



ThinkSystem ST250 Setup Guide



Machine Types: 7Y45 and 7Y46

Note

Before using this information and the product it supports, be sure to read and understand the safety information and the safety instructions, which are available at:

https://pubs.lenovo.com/safety_documentation/

In addition, be sure that you are familiar with the terms and conditions of the Lenovo warranty for your server, which can be found at:

<http://datacentersupport.lenovo.com/warrantylookup>

Twentieth Edition (January 2025)

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Chapter 1. Introduction

The ThinkSystem ST250 server is a 4U [tower server](#) designed for performance and expansion for various IT workloads. With the modular design, the server is flexible to be customized for maximum storage capacity or high storage density with selectable input/output options and tiered system management.

Performance, ease of use, reliability, and expansion capabilities were key considerations in the design of the server. These design features make it possible for you to customize the system hardware to meet your needs today and provide flexible expansion capabilities for the future.

The server comes with a limited warranty. For details about the warranty, see: <https://support.lenovo.com/us/en/solutions/ht503310>

For details about your specific warranty, see: <http://datacentersupport.lenovo.com/warrantylookup>

Server package contents

When you receive your server, verify that the shipment contains everything that you expected to receive.

The server package includes the following items:

Note: Items marked with asterisk (*) are available on some models only.

- ❶ Server
- ❷ Keyboard and front door*
- ❸ Material box, including items such as accessory kit, front door key, power cords* and documentation

Server form factor

The ThinkSystem ST250 server is designed to support both tower and rack form factors.

You can change the server from tower form factor to rack form factor by installing the tower-to-rack conversion kit. For instructions on how to install the tower-to-rack conversion kit, refer to the documentation that comes with the conversion kit.

Features

Performance, ease of use, reliability, and expansion capabilities were key considerations in the design of the server. These design features make it possible for you to customize the system hardware to meet your needs today and provide flexible expansion capabilities for the future.

Your server implements the following features and technologies:

- **Lenovo XClarity Controller (XCC)**

The Lenovo XClarity Controller is the common management controller for Lenovo ThinkSystem server hardware. The Lenovo XClarity Controller consolidates multiple management functions in a single chip on the server system board.

Some of the features that are unique to the Lenovo XClarity Controller are enhanced performance, higher-resolution remote video, and expanded security options. For additional information about the Lenovo XClarity Controller, refer to the XCC documentation compatible with your server at:

<https://pubs.lenovo.com/lxcc-overview/>

Important: Lenovo XClarity Controller (XCC) supported version varies by product. All versions of Lenovo XClarity Controller are referred to as Lenovo XClarity Controller and XCC in this document, unless specified otherwise. To see the XCC version supported by your server, go to <https://pubs.lenovo.com/lxcc-overview/>.

- **UEFI-compliant server firmware**

Lenovo ThinkSystem firmware is Unified Extensible Firmware Interface (UEFI) compliant. UEFI replaces BIOS and defines a standard interface between the operating system, platform firmware, and external devices.

Lenovo ThinkSystem servers are capable of booting UEFI-compliant operating systems, BIOS-based operating systems, and BIOS-based adapters as well as UEFI-compliant adapters.

- **Large system-memory capacity**

The server supports error-correcting code (ECC) unbuffered DIMM (UDIMM). For more information about the specific types and maximum amount of memory, see “Specifications” on page 3.

- **Integrated Trusted Platform Module (TPM)**

This integrated security chip performs cryptographic functions and stores private and public secure keys. It provides the hardware support for the Trusted Computing Group (TCG) specification. You can download the software to support the TCG specification.

Trusted Platform Module (TPM) has two versions - TPM 1.2 and TPM 2.0. You can change the TPM version from 1.2 to 2.0 and back again.

Note: For customers in Chinese Mainland, TPM is not supported. However, customers in Chinese Mainland can install a TPM card (sometimes called a daughter card).

- **Large data-storage capacity and hot-swap capability**

Some server models support a maximum of sixteen 2.5-inch hot-swap drives or a maximum of eight 3.5-inch hot-swap drives. For some models, you can install up to four 3.5-inch hot-swap drives and eight 2.5-inch hot-swap drives into the same server.

Some server models support a maximum of eight 3.5-inch simple-swap drives.

For server models supporting the hot-swap feature, you can add, remove, or replace drives without turning off the server.

- **Mobile access to Lenovo Service Information website**

The server provides a QR code on the system service label, which is on the inside of the server cover, that you can scan the QR code with a mobile device and a QR code reader application to get quick access to the Lenovo Service web site for this server. The Lenovo Service Information web site provides additional information for parts installation and replacement videos, and error codes for server support.

- **Redundant networking connection**

The Lenovo XClarity Controller provides failover capability to a redundant Ethernet connection with the applicable application installed. If a problem occurs with the primary Ethernet connection, all Ethernet traffic that is associated with the primary connection is automatically switched to the optional redundant Ethernet connection. If the applicable device drivers are installed, this switching occurs without data loss and without user intervention.

- **Redundant cooling and power capabilities**

The server supports up to three non-hot-swap fans. Two of the fans will be located in the front, the other will be in the rear.

Some server models support one fixed power supply and some server models support a maximum of two hot-swap power supplies.

Specifications

The following information is a summary of the features and specifications of the server. Depending on the model, some features might not be available, or some specifications might not apply.

Table 1. Specifications

Specification	Description
Dimension	4U server <ul style="list-style-type: none">• Height: 443.5 mm (17.46 inches)• Width: 176 mm (6.93 inches)• Depth: 578 mm (22.76 inches)
Weight (depending on the configuration)	<ul style="list-style-type: none">• Maximum without package:<ul style="list-style-type: none">– 2.5-inch disk drive configuration: 21.26 kg (46.87 lb)– 3.5-inch disk drive configuration: 23.56 kg (51.94 lb)• Minimum with package:<ul style="list-style-type: none">– 2.5-inch disk drive configuration: 17.24 kg (38.01 lb)– 3.5-inch disk drive configuration: 19.32 kg (42.59 lb)
Processor	This server supports one of the following Intel® processors: <ul style="list-style-type: none">• Xeon® E3-21XX• Xeon® E3-22XX• Core i3• Pentium Gold For a list of supported processors, see: http://datacentersupport.lenovo.com
Memory	See “Memory module installation rules and order” on page 58 for detailed information about memory configuration and setup. <ul style="list-style-type: none">• Minimum: 8 GB• Maximum: 128 GB• Slots: four DIMM slots (two channels, two DIMMs per channel)• DIMM types:<ul style="list-style-type: none">– DDR4-2666– 8 GB Single-rank, 16 GB dual-rank, or 32 GB dual-rank– ECC-UDIMM Notes: <ul style="list-style-type: none">• Before installing 32 GB DIMMs, make sure your system has an Intel® Xeon® E processor family installed with UEFI firmware updated to UEFI ISE114H-2.00 or later.• For a list of supported DIMMs, see: https://serverproven.lenovo.com/.

Table 1. Specifications (continued)

Specification	Description
Drive bays (varies by model)	<p>Drive bays and drives supported by your server vary by model.</p> <ul style="list-style-type: none"> • HDD storage drive bays: <ul style="list-style-type: none"> – Up to four 3.5-inch simple-swap disk drives <ul style="list-style-type: none"> – On board SATA ports – Up to eight 3.5-inch simple-swap disk drives <ul style="list-style-type: none"> – On board SATA ports* – Up to four 3.5-inch hot-swap disk drives <ul style="list-style-type: none"> – On board SATA ports – RAID adapter – Up to eight 3.5-inch hot-swap disk drives <ul style="list-style-type: none"> – On board SATA ports* – RAID adapter – Up to eight 2.5-inch hot-swap disk drives <ul style="list-style-type: none"> – On board SATA ports* – RAID adapter – Up to sixteen 2.5-inch hot-swap disk drives <ul style="list-style-type: none"> – RAID adapter – Up to hybrid four 3.5-inch and eight 2.5-inch hot-swap disk drives <ul style="list-style-type: none"> – RAID adapter <p>* When M.2 or optical drive(s) are present , the on-board SATA disk drive support is limited to six HDD.</p> <p>Notes:</p> <ul style="list-style-type: none"> – Your server supports the installation of 2.5-inch SSDs in a 3.5 inch disk bay through the use of a conversion kit. See “Install a 2.5-inch SSD into a 3.5-inch drive bay” on page 65 for details. – When all eight storage drives have been installed, and the system has been set to software RAID mode in the UEFI settings, regardless if the disks are configured as an array or as separate disks, drives 6 and 7 cannot be used to install the Windows operating system. – If the M.2 drive has been installed, and the system has been set to software RAID mode in the UEFI settings, regardless if the disks are configured as an array or as separate disks, the M.2 drive cannot be used to install the Windows operating system. <ul style="list-style-type: none"> • Optical drive bays <ul style="list-style-type: none"> – Two optical drive bays <ul style="list-style-type: none"> – Supports up to two optical drives – When the M.2 drive is present, the optical drive support is limited to one drive. – Supports up to one tape drive (RDX or LTO) <ul style="list-style-type: none"> – Can only be installed in lower optical drive bay – Maximum support number of optical drive plus tape drive is two pieces. <p>Notes:</p> <ul style="list-style-type: none"> – Follow these steps to install the optical drive and tape drive when the M.2 drive is present. <ol style="list-style-type: none"> 1. When the M.2 drive is installed, ensure that SATA port 7 remains unconnected. 2. Install the optical drive into the upper media bay, Bay 1.

Table 1. Specifications (continued)

Specification	Description
	<ol style="list-style-type: none"> 3. Install the backup drive (RDX or LTO tape) into the lower media bay, Bay 0. 4. Connect the optical drive to SATA port 6. 5. If an RDX drive is installed, connect the drive to the internal USB port adjacent to the M.2 drive using the cable that shipped with the RDX drive (see “USB tape drive cable routing” on page 37). 6. If an LTO tape drive is installed, install a SAS HBA into an available PCIe slot, and connect the drive to the adapter with the cable that is shipped with the LTO tape drive (see “SAS tape drive cable routing” on page 36). <ul style="list-style-type: none"> – If your server is installed with a Windows Server operating system, you can use the Windows Backup program to back up the data stored on tape drive media. For detailed information, refer to the user guide of the tape drive. The user guide is available for download at: http://www.lenovo.com/UserManuals
M.2 drive	<p>Supports 2 different physical sizes of M.2 drives:</p> <ul style="list-style-type: none"> • 42 mm (2242) • 80 mm (2280)
Expansion slots	<p>Four PCIe expansion slots are available:</p> <ul style="list-style-type: none"> • Slot 1: PCIe3 x1, Full-height, half-length • Slot 2: PCIe3 x16, Full-height, half-length • Slot 3: PCIe3 x4, Full-height, half-length • Slot 4: PCIe3 x8 (x4, x1), Full-height, half-length <p>Notes:</p> <ol style="list-style-type: none"> 1. PCIe slot 1 and slot 2 do not support ARI and SR-IOV 2. PCIe slot 3 supports ARI and SR-IOV 3. ThinkSystem Broadcom NX-E PCIe 10Gb 2-Port Base-T Ethernet Adapter can only be installed in the slot 2
Input/Output (I/O) features	<ul style="list-style-type: none"> • Front panel <ul style="list-style-type: none"> – One XClarity Controller USB 2.0 connector – One USB 3.1 Gen 1 connector • Rear panel <ul style="list-style-type: none"> – Video Graphics Array (VGA) DB-15 connector – Serial connector – One USB 3.1 Gen 1 connector – One USB 3.1 Gen 2 connector – Two RJ-45 Ethernet connectors – One RJ-45 Ethernet connector for BMC management
Network	<ul style="list-style-type: none"> • Two 1Gbps RJ45 with BCM5720 • One 1Gbps Management RJ45
RAID (depending on model)	<p>The following options with RAID levels 0, 1, and 5 are available for this server. In addition, RAID level 10 is available when four hard-disk/solid-state drives are installed in the server.</p> <ul style="list-style-type: none"> • ThinkSystem RAID 530-8i PCIe 12Gb adapter • ThinkSystem RAID 730-8i 1GB Cache PCIe 12Gb adapter • ThinkSystem RAID 930-8i 2GB Flash PCIe 12Gb adapter • ThinkSystem RAID 930-16i 4GB Flash PCIe 12Gb adapter • ThinkSystem RAID 930-8e 4GB Flash PCIe 12Gb adapter <p>For a list of supported adapters, see:</p> <p>http://datacentersupport.lenovo.com</p>

Table 1. Specifications (continued)

Specification	Description
System fans	<p>Your server comes with the following fans to provide proper system cooling and airflow:</p> <ul style="list-style-type: none"> • One heat sink and fan assembly • Two front system fans • One rear system fan
Electrical input	<p>Universal input:</p> <ul style="list-style-type: none"> • Low range: 100 to 127 V ac • High range: 200 to 240 V ac • Input frequency range: 50 to 60 Hz <p>Note: The ThinkSystem ST250 only supports AC input power. Do not use 240VDC input.</p>
Power supply	<p>The server might come with one of the following power supply configurations:</p> <ul style="list-style-type: none"> • One 250W fixed power supply • One or two 550W redundant power supply <p>Note: If you are using uninterruptible power supplies (UPS), ensure that you use only pure-sine UPS with your ThinkServer server.</p>
Acoustical noise emissions	<ul style="list-style-type: none"> • Sound power, idling <ul style="list-style-type: none"> – 3.7 bels, minimum – 3.8 bels, typical – 4.3 bels, maximum • Sound power, operating <ul style="list-style-type: none"> – 3.7 bels, minimum – 4.0 bels, typical – 4.4 bels, maximum • Sound pressure level, idling (tabletop) <ul style="list-style-type: none"> – 26.8 dBA, minimum – 26.5 dBA, typical – 39.4 dBA, maximum • Sound pressure level, operating (tabletop) <ul style="list-style-type: none"> – 27.0 dBA, minimum – 26.7 dBA, typical – 40.1 dBA, maximum • Sound pressure level, idling (floor) <ul style="list-style-type: none"> – 19.3 dBA, minimum – 19.5 dBA, typical – 29.5 dBA, maximum • Sound pressure level, operating (floor) <ul style="list-style-type: none"> – 19.4 dBA, minimum – 21.0 dBA, typical – 32.3 dBA, maximum <p>Note: The sound levels were measured in controlled acoustical environments according to procedures specified by ISO 7779 and are reported in accordance with ISO 9296. The declared acoustic noise levels are based on specified configurations, which may change slightly depending on configuration/conditions.</p>
Approximate heat output	<ul style="list-style-type: none"> • Minimum configuration: 221 BTU , 65 W (in BTU per hour and watts) • Maximum configuration: 699 BTU, 205 W (in BTU per hour and watts)

Table 1. Specifications (continued)

Specification	Description
Environment	<p>The ThinkSystem ST250 server complies with ASHRAE Class A2 specifications. Depending on the hardware configuration, some models comply with ASHRAE Class A3 specifications. System performance may be impacted when operating temperature is outside ASHRAE A2 specification.</p> <ul style="list-style-type: none"> Air temperature: <ul style="list-style-type: none"> Operating <ul style="list-style-type: none"> ASHRAE Class A2: 10°C to 35°C (50°F to 95°F); the maximum ambient temperature decreases by 1°C for every 300 m (984 ft) increase in altitude above 900 m (2,953 ft). ASHRAE Class A3: 5°C to 40°C (41°F to 104°F); the maximum ambient temperature decreases by 1°C for every 175 m (574 ft) increase in altitude above 900 m (2,953 ft). Limited configuration as 80W processor plus eight 2.5-inch disk drives. Server off: -10°C to 60°C (14°F to 140°F) Shipment/storage: -40°C to 60°C (-40°F to 140°F) Maximum altitude: 3,050 m (10,000 ft) Relative Humidity (non-condensing): <ul style="list-style-type: none"> Operating <ul style="list-style-type: none"> 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) Shipment/storage: 8% to 90% Particulate contamination <p>Attention: Airborne particulates and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server. For information about the limits for particulates and gases, see “Particulate contamination” in <i>ThinkSystem ST250 Maintenance Manual</i>.</p>
Operating systems	<p>Supported and certified operating systems:</p> <ul style="list-style-type: none"> Microsoft Windows Server VMware ESXi Red Hat Enterprise Linux SUSE Linux Enterprise Server <p>References:</p> <ul style="list-style-type: none"> Complete list of available operating systems: https://lenovopress.lenovo.com/osig. OS deployment instructions: “Deploy the operating system” on page 99.

Particulate contamination

Attention: 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 pose a risk to the device that is described in this document.

Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If Lenovo determines that the levels of particulates or gases in your environment have caused damage to the device, Lenovo may condition provision of repair or replacement of devices or parts

on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Table 2. Limits for particulates and gases

Contaminant	Limits
Reactive gases	<p>Severity level G1 as per ANSI/ISA 71.04-1985¹:</p> <ul style="list-style-type: none"> The copper reactivity level shall be less than 200 Å/month (Å/month \approx 0.0035 µg/cm²-hour weight gain).² The silver reactivity level shall be less than 200 Å/month (Å/month \approx 0.0035 µg/cm²-hour weight gain).³ The reactive monitoring of gaseous corrosivity must be conducted approximately 5 cm (2 in.) in front of the rack on the air inlet side at one-quarter and three-quarter frame height off the floor or where the air velocity is much higher.
Airborne particulates	<p>Data centers must meet the cleanliness level of ISO 14644-1 class 8.</p> <p>For data centers without airside economizer, the ISO 14644-1 class 8 cleanliness might be met by choosing one of the following filtration methods:</p> <ul style="list-style-type: none"> The room air might be continuously filtered with MERV 8 filters. Air entering a data center might be filtered with MERV 11 or preferably MERV 13 filters. <p>For data centers with airside economizers, the choice of filters to achieve ISO class 8 cleanliness depends on the specific conditions present at that data center.</p> <ul style="list-style-type: none"> The deliquescent relative humidity of the particulate contamination should be more than 60% RH.⁴ Data centers must be free of zinc whiskers.⁵
<p>¹ ANSI/ISA-71.04-1985. <i>Environmental conditions for process measurement and control systems: Airborne contaminants</i>. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.</p> <p>² The derivation of the equivalence between the rate of copper corrosion growth in the thickness of the corrosion product in Å/month and the rate of weight gain assumes that Cu₂S and Cu₂O grow in equal proportions.</p> <p>³ The derivation of the equivalence between the rate of silver corrosion growth in the thickness of the corrosion product in Å/month and the rate of weight gain assumes that Ag₂S is the only corrosion product.</p> <p>⁴ The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.</p> <p>⁵ Surface debris is randomly collected from 10 areas of the data center on a 1.5 cm diameter disk of sticky electrically conductive tape on a metal stub. If examination of the sticky tape in a scanning electron microscope reveals no zinc whiskers, the data center is considered free of zinc whiskers.</p>	

Management options

The XClarity portfolio and other system management options described in this section are available to help you manage the servers more conveniently and efficiently.

Overview

Options	Description
Lenovo XClarity Controller	<p>Baseboard management controller. (BMC)</p> <p>Consolidates the service processor functionality, Super I/O, video controller, and remote presence capabilities into a single chip on the server system board.</p> <p>Interface</p> <ul style="list-style-type: none">• CLI application• Web GUI interface• Mobile application• REST API <p>Usage and downloads</p> <p>https://pubs.lenovo.com/lxcc-overview/</p>
Lenovo XClarity Administrator	<p>Centralized interface for multi-server management.</p> <p>Interface</p> <ul style="list-style-type: none">• Web GUI interface• Mobile application• REST API <p>Usage and downloads</p> <p>http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/aug_product_page.html</p>
Lenovo XClarity Essentials toolset	<p>Portable and light toolset for server configuration, data collection, and firmware updates. Suitable both for single-server or multi-server management contexts.</p> <p>Interface</p> <ul style="list-style-type: none">• OneCLI: CLI application• Bootable Media Creator: CLI application, GUI application• UpdateXpress: GUI application <p>Usage and downloads</p> <p>https://pubs.lenovo.com/lxce-overview/</p>

Options	Description
Lenovo XClarity Provisioning Manager	<p>UEFI-based embedded GUI tool on a single server that can simplify management tasks.</p> <p>Interface</p> <ul style="list-style-type: none"> • Web interface (BMC remote access) • GUI application <p>Usage and downloads</p> <p>https://pubs.lenovo.com/lxpm-overview/</p> <p>Important: Lenovo XClarity Provisioning Manager (LXPM) supported version varies by product. All versions of Lenovo XClarity Provisioning Manager are referred to as Lenovo XClarity Provisioning Manager and LXPM in this document, unless specified otherwise. To see the LXPM version supported by your server, go to https://pubs.lenovo.com/lxpm-overview/.</p>
Lenovo XClarity Integrator	<p>Series of applications that integrate the management and monitoring functionalities of the Lenovo physical servers with the software used in a certain deployment infrastructure, such as VMware vCenter, Microsoft Admin Center, or Microsoft System Center while delivering additional workload resiliency.</p> <p>Interface</p> <p>GUI application</p> <p>Usage and downloads</p> <p>https://pubs.lenovo.com/lxci-overview/</p>
Lenovo XClarity Energy Manager	<p>Application that can manage and monitor server power and temperature.</p> <p>Interface</p> <ul style="list-style-type: none"> • Web GUI Interface <p>Usage and downloads</p> <p>https://datacentersupport.lenovo.com/solutions/Invo-lxem</p>
Lenovo Capacity Planner	<p>Application that supports power consumption planning for a server or rack.</p> <p>Interface</p> <ul style="list-style-type: none"> • Web GUI Interface <p>Usage and downloads</p> <p>https://datacentersupport.lenovo.com/solutions/Invo-lcp</p>

Functions

Options		Functions							
		Multi-system mgmt	OS deployment	System configuration	Firmware updates ¹	Events/alert monitoring	Inventory/logs	Power mgmt	Power planning
Lenovo XClarity Controller				√	√ ²	√	√ ⁴		
Lenovo XClarity Administrator		√	√	√	√ ²	√	√ ⁴		
Lenovo XClarity Essentials toolset	OneCLI	√		√	√ ²	√	√ ⁴		
	Bootable Media Creator			√	√ ²		√ ⁴		
	UpdateXpress			√	√ ²				
Lenovo XClarity Provisioning Manager			√	√	√ ³		√ ⁵		
Lenovo XClarity Integrator		√	√ ⁶	√	√	√	√	√ ⁷	
Lenovo XClarity Energy Manager		√				√		√	
Lenovo Capacity Planner									√ ⁸

Notes:

1. Most options can be updated through the Lenovo tools. Some options, such as GPU firmware or Omni-Path firmware require the use of supplier tools.
2. The server UEFI settings for option ROM must be set to **Auto** or **UEFI** to update firmware using Lenovo XClarity Administrator, Lenovo XClarity Essentials, or Lenovo XClarity Controller.
3. Firmware updates are limited to Lenovo XClarity Provisioning Manager, Lenovo XClarity Controller, and UEFI updates only. Firmware updates for optional devices, such as adapters, are not supported.
4. The server UEFI settings for option ROM must be set to **Auto** or **UEFI** for detailed adapter card information, such as model name and firmware levels, to be displayed in Lenovo XClarity Administrator, Lenovo XClarity Controller, or Lenovo XClarity Essentials.
5. Limited inventory.
6. The Lenovo XClarity Integrator deployment check for System Center Configuration Manager (SCCM) supports Windows operating system deployment.
7. Power management function is supported only by Lenovo XClarity Integrator for VMware vCenter.
8. It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.

Chapter 2. Server components

This section provides information that helps locate the server components.

Identifying your server

When you contact Lenovo for help, the machine type, model, and serial number information help support technicians to identify your server and provide faster service.

The machine type and serial number are on the ID label on the front of the server.

The following illustration shows the location of the ID label.

Note: The illustrations in this document might differ slightly from your server.

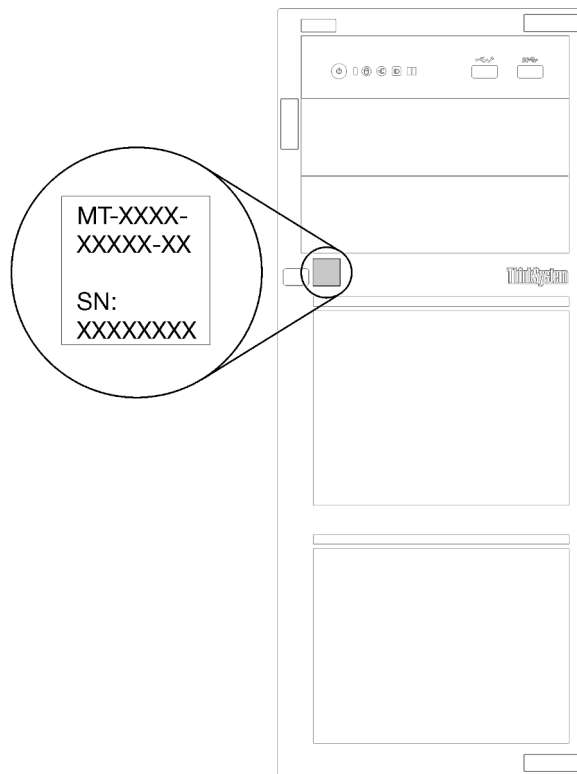


Figure 1. Location of the ID label

XClarity Controller network access label

The XClarity Controller network access label is attached on the front bezel as shown. After you get the server, peel the XClarity Controller network access label away and store it in a safe place for future use.

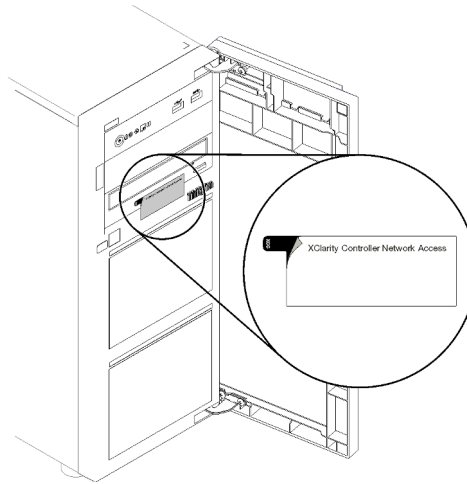


Figure 2. Location of the XClarity Controller network access label

Quick response code

The system service label, which is on the inside of the server cover, provides a quick response (QR) code for mobile access to service information. Scan the QR code with a mobile device and a QR code reader application to get quick access to the Lenovo Service web site for this server. The Lenovo Service web site provides additional information for parts installation and replacement videos, and error codes for server support.

The following illustration shows the QR code.

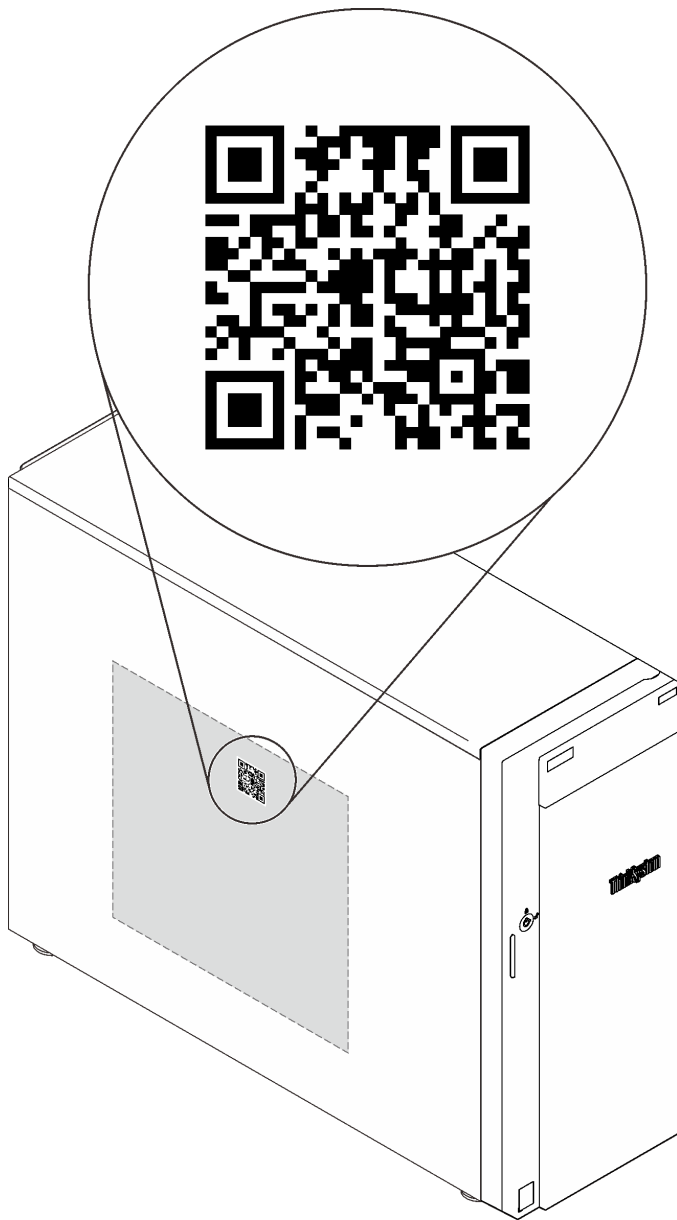


Figure 3. QR code

Front view

The front view of the server varies by model.

