



# ThinkSystem ST250 V2 Setup Guide



**Machine Types:** 7D8F and 7D8G

## 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:

[http://thinksystem.lenovofiles.com/help/topic/safety\\_documentation/pdf\\_files.html](http://thinksystem.lenovofiles.com/help/topic/safety_documentation/pdf_files.html)

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>

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## Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前，请仔细阅读 Safety Information（安全信息）。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας (safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.



Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

ཐོན་ཇུས་འདི་བདེ་སྤྱོད་མ་བྱས་གོང་། སྐྱོར་གྱི་ཡིད་གཟབ་  
བྱ་འདྲ་མིན་ཡོད་པའི་འོད་སྟེར་བལྟ་དགོས།

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

مەزكۇر مەھسۇلاتنى ئورنىتىشتىن بۇرۇن بىخەتەرلىك ئۇچۇرلىرىنى ئوقۇپ چىقىڭ.

Youq mwngz yungh canjbinj neix gaxgonq, itdingh aeu doeg aen  
canjbinj soengq cungj vahgangj ancien siusik.

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## Safety inspection checklist

Use the information in this section to identify potentially unsafe conditions with your server. As each machine was designed and built, required safety items were installed to protect users and service technicians from injury.

**Note:** This device is not intended for use in the direct field of view at visual display workplaces. To avoid incommoding reflections at visual display workplaces, this device must not be placed in the direct field of view.

**Attention:** This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

### CAUTION:

**This equipment must be installed or serviced by trained personnel, as defined by the NEC, IEC 62368-1 & IEC 60950-1, the standard for Safety of Electronic Equipment within the Field of Audio/Video, Information Technology and Communication Technology. Lenovo assumes you are qualified in the servicing of equipment and trained in recognizing hazards energy levels in products.**

**Important:** Electrical grounding of the server is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Use the following checklist to verify that there are no potentially unsafe conditions:

1. Make sure that the power is off and the power cord is disconnected.
2. Check the power cord.
  - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
  - Make sure that the power cord is the correct type.

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

- a. Go to:

<http://dcsc.lenovo.com/#/>

- b. Click **Preconfigured Model** or **Configure to order**.
- c. Enter the machine type and model for your server to display the configurator page.
- d. Click **Power → Power Cables** to see all line cords.
  - Make sure that the insulation is not frayed or worn.
3. Check for any obvious non-Lenovo alterations. Use good judgment as to the safety of any non-Lenovo alterations.
4. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
5. Check for worn, frayed, or pinched cables.
6. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.





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## Chapter 1. Introduction

The ThinkSystem ST250 V2 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>

### Identifying your server

When you contact Lenovo for help, the machine type and serial number information helps 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.

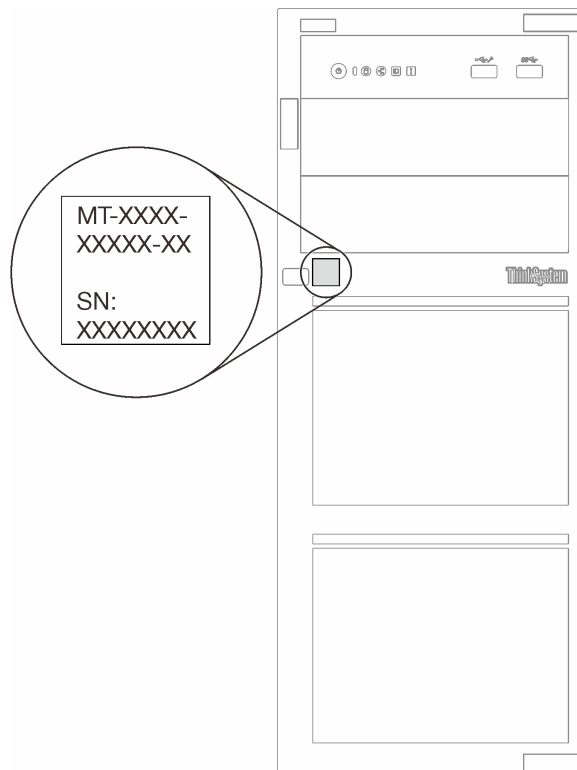
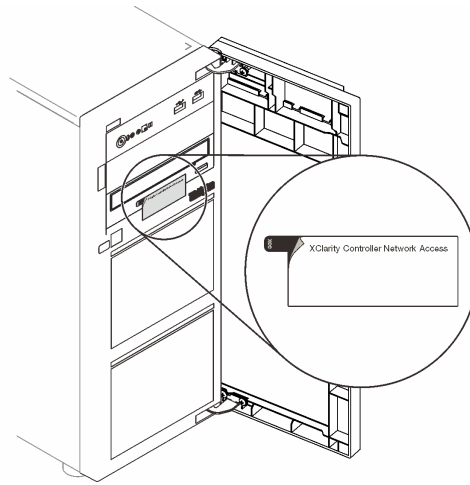


Figure 1. Location of the ID label

## 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.

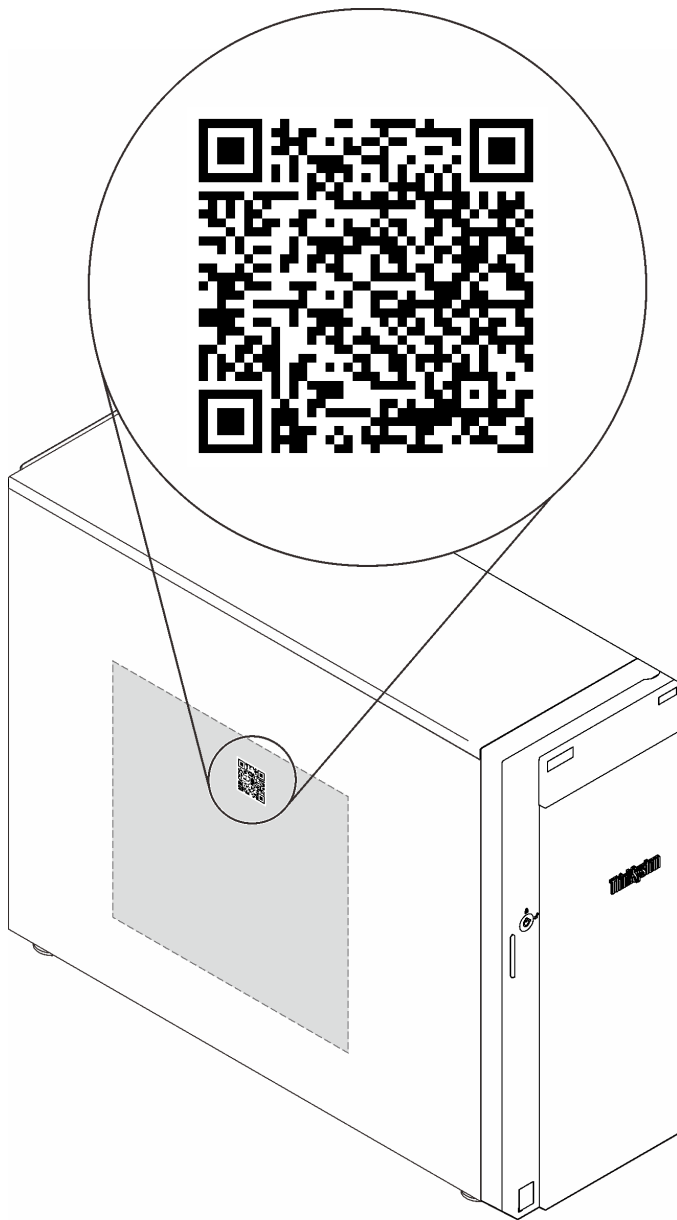


Figure 3. QR code

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## 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:** Some of the items listed are available on select models only.

- Server
- Rail installation kit (optional). Detailed instructions for installing the rail installation kit are provided in the package with the rail installation kit.
- Material box, including items such as power cords, rack installation template, and accessory kit.

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## Server form factor

The ThinkSystem ST250 V2 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 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, see:

[https://sysmgmt.lenovofiles.com/help/topic/lxcc\\_frontend/lxcc\\_overview.html](https://sysmgmt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.html)

**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://sysmgmt.lenovofiles.com/help/topic/lxcc\\_frontend/lxcc\\_overview.html](https://sysmgmt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.html).

- **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.

**Note:** The server does not support DOS (Disk Operating System).

- **Active Memory**

The Active Memory feature improves the reliability of memory through memory mirroring. Memory mirroring mode replicates and stores data on two pairs of memory modules within two channels simultaneously. If a failure occurs, the memory controller switches from the primary pair of memory modules to the backup pair of memory modules.

- **Large system-memory capacity**

The server supports synchronous dynamic random-access memory (SDRAM) registered dual inline memory modules (DIMMs) with error correcting code (ECC). For more information about the specific types and maximum amount of memory, see “Specifications” on page 5.

- **Integrated network support**

The server comes with an integrated 2-port Gigabit Ethernet controller, which supports connection to a 10 Mbps, 100 Mbps, or 1000 Mbps network. In the initial server configuration, Ethernet 1 and Ethernet 2 are activated.

- **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, a Lenovo-qualified TPM 2.0 adapter or a TPM card may be pre-installed.

- **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 eight 2.5-inch hot-swap drives and four 3.5-inch hot-swap drives into the same server.

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

With the hot-swap feature, you can add, remove, or replace hard disk drives without turning off the server.

- **Front panel**

Front panel provides LEDs to help you diagnose problems. For more information about the front panel, see “Front panel” on page 19.

- **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.

- **Active Energy Manager**

Lenovo XClarity Energy Manager is a power and temperature management solution for data centers. You can monitor and manage the power consumption and temperature of Converged, NeXtScale, System x, and ThinkServer servers, and improve energy efficiency using Lenovo XClarity Energy Manager.

- **Redundant cooling and power capabilities**

The server supports a maximum of two 550-watt hot-swap power supplies and four internal fans, which provide redundancy for a typical configuration. The redundant cooling by the fans in the server enables continued operation if one of the fans fails.

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## 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   |
|--|---|
| <b>Dimension</b>                               | 4U server <ul style="list-style-type: none"> <li>• Height: 175 mm (6.89 inches)</li> <li>• Width: 430 mm (16.93 inches)</li> <li>• Depth: 565.7 mm (22.27 inches)</li> </ul>  |
| <b>Weight (depending on the configuration)</b> | <ul style="list-style-type: none"> <li>• Maximum without package:                             <ul style="list-style-type: none"> <li>– 2.5-inch drive configuration: 21.98 kg (48.46 lb)</li> <li>– 3.5-inch drive configuration: 24.28 kg (53.53 lb)</li> </ul> </li> <li>• Minimum with package:                             <ul style="list-style-type: none"> <li>– 2.5-inch drive configuration: 17.96 kg (39.60 lb)</li> <li>– 3.5-inch drive configuration: 20.04 kg (44.18 lb)</li> </ul> </li> </ul>   |
| <b>Processor</b>                               | This server comes with one LGA 1200 socket that supports one of the following Intel® processors scalable up to eight cores: <ul style="list-style-type: none"> <li>• Xeon® E</li> <li>• Pentium®</li> </ul> For a list of supported processors, see: <a href="http://datacentersupport.lenovo.com">http://datacentersupport.lenovo.com</a> .  |
| <b>Memory</b>                                  | See “Memory module installation rules and orders” on page 88 for detailed information about memory configuration and setup. <ul style="list-style-type: none"> <li>• Minimum: 8 GB</li> <li>• Maximum: 128 GB</li> <li>• Slots: four DIMM slots (two channels, two DIMMs per channel)</li> <li>• Supports 8 GB, 16 GB, and 32 GB TruDDR4 3200 MHz ECC UDIMMs</li> </ul>   |
| <b>Drive bays (varies by model)</b>            | Available drive bays might vary by model. <ul style="list-style-type: none"> <li>• Storage drive bays:                             <ul style="list-style-type: none"> <li>– 3.5-inch simple-swap drive configurations                                     <ul style="list-style-type: none"> <li>– Eight 3.5-inch drives   <ul style="list-style-type: none"> <li>• Bay 0 to 6 support SATA drives</li> <li>• Bay 7 supports one of the following:   <ul style="list-style-type: none"> <li>– SATA drive</li> <li>– NVMe drive</li> </ul> </li> </ul> </li> <li>– Six 3.5-inch SATA drives   <ul style="list-style-type: none"> <li>• Bay 0 to 3, 4 and 5 support SATA drives</li> <li>• Optical-drive bay 1 (lower bay) supports one of the following:   <ul style="list-style-type: none"> <li>– Optical drive</li> <li>– Tape drive (RDX or LTO)</li> </ul> </li> <li>• Optical-drive bay 2 (upper bay) supports one optional optical drive</li> </ul> </li> </ul> </li> <li>– 2.5/3.5-inch hot-swap drive configurations                                     <ul style="list-style-type: none"> <li>– Eight 3.5-inch SAS/SATA drives (Bay 0 to 3 and Bay 4 to 7)</li> <li>– Sixteen 2.5-inch SAS/SATA drives (Bay 0 to 7 and Bay 8 to 15)</li> <li>– Four 3.5-inch (Bay 0 to 3) and eight 2.5-inch SAS/SATA drives (Bay 4 to 11)</li> <li>– Optical/tape drive bays   <ul style="list-style-type: none"> <li>• Optical-drive bay 1 (lower bay) supports one of the following:   <ul style="list-style-type: none"> <li>– Optical drive</li> <li>– Tape drive (RDX or LTO)</li> </ul> </li> <li>• Optical-drive bay 2 (upper bay) supports one optional optical drive</li> </ul> </li> </ul> </li> </ul> </li> </ul> |

Table 1. Specifications (continued)

| Specification                      | Description  |
|------------------------------------|--|
| <b>M.2 drive</b>                   | <p>Supports up to two SATA M.2 drives of the following drive form factors:</p> <ul style="list-style-type: none"> <li>• 42 mm (2242)</li> <li>• 60 mm (2260)</li> <li>• 80 mm (2280)</li> <li>• 110 mm (22110)</li> </ul> <p>Supports the following M.2 drive capacity:</p> <ul style="list-style-type: none"> <li>• 128 GB</li> <li>• 240 GB</li> <li>• 480 GB (supported only when the ambient temperature is below 30°C)</li> </ul>   |
| <b>Expansion slots</b>             | <p>Four PCIe expansion slots are available:</p> <ul style="list-style-type: none"> <li>• Slot 1: PCIe Gen3 x4 lane in x4 slot, FH/HL</li> <li>• Slot 2: PCIe Gen4 x16 lane in x16 slot, FH/HL</li> <li>• Slot 3: PCIe Gen3 x4 lane in x4 slot, FH/HL</li> <li>• Slot 4: PCIe Gen3 x4 lane in x8 slot, FH/HL</li> </ul> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. PCIe slot 4 supports an M.2 module.</li> <li>2. Slot 1 and Slot 3 in the ST250 V2 are open-end design, which means that the slots can accept adapters with a longer edge connector than the physical length of the slot connector. For example, if a x8 adapter is installed in the x4 slot 3 of the server, half of the edge connector will not be connected to the slot. The adapter will still function, however performance will be impacted.</li> </ol>   |
| <b>Input/Output (I/O) features</b> | <ul style="list-style-type: none"> <li>• Front panel <ul style="list-style-type: none"> <li>– One Lenovo XClarity Controller USB 2.0 connector</li> <li>– One USB 3.2 Gen 1 (5Gb) connector</li> </ul> </li> <li>• Rear panel <ul style="list-style-type: none"> <li>– One Video Graphics Array (VGA) connector</li> <li>– One serial connector</li> <li>– One Lenovo XClarity Controller network connector</li> <li>– Two Ethernet connectors (shared with Lenovo XClarity Controller network connector)</li> <li>– Four USB 3.2 Gen 2 (10Gb) connectors</li> </ul> </li> </ul>   |
| <b>Network</b>                     | <ul style="list-style-type: none"> <li>• Two 1Gbps RJ45 with BCM 5720</li> <li>• One 1Gbps Management RJ45</li> </ul>  |
| <b>RAID (depending on model)</b>   | <p>The following options are available:</p> <ul style="list-style-type: none"> <li>• Hardware RAID (RAID level 0, 1, 5, and 10): <ul style="list-style-type: none"> <li>– ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Adapter (with flash power module)</li> <li>– ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Adapter (with flash power module)</li> <li>– ThinkSystem RAID 5350-8i PCIe 12Gb Adapter</li> <li>– ThinkSystem 4350-8i SAS/SATA 12Gb HBA</li> <li>– ThinkSystem M.2 SATA 2-Bay RAID Enablement Kit</li> </ul> </li> </ul> <p><b>Note:</b> When ThinkSystem 4350/5350/9350 series RAID adapters are installed, drive number starts from 1 instead of from 0.</p> <ul style="list-style-type: none"> <li>• Software RAID (RAID level 0, 1, 5, and 10): <ul style="list-style-type: none"> <li>– Intel VROC SATA RAID</li> </ul> </li> </ul> <p>For a list of supported adapters, see:</p> <p><a href="http://datacentersupport.lenovo.com">http://datacentersupport.lenovo.com</a></p> |

Table 1. Specifications (continued)

| Specification                     | Description   |
|-----------------------------------|---|
| <b>System fans</b>                | <p>This server comes with the following fans:</p> <ul style="list-style-type: none"> <li>• One heat sink and fan assembly (80 x 80 x 25 mm)</li> <li>• Two front system fans for drives (92 x 92 x 25 mm)</li> <li>• One rear system fan (120 x 120 x 25 mm)</li> </ul>   |
| <b>Electrical input</b>           | <p>Universal input:</p> <ul style="list-style-type: none"> <li>• Low range: 100 to 127 Vac</li> <li>• High range: 200 to 240 Vac</li> <li>• Input frequency range: 50 to 60 Hz</li> </ul> <p><b>Note:</b> ThinkSystem ST250 V2 only supports AC input power. <b>Do not use 240 VDC input.</b></p>   |
| <b>Power supply</b>               | <p>Depending on your configuration, the server comes with one of the following power supply configurations:</p> <ul style="list-style-type: none"> <li>• One 250W or 300W fixed power supply</li> <li>• One or two 550W redundant power supplies</li> </ul>   |
| <b>Acoustical noise emissions</b> | <p>The server has the following acoustical noise emissions declaration:</p> <ul style="list-style-type: none"> <li>• Sound power level (<math>L_{WA(d)}</math>): <ul style="list-style-type: none"> <li>– Idling: 4.3 Bel (Typical), 4.4 Bel (Max)</li> <li>– Operating: 4.3 Bel (Typical), 4.5 Bel (Max)</li> </ul> </li> <li>• Sound pressure level (<math>L_{p(Am)}</math>): <ul style="list-style-type: none"> <li>– Idling: 27.4 dBA (Typical), 28.6 dBA (Max)</li> <li>– Operating: 27.6 dBA (Typical), 29.0 dBA (Max)</li> </ul> </li> </ul> <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• These sound levels were measured in controlled acoustical environments according to procedures specified by ISO7779 and are reported in accordance with ISO 9296, SPL is measured by bystander position(1m).</li> <li>• The declared acoustic sound levels are based on the following configurations, which may change depending on configuration/conditions, for example M.2 drive, Broadcom 57414 25Gb NIC, Broadcom 57416 10Gb NIC, T1000, etc. <ul style="list-style-type: none"> <li>– Typical: 1x 80W CPU, 4x 32GB DIMM, 2x HDD or SSD, RAID 5350-8i, 1x 300W PSU</li> <li>– Max: 1x 95W CPU, 4x 32GB DIMM, 2x HDD or SSD, 2x 550W PSU</li> </ul> </li> </ul> |
| <b>Approximate heat output</b>    | <ul style="list-style-type: none"> <li>• Minimum configuration: 358.05 BTU per hour (105 watts)</li> <li>• Maximum configuration: 1029.82 BTU per hour (302 watts)</li> </ul>   |



Table 1. Specifications (continued)

| Specification                         | Description  |
|---------------------------------------|--|
| <b>Ambient temperature management</b> | <p>Adjust ambient temperature when specific configuration is applied:</p> <ul style="list-style-type: none"> <li>• Eight 3.5-inch drives               <ul style="list-style-type: none"> <li>– When a 95W TDP CPU and a 95W performance heatsink are installed:                   <ul style="list-style-type: none"> <li>– Keep ambient temperature to 35°C or lower. M.2 drives (up to 240GB) are supported in this configuration.</li> <li>– Keep ambient temperature to 30°C or lower when a 480GB M.2 drive is installed.</li> </ul> </li> <li>– When an 80W (or lower) TDP CPU and an 80W heatsink are installed:                   <ul style="list-style-type: none"> <li>– Keep ambient temperature to 35°C or lower. M.2 drives (up to 240GB) are supported in this configuration.</li> <li>– Keep ambient temperature to 30°C or lower when a 480GB M.2 drive is installed.</li> </ul> </li> </ul> </li> <li>• Sixteen 2.5-inch drives               <ul style="list-style-type: none"> <li>– When a 95W TDP CPU and a 95W performance heatsink are installed:                   <ul style="list-style-type: none"> <li>– Keep ambient temperature to 35°C or lower. M.2 drives (up to 240GB) are supported in this configuration.</li> <li>– Keep ambient temperature to 30°C or lower when a 480GB M.2 drive is installed.</li> </ul> </li> <li>– When an 80W (or lower) TDP CPU and an 80W heatsink are installed:                   <ul style="list-style-type: none"> <li>– Keep ambient temperature to 35°C or lower. M.2 drives (up to 240GB) are supported in this configuration.</li> <li>– Keep ambient temperature to 30°C or lower when a 480GB M.2 drive is installed.</li> </ul> </li> </ul> </li> <li>• Eight 2.5-inch drives and four 3.5-inch drives               <ul style="list-style-type: none"> <li>– When an 80W TDP CPU and an 80W heatsink are installed:                   <ul style="list-style-type: none"> <li>– Keep ambient temperature to 40°C or lower.</li> <li>– M.2 drives, 10/25GbE Ethernet adapters, and redundant power supplies should not be installed in this configuration.</li> </ul> </li> <li>– When a 70W (or lower) TDP CPU and an 80W heatsink are installed:                   <ul style="list-style-type: none"> <li>– Keep ambient temperature to 45°C or lower.</li> <li>– M.2 drives, 10/25GbE Ethernet adapters, and redundant power supplies should not be installed in this configuration.</li> </ul> </li> </ul> </li> </ul> |
| <b>Environment</b>                    | <p>The ThinkSystem ST250 V2 server complies with ASHRAE Class A2 specifications. Depending on the hardware configurations, some models comply with ASHRAE Class A3 and A4 specifications. System performance may be impacted when operating temperature is outside ASHRAE A2 specification.</p> <ul style="list-style-type: none"> <li>• Air temperature:               <ul style="list-style-type: none"> <li>– Operating                   <ul style="list-style-type: none"> <li>– 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).</li> <li>– 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).</li> <li>– ASHRAE Class A4: 5°C to 45°C (41°F to 113°F); the maximum ambient temperature decreases by 1°C for every 125 m (410 ft) increase in altitude above 900 m (2,953 ft).</li> </ul> </li> </ul> </li> </ul>  |

Table 1. Specifications (continued)

| Specification                              | Description   |
|--|---|
|  | <ul style="list-style-type: none"> <li>– Server off: 5°C to 45°C (41°F to 113°F)</li> <li>– Shipment/storage: -40°C to 60°C (-40°F to 140°F)</li> <li>• Maximum altitude: 3,050 m (10,000 ft)</li> <li>• Relative Humidity (non-condensing):               <ul style="list-style-type: none"> <li>– Operating                   <ul style="list-style-type: none"> <li>– ASHRAE Class A2: 8% to 80%; maximum dew point: 21°C (70°F)</li> <li>– ASHRAE Class A3: 8% to 85%; maximum dew point: 24°C (75°F)</li> <li>– ASHRAE Class A4: 8% to 90%; maximum dew point: 24°C (75°F)</li> </ul> </li> <li>– Shipment/storage: 8% to 90%</li> </ul> </li> <li>• Particulate contamination</li> </ul> <p><b>Attention:</b> 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 V2 Maintenance Manual</i>.</p> |
| <b>Operating systems</b>                   | <p>Supported and certified operating systems:</p> <ul style="list-style-type: none"> <li>• Microsoft Windows Server 2019, 2022</li> <li>• VMware ESXi 7.0 U3 or later versions</li> <li>• Red Hat Enterprise Linux 8.4 or later versions</li> <li>• SUSE Linux Enterprise Server 15 SP3 or later versions</li> </ul> <p>References:</p> <ul style="list-style-type: none"> <li>• Complete list of available operating systems: <a href="https://lenovopress.com/osig">https://lenovopress.com/osig</a>.</li> <li>• OS deployment instructions: “Deploy the operating system” on page 138.</li> </ul>  |
| <b>Minimal configuration for debugging</b> | <ul style="list-style-type: none"> <li>• One processor</li> <li>• One UDIMM in slot 3</li> <li>• One power supply unit</li> <li>• One drive with RAID adapter and backplane or backplate (if OS is needed for debugging)</li> <li>• One system fan, one processor and heat sink fan, and one front system fan for drives</li> </ul>   |

## 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 71.04-1985<sup>1</sup>:</p> <ul style="list-style-type: none"> <li>• The copper reactivity level shall be less than 300 Angstroms per month (<math>\text{\AA}/\text{month} \approx 0.0039 \mu\text{g}/\text{cm}^2\text{-hour}</math> weight gain).<sup>2</sup></li> <li>• The silver reactivity level shall be less than 200 <math>\text{\AA}/\text{month}</math> (<math>\text{\AA}/\text{month} \approx 0.0035 \mu\text{g}/\text{cm}^2\text{-hour}</math> weight gain).<sup>3</sup></li> <li>• 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.</li> </ul>   |
| 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"> <li>• The room air might be continuously filtered with MERV 8 filters.</li> <li>• Air entering a data center might be filtered with MERV 11 or preferably MERV 13 filters.</li> </ul> <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"> <li>• The deliquescent relative humidity of the particulate contamination should be more than 60% RH.<sup>4</sup></li> <li>• Data centers must be free of zinc whiskers.<sup>5</sup></li> </ul> |
| <p><sup>1</sup> 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><sup>2</sup> The derivation of the equivalence between the rate of copper corrosion growth in the thickness of the corrosion product in <math>\text{\AA}/\text{month}</math> and the rate of weight gain assumes that <math>\text{Cu}_2\text{S}</math> and <math>\text{Cu}_2\text{O}</math> grow in equal proportions.</p> <p><sup>3</sup> The derivation of the equivalence between the rate of silver corrosion growth in the thickness of the corrosion product in <math>\text{\AA}/\text{month}</math> and the rate of weight gain assumes that <math>\text{Ag}_2\text{S}</math> is the only corrosion product.</p> <p><sup>4</sup> 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><sup>5</sup> 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><b>Interface</b></p> <ul style="list-style-type: none"> <li>• CLI application</li> <li>• Web GUI interface</li> <li>• Mobile application</li> <li>• REST API</li> </ul> <p><b>Usage and downloads</b></p> <p><a href="https://sysmgt.lenovofiles.com/help/topic/xcc_frontend/xcc_overview.html">https://sysmgt.lenovofiles.com/help/topic/xcc_frontend/xcc_overview.html</a></p>                    |
| Lenovo XClarity Administrator      | <p>Centralized interface for multi-server management.</p> <p><b>Interface</b></p> <ul style="list-style-type: none"> <li>• Web GUI interface</li> <li>• Mobile application</li> <li>• REST API</li> </ul> <p><b>Usage and downloads</b></p> <p><a href="http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/aug_product_page.html">http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/aug_product_page.html</a></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><b>Interface</b></p> <ul style="list-style-type: none"> <li>• <b>OneCLI</b>: CLI application</li> <li>• <b>Bootable Media Creator</b>: CLI application, GUI application</li> <li>• <b>UpdateXpress</b>: GUI application</li> </ul> <p><b>Usage and downloads</b></p> <p><a href="http://sysmgt.lenovofiles.com/help/topic/xclarity_essentials/overview.html">http://sysmgt.lenovofiles.com/help/topic/xclarity_essentials/overview.html</a></p> |

| Options                              | Description   |
|--------------------------------------|---|
| Lenovo XClarity Provisioning Manager | <p>UEFI-based embedded GUI tool on a single server that can simplify management tasks.</p> <p><b>Interface</b></p> <ul style="list-style-type: none"> <li>• Web interface (BMC remote access)</li> <li>• GUI application</li> </ul> <p><b>Usage and downloads</b></p> <p><a href="https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html">https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html</a></p> <p><b>Important:</b><br/>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 <a href="https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html">https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html</a>.</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><b>Interface</b></p> <p>GUI application</p> <p><b>Usage and downloads</b></p> <p><a href="https://sysmgt.lenovofiles.com/help/topic/lxci/lxci_product_page.html">https://sysmgt.lenovofiles.com/help/topic/lxci/lxci_product_page.html</a></p>  |
| Lenovo XClarity Energy Manager       | <p>Application that can manage and monitor server power and temperature.</p> <p><b>Interface</b></p> <ul style="list-style-type: none"> <li>• Web GUI Interface</li> </ul> <p><b>Usage and downloads</b></p> <p><a href="https://datacentersupport.lenovo.com/solutions/Invo-lxem">https://datacentersupport.lenovo.com/solutions/Invo-lxem</a></p>   |
| Lenovo Capacity Planner              | <p>Application that supports power consumption planning for a server or rack.</p> <p><b>Interface</b></p> <ul style="list-style-type: none"> <li>• Web GUI Interface</li> </ul> <p><b>Usage and downloads</b></p> <p><a href="https://datacentersupport.lenovo.com/solutions/Invo-lcp">https://datacentersupport.lenovo.com/solutions/Invo-lcp</a></p>  |

## Functions

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

### 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.

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## 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 helps support technicians to identify your server and provide faster service.

The model number and serial number are on the ID label on the front of the server. The following illustration shows the location of the ID label containing the machine type, model, and serial number.

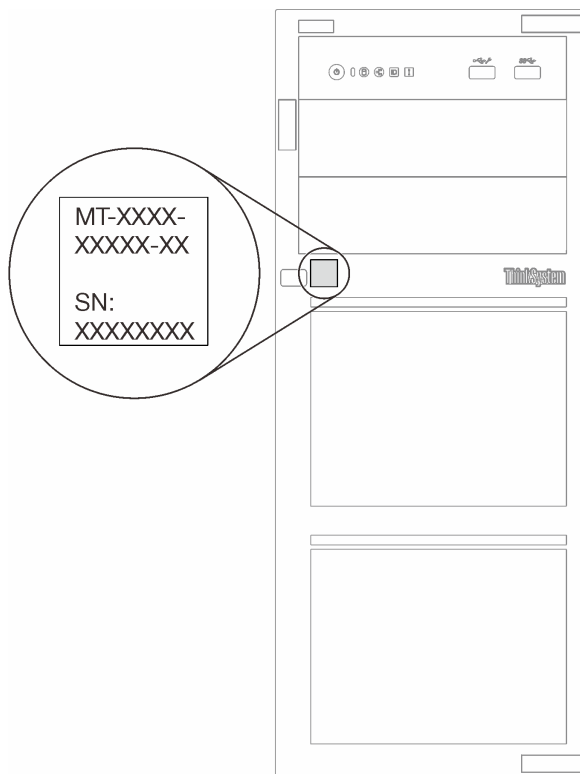
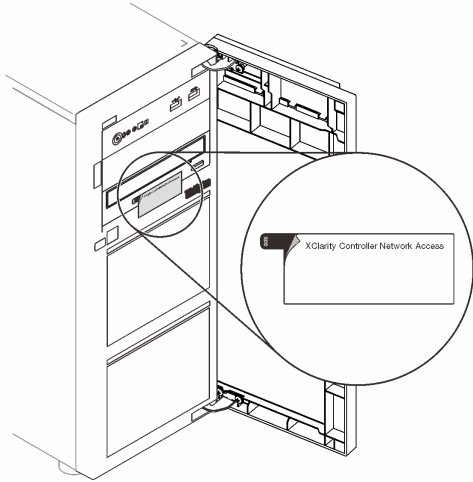


Figure 4. Location of the machine type, model, and serial number

### XClarity Controller network access label

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



*Figure 5. Location of XClarity Controller network access label*

### **QR code**

The system service label on the inside of the server cover provides a QR code for mobile access to service information. You can scan the QR code with a mobile device for quick access to additional information including parts installation, replacement, and error codes.

The following illustration shows the QR code.



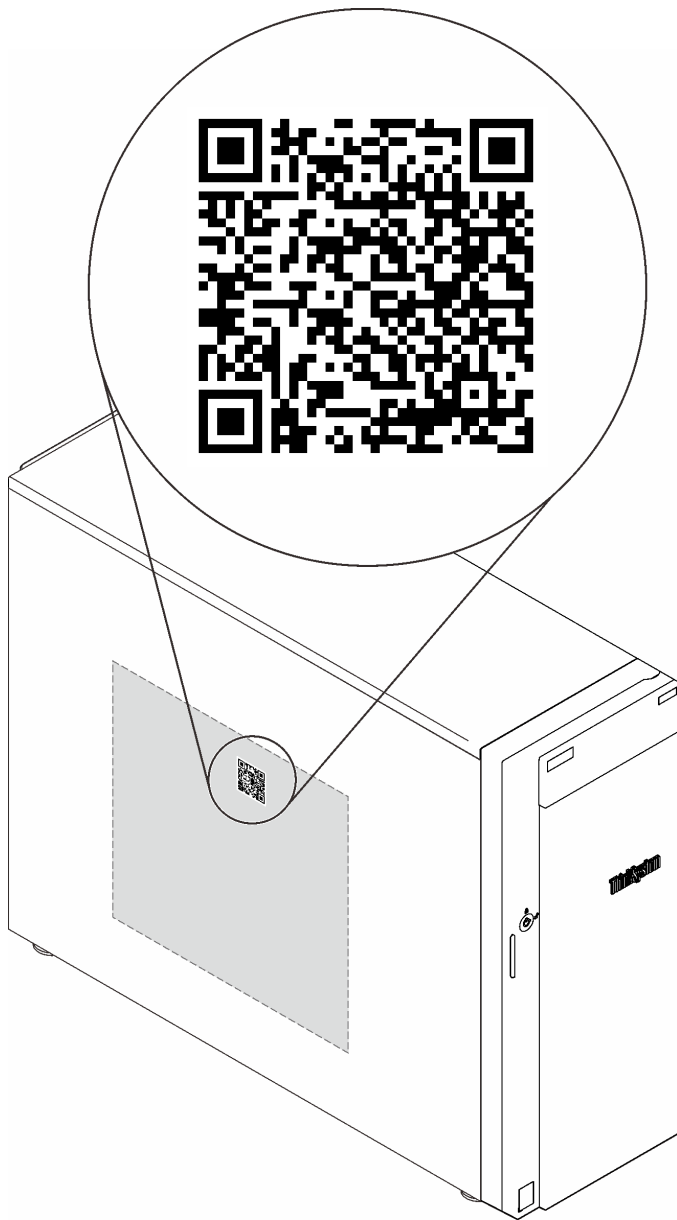


Figure 6. Location of QR code

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## 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 this server model.

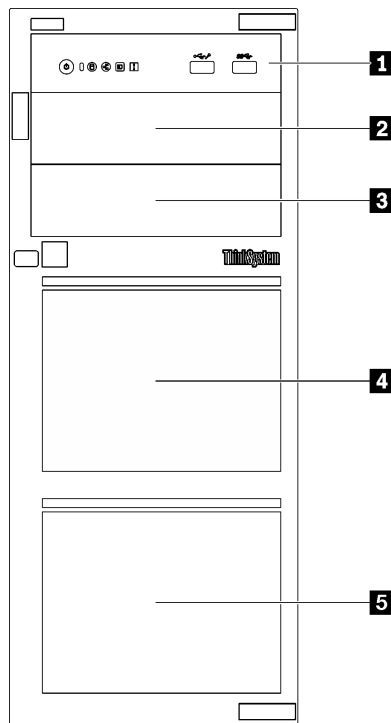


Figure 7. Front view of the server components

Table 3. Components on the front of server models

| Item                          | Description   |
|-------------------------------|---|
| <b>1</b> Front panel          | See “Front panel” on page 19  |
| <b>2</b> Optical-drive bay 2  | The optical drive bay 2 supports an optical drive.  |
| <b>3</b> Optical-drive bay 1  | The optical drive bay 1 supports an optical drive or a tape drive (RDX or LTO).   |
| <b>4 5</b> Storage drive bays | The number of available drive bays varies by model. See “Drive configurations” on page 18 for the complete configuration table. The vacant drive bays must be installed with drive fillers. |

### Drive configurations

| Item     | Eight 3.5-inch simple-swap drives | Six 3.5-inch simple-swap drives<br>+<br>Optical/tape drives | Eight 3.5-inch hot-swap drives<br>+<br>Optical/tape drives | Sixteen 2.5-inch hot-swap drives<br>+<br>Optical/tape drives | Four 3.5-inch hot-swap drives<br>+<br>Eight 2.5-inch hot-swap drives<br>+<br>Optical/tape drives |
|----------|-----------------------------------|---|--|--|--|
| <b>2</b> | N/A                               | Optical-drive bay 2: Optical drive                          | Optical-drive bay 2: Optical drive                         | Optical-drive bay 2: Optical drive                           | Optical-drive bay 2: Optical drive   |

|          |   |   |   |   |   |
|----------|---|---|---|---|---|
| <b>3</b> | N/A   | Optical-drive bay 1: Optical/tape drive | Optical-drive bay 1: Optical/tape drive | Optical-drive bay 1: Optical/tape drive | Optical-drive bay 1: Optical/tape drive |
| <b>4</b> | Three SATA drives (Bay 4, 5, 6) and one SATA/NVMe drive (Bay 7) | Two SATA drives (Bay 4, 5)              | Four SAS/SATA drives (Bay 4 to 7)       | Eight SAS/SATA drives (Bay 8 to 15)     | Eight SAS/SATA drives (Bay 4 to 11)     |
| <b>5</b> | Four SATA drives (Bay 0 to 3)                                   | Four SATA drives (Bay 0 to 3)           | Four SAS/SATA drives (Bay 0 to 3)       | Eight SAS/SATA drives (Bay 0 to 7)      | Four SAS/SATA drives (Bay 0 to 3)       |

**Note:** When ThinkSystem 4350/5350/9350 series RAID adapters are installed, drive number starts from 1 instead of from 0.

