Lenovo ThinkSystem SN850 Server
Product Guide

The Lenovo ThinkSystem SN850 is a high-performance server that offers enhanced security, efficiency, and reliability features to handle business-critical workloads. The blade server incorporates up to four Intel Xeon Processor Scalable Family of processors. The processors feature up to 28 cores each and use Lenovo TruDDR4 memory, which runs at speeds up to 2666 MHz.

Suggested uses: large database, virtualization, enterprise applications, HPC, and cloud applications.

Figure 1 shows the Flex System SN850 server

Figure 1. Flex System SN850 server

Did you know?

The SN850 server uses the new Intel Xeon Scalable Gold and Platinum processors and memory can now operate at speeds up to 2666 MHz. It also includes the next generation UEFI-based Lenovo XClarity Provisioning Manager for rapid system setup and diagnosis, and Lenovo XClarity Controller management processor for systems management and alerting.

Key features

This section describes the key features of the server.

Scalability and performance

The SN850 offers the following features to boost performance, improve scalability, and reduce costs:

- Up to 7 SN850 servers can be installed in one Flex System Enterprise chassis.
- Improves productivity by offering superior system performance with up to 28-core processors, 38.5 MB of L3 cache, up to three 10.4 GT/s Ultra Path Interconnect links and a Thermal Design Power (TDP) rating of up to 165W.
- Supports up to four processors, 112 cores, and 224 threads, which maximizes the concurrent execution of multi-threaded applications. When four processors are installed, they are connected in a Mesh topology to maximize inter-processor communication (requires processors with three UPI connections)
- Intelligent and adaptive system performance with energy-efficient Intel Turbo Boost Technology allows CPU cores to run at maximum speeds during peak workloads by temporarily going beyond processor TDP.
- Intel Hyper-Threading Technology boosts performance for multithreaded applications by enabling simultaneous multithreading within each processor core, up to two threads per core.
- Intel Virtualization Technology integrates hardware-level virtualization hooks that allow operating system vendors to better use the hardware for virtualization workloads.
- Intel Advanced Vector Extensions 512 (AVX-512) enable acceleration of enterprise-class workloads, such as databases and enterprise resource planning.
- Each processor has 6 memory channels with up 2 two DIMMs per channel running at up to 2666 MHz.
- Up to 3.0 TB using 48x 64 GB LRDIMMs (all processors) or 6.0 TB using 48x 128 GB 3DS RDIMMs (requires M-suffix processors).
- Optional support for high-performance PCIe-attached NVMe Flash Storage solid-state drives (SSDs) can significantly improve I/O performance.
- Embedded 4-port 10Gb Intel adapter built into the system board is based on the Intel Ethernet Connection X722 network controller.
- With Intel Integrated I/O Technology, the PCI Express 3.0 controller is integrated into the Intel Xeon processor Scalable family. This integration helps to dramatically reduce I/O latency and increase overall system performance.
- Support for high-bandwidth I/O adapters; up to four in each SN850 server.
- Support for 40 Gb Ethernet, 16 Gb Fibre Channel, and FDR InfiniBand.
- High-speed USB 3.0 port for connectivity to external devices.

Availability and serviceability

The SN850 provides the following features to simplify serviceability and increase system up-time:

- The server offers Single Device Data Correction (SDDC, also known as Chipkill), Adaptive Double-Device Data Correction (ADDDC, also known as Redundant Bit Steering or RBS), memory mirroring, and memory rank sparing for redundancy in the event of a non-correctable memory failure.
- Tool-less cover removal provides easy access to upgrades and serviceable parts, such as CPU, memory, and adapter cards.
- The Dual M.2 Boot Adapter supports RAID-1 which enables two installed M.2 drives to be configured as a redundant pair.
- Hot-swap drives support integrated RAID-1 redundancy for data protection and greater system up-

time.

- Solid-state drives (SSDs), which offer significantly better reliability than mechanical HDDs for greater uptime.
- The power source independent light path diagnostics functionality provides individual LEDs that lead the technician to failed (or failing) components, which simplifies servicing, speeds up problem resolution, and helps improve system availability.
- The built-in XClarity Controller continuously monitors system parameters, triggers alerts, and performs recovery actions in case of failures to minimize downtime.
- Proactive Platform Alerts (including PFA and SMART alerts): Processors, voltage regulators, memory, internal storage (SAS/SATA HDDs and SSDs, NVMe SSDs, flash storage adapters), RAID controllers, and server ambient and sub-component temperatures. Alerts can be surfaced through the system XClarity Controller to managers such as Lenovo XClarity Administrator, VMware vCenter, and Microsoft System Center. These proactive alerts let you take appropriate actions in advance of possible failure, thereby increasing server uptime and application availability.
- Built-in diagnostics in UEFI, using Lenovo XClarity Provisioning Manager, speed up troubleshooting tasks to reduce service time, and supports diagnostic function and to collect service data to USB key drive or remote CIFS share folder.
- Auto-restart in the event of a momentary loss of AC power (based on power policy setting in the XClarity Controller service processor).
- Support for the XClarity Administrator Mobile app running on a supported smartphone and connected to the server through the service-enabled USB port, enables additional local systems management functions.
- Three-year customer replaceable unit and on-site limited warranty; next business day 9x5. Optional service upgrades are available.

Manageability and security

The following powerful systems management features simplify the local and remote management of the SN850:

- Support for Lenovo XClarity Administrator, providing auto-discovery, inventory tracking, monitoring, policy-based firmware updates, address pool management, configuration patterns and operating system installation.
- The server includes an XClarity Controller (XCC) to monitor server availability and perform remote management. XCC Advanced is supported as standard, which enables remote KVM, mounting of remote media files (ISO and IMG image files), boot capture, and power capping.
- 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
- Integrated Trusted Platform Module (TPM) 2.0 support enables advanced cryptographic functionality, such as digital signatures and remote attestation.
- Supports Secure Boot to ensure only a digitally signed operating system can be used. Supported with HDDs and SSDs as well as M.2 drives.
- 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.
- Industry-standard Advanced Encryption Standard (AES) NI support for faster, stronger encryption.
- Intel Execute Disable Bit functionality can help prevent certain classes of malicious buffer overflow attacks when combined with a supporting operating system.
- Intel Trusted Execution Technology provides enhanced security through hardware-based resistance to malicious software attacks, which allows an application to run in its own isolated space that is protected from all other software that is running on a system.

Energy efficiency

The SN850 offers the following energy-efficiency features to save energy, reduce operational costs, increase energy availability, and contribute to a green environment:

- The component-sharing design of the Flex System chassis provides ultimate power and cooling savings.
- The Intel Xeon Processor Scalable Family of processors offer significantly better performance than previous generations of processors, while fitting into the same TDP limits.
- Intel Intelligent Power Capability powers individual processor elements on and off as needed, which reduces power draw.
- Solid state drives (SSDs) use as much as 80% less power than traditional spinning 2.5-inch HDDs.
- The SN850 uses hexagonal ventilation holes which can be grouped more densely than round holes, providing more efficient airflow through the system.

Locations of key components and connectors

Figure 2 shows the front of the server.

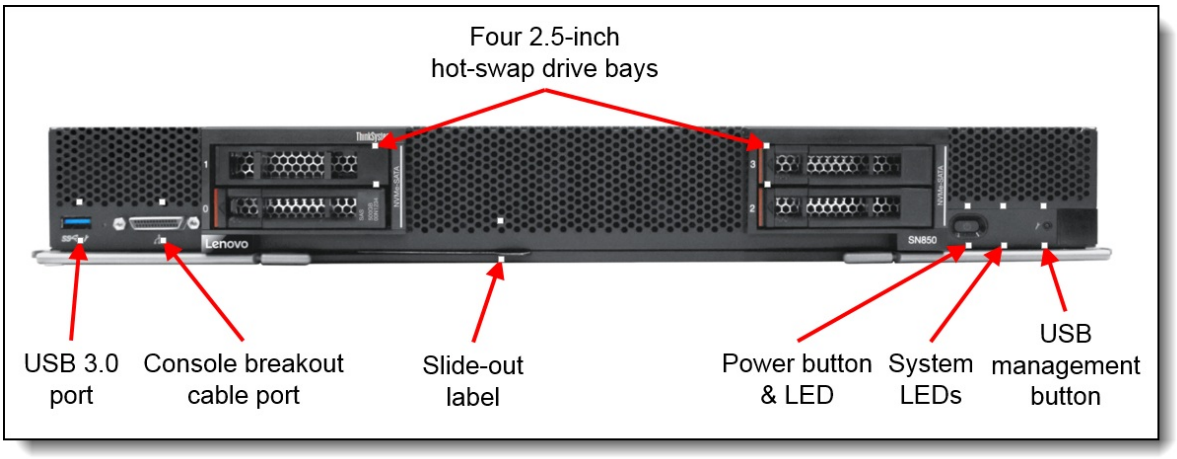

Figure 2. Front view of the SN850 server

Figure 3 shows the locations of key components inside the server.

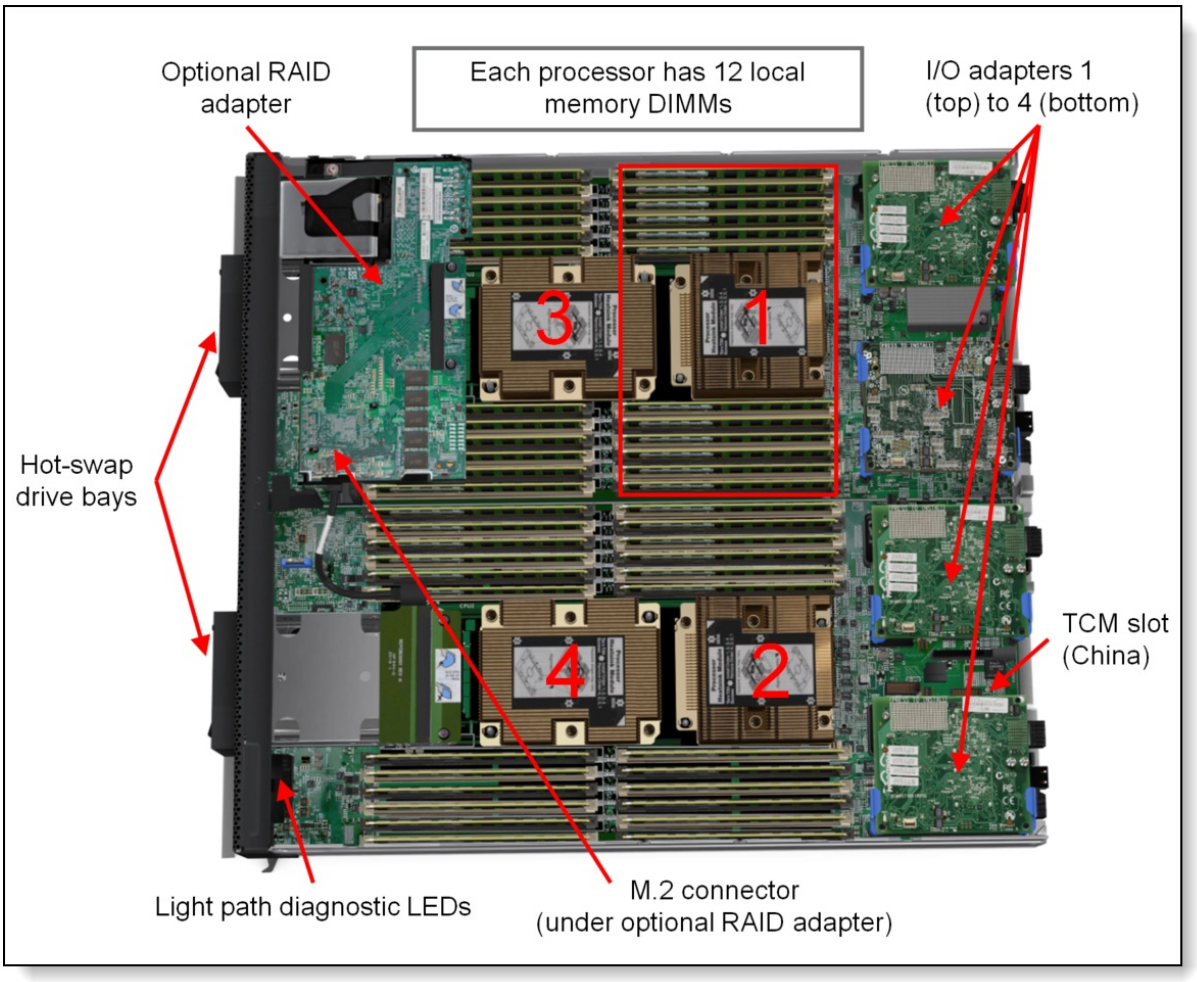

Figure 3. Inside view of the SN850 server

System architecture

The following figure shows the architectural block diagram of the SN850, showing the major components and their connections.

