Lenovo ThinkSystem SR780a V3 Server
Product Guide

The Lenovo ThinkSystem SR780a V3 is a powerful 5U server that features two 5th Gen Intel Xeon Scalable processors and eight high-performance GPUs. This server is the ultimate Generative AI server, with advanced GPU-to-GPU communications and high-speed PCIe 5.0 connectivity between the GPUs, CPUs, and networking.

The SR780a V3 uses advanced liquid cooling for the major heat-producing components to help reduce cooling costs as well as allowing a occupying only 5U of rack space instead of 8U. It was designed fully in-house by Lenovo from ground up to provide best-in-class modularity, thermal performance and reliability.

Suggested uses: AI workloads including modeling, training, simulation, rendering, financial tech, and scientific research



Figure 1. Lenovo ThinkSystem SR780a V3

Did you know?

Lenovo makes “AI for All” possible. We deliver AI to data deployed inside your data center and at the edge. We have the industry’s most comprehensive AI portfolio with over 80 products designed for AI workloads. Lenovo partners with over 50 AI Innovator partners globally to deliver turnkey Hybrid Cloud and Edge AI solutions.

Unique in the industry, Lenovo can deliver AI “from pocket to cloud” with servers, workstations, and AI-enabled devices. Whether you are a public cloud provider or building your AI model on-prem, Lenovo provides systems and solutions that scale to meet your needs. We bring AI to your data where and when you need it the most, in a truly hybrid approach: public, private, or personal.

Key features

The SR780a V3 is designed for use in water-cooled data centers that require maximum GPU performance for AI workloads. Outstanding reliability, availability, and serviceability (RAS) and high-efficiency design can improve your business environment and can help save operational costs.

Performance

The following features boost performance, improve scalability and reduce costs:

- Two 5th Gen Intel Xeon Scalable processors
  - Up to 64 cores and 128 threads
  - Core speed of up to 2.7 GHz
  - TDP rating of up to 350 W
- Eight high-performance onboard NVIDIA GPUs with high-speed interconnects
  - Eight NVIDIA H100 700W SXM5 GPUs with 80GB HBM3 GPU memory per GPU
  - Eight NVIDIA H200 700W SXM5 GPUs with 141GB HBM3 GPU memory per GPU
  - Eight NVIDIA B200 1000W SXM5 GPUs with 180GB HBM3e GPU memory per GPU
- Support for DDR5 system memory DIMMs to maximize the performance of the memory subsystem:
  - Up to 32 DDR5 memory DIMMs, 16 DIMMs per processor
  - 8 memory channels per processor (2 DIMMs per channel)
  - DIMMs operate at 5600 MHz with 1 DIMM per channel, or 4400 MHz with 2 DIMMs per channel
  - Using 32x 96GB RDIMMs, the server supports 3TB of system memory
- Up to 11 PCIe 5.0 x16 slots:
  - Front: 8x PCIe 5.0 x16 FHHL slots with GPU Direct support
  - Rear: Up to 3x PCIe 5.0 FHHL slots
- Supports eight NDR 400Gb/s InfiniBand adapters with high-speed GPU Direct connections, installed in front-accessible PCIe 5.0 x16 slots.
- Supports a NVIDIA BlueField-3 DPU adapter to enable software-defined, hardware-accelerated IT infrastructures
- Supports up to 12x PCIe 5.0 NVMe drives (8x front, 4x rear) for high-speed internal storage. The use of NVMe drives maximizes drive I/O performance, in terms of throughput, bandwidth, and latency.
- Supports two M.2 NVMe drives with RAID support using Intel VROC for convenient operating system boot functions.

Availability and serviceability

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

- Designed to run 24 hours a day, 7 days a week
- The server uses ECC memory and supports memory RAS features including Single Device Data Correction (SDDC, also known as Chipkill), Patrol/Demand Scrubbing, Bounded Fault, DRAM Address Command Parity with Replay, DRAM Uncorrected ECC Error Retry, On-die ECC, ECC Error Check and Scrub (ECS), and Post Package Repair.
- The server offers hot-swap drives for greater system uptime.
- Two NVMe M.2 drives with RAID support with Intel VROC which enables the two M.2 drives to be configured as a redundant pair.
- The server has up to eight hot-swap redundant power supplies with N+N redundancy
- Proactive Platform Alerts (including PFA and SMART alerts): Processors, voltage regulators, memory, internal storage (SAS/SATA HDDs and SSDs, NVMe SSDs, M.2 storage, flash storage adapters), fans, power supplies, server ambient and subcomponent temperatures. Alerts can be surfaced through the XClarity Controller to managers such as Lenovo XClarity Administrator, VMware vCenter, and Microsoft System Center. These proactive alerts let you take appropriate actions in advance of possible failure, thereby increasing server uptime and application availability.
- The built-in XClarity Controller 2 continuously monitors system parameters, triggers alerts, and

performs recovery actions in case of failures to minimize downtime.

- Built-in diagnostics in UEFI, using Lenovo XClarity Provisioning Manager, speed up troubleshooting tasks to reduce service time.
- Lenovo XClarity Provisioning Manager supports diagnostics and can save service data to a USB key drive or remote CIFS share folder for troubleshooting and reduce service time.
- Auto restart in the event of a momentary loss of AC power (based on power policy setting in the XClarity Controller service processor)
- An integrated diagnostics panel with LCD display provides more detailed diagnostics by displaying all error messages and VPD data needed for a service call, thereby aiding with problem resolution and system uptime.
- Support for the XClarity Administrator Mobile app running on a supported smartphone and connected to the server through the service-enabled USB port, enables additional local systems management functions.
- Three-year or one-year customer-replaceable unit and onsite limited warranty, 9 x 5 next business day. Optional service upgrades are available.

Manageability and security

Systems management features simplify local and remote management:

- The server includes an XClarity Controller 2 (XCC2) to monitor server availability. Optional upgrade to XCC Platinum to provide remote control (keyboard video mouse) functions, support for the mounting of remote media files, FIPS 140-3 security, enhanced NIST 800-193 support, boot capture, and other management and security features.
- Lenovo XClarity Administrator offers comprehensive hardware management tools that help to increase uptime, reduce costs and improve productivity through advanced server management capabilities.
- UEFI-based Lenovo XClarity Provisioning Manager, accessible from F1 during boot, provides system inventory information, graphical UEFI Setup, platform update function, operating system installation function, and diagnostic functions.
- Support for Lenovo XClarity Energy Manager which captures real-time power and temperature data from the server and provides automated controls to lower energy costs.
- An integrated industry-standard Unified Extensible Firmware Interface (UEFI) enables improved setup, configuration, and updates, and simplifies error handling.
- Dedicated RJ45 port at the rear of the server for remote management using standard management protocols
- Support for industry standard management protocols, IPMI 2.0, SNMP 3.0, Redfish REST API, serial console via IPMI
- An integrated hardware Trusted Platform Module (TPM) supporting TPM 2.0 enables advanced cryptographic functionality, such as digital signatures and remote attestation.
- Administrator and power-on passwords help protect from unauthorized access to the server.
- Intel Execute Disable Bit functionality can prevent certain classes of malicious buffer overflow attacks when combined with a supported operating system.
- Intel Trusted Execution Technology provides enhanced security through hardware-based resistance to malicious software attacks, allowing an application to run in its own isolated space, protected from all other software running on a system.
- Supports Secure Boot to ensure only a digitally signed operating system can be used.
- Industry-standard Advanced Encryption Standard (AES) NI support for faster, stronger encryption.

Energy efficiency

The following energy-efficiency features help save energy, reduce operational costs, and increase energy availability:

- To maximize performance and energy efficiency, the major components are cooled using direct water cooling, with up to 75% of the heat removed using warm water. The server implements four independent water loops:
  - Water loop for the two CPUs
  - Water loop for the four front GPUs
  - Water loop for the four rear GPUs
  - Water loop for the NVLink switches
- Energy-efficient planar components help lower operational costs.
- High-efficiency power supplies with 80 PLUS Titanium certifications
- Optional Lenovo XClarity Energy Manager provides advanced data center power notification and analysis to help achieve lower heat output and reduced cooling needs.

View in Augmented Reality

View the SR780a V3 in augmented reality (AR) using your smartphone or tablet.

Simply follow these steps:

1. Scan the QR code* with the camera app on your phone
2. Point your phone at a flat surface
3. Wait a few seconds for the model to appear

Once the server appears, you can move your phone around it. You can also drag or rotate the server to reposition it.

For more information about the AR viewer, see the article "Introducing the Augmented Reality Viewer for Lenovo Servers", available from https://lenovopress.lenovo.com/lp1952

* If you're viewing this document on your phone or tablet, simply tap the QR code

Components and connectors

The following figure shows the front of the server. The server supports up to 8x hot-swap PCIe 5.0 NVMe drives at the front of the server. The server also offers 8x front-accessible PCIe 5.0 FHHL slots with GPU Direct connections for high-speed networking.

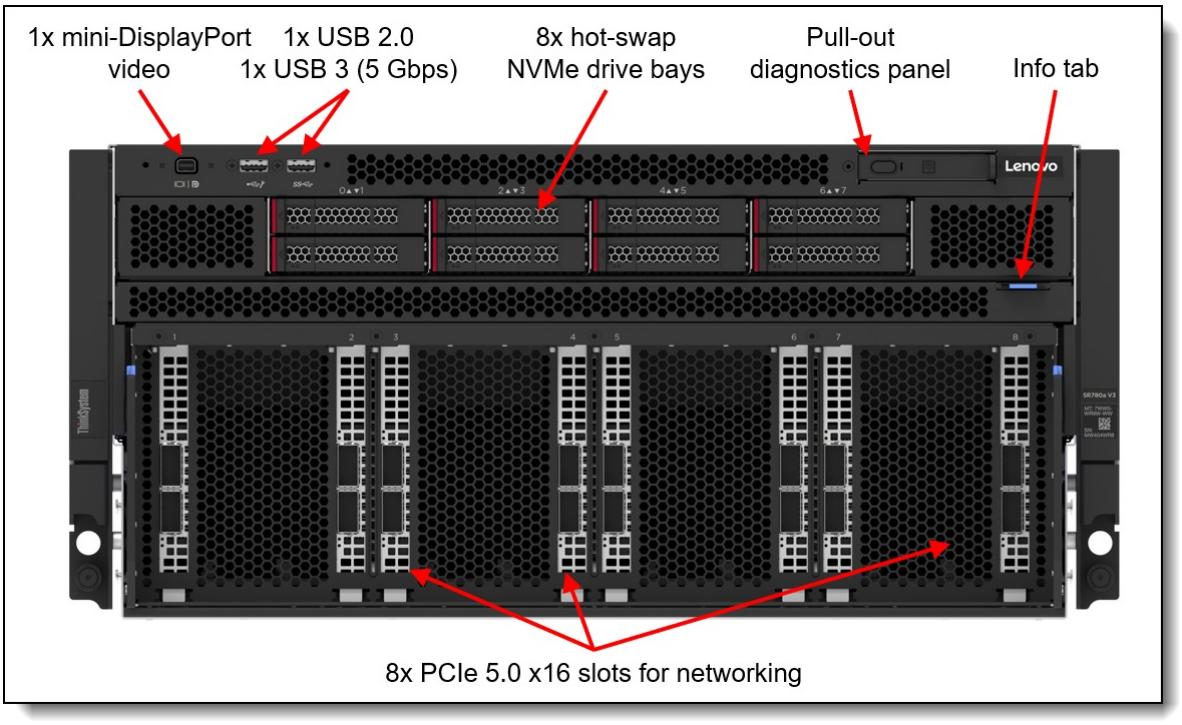


Figure 2. Front view of the ThinkSystem SR780a V3

For details on front-accessible integrated diagnostics panel, see the Local management section.

The following figure shows the components visible from the rear of the server. The server has up to three PCIe 5.0 FHHL slots at the rear.

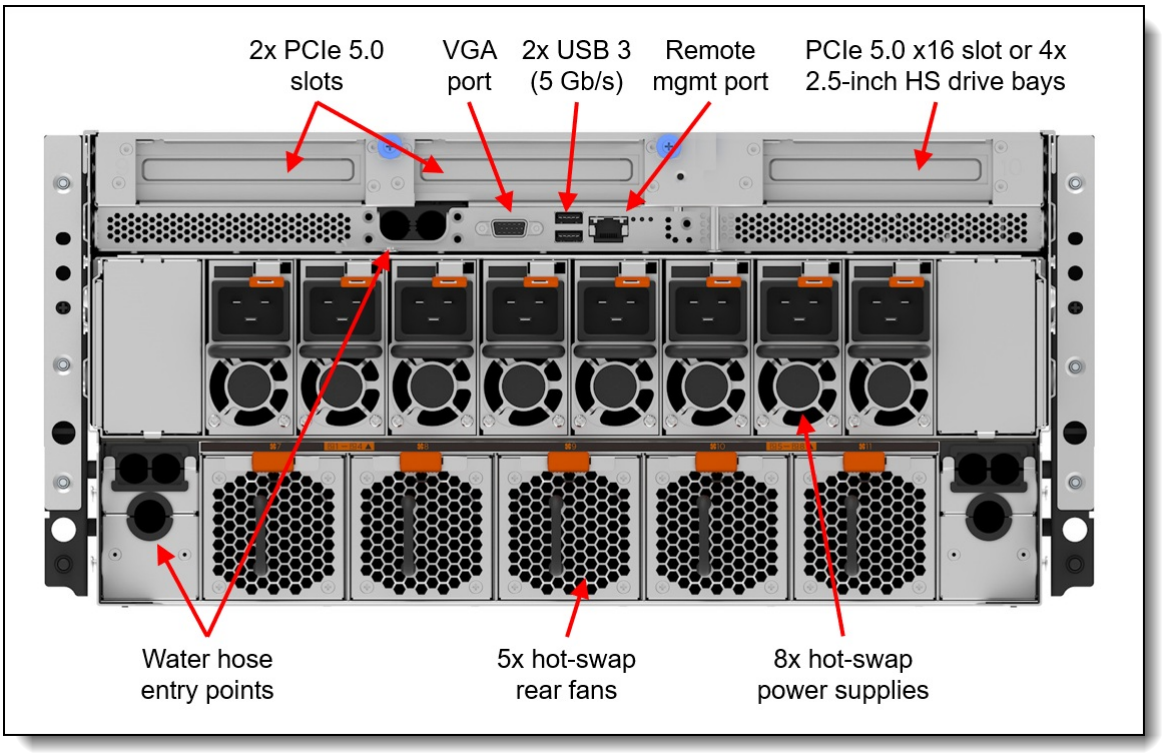


Figure 3. Rear view of the ThinkSystem SR780a V3 (water hoses removed for clarity)

Alternatively, the right-most slot can be replaced with 4x 2.5-inch hot-swap drive bays. The following figure shows the rear of the server with one PCIe 5.0 x16 slot and 4x 2.5-inch hot-swap drive bays.