## 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.

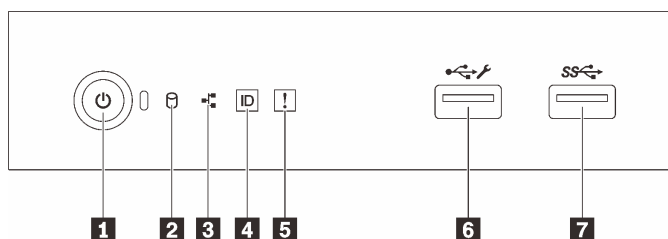


Figure 8. Front panel

Table 4. Components on the front panel

| Callout   | Callout  |
|---|--|
| <b>1</b> Power button with power status LED (green)                                   | <b>5</b> System error LED (yellow)             |
| <b>2</b> Drive activity LED (green)<br><b>Note:</b> For onboard SATA indication only  | <b>6</b> XClarity Controller USB 2.0 connector |
| <b>3</b> Network activity LED (green)<br><b>Note:</b> For onboard LAN indication only | <b>7</b> USB 3.2 Gen 1 connector               |
| <b>4</b> 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). |

| Status  | Color | Description   |
|---|-------|---|
| 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 to 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.         |
| Flashing | Green | The drive is being accessed. |
| 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 | <p>An error has been detected on the server. Causes might include one or more of the following errors:</p> <ul style="list-style-type: none"> <li>• The temperature of the server reached the non-critical temperature threshold.</li> <li>• The voltage of the server reached the non-critical voltage threshold.</li> <li>• A fan has been detected to be running at low speed.</li> <li>• A fan has been removed.</li> <li>• The power supply has a critical error.</li> <li>• The power supply is not connected to the power.</li> </ul> | 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 front USB port for Lenovo XClarity Controller connection” on page 132.

### **7 USB 3.2 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.

---

## **Side view**

Use this information to locate the components from the side of the server.

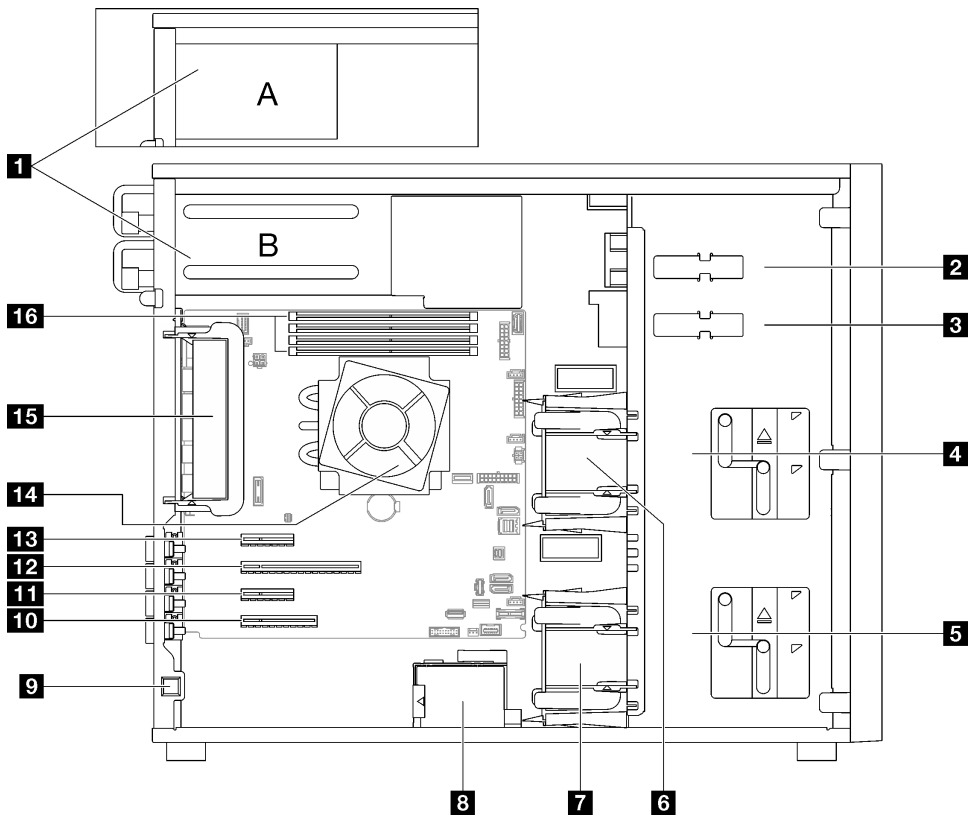


Table 5. Components on the server models side view

|          |                                |           |                         |
|----------|--------------------------------|-----------|-------------------------|
| <b>1</b> | Power supply cage              | <b>9</b>  | Intrusion switch        |
| <b>2</b> | Upper ODD drive bay            | <b>10</b> | PCIe Slot 4             |
| <b>3</b> | Lower ODD/tape drive bay       | <b>11</b> | PCIe Slot 3             |
| <b>4</b> | Upper storage drive cage       | <b>12</b> | PCIe Slot 2             |
| <b>5</b> | Lower storage drive cage       | <b>13</b> | PCIe Slot 1             |
| <b>6</b> | Front system fan 1             | <b>14</b> | Processor and heat sink |
| <b>7</b> | Front system fan 2             | <b>15</b> | Rear system fan         |
| <b>8</b> | RAID flash power module holder | <b>16</b> | DIMM slots              |

## Rear view

Use this information to locate the connectors and components on the rear of the server.

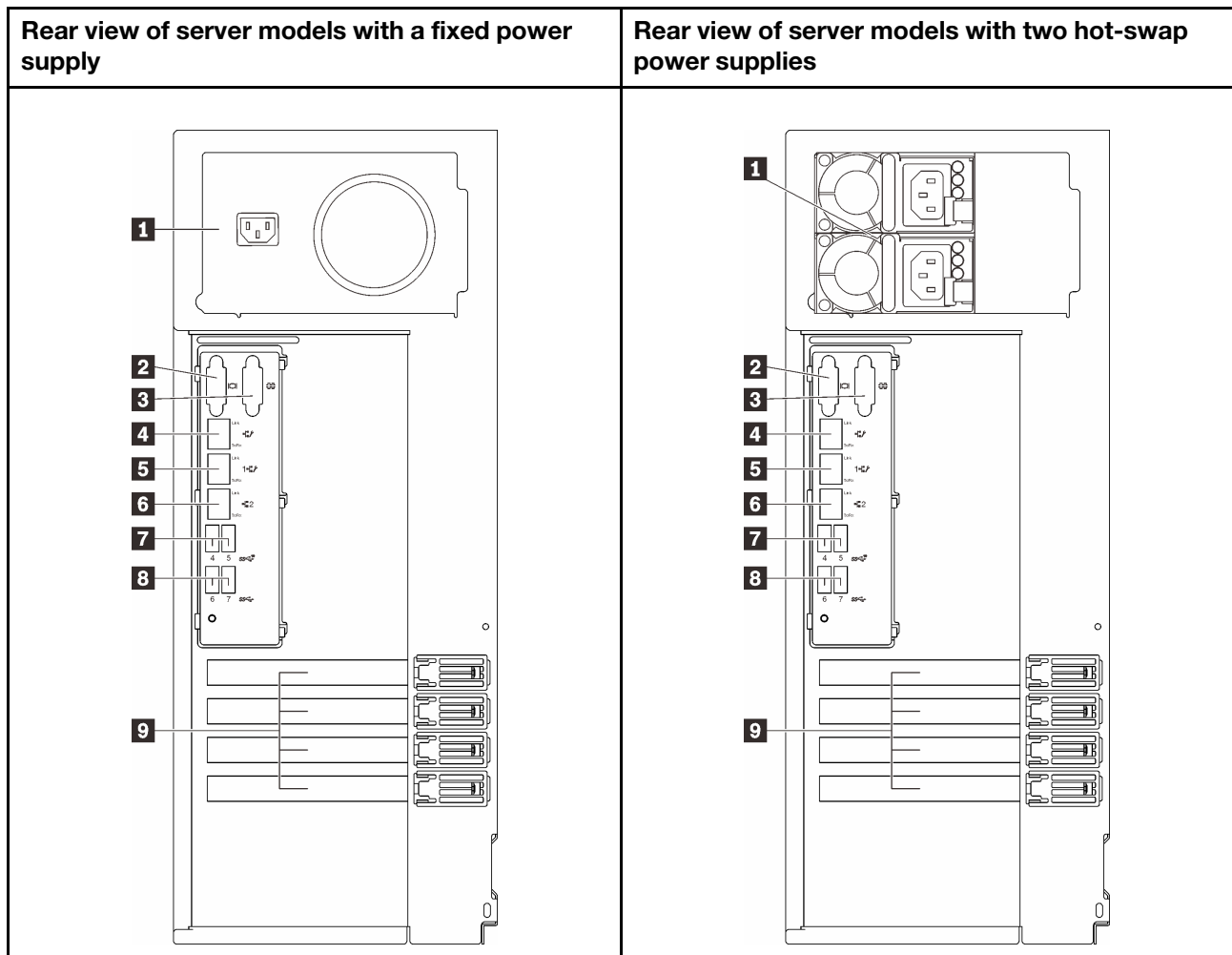


Figure 9. Rear view

Table 6. Components on the rear of server models with a fixed power supply or two hot-swap power supplies

|  |                                   |
|--|-----------------------------------|
| <b>1</b> Power cord connector                                  | <b>6</b> Ethernet connector 2     |
| <b>2</b> VGA connector   | <b>7</b> USB 3.2 Gen 2 connectors |
| <b>3</b> Serial connector                                      | <b>8</b> USB 3.2 Gen 2 connectors |
| <b>4</b> Dedicated XClarity Controller (XCC) network connector | <b>9</b> PCIe slots               |
| <b>5</b> Ethernet connector 1 (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 XClarity Controller. XClarity Controller 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 connectors 1 and 2**

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 24. 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 3.2 Gen 2 connectors**

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.

#### **9 PCIe slots**

There are four PCIe slots on the system board to install appropriate PCIe adapters. For information about the PCIe slots, see “Specifications” on page 5.

---

## **Rear view LEDs**

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



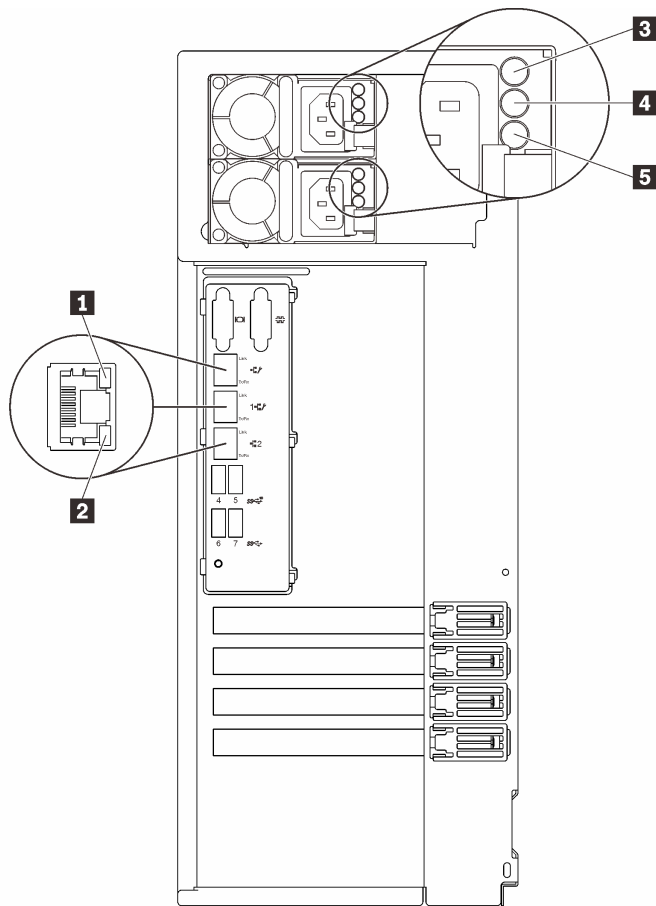


Figure 10. Rear view LEDs of the server

Table 7. LEDs on the rear of the server

| Callout                                | Callout                                  |
|--|--|
| <b>1</b> Ethernet link LED (green)     | <b>4</b> Power output LED (green)        |
| <b>2</b> Ethernet activity LED (green) | <b>5</b> Power supply error LED (yellow) |
| <b>3</b> Power input LED (green)       |  |

### **1 2** Ethernet status LEDs

Each network connector has two status LEDs.

| Ethernet status LED            | Color | Status   | Description                            |
|--------------------------------|-------|----------|--|
| <b>1</b> Ethernet link LED     | Green | On       | Network link is established.           |
|                                | None  | Off      | Network link is disconnected.          |
| <b>2</b> 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  |
|---------------------------------|--|
| <b>3</b> Power input LED        | <ul style="list-style-type: none"> <li>• Off: The power supply is disconnected from the ac power source or a power problem occurs.</li> <li>• Green: The power supply is connected to the ac power source.</li> </ul>  |
| <b>4</b> Power output LED       | <ul style="list-style-type: none"> <li>• Green: The server is on and the power supply is working normally.</li> <li>• 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.</li> </ul> <p>To disable zero-output mode, start the Setup utility, go to <b>System Settings → Power → Zero Output</b> and select <b>Disable</b>. If you disable zero-output mode, both power supplies will be in the active state.</p> <ul style="list-style-type: none"> <li>• 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.</li> </ul> |
| <b>5</b> Power supply error LED | <ul style="list-style-type: none"> <li>• Off: The power supply is working normally.</li> <li>• Yellow: The power supply has failed. To resolve the issue, replace the power supply.</li> </ul>   |

## System-board components

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

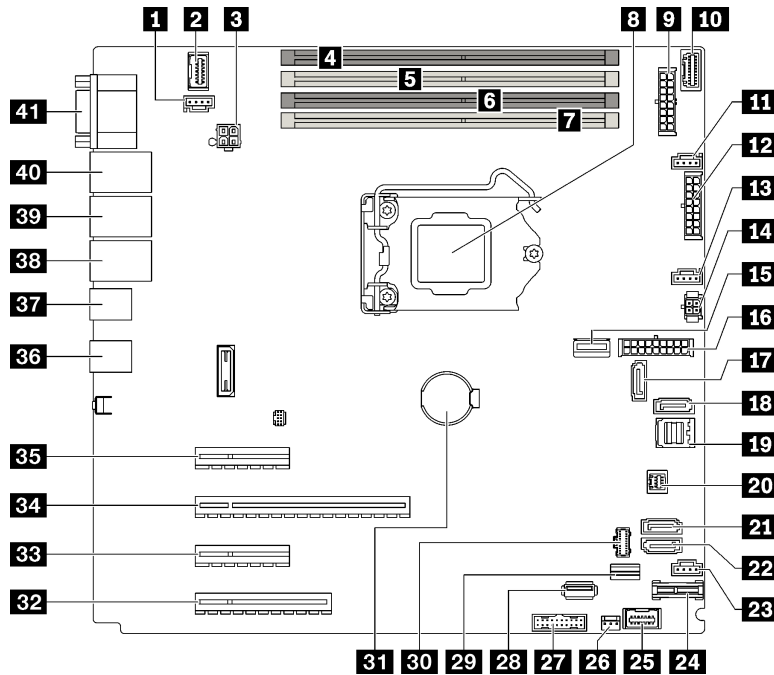


Figure 11. System board components

Table 8. Components on the system board

| Callout  | Callout                                    |
|--|--|
| <b>1</b> Rear fan connector                            | <b>22</b> SATA 4                           |
| <b>2</b> Front VGA connector                           | <b>23</b> Fan 4 connector for front fan    |
| <b>3</b> Processor power connector                     | <b>24</b> TPM/TCM connector                |
| <b>4</b> DIMM Slot 1                                   | <b>25</b> Front panel connector            |
| <b>5</b> DIMM Slot 2                                   | <b>26</b> Intrusion switch connector       |
| <b>6</b> DIMM Slot 3                                   | <b>27</b> Front USB connector              |
| <b>7</b> DIMM Slot 4                                   | <b>28</b> Internal USB 3.2 Gen 1 connector |
| <b>8</b> Processor socket                              | <b>29</b> M.2 signal connector             |
| <b>9</b> Backplane 1 power connector                   | <b>30</b> M.2 power connector              |
| <b>10</b> Power distribution board side band connector | <b>31</b> CMOS battery                     |
| <b>11</b> Fan 1 connector for front fan                | <b>32</b> PCIe Slot 4                      |
| <b>12</b> Backplane 2 power connector                  | <b>33</b> PCIe Slot 3                      |
| <b>13</b> Fan 2 connector for processor                | <b>34</b> PCIe Slot 2                      |
| <b>14</b> Optical/tape drive power connector           | <b>35</b> PCIe Slot 1                      |
| <b>15</b> System power connector                       | <b>36</b> Two USB 3.2 Gen 2 connectors     |

Table 8. Components on the system board (continued)

| Callout                              | Callout   |
|--------------------------------------|---|
| <b>16</b> MCIO x4 connector for NVMe | <b>37</b> Two USB 3.2 Gen 2 connectors                        |
| <b>17</b> SATA 6                     | <b>38</b> Ethernet connector 2                                |
| <b>18</b> SATA 7                     | <b>39</b> Ethernet connector 1 (shared with XCC network port) |
| <b>19</b> SATA 0 to 3                | <b>40</b> Lenovo XClarity Controller(XCC) management port     |
| <b>20</b> SGPIO1 connector           | <b>41</b> VGA and serial port connector                       |
| <b>21</b> SATA 5                     |   |

## System-board LED

The illustration in this section shows the light-emitting diode (LED) on the system board.

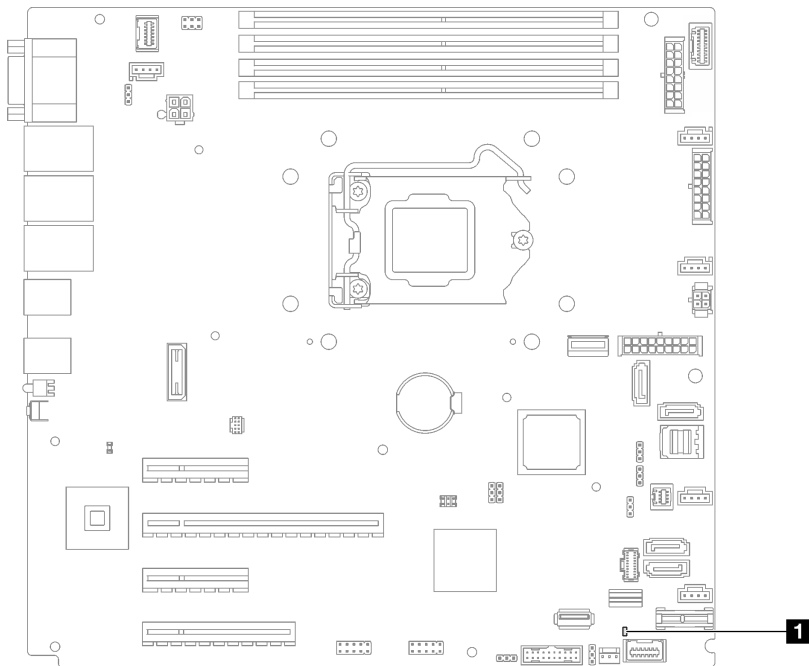


Figure 12. System-board LED

Table 9. System-board LED

|                                   |
|-----------------------------------|
| <b>1</b> System error LED (amber) |
|-----------------------------------|

## System-board jumpers and buttons

The illustration in this section shows the location of the jumpers and buttons on the server.

**Note:** If there is a clear protective sticker on the top of the switch blocks, you must remove and discard it to access the switches.

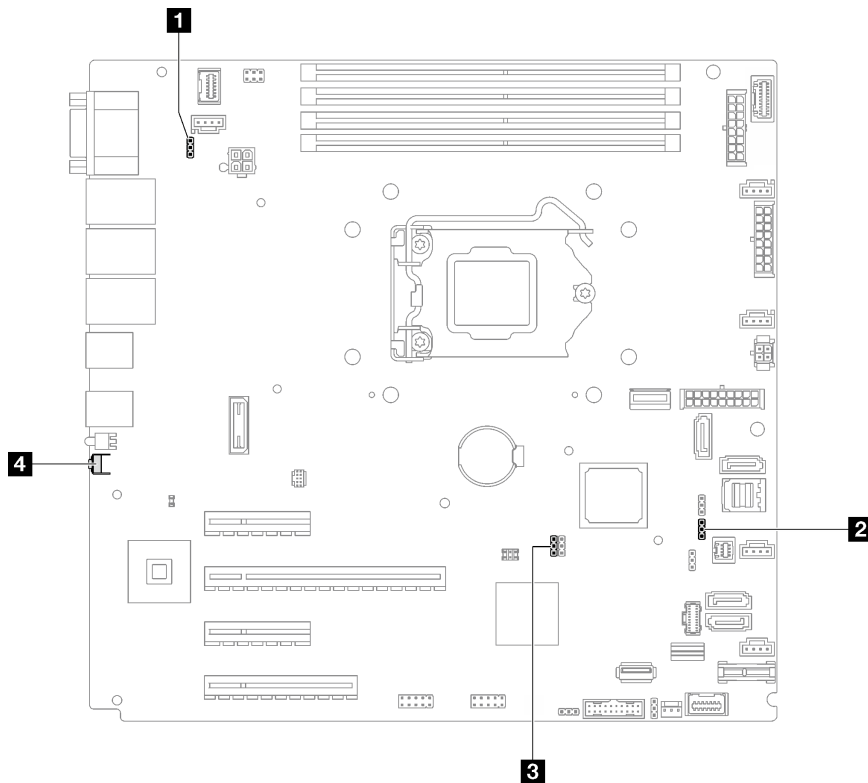


Figure 13. System-board jumpers and buttons

The following table describes the jumpers and buttons on the system board.

Table 10. System-board jumpers and buttons

| Jumper and button name                                  | Jumper setting / Button function  |
|---|---|
| <b>1</b> Power permission override jumper               | <ul style="list-style-type: none"> <li>• Pins 1 and 2: Normal (default).</li> <li>• Pins 2 and 3: Override the power-on permission.</li> </ul>  |
| <b>2</b> Force Lenovo XClarity Controller update jumper | <ul style="list-style-type: none"> <li>• Pins 1 and 2: Normal (default).</li> <li>• Pins 2 and 3: Force the Lenovo XClarity Controller to update to the latest version.</li> </ul>  |
| <b>3</b> Clear CMOS jumper                              | <ul style="list-style-type: none"> <li>• Pins 1 and 2: Normal (default).</li> <li>• Pins 2 and 3: Clear the real-time clock (RTC) registry.</li> </ul>  |
| <b>4</b> Force NMI button                               | This button is on the rear of the server. Press this button to force a nonmaskable interrupt to the processor. You might have to use a pen or the end of a straightened paper clip to press the button. You can also use it to force a blue-screen memory dump (use this button only when you are directed to do so by Lenovo Support). |

**Important:**

1. Before you change any switch settings or move any jumpers, turn off the server; then, disconnect all power cords and external cables. Review the information in [http://thinksystem.lenovofiles.com/help/topic/safety\\_documentation/pdf\\_files.html](http://thinksystem.lenovofiles.com/help/topic/safety_documentation/pdf_files.html), “Installation guidelines” on page 85, “Handling static-sensitive devices” on page 88, and “Power off the server” on page 130.

2. Any system-board switch or jumper block that is not shown in the illustrations in this document are reserved.

## Drive backplates/backplanes

The illustrations in this section identify the connectors on the drive backplates/backplanes.

Following are the drive backplate/backplanes that are supported by this server:

- **Simple-swap drive backplates**
  - “3.5-inch simple-swap backplate (Bay 0-3)” on page 30
  - “3.5-inch simple-swap backplate (Bay 4-7 without optical disk drive)” on page 31
  - “3.5-inch simple-swap backplate (Bay 4-5 with optical disk drive)” on page 31
- **Hot-swap drive backplanes**
  - “3.5-inch hot-swap backplane” on page 32
  - “2.5-inch hot-swap backplane” on page 32

### 3.5-inch simple-swap backplate (Bay 0-3)

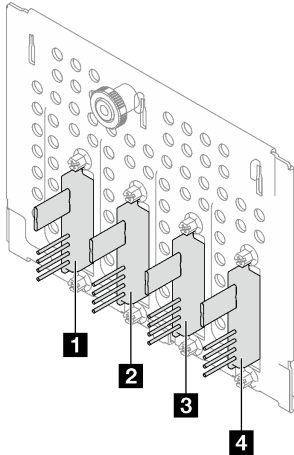


Table 11. 3.5-inch simple-swap backplate (Bay 0-3)

|                                | Bay number in the lower drive cage |
|--------------------------------|------------------------------------|
| <b>1</b> Signal/SATA connector | SATA 3                             |
| <b>2</b> Signal/SATA connector | SATA 2                             |
| <b>3</b> Signal/SATA connector | SATA 1                             |
| <b>4</b> Signal/SATA connector | SATA 0                             |

### 3.5-inch simple-swap backplate (Bay 4-7 without optical disk drive)

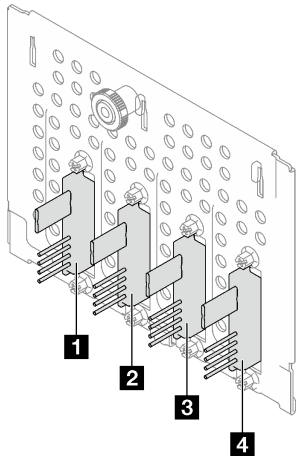


Table 12. 3.5-inch simple-swap backplate (Bay 4-7 without optical disk drive)

|                                | Bay number in the lower drive cage |
|--------------------------------|------------------------------------|
| <b>1</b> Signal/SATA connector | SATA 7                             |
| <b>2</b> Signal/SATA connector | SATA 6                             |
| <b>3</b> Signal/SATA connector | SATA 5                             |
| <b>4</b> Signal/SATA connector | SATA 4                             |

### 3.5-inch simple-swap backplate (Bay 4-5 with optical disk drive)

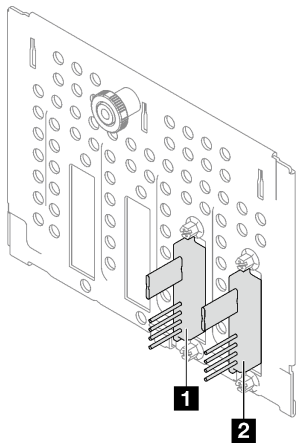


Table 13. 3.5-inch simple-swap backplate (Bay 4-5 with optical disk drive)

|                                | Bay number in the lower drive cage |
|--------------------------------|------------------------------------|
| <b>1</b> Signal/SATA connector | SATA 5                             |
| <b>2</b> Signal/SATA connector | SATA 4                             |

### 3.5-inch hot-swap backplane

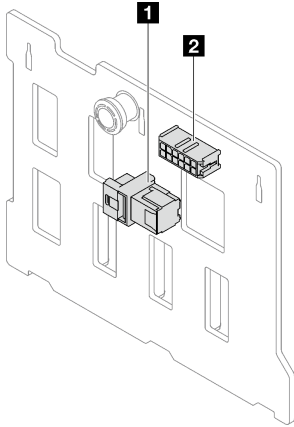


Table 14. 3.5-inch hot-swap backplane connectors

|                          |                             |
|--------------------------|-----------------------------|
| <b>1</b> Power connector | <b>2</b> SAS/SATA connector |
|--------------------------|-----------------------------|

### 2.5-inch hot-swap backplane

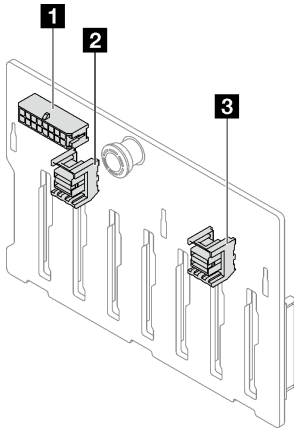


Table 15. 2.5-inch hot-swap backplane connectors

|                               |                               |
|-------------------------------|-------------------------------|
| <b>1</b> Power connector      | <b>3</b> SAS/SATA 0 connector |
| <b>2</b> SAS/SATA 1 connector |                               |

---

## Power distribution board

The illustrations in this section identify the connectors on the power distribution boards.

Two types of power distribution boards are supported by this server:

- “Power distribution board for the fixed power supply” on page 33
- “Power distribution board for hot-swap power supplies” on page 33



### Power distribution board for the fixed power supply

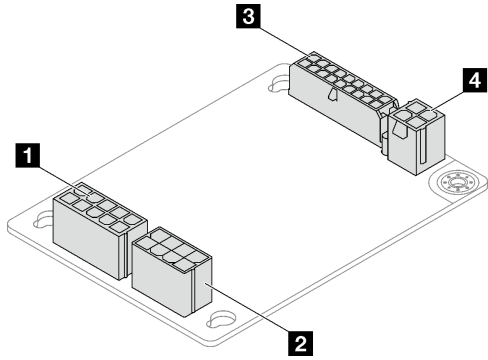


Figure 14. Power distribution board for the fixed power supply

Table 16. Power distribution board for the fixed power supply

|   |                                    |
|---|------------------------------------|
| <b>1</b> Power supply system power connector    | <b>3</b> System power connector    |
| <b>2</b> Power supply processor power connector | <b>4</b> Processor power connector |

### Power distribution board for hot-swap power supplies

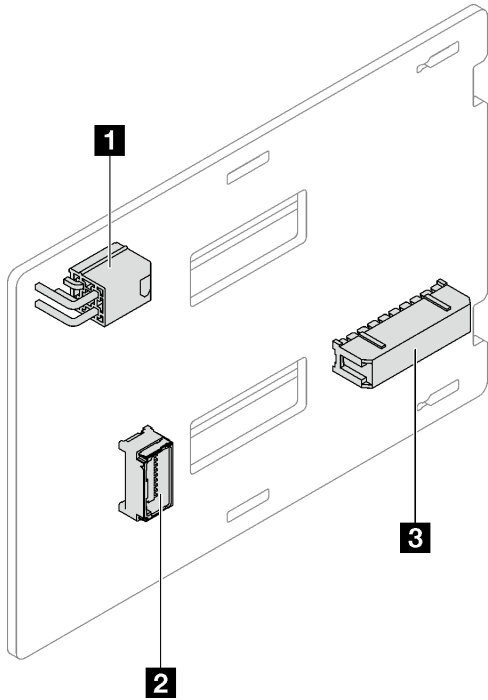


Figure 15. Power distribution board for hot-swap power supplies

Table 17. Power distribution board for hot-swap power supplies

|                                    |                                 |
|------------------------------------|---------------------------------|
| <b>1</b> Processor power connector | <b>3</b> System power connector |
| <b>2</b> Side band connector       |                                 |

## RAID adapters

The illustrations in this section identify the connectors on the RAID adapters.

Following are the RAID adapters that are supported by this server:

- “9350-8i” on page 34
- “9350-16i” on page 34
- “4350/5350-8i” on page 35

### 9350-8i

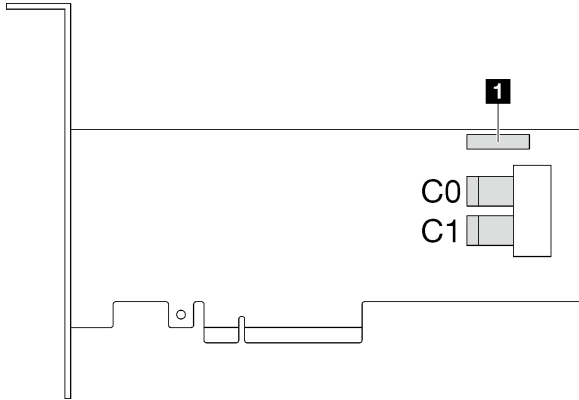


Figure 16. 9350-8i connectors

Table 18. 9350-8i connectors

|  |
|--|
| <b>1</b> RAID flash power module connector |
|--|

### 9350-16i

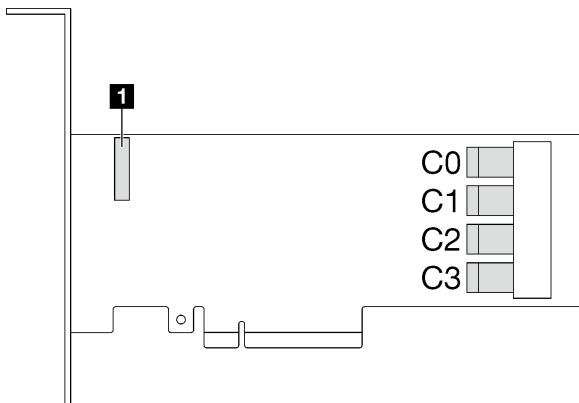


Figure 17. 9350-8i connectors

Table 19. 9350-8i connectors

|  |
|--|
| <b>1</b> RAID flash power module connector |
|--|

## 4350/5350-8i

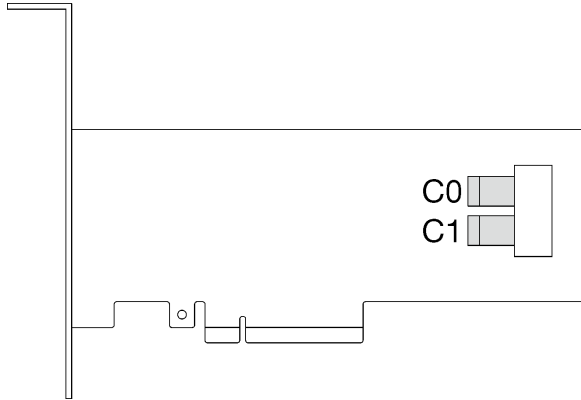


Figure 18. 4350/5350-8i connectors

---

## 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.

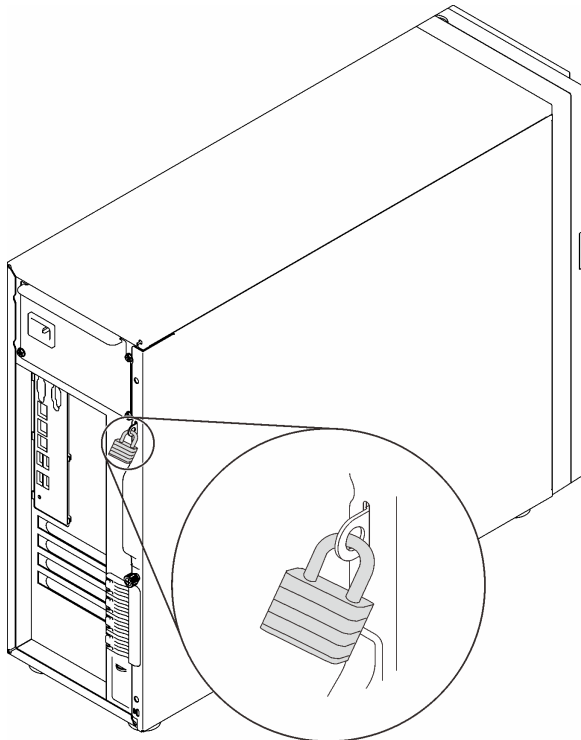


Figure 19. Padlock

### 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>

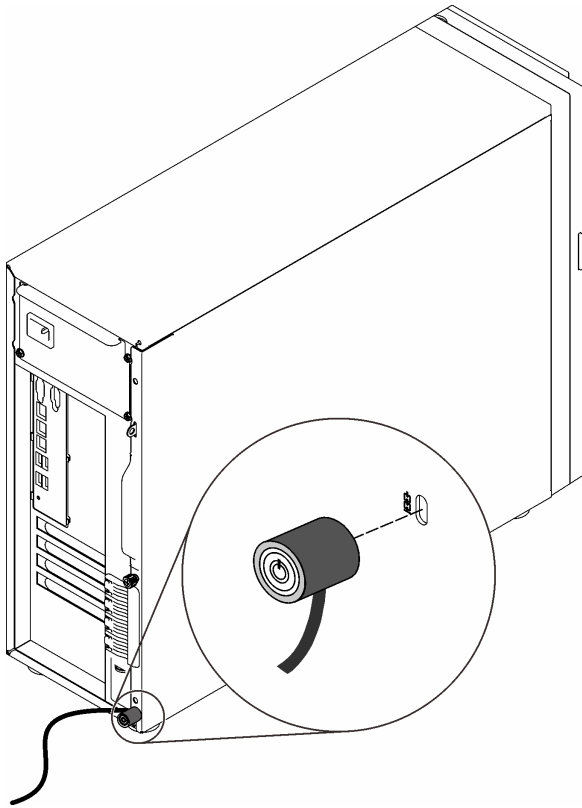


Figure 20. Kensington-style cable lock

### Front door lock

You can remove the key attached on the rear of the server and use it 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.