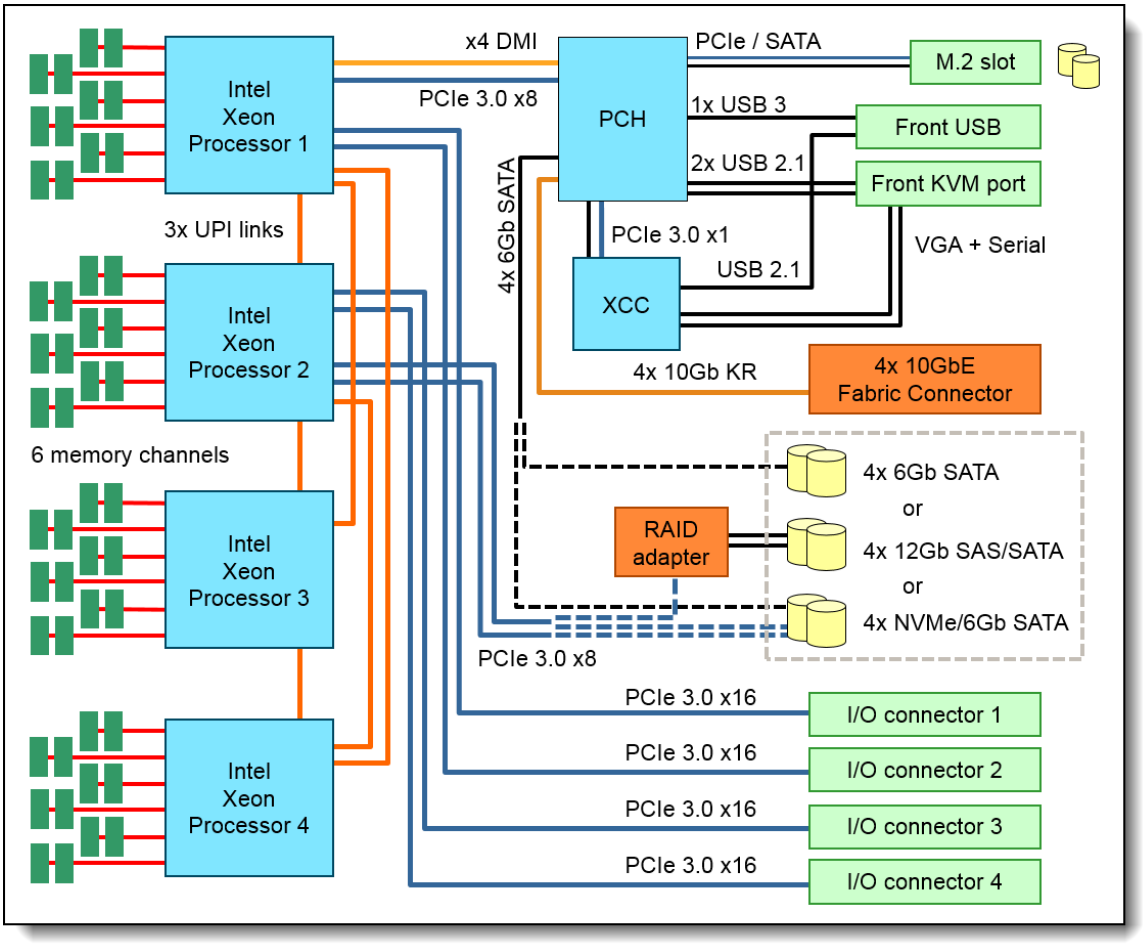

Figure 4. SN850 system architectural block diagram

Standard specifications

The following table lists the standard specifications.

Table 1. Standard specifications

Components	Specification
Machine Type	7X15
Form factor	Double-width Flex System compute node.
Chassis support	Flex System Enterprise Chassis with CMM2.
Processor	Up to four Intel Xeon processor Scalable product family CPUs: from4 cores to 28 cores; core speeds from 1.7 GHz to 3.6 GHz; up to 38.5 MB L3 cache. Up to 3 UPI links with up to 10.4 GT/s each (processor dependent). Up to 2666 MHz memory speed.
Chipset	Intel C624

Components	Specification
Memory	Up to 48 DIMM sockets (12 DIMMs on 6 channels per processor) supporting Lenovo TruDDR4 DIMMs at up to 2666 MHz. RDIMMs, LRDIMMs and 3DS RDIMMs are supported, but memory types cannot be intermixed.
Memory maximums	With RDIMMs: Up to 1.5 TB with 48x 32 GB RDIMMs and four CPUs With LRDIMMs: Up to 3 TB with 48x 64 GB LRDIMMs and four CPUs With 3DS RDIMMs: Up to 6 TB with 48x 128 GB 3DS RDIMMs and four CPUs (requires M-suffix processors that support greater than 786 GB memory per processor)
Memory protection	ECC, SDDC (for x4-based memory DIMMs), ADDDC (for x4-based memory DIMMs, requires Intel Xeon Gold or Platinum processors), memory mirroring, and memory sparing.
Disk drive bays	Four 2.5-inch hot-swap SAS/SATA drive bays that support SAS, SATA, and SSDs. Optional support for four 2.5-inch NVMe PCIe SSDs.
Maximum internal storage	• With four 2.5-inch hot-swap drives: Up to 61.44 TB using 4x 15.36TB 2.5-inch SAS SSDs or up to 8 TB using 4x 2 TB NL SAS HDDs. • With four 2.5-inch NVMe SSDs: Up to 15.4 TB using 4x 3.84 TB PCIe 2.5-inch SSDs. • With two internal Non-Hot-Swap M.2: Up to 256 GB using 2x 128 GB SATA SSDs. No support for the Flex System Storage Expansion Node.
RAID support	RAID-0, RAID-1, RAID-5 and RAID-10 with integrated Intel RSTe controller and optional Basic RAID 530-4i controller; RAID-0, RAID-1, RAID-5, RAID-6 and RAID-10 with optional Advanced RAID 930-4i controller.
Network interfaces	Integrated Intel 10 GbE; optional 1 Gb, 10 GbE, or 40 GbE adapters.
PCI Expansion slots	Four I/O connectors for adapters. PCI Express 3.0 x16 interface. No support for the Flex System PCIe Expansion Node.
Ports	Front: One USB 3.0 port and one console breakout cable port that provides local KVM and serial ports (cable standard with chassis; more cables optional).
Systems management	UEFI, Lenovo XClarity Controller with Pilot4 XE401 baseboard management controller (BMC), Predictive Failure Analysis, light path diagnostics panel, automatic server restart, remote presence. Support for Lenovo XClarity Administrator and Lenovo XClarity Energy Manager.
Security features	Power-on password, administrator's password, Trusted Platform Module (TPM) 1.2 and 2.0, Trusted Cryptographic Module (TCM) - China only.
Video	G200 graphics with 16 MB memory and 2D hardware accelerator, integrated into the XClarity Controller. Maximum resolution is 1920x1200 32bpp at 60Hz.
Limited warranty	Three-year customer-replaceable unit and on-site limited warranty with 9x5/NBD.
Operating systems supported	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware ESXi. See the Operating system support section for specifics.
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: 435 mm (17.1 inches), height 55 mm (2.2 inches), depth 493 mm (19.4 inches).
Weight	Maximum configuration: 12.3 kg (27 lb).

The SN850 server is shipped with the following items:

- Statement of Limited Warranty
- Important Notices

Models

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

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

Models for Australia and New Zealand

Table 2. Models for Australia and New Zealand

Model	Intel Xeon processors†	Memory	Drive bays	RAID	Drives	M.2 drives	10 GbE*	I/O slots
Standard models								
7X15 A035AU	2x Gold 5115 10C 85W 2.4GHz	2x 16GB 1Rx4	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A00JAU	2x Gold 5118 12C 105W 2.3GHz	2x 16GB 1Rx4	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02ZAU	2x Gold 5118 12C 105W 2.3GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A030AU	2x Gold 5120 14C 105W 2.2GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A031AU	2x Gold 6126 12C 125W 2.6GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A032AU	2x Gold 6130 16C 125W 2.1GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02YAU	2x Gold 6134 8C 130W 3.2GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A033AU	2x Gold 6140 18C 140W 2.3GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A034AU	2x Gold 6148 20C 150W 2.4GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A036AU	2x Gold 6152 22C 140W 2.1GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02XAU	2x Platinum 8160 24C 150W 2.1GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A037AU	2x Platinum 8176 28C 165W 2.1GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max

† Processor detail: Quantity, model, core count, TDP, core frequency
* Models with 4x10GbE include a Fabric Connector which routes the embedded X722 10Gb Ethernet controller to I/O slot 3. The Fabric Connector precludes the use of an I/O adapter in slot 3.

Models for South East Asian countries (ASEAN)

Table 3. Models for South East Asian countries (ASEAN)

Model	Intel Xeon processors†	Memory	Drive bays	RAID	Drives	M.2 drives	10 GbE*	I/O slots
Standard models								
7X15 A028SG	2x Gold 5115 10C 85W 2.4GHz	2x 16GB 2Rx8	4x SAS/SATA	RAID 530-4i	Open	Open	Open	0 used 4 max
7X15 A01WSG	2x Gold 5118 12C 105W 2.3GHz	2x 16GB 2Rx8	4x SAS/SATA	RAID 530-4i	Open	Open	Open	0 used 4 max
7X15 A01XSG	2x Gold 5120 14C 105W 2.2GHz	2x 16GB 2Rx8	4x SAS/SATA	RAID 530-4i	Open	Open	Open	0 used 4 max
7X15 A01SSG	2x Gold 6126 12C 125W 2.6GHz	2x 16GB 2Rx8	4x SAS/SATA	RAID 530-4i	Open	Open	Open	0 used 4 max
7X15 A01QSG	2x Gold 6130 16C 125W 2.1GHz	2x 16GB 2Rx8	4x SAS/SATA	RAID 530-4i	Open	Open	Open	0 used 4 max
7X15 A01FSG	2x Gold 6134 8C 130W 3.2GHz	2x 16GB 2Rx8	4x SAS/SATA	RAID 530-4i	Open	Open	Open	0 used 4 max
7X15 A010SG	2x Gold 6140 18C 140W 2.3GHz	2x 32GB	4x SAS/SATA	RAID 530-4i	Open	Open	Open	0 used 4 max
7X15 A00USG	2x Gold 6148 20C 150W 2.4GHz	2x 32GB	4x SAS/SATA	RAID 530-4i	Open	Open	Open	0 used 4 max
7X15 A00RSG	2x Gold 6152 22C 140W 2.1GHz	2x 32GB	4x SAS/SATA	RAID 530-4i	Open	Open	Open	0 used 4 max
7X15 A012SG	2x Platinum 8160 24C 150W 2.1GHz	2x 32GB	4x SAS/SATA	RAID 530-4i	Open	Open	Open	0 used 4 max
7X15 A00ZSG	2x Platinum 8170 26C 165W 2.1GHz	2x 32GB	4x SAS/SATA	RAID 530-4i	Open	Open	Open	0 used 4 max
7X15 A013SG	2x Platinum 8176 28C 165W 2.1GHz	2x 32GB	4x SAS/SATA	RAID 530-4i	Open	Open	Open	0 used 4 max

† Processor detail: Quantity, model, core count, TDP, core frequency
* Models with 4x10GbE include a Fabric Connector which routes the embedded X722 10Gb Ethernet controller to I/O slot 3. The Fabric Connector precludes the use of an I/O adapter in slot 3.

Models for Brazil

Table 4. Models for Brazil

Model	Intel Xeon processors†	Memory	Drive bays	RAID	Drives	M.2 drives	10 GbE*	I/O slots
Standard models								
7X15 A02UBR	2x Gold 5115 10C 85W 2.4GHz	2x 16GB 1Rx4	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02SBR	2x Gold 5118 12C 105W 2.3GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02PBR	2x Gold 5120 14C 105W 2.2GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02MBR	2x Gold 6126 12C 125W 2.6GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02NBR	2x Gold 6130 16C 125W 2.1GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02TBR	2x Gold 6134 8C 130W 3.2GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02LBR	2x Gold 6140 18C 140W 2.3GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02WBR	2x Gold 6148 20C 150W 2.4GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02VBR	2x Gold 6152 22C 140W 2.1GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02QBR	2x Platinum 8160 24C 150W 2.1GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02RBR	2x Platinum 8176 28C 165W 2.1GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max

† Processor detail: Quantity, model, core count, TDP, core frequency
* Models with 4x10GbE include a Fabric Connector which routes the embedded X722 10Gb Ethernet controller to I/O slot 3. The Fabric Connector precludes the use of an I/O adapter in slot 3.

