



ThinkSystem SR635 Setup Guide



Machine Types: 7Y98 and 7Y99

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

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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Chapter 1. Introduction

The ThinkSystem SR635 server is a 1U rack server designed to be highly flexible to support many kinds of Information Technology (IT) workloads. This high-performance, multi-core server is ideally suited for IT environments that require superior processor performance, input/output (I/O) flexibility, and flexible manageability.

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 right rack latch in the front of the server.

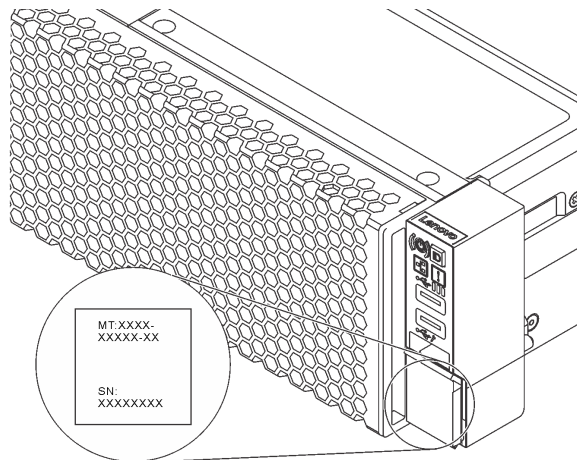


Figure 1. Location of the ID label

Quick response code

The system service label, which is on the top 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 Information Web site provides additional information for parts installation and replacement videos, and error codes for server support.

The following illustration shows the QR code: <https://support.lenovo.com/p/servers/sr635>

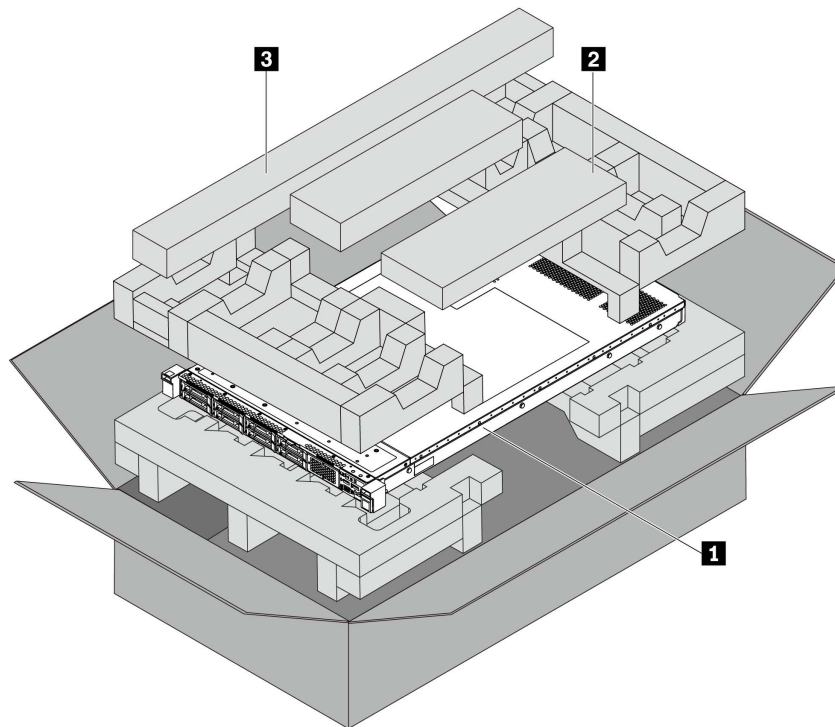


Figure 2. QR code

Server package contents

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

The server package includes the following items:



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

- **1** Server
- **2** Material box, including items such as cable management arm*, accessory kit, power cords* and documentation
- **3** Rail kit*. Detailed instructions for installing the rail kit are provided in the package with the rail 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:

- **Baseboard management controller (BMC)**

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

Note: Because there is no battery backup for RTC in the server, the BMC will load the default date 2020/1/1 after AC cycle. The date will sync with that of BIOS after BIOS initiation.

You can use the ThinkSystem System Manager, a Web-based interface, to access the BMC and apply BMC management options. For detailed information, see:

https://thinksystem.lenovofiles.com/help/topic/7Y00/bmc_user_guide.pdf

- **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 HEAD adapters.

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

- **Large system-memory capacity**

The server supports up to 16 TruDDR4 registered DIMMs (RDIMMs) with Error Checking and Correcting (ECC) technology. For more information about the specific types and maximum amount of memory, see “Specifications” on page 4.

- **Flexible network support**

The server has an Open Compute Project (OCP) 3.0 Ethernet slot for an OCP 3.0 Ethernet adapter, which provides two or four network connectors for network support.

- **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.

Below table lists the supported TPM versions. For more information on TPM configurations, see “Configure security settings” in the *Maintenance Manual*.

TPM version	Type	Outside Chinese Mainland		Chinese Mainland	
		7002 CPU	7003 CPU	7002 CPU	7003 CPU
TPM 1.2	Onboard chip	√			
TPM 2.0	Onboard chip	√	√		
NationZ TPM 2.0	Daughter card			√	√

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

The server models support a maximum of four 3.5-inch hot-swap SAS/SATA storage drives or a maximum of sixteen 2.5-inch hot-swap SAS/SATA/NVMe storage drives.

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

- **Mobile access to Lenovo Service Information Web site**

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

- **Redundant networking connection**

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

- **Redundant cooling and optional power capabilities**

The server supports a maximum of two hot-swap power supplies and six hot-swap 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.

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. Server specifications

Specification	Description
Dimension	<ul style="list-style-type: none"> • 1U • Height: 43.0 mm (1.69 inches) • Width: <ul style="list-style-type: none"> – With rack latches: 482.0 mm (19.0 inches) – Without rack latches: 434.4 mm (17.1 inches) • Depth: 778.3 mm (30.6 inches) <p>Note: The depth is measured with rack latches and power supply installed, but without security bezel installed.</p>
Package weight	Up to 19.2 kg (42.3 lb)
Processor	<ul style="list-style-type: none"> • One AMD® EPYC™ 7002 or 7003 processor • Designed for Land Grid Array (LGA) 4094 (SP3) socket • Scalable up to 64 cores • Thermal Design Power (TDP): up to 280 watts <p>For a list of supported processors, see: https://static.lenovo.com/us/en/serverproven/index.shtml</p>
Heat sink	<ul style="list-style-type: none"> • Standard heat sink • High-performance heat sink

Table 1. Server specifications (continued)

Specification	Description
Memory	<ul style="list-style-type: none"> • Slots: 16 memory module slots • Minimum memory: 8 GB • Maximum memory: 2 TB • Supported memory module type: <ul style="list-style-type: none"> – TruDDR4 2933, single-rank/dual-rank, 8 GB/16 GB/32 GB/64 GB RDIMM – TruDDR4 3200, dual-rank, 16 GB/32 GB/64 GB RDIMM – TruDDR4 2933, quad-rank, 128 GB 3DS RDIMM <p>Note: The operating speed and total memory capacity depend on the processor model and UEFI settings.</p> <p>For a list of supported memory, see the Lenovo ServerProven Web site: https://static.lenovo.com/us/en/serverproven/index.shtml.</p>
Operating systems	<p>Supported and certified operating systems:</p> <ul style="list-style-type: none"> • Microsoft Windows Server • VMware ESXi • Red Hat Enterprise Linux • SUSE Linux Enterprise Server <p>References:</p> <ul style="list-style-type: none"> • Complete list of available operating systems: https://lenovopress.com/osig. • OS deployment instructions: “Deploy the operating system” on page 139.
Internal drives	<ul style="list-style-type: none"> • Up to two M.2 drives • Up to four 3.5-inch hot-swap SAS/SATA drives • Up to twelve 2.5-inch hot-swap SAS/SATA drives • Up to sixteen NVMe drives
PCIe slots	<p>Depending on the model, your server supports up to three PCIe slots in the rear. For detailed information, see “Rear view” on page 18.</p>
Graphics processing unit (GPU)	<ul style="list-style-type: none"> • Maximum: three GPUs • Type: <ul style="list-style-type: none"> – NVIDIA Tesla T4 – NVIDIA Quadro P620
Input/Output (I/O) features	<ul style="list-style-type: none"> • Front panel: <ul style="list-style-type: none"> – One VGA connector (optional) – Two USB 3.2 Gen 1 (5 Gbps) connectors • Rear panel: <ul style="list-style-type: none"> – One VGA connector – Two USB 3.2 Gen 1 (5 Gbps) connectors – Ethernet connectors on OCP 3.0 Ethernet adapter (optional) – One RJ45 BMC management network connector – One serial port

Table 1. Server specifications (continued)

Specification	Description
HBA/RAID adapters (depending on the model)	<p>Support for JBOD mode :</p> <ul style="list-style-type: none"> • 430-8i SAS/SATA 12G HBA adapter • 430-16i SAS/SATA 12G HBA adapter • 430-8e SAS/SATA 12G HBA adapter • 430-16e SAS/SATA 12G HBA adapter • 440-8i SAS/SATA PCIe 12G HBA adapter • 440-16i SAS/SATA PCIe 12G HBA adapter • 440-16e SAS/SATA PCIe 12G HBA adapter <p>Support for JBOD mode and RAID levels 0, 1, 5, 10, and 50:</p> <ul style="list-style-type: none"> • 530-8i PCIe 12G RAID adapter • 730-8i 1G Cache PCIe 12G RAID adapter • 730-8i 2G Flash PCIe 12G RAID adapter <p>Support for JBOD mode and RAID levels 0, 1, 5, 10 ,50 , 6 and 60:</p> <ul style="list-style-type: none"> • 930-8i 2G Flash PCIe 12G RAID adapter • 930-16i 4G Flash PCIe 12G RAID adapter • 930-8e 4G Flash PCIe 12G RAID adapter • 930-16e 4G Flash PCIe 12G RAID adapter • 940-8i 4G Flash PCIe 12G RAID adapter • 940-16i 4G Flash PCIe 12G RAID adapter <p>For technical rules for storage controller adapters, see “Technical rules for HBA/RAID adapters” on page 90.</p>
System fans	Seven dual-rotor hot-swap fans (including one redundant fan rotor)
Power supplies	<p>One or two hot-swap power supplies for redundancy support:</p> <ul style="list-style-type: none"> • 550-watt ac 80 PLUS Platinum • 750-watt ac 80 PLUS Platinum • 750-watt ac 80 PLUS Titanium • 1100-watt ac 80 PLUS Platinum
Minimal configuration for debugging	<ul style="list-style-type: none"> • One processor in processor socket 1 • One memory module in slot 1 • One power supply • One HDD drive or one M.2 drive (if OS is needed for debugging) • Six system fans (depending on the configuration)

Table 1. Server specifications (continued)

Specification	Description																																																								
Acoustical noise emissions	<p>The declared acoustic noise levels are based on below configurations, which may change depending on configurations and conditions:</p> <table border="1"> <thead> <tr> <th>Config.</th> <th>Typical</th> <th>Storage rich</th> <th>GPU rich</th> </tr> </thead> <tbody> <tr> <td>CPU</td> <td>1 x 155 W</td> <td>1 x 155 W</td> <td>1 x 155 W</td> </tr> <tr> <td>DIMM</td> <td>8 x 32 GB</td> <td>16 x 64 GB</td> <td>16 x 64 GB</td> </tr> <tr> <td>Ethernet</td> <td>X710-T2L OCP</td> <td>10 GbE BASE-T 4-port PCIe</td> <td>10 GbE BASE-T 4-port PCIe</td> </tr> <tr> <td>PSU</td> <td>2 x 750 W</td> <td>2 x 750 W</td> <td>2 x 1100 W</td> </tr> <tr> <td>RAID</td> <td>530-8i RAID</td> <td>NA</td> <td>930-16i RAID</td> </tr> <tr> <td>Drive</td> <td>8 x 2.5" HDD</td> <td>16 x 2.5" NVMe SSD</td> <td>10 x 2.5" HDD</td> </tr> <tr> <td>GPU</td> <td>NA</td> <td>NA</td> <td>2 x T4 GPU</td> </tr> </tbody> </table> <p>Acoustic noise levels:</p> <p>Sound power levels (L_{WA,m})</p> <table border="1"> <thead> <tr> <th>Status</th> <th>Typical</th> <th>Storage rich</th> <th>GPU rich</th> </tr> </thead> <tbody> <tr> <td>Idling</td> <td>5.7 Bel</td> <td>7.0 Bel</td> <td>7.0 Bel</td> </tr> <tr> <td>Operating</td> <td>5.9 Bel</td> <td>7.2 Bel</td> <td>8.5 Bel</td> </tr> </tbody> </table> <p>Sound pressure level (L_{pA,m})</p> <table border="1"> <thead> <tr> <th>Status</th> <th>Typical</th> <th>Storage rich</th> <th>GPU rich</th> </tr> </thead> <tbody> <tr> <td>Idling</td> <td>41 dBA</td> <td>54 dBA</td> <td>54 dBA</td> </tr> <tr> <td>Operating</td> <td>43 dBA</td> <td>56 dBA</td> <td>69 dBA</td> </tr> </tbody> </table> <p>Notes:</p> <ul style="list-style-type: none"> • These sound levels were measured in controlled acoustical environments according to procedures specified by ISO7779 and are reported in accordance with ISO 9296. • Government regulations (such as those prescribed by OSHA or European Community Directives) may govern noise level exposure in the workplace and may apply to you and your server installation. The actual sound pressure levels in your installation depend upon a variety of factors, including the number of racks in the installation; the size, materials, and configuration of the room; the noise levels from other equipment; the room ambient temperature, and employee's location in relation to the equipment. Further, compliance with such government regulations depends on a variety of additional factors, including the duration of employees' exposure and whether employees wear hearing protection. Lenovo recommends that you consult with qualified experts in this field to determine whether you are in compliance with the applicable regulations. 	Config.	Typical	Storage rich	GPU rich	CPU	1 x 155 W	1 x 155 W	1 x 155 W	DIMM	8 x 32 GB	16 x 64 GB	16 x 64 GB	Ethernet	X710-T2L OCP	10 GbE BASE-T 4-port PCIe	10 GbE BASE-T 4-port PCIe	PSU	2 x 750 W	2 x 750 W	2 x 1100 W	RAID	530-8i RAID	NA	930-16i RAID	Drive	8 x 2.5" HDD	16 x 2.5" NVMe SSD	10 x 2.5" HDD	GPU	NA	NA	2 x T4 GPU	Status	Typical	Storage rich	GPU rich	Idling	5.7 Bel	7.0 Bel	7.0 Bel	Operating	5.9 Bel	7.2 Bel	8.5 Bel	Status	Typical	Storage rich	GPU rich	Idling	41 dBA	54 dBA	54 dBA	Operating	43 dBA	56 dBA	69 dBA
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Table 1. Server specifications (continued)

Specification	Description																							
Electrical input	<table border="1"> <thead> <tr> <th data-bbox="514 310 743 384">Power supply</th> <th data-bbox="743 310 971 384">100–127 V ac (50–60 Hz)</th> <th data-bbox="971 310 1198 384">200–240 V ac (50–60 Hz)</th> <th data-bbox="1198 310 1417 384">240 V dc*</th> </tr> </thead> <tbody> <tr> <td data-bbox="514 384 743 457">550-watt 80 PLUS Platinum</td> <td data-bbox="743 384 971 457">Yes</td> <td data-bbox="971 384 1198 457">Yes</td> <td data-bbox="1198 384 1417 457">Yes</td> </tr> <tr> <td data-bbox="514 457 743 531">750-watt 80 PLUS Platinum</td> <td data-bbox="743 457 971 531">Yes</td> <td data-bbox="971 457 1198 531">Yes</td> <td data-bbox="1198 457 1417 531">Yes</td> </tr> <tr> <td data-bbox="514 531 743 604">750-watt 80 PLUS Titanium</td> <td data-bbox="743 531 971 604">No</td> <td data-bbox="971 531 1198 604">Yes</td> <td data-bbox="1198 531 1417 604">Yes</td> </tr> <tr> <td data-bbox="514 604 743 678">1100-watt 80 PLUS Platinum</td> <td data-bbox="743 604 971 678">Yes</td> <td data-bbox="971 604 1198 678">Yes</td> <td data-bbox="1198 604 1417 678">Yes</td> </tr> </tbody> </table>				Power supply	100–127 V ac (50–60 Hz)	200–240 V ac (50–60 Hz)	240 V dc*	550-watt 80 PLUS Platinum	Yes	Yes	Yes	750-watt 80 PLUS Platinum	Yes	Yes	Yes	750-watt 80 PLUS Titanium	No	Yes	Yes	1100-watt 80 PLUS Platinum	Yes	Yes	Yes
	Power supply	100–127 V ac (50–60 Hz)	200–240 V ac (50–60 Hz)	240 V dc*																				
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	750-watt 80 PLUS Titanium	No	Yes	Yes																				
	1100-watt 80 PLUS Platinum	Yes	Yes	Yes																				
<p>CAUTION: 240 V dc input (input range: 180–300 V dc) is supported in Chinese Mainland ONLY. Power supply with 240 V dc input cannot support hot plugging power cord function. Before removing the power supply with dc input, please turn off server or disconnect dc power sources at the breaker panel or by turning off the power source. Then, remove the power cord.</p>																								
Environment	<p>The server is supported in the following environment:</p> <p>Note: This server is designed for standard data center environment and recommended to be placed in industrial data center.</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – Operating: <ul style="list-style-type: none"> – ASHRAE class A2: 10–35°C (50–95°F); when the altitude exceeds 900 m (2953 ft), the maximum ambient temperature value decreases by 1°C (1.8°F) with every 300 m (984 ft) of altitude increase. – ASHRAE class A3: 5–40°C (41–104°F); when the altitude exceeds 900 m (2953 ft), the maximum ambient temperature value decreases by 1°C (1.8°F) with every 175 m (574 ft) of altitude increase. – ASHRAE class A4: 5–45°C (41–113°F); when the altitude exceeds 900 m (2953 ft), the maximum ambient temperature value decreases by 1°C (1.8°F) with every 125 m (410 ft) of altitude increase. – Server off: 5–45°C (41–113°F) – Shipping or storage: -40–60°C (-40–140°F) • Maximum altitude: 3050 m (10 000 ft) • Relative humidity (non-condensing): <ul style="list-style-type: none"> – Operating: <ul style="list-style-type: none"> – ASHRAE Class A2: 8%–80%, maximum dew point: 21°C (70°F) – ASHRAE Class A3: 8%–85%, maximum dew point: 24°C (75°F) – ASHRAE Class A4: 8%–90%, maximum dew point: 24°C (75°F) – Shipment or storage: 8%–90% • Particulate contamination <p>Attention: Airborne particulates and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server.</p>																							

Table 1. Server specifications (continued)

Specification	Description
	<p>Your server complies with ASHRAE class A2 specifications. The server performance might be impacted when the operating temperature is outside the ASHRAE A2 specifications. Server model with the following configurations complies with ASHRAE class A3 and class A4 specifications:</p> <ul style="list-style-type: none"> • The processor TDP is 120/155 watts. • There is no NVMe drive, rear drive cage, M.2 drive, GPU adapter, Ethernet adapter of 10 GbE or higher, or PCIe NVMe adapter installed. <p>Note: Server model with 2 port/4 port 1G OCP 3.0 Ethernet adapter installed can comply with ASHRAE class A3 and class A4 specifications.</p>

Particulate contamination

Attention: Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the device that is described in this document.

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

Table 2. Limits for particulates and gases

Contaminant	Limits
Reactive gases	<p>Severity level G1 as per ANSI/ISA 71.04-1985¹:</p> <ul style="list-style-type: none"> • The copper reactivity level shall be less than 300 Å/month (around 0.0039 µg/cm²-hour weight gain).² • The silver reactivity level shall be less than 200 Å/month (around 0.0035 µg/cm²-hour weight gain).³ • The reactive monitoring of gaseous corrosivity must be conducted approximately 5 cm (2 in.) in front of the rack on the air inlet side at one-quarter and three-quarter frame height off the floor or where the air velocity is much higher.
Airborne particulates	<p>Data centers must meet the cleanliness level of ISO 14644-1 class 8.</p> <p>For data centers without airside economizer, the ISO 14644-1 class 8 cleanliness might be met by choosing one of the following filtration methods:</p> <ul style="list-style-type: none"> • The room air might be continuously filtered with MERV 8 filters. • Air entering a data center might be filtered with MERV 11 or preferably MERV 13 filters. <p>For data centers with airside economizers, the choice of filters to achieve ISO class 8 cleanliness depends on the specific conditions present at that data center.</p> <ul style="list-style-type: none"> • The deliquescent relative humidity of the particulate contamination should be more than 60% RH.⁴ • Data centers must be free of zinc whiskers.⁵
<p>¹ ANSI/ISA-71.04-1985. <i>Environmental conditions for process measurement and control systems: Airborne contaminants</i>. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.</p> <p>² The derivation of the equivalence between the rate of copper corrosion growth in the thickness of the corrosion product in Å/month and the rate of weight gain assumes that Cu₂S and Cu₂O grow in equal proportions.</p> <p>³ The derivation of the equivalence between the rate of silver corrosion growth in the thickness of the corrosion product in Å/month and the rate of weight gain assumes that Ag₂S is the only corrosion product.</p> <p>⁴ The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.</p> <p>⁵ Surface debris is randomly collected from 10 areas of the data center on a 1.5 cm diameter disk of sticky electrically conductive tape on a metal stub. If examination of the sticky tape in a scanning electron microscope reveals no zinc whiskers, the data center is considered free of zinc whiskers.</p>	

Management options

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

Overview

Offerings	Description
ThinkSystem System Manager	<p>Baseboard management controller (BMC) of the server. You can use the ThinkSystem System Manager to access the BMC and apply BMC management options.</p> <p>User interface</p> <ul style="list-style-type: none"> • Web GUI <p>Usage and downloads</p> <p>ThinkSystem System Manager</p>
Lenovo XClarity Administrator	<p>Centralized multi-server management tool.</p> <p>User interfaces</p> <ul style="list-style-type: none"> • Web GUI • Mobile application <p>Usage and downloads</p> <p>http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/aug_product_page.html</p>
Lenovo XClarity Energy Manager	<p>Application that can manage and monitor server power and temperature.</p> <p>User interface</p> <ul style="list-style-type: none"> • Web GUI <p>Usage and downloads</p> <p>https://datacentersupport.lenovo.com/solutions/lnvo-lxem</p>
Lenovo XClarity Provisioning Manager	<p>UEFI-based embedded GUI tool on a single server that can simplify management tasks.</p> <p>Interface</p> <ul style="list-style-type: none"> • Web interface (BMC remote access) • GUI application <p>Usage and downloads</p> <p>https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html</p> <p>Important: Lenovo XClarity Provisioning Manager (LXPM) supported version varies by product. All versions of Lenovo XClarity Provisioning Manager are referred to as Lenovo XClarity Provisioning Manager and LXPM in this document, unless specified otherwise. To see the LXPM version supported by your server, go to https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html.</p>

Offerings	Description
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>User interfaces</p> <ul style="list-style-type: none"> • OneCLI: Local CLI client • Bootable Media Creator: <ul style="list-style-type: none"> – Local GUI client – Local CLI client <p>Usage and downloads</p> <p>http://sysmgmt.lenovofiles.com/help/topic/xclarity_essentials/overview.html</p>
Lenovo Capacity Planner	<p>Application that supports power consumption planning for a server or rack.</p> <p>User interface</p> <ul style="list-style-type: none"> • Web GUI <p>Usage and downloads</p> <p>https://datacentersupport.lenovo.com/solutions/lnvo-lcp</p>
Lenovo Business Vantage	<p>A security software tool suite designed to work with the Trusted Platform Module adapter for enhanced security, to keep user data safe, and to erase confidential data completely from a hard disk drive.</p> <p>Note: Supported in Chinese Mainland only.</p> <p>User interfaces</p> <ul style="list-style-type: none"> • Local GUI client <p>Usage and downloads</p> <p>Business Vantage</p>

Functions

Offerings		Functions							
		Multi-system mgmt	OS deployment	System configuration	Firmware updates ¹	Events/alert monitoring	Inventory/logs	Power mgmt	Data center planning
Lenovo XClarity Administrator		√ ²		√ ³	√ ⁴	√	√ ⁷		
Lenovo XClarity Energy Manager		√				√	√		
Lenovo XClarity Essentials toolset	OneCLI						√ ^{6, 7}		
	Bootable Media Creator				√ ⁵				

Offerings		Functions								
		Multi-system mgmt	OS deployment	System configuration	Firmware updates ¹	Events/alert monitoring	Inventory/logs	Power mgmt	Data center planning	Security management
Lenovo XClarity Provisioning Manager			√		√		√ ⁷			
ThinkSystem System Manager				√	√	√	√	√ ⁶		
Lenovo Capacity Planner									√	
Lenovo Business Vantage										√ ⁸

Notes:

1. Most options can be updated through the Lenovo tools. Some options, such as GPU firmware or Omni-Path firmware, require the use of supplier tools.
2. Support managing the server with LDAP binding mode and remote control.
3. For UEFI configuration only.
4. Firmware updates are for BMC firmware, UEFI firmware, and I/O firmware updates.
5. The server UEFI settings for option ROM must be set to **UEFI** to update firmware using Lenovo XClarity Essentials Bootable Media Creator.
6. The server UEFI settings for option ROM must be set to **UEFI** for detailed adapter card information, such as model name and firmware levels, to be displayed in Lenovo XClarity Administrator, ThinkSystem System Manager, or Lenovo XClarity Essentials OneCLI.
7. Limited inventory.
8. Available only in Chinese Mainland.
9. It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.

Chapter 2. Server components

Use the information in this section to learn about each of the components associated with your server.

Front view

The front view of the server varies by model. Depending on the model, your server might look slightly different from the illustrations in this topic.

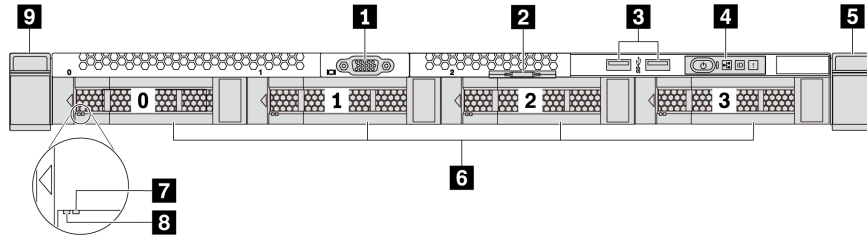


Figure 3. Front view of server model with four 3.5-inch drive bays

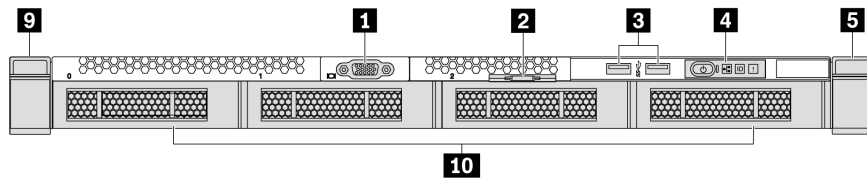


Figure 4. Front view of server model without a backplane (for four 3.5-inch drive bays)

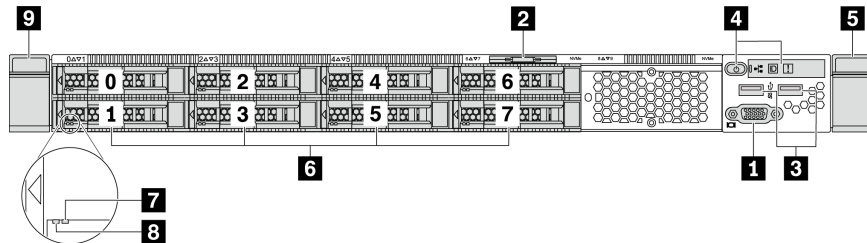


Figure 5. Front view of server model with eight 2.5-inch drive bays

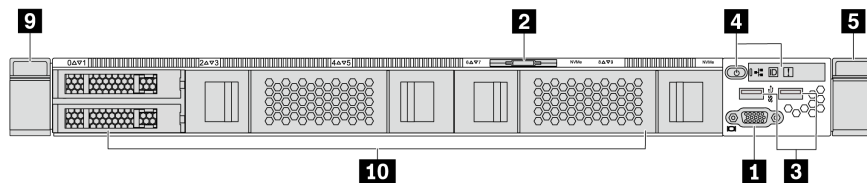


Figure 6. Front view of server model without a backplane (for ten 2.5-inch drive bays)

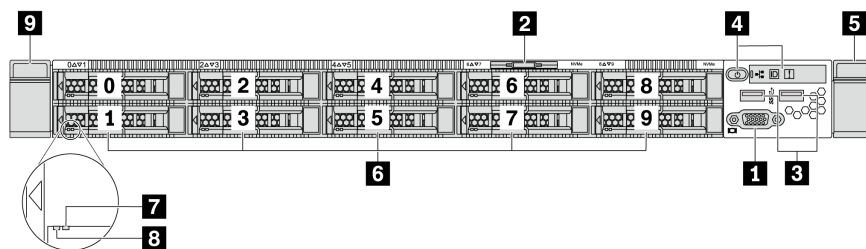


Figure 7. Front view of server model with ten 2.5-inch drive bays

Table 3. Components on the front of the server

1 VGA connector (optional)	2 Pull-out information tab
3 USB 3.2 Gen 1 (5 Gbps) connectors	4 Operator information panel
5 Rack latch (right)	6 Hot-swap drive bays
7 Drive status LED (yellow)	8 Drive activity LED (green)
9 Rack latch (left)	10 Drive bay filler

1 VGA connector

Used to attach a high-performance monitor, a direct-drive monitor, or other devices that use a VGA connector.

2 Pull-out information tab

The ThinkSystem System Manager network access label is attached on the pull-out information tab. The default ThinkSystem System Manager hostname and the IPv6 Link Local Address (LLA) are provided on the tab.

For more information, see [“Set the network connection for the BMC” on page 135](#).

3 USB 3.2 Gen 1 (5 Gbps) connector

Attach a USB-compatible device, such as a USB keyboard, USB mouse, or USB storage device.

4 Operator information panel

For information about the controls and status LEDs on the operator information panel, see [“Operator information panel” on page 17](#).

5 **9** Rack latches

If your server is installed in a rack, you can use the rack latches to help you slide the server out of the rack. You also can use the rack latches and screws to secure the server in the rack so that the server cannot slide out, especially in vibration-prone areas. For more information, refer to the *Rack Installation Guide* that comes with your rail kit.

6 Hot-swap drive bays (drive fillers are installed for no-backplane configuration)

The number of the installed drives in your server varies by model. When you install drives, follow the order of the drive bay numbers.

The EMI integrity and cooling of the server are protected by having all drive bays occupied. The vacant drive bays must be occupied by drive fillers.

7 Drive status LED

8 Drive activity LED

Each hot-swap drive has two LEDs.

Drive LED	Status	Description
7 Drive status LED (right)	Solid yellow	The drive has an error.
	Blinking yellow (blinking slowly, about one flash per second)	The drive is being rebuilt.
	Blinking yellow (blinking rapidly, about four flashes per second)	The RAID adapter is locating the drive.
8 Drive activity LED (left)	Solid green	The drive is powered but not active.
	Blinking green	The drive is active.

Operator information panel

The operator information panel of the server provides controls and LEDs.

The following illustration shows the operator information panel of the server.

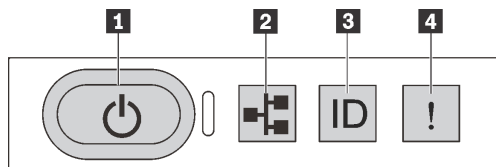


Figure 8. Operator information panel

Table 4. Components on the operator information panel

1 Power button with power status LED	2 Network activity LED (for OCP 3.0 Ethernet adapter)
3 System ID button with system ID LED	4 System error LED

1 Power button with power status LED

You can press the power button to power on the server when you finish setting up the server. You also can hold the power button for several seconds to power off the server if you cannot shut down 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).
Off	None	There is no ac power applied to the server.

2 Network activity LED

When an OCP 3.0 Ethernet adapter is installed, the network activity LED on the front I/O assembly helps you identify the network connectivity and activity. If no OCP 3.0 Ethernet adapter is installed, this LED is off.

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.

3 System ID button with system ID LED

Use this system ID button and the blue system ID LED to visually locate the server. A system ID LED is also located on the rear of the server. Each time you press the system ID button, the state of both the system ID LEDs changes. The LEDs can be changed to on, blinking, or off. You can also use the ThinkSystem System Manager or a remote management program to change the state of the system ID LEDs to assist in visually locating the server among other servers.

4 System error LED

The system error LED helps you to determine if there are any system errors.

Status	Color	Description	Action
On	Yellow	An error has been detected on the server. Causes might include but not limited to the following errors: <ul style="list-style-type: none">• Processor error• Memory module error• Storage failure• PCIe adapter failure• Power supply error• Fan failure• Mainboard failure	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.

Rear view

The rear of the server provides access to several connectors and components, including the power supplies, PCIe adapters, hot-swap drive bays, serial port, and Ethernet connectors.

Rear view of server model with three PCIe slots

The following illustration shows the rear view of server model with three PCIe slots. Depending on the model, your server might look slightly different from the illustration below.

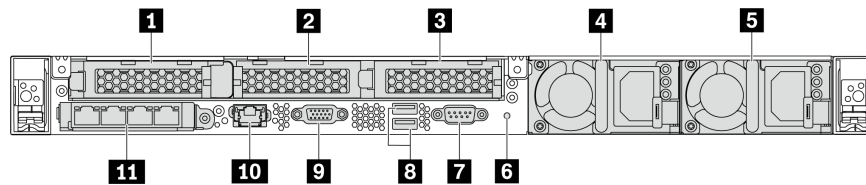


Figure 9. Rear view of server model with three PCIe slots

Table 5. Components on the rear of the server

1 PCIe slot 1 on riser 1 assembly	2 PCIe slot 2 on riser 2 assembly
3 PCIe slot 3 on riser 2 assembly	4 Power supply 1
5 Power supply 2 (optional)	6 NMI button
7 Serial port	8 USB 3.2 Gen 1 (5 Gbps) connectors
9 VGA connector	10 RJ45 BMC management network connector
11 Ethernet connectors on OCP 3.0 Ethernet adapter (optional, two or four connectors may be available)	

1 PCIe slot 1 on riser 1 assembly

Your server supports the following riser card for riser 1 assembly:

- Slot 1: PCIe x16, low-profile

2 3 PCIe slots on riser 2 assembly

Your server supports the following riser card configurations for riser 2 assembly:

Type 1:

- Slot 2: PCIe x16 (x16, x8, x4, x1), low-profile
- Slot 3: PCIe x16 (x16, x8, x4, x1), low-profile

Type 2:

- Slot 2: no riser card installed
- Slot 3: PCIe x16 (x16, x8, x4, x1), low-profile

Rear view of server model with two PCIe slots

The following illustration shows the rear view of the server model with two PCIe slots. Depending on the model, your server might look slightly different from the illustration below.

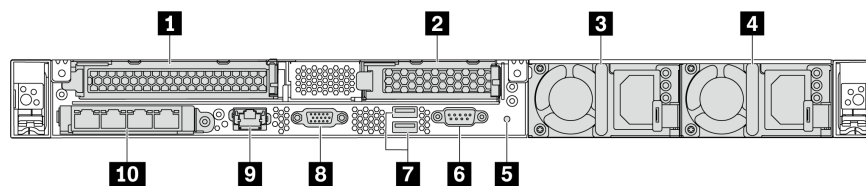


Figure 10. Rear view of server model with two PCIe slots

Table 6. Components on the rear of the server

1 PCIe slot 1 on riser 1 assembly	2 PCIe slot 3 on riser 2 assembly
3 Power supply 1	4 Power supply 2 (optional)
5 NMI button	6 Serial port
7 USB 3.2 Gen 1 (5 Gbps) connectors	8 VGA connector
9 BMC management network connector	10 Ethernet connectors on OCP 3.0 Ethernet adapter (optional, two or four connectors may be available)

1 PCIe slot 1 on riser 1 assembly

Your server supports the following riser card for riser 1 assembly:

Slot 1: PCIe x16 (x16, x8, x4, x1), full-height, full-length

2 PCIe slot 3 on riser 2 assembly

Your server supports the following riser card for riser 2 assembly:

Slot 3: PCIe x16 (x16, x8, x4, x1), low-profile

Rear view of server model with two hot-swap drive bays and one PCIe slot

The following illustration shows the rear view of the server model with two hot-swap drive bays and one PCIe slot. Depending on the model, your server might look slightly different from the illustration below.

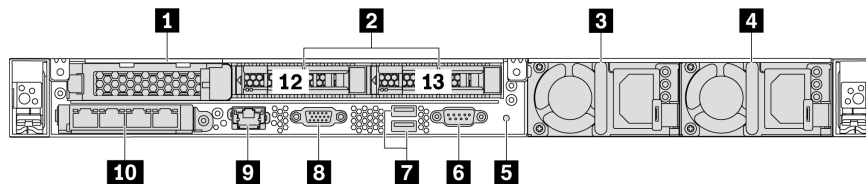


Figure 11. Rear view of server model with two hot-swap drive bays and one PCIe slot

Table 7. Components on the rear of the server

1 PCIe slot 1	2 Rear 2.5-inch drive bays
3 Power supply 1	4 Power supply 2 (optional)
5 NMI button	6 Serial port
7 USB 3.2 Gen 1 (5 Gbps) connectors	8 VGA connector
9 BMC management network connector	10 Ethernet connectors on OCP 3.0 Ethernet adapter (optional, two or four connectors may be available)

1 PCIe slot 1

Slot 1: PCIe x16 (x16, x8, x4, x1), low-profile

2 Rear 2.5-inch drive bays

Used to install two 2.5-inch hot-swap drives on the rear of the server.

The number of the installed drives in your server varies by model. When you install drives, follow the order of the drive bay numbers.

The EMI integrity and cooling of the server are protected by having all drive bays occupied. The vacant drive bays must be occupied by drive bay fillers or drive fillers.

Rear view of server model with one PCIe slot

The following illustration shows the rear view of the server model with one PCIe slot. Depending on the model, your server might look slightly different from the illustration below.

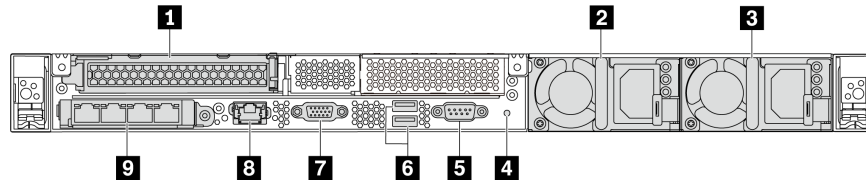


Figure 12. Rear view of server model with one PCIe slot

Table 8. Components on the rear of the server

1 PCIe slot 1 on riser 1 assembly	2 Power supply 1
3 Power supply 2 (optional)	4 NMI button
5 Serial port	6 USB 3.2 Gen 1 (5 Gbps) connectors
7 VGA connector	8 BMC management Ethernet connector
9 Ethernet connectors on OCP 3.0 Ethernet adapter (optional, two or four connectors may be available)	

1 PCIe slot 1

Slot 1: PCIe x16 (x16, x8, x4, x1), full-height/full-length

Rear view of server model with no PCIe slot

The following illustration shows the rear view of the server model with no PCIe slot. Depending on the model, your server might look slightly different from the illustration below.

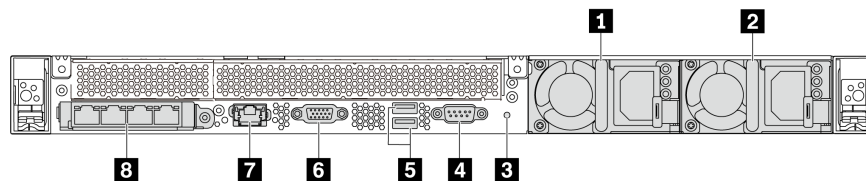


Figure 13. Rear view of server model with no PCIe slot

Table 9. Components on the rear of the server

1 Power supply 1	2 Power supply 2 (optional)
3 NMI button	4 Serial port
5 USB 3.2 Gen 1 (5 Gbps) connectors	6 VGA connector
7 BMC management network connector	8 Ethernet connectors on OCP 3.0 Ethernet adapter (optional, two or four connectors may be available)

The following are common components on the rear view of different models:

- **Power supply 1**
- **Power supply 2 (optional)**

The hot-swap redundant power supplies help you avoid significant interruption to the operation of the system when a power supply fails. You can purchase a power supply option from Lenovo and install the power supply to provide power redundancy without turning off the server.

On each power supply, there are three status LEDs near the power cord connector. For information about the LEDs, see [“Rear view LEDs” on page 22](#).

- **NMI button**

Press this button to force a nonmaskable interrupt (NMI) to the processor. By this way, you can make the operating system halt (such as Windows Blue Screen of Death) and take a memory dump. You might have to use a pen or the end of a straightened paper clip to press the button.

- **Serial port**

Used to connect to the host system serial interface.

- **USB 3.2 Gen 1 (5 Gbps) connectors (2)**

Used to attach a device that requires a USB 2.0 or 3.1 connection, such as a USB keyboard, USB mouse, or USB storage device.

- **VGA connector**

Used to attach a high-performance monitor, a direct-drive monitor, or other devices that use a VGA connector.

- **BMC management network connector**

Used to attach an Ethernet cable to manage the baseboard management controller (BMC).

- **Ethernet connectors on OCP 3.0 Ethernet adapter (optional)**

The OCP 3.0 Ethernet adapter provides two or four extra Ethernet connectors for network connections.

One of the Ethernet connectors on the OCP 3.0 Ethernet adapter can also function as a management connector using the shared management capacity. If the shared management connector fails, traffic can automatically switch over to another connector on the adapter.

Rear view LEDs

The rear of the server provides system ID LED, system error LED, Ethernet LEDs, and power supply LEDs.

The following illustration shows the LEDs on the rear view of server model with two PCIe slots. The LEDs on the rear view of other server models are the same.

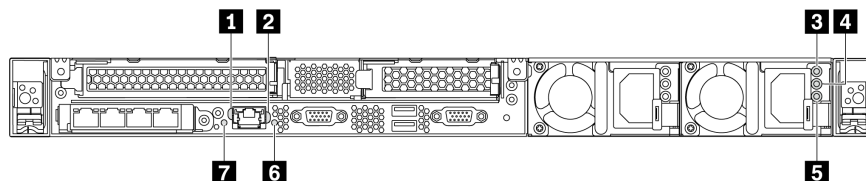


Figure 14. Rear view LEDs

Table 10. LEDs on the rear view of the server

1 Ethernet link LED	2 Ethernet activity LED
3 Power input LED	4 Power output LED
5 Power supply error LED	6 System ID LED
7 System error LED	

1 Ethernet link LED
2 Ethernet activity LED

The BMC network connector has two status LEDs.

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

3 4 5 Power supply LEDs

Each hot-swap power supply has three status LEDs.

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

6 System ID LED

The blue system ID LED helps you to visually locate the server. A system ID LED is also located on the front of the server. Each time you press the system ID button, the state of both the system ID LEDs changes. The LEDs can be changed to on, blinking, or off. You can also use the ThinkSystem System Manager or a remote management program to change the state of the system ID LEDs to assist in visually locating the server among other servers.

7 System error LED

The system error LED helps you to determine if there are any system errors. For details, see [“System error LED” on page 18](#).

System board components

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

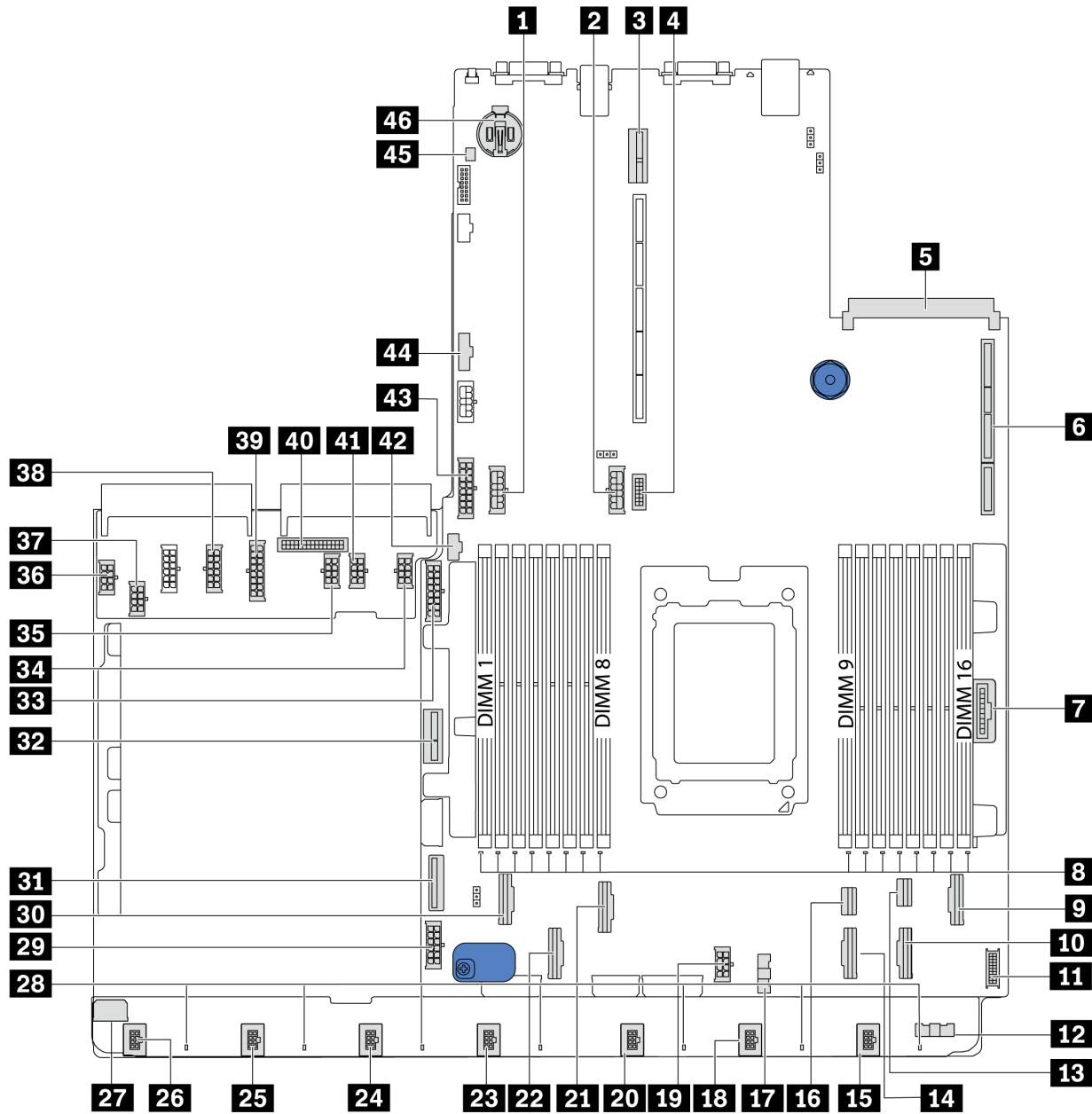


Figure 15. System board components

1 Middle backplane power connector	2 Rear backplane power connector
3 Riser 2 slot	4 Front VGA connector
5 OCP 3.0 Ethernet adapter connector	6 Riser 1 slot
7 Front panel connector	8 DIMM 1-16 error LEDs

9 PCIe connector 6	10 PCIe connector 5
11 Front USB connector	12 Fan board sideband connector (connect to 17)
13 PCIe connector 8	14 PCIe connector 4
15 Fan 7 connector	16 PCIe connector 7
17 Fan board sideband connector (connect to 12)	18 Fan 6 connector
19 CPU power connector (connect to 37)	20 Fan 5 connector
21 PCIe connector 3	22 PCIe connector 2
23 Fan 4 connector	24 Fan 3 connector
25 Fan 2 connector	26 Fan 1 connector
27 Fan board power connector (connect to 36)	28 Fan 1-7 error LEDs
29 System power connector 2 (connect to 38)	30 PCIe connector 1
31 PCIe connector 9	32 Internal riser power connector
33 Front backplane power connector	34 GPU power connector 1 (reserved)
35 GPU power connector 3 (reserved)	36 Fan board power connector (connect to 27)
37 CPU power connector (connect to 19)	38 System power connector 2 (connect to 29)
39 System power connector 1 (connect to 43)	40 PIB sideband connector (connect to 44)
41 GPU power connector 2 (Reserved)	42 M.2 sideband connector
43 System power connector 1 (Connect to 39)	44 PIB sideband connector (connect to 40)
45 Intrusion switch connector	46 CMOS battery (Cr2032)

Note:

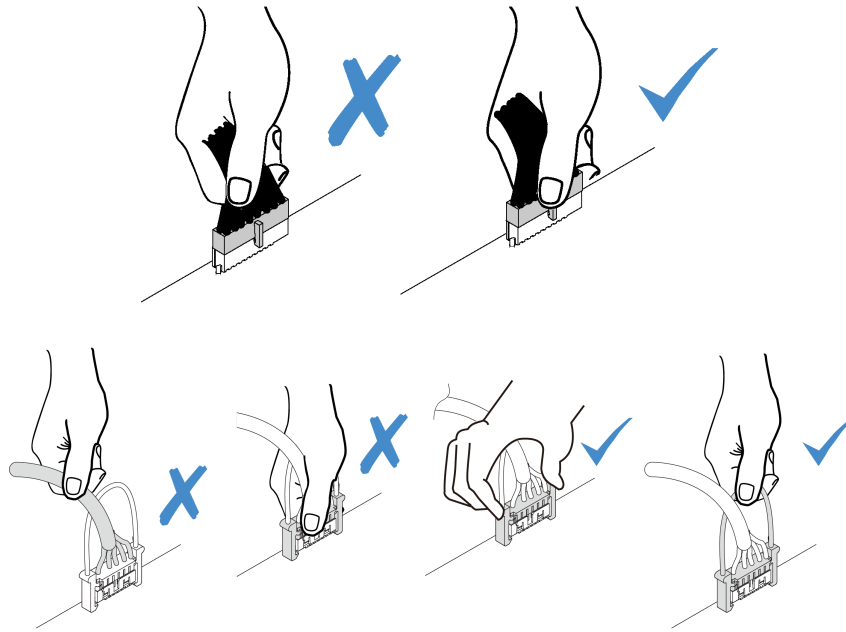
Internal cable routing

Some of the components in the server have internal cables and cable connectors.