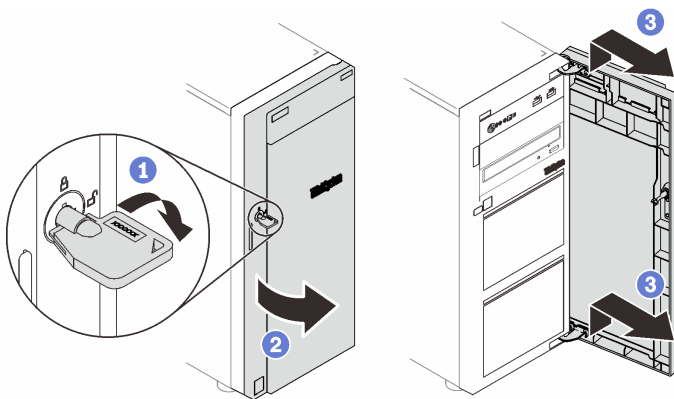


Figure 21. Front door lock

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## Internal cable routing

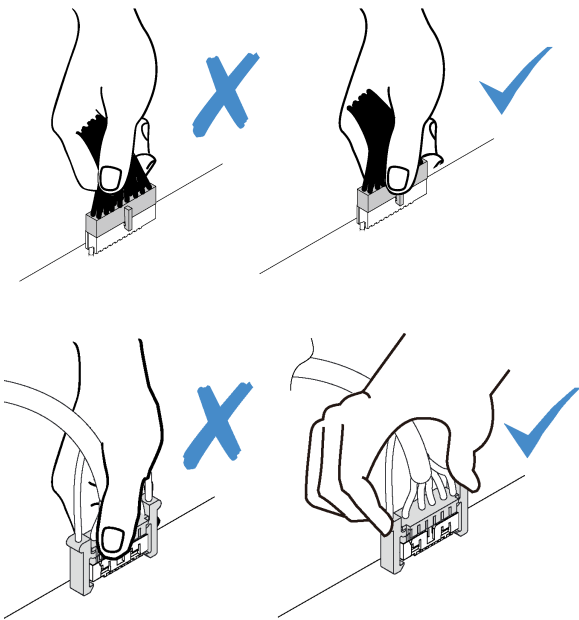
Some of the components in the server come with internal cables meant for specific connectors.

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. Any damage to the cable sockets might require replacing the system board.



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.

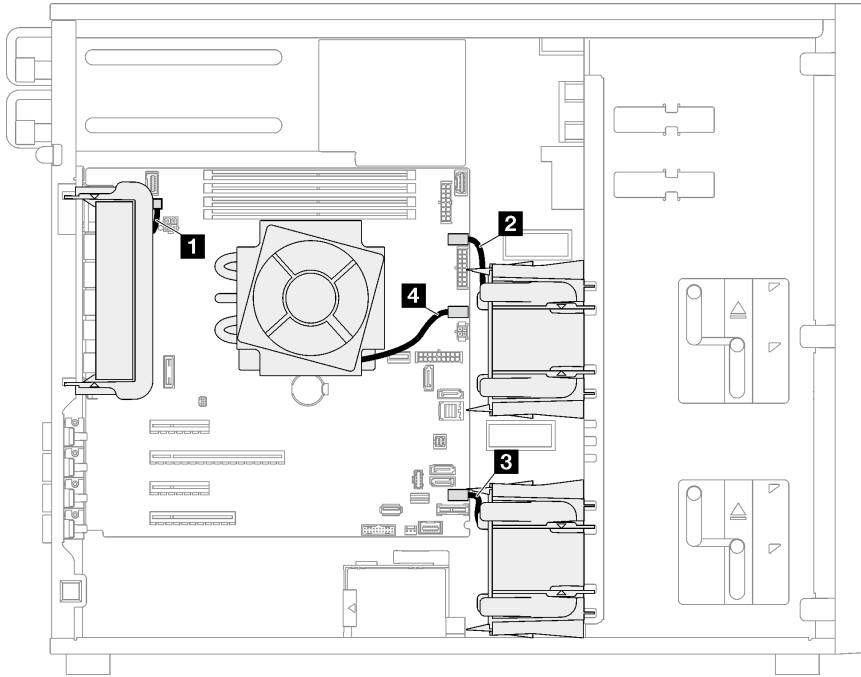


Figure 22. Fan power cable routing

Table 20. Location of fan power connectors on the system board

|          | From               | To                            |
|----------|--------------------|-------------------------------|
| <b>1</b> | Rear system fan    | Rear fan connector            |
| <b>2</b> | Front system fan 1 | Fan 1 connector for front fan |
| <b>3</b> | Front system fan 2 | Fan 4 connector for front fan |
| <b>4</b> | Heat sink fan      | Fan 2 connector for processor |

## 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.

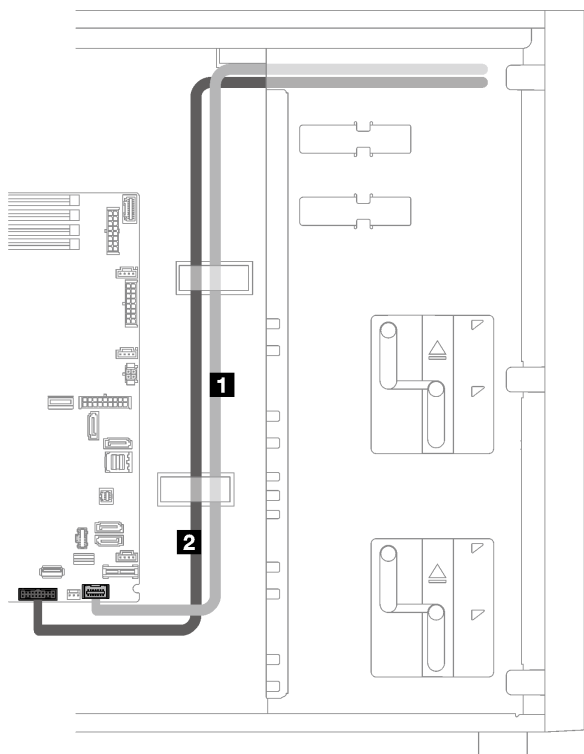


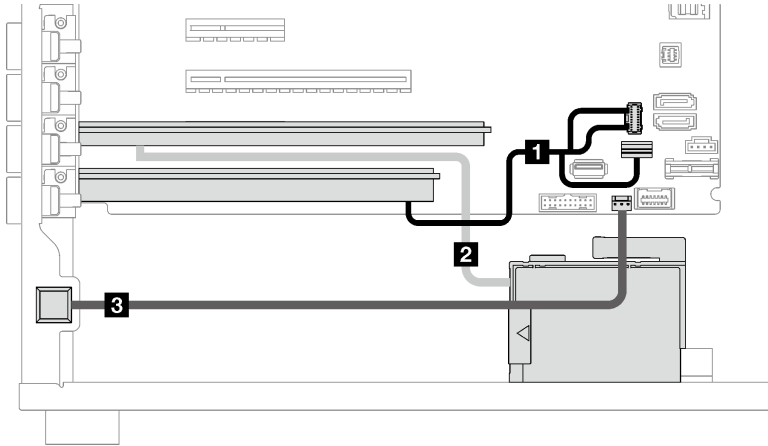
Figure 23. Cable routing for the front panel

| Cable                                     | From        | To  |
|---|-------------|---|
| <b>1</b> Operator-information-panel cable | Front panel | Front-panel connector on the system board |
| <b>2</b> USB cable                        | Front panel | Front USB connector on the system board   |

## M.2 adapter, intrusion switch, and RAID flash power module

Use this section to understand the cable routing for M.2 adapter, intrusion switch, and RAID flash power module.

•

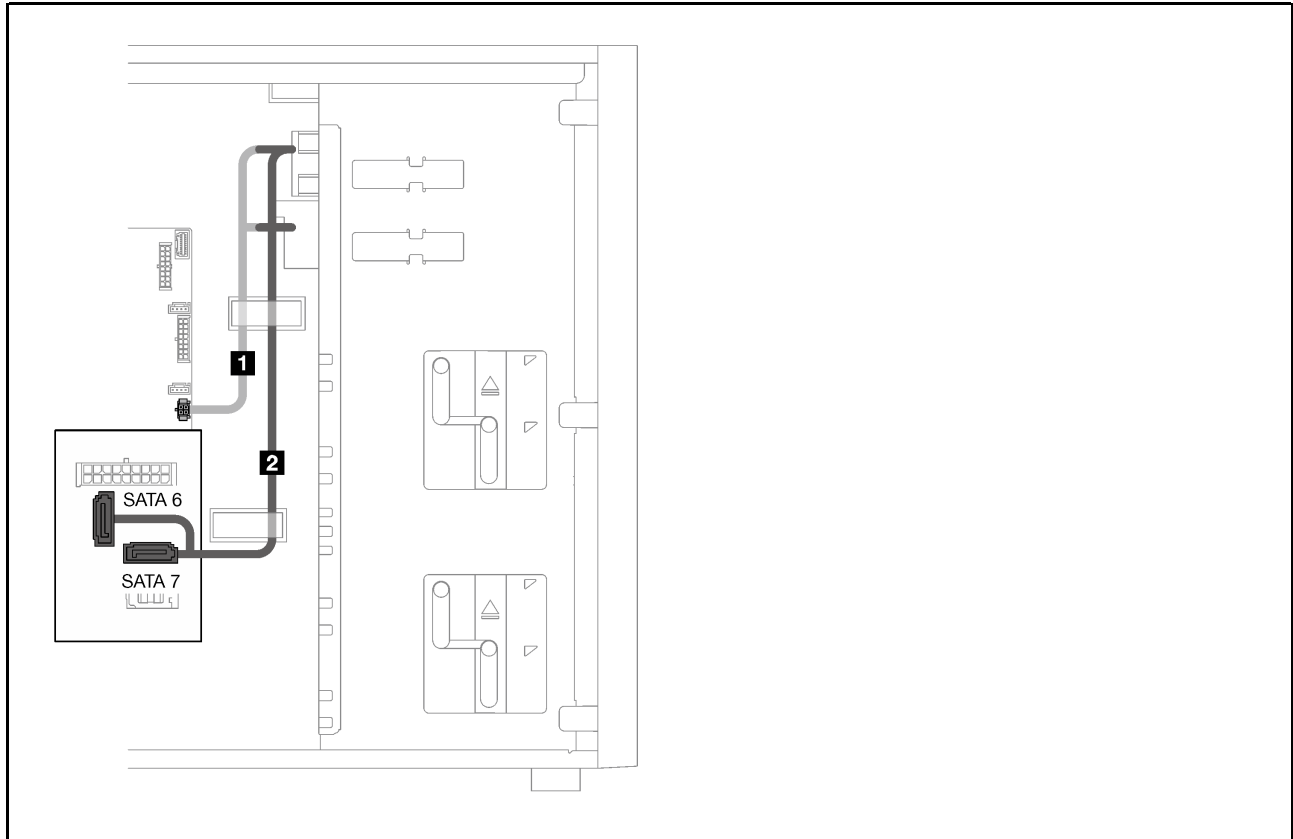


| Cable                                  | From   | To   |
|--|--|--|
| <b>1</b> M.2 cable                     | M.2 adapter                                      | M.2 signal and power connector on the system board |
| <b>2</b> RAID flash power module cable | Flash power module connector on the RAID adapter | RAID Flash power module                            |
| <b>3</b> Intrusion switch cable        | Intrusion switch                                 | Intrusion switch connector on the system board     |

## Optical/tape drives

Use this section to understand the cable routing for server models with optical/tape drives.





|          | From                            | To   |
|----------|---------------------------------|--|
| <b>1</b> | ODD/Tape drive power connectors | ODD/tape drive power connector on the system board |
| <b>2</b> | ODD/Tape drive SATA connectors  | SATA 6, 7  |

## Fixed power supply

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

### Notes:

- Ensure that all cables are routed through the correct cable clips.
- As the processor power connectors on the power distribution board may look similar in appearance, make sure that the **2** power supply processor power cable and **3** processor power cable are routed correctly as illustrated.

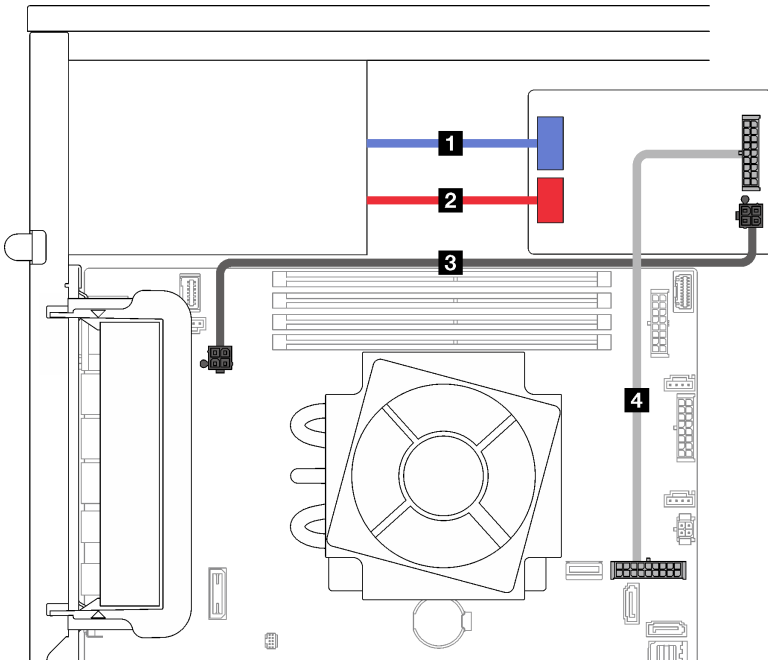


Figure 24. Cable routing for the fixed power supply

| Cable                                       | From (power distribution board)        | To  |
|---|--|---|
| <b>1</b> Power supply system power cable    | Power supply system power connector    | System power connector on the fixed power supply    |
| <b>2</b> Power supply processor power cable | Power supply processor power connector | Processor power connector on the fixed power supply |
| <b>3</b> Processor power cable              | Processor power connector              | Processor power connector on the system board       |
| <b>4</b> System power cable                 | System power connector                 | System power connector on the system board          |

## Redundant power supplies

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

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

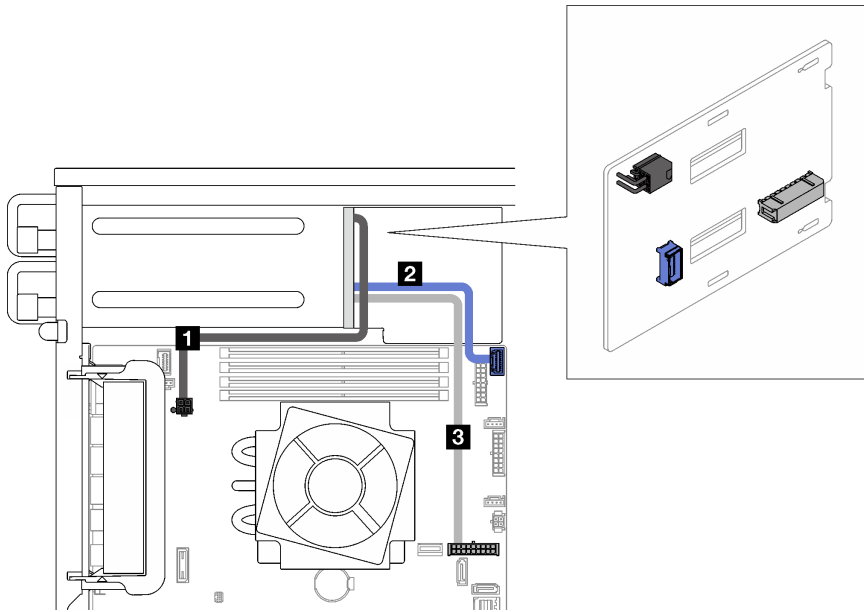


Figure 25. Cable routing for the redundant power supplies

| Cable                          | From (power distribution board) | To   |
|--------------------------------|---------------------------------|--|
| <b>1</b> Processor power cable | Processor power connector       | Processor power connector on the system board                    |
| <b>2</b> Side band connector   | Side band connector             | Power distribution board side band connector on the system board |
| <b>3</b> Power cable           | System power connector          | System power connector on the system board                       |

## Simple-swap drives

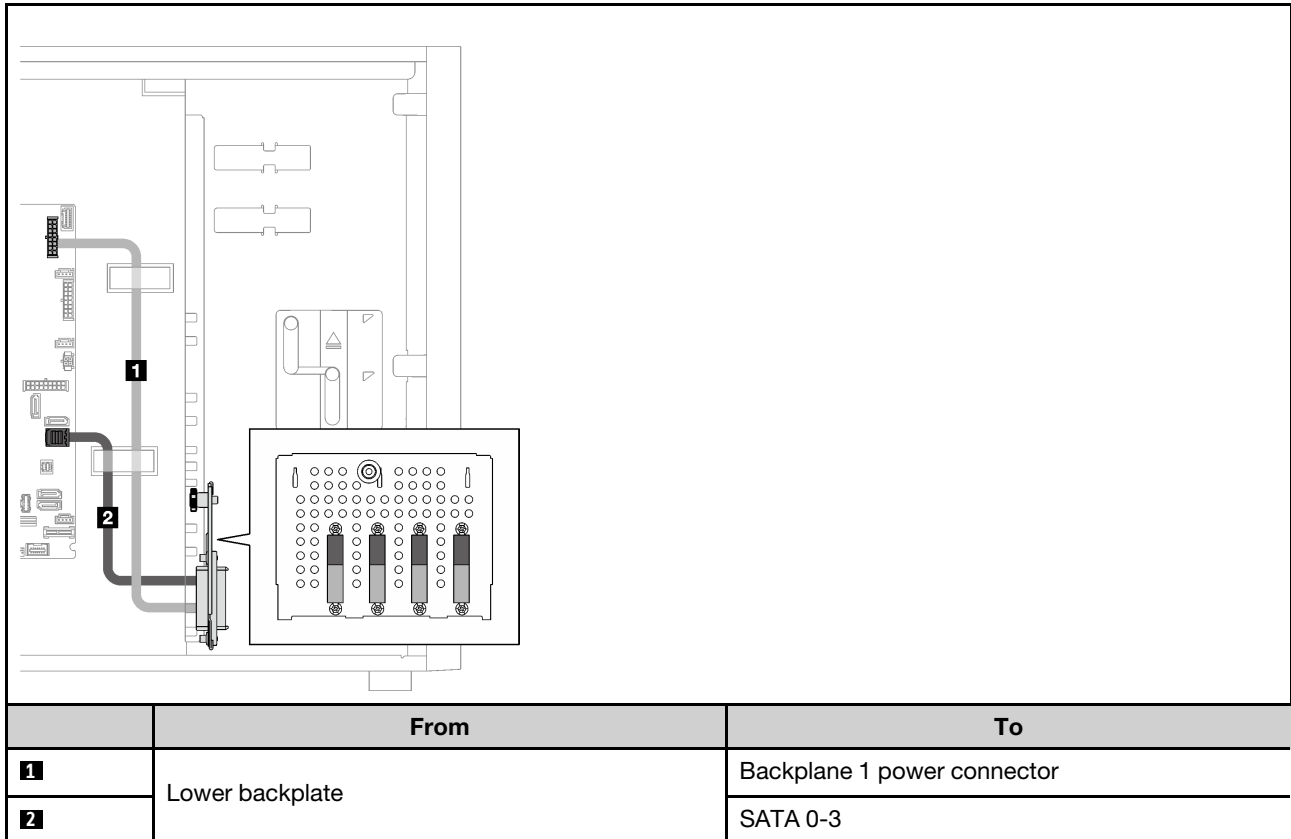
Use this section to understand the cable routing for server models with simple-swap drives.

See the configuration that is applied to the server.

- “Four 3.5-inch SATA drives” on page
- “Eight 3.5-inch SATA drives” on page 45
- “Seven SATA drives and one NVMe drive” on page 46
- “Six 3.5-inch SATA drives with ODD/tape drives” on page

### Four 3.5-inch simple-swap drives

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



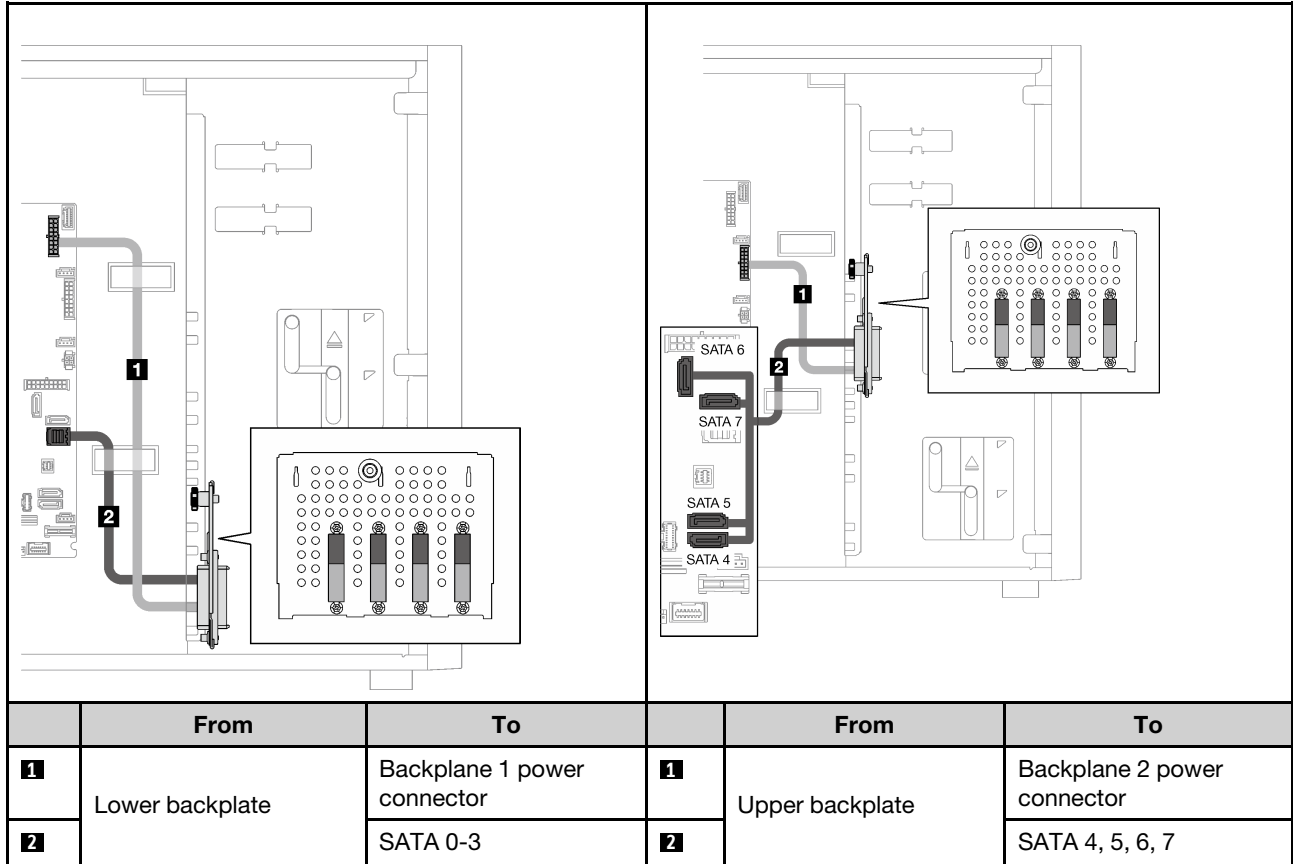
## Eight 3.5-inch simple-swap drives

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

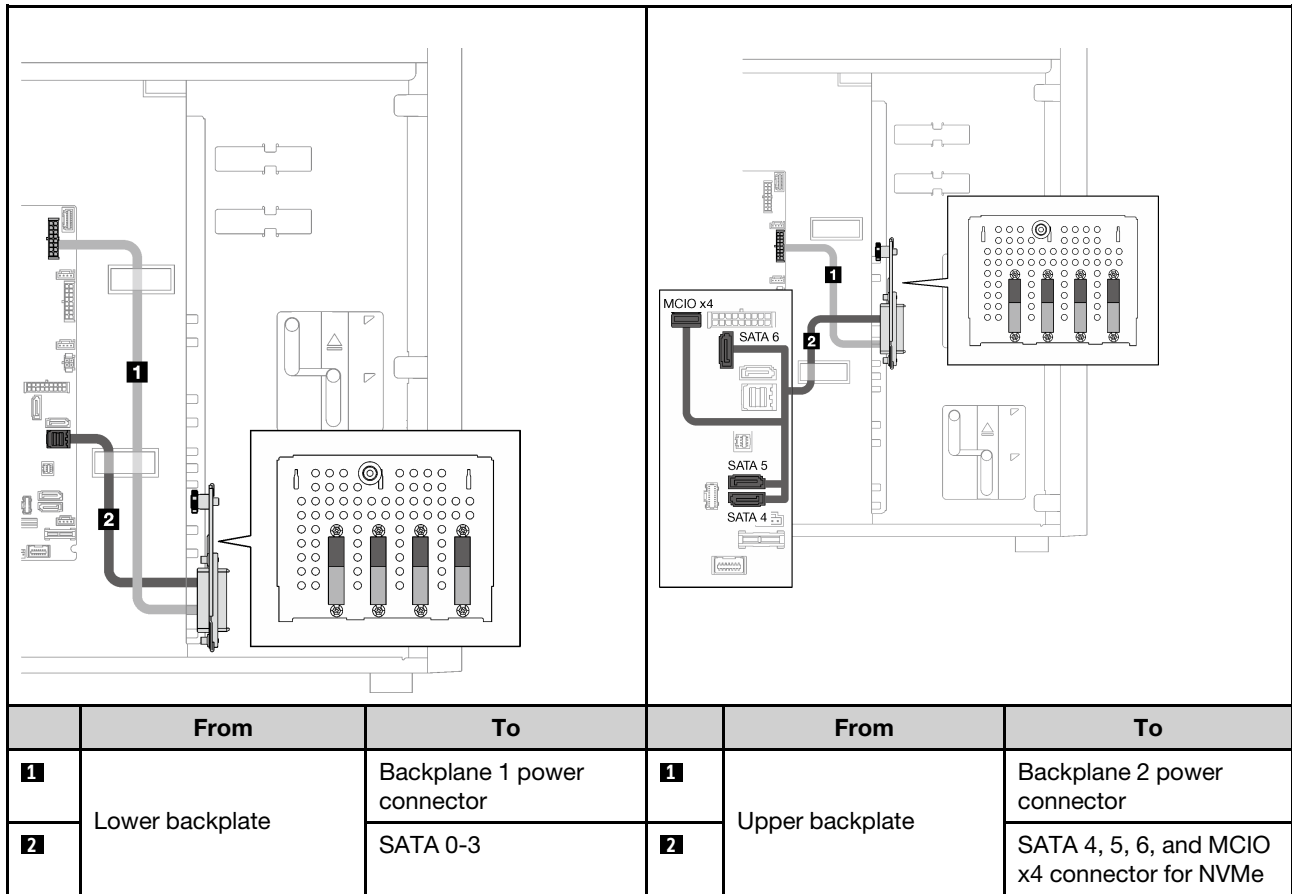
Following are the options available for this configuration:

- “Eight SATA drives” on page 45
- “Seven SATA drives and one NVMe drive” on page 46

### Eight SATA drives

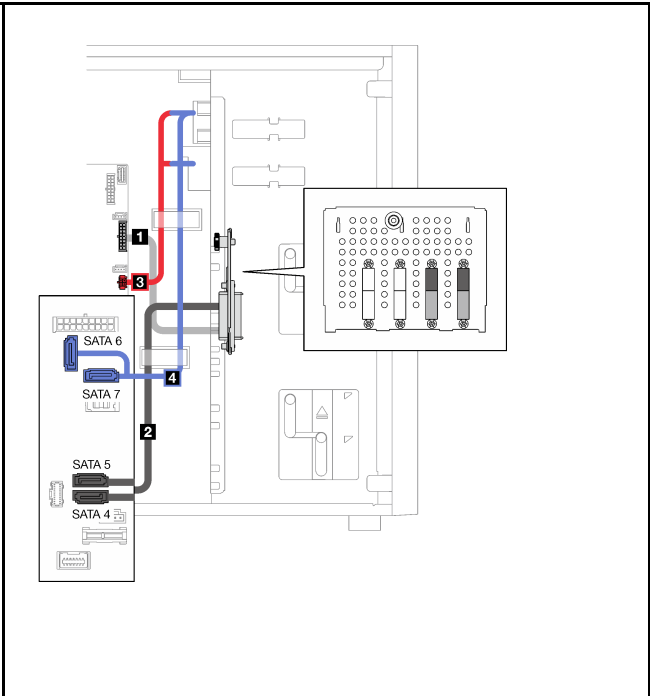
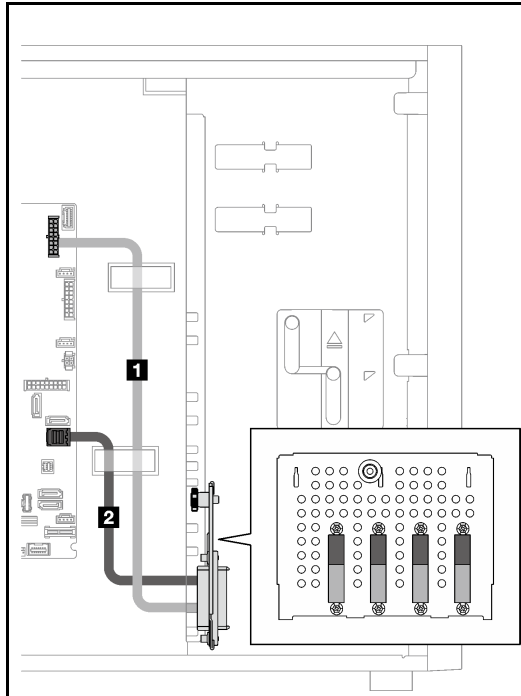


### Seven SATA drives and one NVMe drive



### Six 3.5-inch simple-swap drives with ODD/tape drives

Use this section to understand the cable routing for server models with six 3.5-inch simple-swap drives and ODD/tape drives (software RAID).



|          | From            | To                          |          | From                            | To   |
|----------|-----------------|-----------------------------|----------|---------------------------------|--|
| <b>1</b> | Lower backplate | Backplane 1 power connector | <b>1</b> | Upper backplate                 | Backplane 2 power connector                        |
| <b>2</b> |                 | SATA 0-3                    | <b>2</b> |                                 | SATA 4, 5  |
|          |                 |                             | <b>3</b> | ODD/Tape drive power connectors | ODD/tape drive power connector on the system board |
|          |                 |                             | <b>4</b> | ODD/Tape drive SATA connectors  | SATA 6, 7  |

## Hot-swap drives

Use this section to understand the cable routing for server models with hot-swap drives.

See the configuration that is applied to the server.

- Software RAID
  - “Four 3.5-inch drives” on page 49
  - “Eight 3.5-inch drives” on page 51
  - “Eight 2.5-inch drives” on page 53
- Hardware RAID
  - “Four 3.5-inch drives with one 8i RAID adapter” on page 50
  - “Eight 3.5-inch drives with one 8i RAID adapter” on page 52
  - “Eight 2.5-inch drives with one 8i RAID adapter” on page 54
  - “Sixteen 2.5-inch drives with one 16i RAID adapter” on page 55
  - “Sixteen 2.5-inch drives with two 8i RAID adapters” on page 56
  - “Four 3.5-inch and eight 2.5-inch drives with one 16i RAID adapter” on page 57
  - “Four 3.5-inch and eight 2.5-inch drives with two 8i RAID adapters” on page 58

### Four 3.5-inch hot-swap drives

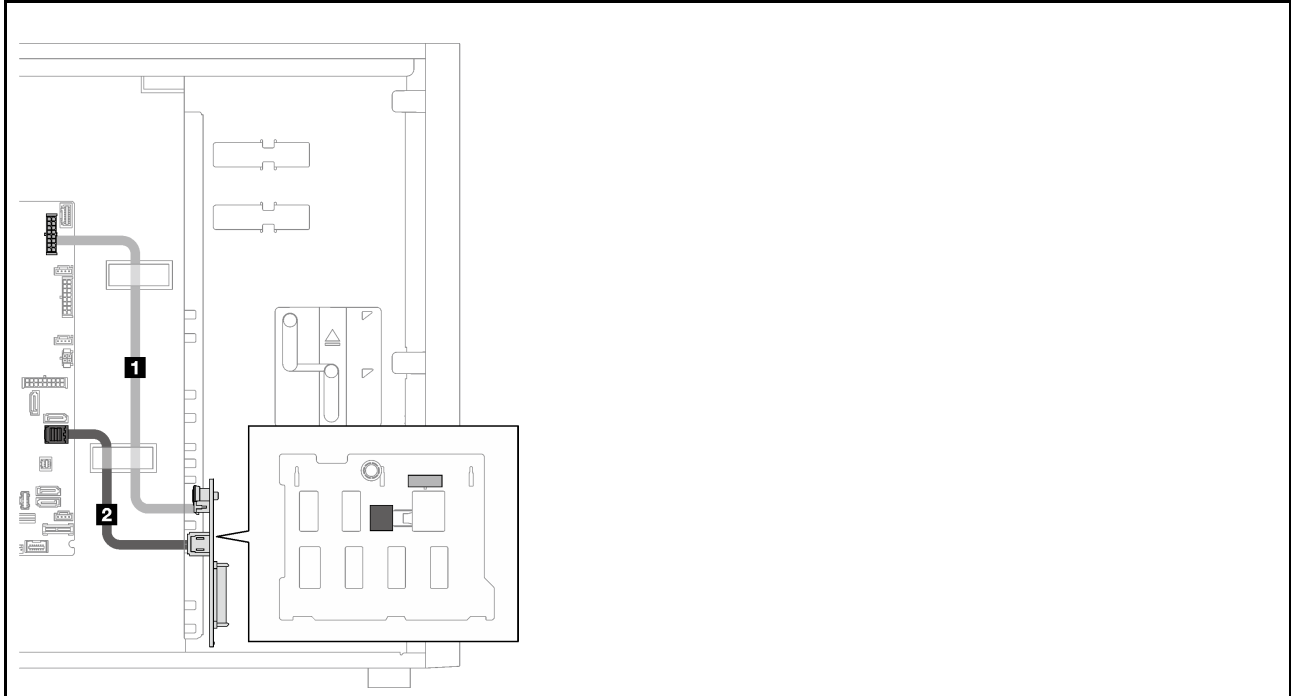
Use this section to understand the cable routing for server models with four 3.5-inch hot-swap drives.

