



ThinkSystem SR950 V3 User Guide



Machine Type: 7DC4, 7DC5, and 7DC6

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>

Fifth Edition (April 2024)

© Copyright Lenovo 2023, 2024.

LIMITED AND RESTRICTED RIGHTS NOTICE: If data or software is delivered pursuant to a General Services Administration (GSA) contract, use, reproduction, or disclosure is subject to restrictions set forth in Contract No. GS-35F-05925.

Contents

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

Safety	v
-------------------------	----------

Safety inspection checklist	vi
---------------------------------------	----

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

Features	1
--------------------	---

Tech Tips	2
---------------------	---

Security advisories	3
-------------------------------	---

Specifications	3
--------------------------	---

Technical specifications	3
------------------------------------	---

Mechanical specifications	6
-------------------------------------	---

Environmental specifications	7
--	---

Management options	9
------------------------------	---

Chapter 2. Server components	13
---	-----------

Front view	13
----------------------	----

Rear view	17
---------------------	----

Top view	18
--------------------	----

Upper processor board (CPU BD) connectors	19
---	----

Upper processor board (CPU BD) switches	20
---	----

System I/O board and interposer assembly connectors	22
---	----

System I/O board and interposer assembly switches	23
---	----

Lower processor board (MB) connectors	24
---	----

Lower processor board (MB) switches	25
---	----

System LEDs and diagnostics display	28
---	----

Chapter 3. Parts list	31
--	-----------

Power cords	33
-----------------------	----

Chapter 4. Unboxing and setup	35
--	-----------

Server package contents	35
-----------------------------------	----

Identify the server and access the Lenovo XClarity Controller	35
---	----

Server setup checklist	38
----------------------------------	----

Chapter 5. Hardware replacement procedures	41
---	-----------

Installation Guidelines	41
-----------------------------------	----

Safety inspection checklist	42
---------------------------------------	----

System reliability guidelines	43
---	----

Working inside the server with the power on	43
---	----

Handling static-sensitive devices	44
---	----

Memory module installation rules and order	44
--	----

Independent memory mode installation order	47
--	----

Memory mirroring mode installation order	49
--	----

Power on and power off the server	49
---	----

Power on the server	49
-------------------------------	----

Power off the server	50
--------------------------------	----

Server replacement	50
------------------------------	----

Remove the server from rails	50
--	----

Install the server to rails	59
---------------------------------------	----

Remove the rails from the rack	69
--	----

Air baffle replacement	71
----------------------------------	----

Remove the upper processor board (CPU BD) air baffle	71
--	----

Install the upper processor board (CPU BD) air baffle	73
---	----

Remove the lower processor board (MB) air baffle	75
--	----

Install the lower processor board (MB) air baffle	76
---	----

CMOS battery (CR2032) replacement	78
---	----

Remove the CMOS battery (CR2032)	78
--	----

Install the CMOS battery (CR2032)	81
---	----

Drive replacement	83
-----------------------------	----

Remove a hot-swap drive	83
-----------------------------------	----

Install a hot-swap drive	86
------------------------------------	----

Drive backplane replacement	88
---------------------------------------	----

Remove a drive backplane	88
------------------------------------	----

Install a drive backplane	90
-------------------------------------	----

Drive cage replacement	91
----------------------------------	----

Remove a drive cage	91
-------------------------------	----

Install a drive cage	93
--------------------------------	----

E3.S cable assembly replacement	95
---	----

Remove an E3.S cable assembly	95
---	----

Install an E3.S cable assembly	96
--	----

EIA flange replacement	97
----------------------------------	----

Remove an EIA flange	97
--------------------------------	----

Install an EIA flange	98
---------------------------------	----

Ethernet port assembly replacement	99
--	----

Remove the Ethernet port assembly	99
---	----

Install the Ethernet port assembly	101
--	-----

Fan and fan cage replacement	103
--	-----

Remove a fan module	103
-------------------------------	-----

Remove the fan cage	104
-------------------------------	-----

Install the fan cage	106
--------------------------------	-----

Install a fan module	108
--------------------------------	-----

Flash power module replacement	109
--	-----

Remove a flash power module	109
---------------------------------------	-----

Install a flash power module	111
--	-----

Front operator panel replacement	113
--	-----

Remove the front operator panel	113	Remove the security bezel	200
Install the front operator panel	115	Install the security bezel	201
Intrusion switch replacement	118	Serial port assembly replacement	204
Remove the top cover intrusion switch	118	Remove the serial port assembly	204
Install the top cover intrusion switch	119	Install the serial port assembly	205
Remove the front intrusion switch	121	Sideband card replacement	207
Install the front intrusion switch	123	Remove the sideband card	207
Lower processor board (MB) replacement (trained technician only)	125	Install the sideband card	209
Remove the lower processor board (MB)	125	Support bracket replacement	211
Install the lower processor board (MB)	130	Remove the support bracket	211
M.2 drive and M.2 boot adapter replacement	134	Install the support bracket	213
Remove an M.2 drive	134	System I/O board and interposer board replacement (trained technician only)	214
Remove the M.2 boot adapter	136	Remove the Firmware and RoT Security Module	214
Install the M.2 boot adapter	138	Install the Firmware and RoT Security Module	216
Adjust the M.2 retainer	140	Remove the system I/O board and interposer board	218
Install an M.2 drive	143	Install the system I/O board and interposer board	223
Memory module replacement	146	Update the Vital Product Data (VPD)	229
Remove a memory module	146	Hide/observe TPM	230
Install a memory module	148	Update the TPM firmware	231
MicroSD card replacement	151	Enable UEFI Secure Boot	232
Remove the MicroSD card	151	Top cover replacement	233
Install the MicroSD card	152	Remove the front top cover	233
OCP module and cage replacement	154	Remove the rear top cover	235
Remove the OCP module	154	Install the rear top cover	236
Remove the OCP cage	155	Install the front top cover	239
Install the OCP cage	157	UPI module replacement	241
Install the OCP module	159	Remove the UPI module	241
PCIe adapter replacement	161	Install the UPI module	244
Remove a PCIe adapter	161	Upper processor board (CPU BD) replacement	247
Install a PCIe adapter	164	Remove the upper processor board (CPU BD)	247
PCIe riser card replacement	168	Install the upper processor board (CPU BD)	252
Remove the PCIe riser card	168	Complete the parts replacement	256
Install the PCIe riser card	171		
Power distribution board replacement	175	Chapter 6. Internal cable routing	259
Remove the power distribution board	175	Identifying connectors	259
Install the power distribution board	178	2.5-inch drive backplane connectors	259
Power interposer board replacement	181	Upper processor board (CPU BD) connectors for cable routing	259
Remove the power interposer board	181	System I/O board and interposer assembly connectors for cable routing	260
Install the power interposer board	183	Lower processor board (MB) connectors for cable routing	261
Power supply unit replacement	184	Power distribution board connectors	262
Remove a hot-swap power supply unit	184	PCIe riser connectors	263
Install a hot-swap power supply unit	186	2.5-inch drive backplane cable routing	263
Processor and heat sink replacement (trained technician only)	188		
Remove a processor and heat sink	188		
Separate the processor from carrier and heat sink	192		
Install a processor and heat sink	194		
Security bezel replacement	200		

E3.S cable assembly cable routing	266
Ethernet port assembly cable routing	267
OCF cable routing	268
Riser card cable routing	269

Chapter 7. System configuration . . .273

Set the network connection for the Lenovo XClarity Controller	273
Set USB port for Lenovo XClarity Controller connection.	274
Update the firmware	275
Configure the firmware	278
Memory module configuration	279
Enable Software Guard Extensions (SGX).	280
RAID configuration	280
Deploy the operating system.	281
Back up the server configuration	282

Chapter 8. Problem determination283

Event logs	283
Troubleshooting by system LEDs and diagnostics display	285
Drive LEDs	285
Front operator panel LEDs	285
Power supply LEDs	287
Upper processor board (CPU BD) LEDs	288
System I/O board LEDs	289
Lower processor board (MB) LEDs	291
Firmware and RoT Security Module LEDs	292
XCC system management port LEDs.	293
External Diagnostics Handset	294
General problem determination procedures	299
Resolving suspected power problems	300
Resolving suspected Ethernet controller problems	300
Troubleshooting by symptom	301
Intermittent problems.	301
Keyboard, mouse, KVM switch or USB-device problems	303

Memory problems	304
Monitor and video problems	305
Network problems	307
Observable problems.	307
Optional-device problems	310
Performance problems	312
Power on and power off problems.	312
Power problems.	313
Serial-device problems	314
Software problems.	314
Storage drive problems	315

Appendix A. Hardware disassembling for recycle319

Disassemble the upper processor board (CPU BD) for recycle	319
Disassemble the lower processor board (MB) for recycle	320
Disassemble the chassis for recycle	322

Appendix B. Getting help and technical assistance325

Before you call	325
Collecting service data	326
Contacting Support	327

Appendix C. Documents and supports329

Documents download	329
Support websites	329

Appendix D. Notices.331

Trademarks	332
Important notes.	332
Electronic emission notices	332
Taiwan Region BSMI RoHS declaration	333
Taiwan Region import and export contact information	333

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 ασφαλείας (safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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



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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

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

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

مەزكۇر مەھسۇلاتنى ئورنىتىشتىن بۇرۇن بىخەتەرلىك ئۇچۇرلىرىنى ئوقۇپ چىقىڭ.

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

Safety inspection checklist

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

Note: The product is not suitable for use at visual display workplaces according to §2 of the Workplace Regulations.

Note: 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 SR950 V3 server (Types 7DC4, 7DC5, and 7DC6) is a 8U rack server that supports eight Intel Xeon processors. It is an enterprise-class server designed for customers requiring eight processors, large amounts of memory, and numerous I/O connections.

Figure 1. ThinkSystem SR950 V3



Features

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

Your server implements the following features and technologies:

- **Features on Demand**

If a Features on Demand feature is integrated in the server or in an optional device that is installed in the server, you can purchase an activation key to activate the feature. For information about Features on Demand, see:

<https://fod.lenovo.com/lkms>

- **Lenovo XClarity Controller (XCC)**

The Lenovo XClarity Controller is the common management controller for Lenovo ThinkSystem server hardware. The Lenovo XClarity Controller consolidates multiple management functions in a single chip on the server system board (system board assembly). Some of the features that are unique to the Lenovo XClarity Controller are enhanced performance, higher-resolution remote video, and expanded security options.

The server supports Lenovo XClarity Controller 2 (XCC2). For additional information about Lenovo XClarity Controller 2 (XCC2), refer to <https://pubs.lenovo.com/lxcc-overview/>.

- **UEFI-compliant server firmware**

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

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

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

- **Active Memory**

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

- **Large system-memory capacity**

The server supports up to 128 TruDDR5 memory DIMMs operating at up to 4800 MHz. For more information about the specific types and maximum amount of memory, see [“Technical specifications” on page 3](#).

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

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

Storage capacity is different depending on server model. See [“Technical specifications” on page 3](#) for more information.

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

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

- **Active Energy Manager**

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

- **Redundant networking connection**

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

- **Redundant cooling**

The redundant cooling by the fans in the server enables continued operation if one of the fans fails.

- **ThinkSystem RAID support**

The ThinkSystem RAID adapter provides hardware redundant array of independent disks (RAID) support to create configurations, supporting RAID levels 0, 1, 5, 6, 10, 50, and 60.

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 on **How To's** from the navigation pane.
3. Click **Article 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

Specifications

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.

Refer to the below table for specifications categories and the content of each category.

Specification category	Technical specifications	Mechanical specifications	Environmental specifications
Content	<ul style="list-style-type: none"> • Processor • Memory • Internal drives • Storage expansion • Expansion slots • Integrated functions and I/O connectors • Network • Front button • RAID adapter • Host bus adapter • System fan • Electrical input • Minimal configuration for debugging • Operating systems 	<ul style="list-style-type: none"> • Dimension • Weight 	<ul style="list-style-type: none"> • Acoustical noise emissions • Environmental

Technical specifications

Summary of the technical specifications of server. Depending on the model, some features might not be available, or some specifications might not apply.

Processor

Supports eight Intel Xeon processors up to 350W TDP, with integrated memory controller and Intel Mesh UPI (Ultra Path Interconnect) topology.

- Designed for LGA 4677 sockets
- Scalable up to 60 cores
- Supports 4 UPI links per processor supporting 12.8 GT/s, 14.4 GT/s and 16 GT/s speeds

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

Memory

See “[Memory module installation rules and order](#)” on page 44 for detailed information about memory configuration and setup.

- 128 dual inline memory module (DIMM) slots
- Memory module type:
 - 10x4 RDIMM: 32 GB, 64 GB, or 96 GB
 - 3DS RDIMM: 128 GB or 256 GB
- Speed:
 - 4800 MT/s for 1 DIMM per channel
 - 4400 MT/s for 2 DIMMs per channel
- Minimum memory: 256 GB (One DIMM per CPU)
- Maximum memory: 32 TB

Note: Operating speed depends on processor model and UEFI settings.

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

Internal drives

The server supports up to two internal 960 GB NVMe M.2 drives with 80 mm (2280) form factor.

For a list of supported M.2 drives, see: <https://serverproven.lenovo.com>.

Storage expansion

Up to sixteen 2.5-inch or E3.S drives

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

Expansion slots

- Six front PCIe slots
- Up to eight rear PCIe slots
- One OCP module slot (optional)
- One rear Ethernet slot (optional)

Note: PCIe slot availability is based on riser card selection.

Integrated functions and I/O connectors

- Lenovo XClarity Controller (XCC), which provides service processor control and monitoring functions, video controller, and remote keyboard, video, mouse, and remote drive capabilities.
 - The server supports Lenovo XClarity Controller 2 (XCC2). For additional information about Lenovo XClarity Controller 2 (XCC2), refer to <https://pubs.lenovo.com/lxcc-overview/>.
- Front connectors:
 - Four external Sideband connectors
 - Sixteen external UPI connectors
 - One external diagnostics connector
 - One serial port
 - Front operator panel
 - System ID button/LED
 - System error LED
 - Network Activity LED
 - Power button/LED
 - One USB 2.0 connector with XCC system management function
 - One VGA connector
 - Two USB 3.2 Gen 1 (5 Gbps) connectors
 - One XCC system management port
- Rear connectors:
 - Twelve PSU supply bays
 - One OCP module slot (optional)
 - One XCC system management port (optional)

Network

Two or four Ethernet connectors on OCP module (optional)

Front button

NMI button

RAID adapter

Onboard NVMe ports with software RAID support (Intel VROC NVMe RAID)

- Intel VROC Standard: requires an activation key and supports RAID levels 0, 1, and 10
- Intel VROC Premium: requires an activation key and supports RAID levels 0, 1, 5, and 10

RAID 0, 1, 10, 5, 50, 6, 60

- ThinkSystem RAID 940-16i 4GB Flash PCIe Gen4 12Gb Adapter
- ThinkSystem RAID 940-8i 4GB Flash PCIe Gen4 12Gb Adapter

For more information about the RAID/HBA adapters, see [Lenovo ThinkSystem RAID Adapter and HBA Reference](#).

Host bus adapter
ThinkSystem 440-8i SAS/SATA PCIe Gen4 12Gb HBA
For more information about the RAID/HBA adapters, see Lenovo ThinkSystem RAID Adapter and HBA Reference .

System fan
Twelve fan modules (two fans in each fan module)
Note: The server supports N+2 redundancy and can operate at its maximum power configuration without performance degradation with two failed fan rotors.

Electrical input
The server supports eight or twelve 1800W 230V Titanium Hot-Swap Gen2 power supplies with N+N redundancy.

Minimal configuration for debugging
<ul style="list-style-type: none"> • Two processors on primary chassis lower processor board (MB) • One DRAM DIMM in slot A1 on primary chassis lower processor board (MB) • One power supply • One M.2 drive in M.2#1 Slot (if OS is needed for debugging)

Operating systems
Supported and certified operating systems:
<ul style="list-style-type: none"> • VMware ESXi • Red Hat Enterprise Linux • SUSE Linux Enterprise Server
References:
<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” on page 281.

Mechanical specifications

Summary of the mechanical specifications of server. Depending on the model, some features might not be available, or some specifications might not apply.

Dimension
8U (Two 4U chassis)
<ul style="list-style-type: none"> • Height per chassis: 175 mm (6.9 inches) • Width per chassis: 447 mm (17.6 inches) • Depth per chassis: 870.3 mm (34.3 inches)

Weight
50 kg (110.23 lb) maximum per chassis

Environmental specifications

Summary of the environmental specifications of server. Depending on the model, some features might not be available, or some specifications might not apply.

Acoustical noise emissions

The server has the following acoustic noise emissions declaration:

- Sound power level (L_{WAd})
 - Idling: 7.3 Bel
 - Operating: 7.9 Bel
- Sound pressure level (L_{pAm}):
 - Idling: 57.3 dBA
 - Operating: 61.9 dBA

Notes:

- These sound levels were measured in controlled acoustical environments according to procedures specified by ISO7779 and are reported in accordance with ISO 9296.
- 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.

Environment

ThinkSystem SR950 V3 complies with ASHRAE Class A2 specifications with most configurations, and depending on the hardware configuration, also complies with ASHRAE Class A3, and Class A4 specifications. System performance may be impacted when operating temperature is outside ASHRAE A2 specification.

- Air temperature:
 - Operating
 - ASHRAE Class A2: 10°C to 35°C (50°F to 95°F); the maximum ambient temperature decreases by 1°C for every 300 m (984 ft) increase in altitude above 900 m (2,953 ft).
 - ASHRAE Class A3: 5°C to 40°C (41°F to 104°F); the maximum ambient temperature decreases by 1°C for every 175 m (574 ft) increase in altitude above 900 m (2,953 ft).
 - ASHRAE Class A4: 5°C to 45°C (41°F to 113°F); the maximum ambient temperature decreases by 1°C for every 125 m (410 ft) increase in altitude above 900 m (2,953 ft).
 - 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):
 - Operating
 - ASHRAE Class A2: 8% to 80%; maximum dew point: 21°C (70°F)
 - ASHRAE Class A3: 8% to 85%; maximum dew point: 24°C (75°F)
 - ASHRAE Class A4: 8% to 90%; maximum dew point: 24°C (75°F)
 - Shipment/storage: 8% to 90%
- Particulate contamination

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 8](#).

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

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 1. Limits for particulates and gases

Contaminant	Limits
Reactive gases	<p>Severity level G1 as per ANSI/ISA 71.04-1985¹:</p> <ul style="list-style-type: none"> • The copper reactivity level shall be less than 200 Å/month (Å/month \approx 0.0035 $\mu\text{g}/\text{cm}^2\text{-hour}$ weight gain).² • The silver reactivity level shall be less than 200 Å/month (Å/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
<p>¹ ANSI/ISA-71.04-1985. <i>Environmental conditions for process measurement and control systems: Airborne contaminants</i>. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.</p> <p>² The derivation of the equivalence between the rate of copper corrosion growth in the thickness of the corrosion product in Å/month and the rate of weight gain assumes that Cu₂S and Cu₂O grow in equal proportions.</p> <p>³ The derivation of the equivalence between the rate of silver corrosion growth in the thickness of the corrosion product in Å/month and the rate of weight gain assumes that Ag₂S is the only corrosion product.</p> <p>⁴ The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.</p> <p>⁵ Surface debris is randomly collected from 10 areas of the data center on a 1.5 cm diameter disk of sticky electrically conductive tape on a metal stub. If examination of the sticky tape in a scanning electron microscope reveals no zinc whiskers, the data center is considered free of zinc whiskers.</p>	

Management options

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

Overview

Options	Description
Lenovo XClarity Controller	<p>Baseboard management controller (BMC)</p> <p>Consolidates the service processor functionality, Super I/O, video controller, and remote presence capabilities into a single chip on the server system board (system board assembly).</p> <p>Interface</p> <ul style="list-style-type: none"> • CLI application • Web GUI interface • Mobile application • Redfish API <p>Usage and downloads</p> <p>https://pubs.lenovo.com/lxcc-overview/</p>
Lenovo XCC Logger Utility	<p>Application that reports the XCC events to local OS system log.</p> <p>Interface</p> <ul style="list-style-type: none"> • CLI application <p>Usage and downloads</p> <ul style="list-style-type: none"> • https://pubs.lenovo.com/lxcc-logger-linux/ • https://pubs.lenovo.com/lxcc-logger-windows/
Lenovo XClarity Administrator	<p>Centralized interface for multi-server management.</p> <p>Interface</p> <ul style="list-style-type: none"> • Web GUI interface • Mobile application • REST API <p>Usage and downloads</p> <p>https://pubs.lenovo.com/lxca/</p>
Lenovo XClarity Essentials toolset	<p>Portable and light toolset for server configuration, data collection, and firmware updates. Suitable both for single-server or multi-server management contexts.</p> <p>Interface</p> <ul style="list-style-type: none"> • OneCLI: CLI application • Bootable Media Creator: CLI application, GUI application • UpdateXpress: GUI application <p>Usage and downloads</p> <p>https://pubs.lenovo.com/lxce-overview/</p>

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

Functions

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

Notes:

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

Chapter 2. Server components

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

Front view

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

Note: Depending on the configuration, your server might be slightly different from the image.

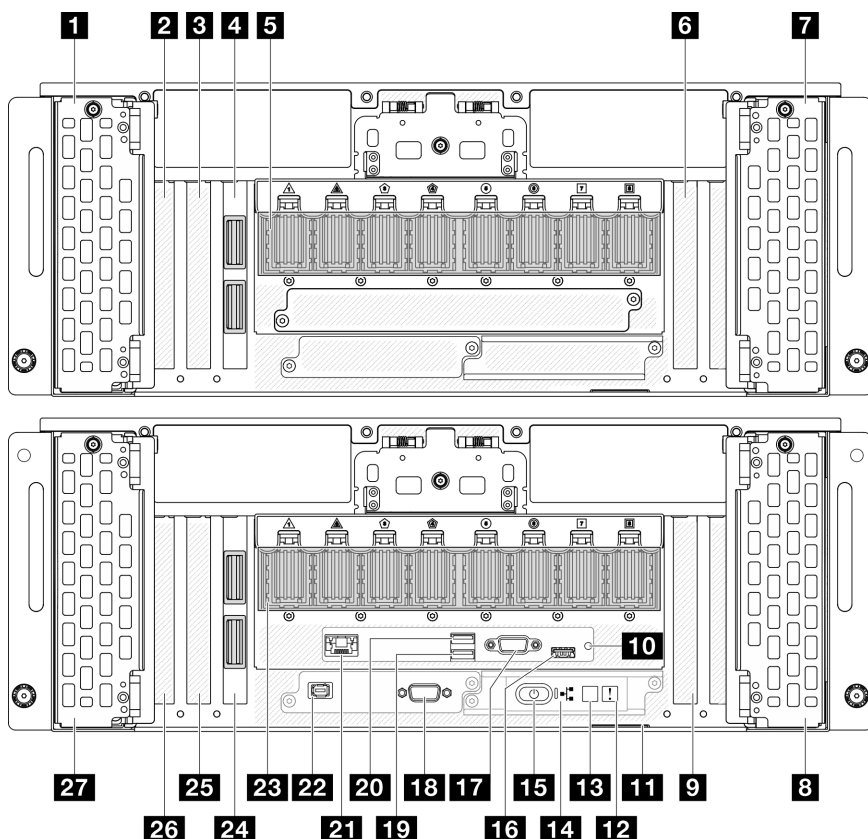


Figure 2. Front view of primary chassis

Table 2. Components on the front view

1 Drive bays 8-11	15 Power button/LED (green)
2 PCIe slot S1	16 USB 2.0 connector with Lenovo XClarity Controller management
3 PCIe slot S2	17 VGA connector
4 Sideband card (Secondary chassis)	18 Serial port
5 UPI module (Secondary chassis)	19 USB 3.2 Gen 1 (5 Gbps)
6 PCIe slot S3	20 USB 3.2 Gen 1 (5 Gbps)
7 Drive bays 12-15	21 XCC system management port (1 GB RJ-45)

Table 2. Components on the front view (continued)

8 Drive bays 4-7	22 External diagnostics handset connector
9 PCIe slot P3	23 UPI module (Primary chassis)
10 NMI button	24 Sideband card (Primary chassis)
11 Pull-out information tab	25 PCIe slot P2
12 System error LED (yellow)	26 PCIe slot P1
13 System ID button/LED (blue)	27 Drive bays 0-3
14 Network activity LED (green)	

1 / 7 / 8 / 27 Drive bays

Install drives to these bays. See [“Install a hot-swap drive” on page 86](#).

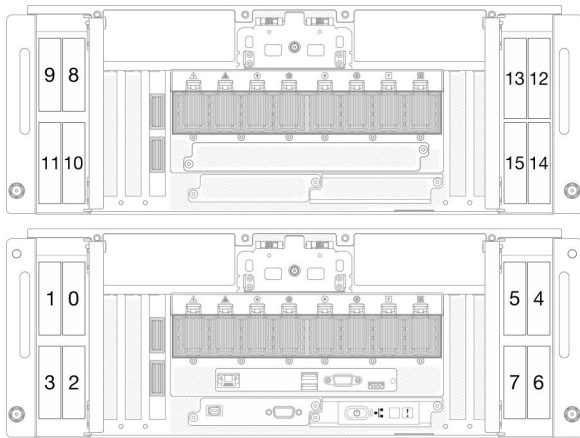


Figure 3. 2.5-inch drive bay numbering

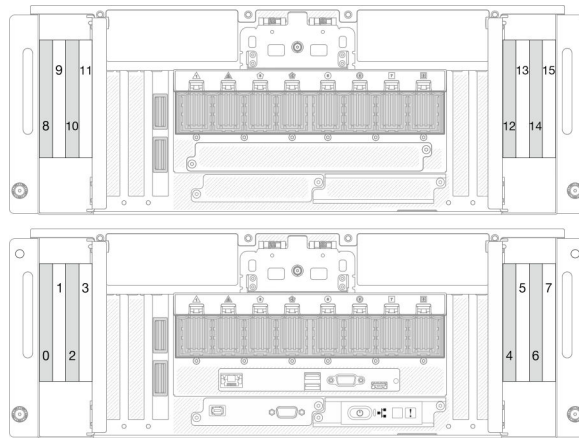


Figure 4. E3.S drive bay numbering

2 / 3 / 6 PCIe slots S1-S3

Install PCIe adapters into these PCIe slots. See [“Install a PCIe adapter” on page 164](#).

4 / 24 Sideband card

Connect the external sideband cables to these sideband cards.

5 / 23 UPI module

Connect the external UPI cables to these UPI modules.

9 / 25 / 26 PCIe slots P1-P3

Install PCIe adapters into these PCIe slots.

10 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.

