

## Lenovo ThinkEdge SE455 V3 Server Product Guide

The Lenovo ThinkEdge SE455 V3 is a single-socket server, with a 2U height and short depth case that can be mounted in a 2-post or 4-post rack. This rugged edge server can handle continuous operating temperatures from 5°C and 55°C as has tolerance to locations with high-dust and vibration.

The ThinkEdge SE455 V3 is based on the new AMD EPYC 8004 Series "Siena" processor and is designed to virtualize traditional IT applications as well as new transformative AI systems, providing the processing power, storage, accelerator, and networking technologies required for today's edge workloads. Lenovo's innovation makes the ThinkEdge SE455 V3 one of the most powerful, yet quiet servers on the market, allowing it to be deployed next to end users without disturbing the workplace.



Figure 1. Lenovo ThinkEdge SE455 V3

### Did you know?

Customers with remote locations have had to make a choice between underpowered IOT gateways and PCs, or overpowered and non-rugged data center servers. With the SE455 V3, they have an option: a compact edge server designed specifically to meet the needs of remote locations with the processing power to run AI workloads.

## Key features

The ThinkEdge SE455 V3 is a purpose-built server that is significantly shorter than a traditional server, making it ideal for deployment in tight spaces. The ThinkEdge SE455 V3 puts increased processing power, storage and network closer to where data is generated, allowing actions resulting from the analysis of that data to take place more quickly.

Since these edge servers are typically deployed outside of secure data centers, they include technology that encrypts the data stored on the device, protecting the data if the system is tampered with, only enabling authorized users to access it.

## Scalability and performance

The SE455 V3 offers numerous features to boost performance, improve scalability and reduce costs:

- Support for a single processor from the powerful AMD EPYC 8004 ("Siena") processor family, designed to optimize "performance per watt"
  - Up to 64 cores
  - Core speeds of up to 2.65 GHz
  - TDP ratings of up to 225W
- Support for up to 6 TruDDR5 memory DIMMs and up to 576 GB of memory using 96 GB DIMMs
- DIMMs operate at up to 4800 MHz for a fast memory subsystem
- Supports up to 6x single-width GPUs or 2x double-wide GPUs, for substantial processing power in an edge system.
- Supports up to 6x AMD Alveo V70 Datacenter Accelerator adapters, tuned for video analytics and natural language processing workloads
- Support for up to 8x 2.5-inch drive bays, 4x hot-swap drives at the front of the server, and 4x non-hot swap drives internal to the server. Optional RAID with the addition of a RAID adapter installed in a slot.
- Supports M.2 drives for convenient operating system boot functions. Available M.2 adapters support either one M.2 drive or two M.2 drives. M.2 with RAID is available using a PCIe RAID adapter or with a B540i-2i M.2 adapter with integrated RAID.
- Supports 8x NVMe drives without oversubscription of PCIe lanes (1:1 connectivity). The use of NVMe drives maximizes drive I/O performance, in terms of throughput and latency.
- Supports up to 6x full-height PCIe slots, all front accessible, plus an additional OCP adapter slot
- The server has a dedicated industry-standard OCP 3.0 small form factor (SFF) slot supporting a variety of Ethernet network adapters. Simple-swap mechanism with thumbscrews and pull-tab enables tool-less installation and removal of the adapter. Supports shared BMC network sideband connectivity to enable out-of-band systems management.
- The server offers PCI Express 5.0 (PCIe Gen 5) I/O expansion capabilities that doubles the theoretical maximum bandwidth of PCIe 4.0 (32GT/s in each direction for PCIe 5.0, compared to 16 GT/s with PCIe 4.0). A PCIe 5.0 x16 slot provides 128 GB/s bandwidth, enough to support a 400GbE network connection.

## Availability and serviceability

The SE455 V3 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 Advanced Memory Device Correction (AMDC), Patrol/Demand Scrubbing, 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, supporting hardware RAID redundancy for data protection and greater system uptime.

- The server has up to two hot-swap redundant power supplies and up to five simple-swap fans with N+1 rotor redundancy to provide availability for business-critical applications.
- Solid-state drives (SSDs) offer more reliability and performance than traditional mechanical HDDs for greater uptime.
- Proactive Platform Alerts (including PFA and SMART alerts): Processors, voltage regulators, memory, internal storage (SAS/SATA SSDs, NVMe SSDs, M.2 storage), fans, power supplies, RAID controllers, server ambient and subcomponent temperatures. Alerts can be surfaced through the XClarity Controller to managers such as Lenovo XClarity Administrator, VMware vCenter, and Microsoft System Center. These proactive alerts let you take appropriate actions in advance of possible failure, thereby increasing server uptime and application availability.
- The built-in XClarity Controller 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)
- Offers a diagnostics port on the front of the server to allow you to attach an external diagnostics handset for enhanced systems management capabilities.
- Support for the XClarity Administrator Mobile app running on a supported smartphone 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 of the SE455 V3:

- 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, power capping, and other management and security features.
- Supports Lockdown Mode Control, to ensure that the system is only used by its intended recipient and that all data and applications remain secure if the tamper detection sensors are triggered.
- Lenovo XClarity Administrator offers comprehensive hardware management tools that help to increase uptime, reduce costs and improve productivity through advanced server management capabilities.
- UEFI-based Lenovo XClarity Provisioning Manager, accessible from F1 during boot, provides system inventory information, graphical UEFI Setup, platform update function, RAID Setup wizard, operating system installation function, and diagnostic functions.
- Support for Lenovo XClarity Energy Manager which captures real-time power and temperature data from the server and provides automated controls to lower energy costs.
- An integrated industry-standard Unified Extensible Firmware Interface (UEFI) enables improved setup, configuration, and updates, and simplifies error handling.
- Support for industry standard management protocols, IPMI 2.0, SNMP 3.0, Redfish REST API, serial console via IPMI
- An integrated hardware Trusted Platform Module (TPM) supporting TPM 2.0 enables advanced cryptographic functionality, such as digital signatures and remote attestation.
- Administrator and power-on passwords help protect from unauthorized access to the server.

- Supports AMD Infinity Guard security features, including Secure Memory Encryption, Secure Encrypted Virtualization and Secure Nested Paging.
- 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.
- Additional physical security features include a lockable front bezel and top cover and secure EIA rack attachment brackets.

### **Energy efficiency**

The SE455 V3 offers the following energy-efficiency features to save energy, reduce operational costs, and increase energy availability:

- Energy-efficient system board components help lower operational costs.
- High-efficiency power supplies with 80 PLUS Platinum and Titanium certifications
- Solid-state drives (SSDs) consume as much as 80% less power than traditional spinning 2.5-inch HDDs.
- Optional Lenovo XClarity Energy Manager provides advanced data center power notification, analysis, and policy-based management to help achieve lower heat output and reduced cooling needs.

### **Enhanced operating environment**

The SE455 V3 offers the following operating environment enhancements:

- The server supports high ambient temperatures, up to 55°C, which allows the server to be installed in a harsher environments, or allows greater fluctuation of temperatures in less controlled environments.
- The server offers acoustic modes which gives the administrator control over maximum noise emissions, which results in the server being less intrusive in an office or other noise-sensitive environments.
- With the SE455 V3, noise mitigation starts the moment that the power is connected. At most ambient temperatures, fan speeds are lowered before and during the boot process, which is especially important when the server is installed in an office or other noise-sensitive environments.
- The SE455 V3 is designed to operate in rugged environments, meeting NEBS Level 3 requirements.
- The server offers various dust mitigation features, including caps for all I/O ports, and a front mounted dust filter, to maximize the system availability and uptime.

### **Components and connectors**

The following figure shows the front view of the ThinkEdge SE455 V3 server. For a closeup of the System LEDs, see the [Local management](#) section.

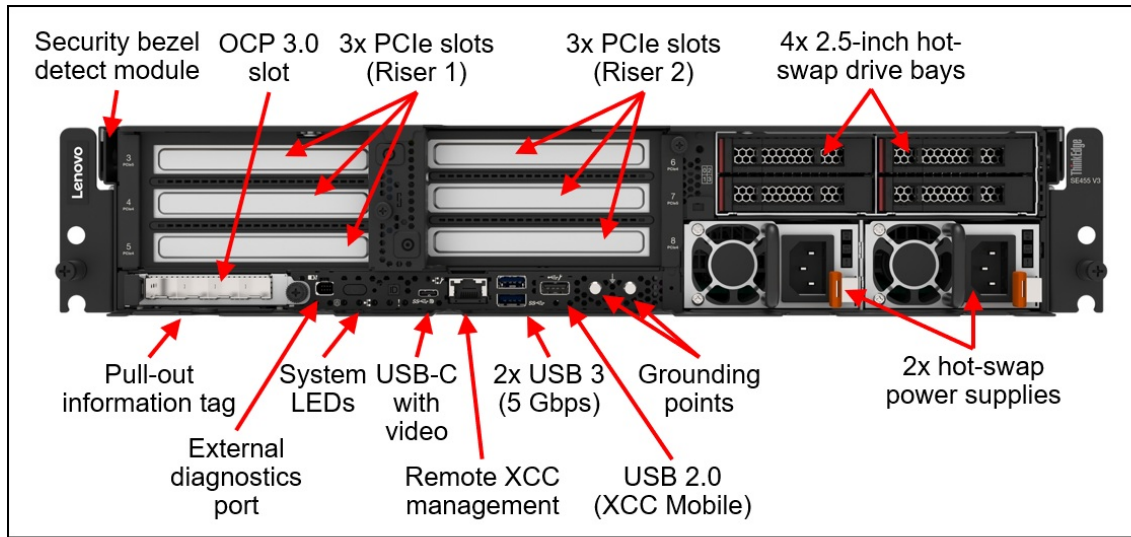


Figure 2. Front view of the ThinkEdge SE455 V3

The following figure shows the rear of the SE455 V3 server.

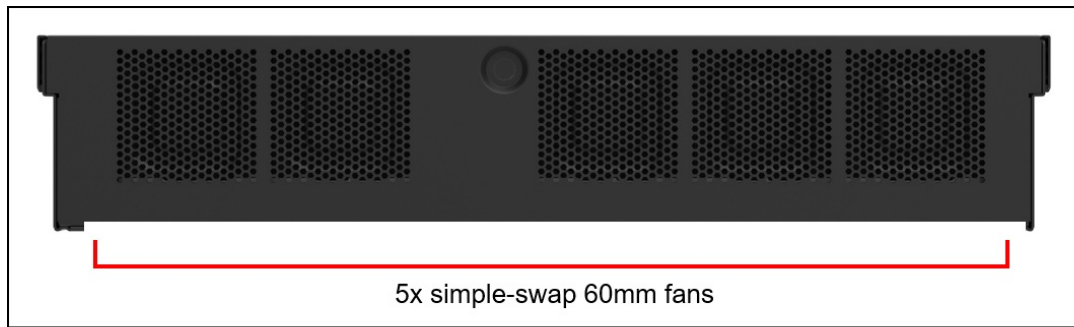


Figure 3. Rear view of the ThinkEdge SE455 V3

The SE455 V3 optionally supports a security bezel which helps restrict physical access to the front of the server while still allowing cables to be properly routed through side panels. The bezel also duplicates the system LEDs that would otherwise be covered up by the bezel. The following figure shows the server with the security bezel attached.



Figure 4. View of the ThinkEdge SE455 V3 with security bezel attached

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

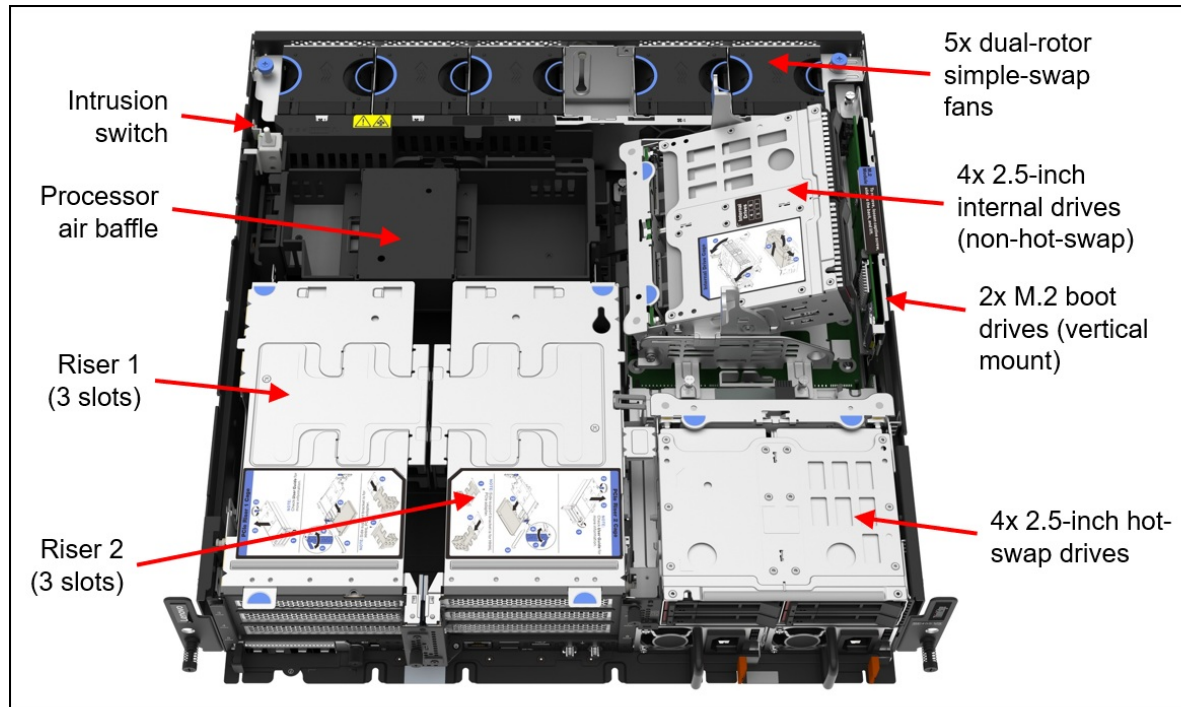


Figure 5. Internal view of the ThinkEdge SE455 V3



The following figure shows the internals with the two riser cards, internal drive cage, and CPU air baffle removed to show the components on the system board.

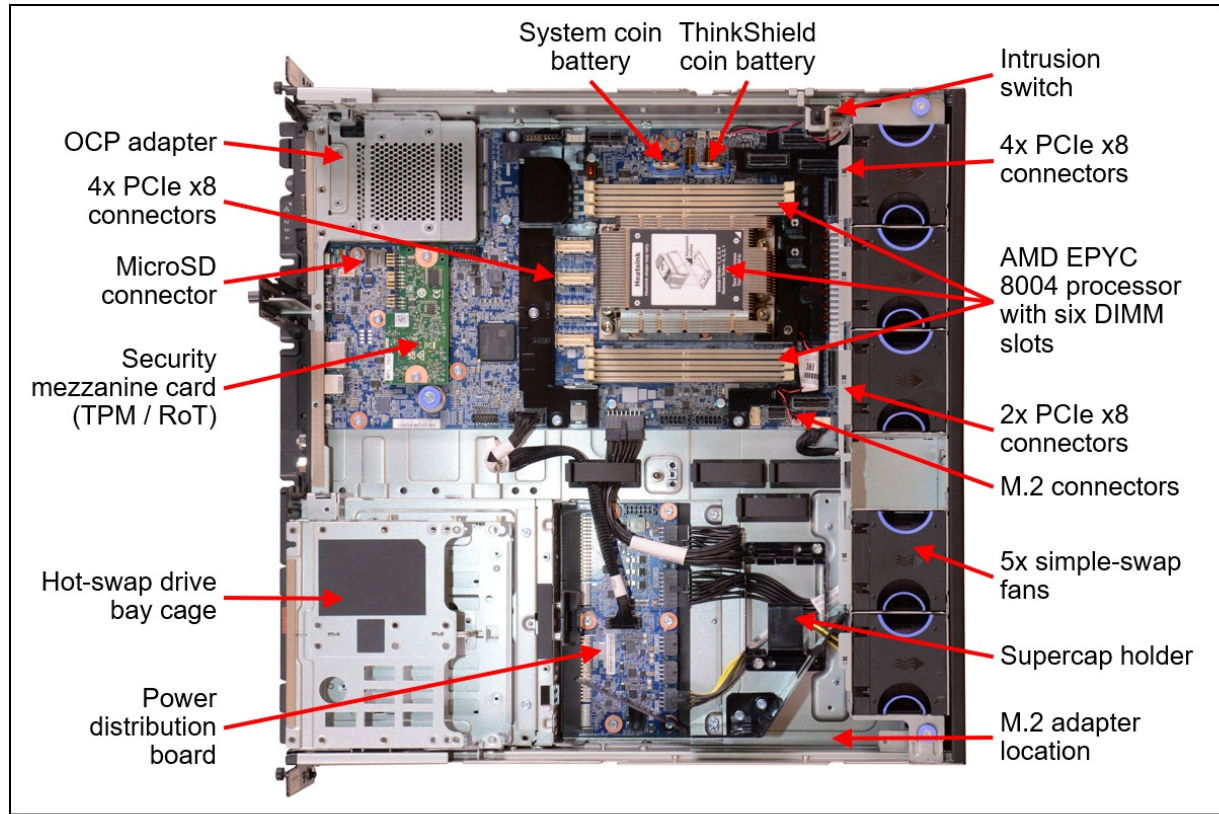


Figure 6. Internal view of the ThinkEdge SE455 V3

## System architecture

The following figure shows the architectural block diagram of the SE455 V3 system, showing the major components and connections. The processor offers 96 PCIe lanes to devices — a mix of Gen4 and Gen5 — and the SE455 V3 presents those as a combination of PCIe slots, an OCP slot, and NVMe drives.

As shown in the figure, the server supports up to 8x NVMe drives, however some drives share connections with slot 6 & 8; this means that in some configurations, slot 6 & 8 are not available. See the [Configurations](#) section for details.

**Tip:** The wrench icons show where the local and remote management functions are enabled.

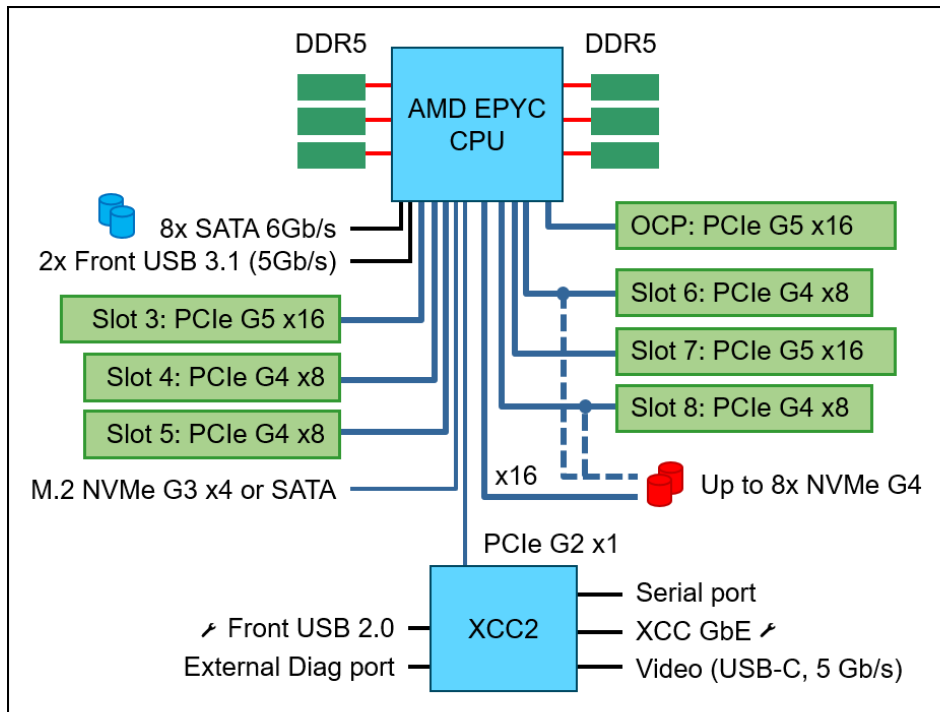


Figure 7. SE455 V3 architectural block diagram



## Standard specifications

The following table lists the standard specifications of the SE455 V3.

