8

* The 100GbE adapters that are not supported in slots 2 and 5 adjacent to A10 GPUs are as follows:

- ThinkSystem Broadcom 57508 100GbE QSFP56 2-port PCIe 4 Ethernet Adapter, 4XC7A08297
- ThinkSystem Mellanox ConnectX-6 Dx 100GbE QSFP56 2-port PCIe Ethernet Adapter, 4XC7A08248

- ThinkSystem Mellanox ConnectX-6 HDR100/100GbE QSFP56 1-port PCIe VPI Adapter, 4C57A14177
- ThinkSystem Mellanox ConnectX-6 HDR100/100GbE QSFP56 2-port PCIe VPI Adapter, 4C57A14178

The following figure shows the slot numbers and riser zones.

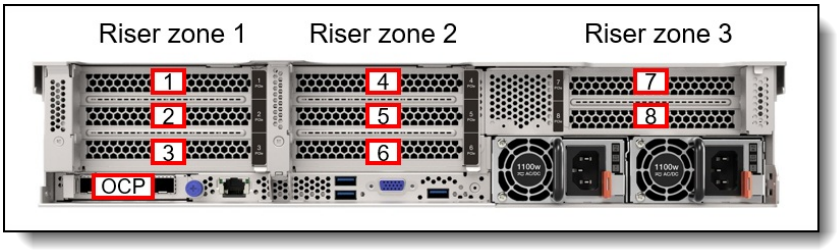

Figure 16. SR650 V2 slot numbers

When installing A10 GPUs, one or more GPU extend air ducts may be required to be installed in the riser zones to help route the proper airflow into the GPU, as follows. The extend air ducts are derived by the configurator for CTO builds, or are part of the GPU Thermal Option Kit for field upgrades.

- 1x A10 GPU installed in slot 1: Riser zone 1 requires an extend air duct
- 2x A10 GPUs installed in slots 1 and 2: No extend air ducts are required
- 2x A10 GPUs installed in slots 1 and 4: Riser zones 1 and 2 require an extend air duct
- 3x A10 GPUs installed in slots 1, 4, 5: Riser zone 1 requires an extend air duct
- 4x A10 GPUs installed in slots 1, 4, 7, 8: Riser zones 1 and 2 require an extend air duct

GPU extend air ducts are required as described above, even if other adapter types are installed in slots 2, 5 or 8.

GPU Thermal Option Kit

When installing an NVIDIA A10 GPU or any double-wide GPU as a field upgrade, you will also need to order the Thermal Option Kit as listed in the following table. This kit is not required for the NVIDIA T4 or P620 GPUs.

Table 65. ThinkSystem SR650 V2 GPU Full Length Thermal Option Kit

Part number	Description	Maximum supported
4H47A38666	ThinkSystem SR650 V2 GPU Full Length Thermal Option Kit • 2x 1U processor performance heatsinks - replace existing 2U heatsinks (SBB7A03313) • 1x ThinkSystem 2U GPU air duct - replaces main air baffle (SBB7A14414) • 3x GPU extend air ducts - needed in a zone if an A10 or other single-wide GPU > 75W is installed in the upper slot (SBB7A17336) • 3x Air duct fillers - needed in each riser zone if no GPU is installed in that zone (SBB7A17338) • 3x GPU power cables for double-wide GPUs (SBB7A21691) • 3x GPU power cables for single-wide GPUs (SBB7A21686) • 3x GPU power Y-cables when 2x single-wide GPUs installed on one riser (SBB7A23757)	1

The following figure shows the GPU air duct with GPU air duct fillers and GPU extend air ducts installed.

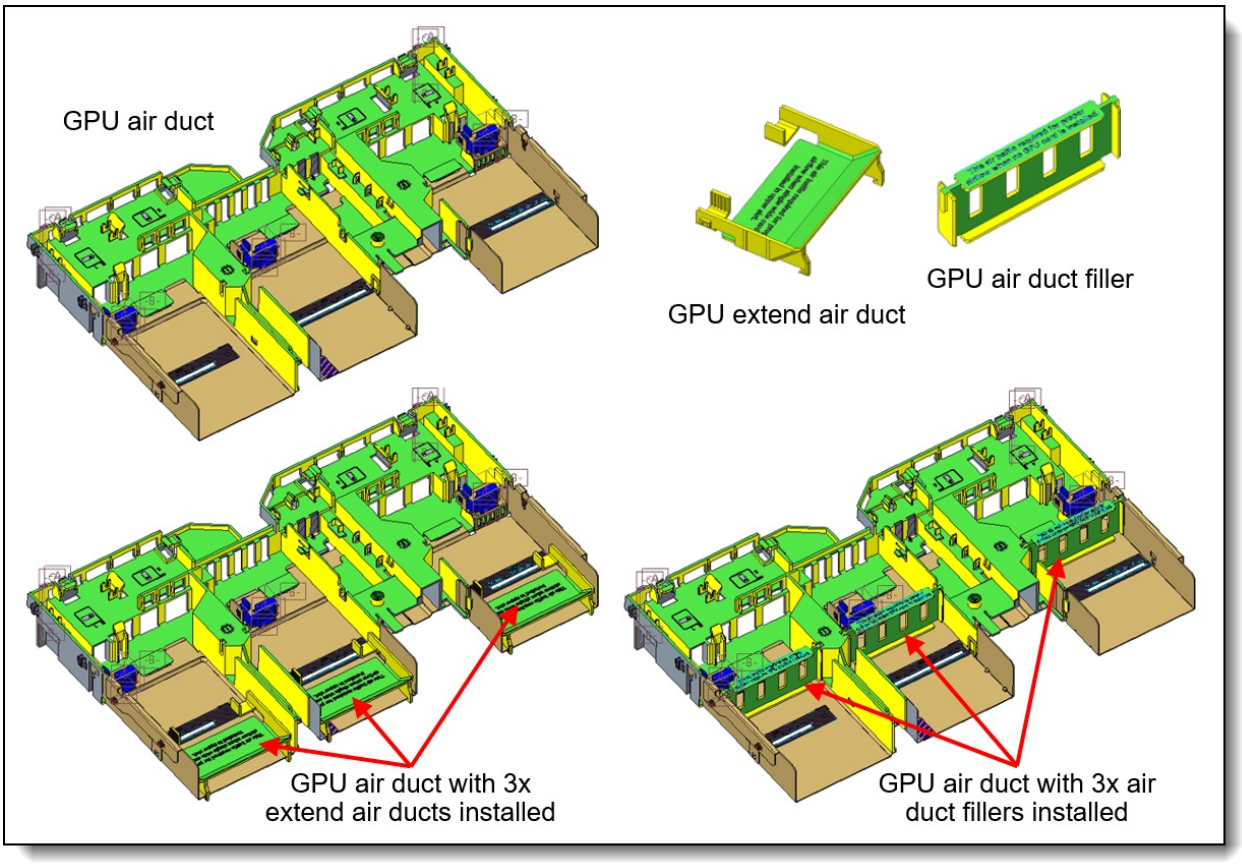

Figure 17. SR650 V2 GPU air duct

Cooling

The SR650 V2 server has up to six 60 mm hot-swap fans. Five fans are needed when one processor is installed and six fans are required when two processors are installed. Fans are N+1 redundant, tolerating a single-rotor failure. The server also has one or two additional fans integrated in each of the two power supplies.