11 Pull-out information tab

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

12 System error LED (yellow)

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

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

13 System ID button/LED (blue)

Use this system ID button and the blue system ID LED to visually locate the server. Each time you press the system ID button, the state of the system ID LED changes. The LED can be changed to on, blinking, or off. You can also use the Lenovo XClarity Controller or a remote management program to change the state of the system ID LED to assist in visually locating the server among other servers.

14 Network Activity LED (green)

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

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

15 Power button/LED (green)

Press this button to turn the server on and off manually. The states of the power LED are as follows:

Status	Color	Description
Off	None	Power is not present, or the power supply has failed.
Fast blinking (about four flashes per second)	Green	<ul style="list-style-type: none">• The server is off, but the XClarity Controller is initializing, and the server is not ready to be powered on.• System-board-assembly power has failed.
Slow blinking (about one flash per second)	Green	The server is off and is ready to be powered on (standby state).
Solid on	Green	The server is on and running.

16 USB 2.0 connector with Lenovo XClarity Controller management

Connect a USB 2.0 device, such as a mouse, keyboard, or other devices, to this connector.

Connection to Lenovo XClarity Controller is primarily intended for users with a mobile device running the Lenovo 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 Lenovo 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 Lenovo XClarity Controller.

- **Shared mode: owned by BMC**

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

- **Shared mode: owned by host**

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

17 VGA connector

Connect a monitor to this connector.

18 Serial port 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).

19 / 20 USB 3.2 Gen 1 (5 Gbps) connector

The USB 3.2 Gen 1 (5 Gbps) connector can be used to attach a USB-compatible device, such as a USB keyboard, USB mouse, or USB storage device.

21 XCC system management port (1 GB RJ-45)

The server has a 1 GB RJ-45 connector dedicated to Lenovo XClarity Controller (XCC) functions. Through the system management port, you can access the Lenovo XClarity Controller directly by connecting your laptop to the management port using an Ethernet cable. Make sure that you modify the IP settings on the laptop so that it is on the same network as the server default settings. A dedicated management network provides additional security by physically separating the management network traffic from the production network.

See the following for more information:

- [“Set the network connection for the Lenovo XClarity Controller” on page 273](#)
- [“XCC system management port LEDs” on page 293](#)

22 External diagnostics handset connector

Connect the external diagnostics handset to this connector. See [“External Diagnostics Handset” on page 294](#) for more details.

Rear view

The rear of the server provides access to several components, including the power supplies, PCIe adapters, serial port, and Ethernet port.

Note: Depending on the configuration, your server might be slightly different from the image.

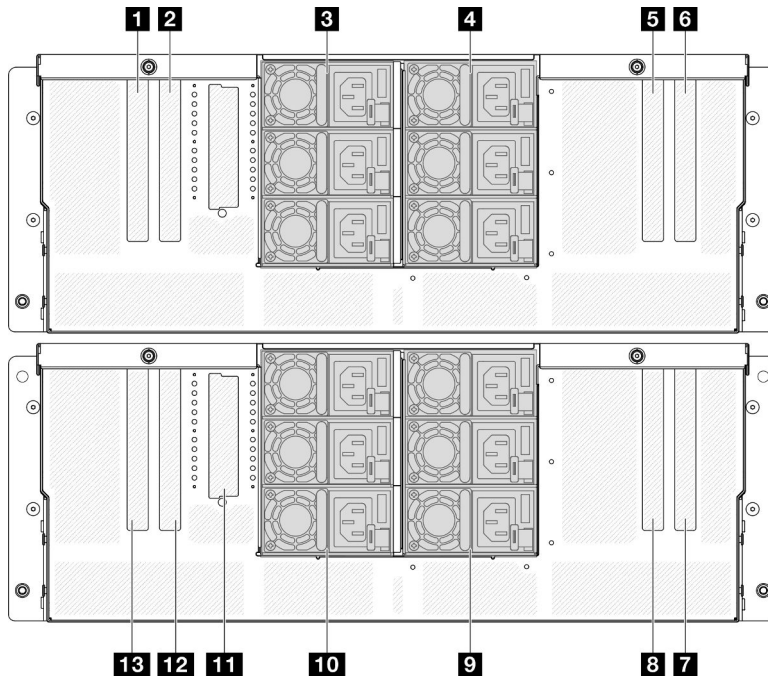


Figure 5. Rear view

Table 3. Components on the rear view

1 PCIe slot S5	8 PCIe slot P7
2 PCIe slot S6	9 PSU P4-P6 (top to bottom)
3 PSU S1-S3 (top to bottom)	10 PSU P1-P3 (top to bottom)
4 PSU S4-S6 (top to bottom)	11 OCP slot
5 PCIe slot S7	12 PCIe slot P6
6 PCIe slot S8	13 PCIe slot P5/XCC system management port
7 PCIe slot P8	

1 / 2 / 5 / 6 PCIe slot S5-S8

Install PCIe adapters into these PCIe slots. See [“Install a PCIe adapter” on page 164](#).

7 / 8 / 12 / 13 PCIe slot P5-P8

Install PCIe adapters into these PCIe slots. See [“Install a PCIe adapter” on page 164](#).

Note: An Ethernet port assembly can also be installed into PCIe slot P5 to function as a redundant XCC system management port.

3 / 4 / 9 / 10 Power supply bays

Install power supply units to these bays, connect them to power cords. See [“Install a hot-swap power supply unit” on page 186](#).

Note: Make sure the power cords are connected properly. See [“Technical specifications” on page 3](#) for the power supplies supported by this system.

For information about the LEDs, see [“Power supply LEDs” on page 287](#).

11 OCP slot

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 6. Port numbering — 2-port OCP module

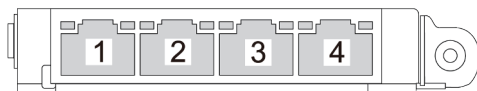


Figure 7. Port numbering — 4-port OCP 3.0 module

Top view

This section contains information on the top view of the server.

The left figure below shows the top view with the top cover and upper processor board (CPU BD) air baffle removed; and the right figure below shows the top view with the top cover, upper processor board (CPU BD), system I/O board and interposer assembly, and lower processor board (MB) air baffle removed.

Notes:

- Depending on the configuration, your server might be slightly different from the image.
- The primary chassis is shown below as an example, the secondary chassis is similar.

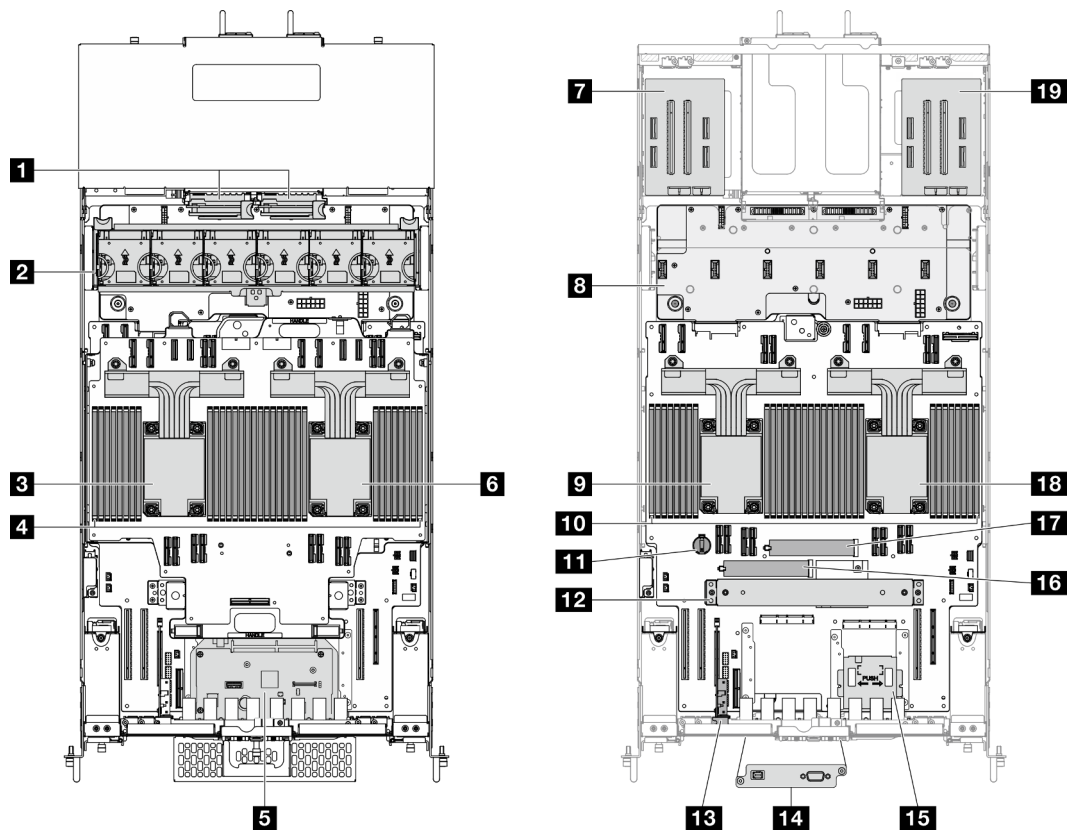


Figure 8. Server top view

Table 4. Component identification (Top view)

1 Power interposer boards (PIB)	11 CMOS battery
2 Fan and fan cage assembly	12 Support bracket
3 CPU7/CPU6	13 Sideband card
4 Memory modules A1-T2 (Upper processor board (CPU BD))	14 Serial port assembly (Primary chassis only)
5 System I/O board and interposer assembly (Primary chassis only)	15 Front operator panel and front operator panel cage (Primary chassis only)
6 CPU5/CPU4	16 M.2 slot 1
7 Left riser card	17 M.2 slot 2
8 Power distribution board (PDB)	18 CPU0/CPU1
9 CPU2/CPU3	19 Right riser card
10 Memory modules A1-T2 (Lower processor board (MB))	

Upper processor board (CPU BD) connectors

The following illustrations show the internal connectors on the upper processor board (CPU BD).

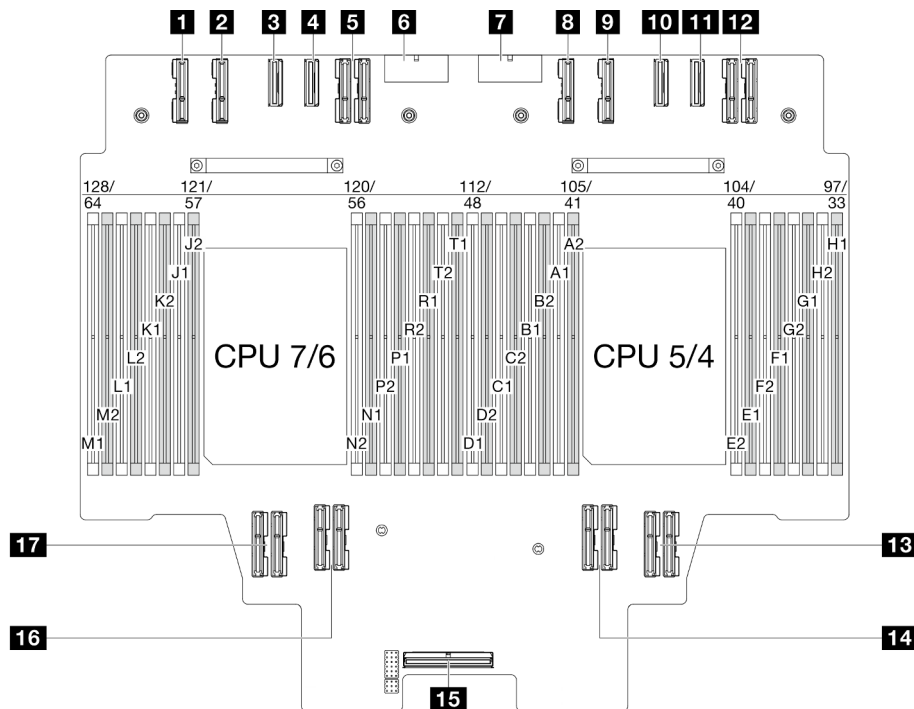


Figure 9. Upper processor board (CPU BD) connectors

Table 5. Upper processor board (CPU BD) connectors

1 PE4AB_L connector	10 PE3CD_R connector
2 PE4CD_L connector	11 PE3AB_R connector
3 PE3CD_L connector	12 UPI3_R connector
4 PE3AB_L connector	13 UPI1_R connector
5 UPI3_L connector	14 UPIO_R connector
6 PWR1 connector	15 Internal sideband connector
7 PWR2 connector	16 UPI1_L connector
8 PE4AB_R connector	17 UPIO_L connector
9 PE4CD_R connector	

Upper processor board (CPU BD) switches

The following illustrations show the location of the switches on the upper processor board (CPU BD).

Important:

- Before you change any switch settings or move any jumpers, turn off the server; then, disconnect all power cords and external cables. Review the following information:
 - https://pubs.lenovo.com/safety_documentation/
 - “Installation Guidelines” on page 41
 - “Handling static-sensitive devices” on page 44
 - “Power off the server” on page 50

- Any upper processor board (CPU BD) switch or jumper block that is not shown in the illustrations in this document are reserved.

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

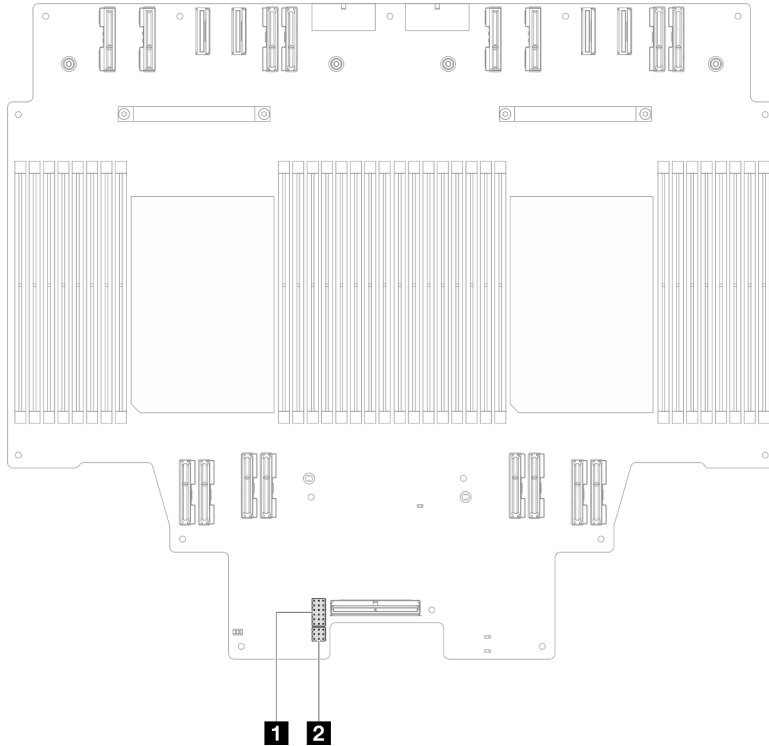


Figure 10. Upper processor board (CPU BD) switches

1 J191	2 J56
---------------	--------------

J191 switch block

The following table describes the functions of the J191 switch block on the upper processor board (CPU BD).

Table 6. Upper processor board (CPU BD) J191 switch block description

Location	Jumper Name	Position	Function
J191A	Reserved	1-2	Reserved
		2-3 (Default)	Reserved
J191B	Reserved	1-2 (Default)	Reserved
		2-3	Reserved
J191C	Reserved	1-2 (Default)	Reserved
		2-3	Reserved
J191D	Reserved	1-2 (Default)	Reserved
		2-3	Reserved
J191E	Reserved	1-2 (Default)	Reserved
		2-3	Reserved

Table 6. Upper processor board (CPU BD) J191 switch block description (continued)

Location	Jumper Name	Position	Function
J191F	Reserved	1-2 (Default)	Reserved
		2-3	Reserved

J56 switch block

The following table describes the functions of the J56 switch block on the upper processor board (CPU BD).

Table 7. Upper processor board (CPU BD) J56 switch block description

Location	Jumper Name	Position	Function
J56A	Reserved	1-2 (Default)	Reserved
		2-3	Reserved
J56B	Reserved	1-2 (Default)	Reserved
		2-3	Reserved
J56C	Reserved	1-2 (Default)	Reserved
		2-3	Reserved

System I/O board and interposer assembly connectors

The following illustrations show the internal connectors on the System I/O board and interposer assembly.

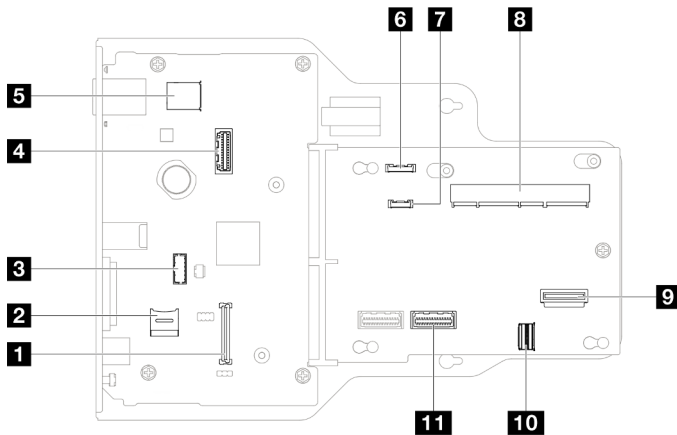


Figure 11. System I/O board and interposer assembly connectors

Table 8. System I/O board and interposer assembly connectors

1 Firmware and RoT security module connector	7 External diagnostics handset connector
2 MicroSD socket	8 SCM connector
3 Serial port module connector	9 Rear OCP connector
4 Second management Ethernet connector	10 Rear Ethernet card connector
5 Internal USB connector	11 PHY 2 connector
6 Front operator panel connector	

System I/O board and interposer assembly switches

The following illustrations show the location of the switches on the system I/O board and interposer assembly.

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 following information:
 - https://pubs.lenovo.com/safety_documentation/
 - “Installation Guidelines” on page 41
 - “Handling static-sensitive devices” on page 44
 - “Power off the server” on page 50
2. Any system I/O board and interposer assembly switch or jumper block that is not shown in the illustrations in this document are reserved.

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

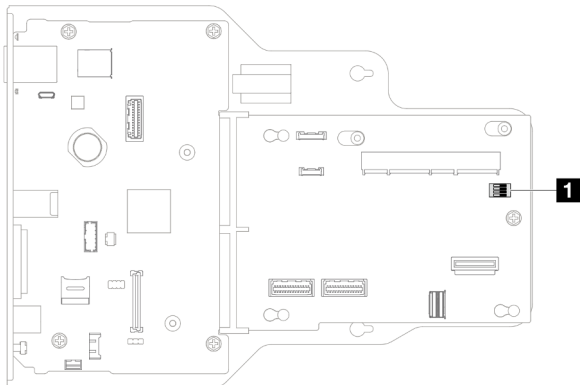


Figure 12. System I/O board and interposer assembly switches

1 SW1

SW1 switch block

The following table describes the functions of the SW1 switch block on the system I/O board and interposer assembly.

Table 9. System I/O board and interposer assembly SW1 switch block description

Switch number	Jumper Name	Default position	Function
SW-1	Low security	Off	Keeping this switch in the On position allows transitioning between signed official IMM builds and IMM test signed builds, and bypasses CRTM boot check of iMM firmware.
SW-2	Reserved	Off	Reserved
SW-3	Reserved	Off	Reserved
SW-4	Reserved	Off	Reserved

Lower processor board (MB) connectors

The following illustrations show the internal connectors on the lower processor board (MB).

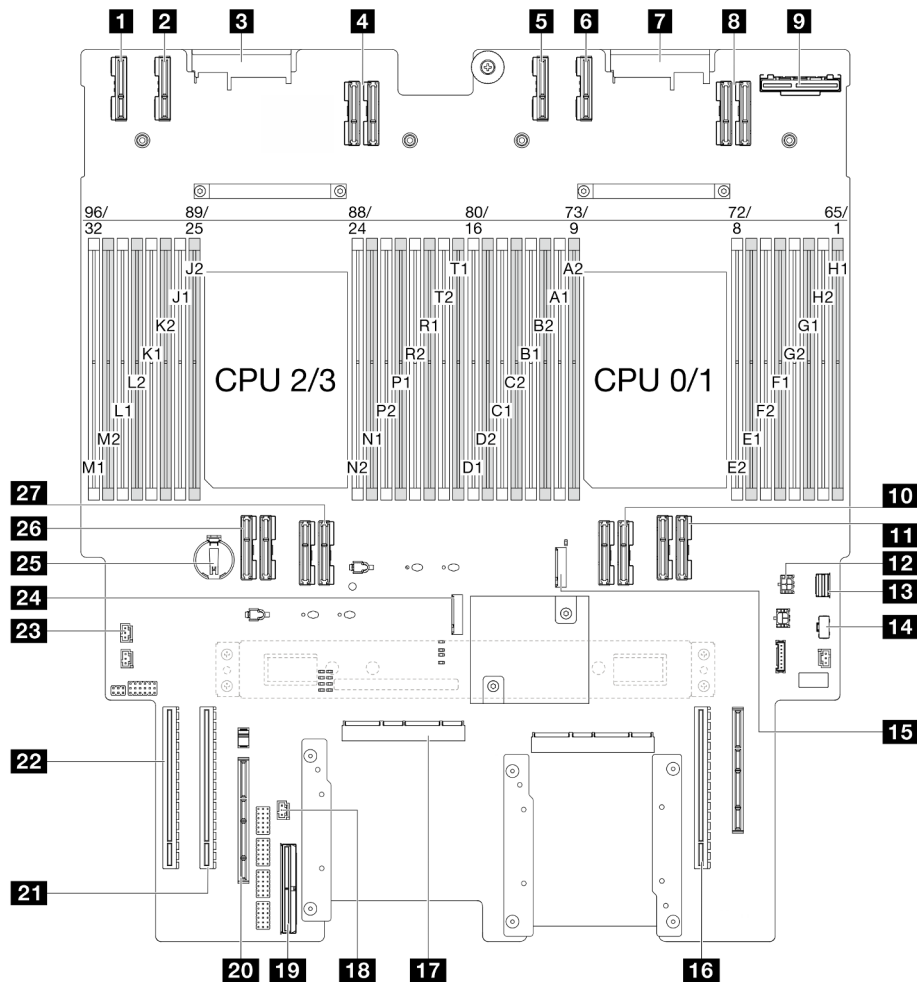


Figure 13. Lower processor board (MB) connectors

Table 10. Lower processor board (MB) connectors

1 PE4AB_L connector	15 M.2 slot 2
2 PE4CD_L connector	16 PCIe slot P3/S3
3 PDB_CONN1 connector	17 SCM connector
4 UPI3_L connector	18 Front intrusion connector
5 PE4AB_R connector	19 Internal sideband connector
6 PE4CD_R connector	20 External sideband slot
7 PDB_CONN2 connector	21 PCIe slot P2/S2
8 UPI3_R connector	22 PCIe slot P1/S1
9 Rear OCP connector	23 Top cover intrusion connector
10 UPIO_R connector	24 M.2 slot 1

Table 10. Lower processor board (MB) connectors (continued)

11 UPI1_R connector	25 CMOS battery
12 Rear OCP power connector	26 UPI0_L connector
13 M.2 signal connector	27 UPI1_L connector
14 M.2 power connector	

Lower processor board (MB) switches

The following illustrations show the location of the switches on the lower processor board (MB).

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 following information:
 - https://pubs.lenovo.com/safety_documentation/
 - “Installation Guidelines” on page 41
 - “Handling static-sensitive devices” on page 44
 - “Power off the server” on page 50
2. Any lower processor board (MB) switch or jumper block that is not shown in the illustrations in this document are reserved.

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

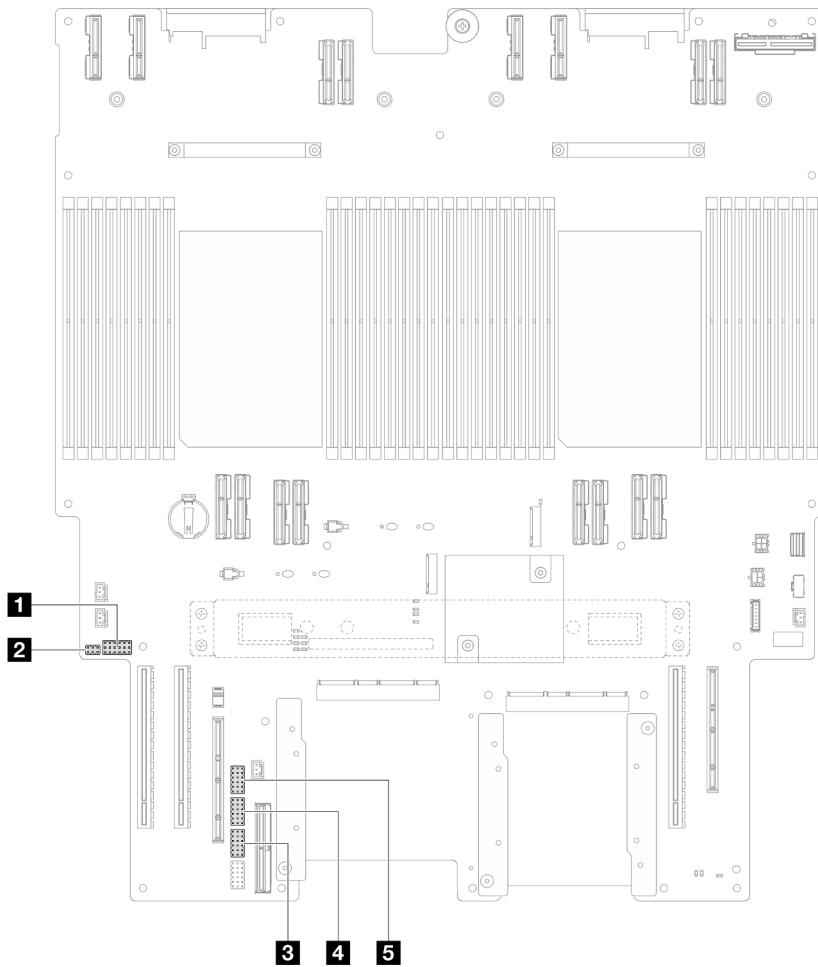


Figure 14. Lower processor board (MB) switches

1 J201	4 J117
2 PJ1	5 J191
3 J02	

J201 switch block

The following table describes the functions of the J201 switch block on the lower processor board (MB).

Table 11. Lower processor board (MB) J201 switch block description

Location	Jumper Name	Position	Function
J201A	Reserved	1-2 (Default)	Reserved
		2-3	Reserved
J201B	Reserved	1-2 (Default)	Reserved
		2-3	Reserved
J201C	Reserved	1-2 (Default)	Reserved
		2-3	Reserved
J201D	Reserved	1-2 (Default)	Reserved

Table 11. Lower processor board (MB) J201 switch block description (continued)

Location	Jumper Name	Position	Function
		2-3	Reserved
J201E	CMOS clear	1-2 (Default)	Off
		2-3	Resets the RTC. A momentary toggle is all that is required. To avoid excessive CMOS battery drain, do not leave this switch in the On position.
J201F	Reserved	1-2 (Default)	Reserved
		2-3	Reserved

PJ1 switch block

The following table describes the functions of the PJ1 switch block on the lower processor board (MB).