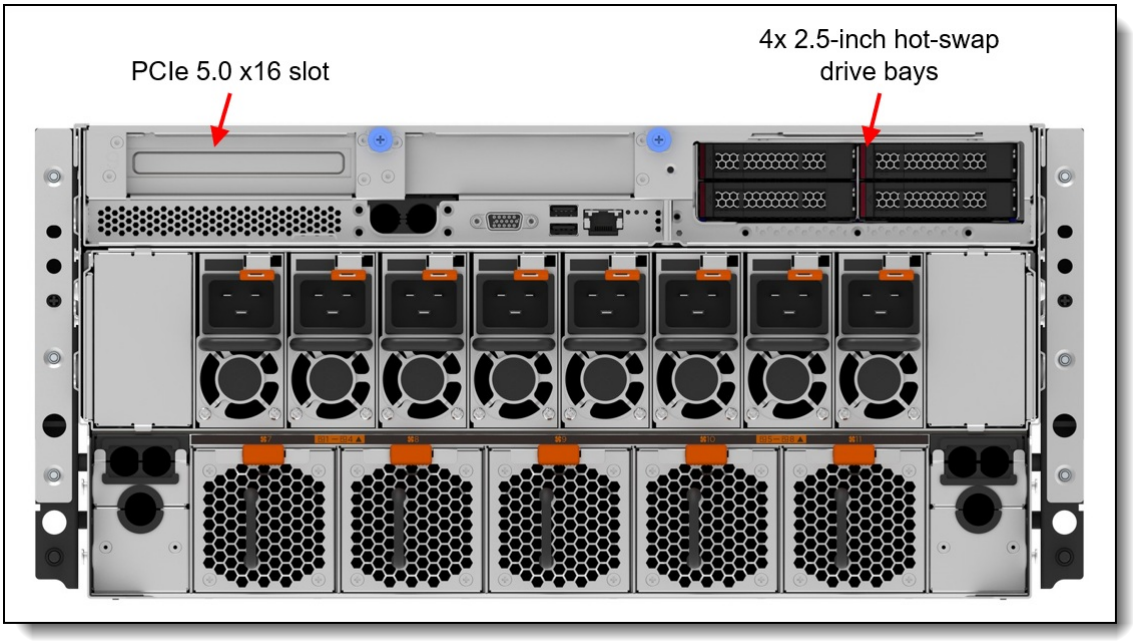


Figure 4. Rear view of the ThinkSystem SR780a V3 with hot-swap drive bays (water hoses removed for clarity)

Standard specifications

The following table lists the standard specifications.

Table 1. Standard specifications

Components	Specification
Machine types	7DJ5 - 3 year warranty
Form factor	5U rack.
Processor	Two 5th Gen Intel Xeon Scalable processors (formerly codenamed "Emerald Rapids"). Supports a processor with 56 cores, core speed of 2.7 GHz, and TDP rating of 350W. Supports PCIe 5.0 for high performance I/O.
Chipset	Intel C741 "Emmitsburg" chipset, part of the platform codenamed "Eagle Stream"
GPUs	Choice of: ● Eight NVIDIA H100 700W SXM5 GPUs with 80GB HBM3 GPU memory per GPU ● Eight NVIDIA H200 700W SXM5 GPUs with 141GB HBM3 GPU memory per GPU ● Eight NVIDIA B200 1000W SXM5 GPUs with 180GB HBM3e GPU memory per GPU
Memory	32 DIMM slots with two processors (16 DIMM slots per processor). Each processor has 8 memory channels, with 2 DIMMs per channel (DPC). Lenovo TruDDR5 RDIMMs are supported. DIMMs operate at up to 5600 MHz at 1 DPC and up to 4400 MHz at 2 DPC.
Memory maximum	Up to 3TB with 32x 96GB RDIMMs
Persistent memory	Not supported.
Memory protection	ECC, SDDC (for x4-based memory DIMMs), ADDDC (for x4-based memory DIMMs excluding 9x4 RDIMMs, requires Platinum or Gold processors), and memory mirroring.
Disk drive bays	Up to 12x 2.5-inch hot-swap drive bays, supporting PCIe 5.0 NVMe drives: ● Front: 8x 2.5-inch hot-swap drive bays ● Rear: 4x 2.5-inch hot-swap drive bays (replaces one of the rear PCIe slots)
OS boot drives	Support for two internal M.2 drives with optional Intel VROC NVMe RAID support for OS boot and data storage functions
Maximum internal storage	174.08 TB using 8x 15.36 TB front NVMe drives + 4x 12.8 TB rear NVMe drives
Storage controller	Onboard NVMe (Non-RAID)
Network interfaces	Supports 8x high-performance network adapters up to 400 Gb/s connectivity with GPU Direct support. Supports a NVIDIA BlueField-3 2-port 200Gb adapter for the User/Control Plane and a Mellanox ConnectX-6 Lx 2-port 10/25GbE adapter for management.
PCI Expansion slots	Up to 11x PCIe 5.0 x16 slots: ● Front: 8x PCIe 5.0 x16 FHHL slots with GPU Direct support ● Rear: Up to 3x PCIe 5.0 FHHL slots (two x16 slots, or two x8 slots + one x16 slot) One of the rear x16 slots can be replaced with 4x 2.5-inch hot-swap drive bays.
Ports	Front: 1x USB 3.2 G1 (5 Gb/s) port, 1x USB 2.0 port (also for XCC local management), 1x Mini DisplayPort video port. Rear: 2x USB 3.2 G1 (5 Gb/s) ports, 1x VGA video port, 1x RJ-45 1GbE systems management port for XCC remote management.

Components	Specification
Cooling	CPUs, GPUs and NVLink switches are cooled using 6th Gen Lenovo Neptune water cooling, implemented using 4x water loops. Up to 75% of the heat generated by the server is removed using warm water. All other components are cooled using fans. 6x internal dual-rotor fans for the compute and storage subsystem, N+1 redundant. 5x rear-mounted dual-rotor fans for the lower components including the front PCIe slots and PCIe switches, N+1 redundant. One fan integrated in each power supply. Front-to-rear airflow.
Power supply	Eight hot-swap redundant AC power supplies with up to N+N redundancy. 80 PLUS Titanium certification. 2600 W AC power supplies requiring 220 V AC supply.
Video	Embedded graphics with 16 MB memory with 2D hardware accelerator, integrated into the XClarity Controller 2 management controller. Two video ports (front Mini DisplayPort and rear VGA); both can be used simultaneously if desired. Maximum resolution of both ports is 1920x1200 at 60Hz.
Hot-swap parts	Drives, power supplies, and fans.
Systems management	Integrated Diagnostics Panel with status LEDs and pull-out LCD display. XClarity Controller 2 (XCC2) embedded management based on the ASPEED AST2600 baseboard management controller (BMC). Dedicated rear Ethernet port for XCC2 remote access for management. XClarity Administrator for centralized infrastructure management, XClarity Integrator plugins, and XClarity Energy Manager centralized server power management. Optional XCC Platinum to enable remote control functions and other features.
Security features	Power-on password, administrator's password, Root of Trust module supporting TPM 2.0 and Platform Firmware Resiliency (PFR).
Operating systems supported	Ubuntu Server, Red Hat Enterprise Linux, VMware ESXi. See the Operating system support section for specifics.
Limited warranty	Three-year or one-year (model dependent) customer-replaceable unit and onsite limited warranty with 9x5 next business day (NBD).
Service and support	Optional service upgrades are available through Lenovo Services: 4-hour or 2-hour response time, 6-hour fix time, 1-year or 2-year warranty extension, software support for Lenovo hardware and some third-party applications.
Dimensions	Width: 447 mm (17.6 in.), height: 219 mm (8.6 in.), depth: 942 mm (37.1 in.). See Physical and electrical specifications for details.
Weight	Maximum: 92 kg (202 lbs)

Models

ThinkSystem SR780a V3 models can be configured by using the Lenovo Data Center Solution Configurator (DCSC).

Topics in this section:

- CTO models
- Base feature codes

CTO models

ThinkSystem SR780a V3 models can be configured by using the Lenovo Data Center Solution Configurator (DCSC).

Preconfigured server models may also be available for the SR780a 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 SR780a V3 server.

Table 2. Base CTO models

Machine Type/Model	Description
7DJ5CTO1WW	ThinkSystem SR780a V3 - 3 Year Warranty with Controlled GPU

Base feature codes

Models of the SR780a V3 are defined based on the GPUs selected, as listed in the following table.

Table 3. Chassis base feature codes

Feature code	Description
C4E1	ThinkSystem SR780a V3 H100 HDX GPU Base
C2F0	ThinkSystem SR780a V3 H200 HDX GPU Base
C695	ThinkSystem SR780a V3 B200 HDX GPU Base

Processors

The SR780a V3 supports fifth-generation Intel Xeon Scalable processors. The server supports two processors. Configurations of one processor are not supported.

Topics in this section:

- Processor options
- Processor features
- Intel On Demand feature licensing
- UEFI operating modes

Processor options

All supported processors have the following characteristics:

- 8 DDR5 memory channels at 2 DIMMs per channel
- Up to 4 UPI links between processors at up to 20 GT/s
- Up to 80 PCIe 5.0 I/O lanes

The following table lists the 5th Gen processors that are currently supported by the SR780a V3.

Table 4. 5th Gen Intel Xeon Processor support

Part number	Feature code	SKU	Description	Quantity supported
CTO only	BYWA	8558P	Intel Xeon Platinum 8558P 48C 350W 2.7GHz Processor	2
CTO only	BYW2	8562Y+	Intel Xeon Platinum 8562Y+ 32C 300W 2.8GHz Processor	2
CTO only	BYWF	8568Y+	Intel Xeon Platinum 8568Y+ 48C 350W 2.3GHz Processor	2
CTO only	BYWG	8570	Intel Xeon Platinum 8570 56C 350W 2.1GHz Processor	2
CTO only	BYWJ	8592+	Intel Xeon Platinum 8592+ 64C 350W 1.9GHz Processor	2

Configuration notes:

- Single-processor configurations are not supported

Processor features

Processors supported by the SR780a V3 introduce new embedded accelerators to add even more processing capability:

- QuickAssist Technology (Intel QAT)

  Help reduce system resource consumption by providing accelerated cryptography, key protection, and data compression with Intel QuickAssist Technology (Intel QAT). By offloading encryption and decryption, this built-in accelerator helps free up processor cores and helps systems serve a larger number of clients.

- Intel Dynamic Load Balancer (Intel DLB)

  Improve the system performance related to handling network data on multi-core Intel Xeon Scalable processors. Intel Dynamic Load Balancer (Intel DLB) enables the efficient distribution of network processing across multiple CPU cores/threads and dynamically distributes network data across multiple CPU cores for processing as the system load varies. Intel DLB also restores the order of networking data packets processed simultaneously on CPU cores.

- Intel Data Streaming Accelerator (Intel DSA)

  Drive high performance for storage, networking, and data-intensive workloads by improving streaming data movement and transformation operations. Intel Data Streaming Accelerator (Intel DSA) is designed to offload the most common data movement tasks that cause overhead in data center-scale deployments. Intel DSA helps speed up data movement across the CPU, memory, and caches, as well as all attached memory, storage, and network devices.

- Intel In-Memory Analytics Accelerator (Intel IAA)

  Run database and analytics workloads faster, with potentially greater power efficiency. Intel In-Memory Analytics Accelerator (Intel IAA) increases query throughput and decreases the memory footprint for in-memory database and big data analytics workloads. Intel IAA is ideal for in-memory databases, open source databases and data stores like RocksDB, Redis, Cassandra, and MySQL.

- Intel Advanced Matrix Extensions (Intel AMX)

  Intel Advanced Matrix Extensions (Intel AMX) is a built-in accelerator in all Silver, Gold, and Platinum processors that significantly improves deep learning training and inference. With Intel AMX, you can fine-tune deep learning models or train small to medium models in just minutes. Intel AMX offers discrete accelerator performance without added hardware and complexity.

The processors also support a separate and encrypted memory space, known as the SGX Enclave, for use by Intel Software Guard Extensions (SGX). The size of the SGX Enclave supported varies by processor model. Intel SGX offers hardware-based memory encryption that isolates specific application code and data in memory. It allows user-level code to allocate private regions of memory (enclaves) which are designed to be protected from processes running at higher privilege levels.

The following table summarizes the key features of all supported 5th Gen processors in the SR780a V3.

Table 5. 5th Gen Intel Xeon Processor features

CPU model	Die	Cores/ threads	Core speed (Base / TB max†)	L3 cache*	Max memory speed	UPI 2.0 links & speed	PCIe lanes	TDP	Accelerators				SGX Enclave Size
									QAT	DLB	DSA	IAA	
8558P	XCC	48 / 96	2.7 / 4.0 GHz	260 MB*	5600 MHz	3 / 20 GT/s	80	350W	1	1	1	1	512GB
8562Y+	MCC	32 / 64	2.8 / 4.1 GHz	60 MB	5600 MHz	3 / 20 GT/s	80	300W	1	1	1	1	512GB
8568Y+	XCC	48 / 96	2.3 / 4.0 GHz	300 MB*	5600 MHz	4 / 20 GT/s	80	350W	1	1	1	1	512GB
8570	XCC	56 / 112	2.1 / 4.0 GHz	300 MB*	5600 MHz	4 / 20 GT/s	80	350W	0	0	1	0	512GB
8592+	XCC	64 / 128	1.9 / 3.9 GHz	320 MB*	5600 MHz	4 / 20 GT/s	80	350W	1	1	1	1	512GB

† The maximum single-core frequency at with the processor is capable of operating
* L3 cache is 1.875 MB per core or larger. Processors with a larger L3 cache per core are marked with an *

Intel On Demand feature licensing

Intel On Demand is a licensing offering from Lenovo for certain 4th Gen and 5th Gen Intel Xeon Scalable processors that implements software-defined silicon (SDSi) features. The licenses allow customers to activate the embedded accelerators and to increase the SGX Enclave size in specific processor models as their workload and business needs change.