Table 1. Standard specifications

Components	Specification
Machine types	7DBY - 3 year warranty
Form factor	2U rack server, short depth (438mm depth, from EIA front rack flange)
Processor	1x AMD EPYC 8004 processor (formerly codenamed "Siena"). Supports up to 64 cores, core speeds of up to 2.65 GHz, and TDP ratings of up to 225W.
GPU and accelerators	Supports up to 6x single-wide GPUs and accelerators Supports up to 2x double-wide GPUs
Memory	6 DIMM slots. The processor has 6 memory channels, with 1 DIMM per channel (DPC). Lenovo TruDDR5 RDIMMs are supported, up to 4800 MHz
Persistent memory	Not supported
Memory maximum	Up to 576 GB with 6x 96GB RDIMMs
Memory protection	ECC, Advanced Memory Device Correction (AMDC), Patrol/Demand Scrubbing, DRAM Address Command Parity with Replay, DRAM Uncorrected ECC Error Retry, On-die ECC, ECC Error Check and Scrub (ECS), Post Package Repair
Drive bays	<ul style="list-style-type: none"> <li>• 4x 2.5-inch hot-swap drive bays (front accessible), supporting SATA or NVMe SSD drives with hot-swap trays</li> <li>• Optional 4x 2.5-inch non-hot-swap drive bays internal to the server, supporting SATA or NVMe SSD drives. Drives are mounted in a cage that rotates up for easy access.</li> <li>• Up to 2x M.2 drives for boot functions, supporting SATA or NVMe drives (optional RAID with separate PCIe adapter)</li> </ul>
Maximum data storage	61.44TB using 8x 7.68TB 2.5-inch SAS/SATA SSDs 92.16TB using 4x 15.36TB + 4x 7.68TB 2.5-inch NVMe SSDs
Storage controller	<ul style="list-style-type: none"> <li>• Up to 8x Onboard SATA ports (non-RAID)</li> <li>• Up to 8x Onboard NVMe ports (non-RAID)</li> <li>• 12 Gb SAS/SATA RAID adapters</li> <li>• 12 Gb SAS/SATA HBA (non-RAID)</li> </ul>
Optical drive bays	No support
Tape drive bays	No support
Network interfaces	Dedicated OCP 3.0 SFF slot with PCIe 5.0 x16 host interface. OCP slot supports a variety of 2-port and 4-port adapters with 1GbE, 10GbE, 25GbE or 100GbE network connectivity. One port can optionally be shared with the XClarity Controller (XCC) management processor for Wake-on-LAN and NC-SI support.  Additional network adapters supported in the PCIe slots.

Components	Specification
PCI Expansion slots	<p>Up to 6x PCIe slots (2x Gen5 x16, 4x Gen4 x8) in two risers, supporting full-height adapters. Riser 2 is optional. All slots are physically x16 slots.</p> <ul style="list-style-type: none"> <li>● Riser 1: <ul style="list-style-type: none"> <li>○ Slot 3: PCIe Gen5 x16 (supports double-wide GPU)</li> <li>○ Slot 4: PCIe Gen4 x8</li> <li>○ Slot 5: PCIe Gen4 x8</li> </ul> </li> <li>● Riser 2 (optional): <ul style="list-style-type: none"> <li>○ Slot 6: PCIe Gen4 x8*</li> <li>○ Slot 7: PCIe Gen5 x16 (supports double-wide GPU)</li> <li>○ Slot 8: PCIe Gen4 x8*</li> </ul> </li> </ul> <p>* Slot 6 and slot 8 are not connected in some configurations with NVMe internal drive bays</p>
Ports	Front: 2x USB 3.1 Type-A (5 Gb/s) ports, 1x USB 3.1 Type-C (USB-C) (5 Gb/s) with support for video connectivity (available dongle to convert USB-C to VGA), USB 2.0 port for XCC local management only, dedicated RJ-45 1GbE remote systems management port, External diagnostics port for local systems management, NMI pinhole.
Cooling	5x simple-swap 60 mm dual-rotor fans (all standard), N+1 rotor redundant.
Power supply	<p>Up to two hot-swap redundant power supplies</p> <ul style="list-style-type: none"> <li>● 1100W Titanium or Platinum AC power supplies</li> <li>● 1800W Platinum AC power supply</li> <li>● 1100W -48V DC power supply</li> </ul> <p>Note: Power supplies are front-mounted so fan rotation is reversed compared to ThinkSystem servers.</p>
Video	Embedded video graphics with 16 MB memory with 2D hardware accelerator, integrated into the XClarity Controller. Maximum resolution is 1920x1200 32bpp at 60Hz.
Hot-swap parts	Drives (in front drive bays only), power supplies
Systems management	Operator panel with status LEDs. Optional External Diagnostics Handset with LCD display. XClarity Controller 2 (XCC2) embedded management based on the ASPEED AST2600 baseboard management controller (BMC). Dedicated 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. ThinkShield Edge Mobile Management mobile app and XClarity Mobile app for local onsite edge server management.
Security features	Centralized security management with ThinkShield Key Vault Portal web site or manage security directly in XCC2. Platform Firmware Resiliency (PFR) Root of Trust (RoT), Trusted Platform Module, supporting TPM 2.0. Lockable top cover, intrusion detection, self-encrypting drive (SED) support, power-on password, administrator's password. Optional front locking security bezel with duplicate status LEDs
Operating systems supported	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware ESXi. See the <a href="#">Operating system support</a> section for specifics.
Mounting options	2-post rack, 4-post short-depth 600mm rack, 4-post 1000mm rack. Available locking security bezel with dust filter. Available security EIA brackets.
Limited warranty	Three-year 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.

Components	Specification
Dimensions	Width: 445 mm (17.5 in.), height: 87 mm (3.4 in.), depth: 452 mm (17.8 in.). See <a href="#">Physical and electrical specifications</a> for details.
Volume	17.5 liters
Weight	19.21 kg (42.35 lbs)

## Models

ThinkEdge SE455 V3 models can be configured by using the [Lenovo Data Center Solution Configurator \(DCSC\)](#).

Topics in this section:

- [CTO models](#)
- [Base feature code](#)
- [Preconfigured models](#)

### CTO models

ThinkEdge SE455 V3 models can be configured by using the [Lenovo Data Center Solution Configurator \(DCSC\)](#).

**Controlled GPU models:** The "Controlled GPU" base CTO models listed in the table are the only models that support high-performance GPUs and accelerators. These models are classified under US Government ECCN regulations and have limited market and customer availability. All other base models do not support high-performance GPUs.

Preconfigured server models may also be available for the SE455 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 ThinkEdge SE455 V3 server.

Table 2. Base CTO models

Machine Type/Model	Description
7DBYCTO1WW	ThinkEdge SE455 V3 - 3Yr Warranty
7DBYCTOAWW	ThinkEdge SE455 V3 - 3Yr Warranty with Controlled GPU

### Base feature code

The following table lists the base feature code for the server.

Table 3. Chassis base feature code

Feature code	Description
BVTK	ThinkEdge SE455 V3 Chassis

### Preconfigured models

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

- [Models for EMEA region](#)

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

Common to all models:

- Lockdown Control is via the XClarity Controller

### Models for EMEA region

Table 4. Models for EMEA region

Model	AMD EPYC Processor†	Memory	RAID	Front bays	Internal bays	OCP adapter	Riser 1	Riser 2	Power supplies	XCC2	Rail kit
Standard models with a 3-year warranty (machine type 7DBY)											
7DBYA00BEA	1x 8124P 16C 125W 2.45G	1x 32GB 1Rx4	Option	4x 2.5" SATA	4x 2.5" SATA	Option	3 HL slots (G5 x16, 2x G4 x8)	Optional HL	1x1100W Titanium	Plat	600mm

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

### Configurations

The following tables list the supported combinations of slots, adapters and drives, based on the number of double-wide (DW) GPUs installed:

- [Configurations without any DW GPUs](#)
- [Configurations with 1x DW GPU](#)
- [Configurations with 2x DW GPUs](#)

Configuration notes:

- GPUs and Riser 2 can be added as field upgrades
- Front drive bays are standard in all configuration; Internal drive bays are optional and can be added or removed using field upgrade parts
- When 1 DW GPU is installed, it is installed in slot 7; slot 6 must remain empty
- When 2 DW GPUs are installed, they are installed in slot 3 and slot 7; slots 4 and slot 6 must remain empty
- In some configurations, PCIe slots 6 & 8 of Riser 2 share one of the onboard NVMe ports used by the drive bays. As a result, if the internal drive bays are NVMe and the front drives are connected to onboard SATA or NVMe, then slots 6 and 8 in Riser 2 are not connected. Slot 7 is still available, however.

Table 5. Configurations without any double-wide GPUs

Cfg	Riser 1			Riser 2			OCP	SATA controller (mutually exclusive)*		Front drives	Internal drives
	Slot 3 Gen5	Slot 4 Gen4	Slot 5 Gen4	Slot 6 Gen4	Slot 7 Gen5	Slot 8 Gen4		Onboard	Adapter		
<b>SATA front drive bays</b>											
1	x16	x8	x8	x8	x16	x8	Option	Yes	Yes	4x SATA	None
2	x16	x8	x8	x8	x16	x8	Option	Yes	Yes	4x SATA	4x SATA
3	x16	x8	x8	-	x16	-	Option	Yes	No	4x SATA	4x NVMe
4	x16	x8	x8	x8	x16	x8	Option	No	Yes	4x SATA	4x NVMe
5	x16	x8	x8	No Riser 2			Option	Yes	Yes	4x SATA	None
6	x16	x8	x8	No Riser 2			Option	Yes	Yes	4x SATA	4x SATA
7	x16	x8	x8	No Riser 2			Option	Yes	Yes	4x SATA	4x NVMe
<b>NVMe front drive bays</b>											
8	x16	x8	x8	x8	x16	x8	Option	None	None	4x NVMe	None
9	x16	x8	x8	-	x16	-	Option	None	None	4x NVMe	4x NVMe
10	x16	x8	x8	x8	x16	x8	Option	No	Yes	4x NVMe	4x SATA
11	x16	x8	x8	No Riser 2			Option	None	None	4x NVMe	None
12	x16	x8	x8	No Riser 2			Option	None	None	4x NVMe	4x NVMe
13	x16	x8	x8	No Riser 2			Option	No	Yes	4x NVMe	4x SATA

\* Each configuration only supports one SATA controller, either onboard SATA or an HBA/RAID adapter, and this controller will connect to both internal drives (if configured) and front drives

Table 6. Configurations with 1 double-wide GPU

Cfg	Riser 1			Riser 2			OCP	SATA controller (mutually exclusive)*		Front drives	Internal drives
	Slot 3 Gen5	Slot 4 Gen4	Slot 5 Gen4	Slot 6 Gen4	Slot 7 Gen5	Slot 8 Gen4		Onboard	Adapter		
<b>SATA front drive bays</b>											
14	x16	x8	x8	-	x16	x8	Optional	Yes	Yes	4x SATA	None
15	x16	x8	x8	-	x16	x8	Optional	Yes	Yes	4x SATA	4x SATA
16	x16	x8	x8	-	x16	-	Optional	Yes	No	4x SATA	4x NVMe
17	x16	x8	x8	-	x16	x8	Optional	No	Yes	4x SATA	4x NVMe
18	x16	-	x8	No Riser 2			Optional	Yes	Yes	4x SATA	None
19	x16	-	x8	No Riser 2			Optional	Yes	Yes	4x SATA	4x SATA
20	x16	-	x8	No Riser 2			Optional	Yes	Yes	4x SATA	4x NVMe
<b>NVMe front drive bays</b>											
21	x16	x8	x8	-	x16	x8	Optional	None	None	4x NVMe	None
22	x16	x8	x8	-	x16	-	Optional	None	None	4x NVMe	4x NVMe
23	x16	x8	x8	-	x16	x8	Optional	No	Yes	4x NVMe	4x SATA
24	x16	-	x8	No Riser 2			Optional	None	None	4x NVMe	None
25	x16	-	x8	No Riser 2			Optional	None	None	4x NVMe	4x NVMe
26	x16	-	x8	No Riser 2			Optional	No	Yes	4x NVMe	4x SATA

\* Each configuration only supports one SATA controller, either onboard SATA or an HBA/RAID adapter, and this controller will connect to both internal drives (if configured) and front drives

Table 7. Configurations with 2 double-wide GPUs

Cfg	Riser 1			Riser 2			OCP	SATA controller (mutually exclusive)*		Front drives	Internal drives
	Slot 3 Gen5	Slot 4 Gen4	Slot 5 Gen4	Slot 6 Gen4	Slot 7 Gen5	Slot 8 Gen4		Onboard	Adapter		
<b>SATA front drive bays</b>											
27	x16	-	x8	-	x16	x8	Optional	Yes	Yes	4x SATA	None
28	x16	-	x8	-	x16	x8	Optional	Yes	Yes	4x SATA	4x SATA
29	x16	-	x8	-	x16	-	Optional	Yes	No	4x SATA	4x NVMe
30	x16	-	x8	-	x16	x8	Optional	No	Yes	4x SATA	4x NVMe
<b>NVMe front drive bays</b>											
31	x16	-	x8	-	x16	x8	Optional	None	None	4x NVMe	None
32	x16	-	x8	-	x16	-	Optional	None	None	4x NVMe	4x NVMe
33	x16	-	x8	-	x16	x8	Optional	No	Yes	4x NVMe	4x SATA

\* Each configuration only supports one SATA controller, either onboard SATA or an HBA/RAID adapter, and this controller will connect to both internal drives (if configured) and front drives

## Processors

The SE455 V3 supports a single processor in the 4th Gen AMD 8004 Series (formerly codenamed "Siena") based on the AMD Zen 4c architecture.

In this section:

- [Processor options](#)
- [Processor features](#)
- [Heatsink](#)
- [UEFI operating modes](#)

### Processor options

The table below lists the processors that are supported. The server supports only 1 processor installed. No field upgrades are offered.

**NEBS-compliant processors:** The processors with the "PN" suffix are NEBS Level 3 compliant. See the [NEBS support](#) section for additional information.

Table 8. Processor options

Feature code	Description
Processors for non-NEBS configurations	
BW2W	ThinkEdge SE455 V3 AMD EPYC 8024P 8C 90W 2.4GHz Processor
BW2V	ThinkEdge SE455 V3 AMD EPYC 8124P 16C 125W 2.45GHz Processor
BW2U	ThinkEdge SE455 V3 AMD EPYC 8224P 24C 160W 2.55GHz Processor
BW2T	ThinkEdge SE455 V3 AMD EPYC 8324P 32C 180W 2.65GHz Processor
BW2S	ThinkEdge SE455 V3 AMD EPYC 8434P 48C 200W 2.5GHz Processor
BW2R	ThinkEdge SE455 V3 AMD EPYC 8534P 64C 200W 2.3GHz Processor
Processors for NEBS configurations	
BY90	ThinkEdge SE455 V3 AMD EPYC 8024PN 8C 80W 2.05GHz Processor
BY8Z	ThinkEdge SE455 V3 AMD EPYC 8124PN 16C 100W 2.0GHz Processor
BY8Y	ThinkEdge SE455 V3 AMD EPYC 8224PN 24C 120W 2.0GHz Processor
BY8X	ThinkEdge SE455 V3 AMD EPYC 8324PN 32C 130W 2.05GHz Processor
BY8W	ThinkEdge SE455 V3 AMD EPYC 8434PN 48C 155W 2.0GHz Processor
BY8V	ThinkEdge SE455 V3 AMD EPYC 8534PN 64C 175W 2.0GHz Processor

### Processor features

The following table lists the features of the supported processors.



Table 9. Processor features

EPYC model	Cores/ threads	Base frequency	Max Boost Frequency†	L3 Cache	Memory channels	Memory bus	TDP
Processors for non-NEBS configurations							
8024P	8C	2.4GHz	3.0 GHz	32 MB	6	4800 MHz	90W
8124P	16C	2.45GHz	3.0 GHz	64 MB	6	4800 MHz	125W
8224P	24C	2.55GHz	3.0 GHz	64 MB	6	4800 MHz	160W
8324P	32C	2.65GHz	3.0 GHz	128 MB	6	4800 MHz	180W
8434P	48C	2.5GHz	3.1 GHz	128 MB	6	4800 MHz	200W
8534P	64C	2.3GHz	3.1 GHz	128 MB	6	4800 MHz	200W
Processors for NEBS configurations							
8024PN	8C	2.05GHz	3.0 GHz	32 MB	6	4800 MHz	80W
8124PN	16C	2.0GHz	3.0 GHz	64 MB	6	4800 MHz	100W
8224PN	24C	2.0GHz	3.0 GHz	64 MB	6	4800 MHz	120W
8324PN	32C	2.05GHz	3.0 GHz	128 MB	6	4800 MHz	130W
8434PN	48C	2.0GHz	3.0 GHz	128 MB	6	4800 MHz	155W
8534PN	64C	2.0GHz	3.1 GHz	128 MB	6	4800 MHz	175W

† The maximum single-core frequency that the processor is capable of operating at

## Heatsink

For factory orders, the SE455 V3 supports either a 1U or 2U processor heatsink, as listed in the following table. Field upgrades are not supported.

Table 10. Processor heatsink

Part number	Feature code	Description
CTO only	BW3L	ThinkEdge SE455 V3 1U Heatsink
CTO only	BW3M	ThinkEdge SE455 V3 2U Heatsink

The 2U heatsink is recommended to maximize heat dissipation and minimize fan noise, and is the default selection in the DCSC configurator.

The 1U heatsink is required for full-length adapters, however it does have the following requirements:

- Processor with TDP ≤ 130W
- Ambient temperature ≤ 45°C

## UEFI operating modes

The SE455 V3 offers preset operating modes that affect energy consumption and performance. These modes are a collection of predefined low-level UEFI settings that simplify the task of tuning the server to suit your business and workload requirements.

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

Table 11. UEFI operating mode presets in DCSC

Feature code	Description
BFYA	Operating mode selection for: "Maximum Efficiency Mode"
BFYB	Operating mode selection for: "Maximum Performance Mode"

The preset modes for the SE455 V3 are as follows:

- **Maximum Efficiency Mode** (feature BFYA): Maximizes performance/watt efficiency while maintaining reasonable performance
- **Maximum Performance Mode** (feature BFYB): Achieves maximum performance but with higher power consumption and lower energy efficiency.

Configuration notes:

- If either acoustic mode is selected in the DCSC configurator, Maximum Performance Mode (feature BFYB) is not available. For more information about the acoustic modes, see the [Acoustic modes](#) section

## Memory options

The SE455 V3 uses Lenovo TruDDR5 memory operating at up to 4800 MHz. The server supports 6 DIMMs. The processor has 6 memory channels and supports 1 DIMM per channel.

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

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.

Table 12. Memory options

Part number	Feature code	Description	DRAM technology
<b>10x4 RDIMMs</b>			
4X77A81438	BQ39	ThinkSystem 32GB TruDDR5 4800MHz (1Rx4) 10x4 RDIMM-A	16Gb
4X77A81441	BQ3D	ThinkSystem 64GB TruDDR5 4800MHz (2Rx4) 10x4 RDIMM-A	16Gb
4X77A81448	BUVV	ThinkSystem 96GB TruDDR5 4800MHz (2Rx4) 10x4 RDIMM-A	24Gb
<b>x8 RDIMMs</b>			
4X77A81437	BQ3C	ThinkSystem 16GB TruDDR5 4800MHz (1Rx8) RDIMM-A	16Gb
4X77A81440	BQ37	ThinkSystem 32GB TruDDR5 4800MHz (2Rx8) RDIMM-A	16Gb
4X77A81447	BUVU	ThinkSystem 48GB TruDDR5 4800MHz (2Rx8) RDIMM-A	24Gb

The following rules apply when selecting the memory configuration:

- The server supports quantities 1, 2, 4, or 6 DIMMs; other quantities not supported
- Mixing not supported:
  - Mixing 16Gb and 24Gb DIMMs is not supported (see the column in the above table)
  - Mixing x4 and x8 is not supported (see the descriptions of the DIMMs)

- Mixing of DIMM rank counts (1R, 2R) is supported, provided the above mixing rules are met. Follow the required installation order installing the DIMMs with the higher rank counts first.
- Mixing of DIMM capacities is supported, provided the above mixing rules are met. Follow the required installation order installing the larger DIMMs first.

**Note:** Memory mirroring and memory rank sparing are not supported.

For best performance, consider the following:

- Ensure the memory installed is at least the same speed as the memory bus of the selected processor.
- Populate all 6 memory channels with identical DIMMs (same Lenovo part number)

The following memory protection technologies are supported:

- ECC detection/correction
- Advanced Memory Device Correction, (AMDC) (for x4-based memory DIMMs; look for "x4" in the DIMM description.)
- Patrol/Demand Scrubbing
- DRAM Address Command Parity with Replay
- DRAM Uncorrected ECC Error Retry
- On-die ECC
- ECC Error Check and Scrub (ECS)
- Post Package Repair

## Internal storage

The SE455 V3 offers the following internal storage options:

- 4x 2.5-inch front hot-swap drive bays, supporting SATA or NVMe SSD drives with hot-swap trays
- 4x 2.5-inch internal non-hot-swap drive bays, supporting SATA or NVMe SSD drives. Drives are mounted in a cage that rotates up for easy access.
- Up to 2x M.2 drives for boot functions, supporting SATA or NVMe drives (optional RAID using a separate PCIe adapter)

**Internal drives are non-hot-swap:** The drives in the internal drive bays have hot-swap trays however they are not classed as hot-swap because the SE455 V3 does not support in-rack servicing, which means that the server must be powered off and removed from the rack before the top cover can be opened.

The locations of these drive bays is shown in the following figure.

