



ThinkSystem SR850 V2 Maintenance Manual



Machine Types: 7D31 and 7D32

Note

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

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

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

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

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Contents

Contents	i
---------------------------	----------

Safetyiii
-------------------------	-------------

Safety inspection checklist	iv
---------------------------------------	----

Chapter 1. Introduction	1
--	----------

Specifications	2
--------------------------	---

Particulate contamination	7
-------------------------------------	---

Firmware updates	8
----------------------------	---

Tech Tips	12
---------------------	----

Security advisories	12
-------------------------------	----

Power on the server	12
-------------------------------	----

Power off the server	13
--------------------------------	----

Chapter 2. Server components	15
---	-----------

Front view	17
----------------------	----

External LCD diagnostics handset	19
--	----

Rear view	25
---------------------	----

Identifying connectors	29
----------------------------------	----

System board connectors	30
-----------------------------------	----

Processor and memory expansion tray connectors	32
--	----

Power backplane connectors	33
--------------------------------------	----

2.5-inch 8-bay drive backplane connectors	33
---	----

PCIe riser card connectors	35
--------------------------------------	----

Switches, jumpers, and buttons	38
--	----

System board LEDs	39
-----------------------------	----

Processor and memory expansion tray LEDs	40
--	----

Parts list	41
----------------------	----

Power cords	45
-----------------------	----

Chapter 3. Internal cable routing	47
--	-----------

Cable routing for 2.5-inch drives	47
---	----

Connecting cables to the processor and memory expansion tray	50
--	----

Connecting cables to the NVMe switch cards	52
--	----

SAS/SATA backplane combinations	53
---	----

NVMe backplane combinations	66
---------------------------------------	----

One-AnyBay-backplane combinations	72
---	----

Two-AnyBay-backplane combinations	90
---	----

Three-AnyBay-backplane combinations	102
---	-----

Chapter 4. Hardware replacement procedures109
---	-------------

Installation Guidelines	109
-----------------------------------	-----

Safety inspection checklist	110
---------------------------------------	-----

System reliability guidelines	111
---	-----

Working inside the server with the power on	111
---	-----

Handling static-sensitive devices	112
---	-----

Replace components in the server	112
--	-----

2.5-inch hot-swap drive and backplane replacement	112
---	-----

7mm drive and drive cage replacement	117
--	-----

CMOS battery (CR2032) replacement	123
---	-----

External LCD diagnostics handset replacement	127
--	-----

Fan and fan cage replacement	131
--	-----

Flash power module replacement	138
--	-----

Heat sink Torx T30 nut replacement	143
--	-----

Intrusion switch replacement	148
--	-----

Memory module replacement	150
-------------------------------------	-----

OCP Ethernet adapter replacement	158
--	-----

PCIe riser assembly and adapter replacement	160
---	-----

Power backplane replacement	171
---------------------------------------	-----

Power supply unit replacement	175
---	-----

Processor and heat sink replacement	182
---	-----

Processor and memory expansion tray replacement	195
---	-----

Security bezel replacement	203
--------------------------------------	-----

System board air baffle replacement	205
---	-----

System board replacement (trained technician only)	207
--	-----

Top cover replacement	219
---------------------------------	-----

Complete the parts replacement	223
--	-----

Chapter 5. Problem determination227
---	-------------

Event logs	227
----------------------	-----

Light path diagnostics	229
----------------------------------	-----

Power supply LEDs	231
-----------------------------	-----

System board LEDs	234
-----------------------------	-----

General problem determination procedures	236
--	-----

Resolving suspected power problems	237
--	-----

Resolving suspected Ethernet controller problems	237
--	-----

Troubleshooting by symptom	238
--------------------------------------	-----

Hard disk drive problems	238
------------------------------------	-----

Fan problems	240
------------------------	-----

Intermittent problems	241
---------------------------------	-----

Keyboard, mouse, KVM switch or USB-device problems	242
--	-----

Memory problems	243
---------------------------	-----

Monitor and video problems	247
Network problems	249
Observable problems	249
Optional-device problems	252
Power on and power off problems	254
Processor problems	255
Serial-device problems	256
Software problems	256

Appendix A. Hardware disassembling for recycle259

Disassemble the server for chassis recycle	259
--	-----

Appendix B. Getting help and technical assistance261

Before you call	261
Collecting service data	262
Contacting Support	263

Appendix C. Notices.265

Trademarks	266
Important notes	266
Telecommunication regulatory statement	266
Electronic emission notices	267
Taiwan Region BSMI RoHS declaration.	267
Taiwan Region import and export contact information	267

Index269

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

ཐོན་ཁུངས་འདི་བདེ་སྤྱོད་མ་བྱས་གོང་། རྒྱུ་རྒྱུ་ཡིད་གཟབ་
བྱ་འདྲ་མིན་ཡོད་པའི་འོད་ཟེར་བལྟ་དགོས།

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

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

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.

Chapter 1. Introduction

The ThinkSystem SR850 V2 is a 2U rack server designed for high-volume network transaction processing. This high-performance, multi-core server is ideally suited for networking environments that require superior processor performance, input/output (I/O) flexibility, and high manageability.

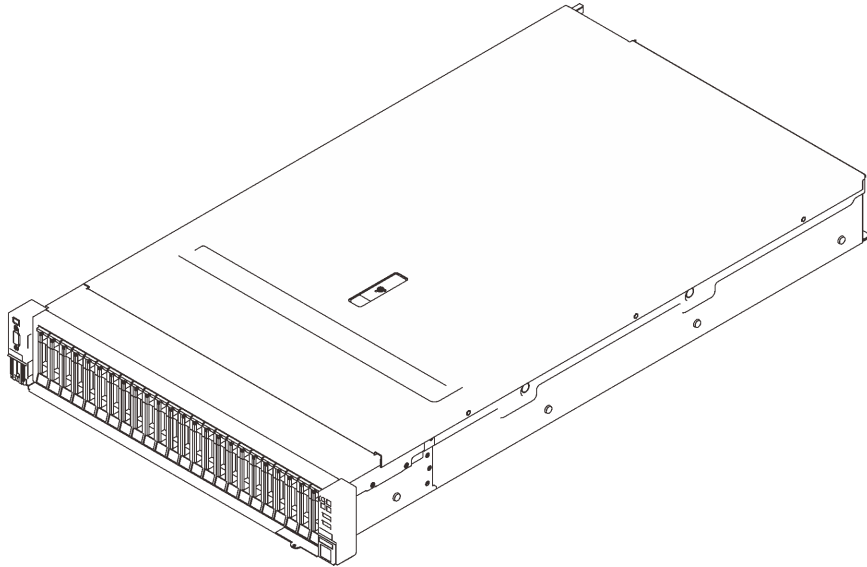


Figure 1. ThinkSystem SR850 V2

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>

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

Following illustration is the QR code: <https://support.lenovo.com/p/servers/sr850v2>

Figure 2. QR code



Specifications

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

Table 1. Specifications, Type 7D31 and 7D32

Specification	Description
Dimension	<p>2U server</p> <ul style="list-style-type: none"> • Height: 86.5 mm (3.4 inches) • Width: <ul style="list-style-type: none"> – With rack handles: 482 mm (19.0 inches) – Without rack handles: 434.4 mm (17.1 inches) • Depth: 880.2 mm (34.7 inches) <p>Note: The depth is measured with rack handles installed, but without the security bezel.</p>
Weight (depending on the configuration)	40 kg (88.2 lb) in maximum
Processor (depending on model)	<p>Supports multi-core Intel Xeon processors, with integrated memory controller and Intel Mesh UPI (Ultra Path Interconnect) topology.</p> <ul style="list-style-type: none"> • Two processor sockets (expandable up to four) with minimal requirement of two installed on the system board. • Designed for LGA 4189 sockets • Scalable up to 28 cores • Supports 6 UPI links at 10.4 GT/s
Memory	<p>See “Memory module installation rules and order” in <i>Setup Guide</i> for detailed information about memory configuration and setup.</p> <ul style="list-style-type: none"> • Capacity <ul style="list-style-type: none"> – Minimum: 16 GB – Maximum: <ul style="list-style-type: none"> – RDIMM: 3 TB – 3DS-RDIMM: 6 TB • Memory module types: <ul style="list-style-type: none"> – Double-data-rate 4 (TruDDR4) error correcting code (ECC) 3200 MT/s registered DIMM (RDIMM) or 3DS RDIMM – Persistent Memory (PMEM) • Capacity (depending on the model): <ul style="list-style-type: none"> – RDIMM: 16 GB, 32 GB, and 64 GB – 3DS-RDIMM: 128 GB, 256 GB – PMEM: 128 GB, 256 GB, and 512 GB <p>Note: PMEMs can be mixed with DRAM DIMMs. See “PMEM rules” in <i>Setup Guide</i> for more information.</p> <ul style="list-style-type: none"> • Slots: 24 two-way interleaved slots (expandable to 48) <p>For a list of supported memory modules, see https://serverproven.lenovo.com/.</p>
Storage expansion	<ul style="list-style-type: none"> • Twenty-four 2.5-inch drive bays support SAS/SATA/NVMe drives. • Two 7mm drive bays support SAS/SATA/NVMe drives. <p>Notes: When the following components are installed in the system, bay 16 to 23 are disabled, and the maximal supported drive quantity is 16.</p> <ul style="list-style-type: none"> – PMEMs – 256 GB 3DS DRIMMs

Table 1. Specifications, Type 7D31 and 7D32 (continued)

Expansion slots	<p>Up to eight slots:</p> <ul style="list-style-type: none"> • Slot 1 to 3 (PCIe riser card 1) <ul style="list-style-type: none"> – PCI Express 3.0 x16 (Slot 1, 2, 3) – PCI Express 3.0 x8 (Slot 1, 2) – PCI Express 3.0 x8 with 7mm drive cage (Slot 1, 2) • Slot 4 (OCP Ethernet adapter) • Slot 5 to 6 (PCIe riser card 2): PCI Express 3.0 x16 <p>Note: Enabling these two slots require four installed processors.</p> <ul style="list-style-type: none"> • Slot 7: PCI Express 3.0 x8 • Slot 8: PCI Express 3.0 x8
Integrated functions	<ul style="list-style-type: none"> • Lenovo XClarity Controller (XCC), which provides service processor control and monitoring functions, video controller, and remote keyboard, video, mouse, and remote drive capabilities. • One system-management RJ-45 connector on the rear to connect to a systems-management network. This connector is dedicated to the Lenovo XClarity Controller functions and runs at 1 GB speed. • Four universal serial bus (USB) ports: <ul style="list-style-type: none"> – Two on the front of the server: <ul style="list-style-type: none"> – One USB 2.0 with Lenovo XClarity Controller management – One USB 3.1 – Two USB 3.1 on the rear of the server • One serial port
RAID adapter (depending on model)	<p>The following options with support for RAID levels 0, 1, and 10 are available for this server with up to four flash power modules:</p> <ul style="list-style-type: none"> • ThinkSystem 430-8i SAS/SATA 12Gb HBA • ThinkSystem 430-16i SAS/SATA 12Gb HBA • ThinkSystem 430-8e SAS/SATA 12Gb HBA • ThinkSystem 430-16e SAS/SATA 12Gb HBA • ThinkSystem RAID 530-8i PCIe 12Gb Adapter • ThinkSystem RAID 530-16i PCIe 12Gb Adapter • ThinkSystem RAID 930-8i 2GB Flash PCIe 12Gb Adapter • ThinkSystem RAID 930-16i 4GB Flash PCIe 12Gb Adapter • ThinkSystem RAID 930-8e 4GB Flash PCIe 12Gb Adapter • ThinkSystem RAID 940-8i 4GB Flash PCIe Gen4 12Gb Adapter • ThinkSystem RAID 940-8i 8GB Flash PCIe Gen4 12Gb Adapter • ThinkSystem RAID 940-16i 8GB Flash PCIe 12Gb Adapter • ThinkSystem RAID 940-32i 8GB Flash PCIe 12Gb Adapter • x16 PCIe 1610-8P adapter • ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Adapter • ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Adapter • ThinkSystem RAID 5350-8i Flash PCIe 12Gb Adapter • ThinkSystem 4350-16i SAS/SATA 12Gb HBA • ThinkSystem 4350-8i SAS/SATA 12Gb HBA
Network	<p>OCP Ethernet adapter with 1G/10G base-T and 10G/25G/50G SPF+</p> <p>For a list of supported adapters, see https://serverproven.lenovo.com/server/sr850-v2.</p>
Fans	<ul style="list-style-type: none"> • Six (60 mm x 56 mm) internal system dual rotor fans (N+1 redundancy)

Table 1. Specifications, Type 7D31 and 7D32 (continued)

<p>Operating System</p>	<p>Supported and certified operating systems:</p> <ul style="list-style-type: none"> • Microsoft Windows Server • VMware ESXi • Red Hat Enterprise Linux • SUSE Linux Enterprise Server <p>References:</p> <ul style="list-style-type: none"> • Complete list of available operating systems: https://lenovopress.lenovo.com/osig. • OS deployment instructions: See “Deploy the operating system” in <i>Setup Guide</i>..
<p>Electrical input</p>	<p>This server supports up to two units of CFF V4 power supplies with N+1 redundancy. Following is the list of supported types:</p> <ul style="list-style-type: none"> • 750-watt Titanium, input power 230 Vac / 240 VDC • 1100-watt Platinum, input power 115 Vac / 230 Vac / 240 VDC • 1100-watt Titanium, input power 230 Vac / 240 VDC • 1800-watt Platinum, input power 230 Vac / 240 VDC • 1800-watt Titanium, input power 230 Vac / 240 VDC • 2400-watt Platinum, input power 230 Vac / 240 VDC • 2600-watt Titanium, input power 230 Vac / 240 VDC <p>CAUTION:</p> <ul style="list-style-type: none"> • 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>Minimal configuration for debugging</p>	<ul style="list-style-type: none"> • Two processors in processor socket 1 and 2 • Two DRAM DIMMs in slot 8 and 20 • One power supply • One drive with RAID adapter and backplane (If OS is needed for debugging) • Six system fans (fan 1 to fan 6)

Table 1. Specifications, Type 7D31 and 7D32 (continued)

<p>Acoustical noise emissions</p>	<p>The server has the following acoustic noise emissions declaration:</p> <ul style="list-style-type: none"> • Sound power level ($L_{WA,d}$) <ul style="list-style-type: none"> – Idling: <ul style="list-style-type: none"> – Typical: 6.2 Bel – GPU: 6.9 Bel – Storage rich: 6.6 Bel – Operating: <ul style="list-style-type: none"> – Typical: 7.4 Bel – GPU: 8.2 Bel – Storage rich: 7.5 Bel • Sound pressure level (L_{pAm}): <ul style="list-style-type: none"> – Idling: <ul style="list-style-type: none"> – Typical: 46 dBA – GPU: 53 dBA – Storage rich: 50 dBA – Operating: <ul style="list-style-type: none"> – Typical: 58 dBA – GPU: 67 dBA – Storage rich: 60 dBA <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. • The declared acoustic sound levels are based on the specified configurations, which may change slightly depending on configuration/conditions. <ul style="list-style-type: none"> – Typical configuration: four 205W processors, twenty-four 64 GB DIMMs, eight SAS hard disk drives, 930-8i, Intel X710-DA2 PCIe 10Gb 2-Port, Intel X550-T2 Dual Port 10GBase-T, two 1800-watt power supply units – GPU configuration: four 165W processors, twenty-four 64 GB DIMMs, sixteen SAS hard disk drives, 940-16i, Intel X710-DA2 PCIe 10Gb 2-Port, two Nvidia Tesla T4, two 1800-watt power supply units – Storage rich configuration: four 250W processors, forty-eight 64 GB DIMMs, twenty-four SAS hard disk drives, 940-16i, 940 8i, Intel X710-DA2 PCIe 10Gb 2-Port, Intel X550-T2 Dual Port 10GBase-T, two 2400-watt power supply units • The declared acoustic noise levels may increase greatly, if high-power components are installed such as high-power NICs, high-power processors and GPUs. • 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.
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Table 1. Specifications, Type 7D31 and 7D32 (continued)

<p>Ambient temperature management</p>	<p>Adjust ambient temperature when specific components are installed:</p> <ul style="list-style-type: none"> • Keep ambient temperature to 35°C or lower when one or more of the following components are installed. <ul style="list-style-type: none"> – Processors with 165 to 205 watts – DRAM DIMMs with capacity larger than 64 GB • Keep ambient temperature to 35°C or lower when the following components are installed in the same unit. <ul style="list-style-type: none"> – Processors with 205 to 250 watts – 24 drives • Keep room temperature to 30°C or lower when one or more of the following components are installed. <ul style="list-style-type: none"> – Processors with 205 or more watts – Intel(R) Xeon(R) Platinum 8356H (190W , 8 core) – 256 GB 3DS RDIMM – Nvidia T4 – PMEMs <p>Important: To avoid throttling, follow the instructions below:</p> <ul style="list-style-type: none"> – It is advised that the ambient temperature is kept 27°C or lower when PMEMs are installed. – Make sure to adopt passive Direct Attach cables when ThinkSystem NVIDIA ConnectX-7 adapter is installed.
<p>Environment</p>	<p>ThinkSystem SR850 V2 complies with ASHRAE Class A2 specifications. Depending on the hardware configuration, some models comply with ASHRAE Class A3 and Class A4 specifications. System performance may be impacted when operating temperature is outside AHSARE A2 specification.</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – Operating <ul style="list-style-type: none"> – ASHARE Class A2: 10°C to 35°C (50°F to 95°F); the maximum ambient temperature decreases by 1°C for every 300 m (984 ft) increase in altitude above 900 m (2,953 ft). – ASHARE Class A3: 5°C to 40°C (41°F to 104°F); the maximum ambient temperature decreases by 1°C for every 175 m (574 ft) increase in altitude above 900 m (2,953 ft). – ASHARE Class A4: 5°C to 45°C (41°F to 113°F); the maximum ambient temperature decreases by 1°C for every 125 m (410 ft) increase in altitude above 900 m (2,953 ft). – Server off: 5°C to 45°C (41°F to 113°F) – Shipment/storage: -40°C to 60°C (-40°F to 140°F) • Maximum altitude: 3,050 m (10,000 ft) • Relative Humidity (non-condensing): <ul style="list-style-type: none"> – Operating <ul style="list-style-type: none"> – ASHRAE Class A2: 8% to 80%; maximum dew point: 21°C (70°F) – ASHRAE Class A3: 8% to 85%; maximum dew point: 24°C (75°F) – ASHRAE Class A4: 8% to 90%; maximum dew point: 24°C (75°F) – Shipment/storage: 8% to 90% • Particulate contamination <p>Attention: Airborne particulates and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server. For information about the limits for particulates and gases, see “Particulate contamination” on page 7.</p>

Table 1. Specifications, Type 7D31 and 7D32 (continued)

	Note: The server is designed for standard data center environment and recommended to be placed in industrial data center.
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Particulate contamination

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

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

Table 2. Limits for particulates and gases

Contaminant	Limits
Reactive gases	<p>Severity level G1 as per ANSI/ISA 71.04-1985¹:</p> <ul style="list-style-type: none"> The copper reactivity level shall be less than 200 Angstroms per month ($\text{\AA}/\text{month} \approx 0.0035 \mu\text{g}/\text{cm}^2\text{-hour}$ weight gain).² The silver reactivity level shall be less than 200 Angstroms per month ($\text{\AA}/\text{month} \approx 0.0035 \mu\text{g}/\text{cm}^2\text{-hour}$ 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

¹ ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.

² The derivation of the equivalence between the rate of copper corrosion growth in the thickness of the corrosion product in $\text{\AA}/\text{month}$ and the rate of weight gain assumes that Cu_2S and Cu_2O grow in equal proportions.

³ The derivation of the equivalence between the rate of silver corrosion growth in the thickness of the corrosion product in $\text{\AA}/\text{month}$ and the rate of weight gain assumes that Ag_2S is the only corrosion product.

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.

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.

Firmware updates

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

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

- Best practices related to updating firmware is available at the following site:
 - <http://lenovopress.com/LP0656>
- The latest firmware can be found at the following site:
 - <http://datacentersupport.lenovo.com/products/servers/thinksystem/sr850v2/downloads>
- You can subscribe to product notification to stay up to date on firmware updates:
 - <https://datacentersupport.lenovo.com/tw/en/solutions/ht509500>

UpdateXpress System Packs (UXSPs)

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

Update method terminology

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

Firmware updating tools

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

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

Tool	Update Methods Supported	Core System Firmware Updates	I/O Devices Firmware Updates	Graphical user interface	Command line interface	Supports UXSPs
Lenovo XClarity Essentials Bootable Media Creator (BoMC)	In-band Out-of-band Off-Target	√	All I/O devices	√ (BoMC application)	√ (BoMC application)	√
Lenovo XClarity Administrator (LXCA)	In-band ¹ Out-of-band ² Off-Target	√	All I/O devices	√		√
Lenovo XClarity Integrator (LXCI) for VMware vCenter	Out-of-band Off-Target	√	Selected I/O devices	√		
Lenovo XClarity Integrator (LXCI) for Microsoft Windows Admin Center	In-band Out-of-band On-Target Off-Target	√	All I/O devices	√		√
Lenovo XClarity Integrator (LXCI) for Microsoft System Center Configuration Manager	In-band On-Target	√	All I/O devices	√		√
Notes:						
1. For I/O firmware updates.						
2. For BMC and UEFI firmware updates.						

- **Lenovo XClarity Provisioning Manager**

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

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

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

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

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

- **Lenovo XClarity Controller**

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

Notes:

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

For additional information about configuring Ethernet over USB, see:

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

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

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

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

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

- **Lenovo XClarity Essentials OneCLI**

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

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

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

- **Lenovo XClarity Essentials UpdateXpress**

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

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

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

- **Lenovo XClarity Essentials Bootable Media Creator**

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

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

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

- **Lenovo XClarity Administrator**

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

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

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

- **Lenovo XClarity Integrator offerings**

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

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

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

Tech Tips

Lenovo continually updates the support website with the latest tips and techniques that you can use to solve issues that your server might encounter. These Tech Tips (also called retain tips or service bulletins) provide procedures to work around issues or solve problems related to the operation of your server.

To find the Tech Tips available for your server:

1. Go to <http://datacentersupport.lenovo.com> and navigate to the support page for your server.
2. Click **Knowledge Base & Guides** from the navigation pane.
3. Click **Documentation Type** → **Solution** from the drop-down menu.

Follow the on-screen instructions to choose the category for the problem that you are having.

Security advisories

Lenovo is committed to developing products and services that adhere to the highest security standards in order to protect our customers and their data. When potential vulnerabilities are reported, it is the responsibility of the Lenovo Product Security Incident Response Team (PSIRT) to investigate and provide information to our customers so they may put mitigation plans in place as we work toward providing solutions.

The list of current advisories is available at the following site:

https://datacentersupport.lenovo.com/product_security/home

Power on the server

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

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

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

For information about powering off the server, see [“Power off the server” on page 13](#).

Power off the server

The server remains in a standby state when it is connected to a power source, allowing the Lenovo XClarity Controller to respond to remote power-on requests. To remove all power from the server (power 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 Lenovo XClarity Controller can place the server in a standby state as an automatic response to a critical system failure.

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

When in a standby state, the server can respond to remote power-on requests sent to the Lenovo XClarity Controller. For information about powering on the server, see [“Power on the server” on page 12](#).

Chapter 2. Server components

This section contains information about each of the components associated with the server.

Identifying your server

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

Figure 3 “Location of the machine type, model, and serial number” on page 15 shows the location of the label containing the machine type, model, and serial number.

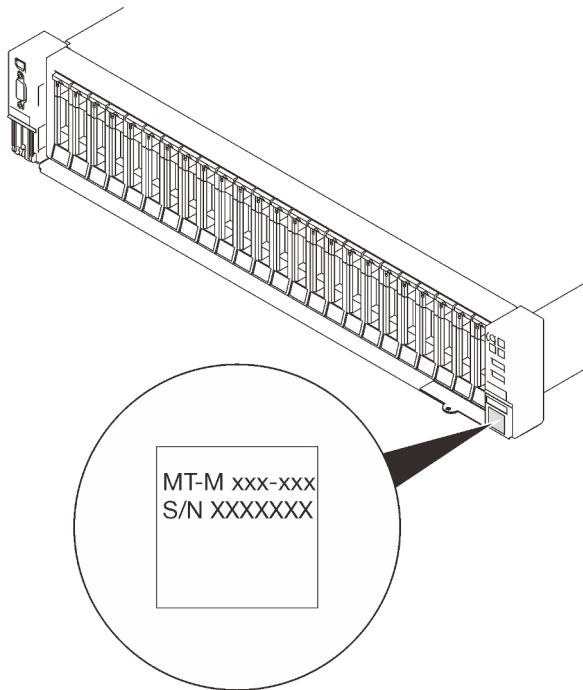


Figure 3. Location of the machine type, model, and serial number

The model number and serial number are on the ID label on the front of the server, as shown in the following illustrations. You can also add other system information labels to the front of the server in the customer label spaces.

XClarity Controller network access label

In addition, the XClarity Controller network access label is attached to the pull-out information tab located near the lower right corner of the front view, with MAC address accessible with a pull.

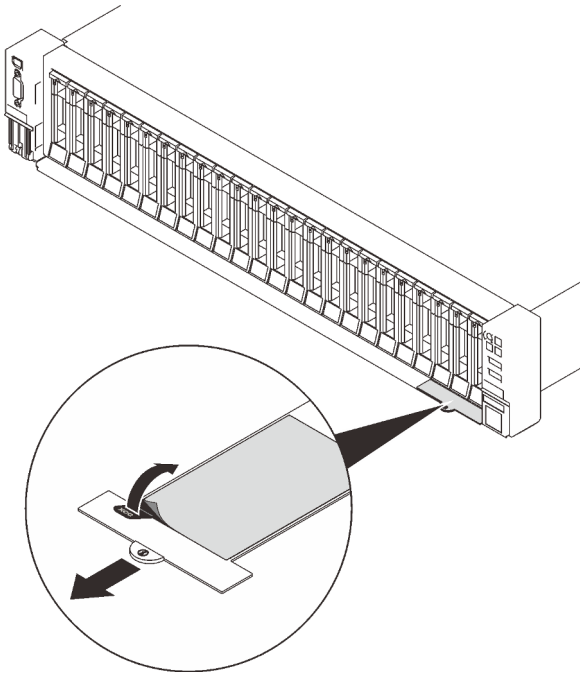


Figure 4. XClarity Controller network access label on the pull-out information tab

Front view

This section contains information about the controls, LEDs, and connectors on the front of the server.

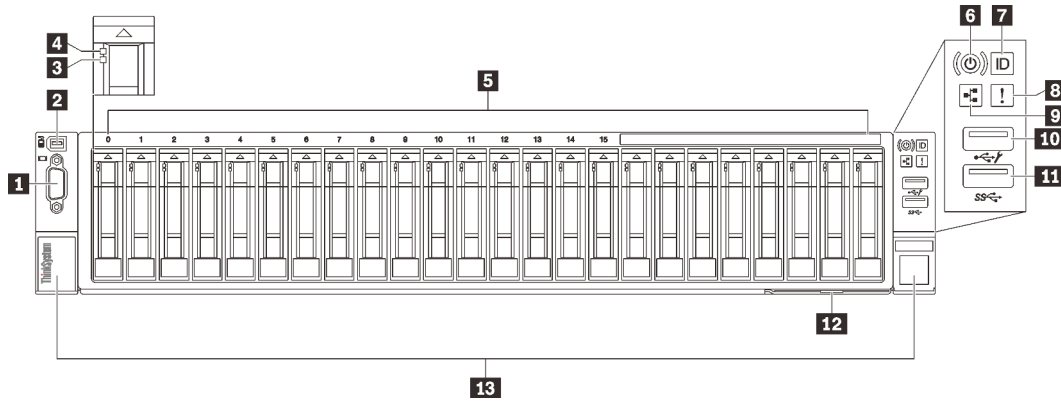


Figure 5. Front view

Table 3. Components on the front view

1	“VGA connector (optional)” on page 17	8	“System error LED (yellow)” on page 18
2	“External LCD diagnostics handset connector” on page 17	9	“Network activity LED (green)” on page 18
3	“Drive status LED (yellow)” on page 17	10	“USB 1” on page 18 (USB 2.0 with Lenovo XClarity Controller management)
4	“Drive activity LED (green)” on page 18	11	“USB 2” on page 18 (USB 3.1)
5	“2.5-inch drive bays” on page 18	12	“Pull-out information tab” on page 18
6	“Power button/LED (green)” on page 18	13	“Rack release latches” on page 19
7	“Identification button/LED (blue)” on page 18		

1 VGA connector (optional)

Connect a monitor to this connector.

Notes:

- When the optional front VGA connector is in use, the rear one will be disabled.
- The maximum video resolution is 1920 x 1200 at 60 Hz.

2 External LCD diagnostics handset connector

Connect the external LCD diagnostics handset here. See “External LCD diagnostics handset” on page 19 for more details.

3 Drive status LED (yellow)

These LEDs indicate the following status:

- The LED is lit: the drive has failed.
- The LED is flashing slowly (once per second): the drive is being rebuilt.
- The LED is flashing rapidly (three times per second): the drive is being identified.

4 Drive activity LED (green)

Each hot-swap drive comes with an activity LED. When this LED is flashing, it indicates that the drive is in use.

5 2.5-inch drive bays

Install 2.5-inch drives to these bays. See [“Install a 2.5-inch hot-swap drive” on page 115](#) for more details.

6 Power button/LED (green)

7 Identification button/LED (blue)

Use this blue LED to visually locate the server among other servers. This LED is also used as a presence detection button. You can use Lenovo XClarity Administrator to light this LED remotely.

8 System error LED (yellow)

When this yellow LED is lit, it indicates that a system error has occurred. This LED can be controlled by the XCC. Information provided from the LCD display of the External LCD diagnostics handset could also help isolate an error.

9 Network activity LED (green)

When this LED is lit, it indicates that the server is transmitting to or receiving signals from the Ethernet LAN.

10 11 USB connectors

Connect a USB device, such as a mouse, keyboard, or other devices, to either of these connectors. Following are detailed descriptions of each connector:

- USB 1: USB 2.0 with Lenovo XClarity Controller management.

Connection to XClarity Controller is primarily intended for users with a mobile device running the XClarity Controller mobile application. When a mobile device is connected to this USB port, an Ethernet over USB connection is established between the mobile application running on the device and the XClarity Controller.

Select **Network** in **BMC Configuration** to view or modify settings.

Four types of settings are available:

- **Host only mode**

In this mode, the USB port is always solely connected to the server.

- **BMC only mode**

In this mode, the USB port is always solely connected to XClarity Controller.

- **Shared mode: owned by BMC**

In this mode, connection to the USB port is shared by the server and XClarity Controller, while the port is switched to XClarity Controller.

- **Shared mode: owned by host**

In this mode, connection to the USB port is shared by the server and XClarity Controller, while the port is switched to the server.

- USB 2: USB 3.1.

12 Pull-out information tab

This tab contains network information such as MAC address and XCC network access label.

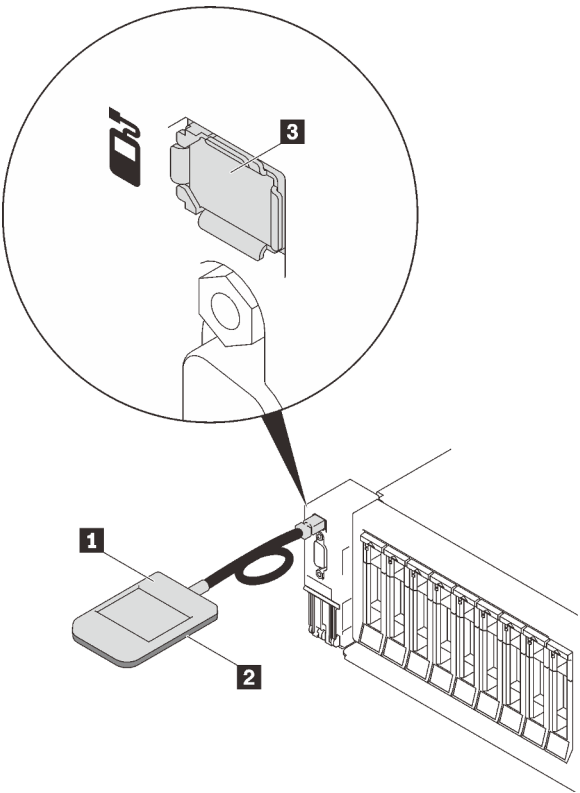
13 Rack release latches

Press on the latch on both sides to disengage the server from the rack and slide it out.

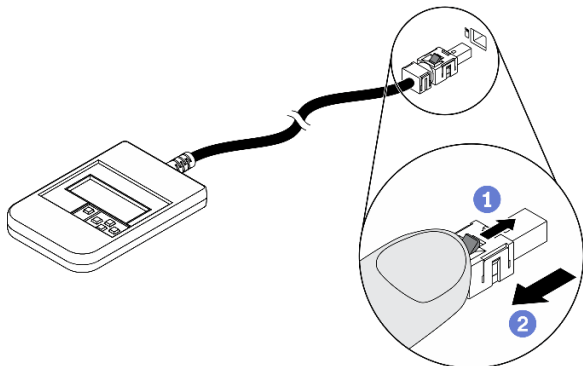
External LCD diagnostics handset

The external LCD diagnostics handset is an external device that is connected to the server with a cable, and it allows quick access to system information such as errors, system status, firmware, network, and health information.

Location of the external LCD diagnostics handset

Location	Callouts
<p>The external LCD diagnostics handset is connected to the server with an external cable.</p> 	<p>1 External LCD diagnostics handset</p> <p>2 Magnetic bottom With this component, the diagnostic handset can be attached to the top or side of the rack with hands spared for service tasks.</p> <p>3 External diagnostics connector This connector is located on the front of the server, and is used to connect an external LCD diagnostics handset.</p>

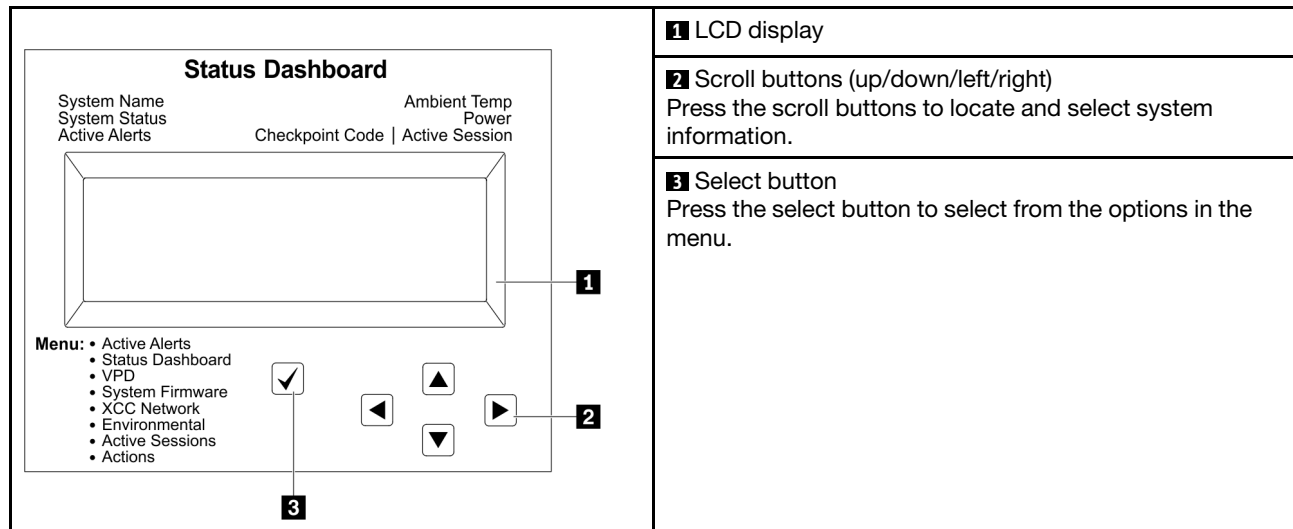
Note: When unplugging the external handset, see the following instructions:



- 1 Press the plastic clip on the plug forward.
- 2 Hold the clip and remove the cable from the connector.

Display panel overview

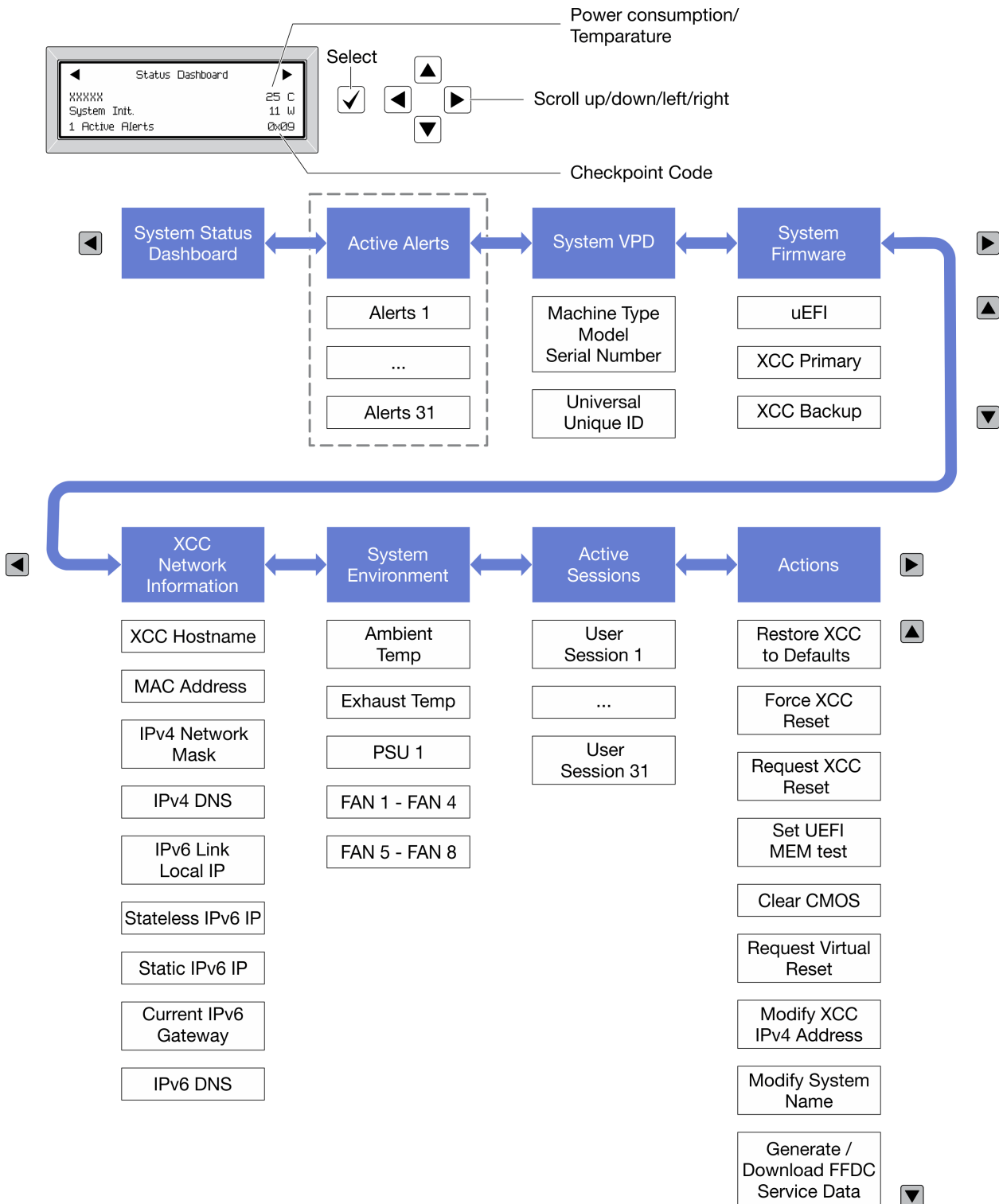
The diagnostics device consists of an LCD display and 5 navigation buttons.



Option flow diagram

The LCD panel displays various system information. Navigate through the options with the scroll keys.

Depending on the model, the options and entries on the LCD display might be different.



Full menu list

Following is the list of available options. Switch between an option and the subordinate information entries with the select button, and switch among options or information entries with the scroll buttons.

Depending on the model, the options and entries on the LCD display might be different.

Home Menu (System Status Dashboard)

Home Menu	Example
<ul style="list-style-type: none"> 1 System name 2 System status 3 Active alert quantity 4 Temperature 5 Power consumption 6 Checkpoint code 	<p>The screenshot shows a 'Status Dashboard' screen with the following elements: <ul style="list-style-type: none"> 1: Left arrow navigation button 2: System name (displayed as 'xxxxxx') 3: System status ('System Init.') 4: Active alert quantity ('1 Active Alerts') 5: Temperature ('25 C') 6: Power consumption ('11 W') 7: Checkpoint code ('0x09') </p>

Active Alerts

Sub Menu	Example
Home screen: Active error quantity Note: The “Active Alerts” menu displays only the quantity of active errors. If no errors occur, the “Active Alerts” menu will not be available during navigation.	1 Active Alerts
Details screen: <ul style="list-style-type: none"> • Error message ID (Type: Error/Warning/Information) • Occurrence time • Possible sources of the error 	Active Alerts: 1 Press ▼ to view alert details FQXSPPU009N(Error) 04/07/2020 02:37:39 PM CPU 1 Status: Configuration Error

System VPD Information

Sub Menu	Example
<ul style="list-style-type: none"> • Machine type and serial number • Universal Unique ID (UUID) 	Machine Type: xxxx Serial Num: xxxxxx Universal Unique ID: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

System Firmware

Sub Menu	Example
UEFI <ul style="list-style-type: none"> Firmware level (status) Build ID Version number Release date 	UEFI (Inactive) Build: D0E101P Version: 1.00 Date: 2019-12-26
XCC Primary <ul style="list-style-type: none"> Firmware level (status) Build ID Version number Release date 	XCC Primary (Active) Build: DVI399T Version: 4.07 Date: 2020-04-07
XCC Backup <ul style="list-style-type: none"> Firmware level (status) Build ID Version number Release date 	XCC Backup (Active) Build: D8BT05I Version: 1.00 Date: 2019-12-30

XCC Network Information

Sub Menu	Example
<ul style="list-style-type: none"> XCC hostname MAC address IPv4 Network Mask IPv4 DNS IPv6 Link Local IP Stateless IPv6 IP Static IPv6 IP Current IPv6 Gateway IPv6 DNS <p>Note: Only the MAC address that is currently in use is displayed (extension or shared).</p>	XCC Network Information XCC Hostname: XCC-xxxx-SN MAC Address: xx:xx:xx:xx:xx:xx IPv4 IP: xx.xx.xx.xx IPv4 Network Mask: x.x.x.x IPv4 Default Gateway: x.x.x.x

System Environmental Information

Sub Menu	Example
<ul style="list-style-type: none">• Ambient temperature• Exhaust temperature• PSU status• Spinning speed of fans by RPM	Ambient Temp: 24 C Exhaust Temp: 30 C PSU1: Vin= 213 w Inlet= 26 C FAN1 Front: 21000 RPM FAN2 Front: 21000 RPM FAN3 Front: 21000 RPM FAN4 Front: 21000 RPM

Active Sessions

Sub Menu	Example
Quantity of active sessions	Active User Sessions: 1

Actions

Sub Menu	Example
Several quick actions are available: <ul style="list-style-type: none">• Restore XCC to Defaults• Force XCC Reset• Request XCC Reset• Set UEFI Memory Test• Clear CMOS• Request Virtual Reseat• Modify XCC Static IPv4 Address/Net mask/Gateway• Modify System Name• Generate/Download FFDC Service Data	Request XCC Reset? This will request the BMC to reboot itself. Hold \checkmark for 3 seconds

Rear view

This section contains information about the LEDs and connectors on the rear of the server.

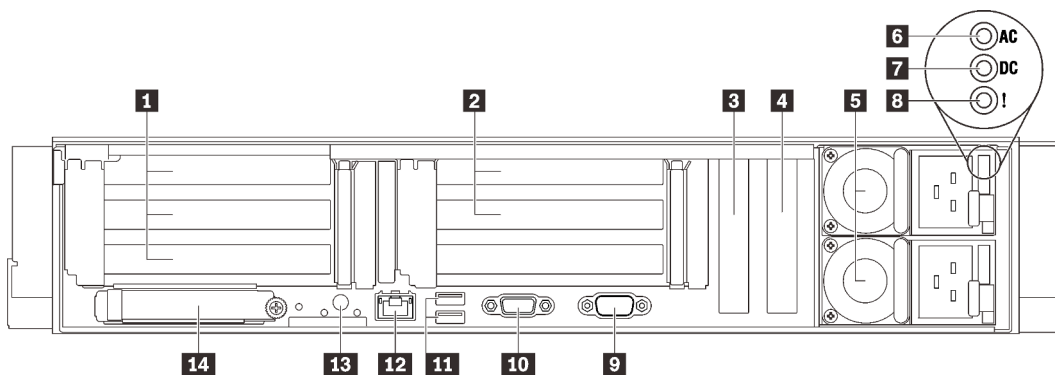


Figure 6. Rear view

Table 4. Components on the rear view

1	“PCIe slot 1-3 (Riser 1)” on page 26	8	“Power supply error LED (yellow)” on page 27
2	“PCIe slot 5-6 (Riser 2)” on page 26	9	“Serial connector” on page 27
3	“PCI Express 3.0 x8” on page 26 (PCIe slot 7)	10	“VGA connector” on page 27
4	“PCI Express 3.0 x8” on page 26 (PCIe slot 8)	11	“USB 3.1 connectors” on page 27
5	“Power supply units” on page 27	12	“XClarity Controller network connector” on page 27
6	“AC power LED (green)” on page 27	13	“NMI button” on page 27
7	“DC power LED (green)” on page 27	14	“OCP 3.0 Ethernet adapter” on page 28

1 Riser 1 (PCIe slot 1-3)

Install a PCIe riser card into this zone. See the following table for PCIe slots corresponding to the supported riser cards.

Table 5. Riser 1 PCIe slots

Slot	x16/x16/x16 riser card	x16/x16 (x8 lanes) riser card (without 7mm drive cage)	x16/x16 (x8 lanes) riser card (with 7mm drive cage)
1	x16	x16 (x8 lane)	x16 (x8 lane)
2	x16	x16 (x8 lane)	x16 (x8 lane)
3	x16	NA	7mm drive cage

2 Riser 2 (PCIe slot 5-6)

Install x16/x16 FH/HL PCIe Riser into this zone.

Table 6. Riser 2 PCIe slots

Slot	x16/x16 PCIe riser card
5	x16
6	x16

3 4 PCI Express 3.0 (x8)

Install adapters, particularly RAID adapters, to these slots.

5 Power supply units

Install power supply units to these bays, connect them to power cords. Make sure the power cords are connected properly. Following are the power supplies supported by this system:

- 750-watt Titanium, input power 230 Vac / 240 VDC
- 1100-watt Platinum, input power 115 Vac / 230 Vac / 240 VDC
- 1100-watt Titanium, input power 230 Vac / 240 VDC
- 1800-watt Platinum, input power 230 Vac / 240 VDC
- 1800-watt Titanium, input power 230 Vac / 240 VDC
- 2400-watt Platinum, input power 230 Vac / 240 VDC
- 2600-watt Titanium, input power 230 Vac / 240 VDC

6 AC power LED (green)

Each hot-swap power supply unit comes with one AC and one DC power LED. When the AC power LED is lit, it indicates that sufficient power is being supplied to the power supply through the power cord. During normal operation, both the AC and DC power LEDs are lit.

7 DC power LED (green)

Each hot-swap power supply unit comes with one AC and one DC power LED. When the DC power LED is lit, it indicates that the power supply is supplying adequate dc power to the system. During normal operation, both the AC and dc power LEDs are lit.

8 Power supply error LED (yellow)

When the power supply error LED is lit, it indicates that the power supply has failed.

9 Serial connector

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

10 VGA connector

Connect a monitor to this connector.

Notes:

- When the optional front VGA connector is in use, the rear one will be disabled.
- The maximum video resolution is 1920 x 1200 at 60 Hz.

11 USB 3.1 connectors

Connect a USB device, such as a mouse, keyboard, or other devices, to either of these connectors.

12 XClarity Controller network connector

Use this connector to manage the server, by using a dedicated management network. If you use this connector, the Lenovo XClarity Controller cannot be accessed directly from the production network. A dedicated management network provides additional security by physically separating the management network traffic from the production network. You can use the Setup utility to configure the server to use a dedicated systems-management network or a shared network.

13 NMI button

Press this button to force a nonmaskable interrupt to the processor. You might have to use a pen or the end of a straightened paper clip to press the button. You can also use it to force a blue-screen memory dump. Use this button only when you are directed to do so by Lenovo Support.

14 OCP 3.0 Ethernet adapter

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 with shared management capacity. If the shared management connector fails, traffic can automatically switch over to another connector on the adapter.

The system may support a 2-port or a 4-port OCP module for network connections. Port numbering are shown in the illustrations below.



Figure 7. Port numbering — 2-port OCP module

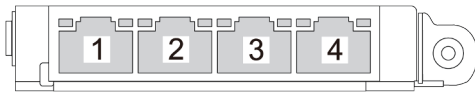


Figure 8. Port numbering — 4-port OCP 3.0 module

Identifying connectors

See this section to locate and identify the connectors on the electric boards.

System board connectors

See this section to identify the connectors on the system board.

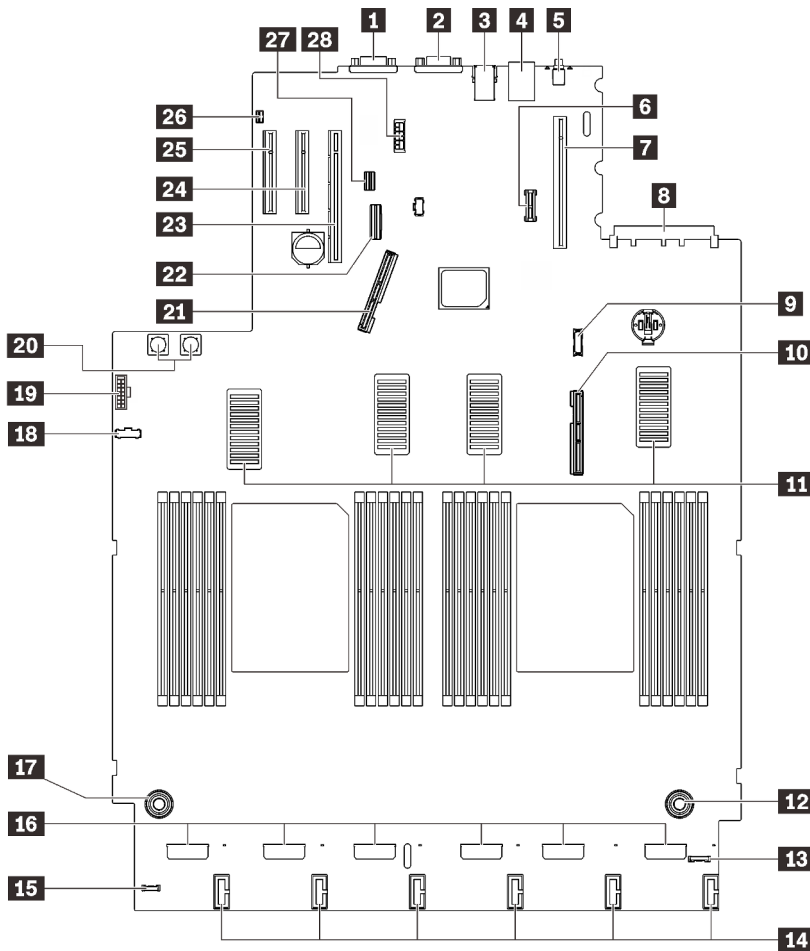


Figure 9. System board connectors

Table 7. System board connectors

1 Serial connector	15 External LCD diagnostics handset connector
2 VGA connector	16 Fan connectors
3 Two USB 3.1	17 Processor and memory expansion tray power connector
4 XClarity Controller network connector	18 Power backplane sideband connector
5 NMI button	19 Front VGA connector
6 TCM/TPM module	20 Power backplane power connector
7 PCIe riser connector (PCIe slot 1 to 3)	21 PCIe signal connector 1
8 OCP connector (PCIe slot 4)	22 On-board SATA connector
9 USB front panel module connector	23 PCIe riser connector (PCIe slot 5 to 6)
10 PCIe signal connector 2	24 PCIe slot 7 (x8)
11 UPI connectors	25 PCIe slot 8 (x8)

Table 7. System board connectors (continued)

12 Processor and memory expansion tray power connector	26 Intrusion switch connector
13 Front I/O connector	27 7mm drive signal connector
14 Drive backplane power connectors	28 7mm drive power connector

Processor and memory expansion tray connectors

See this section to locate the connectors on the processor and memory expansion tray.

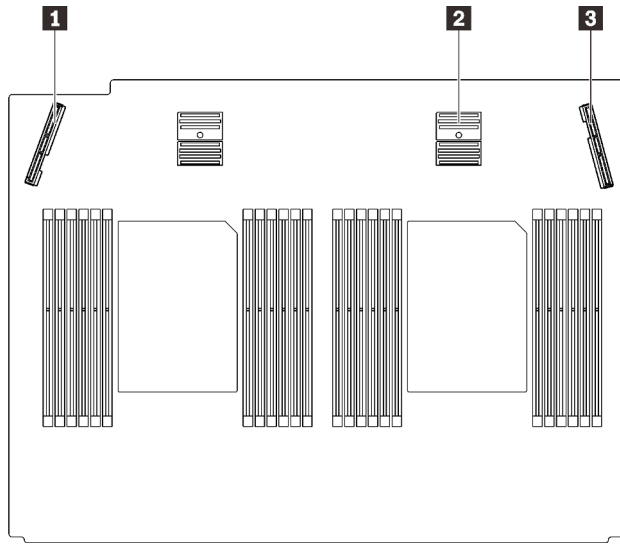


Figure 10. Processor and memory expansion tray connectors

Table 8. Processor and memory expansion tray connectors

1 PCIe signal connector 3	3 PCIe signal connector 6
2 PCIe signal connector 5	

Power backplane connectors

See this section to locate the connectors on the power backplane.

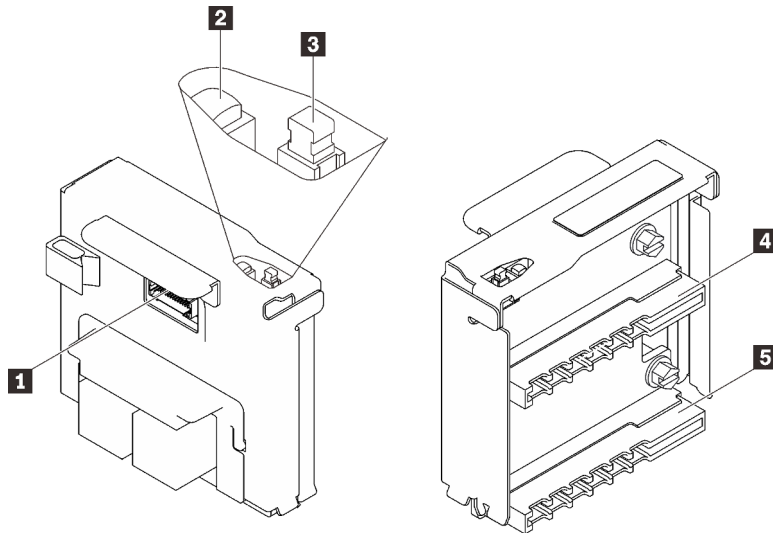


Figure 11. Power backplane components

Table 9. Power backplane components

1 Power backplane sideband connector	4 Power supply unit 2 connector
2 Power LED	5 Power supply unit 1 connector
3 Power switch	

2.5-inch 8-bay drive backplane connectors

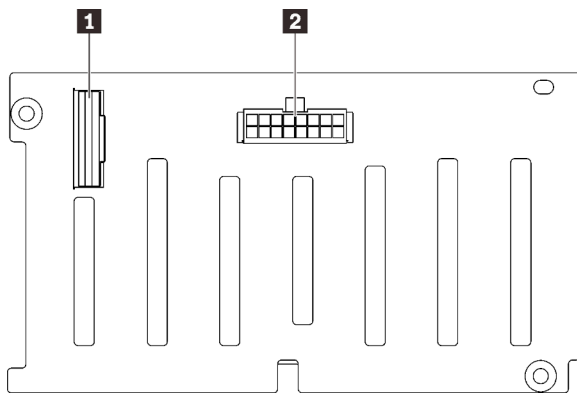
See this section to locate the connectors in the 2.5-inch 8-bay drive backplanes.

Two types of 2.5-inch 8-bay drive backplanes are supported in this system:

- [“SAS/SATA drive backplane” on page 34](#)
- [“AnyBay/NVMe drive backplane” on page 35](#)

SAS/SATA drive backplane

See this section to locate the connectors on the SAS/SATA drive backplanes.



- 1** SAS/SATA signal connector
- 2** Backplane power/configuration connector

Figure 12. SAS/SATA drive backplane connectors

AnyBay/NVMe drive backplane

See this section to locate the connectors on the AnyBay/NVMe drive backplanes.

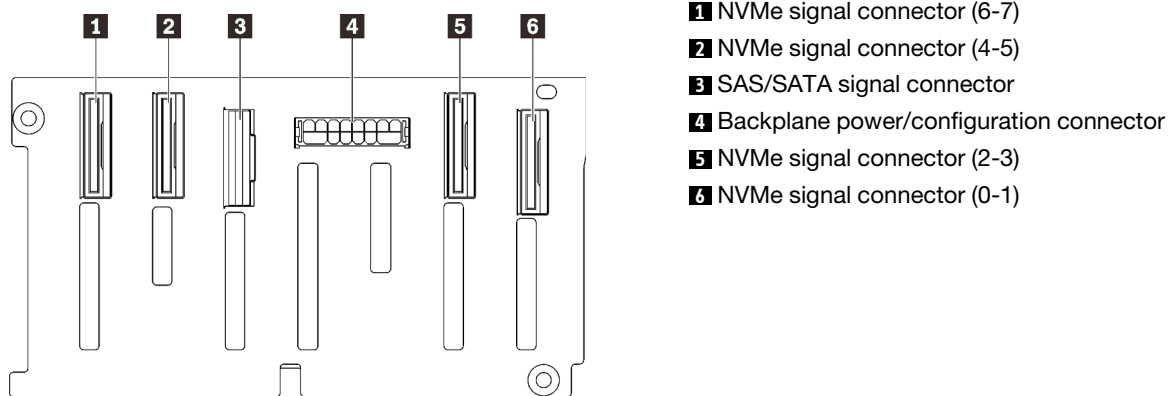


Figure 13. AnyBay/NVMe drive backplane connectors

PCIe riser card connectors

See this section to locate the connectors on the PCIe riser cards.

Two zones are available for PCIe riser cards:

- Zone 1 (Slot 1 to 3) is available for:
 - [“x16/x16 \(x8 lanes\) PCIe riser card” on page 36](#)
 - [“x16/x16/x16 PCIe riser card” on page 37](#)
- Zone 2 (Slot 5 to 6) is available for [“x16/x16 PCIe riser card” on page 38](#).

x16/x16 (x8 lanes) PCIe riser card

See this section to locate the connectors on the x16/x16 (x8 lanes) PCIe riser card.

Note: This card is applied to both x16/x16 (x8 lanes) FH/HL PCIe riser and x16/x16 (x8 lanes) FH/HL PCIe riser with 7mm drive cage bracket.

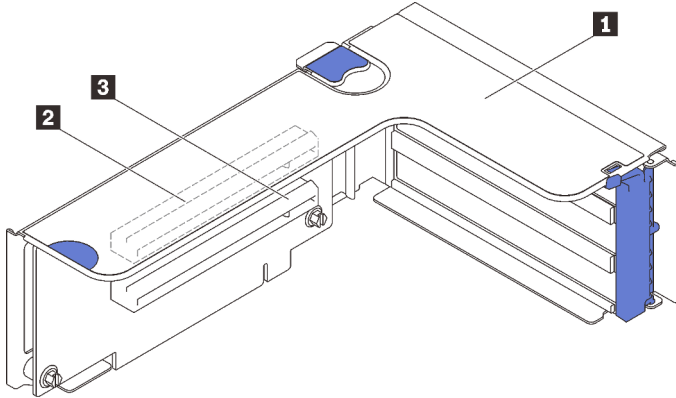


Figure 14. x16/x16 (x8 lanes) PCIe riser card connectors

Table 10. x16/x16 (x8 lanes) PCIe riser card connectors

1 PCIe full-height riser	3 PCI Express 3.0 x16 (x8 lane) (Slot 2)
2 PCI Express 3.0 x16 (x8 lane) (Slot 1)	

x16/x16/x16 PCIe riser card

See this section to locate the connectors on the x16/x16/x16 PCIe riser card.

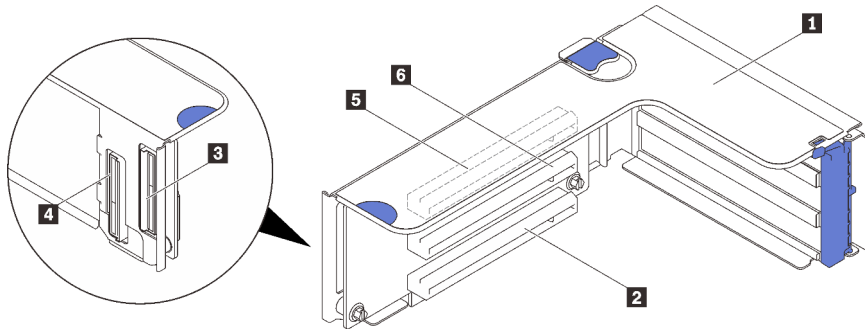


Figure 15. x16/x16/x16 PCIe riser card connectors

1 PCIe full-height riser	4 PCIe cable connector
2 PCI Express 3.0 x16 (Slot 3)	5 PCI Express 3.0 x16 (Slot 1)
3 PCIe cable connector	6 PCI Express 3.0 x16 (Slot 2)

x16/x16 PCIe riser card

See this section to locate the connectors on the x16/x16 PCIe riser card.

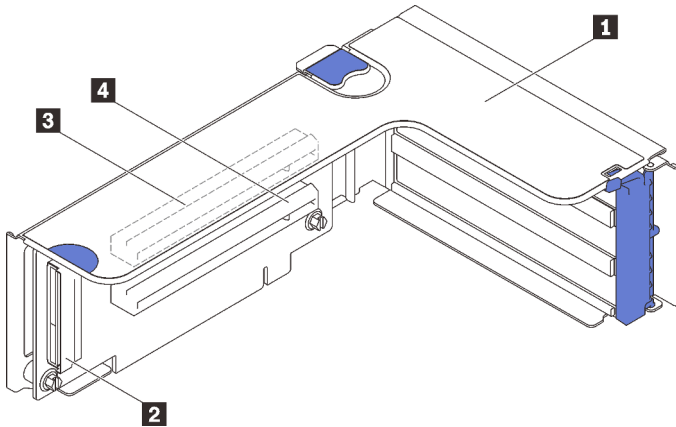


Figure 16. x16/x16 PCIe riser card connectors

1 PCIe full-height riser	3 PCI Express 3.0 x16 (Slot 5)
2 PCIe cable connector	4 PCI Express 3.0 x16 (Slot 6)

Switches, jumpers, and buttons

The following illustration shows the location of the switches, jumpers, and buttons on the server.

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

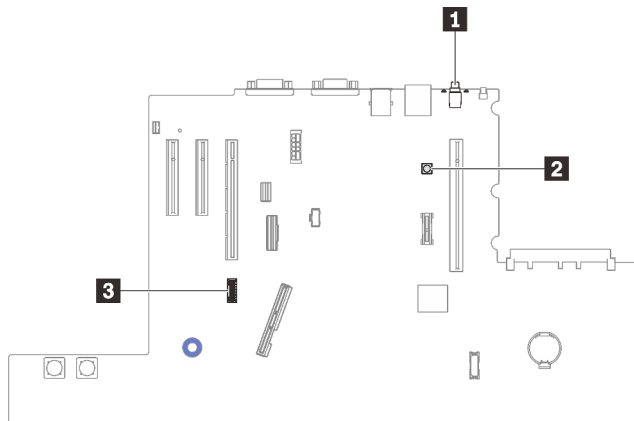


Figure 17. Switches, jumpers and buttons

1 "NMI button" on page 39	3 "SW4" on page 39
2 "Light path button" on page 39	

NMI button

Table 11. NMI button

Button name	Function
Force NMI button	This button is on the rear of the server. Press this button to force a nonmaskable interrupt to the processor. You might have to use a pen or the end of a straightened paper clip to press the button. You can also use it to force a blue screen memory dump (use this button only when you are directed to do so by Lenovo Support).

Light path button

Table 12. Light path button

Button name	Function
Light path button	Press this button to light the LEDs on the system board when the power source has been removed from the server.

SW4

See the following table for SW4 switch block functions.

Table 13. System board SW4 switch block descriptions

Switch number	Default position	Off	On
1, 16	Off	Host TPM Physical Presence disabled	Host TPM Physical Presence enable
2, 15	Off	PASSWORD_OVERRIDE function disabled	PASSWORD_OVERRIDE function enabled
3, 14	Off	Serial port message from uEFI	Serial port message from Lenovo XClarity Controller
4, 13	Off	XCC TPM Physical Presence disabled	XCC TPM Physical Presence enabled
5, 12	Off	Managing Engine recovery mode disabled	Managing Engine set to recovery mode
6, 11	Off	Managing Engine security override disabled	Managing Engine security override enabled
7, 10	Off	Reserved	
8, 9	Off		Real time clock reset

Important:

1. Before you change any switch settings or move any jumpers, turn off the server; then, disconnect all power cords and external cables. Review the information in https://pubs.lenovo.com/safety_documentation/, “Installation Guidelines” on page 109, “Handling static-sensitive devices” on page 112, and “Power off the server” on page 13.
2. Any system board switch or jumper block that is not shown in the illustrations in this document are reserved.

System board LEDs

See this section to locate the LEDs on the system board.

The following illustration shows the light emitting diodes (LEDs) on the system board.

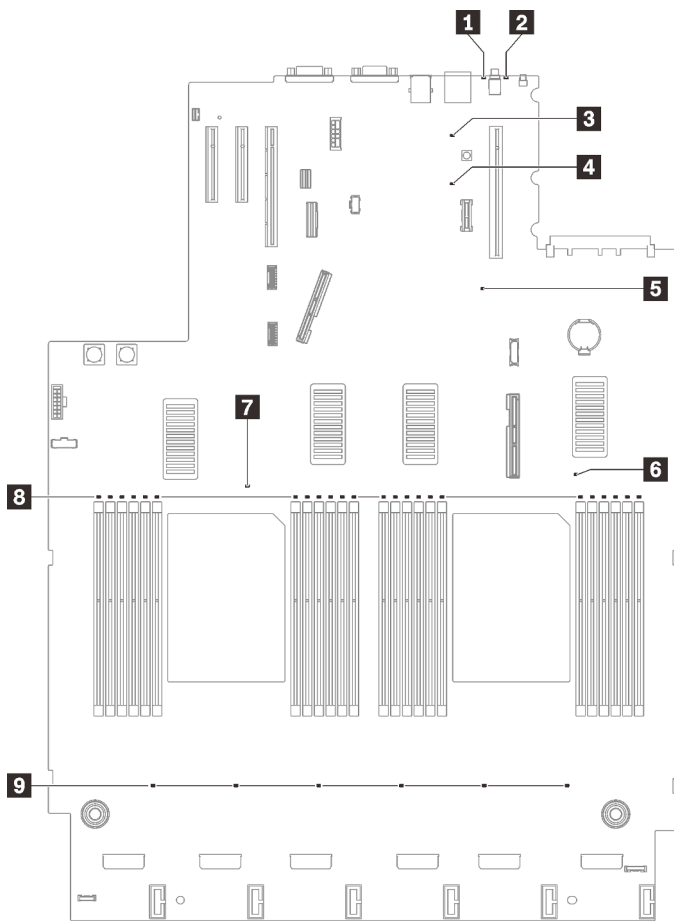


Figure 18. System-board LEDs

Table 14. System board LEDs

1 System error LED (yellow)	6 Processor 2 error LED
2 Identification LED (blue)	7 Processor 1 error LED
3 Light path power LED	8 DIMM 1-24 error LEDs
4 XCC heartbeat LED (Green)	9 Fan error LEDs
5 FPGA heartbeat LED (Green)	

Processor and memory expansion tray LEDs

See this section to locate the LEDs on the processor and memory expansion tray.

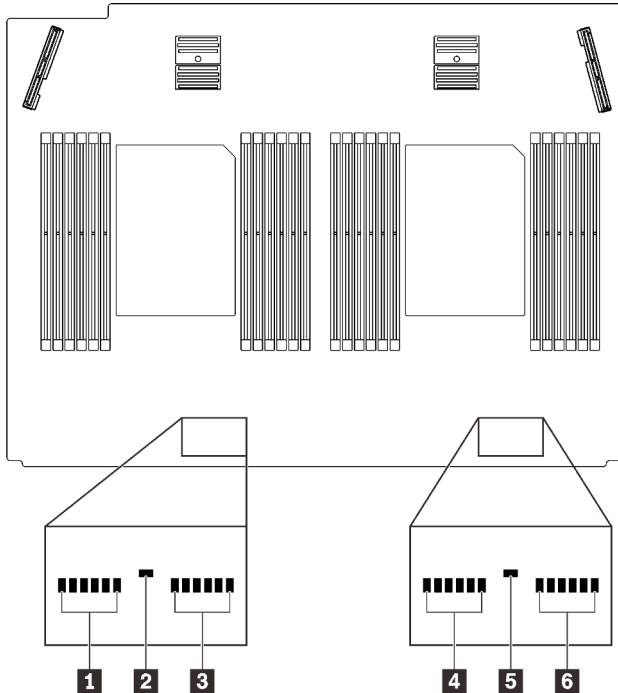


Figure 19. Processor and memory expansion tray LEDs

Table 15. Processor and memory expansion tray LEDs

1 DIMM 25-30 error LEDs	4 DIMM 37-42 error LEDs
2 Processor 3 error LED	5 Processor 4 error LED
3 DIMM 31-36 error LEDs	6 DIMM 43-48 error LEDs

Parts list

Identify each of the components that is available for your server with the parts list.

For more information about ordering the parts shown in [Figure 20 “Server components” on page 42](#):

1. Go to <http://datacentersupport.lenovo.com> and navigate to the support page for your server.
2. Click **Parts & Accessories** → **Parts Lookup**.
3. Enter either the serial number or the machine type model for your server to see the parts for your server.

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

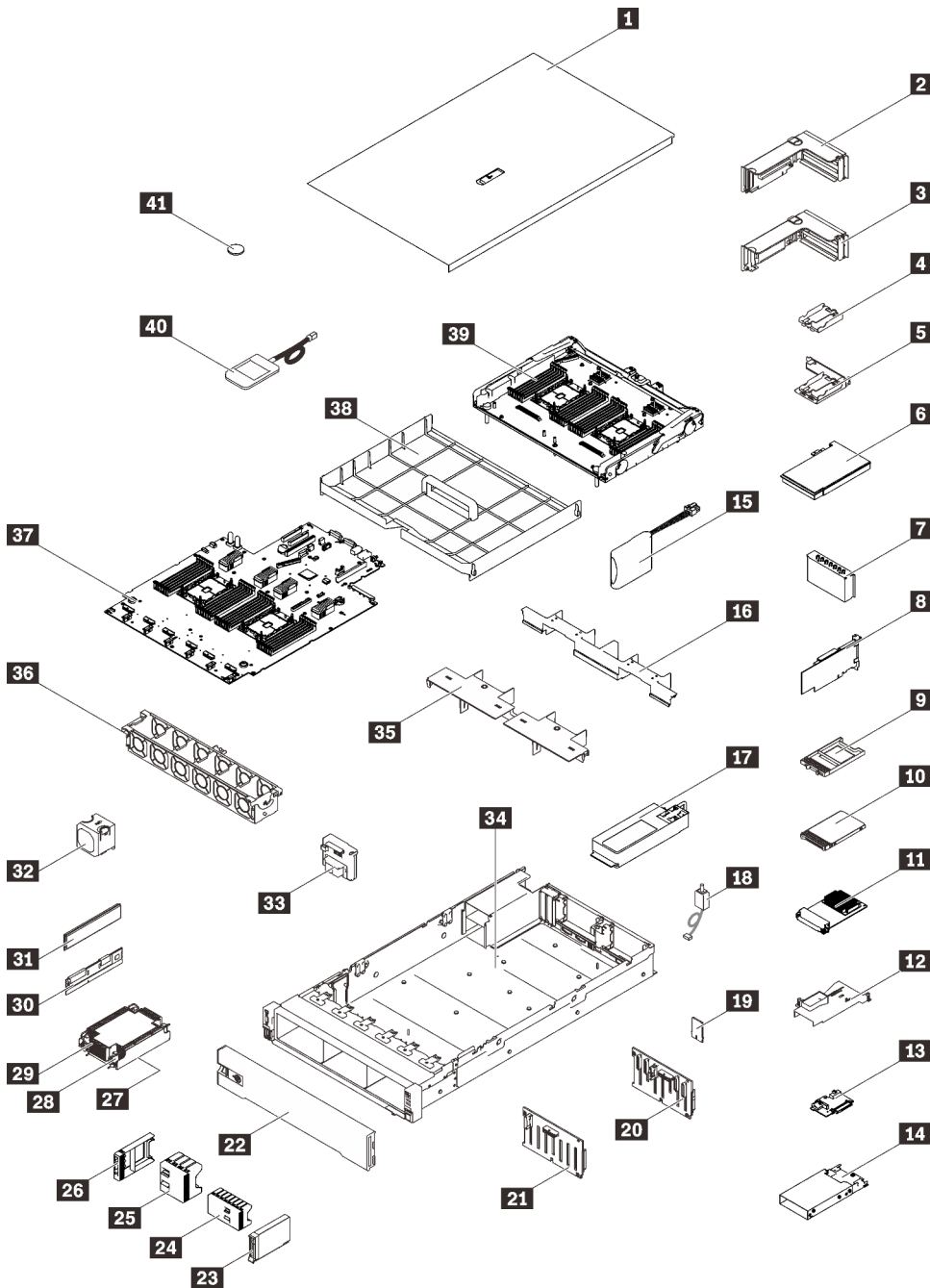


Figure 20. Server components

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 (components, such as a cover or bezel) is your responsibility. If Lenovo acquires or installs a structural component at your request, you will be charged for the service.

Table 16. Parts list

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
For more information about ordering the parts shown in Figure 20 “Server components” on page 42: http://datacentersupport.lenovo.com/products/servers/thinksystem/sr850v2/parts It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.					
1	Top cover	√			
2	PCIe riser card assembly	√			
3	PCIe riser	√			
4	Vertical flash power module holder		√		
5	Horizontal power module holder with bracket	√			
6	Adapter	√			
7	PCIe riser filler	√			
8	RAID adapter	√			
9	7mm drive filler	√			
10	7mm drive	√			
11	OCP 3.0 Ethernet adapter	√			
12	OCP Ethernet adapter air baffle	√			
13	7mm drive backplane	√			
14	7mm drive cage	√			
15	Flash power module	√			
16	Expansion tray air baffle	√			
17	Power supply unit	√			
18	Intrusion switch	√			
19	TPM card (for Chinese Mainland only)			√	
20	2.5-inch 8-bay SAS/SATA backplane	√			
21	2.5-inch 8-bay AnyBay/NVMe backplane	√			
22	Security bezel	√			
23	2.5-inch drive	√			
24	8-bay 2.5-inch drive filler	√			
25	4-bay 2.5-inch drive filler	√			

Table 16. Parts list (continued)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
26	2.5-inch drive filler	√			
27	Processor			√	
28	Heat sink Torx T30	√			
29	Heat sink	√			
30	Persistent Memory Module (PMEM)		√		
31	DRAM DIMM		√		
32	Fan	√			
33	Power backplane	√			
34	Chassis			√	
35	Upper expansion tray air baffle	√			
36	Fan cage	√			
37	System board			√	
38	System board air baffle	√			
39	Processor and memory expansion tray			√	
40	External LCD diagnostics handset	√			
41	CMOS battery (CR2032)				√

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.