Depending on the configuration, the server supports one of the following:

- Standard fans (single-rotor, 17K RPM, 60x38 mm)
- Performance fans (dual-rotor, 19K RPM, 60x56 mm).

The performance fans are dual-rotor counter-rotating units, which means that the fans have two separate propellors, one in front of the other, and that the propellors rotate in opposite directions.

For factory (CTO) orders, the configurator will automatically select the fans required for the configuration. For field upgrades, see the Thermal Rules section in the Information Center for the SR650 V2: https://thinksystem.lenovofiles.com/help/topic/SR650V2/thermal_rules.html?cp=4_11_7_2_1

Ordering information for the fans is listed in the following table.

Table 66. Fan ordering information

Part number	Feature code	Description	Quantity required
4F17A14497	BH8F	ThinkSystem SR650 V2 Standard Fan Option Kit (contains 1 fan)	1x CPU: 5 2x CPUs: 6
4F17A14496	BH8E	ThinkSystem SR650 V2 Performance Fan Option Kit (contains 1 fan)	1x CPU: 5 2x CPUs: 6

Power supplies

The SR650 V2 supports up to two redundant hot-swap power supplies.

The power supply choices are listed in the following table. Both power supplies used in server must be identical.

Tip: When configuring a server in the DCSC configurator, power consumption is calculated precisely by interfacing with Lenovo Capacity Planner. You can therefore select the appropriate power supply for your configuration. However, do consider future upgrades that may require additional power needs.

Table 67. Power supply options

Part number	Feature code	Description	Maximum supported	110V AC	220V AC	240V DC China only	-48V DC
AC input power							
4P57A75971	BHTT	ThinkSystem V2 500W (230V/115V) Platinum Hot-Swap Power Supply v2	2	Yes	Yes	Yes	No
4P57A75972	BHTU	ThinkSystem V2 750W(230V/115V) Platinum Hot-Swap Power Supply v2	2	Yes	Yes	Yes	No
4P57A75973	BHS8	ThinkSystem 750W (230V) v2 Titanium Hot-Swap Power Supply	2	No	Yes	Yes	No
4P57A75974	BHS9	ThinkSystem 1100W (230V/115V) v2 Platinum Hot-Swap Power Supply	2	Yes	Yes	Yes	No
4P57A26294	B8QB	ThinkSystem V2 1800W (230V) Platinum Hot-Swap Power Supply	2	No	Yes	Yes	No
-48V DC input power							
4P57A26296	B8QE	ThinkSystem 1100W -48V DC v2 Power Supply	2	No	No	No	Yes

Dual-voltage power supplies are auto-sensing and support both 110V AC (100-127V 50/60 Hz) and 220V AC (200-240V 50/60 Hz) power. For China customers, all power supplies support 240V DC.

All supported AC power supplies have a C14 connector. The -48V DC power supply has a Weidmuller TOP 4GS/3 7.6 terminal as shown in the following figure.

Figure 18. ThinkSystem 1100W -48V DC v2 Power Supply

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

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 68. 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
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

Part number	Feature code	Description
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

For the -48V DC Power Supply, the following power cable is supported.

Table 69. -48V DC power cable

Part number	Feature code	Description
4X97A59831	BE4V	2.5m, -48VDC Interconnecting Cable

Systems management

The server contains an integrated service processor, XClarity Controller (XCC), which provides advanced 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.

Topics in this section:

- Local management
- System status with XClarity Mobile
- Remote management
- Lenovo XClarity Provisioning Manager
- Lenovo XClarity Administrator
- Lenovo XClarity Essentials
- Lenovo XClarity Energy Manager
- Lenovo Capacity Planner

Local management

The SR650 V2 offers a front operator panel with key LED status indicators, as shown in the following figure.

Tip: The Network LED only shows network activity of the installed OCP network adapter.

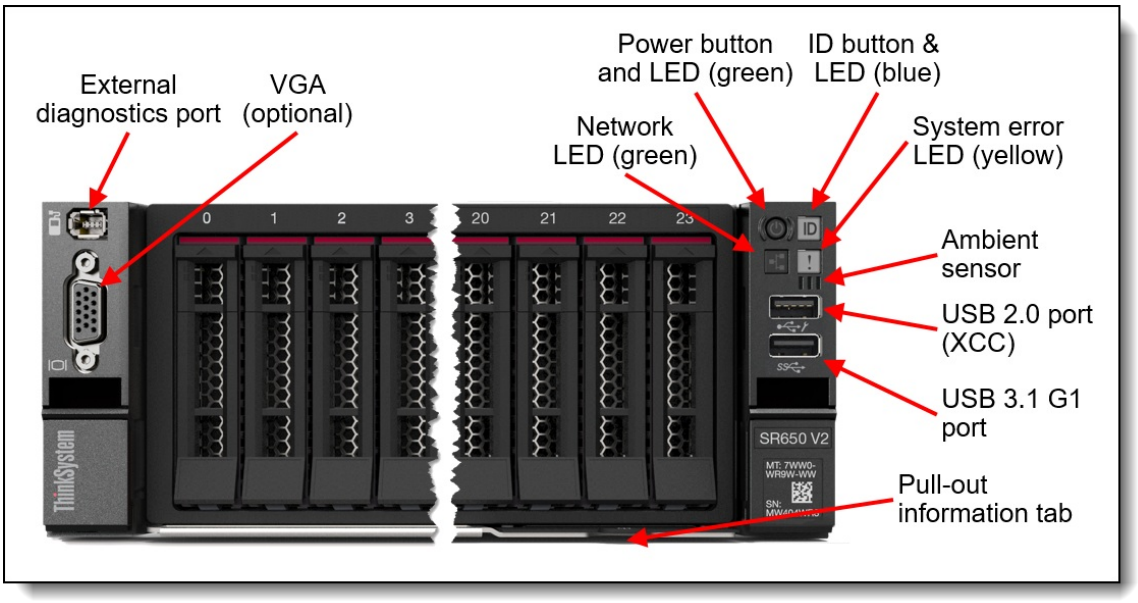

Figure 19. Front operator controls are on the left and right side of the server

Light path diagnostics

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

- Each processor
- Each memory DIMM
- Each drive bay
- Each system fan
- Each power supply

Integrated Diagnostics Panel for 8x 2.5-inch and 16x 2.5-inch drive bay configurations

For configurations with 8x 2.5-inch or 16x 2.5-inch drive bays at the front, the server can optionally be configured to have a pull-out Integrated Diagnostics Panel. The following figure shows the standard (fixed) operator panel and the optional Integrated Diagnostics Panel.