Table 12. Lower processor board (MB) PJ1 switch block description

Location	Jumper Name	Position	Function
PJ1A	Reserved	1-2 (Default)	Reserved
		2-3	Reserved
PJ1B	Reserved	1-2 (Default)	Reserved
		2-3	Reserved

J02 switch block

The following table describes the functions of the J02 switch block on the lower processor board (MB).

Table 13. Lower processor board (MB) J02 switch block description

Location	Jumper Name	Position	Function
J02A	Reserved	1-2 (Default)	Reserved
		2-3	Reserved
J02B	Password clear	1-2 (Default)	Normal
		2-3	Overrides the power-on password. Changing the position of this switch does not affect the administrator password check if an administrator password is set.
J02C	Reserved	1-2 (Default)	Reserved
		2-3	Reserved
J02D	Reserved	1-2 (Default)	Reserved
		2-3	Reserved
J02E	Reserved	1-2 (Default)	Reserved
		2-3	Reserved
J02F	Reserved	1-2 (Default)	Reserved
		2-3	Reserved

J117 switch block

The following table describes the functions of the J117 switch block on the lower processor board (MB).

Table 14. Lower processor board (MB) J117 switch block description

Location	Jumper Name	Position	Function
J117A	Reserved	1-2	Reserved
		2-3 (Default)	Reserved
J117B	Reserved	1-2	Reserved
		2-3 (Default)	Reserved
J117C	ME FW update	1-2 (Default)	Normal
		2-3	Enable ME boot to recovery.
J117D	Flash security override	1-2 (Default)	Disable flash security override.
		2-3	Enable flash security override.
J117E	Reserved	1-2 (Default)	Reserved
		2-3	Reserved
J117F	Reserved	1-2 (Default)	Reserved
		2-3	Reserved

J191 switch block

The following table describes the functions of the J191 switch block on the lower processor board (MB).

Table 15. Lower processor board (MB) J191 switch block description

Location	Jumper Name	Position	Function
J191A	Reserved	1-2 (Default)	Reserved
		2-3	Reserved
J191B	Reserved	1-2	Reserved
		2-3 (Default)	Reserved
J191C	Reserved	1-2 (Default)	Reserved
		2-3	Reserved
J191D	Reserved	1-2	Reserved
		2-3 (Default)	Reserved
J191E	Reserved	1-2 (Default)	Reserved
		2-3	Reserved
J191F	Reserved	1-2 (Default)	Reserved
		2-3	Reserved

System LEDs and diagnostics display

See the following section for information on available system LEDs and diagnostics display.

For more information, refer to [“Troubleshooting by system LEDs and diagnostics display”](#) on page 285.

Chapter 3. Parts list

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

For more information about ordering parts:

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

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

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

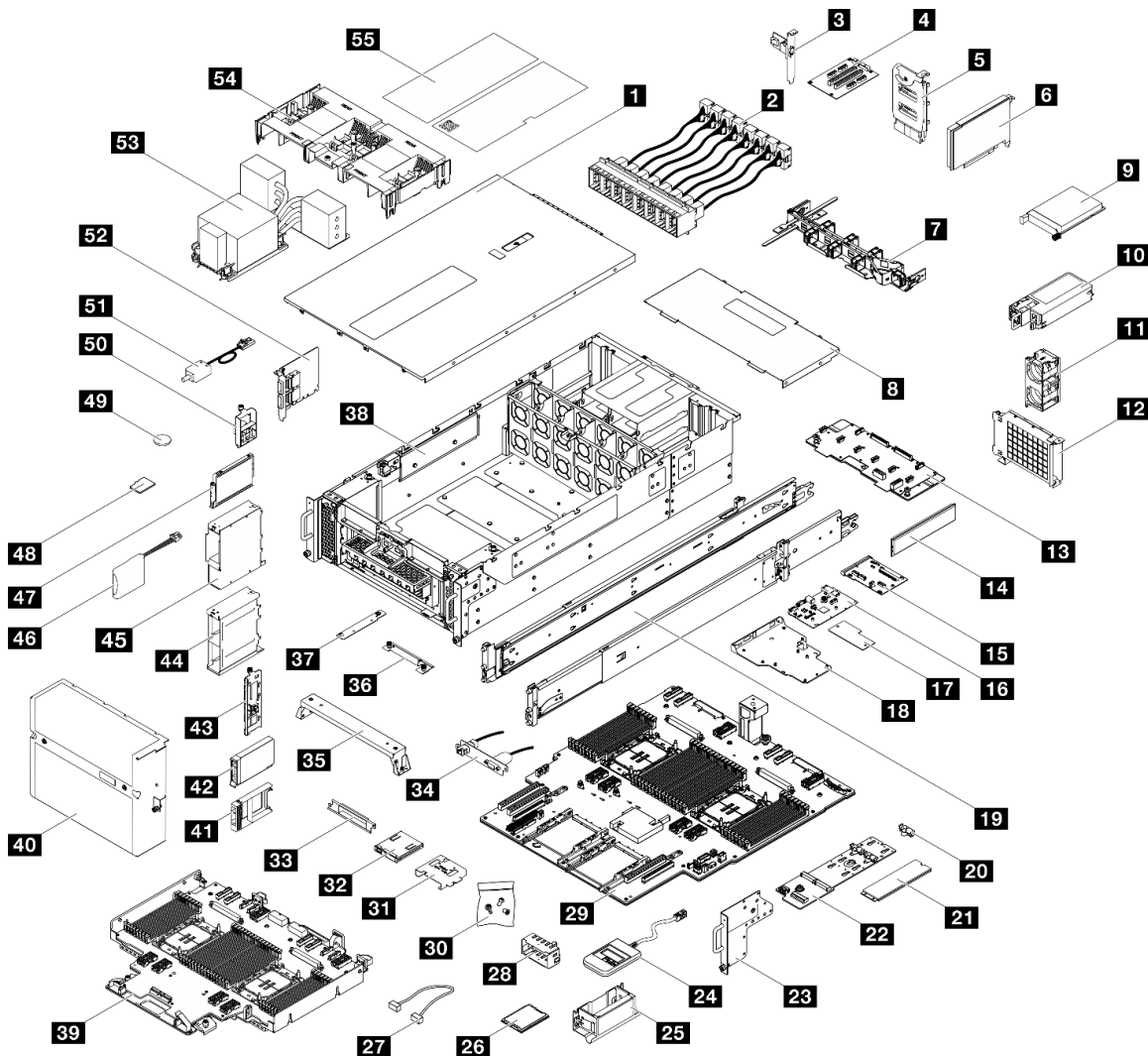


Figure 15. Server components

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

- **T1:** 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.
- **T2:** 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.
- **F:** Field replaceable unit (FRU). FRUs must be installed only by trained service technicians.
- **C:** Consumable and Structural parts. Purchase and replacement of consumable and structural parts (components, such as a filler 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

Description	Type	Description	Type
For more information about ordering parts:			
1. Go to http://datacentersupport.lenovo.com and navigate to the support page for your server.			
2. Click Parts .			
3. Enter the serial number to view a listing of parts for your server.			
1 Front top cover	T1	29 Lower processor board (MB)	F
2 UPI module	T1	30 Fasteners kit	T1
3 Ethernet port assembly	T1	31 Front operator panel cage	C
4 PCIe riser card	T2	32 Front operator panel	T1
5 Power interposer board	T2	33 Front operator panel bracket	C
6 PCIe adapter	T1	34 Serial port assembly	T1
7 Cable management arm	T2	35 Support bracket	C
8 Rear top cover	T1	36 SCM bracket	C
9 OCP module	T1	37 Lower processor board (MB) bracket	C
10 Power supply unit	T1	38 Chassis	F
11 Fan module	T1	39 Upper processor board (CPU BD)	F
12 OCP cage	T1	40 Security bezel	T1
13 Power distribution board	T2	41 2.5-inch drive filler (1-bay)	C
14 Memory module	T1/F*	42 2.5-inch hot-swap drive	T1
15 Interposer board	F	43 2.5-inch drive backplane	T1
16 System I/O board	F	44 2.5-inch drive cage	C
17 Firmware and RoT security module	F	45 E3.S drive cage	C
18 System I/O board and interposer tray	C	46 Flash power module	T1
19 Slide rail kit	T2	47 E3.S drive	T1
20 M.2 drive retainer	C	48 MicroSD card	F
21 M.2 drive	T1	49 CMOS battery (CR2032)	C
22 M.2 boot adapter	T1	50 E3.S cable assembly	T1
23 EIA flange	C	51 Intrusion switch	T1
24 External diagnostics handset	T1	52 Sideband card	T1
25 Lift handles	C	53 Processor heat sink and processor carrier	F

Table 16. Parts list (continued)

Description	Type	Description	Type
26 Processor	F	54 Air baffle	T1
27 Cables	T1	55 Labels kit	T1
28 PSU filler	C		

Note: * For memory modules installed on the lower processor board (MB).

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 4. Unboxing and setup

Information in this section assists you on unboxing and setting up the server. When unboxing the server, check if the items in the package are correct, and learn where to find information of server serial number and Lenovo XClarity Controller access. Make sure to follow the instructions in [“Server setup checklist” on page 38](#) when setting up the server.

Server package contents

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

The server package includes the following items:

- Server
- Rail installation kit*. Installation guide is provided in the package.
- Cable management arm*. Installation guide is provided in the package.
- Material box, including items such as lift handles, power cords*, accessory kit, and printed documents.

Notes:

- Some of the items listed are available on select models only.
- Items marked with asterisk(*) are optional.

If any item is missing or damaged, contact your place of purchase. Ensure that you retain your proof of purchase and packing material. They might be required to receive warranty service.

Identify the server and access the Lenovo XClarity Controller

This section contains instruction on how to identify your server and where to find the Lenovo XClarity Controller access information.

Identifying your server

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

The illustration below shows the location of the ID label which contains the model number, machine type, and serial number of the server. You can also add other system information labels to the front of the server in the customer label spaces.

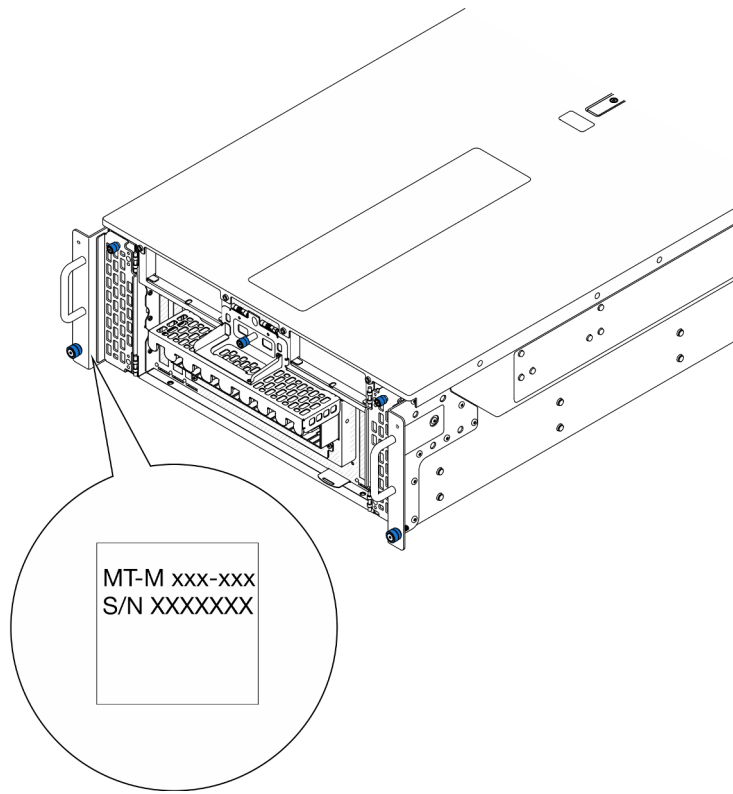


Figure 16. Location of the ID label

Lenovo XClarity Controller network access label

In addition, the Lenovo XClarity Controller network access label is attached to the pull-out information tab located near the bottom right on the front of the primary chassis, with MAC address accessible with a pull.

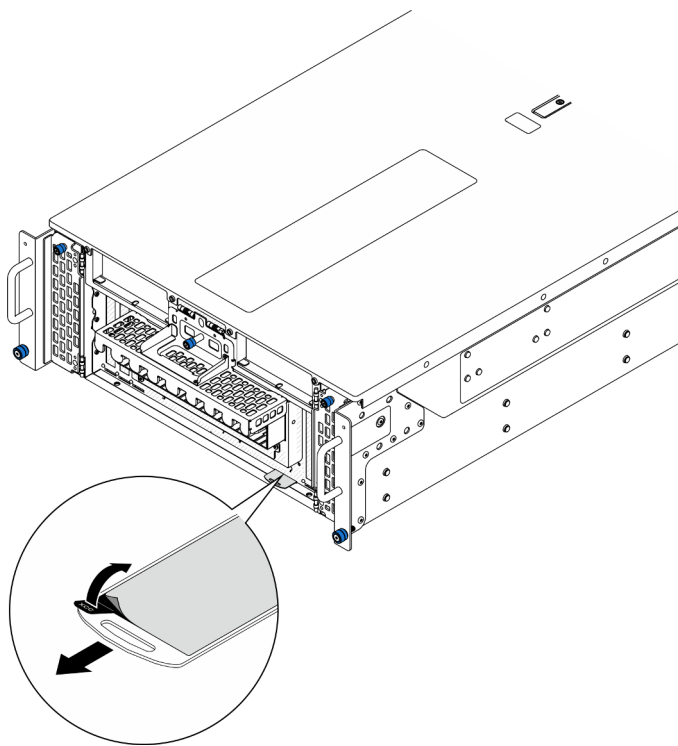


Figure 17. Lenovo XClarity Controller network access label on the pull-out information tab

Service Label and QR code

In addition, the system Service Label located on the inside surface of the front top cover, provides a quick response (QR) code for mobile access to service information. You can scan the QR code with a mobile device using a QR code reader application and get quick access to the Service Information web page. The Service Information web page provides additional information for parts installation and replacement videos, and error codes for server support.

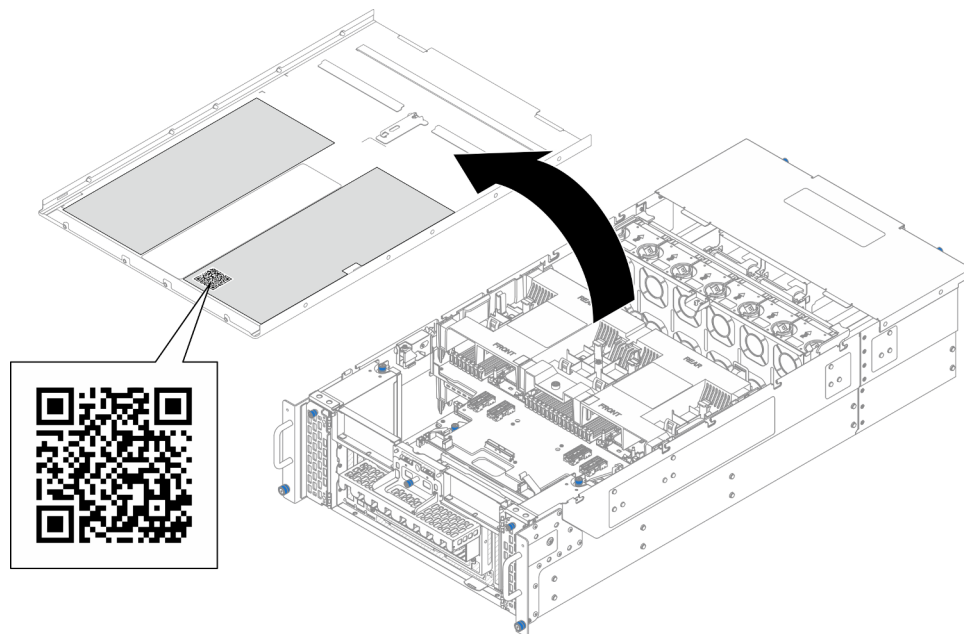


Figure 18. Service Label and QR code

Server setup checklist

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

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

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

Setup the server hardware

Complete the following procedures to setup the server hardware.

1. Unpack the server package. See [“Server package contents” on page 35](#).
2. Install any required hardware or server options. See the related topics in [Chapter 5 “Hardware replacement procedures” on page 41](#).
3. If necessary, install the rail and CMA to a standard rack cabinet. Follow the instructions in *Rail Installation Guide* and *CMA Installation Guide* that come with the rail and CMA kit.
4. If necessary, install the server into a standard rack cabinet. See [“Install the server to rails” on page 59](#).
5. Connect all external cables to the server. See [Chapter 2 “Server components” on page 13](#) for connectors locations.

Typically, you will need to connect the following cables:

- Connect server to the power source
 - Connect server to the data network
 - Connect the server to the storage device
 - Connect the server to the management network
6. Power on the server.

Power button location and power LED are specified in:

- [Chapter 2 “Server components” on page 13](#)
- [“Troubleshooting by system LEDs and diagnostics display” on page 285](#)

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.

Note: You can access the management processor interface to configure the system without powering on the server. Whenever the server is connected to power, the management processor interface is available. For details about accessing the management server processor, see “Opening and Using the XClarity Controller Web Interface” section in the XCC documentation compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>.

7. Validate the server. Make sure that the power LED, Ethernet connector LED, and network LED are lit with green light, which means the server hardware was set up successfully.

See [“Troubleshooting by system LEDs and diagnostics display” on page 285](#) for more information on the LED indications.

Configure the system

Complete the following procedures to configure the system. For detailed instructions, refer to [Chapter 7 “System configuration” on page 273](#).

1. Set the network connection for the Lenovo XClarity Controller to the management network.
2. Update the firmware for the server, if necessary.
3. Configure the firmware for the server.

The following information is available for RAID configuration:

- <https://lenovopress.lenovo.com/lp0578-lenovo-raid-introduction>
 - <https://lenovopress.lenovo.com/lp0579-lenovo-raid-management-tools-and-resources>
4. Install the operating system.
 5. Back up the server configuration.
 6. Install the applications and programs for which the server is intended to be used.

Chapter 5. 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.

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: “Working inside the server with the power on” on page 43 and “Handling static-sensitive devices” on page 44.
- 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>.
 - For the option package contents, see <https://serveroption.lenovo.com/>.
- For more information about ordering parts:
 1. Go to <http://datacentersupport.lenovo.com> and navigate to the support page for your server.
 2. Click **Parts**.
 3. Enter the serial number to view a listing of parts for your server.
- 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 <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to download firmware updates for your server.

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

- 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 “Update the firmware” on page 275.
- It is good practice to make sure that the server is working correctly before you install an optional component.
- Keep the working area clean, and place removed components on a flat and smooth surface that does not shake or tilt.
- Do not attempt to lift an object that might be too heavy for you. If you have to lift a heavy object, read the following precautions carefully:
 - Make sure that you can stand steadily without slipping.
 - Distribute the weight of the object equally between your feet.

- Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
- To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Back up all important data before you make changes related to the disk drives.
- Have a small flat-blade screwdriver, a small Phillips screwdriver, and a T8 torx screwdriver available.
- To view the error LEDs on the system board (system board assembly) 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.
- When replacing power supply units or fans, make sure to refer to redundancy rules for these components.
- Blue on a component indicates touch points, where you can grip to remove a component from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange on or near a component indicates that the component can be hot-swapped if the server and operating system support hot-swap capability, which means that you can remove or install the component while the server is still running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- The Red strip on the drives, adjacent to the release latch, indicates that the drive can be hot-swapped if the server and operating system support hot-swap capability. This means that you can remove or install the drive while the server is still running.

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

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

Safety inspection checklist

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

Note: The product is not suitable for use at visual display workplaces according to §2 of the Workplace Regulations.

Note: 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.

Memory module installation rules and order

Memory modules must be installed in a specific order based on the memory configuration that you implement and the number of processors and memory modules installed in the server.

Supported memory types

For information on the types of memory module supported by this server, see “Memory” section in [“Technical specifications” on page 3](#).

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

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

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

https://dcsc.lenovo.com/#/memory_configuration

Specific information about the required installation order of memory modules in your server based on the system configuration and memory mode that you are implementing is shown below.

Memory modules and processors layout

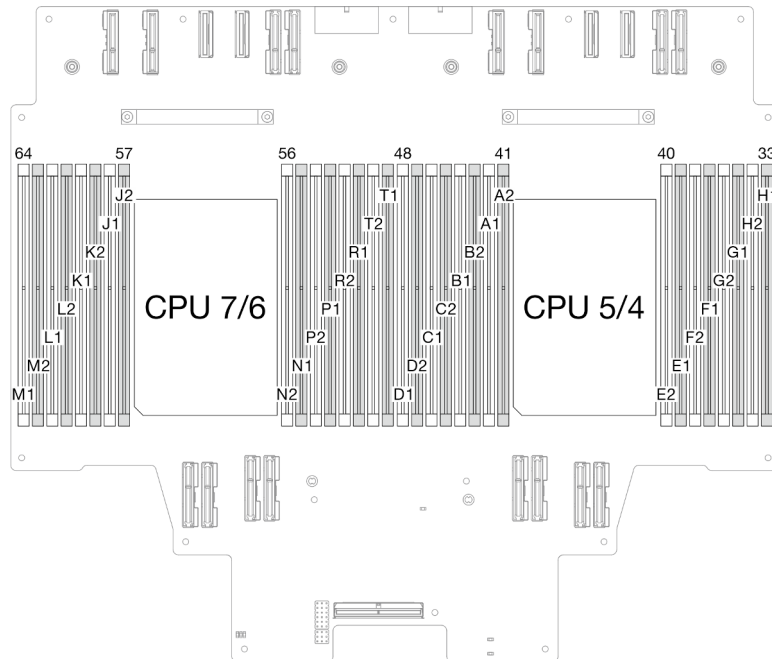


Figure 19. Memory modules and processors layout (upper processor board (CPU BD))

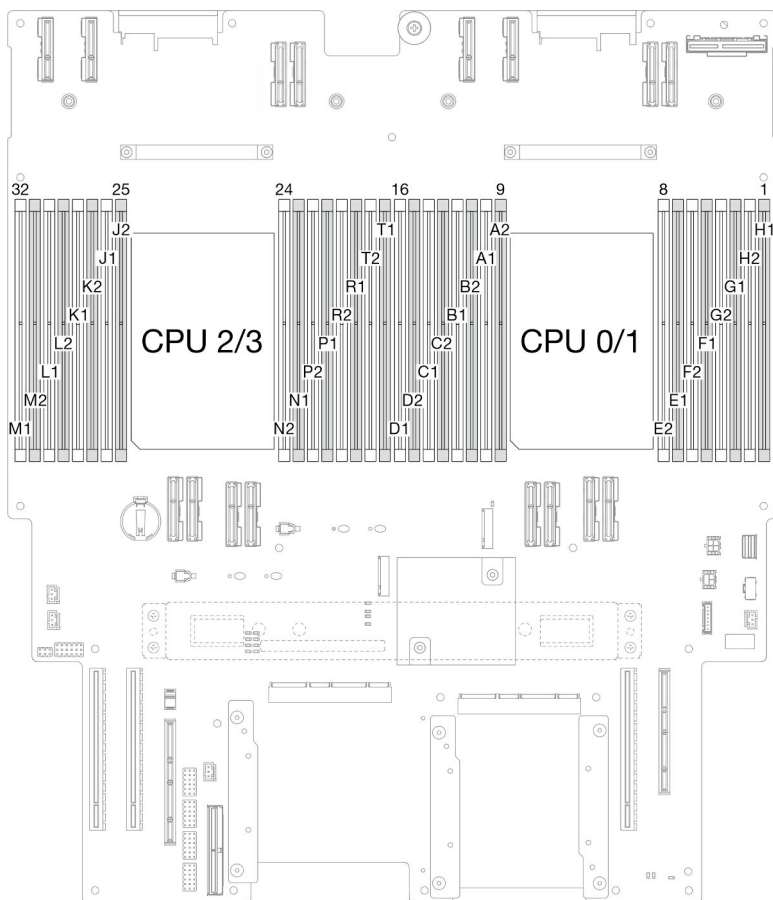


Figure 20. Memory modules and processors layout (lower processor board (MB))

The memory-channel configuration table below shows the relationship between the processors, memory controllers, memory channels, and memory module slot numbers.

Table 17. Memory slot and channel identification

Processor	Processor 0/1/4/5															
Controller	iMC3				iMC2				iMC0				iMC1			
Channel	CH1		CH0		CH1		CH0		CH0		CH1		CH0		CH1	
Slot No.	0	1	0	1	0	1	0	1	1	0	1	0	1	0	1	0
DIMM No.	D1	D2	C1	C2	B1	B2	A1	A2	E2	E1	F2	F1	G2	G1	H2	H1
Processor	Processor 2/3/6/7															
Controller	iMC3				iMC2				iMC0				iMC1			
Channel	CH1		CH0		CH1		CH0		CH0		CH1		CH0		CH1	
Slot No.	0	1	0	1	0	1	0	1	1	0	1	0	1	0	1	0
DIMM No.	M1	M2	L1	L2	K1	K2	J1	J2	N2	N1	P2	P1	R2	R1	T2	T1

Memory module installation guideline

- A label on each DIMM identifies the DIMM type. This information is in the format **xxxxx nRxxx PC4-xxxxx-xx-xx-xxx**. Where *n* indicates if the DIMM is single-rank (*n*=1) or dual-rank (*n*=2).

- At least one DIMM is required for each processor. Install at least eight DIMMs per processor for good performance.
- When you replace a DIMM, the server provides automatic DIMM enablement capability without requiring you to use the Setup Utility to enable the new DIMM manually.

Independent memory mode installation order

Independent memory mode provides the highest level of memory performance, but lacks failover protection. The DIMM installation order for independent memory mode varies based on the number of processors and memory modules installed in the server.

Follow the rules below when installing memory modules in independent mode:

- There should be at least one DDR5 DIMM per processor.
- All DDR5 memory modules must operate at the same speed in the same system.
- Memory population must be identical between processors.
- Memory modules from different vendors are supported.
- In each memory channel, populate the slot farthest from the processor (slot 0) first.
- All memory modules must be DDR5 memory modules.
- Mixing 16Gbit (16 GB, 32 GB) and 24Gbit (96 GB) memory module is not allowed in a system.
- 96 GB memory module must be identically populated in the system and only supported on Intel Xeon Platinum processor.
- 96 GB memory module can only support 1DPC (8 DIMMs per processor) and 2DPC (16 DIMMs per processor) configurations.
- All memory modules to be installed must be of the same type.
 - Value RDIMM cannot be mixed with non-value RDIMMs in a system.
 - 3DS RDIMM cannot be mixed with non-3DS RDIMMs in a system.
- All memory modules in a system must have the same number of ranks.
- Before installing 24Gbit (96 GB) memory module to the system, make sure to update the UEFI firmware to the latest version first, then remove all existing 16Gbit (16 GB, 32 GB) memory modules.