To connect cables, observe the following guidelines:

- Power off the server before you connect or disconnect any internal cables.
- See the documentation that comes with any external devices for additional cabling instructions. It might be easier for you to route cables before you connect the devices to the server.
- Cable identifiers of some cables are printed on the cables that come with the server and optional devices. Use these identifiers to connect the cables to the correct connectors.
- Ensure that the relevant cables pass through the cable clips.

Note: 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.



Power/Sideband cable routing

Use the section to understand the power and sideband cable routing for CPU, backplanes, PIB board, fan board, internal drive assembly, and rear drive cage.

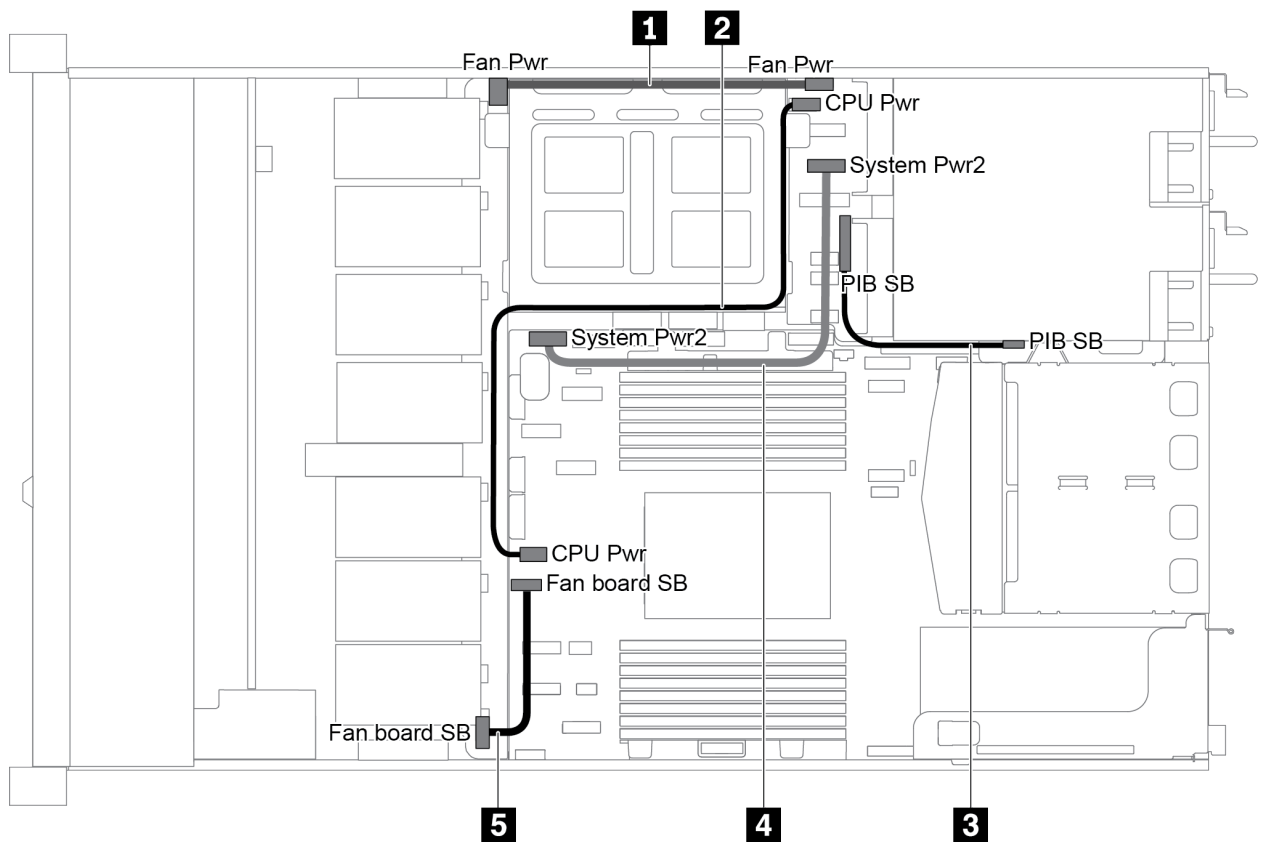


Figure 16. 2.5-inch chassis-1

Cable	From	To
1	Fan board power connector on the fan board	Fan board power connector on the PIB board
2	CPU power connector on the PIB board	CPU power connector on the system board
3	PIB sideband connector on the PIB board	PIB sideband connector on the system board
4	System power connector 2 on the PIB board	System power connector 2 on the system board
5	Sideband connector on the fan board	Fan sideband connector on the system board

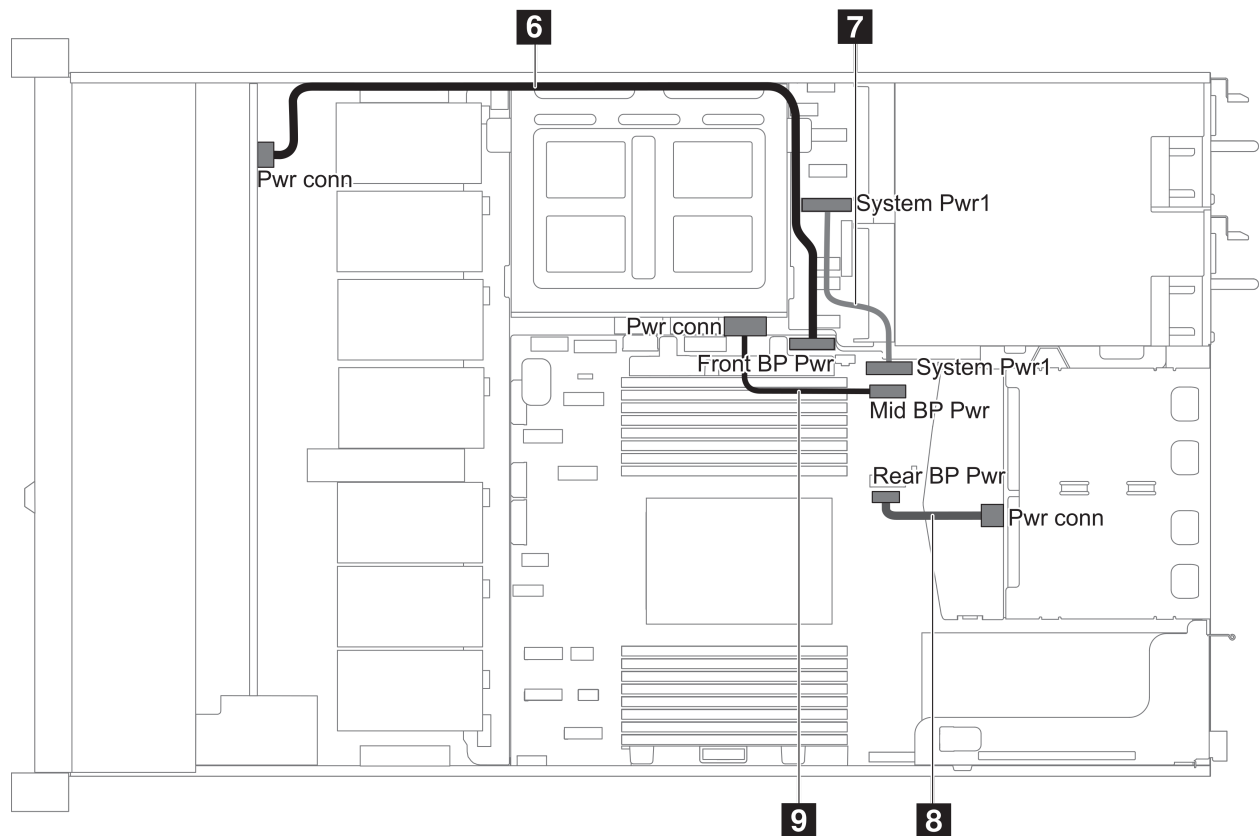


Figure 17. 2.5-inch chassis-2

Cable	From	To
5	Front backplane power connector on the front backplane	Front backplane power connector on the system board
6	System power connector 1 on the PIB board	System power connector 1 on the system board
7	Power connector on the rear backplane	Rear backplane power connector on the system board
8	Power connector on the middle backplane	Middle backplane power connector on the system board

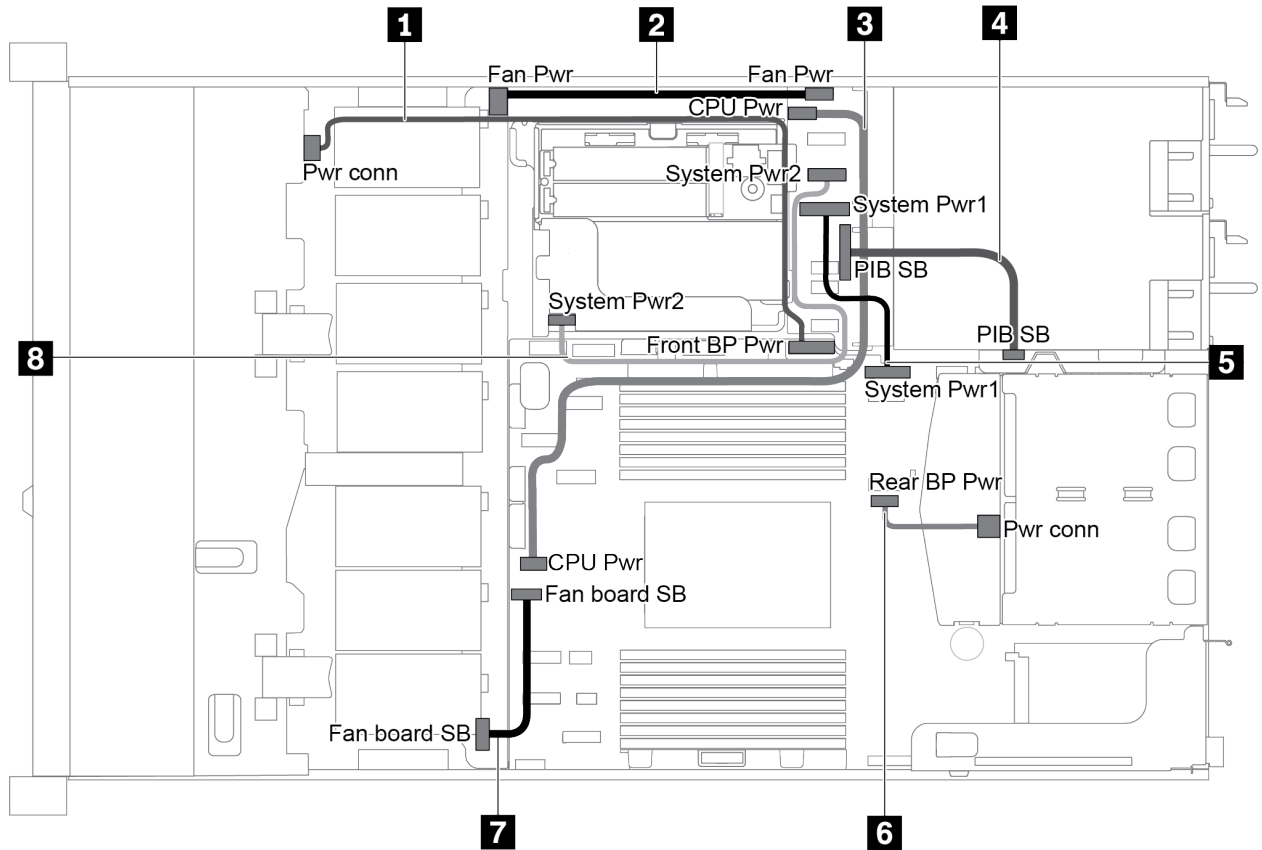


Figure 18. 3.5-inch chassis

Cable	From	To
1	Power connector on the front backplane	Front backplane power connector on the system board
2	Fan board power connector on the fan board	Fan board power connector on the PIB board
3	CPU power connector on the PIB board	CPU power connector on the system board
4	PIB sideband connector on the PIB board	PIB sideband connector on the system board
5	System power connector 1 on the PIB board	System power connector 1 on the system board
6	Power connector on the rear backplane	Rear backplane power connector on the system board
7	Sideband connector on the fan board	Fan sideband connector on the system board

Server model with four 3.5-inch SAS/SATA drives

Use this section to understand the connectors on the backplane and internal cable routing for server model with four 3.5-inch SAS/SATA drives.

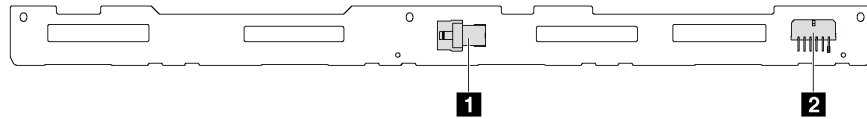


Figure 19. Connectors on the backplane for four 3.5-inch SAS/SATA drives

1 SAS connector

2 Power connector

For power cable connection, see [“Power/Sideband cable routing”](#) on page 26.

Refer to the following cable routing for different configurations:

- [“Four 3.5-inch SATA drives”](#) on page 30
- [“Four 3.5-inch SAS/SATA drives and one 8i RAID/HBA adapter”](#) on page 31
- [“Four 3.5-inch SATA drives and rear SAS/SATA drive assembly”](#) on page 32
- [“Four 3.5-inch SAS/SATA drives, rear SAS/SATA drive assembly and one 8i RAID/HBA adapter”](#) on page 33
- [“Four 3.5-inch SATA drives and rear NVMe drive assembly”](#) on page 33
- [“Four 3.5-inch SAS/SATA drives, rear NVMe drive assembly and one 8i RAID/HBA adapter”](#) on page 34
- [“Four 3.5-inch SATA drives and middle drive cage”](#) on page 35
- [“Four 3.5-inch SAS/SATA drives, middle drive cage and one 8i RAID/HBA adapter”](#) on page 37

Four 3.5-inch SATA drives

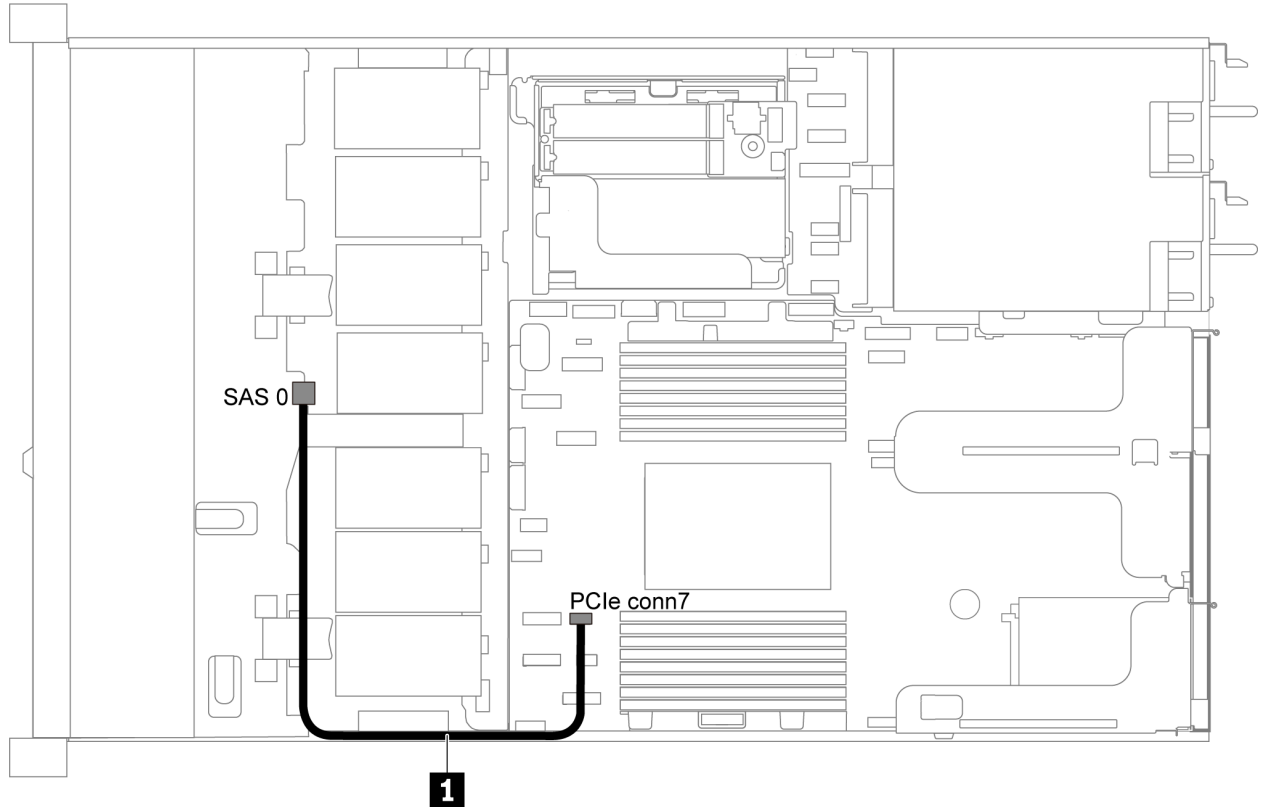


Figure 20. Cable routing for server model with four 3.5-inch SATA drives

Note: When the SAS/SATA backplanes are connected to PCIe connectors on the system board, only SATA drives are supported. No SAS drives are supported.

Cable	From	To
1 SAS signal cable for front backplane	SAS connector on the front backplane	PCIe connector 7 on the system board

Four 3.5-inch SAS/SATA drives and one 8i RAID/HBA adapter

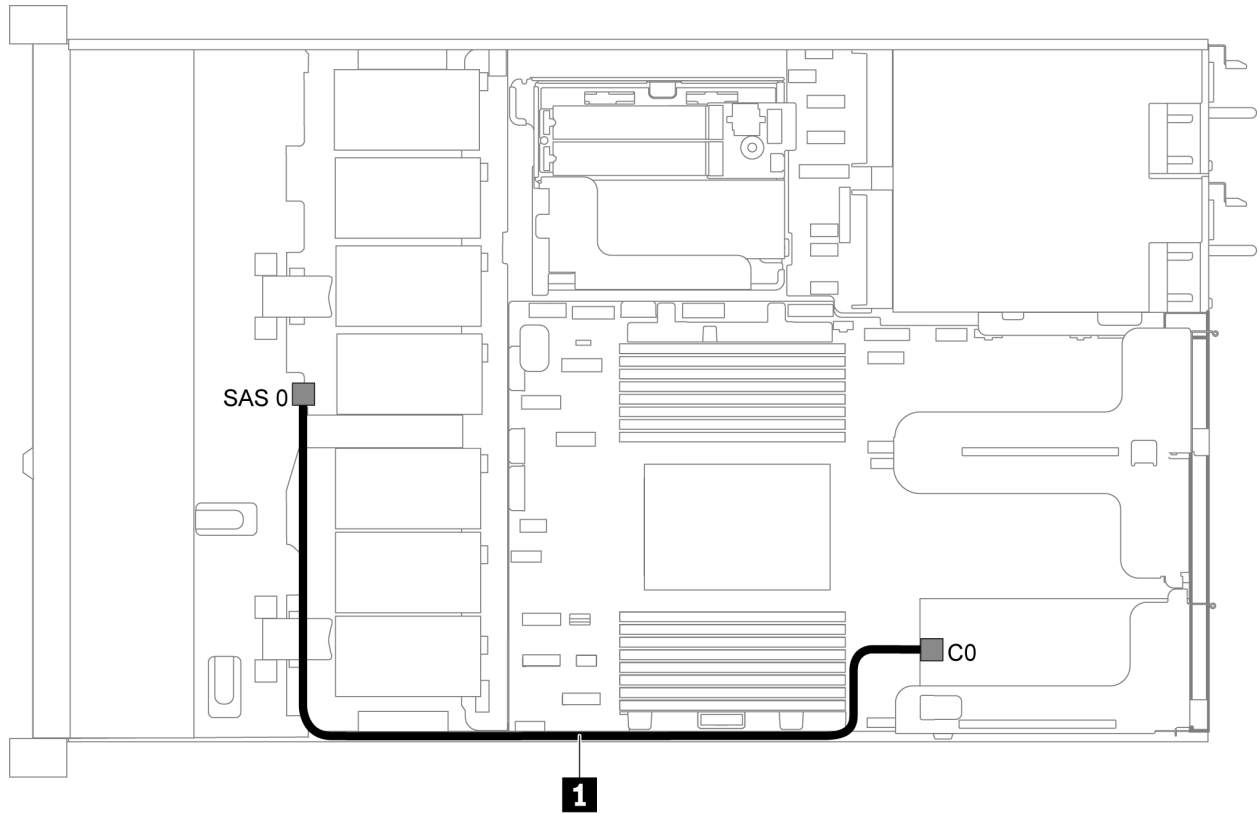


Figure 21. Cable routing for server model with four 3.5-inch SAS/SATA drives and one 8i RAID/HBA adapter

Note: RAID/HBA adapters can be installed in PCIe slot 1 or internal riser assembly.

Cable	From	To
1 SAS signal cable for front backplane	SAS connector on the front backplane	C0 connector on the RAID/HBA adapter

Four 3.5-inch SATA drives and rear SAS/SATA drive assembly

Notes:

- When the SAS/SATA backplanes are connected to PCIe connectors on the system board, only SATA drives are supported. No SAS drives are supported.
- The cable routing illustration is based on the scenario that the rear hot-swap drive cage is installed. Depending on the model, the rear hot-swap drive cage might not be available on your server.

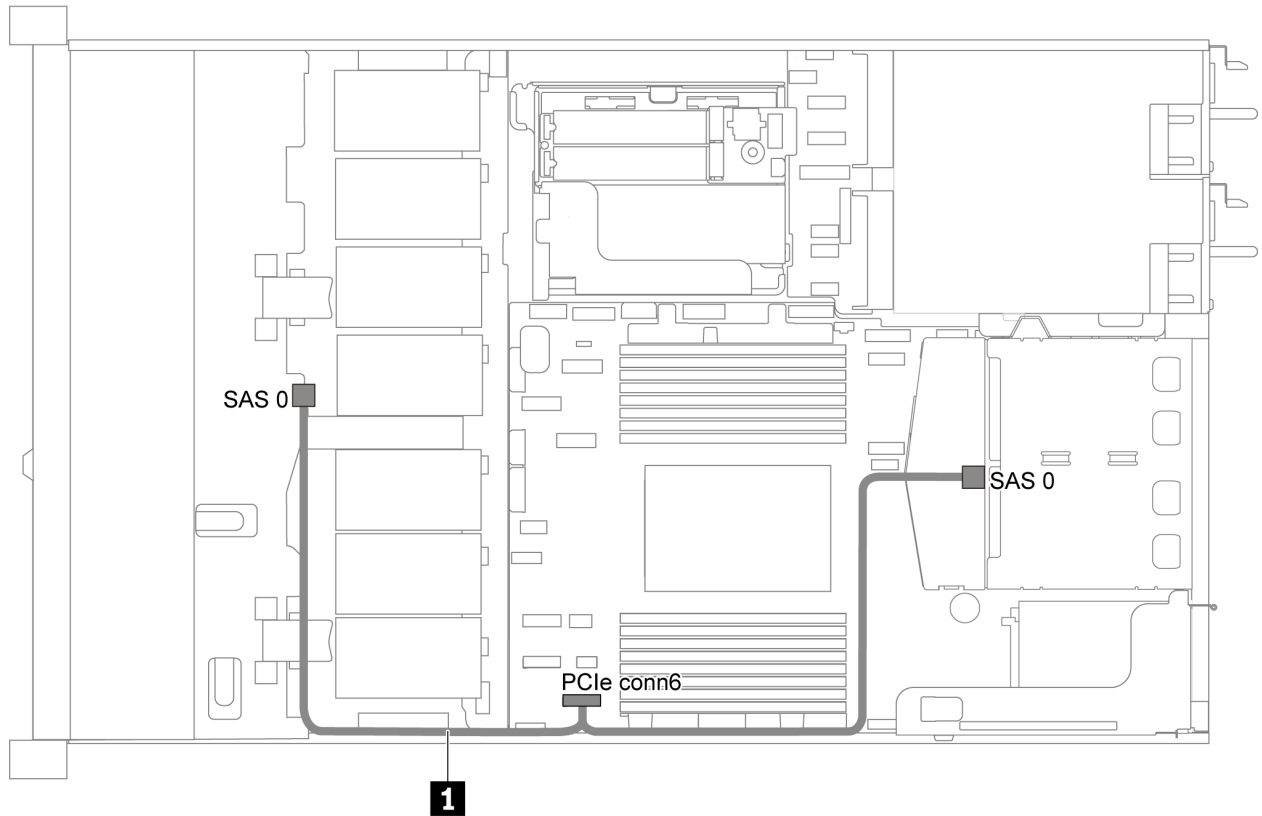


Figure 22. Cable routing for server model with four 3.5-inch SATA drives and rear SAS/SATA drive assembly

Cable	From	To
1 SAS signal cable for front backplane	SAS connector on the front backplane	PCIe connector 6 on the system board

Four 3.5-inch SAS/SATA drives, rear SAS/SATA drive assembly and one 8i RAID/HBA adapter

Note: The cable routing illustration is based on the scenario that the rear hot-swap drive cage is installed. Depending on the model, the rear hot-swap drive cage might not be available on your server.

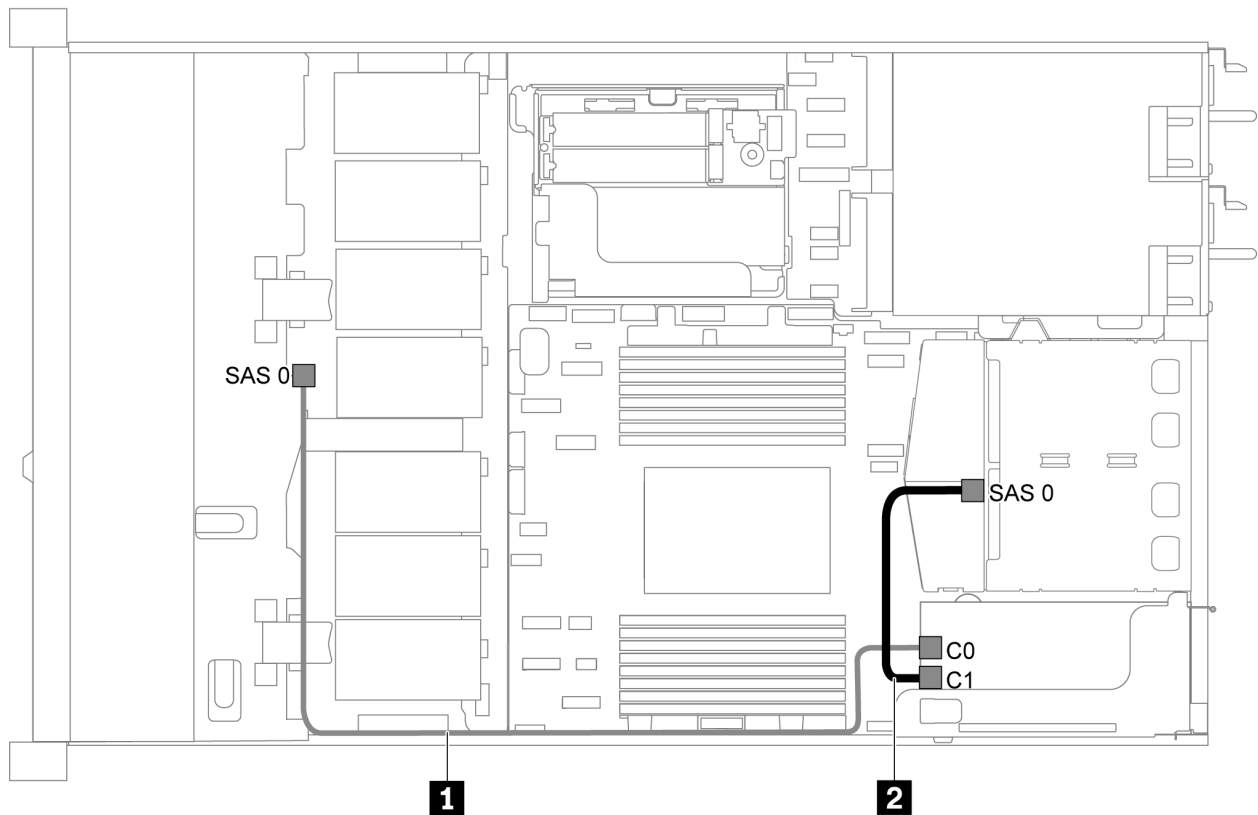


Figure 23. Cable routing for server model with four 3.5-inch SAS/SATA drives, rear SAS/SATA drive assembly and one 8i RAID/HBA adapter

Notes:

- RAID/HBA adapters can be installed in PCIe slot 1 or internal riser assembly.
- When a Gen 4 RAID/HBA adapter is installed, ensure that you use the corresponding Gen 4 cable:

ThinkSystem SR635 2.5" SAS/SATA 2-Bay Rear Backplane X40 RAID Cable Kit

Cable	From	To
1 SAS signal cable for front backplane	SAS connector on the front backplane	The RAID/HBA adapter <ul style="list-style-type: none"> • Gen 3: C0 • Gen 4: C0
2 SAS signal cable for rear backplane	SAS connector on the rear backplane	The RAID/HBA adapter <ul style="list-style-type: none"> • Gen 3: C1 • Gen 4: C0

Four 3.5-inch SATA drives and rear NVMe drive assembly

Notes:

- When the SAS/SATA backplanes are connected to PCIe connectors on the system board, only SATA drives are supported. No SAS drives are supported.
- The cable routing illustration is based on the scenario that the rear hot-swap drive cage is installed. Depending on the model, the rear hot-swap drive cage might not be available on your server.

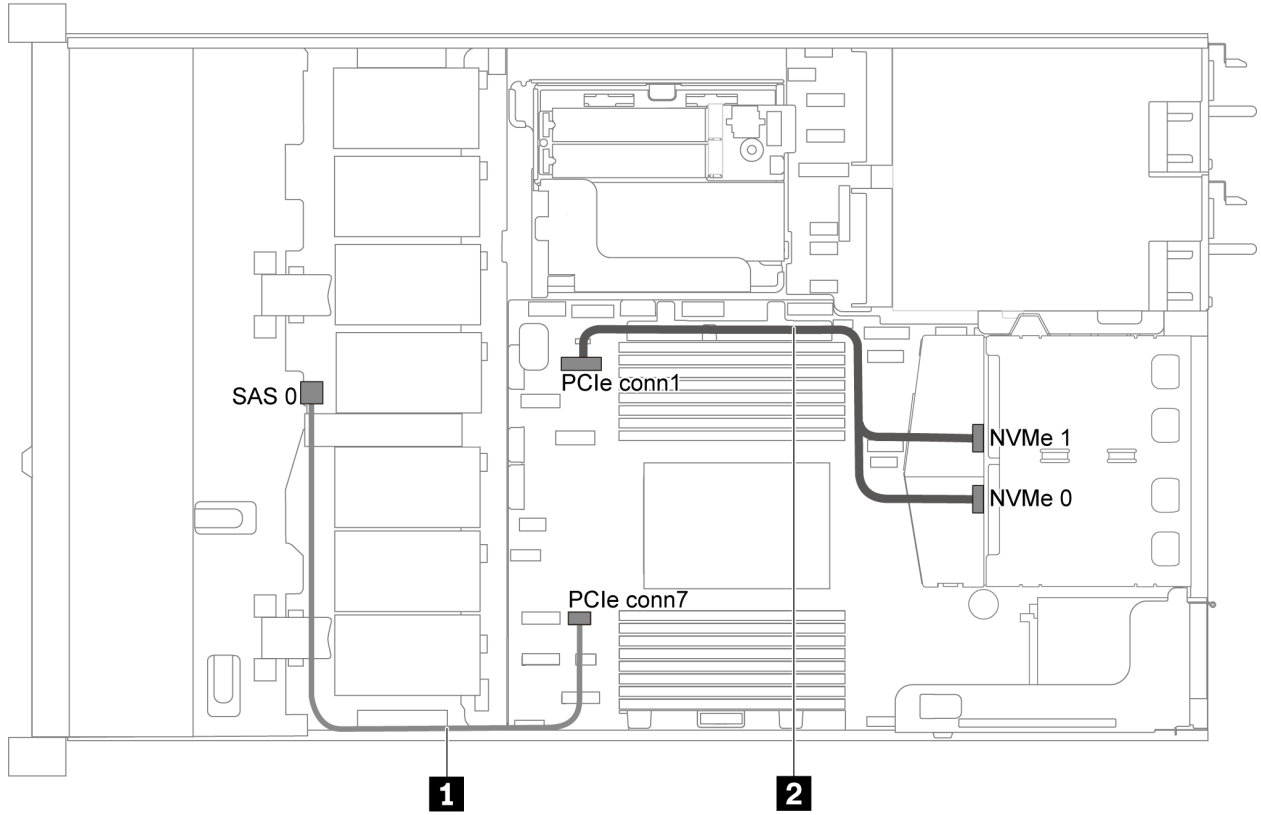


Figure 24. Cable routing for server model with four 3.5-inch SATA drives and rear NVMe drive assembly

Cable	From	To
1 SAS signal cable for front backplane	SAS connector on the front backplane	PCIe connector 7 on the system board
2 NVMe signal cable for rear backplane	NVMe connectors on the rear backplane	PCIe connector 1 on the system board

Four 3.5-inch SAS/SATA drives, rear NVMe drive assembly and one 8i RAID/HBA adapter

Note: The cable routing illustration is based on the scenario that the rear hot-swap drive cage is installed. Depending on the model, the rear hot-swap drive cage might not be available on your server.

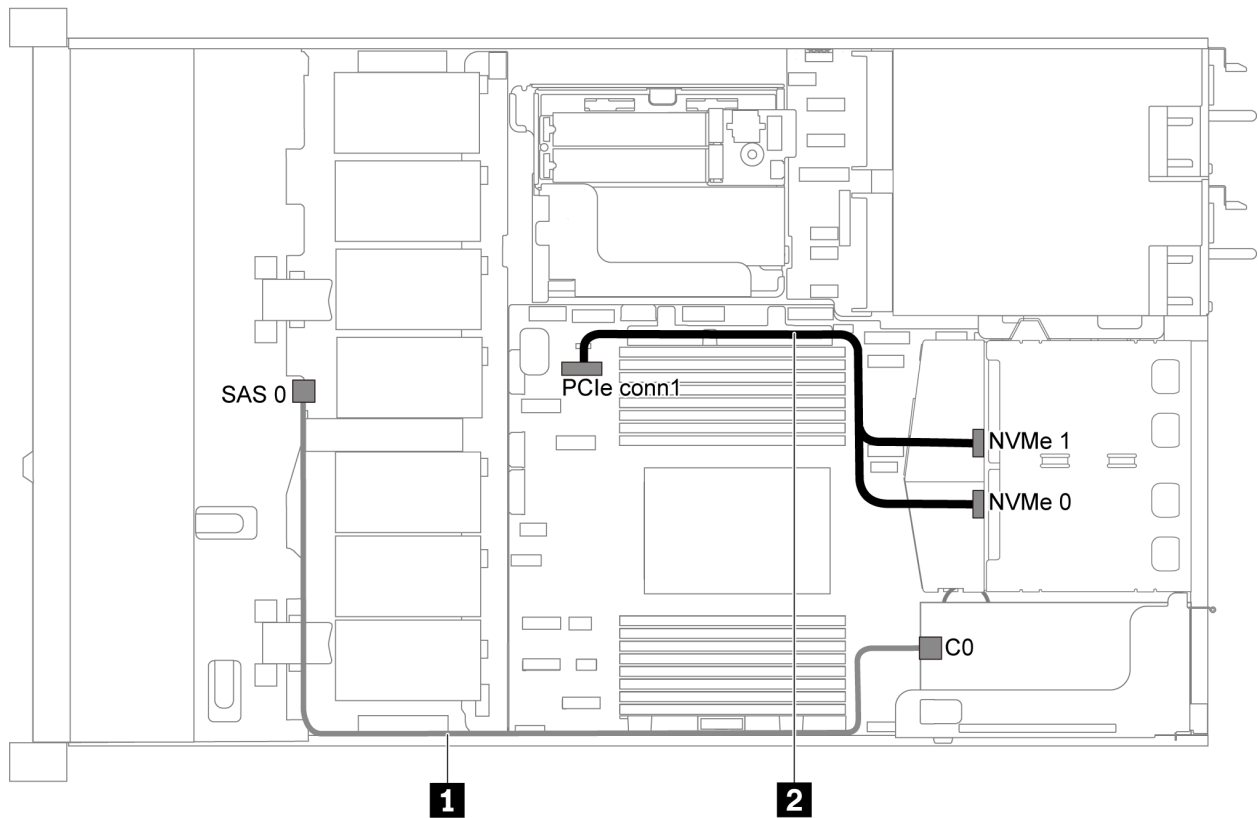


Figure 25. Cable routing for server model with four 3.5-inch SAS/SATA drives, rear NVMe drive assembly and one 8i RAID/HBA adapter

Notes:

- RAID/HBA adapters can be installed in PCIe slot 1 or internal riser assembly.
- When a Gen 4 RAID/HBA adapter is installed, ensure that you use the corresponding Gen 4 cable:

ThinkSystem SR635 3.5" SAS/SATA 4-Bay X40 RAID Cable Kit

Cable	From	To
1 SAS signal cable for front backplane	SAS connector on the front backplane	C0 connector on the RAID/HBA adapter
2 NVMe signal cable for rear backplane	NVMe connectors on the rear backplane	PCIe connector 1 on the system board

Four 3.5-inch SATA drives and middle drive cage

Note: When the SAS/SATA backplanes are connected to PCIe connectors on the system board, only SATA drives are supported. No SAS drives are supported.

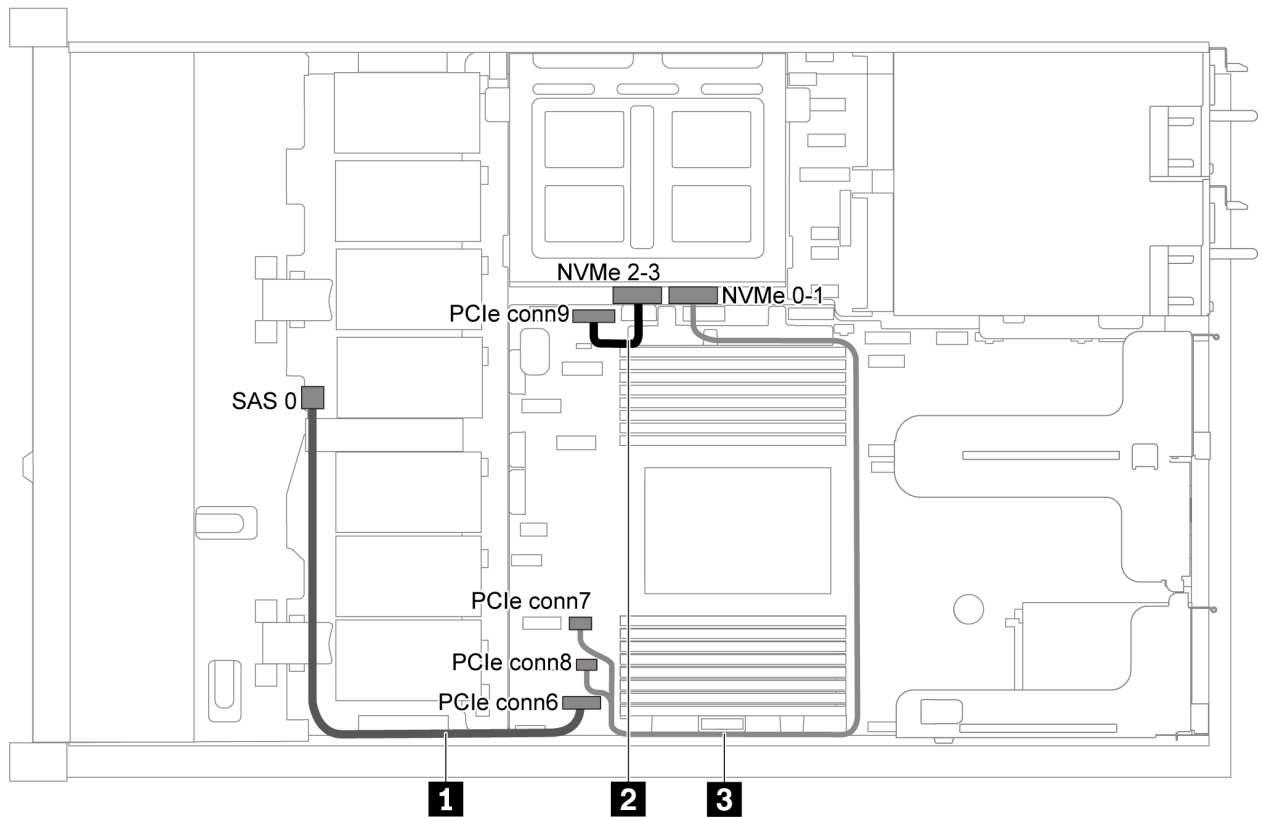


Figure 26. Cable routing for server model with four 3.5-inch SATA drives and middle drive cage

Cable	From	To
1 SAS signal cable for front backplane	SAS connector on the front backplane	PCIe connector 6 on the system board
2 NVMe signal cable for internal backplane	NVMe 2-3 connector on the internal backplane	PCIe connector 9 on the system board
3 NVMe signal cable for internal backplane	NVMe 0-1 connector on the internal backplane	PCIe connector 7 and PCIe connector 8 on the system board

Four 3.5-inch SAS/SATA drives, middle drive cage and one 8i RAID/HBA adapter

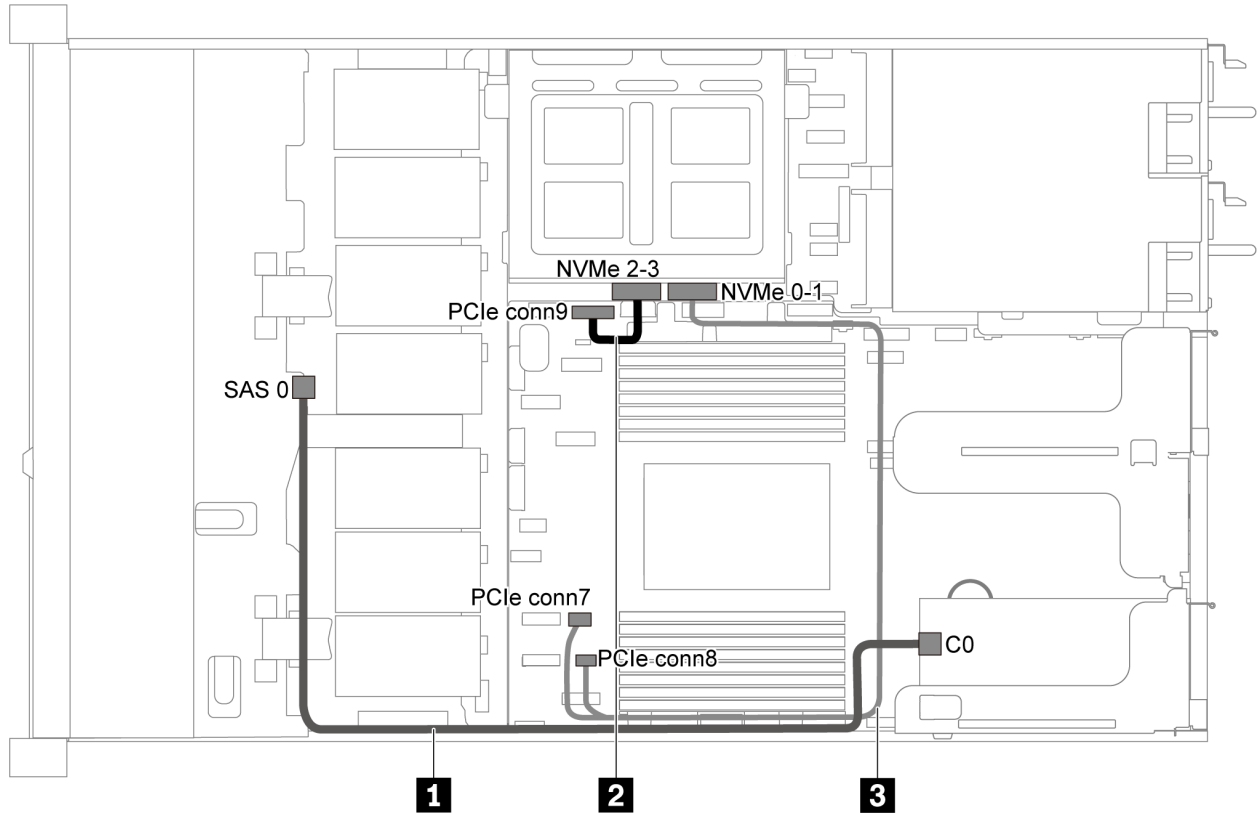


Figure 27. Cable routing for server model with four 3.5-inch SAS/SATA drives, middle drive cage and one 8i RAID/HBA adapter

Note: When a Gen 4 RAID/HBA adapter is installed, ensure that you use the corresponding Gen 4 cable:

ThinkSystem SR635 3.5" SAS/SATA 4-Bay X40 RAID Cable Kit

Cable	From	To
1 SAS signal cable for front backplane	SAS connector on the front backplane	C0 connector on the RAID/HBA adapter
2 NVMe signal cable for internal backplane	NVMe 2-3 connector on the internal backplane	PCIe connector 9 on the system board
3 NVMe signal cable for internal backplane	NVMe 0-1 connector on the internal backplane	PCIe connector 7 and PCIe connector 8 on the system board

Server model with eight 2.5-inch SAS/SATA drives

Use this section to understand the connectors on the backplane and internal cable routing for server model with eight 2.5-inch SAS/SATA drives.

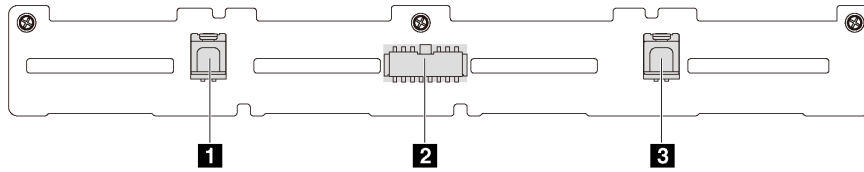


Figure 28. Connectors on the backplane for eight 2.5-inch SAS/SATA drives

1 SAS 1 connector

2 Power connector

3 SAS 0 connector

Refer to the following cable routing for different configurations:

- [“Eight 2.5-inch SATA drives” on page 39](#)
- [“Eight 2.5-inch SAS/SATA drives and one 8i RAID/HBA adapter” on page 40](#)
- [“Eight 2.5-inch SATA drives and rear SAS/SATA drive assembly” on page 40](#)
- [“Eight 2.5-inch SAS/SATA drives, rear SAS/SATA drive assembly and two 8i RAID/HBA adapters” on page 42](#)
- [“Eight 2.5-inch SAS/SATA drives, rear SAS/SATA drive assembly and one 16i RAID/HBA adapter” on page 43](#)
- [“Eight 2.5-inch SATA drives and rear NVMe drive assembly” on page 43](#)
- [“Eight 2.5-inch SAS/SATA drives, rear NVMe drive assembly and one 8i RAID/HBA adapter” on page 44](#)

For power cable connection, see [“Power/Sideband cable routing” on page 26](#).