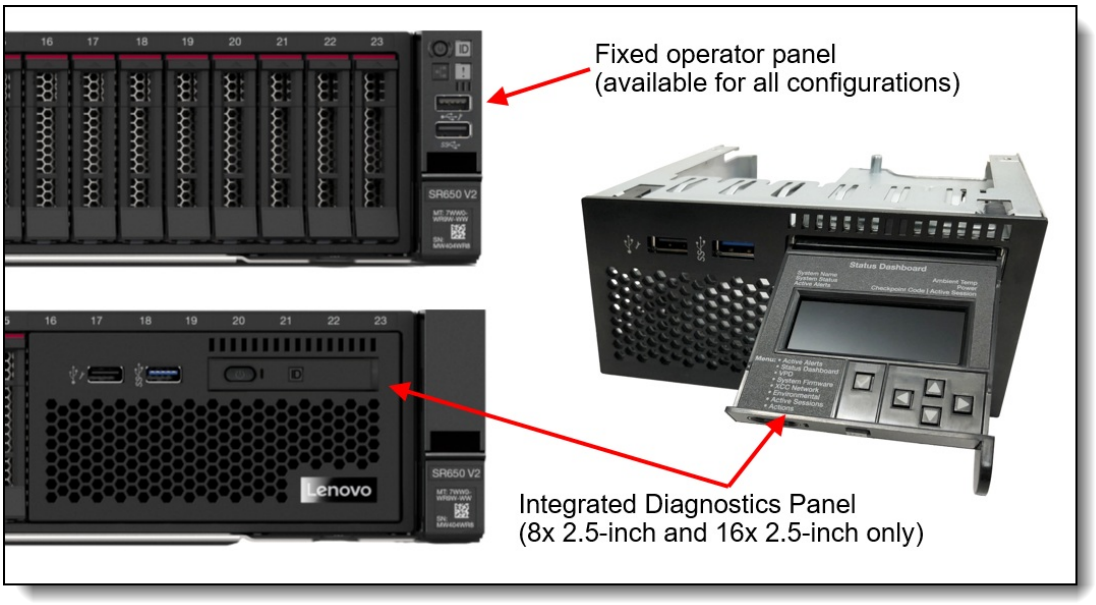

Figure 20. Operator panel choices for the 8x 2.5-inch drive bay configuration

The Integrated Diagnostics Panel allows quick access to system status, firmware, network, and health information. The LCD display on the panel and the function buttons give you access to the following information:

- Active alerts
- Status Dashboard
- 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
- Active XCC sessions
- System reset action

The Integrated Diagnostics Panel can be configured as listed in the following table. It is only available configure-to-order (CTO); not available as a field upgrade.

Table 70. Ordering information for the Integrated Diagnostics Panel

Part number	Feature code	Description
CTO only	B8MS	ThinkSystem 2U 16x2.5" Front Operator Panel

External Diagnostics Handset

The SR650 V2 also has a port to connect an External Diagnostics Handset as shown in the following figure. The External Diagnostics Handset has the same functions as the Integrated Diagnostics Panel but has the advantages of not consuming space on the front of the server plus it can be shared amongst many servers in your data center. The handset has a magnet on the back of it to allow you to easily mount it on a convenient place on any rack cabinet.

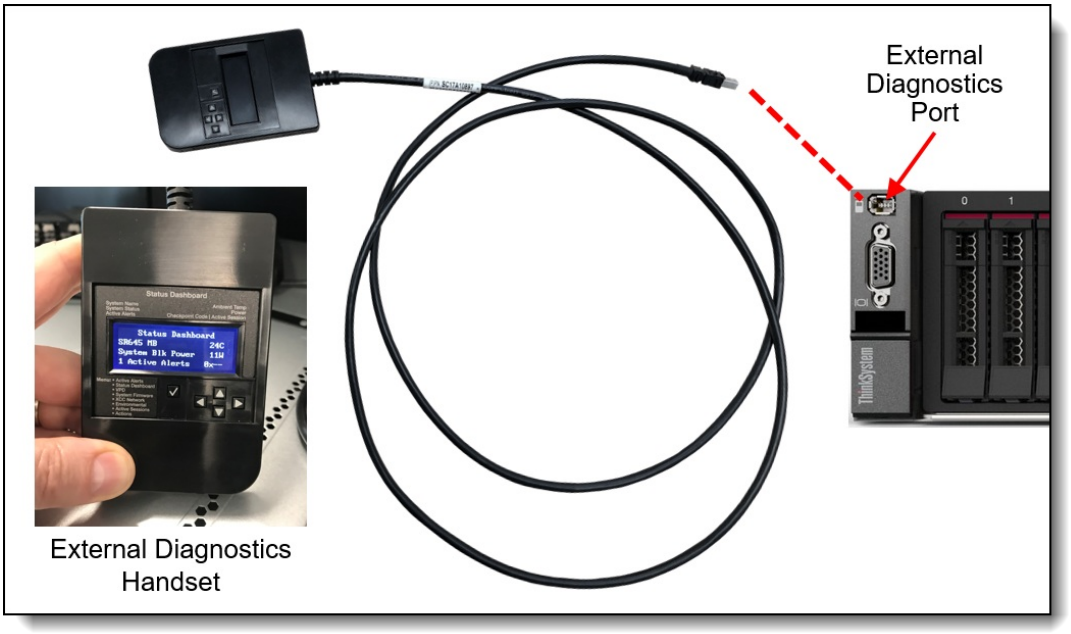

Figure 21. External Diagnostics Handset

Ordering information for the External Diagnostics Handset with is listed in the following table.