The following illustration shows the server components that may appear on the front of your server model.

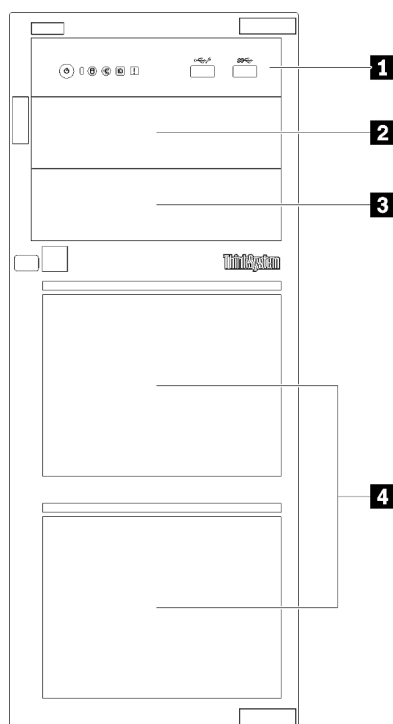


Figure 4. Front view of the server components

Table 3. Components on the front of server models

Item	Description
1 Front panel	See “Front panel” on page 21
2 Optical-drive bay 2	The optical drive bay 2 is for a secondary optical drive.
3 Optical-drive bay 1	The optical drive bay 1 is for an optical drive or a tape drive.
4 Storage drive bays	The number of installed drives in your server varies by model. The vacant drive bays are occupied by drive fillers. When you install drives, follow the order of the drive bay numbers.

The following illustrations show the server front views based on the different supported drive configurations.

Attention: For server models that support eight drives, note the following:

Only a maximum of **six hard drives** and not eight can be installed in the server if **no** ServeRAID SAS/SATA controller is installed, but **any** of the following drives are installed:

- One optical disk drive
- Two optical disk drives
- One SATA M2 drive
- One SATA M2 drive and one optical disk drive

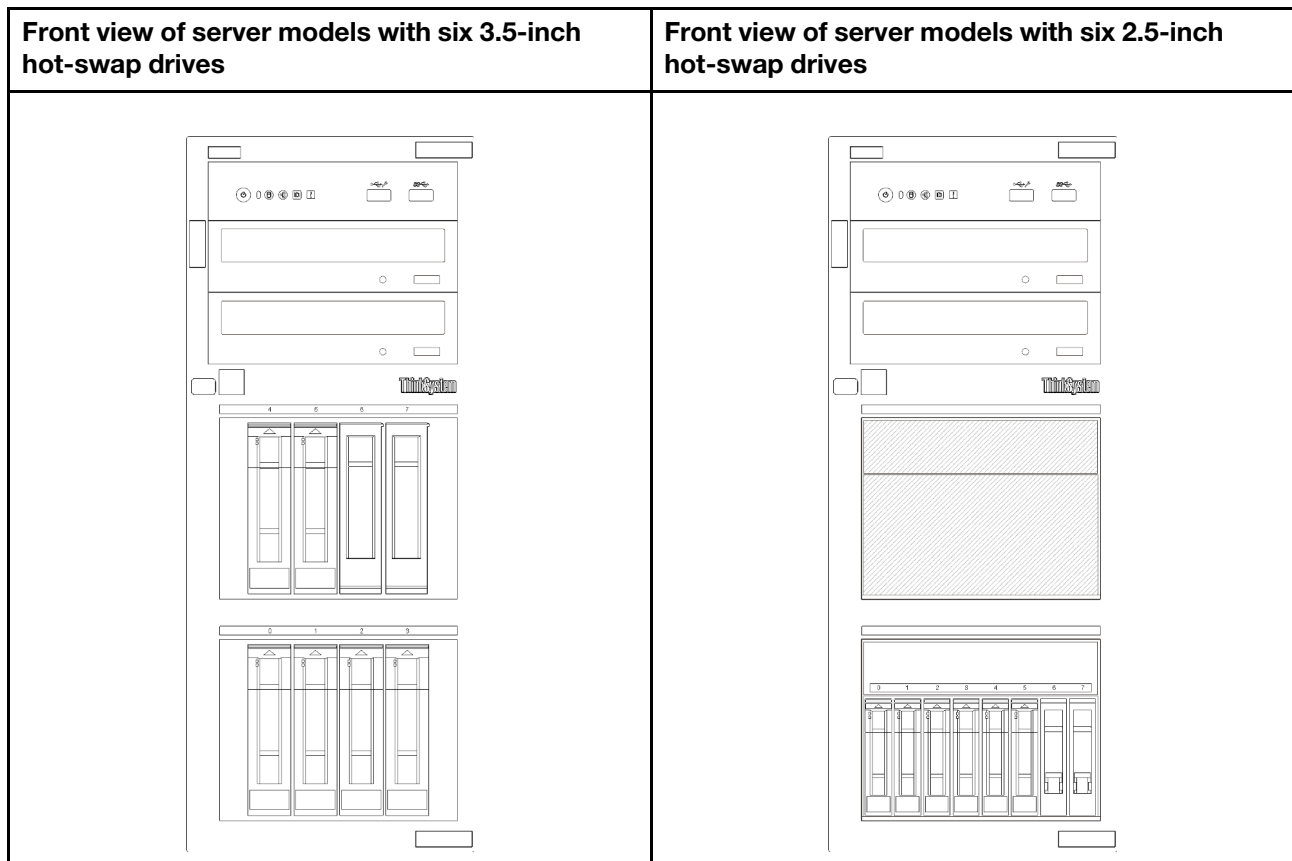


Figure 5. Front view of server models with six 3.5-inch or 2.5-inch hot-swap drives

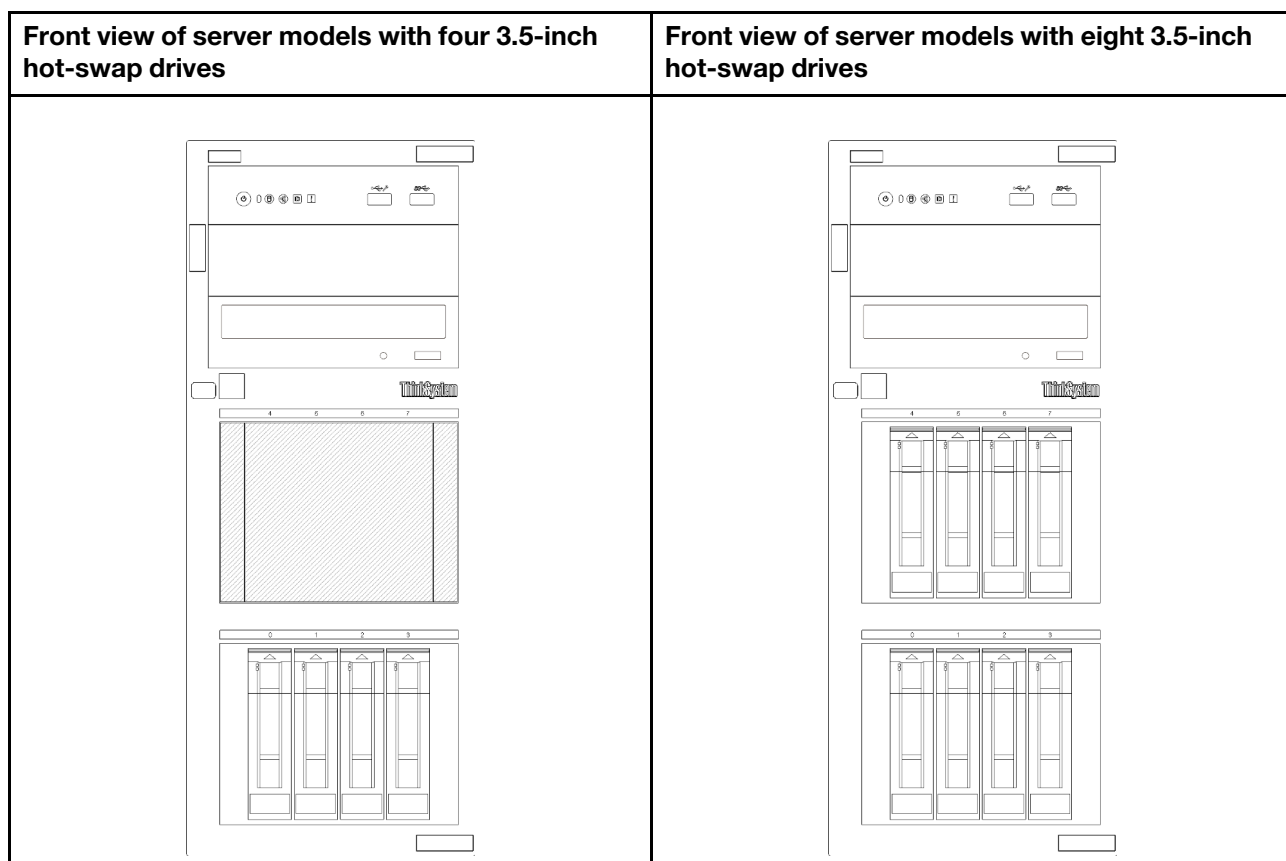


Figure 6. Front view of server models with four/eight 3.5-inch hot-swap drives

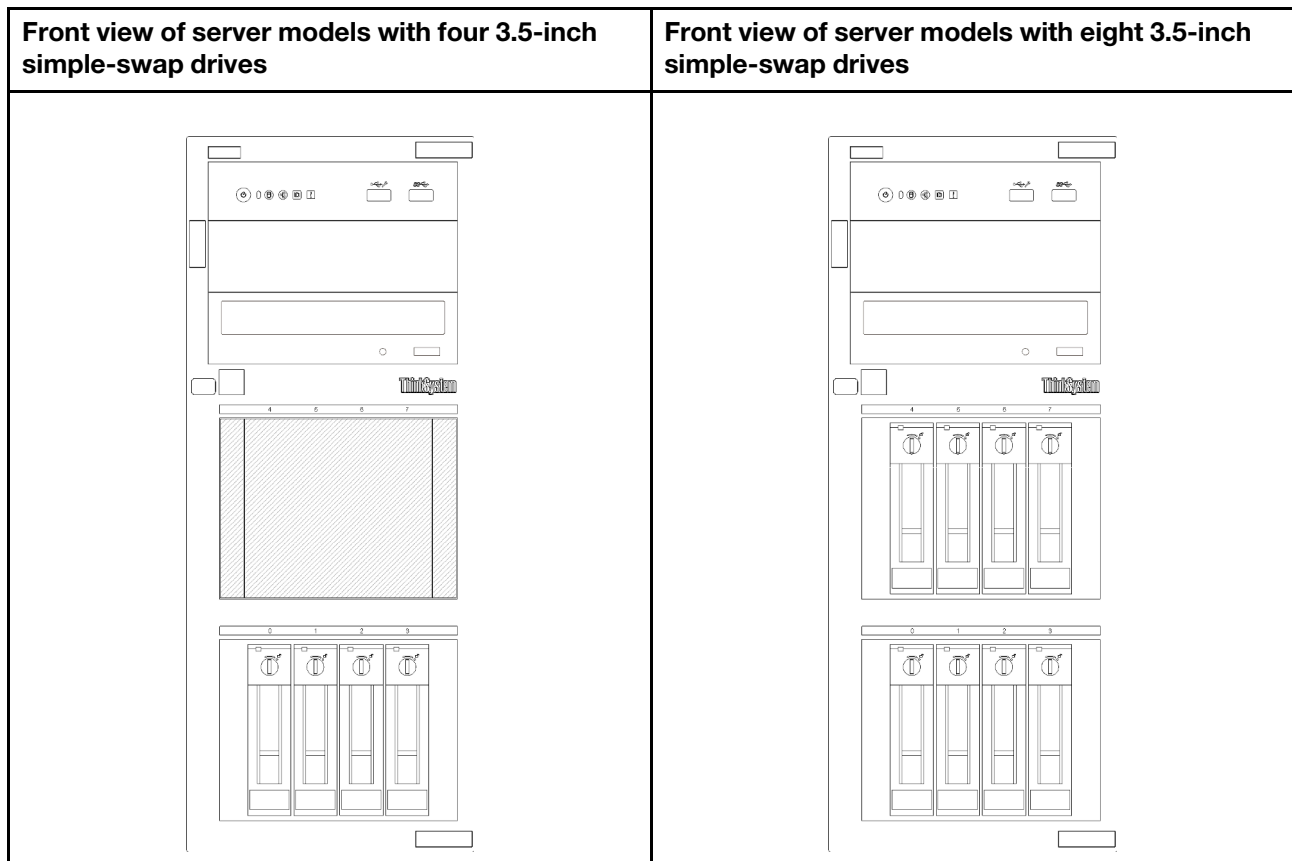


Figure 7. Front view of server models with four/eight 3.5-inch simple-swap drives

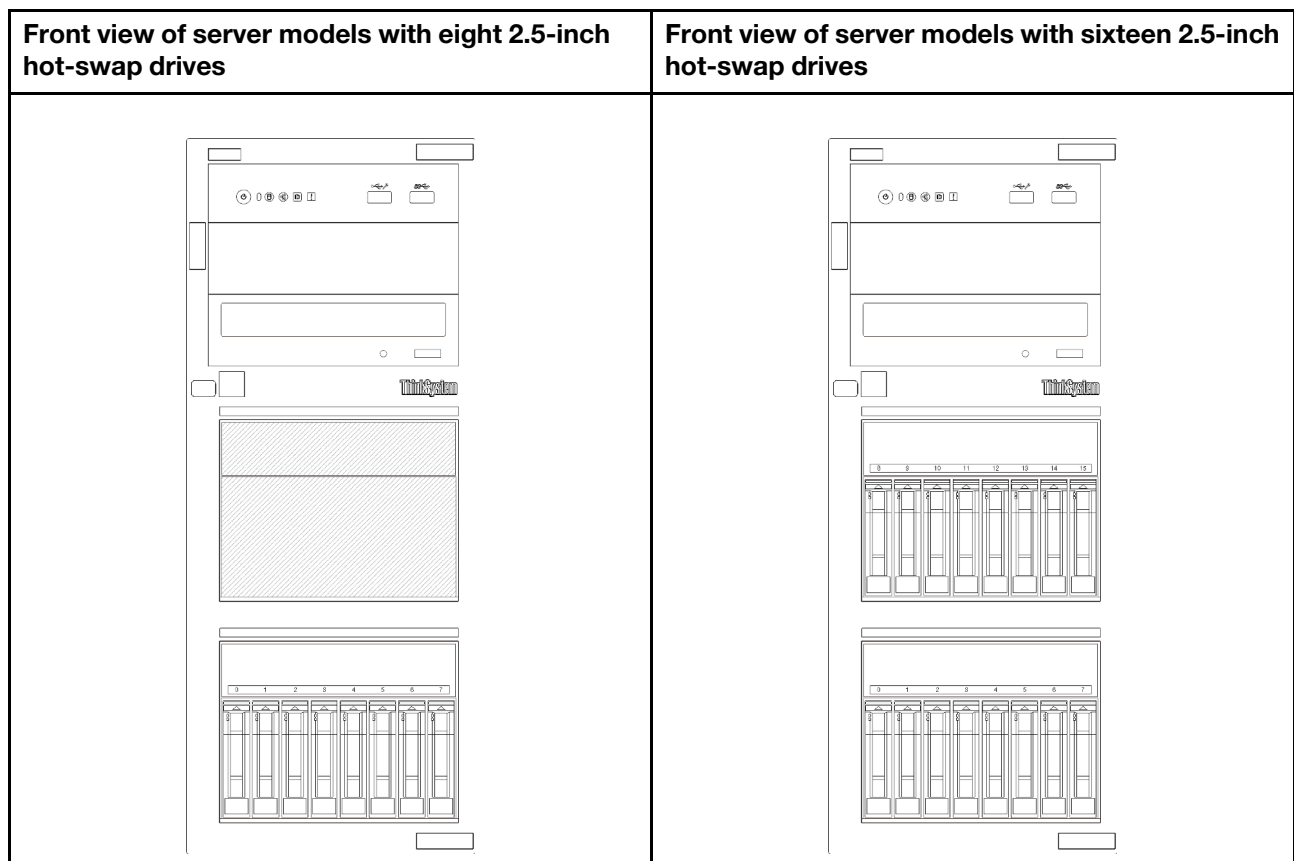


Figure 8. Front view of server models with eight/sixteen 2.5-inch hot-swap drives

Front view of server models with four 3.5-inch hot-swap drives and eight 2.5-inch hot-swap drives

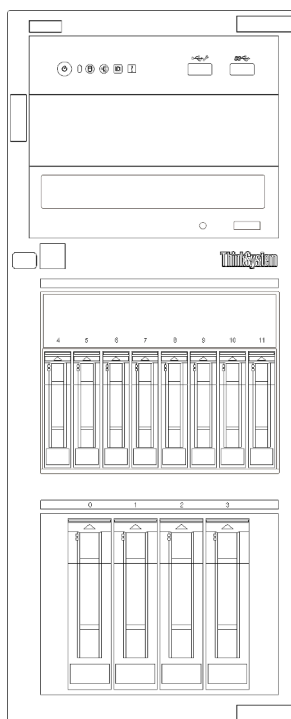


Figure 9. Front view of server models with four 3.5-inch hot-swap drives and eight 2.5-inch hot-swap drives

Front panel

The front panel of the server provides controls, connectors, and LEDs.

The following illustration shows the control, connectors, and LEDs on the front panel of the server.

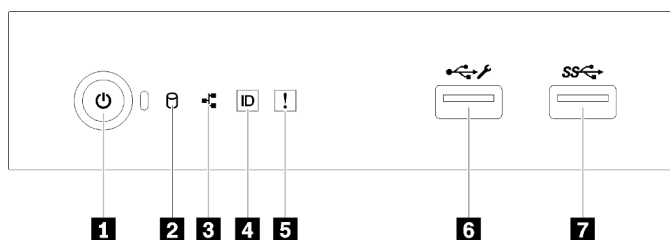


Figure 10. Front panel

Table 4. Components on the front panel

Callout	Callout
1 Power button with power status LED (green)	5 System error LED (yellow)
2 Drive activity LED (green) Note: For onboard SATA indication only	6 XClarity Controller USB 2.0 connector

Table 4. Components on the front panel (continued)

Callout	Callout
3 Network activity LED (green) Note: For onboard LAN indication only	7 USB 3.1 Gen 1 connector
4 System ID button with system ID LED (blue)	

1 Power button with power status LED

You can press the power button to turn on the server when you finish setting up the server. You also can hold the power button for several seconds to turn off the server if you cannot turn off the server from the operating system. The power status LED helps you determine the current power status.

Status	Color	Description
Solid on	Green	The server is on and running.
Slow blinking (about one flash per second)	Green	The server is off and is ready to be powered on (standby state).
Fast blinking (about four flashes per second)	Green	The server is off, but the XClarity Controller is initializing, and the server is not ready to be powered on.
Off	None	There is no ac power applied to the server.

2 Drive activity LED

The drive activity LED helps you determine the status of the drive activity.

Note: The drive activity LED only indicates the activities of drives that are connected to the SATA ports on the system board.

Status	Color	Description
Solid on	Green	The drive is active.
Off	None	The drive is not active.

3 Network activity LED

The network activity LED helps you identify the network connectivity and activity.

Status	Color	Description
On	Green	The server is connected to a network.
Blinking	Green	The network is connected and active.
Off	None	The server is disconnected from the network.

4 System ID button with system ID LED

Use this system ID button and the blue system ID LED to visually locate the server. Each time you press the system ID button, the state of the system ID LED changes. The LED can be changed to on, blinking, or off.

You can also use the Lenovo XClarity Controller or a remote management program to change the state of the system ID LED to assist in visually locating the server among other servers.

If the XClarity Controller USB connector is set to have both the USB 2.0 function and XClarity Controller management function, you can press the system ID button for three seconds to switch between the two functions.

5 System error LED

The system error LED provides basic diagnostic functions for your server.

Status	Color	Description	Action
On	Yellow	An error has been detected on the server. Causes might include one or more of the following errors: <ul style="list-style-type: none">• The temperature of the server reached the non-critical temperature threshold.• The voltage of the server reached the non-critical voltage threshold.• A fan has been detected to be running at low speed.• A fan has been removed.• The power supply has a critical error.• The power supply is not connected to the power.	Check the event log to determine the exact cause of the error.
Off	None	The server is off or the server is on and is working correctly.	None.

6 XClarity Controller USB connector

Depending on the setting, this connector supports USB 2.0 function, XClarity Controller management function, or both.

- If the connector is set for USB 2.0 function, you can attach a device that requires a USB 2.0 connection, such as a keyboard, a mouse, or a USB storage device.
- If the connector is set for XClarity Controller management function, you can attach a mobile device installed with the application to run XClarity Controller event logs.
- If the connector is set to have both functions, you can press the system ID button for three seconds to switch between the two functions.

For more information, see “Set the front USB 2.0 connector for Lenovo XClarity Controller connection” on page 92.

7 USB 3.1 Gen 1 connector

Used to attach a device that requires a USB 2.0 or 3.0 connection, such as a keyboard, a mouse, or a USB flash drive.

Rear view

Use this information to locate the connectors and components on the rear of your server. The following illustration shows the rear view of a server with a screw-secured, fixed power supply.

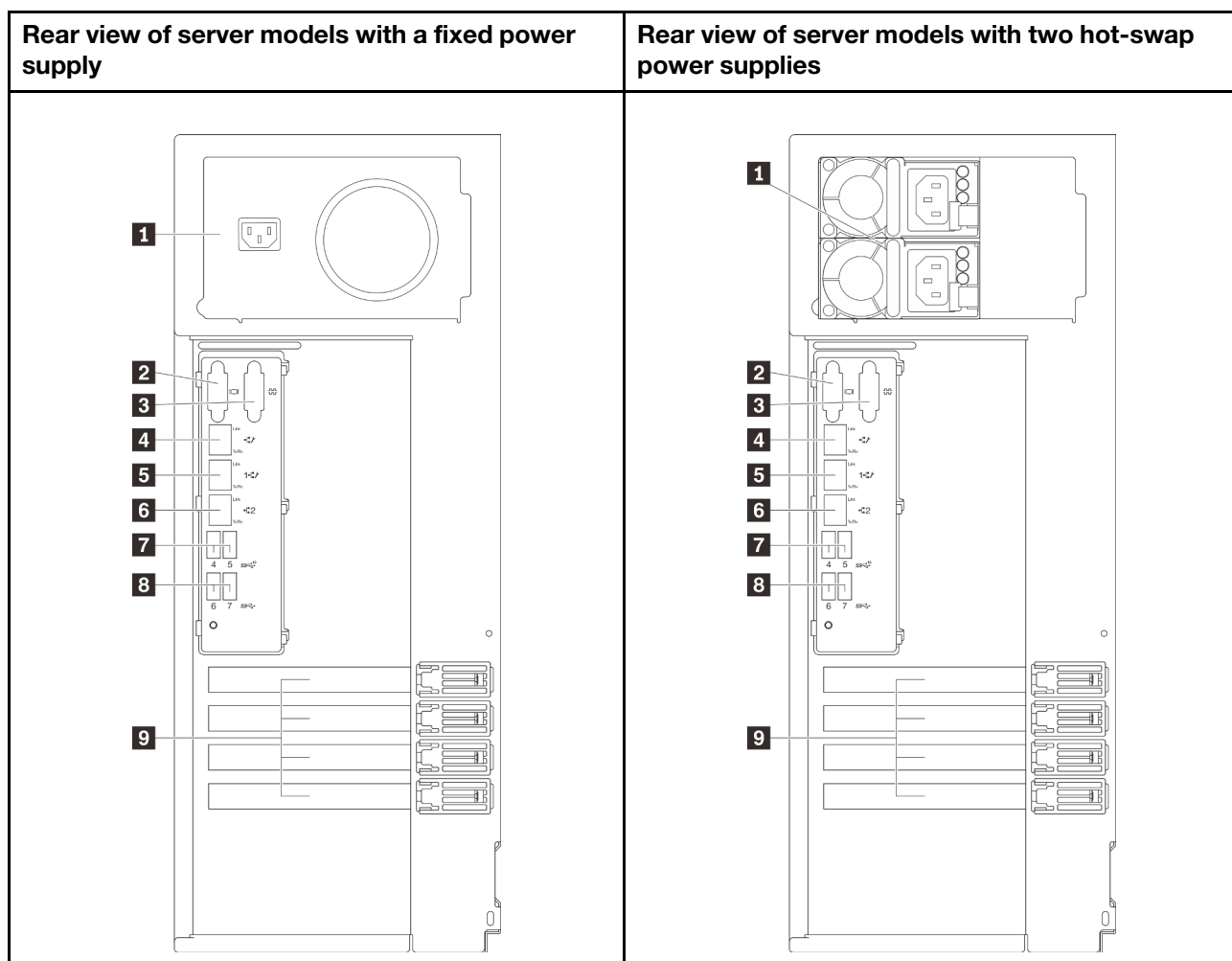


Figure 11. Rear view

Table 5. Components on the rear of server models with a fixed power supply or two hot-swap power supplies

1 Power cord connector	6 Ethernet 2 connector
2 VGA connector	7 USB 3.1 Gen 2 connector
3 Serial connector	8 USB 3.1 Gen 1 connector
4 Dedicated XClarity Controller (XCC) network connector	9 PCIe slots
5 Ethernet 1 connector (shared with XCC network port)	

1 Power cord connector

Connect the power cord to this component.

2 VGA connector

Used to attach a VGA-compatible video device, such as a VGA monitor.

3 Serial connector

Connect a 9-pin serial device to this connector. The serial port is shared with the XCC. The XCC can take control of the shared serial port to redirect serial traffic, using Serial over LAN (SOL).

4 Dedicated XClarity Controller (XCC) network connector

Used to attach an Ethernet cable to manage the system using XClarity Controller.

5 6 Ethernet 1 and 2 connectors

Used to attach an Ethernet cable for a LAN. Each Ethernet connector has two status LEDs to help you identify the Ethernet connectivity and activity. For more information, see “Rear view LEDs” on page 25. Ethernet 1 connector can be set as XClarity Controller Network connector.

To set Ethernet 1 connector as XClarity Controller Network connector, start Setup Utility and select **BMC Settings → Network Settings → Network Settings Network Interface Port : Shared**. Then, click **Shared NIC on** and select **Onboard Port 1**.

7 8 USB 3.1 Gen1 or Gen 2 connectors

Used to attach a device that requires a USB 3.1 connection, such as a keyboard, a mouse, or a USB flash drive.

9 PCIe slots

Your server has four PCIe slots on the system board for you to install appropriate PCIe adapters. For information about the PCIe slots, see “Specifications” on page 3.