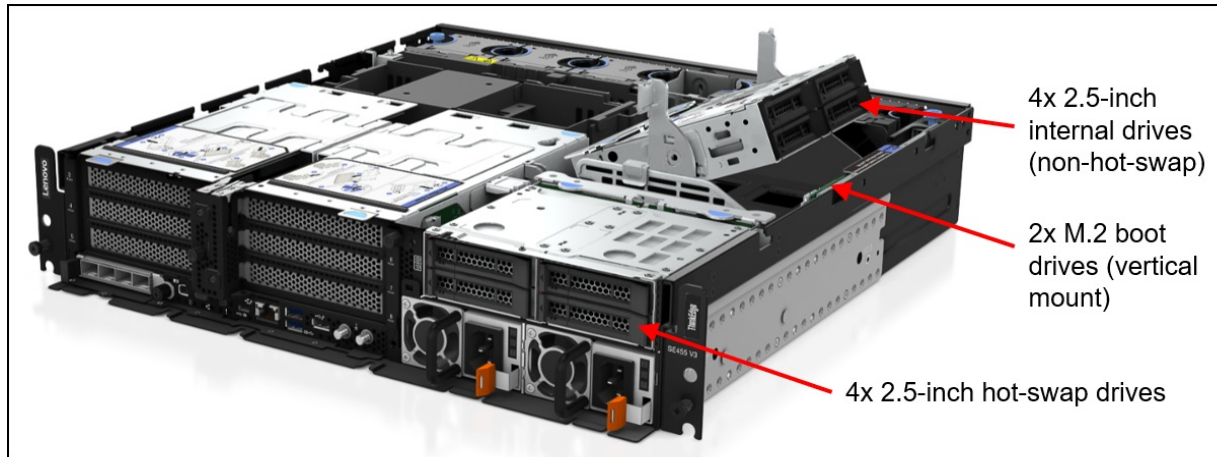


Figure 8. SE455 V3 drive bays

In this section:

- [Front hot-swap drive bays](#)
- [Internal drive bays](#)
- [Supported drive bay combinations](#)
- [Storage field upgrades](#)
- [M.2 drives](#)
- [RAID flash power module \(supercap\) support](#)

### Front hot-swap drive bays

The SE455 V3 supports 4x 2.5-inch hot-swap drive bays at the front of the server, using the backplanes listed in the following table.

Table 13. CTO feature codes for the front drive bays

Feature code	Description
BVUV	ThinkEdge SE455 V3 2.5" SAS/SATA Backplane
BVUU	ThinkEdge SE455 V3 2.5" NVMe Backplane

Configuration requirements:

- Front drive bays are standard in all configurations of the SE455 V3 and cannot be deselected
- Drives supported are either SATA or NVMe, depending on the backplane selected.
- NVMe drives have a PCIe Gen 4 connection
- SAS drives are currently not supported (once supported, the use of SAS drives require a RAID adapter or SAS HBA)

### Internal drive bays

The SE455 V3 supports 4x 2.5-inch drive bays internal to the server on the right side as shown in the figure above.

The drives are installed in a cage that rotates up for easy access, and are mounted with hot-swap drive trays, however they are *not* considered hot-swap. This is because the SE455 V3 does not support in-rack servicing, which means that the server must be powered off and removed from the rack before the top cover can be opened.

The backplanes for the internal drive bays are listed in the following table.

**Tip:** These internal drive backplanes are the same feature codes as the front drive backplanes.

Table 14. Internal drive bays

Part number	Feature code	Description
CTO only	BVUV	ThinkEdge SE455 V3 2.5" SAS/SATA Backplane
CTO only	BVUU	ThinkEdge SE455 V3 2.5" NVMe Backplane

Configuration requirements:

- Internal drive bays are optional.
- Drives supported are either SATA or NVMe, depending on the backplane selected.
- NVMe drives have a PCIe Gen 4 connection
- The front and internal backplanes can be different (they don't both have to be SATA backplanes for example).
- SAS drives are currently not supported (once supported, the use of SAS drives require a RAID adapter or SAS HBA).
- PCIe slots 6 & 8 of Riser 2 share one of the onboard NVMe ports used by the drive bays. As a result, If the internal drive bays are NVMe and the front drives are connected to onboard SATA or NVMe, then slots 6 and 8 in Riser 2 are not connected. Slot 7 is still available, however. See the [Configurations](#) section for specifics.

### Supported drive bay combinations

The following table lists the supported drive bay combinations.

Table 15. Supported drive bay combinations

Config	Front hot-swap drive bays	Internal drive bays	Comment
K	4x SATA (Adapter)	No support	
A	4x SATA (Adapter)	4x SATA (Adapter)	
M	4x SATA (Adapter)	4x NVMe (Onboard)	
J	4x SATA (Onboard)	No support	
F	4x SATA (Onboard)	4x SATA (Onboard)	
G	4x SATA (Onboard)	4x NVMe (Onboard)	Slots 6 and 8 (Riser 2) are not available
I	4x NVMe (Onboard)	No support	
E	4x NVMe (Onboard)	4x NVMe (Onboard)	Slots 6 and 8 (Riser 2) are not available
Q	4x NVMe (Onboard)	4x SATA (Adapter)	

### Storage field upgrades

The following field upgrades are supported:

- Convert a configuration from an onboard controller to a RAID adapter or SAS HBA
- Convert a configuration from a RAID adapter or SAS HBA to an onboard controller
- Change the front hot-swap drive bays from NVMe to SATA, or from SATA to NVMe
- Change the internal drive bays from NVMe to SATA, or from SATA to NVMe

- Add the internal drive bays, either SATA or NVMe
- Remove the internal drive bays

The following table lists the part numbers for upgrading the front drive bays.

Table 16. Field upgrades for the front drive bays

Part number	Description	Max qty	Purpose
Front backplanes			
4XF7A93019	ThinkEdge SE455 V3 4x2.5" SAS/SATA Backplane Option Kit	2	Backplane and bracket for SAS/SATA drives (front or internal)
4XF7A93020	ThinkEdge SE455 V3 4x2.5" NVMe Backplane Option Kit	2	Backplane and bracket for the NVMe drives (front or internal)
SATA cables for connecting front drive bays to the onboard SATA controller			
4X97A93015	ThinkEdge SE455 V3 Onboard SATA Cable for Front Drive Bays	1	SATA cable for front drive bays using the onboard SATA controller
4X97A93016	ThinkEdge SE455 V3 Onboard SATA Y-Cable for Front and Internal Drive Bays	1	SATA cable for use with SATA drives in both front and internal drive bays using the onboard SATA controller
SATA cables for connecting front drive bays to a SAS/SATA adapter			
4X97A88850	ThinkEdge SE455 V3 X350 SAS/SATA Cable for Front/Internal Drive Bays	2	Cable needed for 4350 or 5350 adapters when connected to the front or internal backplane, one per backplane
4X97A88851	ThinkEdge SE455 V3 X40 SAS/SATA Cable for Front/Internal Drive Bays	1	Cable needed for 440, 540, or 940 adapters when <i>either</i> the front or internal backplane is installed
4X97A88852	ThinkEdge SE455 V3 X40 SAS/SATA Y-Cable for Front and Internal Drive Bays	1	Cable needed for 440, 540, or 940 adapters when <i>both</i> the front and internal backplanes are installed and connected to the adapter. Single Y-cable connects to both backplanes.
NVMe cables for connecting front drive bays to the onboard NVMe controller			
4X97A93017	ThinkEdge SE455 V3 Onboard NVMe Cable for Front Drive Bays	1	NVMe cable for front drive bays

The following table lists the part numbers for upgrading the internal drive bays.

Table 17. Field upgrades for internal drive bays

Part number	Description	Max qty	Purpose
Internal drive cage			
4XF7A93022	ThinkEdge SE455 V3 Internal Drive Bays Option Kit	1	Internal drive cage and lift mechanism, and backplane power cable
Internal drive bay backplanes			
4XF7A93019	ThinkEdge SE455 V3 4x2.5" SAS/SATA Backplane Option Kit	2	Backplane and bracket for SAS/SATA drives (front or internal)
4XF7A93020	ThinkEdge SE455 V3 4x2.5" NVMe Backplane Option Kit	2	Backplane and bracket for the NVMe drives (front or internal)
SATA cables to connect Internal drive bay to the onboard SATA controller			
4X97A93016	ThinkEdge SE455 V3 Onboard SATA Y-Cable for Front and Internal Drive Bays	1	SATA cable for use with SATA drives in both front and internal drive bays using the onboard SATA controller
SATA cables for connecting internal drive bays to a SAS/SATA adapter			
4X97A88850	ThinkEdge SE455 V3 X350 SAS/SATA Cable for Front/Internal Drive Bays	2	Cable needed for 4350 or 5350 adapters when connected to the front or internal backplane, one per backplane
4X97A88851	ThinkEdge SE455 V3 X40 SAS/SATA Cable for Front/Internal Drive Bays	1	Cable needed for 440, 540, or 940 adapters when <i>either</i> the front or internal backplane is installed
4X97A88852	ThinkEdge SE455 V3 X40 SAS/SATA Y-Cable for Front and Internal Drive Bays	1	Cable needed for 440, 540, or 940 adapters when <i>both</i> the front and internal backplanes are installed and connected to the adapter. Single Y-cable connects to both backplanes.
NVMe cables to connect Internal drive bay to the onboard NVMe controller			
4X97A93018	ThinkEdge SE455 V3 Onboard NVMe Cables for Internal Drive Bays	1	NVMe Cable for internal drive bays. Option part contains two cables, choice of cable depends on front bay configuration.

If you wish to remove the internal drive bay, you will need to add the air baffle to ensure proper air flow to the M.2 adapter. Ordering information is listed in the following table.

Table 18. M.2 air baffle kit

Part number	Description	Max qty	Purpose
4XF7A93023	ThinkEdge SE455 V3 M.2 Air Baffle Kit	1	Needed to ensure sufficient air is directed to the M.2 adapter. Contains two air baffles

## M.2 drives

The SE455 V3 supports one or two M.2 form-factor SATA or NVMe drives for use as an operating system boot solution. The M.2 drives install into an M.2 adapter which is mounted vertically in the SE455 V3 in a carrier.

The supported M.2 adapter is listed in the following table.



Table 19. M.2 adapter

Part number	Feature code	Description	SATA drives	NVMe drives	RAID	Maximum supported
4Y37A79663	BVUY	ThinkSystem M.2 SATA/x4 NVMe 2-Bay Adapter	Yes*	Yes (x4)	Adapter	1
4Y37A90063	BZPA	ThinkSystem M.2 RAID B540i-2i SATA/NVMe Adapter	Yes	Yes (x1)	Yes (Broadcom)	1

\* SATA drives are supported only with the addition of the RAID 5350-8i adapter

The ThinkSystem M.2 SATA/x4 NVMe 2-Bay Adapter (4Y37A79663) has the following features:

- Supports one or two M.2 drives, either SATA or NVMe
- When two drives installed, they must be either both SATA or both NVMe
- NVMe is supported by using a cable that connects to an onboard NVMe port
- SATA is only supported by connecting to a RAID 5350-8i adapter; no onboard SATA port is supported
- Support 42mm, 60mm, 80mm and 110mm drive form factors (2242, 2260, 2280 and 22110)
- RAID support is implemented using a separate RAID adapter
- Either 6Gbps SATA or PCIe 3.0 x4 interface to the drives depending on the drives installed
- Supports monitoring and reporting of events and temperature through I2C
- Firmware update via Lenovo firmware update tools
- When connected to a separate PCIe RAID adapter, supports SED drive encryption via the RAID adapter, otherwise no SED support

The ThinkSystem M.2 RAID B540i-2i SATA/NVMe Adapter (4Y37A90063) has the following features:

- Supports one or two M.2 drives, either SATA or NVMe
- Support 42mm, 60mm, 80mm and 110mm drive form factors (2242, 2260, 2280 and 22110)
- RAID support via an onboard Broadcom SAS3808N RAID Controller
- With 1 drive, supports JBOD
- With 2 drives, supports 2-drive RAID-0, 2-drive RAID-1, or JBOD
- PCIe 4.0 x2 host interface; PCIe 4.0 x1 connection to each drive
- Management and configuration support via UEFI and OS-based tools
- Supports monitoring and reporting of events and temperature
- Firmware update via Lenovo firmware update tools
- Supports SED drive encryption

ThinkSystem M.2 SATA/x4 NVMe 2-Bay Adapter (4Y37A79663) optionally supports RAID with the addition of a separate RAID adapter. For CTO orders, ordering information is listed in the following table.

Table 20. CTO feature codes to select M.2 RAID

Feature code	Description	RAID support	Maximum supported
Controllers for RAID support of M.2 drives (4Y37A79663 only)			
BVL1	ThinkSystem RAID 5350-8i for M.2 SATA boot Enablement	SATA	1
BVL3	ThinkSystem RAID 540-8i for M.2 NVMe boot Enablement	NVMe	1

### M.2 field upgrades

The SE455 V3 supports the adding either M.2 adapter as a field upgrade.

The following table lists the part numbers needed to add the ThinkSystem M.2 SATA/x4 NVMe 2-Bay Adapter (4Y37A79663) as a field upgrade. Note that 4XF7A89291 does not include the M.2 adapter; you will need to order 4Y37A79663 as well.

Table 21. M.2 field upgrades for ThinkSystem M.2 SATA/x4 NVMe 2-Bay Adapter (4Y37A79663)

Part number	Description	Contents
Components required to install the M.2 adapter (both required)		
4Y37A79663	ThinkSystem M.2 SATA/x4 NVMe 2-Bay Adapter	M.2 adapter
4XF7A89291	ThinkEdge SE455 V3 M.2 SATA/x4 NVMe Carrier and Cable Kit	M.2 carrier and cables
Cable required for M.2 support of a RAID adapter (only one required, based on the adapter selected)		
4X97A89292	ThinkEdge SE455 V3 M.2 SATA Cable for 5350-8i Adapter	Cables for the 5350-8i
4X97A89293	ThinkEdge SE455 V3 M.2 NVMe Cable for 540-8i Adapter	Cables for the 540-8i
RAID adapter (only one required, based on the desired protocol needed, SATA or NVMe)		
4Y37A72482	ThinkSystem RAID 5350-8i PCIe 12Gb Adapter	RAID adapter for SATA
4Y37A78834	ThinkSystem RAID 540-8i PCIe Gen4 12Gb Adapter	RAID adapter for NVMe*

\* Once the 540-8i adapter is installed, it will need to be configured to operate in Tri-mode to enable NVMe RAID.

The following table lists the part numbers needed to add the ThinkSystem M.2 RAID B540i-2i SATA/NVMe Adapter (4Y37A90063) as a field upgrade. A separate RAID adapter is not required nor supported.

Table 22. M.2 field upgrades for ThinkSystem M.2 RAID B540i-2i SATA/NVMe Adapter (4Y37A90063)

Part number	Description	Contents
Components required to install the M.2 adapter (both required)		
4Y37A90063	ThinkSystem M.2 RAID B540i-2i SATA/NVMe Adapter	M.2 adapter
4XF7A93021	ThinkEdge SE455 V3 M.2 RAID B540i-2i Carrier and Cable Kit	M.2 carrier and cable

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

### RAID flash power module (supercap) support

If you plan to add a RAID 940 adapters as a field upgrade, then you will also need to order a separate cable kit. This kit provides a cable of suitable length to connect the RAID adapter's flash power module (supercap) to the RAID adapter.

For CTO orders, the components in the installation kit are automatically derived when you select the RAID adapter.

The supercap is installed in a dedicated location adjacent to the M.2 adapter as shown in the [internal view of the server](#).

Ordering information for the cable kit is listed in the following table. The supercap itself is included with the adapter and does not need to be ordered separately.

Table 23. RAID Flash Power Module cable kit

Part number	Feature code	Description	Maximum supported
4X97A88849	BW2Q	ThinkEdge SE455 V3 Supercap Cable	1

### Controllers for internal storage

The drives of the SE455 V3 are connected to controller on the system board:

- Onboard SATA ports (no RAID support)
- Onboard NVMe ports (no RAID support)

The following table lists the controllers that can also be used for the internal storage of the server.

Configuration rules:

- Only one SATA controller (onboard or RAID adapter or HBA) can be selected. It is not supported to have one controller for the internal drives and a separate controller for the hot-swap drives.

Table 24. Internal Storage adapter support

Part number	Feature code	Description	Maximum supported	Slots supported	Adapter length
Onboard controllers					
None	BC4V	Non-RAID NVMe	1	-	-
SAS HBAs					
4Y37A72480	BJHH	ThinkSystem 4350-8i SAS/SATA 12Gb HBA	1	4,5,7,8	Half
4Y37A78601	BM51	ThinkSystem 440-8i SAS/SATA PCIe Gen4 12Gb HBA	1	4,5,7,8	Half
RAID adapters					
4Y37A72482	BJHK	ThinkSystem RAID 5350-8i PCIe 12Gb Adapter	1	4,5,7,8	Half
4Y37A78834	BMFT	ThinkSystem RAID 540-8i PCIe Gen4 12Gb Adapter	1	4,5,7,8	Half
4Y37A09728	B8NY	ThinkSystem RAID 940-8i 4GB Flash PCIe Gen4 12Gb Adapter	1	4,5,7,8	Half

The onboard SATA controller has the following features:

- Controller integrated into the AMD processor
- Supports up to 8 SATA drives
- Each drive has a 6Gb SATA connection
- JBOD only; no RAID support

The onboard NVMe support has the following features:

- Controller integrated into the AMD processor
- Supports up to 8 NVMe drives direct connected to onboard ports
- Each drive has PCIe 4.0 x4 host interface
- JBOD only; no RAID support

For specifications about the RAID adapters and HBAs supported by the SE455 V3, see the ThinkSystem RAID Adapter and HBA Reference, available from:

<https://lenovopress.lenovo.com/lp1288-thinksystem-raid-adapter-and-hba-reference#se455-v3-support=SE455%2520V3>

For more information about each of the adapters, see the product guides in the RAID adapters or HBA sections of the Lenovo Press web site:

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

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

## Internal drive options

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

2.5-inch hot-swap drives:

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

M.2 drives:

- [M.2 SATA drives](#)
- [M.2 PCIe 4.0 NVMe drives](#)

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

**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 25. 2.5-inch hot-swap 6 Gb SATA SSDs

Part number	Feature code	Description	SED support	Max Qty
<b>2.5-inch hot-swap SSDs - 6 Gb SATA - Mixed Use/Mainstream (3-5 DWPD)</b>				
4XB7A82289	BQ21	ThinkSystem 2.5" 5400 MAX 480GB Mixed Use SATA 6Gb HS SSD	Support	8
4XB7A82290	BQ24	ThinkSystem 2.5" 5400 MAX 960GB Mixed Use SATA 6Gb HS SSD	Support	8
4XB7A82291	BQ22	ThinkSystem 2.5" 5400 MAX 1.92TB Mixed Use SATA 6Gb HS SSD	Support	8
4XB7A82292	BQ23	ThinkSystem 2.5" 5400 MAX 3.84TB Mixed Use SATA 6Gb HS SSD	Support	8
4XB7A17125	BA7Q	ThinkSystem 2.5" S4620 480GB Mixed Use SATA 6Gb HS SSD	No	8
4XB7A17126	BA4T	ThinkSystem 2.5" S4620 960GB Mixed Use SATA 6Gb HS SSD	No	8
4XB7A17127	BA4U	ThinkSystem 2.5" S4620 1.92TB Mixed Use SATA 6Gb HS SSD	No	8
4XB7A17128	BK7L	ThinkSystem 2.5" S4620 3.84TB Mixed Use SATA 6Gb HS SSD	No	8
<b>2.5-inch hot-swap SSDs - 6 Gb SATA - Read Intensive/Entry (&lt;3 DWPD)</b>				
4XB7A82258	BQ1Q	ThinkSystem 2.5" 5400 PRO 240GB Read Intensive SATA 6Gb HS SSD	Support	8
4XB7A82263	BQ1T	ThinkSystem 2.5" 5400 PRO 7.68TB Read Intensive SATA 6Gb HS SSD	Support	8
4XB7A17072	B99D	ThinkSystem 2.5" S4520 240GB Read Intensive SATA 6Gb HS SSD	No	8
4XB7A17101	BA7G	ThinkSystem 2.5" S4520 480GB Read Intensive SATA 6Gb HS SSD	No	8
4XB7A17102	BA7H	ThinkSystem 2.5" S4520 960GB Read Intensive SATA 6Gb HS SSD	No	8
4XB7A17103	BA7J	ThinkSystem 2.5" S4520 1.92TB Read Intensive SATA 6Gb HS SSD	No	8
4XB7A17104	BK77	ThinkSystem 2.5" S4520 3.84TB Read Intensive SATA 6Gb HS SSD	No	8
4XB7A17105	BK78	ThinkSystem 2.5" S4520 7.68TB Read Intensive SATA 6Gb HS SSD	No	8