Table 71. External Diagnostics Handset ordering information

Part number	Feature code	Description
4TA7A64874	BEUX	ThinkSystem External Diagnostics Handset

The front of the server also houses an information pull-out tab (also known as the network access tag). See Figure 2 for the location. A label on the tab shows the network information (MAC address and other data) to remotely access the service processor.

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 SNMP v1)
- Common Information Model (CIM-XML)
- Representational State Transfer (REST) support
- Redfish support (DMTF compliant)
- Web browser - HTML 5-based browser interface (Java and ActiveX not required) using a responsive design (content optimized for device being used - laptop, tablet, phone) with NLS support

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 to the feature enabled or disabled in the factory, using the feature codes listed in the following table.

Table 72. IPMI-over-LAN settings

Feature code	Description
B7XZ	Disable IPMI-over-LAN (default)
B7Y0	Enable IPMI-over-LAN

There are two XClarity Controller upgrades available for the server, Advanced and Enterprise.

XCC Advanced Upgrade adds the following functions:

- 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
- International keyboard mapping support
- Syslog alerting
- Redirecting serial console via SSH
- Component replacement log (Maintenance History log)
- Access restriction (IP address blocking)
- Lenovo SED security key management
- Displaying graphics for real-time and historical power usage data and temperature

XCC Enterprise Upgrade enables the following additional features:

- Boot video capture and crash video capture
- Virtual console collaboration - Ability for up to 6 remote users to be log into the remote session simultaneously
- Remote console Java client
- Mapping the ISO and image files located on the local client as virtual drives for use by the server
- Mounting the remote ISO and image files via HTTPS, SFTP, CIFS, and NFS
- Power capping
- System utilization data and graphic view
- Single sign on with Lenovo XClarity Administrator
- Update firmware from a repository
- License for XClarity Energy Manager

For configure-to-order (CTO), you can enable the required XCC functionality by selecting the appropriate XCC feature codes listed in the following table:

- XCC Standard - select neither feature listed in the table
- XCC Advanced - select feature AVUT
- XCC Enterprise - select feature AUPW

Table 73. XClarity Controller upgrades for configure-to-order

Feature code	Description
AVUT	ThinkSystem XClarity Controller Standard to Advanced Upgrade
AUPW	ThinkSystem XClarity Controller Standard to Enterprise Upgrade

For systems with XCC Standard or XCC Advanced installed, field upgrades are available as listed in the following table.

Table 74. XClarity Controller field upgrades

Part number	Description
4L47A09132	ThinkSystem XClarity Controller Standard to Advanced Upgrade (for servers that have XCC Standard)
4L47A09133	ThinkSystem XClarity Controller Advanced to Enterprise Upgrade (for servers that have XCC Advanced)

Lenovo XClarity Provisioning Manager

Lenovo XClarity Provisioning Manager (LXPM) is a UEFI-based application embedded in ThinkSystem servers and accessible via the F1 key during system boot.

LXPM provides the following functions:

- Graphical UEFI Setup
- System inventory information and VPD update
- System firmware updates (UEFI and XCC)
- RAID setup wizard
- OS installation wizard (including unattended OS installation)
- Diagnostics functions

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 75. 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/lnvo-lxem
- Lenovo Information Center:
  https://sysmgt.lenovofiles.com/help/topic/LXEM/lxem_overview.html?cp=4

Lenovo Capacity Planner

Lenovo Capacity Planner is a power consumption evaluation tool that enhances data center planning by enabling IT administrators and pre-sales professionals to understand various power characteristics of racks, servers, and other devices. Capacity Planner can dynamically calculate the power consumption, current, British Thermal Unit (BTU), and volt-ampere (VA) rating at the rack level, improving the planning efficiency for large scale deployments.

For more information, refer to the Capacity Planner web page:
http://datacentersupport.lenovo.com/us/en/solutions/lnvo-lcp

Security

The server offers the following electronic security features:

- Administrator and power-on password
- Trusted Platform Module (TPM) supporting TPM 2.0 (no support for TPM 1.2)
- Optional Nationz TPM 2.0, available only in China (CTO only)
- Self-encrypting drives (SEDs) with support for enterprise key managers - see the SED encryption key management section

The server is NIST SP 800-147B compliant.

The SR650 V2 server also offers the following physical security features:

- Optional chassis intrusion switch
- Optional lockable front security bezel

The optional lockable front security bezel is shown in the following figure and includes a key that enables you to secure the bezel over the drives and system controls thereby reducing the chance of unauthorized or accidental access to the server.

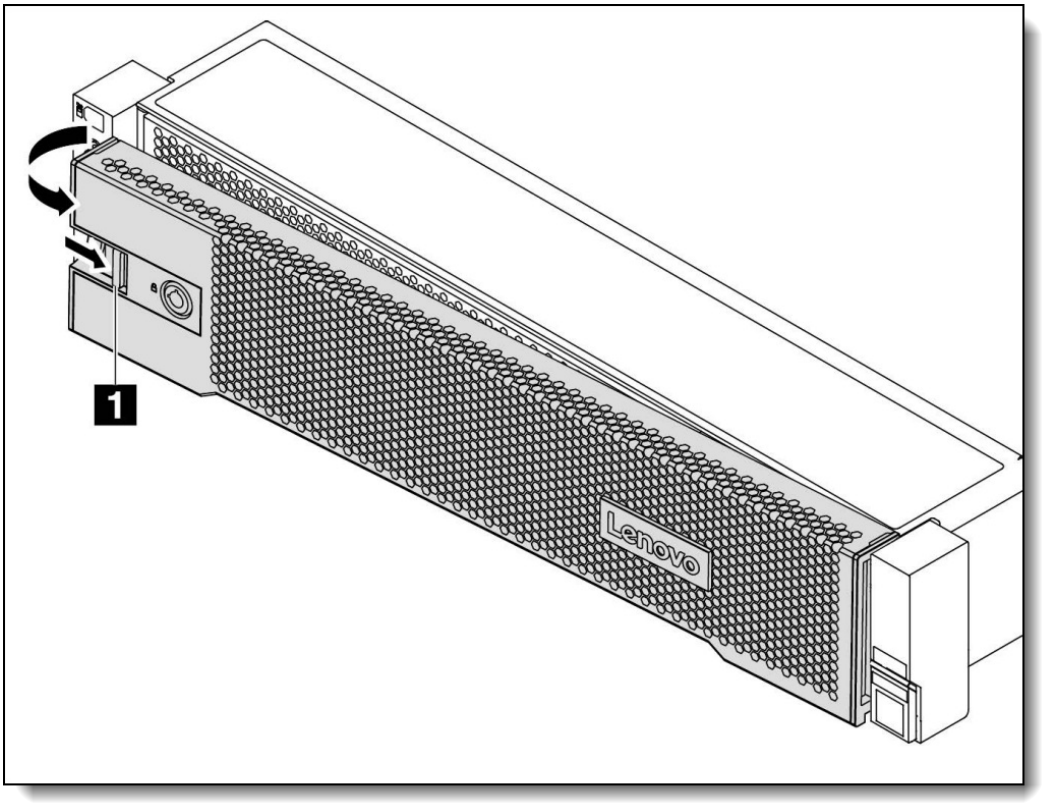

Figure 22. Lockable front security bezel

The dimensions of the security bezel are:

- Width: 437 mm (17.2 in.)
- Height: 87 mm (3.4 in.)
- Width: 23 mm (0.9 in.)