Rear view LEDs

The illustration in this section shows the LEDs on the rear the server.

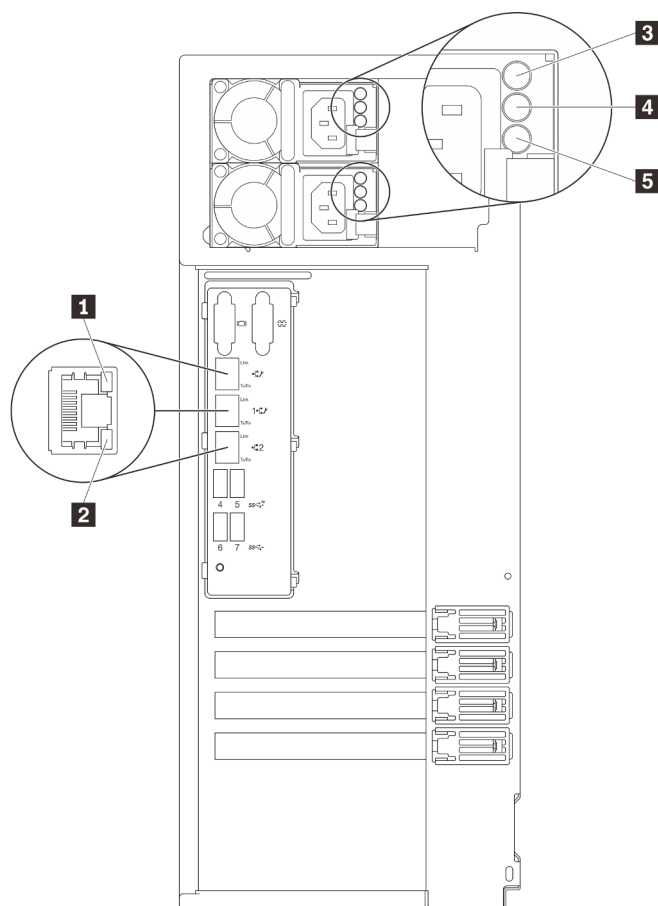


Figure 12. Rear view LEDs of the server

Table 6. LEDs on the rear of the server

Callout	Callout
1 Ethernet link LED (green)	4 Power output LED (green)
2 Ethernet activity LED (green)	5 Power supply error LED (yellow)
3 Power input LED (green)	

1 2 Ethernet status LEDs

Each network connector has two status LEDs.

Ethernet status LED	Color	Status	Description
1 Ethernet link LED	Green	On	Network link is established.
	None	Off	Network link is disconnected.
2 Ethernet activity LED	Green	Blinking	Network link is connected and active.
	None	Off	The server is disconnected from a LAN.

3 Power input LED

4 Power output LED

5 Power supply error LED

Each hot-swap power supply has three status LEDs.

LED	Description
3 Power input LED	<ul style="list-style-type: none">Off: The power supply is disconnected from the ac power source or a power problem occurs.Green: The power supply is connected to the ac power source.
4 Power output LED	<ul style="list-style-type: none">Green: The server is on and the power supply is working normally.Blinking green: The power supply is in zero-output mode (standby). When the server power load is 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. To disable zero-output mode, start the Setup utility, go to System Settings → Power → Zero Output and select Disable. If you disable zero-output mode, both power supplies will be in the active state.Off: The server is powered off, or the power supply is not working properly. If the server is powered on but the power output LED is off, replace the power supply.
5 Power supply error LED	<ul style="list-style-type: none">Off: The power supply is working normally.Yellow: The power supply has failed. To resolve the issue, replace the power supply.

System board components

The illustration in this section shows the component locations on the system board.

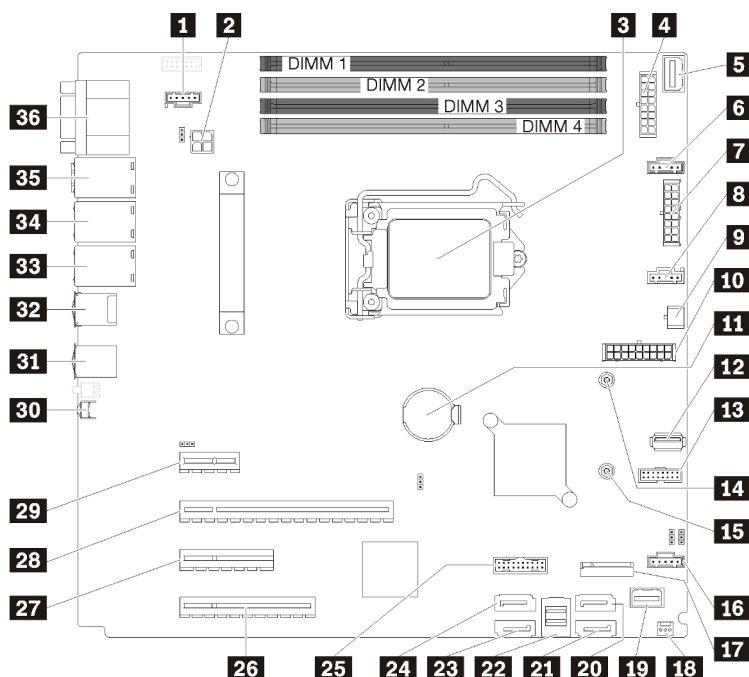


Figure 13. System board components

Table 7. Components on the system board

Callout	Callout
1 Fan 3 connector for Rear FAN	19 Front panel connector
2 Processor power connector	20 SATA hard disk drive 6/optical disk drive connector 1
3 Processor	21 SATA hard disk drive 7/optical disk drive connector 2
4 Backplane 1 power connector	22 SATA hard disk drive 0–3 connector
5 PIB side band connector	23 SATA hard disk drive 4 connector
6 Fan 1 connector for Front FAN 1	24 SATA hard disk drive 5 connector
7 Backplane 2 power connector	25 Front USB 3.0 / 2.0 header
8 Fan 2 connector for CPU FAN	26 PCIe3 x8 slot 4
9 Optical drive power connector	27 PCIe3 x4 slot 3
10 System power connector	28 PCIe3 x16 slot 2
11 CMOS battery	29 PCIe3 x1 slot 1
12 Internal USB 3.1 Gen 1 connector	30 NMI button
13 TPM card connector	31 USB 3.1 Gen 1 connectors
14 Mounting nut for 80 mm M.2	32 USB 3.1 Gen 2 connectors
15 Mounting nut for 42 mm M.2	33 Ethernet 2 connector

Table 7. Components on the system board (continued)

Callout	Callout
16 Fan 4 connector for Front FAN 4	34 Ethernet 1 connector (shared with XCC network port)
17 M.2 module connector	35 Dedicated XClarity Controller (XCC) network connector
18 Chassis intrusion switch connector	36 VGA + COM connector

System board jumpers

The following illustration shows the location of the jumpers on the server.

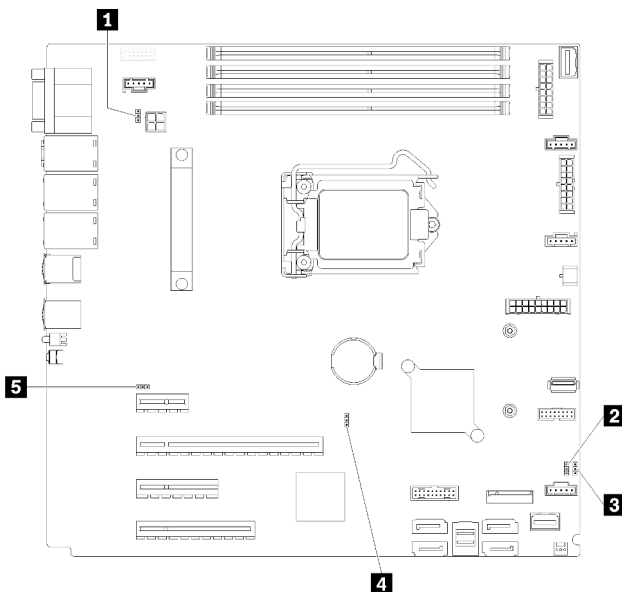


Figure 14. System board jumpers

Table 8. Jumper description

Jumper name	Jumper setting
1 NCSI functional header jumper	<ul style="list-style-type: none"> Pins 1&2: Default Pins 2&3: Disable
2 Power permission override jumper	<ul style="list-style-type: none"> Pins 1&2: Default Pins 2&3: Enable
3 Clear CMOS jumper	<ul style="list-style-type: none"> Pins 1&2: Default Pins 2&3: CMOS clear
4 TPM presence header jumper	<ul style="list-style-type: none"> Pins 1&2: Default Pins 2&3: TPM presence asserted
5 IMM force update jumper	<ul style="list-style-type: none"> Pins 1&2: Default Pins 2&3: Enable

Important:

- Before you move the jumpers, turn off the server; then, disconnect all power cords and external cables. Do not open your server or attempt any repair before reading and understanding the following information:

- https://pubs.lenovo.com/safety_documentation/
- “Handling static-sensitive devices” on page 57
- Any system-board switch or jumper block that is not shown in the illustrations in this document are reserved.

Server locks

Locking the server cover prevents unauthorized access to the inside of your server. Locking the front door (available on some models) prevents unauthorized access to the installed drives.

Padlock

Your server comes with a padlock loop. When a padlock is installed, the server cover cannot be removed.

Note: It is recommended to purchase your own padlock from a local store.

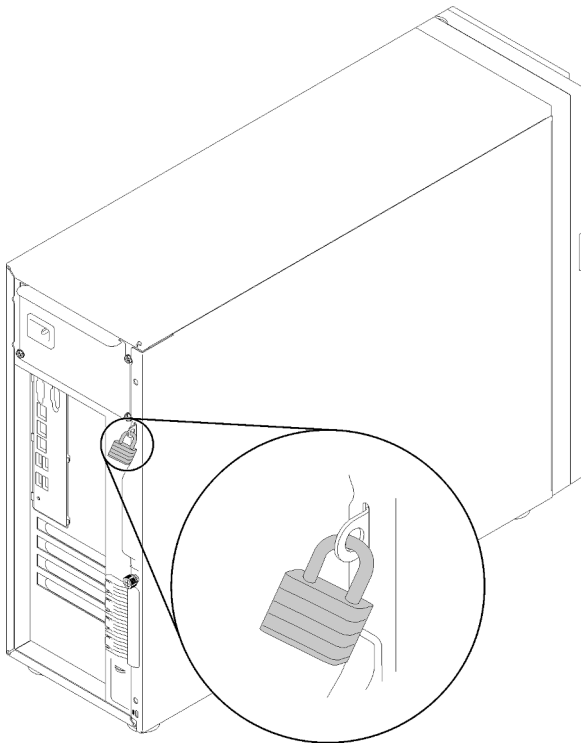


Figure 15. Padlock

Kensington-style cable lock

You can use a Kensington-style cable lock to secure your server to a desk, table, or other non-permanent fixture. The cable lock attaches to the security-lock slot at the rear of your server and is operated with a key or combination depending on the type selected. The cable lock also locks the server cover. This is the same type of lock used with many notebook computers. You can order such a cable lock directly from Lenovo by searching for **Kensington** at:

<http://www.lenovo.com/support>

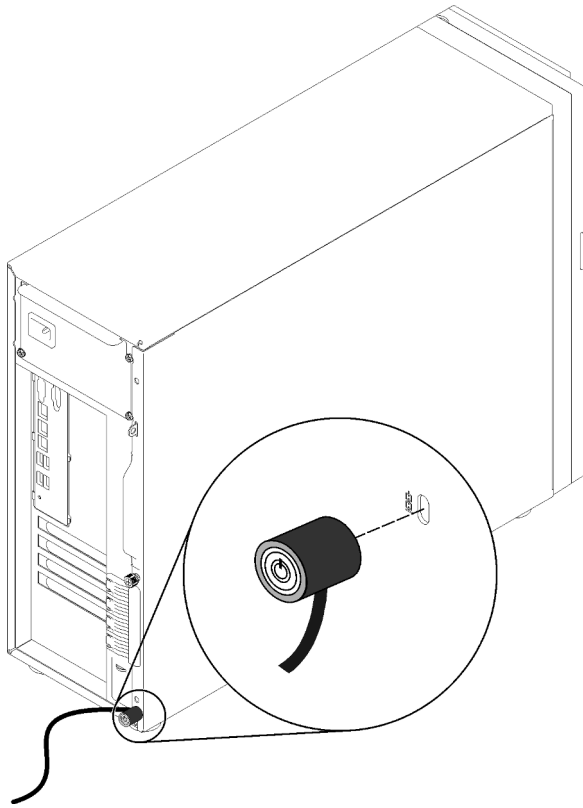


Figure 16. Kensington-style cable lock

Front door lock

You can use the key in the material box to open or lock the front door of the server. The front door protects the drive cage and prevents unauthorized access to the installed drives.

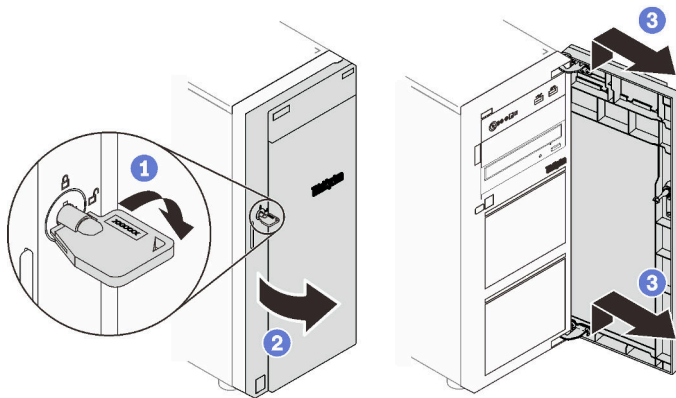


Figure 17. Front door lock

Internal cable routing

Some of the components in the server come with internal cables meant for specific connectors.

Before connecting the cables, read the following guidelines carefully:

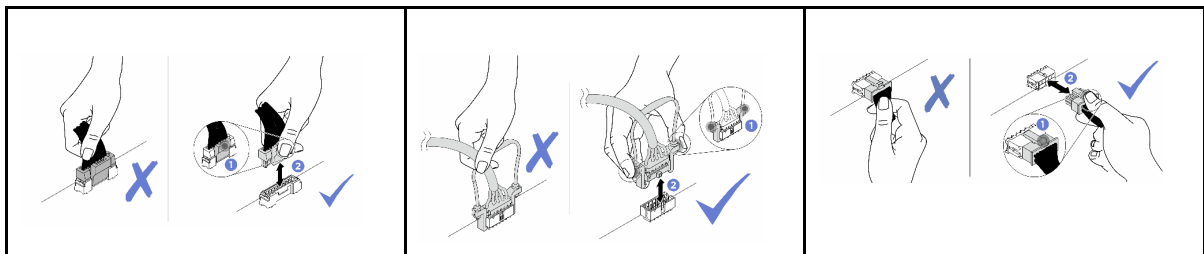
- Turn off the server before you connect or disconnect any internal cables.

- Refer to the documentation that comes with any external devices for additional cabling instructions.
- Make use of the identifiers printed on the cables to locate the proper connectors.
- Ensure that the cable is not pinched and does not cover any connectors or obstruct any components on the system board.

Notes:

1. Disengage all latches, release tabs, or locks on cable connectors when you disconnect cables from the system board. Failing to release them before removing the cables will damage the cable sockets on the system board, which are fragile. Strictly observe the following instructions to avoid damaging cable sockets on the system board. Any damage to the cable sockets might require replacing the system board.
 - Connect cable connectors vertically or horizontally in alignment with the orientations of the corresponding cable sockets, avoiding any tilt.
 - To disconnect cables from the system board, do as follows:
 - a. Press and hold all latches, release tabs, or locks on cable connectors to release the cable connectors.
 - b. Remove the cable connectors vertically or horizontally in alignment with the orientations of the corresponding cable sockets, avoiding any tilt.

Note: The cable connectors might look different from those in the illustration, but the removal procedure is the same.



2. When installing the front system fan into the chassis, make sure the cables do not interfere with the two posts and the fan is firmly seated.

Fan power cable

Use the section to understand the internal routing and connectors for the fan power cables.

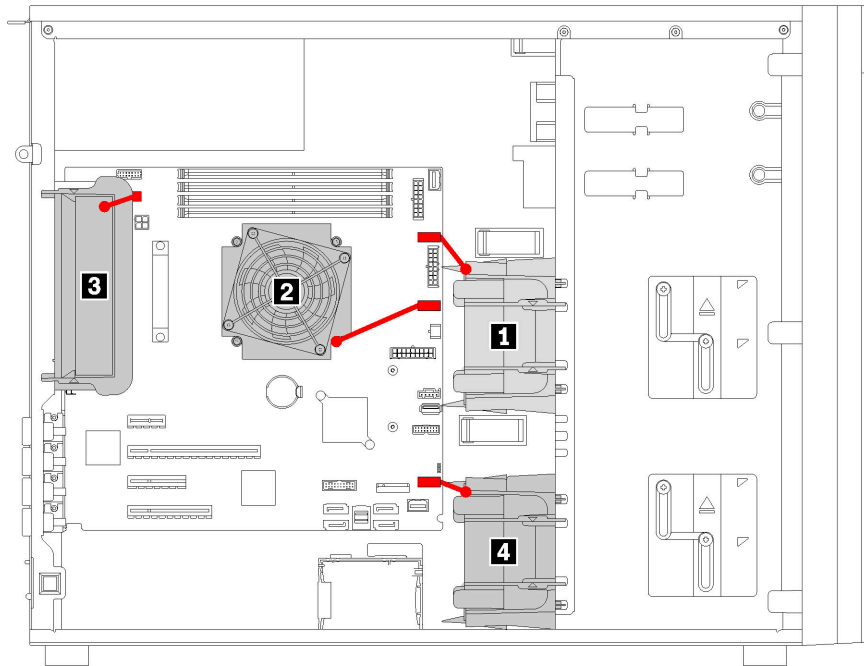


Figure 18. Fan power cable routing

Table 9. Location of fan power connectors on system board

Callout	Callout
1 Front fan 1	3 Rear fan
2 CPU fan	4 Front fan 4

Front panel

Use the section to understand the cable routing for the front panel.

Note: Ensure that all cables are routed through the correct cable clips.

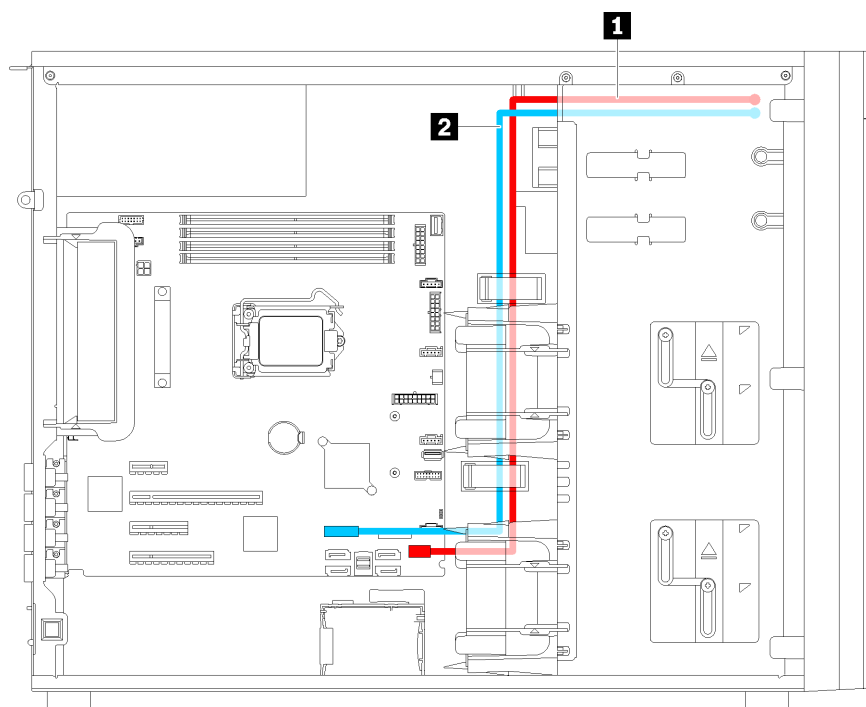


Figure 19. Cable routing for the front panel

Cable	From	To
1 Operator-information-panel cable	Rear of front panel	Operator-information-panel connector on the system board
2 USB cable	Rear of front panel	Front-panel-USB connector on the system board

Optical drive

Use the section to understand the cable routing for the optical drives.

Note: Ensure that all cables are routed through the correct cable clips.

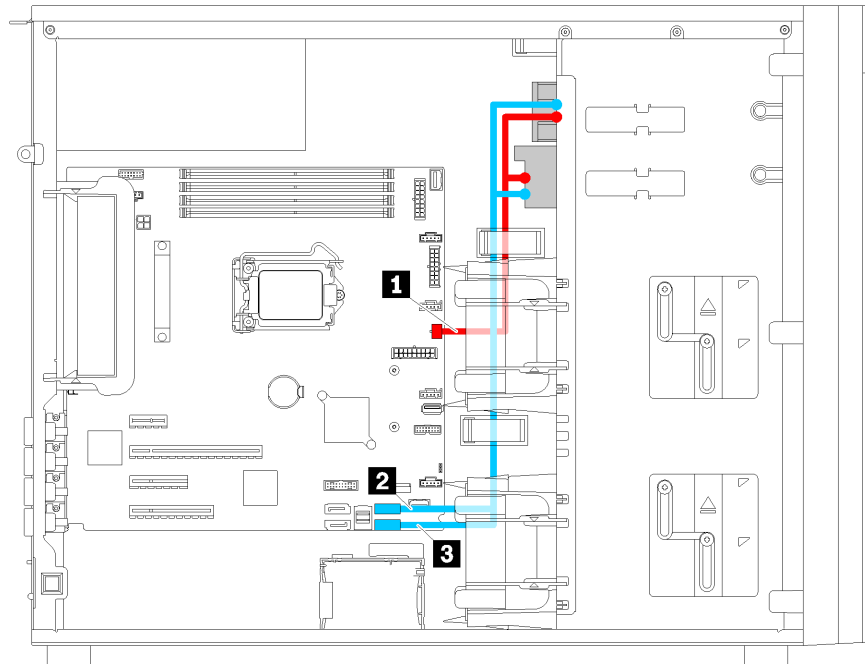


Figure 20. Cable routing for the optical drives

Cable	From	To
1 Power cable	Power connector on each optical drive	Optical disk drive power connector on the system board
2 Signal cable	Signal connector on the optical drive 1	Optical disk drive 1 signal connector on the system board
3 Signal cable	Signal connector on the optical drive 2	Optical disk drive 2 signal connector on the system board

Tape drive

Use the section to understand the cable routing for the tape drive.

SAS tape drive

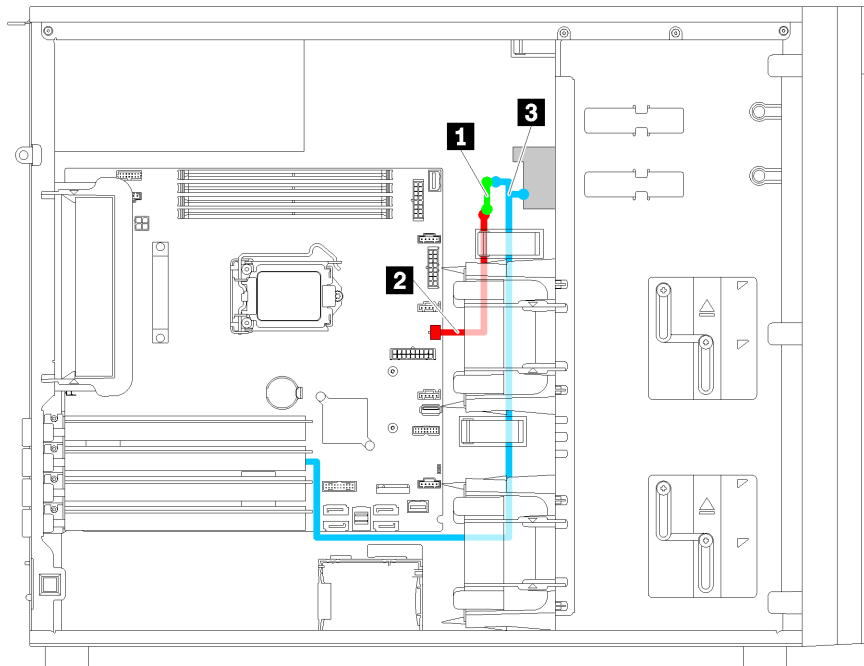


Figure 21. Cable routing for the SAS tape drive

Cable	From	To
1 Signal to power cable	Power connector on tape drive	Power connector on power cable
2 Power cable	Power connector on power cable	Optical drive power connector on system board
3 Signal cable with power	Signal connector on tape drive	An available connector on the HBA adapter

Note: Ensure that all cables are routed through the correct cable clips.

USB tape drive

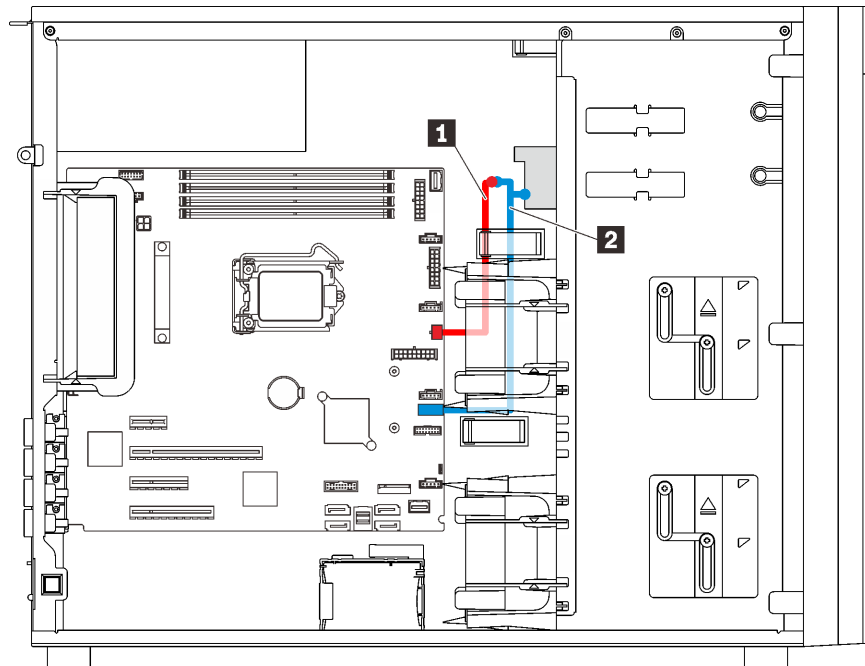


Figure 22. Cable routing for the USB tape drive

Cable	From	To
1 Power cable	Power connector on power cable	Optical drive power connector on system board
2 Signal cable	Signal connector on the tape drive	Internal USB 3.0 connector on the system board

Note: Ensure that all cables are routed through the correct cable clips.

Redundant power supply

Use the section to understand the cable routing for the redundant power supply.

Notes:

- Ensure that all cables are routed through the correct cable clips.
- When installing front fan 2, the cabling highlighted by the red circle may interfere with the installation. If this happens, push the cabling downwards and neatly tuck them under front fan 2.