Table 26. 2.5-inch hot-swap PCIe 4.0 NVMe SSDs

Part number	Feature code	Description	SED support	Max Qty
<b>2.5-inch SSDs - U.2 PCIe 4.0 NVMe - Mixed Use/Mainstream (3-5 DWPD)</b>				
4XB7A17129	BNEG	ThinkSystem 2.5" U.2 P5620 1.6TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Support	8
4XB7A17130	BNEH	ThinkSystem 2.5" U.2 P5620 3.2TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Support	8
4XB7A17133	BNEZ	ThinkSystem 2.5" U.2 P5620 6.4TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Support	8
4XB7A17136	BA4V	ThinkSystem 2.5" U.2 P5620 12.8TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Support	4*
<b>2.5-inch SSDs - U.3 PCIe 4.0 NVMe - Mixed Use/Mainstream (3-5 DWPD)</b>				
4XB7A79639	BNF1	ThinkSystem 2.5" U.3 7450 MAX 800GB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Support	8
4XB7A13967	BNEJ	ThinkSystem 2.5" U.3 7450 MAX 1.6TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Support	4*
4XB7A13970	BNEY	ThinkSystem 2.5" U.3 7450 MAX 3.2TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Support	4*
4XB7A13971	BNEL	ThinkSystem 2.5" U.3 7450 MAX 6.4TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	Support	4*
<b>2.5-inch SSDs - U.2 PCIe 4.0 NVMe - Read Intensive/Entry (&lt;3 DWPD)</b>				
4XB7A13941	BMGD	ThinkSystem 2.5" U.2 P5520 1.92TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	Support	8
4XB7A13942	BMGE	ThinkSystem 2.5" U.2 P5520 3.84TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	Support	8
4XB7A13943	BNEF	ThinkSystem 2.5" U.2 P5520 7.68TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	Support	8
4XB7A13631	BNEQ	ThinkSystem 2.5" U.2 P5520 15.36TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	Support	4*
<b>2.5-inch SSDs - U.3 PCIe 4.0 NVMe - Read Intensive/Entry (&lt;3 DWPD)</b>				
4XB7A79646	BNF3	ThinkSystem 2.5" U.3 7450 PRO 960GB Read Intensive NVMe PCIe 4.0 x4 HS SSD	Support	8
4XB7A79647	BNF2	ThinkSystem 2.5" U.3 7450 PRO 1.92TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	Support	8
4XB7A79648	BNF5	ThinkSystem 2.5" U.3 7450 PRO 3.84TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	Support	4*
4XB7A79649	BNF4	ThinkSystem 2.5" U.3 7450 PRO 7.68TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	Support	4*

\* Only supported in the front hot-swap drive bays; not supported in the internal drive bays

Table 27. M.2 SATA drives

Part number	Feature code	Description	SED support	Max Qty
<b>M.2 SSDs - 6 Gb SATA - Read Intensive/Entry (&lt;3 DWPD)</b>				
4XB7A82286	BQ1Z	ThinkSystem M.2 5400 PRO 240GB Read Intensive SATA 6Gb NHS SSD	Support	2
4XB7A82287	BQ1Y	ThinkSystem M.2 5400 PRO 480GB Read Intensive SATA 6Gb NHS SSD	Support	2
4XB7A82288	BQ20	ThinkSystem M.2 5400 PRO 960GB Read Intensive SATA 6Gb NHS SSD	Support	2
7N47A00130	AUUUV	ThinkSystem M.2 128GB SATA 6Gbps Non-Hot Swap SSD	No	2

Table 28. M.2 PCIe 4.0 NVMe drives

Part number	Feature code	Description	SED support	Max Qty
<b>M.2 SSDs - PCIe 4.0 NVMe - Read Intensive/Entry (&lt;3 DWPD)</b>				
4XB7A82636	BS2P	ThinkSystem M.2 7450 PRO 480GB Read Intensive NVMe PCIe 4.0 x4 NHS SSD	Support	2
4XB7A13999	BKSR	ThinkSystem M.2 7450 PRO 960GB Read Intensive NVMe PCIe 4.0 x4 NHS SSD	Support	2

## Optical drive

The SE455 V3 does not support an optical drive.

## I/O expansion

The SE455 V3 has up to six full-height (FH) PCIe slots for adapters, plus an OCP 3.0 slot. Slots are half-length (FHHL) by default, unless a full-length (FHFL) adapter is selected in the configurator.

- Riser 1:
  - Slot 3: PCIe Gen5 x16
  - Slot 4: PCIe Gen4 x8
  - Slot 5: PCIe Gen4 x8
- Riser 2 (optional)
  - Slot 6: PCIe Gen4 x8 (not connected in some configurations)
  - Slot 7: PCIe Gen5 x16
  - Slot 8: PCIe Gen4 x8 (not connected in some configurations)
- OCP slot 9: PCIe G5 x16

Specific support for these slots is listed in the [Configurations](#) section.

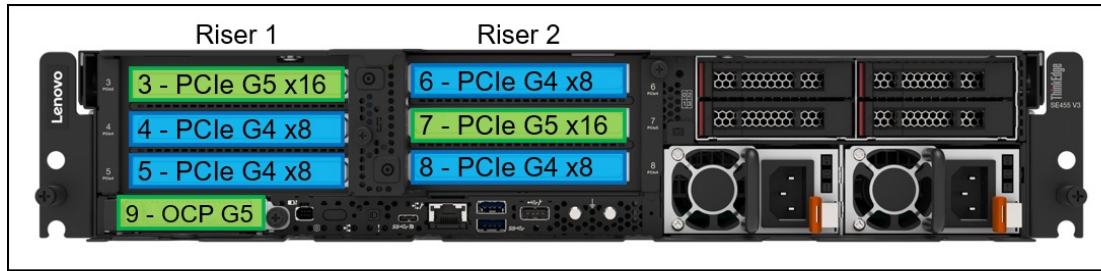


Figure 9. Slot numbering

Ordering information for the Risers are listed in the following table. Riser 1 is standard in all configuration, but Riser 2 is optional and can also be added as a field upgrade.

Table 29. I/O expansion

Part number	Feature code	Description
CTO only	BVUR	ThinkEdge SE455 V3 Riser1
4XF7A89287	BVUS	ThinkEdge SE455 V3 Riser2 Kit

Configurations notes:

- Risers are configured in the factory to support either full-length (FL) adapters or half-length (HL) adapters, based on the adapters selected. Air baffles and cages are derived by the configurator based on whether the adapters are FL or HL to ensure proper airflow and adapter support. For CTO factory orders:
  - Risers with only HL adapters or without any adapters installed will be configured to only support HL adapters
  - Risers with a FL adapter installed will be configured to support FL adapters or a mix of FL and HL adapters
- The use of full-length (FL) adapters requires full-length slots and the processor must have a 1U heatsink; a 2U heatsink is not supported as the FL adapter and 2U heatsink occupy the same physical space.
- If a riser is configured to support FL adapters then it is the upper two slots that support FL adapters (slots 3 & 4 in Riser 1, slots 6 & 7 in Riser 2). The lower slot in each riser (slot 5 and slot 9) will be a HL slot due to physical interference of the 1U heatsink and other components.

### Slot field upgrades

The risers in the SE455 V3 are configured in one of two ways, depending on the factory configuration:

- Support for half-length adapters only (includes low profile): All three slots in the riser will only support half-length adapters. This is the default configuration, and is used if no adapters are configured or if only half-length adapters are configured.
- Support for full-length adapters: The top two slots will support full-length (FHFL) adapters; the bottom slot will only support half-length adapters. Risers will only be configured this way if an adapter in the factory order is a full-length adapter (eg double-wide GPU).

If you wish to convert a server from full-length to half-length or from half-length to full-length, then you will need to order the kit listed in the following table.

**Tip:** A server that is configured for full-length adapters does not automatically support 3x HL (or low profile) adapters per riser, due to the required air baffles not being present. To support 3x HL adapters, you will to order the enablement kit listed in the table.



Table 30. Full Length Adapter Enablement Kit

Part number	Description	Quantity	Purpose
4XF7A89286	ThinkEdge SE455 V3 Full Length Adapter Enablement Kit	1 per server	Converts Riser 1 (slots 3 & 4) and Riser 2 (slots 6 & 7) slots to full-length slots or to half-length slots

Upgrade notes:

- The server only supports FL adapters provided the CPU has a 1U heatsink attached. If a 2U heatsink is used, then the server cannot support an upgrade to FL adapters.
- If Riser 2 is not present, and you wish to add Riser 2 with FL adapter support (eg to add support for a second DW GPU), you will only need to order ThinkEdge SE455 V3 Riser2 Kit, 4XF7A89287. The ThinkEdge SE455 V3 Full Length Adapter Enablement Kit (4XF7A89286) is not required as 4XF7A89287 includes the needed components for FL adapters. For GPUs, you may also need to order a GPU auxiliary power cable as described in the [GPU adapters](#) section.

If you remove a PCIe adapter or an OCP adapter, you should replace them with a slot filler to ensure the correct airflow is maintained. Ordering details are listed in the following table.

Table 31. Slot Filler Kit

Part number	Description	Contents
4XF7A93032	ThinkEdge SE455 V3 PCIe and OCP Slot Filler Kit	1x perforated OCP slot end bracket 3x solid PCIe slot end brackets

## Serial port

The SE455 V3 optionally supports a RS-232 serial port by adding a COM port bracket to a PCIe slot. The bracket is only supported in slot 5 (Riser 1). Ordering information is shown in the following table.

Table 32. Serial port

Part number	Feature code	Description	Maximum supported	Slot supported
4Z17A80446	BMNJ	ThinkSystem COM Port Upgrade Kit v2	1	5

The bracket is shown in the following figure.

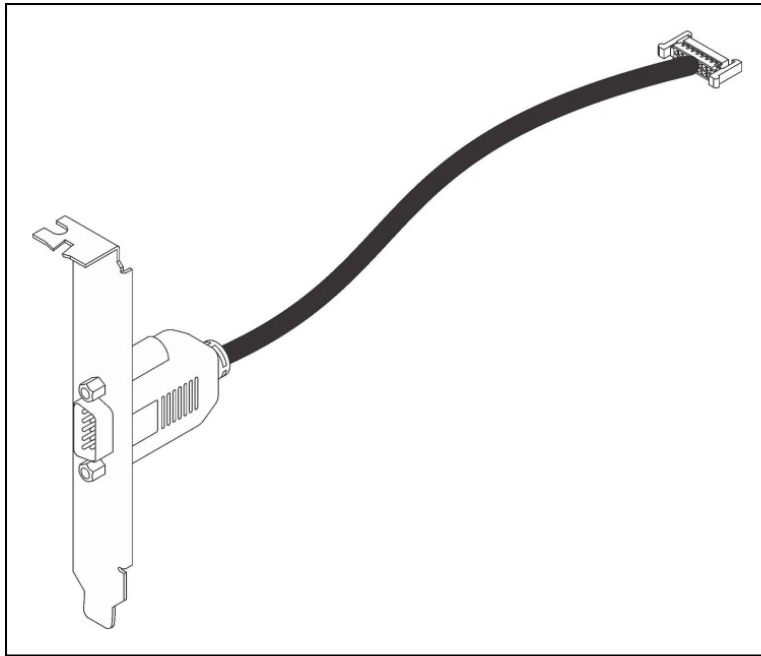


Figure 10. ThinkSystem COM Port Upgrade Kit v2

## Network adapters

The SE455 V3 has a dedicated OCP 3.0 SFF slot with PCIe 5.0 x16 host interface. One port can optionally be shared with the XCC management processor for Wake-on-LAN and NC-SI support.

The following table lists the supported OCP adapters.

Table 33. OCP network adapters

Part number	Feature code	Description	Maximum supported
<b>Gigabit Ethernet</b>			
4XC7A08235	B5T1	ThinkSystem Broadcom 5719 1GbE RJ45 4-port OCP Ethernet Adapter	1
4XC7A08277	B93E	ThinkSystem Intel I350 1GbE RJ45 4-port OCP Ethernet Adapter	1
<b>10 Gb Ethernet 10GBASE-T</b>			
4XC7A08236	B5ST	ThinkSystem Broadcom 57416 10GBASE-T 2-port OCP Ethernet Adapter	1
4XC7A08278	BCD5	ThinkSystem Intel X710-T2L 10GBASE-T 2-port OCP Ethernet Adapter	1
4XC7A80268	BPPY	ThinkSystem Intel X710-T4L 10GBase-T 4-Port OCP Ethernet Adapter	1
<b>25 Gb Ethernet</b>			
4XC7A08237	BN2T	ThinkSystem Broadcom 57414 10/25GbE SFP28 2-Port OCP Ethernet Adapter	1
4XC7A80567	BPPW	ThinkSystem Broadcom 57504 10/25GbE SFP28 4-Port OCP Ethernet Adapter	1
4XC7A08294	BCD4	ThinkSystem Intel E810-DA2 10/25GbE SFP28 2-Port OCP Ethernet Adapter	1
4XC7A80269	BP8L	ThinkSystem Intel E810-DA4 10/25GbE SFP28 4-Port OCP Ethernet Adapter	1
4XC7A62582	BE4T	ThinkSystem Mellanox ConnectX-6 Lx 10/25GbE SFP28 2-Port OCP Ethernet Adapter	1
<b>100 Gb Ethernet</b>			
4XC7A08243	BPPX	ThinkSystem Broadcom 57508 100GbE QSFP56 2-Port OCP Ethernet Adapter	1

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

Table 34. PCIe network adapters

Part number	Feature code	Description	Maximum supported	Slots supported	Adapter length
Gigabit Ethernet					
7ZT7A00484	AUZV	ThinkSystem Broadcom 5719 1GbE RJ45 4-Port PCIe Ethernet Adapter	6	All slots	Half
7ZT7A00535	AUZW	ThinkSystem I350-T4 PCIe 1Gb 4-Port RJ45 Ethernet Adapter	6	All slots	Half
10 Gb Ethernet 10GBASE-T					
7ZT7A00496	AUKP	ThinkSystem Broadcom 57416 10GBASE-T 2-Port PCIe Ethernet Adapter	6	All slots	Half
4XC7A80266	BNWL	ThinkSystem Intel X710-T2L 10GBase-T 2-Port PCIe Ethernet Adapter	6	All slots	Half
4XC7A79699	BMXB	ThinkSystem Intel X710-T4L 10GBase-T 4-Port PCIe Ethernet Adapter	6	All slots	Half
25 Gb Ethernet					
4XC7A08238	BK1H	ThinkSystem Broadcom 57414 10/25GbE SFP28 2-port PCIe Ethernet Adapter	6	All slots	Half
4XC7A80566	BNWM	ThinkSystem Broadcom 57504 10/25GbE SFP28 4-Port PCIe Ethernet Adapter	6	All slots	Half
4XC7A08295	BCD6	ThinkSystem Intel E810-DA2 10/25GbE SFP28 2-Port PCIe Ethernet Adapter	6	All slots	Half
4XC7A80267	BP8M	ThinkSystem Intel E810-DA4 10/25GbE SFP28 4-Port PCIe Ethernet Adapter	6	All slots	Half
4XC7A62580	BE4U	ThinkSystem Mellanox ConnectX-6 Lx 10/25GbE SFP28 2-Port PCIe Ethernet Adapter	6	All slots	Half
100 Gb Ethernet					
4XC7A08297	BK1J	ThinkSystem Broadcom 57508 100GbE QSFP56 2-port PCIe 4 Ethernet Adapter	6	All slots	Half
4XC7A08248	B8PP	ThinkSystem Mellanox ConnectX-6 Dx 100GbE QSFP56 2-port PCIe 4 Ethernet Adapter	6	All slots	Half
200 Gb Ethernet / NDR200 InfiniBand					
4XC7A81883	BQBN	ThinkSystem NVIDIA ConnectX-7 NDR200/200GbE QSFP112 2-port PCIe Gen5 x16 InfiniBand Adapter	6	All slots	Half

Configuration rules:

- For CTO orders, the quantity of Ethernet and InfiniBand cables is limited as follows, due to space limitations in the server packaging. Additional cables can be ordered separately using part numbers.
  - With the security bezel included in the order, at most 2x cables (power cords or network cables) can be included in the CTO order
  - If the security bezel is not included in the order, at most 4x cables (power cords or network cables) can be included in the CTO order
  - No cables 10m or longer can be included in the CTO order and will need to be ordered separately as part numbers.

For more information, including the transceivers and cables that each adapter supports, see the list of Lenovo Press Product Guides in the Networking adapters category:

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

## Accelerators

The SE455 V3 supports the accelerators listed in the following table.

Table 35. Accelerators

Part number	Feature code	Description	Maximum supported	Slots supported	Adapter length
4X67A86560	BVVC	ThinkSystem AMD Alveo V70 Datacenter Accelerator Adapter	6	All slots	Half
4X67A84009	BS49	ThinkSystem Qualcomm Cloud AI 100	3	6, 7, 8	Half

## GPU adapters

The following table lists the supported GPUs.

Table 36. Supported GPUs

Part number	Feature code	Description	Maximum supported	Slots supported	Adapter length
Single-wide GPUs					
CTO only	BP05	ThinkSystem NVIDIA A2 16GB PCIe Gen4 Passive GPU	6	All slots	Half
4X67A81547	BQZT	ThinkSystem NVIDIA A2 16GB PCIe Gen4 Passive GPU w/o CEC	6	All slots	Half
4X67A84824	BS2C	ThinkSystem NVIDIA L4 24GB PCIe Gen4 Passive GPU	6	All slots	Half
Double-wide GPUs					
4X67A84823	BT87	ThinkSystem NVIDIA L40 48GB PCIe Gen4 Passive GPU	2	3,7	Full

Configuration notes:

- Some NVIDIA A Series GPUs are available as two feature codes, one with a CEC chip and one without a CEC chip (ones without the CEC chip have "w/o CEC" in the name). The CEC is a secondary Hardware Root of Trust (RoT) module that provides an additional layer of security, which can be used by customers who have high regulatory requirements or high security standards. NVIDIA uses a multi-layered security model and hence the protection offered by the primary Root of Trust embedded in the GPU is expected to be sufficient for most customers. The CEC defeatured products still offer Secure Boot, Secure Firmware Update, Firmware Rollback Protection, and In-Band Firmware Update Disable. Specifically, without the CEC chip, the GPU does not support Key Revocation or Firmware Attestation. CEC and non-CEC GPUs of the same type of GPU can be mixed in field upgrades.
- Installed GPUs must be identical
- The use of the NVIDIA L40 GPU may require 1800W power supplies, depending on the configuration
- The use of the NVIDIA L40 GPU requires:
  - 1U heatsink
  - Processor with TDP ≤ 130W
  - Ambient temperature ≤ 45°C - see [Operating environment](#) section
  - No acoustic mode selected in the configurator - see [Acoustic modes](#) section

## Field upgrades of the NVIDIA L40 GPU

For field upgrades to add the NVIDIA L40 GPU, additional components are required. These are automatically included in the order for CTO builds, but must be ordered separately for field upgrades, as listed in the following table:

- Auxiliary power cable
- Full-length adapter kit

You will need these two options if you are adding 1x or 2x L40 GPUs, including if you are adding a second L40 GPU to a server that already has one L40 installed in the factory.

If you have Riser 2 installed and only plan to install 1x L40 GPU, install it in Riser 2 (slot 7) to optimize thermal and acoustic performance.

For two GPUs, you will also need to order the Riser 2 kit, if the server doesn't already have Riser 2 installed. See the [I/O expansion](#) section.

**Removing an NVIDIA L40 GPU:** If you wish to remove an L40 GPU from the server and no other full-length adapters are installed in that riser, you will also need to use the full-length adapter kit to convert the riser from full-length to half-length. This will ensure the riser has the necessary brackets and air flow.

Table 37. Components needed for the NVIDIA L40 GPU as a field upgrade

Part number	Description	Quantity	Purpose
4X97A89288	ThinkEdge NVIDIA L40 GPU Power Cable Kit	1 per server	Auxiliary power cables for 2x NVIDIA L40 GPUs (contains 2 cables)
4XF7A89286	ThinkEdge SE455 V3 Full Length Adapter Enablement Kit	1 per server	Converts Riser 1 and Riser 2 slots from half-length to full-length slots, or from full-length to half-length

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

## Cooling

The SE455 V3 server has five 60 mm dual-rotor simple-swap fans.

All five are standard and support N+1 rotor redundancy. If customers choose to have spare fans available for immediate use should one fail, they can be ordered using the part number in the following table.

Table 38. Spare fan

Part number	Description
4XF7A89290	ThinkEdge SE455 V3 Fan

## Power supplies

The SE455 V3 supports one or two hot-swap power supplies, installed at the front of the server. When two are installed, they form a redundant pair. Ordering information is listed in the following table.