Table 18. Independent mode

Total DIMMs	Processor 0/1/4/5															
	D1	D2	C1	C2	B1	B2	A1	A2	E2	E1	F2	F1	G2	G1	H2	H1
8 DIMMs							A1									
16 DIMMs*							A1							G1		
32 DIMMs*			C1				A1			E1				G1		
48 DIMMs*	D1		C1				A1			E1		F1		G1		
64 DIMMs*	D1		C1		B1		A1			E1		F1		G1		H1
96 DIMMs*	D1		C1	C2	B1		A1	A2	E2	E1		F1	G2	G1		H1
128 DIMMs*	D1	D2	C1	C2	B1	B2	A1	A2	E2	E1	F2	F1	G2	G1	H2	H1
Total DIMMs	Processor 2/3/6/7															
	M1	M2	L1	L2	K1	K2	J1	J2	N2	N1	P2	P1	R2	R1	T2	T1
8 DIMMs							J1									
16 DIMMs*							J1							R1		

Table 18. Independent mode (continued)

32 DIMMs*			L1				J1			N1				R1		
48 DIMMs*	M1		L1				J1			N1		P1		R1		
64 DIMMs*	M1		L1		K1		J1			N1		P1		R1		T1
96 DIMMs*	M1		L1	L2	K1		J1	J2	N2	N1		P1	R2	R1		T1
128 DIMMs*	M1	M2	L1	L2	K1	K2	J1	J2	N2	N1	P2	P1	R2	R1	T2	T1

Note: DIMM configurations that support the Sub NUMA Clustering (SNC) feature, which can be enabled via UEFI. SNC is not supported if DIMM population does not follow the sequence indicated by the table above.

Memory mirroring mode installation order

Memory-mirroring mode provides full memory redundancy while reducing the total system memory capacity in half. Memory channels are grouped in pairs with each channel receiving the same data. If a failure occurs, the memory controller switches from the DIMMs on the primary channel to the DIMMs on the backup channel. The DIMM installation order for memory mirroring varies based on the number of processors and DIMMs installed in the server.

Memory mirroring guidelines:

- Memory mirroring reduces the maximum available memory by half of the installed memory. For example, if the server has 64 GB of installed memory, only 32 GB of addressable memory is available when memory mirroring is enabled.
- Each DIMM must be identical in size and architecture.
- DIMMs on each memory channel must be of equal density.
- If two memory channels have DIMMs, mirroring occurs across two DIMMs (channels 0/1 will both contain the primary/secondary memory caches).
- If three memory channels have DIMMs, mirroring occurs across all three DIMMs (channels 0/1, channels 1/2, and channels 2/0 will all contain primary/secondary memory caches).
- Partial Memory Mirroring is a sub-function of memory mirroring. It requires following the memory installation order of memory mirroring mode.
- Before installing 24Gbit (96 GB) memory module to the system, make sure to update the UEFI firmware to the latest version first, then remove all existing 16Gbit (16 GB, 32 GB, 64 GB, 128 GB, 256 GB) memory modules.

Table 19. Memory mirroring mode

Total DIMMs	Processor 0/1/4/5															
	D1	D2	C1	C2	B1	B2	A1	A2	E2	E1	F2	F1	G2	G1	H2	H1
64 DIMMs	D1		C1		B1		A1			E1		F1		G1		H1
128 DIMMs	D1	D2	C1	C2	B1	B2	A1	A2	E2	E1	F2	F1	G2	G1	H2	H1
Total DIMMs	Processor 2/3/6/7															
	M1	M2	L1	L2	K1	K2	J1	J2	N2	N1	P2	P1	R2	R1	T2	T1
64 DIMMs	M1		L1		K1		J1			N1		P1		R1		T1
128 DIMMs	M1	M2	L1	L2	K1	K2	J1	J2	N2	N1	P2	P1	R2	R1	T2	T1

Power on and power off the server

Follow the instructions in this section to power on and power off the server.

Power on the server

First connect the power cords to the **secondary chassis**, then connect the power cords to the **primary chassis**. 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).

Note: It is recommended to connect PSU P1-P3/S1-S3 to a PDU different from PSU P4-P6/S4-S6 in case of PDU failure.

Power button location and power LED are specified in:

- [Chapter 2 “Server components” on page 13](#)

- [“Troubleshooting by system LEDs and diagnostics display” on page 285](#)

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 50](#).

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), first disconnect all the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**.

Power button location and power LED are specified in:

- [Chapter 2 “Server components” on page 13](#)
- [“Troubleshooting by system LEDs and diagnostics display” on page 285](#)

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 49](#).

Server replacement

Follow the instructions in this section to remove and install the server.

Remove the server from rails

About this task

S036



18 - 32 kg (39 - 70 lb)



32 - 55 kg (70 - 121 lb)

CAUTION:
Use safe practices when lifting.

R006



CAUTION:

Do not place any object on top of a rack-mounted device unless that rack-mounted device is intended for use as a shelf.

S037



CAUTION:

The weight of this part or unit is more than 55 kg (121.2 lb). It takes specially trained persons, a lifting device, or both to safely lift this part or unit.

Attention:

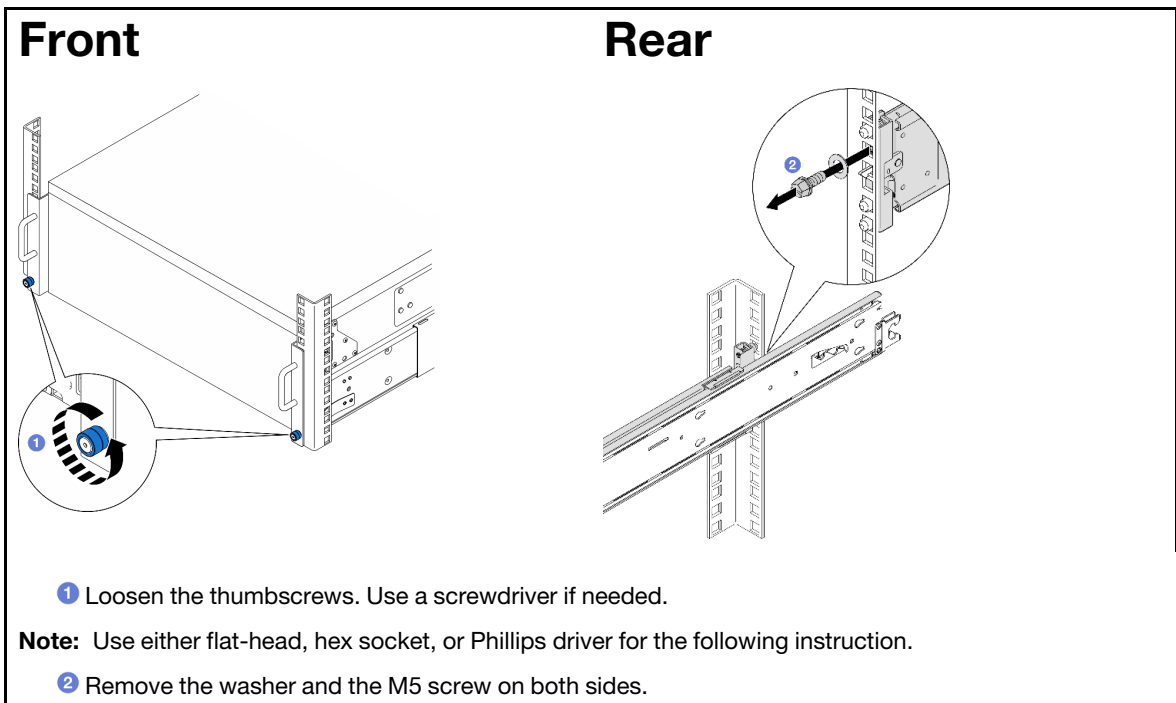
- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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.

Notes:







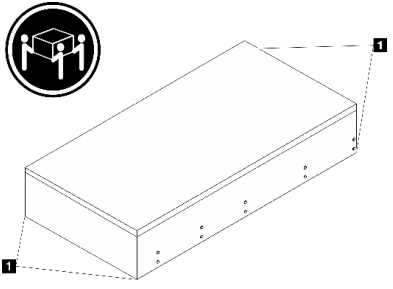
- Depending on the configuration, your server might be slightly different from the image.
- The primary chassis is shown below as an example, the secondary chassis is similar.

Procedure

- Step 1. Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- Step 2. If a security bezel is installed, remove it. See [“Remove the security bezel” on page 200](#).
- Step 3. Disengage the sever if it has been secured to the rack.



Step 4. Determine the lifting method. Two lifting options are available:

  <p>18-32 kg 39-70 lb</p>	  <p>32-55 kg 70-121 lb</p>
<p>For two-person lift, remove the following components beforehand:</p> <ul style="list-style-type: none"> • All the power supply units • All the storage drives • Top cover 	  <p>55-100 kg 121-220 lb</p>
	<p>CAUTION: Make sure to lift the server by holding the lift points.</p>
<p>1 Lift point</p>	

Step 5. Disconnect the sideband cables from the primary and secondary chassis.

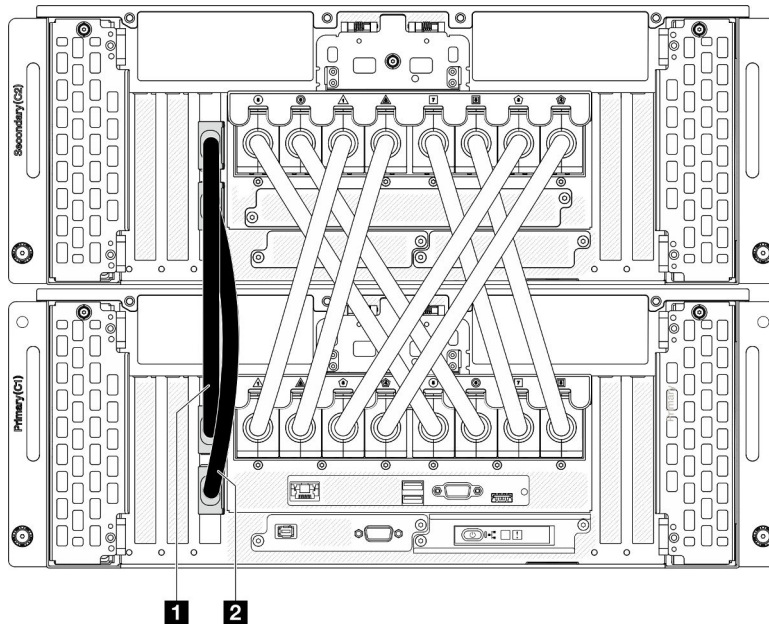


Figure 21. Disconnecting sideband cables

1 Sideband cable 1	1 Sideband cable 2
--------------------	--------------------

Step 6. Open the UPI cover on the primary chassis.

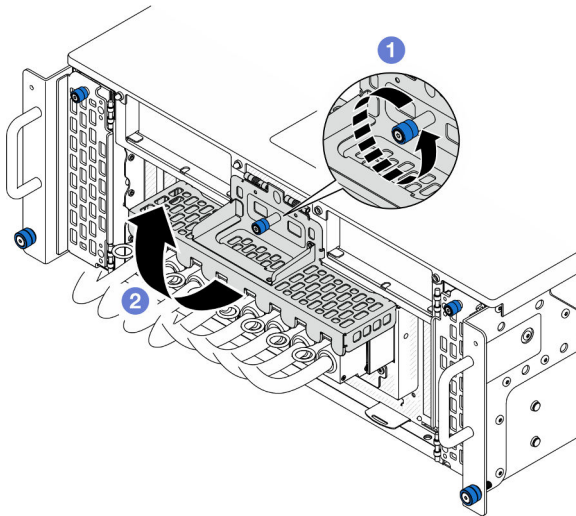


Figure 22. Opening UPI cover

- a. 1 Loosen the thumbscrew on the UPI cover. Use a screwdriver if needed.
- b. 2 UPI cover will open automatically.

Step 7. Disconnect the external UPI cables from the primary chassis.

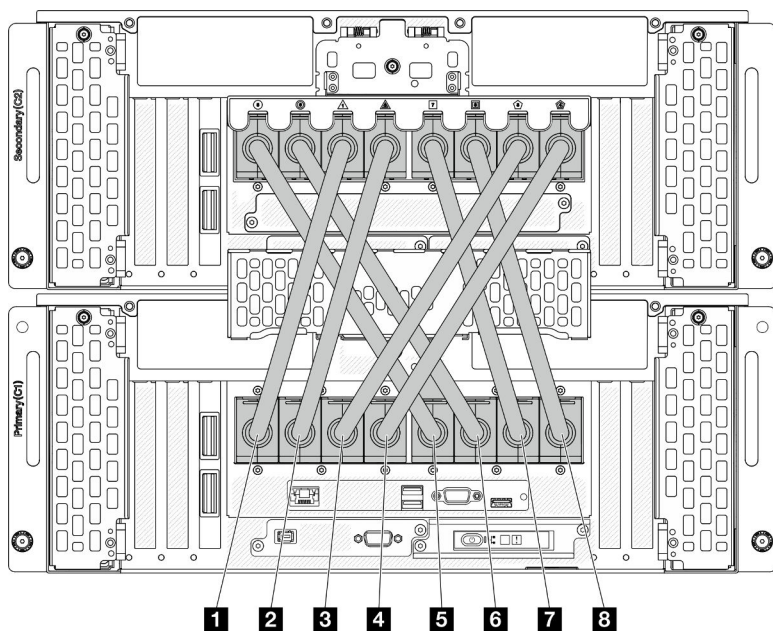


Figure 23. Disconnecting external UPI cables

1 External UPI cable 1	5 External UPI cable 5
2 External UPI cable 2	6 External UPI cable 6
3 External UPI cable 3	7 External UPI cable 7
4 External UPI cable 4	8 External UPI cable 8

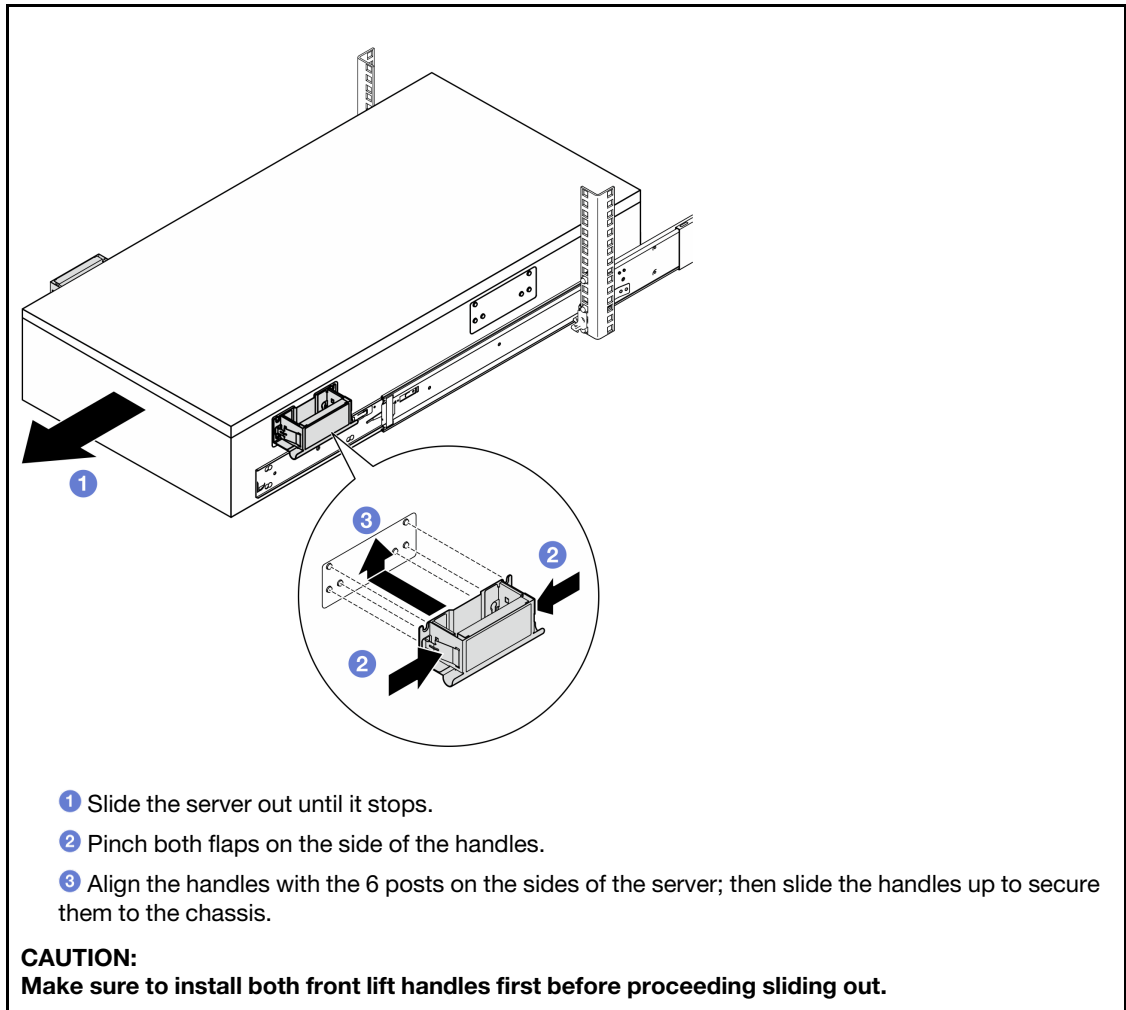
Step 8. Repeat the previous two steps on the secondary chassis to disconnect and remove the external UPI cables.

Step 9. Disconnect all external cables from the chassis.

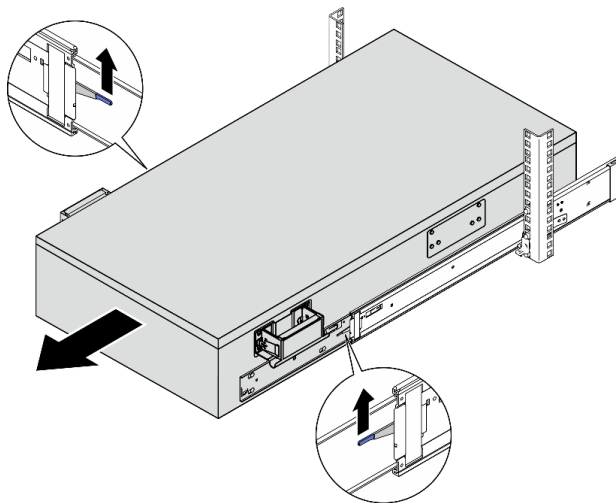
Note: When disconnecting cables, make a list of each cable and record the connectors the cable is connected to, and use the record as a cabling checklist after installing the chassis back into the rack.

Step 10. Remove the server along with the inner rails from rack

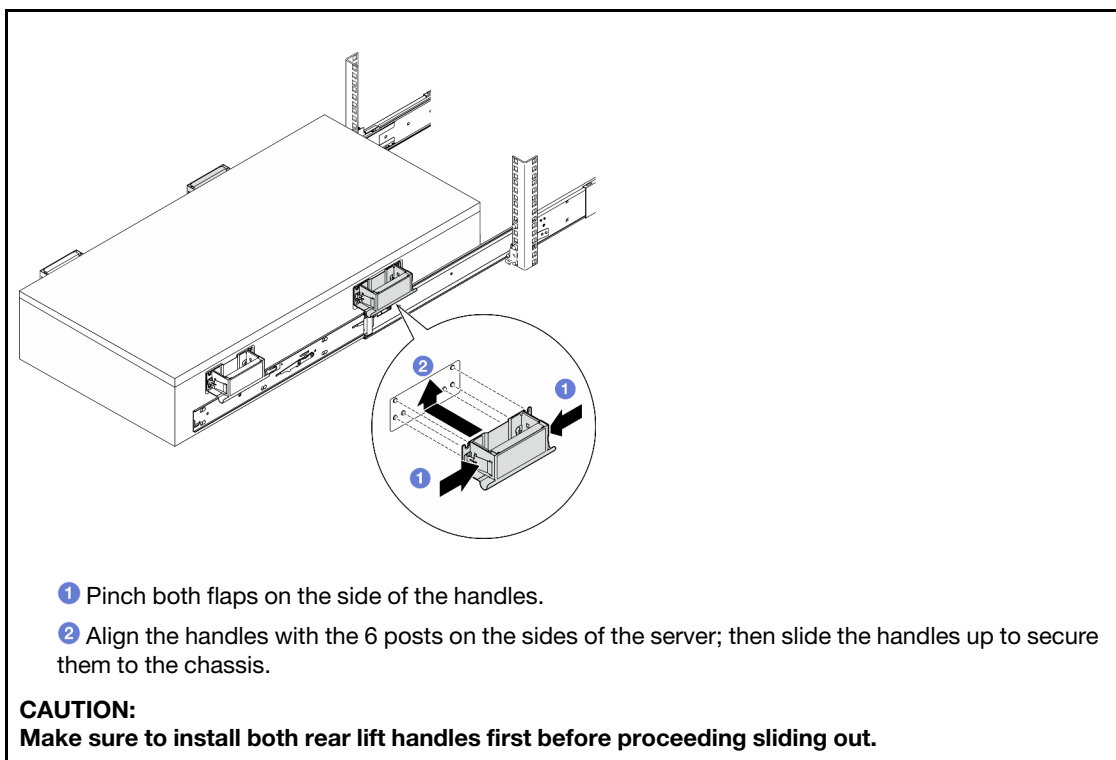
- a. Install the front lift handle.



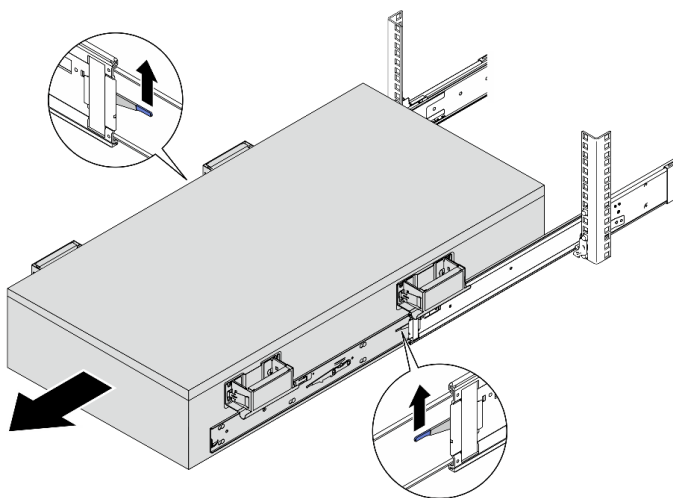
b. Lift the first lock latches up to proceed sliding out.

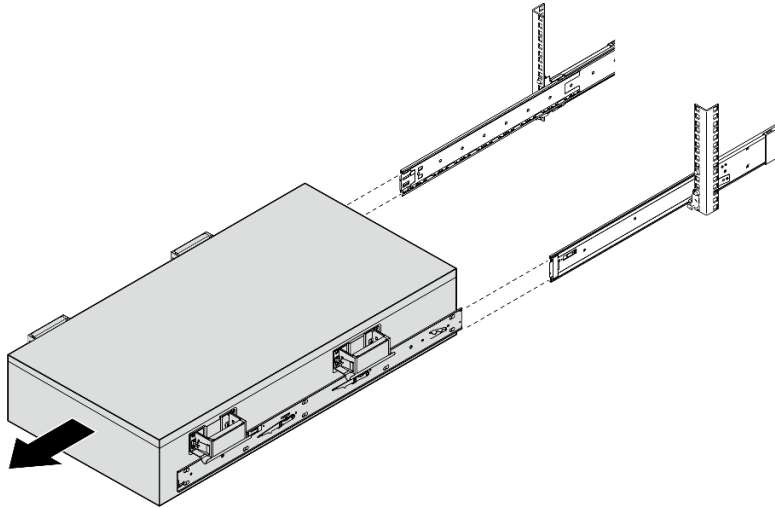


c. Attach the rear handles.

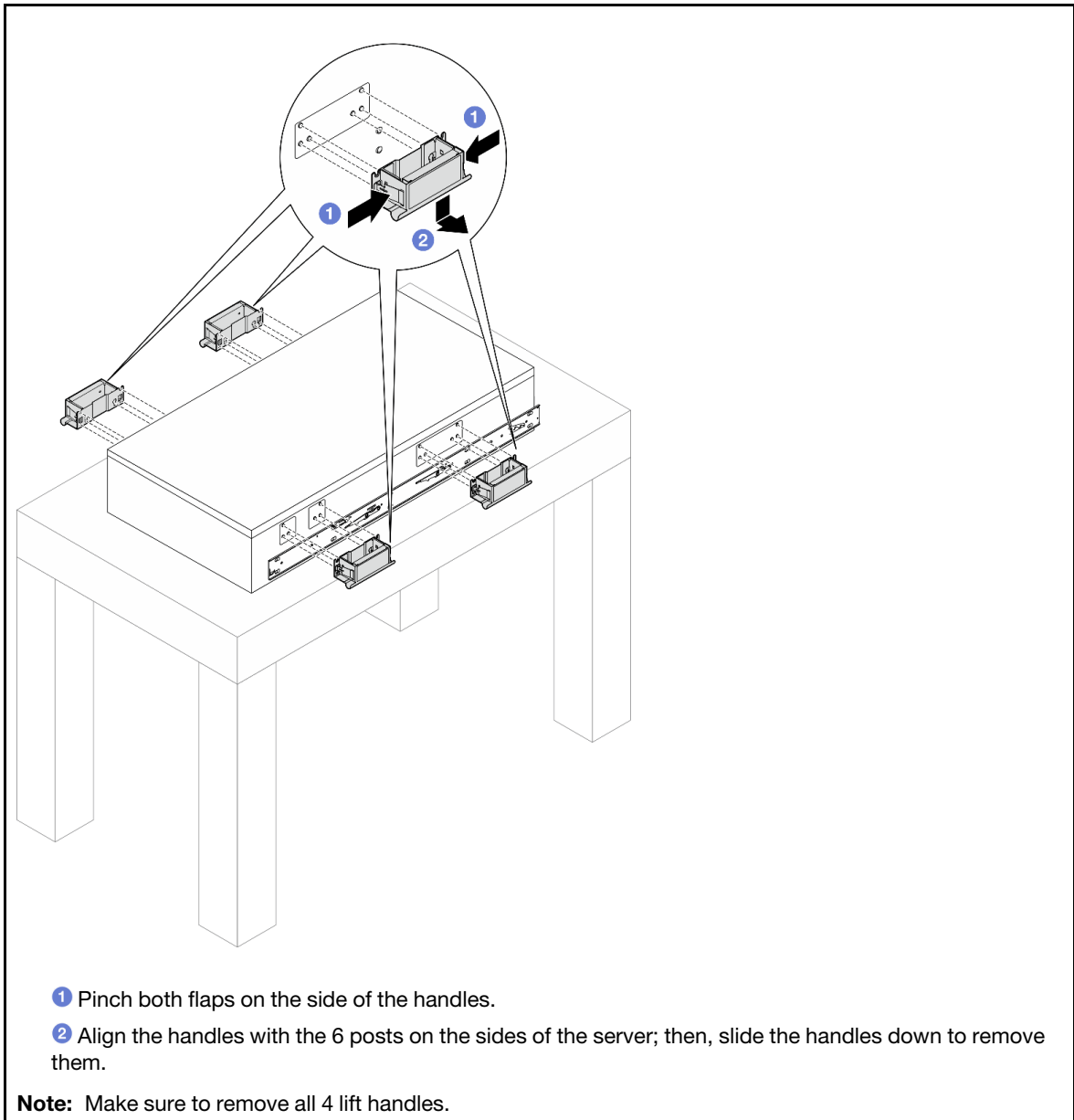


- d. Lift the second lock latches up and remove the server completely from the rack; then place it on a table.