Eight 2.5-inch SATA drives

Note: When the SAS/SATA backplanes are connected to PCIe connectors on the system board, only SATA drives are supported. No SAS drives are supported.

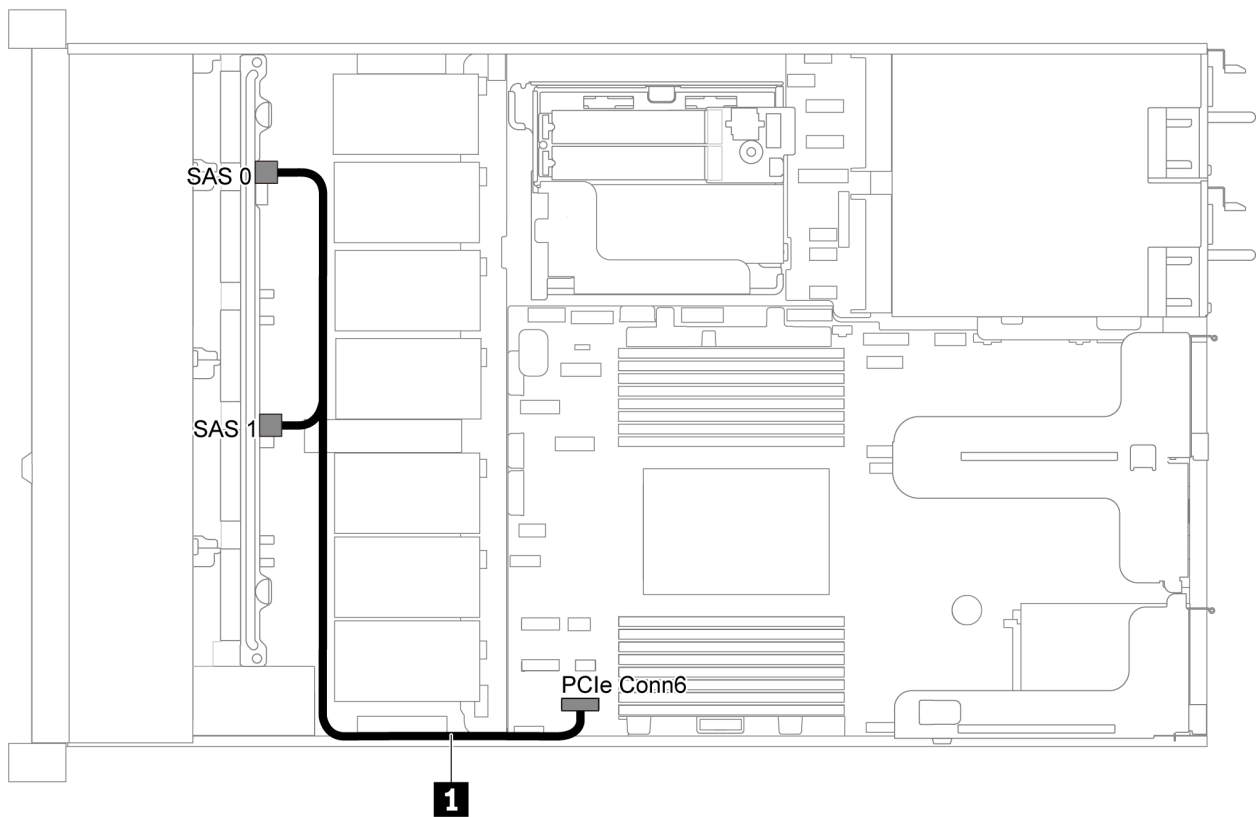


Figure 29. Cable routing for server model with eight 2.5-inch SATA drives

Cable	From	To
1 SAS signal cable for front backplane	SAS 0 and SAS 1 connectors on the front backplane	PCIe connector 6 on the system board

Eight 2.5-inch SAS/SATA drives and one 8i RAID/HBA adapter

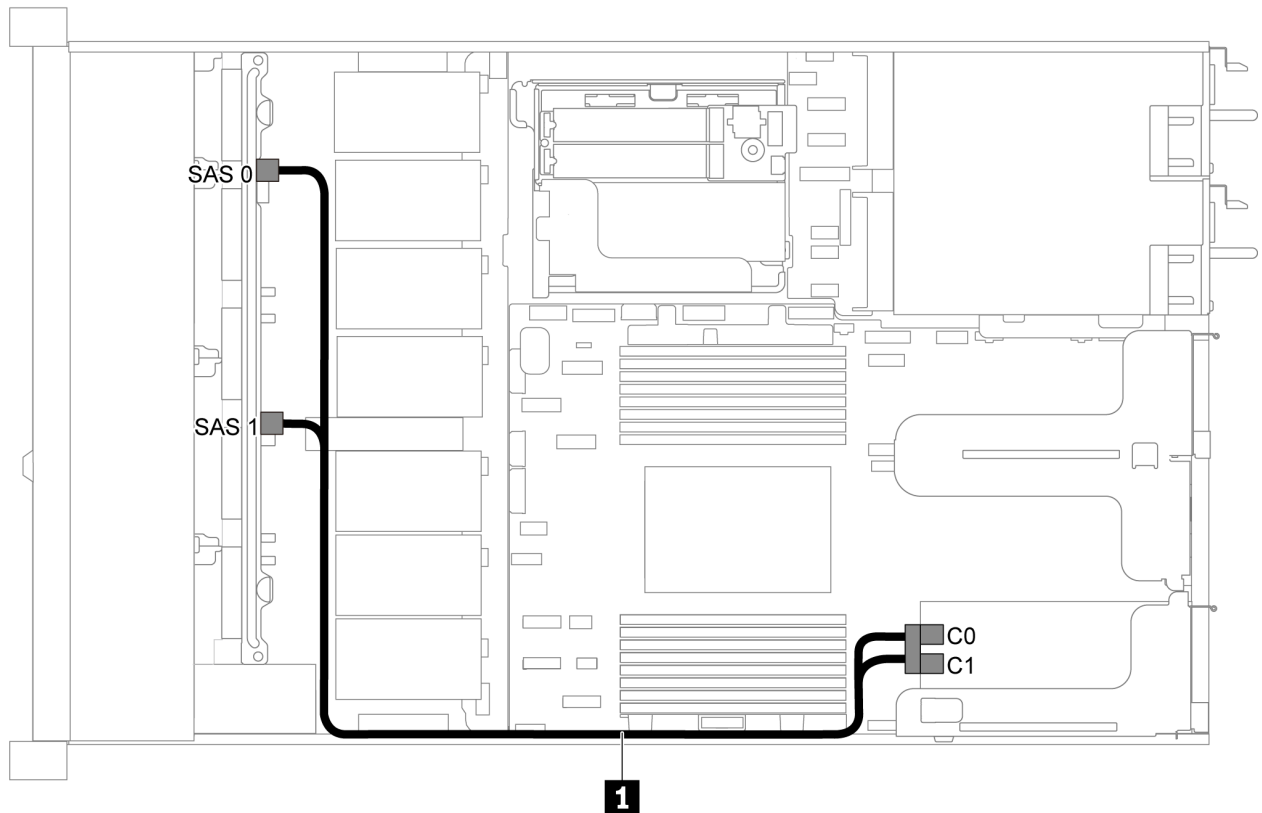


Figure 30. Cable routing for server model with eight 2.5-inch SAS/SATA drives and one 8i RAID/HBA adapter

Notes:

- RAID/HBA adapters can be installed in PCIe slot 1 or internal riser assembly.
- When a Gen 4 RAID/HBA adapter is installed, ensure that you use the corresponding Gen 4 cable:

ThinkSystem SR635 2.5" SAS/SATA 8-Bay X40 RAID Cable Kit

Cable	From	To
1 SAS signal cable for front backplane	SAS 0 and SAS 1 connectors on the front backplane	The RAID/HBA adapter <ul style="list-style-type: none"> • Gen 3: C0C1 • Gen 4: C0

Eight 2.5-inch SATA drives and rear SAS/SATA drive assembly

Notes:

- When the SAS/SATA backplanes are connected to PCIe connectors on the system board, only SATA drives are supported. No SAS drives are supported.
- The cable routing illustration is based on the scenario that the rear hot-swap drive cage is installed. Depending on the model, the rear hot-swap drive cage might not be available on your server.

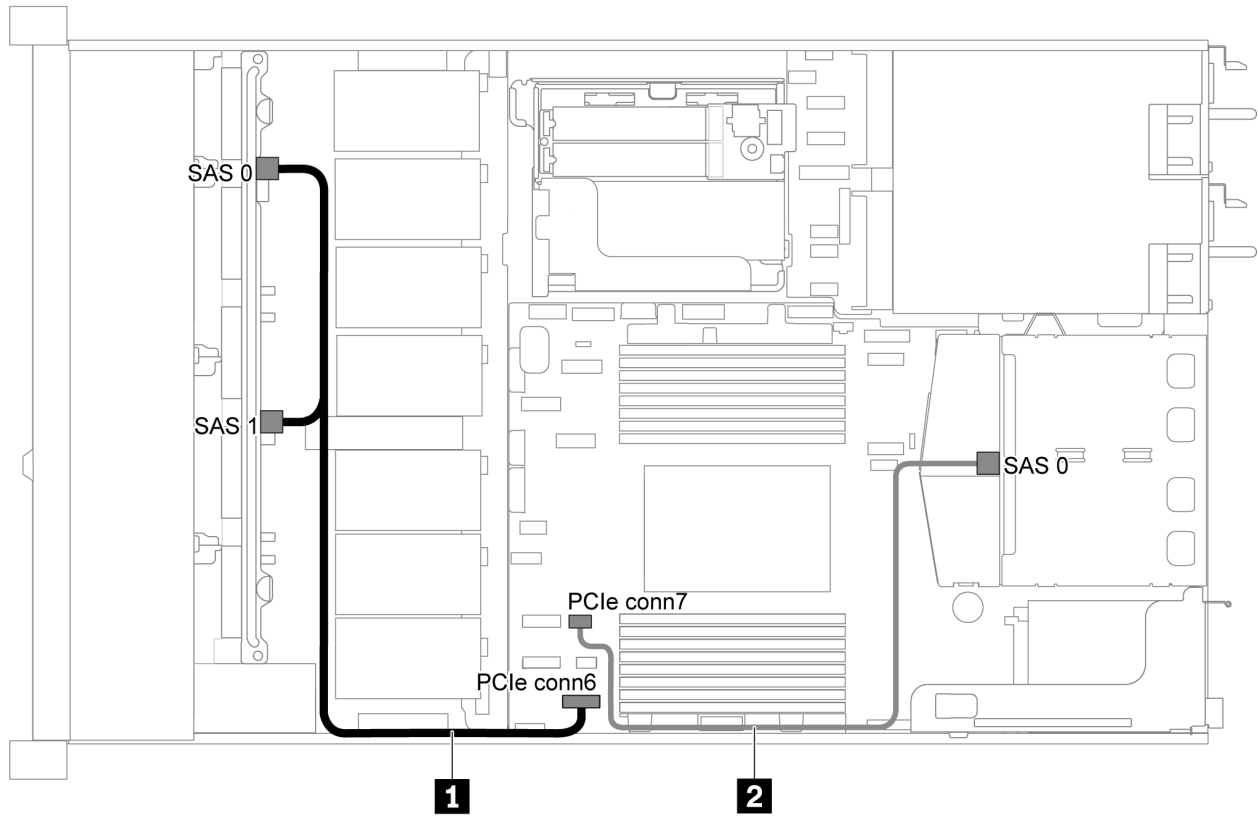


Figure 31. Cable routing for server model with eight 2.5-inch SATA drives and rear SAS/SATA drive assembly

Cable	From	To
1 SAS signal cable for front backplane	SAS 0 and SAS 1 connectors on the front backplane	PCIe connector 6 on the system board
2 SAS signal cable for rear backplane	SAS connector on the rear backplane	PCIe connector 7 on the system board

Eight 2.5-inch SAS/SATA drives, rear SAS/SATA drive assembly and two 8i RAID/HBA adapters

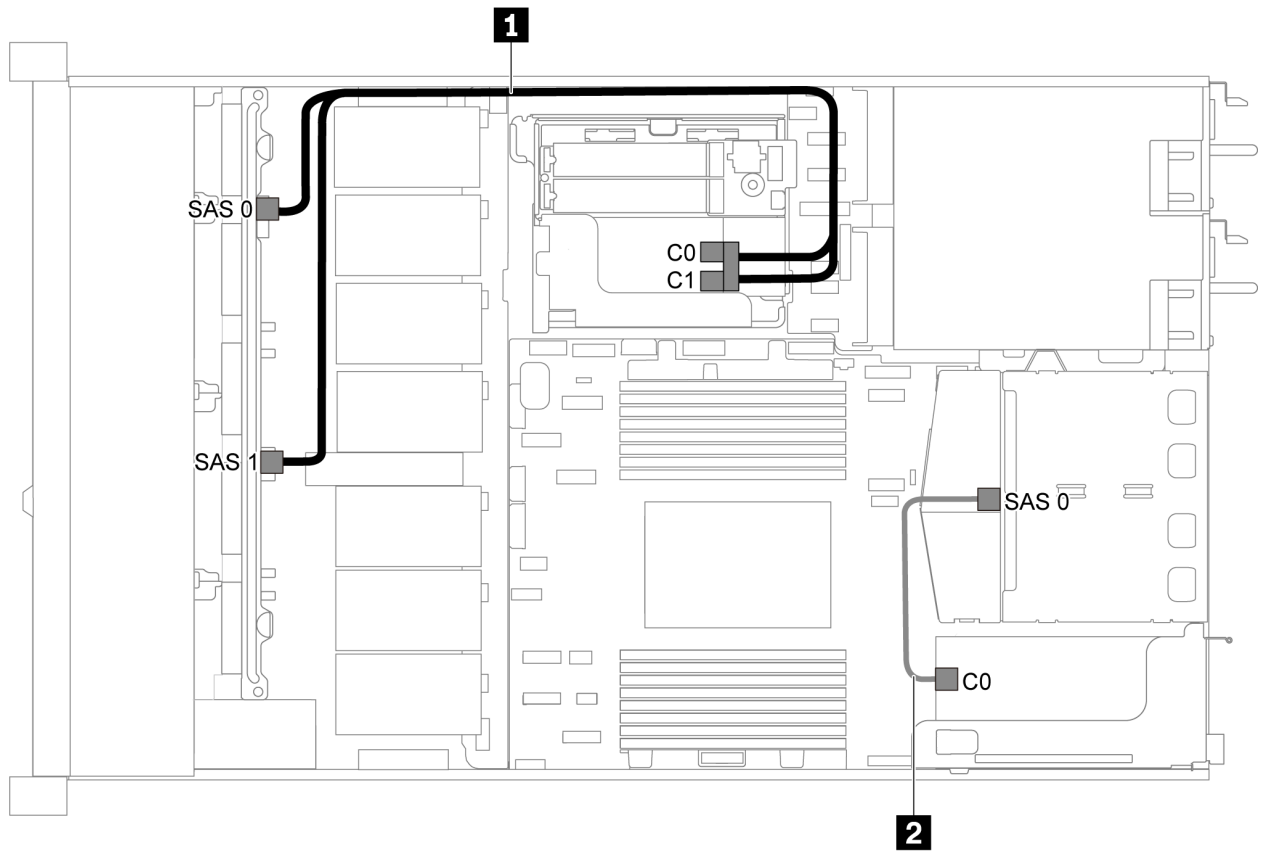


Figure 32. Cable routing for server model with eight 2.5-inch SAS/SATA drives, rear SAS/SATA drive assembly and two 8i RAID/HBA adapters

Notes:

- When a Gen 4 RAID/HBA adapter is installed, ensure that you use the corresponding Gen 4 cable:
 For cable 1: **ThinkSystem SR635 2.5" SAS/SATA 8-Bay X40 RAID Cable Kit**
 For cable 2: **ThinkSystem SR635 2.5" SAS/SATA 2-Bay Rear Backplane X40 RAID Cable Kit**

Cable	From	To
1 SAS signal cable for front backplane	SAS 0 and SAS 1 connectors on the front backplane	The RAID/HBA adapter <ul style="list-style-type: none"> • Gen 3: C0C1 • Gen 4: C0
2 SAS signal cable for rear backplane	SAS connector on the rear backplane	C0 connectors on the RAID/HBA adapter

Eight 2.5-inch SAS/SATA drives, rear SAS/SATA drive assembly and one 16i RAID/HBA adapter

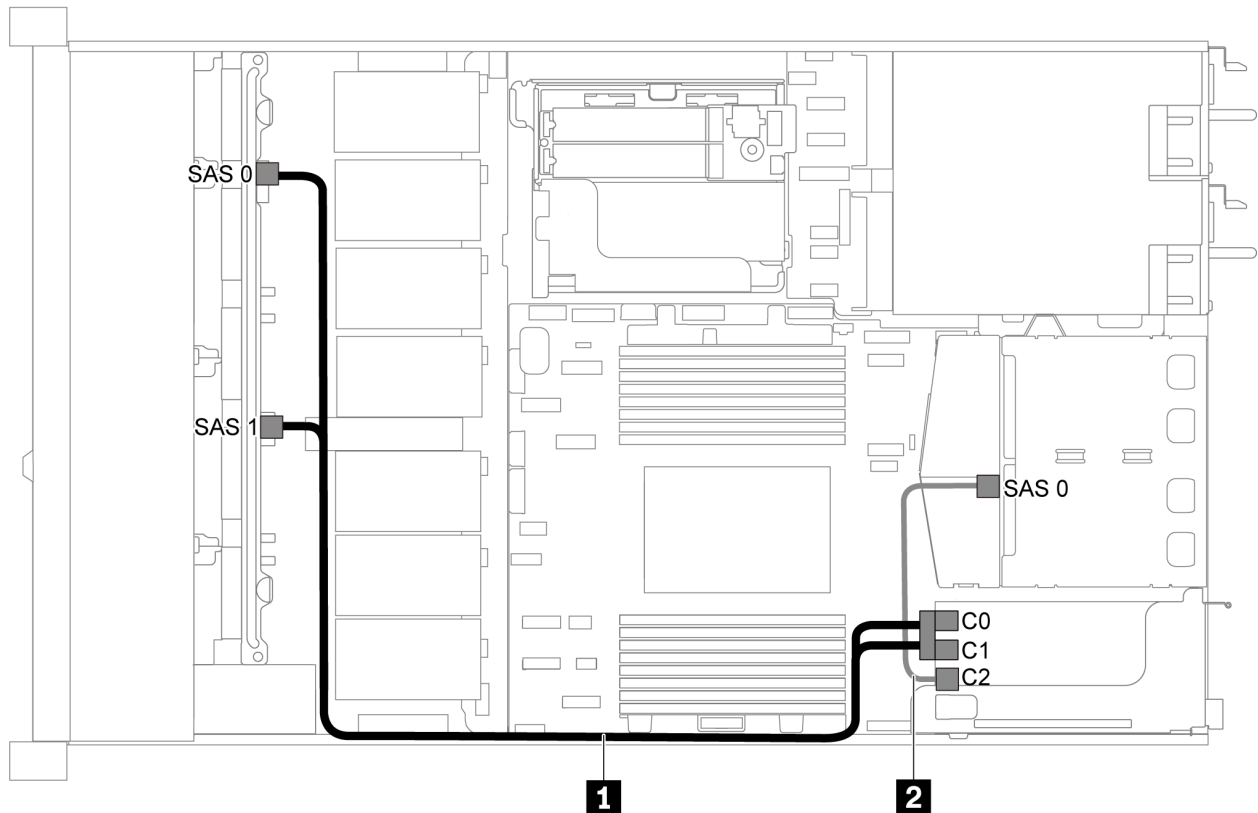


Figure 33. Cable routing for server model with eight 2.5-inch SAS/SATA drives, rear SAS/SATA drive assembly and one 16i RAID/HBA adapter

Notes:

- RAID/HBA adapters can be installed in PCIe slot 1 or internal riser assembly.
- When a Gen 4 RAID/HBA adapter is installed, ensure that you use the corresponding Gen 4 cable:

For cable 1: **ThinkSystem SR635 2.5" SAS/SATA 8-Bay X40 RAID Cable Kit**

For cable 2: **ThinkSystem SR635 2.5" SAS/SATA 2-Bay Rear Backplane X40 RAID Cable Kit**

Cable	From	To
1 SAS signal cable for front backplane	SAS 0 and SAS 1 connectors on the front backplane	The RAID/HBA adapter <ul style="list-style-type: none"> Gen 3: C0C1 Gen 4: C0
2 SAS signal cable for rear backplane	SAS connector on the rear backplane	The RAID/HBA adapter <ul style="list-style-type: none"> Gen 3: C2 Gen 4: C1

Eight 2.5-inch SATA drives and rear NVMe drive assembly

Notes:

- When the SAS/SATA backplanes are connected to PCIe connectors on the system board, only SATA drives are supported. No SAS drives are supported.

- The cable routing illustration is based on the scenario that the rear hot-swap drive cage is installed. Depending on the model, the rear hot-swap drive cage might not be available on your server.

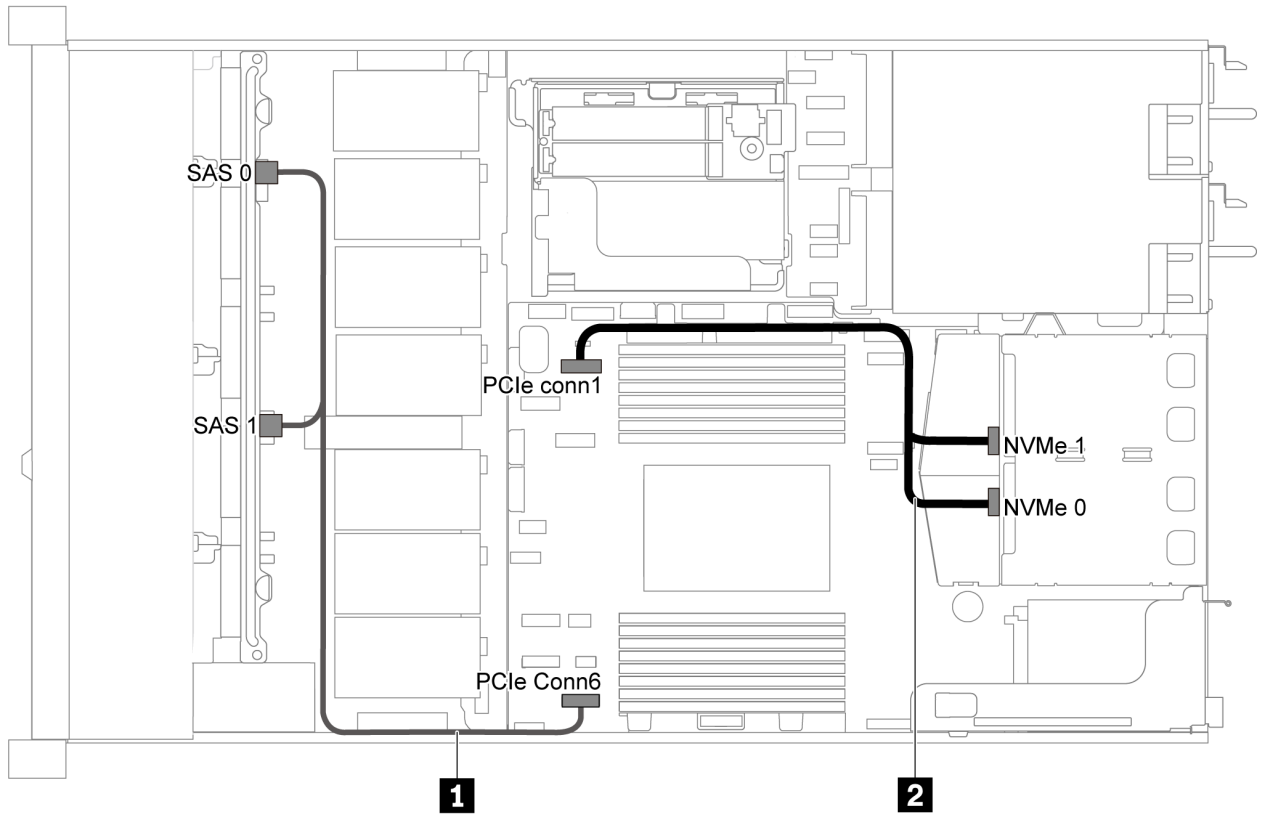


Figure 34. Cable routing for server model with eight 2.5-inch SATA drives and rear NVMe drive assembly

Cable	From	To
1 SAS signal cable for front backplane	SAS 0 and SAS 1 connectors on the front backplane	PCIe connector 6 on the system board
2 NVMe signal cable for rear backplane	NVMe connectors on the rear backplane	PCIe connector 1 on the system board

Eight 2.5-inch SAS/SATA drives, rear NVMe drive assembly and one 8i RAID/HBA adapter

Note: The cable routing illustration is based on the scenario that the rear hot-swap drive cage is installed. Depending on the model, the rear hot-swap drive cage might not be available on your server.

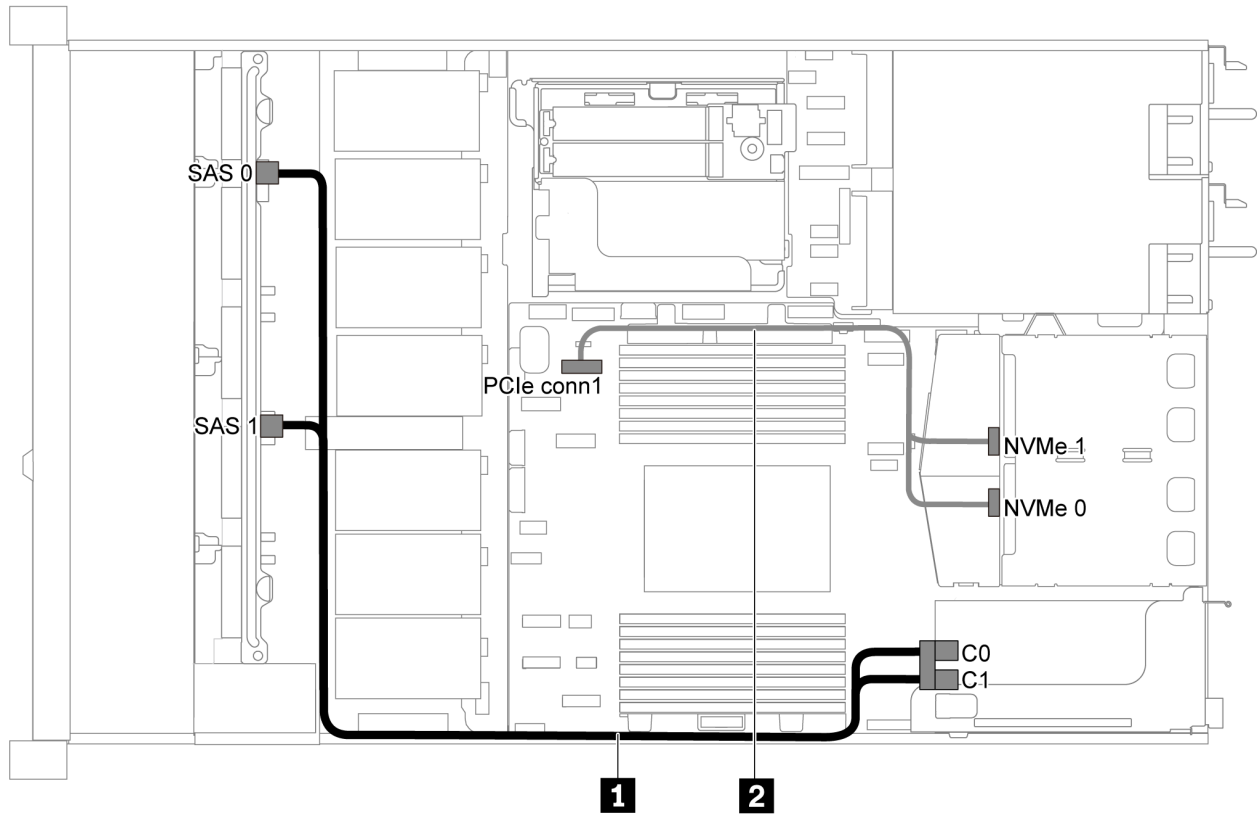


Figure 35. Cable routing for server model with eight 2.5-inch SAS/SATA drives, rear NVMe drive assembly and one 8i RAID/HBA adapter

Notes:

- RAID/HBA adapters can be installed in PCIe slot 1 or internal riser assembly.
- When a Gen 4 RAID/HBA adapter is installed, ensure that you use the corresponding Gen 4 cable:

ThinkSystem SR635 2.5" SAS/SATA 8-Bay X40 RAID Cable Kit

Cable	From	To
1 SAS signal cable for front backplane	SAS 0 and SAS 1 connectors on the front backplane	The RAID/HBA adapter <ul style="list-style-type: none"> • Gen 3: C0C1 • Gen 4: C0
2 NVMe signal cable for rear backplane	NVMe connectors on the rear backplane	PCIe connector 1 on the system board

Server model with six 2.5-inch SAS/SATA drives and four 2.5-inch NVMe drives

Use this section to understand the connectors on the backplane and the internal cable routing for server model with six 2.5-inch SAS/SATA drives and four 2.5-inch NVMe drives.

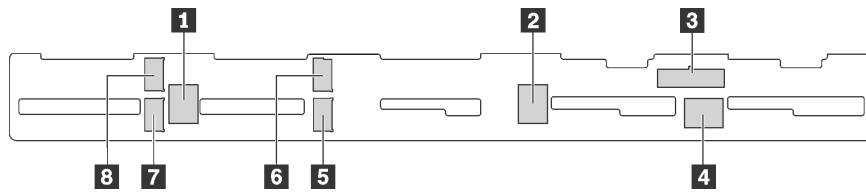


Figure 36. Connectors on the backplane for six 2.5-inch SAS/SATA drives and four 2.5-inch NVMe drives

- | | | | |
|---------------------------|---------------------------|---------------------------|---------------------------|
| 1 SAS 2 connector | 2 SAS 1 connector | 3 Power connector | 4 SAS 0 connector |
| 5 NVMe 1 connector | 6 NVMe 0 connector | 7 NVMe 3 connector | 8 NVMe 2 connector |

Notes:

- NVMe drives are only supported in drive bays 6–9.

For power cable connection, see [“Power/Sideband cable routing” on page 26](#).

Refer to the following cable routing for different configurations:

Note: When the SAS/SATA backplanes are connected to PCIe connectors on the system board, only SATA drives are supported. No SAS drives are supported.

- [“Six 2.5-inch SATA drives and four 2.5-inch NVMe drives” on page 46](#)
- [“Six 2.5-inch SAS/SATA drives, four 2.5-inch NVMe drives and one 16i RAID/HBA adapter” on page 48](#)
- [“Six 2.5-inch SATA drives, four 2.5-inch NVMe drives and rear SAS/SATA drive assembly” on page 49](#)
- [“Six 2.5-inch SAS/SATA drives, four 2.5-inch NVMe drives, rear SAS/SATA drive assembly and one 16i RAID/HBA adapter” on page 50](#)
- [“Six 2.5-inch SATA drives, four 2.5-inch NVMe drives and rear NVMe drive assembly” on page 51](#)
- [“Six 2.5-inch SAS/SATA drives, four 2.5-inch NVMe drives, rear NVMe drive assembly and one 16i RAID/HBA adapter” on page 52](#)

Six 2.5-inch SATA drives and four 2.5-inch NVMe drives

Note: When the SAS/SATA backplanes are connected to PCIe connectors on the system board, only SATA drives are supported. No SAS drives are supported.

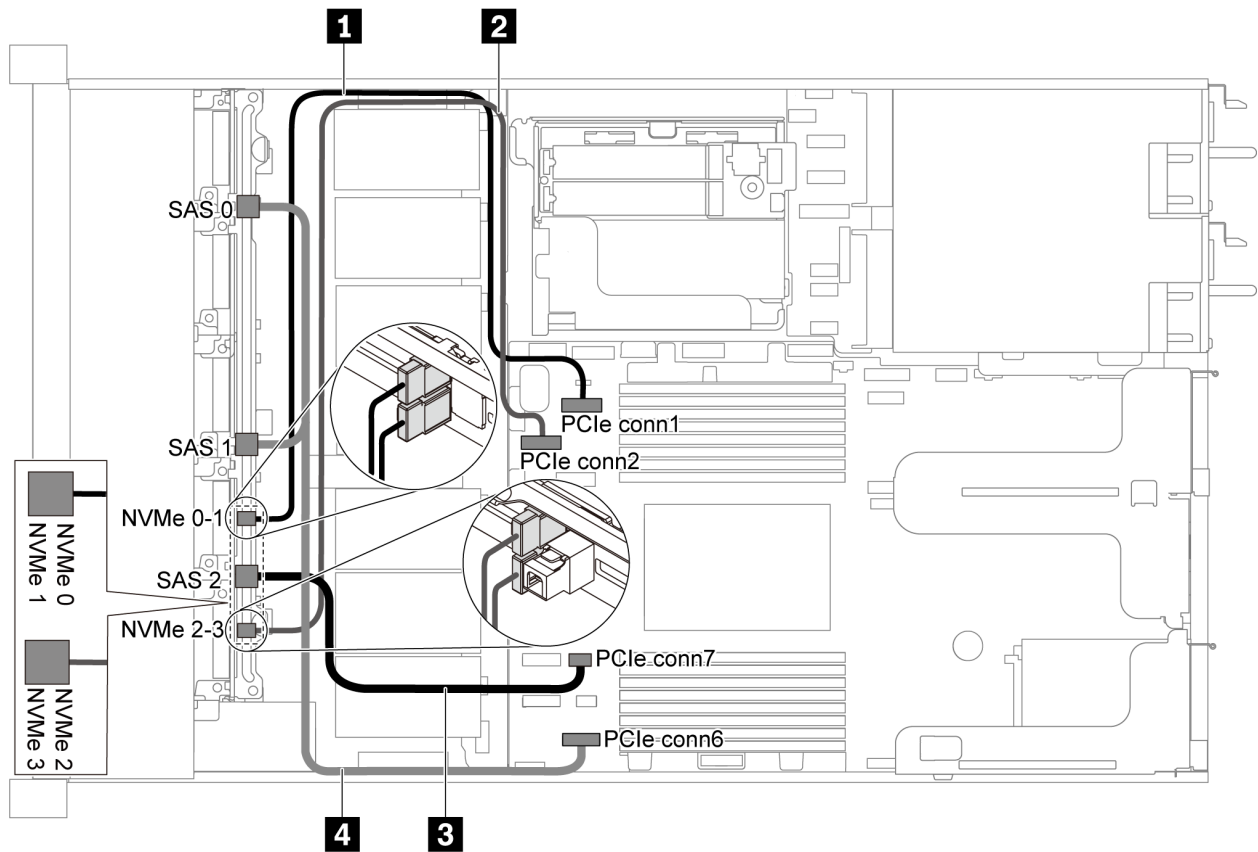


Figure 37. Cable routing for server model with six 2.5-inch SATA drives and four 2.5-inch NVMe drives

Cable	From	To
1 NVMe signal cable for front backplane	NVMe 0 and NVMe 1 connectors on the front backplane	PCIe connector 1 on the system board
2 NVMe signal cable for front backplane	NVMe 2 and NVMe 3 connectors on the front backplane	PCIe connector 2 on the system board
3 SAS signal cable for front backplane	SAS 2 connector on the front backplane	PCIe connector 7 on the system board
4 SAS signal cable for front backplane	SAS 0 and SAS 1 connectors on the front backplane	PCIe connector 6 on the system board

Six 2.5-inch SAS/SATA drives, four 2.5-inch NVMe drives and one 16i RAID/HBA adapter

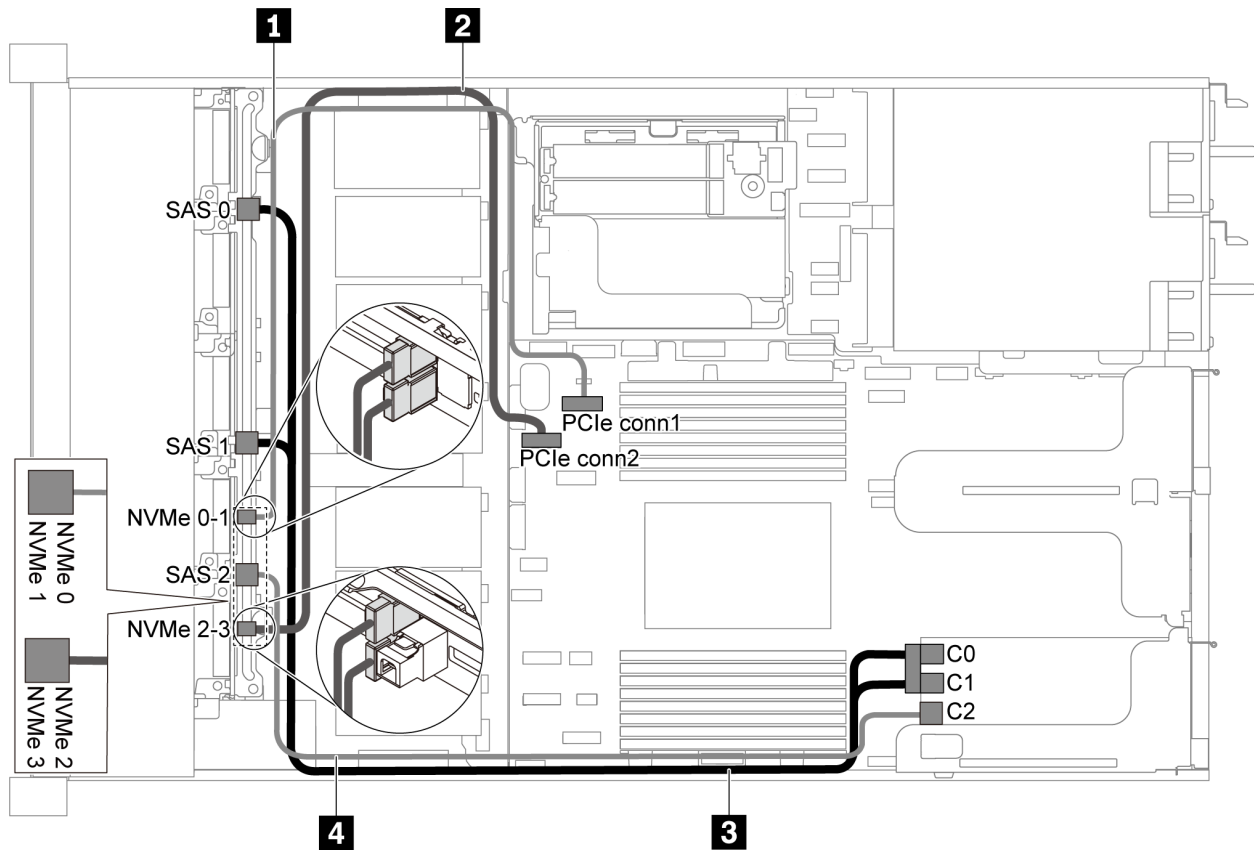


Figure 38. Cable routing for server model with six 2.5-inch SAS/SATA drives, four 2.5-inch NVMe drives and one 16i RAID/HBA adapter

Notes:

- RAID/HBA adapters can be installed in PCIe slot 1 or internal riser assembly.
- When a Gen 4 RAID/HBA adapter is installed, ensure that you use the corresponding Gen 4 cable:

ThinkSystem SR635 Front 6x2.5" SAS/SATA + 4x2.5" AnyBay X40 RAID Cable Kit

Cable	From	To
1 NVMe signal cable for front backplane	NVMe 0 and NVMe 1 connectors on the front backplane	PCIe connector 1 on the system board
2 NVMe signal cable for front backplane	NVMe 2 and NVMe 3 connectors on the front backplane	PCIe connector 2 on the system board
3 SAS signal cable for front backplane	SAS 0 and SAS 1 connectors on the front backplane	The RAID/HBA adapter <ul style="list-style-type: none"> • Gen 3: C0C1 • Gen 4: C0
4 SAS signal cable for front backplane	SAS 2 connector on the front backplane	The RAID/HBA adapter <ul style="list-style-type: none"> • Gen 3: C2 • Gen 4: C1

Six 2.5-inch SATA drives, four 2.5-inch NVMe drives and rear SAS/SATA drive assembly

Notes:

- When the SAS/SATA backplanes are connected to PCIe connectors on the system board, only SATA drives are supported. No SAS drives are supported.
- The cable routing illustration is based on the scenario that the rear hot-swap drive cage is installed. Depending on the model, the rear hot-swap drive cage might not be available on your server.

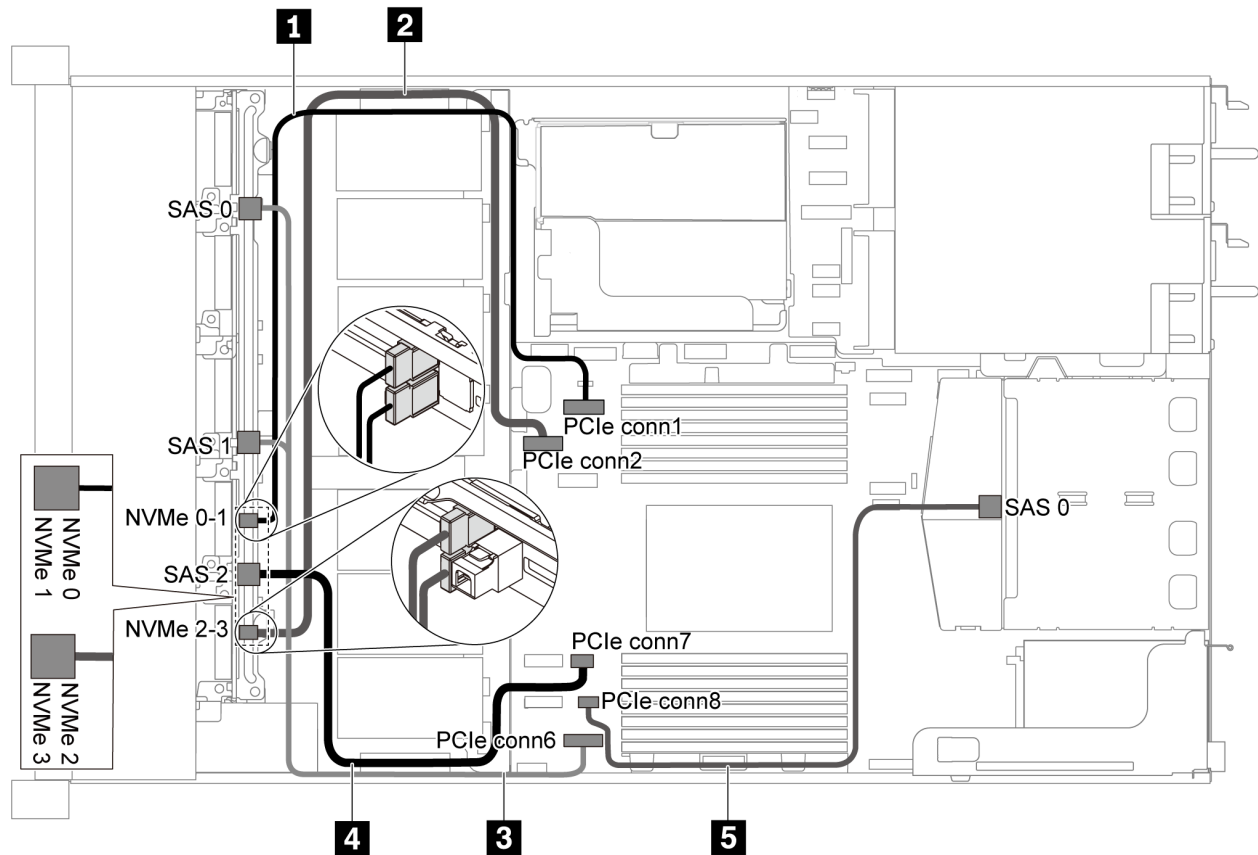


Figure 39. Cable routing for server model with six 2.5-inch SATA drives, four 2.5-inch NVMe drives and rear SAS/SATA drive assembly

Note: M.2 drive is not supported for this configuration.

Cable	From	To
1 NVMe signal cable for front backplane	NVMe 0 and NVMe 1 connectors on the front backplane	PCIe connector 1 on the system board
2 NVMe signal cable for front backplane	NVMe 2 and NVMe 3 connectors on the front backplane	PCIe connector 2 on the system board
3 SAS signal cable for front backplane	SAS 0 and SAS1 connectors on the front backplane	PCIe connector 6 on the system board
4 SAS signal cable for front backplane	SAS 2 connector on the front backplane	PCIe connector 7 on the system board
5 SAS signal cable for rear backplane	SAS connector on the rear backplane	PCIe connector 8 on the system board

Six 2.5-inch SAS/SATA drives, four 2.5-inch NVMe drives, rear SAS/SATA drive assembly and one 16i RAID/HBA adapter

Note: The cable routing illustration is based on the scenario that the rear hot-swap drive cage is installed. Depending on the model, the rear hot-swap drive cage might not be available on your server.

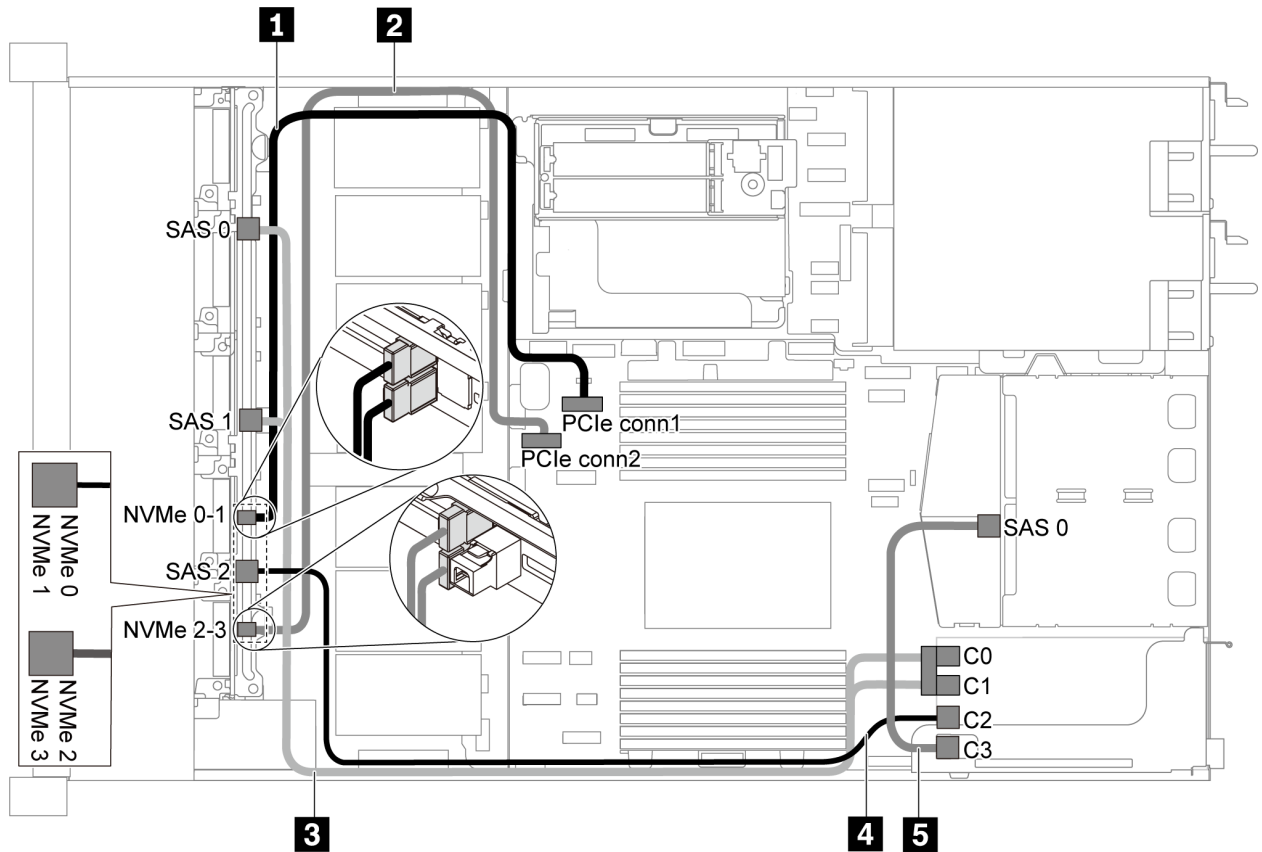


Figure 40. Cable routing for server model with six 2.5-inch SAS/SATA drives, four 2.5-inch NVMe drives, rear SAS/SATA drive assembly and one 16i RAID/HBA adapter

Notes:

- RAID/HBA adapters can be installed in PCIe slot 1 or internal riser assembly.
- When a Gen 4 RAID/HBA adapter is installed, ensure that you use the corresponding Gen 4 cable:

For cable 3: **ThinkSystem SR635 Front 6x2.5" SAS/SATA + 4x2.5" AnyBay X40 RAID Cable Kit**

For cable 4 and 5: **ThinkSystem SR635 2.5" SAS/SATA 2-Bay Rear Backplane X40 RAID Cable Kit**

Cable	From	To
1 NVMe signal cable for front backplane	NVMe 0 and NVMe 1 connectors on the front backplane	PCIe connector 1 on the system board
2 NVMe signal cable for front backplane	NVMe 2 and NVMe 3 connectors on the front backplane	PCIe connector 2 on the system board
3 SAS signal cable for front backplane	SAS 0 and SAS 1 connectors on the front backplane	The RAID/HBA adapter <ul style="list-style-type: none"> • Gen 3: C0C1 • Gen 4: C0

Cable	From	To
4 SAS signal cable for front backplane	SAS 2 connector on the front backplane	The RAID/HBA adapter <ul style="list-style-type: none"> • Gen 3: C2 • Gen 4: C1
5 SAS signal cable for rear backplane	SAS connector on the rear backplane	The RAID/HBA adapter <ul style="list-style-type: none"> • Gen 3: C3 • Gen 4: C1

Six 2.5-inch SATA drives, four 2.5-inch NVMe drives and rear NVMe drive assembly

Notes:

- When the SAS/SATA backplanes are connected to PCIe connectors on the system board, only SATA drives are supported. No SAS drives are supported.
- The cable routing illustration is based on the scenario that the rear hot-swap drive cage is installed. Depending on the model, the rear hot-swap drive cage might not be available on your server.