Table 39. Power options

Part number	Feature code	Description	Maximum supported
Titanium power supplies			
4P57A78358	BRH9	ThinkEdge 1100W 230V Titanium Hot-Swap Power Supply	2
Platinum power supplies			
4P57A78281	BMH8	ThinkEdge 1100W 230V/115V Platinum Hot-Swap Power Supply	2
4P57A78282	BMH9	ThinkEdge 1800W 230V Platinum Hot-Swap Power Supply	2
DC power supply			
4P57A78283	BMHA	ThinkEdge 1100W -48V DC Hot-Swap Power Supply	2

Configuration requirements:

- If two power supplies are installed, they must be identical.
- Some configurations may require 1800W power supplies. To determine the power supply needed for your configuration, use Lenovo Capacity Planner as described in the [Capacity Planner](#) section.
- Power supplies from other ThinkSystem servers have fans that operate in the opposite direction and are not supported.
- For CTO orders, the quantity of power cables is limited as follows, due to space limitations in the server packaging. Additional cables can be ordered separately using part numbers.
  - With the security bezel included in the order, at most 2x cables (power cords or network cables) can be included in the CTO order
  - If the security bezel is not included in the order, at most 4x cables (power cords or network cables) can be included in the CTO order

**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

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

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

Table 40. Power cords

Part number	Feature code	Description
Rack cables - C13 to C14		
SL67B08593	BPHZ	0.5m, 10A/100-250V, C13 to C14 Jumper Cord
00Y3043	A4VP	1.0m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable
4L67A08367	B0N5	1.0m, 13A/100-250V, C13 to C14 Jumper Cord
39Y7937	6201	1.5m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable
4L67A08368	B0N6	1.5m, 13A/100-250V, C13 to C14 Jumper Cord
4L67A08365	B0N4	2.0m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable
4L67A08369	6570	2.0m, 13A/100-250V, C13 to C14 Jumper Cord
4L67A08366	6311	2.8m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable
4L67A08370	6400	2.8m, 13A/100-250V, C13 to C14 Jumper Cord
39Y7932	6263	4.3m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable
4L67A08371	6583	4.3m, 13A/100-250V, C13 to C14 Rack Power Cable
Rack cables - C13 to C14 (Y-cable)		
00Y3046	A4VQ	1.345m, 2X C13 to C14 Jumper Cord, Rack Power Cable
00Y3047	A4VR	2.054m, 2X C13 to C14 Jumper Cord, Rack Power Cable
Rack cables - C13 to C20		
39Y7938	6204	2.8m, 10A/100-250V, C13 to IEC 320-C20 Rack Power Cable
Rack cables - C13 to C20 (Y-cable)		
47C2491	A3SW	1.2m, 16A/100-250V, 2 Short C13s to Short C20 Rack Power Cable
47C2492	A3SX	2.5m, 16A/100-250V, 2 Long C13s to Short C20 Rack Power Cable
47C2493	A3SY	2.8m, 16A/100-250V, 2 Short C13s to Long C20 Rack Power Cable
47C2494	A3SZ	4.1m, 16A/100-250V, 2 Long C13s to Long C20 Rack Power Cable
Line cords		
39Y7930	6222	2.8m, 10A/250V, C13 to IRAM 2073 (Argentina) Line Cord
81Y2384	6492	4.3m 10A/220V, C13 to IRAM 2073 (Argentina) Line Cord
39Y7924	6211	2.8m, 10A/250V, C13 to AS/NZ 3112 (Australia/NZ) Line Cord
81Y2383	6574	4.3m, 10A/230V, C13 to AS/NZS 3112 (Aus/NZ) Line Cord
69Y1988	6532	2.8m, 10A/250V, C13 to NBR 14136 (Brazil) Line Cord
81Y2387	6404	4.3m, 10A/250V, C13 - 2P+Gnd (Brazil) Line Cord
39Y7928	6210	2.8m, 220-240V, C13 to GB 2099.1 (China) Line Cord
81Y2378	6580	4.3m, 10A/220V, C13 to GB 2099.1 (China) Line Cord
39Y7918	6213	2.8m, 10A/250V, C13 to DK2-5a (Denmark) Line Cord
81Y2382	6575	4.3m, 10A/230V, C13 to DK2-5a (Denmark) Line Cord
39Y7917	6212	2.8m, 10A/230V, C13 to CEE7-VII (Europe) Line Cord

Part number	Feature code	Description
81Y2376	6572	4.3m, 10A/230V, C13 to CEE7-VII (Europe) Line Cord
39Y7927	6269	2.8m, 10A/250V, C13(2P+Gnd) (India) Line Cord
81Y2386	6567	4.3m, 10A/240V, C13 to IS 6538 (India) Line Cord
39Y7920	6218	2.8m, 10A/250V, C13 to SI 32 (Israel) Line Cord
81Y2381	6579	4.3m, 10A/230V, C13 to SI 32 (Israel) Line Cord
39Y7921	6217	2.8m, 220-240V, C13 to CEI 23-16 (Italy/Chile) Line Cord
81Y2380	6493	4.3m, 10A/230V, C13 to CEI 23-16 (Italy/Chile) Line Cord
46M2593	A1RE	2.8m, 12A/125V, C13 to JIS C-8303 (Japan) Line Cord
4L67A08362	6495	4.3m, 12A/200V, C13 to JIS C-8303 (Japan) Line Cord
39Y7926	6335	4.3m, 12A/100V, C13 to JIS C-8303 (Japan) Line Cord
39Y7922	6214	2.8m, 10A/250V, C13 to SABS 164 (S Africa) Line Cord
81Y2379	6576	4.3m, 10A/230V, C13 to SABS 164 (South Africa) Line Cord
39Y7925	6219	2.8m, 220-240V, C13 to KETI (S Korea) Line Cord
81Y2385	6494	4.3m, 12A/220V, C13 to KSC 8305 (S. Korea) Line Cord
39Y7919	6216	2.8m, 10A/250V, C13 to SEV 1011-S24507 (Swiss) Line Cord
81Y2390	6578	4.3m, 10A/230V, C13 to SEV 1011-S24507 (Sws) Line Cord
23R7158	6386	2.8m, 10A/125V, C13 to CNS 10917-3 (Taiwan) Line Cord
81Y2375	6317	2.8m, 10A/240V, C13 to CNS 10917-3 (Taiwan) Line Cord
81Y2374	6402	2.8m, 13A/125V, C13 to CNS 60799 (Taiwan) Line Cord
4L67A08363	AX8B	4.3m, 10A 125V, C13 to CNS 10917 (Taiwan) Line Cord
81Y2389	6531	4.3m, 10A/250V, C13 to 76 CNS 10917-3 (Taiwan) Line Cord
81Y2388	6530	4.3m, 13A/125V, C13 to CNS 10917 (Taiwan) Line Cord
39Y7923	6215	2.8m, 10A/250V, C13 to BS 1363/A (UK) Line Cord
81Y2377	6577	4.3m, 10A/230V, C13 to BS 1363/A (UK) Line Cord
90Y3016	6313	2.8m, 10A/120V, C13 to NEMA 5-15P (US) Line Cord
46M2592	A1RF	2.8m, 10A/250V, C13 to NEMA 6-15P Line Cord
00WH545	6401	2.8m, 13A/120V, C13 to NEMA 5-15P (US) Line Cord
4L67A08359	6370	4.3m, 10A/125V, C13 to NEMA 5-15P (US) Line Cord
4L67A08361	6373	4.3m, 10A/250V, C13 to NEMA 6-15P (US) Line Cord
4L67A08360	AX8A	4.3m, 13A/120V, C13 to NEMA 5-15P (US) Line Cord

### -48V DC power cord

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

Table 41. -48V DC power cable

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

### Systems management

The SE455 V3 contains an integrated service processor, XClarity Controller 2 (XCC2), which provides advanced control, monitoring, and alerting functions. The XCC2 is based on the ASPEED AST2600 baseboard management controller (BMC).

Topics in this section:

- [Local management](#)
- [External Diagnostics Handset](#)
- [System status with XClarity Mobile](#)
- [Remote management](#)
- [MicroSD slot for XCC2 storage](#)
- [XCC2 Platinum](#)
- [Lenovo XClarity Provisioning Manager](#)
- [Lenovo XClarity Administrator](#)
- [Lenovo XClarity Integrators](#)
- [Lenovo XClarity Essentials](#)
- [Lenovo XClarity Energy Manager](#)
- [Lenovo Capacity Planner](#)

**Activation:** See the [System Lockdown](#) section

## Local management

The SE455 V3 offers a front operator panel with key controls and status indicators, as shown in the following figure.

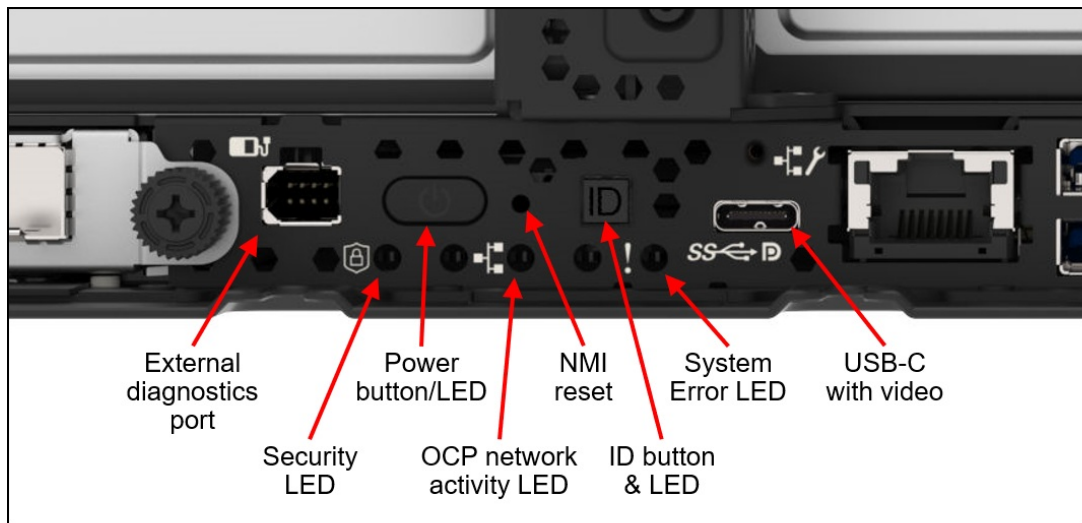


Figure 11. Front operator panel and system LEDs

The buttons on the front of the server:

- Power button
- ID (identification) button - turns on the LED housed within the button as well as passing the signal to the XCC for display remotely in XClarity Administrator
- NMI reset (pin hole) - force a nonmaskable interrupt (NMI) to the processor

The LEDs on the front of the server are as follows:

- Security LED (green) - indicates the state of server security:
  - Solid on - The server is operating with security feature enabled
  - Blinking - The server is in System Lockdown Mode. The server must be activated or unlocked to operate
  - Off - No security feature is enabled on the server

- Power LED (green) - indicates power status, as follows:
  - Off - Server does not have power applied
  - Fast flash (4 times per second) - The server has just had power applied and is not ready to be powered on yet
  - Slow flash (once per second) - Server is ready to be powered on
  - On solid - Server is powered on
- Ethernet network activity - indicates when the Ethernet adapter installed in the OCP slot has activity
- Identification LED (blue) - lights when the button is pressed or when the function is activated remotely in XClarity Controller.
- System error LED (yellow)

The power, network, ID and error LEDs are duplicated on the front of the security bezel as shown in the [Security](#) section.

The SE455 V3 provides a USB-C port for connecting to a local video display. For VGA connections, a USB-C-to-VGA conversion cable is included with the server. Additional VGA cables can be ordered as listed in the following table.

Table 42. USB-C to VGA video conversion cable

Part number	Feature code	Description
4X97A86591	BS4E	ThinkEdge 130mm USB-C to VGA Display Cable

### External Diagnostics Handset

The SE455 V3 also has a port to connect an External Diagnostics Handset as shown in the following figure. The External Diagnostics Handset has the same functions as the Integrated Diagnostics Panel but has the advantages of not consuming space on the front of the server plus it can be shared amongst many servers in your data center. The handset has a magnet on the back of it to allow you to easily mount it on a convenient place on any rack cabinet.

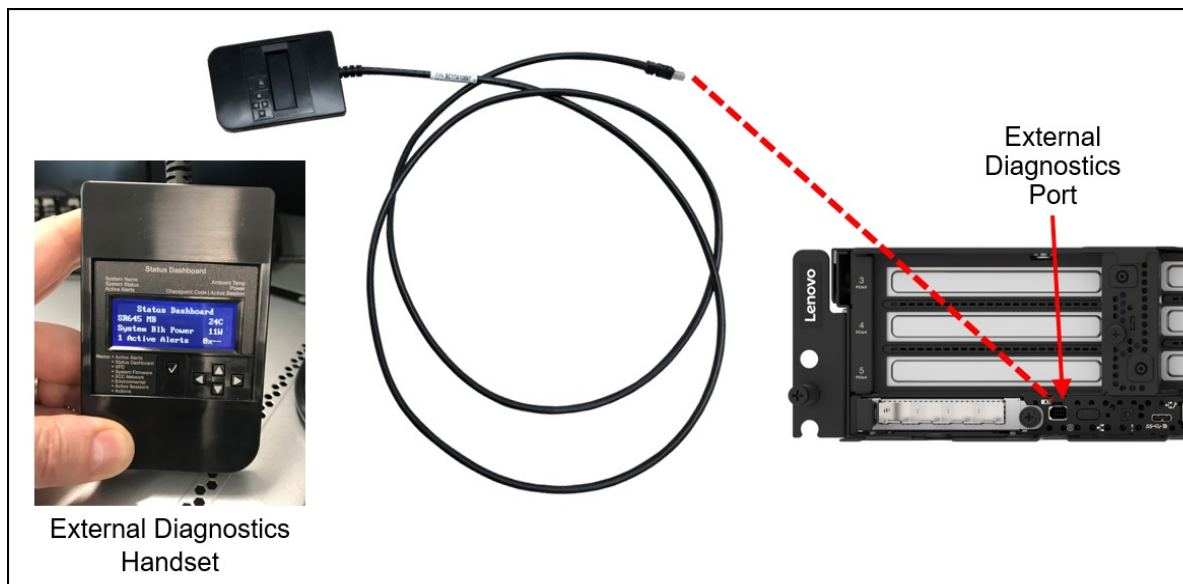


Figure 12. External Diagnostics Handset

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

**Field upgrade only:** The External Diagnostics Handset is only available as an option for field upgrades. Not available in CTO orders.


Table 43. External Diagnostics Handset ordering information

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

### 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

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

Remote management is available via the following connections:

- Via the dedicated Ethernet port for management. See the [Components and connectors](#) section for the location of these ports.
- Via Port 1 of the OCP adapter (if installed), which supports NC-SI to allow sharing of the Ethernet port between the operating system and remote management.

The front of the server houses an pull-out information 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. See the [Components and connectors](#) section for the location of this pull-out tab.

## MicroSD slot for XCC2 storage

The SE455 V3 offers a MicroSD card slot 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. Without a MicroSD card installed, the XCC2 controller will have 100MB of available RDOC storage.

The MicroSD card slot is located at the front of the server adjacent to the OCP slot, as shown in the [Internal view](#) of the server.

Ordering information for the supported USB drive and Micro SD card are listed in the following table.

Table 44. MicroSD storage for XCC2

Part number	Feature code	Description
4X77A77064	BNWP	ThinkSystem MicroSD 32GB Class 10 Flash Memory Card

## XCC2 Platinum

The XCC2 service processor in the SE455 V3 supports an upgrade to the Platinum level of features. Compared to the XCC functions of ThinkSystem V2 and earlier systems, Platinum adds the same features as Enterprise and Advanced levels in ThinkSystem V2, plus additional features.

XCC2 Platinum adds the following Enterprise and Advanced functions:

- Remotely viewing video with graphics resolutions up to 1600x1200 at 75 Hz with up to 23 bits per pixel, regardless of the system state
- Remotely accessing the server using the keyboard and mouse from a remote client
- International keyboard mapping support
- Syslog alerting
- Redirecting serial console via SSH
- Component replacement log (Maintenance History log)
- Access restriction (IP address blocking)
- Lenovo SED security key management
- Displaying graphics for real-time and historical power usage data and temperature
- Boot video capture and crash video capture
- Virtual console collaboration - Ability for up to 6 remote users to be log into the remote session simultaneously
- Remote console Java client
- Mapping the ISO and image files located on the local client as virtual drives for use by the server
- Mounting the remote ISO and image files via HTTPS, SFTP, CIFS, and NFS
- System utilization data and graphic view
- Single sign on with Lenovo XClarity Administrator
- Update firmware from a repository
- License for XClarity Energy Manager

**Note:** The SE455 V3 does not support Power capping.

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

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

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

Table 45. XCC2 Platinum license upgrade

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

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

Table 46. 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](https://pubs.lenovo.com/xcc2/NN1ia_c_systemguard)

### Lenovo XClarity Provisioning Manager

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

LXPM provides the following functions:

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

### Lenovo XClarity Administrator

Lenovo XClarity Administrator is a centralized resource management solution designed to reduce complexity, speed response, and enhance the availability of Lenovo systems and solutions. It provides agent-free hardware management for ThinkSystem servers, in addition to ThinkServer, System x, and Flex System servers. The administration dashboard is based on HTML 5 and allows fast location of resources so tasks can be run quickly.

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

Lenovo XClarity Administrator is an optional software component for the SE455 V3. The software can be downloaded and used at no charge to discover and monitor the SE455 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 47. Lenovo XClarity Pro ordering information

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

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

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

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

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

For more information, refer to the Lenovo XClarity Administrator Product Guide:

<http://lenovopress.com/tips1200>

### Lenovo XClarity Integrators

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

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



Lenovo XClarity Integrators offer the following additional features:

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

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

## Lenovo XClarity Essentials

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

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

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

## Lenovo XClarity Energy Manager

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

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

Table 48. Lenovo XClarity Energy Manager

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

**Note:** The SE455 V3 does not support the following Energy Manager functions:

- Power capping
- Policy-based management

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

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

## Lenovo Capacity Planner

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

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

## Security

Topics in this section:

- [Security features](#)
- [Intrusion switch](#)
- [Firmware and Root of Trust Security Module](#)
- [Security bezel](#)
- [Platform Firmware Resiliency - Lenovo ThinkShield](#)
- [System Lockdown Mode](#)
- [SED encryption in factory orders](#)
- [AMD Infinity Guard](#)

### Security features

The SE455 V3 offers a number of security features, both electronic and physical.

Physical security features:

- Lockable top cover
- Front security bezel with key lock (optional, available as a field upgrade). See [Security bezel](#).
- Intrusion detection. See [Intrusion switch](#).
- EIA mounting flange with security key (optional, available as a field upgrade). Available EIA bracket that uses a security screw to attach the server to the front flange of the rack cabinet. See [EIA bracket with security screw](#) for more information.

Electronic security features include:

- Tamper Detection with System Lockdown. In the event of an intrusion or movement, the server can be configured in XCC to perform actions, including server shutdown, data SED lockdown, and disabling remote access to the XCC from the network ports (referred to as the BMC network bridge).
- Management of these lockdown features can be either centralized via the ThinkShield Key Vault Portal, or performed locally in the XCC management controller. See the [System Lockdown Mode Control](#) system for details.
- Self-encrypting (SED) drives that ensure data is secured when the drives are powered off
- Administrator password and a power-on password in UEFI

- Root of Trust (RoT) module providing Platform Firmware Resiliency (PFR) and Trusted Platform Module (TPM 2.0) functionality. See [Firmware and Root of Trust Security Module](#) .
- AMD Infinity Guard, as described in the AMD Infinity Guard section

For more information, see ThinkEdge Security, available from:  
<https://lenovopress.lenovo.com/lp1725-thinkedge-security>

The server is NIST SP 800-147B compliant.

The following figure shows the location of the exterior security features.

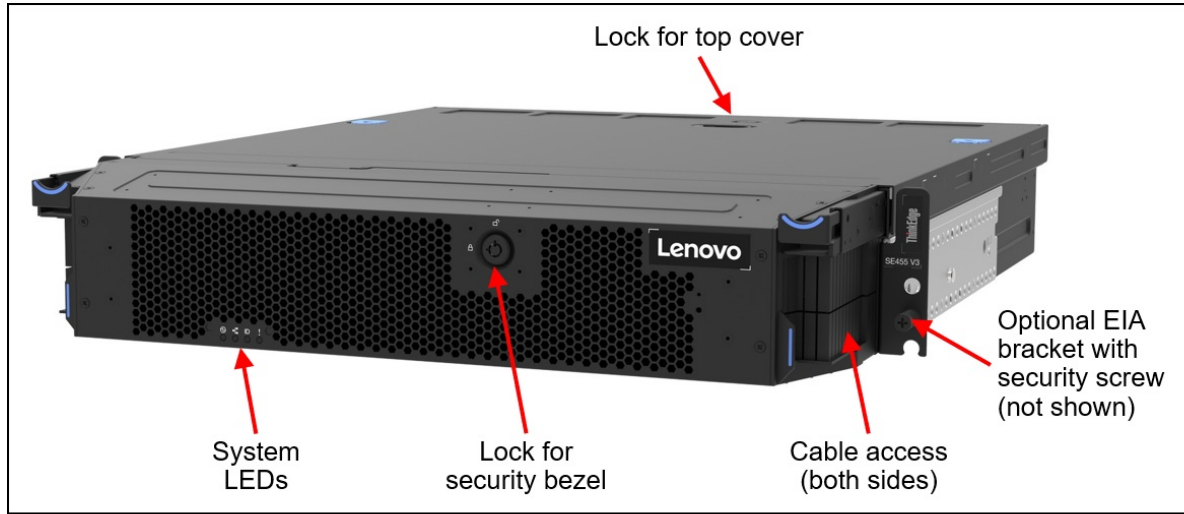


Figure 13. SE455 V3 Security bezel

### Intrusion switch

The server supports an intrusion switch that rests against the top cover. See the [Internal view](#) of the server for the location of this component. In the event that the cover is removed, a Warning event is recorded in XClarity Controller and actions can be taken to secure the server.