The available upgrades are the following:

- Up to 4x QuickAssist Technology (Intel QAT) accelerators
- Up to 4x Intel Dynamic Load Balancer (Intel DLB) accelerators
- Up to 4x Intel Data Streaming Accelerator (Intel DSA) accelerators
- Up to 4x Intel In-Memory Analytics Accelerator (Intel IAA) accelerators
- 512GB SGX Enclave, an encrypted memory space for use by Intel Software Guard Extensions (SGX)

See the Processor features section for a brief description of each accelerator and the SGX Enclave.

The following table lists the ordering information for the licenses. Accelerator licenses are bundled together based on the suitable workloads each would benefit with the additional accelerators.

Licenses can be activated in the factory (CTO orders) using feature codes, or as field upgrades using the option part numbers. With the field upgrades, they allow customers to only activate the accelerators or to increase the SGX Enclave size when their applications can best take advantage of them.

Intel On Demand is licensed on individual processors. For servers with two processors, customers will need a license for each processor and the licenses of the two processors must match. If customers add a second processor as a field upgrade, then you must ensure that the Intel On Demand licenses match the first processor.

Each license enables a certain quantity of embedded accelerators - the total number of accelerators available after activation is listed in the table. For example, Intel On Demand Communications & Storage Suite 4 (4L47A89451), once applied to the server, will result in a total of 4x QAT, 4x DLB and 4x DSA accelerators to be enabled the processor. The number of IAA accelerators is unchanged in this example.

Table 6. Ordering information for Intel on Demand

Part number	Feature code	License bundle	Accelerators and SGX Enclave enabled after the upgrade is applied (NC = No change)				
			QAT	DLB	DSA	IAA	SGX Enclave
4L47A89451	BX9C	Intel On Demand Communications & Storage Suite 4 (CSS4)	4	4	4	NC	No change
4L47A89452	BX9D	Intel On Demand Analytics Suite 4 (AS4)	NC	NC	4	4	No change
4L47A89453	BX9A	Intel On Demand Communications & Storage Suite 2 (CSS2)	2	2	NC	NC	No change
4L47A89454	BX9B	Intel On Demand Analytics Suite 1 (AS1)	NC	NC	NC	1	No change
4L47A89455	BX9E	Intel On Demand SGX 512GB Enclave	NC	NC	NC	NC	512 GB

The following table lists the 5th Gen processors that support Intel on Demand. The table shows the default accelerators and default SGX Enclave size, and it shows (with green highlight) what the total new accelerators and SGX Enclave would be once the Intel On Demand features have been activated.

Table 7. Intel On Demand support by processor - 5th Gen processors

CPU model	Default accelerators and SGX Enclave					Intel On Demand upgrades					New accelerator quantities and SGX Enclave after applying Intel On Demand				
						BX9C	BX9D	BX9A	BX9B	BX9E	Green = additional accelerators/enclave added				
	QAT	DLB	DSA	IAA	SGX Enclv	CSS4 (4xQAT, 4xDLB, 4xDSA)	AS4 (4xDSA, 4xIAA)	CSS2 (2xQAT, 2xDLB)	AS1 (1xIAA)	SGX512	QAT	DLB	DSA	IAA	SGX Enclv
8558P	1	1	1	1	512GB	No	Support	No	No	No	1	1	4	4	512GB
8562Y+	1	1	1	1	512GB	No	No	Support	No	No	2	2	1	1	512GB
8568Y+	1	1	1	1	512GB	Support	Support	No	No	No	4	4	4	4	512GB
8570	0	0	1	0	512GB	No	Support	No	No	No	0	0	4	4	512GB
8592+	1	1	1	1	512GB	Support	Support	No	No	No	4	4	4	4	512GB

Configuration rules:

- Not all processors support Intel On Demand upgrades - see the table for those that do not support Intel On Demand
- Upgrades can be performed in the factory (feature codes) or in the field (part numbers) but not both, and only one time
- Upgrades cannot be removed once activated
- SGX Enclave upgrades are independent of the accelerator upgrades; install either or both as desired
- For processors that support more than one upgrade, all upgrades must be performed at the same time
- Only one of each type of upgrade can be applied to a processor (eg 2x BX9A is not supported; 4x BX9B is not supported)
- The number of accelerators listed for each upgrade is the number of accelerators that will be active one the upgrade is complete (ie the total number, not the number to be added)
- If a server has two processors, then two feature codes must be selected, one for each processor. The upgrades on the two processors must be identical.
- If a one-processor server with Intel On Demand features activated on it has a 2nd processor added as a field upgrade, the 2nd processor must also have the same features activated by purchasing the appropriate part numbers.

UEFI operating modes

The SR780a 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.

UK and EU customers: For compliance with the ERP Lot9 regulation, you should select feature BFYE. For some systems, you may not be able to make a selection, in which case, it will be automatically derived by the configurator.

Table 8. 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 SR780a 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.

For details about these preset modes, and all other performance and power efficiency UEFI settings offered in the SR780a V3, see the paper "Tuning UEFI Settings for Performance and Energy Efficiency on Intel Xeon Scalable Processor-Based ThinkSystem Servers", available from https://lenovopress.lenovo.com/lp1477.

Memory options

The SR780a V3 uses Lenovo TruDDR5 memory operating at up to 5600 MHz. The server supports up to 32 DIMMs with 2 processors. The processors have 8 memory channels and support 2 DIMMs per channel (DPC). The server supports 3TB of memory using 32x 96GB RDIMMs and two processors.

DIMMs operate at the following speeds, up to the memory bus speed of the processor selected:

- 1 DIMM per channel (DPC): Up to 5600 MHz
- 2 DIMMs per channel: Up to 4400 MHz

Lenovo TruDDR5 memory uses the highest quality components that are sourced from Tier 1 DRAM suppliers and only memory that meets the strict requirements of Lenovo is selected. It is compatibility tested and tuned to maximize performance and reliability. From a service and support standpoint, Lenovo TruDDR5 memory automatically assumes the system warranty, and Lenovo provides service and support worldwide.

The following table lists the 5600 MHz memory options that are currently supported by the SR780a V3.

Table 9. 5600 MHz memory options

Part number	Feature code	Description	DRAM technology
10x4 RDIMMs - 5600 MHz			
4X77B00032	C5H9	ThinkSystem 64GB TruDDR5 5600MHz (2Rx4) 10x4 RDIMM	16Gb
4X77B00033	C5HA	ThinkSystem 96GB TruDDR5 5600MHz (2Rx4) 10x4 RDIMM	24Gb
4X77A93887	C4EA	ThinkSystem 128GB TruDDR5 5600MHz (2Rx4) RDIMM	32Gb

For more information on DDR5 memory, see the Lenovo Press paper, *Introduction to DDR5 Memory*, available from https://lenovopress.com/lp1618.

The following rules apply when selecting the memory configuration:

- The SR780a V3 requires 32 DIMMs be installed, 16 DIMMs per processor; other quantities currently not supported
- All memory DIMMs must be identical part numbers; mixing is not supported
- The memory DIMMs are installed 2 DIMMs per channel (DPC) and will operate at 4400 MHz
- Support is planned for 16 DIMMs at 1 DPC (8 DIMMs per processor) for 4Q/2024.

The following memory protection technologies are supported:

- ECC detection/correction
- Bounded Fault detection/correction
- SDDC (for 10x4-based memory DIMMs; look for "x4" in the DIMM description)
- ADDDC (for 10x4-based memory DIMMs, not supported with 9x4 DIMMs)
- Memory mirroring

See the Lenovo Press article, RAS Features of the Lenovo ThinkSystem Intel Servers for more information about memory RAS features.

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

Memory rank sparing is implemented using ADDDC/ADC-SR/ADDDC-MR to provide DRAM-level sparing feature support.

GPU accelerators

A key feature of the SR780a V3 is the integration of an 8-GPU complex in the lower half of the server.

The GPUs supported are listed in the following table.

Table 10. GPU accelerators

Part number	Feature code	Description	Max Qty
CTO only	C4EJ	ThinkSystem NVIDIA HGX H100 80GB 700W 8-GPU Liquid Cooled Board	1
CTO only	C2ER	ThinkSystem NVIDIA HGX H200 141GB 700W 8-GPU Liquid Cooled Board	1
CTO only	C696	ThinkSystem NVIDIA HGX B200 1000W 180GB 8-GPU Liquid-Cooled Board	1

Configuration rules:

- The choice of GPU must match the Base feature code as listed in the Models section

Table 11. GPU specifications

Specification	NVIDIA H100	NVIDIA H200	NVIDIA B200
Form Factor	SXM5	SXM5	SXM5
FP64	34 teraFLOPS	34 teraFLOPS	40 teraFLOPS
FP64 Tensor Core	67 teraFLOPS	67 teraFLOPS	40 teraFLOPS
FP32	67 teraFLOPS	67 teraFLOPS	80 teraFLOPS
TF32 Tensor Core	495 / 989 teraFLOPS*	495 / 989 teraFLOPS*	1.1 / 2.2 petaFLOPS*
BFLOAT16 Tensor	990 / 1,979 teraFLOPS*	990 / 1,979 teraFLOPS*	2.25 / 4.5 petaFLOPS*
FP16 Tensor Core	990 / 1,979 teraFLOPS*	990 / 1,979 teraFLOPS*	2.25 / 4.5 petaFLOPS*
FP8 Tensor Core	1,979 / 3,958 teraFLOPS*	1,979 / 3,958 teraFLOPS*	4.5 / 9 petaFLOPS*
INT8 Tensor Core	1,979 / 3,958 teraOPS*	1,979 / 3,958 teraOPS*	4.5 / 9 petaOPS*
GPU Memory	80 GB HBM3	141 GB HBM3e	180 GB HBM3e
GPU Memory Bandwidth	3.35 TB/s	4.8 TB/s	8 TB/s
Total Graphics Power (TGP) or Continuous Electrical Design Point (EDPc)	700W	700W	1000W
Multi-Instance GPUs	Up to 7 MIGs @ 10 GB	Up to 7 MIGs @ 18 GB	Up to 7 MIGs @ 23 GB
Interconnect	NVLink: 900 GB/s PCIe Gen5: 128 GB/s	NVLink: 900 GB/s PCIe Gen5: 128 GB/s	NVLink: 900 GB/s PCIe Gen5: 128 GB/s

* Without / with structural sparsity enabled

Internal storage

The SR780a V3 has 8x 2.5-inch hot-swap drive bays at the front of the server, using a single 8-bay drive backplane. Optionally, the server also supports 4x 2.5-inch hot-swap drive bays at the rear of the server in the place of one of the rear PCIe slots. All drive bays support NVMe drives, each with a PCIe 5.0 x4 host interface.

The server also supports one or two M.2 drives, installed in dedicated slots on the system board of the server.

In this section:

- Front drive backplane
- Rear drive backplane
- M.2 drives

Front drive backplane

The server has 8x 2.5-inch NVMe drive bays at the front of the server. See the Components and connectors section for the location of the drives. Ordering information for the backplane is shown in the following table.

NVMe only: Even though the backplane name indicates it is an AnyBay backplane, the SR780a V3 only supports NVMe drives.

Table 12. Front drive backplanes

Part number	Feature code	Description	Quantity supported
CTO only	C2ET	ThinkSystem 8x2.5" PCIe Gen5 AnyBay Storage Backplane	1

Configuration notes:

- Front drives are numbered 0 to 7, rear drives are numbered 8 to 11

Rear drive backplane

The server optionally supports 4x 2.5-inch NVMe drive bays at the rear of the server. See the Components and connectors section for the location of the drives. Ordering information for the rear drive backplane is shown in the following table.

NVMe only: Even though the backplane name indicates it is an AnyBay backplane, the SR780a V3 only supports NVMe drives.

Table 13. Rear drive backplane

Part number	Feature code	Description	Quantity supported
CTO only	C4E3	ThinkSystem SR780a V3 4x2.5" PCIe Gen5 AnyBay Rear Storage Backplane	1
CTO only	C4HL	ThinkSystem SR780a V3 Rear Storage Assembly	1

Configuration notes:

- The rear drive backplane is mutually exclusive with slot 10. See I/O expansion for supported drive and slot combinations.
- No field upgrades are offered
- Front drives are numbered 0 to 7, rear drives are numbered 8 to 11

M.2 drives

The SR780a V3 supports one or two M.2 22110 form-factor NVMe drives for use as an operating system boot solution or as additional storage. The two M.2 drives installed into a connector located on the system board. The two drives are installed one above the other.