Models for EMEA countries

Table 5. Models for EMEA countries

Model	Intel Xeon processors†	Memory	Drive bays	RAID	Drives	M.2 drives	10 GbE*	I/O slots
Standard models								
7X15 A02BEA	2x Gold 5115 10C 85W 2.4GHz	2x 16GB 1Rx4	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02FEA	2x Gold 5118 12C 105W 2.3GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02AEA	2x Gold 5120 14C 105W 2.2GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A029EA	2x Gold 6126 12C 125W 2.6GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02JEA	2x Gold 6130 16C 125W 2.1GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02GEA	2x Gold 6134 8C 130W 3.2GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A019EA	2x Gold 6138 20C 125W 2.0GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02EEA	2x Gold 6140 18C 140W 2.3GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02CEA	2x Gold 6148 20C 150W 2.4GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02HEA	2x Gold 6152 22C 140W 2.1GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02KEA	2x Platinum 8160 24C 150W 2.1GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A02DEA	2x Platinum 8176 28C 165W 2.1GHz	2x 32GB	4x NVMe/SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max

† Processor detail: Quantity, model, core count, TDP, core frequency
* Models with 4x10GbE include a Fabric Connector which routes the embedded X722 10Gb Ethernet controller to I/O slot 3. The Fabric Connector precludes the use of an I/O adapter in slot 3.

Models for Hong Kong, Taiwan, Korea (HTK)

Table 6. Models for Hong Kong, Taiwan, Korea (HTK)

Model	Intel Xeon processors†	Memory	Drive bays	RAID	Drives	M.2 drives	10 GbE*	I/O slots
Standard models								
7X15 A026CN	2x Gold 5120 14C 105W 2.2GHz	2x 16GB 2Rx8	4x SATA	RSTe RAID	Open	Open	Open	0 used 4 max
7X15 A01PCN	2x Gold 5120 14C 105W 2.2GHz	2x 32GB	4x SATA	RSTe RAID	Open	M.2 Single Adapter 1x 32GB M.2	Open	0 used 4 max
7X15 A020CN	2x Gold 5120 14C 105W 2.2GHz	2x 32GB	4x SATA	RSTe RAID	Open	Open	Open	0 used 4 max
7X15 A01UCN	2x Gold 6140 18C 140W 2.3GHz	2x 16GB 2Rx8	4x SATA	RSTe RAID	Open	Open	Open	0 used 4 max
7X15 A01JCN	2x Gold 6140 18C 140W 2.3GHz	2x 32GB	4x SATA	RSTe RAID	Open	M.2 Single Adapter 1x 32GB M.2	Open	0 used 4 max
7X15 A01RCN	2x Gold 6140 18C 140W 2.3GHz	2x 32GB	4x SATA	RSTe RAID	Open	Open	Open	0 used 4 max
7X15 A01LCN	2x Gold 6142 16C 150W 2.6GHz	2x 16GB 2Rx8	4x SATA	RSTe RAID	Open	Open	Open	0 used 4 max
7X15 A01ECN	2x Gold 6142 16C 150W 2.6GHz	2x 32GB	4x SATA	RSTe RAID	Open	Open	Open	0 used 4 max
7X15 A01HCN	2x Gold 6142 16C 150W 2.6GHz	2x 32GB	4x SATA	RSTe RAID	Open	M.2 Single Adapter 1x 32GB M.2	Open	0 used 4 max
7X15 A00LCN	2x Platinum 8160 24C 150W 2.1GHz	2x 16GB 2Rx8	4x SATA	RSTe RAID	Open	Open	Open	0 used 4 max
7X15 A00MCN	2x Platinum 8160 24C 150W 2.1GHz	2x 32GB	4x SATA	RSTe RAID	Open	M.2 Single Adapter 1x 128GB M.2	Open	0 used 4 max
7X15 A00YCN	2x Platinum 8160 24C 150W 2.1GHz	2x 32GB	4x SATA	RSTe RAID	Open	Open	Open	0 used 4 max
7X15 A027CN	2x Platinum 8170 26C 165W 2.1GHz	2x 16GB 2Rx8	4x SATA	RSTe RAID	Open	Open	Open	0 used 4 max
7X15 A00WCN	2x Platinum 8170 26C 165W 2.1GHz	2x 32GB	4x SATA	RSTe RAID	Open	M.2 Single Adapter 1x 128GB M.2	Open	0 used 4 max
7X15 A018CN	2x Platinum 8170 26C 165W 2.1GHz	2x 32GB	4x SATA	RSTe RAID	Open	Open	Open	0 used 4 max
7X15 A00PCN	2x Platinum 8176 28C 165W 2.1GHz	2x 32GB	4x SATA	RSTe RAID	Open	M.2 Single Adapter 1x 32GB M.2	Open	0 used 4 max
7X15 A01BCN	2x Platinum 8176 28C 165W 2.1GHz	2x 32GB	4x SATA	RSTe RAID	Open	M.2 Single Adapter 1x 128GB M.2	Open	0 used 4 max

† Processor detail: Quantity, model, core count, TDP, core frequency
* Models with 4x10GbE include a Fabric Connector which routes the embedded X722 10Gb Ethernet controller to I/O slot 3. The Fabric Connector precludes the use of an I/O adapter in slot 3.

Models for India

Table 7. Models for India

Model	Intel Xeon processors†	Memory	Drive bays	RAID	Drives	M.2 drives	10 GbE*	I/O slots
Standard models								
7X15 A009SG	2x Gold 5118 12C 105W 2.3GHz	2x 16GB 1Rx4	4x SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A00DSG	2x Gold 5118 12C 105W 2.3GHz	2x 16GB 1Rx4	4x SAS/SATA	RAID 530-4i	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A00QSG	2x Gold 5120 14C 105W 2.2GHz	2x 16GB 1Rx4	4x SAS/SATA	RAID 530-4i	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A006SG	2x Gold 5120 14C 105W 2.2GHz	2x 32GB	4x SAS/SATA	RAID 530-4i	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A00CSG	2x Gold 5120 14C 105W 2.2GHz	2x 32GB	4x SAS/SATA	RAID 930-4i	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A00ESG	2x Gold 6126 12C 125W 2.6GHz	2x 16GB 1Rx4	4x SAS/SATA	RAID 530-4i	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A00FSG	2x Gold 6130 16C 125W 2.1GHz	2x 16GB 1Rx4	4x SAS/SATA	RAID 530-4i	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A01NSG	2x Gold 6130 16C 125W 2.1GHz	2x 16GB 1Rx4	4x SAS/SATA	RAID 930-4i	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A01DSG	2x Gold 6138 20C 125W 2.0GHz	2x 32GB	4x SAS/SATA	RAID 930-4i	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A01MSG	2x Gold 6140 18C 140W 2.3GHz	2x 32GB	4x SAS/SATA	RAID 930-4i	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A01KSG	2x Gold 6142 16C 150W 2.6GHz	2x 16GB 1Rx4	4x SAS/SATA	RAID 930-4i	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A01VSG	2x Gold 6142 16C 150W 2.6GHz	2x 16GB 1Rx4	4x SAS/SATA	RAID 530-4i	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A024SG	2x Gold 6152 22C 140W 2.1GHz	2x 32GB	4x SAS/SATA	RAID 930-4i	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A025SG	2x Platinum 8176 28C 165W 2.1GHz	2x 32GB	4x SAS/SATA	RAID 930-4i	Open	Open	4x 10 GbE embedded	1 used 4 max

† Processor detail: Quantity, model, core count, TDP, core frequency
* Models with 4x10GbE include a Fabric Connector which routes the embedded X722 10Gb Ethernet controller to I/O slot 3. The Fabric Connector precludes the use of an I/O adapter in slot 3.

Models for Japan

Table 8. Models for Japan

Model	Intel Xeon processors†	Memory	Drive bays	RAID	Drives	M.2 drives	10 GbE*	I/O slots
Standard models								
7X15 A008JP	2x Gold 5115 10C 85W 2.4GHz	2x 16GB 1Rx4	4x SATA	RSTe RAID	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A00SJP	2x Gold 6126 12C 125W 2.6GHz	2x 16GB 1Rx4	4x SAS/SATA	RAID 930-4i	Open	Open	4x 10 GbE embedded	1 used 4 max

† Processor detail: Quantity, model, core count, TDP, core frequency
* Models with 4x10GbE include a Fabric Connector which routes the embedded X722 10Gb Ethernet controller to I/O slot 3. The Fabric Connector precludes the use of an I/O adapter in slot 3.

Models for Latin American Countries (except Brazil)

Table 9. Models for Latin American Countries (except Brazil)

Model	Intel Xeon processors†	Memory	Drive bays	RAID	Drives	M.2 drives	10 GbE*	I/O slots
Standard models								
7X15 A022LA	2x Gold 5115 10C 85W 2.4GHz	2x 16GB 2Rx8	4x SAS/SATA	RAID 530-4i	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A021LA	2x Gold 5118 12C 105W 2.3GHz	2x 16GB 2Rx8	4x SAS/SATA	RAID 530-4i	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A01ZLA	2x Gold 5120 14C 105W 2.2GHz	2x 32GB	4x SAS/SATA	RAID 930-4i	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A01YLA	2x Gold 6130 16C 125W 2.1GHz	2x 32GB	4x SAS/SATA	RAID 930-4i	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A01CLA	2x Gold 6140 18C 140W 2.3GHz	2x 32GB	4x SAS/SATA	RAID 930-4i	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A01ALA	2x Gold 6148 20C 150W 2.4GHz	2x 32GB	4x SAS/SATA	RAID 930-4i	Open	Open	4x 10 GbE embedded	1 used 4 max
7X15 A007LA	2x Platinum 8160 24C 150W 2.1GHz	2x 32GB	4x SAS/SATA	RAID 930-4i	Open	Open	4x 10 GbE embedded	1 used 4 max

† Processor detail: Quantity, model, core count, TDP, core frequency
* Models with 4x10GbE include a Fabric Connector which routes the embedded X722 10Gb Ethernet controller to I/O slot 3. The Fabric Connector precludes the use of an I/O adapter in slot 3.

Models for USA and Canada

Table 10. Models for USA and Canada

Model	Intel Xeon processors†	Memory	Drive bays	RAID	Drives	M.2 drives	10 GbE*	I/O slots
Standard models								
7X15 A011NA	2x Gold 5118 12C 105W 2.3GHz	2x 32GB	Open	Open	Open	Open	Open	0 used 4 max
7X15 A014NA	2x Gold 5120 14C 105W 2.2GHz	2x 32GB	Open	Open	Open	Open	Open	0 used 4 max
7X15 A016NA	2x Gold 6130 16C 125W 2.1GHz	2x 32GB	Open	Open	Open	Open	Open	0 used 4 max
7X15 A015NA	2x Gold 6150 18C 165W 2.7GHz	2x 32GB	Open	Open	Open	Open	Open	0 used 4 max
7X15 A00BNA	2x Platinum 8170 26C 165W 2.1GHz	2x 32GB	Open	Open	Open	Open	Open	0 used 4 max

† Processor detail: Quantity, model, core count, TDP, core frequency
* Models with 4x10GbE include a Fabric Connector which routes the embedded X722 10Gb Ethernet controller to I/O slot 3. The Fabric Connector precludes the use of an I/O adapter in slot 3.

Chassis support

The SN850 server is supported in the Flex System chassis as listed in the following table.