The intrusion switch is included in all orders.

Table 49. Intrusion switch

Feature code	Description
BVV6	ThinkEdge SE455 V3 Intrusion Switch

## Firmware and Root of Trust Security Module

The SE455 V3 includes a security mezzanine card that plugs into the system board as shown in the [Internal view](#) of the server. The RoT module has the following functions:

- Contains the following components:
  - Root of Trust chip
  - Trusted Platform Module 2.0 (TPM 2.0) chip
  - Non-volatile storage for configuration data
- Provides support for Platform Firmware Resiliency (PFR) as described in the [Lenovo ThinkShield - Platform Firmware Resiliency](#) section
- Allows field recovery of a firmware-corrupted system without requiring planar replacement
- Allows field replacement of system planar while maintaining customer code levels and configuration settings

Ordering information is listed in the following table.

Table 50. Root of Trust module

Part number	Feature code	Description	Markets
CTO only	BVTM	ThinkEdge SE455 V3 Root of Trust	All markets except China
CTO only	BVTN	ThinkEdge SE455 V3 Root of Trust for PRC	China only

## Security bezel

The security bezel is an optional component that mounts on the front of the server that restricts access to networking connectors on the front of the server. In the event that the bezel is added or removed, an Information event is recorded in XClarity Controller and actions can be taken to secure the server.

The following figure shows the SE455 V3 with security bezel installed.



Figure 14. SE455 V3 with security bezel installed

The security bezel includes a dust filter as described in the [Operating environment](#) section. Additional dust filters are orderable.

Ordering information for the bezel and additional dust filters is listed in the following table.

Table 51. Security bezel

Part number	Feature code	Description
4XF7A88070	BVTQ	ThinkEdge SE455 V3 Security Bezel Kit
4XF7A89295	None*	ThinkEdge SE455 V3 Bezel Filter

\* Field upgrades only; the security bezel includes one filter

The security bezel also includes the following system LEDs:

- Power
- Ethernet network activity (OCP adapter)
- ID (identification)
- System error

See the [Local management](#) section for information about these LEDs.

### 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 ThinkEdge SE455 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 SE455 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 52. 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.

## System Lockdown Mode

System Lockdown Mode is an optional security feature of the SE455 V3 that ensures that the system is only used by its intended recipient and that all data and applications remains secure.

System Lockdown Mode is an optional feature that can be remotely managed in two ways:

- ThinkShield Key Vault Portal Managed. This provides a centralised remote management approach, allowing the administrator to remotely managed multiple systems and to register ownership of systems to their company, which reduces the system's value if stolen.
- XClarity Controller Managed. This provides remote management level control to an individual system using XCC web interface, OneCLI or Redfish.

To select ThinkShield Key Vault Portal Managed in factory orders, select feature BYBR, as listed in the following table. The default in DCSC is to select XClarity Controller Managed, feature BYBQ.

Table 53. Feature codes to activate System Lockdown mode

Feature code	Description	Purpose
BYBR	ThinkShield Key Vault Portal Managed	System Lockdown Mode is enabled in the factory (Activation required on delivery). The server remains secured and in System Lockdown Mode until registered and activated with the ThinkEdge Key Vault Portal. Unauthorized tampering of the server will result in the server being locked down and the data secured, and will remain in this state until reauthenticated with the Key Vault Portal.
BYBQ	XClarity Controller Managed	Default choice in DCSC. System Lockdown Mode is not enabled in the factory. Configures the server security to be managed by the XCC2 management processor. Server will boot at first power on and, by default, will not be locked down on any tamper event. You can configure tamper detection in the XCC2 interface if desired. The server can be converted to be managed ThinkShield Key Vault Portal at a later stage if desired (one-way conversion).

If System Lockdown is enabled in the factory, the system will be delivered in system lockdown mode and will require activation before operation. There are three ways the server can be activated:

- Using a mobile device (iOS or Android) connect to the server to the USB management port on the front of the server and running the [ThinkShield Edge Mobile Management app](#).
- Connecting the system to the Internet via the XCC management port on the front of the server and accessing the [ThinkShield Key Vault Portal](#) from a web browser on another system.
- In a disconnected mode, where neither a mobile device or an internet connection to the SE455 V3 are available.

For more information, see ThinkEdge Security, available from:

<https://lenovopress.lenovo.com/lp1725-thinkedge-security>

**Converting from XCC Managed to Portal Managed:** Is it possible to convert a system from XCC Managed security to ThinkShield Key Vault Portal Managed via the XCC management interface, however the reverse is not possible. Once a server is in ThinkShield Key Vault Portal Managed mode, it cannot be converted back to XClarity Controller Managed.

The SE455 V3 offers a Security LED that indicates the status of the server:

- LED on: Security is enabled; System is operational.
- LED blinking: Security is enabled and the server is in lockdown, either due to being delivered from the factory in lockdown mode or has entered lockdown as a result of a tamper event. System must be activated or reactivated before becoming operational.
- LED off: Security is disabled; System is operational.

### SED encryption in factory orders

The SE455 V3 also optionally supports enabling SED drive encryption in the factory using feature BYBS as listed in the following table. This feature enables SED on the selected drives and sets and SED Authentication Key (SED AK).

If SED drive encryption is disabled in factory, it is possible to enable it later in XClarity Controller. Note that it is not possible to disable drive encryption once it has been enabled.

**Tip:** SED encryption is a function that is independent of System Lockdown Control.

Table 54. SED encryption in factory orders

Feature code	Description	Purpose
BYBS	SED Enabled	Enables SED drive encryption on all factory installed drives and sets an SED Authentication Key (AK).
C1QS	SED Disabled	No drive encryption set in factory. It can be enabled later in XClarity Controller.

### AMD Infinity Guard

The SE455 V3 implements the following security features enabled in the AMD EPYC processor:

- Secure Memory Encryption  
Helps protect against attacks on the integrity of main memory (such as cold-boot attacks) because it encrypts the data. High-performance encryption engines integrated into the memory channels help speed performance. All of this is accomplished without modifications to your application software.
- Secure Encrypted Virtualization  
Helps safeguard privacy and integrity by encrypting each virtual machine with one of up to 509 unique encryption keys known only to the processor. This aids in protecting confidentiality of your data even if a malicious virtual machine finds a way into your virtual machine's memory, or a compromised hypervisor reaches into a guest virtual machine.
- Secure Nested Paging  
Adds strong memory integrity protection capabilities to help prevent malicious hypervisor based attacks like data replay, memory re-mapping, and more in order to create an isolated execution environment.
- Secure Boot  
Mitigates against firmware-level attacks, Extends the AMD silicon root of trust to help protect the system BIOS. This helps the system establish an unbroken chain of trust from the AMD silicon root of trust to the BIOS using AMD Secure Boot, and then from the system BIOS to the OS Bootloader using UEFI secure boot.

- Shadow Stack

Provides hardware-enforced stack protection capabilities address threat vectors such as return oriented programming attacks by keeping a record of the return addresses so a comparison can be made to ensure integrity is not compromised. In addition, AMD Shadow Stack enables Microsoft® hardware enforced stack protection.

For more information, see the AMD Infinity Guard web page:

<https://www.amd.com/en/technologies/infinity-guard>

## Rack installation

The SE455 V3 server can be installed in a rack cabinet, either 2-post, 4-post long, or 4-post short.

In this section:

- [Rail kits](#)
- [EIA bracket with security screw](#)
- [EIA bracket adjustment](#)

### Rail kits

The following table lists the available rail kits. Each kit includes the left and right rails plus mounting hardware.

Table 55. Rail kits

Part number	Feature code	Description
4XF7A90718	BY8U*	ThinkEdge 1000mm Friction Rail Kit v2
4XF7A81942	BMH2	ThinkEdge 600mm Ball Bearing Rail Kit
4XF7A81941	BMH1	ThinkEdge 2-Post Friction Rail Kit

**\* 1000mm rail kit and CTO orders:** The 1000mm rail kit can only be included in CTO orders provided that the server is installed and shipped in a rack cabinet from the factory. If the order does not include factory installation into a rack cabinet, then the rail kit will need to be ordered separately using the option part number.

The following table summarizes the specifications of the available rail kits.

Table 56. Specifications of the SE455 V3 rail kits

Specification	ThinkEdge 1000mm Friction Rail Kit v2	ThinkEdge 600mm Ball Bearing Rail Kit	ThinkEdge 2-Post Friction Rail Kit
Part number	4XF7A90718	4XF7A81942	4XF7A81941
CMA	No	No	No
Rail length	751 mm (29.56 in)	454 mm (17.87 in)	484 mm (19.06 in)
Rail type	Full-out slide rail (friction)	Full-out slide rail (ball bearing)	Half-out slide rail (friction)
Slide travel	480 mm (18.9 in)	485 mm (19.1 in)	270 mm (10.6 in)
Tool-less installation	Yes	Yes	No (screw-in)
In-rack server maintenance	Limited support	No	No
1U PDU support	Yes	Yes	Yes
0U PDU support	Limited support	Not applicable	Not applicable



Specification	ThinkEdge 1000mm Friction Rail Kit v2	ThinkEdge 600mm Ball Bearing Rail Kit	ThinkEdge 2-Post Friction Rail Kit
Rack type	Four-post IBM and Lenovo standard rack	Four-post 600 mm depth standard rack	2-post rack
Mounting holes	Square or round	Square or round	Square, round, or threaded
Mounting flange thickness	2 - 3.3 mm (0.08 - 0.13 in)	2 - 3.3 mm (0.08 - 0.13 in)	76 - 279 mm (3 - 11 in)
Supported distance between front and rear mounting flanges	610 - 864 mm (24 - 34 in)	380 - 500mm (15 - 19.7 in)	Not applicable

For details on the installation of these kits, see each of the ThinkEdge SE455 V3 rack installation guides, available from the Information Center, <https://pubs.lenovo.com>

For information on supported rack cabinets, see the [Rack cabinets](#) section.

### EIA bracket with security screw

The SE455 V3 offers two types of EIA brackets (also known as ear brackets or ears):

- Standard EIA bracket - uses thumbscrews to secure the server to the front flange of the cabinet
- Security EIA bracket - uses security screws and key to secure the server to the front flange of the cabinet

The use of the security bracket and key (the key is included with the brackets) aids in preventing unauthorized personnel from removing the server from the rack.

The following figure shows the two EIA bracket types.

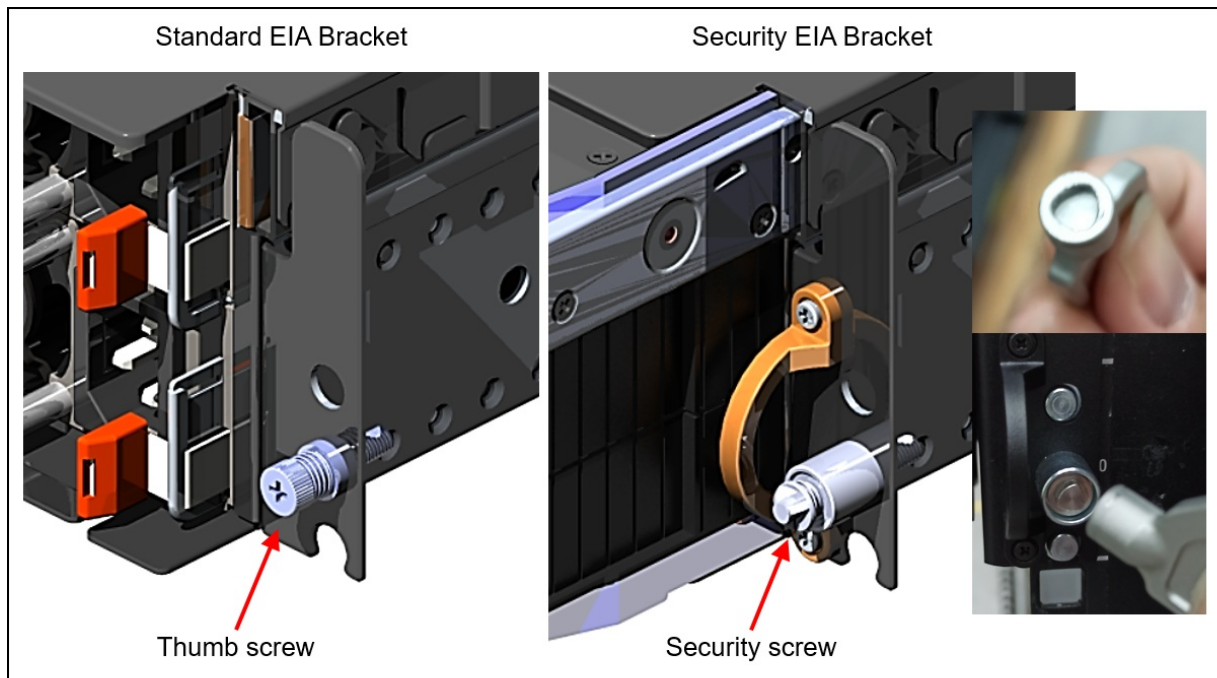


Figure 15. EIA brackets for the SE455 V3

Ordering information is listed in the following table.

Table 57. EIA bracket choices

Part number	Feature code	Description
4XF7A90723	BY8L	ThinkEdge SE455 V3 Security EIA Bracket
CTO only	BVTX	ThinkEdge SE455 V3 Standard EIA Bracket

### EIA bracket adjustment

When installed in a rack cabinet, the EIA brackets on either side of the SE455 V3 chassis can be adjusted to best fit the front cabling and clearance needs of your environment. The EIA brackets can be in one of six different positions as shown in the following figure.

Position 1 locates the server as far back into the rack cabinet as possible, such that the front of the security bezel is flush with the front flange of the cabinet. The distance between positions 1, 2, 3, 4, 5, and 6 is 12.5 mm. Position "Max" positions the server as far forward as possible, and is an additional 37.5 mm from position 6, for a total of 112.5 mm difference between positions 1 and Max.

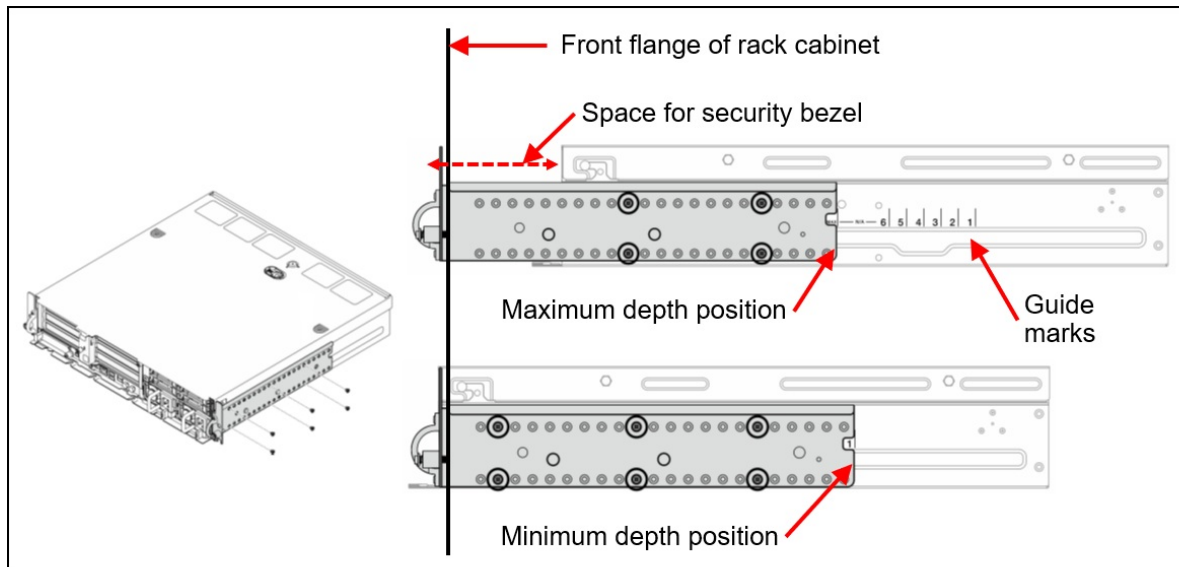


Figure 16. Adjusting the locations of the EIA brackets on the sides of the server

## Operating system support

The SE455 V3 supports the following operating systems:

- Microsoft Windows Server 2019
- Microsoft Windows Server 2022
- Red Hat Enterprise Linux 8.6
- Red Hat Enterprise Linux 8.8
- Red Hat Enterprise Linux 8.9
- Red Hat Enterprise Linux 9.0
- Red Hat Enterprise Linux 9.2
- Red Hat Enterprise Linux 9.3
- SUSE Linux Enterprise Server 15 SP4
- SUSE Linux Enterprise Server 15 SP5
- SUSE Linux Enterprise Server 15 Xen SP4
- SUSE Linux Enterprise Server 15 Xen SP5
- Ubuntu 20.04 LTS 64-bit
- Ubuntu 22.04 LTS 64-bit
- VMware ESXi 7.0 U3
- VMware ESXi 8.0 U1
- VMware ESXi 8.0 U2

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

<https://lenovopress.com/osig#servers=se455-v3-7dby>

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

Table 58. VMware ESXi preload

Part number	Feature code	Description
CTO only	BMEY	VMware ESXi 7.0 U3 (Factory Installed)
CTO only	BQ8S	VMware ESXi 8.0 U1 (Factory Installed)
CTO only	BYC7	VMware ESXi 8.0 U2 (Factory Installed)

Configuration rule:

- An ESXi preload cannot be selected if the configuration includes an NVIDIA GPU (ESXi preload cannot include the NVIDIA driver)

## Hyperconverged infrastructure support

Lenovo ThinkEdge systems can be used in hyperconverged solutions either as part of a Lenovo configured and optimized Lenovo ThinkAgile solution, or as a user-configured system.

Refer to the following links for full details.

### VMware vSAN

SE455 V3 supports vSAN ESA. For more information refer to this page:  
[vSAN Express Storage Architecture \(ESA\) ReadyNode Configurator](#)

### Microsoft Azure Stack HCI

SE455 V3 is the base hardware for the ThinkAgile MX455 V3 Edge Integrated System. For more information refer to the product guide:

<https://lenovopress.lenovo.com/lp1889-thinkagile-mx455-v3-edge-integrated-system>

### Sunlight

SE455 V3 is supported by Sunlight HyperConverged Edge. For more information refer to this page:

<https://sunlight.io/products/thinkedgethinksystem>

## Physical and electrical specifications

The SE455 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: 445 mm (17.5 inches)
- Height: 87 mm (3.4 inches)
- Depth: 452 mm (17.8 inches)

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

Table 59. Detailed dimensions

Dimension	Description
481 mm	$X_a$ = Width, to the outsides of the front EIA flanges
435 mm	$X_b$ = Width, to the rack rail mating surfaces
445 mm	$X_c$ = Width, to the outer most chassis body feature
87 mm	$Y_a$ = Height, from the bottom of chassis to the top of the chassis
438 mm	$Z_a$ = Depth, from the rack flange mating surface to the rearmost I/O port surface
438 mm	$Z_b$ = Depth, from the rack flange mating surface to the rearmost feature of the chassis body
438 mm	$Z_c$ = Depth, from the rack flange mating surface to the rearmost feature such as power supply handle
14 mm	$Z_d$ = Depth, from the forwardmost feature on front of EIA flange to the rack flange mating surface
109 mm	$Z_e$ = Depth, from the front of security bezel (if applicable) or forwardmost feature to the rack flange mating surface

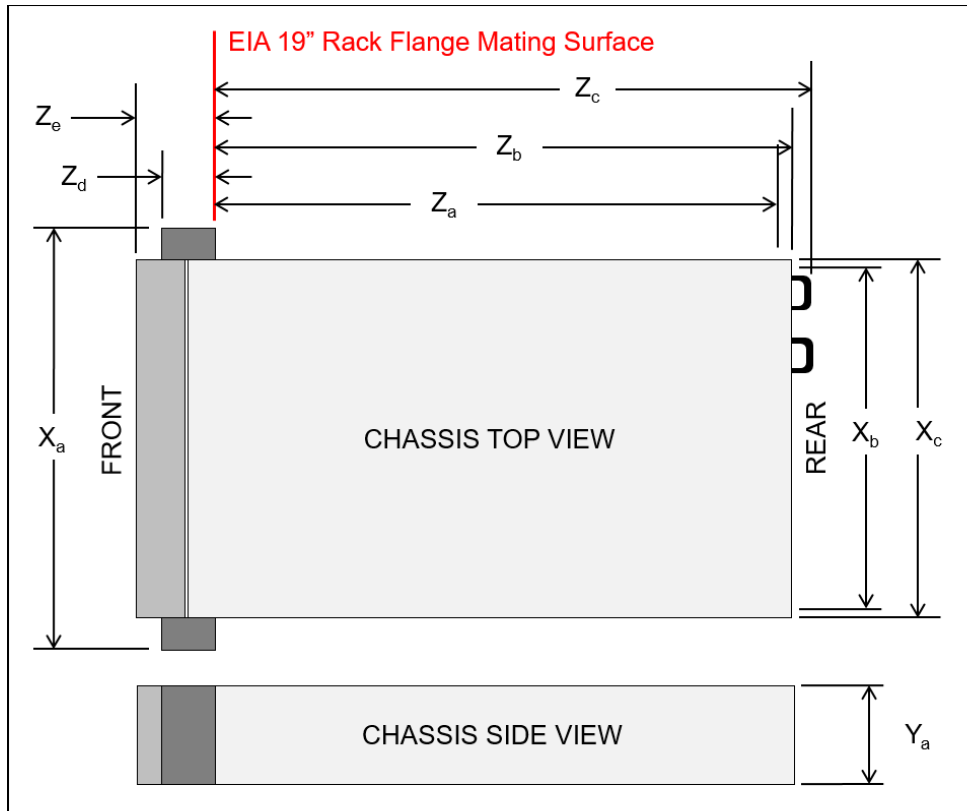


Figure 17. Server dimensions

The shipping dimensions (cardboard packaging) of the SE455 V3 are as follows:

- Width: 596 mm (23.5 inches)
- Height: 282 mm (11.1 inches)
- Depth: 720 mm (28.3 inches)

The server has the following maximum weight:

- 19.21 kg (42.35 lbs)

Electrical specifications for AC input power supplies:

- Input voltage:
  - 100 to 127 (nominal) Vac, 50 Hz or 60 Hz
  - 200 to 240 (nominal) Vac, 50 Hz or 60 Hz
  - 240 Vdc (input range: 180-300 V dc) (China only)
- Inlet current:
  - 100-127 V:
    - 1100W power supply: 12 A\*
    - 1800W power supply: Not supported
  - 200-240 V:
    - 1100W power supply: 6.0 A
    - 1800W power supply: 10 A

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

Electrical specifications for DC input power supply:

- Input voltage: -44 to -54 Vdc
- Inlet current (1100W power supply): 26 A

## Grounding cable

The SE455 V3 includes two grounding points on the front of the server to enable the connection of a grounding cable. The table below lists the ordering information for the supported cable.