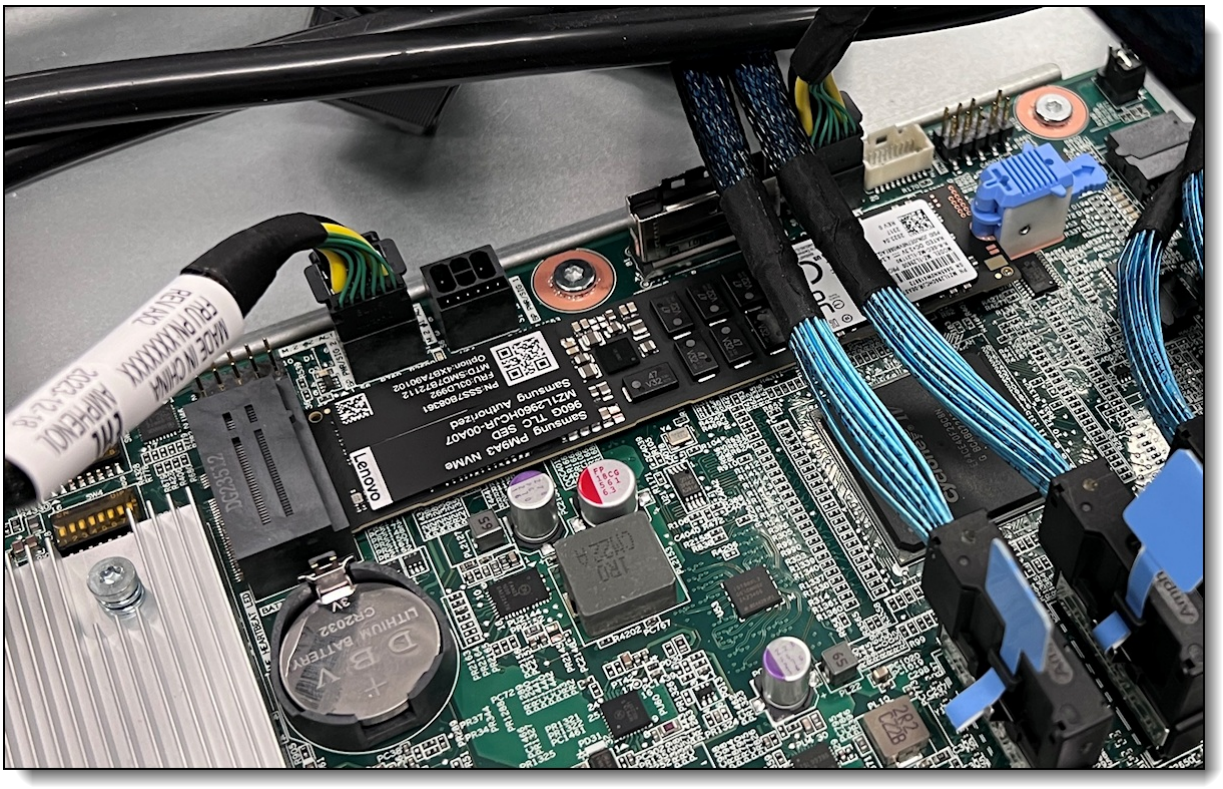


Figure 5. M.2 connector on the SR780a V3 (two M.2 drives)

Configuration rules:

- The M.2 drives must be 22110 form factor; other M.2 form factors are not supported
- Only NMVe drives are supported; SATA drives are not supported
- RAID is optional and implemented using Intel VROC; ordering information is listed in the following table.

Table 14. M.2 RAID support

Part number	Feature code	Description
CTO only	BS7M	Intel VROC (VMD NVMe RAID) Standard for M.2

Supported drives are listed in the Internal drive options section.

Controllers for internal storage

The drives of the SR780a V3 are connected to an integrated NVMe storage controller:

- Onboard PCIe 5.0 x4 NVMe ports

The onboard NVMe support has the following features:

- Controller integrated into the processor
- Each drive has PCIe 5.0 x4 host interface
- Supports JBOD
- No support for RAID

Note: The SR780a V3 does not support VROC RAID on the 2.5-inch drives.

Internal drive options

The following tables list the drive options for internal storage of the server. Drives are supported in the front or rear drive bays as indicated in the tables.

2.5-inch hot-swap drives:

- 2.5-inch hot-swap PCIe 5.0 NVMe SSDs
- 2.5-inch hot-swap PCIe 4.0 NVMe SSDs

M.2 drives:

- M.2 PCIe 4.0 NVMe drives

SED support: The tables include a column to indicate which drives support SED encryption. The encryption functionality can be disabled if needed. Note: Not all SED-enabled drives have "SED" in the description.

Table 15. 2.5-inch hot-swap PCIe 5.0 NVMe SSDs

Part number	Feature code	Description	SED support	Max Qty	Location
2.5-inch SSDs - U.3 PCIe 5.0 NVMe - Mixed Use/Mainstream (3-5 DWPD)					
4XB7A94637	C4D4	ThinkSystem 2.5" U.3 PM1745 1.6TB Mixed Use NVMe PCIe 5.0 x4 HS SSD	Support	8	Front bays
4XB7A94638	C1F1	ThinkSystem 2.5" U.3 PM1745 3.2TB Mixed Use NVMe PCIe 5.0 x4 HS SSD	Support	8	Front bays
CTO only	C4HM	ThinkSystem 2.5" U.3 PM1745 6.4TB Mixed Use NVMe PCIe 5.0 x4 HS SSD	Support	8	Front bays
CTO only	C4HN	ThinkSystem 2.5" U.3 PM1745 12.8TB Mixed Use NVMe PCIe 5.0 x4 HS SSD	Support	8	Front bays
2.5-inch SSDs - U.3 PCIe 5.0 NVMe - Read Intensive/Entry (<3 DWPD)					
4XB7A82366	BTPZ	ThinkSystem 2.5" U.3 PM1743 1.92TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	Support	8	Front bays
4XB7A82367	BTQ0	ThinkSystem 2.5" U.3 PM1743 3.84TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	Support	8	Front bays
4XB7A82368	BTQ1	ThinkSystem 2.5" U.3 PM1743 7.68TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	Support	8	Front bays
4XB7A82369	BTQ2	ThinkSystem 2.5" U.3 PM1743 15.36TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	Support	8	Front bays

Table 16. 2.5-inch hot-swap PCIe 4.0 NVMe SSDs

Part number	Feature code	Description	SED support	Max Qty	Location
2.5-inch SSDs - U.3 PCIe 4.0 NVMe - Mixed Use/Mainstream (3-5 DWPD)					
4XB7A84056	BRG0	ThinkSystem 2.5" U.3 7450 MAX 12.8TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Support	4	Rear bays

Table 17. M.2 PCIe 4.0 NVMe drives

Part number	Feature code	Description	SED support	Max Qty
M.2 SSDs - PCIe 4.0 NVMe - Read Intensive/Entry (<3 DWPD)				
4XB7A90102	BXMH	ThinkSystem M.2 PM9A3 960GB Read Intensive NVMe PCIe 4.0 x4 NHS SSD	Support	2
4XB7A90103	BXMG	ThinkSystem M.2 PM9A3 1.92TB Read Intensive NVMe PCIe 4.0 x4 NHS SSD	Support	2

Optical drives

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

Table 18. External optical drive

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

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

I/O expansion

The SR780a V3 supports a total of up to 11x PCIe slots, 8x at the front and 3x at the rear.

Front slots are designed for high-speed GPU Direct networking to maximize performance of the GPUs. The front slots connect to the processors and to the GPUs via a PCIe switch. All front slots are standard.

- Slot 1: PCIe 5.0 x16 FHHL, connected to CPU 1
- Slot 2: PCIe 5.0 x16 FHHL, connected to CPU 1
- Slot 3: PCIe 5.0 x16 FHHL, connected to CPU 1
- Slot 4: PCIe 5.0 x16 FHHL, connected to CPU 1
- Slot 5: PCIe 5.0 x16 FHHL, connected to CPU 2
- Slot 6: PCIe 5.0 x16 FHHL, connected to CPU 2
- Slot 7: PCIe 5.0 x16 FHHL, connected to CPU 2
- Slot 8: PCIe 5.0 x16 FHHL, connected to CPU 2

Rear PCIe slots are as follows:

- Slot 9: PCIe 5.0 FHHL, connected to CPU 2
  - If slot 11 is not present, slot 9 is PCIe 5.0 x16
  - If slot 11 is present, slot 9 is PCIe 5.0 x8
- Slot 10, PCIe 5.0 x16 FHHL, connected to CPU 1 (mutually exclusive with rear drive bays)
- Slot 11, PCIe 5.0 x8 FHHL, connected to CPU 2

The front and rear slots are shown in the following figure.

Tip: The SR780a V3 does not have an OCP slot.

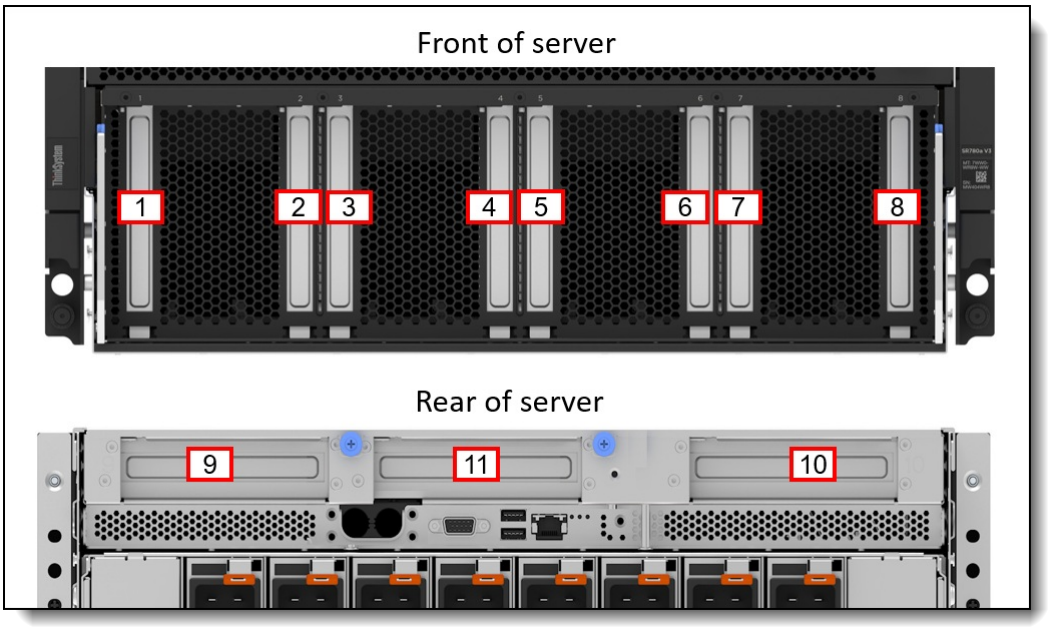


Figure 6. SR780a V3 slots

Tip: Slot numbering for other PCIe devices are as follows:

- M.2 drives: Slots 33 and 34
- GPUs: Slots 17 - 24

The following table list the combinations of slots and drive bays that are supported at the rear of the server. Rear drive bays are described in the Internal storage section.

Table 19. Supported rear slot/drive bay combinations (listed with feature codes)

Slot 9 (left) (CPU 2)	Slot 11 (middle) (CPU 2)	Slot 10 (right) (CPU 1)
Empty	Empty	Empty
PCIe x16 (C2EX)	Empty	Empty
PCIe x16 (C2EX)	Empty	PCIe x16 (C2EX)
PCIe x16 (C2EX)	Empty	4x 2.5-inch drives (C4E3)
PCIe x8 (C70Q)	PCIe x8 (C70R)	PCIe x16 (C2EX)
PCIe x8 (C70Q)	PCIe x8 (C70R)	4x 2.5-inch drives (C4E3)
PCIe x8 (C70Q)	PCIe x8 (C70R)	Empty
Empty	Empty	4x 2.5-inch drives (C4E3)

Ordering information for the rear slots is listed in the following table.

Table 20. Rear slot ordering information

Part number	Feature code	Description	Slots	Max qty
Riser selections				
CTO only	C2EX	ThinkSystem SR780a V3 x16 PCIe Rear IO Riser	9, 10	2
CTO only	C70Q	ThinkSystem SR780a V3 x8 PCIe Rear IO Riser	9	1
CTO only	C70R	ThinkSystem SR780a V3 x8 PCIe Rear Middle IO Riser	11	1

Network adapters

The SR780a V3 supports the network adapters listed in the following table.

Table 21. Network adapters

Part number	Feature code	Description	Quantities	Slots
Network adapters for GPU Direct				
4XC7A08297	BK1J	ThinkSystem Broadcom 57508 100GbE QSFP56 2-Port PCIe 4 Ethernet Adapter	4 or 8	Front 1-8
4XC7A95572	C4GA	ThinkSystem Broadcom 57608 2x200/1x400GbE QSFP112 PCIe Ethernet Adapter	4 or 8	Front 1-8
4XC7A81883	BQBN	ThinkSystem NVIDIA ConnectX-7 NDR200/200GbE QSFP112 2-port PCIe Gen5 x16 Adapter	4 or 8	Front 1-8
4XC7A93809	C0Q4	ThinkSystem NVIDIA BlueField-3 B3140H VPI QSFP112 1P 400G PCIe Gen5 x16 Adapter	4 or 8	Front 1-8
4XC7A80289	BQ1N	ThinkSystem NVIDIA ConnectX-7 NDR OSFP400 1-Port PCIe Gen5 x16 InfiniBand Adapter	4 or 8	Front 1-8
4XC7A95508	C51C	ThinkSystem NVIDIA ConnectX-7 NDR400 OSFP 1-port PCIe Gen5 VPI Adapter	4 or 8	Front 1-8
Network adapter for User/Control Plane				
4XC7A87752	BVBG	ThinkSystem NVIDIA BlueField-3 B3220 VPI QSFP112 2P 200G PCIe Gen5 x16 Adapter	1	Rear 9,10
Network adapter for Management				
4XC7A62580	BE4U	ThinkSystem Mellanox ConnectX-6 Lx 10/25GbE SFP28 2-port PCIe Ethernet Adapter	3	Rear 9,10,11
4XC7A08248	B8PP	ThinkSystem Mellanox ConnectX-6 Dx 100GbE QSFP56 2-port PCIe Ethernet Adapter	2	Rear 9,10

Configuration rules:

- For the adapters in the front PCIe slots, quantities of 4 or 8 are supported and must all be identical; mixing not supported

Fibre Channel host bus adapters

Fibre Channel adapters may be supported under Special Bid (CORE) conditions. Contact your Lenovo sales representative for details.

Cooling

To maximize performance and energy efficiency, the major components of the server are cooled using direct water cooling, with up to 75% of the heat removed using warm water. The server implements four independent water loops:

- Water loop for the two CPUs
- Water loop for the four front GPUs
- Water loop for the four rear GPUs
- Water loop for the NVLink switches

For the remaining components, the server uses high-performance cooling fans. Airflow is front to back.