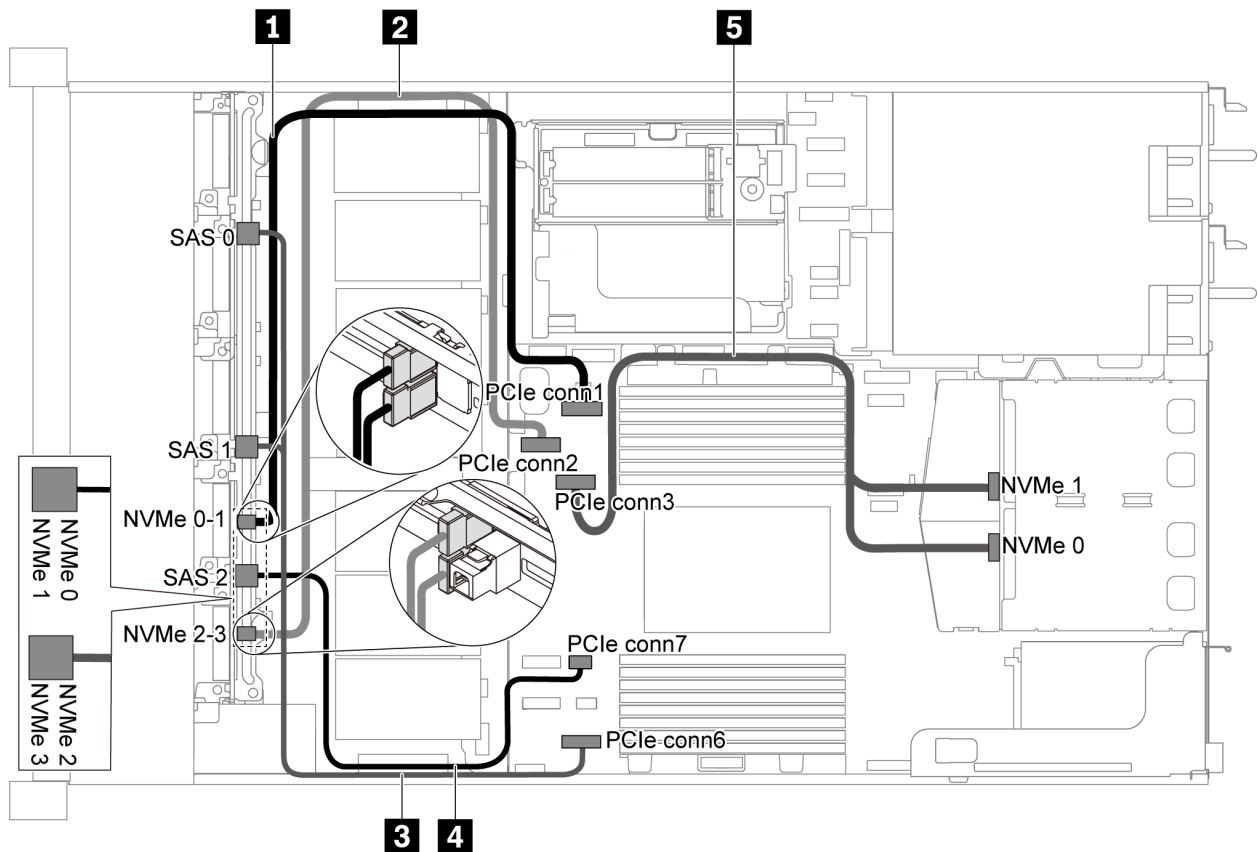


Figure 41. Cable routing for server model with six 2.5-inch SATA drives, four 2.5-inch NVMe drives and rear NVMe drive assembly

Cable	From	To
1 NVMe signal cable for front backplane	NVMe 0 and NVMe 1 connectors on the front backplane	PCIe connector 1 on the system board
2 NVMe signal cable for front backplane	NVMe 2 and NVMe 3 connectors on the front backplane	PCIe connector 2 on the system board
3 SAS signal cable for front backplane	SAS 0 and SAS1 connectors on the front backplane	PCIe connector 6 on the system board
4 SAS signal cable for front backplane	SAS 2 connector on the front backplane	PCIe connector 7 on the system board
5 NVMe signal cable for rear backplane	NVMe connectors on the rear backplane	PCIe connector 3 on the system board

Six 2.5-inch SAS/SATA drives, four 2.5-inch NVMe drives, rear NVMe drive assembly and one 16i RAID/HBA adapter

Note: The cable routing illustration is based on the scenario that the rear hot-swap drive cage is installed. Depending on the model, the rear hot-swap drive cage might not be available on your server.

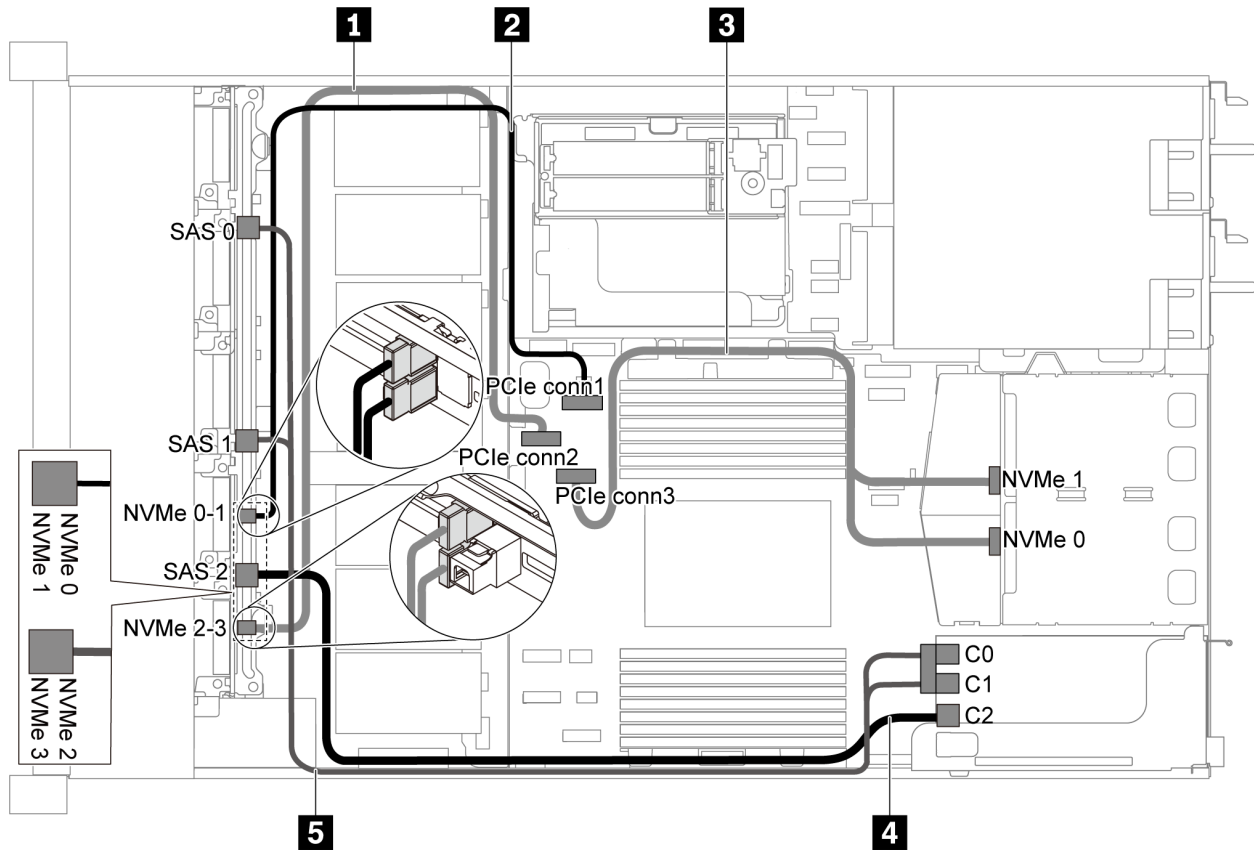


Figure 42. Cable routing for server model with six 2.5-inch SAS/SATA drives, four 2.5-inch NVMe drives, rear NVMe drive assembly and one 16i RAID/HBA adapter

Notes:

- RAID/HBA adapters can be installed in PCIe slot 1 or internal riser assembly.
- When a Gen 4 RAID/HBA adapter is installed, ensure that you use the corresponding Gen 4 cable:

ThinkSystem SR635 Front 6x2.5" SAS/SATA + 4x2.5" AnyBay X40 RAID Cable Kit

Cable	From	To
1 NVMe signal cable for front backplane	NVMe 2 and NVMe 3 connectors on the front backplane	PCIe connector 2 on the system board
2 NVMe signal cable for front backplane	NVMe 0 and NVMe 1 connectors on the front backplane	PCIe connector 1 on the system board
3 NVMe signal cable for rear backplane	NVMe connectors on the rear backplane	PCIe connector 3 on the system board
4 SAS signal cable for front backplane	SAS 2 connector on the front backplane	The RAID/HBA adapter <ul style="list-style-type: none"> • Gen 3: C2 • Gen 4: C1
5 SAS signal cable for front backplane	SAS 0 and SAS 1 connectors on the front backplane	The RAID/HBA adapter <ul style="list-style-type: none"> • Gen 3: C0C1 • Gen 4: C0

Server model with ten 2.5-inch SAS/SATA/NVMe drives

Use this section to understand the connectors on the backplane and the internal cable routing for server model with ten 2.5-inch SAS/SATA/NVMe drives.

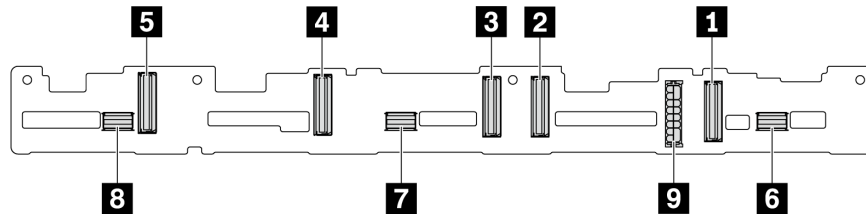


Figure 43. Connectors on the backplane for ten 2.5-inch SAS/SATA/NVMe drives

- 1** NVMe 0–1 connector **2** NVMe 2–3 connector **3** NVMe 4–5 connector **4** NVMe 6–7 connector
- 5** NVMe 8–9 connector **6** SAS/SATA 0–3 **7** SAS/SATA 4–7 **8** SAS/SATA 8–9
- 9** Power connector

For power cable connection, see [“Power/Sideband cable routing” on page 26](#).

Refer to the following cable routing for different configurations:

Note: When the SAS/SATA/NVMe backplanes are connected to PCIe connectors on the system board, only SATA/NVMe drives are supported. No SAS drives are supported.

- [“Ten 2.5-inch SATA/NVMe drives” on page 54](#)
- [“Ten 2.5-inch SAS/SATA/NVMe drives and one 16i RAID/HBA adapter” on page 55](#)
- [“Ten 2.5-inch SATA/NVMe drives and rear SAS/SATA drive assembly” on page 56](#)
- [“Ten 2.5-inch SAS/SATA/NVMe drives, rear SAS/SATA drive assembly and one 16i RAID/HBA adapter” on page 57](#)
- [“Ten 2.5-inch SAS/SATA/NVMe drives, rear NVMe drive assembly and one 16i RAID/HBA adapter” on page 59](#)

- “Ten 2.5-inch SAS/SATA/NVMe drives, rear SAS/SATA drive assembly, middle NVMe drive assembly and one 16i RAID/HBA adapter” on page 60
- “Ten 2.5-inch NVMe drives, rear NVMe drive assembly and middle NVMe drive assembly” on page 62
- “Ten 2.5-inch SAS/SATA/NVMe drives, rear NVMe drive assembly, middle NVMe drive assembly and one 16i RAID/HBA adapter” on page 64
- “Ten 2.5-inch SAS/SATA/NVMe drives, middle NVMe drive assembly and one 16i RAID/HBA adapter” on page 66

Ten 2.5-inch SATA/NVMe drives

Note: When the SAS/SATA backplanes are connected to PCIe connectors on the system board, only SATA drives are supported. No SAS drives are supported.

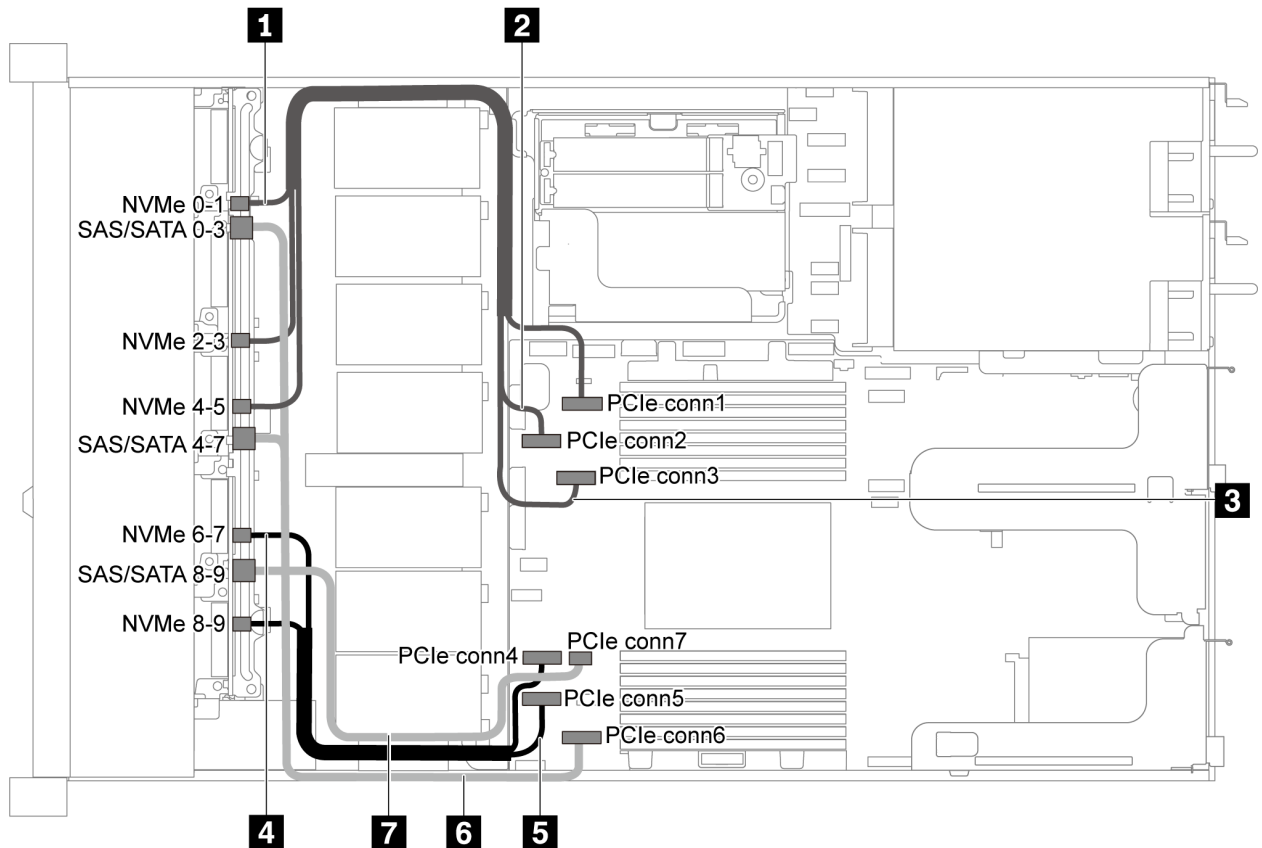


Figure 44. Cable routing for server model with ten 2.5-inch SATA/NVMe drives

Cable	From	To
1 NVMe signal cable for front backplane	NVMe 0-1 connector on the front backplane	PCIe connector 1 on the system board
2 NVMe signal cable for front backplane	NVMe 2-3 connector on the front backplane	PCIe connector 2 on the system board
3 NVMe signal cable for front backplane	NVMe 4-5 connector on the front backplane	PCIe connector 3 on the system board
4 NVMe signal cable for front backplane	NVMe 6-7 connector on the front backplane	PCIe connector 4 on the system board

Cable	From	To
5 NVMe signal cable for front backplane	NVMe 8–9 connector on the front backplane	PCIe connector 5 on the system board
6 SAS signal cable for front backplane	SAS/SATA 0–3 and 4–7 connectors on the front backplane	PCIe connector 6 on the system board
7 SAS signal cable for front backplane	SAS/SATA 8–9 connector on the front backplane	PCIe connector 7 on the system board

Ten 2.5-inch SAS/SATA/NVMe drives and one 16i RAID/HBA adapter

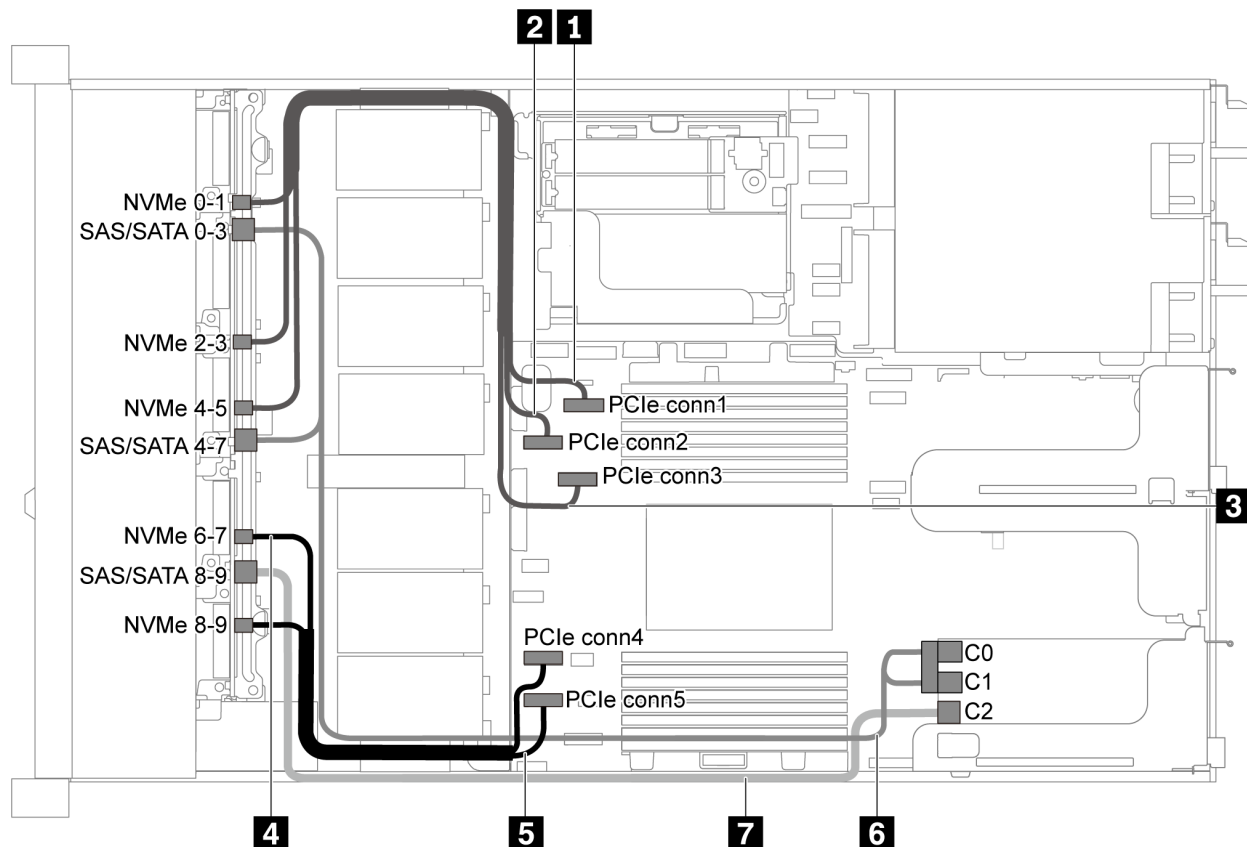


Figure 45. Cable routing for server model with ten 2.5-inch SAS/SATA/NVMe drives and one 16i RAID/HBA adapter

Notes:

- RAID/HBA adapters can be installed in PCIe slot 1 or internal riser assembly.
- When a Gen 4 RAID/HBA adapter is installed, ensure that you use the corresponding Gen 4 cable:

ThinkSystem SR635 2.5" SAS/SATA/AnyBay 10-Bay X40 RAID Cable Kit

Cable	From	To
1 NVMe signal cable for front backplane	NVMe 0–1 connector on the front backplane	PCIe connector 1 on the system board
2 NVMe signal cable for front backplane	NVMe 2–3 connector on the front backplane	PCIe connector 2 on the system board

Cable	From	To
3 NVMe signal cable for front backplane	NVMe 4–5 connector on the front backplane	PCIe connector 3 on the system board
4 NVMe signal cable for front backplane	NVMe 6–7 connector on the front backplane	PCIe connector 4 on the system board
5 NVMe signal cable for front backplane	NVMe 8–9 connector on the front backplane	PCIe connector 5 on the system board
6 SAS signal cable for front backplane	SAS/SATA 0–3 and SAS/SATA 4–7 connectors on the front backplane	The RAID/HBA adapter in PCIe slot 1 <ul style="list-style-type: none"> • Gen 3: C0C1 • Gen 4: C0
7 SAS signal cable for front backplane	SAS/SATA 8–9 connector on the front backplane	The RAID/HBA adapter in PCIe slot 1 <ul style="list-style-type: none"> • Gen 3: C2 • Gen 4: C1

Ten 2.5-inch SATA/NVMe drives and rear SAS/SATA drive assembly

Notes:

- When the SAS/SATA backplanes are connected to PCIe connectors on the system board, only SATA drives are supported. No SAS drives are supported.
- The cable routing illustration is based on the scenario that the rear hot-swap drive cage is installed. Depending on the model, the rear hot-swap drive cage might not be available for your server.

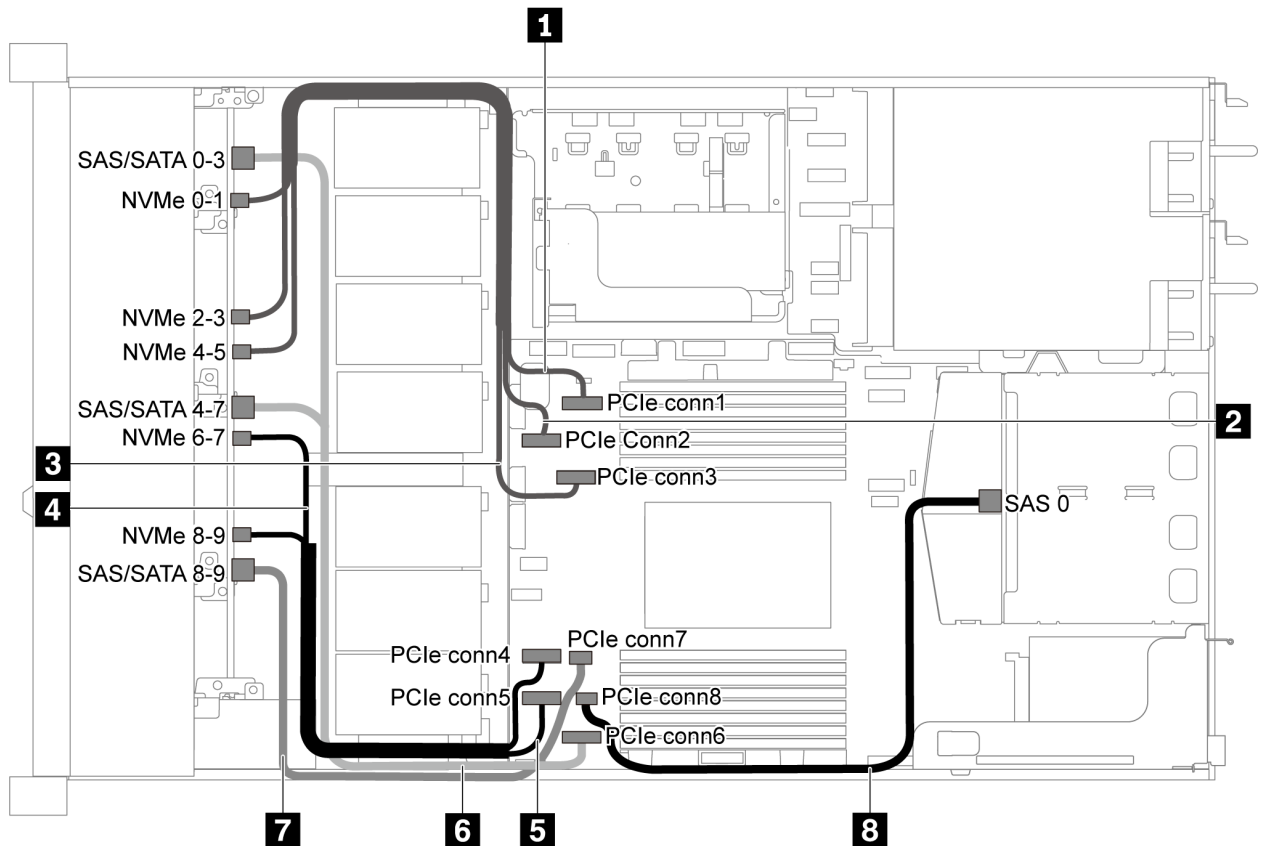


Figure 46. Cable routing for server model with ten 2.5-inch SATA/NVMe drives and rear SAS/SATA drive assembly

Note: M.2 drive is not supported for this configuration.

Cable	From	To
1 NVMe signal cable for front backplane	NVMe 0–1 connector on the front backplane	PCIe connector 1 on the system board
2 NVMe signal cable for front backplane	NVMe 2–3 connector on the front backplane	PCIe connector 2 on the system board
3 NVMe signal cable for front backplane	NVMe 4–5 connector on the front backplane	PCIe connector 3 on the system board
4 NVMe signal cable for front backplane	NVMe 6–7 connector on the front backplane	PCIe connector 4 on the system board
5 NVMe signal cable for front backplane	NVMe 8–9 connector on the front backplane	PCIe connector 5 on the system board
6 SAS signal cable for front backplane	SAS/SATA 0–3 and 4–7 connectors on the front backplane	PCIe connector 6 on the system board
7 SAS signal cable for front backplane	SAS/SATA 8–9 connector on the front backplane	PCIe connector 7 on the system board
8 SAS signal cable for rear backplane	SAS connector on the rear backplane	PCIe connector 8 on the system board

Ten 2.5-inch SAS/SATA/NVMe drives, rear SAS/SATA drive assembly and one 16i RAID/HBA adapter

Note: The cable routing illustration is based on the scenario that the rear hot-swap drive cage is installed. Depending on the model, the rear hot-swap drive cage might not be available on your server.

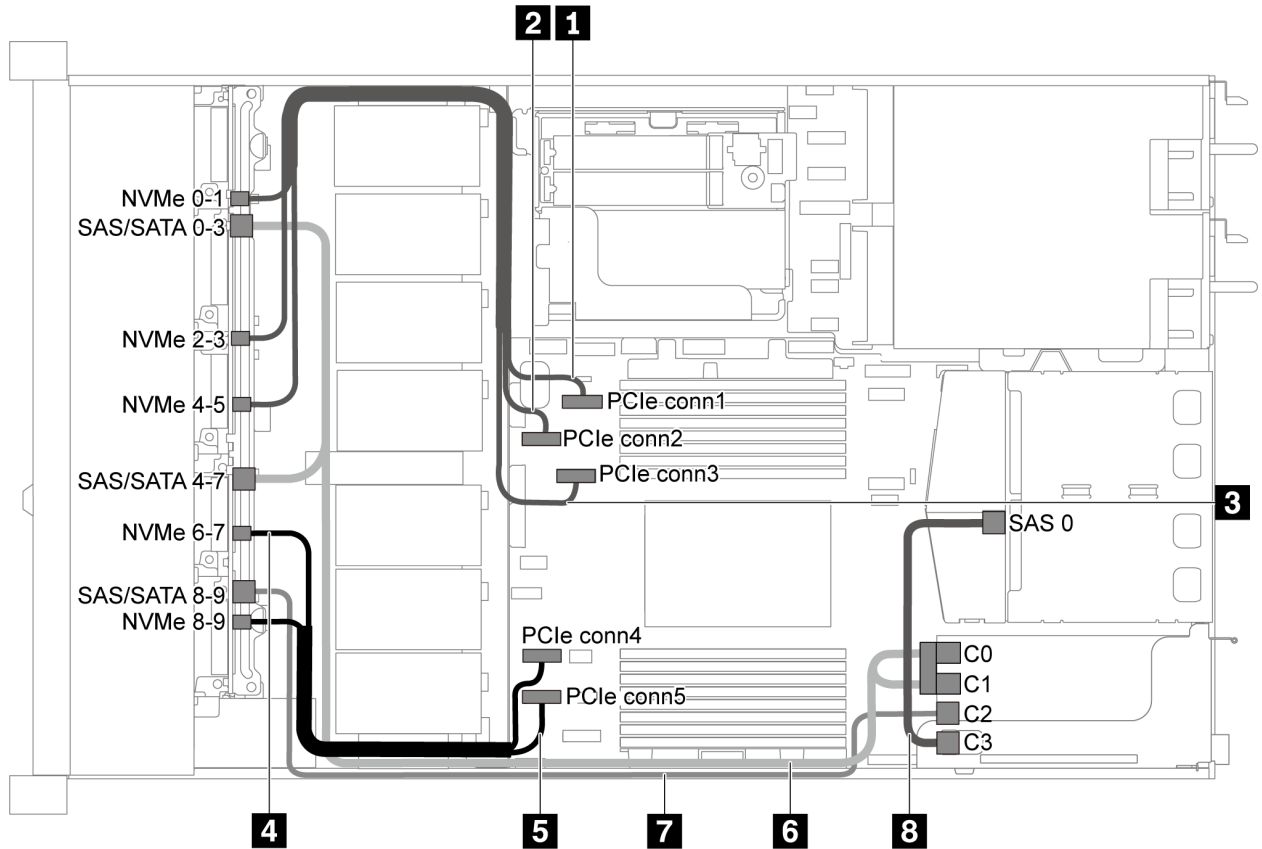


Figure 47. Cable routing for server model with ten 2.5-inch SAS/SATA/NVMe drives, rear SAS/SATA drive assembly and one 16i RAID/HBA adapter

Notes:

- RAID/HBA adapters can be installed in PCIe slot 1 or internal riser assembly.
- When a Gen 4 RAID/HBA adapter is installed, ensure that you use the corresponding Gen 4 cable:

For cable 6: **ThinkSystem SR635 2.5" SAS/SATA/AnyBay 10-Bay X40 RAID Cable Kit**

For cable 7 and 8: **ThinkSystem SR635 2.5" SAS/SATA 2-Bay Rear Backplane X40 RAID Cable Kit**

Cable	From	To
1 NVMe signal cable for front backplane	NVMe 0-1 connector on the front backplane	PCIe connector 1 on the system board
2 NVMe signal cable for front backplane	NVMe 2-3 connector on the front backplane	PCIe connector 2 on the system board
3 NVMe signal cable for front backplane	NVMe 4-5 connector on the front backplane	PCIe connector 3 on the system board
4 NVMe signal cable for front backplane	NVMe 6-7 connector on the front backplane	PCIe connector 4 on the system board
5 NVMe signal cable for front backplane	NVMe 8-9 connector on the front backplane	PCIe connector 5 on the system board

Cable	From	To
6 SAS signal cable for front backplane	SAS/SATA 0–3 and SAS/SATA 4–7 connectors on the front backplane	The RAID/HBA adapter in PCIe slot 1 <ul style="list-style-type: none"> • Gen 3: C0C1 • Gen 4: C0
7 SAS signal cable for front backplane	SAS/SATA 8–9 connector on the front backplane	The RAID/HBA adapter in PCIe slot 1 <ul style="list-style-type: none"> • Gen 3: C2 • Gen 4: C1
8 SAS signal cable for rear backplane	SAS connector on the rear backplane	The RAID/HBA adapter in PCIe slot 1 <ul style="list-style-type: none"> • Gen 3: C3 • Gen 4: C1

Ten 2.5-inch SAS/SATA/NVMe drives, rear NVMe drive assembly and one 16i RAID/HBA adapter

Note: The cable routing illustration is based on the scenario that the rear hot-swap drive cage is installed. Depending on the model, the rear hot-swap drive cage might not be available on your server.

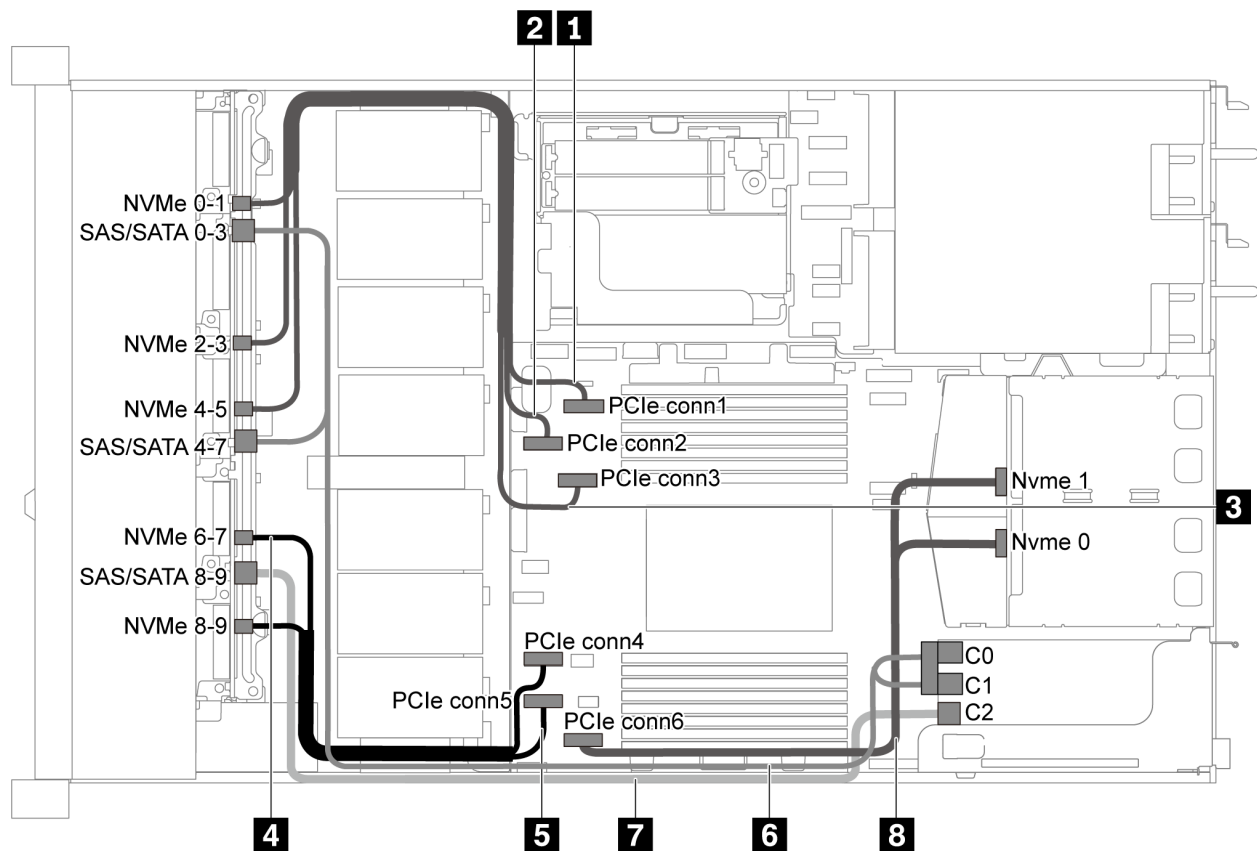


Figure 48. Cable routing for server model with ten 2.5-inch SAS/SATA/NVMe drives, rear NVMe drive assembly and one 16i RAID/HBA adapter

Notes:

- RAID/HBA adapters can be installed in PCIe slot 1 or internal riser assembly.
- When a Gen 4 RAID/HBA adapter is installed, ensure that you use the corresponding Gen 4 cable:

ThinkSystem SR635 2.5" SAS/SATA/AnyBay 10-Bay X40 RAID Cable Kit

Cable	From	To
1 NVMe signal cable for front backplane	NVMe 0–1 connector on the front backplane	PCIe connector 1 on the system board
2 NVMe signal cable for front backplane	NVMe 2–3 connector on the front backplane	PCIe connector 2 on the system board
3 NVMe signal cable for front backplane	NVMe 4–5 connector on the front backplane	PCIe connector 3 on the system board
4 NVMe signal cable for front backplane	NVMe 6–7 connector on the front backplane	PCIe connector 4 on the system board
5 NVMe signal cable for front backplane	NVMe 8–9 connector on the front backplane	PCIe connector 5 on the system board
6 SAS signal cable for front backplane	SAS/SATA 0–3 and SAS/SATA 4–7 connectors on the front backplane	The RAID/HBA adapter in PCIe slot 1 <ul style="list-style-type: none"> • Gen 3: C0C1 • Gen 4: C0
7 SAS signal cable for front backplane	SAS/SATA 8–9 connector on the front backplane	The RAID/HBA adapter in PCIe slot 1 <ul style="list-style-type: none"> • Gen 3: C2 • Gen 4: C1
8 NVMe signal cable for rear backplane	NVMe connectors on the rear backplane	PCIe connector 6 on the system board

Ten 2.5-inch SAS/SATA/NVMe drives, rear SAS/SATA drive assembly, middle NVMe drive assembly and one 16i RAID/HBA adapter

Notes:

- The cable routing illustration is based on the scenario that the rear hot-swap drive cage and middle NVMe drive assembly are installed. Depending on the model, the rear hot-swap drive cage and middle NVMe drive assembly might not be available on your server.
- The following two illustrations are for the same configuration.

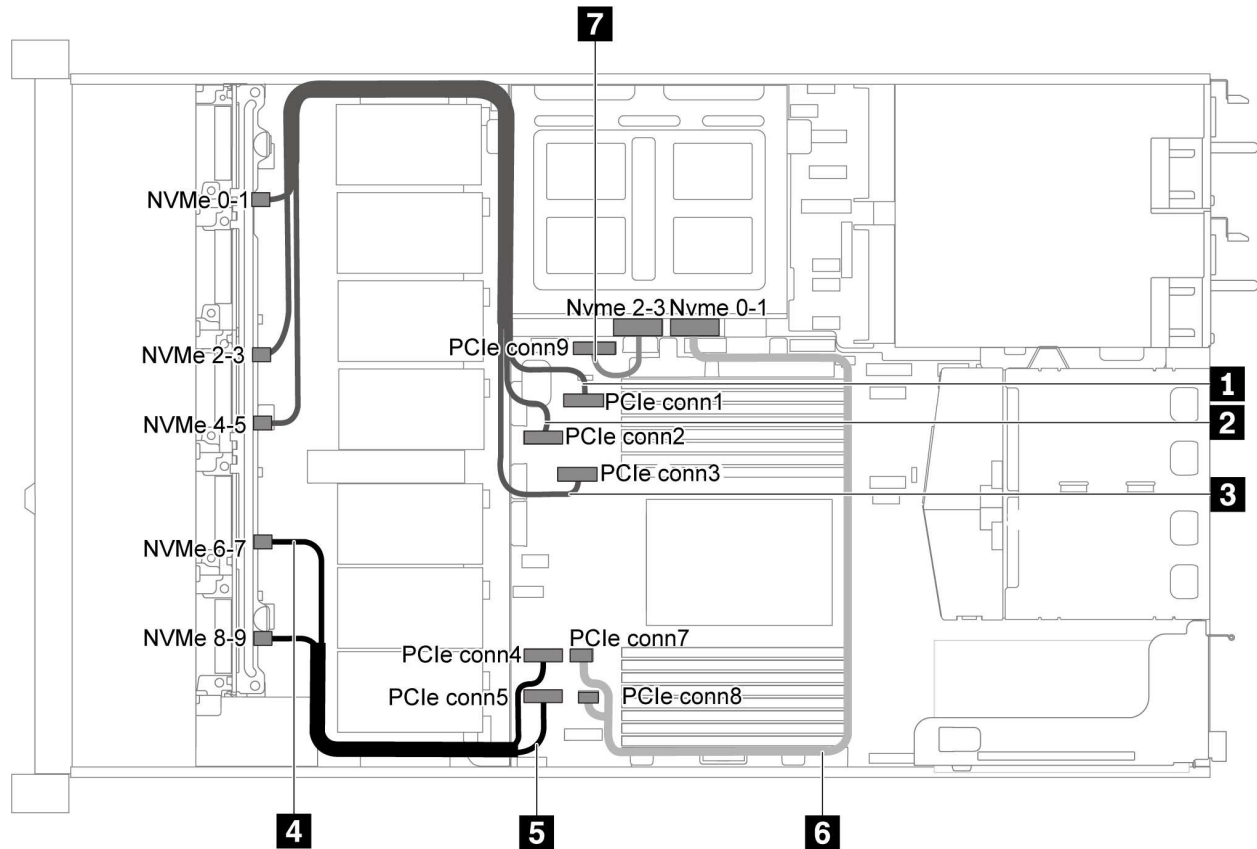


Figure 49. Cable routing for server model with ten 2.5-inch SAS/SATA/NVMe drives, rear SAS/SATA drive assembly, middle NVMe drive assembly and one 16i RAID/HBA adapter-1

Cable	From	To
1 NVMe signal cable for front backplane	NVMe 0–1 connector on the front backplane	PCIe connector 1 on the system board
2 NVMe signal cable for front backplane	NVMe 2–3 connector on the front backplane	PCIe connector 2 on the system board
3 NVMe signal cable for front backplane	NVMe 4–5 connector on the front backplane	PCIe connector 3 on the system board
4 NVMe signal cable for front backplane	NVMe 6–7 connector on the front backplane	PCIe connector 4 on the system board
5 NVMe signal cable for front backplane	NVMe 8–9 connector on the front backplane	PCIe connector 5 on the system board
6 NVMe signal cable for middle backplane	NVMe 0–1 connector on the middle backplane	PCIe connector 7 and PCIe connector 8 on the system board
7 NVMe signal cable for middle backplane	NVMe 2–3 connector on the middle backplane	PCIe connector 9 on the system board

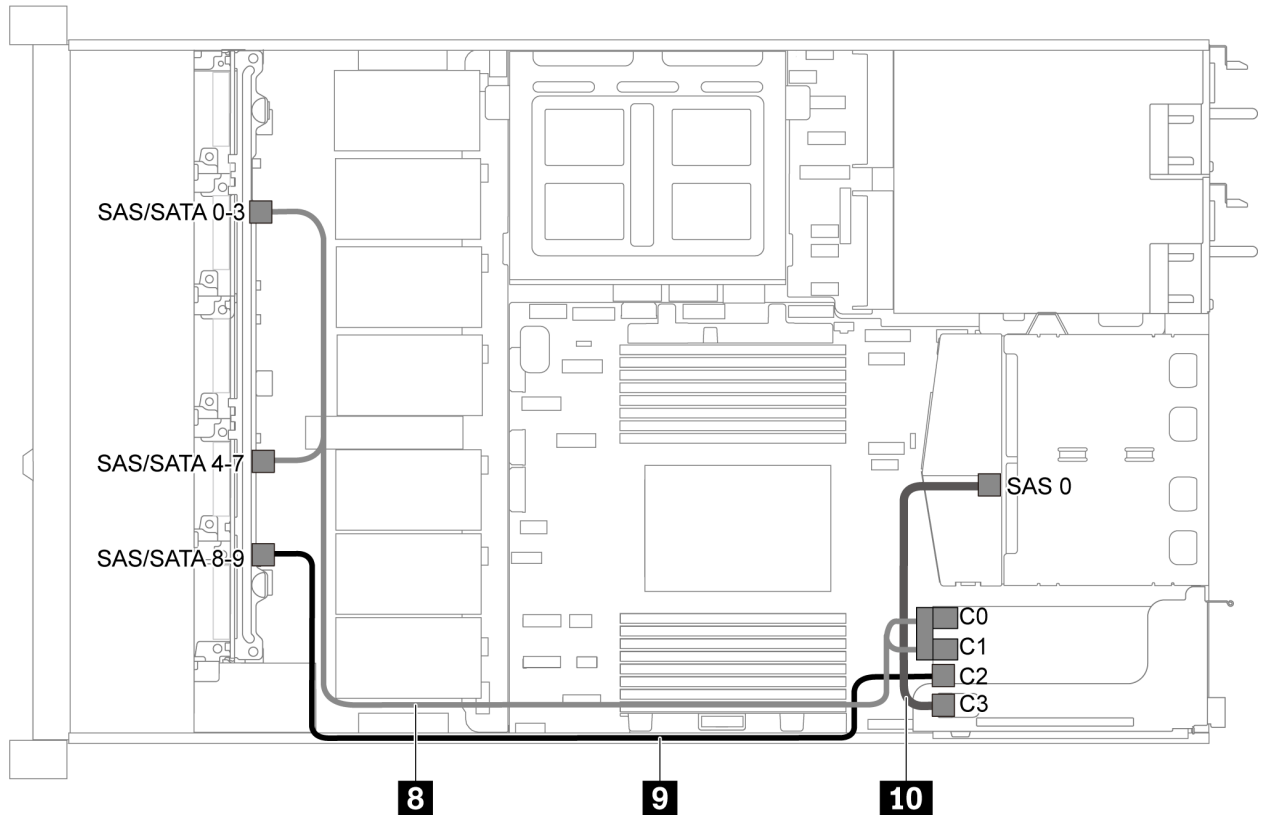


Figure 50. Cable routing for server model with ten 2.5-inch SAS/SATA/NVMe drives, rear SAS/SATA drive assembly, middle NVMe drive assembly and one 16i RAID/HBA adapter-2

Note: When a Gen 4 RAID/HBA adapter is installed, ensure that you use the corresponding Gen 4 cable:

For cable 8: **ThinkSystem SR635 2.5" SAS/SATA/AnyBay 10-Bay X40 RAID Cable Kit**

For cable 9 and 10: **ThinkSystem SR635 2.5" SAS/SATA 2-Bay Rear Backplane X40 RAID Cable Kit**

Cable	From	To
8 SAS signal cable for front backplane	SAS/SATA 0-3 and SAS/SATA 4-7 connectors on the front backplane	The RAID/HBA adapter in PCIe slot 1 <ul style="list-style-type: none"> • Gen 3: C0C1 • Gen 4: C0
9 SAS signal cable for front backplane	SAS/SATA 8-9 connector on the front backplane	The RAID/HBA adapter in PCIe slot 1 <ul style="list-style-type: none"> • Gen 3: C2 • Gen 4: C1
10 SAS signal cable for rear backplane	SAS 0 connector on the middle backplane	The RAID/HBA adapter in PCIe slot 1 <ul style="list-style-type: none"> • Gen 3: C3 • Gen 4: C1

Ten 2.5-inch NVMe drives, rear NVMe drive assembly and middle NVMe drive assembly

Notes: The cable routing illustration is based on the scenario that the rear hot-swap drive cage and middle NVMe drive assembly are installed. Depending on the model, the rear hot-swap drive cage and middle NVMe

drive assembly might not be available on your server. For the following configurations without the rear hot-swap drive cage or middle NVMe drive assembly, you can also refer to the illustration and table for the cable routing.