Following are the options available for this configuration:

- “Software RAID” on page 49
- “One 8i RAID adapter” on page 50

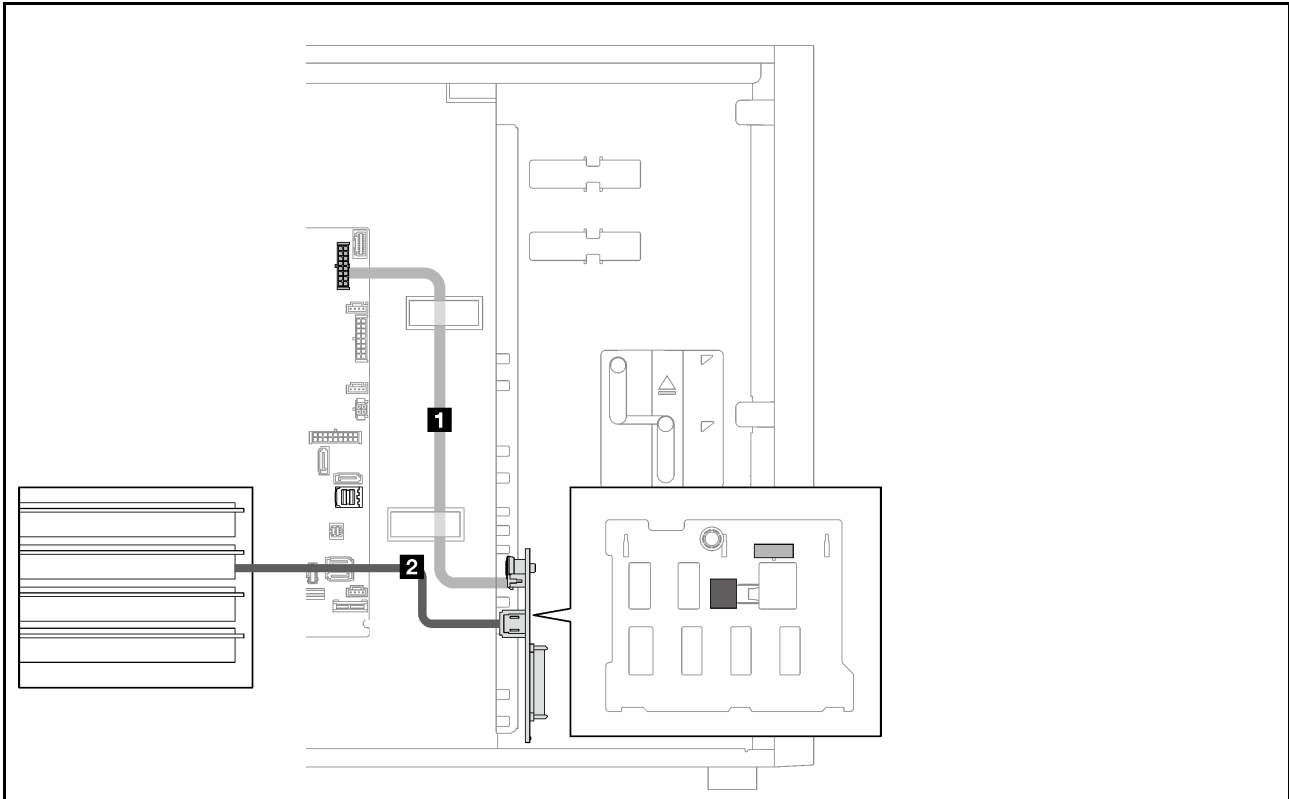


## Software RAID



|          | From                               | To                          |
|----------|------------------------------------|-----------------------------|
| <b>1</b> | Lower backplane power connector    | Backplane 1 power connector |
| <b>2</b> | Lower backplane SAS/SATA connector | SATA 0-3                    |

## One 8i RAID adapter



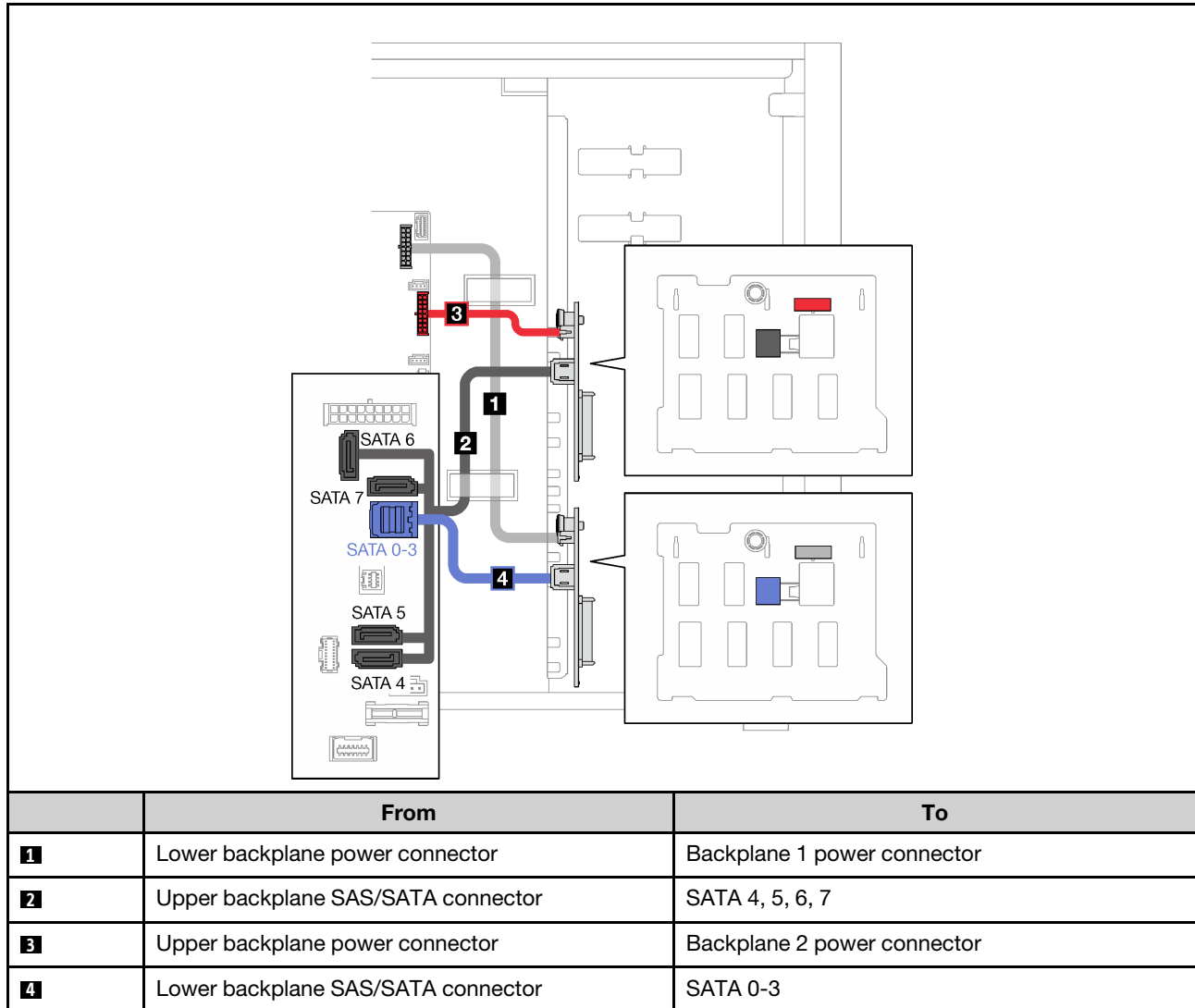
|          | From                               | To                          |
|----------|------------------------------------|-----------------------------|
| <b>1</b> | Lower backplane power connector    | Backplane 1 power connector |
| <b>2</b> | Lower backplane SAS/SATA connector | C0                          |

## Eight 3.5-inch hot-swap drives

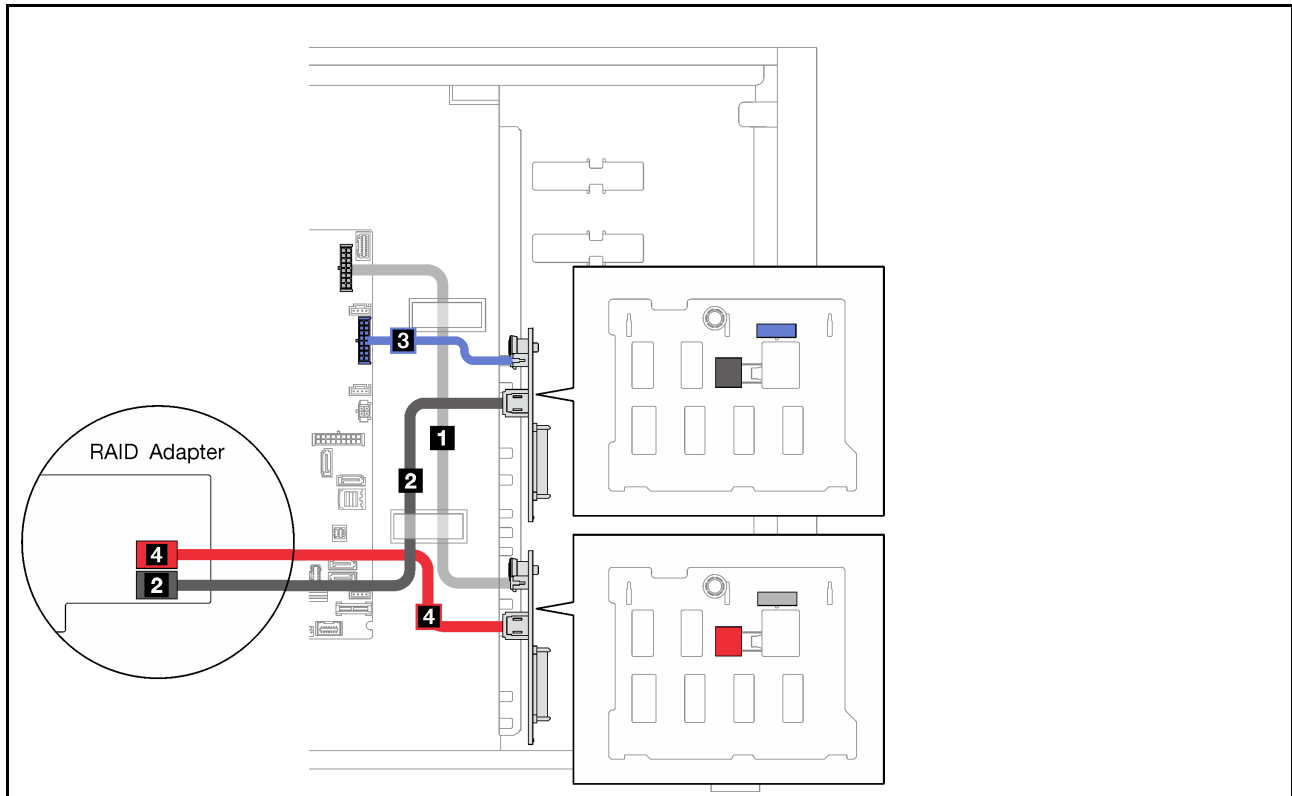
Use this section to understand the cable routing for server models with eight 3.5-inch hot-swap drives.

- “Software RAID” on page 51
- “One 8i RAID adapter” on page 52

### Software RAID



## One 8i RAID adapter



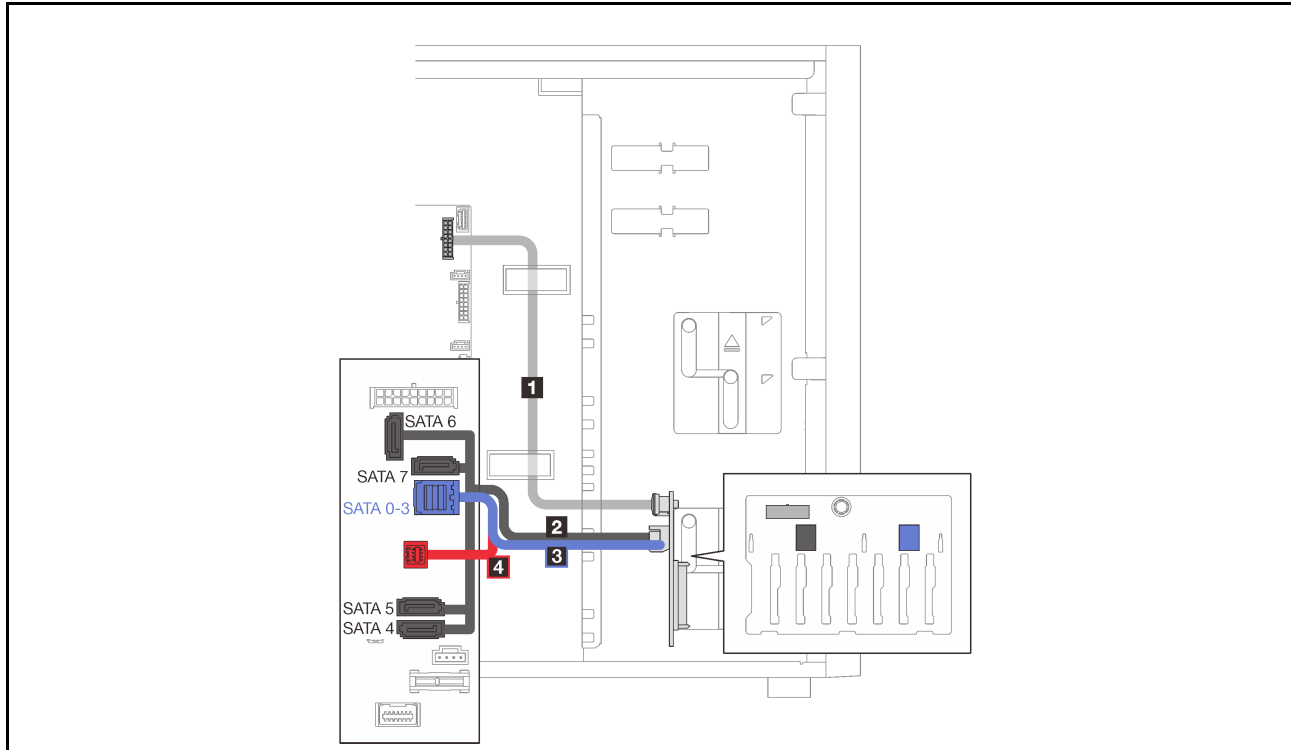
|          | From                               | To                          |
|----------|------------------------------------|-----------------------------|
| <b>1</b> | Lower backplane power connector    | Backplane 1 power connector |
| <b>2</b> | Upper backplane SAS/SATA connector | X350-8i: C1                 |
| <b>3</b> | Upper backplane power connector    | Backplane 2 power connector |
| <b>4</b> | Lower backplane SAS/SATA connector | C0                          |

## Eight 2.5-inch hot-swap drives

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

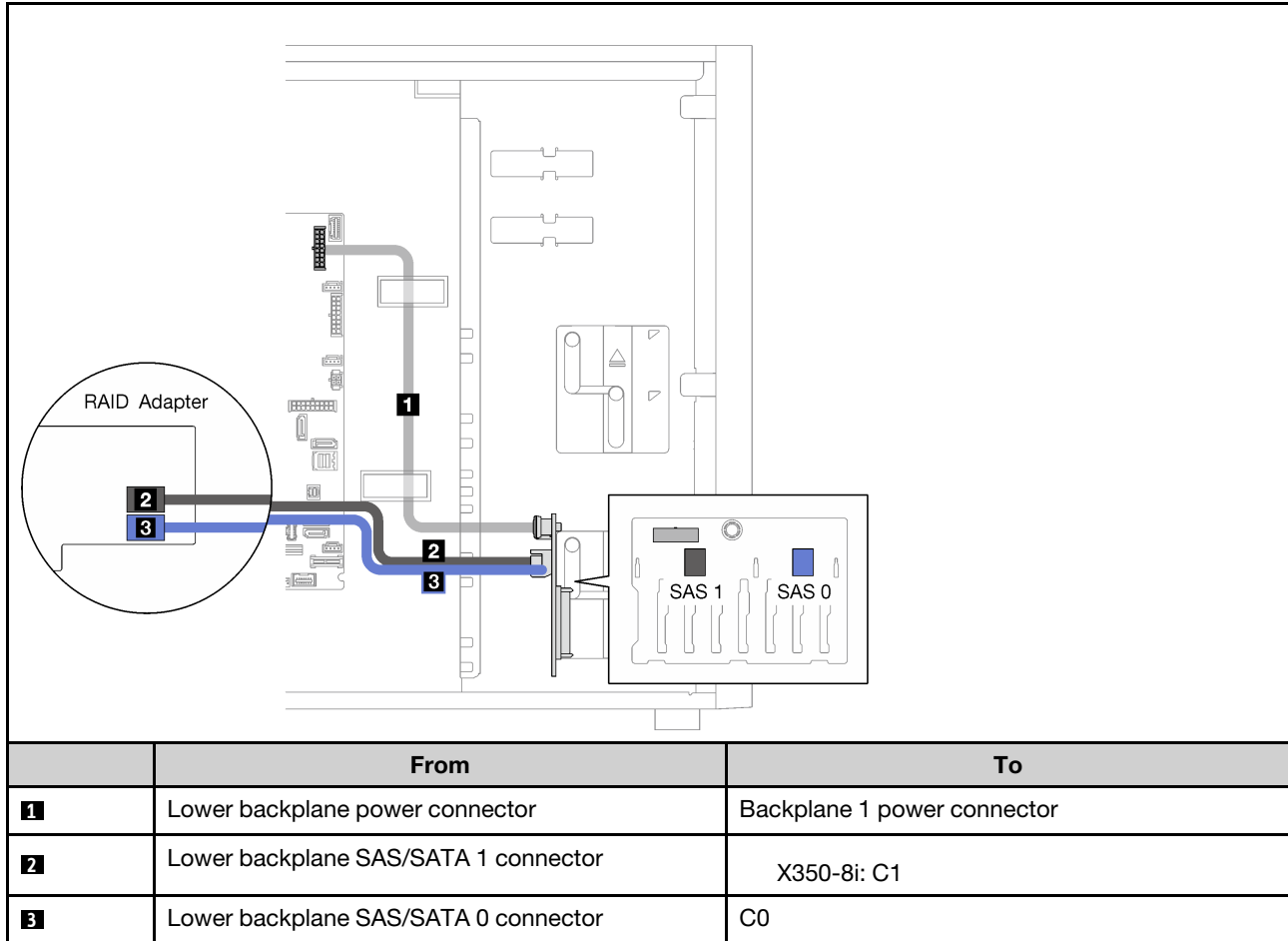
- “Software RAID” on page 53
- “One 8i RAID adapter” on page 54

## Software RAID



|          | From                                 | To                          |
|----------|--------------------------------------|-----------------------------|
| <b>1</b> | Lower backplane power connector      | Backplane 1 power connector |
| <b>2</b> | Lower backplane SAS/SATA 1 connector | SATA 4, 5, 6, 7             |
| <b>3</b> | Lower backplane SAS/SATA 0 connector | SATA 0-3                    |
| <b>4</b> | Lower backplane                      | SGPIO1 connector            |

## One 8i RAID adapter

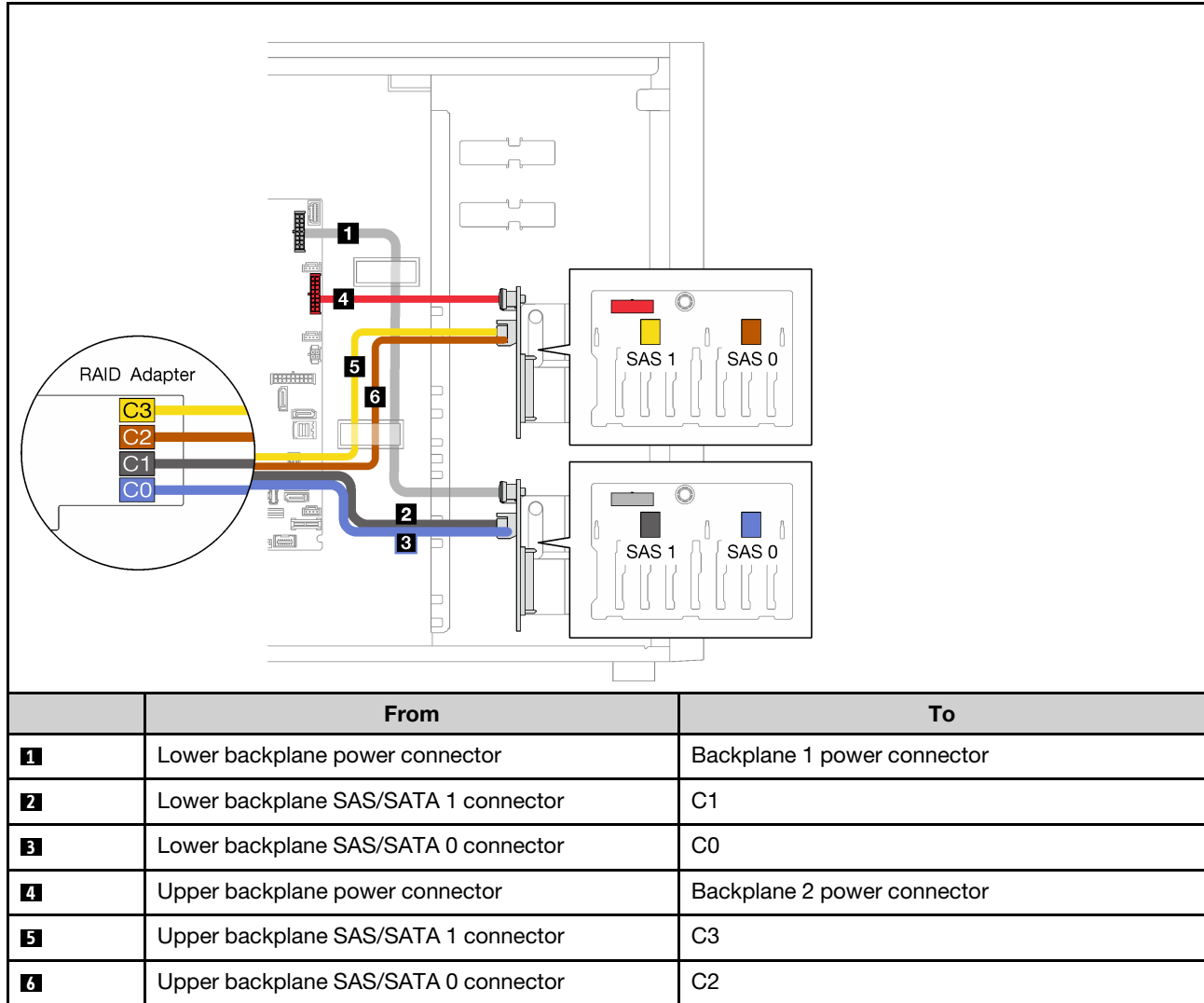


## Sixteen 2.5-inch hot-swap drives

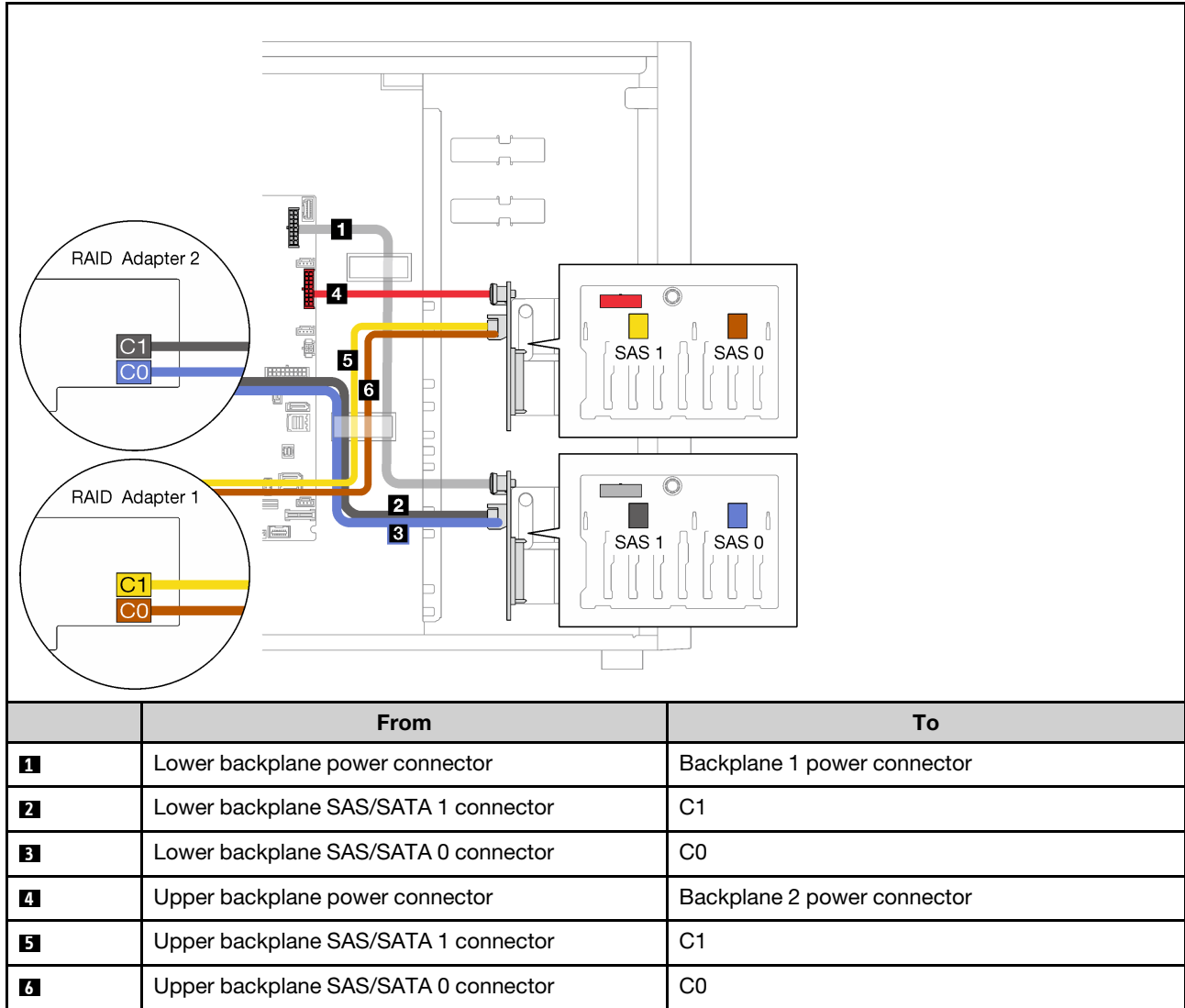
Use this section to understand the cable routing for server models with sixteen 2.5-inch hot-swap drives.

- “One 9350-16i RAID adapter” on page 55
- “Two 4350/5350-8i RAID adapters” on page 56

## One 9350-16i RAID adapter



## Two 4350/5350-8i RAID adapters



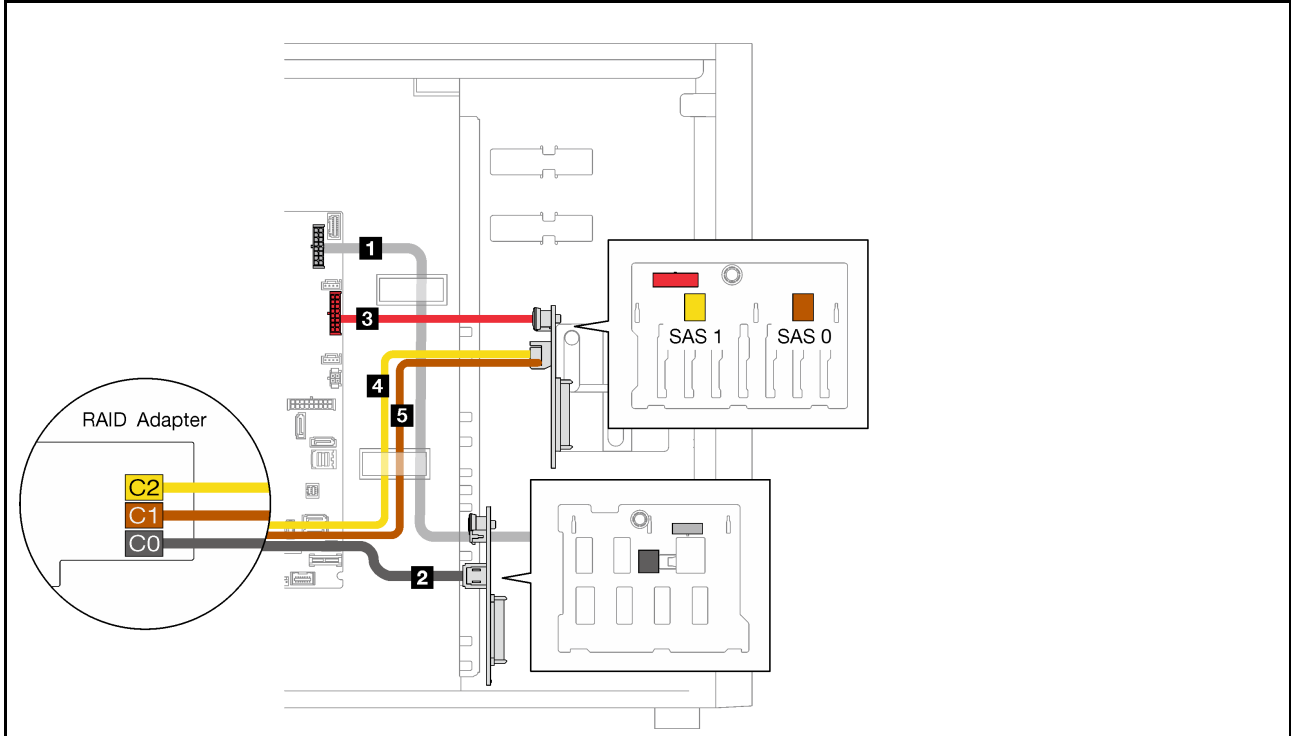
## Four 3.5-inch and eight 2.5-inch hot-swap drives

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

- “One 9350-16i RAID adapter” on page 57
- “Two 4350/5350-8i RAID adapters” on page 58

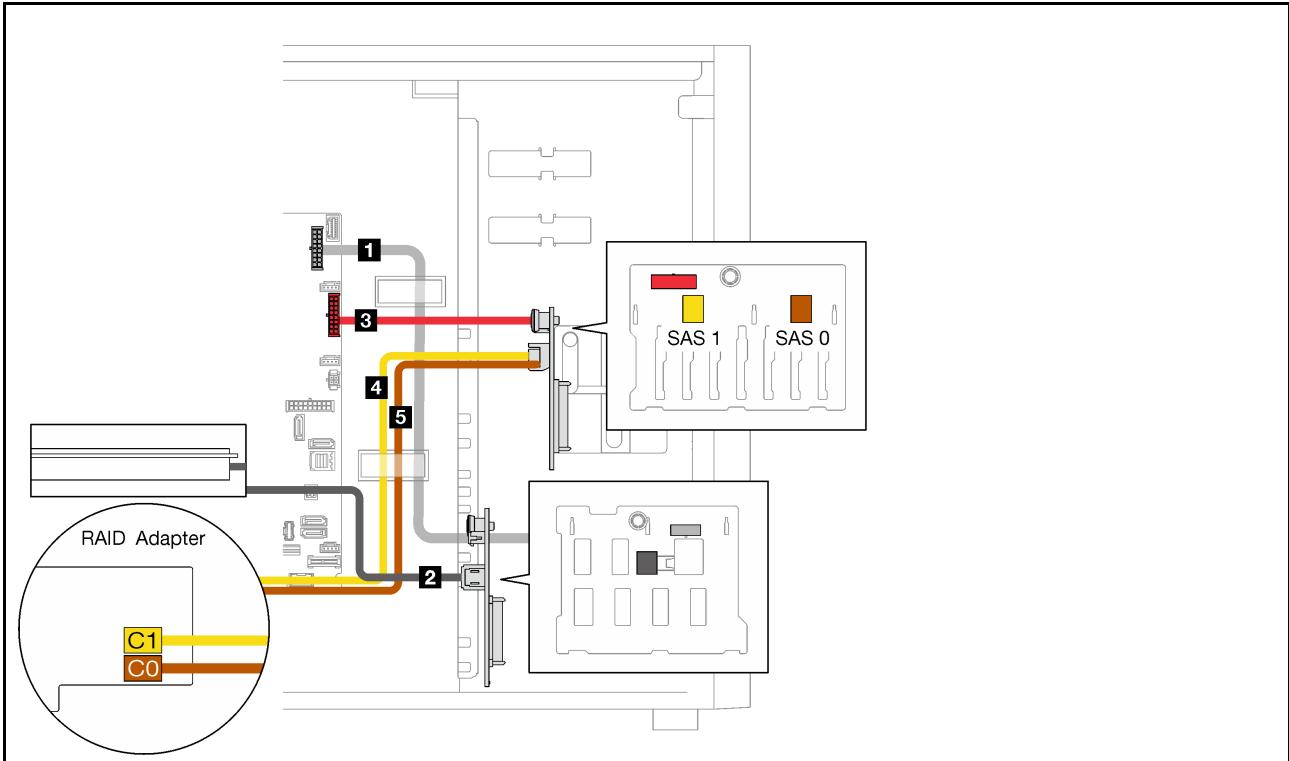


One 9350-16i RAID adapter



|          | From                                 | To                          |
|----------|--------------------------------------|-----------------------------|
| <b>1</b> | Lower backplane power connector      | Backplane 1 power connector |
| <b>2</b> | Lower backplane SAS/SATA connector   | C0                          |
| <b>3</b> | Upper backplane power connector      | Backplane 2 power connector |
| <b>4</b> | Upper backplane SAS/SATA 1 connector | C2                          |
| <b>5</b> | Upper backplane SAS/SATA 0 connector | C1                          |

## Two 4350/5350-8i RAID adapters



|          | From                                 | To                          |
|----------|--------------------------------------|-----------------------------|
| <b>1</b> | Lower backplane power connector      | Backplane 1 power connector |
| <b>2</b> | Lower backplane SAS/SATA connector   | C0, Slot 2                  |
| <b>3</b> | Upper backplane power connector      | Backplane 2 power connector |
| <b>4</b> | Upper backplane SAS/SATA 1 connector | C1, Slot 4                  |
| <b>5</b> | Upper backplane SAS/SATA 0 connector | C0, Slot 4                  |

## 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 26 “Server components” on page 59:

<http://datacentersupport.lenovo.com/us/en/products/servers/thinksystem/st250v2/7D8F/parts>

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

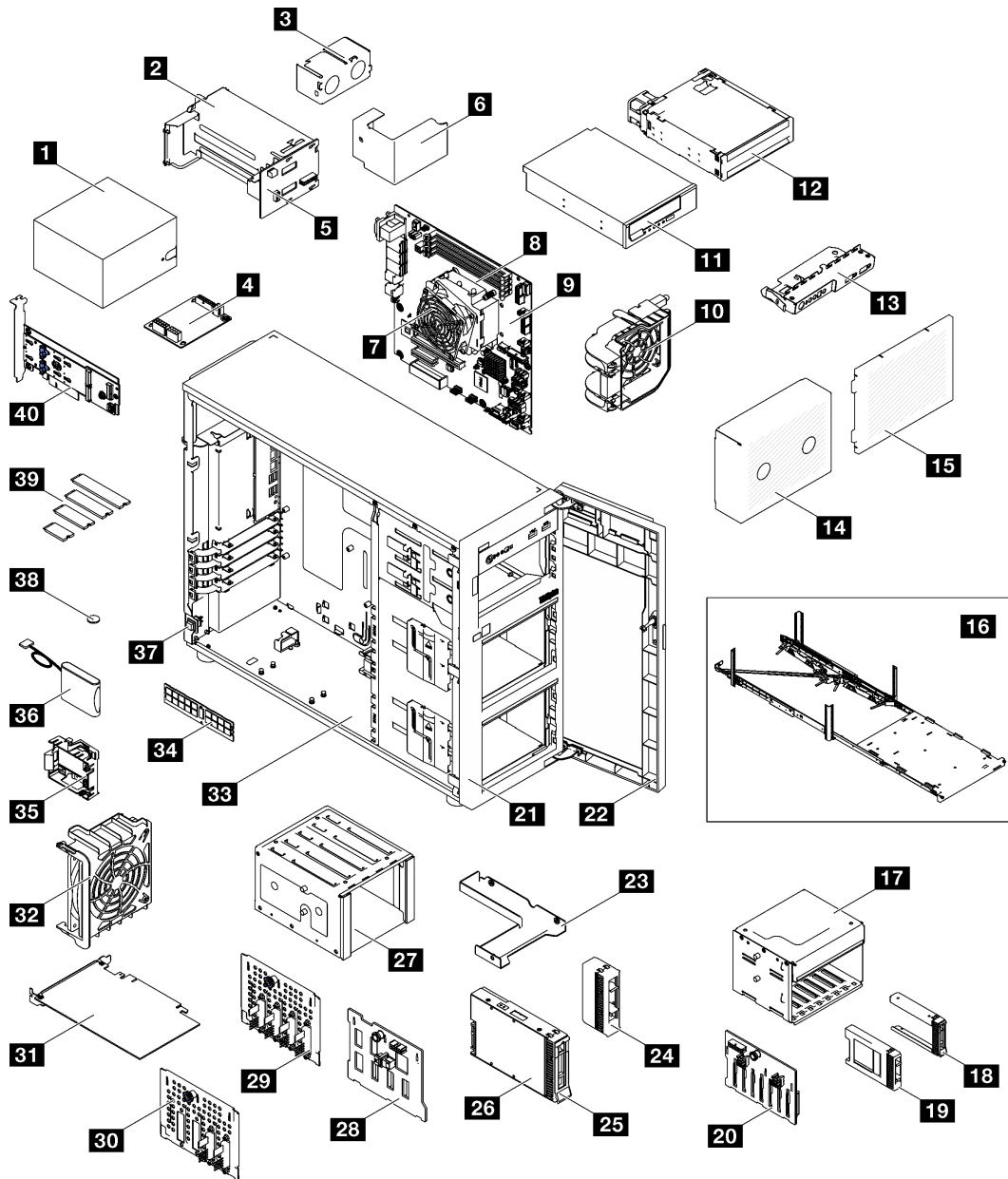


Figure 26. Server components

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 21. Parts listing

| Index   | Description  | Tier 1 CRU | Tier 2 CRU | FRU | Consumable and Structural parts |
|---|--|------------|------------|-----|---------------------------------|
| For more information about ordering the parts shown in Figure 26 “Server components” on page 59:<br><a href="http://datacentersupport.lenovo.com/us/en/products/servers/thinksystem/st250v2/7D8F/parts">http://datacentersupport.lenovo.com/us/en/products/servers/thinksystem/st250v2/7D8F/parts</a> |  |            |            |     |                                 |
| <b>1</b>  | Fixed power supply                                   | √          |            |     |                                 |
| <b>2</b>  | Hot-swap power supply                                | √          |            |     |                                 |
| <b>3</b>  | Hot-swap power supply filler                         |            |            |     | √                               |
| <b>4</b>  | Power distribution board for fixed power supply      |            |            |     | √                               |
| <b>5</b>  | Power distribution board for hot-swap power supplies |            | √          |     |                                 |
| <b>6</b>  | Power distribution board cover                       | √          |            |     |                                 |
| <b>7</b>  | Heat sink and fan                                    |            |            | √   |                                 |
| <b>8</b>  | Processor  |            |            | √   |                                 |
| <b>9</b>  | System board   |            | √          |     |                                 |
| <b>10</b>   | Front system fan                                     | √          |            |     |                                 |
| <b>11</b>   | 5.25-inch LTO/RDX tape drive                         | √          |            |     |                                 |
| <b>12</b>   | 5.25-inch optical disk drive                         |            |            | √   |                                 |
| <b>13</b>   | Front panel board assembly                           | √          |            |     |                                 |
| <b>14</b>   | Drive cage filler                                    |            |            |     | √                               |
| <b>15</b>   | Drive cage cover                                     |            | √          |     |                                 |
| <b>16</b>   | Tower-to-rack conversion kit                         | √          |            |     |                                 |
| <b>17</b>   | 2.5-inch drive cage                                  | √          |            |     |                                 |
| <b>18</b>   | 2.5-inch drive filler                                | √          |            |     |                                 |
| <b>19</b>   | 2.5-inch drive                                       | √          |            |     |                                 |
| <b>20</b>   | 2.5-inch hot-swap drive backplane                    |            | √          |     |                                 |
| <b>21</b>   | Front bezel  |            |            | √   |                                 |
| <b>22</b>   | Front door   | √          |            |     |                                 |
| <b>23</b>   | 2.5-inch to 3.5-inch drive adapter                   | √          |            |     |                                 |
| <b>24</b>   | 3.5-inch drive filler                                | √          |            |     |                                 |
| <b>25</b>   | 3.5-inch drive carrier                               |            |            | √   |                                 |
| <b>26</b>   | 3.5-inch drive                                       | √          |            |     |                                 |
| <b>27</b>   | 3.5-inch drive cage                                  |            |            | √   |                                 |
| <b>28</b>   | 3.5-inch hot-swap drive backplane                    |            | √          |     |                                 |

Table 21. Parts listing (continued)

| Index | Description                                   | Tier 1 CRU | Tier 2 CRU | FRU | Consumable and Structural parts |
|-------|---|------------|------------|-----|---------------------------------|
| 29    | 3.5-inch simple-swap drive backplate          |            |            | √   |                                 |
| 30    | 3.5-inch simple-swap drive backplate with ODD |            |            | √   |                                 |
| 31    | PCIe adapter                                  | √          |            |     |                                 |
| 32    | Rear system fan                               | √          |            |     |                                 |
| 33    | Chassis                                       | √          |            |     |                                 |
| 34    | Memory module                                 | √          |            |     |                                 |
| 35    | RAID flash power module holder                |            |            |     | √                               |
| 36    | RAID flash power module                       | √          |            |     |                                 |
| 37    | Intrusion switch                              |            | √          |     |                                 |
| 38    | CMOS battery (CR2032)                         | √          |            |     |                                 |
| 39    | M.2 drive                                     | √          |            |     |                                 |
| 40    | M.2 boot adapter                              |            | √          |     |                                 |

## 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.

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## Chapter 3. Internal cable routing

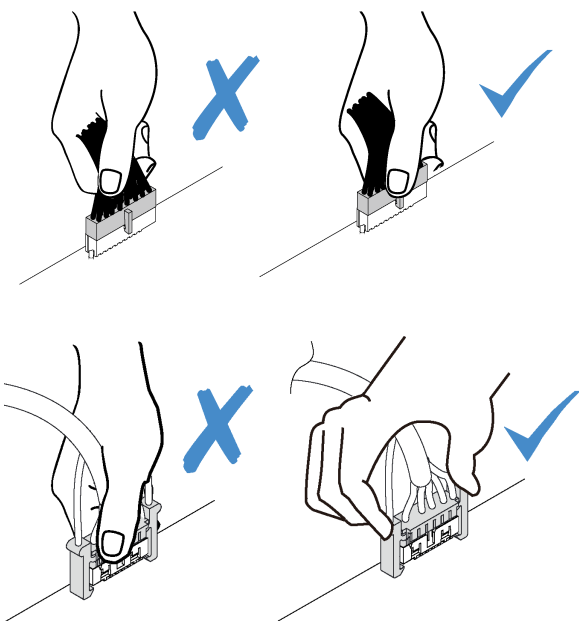
Some of the components in the server come with internal cables meant for specific connectors.