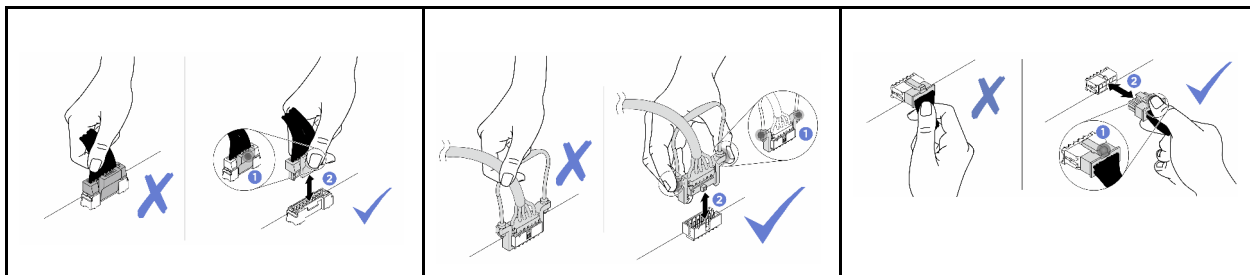
Chapter 3. Internal cable routing

See this section to do cable routing for specific components.

Attention: Disengage all latches, release tabs, or locks on cable connectors when you disconnect cables from the system board. Failing to release them before removing the cables will damage the cable sockets on the system board, which are fragile. Strictly observe the following instructions to avoid damaging cable sockets on the system board. Any damage to the cable sockets might require replacing the system board.

- Connect cable connectors vertically or horizontally in alignment with the orientations of the corresponding cable sockets, avoiding any tilt.
- To disconnect cables from the system board, do as follows:
 1. Press and hold all latches, release tabs, or locks on cable connectors to release the cable connectors.
 2. Remove the cable connectors vertically or horizontally in alignment with the orientations of the corresponding cable sockets, avoiding any tilt.

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



Cable routing for 2.5-inch drives

Follow the instructions in this section to learn how to do cable routing for 2.5-inch drives.

Go through the following list to acquire necessary information before starting cable routing for 2.5-inch drives.

Preliminary parts removal and installation

1. Make sure the following components are removed beforehand:
 - Top cover (see [“Remove the top cover” on page 219](#))
 - Processor and memory expansion tray (see [“Remove the processor and memory expansion tray” on page 195](#))
 - Fan cage (see [“Remove the fan cage assembly” on page 131](#))
2. Make sure to install all the drive backplanes that you plan to installed (see [“Install a drive backplane” on page 114](#)).

Power cables

Connect power cables to drive backplanes as illustrated.

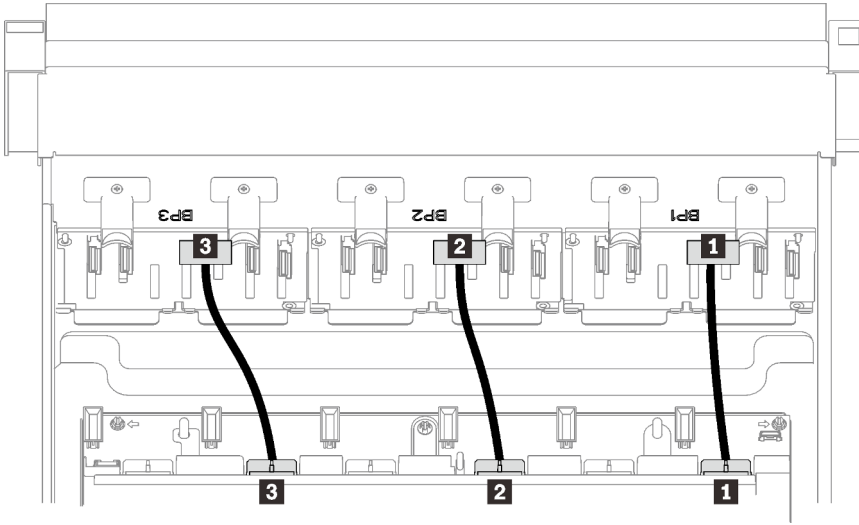


Figure 21. Drive backplane power cables

Table 17. Drive backplane power cables

1 Drive backplane 1 to connector 1	3 Drive backplane 3 to connector 3
2 Drive backplane 2 to connector 2	

Cable guides

Make sure all the signal cables go through the cable guides on the system board and the memory expansion tray.

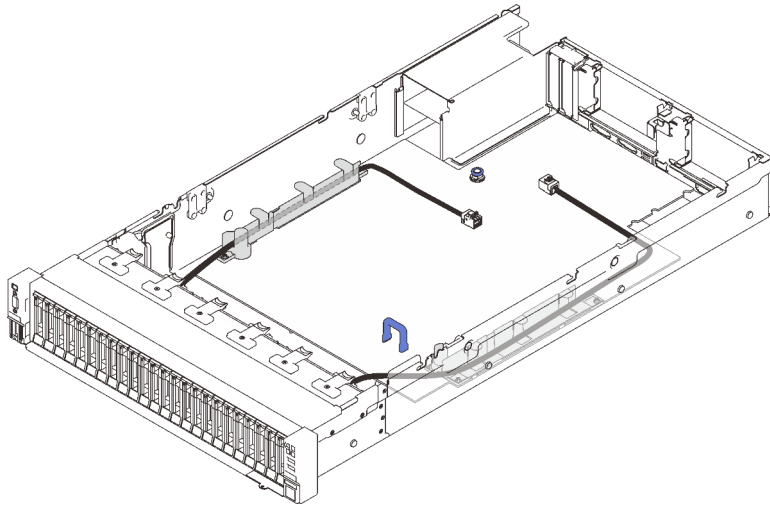


Figure 22. Cable guides on the system board

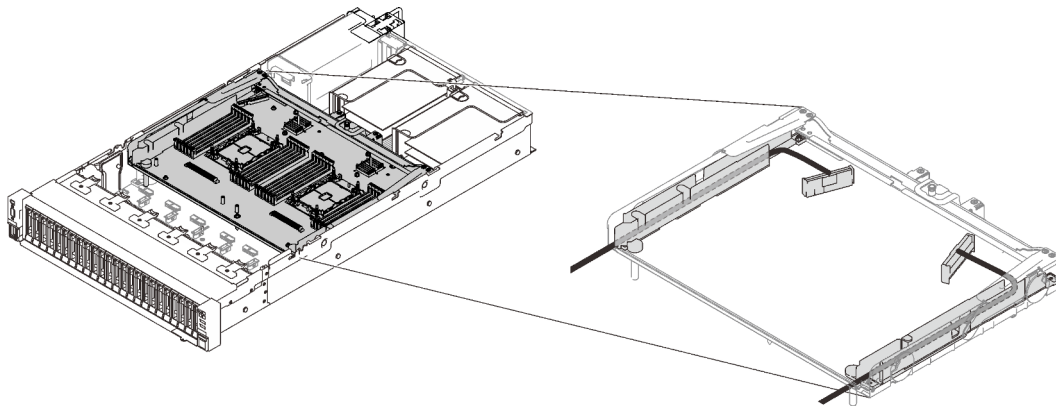


Figure 23. Cable guides on the processor and memory expansion tray

SAS/SATA cables for Gen3 and Gen4 RAID adapters

When picking cables for 8i and 16i RAID adapters from SAS/SATA cable kits, make sure to choose the cables based on the generation of RAID adapters that you plan to install:

- **Gen3 RAID adapters** (430-8i, 930-8i, 430-16i, 530-16i, 930-16i): MiniSAS to Slimline cable
- **Gen4 RAID adapters** (940-8i, 940-16i): Slimline cable

Backplane and PCIe slot reference

See the label on the cable for reference of PCIe slots to installed RAID adapters or PCIe switch cards in. For example, “BP 1/4” and “Slot 1/8” means the cable could be applied to the following scenarios:

- Connecting backplane 1 to RAID adapter that is installed in slot 1
- Connecting backplane 4 to RAID adapter that is installed in slot 8

Connecting cables to the processor and memory expansion tray

Follow the instructions in this section to learn how to connect cables to the processor and memory expansion tray.

When working on cable routing plans that involve the processor and memory expansion tray, perform the procedure in the following order.

1. Connect the following:
 - Connect all the cables in the plan to corresponding drive backplanes.
 - Connect all the SAS/SATA cables to the adapters or the on-board SAS/SATA connector.
 - If applicable, connect the two PCIe cables to the connectors on the system board.
2. Install the expansion tray air baffle.

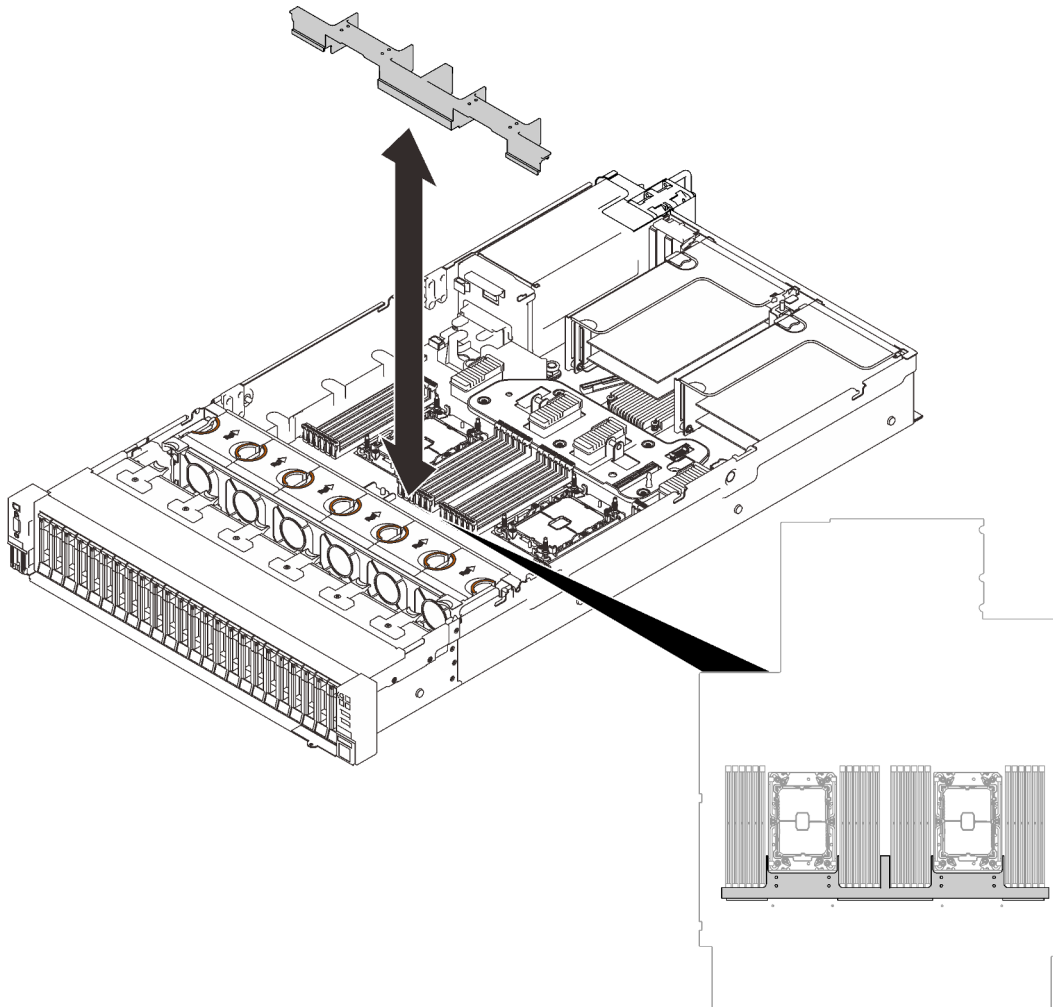


Figure 24. Installing the expansion tray air baffle

3. Align the processor and memory expansion tray with the two pairs of guides on the sides, and lower it into the chassis.

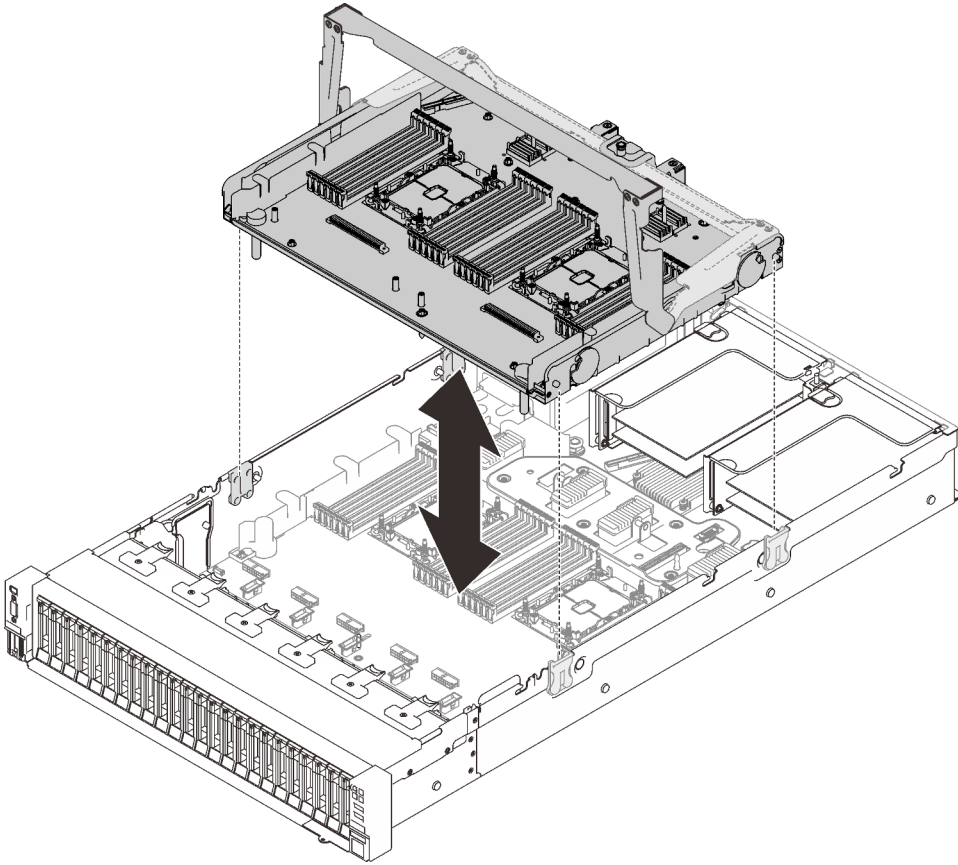


Figure 25. Installing the processor and memory expansion tray

4. Route the two PCIe cables through the side cable guides, and connect them to the processor and memory expansion tray.

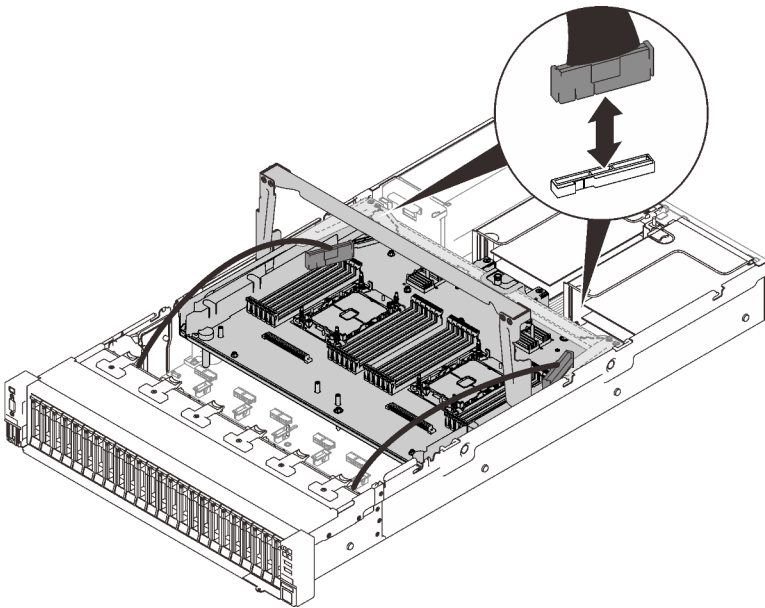


Figure 26. Connecting cables to the expansion tray

5. Secure the processor and memory expansion tray.

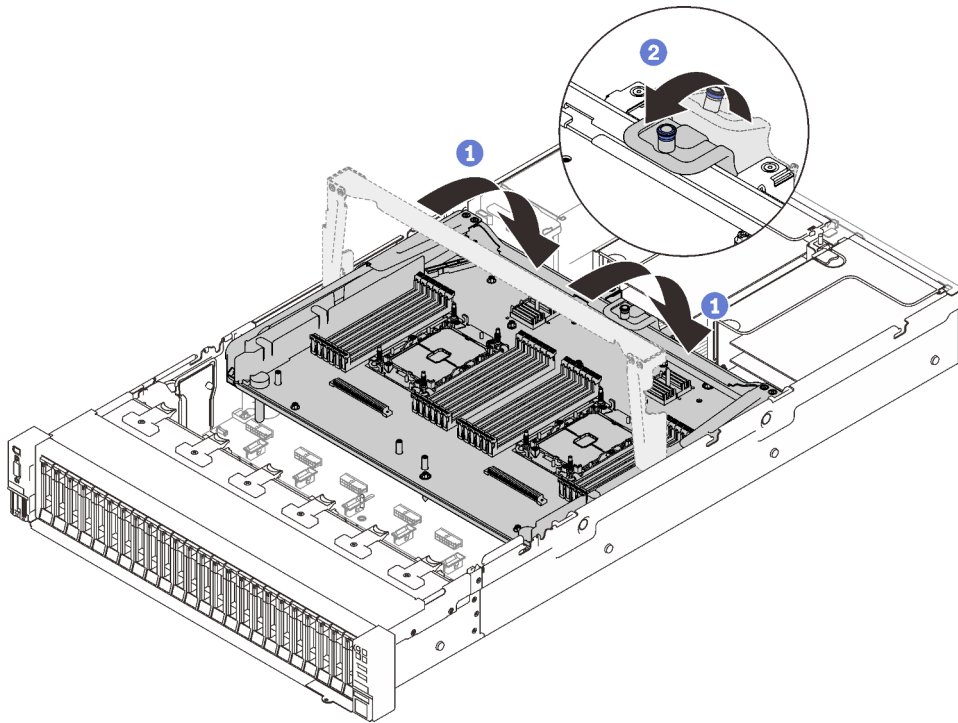


Figure 27. Securing the processor and memory expansion tray

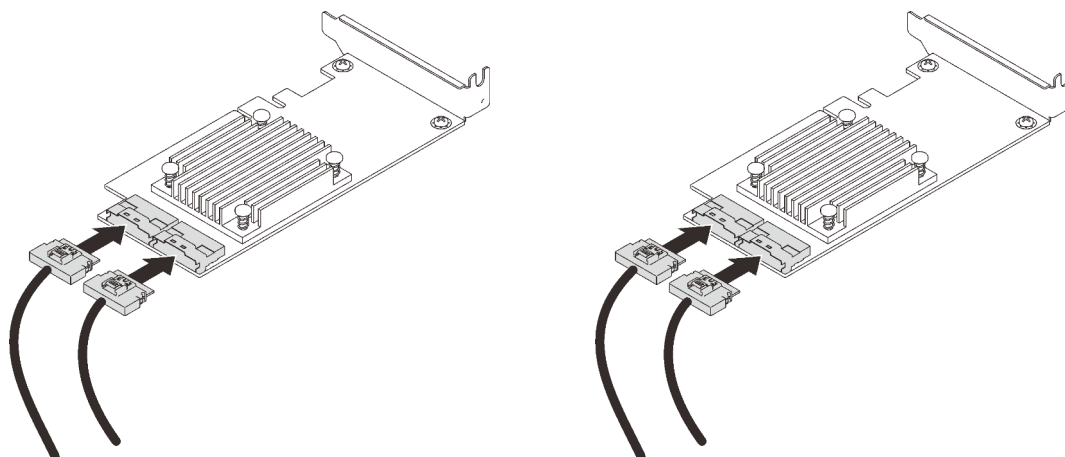
- 1 Rotate the handle all the way down. This connects and fixes the expansion tray to the system board.
- 2 Pull the retaining tab back to secure the handle.

Connecting cables to the NVMe switch cards

Follow the instructions in this section to learn how to connect cables to the NVMe switch cards.

When working on cable routing plans that involve NVMe switch cards, perform the procedure in the following order.

- Step 1. Complete the procedure in [“Connecting cables to the processor and memory expansion tray”](#) on [page 50](#).
- Step 2. Connect the four PCIe cables to the two NVMe switch cards.



Note: Make sure to match the drive backplane and NVMe switch card connectors as following:

Table 18. Drive backplane and NVMe switch card connectors

AnyBay/NVMe drive backplane connector	Switch card connector
0-1	C0
2-3	C1
4-5	C0
6-7	C1

Figure 28. Connecting cables to the NVMe switch cards

Step 3. Install the two adapters into corresponding slots on the x16/x16 PCIe riser card (see [“Install an adapter in the PCIe riser assembly” on page 166](#)).

Note:

Table 19. NVMe switch cards and corresponding PCIe slot numbers

	AnyBay/NVMe drive backplane connectors which are connected to the NVMe switch card	PCIe slot number
1	0-1, 2-3	Slot 5
2	4-5, 6-7	Slot 6

Step 4. Install the PCIe riser card (see [“Install the PCIe riser assembly” on page 168](#)).

SAS/SATA backplane combinations

Follow the instructions in this section to learn how do cable routing for combinations with SAS/SATA backplanes.

See the following sections for cable routing combinations with only SAS/SATA drive backplanes.

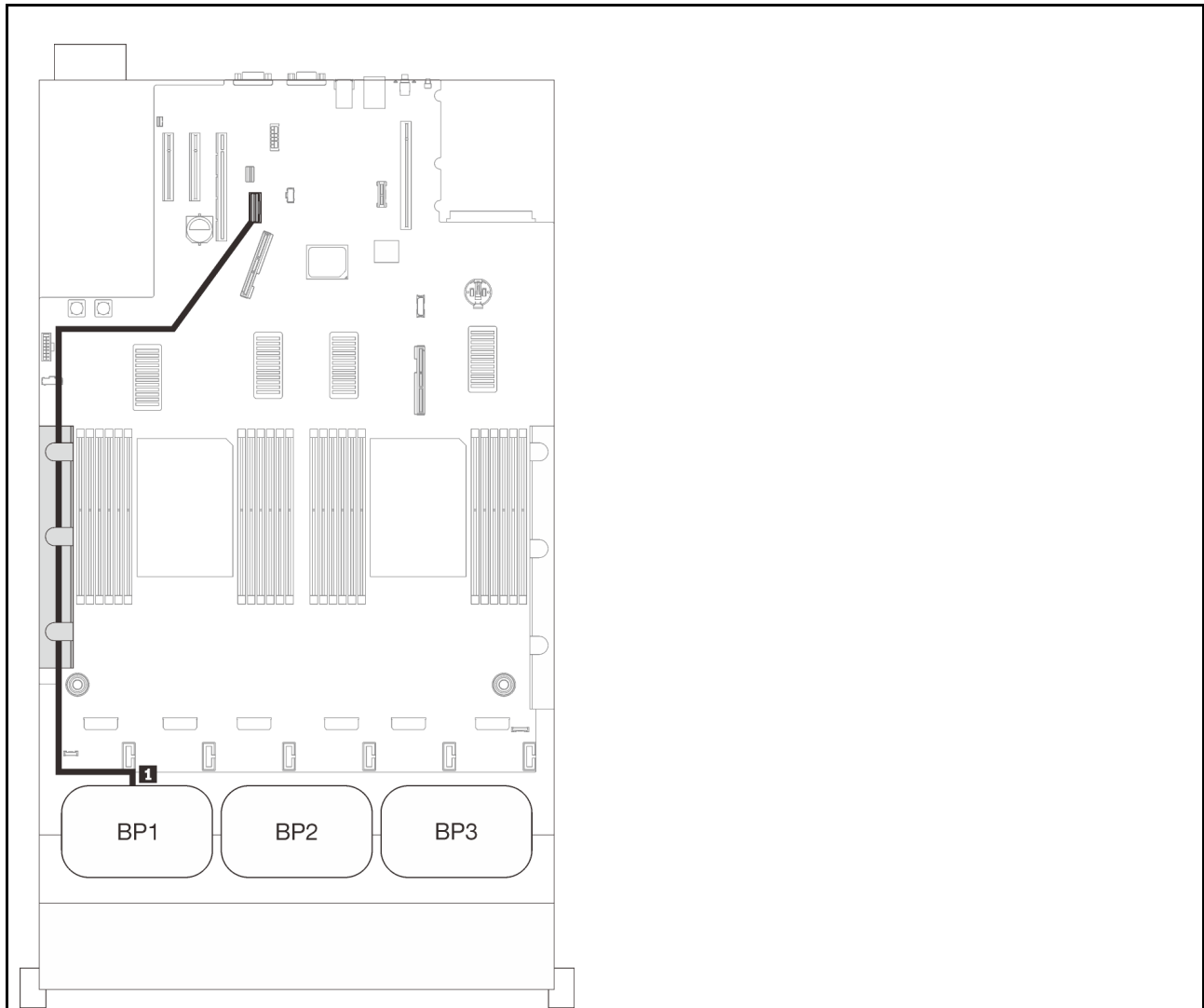
- [“One backplane” on page 55](#)
- [“Two backplanes” on page 58](#)

- [“Three backplanes” on page 59](#)

One backplane

One SAS/SATA backplane

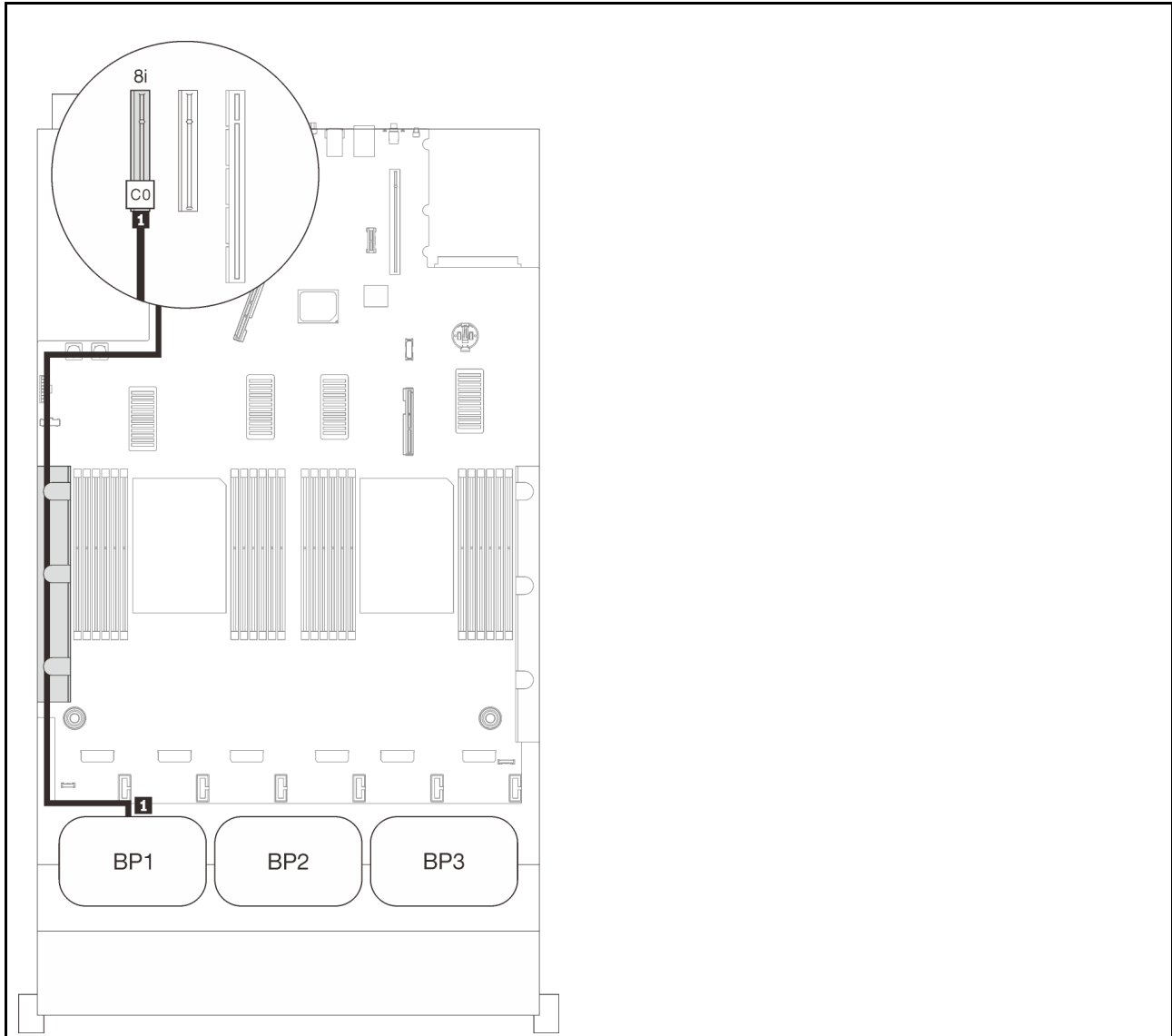
On-board connector



SAS/SATA cable routing

	Length	To
1	845 mm	On-board

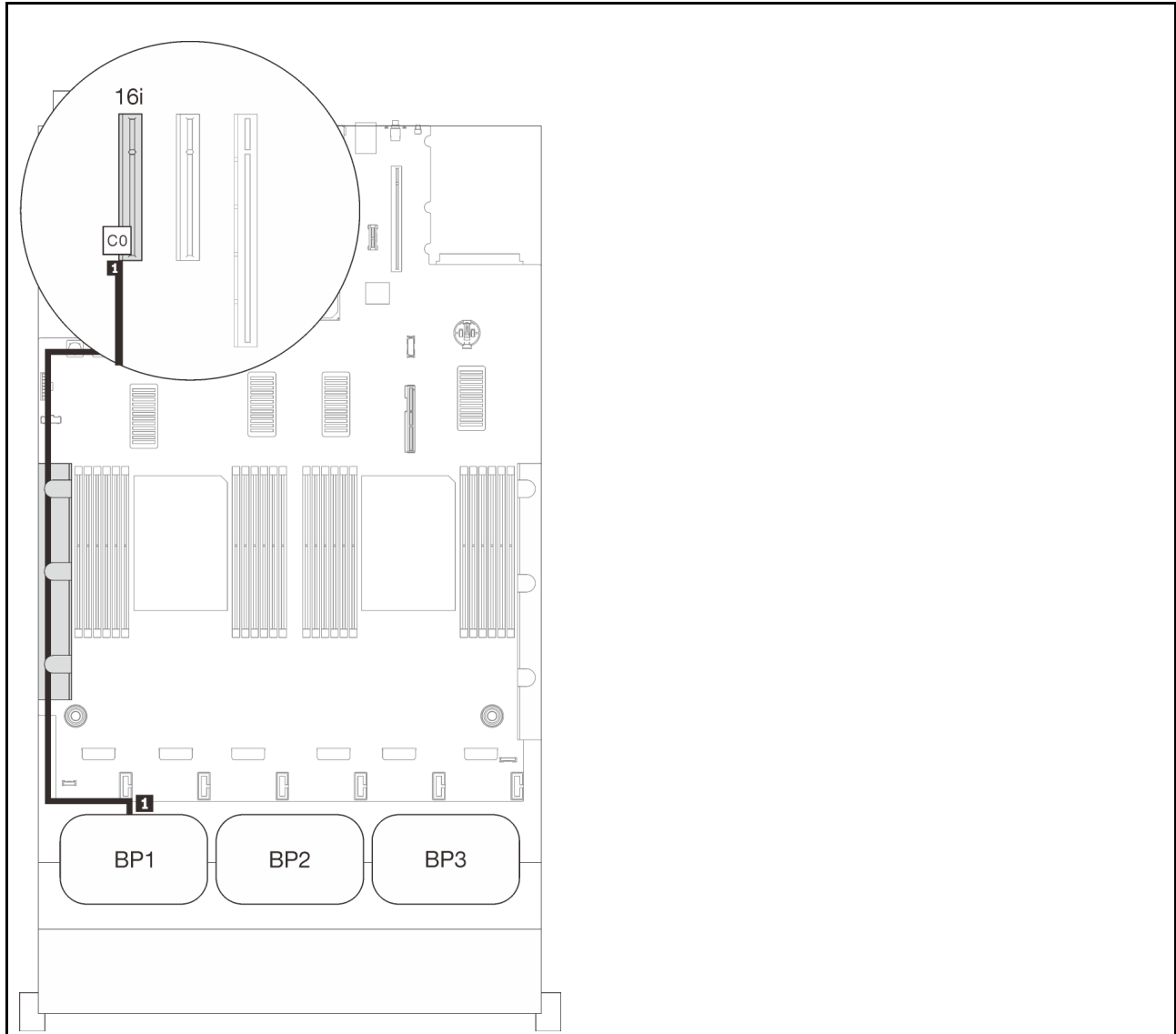
8i RAID adapter



SAS/SATA cable routing

	Length	To
1	<ul style="list-style-type: none"> • Gen3: 665 mm • Gen4: 690 mm 	C0 (8i)

16i RAID adapter



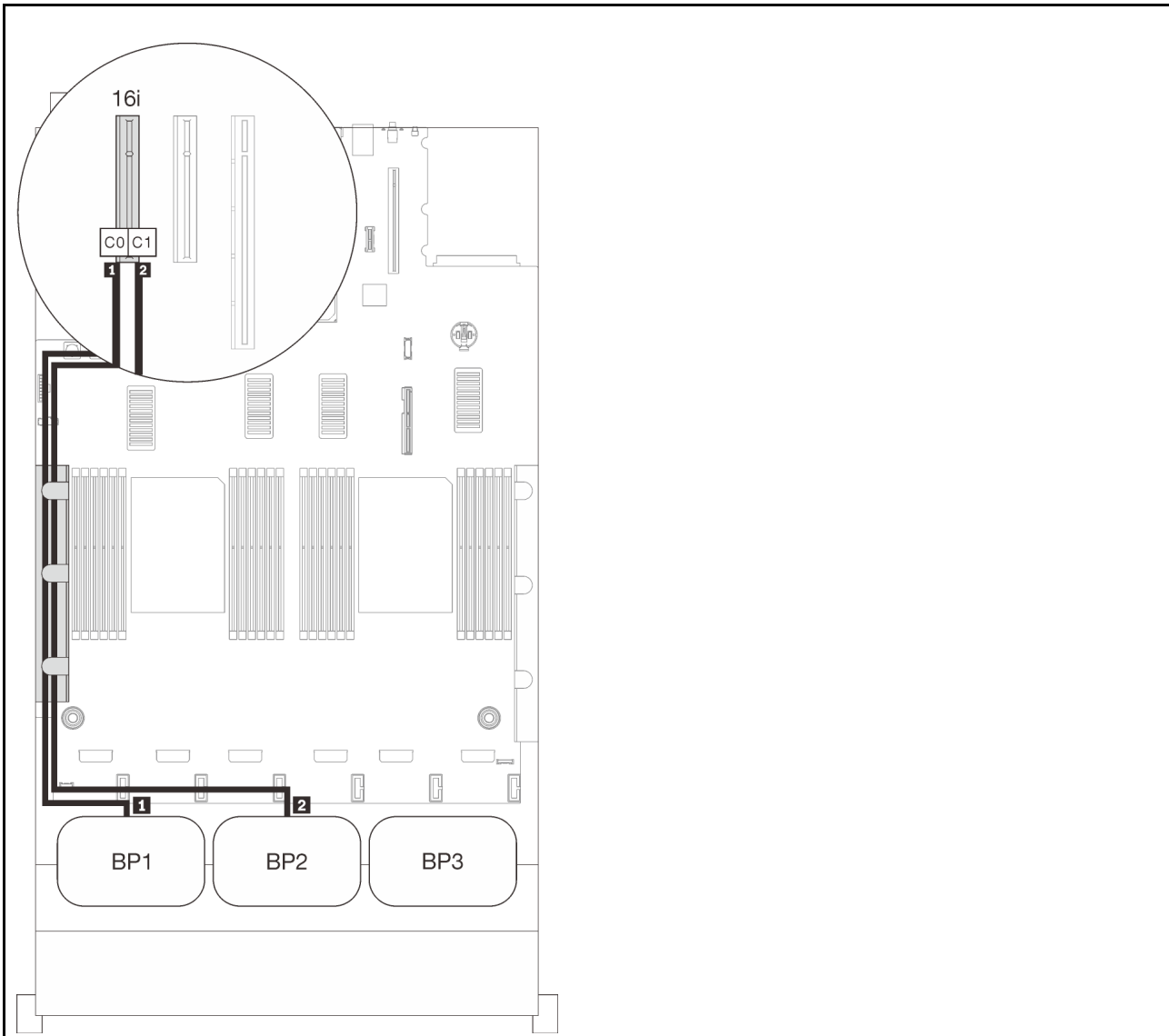
SAS/SATA cable routing

	Length	To
1	<ul style="list-style-type: none"> • Gen3: 665 mm • Gen4: 690 mm 	C0 (16i)

Two backplanes

Two SAS/SATA backplanes

16i RAID adapter



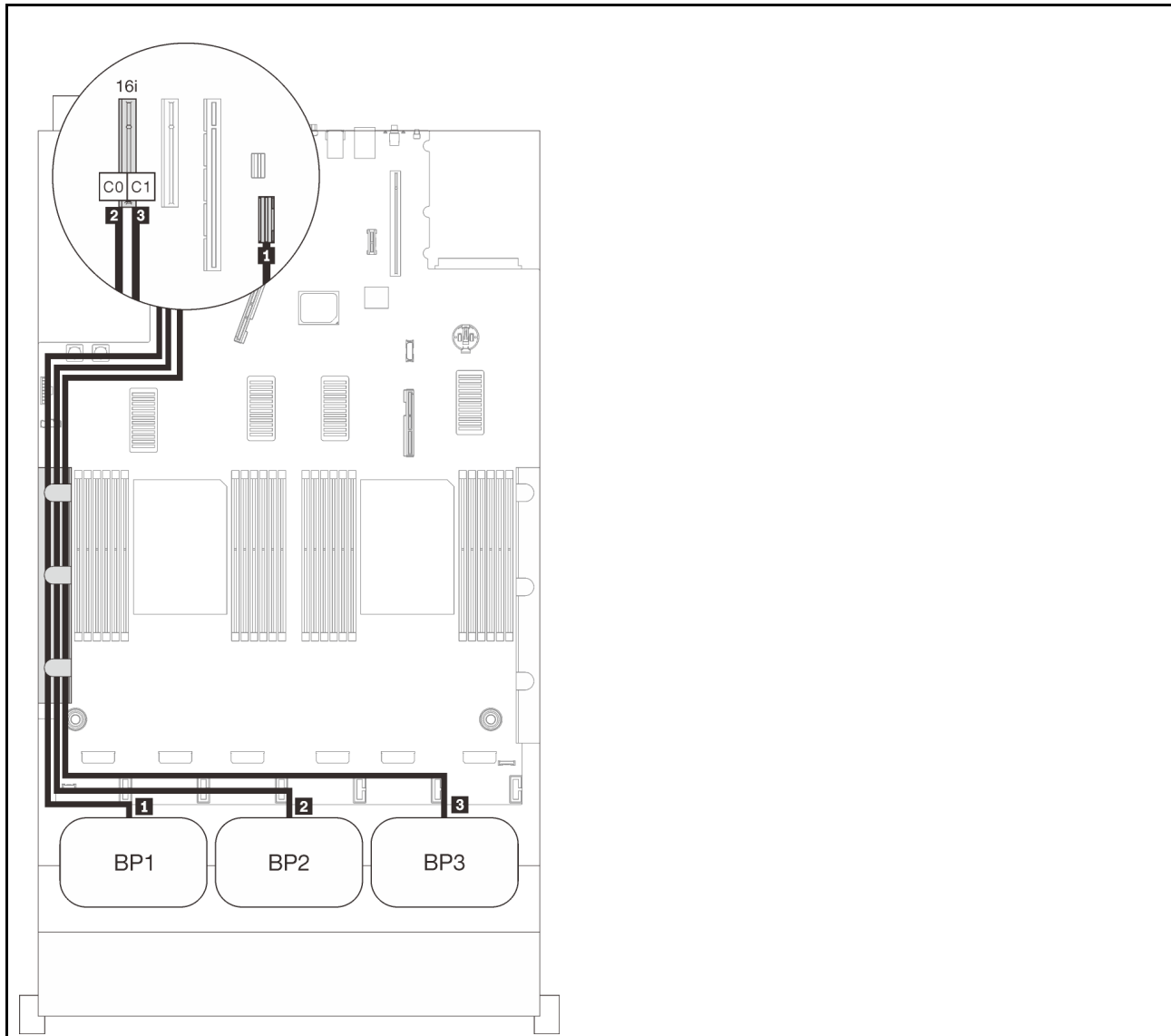
SAS/SATA cable routing

	Length	To
1	<ul style="list-style-type: none"> Gen3: 665 mm Gen4: 690 mm 	C0 (16i)
2	860 mm	C1 (16i)

Three backplanes

Three SAS/SATA backplanes

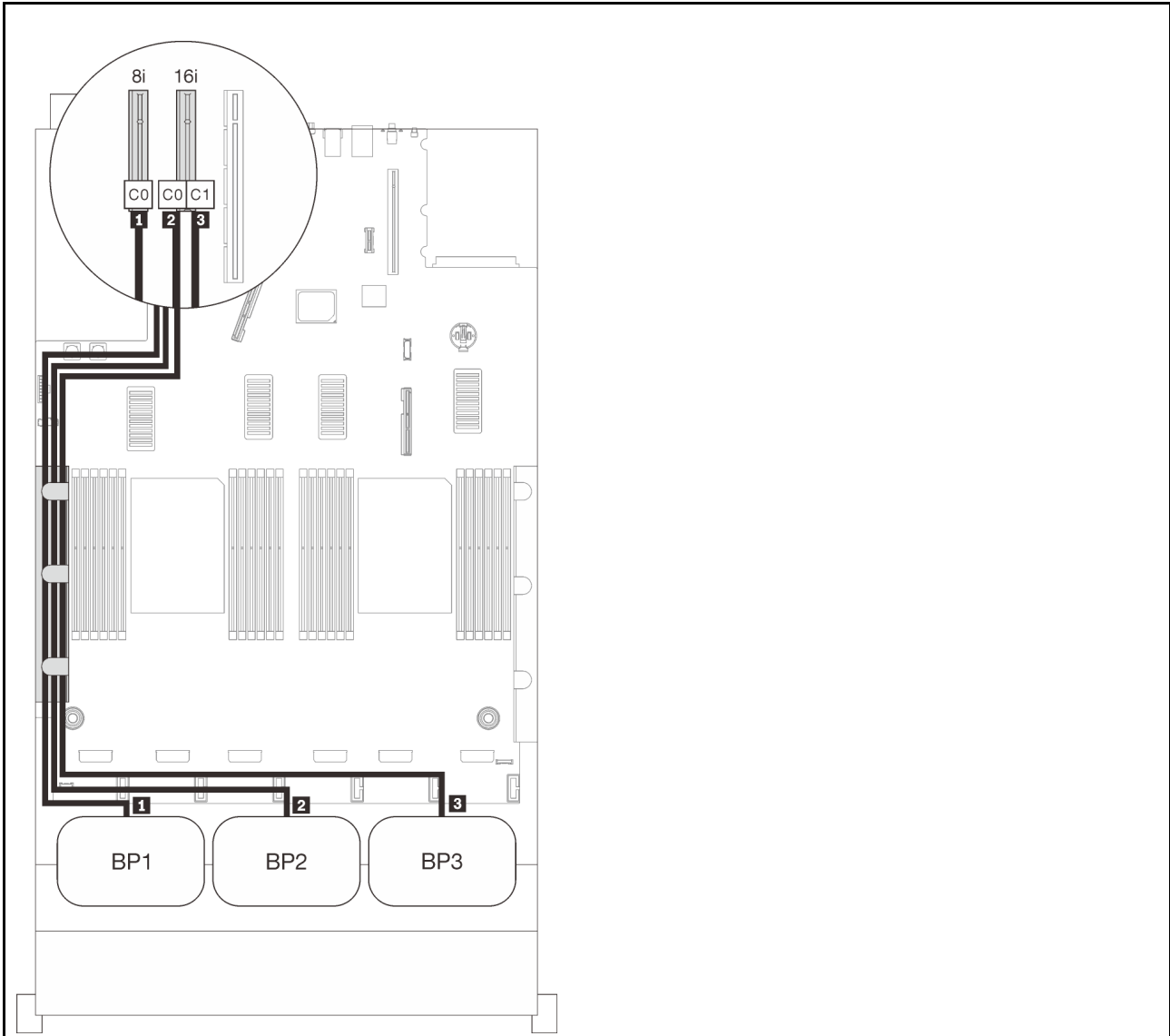
On-board connector + 16i RAID adapter



SAS/SATA cable routing

	Length	To
1	845 mm	On-board
2	860 mm	C0 (16i)
3	1000 mm	C1 (16i)

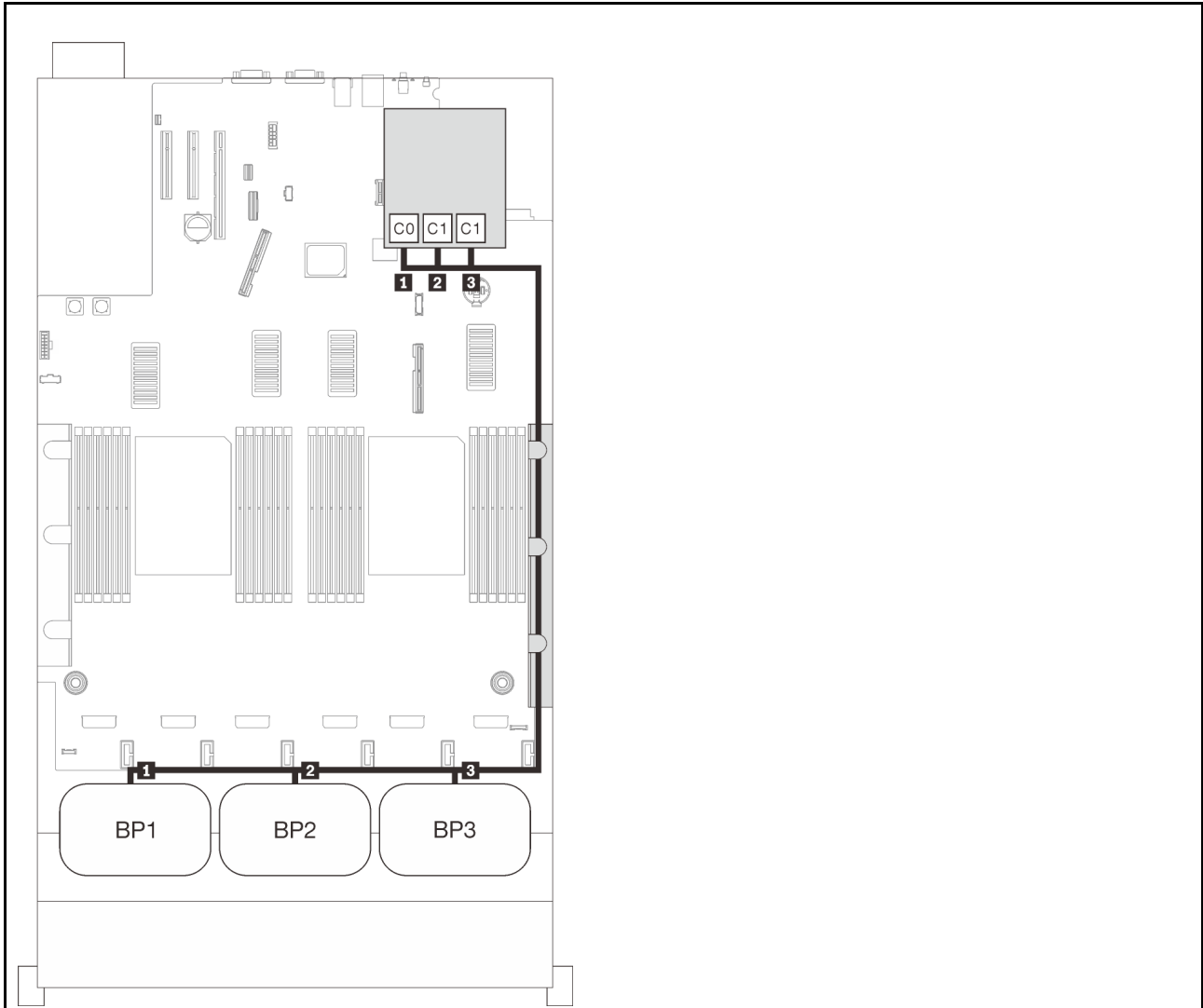
8i + 16i RAID adapter



SAS/SATA cable routing

	Length	To
1	<ul style="list-style-type: none"> • Gen3: 665 mm • Gen4: 690 mm 	C0 (8i)
2	860 mm	C0 (16i)
3	1000 mm	C1 (16i)

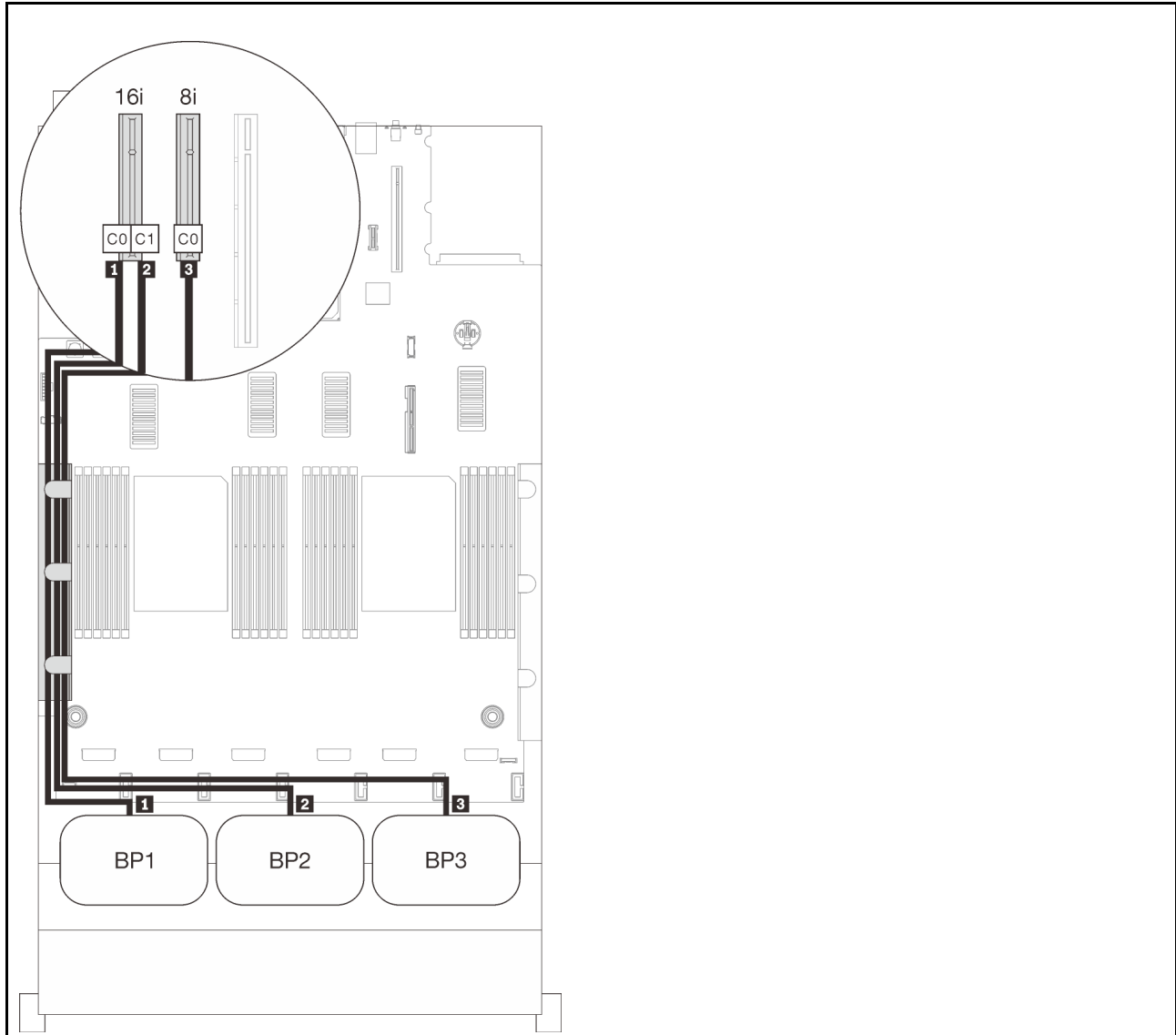
32i RAID adapter



SAS/SATA cable routing

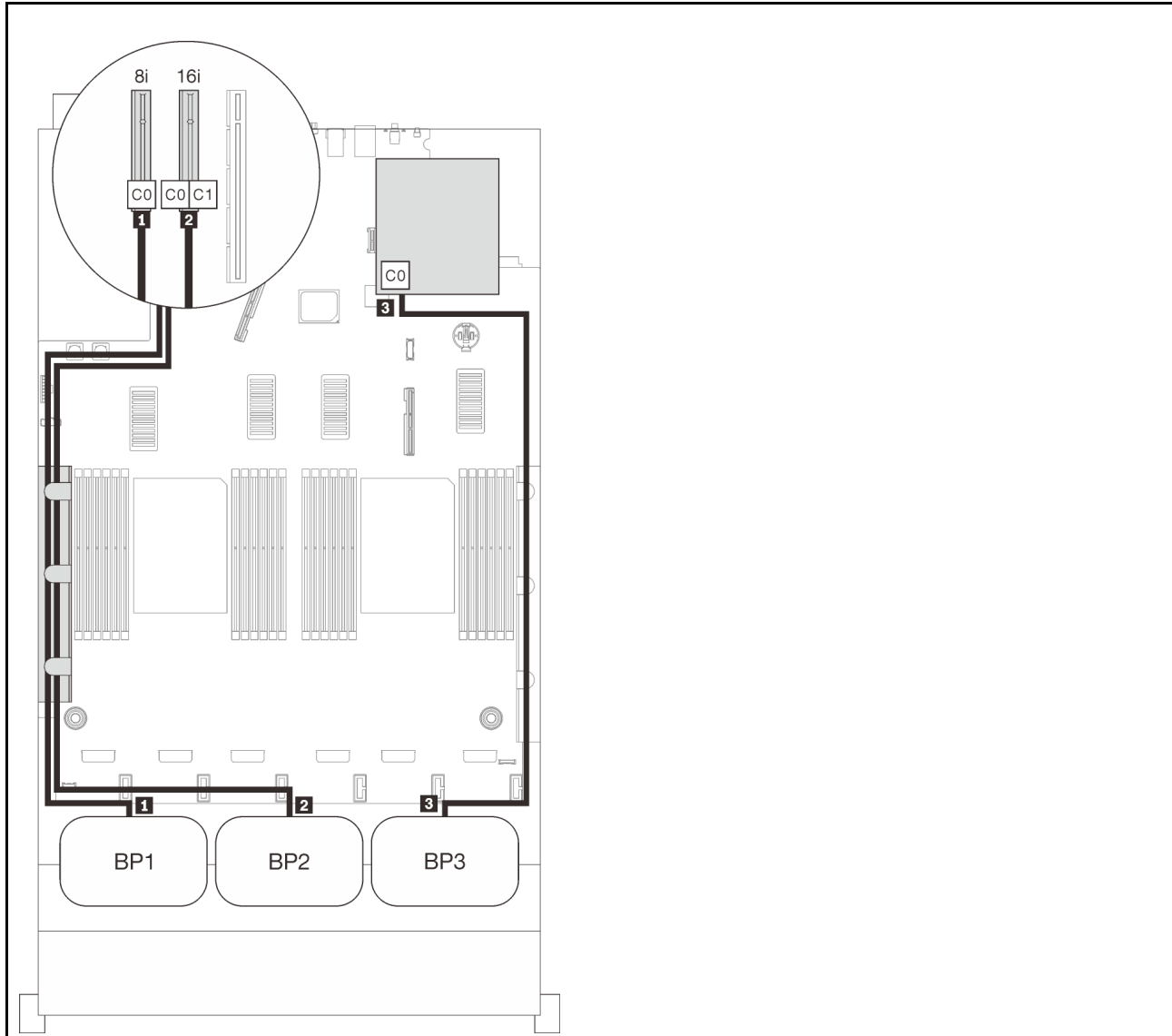
	Length	To
1	860 mm	C0 (32i)
2	690 mm	C1 (32i)
3	665 mm	C2 (32i)

16i + 8i RAID adapter



SAS/SATA cable routing		
	Length	To
1	<ul style="list-style-type: none"> • Gen3: 665 mm • Gen4: 690 mm 	C0 (16i)
2	860 mm	C1 (16i)
3	1000 mm	C0 (8i)

8i + 8i + 8i RAID adapter



SAS/SATA cable routing

	Length	To
1	665 mm	C0 (8i)
2	860 mm	C0 (8i)
3	665 mm	C0 (8i)

NVMe backplane combinations

Follow the instructions in this section to learn how do cable routing for pure NVMe backplanes.

Notes:

- See [“Connecting cables to the processor and memory expansion tray” on page 50](#) to perform the procedure properly while connecting PCIe cables to the processor and memory expansion tray.
- See [“Connecting cables to the NVMe switch cards” on page 52](#) to perform the procedure properly while connecting PCIe cables to the PCIe switch cards.

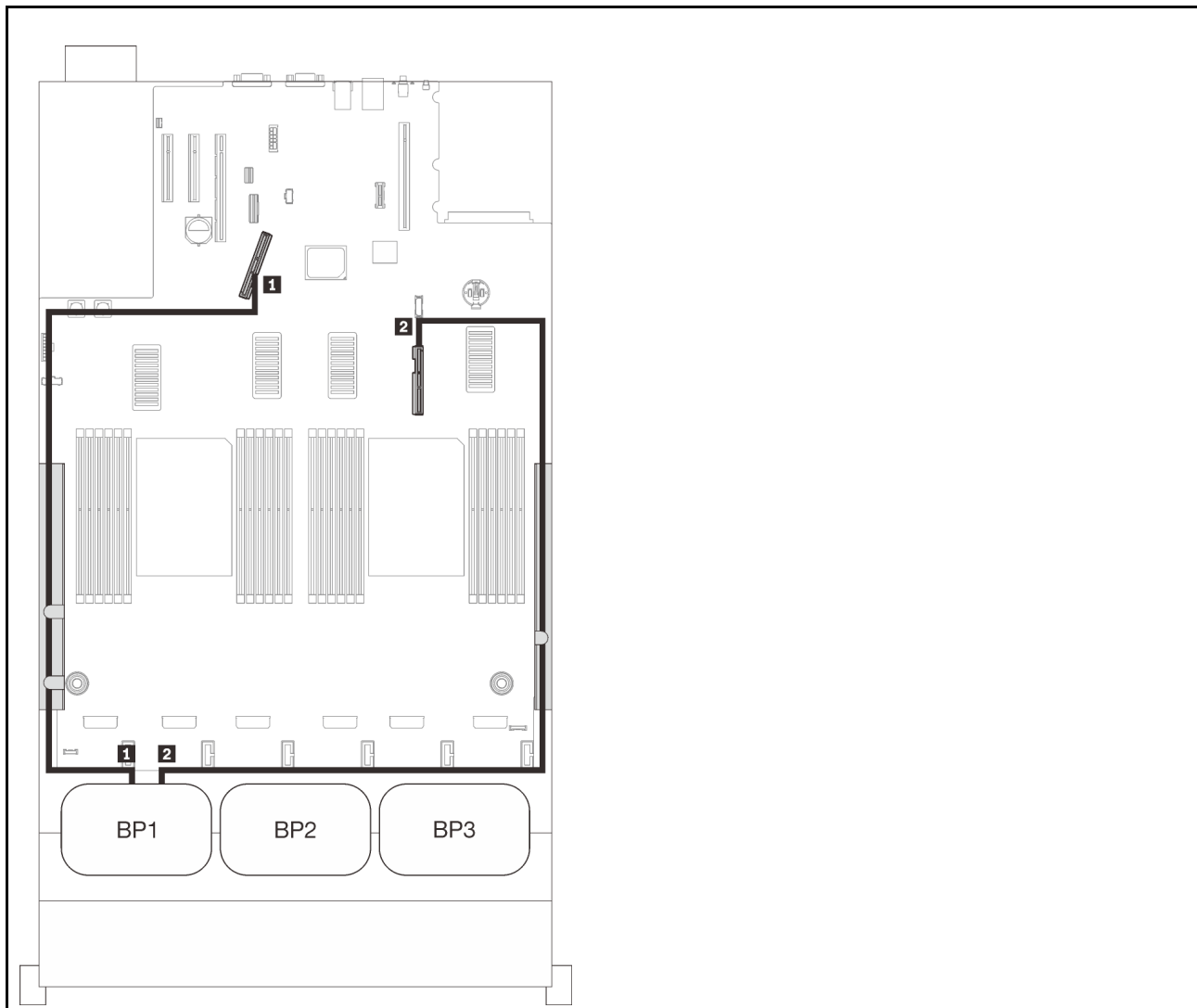
See the following sections for cable routing combinations with only NVMe drive backplanes.

- [“One backplane” on page 67](#)
- [“Two backplanes” on page 69](#)
- [“Three backplanes” on page 71](#)

One backplane

One NVMe backplane

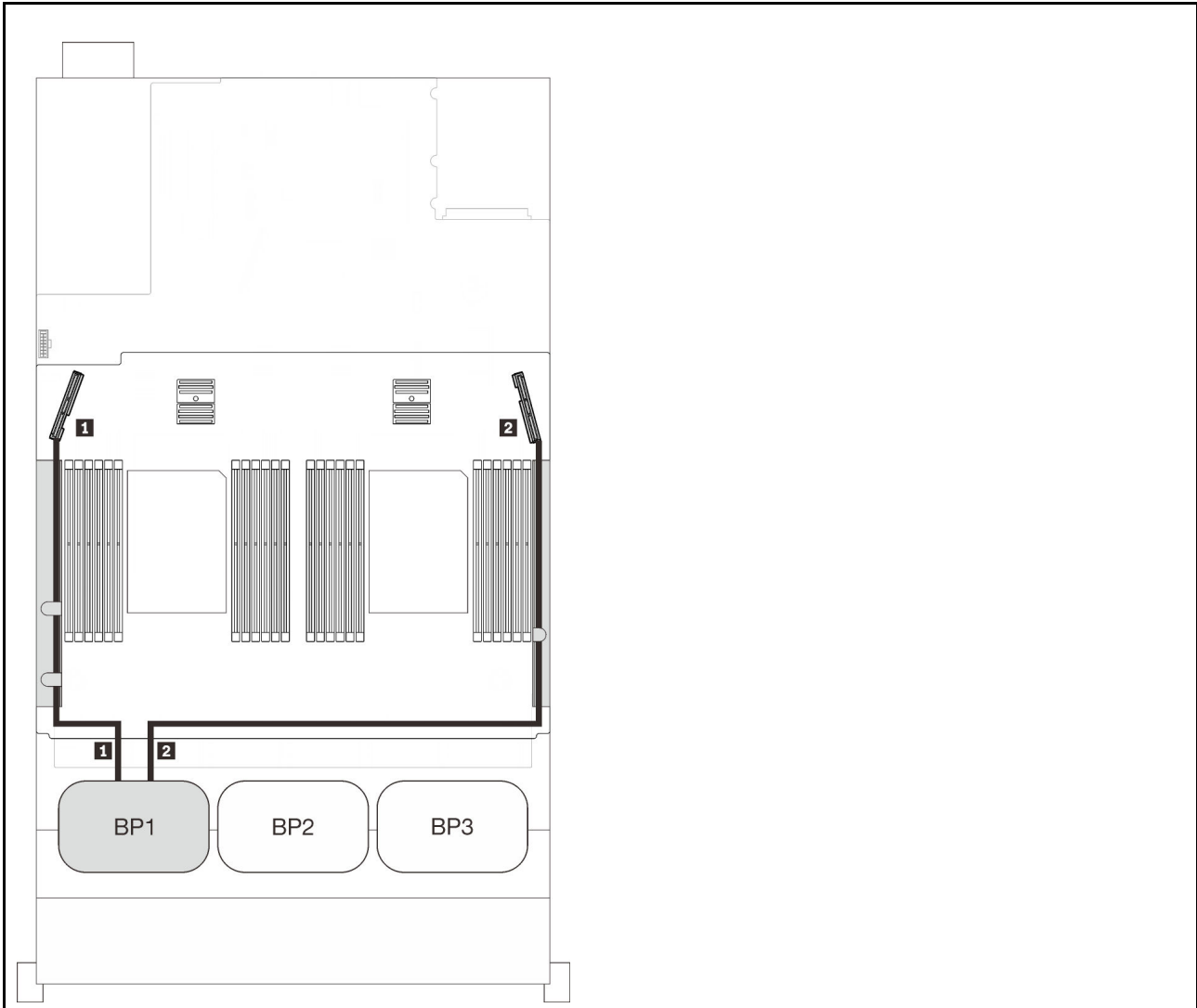
System board



PCIe cable routing

NVMe connector	Length	To
1 0-1, 2-3	670 mm	PCIe 1 (on-board)
2 4-5, 6-7	910 mm	PCIe 2 (on-board)

Processor and memory expansion tray



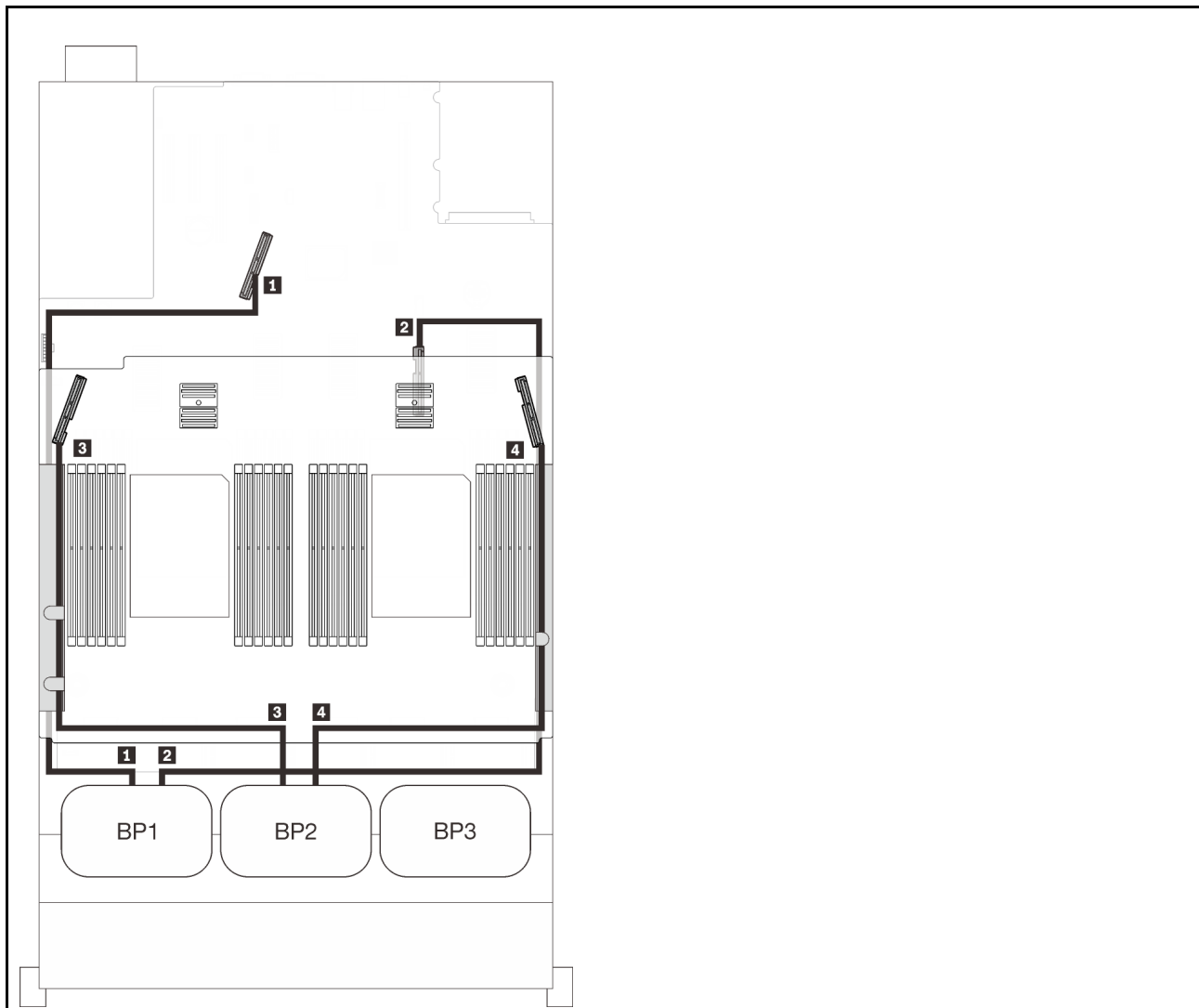
PCIe cable routing

NVMe connector	Length	To
1 0-1, 2-3	530 mm	PCIe 3 (tray)
2 4-5, 6-7	670 mm	PCIe 6 (tray)

Two backplanes

Two NVMe backplanes

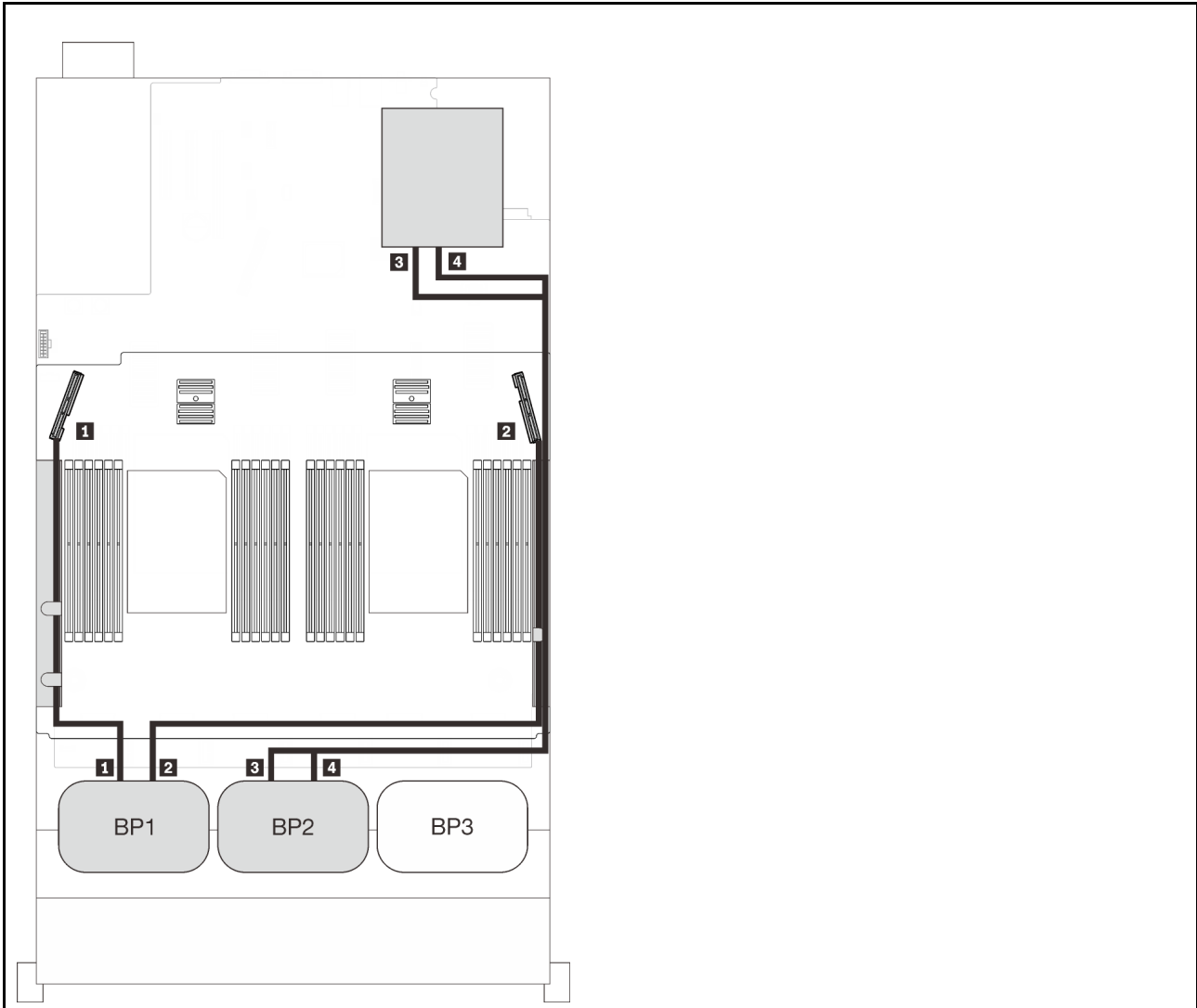
System board + processor and memory expansion tray



PCIe cable routing

NVMe connector	Length	To
1 0-1, 2-3	670 mm	PCIe 1 (on-board)
2 4-5, 6-7	910 mm	PCIe 2 (on-board)
3 0-1, 2-3	530 mm	PCIe 3 (tray)
4 4-5, 6-7	670 mm	PCIe 6 (tray)

Processor and memory expansion tray + PCIe switch cards



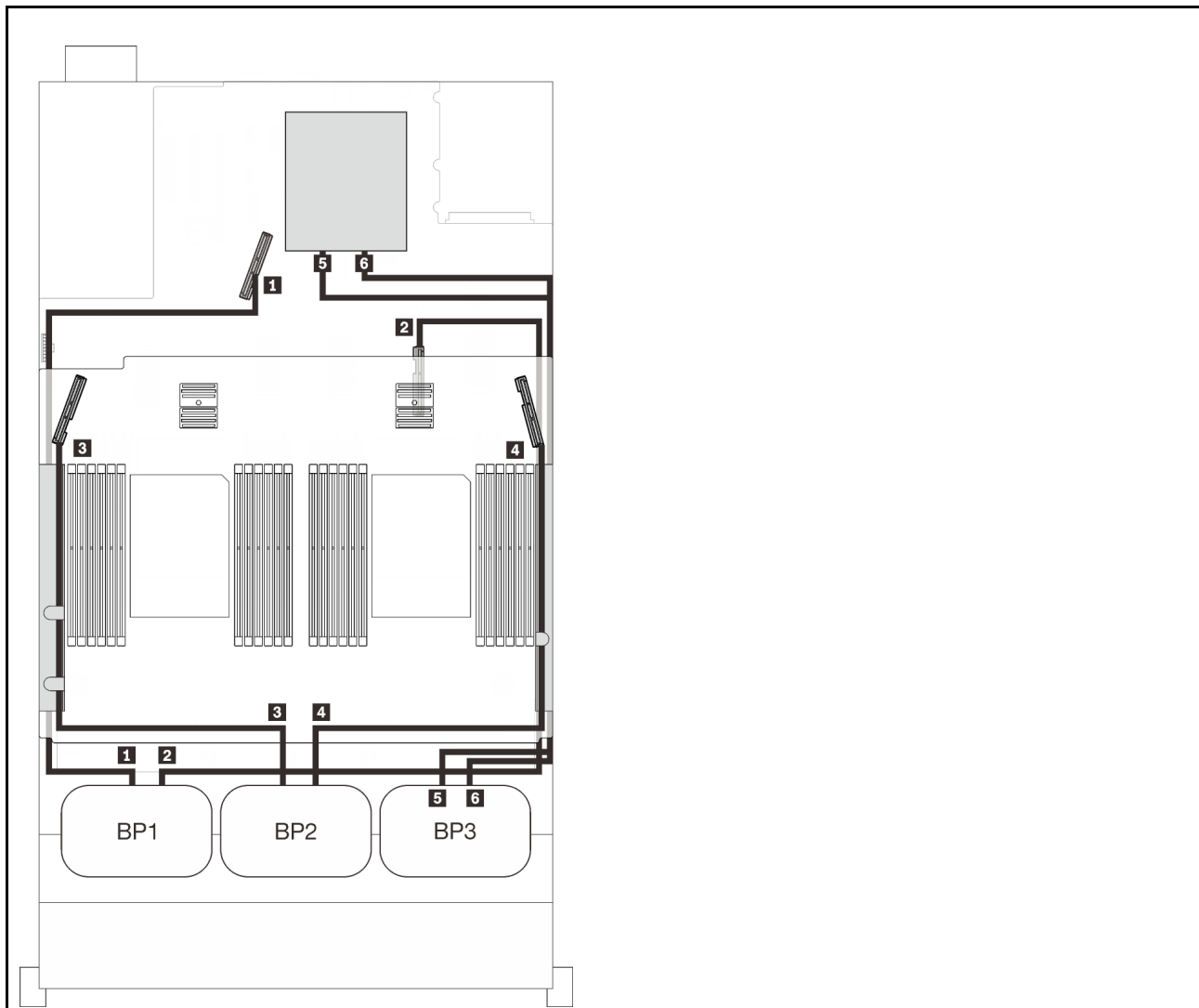
PCIe cable routing

NVMe connector	Length	To
1 0-1, 2-3	530 mm	PCIe 3 (tray)
2 4-5, 6-7	670 mm	PCIe 6 (tray)
3 0-1, 2-3	1100 mm	C0, C1 (Slot 5)
4 4-5, 6-7	1100 mm	C0, C1 (Slot 6)

Three backplanes

Three NVMe backplanes

System board + processor and memory expansion tray + PCIe switch cards



PCIe cable routing

NVMe connector	Length	To
1 0-1, 2-3	670 mm	PCIe 1 (on-board)
2 4-5, 6-7	910 mm	PCIe 2 (on-board)
3 0-1, 2-3	530 mm	PCIe 3 (tray)
4 4-5, 6-7	670 mm	PCIe 6 (tray)
5 0-1, 2-3	1100 mm	C0, C1 (Slot 5)
6 4-5, 6-7	1100 mm	C0, C1 (Slot 6)

One-AnyBay-backplane combinations

Follow the instructions in this section to learn how do cable routing for combinations with one AnyBay backplane.