- 6x internal hot-swap 60mm dual-rotor fans to cool the storage and compute shuttle components (drives, memory, rear slots)
  - Fans are N+1 rotor redundant
  - Fans operate at a peak of 21K RPM
- 5x rear hot-swap 80mm dual-rotor fans to cool the GPUs, drive bays, and PCIe switches
  - Fans are N+1 rotor redundant
  - Fans operate at a peak of 21K RPM

Each of the eight power supplies also has an integrated dual-rotor fan. Fans operate at a peak of 28.5K RPM.

Table 22. Fan ordering information

Part number	Feature code	Description	Quantity standard
CTO only	C2RE	ThinkSystem Internal Fans	6
CTO only	C2RF	ThinkSystem Rear Fans	5

Power supplies

The SR780a V3 supports eight redundant hot-swap power supplies. All are standard. The power supplies are N+N redundant.

Ordering information is listed in the following table.

Table 23. Power supply options

Part number	Feature code	Description	Connector	Qty	110V AC	220V AC
AC input power - 80 PLUS Titanium efficiency						
CTO only	C4HK	ThinkSystem 2600W 230V Titanium Hot-Swap Gen2 Power Supply v4	C19	8	No	Yes
CTO only	C0UD	ThinkSystem 3200W 230V Titanium CRPS Premium Hot-Swap Power Supply	C19	8	No	Yes

For power specifications, see the Physical and electrical specifications section.

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

Power supply LEDs

The supported hot-swap power supplies have the following LEDs:

- Power input LED:
  - Green: The power supply is connected to the AC power source
  - Off: The power supply is disconnected from the AC power source or a power problem has occurred
- Power output LED:
  - Green: The server is on and the power supply is working normally
  - Blinking green: The power supply is in Zero-output/Standby mode (see below)
  - Off: The server is powered off, or the power supply is not working properly
- Power supply error LED:
  - Off: The power supply is working normally
  - Yellow: The power supply has failed

Zero-output mode: When Zero-output mode (also known as Standby mode or Cold Redundancy mode) is configured in XCC and the server power load is sufficiently low, one of the installed power supplies enters into the Standby state while the other one delivers entire load. When the power load increases, the standby power supply will switch to Active state to provide sufficient power to the server. Zero-output mode can be enabled or disabled in the XClarity Controller web interface, Server Configuration > Power Policy. If you select Disable, then both power supplies will be in the Active state.

Power cords (C19 connectors)

Line cords and rack power cables with C19 connectors can be ordered as listed in the following table.

Table 24. Power cords (C19 connectors)

Part number	Feature code	Description
Rack cables		
4L67A86677	BPJ0	0.5m, 16A/100-250V, C19 to IEC 320-C20 Rack Power Cable
4L67A86678	B4L0	1.0m, 16A/100-250V, C19 to IEC 320-C20 Rack Power Cable
4L67A86679	B4L1	1.5m, 16A/100-250V, C19 to IEC 320-C20 Rack Power Cable
4L67A86680	B4L2	2.0m, 16A/100-250V, C19 to IEC 320-C20 Rack Power Cable
39Y7916	6252	2.5m, 16A/100-240V, C19 to IEC 320-C20 Rack Power Cable
4L67A86681	B4L3	4.3m, 16A/100-250V, C19 to IEC 320-C20 Rack Power Cable
Line cords		
40K9777	6276	4.3m, 220-240V, C19 to IRAM 2073 (Argentina) Line cord
40K9773	6284	4.3m, 220-240V, C19 to AS/NZS 3112 (Aus/NZ) Line cord
40K9775	6277	4.3m, 250V, C19 to NBR 14136 (Brazil) Line Cord
40K9774	6288	4.3m, 220-240V, C19 to GB2099.1 (China) Line cord
40K9769	6283	4.3m, 16A/230V, C19 to IEC 309-P+N+G (Den/Sws) Line Cord
40K9766	6279	4.3m, 220-240V, C19 to CEE7-VII (European) Line cord
40K9776	6285	4.3m, 220-240V, C19 to IS6538 (India) Line cord
40K9771	6282	4.3m, 220-240V, C19 to SI 32 (Israel) Line cord
40K9768	6281	4.3m, 220-240V, C19 to CEI 23-16 (Italy) Line cord
40K9770	6280	4.3m, 220-240V, C19 to SABS 164 (South Africa) Line cord
41Y9231	6289	4.3m, 15A/250V, C19 to KSC 8305 (S. Korea) Line Cord
81Y2391	6549	4.3m, 16A/230V, C19 to SEV 1011 (Sws) Line Cord
41Y9230	6287	4.3m, 16A/250V, C19 to CNS 10917-3 (Taiwan) Line Cord

Part number	Feature code	Description
40K9767	6278	4.3m, 220-240V, C19 to BS 1363/A w/13A fuse (UK) Line Cord
40K9772	6275	4.3m, 16A/208V, C19 to NEMA L6-20P (US) Line Cord
00D7197	A1NV	4.3m, 15A/250V, C19 to NEMA 6-15P (US) Line Cord

Systems management

The SR780a V3 contains 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.

Topics in this section:

- System I/O Board (DC-SCM)
- Local management
- 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
- Lenovo Capacity Planner

System I/O Board (DC-SCM)

The SR780a V3 implements a separate System I/O Board, also known as the DC-SCM (Data Center Secure Control Module or DCSCM), that connects to the CPU board in the Compute shuttle. The location of the System I/O Board and Compute shuttle is shown in the Components and connectors section. The System I/O Board contains all the connectors visible at the rear of the server as shown in the following figure.

Note: The NMI (non-maskable interrupt) button is not accessible from the rear of the server. Lenovo recommends using the NMI function that is part of the XCC user interfaces instead.

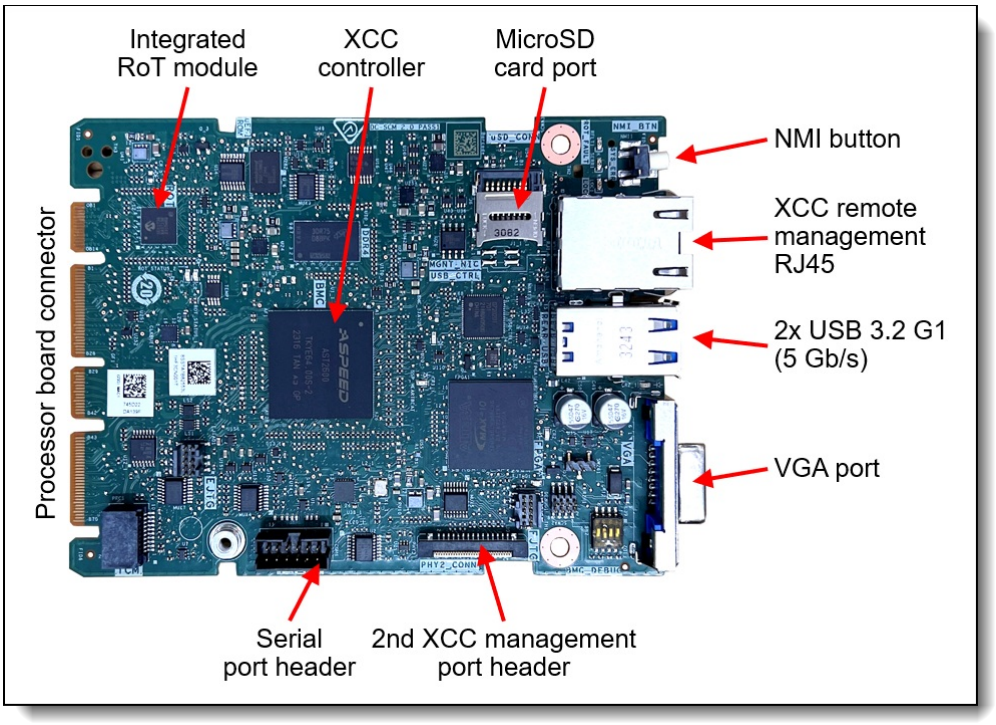


Figure 7. System I/O Board

The board also has the following components:

- XClarity Controller 2, implemented using the ASPEED AST2600 baseboard management controller (BMC).
- Root of Trust (RoT) module - implements Platform Firmware Resiliency (PFR) hardware Root of Trust (RoT) which enables the server to be NIST SP800-193 compliant. For more details about PFR, see the Security section.
- MicroSD card port to enable the use of a MicroSD card for additional storage for use with the XCC2 controller. XCC2 can use the storage as a Remote Disc on Card (RDOC) device (up to 4GB of storage). It can also be used to store firmware updates (including N-1 firmware history) for ease of deployment.

  Tip: Without a MicroSD card installed, the XCC controller will have 100MB of available RDOC storage.

Ordering information for the supported Micro SD cards are listed in the MicroSD for XCC local storage section.

Local management

The SR780a V3 offers a front operator panel with key LED status indicators on the front, as shown in the following figure. The server also includes an integrated LCD diagnostics panel

Tip: The network LED is not used because the SR780a V3 does not include an OCP slot. The LED will blink at a constant 1 Hz rate.

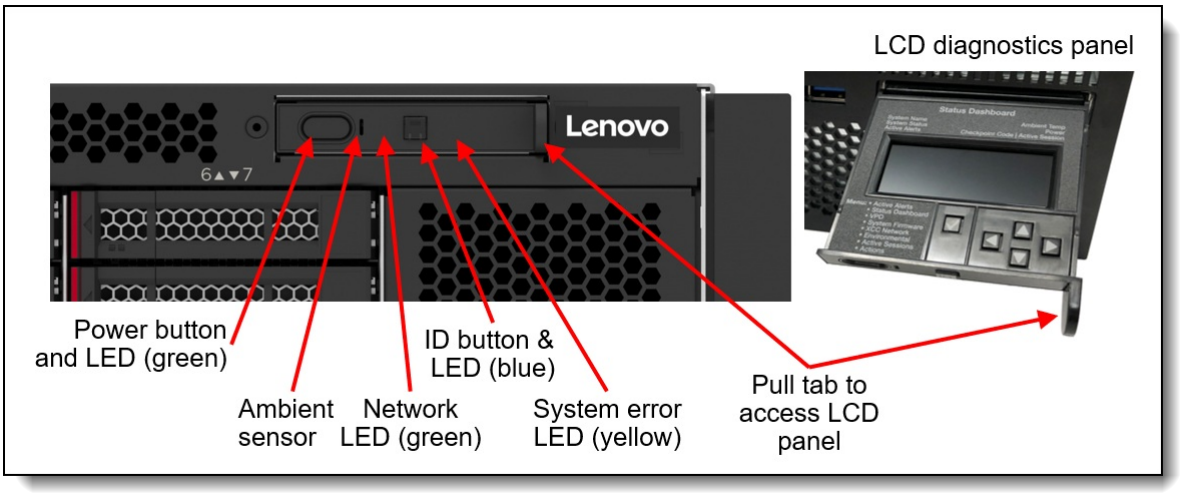


Figure 8. Front operator panel with pull-out diagnostics panel

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

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

Light path diagnostics

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

- Each memory DIMM
- Each drive bay
- Each power supply

Information pull-out tab

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

System status with XClarity Mobile

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

The steps to connect the mobile device are as follows:

1. Enable USB Management on the server, by holding down the ID button for 3 seconds (or pressing the dedicated USB management button if one is present)
2. Connect the mobile device via a USB cable to the server's USB port with the management symbol 

3. In iOS or Android settings, enable Personal Hotspot or USB Tethering
4. Launch the Lenovo XClarity Mobile app

Once connected you can see the following information:

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

Remote management

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

Remote server management is provided through industry-standard interfaces:

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

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

Table 25. IPMI-over-LAN settings

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

XCC2 Platinum

In the SR780a V3, XCC2 has the Platinum level of features built into the server. Compared to the XCC functions of ThinkSystem V2 and earlier systems, Platinum offers the same features as Enterprise and Advanced levels in ThinkSystem V2, plus additional features.

DCSC tip: Even though XCC2 Platinum is a standard feature of the SR780a V3, it does *not* appear in the list of feature codes for the configuration in DCSC.

XCC2 Platinum includes 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 includes 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

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 26. 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. 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 SR780a V3. The software can be downloaded and used at no charge to discover and monitor the SR780a 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 27. 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 140-3 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 version. Because the Platinum version of XCC is standard in the SR780a V3, a license for XClarity Energy Manager is included.

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/

Lenovo Capacity Planner

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

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

Security

Topics in this section:

- Security features
- Platform Firmware Resiliency - Lenovo ThinkShield
- Security standards

Security features

The SR780a V3 server offers the following electronic security features:

- Secure Boot function of the Intel processor
- Support for Platform Firmware Resiliency (PFR) hardware Root of Trust (RoT) - see the Platform Firmware Resiliency section
- Firmware signature processes compliant with FIPS and NIST requirements
- System Guard (part of XCC Platinum) - Proactive monitoring of hardware inventory for unexpected component changes
- Administrator and power-on password
- Integrated Trusted Platform Module (TPM) supporting TPM 2.0
- Self-encrypting drives (SEDs) with support for enterprise key managers

The server is NIST SP 800-147B compliant.

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 SR780a 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 SR780a 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 28. 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.

Security standards

The SR780a V3 supports the following security standards and capabilities:

- **Industry Standard Security Capabilities**
  - Intel CPU Enablement
    - AES-NI (Advanced Encryption Standard New Instructions)
    - CBnT (Converged Boot Guard and Trusted Execution Technology)
    - CET (Control flow Enforcement Technology)
    - Hardware-based side channel attack resilience enhancements
    - MKTME/TME (Multi-Key Total Memory Encryption)
    - SGX (Software Guard eXtensions)
    - SGX-TEM (Trusted Environment Mode)
    - TDX (Trust Domain Extensions)
    - TXT (Trusted eXecution Technology)
    - VT (Virtualization Technology)
    - XD (eXecute Disable)
  - 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
  - FIPS 140-3 (in progress) validated cryptography for XCC
  - CNSA Suite 1.0 Quantum-resistant cryptography for XCC
  - Lenovo System Guard

  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)
  - 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

Rack installation

The SR780a V3 installs in a standard 19-inch rack cabinet. It is supported installed on a stab-in slide rail kit as listed in the following table. Also included in all orders are four detachable lift handles to aid with the installation of the server into the rack cabinet.

