Lenovo ThinkSystem ST50 V3 Server
Product Guide

The ThinkSystem ST50 V3 is a value 1-socket tower server that also be rack mounted as a rack server. It is ideal for small-to-medium businesses, remote offices, branch offices, banking and public sector. The server supports one Intel Xeon E-2400 Series processor (formerly codenamed "Raptor Lake") or Intel Pentium and up to 128 GB of 4800 MHz TruDDR5 ECC memory.

Figure 1 shows the ThinkSystem ST50 V3.

Figure 1. Lenovo ThinkSystem ST50 V3

Did you know?

The ThinkSystem ST50 V3 is an entry-level server with enterprise-grade management features. It offers full support of Lenovo XClarity Administrator for comprehensive systems management and includes the next generation UEFI-based Lenovo XClarity Provisioning Manager for system setup and diagnosis, and the Lenovo XClarity Controller management processor for ongoing systems management and alerting. These tools make the ST50 V3 easy to deploy, integrate, service, and manage.

Key features

The ThinkSystem ST50 V3 is a office-friendly tower server that has been optimized to provide enterprise-class features to small businesses, retail, educational institutions and branch offices.

Scalability and performance

The ST50 V3 offers the following features to boost performance, improve scalability, and reduce costs:

- Improved single-socket processor performance:
  - Intel Xeon E-2400 Series processors ("Raptor Lake") up to to 8 cores and core speeds up to 3.5 GHz
  - Intel Pentium G7400 and G7400T processors ("Alder Lake") with 2 cores and core speeds up to 3.7 GHz
- Up to four 4800 MHz DDR5 ECC UDIMMs provide speed and capacity of up to 128 GB
- Three PCIe slots for I/O expansion, one of which has the new PCIe Gen5 interface to maximize I/O performance.
- Flexible storage configurations support either 2.5-inch or 3.5-inch NHS drives. Drive bays support SATA HDDs, SSDs and Slim Optical Disc Drive.
  - Up to 1x 2.5-inch NHS drive bays
  - Up to 3x 3.5-inch NHS drive bays
  - Up to 1x slim SATA ODD bay (Optional)
- The use of solid-state drives (SSDs) instead of, or along with, traditional hard disk drives (HDDs) can significantly improve I/O performance. An SSD can support up to 100 times more I/O operations per second (IOPS) than a typical HDD
- Supports ThinkSystem RAID 5350-8i PCIe 12Gb Adapter and SATA Drives only
- Support for optical drives or external backup drives
- Supports two M.2 drives for OS boot support with VROC RAID redundancy (no support for NVMe RAID)
- The server has two integrated Gigabit Ethernet ports
- The server offers one PCIe 5.0 slot plus two PCIe 4.0 I/O expansion slots
- No support for GPU

Availability and serviceability

The ST50 V3 provides the following features to simplify serviceability and increase system uptime:

- Designed to run 24 hours a day, 7 days a week
- The ST50 V3 supports UDIMM memory with ECC protection which provides error correction not available in PC-class "servers" that use parity memory. Avoiding system crashes (and data loss) due to soft memory errors means greater system uptime.
- The server offers non-hot-swap (NHS) SSDs and HDDs, and supports RAID redundancy for data protection and greater system uptime.
- The server supports single power supply.
- A choice of affordable onboard SATA RAID or advanced hardware RAID redundancy offers data protection and greater system uptime.
- The use of SSDs can provide better reliability than the use of traditional HDDs, for greater uptime.
- The built-in XClarity Controller continuously monitors system parameters, triggers alerts, and performs recovery actions in case of failures to minimize downtime.
- Allows preventive actions in advance of possible failure, thereby increasing server uptime and application availability with Proactive Platform Alerts (including PFA and SMART alerts) for memory, internal storage (SATA HDDs and SSDs, M.2 SSDs), RAID controllers, and server ambient and sub-

component temperatures. SAS drives are not supported.

- 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.
- Support for the XClarity Administrator Mobile app running on a supported smartphone and connected to the server through the service-enabled USB port, enables additional local systems management functions.
- Auto restart in the event of a momentary loss of AC power (based on power policy setting in the XClarity Controller service processor)
- One-year or three-year customer-replaceable unit (CRU) and onsite limited warranty with next business day response. Optional service upgrades are available.

Manageability and security

The following systems management features simplify local and remote management of the ST50 V3:

- The server includes an XClarity Controller2 (XCC2) to monitor server availability. Optional upgrade to XCC Advanced to provide remote control (keyboard video mouse) functions. Optional upgrade to XCC2 Platinum 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.
- New UEFI-based Lenovo XClarity Provisioning Manager, accessible from F1 during boot, provides system inventory information, graphical UEFI Setup, platform update function, RAID Setup wizard, operating system installation function, and diagnostic functions.
- Support for Lenovo XClarity Energy Manager which captures real-time power and temperature data from the server and provides automated controls to lower energy costs.
- Integrated Trusted Platform Module (TPM) 2.0 support enables advanced cryptographic functionality, such as digital signatures and remote attestation.
- 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 (Intel Xeon E processors only) 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.
- Helps prevent unauthorized software from running on the server by protecting against boot block-level malicious software with Intel Boot Guard technology.
- Physical security measures to prevent unauthorized access: Loop for a padlock to prevent the side panel from being opened and a slot at the rear of the server for a Kensington Cable Lock. Optional chassis intrusion switch (included in some models).

Energy efficiency

The ST50 V3 offers the following energy saving features to save energy, reduce operational costs, increase energy availability, and contribute to the green environment:

- Energy-efficient planar components help lower operational costs.
- 500W PSU with ErP Lot9 Compliant. Energy Star certified.
- Intel Intelligent Power Capability powers individual processor elements on and off as needed to reduce power draw.

- DDR5 memory DIMMs support up to 4400 MT/s (One DIMM per Channel)
- SSDs use as much as 80% less power than traditional spinning HDDs.
- The server uses hexagonal ventilation holes, which can be grouped more densely than round holes, providing more efficient airflow through the system.
- Optional Lenovo XClarity Energy Manager provides advanced data center power notification, analysis, and policy-based management to help achieve lower heat output and reduced cooling needs.

Comparing the ST50 V3 to the ST50 series

The ThinkSystem ST50 V3 improves on the previous generation ST50, as summarized in the following table.

Table 1. Comparing the ST50 V3 to the ST50s

Feature	ST50 V3	ST50 V2	ST50	Benefits
Form Factor	• 1-Socket (1S) Entry Tower • 17 liter chassis	• 1-Socket (1S) Entry Tower • 17 liter chassis	• 1-Socket (1S) Entry Tower • 25 liter chassis	• Smaller unit takes up less space
Processor	• Support single Xeon E-2400 Series "Raptor Lake" processor up to 8C / 95W • Also supports Pentium processors (Alder Lake) • Intel C266 "Raptor Lake" Platform Controller Hub (PCH-S)	• Support single Xeon E2300 Series "Rocket Lake" processor up to 8C / 95W • Also supports Pentium processors • Intel C256 "Tiger Lake" Platform Controller Hub (PCH)	• Supports single Xeon E2200 Series "Coffee Lake-S" processor up to 6C / 95W • Also supports Pentium, Core i3 and Celeron processors • Uses Intel C246 "Cannon Lake" Platform Controller Hub (PCH)	• Supports the latest generation Intel Xeon E processors
Memory	• 4x UDIMM slots, up to 128GB, 4800MHz with Xeon E-2400 processors • 4x UDIMM slots, up to 128GB, 4800MHz with Pentium processors • TruDDR5 ECC memory (DDR5 memory support up to 4400 MT/s (One DIMM per Channel configurations)	• 4x UDIMM slots, up to 128GB, 3200MHz with Xeon E-2300 processors • TruDDR4 ECC memory	• 4x UDIMM slots, up to 64GB, 2666MHz • TruDDR4 ECC memory (in China, also support for non-ECC memory)	• Enterprise-grade memory sufficient for most SMB and retail applications

Feature	ST50 V3	ST50 V2	ST50	Benefits
Storage	• Up to 4 bays • 3x 3.5” HDD or SSD, (1 standard, 2 optional); 1x2.5” SSD (optional) • 2x M.2 SATA SSD supporting RAID 0 and RAID 1 using VROC, installs in an adapter in a PCIe slot. • 1x slim SATA DVD-RW in dedicated bay (optional)	• Up to 3 bays • 2x 3.5” HDD or SSD, (1 standard, 1 optional); 1x2.5” SSD (optional) • 1x M.2 NVMe SSD (2280 form factor) • 1x slim SATA DVD-RW in dedicated bay (optional)	• Up to 4 bays • 4x 3.5” drive bays (includes one that can be shared with optical drive or used instead for RDX/tape drive) • 2x SD cards in SD Adapter module • 1x optical drive or RDX/tape drive bay	• Support for both HDDs for capacity and SSDs for better performance • Optical drive support for ease of software installation • M.2 drive support to separate the OS from the applications and data
RAID	• Supports a SAS HBA or RAID adapter for hardware RAID functionality • 12Gb SAS/SATA/RAID support • PCIe 4.0 and PCIe 5.0 adapters • Intel VROC 8.x SW RAID (no support for NVMe RAID)	• Intel VROC 6.x SW RAID • HW RAID support (limited)	• Intel RSTe SW RAID • HW RAID support (limited)	• RAID capability maximizes reliability and uptime
Cooling	• 2x system fans (Front drive bay and rear), 1x CPU fan	• 2x system fans (Front drive bay and rear), 1x CPU fan	• 2x system fans (Front drive bay and rear), 1x CPU fan	• Ensures all components are sufficiently cooled
Networking	• 2x 1GbE Onboard Ethernet ports (Broadcom BCM5720) • Rear 1 port allows remote connectivity to the XCC2 management controller	• 1x 1GbE Embedded (Intel I219-LM)	• 1x 1GbE Embedded (Intel I219-LM)	• Easy built-in networking

Feature	ST50 V3	ST50 V2	ST50	Benefits
Management	• XClarity Controller with upgrades • Full XClarity software suite including XClarity Administrator • Dedicated Ethernet port for remote management • Optional intrusion switch • Platform Firmware Resiliency (PFR) hardware Root of Trust	• Intel AMT 15 Management • TPM embedded: TPM 2.0 • Lenovo XClarity Provisioning Manager Lite (USB based)	• Intel AMT 12 Management • TPM embedded Optional : TPM 2.0 / TPM 1.2 • Lenovo XClarity Provisioning Manager Lite (USB based)	• Supports the latest embedded systems management tools from Intel and Lenovo • TPM 2.0 enables advanced cryptographic functionality, such as digital signatures and remote attestation • LXPM Lite provides easy system setup and firmware upgrades
PCIe Slots	• 3 PCIe slots (x4, x16, x4) • Includes a PCIe Gen5 x16 slot	• 3 PCIe slots (x16, x4, x1) • Includes a PCIe Gen4 x16 slot (requires Xeon E-2300 processor)	• 3 PCIe slots (x16, x4, x1) • Includes a PCIe Gen3 x16 slot	• Support the latest PCIe Gen5 slot technology • Support for a high-performance PCIe x16 adapter
Front I/O	• One USB 3.2 G1 (5 Gb/s) port • One USB 2.0 port (also for XClarity Mobile connectivity for local systems management)	• Power button & LED • Thermal sensor • 1x USB 3.2 G2 (10 Gbps) with USB-C connector • 2x USB 3.2 G1 (5 Gbps); 2x USB 3.2 G2 (10 Gbps) ports • 1x Microphone port, 1x Headset port	• Power button & LED • Thermal sensor • 2x USB 3.2 G1 (5 Gbps) ports	• Expansive USB support • Thermal sensor ensures the server does not overheat if the ambient temperature rises
Rear I/O	• Four USB 3.2 G1 (5 Gb/s) ports • One VGA video • One RJ-45 systems management • Two RJ-45 GbE network ports • One serial port	• 4x USB 3.2 G1 (5 Gbps) ports • 2x DP Ports • 1x Serial port • 1x 1GbE LAN • 1x Audio line out	• 2x USB 3.2 G1 (5 Gbps), 2x USB 2.0 ports • 2x DP Ports • 1x Serial port • 1x 1GbE LAN • 1x Audio line out	• Expansive USB support • Integrated Gigabit networking • Serial port for applications that require it

Feature	ST50 V3	ST50 V2	ST50	Benefits
Power Supply	• 1x Fixed power supply • Choose from 300W Gold or 500W Platinum	• 1x Fixed power supply • Choose from 300W Gold or 500W Platinum	• 1x Fixed power supply • Choose from 250W Platinum or 400W Platinum	• Select the power supply that best suits the configuration to maximize efficiency

Components and connectors

The following figure shows the front of the server.