**Field upgrade only:** The Grounding Cable is only available as an option for field upgrades. Not available in CTO orders.

Table 60. Grounding cable

Part number	Feature code	Description	Maximum supported
4X97A84041	BMG0*	ThinkEdge Grounding Cable with Lug (2500mm, 6 AWG)	1

\* Field upgrade only; not available in CTO orders

The following figure shows the cable.

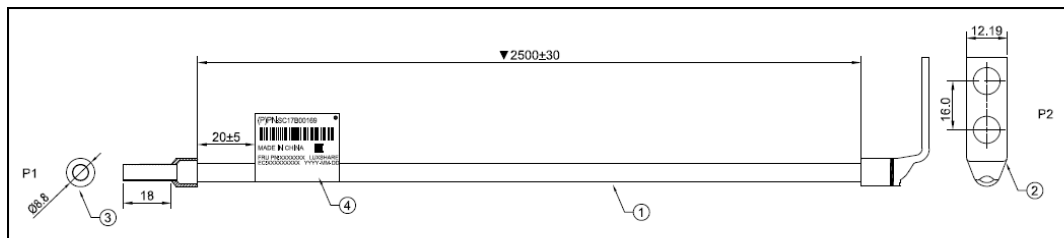


Figure 18. Grounding cable

## Operating environment

The SE455 V3 server complies with ASHRAE Class A2 specifications with most configurations, and depending on the hardware configuration, also complies with ASHRAE Class A3 or A4 specifications.

Topics in this section:

- [Temperature and humidity](#)
- [Configuration requirements](#)
- [Acoustic modes](#)
- [Acoustical noise emissions](#)
- [Shock and vibration](#)
- [NEBS support](#)
- [Particulate contamination](#)
- [Dust filter](#)
- [Replacement port dust covers](#)

### Temperature and humidity

The server is supported in the following environment:

**Tip:** Additional high temperature and humidity support may be possible for specific configurations. For more information contact your Lenovo sales representative or business partner.

Air temperature:

- Operating:
  - ASHRAE A2: 10°C to 35°C (50°F to 95°F); the maximum ambient temperature decreases by 1°C for every 300 m (984 ft) increase in altitude above 900 m (2,953 ft).
  - ASHRAE A3: 5°C to 40°C (41°F to 104°F); the maximum ambient temperature decreases by 1°C for every 175 m (574 ft) increase in altitude above 900 m (2,953 ft).
  - ASHRAE A4: 5°C to 45°C (41°F to 113°F); the maximum ambient temperature decreases by 1°C for every 125 m (410 ft) increase in altitude above 900 m (2,953 ft).
  - Extended operation temperature (with limited configuration): 5°C to 55°C (41°F to 131°F)
- Server off: -5°C to 55°C (23°F to 131°F)
- Shipment/storage: -40°C to 70°C (-40°F to 158°F)

Maximum altitude: 3,050 m (10,000 ft)

Relative Humidity (non-condensing):

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

### Configuration requirements

The following table lists the components that are supported based on the ambient temperature.

Table 61. Configuration requirements (Green=No restriction; Yellow=Some restrictions; White=No support)

Components	Up to 35°C	Up to 40°C	Up to 45°C	Up to 50°C	Up to 55°C
------------	------------	------------	------------	------------	------------

Components	Up to 35°C	Up to 40°C	Up to 45°C	Up to 50°C	Up to 55°C
<b>Processor</b>	All processors	All processors	All processors	All processors except: <ul style="list-style-type: none"> <li>• 8224P (24 cores)</li> <li>• 8324P (32 cores)</li> <li>• 8434P (48 cores)</li> <li>• 8534P (64 cores)</li> </ul>	All processors† except: <ul style="list-style-type: none"> <li>• 8124P (16 cores)</li> <li>• 8224P (24 cores)</li> <li>• 8324P (32 cores)</li> <li>• 8434P (48 cores)</li> <li>• 8534P (64 cores)</li> </ul>
<b>Memory</b>	All memory	All memory	All memory	All memory except: <ul style="list-style-type: none"> <li>• 96GB RDIMMs</li> </ul>	All memory except: <ul style="list-style-type: none"> <li>• 96GB RDIMMs</li> <li>• 64GB RDIMMs</li> </ul>
<b>Network and storage PCI adapters</b>	All adapters	All adapters	All adapters	All adapters	All adapters except: <ul style="list-style-type: none"> <li>• RAID 940-8i 4GB Flash PCIe Gen4 12Gb Adapter</li> <li>• Broadcom 57508 100GbE QSFP56 2-port PCIe 4 Ethernet Adapter V2</li> <li>• Mellanox ConnectX-6 Dx 100GbE QSFP56 2-port PCIe Ethernet Adapter</li> <li>• NVIDIA ConnectX-7 NDR200/HDR QSFP112 2-port PCIe Gen5 x16 InfiniBand Adapter</li> </ul>



Components	Up to 35°C	Up to 40°C	Up to 45°C	Up to 50°C	Up to 55°C
<b>OCP adapters</b>	All adapters	All adapters	All adapters	All adapters	All adapters except: <ul style="list-style-type: none"> <li>Broadcom 57508 100GbE QSFP56 2-Port OCP Ethernet Adapter</li> </ul>
<b>GPUs and accelerators</b>	All GPUs & accelerators	All GPUs & accelerators	All GPUs & accelerators except: <ul style="list-style-type: none"> <li>NVIDIA L40</li> </ul>	No support	No support
<b>Front SATA drives</b>	All SATA drives	All SATA drives	All SATA drives	All SATA drives	All SATA drives
<b>Front NVMe drives</b>	All NVMe drives	All NVMe drives except: <ul style="list-style-type: none"> <li>7450 PRO, 3.84TB or larger</li> <li>7450 MAX, 1.6TB or larger</li> </ul>	All NVMe drives except: <ul style="list-style-type: none"> <li>7450 PRO, 3.84TB or larger</li> <li>7450 MAX, 1.6TB or larger</li> </ul>	All NVMe drives except: <ul style="list-style-type: none"> <li>7450 PRO, 3.84TB or larger</li> <li>7450 MAX, 1.6TB or larger</li> <li>P5520, 7.68TB or larger</li> <li>P5620, 6.4TB or larger</li> </ul>	No support
<b>Internal SATA drives</b>	All SATA drives	All SATA drives	All SATA drives	No support	No support
<b>Internal NVMe drives</b>	All NVMe drives* except: <ul style="list-style-type: none"> <li>7450 PRO, 3.84TB or larger</li> <li>P5520, 15.36TB</li> <li>P5620, 12.8TB</li> <li>7450 MAX, 1.6TB or larger</li> </ul>	No support	No support	No support	No support
<b>M.2 SATA drives</b>	All SATA drives	All SATA drives	All SATA drives	All SATA drives	No support
<b>M.2 NVMe drives</b>	All NVMe drives	All NVMe drives	All NVMe drives	No support	No support

\* For internal NVMe drives, the P5520 (7.68TB) and P5620 (6.4TB) drives might be throttled when ambient temperature is higher than 30°C

† The 8434PN (48 cores) and 8534PN (64 cores) processors are only supported if Riser 2 is not installed

For more information, see the following page:

[https://pubs.lenovo.com/se455-v3/server\\_specifications\\_environmental](https://pubs.lenovo.com/se455-v3/server_specifications_environmental)

## Acoustic modes

The SE455 V3 supports different acoustic modes, which optimize the operation of system fans to lower the overall noise level of the server. This is achieved by closely monitoring components to ensure they operate within the cooling available.

You can specify which acoustic mode you want enabled in the factory by specifying one of the feature codes listed in the following table in the DCSC configurator. By selecting the mode, the configurator will limit the configuration options to ensure the noise requirements are met. You can also specify or change the acoustic mode in UEFI. During server operation, power capping may be enabled, if needed, to ensure that noise limits are met.

Table 62. Acoustic modes in DCSC

Feature code	Description	Meaning
BY8K	Acoustic Mode Disabled	The server will not actively cap noise levels
BY92	Optimised for Acoustics - Mode 1	With proper configuration, the server operates with a sound pressure level of: <ul style="list-style-type: none"> <li>• 45 dBA at 25°C and below</li> <li>• 52 dBA at 25°C to 30°C</li> <li>• 58 dBA at 30°C to 35°C.</li> </ul>
BY91	Optimised for Acoustics - Mode 2	With proper configuration, the server operates with a sound pressure level of: <ul style="list-style-type: none"> <li>• 40 dBA at 25°C and below</li> <li>• 49 dBA at 25°C to 30°C</li> <li>• 55 dBA at 30°C to 35°C</li> </ul>

The acoustic modes are designed to run with an ambient temperature of no more than 35°C. Above 35°C, the acoustic mode will be exited to prevent the system from overheating. Once the ambient temperature returns to below 35°C, the acoustic mode will be re-enabled automatically.

The following table lists the components that are recommended in the acoustic modes.

Table 63. Components recommended in each acoustic mode (Green=No restriction; Yellow=Some restriction; White=Not recommended)

Category	Acoustic mode 1	Acoustic mode 2	Comment
Maximum noise levels	45 dBA below 25°C 52 dBA at 25-30°C 58 dBA at 30-35°C	40 dBA below 25°C 49 dBA at 25-30°C 55 dBA at 30-35°C	The server will throttle components to maintain these noise levels at the specified ambient temperatures

Category	Acoustic mode 1	Acoustic mode 2	Comment
CPU	<ul style="list-style-type: none"> <li>8024P (8 cores, 90W)</li> <li>8124P (16 cores, 125W)</li> <li>8024PN (8 cores, 80W)</li> <li>8124PN (16 cores, 100W)</li> <li>8224PN (24 cores, 120W)</li> <li>8324PN (32 cores, 130W)</li> </ul> <p>Other processors are not recommended*</p>	<ul style="list-style-type: none"> <li>8024P (8-core, 90W)</li> <li>8024PN (8 cores, 80W)</li> <li>8124PN (16 cores, 100W)</li> </ul> <p>Other processors are not recommended*</p>	2U heatsink is required
Memory	16, 32, 48GB RDIMMs	16, 32, 48GB RDIMMs	
Networking & storage adapters	All supported	All supported except ConnectX-7 NDR200	No quantity limit
GPUs & accelerators	<ul style="list-style-type: none"> <li>2x NVIDIA L4</li> <li>2x NVIDIA A2</li> </ul>	Not recommended*	<p>For Acoustic Mode 1:</p> <ul style="list-style-type: none"> <li>GPU to use slot 4 or 7</li> <li>For the L4 GPU, power may be limited for sustained load</li> <li>No support NVIDIA L40, AMD V70, Qualcomm AI 100</li> </ul>
Internal SATA drives	All supported	Not recommended*	
Internal NVMe drives	Not recommended*	Not recommended*	
Front SATA drives	All supported	All supported	
Front NVMe drives	<ul style="list-style-type: none"> <li>P5520 - 3.84TB or lower</li> <li>P5620 - 3.2TB or lower</li> <li>7450 PRO - 1.92TB or lower</li> <li>7450 MAX - 800GB</li> </ul>	<ul style="list-style-type: none"> <li>P5520 - 3.84TB or lower</li> <li>P5620 - 3.2TB or lower</li> <li>7450 PRO - 1.92TB or lower</li> <li>7450 MAX - 800GB</li> </ul>	Power capping may occur at peak workloads
M.2 SATA	All supported	All supported	
M.2 NVMe	Not recommended*	Not recommended*	

\* If a component is listed as “not recommended” then that means that the component usually generates too much heat for the fans to run at a low enough speed to keep the noise of the system low. If the component is installed and is only lightly loaded, it may still be possible to run the server in the Acoustic Mode

## Acoustical noise emissions

The server has the following acoustic noise emissions declaration:

- Sound power level ( $L_{WAd}$ )
  - Idling:
    - Minimum: 5.5 Bel
    - GPU Rich: 5.5 Bel
    - Storage Rich: 5.8 Bel
  - Operating profile 1:
    - Minimum: 5.5 Bel
    - GPU Rich: 5.5 Bel
    - Storage Rich: 5.8 Bel
  - Operating profile 2:
    - Minimum: 5.5 Bel
    - GPU Rich: 7.4 Bel
    - Storage Rich: 6.0 Bel
- Sound pressure level ( $L_{pAm}$ ):
  - Idling:
    - Minimum: 39.0 dBA
    - GPU Rich: 39.0 dBA
    - Storage Rich: 42.8 dBA
  - Operating profile 1:
    - Minimum: 39.0 dBA
    - GPU Rich: 39.0 dBA
    - Storage Rich: 42.8 dBA
  - Operating profile 2:
    - Minimum: 39.0 dBA
    - GPU Rich: 58.2 dBA
    - Storage Rich: 44.6 dBA

### Notes:

- These sound levels were measured in controlled acoustical environments according to procedures specified by ISO7779 and are reported in accordance with ISO 9296. Operating profile 1 is represented by 50% CPU TDP. Operating profile 2 is represented by 100% CPU TDP or 70%/30% storage write/read or 100% GPU.
- The declared acoustic sound levels are based on the specified configurations, which may change depending on configuration/conditions.
  - Minimum: 1x AMD EPYC 8024P (8 core, 90W) CPU, 4x ThinkSystem 32GB TruDDR5 4800MHz (2Rx8) RDIMMs, 1x ThinkSystem Intel X710-T2L 10GBASE-T 2-port OCP Ethernet Adapter, 2x 5400 Pro 2280 M.2 SATA SSD 960GB boot drive, 4x ThinkSystem 2.5" 5400 MAX 3.84TB Mixed Use SATA 6Gb HS SSD data drives, 2x ThinkSystem RAID 5350-8i PCIe 12Gb Adapter, 2x AC PSU 1100W
  - GPU Rich: 1x AMD EPYC 8224P (24 core, 160W) CPU, 4x ThinkSystem 32GB TruDDR5 4800MHz (2Rx8) RDIMMs, 1x ThinkSystem Intel X710-T2L 10GBASE-T 2-port OCP Ethernet Adapter, 2x 5400 Pro 2280 M.2 SATA SSD 960GB boot drive, 4x ThinkSystem 2.5" 5400 MAX 3.84TB Mixed Use SATA 6Gb HS SSD data drives, 2x ThinkSystem RAID 5350-8i PCIe 12Gb Adapter, 4x ThinkSystem NVIDIA L4 24GB PCIe Gen4 Passive GPU, 2x AC PSU 1100W
  - Storage Rich: 1x AMD EPYC 8124P (16 core, 125W) CPU, 4x ThinkSystem 32GB TruDDR5 4800MHz (2Rx8) RDIMMs, 1x ThinkSystem Intel X710-T2L 10GBASE-T 2-Port PCIe Ethernet Adapter, 2x 5400 Pro 2280 M.2 SATA SSD 960GB boot drive, 8x ThinkSystem 2.5" 5400 PRO 7.68TB Read Intensive SATA 6Gb HS SSD, 2x AC PSU 1100W
- Government regulations (such as those prescribed by OSHA or European Community Directives) may govern noise level exposure in the workplace and may apply to you and your server installation. The actual sound pressure levels in your installation depend upon a variety of factors, including the number of racks in the installation; the size, materials, and configuration of the room; the noise levels

from other equipment; the room ambient temperature, and employee's location in relation to the equipment. Further, compliance with such government regulations depends on a variety of additional factors, including the duration of employees' exposure and whether employees wear hearing protection. Lenovo recommends that you consult with qualified experts in this field to determine whether you are in compliance with the applicable regulations.

## Shock and vibration

The server has the following vibration and shock limits:

- Vibration:
  - Operating: 0.21 G rms at 5 Hz to 500 Hz for 15 minutes across 3 axes
  - Non-operating (in packaging): 1.04 G rms at 2 Hz to 200 Hz for 15 minutes across 6 surfaces
  - Rack-load vibration: 0.8 G rms at 2 Hz to 200 Hz
- Shock:
  - Operating: 15 G for 3 milliseconds in each direction (positive and negative X, Y, and Z axes)
  - Non-operating (in packaging): 52 G at 152 in/sec
- Rack-load drop
  - Free-fall drop height: 40 to 100mm
  - Equivalent shock: 40 to 70 inch/sec, 2-3 ms
- NEBS GR63:
  - Bench handling drop:
    - Edge drop height (each edge): 100mm
    - Free-fall drop height: 75mm
  - Office vibration: 0.21Grms, 5-100 Hz, 30 min/axis
  - Earthquake test: GR63 earthquake zone 4

## NEBS support

The SE455 V3 is designed to support NEBS Level 3 compliance. NEBS3 is defined as follows:

- Operating temperature: 5°C to 40°C.
- High altitude operating temperature (1829m to 3960m, 6000ft to 13,000ft): 5°C to 35°C
- Short term operating temp\*: -5°C to 55°C
- Humidity: 5% to 85% RH, Non-condensing.
- Maximum rate of change(°C /hr) should  $\leq$  20 Humidity transition rate should  $\leq$  10%/hr.

\* Short-term conditions: A period of no more than 96 consecutive hours and a total of not more than 15 days in 1 year. A total of 360 hours in any given year, but no more than 15 occurrences during a 1-year period.

NEBS configurations use one of the NEBS-compliant AMD EPYC processors (8xxxPN processor SKUs). For details, see the [Processors](#) section.

For more information about NEBS support, contact your sales representative.

## 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 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/>

## Dust filter

The SE455 V3 supports the use of a dust filter which is installed inside the security bezel. The dust filter has a Minimum Efficiency Rating Value (MERV) of 2, per ASHRAE Standard 52.2-2017.

A single dust filter is included with the security bezel as described in the [Security](#) section.

Ordering information for additional dust filters is listed in the following table.

Table 64. Replacement dust filter

Part number	Description
4XF7A89295	ThinkEdge SE455 V3 Bezel Filter

The dust filter is installed inside the security bezel as shown in the following figure.