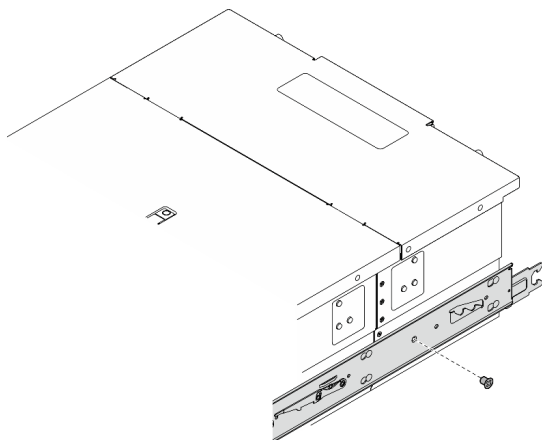




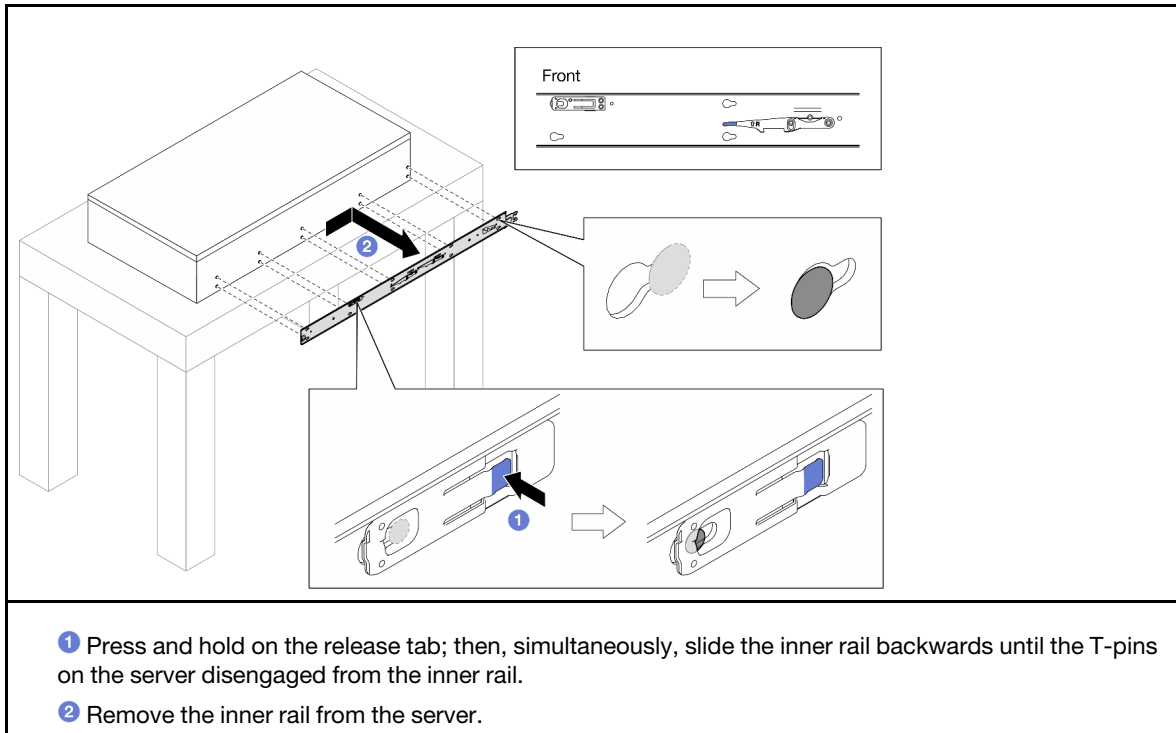
Step 11. Remove the lift handles.



Step 12. Loosen and remove an M4 screw in the corresponding hole on both inner rails as shown.



Step 13. Remove the inner rail from the server.



Step 14. Repeat the previous two steps on the other rail.

Install the server to rails

About this task

S036



18 - 32 kg (39 - 70 lb)



32 - 55 kg (70 - 121 lb)

CAUTION:
Use safe practices when lifting.

R006



CAUTION:
Do not place any object on top of a rack-mounted device unless that rack-mounted device is intended for use as a shelf.

S037



CAUTION:
The weight of this part or unit is more than 55 kg (121.2 lb). It takes specially trained persons, a lifting device, or both to safely lift this part or unit.

Attention:








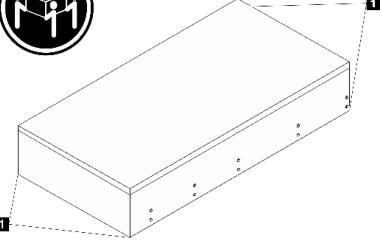
- Read “Installation Guidelines” on page 41 and “Safety inspection checklist” on page 42 to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See “Power off the server” on page 50.
- 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.

Notes:

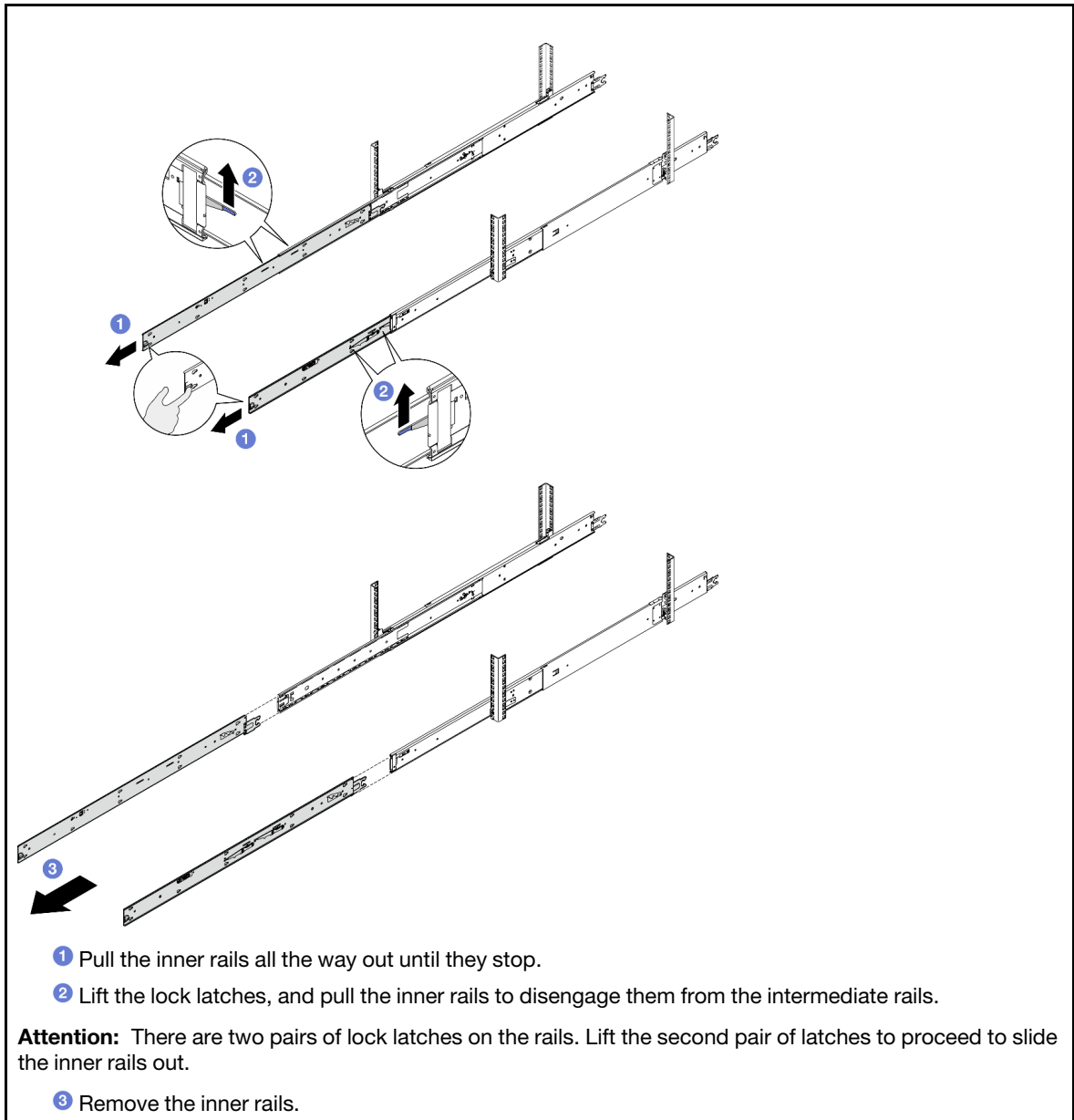
- Depending on the configuration, your server might be slightly different from the image.
- The primary chassis is shown below as an example, the secondary chassis is similar.

Procedure

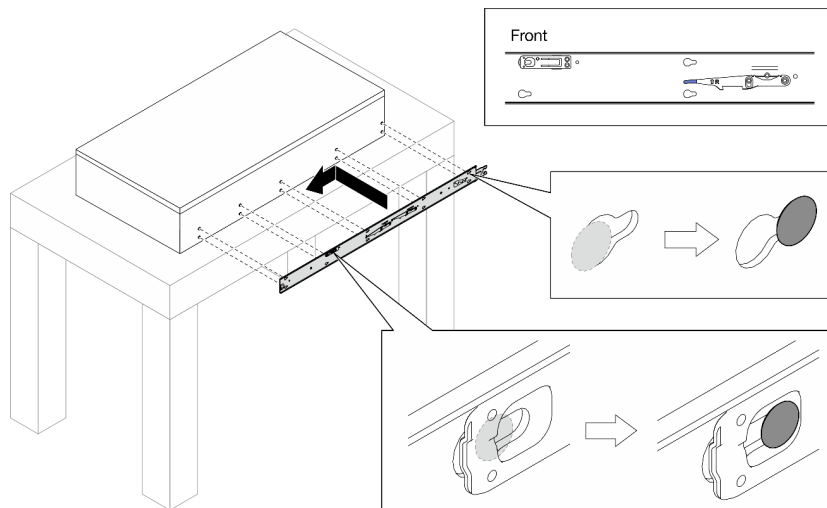
Step 1. Lift the server and place it on a table. Two lifting options are available:

  <p>18-32 kg 39-70 lb</p> <p>For two-person lift, remove the following components beforehand:</p> <ul style="list-style-type: none">• All the power supply units• All the storage drives• Top cover	  <p>32-55 kg 70-121 lb</p>   <p>55-100 kg 121-220 lb</p> <p>Otherwise, lift the server with three people or a lifting device.</p>
 	<p>CAUTION: Make sure to lift the server by holding the lift points.</p>
<p>1 Lift point</p>	

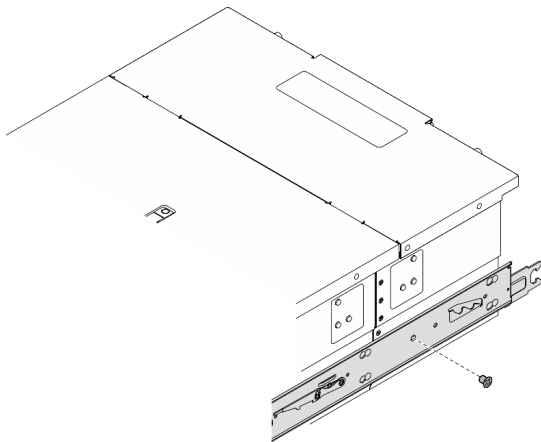
Step 2. Remove the inner rails from the intermediate rails.



Step 3. Align the slots on the inner rail with the corresponding T-pins on the side of the server; then, slide the inner rail forwards until the T-pins lock into place with the inner rail.

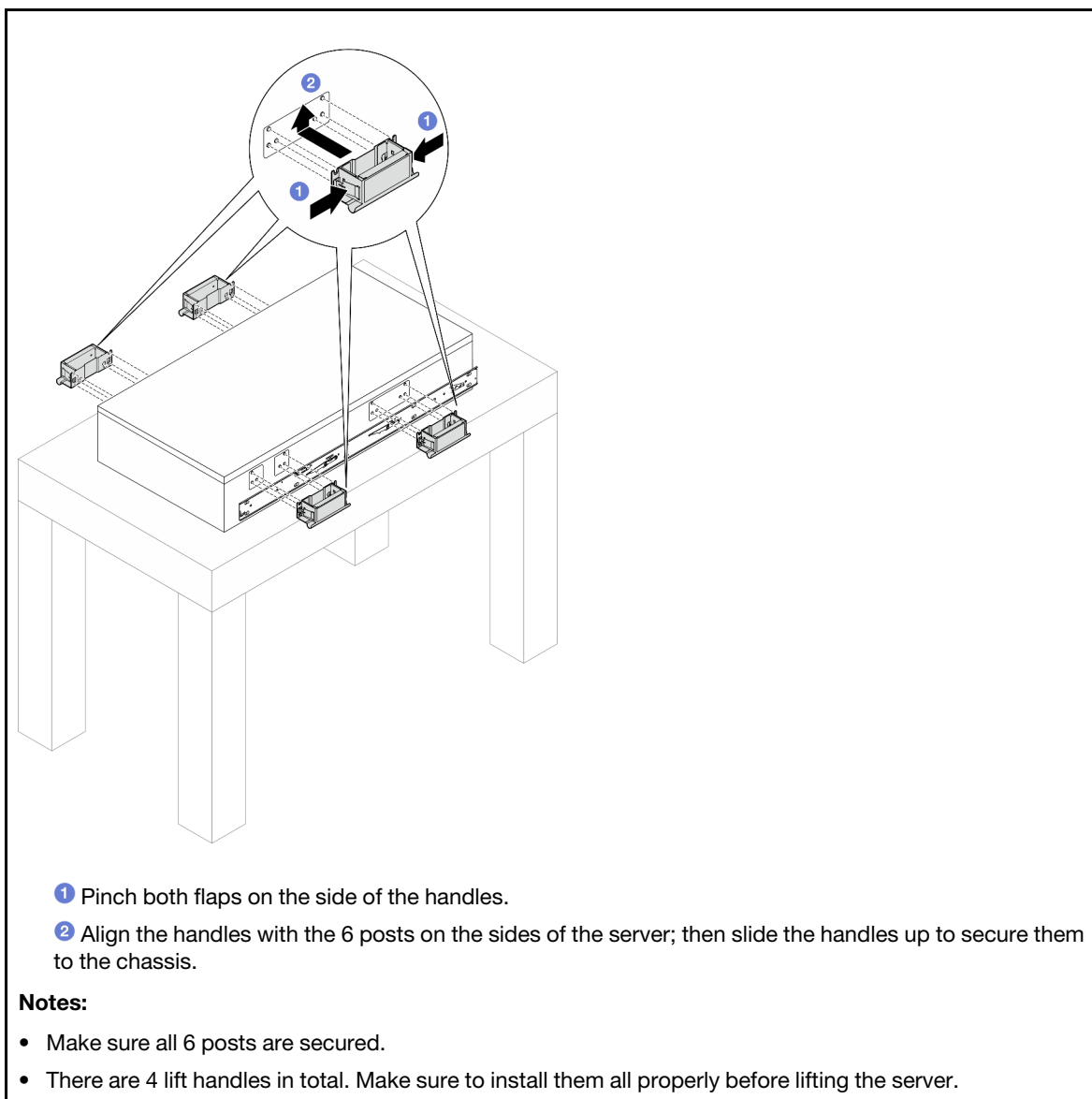


Step 4. Insert and tighten an M4 screw to secure the inner rail as shown.

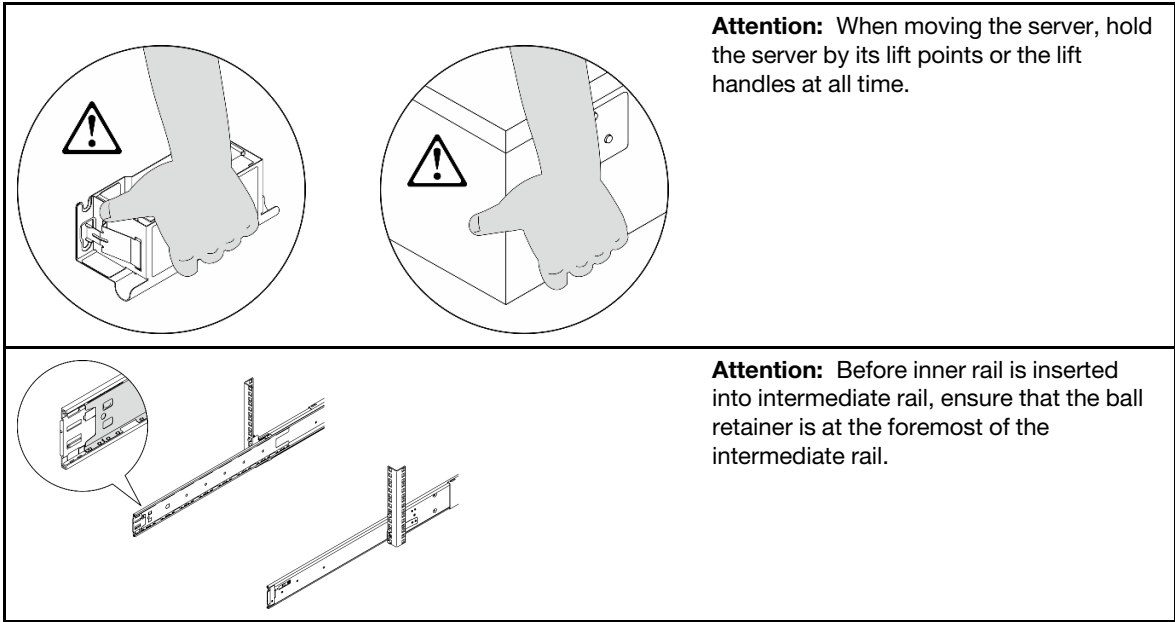


Step 5. Repeat the previous two steps on the other rail.

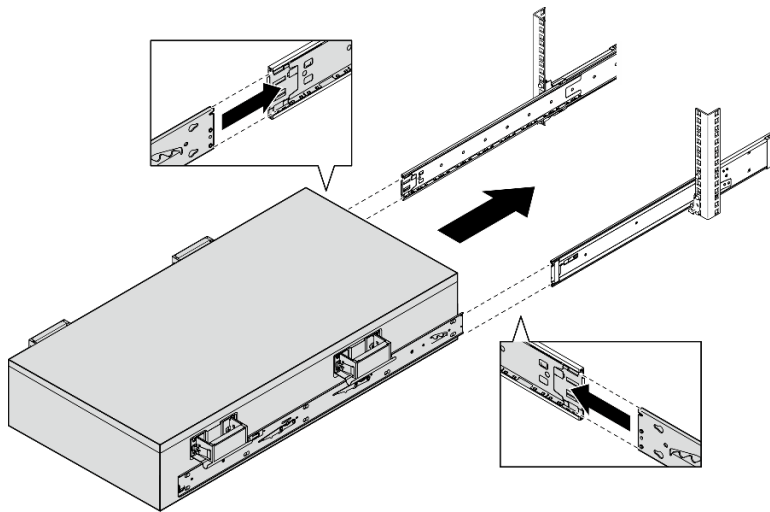
Step 6. Attach the lift handle.



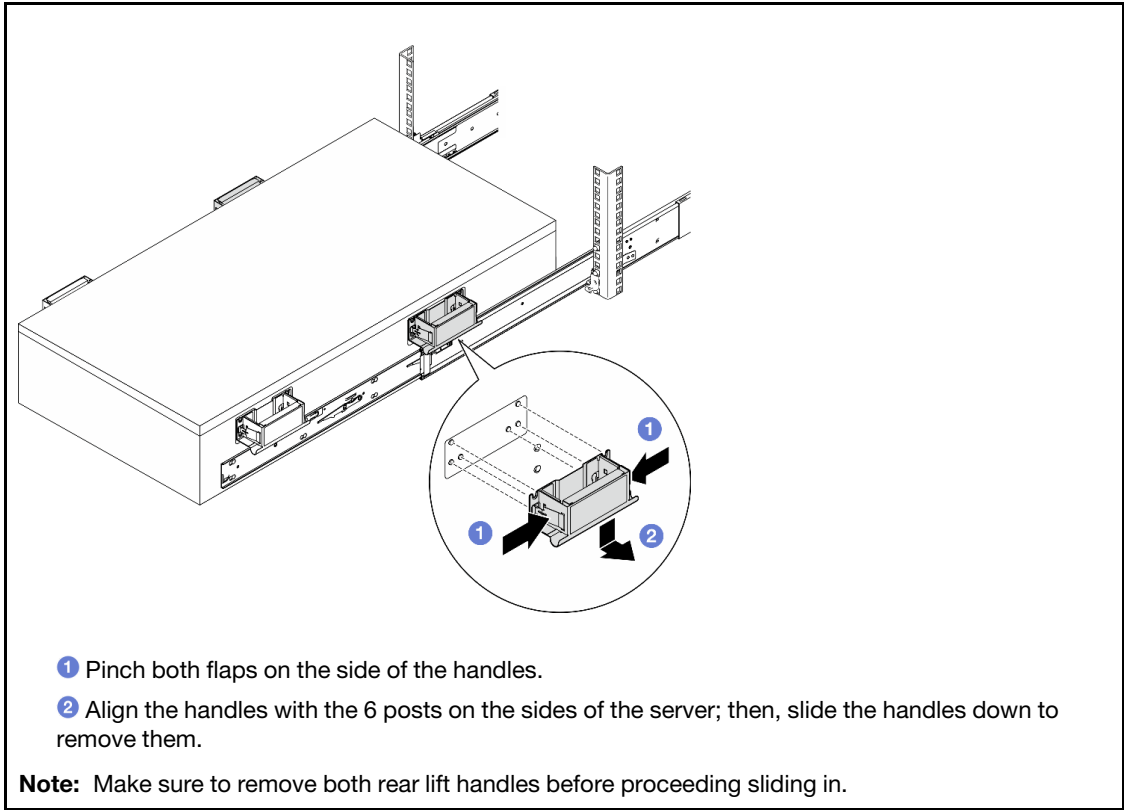
Step 7. Install the server to the rack.



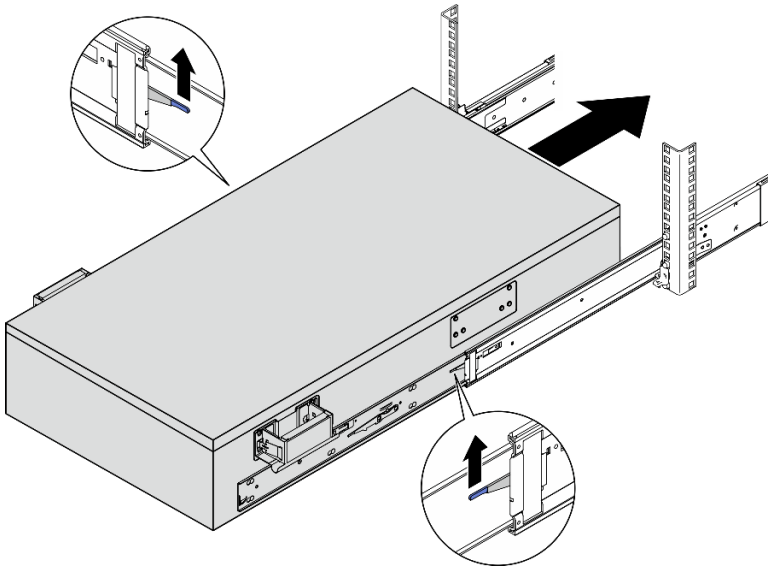
- a. Align both rear ends of the inner rails with the openings in the intermediate rails, and make sure the two pairs of rails mate correctly. Then, carefully slide the server into the rack until the rails snap into place.