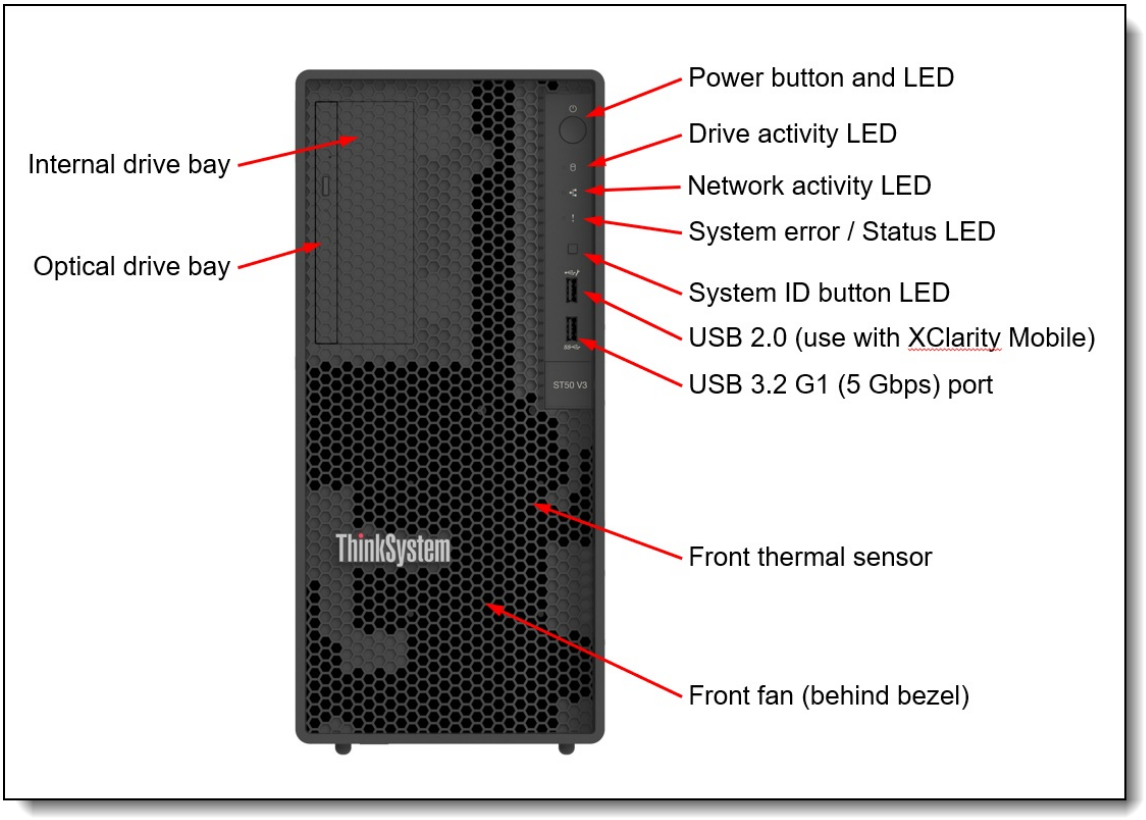

Figure 2. Front view of the ThinkSystem ST50 V3 server

The following figure shows the rear of the server.

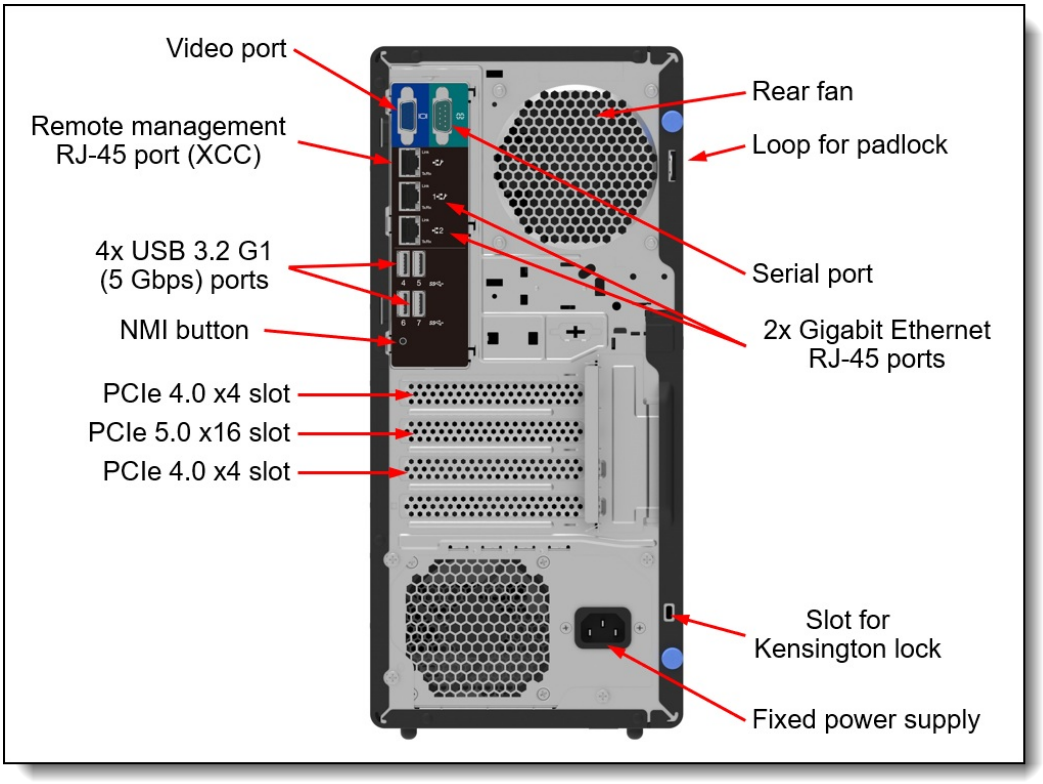

Figure 3. Rear view of the ThinkSystem ST50 V3 server

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

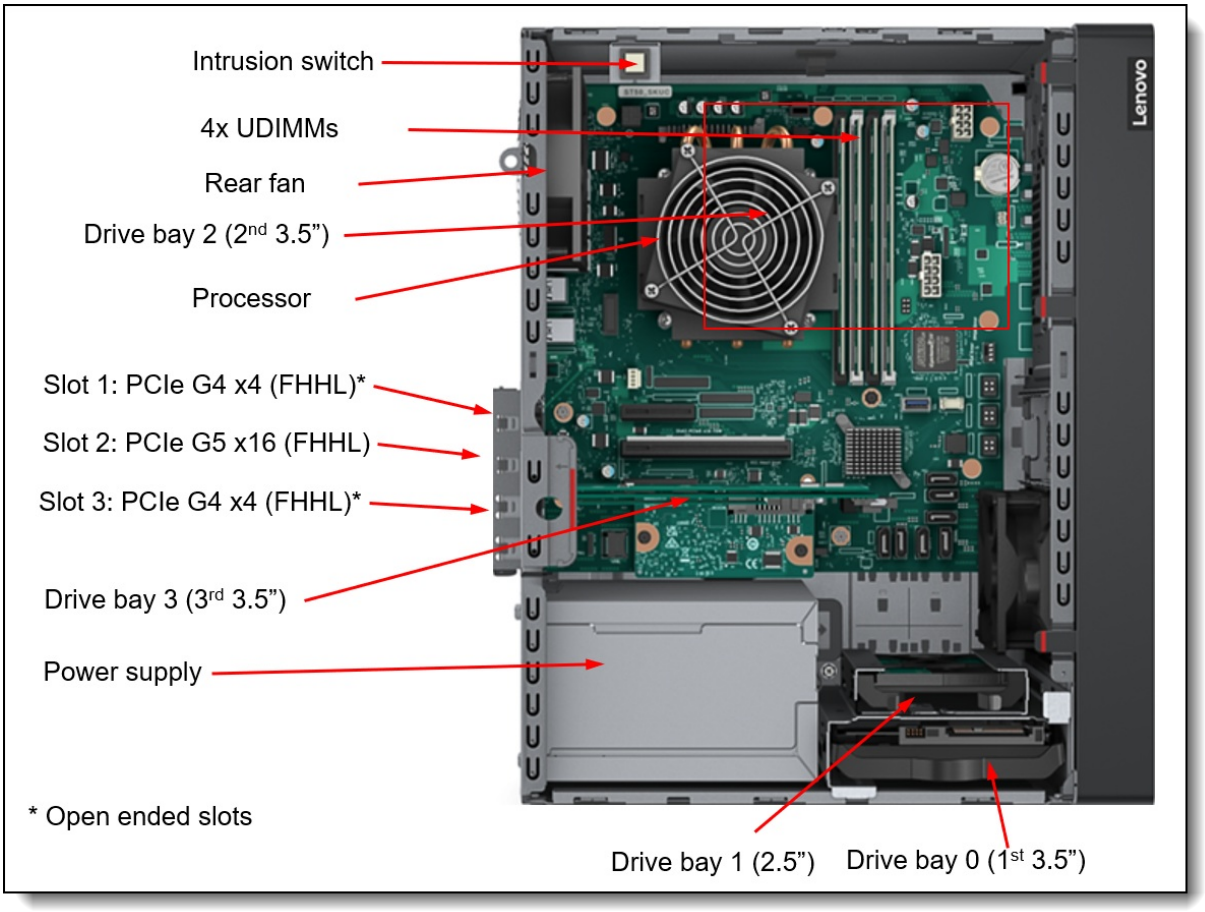

Figure 4. Internal view of the ThinkSystem ST50 V3 server

System architecture

The following figure shows the architectural block diagram of the ST50 V3, showing the major components and their connections.

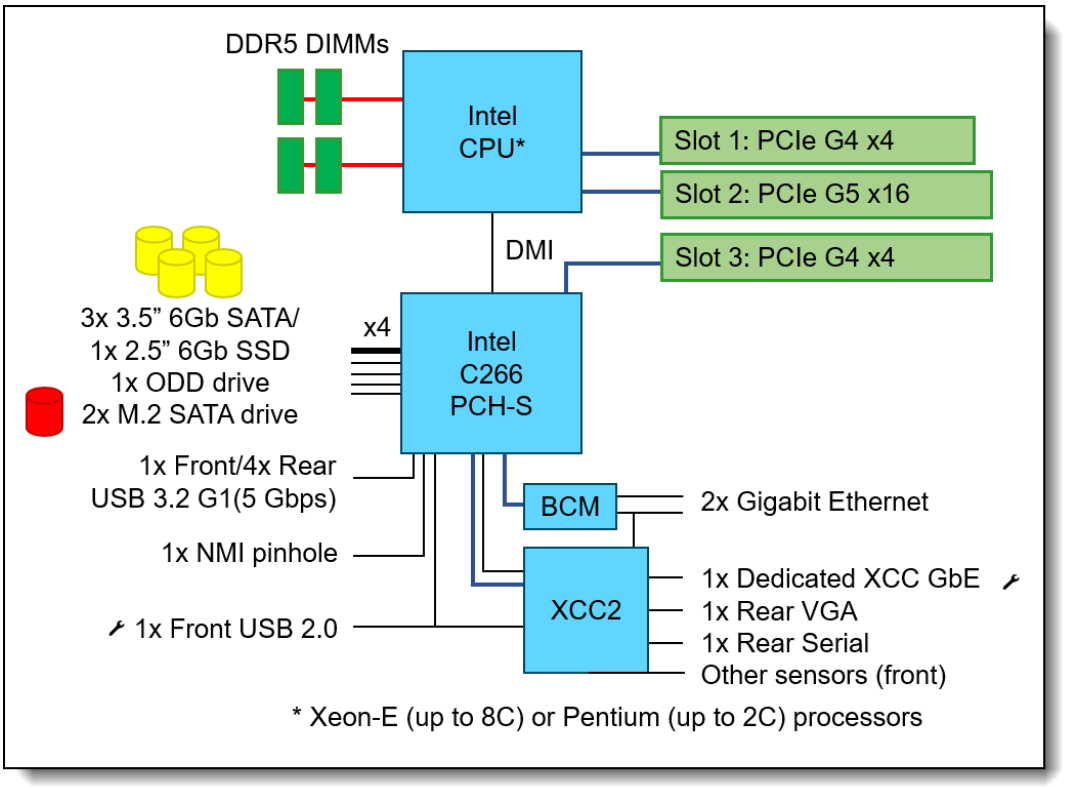

Figure 5. ST50 V3 system architectural block diagram

Standard specifications

The following table lists the standard specifications.

Table 2. Standard specifications

Components	Specification
Machine type	7DF4 - 1 year warranty 7DF3 - 3 year warranty
Form factor	Tower (can be installed in a rack with the available Rack Mount Kit)
Processor	One Intel processor. Choose from: • Intel Xeon E-2400 Series processors ("Raptor Lake-E") up to to 8 cores, with core speeds up to 3.5 GHz • Intel Pentium G7400 and G7400T processors ("Alder Lake-R") with 2 cores, with core speeds up to 3.7 GHz
Chipset	Intel Rocket Lake PCH-S, C266
Memory	Four DIMM sockets supporting Lenovo TruDDR5 DIMMs at 4400 MHz (Xeon processors) or 4400 MHz (Pentium processors). Support ECC UDIMMs.
Memory maximum	Up to 128 GB using 4x 32 GB UDIMMs.

Components	Specification
Memory protection	Error-correcting code (ECC)
Disk drive bays	Available configurations: • 1x 2.5-inch NHS SATA SSD drive bays • 3x 3.5-inch NHS SATA HDD/SSD drive bays • 1x slim SATA ODD bay (optional) In addition, the ST50 V3 supports two M.2 drives installed in an M.2 adapter which is installed in PCIe slot 3. Note: Drive Bay 3 (3rd 3.5”) kit and M.2 2-Bay Enablement Kit are mutually exclusive because both kits are installed/assembled at PCIe Slot 3.

Maximum internal storage	• 2.5-inch drives:
	  ◦ 960GB using 1x 960GB 2.5-inch SATA SSD
	• 3.5-inch drives:
	  ◦ 24TB using 3x 8TB 3.5-inch SATA NHS HDDs
	• Intermix of traditional HDDs and SSDs in the same array is not supported.

Storage controller	• Onboard 6 Gb SATA (OB SATA):
	  ◦ AHCI mode, for JBOD support
	  ◦ RAID Mode, using Intel VROC SATA RAID, supporting RAID 0, 1, 5
	• 12 Gb SAS/SATA RAID adapter, supporting RAID 0, 1, 5
	• 12 Gb SAS/SATA host bus adapters

Optical drive bays	Supports Slim SATA DVD-RW (multiburner).
Tape drive bays	Supports external one tape USB 3.0 RDX drive.
Network interfaces	Two integrated Gigabit Ethernet 1000BASE-T ports (RJ-45) based on Broadcom BCM5720 embedded controller, one can be shared with XCC for systems management. Third dedicated Gigabit Ethernet port for XCC systems management.
PCI Expansion slots	Three PCIe slots (1x PCIe 5.0, 2x PCIe 4.0) as follows: • Slot 1: PCIe G4 x4 (x4 slot, open-ended) 25W full-height half-length (FHHL) • Slot 2: PCIe G5 x16 (x16 slot, closed-ended) 75W full-height half-length (FHHL) • Slot 3: PCIe G4 x4 (x4 slot, open-ended) 25W full-height half-length (FHHL)
Ports	Front: • One USB 3.2 G1 (5 Gb/s) port • One USB 2.0 port (also for XClarity Mobile connectivity for local systems management) Rear: • Four USB 3.2 G1 (5 Gb/s) ports • One VGA video • One RJ-45 systems management • Two RJ-45 GbE network ports • One serial port
Cooling	Supports ASHRAE A2 environments. Three fans. Two fixed system fans (front drive bay and rear). Additional fan attached to the processor heat sink and in the power supplies.