The following table lists the security options for the SR650 V2.

Table 76. Security features

Part number	Feature code	Description
4X97A59835	BAJJ	ThinkSystem 1U Intrusion Cable from MB to MB Switch
4XH7A09886	BAUD	ThinkSystem SR650 V2/SR665 Security Bezel v2
CTO only*	B8LE	ThinkSystem Nationz Trusted Platform Module v2.0 (China customers only)

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

Lenovo ThinkShield - Platform Firmware Resiliency

Lenovo's ThinkShield Security is a transparent and comprehensive approach to security that extends to all dimensions of our data center products: from development, to supply chain, and through the entire product lifecycle.

The ThinkSystem SR650 V2 offers Platform Firmware Resiliency (PFR) hardware Root of Trust (RoT) which is NIST SP800-193 compliant. This offering further enhances key platform subsystem protections against unauthorized firmware updates and corruption, to restore firmware to an integral state, and to closely monitor firmware for possible compromise from cyber attacks.

PFR operates upon the following server components:

- UEFI image – the low level server firmware that connects the operating system to the server hardware
- XCC image – the management "engine" software that controls and reports on the server status separate from the server operating system
- FPGA image – the code that runs the server's lowest level hardware controller on the motherboard

The Lenovo Platform Root of Trust Hardware performs the following three main functions:

- Detection – Measures the firmware and updates for authenticity
- Recovery – Recovers a corrupted image to a known-safe image
- Protection – Monitors the system to ensure the known-good firmware is not maliciously written

These enhanced protection capabilities are implemented using a dedicated, discrete security processor whose implementation has been rigorously validated by leading third-party security firms. Security evaluation results and design details are available for customer review – providing unprecedented transparency and assurance.

Intel Transparent Supply Chain

Add a layer of protection in your data center and have peace of mind that the server hardware you bring into it is safe authentic and with documented, testable, and provable origin.

Lenovo has one of the world's best supply chains, as ranked by Gartner Group, backed by extensive and mature supply chain security programs that exceed industry norms and US Government standards. Now we are the first Tier 1 manufacturer to offer Intel® Transparent Supply Chain in partnership with Intel, offering you an unprecedented degree of supply chain transparency and assurance.

To enable Intel Transparent Supply Chain for the Intel-based servers in your order, add the following feature code in the DCSC configurator, under the Security tab.

Table 77. Intel Transparent Supply Chain ordering information

Feature code	Description
BB0P	Intel Transparent Supply Chain

For more information on this offering, see the paper *Introduction to Intel Transparent Supply Chain on Lenovo ThinkSystem Servers*, available from https://lenovopress.com/lp1434-introduction-to-intel-transparent-supply-chain-on-thinksystem-servers.

Rack installation

The following table lists the rack installation options that are available for the SR650 V2.

The VGA Upgrade Kit allows you to upgrade your server by adding a VGA video port to the front of the server (if the server does not already come with a front VGA port). When the front VGA is in use, the rear VGA port is automatically disabled.

Table 78. Rack installation options

Option	Feature Code	Description
Optional front VGA port		
4X97A12645	B8ME	ThinkSystem 2U EIA Latch w/ VGA and External Diagnostics Port Upgrade Kit (adds a VGA port to the front of the server)
Rail Kits		
4M17A13564	B42B / BK7W	ThinkSystem Toolless Friction Rail v2
4M17A11754	B8LA	ThinkSystem Toolless Slide Rail Kit v2
4M17A11756	B91Y	ThinkSystem Toolless Slide Rail Kit v2 with 2U CMA
Enhanced Rail Kits for > 34 kg server weight*		
4M17A11755	B8LB	ThinkSystem Toolless Slide Rail Kit v2 Enhanced
4M17A11757	B97N	ThinkSystem Toolless Slide Rail Kit v2 Enhanced with 2U CMA
Separate Cable Management Arm		
7M27A05698	Field upgrade	ThinkSystem 2U CMA Upgrade Kit for Toolless Slide Rail

* The Enhanced Slide Rail Kits are used when the server is shipped in a rack and the server is 34 kg or heavier (configuration with 20x 3.5-inch HDDs for example)

The following table summarizes the rail kit features and specifications.

Table 79. Rail kit features and specifications summary

Option name	ThinkSystem Toolless Friction Rail v2	ThinkSystem Toolless Slide Rail Kit v2	ThinkSystem Toolless Slide Rail Kit v2 Enhanced	ThinkSystem Toolless Slide Rail Kit v2 with 2U CMA	ThinkSystem Toolless Slide Rail Kit v2 Enhanced with 2U CMA
Option part number	4M17A13564	4M17A11754	4M17A11755	4M17A11756	4M17A11757
Rail type	Half-out slide rail (friction)	Full-out slide rail (ball bearing)	Full-out slide rail (ball bearing)	Full-out slide rail (ball bearing)	Full-out slide rail (ball bearing)
Toolless installation	Yes	Yes	Yes	Yes	Yes
CMA support	No	Optional, 7M27A05698*	Optional, 7M27A05698*	Included	Included
Supported rack type	Four-post IBM and Lenovo standard rack, complying with the IEC standard	Four-post IBM and Lenovo standard rack, complying with the IEC standard	Four-post IBM and Lenovo standard rack, complying with the IEC standard	Four-post IBM and Lenovo standard rack, complying with the IEC standard	Four-post IBM and Lenovo standard rack, complying with the IEC standard
In-rack server maintenance	No	Yes	Yes	Yes	Yes
1U PDU support	Yes	Yes	Yes	Yes	Yes
0U PDU support	Yes	Limited support**	Limited support**	Limited support**	Limited support**
Supported mounting holes	Square or round	Square or round	Square, round, or threaded	Square or round	Square, round, or threaded
Thickness of mounting flanges	2.0-3.3 mm (0.08-0.13 inches)	2.0-3.3 mm (0.08-0.13 inches)	2.0-3.3 mm (0.08-0.13 inches)	2.0-3.3 mm (0.08-0.13 inches)	2.0-3.3 mm (0.08-0.13 inches)
Supported distance between front and rear mounting flanges‡	610-864 mm (24-34 inches)	610-813 mm (24-32 inches)	635-813 mm (25-32 inches)	610-813 mm (24-32 inches)	635-813 mm (25-32 inches)
Rail length†	751 mm (29.6 inches)	740 mm (29.1 inches)	740 mm (29.1 inches)	820 mm (32.3 inches)	820 mm (32.3 inches)