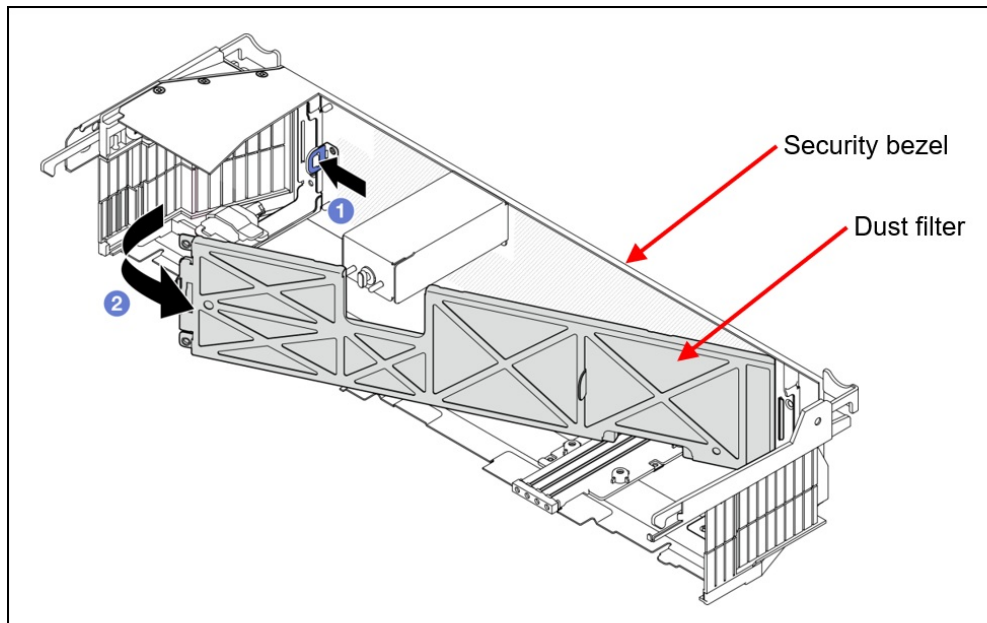


Figure 19. Dust filter in the security bezel

XClarity Controller can be configured to perform a monthly automated check of the dust filter to ensure sufficient airflow, as shown in the following figure. You can also perform an immediate test if desired. If air flow is reduced below a predefined threshold, an XCC hardware event will be triggered. Note that during the test, the system fans are ramped up to full speed for up to 30 seconds. Server performance is not affected during this test.

For more information, see online documentation at:  
[https://pubs.lenovo.com/se455-v3/dust\\_filter\\_measurement](https://pubs.lenovo.com/se455-v3/dust_filter_measurement)

### Dust Filter Measurement

If this device is not installed in a data center but in some environments where air quality is poor, such as manufacturing floor or warehouse, the dust filter might be obstructed over time. It is therefore recommended to run the dust filter measurement periodically to check for sufficient air flow for good thermal performance. If air flow is reduced below a predefined threshold, a hardware event will be triggered to notify the device administrator.

**Note:** When the dust filter measurement runs, all the fans are ramped up to full speed for nearly 30 seconds which results in very loud noise that might disturb the surrounding people. This activity does not impact workload running on the device.

Schedule: Last Friday of every Month ▼      Time: 09:00 ▼

Next automated dust filter measurement is scheduled for

Apply
Cancel

Figure 20. Dust filter measurement in XCC

### Replacement port dust covers

By default, the server includes dust covers for all front I/O ports, to reduce the impact of dust in your environment. If needed, you can order replacement covers. Ordering information is listed in the following table.

Table 65. Replacement port dust covers

Part number	Description	Contents
4XF7A93024	ThinkEdge SE455 V3 Port Dust Cover Kit	<ul style="list-style-type: none"> <li>• 1x USB-C port covers</li> <li>• 3x USB-A port cover</li> <li>• 1x Diagnostics Port cover</li> <li>• 2x Security bezel mounting hole covers</li> <li>• 1x RJ45 port cover</li> </ul>

### Warranty and Support

The ThinkEdge SE455 V3 has a 3-year warranty:

- 7DBY - 3 year warranty

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

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

- **Premier Support**

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

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

- **Warranty Upgrade (Preconfigured Support)**

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

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

- **Managed Services**

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

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

- **Technical Account Management (TAM)**

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

- **Enterprise Server Software Support**

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



- **YourDrive YourData**

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

- **Health Check**

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

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

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

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

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

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

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

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

## Services

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

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

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

- **Asset Recovery Services**

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

- **Assessment Services**

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

- **Design Services**

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

- **Basic Hardware Installation**

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

- **Deployment Services**

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

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

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

## Regulatory compliance

The SE455 V3 conforms to the following standards:

- ANSI/UL62368-1
- IEC 62368-1 (CB Certificate and CB Test Report)
- FCC - Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 7, Class A
- CSA C22.2 No. 62368-1
- CISPR 32, Class A, CISPR 35
- Argentina IEC 62368-1: 2018
- Japan VCCI, Class A
- Taiwan BSMI CNS15936, Class A; CNS15598-1; Section 5 of CNS15663
- CE, UKCA Mark (EN55032 Class A, EN62368-1, EN55024, EN55035, EN61000-3-2, EN61000-3-3, (EU) 2019/424, and EN IEC 63000 (RoHS))
- Korea KN32, Class A, KN35
- Russia, Belorussia and Kazakhstan, TP EAC 037/2016 (for RoHS)
- Russia, Belorussia and Kazakhstan, EAC: TP TC 004/2011 (for Safety); TP TC 020/2011 (for EMC)
- EAC Russia, Belorussia and Kazakhstan, TR CU 020/2011 and TR CU 004/2011
- Australia/New Zealand AS/NZS CISPR 32, Class A; AS/NZS 62368.1
- UL Green Guard, UL2819
- Energy Star 4.0
- EPEAT (NSF/ ANSI 426) Bronze
- China CCC certificate, GB17625.1; GB4943.1; GB/T9254.1
- China CECP certificate, CQC3135
- China CELP certificate, HJ 2507-2011
- Japanese Energy-Saving Act
- Mexico NOM-019
- TUV-GS (EN62368-1, and EK1-ITB2000)
- India BIS 13252 (Part 1)
- Germany GS
- Brazil INMETRO
- South Africa NRCS LOA
- Ukraine UkrCEPRO
- Morocco CMIM Certification (CM)
- EU2019/424 Energy Related Product (ErP Lot9)
- NEBS 3

## Uninterruptible power supply units

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

Table 66. Uninterruptible power supply units

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

† Only available in China and the Asia Pacific market.

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

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

## Power distribution units

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

Table 67. Power distribution units

Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
<b>0U Basic PDUs</b>															
00YJ776	ATZY	0U 36 C13/6 C19 24A 1 Phase PDU	N	Y	Y	N	N	N	N	N	N	Y	Y	Y	N
<b>0U Switched and Monitored PDUs</b>															
00YJ783	AU04	0U 12 C13/12 C19 Switched and Monitored 48A 3 Phase PDU	N	N	Y	N	N	N	Y	N	N	Y	Y	Y	N
00YJ781	AU03	0U 20 C13/4 C19 Switched and Monitored 24A 1 Phase PDU	N	N	Y	N	Y	N	Y	N	N	Y	Y	Y	N
<b>1U Switched and Monitored PDUs</b>															
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
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
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
4PU7A77468	BLC5	1U 12 C19/C13 switched and monitored 32A 3P WYE PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4PU7A81118	BNDW	1U 18 C19/C13 switched and monitored 48A 3P WYE PDU - CE	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y
<b>1U Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets)</b>															
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
<b>1U C13 Enterprise PDUs (12x IEC 320 C13 outlets)</b>															
39Y8941	6010	DPI C13 Enterprise PDU Module (WW)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>1U Front-end PDUs (3x IEC 320 C19 outlets)</b>															
39Y8938	6002	DPI Single-phase 30A/120V Front-end PDU (US)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
39Y8939	6003	DPI Single-phase 30A/208V Front-end PDU (US)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
39Y8934	6005	DPI Single-phase 32A/230V Front-end PDU (International)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
39Y8940	6004	DPI Single-phase 60A/208V Front-end PDU (US)	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N
39Y8935	6006	DPI Single-phase 63A/230V Front-end PDU (International)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>1U NEMA PDUs (6x NEMA 5-15R outlets)</b>															
39Y8905	5900	DPI 100-127V NEMA PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>Line cords for 1U PDUs that ship without a line cord</b>															

Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
40K9611	6504	4.3m, 32A/380-415V, EPDU/IEC 309 3P+N+G 3ph wye (non-US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9612	6502	4.3m, 32A/230V, EPDU to IEC 309 P+N+G (non-US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9613	6503	4.3m, 63A/230V, EPDU to IEC 309 P+N+G (non-US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9614	6500	4.3m, 30A/208V, EPDU to NEMA L6-30P (US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9615	6501	4.3m, 60A/208V, EPDU to IEC 309 2P+G (US) Line Cord	N	N	Y	N	N	N	Y	N	N	Y	Y	Y	N
40K9617	6505	4.3m, 32A/230V, Souriau UTG Female to AS/NZ 3112 (Aus/NZ) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9618	6506	4.3m, 32A/250V, Souriau UTG Female to KSC 8305 (S. Korea) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

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 Lenovo rack cabinets.

Table 68. Supported Lenovo rack cabinets

MTM	Description	Qty of SE455 V3	Comment
7D2BCTO1WW, 7D2NCTO1WW	Micro Datacenter 12U Rack	6	
7D2CCTO1WW, 7D2PCTO1WW	Micro Datacenter 18U Rack	9	
9363-4PX, 4EX, RC4, LC4	42U 1100mm Enterprise V2 Dynamic Rack	21	Require Extension kit (L1 00YE457) and Rail kit (SBB7A78953)
1410-PRB, ERB, HPB, HEB	Intelligent Cluster 42U 1100mm Enterprise V2 Rack Family	21	Require Extension kit (L1 00YE457) and Rail kit (SBB7A78953)

For information about these rack cabinets, see the Lenovo Rack Cabinet Reference:  
<https://lenovopress.com/lp1287-lenovo-rack-cabinet-reference>

For more information about rail kits, see the [Rack installation](#) section.

## KVM console options

The following table lists the supported KVM consoles.

Table 69. 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 71. KVM switches and options

Part number	Description
KVM Console switches	
1754D2X	Global 4x2x32 Console Manager (GCM32)
1754D1X	Global 2x2x16 Console Manager (GCM16)
1754A2X	Local 2x16 Console Manager (LCM16)
1754A1X	Local 1x8 Console Manager (LCM8)
Cables for GCM and LCM Console switches	
46M5383	Virtual Media Conversion Option Gen2 (VCO2)
46M5382	Serial Conversion Option (SCO)

For more information, see the list of Product Guides in the KVM Switches and Consoles category:

<http://lenovopress.com/servers/options/kvm>

## Lenovo Financial Services

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

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

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

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

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

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

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

## Seller training courses

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

### 1. **Business Problems Addressed with Lenovo Data & Analytics Solutions**

2024-01-31 | 20 minutes | Employees and Partners

Data is the quantities, characters, or symbols on which operations are performed by a computer, which is then stored and transmitted in the form of electrical signals and recorded on magnetic, optical, solid state, or mechanical recording media. All different types of organizations rely more and more on their data to gain valuable insights and improve their business. As expected, they will have challenges with gaining this insight. In this course we will discuss those challenges and problems our customers face and describe how Lenovo Data and Analytics Solutions can help customers solve each problem.

After completing this training, you will be able to define the following common problems for databases and big data and describe how Lenovo can help customers solve each problem: scalability, management, performance, protection, security, knowledge/skill, and technology evolution.

After completing this training, you will be able to define the following common problems for databases and big data and describe how Lenovo can help customers solve each problem: scalability, management, performance, protection, security, knowledge/skill, and technology evolution.

Published: 2024-01-31

Length: 20 minutes

Employee link: [Grow@Lenovo](mailto:Grow@Lenovo)

Partner link: [Lenovo Partner Learning](#)

Course code: DSOLP200

### 2. **Family Introduction: Edge Servers**

2024-01-22 | 18 minutes | Employees and Partners

This course introduces the concept of edge servers. Edge servers are used at the edge of an IoT environment, where they perform pre-processing of data, and data forwarding to core environments.

Course Objectives:

- Describe the Internet of Things (IoT)
- Define an edge server
- Discuss edge server features

Published: 2024-01-22

Length: 18 minutes

Employee link: [Grow@Lenovo](mailto:Grow@Lenovo)

Partner link: [Lenovo Partner Learning](#)

Course code: SXXW1105



### 3. **Partner Technical Webinar - Tech World 23 Review**

2023-12-22 | 60 minutes | Employees and Partners

In this 60-minute replay, Kenny James, Lenovo Channel Sales Engineering Director, joined us to give a Channel CTO's perspective on this year's Tech World 2023 conference where the theme was AI for All.

Published: 2023-12-22

Length: 60 minutes

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: 121523

### 4. **Basics of the Edge Ecosystem for Sellers**

2023-12-15 | 20 minutes | Employees and Partners

The purpose of this learning module is to familiarize Lenovo field sales, inside sales and partners with the Edge ecosystem and how Lenovo fits into the Edge space.

- Explain the basics of an Edge Ecosystem
- Articulate the inherent challenges of Edge Computing
- Present how Lenovo fits in the Edge Ecosystem

Published: 2023-12-15

Length: 20 minutes

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DTEF101

### 5. **The 10-minute Edge conversation for Lenovo Sellers**

2023-12-14 | 20 minutes | Employees and Partners

The purpose of this course is to enable sellers to have a 10 to 15-minute customer conversation addressing the relevancy of Edge solutions to the customer business.

Learning Objectives:

- Prepare for the initial customer conversation
- Hold a 10-minute Edge Operational Technology (OT) conversation
- Take the appropriate steps to progress the sale

Published: 2023-12-14

Length: 20 minutes

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DTEF103

6. **VTT: Lenovo in the Era of the Edge-June 2023**  
2023-12-04 | 60 minutes | Employees and Partners

Join Richard Jenkins from the Lenovo Edge Computing Business Development group as he discusses how Lenovo fits in the era of the Edge. Topics covered in this VTT session include:

- customer use cases at the Edge
- the needed consortium to build an Edge Solution
- Lenovo edge portfolio
- The advantages of LOC-A and XClarity at the Edge

Published: 2023-12-04

Length: 60 minutes

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DVEDG201

7. **Partner Technical Webinar - ThinkEdge Portfolio Update**  
2023-11-27 | 60 minutes | Employees and Partners

In this 60-minute replay, Trent Richardson, Lenovo ThinkEdge Global Solutions Leader, reviewed the total ThinkEdge portfolio. He highlighted the breadth of the portfolio as driven by customer demands and the differing requirements for the edge.

Published: 2023-11-27

Length: 60 minutes

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: 111723

8. **Intro to Edge: 3Ws of Edge Computing for Lenovo Sellers**  
2023-09-14 | 13 minutes | Employees and Partners

This course provides fundamental concepts and a learning foundation for those who are new to the data center and to computing at the Edge. It defines where is the Edge, identifies what are the business drivers for edge computing, and discusses why is edge computing important to Lenovo. September 2023

Published: 2023-09-14

Length: 13 minutes

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DTEF100

## 9. **Lenovo Solutions for the Edge - Who Are the Customers?**

2023-09-14 | 25 minutes | Employees and Partners

This course is focused on enabling sellers to identify opportunities for Lenovo Edge and Edge AI Solutions. Topics include a general overview of the Lenovo Edge portfolio and recognizing how edge computing can benefit customers.

Course Objectives:

- Identify Lenovo Edge Opportunities
- Recognize how an Edge solution would benefit your customer
- Provide a general overview of Lenovo solutions at the Edge
- Identify key points for your customer Edge conversation

Published: 2023-09-14

Length: 25 minutes

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DTEF102

## 10. **Family Portfolio - AMD Edge Servers**

2023-09-12 | 15 minutes | Employees and Partners

This course introduces edge environments, and the roles played by Lenovo AMD edge servers in those environments.

When you have completed this course, you should be able to describe the features of the AMD edge server in the Lenovo portfolio, determine which solutions this server is best suited for, and list the customer benefits of using this server in solutions.

Published: 2023-09-12

Length: 15 minutes

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: SXXW2511

## 11. **Family Portfolio - Edge**

2023-09-12 | 15 minutes | Employees and Partners

This course introduces edge environments, and the roles played by Lenovo edge servers and edge clients in those environments. It looks briefly at use cases for these edge devices.

When you have completed this course, you should be able to list the edge solutions in the Lenovo portfolio, describe the features of each solution, and determine which solution is best suited to a specific environment.

Published: 2023-09-12

Length: 15 minutes

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: SXXW2513r2

12. **FY24Q2 Edge Solutions Update**

2023-09-11 | 10 minutes | Employees and Partners

This update is designed to help you discuss the features and customer benefits of the new Lenovo ThinkEdge SE455 V3 edge server, and to introduce an addition to the Lenovo TruScale family - TruScale for Edge.

Published: 2023-09-11

Length: 10 minutes

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: SXXW2513r2a

13. **Lenovo Data Center Product Portfolio**

2023-07-21 | 15 minutes | Employees and Partners

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

Published: 2023-07-21

Length: 15 minutes

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: SXXW1110r6

14. **Lenovo XClarity Management Hub for Edge Server Devices**

2023-06-08 | 50 minutes | Employees and Partners

This course offers a comprehensive overview and demonstration of the enhanced capability to manage ThinkEdge Server Devices through Lenovo XClarity Management Hub in Lenovo XClarity Orchestrator (LXCO).

Published: 2023-06-08

Length: 50 minutes

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DXCO201

15. **Lenovo XClarity Management Hub for Edge Client Devices**

2023-06-08 | 50 minutes | Employees and Partners

This course offers a comprehensive overview and demonstration of the enhanced capability to manage ThinkEdge Client Devices through Lenovo XClarity Management Hub in Lenovo XClarity Orchestrator (LXCO).

Published: 2023-06-08

Length: 50 minutes

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DXCO202

## Related publications and links

For more information, see these resources:

- Lenovo ThinkEdge SE455 V3 product page:  
<https://www.lenovo.com/us/en/p/servers-storage/servers/edge/thinkedge-se455-v3/len21te0003>
- Interactive 3D Tour of the ThinkEdge SE455 V3:  
<https://lenovopress.lenovo.com/lp1820-3d-tour-thinkedge-se455-v3>
- ThinkEdge SE455 V3 drivers and support  
<https://datacentersupport.lenovo.com/us/en/products/servers/thinkedge/se455v3thinkedge/7dby>
- Lenovo Hardware Installation & Removal Videos on the SE455 V3  
<https://www.youtube.com/playlist?list=PLYV5R7hVcs-BkQODpd0GAxcf40LXZLcz9>
- \*}Lenovo ThinkEdge SE455 V3 product publications:  
<https://pubs.lenovo.com/se455-v3/>
  - Activation Guide
  - User Guide
  - Messages and Codes Reference
  - UEFI Manual
  - Rack installation guide (1000mm rack)
  - Rack installation guide (600mm rack)
  - Rack installation guide (Two-post rack)
- User Guides for options:  
<https://serveroption.lenovo.com>
- ServerProven hardware compatibility:  
<https://serverproven.lenovo.com>

## Related product families

Product families related to this document are the following:

- [Edge Computing and Internet of Things \(IoT\)](#)
- [Edge Servers](#)
- [ThinkEdge SE455 V3 Server](#)

## Notices

Lenovo may not offer the products, services, or features discussed in this document in all countries. Consult your local Lenovo representative for information on the products and services currently available in your area. Any reference to a Lenovo product, program, or service is not intended to state or imply that only that Lenovo product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any Lenovo intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any other product, program, or service. Lenovo may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

Lenovo (United States), Inc.  
8001 Development Drive  
Morrisville, NC 27560  
U.S.A.  
Attention: Lenovo Director of Licensing

LENOVO PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. Lenovo may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

The products described in this document are not intended for use in implantation or other life support applications where malfunction may result in injury or death to persons. The information contained in this document does not affect or change Lenovo product specifications or warranties. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Lenovo or third parties. All information contained in this document was obtained in specific environments and is presented as an illustration. The result obtained in other operating environments may vary. Lenovo may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Any references in this publication to non-Lenovo Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this Lenovo product, and use of those Web sites is at your own risk. Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

© Copyright Lenovo 2024. All rights reserved.

This document, LP1724, was created or updated on February 6, 2024.

Send us your comments in one of the following ways:

- Use the online Contact us review form found at:  
<https://lenovopress.lenovo.com/LP1724>
- Send your comments in an e-mail to:  
[comments@lenovopress.com](mailto:comments@lenovopress.com)

This document is available online at <https://lenovopress.lenovo.com/LP1724>.

## Trademarks

Lenovo and the Lenovo logo are trademarks or registered trademarks of Lenovo in the United States, other countries, or both. A current list of Lenovo trademarks is available on the Web at <https://www.lenovo.com/us/en/legal/copytrade/>.

The following terms are trademarks of Lenovo in the United States, other countries, or both:

Lenovo®  
Bootable Media Creator  
Flex System  
Intelligent Cluster  
Lenovo Services  
ServerProven®  
System x®  
ThinkAgile®  
ThinkEdge®  
ThinkShield®  
ThinkServer®  
ThinkSystem®  
UpdateXpress System Packs  
XClarity®

The following terms are trademarks of other companies:

Intel® and Xeon® are trademarks of Intel Corporation or its subsidiaries.

Linux® is the trademark of Linus Torvalds in the U.S. and other countries.

Microsoft®, ActiveX®, Azure®, PowerShell, Windows PowerShell®, Windows Server®, and Windows® are trademarks of Microsoft Corporation in the United States, other countries, or both.

SPECpower® is a trademark of the Standard Performance Evaluation Corporation (SPEC).

Other company, product, or service names may be trademarks or service marks of others.