Components	Specification
Power supply	Model dependent choices • One fixed 300W Gold power supply • One fixed 500W Platinum power supply: Energy Star and ErP Lot 9 compliant.
Systems management	Operator panel with status LEDs. XClarity Controller2 (XCC2) embedded management, XClarity Administrator centralized infrastructure delivery, XClarity Integrator plugins, and XClarity Energy Manager centralized server power management. Optional XClarity Controller platinum to enable remote control functions.
Security features	Power-on password, administrator's password, Trusted Platform Module, supporting TPM 2.0. Optional chassis intrusion switch. Padlock loop and Kensington cable for physical security.
Video	G200 graphics with 16 MB memory, integrated into the XClarity Controller. For use with local Administrator functions (not designed for workstation use). Maximum resolution is 1920x1200 32bpp at 60Hz.
Operating systems supported	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware ESXi. See the Operating systems 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: 170 mm (6.7 inches), Height: 376 mm (14.8 inches) with stand, 370 mm (14.6 inches) without stand, Depth: 315 mm (12.4 inches). See Physical and electrical specifications for details.
Weight	Fully configured: 11.96 kg (26.4 lbs)

The ST50 V3 server is shipped with the following items:

- Documentation flyer
- Power cords (model and region dependent)
- Mouse & keyboard (model dependent)

Models

ThinkSystem ST50 V3 models can be configured by using the Lenovo Data Center Solution Configurator (DCSC).

Preconfigured server models may also be available for the ST50 V3, 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 ST50 V3 server.

Table 3. Base CTO models

Machine Type/Model	Description
7DF3CTO1WW	ThinkSystem ST50 V3 – 3-year warranty
7DF4CTO1WW	ThinkSystem ST50 V3 – 1-year warranty

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 countries
- Models for Latin American countries
- Models for Canada and US

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

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 4. Models for Asia Pacific markets

Model	Intel processors†	Memory	Drive Contr	Drive bays Drives	Add'l Cards	DVD	Power supply	Pwr cord	XCC2	Intru. sw.
Standard models with a 3-year warranty (machine type 7DF3)										
7DF3A00RAP	Xeon E-2414 4C 55W 2.6GHz	1x 16GB	OB SATA / AHCI	3x 3.5-in NHS / Open bay	Opt	Yes	500W fixed	No	Std	Opt
7DF3A00PAP	Xeon E-2436 6C 65W 2.9GHz	1x 16GB	OB SATA / AHCI	3x 3.5-in NHS / Open bay	Opt	Yes	500W fixed	No	Std	Opt
7DF3A00GAP	Xeon E-2468 8C 65W 2.6GHz	1x 16GB	OB SATA / AHCI	3x 3.5-in NHS / Open bay	Opt	Yes	500W fixed	No	Std	Opt
7DF3A00KAP	Xeon E-2434 4C 55W 3.4GHz	1x 16GB	OB SATA / AHCI	3x 3.5-in NHS / Open bay	Opt	Yes	500W fixed	No	Std	Opt

† Processor detail: Model, number of cores, TDP, core frequency

Models for Australia and New Zealand

Table 5. Models for Australia and New Zealand

Model	Intel processors†	Memory	Drive Contr	Drive bays Drives	Add'l Cards	DVD	Power supply	Pwr cord	XCC2	Intru. sw.
Standard models with a 3-year model (machine type 7DF3)										
7DF3A00DAU	Xeon E-2414 4C 55W 2.6GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA:Open bay; 1x M.2 SATA/x4NVMe:Open bay	Opt	Open	300W fixed	Yes	Std	Opt
TopSeller models with a 3-year model (machine type 7DF3)										
7DF3A00XAU	Xeon E-2434 4C 55W 3.4GHz	1x 16GB	OB SATA / AHCI	1x 2.5" SATA:Open bay; 1x M.2 SATA/x4NVMe:Open bay	Opt	Open	300W fixed	Yes	Std	Opt
7DF3A00WAU	Xeon E-2414 4C 55W 2.6GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA, 1x 2.5" SATA:Open bay HDD; 1x M.2 SATA/x4NVMe:Open bay	Opt	Open	300W fixed	Yes	Std	Opt
7DF3A00CAU	Xeon E-2456 6C 80W 3.2GHz	1x 16GB	OB SATA / AHCI	1x 2.5" SATA:Open bay; 1x M.2 SATA/x4NVMe:Open bay	Opt	Open	500W fixed	Yes	Std	Opt
7DF3A00AAU	Xeon E-2436 6C 65W 2.9GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA, 1x 2.5" SATA:Open bay HDD; 1x M.2 SATA/x4NVMe:Open bay	Opt	Open	300W fixed	Yes	Std	Opt
7DF3A00BAU	Xeon E-2478 8C 80W 2.8GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA, 1x 2.5" SATA:Open bay HDD; 1x M.2 SATA/x4NVMe:Open bay	Opt	No	500W fixed	Yes	Std	Opt

† Processor detail: Model, number of cores, TDP, core frequency

Models for Brazil

Table 6. Models for Brazil

Model	Intel processors†	Memory	Drive Contr	Drive bays Drives	Add'l Cards	DVD	Power supply	Pwr cord	XCC2	Intru. sw.
TopSeller models with 3-year warranty (machine type 7DF3)										
7DF3A019BR	Xeon E-2414 4C 55W 2.6GHz	1x 16GB	OB SATA/SW RAID**	3x 3.5" SATA: 2x 2TB SATA HDD; 1x M.2 SATA/x4NVMe:Open bay	Opt	Open	300W fixed	Yes	Std	Opt

† Processor detail: Model, number of cores, TDP, core frequency
**On Board SATA Software RAID (AVV0) - adapter reference

Models for EMEA countries

Table 7. Models for EMEA countries

Model	Intel processors†	Memory	Drive Contr	Drive bays Drives	Add'l Cards	DVD	Power supply	Pwr cord	XCC2	Intru. sw.
Standard models with 3-year warranty (machine type 7DF3)										
7DF3A017EA	Xeon E-2414 4C 55W 2.6GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA: 2x 4TB SATA HDD	Opt	Open	500W fixed	Yes	Std	Yes
7DF3A016EA	Xeon E-2414 4C 55W 2.6GHz	1x 32GB	OB SATA / AHCI	3x 3.5" SATA: 2x 4TB SATA HDD	Opt	Open	500W fixed	Yes	Std	Yes
7DF3A015EA	Xeon E-2414 4C 55W 2.6GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA: 2x 2TB SATA HDD	Opt	Open	500W fixed	Yes	Std	Yes
7DF3A014EA	Xeon E-2414 4C 55W 2.6GHz	1x 32GB	OB SATA / AHCI	3x 3.5" SATA: 2x 2TB SATA HDD	Opt	Open	500W fixed	Yes	Std	Yes
7DF3A013EA	Xeon E-2414 4C 55W 2.6GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA: 1x 4TB SATA HDD	Opt	Open	500W fixed	Yes	Std	Yes
7DF3A012EA	Xeon E-2434 4C 55W 3.4GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA: 2x 4TB SATA HDD	Opt	Open	500W fixed	Yes	Std	Yes
7DF3A011EA	Xeon E-2434 4C 55W 3.4GHz	1x 32GB	OB SATA / AHCI	3x 3.5" SATA: 2x 4TB SATA HDD	Opt	Open	500W fixed	Yes	Std	Yes
7DF3A010EA	Xeon E-2414 4C 55W 2.6GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA: 2x 960GB SATA HDD	Opt	Open	500W fixed	Yes	Std	Yes
7DF3A00ZEA	Xeon E-2434 4C 55W 3.4GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA: 2x 960GB SATA HDD	Opt	Open	500W fixed	Yes	Std	Yes
7DF3A00YEA	Xeon E-2434 4C 55W 3.4GHz	1x 32GB	OB SATA / AHCI	3x 3.5" SATA: 2x 960GB SATA HDD	Opt	Open	500W fixed	Yes	Std	Yes
7DF3A00VEA	Xeon E-2434 4C 55W 3.4GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA: 1x 4TB SATA HDD	Opt	Open	500W fixed	Yes	Std	Yes
7DF3A00TEA	Xeon E-2434 4C 55W 3.4GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA: 2x 1TB SATA HDD	Opt	Open	500W fixed	Yes	Std	Yes
7DF3A00SEA	Xeon E-2436 6C 65W 2.9GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA: 2x 960GB SATA HDD	Opt	Open	500W fixed	Yes	Std	Yes
7DF3A00MEA	Xeon E-2414 4C 55W 2.6GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA: 1x 2TB SATA HDD	Opt	Open	500W fixed	Yes	Std	Yes
7DF3A00LEA	Xeon E-2434 4C 55W 3.4GHz	1x 32GB	OB SATA / AHCI	3x 3.5" SATA: 1x 2TB SATA HDD	Opt	Open	500W fixed	Yes	Std	Yes
7DF3A00JEA	Xeon E-2456 6C 80W 3.2GHz	1x 32GB	OB SATA / AHCI	3x 3.5" SATA: 2x 960GB SATA HDD	Opt	Open	500W fixed	Yes	Std	Yes
7DF3A00EEA	Xeon E-2414 4C 55W 2.6GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA: 2x 1TB SATA HDDy	Opt	Open	500W fixed	Yes	Std	Yes
7DF3A00NEA	Xeon E-2456 6C 80W 3.2GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA: 2x 960GB SATA HDD	Opt	Open	500W fixed	Yes	Std	Yes
7DF3A009EA	Xeon E-2434 4C 55W 3.4GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA: 1x 2TB SATA HDD	Opt	Open	500W fixed	Yes	Std	Yes
7DF3A00QEA	Xeon E-2434 4C 55W 3.4GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA: 2x 2TB SATA HDD	Opt	Open	500W fixed	Yes	Std	Yes

† Processor detail: Model, number of cores, TDP, core frequency

Models for Latin American countries

Table 8. Models for Latin American countries

Model	Intel processors†	Memory	Drive C'troller	Drive bays Drives	Slots	Add'l Cards	Power supply (cord)	XCC2	Front VGA	Intru. sw.
Standard models with 3-year warranty (machine type 7DF3)										
7DF3A01BLA	Xeon E-2414 4C 55W 2.6GHz	1x 16GB	OB SATA / AHCI	2x 3.5-in NHS: 2x 2TB SATA NHS	x4 FH, x16 FH, x4 FH	Opt	1x 300W PSU / 1 (Y)	Std	Opt	Opt

† Processor detail: Model, number of cores, TDP, core frequency

Models for Canada and US

Table 9. Models for Canada and US

Model	Intel processors†	Memory	Drive Contr	Drive bays Drives	Additional Cards	DVD	Power supply	Pwr cord	XCC2	Intru. sw.
Standard models with 3-year warranty (machine type 7DF3)										
7DF3A00HNA	Xeon E-2414 4C 55W 2.6GHz	1x 16GB	OB SATA / AHC	3x 3.5" SATA: Open bay HDD	Opt	Open	300W fixed	Yes	Std	Opt
7DF3A00FNA	Xeon E-2456 6C 80W 3.2GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA: Open bay HDD	Opt	Open	300W fixed	Yes	Std	Opt
7DF3A00UNA	Xeon E-2488 8C 95W 3.2GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA: Open bay HDD	Opt	Open	500W fixed	Yes	Std	Opt
7DF3A018NA	Xeon E-2434 4C 55W 3.4GHz	1x 16GB	OB SATA / AHCI	3x 3.5" SATA: Open bay HDD	Opt	Open	300W fixed	Yes	Std	Opt

† Processor detail: Model, number of cores, TDP, core frequency

Processors

The ST50 V3 supports one processor from the following Intel product families:

- Intel Xeon E-2400 Series processors ("Raptor Lake-E")
- Intel Alder Lake Pentium Gold G7400 and G7400T processors

All supported processors have the following characteristics:

- LGA 1700 socket
- Direct Media Interface (DMI) 4.0 connection to PCH-S
  - Xeon E-2400: DMI 4.0 x8 connection
  - Pentium: DMI 4.0 x8 connection
- Two DDR5 memory channels
- Support for ECC memory
  - Xeon E-2400: Up to 4800 MHz memory speed
  - Pentium: Up to 4800 MHz memory speed
- PCIe lanes:
  - 16 lanes PCIe 5.0 + 4 lanes PCIe 4.0

The following table lists the supported processors.

Table 10. Supported processors

Feature code	Intel model	TDP	Cores	Core speed	Cache	Max memory speed
Intel Pentium processors						
BWM7	G7400T	35 W	2	3.1 GHz	6 MB	4800 MHz
BWM8	G7400	46 W	2	3.7 GHz	6 MB	4800 MHz
Intel Xeon E processors						
BXJZ	E-2414	55 W	4	2.6 GHz	8 MB	4800 MHz
BWMA	E-2434	55 W	4	3.4 GHz	8 MB	4800 MHz
BWMB	E-2436	65 W	6	2.9 GHz	12 MB	4800 MHz
BWMC	E-2456	80 W	6	3.3 GHz	12 MB	4800 MHz
BWMD	E-2468	65 W	8	2.6 GHz	16 MB	4800 MHz
BWME	E-2478	80 W	8	2.8 GHz	16 MB	4800 MHz
BWLS	E-2486	95 W	6	3.5 GHz	12 MB	4800 MHz
BWMF	E-2488	95 W	8	3.2 GHz	16 MB	4800 MHz

UEFI operating modes

The ST50 V3 offers preset operating modes that affect energy consumption and performance. These modes are a collection of predefined low-level UEFI settings that simplify the task of tuning the server to suit your business and workload requirements.