Table 11. Chassis support

Chassis models	Description	Supports SN850
8721-HC1 based: 8721-A1x, LRx, DCx 8721-K1G, E1Y, E2Y	Lenovo Flex System Enterprise Chassis with CMM (68Y7030) standard	No
8721-HC2 based: 8721-ALx, DLx 8721-E3Y, E4Y	Lenovo Flex System Enterprise Chassis with CMM2 (00FJ669) standard	Yes
7385-DCx	Lenovo Flex System Carrier-Grade Chassis	No

Note: CMM2 firmware should be 1.6.1 or later to support ThinkSystem compute nodes

Up to seven SN850 servers can be installed in the chassis; however, the actual number that can be installed in a chassis depends on the following factors:

- TDP power rating for the processors that are installed in the SN850
- Number of power supplies that are installed in the chassis
- Capacity of the installed power supplies (2100 W or 2500 W)
- Chassis power redundancy policy that is used (N+1 or N+N)

The following table provides guidelines about what number of SN850 servers can be installed. For more information, use Lenovo Capacity Planner, which is found at the following web page: https://datacentersupport.lenovo.com/us/en/products/solutions-and-software/software/lenovo-capacity-planner/solutions/ht504651

The following color coding was used In the table:

- Green = No restriction on the number of SN850 servers that can be installed
- Yellow = Some bays must be left empty in the chassis

Table 12. Maximum number of SN850 servers that can be installed based on installed power supplies and power redundancy policy used

SN850 CPU TDP rating	2100 W power supplies installed				2500 W power supplies installed			
	N+1, N=5 6 power supplies	N+1, N=4 5 power supplies	N+1, N=3 5 power supplies	N+N, N=3 6 power supplies	N+1, N=5 6 power supplies	N+1, N=4 5 power supplies	N+1, N=3 4 power supplies	N+N, N=3 6 power supplies
85 W	7	7	5	5	7	7	7	7
105 W	7	7	5	5	7	7	7	7
125 W	7	7	5	5	7	7	6	7
130 W	7	6	5	5	7	7	6	6
140 W	7	6	5	5	7	7	6	6
150 W	7	6	5	5	7	7	6	6
165 W	7	6	5	5	7	7	5	6

Processor options

The SN850 supports the Intel Xeon Processor Scalable Family options that are listed in the following table. The server supports two or four processors. When four processors are installed, they are connected in the Mesh topology to maximize inter-processor communication (requires processors with three UPI connections).

All supported processors have the following characteristics:

- 14 nm process technology
- Six DDR4 memory channels
- 48 PCIe 3.0 I/O lanes
- 1 MB L2 cache
- 1.375 MB L3 cache per core (except where larger, as noted with ** in the table below)
- Intel Hyper-Threading Technology
- Intel Turbo Boost Technology 2.0
- Intel Advanced Vector Extensions 512 (AVX-512)
- Intel Ultra Path Interconnect (UPI) links at 10.4 GT/s (replaces QPI)

Depending on the processor model installed, the processors are connected together using either two or three UPI links. Processors with a T suffix are those that have more robust thermal characteristics (higher T-case). Processors with an M suffix support support greater than 768 GB per processor.

Note: The SN850 processor part numbers listed include two processors.

Table 13. SN850 processor options

Part number	Feature code	Intel Xeon processor	Memory speed	Supports >768 GB per CPU	L3 cache**	AVX-512 FMA units*	UPI Links
7XG7A06281	AX8M	Xeon Gold 5115 10C 85W 2.4GHz	2400 MHz	No	13.75 MB	1	2
4XG7A09155	B13A	Xeon Gold 5117 14C 105W 2.0GHz	2400 MHz	No	19.25 MB	1	2
7XG7A06282	AX7D	Xeon Gold 5118 12C 105W 2.3GHz	2400 MHz	No	16.5 MB	1	2
4XG7A09154	AX7F	Xeon Gold 5119T 14C 85W 1.9GHz	2400 MHz	No	19.25 MB	1	2
7XG7A06284	AX7C	Xeon Gold 5120 14C 105W 2.2GHz	2400 MHz	No	19.25 MB	1	2
7XG7A06283	AX7E	Xeon Gold 5120T 14C 105W 2.2GHz	2400 MHz	No	19.25 MB	1	2
7XG7A06270	AX70	Xeon Gold 5122 4C 105W 3.6GHz	2666 MHz*	No	16.5 MB**	2*	2
7XG7A06268	AWEX	Xeon Gold 6126 12C 125W 2.6GHz	2666 MHz	No	19.25 MB**	2	3
4XG7A09152	AX6Z	Xeon Gold 6128 6C 115W 3.4GHz	2666 MHz	No	19.25 MB**	2	3
7XG7A06265	AX6D	Xeon Gold 6130 16C 125W 2.1GHz	2666 MHz	No	22 MB	2	3
7XG7A06263	AX72	Xeon Gold 6130T 16C 125W 2.1GHz	2666 MHz	No	22 MB	2	3
4XG7A09151	AX6U	Xeon Gold 6132 14C 140W 2.6GHz	2666 MHz	No	19.25 MB	2	3
7XG7A06269	AX6Y	Xeon Gold 6134 8C 130W 3.2GHz	2666 MHz	No	24.75 MB**	2	3
4XG7A09150	AX7A	Xeon Gold 6134M 8C 130W 3.2GHz	2666 MHz	Yes	24.75 MB**	2	3
7XG7A06267	AX6W	Xeon Gold 6136 12C 150W 3.0GHz	2666 MHz	No	24.75 MB**	2	3

Part number	Feature code	Intel Xeon processor	Memory speed	Supports >768 GB per CPU	L3 cache**	AVX-512 FMA units*	UPI Links
7XG7A06260	AX6Q	Xeon Gold 6138 20C 125W 2.0GHz	2666 MHz	No	27.5 MB	2	3
4XG7A09153	AX71	Xeon Gold 6138T 20C 125W 2.0GHz	2666 MHz	No	27.5 MB	2	3
7XG7A06262	AX6R	Xeon Gold 6140 18C 140W 2.3GHz	2666 MHz	No	24.75 MB	2	3
4XG7A09149	AX79	Xeon Gold 6140M 18C 140W 2.3GHz	2666 MHz	Yes	24.75 MB	2	3
7XG7A06264	AX6E	Xeon Gold 6142 16C 150W 2.6GHz	2666 MHz	No	22 MB	2	3
4XG7A09148	AX78	Xeon Gold 6142M 16C 150W 2.6GHz	2666 MHz	Yes	22 MB	2	3
7XG7A06277	AWEW	Xeon Gold 6148 20C 150W 2.4GHz	2666 MHz	No	27.5 MB	2	3
7XG7A06261	AX6T	Xeon Gold 6150 18C 165W 2.7GHz	2666 MHz	No	24.75 MB	2	3
7XG7A06259	AX6P	Xeon Gold 6152 22C 140W 2.1GHz	2666 MHz	No	30.25 MB	2	3
7XG7A06266	AX6L	Xeon Platinum 8153 16C 125W 2.0GHz	2666 MHz	No	22 MB	2	3
7XG7A06280	AWEV	Xeon Platinum 8156 4C 105W 3.6GHz	2666 MHz	No	16.5 MB**	2	3
7XG7A06279	AX7B	Xeon Platinum 8158 12C 150W 3.0GHz	2666 MHz	No	24.75 MB**	2	3
7XG7A06258	AWGJ	Xeon Platinum 8160 24C 150W 2.1GHz	2666 MHz	No	33 MB	2	3
4XG7A09147	AX77	Xeon Platinum 8160M 24C 150W 2.1GHz	2666 MHz	Yes	33.0 MB	2	3
7XG7A06257	AX6K	Xeon Platinum 8164 26C 150W 2.0GHz	2666 MHz	No	35.75 MB	2	3
7XG7A06256	AX6J	Xeon Platinum 8170 26C 165W 2.1GHz	2666 MHz	No	35.75 MB	2	3
4XG7A09146	AX76	Xeon Platinum 8170M 26C 165W 2.1GHz	2666 MHz	Yes	35.75 MB	2	3
7XG7A06255	AX6H	Xeon Platinum 8176 28C 165W 2.1GHz	2666 MHz	No	38.5 MB	2	3
4XG7A09145	AX75	Xeon Platinum 8176M 28C 165W 2.1GHz	2666 MHz	Yes	38.5 MB	2	3

* All Gold 5000-level processors, except the 5122, support 2400 MHz memory speeds and have one AVX-512 512-bit FMA units. The 5122 processor supports 2666 MHz and has two FMA units
** L3 cache is 1.375 MB per core except with the processor indicated with ** where the cache size is larger

Memory options

The SN850 uses Lenovo TruDDR4 memory operating at speeds up to 2666 MHz.

TruDDR4 Memory uses the highest quality components that are sourced from Tier 1 DRAM suppliers and only memory that meets the strict requirements of Lenovo is selected. It is compatibility tested and tuned on every ThinkSystem server to maximize performance and reliability. TruDDR4 Memory has a unique signature that is programmed into the DIMM that enables ThinkSystem servers to verify whether the memory that is installed is qualified and supported by Lenovo.

From a service and support standpoint, Lenovo TruDDR4 memory automatically assumes the Lenovo system warranty and Lenovo provides service and support worldwide.

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

The following table lists the memory options that are available for the SN850 server.

Table 14. Memory options

Part number	Feature code	Description	Maximum supported
RDIMMs			
7X77A01301	AUU1	ThinkSystem 8GB TruDDR4 2666 MHz (1Rx8 1.2V) RDIMM	48 (12 per processor)
7X77A01302	AUNB	ThinkSystem 16GB TruDDR4 2666 MHz (1Rx4 1.2V) RDIMM	48 (12 per processor)
7X77A01303	AUNC	ThinkSystem 16GB TruDDR4 2666 MHz (2Rx8 1.2V) RDIMM	48 (12 per processor)
7X77A01304	AUND	ThinkSystem 32GB TruDDR4 2666 MHz (2Rx4 1.2V) RDIMM	48 (12 per processor)
LRDIMMs			
7X77A01305	AUNE	ThinkSystem 64GB TruDDR4 2666 MHz (4Rx4 1.2V) LRDIMM	48 (12 per processor)
3DS RDIMMs			
7X77A01307	AUNF	ThinkSystem 128GB TruDDR4 2666 MHz (8Rx4 1.2V) 3DS RDIMM	48 (12 per processor)

The following rules apply when selecting the memory configuration:

- The server supports RDIMMs, LRDIMMs and 3DS RDIMMs. UDIMMs are not supported.
- Mixing RDIMMs and LRDIMMs is not supported.
- Mixing 3DS RDIMMs with either RDIMMs or LRDIMMs is not supported.
- Mixing x4 and x8 DIMMs is supported.
- For best performance, populate memory DIMMs in quantities of 6 or 12 per processor, so that all memory channels are used.

The following memory protection technologies are supported:

- ECC
- SDDC (for x4-based memory DIMMs; look for "x4" in the DIMM description)
- ADDDC (for x4-based memory DIMMs; Gold and Platinum processors only)
- Memory channel mirroring
- Memory rank sparing

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

If memory rank sparing is used, then a minimum of one quad-rank DIMM or two single-rank or dual-rank DIMMs must be installed per populated channel (the DIMMs do not need to be identical). In rank sparing mode, one rank of a DIMM in each populated channel is reserved as spare memory. The largest rank in the channel will be automatically selected as the spare rank. The amount of memory available to the operating system depends on the number, capacity and rank counts of the DIMMs installed.

Internal storage

The SN850 server has four 2.5-inch hot-swap drive bays that are accessible from the front of the blade server (see Figure 2). Depending on server configuration and installed backplanes, these bays connect to either the integrated 6 Gbps SATA controller, optional Lenovo RAID controllers or directly to PCIe lanes for NVMe drives.

In addition, the SN850 can also support one or two M.2 form factor SSD drives on a separate adapter. The following table lists the supported M.2 adapters (enablement kits). For more information, see the ThinkSystem M.2 Drives and M.2 Adapters product guide: https://lenovopress.com/lp0769-thinksystem-m2-drives-adapters

Virtualization support: The integrated SATA controller 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.

Storage backplane kits, RAID and M.2 upgrades are listed below.

Table 15. Internal storage upgrades

Part number	Feature code	Name and description	Drive types supported	Maximum supported
7M17A03930	AVEA	ThinkSystem SATA Backplane kit for SN850 (includes 2 backplanes)	4x SATA	1
7M17A03931	AVEB	ThinkSystem NVMe/SATA Backplane Kit for SN850 (includes 2 backplanes)	4x NVMe or 4x SATA or combination	1
7M17A03933	AVED	ThinkSystem RAID 930-4i-2GB 4 Drive Adapter Kit for SN850 (includes RAID adapter, 2 backplanes and interposer)	4x SATA or 4x SAS or combination	1
7M17A03932	AVEC	ThinkSystem RAID 530-4i 4 Drive Adapter Kit for SN850 (includes RAID adapter, 2 backplanes and interposer)	4x SATA or 4x SAS or combination	1
7Y37A01092	AUMU	ThinkSystem M.2 Enablement Kit	1x M.2	1
7Y37A01093	AUMV	ThinkSystem M.2 with Mirroring Enablement Kit	2x M.2	1

Supported drives are listed in the Internal drive options section.

Controllers for Internal Storage

In addition to the optional M.2 RAID-1 enabled adapter, the SN850 supports 3 different RAID controllers as shown in the table below.