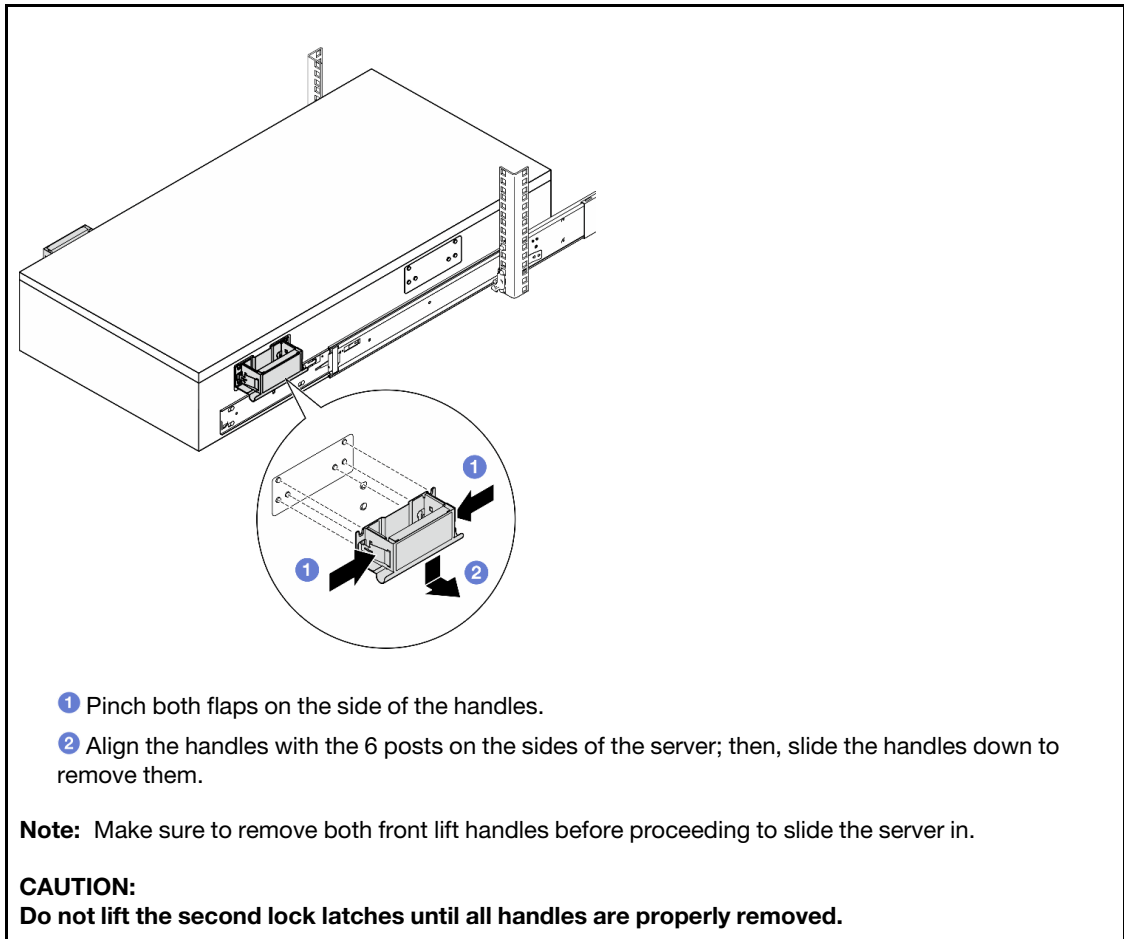
- b. Remove the rear lift handles.



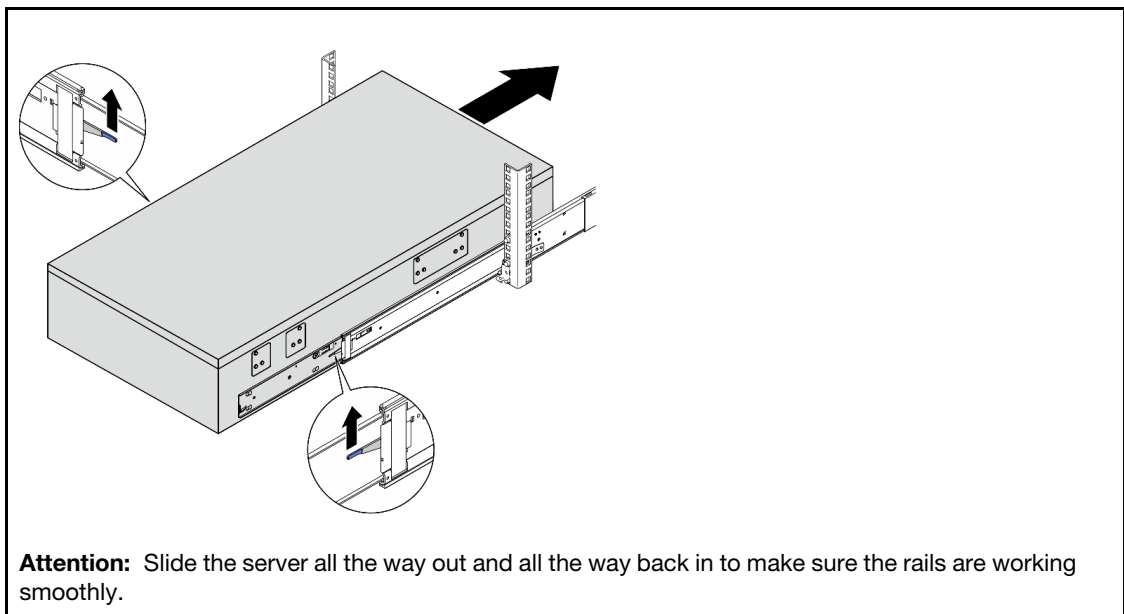
- c. Lift the first pair of lock latches to proceed to slide the server in until the rails snap into place.



- d. Remove the front lift handles.



- e. Lift the second pair of lock latches to proceed to slide the server in.



- Step 8. Connect the external UPI cables to the primary chassis. Make sure the cables match the number and pattern shown on the UPI label.

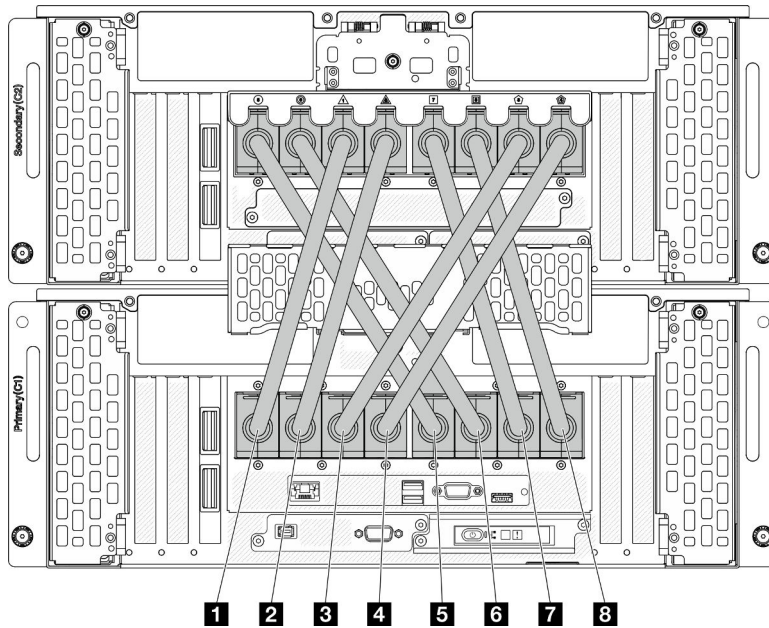


Figure 24. Connecting external UPI cables

1 External UPI cable 1	5 External UPI cable 5
2 External UPI cable 2	6 External UPI cable 6
3 External UPI cable 3	7 External UPI cable 7
4 External UPI cable 4	8 External UPI cable 8

Step 9. Close the UPI cover on the primary chassis.

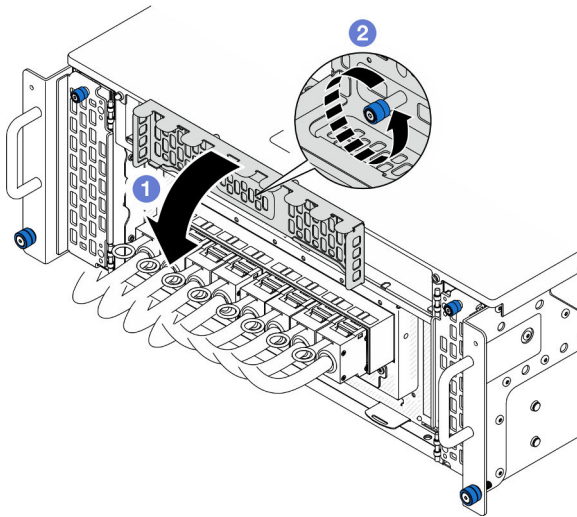


Figure 25. Closing UPI cover

- a. **1** Close the UPI cover.
- b. **2** Tighten the thumbscrew to secure the UPI cover. Use a screwdriver if needed.

Step 10. Repeat the previous two steps on the secondary chassis to connect and install the external UPI cables.

Step 11. Connect the sideband cables to the primary and secondary chassis.

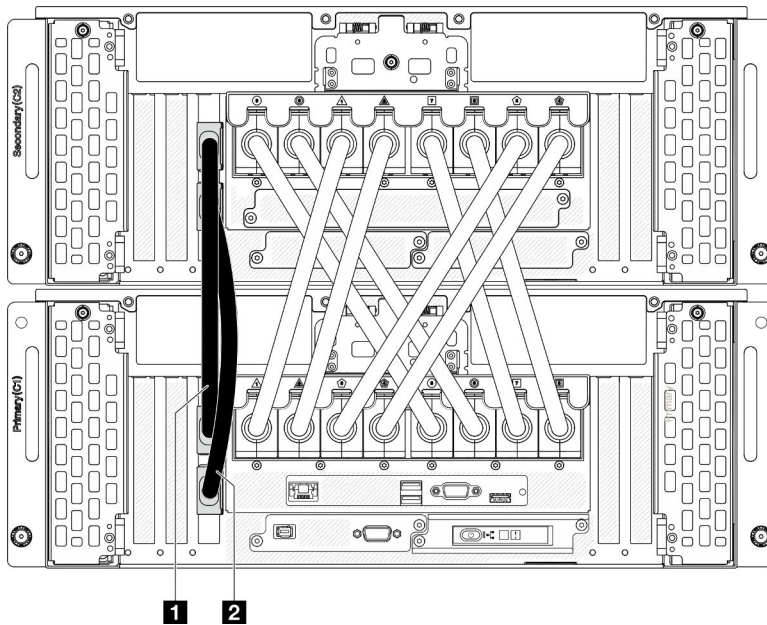


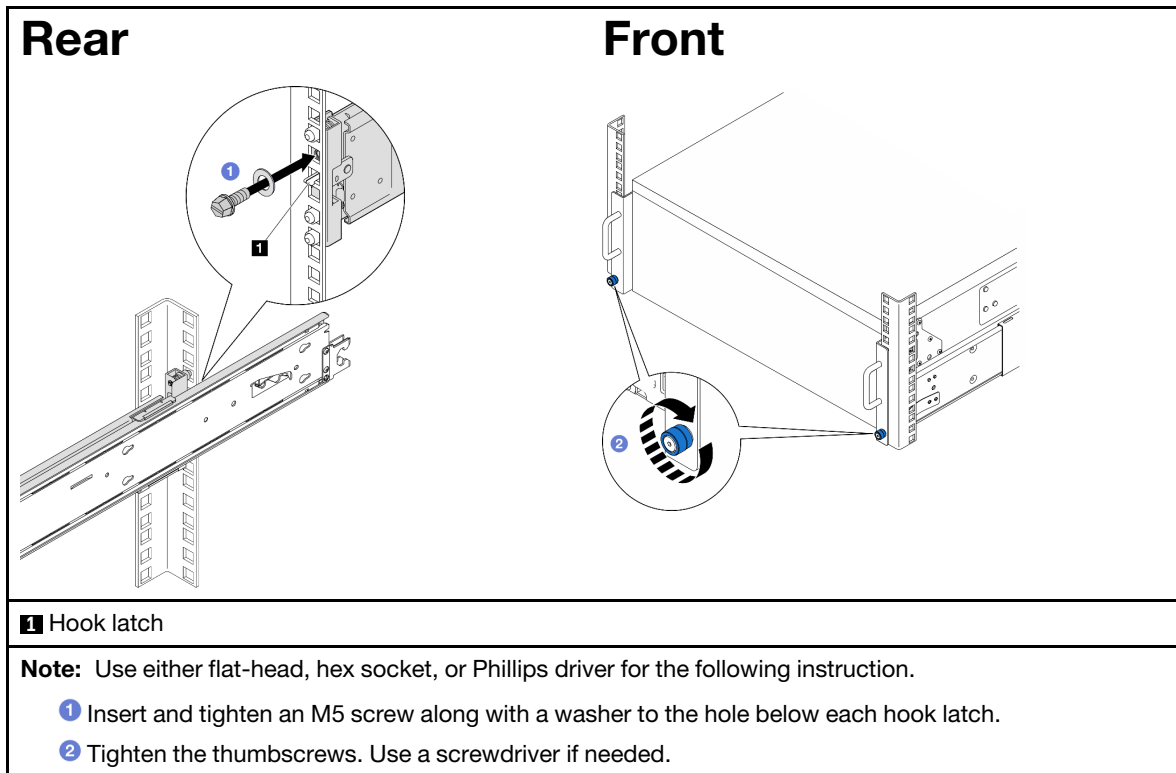
Figure 26. Connecting sideband cables

1 Sideband cable 1	1 Sideband cable 2
--------------------	--------------------

Step 12. Connect all remaining external cables to the chassis.

Step 13. Reinstall all the components that were removed previously.

Step 14. (Optional) Secure the server to the rack.



Step 15. If you have removed a security bezel, reinstall it. See [“Install the security bezel” on page 201](#).

Step 16. Reconnect the power cords to the **secondary chassis**, then reconnect the power cords to the **primary chassis**.

Note: It is recommended to connect PSU P1-P3/S1-S3 to a PDU different from PSU P4-P6/S4-S6 in case of PDU failure.

Step 17. Reconnect all external cables that you removed.

After you finish

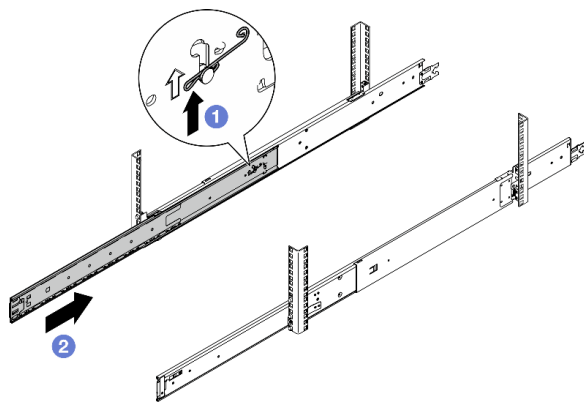
Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

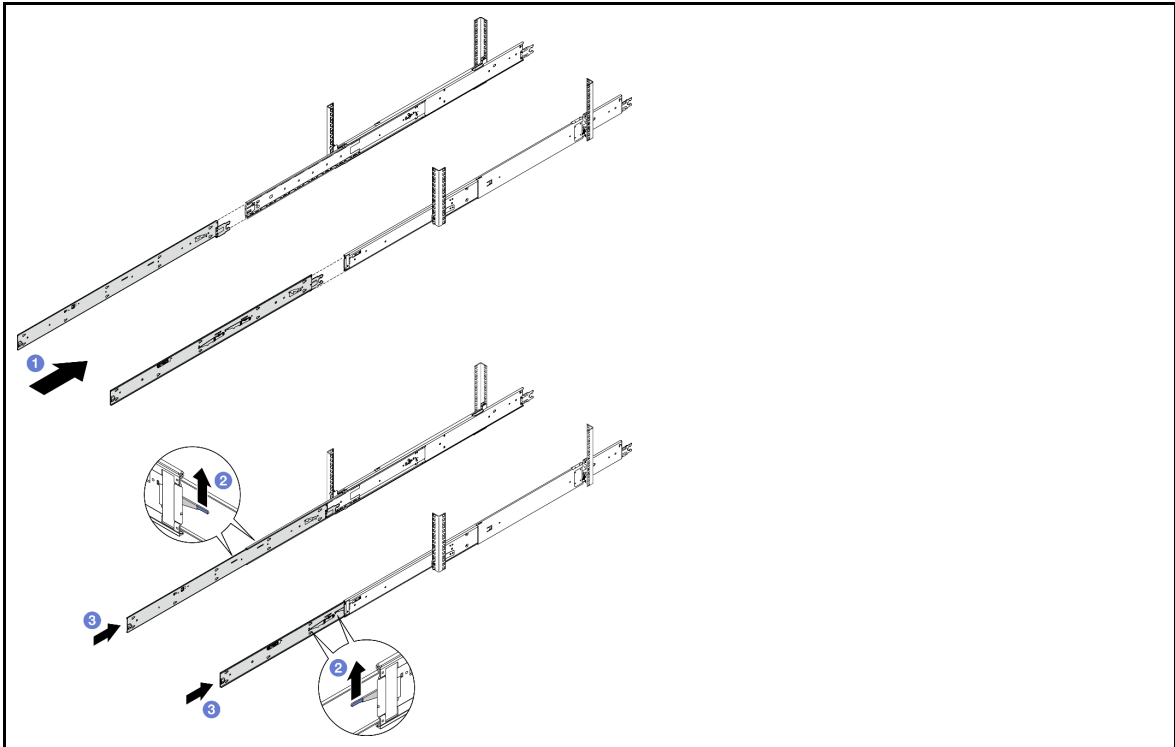
Remove the rails from the rack

Procedure

Step 1. Remove the server from rails. See [“Remove the server from rails” on page 50](#).

Step 2. Before removing the rails from the rack, there are two options to retract the rails into fully retracted state.

Option 1

<ul style="list-style-type: none">1 Lift the release spring.2 Retract the intermediate rail to fully retracted state.3 Repeat the previous steps to the other rail.
Option 2



1 Insert the inner rail into the intermediate rail until it stops.

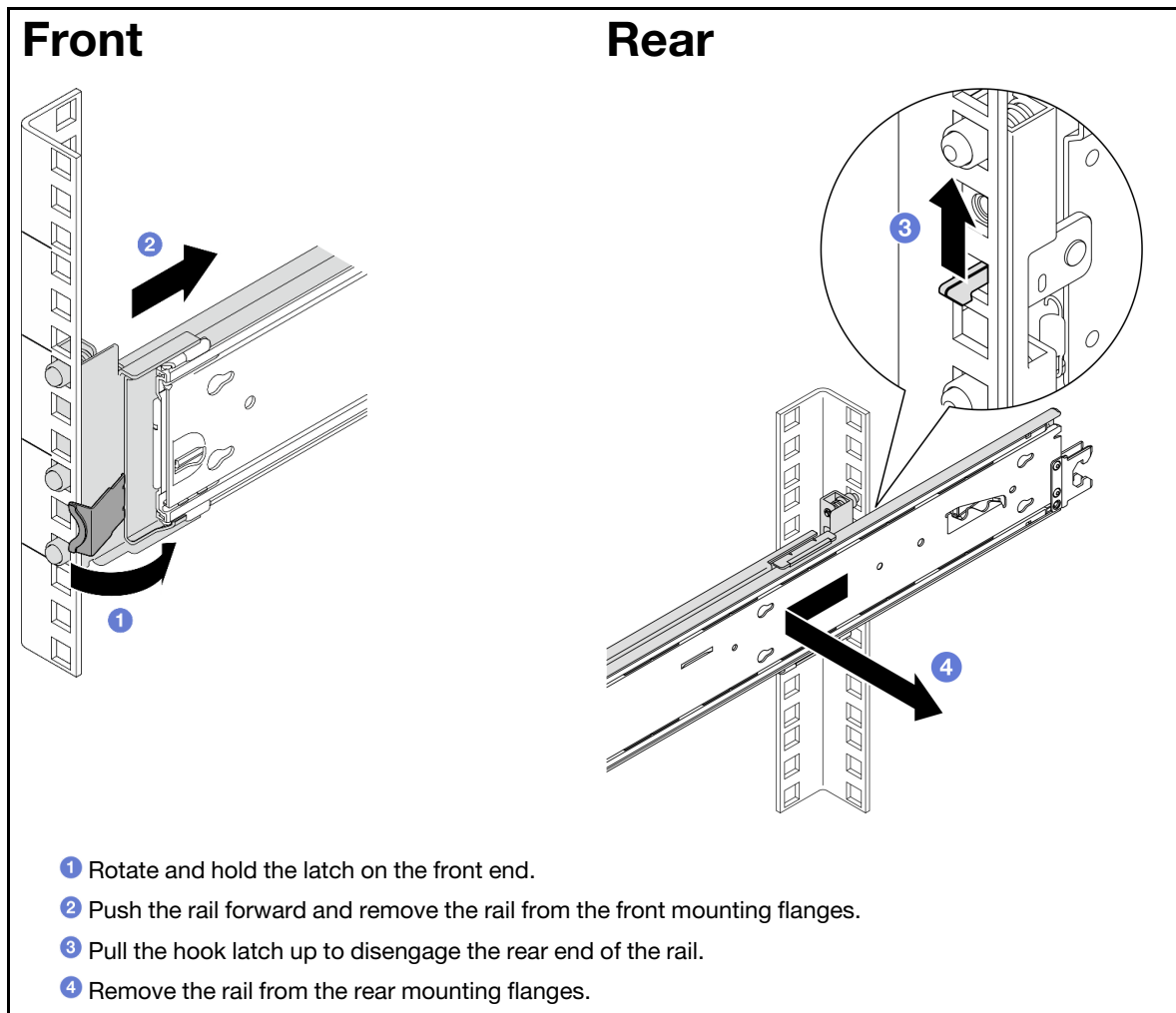
2 Lift the lock latches up.

Attention: There are two pairs of lock latches on the rails. Lift the second pair up again.

3 Push the inner rail in to fully retracted state.

4 Repeat the previous steps to the other rail.

Step 3. Remove the rails from the rack.



After you finish

1. Install a replacement unit. See the instructions in *Rail Installation Guide* that comes with the rail kit.
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.

Air baffle replacement

Follow the instructions in this section to remove and install the air baffle.

Remove the upper processor board (CPU BD) air baffle

Follow the instructions in this section to remove the upper processor board (CPU BD) air baffle.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.

- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- If the server is installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).
- If you intend to install memory modules in the server, you must first remove the air baffle from the server.

Procedure

Step 1. Remove the front top cover. See [“Remove the front top cover” on page 233](#).

Step 2. Disconnect the cables from the M.2 boot adapter.

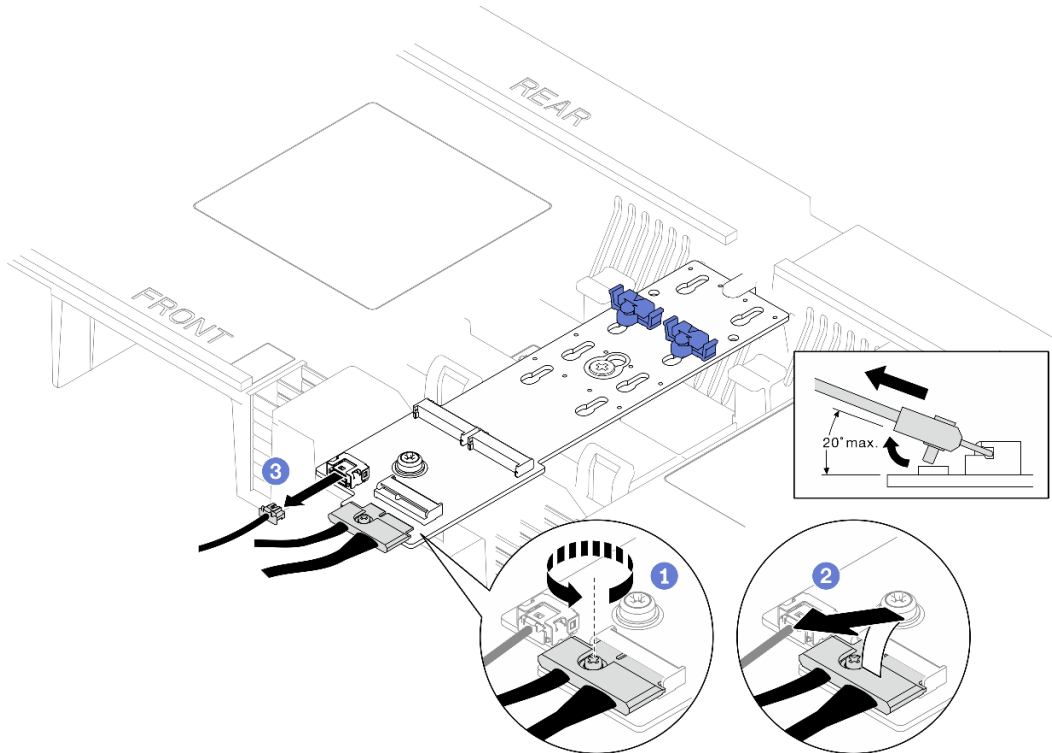


Figure 27. Disconnecting cable from M.2 boot adapter

- Loosen the screw on the signal cable.
 - Tilt the connector and remove it.
 - Remove the power cable.
- Step 3. Record the cable connections first; then, disconnect and lift the cables routed through the upper processor board (CPU BD) air baffle and set them aside.
- Step 4. Grasp both blue handles on the upper processor board (CPU BD) air baffle and carefully lift it out of the chassis.

Attention: For proper cooling and airflow, reinstall the upper processor board (CPU BD) and lower processor board (MB) air baffles before you turn on the server. Operating the server with the air baffle removed might damage server components.

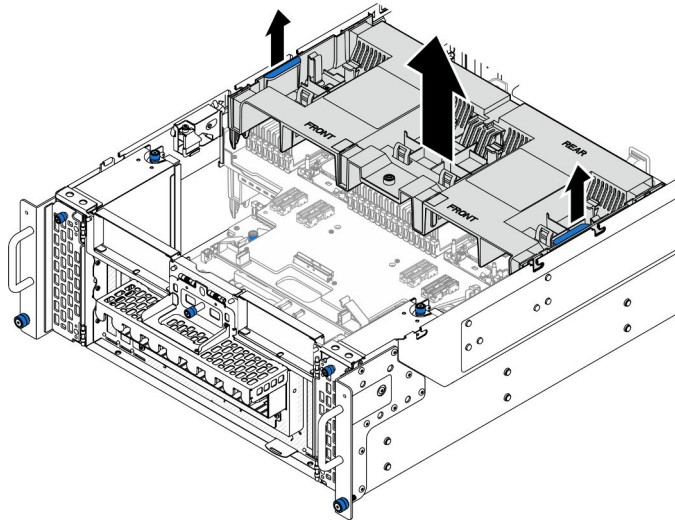


Figure 28. Removing upper processor board (CPU BD) air baffle

After you finish

1. Install a replacement unit. See [“Install the upper processor board \(CPU BD\) air baffle” on page 73](#).
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 upper processor board (CPU BD) air baffle

Follow the instructions in this section to install the upper processor board (CPU BD) air baffle.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- If the server is installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).
- If you intend to install memory modules in the server, you must first remove the air baffle from the server.
- For proper cooling and airflow, reinstall the upper processor board (CPU BD) and lower processor board (MB) air baffles before you turn on the server. Operating the server with the air baffle removed might damage server components.

Procedure

- Step 1. Grasp both blue handles and align the upper processor board (CPU BD) air baffle tabs with the slots on both sides of the chassis; then, lower the upper processor board (CPU BD) air baffle into the chassis.

Note: Close the retaining clip on each end of the memory module connector before installing the upper processor board (CPU BD) air baffle for proper cooling.