See the following sections for cable routing combinations with one AnyBay drive backplane.

- [“With two processors” on page 73](#)
 - [“One backplane” on page 73](#)
 - [“Two backplanes” on page 76](#)
 - [“Three backplanes” on page 77](#)
- [“With four processors” on page 81](#)
 - [“One backplane” on page 81](#)
 - [“Two backplanes” on page 84](#)
 - [“Three backplanes” on page 86](#)

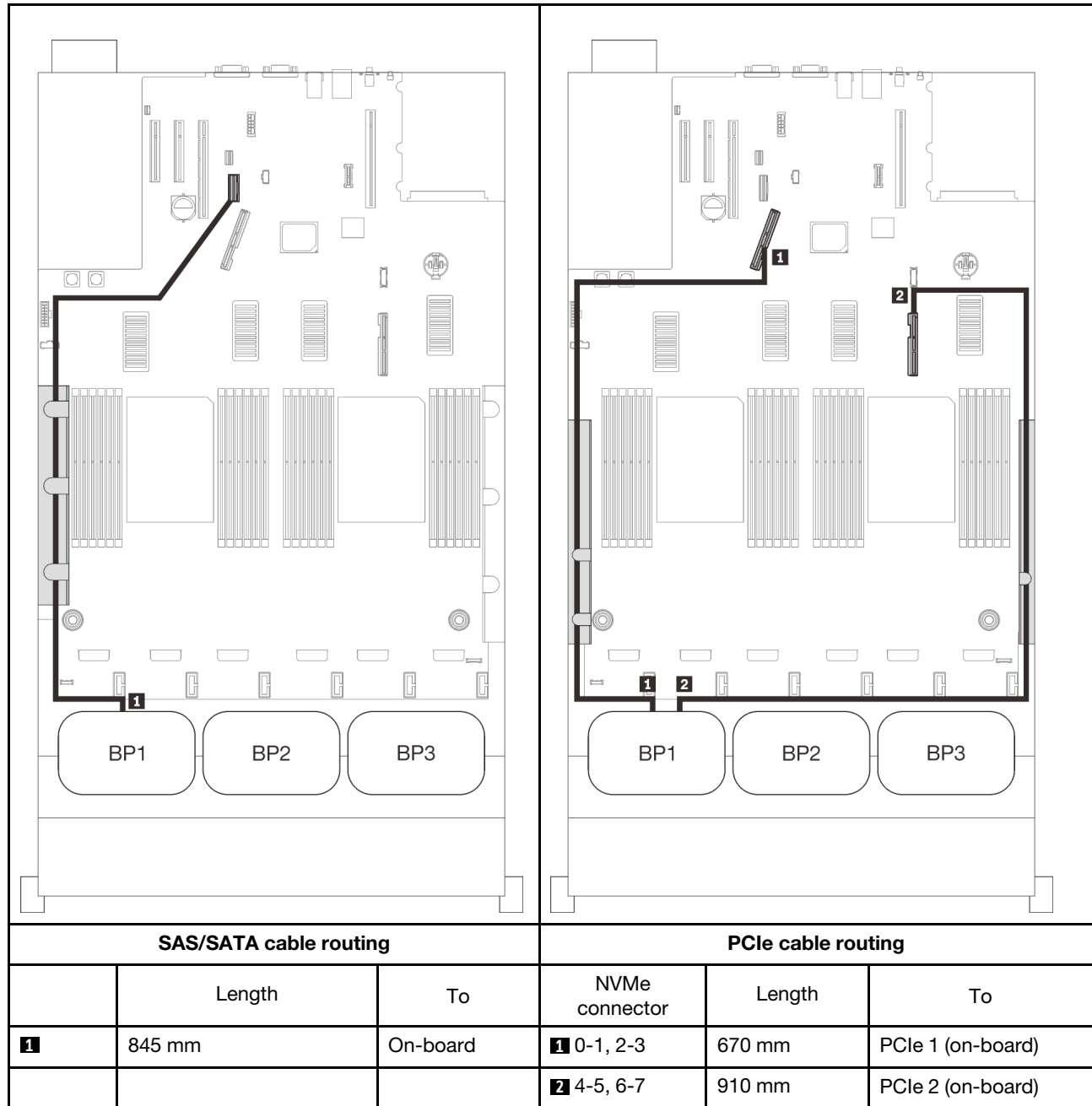
With two processors

Follow the instructions in this section to learn how do cable routing for combinations with one AnyBay backplane and two processors.

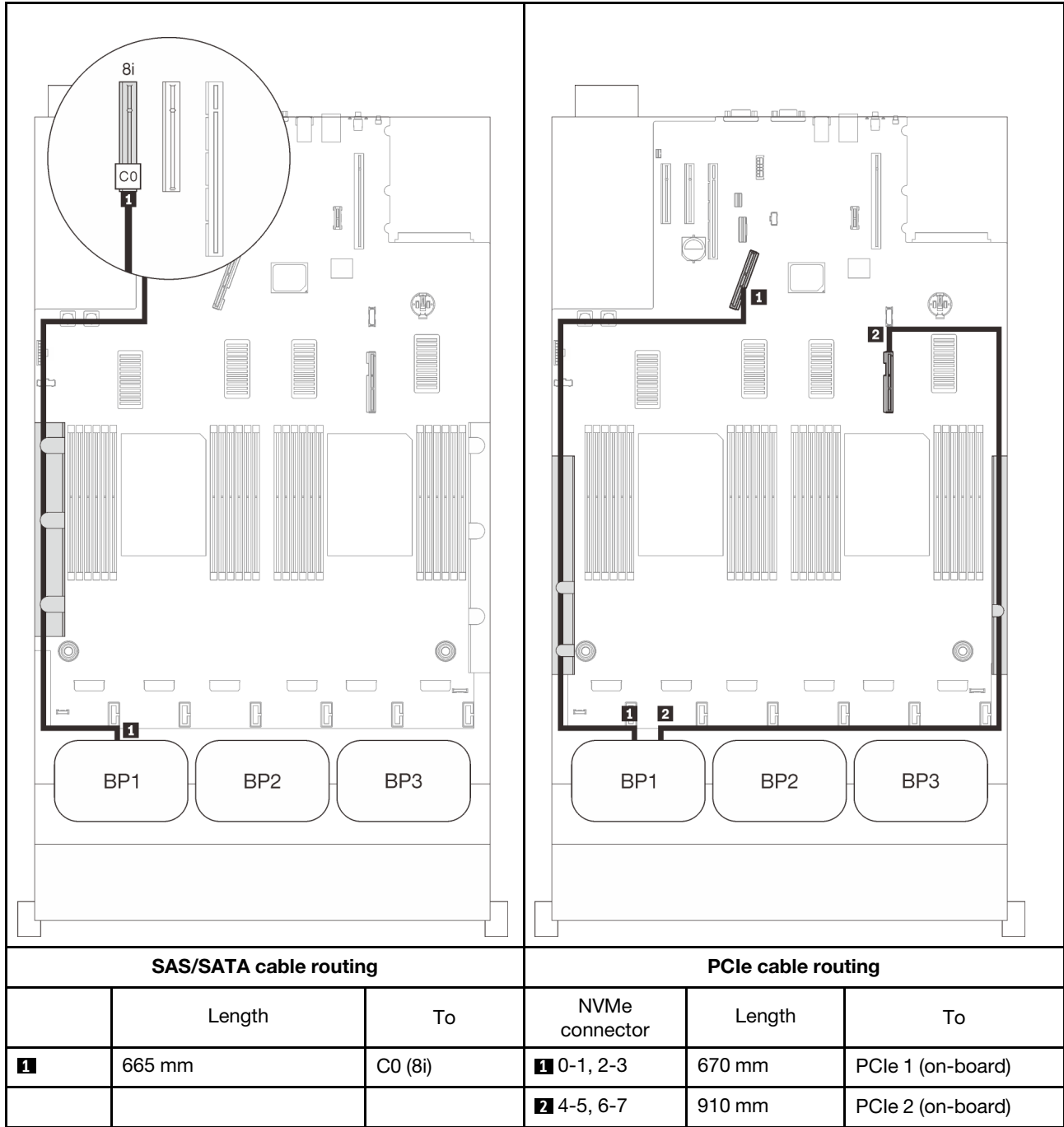
One backplane

One AnyBay backplane

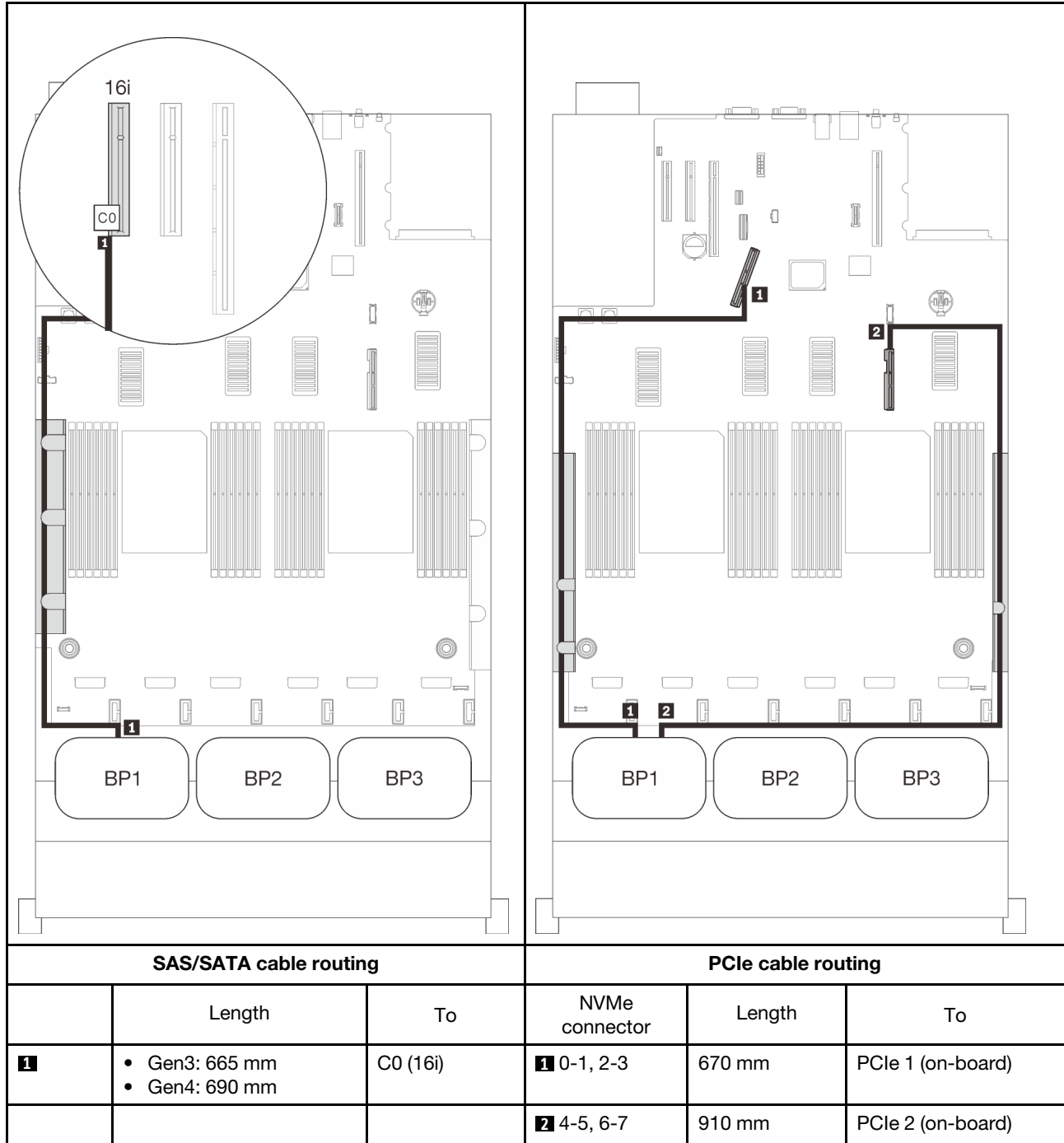
On-board connector



8i RAID adapter



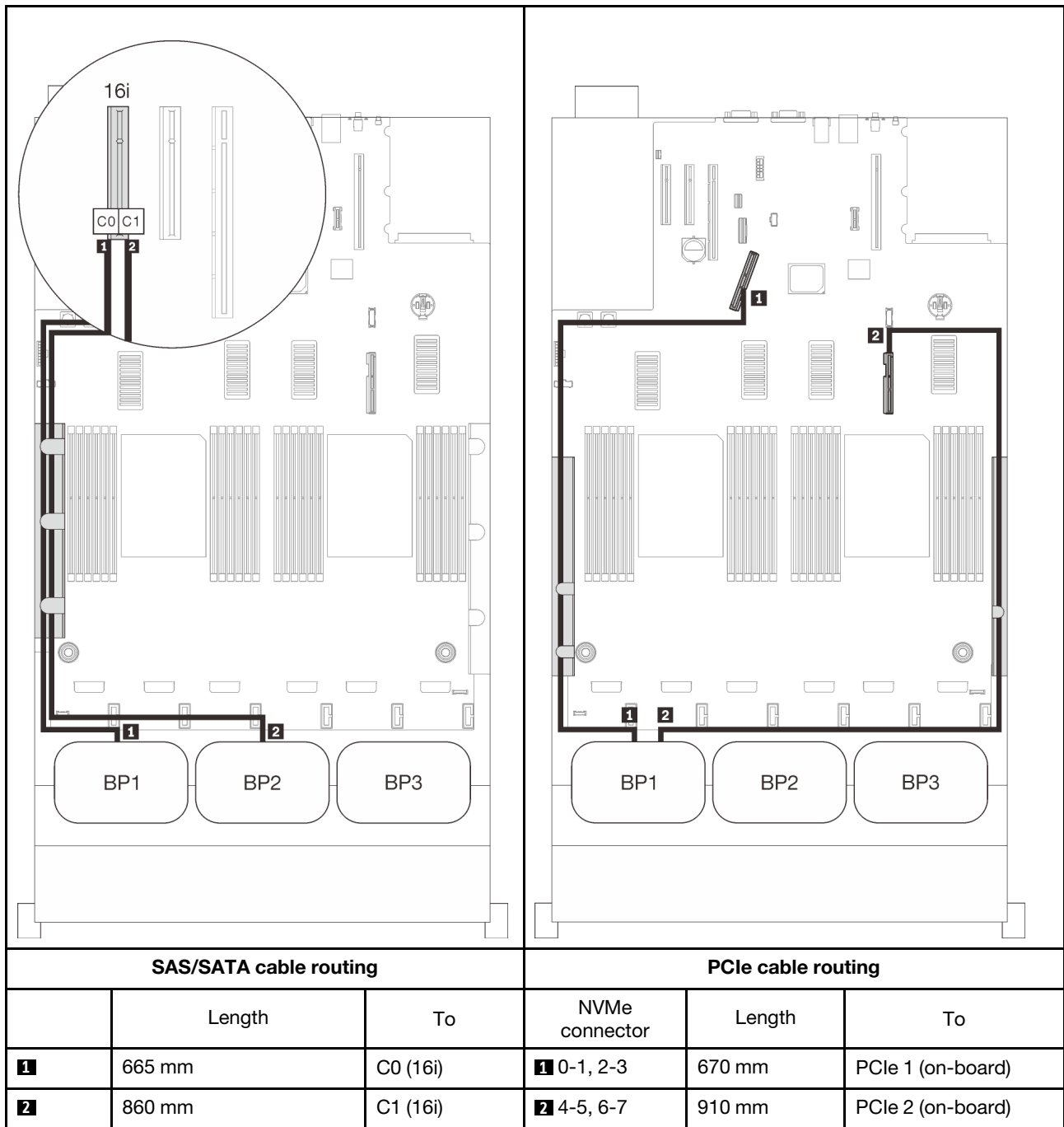
16i RAID adapter



Two backplanes

One AnyBay and one SAS/SATA backplane

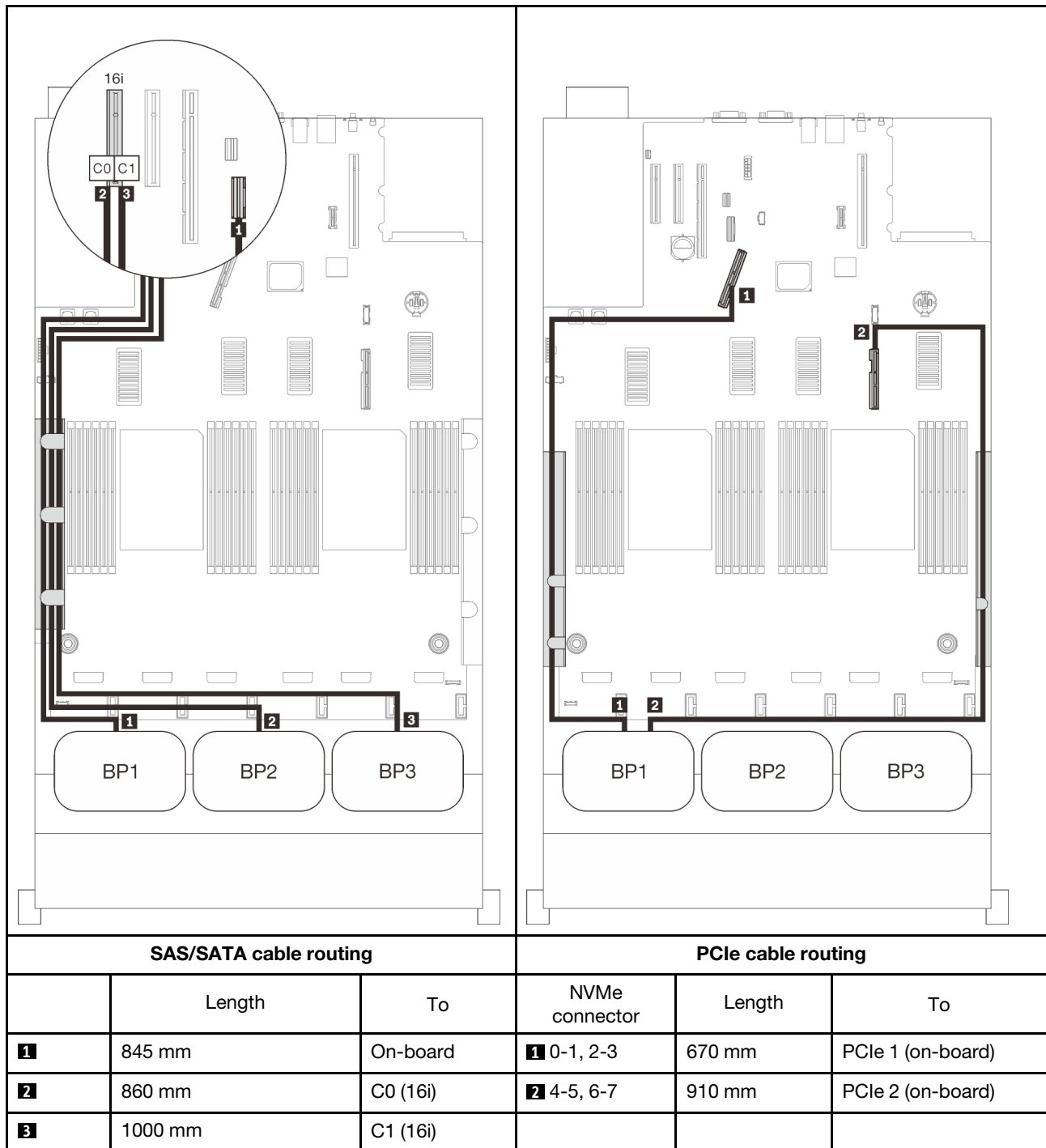
16i RAID adapter



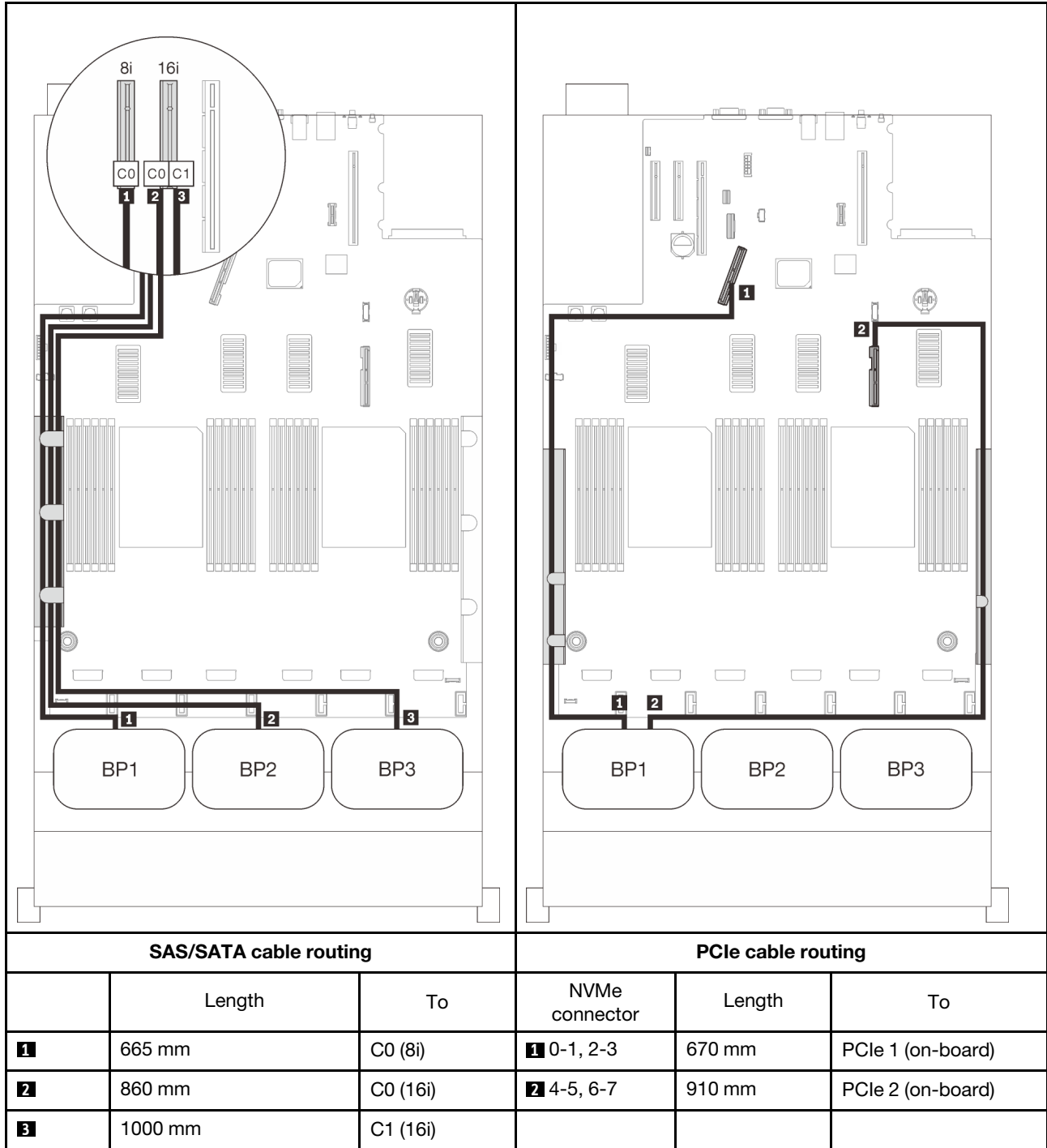
Three backplanes

One AnyBay and two SAS/SATA backplanes

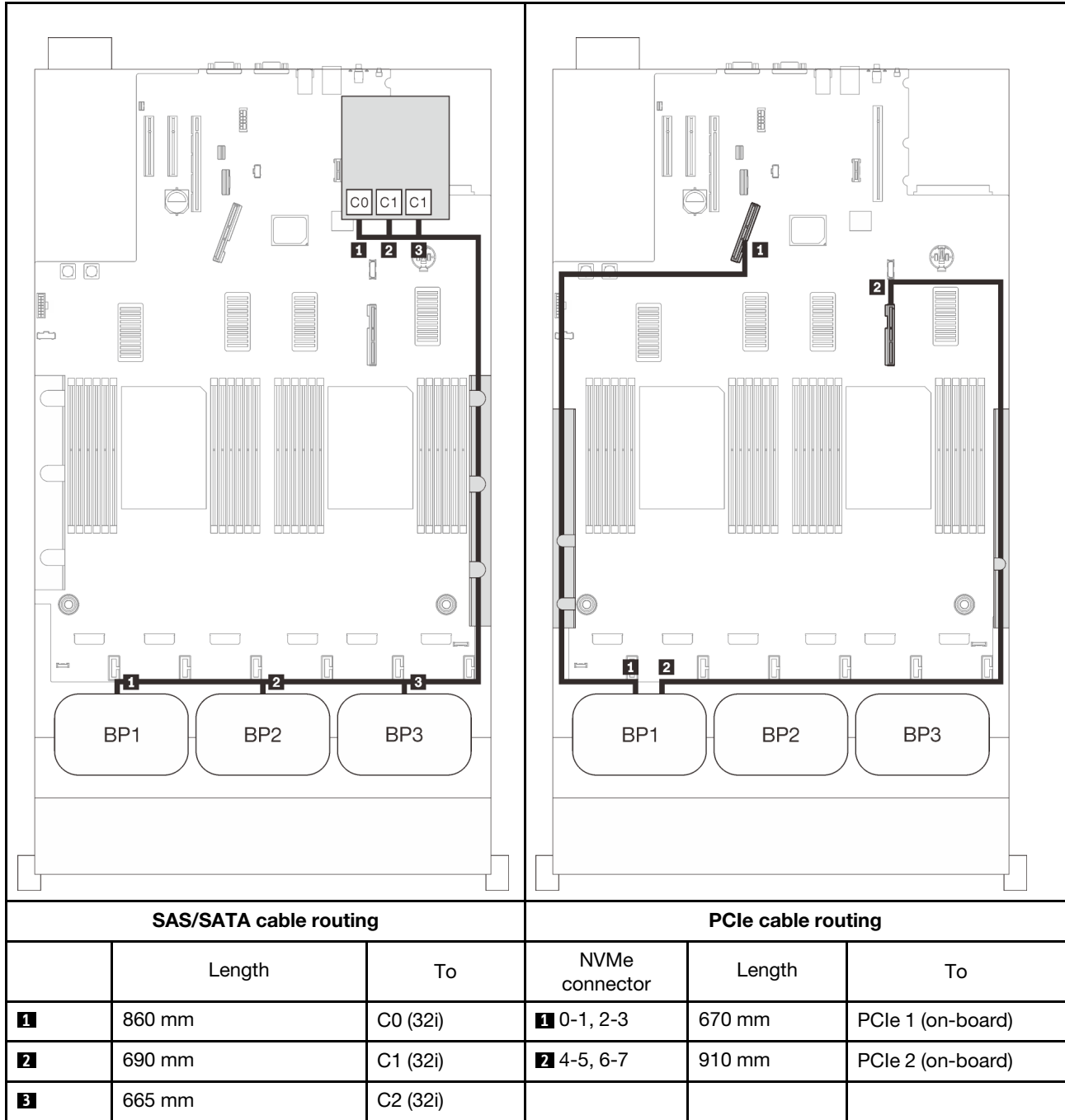
On-board connector + 16i RAID adapter



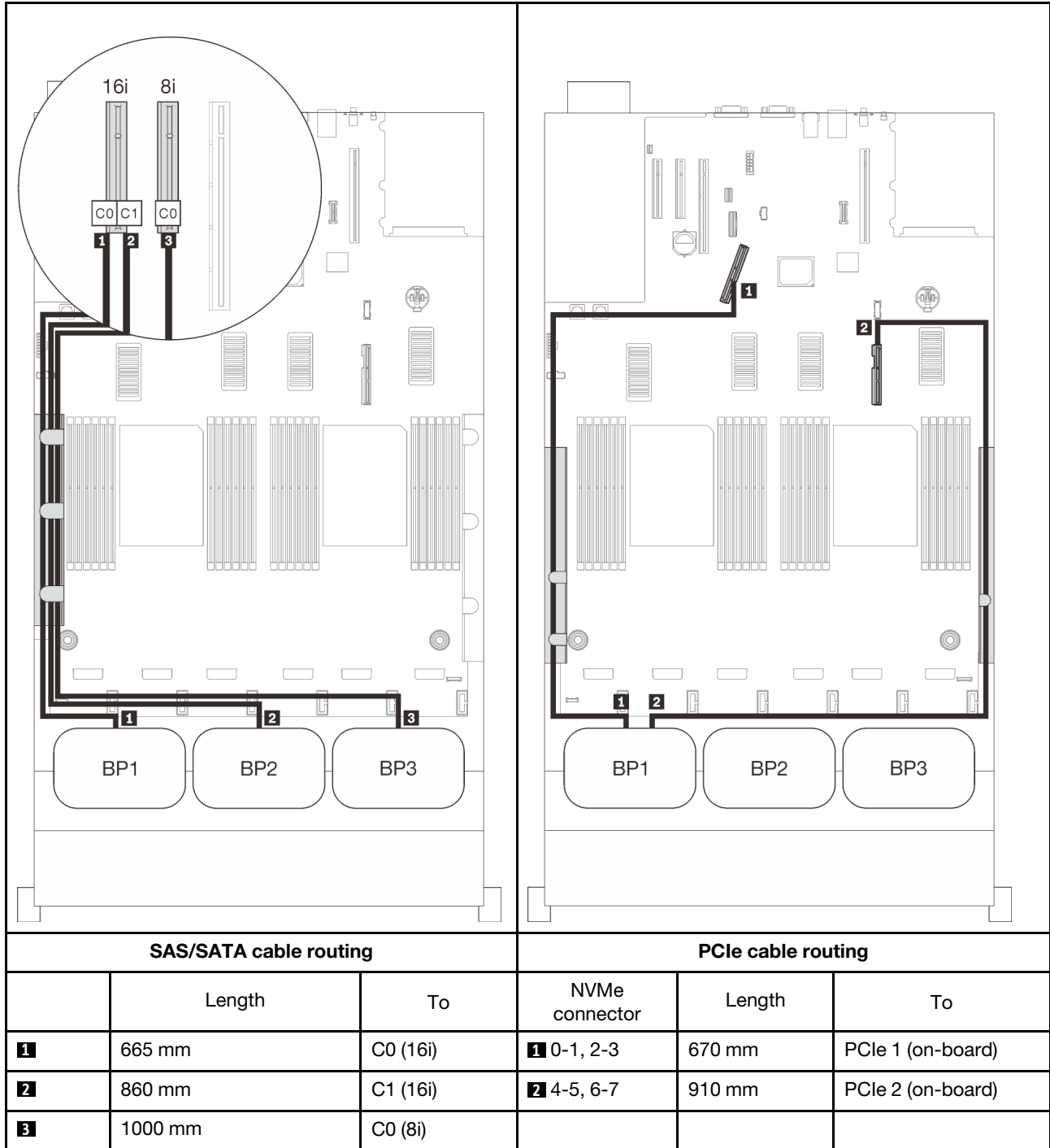
8i + 16i RAID adapters



32i RAID adapter



16i + 8i RAID adapter



With four processors

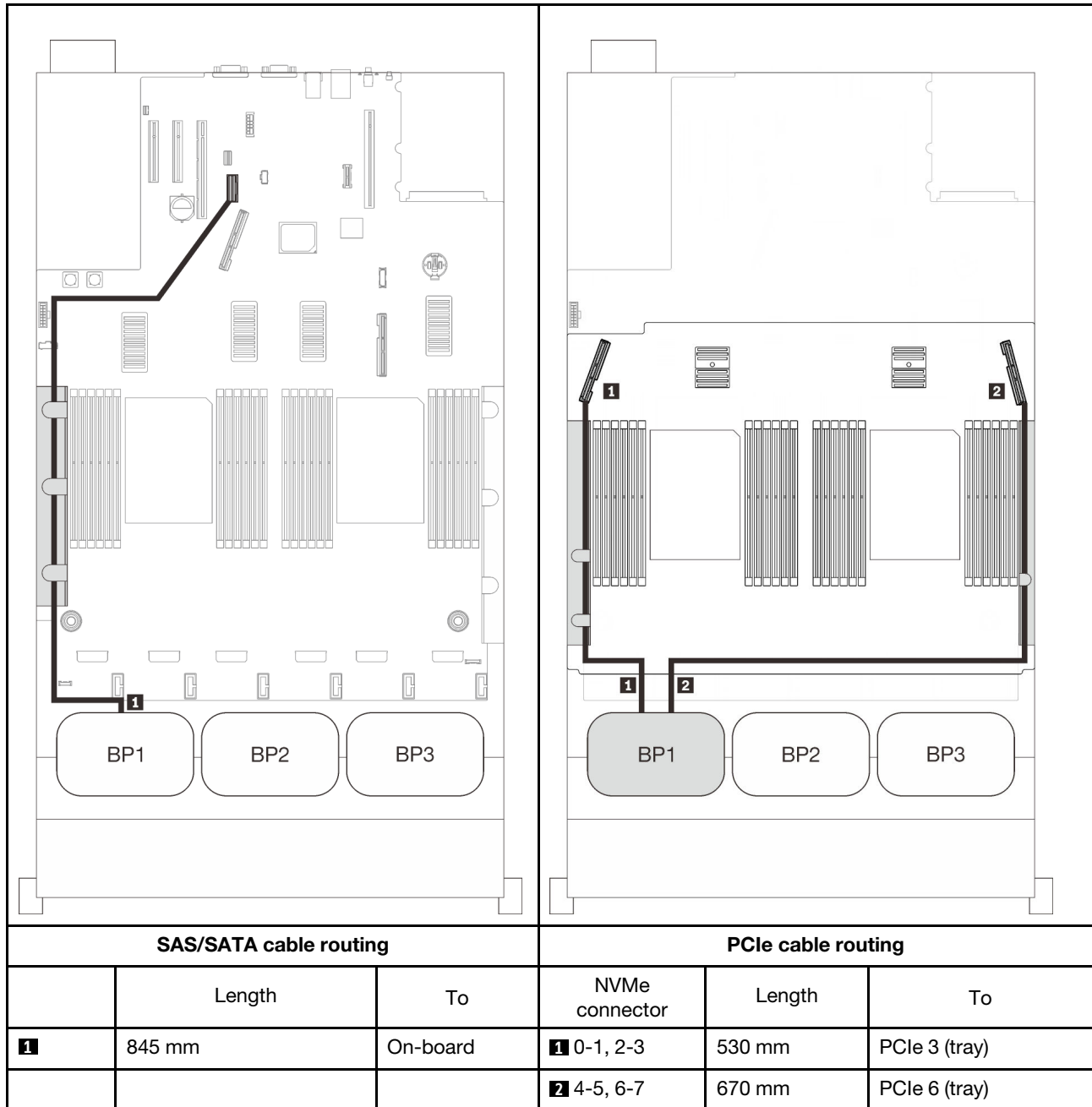
with four processors installed, the two PCIe connectors on the expansion tray are also available. Follow the instructions in this section to learn how do cable routing for combinations with one AnyBay backplane and these two connectors.

Note: See [“Connecting cables to the processor and memory expansion tray” on page 50](#) to perform the procedure properly while connecting PCIe cables to the processor and memory expansion tray.

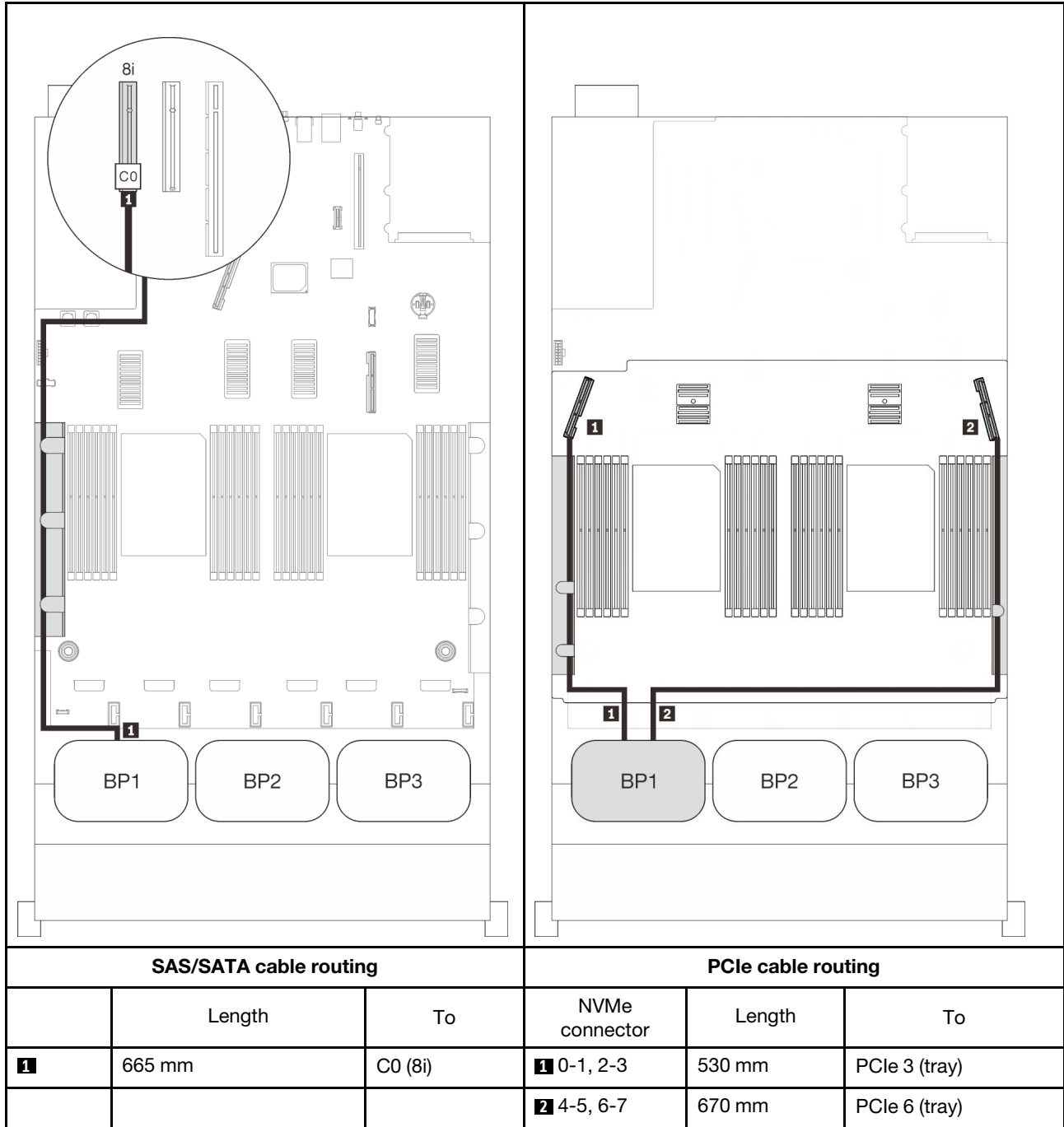
One backplane

One AnyBay backplane

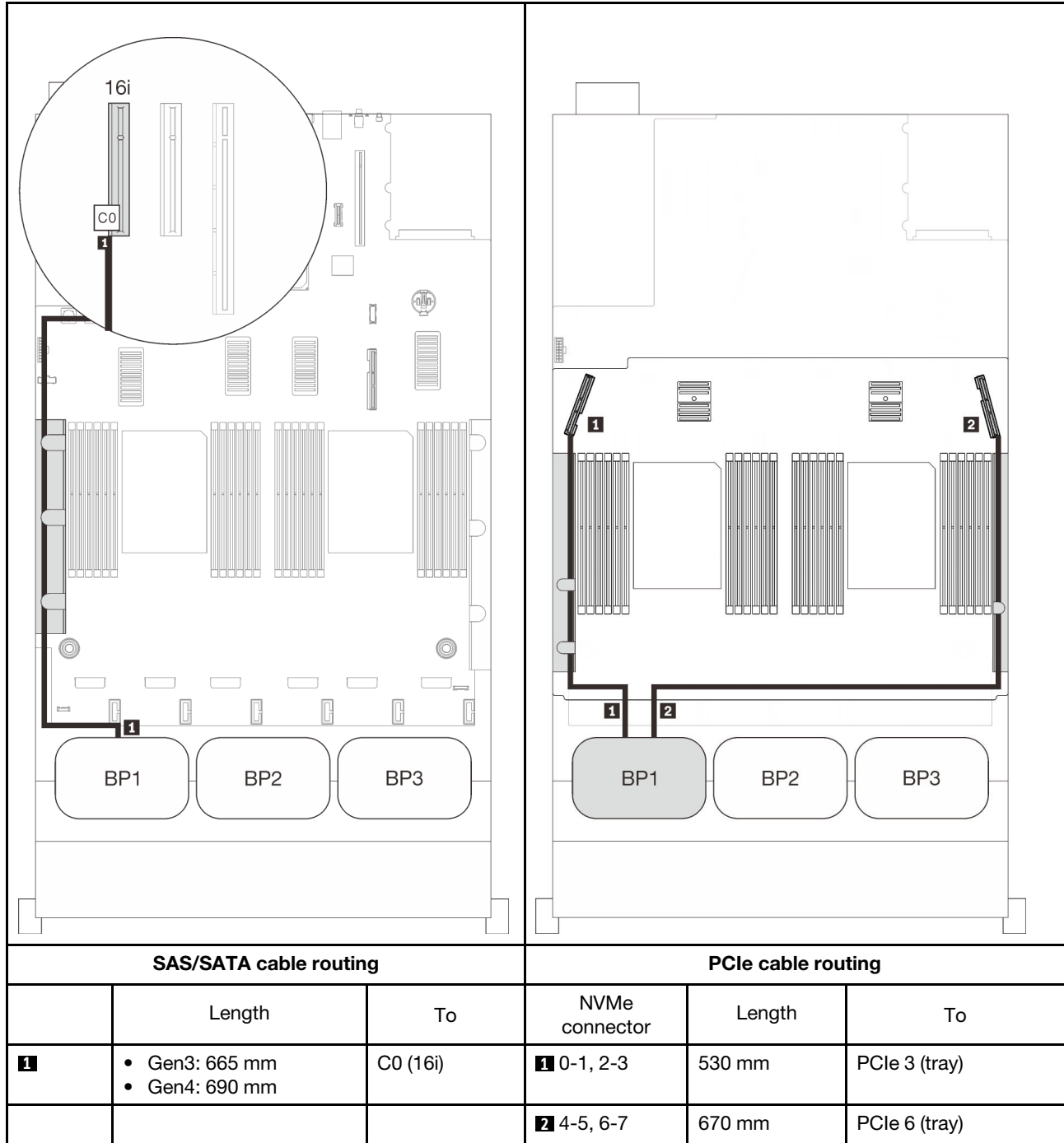
On-board connector



8i RAID adapter



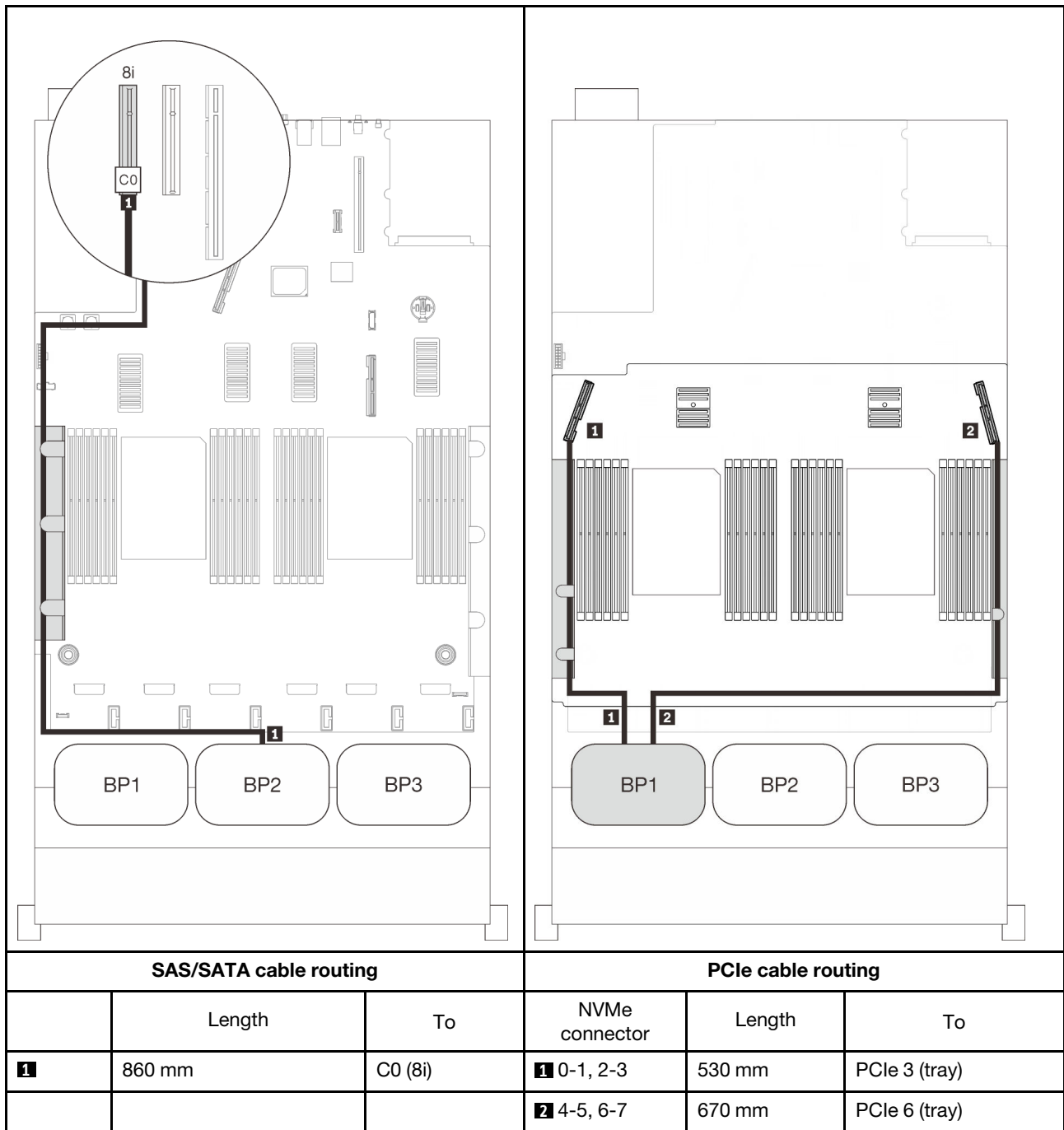
16i RAID adapter



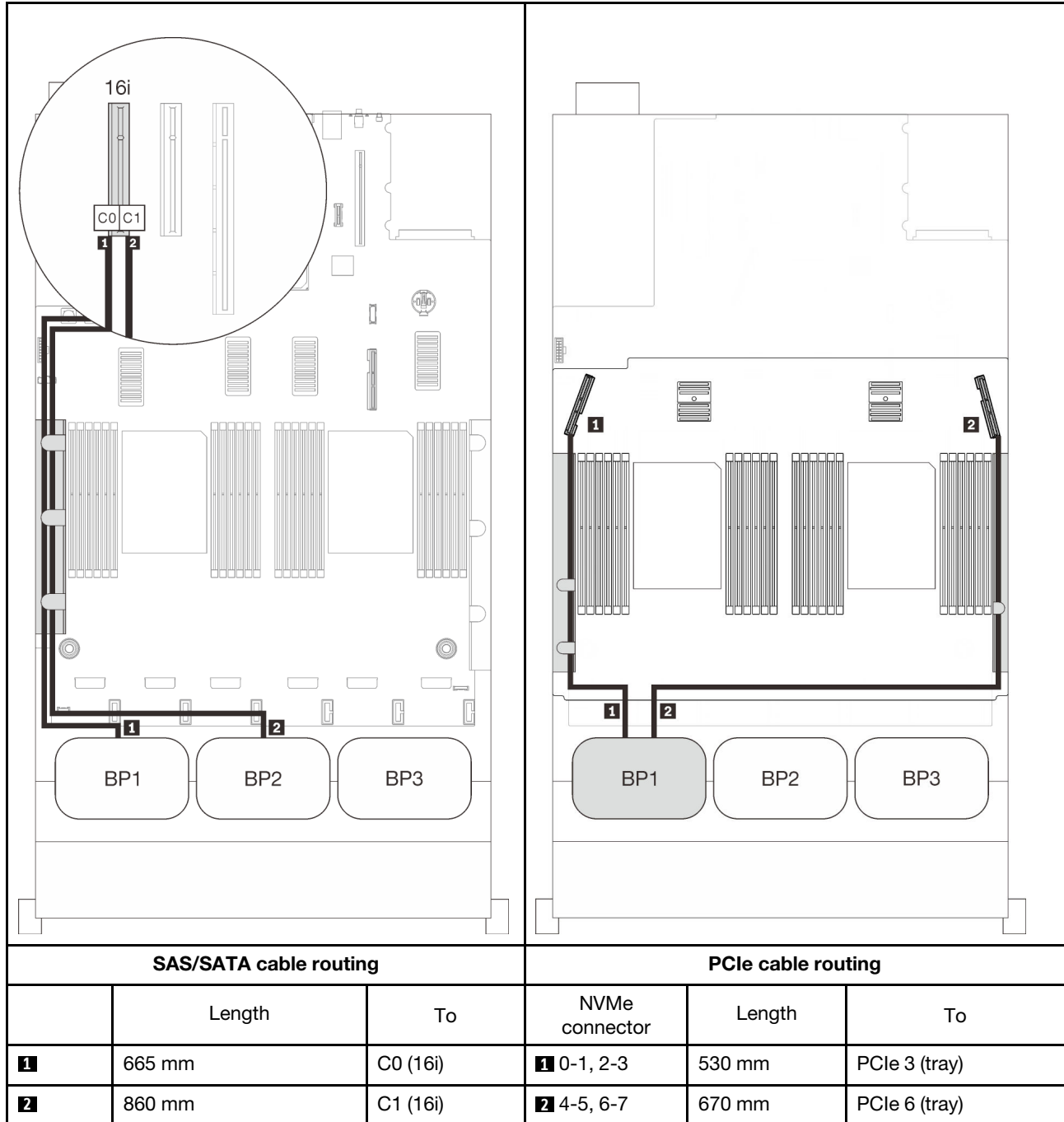
Two backplanes

One AnyBay and one SAS/SATA backplane

8i RAID adapter



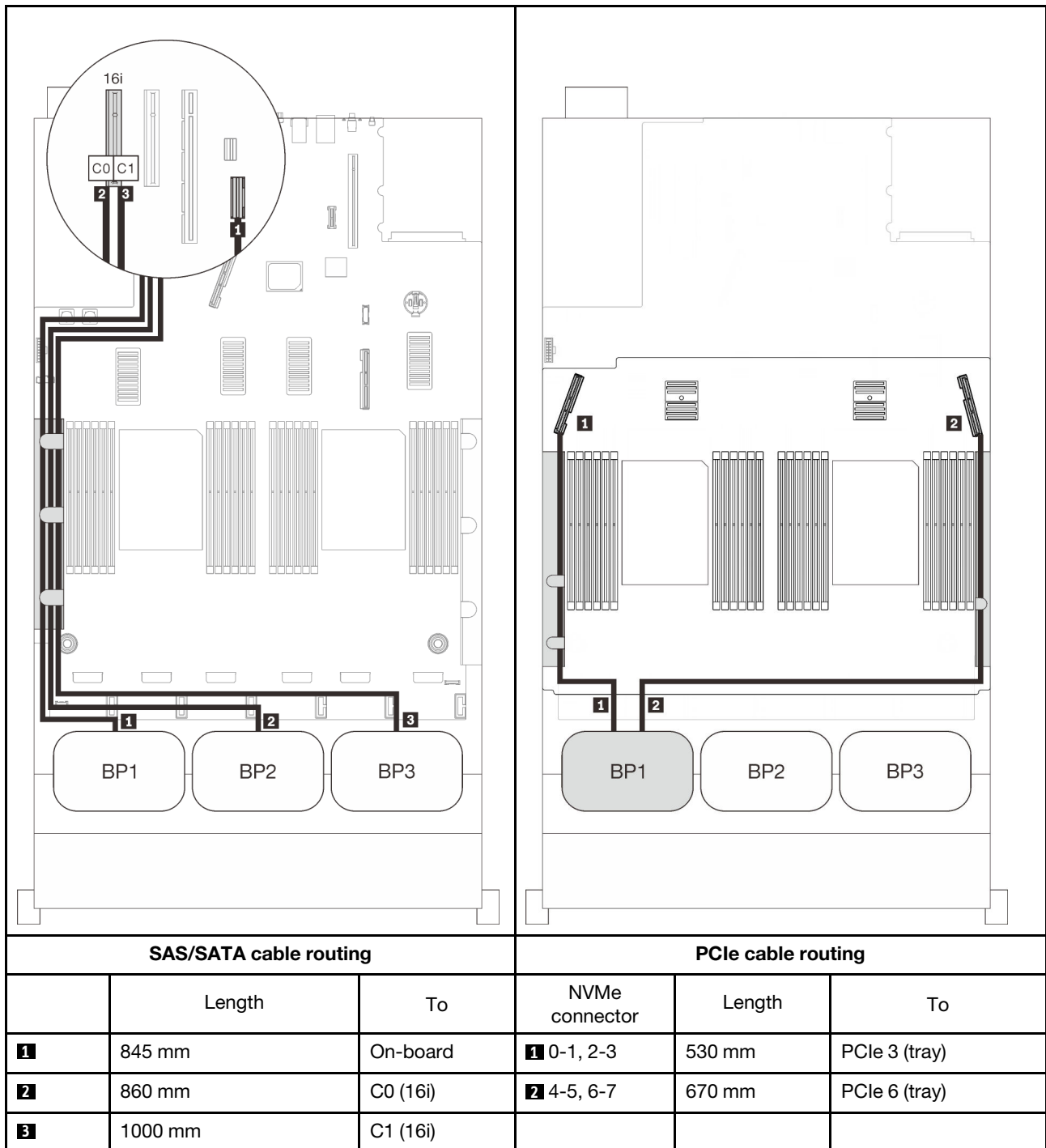
16i RAID adapter



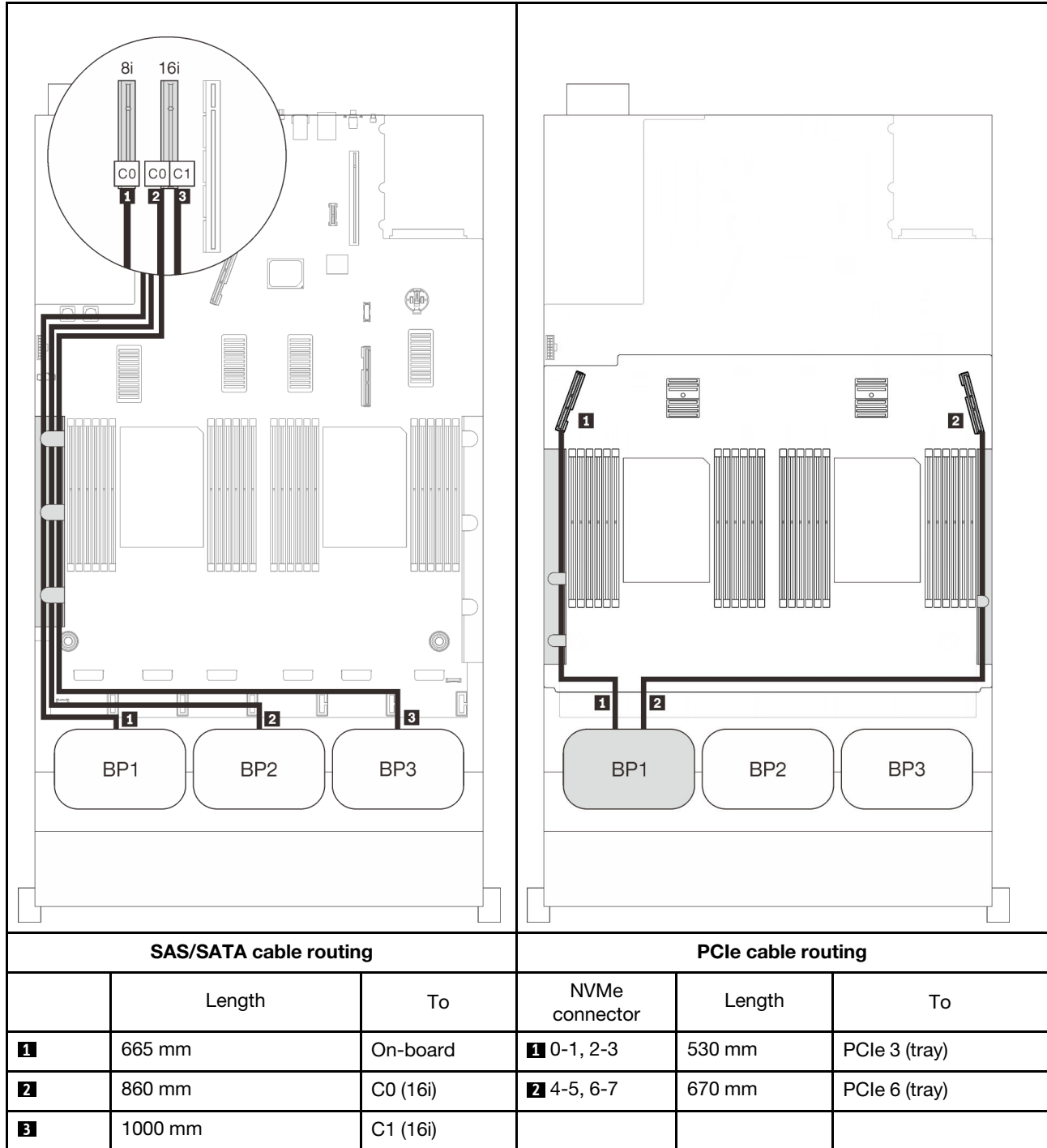
Three backplanes

One AnyBay and two SAS/SATA backplanes

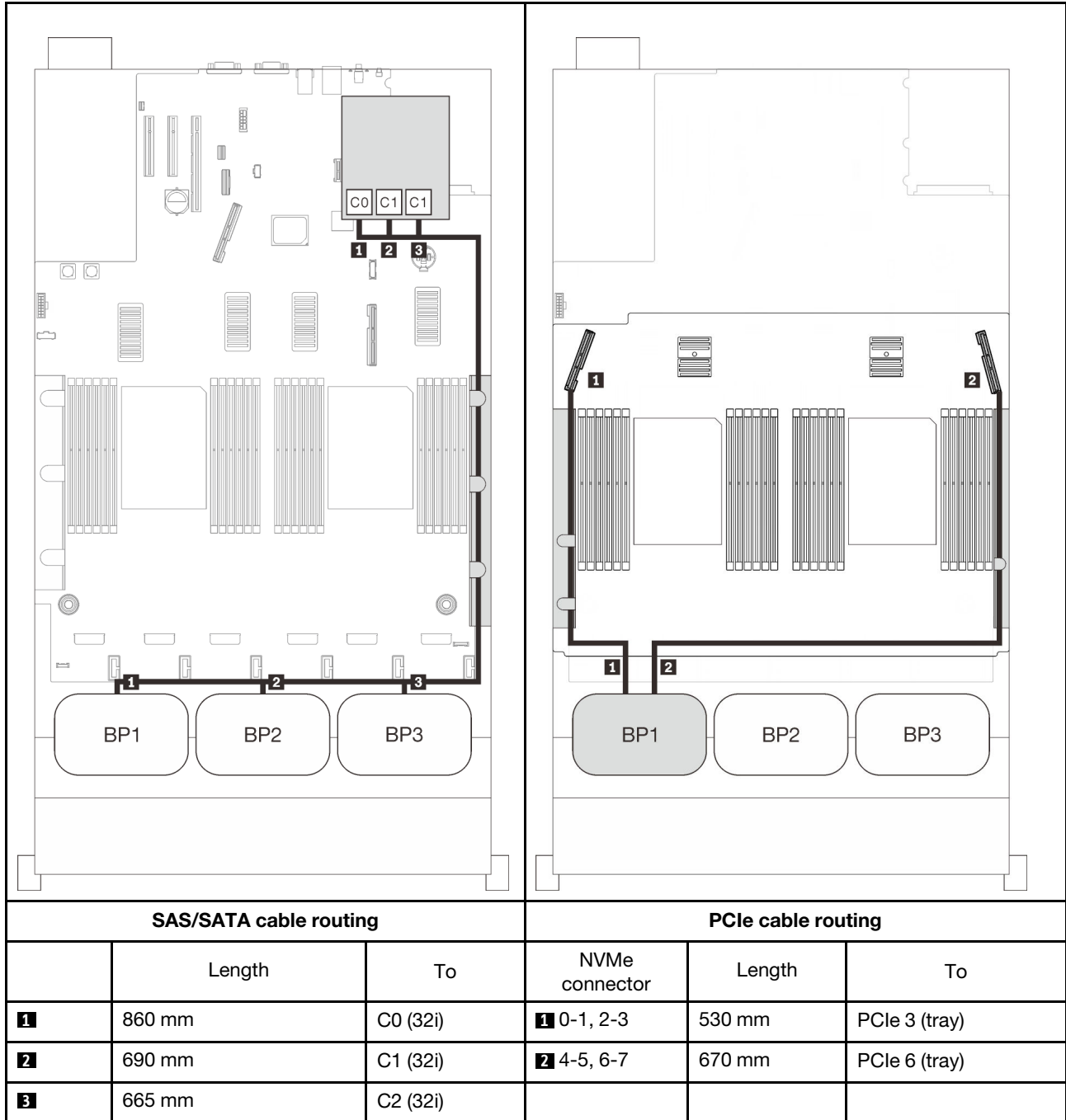
On-board connector + 16i RAID adapter



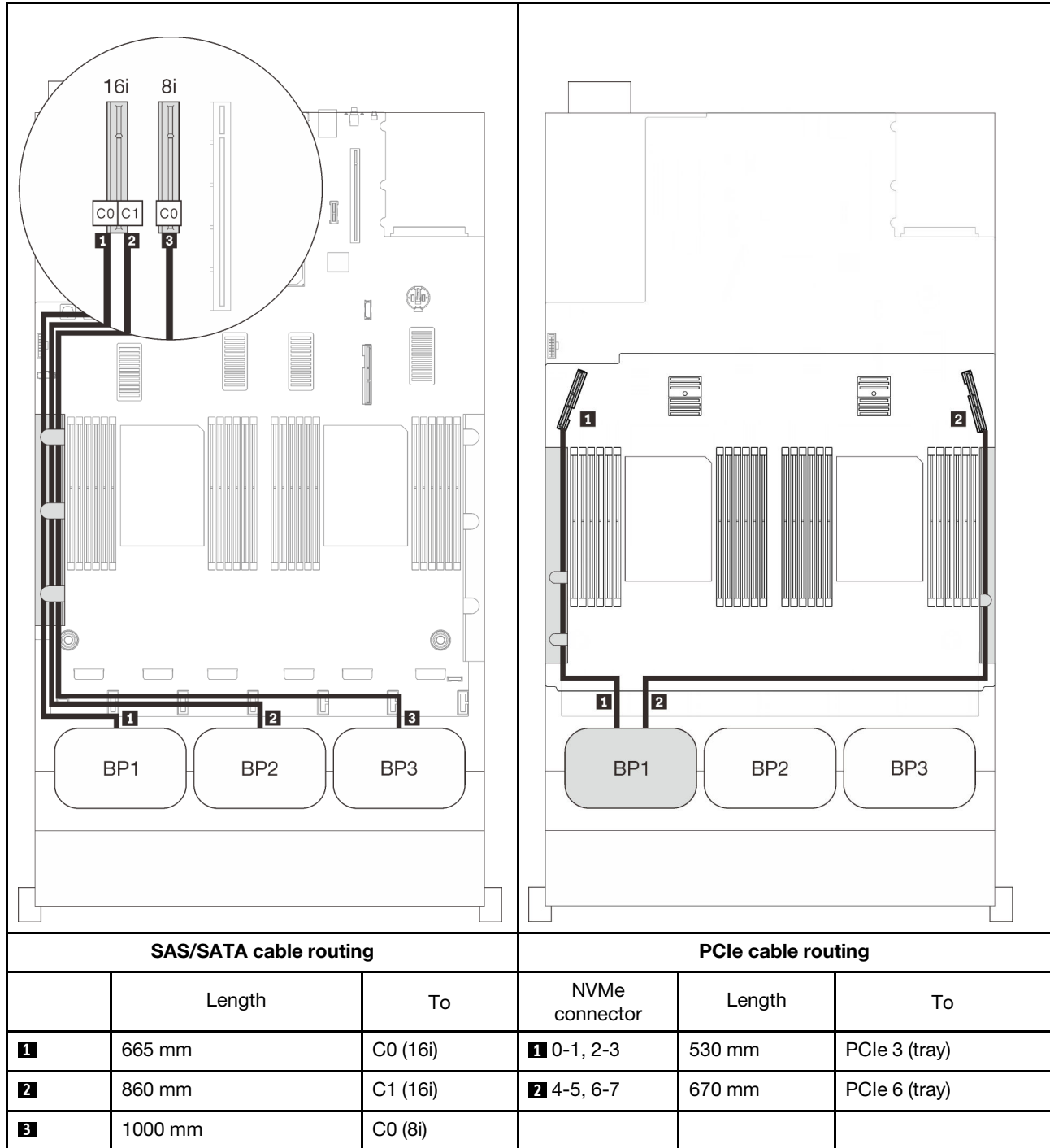
8i + 16i RAID adapters



32i RAID adapter



16i + 8i RAID adapter



Two-AnyBay-backplane combinations

Follow the instructions in this section to learn how do cable routing for combinations with two AnyBay backplanes.

Note: These combinations require four installed processors.

See the following sections for cable routing combinations with two AnyBay drive backplanes.

- [“Without PCIe switch card” on page 90](#)
 - [“Two backplanes” on page 90](#)
 - [“Three backplanes” on page 92](#)
- [“With PCIe switch card” on page 96](#)
 - [“Two backplanes” on page 97](#)
 - [“Three backplanes” on page 98](#)

Without PCIe switch card

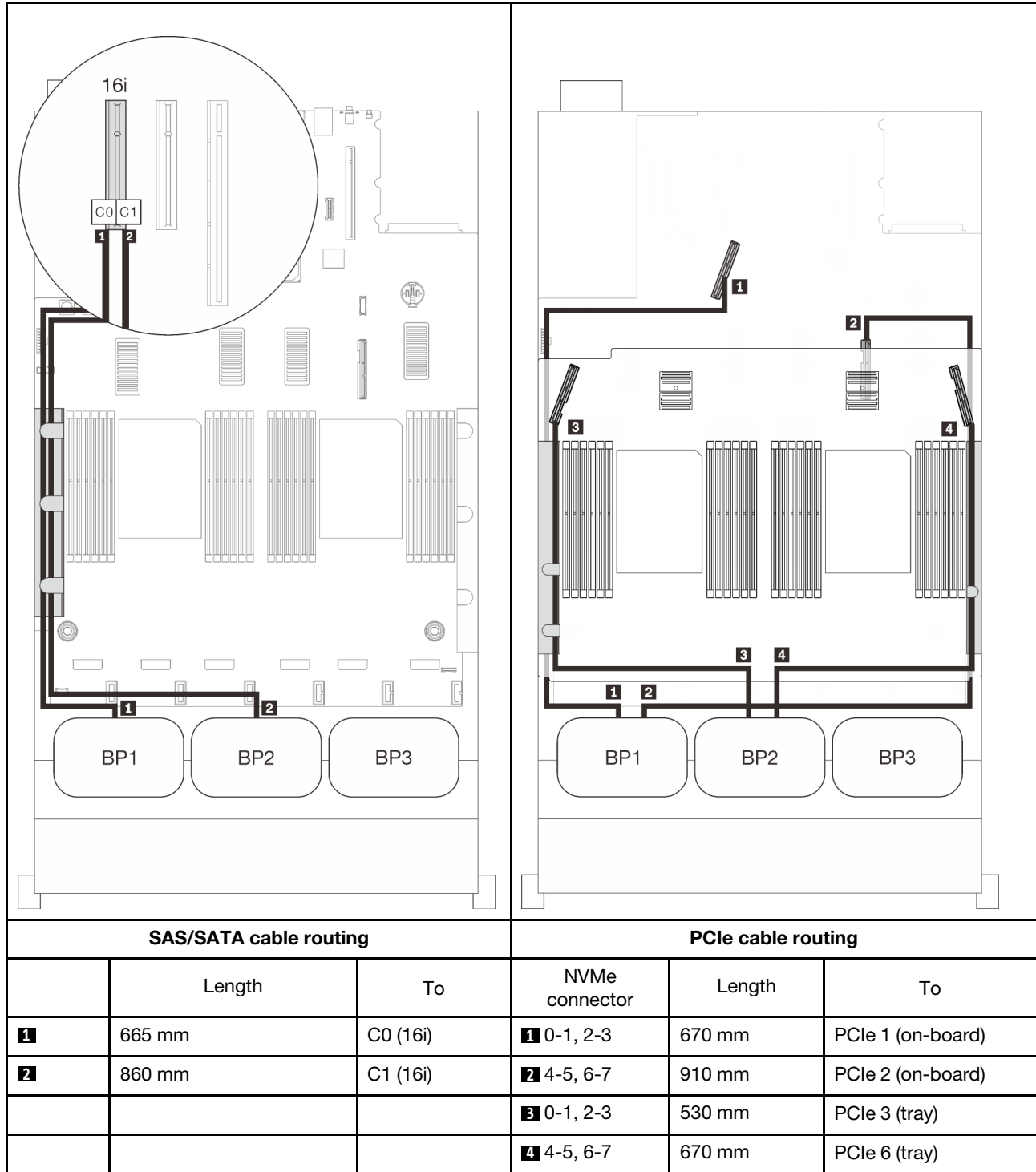
Follow the instructions in this section to learn how do cable routing for combinations with two AnyBay backplanes and not PCIe switch card.

Note: See [“Connecting cables to the processor and memory expansion tray” on page 50](#) to perform the procedure properly while connecting PCIe cables to the processor and memory expansion tray.