- Ten 2.5-inch NVMe drives: Connect Cable **1** and Cable **2**
- Ten 2.5-inch NVMe drives and rear NVMe drive assembly: Connect Cable **1**, Cable **2**, and Cable **5**
- Ten 2.5-inch NVMe drives and middle NVMe drive assembly: Connect Cable **1**, Cable **2**, Cable **3**, and Cable **4**

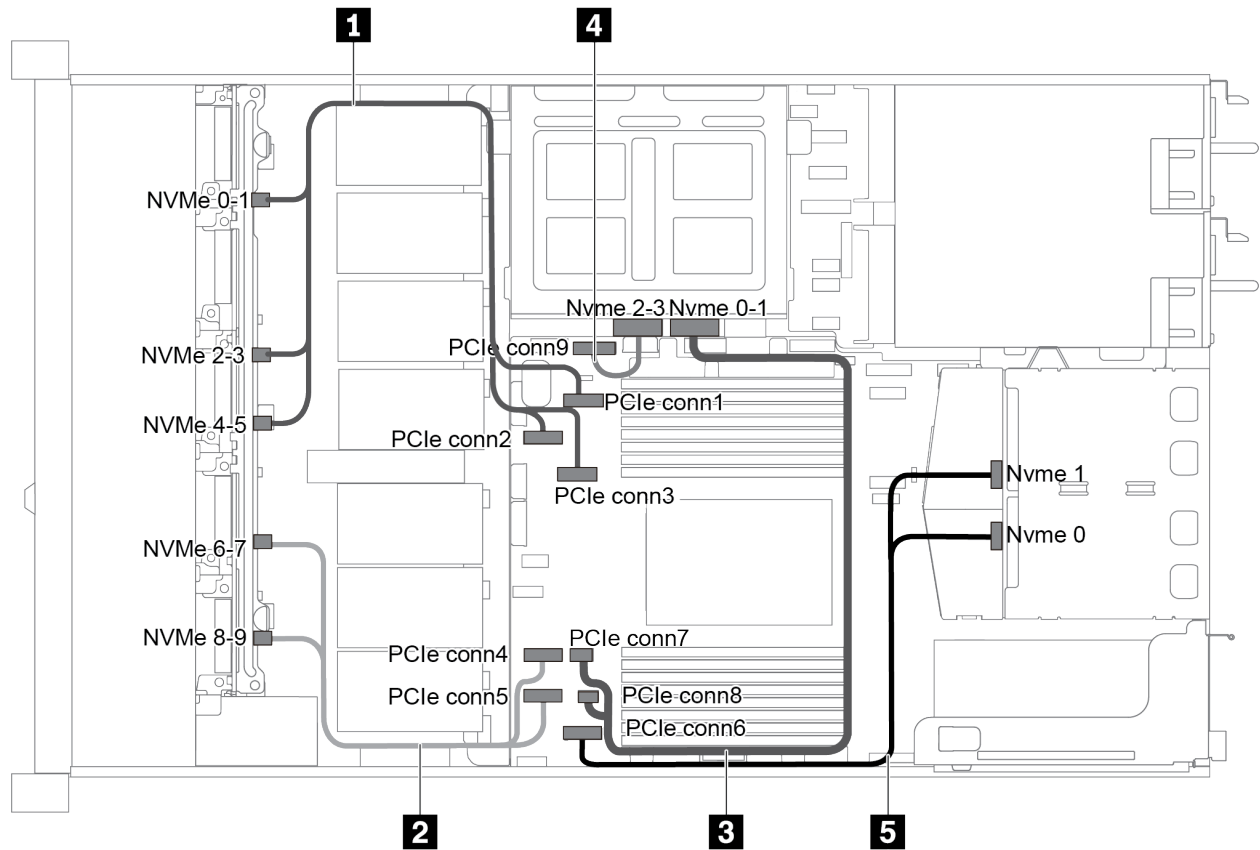


Figure 51. Cable routing for server model with ten 2.5-inch NVMe drives, rear NVMe drive assembly and middle NVMe drive assembly

Cable	From	To
1 NVMe signal cable for front backplane	NVMe 0–1, NVMe 2–3, and NVMe 4–5 connectors on the front backplane	PCIe connector 1, PCIe connector 2, and PCIe connector 3 on the system board
2 NVMe signal cable for front backplane	NVMe 6–7 and NVMe 8–9 connectors on the front backplane	PCIe connector 4 and PCIe connector 5 on the system board
3 NVMe signal cable for middle backplane	NVMe 0–1 connector on the middle backplane	PCIe connector 7 and PCIe connector 8 on the system board
4 NVMe signal cable for middle backplane	NVMe 2–3 connector on the middle backplane	PCIe connector 9 on the system board
5 NVMe signal cable for rear backplane	NVMe 0 and NVMe 1 connectors on the rear backplane	PCIe connector 6 on the system board

Ten 2.5-inch SAS/SATA/NVMe drives, rear NVMe drive assembly, middle NVMe drive assembly and one 16i RAID/HBA adapter

Notes:

- The cable routing illustration is based on the scenario that the rear hot-swap drive cage and middle NVMe drive assembly are installed. Depending on the model, the rear hot-swap drive cage and middle NVMe drive assembly might not be available on your server.
- The following two illustrations are for the same configuration.

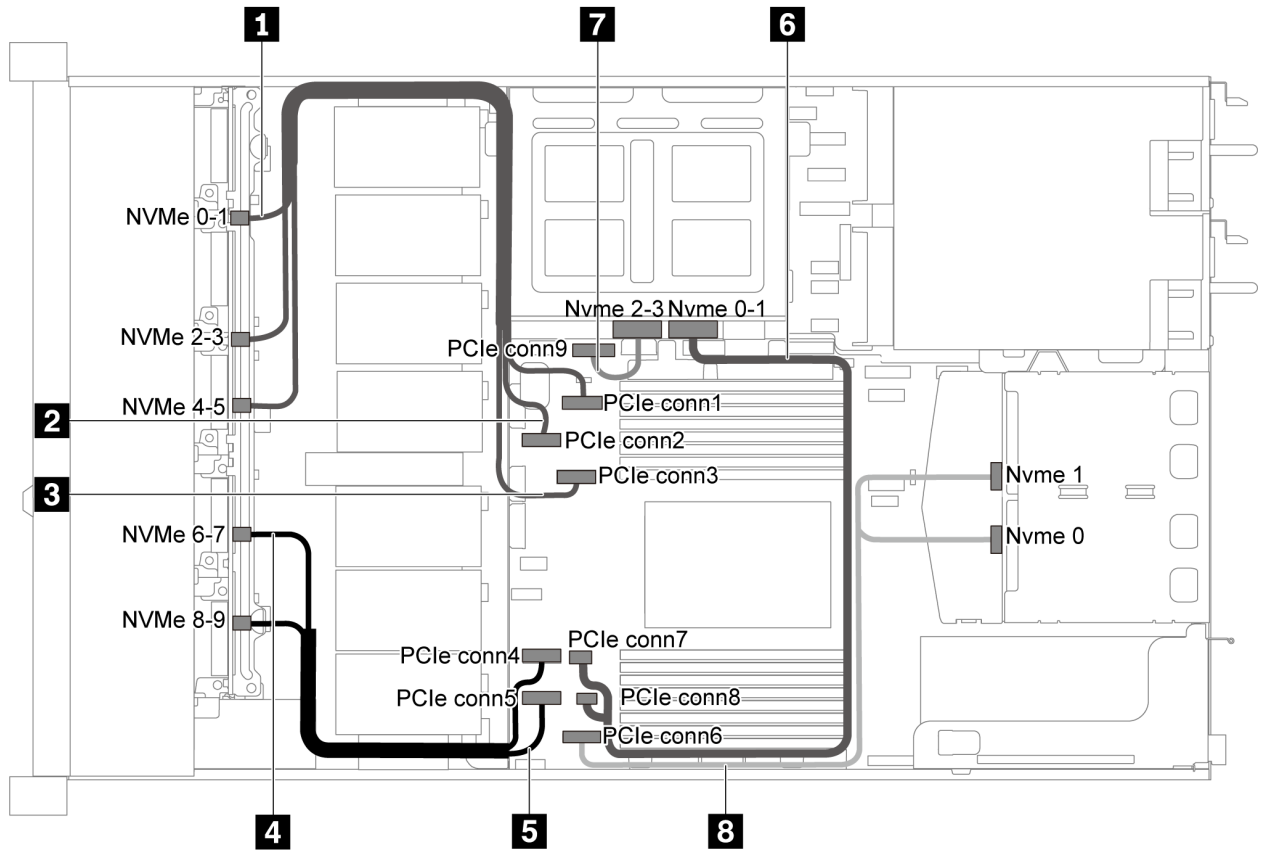


Figure 52. Cable routing for server model with ten 2.5-inch SAS/SATA/NVMe drives, rear NVMe drive assembly, middle NVMe drive assembly and one 16i RAID/HBA adapter-1

Cable	From	To
1 NVMe signal cable for front backplane	NVMe 0-1 connector on the front backplane	PCIe connector 1 on the system board
2 NVMe signal cable for front backplane	NVMe 2-3 connector on the front backplane	PCIe connector 2 on the system board
3 NVMe signal cable for front backplane	NVMe 4-5 connector on the front backplane	PCIe connector 3 on the system board
4 NVMe signal cable for front backplane	NVMe 6-7 connector on the front backplane	PCIe connector 4 on the system board
5 NVMe signal cable for front backplane	NVMe 8-9 connector on the front backplane	PCIe connector 5 on the system board

Cable	From	To
6 NVMe signal cable for middle backplane	NVMe 0–1 connector on the middle backplane	PCIe connector 7 and PCIe connector 8 on the system board
7 NVMe signal cable for middle backplane	NVMe 2–3 connector on the middle backplane	PCIe connector 9 on the system board
8 NVMe signal cable for rear backplane	NVMe 0 and NVMe 1 connectors on the rear backplane	PCIe connector 6 on the system board

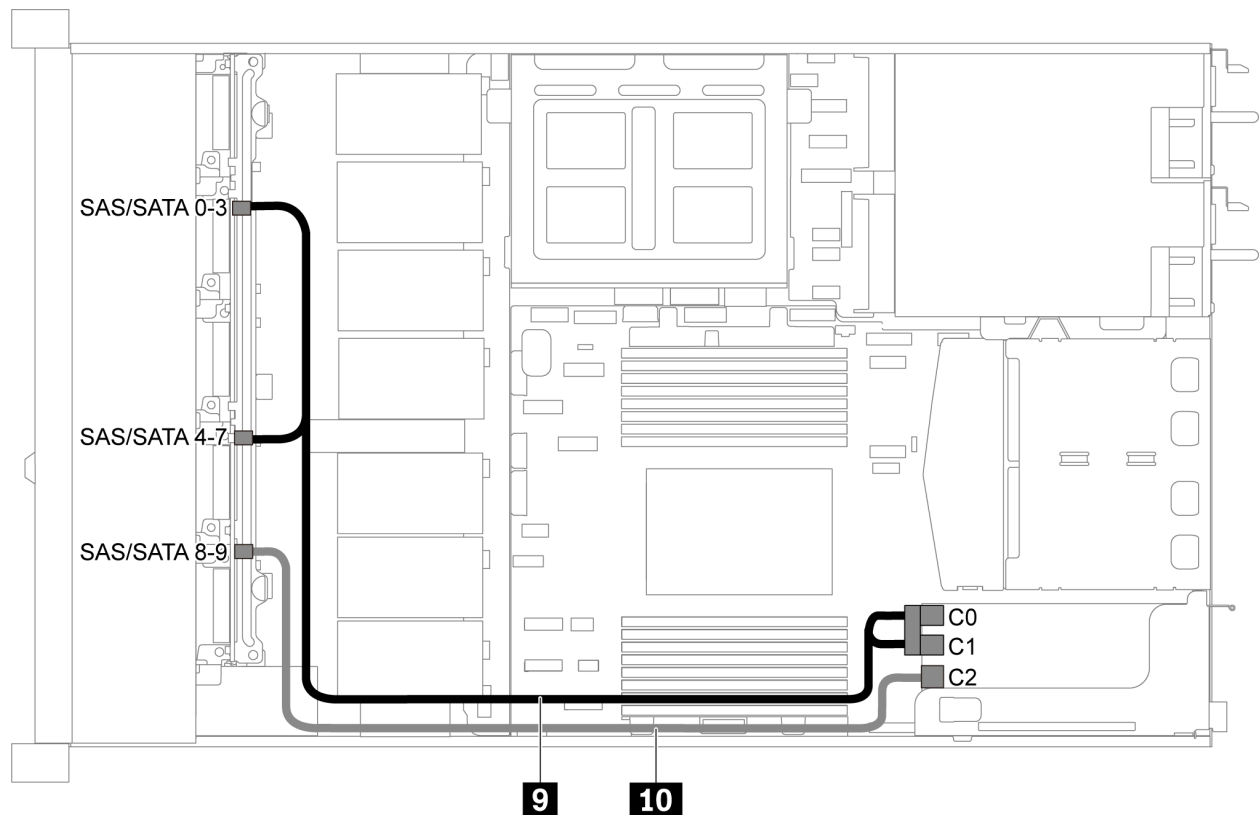


Figure 53. Cable routing for server model with ten 2.5-inch SAS/SATA/NVMe drives, rear SAS/SATA drive assembly, middle NVMe drive assembly and one 16i RAID/HBA adapter-2

Note: When a Gen 4 RAID/HBA adapter is installed, ensure that you use the corresponding Gen 4 cable:

ThinkSystem SR635 2.5" SAS/SATA/AnyBay 10-Bay X40 RAID Cable Kit

Cable	From	To
9 SAS signal cable for front backplane	SAS/SATA 0–3 and SAS/SATA 4–7 connectors on the front backplane	The RAID/HBA adapter in PCIe slot 1 <ul style="list-style-type: none"> • Gen 3: C0C1 • Gen 4: C0
10 SAS signal cable for front backplane	SAS/SATA 8–9 connector on the front backplane	The RAID/HBA adapter in PCIe slot 1 <ul style="list-style-type: none"> • Gen 3: C2 • Gen 4: C1

Ten 2.5-inch SAS/SATA/NVMe drives, middle NVMe drive assembly and one 16i RAID/HBA adapter

Notes:

- The cable routing illustration is based on the scenario that the middle NVMe drive assembly is installed. Depending on the model, the middle NVMe drive assembly might not be available on your server.
- The following two illustrations are for the same configuration.

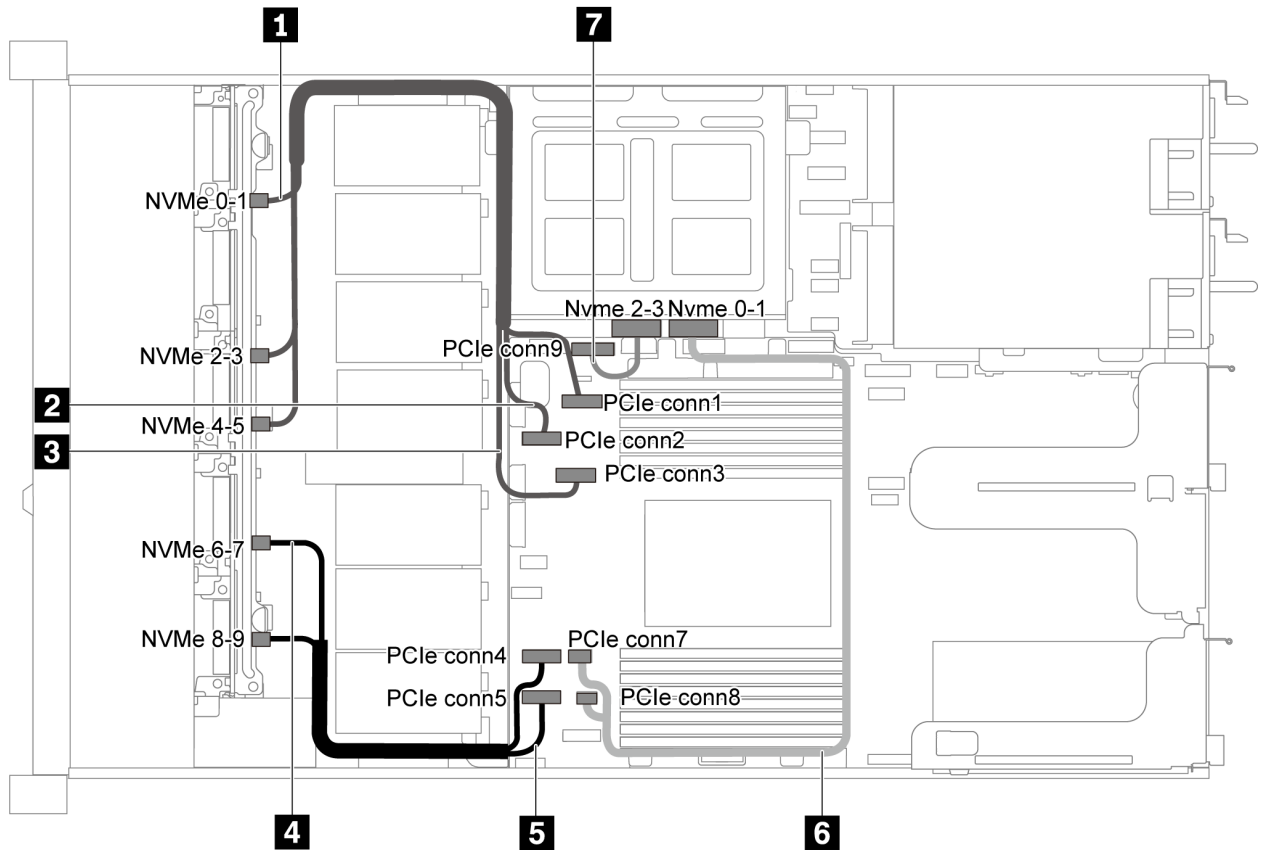


Figure 54. Cable routing for server model with ten 2.5-inch SAS/SATA/NVMe drives, middle NVMe drive assembly and one 16i RAID/HBA adapter-1

Cable	From	To
1 NVMe signal cable for front backplane	NVMe 0–1 connector on the front backplane	PCIe connector 1 on the system board
2 NVMe signal cable for front backplane	NVMe 2–3 connector on the front backplane	PCIe connector 2 on the system board
3 NVMe signal cable for front backplane	NVMe 4–5 connector on the front backplane	PCIe connector 3 on the system board
4 NVMe signal cable for front backplane	NVMe 6–7 connector on the front backplane	PCIe connector 4 on the system board
5 NVMe signal cable for front backplane	NVMe 8–9 connector on the front backplane	PCIe connector 5 on the system board

Cable	From	To
6 NVMe signal cable for middle backplane	NVMe 0–1 connector on the middle backplane	PCIe connector 7 on the system board
7 NVMe signal cable for middle backplane	NVMe 2–3 connector on the middle backplane	PCIe connector 9 on the system board

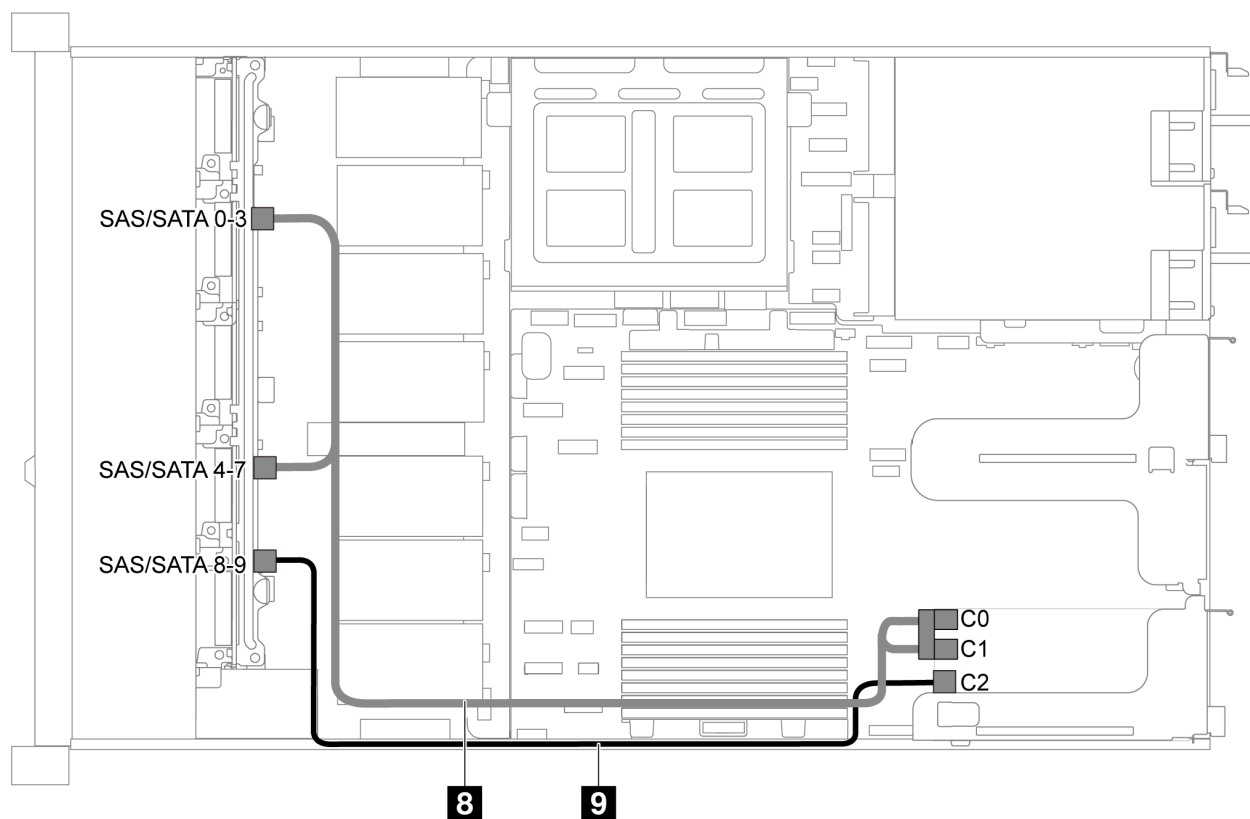


Figure 55. Cable routing for server model with ten 2.5-inch SAS/SATA/NVMe drives, middle NVMe drive assembly and one 16i RAID/HBA adapter-2

Note: When a Gen 4 RAID/HBA adapter is installed, ensure that you use the corresponding Gen 4 cable:

ThinkSystem SR635 2.5" SAS/SATA/AnyBay 10-Bay X40 RAID Cable Kit

Cable	From	To
8 SAS signal cable for front backplane	SAS/SATA 0–3 and SAS/SATA 4–7 connectors on the front backplane	The RAID/HBA adapter in PCIe slot 1 <ul style="list-style-type: none"> • Gen 3: C0C1 • Gen 4: C0
9 SAS signal cable for front backplane	SAS/SATA 8–9 connector on the front backplane	The RAID/HBA adapter in PCIe slot 1 <ul style="list-style-type: none"> • Gen 3: C2 • Gen 4: C1

M.2 module cable routing

Use the section to understand the cable routing for the M.2 module.

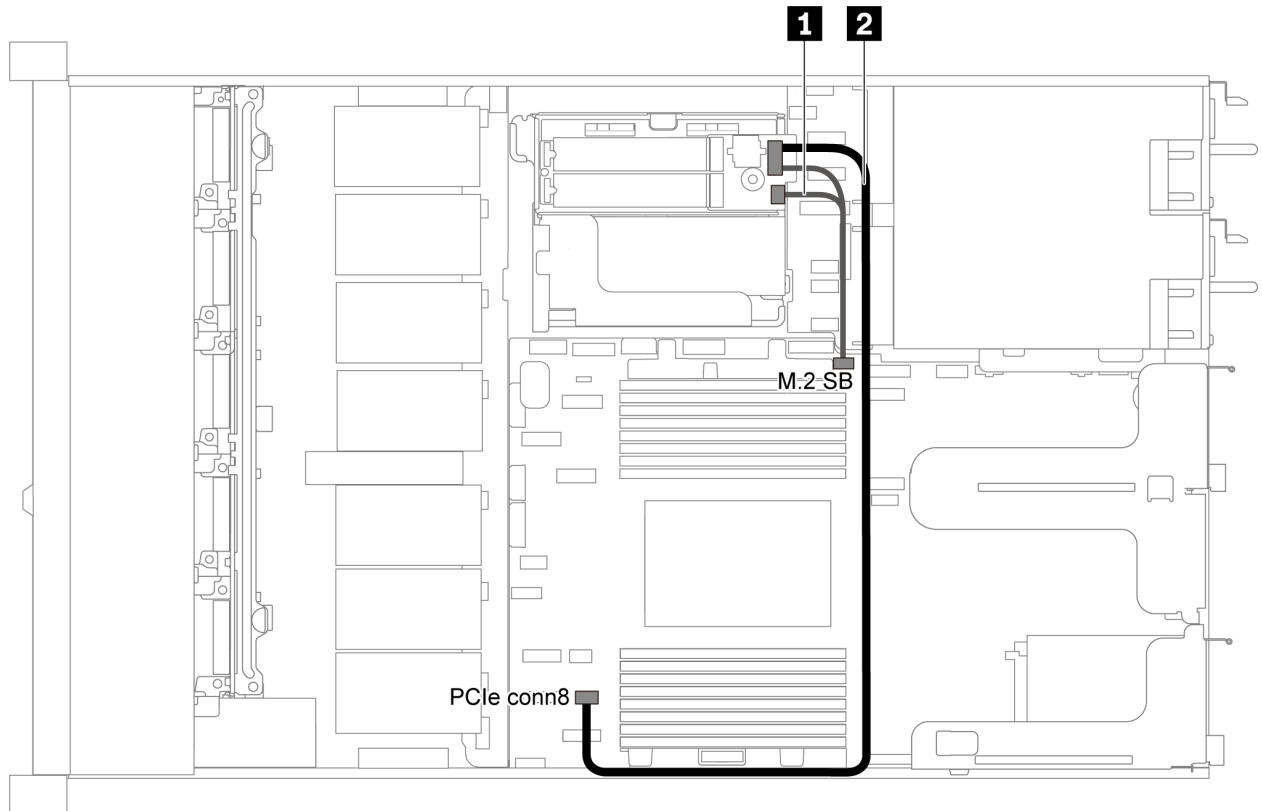


Figure 56. Cable routing for server model with M.2 module

Cable	From	To
1	M.2 sideband connectors on the M.2 module	M.2 sideband connector on the system board
2	Power connector on the M.2 module	PCIe connector 8 on the system board

Super capacitor cable routing

Use the section to understand the cable routing for the super capacitor.

Cable routing for server model with two super capacitors

Note: For server model with 3.5-inch drive bays, it supports up to two RAID super capacitor modules.

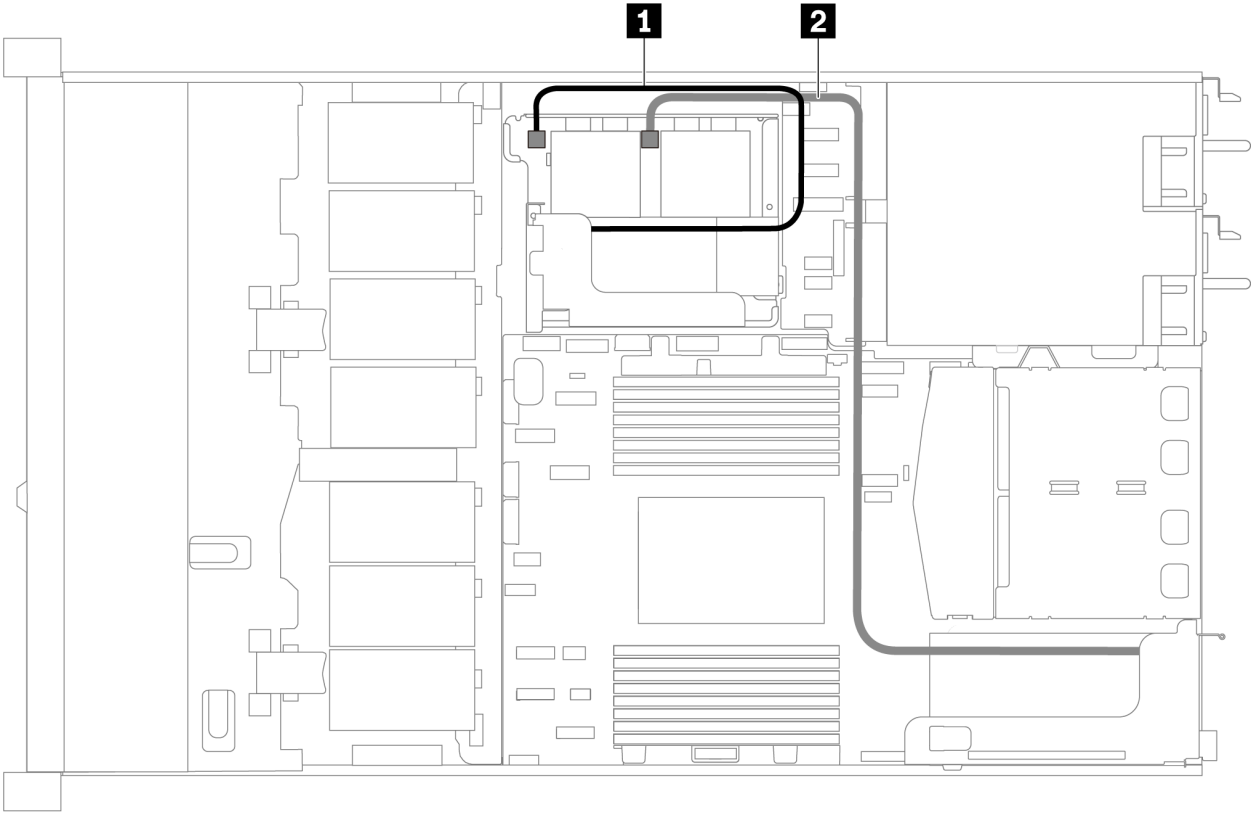


Figure 57. Cable routing for server model with two super capacitors

From	To
1 Super capacitor connector	Super capacitor connector on the RAID adapter installed in the internal riser kit
2 Super capacitor connector	Super capacitor connector on the RAID adapter installed in the PCIe slot 1

Cable routing for server model with three super capacitors

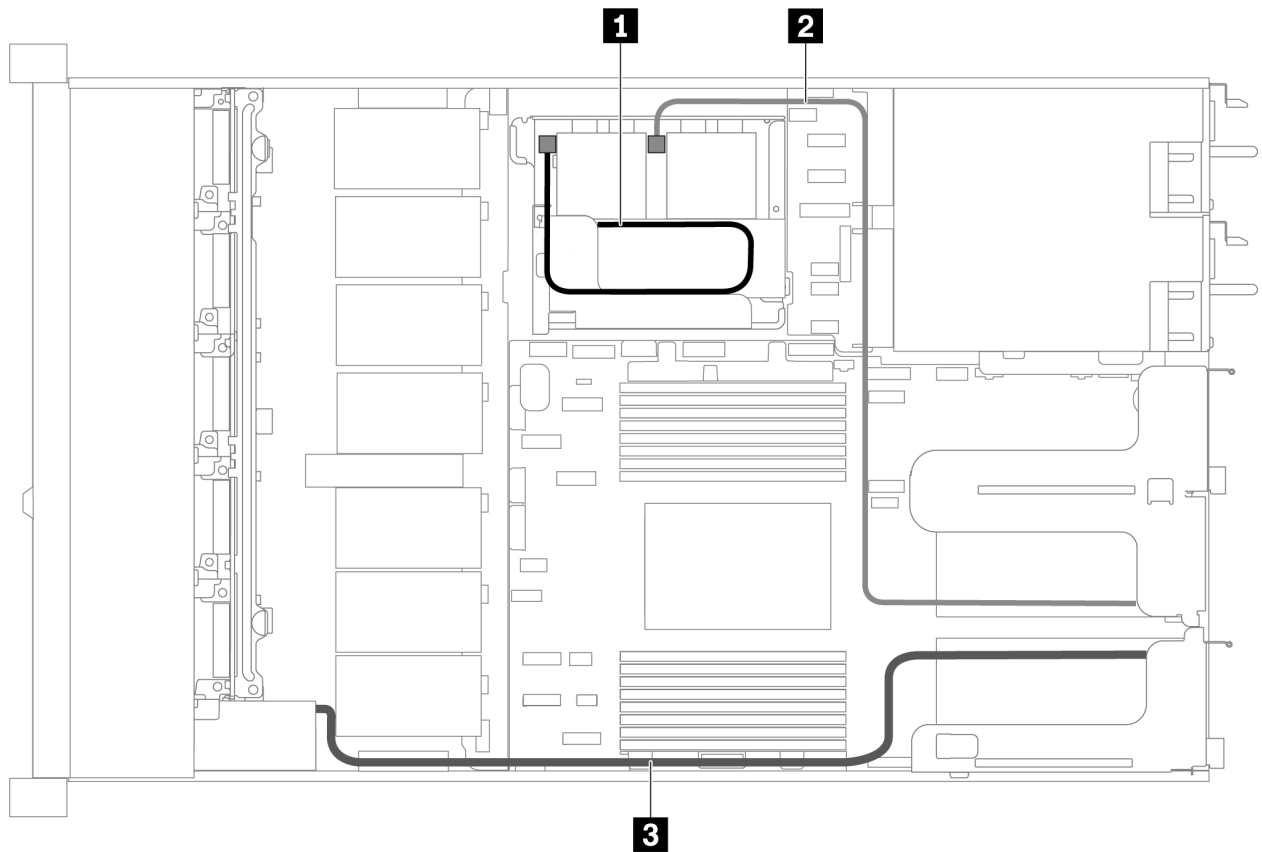


Figure 58. Cable routing for server model with three super capacitors

From	To
1 Super capacitor connector	Super capacitor connector on the RAID adapter installed in the internal riser kit
2 Super capacitor connector	Super capacitor connector on the RAID adapter installed in the PCIe slot 2
3 Super capacitor connector	Super capacitor connector on the RAID adapter installed in the PCIe slot 1

VGA/USB/Front panel connector

Use the section to understand the cable routing for the VGA/USB/Front panel connector on the left rack latch.

Note: The VGA connector is available on some models.

The following is the cable routing for server model with four 3.5-inch drive bays.

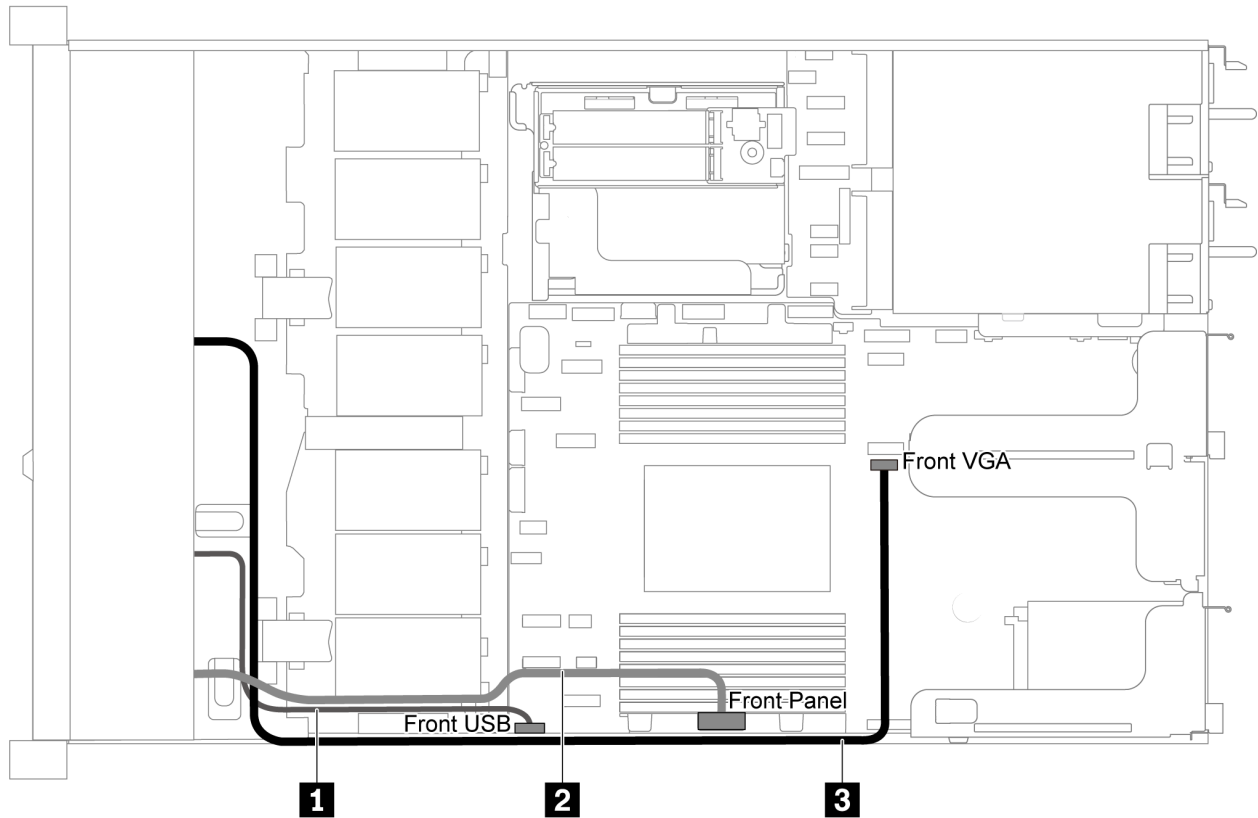


Figure 59. VGA/USB/Front panel connector cable routing for server model with four 3.5-inch drive bays

Cable	To
1 USB cable from the front of server	Front USB connector on the system board
2 Front panel cable from the front of server	Front Panel connector on the system board
3 VGA cable from the front of server	Front VGA connector on the system board

The following is the cable routing for server model with eight/ten 2.5-inch drive bays.

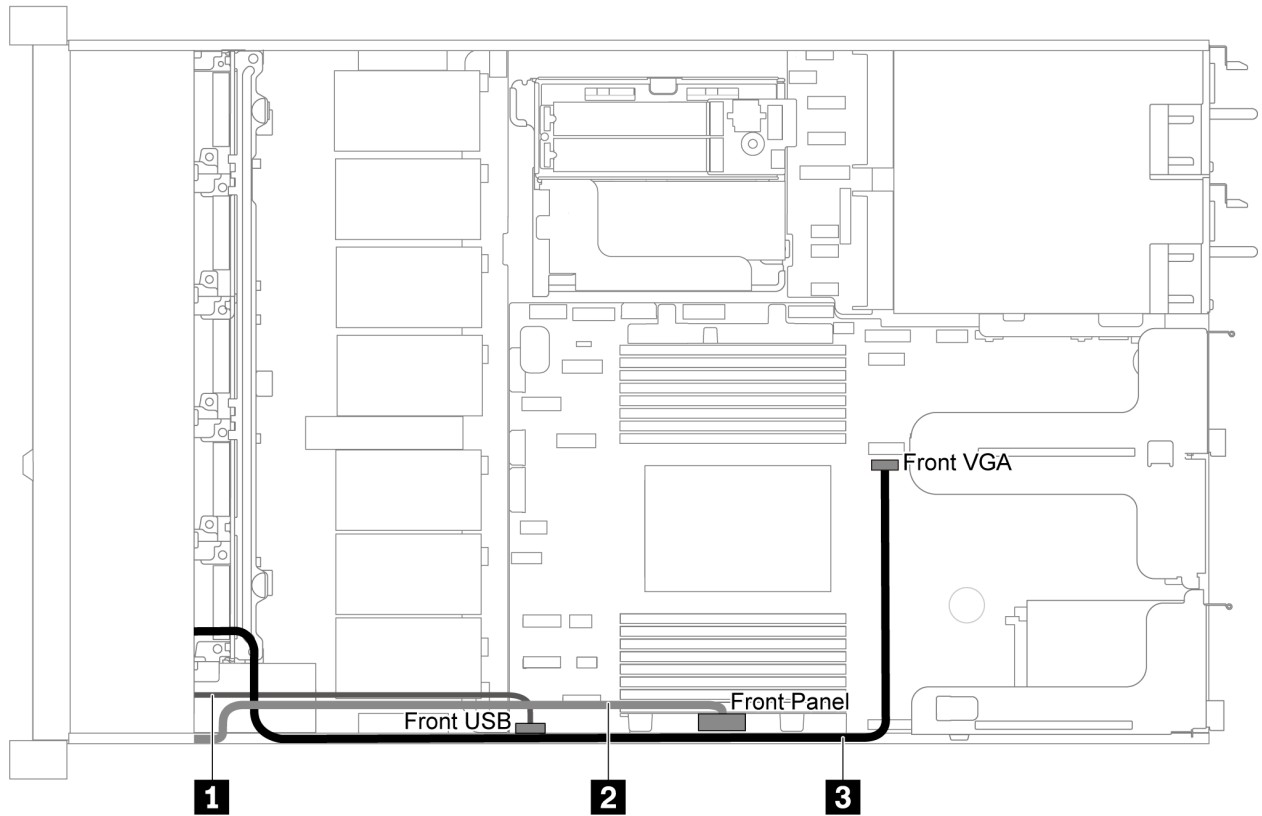


Figure 60. VGA/USB/Front panel connector cable routing for server model with eight/ten 2.5-inch drive bays

Cable	To
1 USB cable from the front of server	Front USB connector on the system board
2 Front panel cable from the front of server	Front Panel connector on the system board
3 VGA cable from the front of server	Front VGA connector on the system board

Intrusion switch cable routing

Use the section to understand the cable routing for the intrusion switch.

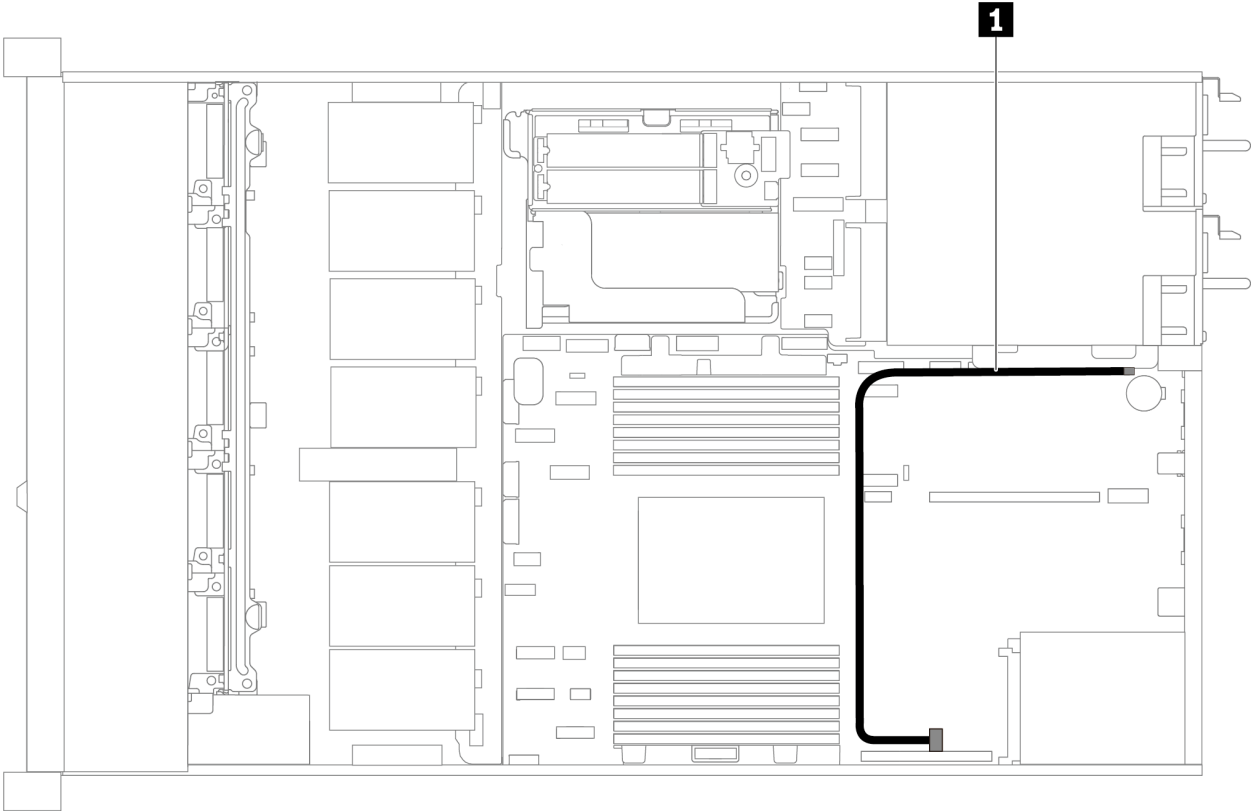


Figure 61. Cable routing for server model with intrusion switch

Cable	To
1 Intrusion switch cable from the riser bracket	Intrusion switch connector on the system board

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 62 “Server components” on page 74](#):

<http://datacentersupport.lenovo.com/us/en/products/servers/thinksystem/sr635/7y98/parts>

It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.

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

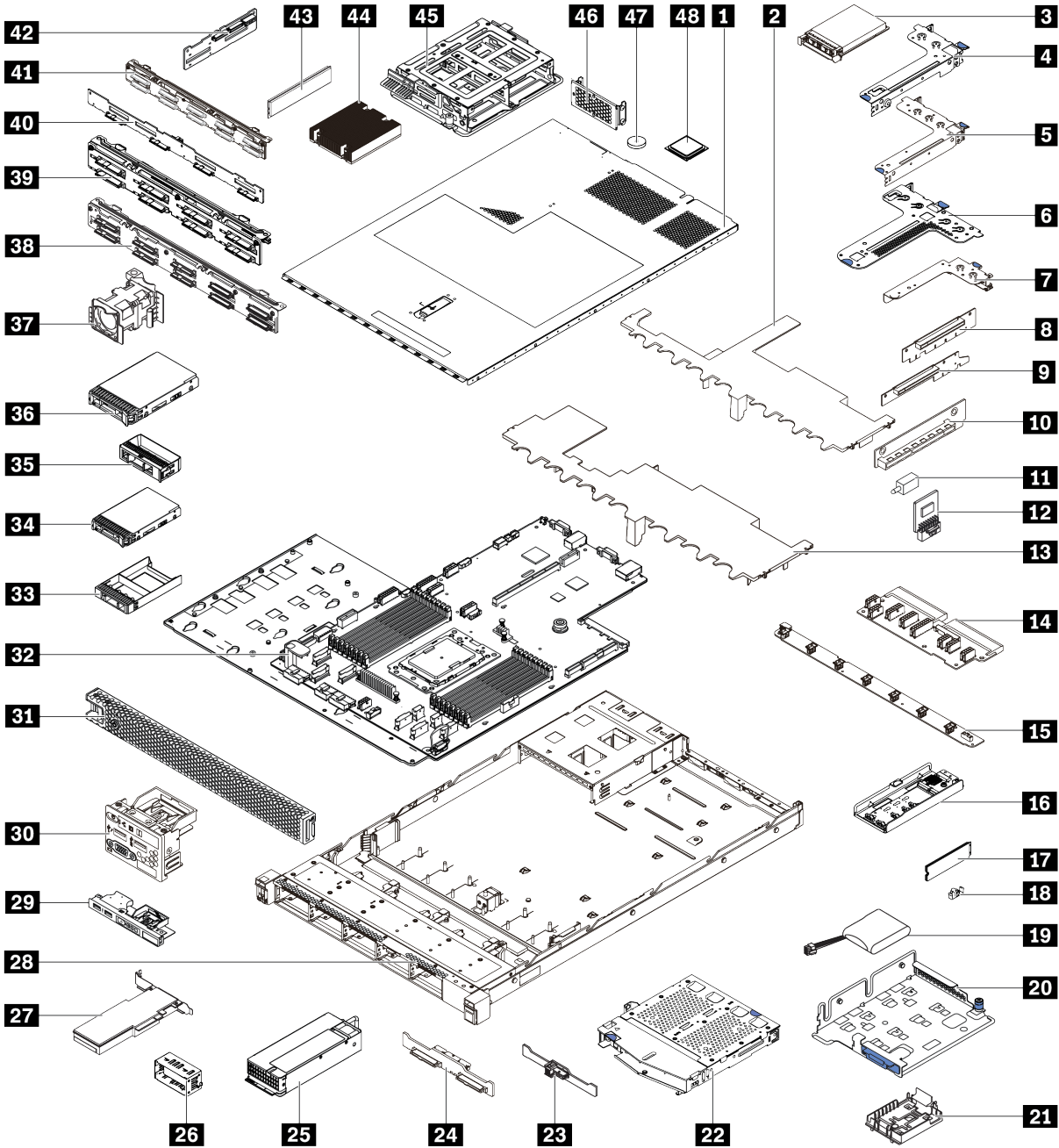


Figure 62. Server components

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 11. Parts list

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural parts
For more information about ordering the parts shown in Figure 62 “Server components” on page 74: http://datacentersupport.lenovo.com/us/en/products/servers/thinksystem/sr635/7y98/parts					
1	Top cover	√			
2	Air baffle for middle drive cage				√
3	OCP 3.0 Ethernet adapter	√			
4	Riser bracket (low profile)	√			
5	Riser bracket (full-height, full-length)	√			
6	Riser bracket (low profile + low profile)	√			
7	Internal riser bracket (low profile)	√			
8 9 10	Riser card	√			
11	Intrusion switch	√			
12	TPM adapter (For Chinese Mainland only)			√	
13	Standard air baffle				√
14	PIB board			√	
15	Fan board			√	
16	M.2 bracket	√			
17	M.2 drive	√			
18	M.2 retainer clip	√			
19	RAID super capacitor	√			
20	M.2/riser support bracket	√			
21	RAID super capacitor holder	√			
22	Rear hot-swap drive cage	√			
23	Rear SAS/SATA backplane	√			
24	Rear NVMe backplane	√			
25	Power supply	√			
26	Power supply filler	√			
27	PCIe adapter	√			
28	Chassis			√	
29	Front I/O assembly, server models with four 3.5-inch drive bays	√			
30	Front I/O assembly, server models with eight or ten 2.5-inch drive bays	√			

Table 11. Parts list (continued)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural parts
31	Security bezel	√			
32	System board			√	
33	Filler, 2.5-inch drive				√
34	Storage drive, 2.5-inch, hot-swap	√			
35	Filler, 3.5-inch drive				√
36	Storage drive, 3.5-inch, hot-swap	√			
37	System fan	√			
38	Backplane, ten 2.5-inch hot-swap drives	√			
39	Backplane, eight 2.5-inch hot-swap drives	√			
40	Backplane, four 3.5-inch hot-swap drives	√			
41	Backplane, ten 2.5-inch AnyBay hot-swap drives	√			
42	Middle backplane, four 2.5-inch hot-swap drives	√			
43	Memory module	√			
44	Heat sink			√	
45	Internal drive cage, four 2.5-inch hot-swap drives				√
46	Rear wall bracket				√
47	CMOS battery				√
48	Processor			√	

Power cords

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

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

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

Notes:

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

Chapter 3. Server hardware setup

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

Server setup checklist

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

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

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

1. Unpack the server package. See [“Server package contents” on page 2](#).
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 93](#).
 - b. If necessary, install the server into a standard rack cabinet by using the rail kit shipped with the server. See the *Rack Installation Guide* that comes with optional rail kit.
 - c. Connect the Ethernet cables and power cords to the server. See [“Rear view” on page 18](#) to locate the connectors. See [“Cable the server” on page 133](#) for cabling best practices.
 - d. Power on the server. See [“Power on the server” on page 133](#).