The following table lists the feature codes that allow you to specify the mode you wish to preset in the factory for CTO orders.

Table 11. UEFI operating mode presets in DCSC

Feature code	Description
BFYB	Operating mode selection for: "Maximum Performance Mode"
BFYC	Operating mode selection for: "Minimal Power Mode"
BFYD	Operating mode selection for: "Efficiency Favoring Power Savings Mode"
BFYE	Operating mode selection for: "Efficiency - Favoring Performance Mode"

The preset modes for the ST50 V3 are as follows:

- **Maximum Performance Mode** (feature BFYB): Achieves maximum performance but with higher power consumption and lower energy efficiency.
- **Minimal Power Mode** (feature BFYC): Minimize the absolute power consumption of the system.
- **Efficiency Favoring Power Savings Mode** (feature BFYD): Maximize the performance/watt efficiency with a bias towards power savings. This is the favored mode for SPECpower benchmark testing, for example.
- **Efficiency Favoring Performance Mode** (feature BFYE): Maximize the performance/watt efficiency with a bias towards performance. This is the favored mode for Energy Star certification, for example.

Memory options

The ST50 V3 supports Lenovo TruDDR5 memory. TruDDR5 memory uses the highest-quality components sourced from Tier 1 DRAM suppliers and only memory that meets strict requirements is selected. It is compatibility-tested and tuned to maximize performance and reliability.

TruDDR5 memory has a unique signature programmed into the DIMM, which enables ThinkSystem servers to verify whether the memory installed is qualified and supported. From a service and support standpoint, TruDDR5 memory automatically assumes the system's warranty, and service and support provided worldwide.

The processors have 2 memory channels and support 2 DIMMs per channel. The ST50 V3 supports 1, 2, 3 or 4 DIMMs. All DIMMs installed must be identical.

DIMMs installed in the ST50 V3 operate at a speed based on the processor installed, the number of DIMMs installed, and whether the DIMMs are single-rank or dual-rank:

- When connected to a Xeon or Pentium processor:
  - 1 or 2 DIMMs: 4400 MHz
  - 4 single-rank (1R) DIMMs: 4000 MHz
  - 4 dual-rank (2R) DIMMs: 3600 MHz

The following table lists the memory options that are available for the ST50 V3 server.

Table 12. Tatlow memory section

Part number	Feature code	Description	Maximum supported
4X77A88511	BWLK	ThinkSystem 16GB TruDDR5 4800MHz (1Rx8) ECC UDIMM	4
4X77A88512	BWLJ	ThinkSystem 32GB TruDDR5 4800MHz (2Rx8) ECC UDIMM	4

The following rules apply when selecting the memory configuration:

- The server only supports UDIMMs
- Quantities of 1, 2, 3 or 4 DIMMs are supported.
- All DIMMs must be identical (same part number)
- When installing two DIMMs, install one in each memory channel (DIMM slots 1 and 3)
- Memory mirroring and memory rank sparing are not supported

Internal storage

The ST50 V3 supports 2.5-inch NHS SATA SSD and 3.5-inch NHS SATA HDD/SSD for internal drive bay configurations.

In this section:

Drive bays

The server supports:

- Drive bay 0
  - 3.5-inch hard-disk drive or solid-state drive (non-hot-swap)
- Drive bay 1 (optional)
  - 2.5-inch hard-disk drive or solid-state drive (non-hot-swap)

- Drive bay 2 (optional)
  - 3.5-inch hard-disk drive or solid-state drive (non-hot-swap)
- Drive bay 3 (optional)
  - 3.5-inch hard-disk drive or solid-state drive (non-hot-swap)
- ODD drive bay (optional)
  - One 9mm-Slim SATA DVD-RW (Optical disk drive)

Note: Mixing of traditional HDDs and SSDs in the same array is not supported

The onboard SATA controller supports SATA drives only. NHS drive configurations supporting SATA drives only.

Note: Drive Bay 3 (3rd 3.5”) kit and M.2 2-Bay Enablement Kit are mutually exclusive because both kits are installed/assembled at PCIe Slot 3.

The different drive bay configurations supported are shown in the following figure. The server also supports two M.2 drives, installed in a PCIe slot 3 and as shown in the internal view of the server.

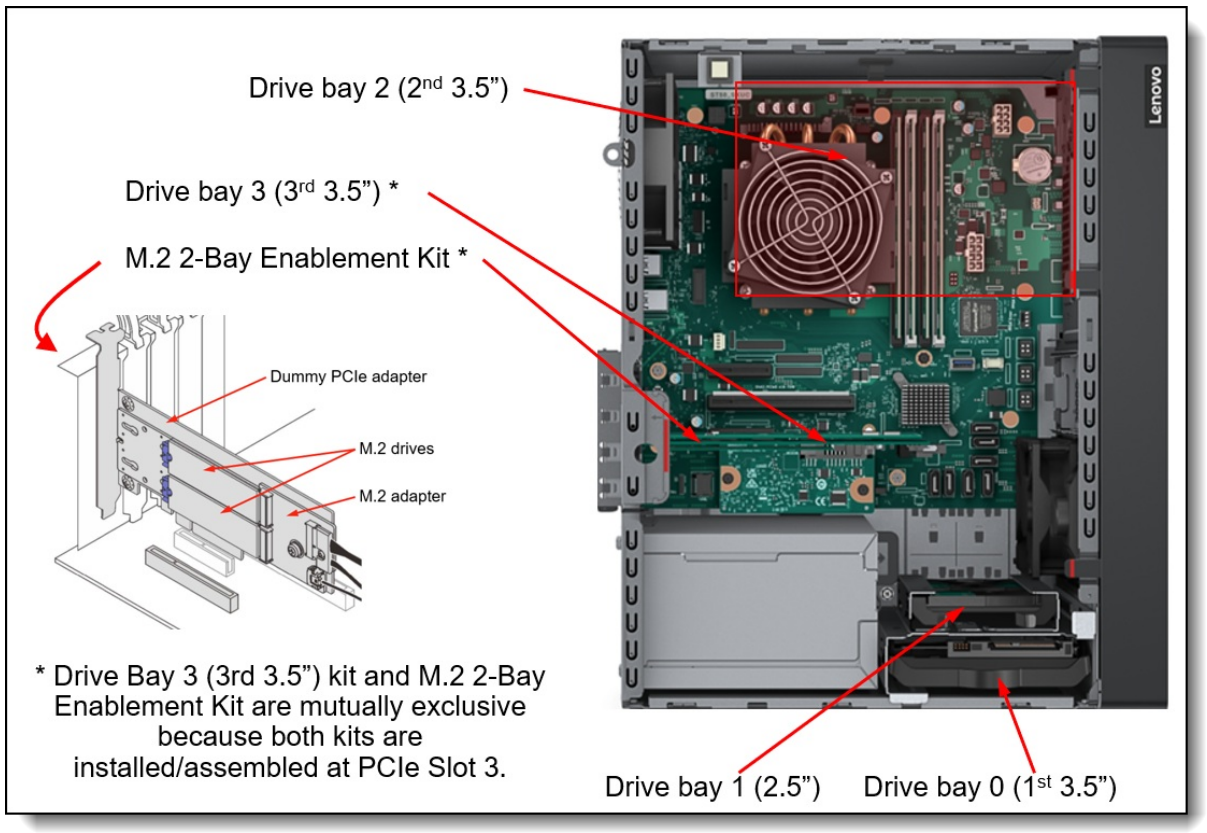

Figure 6. Internal drive bay configurations

M.2 drives

The ST50 V3 server supports two M.2 form-factor SATA drives installed in an M.2 adapter attached to a dummy PCIe adapter. The PCIe adapter is in turn installed in a PCIe slot. The M.2 adapter is connected via cables to the system board; the edge connector of the PCIe adapter only provides physical support and does not provide PCIe signals or power.

The following figure shows the M.2 adapter for the ST50 V3.

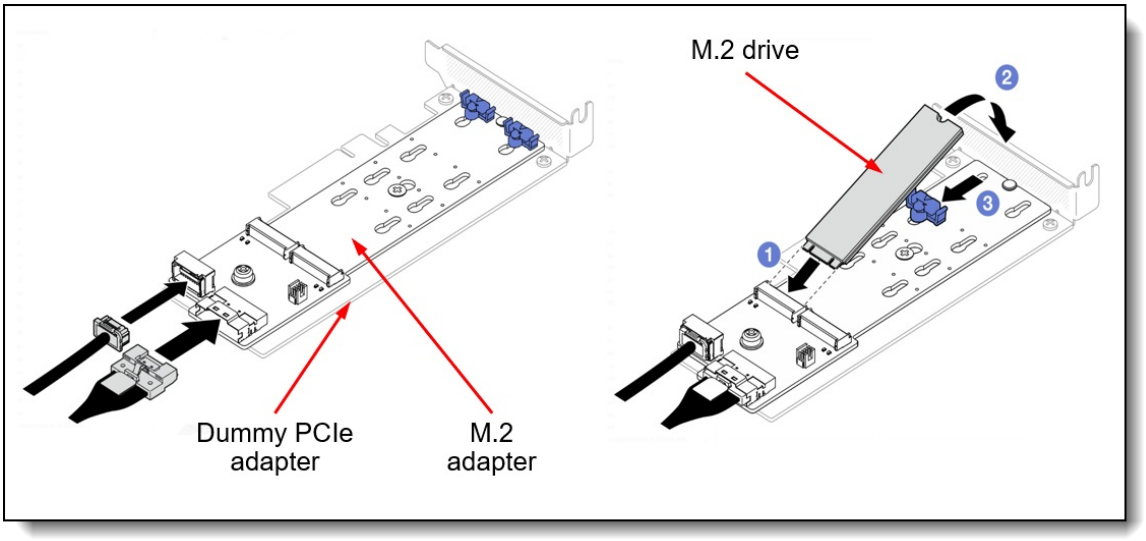

Figure 7. M.2 adapter (BM8X) with an M.2 drive installed in a PCIe slot

The following table lists the ordering information. For field upgrades, in addition to the ThinkSystem M.2 SATA/NVMe 2-Bay Enablement Adapter, you will also need to order the M.2 Signal & Power Cable Kit.

Supported drives are listed in the Internal drive options section.

Table 13. M.2 adapter for ST50 V3

Part number	Feature code	Description	Maximum supported	Slots supported
CTO only	BM8X	ThinkSystem M.2 SATA/NVMe 2-Bay Enablement Adapter • M.2 SATA/x4 NVMe 2-Bay Enablement Kit, BM8X • ThinkSystem ST250 Series Dummy PCIe Card, BMTU • M.2 signal Cable BWN1 • M.2 Power Cable BWN2	1	slot 3
4Y37A79663	N/A	ThinkSystem M.2 SATA/x4 NVMe 2-Bay Enablement Kit	1	slot 3
4Z57A88898	N/A	ThinkSystem SR250 V3/ST250 Series M.2 Cable Kit Includes: • ThinkSystem ST250 Series Dummy PCIe Card, BMTU • M.2 signal Cable BWN1 • M.2 Power Cable BWN2 • ThinkSystem M.2 ULP-PH 1.0+SLIMx4 130mm, BYY7	1	N/A

N/A - not applicable

Configuration rules:

- The M.2 PCIe adapter is only supported in slot 3
- M.2 2-Bay Enablement Kit and Drive Bay 3 (3rd 3.5”) kit are mutually exclusive because both kits are installed / assembled at PCIe Slot 3 (dedicated SATA 6, 7 connector of M.2 connection).

The M.2 SATA/NVMe 2-Bay Enablement Kit has the following features when installed in the ST50 V3:

- Supports one or two M.2 SATA drives, either SATA or NVMe
- When two drives installed, they must be either both SATA or both NVMe JBOD native support; no built-in RAID support (RAID can be enabled via Intel VROC SATA RAID)

- Supports monitoring and reporting of events and temperature through I2C
- Firmware update via Lenovo firmware update tools

For details about M.2 components, see

- ThinkSystem M.2 Drives and M.2 Adapters product guide:

https://lenovopress.com/lp0769-thinksystem-m2-drives-adapters

- The Lenovo docs - server guide:

https://pubs.labs.lenovo.com/st250-v3/m2_drive_replacement

Controllers for internal storage

The ST50 V3 supports the use of the onboard 6Gb SATA ports to connect SATA drives. Non-Hot-swap SATA drives are supported. These onboard SATA ports support RSTe mode for RAID functionality or AHCI mode for JBOD support.

In addition to the onboard SATA controller, the ST50 V3 with hot-swap drives supports the use of an internal RAID adapter or HBA. The following table lists the supported adapters.

Table 14. Controllers for internal storage

Part number	Feature code	Description	Slots supported	Maximum supported	Supercap included
SAS/SATA HBA					
4Y37A72480	BJHH	ThinkSystem 4350-8i SAS/SATA 12Gb HBA	1, 2, 3	1	No
RAID adapters - 8 ports					
4Y37A72482	BJHK	ThinkSystem RAID 5350-8i PCIe 12Gb Adapter	1, 2, 3	1	No

For a comparison of the functions of the supported storage adapters, see the ThinkSystem RAID Adapter and HBA Reference:
https://lenovopress.com/lp1288-thinksystem-raid-adapter-and-hba-reference#st250-v2-support=ST250%2520V2

Configuration notes:

- **Virtualization support**: The onboard SATA ports can be used with virtualization hypervisors, including VMware ESXi, Linux KVM, Xen, and Microsoft Hyper-V, however support is limited to AHCI (non-RAID) mode. RSTe mode is not supported with virtualization hypervisors.
- **Windows support**: Windows only supports a RSTe-based RAID array of no more than 6 drives.

Field upgrades

The following table lists the supported field upgrades.