* CMA mounting brackets are not preinstalled on the rail. The CMA mounting brackets are contained in the CMA option kit package and you will need to install the CMA mounting brackets first. For detailed instructions, refer to the documentation that comes with the CMA option kit.
** If you want to install the rails and a 0U PDU into the same rack, the rack must meet the height and depth requirements as described in ThinkSystem Rail Support Matrix.
‡ For best performance, it is recommended that you install the rails to the racks with a 719-mm distance (28.31-inch, Lenovo rack default distance) between the front and rear mounting flanges.
† Measured when mounted on the rack, from the front surface of the front mounting flange to the rear most point of the rail. Rail is in closed position.

Operating system support

The server supports the following operating systems:

- Microsoft Windows Server 2016
- Microsoft Windows Server 2019
- Microsoft Windows Server 2022
- Red Hat Enterprise Linux 7.9
- Red Hat Enterprise Linux 8.2
- Red Hat Enterprise Linux 8.3
- SUSE Linux Enterprise Server 12 SP5
- SUSE Linux Enterprise Server 12 Xen SP5
- SUSE Linux Enterprise Server 15 SP2
- SUSE Linux Enterprise Server 15 Xen SP2
- VMware ESXi 6.7 U3
- VMware ESXi 7.0 U2

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=sr650-v2-7z72-7z73

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 80. VMware ESXi preload

Part number	Feature code	Description
CTO only	B88T	VMware ESXi 6.7 U3 (factory installed)
CTO only	BHSR	VMware ESXi 7.0 U2 (Factory Installed)

You can download supported VMware vSphere hypervisor images from the following web page and load it on the M.2 drives or 7mm drives using the instructions provided:
https://vmware.lenovo.com/content/custom_iso/

Physical and electrical specifications

The SR650 V2 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: 445 mm (17.5 inches)
- Height: 87 mm (3.4 inches)
- Depth: 764 mm (30.1 inches)

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

Table 81. Detailed dimensions

Dimension	Description
482 mm	X_a = Width, to the outsides of the front EIA flanges
435 mm	X_b = Width, to the rack rail mating surfaces
445 mm	X_c = Width, to the outer most chassis body feature
87 mm	Ya = Height, from the bottom of chassis to the top of the chassis
698 mm	Za = Depth, from the rack flange mating surface to the rearmost I/O port surface
730 mm	Zb = Depth, from the rack flange mating surface to the rearmost feature of the chassis body
727 mm (≤1100W PSU) 755 mm (1800W PSU) 781 mm (2400W PSU)	Zc = Depth, from the rack flange mating surface to the rearmost feature such as power supply handle
34 mm	Zd = Depth, from the forwardmost feature on front of EIA flange to the rack flange mating surface
46 mm	Ze = Depth, from the front of security bezel (if applicable) or forwardmost feature to the rack flange mating surface

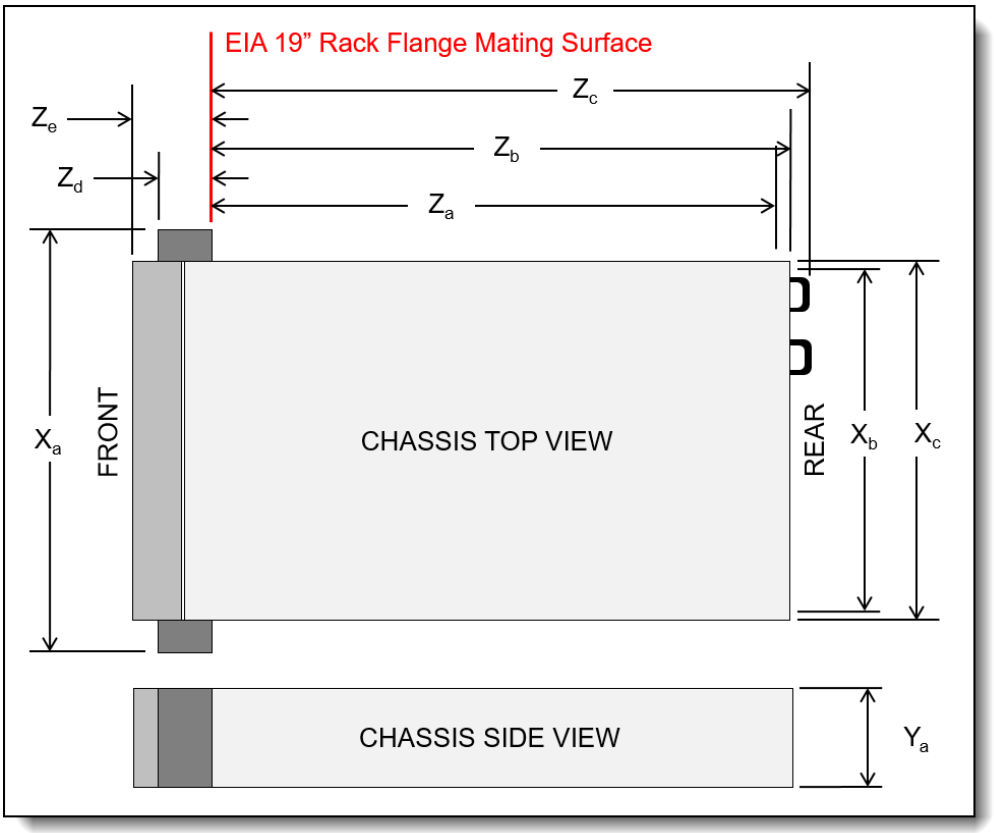

Figure 23. Server dimensions

The shipping dimensions (cardboard packaging) of the SR650 V2 are as follows:

- Width: 592 mm (23.3 inches)
- Height: 282 mm (11.1 inches)
- Depth: 992 mm (39.1 inches)

The server has the following weight:

- Base configuration: 21.4 kg (47.2 lb)
- Maximum weight: 38.8 kg (85.5 lb)

Electrical specifications for AC input power supplies:

- Input voltage:
  - 100 to 127 (nominal) Vac, 50 Hz or 60 Hz
  - 200 to 240 (nominal) Vac, 50 Hz or 60 Hz
  - 180 to 300 Vdc (China only)
- Inlet current:
  - 100-127 V:
    - 500W power supply: 5.7 A
    - 750W Platinum power supply: 8.4 A
    - 750W Titanium power supply: Not supported
    - 1100W power supply: 12 A*
    - 1800W power supply: Not supported
  - 200-240 V:
    - 500W power supply: 2.7 A
    - 750W Platinum power supply: 4.1 A
    - 750W Titanium power supply: 4 A
    - 1100W power supply: 6.0 A
    - 1800W power supply: 10 A

* In China, this power supply cannot exceed 10 A current.