Two backplanes

Two AnyBay backplanes

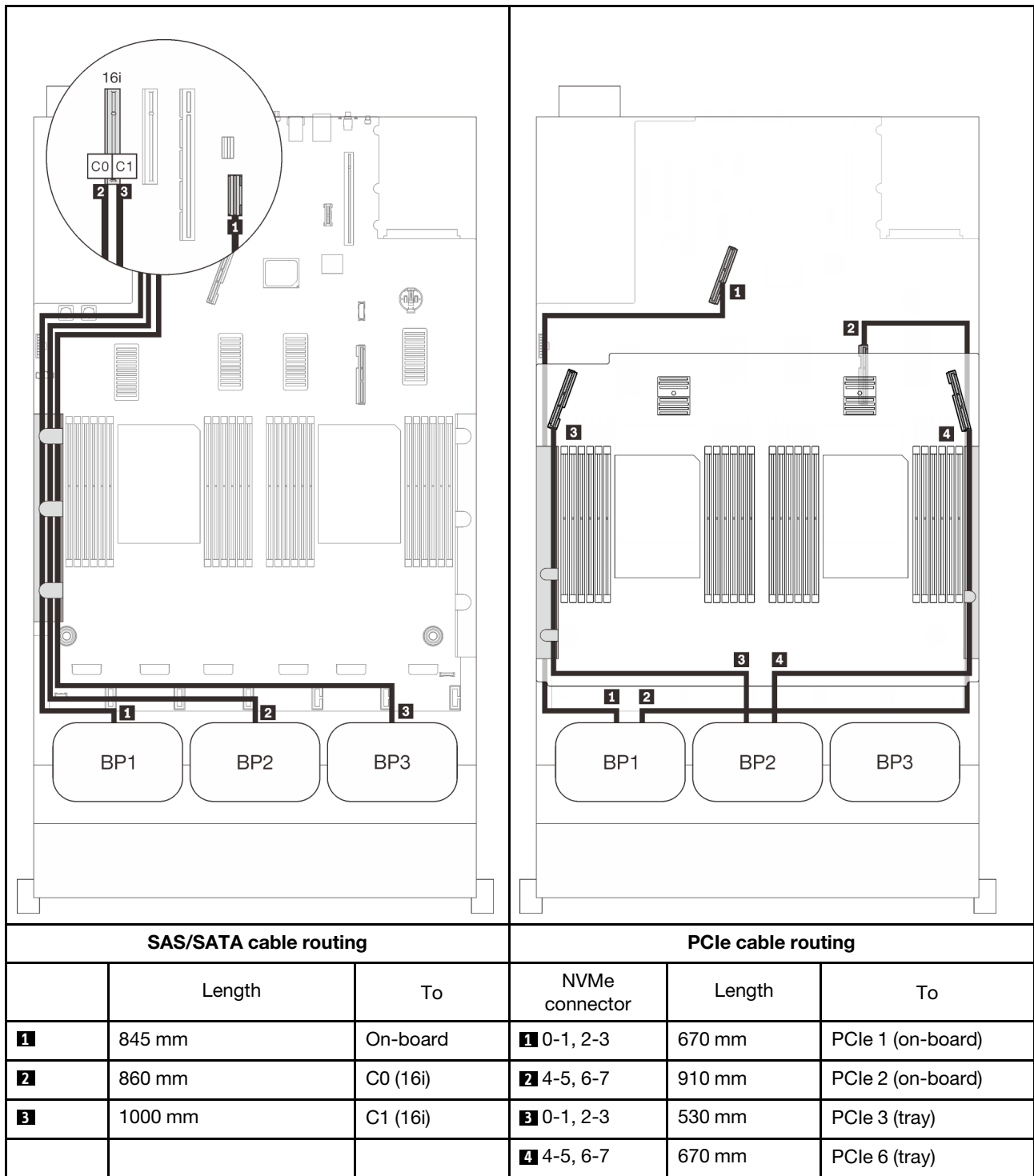
16i RAID adapter



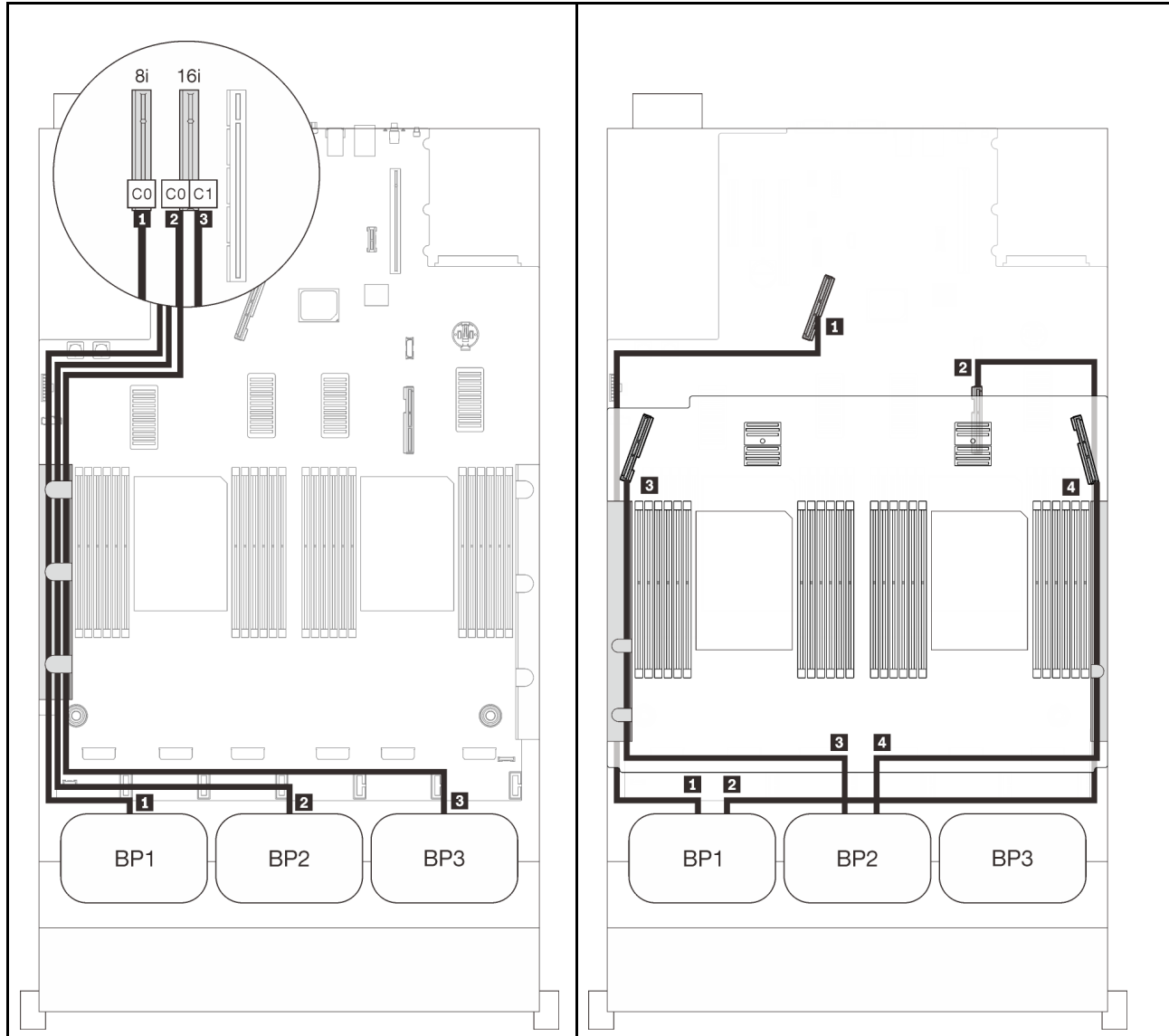
Three backplanes

Two AnyBay and one SAS/SATA backplane

On-board connector + 16i RAID adapter



8i + 16i RAID adapters

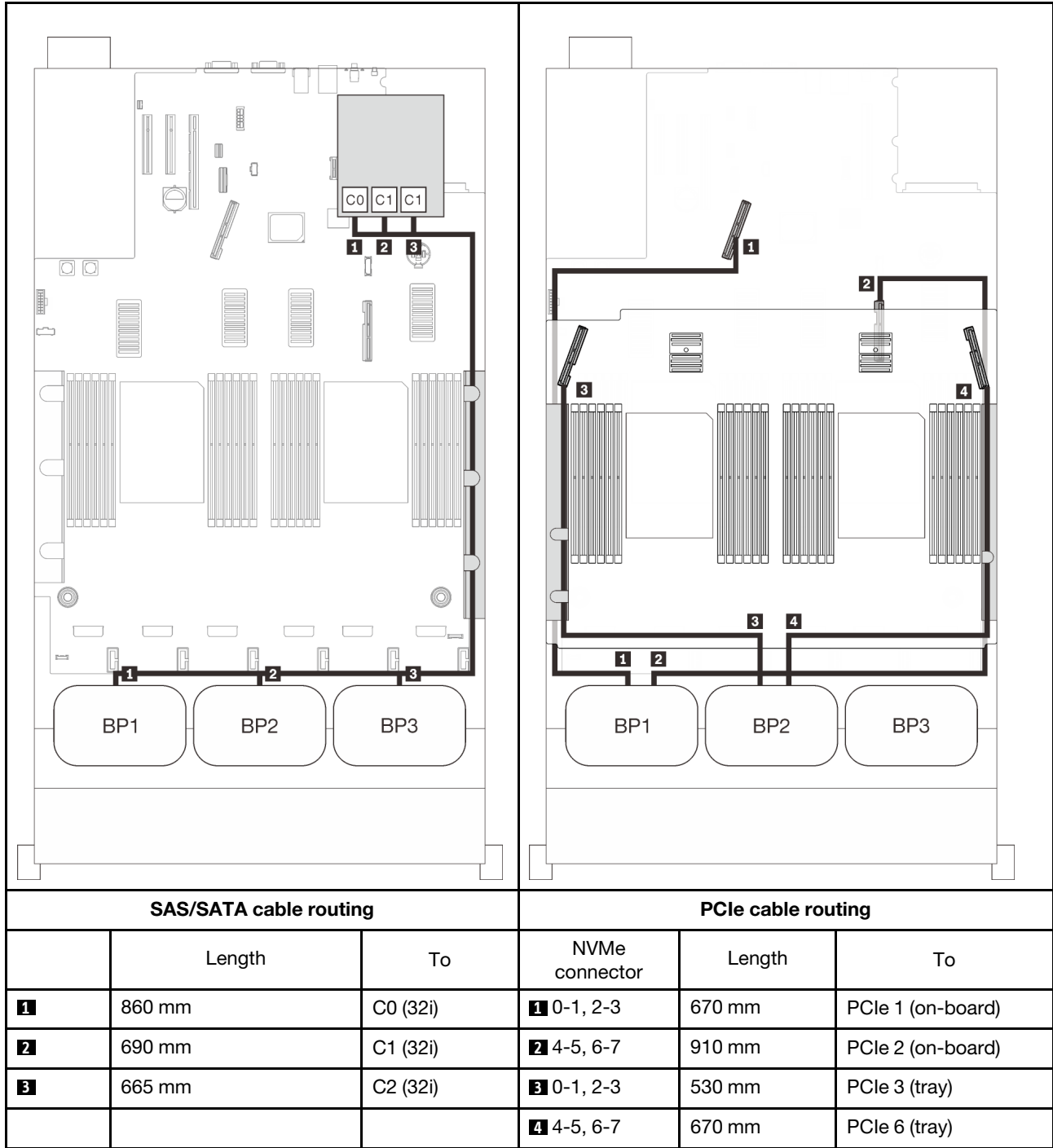


SAS/SATA cable routing

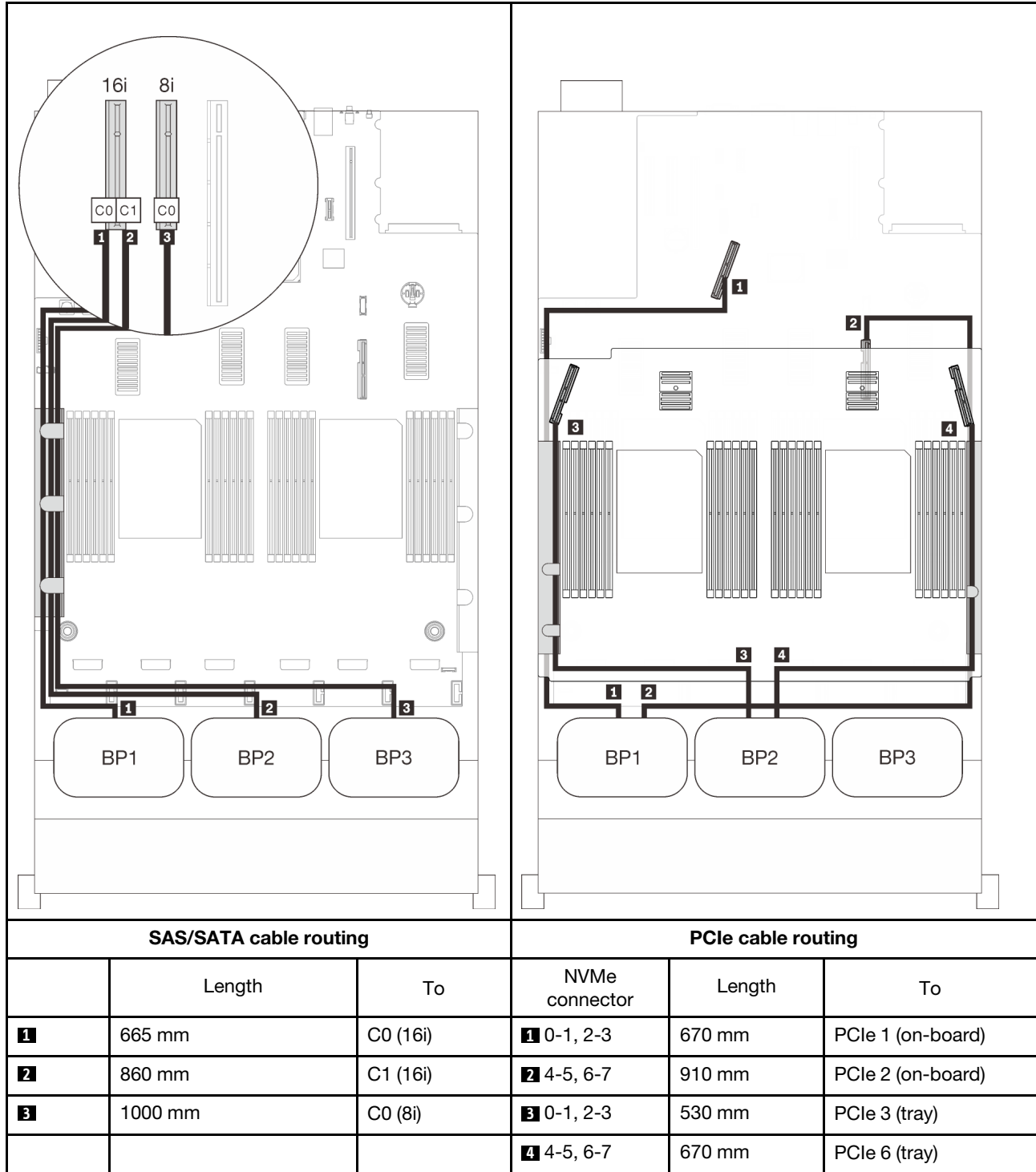
PCIe cable routing

	Length	To	NVMe connector	Length	To
1	665 mm	C0 (8i)	1 0-1, 2-3	670 mm	PCIe 1 (on-board)
2	860 mm	C0 (16i)	2 4-5, 6-7	910 mm	PCIe 2 (on-board)
3	1000 mm	C1 (16i)	3 0-1, 2-3	530 mm	PCIe 3 (tray)
			4 4-5, 6-7	670 mm	PCIe 6 (tray)

32i RAID adapter



16i + 8i RAID adapter



With PCIe switch card

With one PCIe switch card installed, there is one more option for NVMe cable connection. Follow the instructions in this section to learn how do cable routing for combinations with two AnyBay backplanes and a PCIe switch card.

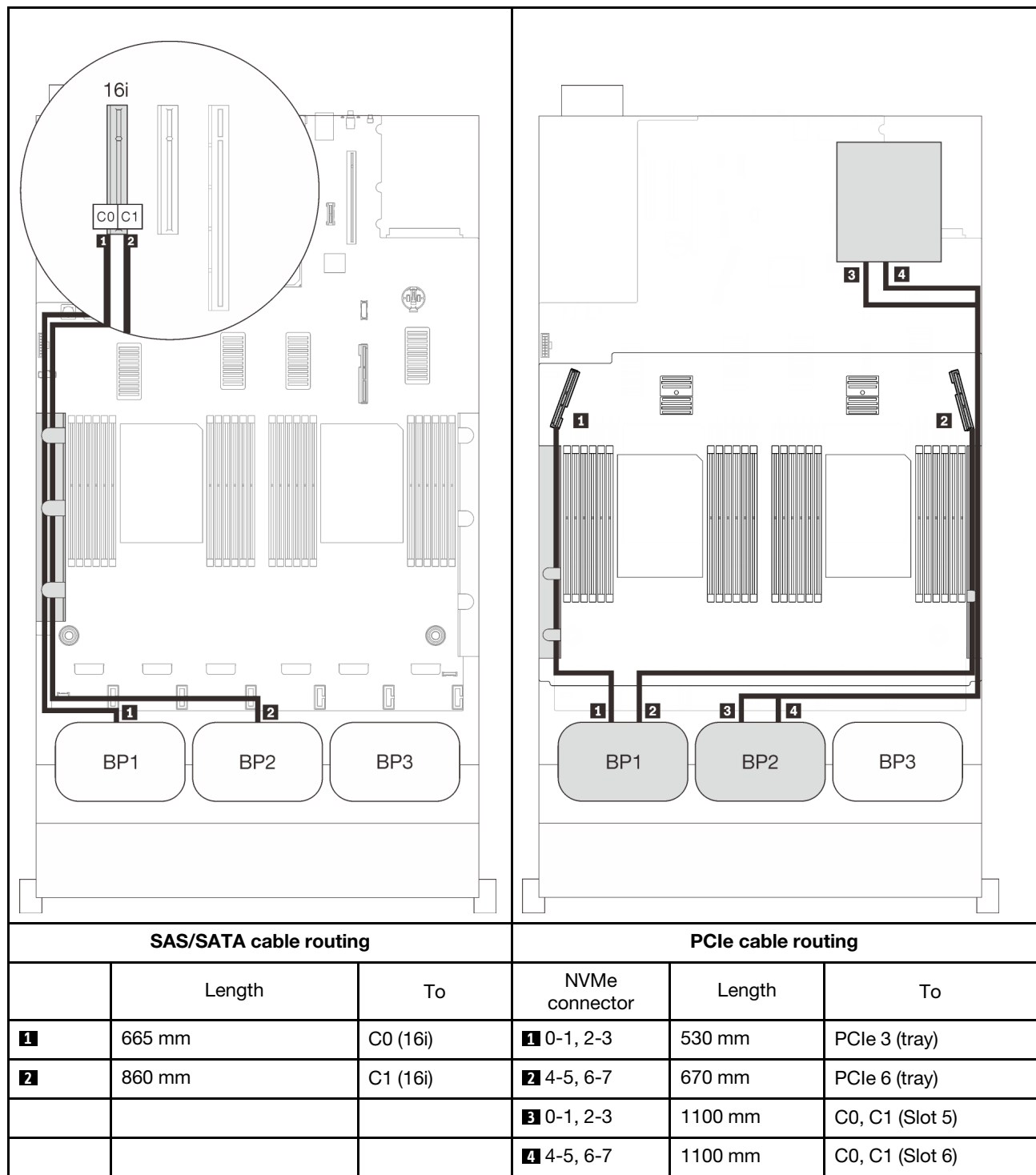
Notes:

- See [“Connecting cables to the processor and memory expansion tray” on page 50](#) to perform the procedure properly while connecting PCIe cables to the processor and memory expansion tray.
- See [“Connecting cables to the NVMe switch cards” on page 52](#) to perform the procedure properly while connecting PCIe cables to the PCIe switch cards.

Two backplanes

Two AnyBay backplanes

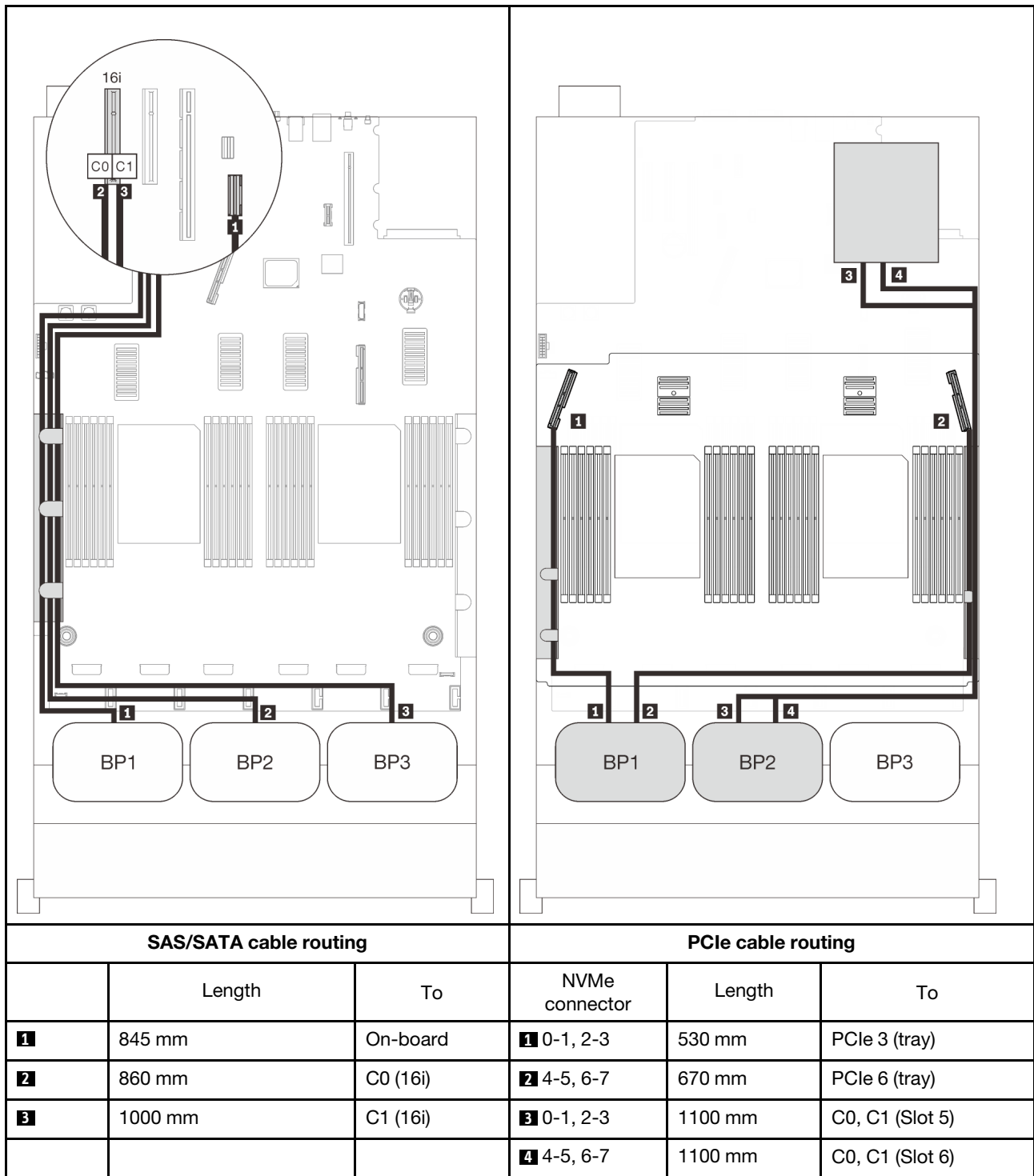
16i RAID adapter



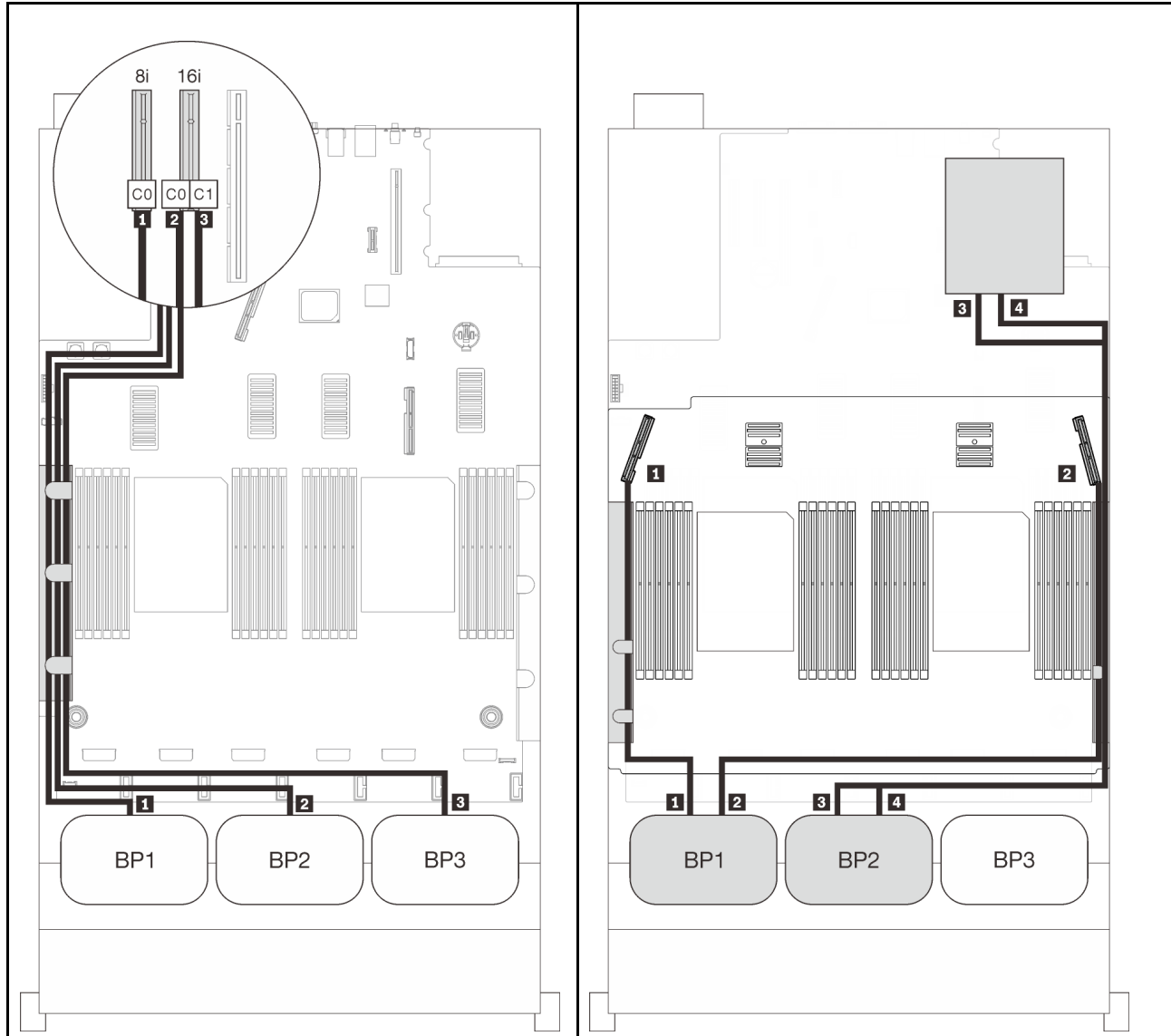
Three backplanes

Two AnyBay and one SAS/SATA backplane

On-board connector + 16i RAID adapter



8i + 16i RAID adapters

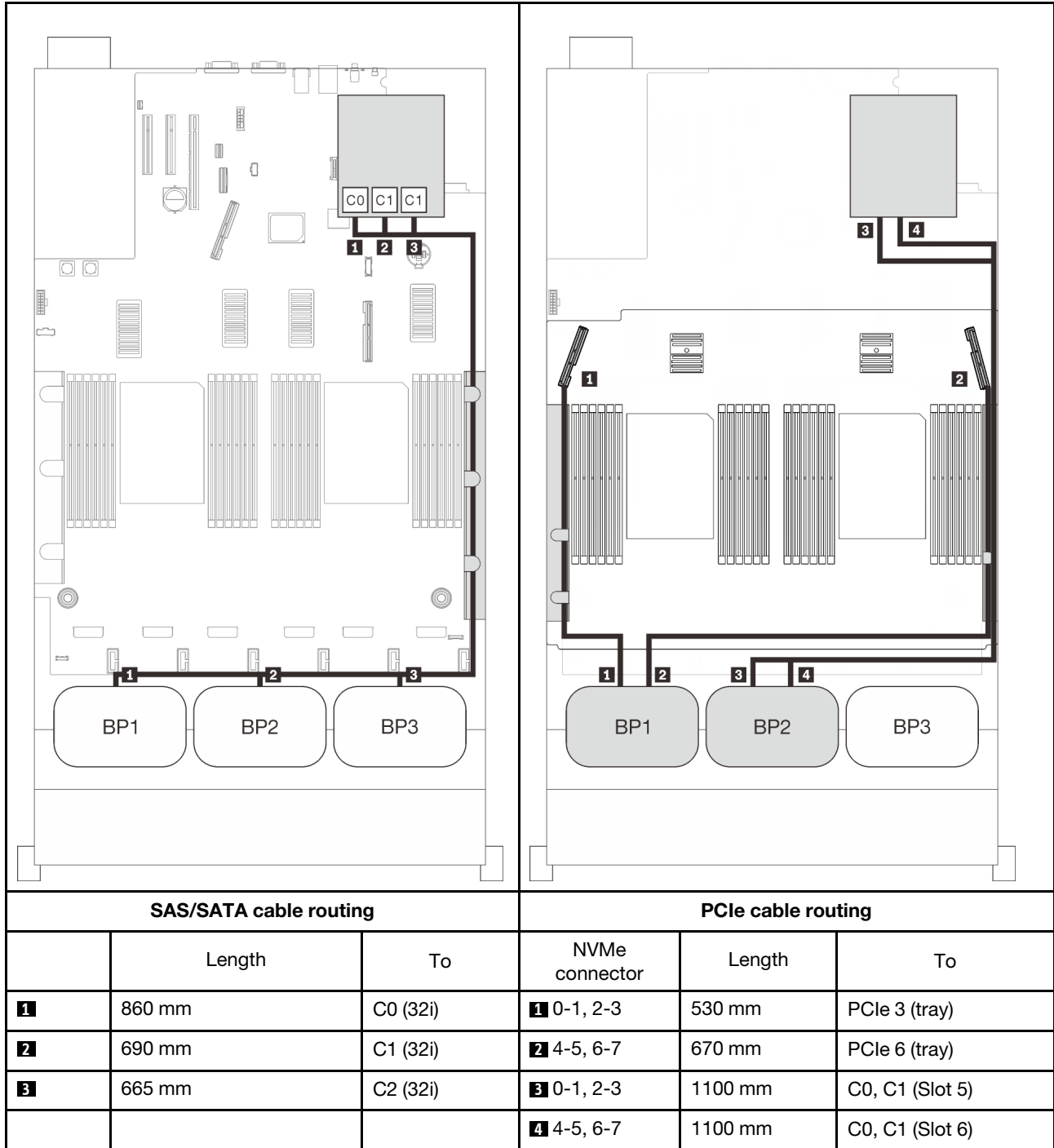


SAS/SATA cable routing

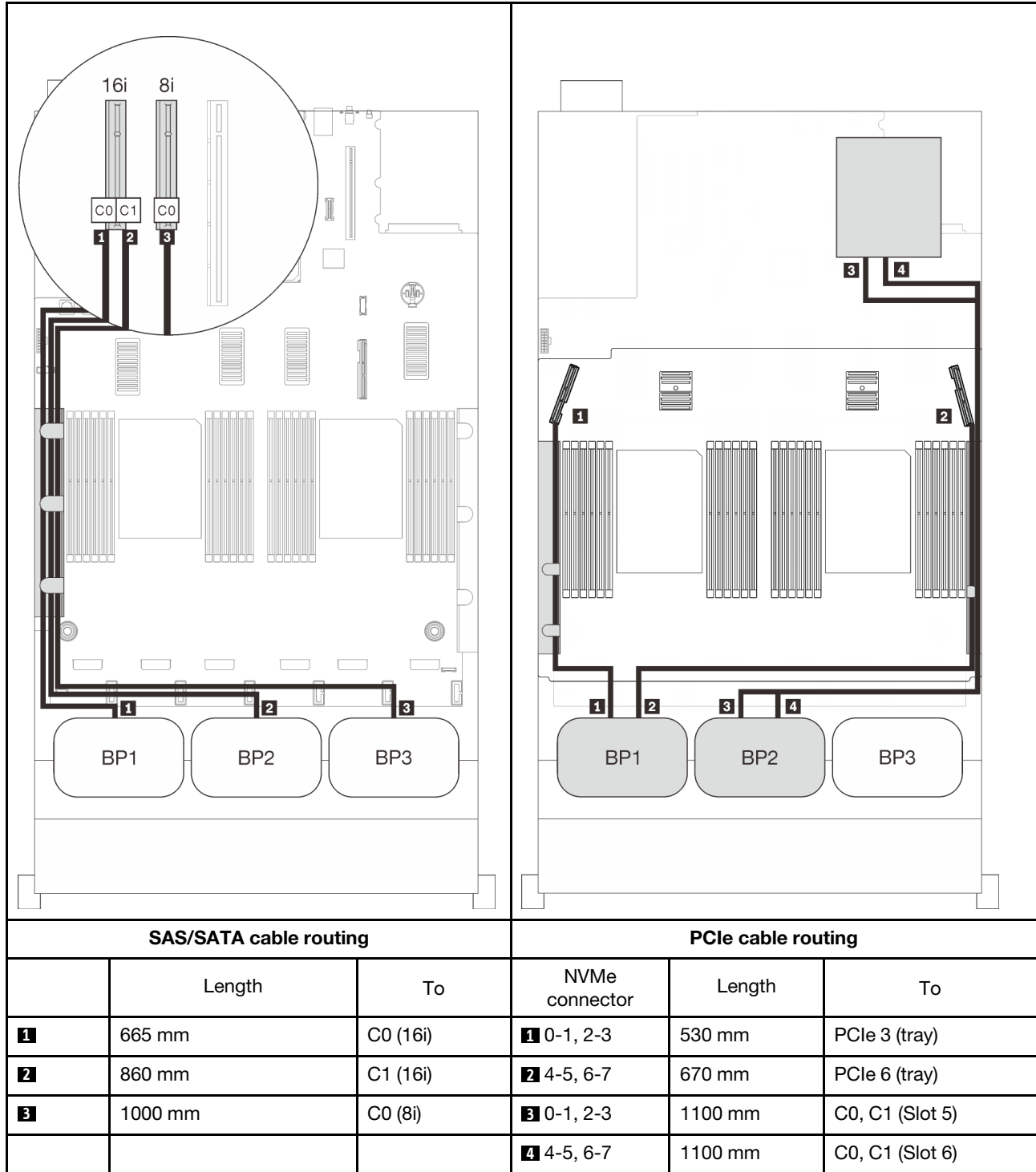
PCIe cable routing

	Length	To	NVMe connector	Length	To
1	665 mm	C0 (8i)	1 0-1, 2-3	530 mm	PCIe 3 (tray)
2	860 mm	C0 (16i)	2 4-5, 6-7	670 mm	PCIe 6 (tray)
3	1000 mm	C1 (16i)	3 0-1, 2-3	1100 mm	C0, C1 (Slot 5)
			4 4-5, 6-7	1100 mm	C0, C1 (Slot 6)

32i RAID adapter



16i + 8i RAID adapter



Three-AnyBay-backplane combinations

Follow the instructions in this section to learn how do cable routing for combinations with three AnyBay backplanes.

Notes:

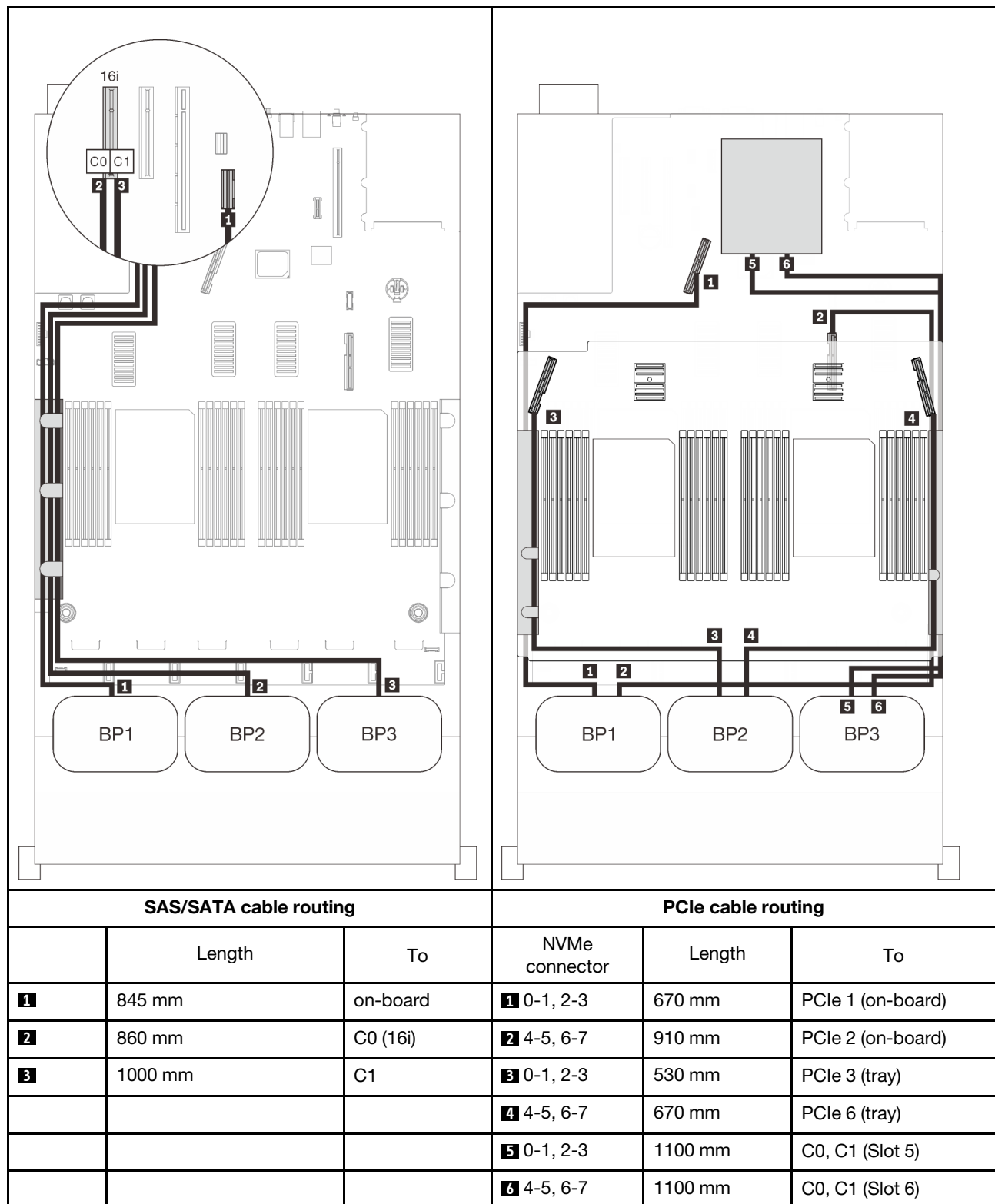
- These combinations require four installed processors.
- See [“Connecting cables to the processor and memory expansion tray” on page 50](#) to perform the procedure properly while connecting PCIe cables to the processor and memory expansion tray.
- See [“Connecting cables to the NVMe switch cards” on page 52](#) to perform the procedure properly while connecting PCIe cables to the PCIe switch cards.

See the following sections for cable routing combinations with three AnyBay drive backplanes.

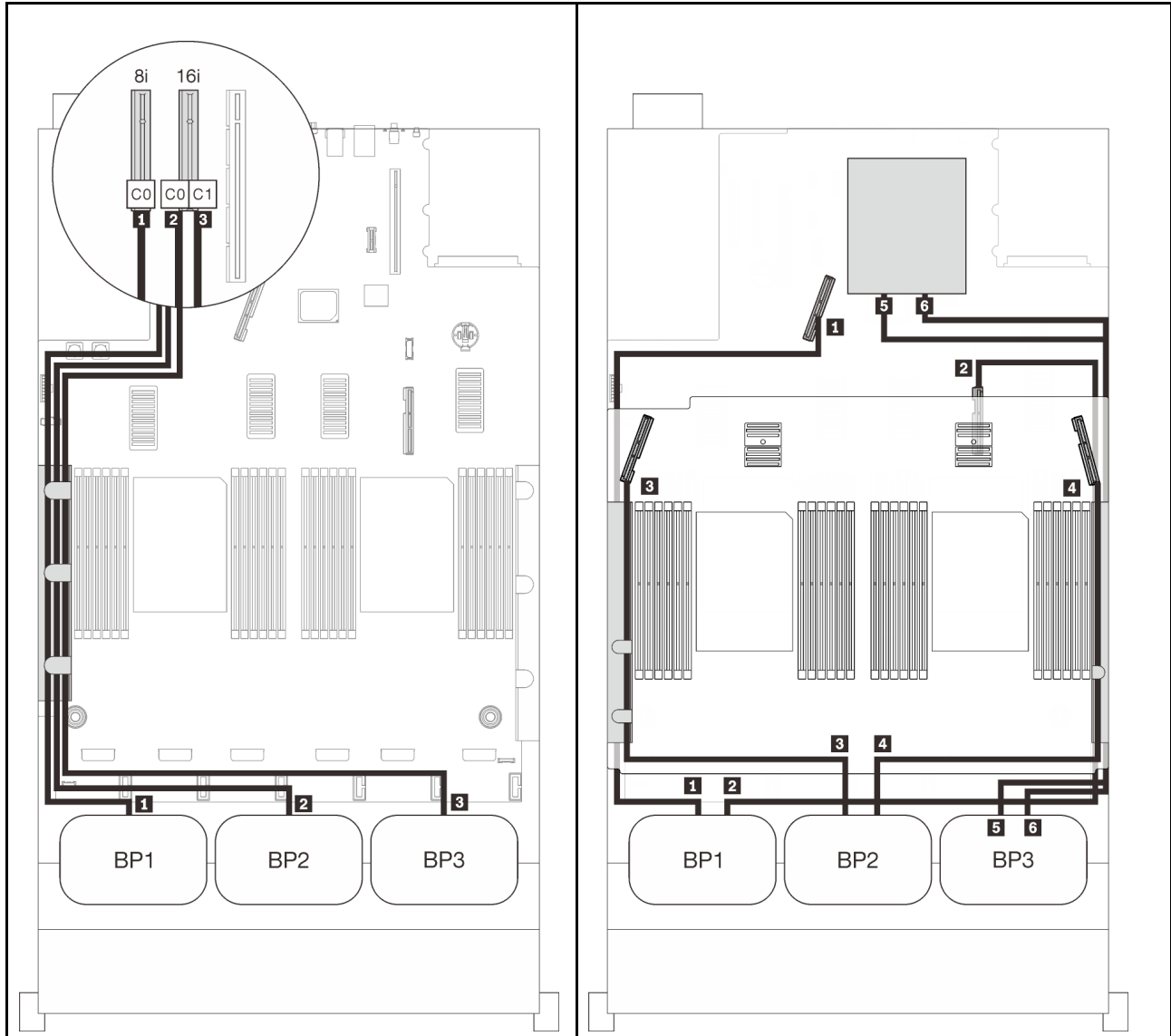
Three backplanes

Three AnyBay backplanes

On-board connector + 16i RAID adapter



8i + 16i RAID adapters

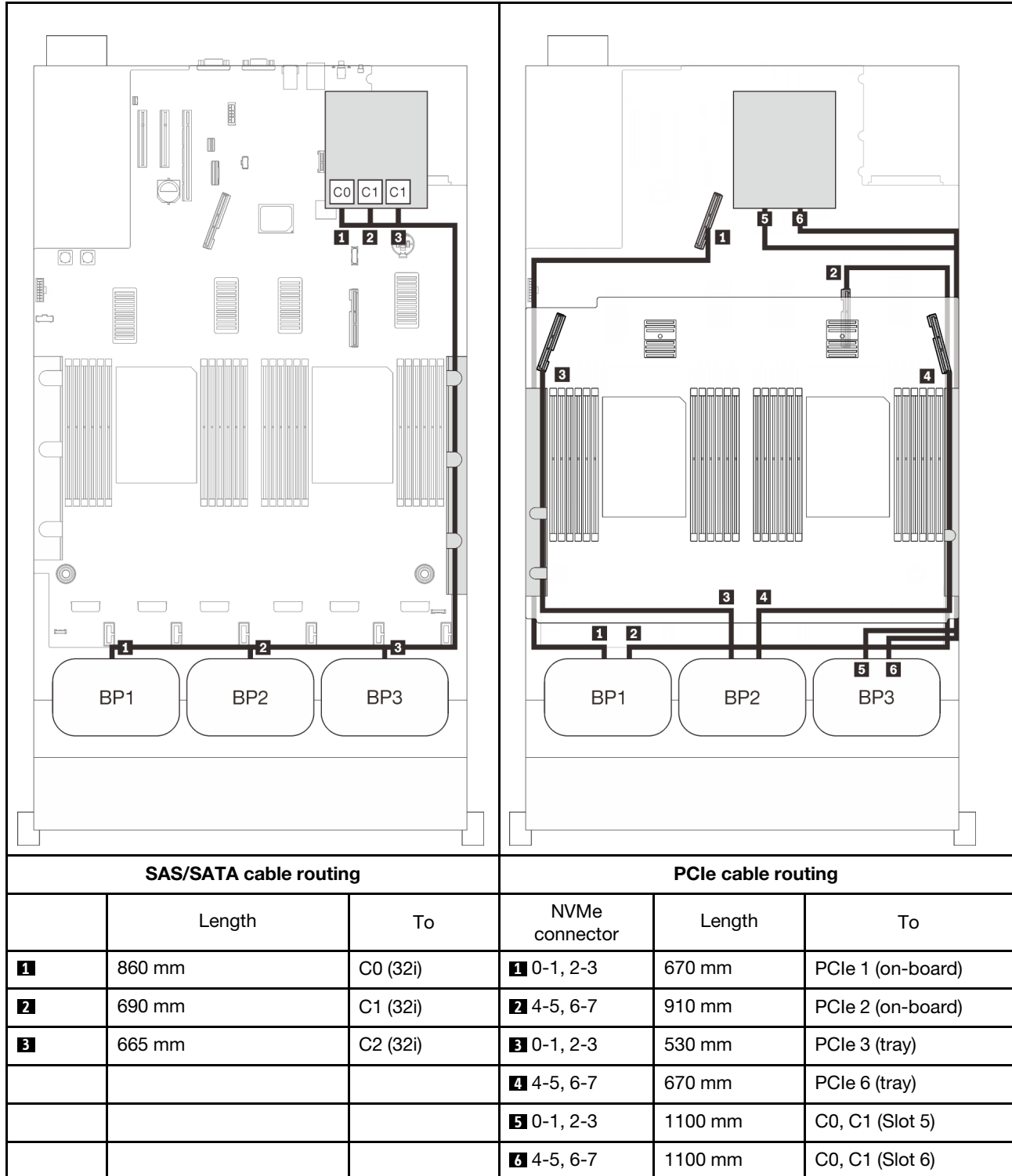


SAS/SATA cable routing

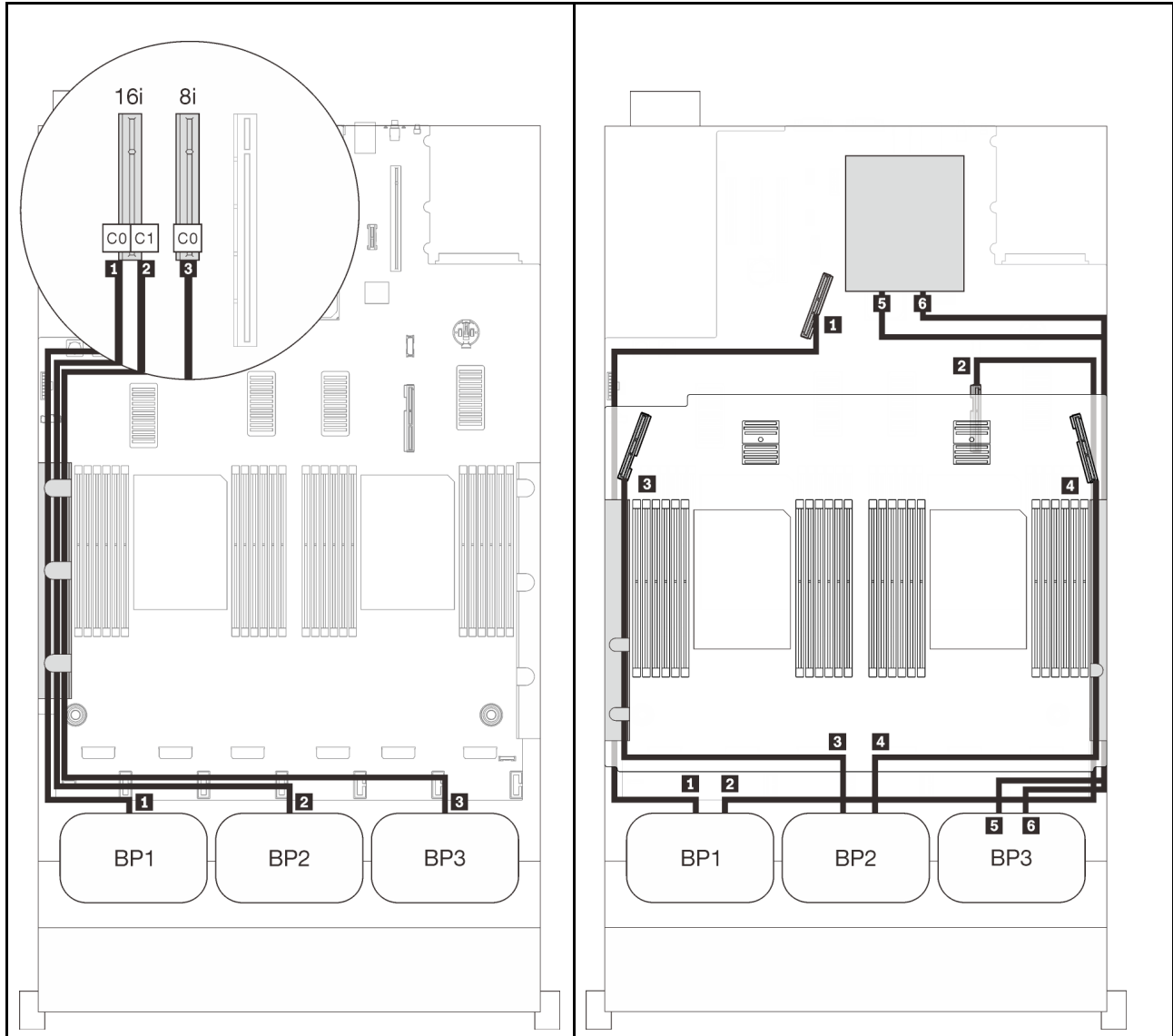
PCIe cable routing

	Length	To	NVMe connector	Length	To
1	665 mm	on-board	1 0-1, 2-3	670 mm	PCIe 1 (on-board)
2	860 mm	C0 (16i)	2 4-5, 6-7	910 mm	PCIe 2 (on-board)
3	1000 mm	C1	3 0-1, 2-3	530 mm	PCIe 3 (tray)
			4 4-5, 6-7	670 mm	PCIe 6 (tray)
			5 0-1, 2-3	1100 mm	C0, C1 (Slot 5)
			6 4-5, 6-7	1100 mm	C0, C1 (Slot 6)

32i RAID adapter



16i + 8i RAID adapter



SAS/SATA cable routing

PCIe cable routing

	Length	To	NVMe connector	Length	To
1	665 mm	C0 (16i)	1 0-1, 2-3	670 mm	PCIe 1 (on-board)
2	860 mm	C1 (16i)	2 4-5, 6-7	910 mm	PCIe 2 (on-board)
3	1000 mm	C0 (8i)	3 0-1, 2-3	530 mm	PCIe 3 (tray)
			4 4-5, 6-7	670 mm	PCIe 6 (tray)
			5 0-1, 2-3	1100 mm	C0, C1 (Slot 5)
			6 4-5, 6-7	1100 mm	C0, C1 (Slot 6)

Chapter 4. Hardware replacement procedures

This section provides installation and removal procedures for all serviceable system components. Each component replacement procedure references any tasks that need to be performed to gain access to the component being replaced.

For more information about ordering parts:

1. Go to <http://datacentersupport.lenovo.com> and navigate to the support page for your server.
2. Click **Service Parts**.
3. Enter the serial number to view a listing of parts for your server.

Note: If you replace a part, such as an adapter, that contains firmware, you might also need to update the firmware for that part. For more information about updating firmware, see [“Firmware updates” on page 8](#).

Installation Guidelines

Before installing components in your server, read the installation guidelines.

Before installing optional devices, read the following notices carefully:

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

- Read the safety information and guidelines to ensure your safety at work:
 - A complete list of safety information for all products is available at:
https://pubs.lenovo.com/safety_documentation/
 - The following guidelines are available as well: [“Handling static-sensitive devices” on page 112](#) and [“Working inside the server with the power on” on page 111](#).
- Make sure the components you are installing are supported by your server. For a list of supported optional components for the server, see <https://serverproven.lenovo.com/>.
- When you install a new server, download and apply the latest firmware. This will help ensure that any known issues are addressed, and that your server is ready to work with optimal performance. Go to <http://datacentersupport.lenovo.com/products/servers/thinksystem/sr850v2/downloads> to download firmware updates for your server.

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

- It is good practice to make sure that the server is working correctly before you install an optional component.
- Keep the working area clean, and place removed components on a flat and smooth surface that does not shake or tilt.
- Do not attempt to lift an object that might be too heavy for you. If you have to lift a heavy object, read the following precautions carefully:
 - Make sure that you can stand steadily without slipping.
 - Distribute the weight of the object equally between your feet.
 - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.

- To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes related to the disk drives.
- Have a small flat-blade screwdriver, 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.
- Terra-cotta on a component or a terra-cotta label on or near a component indicates that the component can be hot-swapped if the server and operating system support hot-swap capability, which means that you can remove or install the component while the server is still running. (Terra-cotta can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- The Red strip on the drives, adjacent to the release latch, indicates that the drive can be hot-swapped if the server and operating system support hot-swap capability. This means that you can remove or install the drive while the server is still running.

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

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

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 after 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.
- All processor sockets must contain either a socket cover or a processor with heat sink.
- When more than one processor is installed, fan population rules for each server must be strictly followed.

Working inside the server with the power on

You might need to keep the power on with the server cover removed to look at system information on the display panel or to replace hot-swap components. Review these guidelines before doing so.

Attention: The server might stop and data loss 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 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

Review these guidelines before you handle static-sensitive devices to reduce the possibility of damage from electrostatic discharge.

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.

Replace components in the server

Follow instructions in this section to remove or install components in the server.

2.5-inch hot-swap drive and backplane replacement

Follow instructions in this section to install or remove 2.5-inch hot-swap drives and backplanes.

Remove a 2.5-inch hot-swap drive

Follow instructions in this section to remove a 2.5-inch hot-swap drive.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.

Procedure

- Step 1. Remove the security bezel (see [“Remove the security bezel” on page 203](#)).
- Step 2. Gently rotate the release latch away to unlock the drive handle.

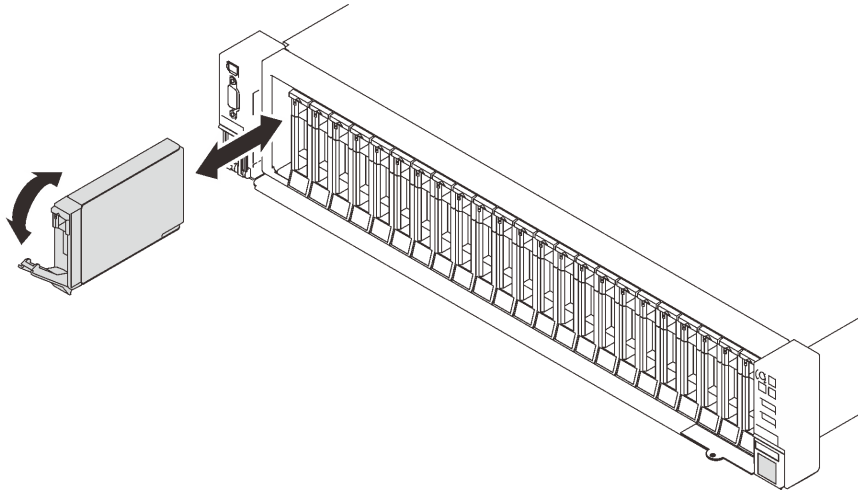


Figure 29. Removing a 2.5-inch drive

- Step 3. Grasp and pull the handle to remove the drive from the drive bay.

After this task is completed

1. Install a replacement unit or filler (see [“Install a 2.5-inch hot-swap drive” on page 115](#)).
2. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

[Watch the procedure on YouTube](#)

Remove a drive backplane

Follow instructions in this section to remove a drive backplane.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Procedure

- Step 1. Make preparations for this task.
 - a. Remove the security bezel (see [“Remove the security bezel” on page 203](#)).
 - b. Remove the top cover (see [“Remove the top cover” on page 219](#)).

- c. Remove the fan cage assembly (see [“Remove the fan cage assembly” on page 131](#)).
- d. Disengage all the drives or fillers from the backplane to be removed (see [“Remove a 2.5-inch hot-swap drive” on page 112](#)), and disconnect the cables that are connected to the backplane.

Step 2. Remove the drive backplane.

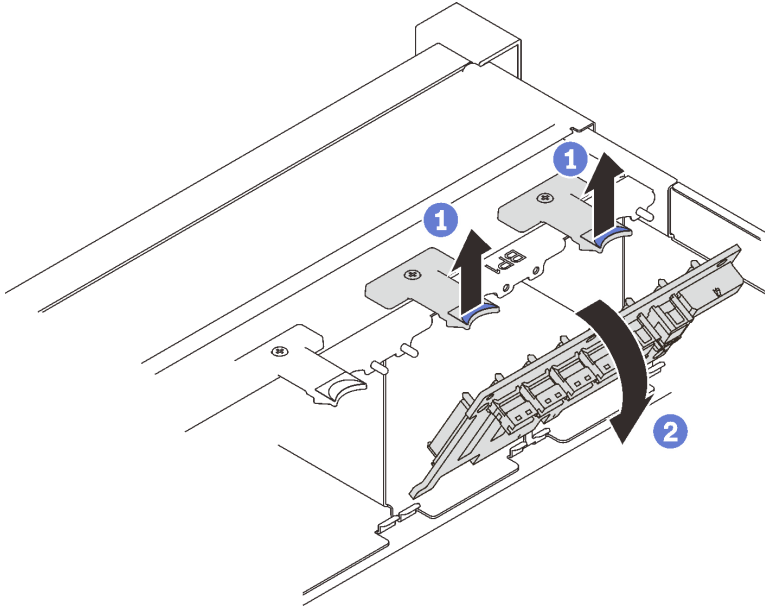


Figure 30. Removing the drive backplane

- 1 Lift and hold the retention latches on top of the backplane.
- 2 Rotate the backplane from the top to disengage it from the retention latches.

After this task is completed

1. Install a replacement unit (see [“Install a drive backplane” on page 114](#)), or fill the corresponding drive bays with drive fillers.
2. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

[Watch the procedure on YouTube](#)

Install a drive backplane

Follow instruction in this section to install a drive backplane.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. Install the drive backplane.

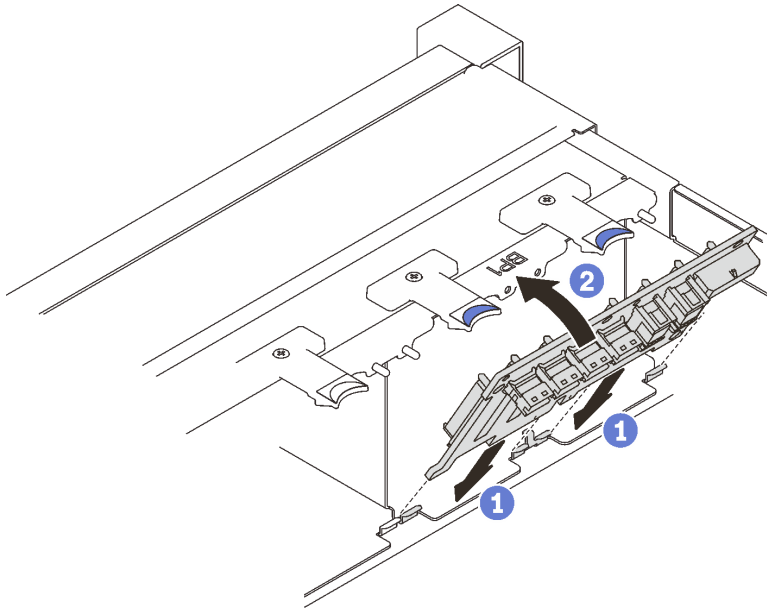


Figure 31. Installing the drive backplane

- 1 Align the tabs on the bottom of the drive backplane with the slots on the system board, and insert them into the slots.
- 2 Push the top of the drive backplane forward until it clicks in place.

After this task is completed

Proceed to complete the parts replacement (see [“Complete the parts replacement”](#) on page 223).

Demo video

[Watch the procedure on YouTube](#)

Install a 2.5-inch hot-swap drive

Follow instructions in this section to install a 2.5-inch hot-swap drive.

About this task

Attention:

- Go over [“Installation Guidelines”](#) on page 109 to ensure that you work safely.

Notes: The server supports up to three drive backplanes with the following corresponding drive bay numbers.

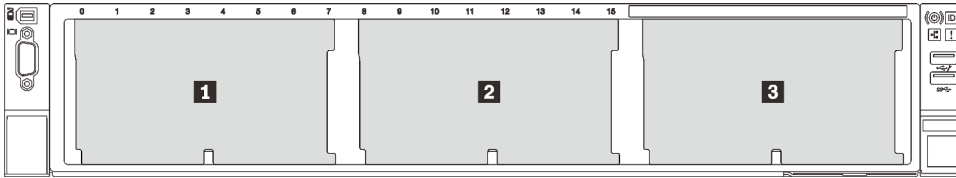


Figure 32. Drive backplane numbering

Table 20. Drive backplanes and corresponding drive bays

	Drive backplane	Drive bay	Supported drive backplane	Supported drive
1	1	0 to 7	<ul style="list-style-type: none"> • 2.5-inch SAS/SATA 8-bay drive backplane • 2.5-inch AnyBay/NVMe 8-bay drive backplane 	<ul style="list-style-type: none"> • 2.5-inch SAS/SATA drives • 2.5-inch NVMe drives
2	2	8 to 15		
3	3	16 to 23		

Notes: When the following components are installed in the system, bay 16 to 23 are disabled, and the maximal supported drive quantity is 16.

- PMEMs
- 256 GB 3DS DRIMMs

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

Procedure

- Step 1. If a drive filler has been installed in the drive bay, remove it.
- Step 2. Gently rotate the release latch away to unlock the drive handle.
- Step 3. Slide the drive into the drive bay, and push it until it stops.

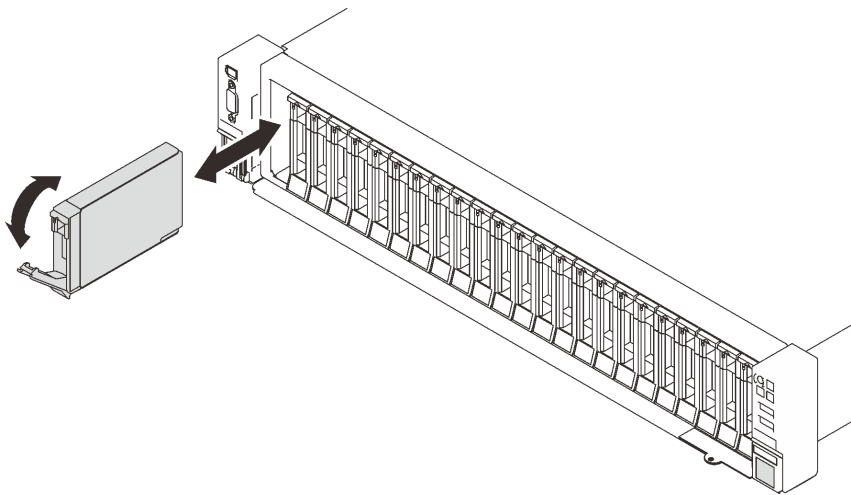


Figure 33. Installing a 2.5-inch drive

- Step 4. Rotate the handle back to the locked position.

After this task is completed

1. Check the drive status LED to verify if the drive is operating correctly:

- If the yellow LED is lit continuously, it is malfunctioning and must be replaced.
- If the green LED is flashing, the drive is functioning.

Note: If the server is configured for RAID operation through a ThinkSystem RAID adapter, you might have to reconfigure your disk arrays after you install drives. See the ThinkSystem RAID adapter documentation for additional information about RAID operation and complete instructions for using ThinkSystem RAID adapter.

2. If any of the drive bays are left empty, fill them with drive bay fillers.

Demo video

[Watch the procedure on YouTube](#)

7mm drive and drive cage replacement

Follow instructions in this section to remove or install the 7mm drive and drive cage.

Remove a 7mm drive

Follow instructions in this section to remove a 7mm drive.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.

Procedure

Step 1. Gently rotate the release latch away to unlock the drive handle.

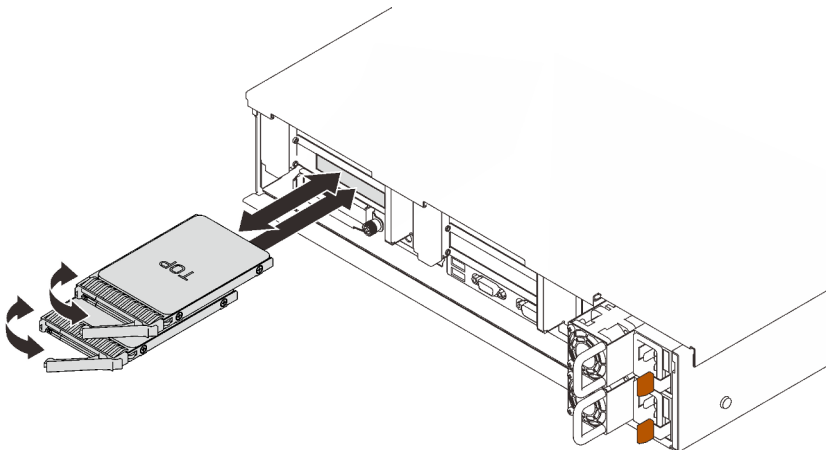


Figure 34. Removing 7mm drives

Step 2. Grasp and pull the handle to remove the drive from the drive bay.

After this task is completed

- Install a replacement unit or a filler (see [“Install a 7mm drive” on page 121](#)).

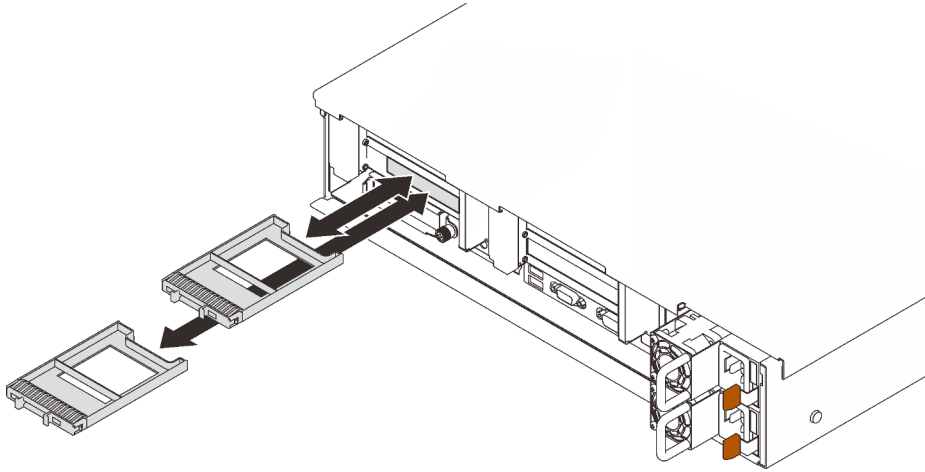


Figure 35. Installing 7mm drive fillers

- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

[Watch the procedure on YouTube](#)

Remove the 7mm drive cage

Follow instructions in this section to remove the 7mm drive cage.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Procedure

Step 1. Make preparations for this task.

- a. If drives or fillers have been installed, remove them (see [“Remove a 7mm drive” on page 117](#)).
- b. Remove the top cover (see [“Remove the top cover” on page 219](#)).
- c. Disconnect the cables from the 7mm drive cage.
- d. Remove the PCIe riser assembly in riser zone 1 (see [“Remove the PCIe riser assembly from zone 1” on page 161](#)).

Step 2. Remove the 7mm drive cage from the riser.

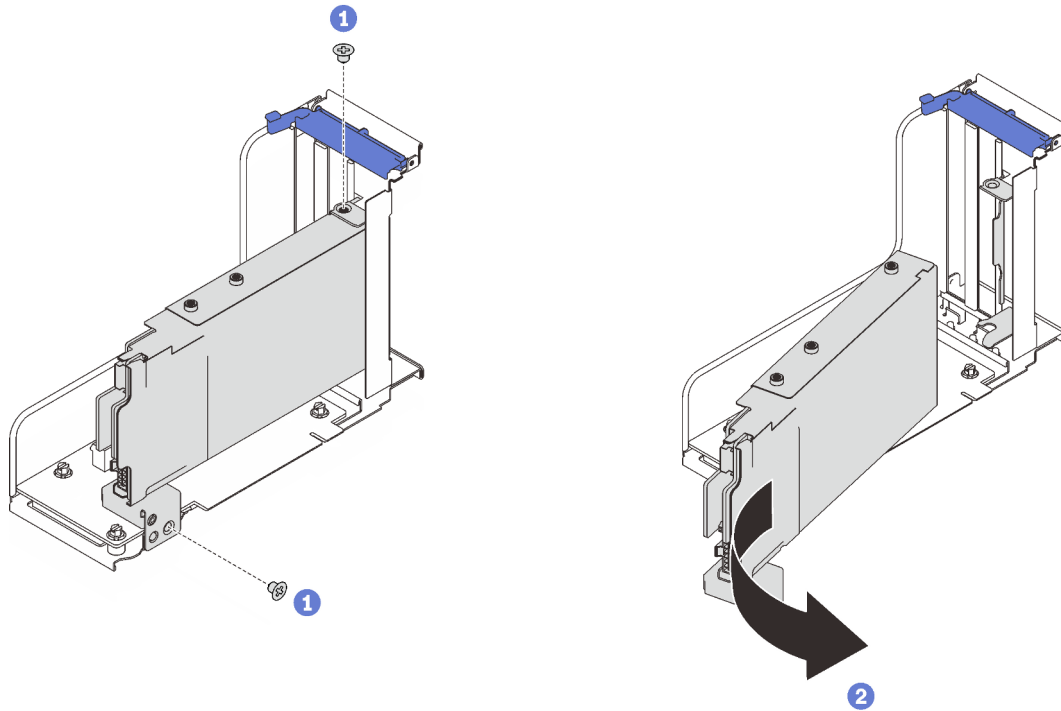


Figure 36. Removing the 7mm drive cage from the riser

- 1 Remove the two screws that secure the drive cage to the riser.
- 2 Rotate the drive cage to remove it from the riser.

After this task is completed

- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.
- If you plan to recycle the component:
 1. Remove the three screws that secure the two drive backplanes to the drive cage.

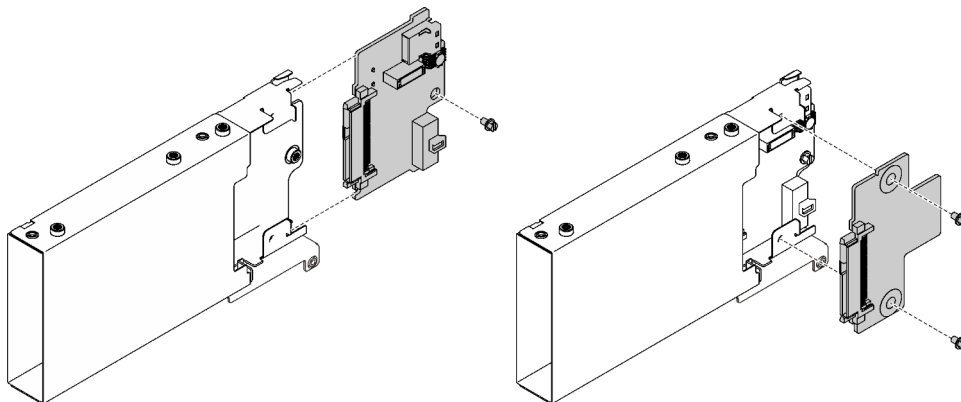


Figure 37. Disassembling the 7mm drive cage

2. Recycle the component in compliance with local regulations.

Demo video

[Watch the procedure on YouTube](#)

Install the 7mm drive cage

Follow instructions in this section to install the 7mm drive cage.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. Make preparations for this task.

- a. If necessary, secure the two drive backplanes to the drive cage with three screws.

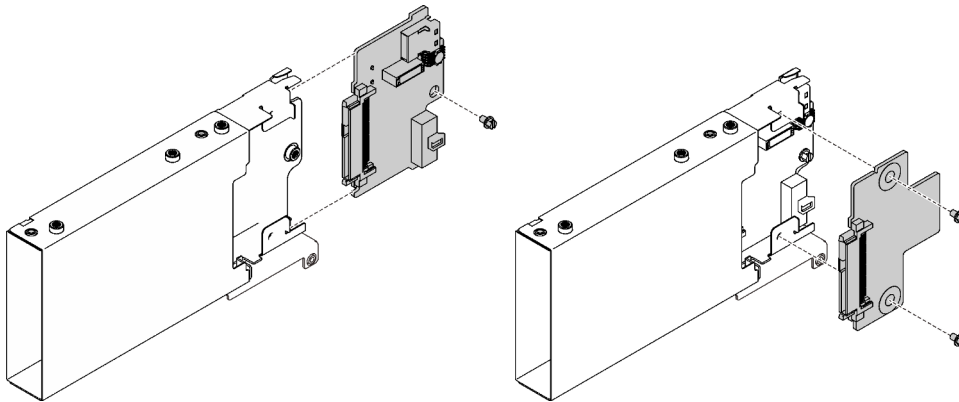


Figure 38. Installing the 7mm drive backplanes

- b. Install the 7mm drive cage to the x16/x16 (x8 lanes) PCIe riser with 7mm drive cage bracket.

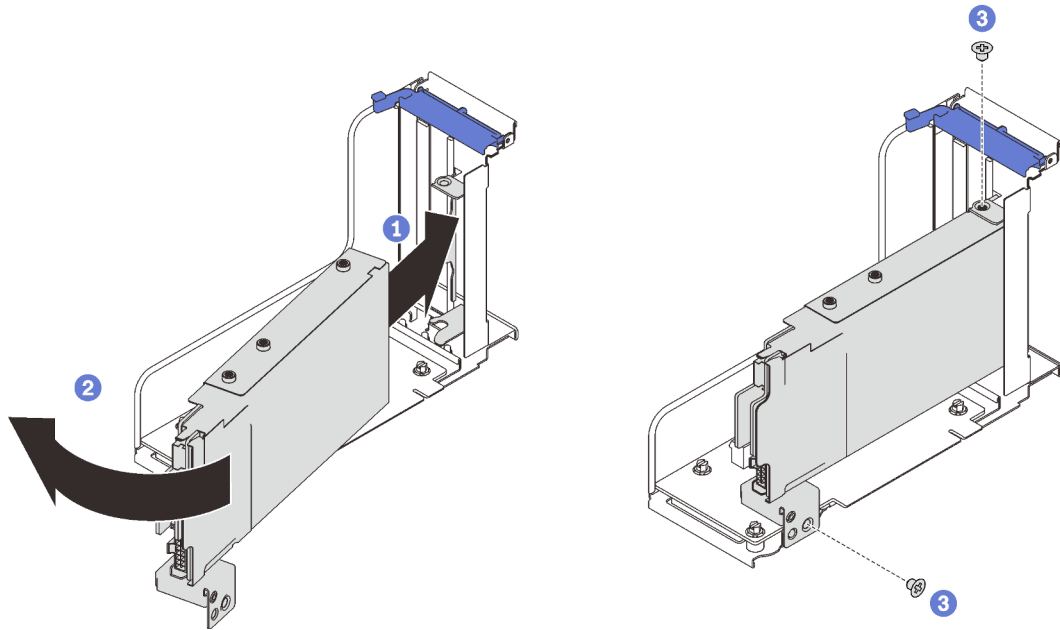


Figure 39. Installing the 7mm drive cage to the riser

- 1 Align the drive cage with the slot on the riser.
- 2 Rotate the other end of the cage inwards.
- 3 Secure the drive cage to the riser with two screws.

Step 2. If you plan to install other adapters to the riser, do it now (see [“Install an adapter in the PCIe riser assembly” on page 166](#)).

Step 3. Install the PCIe riser card into Zone 1 (see [“Install the PCIe riser assembly to zone 1” on page 169](#)).

After this task is completed

Proceed to complete the parts replacement (see [“Complete the parts replacement” on page 223](#)).

Demo video

[Watch the procedure on YouTube](#)

Install a 7mm drive

Follow the instructions in this section to install a 7mm drive.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Procedure

Step 1. If a drive filler has been installed in the drive bay, remove it.

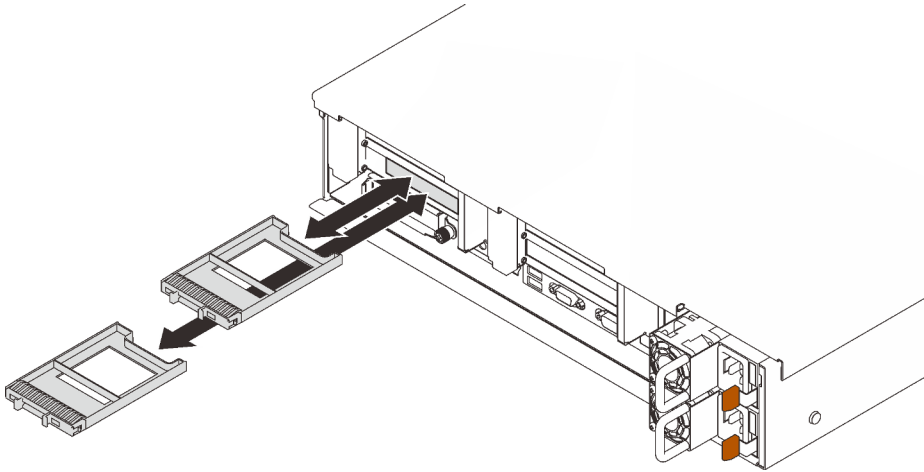


Figure 40. Removing 7mm drive fillers

Step 2. Gently rotate the release latch away to unlock the drive handle.