Table 15. Kits available for field upgrades

Part number	Description
4XF7A78617	ThinkSystem ST50 V2/V3 2.5" HDD Cage Kit
4XF7A79662	ThinkSystem ST50 V2/V3 2nd 3.5" HDD Cage Kit
4F17A80568	ThinkSystem ST50 V2/V3 System Rear Fan Kit
4XF7A93516	ThinkSystem ST50 V3 3rd 3.5” HDD Cage kit
4X97A93517	ThinkSystem ST50 V3 Internal Drive Cable Accessories Kit

Internal drive options

The following tables list the drive options for internal storage of the server.

2.5-inch NHS drives:

- 2.5-inch NHS 6 Gb SATA SSDs

3.5-inch NHS drives:

- 3.5-inch NHS 6 Gb SATA HDDs
- 3.5-inch NHS 6 Gb SATA SSDs

M.2 drives:

- M.2 SATA drives

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

Table 16. 2.5-inch NHS 6 Gb SATA SSDs

Part number	Feature code	Description	Max Qty
2.5-inch NHS SSDs - 6 Gb SATA			
CTO only	BMEB	ThinkSystem ST50 V2/V3 2.5" S4520 240GB Read Intensive SATA 6Gb NHS SSD	1
CTO only	BMEA	ThinkSystem ST50 V2/V3 2.5" S4520 480GB Read Intensive SATA 6Gb NHS SSD	1
CTO only	BME9	ThinkSystem ST50 V2/V3 2.5" S4520 960GB Read Intensive SATA 6Gb NHS SSD	1
CTO only	BR0S	ThinkSystem ST50 V2/V3 2.5" 5400 PRO 240GB Read Intensive SATA 6Gb NHS SSD	1
CTO only	BR0R	ThinkSystem ST50 V2/V3 2.5" 5400 PRO 480GB Read Intensive SATA 6Gb NHS SSD	1
CTO only	BR0Q	ThinkSystem ST50 V2/V3 2.5" 5400 PRO 960GB Read Intensive SATA 6Gb NHS SSD	1

Table 17. 3.5-inch NHS 6 Gb SATA HDDs

Part number	Feature code	Description	Max Qty
3.5-inch NHS HDDs - 6 Gb SATA			
CTO only	BMEJ	ThinkSystem ST50 V2/V3 3.5" 1TB Client 7.2K SATA 6Gb Non-Hot Swap 512e HDD	3
CTO only	BMEH	ThinkSystem ST50 V2/V3 3.5" 2TB Client 7.2K SATA 6Gb Non-Hot Swap 512e HDD	3
CTO only	BMED	ThinkSystem ST50 V2/V3 3.5" 1TB 7.2K SATA 6Gb Non-Hot Swap 512n HDD	3
CTO only	BMEC	ThinkSystem ST50 V2/V3 3.5" 2TB 7.2K SATA 6Gb Non-Hot Swap 512n HDD	3
CTO only	BMEG	ThinkSystem ST50 V2/V3 3.5" 4TB 7.2K SATA 6Gb Non-Hot Swap 512n HDD	3
CTO only	BMEF	ThinkSystem ST50 V2/V3 3.5" 6TB 7.2K SATA 6Gb Non-Hot Swap 512e HDD	3
CTO only	BMEE	ThinkSystem ST50 V2/V3 3.5" 8TB 7.2K SATA 6Gb Non-Hot Swap 512e HDD	3

Table 18. 3.5-inch NHS 6 Gb SATA SSDs

Part number	Feature code	Description	Max Qty
3.5-inch NHS SSDs - 6 Gb SATA - Read Intensive/Entry (<3 DWPD)			
CTO only	BME2	ThinkSystem ST50 V2/V3 3.5" S4520 240GB Read Intensive SATA 6Gb NHS SSD	3
CTO only	BME6	ThinkSystem ST50 V2/V3 3.5" S4520 480GB Read Intensive SATA 6Gb NHS SSD	3
CTO only	BME5	ThinkSystem ST50 V2/V3 3.5" S4520 960GB Read Intensive SATA 6Gb NHS SSD	3
CTO only	BR0P	ThinkSystem ST50 V2/V3 3.5" 5400 PRO 240GB Read Intensive SATA 6Gb NHS SSD	3
CTO only	BR0N	ThinkSystem ST50 V2/V3 3.5" 5400 PRO 480GB Read Intensive SATA 6Gb NHS SSD	3
CTO only	BR0M	ThinkSystem ST50 V2/V3 3.5" 5400 PRO 960GB Read Intensive SATA 6Gb NHS SSD	3

Table 19. M.2 SATA drives

Part number	Feature code	Description	Max Qty
M.2 SSDs - 6 Gb SATA - Read Intensive/Entry (<3 DWPD)			
4XB7A82286	BQ1Z	ThinkSystem M.2 5400 PRO 240GB Read Intensive SATA 6Gb NHS SSD	2
4XB7A82287	BQ1Y	ThinkSystem M.2 5400 PRO 480GB Read Intensive SATA 6Gb NHS SSD	2
4XB7A82288	BQ20	ThinkSystem M.2 5400 PRO 960GB Read Intensive SATA 6Gb NHS SSD	2

External backup units

The ST50 V3 supports the external backup unit only. Options are listed in the following table.

Table 20. External backup units

Part number	Feature code	Description	Maximum supported
RDX dock			
4T27A10725	B32R	ThinkSystem RDX External USB 3.0 Dock	1
RDX media			
7TP7A01601	AVF8	ThinkSystem RDX 500GB Cartridge	Not applicable
7TP7A01602	AVF1	ThinkSystem RDX 1TB Cartridge	Not applicable
7TP7A01603	AVF0	ThinkSystem RDX 2TB Cartridge	Not applicable
7TP7A04318	AXD1	ThinkSystem RDX 4TB Cartridge	Not applicable

For more information about the RDX dock, see the Backup Units page on the Lenovo Press site:
https://lenovopress.com/servers/options/backup

Optical drives

The ST50 V3 supports the internal optical drive options listed in the following table. The internal optical is installed in the ODD Cage Kit.

Table 21. Optical drives

Part number	Feature code	Description	Maximum supported
Internal optical drives			
CTO only	BMEU	ThinkSystem ST50 V2/V3 9mm-Slim SATA DVD-RW	1
CTO only	BMEX	ThinkSystem ST50 V2/V3 Slim ODD Cage Kit	1

Configuration rules:

- For field upgrades to add an optical drive, you will need to also order the cable kit listed in the following table. This kit is not needed for factory (CTO) orders.

Table 22. Upgrade options table

Part number	Description	Maximum supported
4XF7A78619	ThinkSystem ST50 V2/V3 Slim ODD Cage Kit	1
4XA7A77462	ThinkSystem ST50 V2/V3 9mm-Slim SATA DVD-RW	1
4X97A93517	ThinkSystem ST50 V3 Internal Drive Cable Accessories Kit	1

The optical drive is based on the HLDS Model GUE1N Super Multi DVD Writer and supports the following formats:

- DVD-ROM, DVD-ROM DL, DVD-R, DVD-R DL, DVD-RW, DVD-RAM, DVD+R, DVD+R DL, DVD+RW
- CD-ROM, CD-ROM XA, CD-I, Video CD, CD-Audio, CD-Extra, CD-Text, CD-R, CD-RW

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

Table 23. 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 options

The ST50 V3 server has one PCIe 5.0 slot and two PCIe 4.0 slots, as follows:

- Slot 1: PCIe 4.0 x4 full-height, half-length (x1 physical slot, open ended), supports 25W adapters
- Slot 2: PCIe 5.0 x16 full-height, half-length (x16 physical slot, closed ended), supports 75W adapters
- Slot 3: PCIe 4.0 x4 full-height, half-length (x4 physical slot, open ended), supports 25W adapters

Slot 1 and slot 3 in the ST50 V3 are an open-end design, which means that it can accept adapters with a longer edge connector than the physical length of the slot connector. For example, if a x8 adapter is installed in the x4 slot 3 of the server, half of the edge connector will not be connected to the slot. The adapter will still function, however performance will be impacted.

The following figure shows the locations of the PCIe slots.

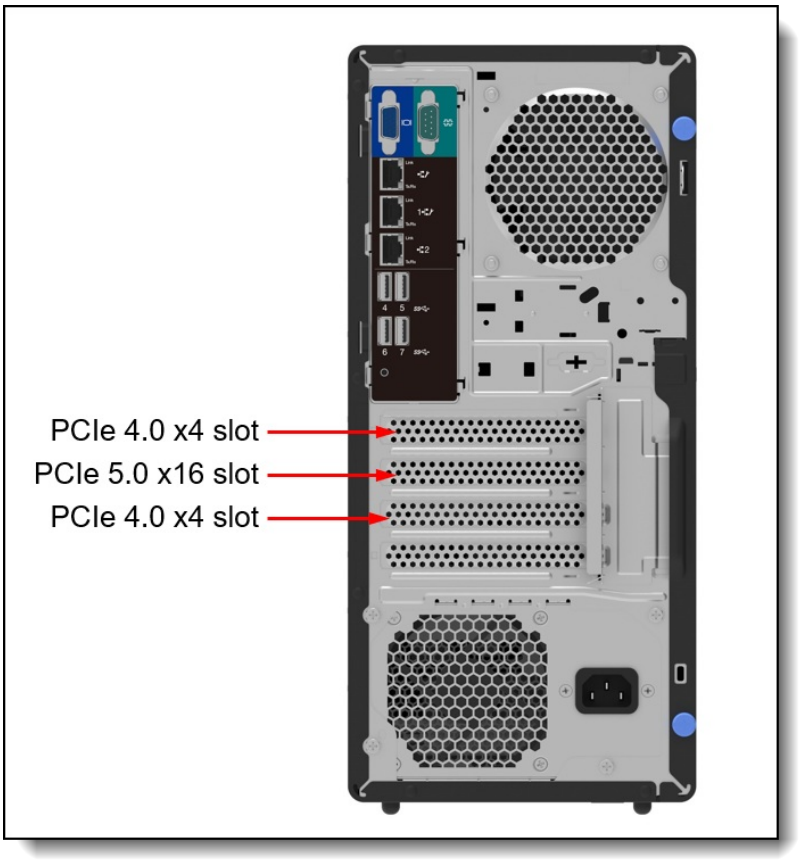

Figure 8. ThinkSystem ST50 V3 PCIe slots

Network adapters

The ST50 V3 has two onboard Gigabit Ethernet ports, connected to a Broadcom BCM5720 embedded controller.

The BCM5720 embedded controller has the following features:

- Two 10/100/1000 Mb Ethernet RJ-45 ports
- NIC Teaming (load balancing and failover)
- IEEE 802.3ad Link Aggregation
- I/O Virtualization (IOV) for VMWare NetQueue and Microsoft VMQ
- IEEE 802.1Q Virtual Local Area Networks (VLANs)
- IEEE 802.3x flow control
- TCP, IP, and UDP checksum offload
- Large Send Offload (LSO) and TCP Segmentation Offload (TSO)
- Receive Side Scaling (RSS) and Transmit Side Scaling (TSS)
- Jumbo frames up to 9600 bytes
- IEEE 802.3az-2010 Energy Efficient Ethernet (EEE) compliant
- Hardware assist for IEEE 1588 and IEEE 802.1AS time synchronization implementations
- Preboot eXecution Environment (PXE) remote boot
- Wake on LAN (WOL) support

The following table lists other supported network adapters. The maximum supported column indicates which slots each adapter is supported in. For slot locations see the I/O expansion options section.

Table 24. Network adapters

Part number	Feature code	Description	Slots supported	Maximum supported
Gigabit Ethernet				
7ZT7A00484	AUZV	ThinkSystem Broadcom 5719 1GbE RJ45 4-Port PCIe Ethernet Adapter	1, 2, 3	3
7ZT7A00535	AUZW	ThinkSystem I350-T4 PCIe 1Gb 4-Port RJ45 Ethernet Adapter	1, 2, 3	3
10 Gb Ethernet - 10GBASE-T				
7ZT7A00496	AUKP	ThinkSystem Broadcom 57416 10GBASE-T 2-Port PCIe Ethernet Adapter	1, 2, 3	1
4XC7A79699	BMXB	ThinkSystem Intel X710-T4L 10GBase-T 4-Port PCIe Ethernet Adapter	1, 2, 3	1

Configuration notes:

- For more information, including the transceivers and cables that each adapter supports, see the list of Lenovo Press Product Guides in the Ethernet adapters category: http://lenovopress.com/servers/options/ethernet#rt=product-guide

SAS adapters for external storage

The ST50 V3 does not currently support connectivity to external SAS storage.

Fibre Channel host bus adapters

The ST50 V3 does not currently support Fibre Channel host bus adapters.

Flash Storage adapters

The ST50 V3 does not currently support Flash Storage adapters.

GPU adapters

The ST50 V3 server does not support the graphics processing units (GPUs).

Fans and cooling

The ST50 V3 has the following variable-speed fans. All fans are fixed (non-hot-swap).

- Two system fans, one at the front and one at the rear of the server, mounted on the drive cages. If the server has one drive cage, only one front fan is included.
- One system fan at the rear of the server
- Fan mounted on the heatsink of the processor

See the Inside view in the Components and connectors section for locations.

Power supplies

The server supports a single fixed power supply. The following table lists the supported power supplies.

Table 25. Power supplies

Part number	Feature code	Description	Maximum quantity	ErP Lot 9 compliant	110V AC	220V AC
Fixed power supplies						
CTO only	BMFL	ATX-300W Power Supply	1	No	Yes	Yes
CTO only	BMTC	ThinkSystem 500W Platinum ATX Power Supply	1	Yes	Yes	Yes

Power supply options do not include a line cord.

For server configurations, the inclusion of a power supply is model dependent. Configure-to-order models can be configured without a power cord if desired.