Electrical specifications for DC input power supply:

- Input voltage: -48 to -60 Vdc
- Inlet current (1100W power supply): 26 A

Operating environment

The SR650 V2 server complies with ASHRAE Class A2 specifications with most configurations, and depending on the hardware configuration, also complies with ASHRAE Class A3 and Class A4 specifications.

For restrictions to ASHRAE support regarding maximum ambient temperature, see the Thermal Rules section in the Information Center for the SR650 V2:
https://thinksystem.lenovofiles.com/help/topic/SR650V2/thermal_rules.html?cp=4_11_7_2_1

Temperature and humidity

The server is supported in the following environment:

- Air temperature:
  - Operating:
    - ASHRAE Class A2: 10°C to 35°C (50°F to 95°F); the maximum ambient temperature decreases by 1°C for every 300 m (984 ft) increase in altitude above 900 m (2,953 ft).
    - ASHRAE Class A3: 5°C to 40°C (41°F to 104°F); the maximum ambient temperature decreases by 1°C for every 175 m (574 ft) increase in altitude above 900 m (2,953 ft).
    - ASHRAE Class A4: 5°C to 45°C (41°F to 113°F); the maximum ambient temperature decreases by 1°C for every 125 m (410 ft) increase in altitude above 900 m (2,953 ft).
  - Server off: 5°C to 45°C (41°F to 113°F)
  - Shipment/storage: -40°C to 60°C (-40°F to 140°F)
- Maximum altitude: 3,050 m (10,000 ft)
- Relative Humidity (non-condensing):

    - Operating
        - ASHRAE Class A2: 8% to 80%; maximum dew point: 21°C (70°F)
        - ASHRAE Class A3: 8% to 85%; maximum dew point: 24°C (75°F)
        - ASHRAE Class A4: 8% to 90%; maximum dew point: 24°C (75°F)
    - Shipment/storage: 8% to 90%

Acoustical noise emissions

The server has the following acoustic noise emissions declaration:

- Sound power level (L_{WAd}):
    - Idling: 5.9 Bel (Typical), 7.2 Bel (GPU rich), 7.5 Bel (Storage rich)
    - Operating: 6.2 Bel (Typical), 8.5 Bel (GPU rich), 7.6 Bel (Storage rich)
- Sound pressure level (L_{pAm}):
    - Idling: 42.6 dBA (Typical), 56.3 dBA (GPU rich), 60 dBA (Storage rich)
    - Operating: 45.8 dBA (Typical), 68.5dBA (GPU rich), 60.3 dBA (Storage rich)

Notes:

- These sound levels were measured in controlled acoustical environments according to procedures specified by ISO7779 and are reported in accordance with ISO 9296.
- The declared acoustic sound levels are based on the configurations, which may change slightly depending on configuration/conditions, for example high-power processors and GPUs, and high-power network adapters such as the Mellanox ConnectX-6 HDR/200GbE QSFP56 PCIe Adapters or the Broadcom 57454 10GBASE-T 4-port OCP Ethernet Adapter.
    - Typical config: 2x 165W CPU, 8x 64GB RDIMM, 8x SAS HDD, RAID 940-8i, Intel X710-T2L 10GBASE-T 2-port OCP, 2x 750W power supplies
    - GPU-rich config: 2x 205W CPU, 3x NVIDIA V100S GPUs, 32x 64GB RDIMM, 16x SAS HDD, RAID 940-16i, Intel X710-T2L 10GBASE-T 2-port OCP, 2x 1800W power supplies
    - Storage-rich config: 2x 165W CPU, 16x 64GB RDIMM, 20x SAS HDD, RAID 940-8i, Intel X710-T2L 10GBASE-T 2-port OCP, 2x 1100W power supplies
- Government regulations (such as those prescribed by OSHA or European Community Directives) may govern noise level exposure in the workplace and may apply to you and your server installation. The actual sound pressure levels in your installation depend upon a variety of factors, including the number of racks in the installation; the size, materials, and configuration of the room; the noise levels from other equipment; the room ambient temperature, and employee's location in relation to the equipment. Further, compliance with such government regulations depends on a variety of additional factors, including the duration of employees' exposure and whether employees wear hearing protection. Lenovo recommends that you consult with qualified experts in this field to determine whether you are in compliance with the applicable regulations.

Shock and vibration

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:
        - 23 kg - 31 kg: 35 G for 152 in./sec velocity change across 6 surfaces (3x GPU config, 2.5” config)
        - 32 kg - 68 kg: 35 G for 136 in./sec velocity change across 6 surfaces (20x 3.5” HDD config)

Particulate contamination

Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might damage the system that might cause the system to malfunction or stop working altogether. The following specifications indicate the limits of particulates that the system can tolerate:

- Reactive gases:
  - The reactivity rate of copper coupons shall be less than 200 Angstroms per month (Å/month)
  - The reactivity rate of silver coupons shall be less than 200 Å/month
- Airborne particulates:
  - The room air should be continuously filtered with MERV 8 filters.
  - Air entering a data center should be filtered with MERV 11 or preferably MERV 13 filters.
  - The deliquescent relative humidity of the particulate contamination should be more than 60% RH
  - Data centers must be free of zinc whiskers

For additional information, see the Specifications section of the Setup Guide for the server, available from the Lenovo ThinkSystem Information Center, https://thinksystem.lenovofiles.com/help/index.jsp

Warranty and Support

The SR650 V2 has a 1-year or 3-year warranty based on the machine type of the system:

- 7Z72 - 1 year warranty
- 7Z73 - 3 year warranty
- 7D15 - 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 Infrastructure Solutions Group (ISG) Servers and System Storage
  http://pcsupport.lenovo.com/us/en/solutions/ht503310
- Lenovo Data Center Services Agreement
  http://support.lenovo.com/us/en/solutions/ht116628