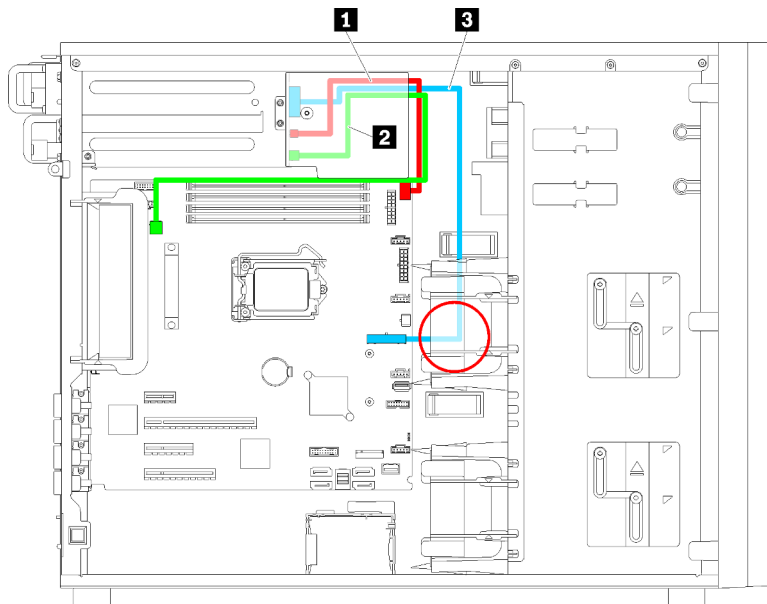


Figure 23. Cable routing for the redundant power supply

Cable	From	To
1 Signal cable	Signal connector on the power interface board	Signal connector on the system board
2 CPU power cable	CPU power connector on the power interface board	CPU power connector on the system board
3 Power cable	System power connector on the power interface board	System power connector on the system board

Fixed power supply

Use the section to understand the cable routing for the fixed power supply.

Note: Ensure that all cables are routed through the correct cable clips.

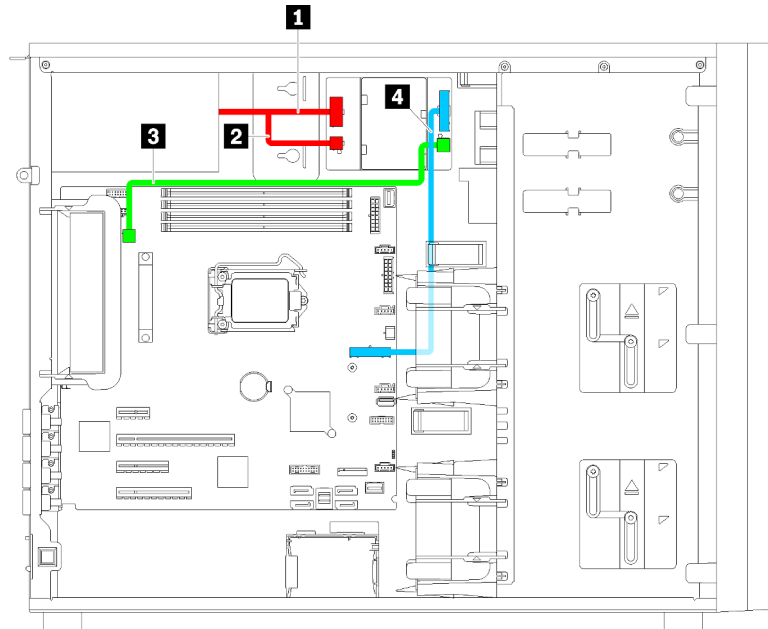


Figure 24. Cable routing for the fixed power supply

Cable	From	To
1 Power supply system power cable	System power connector on paddle board	System power connector on the fixed power supply
2 Power supply CPU power cable	CPU power connector on paddle board	CPU power connector on the fixed power supply
3 CPU power cable	CPU power connector on the fixed power supply	CPU power connector on the system board
4 System power cable	System power connector on the fixed power supply	System power connector on the system board

Simple-swap-drive backplate

Use the section to understand the cable routing for the simple-swap-drive backplate.

This topic contains the following information:

- “Server models with four 3.5-inch simple-swap drives (software RAID)” on page 40
- “Server models with eight 3.5-inch simple-swap drives (software RAID)” on page 41

Server models with four 3.5-inch simple-swap drives (software RAID)

Use this section to understand the cable routing for server models with four 3.5-inch simple-swap drives (software RAID).

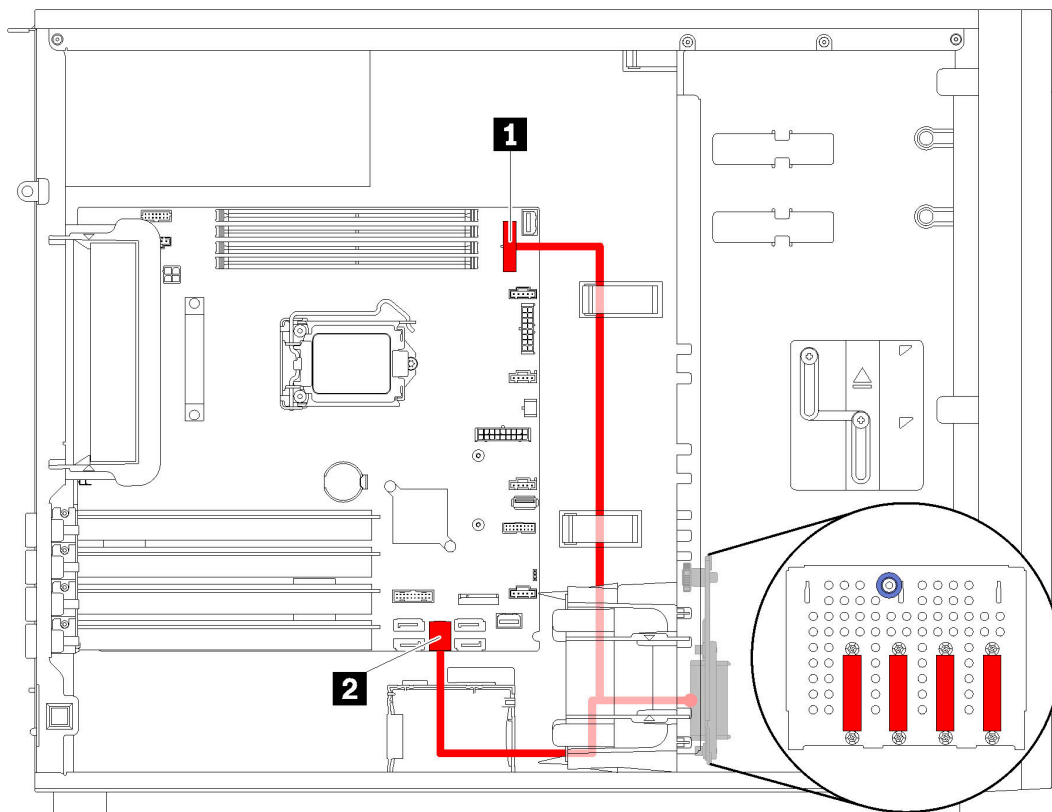


Figure 25. Cable routing for server models with four 3.5-inch simple-swap drives (software RAID)

Note: Ensure that all cables are routed through the correct cable clips.

Cable	From	To
Simple-swap disk drive cable	SAS connector on the backplate	1 Backplane 1 power connector on the system board
		2 SATA 0-3 connector on the system board

Server models with eight 3.5-inch simple-swap drives (software RAID)

Use this section to understand the cable routing for server models with eight 3.5-inch simple-swap drives (software RAID).

Note: Ensure that all cables are routed through the correct cable clips.

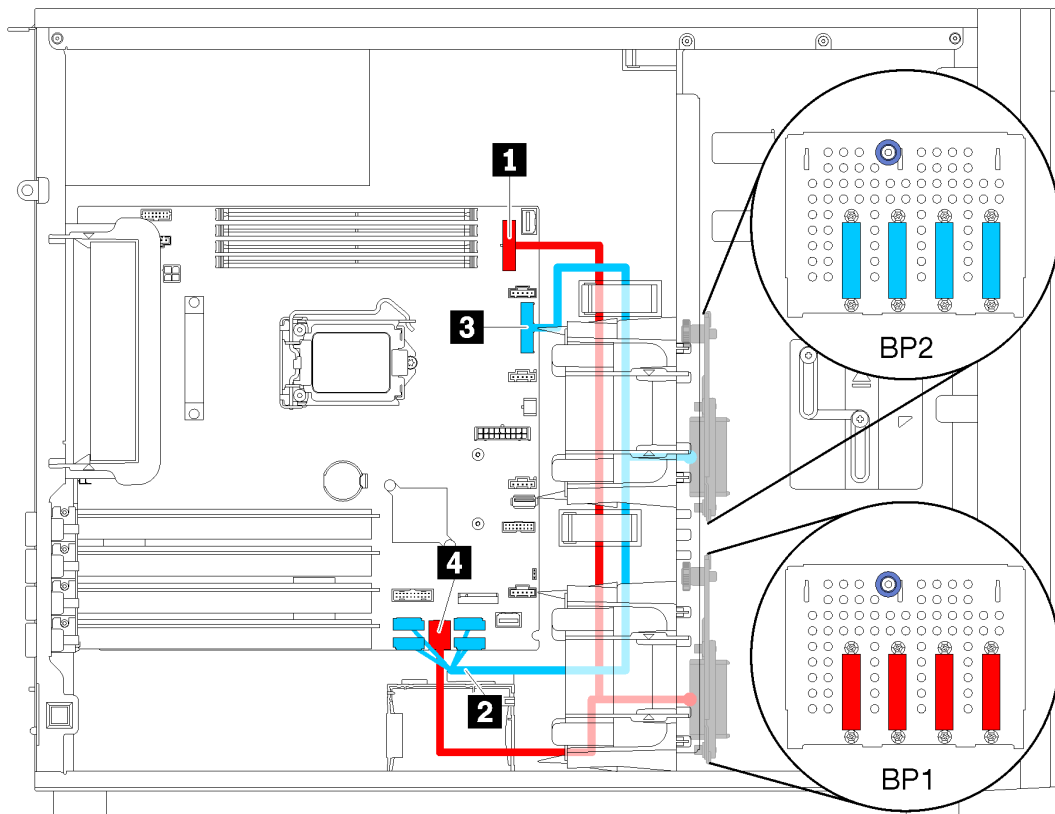


Figure 26. Cable routing for server models with eight 3.5-inch simple-swap drives (software RAID)

Cable	From	To
First simple-swap disk drive cable	SAS connector on the backplate	1 Backplane 1 power connector on the system board
		4 SATA 0–3 connector on the system board
Second simple-swap disk drive cable	SAS connector on the backplate	2 SATA 4–7 connector on the system board
		3 Backplane 2 power connector on the system board

Hot-swap-drive backplane

Use the section to understand the cable routing for hot-swap-drive backplanes.

This topic contains the following information:

- “Server models with eight 2.5-inch hot-swap drives (hardware RAID)” on page 44
- “Server models with sixteen 2.5-inch hot-swap drives (hardware RAID)” on page 45
- “Server models with four 3.5-inch hot-swap drives (hardware RAID)” on page 42
- “Server models with eight 3.5-inch hot-swap drives (hardware RAID)” on page 43
- “Server models with four 3.5-inch hot-swap drives and eight 2.5-inch hot-swap drives (hardware RAID)” on page 48

Before you route cables for backplanes, observe the following guidelines when select a PCIe slot:

- The NVMe adapter can be installed only in PCIe slot 2.
- Internal RAID adapters can be installed in either PCIe slot 1 or PCIe slot 2.

Server models with four 3.5-inch hot-swap drives (hardware RAID)

Use this section to understand the cable routing for server models with four 3.5-inch hot-swap SAS/SATA drives (hardware RAID).

Notes:

- Ensure that all cables are routed through the correct cable clips.
- Broken lines indicate the hidden parts.

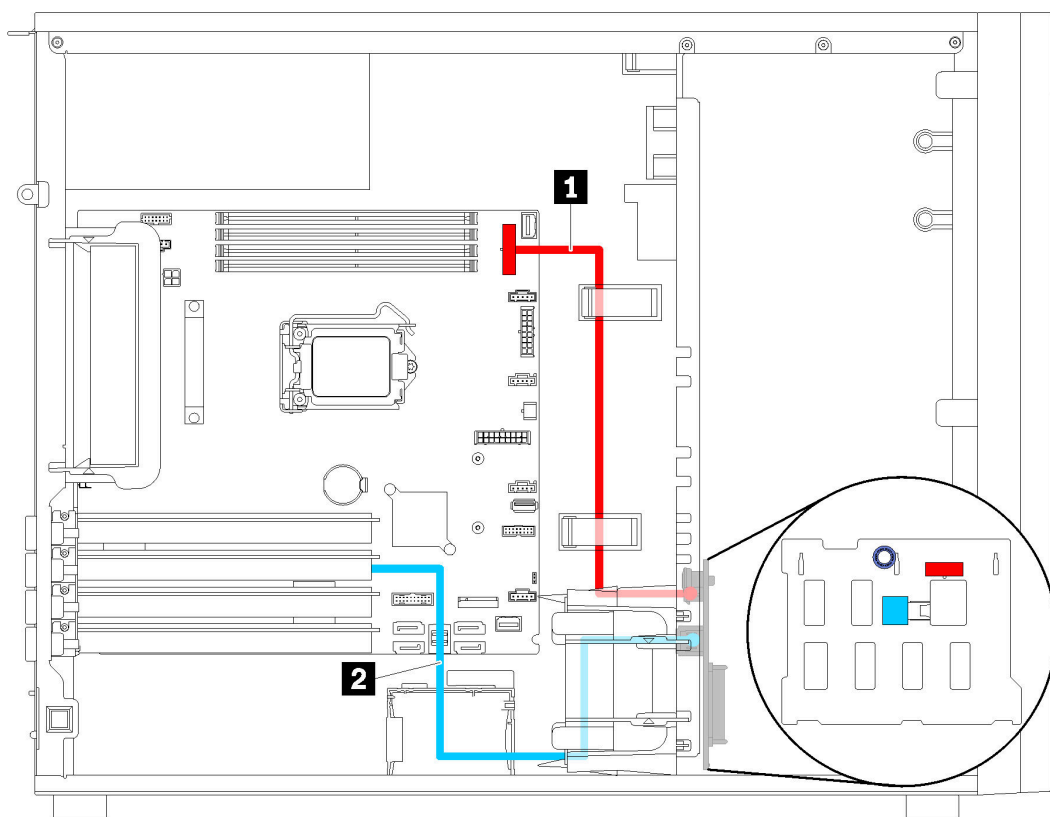


Figure 27. Cable routing for server models with four 3.5-inch hot-swap drives (hardware RAID)

Cable	From	To
1 Power cable for backplane 1	Power connector on backplane 1	Backplane 1 power connector on the system board
2 SAS signal cable for backplane 1	SAS connector on backplane 1	An available connector on the RAID adapter

Server models with eight 3.5-inch hot-swap drives (hardware RAID)

Use this section to understand the cable routing for server models with eight 3.5-inch hot-swap drives (hardware RAID).

Note: Ensure that all cables are routed through the correct cable clips.

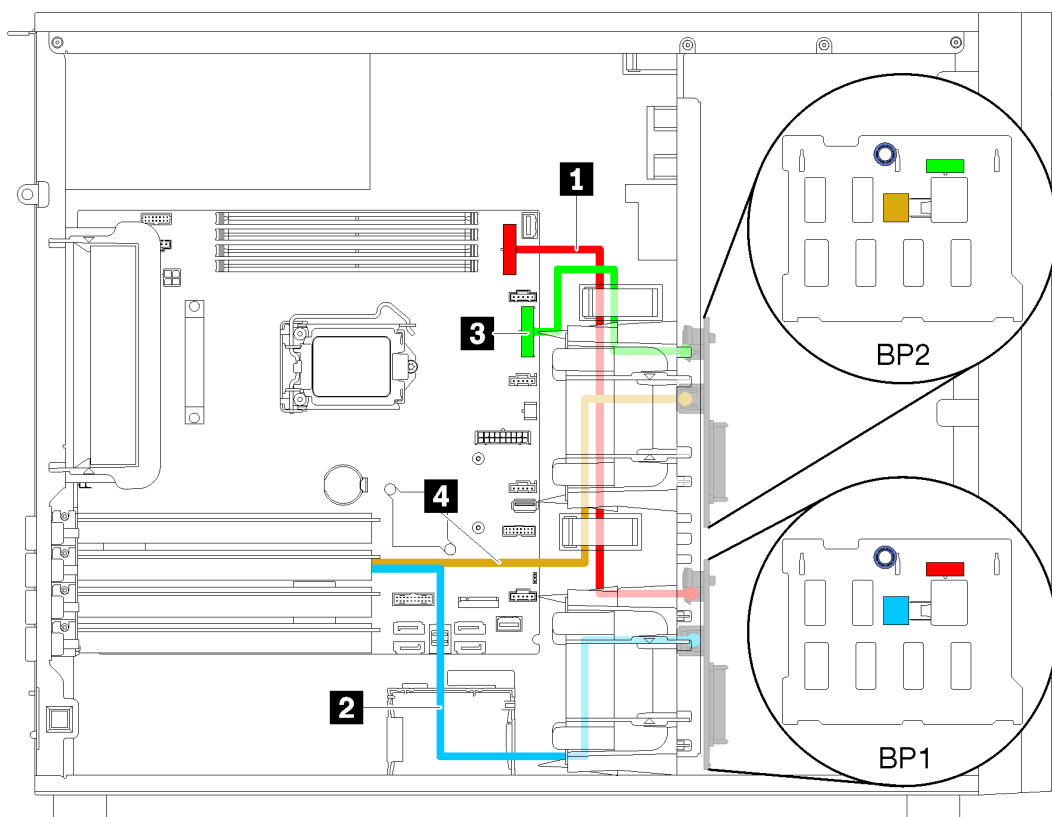


Figure 28. Cable routing for server models with eight 3.5-inch hot-swap drives (hardware RAID)

Cable	From	To
1 Power cable for backplane 1	Power connector on backplane 1	Backplane 1 power connector on the system board
2 SAS signal cable for backplane 1	SAS connector on backplane 1	An available connector on the RAID adapter
3 Power cable for backplane 2	Power connector on backplane 2	Backplane 2 power connector on the system board
4 SAS signal cable for backplane 2	SAS connector on backplane 2	An available connector on the RAID adapter

Server models with eight 2.5-inch hot-swap drives (hardware RAID)

Use this section to understand the cable routing for server models with eight 2.5-inch hot-swap drives (hardware RAID).

Note: Ensure that all cables are routed through the correct cable clips.

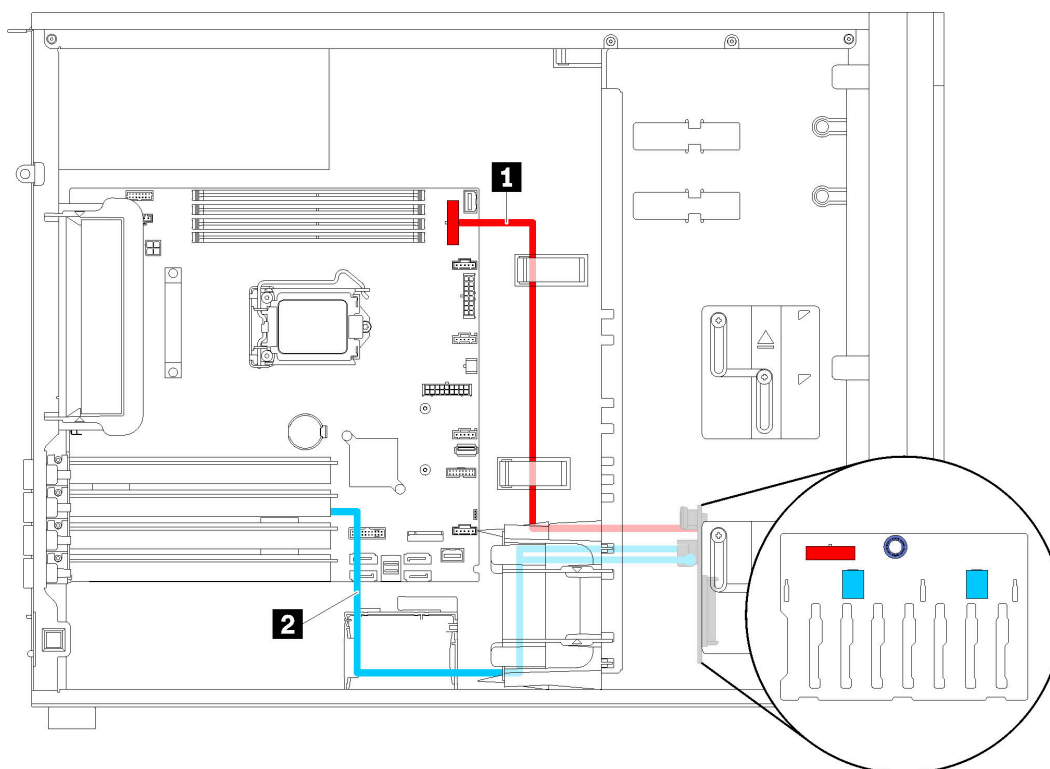


Figure 29. Cable routing for server models with eight 2.5-inch hot-swap drives (hardware RAID)

Cable	From	To
1 Power cable	Power connector on the backplane	Backplane 1 power connector on the system board
2 SAS signal cable	SAS 0 and SAS 1 connectors on the backplane	Connectors on the RAID adapter

Server models with sixteen 2.5-inch hot-swap drives (hardware RAID)

Use this section to understand the cable routing for server models with sixteen 2.5-inch hot-swap drives (hardware RAID).

Notes:

- There are two types of configurations:
 - Two 8i RAID adapters
 - One 16i RAID adapter
- Ensure that all cables are routed through the correct cable clips.

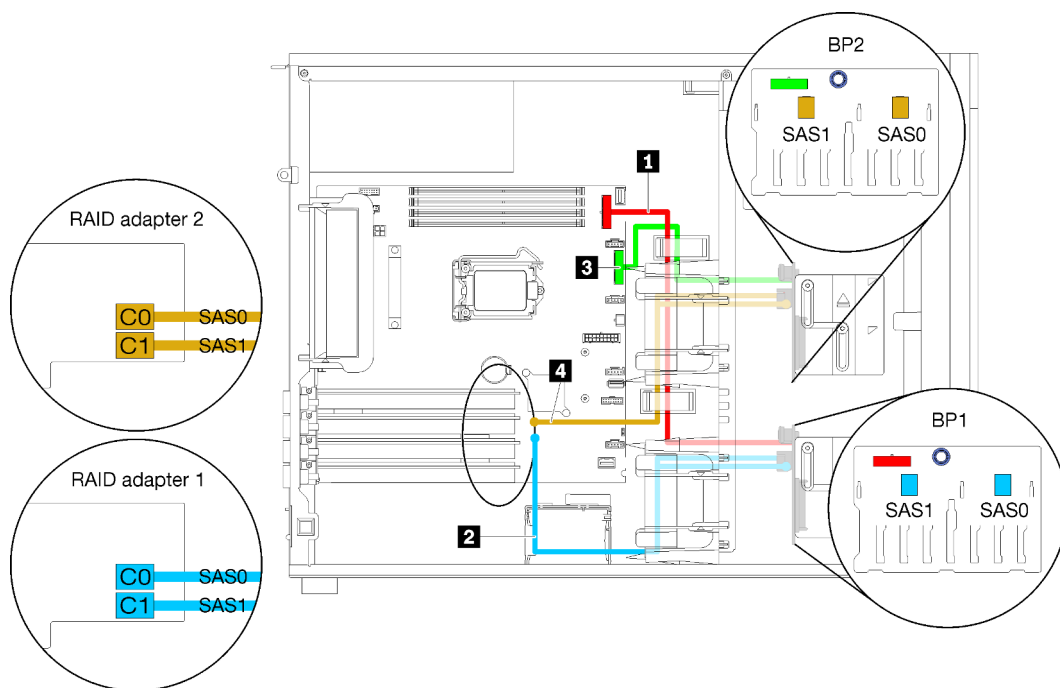


Figure 30. Cable routing server models with sixteen 2.5-inch hot-swap drives, two 8i RAID adapters (hardware RAID)

Cable	From	To
1 Power cable for backplane 1	Power connector on backplane 1	Backplane 1 power connector on the system board
2 SAS signal cable for backplane 1	SAS 0 and SAS 1 connectors on backplane 1	Connectors on RAID adapter 1
3 Power cable for backplane 2	Power connector on backplane 2	Backplane 2 power connector on the system board
4 SAS signal cable for backplane 2	SAS 0 and SAS 1 connectors on backplane 2	Connectors on RAID adapter 2

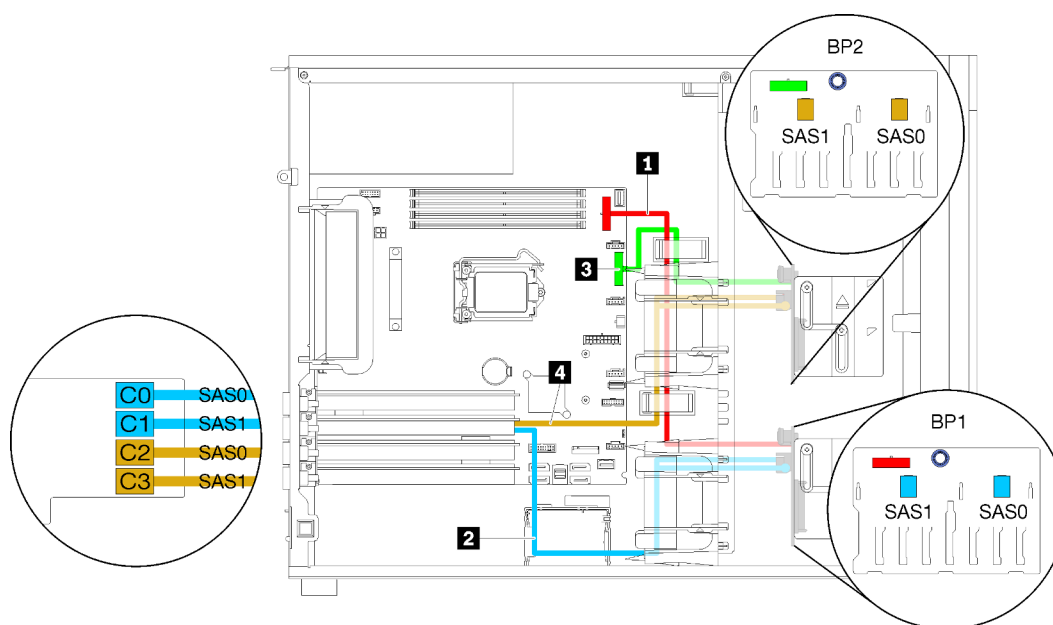


Figure 31. Cable routing server models with sixteen 2.5-inch hot-swap drives, one 16i RAID adapter (hardware RAID)

Cable	From	To
1 Power cable for backplane 1	Power connector on backplane 1	Backplane 1 power connector on the system board
2 SAS signal cable for backplane 1	SAS 0 and SAS 1 connectors on backplane 1	C0 and C1 connectors on the 16i RAID adapter
3 Power cable for backplane 2	Power connector on backplane 2	Backplane 2 power connector on the system board
4 SAS signal cable for backplane 2	SAS 0 and SAS 1 connectors on backplane 2	C2 and C3 connectors on the 16i RAID adapter

Server models with four 3.5-inch hot-swap drives and eight 2.5-inch hot-swap drives (hardware RAID)

Use this section to understand the cable routing for server models with four 3.5-inch hot-swap drives and eight 2.5-inch hot-swap drives (hardware RAID).

Server model: four 3.5-inch hot-swap drives and eight 2.5-inch hot-swap drives (hardware RAID)

Notes:

- There are two types of configurations:
 - Two 8i RAID adapters
 - One 16i RAID adapter
- Ensure that all cables are routed through the correct cable clips.