To ensures that the properly sized power supply is chosen for optimal performance, it is highly recommended to validate system configuration for specific power requirements by using the latest version of the Lenovo Capacity Planner:
https://datacentersupport.lenovo.com/us/en/products/solutions-and-software/software/lenovo-capacity-planner/solutions/ht504651

Power cords

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

110V customers: If you plan to use the 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 26. Power cords

Part number	Feature code	Description
Rack cables - C13 to C14		
SL67B08593	BPHZ	0.5m, 10A/100-250V, C13 to C14 Jumper Cord
00Y3043	A4VP	1.0m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable
4L67A08367	B0N5	1.0m, 13A/100-250V, C13 to C14 Jumper Cord
39Y7937	6201	1.5m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable

Part number	Feature code	Description
4L67A08368	B0N6	1.5m, 13A/100-250V, C13 to C14 Jumper Cord
4L67A08365	B0N4	2.0m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable
4L67A08369	6570	2.0m, 13A/100-250V, C13 to C14 Jumper Cord
4L67A08366	6311	2.8m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable
4L67A08370	6400	2.8m, 13A/100-250V, C13 to C14 Jumper Cord
39Y7932	6263	4.3m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable
4L67A08371	6583	4.3m, 13A/100-250V, C13 to C14 Rack Power Cable
Rack cables - C13 to C14 (Y-cable)		
00Y3046	A4VQ	1.345m, 2X C13 to C14 Jumper Cord, Rack Power Cable
00Y3047	A4VR	2.054m, 2X C13 to C14 Jumper Cord, Rack Power Cable
Rack cables - C13 to C20		
39Y7938	6204	2.8m, 10A/100-250V, C13 to IEC 320-C20 Rack Power Cable
Rack cables - C13 to C20 (Y-cable)		
47C2491	A3SW	1.2m, 16A/100-250V, 2 Short C13s to Short C20 Rack Power Cable
47C2492	A3SX	2.5m, 16A/100-250V, 2 Long C13s to Short C20 Rack Power Cable
47C2493	A3SY	2.8m, 16A/100-250V, 2 Short C13s to Long C20 Rack Power Cable
47C2494	A3SZ	4.1m, 16A/100-250V, 2 Long C13s to Long C20 Rack Power Cable
Line cords		
39Y7930	6222	2.8m, 10A/250V, C13 to IRAM 2073 (Argentina) Line Cord
81Y2384	6492	4.3m 10A/220V, C13 to IRAM 2073 (Argentina) Line Cord
39Y7924	6211	2.8m, 10A/250V, C13 to AS/NZ 3112 (Australia/NZ) Line Cord
81Y2383	6574	4.3m, 10A/230V, C13 to AS/NZS 3112 (Aus/NZ) Line Cord
69Y1988	6532	2.8m, 10A/250V, C13 to NBR 14136 (Brazil) Line Cord
81Y2387	6404	4.3m, 10A/250V, C13 - 2P+Gnd (Brazil) Line Cord
39Y7928	6210	2.8m, 220-240V, C13 to GB 2099.1 (China) Line Cord
81Y2378	6580	4.3m, 10A/220V, 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/230V, C13 to DK2-5a (Denmark) Line Cord
39Y7917	6212	2.8m, 10A/230V, C13 to CEE7-VII (Europe) Line Cord
81Y2376	6572	4.3m, 10A/230V, C13 to CEE7-VII (Europe) Line Cord
39Y7927	6269	2.8m, 10A/250V, C13(2P+Gnd) (India) Line Cord
81Y2386	6567	4.3m, 10A/240V, 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/230V, C13 to SI 32 (Israel) Line Cord
39Y7921	6217	2.8m, 220-240V, C13 to CEI 23-16 (Italy/Chile) Line Cord
81Y2380	6493	4.3m, 10A/230V, C13 to CEI 23-16 (Italy/Chile) Line Cord
46M2593	A1RE	2.8m, 12A/125V, C13 to JIS C-8303 (Japan) Line Cord
4L67A08362	6495	4.3m, 12A/200V, C13 to JIS C-8303 (Japan) Line Cord
39Y7926	6335	4.3m, 12A/100V, C13 to JIS C-8303 (Japan) Line Cord
39Y7922	6214	2.8m, 10A/250V, C13 to SABS 164 (S Africa) Line Cord
81Y2379	6576	4.3m, 10A/230V, C13 to SABS 164 (South Africa) Line Cord
39Y7925	6219	2.8m, 220-240V, C13 to KETI (S Korea) Line Cord

Part number	Feature code	Description
81Y2385	6494	4.3m, 12A/220V, C13 to KSC 8305 (S. Korea) Line Cord
39Y7919	6216	2.8m, 10A/250V, C13 to SEV 1011-S24507 (Swiss) Line Cord
81Y2390	6578	4.3m, 10A/230V, C13 to SEV 1011-S24507 (Sws) Line Cord
23R7158	6386	2.8m, 10A/125V, C13 to CNS 10917-3 (Taiwan) Line Cord
81Y2375	6317	2.8m, 10A/240V, C13 to CNS 10917-3 (Taiwan) Line Cord
81Y2374	6402	2.8m, 13A/125V, C13 to CNS 60799 (Taiwan) Line Cord
4L67A08363	AX8B	4.3m, 10A 125V, C13 to CNS 10917 (Taiwan) Line Cord
81Y2389	6531	4.3m, 10A/250V, C13 to 76 CNS 10917-3 (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/230V, C13 to BS 1363/A (UK) Line Cord
90Y3016	6313	2.8m, 10A/120V, C13 to NEMA 5-15P (US) Line Cord
46M2592	A1RF	2.8m, 10A/250V, C13 to NEMA 6-15P Line Cord
00WH545	6401	2.8m, 13A/120V, 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/120V, C13 to NEMA 5-15P (US) Line Cord

Systems management

The ST50 V3 an integrated service processor, XClarity Controller 2 (XCC), which provides advanced control, monitoring, and alerting functions. The XCC2 is based on the AST2600 baseboard management controller (BMC) using a dual-core ARM Cortex A7 32-bit RISC service processor running at 1.2 GHz.

- Front operator panel
- System status with XClarity Mobile
- Remote management
- XCC2 Platinum
- Lenovo XClarity Provisioning Manager
- Lenovo XClarity Administrator
- Lenovo XClarity Integrators
- Lenovo XClarity Essentials
- Lenovo XClarity Energy Manager

Front operator panel

The ST50 V3 offers a front operator panel showing key LED status indicators, as shown in the following figure.

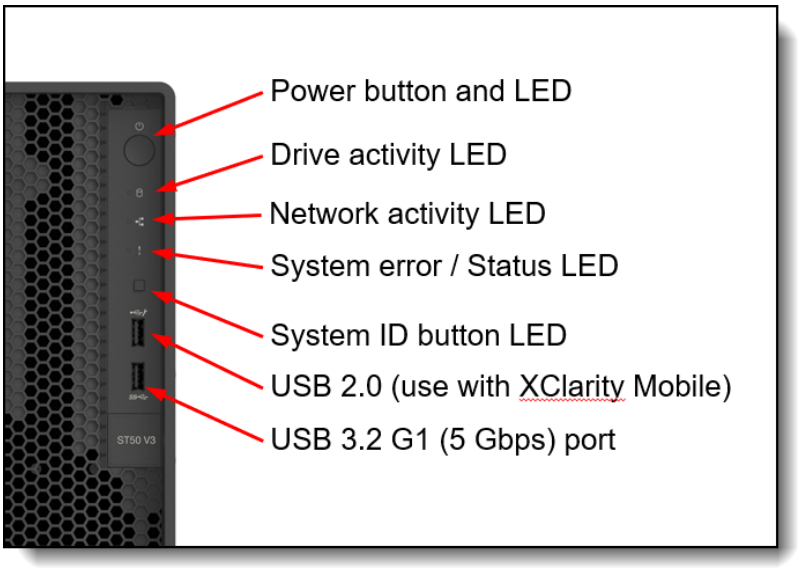

Figure 9. Front operator panel

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 27. IPMI-over-LAN settings

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

XCC2 Platinum

The XCC2 service processor in the ST50 V3 supports an upgrade to the Platinum level of features. Compared to the XCC functions of ThinkSystem V2 and earlier systems, Platinum adds the same features as Enterprise and Advanced levels in ThinkSystem V2, plus additional features.

XCC2 Platinum adds the following Enterprise and Advanced 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
- 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

XCC2 Platinum also adds the following features that are new to XCC2:

- System Guard - Monitor hardware inventory for unexpected component changes, and simply log the event or prevent booting
- Enterprise Strict Security mode - Enforces CNSA 1.0 level security
- Neighbor Group - Enables administrators to manage and synchronize configurations and firmware level across multiple servers

Ordering information is listed in the following table. XCC2 Platinum is a software license upgrade - no additional hardware is required.

Table 28. XCC2 Platinum license upgrade

Part number	Feature code	Description
7S0X000KWW	SBCV	Lenovo XClarity Controller 2 (XCC2) Platinum Upgrade

With XCC2 Platinum, for CTO orders, you can request that System Guard be enabled in the factory and the first configuration snapshot be recorded. To add this to an order, select feature code listed in the following table. The selection is made in the Security tab of the DCSC configurator.

Table 29. Enable System Guard in the factory (CTO orders)

Feature code	Description
BUT2	Install System Guard

For more information about System Guard, see https://pubs.lenovo.com/xcc2/NN1ia_c_systemguard

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. It 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 is an optional software component for the ST50 V3. The software can be downloaded and used at no charge to discover and monitor the ST50 V3 and to manage firmware upgrades.

If software support is required for Lenovo XClarity Administrator, or premium features such as configuration management and operating system deployment are required, Lenovo XClarity Pro software subscription should be ordered. Lenovo XClarity Pro is licensed on a per managed system basis, that is, each managed Lenovo system requires a license.

The following table lists the Lenovo XClarity software license options.

Table 30. Lenovo XClarity Pro ordering information

Part number	Feature code	Description
00MT201	1339	Lenovo XClarity Pro, per Managed Endpoint w/1 Yr SW S&S
00MT202	1340	Lenovo XClarity Pro, per Managed Endpoint w/3 Yr SW S&S
00MT203	1341	Lenovo XClarity Pro, per Managed Endpoint w/5 Yr SW S&S
7S0X000HWW	SAYV	Lenovo XClarity Pro, per Managed Endpoint w/6 Yr SW S&S
7S0X000JWW	SAYW	Lenovo XClarity Pro, per Managed Endpoint w/7 Yr SW S&S

Lenovo XClarity Administrator offers the following standard features that are available at no charge:

- Auto-discovery and monitoring of Lenovo systems
- Firmware updates and compliance enforcement
- External alerts and notifications via SNMP traps, syslog remote logging, and e-mail
- Secure connections to managed endpoints
- NIST 800-131A or FIPS 140-2 compliant cryptographic standards between the management solution and managed endpoints
- Integration into existing higher-level management systems such as cloud automation and orchestration tools through REST APIs, providing extensive external visibility and control over hardware resources
- An intuitive, easy-to-use GUI
- Scripting with Windows PowerShell, providing command-line visibility and control over hardware resources

Lenovo XClarity Administrator offers the following premium features that require an optional Pro license:

- Pattern-based configuration management that allows to define configurations once and apply repeatedly without errors when deploying new servers or redeploying existing servers without disrupting the fabric
- Bare-metal deployment of operating systems and hypervisors to streamline infrastructure provisioning

For more information, refer to the Lenovo XClarity Administrator Product Guide:
http://lenovopress.com/tips1200

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 (LXEM) 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.

LXEM is a licensed product. A single-node LXEM license is included with the XClarity Controller Platinum upgrade as described in the XCC2 Platinum section. If your server does not have the XCC Platinum upgrade, Energy Manager licenses can be ordered as shown in the following table.

Table 31. Lenovo XClarity Energy Manager

Part number	Description
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
- User Guide for XClarity Energy Manager:
  https://pubs.lenovo.com/lxem/

Security

Topics in this section:

Security features

The ST50 V3 offers the following security features:

- Electronic security measures:
  - Administrator and power-on passwords
  - Secure firmware updates
  - Trusted Platform Module (TPM) supporting TPM 2.0
  - For China customers, the Nationz TPM plug-in module
  - Self-encrypting drives with support for IBM Security Key Lifecycle Manager
- Mechanical security measures
  - Loop for a padlock to prevent the side panel from being opened
  - Slot at the rear of the server for a Kensington Cable Lock
  - Optional chassis intrusion switch

The server is NIST SP 800-147B compliant.

The Nationz TPM module is installed in a dedicated socket on the system board. See the Components and connectors section for locations of physical components.

The following table lists the security options for the server.

Table 32. Security

Part number	Feature code	Description
4XF7A78616	BMET	ThinkSystem ST50 V2/V3 Intrusion Switch Kit

Platform Firmware Resiliency - Lenovo ThinkShield

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 ST50 V3 includes Platform Firmware Resiliency (PFR) hardware Root of Trust (RoT) which enables the system to be 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.

The ST50 V3 includes support for Secure Boot, a UEFI firmware security feature developed by the UEFI Consortium that ensures only immutable and signed software are loaded during the boot time. The use of Secure Boot helps prevent malicious code from being loaded and helps prevent attacks, such as the installation of rootkits. Lenovo offers the capability to enable secure boot in the factory, to ensure end-to-end protection. Alternatively, Secure Boot can be left disabled in the factory, allowing the customer to enable it themselves at a later point, if desired.

The following table lists the relevant feature code(s).

Table 33. Secure Boot options

Part number	Feature code	Description	Purpose
CTO only	BPKQ	TPM 2.0 with Secure Boot	Configure the system in the factory with Secure Boot enabled.
CTO only	BPKR	TPM 2.0	Configure the system without Secure Boot enabled. Customers can enable Secure Boot later if desired.

Tip: If Secure Boot is not enabled in the factory, it can be enabled later by the customer. However once Secure Boot is enabled, it cannot be disabled.

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 34. 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.