Table 29. Rack installation options

Part number	Feature	Description
CTO only	C2P8	ThinkSystem SR780a V3 Rail Kit
CTO only	AUMY	ThinkSystem Lift Handles

The figure below shows the rail kit and lift handles attached to the server.

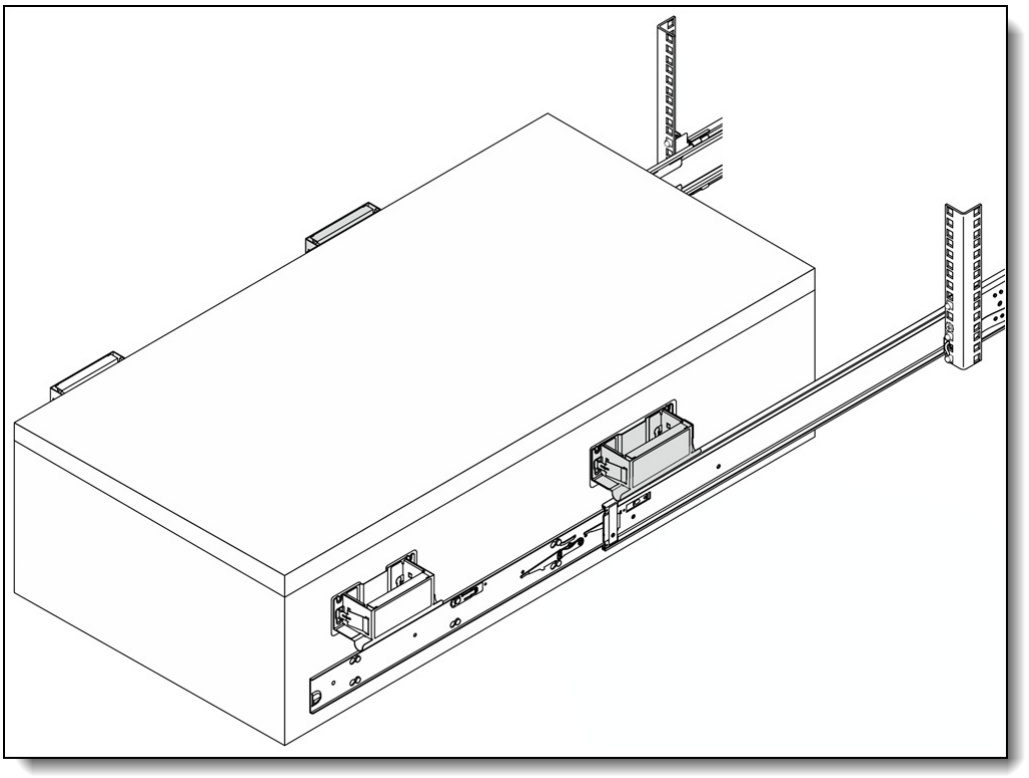


Figure 9. ThinkSystem SR780a V3 Rail Kit

Configuration rules:

- A maximum of 8x SR780a V3 servers can be installed in a single 42U rack cabinet
- A maximum of 9x SR780a V3 servers can be installed in a single 48U rack cabinet
- The rail kit is included in CTO orders by default, but can be removed if desired
- A cable management arm (CMA) is not supported

The following table summarizes the rail kit features and specifications.

Table 30. Rail kit specifications

Feature	ThinkSystem SR780a V3 Rail Kit
Option part number	None (Feature C2P8)
Rail type	Full-out slide rail (ball bearing)
Toolless installation	Yes
CMA support	No
Supported rack type	Four-post IBM and Lenovo standard rack, complying with the IEC standard
In-rack server maintenance	Yes
1U PDU support	Yes
0U PDU support	Limited support
Supported mounting holes	Square (9.2 to 9.5mm), round (diameter 7.1 mm), or threaded (tool kit is required)
Thickness of mounting flanges	2.0 to 3.3 mm (0.08 to 0.13 inches)
Supported distance between front and rear mounting flanges	644 to 861mm (26 to 34 inches)
Rail length†	917 mm (36.1 inches)

† 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.

Material lift

Considering the weight of the trays in the server, an onsite material lift is required to allow service by a single person. If you do not already have a material lift available, Lenovo offers the Genie Lift GL-8 material lift as configurable option to the rack cabinets. Ordering information is listed in the following table.

Note: If neither the Genie Lift GL-8 nor the ServerLift SL-350x is available onsite when onsite service is required, the customer will be responsible for getting the system to a suitable work surface (with access to power) prior to service technician arrival and returning the system to the rack when service is complete prior to service technician departure.

Table 31. Genie Lift GL-8 ordering information

Part number	Description
4XF7B02087	Genie Lift GL-8 (Standard Base) Material Lift Option Kit • Genie GL-8 material lift • Load platform • Foot-release brake

Operating system support

The SR780a V3 supports the following operating systems:

- Red Hat Enterprise Linux 9.4
- Ubuntu 22.04 LTS 64-bit
- Ubuntu 24.04 LTS 64-bit
- VMware ESXi 8.0 U3

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.lenovo.com/osig#servers=sr780a-v3-7dj5

Physical and electrical specifications

The SR780a V3 has the following overall physical dimensions, excluding components that extend outside the standard chassis, such as EIA flanges, front security bezel (if any), and power supply handles:

- Width: 447 mm (17.6 inches)
- Height: 219 mm (8.6 inches)
- Depth: 942 mm (37.1 inches)

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

Table 32. Detailed dimensions

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

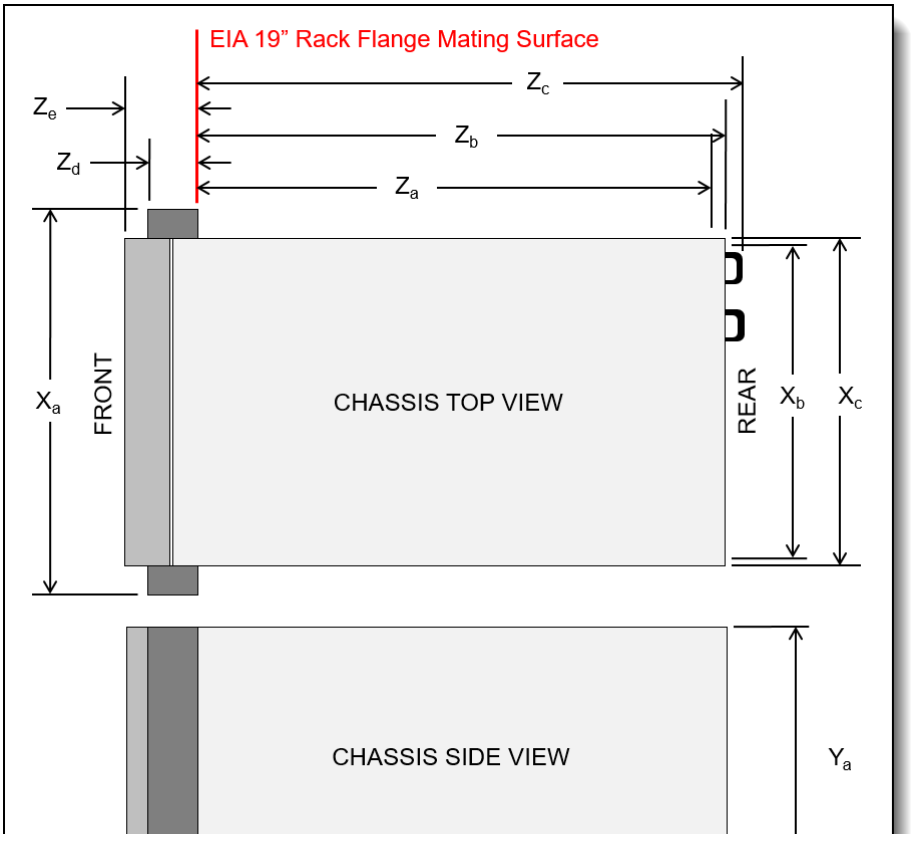




Figure 10. Enclosure dimensions

The shipping (cardboard packaging) dimensions of the SR780a V3 are as follows:

- Width: 600 mm (23.6 inches)
- Height: 740 mm (29.1 inches)
- Depth: 1200 mm (47.2 inches)

The server has the following weight:

- With H100/H200 GPUs: 90 kg (199 lb)
- With B200 GPUs: 92 kg (202 lb)

Electrical specifications for AC input power supplies:

- Input voltage:
  - 200 to 240 (nominal) Vac, 50 Hz or 60 Hz
  - 180 to 300 Vdc (China only)
- Inlet current: See the following table.

Table 33. Maximum inlet current

Part number	Description	100V AC	200V AC	220V AC	240V DC
4P57A72667	ThinkSystem 2600W 230V Titanium Hot-Swap Gen2 Power Supply v4	No support	13.2A	13A	11.9A

Operating environment

The SR780a V3 server complies with ASHRAE Class A2 specifications. System performance may be impacted when operating temperature is outside AHSARE A2 specification.

Topics in this section:

- Ambient temperature requirements
- Temperature and humidity
- Water requirements
- Particulate contamination

Ambient temperature requirements

Adjust ambient temperature when specific components are installed.

- Keep the ambient temperature to 30°C or lower when ThinkSystem NVIDIA BlueField-3 B3220 VPI QSFP112 2P 200G PCIe Gen5 x16 Adapter is installed in PCIe riser 1 (PCIe slot 9).

For information, see the Environmental specifications and Thermal rules sections in the product documentation:
https://pubs.lenovo.com/sr780a-v3/server_specifications_environmental
https://pubs.lenovo.com/sr780a-v3/thermal_rules

Temperature and humidity

The server is supported in the following environment:

- Air temperature:
  - Operating:
    - ASHRAE Class A2: 10°C to 35°C (50°F to 95°F); the maximum ambient temperature decreases by 1°C for every 300 m (984 ft) increase in altitude above 900 m (2,953 ft).
  - 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%

Water requirements

The server uses warm water to extract the heat from key components. The water requirements are as follows:

- Water temperature:
  - ASHRAE class W45: up to 45°C (113°F) inlet temperature to the rack
- With H100/H200 GPUs:
  - Maximum pressure: 4.4 bars
  - Minimum water flow rate: 10 liters per minute per chassis
- With B200 GPUs:
  - Maximum pressure: 4.4 bars
  - Minimum water flow rate: 12 liters per minute per chassis

The water required to initially fill the system side cooling loop must be reasonably clean, bacteria-free water (<100 CFU/ml) such as de-mineralized water, reverse osmosis water, de-ionized water, or distilled water. The water must be filtered with an in-line 50 micron filter (approximately 288 mesh). The water must be treated with anti-biological and anti-corrosion measures. The water quality must be maintained over the lifetime of the system to receive warranty and support on the water-bearing components.

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/

Water infrastructure

The SR780a V3 uses direct-attach water cooling to cool the major components of the server. The following water infrastructure components are required in the rack cabinet and data center:

- Supported 42U or 48U rack cabinet

  The 42U or 48U Heavy Duty Rack Cabinet (machine types 7D6D or 7D6E) are supported. Two 0U mounting points are required for the water manifolds, at the rear of the rack cabinet, one either side.

  For information about the 42U and 48U Heavy Duty Rack Cabinets, see the product guide: https://lenovopress.lenovo.com/lp1498-lenovo-heavy-duty-rack-cabinets

- 38-port water manifold (machine type 7DE6), installed in the rear of the rack cabinet

  The manifold provides quick-disconnect couplings that each server in the rack are connected to. Ordering information is in the table below.

- Coolant distribution unit (CDU), either in-rack or in-row

  In-rack CDUs are installed at the bottom of the rack cabinet. The supported in-rack CDU is as follows:

  - Lenovo Neptune DWC RM100 In-Rack CDU; see the RM100 In-Rack Coolant Distribution Unit section

  In-row CDUs are separate cabinets that are typically installed at the end of a row of rack cabinets. Examples of suitable in-row CDUs include (but not limited to):

  - CoolTera FS400 310KW CDU
  - Vertiv Liebert XDU60 60KW CDU

- Hose kit to connect to the CDU to the manifold

  Ordering information is in the table below.

The following figure shows the water manifolds installed in a rack cabinet.