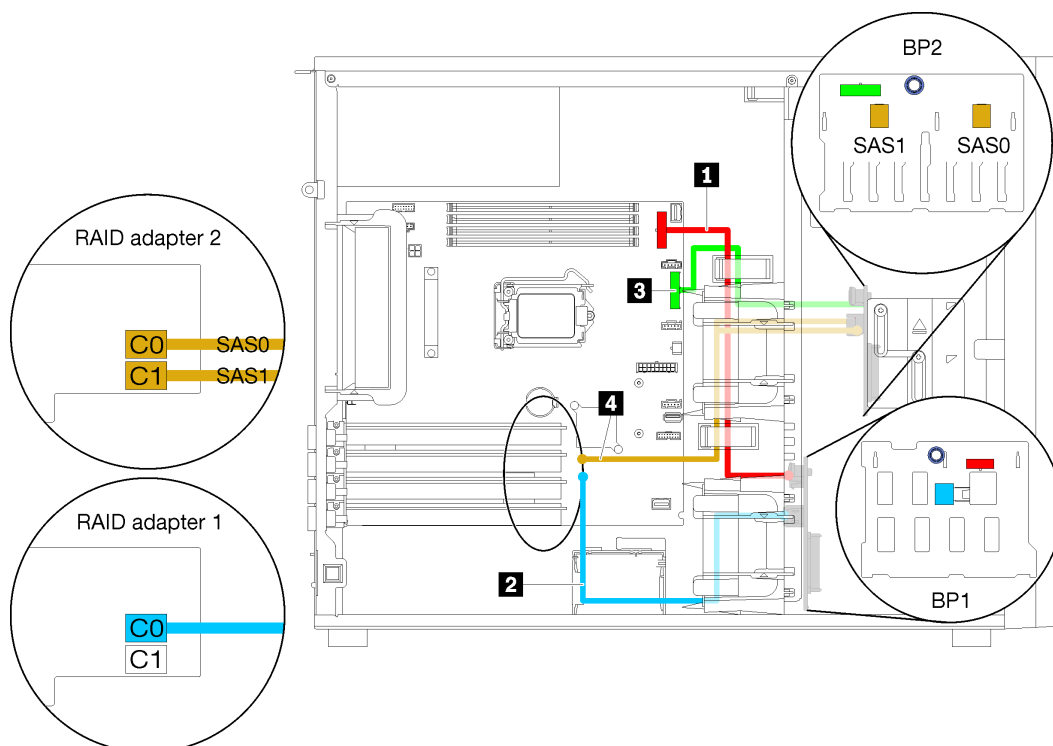


Figure 32. Cable routing for server models with four 3.5-inch hot-swap drives, eight 2.5-inch hot-swap drives, two 8i RAID adapters (hardware RAID)

Cable	From	To
1 Power cable for backplane 1	Power connector on backplane 1	Backplane 1 power connector on the system board
2 SAS signal cable for backplane 1	SAS connector on backplane 1	C0 connector on one 8i RAID adapter 1
3 Power cable for backplane 2	Power connector on backplane 2	Backplane 2 power connector on the system board
4 SAS signal cable for backplane 2	SAS 1 and SAS 2 connectors on backplane 2	C0 and C1 connectors on one 8i RAID adapter 2

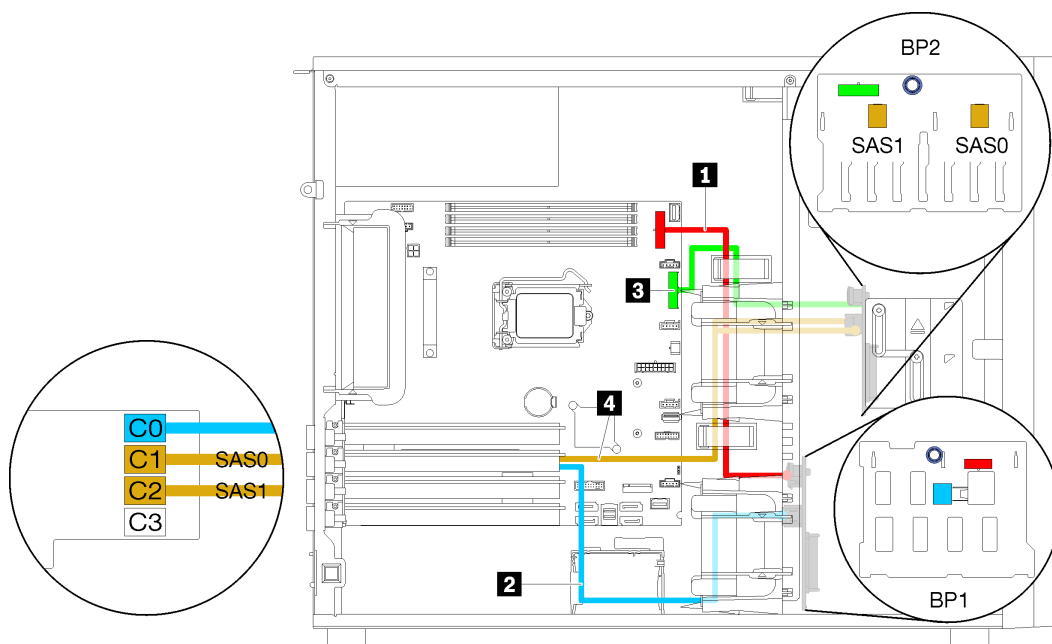


Figure 33. Cable routing for server models with four 3.5-inch hot-swap drives, eight 2.5-inch hot-swap drives, one 16i RAID adapter (hardware RAID)

Cable	From	To
1 Power cable for backplane 1	Power connector on backplane 1	Backplane 1 power connector on the system board
2 SAS signal cable for backplane 1	SAS connector on backplane 1	C0 connector on 16i RAID adapter
3 Power cable for backplane 2	Power connector on backplane 2	Backplane 2 power connector on the system board
4 SAS signal cable for backplane 2	SAS 1 and SAS 2 connectors on backplane 2	C1 and C2 connectors on 16i RAID adapter

Parts list

Use the parts list to identify each of the components that are available for your server.

For more information about ordering the parts shown in Figure 34 “Server components” on page 50:

<http://datacentersupport.lenovo.com/products/servers/thinksystem/st250/7y45/parts>

Note: Depending on the model, your server might look slightly different from the illustration.

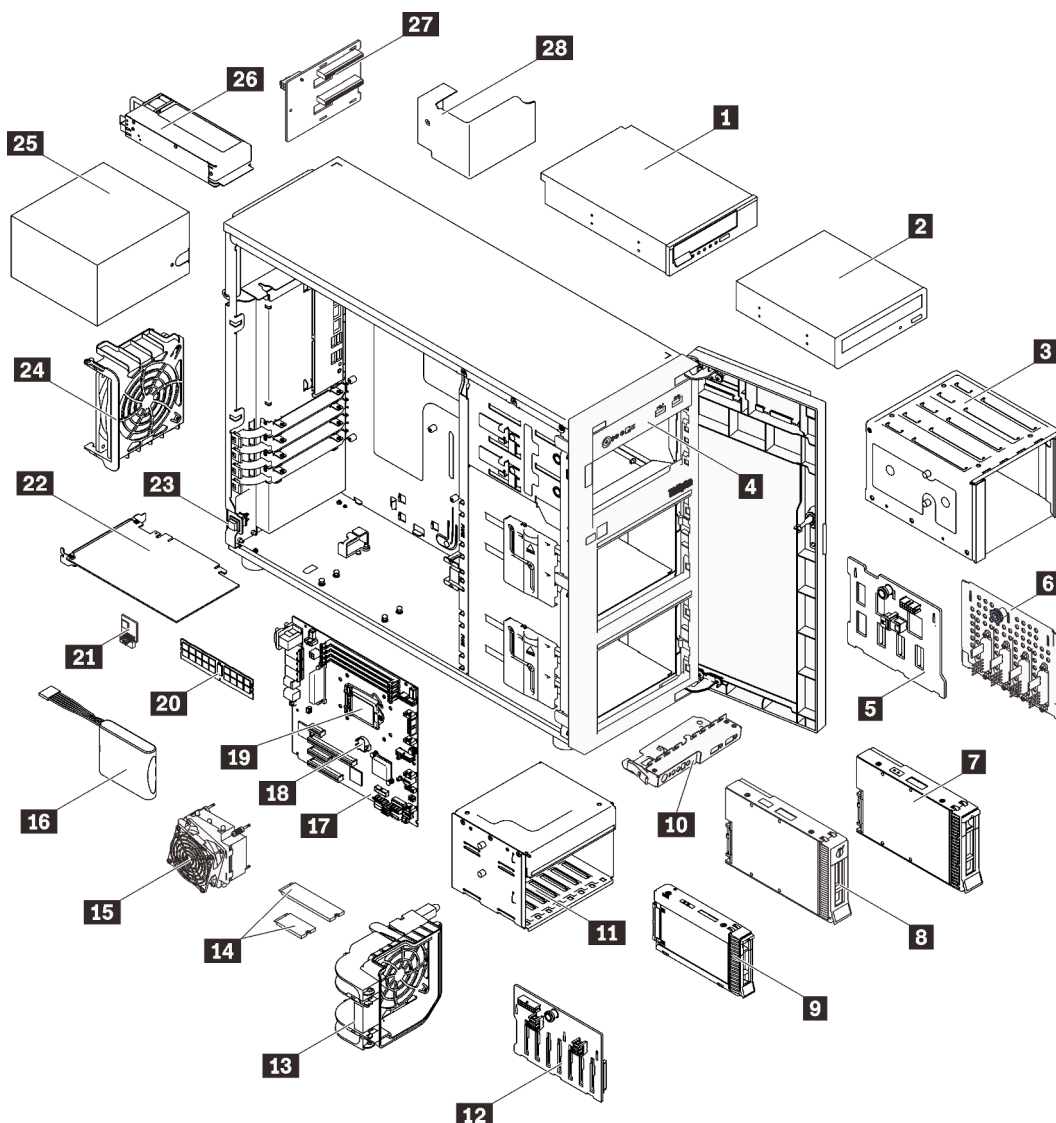


Figure 34. Server components

The parts listed in the following table are identified as one of the following:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request with no service agreement, you will be charged for the installation.
- **Tier 2 customer replaceable unit (CRU):** You may install a Tier 2 CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.
- **Consumable and Structural parts:** Purchase and replacement of consumable and structural parts is your responsibility. If Lenovo acquires or installs a structural component at your request, you will be charged for the service.

Table 10. Parts listing

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural parts
<p>For more information about ordering the parts shown in Figure 34 “Server components” on page 50:</p> <p>http://datacentersupport.lenovo.com/products/servers/thinksystem/st250/7y45/parts</p> <p>It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.</p>					
1	5.25-inch LTO/RDX tape drive	√			
2	5.25-inch optical disk drive	√			
3	3.5-inch disk drive cage				√
4	Chassis				√
5	3.5-inch hot-swap drive backplane		√		
6	3.5-inch simple-swap drive backplate	√			
7	3.5-inch hot-swap drive	√			
8	3.5-inch simple-swap drive	√			
9	2.5-inch hot-swap drive	√			
10	Front panel board assembly	√			
11	2.5-inch disk drive cage				√
12	2.5-inch hot-swap drive backplane		√		
13	Front fan	√			
14	M.2 drive (42mm and 80mm)	√			
15	Heat sink fan assembly			√	
16	Flash power module	√			
17	System board			√	
18	CMOS battery (CR2032)				√
19	Processor			√	
20	DIMM	√			
21	TPM card			√	
22	PCIe adapter	√			
23	Intrusion switch	√			
24	Rear fan	√			
25	Fixed power supply unit		√		
26	Redundant power supply unit	√			

Table 10. Parts listing (continued)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural parts
27	Power distribution board		√		
28	Power distribution board cover				√

Power cords

Several power cords are available, depending on the country and region where the server is installed.

To view the power cords that are available for the server:

1. Go to:
<http://dcsc.lenovo.com/#/>
2. Click **Preconfigured Model** or **Configure to order**.
3. Enter the machine type and model for your server to display the configurator page.
4. Click **Power** → **Power Cables** to see all line cords.

Notes:

- For your safety, a power cord with a grounded attachment plug is provided to use with this product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.
- Power cords for this product that are used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).
- For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.
- For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.
- For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.
- Power cords for a specific country or region are usually available only in that country or region.

Chapter 3. Server hardware setup

To set up the server, install any options that have been purchased, cable the server, configure and update the firmware, and install the operating system.

Server setup checklist

Use the server setup checklist to ensure that you have performed all tasks that are required to set up your server.

The server setup procedure varies depending on the configuration of the server when it was delivered. In some cases, the server is fully configured and you just need to connect the server to the network and an ac power source, and then you can power on the server. In other cases, the server needs to have hardware options installed, requires hardware and firmware configuration, and requires an operating system to be installed.

The following steps describe the general procedure for setting up a server:

1. Unpack the server package. See “Server package contents” on page 1.
2. Set up the server hardware.
 - a. Install any required hardware or server options. See the related topics in “Install server hardware options” on page 59.
 - b. If necessary, install the server into a standard rack cabinet by using the tower-to-rack conversion kit. See the documentation that comes with the optional conversion kit.
 - c. Connect the Ethernet cables and power cords to the server. See “Rear view” on page 23 to locate the connectors. See “Cable the server” on page 89 for cabling best practices.
 - d. Power on the server. See “Power on the server” on page 90.

Note: You can access the management processor interface to configure the system without powering on the server. Whenever the server is connected to power, the management processor interface is available. For details about accessing the management server processor, see:

“Opening and Using the XClarity Controller Web Interface” section in the XCC documentation version compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>.

- e. Validate that the server hardware was set up successfully. See “Validate server setup” on page 90.
3. Configure the system.
 - a. Connect the Lenovo XClarity Controller to the management network. See “Set the network connection for the Lenovo XClarity Controller” on page 91.
 - b. Update the firmware for the server, if necessary. See “Update the firmware” on page 92.
 - c. Configure the firmware for the server. See “Configure the firmware” on page 96.

The following information is available for RAID configuration:

- <https://lenovopress.com/lp0578-lenovo-raid-introduction>
 - <https://lenovopress.com/lp0579-lenovo-raid-management-tools-and-resources>
- d. Install the operating system. See “Deploy the operating system” on page 99.
 - e. Back up the server configuration. See “Back up the server configuration” on page 99.
 - f. Install the applications and programs for which the server is intended to be used.

Installation Guidelines

Use the installation guidelines to install components in your server.

Before installing optional devices, read the following notices carefully:

Attention: Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.

- Read the safety information and guidelines to ensure your safety at work:
 - A complete list of safety information for all products is available at: https://pubs.lenovo.com/safety_documentation/
 - “Handling static-sensitive devices” on page 57
- Make sure the components you are installing are supported by the server. For a list of supported optional components for the server, see <https://serverproven.lenovo.com/>.
- When you install a new server, download and apply the latest firmware. This will help ensure that any known issues are addressed, and that your server is ready to work with optimal performance. Go to [ThinkSystem ST250 Drivers and Software](#) to download firmware updates for your server.

Important: Some cluster solutions require specific code levels or coordinated code updates. If the component is part of a cluster solution, verify the latest Best Recipe code level menu for cluster supported firmware and driver before you update the code.

- It is good practice to make sure that the server is working correctly before you install an optional component.
- Keep the working area clean, and place removed components on a flat and smooth surface that does not shake or tilt.
- Do not attempt to lift an object that might be too heavy for you. If you have to lift a heavy object, read the following precautions carefully:
 - Make sure that you can stand steadily without slipping.
 - Distribute the weight of the object equally between your feet.
 - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
 - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes related to the disk drives.
- Have a small flat-blade screwdriver, a small Phillips screwdriver, and a T8 torx screwdriver available.
- You do not have to turn off the server to remove or install hot-swap power supplies or hot-plug USB devices. However, you must turn off the server before you perform any steps that involve removing or installing adapter cables, and you must disconnect the power source from the server before you perform any steps that involve removing or installing a DIMM.
- Blue on a component indicates touch points, where you can grip to remove a component from or install it in the server, open or close a latch, and so on.
- Terra-cotta on a component or a terra-cotta label on or near a component indicates that the component can be hot-swapped if the server and operating system support hot-swap capability, which means that you can remove or install the component while the server is still running. (Terra-cotta can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.

- The Red strip on the drives, adjacent to the release latch, indicates that the drive can be hot-swapped if the server and operating system support hot-swap capability. This means that you can remove or install the drive while the server is still running.

Note: See the system specific instructions for removing or installing a hot-swap drive for any additional procedures that you might need to perform before you remove or install the drive.

- After finishing working on the server, make sure you reinstall all safety shields, guards, labels, and ground wires.

System reliability guidelines

The system reliability guidelines to ensure proper system cooling.

Make sure the following requirements are met:

- When the server comes with redundant power, a power supply must be installed in each power-supply bay.
- Adequate space around the server must be spared to allow server cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the server. Do not place any object in front of the fans.
- For proper cooling and airflow, refit the server cover before you turn the power on. Do not operate the server for more than 30 minutes with the server cover removed, for it might damage server components.
- Cabling instructions that come with optional components must be followed.
- A failed fan must be replaced within 48 hours since malfunction.
- A removed hot-swap drive must be replaced within two minutes after removal.
- A removed hot-swap power supply must be replaced within two minutes after removal.
- Every air baffle that comes with the server must be installed when the server starts (some servers might come with more than one air baffle). Operating the server with a missing air baffle might damage the processor.
- All processor sockets must contain either a socket cover or a processor with heat sink.
- When more than one processor is installed, fan population rules for each server must be strictly followed.

Handling static-sensitive devices

Follow this procedure to handle static-sensitive devices.

Attention: Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.

- Limit your movement to prevent building up static electricity around you.
- Take additional care when handling devices during cold weather, for heating would reduce indoor humidity and increase static electricity.
- Always use an electrostatic-discharge wrist strap or other grounding system.
- While the device is still in its static-protective package, touch it to an unpainted metal surface on the outside of the server for at least two seconds. This drains static electricity from the package and from your body.
- Remove the device from the package and install it directly into the server without putting it down. If it is necessary to put the device down, put it back into the static-protective package. Never place the device on the server or on any metal surface.
- When handling a device, carefully hold it by the edges or the frame.

- Do not touch solder joints, pins, or exposed circuitry.
- Keep the device from others' reach to prevent possible damages.

Memory module installation rules and order

DIMMs must be installed in a specific order based on the memory configuration of the server.

The following illustration shows the location of the DIMM connectors on the system board.

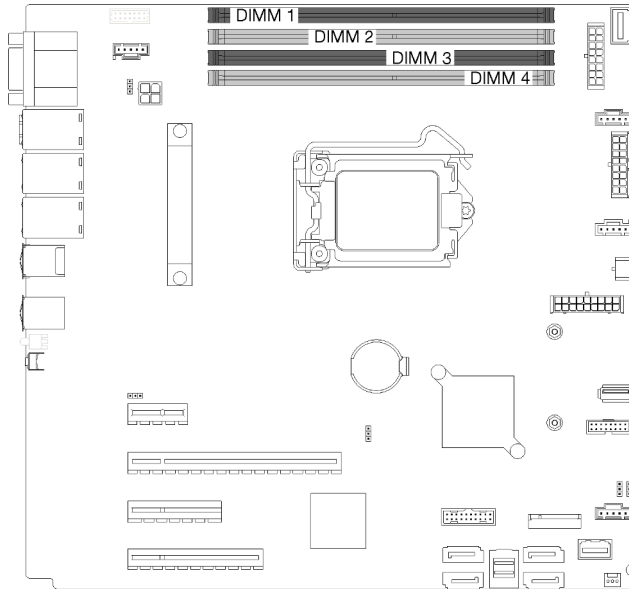


Figure 35. DIMM slots

This server comes with four DIMM slots with the following features:

For a list of supported DIMM options, see: <https://serverproven.lenovo.com/>

Before installing a DIMM, ensure that all DIMMs to be installed must be the same type. This server supports the following types of DIMMs:

- DDR4 UDIMM with ECC technology

Your server supports the following memory modes:

- Independent mode

Independent mode

Independent mode provides high performance memory capability. Individual channels can run at different DIMM timings, but all channels must run at the same interface frequency.

Note: All DIMMs installed must be the same type.

The following table shows the DIMM installation order.

Table 11. DIMM installation order

Number of DIMMs	DIMM Slot Number			
	1	2	3	4
One DIMM			X	
Two DIMMs	X		X	
Three DIMMs	X		X	X
Four DIMMs	X	X	X	X


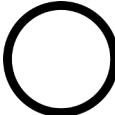

Install server hardware options

This section has instructions for performing initial installation of optional hardware. Each component installation procedure references any tasks that need to be performed to gain access to the component being replaced.

Installation procedures are presented in the optimum sequence to minimize work.

Remove the server cover

Use this information to remove the server cover.

 <p>“Read the installation Guidelines” on page 56</p>	 <p>“Power off the server for this task” on page 90</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 57</p>
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S014



CAUTION:

Hazardous voltage, current, and energy levels might be present. Only a qualified service technician is authorized to remove the covers where the label is attached.

S033



CAUTION:

Hazardous energy present. Voltages with hazardous energy might cause heating when shorted with metal, which might result in spattered metal, burns, or both.

- Step 1. Use a screwdriver to loosen the thumbscrew that secures the server cover. The thumbscrew is an integrated part of the server cover. Do not try to remove the thumbscrew from the server cover
- Step 2. Slide the server cover to the rear until it stops.
- Step 3. Pivot the server cover outward to remove it.

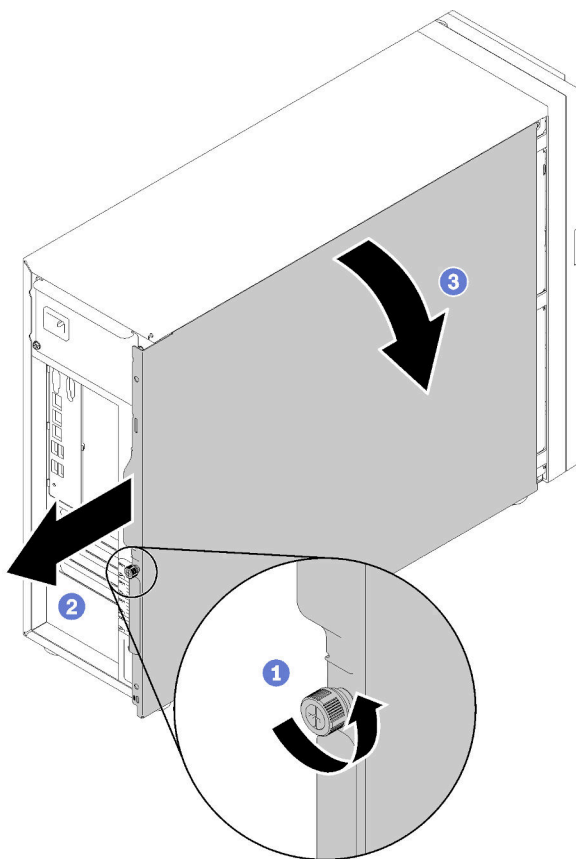


Figure 36. Server cover removal

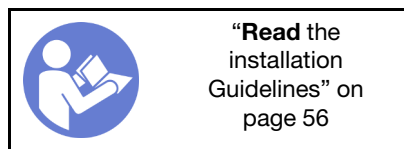
Attention: For proper cooling, always install the server cover before powering on the server. Operating the server without the cover properly installed might result in server component damage.

Demo video

Watch the procedure on YouTube

Remove the front door

Use this information to remove the front door.



Step 1. Open the front door.

Step 2. Lift the front door slightly upward until you can completely remove it.

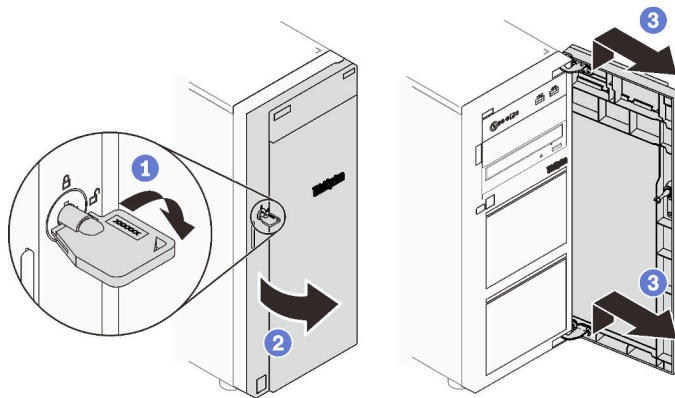




Figure 37. Front door removal

Demo video

Watch the procedure on YouTube

Remove the front bezel

Use this information to remove the front bezel.

 <p>“Read the installation Guidelines” on page 56</p>	 <p>“Power off the server for this task” on page 90</p>
--	--

Step 1. Remove the front door (see “Remove the front door” on page 60).

Step 2. Lift the three plastic tabs to release left side of the bezel from the chassis; then, pivot the bezel as shown to remove it from the chassis.

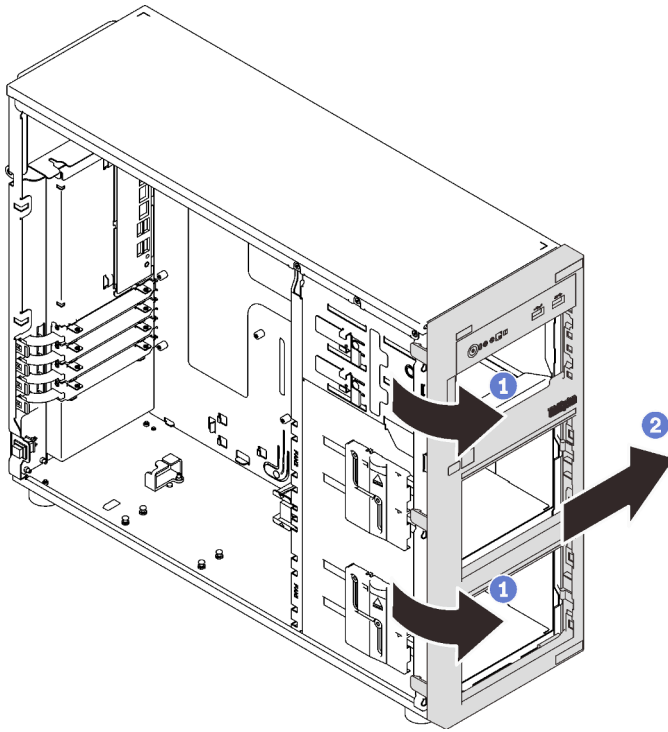





Figure 38. Front bezel removal

Demo video

Watch the procedure on YouTube

Install the 3.5-inch/2.5-inch drive cage

Use this information to install the 3.5-inc /2.5-inch drive cage.

 <p>“Read the installation Guidelines” on page 56</p>	 <p>“Power off the server for this task” on page 90</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 57</p>
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To install the drive cage, complete the following steps:

- Step 1. Install the backplane or backplate (see “Install the 3.5-inch/2.5-inch hot-swap backplane” on page 63 or “Install the 3.5-inch simple-swap drive backplate” on page 64).
- Step 2. Press the drive cage in until the release latch clicks into place.

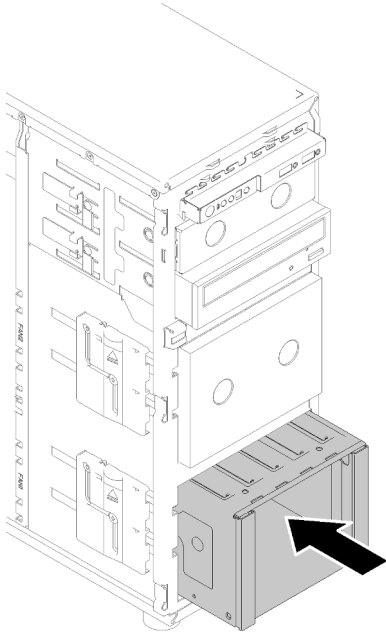



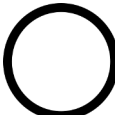

Figure 39. Drive cage installation

Demo video

Watch the procedure on YouTube

Install the 3.5-inch/2.5-inch hot-swap backplane

Use this information to install the 3.5-inch/2.5-inch hot-swap backplane.