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. Any damage to the cable sockets might require replacing the system board.



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.

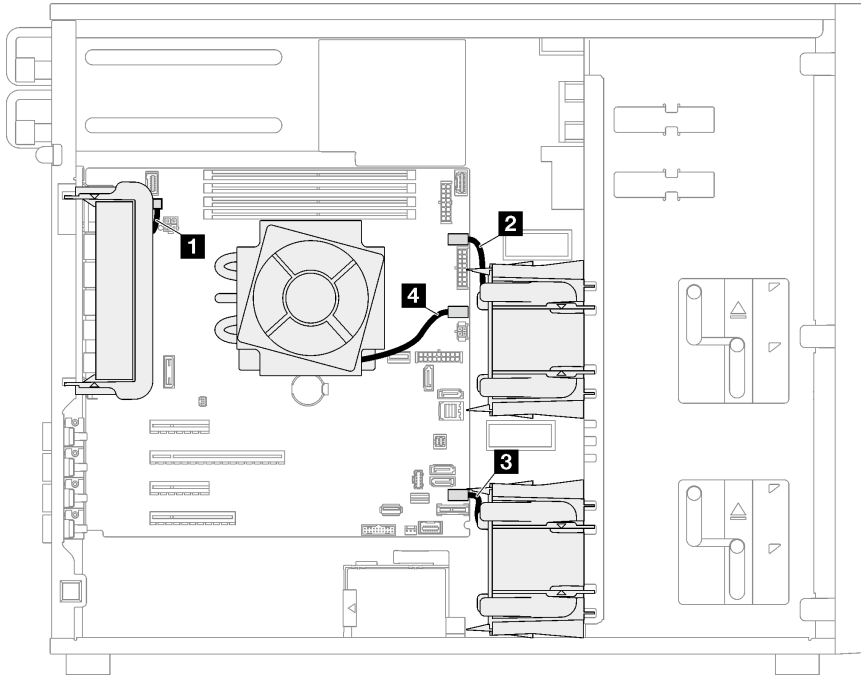


Figure 27. Fan power cable routing

Table 22. Location of fan power connectors on the system board

|          | From               | To                            |
|----------|--------------------|-------------------------------|
| <b>1</b> | Rear system fan    | Rear fan connector            |
| <b>2</b> | Front system fan 1 | Fan 1 connector for front fan |
| <b>3</b> | Front system fan 2 | Fan 4 connector for front fan |
| <b>4</b> | Heat sink fan      | Fan 2 connector for processor |

## 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.



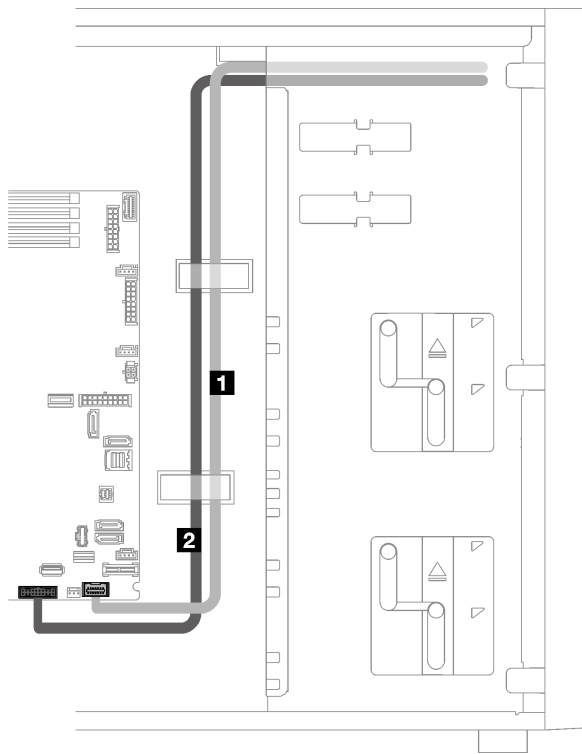


Figure 28. Cable routing for the front panel

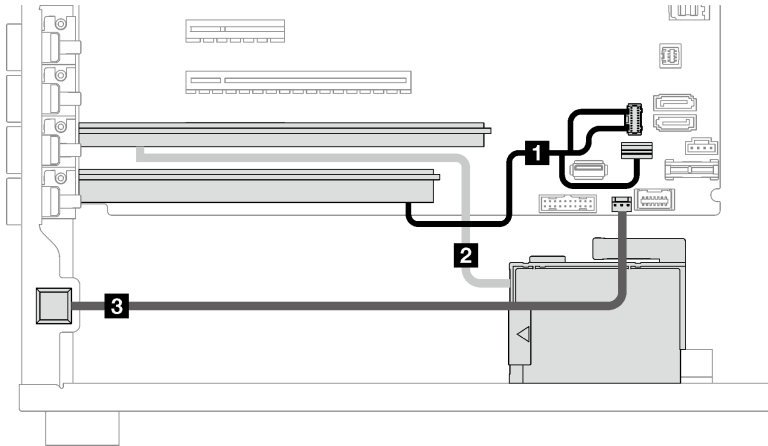
| Cable                                     | From        | To  |
|---|-------------|---|
| <b>1</b> Operator-information-panel cable | Front panel | Front-panel connector on the system board |
| <b>2</b> USB cable                        | Front panel | Front USB connector on the system board   |

---

## M.2 adapter, intrusion switch, and RAID flash power module

Use this section to understand the cable routing for M.2 adapter, intrusion switch, and RAID flash power module.

•

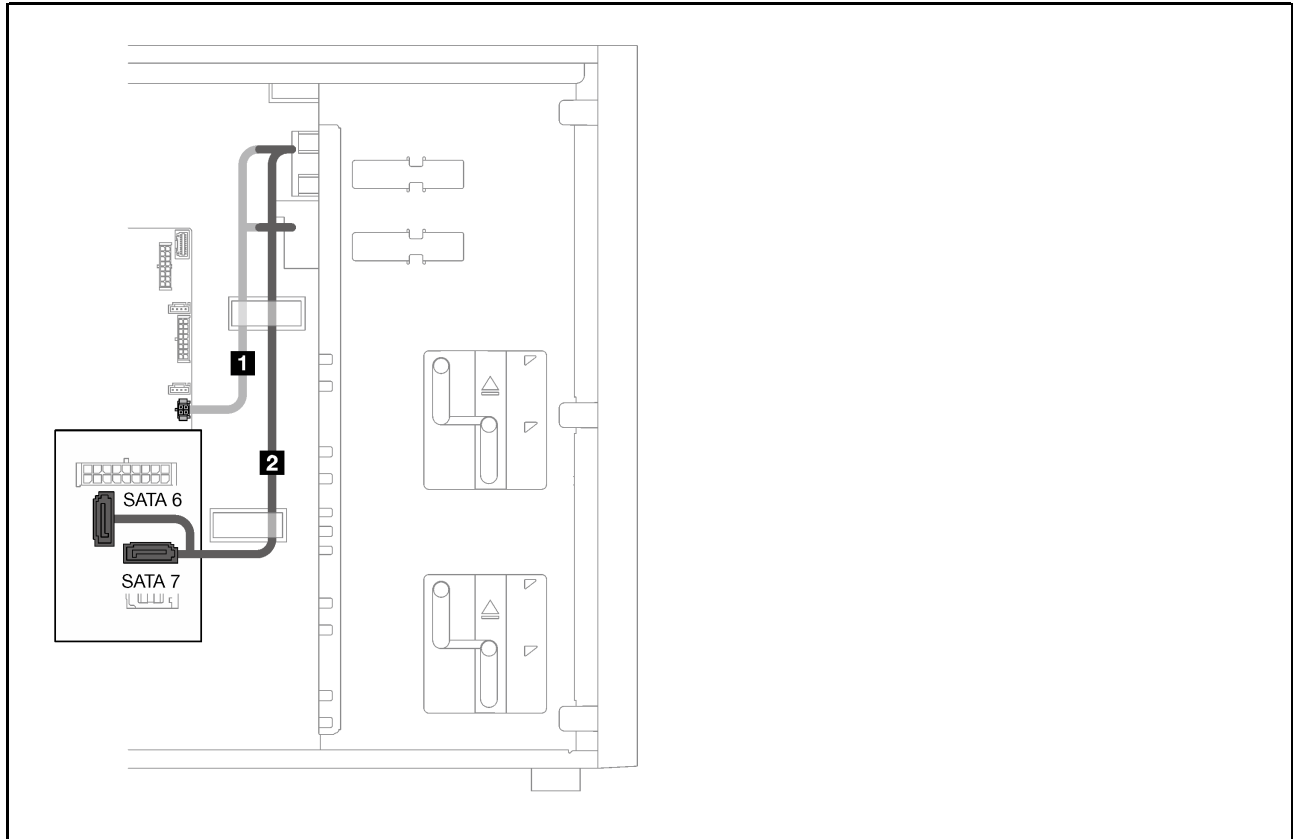


| Cable                                  | From   | To   |
|--|--|--|
| <b>1</b> M.2 cable                     | M.2 adapter                                      | M.2 signal and power connector on the system board |
| <b>2</b> RAID flash power module cable | Flash power module connector on the RAID adapter | RAID Flash power module                            |
| <b>3</b> Intrusion switch cable        | Intrusion switch                                 | Intrusion switch connector on the system board     |

---

## Optical/tape drives

Use this section to understand the cable routing for server models with optical/tape drives.



|          | From                            | To   |
|----------|---------------------------------|--|
| <b>1</b> | ODD/Tape drive power connectors | ODD/tape drive power connector on the system board |
| <b>2</b> | ODD/Tape drive SATA connectors  | SATA 6, 7  |

## Fixed power supply

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

### Notes:

- Ensure that all cables are routed through the correct cable clips.
- As the processor power connectors on the power distribution board may look similar in appearance, make sure that the **2** power supply processor power cable and **3** processor power cable are routed correctly as illustrated.

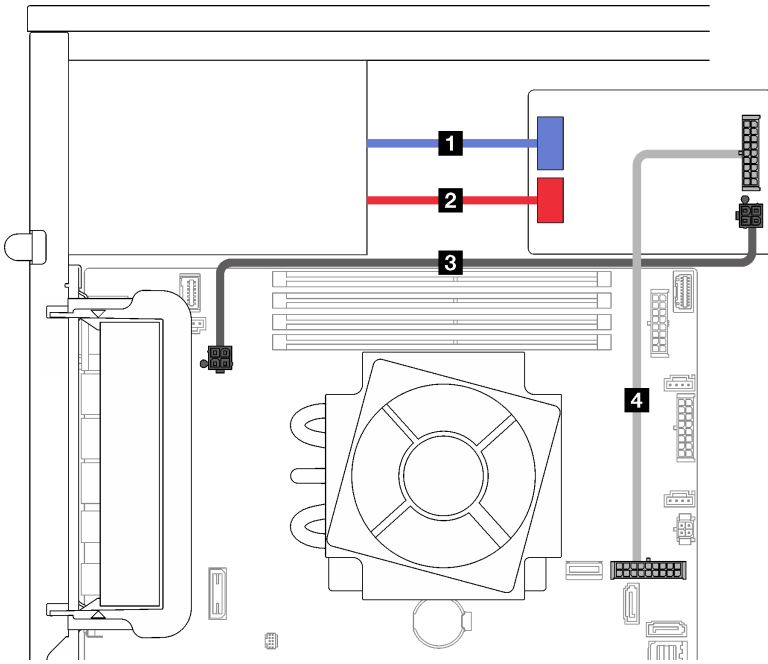


Figure 29. Cable routing for the fixed power supply

| Cable                                       | From (power distribution board)        | To  |
|---|--|---|
| <b>1</b> Power supply system power cable    | Power supply system power connector    | System power connector on the fixed power supply    |
| <b>2</b> Power supply processor power cable | Power supply processor power connector | Processor power connector on the fixed power supply |
| <b>3</b> Processor power cable              | Processor power connector              | Processor power connector on the system board       |
| <b>4</b> System power cable                 | System power connector                 | System power connector on the system board          |

## Redundant power supplies

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

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

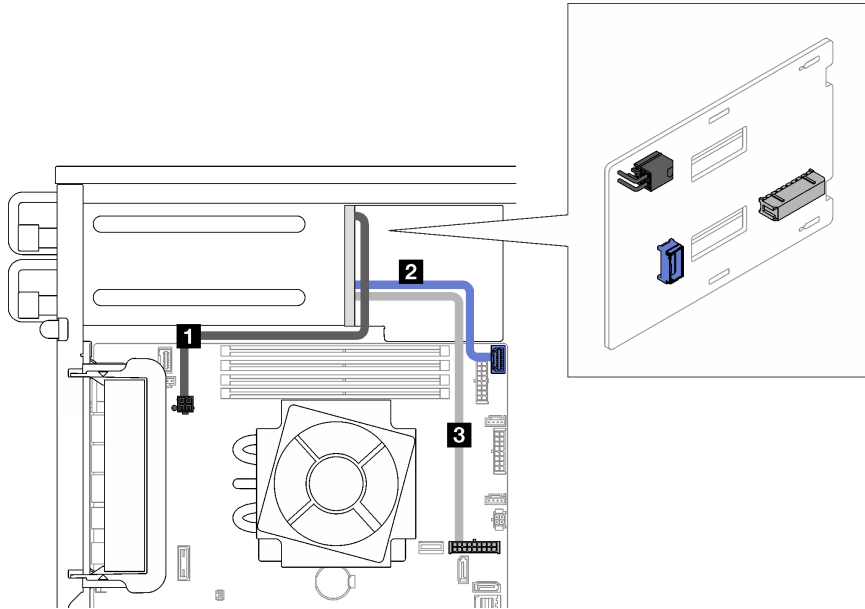


Figure 30. Cable routing for the redundant power supplies

| Cable                          | From (power distribution board) | To   |
|--------------------------------|---------------------------------|--|
| <b>1</b> Processor power cable | Processor power connector       | Processor power connector on the system board                    |
| <b>2</b> Side band connector   | Side band connector             | Power distribution board side band connector on the system board |
| <b>3</b> Power cable           | System power connector          | System power connector on the system board                       |

## Simple-swap drives

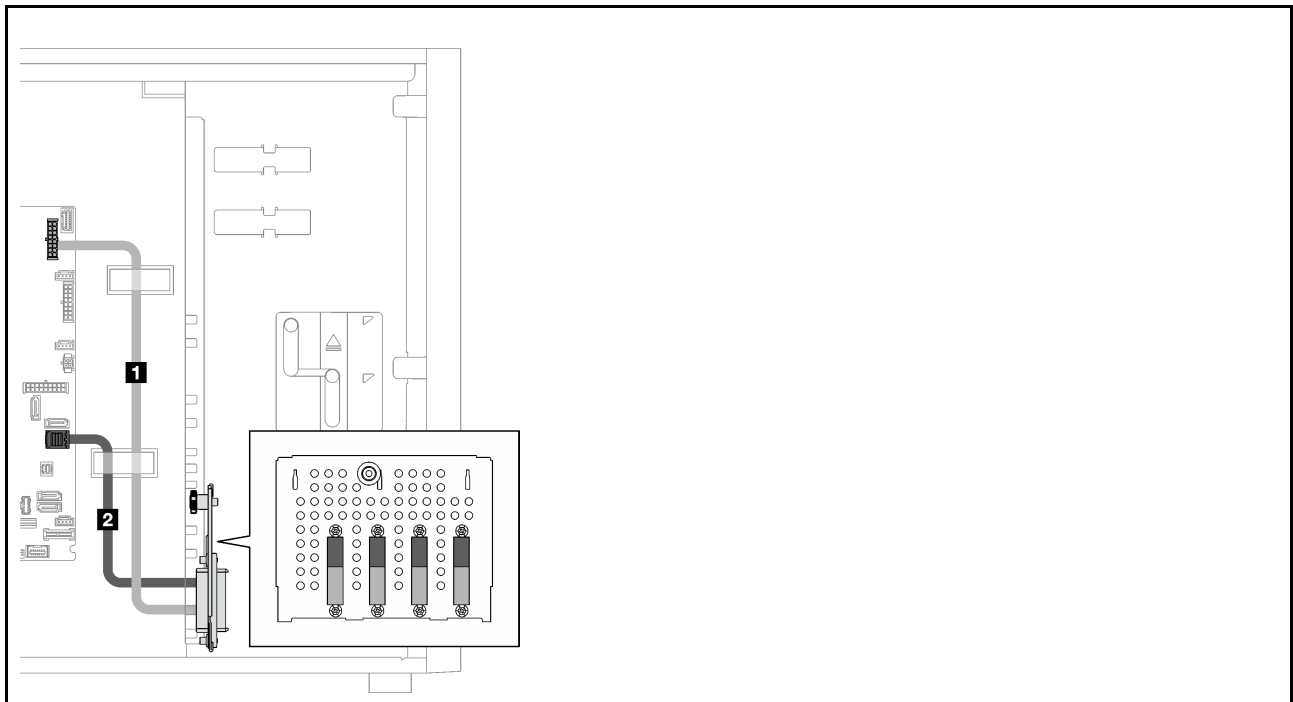
Use this section to understand the cable routing for server models with simple-swap drives.

See the configuration that is applied to the server.

- “Four 3.5-inch SATA drives” on page
- “Eight 3.5-inch SATA drives” on page 71
- “Seven SATA drives and one NVMe drive” on page 72
- “Six 3.5-inch SATA drives with ODD/tape drives” on page

### Four 3.5-inch simple-swap drives

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



|          | From            | To                          |
|----------|-----------------|-----------------------------|
| <b>1</b> | Lower backplate | Backplane 1 power connector |
| <b>2</b> |                 | SATA 0-3                    |

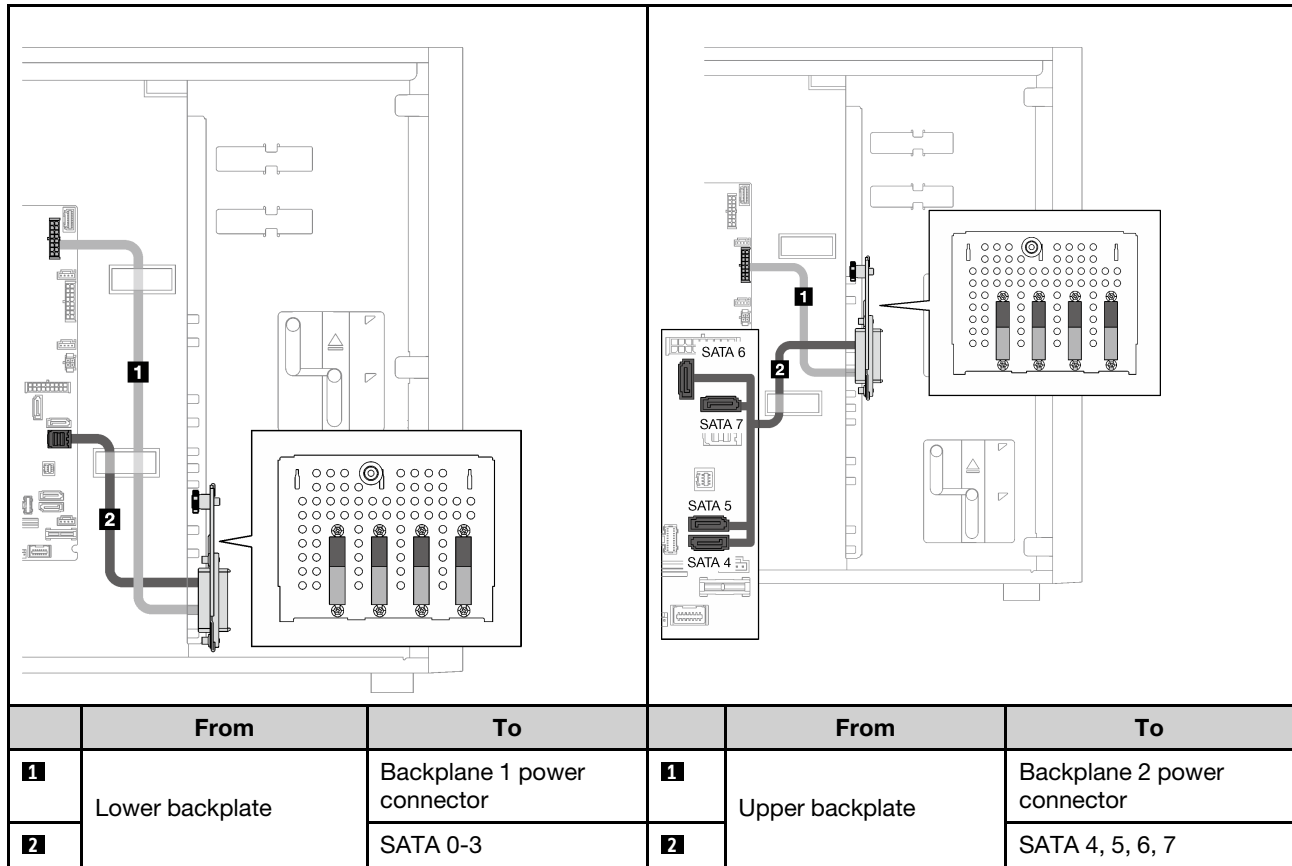
## Eight 3.5-inch simple-swap drives

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

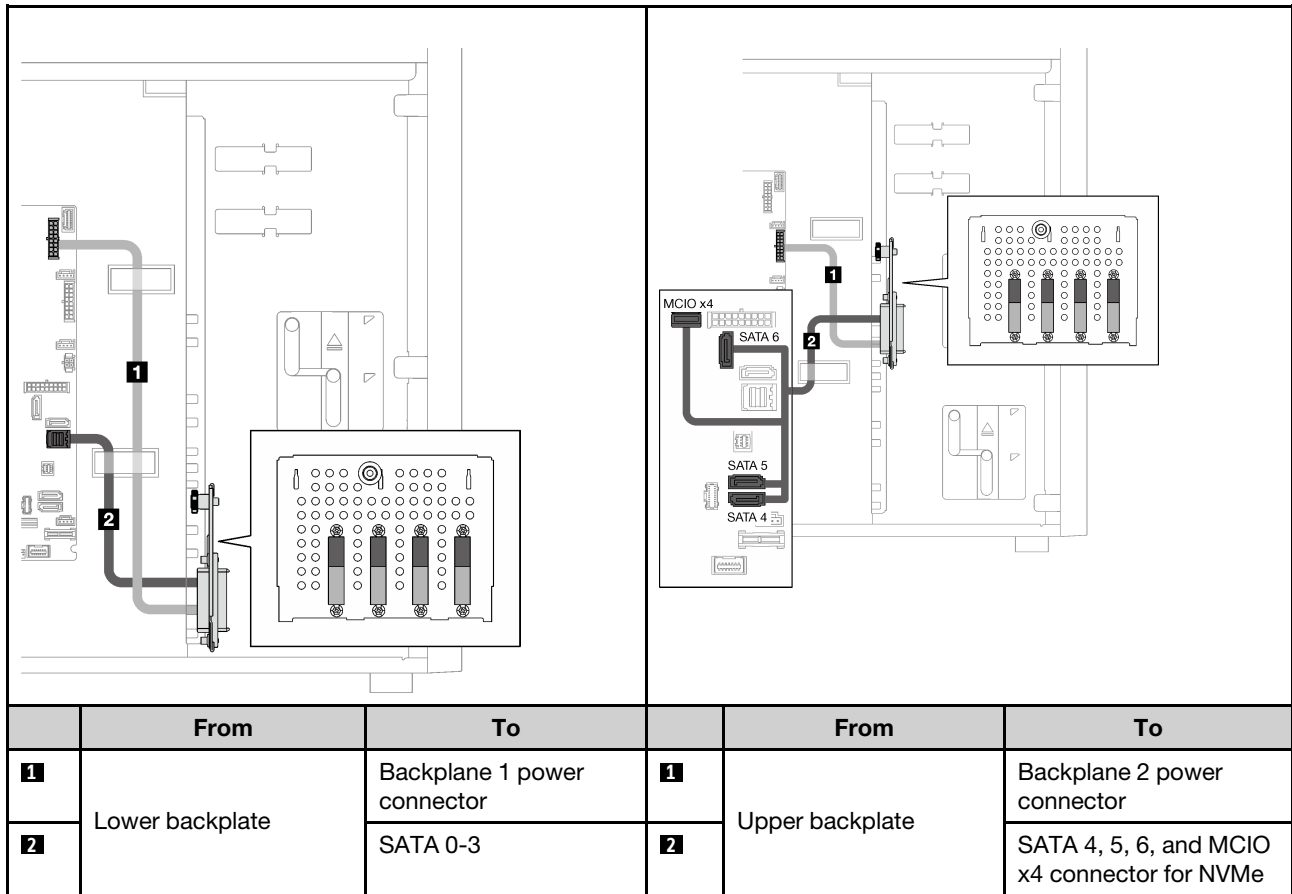
Following are the options available for this configuration:

- “Eight SATA drives” on page 71
- “Seven SATA drives and one NVMe drive” on page 72

### Eight SATA drives



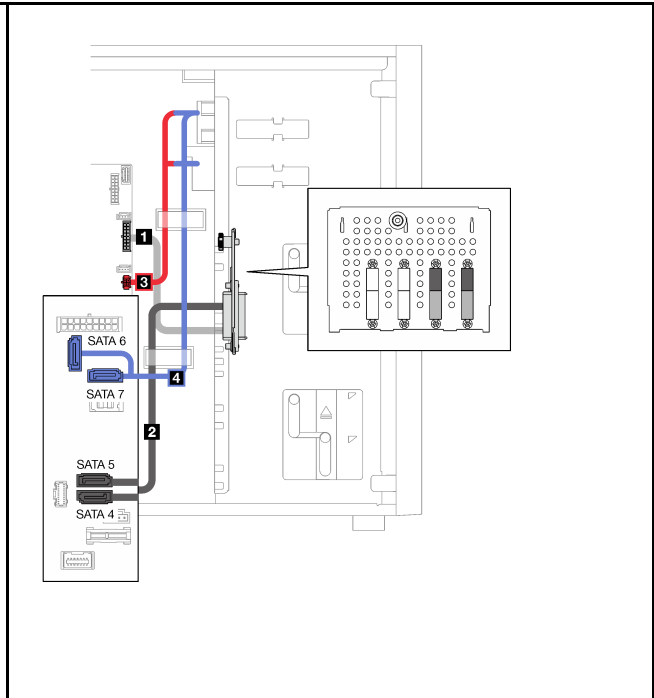
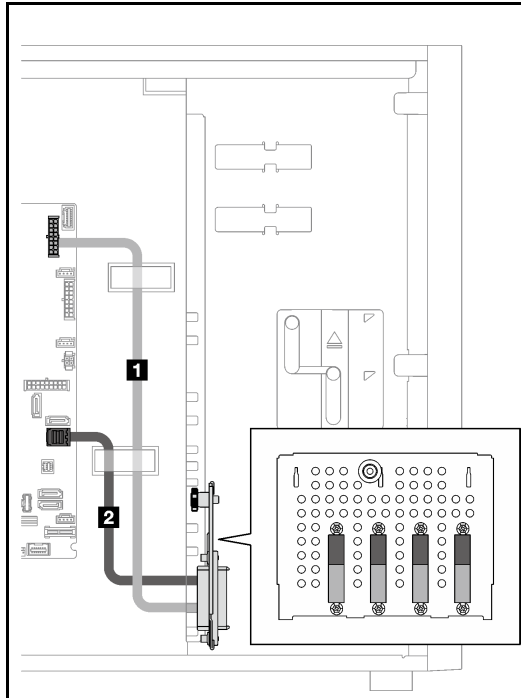
## Seven SATA drives and one NVMe drive



## Six 3.5-inch simple-swap drives with ODD/tape drives

Use this section to understand the cable routing for server models with six 3.5-inch simple-swap drives and ODD/tape drives (software RAID).





|          | From            | To                          |          | From                            | To   |
|----------|-----------------|-----------------------------|----------|---------------------------------|--|
| <b>1</b> | Lower backplate | Backplane 1 power connector | <b>1</b> | Upper backplate                 | Backplane 2 power connector                        |
|          |                 | SATA 0-3                    |          |                                 | <b>2</b>   |
| <b>2</b> | Lower backplate | SATA 0-3                    | <b>3</b> | ODD/Tape drive power connectors | ODD/tape drive power connector on the system board |
|          |                 |                             |          |                                 | <b>4</b>   |

---

## Hot-swap drives

Use this section to understand the cable routing for server models with hot-swap drives.

See the configuration that is applied to the server.

- Software RAID
  - “Four 3.5-inch drives” on page 75
  - “Eight 3.5-inch drives” on page 77
  - “Eight 2.5-inch drives” on page 79
- Hardware RAID
  - “Four 3.5-inch drives with one 8i RAID adapter” on page 76
  - “Eight 3.5-inch drives with one 8i RAID adapter” on page 78
  - “Eight 2.5-inch drives with one 8i RAID adapter” on page 80
  - “Sixteen 2.5-inch drives with one 16i RAID adapter” on page 81
  - “Sixteen 2.5-inch drives with two 8i RAID adapters” on page 82
  - “Four 3.5-inch and eight 2.5-inch drives with one 16i RAID adapter” on page 83
  - “Four 3.5-inch and eight 2.5-inch drives with two 8i RAID adapters” on page 84

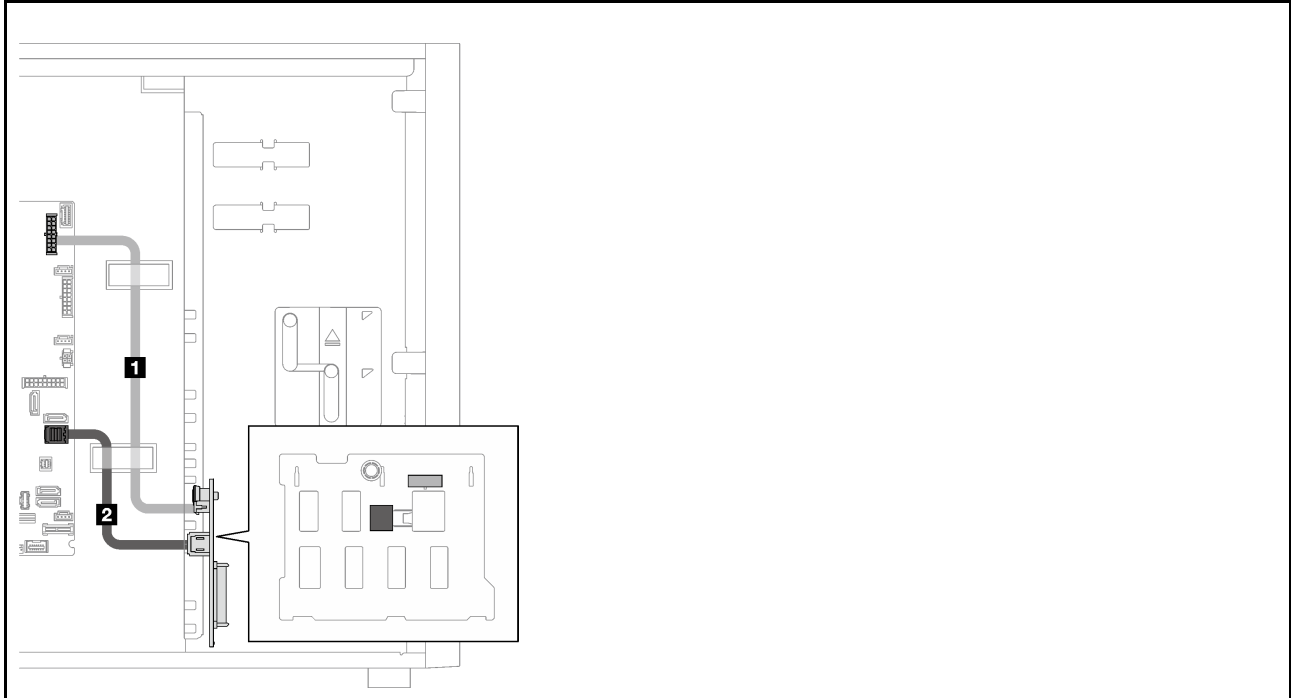
### Four 3.5-inch hot-swap drives

Use this section to understand the cable routing for server models with four 3.5-inch hot-swap drives.