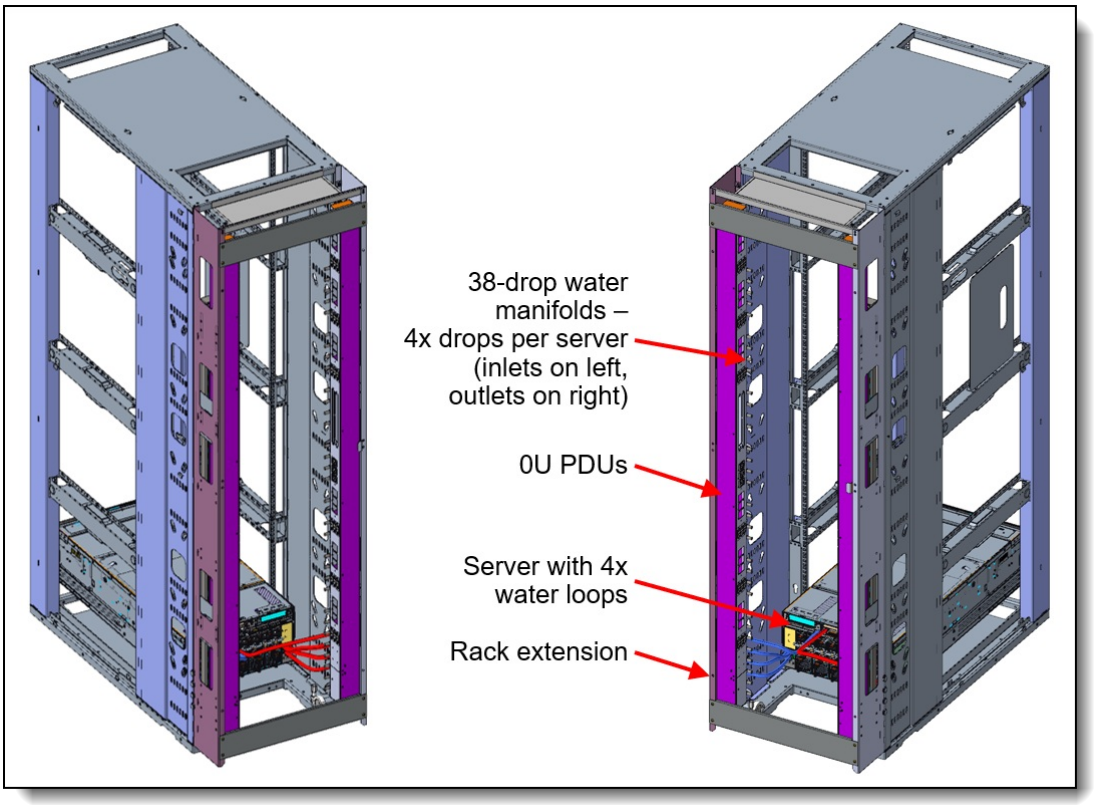


Figure 11. Water manifold connections

Configuration requirements:

- Maximum number of SR780a V3 servers support in a rack (limits due to safety requirements when installing the servers):
  - 48U rack: 9 servers
  - 42U rack with in-rack CDU: 7 servers
  - 42U rack without in-rack CDU: 8 servers
- With H100/H200 GPUs:
  - Maximum pressure: 4.4 bars
  - Minimum water flow rate: 10 liters per minute per chassis
- With B200 GPUs:
  - Maximum pressure: 4.4 bars
  - Minimum water flow rate: 12 liters per minute per chassis

Note: Water quality must be maintained over the lifetime of the system to receive warranty and support on affecting components. For water quality requirement, see Lenovo Neptune Direct Water-Cooling Standards

The 38-drop water manifold and hoses can be ordered as listed in the following table.

Table 34. Water infrastructure ordering information

Part number	Feature code	Description
Manifold for 42U and 48U rack cabinet		
4XF7A90061	C5YW	ThinkSystem Neptune DWC 38 Port Rack Manifold
Hoses to connect the manifold to an in-rack CDU		
4XF7A90232	C5YX	Connection Set - 38/45 Ports Manifold with in-rack CDU
4XF7A90233	C5YY	Connection Set, for 38 Ports manifold with in-Rack CDU in 48U Rack
Hoses to connect the manifold to an in-row CDU		
4XF7A90234	C5YZ	Hose Set, 1 inch EPDM, 1.3m, for 38 Ports manifold for in-row CDU
4XF7A90235	C5Z0	Hose Set, 1 inch EPDM, 2.3m, for 38 Ports manifold for in-row CDU

Configuration notes:

- This water connection solution described here cannot be used with the DW612S and N1380 enclosures as the water requirements are different.
- The hoses for in-row CDUs that are listed in the table above have Eaton FD83 quick-disconnect couplings

RM100 In-Rack Coolant Distribution Unit

The RM100 In-Rack Coolant Distribution Unit (CDU) can provide 100kW cooling capacity within the rack cabinet. It is designed as a 4U high rack device installed at the bottom of the rack. The CDU is supported in the 42U and 48U Heavy Duty Rack Cabinets.

For information about the 42U and 48U Heavy Duty Rack Cabinets, see the product guide: https://lenovopress.lenovo.com/lp1498-lenovo-heavy-duty-rack-cabinets

The following figure shows the RM100 CDU.



Figure 12. RM100 In-Rack Coolant Distribution Unit

The CDU can be ordered using the CTO process in the configurators using machine type 7DBL. The following table lists the base CTO model and base feature code.

Table 35. RM100 ordering information

CTO model	Base feature	Description
7DBLCTOLWW	BRL4	Lenovo Neptune DWC RM100 In-Rack CDU

For details and exact specification of the CDU, see the In-Rack CDU Operation & Maintenance Guide: https://pubs.lenovo.com/hdc_rackcabinet/rm100_user_guide.pdf

Professional Services: The factory integration of the In-Rack CDU requires Lenovo Professional Services review and approval for warranty and associated extended services. Before ordering CDU and manifold, contact the Lenovo Professional Services team (CDUsupport@lenovo.com).

Warranty upgrades and post-warranty support

The SR780a V3 has a 3-year warranty based on the machine type of the system:

- 7DJ5 - 3 year warranty
- Genie Lift GL-8 Material Lift (7D5Y) - 3-year warranty

Our global network of regional support centers offers consistent, local-language support enabling you to vary response times and level of service to match the criticality of your support needs:

- **Standard Next Business Day** – Best choice for non-essential systems requiring simple maintenance.
- **Premier Next Business Day** – Best choice for essential systems requiring technical expertise from senior-level Lenovo engineers.
- **Premier 24x7 4-Hour Response** – Best choice for systems where maximum uptime is critical.
- **Premier Enhanced Storage Support 24x7 4-Hour Response** – Best choice for storage systems where maximum uptime is critical.

For more information, consult the brochure Lenovo Operational Support Services for Data Centers Services.

Services

Lenovo Data Center Services empower you at every stage of your IT lifecycle. From expert advisory and strategic planning to seamless deployment and ongoing support, we ensure your infrastructure is built for success. Our comprehensive services accelerate time to value, minimize downtime, and free your IT staff to focus on driving innovation and business growth.

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

In this section:

- Lenovo Advisory Services
- Lenovo Plan & Design Services
- Lenovo Deployment, Migration, and Configuration Services
- Lenovo Support Services
- Lenovo Managed Services
- Lenovo Sustainability Services

Lenovo Advisory Services

Lenovo Advisory Services simplify the planning process, enabling customers to build future-proofed strategies in as little as six weeks. Consultants provide guidance on projects including VM migration, storage, backup and recovery, and cost management to accelerate time to value, improve cost efficiency, and build a flexibly scalable foundation.

- **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.

Lenovo Plan & Design Services

Unlock faster time to market with our tailored, strategic design workshops to align solution approaches with your business goals and technical requirements. Leverage our deep solution expertise and end-to-end delivery partnership to meet your goals efficiently and effectively.

Lenovo Deployment, Migration, and Configuration Services

Optimize your IT operations by shifting labor-intensive functions to Lenovo's skilled technicians for seamless on-site or remote deployment, configuration, and migration. Enjoy peace of mind, faster time to value, and comprehensive knowledge sharing with your IT staff, backed by our best-practice methodology.

- **Deployment Services for Storage and ThinkAgile**

  A comprehensive range of remote and onsite options tailored specifically for your business needs to ensure your storage and ThinkAgile hardware are fully operational from the start.

- **Hardware Installation Services**

  A full-range, comprehensive setup for your hardware, including unpacking, inspecting, and positioning components to ensure your equipment is operational and error-free for the most seamless and efficient installation experience, so you can quickly benefit from your investments.

- **DM/DG File Migration Services**

  Take the burden of file migration from your IT’s shoulders. Our experts will align your requirements and business objectives to the migration plans while coordinating with your team to plan and safely execute the data migration to your storage platforms.

- **DM/DG/DE Health Check Services**

  Our experts perform proactive checks of your Firmware and system health to ensure your machines are operating at peak and optimal efficiency to maximize up-time, avoid system failures, ensure the security of IT solutions and simplify maintenance.

- **Factory Integrated Services**

  A suite of value-added offerings provided during the manufacturing phase of a server or storage system that reduces time to value. These services aim at improving your hardware deployment experience and enhance the quality of a standard configuration before it arrives at your facility.

Lenovo Support Services

In addition to response time options for hardware parts, repairs, and labor, Lenovo offers a wide array of additional support services to ensure your business is positioned for success and longevity. Our goal is to reduce your capital outlays, mitigate your IT risks, and accelerate your time to productivity.

- **Premier Support for Data Centers**

  Your direct line to the solution that promises the best, most comprehensive level of support to help you fully unlock the potential of your data center.

- **Premier Enhanced Storage Support (PESS)**

  Gain all the benefits of Premier Support for Data Centers, adding dedicated storage specialists and resources to elevate your storage support experience to the next level.

- **Committed Service Repair (CSR)**

  Our commitment to ensuring the fastest, most seamless resolution times for mission-critical systems that require immediate attention to ensure minimal downtime and risk for your business. This service is only available for machines under the Premier 4-Hour Response SLA.

- **Multivendor Support Services (MVS)**

  Your single point of accountability for resolution support across vast range of leading Server, Storage, and Networking OEMs, allowing you to manage all your supported infrastructure devices seamlessly from a single source.

- **Keep Your Drive (KYD)**

  Protect sensitive data and maintain compliance with corporate retention and disposal policies to ensure your data is always under your control, regardless of the number of drives that are installed in your Lenovo server.

- **Technical Account Manager (TAM)**

  Your single point of contact to expedite service requests, provide status updates, and furnish reports to track incidents over time, ensuring smooth operations and optimized performance as your business grows.

- **Enterprise Software Support (ESS)**

  Gain comprehensive, single-source, and global support for a wide range of server operating systems and Microsoft server applications.

For more information, consult the brochure Lenovo Operational Support Services for Data Centers.

Lenovo Managed Services

Achieve peak efficiency, high security, and minimal disruption with Lenovo's always-on Managed Services. Our real-time monitoring, 24x7 incident response, and problem resolution ensure your infrastructure operates seamlessly. With quarterly health checks for ongoing optimization and innovation, Lenovo's remote active monitoring boosts end-user experience and productivity by keeping your data center's hardware performing at its best.

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.

Lenovo Sustainability Services

- **Asset Recovery Services**

  Lenovo Asset Recovery Services (ARS) provides a secure, seamless solution for managing end-of-life IT assets, ensuring data is safely sanitized while contributing to a more circular IT lifecycle. By maximizing the reuse or responsible recycling of devices, ARS helps businesses meet sustainability goals while recovering potential value from their retired equipment. For more information, see the Asset Recovery Services offering page.

- **CO2 Offset Services**

  Lenovo's CO2 Offset Services offer a simple and transparent way for businesses to take tangible action on their IT footprint. By integrating CO2 offsets directly into device purchases, customers can easily support verified climate projects and track their contributions, making meaningful progress toward their sustainability goals without added complexity.

- **Lenovo Certified Refurbished**

  Lenovo Certified Refurbished offers a cost-effective way to support IT circularity without compromising on quality and performance. Each device undergoes rigorous testing and certification, ensuring reliable performance and extending its lifecycle. With Lenovo's trusted certification, you gain peace of mind while making a more sustainable IT choice.

Lenovo TruScale

Lenovo TruScale XaaS is your set of flexible IT services that makes everything easier. Streamline IT procurement, simplify infrastructure and device management, and pay only for what you use – so your business is free to grow and go anywhere.

Lenovo TruScale is the unified solution that gives you simplified access to:

- The industry's broadest portfolio – from pocket to cloud – all delivered as a service
- A single-contract framework for full visibility and accountability
- The global scale to rapidly and securely build teams from anywhere
- Flexible fixed and metered pay-as-you-go models with minimal upfront cost
- The growth-driving combination of hardware, software, infrastructure, and solutions – all from one single provider with one point of accountability.

For information about Lenovo TruScale offerings that are available in your region, contact your local Lenovo sales representative or business partner.

Regulatory compliance

The SR780a V3 conforms to the following standards:

- ANSI/UL 62368-1
- IEC 62368-1 (CB Certificate and CB Test Report)
- CSA C22.2 No. 62368-1
- Argentina IEC 60950-1
- Mexico NOM-019
- India BIS 13252 (Part 1)
- Germany GS
- TUV-GS (EN62368-1, and EK1-ITB2000)
- Brazil INMETRO
- South Africa NRCS LOA
- Ukraine UkrCEPRO
- Morocco CMIM Certification (CM)
- Russia, Belorussia and Kazakhstan, TP EAC 037/2016 (for RoHS)
- Russia, Belorussia and Kazakhstan, EAC: TP TC 004/2011 (for Safety); TP TC 020/2011 (for EMC)
- CE, UKCA Mark (EN55032 Class A, EN62368-1, EN55035, EN61000-3-11, EN61000-3-12, (EU) 2019/424, and EN IEC 63000 (RoHS))
- FCC - Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 7, Class A
- CISPR 32, Class A, CISPR 35
- Korea KN32, Class A, KN35
- Japan VCCI, Class A
- Taiwan BSMI CNS15936, Class A; CNS15598-1; Section 5 of CNS15663
- Australia/New Zealand AS/NZS CISPR 32, Class A; AS/NZS 62368.1
- UL Green Guard, UL2819
- Japanese Energy-Saving Act
- EU2019/424 Energy Related Product (ErP Lot9)