Table 16. SN850 RAID controllers with features

Feature	Onboard	RAID 530-4i	RAID 930-4i
Adapter type	Software RAID	RAID controller	RAID controller
Part number	None	7M17A03932	7M17A03933
Form factor	Integrated	Adapter	Adapter
Controller chip	Intel PCH (RSTe)	LSI SAS3404	LSI SAS3504
Host interface	Not applicable	PCIe 3.0x8	PCIe 3.0x8
Port interface	6 Gb SATA	12 Gb SAS	12 Gb SAS
Drive interface	SATA	SAS, SATA	SAS, SATA
Drive type	HDD, SSD	HDD, SED, SSD	HDD, SED, SSD
Hot-swap drives	Yes	Yes	Yes
Max devices	4	4	4
RAID levels	0, 1, 10, 5	0, 1, 10, 5	0, 1, 10, 5, 6
JBOD mode	Yes	Yes	Yes
Cache	No	No	2GB (Standard)
CacheVault cache protection	No	No	Yes (Flash)
Performance Accelerator (FastPath)	No	Yes	Yes
SED support	No	Yes	Yes

Both the 530-4i and 930-4i replace the onboard SATA controller in the server and support high-performance RAID to the four internal 2.5-inch drive bays.

The following figure shows the ThinkSystem RAID 530-4i adapter for the SN850 blade server. Note that the plastic frame in the lower right of the adapter is part of the mechanism that attaches the adapter to the server; this adapter does not support a supercapacitor.

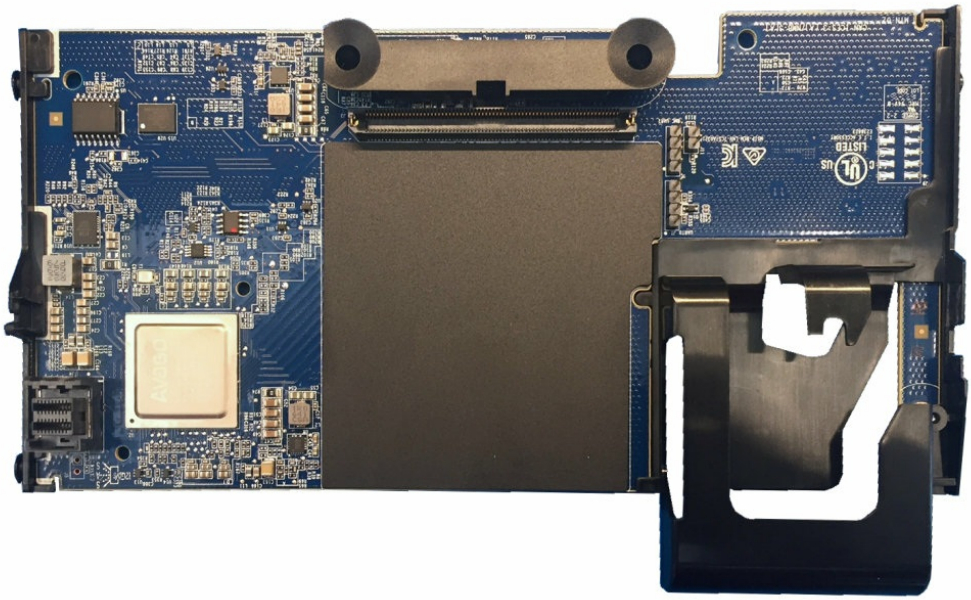

Figure 5. ThinkSystem RAID 530-4i

Both ThinkSystem RAID Adapter kits for SN850 include the following components:

- RAID controller
- Two replacement 2-drive SAS/SATA backplanes
- Interposer cable

Internal drive options

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

- Table 17: 2.5-inch hot-swap 12 Gb SAS HDDs
- Table 18: 2.5-inch hot-swap 6 Gb SAS/SATA HDDs
- Table 19: 2.5-inch hot-swap 12 Gb SAS SSDs
- Table 20: 2.5-inch hot-swap 6 Gb SAS/SATA SSDs
- Table 21: 2.5-inch U.2 NVMe SSDs
- Table 22: M.2 drives

Tip: The use of M.2 drives requires an additional adapter as described in the Internal storage section.

Table 17. 2.5-inch hot-swap 12 Gb SAS HDDs

Part number	Feature	Description	Maximum supported
2.5-inch hot-swap HDDs - 12 Gb SAS 10K			
7XB7A00024	AULY	ThinkSystem 2.5" 300GB 10K SAS 12Gb Hot Swap 512n HDD	4
7XB7A00025	AULZ	ThinkSystem 2.5" 600GB 10K SAS 12Gb Hot Swap 512n HDD	4
7XB7A00026	AUM0	ThinkSystem 2.5" 900GB 10K SAS 12Gb Hot Swap 512n HDD	4
7XB7A00027	AUM1	ThinkSystem 2.5" 1.2TB 10K SAS 12Gb Hot Swap 512n HDD	4
7XB7A00028	AUM2	ThinkSystem 2.5" 1.8TB 10K SAS 12Gb Hot Swap 512e HDD	4
7XB7A00069	B0YS	ThinkSystem 2.5" 2.4TB 10K SAS 12Gb Hot Swap 512e HDD	4
2.5-inch hot-swap HDDs - 12 Gb SAS 15K			
7XB7A00021	AULV	ThinkSystem 2.5" 300GB 15K SAS 12Gb Hot Swap 512n HDD	4
7XB7A00022	AULW	ThinkSystem 2.5" 600GB 15K SAS 12Gb Hot Swap 512n HDD	4
7XB7A00023	AULX	ThinkSystem 2.5" 900GB 15K SAS 12Gb Hot Swap 512e HDD	4
2.5-inch hot-swap HDDs - 12 Gb NL SAS			
7XB7A00034	AUM6	ThinkSystem 2.5" 1TB 7.2K SAS 12Gb Hot Swap 512n HDD	4
7XB7A00035	AUM7	ThinkSystem 2.5" 2TB 7.2K SAS 12Gb Hot Swap 512n HDD	4
2.5-inch hot-swap SED HDDs - 12 Gb SAS 10K			
7XB7A00030	AUM4	ThinkSystem 2.5" 300GB 10K SAS 12Gb Hot Swap 512n HDD SED	4
7XB7A00031	AUM5	ThinkSystem 2.5" 600GB 10K SAS 12Gb Hot Swap 512n HDD SED	4

Table 18. 2.5-inch hot-swap 6 Gb SAS/SATA HDDs

Part number	Feature	Description	Maximum supported
2.5-inch hot-swap HDDs - 6 Gb NL SATA			
7XB7A00036	AUUE	ThinkSystem 2.5" 1TB 7.2K SATA 6Gb Hot Swap 512n HDD	4
7XB7A00037	AUUJ	ThinkSystem 2.5" 2TB 7.2K SATA 6Gb Hot Swap 512e HDD	4

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

Part number	Feature	Description	Maximum supported
2.5-inch hot-swap SSDs - 12 Gb SAS - Enterprise Capacity			
7N47A00123	B116	ThinkSystem 2.5" PM1633a 15.36TB Capacity SAS 12Gb Hot Swap SSD	4
2.5-inch hot-swap SSDs - 12 Gb SAS - Enterprise Performance (10+ DWPD)			
7N47A00124	AUMG	ThinkSystem 2.5" HUSMM32 400GB Performance SAS 12Gb Hot Swap SSD	4
2.5-inch hot-swap SSDs - 12 Gb SAS - Enterprise Mainstream (3-5 DWPD)			
7N47A00117	AUMC	ThinkSystem 2.5" PM1635a 400GB Mainstream SAS 12Gb Hot Swap SSD	4
7N47A00119	AVRG	ThinkSystem 2.5" PM1635a 1.6TB Mainstream SAS 12Gb Hot Swap SSD	4
7N47A00120	AVRJ	ThinkSystem 2.5" PM1635a 3.2TB Mainstream SAS 12Gb Hot Swap SSD	4

Table 20. 2.5-inch hot-swap 6 Gb SAS/SATA SSDs

Part number	Feature	Description	Maximum supported
2.5-inch hot-swap SSDs - 6 Gb SATA - Enterprise Mainstream (3-5 DWPD)			
7SD7A05765	B10W	ThinkSystem 2.5" 5100 240GB Mainstream SATA 6Gb Hot Swap SSD	4
7SD7A05764	B10X	ThinkSystem 2.5" 5100 480GB Mainstream SATA 6Gb Hot Swap SSD	4
7SD7A05763	B10Y	ThinkSystem 2.5" 5100 960GB Mainstream SATA 6Gb Hot Swap SSD	4
7SD7A05762	B10Z	ThinkSystem 2.5" 5100 1.92TB Mainstream SATA 6Gb Hot Swap SSD	4
7SD7A05761	B110	ThinkSystem 2.5" 5100 3.84TB Mainstream SATA 6Gb Hot Swap SSD	4
7SD7A05723	B0ZP	ThinkSystem 2.5" Intel S4600 240GB Mainstream SATA 6Gb Hot Swap SSD	4
7SD7A05722	B0ZQ	ThinkSystem 2.5" Intel S4600 480GB Mainstream SATA 6Gb Hot Swap SSD	4
7SD7A05721	B0ZR	ThinkSystem 2.5" Intel S4600 960GB Mainstream SATA 6Gb Hot Swap SSD	4
7SD7A05720	B0ZS	ThinkSystem 2.5" Intel S4600 1.92TB Mainstream SATA 6Gb Hot Swap SSD	4
2.5-inch hot-swap SSDs - 6 Gb SATA - Enterprise Entry (<3 DWPD)			
4XB7A10195	B34H	ThinkSystem 2.5" PM883 240GB Entry SATA 6Gb Hot Swap SSD	4
4XB7A10196	B34J	ThinkSystem 2.5" PM883 480GB Entry SATA 6Gb Hot Swap SSD	4
4XB7A10197	B34K	ThinkSystem 2.5" PM883 960GB Entry SATA 6Gb Hot Swap SSD	4
4XB7A10198	B34L	ThinkSystem 2.5" PM883 1.92TB Entry SATA 6Gb Hot Swap SSD	4
4XB7A10199	B34M	ThinkSystem 2.5" PM883 3.84TB Entry SATA 6Gb Hot Swap SSD	4
4XB7A10153	B2X2	ThinkSystem 2.5" 5200 480GB Entry SATA 6Gb Hot Swap SSD	4
4XB7A10154	B2X3	ThinkSystem 2.5" 5200 960GB Entry SATA 6Gb Hot Swap SSD	4
4XB7A10155	B2X4	ThinkSystem 2.5" 5200 1.92TB Entry SATA 6Gb Hot Swap SSD	4
4XB7A10156	B2X5	ThinkSystem 2.5" 5200 3.84TB Entry SATA 6Gb Hot Swap SSD	4
4XB7A10157	B2X6	ThinkSystem 2.5" 5200 7.68TB Entry SATA 6Gb Hot Swap SSD	4
7N47A00111	AUUQ	ThinkSystem 2.5" PM863a 240GB Entry SATA 6Gb Hot Swap SSD	4
7N47A00112	AUM9	ThinkSystem 2.5" PM863a 480GB Entry SATA 6Gb Hot Swap SSD	4
7N47A00113	AVCZ	ThinkSystem 2.5" PM863a 960GB Entry SATA 6Gb Hot Swap SSD	4
7N47A00114	AVRC	ThinkSystem 2.5" PM863a 1.92TB Entry SATA 6Gb Hot Swap SSD	4
4XB7A08502	B10N	ThinkSystem 2.5" 5100 480GB Entry SATA 6Gb Hot Swap SSD	4
4XB7A08503	B10P	ThinkSystem 2.5" 5100 960GB Entry SATA 6Gb Hot Swap SSD	4
4XB7A08504	B10Q	ThinkSystem 2.5" 5100 1.92TB Entry SATA 6Gb Hot Swap SSD	4
4XB7A08505	B10R	ThinkSystem 2.5" 5100 3.84TB Entry SATA 6Gb Hot Swap SSD	4
7SD7A05742	B0YY	ThinkSystem 2.5" Intel S4500 240GB Entry SATA 6Gb Hot Swap SSD	4
7SD7A05741	B0YZ	ThinkSystem 2.5" Intel S4500 480GB Entry SATA 6Gb Hot Swap SSD	4
7SD7A05740	B0Z0	ThinkSystem 2.5" Intel S4500 960GB Entry SATA 6Gb Hot Swap SSD	4
7SD7A05739	B0Z1	ThinkSystem 2.5" Intel S4500 1.92TB Entry SATA 6Gb Hot Swap SSD	4
7SD7A05738	B0Z2	ThinkSystem 2.5" Intel S4500 3.84TB Entry SATA 6Gb Hot Swap SSD	4