Following are the options available for this configuration:

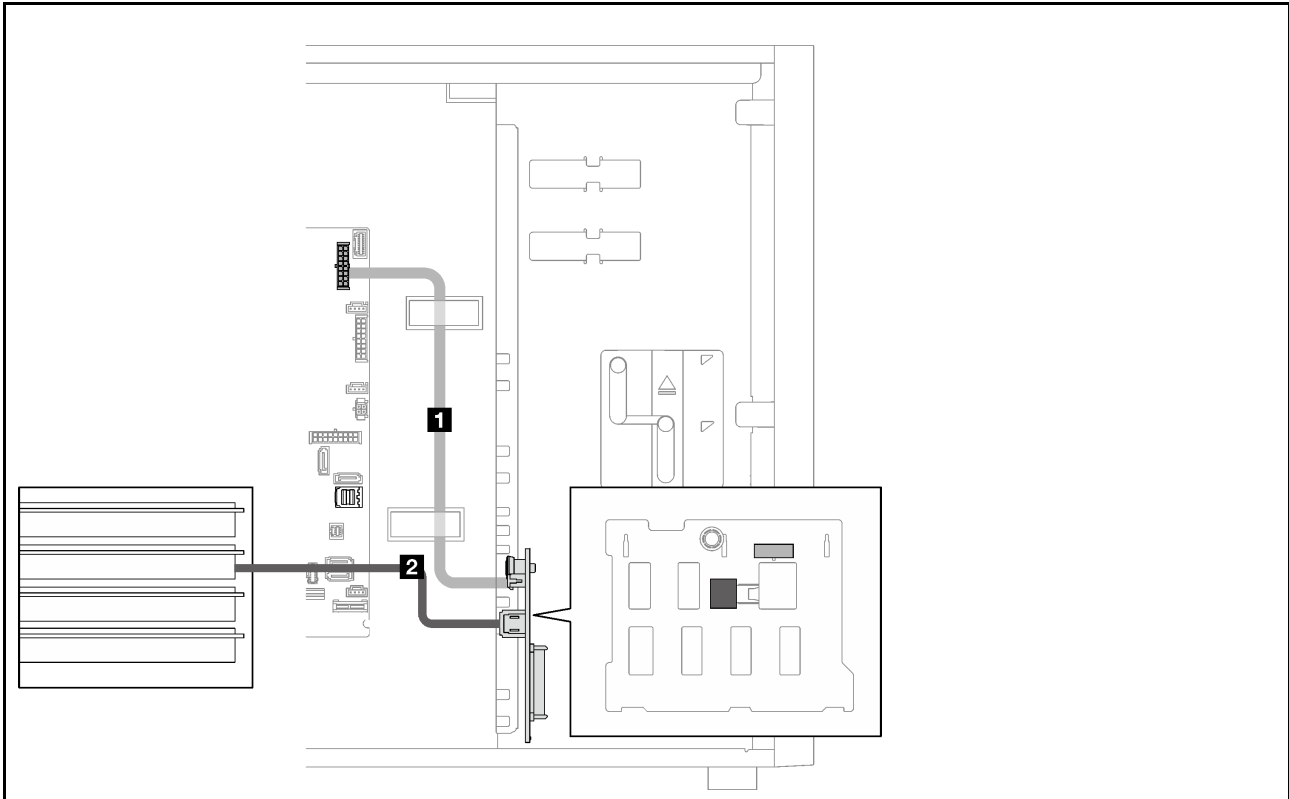
- “Software RAID” on page 75
- “One 8i RAID adapter” on page 76

## Software RAID



|          | From                               | To                          |
|----------|------------------------------------|-----------------------------|
| <b>1</b> | Lower backplane power connector    | Backplane 1 power connector |
| <b>2</b> | Lower backplane SAS/SATA connector | SATA 0-3                    |

## One 8i RAID adapter



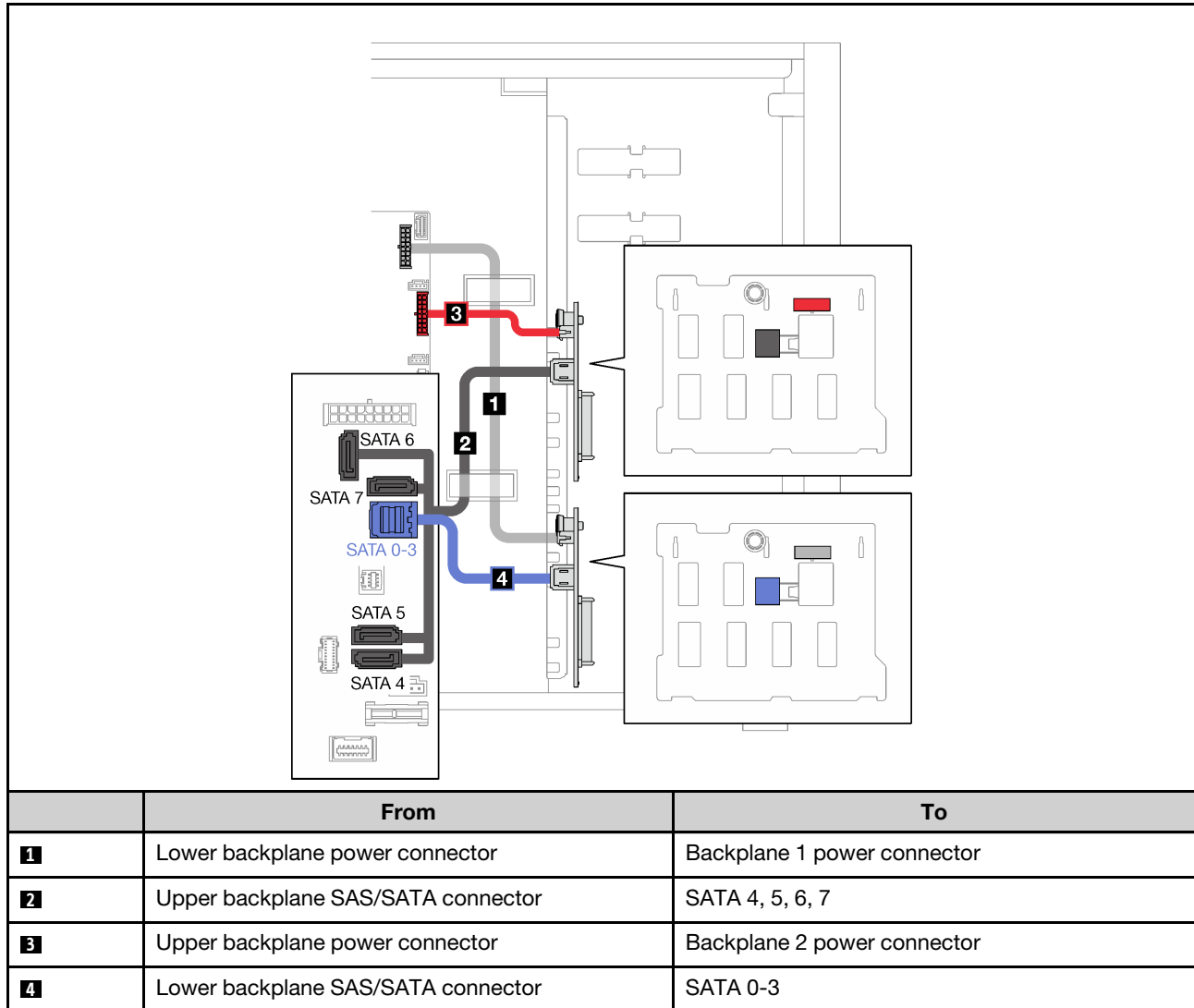
|          | From                               | To                          |
|----------|------------------------------------|-----------------------------|
| <b>1</b> | Lower backplane power connector    | Backplane 1 power connector |
| <b>2</b> | Lower backplane SAS/SATA connector | C0                          |

## Eight 3.5-inch hot-swap drives

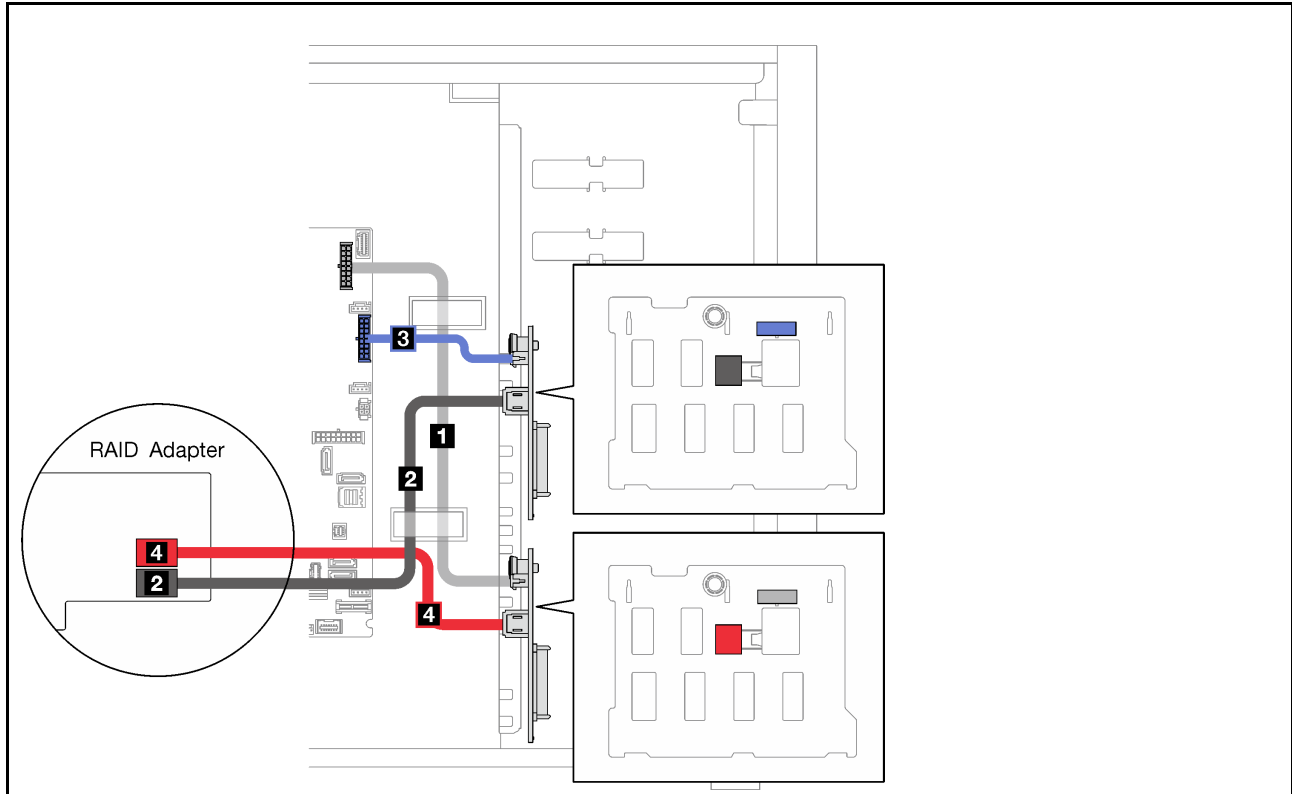
Use this section to understand the cable routing for server models with eight 3.5-inch hot-swap drives.

- “Software RAID” on page 77
- “One 8i RAID adapter” on page 78

### Software RAID



## One 8i RAID adapter



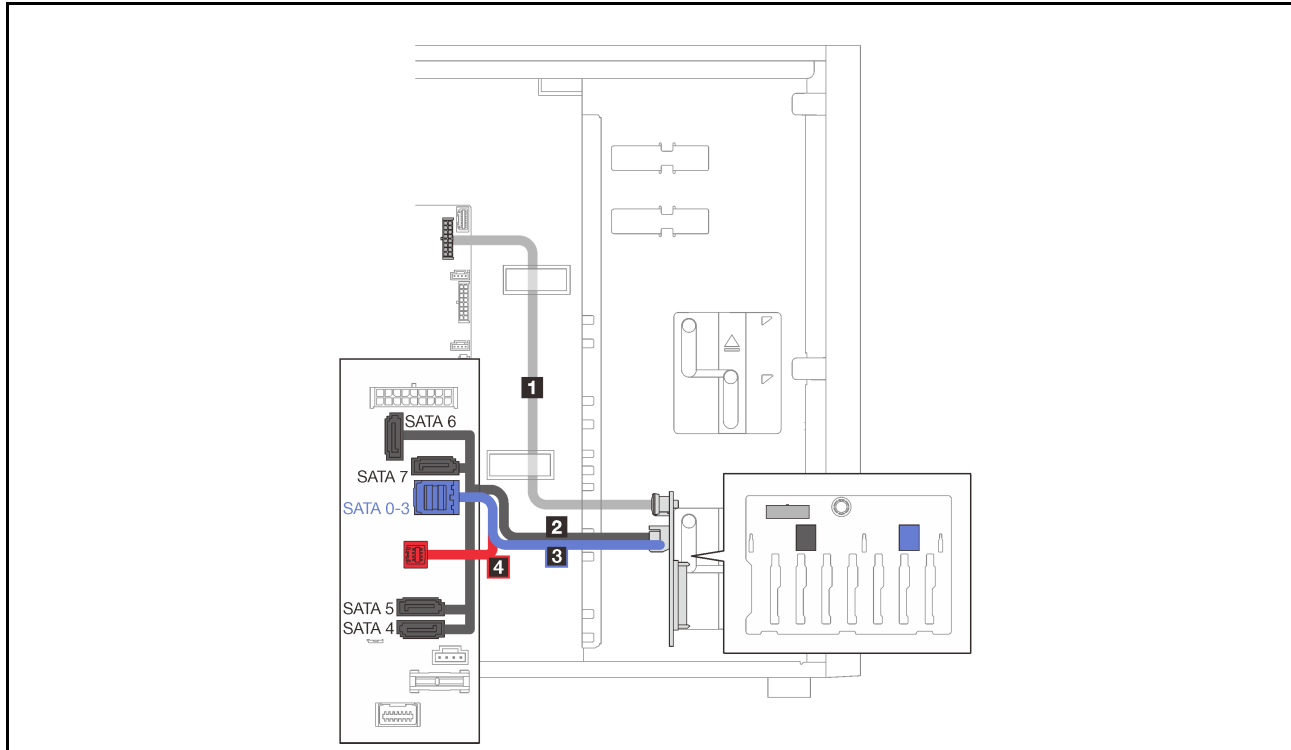
|          | From                               | To                          |
|----------|------------------------------------|-----------------------------|
| <b>1</b> | Lower backplane power connector    | Backplane 1 power connector |
| <b>2</b> | Upper backplane SAS/SATA connector | X350-8i: C1                 |
| <b>3</b> | Upper backplane power connector    | Backplane 2 power connector |
| <b>4</b> | Lower backplane SAS/SATA connector | C0                          |

## Eight 2.5-inch hot-swap drives

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

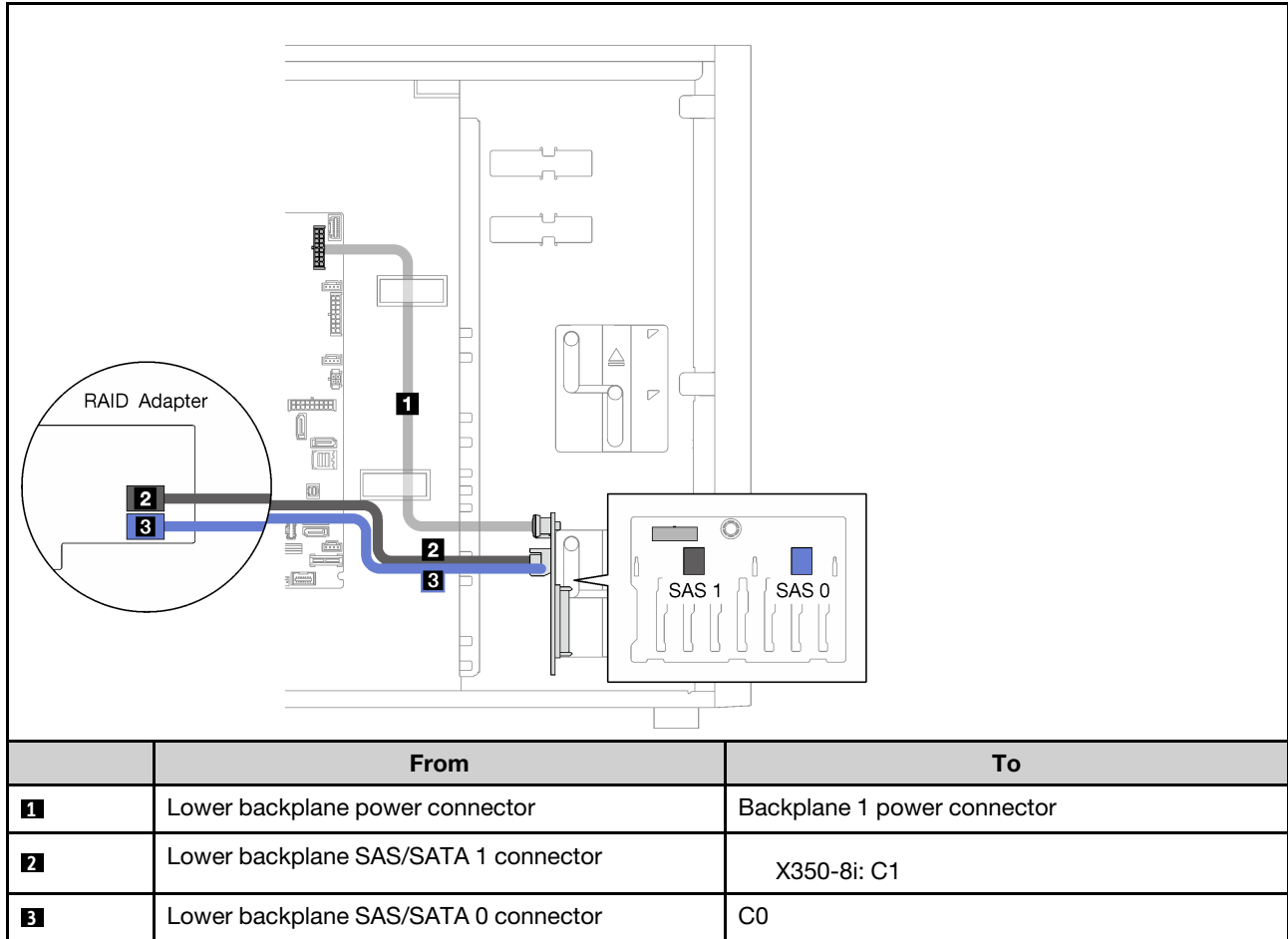
- “Software RAID” on page 79
- “One 8i RAID adapter” on page 80

## Software RAID



|          | From                                 | To                          |
|----------|--------------------------------------|-----------------------------|
| <b>1</b> | Lower backplane power connector      | Backplane 1 power connector |
| <b>2</b> | Lower backplane SAS/SATA 1 connector | SATA 4, 5, 6, 7             |
| <b>3</b> | Lower backplane SAS/SATA 0 connector | SATA 0-3                    |
| <b>4</b> | Lower backplane                      | SGPIO1 connector            |

## One 8i RAID adapter



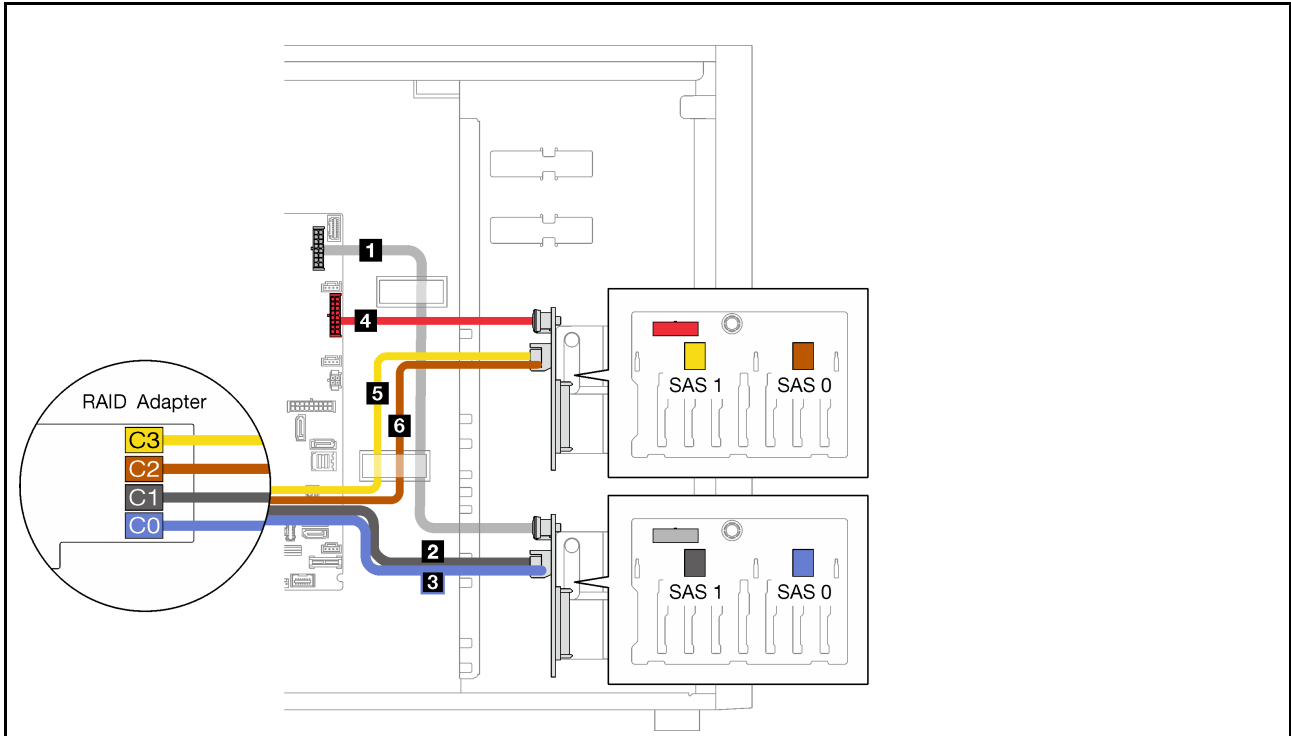
## Sixteen 2.5-inch hot-swap drives

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

- “One 9350-16i RAID adapter” on page 81
- “Two 4350/5350-8i RAID adapters” on page 82

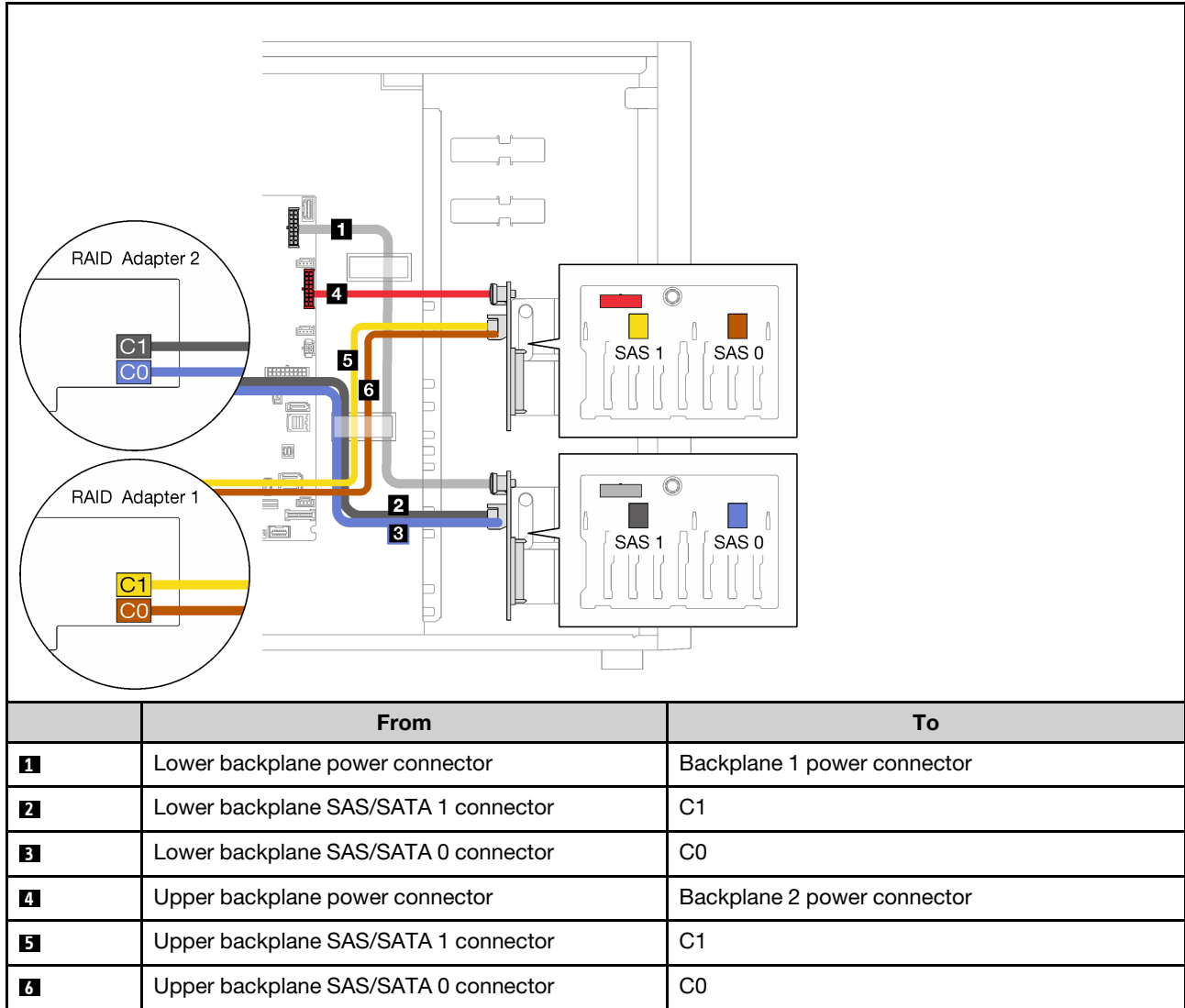


One 9350-16i RAID adapter



|          | From                                 | To                          |
|----------|--------------------------------------|-----------------------------|
| <b>1</b> | Lower backplane power connector      | Backplane 1 power connector |
| <b>2</b> | Lower backplane SAS/SATA 1 connector | C1                          |
| <b>3</b> | Lower backplane SAS/SATA 0 connector | C0                          |
| <b>4</b> | Upper backplane power connector      | Backplane 2 power connector |
| <b>5</b> | Upper backplane SAS/SATA 1 connector | C3                          |
| <b>6</b> | Upper backplane SAS/SATA 0 connector | C2                          |

## Two 4350/5350-8i RAID adapters

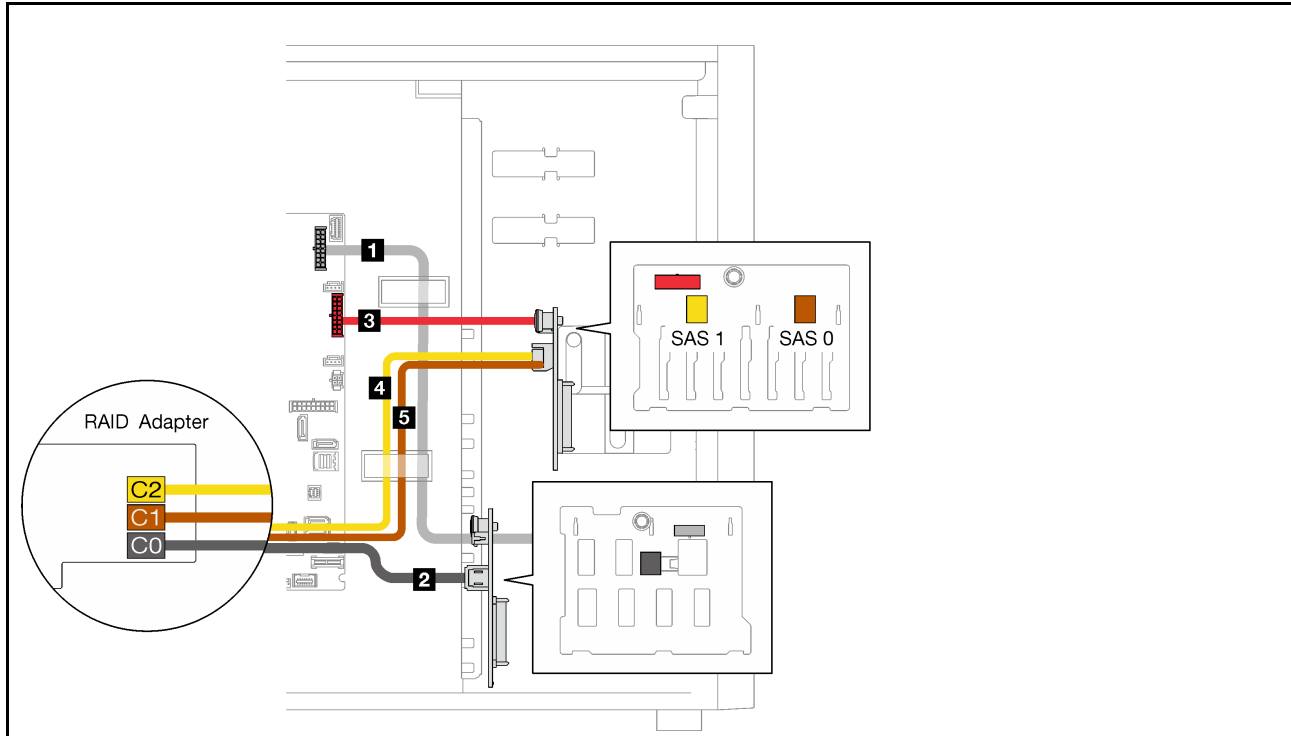


## Four 3.5-inch and eight 2.5-inch hot-swap drives

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

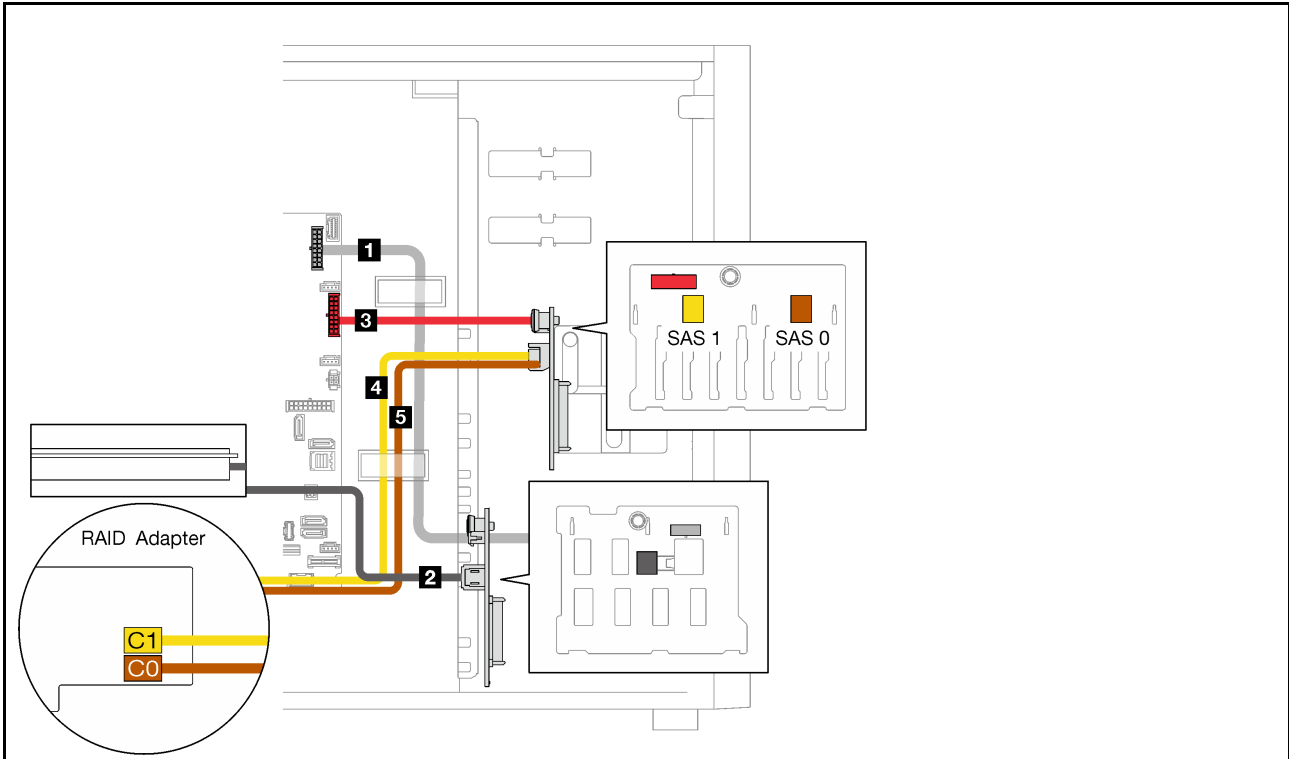
- “One 9350-16i RAID adapter” on page 83
- “Two 4350/5350-8i RAID adapters” on page 84

### One 9350-16i RAID adapter



|          | From                                 | To                          |
|----------|--------------------------------------|-----------------------------|
| <b>1</b> | Lower backplane power connector      | Backplane 1 power connector |
| <b>2</b> | Lower backplane SAS/SATA connector   | C0                          |
| <b>3</b> | Upper backplane power connector      | Backplane 2 power connector |
| <b>4</b> | Upper backplane SAS/SATA 1 connector | C2                          |
| <b>5</b> | Upper backplane SAS/SATA 0 connector | C1                          |

## Two 4350/5350-8i RAID adapters



|          | From                                 | To                          |
|----------|--------------------------------------|-----------------------------|
| <b>1</b> | Lower backplane power connector      | Backplane 1 power connector |
| <b>2</b> | Lower backplane SAS/SATA connector   | C0, Slot 2                  |
| <b>3</b> | Upper backplane power connector      | Backplane 2 power connector |
| <b>4</b> | Upper backplane SAS/SATA 1 connector | C1, Slot 4                  |
| <b>5</b> | Upper backplane SAS/SATA 0 connector | C0, Slot 4                  |

---

## Chapter 4. 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 3.
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 90.
  - b. If necessary, install the server into a standard rack cabinet by using the rail kit shipped with the server. See the *Rack Installation Instructions* that comes with optional rail kit.
  - c. Connect the Ethernet cables and power cords to the server. See “Rear view” on page 22 to locate the connectors. See “Cable the server” on page 129 for cabling best practices.
  - d. Power on the server. See “Power on the server” on page 130.
  - e. Validate that the server hardware was set up successfully. See “Validate server setup” on page 130.
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 131.
  - b. Update the firmware for the server, if necessary. See “Update the firmware” on page 133.
  - c. Configure the firmware for the server. See “Configure the firmware” on page 136.

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 138.
  - e. Back up the server configuration. See “Back up the server configuration” on page 139.
  - 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 that you work safely.
  - A complete list of safety information for all products is available at: [http://thinksystem.lenovofiles.com/help/topic/safety\\_documentation/pdf\\_files.html](http://thinksystem.lenovofiles.com/help/topic/safety_documentation/pdf_files.html)
  - The following guidelines are available as well: “Handling static-sensitive devices” on page 88.
- Make sure the components you are installing are supported by the server. For a list of supported optional components for the server, see <https://static.lenovo.com/us/en/serverproven/index.shtml>.
- 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 V2 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 that the latest level of code is supported for the cluster solution 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 and a small Phillips 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.
- Orange on a component or an orange 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. (Orange 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.

## Safety inspection checklist

Use the information in this section to identify potentially unsafe conditions with your solution. As each machine was designed and built, required safety items were installed to protect users and service technicians from injury.

**Note:** This device is not intended for use in the direct field of view at visual display workplaces. To avoid incommoding reflections at visual display workplaces, this device must not be placed in the direct field of view.

### CAUTION:

**This equipment must be installed or serviced by trained personnel, as defined by the NEC, IEC 62368-1 & IEC 60950-1, the standard for Safety of Electronic Equipment within the Field of Audio/Video, Information Technology and Communication Technology. Lenovo assumes you are qualified in the servicing of equipment and trained in recognizing hazards energy levels in products. Access to the equipment is by the use of a tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.**

**Important:** Electrical grounding of the solution is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Use the following checklist to verify that there are no potentially unsafe conditions:

1. Make sure that the power is off and the power cord is disconnected.
2. Check the power cord.
  - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
  - Make sure that the power cord is the correct type.

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

  - a. Go to:  
<http://dcsc.lenovo.com/#/>
  - b. Click **Preconfigured Model** or **Configure to order**.
  - c. Enter the machine type and model for your server to display the configurator page.
  - d. Click **Power** → **Power Cables** to see all line cords.
  - Make sure that the insulation is not frayed or worn.
3. Check for any obvious non-Lenovo alterations. Use good judgment as to the safety of any non-Lenovo alterations.
4. Check inside the solution for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
5. Check for worn, frayed, or pinched cables.
6. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

## 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 orders

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

The following illustration shows the location of the memory module slots on the system board.



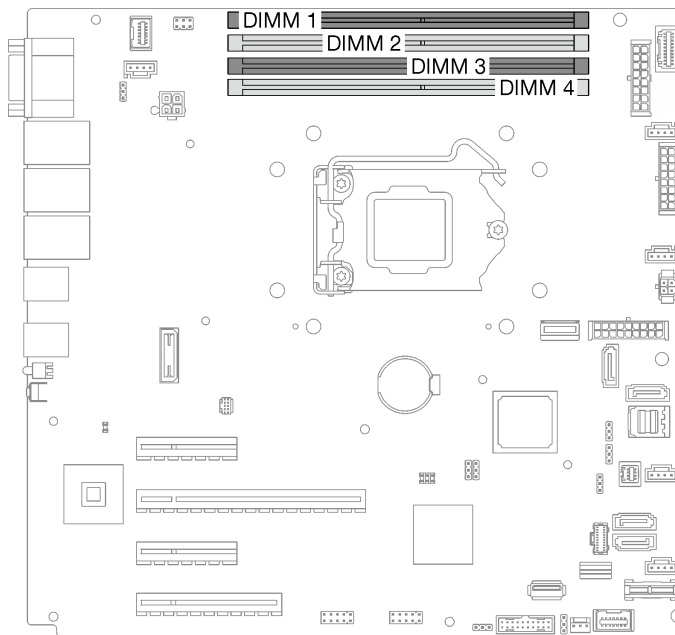


Figure 31. Memory module slots on the system board

This server comes with four memory module slots.

For a list of supported memory module options, see: <https://static.lenovo.com/us/en/serverproven/index.shtml>

Before installing a memory module, ensure that all memory modules to be installed must be the same type. This server supports the following type of memory modules:

- Industry-standard double-data-rate 4 (DDR4) UDIMM with 3200MHz error-correcting code (ECC) technology

Your server supports the “Independent mode” on page 89.

### Independent mode

Independent mode provides high performance memory capability. You can populate all channels with no matching requirements. Individual channels can run at different DIMM timings, but all channels must run at the same interface frequency.

The following table shows the memory module installation order.

Table 23. Memory module installation order

| Number of Memory Modules | Memory Module Slot Number |   |   |   |
|--------------------------|---------------------------|---|---|---|
|                          | 1                         | 2 | 3 | 4 |
| 1                        |                           |   | X |   |
| 2                        | X                         |   | X |   |
| 4                        | 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.

#### About this task

To avoid potential danger, read and follow the following safety statements.

- **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.

- **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.

**Attention:**

- Read the “Installation guidelines” on page 85 to ensure that you work safely.
- Turn off the server and peripheral devices, and disconnect the power cords and all external cables (see “Power off the server” on page 130).
- If the server is in a rack, remove it from the rack.

- Remove any locking device that secures the server cover, such as a Kensington lock or a pad lock.

### Watch the procedure

A video of this procedure is available at YouTube: <https://youtube.com/playlist?list=PLYV5R7hVcs-DoEcxrm2zKNpaKOdZ3f8Qc>.

### Procedure

Step 1. Remove the server cover.

- 1 Loosen the thumbscrew that secures the server cover with a screwdriver.

**Note:** The thumbscrew is an integrated part of the server cover. Do not try to remove it from the server cover.

- 2 Slide the server cover towards the rear of the server until the server cover is disengaged from the chassis.
- 3 Pivot the server cover outwards and remove it from the chassis. Place the cover on a flat clean surface.

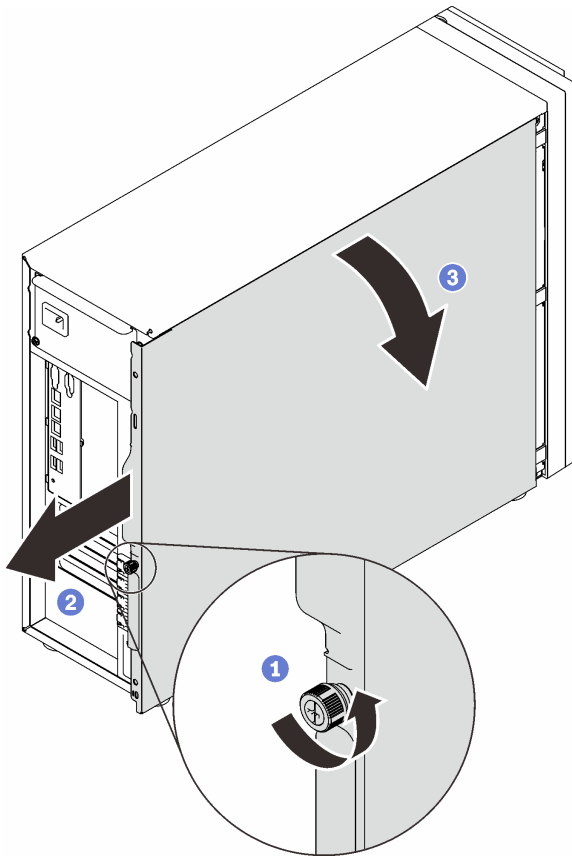


Figure 32. Removing the server cover

**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.

### Remove the front door

Use this information to remove the front door.

## About this task

To avoid potential danger, read and follow the following safety statements.

- **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.**

**Attention:**

- Read the “Installation guidelines” on page 85 to ensure that you work safely.
- Turn off the server and peripheral devices, and disconnect the power cords and all external cables (see “Power off the server” on page 130).
- If the server is in a rack, remove it from the rack.
- Remove any locking device that secures the server cover, such as a Kensington lock or a pad lock.