Services

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

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

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

- **Asset Recovery Services**

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

- **Assessment Services**

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

- **Design Services**

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

- **Basic Hardware Installation**

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

- **Deployment Services**

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

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

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

Regulatory compliance

The SR650 V2 conforms to the following standards:

- ANSI/UL 62368-1
- IEC 62368-1 (CB Certificate and CB Test Report)
- FCC - Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 7, Class A
- CSA C22.2 No. 62368-1
- CISPR 32, Class A, CISPR 35
- Japan VCCI, Class A
- Taiwan BSMI CNS13438, Class A; CNS14336-1; Section 5 of CNS15663
- CE, UKCA Mark (EN55032 Class A, EN62368-1, EN55024, EN55035, EN61000-3-2, EN61000-3-3, (EU) 2019/424, and EN50581)
- Korea KN32, Class A, KN35
- Russia, Belorussia and Kazakhstan, TP EAC 037/2016 (for RoHS)
- Russia, Belorussia and Kazakhstan, EAC: TP TC 004/2011 (for Safety); TP TC 020/2011 (for EMC)
- Australia/New Zealand AS/NZS CISPR 32, Class A; AS/NZS 62368.1
- UL Green Guard, UL2819
- Energy Star 3.0
- EPEAT (NSF/ ANSI 426) Bronze
- China CCC certificate, GB17625.1; GB4943.1; GB/T9254
- China CECP certificate, CQC3135
- China CELP certificate, HJ 2507-2011
- Japanese Energy-Saving Act
- Mexico NOM-019
- TUV-GS (EN62368-1, and EK1-ITB2000)
- India BIS
- Germany GS

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 82. 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 83. 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 84. 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 for high-performance storage expansion. See the DB Series product guides for models and configuration options:

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

Uninterruptible power supply units

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

Table 85. 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 86. Power distribution units

Part number	Description
0U Basic PDUs	
00YJ776	0U 36 C13/6 C19 24A/200-240V 1 Phase PDU with NEMA L6-30P line cord
00YJ777	0U 36 C13/6 C19 32A/200-240V 1 Phase PDU with IEC60309 332P6 line cord
00YJ778	0U 21 C13/12 C19 32A/200-240V/346-415V 3 Phase PDU with IEC60309 532P6 line cord
00YJ779	0U 21 C13/12 C19 48A/200-240V 3 Phase PDU with IEC60309 460P9 line cord
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
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)

Part number	Description
40K9617	DPI Australian/NZ 3112 Line Cord
40K9618	DPI Korean 8305 Line Cord

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

Rack cabinets

The following table lists the supported rack cabinets.

Table 87. Rack cabinets

Part number	Description
93072RX	25U Standard Rack
93072PX	25U Static S2 Standard Rack
93634PX	42U 1100mm Dynamic Rack
93634EX	42U 1100mm Dynamic Expansion Rack
93604PX	42U 1200mm Deep Dynamic Rack
93614PX	42U 1200mm Deep Static Rack
93084EX	42U Enterprise Expansion Rack
93084PX	42U Enterprise Rack
93074RX	42U Standard Rack

For specifications about these racks, see the Lenovo Rack Cabinet Reference, available from:
https://lenovopress.com/lp1287-lenovo-rack-cabinet-reference

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

KVM console options

The following table lists the supported KVM consoles.

Table 88. KVM console

Part number	Description
4XF7A73009	ThinkSystem 18.5" LCD Console (with English keyboard)

The following table lists the available KVM switches and the options that are supported with them.

Table 90. KVM switches and options

Part number	Description
KVM Console switches	
1754D1T	ThinkSystem Digital 2x1x16 KVM Switch (DVI video output port)
1754A1T	ThinkSystem Analog 1x8 KVM Switch (DVI video output port)
1754D2X	Global 4x2x32 Console Manager (GCM32)
1754D1X	Global 2x2x16 Console Manager (GCM16)
1754A2X	Local 2x16 Console Manager (LCM16)
1754A1X	Local 1x8 Console Manager (LCM8)
Cables for ThinkSystem Digital and Analog KVM Console switches	
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
Cables for GCM and LCM Console switches	
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

Lenovo Financial Services

Lenovo Financial Services reinforces Lenovo's commitment to deliver pioneering products and services that are recognized for their quality, excellence, and trustworthiness. Lenovo Financial Services offers financing solutions and services that complement your technology solution anywhere in the world.

We are dedicated to delivering a positive finance experience for customers like you who want to maximize your purchase power by obtaining the technology you need today, protect against technology obsolescence, and preserve your capital for other uses.

We work with businesses, non-profit organizations, governments and educational institutions to finance their entire technology solution. We focus on making it easy to do business with us. Our highly experienced team of finance professionals operates in a work culture that emphasizes the importance of providing outstanding customer service. Our systems, processes and flexible policies support our goal of providing customers with a positive experience.

We finance your entire solution. Unlike others, we allow you to bundle everything you need from hardware and software to service contracts, installation costs, training fees, and sales tax. If you decide weeks or months later to add to your solution, we can consolidate everything into a single invoice.

Our Premier Client services provide large accounts with special handling services to ensure these complex transactions are serviced properly. As a premier client, you have a dedicated finance specialist who manages your account through its life, from first invoice through asset return or purchase. This specialist develops an in-depth understanding of your invoice and payment requirements. For you, this dedication provides a high-quality, easy, and positive financing experience.

For your region-specific offers, please ask your Lenovo sales representative or your technology provider about the use of Lenovo Financial Services. For more information, see the following Lenovo website:

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

Related publications and links

For more information, see these resources:

- ThinkSystem SR650 V2 product page:
  https://www.lenovo.com/us/en/data-center/servers/racks/ThinkSystem-SR650-V2/p/77XX7SR65V2
- ThinkSystem SR650 V2 datasheet
  https://lenovopress.com/ds0126
- Interactive 3D Tour of the ThinkSystem SR650 V2:
  https://lenovopress.com/lp1424
- Lenovo Press video walk-through of the ThinkSystem SR650 V2:
  https://lenovopress.com/lp1403
- ThinkSystem SR650 V2 drivers and support
  http://datacentersupport.lenovo.com/products/servers/thinksystem/sr650v2/7z73/downloads
- Lenovo ThinkSystem SR650 V2 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
- ServerProven hardware compatibility:
  http://www.lenovo.com/us/en/serverproven

Related product families

Product families related to this document are the following:

- 2-Socket Rack Servers
- ThinkSystem SR650 V2 Server

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This document, LP1392, was created or updated on September 14, 2021.

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