 <p>“Read the installation Guidelines” on page 56</p>	 <p>“Power off the server for this task” on page 90</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 57</p>
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To install a hot-swap drive backplane, complete the following steps:

- Step 1. Position the backplane on the drive cage so that the tabs on the drive cage are inserted into the corresponding holes in the backplane; then, align bottom of backplane inside the bottom tabs of the drive cage.
- Step 2. While pulling the plunger, slide down the backplane until it is seated at the bottom of the drive cage; then, close the plunger to secure the backplane into position.

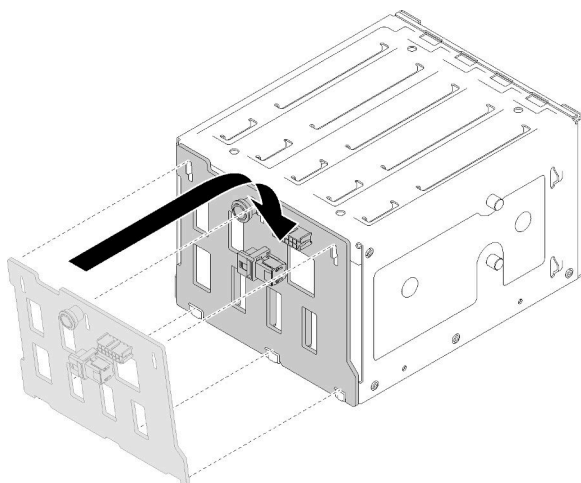


Figure 40. Hot-swap drive backplane installation

Step 3. Install the drive cage into the chassis (see “Install the 3.5-inch/2.5-inch drive cage” on page 62).

Demo video

Watch the procedure on YouTube

Install the 3.5-inch simple-swap drive backplate

Use this information to install the 3.5-inch simple-swap drive backplate.

	<p>“Read the installation Guidelines” on page 56</p>		<p>“Power off the server for this task” on page 90</p>		<p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 57</p>
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To install a simple-swap drive backplate, complete the following steps:

- Step 1. Position the backplate on the drive cage so that the tabs on the drive cage are inserted into the corresponding holes in the backplate.
- Step 2. Close the plunger to secure the backplate into position.

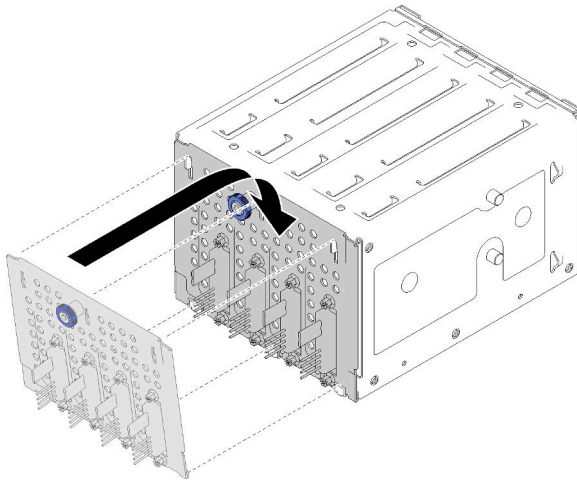


Figure 41. Simple-swap drive backplate installation



Step 3. Press the drive cage in until the release latch clicks into place (see “Install the 3.5-inch/2.5-inch drive cage” on page 62).

Demo video

Watch the procedure on YouTube

Install a 2.5-inch SSD into a 3.5-inch drive bay

Use this information to install a 2.5-inch SSD into a 3.5-inch drive bay.

 <p>“Read the installation Guidelines” on page 56</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 57</p>
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To install a 2.5-inch SSD into a 3.5-inch drive bay, complete the following steps:

- Step 1. Locate the appropriate drive bay.
- Step 2. If necessary, remove the 3.5-inch drive tray.
- Step 3. Position the 2.5-inch SSD into the 2.5-inch to 3.5-inch drive adapter.

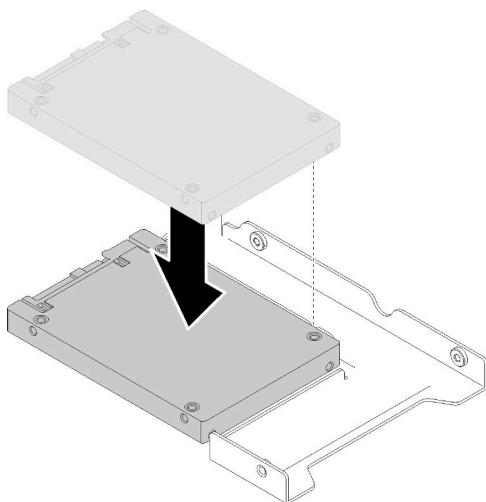


Figure 42. Positioning the 2.5-inch SSD into the drive adapter

- Step 4. Align the two screw holes in the SSD with the corresponding holes in the drive adapter; then, install the two screws to secure the drive to the drive adapter.

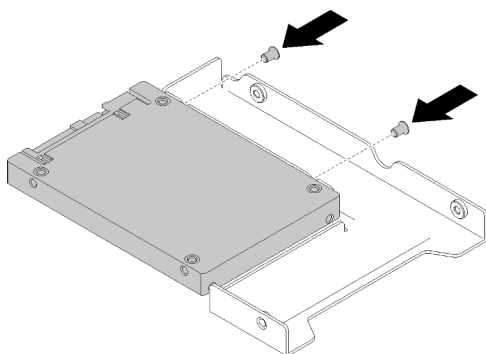


Figure 43. Screw installation to secure the SSD to the drive adapter

- Step 5. Position the drive adapter with the SSD into the 3.5-inch drive tray. Align the screw holes in the drive adapter and the SSD with the corresponding holes in the tray; then, install the five screws to secure the drive adapter and the SSD into the tray.

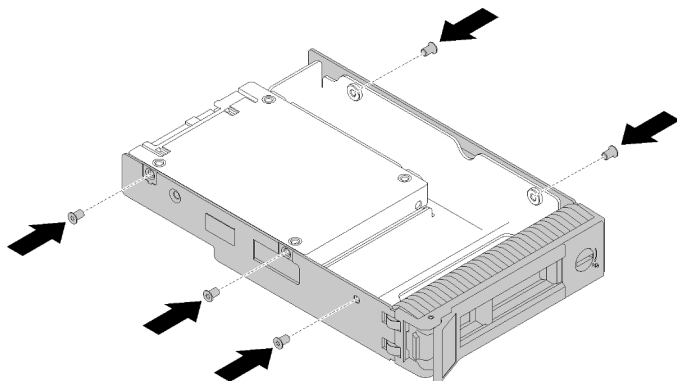


Figure 44. Screw installation to secure the drive adapter and the SSD to the drive tray

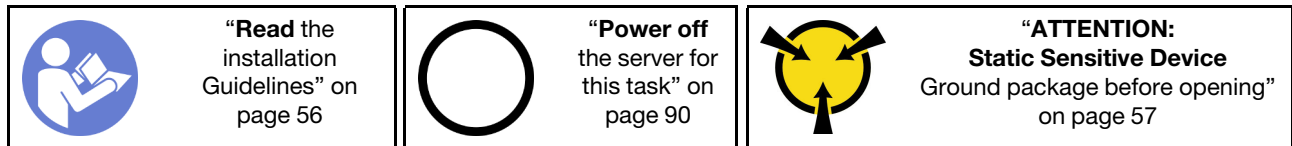
Step 6. Slide the tray with the SSD into the drive bay from the front until it snaps into position and then completely close the handle. See “Install a hot-swap drive” on page 71.

Demo video

Watch the procedure on YouTube

Install a DIMM

Use this information to install a DIMM.



See “Memory module installation rules and order” on page 58 for detailed information about memory configuration and setup.

Attention:

- Disconnect all power cords for this task.
- DIMMs are sensitive to static discharge and require special handling. In addition to the standard guidelines for Handling static-sensitive devices:
 - Always wear an electrostatic-discharge strap when removing or installing DIMMs. Electrostatic-discharge gloves can also be used.
 - Never hold two or more DIMMs together so that they touch. Do not stack DIMMs directly on top of each other during storage.
 - Never touch the gold DIMM connector contacts or allow these contacts to touch the outside of the DIMM connector housing.
 - Handle DIMMs with care: never bend, twist, or drop a DIMM.

Before installing a DIMM:

1. Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
2. Ensure that you consider and follow the DIMM installation rules when performing the operation. See “Memory module installation rules and order” on page 58.

To install a DIMM, complete the following steps:

Step 1. Open the retaining clips on each end of the DIMM slot; then, install the DIMM into the slot.

Attention: To avoid breaking the retaining clips or damaging the DIMM slots, open and close the clips gently.

Step 2. Firmly press the DIMM straight down into the slot by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the slot.

Note: If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly inserted; open the retaining clips, remove the DIMM, and then reinsert it.

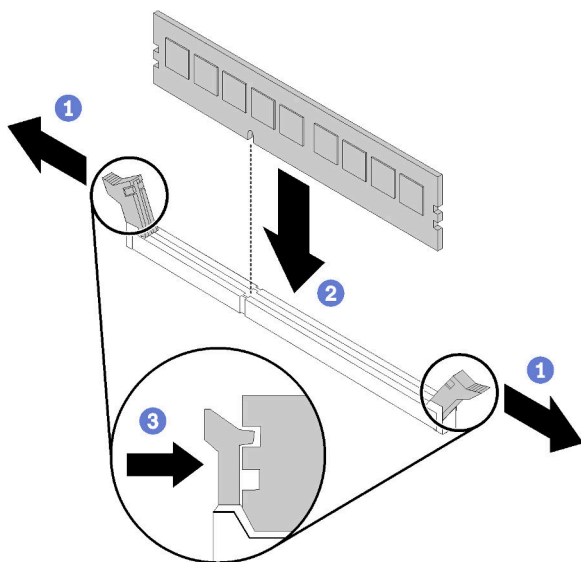





Figure 45. DIMM installation

Demo video

Watch the procedure on YouTube

Install a flash power module

Use this information to install a flash power module.

 <p>“Read the installation Guidelines” on page 56</p>	 <p>“Power off the server for this task” on page 90</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 57</p>
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Before installing a flash power module:

1. Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

To install a flash power module, complete the following steps:

- Step 1. Note the orientation of the flash power module; then, gently insert the flash power module into the bracket.

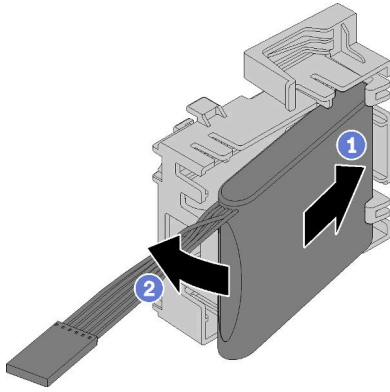


Figure 46. Flash power module installation into bracket

- Step 2. Position the flash power module and bracket assembly onto the chassis, where the tabs on the bracket pass through the corresponding holes in the chassis. Move the assembly as shown until it is secured onto the chassis.

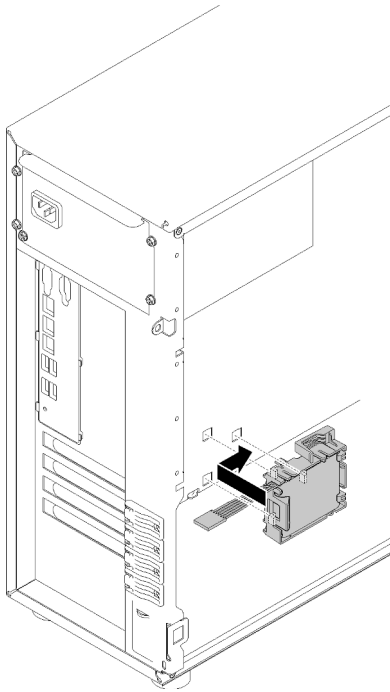


Figure 47. Flash power module and bracket assembly installation onto chassis

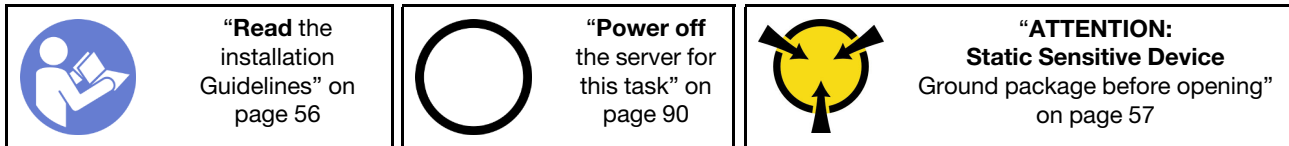
- Step 3. Connect the flash power module cable to the RAID adapter.

Demo video

Watch the procedure on YouTube

Install a front system fan

Use this information to install a front system fan.



S033



CAUTION:

Hazardous energy present. Voltages with hazardous energy might cause heating when shorted with metal, which might result in spattered metal, burns, or both.

S009



CAUTION:

To avoid personal injury, disconnect the fan cables before removing the fan from the device.

S002



CAUTION:

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

Before installing the front system fan:

1. Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

To install the front system fan, complete the following steps:

Step 1. Position the front system fan where the four tabs are aligned with the corresponding holes in the mounting area. In addition, ensure that the two posts of the front system fan are aligned with the corresponding holes in the inner side of the chassis; then, carefully slide the front system fan into the chassis until it snaps into position.

Note: When installing the front system fan into the chassis, make sure the cables do not interfere with the two posts and the fan is firmly seated.

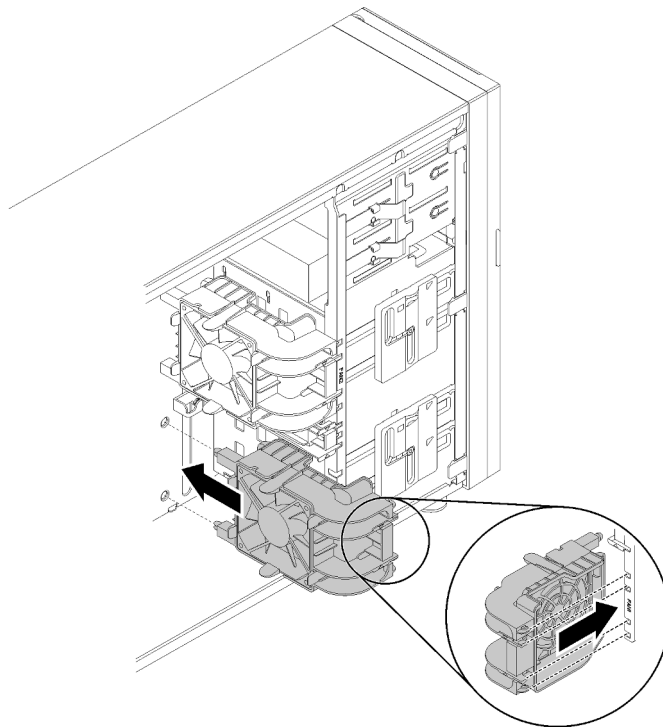


Figure 48. Front system fan installation



Step 2. Connect the front system fan power cable to the Fan 1 or Fan 4 connector on the system board. See “System board components” on page 28 and “Fan power cable” on page 32.

Demo video

Watch the procedure on YouTube

Install a hot-swap drive

Use this information to install a hot-swap drive.

 <p>“Read the installation Guidelines” on page 56</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 57</p>
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The following notes describe the type of drives that your server supports and other information that you must consider when you install a drive.

- Depending on your server models, your server supports the following drive types:
 - Solid-state drives
 - SAS/SATA drives

For a complete list of supported optional devices for the server, see: <https://serverproven.lenovo.com/>

- The drive bays are numbered to indicate the installation order (starting from number “0”). Follow the installation order when you install a drive. See “Front view” on page 15.
- The drives in a single RAID array must be the same type, same size, and same capacity.

Before installing a hot-swap drive:

1. If the drive bay has a drive filler installed, remove it. Keep the drive filler in a safe place for future use.
2. Touch the static-protective package that contains the new hot-swap drive to any unpainted surface on the outside of the server. Then, take the new hot-swap drive out of the package and place it on a static-protective surface.

To install a hot-swap drive, complete the following steps:

Step 1. Ensure that the tray handle is in the open position. Slide the drive into the drive bay until it snaps into position.

Step 2. Close the tray handle to lock the drive in place.

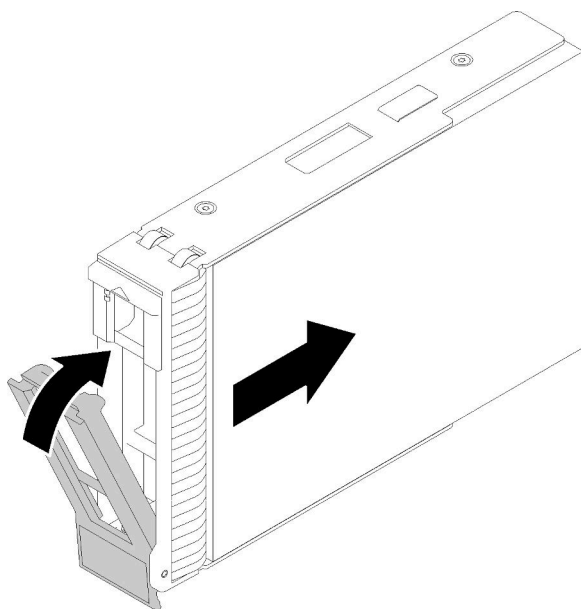


Figure 49. Hot-swap drive installation

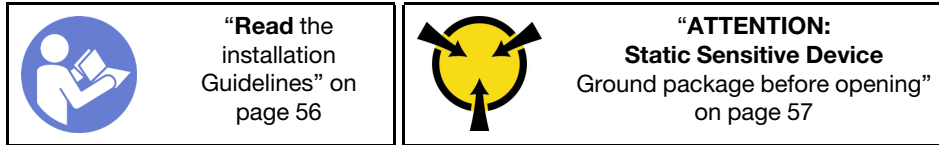
Step 3. The hot-swap drive should be powered up and begin initialization. Check the drive LEDs to verify that the drive is operating correctly.

Demo video

Watch the procedure on YouTube

Install a hot-swap power supply

Use this information to install a hot-swap power supply.



The following tips describe the type of power supply that the server supports and other information that you must consider when you install a power supply:

- The standard shipping has only one power supply installed in the server. For redundancy and hot-swap support, you must install an additional hot-swap power supply. Certain customized models might be shipped with two power supplies installed.
- Ensure that the devices that you are installing are supported. For a list of supported optional devices for the server, go to:
<https://serverproven.lenovo.com/>

Notes:

- Ensure that the two power supplies installed on the server have the same wattage.

- If you are replacing the existing power supply with a new power supply of different wattage, attach the power information label that comes with this option onto the existing label near the power supply.

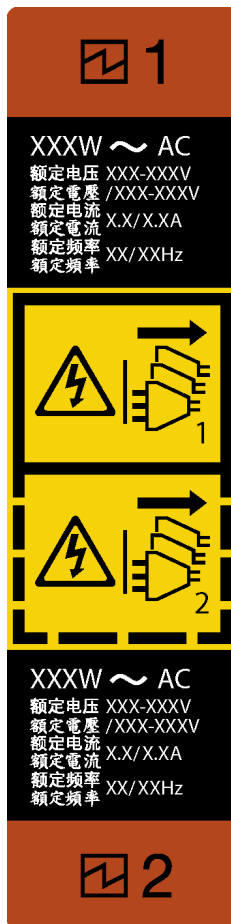


Figure 50. Hot-swap power supply label

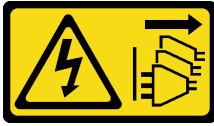
S035



CAUTION:

Never remove the cover on a power supply or any part that has this label attached. Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

S002



CAUTION:

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S001



Electrical current from power, telephone, and communication cables is hazardous.
To avoid a shock hazard:

- Connect all power cords to a properly wired and grounded electrical outlet/source.
- Connect any equipment that will be attached to this product to properly wired outlets/sources.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

The following tips describe the information that you must consider when you install a power supply with dc input.

NEVER CONNECT AND DISCONNECT THE POWER SUPPLY CABLE AND EQUIPMENT WHILE YOUR EQUIPMENT IS POWERED ON WITH DC SUPPLY (hot-plugging). Otherwise you may damage the equipment and result in data loss, the damages and losses result from incorrect operation of the equipment will not be covered by the manufacturers' warranty.

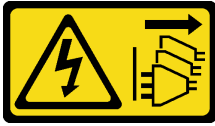
S035



CAUTION:

Never remove the cover on a power supply or any part that has this label attached. Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

S019



CAUTION:

The power-control button on the device does not turn off the electrical current supplied to the device. The device also might have more than one connection to dc power. To remove all electrical current from the device, ensure that all connections to dc power are disconnected at the dc power input terminals.

S029



Electrical current from power, telephone, and communication cables is hazardous.
To avoid a shock hazard:

- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- Connect all power cords to a properly wired and grounded power source.
- Connect to properly wired power sources any equipment that will be attached to this product.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached ac power cords, dc power sources, network connections, telecommunications systems, and serial cables before you open the device covers, unless you are instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.

To Connect:

1. Turn OFF all power sources and equipment that is to be attached to this product.
2. Attach signal cables to the product.
3. Attach power cords to the product.
 - For ac systems, use appliance inlets.
 - For dc systems, ensure correct polarity of -48 V dc connections: RTN is + and -48 V dc is -. Earth ground should use a two-hole lug for safety.
4. Attach signal cables to other devices.
5. Connect power cords to their sources.
6. Turn ON all the power sources.

To Disconnect:

1. Turn OFF all power sources and equipment that is to be attached to this product.
 - For ac systems, remove all power cords from the chassis power receptacles or interrupt power at the ac power distribution unit.
 - For dc systems, disconnect dc power sources at the breaker panel or by turning off the power source. Then, remove the dc cables.
2. Remove the signal cables from the connectors.
3. Remove all cables from the devices.

Before installing the hot -swap power supply,

1. Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

To install the hot-swap power supply, complete the following steps:

Step 1. If there is a power-supply-bay filler installed, remove it.

Important: To ensure proper cooling during normal server operation, both of the power supply bays must be occupied. This means that each bay must have a power supply installed; or one has a power supply installed and the other has a power-supply filler installed.

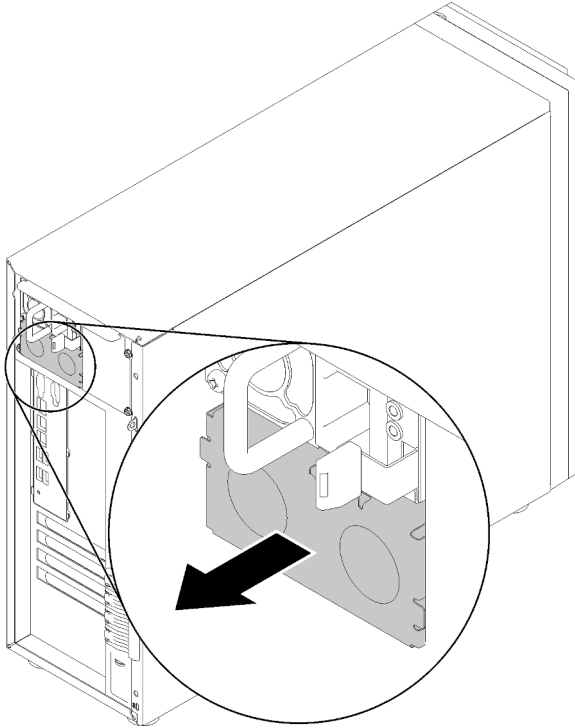


Figure 51. Hot-swap power supply filler removal

Step 2. Note the orientation of the hot-swap power supply, and then slide it into the chassis until it snaps into position.

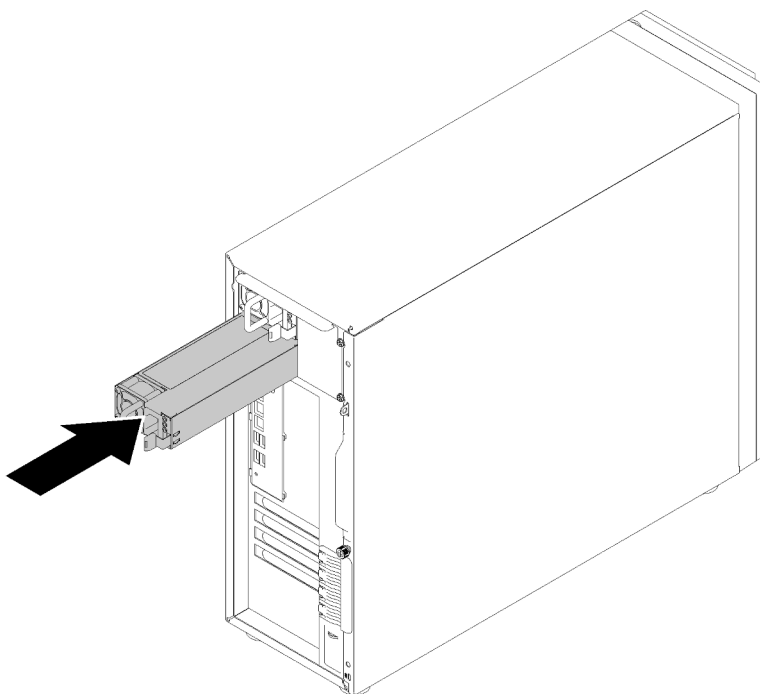





Figure 52. Hot-swap power supply installation

Demo video

Watch the procedure on YouTube

Install the M.2 drive

Use this information to install the M.2 drive.

 <p>“Read the installation Guidelines” on page 56</p>	 <p>“Power off the server for this task” on page 90</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 57</p>
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Before installing the M.2 drive:

1. Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
2. Obtain a #1 Phillips screwdriver and a 4.5mm hex socket screwdriver

To install the M.2 drive, complete the following steps:

Two different M.2 drive lengths are supported by the server - 42mm and 80mm drives. If necessary, by using a 4.5mm hex socket screwdriver, remove the standoff and screw it to the appropriate mounting point to accommodate the specific drive.

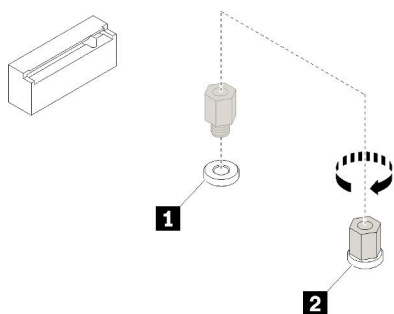


Figure 53. Moving standoff to appropriate mounting point

Table 12. Standoff location on system board

Callout	Callout
1 Standoff for 42 mm M.2 drive	2 Standoff for 80 mm M.2 drive

Step 1. Insert the M.2 drive at an angle into the connector; then, rotate it.

Step 2. Using a #1 Phillips screwdriver, tighten the screw that you saved earlier to secure the drive to the system board.

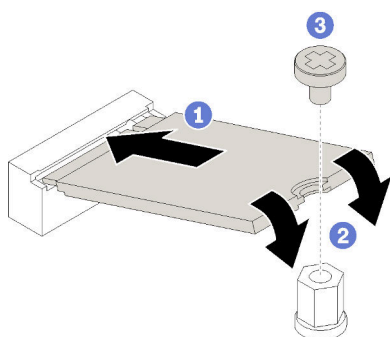


Figure 54. M.2 drive installation

After installing the M.2 drive, use the Lenovo XClarity Provisioning Manager to configure the RAID. For more information, see:

http://sysmgt.lenovofiles.com/help/topic/LXPM/RAID_setup.html




Demo video

Watch the procedure on YouTube

Install an optical drive

Use this information to install an optical drive.

Note: When a standalone optical drive is be installed, you will need to additionally purchase the ThinkSystem ST250 ODD/Tape Cable Kit option in order to install the drive.

 <p>“Read the installation Guidelines” on page 56</p>	 <p>“Power off the server for this task” on page 90</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 57</p>
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S006



CAUTION:

When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:

- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

S007



CAUTION:

This product contains a Class 1M laser. Do not view directly with optical instruments.