Table 21. 2.5-inch U.2 NVMe SSDs

Part number	Feature	Description	Maximum supported
2.5-inch SSDs - NVMe - Enterprise Performance (10+ DWPD)			
7XB7A05923	AWG6	ThinkSystem U.2 PX04PMB 800GB Performance NVMe PCIe 3.0 x4 Hot Swap SSD	4
7XB7A05922	AWG7	ThinkSystem U.2 PX04PMB 1.6TB Performance NVMe PCIe 3.0 x4 Hot Swap SSD	4
7N47A00081	AUMJ	ThinkSystem U.2 Intel P4800X 375GB Performance NVMe PCIe 3.0 x4 Hot Swap SSD	4
2.5-inch SSDs - NVMe - Enterprise Mainstream (3-5 DWPD)			
7N47A00095	AUUY	ThinkSystem U.2 PX04PMB 960GB Mainstream NVMe PCIe 3.0 x4 Hot Swap SSD	4
7N47A00096	AUMF	ThinkSystem U.2 PX04PMB 1.92TB Mainstream NVMe PCIe 3.0 x4 Hot Swap SSD	4
7SD7A05772	B11J	ThinkSystem U.2 Intel P4600 1.6TB Mainstream NVMe PCIe 3.0 x4 Hot Swap SSD	4
7SD7A05771	B11K	ThinkSystem U.2 Intel P4600 3.2TB Mainstream NVMe PCIe 3.0 x4 Hot Swap SSD	4
2.5-inch SSDs - NVMe - Enterprise Entry (<3 DWPD)			
4XB7A10175	B34N	ThinkSystem U.2 PM983 1.92TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	4
4XB7A10176	B34P	ThinkSystem U.2 PM983 3.84TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	4
7N47A00984	AUV0	ThinkSystem U.2 PM963 1.92TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	4
7N47A00985	AUUU	ThinkSystem U.2 PM963 3.84TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	4
7SD7A05779	B11C	ThinkSystem U.2 Intel P4500 1.0TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	4
7SD7A05778	B11D	ThinkSystem U.2 Intel P4500 2.0TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	4
7SD7A05777	B11E	ThinkSystem U.2 Intel P4500 4.0TB Entry NVMe PCIe 3.0 x4 Hot Swap SSD	4

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

Table 22. M.2 drives

Part number	Feature	Description	Maximum supported
M.2 SSDs - 6 Gb SATA - Enterprise Entry (<3 DWPD)			
7N47A00129	AUUL	ThinkSystem M.2 CV1 32GB SATA 6Gbps Non-Hot-Swap SSD	2
7N47A00130	AUUV	ThinkSystem M.2 CV3 128GB SATA 6Gbps Non-Hot-Swap SSD	2
7SD7A05703	B11V	ThinkSystem M.2 5100 480GB SATA 6Gbps Non-Hot-Swap SSD	2

Integrated virtualization

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

VMware ESXi is available as a factory installed option for M.2 drives. Feature codes are listed below.

Figure 23. VMware ESXi factory preloads

Part number	Feature code	Description
CTO only	AXFT	VMware ESXi 6.5 (factory installed)
CTO only	AXFS	VMware ESXi 6.0 U3 (factory installed)

Alternatively, you can download supported VMware vSphere hypervisor images from the following web page and load it on the M.2 drives using the instructions provided:

http://www3.lenovo.com/us/en/data-center/solutions/alliances/vmware/#tab-VMware-tab-main-2

Internal tape drives

The server does not support an internal tape drive. However, it can be attached to external tape drives by using Fibre Channel connectivity.

Optical drives

The server does not support an internal optical drive option, however, you can connect an external USB optical drive. See https://datacentersupport.lenovo.com/us/en/documents/pd011281 for information about available external optical drives from Lenovo. Alternatively, use the remote media feature of the XClarity Controller and the Chassis Management Module.

Embedded 10Gb Network Adapter

The SN850 includes an embedded 4-port 10Gb Intel controller built into the system board. Each SN850 model that uses the embedded Intel controller also has the fabric connector installed in I/O connector 3 to provide connectivity to the Flex system chassis midplane. The feature code for the Fabric Connector is AUYN. The location of the fabric connector is shown below.

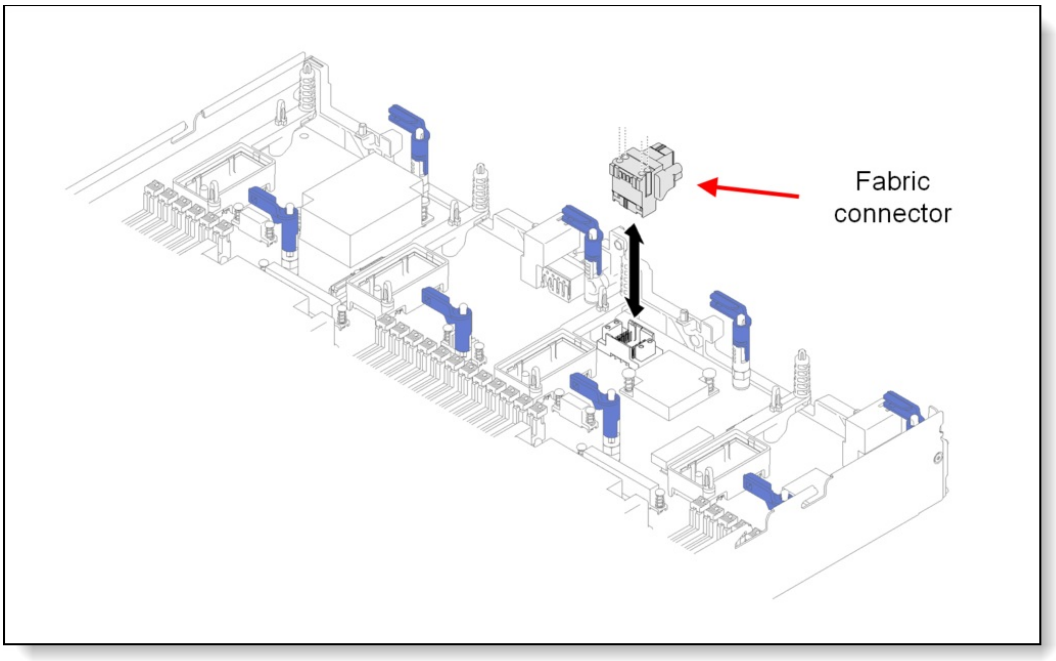

Figure 6. Location of fabric connector in SN850 server

Table 25 and Figure 9 show how the 4 ports of the embedded controller connect through the Fabric Connector to the corresponding I/O module ports. The Fabric Connector can be removed, if required, to allow the installation of an I/O adapter on I/O connector 3.

The embedded 10Gb controller is based on the Intel Ethernet Connection X722 network controller which is part of the Intel C624 "Lewisburg" PCH chipset of the SN850 and other Lenovo ThinkSystem servers.

The Intel X722 controller is optimized for data center, cloud, and mobile applications and includes the following features:

- VXLAN/NVGRE Hardware Offloads: These stateless offloads preserve application performance for overlay networks. With these offloads, it is possible to distribute network traffic across CPU cores. At the same time, the controller offloads LSO, GSO, and checksum from the host software, which reduces CPU overhead.
- Low latency: Intel Ethernet Flow Director delivers hardware-based application steering and Intel Data Direct I/O makes the processor cache the primary destination and source of I/O data rather than main memory.
- Virtualization performance: With Intel Virtualization Technology (VT), the controller delivers outstanding I/O performance in virtualized server environments. The controller reduces I/O bottlenecks by providing intelligent offloads for networking traffic per virtual machine (VM), which enables near-line rate speeds for small packets and supports almost an unlimited amount of isolated traffic flows so that you can scale your cloud environment.
- Next-generation VMDq: The controller supports up to 128 VMDq VMs and offers enhanced Quality of Service (QoS) by providing weighted round-robin servicing for the Tx data. The controller offloads the data-sorting functionality from the hypervisor to the network silicon, which improves data throughput and CPU usage.
- SR-IOV implementation: Provides an implementation of the PCI-SIG standard for I/O Virtualization. The physical configuration of each port is divided into multiple virtual ports. Each virtual port is assigned to an individual VM directly by bypassing the virtual switch in the Hypervisor, which results in near-native performance.
- iWarp RDMA support implements kernel bypass and direct data placement and allows for more efficient high-speed networking by eliminating queues and network related interrupts

- VM load balancing: Provides traffic load balancing (Tx and Rx) across VMs that are bound to the team interface. It also provides fault tolerance if a switch, port, or cable fails or is disconnected.
- Auto-detect (PnP) feature for the LOM adapters, enabling you to change speed (eg from a 1Gb LOM to 10 Gb LOM) and the network interface will automatically reconfigure during the boot process.

Note: The onboard Ethernet controller does not support 10 Mb or 100 Mb Ethernet connections.

I/O expansion options

The SN850 has four I/O expansion connectors for attaching I/O adapter cards. The I/O expansion connectors use a high-density, 216-pin PCIe connection. Installing I/O adapter cards allows the server to connect with I/O modules in the chassis. Each slot has a PCI Express 3.0 x16 host interface and all slots support the same form-factor adapters.

The following figure shows the location of the I/O expansion connectors.

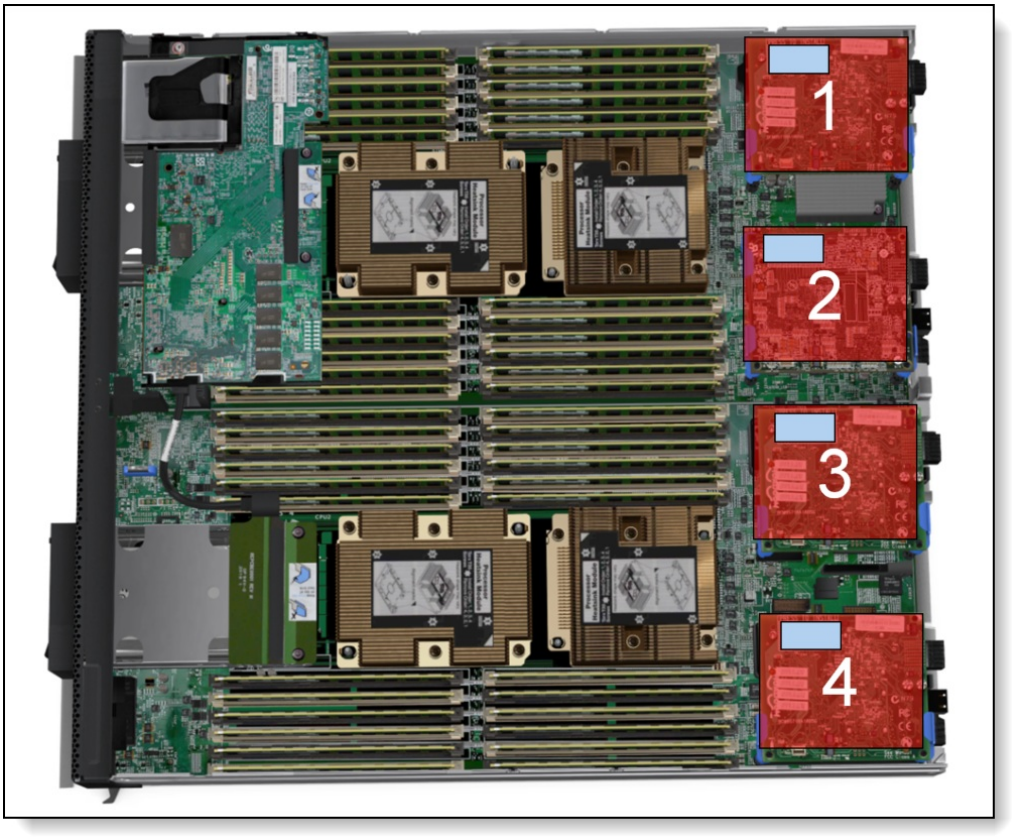

Figure 7. Location of the I/O adapter slots in the SN850 server

All I/O adapters are the same form factor. A compatible switch or pass-through module must be installed in the corresponding I/O bays in the chassis, as indicated in the following table. Installing two switches means that all ports of the adapter are enabled, which improves performance and network availability.