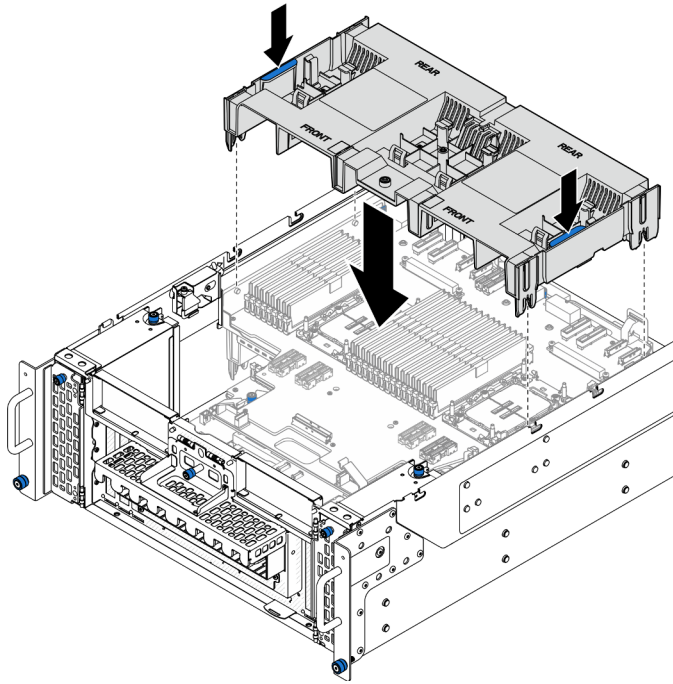


Figure 29. Installing upper processor board (CPU BD) air baffle

- Step 2. Slightly press the upper processor board (CPU BD) air baffle down until it is securely seated.
- Step 3. Reconnect all the cables that were removed earlier and route them through the upper processor board (CPU BD) air baffle.
- Step 4. Connect the cables to the M.2 boot adapter.

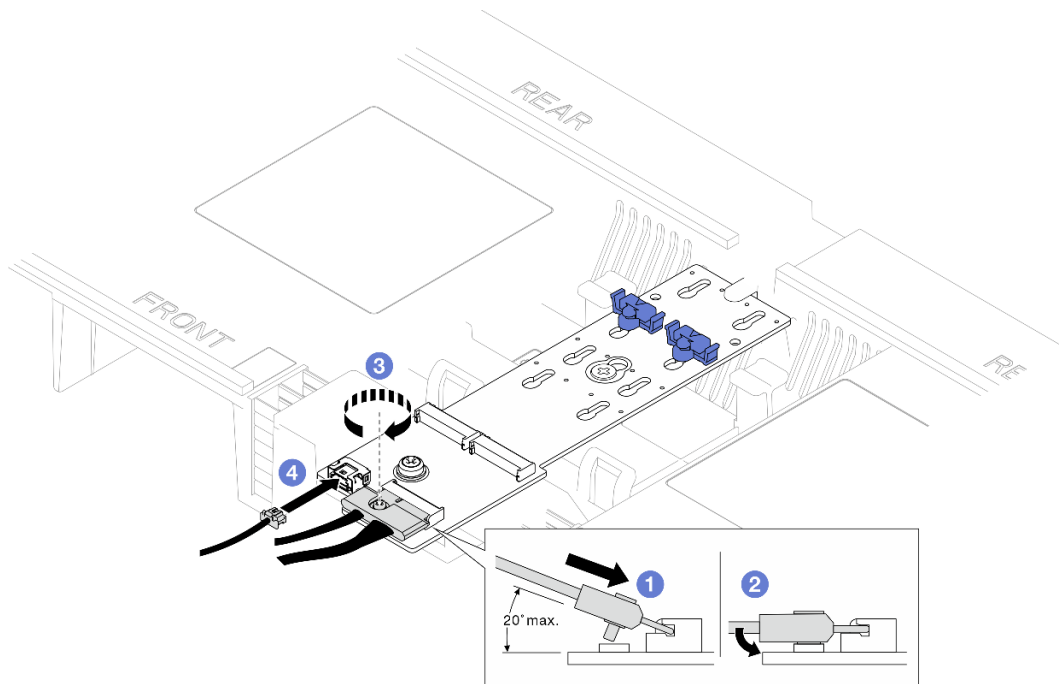


Figure 30. Connecting cable to M.2 boot adapter

1. ① Tilt the connector at an angle of 20 degrees or lower, and insert it until its bottom surface reaches the ramp.
2. ② Press the connector down flat.
3. ③ Tighten the screw on the signal cable.
4. ④ Connect the power cable.

After you finish

1. Reinstall the front top cover. See [“Install the front top cover”](#) on page 239.
2. Complete the parts replacement. See [“Complete the parts replacement”](#) on page 256.

Demo video

[Watch the procedure on YouTube](#)

Remove the lower processor board (MB) air baffle

Follow the instructions in this section to remove the lower processor board (MB) air baffle.

About this task

Attention:

- Read [“Installation Guidelines”](#) on page 41 and [“Safety inspection checklist”](#) on page 42 to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server”](#) on page 50.
- If the server is installed in a rack, remove the server from the rack. See [“Remove the server from rails”](#) on page 50.

- If you intend to install memory modules in the server, you must first remove the air baffle from the server.

Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover”](#) on page 233.
- b. Remove the upper processor board (CPU BD) air baffle. See [“Remove the upper processor board \(CPU BD\) air baffle”](#) on page 71.
- c. Remove the upper processor board (CPU BD). See [“Remove the upper processor board \(CPU BD\)”](#) on page 247.

Step 2. Record the cable connections first; then, disconnect and lift the cables routed through the lower processor board (MB) air baffle and set them aside.

Step 3. Grasp both blue handles on the lower processor board (MB) air baffle and carefully lift it out of the chassis.

Attention: For proper cooling and airflow, reinstall the upper processor board (CPU BD) and lower processor board (MB) air baffles before you turn on the server. Operating the server with the air baffle removed might damage server components.

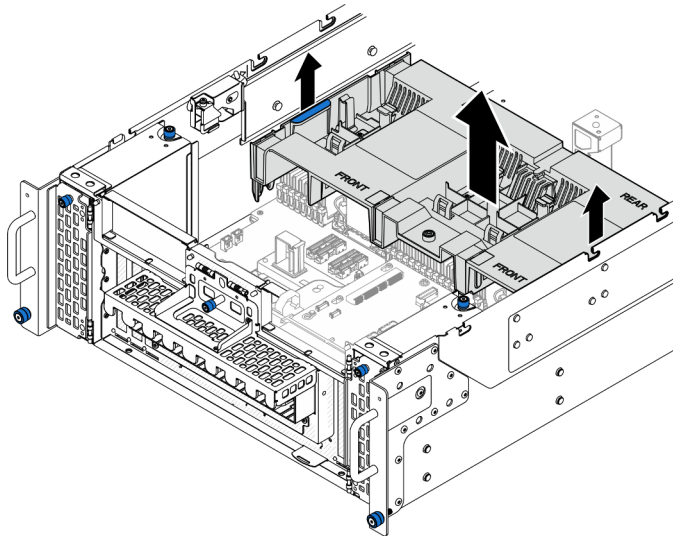


Figure 31. Removing lower processor board (MB) air baffle

After you finish

1. Install a replacement unit. See [“Install the lower processor board \(MB\) air baffle”](#) on page 76.
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 lower processor board (MB) air baffle

Follow the instructions in this section to install the lower processor board (MB) air baffle.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- If the server is installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).
- If you intend to install memory modules in the server, you must first remove the air baffle from the server.
- For proper cooling and airflow, reinstall the upper processor board (CPU BD) and lower processor board (MB) air baffles before you turn on the server. Operating the server with the air baffle removed might damage server components.

Procedure

- Step 1. Grasp both blue handles and align the lower processor board (MB) air baffle tabs with slots on both sides of the chassis; then, lower the lower processor board (MB) air baffle into the chassis.

Note: Close the retaining clip on each end of the memory module connector before installing the upper processor board (CPU BD) air baffle for proper cooling.

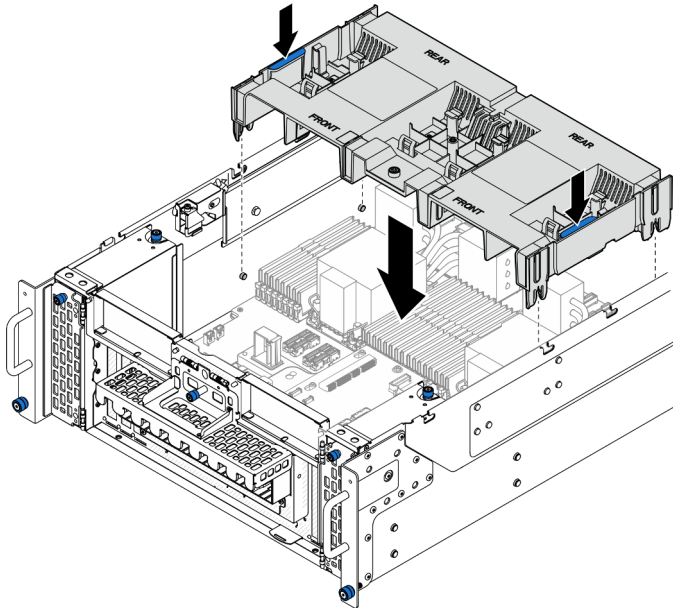


Figure 32. Installing lower processor board (MB) air baffle

- Step 2. Slightly press the lower processor board (MB) air baffle down until it is securely seated.
- Step 3. Reconnect all the cables that were removed earlier and route them through the lower processor board (MB) air baffle.

After you finish

1. Reinstall the upper processor board (CPU BD). See [“Install the upper processor board \(CPU BD\)” on page 252](#).

2. Reinstall the upper processor board (CPU BD) air baffle. See [“Install the upper processor board \(CPU BD\) air baffle” on page 73.](#)
3. Reinstall the front top cover. See [“Install the front top cover” on page 239.](#)
4. Complete the parts replacement. See [“Complete the parts replacement” on page 256.](#)

Demo video

[Watch the procedure on YouTube](#)

CMOS battery (CR2032) replacement

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

Remove the CMOS battery (CR2032)

Follow the 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 CMOS battery must be handled correctly to avoid possible danger. If you replace the CMOS battery, you must adhere to local ordinances or regulations for battery disposal.
- 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 CMOS 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 of 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:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 233](#).
- b. Remove the upper processor board (CPU BD) air baffle. See [“Remove the upper processor board \(CPU BD\) air baffle” on page 71](#).
- c. Remove the upper processor board (CPU BD). See [“Remove the upper processor board \(CPU BD\)” on page 247](#).

Step 2. Locate the CMOS battery on the lower processor board (MB).

Note: The CMOS battery is only used on the primary chassis lower processor board (MB).

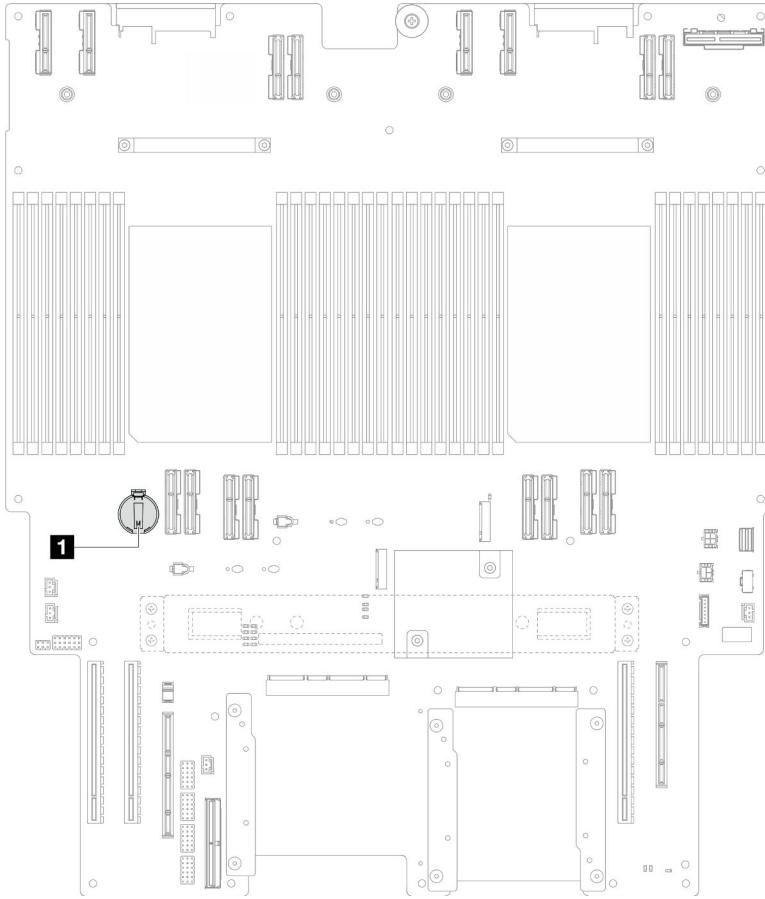


Figure 33. CMOS battery location

1 CMOS battery location

Step 3. 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 lower processor board (MB) and result in lower processor board (MB) replacement.



After you finish

1. Install a replacement unit. See [“Install the CMOS battery \(CR2032\)” on page 81](#).
2. Dispose of the CMOS battery as required by local ordinances or regulations.

Demo video

[Watch the procedure on YouTube](#)

Install the CMOS battery (CR2032)

Follow the 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 of 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:

- Read “[Installation Guidelines](#)” on page 41 and “[Safety inspection checklist](#)” on page 42 to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See “[Power off the server](#)” on page 50.
- 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 installed in a rack, remove the server from the rack. See “[Remove the server from rails](#)” on page 50.

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

Procedure

Step 1. Locate the CMOS battery on the lower processor board (MB).

Note: The CMOS battery is only used on the primary chassis lower processor board (MB).

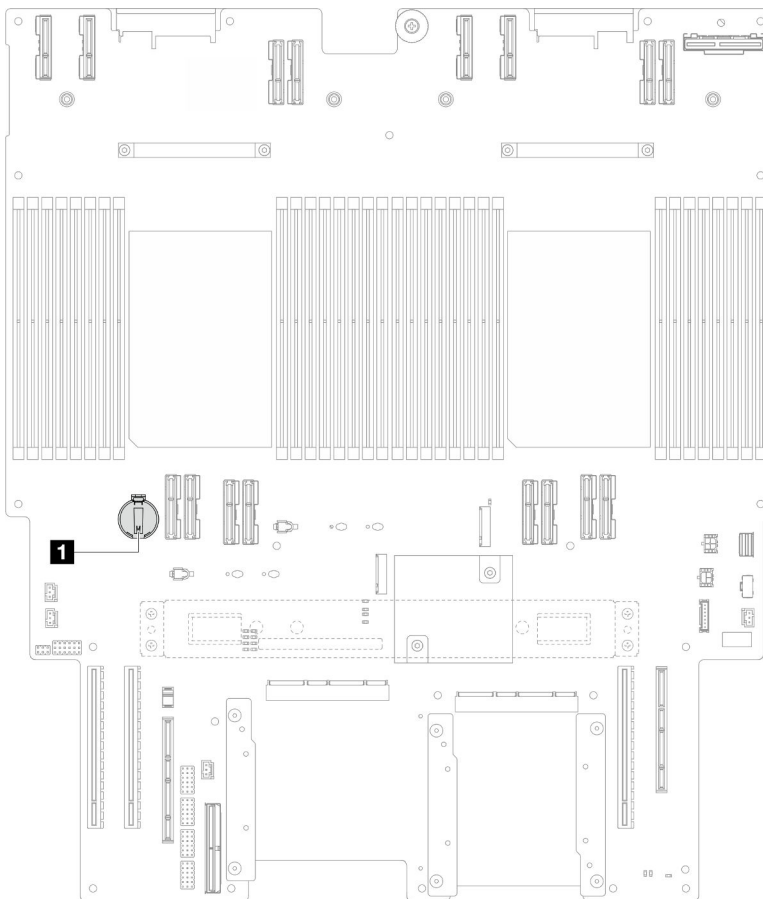


Figure 34. CMOS battery location

1 CMOS battery location

- Step 2. Touch the static-protective package that contains the new part to any unpainted surface on the outside of the server; then, take the new part out of the package and place it on a static-protective surface.
- Step 3. 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.

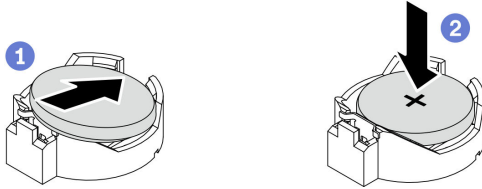


Figure 35. Installing the CMOS battery

After you finish

1. Reinstall the upper processor board (CPU BD). See [“Install the upper processor board \(CPU BD\)” on page 252](#).
2. Reinstall the upper processor board (CPU BD) air baffle. See [“Install the upper processor board \(CPU BD\) air baffle” on page 73](#).
3. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
4. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).
5. Use the Setup utility to set the date, time, and any passwords.

Note: After you install the CMOS battery, you must reconfigure the server and reset the system date and time.

Demo video

[Watch the procedure on YouTube](#)

Drive replacement

Follow the instructions in this section to install or remove drives.

Remove a hot-swap drive

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

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- 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.
- To make sure that there is adequate system cooling, do not operate the server for more than two minutes without either a drive or a filler installed in each bay.

- If one or more NVMe solid-state drives are to be removed, it is recommended to disable them beforehand via the operating system.
- Before you remove or make changes to drives, drive controllers, including controllers that are integrated on the lower processor board (MB) or upper processor board (CPU BD), drive backplanes or drive cables, back up all important data that is stored on the drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

Note: Make sure you have the drive bay fillers available if some drive bays will be left empty after the removal.

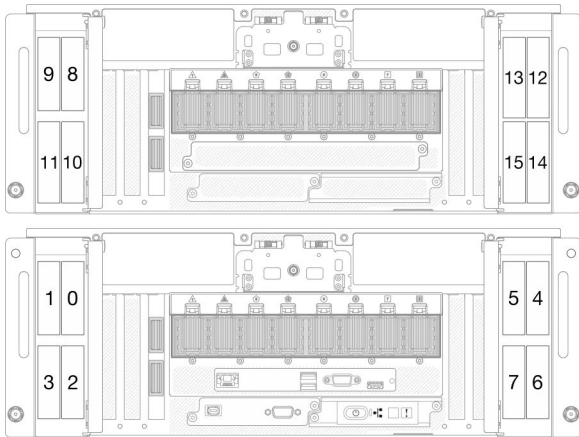


Figure 36. 2.5-inch drive bay numbering

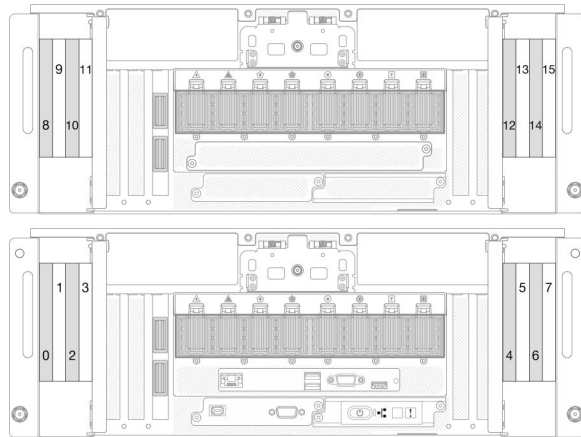


Figure 37. E3.S drive bay numbering

Procedure

Step 1. Open the drive door.

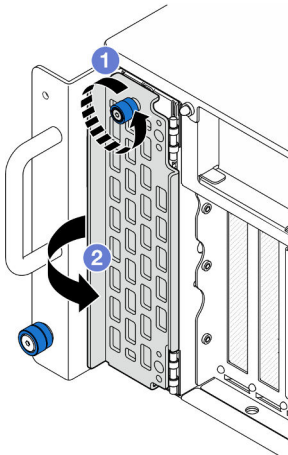


Figure 38. Opening the drive door

- 1 Loosen the thumbscrew. Use a screwdriver if needed.
- 2 Grasp the thumbscrew and open the drive door.

Step 2. Remove the drive.

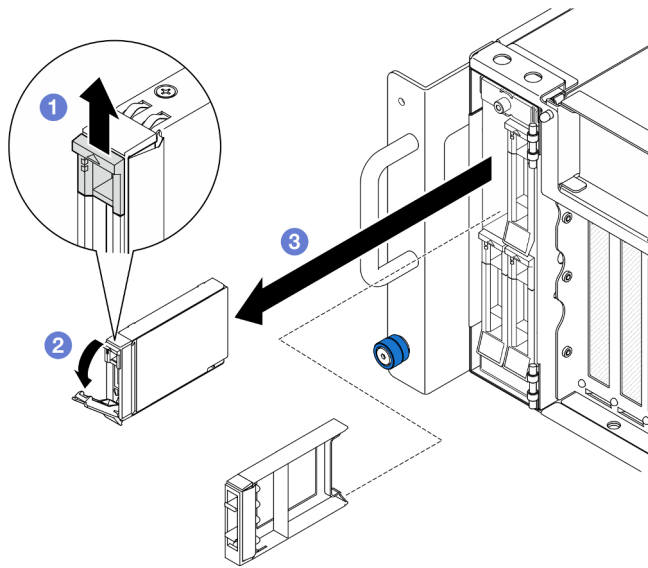


Figure 39. Removing a 2.5-inch drive

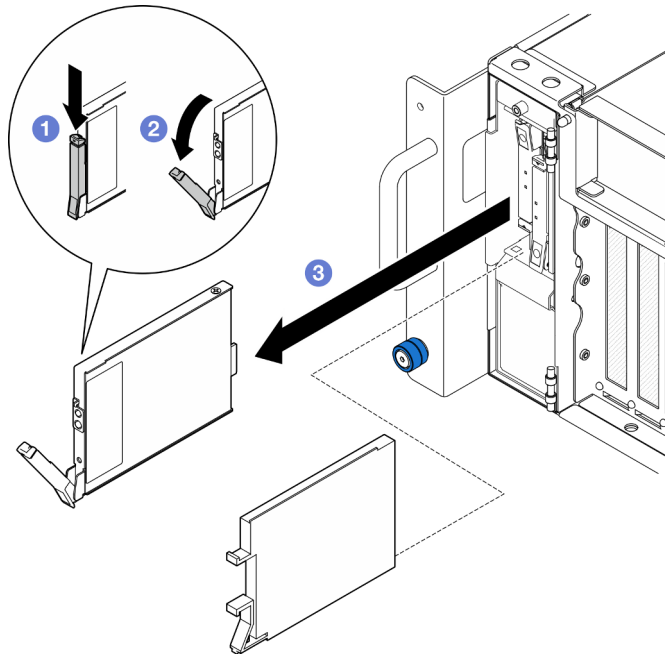


Figure 40. Removing an E3.S drive

Note: The E3.S drive tray handle opens in different directions depending on the E3.S drive location.

- a. ① Slide the release latch to open the tray handle.
- b. ② The tray handle opens automatically.
- c. ③ Grasp and pull the handle to remove the drive from the drive bay.

After you finish

1. Install a replacement unit or filler. See [“Install a hot-swap drive” on page 86](#).

- 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 drive

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

About this task

Attention:

- Read “[Installation Guidelines](#)” on page 41 and “[Safety inspection checklist](#)” on page 42 to ensure that you work safely.
- 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.
- To make sure that there is adequate system cooling, do not operate the server for more than two minutes without either a drive or a drive bay filler installed in each bay.
- Before you remove or make changes to drives, drive controllers, including controllers that are integrated on the lower processor board (MB) or upper processor board (CPU BD), drive backplanes or drive cables, back up all important data that is stored on the drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

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

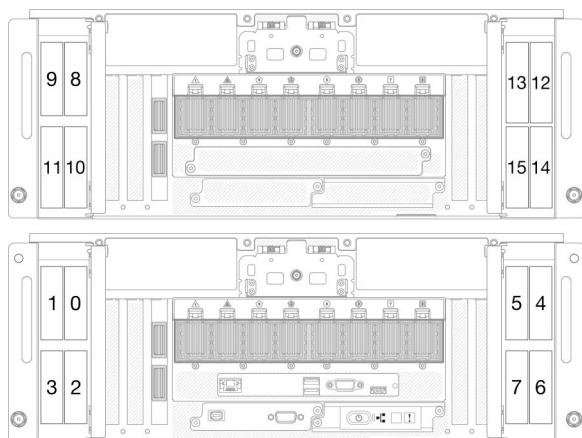


Figure 41. 2.5-inch drive bay numbering

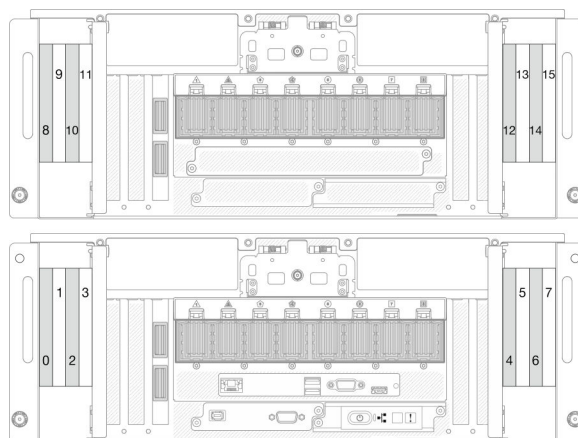


Figure 42. E3.S drive bay numbering

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “[Update the firmware](#)” on page 275 for more information on firmware updating tools.

Procedure

- Step 1. Touch the static-protective package that contains the new part to any unpainted surface on the outside of the server; then, take the new part out of the package and place it on a static-protective surface.
- Step 2. If a drive filler has been installed in the drive bay, remove it.
- Step 3. Install the drive.

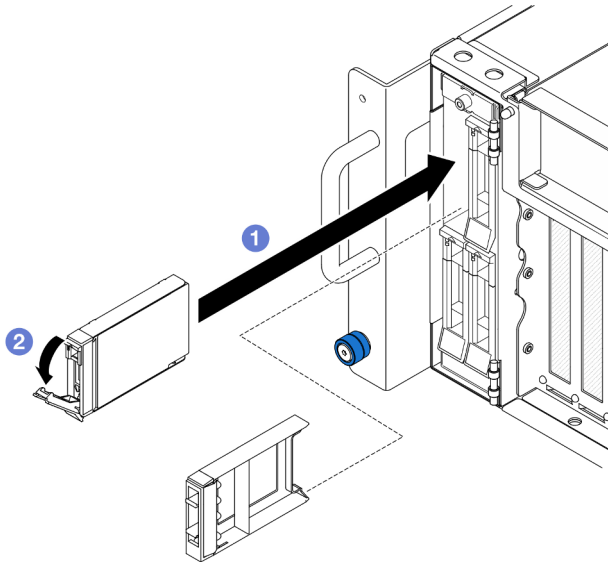


Figure 43. Installing a 2.5-inch drive

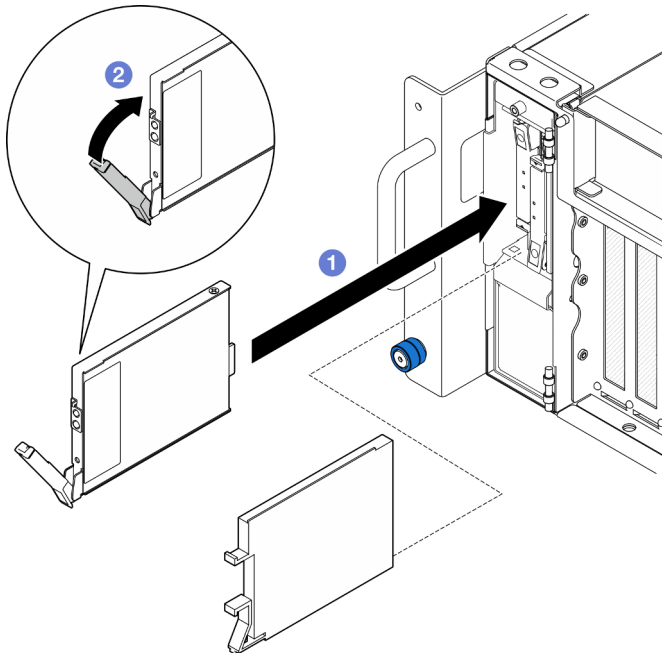


Figure 44. Installing an E3.S drive

Note: The E3.S drive tray handle opens in different directions depending on the E3.S drive location.