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

https://thinksystem.lenovofiles.com/help/topic/7Y00/bmc_user_guide.pdf

- e. Validate that the server hardware was set up successfully. See [“Validate server setup” on page 133](#).
3. Configure the system.
 - a. Connect the ThinkSystem System Manager to the management network. See [“Set the network connection for the BMC” on page 135](#).
 - b. Update the firmware for the server, if necessary. See [“Update the firmware” on page 135](#).
 - c. Configure the firmware for the server. See [“Configure the firmware” on page 138](#).

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 139](#).
 - 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 your safety at work.
 - A complete list of safety information for all products is available at:
http://thinksystem.lenovofiles.com/help/topic/safety_documentation/pdf_files.html
 - The following guidelines are available as well: “[Handling static-sensitive devices](#)” on page 82 and “[Working inside the server with the power on](#)” on page 82.
- 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 SR635 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.
- Back up all important data before you make changes related to the disk drives.
- Have a small flat-blade screwdriver, a small Phillips screwdriver, and a T8 torx screwdriver available.
- To view the error LEDs on the system board and internal components, leave the power on.
- You do not have to turn off the server to remove or install hot-swap power supplies, hot-swap fans, 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 riser card.
- 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.
- 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 server. As each machine was designed and built, required safety items were installed to protect users and service technicians from injury.

Notes:

1. The product is not suitable for use at visual display workplaces according to §2 of the Workplace Regulations.
2. The set-up of the server is made in the server room only.

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 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.

System reliability guidelines

Review the system reliability guidelines to ensure proper system cooling and reliability.

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 fan must be replaced within 30 seconds after removal.
- 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.
- Processor socket must contain either a socket cover or a processor with heat sink.

Working inside the server with the power on

Guidelines to work inside the server with the power on.

Attention: The server might stop and loss of data might occur when internal server components are exposed to static electricity. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding systems when working inside the server with the power on.

- Avoid loose-fitting clothing, particularly around your forearms. Button or roll up long sleeves before working inside the server.
- Prevent your necktie, scarf, badge rope, or long hair from dangling into the server.
- Remove jewelry, such as bracelets, necklaces, rings, cuff links, and wrist watches.
- Remove items from your shirt pocket, such as pens and pencils, in case they fall into the server as you lean over it.
- Avoid dropping any metallic objects, such as paper clips, hairpins, and screws, into the server.

Handling static-sensitive devices

Use this information 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, particularly when working inside the server with the power on.
- 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

Memory modules must be installed in a specific order based on the memory configuration that you implement on your server.

Your server has 16 memory slots and supports:

- Minimum: 8 GB
- Maximum: 2 TB
- Type (depending on the model):
 - TruDDR4 2933, single-rank or dual-rank, 8 GB/16 GB/32 GB/64 GB RDIMM
 - TruDDR4 3200, dual-rank, 16 GB/32 GB/64 GB RDIMM
 - TruDDR4 2933, quad-rank, 128 GB 3DS RDIMM

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

Follow the below rules when you install or replace a memory module:

- Memory modules in your server must be the same type.
- Memory modules from different vendors are supported.
- Memory modules with different capacities are supported. Install the memory module that has the higher capacity first.
- Memory modules with different ranks are supported. Install the memory module with the highest rank first.
- Do not mix x4 and x8 DIMMs in the same channel.
- DIMMs of 3200 MHz and 2933 MHz are supported:
 - 2933 MHz DIMMs: operate at 2933 MHz for both 1 DIMM per channel and 2 DIMMs per channel
 - 3200 MHz DIMMs: operate at 3200 MHz when 1 DIMM per channel, but operate at 2933 MHz when 2 DIMMs per channel
 - Mixing of 2933 MHz and 3200 MHz DIMMs are supported in different channels, operating at 2933 MHz.

Note: Operating speed depends on the processor model. If the processor only supports a memory bus speed of 2666 MHz, all the installed DIMMs operate at 2666 MHz.

- Install a memory module filler if there is no memory module installed in the slot.

The following illustration helps you to locate the memory slots on the system board.

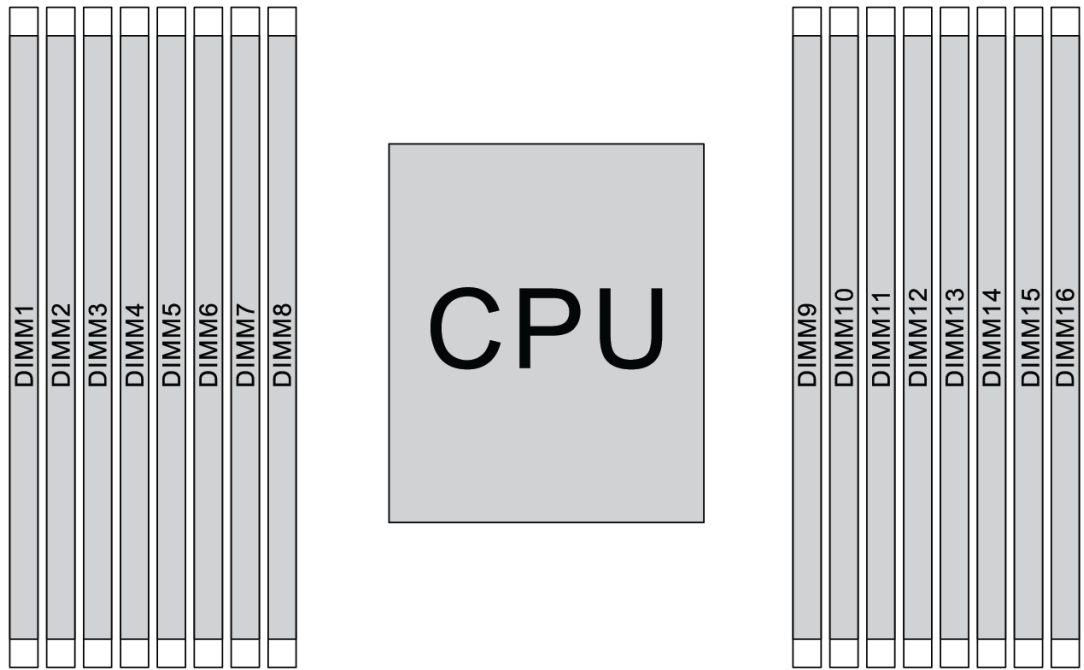


Figure 63. DIMM locations

The following table shows the relationship between the processors, memory controllers, memory channels, slots, and DIMM numbers. The system has eight channels, and supports up to two DIMMs per channel. DIMMs must be populated from farthest slot (slot 1) to closest slot (slot 0) to the processor on a per-channel basis when a data bus daisy chain topology is used. DIMMs may be populated in either slot on a per-channel basis when a data bus balanced tee route topology is used.

Table 12. DIMM installation order

Unified Memory Controller (UMC)	UMC2		UMC3		UMC1		UMC0		UMC6		UMC7		UMC5		UMC4	
Channel (CH)	D		C		B		A		E		F		G		H	
CH slot	1	0	1	0	1	0	1	0	0	1	0	1	0	1	0	1
DIMM number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 DIMM			3													
2 DIMMs	1		3													
3 DIMMs	1		3											14		
4 DIMMs	1		3											14		16
5 DIMMs	1		3				7							14		16
6 DIMMs	1		3		5		7							14		16
7 DIMMs	1		3		5		7			10				14		16
8 DIMMs	1		3		5		7			10		12		14		16
9 DIMMs	1		3	4	5		7			10		12		14		16

Table 12. DIMM installation order (continued)

10 DIMMs	1	2	3	4	5		7			10		12		14		16
11 DIMMs	1	2	3	4	5		7			10		12	13	14		16
12 DIMMs	1	2	3	4	5		7			10		12	13	14	15	16
13 DIMMs	1	2	3	4	5		7	8		10		12	13	14	15	16
14 DIMMs	1	2	3	4	5	6	7	8		10		12	13	14	15	16
15 DIMMs	1	2	3	4	5	6	7	8	9	10		12	13	14	15	16
16 DIMMs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Note: There are performance-optimized 6-DIMM and 12-DIMM configurations for server models with 7003 series CPU. For details, see the table below.

DIMM Qty	DIMM population order
6	1, 3, 7, 10, 14, 16
12	1, 2, 3, 4, 7, 8, 9, 10, 13, 14, 15, 16

Technical rules

Refer to the below technical rules and limitations when you install the related server components.

Technical rules for processor and heat sink

The following lists the supported heat sink for processors of different default TDP.

Processor (default TDP)	Heat sink
120/155/180/200 watts	1U standard heat sink
225/240/280 watts	1U high-performance heat sink

Rules about 280-watt processor installation

The following are rules to be followed when the server is configured with a 280-watt processor.

- Ethernet adapters with AOC is not supported in PCIe slot 2.
- 10/25 GbE Ethernet adapters with AOC are supported in PCIe slot 1 or 3 when the ambient temperature is less than 30°C.
- 100/200 GbE Ethernet adapters are supported in PCIe slot 1 or 3 when the ambient temperature is less than 30°C.
- Fibre channel card is not supported in PCIe slot 2.

Technical rules for power supply

The following table lists the technical rules between processor TDP and GPU adapters for different configurations with different types of power supply.

- For 750-watt power supply:

Configuration	GPU	Processor TDP
4 x 3.5-inch front drive bays	2	120/155/180/200 watts
	3	120 watts
8 x 2.5-inch front drive bays	2	120/155/180/200 watts
8 x 2.5-inch front drive bays (6 drives + 2 vacant drive bays)	3	120 watts
6 x 2.5-inch front drive bays + 4 x 2.5-inch AnyBay front drive bays	1	120/155/180/200 watts
	2	120 watts
6 x 2.5-inch front drive bays + 4 x 2.5-inch AnyBay front drive bays (vacant)	3	120 watts
10 x 2.5-inch AnyBay front drive bays	1	120 watts
10 x 2.5-inch AnyBay front drive bays (6 drives + 4 vacant drive bays)	2	120 watts
4 x 3.5-inch chassis without front drives	2	120/155/180/200 watts
	3	120 watts
10 x 2.5-inch chassis without front drives	1	120 watts

- For 1100-watt power supply:

Configuration	Maximum GPU	Processor TDP
4 x 3.5-inch front drive bays	2	120/155/180/200 watts
	3	120 watts
8 x 2.5-inch front drive bays	2	120/155/180/200 watts
8 x 2.5-inch front drive bays (6 drives + 2 vacant drive bays)	3	120 watts
6 x 2.5-inch front drive bays + 4 x 2.5-inch AnyBay front drive bays	2	120/155/180/200 watts
6 x 2.5-inch front drive bays + 4 x 2.5-inch AnyBay front drive bays (vacant)	3	120 watts
10 x 2.5-inch AnyBay front drive bays	2	120/155/180/200 watts
10 x 2.5-inch AnyBay front drive bays (6 drives + 4 vacant drive bays)	3	120 watts
4 x 3.5-inch chassis without front drives	2	120/155/180/200 watts
	3	120 watts
10 x 2.5-inch chassis without front drives	2	120/155/180/200 watts

The following table lists the technical rules for processor TDP and the supported configurations with different types of power supply.

- For 550-watt power supply:

Supported configuration	Processor TDP
4 x 3.5-inch front drive bays	120/155 watts
4 x 3.5-inch chassis without front drives and without GPU installed	120/155 watts

- For 750-watt power supply:

Supported configuration	Processor TDP
4 x 3.5-inch front drive bays	120/155/180/200/225/240/280 watts
4 x 3.5-inch front drive bays + middle NVMe drives	120/155/180/200 watts
4 x 3.5-inch front drive bays + rear SAS/SATA/NVMe drives	120/155 watts
8 x 2.5-inch front drive bays	120/155/180/200/225/240 watts
8 x 2.5-inch front drive bays + rear SAS/SATA/NVMe drives	120/155 watts
6 x 2.5-inch front drive bays + 4 x 2.5-inch AnyBay front drive bays	120/155/180/200 watts
6 x 2.5-inch front drive bays + 4 x 2.5-inch AnyBay front drive bays + rear SAS/SATA/NVMe drives	120/155 watts
10 x 2.5-inch AnyBay front drive bays	120/155 watts
10 x 2.5-inch AnyBay front drive bays + rear SAS/SATA/NVMe drives	120 watts
4 x 3.5-inch chassis without front drives and without GPU installed	120/155/180/200/225/240/280 watts
10 x 2.5-inch chassis without front drives and without GPU installed	120/155 watts

- For 1100-watt power supply:

Supported configuration	Processor TDP
4 x 3.5-inch front drive bays	120/155/180/200/225/240/280 watts
4 x 3.5-inch front drive bays + middle NVMe drives	120/155/180/200/225/240/280 watts
4 x 3.5-inch front drive bays + rear SAS/SATA/NVMe drives	120/155 watts
8 x 2.5-inch front drive bays	120/155/180/200/225/240/280 watts
8 x 2.5-inch front drive bays + rear SAS/SATA/NVMe drives	120/155 watts
6 x 2.5-inch front drive bays + 4 x 2.5-inch AnyBay front drive bays	120/155/180/200/225/240/280 watts
6 x 2.5-inch front drive bays + 4 x 2.5-inch AnyBay front drive bays + rear SAS/SATA/NVMe drives	120/155 watts
10 x 2.5-inch AnyBay front drive bays	120/155/180/200/225/240/280 watts
10 x 2.5-inch AnyBay front drive bays + rear SAS/SATA/NVMe drives	120/155 watts

Supported configuration	Processor TDP
10 x 2.5-inch AnyBay front drive bays + rear SAS/SATA/ NVMe drives + middle NVMe drives	120/155 watts
10 x 2.5-inch AnyBay front drive bays + middle NVMe drives	120/155/180/200/225/240/280 watts
10 x 2.5-inch chassis without front drives and without GPU installed	120/155/180/200/225/240/280 watts
4 x 3.5-inch chassis without front drives and without GPU installed	120/155/180/200/225/240/280 watts

Technical rules for system fans

Note: If an OCP 3.0 Ethernet adapter is installed, when the system is powered off but still plugged in to AC power, system fans will continue to spin at a much lower speed. This is the system design to provide proper cooling for the OCP 3.0 Ethernet adapter.

Follow the following rules for system fan selection:

- Standard fans are selected when no GPU adapter, rear drive cage, middle drive cage, or Ethernet adapter of 100 GbE or higher is installed and the processor TDP is 120 watts or 155 watts.
- Only when standard fans are selected, can 3.5" 14TB and 12TB SAS/SATA HDD be supported.
- Performance fans are selected when a GPU adapter, rear drive cage, middle drive cage, or Ethernet adapter of 100 GbE or higher is installed, or the processor TDP is 180 watts, 200 watts, 225 watts, 240 watts, or 280 watts.
- Fan 1 is optional when no M.2 drive, internal PCIe adapter, middle drive cage, rear drive cage or GPU adapter is installed. However, if no fan 1 is installed, you must keep the location for fan 1 occupied by a fan filler to ensure proper airflow.

Technical rules for GPU adapters

For NVIDIA Tesla T4, the rules of installing two and three GPUs are as follows:

For two GPUs:

- PCIe slot priority to install the GPU: PCIe slot 1, PCIe slot 3, PCIe slot 2.
- High-performance fan must be selected.
- Internal drive assembly and rear drive cage are not supported.
- PCIe SSD adapter is not supported.
- Maximum TDP for CPU is 200 watts.

For three GPUs:

- If intrusion switch is installed, the server supports up to two GPU adapters in PCIe slot 2 and slot 3.
- PCIe slot priority to install the GPU: PCIe slot 1, PCIe slot 3, PCIe slot 2.
- High-performance fan must be selected.
- Internal drive assembly and rear drive cage are not supported.
- PCIe SSD adapter is not supported.
- It can only be supported when servers are configured as 4 x 3.5" SAS/SATA, 8 x 2.5" SAS/SATA (6 x 2.5" SAS/SATA + 2 x HDD vacant), 6 x 2.5" SAS/SATA + 4 x 2.5" AnyBay (6 x 2.5" SAS/SATA + 4 x HDD vacant) or 10 x 2.5" AnyBay (6 x 2.5" AnyBay + 4 x HDD vacant).

- For 8 x 2.5" SAS/SATA (6 x 2.5" SAS/SATA + 2 x HDD vacant), if HDDs are installed in slots 0-5, two 1 x 2.5" single filler should be installed on slots 6 and 7.
- For 6 x 2.5" SAS/SATA + 4 x 2.5" AnyBay (6 x 2.5" SAS/SATA + 4 x HDD vacant), if HDDs are installed in slots 0-5, four 1 x 2.5" single filler should be installed on slots 6, 7, 8 and 9.
- For 10 x 2.5" AnyBay (6 x 2.5" AnyBay + 4 x HDD vacant), if HDDs are installed in slots 0-5, four 1 x 2.5" single filler should be installed on slots 6, 7, 8 and 9.

The following table lists the technical rules between NVIDIA Tesla T4 GPU adapters and processor TDP for different configurations.

Supported configuration for drives in front backplane	NVIDIA Tesla T4 GPU adapters	Processor TDP	Supported ambient temperature
<ul style="list-style-type: none"> • 4 x 3.5-inch SAS/SATA • 8 x 2.5-inch SAS/SATA • 6 x 2.5-inch SAS/SATA + 4 x 2.5-inch AnyBay • 10 x 2.5-inch AnyBay 	2	120 watts	up to 35°C
<ul style="list-style-type: none"> • 4 x 3.5-inch SAS/SATA • 8 x 2.5-inch SAS/SATA • 6 x 2.5-inch SAS/SATA + 4 x 2.5-inch AnyBay • 10 x 2.5-inch AnyBay 	2	120/155/180/200 watts	up to 30°C
<ul style="list-style-type: none"> • 4 x 3.5-inch SAS/SATA • 6 x 2.5-inch SAS/SATA+ 2 vacant drive bays • 6 x 2.5-inch AnyBay + 4 vacant drive bays 	3	120 watts	up to 30°C

For NVIDIA Quadro P620, the rules of installing one to three GPUs are the same. See the following:

- If intrusion switch is installed, the server supports up to two GPU adapters in PCIe slot 2 and slot 3.
- PCIe slot priority to install the GPU: PCIe slot 1, PCIe slot 3, PCIe slot 2.
- High-performance fan must be selected.
- Internal drive assembly and rear drive cage are not supported.
- PCIe SSD adapter is not supported.
- Maximum TDP for CPU is 225 watts.

The following table lists the technical rules between NVIDIA Quadro P620 GPU adapters and processor TDP for different configurations.

Supported configuration for drives in front backplane	NVIDIA Quadro P620 GPU adapters	Processor TDP	Supported ambient temperature
<ul style="list-style-type: none"> • 4 x 3.5-inch SAS/SATA • 8 x 2.5-inch SAS/SATA • 6 x 2.5-inch SAS/SATA + 4 x 2.5-inch AnyBay • 10 x 2.5-inch AnyBay 	3	120/155/180/200/225 watts	up to 35°C

Technical rules for drives

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

- Depending on your server models, your server supports the following types of drives:
 - SAS/SATA HDD
 - SAS/SATA SSD
 - NVMe SSD

For a list of supported drives, 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 15.
- You can mix drives of different types and different capacities in one system, but not in one RAID array. The following priorities are recommended:
 - Drive type priority: NVMe SSD, SAS SSD, SATA SSD, SAS HDD, SATA HDD
 - Drive capacity priority: the lowest capacity first
- The drives in a single RAID array must be the same type, same size, and same capacity.
- If you select 12 or 14 TB 3.5-inch SAS/SATA drives, only standard fan is supported.
- For middle drive cage:
 - Only NVMe drives are supported.

Note: Only 7 mm NVMe drives are supported based on thermal consideration.

 - High-performance fan should be selected, and the supported ambient temperature is up to 30°C.
- For rear drive cage:
 - Both SAS/SATA and NVMe drives are supported.

Note: For NVMe drives, only 7 mm NVMe drives are supported based on thermal consideration.

 - High-performance fan should be selected, and the supported ambient temperature is up to 30°C.
 - Supported processor TDP is 120/155 watts.

Technical rules for HBA/RAID adapters

The following are installation rules to install HBA/RAID adapters:

- If you plan to use the RAID 530-8i adapter in the server, it must have firmware 50.3.0-1032 or later applied before it can be used in the server. If the adapter you plan to use has older firmware, it must first be upgraded by installing it in a supported server and upgrading the firmware there. For more information, see <https://datacentersupport.lenovo.com/us/zh/solutions/ht509177>.

- If a 730-8i 2G, 930-8i, 930-16i, 930-8e, 930-16e , 940-8i or 940-16i RAID/HBA adapter is installed, a super capacitor must be installed.
- The RAID 940 adapters can be mixed with the ThinkSystem 440-8i SAS/SATA PCIe Gen4 12Gb HBA and the ThinkSystem 440-16i SAS/SATA PCIe Gen4 12Gb HBA.
- The RAID 940/440 adapters cannot be mixed with the RAID 930/730/530/430 adapters.
- 730-8i 1G RAID adapter cannot be mixed with 530-8i, 730-8i 2G, or 930-8i RAID/HBA adapter.
- When a 730-8i 1G or 530-8i RAID/HBA adapter installed, no super capacitor is supported.
- HBA adapter cannot be mixed with RAID adapter. However, for the configuration of eight 2.5 SAS/SATA drives in front bays and two 2.5 SAS/SATA drives in rear bays, you can select 530-8i RAID/HBA adapter for front drives and 430-8i for rear drives.
- For PCIe SSD adapter:
 - Only high-performance fan can be installed.
 - The TDP for supported processor is 120/155 watts.

Technical rules for PCIe NVMe adapter

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

- For PCIe NVMe adapter:
 - Three PCIe NVMe adapters can be supported and installed in PCIe slot 1, 2, and 3.
 - High-performance fan should be selected, and the supported ambient temperature is up to 35°C.
 - Supported processor TDP is 120/155 watts.

Technical rules for Ethernet adapters

The following table lists supported PCIe Ethernet adapters:

Manufacturer	Name	Port	Speed	PCIe lane	Slots supported
Broadcom	NetXtreme	2	1GbE	x8	1, 3, 2
	NetXtreme	4	1GbE	x8	1, 3, 2
	NetXtreme	2	10GbE	x8	1, 3, 2
	57414	2	10/25GbE	x8	1, 3, 2
	57454	4	10/25GbE	x16	1
	57508	2	100GbE	x16	1, 3, 2
	57454	4	10/25GbE	x16	1
	57454	4	10GbE	x8	1, 3, 2
Mellanox	ConnectX-4 Lx	2	10/25GbE	x8	1, 3, 2
	ConnectX-6 Dx	2	100GbE	x16	1, 3, 2
	ConnectX-6 Dx	2	50GbE	x8	1, 3, 2
	ConnectX-6 Lx	2	10/25GbE	x8	1, 3, 2
Intel	X550-T2	2	10GbE	x8	1, 3, 2
	I350-T2	2	1GbE	x8	1, 3, 2
	I350-T4	4	1GbE	x8	1, 3, 2

Manufacturer	Name	Port	Speed	PCIe lane	Slots supported
	I350-F1	1	1GbE	x8	1, 3, 2
	X710-DA2	2	10GbE	x8	1, 3, 2
	E810-DA2	2	10/25GbE	x8	1, 3, 2
Qlogic	41232	2	10/25GbE	x8	1, 3, 2
Other	4-Port 10G Base T PCIe Adapter (Ethernet) - La Paz	4	10GbE	x8	1, 3, 2

The following are rules to be followed when the server is configured with Ethernet adapters.

- When the processor default TDP is 280 watts :
 - Ethernet adapters with AOC are not supported in PCIe slot 2.
 - 10/25 GbE Ethernet adapters are supported when standard fans are installed.
 - 100/200 GbE Ethernet adapters are supported when performance fans are installed.
 - 10/25 GbE Ethernet adapters with AOC are supported in PCIe slot 1 or 3 when the ambient temperature is less than 30°C.
 - 100/200 GbE Ethernet adapters are supported in PCIe slot 1 or 3 when the ambient temperature is less than 30°C.
- When the processor default TDP is equal to or less than 225 watts:
 - 100/200 GbE Ethernet adapters are supported when performance fans are installed.
 - 100/200 GbE Ethernet adapters are supported when the ambient temperature is less than 30°C.

Notes: The following adapters require a full-height bracket and must be installed in a full-height slot:

- ThinkSystem Broadcom 57454 10/25GbE SFP28 4-port PCIe Ethernet Adapter
- ThinkSystem Broadcom 57454 10/25GbE SFP28 4-port PCIe Ethernet Adapter_Refresh (V2)

Technical rules for OCP 3.0 Ethernet adapters

The following table lists supported OCP 3.0 Ethernet adapters:

Manufacturer	Name	Port	Speed	PCIe lane
Broadcom	5719	4	1GbE	x8
	57416	2	10GbE	x8
	57414	2	10/25GbE	x8
	57454	4	10/25GbE	x16
	57454	4	10GbE	x8
	57416	2	10GbE	x8
	5720	2	1GbE	x8
Mellanox	ConnectX-4 Lx	2	10/25GbE	x8
	ConnectX-6 Lx	2	10/25GbE	x8
Intel	I350	4	1GbE	x8
	X710-T2L	2	10GbE	x8

Manufacturer	Name	Port	Speed	PCIe lane
	E810-DA2	2	10/25GbE	x8
Qlogic	41232	2	10/25GbE	x8
	41132	2	10GbE	x8

Install server hardware options

This section includes 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.

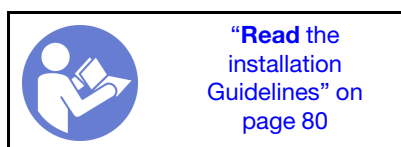
Installation procedures are presented in the optimum sequence to minimize work.

Attention: To ensure the components you install work correctly without problems, read the following precautions carefully.

- 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>.
- Always 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 SR635 Drivers and Software](#) to download firmware updates for your server.
- It is good practice to make sure that the server is working correctly before you install an optional component.
- Follow the installation procedures in this section and use appropriate tools. Incorrectly installed components can cause system failure from damaged pins, damaged connectors, loose cabling, or loose components.

Remove the security bezel

Use this information to remove the security bezel.



To remove the security bezel, complete the following steps:

Watch the procedure. A video of the installation and removal process is available:

- YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-DTDY1ImpIPpJVOzo7dKq14>

Step 1. Use the key to unlock the security bezel.

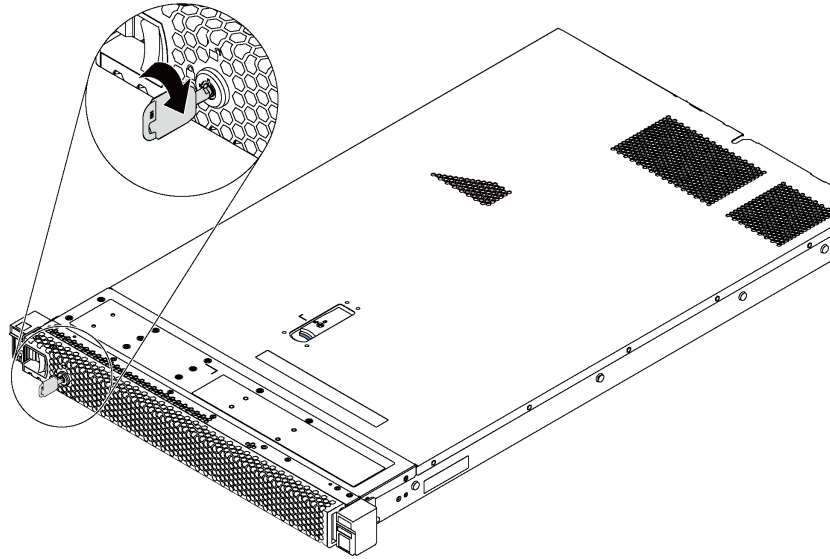


Figure 64. Security bezel unlock

Step 2. Press the blue release latch and pivot the security bezel outward to remove it from the chassis.

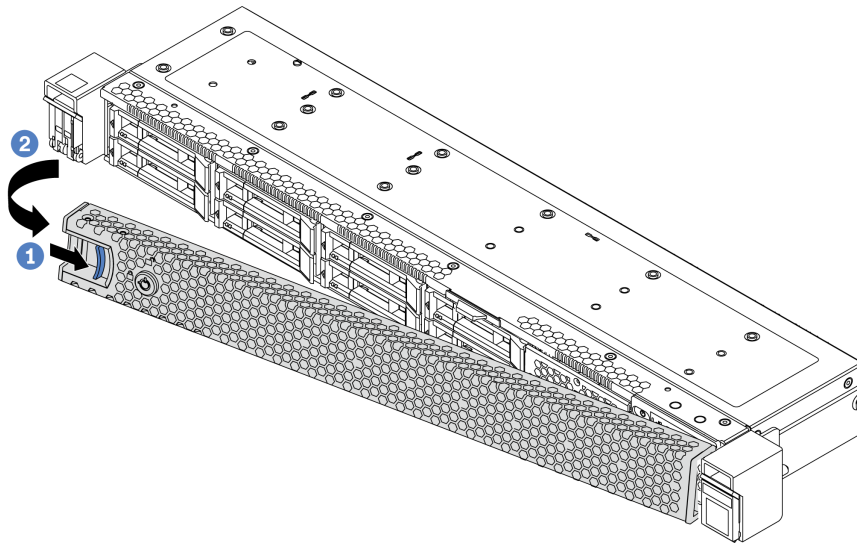

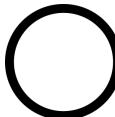



Figure 65. Security bezel removal

Attention: Before you ship the rack with the server installed, reinstall and lock the security bezel into place.

Remove the top cover

Use this information to remove the top cover.

 <p>“Read the installation Guidelines” on page 80</p>	 <p>“Power off the server for this task” on page 133</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 82</p>
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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.

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.

To remove the top cover, complete the following steps:

Watch the procedure. A video of the installation and removal process is available:

- YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-DTDY1ImpIPpJV0zo7dKq14>

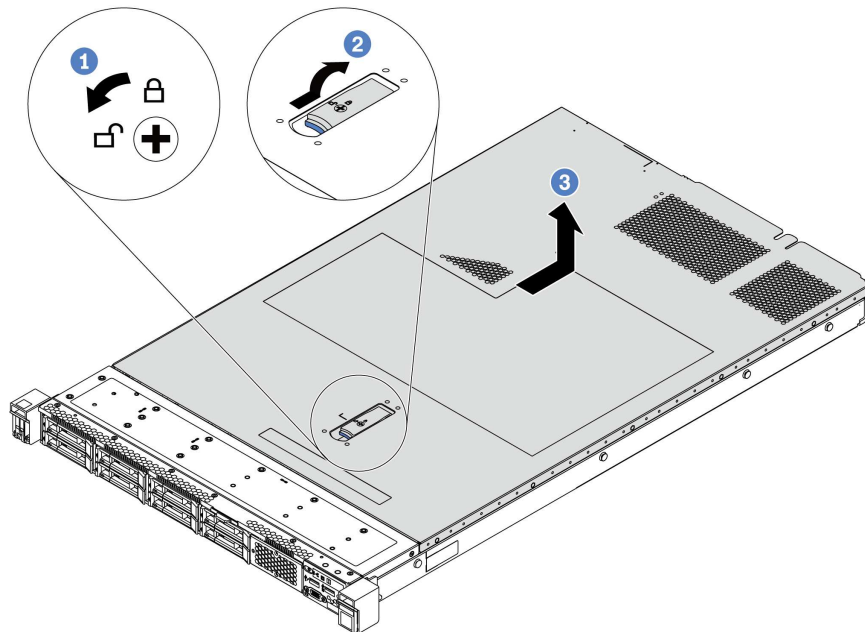


Figure 66. Top cover removal

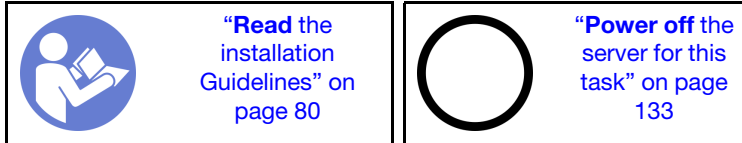
- Step 1. Use a screwdriver to turn the cover lock to the unlocked position as shown.
- Step 2. Press the release button on the cover latch and then fully open the cover latch.
- Step 3. Slide the top cover to the rear of the server until it is disengaged from the chassis. Then, lift the top cover off the chassis and place it on a flat clean surface.

Attention:

- Handle the top cover carefully. Dropping the top cover with the cover latch open might damage the cover latch.
- For proper cooling and airflow, install the top cover before you power on the server.

Remove the air baffle

Use this information to remove the air baffle.



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.

S017



CAUTION:

Hazardous moving fan blades nearby.

Note: Depending on the model, your server might not have an air baffle installed.

Before removing the air baffle, if there is a RAID super capacitor module installed on the bottom of the air baffle, disconnect the RAID super capacitor module cable first.

To remove the air baffle, complete the following step:

Watch the procedure. A video of the installation and removal process is available:

- YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-DTDY1ImpIPpJVOzo7dKq14>

Note: The air baffle you want to remove might be different from the following illustrations, but the removal method is the same.

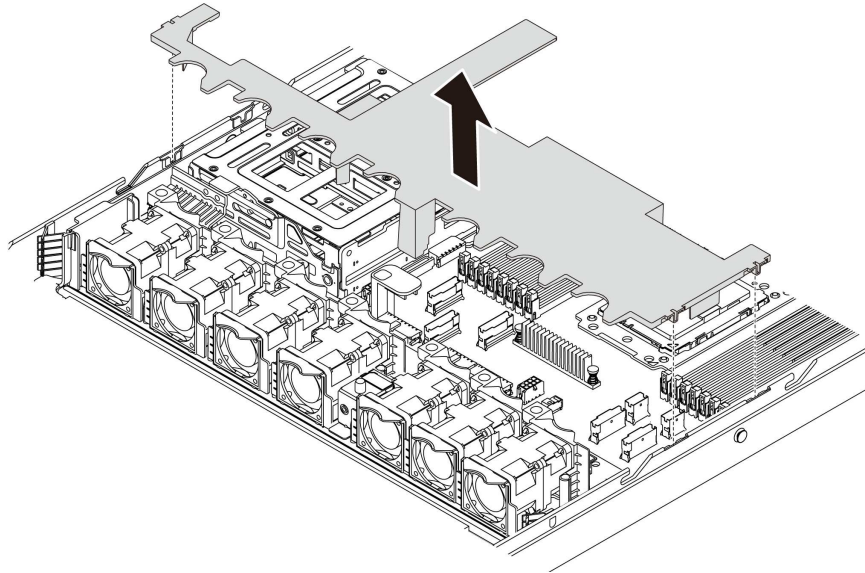


Figure 67. Air baffle removal




Step 1. Grasp the air baffle and carefully lift it out of the server.

Attention: For proper cooling and airflow, install the air baffle before you power on the server. Operating the server with the air baffle removed might damage server components.

After removing the air baffle, begin installing any options that you have purchased.

Replace a heat sink

This task has instructions for replacing a heat sink. Heat sink replacement requires a Torx #T20 screwdriver.

 <p>“Read the installation Guidelines” on page 80</p>	 <p>“Power off the server for this task” on page 133</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 82</p>
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Before installing some options, such as middle drive cage or GPU adapter, you might need to replace the heat sink with the required heat sink. For detailed information on heat sink selection, see [“Technical rules for processor and heat sink”](#) on page 85.

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Attention:

- The heat sink is necessary to maintain proper thermal conditions for the processor. Do not power on the server with the heat sink removed.
- Do not touch the processor socket or processor contacts. Processor-socket contacts are very fragile and easily damaged. Contaminants on the processor contacts, such as oil from your skin, can cause connection failures.
- Do not allow the thermal grease on the processor or heat sink to come in contact with anything. Contact with any surface can compromise the thermal grease, rendering it ineffective. Thermal grease can damage

components, such as electrical connectors in the processor socket. Do not remove the grease cover from a heat sink until you are instructed to do so.

To replace the heat sink, complete the following steps:

Watch the procedure. A video of the installation and removal process is available:

- YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-DTDY1ImplPpJVOzo7dKq14>

Step 1. Remove the installed heat sink.

- Use a Torx #T20 screwdriver to loosen all the captive screws in the *removal sequence* shown on the heat-sink label.
- After loosening each captive screw, wait for about 30 seconds for the heat sink to loosen from the processor. Then, carefully lift the heat sink up.

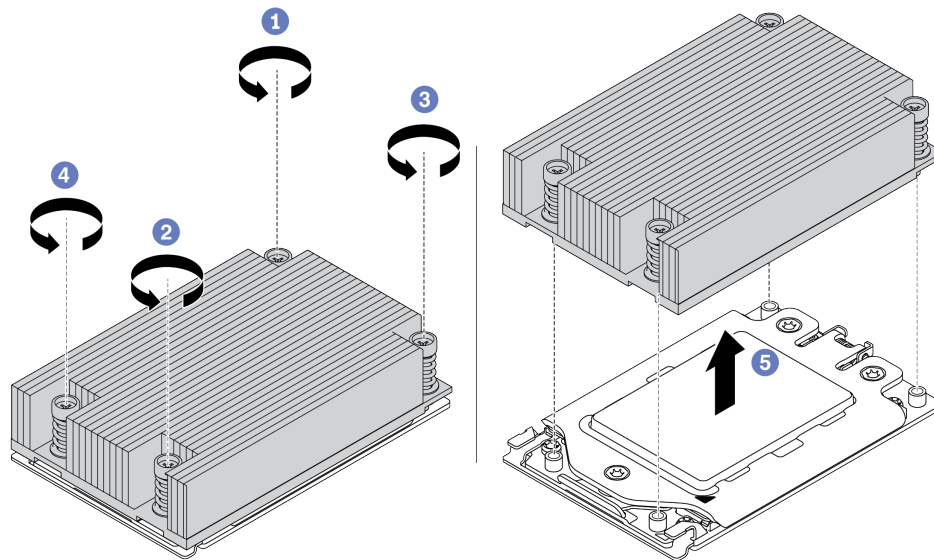


Figure 68. Removing a heat sink

Step 2. Install the new heat sink.

- Orient the heat sink with the screw holes on the processor plate. The captive screws on the heat sink should align with the screw holes on the processor plate.
- Tighten all the captive screws in the *installation sequence* shown on the heat-sink label.

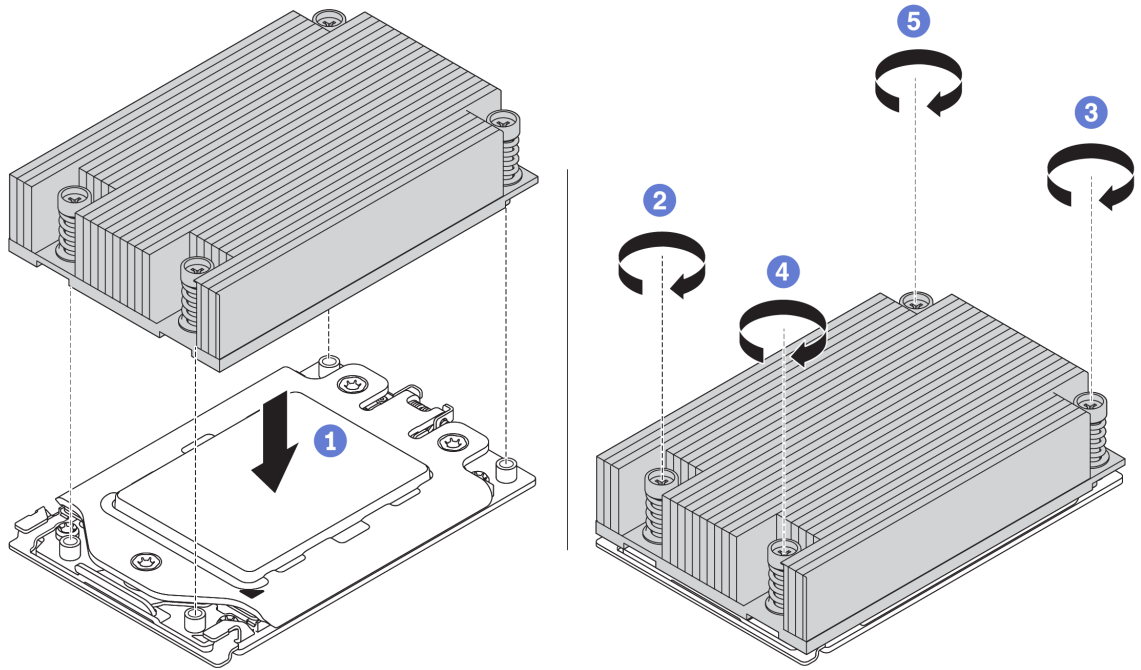




Figure 69. Installing a heat sink

After installing a heat sink,

1. If there are memory modules to install, install them. See [“Install a memory module” on page 100](#).
2. Install other options you want to install.

Install a system fan

Use this information to install a system fan.

 <p>“Read the installation Guidelines” on page 80</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 82</p>
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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.

S017



CAUTION:
Hazardous moving fan blades nearby.

Before installing a system fan:

- Remove the fan filler.
- Touch the static-protective package that contains the new system fan to any unpainted surface on the outside of the server. Then, take the new system fan out of the package and place it on a static-protective surface.

To install a system fan, complete the following steps:

Watch the procedure. A video of the installation and removal process is available:

- YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-DTDY1ImpIPpJVOzo7dKq14>

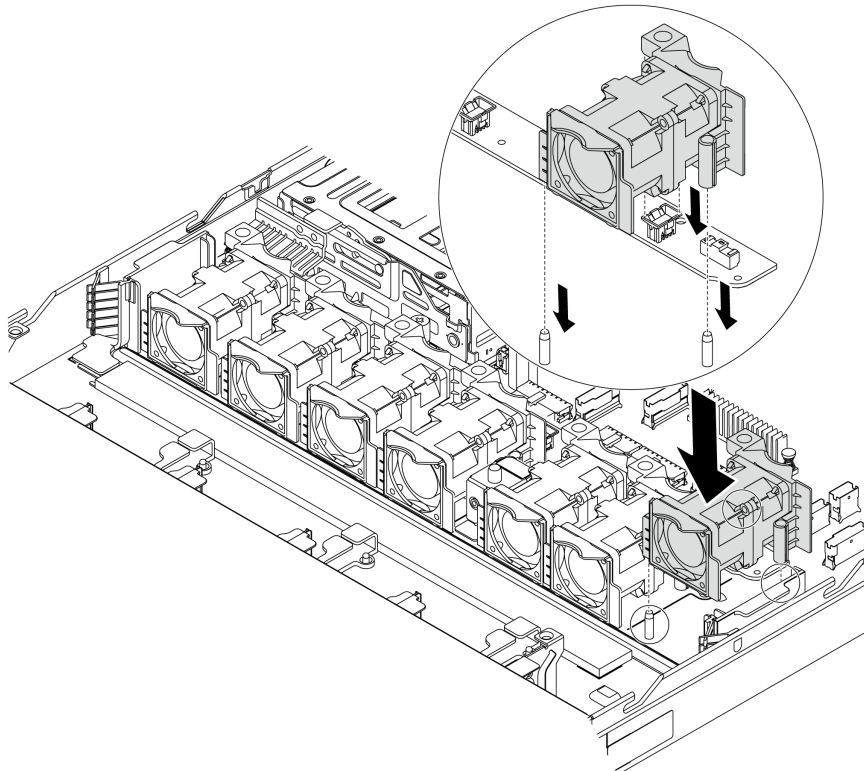
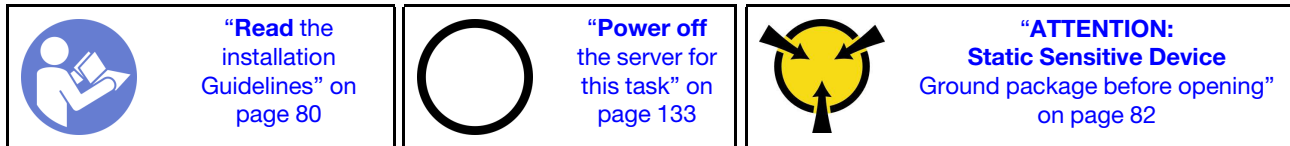


Figure 70. System fan installation

- Step 1. Align the two holes in the system fan with the two pins on the chassis.
- Step 2. Press the system fan down until it is seated correctly in the slot. Ensure that the fan connector is installed correctly to the connector on the system board.

Install a memory module

Use this information to install a memory module.



Attention:

- Disconnect all power cords for this task.
- Memory modules are sensitive to static discharge and require special handling. In addition to the standard guidelines for “Handling static-sensitive devices” on page 82:
 - 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 touch. 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 or passive components by the high insertion force.

Before installing a memory module:

1. Touch the static-protective package that contains the new memory module to any unpainted surface on the outside of the server. Then, take the new memory module out of the package and place it on a static-protective surface.
2. Locate the required memory module slot on the system board. See “DIMM installation rules” on page 83. Ensure that you observe the installation rules and sequence.

To install a memory module, complete the following steps:

Watch the procedure. A video of the installation and removal process is available:

- YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-DTDY1ImpIPpJVOzo7dKq14>

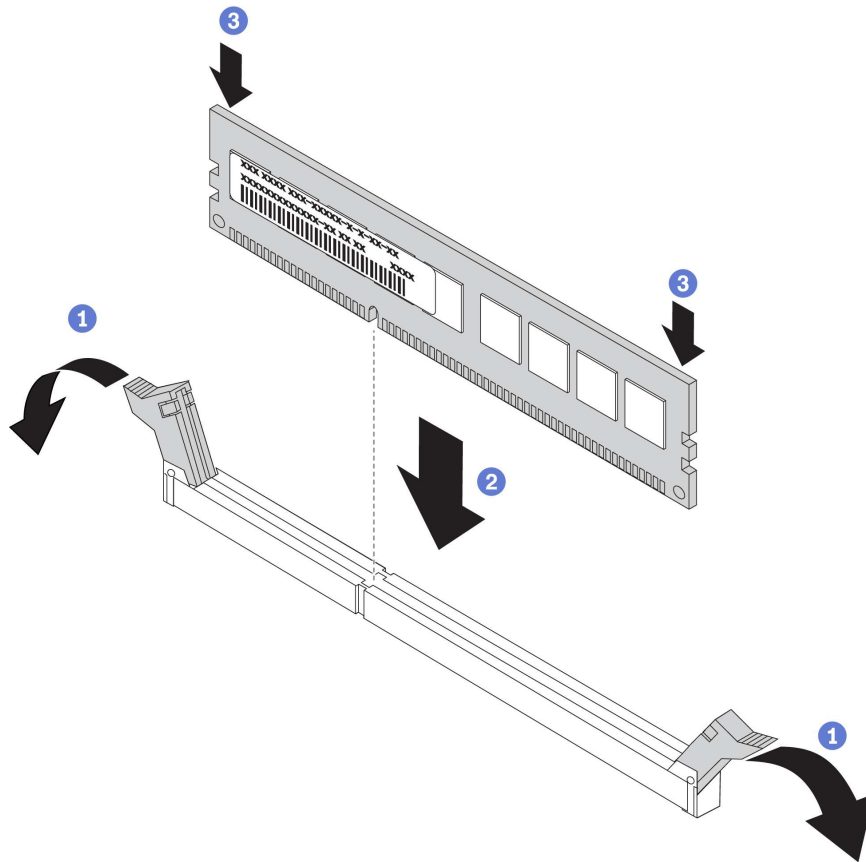


Figure 71. Memory module installation

Step 1. Open the retaining clips on each end of the memory module slot.