Security standards

The ST50 V3 supports the following security standards and capabilities:

- **Industry Standard Security Capabilities**
  - Intel CPU Enablement
    - AES-NI (Advanced Encryption Standard New Instructions)
    - Secure Key
    - MKTME/TME (Multi-Key Total Memory Encryption)
    - OS Guard
    - TXT (Trusted eXecution Technology)
    - XD (eXecute Disable)
    - Boot Guard
    - MBEC (Mode-based Execute Control)
    - VT-x (Virtualization Technology-x)
    - VT-rp (Virtualization Technology with Redirect Protection)
    - VT-d (Virtualization Technology for Directed I/O)
    - VT-x with EPT (Extended Page Tables)
  - Microsoft Windows Security Enablement
    - Credential Guard
    - Device Guard
    - Host Guardian Service
  - TCG (Trusted Computing Group) TPM (Trusted Platform Module) 2.0
  - UEFI (Unified Extensible Firmware Interface) Forum Secure Boot
- **Hardware Root of Trust and Security**
  - Independent security subsystem providing platform-wide NIST SP800-193 compliant Platform Firmware Resilience (PFR)
  - Management domain RoT supplemented by the Secure Boot features of XCC
- **Platform Security**
  - Boot and run-time firmware integrity monitoring with rollback to known-good firmware (e.g., “self-healing”)
  - Non-volatile storage bus security monitoring and filtering
  - Resilient firmware implementation, such as to detect and defeat unauthorized flash writes or SMM (System Management Mode) memory incursions
  - Patented IPMI KCS channel privileged access authorization (USPTO Patent# 11,256,810)
  - Host and management domain authorization, including integration with CyberArk for enterprise password management
  - KMIP (Key Management Interoperability Protocol) compliant, including support for IBM SKLM and Thales KeySecure
  - Reduced “out of box” attack surface
  - Configurable network services

  For more information on platform security, see the paper “How to Harden the Security of your ThinkSystem Server and Management Applications” available from https://lenovopress.com/lp1260-how-to-harden-the-security-of-your-thinksystem-server.
- **Standards Compliance and/or Support**
  - NIST SP800-131A rev 2 “Transitioning the Use of Cryptographic Algorithms and Key Lengths”
  - NIST SP800-147B “BIOS Protection Guidelines for Servers”
  - NIST SP800-193 “Platform Firmware Resiliency Guidelines”

- ISO/IEC 11889 “Trusted Platform Module Library”
- Common Criteria TCG Protection Profile for “PC Client Specific TPM 2.0”
- European Union Commission Regulation 2019/424 (“ErP Lot 9”) “Ecodesign Requirements for Servers and Data Storage Products” Secure Data Deletion
- Optional FIPS 140-2 validated Self-Encrypting Disks (SEDs) with external KMIP-based key management

- **Product and Supply Chain Security**
  - Suppliers validated through Lenovo’s Trusted Supplier Program
  - Developed in accordance with Lenovo’s Secure Development Lifecycle (LSDL)
  - Continuous firmware security validation through automated testing, including static code analysis, dynamic network and web vulnerability testing, software composition analysis, and subsystem-specific testing, such as UEFI security configuration validation
  - Ongoing security reviews by US-based security experts, with attestation letters available from our third-party security partners
  - Digitally signed firmware, stored and built on US-based infrastructure and signed on US-based Hardware Security Modules (HSMs)
  - Manufacturing transparency via Intel Transparent Supply Chain (for details, see https://lenovopress.com/lp1434-introduction-to-intel-transparent-supply-chain-on-lenovo-thinksystem-servers)
  - TAA (Trade Agreements Act) compliant manufacturing, by default in Mexico for North American markets with additional US and EU manufacturing options
  - US 2019 NDAA (National Defense Authorization Act) Section 889 compliant

Keyboards and Mice

The following table lists the supported full-sized USB keyboards and mice available for Lenovo ThinkSystem servers.

The keyboards have the following features:

- Full-sized 104-key keyboard with 3 special Windows keys
- 3 LEDs for caps lock, scroll lock and num lock
- Wired USB connection with 1.8m cable
- Adjustable feet at the rear of the keyboard

Tip: For keyboards that fit in the rack-mounted console kit, see the KVM console options section, or the ThinkSystem 18.5-inch LCD Console product guide

Table 35. Lenovo Preferred Pro USB Full-sized keyboards - ThinkSystem

Part number	Feature code	Description
Mice		
7M57A04698	B0LN	ThinkSystem Optical Wheel Mouse - USB
Keyboards		
7ZB7A05521	AXTM	ThinkSystem Pref. Pro II USB Keyboard - Arabic
7ZB7A05520	AXTN	ThinkSystem Pref. Pro II USB Keyboard - Arabic/French
7ZB7A05519	AXTP	ThinkSystem Pref. Pro II USB Keyboard - Belgium/French
7ZB7A05518	AXTQ	ThinkSystem Pref. Pro II USB Keyboard - Belgium/UK
7ZB7A05517	AXTR	ThinkSystem Pref. Pro II USB Keyboard - Brazil/Portuguese
7ZB7A05515	AXTS	ThinkSystem Pref. Pro II USB Keyboard - Bulgarian
7ZB7A05511	AXTU	ThinkSystem Pref. Pro II USB Keyboard - Czech
7ZB7A05509	AXTV	ThinkSystem Pref. Pro II USB Keyboard - Danish
7ZB7A05508	AXTW	ThinkSystem Pref. Pro II USB Keyboard - Dutch
7ZB7A05506	AXTX	ThinkSystem Pref. Pro II USB Keyboard - French
7ZB7A05496	AXTZ	ThinkSystem Pref. Pro II USB Keyboard - French Canadian French
7ZB7A05504	AXTY	ThinkSystem Pref. Pro II USB Keyboard - French Canadian Multilingual
7ZB7A05495	AXU0	ThinkSystem Pref. Pro II USB Keyboard - German
7ZB7A05494	AXU1	ThinkSystem Pref. Pro II USB Keyboard - Greek
7ZB7A05493	AXU2	ThinkSystem Pref. Pro II USB Keyboard - Hebrew
7ZB7A05492	AXU3	ThinkSystem Pref. Pro II USB Keyboard - Hungarian
7ZB7A05491	AXU4	ThinkSystem Pref. Pro II USB Keyboard - Iceland
7ZB7A05490	AXU5	ThinkSystem Pref. Pro II USB Keyboard - Italy
7ZB7A05489	AXU6	ThinkSystem Pref. Pro II USB Keyboard -Japanese
7ZB7A05488	AXU7	ThinkSystem Pref. Pro II USB Keyboard - Korean
7ZB7A05487	AXU8	ThinkSystem Pref. Pro II USB Keyboard - LA Spanish
7ZB7A05486	AXU9	ThinkSystem Pref. Pro II USB Keyboard - Norwegian
7ZB7A05485	AXUA	ThinkSystem Pref. Pro II USB Keyboard - Polish
7ZB7A05484	AXUB	ThinkSystem Pref. Pro II USB Keyboard- Portugese
7ZB7A05483	AXUC	ThinkSystem Pref. Pro II USB Keyboard - Romanian
7ZB7A05482	AXUD	ThinkSystem Pref. Pro II USB Keyboard - Russian/Cy

Part number	Feature code	Description
7ZB7A05481	AXUE	ThinkSystem Pref. Pro II USB Keyboard - Serbian/Cyrilic
7ZB7A05480	AXUF	ThinkSystem Pref. Pro II USB Keyboard - Slovak
7ZB7A05471	AXUQ	ThinkSystem Pref. Pro II USB Keyboard - Slovenian
7ZB7A05479	AXUG	ThinkSystem Pref. Pro II USB Keyboard - Spanish
7ZB7A05478	AXUH	ThinkSystem Pref. Pro II USB Keyboard- Swedish/Finn
7ZB7A05477	AXUJ	ThinkSystem Pref. Pro II USB Keyboard - Swiss, F/G
7ZB7A05476	AXUK	ThinkSystem Pref. Pro II USB Keyboard - Thailand
7ZB7A05513	AXTT	ThinkSystem Pref. Pro II USB Keyboard - Trad Chinese/US
7ZB7A05474	AXUM	ThinkSystem Pref. Pro II USB Keyboard - Turkish 179
7ZB7A05475	AXUL	ThinkSystem Pref. Pro II USB Keyboard - Turkish 440
7ZB7A05473	AXUN	ThinkSystem Pref. Pro II USB Keyboard - UK English
7ZB7A05522	AXTL	ThinkSystem Pref. Pro II USB Keyboard - US English
7ZB7A05472	AXUP	ThinkSystem Pref. Pro II USB Keyboard - US Euro

Rack installation

The ST50 V3 can be installed in the rack with the Rack Mount Kit, which converts the server to a rack-mountable server.

Note: The server is a 4U rack mount server, however the rack mount kit adds 1U to the vertical space occupied by the server. The total rack space occupied is 5U.

Part number information is listed in the following table. The kit can only be ordered as an option part number, not in a CTO order.

Table 36. Rack installation options

Part number	Description
4XF7A78620	ThinkSystem ST50 Series / ST250 Series Rack Mount Kit

The rack mount kit includes the following items:

- 1U tray to hold the server horizontally
- Left and right slide rails
- Cable management arm
- Brackets and other hardware
- Installation instructions

The following table summarizes the rail kit features and specifications.

Table 37. Rail kit features and specifications summary

Feature	ThinkSystem ST50 Series / ST250 Series Rack Mount Kit
Option part number	4XF7A78620
Rail type	Full-out slide rail (ball bearing)
Toolless installation	Yes
CMA support	Included
Supported rack type	Four-post IBM and Lenovo standard rack, complying with the IEC standard
In-rack server maintenance	No
1U PDU support	Yes
0U PDU support	Limited support**
Supported mounting holes	Square or round
Thickness of mounting flanges	2.0 to 3.3 mm (0.08 to 0.13 inches)
Supported distance between front and rear mounting flanges‡	665 to 900 mm (26.2 to 35.4 inches)
Rail length†	792 mm (31.2 inches)

** 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 (28.3-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 systems

The server supports the following operating systems:

- Microsoft Windows Server 2022
- Red Hat Enterprise Linux 9.4
- SUSE Linux Enterprise Server 15 SP5
- SUSE Linux Enterprise Server 15 Xen SP5
- Ubuntu 24.04 LTS 64-bit
- VMware ESXi 8.0 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

Virtualization support: The onboard SATA ports of the server can be used with virtualization hypervisors, including VMware ESXi, Linux KVM, Xen, and Microsoft Hyper-V, however support is limited to AHCI (non-RAID) mode. RSTe mode is not supported with virtualization hypervisors.

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

Table 38. VMware ESXi preload

Part number	Feature code	Description
CTO only	BYC7	VMware ESXi 8.0 U2 (Factory Installed)

Physical and electrical specifications

The ST50 V3 has the following overall physical dimensions, including tower feet, excluding components that extend outside the standard chassis, such as power supply handles:

- Width: 170 mm (6.7 inches)
- Height: 376 mm (14.8 inches)
- Depth: 315 mm (12.4 inches)

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

Table 39. Detailed dimensions

Dimension	Description
170 mm	X_a = Width, using widest features (not including feet)
132 mm	X_b = Width, with chassis feet extended
376 mm	Y_a = Height, from bottom of feet to top of chassis body
370 mm	Y_b = Height, from bottom of chassis body to top of chassis body
299 mm	Z_a = Depth, from front door to most rearward I/O port surface
315 mm	Z_b = Depth, from front door to deepest feature of the chassis body feature
315 mm	Z_c = Depth, from front door to deepest feature such as power supply handle
37 mm	Z_e = Depth, front door to front plate of chassis body

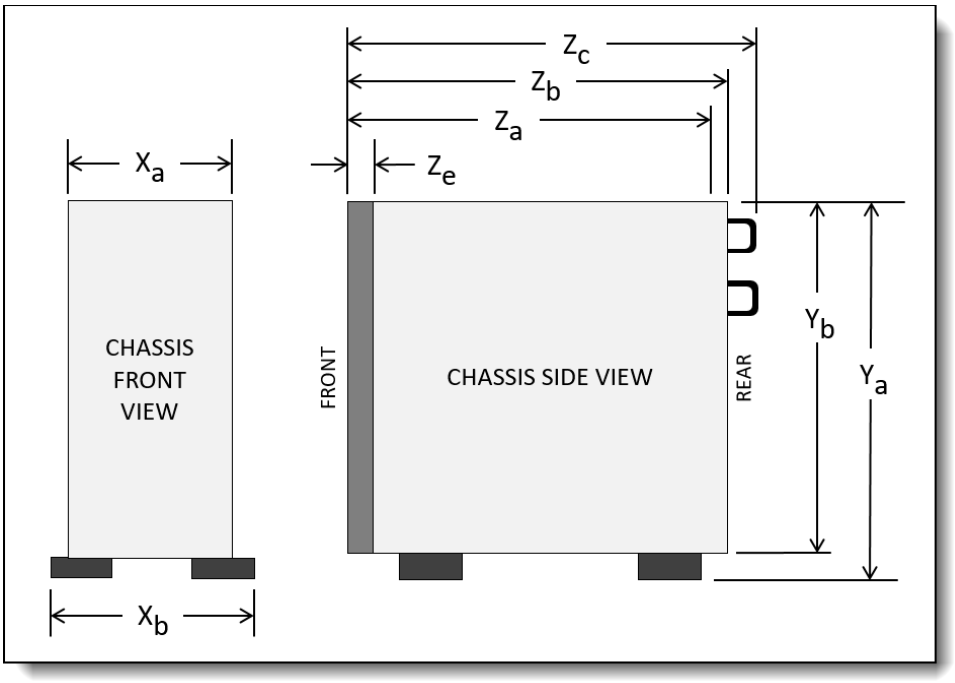

Figure 10. Server dimension

The shipping dimensions (cardboard packaging) of the ST50 V3 are as follows:

- Width: 280 mm (11.0 inches)
- Height: 540 mm (21.3 inches)
- Depth: 420 mm (16.5 inches)

The server has the following weight:

- Weight, fully configured: 11.96 kg (26.4 lbs)

Electrical requirements are as follows:

- Models with a 300 W AC fixed power supply:
  - 100-127 (nominal) V ac; 50 Hz or 60 Hz, 3.88 A
  - 200-240 (nominal) V ac; 50 Hz or 60 Hz, 1.69 A
- Models with a 500 W AC fixed power supply:
  - 100-127 (nominal) V ac; 50 Hz or 60 Hz, 6.13 A
  - 200-240 (nominal) V ac; 50 Hz or 60 Hz, 2.7 A

Operating environment

ThinkSystem ST50 V3 complies with ASHRAE Class A2 specifications. System performance may be impacted when the operating temperature is outside AHSARE A2 specification.