**Watch the procedure**

A video of this procedure is available at YouTube: <https://youtube.com/playlist?list=PLYV5R7hVcs-DoEcxrm2zKNpaK0dZ3f8Qc>.

## Procedure

Step 1. Remove the front door.

- 1 Turn the cover lock to the unlocked position with the front door key.
- 2 Open the front door.
- 3 Lift the front door slightly until you can completely remove it.

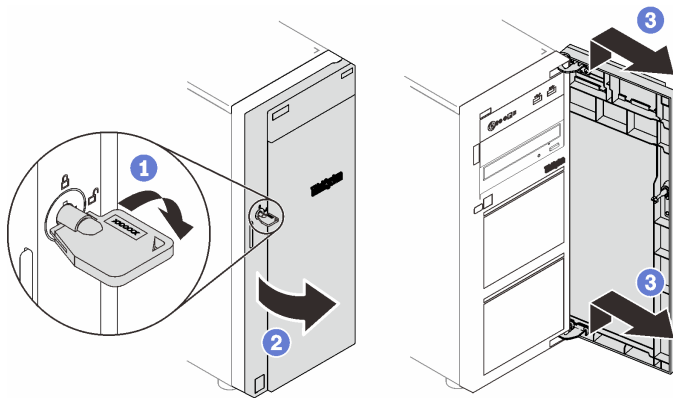


Figure 33. Removing the front door

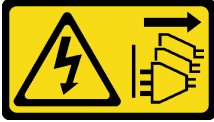
## Remove the front bezel

Use this information to remove the front bezel.

## About this task

To avoid potential danger, read and follow the following safety statements.

- **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.

**Attention:**

- Read the “Installation guidelines” on page 85 to ensure that you work safely.
- Turn off the server and peripheral devices, and disconnect the power cords and all external cables (see “Power off the server” on page 130).
- If the server is in a rack, remove it from the rack.
- Remove any locking device that secures the server cover, such as a Kensington lock or a pad lock.

**Watch the procedure**

A video of this procedure is available at YouTube: <https://youtube.com/playlist?list=PLYV5R7hVcs-DoEcxrm2zKNpaKOdZ3f8Qc>.

**Procedure**

Step 1. Make preparations for this task.

- a. Remove the server cover (see “Remove the server cover” on page 90).
- b. Remove the front door (see “Remove the front door” on page 91).

Step 2. Remove the front bezel.

- a. ① Lift the three plastic tabs to release left side of the bezel from the chassis.
- b. ② Pivot the bezel as shown to remove it from the chassis.

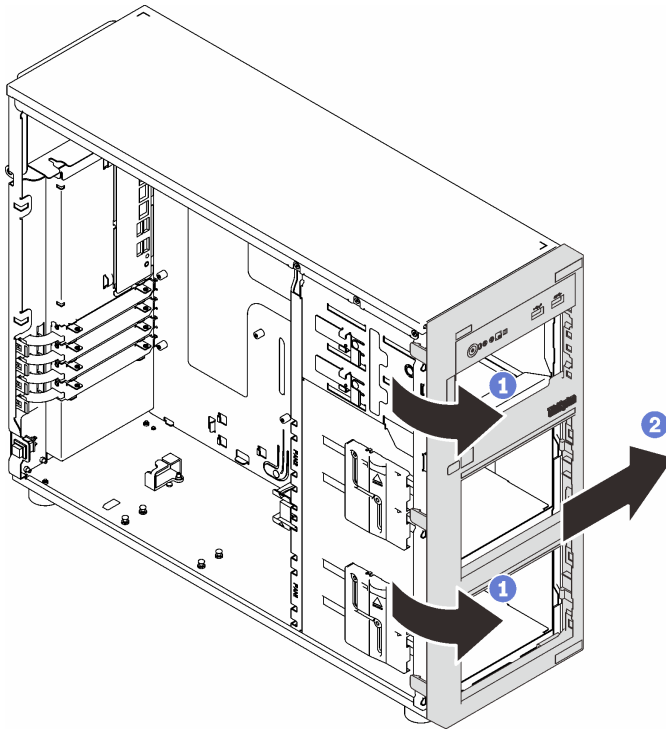


Figure 34. Removing the front bezel

## Install a hot-swap power supply

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

### About this task

To avoid potential danger, read and follow the following safety statements.

- **S001**



 **DANGER**

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.

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.

**Attention:** This type of power supply is hot-swap only when two power supplies are installed for redundancy. If only one power supply is installed, you must power off the server first before removing the power supply.

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.

- **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.

- **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.

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 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.

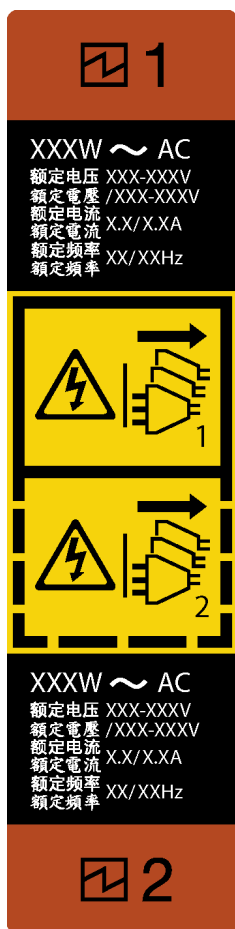


Figure 35. Hot-swap power supply label

- Ensure that the devices that you are installing are supported. For a list of supported optional devices for the server, go to:  
<https://static.lenovo.com/us/en/serverproven/index.shtml>

**Attention:**

- Read the “Installation guidelines” on page 85 to ensure that you work safely.
- 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.

**Watch the procedure**

A video of this procedure is available at YouTube: <https://youtube.com/playlist?list=PLYV5R7hVcs-DoEcxrm2zKNpaK0dZ3f8Qc>.

**Procedure**

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

**Important:** During normal operation, each power supply bay must contain either a power supply or power supply filler for proper cooling.



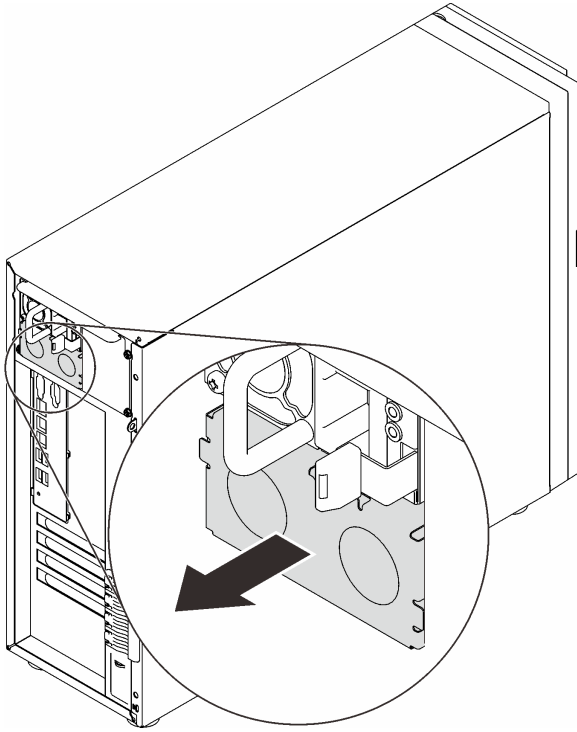


Figure 36. Removing a hot-swap power supply filler

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

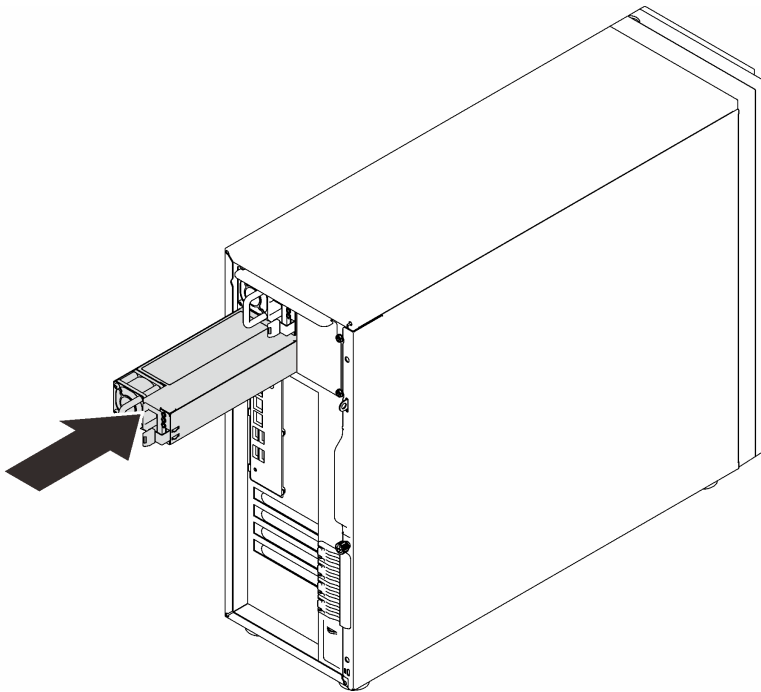


Figure 37. Installing a hot-swap power supply

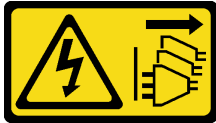
## Install the 3.5-inch/2.5-inch drive cage

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

### About this task

To avoid potential danger, read and follow the following safety statements.

- **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.**

#### **Attention:**

- Read the “Installation guidelines” on page 85 to ensure that you work safely.
- 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.

#### **Watch the procedure**

A video of this procedure is available at YouTube: <https://youtube.com/playlist?list=PLYV5R7hVcs-DoEcxrm2zKNpaK0dZ3f8Qc>.

#### **Procedure**

- Step 1. Install the backplane or backplate (see “Install the 3.5-inch/2.5-inch hot-swap backplane” on page 99 or “Install the 3.5-inch simple-swap drive backplate” on page 100).
- Step 2. Slide the drive cage in until the release latch clicks into place.

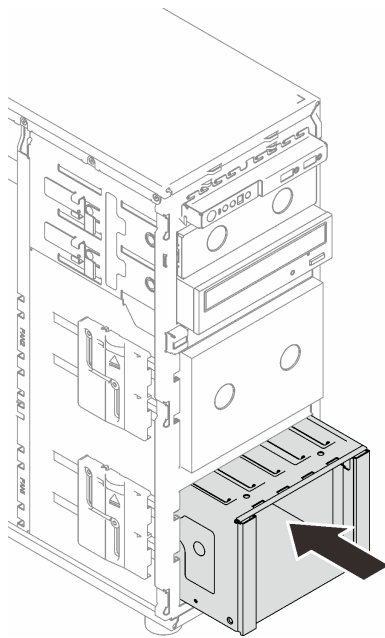


Figure 38. Installing the drive cage

## 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.

### About this task

To avoid potential danger, read and follow the following safety statements.

- **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.

#### Attention:

- Read the “Installation guidelines” on page 85 to ensure that you work safely.
- 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.

#### Watch the procedure

A video of this procedure is available at YouTube: <https://youtube.com/playlist?list=PLYV5R7hVcs-DoEcxrm2zKNpaKOdZ3f8Qc>.

### Procedure

- Step 1. Align the slots on the backplane with the tabs on the drive cage, and insert the tabs into the slots.
- Step 2. While pulling the plunger, slide down the backplane until it clicks into place; then, close the plunger to secure the backplane.

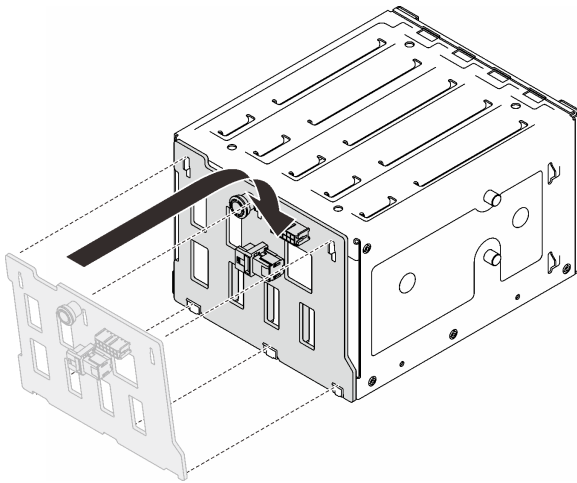


Figure 39. Installing the hot-swap drive backplane

## Install the 3.5-inch simple-swap drive backplate

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

### About this task

To avoid potential danger, read and follow the following safety statements.

- **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.

#### Attention:

- Read the “Installation guidelines” on page 85 to ensure that you work safely.
- 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.

#### Watch the procedure

A video of this procedure is available at YouTube: <https://youtube.com/playlist?list=PLYV5R7hVcs-DoEcxrm2zKNpaK0dZ3f8Qc>.

## Procedure

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

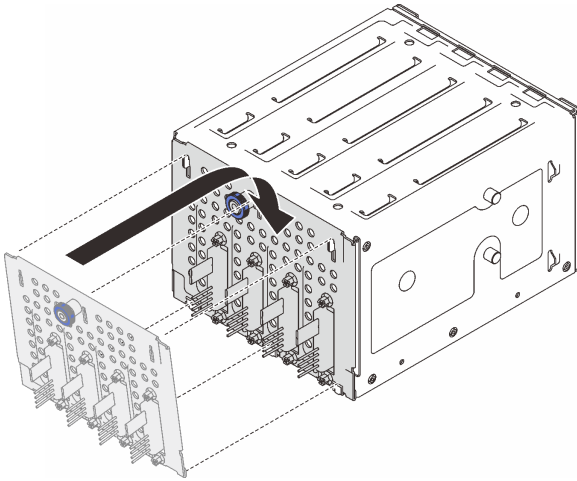


Figure 40. Installing the simple-swap drive backplate

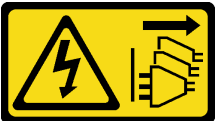
## Install a front system fan

Use this information to install a front system fan.

### About this task

To avoid potential danger, read and follow the following safety statements.

- **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.

- **S009**



**CAUTION:**

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

- **S017**



**CAUTION:**

Hazardous moving fan blades nearby. Keep fingers and other body parts away.

- **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.

**Attention:**

- Read the “Installation guidelines” on page 85 to ensure that you work safely.
- 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.

**Watch the procedure**

A video of this procedure is available at YouTube: <https://youtube.com/playlist?list=PLYV5R7hVcs-DoEcxrm2zKNpaKOdZ3f8Qc>.

**Procedure**

- Step 1. Align the four tabs of the front system fan with the corresponding slots in the mounting area, and align the two posts of the fan with the corresponding slots in the inner side of the chassis.
- Step 2. Carefully slide the front system fan into the chassis until it snaps into place.

**Note:** Make sure the cables do not interfere with the two posts of the front system fan.

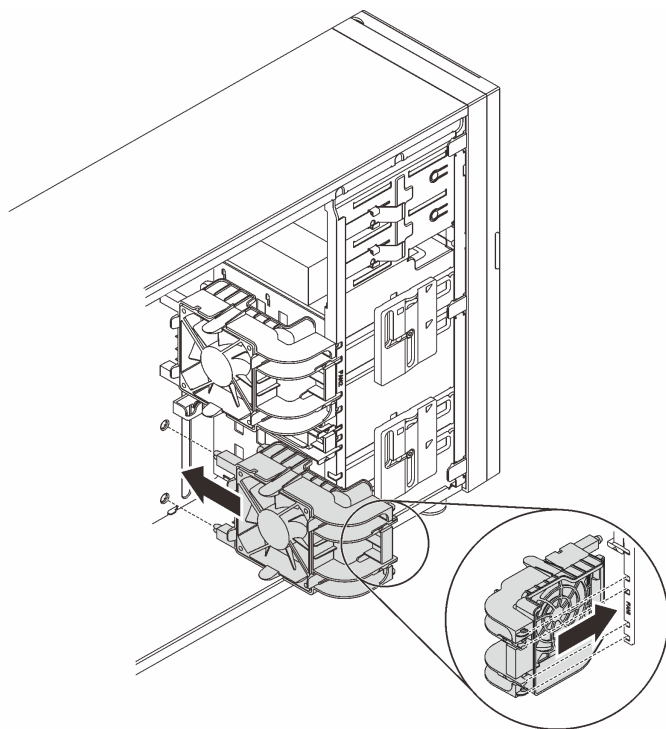


Figure 41. Installing the front system fan

- Step 3. 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 27 and “Fan power cable” on page 63.

## Install a memory module

Use this information to install a memory module.

### About this task

To avoid potential danger, read and follow the following safety statements.

- **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.

#### **Attention:**

- Read the “Installation guidelines” on page 85 to ensure that you work safely.
- Make sure to adopt one of the supported configurations listed in “Memory module installation rules and orders” on page 88.

- 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.
- Memory modules are sensitive to static discharge and require special handling. Refer to the standard guidelines for “Handling static-sensitive devices” on page 88.
  - Always wear an electrostatic-discharge strap when removing or installing memory modules. Electrostatic-discharge gloves can also be used.
  - Never hold two or more memory modules together so that they do not touch each other. Do not stack memory modules directly on top of each other during storage.
  - Never touch the gold memory module connector contacts or allow these contacts to touch the outside of the memory module connector housing.
  - Handle memory modules with care: never bend, twist, or drop a memory module.
  - Do not use any metal tools (such as jigs or clamps) to handle the memory modules, because the rigid metals may damage the memory modules.
  - Do not insert memory modules while holding packages or passive components, which can cause package cracks or detachment of passive components by the high insertion force.

### Watch the procedure

A video of this procedure is available at YouTube: <https://youtube.com/playlist?list=PLYV5R7hVcs-DoEcxrm2zKNpaK0dZ3f8Qc>.

### Procedure

Step 1. Locate the memory module slot on the system board.

The following illustration shows the location of memory module slots on the system board.

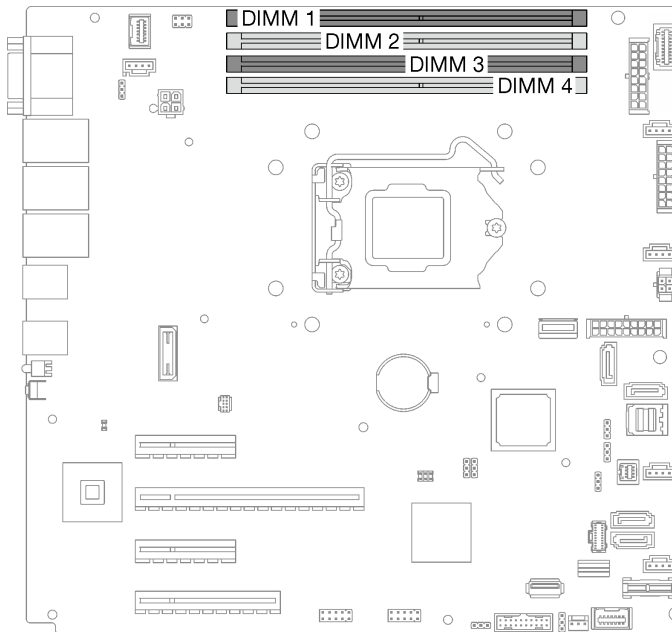


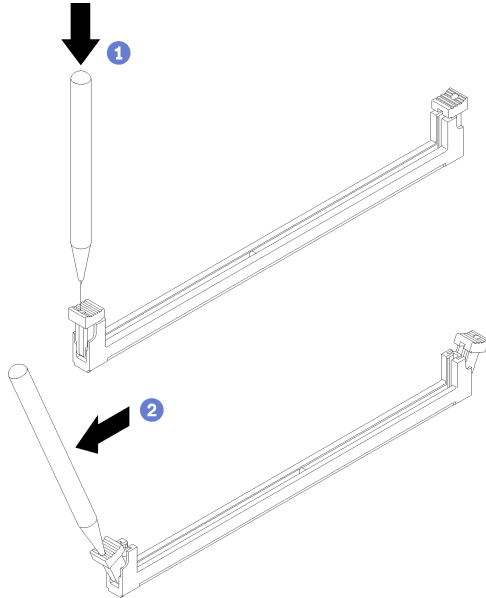
Figure 42. Memory module slots on the system board

- Step 2. Open the retaining clips on each end of memory module slot.
- a. ① Place the tip of the tool in the recess on the top of the retaining clip.
  - b. ② Carefully rotate the retaining clip away from the memory module slot.



**Attention:**

- To avoid breaking the retaining clips or damaging the memory module slots, handle the clips gently.
- If necessary, you can use a pointed tool to open the retaining clips due to space constraints. Pencils are not recommended as a tool as they may not be strong enough.



*Figure 43. Opening retaining clips*

- Step 3. Touch the static-protective package that contains the memory module to any unpainted surface on the outside of the server. Then, remove the memory module from the package and place it on a static-protective surface.
- Step 4. Install the memory module.
- a. ① Make sure that the retaining clips are in the fully open position.
  - b. ② Align the memory module with the slot, and gently place the memory module on the slot with both hands.
  - c. ③ Firmly press both ends of the memory module straight down into the slot until the retaining clips snap into the locked position.

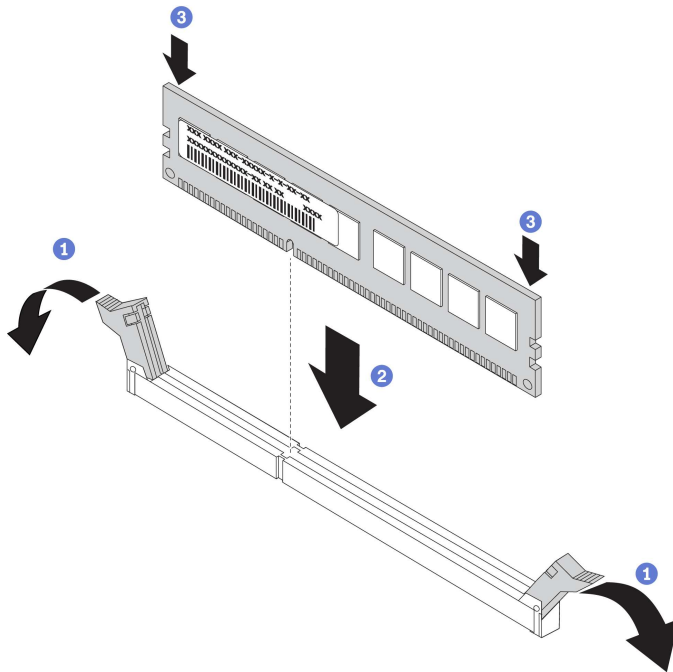


Figure 44. Installing a memory module

**Note:** If there is a gap between the memory module and the retaining clips, the memory module has not been correctly inserted. In this case, open the retaining clips, remove the memory module, and then reinsert it.

## Install the M.2 drive

Use this information to install the M.2 drive.

### About this task

To avoid potential danger, read and follow the following safety statements.

- **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.

#### Attention:

- Read the “Installation guidelines” on page 85 to ensure that you work safely.
- 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.

#### Watch the procedure

A video of this procedure is available at YouTube: <https://youtube.com/playlist?list=PLYV5R7hVcs-DoEcxrm2zKNpaK0dZ3f8Qc>.

## Procedure

Step 1. Locate the M.2 drive slot on the M.2 boot adapter.

**Note:** As ThinkSystem ST250 V2 supports two M.2 drives, install your M.2 drive in **slot 0** first.

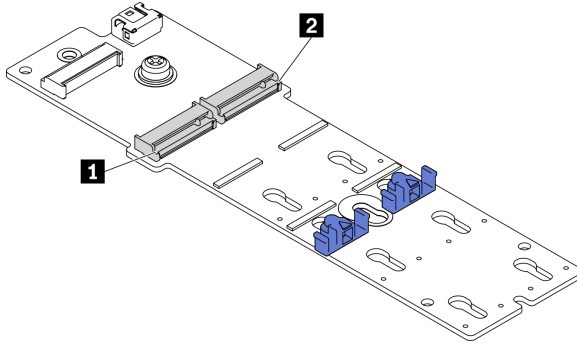


Figure 45. M.2 drive slots

Table 24. M.2 drive slot locations on M.2 boot adapter

|                           |                           |
|---------------------------|---------------------------|
| <b>1</b> M.2 drive slot 0 | <b>2</b> M.2 drive slot 1 |
|---------------------------|---------------------------|

Step 2. Install an M.2 drive.

- a. **1** Insert the M.2 drive at an angle into the connector.
- b. **2** Pivot the M.2 drive down until the notch catches on the lip of the retainer.
- c. **3** Slide the retainer forward (towards the connector) to secure the M.2 drive into place.

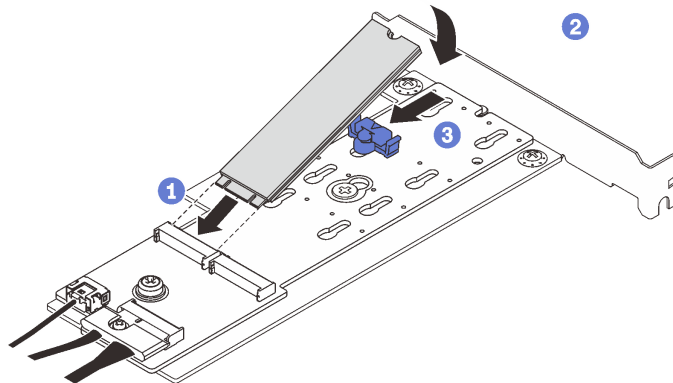


Figure 46. Installing an M.2 drive

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

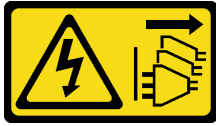
## Install a RAID flash power module

Use this information to install a RAID flash power module.

## About this task

To avoid potential danger, read and follow the following safety statements.

- **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.

### Attention:

- Read the “Installation guidelines” on page 85 to ensure that you work safely.
- 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.

### Watch the procedure

A video of this procedure is available at YouTube: <https://youtube.com/playlist?list=PLYV5R7hVcs-DoEcxrm2zKNpaK0dZ3f8Qc>.

## Procedure

**Note:** Your RAID flash power module might look slightly different from those shown in the illustrations.

Step 1. Install the RAID flash power module into the bracket.

- 1 Align the RAID flash power module with the bracket.
- 2 Rotate the other end of the module inward until it is secured in the bracket.

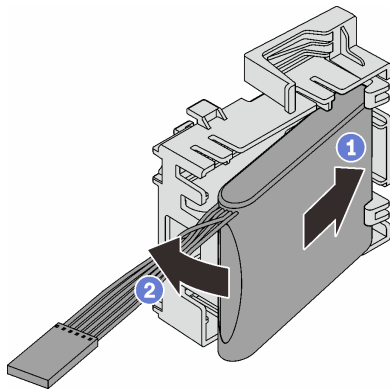


Figure 47. Installing the RAID flash power module into the bracket

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

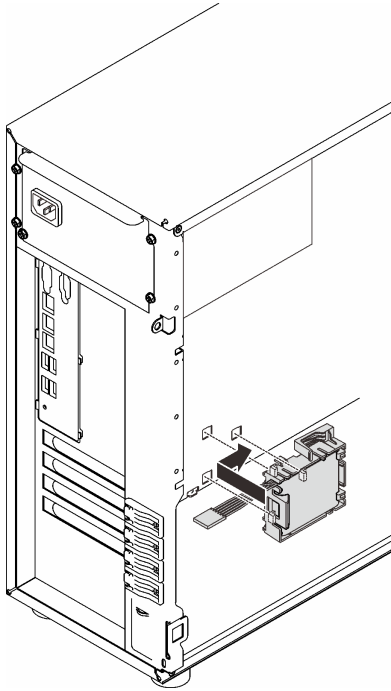
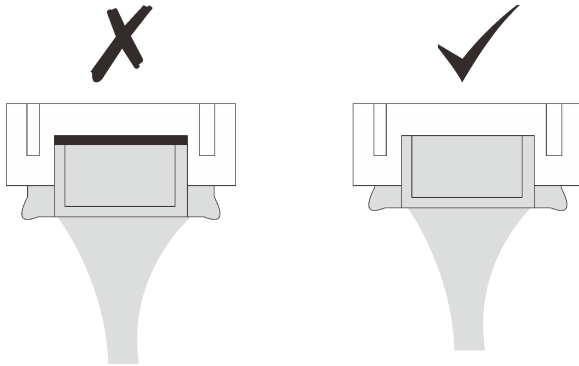


Figure 48. Installing the RAID flash power module and bracket assembly onto the chassis

Step 3. Connect the RAID flash power module cable to the RAID adapter. See “M.2 adapter, intrusion switch, and RAID flash power module” on page 66.

**Note:** Make sure that the RAID flash power module cable connector is fully seated in place as illustrated when being plugged into the connector on the 9350-8i or 9350-16i RAID adapter.



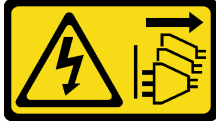
## Install a PCIe adapter

Use this information to install a PCIe adapter.

### About this task

To avoid potential danger, read and follow the following safety statements.

- **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.

**Attention:**

- Read the “Installation guidelines” on page 85 to ensure that you work safely.
- Use any documentation that comes with the PCIe adapter and follow those instructions in addition to the instructions in this section.
- 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.

**Notes:**

- Depending on the specific type, your PCIe adapter might look different from the illustration in this section.

**Watch the procedure**

A video of this procedure is available at YouTube: <https://youtube.com/playlist?list=PLYV5R7hVcs-DoEcXrm2zKNpaK0dZ3f8Qc>.

Four PCIe slots are available in this server. Follow the following priority when installing PCIe adapters.

- When the M.2 adapter is to be installed, install it to **Slot 4** first.
- Otherwise, following the following order based on the type of adapters:

- **RAID adapters** (Slot 2<sup>\*</sup> >> 4<sup>\*</sup> >> 3 >> 1)<sup>1</sup>

(Listing in the order of priority)

1. ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Adapter
2. ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Adapter
3. ThinkSystem RAID 5350-8i PCIe 12Gb Adapter
4. ThinkSystem 4350-8i SAS/SATA 12Gb HBA
5. ThinkSystem 430-8e SAS/SATA 12Gb HBA

- **Network adapters** (Slot 1 >> 3 >> 4<sup>\*</sup> >> 2<sup>\*</sup>)

(Listing in the order of priority)

1. Broadcom 57414 10/25GbE SFP28 2-port PCIe Ethernet Adapter (only supported by Slot 1 >> 4)
2. Intel X710-DA4 4x10Gb SFP+ Adapter
3. ThinkSystem Intel E810-DA2 10/25GbE SFP28 2-Port PCIe Ethernet Adapter
4. Broadcom 5719 1GbE RJ45 4-Port PCIe Ethernet Adapter
5. ThinkSystem Intel X710-T4L 10GBASE-T 4-Port PCIe Ethernet Adapter
6. ThinkSystem Intel I350-T4 PCIe 1Gb 4-Port RJ45 Ethernet Adapter
7. Intel X550-T2 Dual Port 10GBase-T Adapter

---

1. Slot 1 only supports ThinkSystem 430-8e HBA

8. ThinkSystem Intel I350-T2 PCIe 1Gb 2-Port RJ45 Ethernet Adapter
9. Broadcom 5720 1GbE RJ45 2-Port PCIe Ethernet Adapter

\* If the slot is available.

**Note:** Slot 1 and Slot 3 in the ST250 V2 are open-end design, which means that the slots can accept adapters with a longer edge connector than the physical length of the slot connector. For example, if a x8 adapter is installed in the x4 slot 3 of the server, half of the edge connector will not be connected to the slot. The adapter will still function, however performance will be impacted.

## Procedure

- Step 1. Lay the server on its side for easier operation.
- Step 2. Locate the applicable PCIe slot (see “Specifications” on page 5 to identify the different types of PCIe slots in your server).
- Step 3. If a bracket is installed in the PCIe slot, remove it. Save the bracket for future use.
- Step 4. Open the retaining clip, and position the PCIe adapter over the slot.
- Step 5. Install a PCIe adapter.
  - a. ① Carefully press the PCIe adapter straight down until it is seated in the slot.
  - b. ② Close the retaining clip to secure the PCIe adapter in place.

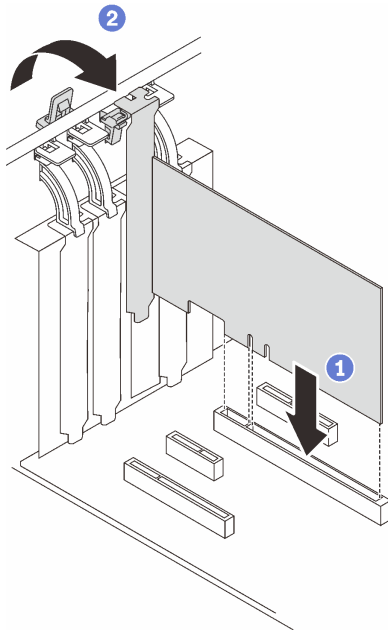


Figure 49. Installing a PCIe adapter

## After this task is completed

Depending on the type of the PCIe adapter, you might need to connect any required cables.

- After installing RAID adapters, see Cable routing for hot-swap drives with hardware RAID to complete the corresponding cable routing.
- After installing M.2 boot adapter, see “M.2 adapter, intrusion switch, and RAID flash power module” on page 66 to complete cable routing.

- After installing the following RAID adapters, see “M.2 adapter, intrusion switch, and RAID flash power module” on page 66 to complete cable routing for the RAID flash power module.
  - ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Adapter (with flash power module)
  - ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Adapter (with flash power module)

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

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

### About this task

To avoid potential danger, read and follow the following safety statements.

- **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.

#### Attention:

- Read the “Installation guidelines” on page 85 to ensure that you work safely.
- 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.

#### Watch the procedure

A video of this procedure is available at YouTube: <https://youtube.com/playlist?list=PLYV5R7hVcs-DoEcxrm2zKNpaK0dZ3f8Qc>.

### Procedure

Step 1. Position the 2.5-inch drive into the 2.5-inch to 3.5-inch drive adapter.



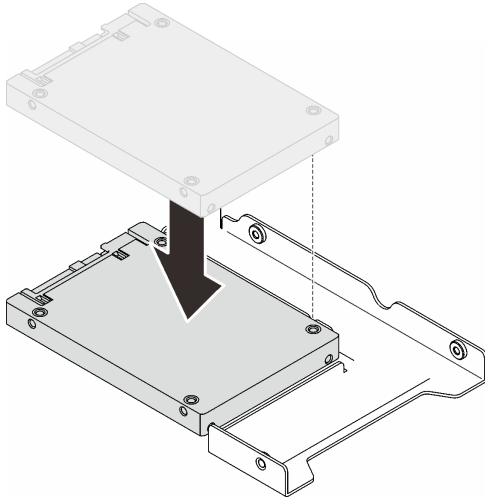


Figure 50. Positioning the 2.5-inch drive into the drive adapter

- Step 2. Align the two screw holes in the drive with the corresponding holes in the drive adapter; then, secure the drive to the drive adapter with the two screws.

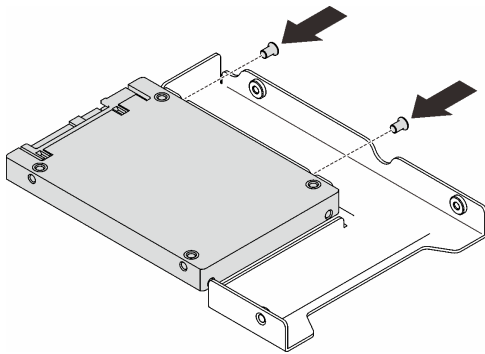


Figure 51. Installing the screws to secure the drive to the drive adapter

- Step 3. Locate the drive bay to install the drive tray.  
Step 4. Align the screw holes on the drive adapter and the drive with the corresponding holes in the tray; then, secure the drive adapter and the drive into the tray with the five screws.

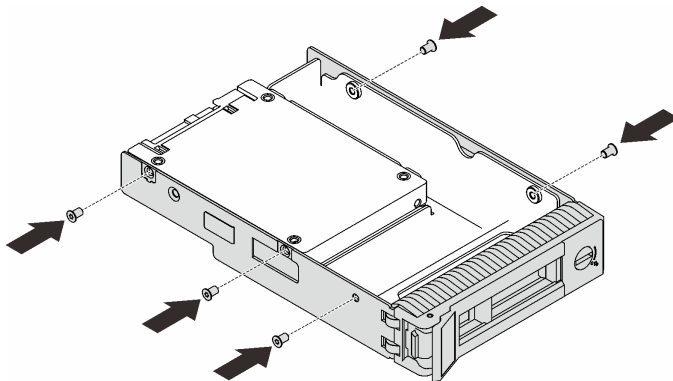


Figure 52. Installing the screws to secure the drive adapter and the drive to the drive tray

Step 5. Slide the tray into the drive bay from the front until it snaps into place, and then completely close the handle.

## Install a hot-swap drive

Use this information to install a hot-swap drive.

### About this task

#### Attention:

- Read the “Installation guidelines” on page 85 to ensure that you work safely.
- 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 avoid damage to the drive connectors, make sure that the server top cover is in place and fully closed whenever you install or remove a hot-swap drive.
- To make sure that there is adequate system cooling, do not operate the server for more than two minutes without either a drive or a filler installed in each bay.
- Before you remove or make changes to drives, drive controllers (including controllers that are integrated on the system board), drive backplanes or drive cables, back up all important data that is stored on drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

The following notes describe the type of drives that your server supports and other information that you must consider when you install a drive.

- Locate the documentation that comes with the drive and follow those instructions in addition to the instructions in this chapter.
- Depending on your server models, your server supports the following drive types:
  - Up to sixteen 2.5-inch hot-swap SATA/SAS drives
  - Up to eight 3.5-inch hot-swap SATA/SAS drives
  - Up to four 3.5-inch hot-swap SATA/SAS drives and eight 2.5-inch hot-swap SATA/SAS drives
- For a complete list of supported drives and optional devices for the server, see: <https://static.lenovo.com/us/en/serverproven/index.shtml>
- 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 17.
- The drives in a single RAID array must be the same type, same size, and same capacity.