Table 24. Adapter to I/O bay correspondence

I/O adapter slot in the server	Port on the adapter	Corresponding I/O module bay in the chassis
Slot 1	Port 1	Module bay 1
	Port 2	Module bay 2
	Port 3 (for 4-port cards)	Module bay 1
	Port 4 (for 4-port cards)	Module bay 2
Slot 2	Port 1	Module bay 3
	Port 2	Module bay 4
	Port 3 (for 4-port cards)	Module bay 3
	Port 4 (for 4-port cards)	Module bay 4
Slot 3	Port 1	Module bay 1
	Port 2	Module bay 2
	Port 3 (for 4-port cards)	Module bay 1
	Port 4 (for 4-port cards)	Module bay 2
Slot 4	Port 1	Module bay 3
	Port 2	Module bay 4
	Port 3 (for 4-port cards)	Module bay 3
	Port 4 (for 4-port cards)	Module bay 4

For more information about supported switches, see the Flex System Interoperability Guide, which is available at this web page:
http://lenovopress.com/fsig

The following figure shows the location of the I/O module bays in the Flex System Enterprise Chassis.

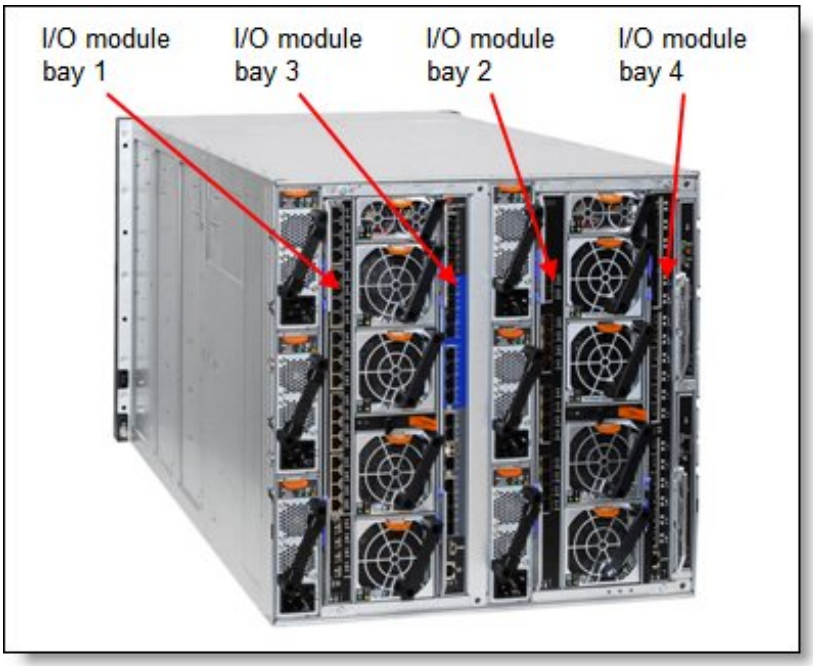

Figure 8. Location of the I/O module bays in the Flex System Enterprise Chassis

The following figure shows how two-port adapters are connected to switches that are installed in the chassis.

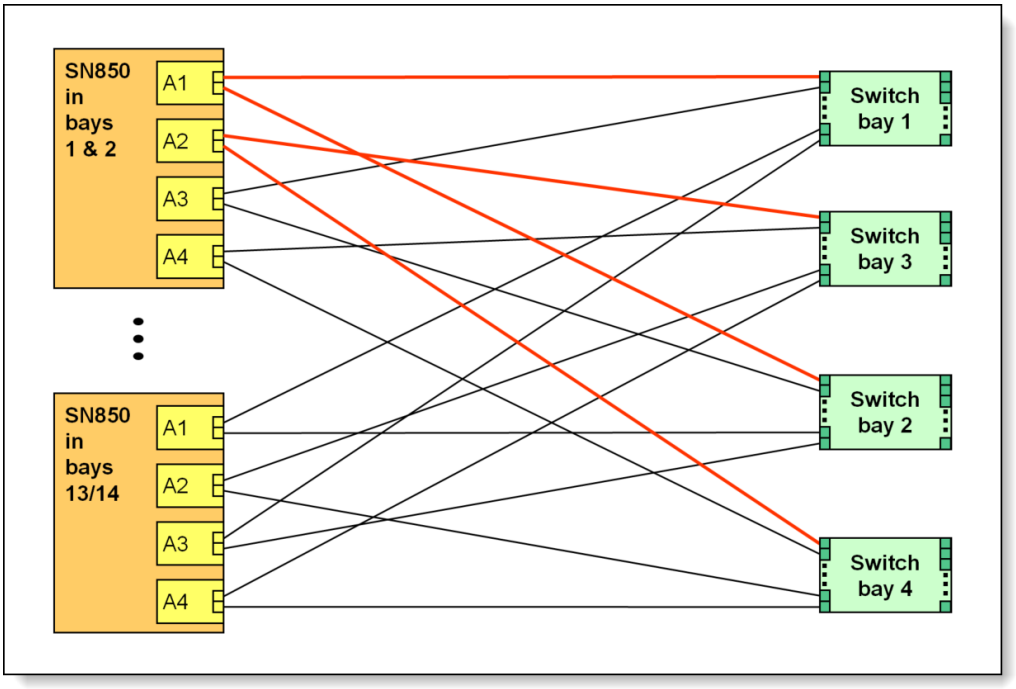

Figure 9. Logical layout of the interconnects between I/O adapters and I/O modules

Network adapters

In addition to the embedded Intel 4-port 10Gb controller (model specific), the SN850 supports other network adapters that can be installed in IO slots.

The following table lists the supported network adapters and upgrades. Adapters can be installed in any slot. However, compatible switches must be installed in the corresponding bays of the chassis.

Table 25. Network adapters

Part number	Feature code	Description	Number of ports
50 Gb Ethernet			
7XC7A05843	B2VT	ThinkSystem QLogic QL45212 Flex 50Gb 2-Port Ethernet Adapter	2
7XC7A05845	B2VV	ThinkSystem QLogic QL45262 Flex 50Gb 2-Port Ethernet Adapter with iSCSI/FCoE	2
40 Gb Ethernet			
7ZT7A00502	AVCU	ThinkSystem Mellanox ConnectX-3 Mezz 40Gb 2-Port Ethernet Adapter	2
25 Gb Ethernet			
7XC7A05844	B2VU	ThinkSystem QLogic QL45214 Flex 25Gb 4-Port Ethernet Adapter	4
10 Gb Ethernet			
01CV780	AU7X	Flex System CN4052S 2-port 10Gb Virtual Fabric Adapter Advanced (with FCoE / iSCSI)	2
00AG540	ATBT	Flex System CN4052S 2-port 10Gb Virtual Fabric Adapter	2
01CV790	AU7Y	Flex System CN4054S 4-port 10Gb Virtual Fabric Adapter Advanced (with FCoE / iSCSI)	4
00AG590	ATBS	Flex System CN4054S 4-port 10Gb Virtual Fabric Adapter	4
InfiniBand			
7ZT7A00508	AUKV	ThinkSystem Mellanox ConnectX-3 Mezz FDR 2-Port InfiniBand Adapter	2

FCoE and iSCSI support: ThinkSystem server adapters do not support Features on Demand, so the CN4052S and CN4054S 2-port 10Gb basic adapters cannot be upgraded to FCoE support. If you need FCoE or iSCSI support use the 01CV780 or 01CV790 adapters.

For more details about these adapters, see the Lenovo Press product guides in the Network adapters category: https://lenovopress.com/servers/blades/nic

For more information about adapter-to-switch compatibility, see the Flex System Interoperability Guide: http://lenovopress.com/fsig

Storage host bus adapters

The following table lists storage Host Bus Adapters (HBAs) that are supported by the SN850. Storage HBAs are supported in all slots, however for CTO orders, the HBAs are installed only in slots 2 and 4.

Table 26. Storage adapters

Part number	Feature code	Description	Number of ports
Fibre Channel			
7ZT7A00520	AVCV	ThinkSystem QLogic QML2692 Mezz 16Gb 2-Port Fibre Channel Adapter	2
7ZT7A00521	AVCW	ThinkSystem Emulex LPm16002B-L Mezz 16Gb 2-Port Fibre Channel Adapter	2
7ZT7A00522	AVCX	ThinkSystem Emulex LPm16004B-L Mezz 16Gb 4-Port Fibre Channel Adapter	4

For details about these adapters, see the Lenovo Press product guides in the Storage adapters category: https://lenovopress.com/servers/blades/hba

For more information about adapter-to-switch compatibility, see the Flex System Interoperability Guide: http://lenovopress.com/fsig

Power supplies

Power to the blade server is derived from the power supplies that are installed in the chassis. There are no server options regarding power supplies.

System Management

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

Local management

As shown in Figure 2, the SN850 front panel includes a USB port, status indicators, a button to enable management via the USB port and a console breakout cable port. The breakout cable (supplied with the chassis) provides serial, video and a USB port for connecting a local console. The USB ports on the breakout cable support keyboard and mouse; storage devices are not supported.

System status with XClarity Mobile

The Lenovo XClarity Mobile (LXCM) app now 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 pressing and holding for 3 seconds the dedicated USB management button on the front of the server.
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)

Light Path Diagnostics

The SN850 includes light path diagnostics. If an environmental condition exceeds a threshold or if a system component fails, XCC lights LEDs inside the server to help you diagnose the problem and find the failing part.

For quick problem determination when you are physically at the server, the server offers the following three-step guided path:

- Illuminate the Fault LED on the front panel.
- Identify the fault in the light path diagnostics panel, as shown in the following figure.
- If a DIMM is faulty, the LED next to it is illuminated.

The SN850 light path diagnostics panel is inside the server near the front panel, as shown in the following figure.

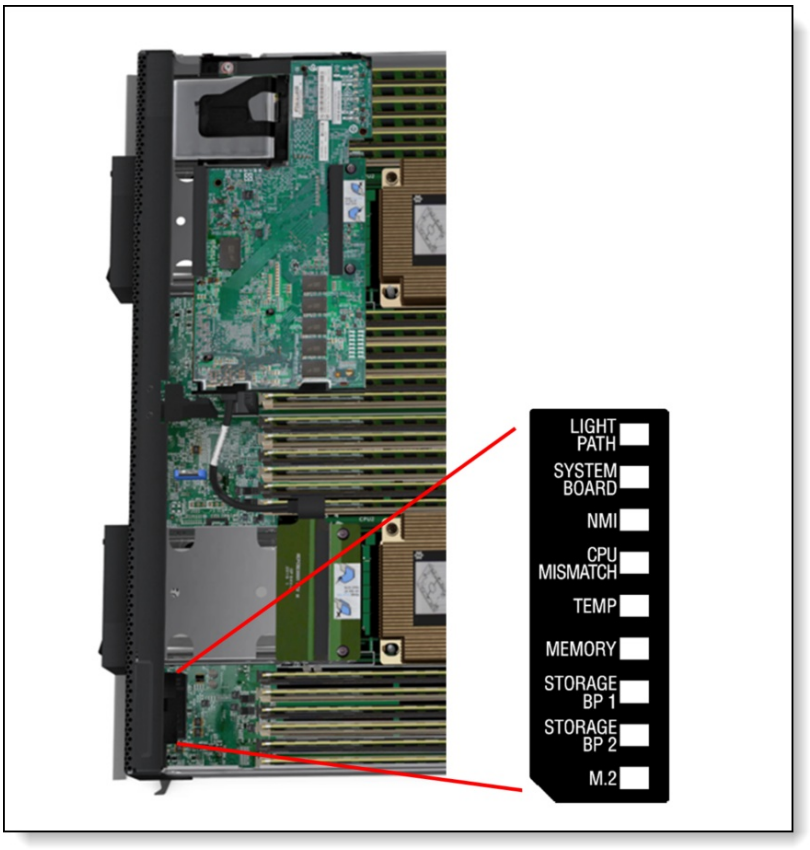

Figure 10. Location of SN850 light path diagnostics panel

To illuminate the light path diagnostics LEDs, power off the server, slide it out of the chassis, and press and hold the power button. The power button doubles as the light path diagnostics reminder button when the server is removed from the chassis.

The meanings of the LEDs in the light path diagnostics panel are listed in the following table.

Table 27. Light path diagnostic panel LEDs

LED	Meaning
LIGHT PATH	The light path diagnostics panel is operational.
SYSTEM BOARD	A system board error is detected.
NMI	A non-maskable interrupt (NMI) occurred.
CPU MISMATCH	The processors are mismatched.
TEMP	An over-temperature condition occurred that was critical enough to shut down the server.
MEMORY	A memory fault occurred. The corresponding DIMM error LEDs on the system board are also lit.
STORAGE BP 1	A hard disk drive backplane error has occurred.
M.2	A M.2 backplane error has occurred.

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

Remote management

Lenovo XClarity Controller (XCC) is an all-new embedded management engine common in every ThinkSystem server.