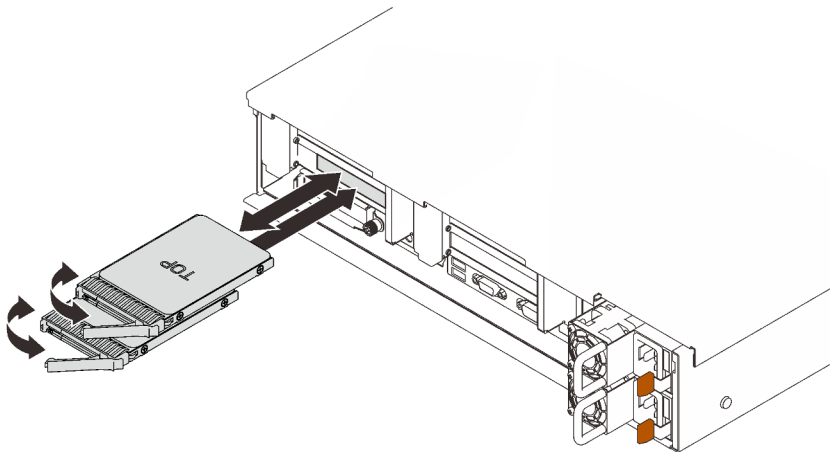


Figure 41. Installing 7mm drives

Step 3. Slide the drive into the drive bay, and push it until it stops.

Step 4. Rotate the handle back to the locked position.

After this task is completed

Check the drive status LED to verify if the drive is operating correctly:

- If the yellow LED is lit continuously, it is malfunctioning and must be replaced.
- If the green LED is flashing, the drive is functioning.

Note: If the server is configured for RAID operation through a ThinkSystem RAID adapter, you might have to reconfigure your disk arrays after you install drives. See the ThinkSystem RAID adapter documentation for additional information about RAID operation and complete instructions for using ThinkSystem RAID adapter.

Demo video

[Watch the procedure on YouTube](#)

CMOS battery (CR2032) replacement

Follow instructions in this section to remove or install the CMOS battery (CR2032).

Remove the CMOS battery (CR2032)

Follow instructions in this section to remove the CMOS battery.

About this task

The following notes describe information that you must consider when replacing the battery:

- Lenovo has designed this product with your safety in mind. The lithium battery must be handled correctly to avoid possible danger. If you replace the battery, you must adhere to the following instructions.
- If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.
- After you replace the battery, you must reconfigure the server and reset the system date and time.

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.

S004



CAUTION:

When replacing the lithium battery, use only Lenovo specified part number or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- Throw or immerse into water
- Heat to more than 100°C (212°F)
- Repair or disassemble

Dispose of the battery as required by local ordinances or regulations.

S005



CAUTION:

The battery is a lithium ion battery. To avoid possible explosion, do not burn the battery. Exchange it only with the approved part. Recycle or discard the battery as instructed by local regulations.

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Procedure

Step 1. Make preparations for this task.

- a. Remove the top cover (see [“Remove the top cover” on page 219](#)).
- b. Remove the system board air baffle (see [“Remove the system board air baffle” on page 205](#)) or the processor and memory expansion tray and the expansion tray air baffle (see [“Remove the processor and memory expansion tray” on page 195](#)).
- c. Remove the PCIe riser assembly in riser zone 1 (see [“Remove the PCIe riser assembly from zone 1” on page 161](#)).
- d. If OCP adapter air baffle has been installed, remove it.

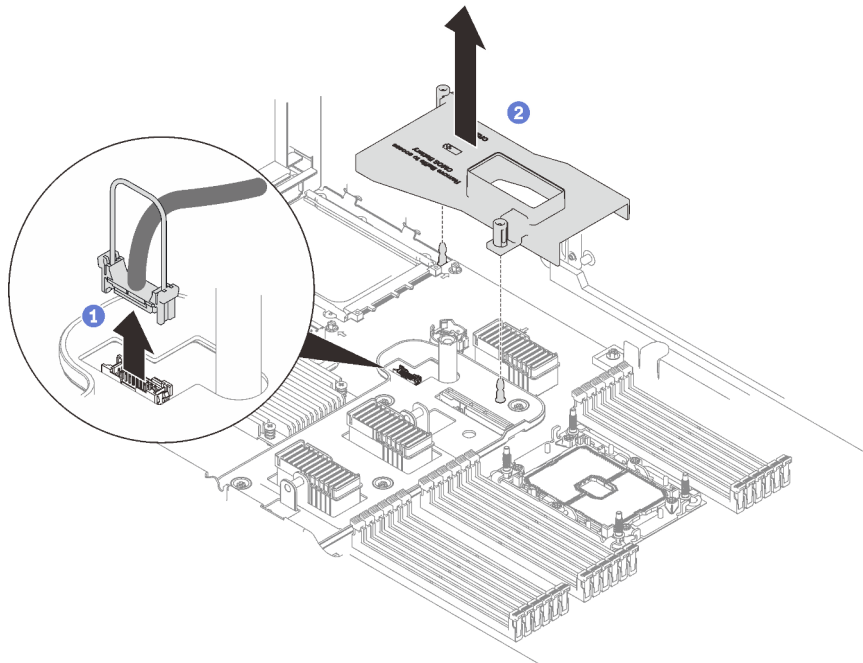


Figure 42. Remove the OCP adapter air baffle

- 1 Grasp and lift the handle to disconnect the USB cable from the system board.
 - 2 Lift the air baffle to remove it.
- e. Locate the CMOS battery on the system board.

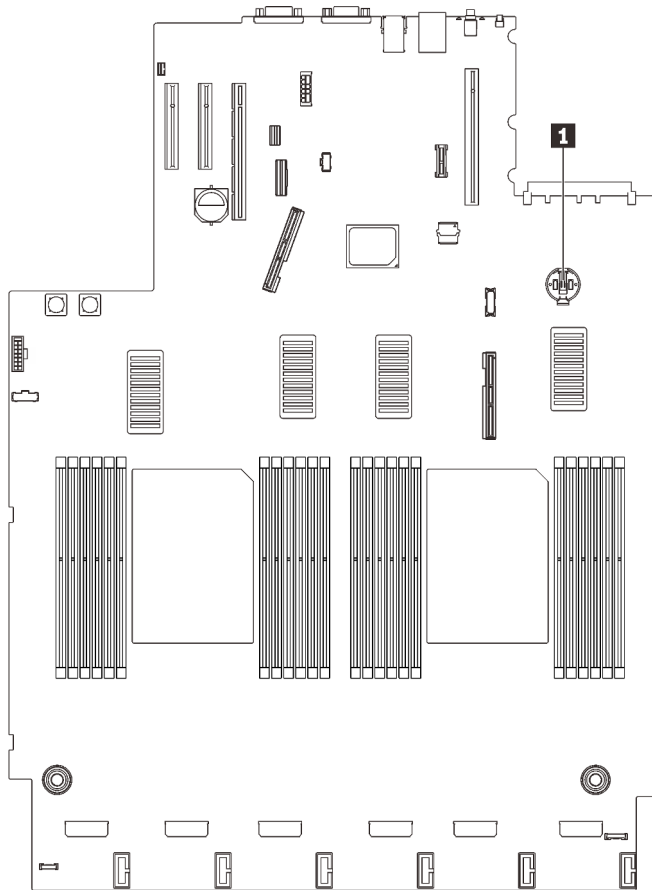


Figure 43. CMOS battery location on the system board

Table 21. CMOS battery location

1 CMOS battery

Step 2. Gently press on the nub on the side of the CMOS battery as illustrated; then, pivot the battery away from the seat to remove it.

Attention: Avoid excessive force on the CMOS battery, as it might damage the socket on the system board and result in system board replacement.

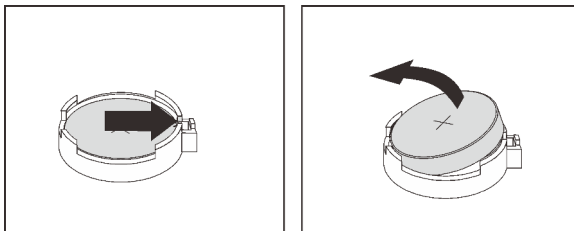


Figure 44. Removing the CMOS battery

Step 3. Pick up the battery with finger tips.

After this task is completed

- Install a replacement unit (see “Install the CMOS battery (CR2032)” on page 126).
- Dispose the component with compliance to local regulations.

Demo video

[Watch the procedure on YouTube](#)

Install the CMOS battery (CR2032)

Follow instructions in this section to install the CMOS battery.

About this task

- When replacing the CMOS battery, you must replace it with another CMOS battery of the same type from the same manufacturer.
- After you replace the CMOS battery, you must reconfigure the server and reset the system date and time.
- To avoid possible danger, read and follow the following safety statement.

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.

S004



CAUTION:

When replacing the lithium battery, use only Lenovo specified part number or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- Throw or immerse into water
- Heat to more than 100°C (212°F)
- Repair or disassemble

Dispose of the battery as required by local ordinances or regulations.

S005



CAUTION:

The battery is a lithium ion battery. To avoid possible explosion, do not burn the battery. Exchange it only with the approved part. Recycle or discard the battery as instructed by local regulations.

Attention:

- Go over “[Installation Guidelines](#)” on page 109 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Note: Follow any special handling and installation instructions that come with the replacement battery.

Procedure

- Step 1. Place the CMOS battery on top of the socket with the positive (+) symbol facing up, and press the battery into the seat until it clicks in place.

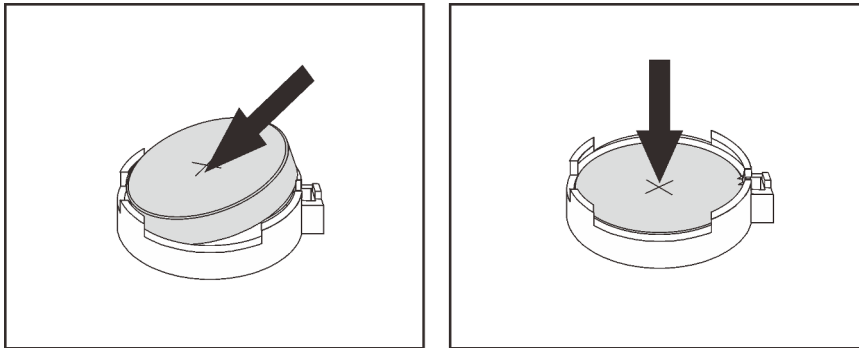


Figure 45. Installing the CMOS battery

After this task is completed

1. Proceed to complete the parts replacement (see “[Complete the parts replacement](#)” on page 223).
2. Reset date, time, and all the passwords.

Demo video

[Watch the procedure on YouTube](#)

External LCD diagnostics handset replacement

Follow instructions in this section to remove or install the external LCD diagnostics handset.

Remove the external LCD diagnostics handset

Follow instructions in this section to remove the external LCD diagnostics handset.

About this task

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.

S017



CAUTION:

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

S033



CAUTION:

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

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).

Procedure

Step 1. Disconnect the external LCD diagnostics handset cable.

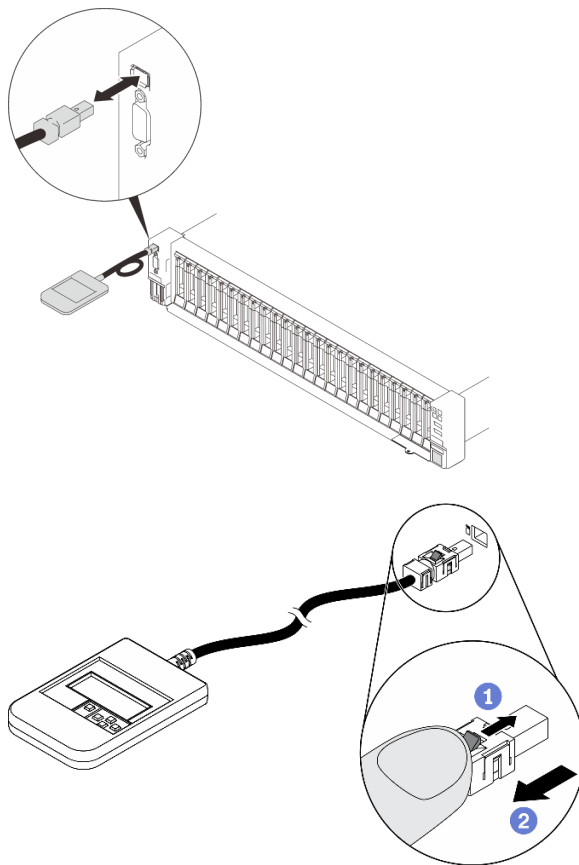


Figure 46. Disconnecting the external LCD diagnostics handset cable

- 1 Press and hold on the latch on top of the connector.
- 2 Pull to disconnect the cable from the server.

After this task is completed

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Install the external LCD diagnostics handset

Follow instructions in this section to install the external LCD diagnostics handset.

About this task

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.

S017



CAUTION:

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

S033



CAUTION:

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

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. Align the connector on the cable with that on the server, and push it in.

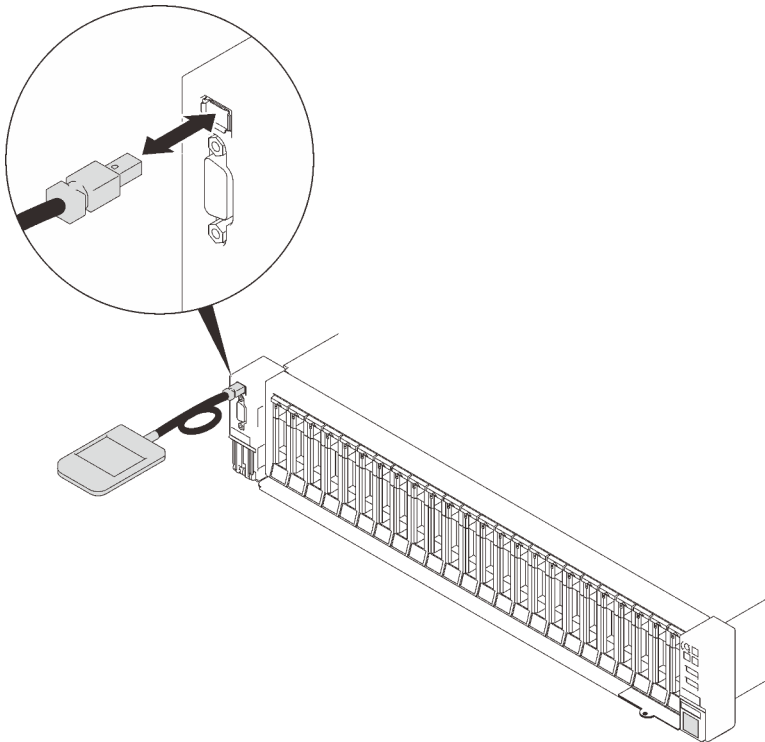


Figure 47. Connecting the external LCD diagnostics handset cable

Step 2. Attach the external LCD diagnostics handset to a metal surface with the magnetic bottom.

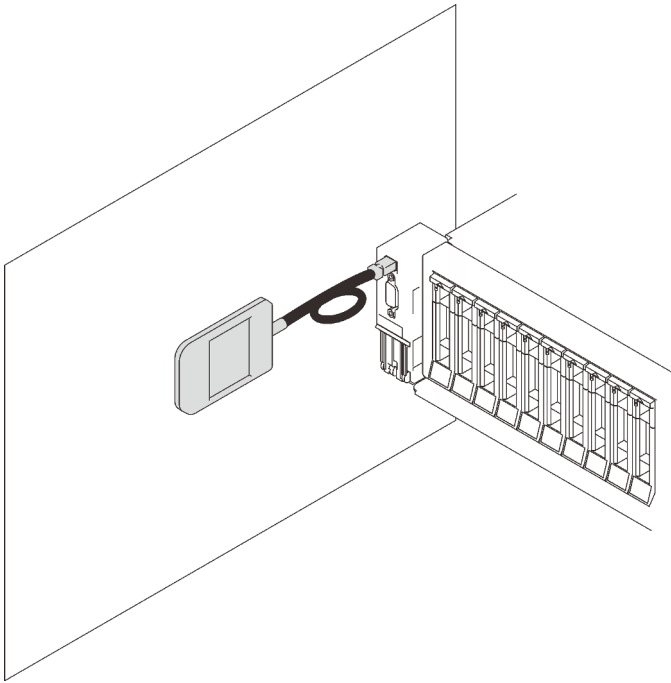


Figure 48. Attaching the external LCD diagnostics handset to a metal surface

After this task is completed

Proceed to complete the parts replacement (see [“Complete the parts replacement” on page 223](#)).

Fan and fan cage replacement

Follow instructions in this section to remove or install the fans and the fan cage assembly.

Remove the fan cage assembly

Follow instructions in this section to remove the fan cage assembly.

About this task

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.

S017



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

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Procedure

- Step 1. Make preparations for this task.
- a. Remove the top cover (see [“Remove the top cover” on page 219](#)).
- Step 2. Lift and rotate the fan cage release latches to disengage the fan cage assembly from the server.

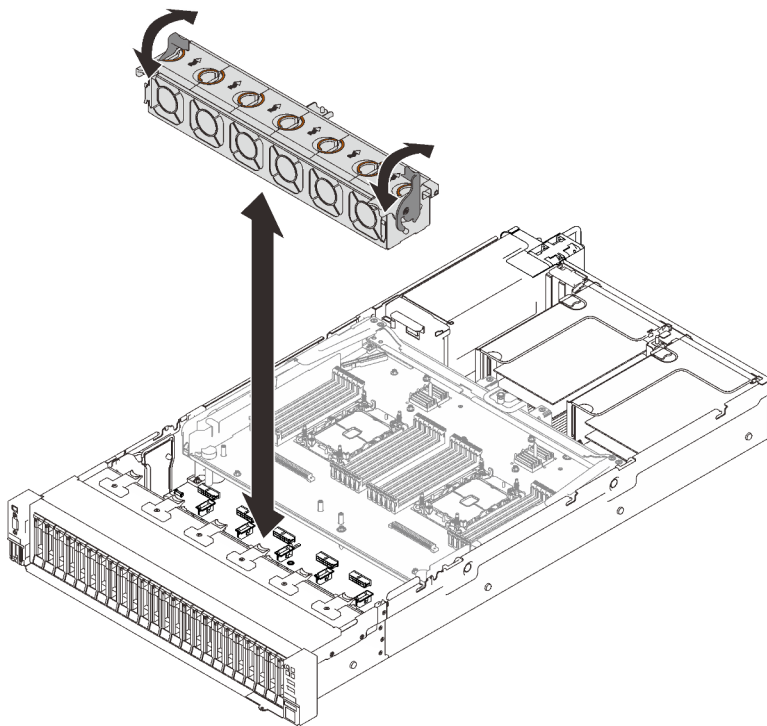


Figure 49. Removing the fan cage assembly

- Step 3. Lift the fan cage assembly to remove it.

After this task is completed

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

[Watch the procedure on YouTube](#)

Install the fan cage assembly

Follow instructions in this section to install the fan cage assembly.

About this task

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.

S017



CAUTION:

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

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. Align the fan cage assembly to the guides on both sides of the server, and lower it into the server.

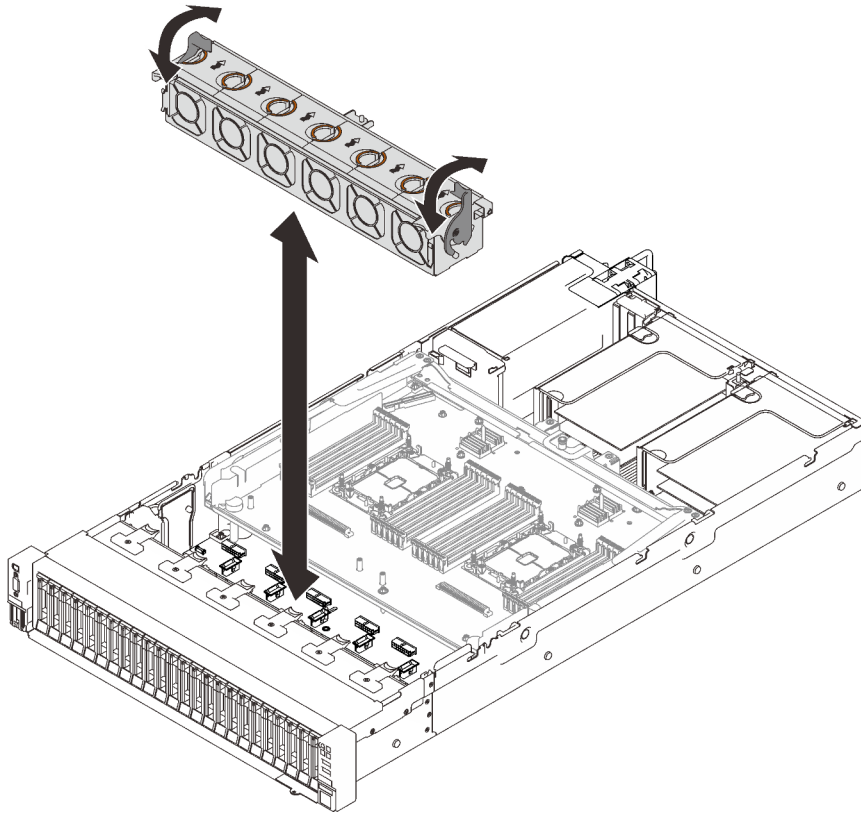


Figure 50. Installing the fan cage assembly

Step 2. Rotate the fan cage release latches down until they stop.

After this task is completed

Proceed to complete the parts replacement (see [“Complete the parts replacement” on page 223](#)).

Demo video

[Watch the procedure on YouTube](#)

Remove a fan

Follow instructions in this section to remove a fan.

About this task

S002



CAUTION:

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To

remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S014



CAUTION:

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

S017



CAUTION:

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

S033



CAUTION:

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

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Procedure

Procedure

Step 1. Make preparations for this task.

- a. Remove the top cover (see [“Remove the top cover” on page 219](#)).

Step 2. Remove the fan.

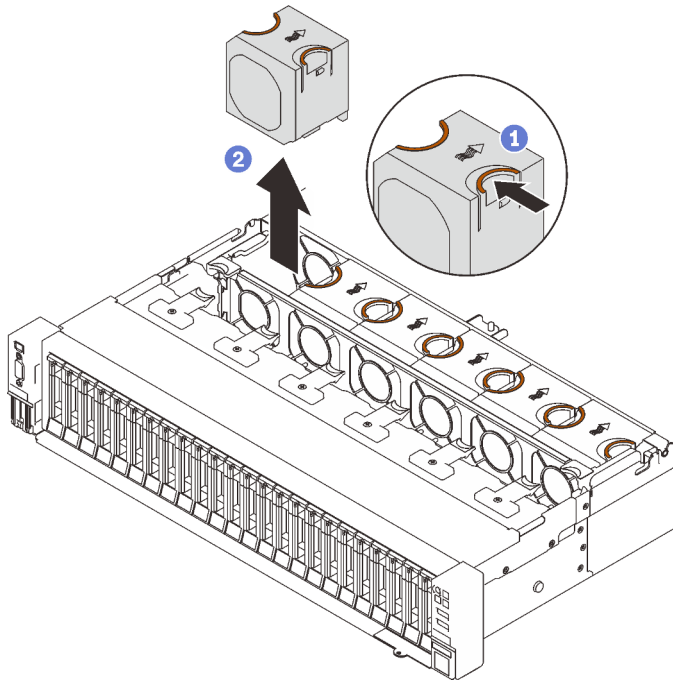


Figure 51. Removing a fan

- 1 Pinch and hold on the orange touch points on the top of the fan.
- 2 Lift the fan to remove it.

After this task is completed

- Install a replacement unit (see “Install a fan” on page 136).
- **Attention:** With power on, complete the replacement within 30 seconds to ensure proper operation.
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

[Watch the procedure on YouTube](#)

Install a fan

Follow instructions in this section to install a hot-swap fan.

About this task

S002



CAUTION:

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To

remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S014



CAUTION:

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

S017



CAUTION:

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

S033



CAUTION:

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

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Procedure

- Step 1. Align the fan over the fan slot in the fan cage assembly, and insert the fan into the fan cage assembly until it clicks into place.

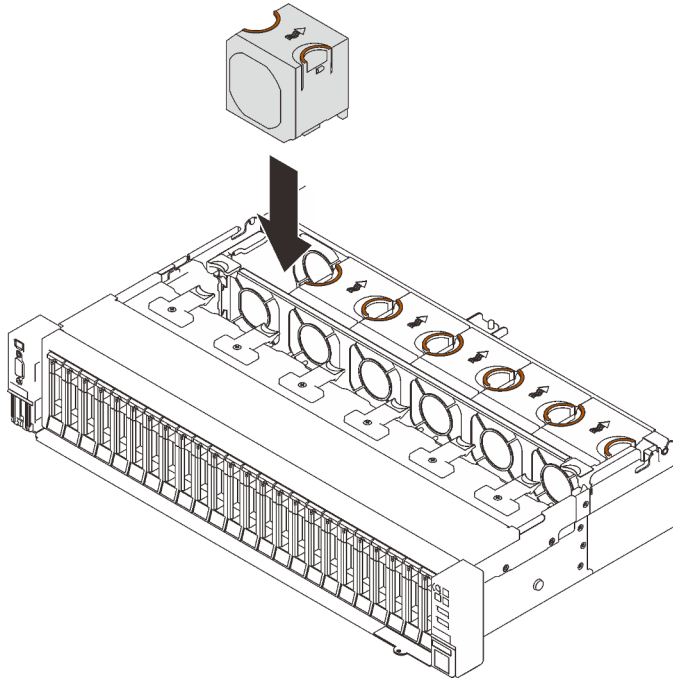


Figure 52. Installing a fan

Attention: With power on, complete the replacement within 30 seconds to ensure proper operation.

After this task is completed

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

[Watch the procedure on YouTube](#)

Flash power module replacement

Follow instructions in this section to remove or install the flash power module.

Remove a flash power module

Follow instructions in this section to remove a flash power module.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Procedure

Step 1. Make preparations for this task.

- a. Remove the top cover (see [“Remove the top cover”](#) on page 219).
- b. Remove the PCIe riser (see [“Remove the PCIe riser assembly”](#) on page 160) where the flash power module is located.

Step 2. Remove the flash power module.

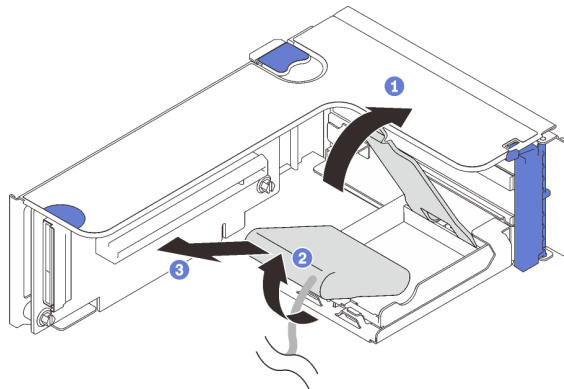


Figure 53. Removing flash power module from vertical holder

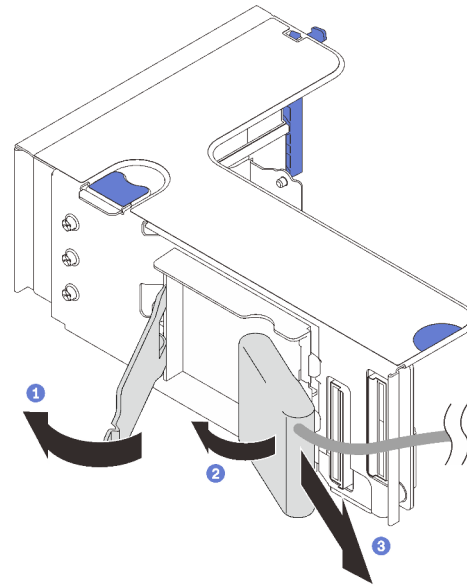


Figure 54. Removing flash power module from horizontal holder

- 1 Press and release the retaining latch.
- 2 Rotate the flash power module away.
- 3 Remove the flash power module.

After this task is completed

- Install a replacement unit (see [“Install a flash power module”](#) on page 142).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.
- If you plan to remove or recycle the flash power module holder:
 - **Vertical holder**

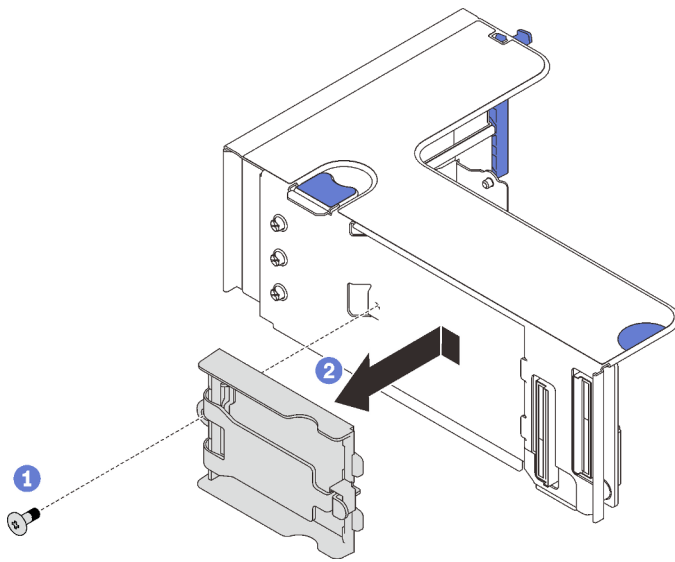


Figure 55. Removing the vertical holder

- 1 Remove the screw that secures the holder to the riser.
- 2 Slide the holder forward slightly to disengage it from the riser, and remove the holder.

– **Horizontal holder**

1. Remove the screw that secures the holder bracket to the riser, and remove the bracket from the riser.

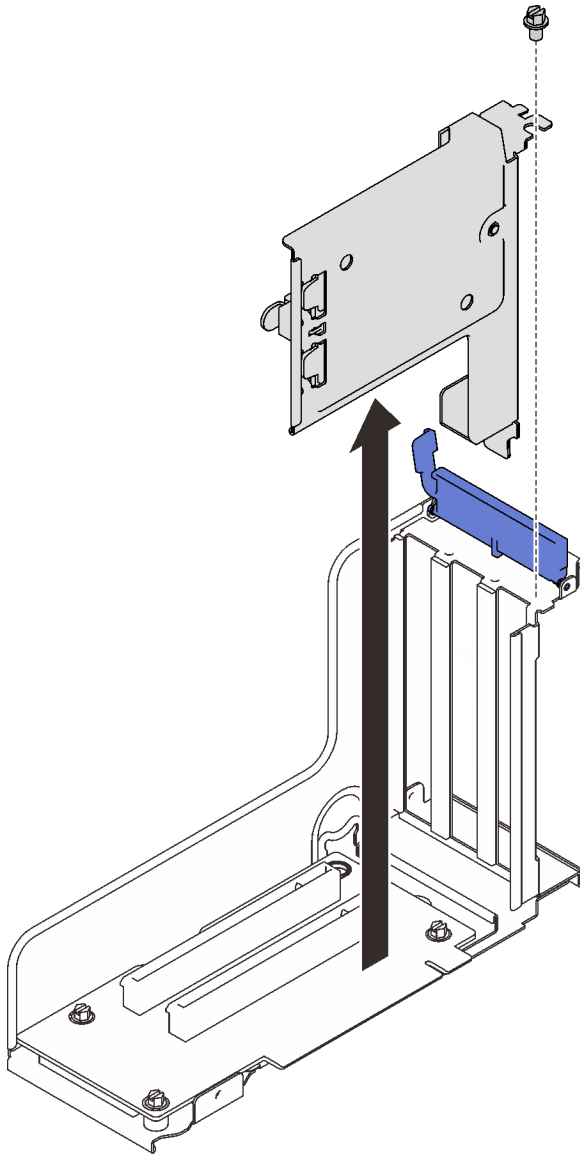
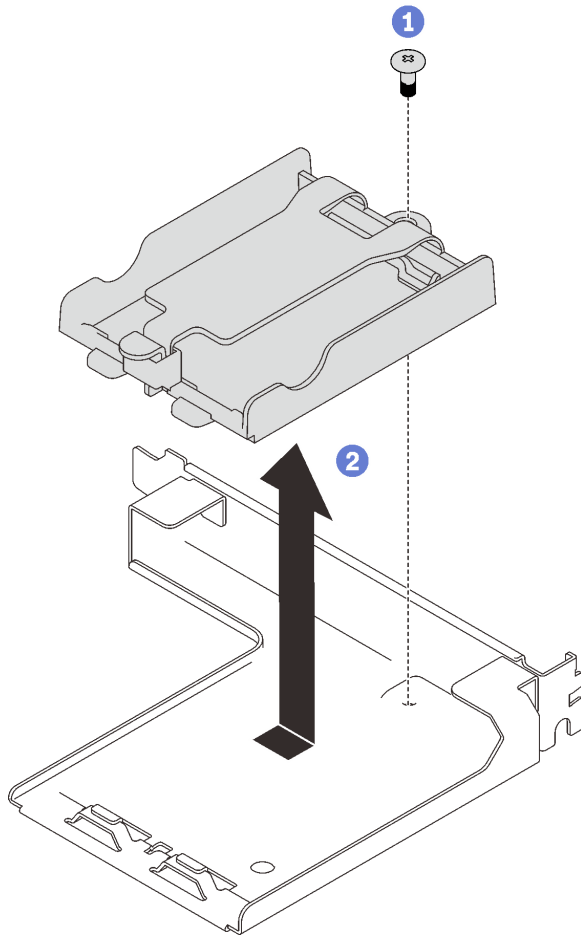


Figure 56. Removing the holder bracket from the PCIe riser

2. Remove the holder from the bracket.



- 1 Remove the screw that secures the holder to the bracket.
- 2 Slide the holder forward slightly to disengage it from the bracket, and remove the holder.

Figure 57. Removing the horizontal holder from the bracket

Then, recycle the component in compliance with local regulations.

Demo video

[Watch the procedure on YouTube](#)

Install a flash power module

Follow instructions in this section to install a flash power module.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. Install the flash power module.

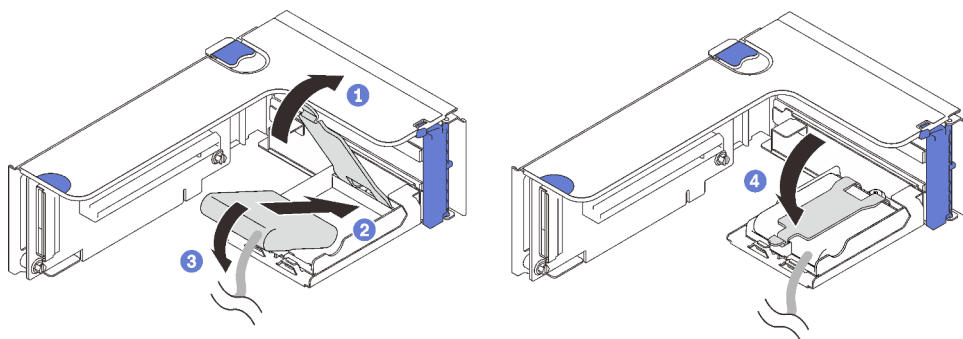


Figure 58. Installing the flash power module into a horizontal holder

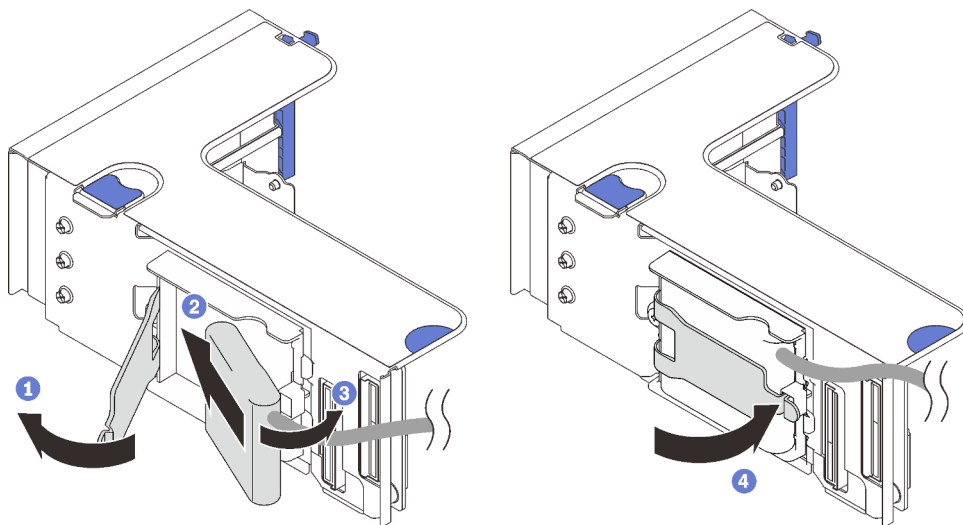


Figure 59. Installing the flash power module into the vertical holder

- 1 Press and release the retaining latch.
- 2 Align the flash power module with the holder hinge.
- 3 Rotate the other end of the module inward until it is secured in the holder.
- 4 Close the retaining latch.

After this task is completed

1. Install the PCIe riser assembly (see “[Install the PCIe riser assembly](#)” on page 168).
2. Connect the cable to the corresponding RAID adapters.
3. Proceed to complete the parts replacement (see “[Complete the parts replacement](#)” on page 223).

Demo video

[Watch the procedure on YouTube](#)

Heat sink Torx T30 nut replacement

Follow the instructions in this section to remove and install a heat sink Torx T30 nut.

Remove a heat sink Torx T30 nut

Follow the instructions in this section to remove a PEEK (Polyether ether ketone) Torx T30 nut on the heat sink.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.
- Do not touch the processor contacts. Contaminants on the processor contacts, such as oil from your skin, can cause connection failures.

Note: The heat sink, processor, and processor carrier for the system might be different from those shown in the illustrations.

Procedure

Step 1. Make preparations for this task.

- a. Remove the top cover (see [“Remove the top cover” on page 219](#)).
- b. Remove the following components depending on the location of the processor that is to be removed:
 - If the processor is located on the processor and memory expansion tray, **do not** remove the expansion tray. Only remove the air baffle from the expansion tray.

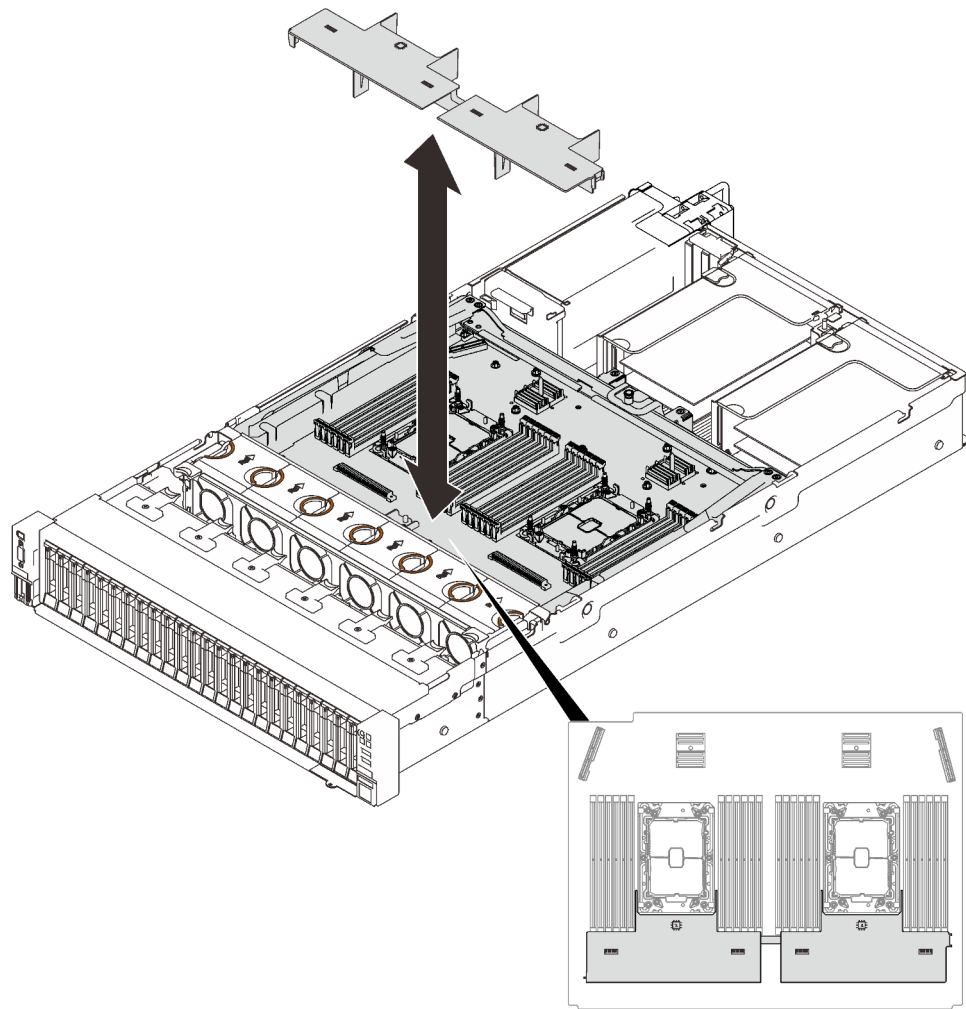


Figure 60. Removing the air baffle from the expansion tray

- If the processor is located on the system board:
 1. Remove one of the following components.
 - System air baffle (see [“Remove the system board air baffle”](#) on page 205)
 - Processor and memory expansion tray and expansion tray air baffle (see [“Remove the processor and memory expansion tray”](#) on page 195)
 2. Remove the expansion tray air baffle.

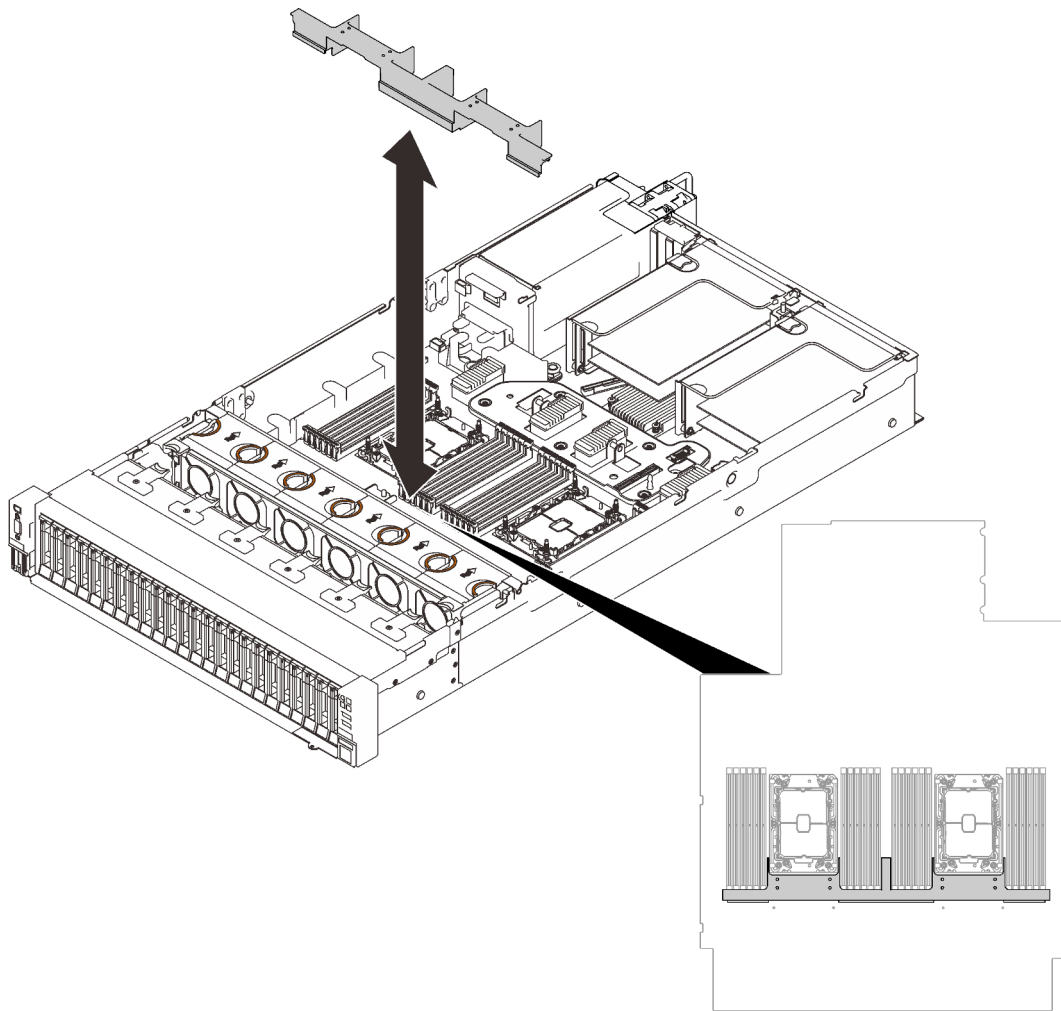


Figure 61. Removing the expansion tray air baffle

- c. Remove the PHM. See [“Remove a processor and heat sink”](#) on page 182.

Step 2. Remove the Torx T30 nut.

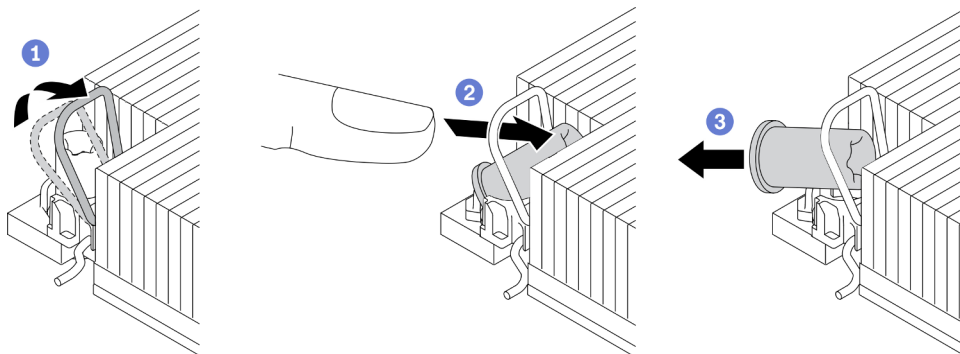


Figure 62. Removing a Torx T30 nut from the heat sink

Note: Do not touch the gold contacts on the bottom of the processor.

- a. **1** Rotate the anti-tilt wire bail inwards.

- b. **2** Push the upper edge of the Torx T30 nut towards the center of the heat sink until it disengages.
- c. **3** Remove the Torx T30 nut.

Attention: Visually inspect the removed Torx T30 nut, if the nut is cracked or damaged, make sure no debris or broken pieces are left inside the server.

After you finish

1. Install a new Torx T30 nut. See [“Install a heat sink Torx T30 nut” on page 147](#).
2. Proceed to complete the parts replacement (see [“Complete the parts replacement” on page 223](#)).

Demo video

[Watch the procedure on YouTube](#)

Install a heat sink Torx T30 nut

Follow the instructions in this section to install a PEEK (Polyether ether ketone) Torx T30 nut on the heat sink.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- Do not touch the processor contacts. Contaminants on the processor contacts, such as oil from your skin, can cause connection failures.

Note: The heat sink, processor, and processor carrier for the system might be different from those shown in the illustrations.

Procedure

Step 1. Install the Torx T30 nut.

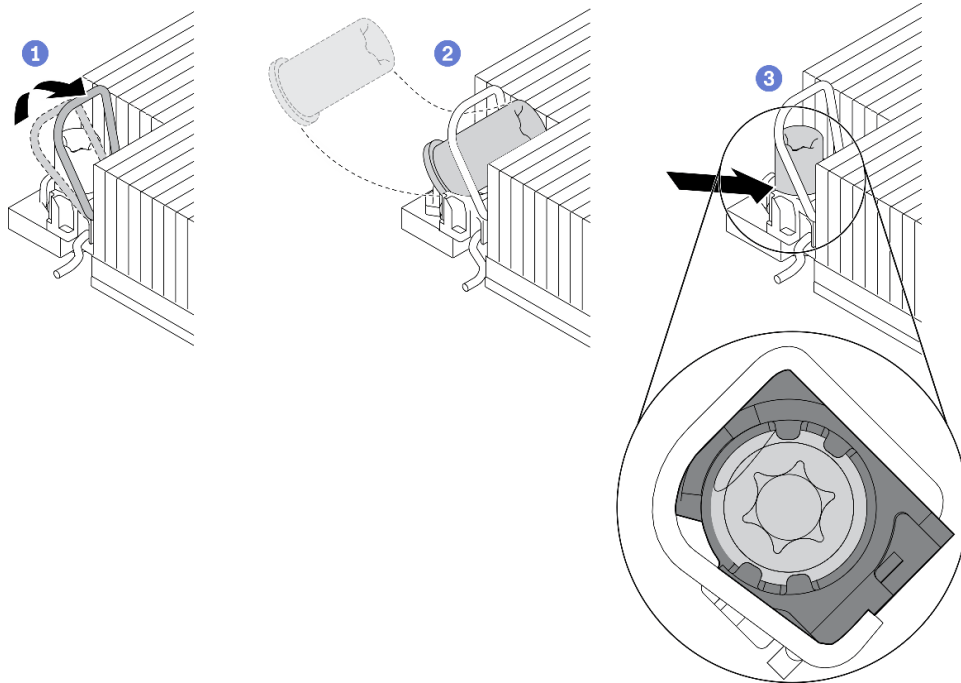


Figure 63. Installing a Torx T30 nut into the heat sink

Note: Do not touch the gold contacts on the bottom of the processor.

- a. ① Rotate the anti-tilt wire bail inwards.
- b. ② Orient the Torx T30 nut under the anti-tilt wire bail; then, align the Torx T30 nut with the socket at an angle as shown.
- c. ③ Push the lower edge of the Torx T30 nut into the socket until it clicks into place. Make sure the Torx T30 nut is secured under the four clips in the socket.

After you finish

1. Make sure all four nuts are installed to the PHM, and install the PHM. See [“Install a processor and heat sink” on page 189](#).
2. Proceed to complete the parts replacement (see [“Complete the parts replacement” on page 223](#)).

Demo video

[Watch the procedure on YouTube](#)

Intrusion switch replacement

Follow instructions in this section to remove or install the intrusion switch.

Remove the intrusion switch

Follow instructions in this section to remove the intrusion switch.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.

- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Procedure

Step 1. Make preparations for this task.

- Remove the top cover (see [“Remove the top cover” on page 219](#)).
- Remove the PCIe riser assembly in riser zone 1 (see [“Remove the PCIe riser assembly from zone 1” on page 161](#)).
- Remove the PCIe riser assembly in riser zone 2 (see [“Remove the PCIe riser assembly from zone 2” on page 162](#)).

Step 2. Disconnect the cable from the system board.

Attention: To avoid damaging the system board, make sure to follow the instructions in [Chapter 3 “Internal cable routing” on page 47](#) when disconnecting cables from the system board.

Step 3. Grasp the switch, and pull to remove it from the seat.

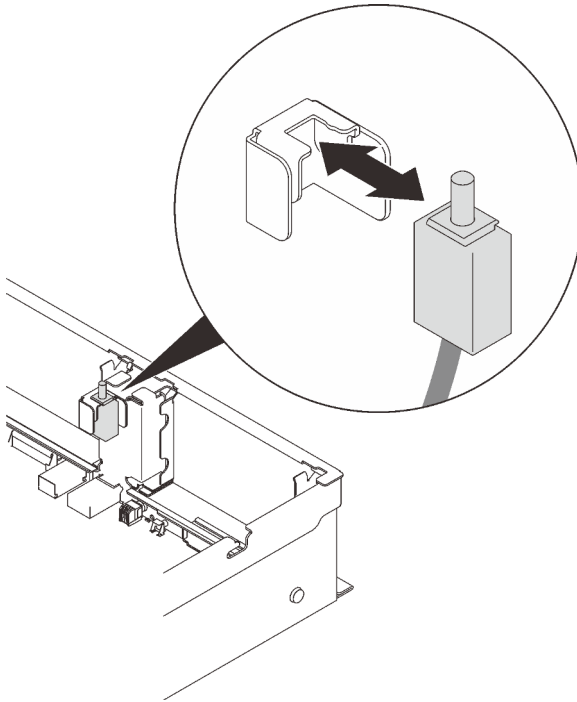


Figure 64. Removing the intrusion switch

After this task is completed

- Install a replacement unit (see [“Install the intrusion switch” on page 150](#)).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

[Watch the procedure on YouTube](#)

Install the intrusion switch

Follow instructions in this section to install the intrusion switch.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. Align the intrusion switch with the slot between the two riser zones, and push it in.

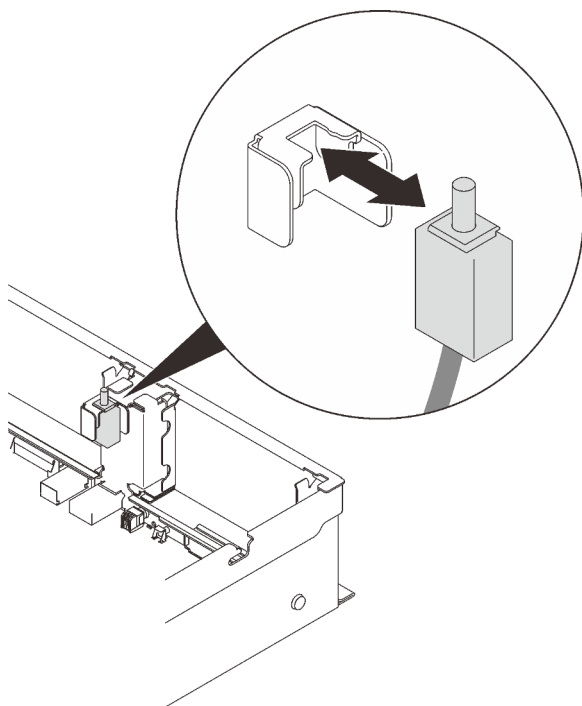


Figure 65. Installing the intrusion switch

Step 2. Connect the cable to the system board. See [“System board connectors” on page 30](#) to locate the connector on the system board.

After this task is completed

Proceed to complete the parts replacement (see [“Complete the parts replacement” on page 223](#)).

Demo video

[Watch the procedure on YouTube](#)

Memory module replacement

Follow instructions in this section to remove or install a memory module.

Memory module slot location

Locate the memory module to replace based on the following figures.

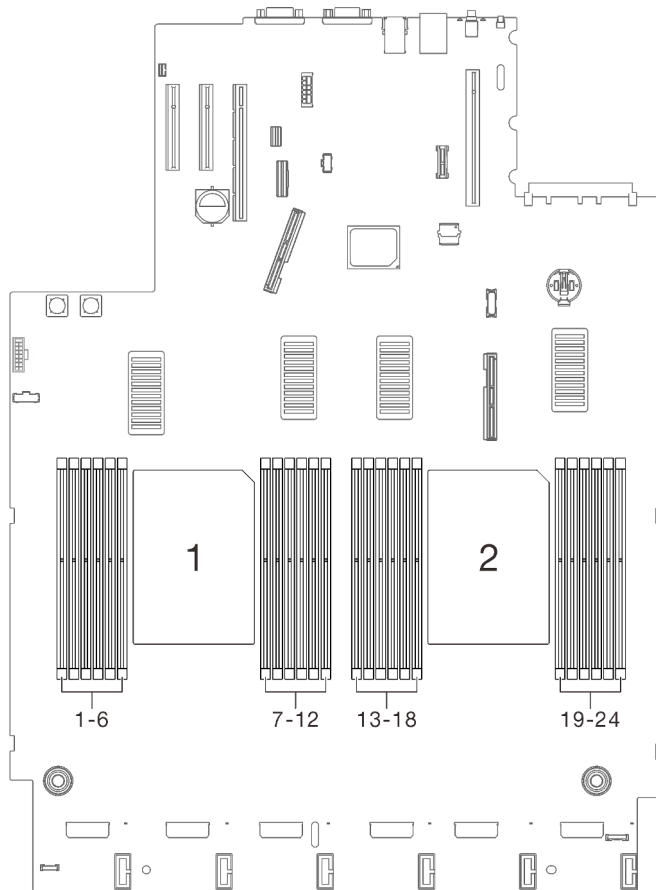


Figure 66. Memory module slot 1-24 on the system board

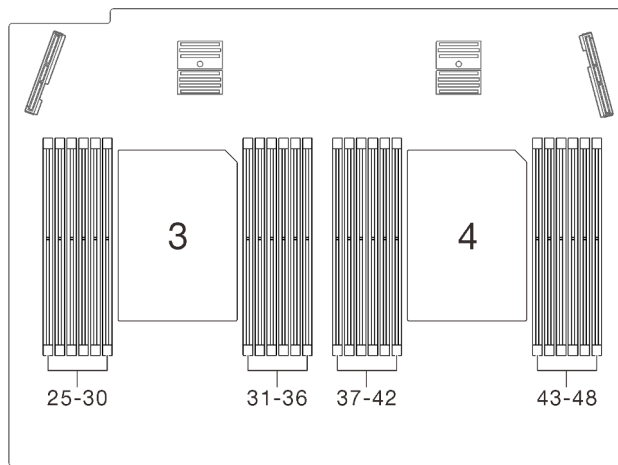
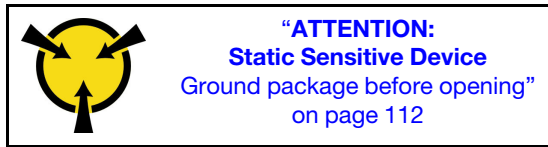


Figure 67. Memory module slot 25-48 on the expansion tray

Remove a memory module

Follow instructions in this section to remove a memory module.

About this task



Attention: Memory modules are sensitive to static discharge and require special handling. In addition to the standard guidelines for [“Handling static-sensitive devices” on page 112](#):

- 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 modules.
- Do not insert memory modules while holding packages or passive components, which can cause package cracks or detachment of passive components by the high insertion force.
- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Procedure

Step 1. Make preparations for this task.

a. If any of the modules to be removed is PMEM:

- In the case of pure system board or expansion tray replacement, keep records of the slots in which the modules are installed, and make sure to install them back to the exact same slots after system board or expansion tray replacement.
- If the removed PMEM is to be replaced or reused in a different configuration, make sure to complete the following procedure before physically removing the module.

Attention: Without the following steps being completed, the removed PMEM will not be usable in another system or configuration.

1. Back up stored data in PMEM namespaces.
2. Disable PMEM security with one of the following options:

– **LXPM**

Go to **UEFI Setup → System Settings → Intel Optane PMEMs → Security → Press to Disable Security**, and input passphrase to disable security.

– **Setup Utility**

Go to **System Configuration and Boot Management → System Settings → Intel Optane PMEMs → Security → Press to Disable Security**, and input passphrase to disable security.

3. Delete namespaces with command corresponding to the operating system that is installed:

– **Linux** command:

```
ndctl destroy-namespace all -f  
ndctl destroy-namespace all -f
```

– **Windows** Powershell command

```
Get-PmemDisk | Remove-PmemDisk
```

4. Clear Platform Configuration Data (PCD) and Namespace Label Storage Area (LSA) with the following ipmctl command (for both Linux and Windows).

```
ipmctl delete -pcd
```

Notes: See the following links to learn how to download and use ipmctl in different operating systems:

– Windows: <https://datacentersupport.lenovo.com/us/en/videos/YTV101407>

– Linux: <https://datacentersupport.lenovo.com/us/en/solutions/HT508642>

5. Reboot the system.

b. Remove the top cover (see “[Remove the top cover](#)” on page 219).

c. Remove the following components depending on the location of the processor that is to be removed:

- If the processor is located on the processor and memory expansion tray, **do not** remove the expansion tray. Only remove the air baffle from the expansion tray.

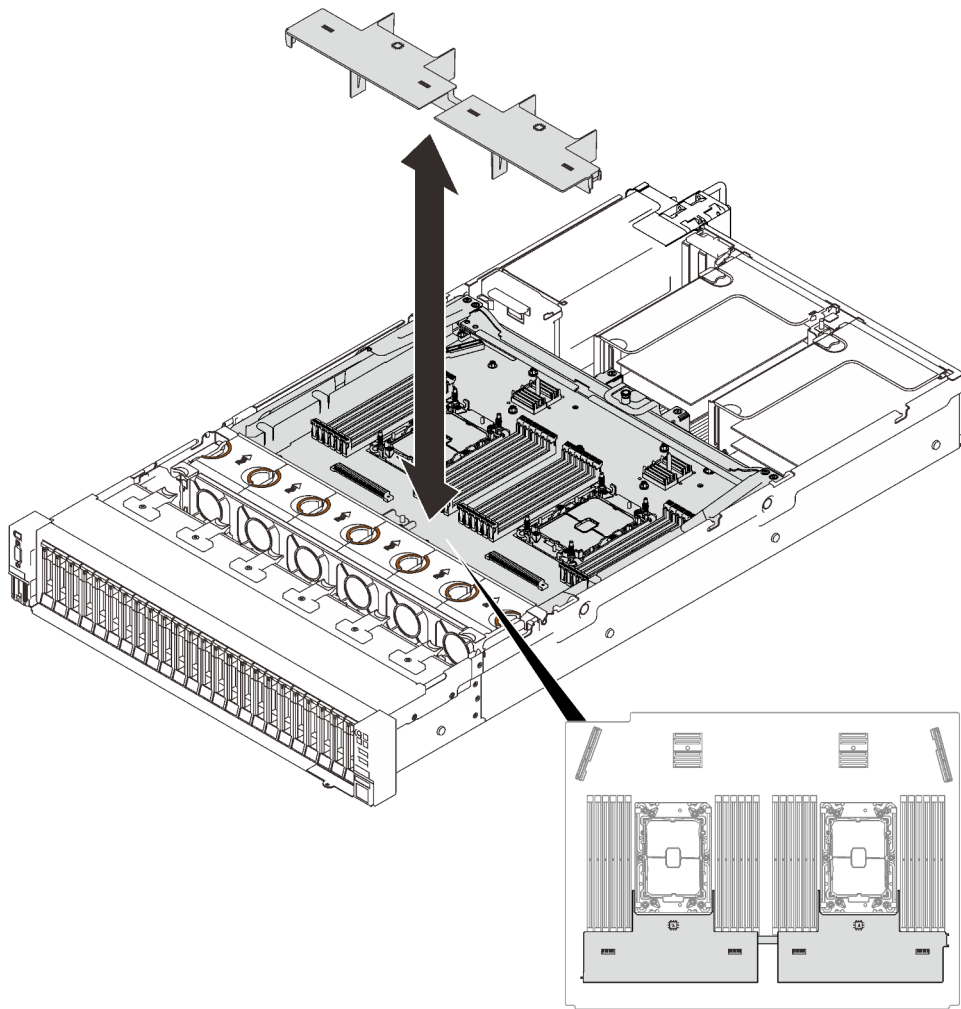


Figure 68. Removing the air baffle from the expansion tray

- If the processor is located on the system board:
 1. Remove one of the following components.
 - System air baffle (see [“Remove the system board air baffle”](#) on page 205)
 - Processor and memory expansion tray and expansion tray air baffle (see [“Remove the processor and memory expansion tray”](#) on page 195)
 2. Remove the expansion tray air baffle.

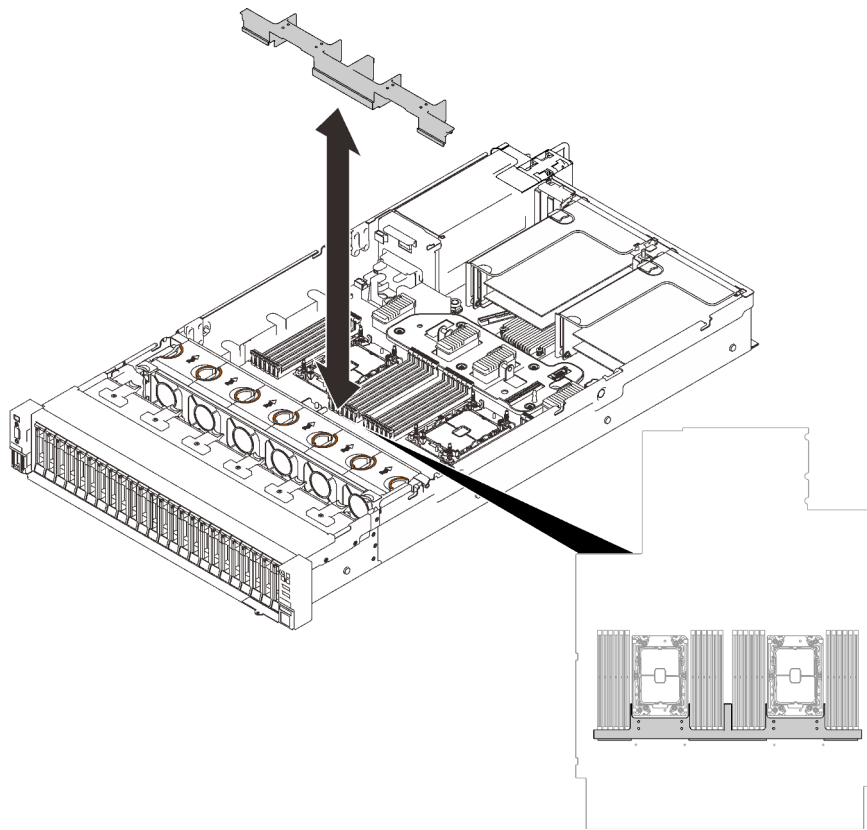


Figure 69. Removing the expansion tray air baffle

Step 2. Remove the memory module from the slot.

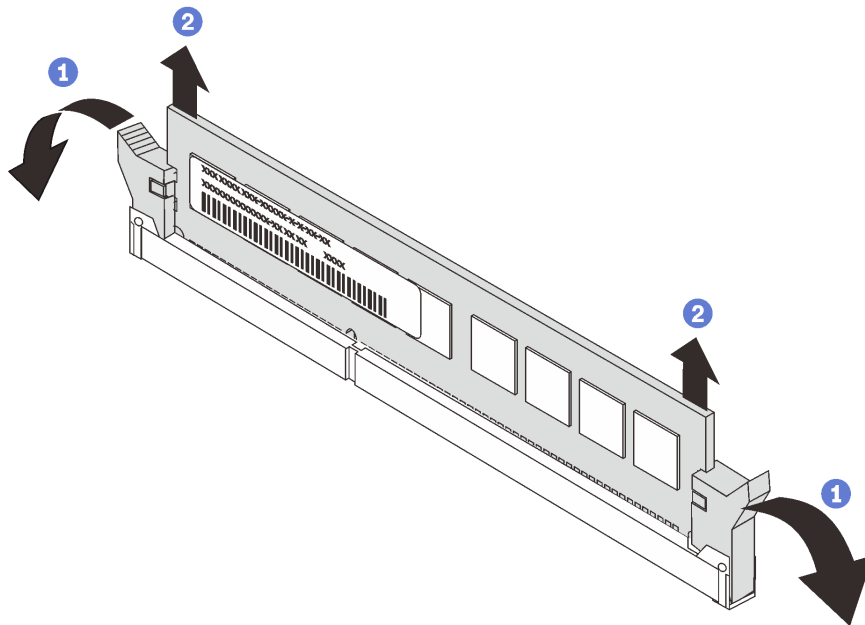


Figure 70. Removing a memory module

- 1 Open the retaining clip on each end of the memory module slot.

- 2 Grasp the memory module at both ends, and gently lift and remove it from the slot.

After this task is completed

1. Install a replacement unit (see [“Install a memory module” on page 156](#)).
2. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

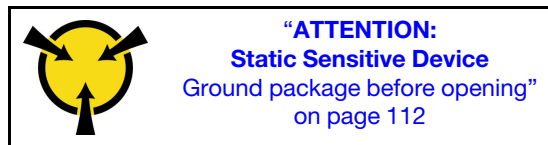
[Watch the procedure on YouTube](#)

Install a memory module

Follow instructions in this section to install a memory module.

About this task

See “Memory module installation rules and order” in *Setup Guide* for detailed information about memory configuration and setup.



Attention: Memory modules are sensitive to static discharge and require special handling. In addition to the standard guidelines for [“Handling static-sensitive devices” on page 112](#):

- 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 modules.
- Do not insert memory modules while holding packages or passive components, which can cause package cracks or detachment of passive components by the high insertion force.
- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Important:

- If you are installing memory modules on the processor and memory expansion tray, **do not** remove the expansion tray. Install the modules while the expansion tray is installed in the chassis to avoid accidental damages to components.

- Ensure that you have observed the installation rules and sequence in “Memory module installation rules and order” in *Setup Guide*.

Procedure

Step 1. If any of the modules to be installed is PMEM, make sure to complete the following procedure before physically installing the module:

1. Back up stored data in PMEM namespaces.
2. Disable PMEM security with one of the following options:
 - **LXPM**
Go to **UEFI Setup → System Settings → Intel Optane PMEMs → Security → Press to Disable Security**, and input passphrase to disable security.
 - **Setup Utility**
Go to **System Configuration and Boot Management → System Settings → Intel Optane PMEMs → Security → Press to Disable Security**, and input passphrase to disable security.
3. Delete namespaces with command corresponding to the operating system that is installed:
 - **Linux** command:

```
ndctl destroy-namespace all -f  
ndctl destroy-namespace all -f
```
 - **Windows** Powershell command

```
Get-PmemDisk | Remove-PmemDisk
```
4. Clear Platform Configuration Data (PCD) and Namespace Label Storage Area (LSA) with the following ipmctl command (for both Linux and Windows).

```
ipmctl delete -pcd
```

Notes: See the following links to learn how to download and use ipmctl in different operating systems:

- Windows: <https://datacentersupport.lenovo.com/us/en/videos/YTV101407>
- Linux: <https://datacentersupport.lenovo.com/us/en/solutions/HT508642>

5. Reboot the system.

Step 2. Install the memory module into the slot.

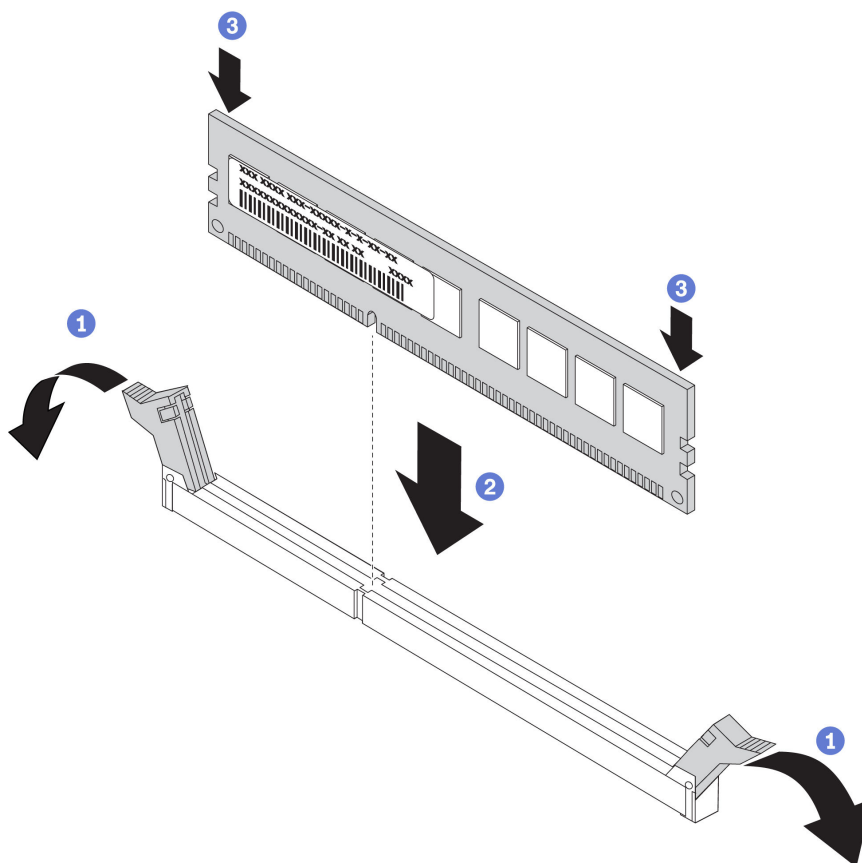


Figure 71. Installing a memory module

- 1 Gently open the retaining clip on each end of the memory module slot.
- 2 Align the memory module with the slot, and gently place the memory module on the slot.
- 3 Firmly press both ends of the memory module straight down 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. In this case, open the retaining clips, remove the memory module, and then reinsert it.

After this task is completed

Proceed to complete the parts replacement (see [“Complete the parts replacement” on page 223](#)).

Demo video

[Watch the procedure on YouTube](#)

OCP Ethernet adapter replacement

Follow instructions in this section to install or remove the OCP Ethernet adapter .

Remove the OCP Ethernet adapter

Follow instructions in this section to remove the OCP Ethernet adapter.

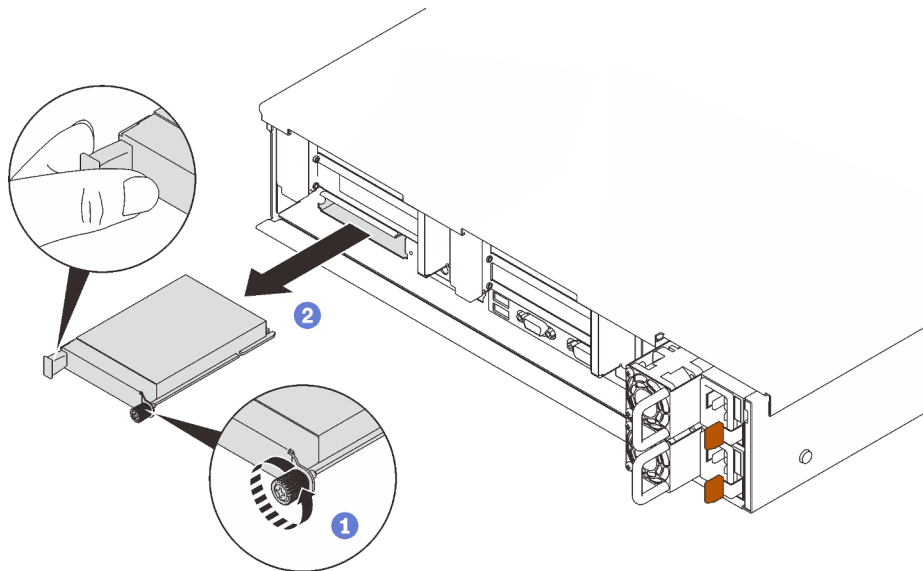
About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Procedure

Step 1. Remove the OCP Ethernet adapter.



- 1 Loosen the captive screw.
- 2 Grasp the handle, and slide the adapter out.

Figure 72. Removing the OCP Ethernet adapter

After this task is completed

1. Install a replacement unit or a filler (see [“Install the OCP Ethernet adapter” on page 159](#)).
2. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

[Watch the procedure on YouTube](#)

Install the OCP Ethernet adapter

Follow instructions in this section to install the OCP Ethernet adapter.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. Install the OCP Ethernet adapter.