S008



DANGER

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following: Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

Before installing an optical drive:

1. Follow these steps to install the optical drive and tape drive when the M.2 drive is present.
 - a. When the M.2 drive is installed, ensure that SATA port 7 remains unconnected.
 - b. Install the optical drive into the upper media bay, Bay 1.
 - c. Install the backup drive (RDX or LTO tape) into the lower media bay, Bay 0.
 - d. Connect the optical drive to SATA port 6.
 - e. If an RDX drive is installed, connect the drive to the internal USB port adjacent to the M.2 drive using the cable that shipped with the RDX drive (see “USB tape drive cable routing” on page 37).
 - f. If an LTO tape drive is installed, install a SAS HBA into an available PCIe slot, and connect the drive to the adapter with the cable that is shipped with the LTO tape drive (see “SAS tape drive cable routing” on page 36).

2. Touch the static-protective package that contains the new optical drive to any unpainted surface on the outside of the server; then, , take the new optical drive out of the package and place it on a static-protective surface.

To install an optical drive, complete the following steps:

- Step 1. Remove the front door (see “Remove the front door” on page 60).
- Step 2. Remove the front bezel (see “Remove the front bezel” on page 61).
- Step 3. If necessary, press the tabs on the side of the plastic bay filler of the optical drive bay and push the plastic bay filler as shown to remove it.

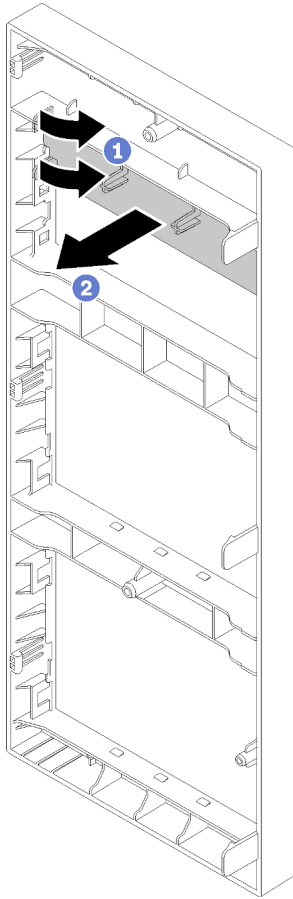


Figure 55. Plastic bay filler removal in the optical drive bay

- Step 4. If necessary, insert two of your fingers into the holes in the EMI shield and carefully pull the EMI shield out of the chassis.

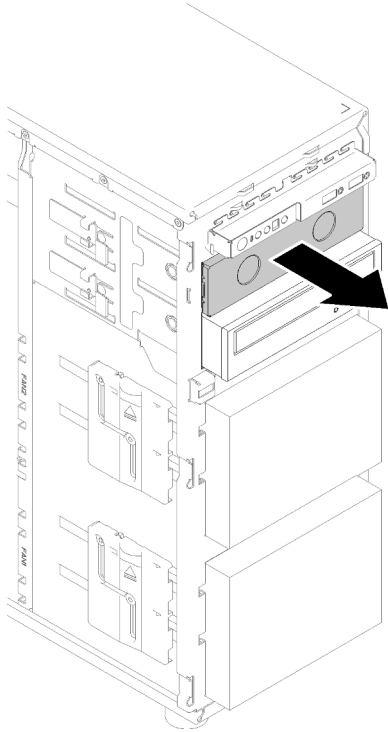


Figure 56. EMI shield removal in optical drive bay

- Step 5. Insert the optical drive into the optical drive bay and slide it in until it is obstructed.
- Step 6. Gently pull the metal tab on the slide of the chassis and slide the optical drive slightly. Release the tab and keep sliding the optical drive until it snaps into position.

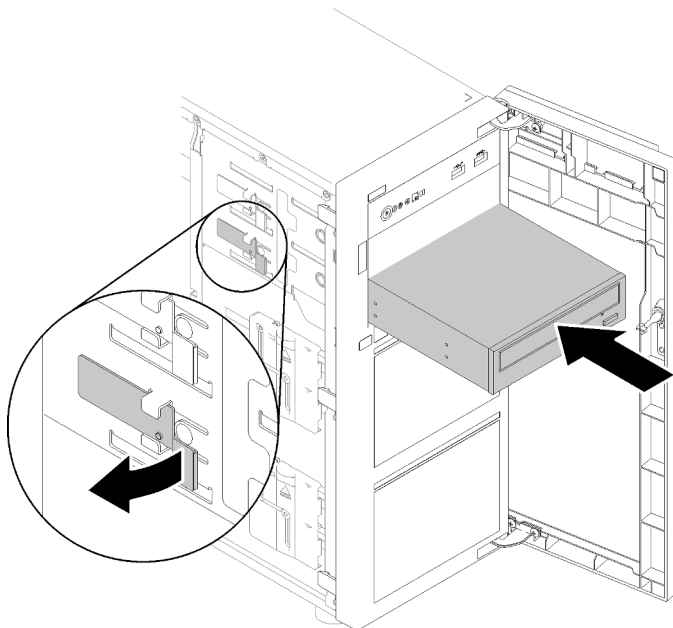


Figure 57. Optical drive installation

- Step 7. Connect the power cable and the signal cable to the rear of the optical drive. See “Cable routing: optical drive” on page 35.


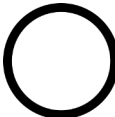

Step 8. Save the removed EMI-protective shield from the chassis and the plastic bay filler from the front bezel in case you later remove the drive and need the shields to cover the drive bay.

Demo video

Watch the procedure on YouTube

Install a PCIe adapter

Use this information to install a PCIe adapter.

 <p>“Read the installation Guidelines” on page 56</p>	 <p>“Power off the server for this task” on page 90</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 57</p>
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Notes:

- Depending on the specific type, your PCIe adapter might look different from the illustration in this topic.
- Use any documentation that comes with the PCIe adapter and follow those instructions in addition to the instructions in this topic.
- ThinkSystem Broadcom NX-E PCIe 10Gb 2-Port Base-T Ethernet Adapter can only be installed in the slot 2.

Before installing a PCIe adapter:

1. If a bracket is installed in the PCIe slot, remove it. Store the bracket for the PCIe slot in case that you later remove the PCIe adapter and need the bracket to cover the place.
2. Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

To install a PCIe adapter, complete the following steps:

- Step 1. Lay the server on its side for easier operation.
- Step 2. Locate the applicable PCIe slot. See “Specifications” on page 3 to identify the different types of PCIe slots in your server.

Step 3. Open the card latch. Position the new PCIe adapter over the PCIe slot; then, carefully press the PCIe card straight down until it is securely seated in the slot. Close the card latch to secure the PCIe adapter in place.

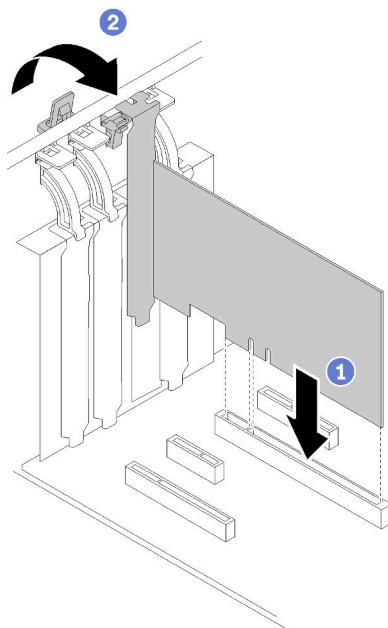


Figure 58. PCIe adapter installation


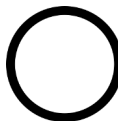

Step 4. Depending on the type of the PCIe adapter, you might need to connect any required cables. Refer to “Internal cable routing” on page 31 or the documentation that comes with the PCIe adapter for specific information.

Demo video

Watch the procedure on YouTube

Install a simple-swap drive

Use this information to install a simple-swap drive.

 <p>“Read the installation Guidelines” on page 56</p>	 <p>“Power off the server for this task” on page 90</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 57</p>
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The following notes describe the type of drives that your server supports and other information that you must consider when you install a drive.

- For a complete list of supported optional devices for the server, see: <https://serverproven.lenovo.com/>
- The drive bays are numbered to indicate the installation order (starting from number “0”). Follow the installation order when you install a drive. See “Front view” on page 15.
- The drives in a single RAID array must be the same type, same size, and same capacity.

Before installing a simple-swap drive:

1. If the drive bay has a drive filler installed, remove it. Keep the drive filler in a safe place for future use.

To install a simple-swap drive, complete the following steps:

- Step 1. Ensure that the tray handle is in the open position. Align the drive with the guide rails in the bay; then, gently push the drive into the bay until the drive stops.
- Step 2. Close the tray handle to lock the drive in place.

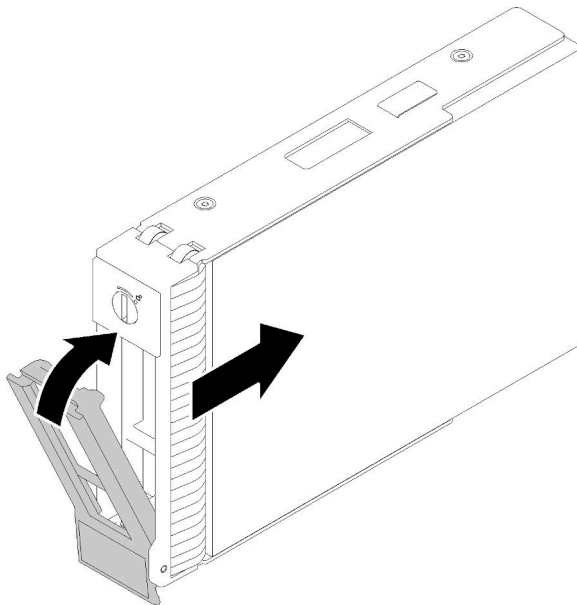


Figure 59. Simple-swap drive installation into drive bay


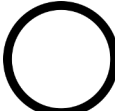

- Step 3. Connect signal and power cable to the system board. See “Internal cable routing” on page 31 for details.

Demo video

Watch the procedure on YouTube

Install a tape drive

Use this information to install a tape drive.

 <p>“Read the installation Guidelines” on page 56</p>	 <p>“Power off the server for this task” on page 90</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 57</p>
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Before installing a tape drive:

1. Follow these steps to install the optical drive and tape drive when the M.2 drive is present.
 - a. When the M.2 drive is installed, ensure that SATA port 7 remains unconnected.
 - b. Install the optical drive into the upper media bay, Bay 1.
 - c. Install the backup drive (RDX or LTO tape) into the lower media bay, Bay 0.
 - d. Connect the optical drive to SATA port 6.

- e. If an RDX drive is installed, connect the drive to the internal USB port adjacent to the M.2 drive using the cable that shipped with the RDX drive (see “USB tape drive cable routing” on page 37).
 - f. If an LTO tape drive is installed, install a SAS HBA into an available PCIe slot, and connect the drive to the adapter with the cable that is shipped with the LTO tape drive (see “SAS tape drive cable routing” on page 36).
2. Touch the static-protective package that contains the new tape drive to any unpainted surface on the outside of the server; then, take the tape drive out of the package and place it on a static-protective surface.

To install a tape drive, complete the following steps:

- Step 1. The tape drive must be installed into the lower optical drive bay. If the drive bay is covered by a filler, remove it first. Store the filler in case that you later remove the tape drive and need the filler to cover the place.
- Step 2. Insert the tape drive into the lower drive bay and slide it in until it is obstructed. Gently pull the metal tab on the side of the chassis, and then continue to slide the tape drive in until it snaps into position.

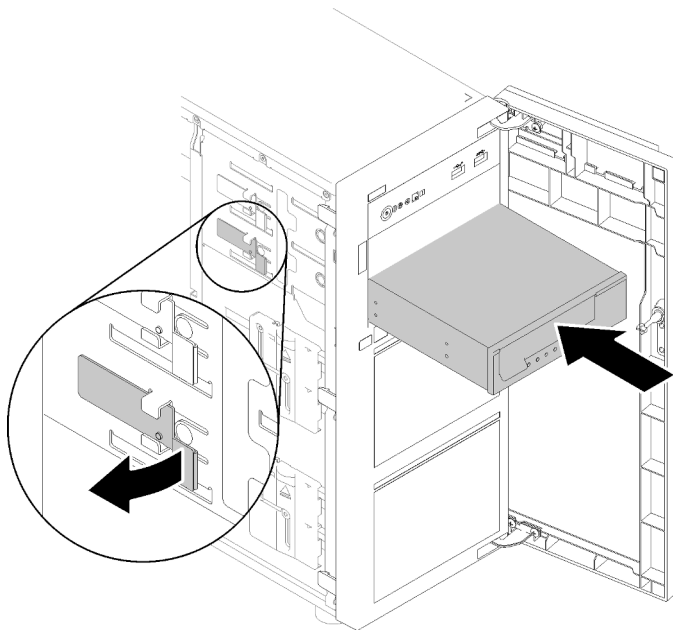


Figure 60. Tape drive installation

- Step 3. Connect the power and signal cables to the rear of the tape drive. See “Tape drive” on page 36.


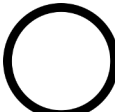

Note: For the LTO tape drive, connect one end of the signal cable to the LTO tape drive; then, connect the other end of the signal cable to the RAID adapter.

Demo video

Watch the procedure on YouTube

Install the server cover

Use this information to install the server cover.

 <p>“Read the installation Guidelines” on page 56</p>	 <p>“Power off the server for this task” on page 90</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 57</p>
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S014



CAUTION:

Hazardous voltage, current, and energy levels might be present. Only a qualified service technician is authorized to remove the covers where the label is attached.

S033



CAUTION:

Hazardous energy present. Voltages with hazardous energy might cause heating when shorted with metal, which might result in spattered metal, burns, or both.

Before installing the server cover:

1. Ensure that all adapters and other components are installed and seated correctly and that you have not left loose tools or parts inside the server.
2. Ensure that all internal cables are correctly routed. See “Internal cable routing” on page 31.
3. If you are installing a new server cover, attach the service label to the inside of the new server cover first if necessary.

Note: A new server cover comes without a service label attached. If you need a service label, order it together with the new server cover. The service label is free of charge.

To install the server cover, complete the following steps:

- Step 1. Position the server cover on the chassis so that the rail on the bottom of the server cover engages the bottom rail on the chassis. Align the tabs on the server cover with the corresponding holes in the top edge of the chassis; then, pivot the server cover to close it.

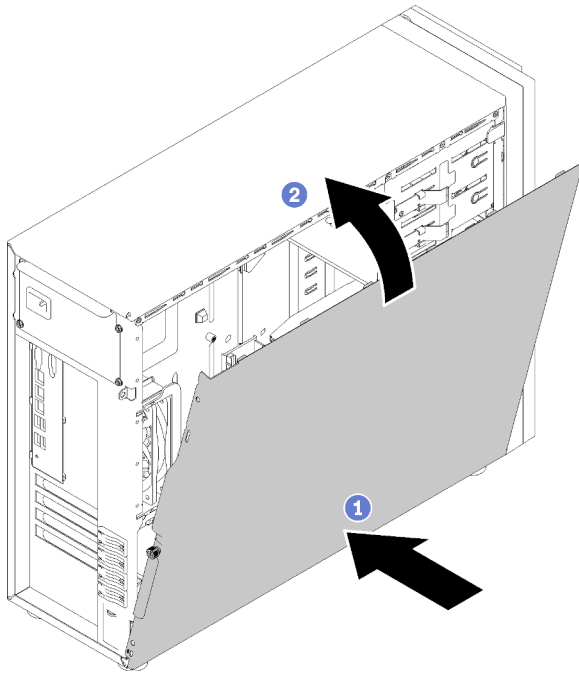


Figure 61. Server cover installation (1)

Note: Before you slide the cover forward, ensure that all the tabs of the cover engage the chassis correctly. If all the tabs do not engage the chassis correctly, it will be very difficult to remove the cover later.

- Step 2. Slide the server cover to the front of the chassis until it snaps into position.

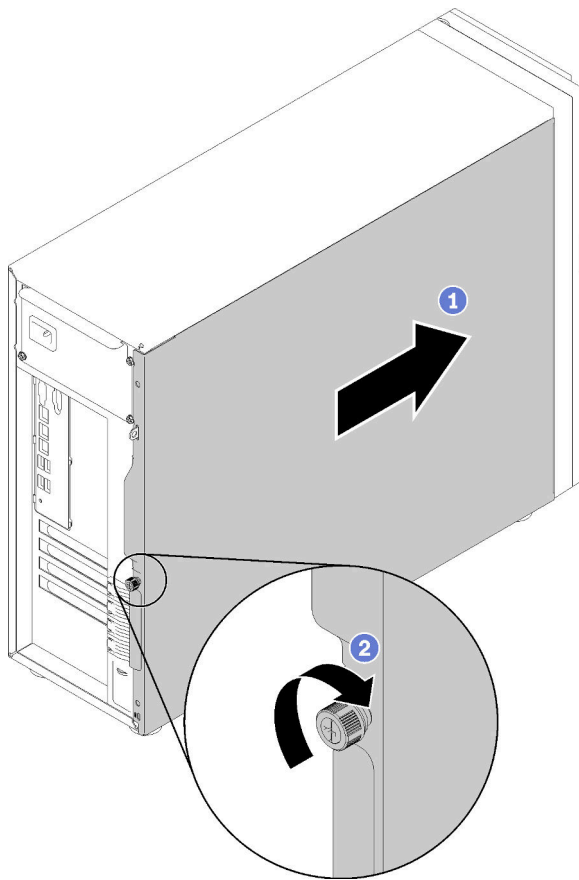


Figure 62. Server cover installation (2)

Step 3. Use a screwdriver to tighten the thumbscrew on the server cover to secure the server cover in place.

Demo video

Watch the procedure on YouTube

Cable the server

Attach all external cables to the server. Typically, you will need to connect the server to a power source, to the data network, and to storage. In addition, you will need to connect the server to the management network.

Connect to power

Connect the server to power.

Connect to the network

Connect the server to the network.

Connect to storage

Connect the server to any storage devices.

Power on the server

After the server performs a short self-test (power status LED flashes quickly) when connected to input power, it enters a standby state (power status LED flashes once per second).

The server can be turned on (power LED on) in any of the following ways:

- You can press the power button.
- The server can restart automatically after a power interruption.
- The server can respond to remote power-on requests sent to the Lenovo XClarity Controller.

For information about powering off the server, see “Power off the server” on page 90.

Validate server setup

After powering up the server, make sure that the LEDs are lit and that they are green.

Power off the server

The server remains in a standby state when it is connected to a power source, allowing the Lenovo XClarity Controller to respond to remote power-on requests. To remove all power from the server (power-on LED off), you must disconnect all power cables.

To place the server in a standby state (power-on LED flashes once per second):

Note: The Lenovo XClarity Controller can place the server in a standby state as an automatic response to a critical system failure.

- Start an orderly shutdown using the operating system (if supported by your operating system).
- Press the power-on button to start an orderly shutdown (if supported by your operating system).
- Press and hold the power button for more than 4 seconds to force a shutdown.

When in a standby state, the server can respond to remote power-on requests sent to the Lenovo XClarity Controller. For information about powering on the server, see “Power on the server” on page 90.

Chapter 4. System configuration

Complete these procedures to configure your system.

Set the network connection for the Lenovo XClarity Controller

Before you can access the Lenovo XClarity Controller over your network, you need to specify how Lenovo XClarity Controller will connect to the network. Depending on how the network connection is implemented, you might need to specify a static IP address as well.

The following methods are available to set the network connection for the Lenovo XClarity Controller if you are not using DHCP:

- If a monitor is attached to the server, you can use Lenovo XClarity Provisioning Manager to set the network connection.

Complete the following steps to connect the Lenovo XClarity Controller to the network using the Lenovo XClarity Provisioning Manager.

1. Start the server.
2. Press the key specified in the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.)
3. Go to **LXPM → UEFI Setup → BMC Settings** to specify how the Lenovo XClarity Controller will connect to the network.
 - If you choose a static IP connection, make sure that you specify an IPv4 or IPv6 address that is available on the network.
 - If you choose a DHCP connection, make sure that the MAC address for the server has been configured in the DHCP server.
4. Click **OK** to apply the setting and wait for two to three minutes.
5. Use an IPv4 or IPv6 address to connect Lenovo XClarity Controller.

Important: The Lenovo XClarity Controller is set initially with a user name of USERID and password of PASSW0RD (with a zero, not the letter O). This default user setting has Supervisor access. It is required to change this user name and password during your initial configuration for enhanced security.

- If no monitor attached to the server, you can set the network connection through the Lenovo XClarity Controller interface. Connect an Ethernet cable from your laptop to Lenovo XClarity Controller connector, which is located at the rear of the server. For the location of the Lenovo XClarity Controller connector, see “Rear view” on page 23.

Note: Make sure that you modify the IP settings on the laptop so that it is on the same network as the server default settings.

The default IPv4 address and the IPv6 Link Local Address (LLA) is provided on the Lenovo XClarity Controller Network Access label that is affixed to the Pull Out Information Tab.

- If you are using the Lenovo XClarity Administrator Mobile app from a mobile device, you can connect to the Lenovo XClarity Controller through the Lenovo XClarity Controller USB connector on the front of the server. For the location of the Lenovo XClarity Controller USB connector, see “Front view” on page 15.

Note: The Lenovo XClarity Controller USB connector mode must be set to manage the Lenovo XClarity Controller (instead of normal USB mode). To switch from normal mode to Lenovo XClarity Controller

management mode, hold the blue ID button on the front panel for at least 3 seconds until its LED flashes slowly (once every couple of seconds).

To connect using the Lenovo XClarity Administrator Mobile app:

1. Connect the USB cable of your mobile device to the Lenovo XClarity Administrator USB connector on the front panel.
2. On your mobile device, enable USB tethering.
3. On your mobile device, launch the Lenovo XClarity Administrator mobile app.
4. If automatic discovery is disabled, click **Discovery** on the USB Discovery page to connect to the Lenovo XClarity Controller.

For more information about using the Lenovo XClarity Administrator Mobile app, see:

http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/lxca_usemobileapp.html

Set the front USB 2.0 connector for Lenovo XClarity Controller connection

Your server come with a front USB 3.0 connector (also called XClarity Controller USB connector) that you can use as a Lenovo XClarity Controller management connection. See “Front panel” on page 21 for the location of this connector. Before you can access the Lenovo XClarity Controller through this USB connector, you need to configure this connector for Lenovo XClarity Controller connection.

You can switch this USB connector between normal and Lenovo XClarity Controller management operation by performing one of the following steps.

- Hold the ID button for at least 3 second until its LED flashes slowly (once every couple of seconds). See “Front panel” on page 21 for ID button location.
- From the Lenovo XClarity Controller management controller CLI, run the `usbfp` command. For information about using the Lenovo XClarity Controller CLI, see the “Command-line interface” section in the XCC documentation compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>.
- From the Lenovo XClarity Controller management controller web interface, click **BMC Configuration → Network → Front Panel USB Port Management**. For information about Lenovo XClarity Controller web interface functions, see http://managementsoftware.lenovofiles.com/help/topic/com.lenovo.thinksystem.xcc.doc/dw1lm_r_immactiondescriptions.html.

You can also check the current setting of the front USB 3.0 connector using the Lenovo XClarity Controller management controller CLI (`usbfp` command) or the Lenovo XClarity Controller management controller web interface (**BMC Configuration → Network → Front Panel USB Port Management**). See http://managementsoftware.lenovofiles.com/help/topic/com.lenovo.thinksystem.xcc.doc/dw1lm_c_ch7_commandlineinterface.html or http://managementsoftware.lenovofiles.com/help/topic/com.lenovo.thinksystem.xcc.doc/dw1lm_r_immactiondescriptions.html.

Update the firmware

Several options are available to update the firmware for the server.

You can use the tools listed here to update the most current firmware for your server and the devices that are installed in the server.

- Best practices related to updating firmware is available at the following site:
 - <http://lenovopress.com/LP0656>
- The latest firmware can be found at the following site:

- <http://datacentersupport.lenovo.com/products/servers/thinksystem/st250/7Y45/downloads>
- You can subscribe to product notification to stay up to date on firmware updates:
 - <https://datacentersupport.lenovo.com/tw/en/solutions/ht509500>

UpdateXpress System Packs (UXSPs)

Lenovo typically releases firmware in bundles called UpdateXpress System Packs (UXSPs). To ensure that all of the firmware updates are compatible, you should update all firmware at the same time. If you are updating firmware for both the Lenovo XClarity Controller and UEFI, update the firmware for Lenovo XClarity Controller first.

Update method terminology

- **In-band update.** The installation or update is performed using a tool or application within an operating system that is executing on the server's core CPU.
- **Out-of-band update.** The installation or update is performed by the Lenovo XClarity Controller collecting the update and then directing the update to the target subsystem or device. Out-of-band updates have no dependency on an operating system executing on the core CPU. However, most out-of-band operations do require the server to be in the S0 (Working) power state.
- **On-Target update.** The installation or update is initiated from an installed operating system executing on the target server itself.
- **Off-Target update.** The installation or update is initiated from a computing device interacting directly with the server's Lenovo XClarity Controller.
- **UpdateXpress System Packs (UXSPs).** UXSPs are bundled updates designed and tested to provide the interdependent level of functionality, performance, and compatibility. UXSPs are server machine-type specific and are built (with firmware and device driver updates) to support specific Windows Server, Red Hat Enterprise Linux (RHEL) and SUSE Linux Enterprise Server (SLES) operating system distributions. Machine-type-specific firmware-only UXSPs are also available.

Firmware updating tools

See the following table to determine the best Lenovo tool to use for installing and setting up the firmware:

Tool	Update Methods Supported	Core System Firmware Updates	I/O Devices Firmware Updates	Graphical user interface	Command line interface	Supports UXSPs
Lenovo XClarity Provisioning Manager (LXPM)	In-band ² On-Target	√		√		
Lenovo XClarity Controller (XCC)	Out-of-band Off-Target	√	Selected I/O devices	√		

Tool	Update Methods Supported	Core System Firmware Updates	I/O Devices Firmware Updates	Graphical user interface	Command line interface	Supports UXSPs
Lenovo XClarity Essentials OneCLI (OneCLI)	In-band Out-of-band On-Target Off-Target	√	All I/O devices		√	√
Lenovo XClarity Essentials UpdateXpress (LXCE)	In-band Out-of-band On-Target Off-Target	√	All I/O devices	√		√
Lenovo XClarity Essentials Bootable Media Creator³ (BoMC)	In-band Out-of-band Off-Target	√	All I/O devices	√ (BOMC application)	√ (BOMC application)	√
Lenovo XClarity Administrator (LXCA)	In-band ¹ Out-of-band ² Off-Target	√	All I/O devices	√		√
Lenovo XClarity Integrator (LXCI) for VMware vCenter	Out-of-band Off-Target	√	Selected I/O devices	√		
Lenovo XClarity Integrator (LXCI) for Microsoft Windows Admin Center	In-band Out-of-band On-Target Off-Target	√	All I/O devices	√		√

Tool	Update Methods Supported	Core System Firmware Updates	I/O Devices Firmware Updates	Graphical user interface	Command line interface	Supports UXSPs
Lenovo XClarity Integrator (LXCI) for Microsoft System Center Configuration Manager	In-band On-Target	✓	All I/O devices	✓		✓
Notes: <ol style="list-style-type: none"> 1. For I/O firmware updates. 2. For BMC and UEFI firmware updates. 						

- **Lenovo XClarity Provisioning Manager**

From Lenovo XClarity Provisioning Manager, you can update the Lenovo XClarity Controller firmware, the UEFI firmware, and the Lenovo XClarity Provisioning Manager software.

Note: By default, the Lenovo XClarity Provisioning Manager Graphical User Interface is displayed when you start the server and press the key specified in the on-screen instructions. If you have changed that default to be the text-based system setup, you can bring up the Graphical User Interface from the text-based system setup interface.