- 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).
  - Server off: 5°C to 45°C (41°F to 113°F)
  - Shipment/storage: -20°C to 60°C (-4°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)
    - Shipment/storage: 8% to 90%
- Particulate contamination

Temperature and humidity

The ambient temperature must be 35°C or lower if the server has any of the following components:

- M.2 drives (960 GB or below)

NOTE

When the ambient temperature is greater than the supported temperature, the server will shut down. The server will not power on again until the ambient temperature falls within the supported temperature range.

Acoustical noise emissions

The server has the following acoustic noise emissions declaration:

- Sound power level (L_{WAd})
    - Idling: 3.4 Bel (Typical), 4.0 Bel (Max.)
    - Operating 1: 3.4 Bel (Typical), 4.0 Bel (Max.)
    - Operating 2: 4.8 Bel (Typical), 5.4 Bel (Max.)
- Sound pressure level (L_{pAm}):
    - Idling: 20.3 dBA (Typical), 27.6 dBA (Max.)
    - Operating 1: 20.3 dBA (Typical), 27.6 dBA (Max.)
    - Operating 2: 35.1 dBA (Typical), 40.6 dBA (Max.)

NOTE

- These sound levels were measured in controlled acoustical environments according to procedures specified by ISO 7779 and are reported in accordance with ISO 9296. Testing was conducted at 23°C ± 2°C to align with ISO7779 procedures.
- Idling mode is the steady state in which the server is powered on but not operating any intended function. Operating mode 1 is 50% CPU TDP. Operating mode 2 is 100% CPU TDP.
- The declared acoustic sound levels are based on the following configurations, which may change depending on configuration/conditions:
    - Typical: 1x 80W CPU, 1x 16GB DIMM, 1x 3.5" HDD, 1x Slim SATA ODD, 1x 300W fixed PSU
    - Maximum: 1x 95W CPU, 4x 32 GB DIMM, 3x 3.5" HDD, 1x 2.5" SSD, 1x Slim SATA ODD, 1x 5350-8i RAID, 1x 1G NIC, 1x 500W fixed PSU
- 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.

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 copper reactivity level shall be less than 200 Angstroms per month (Å/month)
  - The silver reactivity level 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
  - Environment must be free of zinc whiskers

For additional information, see the Specifications section of the documentation for the server, available from the Lenovo Documents site, https://pubs.lenovo.com/

Warranty and Support

The ST50 V3 has a 1-year or 3-year warranty, based on the machine type of the system:

- 7DF4 - 1 year warranty
- 7DF3 - 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 markets). Bundled with YourDrive YourData.
  - **Advanced Service:** 24x7 service coverage with 2-hour onsite response or 6-hour committed repair (available only in select markets). 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 markets or regions. 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 ST50 V3 conforms to the following standards:

External backup units

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

Table 40. External USB backup options

Part number	Description
External RDX USB dock	
4T27A10725	ThinkSystem RDX External USB 3.0 Dock
External RDX cartridges	
7TP7A01601	ThinkSystem RDX 500GB Cartridge
7TP7A01602	ThinkSystem RDX 1TB Cartridge
7TP7A01603	ThinkSystem RDX 2TB Cartridge
7TP7A04318	ThinkSystem RDX 4TB Cartridge

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

Rack cabinets

The ST50 V3 server can be installed horizontally in a rack cabinet using the Rack Mount Kit, as described in the Rack installation section.

The following table lists the supported rack cabinets.

Table 41. Rack cabinets

Part number	Description
93072RX	25U Standard Rack (1000mm)
93072PX	25U Static S2 Standard Rack (1000mm)
7D6DA007WW	ThinkSystem 42U Onyx Primary Heavy Duty Rack Cabinet (1200mm)
7D6DA008WW	ThinkSystem 42U Pearl Primary Heavy Duty Rack Cabinet (1200mm)
1410-O42	Lenovo EveryScale 42U Onyx Heavy Duty Rack Cabinet
1410-P42	Lenovo EveryScale 42U Pearl Heavy Duty Rack Cabinet
93604PX	42U 1200mm Deep Dynamic Rack
93614PX	42U 1200mm Deep Static Rack
93634PX	42U 1100mm Dynamic Rack
93634EX	42U 1100mm Dynamic Expansion Rack
93074RX	42U Standard Rack (1000mm)
7D6EA009WW	ThinkSystem 48U Onyx Primary Heavy Duty Rack Cabinet (1200mm)
7D6EA00AWW	ThinkSystem 48U Pearl Primary Heavy Duty Rack Cabinet (1200mm)
1410-O48	Lenovo EveryScale 48U Onyx Heavy Duty Rack Cabinet
1410-P48	Lenovo EveryScale 48U Pearl Heavy Duty Rack Cabinet

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 42. KVM console

Part number	Description
4XF7A84188	ThinkSystem 18.5" LCD Console (with US English keyboard)

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

Table 44. KVM switches and options

Part number	Description
KVM Console switches	
1754D2X	Global 4x2x32 Console Manager (GCM32)
1754D1X	Global 2x2x16 Console Manager (GCM16)
1754A2X	Local 2x16 Console Manager (LCM16)
1754A1X	Local 1x8 Console Manager (LCM8)
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/

Seller training courses

The following sales training courses are offered for employees and partners (login required). Courses are listed in date order.

1. **Partner Technical Webinar - Towers Towers and more Towers**
   2024-06-10 | 60 minutes | Employees and Partners

   In this 60-minute replay, We had the Dream of Towers assembled.
   First on deck was Mark Bica and Joe Allen with a Product Overview
   Second on deck was George Scarborough and Stephanie Casmerwith Programs and Stock Levels and
   Bringing us home was Jon Lytle and David Gywer with Use Cases

   Published: 2024-06-10
   Length: 60 minutes
   Employee link: Grow@Lenovo
   Partner link: Lenovo Partner Learning
   Course code: 060724

2. **SAP Webinar for Lenovo Sellers: Lenovo Portfolio Update for SAP Landscapes**
   2024-06-04 | 60 minutes | Employees Only

   Join Mark Kelly, Advisory IT Architect with the Lenovo Global SAP Center of Competence as he discusses:
   • Challenges in the SAP environment
   • Lenovo On-premise Solutions for SAP
   • Lenovo support resources for SAP solutions

   Published: 2024-06-04
   Length: 60 minutes
   Employee link: Grow@Lenovo
   Course code: DSAPF101
3. **Lenovo Data Center Product Portfolio**
   2024-05-29 | 20 minutes | Employees and Partners

   This course introduces the Lenovo data center portfolio, and covers servers, storage, storage networking, and software-defined infrastructure products. After completing this course about Lenovo data center products, you will be able to identify product types within each data center family, describe Lenovo innovations that this product family or category uses, and recognize when a specific product should be selected.

   Published: 2024-05-29
   Length: 20 minutes
   Employee link: Grow@Lenovo
   Partner link: Lenovo Partner Learning
   Course code: SXXW1110r7
4. **VTT Cloud Architecture: NVidia Using Cloud for GPUs and AI**
   2024-05-22 | 60 minutes | Employees Only

   Join JD Dupont, NVIDIA Head of Americas Sales, Lenovo partnership and Veer Mehta, NVIDIA Solution Architect on an interactive discussion about cloud to edge, designing cloud Solutions with Nvidia GPUs and minimizing private\hybrid cloud OPEX with GPUs. Discover how you can use what is done at big public cloud providers for your customers. We will also walk through use cases and see a demo you can use to help your customers.

   Published: 2024-05-22
   Length: 60 minutes
   Employee link: Grow@Lenovo
   Course code: DVCLD212
5. **Partner Technical Webinar - ISG Portfolio Update**
   2024-04-15 | 60 minutes | Employees and Partners

   In this 60-minute replay, Mark Bica, NA ISG Server Product Manager reviewed the Lenovo ISG portfolio. He covered new editions such as the SR680a \ SR685a, dense servers, and options that are strategic for any workload.

   Published: 2024-04-15
   Length: 60 minutes
   Employee link: Grow@Lenovo
   Partner link: Lenovo Partner Learning
   Course code: 041224

6. **Partner Technical Webinar – StorMagic**
   2024-03-19 | 60 minutes | Employees and Partners

   March 08, 2024 – In this 60-minute replay, Stuart Campbell and Wes Ganeko of StorMagic joined us and provided an overview of StorMagic on Lenovo. They also demonstrated the interface while sharing some interesting use cases.

   Published: 2024-03-19
   Length: 60 minutes
   Employee link: Grow@Lenovo
   Partner link: Lenovo Partner Learning
   Course code: 030824
7. **Intel Transparent Supply Chain on Lenovo Servers**
   2024-01-29 | 12 minutes | Employees and Partners

   This course introduces the Intel Transparent Supply Chain (TSC) program, explains how the program works, and discusses the benefits of the Intel TSC program to customers. Adding the Intel TSC feature to an order is explained.

   Course objectives:
   • Describe the Intel® Transparent Supply Chain program
   • Explain how the Intel® Transparent Supply Chain program works
   • Discuss the benefits of the Intel® Transparent Supply Chain program to Lenovo customers
   • Explain how to add Intel® Transparent Supply Chain program feature to an order

   Published: 2024-01-29
   Length: 12 minutes
   Employee link: Grow@Lenovo
   Partner link: Lenovo Partner Learning
   Course code: SXXW1230
8. **Family Portfolio: Storage Controller Options**
   2024-01-23 | 25 minutes | Employees and Partners

   This course covers the storage controller options available for use in Lenovo servers. The classes of storage controller are discussed, along with a discussion of where they are used, and which to choose.

   After completing this course, you will be able to:
   • Describe the classes of storage controllers
   • Discuss where each controller class is used
   • Describe the available options in each controller class

   Published: 2024-01-23
   Length: 25 minutes
   Employee link: Grow@Lenovo
   Partner link: Lenovo Partner Learning
   Course code: SXXW1111

9. **Lenovo-Intel Sustainable Solutions QH**
   2024-01-22 | 10 minutes | Employees and Partners

   This Quick Hit explains how Lenovo and Intel are committed to sustainability, and introduces the Lenovo-Intel joint sustainability campaign. You will learn how to use this campaign to show customers what that level of commitment entails, how to use the campaign's unsolicited proposal approach, and how to use the campaign as a conversation starter which may lead to increased sales.

   Published: 2024-01-22
   Length: 10 minutes
   Employee link: Grow@Lenovo
   Partner link: Lenovo Partner Learning
   Course code: SXXW2524a

10. **Family Introduction: Rack and Tower**
    2024-01-19 | 11 minutes | Employees and Partners

    This course is designed to give Lenovo sales and partner representatives a foundation on the characteristics of the rack and tower server family. As an introduction to the family, this course also includes positioning, when to use a product, and keywords a client may use when discussing a rack product.

    Course Objectives:
    • Family Characteristics
    • Priority Positioning
    • Product Usage
    • Keywords and Phrases

    Published: 2024-01-19
    Length: 11 minutes
    Employee link: Grow@Lenovo
    Partner link: Lenovo Partner Learning
    Course code: SXXW1100r3

11. **FY24Q3 Intel Servers Update**
    2023-12-11 | 15 minutes | Employees and Partners

    This update is designed to help you discuss the features and customer benefits of Lenovo servers that use the 5th Gen Intel® Xeon® processors. Lenovo has also introduced a new server, the ThinkSystem SD650-N V3, which expands the supercomputer server family. Reasons to call your customer and talk about refreshing their infrastructure are also included as a guideline.

    Published: 2023-12-11
    Length: 15 minutes
    Employee link: Grow@Lenovo
    Partner link: Lenovo Partner Learning
    Course code: SXXW2522a

12. **Partner Technical Webinar - Data Center Limits and ISG TAA Compliance**
    2023-05-16 | 60 minutes | Employees and Partners

    In this 60-minute replay, we had two topics. First Vinod Kamath, Lenovo Distinguished Engineer for Data Center Cooling presented on the Systems Configuration and Data Center Ambient Limits. Second, Shama Patari, Lenovo Trade Council, and Glenn Johnson, Lenovo Principal Engineer for Supply Chain presented on ISG TAA Compliance.

    Published: 2023-05-16
    Length: 60 minutes
    Employee link: Grow@Lenovo
    Partner link: Lenovo Partner Learning
    Course code: 051223

13. **Lenovo Sustainable Computing**
    2022-09-16 | 4 minutes | Employees and Partners

    This Quick Hit describes the Lenovo sustainable computing program, and the many ways in which Lenovo strives to respect and protect the environment.

    Published: 2022-09-16
    Length: 4 minutes
    Employee link: Grow@Lenovo
    Partner link: Lenovo Partner Learning
    Course code: SXXW2504a

Related publications and links

For more information, see these resources:

- ThinkSystem ST50 V3 product page
  https://www.lenovo.com/us/en/p/servers-storage/servers/towers/lenovo-thinksystem-st50-v3/len21ts0034
- ThinkSystem ST50 V3 interactive 3D tour
  https://lenovopress.lenovo.com/3dtours/st50-v3/
- ThinkSystem ST50 V3 drivers and support
  https://datacentersupport.lenovo.com/us/en
- Lenovo ThinkSystem ST50 V3 product publications:
  https://pubs.lenovo.com/st50-v3/
  - User Guide, which includes:
    - System Configuration Guide
    - Hardware Maintenance Guide
  - Rack Installation Guides
  - Messages and Codes Reference
  - UEFI Manual for ThinkSystem Servers
- ServerProven hardware compatibility:
  https://serverproven.lenovo.com/

Related product families

Product families related to this document are the following:

- 1-Socket Tower Servers
- ThinkSystem ST50 V3 Server

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