Power distribution units

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

Table 36. Power distribution units

Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
0U Basic PDUs															
4PU7A93176	C0QH	0U 36 C13 and 6 C19 Basic 32A 1 Phase PDU v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4PU7A93169	C0DA	0U 36 C13 and 6 C19 Basic 32A 1 Phase PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4PU7A93177	C0QJ	0U 24 C13/C15 and 24 C13/C15/C19 Basic 32A 3 Phase WYE PDU v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4PU7A93170	C0D9	0U 24 C13/C15 and 24 C13/C15/C19 Basic 32A 3 Phase WYE PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
0U Switched and Monitored PDUs															
4PU7A93181	C0QN	0U 21 C13/C15 and 21 C13/C15/C19 Switched and Monitored 48A 3 Phase Delta PDU v2 (60A derated)	N	Y	N	N	N	N	N	Y	N	Y	N	Y	N
4PU7A93174	C0D5	0U 21 C13/C15 and 21 C13/C15/C19 Switched and Monitored 48A 3 Phase Delta PDU (60A derated)	N	Y	N	N	N	N	N	Y	N	N	N	Y	N
4PU7A93178	C0QK	0U 20 C13 and 4 C19 Switched and Monitored 32A 1 Phase PDU v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4PU7A93171	C0D8	0U 20 C13 and 4 C19 Switched and Monitored 32A 1 Phase PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4PU7A93182	C0QP	0U 18 C13/C15 and 18 C13/C15/C19 Switched and Monitored 63A 3 Phase WYE PDU v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4PU7A93175	C0CS	0U 18 C13/C15 and 18 C13/C15/C19 Switched and Monitored 63A 3 Phase WYE PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4PU7A93180	C0QM	0U 18 C13/C15 and 18 C13/C15/C19 Switched and Monitored 32A 3 Phase WYE PDU v2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4PU7A93173	C0D6	0U 18 C13/C15 and 18 C13/C15/C19 Switched and Monitored 32A 3 Phase WYE PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4PU7A93179	C0QL	0U 16 C13/C15 and 16 C13/C15/C19 Switched and Monitored 24A 1 Phase PDU v2 (30A derated)	N	Y	N	N	N	N	N	Y	N	Y	N	Y	N
4PU7A93172	C0D7	0U 16 C13/C15 and 16 C13/C15/C19 Switched and Monitored 24A 1 Phase PDU(30A derated)	N	Y	N	N	N	N	N	Y	N	N	N	Y	N
1U Switched and Monitored PDUs															
4PU7A90808	C0D4	1U 18 C19/C13 Switched and monitored 48A 3P WYE PDU V2 ETL	N	N	N	N	N	N	N	Y	N	Y	Y	Y	N
4PU7A81117	BNDV	1U 18 C19/C13 switched and monitored 48A 3P WYE PDU - ETL	N	N	N	N	N	N	N	N	N	N	N	Y	N
4PU7A90809	C0DE	1U 18 C19/C13 Switched and monitored 48A 3P WYE PDU V2 CE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
4PU7A81118	BNDW	1U 18 C19/C13 switched and monitored 48A 3P WYE PDU – CE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y

Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
4PU7A90810	C0DD	1U 18 C19/C13 Switched and monitored 80A 3P Delta PDU V2	N	N	N	N	N	N	N	Y	N	Y	Y	Y	N
4PU7A77467	BLC4	1U 18 C19/C13 Switched and Monitored 80A 3P Delta PDU	N	N	N	N	N	N	N	N	N	Y	N	Y	N
4PU7A90811	C0DC	1U 12 C19/C13 Switched and monitored 32A 3P WYE PDU V2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4PU7A90812	C0DB	1U 12 C19/C13 Switched and monitored 60A 3P Delta PDU V2	N	N	N	N	N	N	N	Y	N	Y	Y	Y	N
4PU7A77469	BLC6	1U 12 C19/C13 switched and monitored 60A 3P Delta PDU	N	N	N	N	N	N	N	N	N	N	N	Y	N
71763NU	6051	Ultra Density Enterprise C19/C13 PDU 60A/208V/3PH	N	N	Y	N	N	N	N	N	N	Y	Y	Y	N
71762NX	6091	Ultra Density Enterprise C19/C13 PDU Module	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Line cords for 1U PDUs that ship without a line cord															
40K9611	6504	DPI 32a Cord (IEC 309 3P+N+G)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9612	6502	DPI 32a Cord (IEC 309 P+N+G)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9613	6503	DPI 63a Cord (IEC 309 P+N+G)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9614	6500	DPI 30a Cord (NEMA L6-30P)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9615	6501	DPI 60a Cord (IEC 309 2P+G)	N	N	Y	N	N	N	Y	N	N	Y	Y	Y	N

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

Rack cabinets

The following table lists the supported rack cabinets.

Table 37. Rack cabinets

Model	Description
7D6DA007WW	ThinkSystem 42U Onyx Primary Heavy Duty Rack Cabinet (1200mm)
7D6DA008WW	ThinkSystem 42U Pearl Primary Heavy Duty Rack Cabinet (1200mm)
7D6EA009WW	ThinkSystem 48U Onyx Primary Heavy Duty Rack Cabinet (1200mm)
7D6EA00AWW	ThinkSystem 48U Pearl Primary Heavy Duty Rack Cabinet (1200mm)
1410O42	Lenovo EveryScale 42U Onyx Heavy Duty Rack Cabinet
1410P42	Lenovo EveryScale 42U Pearl Heavy Duty Rack Cabinet
1410O48	Lenovo EveryScale 48U Onyx Heavy Duty Rack Cabinet
1410P48	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

For information about the 42U and 48U Heavy Duty Rack Cabinets, see the product guide:
https://lenovopress.lenovo.com/lp1498-lenovo-heavy-duty-rack-cabinets

Configuration notes:

- With the SR780a V3, the water manifold must be installed in rear rack extension (either 100mm or 180mm extension); the 85mm extension is not supported.
- 1U PDUs are supported in side pockets, however be aware that there may be power cord accessibility issues due to the narrow opening to access outlets.
- 0U PDU are only supported in rear extensions. The 100mm rear extension supports 1x 0U PDU per side when used in conjunction with the water manifold. The 180mm extension supports 2x 0U PDUs per side (56mm wide PDU).
- RDHX support: Only the 42U rack cabinet supports the Rear Door Heat Exchanger (RDHX) and requires the 100mm extension. 180mm extensions do not currently support RDHX. The RDHX cannot ship from the factory attached to the rack and will need to assembled at the customer site.

KVM console options

The following table lists the supported KVM consoles.

Table 38. 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 40. KVM switches and options

Part number	Description
KVM Console switches	
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

Why wait to obtain the technology you need now? No payments for 90 days and predictable, low monthly payments make it easy to budget for your Lenovo solution.

- **Flexible**

  Our in-depth knowledge of the products, services and various market segments allows us to offer greater flexibility in structures, documentation and end of lease options.

- **100% Solution Financing**

  Financing your entire solution including hardware, software, and services, ensures more predictability in your project planning with fixed, manageable payments and low monthly payments.

- **Device as a Service (DaaS)**

  Leverage latest technology to advance your business. Customized solutions aligned to your needs. Flexibility to add equipment to support growth. Protect your technology with Lenovo's Premier Support service.

- **24/7 Asset management**

  Manage your financed solutions with electronic access to your lease documents, payment histories, invoices and asset information.

- **Fair Market Value (FMV) and $1 Purchase Option Leases**

  Maximize your purchasing power with our lowest cost option. An FMV lease offers lower monthly payments than loans or lease-to-own financing. Think of an FMV lease as a rental. You have the flexibility at the end of the lease term to return the equipment, continue leasing it, or purchase it for the fair market value. In a $1 Out Purchase Option lease, you own the equipment. It is a good option when you are confident you will use the equipment for an extended period beyond the finance term. Both lease types have merits depending on your needs. We can help you determine which option will best meet your technological and budgetary goals.

Ask your Lenovo Financial Services representative about this promotion and how to submit a credit application. For the majority of credit applicants, we have enough information to deliver an instant decision and send a notification within minutes.

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 - 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.

   Tags: ThinkSystem

   Published: 2024-04-15
   Length: 60 minutes

   Start the training:
   Employee link: Grow@Lenovo
   Partner link: Lenovo Partner Learning

   Course code: 041224

2. **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.

   Tags: Artificial Intelligence (AI), Cloud, Nvidia, Software Defined Infrastruture (SDI), Technical Sales

   Published: 2024-05-22
   Length: 60 minutes

   Start the training:
   Employee link: Grow@Lenovo

   Course code: DVCLD212

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.

   Tags: Advanced DataCenter, DataCenter Products, ThinkAgile, ThinkEdge, ThinkSystem

   Published: 2024-05-29
   Length: 20 minutes

   Start the training:
   Employee link: Grow@Lenovo
   Partner link: Lenovo Partner Learning

   Course code: SXXW1110r7

4. **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

   Tags: SAP, ThinkAgile, ThinkEdge, ThinkSystem

   Published: 2024-06-04
   Length: 60 minutes

   Start the training:
   Employee link: Grow@Lenovo

   Course code: DSAPF101

5. **Partner Technical Webinar - OneIQ**
   2024-07-15 | 60 minutes | Employees and Partners

   In this 60-minute replay, Peter Grant, Field CTO for OneIQ, reviewed and demo'd the capabilities of OneIQ including collecting data and analyzing. Additionally, Peter and the team discussed how specific partners (those with NA Channel SA coverage) will get direct access to OneIQ and other partners can get access to OneIQ via Distribution or the NA LETS team.

   Tags: Technical Sales

   Published: 2024-07-15
   Length: 60 minutes

   Start the training:
   Employee link: Grow@Lenovo
   Partner link: Lenovo Partner Learning

   Course code: 071224

6. **Q2 Solutions Launch TruScale GPU Next Generation Management in the AI Era Quick Hit**
   2024-09-10 | 6 minutes | Employees and Partners

   This Quick Hit focuses on Lenovo announcing additional ways to help you build, scale, and evolve your customer's private AI faster for improved ROI with TruScale GPU as a Service, AI-driven systems management, and infrastructure transformation services.

   Tags: Artificial Intelligence (AI), Services, TruScale

   Published: 2024-09-10
   Length: 6 minutes

   Start the training:
   Employee link: Grow@Lenovo
   Partner link: Lenovo Partner Learning

   Course code: SXXW2543a

7. **Virtual Facilitated Session - ThinkSystem Rack and Tower Primer for ISO Client Managers**
   2024-10-31 | 90 minutes | Employees Only

   In this Virtual Instructor-Led Training Session, ISO Client Managers will be able to build on the knowledge gained in Module 1 (eLearning) of the ThinkSystem Rack and Tower Server Primer for ISO Client Managers curriculum.

   IMPORTANT! Module 1 (eLearning) must be completed to be eligible to participate in this session. Please note that places are subject to availability. If you are selected, you will receive the invite to this session via email.

   Tags: Sales, Server, ThinkSystem

   Published: 2024-10-31
   Length: 90 minutes

   Start the training:
   Employee link: Grow@Lenovo

   Course code: DSRTO102

8. **Partner Technical Webinar - LenovoPress updates and LPH Demo**
   2024-11-13 | 60 minutes | Employees and Partners

   In this 60-minute replay, we had 3 topics. First, David Watts, Lenovo Sr Manager LenovoPress, gave an update on LenovoPress and improvements to finding Seller Training Courses (both partner and Lenovo). Next, Ryan Tuttle, Lenovo LETS Solution Architect, gave a demo of Lenovo Partner Hub (LPH) including how to find replays of Partner Webinars in LPL. Finally, Joe Murphy, Lenovo Sr Manager of LETS NA, gave a quick update on the new Stackable Warranty Options in DCSC.

   Tags: Technical Sales

   Published: 2024-11-13
   Length: 60 minutes

   Start the training:
   Employee link: Grow@Lenovo
   Partner link: Lenovo Partner Learning

   Course code: 110824
9. **Partner Technical Webinar - Server Update with Mark Bica**
   2024-11-26 | 60 minutes | Employees and Partners

   In this 60-minute replay, Mark Bica, Lenovo Product Manager gave an update on the server portfolio. Mark presented on the new V4 Intel servers with Xeon 6 CPUs. He reviewed where the new AMD 5th Gen EPYC CPUs will be used in our servers. He followed with a review of the GPU dense servers including SR680, SR680a, SR575 and SR780a. Mark concluded with a review of the SC777 and SC750 that were introduced at TechWorld.

   Tags: Server

   Published: 2024-11-26
   Length: 60 minutes

   Start the training:
   Employee link: Grow@Lenovo
   Partner link: Lenovo Partner Learning

   Course code: 112224

10. **ThinkSystem Rack and Tower Introduction for ISO Client Managers**
2024-12-10 | 20 minutes | Employees Only

In this course, you will learn about Lenovo's Data Center Portfolio, its ThinkSystem Family and the key features of the Rack and Tower servers. It will equip you with foundational knowledge which you can then expand upon by participating in the facilitated session of the curriculum.

Course Objectives:
• By the end of this course, you should be able to:
• Identify Lenovo's main data center brands.
• Describe the key components of the ThinkSystem Family servers.
• Differentiate between the Rack and Tower servers of the ThinkSystem Family.
• Understand the value Rack and Tower servers can provide to customers.

Tags: Server, ThinkSystem

Published: 2024-12-10
Length: 20 minutes

Start the training:
Employee link: Grow@Lenovo

Course code: DSRTO101r2

11. **Family Portfolio: Storage Controller Options**
2025-03-03 | 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

Tags: Sales, Storage

Published: 2025-03-03
Length: 25 minutes

Start the training:
Employee link: Grow@Lenovo
Partner link: Lenovo Partner Learning

Course code: SXXW1111r2

12. **Partner Technical Webinar - DCSC Improvements - MAY0225**
2025-05-05 | 60 minutes | Partners Only

    In this 60-minute replay, new improvements to DCSC were reviewed. Joe Allen, Lenovo NA LETS, presented the new PCI wizard and discussed RAID adapters. Ryan Tuttle, Lenovo NA LETS presented Spreadsheet import, Autocorrect and Expanded selections on by default. Joe Murphy, Lenovo NA LETS closed out with review of Error Message improvements and location of ThinkAgile MX and VX in the DCSC menus.

    Tags: Technical Sales

    Published: 2025-05-05
    Length: 60 minutes

    Start the training:
    Partner link: Lenovo Partner Learning

    Course code: MAY0225

Related publications and links

For more information, see these resources:

- ThinkSystem SR780a V3 product page:
https://www.lenovo.com/us/en/p/servers-storage/servers/racks/lenovo-thinksystem-sr780a-v3/len21ts0032
- ThinkSystem SR780a V3 datasheet
https://lenovopress.lenovo.com/datasheet/ds0182-lenovo-thinksystem-sr780a-v3
- ThinkSystem SR780a V3 drivers and support
http://datacentersupport.lenovo.com/products/servers/thinksystem/sr780av3/7dj5/downloads
- Lenovo ThinkSystem SR780a V3 product publications:
https://pubs.lenovo.com/sr780a-v3/
    - User Guide, which includes:
        - System Configuration Guide
        - Hardware Maintenance Guide
    - Rack Installation Guides
    - Messages and Codes Reference
    - UEFI Manual for ThinkSystem Servers
- User Guides for options:
https://serveroption.lenovo.com
- ServerProven hardware compatibility:
http://serverproven.lenovo.com

Related product families

Product families related to this document are the following:

- 2-Socket Rack Servers
- ThinkSystem SR780a V3 Server

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