For additional information about using Lenovo XClarity Provisioning Manager to update firmware, see:

“Firmware Update” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>

- **Lenovo XClarity Controller**

If you need to install a specific update, you can use the Lenovo XClarity Controller interface for a specific server.

Notes:

- To perform an in-band update through Windows or Linux, the operating system driver must be installed and the Ethernet-over-USB (sometimes called LAN over USB) interface must be enabled.

For additional information about configuring Ethernet over USB, see:

“Configuring Ethernet over USB” section in the XCC documentation version compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>

- If you update firmware through the Lenovo XClarity Controller, make sure that you have downloaded and installed the latest device drivers for the operating system that is running on the server.

For additional information about using Lenovo XClarity Controller to update firmware, see:

“Updating Server Firmware” section in the XCC documentation compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>

- **Lenovo XClarity Essentials OneCLI**

Lenovo XClarity Essentials OneCLI is a collection of command line applications that can be used to manage Lenovo servers. Its update application can be used to update firmware and device drivers for your servers. The update can be performed within the host operating system of the server (in-band) or remotely through the BMC of the server (out-of-band).

For additional information about using Lenovo XClarity Essentials OneCLI to update firmware, see:

https://pubs.lenovo.com/lxce-onecli/onecli_c_update

- **Lenovo XClarity Essentials UpdateXpress**

Lenovo XClarity Essentials UpdateXpress provides most of OneCLI update functions through a graphical user interface (GUI). It can be used to acquire and deploy UpdateXpress System Pack (UXSP) update packages and individual updates. UpdateXpress System Packs contain firmware and device driver updates for Microsoft Windows and for Linux.

You can obtain Lenovo XClarity Essentials UpdateXpress from the following location:

<https://datacentersupport.lenovo.com/solutions/Invo-xpress>

- **Lenovo XClarity Essentials Bootable Media Creator**

You can use Lenovo XClarity Essentials Bootable Media Creator to create bootable media that is suitable for firmware updates, VPD updates, inventory and FFDC collection, advanced system configuration, FoD Keys management, secure erase, RAID configuration, and diagnostics on supported servers.

You can obtain Lenovo XClarity Essentials BoMC from the following location:

<https://datacentersupport.lenovo.com/solutions/Invo-bomc>

- **Lenovo XClarity Administrator**

If you are managing multiple servers using the Lenovo XClarity Administrator, you can update firmware for all managed servers through that interface. Firmware management is simplified by assigning firmware-compliance policies to managed endpoints. When you create and assign a compliance policy to managed endpoints, Lenovo XClarity Administrator monitors changes to the inventory for those endpoints and flags any endpoints that are out of compliance.

For additional information about using Lenovo XClarity Administrator to update firmware, see:

http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/update_fw.html

- **Lenovo XClarity Integrator offerings**

Lenovo XClarity Integrator offerings can integrate management features of Lenovo XClarity Administrator and your server with software used in a certain deployment infrastructure, such as VMware vCenter, Microsoft Admin Center, or Microsoft System Center.

For additional information about using Lenovo XClarity Integrator to update firmware, see:

<https://pubs.lenovo.com/lxci-overview/>

Configure the firmware

Several options are available to install and set up the firmware for the server.

- **Lenovo XClarity Provisioning Manager**

From Lenovo XClarity Provisioning Manager, you can configure the UEFI settings for your server.

Notes: The Lenovo XClarity Provisioning Manager provides a Graphical User Interface to configure a server. The text-based interface to system configuration (the Setup Utility) is also available. From Lenovo XClarity Provisioning Manager, you can choose to restart the server and access the text-based interface. In addition, you can choose to make the text-based interface the default interface that is displayed when you start LXPM. To do this, go to **Lenovo XClarity Provisioning Manager → UEFI Setup → System Settings → <F1>Start Control → Text Setup**. To start the server with Graphic User Interface, select **Auto** or **Tool Suite**.

See the following documentations for more information:

– *Lenovo XClarity Provisioning Manager User Guide*

- Search for the LXPM documentation version compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>
 - *UEFI User Guide*
 - <https://pubs.lenovo.com/uefi-overview/>
- **Lenovo XClarity Essentials OneCLI**

You can use the config application and commands to view the current system configuration settings and make changes to Lenovo XClarity Controller and UEFI. The saved configuration information can be used to replicate or restore other systems.

For information about configuring the server using Lenovo XClarity Essentials OneCLI, see:

https://pubs.lenovo.com/lxce-onecli/onecli_c_settings_info_commands
- **Lenovo XClarity Administrator**

You can quickly provision and pre-provision all of your servers using a consistent configuration. Configuration settings (such as local storage, I/O adapters, boot settings, firmware, ports, and Lenovo XClarity Controller and UEFI settings) are saved as a server pattern that can be applied to one or more managed servers. When the server patterns are updated, the changes are automatically deployed to the applied servers.

Specific details about updating firmware using Lenovo XClarity Administrator are available at:

http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/server_configuring.html
- **Lenovo XClarity Controller**

You can configure the management processor for the server through the Lenovo XClarity Controller Web interface or through the command-line interface.

For information about configuring the server using Lenovo XClarity Controller, see:

“Configuring the Server” section in the XCC documentation compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>

Memory configuration

Memory performance depends on several variables, such as memory mode, memory speed, memory ranks, memory population and processor.

More information about optimizing memory performance and configuring memory is available at the Lenovo Press website:

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

In addition, you can take advantage of a memory configurator, which is available at the following site:

http://1config.lenovo.com/#/memory_configuration

For specific information about the required installation order of memory modules in your server based on the system configuration and memory mode that you are implementing, see “Memory module installation rules and order” on page 58.

RAID configuration

Using a Redundant Array of Independent Disks (RAID) to store data remains one of the most common and cost-efficient methods to increase server's storage performance, availability, and capacity.

RAID increases performance by allowing multiple drives to process I/O requests simultaneously. RAID can also prevent data loss in case of a drive failure by reconstructing (or rebuilding) the missing data from the failed drive using the data from the remaining drives.

RAID array (also known as RAID drive group) is a group of multiple physical drives that uses a certain common method to distribute data across the drives. A virtual drive (also known as virtual disk or logical drive) is a partition in the drive group that is made up of contiguous data segments on the drives. Virtual drive is presented up to the host operating system as a physical disk that can be partitioned to create OS logical drives or volumes.

An introduction to RAID is available at the following Lenovo Press website:

<https://lenovopress.com/lp0578-lenovo-raid-introduction>

Detailed information about RAID management tools and resources is available at the following Lenovo Press website:

<https://lenovopress.com/lp0579-lenovo-raid-management-tools-and-resources>

Upgrading from Software RAID to Hardware RAID

Use the information in this section to upgrade from software RAID to hardware RAID.

In general, when upgrading from software RAID to hardware RAID, you will additionally need to purchase the Thinksystem ST250 Hardware RAID Cable Kit. Note that the upgrade scenarios will be different if a second disk cage and backplane has been installed. See the following table for details.

- **Software RAID to Hardware RAID**

Table 13. Upgrade scenarios

Scenarios	Before upgrade	After upgrade	RAID adapter
Scenario 1	Four 3.5 hot-swap drives (software RAID)	Four 3.5 hot-swap drives (hardware RAID)	One RAID adapter - 8i
Scenario 2	Eight 3.5 hot-swap drives (software RAID)	Eight 3.5 hot-swap drives (hardware RAID)	One RAID adapter - 8i
Scenario 3	Eight 2.5 hot-swap drives (software RAID)	Eight 3.5 hot-swap drives (hardware RAID)	One RAID adapter - 8i

- **Software RAID to Hardware RAID (second disk drive cage and backplane kit is installed)**

Table 14. Upgrade scenarios

Scenarios	Before upgrade	After upgrade	RAID adapter
Scenario 1	Four 3.5 hot-swap drives (software RAID)	Eight 3.5 hot-swap drives (hardware RAID)	One RAID adapter - 8i
Scenario 2	Four 3.5 hot-swap drives (software RAID)	Four 3.5 hot-swap drives plus Eight 2.5 hot-swap drives (hardware RAID)	One RAID adapter - 16i or Two RAID adapters - 8i
Scenario 3	Eight 2.5 hot-swap drives (software RAID)	Sixteen 2.5 hot-swap drives (hardware RAID)	One RAID adapter - 16i or Two RAID adapters - 8i

For information on the cable routing, see “Internal cable routing” on page 31.

Deploy the operating system

Several options are available to deploy an operating system on the server.

Available operating systems

- Microsoft Windows Server
- VMware ESXi
- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server

Complete list of available operating systems: <https://lenovopress.lenovo.com/osig>.

Tool-based deployment

- **Multi-server**

Available tools:

- Lenovo XClarity Administrator
http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/compute_node_image_deployment.html
- Lenovo XClarity Essentials OneCLI
https://pubs.lenovo.com/lxce-onecli/onecli_r_uxspi_proxy_tool
- Lenovo XClarity Integrator deployment pack for SCCM (for Windows operating system only)
https://pubs.lenovo.com/lxci-deploypack-sccm/dpsccm_c_endtoend_deploy_scenario

- **Single-server**

Available tools:

- Lenovo XClarity Provisioning Manager
“OS Installation” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>
- Lenovo XClarity Essentials OneCLI
https://pubs.lenovo.com/lxce-onecli/onecli_r_uxspi_proxy_tool
- Lenovo XClarity Integrator deployment pack for SCCM (for Windows operating system only)
https://pubs.lenovo.com/lxci-deploypack-sccm/dpsccm_c_endtoend_deploy_scenario

Manual deployment

If you cannot access the above tools, follow the instructions below, download the corresponding OS *Installation Guide*, and deploy the operating system manually by referring to the guide.

1. Go to <https://datacentersupport.lenovo.com/solutions/server-os>.
2. Select an operating system from the navigation pane and click **Resources**.
3. Locate the “OS Install Guides” area and click the installation instructions. Then, follow the instructions to complete the operation system deployment task.

Back up the server configuration

After setting up the server or making changes to the configuration, it is a good practice to make a complete backup of the server configuration.

Make sure that you create backups for the following server components:

- **Management processor**

You can back up the management processor configuration through the Lenovo XClarity Controller interface. For details about backing up the management processor configuration, see:

“Backing up the BMC configuration” section in the XCC documentation compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>.

Alternatively, you can use the **save** command from Lenovo XClarity Essentials OneCLI to create a backup of all configuration settings. For more information about the **save** command, see:

https://pubs.lenovo.com/lxce-onecli/onecli_r_save_command

- **Operating system**

Use your own operating-system and user-data backup methods to back up the operating system and user data for the server.

Update the Vital Product Data (VPD)

After initial setup of the system, you can update some Vital Product Data (VPD), such as asset tag and Universal Unique Identifier (UUID).

Update the Universal Unique Identifier (UUID)

Optionally, you can update the Universal Unique Identifier (UUID).

There are two methods available to update the UUID:

- From Lenovo XClarity Provisioning Manager

To update the UUID from Lenovo XClarity Provisioning Manager:

1. Start the server and press the key according to the on-screen instructions. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) The Lenovo XClarity Provisioning Manager interface is displayed by default.
2. If the power-on Administrator password is required, enter the password.
3. From the System Summary page, click **Update VPD**.
4. Update the UUID.

- From Lenovo XClarity Essentials OneCLI

Lenovo XClarity Essentials OneCLI sets the UUID in the Lenovo XClarity Controller. Select one of the following methods to access the Lenovo XClarity Controller and set the UUID:

- Operate from the target system, such as LAN or keyboard console style (KCS) access
- Remote access to the target system (TCP/IP based)

To update the UUID from Lenovo XClarity Essentials OneCLI:

1. Download and install Lenovo XClarity Essentials OneCLI.

To download Lenovo XClarity Essentials OneCLI, go to the following site:

<https://datacentersupport.lenovo.com/solutions/HT116433>

2. Copy and unpack the OneCLI package, which also includes other required files, to the server. Make sure that you unpack the OneCLI and the required files to the same directory.

3. After you have Lenovo XClarity Essentials OneCLI in place, type the following command to set the UUID:

```
onecli config createuuid SYSTEM_PROD_DATA.SysInfoUUID [access_method]
```

Where:

[access_method]

The access method that you select to use from the following methods:

- Online authenticated LAN access, type the command:
`[--bmc-username <xcc_user_id> --bmc-password <xcc_password>]`

Where:

xcc_user_id

The BMC/IMM/XCC account name (1 of 12 accounts). The default value is USERID.

xcc_password

The BMC/IMM/XCC account password (1 of 12 accounts).

Example command is as follows:

```
onecli config createuuid SYSTEM_PROD_DATA.SysInfoUUID --bmc-username <xcc_user_id>  
--bmc-password <xcc_password>
```

- Online KCS access (unauthenticated and user restricted):

You do not need to specify a value for *access_method* when you use this access method.

Example command is as follows:

```
onecli config createuuid SYSTEM_PROD_DATA.SysInfoUUID
```

Note: The KCS access method uses the IPMI/KCS interface, which requires that the IPMI driver be installed.

- Remote LAN access, type the command:
`[--bmc <xcc_user_id>:<xcc_password>@<xcc_external_ip>]`

Where:

xcc_external_ip

The BMC/IMM/XCC external IP address. There is no default value. This parameter is required.

xcc_user_id

The BMC/IMM/XCC account name (1 of 12 accounts). The default value is USERID.

xcc_password

The BMC/IMM/XCC account password (1 of 12 accounts).

Note: BMC, IMM, or XCC external IP address, account name, and password are all valid for this command.

Example command is as follows:

```
onecli config createuuid SYSTEM_PROD_DATA.SysInfoUUID --bmc <xcc_user_id>:<xcc_  
password>@<xcc_external_ip>
```

4. Restart the Lenovo XClarity Controller.
5. Restart the server.

Update the asset tag

Optionally, you can update the asset tag.

There are two methods available to update the asset tag:

- From Lenovo XClarity Provisioning Manager

To update the asset tag from Lenovo XClarity Provisioning Manager:

1. Start the server and press the key specified in the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface.
2. If the power-on Administrator password is required, enter the password.
3. From the System Summary page, click **Update VPD**.
4. Update the asset tag information.

- From Lenovo XClarity Essentials OneCLI

Lenovo XClarity Essentials OneCLI sets the asset tag in the Lenovo XClarity Controller. Select one of the following methods to access the Lenovo XClarity Controller and set the asset tag:

- Operate from the target system, such as LAN or keyboard console style (KCS) access
- Remote access to the target system (TCP/IP based)

To update the asset tag from Lenovo XClarity Essentials OneCLI:

1. Download and install Lenovo XClarity Essentials OneCLI.

To download Lenovo XClarity Essentials OneCLI, go to the following site:

<https://datacentersupport.lenovo.com/solutions/HT116433>

2. Copy and unpack the OneCLI package, which also includes other required files, to the server. Make sure that you unpack the OneCLI and the required files to the same directory.
3. After you have Lenovo XClarity Essentials OneCLI in place, type the following command to set the DMI:

```
onecli config set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> [access_method]
```

Where:

<asset_tag>

The server asset tag number. Type aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa, where aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa is the asset tag number.

[access_method]

The access method that you select to use from the following methods:

- Online authenticated LAN access, type the command:
[-bmc-username <xcc_user_id> --bmc-password <xcc_password>]

Where:

xcc_user_id

The BMC/IMM/XCC account name (1 of 12 accounts). The default value is USERID.

xcc_password

The BMC/IMM/XCC account password (1 of 12 accounts).

Example command is as follows:

```
onecli config set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> --bmc-username <xcc_user_id> --bmc-password <xcc_password>
```

- Online KCS access (unauthenticated and user restricted):

You do not need to specify a value for *access_method* when you use this access method.

Example command is as follows:

```
onecli config set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag>
```

Note: The KCS access method uses the IPMI/KCS interface, which requires that the IPMI driver be installed.

- Remote LAN access, type the command:

```
[--bmc <xcc_user_id>:<xcc_password>@<xcc_external_ip>]
```

Where:

xcc_external_ip

The BMC/IMM/XCC IP address. There is no default value. This parameter is required.

xcc_user_id

The BMC/IMM/XCC account (1 of 12 accounts). The default value is USERID.

xcc_password

The BMC/IMM/XCC account password (1 of 12 accounts).

Note: BMC, IMM, or XCC internal LAN/USB IP address, account name, and password are all valid for this command.

Example command is as follows:

```
onecli config set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> --bmc <xcc_user_id>:  
<xcc_password>@<xcc_external_ip>
```

4. Reset the Lenovo XClarity Controller to the factory defaults. See “Resetting the BMC to Factory Default” section in the XCC documentation compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>.

Chapter 5. Resolving installation issues

Follow this procedure to resolve issues that you might have when setting up your system.

Use the information in this section to diagnose and resolve problems that you might encounter during the initial installation and setup of your server.

- “Server does not power on” on page 105
- “The server immediately displays the POST Event Viewer when it is turned on” on page 105
- “Embedded hypervisor is not in the boot list” on page 106
- “Server cannot recognize a hard drive” on page 106
- “Displayed system memory is less than installed physical memory” on page 107
- “A Lenovo optional device that was just installed does not work.” on page 107
- “Voltage planar fault is displayed in the event log” on page 108

Server does not power on

Complete the following steps until the problem is resolved:

1. Check the event log for any events related to the server not powering on.
2. Check for any LEDs that are flashing amber.
3. Check the power LED on the system board.
4. Check if AC power LED is lit on or the amber LED is lit on at the PSU rear side.
5. AC cycle the system.
6. Remove the CMOS battery for at least ten seconds, then, reinstall the CMOS battery.
7. Try to power on the system by IPMI command through XCC or by the power button.
8. Implement the minimum configuration (one processor, one DIMM and one PSU without any adapter and any drive installed).
9. Reseat all power supplies and make sure that AC LEDs on the PSU rear side are lit.
10. Replace the each power supply and check the power button function after installing the each one.
11. If the issue cannot be resolved by above actions, call service to review the issue symptom and see whether the system board replacement is necessary.

The server immediately displays the POST Event Viewer when it is turned on

Complete the following steps until the problem is solved.

1. Correct any errors that are indicated by the light path diagnostics LEDs.
2. Make sure that the server supports all the processors and that the processors match in speed and cache size.

You can view processor details from system setup.

To determine if the processor is supported for the server, see <https://serverproven.lenovo.com/>.

3. (Trained technician only) Make sure that processor 1 is seated correctly
4. (Trained technician only) Remove processor 2 and restart the server.
5. Replace the following components one at a time, in the order shown, restarting the server each time:
 - a. (Trained technician only) Processor
 - b. (Trained technician only) System board

Embedded hypervisor is not in the boot list

Complete the following steps until the problem is solved.

1. If the server has been installed, moved, or serviced recently, or if this is the first time the embedded hypervisor is being used, make sure that the device is connected properly and that there is no physical damage to the connectors.
2. See the documentation that comes with the optional embedded hypervisor flash device for setup and configuration information.
3. Check <https://serverproven.lenovo.com/> to validate that the embedded hypervisor device is supported for the server.
4. Make sure that the embedded hypervisor device is listed in the list of available boot options. From the management controller user interface, click **Server Configuration → Boot Options**.

For information about accessing the management controller user interface, see “Opening and Using the XClarity Controller Web Interface” section in the XCC documentation compatible with your server at:

<https://pubs.lenovo.com/lxcc-overview/>

5. Check <http://datacentersupport.lenovo.com> for any tech tips (service bulletins) related to the embedded hypervisor and the server.
6. Make sure that other software works on the server to ensure that it is working properly.

Server cannot recognize a hard drive

Complete the following steps until the problem is solved.

1. Observe the associated yellow hard disk drive status LED. If the LED is lit, it indicates a drive fault.
2. If the LED is lit, remove the drive from the bay, wait 45 seconds, and reinsert the drive, making sure that the drive assembly connects to the hard disk drive backplane.
3. Observe the associated green hard disk drive activity LED and the yellow status LED:
 - If the green activity LED is flashing and the yellow status LED is not lit, the drive is recognized by the controller and is working correctly. Run the diagnostics tests for the hard disk drives. When you start a server and press the key according to the on-screen instructions, the LXPM is displayed by default. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) You can perform hard drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → HDD test/Disk Drive Test**.
 - If the green activity LED is flashing and the yellow status LED is flashing slowly, the drive is recognized by the controller and is rebuilding.
 - If neither LED is lit or flashing, check the hard disk drive backplane.
 - If the green activity LED is flashing and the yellow status LED is lit, replace the drive. If the activity of the LEDs remains the same, go to step Hard disk drive problems. If the activity of the LEDs changes, return to step 1.
4. Make sure that the hard disk drive backplane is correctly seated. When it is correctly seated, the drive assemblies correctly connect to the backplane without bowing or causing movement of the backplane.
5. Reseat the backplane power cable and repeat steps 1 through 3.
6. Reseat the backplane signal cable and repeat steps 1 through 3.
7. Suspect the backplane signal cable or the backplane:
 - Replace the affected backplane signal cable.
 - Replace the affected backplane.
8. Run the diagnostics tests for the hard disk drives. When you start a server and press the key according to the on-screen instructions, the LXPM is displayed by default. (For more information, see the “Startup”

section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) You can perform hard drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → HDD test/Disk Drive Test.**

Based on those tests:

- If the adapter passes the test but the drives are not recognized, replace the backplane signal cable and run the tests again.
- Replace the backplane.
- If the adapter fails the test, disconnect the backplane signal cable from the adapter and run the tests again.
- If the adapter fails the test, replace the adapter.

Displayed system memory is less than installed physical memory

Complete the following procedure to solve the problem.

Note: Each time you install or remove a memory module, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server.

1. Make sure that:

- No error LEDs are lit on the operator information panel.
- No memory module error LEDs are lit on the system board.
- Memory mirrored channel does not account for the discrepancy.
- The memory modules are seated correctly.
- You have installed the correct type of memory module (see “Memory module installation rules and order” on page 58 for requirements).
- After changing or replacing a memory module, memory configuration is updated accordingly in the Setup Utility.
- All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled.
- There is no memory mismatch when the server is at the minimum memory configuration.

2. Reseat the memory modules, and then restart the server.

3. Check the POST error log:

- If a memory module was disabled by a systems-management interrupt (SMI), replace the memory module.
- If a memory module was disabled by the user or by POST, reseat the memory module; then, run the Setup Utility and enable the memory module.

4. Re-enable all memory modules using the Setup Utility, and then restart the server.

5. (Trained technician only) Install the failing memory module into a memory module connector for processor 2 (if installed) to verify that the problem is not the processor or the memory module connector.

6. (Trained technician only) Replace the system board.

A Lenovo optional device that was just installed does not work.

1. Make sure that:

- The device is supported for the server (see <https://serverproven.lenovo.com/>).
- You followed the installation instructions that came with the device and the device is installed correctly.
- You have not loosened any other installed devices or cables.

- You updated the configuration information in system setup. When you start a server and press the key according to the on-screen instructions to display the Setup Utility. (For more information, see the “Startup” section in the LXPm documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) Whenever memory or any other device is changed, you must update the configuration.
2. Reseat the device that you have just installed.
 3. Replace the device that you have just installed.
 4. Reseat the cable connection and check there is no physical damage to the cable.
 5. If there is any cable damages, then replace the cable.

Voltage planar fault is displayed in the event log

Complete the following steps until the problem is solved.

1. Revert the system to the minimum configuration. See “Specifications” on page 3 for the minimally required number of processors and DIMMs.
2. Restart the system.
 - If the system restarts, add each of the removed items one at a time and restart the system each time until the error occurs. Replace the item for which the error occurs.
 - If the system does not restart, suspect the system board.

Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about Lenovo products, you will find a wide variety of sources available from Lenovo to assist you.

On the World Wide Web, up-to-date information about Lenovo systems, optional devices, services, and support are available at:

<http://datacentersupport.lenovo.com>

Note: IBM is Lenovo's preferred service provider for ThinkSystem.

Before you call

Before you call, there are several steps that you can take to try and solve the problem yourself. If you decide that you do need to call for assistance, gather the information that will be needed by the service technician to more quickly resolve your problem.

Attempt to resolve the problem yourself

You can solve many problems without outside assistance by following the troubleshooting procedures that Lenovo provides in the online help or in the Lenovo product documentation. The Lenovo product documentation also describes the diagnostic tests that you can perform. The documentation for most systems, operating systems, and programs contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

You can find the product documentation for your ThinkSystem products at <https://pubs.lenovo.com/>

You can take these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Check for updated software, firmware, and operating-system device drivers for your Lenovo product. The Lenovo Warranty terms and conditions state that you, the owner of the Lenovo product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.
- If you have installed new hardware or software in your environment, check <https://serverproven.lenovo.com/> to make sure that the hardware and software are supported by your product.
- Go to <http://datacentersupport.lenovo.com> and check for information to help you solve the problem.
 - Check the Lenovo forums at https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv_eq to see if someone else has encountered a similar problem.

Gathering information needed to call Support

If you require warranty service for your Lenovo product, the service technicians will be able to assist you more efficiently if you prepare the appropriate information before you call. You can also go to <http://datacentersupport.lenovo.com/warrantylookup> for more information about your product warranty.

Gather the following information to provide to the service technician. This data will help the service technician quickly provide a solution to your problem and ensure that you receive the level of service for which you might have contracted.

- Hardware and Software Maintenance agreement contract numbers, if applicable
- Machine type number (Lenovo 4-digit machine identifier)
- Model number
- Serial number
- Current system UEFI and firmware levels
- Other pertinent information such as error messages and logs

As an alternative to calling Lenovo Support, you can go to <https://support.lenovo.com/servicerequest> to submit an Electronic Service Request. Submitting an Electronic Service Request will start the process of determining a solution to your problem by making the pertinent information available to the service technicians. The Lenovo service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

Collecting service data

To clearly identify the root cause of a server issue or at the request of Lenovo Support, you might need collect service data that can be used for further analysis. Service data includes information such as event logs and hardware inventory.

Service data can be collected through the following tools:

- **Lenovo XClarity Provisioning Manager**

Use the Collect Service Data function of Lenovo XClarity Provisioning Manager to collect system service data. You can collect existing system log data or run a new diagnostic to collect new data.

- **Lenovo XClarity Controller**

You can use the Lenovo XClarity Controller web interface or the CLI to collect service data for the server. The file can be saved and sent to Lenovo Support.

- For more information about using the web interface to collect service data, see the “Downloading service data” section in the XCC documentation version compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>.
- For more information about using the CLI to collect service data, see the “ffdc command” section in the XCC documentation version compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>.

- **Lenovo XClarity Administrator**

Lenovo XClarity Administrator can be set up to collect and send diagnostic files automatically to Lenovo Support when certain serviceable events occur in Lenovo XClarity Administrator and the managed endpoints. You can choose to send diagnostic files to Lenovo Support using Call Home or to another service provider using SFTP. You can also manually collect diagnostic files, open a problem record, and send diagnostic files to the Lenovo Support Center.

You can find more information about setting up automatic problem notification within the Lenovo XClarity Administrator at http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/admin_setupcallhome.html.

- **Lenovo XClarity Essentials OneCLI**

Lenovo XClarity Essentials OneCLI has inventory application to collect service data. It can run both in-band and out-of-band. When running in-band within the host operating system on the server, OneCLI can collect information about the operating system, such as the operating system event log, in addition to the hardware service data.

To obtain service data, you can run the **getinfor** command. For more information about running the **getinfor**, see https://pubs.lenovo.com/lxce-onecli/onecli_r_getinfor_command.

Contacting Support

You can contact Support to obtain help for your issue.

You can receive hardware service through a Lenovo Authorized Service Provider. To locate a service provider authorized by Lenovo to provide warranty service, go to <https://datacentersupport.lenovo.com/serviceprovider> and use filter searching for different countries. For Lenovo support telephone numbers, see <https://datacentersupport.lenovo.com/supportphonelist> for your region support details.

Appendix B. Trademarks

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Part Number: SP47A37787

Printed in China

(1P) P/N: SP47A37787