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

Step 2. Align the memory module with the slot, and gently place the memory module on the slot with both hands.

Step 3. Firmly press both ends of the memory module straight down into the slot until the retaining clips snap into the locked position.

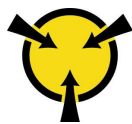
Note: If there is a gap between the memory module and the retaining clips, the memory module has not been correctly inserted. Open the retaining clips, remove the memory module, and then reinsert it.

Install a hot-swap power supply

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



“Read the
installation
Guidelines” on
page 80



“**ATTENTION:**
Static Sensitive Device
Ground package before opening”
on page 82

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

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

Notes:

- Ensure that the two power supplies installed on the server have the same wattage.
- If you are replacing the existing power supply with a new power supply of different wattage, attach the power rating label that comes with this option onto the existing label on the top cover near the power supply.



Figure 72. Hot-swap power supply label on the cover

S035



CAUTION:

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

S002



CAUTION:

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

S001





DANGER

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

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

To Connect:

1. Turn everything OFF.
2. Attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

To Disconnect:

1. Turn everything OFF.
2. Remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

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

CAUTION:

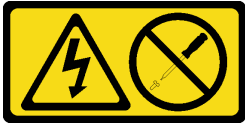
240 V dc input (input range: 180-300 V dc) is supported in Chinese Mainland ONLY. Power supply with 240 V dc input cannot support hot plugging power cord function. Before removing the power supply with dc input, please turn off server or disconnect dc power sources at the breaker panel or by turning off the power source. Then, remove the power cord.



在直流输入状态下，若电源供应器插座不支持热插拔功能，请务必不要对设备电源线进行热插拔。此操作可能导致设备损坏及数据丢失。因错误执行热插拔导致的设备故障或损坏，不属于保修范围。

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

S035



CAUTION:

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

S019



CAUTION:

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

Before installing a hot-swap power supply, touch the static-protective package that contains the new hot-swap power supply to any unpainted surface on the outside of the server. Then, take the new hot-swap power supply out of the package and place it on a static-protective surface.

See “[Technical rules for power supply](#)” on page 85 before you install the power supply.

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

Watch the procedure. A video of the installation and removal process is available:

- YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-DTDY1ImpIPpJVOzo7dKq14>

Step 1. Remove the power-supply filler.

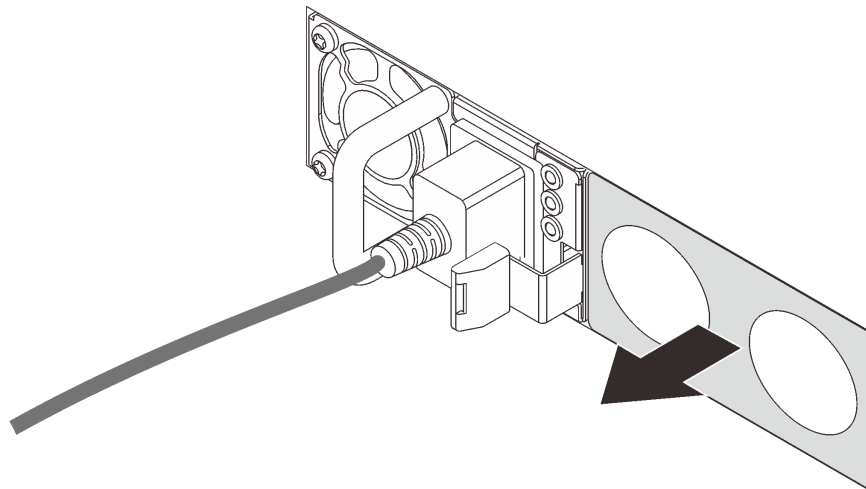


Figure 73. Hot-swap power supply filler removal

Step 2. Slide the new hot-swap power supply into the bay until the release latch clicks into place.

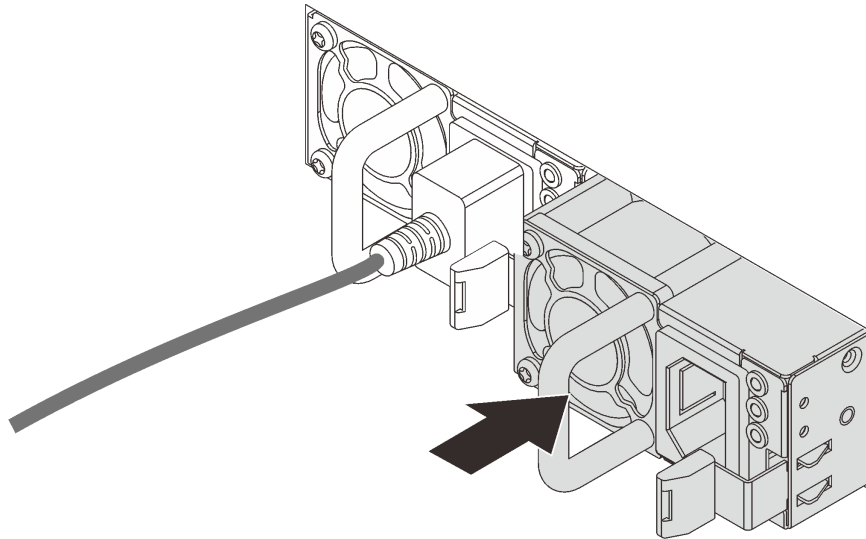

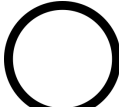



Figure 74. Hot-swap power supply installation

Install the rear hot-swap drive cage

Use this information to install the rear hot-swap drive cage.

 <p>“Read the installation Guidelines” on page 80</p>	 <p>“Power off the server for this task” on page 133</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 82</p>
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Before installing the rear hot-swap drive cage, touch the static-protective package that contains the new rear hot-swap drive cage to any unpainted surface on the outside of the server. Then, take the new rear hot-swap drive cage out of the package and place it on a static-protective surface.

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

Watch the procedure. A video of the installation and removal process is available:

- YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-DTDY1ImpIPpJVOzo7dKq14>

Step 1. Gently press and hold the tab on the rear hot-swap drive cage as shown and remove the air baffle from the rear hot-swap drive cage.

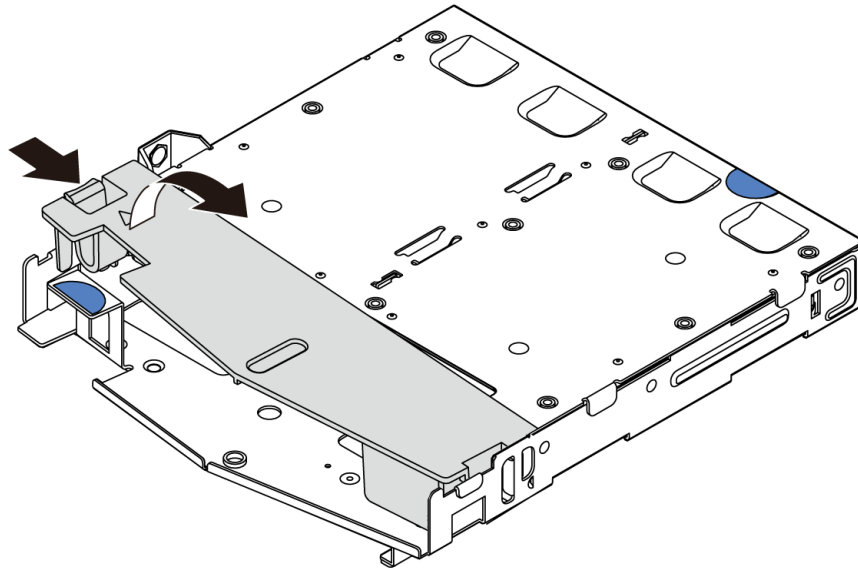


Figure 75. Air baffle removal

- Step 2. Align the rear backplane with the rear hot-swap drive cage and lower it into the rear hot-swap drive cage.

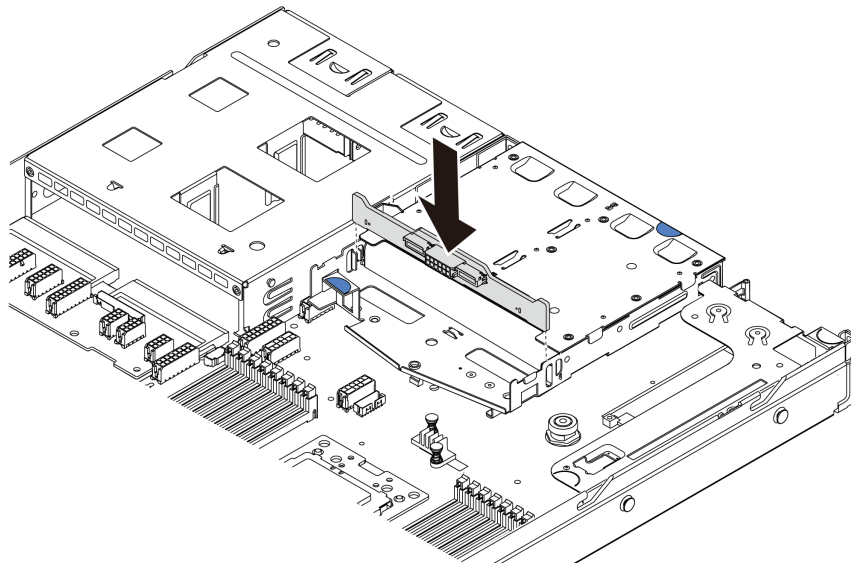


Figure 76. Rear backplane installation

- Step 3. Connect the signal cable and the power cable on the rear backplane. Refer to [“Internal cable routing” on page 25](#).

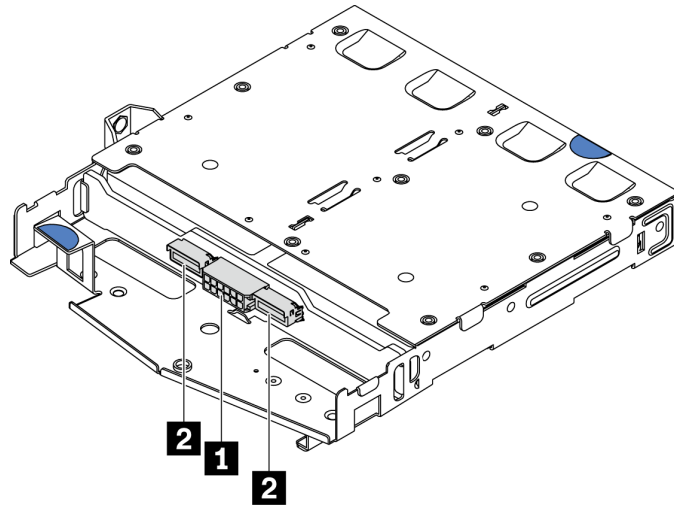


Figure 77. NVMe rear backplane connectors

1	Power connector
2	NVMe signal connector

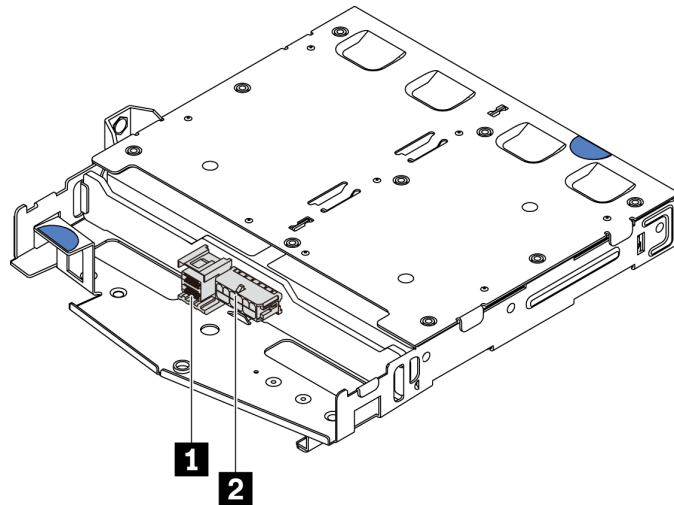


Figure 78. SAS/SATA rear backplane connectors

1	SAS/SATA signal connector
2	Power connector

Step 4. Install the air baffle into the rear hot-swap drive cage as shown.

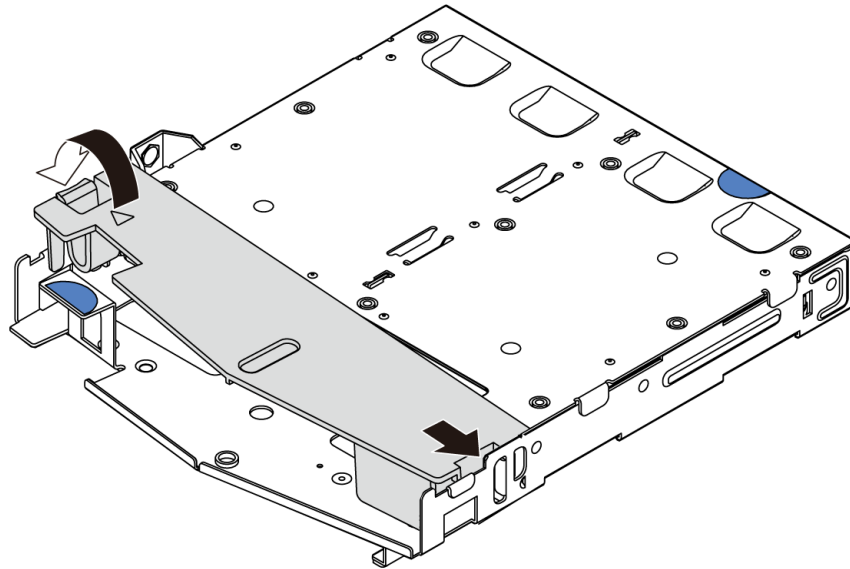


Figure 79. Air baffle installation

- Step 5. Align the three pins on the rear hot-swap drive cage with the holes and slot in the chassis. Then, lower the rear hot-swap drive cage into the chassis until it is fully seated.

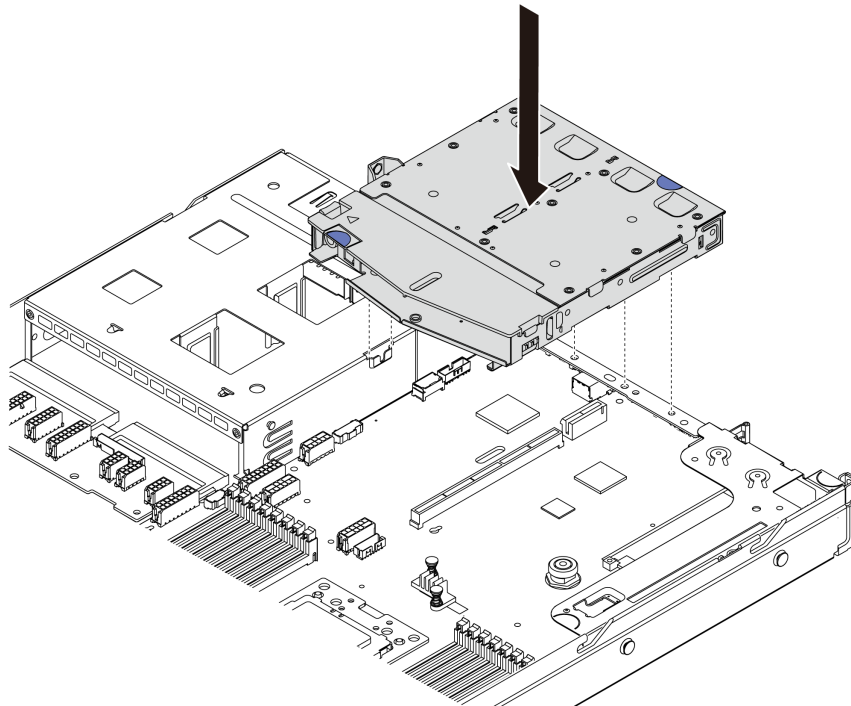


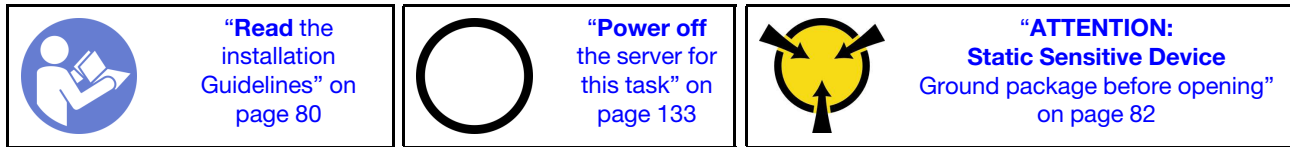
Figure 80. Rear hot-swap drive cage installation

- Step 6. Connect the signal cable and connect the power cable to the system board. See [“Internal cable routing” on page 25](#).

After installing the rear hot-swap drive cage, install the rear hot-swap drives. See [“Install a hot-swap drive” on page 131](#).

Install the RAID super capacitor module

Use this information to install the RAID super capacitor module.



Note: The following is the locations for super capacitor modules.

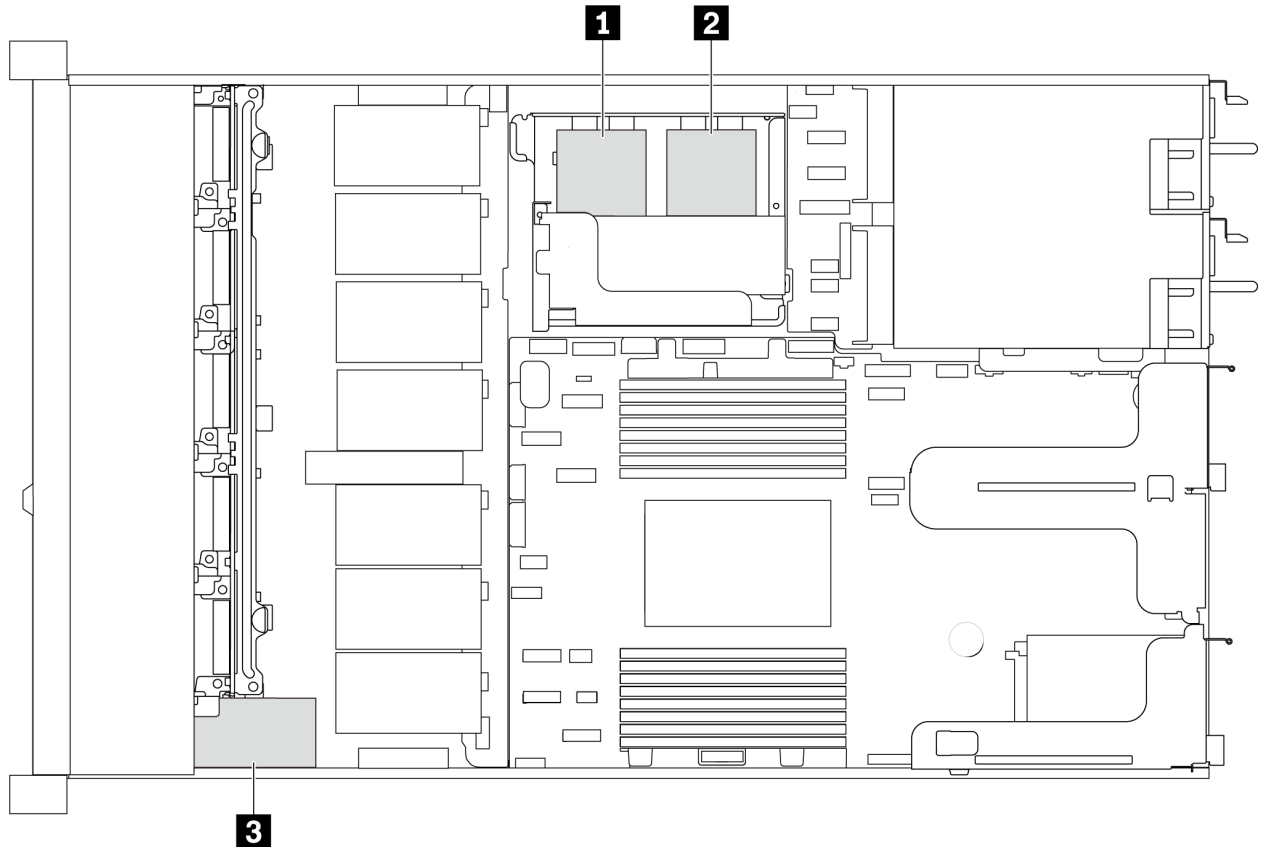


Figure 81. RAID super capacitor module location

The following are installation rules to install the super capacitor:

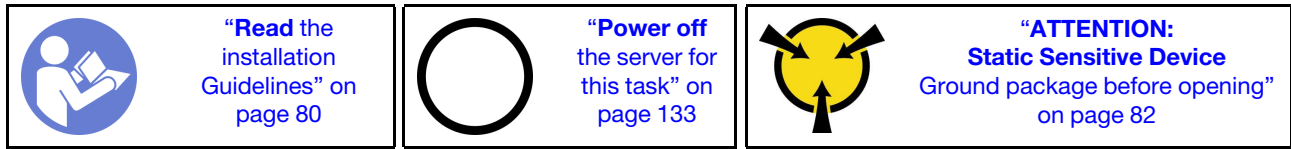
- For server models with 3.5-inch drive bays, it supports up to two RAID super capacitor modules.
- For server models with 2.5-inch drive bays, it supports up to three RAID super capacitor modules:
 - If you have an internal RAID card installed, connect the RAID card to **1** or **2**.
 - If you have a RAID card installed in PCIe slot 1, connect the RAID card to **1**, **2** or **3**.
 - If you have a RAID card installed in PCIe slot 3 or PCIe slot 2, connect the RAID card to **1** or **2**.

Refer to the following topics to install the RAID super capacitor module in different locations:

- [“Install a super capacitor module on the M.2/riser support bracket” on page 112](#)
- [“Install the RAID super capacitor module on the chassis” on page 111](#)

Install the RAID super capacitor module on the chassis

Use this information to install the RAID super capacitor module on the chassis.



Before installing the RAID super capacitor module on the chassis, touch the static-protective package that contains the new RAID super capacitor module to any unpainted surface on the outside of the server. Then, take the new RAID super capacitor module out of the package and place it on a static-protective surface.

To install the RAID super capacitor module on the chassis, complete the following steps:

- Step 1. If the server comes with a tray that covers the place of the RAID super capacitor module on the chassis, remove it first.

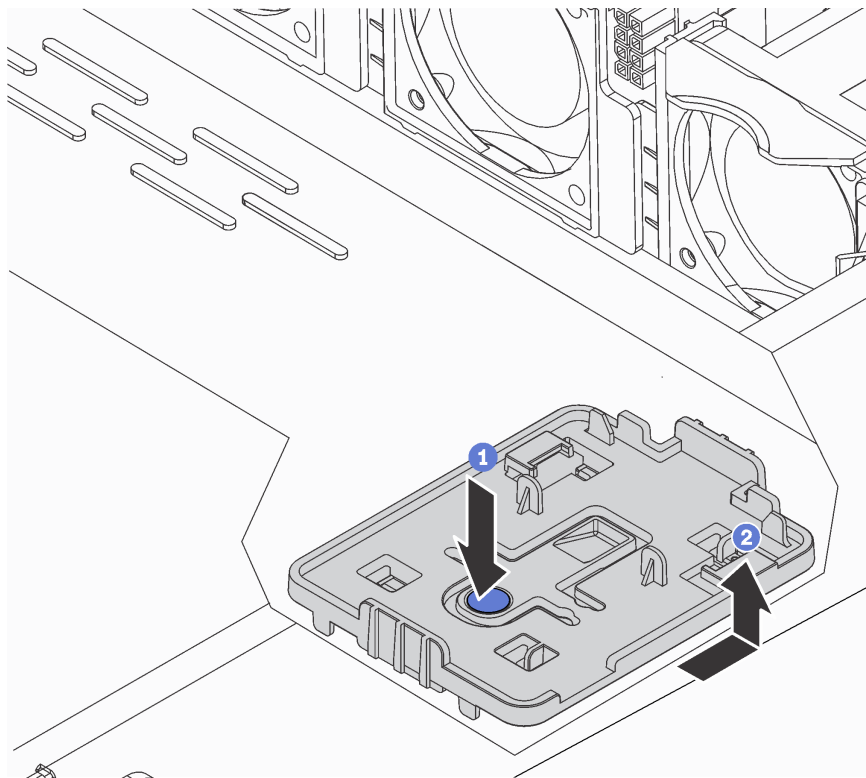


Figure 82. Tray removal

- Step 2. If the server does not have a RAID super capacitor module holder on the chassis, install one first.

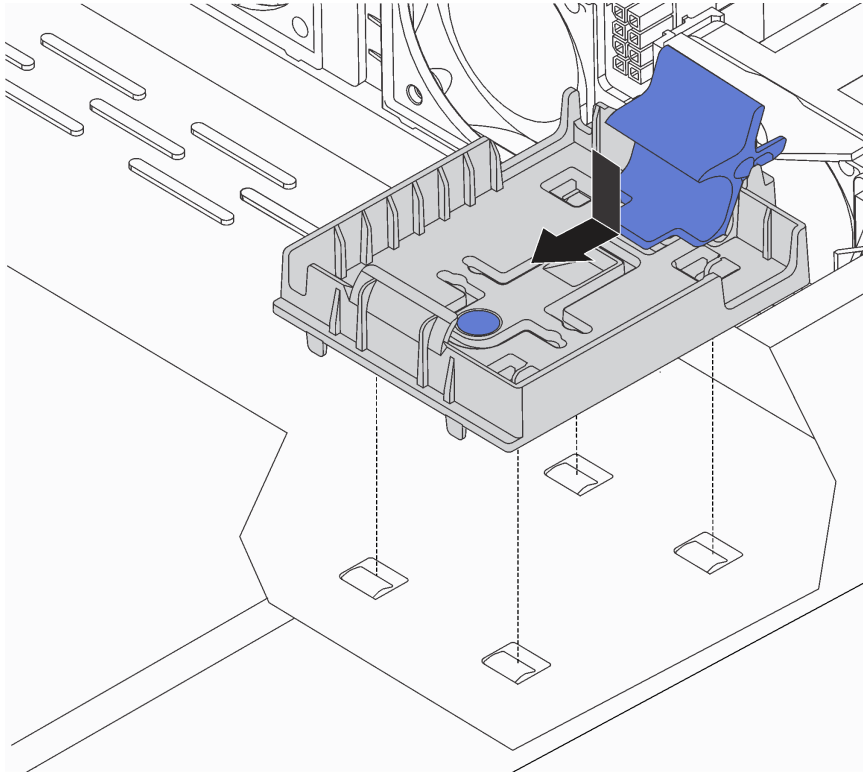


Figure 83. RAID super capacitor module holder installation

Step 3. Open the retention clip on the holder, put the RAID super capacitor module into the holder and press it down to secure it into the holder.

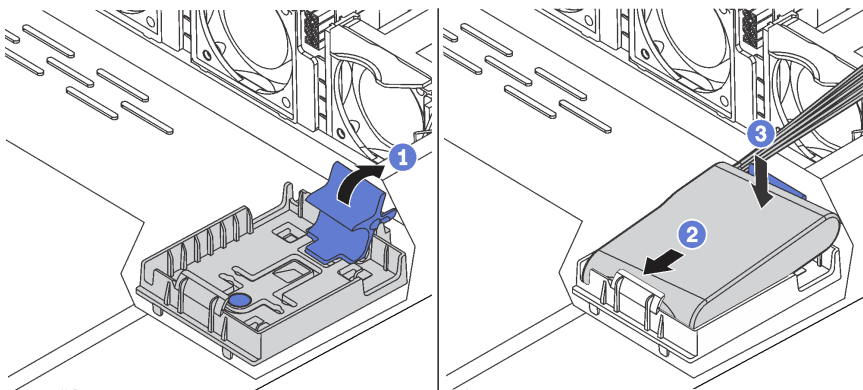


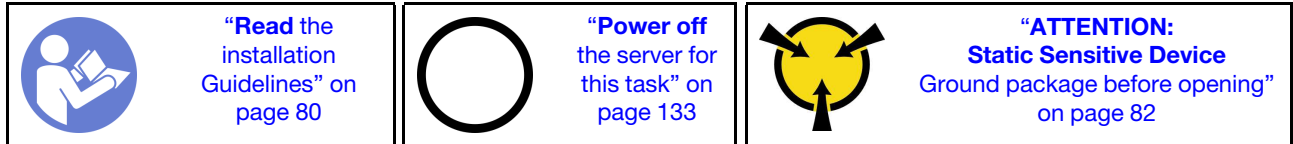
Figure 84. Installation of the RAID super capacitor module on the chassis

After installing the super capacitor module:

1. Connect the super capacitor module to an adapter with the extension cable that comes with the super capacitor module. See [“Super capacitor cable routing”](#) on page 68.

Install a super capacitor module on the M.2/riser support bracket

Use this information to install a super capacitor module.



Before installing the RAID super capacitor module on the chassis, touch the static-protective package that contains the new RAID super capacitor module to any unpainted surface on the outside of the server. Then, take the new RAID super capacitor module out of the package and place it on a static-protective surface.

To install a super capacitor module, complete the following steps:

Step 1. Align the notches on the M.2/riser support bracket with the pins on the chassis, put the M.2/riser support bracket in place, and then fasten the screw.

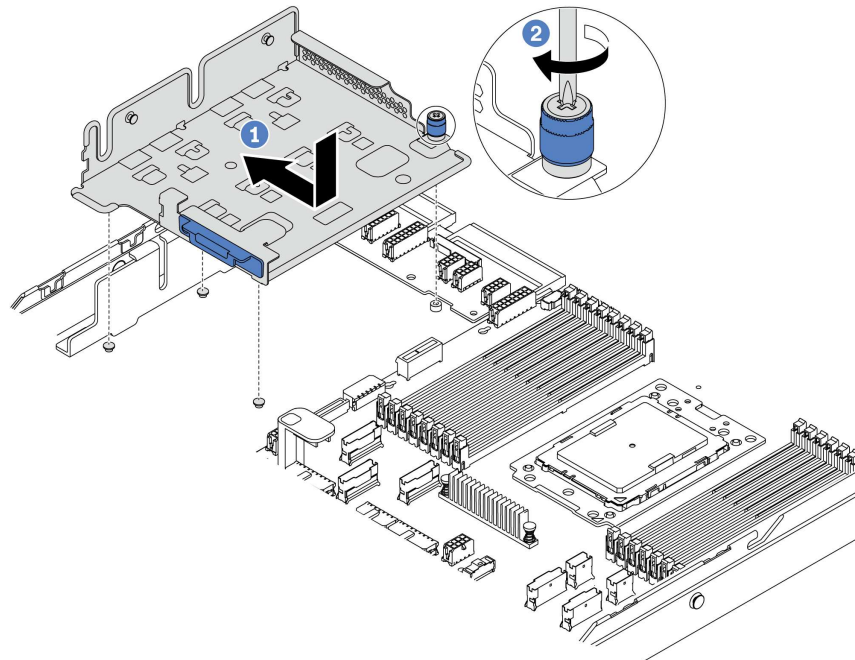


Figure 85. M.2/riser support bracket installation

Step 2. Install two super capacitor module holders.

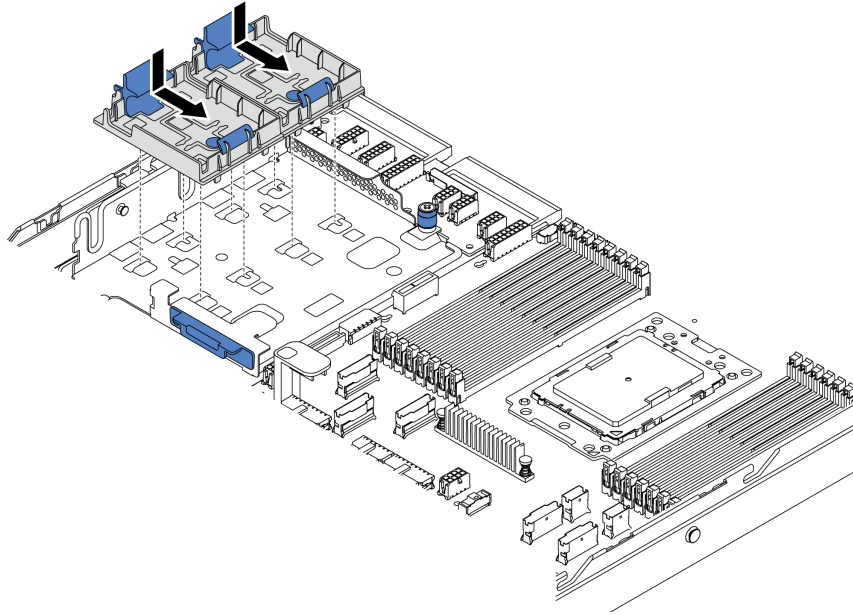


Figure 86. Super capacitor module holder installation

Step 3. Open the retention clip on a holder, put a super capacitor module into the holder, and press it down to secure it into the holder.

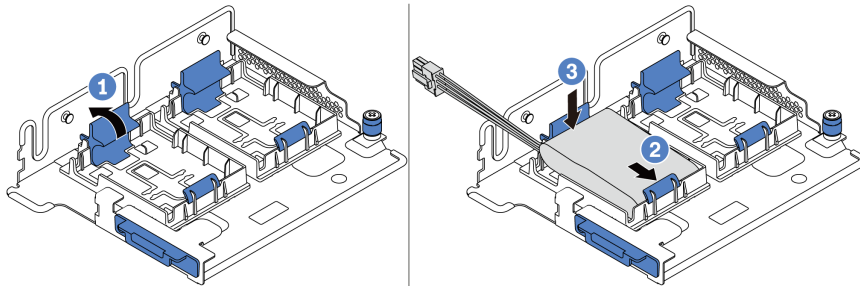


Figure 87. Super capacitor module installation

After installing the super capacitor module:

1. Connect the super capacitor module to an adapter with the extension cable that comes with the super capacitor module. See [“Super capacitor cable routing” on page 68](#).

Install the internal riser assembly

Use this information to install the internal riser assembly.

	<p>“Read the installation Guidelines” on page 80</p>	<p>“Power off the server for this task” on page 133</p>	<p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 82</p>
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To install the internal riser assembly, complete the following steps:

- Step 1. Install the internal riser assembly and install the super capacitor on the internal riser assembly. See [“Install a super capacitor module on the M.2/riser support bracket” on page 112](#).

Step 2. Align the pins and connectors of the internal riser assembly with the holes and connectors on the chassis, and then secure the assembly in place.

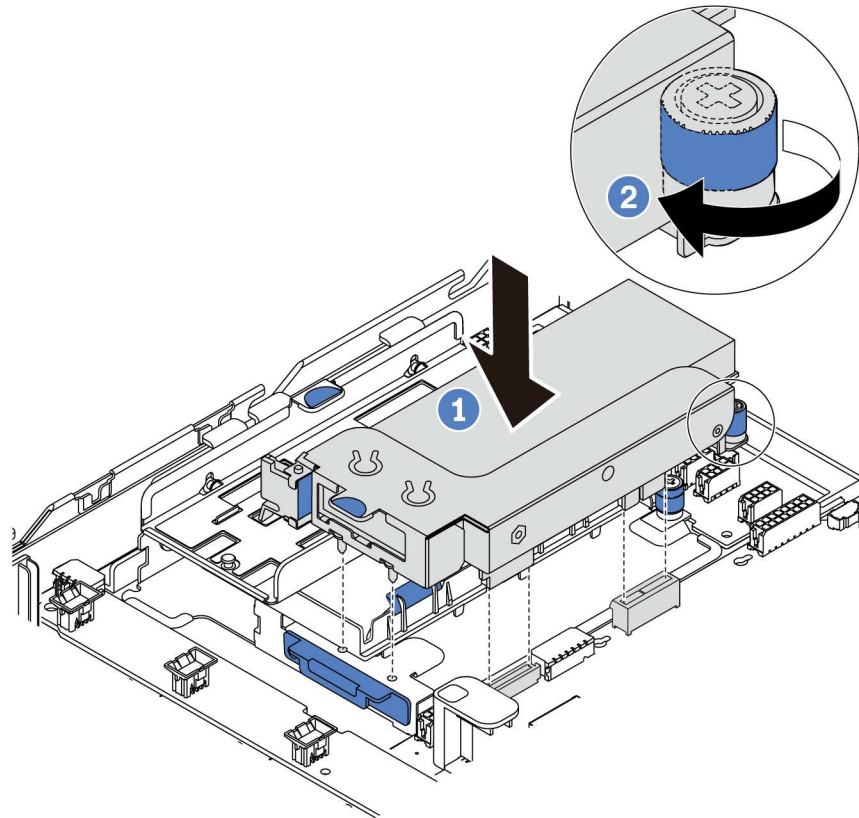

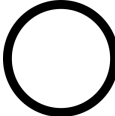



Figure 88. Internal riser assembly installation

Step 3. Tighten the captive screw to further secure the assembly.

Install the M.2 adapter and M.2 drive

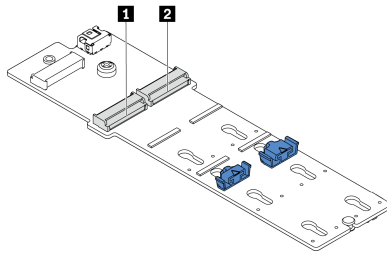
Use this information to install the M.2 adapter and M.2 drive.

	<p>“Read the installation Guidelines” on page 80</p>		<p>“Power off the server for this task” on page 133</p>		<p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 82</p>
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Before installing the M.2 adapter and M.2 drive:

1. Touch the static-protective package that contains the new M.2 adapter and M.2 drive to any unpainted surface on the outside of the server. Then, take the new M.2 adapter and M.2 drive out of the package and place them on a static-protective surface.
2. Adjust the retainer on the M.2 adapter to accommodate the particular size of the M.2 drive you wish to install. See [“Adjust the retainer on the M.2 adapter”](#) on page 118.
3. Locate the M.2 drive slot on the M.2 adapter.

Note: For some M.2 adapters that support two identical M.2 drives, install the M.2 drive in slot 0 first.



- 1** Slot 0
- 2** Slot 1

Figure 89. M.2 drive slot

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

Notes:

- The M.2 adapter module is shipped with a loosen screw, but it is not necessarily used for the installation.
- The M.2 adapter you want to install might be different from the following illustrations, but the installation method is the same.

Watch the procedure. A video of the installation and removal process is available:

- YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-DTDY1ImplPpJV0zo7dKq14>

- Step 1. Install the internal riser assembly and install the super capacitor modules on the M.2/riser support bracket. See “Install a super capacitor module on the M.2/riser support bracket” on page 112.
- Step 2. Align the pins of the M.2 module bracket with the two holes on both sides of the M.2/riser support bracket, and then install the bracket on the super capacitor modules.

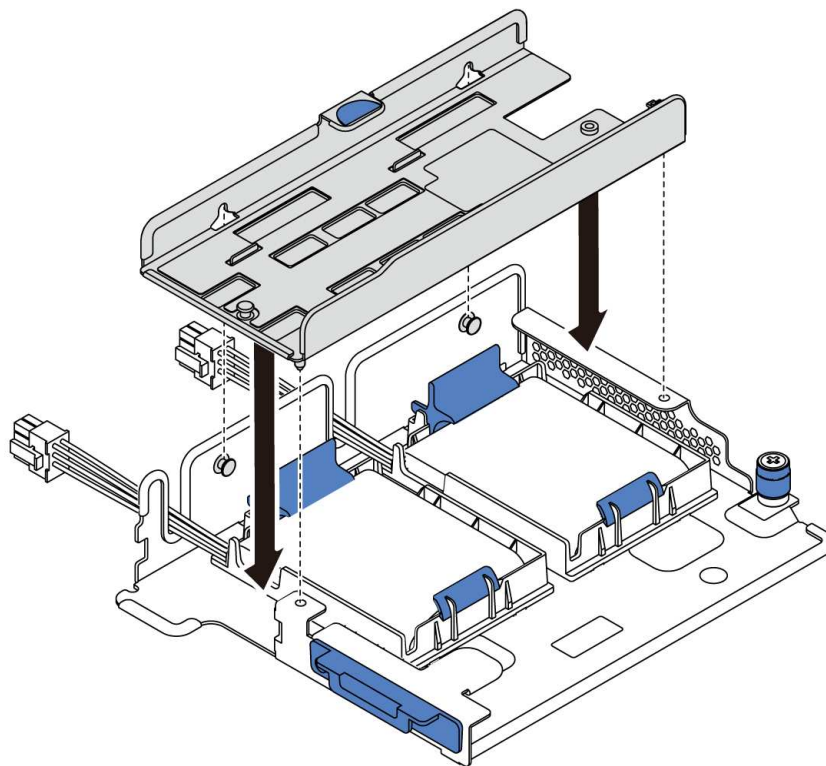


Figure 90. M.2 module bracket installation

Step 3. Install the M.2 adapter into the bracket and secure the screw.

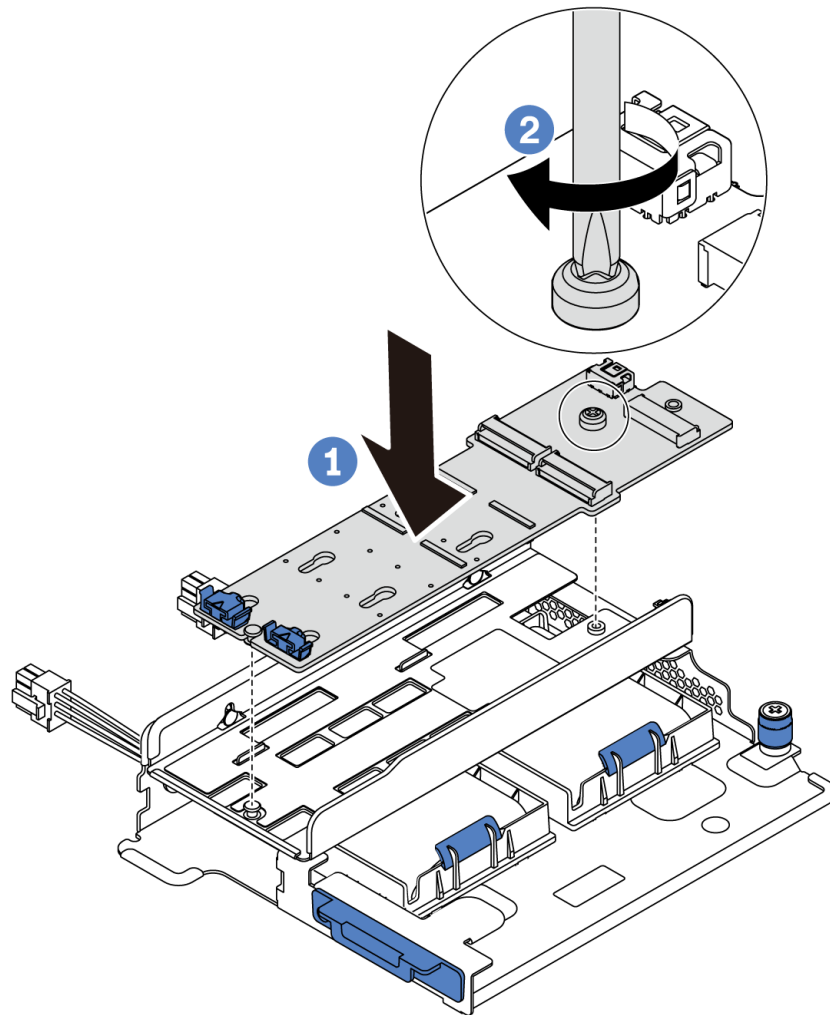


Figure 91. M.2 adapter installation

Step 4. Install the M.2 drive on the M.2 adapter.

- a. Insert the M.2 drive at an angle of approximately 30 degrees into the connector.
- b. Rotate the M.2 drive down until the notch **1** catches on the lip of the retainer **2**.
- c. Slide the retainer forward (toward the connector) to secure the M.2 drive into place.

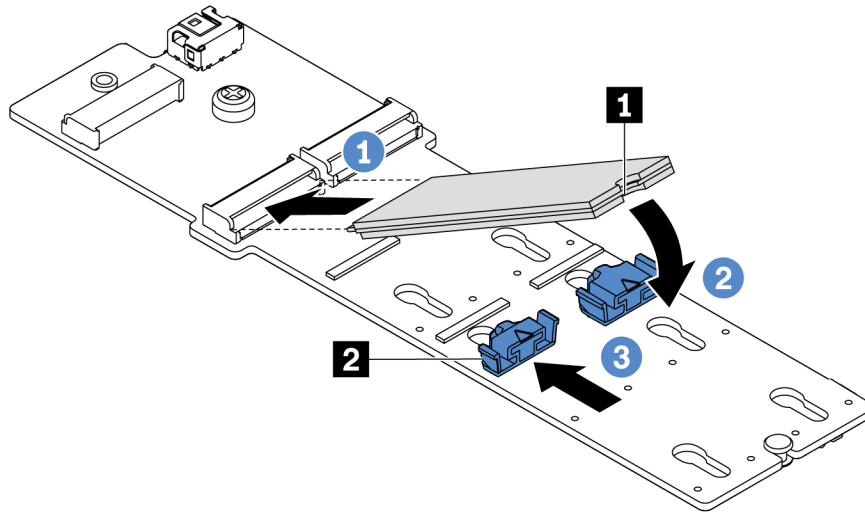


Figure 92. M.2 drive installation


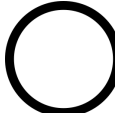

After installing the M.2 adapter and M.2 drive:

1. Connect the cables of the M.2 adapter. See “M.2 module cable routing” on page 68.
2. Use the Lenovo XClarity Provisioning Manager to configure the RAID. For more information, see: https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html

Important: Lenovo XClarity Provisioning Manager (LXPM) supported version varies by product. All versions of Lenovo XClarity Provisioning Manager are referred to as Lenovo XClarity Provisioning Manager and LXPM in this document, unless specified otherwise. To see the LXPM version supported by your server, go to https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html.

Adjust the retainer on the M.2 adapter

Use this information to adjust the retainer on the M.2 adapter.

	<p>“Read the installation Guidelines” on page 80</p>		<p>“Power off the server for this task” on page 133</p>		<p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 82</p>
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Before adjusting the retainer on the M.2 adapter, locate the correct keyhole that the retainer should be installed into to accommodate the particular size of the M.2 drive you wish to install.

To adjust the retainer on the M.2 adapter, complete the following steps:

Note: The M.2 adapter might be different from the following illustrations, but the adjustment method is the same.

Watch the procedure. A video of the installation and removal process is available:

- YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-DTDY1ImpIPpJVOzo7dKq14>

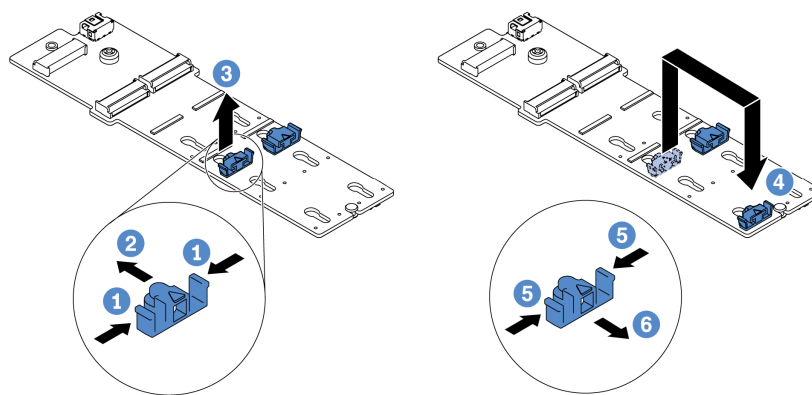





Figure 93. M.2 retainer adjustment

- Step 1. Press both sides of the retainers.
- Step 2. Move the retainer forward until it is in the large opening of the keyhole.
- Step 3. Take the retainer out of the keyhole.
- Step 4. Insert the retainer into the correct keyhole.
- Step 5. Press both sides of the retainer.
- Step 6. Slide the retainer backwards until it is seated in place.