### Watch the procedure

A video of this procedure is available at YouTube: <https://youtube.com/playlist?list=PLYV5R7hVcs-DoEcxrm2zKNpaK0dZ3f8Qc>.

### Procedure

- Step 1. If a drive filler is installed in this drive bay, remove it first. Keep the drive filler in a safe place for future use.
- Step 2. Make sure that the drive tray handle is in the open position. Slide the drive into the drive bay until it clicks in place.
- Step 3. Rotate the drive handle to the fully closed position.

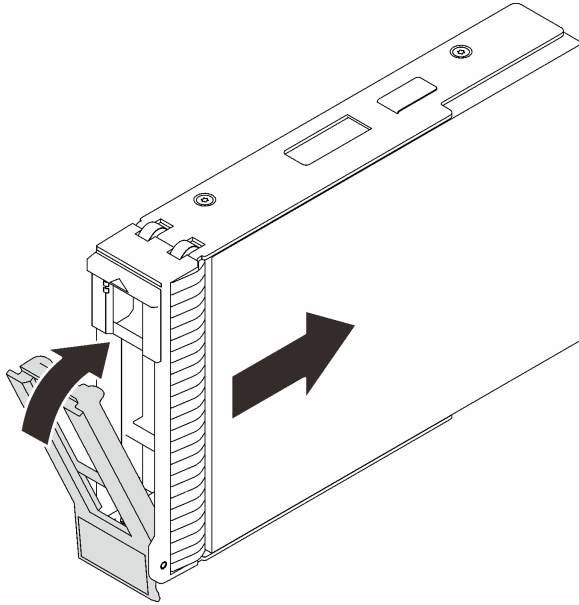


Figure 53. Installing the hot-swap drive

## Install a simple-swap drive

Use this information to install a simple-swap drive.

### About this task

To avoid potential danger, read and follow the following safety statements.

- **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.**

#### **Attention:**

- Read the “Installation guidelines” on page 85 to ensure that you work safely.
- 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 avoid damage to the drive connectors, make sure that the server top cover is in place and fully closed whenever you install or remove a simple-swap drive.
- To make sure that there is adequate system cooling, do not operate the server for more than two minutes without either a drive or a filler installed in each bay.
- Before you remove or make changes to drives, drive controllers (including controllers that are integrated on the system board), drive backplanes or drive cables, back up all important data that is stored on drives.
- If an NVMe drive is to be removed, it is recommended to disable it beforehand via the operating system.

- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

The following notes describe the type of drives that your server supports and other information that you must consider when you install a drive.

- Locate the documentation that comes with the drive and follow those instructions in addition to the instructions in this chapter.
- Depending on your server models, your server supports the following drive types:
  - Up to four 3.5-inch simple-swap SATA drives
  - Up to three 3.5-inch simple-swap SATA drives and one NVMe drive
- For a complete list of supported drives and optional devices for the server, see: <https://static.lenovo.com/us/en/serverproven/index.shtml>
- 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 17.
- The drives in a single RAID array must be the same type, same size, and same capacity.

### Watch the procedure

A video of this procedure is available at YouTube: <https://youtube.com/playlist?list=PLYV5R7hVcs-DoEcxrm2zKNpaK0dZ3f8Qc>.

### Procedure

- Step 1. If the drive bay has a drive filler installed, remove it. Keep the drive filler in a safe place for future use.
- Step 2. Ensure that the drive 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 3. Rotate the drive handle to the fully closed position to lock the drive in place.

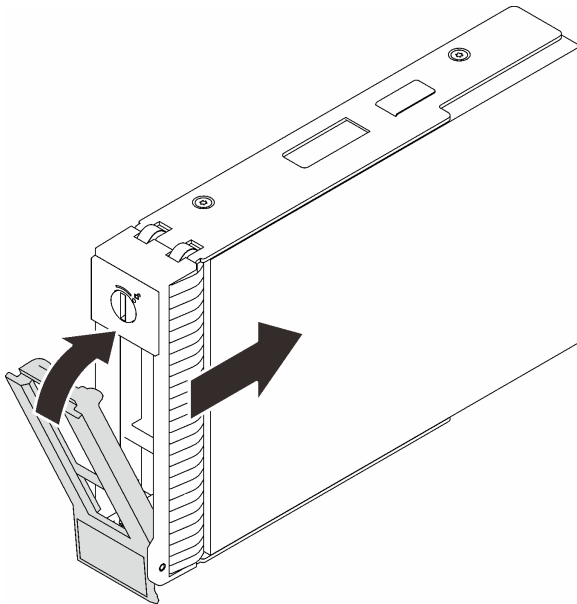


Figure 54. Installing the simple-swap drive

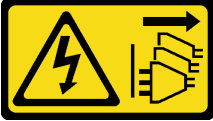
## Install an optical drive

Use this information to install an optical drive.

### About this task

To avoid potential danger, read and follow the following safety statements.

- **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.

- **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.

**Attention:**

- Read the “Installation guidelines” on page 85 to ensure that you work safely.
- 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.

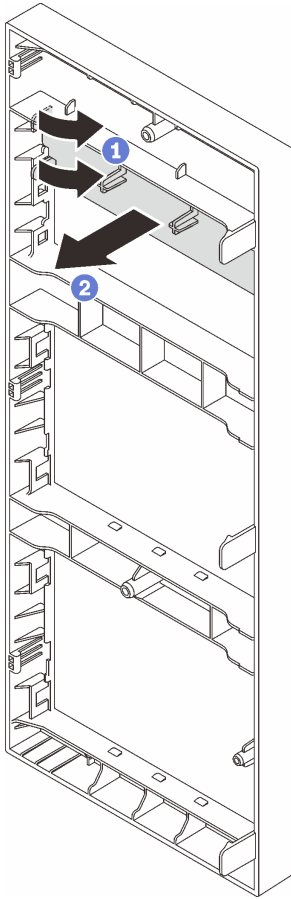
### Watch the procedure

A video of this procedure is available at YouTube: <https://youtube.com/playlist?list=PLYV5R7hVcs-DoEcXrm2zKNpaK0dZ3f8Qc>.

To install an optical drive, complete the following steps:

### Procedure

- Step 1. If necessary, remove the plastic bay filler from the optical drive bay.
  - a. ① Press the tabs on the side of the plastic bay filler of the optical drive bay.
  - b. ② Remove the drive bay filler as shown.



*Figure 55. Removing the plastic bay filler from the optical drive bay*

Step 2. If necessary, insert two of your fingers into the holes in the EMI shield and carefully pull the EMI shield out of the chassis.

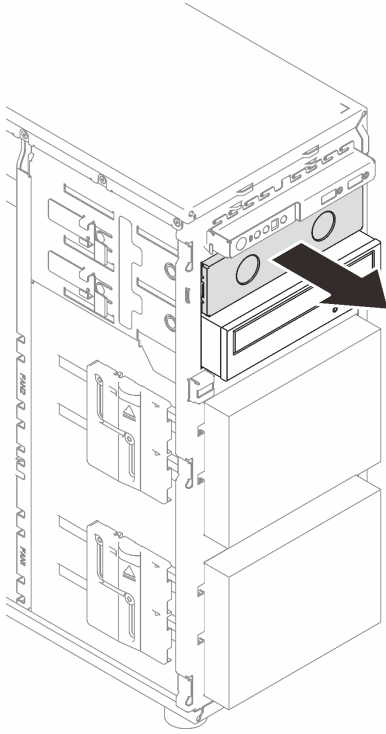


Figure 56. Removing the EMI shield from the optical drive bay

- Step 3. Gently pull the metal tab on the side of the chassis, and insert the optical drive into the optical drive bay.
- Step 4. Release the tab and keep sliding the optical drive until it snaps into place.

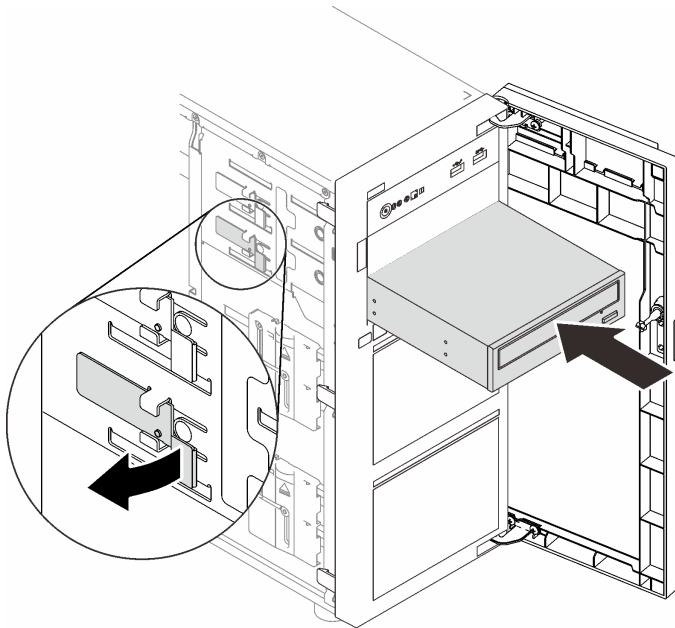


Figure 57. Installing an optical drive

- Step 5. Connect the power cable and the signal cable to the rear of the optical drive. See “Optical/tape drives” on page 66.

Step 6. Save the removed EMI-protective shield from the chassis and the plastic bay filler from the front bezel for future use.

## Install a tape drive

Use this information to install a tape drive.

### About this task

To avoid potential danger, read and follow the following safety statements.

- **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.

- **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.

**Attention:**

- Read the “Installation guidelines” on page 85 to ensure that you work safely.
- 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.

**Watch the procedure**

A video of this procedure is available at YouTube: <https://youtube.com/playlist?list=PLYV5R7hVcs-DoEcxrm2zKNpaK0dZ3f8Qc>.

To install a tape drive, complete the following steps:

### Procedure

Step 1. The tape drive must be installed into the lower optical drive bay. If a filler is installed in the drive bay, remove it first. Keep the drive filler in a safe place for future use.



- 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 place.

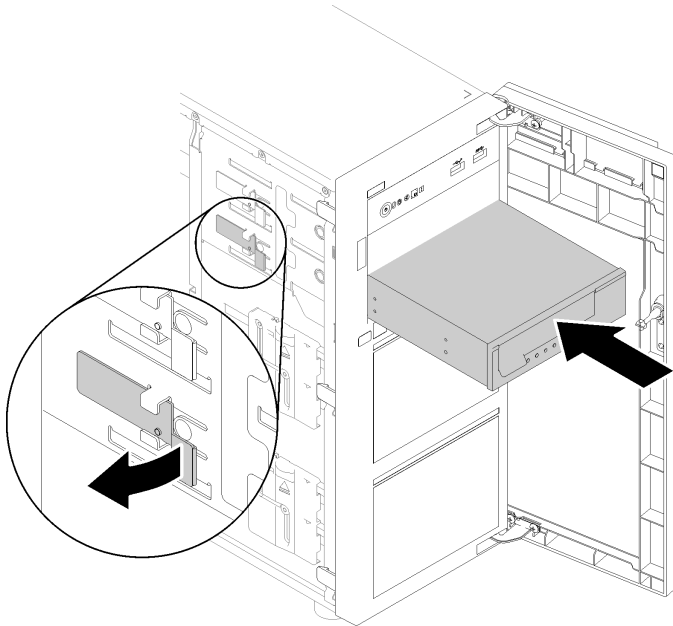


Figure 58. Installing a tape drive

- Step 3. Connect the power and signal cables to the rear of the tape drive. See “Optical/tape drives” on page 66.

## Install the server cover

Use this information to install the server cover.

### About this task

To avoid potential danger, read and follow the following safety statements.

- **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.

- **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.

**Attention:**

- Read the “Installation guidelines” on page 85 to ensure that you work safely.
- 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.
- Ensure that all internal cables are correctly routed (see Chapter 3 “Internal cable routing” on page 63).

**Watch the procedure**

A video of this procedure is available at YouTube: <https://youtube.com/playlist?list=PLYV5R7hVcs-DoEcxrm2zKNpaK0dZ3f8Qc>.

**Procedure**

Step 1. Install the server cover.

- a. ① Align the tabs on the server cover with the corresponding slots on the top edge of the chassis.
- b. ② Pivot the server cover to close it.

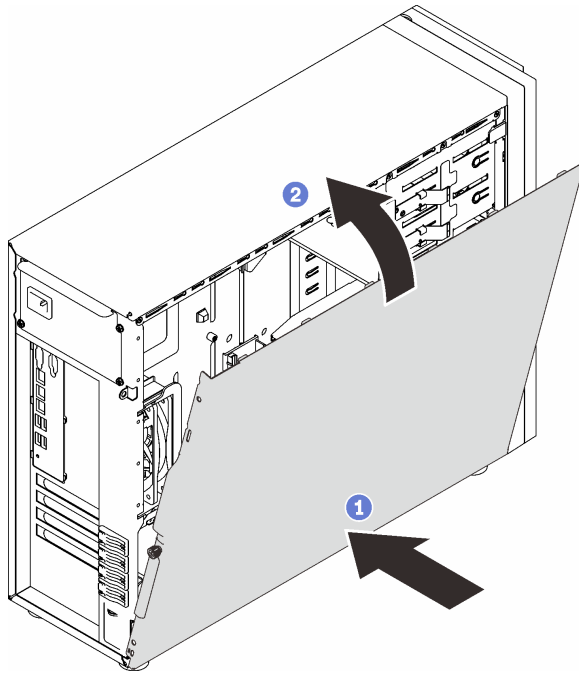


Figure 59. Positioning the server cover onto the chassis

**Note:** Before sliding the cover forward, ensure that all the tabs on the cover align to the slots and engage the chassis properly.

Step 2. Secure the server cover to the chassis.

- a. ① Slide the server cover towards the front of the chassis until it stops.
- b. ② Tighten the thumbscrew with a screwdriver to secure the server cover.

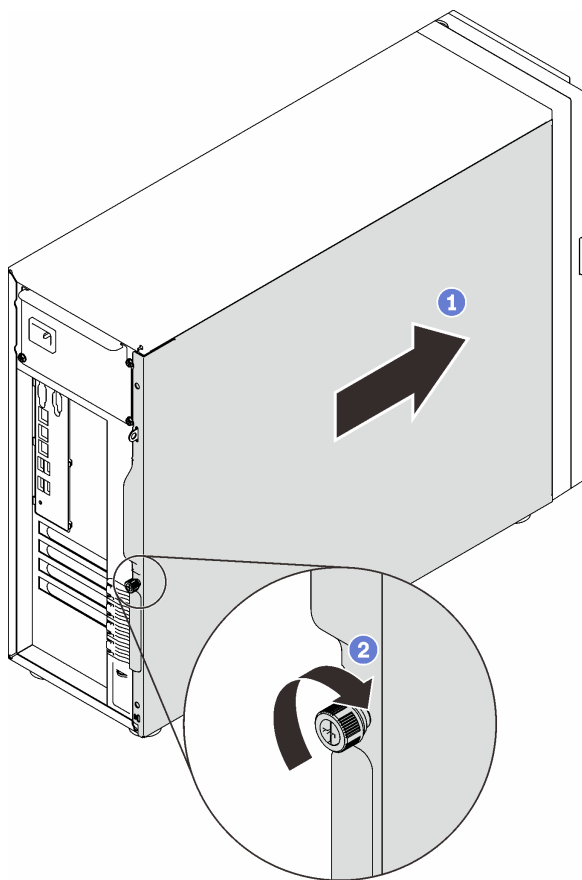


Figure 60. Securing the server cover to the chassis

---

## Install the server into the rails

Follow instructions in this section to install ST250 V2 into the rails.

### 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.

## 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.

## **About this task**

### **Attention:**

- Read the “Installation guidelines” on page 85 to ensure that you work safely.
- Turn off the server and peripheral devices, and disconnect the power cords and all external cables (see “Power off the server” on page 130).

### **Watch the procedure**

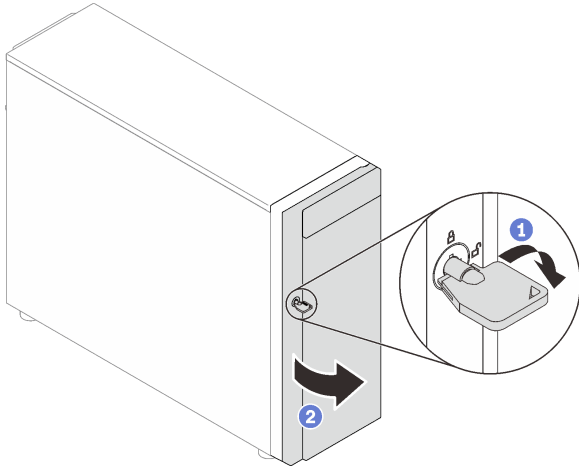
A video of this procedure is available at YouTube: <https://youtube.com/playlist?list=PLYV5R7hVcs-DoEcxrm2zKNpaKOdZ3f8Qc>.

## **Procedure**

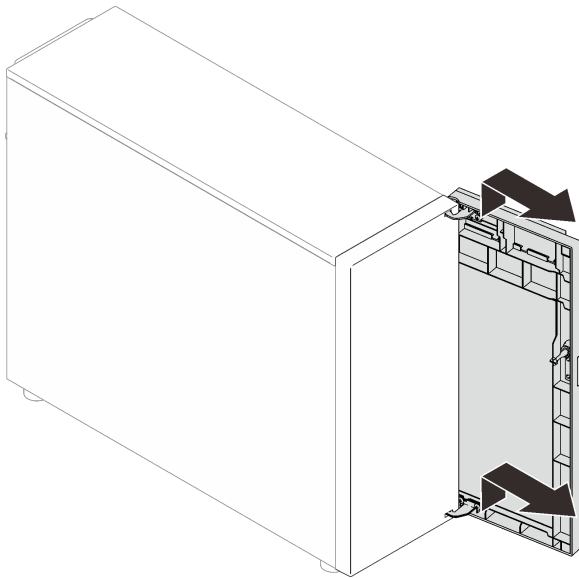
**Note:** Your system might look slightly different from those shown in the illustrations.

Step 1. Unlock ST250 V2 front door.

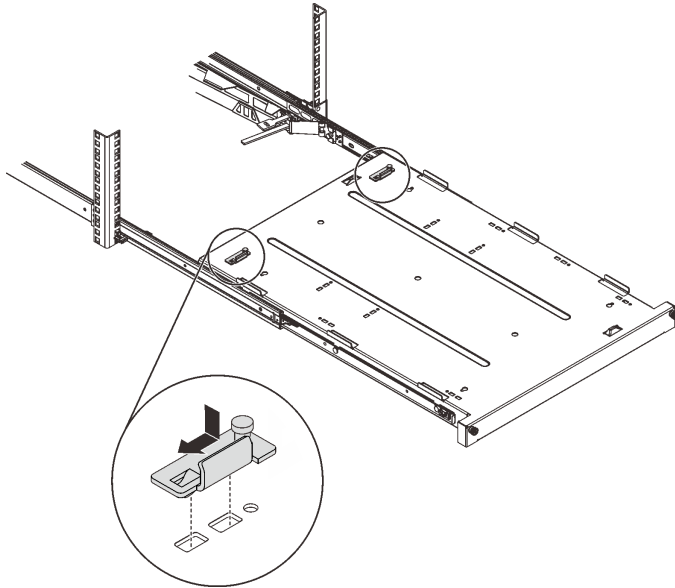
- a. ① Slide and push the key into the corresponding hole on the front door and turn it clockwise to unlock the door.
- b. ② Open the front door.



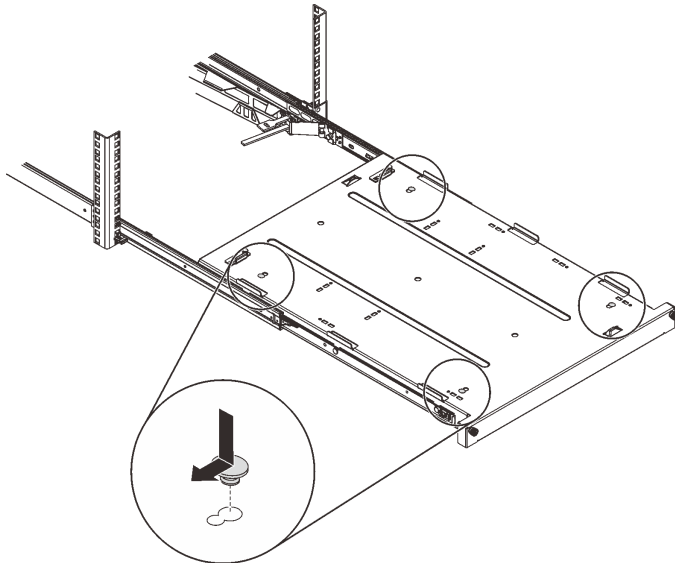
Step 2. Lift the front door to detach the hinge, and remove it from the server.



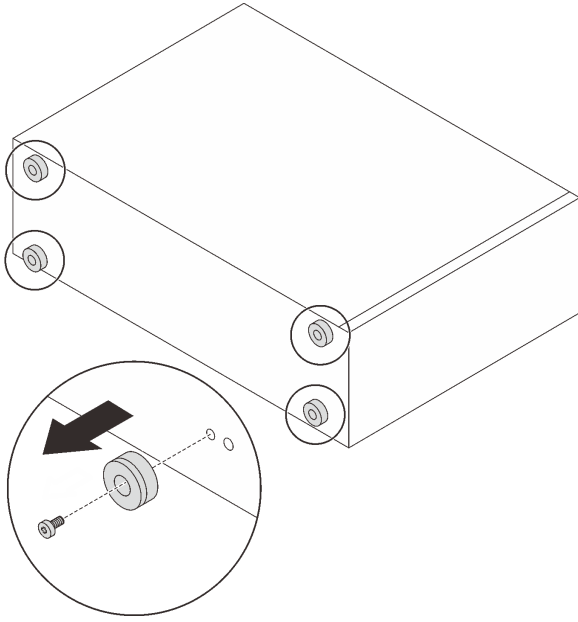
Step 3. Install the two brackets as illustrated.



Step 4. Install the four rubber safety pads as illustrated.



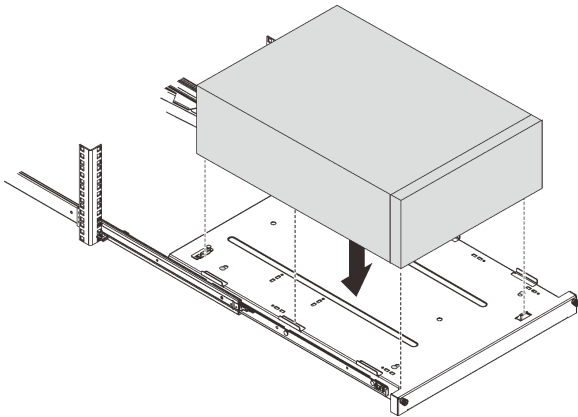
Step 5. Remove the four screws and feet from the server.



Step 6. Align the server with the brackets and the tab on the front of the tray; then, gently place the server on the tray.



**CAUTION:**  
Use safe practices when lifting the server.

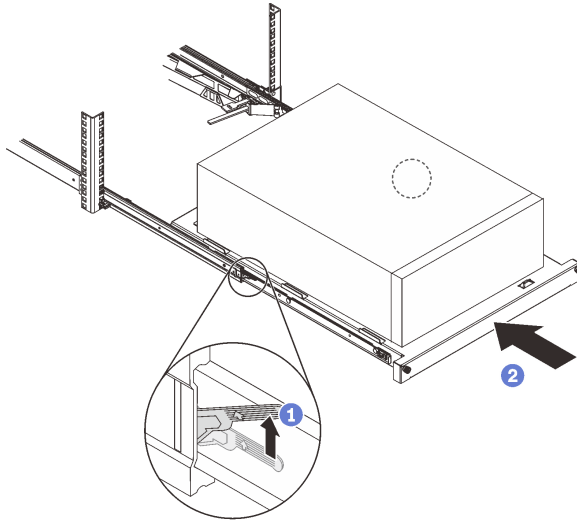


Step 7. Install the server into the rack cabinet.

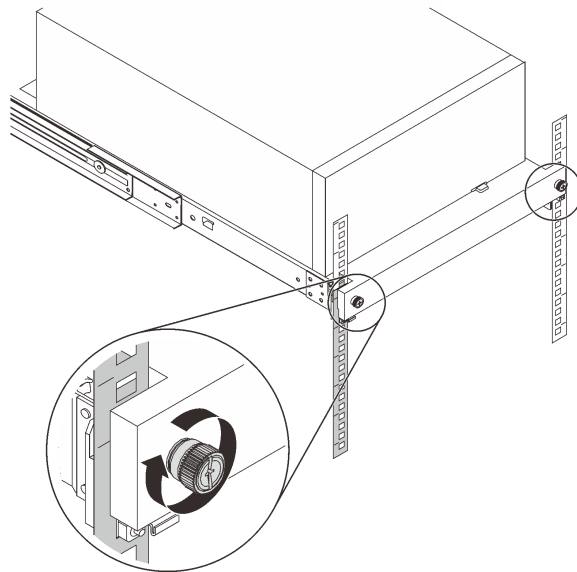
- 1 Lift the rail latches on both sides.
- 2 Gently slide and push the tray into the rack cabinet.

**CAUTION:**  
To avoid hurting yourself, keep your hands from the latch area when the latches approach the outer rail.





Step 8. Secure the tray with two M6 x 16 screws to the front of the rack cabinet.



---

## 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 130.

---

## 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 130.

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## Chapter 5. System configuration

Complete these procedures to configure your system.

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### 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. When you see <F1> Setup, press F1 to open up the Lenovo XClarity Provisioning Manager.
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 22.

**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 17.

**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](http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/lxca_usemobileapp.html)

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## Set front USB port for Lenovo XClarity Controller connection

Before you can access the Lenovo XClarity Controller through the front USB port, you need to configure the USB port for Lenovo XClarity Controller connection.

### Server support

To see if your server supports accessing Lenovo XClarity Controller through the front USB port, check one of the following:

- Refer to Chapter 2 “Server components” on page 15.



- If there is a wrench icon on the USB port of your server, you can set the USB port to connect to Lenovo XClarity Controller.

### Setting the USB port for Lenovo XClarity Controller connection

You can switch the USB port 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 Chapter 2 “Server components” on page 15 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://sysmgt.lenovofiles.com/help/topic/lxcc\\_frontend/lxcc\\_overview.html](https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.html).
- From the Lenovo XClarity Controller management controller web interface, click **BMC Configuration** → **Network** → **Front Panel USB Port Manager**. For information about Lenovo XClarity Controller web interface functions, see the “Description of XClarity Controller functions on web interface” section in the XCC documentation compatible with your server at [https://sysmgt.lenovofiles.com/help/topic/lxcc\\_frontend/lxcc\\_overview.html](https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.html).

### Checking USB port current setting

You can also check the current setting of the USB port 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 Manager**). See the “Command-line interface” and “Description of XClarity Controller functions on web interface” sections in the XCC documentation compatible with your server at [https://sysmgt.lenovofiles.com/help/topic/lxcc\\_frontend/lxcc\\_overview.html](https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.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/us/en/products/servers/thinksystem/st250v2/7D8F/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 Operating System executing on the server's operating system.
- **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 |
|--|--|------------------------------|------------------------------|--------------------------|-------------------------|----------------|
| <b>Lenovo XClarity Provisioning Manager (LXPM)</b>   | In-band <sup>2</sup><br>On-Target                              | √                            |                              | √                        |                         |                |
| <b>Lenovo XClarity Controller (XCC)</b>  | Out-of-band<br>Off-Target                                      | √                            | Selected I/O devices         | √                        |                         |                |
| <b>Lenovo XClarity Essentials OneCLI (OneCLI)</b>  | In-band<br>Out-of-band<br>On-Target<br>Off-Target              | √                            | All I/O devices              |                          | √                       | √              |
| <b>Lenovo XClarity Essentials UpdateXpress (LXCE)</b>                                      | In-band<br>Out-of-band<br>On-Target<br>Off-Target              | √                            | All I/O devices              | √                        |                         | √              |
| <b>Lenovo XClarity Essentials Bootable Media Creator (BoMC)</b>                            | In-band<br>Out-of-band<br>Off-Target                           | √                            | All I/O devices              | √<br>(BoMC application)  | √<br>(BoMC application) | √              |
| <b>Lenovo XClarity Administrator (LXCA)</b>  | In-band <sup>1</sup><br>Out-of-band <sup>2</sup><br>Off-Target | √                            | All I/O devices              | √                        |                         | √              |
| <b>Lenovo XClarity Integrator (LXCI) for VMware vCenter</b>                                | Out-of-band<br>Off-Target                                      | √                            | Selected I/O devices         | √                        |                         |                |
| <b>Lenovo XClarity Integrator (LXCI) for Microsoft Windows Admin Center</b>                | In-band<br>Out-of-band<br>On-Target<br>Off-Target              | √                            | All I/O devices              | √                        |                         | √              |
| <b>Lenovo XClarity Integrator (LXCI) for Microsoft System Center Configuration Manager</b> | In-band<br>On-Target   | √                            | All I/O devices              | √                        |                         | √              |
| <b>Notes:</b>  |  |                              |                              |                          |                         |                |
| 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 press F1. 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://sysmgt.lenovofiles.com/help/topic/lxpm\\_frontend/lxpm\\_product\\_page.html](https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html)

- **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://sysmgt.lenovofiles.com/help/topic/lxcc\\_frontend/lxcc\\_overview.html](https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.html)

- 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 specific details about updating firmware using Lenovo XClarity Controller, see:

“Updating Server Firmware” section in the XCC documentation compatible with your server at [https://sysmgt.lenovofiles.com/help/topic/lxcc\\_frontend/lxcc\\_overview.html](https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.html)

- **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 specific details about updating firmware using Lenovo XClarity Essentials OneCLI, see:

[http://sysmgt.lenovofiles.com/help/topic/toolstr\\_cli\\_lenovo/onecli\\_c\\_update.html](http://sysmgt.lenovofiles.com/help/topic/toolstr_cli_lenovo/onecli_c_update.html)

- **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.

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

[http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/update\\_fw.html](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 specific details about updating firmware using Lenovo XClarity Integrator offerings, see:

[https://sysmgt.lenovofiles.com/help/topic/lxci/lxci\\_product\\_page.html](https://sysmgt.lenovofiles.com/help/topic/lxci/lxci_product_page.html)

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## Configure the firmware

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

**Important:** Do not configure option ROMs to be set to **Legacy** unless directed to do so by Lenovo Support. This setting prevents UEFI drivers for the slot devices from loading, which can cause negative side effects for Lenovo software, such as Lenovo XClarity Administrator and Lenovo XClarity Essentials OneCLI, and to the Lenovo XClarity Controller. The side effects include the inability to determine adapter card details, such as model name and firmware levels. When adapter card information is not available, generic information for the model name, such as "Adapter 06:00:00" instead of the actual model name, such as "ThinkSystem RAID 930-16i 4GB Flash." In some cases, the UEFI boot process might also hang.

- **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 press **F1**. 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://sysmgt.lenovofiles.com/help/topic/lxpm\\_frontend/lxpm\\_product\\_page.html](https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html)
- *UEFI User Guide*
  - [https://thinksystem.lenovofiles.com/help/topic/dcg\\_uefi/overview\\_dcg\\_uefi.html](https://thinksystem.lenovofiles.com/help/topic/dcg_uefi/overview_dcg_uefi.html)

- **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:

[http://sysmgt.lenovofiles.com/help/topic/toolsctr\\_cli\\_lenovo/onecli\\_c\\_settings\\_info\\_commands.html](http://sysmgt.lenovofiles.com/help/topic/toolsctr_cli_lenovo/onecli_c_settings_info_commands.html)

- **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](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://sysmgt.lenovofiles.com/help/topic/lxcc\\_frontend/lxcc\\_overview.html](https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.html)

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## 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](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 [the \*ThinkSystem ST250 V2 Memory Population Reference\*](#).

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## 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>

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## Deploy the operating system

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

### Available operating systems

- Microsoft Windows Server 2019, 2022
- VMware ESXi 7.0 U3 or later versions
- Red Hat Enterprise Linux 8.4 or later versions
- SUSE Linux Enterprise Server 15 SP3 or later versions

Complete list of available operating systems: <https://lenovopress.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](http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/compute_node_image_deployment.html)

- Lenovo XClarity Essentials OneCLI

[http://sysmgt.lenovofiles.com/help/topic/toolstr\\_cli\\_lenovo/onecli\\_r\\_uxspi\\_proxy\\_tool.html](http://sysmgt.lenovofiles.com/help/topic/toolstr_cli_lenovo/onecli_r_uxspi_proxy_tool.html)

- Lenovo XClarity Integrator deployment pack for SCCM (for Windows operating system only)

[https://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxci\\_deploypack\\_sccm.doc/dpsccm\\_c\\_endtoend\\_deploy\\_scenario.html](https://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxci_deploypack_sccm.doc/dpsccm_c_endtoend_deploy_scenario.html)

- **Single-server**

Available tools:

- Lenovo XClarity Provisioning Manager

“OS Installation” section in the LXPM documentation compatible with your server at [https://sysmgt.lenovofiles.com/help/topic/lxpm\\_frontend/lxpm\\_product\\_page.html](https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html)

- Lenovo XClarity Essentials OneCLI

[http://sysmgt.lenovofiles.com/help/topic/toolstr\\_cli\\_lenovo/onecli\\_r\\_uxspi\\_proxy\\_tool.html](http://sysmgt.lenovofiles.com/help/topic/toolstr_cli_lenovo/onecli_r_uxspi_proxy_tool.html)

- Lenovo XClarity Integrator deployment pack for SCCM (for Windows operating system only)

[https://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxci\\_deploypack\\_sccm.doc/dpsccm\\_c\\_endtoend\\_deploy\\_scenario.html](https://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxci_deploypack_sccm.doc/dpsccm_c_endtoend_deploy_scenario.html)

## 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://sysmgt.lenovofiles.com/help/topic/ixcc\\_frontend/ixcc\\_overview.html](https://sysmgt.lenovofiles.com/help/topic/ixcc_frontend/ixcc_overview.html).

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:

[http://sysmgt.lenovofiles.com/help/topic/toolsctr\\_cli\\_lenovo/onecli\\_r\\_save\\_command.html](http://sysmgt.lenovofiles.com/help/topic/toolsctr_cli_lenovo/onecli_r_save_command.html)

- **Operating system**

Use your 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 F1 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 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 set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value> [access_method]
```

Where:

*<uuid\_value>*

Up to 16-byte hexadecimal value assigned by you.

*[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.SysInfoUUID <uuid_value> --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.SysInfoUUID <uuid_value>
```

**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 set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value>  
--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 F1 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 asset 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://sysmgt.lenovofiles.com/help/topic/ixcc\\_frontend/ixcc\\_overview.html](https://sysmgt.lenovofiles.com/help/topic/ixcc_frontend/ixcc_overview.html).

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## Chapter 6. Resolving installation issues

Use this information 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 143
- “The server immediately displays the POST Event Viewer when it is turned on” on page 143
- “Embedded hypervisor is not in the boot list” on page 143
- “Server cannot recognize a hard drive” on page 144
- “Displayed system memory less than installed physical memory” on page 145
- “A Lenovo optional device that was just installed does not work.” on page 145
- “Voltage planar fault is displayed in the event log” on page 145

### 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. Reseat the power supply.
5. Replace the power supply.

### 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://static.lenovo.com/us/en/serverproven/index.shtml>.

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://static.lenovo.com/us/en/serverproven/index.shtml> 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 the XClarity Controller product documentation:

[https://sysmgt.lenovofiles.com/help/topic/lxcc\\_frontend/lxcc\\_overview.html](https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.html)

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 F1, the LXPM interface is displayed by default. You can perform hard drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → HDD 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 F1, the LXPM interface is displayed by default. You can perform hard drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → HDD 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 less than installed physical memory

Complete the following steps until the problem is resolved:

**Note:** Each time you install or remove a DIMM, 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 DIMM 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.
  - If you changed the memory, you updated the memory configuration 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 DIMMs, and then restart the server.
3. Run memory diagnostics. When you start a server and press F1, the Lenovo XClarity Provisioning Manager interface is displayed by default. You can perform memory diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → Memory test**.
4. Check the POST error log:
  - If a DIMM was disabled by a systems-management interrupt (SMI), replace the DIMM.
  - If a DIMM was disabled by the user or by POST, reseat the DIMM; then, run the Setup utility and enable the DIMM.
5. Reseat the DIMM.
6. Restart the server.

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

1. Make sure that:
  - The device is supported for the server (see <https://static.lenovo.com/us/en/serverproven/index.shtml>).
  - 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 F1 to display the system setup interface. Whenever memory or any other device is changed, you must update the configuration.
2. Reseat the device that you just installed.
3. Replace the device that you just installed.

## 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 5 for the minimally required number of processors and DIMMs.
2. Restart the system.
  - If the system restarts, add each of the items that you removed one at a time, restarting 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.



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## 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.

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### 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 the following location:

<http://thinksystem.lenovofiles.com/help/index.jsp>

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://static.lenovo.com/us/en/serverproven/index.shtml> to make sure that the hardware and software is 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](https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv_eq) to see if someone else has encountered a similar problem.

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.

## Gathering information needed to call Support

If you believe that you require warranty service for your Lenovo product, the service technicians will be able to assist you more efficiently if you prepare before you call. You can also see <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.

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## 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://sysmgt.lenovofiles.com/help/topic/lxcc\\_frontend/lxcc\\_overview.html](https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.html).
- 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://sysmgt.lenovofiles.com/help/topic/lxcc\\_frontend/lxcc\\_overview.html](https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.html).

- **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](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 [http://sysmgt.lenovofiles.com/help/topic/toolsctr\\_cli\\_lenovo/onecli\\_r\\_getinfor\\_command.html](http://sysmgt.lenovofiles.com/help/topic/toolsctr_cli_lenovo/onecli_r_getinfor_command.html).

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## 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/supportphonenumberlist> for your region support details.



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## **Appendix B. Trademarks**

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