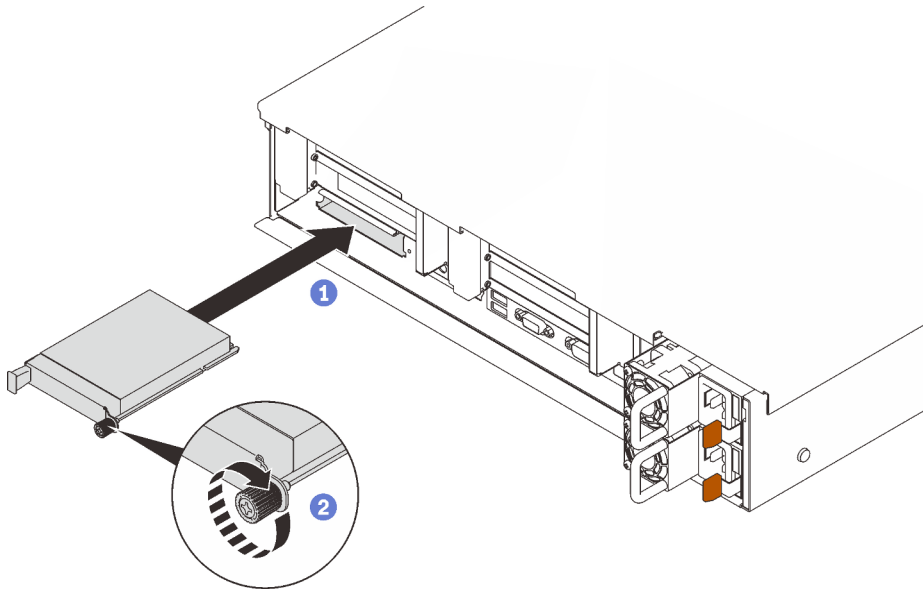


Figure 73. Installing the OCP Ethernet adapter

- 1 Slide the adapter into the PCIe slot.
- 2 Tighten the captive screw to secure the adapter.

After this task is completed

Proceed to complete the parts replacement (see [“Complete the parts replacement” on page 223](#)).

Demo video

[Watch the procedure on YouTube](#)

PCIe riser assembly and adapter replacement

Follow instructions in this section to remove or install the PCIe riser assembly and the adapters.

Notes: To prevent potential thermal issues, change the **Misc** setting in the BIOS from **Option3** (default value) to **Option1** if the following two conditions are met:

- The server is equipped with a GPU adapter.
- The UEFI firmware version is M5E128A or later.

For the method of changing the **Misc** setting, see <https://support.lenovo.com/us/en/solutions/TT1832>.

Remove the PCIe riser assembly

Follow instructions in this section to remove the PCIe riser assembly.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Two zones could be installed with a PCIe riser assembly. See the following instructions based on the location of the riser:

- **Zone 1** (PCIe slot 1 to 3): [“Remove the PCIe riser assembly from zone 1” on page 161](#)
- **Zone 2** (PCIe slot 5 to 6): [“Remove the PCIe riser assembly from zone 2” on page 162](#)

Remove the PCIe riser assembly from zone 1

Procedure

Step 1. Make preparations for this task.

- a. Remove the top cover (see [“Remove the top cover” on page 219](#)).
- b. Disconnect cables that are connected to the adapters.

Step 2. Grasp and lift the PCIe riser assembly to remove it from the system board.

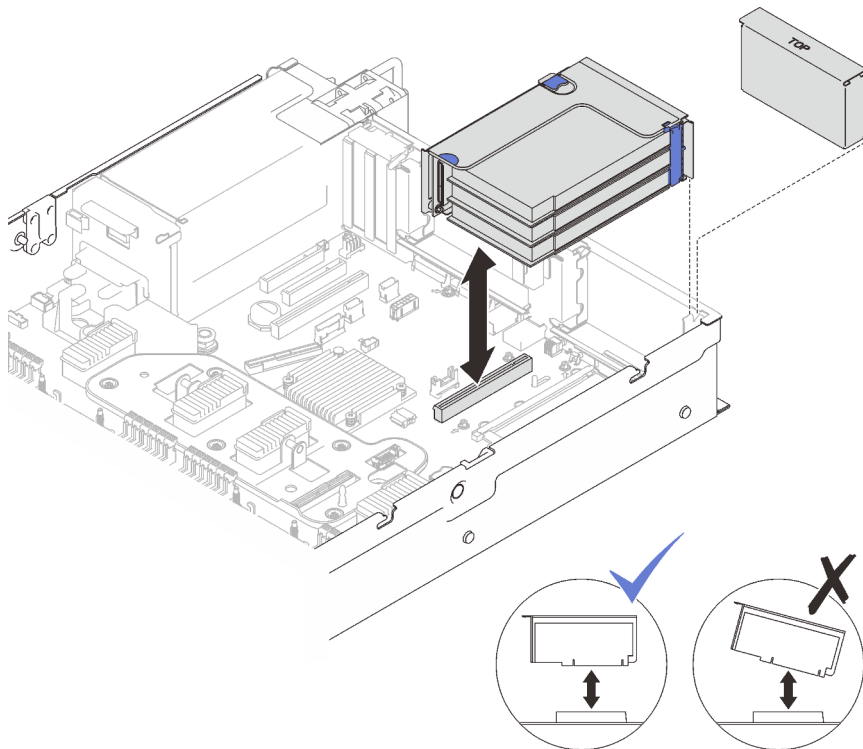


Figure 74. Removing the PCIe riser assembly from zone 1

Demo video

[Watch the procedure on YouTube](#)

Remove the PCIe riser assembly from zone 2

Procedure

Step 1. Make preparations for this task.

- a. Remove the top cover (see [“Remove the top cover” on page 219](#)).
- b. Disconnect cables that are connected to the adapters.

Step 2. Remove the PCIe riser assembly.

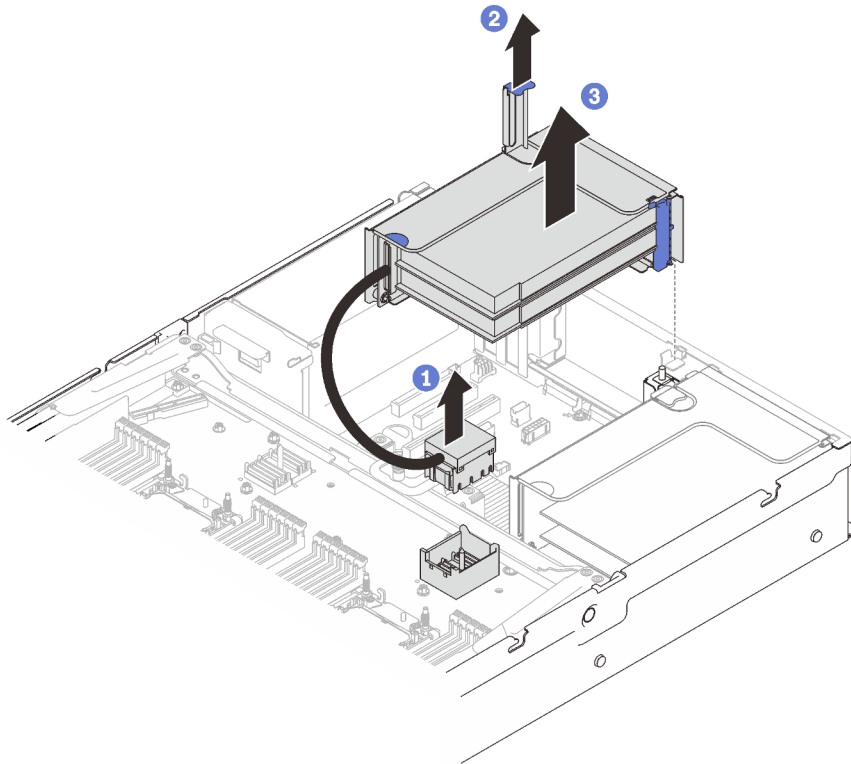


Figure 75. Removing the PCIe riser assembly from zone 2

- 1 Grasp the PCIe connector, and lift it gently and evenly to remove it from the processor and memory expansion tray.
- 2 Pull the riser handle up.
- 3 Lift and remove the PCIe riser assembly.

After this task is completed

- Fill the riser slot with a replacement unit or a filler (see [“Install the PCIe riser assembly” on page 168](#)).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.
- If you plan to recycle the component:
 1. Remove the three screws that secure the riser assembly to the bracket, and slide the riser assembly slightly away to disengage and remove it from the bracket.

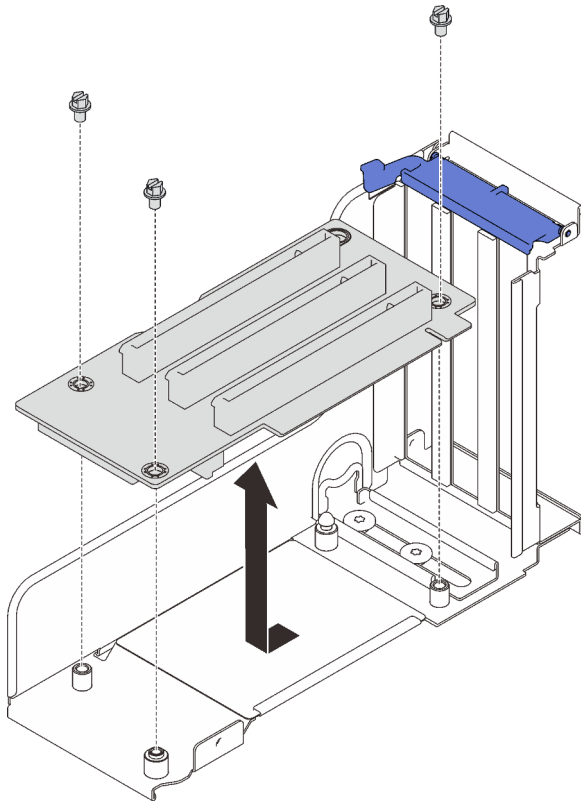


Figure 76. Disassembling the PCIe riser card

2. Recycle the component in compliance with local regulations.

Demo video

[Watch the procedure on YouTube](#)

Remove an adapter

Follow the instructions in this section to remove an adapter.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Remove an adapter from the system board

Procedure

- Step 1. Make preparations for this task.
 - a. Remove the top cover (see [“Remove the top cover” on page 219](#)).
 - b. Disconnect all the cables (including external ones) from the adapter.

- Step 2. Open the retaining latch.
- Step 3. Remove the screw that secures the adapter.
- Step 4. Grasp the adapter by upper corners, and remove it from the system board.

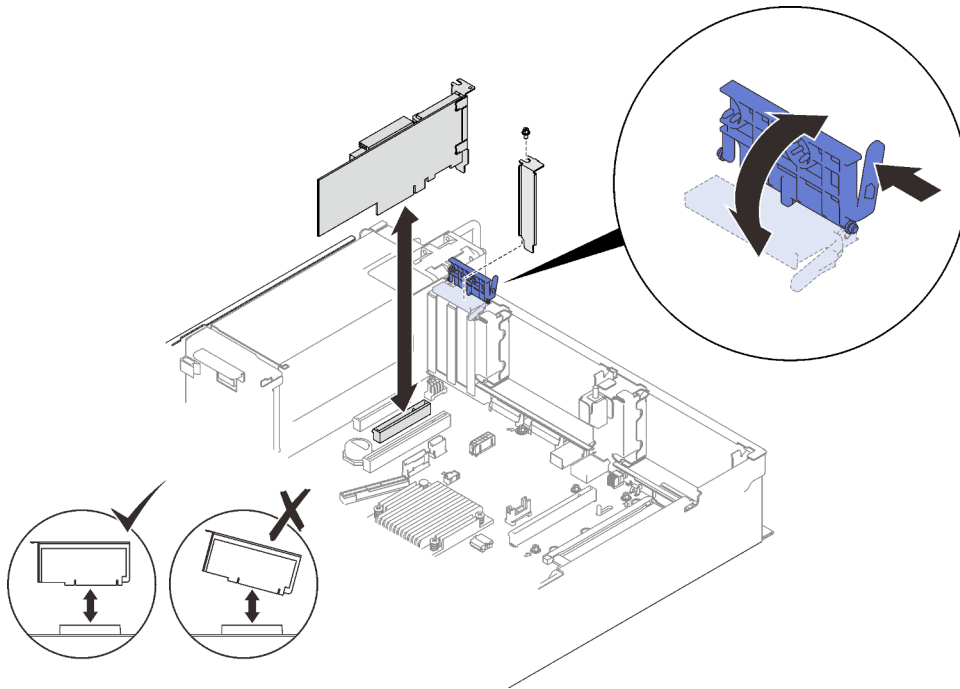


Figure 77. Removing an adapter from the system board

Remove an adapter from the PCIe riser card assembly

Procedure

- Step 1. Make preparations for this task.
 - a. Remove the top cover (see [“Remove the top cover” on page 219](#)).
 - b. Disconnect all the cables (including external ones) from the adapters that are installed in the PCIe riser card assembly.
 - c. Remove the PCIe riser assembly where the adapter has been installed (see [“Remove the PCIe riser assembly” on page 160](#)).
- Step 2. Open the retaining latch on the PCIe riser card assembly.

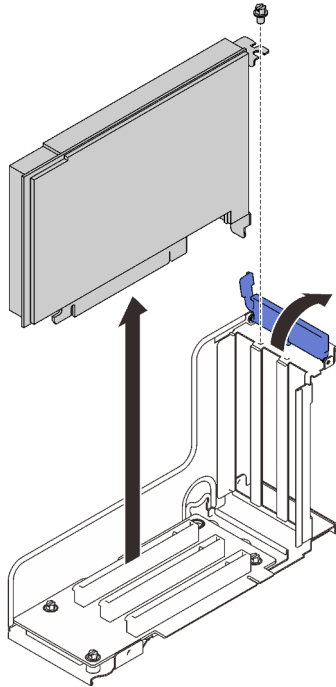


Figure 78. Removing an adapter from the PCIe riser card assembly

Step 3. Remove the screw that secures the adapter to the riser assembly.

Step 4. Remove the adapter from the PCIe riser card assembly.

After this task is completed

1. Install a replacement unit or a filler (see [“Install an adapter” on page 165](#)).
2. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

[Watch the procedure on YouTube](#)

Install an adapter

Follow the instructions in this section to install an adapter.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Notes:

- For a list of supported adapters, see <https://serverproven.lenovo.com/server/sr850-v2>.
- The following adapters must be installed in the PCIe riser assembly.
 - ThinkSystem Broadcom 57454 10/25GbE SFP28 4-port PCIe Ethernet Adapter

- ThinkSystem Broadcom 57454 10/25GbE SFP28 4-port PCIe Ethernet Adapter V2
- ThinkSystem Broadcom 57504 10/25GbE SFP28 4-port PCIe Ethernet Adapter

Install an adapter on the system board

Procedure

- Step 1. Open the retention latch.
- Step 2. If a filler has been installed in the PCIe slot, remove the screw that secures it, and remove the filler.
- Step 3. Align the adapter with the connector on the system board, and push it in.

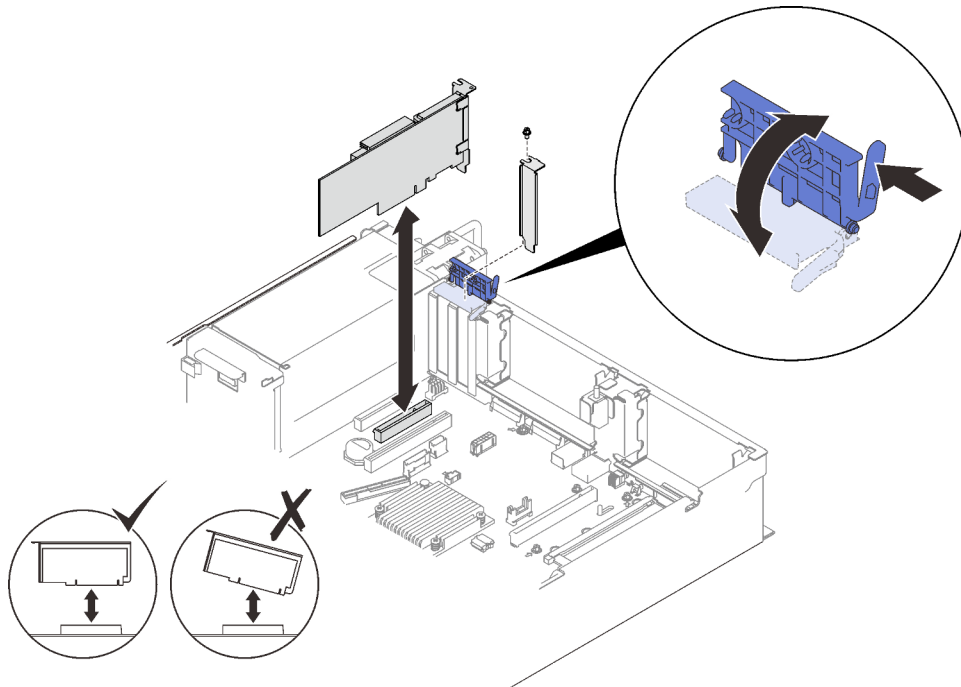


Figure 79. Installing an adapter to the system board

- Step 4. Secure the adapter with a screw.
- Step 5. Close the retention latch.

Install an adapter in the PCIe riser assembly

Important: Make sure to adopt passive Direct Attach cables when ThinkSystem NVIDIA ConnectX-7 adapter is installed.

Notes:

- When installing the following adapters:
 - Nvidia T4
 - Mellanox ConnectX-6 HDR 100/100GbE QSFP56 1-port PCIe VPI Adapter
 - Mellanox ConnectX-6 HDR 100/100GbE QSFP56 2-port PCIe VPI Adapter
 - Mellanox ConnectX-6 HDR/200GbE QSFP56 1-port PCIe 4 VPI Adapter
 - ThinkSystem NVIDIA ConnectX-7 NDR200/200GbE QSFP112 2-port PCIe Gen5 x16 InfiniBand Adapter
 - ThinkSystem NVIDIA ConnectX-7 NDR400 OSFP 1-Port PCIe Gen5 Adapter

make sure to adopt the following risers and PCIe slots, and do not install any other adapters to the risers:

- Zone 1: **slot 1** in x16/x16/x16 (x8 lanes) riser
- Zone 2: **slot 5** in x16/x16 riser
- When installing two units of Nvidia T4, make sure to meet the following system requirements.
 - Maximal capacity of each memory module is 64 GB.
 - Maximal quantity depends on processors wattage:
 - Less than 165 watts: 48
 - 165 to 250 watt: 24
 - Maximal quantity of 2.5-inch drives is 16.
- NVMe PCIe 4.0 x8 Flash Adapter has to be installed in slot 1, 5, 7, or 8.
- When Nvidia T4 is installed:
 - If OCP Ethernet adapter is installed in slot 4, slot 7 is disabled.
 - If an adapter is installed in slot 7, slot 4 is disabled.
- To prevent potential thermal issues, change the **Misc** setting in the BIOS from **Option3** (default value) to **Option1** if the following two conditions are met:
 - The server is equipped with a GPU adapter.
 - The UEFI firmware version is M5E128A or later.

For the method of changing the **Misc** setting, see <https://support.lenovo.com/us/en/solutions/TT1832>.

Procedure

- Step 1. Open the retaining bracket on the PCIe riser assembly.
- Step 2. If a filler has been installed to the slot on the riser, remove the screw that secures it and remove the filler.
- Step 3. Align the adapter with the connector on the PCIe riser assembly, and push it in.

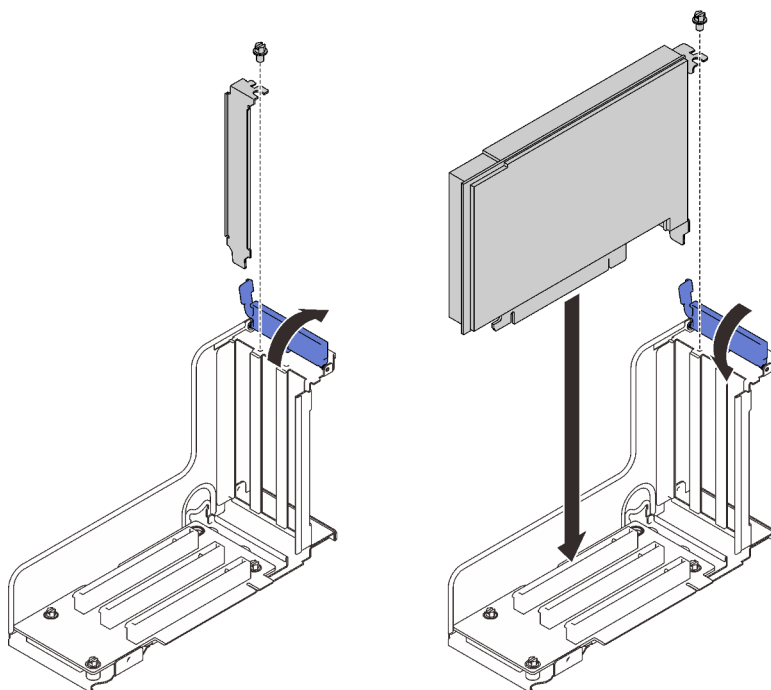


Figure 80. Installing an adapter into the PCIe riser assembly

Step 4. Secure the adapter with a screw.

Step 5. Close the retention latch.

After this task is completed

- If one of the following adapters has been installed and there is only one or no installed flash power module in the system, install a flash power module (see [“Install a flash power module” on page 142](#)).
 - ThinkSystem RAID 930-8i 2GB Flash PCIe 12Gb Adapter
 - ThinkSystem RAID 930-16i 4GB Flash PCIe 12Gb Adapter
 - ThinkSystem RAID 930-8e 4GB Flash PCIe 12Gb Adapter
 - ThinkSystem RAID 940-8i 4GB Flash PCIe Gen4 12Gb Adapter
 - ThinkSystem RAID 940-8i 8GB Flash PCIe Gen4 12Gb Adapter
 - ThinkSystem RAID 940-16i 8GB Flash PCIe 12Gb Adapter
 - ThinkSystem RAID 940-32i 8GB Flash PCIe 12Gb Adapter
- Proceed to complete the parts replacement (see [“Complete the parts replacement” on page 223](#)).

Demo video

[Watch the procedure on YouTube](#)

Install the PCIe riser assembly

Follow instructions in this section to install the PCIe riser assembly.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Two zones could be installed with a PCIe riser assembly. See the following instructions for supported risers and installation procedure.

- **Zone 1** (PCIe slot 1 to 3):
 - This zone supports the following types of riser assembly:
 - x16/x16/x16 PCIe riser
 - x16/x16 (x8 lanes) FH/HL PCIe riser
 - x16/x16 (x8 lanes) FH/HL PCIe riser with 7mm drive cage bracket
 - Follow the instructions in [“Install the PCIe riser assembly to zone 1” on page 169](#) to install a riser assembly.
- **Zone 2** (PCIe slot 5 to 6):
 - This zone supports x16/x16 FH/HL PCIe riser.
 - Follow the instructions in [“Install the PCIe riser assembly to zone 2” on page 170](#) to install a riser assembly.

Install the PCIe riser assembly to zone 1

Procedure

Step 1. Align the PCIe riser assembly with the connector on the system board, and push it in.

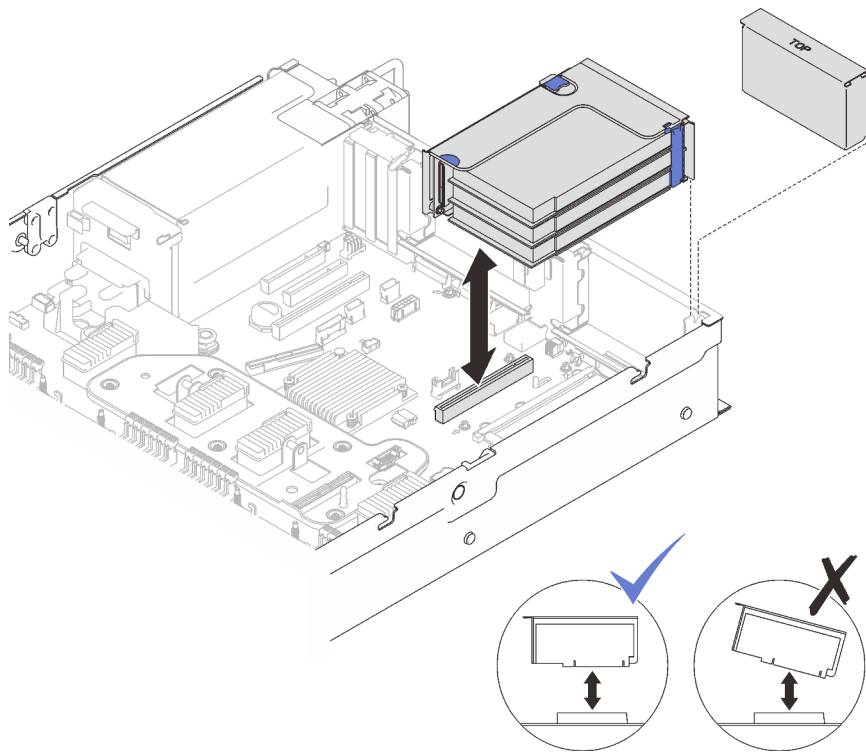


Figure 81. Installing the PCIe riser assembly to zone 1

Step 2. If you are installing x16/x16/x16 riser assembly, connect the two PCIe cables to the system board.

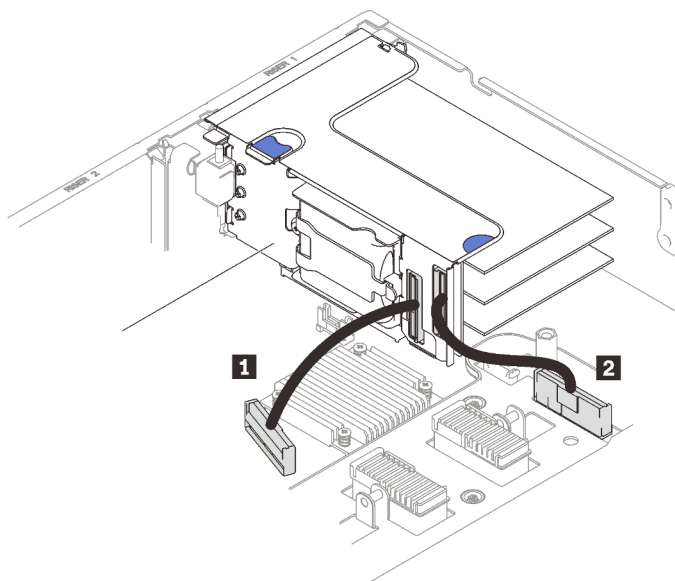


Figure 82. Connecting PCIe cables from x16/x16/x16 riser to the system board

1 PCIe connector 1	2 PCIe connector 2
---------------------------	---------------------------

Demo video

[Watch the procedure on YouTube](#)

Install the PCIe riser assembly to zone 2

Procedure

Step 1. Install the PCIe riser assembly to zone 2.

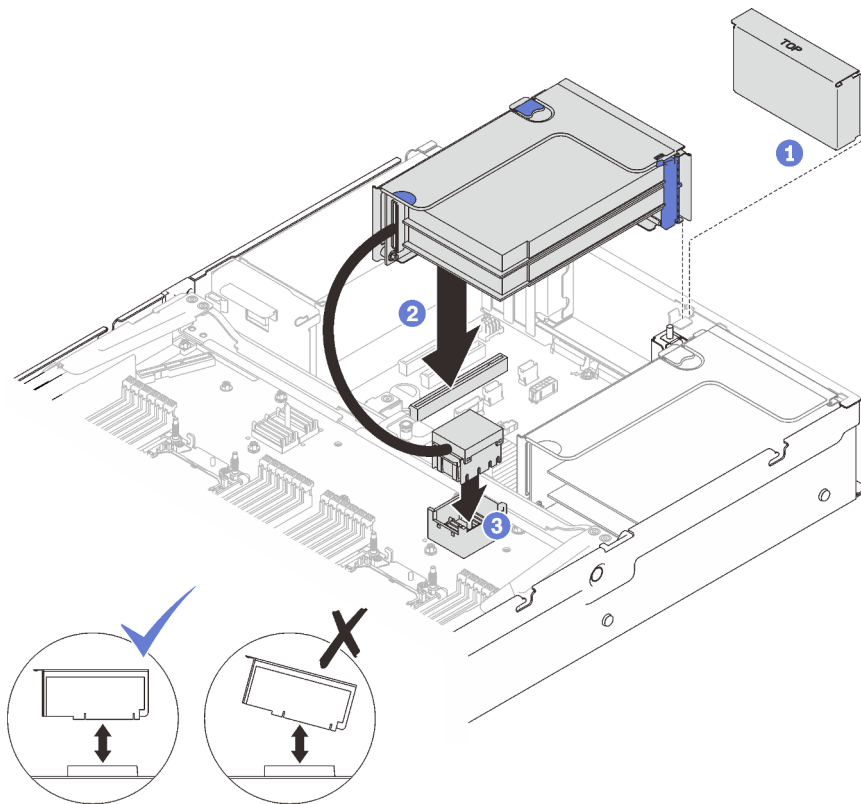


Figure 83. Installing the PCIe riser assembly to zone 2

- 1 If a filler has been installed, remove it.
- 2 Align the PCIe riser assembly with the connector on the system board, and push it in.
- 3 Connect the PCIe cable to PCIe connector 5 on the processor and memory expansion tray.

After this task is completed

1. Reconnect all the required cables.
2. Proceed to complete the parts replacement (see [“Complete the parts replacement” on page 223](#)).

Demo video

[Watch the procedure on YouTube](#)

Power backplane replacement

Follow instructions in this section to remove or install the power backplane .

Remove the power backplane

Follow instructions in this section to remove the power backplane.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.

- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Procedure

Step 1. Make preparations for this task.

- Remove the top cover (see [“Remove the top cover” on page 219](#)).
- Remove the fan cage assembly (see [“Remove the fan cage assembly” on page 131](#)).
- Remove the system board air baffle (see [“Remove the system board air baffle” on page 205](#)) or the processor and memory expansion tray and the expansion tray air baffle (see [“Remove the processor and memory expansion tray” on page 195](#)).
- Gently pull and disengage every installed power supply unit.

Step 2. Disconnect the power backplane cable and remove it from the cable clip.

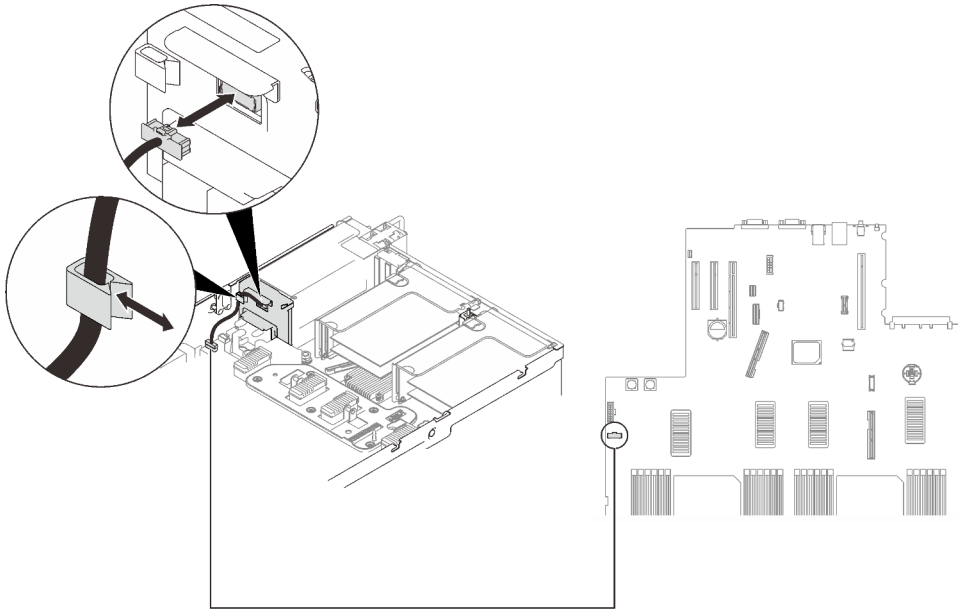


Figure 84. Disconnecting the power backplane cable

Step 3. Grasp and lift the power backplane to remove it.

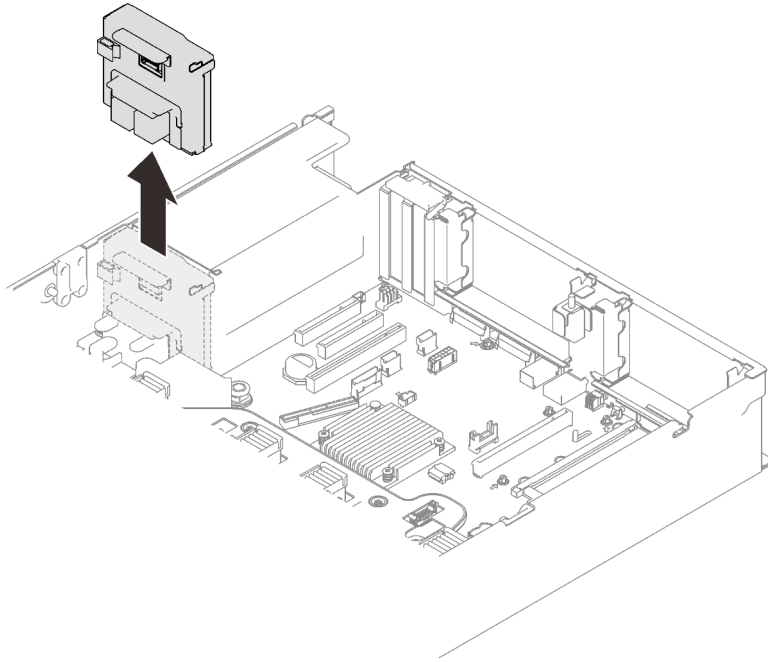


Figure 85. Removing the power backplane

After this task is completed

- Install a replacement unit (see [“Install the power backplane” on page 174](#)).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.
- If you plan to recycle the component:
 1. Remove the four screws, and slide the backplane down to remove it from the bracket.

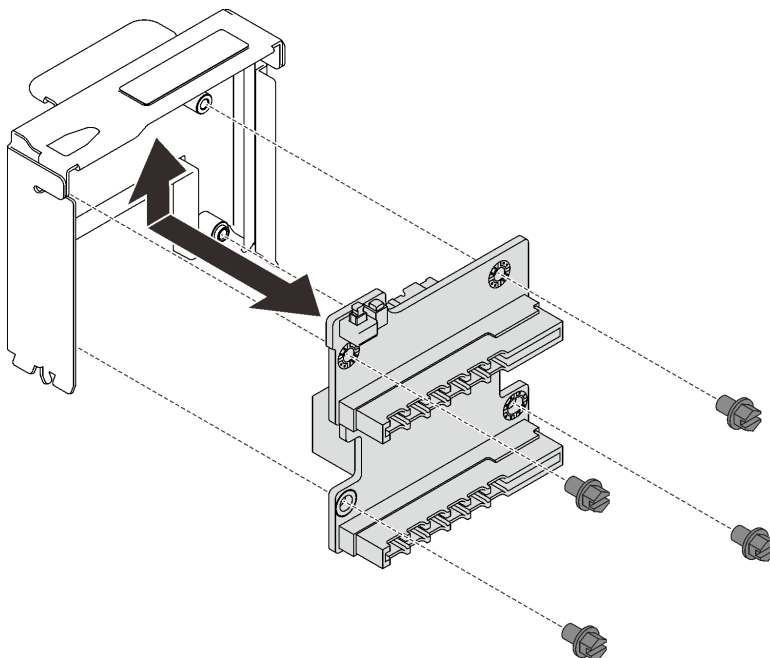


Figure 86. Disassembling the power backplane

2. Recycle the component in compliance with local regulations.

Demo video

[Watch the procedure on YouTube](#)

Install the power backplane

Follow instructions in this section to install the power backplane.

About this task

Attention:

- Go over “[Installation Guidelines](#)” on [page 109](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

- Step 1. Align the bottom connector on the backplane to the corresponding connector on the system board, and push the backplane in.

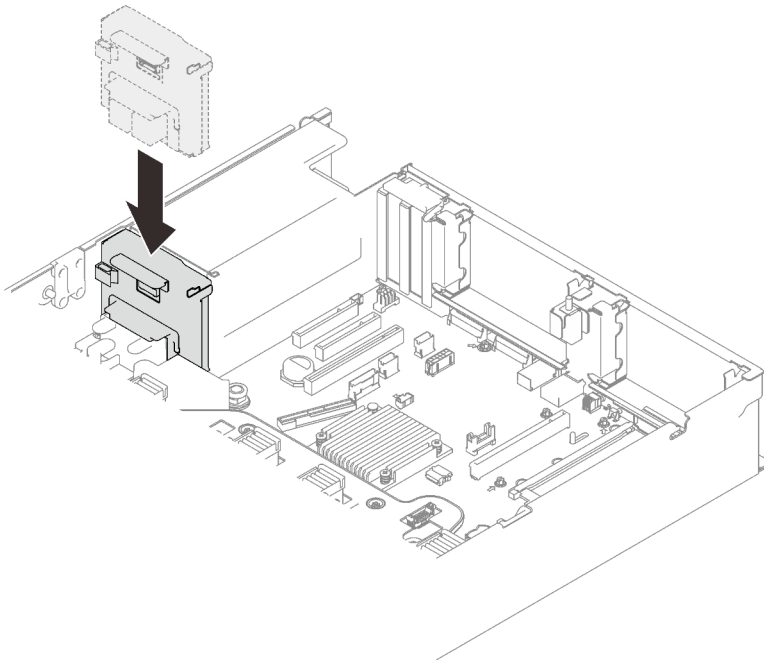


Figure 87. Installing the power backplane

- Step 2. Route the power backplane cable through the cable clip, and connect it to the power backplane.

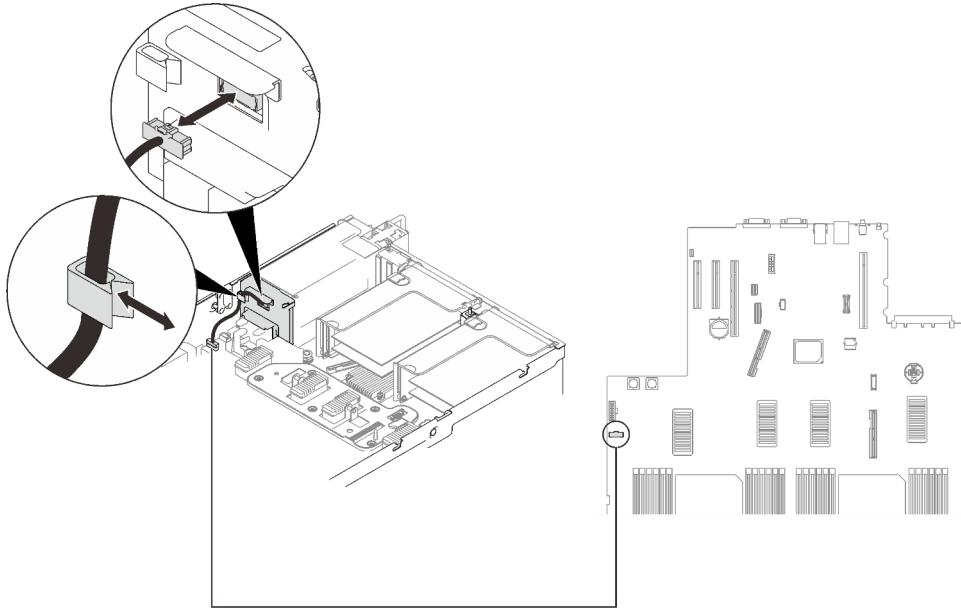


Figure 88. Connecting the power backplane cable

After this task is completed

Proceed to complete the parts replacement (see [“Complete the parts replacement”](#) on page 223).

Demo video

[Watch the procedure on YouTube](#)

Power supply unit replacement

Follow instructions in this section to install or remove power supply units.

Remove a hot-swap power supply unit

Follow instructions in this section to remove a hot-swap power supply unit.

About this task

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.

S029



 **DANGER**

**For -48V dc power supply, electrical current from power cords is hazardous.
To avoid a shock hazard:**

- **To connect or disconnect -48V dc power cords when you need to remove/replace install redundancy power supply unit(s).**

To Connect:

1. Turn OFF subject dc power source(s) and equipment (s) that are attached to this product.
2. Install the power supply unit(s) into the system housing.
3. Attach dc power cord(s) to the product.
 - Ensure correct polarity of -48 V dc connections: RTN is + and -48 V dc is -. Earth ground should be connected very well.
4. Connect dc power cord(s) to subject power source (s).
5. Turn ON all the power source(s).

To Disconnect:

1. Disconnect or turn off the subject dc power source(s) (at the breaker panel) before removing the power supply unit(s).
2. Remove the subject dc cord(s) and make sure the wire terminal of power cord(s) is insulated.
3. Unplug the subject power supply unit(s) from the system housing.

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.

Attention: Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.

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.**

Procedure

Step 1. Make preparations for this task.

- a. If CMA has been installed, do the following:

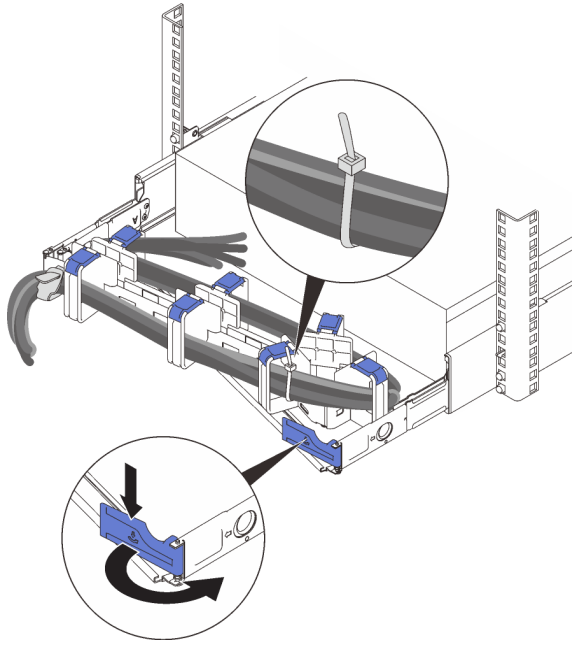


Figure 89. Adjusting CMA

1. Press down the stop bracket and rotate it to the open position.
2. Rotate the CMA out of the way to gain access to the power supply bay.

Note: Make sure the cables are secured to the CMA with cable straps.

Step 2. Remove the power supply.

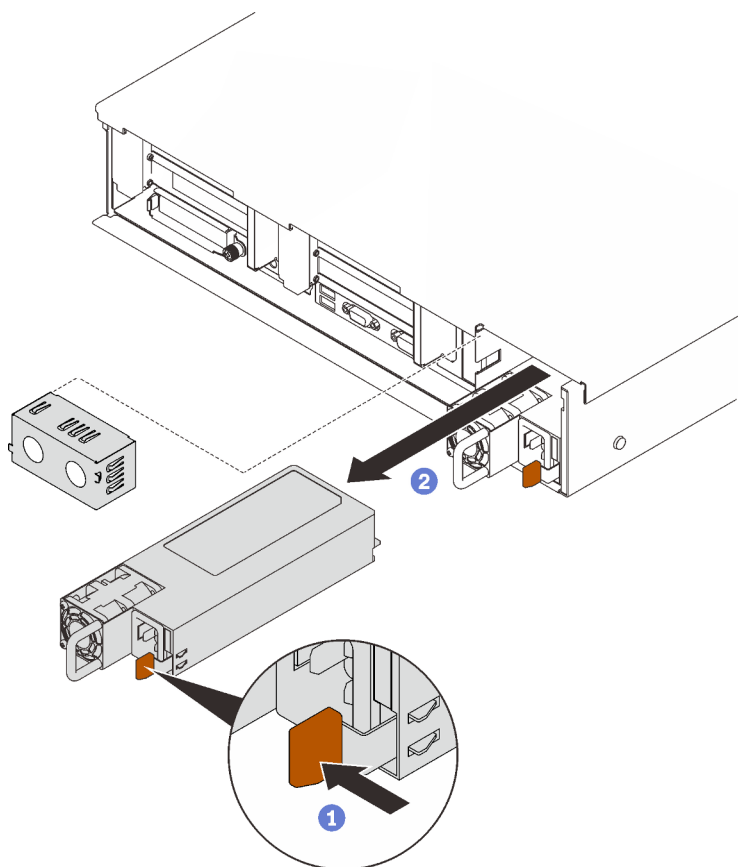


Figure 90. Removing the power supply

- 1 Press and hold on the orange release tab.
- 2 Grasp the handle and slide the power supply unit out from the server.

After this task is completed

1. Fill the power supply bay with a replacement unit or a filler (see [“Install a hot-swap power supply unit”](#) on page 178).
2. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

[Watch the procedure on YouTube](#)

Install a hot-swap power supply unit

Follow instructions in this section to install a hot-swap power supply unit.

About this task

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.

S029



**For -48V dc power supply, electrical current from power cords is hazardous.
To avoid a shock hazard:**

- **To connect or disconnect -48V dc power cords when you need to remove/replace install redundancy power supply unit(s).**

To Connect:

1. Turn OFF subject dc power source(s) and equipment (s) that are attached to this product.
2. Install the power supply unit(s) into the system housing.
3. Attach dc power cord(s) to the product.
 - Ensure correct polarity of -48 V dc connections: RTN is + and -48 V dc is -. Earth ground should be connected very well.
4. Connect dc power cord(s) to subject power source (s).
5. Turn ON all the power source(s).

To Disconnect:

1. Disconnect or turn off the subject dc power source(s) (at the breaker panel) before removing the power supply unit(s).
2. Remove the subject dc cord(s) and make sure the wire terminal of power cord(s) is insulated.
3. Unplug the subject power supply unit(s) from the system housing.

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.

Following are the types of power supply units compatible to this server and notices to take during installation. These power supplies are designed for parallel operation. In the event of a power supply failure, the redundant power supply continues to power the system. The server supports a maximum of two power supply units with N+1 redundancy support.

- 750-watt Titanium, input power 230 Vac / 240 VDC
- 1100-watt Platinum, input power 115 Vac / 230 Vac / 240 VDC
- 1100-watt Titanium, input power 230 Vac / 240 VDC
- 1800-watt Platinum, input power 230 Vac / 240 VDC
- 1800-watt Titanium, input power 230 Vac / 240 VDC
- 2400-watt Platinum, input power 230 Vac / 240 VDC
- 2600-watt Titanium, input power 230 Vac / 240 VDC

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.**

Procedure

Step 1. Make preparations for this task.

- a. Make sure the power supply unit to be installed is of the same wattage as the installed ones. Otherwise, complete the following steps:
 1. Turn off the server and peripheral devices.
 2. Disconnect the power cords and all external cables.
 3. Remove all the installed power supply units.
 4. Make sure all the power supply units to be installed are of the same wattage. Do not mix power supply units of different wattages in the same unit of server.
- b. If CMA has been installed, do the following:

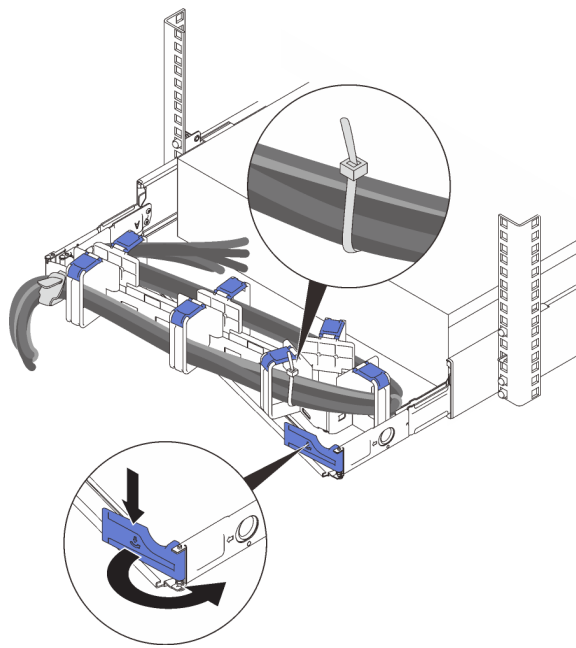


Figure 91. Adjusting CMA

1. Press down the stop bracket and rotate it to the open position.
2. Rotate the CMA out of the way to gain access to the power supply bay.

Note: Make sure the cables are secured to the CMA with cable straps.

- c. If you are installing the power supply into an empty bay, remove the power supply filler panel from the power supply bay.
- d. If more than one units are to be installed, start with the lowest available power supply bay.

Step 2. Grasp the handle on the rear of the power supply, and slide it into the power-supply bay until it clicks into place.

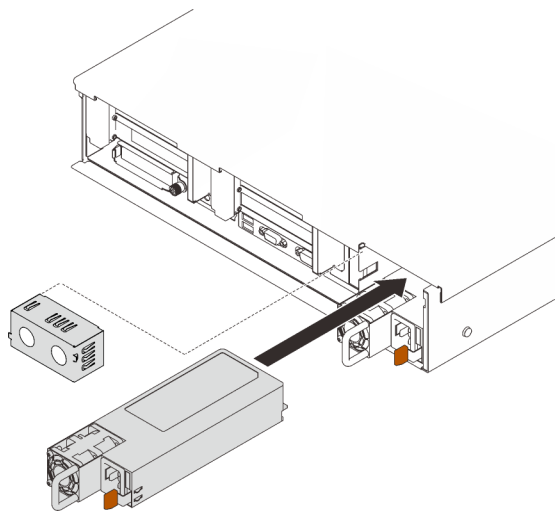


Figure 92. Installing a power supply unit

After this task is completed

1. Connect the power cord to the power supply unit, and make sure it's properly connected to the power.
2. Pull the handle to try if the power supply unit is properly installed. If it slides out, reinstall it.

Demo video

[Watch the procedure on YouTube](#)

Processor and heat sink replacement

Follow instructions in this section to remove and install a processor and heat sink.

Attention: Before you begin replacing a processor, make sure that you have an alcohol cleaning pad and thermal grease.

Remove a processor and heat sink

This task has instructions for removing an assembled processor and heat sink, known as a processor-heat-sink module (PHM). This task requires a Torx T30 driver. This procedure must be executed by a trained technician.

About this task

S002



CAUTION:

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

Attention:

- Read “Installation Guidelines” on page 109 to ensure that you work safely.
- Power off the server and disconnect all power cords for this task.
- 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.
- If the server is in a rack, remove it from the rack.
- Each processor socket must always contain a cover or a PHM. When removing or installing a PHM, protect empty processor sockets with a cover.
- 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 the electrical connectors in the processor socket.
- Remove and install only one PHM at a time. If the system board supports multiple processors, install the PHMs starting with the first processor socket.

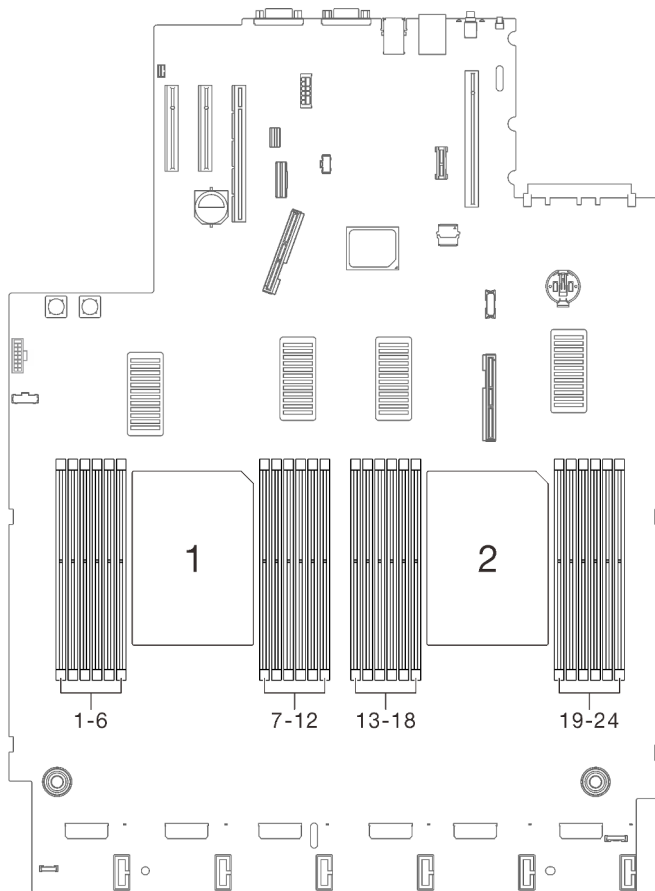


Figure 93. Processor 1 and 2 location on the system board

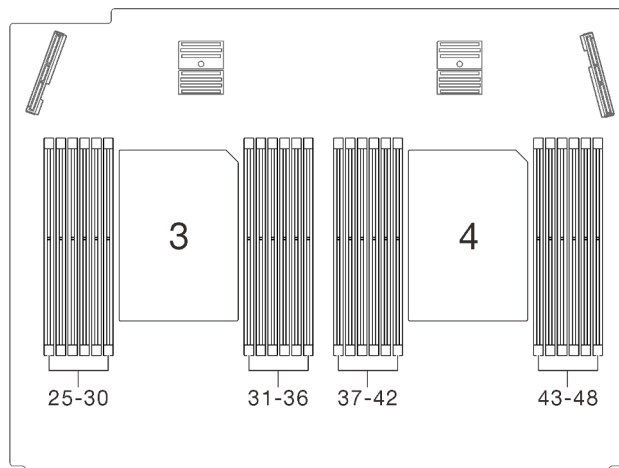


Figure 94. Processor 3 and 4 location on the processor and memory expansion tray

Note: The heat sink, processor, and processor carrier for your system might be different from those shown in the illustrations.

The following illustration shows the components of the PHM.

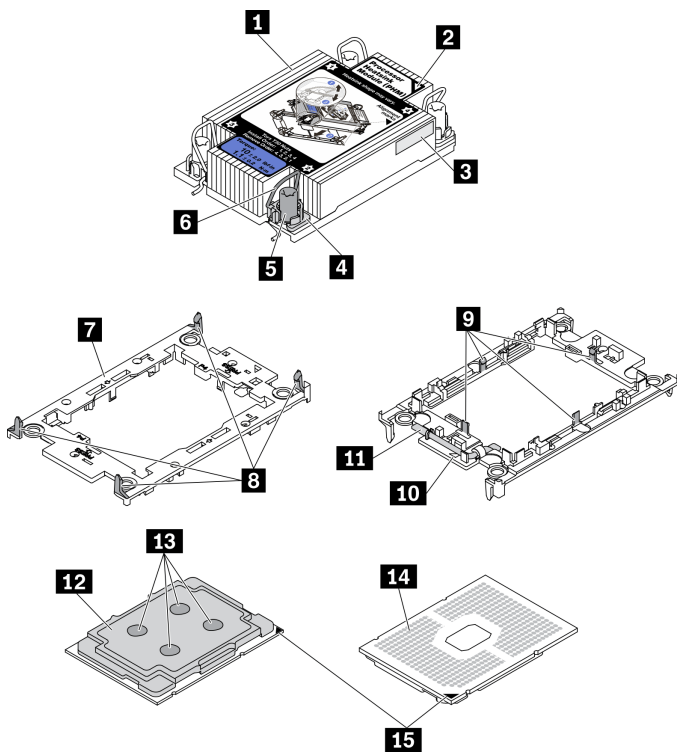


Figure 95. PHM components

1 Heat sink	9 Clips to secure processor in carrier
2 Heat sink triangular mark	10 Carrier triangular mark
3 Processor identification label	11 Processor ejector handle
4 Nut and wire bail retainer	12 Processor heat spreader
5 Torx T30 nut	13 Thermal grease
6 Anti-tilt wire bail	14 Processor contacts
7 Processor carrier	15 Processor triangular mark
8 Clips to secure carrier to heat sink	

Procedure

Step 1. Make preparations for this task.

- a. Remove the top cover. See [“Remove the top cover” on page 219.](#)
- b. Remove the following components depending on the location of the processor that is to be removed:
 - If the processor is located on the processor and memory expansion tray, **do not** remove the expansion tray. Only remove the air baffle from the expansion tray.

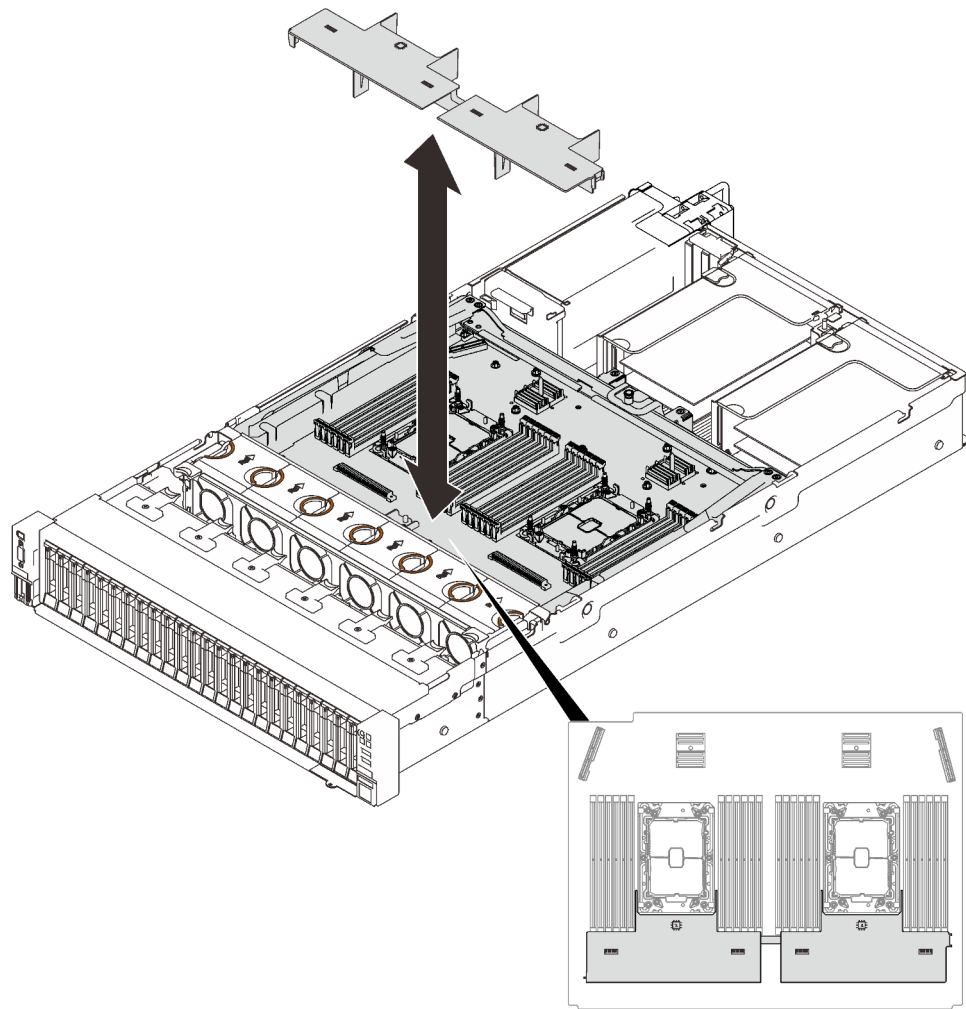


Figure 96. Removing the air baffle from the expansion tray

- If the processor is located on the system board:
 1. Remove one of the following components.
 - System air baffle (see [“Remove the system board air baffle”](#) on page 205)
 - Processor and memory expansion tray and expansion tray air baffle (see [“Remove the processor and memory expansion tray”](#) on page 195)
 2. Remove the expansion tray air baffle.

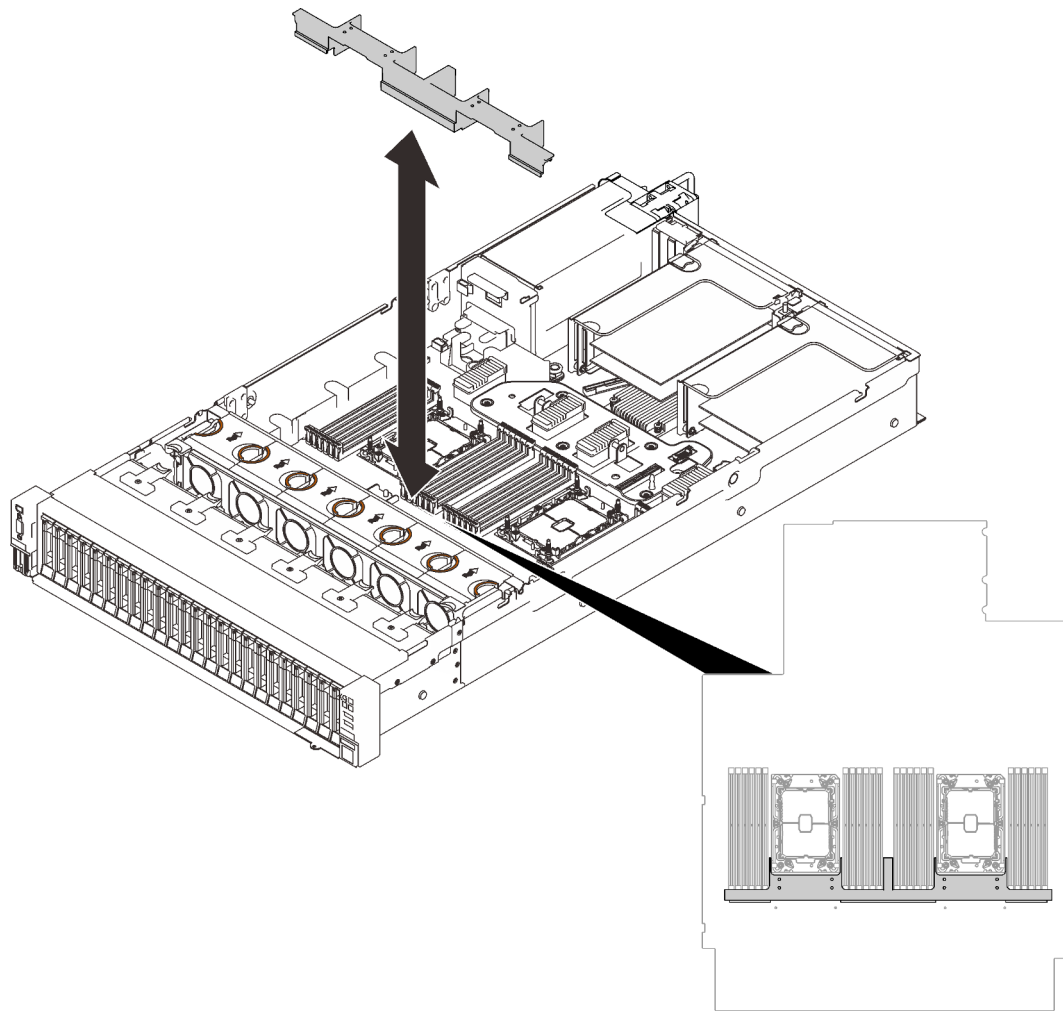


Figure 97. Removing the expansion tray air baffle

Step 2. If the processor comes with a T-shaped heat sink, fully loosen the two heat sink screws as shown.

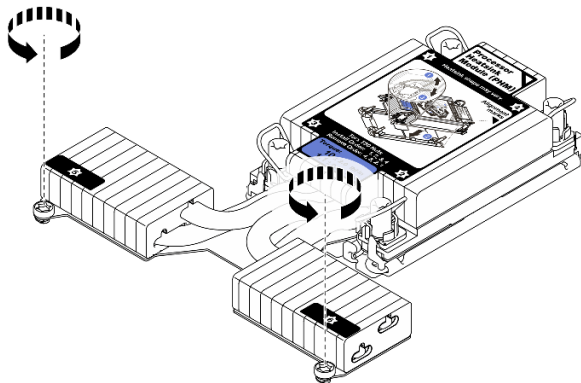


Figure 98. Loosening T-shaped heat sink screws

Step 3. Remove the PHM from the system board.

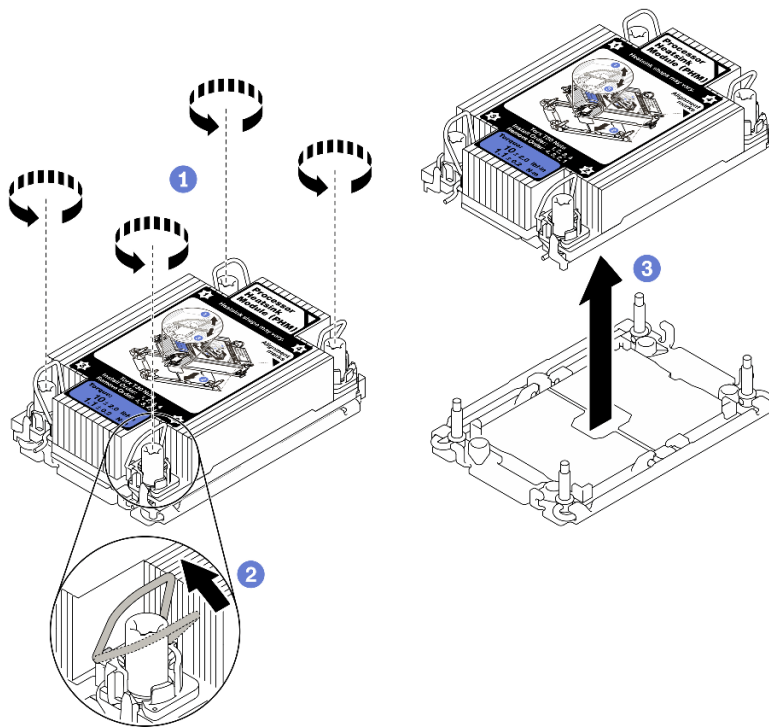


Figure 99. Removing a PHM

- 1 Fully loosen the Torx T30 nuts on the PHM *in the removal sequence shown* on the heat-sink label.
- 2 Rotate the anti-tilt wire bails inward.
- 3 Carefully lift the PHM from the processor socket. If the PHM cannot be fully lifted out of the socket, further loosen the Torx T30 nuts and try lifting the PHM again.

Notes:

- Do not touch the contacts on the bottom of the processor.
- Keep the processor socket clean from any object to prevent possible damages.

After you finish

- Each processor socket must always contain a cover or a PHM. Protect empty processor sockets with a cover or install a new PHM.
- If you are removing the PHM as part of a system board replacement, set the PHM aside.
- If you are reusing the processor or heat sink, separate the processor from its retainer. See [“Separate the processor from carrier and heat sink” on page 188](#)
- If you are instructed to return the defective component, please package the part to prevent any shipping damage. Reuse the packaging the new part arrived in and follow all packaging instructions.

Demo video

[Watch the procedure on YouTube](#)

Separate the processor from carrier and heat sink

This task has instructions for separating a processor and its carrier from an assembled processor and heat sink, known as a processor-heat-sink module (PHM). This procedure must be executed by a trained technician.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.
- 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.
- Do not touch the processor contacts. 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 the electrical connectors in the processor socket.

Note: The heat sink, processor, and processor carrier for your system might be different than those shown in the illustrations.

Procedure

Step 1. Separate the processor from the heat sink and carrier.

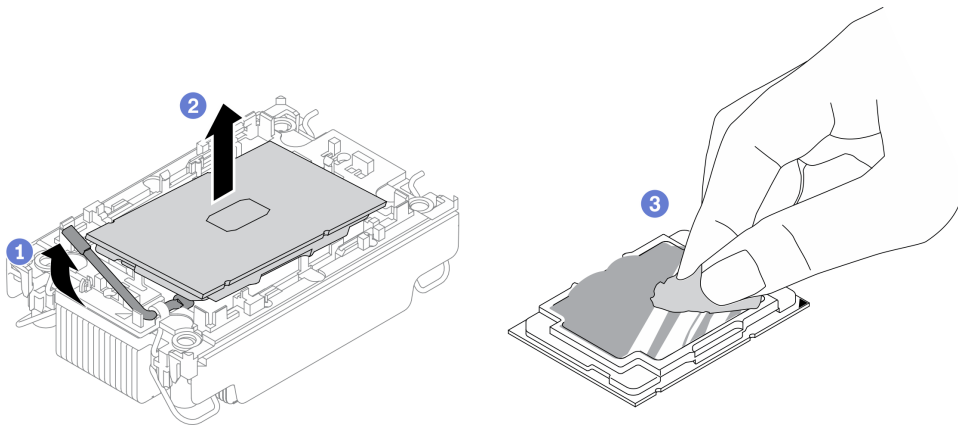


Figure 100. Separating a processor from the heat sink and carrier

Note: Do not touch the contacts on the processor.

- a. **1** Lift the handle to release the processor from the carrier.
- b. **2** Hold the processor by its edges; then, lift the processor from the heat sink and carrier.
- c. **3** Without putting the processor down, wipe the thermal grease from the top of the processor with an alcohol cleaning pad; then, place the processor on a static protective surface with the processor-contact side up.

Step 2. Separate the processor carrier from the heat sink.

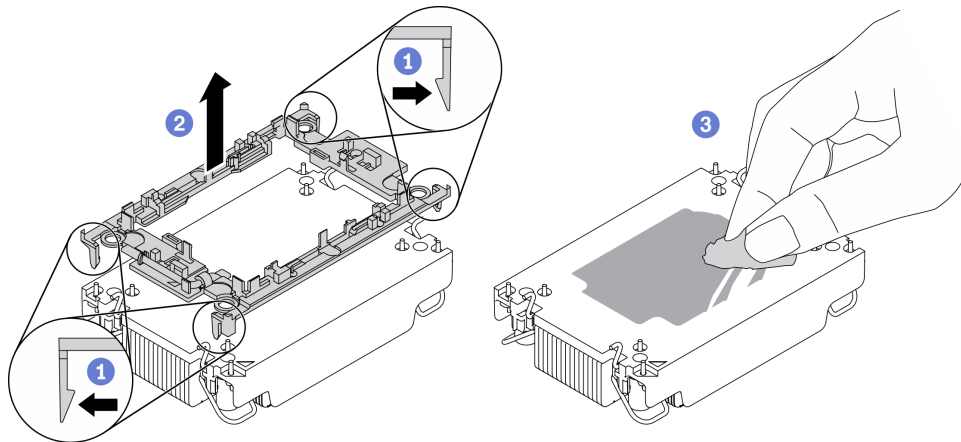


Figure 101. Separating a processor carrier from the heat sink

Note: The processor carrier will be discarded and replaced with a new one.

- a. 1 Release the retaining clips from the heat sink.
- b. 2 Lift the carrier from the heat sink.
- c. 3 Wipe the thermal grease from the bottom of the heat sink with an alcohol cleaning pad.

If you are instructed to return the defective component, please package the part to prevent any shipping damage. Reuse the packaging the new part arrived in and follow all packaging instructions.

Demo video

[Watch the procedure on YouTube](#)

Install a processor and heat sink

This task has instructions for installing an assembled processor and heat sink, known as a processor-heat-sink module (PHM). This task requires a Torx T30 driver. This procedure must be executed by a trained technician.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- Power off the server and disconnect all power cords for this task.
- 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.
- Each processor socket must always contain a cover or a PHM. When removing or installing a PHM, protect empty processor sockets with a cover.
- 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 the electrical connectors in the processor socket.
- Remove and install only one PHM at a time. If the system board supports multiple processors, install the PHMs starting with the first processor socket.

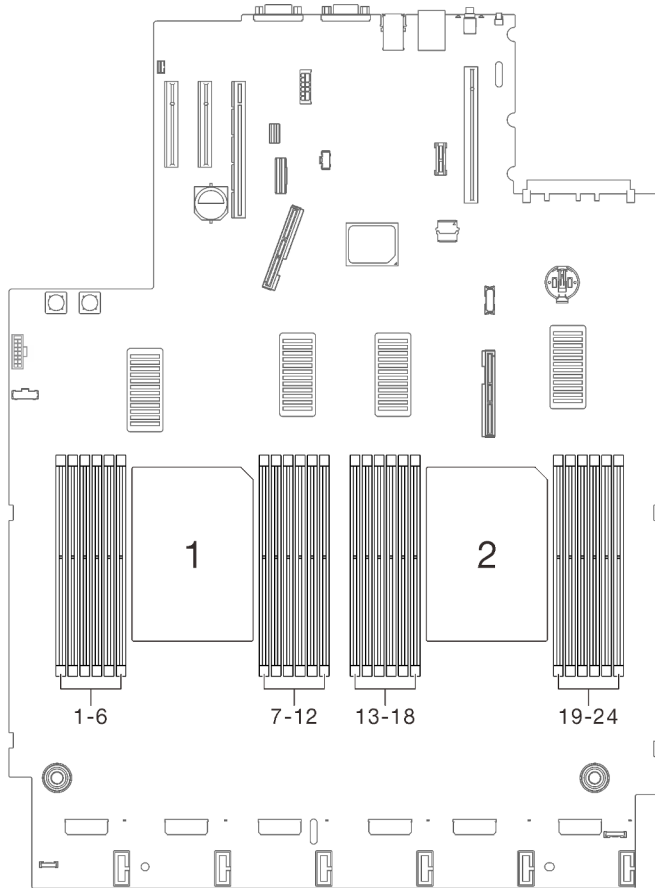


Figure 102. Processor 1 and 2 location on the system board

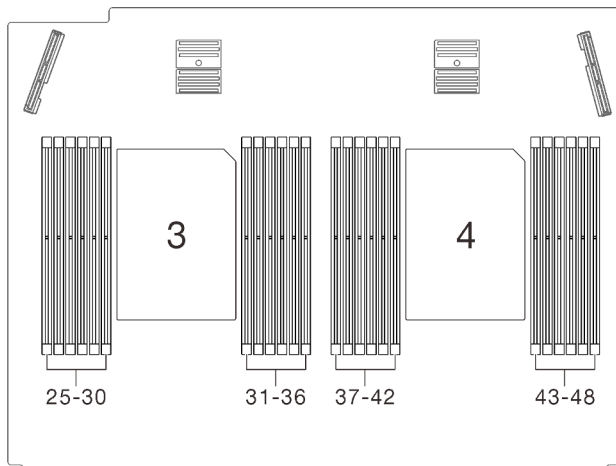


Figure 103. Processor 3 and 4 location on the processor and memory expansion tray

Notes:

- The heat sink, processor, and processor carrier for the system might be different from those shown in the illustrations.
- PHMs are keyed for the socket where they can be installed and for their orientation in the socket.
- See <https://serverproven.lenovo.com/> for a list of processors supported for your server. All processors on the system board must have the same speed, number of cores, and frequency.
- Before you install a new PHM or replacement processor, update your system firmware to the latest level. See “Update the firmware” in the *ThinkSystem SR850 V2 Setup Guide*.

The following illustration shows the components of the PHM.

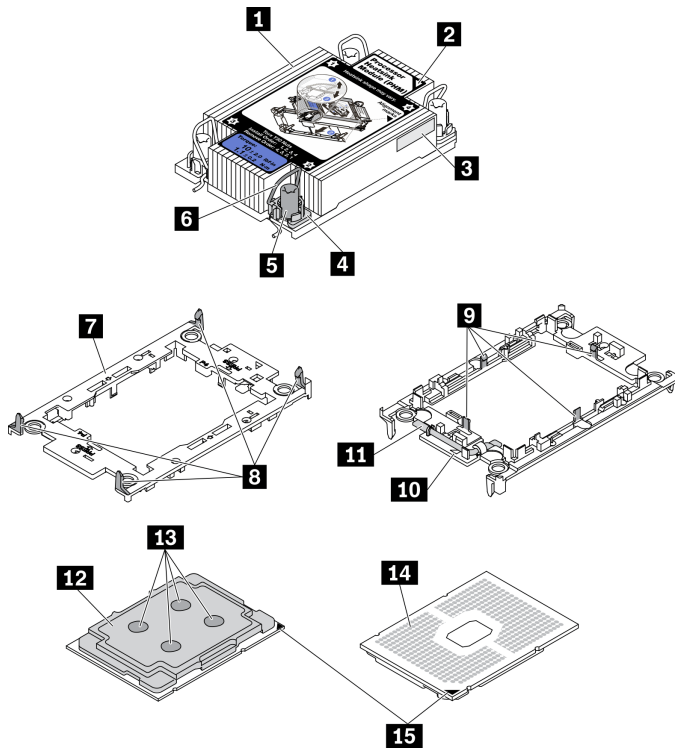


Figure 104. PHM components

1 Heat sink	9 Clips to secure processor in carrier
2 Heat sink triangular mark	10 Carrier triangular mark
3 Processor identification label	11 Processor ejector handle
4 Nut and wire bail retainer	12 Processor heat spreader
5 Torx T30 nut	13 Thermal grease
6 Anti-tilt wire bail	14 Processor contacts
7 Processor carrier	15 Processor triangular mark
8 Clips to secure carrier to heat sink	

Procedure

Step 1. If you are replacing a processor and reusing the heat sink.