There are two ways to access the management processor:

- Command-line interface. To access the CLI interface, use SSH to log in to the management processor.
- Web-based interface. To access the web-based interface, point your browser to the IP address for the management processor. The new intuitive interface includes at-a-glance visualizations and simple access to common system actions. The dashboard is shown in the following figure.

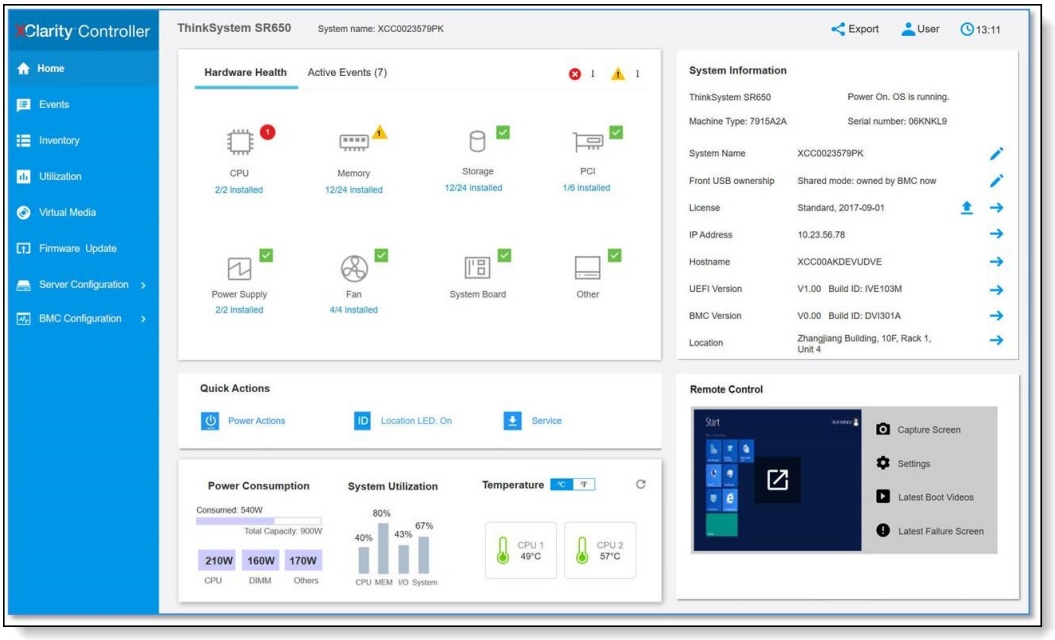

Figure 11. Lenovo XClarity Controller dashboard

Remote server management is provided through industry-standard interfaces:

- Intelligent Platform Management Interface (IPMI) Version 2.0
- Simple Network Management Protocol (SNMP) Version 3 (no SET commands; no SMNP v1)
- Common Information Model (CIM-XML)
- Representational State Transfer (REST) support
- Redfish support (DMTF compliant)
- Web browser - HTML 5-based browser interface (Java and ActiveX not required) using a responsive design (content optimized for device being used - laptop, tablet, phone) with NLS support

Virtual presence (remote control) and virtual media capability also come standard in the SN850. The remote control functions include the following:

- Remotely viewing video with graphics resolutions up to 1600x1200 at 75 Hz with up to 32 bits per pixel, regardless of the system state
- Remotely accessing the server using the keyboard and mouse from a remote client
- Capturing blue-screen errors
- International keyboard mapping support
- LDAP-based authentication
- Remote mounting of ISO and diskette IMG image files as virtual drives that are available for use by the server
- Boot Capture
- Virtual console collaboration - Ability for up to 6 remote users to be log into the remote session simultaneously
- Power capping

Lenovo XClarity Energy Manager

Lenovo XClarity Energy Manager (LXEM) is an agent-less, web-based console that provides power management for ThinkServer, System x and ThinkSystem servers. 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 Enterprise (XCC Enterprise) version. Because the Enterprise version of XCC is standard in the SN850, a license for XClarity Energy Manager is included. For more information on LXEM, please see the User Guide: http://datacentersupport.lenovo.com/us/en/downloads/ds101160

Lenovo XClarity Administrator

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

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

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

Lenovo XClarity Administrator provides full management function to ThinkSystem servers, including the following:

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

For more information about Lenovo XClarity Administrator, including ordering part numbers, see the Lenovo XClarity Administrator Product Guide:
https://lenovopress.com/tips1200-lenovo-xclarity-administrator

Lenovo XClarity Provisioning Manager

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

Lenovo XClarity Provisioning Manager 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 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 setting, 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

Security

The server offers the following security features:

- Administrator and power-on password
- Trusted Platform Module (TPM) supporting both TPM 1.2 and TPM 2.0
- Optional plugin Trusted Cryptographic Module (TCM) or Nationz TPM, available only in China

The plugin modules, available only for China customers, are installed in a dedicated socket on the system board, as shown in Figure 3. Ordering information is shown in the following table.

Table 28. Security features

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

* Available configure-to-order or pre-configured models only; Not available as a field upgrade.

Operating system support

The server supports the following operating systems:

- Microsoft Windows Server 2012 R2
- Microsoft Windows Server 2016
- Microsoft Windows Server, version 1709
- Red Hat Enterprise Linux 6.9 x64
- Red Hat Enterprise Linux 7.3
- Red Hat Enterprise Linux 7.4
- Red Hat Enterprise Linux 7.5
- SUSE Linux Enterprise Server 11 Xen x64 SP4
- SUSE Linux Enterprise Server 11 x64 SP4
- SUSE Linux Enterprise Server 12 SP2
- SUSE Linux Enterprise Server 12 SP3
- SUSE Linux Enterprise Server 12 Xen SP2
- SUSE Linux Enterprise Server 12 Xen SP3
- VMware ESXi 6.0 U3
- VMware ESXi 6.5
- VMware ESXi 6.5 U1
- VMware ESXi 6.5 U2
- VMware ESXi 6.7

For a complete list of supported, certified and tested operating systems, plus additional details and links to relevant web sites, see the Operating System Interoperability Guide:
https://lenovopress.com/osig#servers=sn850-7x15

Physical specifications

The server features the following dimensions and weight (approximate):

- Height: 55.5 mm (2.2 in)
- Depth: 492.7 mm (19.4 in)
- Width: 435.3 mm (17.1 in)
- Maximum weight: 12.3 kg (27.0 lb)

Supported environment

The Lenovo ThinkSystem SN850 server complies with ASHRAE Class A3 specifications. System performance may be impacted when operating temperature is above ASHRAE A3 specification or fan failed condition.

- Air temperature:
  - Operating:
    - ASHRAE Class A2: 10 °C - 35 °C (50 °F - 95 °F); decrease the maximum ambient temperature by 1 °C for every 300 m (984 ft) increase in altitude above 900 m (2,953 ft)
    - ASHRAE Class A3: 5 °C - 40 °C (41 °F - 104 °F); decrease the maximum ambient temperature by 1 °C for every 175 m (574 ft) increase in altitude above 900 m (2,953 ft)
  - Server off: 5°C to 45°C (41°F to 113°F)
  - Shipment/Storage: -40 °C to 60 °C (-40 °F to 140 °F)
- Maximum altitude: 3,050 m (10,000 ft)
- Relative Humidity (non-condensing):
  - Operating:
    - ASHRAE Class A2: 8% - 80%, maximum dew point: 21°C (70°F)
    - ASHRAE Class A3: 8% - 85%, maximum dew point: 24°C (75°F)
  - Shipment/Storage: 8% - 90%

Warranty options

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.

Also available are Lenovo Services warranty maintenance upgrades and post-warranty maintenance agreements, with a predefined scope of services, including service hours, response time, term of service, and service agreement terms and conditions.

Lenovo warranty service upgrade offerings are country-specific. Not all warranty service upgrades are available in every country. For more information about Lenovo warranty service upgrade offerings that are available in your country, go to the Data Center Advisor and Configurator (formerly known as LESC) website http://lesc.lenovo.com, then do the following:

1. In the Customize a Model box in the middle of the page, select the **Services** option in the Customization Option dropdown menu
2. Enter the machine type & model of the system
3. From the search results, you can click either **Deployment Services** or **Support Services** to view the offerings

The following table explains warranty service definitions in more detail.

Table 29. Warranty service definitions

Term	Description
Onsite Service	If a problem with your product cannot be resolved via telephone, a Service Technician will be dispatched to arrive at your location.
Parts Delivered	If a problem with your product cannot be resolved via telephone and a CRU part is required, Lenovo will send a replacement CRU to arrive at your location. If a problem with your product cannot be resolved via telephone and a FRU part is required, a Service Technician will be dispatched to arrive at your location.
Technician Installed Parts	If a problem with your product cannot be resolved via telephone, a Service Technician will be dispatched to arrive at your location.
Hours of coverage	• 9x5: 9 hours/day, 5 days/week, during normal business hours, excluding local public & national holidays • 24x7: 24 hours per day, 7 days per week, 365 days per year.
Response time target	2 hours, 4 hours, or Next Business Day: The time period from when the telephone based troubleshooting is completed and logged, to the delivery of the CRU or arrival of a Service Technician and part at the Customer's location for repair.
Committed Repair	6 hours: The time period between the service request registration in Lenovo's call management system and the restoration of the product to conformance with its specification by a Service Technician.

The following Lenovo warranty service upgrades are available:

- Warranty and maintenance service upgrades:
  - Three, four, or five years of 9x5 or 24x7 service coverage
  - Parts delivered or technician installed parts from next business day to 4 or 2 hours
  - Committed repair service
  - Warranty extension of up to 5 years
  - Post warranty extensions
- Committed Repair Service

  Committed Repair Services enhances the level of Warranty Service Upgrade or Post Warranty/Maintenance Service offering associated with the selected systems. Offerings vary and are available in select countries.

  - Priority handling to meet defined time frames to restore the failing machine to good working condition
  - 24x7x6 committed repair: Service performed 24 hours per day, 7 days per week, within 6 hours
- YourDrive YourData

  Lenovo's YourDrive YourData service 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 with Lenovo warranty upgrades and extensions.

- Microcode Support

  Keeping microcode current helps prevent hardware failures and security exposure. There are two levels of service: analysis of the installed base and analysis and update where required. Offerings vary by country and can be bundled with other warranty upgrades and extensions.

- Enterprise Software Support

  Lenovo Enterprise Server Software Support can help you troubleshoot your entire server software stack. Choose support for server operating systems from Microsoft, Red Hat, SUSE, and VMware; Microsoft server applications; or both operating systems and applications. Support staff can help answer troubleshooting and diagnostic questions, address product compatibility and interoperability issues, isolate causes of problems, report defects to software vendors, and more.

  In addition, you can access hardware “how to” support for ThinkSystem servers. Staff can help resolve hardware problems not covered under warranty, refer you to the right documentation and publications, provide corrective service information for known defects, and transfer you to a hardware support call center if needed.

- Hardware Installation Services

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

Regulatory compliance

The server conforms to the following standards:

- ASHRAE Class A3
- FCC - Verified to comply with Part 15 of the FCC Rules Class A
- Canada ICES-004, issue 3 Class A
- UL/IEC 60950-1
- CSA C22.2 No. 60950-1
- Japan VCCI, Class A
- IEC 60950-1 (CB Certificate and CB Test Report)
- Taiwan BSMI CNS13438, Class A; CNS14336
- Australia/New Zealand AS/NZS CISPR 22, Class A
- Korea KN22, Class A, KN24
- IEC 60950-1 (CB Certificate and CB Test Report)
- CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2,
- EN61000-3-3)
- TUV-GS (EN60950-1/IEC 60950-1, EK1-ITB2000)

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:

http://www.lenovofs.com

Related publications and links

For more information, see the following resources:

- ThinkSystem SN850 server product page
  http://www3.lenovo.com/us/en/p/77XX7FSFS85
- Interactive 3D Tour of the ThinkSystem SN850
  https://lenovopress.com/lp0669-3d-tour-thinksystem-sn850
- ThinkSystem SN850 drivers and support
  http://datacentersupport.lenovo.com/products/servers/thinksystem/sn850/7x15/downloads
- Flex System Information Center
  http://flexsystem.lenovofiles.com/help/index.jsp
- Operating System Interoperability Guide for SN850
  https://lenovopress.com/osig#servers=SN850&support=all
- Flex System Interoperability Guide
  http://lenovopress.com/fsig
- Support Portal for the SN850
  https://datacentersupport.lenovo.com/us/en/

Related product families

Product families related to this document are the following:

- Blade Servers
- ThinkSystem SN850 Server

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