Install the middle drive cage

Use this information to install the middle drive cage.

 <p>“Read the installation Guidelines” on page 80</p>	 <p>“Power off the server for this task” on page 133</p>	 <p>“ATTENTION: Static Sensitive Device” Ground package before opening” on page 82</p>
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Before installing the middle drive cage, touch the static-protective package that contains the new middle drive cage to any unpainted surface on the outside of the server. Then, take the new internal drive assembly out of the package and place it on a static-protective surface.

To install the middle drive cage, complete the following steps:

Watch the procedure. A video of the installation and removal process is available:

- YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-DTDY1ImpIPpJVOzo7dKq14>

- Step 1. Install the internal backplane on the middle drive cage.
 - a. Align the internal backplane with the middle drive cage and lower it into the middle drive cage until it is fully seated.
 - b. Install the screws to secure the internal backplane in place.

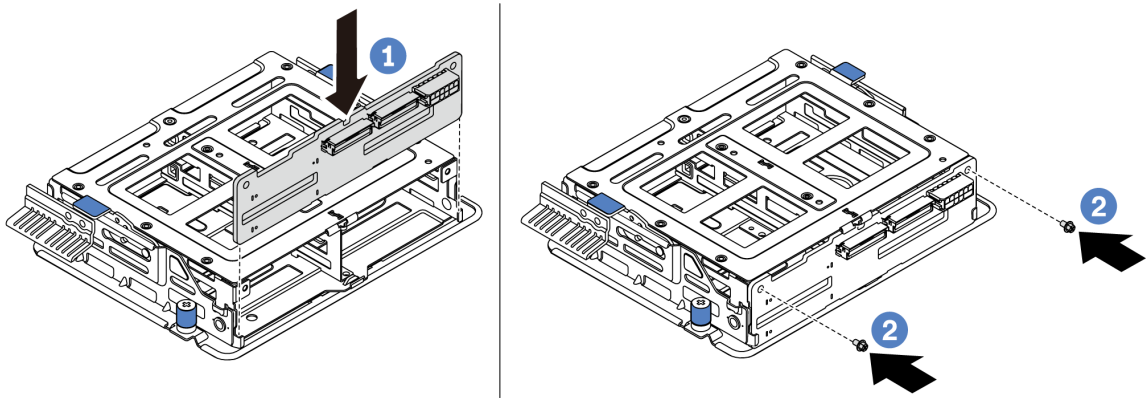


Figure 94. Internal backplane installation

Step 2. Align the two pins on the middle drive cage with the holes and slot in the chassis. Then, lower the middle drive assembly into the chassis and push forward the cage until it is fully seated.

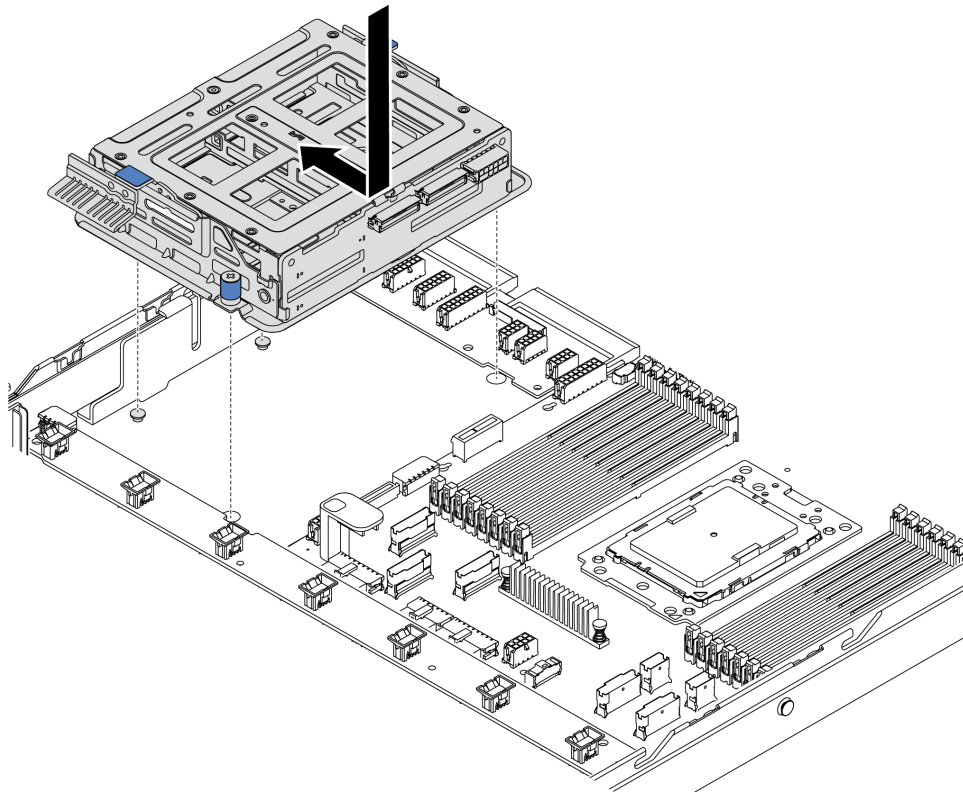


Figure 95. Middle drive cage installation-1

Step 3. Tighten the thumbscrews to secure the middle drive cage.

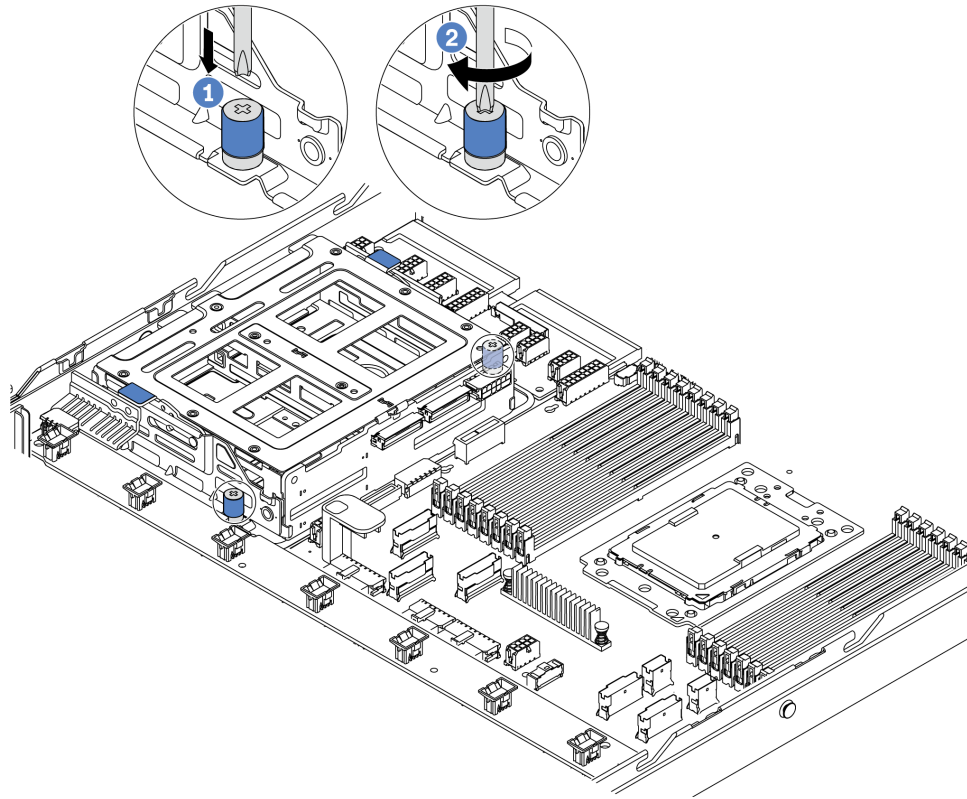


Figure 96. Middle drive cage installation-2

Step 4. Hold and lift the two blue handles. Install the hot-swap drives in the middle drive cage.

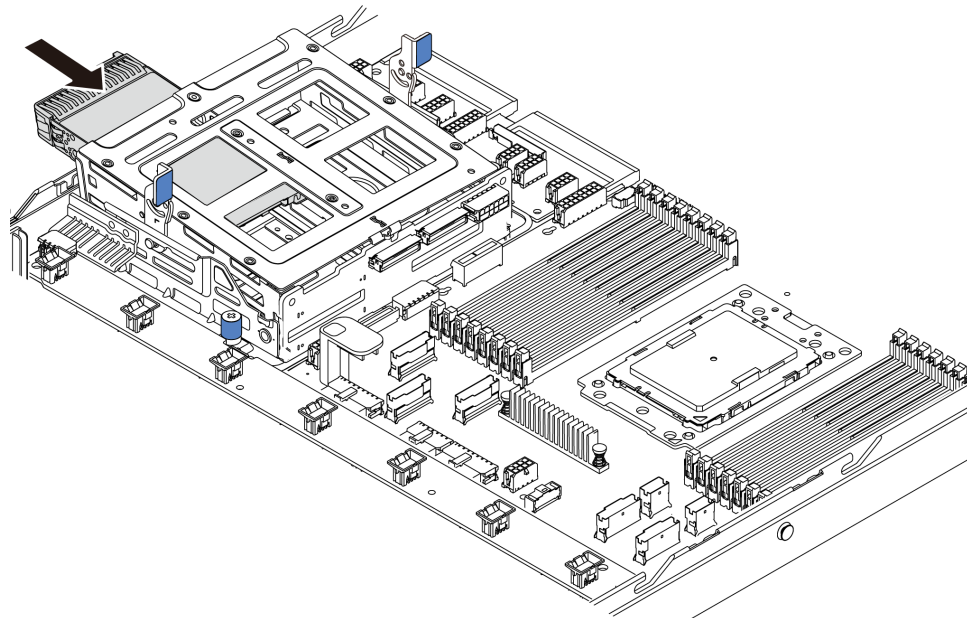


Figure 97. Internal hot-swap drive installation-1

Step 5. Press two blue handles and slide down the cage.

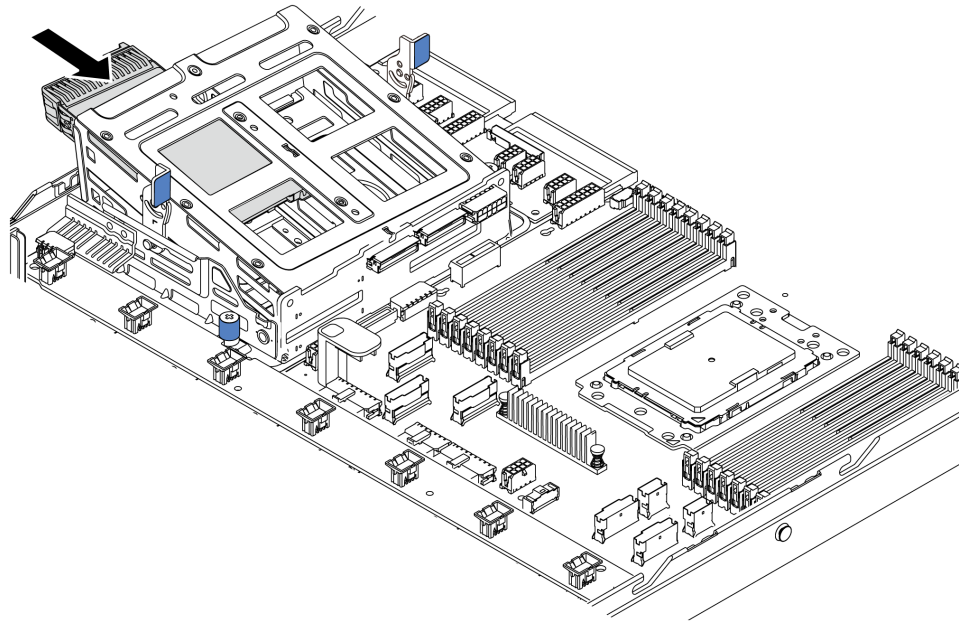


Figure 98. Internal hot-swap drive installation-2


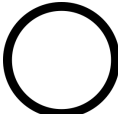

After installing all hot-swap drives:

1. Connect the cables to the middle drive cage. See “Internal cable routing” on page 25.
2. Use the Lenovo XClarity Provisioning Manager to configure the RAID if necessary. For more information, see:
https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html

Important: Lenovo XClarity Provisioning Manager (LXPM) supported version varies by product. All versions of Lenovo XClarity Provisioning Manager are referred to as Lenovo XClarity Provisioning Manager and LXPM in this document, unless specified otherwise. To see the LXPM version supported by your server, go to https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html.

Install the OCP 3.0 Ethernet adapter

Use this information to install the OCP 3.0 Ethernet adapter.

 <p>“Read the installation Guidelines” on page 80</p>	 <p>“Power off the server for this task” on page 133</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 82</p>
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CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Note: If there is an OCP 3.0 Ethernet adapter installed, when the system is powered off but still plugged in to AC power, system fans will continue to spin at a much lower speed. This is the system design to provide proper cooling for the OCP 3.0 Ethernet adapter.

Before installing the OCP 3.0 Ethernet adapter, touch the static-protective package that contains the new OCP 3.0 Ethernet adapter to any unpainted surface on the outside of the server. Then, take the new OCP 3.0 Ethernet adapter out of the package and place it on a static-protective surface.

To install the OCP 3.0 Ethernet adapter, complete the following steps:

Watch the procedure. A video of the installation and removal process is available:

- YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-DTDY1ImplPpJVOzo7dKq14>

Step 1. Attach the OCP 3.0 Ethernet adapter label that comes with this option on the rear of the server.

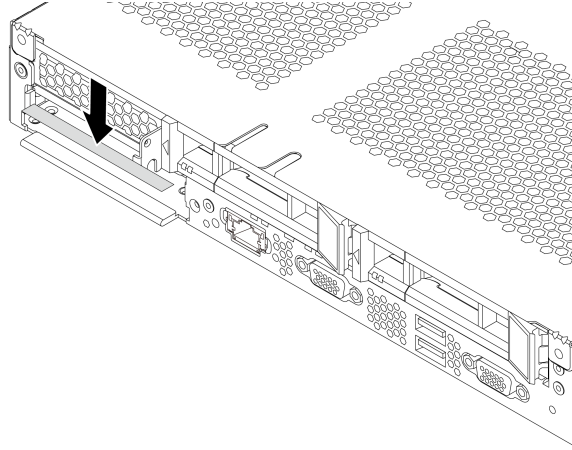


Figure 99. OCP 3.0 Ethernet adapter label installation

Step 2. Push the OCP 3.0 Ethernet adapter as shown to insert it into the connector on the system board. Tighten the thumbscrew to secure the adapter.

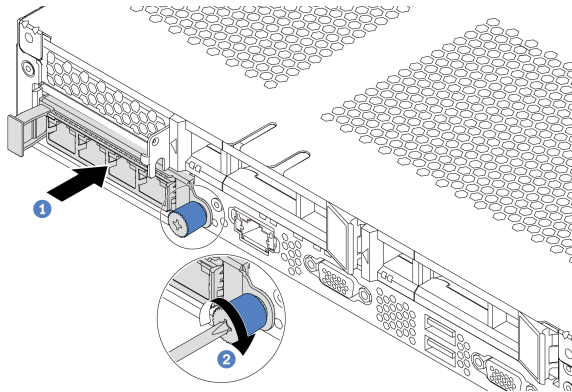

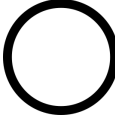



Figure 100. OCP 3.0 Ethernet adapter installation

Install a PCIe adapter and riser assembly

Use this information to install a PCIe adapter and riser assembly.

	“Read the installation Guidelines” on page 80		“Power off the server for this task” on page 133		“ATTENTION: Static Sensitive Device Ground package before opening” on page 82
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Before installing a PCIe adapter and riser assembly:

1. Touch the static-protective package that contains the new PCIe adapter to any unpainted surface on the outside of the server. Then, take the new PCIe adapter out of the package and place it on a static-protective surface.
2. Touch the static-protective package that contains the new riser assembly to any unpainted surface on the outside of the server. Then, take the new riser assembly out of the package and place it on a static-protective surface.
3. Locate the correct PCIe slot for the PCIe adapter. For information about the PCIe slots and supported PCIe adapters, see [“Rear view” on page 18](#).
4. Before installing the PCIe adapter, refer to the specific technical rules for the PCIe adapter:
 - [“Technical rules for HBA/RAID adapters” on page 90](#)
 - [“Technical rules for PCIe NVMe adapter” on page 91](#)
 - [“Technical rules for Ethernet adapters” on page 91](#)

For servers with riser assembly, it comes with one of the following riser assembly configurations:

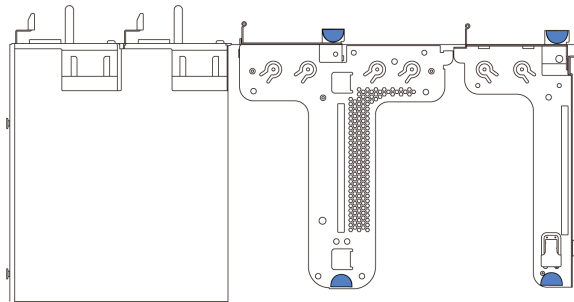


Figure 101. Configuration 1

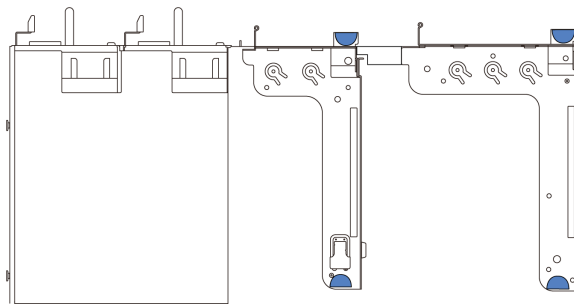


Figure 102. Configuration 2

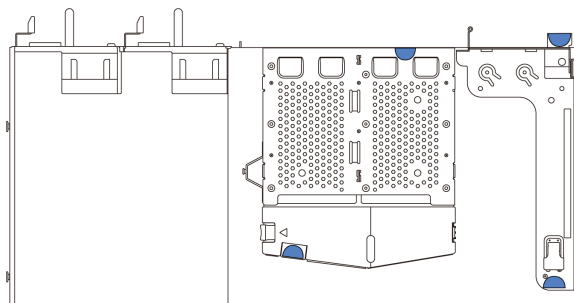


Figure 103. Configuration 3

To install a PCIe adapter and riser assembly, complete the following steps:

Watch the procedure. A video of the installation and removal process is available:

- YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-DTDY1ImplPpJVZOzo7dKq14>

Step 1. Align the PCIe adapter with the PCIe slot on the riser card. Then, carefully press the PCIe adapter straight into the slot until it is securely seated and its bracket also is secured.

Step 2. Pivot the latch on the riser bracket to the closed position.

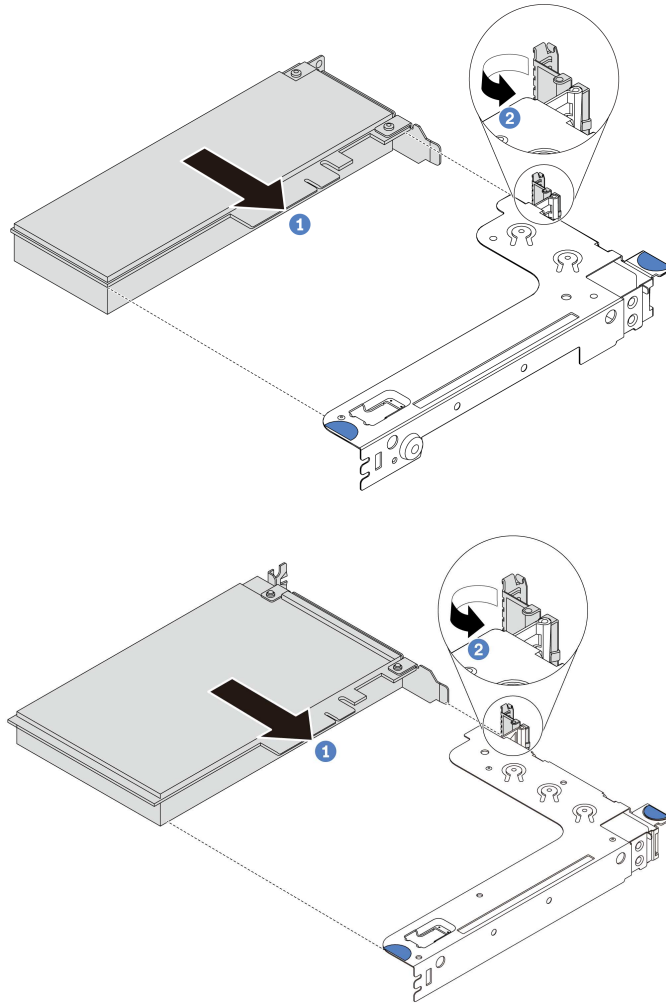


Figure 104. Riser 1 assembly (LP/FHFL) installation

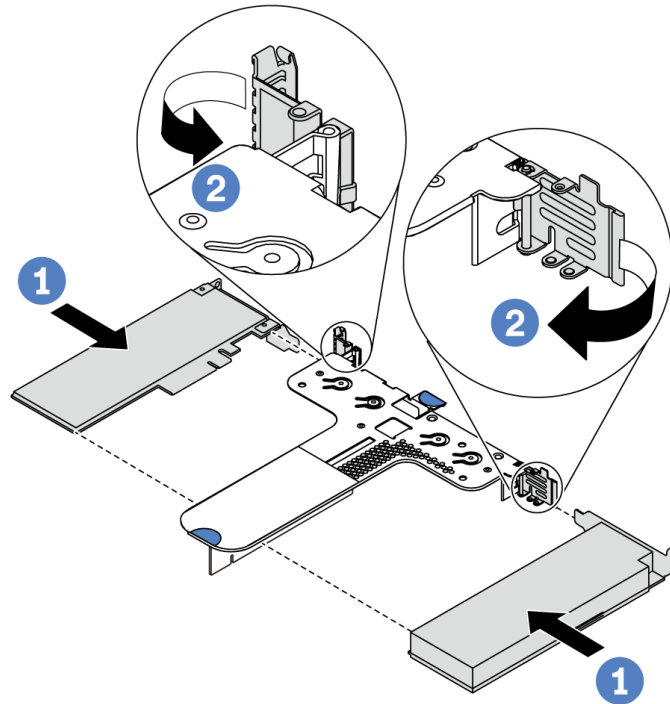


Figure 105. Riser 2 assembly (LP+LP) installation

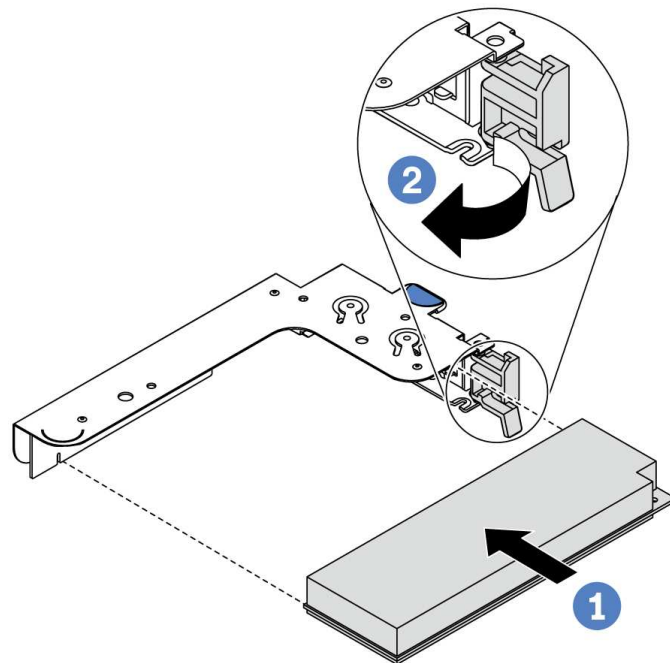


Figure 106. Internal riser assembly (LP) installation

- Step 3. Connect cables to the PCIe adapter in the riser assembly. See [“Internal cable routing” on page 25](#).
- Step 4. Position the riser assembly on the chassis. Align the two pins on the bracket with the two holes in the chassis and align the riser card with the riser slot on the system board. Then, carefully press the riser assembly straight down into the slot until it is fully seated.

Note: The riser assembly you want to install might be different from the following illustration, but the installation method is the same.

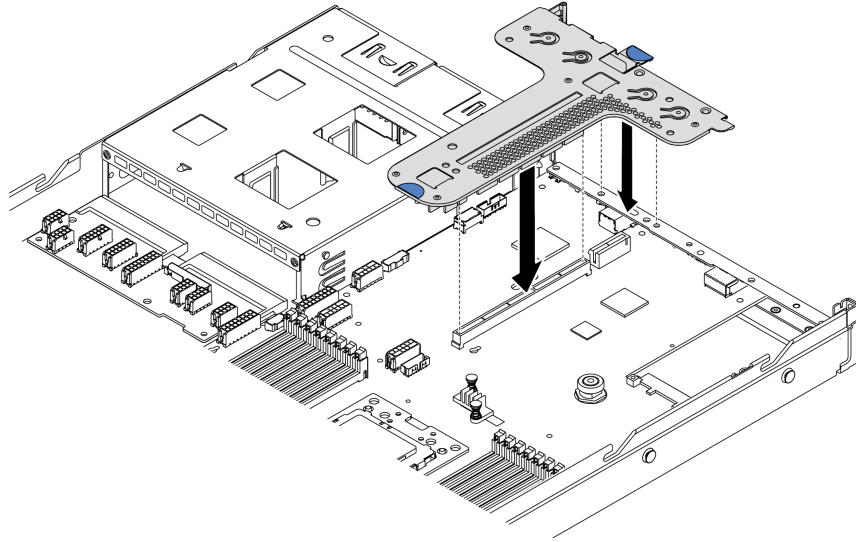


Figure 107. Riser assembly installation

If you install riser assembly for configuration 2, you must install the rear wall bracket between the two riser assemblies.

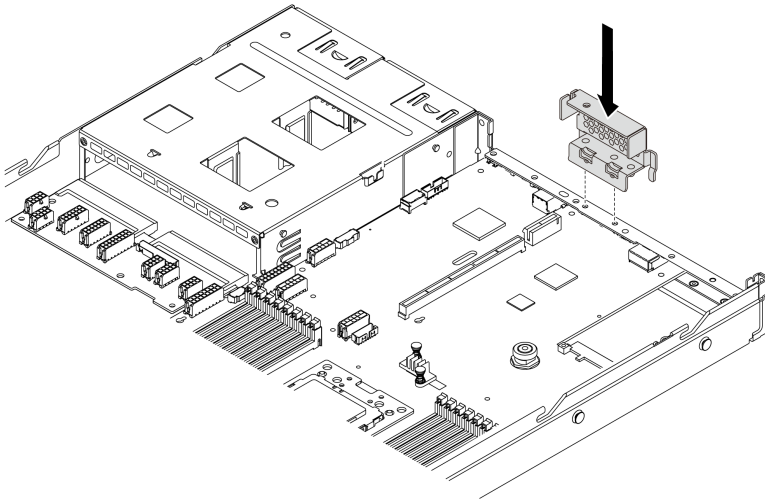





Figure 108. Rear wall bracket installation

Install an intrusion switch

Use this information to install an intrusion switch.

 <p>“Read the installation Guidelines” on page 80</p>	 <p>“Power off the server for this task” on page 133</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 82</p>
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Before installing the intrusion switch, touch the static-protective package that contains the new intrusion switch to any unpainted surface on the outside of the server. Then, take the new intrusion switch out of the package and place them on a static-protective surface.

The intrusion switch can only be installed in riser 1 assembly (LP/FHFL). The riser bracket in which the intrusion switch is installed might be different from the illustration below, but the installation method is the same. For different types of supported riser bracket, see [Figure 104 “Riser 1 assembly \(LP/FHFL\) installation” on page 125](#).

To install an intrusion switch, complete the following steps:

Watch the procedure. A video of the installation and removal process is available:

- YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-DTDY1ImpIppJVOzo7dKq14>

Step 1. Insert the intrusion switch into the riser bracket and push it in the direction as shown until it is fully seated.

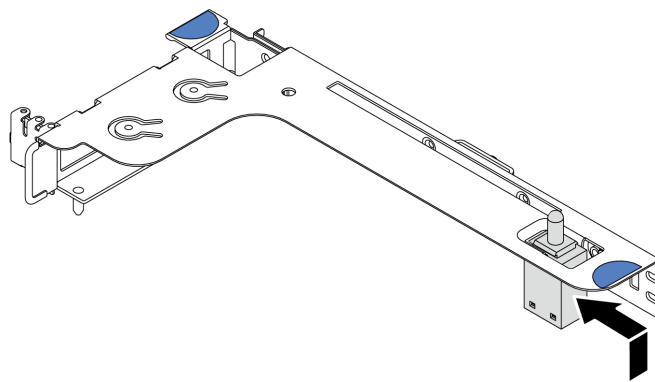



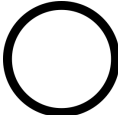

Figure 109. Intrusion switch installation

Step 2. Install the riser assembly into the chassis. See [Step 4 on page 126](#).

Step 3. Connect the cable of the intrusion switch to the intrusion switch connector on the system board. For the cable routing of the intrusion switch, refer to [“Intrusion switch cable routing” on page 72](#).

Install a GPU adapter

Use this information to install a GPU adapter.

 <p>“Read the installation Guidelines” on page 80</p>	 <p>“Power off the server for this task” on page 133</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 82</p>
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Notes:

- Only certain types of GPU adapters are supported, refer to [“Specifications” on page 4](#) for detailed information.
- GPU adapters are supported on some server model with requirements, refer to [“Technical rules for GPU adapters” on page 88](#).

To install a GPU adapter, complete the following steps:

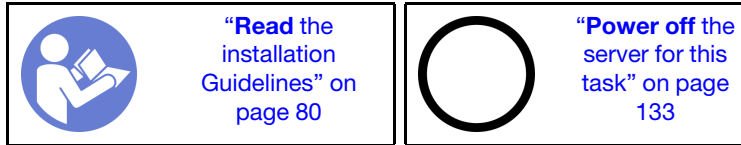
Step 1. Locate the appropriate PCIe slot for the GPU adapter.

Step 2. Align the GPU adapter with the PCIe slot on the riser card. Then, carefully press the GPU adapter straight into the slot until it is securely seated. See “Install a PCIe adapter and riser assembly” on page 123.

Step 3. Reinstall the riser bracket. See “Install a PCIe adapter and riser assembly” on page 123.

Install the air baffle

Use this information to install the air baffle.



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.

S017



CAUTION:

Hazardous moving fan blades nearby.

To install the air baffle, complete the following steps:

Watch the procedure. A video of the installation and removal process is available:

- YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-DTDY1ImpIPpJVOzo7dKq14>

Note: The air baffle you want to install might be different from the following illustrations, but the installation method is the same.

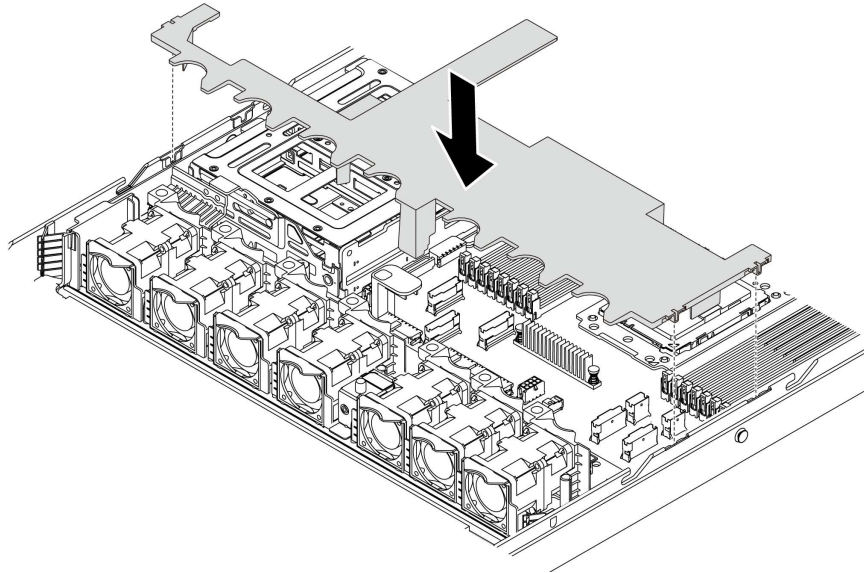



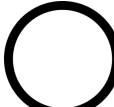

Figure 110. Air baffle installation

- Step 1. Align the tabs on both sides of the air baffle with the corresponding slots on both sides of the chassis.
- Step 2. Lower the air baffle into the chassis and press the air baffle down until it is securely seated.

After installing the air baffle, if there is a RAID super capacitor module installed on the bottom of the air baffle, connect it to the RAID adapter with the extension cable that comes with the RAID super capacitor module.

Install the top cover

Use this information to install the top cover.

 <p>“Read the installation Guidelines” on page 80</p>	 <p>“Power off the server for this task” on page 133</p>	 <p>“ATTENTION: Static Sensitive Device Ground package before opening” on page 82</p>
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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.

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.

Before installing the top cover:

1. Ensure that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server.
2. Ensure that all internal cables are correctly routed. See “Internal cable routing” on page 25.

To install the top cover, complete the following steps:

Watch the procedure. A video of the installation and removal process is available:

- YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-DTDY1ImpIPpJVOzo7dKq14>

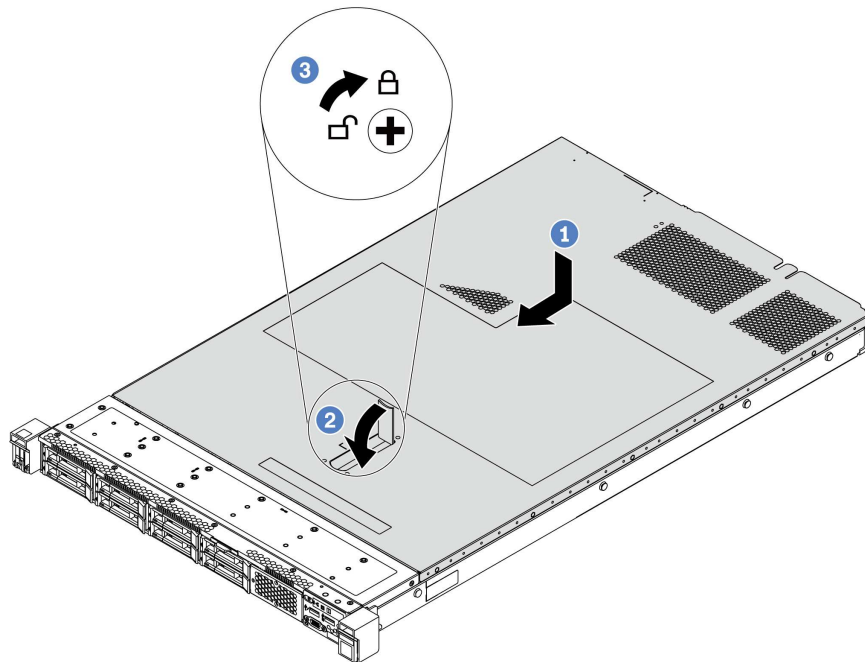


Figure 111. Top cover installation

Step 1. Ensure that the cover latch is in the open position. Lower the top cover onto the chassis until both sides of the top cover engage with the guides on both sides of the chassis. Then, slide the top cover to the front of the chassis.

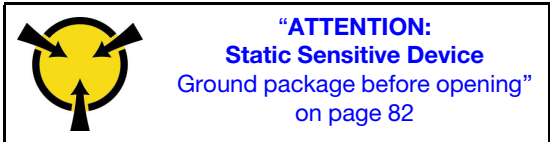
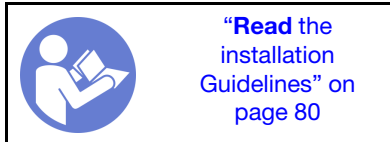
Note: Before you slide the top cover forward, ensure that all the tabs on the top cover engage the chassis correctly.

Step 2. Pivot the cover latch until the top cover snaps into position. Ensure that the cover latch is completely closed.

Step 3. Use a screwdriver to turn the cover lock to the locked position.

Install a hot-swap drive

Use this information to install a hot-swap drive.



Before installing a hot-swap drive:

1. Remove the drive filler from the drive bay. Keep the drive filler in a safe place.

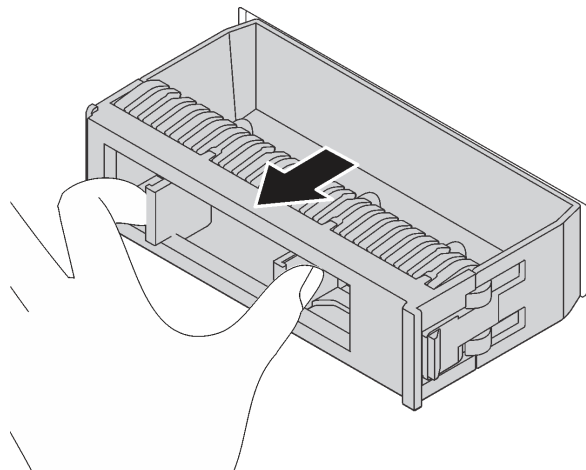


Figure 112. Drive filler removal

2. Touch the static-protective package that contains the new drive to any unpainted surface on the outside of the server. Then, take the new drive out of the package and place it on a static-protective surface.
3. See “Technical rules for drives” on page 90 before you install the hot-swap drive.

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

Watch the procedure. A video of the installation and removal process is available:

- YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-DTDY1ImplPpJVOzo7dKq14>

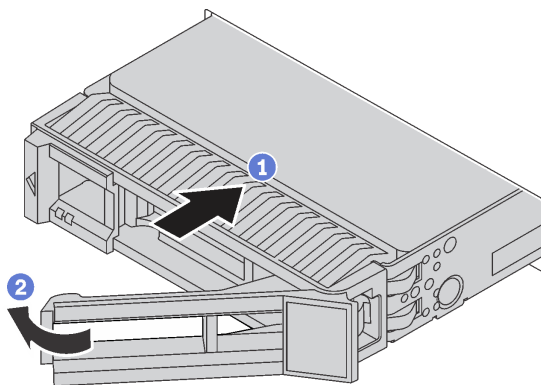


Figure 113. Hot-swap drive installation

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

- Step 2. Close the drive tray handle to lock the drive in place.
- Step 3. Continue to install additional hot-swap drives if necessary.

Install the server in a rack

To install the server in a rack, follow the instructions that are provided in the Rail Installation Kit for the rails on which the server will be installed.

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 BMC.

For information about powering off the server, see [“Power off the server” on page 133](#).

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 BMC to respond to remote power-on requests. To remove all power from the server (power status LED off), you must disconnect all power cables.

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

Note: The ThinkSystem System Manager 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 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 BMC. For information about powering on the server, see https://thinksystem.lenovofiles.com/help/topic/7Y00/bmc_user_guide.pdf.

Chapter 4. System configuration

Complete these procedures to configure your system.

Set the network connection for the BMC

You can use the ThinkSystem System Manager (TSM), a Web-based interface, to access the baseboard management controller (BMC) over your network. Before you access the BMC, you need to specify how the BMC will connect to the network.

Obtaining the IP address for the BMC

By default, the BMC will automatically search the DHCP server on the network to obtain an assigned IP address.

To view the IP address, perform the following steps:

1. Connect an Ethernet cable from the network to the BMC management Ethernet connector. If the management connector is unavailable, connect the server to the network through one of the Ethernet connectors on the OCP NIC adapter. For the location of the two types of connectors, see [“Rear view” on page 18](#).
2. Attach a monitor to the server.
3. Power on the server. The BMC IP address is displayed on the welcome page.

Alternatively, you can also set a static IP address by using Setup Utility:

1. Start the server. When you see **<F1> System Setup**, press F1 to open Setup Utility.
2. Go to **Server Mgmt → BMC network configuration**. Specify a static IP address for the BMC.

Logging into ThinkSystem System Manager

After acquiring BMC IP address, you can log in to the ThinkSystem System Manager over your network to manage the BMC.

To log in to the ThinkSystem System Manager:

1. Enter the BMC IP address in the Web browser. The login page is displayed.

Note: ThinkSystem System Manager is accessible through standard Web browsers with HTTPS. For secure connection, ThinkSystem System Manager only supports HTTPS access. For example, enter *https://BMC IP address* in the Web browser.

2. On the login page, select the language, and enter the user name and password. The default user name and password for ThinkSystem System Manager are:
 - User name: USERID
 - Password: PASSW0RD (with a zero, not the letter O)

Note: The default password must be changed during your initial login.

For detailed information on ThinkSystem System Manager, see https://thinksystem.lenovofiles.com/help/topic/7Y00/bmc_user_guide.pdf.

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.

Note: 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 BMC and UEFI, update the firmware for BMC first.

Best practice related to updating firmware is available at the following location:

<http://lenovopress.com/LP0656>

Important 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 BMC 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 not 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 BMC.
- **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.

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

Note: The server UEFI settings for option ROM must be set to **UEFI** to update the firmware using Lenovo XClarity Essentials. For more information, see the following Tech Tip:

<https://datacentersupport.lenovo.com/us/en/solutions/ht506118>

Tool	In-band update	Out-of-band update	On-target update	Off-target update	Graphical user interface	Command-line interface	Supports UXSPs
Lenovo XClarity Provisioning Manager Limited to core system firmware only.	√			√	√		
ThinkSystem System Manager Supports core system firmware and most advanced I/O option firmware updates		√		√	√	√	

Tool	In-band update	Out-of-band update	On-target update	Off-target update	Graphical user interface	Command-line interface	Supports UXSPs
Lenovo XClarity Essentials Bootable Media Creator Supports core system firmware and I/O firmware updates. You can update the Microsoft Windows operating system, but device drivers are not included on the bootable image	√				√	√	√
Lenovo XClarity Administrator Supports core system firmware and I/O firmware updates	√ ¹	√ ²		√	√		

Notes:

1. For I/O firmware updates.
2. For BMC and UEFI firmware updates.

The latest firmware can be found at the following site:

<http://datacentersupport.lenovo.com/products/servers/thinksystem/sr635/7y98/downloads>

- **Lenovo XClarity Provisioning Manager**

From Lenovo XClarity Provisioning Manager, you can update the BMC 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 F11. 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://sysmgmt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html

- **ThinkSystem System Manager**

From ThinkSystem System Manager, you can update the system firmware, the backplane firmware, and the power supply firmware.

If you need to install a specific update, you can use ThinkSystem System Manager for a specific server.

Specific details about updating firmware using ThinkSystem System Manager are available at:

https://thinksystem.lenovofiles.com/help/topic/7Y00/bmc_user_guide.pdf

- **Lenovo XClarity Essentials Bootable Media Creator**

You can use Lenovo XClarity Essentials Bootable Media Creator to create bootable media that is suitable for applying firmware updates.

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:

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

Configure the firmware

You can configure the management processor for the server through the BMC Web interface (ThinkSystem System Manager) or through the command-line interface.

For information about configuring the server using ThinkSystem System Manager, see:

https://thinksystem.lenovofiles.com/help/topic/7Y00/bmc_user_guide.pdf

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 Web site:

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

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

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

For specific information about the required installation order of memory modules in your server based on the system configuration and memory mode that you are implementing, see “[Memory module installation rules](#)” on page 83.

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 Web site:

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

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

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

Deploy the operating system

Two methods are available for deploying an operating system on the server.

Available operating systems

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

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

Tool-based deployment

Lenovo XClarity Provisioning Manager

https://sysmgt.lenovofiles.com/help/topic/ixpml_v2/os_installation.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 BMC interface. For details about backing up the management processor configuration, see https://thinksystem.lenovofiles.com/help/topic/7Y00/bmc_user_guide.pdf.

- **Operating system**

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

Chapter 5. 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 141](#)
- [“The server immediately displays the POST Event Viewer when it is turned on” on page 141](#)
- [“Embedded hypervisor is not in the boot list” on page 141](#)
- [“Server cannot recognize a hard disk drive” on page 142](#)
- [“Displayed system memory is less than installed physical memory” on page 143](#)
- [“A Lenovo optional device that was just installed does not work” on page 143](#)
- [“Voltage system board fault is displayed in the event logs” on page 144](#)

Server does not power on

Complete the following steps until the problem is solved.

1. Make sure that the ac power is applied correctly to the server. Make sure that the ac power cords are correctly connected to the server and to a working electrical outlet.
2. Check the event log for any events related to the server not powering on.
3. Check for any LEDs that are flashing amber.
4. Check the power LED on the system board.
5. Reseat the power supply.
6. 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. Check BMC event logs and resolve the errors in the event logs.
2. Make sure that the UEFI firmware and BMC firmware are the latest version.
3. Revert the system to the minimum configuration.
4. Correct any errors that are indicated by the light path diagnostics LEDs.
5. 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>.

6. (Trained technician only) Make sure that the processor is seated correctly.
7. Replace the following components one at a time, in the order shown, and restart 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 ThinkSystem System Manager documentation:

https://thinksystem.lenovofiles.com/help/topic/7Y00/bmc_user_guide.pdf

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 disk 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 F11, the Lenovo XClarity Provisioning Manager interface is displayed by default. You can perform hard disk 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 F11, the Lenovo XClarity Provisioning Manager interface is displayed by default. You can perform hard disk 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 is less than installed physical memory

Complete the following steps until the problem is solved.

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. Check memory module event logs and run memory module diagnostics:
 - a. Identify the failing memory module, and install the failing memory module in a different slot.
 - b. Restart the server and check the memory module event logs. If the problem is related to the memory module slot, replace the failing the memory module.
3. Reseat the DIMMs, and then restart the server.
4. Run memory diagnostics. When you start a server and press F11, 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**.
5. 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.
6. Reseat the DIMM.
7. 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 system board fault is displayed in the event logs

Complete the following steps until the problem is solved.

1. Check BMC event logs and resolve the errors described in the event logs according to *ThinkSystem System Manager User Guide*. See https://thinksystem.lenovofiles.com/help/topic/7Y00/bmc_user_guide.pdf.
2. Update UEFI firmware and BMC firmware to the latest version.
3. Revert the system to the minimum configuration. See “Specifications” on page 4 for the minimally required number of processors and DIMMs.
4. 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.

Appendix A. Getting help and technical assistance

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

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

<http://datacentersupport.lenovo.com>

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

Before you call

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

Attempt to resolve the problem yourself

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

You can find the product documentation for your ThinkSystem products at 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_eg to see if someone else has encountered a similar problem.

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.

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.

- **BMC**

You can use the BMC Web user 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 https://thinksystem.lenovofiles.com/help/topic/7Y00/bmc_user_guide.pdf.

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/supportphonenumber> for your region support details.

Appendix B. Notices

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Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

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Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1 024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard-disk-drive bays with the largest currently supported drives that are available from Lenovo.

Maximum memory might require replacement of the standard memory with an optional memory module.

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as total bytes written (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. Lenovo is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.

Lenovo makes no representations or warranties with respect to non-Lenovo products. Support (if any) for the non-Lenovo products is provided by the third party, not Lenovo.

Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

Telecommunication regulatory statement

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks. Further certification may be required by law prior to making any such connection. Contact a Lenovo representative or reseller for any questions.

Electronic emission notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

Additional electronic emissions notices are available at:

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

Taiwan BSMI RoHS declaration

單元 Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	鉛Lead (Pb)	汞Mercury (Hg)	鎘Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr ⁺⁶)	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
機架	○	○	○	○	○	○
外部蓋板	○	○	○	○	○	○
機械組零件	-	○	○	○	○	○
空氣傳動設備	-	○	○	○	○	○
冷卻組零件	-	○	○	○	○	○
內存模組	-	○	○	○	○	○
處理器模組	-	○	○	○	○	○
電纜組零件	-	○	○	○	○	○
電源供應器	-	○	○	○	○	○
儲備設備	-	○	○	○	○	○
電路卡	-	○	○	○	○	○
光碟機	-	○	○	○	○	○

備考1. “超出0.1 wt%”及“超出0.01 wt%”係指限用物質之百分比含量超出百分比含量基準值。
 Note1: “exceeding 0.1wt%” and “exceeding 0.01 wt%” indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.

備考2. “○”係指該項限用物質之百分比含量未超出百分比含量基準值。
 Note2: “○”indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.

備考3. “-”係指該項限用物質為排除項目。
 Note3: The “-“ indicates that the restricted substance corresponds to the exemption.

Taiwan import and export contact information

Contacts are available for Taiwan import and export information.

委製商/進口商名稱: 台灣聯想環球科技股份有限公司
 進口商地址: 台北市南港區三重路 66 號 8 樓
 進口商電話: 0800-000-702

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