- a. Remove the processor identification label from the heat sink and replace it with the new label that comes with the replacement processor.
- b. If there is any old thermal grease on the heat sink, wipe the thermal grease from the bottom of the heat sink with an alcohol cleaning pad.

Step 2. If you are replacing a heat sink and reusing the processor.

- a. Remove the processor identification label from the old heat sink and place it on the new heat sink in the same location. The label is on the side of the heat sink closest to the triangular alignment mark.

Note: If you are unable to remove the label and place it on the new heat sink, or if the label is damaged during transfer, write the processor serial number from the processor identification label on the new heat sink in the same location as the label would be placed using a permanent marker.

- b. Install the processor into a new carrier.

Note: Replacement heat sinks come with both gray and black processor carriers. Make sure to use the carrier with the same color as the one you discarded earlier.

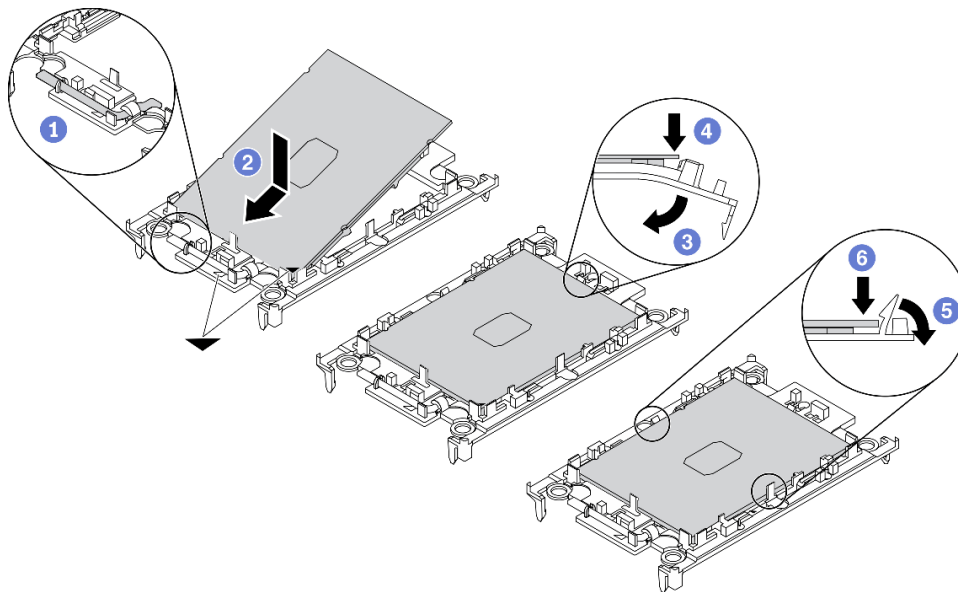


Figure 105. Installing a processor carrier

- 1 Make sure the handle on the carrier is in the closed position.
- 2 Align the processor on the new carrier so that the triangular marks align; then, insert the marked end of the processor into the carrier.
- 3 Hold the inserted end of the processor in place; then, pivot the unmarked end of the carrier down and away from the processor.
- 4 Press the processor and secure the unmarked end under the clip on the carrier.
- 5 Carefully pivot the sides of the carrier down and away from the processor.
- 6 Press the processor and secure the sides under the clips on the carrier.

Note: To prevent the processor from falling out of the carrier, keep the processor-contact side up and hold the processor-carrier assembly by the sides of the carrier.

Step 3. Apply the thermal grease.

- a. Carefully place the processor and carrier in the shipping tray with the processor-contact side down. Make sure the triangular mark on the carrier is aligned with the triangular mark in the shipping tray.
- b. If there is any old thermal grease on the processor, gently wipe the top of the processor with an alcohol cleaning pad.

Note: Make sure the alcohol has fully evaporated before applying new thermal grease.

- c. Apply the thermal grease on the top of the processor with syringe by forming four uniformly spaced dots, while each dot consists of about 0.1 ml of thermal grease.

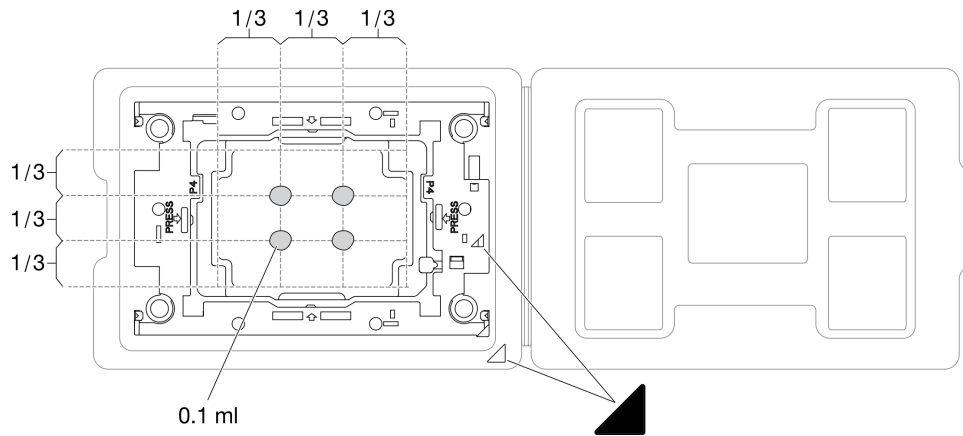


Figure 106. Thermal grease application with processor in the shipping tray

Step 4. Assemble the processor and heat sink.

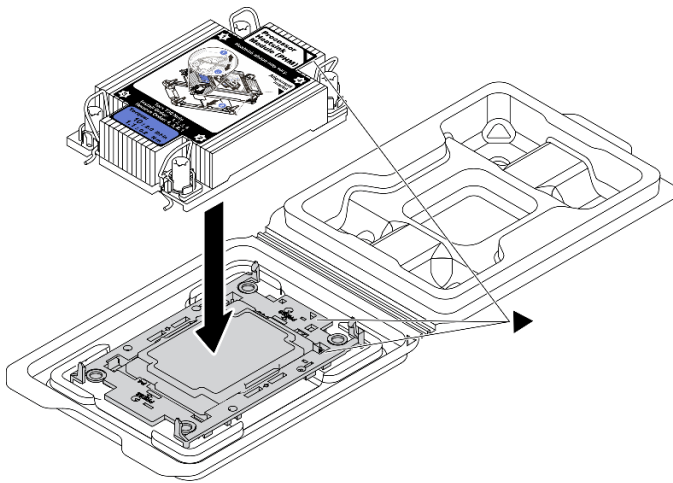


Figure 107. Assembling the PHM with processor in shipping tray

- a. Align the triangular mark on the heat sink label with the triangular mark on the processor carrier and processor.
- b. Install the heat sink onto the processor-carrier.
- c. Press the carrier into place until the clips at all four corners engage.

Step 5. Install the processor-heat-sink module into the system board socket.

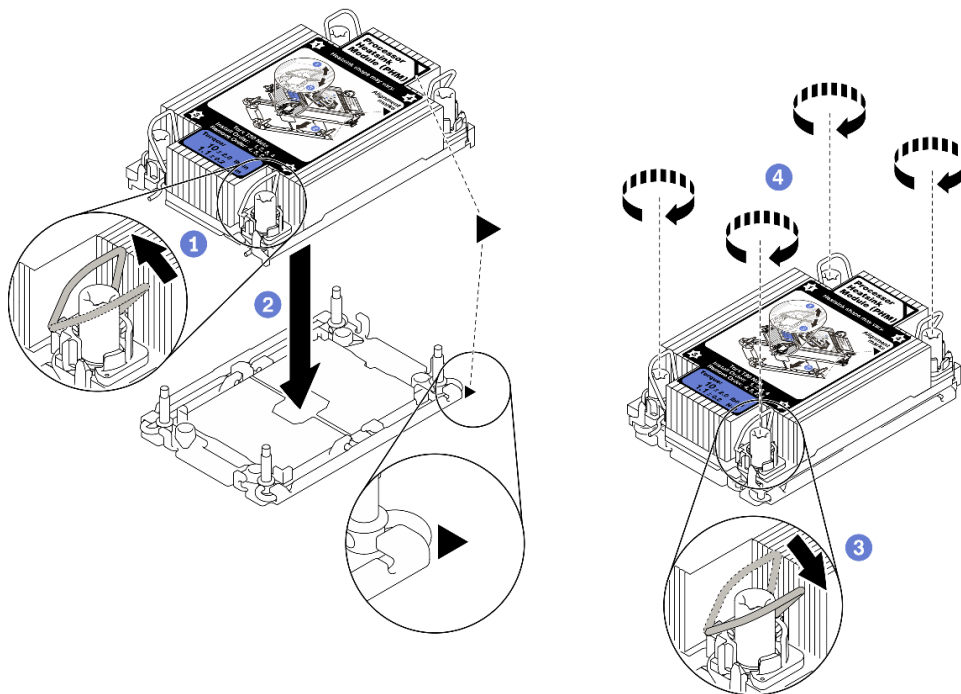


Figure 108. Installing a PHM

- 1 Rotate the anti-tilt wire bails inward.
- 2 Align the triangular mark and four Torx T30 nuts on the PHM with the triangular mark and threaded posts of the processor socket; then, insert the PHM into the processor socket.
- 3 Rotate the anti-tilt wire bails outward until they engage with the hooks in the socket.
- 4 Fully tighten the Torx T30 nuts *in the installation sequence shown* on the heat-sink label. Tighten the screws until they stop; then, visually inspect to make sure that there is no gap between the screw shoulder beneath the heat sink and the processor socket. (For reference, the torque required for the fasteners to fully tighten is 1.1 newton-meters, 10 inch-pounds).

Step 6. If the processor comes with a T-shaped heat sink, fully tighten the two heat sink screws as shown. (For reference, the torque required for the fasteners to fully tighten is 1.1 newton-meters, 10 inch-pounds).

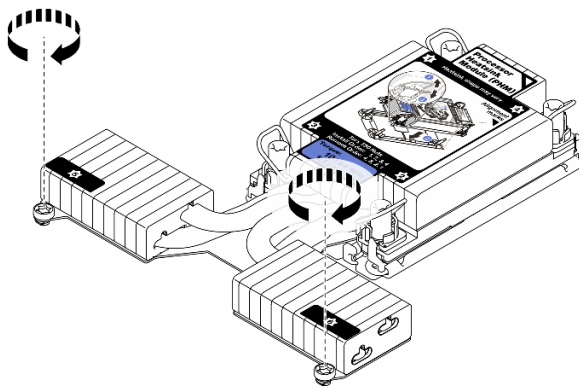


Figure 109. Tightening T-shaped heat sink screws

After this task is completed

Proceed to complete the parts replacement (see [“Complete the parts replacement” on page 223](#)).

Demo video

[Watch the procedure on YouTube](#)

Processor and memory expansion tray replacement

Follow instructions in this section to remove or install the processor and memory expansion tray and corresponding air baffles.

Remove the processor and memory expansion tray

Follow instructions in this section to remove the processor and memory expansion tray.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Procedure

Step 1. Make preparations for this task.

- a. Remove the top cover (see [“Remove the top cover” on page 219](#)).
- b. Remove the fan cage assembly (see [“Remove the fan cage assembly” on page 131](#)).
- c. If you are replacing the processor and memory expansion tray, remove the memory modules (see [“Remove a memory module” on page 151](#)), and PHMs (see [“Remove a processor and heat sink” on page 182](#)) from the expansion tray.

Important: To avoid component damage, **DO NOT** remove or install memory modules or PHMs when the tray is removed from the server.

Step 2. Disengage the processor and memory expansion tray.

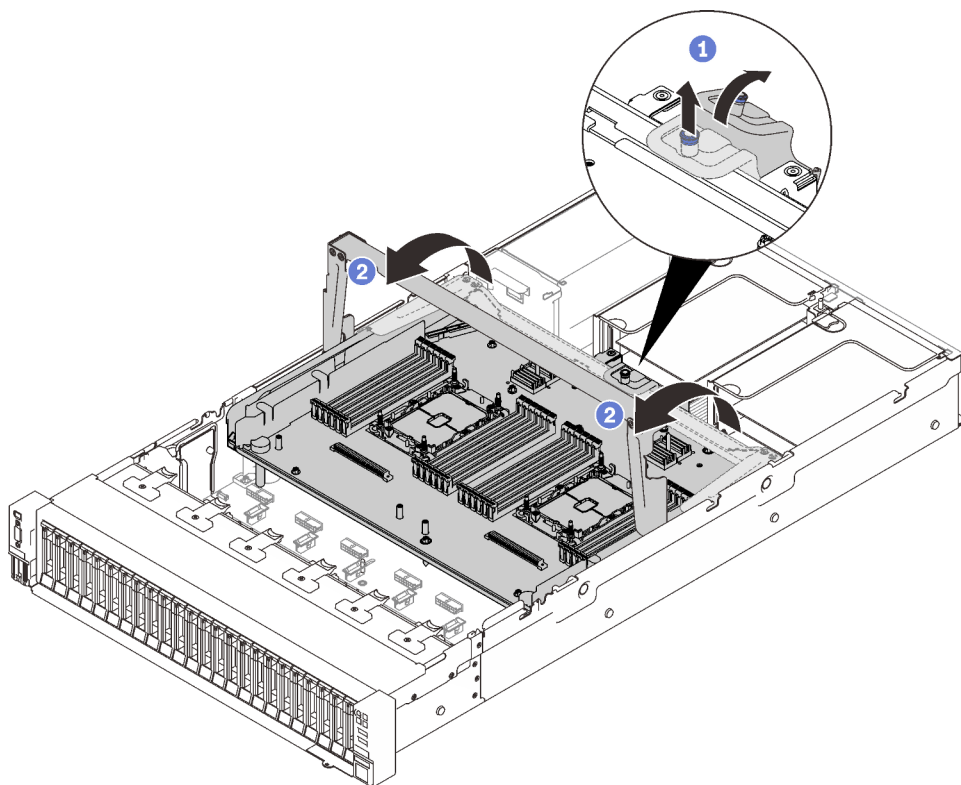


Figure 110. Disengaging the processor and memory expansion tray

- 1 Grasp and pull the captive screw up; then, push it forward to disengage the handle.
- 2 Rotate the handle all the way up until it is in the vertical position.

Step 3. If the two PCIe cables are connected, disconnect them.

Attention: To avoid damaging the system board, make sure to follow the instructions in [Chapter 3](#) “Internal cable routing” on page 47 when disconnecting cables from the system board.

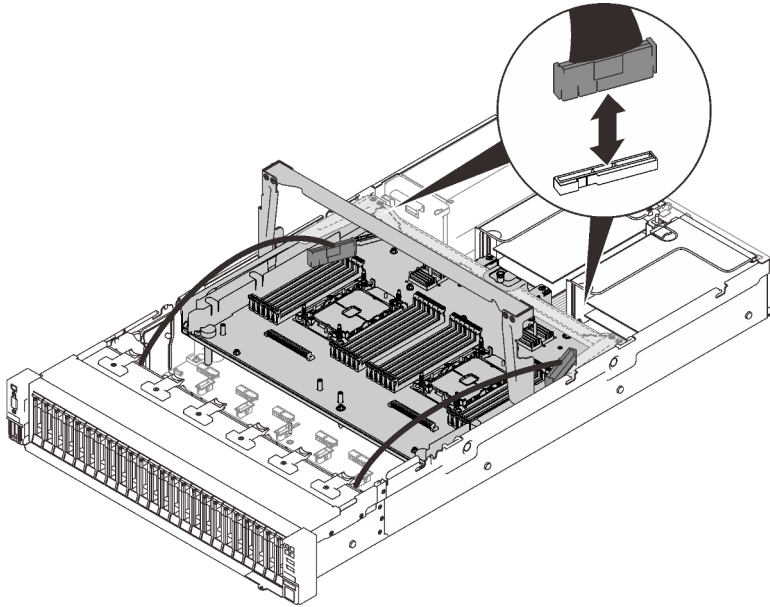


Figure 111. Disconnecting PCIe cables

Step 4. Lift the expansion tray and remove it.

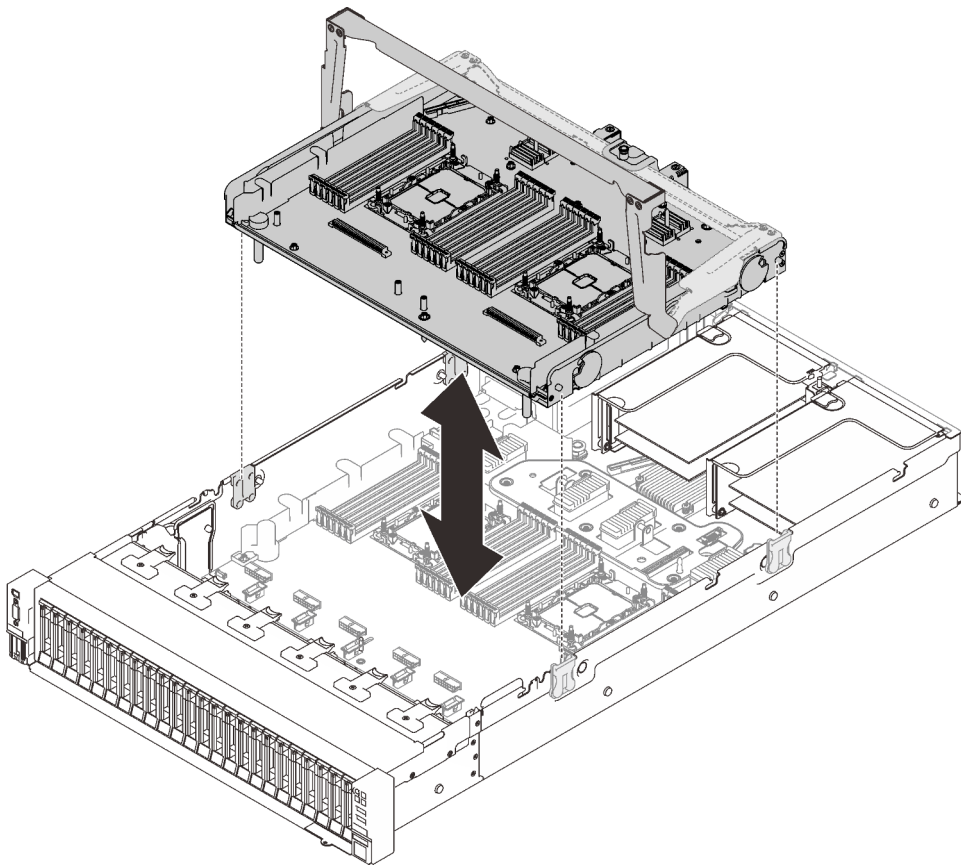


Figure 112. Removing the processor and memory expansion tray

After this task is completed

- Install a replacement unit (see [“Install the processor and memory expansion tray” on page 199](#)) or the system board air baffle (see [“Install the system board air baffle” on page 206](#)).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.
- If you plan to recycle the system board, follow the instructions in [“Disassemble the processor and memory expansion tray for recycle” on page 198](#) for compliance with local regulations.

Demo video

[Watch the procedure on YouTube](#)

Disassemble the processor and memory expansion tray for recycle

Follow the instructions in this section to disassemble the processor and memory expansion tray before recycle.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Procedure

Step 1. Make preparations for this task.

- a. Remove the processor and memory expansion tray from the server (see [“Remove the processor and memory expansion tray” on page 195](#)).
- b. Refer to local environmental, waste or disposal regulations to ensure compliance.

Step 2. Remove the following components as illustrated:

- Nine slotted screws
- Two standoffs (with 12 mm wrench)

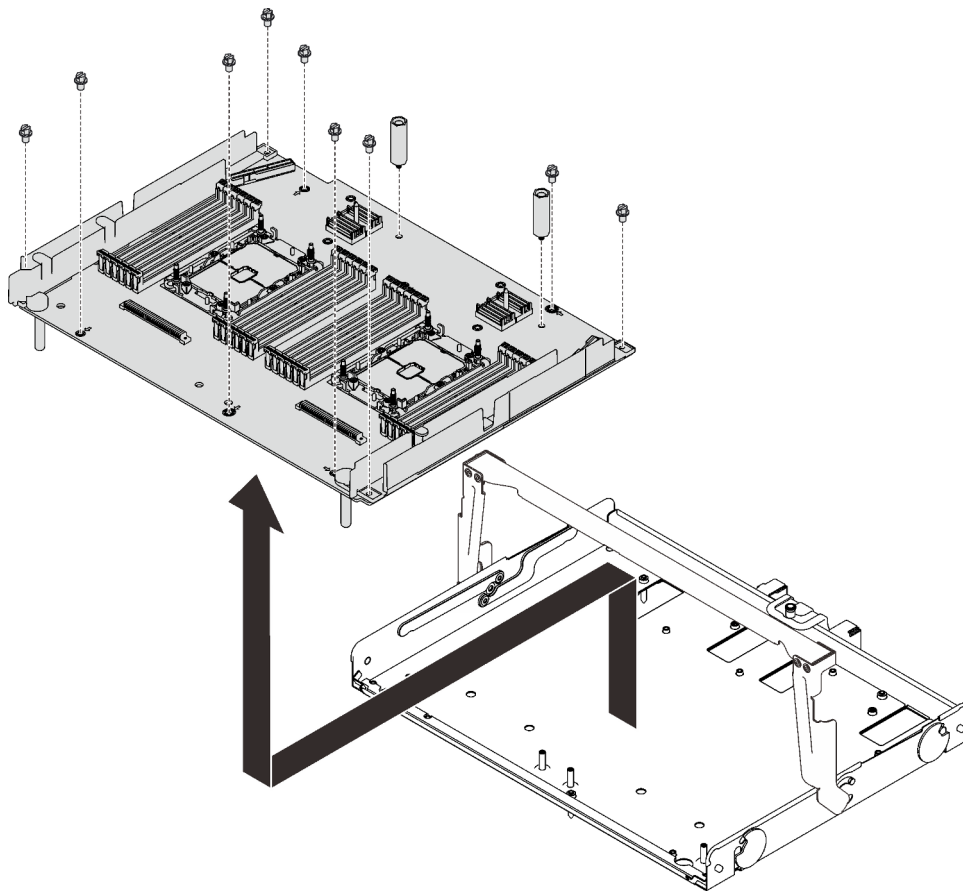


Figure 113. Disassembling the expansion tray

Step 3. Separate the expansion board from the supporting tray.

After this task is completed

Recycle the unit in compliance with local regulations.

Install the processor and memory expansion tray

Follow instructions in this section to install the processor and memory expansion tray.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Important: To avoid component damage, **DO NOT** remove or install memory modules or PHMs when the tray is removed from the server.

Procedure

Step 1. Make sure the expansion tray air baffle is installed on the system board. If not, install it.

Attention: Air baffle is required for airflow that creates proper cooling. Make sure to install proper air baffles for system configuration before the power is turned on.

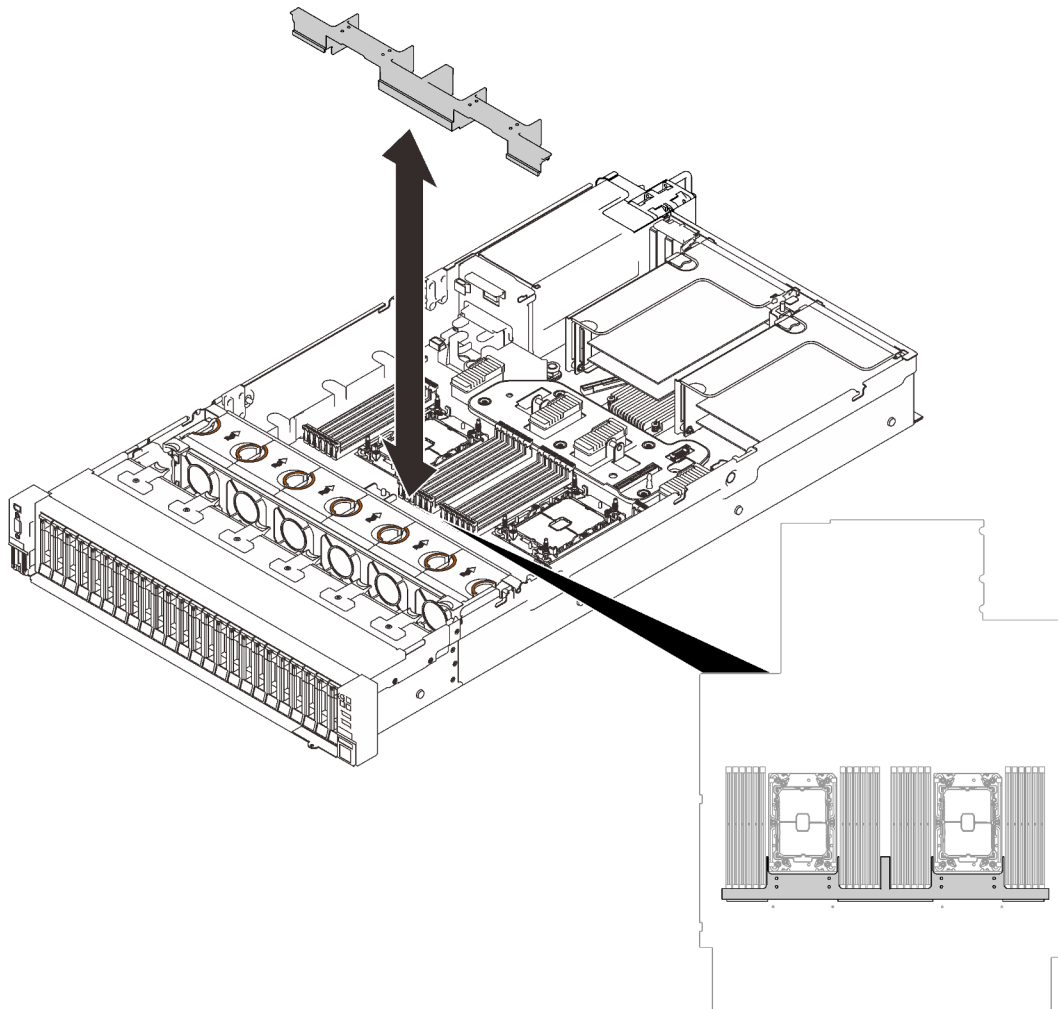


Figure 114. Installing the expansion tray air baffle

Step 2. Align the processor and memory expansion tray with the two pairs of guides on the sides, and lower it into the chassis.

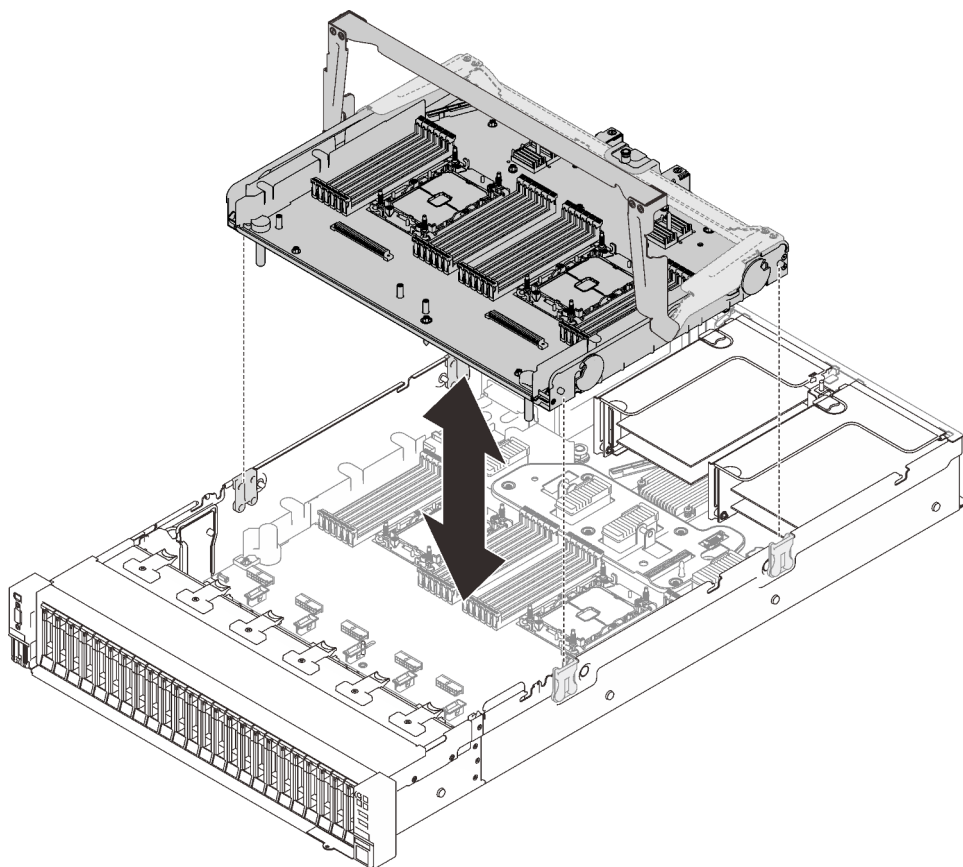


Figure 115. Installing the processor and memory expansion tray

- Step 3. If you plan to install memory modules and PHMs, do it now (see [“Install a memory module”](#) on page 156 and [“Install a processor and heat sink”](#) on page 189).
- Step 4. If applicable, route the two PCIe cables through the cable guides, and connect them to the expansion tray.

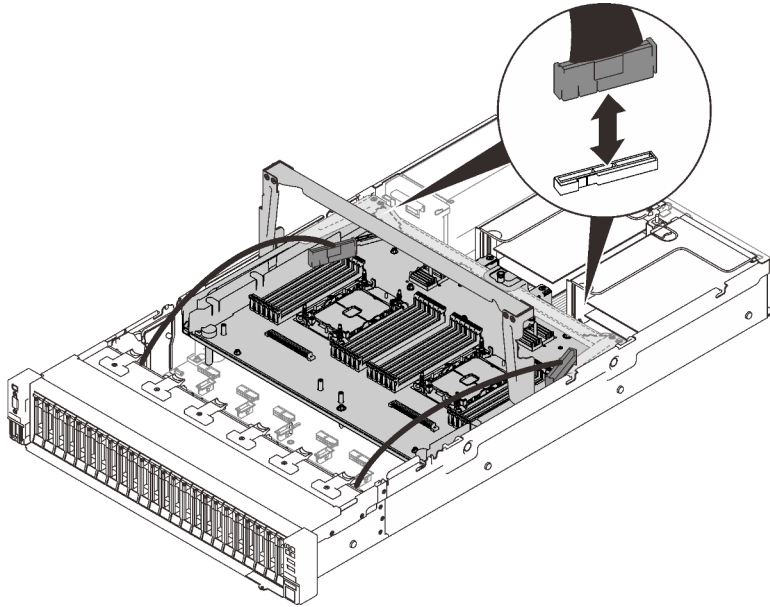


Figure 116. Connecting cables to the expansion tray

Step 5. Secure the processor and memory expansion tray.

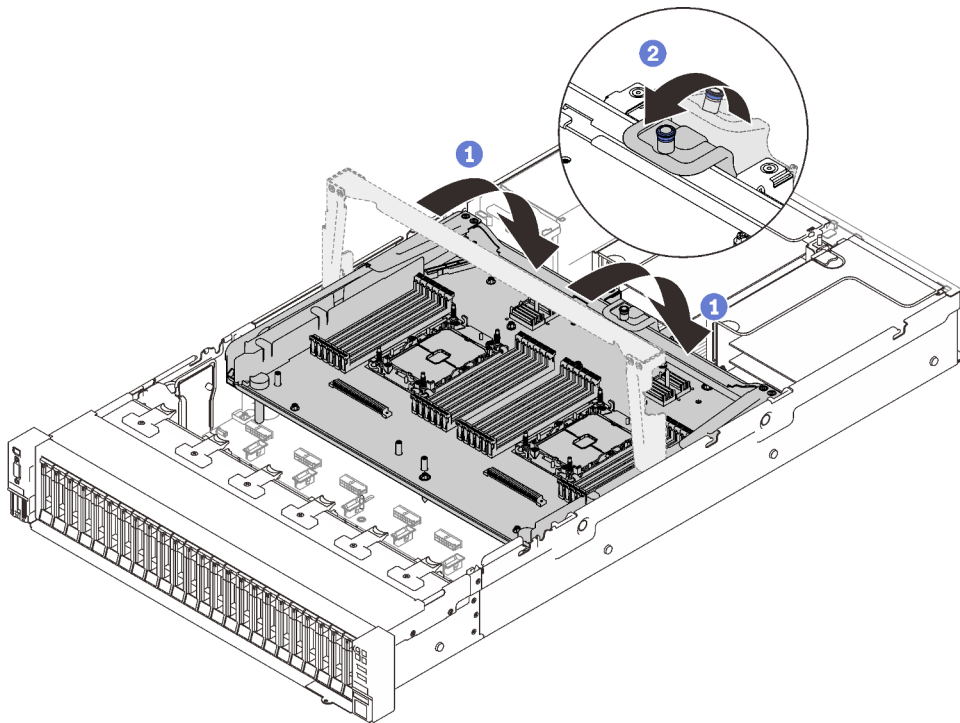


Figure 117. Securing the processor and memory expansion tray

- 1 Rotate the handle all the way down. This connects and fixes the expansion tray to the system board.
- 2 Pull the retaining tab back to secure the handle.

After this task is completed

Proceed to complete the parts replacement (see [“Complete the parts replacement”](#) on page 223).

Demo video

[Watch the procedure on YouTube](#)

Security bezel replacement

Follow instructions in this section to remove or install the security bezel.

Remove the security bezel

Follow the instructions in this section to remove the security bezel.

About this task

Attention:

- Go over [“Installation Guidelines”](#) on page 109 to ensure that you work safely.

Procedure

Step 1. Insert and rotate the key clockwise to unlock the security bezel.

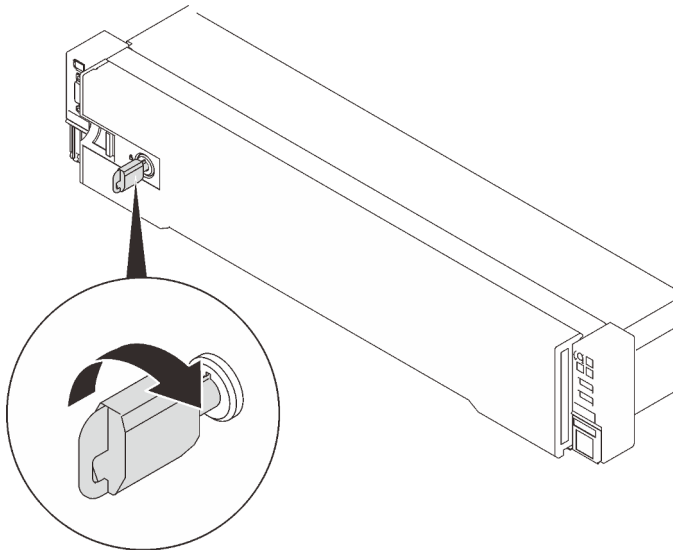


Figure 118. Unlocking the security bezel

Step 2. Press on the release latch, and rotate the security bezel away to remove it from the chassis.

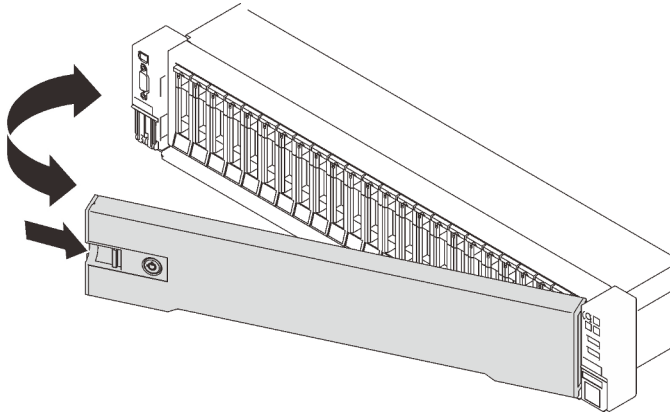


Figure 119. Removing the security bezel

Demo video

[Watch the procedure on YouTube](#)

Install the security bezel

Follow the instructions in this section to install the security bezel.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Procedure

- Step 1. Insert the tabs on the security bezel into the slots on the right rack handle; then, press and hold the release latch, and rotate the security bezel towards the chassis until the other side clicks into place.

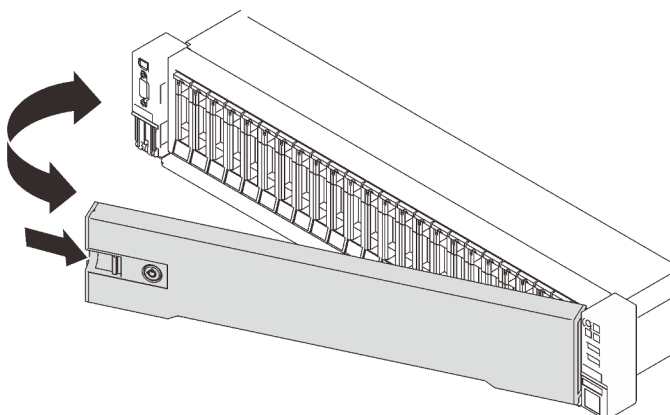


Figure 120. Installing the security bezel

- Step 2. Insert and rotate the key counterclockwise to lock the security bezel.

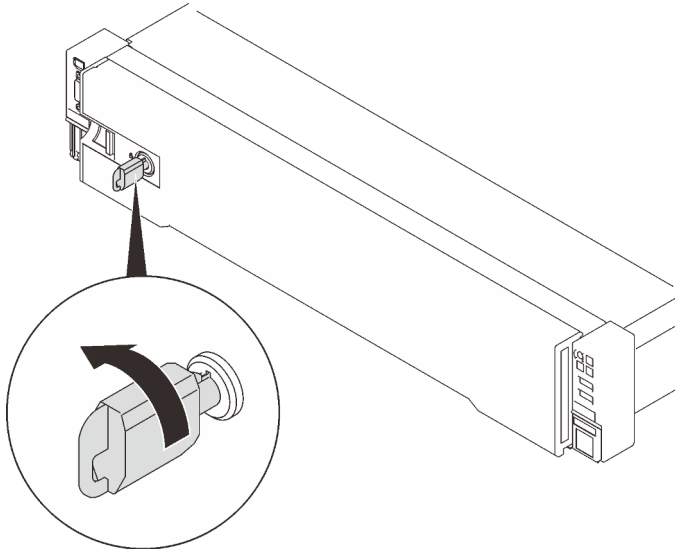


Figure 121. Locking the security bezel

Demo video

[Watch the procedure on YouTube](#)

System board air baffle replacement

Follow instructions in this section to install or remove the system board air baffle.

About this task

Note: If the server comes with four processors, it does not come with this component.

Remove the system board air baffle

Follow instructions in this section to remove the system board air baffle.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Procedure

- Step 1. Make preparations for this task.
 - a. Remove the top cover (see [“Remove the top cover” on page 219](#)).
- Step 2. Lift the system air baffle to remove it from the server.

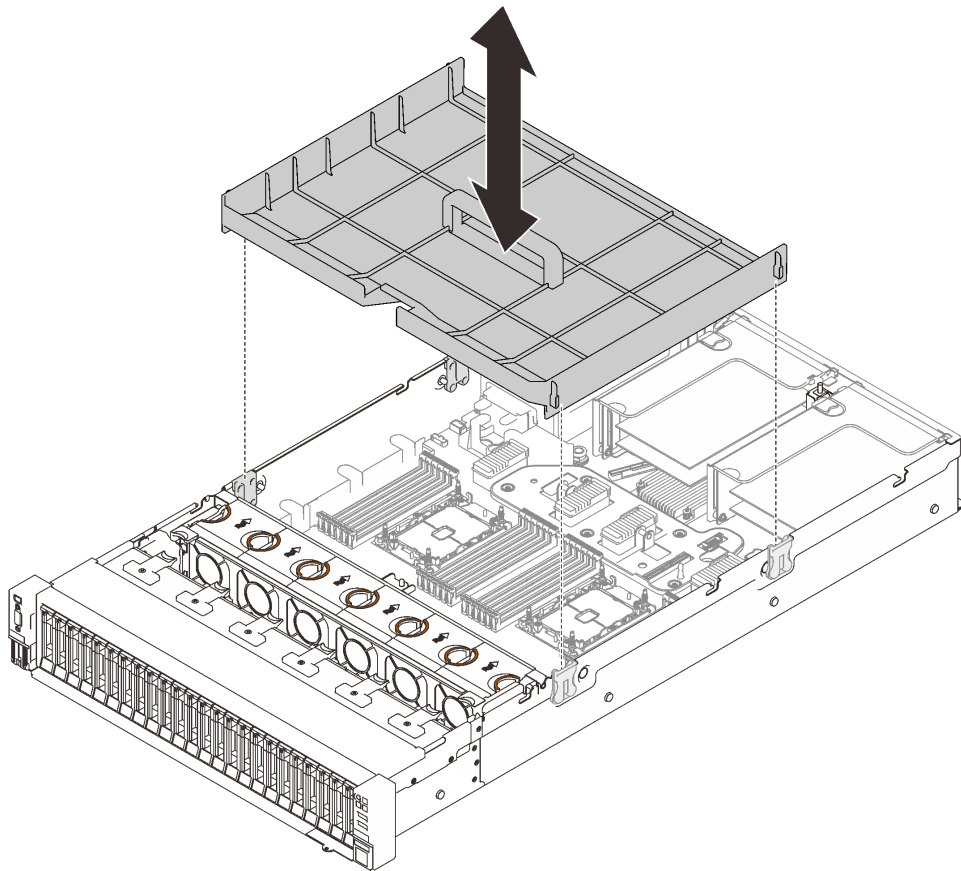


Figure 122. Removing the system board air baffle

After this task is completed

- Install the processor and memory expansion tray (see [“Install the processor and memory expansion tray” on page 199](#)).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

[Watch the procedure on YouTube](#)

Install the system board air baffle

Follow instructions in this section to install the system board air baffle.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. Align the system board air baffle with the two pairs of guides on the sides, and lower it into the server.

Attention: Air baffle is required for airflow that creates proper cooling. Make sure to install proper air baffles for system configuration before the power is turned on.

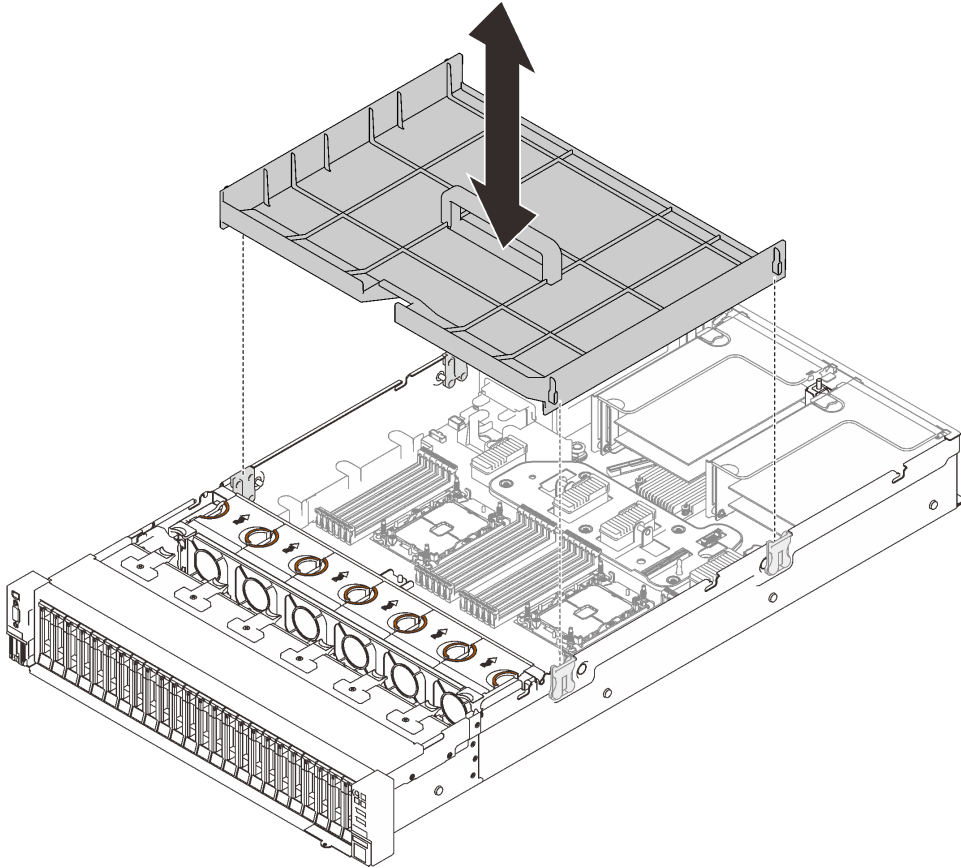


Figure 123. Installing the system board air baffle

After this task is completed

Proceed to complete the parts replacement (see [“Complete the parts replacement”](#) on page 223).

Demo video

[Watch the procedure on YouTube](#)

System board replacement (trained technician only)

Follow instructions in this section to remove or install the system board.

About this task

Note: This task must be operated by trained technicians.

Remove the system board

Follow instructions in this section to remove the system board.

Attention:

- Removing and installing this component requires trained technicians. **Do not** attempt to remove or install it without proper training.
- When replacing the system board, always update the server with the latest firmware or restore the pre-existing firmware. Make sure that you have the latest firmware or a copy of the pre-existing firmware before you proceed.
- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Procedure

Step 1. Make preparations for this task.

- a. Record all system configuration information, such as Lenovo XClarity Controller (XCC) IP addresses, vital product data, and the machine type, model number, serial number, Universally Unique Identifier, and asset tag of the server.
- b. Save the system configuration to an external device with Lenovo XClarity Essentials.
- c. Save the system event log to external media.
- d. Remove the top cover (see [“Remove the top cover” on page 219](#)).
- e. Remove the fan cage assembly (see [“Remove the fan cage assembly” on page 131](#)).
- f. Remove the system board air baffle (see [“Remove the system board air baffle” on page 205](#)) or the processor and memory expansion tray and the expansion tray air baffle (see [“Remove the processor and memory expansion tray” on page 195](#)).
- g. Disconnect all the cables from the system board. Make a list of each cable as you disconnect it and use it as a checklist after installing the new system board.
- h. Remove the PCIe riser assemblies (see [“Remove the PCIe riser assembly” on page 160](#)).
- i. Remove all the adapters from the system board (see [“Remove an adapter” on page 163](#) and [“Remove the OCP Ethernet adapter” on page 158](#)).
- j. Label the slot number on each memory module, remove all the memory modules from the system board, and set them aside on a static-protective surface for reinstallation (see [“Remove a memory module” on page 151](#)).

Important: It is advised to print out the layout of memory module slots for reference.

- k. Remove the power backplane (see [“Remove the power backplane” on page 171](#)).
- l. Remove both the PHMs that are installed on the system board (see [“Install a processor and heat sink” on page 189](#)).

Step 2. Disengage the system board.

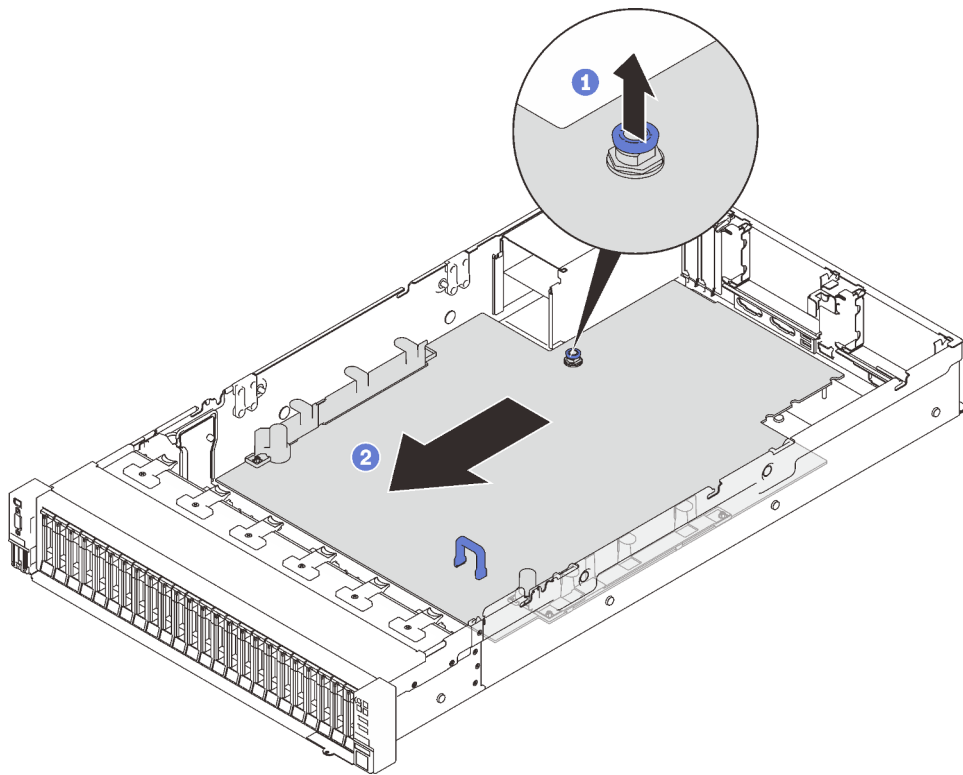


Figure 124. Disengaging the system board

- 1 Pull the captive screw up to release the system board.
- 2 Grasp the blue handle, and slide the system board back slightly to disengage it from the chassis.

Note: This handle only serves the purpose of removing system board. Do not attempt to lift the whole server with it.

Step 3. Slide the system board left and up, and remove it from the chassis.

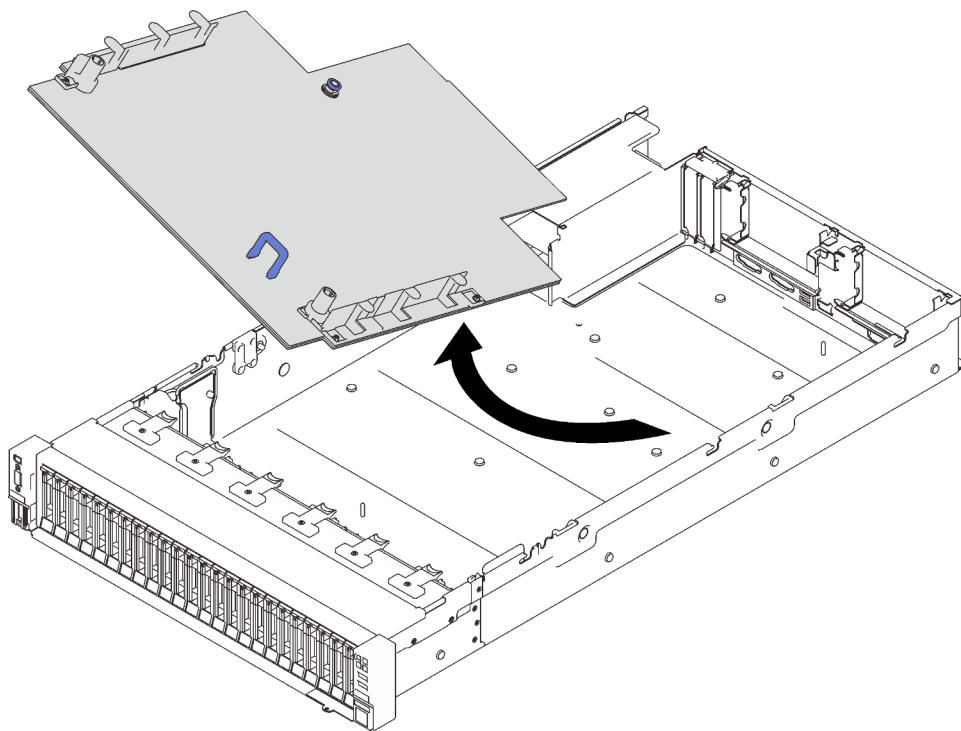


Figure 125. Removing the system board

After this task is completed

- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Important: Before returning the system board, make sure that you install the processor socket dust covers from the new system board. To replace a processor socket dust cover:

1. Take a dust cover from the processor socket assembly on the new system board, and orient it correctly above the processor socket assembly on the removed system board.
 2. Gently press down the dust cover legs to the processor socket assembly, pressing on the edges to avoid damage to the socket pins. You might hear a click on the dust cover is securely attached.
 3. **Make sure** that the dust cover is securely attached to the processor socket assembly.
- If you are planning to recycle the system board, follow the instructions in [“Disassemble the system board for recycle” on page 210](#) for compliance with local regulations.

Demo video

[Watch the procedure on YouTube](#)

Disassemble the system board for recycle

Follow the instructions in this section to disassemble the processor and memory expansion tray before recycle.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.

- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Step 1. Make preparations for this task.

- a. Remove the system board from the server (see [“Remove the system board” on page 207](#)).
- b. Refer to local environmental, waste or disposal regulations to ensure compliance.

Step 2. Remove the following components as illustrated:

- 22 slotted screws
- Two standoffs (with 12 mm wrench)
- One plunger (with 11 mm and 16 mm wrench)

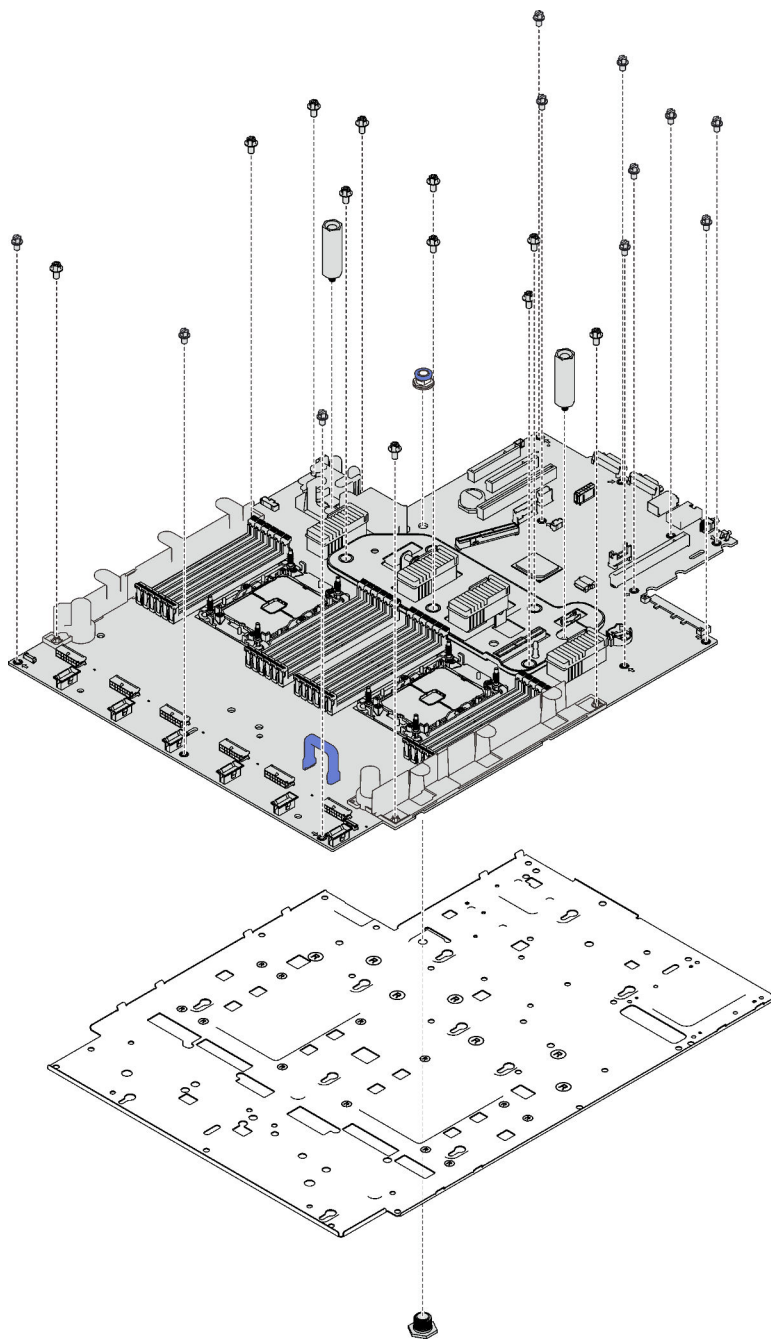


Figure 126. Disassembling the system board

Step 3. Separate the system board from the supporting sheet metal.

After this task is completed

Recycle the unit in compliance with local regulations.

Install the system board

Follow instructions in this section to install the system board.

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

- Step 1. Place the system board above the front VGA and diagnostics assembly, and slide the board right and forward into the chassis.

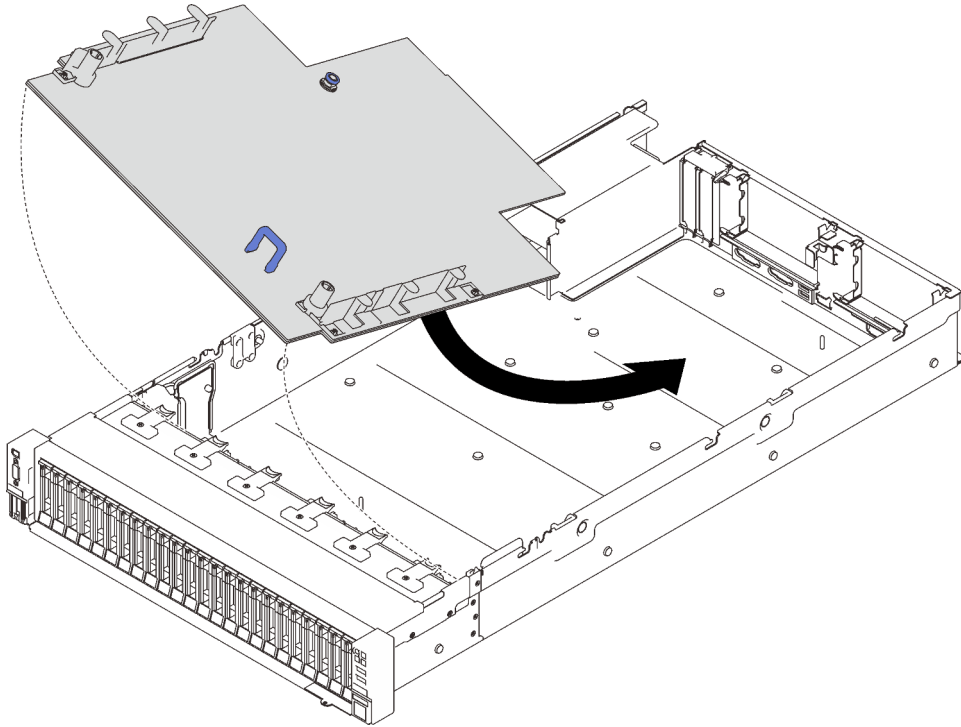


Figure 127. Installing the system board

- Step 2. Slide the system board forward until it stops.

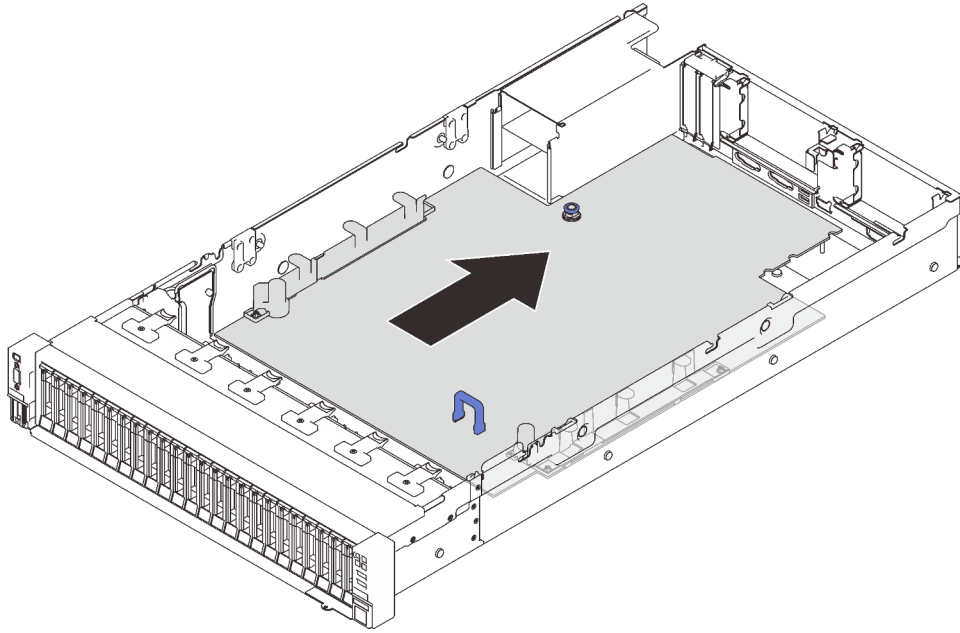


Figure 128. Installing the system board

After this task is completed

1. Install the power backplane (see [“Install the power backplane” on page 174](#)).
2. Install both PHMs (see [“Install a processor and heat sink” on page 189](#)).
3. Install each memory module to the same slot on the new system board as on the defective system board (see [“Install a memory module” on page 156](#)) until all the memory modules are installed.
4. Reinstall the drive backplanes (see [“Install a drive backplane” on page 114](#)).
5. Install the power supplies (see [“Install a hot-swap power supply unit” on page 178](#)).
6. Proceed to complete the parts replacement (see [“Complete the parts replacement” on page 223](#)).
7. Reconnect all the required cables, and boot the server.
8. Update the machine type and serial number with new vital product data (VPD). Use the Lenovo XClarity Provisioning Manager to update the machine type and serial number. See [“Update the machine type and serial number” on page 214](#).
9. Enable TPM/TCM. See [“Enable TPM” on page 216](#)
10. Optionally, enable Secure Boot. See [“Enable UEFI Secure Boot” on page 219](#).

Demo video

[Watch the procedure on YouTube](#)

Update the machine type and serial number

After the system board is replaced by trained service technicians, the machine type and serial number must be updated.

There are two methods available to update the machine type and serial number:

- From Lenovo XClarity Provisioning Manager

To update the machine type and serial number from Lenovo XClarity Provisioning Manager:

1. Start the server and press the key according to the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface.
 2. If the power-on Administrator password is required, enter the password.
 3. From the System Summary page, click **Update VPD**.
 4. Update the machine type and serial number.
- From Lenovo XClarity Essentials OneCLI

Lenovo XClarity Essentials OneCLI sets the machine type and serial number in the Lenovo XClarity Controller. Select one of the following methods to access the Lenovo XClarity Controller and set the machine type and serial number:

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

To update the machine type and serial number from Lenovo XClarity Essentials OneCLI:

1. Download and install Lenovo XClarity Essentials OneCLI.

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

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

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

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> [access_method]
onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> [access_method]
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> [access_method]
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx <system model> --override [access_method]
```

Where:

<m/t_model>

The server machine type and model number. Type xxxxyyyyyy, where xxxx is the machine type and yyyyyy is the server model number.

<s/n>

The serial number on the server. Type zzzzzzzz (length 8-10 characters), where zzzzzzz is the serial number.

<system model>

The system model. Type system yyyyyyyy, where yyyyyyyy is the product identifier.

[access_method]

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

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

Where:

xcc_user_id

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

xcc_password

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

Example commands are as follows:

```

onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> --bmc-username <xcc_user_id>
--bmc-password <xcc_password>
onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> --bmc-username <xcc_user_id> --bmc-
password <xcc_password>
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> --bmc-username xcc_user_
id --bmc-password xcc_password
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx <system model> --override --bmc-
username xcc_user_id --bmc-password xcc_password

```

- Online KCS access (unauthenticated and user restricted):

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

Example commands are as follows:

```

onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model>
onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n>
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model>
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx <system model> --override

```

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

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

Where:

xcc_external_ip

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

xcc_user_id

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

xcc_password

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

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

Example commands are as follows:

```

onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> --bmc <xcc_user_id>:<xcc_
password>@<xcc_external_ip>
onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> --bmc <xcc_user_id>:<xcc_
password>@<xcc_external_ip>

onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> --bmc xcc_user_id:xcc_
password@xcc_external_ip
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx <system model> --override --bmc xcc_
user_id:xcc_password@xcc_external_ip

```

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

Enable TPM

The server supports Trusted Platform Module (TPM).

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

When a system board is replaced, you must make sure that the TPM 2.0 firmware is updated to the latest version and the TPM policy is set correctly.

CAUTION:

Take special care when setting the TPM policy. If it is not set correctly, the system board can become unusable.

Update the TPM 2.0 firmware

When a system board is replaced, you must make sure that the TPM 2.0 firmware is updated to the latest version.

To update the TPM version:

1. Go to <http://datacentersupport.lenovo.com> and navigate to the support page for your server.
2. Click **Drivers & Software** and download the latest version of BIOS/UEFI firmware.
3. Update the firmware. See “[Firmware updates](#)” on page 8.
4. Power on the system and press F1.
5. If you have set the power on password, enter the correct password.
6. Wait for about 90 seconds, the setup utilities window is displayed.
7. Navigate to **System Settings → Security → Trusted Platform Module** and update the TPM.
8. Reboot the system once the update is complete.

Set the TPM policy

By default, a replacement system board is shipped with the TPM policy set to **undefined**. You must modify this setting to match the setting that was in place for the system board that is being replaced.

There are two methods available to set the TPM policy:

- From Lenovo XClarity Provisioning Manager

To set the TPM policy from Lenovo XClarity Provisioning Manager:

1. Start the server and press the key according to the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface.
2. If the power-on Administrator password is required, enter the password.
3. From the System Summary page, click **Update VPD**.
4. Set the policy to one of the following settings.
 - **NationZ TPM 2.0 enabled - China only**. Customers in the Chinese Mainland should choose this setting if a NationZ TPM 2.0 adapter is installed.
 - **TPM enabled - ROW**. Customers outside of the Chinese Mainland should choose this setting.
 - **Permanently disabled**. Customers in the Chinese Mainland should use this setting if no TPM adapter is installed.

Note: Although the setting **undefined** is available as a policy setting, it should not be used.

- From Lenovo XClarity Essentials OneCLI

Note: Please note that a Local IPMI user and password must be setup in Lenovo XClarity Controller for remote accessing to the target system.

To set the TPM policy from Lenovo XClarity Essentials OneCLI:

1. Read TpmTcmPolicyLock to check whether the TPM_TCM_POLICY has been locked:
`OneCli.exe config show imm.TpmTcmPolicyLock --override --imm <userid>:<password>@<ip_address>`

Note: The imm.TpmTcmPolicyLock value must be 'Disabled', which means TPM_TCM_POLICY is NOT locked and changes to the TPM_TCM_POLICY are permitted. If the return code is 'Enabled' then no changes to the policy are permitted. The planar may still be used if the desired setting is correct for the system being replaced.

2. Configure the TPM_TCM_POLICY into XCC:

- For customers in Chinese Mainland with no TPM, or customers that require to disable TPM:
`OneCli.exe config set imm.TpmTcmPolicy "NeitherTpmNorTcm" --override --imm <userid>:<password>@<ip_address>`
- For customers in Chinese Mainland that require to enable TPM:
`OneCli.exe config set imm.TpmTcmPolicy "NationZTPM20Only" --override --imm <userid>:<password>@<ip_address>`
- For customers outside Chinese Mainland that require to enable TPM:
`OneCli.exe config set imm.TpmTcmPolicy "TpmOnly" --override --imm <userid>:<password>@<ip_address>`

3. Issue reset command to reset system:

`OneCli.exe misc ospower reboot --imm <userid>:<password>@<ip_address>`

4. Read back the value to check whether the change has been accepted:

`OneCli.exe config show imm.TpmTcmPolicy --override --imm <userid>:<password>@<ip_address>`

Notes:

- If the read back value is matched it means the TPM_TCM_POLICY has been set correctly.

imm.TpmTcmPolicy is defined as below:

- Value 0 use string "Undefined", which means UNDEFINED policy.
- Value 1 use string "NeitherTpmNorTcm", which means TPM_PERM_DISABLED.
- Value 2 use string "TpmOnly", which means TPM_ALLOWED.
- Value 4 use string "NationZTPM20Only", which means NationZ_TPM20_ALLOWED.
- Below 4 steps must also be used to 'lock' the TPM_TCM_POLICY when using OneCli/ASU commands:

5. Read TpmTcmPolicyLock to check whether the TPM_TCM_POLICY has been locked, command as below:

`OneCli.exe config show imm.TpmTcmPolicyLock --override --imm <userid>:<password>@<ip_address>`

The value must be 'Disabled', it means TPM_TCM_POLICY is NOT locked and must be set.

6. Lock the TPM_TCM_POLICY:

`OneCli.exe config set imm.TpmTcmPolicyLock "Enabled" --override --imm <userid>:<password>@<ip_address>`

7. Issue reset command to reset system, command as below:

`OneCli.exe misc ospower reboot --imm <userid>:<password>@<ip_address>`

During the reset, UEFI will read the value from imm.TpmTcmPolicyLock, if the value is 'Enabled' and the imm.TpmTcmPolicy value is valid, UEFI will lock the TPM_TCM_POLICY setting.

Note: The valid values for imm.TpmTcmPolicy include 'NeitherTpmNorTcm', 'TpmOnly', and 'NationZTPM20Only'.

If the imm.TpmTcmPolicyLock is set as 'Enabled' but imm.TpmTcmPolicy value is invalid, UEFI will reject the 'lock' request and change imm.TpmTcmPolicyLock back to 'Disabled'.

8. Read back the value to check whether the 'Lock' is accepted or rejected. Command as below:

`OneCli.exe config show imm.TpmTcmPolicy --override --imm <userid>:<password>@<ip_address>`

Note: If the read back value is changed from 'Disabled' to 'Enabled' that means the TPM_TCM_POLICY has been locked successfully. There is no method to unlock a policy once it has been set other than replacing system board.

imm.TpmTcmPolicyLock is defined as below:

Value 1 uses string "Enabled" , which means lock the policy. Other values are not accepted.

Enable UEFI Secure Boot

Optionally, you can enable UEFI Secure Boot.

There are two methods available to enable UEFI Secure Boot:

- From Lenovo XClarity Provisioning Manager

To enable UEFI Secure Boot from Lenovo XClarity Provisioning Manager:

1. Start the server and press the key specified in the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface. (For more information, see the "Startup" section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.)
2. If the power-on Administrator password is required, enter the password.
3. From the UEFI Setup page, click **System Settings** → **Security** → **Secure Boot**.
4. Enable Secure Boot and save the settings.

- From Lenovo XClarity Essentials OneCLI

To enable UEFI Secure Boot from Lenovo XClarity Essentials OneCLI:

1. Download and install Lenovo XClarity Essentials OneCLI.

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

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

2. Run the following command to enable Secure Boot:

```
OneCli.exe config set SecureBootConfiguration.SecureBootSetting Enabled --bmc <userid>:<password>@<ip_
address>
```

where:

- <userid>:<password> are the credentials used to access the BMC (Lenovo XClarity Controller interface) of your server. The default user ID is USERID, and the default password is PASSWORD (zero, not an uppercase o)
- <ip_address> is the IP address of the BMC.

For more information about the Lenovo XClarity Essentials OneCLI `set` command, see:

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

Note: If disabling UEFI secure boot is needed, run the following command:

```
OneCli.exe config set SecureBootConfiguration.SecureBootSetting Disabled --bmc <userid>:<password>@<ip_
address>
```

Top cover replacement

Follow instructions in this section to install or remove the top cover.

Remove the top cover

Follow the instructions in this section to remove the top cover.

About this task

S014



CAUTION:

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

S033



CAUTION:

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

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

Procedure

Step 1. If the top cover is locked, unlock it with a screwdriver (direction **1**).

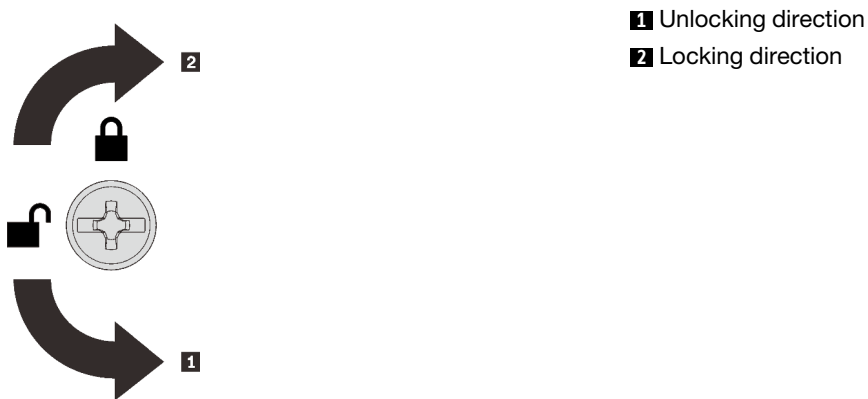


Figure 129. Top cover locking/unlocking direction

Step 2. Remove the top cover from the server.

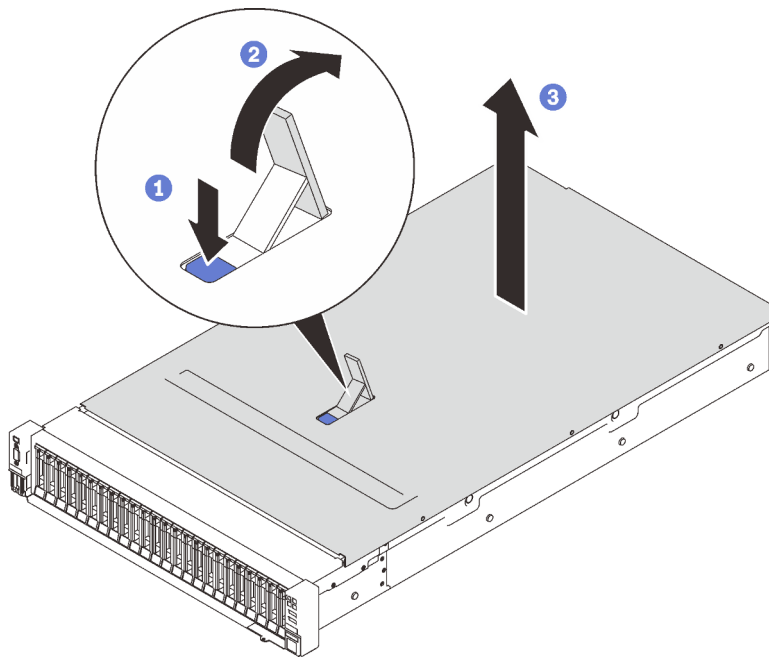


Figure 130. Removing the top cover

- 1 Press on the blue cover release latch.
- 2 Rotate the end of the latch up until it is in vertical position.
- 3 Lift the top cover to remove it.

After this task is completed

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

[Watch the procedure on YouTube](#)

Install the top cover

Follow instructions in this section to install the server top cover.

About this task

S014



CAUTION:

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

S033



CAUTION:

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

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. Install the top cover.

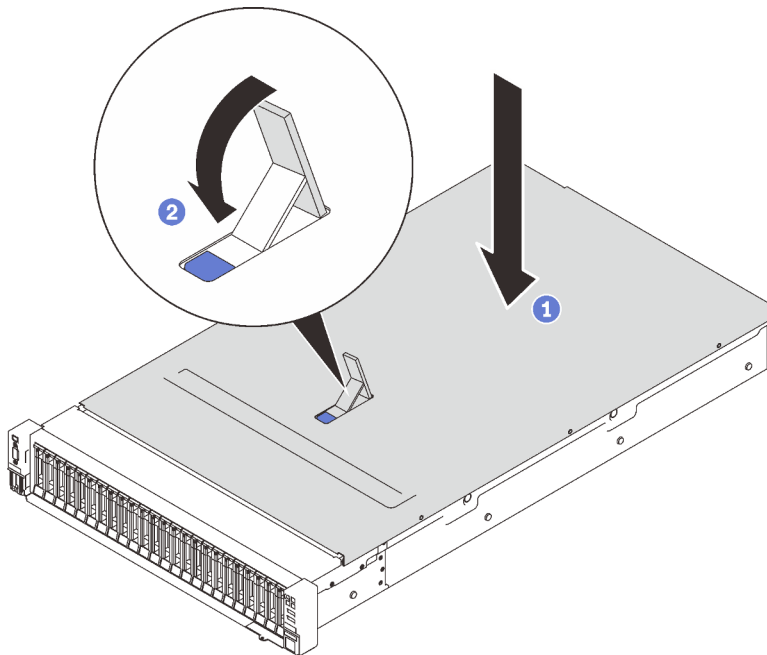


Figure 131. Installing the top cover

- 1 Place the top cover over top of the server with both sides aligned.
- 2 Rotate the latch down until it stops.

Step 2. (Optional) Lock the top cover with a screw driver (direction .



Figure 132. Top cover locking/unlocking direction

After this task is completed

Proceed to complete the parts replacement (see [“Complete the parts replacement”](#) on page 223).

Demo video

[Watch the procedure on YouTube](#)

Complete the parts replacement

Go through this checklist before completing parts replacement.

To complete parts replacement, go through the following list:

1. Ensure that all the removed components have been properly reinstalled and that no tools or loose screws are left inside your server.
2. Properly route and secure the cables in the server. Refer to the cable connecting and routing information for each component.
3. Make sure to install one of the following:
 - With two installed processors: system air baffle.
 - With four installed processors:
 - Processor and memory expansion tray
 - **Expansion tray air baffle** and **upper expansion tray air baffle**

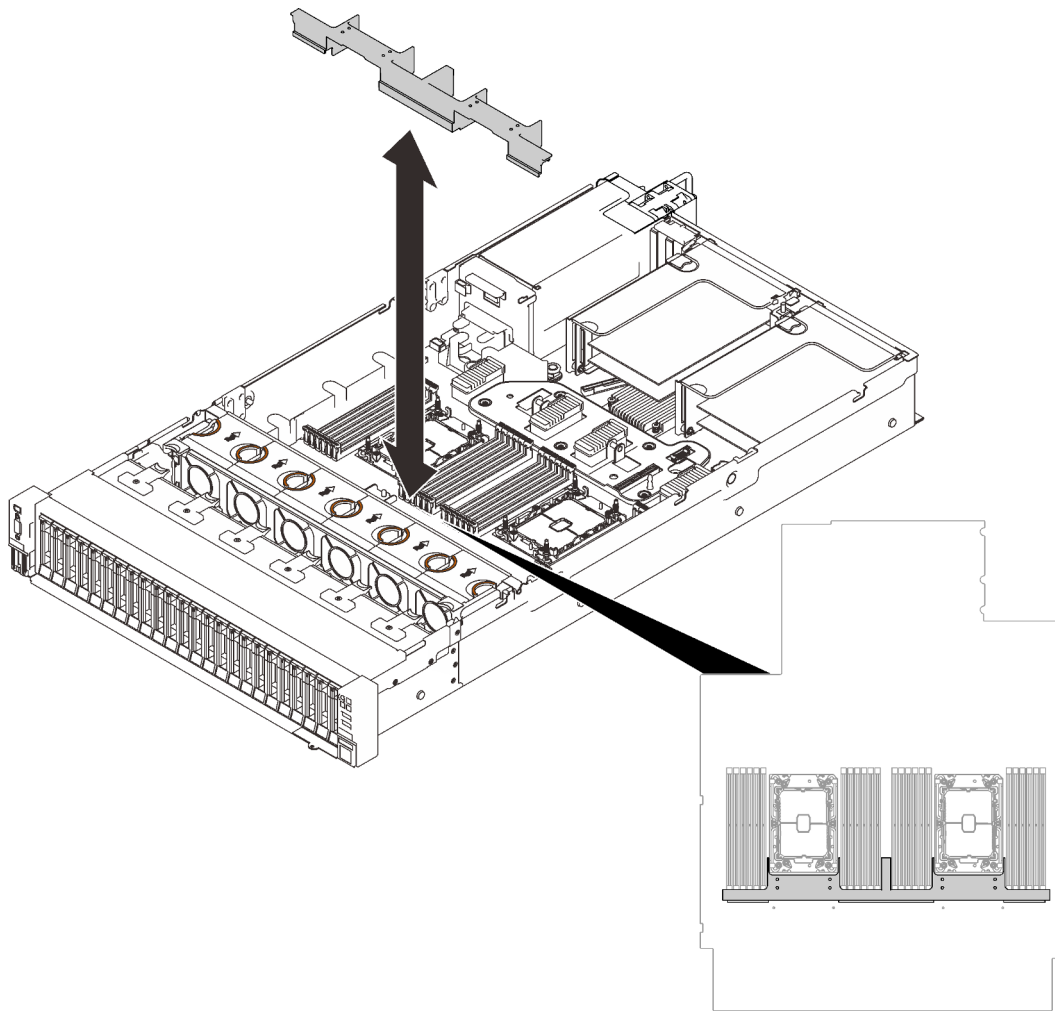


Figure 133. Installing the air baffle to the system board

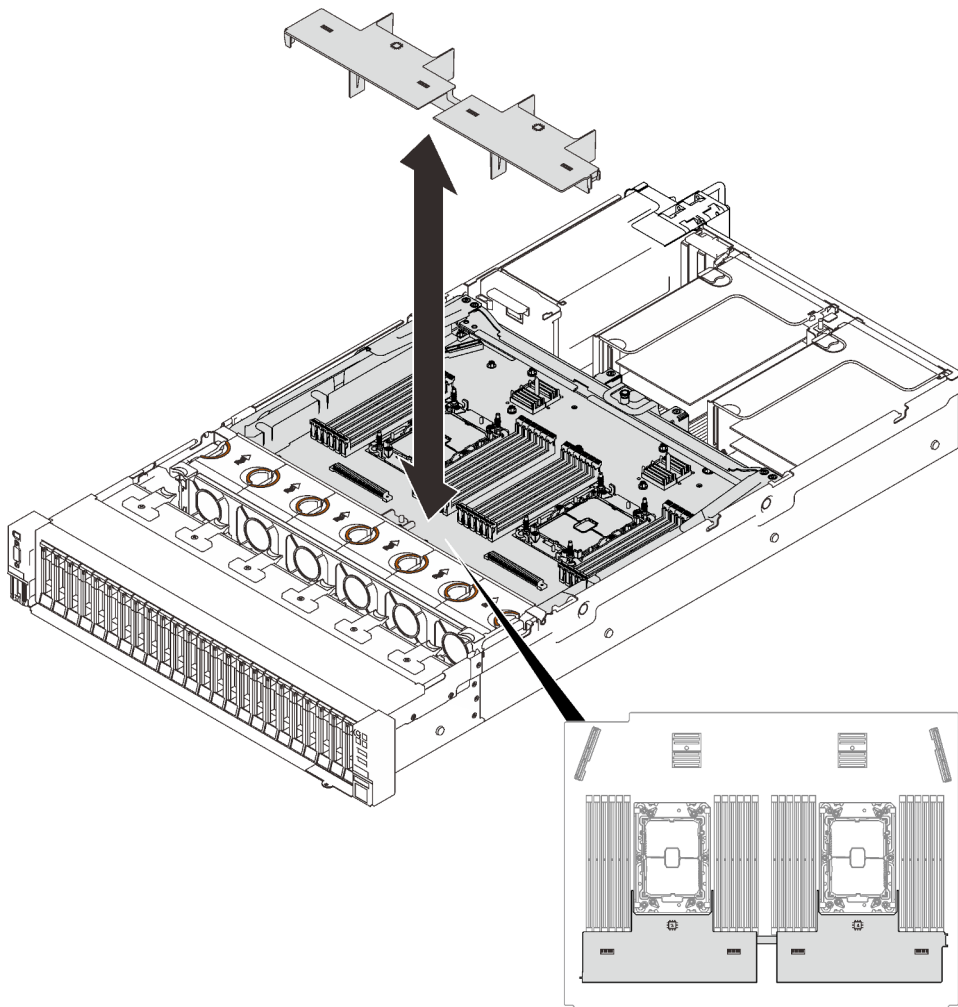


Figure 134. Installing air baffle to the expansion tray

Attention: Air baffle is required for airflow that creates proper cooling. Make sure to install proper air baffles for system configuration before the power is turned on.

4. If the top cover has been removed, reinstall it. See “Install the top cover” on page 221.
5. Reconnect external cables and power cords to the server.

Attention: To avoid component damage, connect the power cords last.

6. Update the server configuration.
 - Download and install the latest device drivers: <http://datacentersupport.lenovo.com>.
 - Update the system firmware. See “Firmware updates” on page 8.
 - Update the UEFI configuration.
 - Reconfigure the disk arrays if you have installed or removed a hot-swap drive or a RAID adapter. See the Lenovo XClarity Provisioning Manager User Guide, which is available for download at: <http://datacentersupport.lenovo.com>.

Chapter 5. Problem determination

Use the information in this section to isolate and resolve issues that you might encounter while using your server.

Lenovo servers can be configured to automatically notify Lenovo Support if certain events are generated. You can configure automatic notification, also known as Call Home, from management applications, such as the Lenovo XClarity Administrator. If you configure automatic problem notification, Lenovo Support is automatically alerted whenever a server encounters a potentially significant event.

To isolate a problem, you should typically begin with the event log of the application that is managing the server:

- If you are managing the server from the Lenovo XClarity Administrator, begin with the Lenovo XClarity Administrator event log.
- If you are using some other management application, begin with the Lenovo XClarity Controller event log.

Event logs

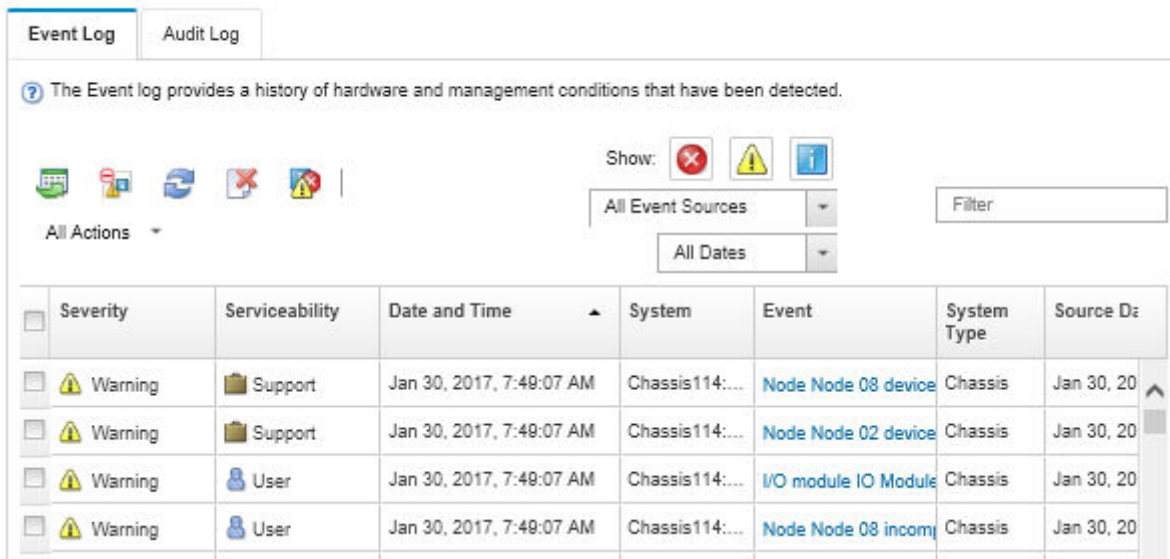
An *alert* is a message or other indication that signals an event or an impending event. Alerts are generated by the Lenovo XClarity Controller or by UEFI in the servers. These alerts are stored in the Lenovo XClarity Controller Event Log. If the server is managed by the Chassis Management Module 2 or by the Lenovo XClarity Administrator, alerts are automatically forwarded to those management applications.

Note: For a listing of events, including user actions that might need to be performed to recover from an event, see the *Messages and Codes Reference*, which is available at:https://pubs.lenovo.com/sr850-v2/pdf_files




Lenovo XClarity Administrator event log

If you are using Lenovo XClarity Administrator to manage server, network, and storage hardware, you can view the events from all managed devices through the XClarity Administrator.

Logs



The Event log provides a history of hardware and management conditions that have been detected.

Show:   

All Event Sources All Dates

Severity	Serviceability	Date and Time	System	Event	System Type	Source ID
Warning	Support	Jan 30, 2017, 7:48:07 AM	Chassis114:...	Node Node 08 device	Chassis	Jan 30, 20
Warning	Support	Jan 30, 2017, 7:48:07 AM	Chassis114:...	Node Node 02 device	Chassis	Jan 30, 20
Warning	User	Jan 30, 2017, 7:48:07 AM	Chassis114:...	I/O module IO Module	Chassis	Jan 30, 20
Warning	User	Jan 30, 2017, 7:48:07 AM	Chassis114:...	Node Node 08 incom	Chassis	Jan 30, 20

Figure 135. Lenovo XClarity Administrator event log

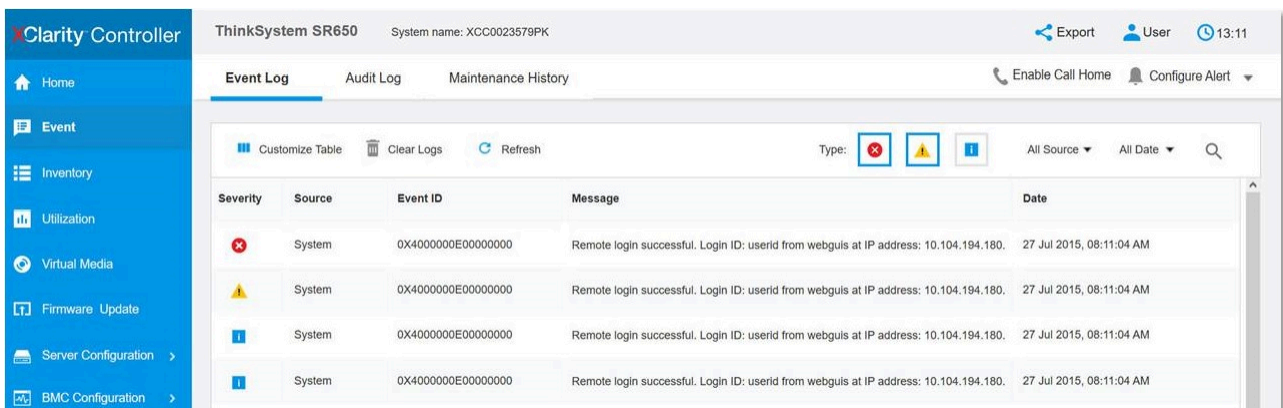
For more information about working with events from XClarity Administrator, see:

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

Lenovo XClarity Controller event log

The Lenovo XClarity Controller monitors the physical state of the server and its components using sensors that measure internal physical variables such as temperature, power-supply voltages, fan speeds, and component status. The Lenovo XClarity Controller provides various interfaces to systems management software and to system administrators and users to enable remote management and control of a server.



The Lenovo XClarity Controller monitors all components of the server and posts events in the Lenovo XClarity Controller event log.



ThinkSystem SR650 System name: XCC0023579PK

Event Log Audit Log Maintenance History

Customize Table Clear Logs Refresh

Type:   All Source All Date





Severity	Source	Event ID	Message	Date
	System	0X4000000E00000000	Remote login successful. Login ID: userid from webguis at IP address: 10.104.194.180.	27 Jul 2015, 08:11:04 AM
	System	0X4000000E00000000	Remote login successful. Login ID: userid from webguis at IP address: 10.104.194.180.	27 Jul 2015, 08:11:04 AM
	System	0X4000000E00000000	Remote login successful. Login ID: userid from webguis at IP address: 10.104.194.180.	27 Jul 2015, 08:11:04 AM
	System	0X4000000E00000000	Remote login successful. Login ID: userid from webguis at IP address: 10.104.194.180.	27 Jul 2015, 08:11:04 AM

Figure 136. Lenovo XClarity Controller event log

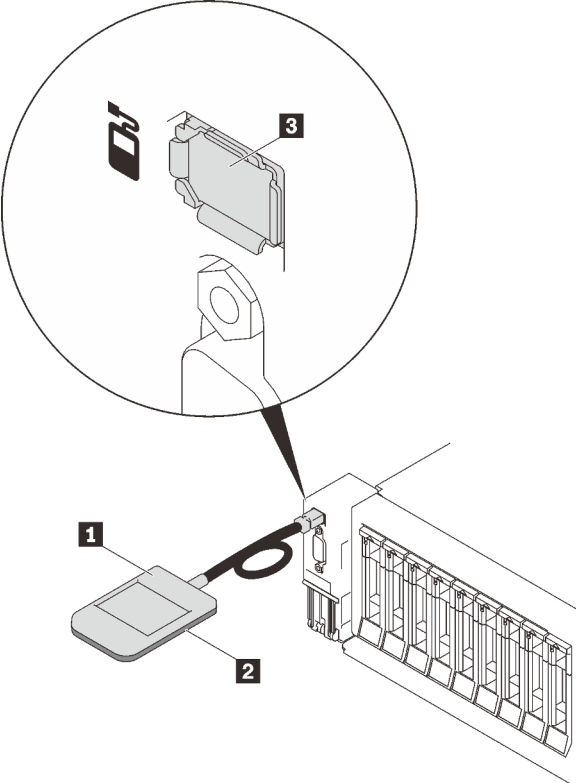
For more information about accessing the Lenovo XClarity Controller event log, see:

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

Light path diagnostics

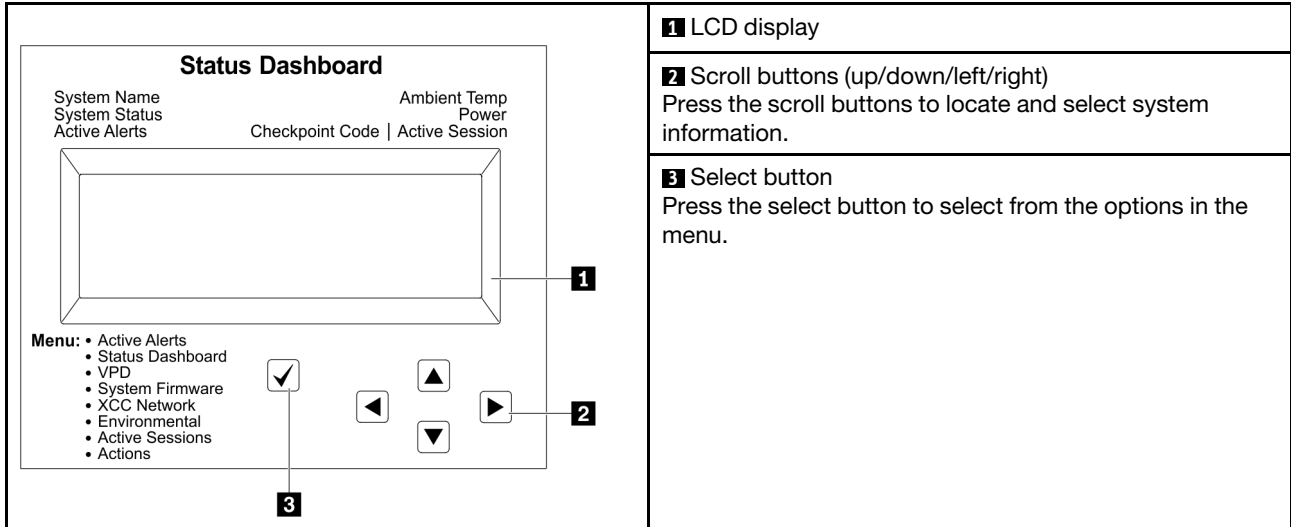
Light path diagnostics is a system of LEDs on various external and internal components of the server that leads you to the failed component. By viewing the LEDs in a particular order, you can often identify the source of the error.

Information of failed components is often available on external LCD diagnostics handset.

Location	Callouts
<p data-bbox="196 579 816 632">The external LCD diagnostics handset is connected to the server with an external cable.</p> 	<p data-bbox="833 579 1230 606">1 External LCD diagnostics handset</p>
	<p data-bbox="833 627 1442 737">2 Magnetic bottom With this component, the diagnostic handset can be attached to the top or side of the rack with hands spared for service tasks.</p>
	<p data-bbox="833 1058 1450 1140">3 External diagnostics connector This connector is located on the front of the server, and is used to connect an external LCD diagnostics handset.</p>

Display panel overview

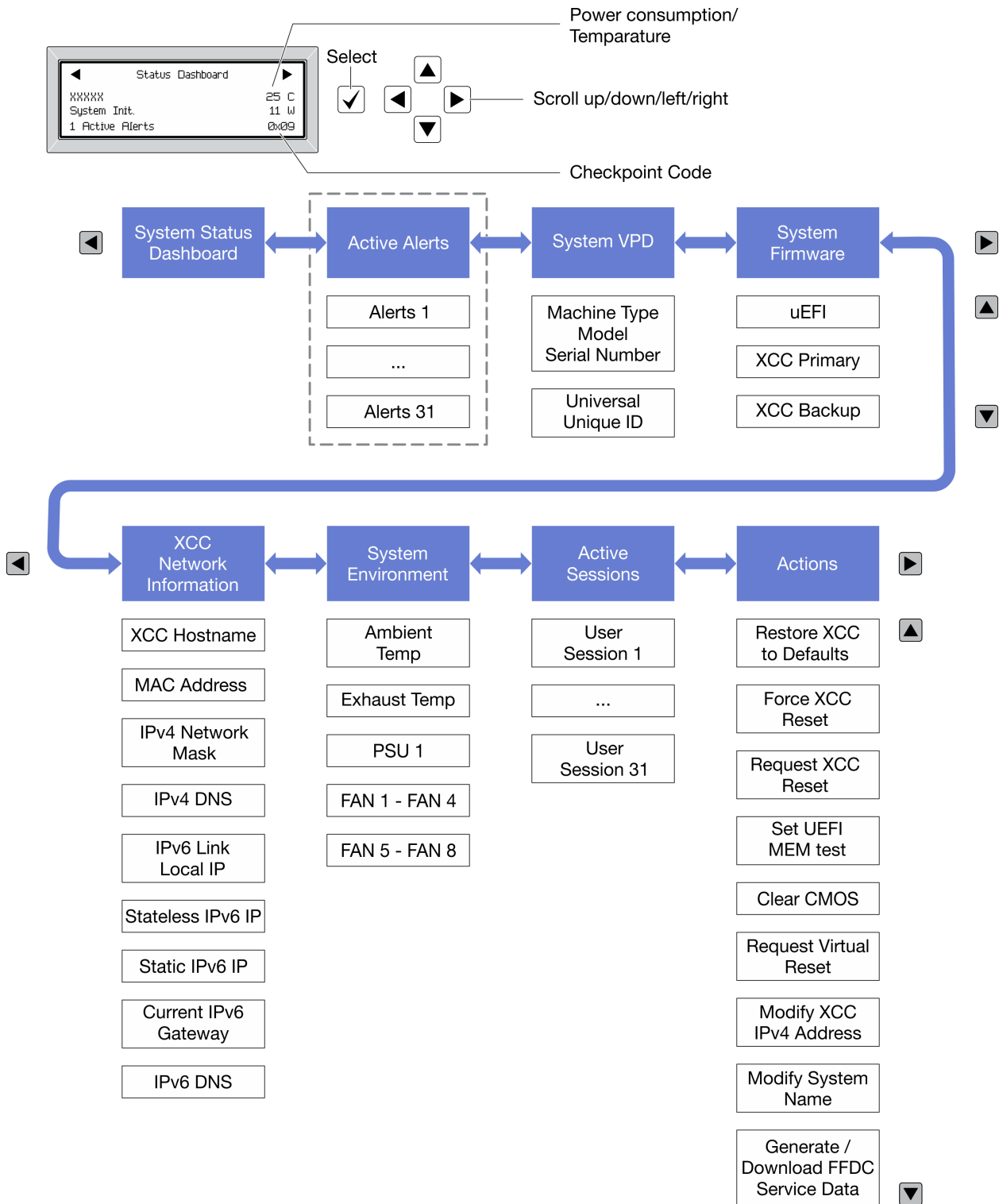
The diagnostics device consists of an LCD display and 5 navigation buttons.



Option flow diagram

The LCD panel displays various system information. Navigate through the options with the scroll keys.

Depending on the model, the options and entries on the LCD display might be different.



Power supply LEDs

This topic provides information about various power supply LED status and corresponding action suggestions.




The following minimum configuration is required for the ac power LED on the power supply to be lit:

- Power supply
- Power cord
- Appropriate input power from the power source

The following minimum configuration is required for the server to start:

- 16 GB DIMM
- Two processors installed
- At least one 2.5-inch drive installed
- One power supply
- Power cord

The following table describes the problems that are indicated by various combinations of the power-supply LEDs and the power-on LED on the front operator panel and suggested actions to correct the detected problems.

Power supply LEDs			Description	Action	Note
AC	DC	Error			
					
On	On	Off	Normal operation		The server is functioning correctly.
Off	Off	Off	No ac power to the server, a problem with the ac power source, or a power supply has failed.	<ol style="list-style-type: none"> 1. Check the ac power to the server. 2. Make sure that the power cord is connected to a functioning power source. 3. Restart the server. If the error remains, check the power-supply LEDs. 4. Replace the power supply. 	
Off	Off	On	No input power to the power supply or the power supply has detected an internal problem.	<ol style="list-style-type: none"> 1. Make sure that the power cord is connected to a functioning power source. 2. Replace the power supply. 	This happens only when a second power supply is providing power to the server.
Off	On	Off	The power supply has failed.	Replace the power supply.	

On	Blinking	Off	The power supply is in zero output mode (standby). When the total power consumption is low, only one of the power supplies delivers the entire power, while the other is put into this mode.	Zero output advanced mode is on by default, and the standby power supply unit will function normally when power consumption increases. To disable zero output mode, choose F1 -> System Settings -> Power -> Zero Output -> Disable .	
Off	On	On	Faulty power supply.	Replace the power supply.	
On	Off	Off	The system is off: The system is connected to power.	<ol style="list-style-type: none"> 1. Reseat the power supply unit. 2. Replace the power supply unit. 	PSU should be ON initially when AC input is ready.
			The system is on: Power supply not fully seated, faulty standard I/O book, or faulty power supply.	<ol style="list-style-type: none"> 1. Reseat the power supply unit. 2. Replace the power supply unit. 3. Replace the standard I/O book. 	It usually indicates the power supply is not fully seated.
On	Off	On	Faulty power supply.	Replace the power supply.	
On	On	On	Faulty power supply.	Replace the power supply.	

System board LEDs

The following illustrations show the light emitting diodes (LEDs) on the system board.

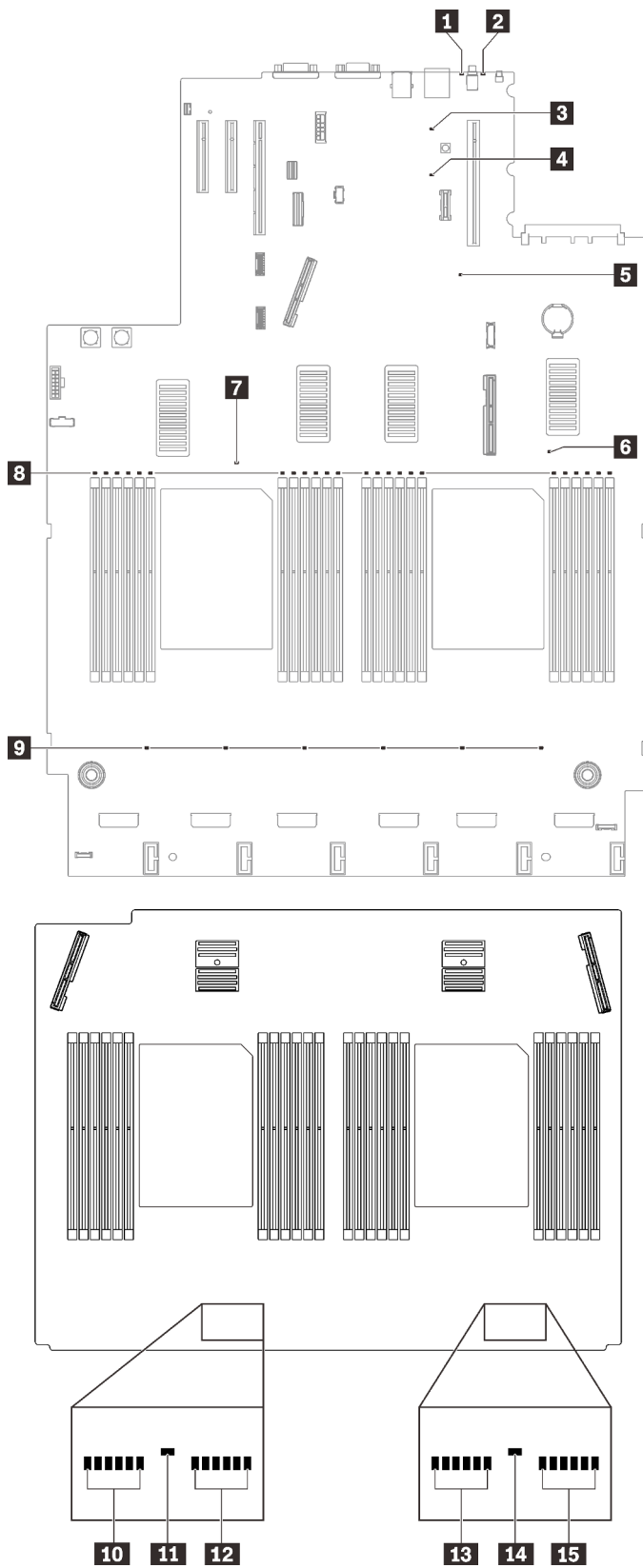


Figure 137. System board and expansion board LEDs

Table 22. System board LEDs descriptions and actions

LED	Descriptions and actions
1 System error LED (yellow)	LED on: An error has occurred. Complete the following steps: <ol style="list-style-type: none"> 1. Check the identification LED and check log LED and follow the instructions. 2. Check the Lenovo XClarity Controller event log and the system error log for information about the error. 3. Save the log if necessary, and clear the log afterward.
2 Identification LED (blue)	This LED is used as a presence detection LED. You can use Lenovo XClarity Controller to light this LED remotely. Use this LED to locate the server among other servers visually.
3 Light path power LED	This LED indicates if there is sufficient power to lit the LEDs when light path button is pressed while the system is not connected to the power.
4 XCC heartbeat LED (green)	This LED indicates XCC heartbeat and boot process: <ul style="list-style-type: none"> • LED blinking fast: XCC code is in the loading process. • LED going off momentarily: XCC code has loaded completely. • LED going off momentarily and then starts blinking slowing: XCC is fully operational. You can now press the power-control button to power on the server.
5 FPGA heartbeat LED (green)	This LED indicates power-on and power-off sequencing. <ul style="list-style-type: none"> • LED blinking: the system is functioning properly, and no action is necessary. • LED not blinking: (trained technician only) replace the system board (see “System board replacement (trained technician only)” on page 207).
6 7 11 14 Processor error LEDs	LED on: An error has occurred to the processor the LED represents. See “Processor problems” on page 255 for more information.
8 10 12 13 15 DIMM error LEDs	LED on: An error has occurred to the DIMM which the LED represents. See “Memory problems” on page 243 for more information.
9 Fan error LEDs	LED on: An error has occurred to the fan the LED represents. See “Fan problems” on page 240 for more information.

General problem determination procedures

Use the information in this section to resolve problems if the event log does not contain specific errors or the server is inoperative.

If you are not sure about the cause of a problem and the power supplies are working correctly, complete the following steps to attempt to resolve the problem:

1. Power off the server.
2. Make sure that the server is cabled correctly.
3. Remove or disconnect the following devices if applicable, one at a time, until you find the failure. Power on and configure the server each time you remove or disconnect a device.
 - Any external devices.
 - Surge-suppressor device (on the server).
 - Printer, mouse, and non-Lenovo devices.
 - Each adapter.
 - Hard disk drives.

- Memory modules until you reach the minimum configuration that is supported for the server.

See [“Specifications” on page 2](#) to determine the minimum configuration for your server.

4. Power on the server.

If the problem is solved when you remove an adapter from the server, but the problem recurs when you install the same adapter again, suspect the adapter. If the problem recurs when you replace the adapter with a different one, try a different PCIe slot.

If the problem appears to be a networking problem and the server passes all system tests, suspect a network cabling problem that is external to the server.

Resolving suspected power problems

Power problems can be difficult to solve. For example, a short circuit can exist anywhere on any of the power distribution buses. Usually, a short circuit will cause the power subsystem to shut down because of an overcurrent condition.

Complete the following steps to diagnose and resolve a suspected power problem.

Step 1. Check the event log and resolve any errors related to the power.

Note: Start with the event log of the application that is managing the server. For more information about event logs, see [“Event logs” on page 227](#)

Step 2. Check the power backplane LED to make sure it is lit (see [“Power backplane connectors” on page 33](#)). If not, press the switch to turn it on.

Step 3. Check for short circuits, for example, if a loose screw is causing a short circuit on a circuit board.

Step 4. Remove the adapters and disconnect the cables and power cords to all internal and external devices until the server is at the minimum configuration that is required for the server to start. See [“Specifications” on page 2](#) to determine the minimum configuration for your server.

Step 5. Reconnect all ac power cords and turn on the server. If the server starts successfully, reseat the adapters and devices one at a time until the problem is isolated.

If the server does not start from the minimum configuration, see [“Power supply LEDs” on page 231](#) to replace the components in the minimum configuration one at a time until the problem is isolated.

Resolving suspected Ethernet controller problems

The method that you use to test the Ethernet controller depends on which operating system you are using. See the operating-system documentation for information about Ethernet controllers, and see the Ethernet controller device-driver readme file.

Complete the following steps to attempt to resolve suspected problems with the Ethernet controller.

Step 1. Make sure that the correct device drivers, which come with the server are installed and that they are at the latest level.

Step 2. Make sure that the Ethernet cable is installed correctly.

- The cable must be securely attached at all connections. If the cable is attached but the problem remains, try a different cable.
- Make sure that the cable rating is applicable for the network speed selected. For example, an SFP+ cable is only suitable for 10G operation. An SFP25 cable is needed for 25G operation. Likewise for Base-T operation, a CAT5 cable is required for 1G Base-T operation while a CAT6 cable is required for 10G Base-T operation.

- Step 3. Set both the adapter port and the switch port to auto-negotiation. If auto-negotiation is not supported on one of the ports, try configuring both ports manually to match each other.
- Step 4. Check the Ethernet controller LEDs on the server. These LEDs indicate whether there is a problem with the connector, cable, or hub.

Although some adapters may vary, when installed vertically the adapter link LED is typically on the left of the port and the activity LED is typically on the right.

- The Ethernet link status LED is lit when the Ethernet controller receives a link indication from the switch. If the LED is off, there might be a defective connector or cable or a problem with the switch.
 - The Ethernet transmit/receive activity LED is lit when the Ethernet controller sends or receives data over the Ethernet network. If the Ethernet transmit/receive activity is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Step 5. Check the Network activity LED on the rear of the server. The Network activity LED is lit when data is active on the Ethernet network. If the Network activity LED is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Step 6. Check for operating-system-specific causes of the problem, and also make sure that the operating system drivers are installed correctly.
- Step 7. Make sure that the device drivers on the client and server are using the same protocol.

If the Ethernet controller still cannot connect to the network but the hardware appears to be working, the network administrator must investigate other possible causes of the error.

Troubleshooting by symptom

See this section to find solutions to problems that have identifiable symptoms.

To use the symptom-based troubleshooting information in this section, complete the following steps:

1. Check the event log of the application that is managing the server and follow the suggested actions to resolve any event codes.
 - If you are managing the server from the Lenovo XClarity Administrator, begin with the Lenovo XClarity Administrator event log.
 - If you are managing the server from the Chassis Management Module 2, begin with the Chassis Management Module 2 event log.
 - If you are using some other management application, begin with the Lenovo XClarity Controller event log.

For more information about event logs, see [“Event logs” on page 227](#)

2. Review this section to find the symptoms that you are experiencing and follow the suggested actions to resolve the issue.
3. If the problem persists, contact support (see [“Contacting Support” on page 263](#)).

Hard disk drive problems

Use this information to resolve issues related to the hard disk drives.

- [“Server cannot recognize a hard drive” on page 239](#)
- [“Multiple hard drives fail” on page 239](#)
- [“Multiple hard drives are offline” on page 240](#)
- [“A replacement hard disk drive does not rebuild” on page 240](#)

- “Green hard disk drive activity LED does not represent actual state of associated drive” on page 240
- “Yellow hard disk drive status LED does not represent actual state of associated drive” on page 240

Server cannot recognize a hard drive

Complete the following steps until the problem is solved.

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

Based on those tests:

- If the backplane 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.

Multiple hard drives fail

Complete the following steps until the problem is solved:

- View the Lenovo XClarity Controller event log for events related to power supplies or vibration issues and resolve those events.
- Make sure that the device drivers and firmware for the hard disk drive and server are at the latest level

Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

Multiple hard drives are offline

Complete the following steps until the problem is solved:

- View the Lenovo XClarity Controller event log for events related to power supplies or vibration issues and resolve those events.
- View the storage subsystem log for events related to the storage subsystem and resolve those events.

A replacement hard disk drive does not rebuild

Complete the following steps until the problem is solved:

1. Make sure that the hard disk drive is recognized by the adapter (the green hard disk drive activity LED is flashing).
2. Review the SAS/SATA RAID adapter documentation to determine the correct configuration parameters and settings.

Green hard disk drive activity LED does not represent actual state of associated drive

Complete the following steps until the problem is solved:

1. If the green hard disk drive activity LED does not flash when the drive is in use, run the diagnostics tests for the hard disk drives. When you start a server and press the key according to the on-screen instructions, the LXPM is displayed by default. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) You can perform hard drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → HDD test/Disk Drive Test.**
2. If the drive passes the test, replace the backplane.
3. If the drive fails the test, replace the drive.

Yellow hard disk drive status LED does not represent actual state of associated drive

Complete the following steps until the problem is solved:

1. Turn off the server.
2. Reseat the SAS/SATA adapter.
3. Reseat the backplane signal cable and backplane power cable.
4. Reseat the hard disk drive.
5. Power on the server and observe the activity of the hard disk drive LEDs.

Note: *Depending on the LXPM version, you may see **HDD test** or **Disk Drive Test**.

Fan problems

See this section to resolve issues related the to fans.

- [“Abnormally high RPM \(revolutions per minute\)” on page 241](#)

Abnormally high RPM (revolutions per minute)

Complete the following procedure to solve the problem.

1. Check to see if the system inlet perforation or heat sinks are clogged.
2. Make sure that all air baffles are correctly installed in the server.
3. Check the thermal grease on the processor , and make sure it's not contaminated.

Intermittent problems

Use this information to solve intermittent problems.

- “Intermittent external device problems” on page 241
- “Intermittent KVM problems” on page 241
- “Intermittent unexpected reboots” on page 241

Intermittent external device problems

Complete the following steps until the problem is solved.

1. Update the UEFI and XCC firmware to the latest versions.
2. Make sure that the correct device drivers are installed. See the manufacturer's website for documentation.
3. For a USB device:
 - a. Make sure that the device is configured correctly.

Restart the server and press the key according to the on-screen instructions to display the LXPM system setup interface. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) Then, click **System Settings** → **Devices and I/O Ports** → **USB Configuration**.

- b. Connect the device to another port. If using a USB hub, remove the hub and connect the device directly to the server. Make sure that the device is configured correctly for the port.

Intermittent KVM problems

Complete the following steps until the problem is solved.

Video problems:

1. Make sure that all cables and the console breakout cable are properly connected and secure.
2. Make sure that the monitor is working properly by testing it on another server.
3. Test the console breakout cable on a working server to ensure that it is operating properly. Replace the console breakout cable if it is defective.

Keyboard problems:

Make sure that all cables and the console breakout cable are properly connected and secure.

Mouse problems:

Make sure that all cables and the console breakout cable are properly connected and secure.

Intermittent unexpected reboots

Note: Some uncorrectable errors require that the server reboot so that it can disable a device, such as a memory DIMM or a processor to allow the machine to boot up properly.

1. If the reset occurs during POST and the POST watchdog timer is enabled, make sure that sufficient time is allowed in the watchdog timeout value (POST Watchdog Timer).

To check the POST watchdog time, restart the server and press the key according to the on-screen instructions to display the LXPM system setup interface. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) Then, click **BMC Settings → POST Watchdog Timer**.

2. If the reset occurs after the operating system starts, do one of the followings:
 - Enter the operating system when the system operates normally and set up operating system kernel dump process (Windows and Linux base operating systems will be using different method). Enter the UEFI setup menus and disable the feature, or disable it with the following OneCli command.
`OneCli.exe config set SystemRecovery.RebootSystemOnNMI Disable --bmc XCC_USER:XCC_PASSWORD@XCC_IPAddress`
 - Disable any automatic server restart (ASR) utilities, such as the Automatic Server Restart IPMI Application for Windows, or any ASR devices that are installed.
3. See the management controller event log to check for an event code that indicates a reboot. See “[Event logs](#)” on page 227 for information about viewing the event log. If you are using Linux base operating system, then capture all logs back to Lenovo support for further investigation.

Keyboard, mouse, KVM switch or USB-device problems

Use this information to solve problems related to a keyboard, mouse, KVM switch or USB-device problems.

- “[All or some keys on the keyboard do not work](#)” on page 242
- “[Mouse does not work](#)” on page 242
- “[KVM switch problems](#)” on page 242
- “[USB-device does not work](#)” on page 243

All or some keys on the keyboard do not work

1. Make sure that:
 - The keyboard cable is securely connected.
 - The server and the monitor are turned on.
2. If you are using a USB keyboard, run the Setup utility and enable keyboardless operation.
3. If you are using a USB keyboard and it is connected to a USB hub, disconnect the keyboard from the hub and connect it directly to the server.
4. Replace the keyboard.

Mouse does not work

1. Make sure that:
 - The mouse cable is securely connected to the server.
 - The mouse device drivers are installed correctly.
 - The server and the monitor are turned on.
 - The mouse option is enabled in the Setup utility.
2. If you are using a USB mouse and it is connected to a USB hub, disconnect the mouse from the hub and connect it directly to the server.
3. Replace the mouse.

KVM switch problems

1. Make sure that the KVM switch is supported by your server.

2. Make sure that the KVM switch is powered on correctly.
3. If the keyboard, mouse or monitor can be operated normally with direct connection to the server, then replace the KVM switch.

USB-device does not work

1. Make sure that:
 - The correct USB device driver is installed.
 - The operating system supports USB devices.
2. Make sure that the USB configuration options are set correctly in system setup.

Restart the server and press the key according to the on-screen instructions to display the LXPM system setup interface. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) Then, click **System Settings → Devices and I/O Ports → USB Configuration**.

3. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server.

Memory problems

See this section to resolve issues related to memory.

- [“Displayed system memory is less than installed physical memory” on page 243](#)
- [“Multiple memory modules in a channel identified as failing” on page 244](#)
- [“Attempt to change to another PMEM mode fails” on page 245](#)
- [“Extra namespace appears in an interleaved region” on page 245](#)
- [“Migrated PMEMs are not supported” on page 245](#)
- [“Invalid memory population detected” on page 246](#)
- [“PMEMs installed in wrong slots after system board replacement” on page 246](#)
- [“After PMEMs are reconfigured, error messages and LEDs persist to indicate PMEMs are installed in wrong slots” on page 246](#)
- [“Cannot create goal successfully when installing PMEMs to the system for the first time” on page 246](#)

Displayed system memory is less than installed physical memory

Complete the following procedure to solve the problem.

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

1. Make sure that:
 - No error LEDs are lit on the operator information panel.
 - No memory module error LEDs are lit on the system board.
 - Memory mirrored channel does not account for the discrepancy.
 - The memory modules are seated correctly.
 - You have installed the correct type of memory module (see “PMEM rules” in *Setup Guide* for requirements).
 - After changing or replacing a memory module, memory configuration is updated accordingly in the Setup Utility.
 - All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled.

- There is no memory mismatch when the server is at the minimum memory configuration.
- When PMEMs are installed:
 - a. If the memory is set in App Direct Mode, all the saved data have been backed up, and created namespaces are deleted before any PMEM is replaced or added.
 - b. Refer to “PMEM rules” in *Setup Guide* and see if the displayed memory fits the mode description.
 - c. If PMEMs are recently set in Memory Mode, turn it back to App Direct Mode and examine if there is namespace that has not been deleted.
 - d. Go to the Setup Utility, select **System Configuration and Boot Management → Intel Optane PMEMs → Security**, and make sure security of all the PMEM units is disabled.
- 2. Reseat the memory modules, and then restart the server.
- 3. Check the POST error log:
 - If a memory module was disabled by a systems-management interrupt (SMI), replace the memory module.
 - If a memory module was disabled by the user or by POST, reseat the memory module; then, run the Setup utility and enable the memory module.
- 4. Run memory diagnostics. When you start a solution and press F1, the LXPM interface is displayed by default. You can perform memory diagnostics with this interface. From the Diagnostic page, go to **Run Diagnostic → Memory test** or **PMEM test**.

Notes: When PMEMs are installed, run diagnostics based on the mode that is set presently:

- App Direct Mode:
 - Run Memory Test for DRAM memory modules.
 - Run PMEM Test for PMEMs.
 - Memory Mode:
 - Run both Memory Test and PMEM Test for PMEMs.
5. Reverse the modules between the channels (of the same processor), and then restart the server. If the problem is related to a memory module, replace the failing memory module.

Note: When PMEMs are installed, only adopt this method in Memory Mode.
 6. Re-enable all memory modules using the Setup utility, and then restart the server.
 7. (Trained technician only) Install the failing memory module into a memory module connector for processor 2 (if installed) to verify that the problem is not the processor or the memory module connector.
 8. (Trained technician only) Replace the system board.

Multiple memory modules in a channel identified as failing

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

Complete the following procedure to solve the problem.

1. Reseat the memory modules; then, restart the server.
2. Remove the highest-numbered memory module of those that are identified and replace it with an identical known good memory module; then, restart the server. Repeat as necessary. If the failures continue after all identified memory modules are replaced, go to step 4.
3. Return the removed memory modules, one at a time, to their original connectors, restarting the server after each memory module, until a memory module fails. Replace each failing memory module with an

identical known good memory module, restarting the server after each memory module replacement. Repeat step 3 until you have tested all removed memory modules.

4. Replace the highest-numbered memory module of those identified; then, restart the server. Repeat as necessary.
5. Reverse the memory modules between the channels (of the same processor), and then restart the server. If the problem is related to a memory module, replace the failing memory module.
6. (Trained technician only) Install the failing memory module into a memory module connector for processor 2 (if installed) to verify that the problem is not the processor or the memory module connector.
7. (Trained technician only) Replace the system board.

Attempt to change to another PMEM mode fails

After the PMEM mode is changed and the system is successfully restarted, if the PMEM mode stays the same instead of being changed, check the DRAM DIMMs and PMEM capacity to see if it meets the requirement of the new mode (see “PMEM rules” in *Setup Guide*).

Extra namespace appears in an interleaved region

If there are two created namespaces in one interleaved region, VMware ESXi ignores the created namespaces and creates an extra new namespace during system booting. Delete the created namespaces in either the Setup Utility or the operating system before the first booting with ESXi.

Migrated PMEMs are not supported

Intel Optane PMEM interleave set (DIMM X) is migrated from another system (Platform ID: 0x00), these migrated PMEMs are not supported nor warranted in this system.

If this warning message appears, complete the following steps:

1. Move the modules back to the original system with the exact same configuration as the previous one.
2. Back up stored data in PMEM namespaces.
3. Disable PMEM security with one of the following options:

- **LXPM**

Go to **UEFI Setup → System Settings → Intel Optane PMEMs → Security → Press to Disable Security**, and input passphrase to disable security.

- **Setup Utility**

Go to **System Configuration and Boot Management → System Settings → Intel Optane PMEMs → Security → Press to Disable Security**, and input passphrase to disable security.

4. Delete namespaces with command corresponding to the operating system that is installed:

- **Linux** command:

```
ndctl destroy-namespace all -f
ndctl destroy-namespace all -f
```

- **Windows** Powershell command

```
Get-PmemDisk | Remove-PmemDisk
```

5. Clear Platform Configuration Data (PCD) and Namespace Label Storage Area (LSA) with the following `ipmctl` command (for both Linux and Windows).

```
ipmctl delete -pcd
```

Notes: See the following links to learn how to download and use `ipmctl` in different operating systems:

- Windows: <https://datacentersupport.lenovo.com/us/en/videos/YTV101407>
- Linux: <https://datacentersupport.lenovo.com/us/en/solutions/HT508642>

6. Reboot the system, and press F1 to enter Setup Utility.
7. Power off the system.
8. Remove the modules to be reused for a new system or configuration.

Invalid memory population detected

Invalid memory population (unsupported DIMM population) detected. Please verify memory configuration is valid.

If this warning message appears, complete the following steps:

1. See “Memory module installation rules and order” in *Setup Guide* to make sure the present memory module population sequence is supported.
2. If the present sequence is indeed supported, see if any of the modules is displayed as “disabled” in Setup Utility.
3. Reseat the module that is displayed as “disabled,” and reboot the system.
4. If the problem persists, replace the memory module.

PMEMs installed in wrong slots after system board replacement

DIMM X of Intel Optane PMEM persistent interleave set should be moved to DIMM Y.

If this warning message appears, complete the following steps:

1. Record each of the instructions of changing PMEM slot from XCC events.
2. Power off the system, and remove the PMEMs that are mentioned in the warning messages. It is suggested to label these PMEMs to avoid confusion.
3. Install the PMEMs in the correct slot number indicated in the warning messages. Remove the labels to avoid blocking airflow and cooling.
4. Complete replacement and power on the system. Make sure there is no similar warning messages in XCC.

Note: Do not perform any provisioning on PMEM to avoid data lost when the messages are still present in XCC events.

After PMEMs are reconfigured, error messages and LEDs persist to indicate PMEMs are installed in wrong slots

AC the system or restart XCC to solve this problem.

Cannot create goal successfully when installing PMEMs to the system for the first time

When seeing ones of the following messages:

- ERROR: Cannot retrieve memory resources info
- ERROR: One or more PMEM modules do not have PCD data. A platform reboot is recommended to restore valid PCD data.

Complete the following steps to solve the problem.

1. If the PMEMs have been installed in another system with stored data, perform the following steps to erase the data.
 - a. Based on the original population order, install the PMEMs to the original system where they were installed previously, and back up the data from the PMEMs to other storage devices.
 - b. Disable PMEM security with one of the following options:

- **LXPM**

Go to **UEFI Setup → System Settings → Intel Optane PMEMs → Security → Press to Disable Security**, and input passphrase to disable security.

- **Setup Utility**

Go to **System Configuration and Boot Management → System Settings → Intel Optane PMEMs → Security → Press to Disable Security**, and input passphrase to disable security.

c. Delete namespaces with command corresponding to the operating system that is installed:

- **Linux** command:

```
ndctl destroy-namespace all -f
ndctl destroy-namespace all -f
```

- **Windows** Powershell command

```
Get-PmemDisk | Remove-PmemDisk
```

d. Clear Platform Configuration Data (PCD) and Namespace Label Storage Area (LSA) with the following ipmctl command (for both Linux and Windows).

```
ipmctl delete -pcd
```

Notes: See the following links to learn how to download and use ipmctl in different operating systems:

- Windows: <https://datacentersupport.lenovo.com/us/en/videos/YTV101407>
- Linux: <https://datacentersupport.lenovo.com/us/en/solutions/HT508642>

2. Install the PMEMs back to the target system, and upgrade system firmware to the latest version without entering Setup Utility.
3. If the problem persists, overwrite PMEMs with the following ndctl command.

```
ndctl sanitize-dimm --overwrite all
```
4. Monitor the overwrite status with the following command.

```
watch -n 1 "ipmctl show -d OverwriteStatus -dimm"
```
5. When seeing all PMEM OverwriteStatus=Completed, reboot the system and see if the problem persists.

Monitor and video problems

See this section to solve problems related to a monitor or video.

- [“Incorrect characters are displayed” on page 247](#)
- [“Screen is blank” on page 248](#)
- [“Screen goes blank when you start some application programs” on page 248](#)
- [“The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.” on page 248](#)
- [“The wrong characters appear on the screen” on page 248](#)
- [“Management controller remote presence cannot work” on page 249](#)

Incorrect characters are displayed

Complete the following steps:

1. Verify that the language and locality settings are correct for the keyboard and operating system.
2. If the wrong language is displayed, update the server firmware to the latest level. See [“Firmware updates” on page 8](#).

Screen is blank

1. If the server is attached to a KVM switch, bypass the KVM switch to eliminate it as a possible cause of the problem: connect the monitor cable directly to the correct connector on the rear of the server.
2. If the server installed with the graphical adapters while turning on the server, the Lenovo logo displays on the screen after approximately 3 minutes. This is normal operation while the system loads.
3. Make sure that:
 - The server is turned on and there is power supplied to the server.
 - The monitor cables are connected correctly.
 - The monitor is turned on and the brightness and contrast controls are adjusted correctly.
4. Make sure that the correct server is controlling the monitor, if applicable.
5. Make sure that the video output is not affected by corrupted server firmware; see [“Firmware updates” on page 8](#).
6. If the problem remains, contact Lenovo Support.

Screen goes blank when you start some application programs

1. Make sure that:
 - The application program is not setting a display mode that is higher than the capability of the monitor.
 - You installed the necessary device drivers for the application.

The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.

1. If the monitor self-tests show that the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescents, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor.

Attention: Moving a color monitor while it is turned on might cause screen discoloration.

Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor.

Notes:

- a. To prevent diskette drive read/write errors, make sure that the distance between the monitor and any external diskette drive is at least 76 mm (3 in.).
 - b. Non-Lenovo monitor cables might cause unpredictable problems.
2. Reseat the monitor cable.
 3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time:
 - a. Monitor cable
 - b. Video adapter (if one is installed)
 - c. Monitor
 - d. (Trained technician only) System board.

The wrong characters appear on the screen

Complete the following steps until the problem is solved:

1. Verify that the language and locality settings are correct for the keyboard and operating system.
2. If the wrong language is displayed, update the server firmware to the latest level. See [“Firmware updates” on page 8](#).

Management controller remote presence cannot work

The management controller remote presence function is unable to display the system screen when an optional video adapter is present. To use the management controller remote presence function, remove the optional video adapter or use the onboard VGA as the display device.

Network problems

See this section to resolve issues related to networking.

- [“Could not log in using LDAP account with SSL enabled” on page 249](#)
- [“Network connection is lost or with degraded performance” on page 249](#)
- [“Network settings can not be changed” on page 249](#)

Could not log in using LDAP account with SSL enabled

Complete the following procedure to solve the problem:

1. Make sure that the license key is valid.
2. Generate a new license key and log in again.

Network connection is lost or with degraded performance

Complete the following procedure to solve the problem:

1. Network connection may be lost or with degraded performance with exposure to conducted and/or radiated frequency. Take appropriate actions in this case.

Network settings can not be changed

Complete the following procedure to solve the problem:

1. Go to **Setup Utility → BMC Settings → Network Settings**, and check if the system is configured as following:
 - In **Network Interface Port**, **Dedicated** is set.
 - In **Fail-over Rule**, **Failover to Shared NIC** is set.
 - In **Failed over to Shared NIC → Network Settings**, **Independence** is set.
2. If the system is indeed configured so, go to **Setup Utility → BMC Settings → Network Settings → Network Interface Port**, and select **Shared NIC**.
3. Change network settings as you plan, and save the settings.
4. Go to **Setup Utility → BMC Settings → Network Settings → Network Interface Port**, and select **Dedicated**.

Observable problems

Use this information to solve observable problems.

- [“Server hangs during the UEFI boot process” on page 250](#)
- [“The server immediately displays the POST Event Viewer when it is turned on” on page 250](#)
- [“Server is unresponsive \(POST is complete and operating system is running\)” on page 250](#)
- [“Server is unresponsive \(POST failed and cannot start System Setup\)” on page 251](#)
- [“Voltage planar fault is displayed in the event log” on page 251](#)
- [“Unusual smell” on page 251](#)
- [“Server seems to be running hot” on page 251](#)

- “Cannot enter legacy mode after installing a new adapter” on page 252
- “Cracked parts or cracked chassis” on page 252

Server hangs during the UEFI boot process

If the system hangs during the UEFI boot process with the message UEFI: DXE INIT on the display, make sure that Option ROMs were not configured with a setting of **Legacy**. You can remotely view the current settings for Option ROMs by running the following command using the Lenovo XClarity Essentials OneCLI:

```
onecli config show EnableDisableAdapterOptionROMSupport --bmc xcc_userid:xcc_password@xcc_ipaddress
```

To recover a system that hangs during the boot process with Legacy Option ROM settings, see the following Tech Tip:

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

If legacy Option ROMs must be used, do not set slot Option ROMs to **Legacy** on the Devices and I/O Ports menu. Instead, set slot Option ROMs to **Auto** (the default setting), and set the System Boot Mode to **Legacy Mode**. Legacy option ROMs will be invoked shortly before the system boots.

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

Complete the following steps until the problem is solved.

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

You can view processor details from system setup.

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

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

Server is unresponsive (POST is complete and operating system is running)

Complete the following steps until the problem is solved.

- If you are in the same location as the compute node, complete the following steps:
 1. If you are using a KVM connection, make sure that the connection is operating correctly. Otherwise, make sure that the keyboard and mouse are operating correctly.
 2. If possible, log in to the compute node and verify that all applications are running (no applications are hung).
 3. Restart the compute node.
 4. If the problem remains, make sure that any new software has been installed and configured correctly.
 5. Contact your place of purchase of the software or your software provider.
- If you are accessing the compute node from a remote location, complete the following steps:
 1. Make sure that all applications are running (no applications are hung).
 2. Attempt to log out of the system and log back in.

3. Validate the network access by pinging or running a trace route to the compute node from a command line.
 - a. If you are unable to get a response during a ping test, attempt to ping another compute node in the enclosure to determine whether it is a connection problem or compute node problem.
 - b. Run a trace route to determine where the connection breaks down. Attempt to resolve a connection issue with either the VPN or the point at which the connection breaks down.
4. Restart the compute node remotely through the management interface.
5. If the problem remains, verify that any new software has been installed and configured correctly.
6. Contact your place of purchase of the software or your software provider.

Server is unresponsive (POST failed and cannot start System Setup)

Configuration changes, such as added devices or adapter firmware updates, and firmware or application code problems can cause the server to fail POST (the power-on self-test).

If this occurs, the server responds in either of the following ways:

- The server restarts automatically and attempts POST again.
- The server hangs, and you must manually restart the server for the server to attempt POST again.

After a specified number of consecutive attempts (automatic or manual), the server reverts to the default UEFI configuration and starts System Setup so that you can make the necessary corrections to the configuration and restart the server. If the server is unable to successfully complete POST with the default configuration, there might be a problem with the system board.

You can specify the number of consecutive restart attempts in System Setup. Restart the server and press the key according to the on-screen instructions to display the LXPM system setup interface. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) Then, click **System Settings** → **Recovery and RAS** → **POST Attempts** → **POST Attempts Limit**. Available options are 3, 6, 9, and disable.

Voltage planar fault is displayed in the event log

Complete the following steps until the problem is solved.

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

Unusual smell

Complete the following steps until the problem is solved.

1. An unusual smell might be coming from newly installed equipment.
2. If the problem remains, contact Lenovo Support.

Server seems to be running hot

Complete the following steps until the problem is solved.

Multiple compute nodes or chassis:

1. Make sure that the room temperature is within the specified range (see “Specifications” on page 2).

2. Make sure that the fans are installed correctly.
3. Update the UEFI and XCC to the latest versions.
4. Make sure that the fillers in the server are installed correctly (see *Maintenance Manual* for detailed installation procedures).
5. Use the IPMI command to ramp up the fan speed to the full fan speed to see whether the issue can be resolved.

Note: The IPMI raw command should only be used by trained technician and the each system has its own specific PMI raw command.

6. Check the management processor event log for rising temperature events. If there are no events, the compute node is running within normal operating temperatures. Note that you can expect some variation in temperature.

Cannot enter legacy mode after installing a new adapter

Complete the following procedure to solve the problem.

1. Go to **UEFI Setup → Devices and I/O Ports → Set Option ROM Execution Order**.
2. Move the RAID adapter with operation system installed to the top of the list.
3. Select **Save**.
4. Reboot the system and auto boot to operation system.

Cracked parts or cracked chassis

Contact Lenovo Support.

Optional-device problems

Use this information to solve problems related to optional devices.

- [“External USB device is not recognized” on page 252](#)
- [“PCIe adapter is not recognized or is not functioning” on page 252](#)
- [“Insufficient PCIe resources are detected.” on page 253](#)
- [“A Lenovo optional device that was just installed does not work.” on page 253](#)
- [“A Lenovo optional device that worked previously does not work now” on page 254](#)

External USB device is not recognized

Complete the following steps until the problem is resolved:

1. Update the UEFI firmware to the latest version.
2. Make sure that the proper drivers are installed on the compute node. See the product documentation for the USB device for information about device drivers.
3. Use the Setup utility to make sure that the device is configured correctly.
4. If the USB device is plugged into a hub or the console breakout cable, unplug the device and plug it directly into the USB port on the front of the compute node.

PCIe adapter is not recognized or is not functioning

Complete the following steps until the problem is resolved:

1. Update the UEFI firmware to the latest version.
2. Check the event log and resolve any issues related to the device.

3. Validate that the device is supported for the server (see <https://serverproven.lenovo.com/>). Make sure that the firmware level on the device is at the latest supported level and update the firmware if applicable.
4. Make sure that the adapter is installed in a correct slot.
5. Make sure that the proper device drivers are installed for the device.
6. Resolve any resource conflicts if running legacy mode (UEFI). Check legacy ROM boot orders and modify the UEFI setting for MM config base.

Note: Ensure that you modify the ROM boot order associated with the PCIe adapter to the first execution order.

7. Check <http://datacentersupport.lenovo.com> for any tech tips (also known as retain tips or service bulletins) that might be related to the adapter.
8. Ensure any adapter external connections are correct and that the connectors are not physically damaged.
9. Make sure that the PCIe adapter is installed with the supported operating system.

Insufficient PCIe resources are detected.

If you see an error message stating “Insufficient PCI Resources Detected,” complete the following steps until the problem is resolved:

1. Press Enter to access System Setup Utility.
2. Select **System Settings → Devices and I/O Ports → MM Config Base**; then, modify the setting to increase the device resources. For example, modify 3 GB to 2 GB or modify 2 GB to 1 GB.
3. Save the settings and restart the system.
4. If the error recurs with the highest device resource setting (1GB), shutdown the system and remove some PCIe devices; then, power on the system.
5. If the reboot failed, repeat step 1 to step 4.
6. If the error recurs, press Enter to access System Setup Utility.
7. Select **System Settings → Devices and I/O Ports → PCI 64-Bit Resource Allocation**, then; modify the setting from **Auto** to **Enable**.
8. If the Boot Device does not support MMIO above 4GB for Legacy Boot, use UEFI Boot Mode or remove/disable some PCIe devices.
9. DC cycle the system and ensure the system is enter UEFI boot menu or the operating system; then, capture the FFDC log.
10. Contact Lenovo technical support.

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

1. Make sure that:
 - The device is supported for the server (see <https://serverproven.lenovo.com/>).
 - You followed the installation instructions that came with the device and the device is installed correctly.
 - You have not loosened any other installed devices or cables.
 - You updated the configuration information in system setup. When you start a server and press the key according to the on-screen instructions to display the Setup Utility. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) Whenever memory or any other device is changed, you must update the configuration.
2. Reseat the device that you have just installed.
3. Replace the device that you have just installed.
4. Reseat the cable connection and check there is no physical damage to the cable.

5. If there is any cable damages, then replace the cable.

A Lenovo optional device that worked previously does not work now

1. Make sure that all of the cable connections for the device are secure.
2. If the device comes with test instructions, use those instructions to test the device.
3. Reseat the cable connection and check if any physical parts have been damaged, .
4. Replace the cable.
5. Reseat the failing device.
6. Replace the failing device.

Power on and power off problems

See this section to resolve issues when powering on or powering off the server.

- [“Embedded hypervisor is not in the boot list” on page 254](#)
- [“Server does not power on” on page 254](#)
- [“Server does not power off” on page 255](#)
- [“Unexpected shutdown with LED not lit” on page 255](#)

Embedded hypervisor is not in the boot list

Complete the following steps until the problem is resolved:

1. Make sure that the optional embedded hypervisor flash device is selected on the boot manager <F12> Select Boot Device at startup.
2. Make sure that the embedded hypervisor flash device is seated in the connector correctly.
3. See the documentation that comes with the optional embedded hypervisor flash device to validate that the device is configured correctly.
4. Make sure that other software works on the server.

Server does not power on

Complete the following steps until the problem is resolved:

Note: The power-control button will not function until approximately 5 to 10 seconds after the server has been connected to power.

1. Make sure that the power-control button is working correctly:
 - a. Disconnect the server power cords.
 - b. Reconnect the power cords.
 - c. (Trained technician only) Reseat the operator information panel cable, and then repeat steps 1a and 1b.
 - (Trained technician only) If the server starts, reseat the operator information panel. If the problem remains, replace the operator information panel.
 - If the server does not start, bypass the power-control button by using the force power-on jumper. If the server starts, reseat the operator information panel. If the problem remains, replace the operator information panel.
2. Make sure that the reset button is working correctly:
 - a. Disconnect the server power cords.
 - b. Reconnect the power cords.

- c. (Trained technician only) Reseat the operator information panel cable, and then repeat steps 2a and 2b.
 - (Trained technician only) If the server starts, replace the operator information panel.
 - If the server does not start, go to step 3.
3. Make sure that both power supplies installed in the server are of the same type. Mixing different power supplies in the server will cause a system error (the system-error LED on the front panel turns on).
4. Make sure that:
 - The power cords are correctly connected to the server and to a working electrical outlet.
 - The type of memory that is installed is correct.
 - The DIMMs are fully seated.
 - The LEDs on the power supply do not indicate a problem.
 - The processors are installed in the correct sequence.
5. Reseat the following components:
 - a. Operator information panel connector
 - b. Power supplies
6. Replace the following components, restarting the server each time:
 - a. Operator information panel connector
 - b. Power supplies
7. If you just installed an optional device, remove it, and restart the server. If the server now starts, you might have installed more devices than the power supply supports.
8. See [“Power supply LEDs” on page 231](#).

Server does not power off

Complete the following steps until the problem is resolved:

1. Determine whether you are using an Advanced Configuration and Power Interface (ACPI) or a non-ACPI operating system. If you are using a non-ACPI operating system, complete the following steps:
 - a. Press Ctrl+Alt+Delete.
 - b. Turn off the server by pressing the power-control button and holding it down for 5 seconds.
 - c. Restart the server.
 - d. If the server fails POST and the power-control button does not work, disconnect the power cord for 20 seconds; then, reconnect the power cord and restart the server.
2. If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.

Unexpected shutdown with LED not lit

Complete the following steps until the problem is resolved:

1. Check the XCC event log, and resolve related errors if found any.
2. Reseat power supply.
3. If the error recurs, replace power supply.

Processor problems

See this section to solve problems related to a monitor or video.

- [“The server goes directly to the POST event viewer when it is turned on.” on page 256](#)

The server goes directly to the POST event viewer when it is turned on.

1. Check the light path diagnostics LEDs and the XCC event log, and resolve any errors that have occurred.
2. Make sure that the server supports all the processors and that the processors match in speed and cache size. You can view processor details from system setup. To determine if the processor is supported for the server, see <https://serverproven.lenovo.com/>
3. (Trained technician only) Make sure that processor 1 is seated correctly
4. (Trained technician only) Remove processor 2 and restart the server. (3 and 4)
5. Replace the following components one at a time, in the order shown, restarting the server each time:
 - a. (Trained technician only) Processor
 - b. (Trained technician only) System board

Serial-device problems

See this section to solve problems with serial ports or devices.

- [“Number of displayed serial ports is less than the number of installed serial ports” on page 256](#)
- [“Serial device does not work” on page 256](#)

Number of displayed serial ports is less than the number of installed serial ports

Complete the following procedure to solve the problem.

1. Make sure that:
 - Each port is assigned a unique address in the Setup utility and none of the serial ports is disabled.
 - The serial-port adapter (if one is present) is seated correctly
2. Reseat the serial port adapter.
3. Replace the serial port adapter.

Serial device does not work

Complete the following procedure to solve the problem.

1. Make sure that:
 - The device is compatible with the server.
 - The serial port is enabled and is assigned a unique address.
 - The device is connected to the correct connector.
2. Reseat the following components::
 - a. Failing serial device.
 - b. Serial cable.
3. Replace the following components:
 - a. Failing serial device.
 - b. Serial cable.
4. (Trained technician only) Replace the system board.

Software problems

See this section to solve software problems.

1. To determine whether the problem is caused by the software, make sure that:
 - The server has the minimum memory that is needed to use the software. For memory requirements, see the information that comes with the software.

Note: If you have just installed an adapter or memory, the server might have a memory-address conflict.

- The operating system is on the ServerProven list (see <https://serverproven.lenovo.com/>) and supported by your hardware.
 - The software is designed to operate on the server.
 - Other software works on the server.
 - The software works on another server.
2. If you receive any error messages while you use the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem.
 3. Check the operating system logs for any events related to your software and attempt to resolve them.
 4. Contact your place of purchase of the software.

Appendix A. Hardware disassembling for recycle

Follow the instructions in this section to recycle components with compliance with local laws or regulations.

Disassemble the server for chassis recycle

Follow the instructions in this section to disassemble the server before recycling the chassis.

About this task

Attention:

- Go over [“Installation Guidelines” on page 109](#) to ensure that you work safely.
- Turn off the server and peripheral devices and disconnect the power cords and all external cables (see [“Power off the server” on page 13](#)).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.

- Step 1. Remove the security bezel (see [“Remove the security bezel” on page 203](#)).
- Step 2. Remove all the installed drives and fillers (see [“Remove a 2.5-inch hot-swap drive” on page 112](#) and [“Remove a 7mm drive” on page 117](#)).
- Step 3. Remove all the installed power supply units and fillers (see [“Remove a hot-swap power supply unit” on page 175](#)).
- Step 4. Remove the top cover (see [“Remove the top cover” on page 219](#)).
- Step 5. Remove the system board air baffle (see [“Remove the system board air baffle” on page 205](#)) or the processor and memory expansion tray and the expansion tray air baffle (see [“Remove the processor and memory expansion tray” on page 195](#)).
- Step 6. Remove the fan cage assembly (see [“Remove the fan cage assembly” on page 131](#)).
- Step 7. Remove the external LCD diagnostics handset (see [“Remove the external LCD diagnostics handset” on page 127](#)).
- Step 8. Remove both PCIe riser card assemblies (see [“Remove the PCIe riser assembly” on page 160](#)).
- Step 9. Remove all the adapters that are installed on the system board (see [“Remove an adapter” on page 163](#) and [“Remove the OCP Ethernet adapter” on page 158](#)).
- Step 10. Remove the memory modules that are installed on the system board (see [“Remove a memory module” on page 151](#)).
- Step 11. Remove both PHMs that are installed on the system board (see [“Remove a processor and heat sink” on page 182](#)).
- Step 12. Remove the power backplane from the system board (see [“Remove the power backplane” on page 171](#)).
- Step 13. Remove the system board (see [“Remove the system board” on page 207](#)).

After disassembling the server, recycle the unit in compliance with local regulations.

Appendix B. 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: This section includes references to IBM web sites and information about obtaining service. 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://serverproven.lenovo.com/> 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.

- **Lenovo XClarity Controller**

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

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

- **Lenovo XClarity Administrator**

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

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

- **Lenovo XClarity Essentials OneCLI**

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

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

Contacting Support

You can contact Support to obtain help for your issue.

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

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Important notes

Processor speed indicates the internal clock speed of the processor; 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 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 drive capacities assume the replacement of any standard drives and population of all drive bays with the largest currently supported drives that are available from Lenovo.

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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.

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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.

Taiwan Region 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	-	○	○	○	○	○
印刷電路板	-	○	○	○	○	○

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 Region import and export contact information

Contacts are available for Taiwan Region 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

Index

B

board internal connectors 29, 33, 35

C

cable routing
drive 47, 50, 52, 66, 72–73, 81, 90, 96, 102
cables
connecting and routing to the server 47
chassis 259
collecting service data 262
completing
parts replacement 223
connecting cables
to the server 47
connectors 29, 33, 35
connectors, internal system board 30
connectors, processor and memory expansion tray 32
creating a personalized support web page 261
custom support web page 261

D

devices, static-sensitive
handling 112
diagnostics panel
LCD 19
disassembling 259
drive
cable routing 47, 50, 52, 66, 72–73, 81, 90, 96, 102
drive backplane 33

E

enable
TPM 216
Ethernet
controller
troubleshooting 237
Ethernet controller problems
solving 237
External
LCD diagnostics handset 19

F

fan problems 240
firmware
update 8
firmware updates 8
force NMI button
function 38
front view
LED location 17
front view of the server 17

G

Getting help 261
guidelines
options installation 109

system reliability 111

H

handling static-sensitive devices 112
hard disk drive problems 238
hardware service and support telephone numbers 263
help 261

I

important notices 266
installation
guidelines 109
installation guidelines 109
internal, PCIe riser card connectors 35
internal, power backplane connectors 33
internal, processor and memory expansion tray 32
internal, system board connectors 29–30
Introduction 1

K

keyboard problems 242

L

LCD
diagnostics panel 19
LCD diagnostics handset
External 19
LEDs
on the system board 39
processor and memory expansion tray 40

M

monitor problems 247, 255
mouse problems 242

N

network
problems 249
NMI button 38
notes, important 266
notices 265

P

parts list 41
parts replacement, completing 223
power cords 45
power off the server 13
power on the server 12
power problems 237
problems
Ethernet controller 237
fan 240

- hard disk drive 238
- keyboard 242
- monitor 247, 255
- mouse 242
- network 249
- power 237
- serial-device 256
- software 256
- USB device 242
- video 247, 255
- processor and memory expansion tray 259
- Processor and memory expansion tray connector 32

R

- recycle 259
- recycling 259
- routing the server cables 47

S

- safety iii
- safety inspection checklist iv, 110
- security advisories 12
- serial-device problems 256
- server, front view 17
- service and support
 - before you call 261
 - hardware 263
 - software 263
- service data 262
- software problems 256
- software service and support telephone numbers 263
- solving
 - Ethernet controller problems 237
- solving power problems 237
- static-sensitive devices
 - handling 112
- support web page, custom 261
- system board 259
 - LEDs 39–40
- System board
 - LED 234

- system board internal connectors 30
- system reliability guidelines 111

T

- Taiwan Region BSMI RoHS declaration 267
- Taiwan Region import and export contact information 267
- Tech Tips 12
- telecommunication regulatory statement 266
- telephone numbers 263
- TPM 216
- TPM 2.0 firmware 217
- TPM version 217
- trademarks 266
- troubleshooting 247, 255–256
 - by symptom 238
 - fan problems 240
 - hard disk drive problems 238
 - keyboard problems 242
 - mouse problems 242
 - network problems 249
 - serial-device problems 256
 - symptoms-based troubleshooting 238
 - USB-device problems 242
 - video 247, 255
- Trusted Platform Module 216

U

- update 217
- USB-device problems 242

V

- video problems 247, 255

W

- working inside the server
 - power on 111

Lenovo