- a. ① Ensure that the tray handle is in the open position. Slide the drive into the drive bay, and push it until it stops.
- b. ② Rotate the handle back to the locked position.

Step 4. Close the drive door.

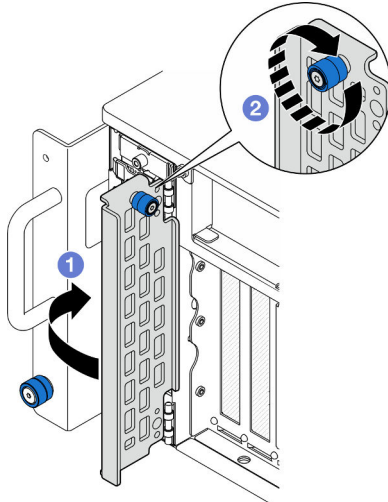


Figure 45. Closing drive door

- a. ① Grasp the thumbscrew and close the drive door.
- b. ② Tighten the thumbscrew on the drive door. Use a screwdriver if needed.

After you finish

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](#)

Drive backplane replacement

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

Remove a drive backplane

Follow the instructions in this section to remove a drive backplane.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 233](#).
- b. Remove all the hot-swap drives and drive fillers. See [“Remove a hot-swap drive” on page 83](#).
- c. Record the cable connections first; then, disconnect the power and signal cables from the backplane. See [“2.5-inch drive backplane cable routing” on page 263](#) for more information on the internal cable routing.

Step 2. Remove the drive backplane.

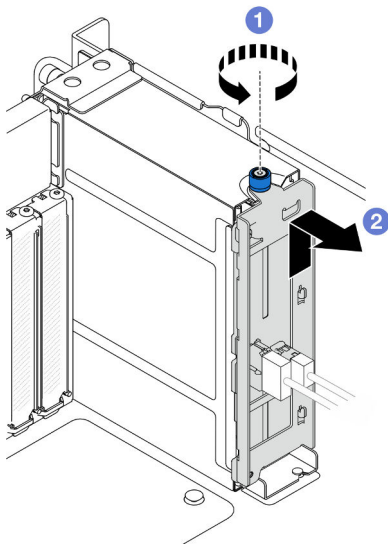


Figure 46. Removing 2.5-inch drive backplane

- a. ① Loosen the thumbscrew. Use a screwdriver if needed.
- b. ② Unhook the drive backplane and remove it from the chassis.

After you finish

1. Install a replacement unit or fill the corresponding drive bays with drive fillers. See [“Install a drive backplane” on page 90](#).
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.
3. If you plan to recycle the component.

- a. Remove the two screws, and separate the backplane from the bracket.

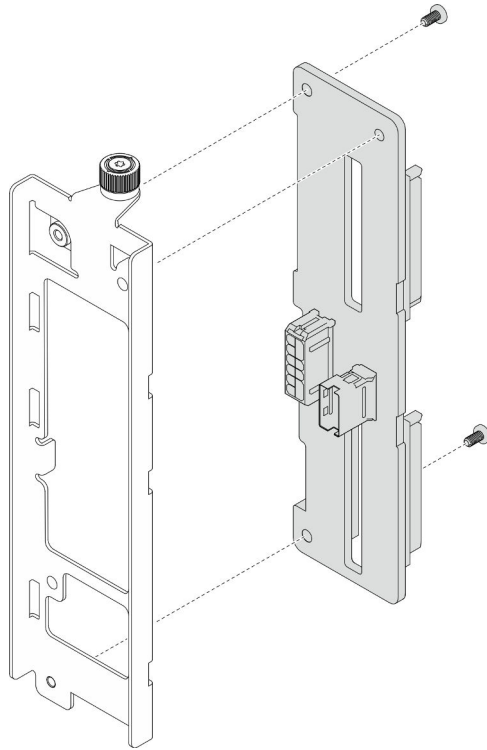


Figure 47. Disassembling the drive backplane

- b. Recycle the component in compliance with local regulations.

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:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “[Update the firmware](#)” on [page 275](#) for more information on firmware updating tools.

Procedure

Step 1. Install the drive backplane.

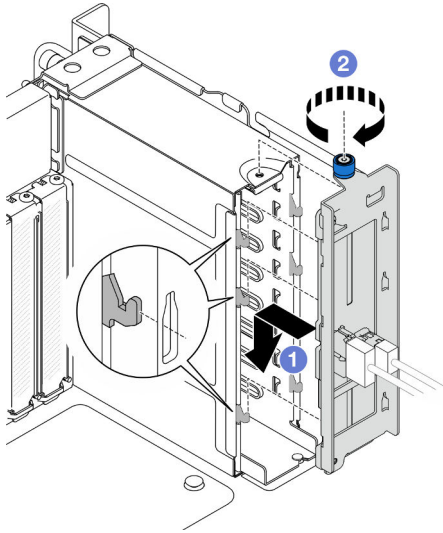


Figure 48. Installing 2.5-inch drive backplane

- 1 Hook the drive backplane onto the drive cage.
- 2 Tighten the thumbscrew. Use a screwdriver if needed.

After you finish

1. Connect the power and signal cables to the backplane. See “[2.5-inch drive backplane cable routing](#)” on [page 263](#) for more information on the internal cable routing.
2. Reinstall all the hot-swap drives and drive fillers. See “[Install a hot-swap drive](#)” on [page 86](#).
3. Reinstall the front top cover. See “[Install the front top cover](#)” on [page 239](#).
4. Complete the parts replacement. See “[Complete the parts replacement](#)” on [page 256](#).

Demo video

[Watch the procedure on YouTube](#)

Drive cage replacement

Follow the instructions in this section to install or remove a drive cage.

Remove a drive cage

Follow the instructions in this section to remove a drive cage.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 233](#).
- b. Remove all the hot-swap drives and drive fillers. See [“Remove a hot-swap drive” on page 83](#).
- c. Remove the drive backplane or E3.S cable assembly. See [“Remove a drive backplane” on page 88](#) or [“Remove an E3.S cable assembly” on page 95](#).

Step 2. Remove the drive cage.

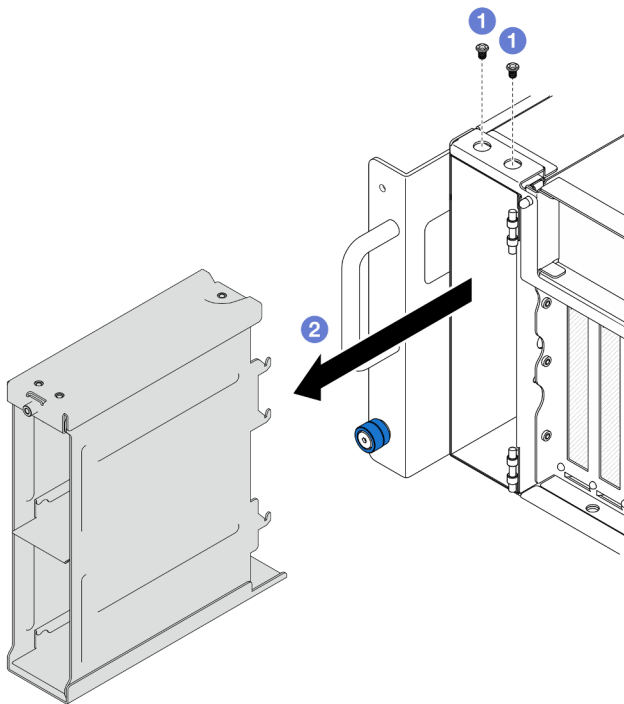


Figure 49. Removing 2.5-inch drive cage

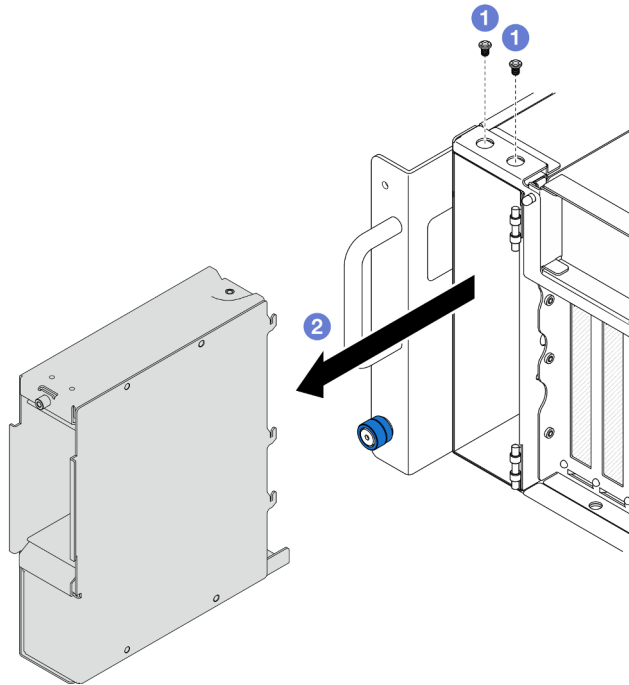


Figure 50. Removing E3.S drive cage

- a. ① Remove the two screws.
- b. ② Slide the drive cage away from the chassis and remove it.

After you finish

1. Install a replacement unit. See [“Install a drive cage” on page 93](#).
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 cage

Follow instruction in this section to install a drive cage.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails”](#) on page 50.

Procedure

Step 1. Install the drive cage.

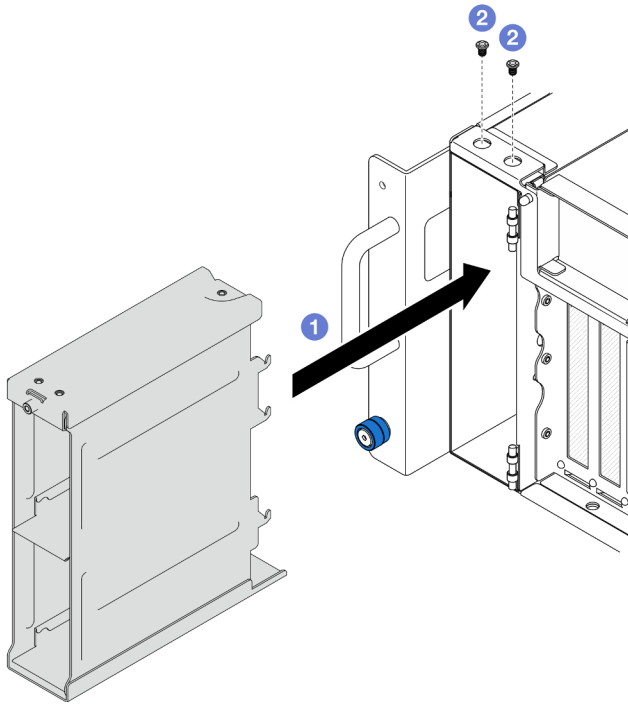


Figure 51. Installing 2.5-inch drive cage

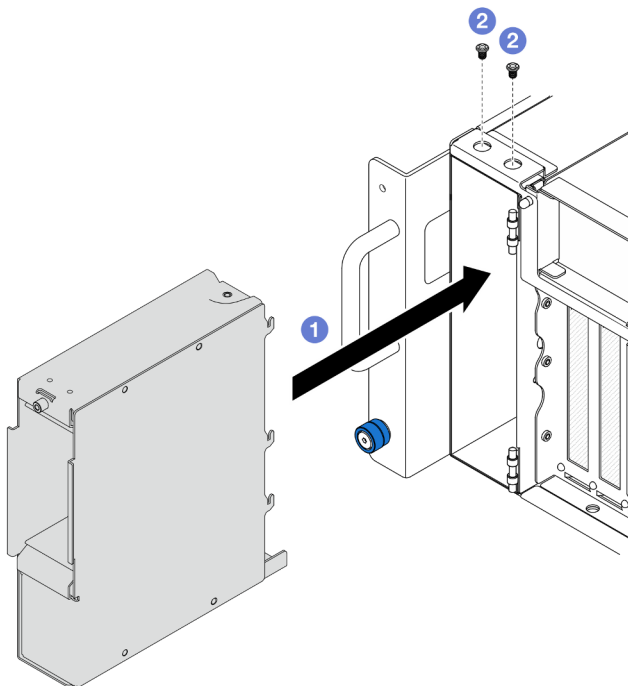


Figure 52. Installing E3.S drive cage

- a. ① Slide the drive cage into the chassis.
- b. ② Secure the drive cage with two screws.

After you finish

1. Reinstall the drive backplane or E3.S cable assembly. See [“Install a drive backplane” on page 90](#) or [“Install an E3.S cable assembly” on page 96](#).
2. Reinstall all the hot-swap drives and drive fillers. See [“Install a hot-swap drive” on page 86](#).
3. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
4. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

E3.S cable assembly replacement

Follow the instructions in this section to install or remove an E3.S cable assembly.

Remove an E3.S cable assembly

Follow the instructions in this section to remove an E3.S cable assembly.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 233](#).
- b. Remove all the hot-swap drives and drive fillers. See [“Remove a hot-swap drive” on page 83](#).
- c. Record the cable connections first; then, disconnect the power and signal cables from the riser card and upper processor board (CPU BD). See [“E3.S cable assembly cable routing” on page 266](#) for more information on the internal cable routing.

Step 2. Remove the E3.S cable assembly.

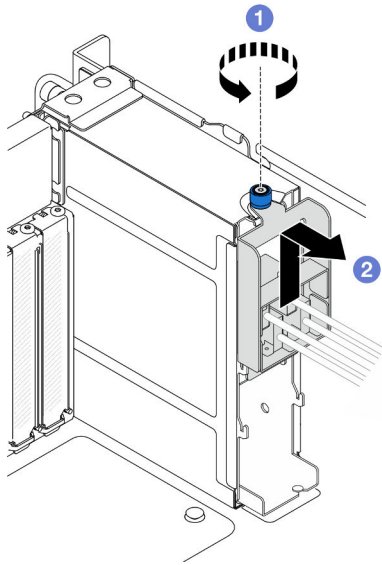


Figure 53. Removing E3.S cable assembly

- a. ① Loosen the thumbscrew. Use a screwdriver if needed.
- b. ② Unhook the E3.S cable assembly and remove it from the chassis.

After you finish

1. Install a replacement unit or fill the corresponding drive bays with drive fillers. See [“Install an E3.S cable assembly” on page 96](#).
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.

Install an E3.S cable assembly

Follow instruction in this section to install an E3.S cable assembly.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

Step 1. Install the E3.S cable assembly.

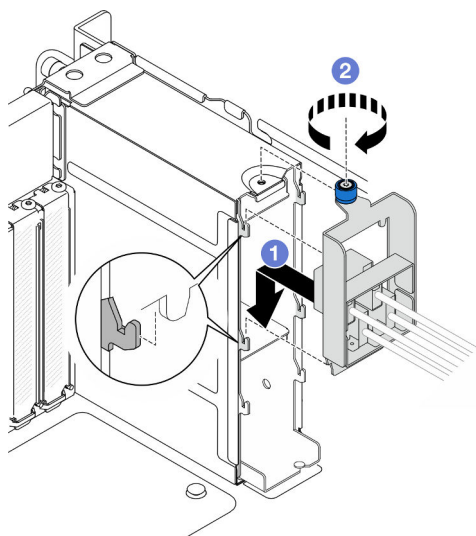


Figure 54. Installing E3.S cable assembly

- a. ① Hook the E3.S cable assembly onto the drive cage.
- b. ② Tighten the thumbscrew. Use a screwdriver if needed.

After you finish

1. Connect the power and signal cables to the riser card and upper processor board (CPU BD). See [“E3.S cable assembly cable routing” on page 266](#) for more information on the internal cable routing.
2. Reinstall all the hot-swap drives and drive fillers. See [“Install a hot-swap drive” on page 86](#).
3. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
4. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

EIA flange replacement

Follow the instructions in this section to install or remove an EIA flange.

Remove an EIA flange

Follow the instructions in this section to remove an EIA flange.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

- Step 1. Remove the front top cover. See [“Remove the front top cover” on page 233](#).
- Step 2. Remove nine screws and remove the EIA flange from the chassis.

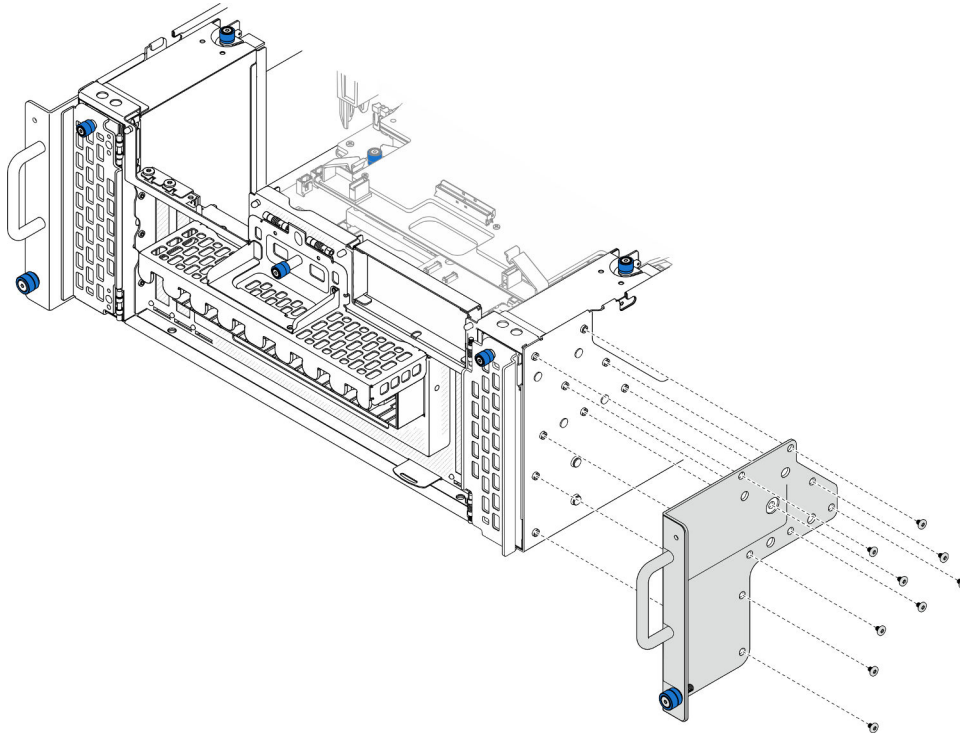


Figure 55. Removing EIA flange

After you finish

1. Install a replacement unit. See [“Install an EIA flange” on page 98](#).
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 EIA flange

Follow the instructions in this section to install an EIA flange.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).

- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

Step 1. Align and install the EIA flange to the chassis and secure it with install nine screws.

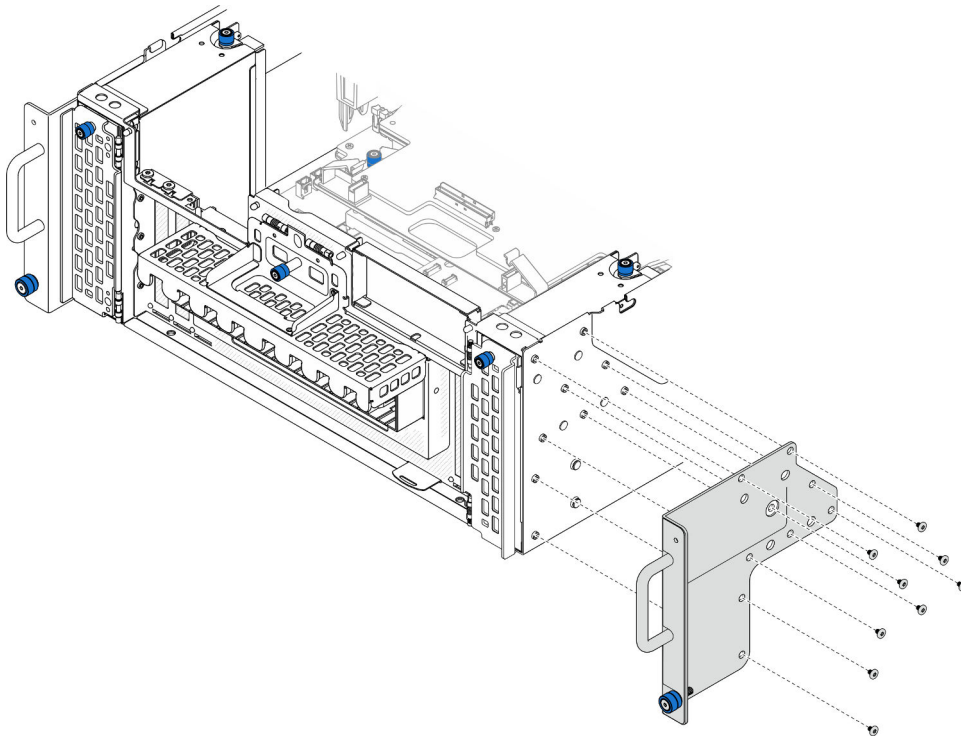


Figure 56. Installing EIA flange

After you finish

1. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

Ethernet port assembly replacement

Follow the instructions in this section to install or remove the Ethernet port assembly.

Remove the Ethernet port assembly

Follow the instructions in this section to remove the Ethernet port assembly.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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.

Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 233](#).
- b. Remove the rear top cover. See [“Remove the rear top cover” on page 235](#).
- c. If you are replacing the Ethernet port assembly cable, remove the upper processor board (CPU BD) air baffle and upper processor board (CPU BD). See [“Remove the upper processor board \(CPU BD\) air baffle” on page 71](#) and [“Remove the upper processor board \(CPU BD\)” on page 247](#).

Step 2. Remove the screw that secures the Ethernet port assembly; then, grasp the Ethernet port assembly and carefully pull it out of the chassis.

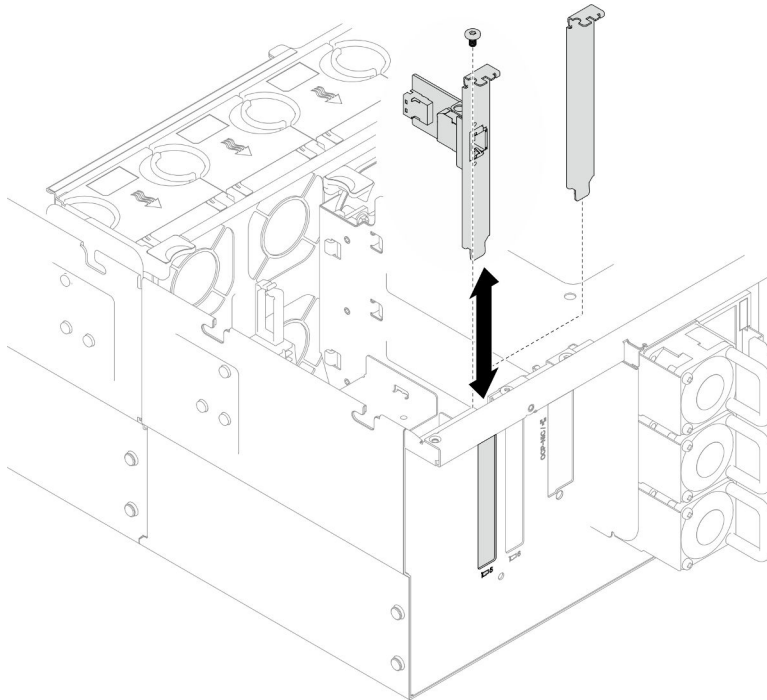


Figure 57. Removing Ethernet port assembly

- Step 3. Disconnect the cable from the Ethernet port assembly and interposer board. See [“Ethernet port assembly cable routing” on page 267](#).
- Step 4. If necessary, remove the two screws and separate the Ethernet port card from the bracket.

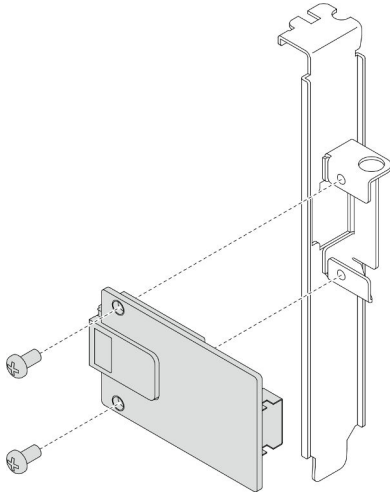


Figure 58. Removing the Ethernet port card

After you finish

1. Install a replacement unit. See [“Install the Ethernet port assembly” on page 101](#).
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 Ethernet port assembly

Follow the instructions in this section to install the Ethernet port assembly.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to [“Update the firmware” on page 275](#) for more information on firmware updating tools.

Procedure

Step 1. If necessary, align the Ethernet port card to the bracket and install two screws to secure it.

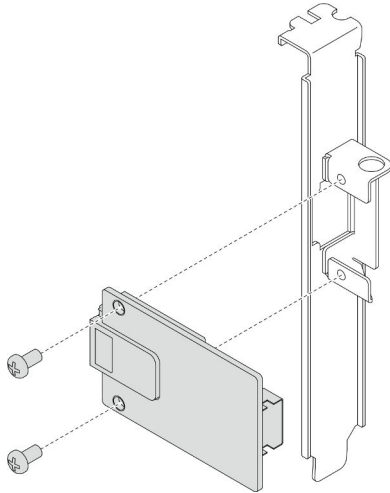


Figure 59. Installing the Ethernet port card

- Step 2. Connect the cable to the Ethernet port assembly and interposer board. See [“Ethernet port assembly cable routing” on page 267](#).
- Step 3. Align and install the Ethernet port assembly into the chassis; then, install the screw to secure the Ethernet port assembly.

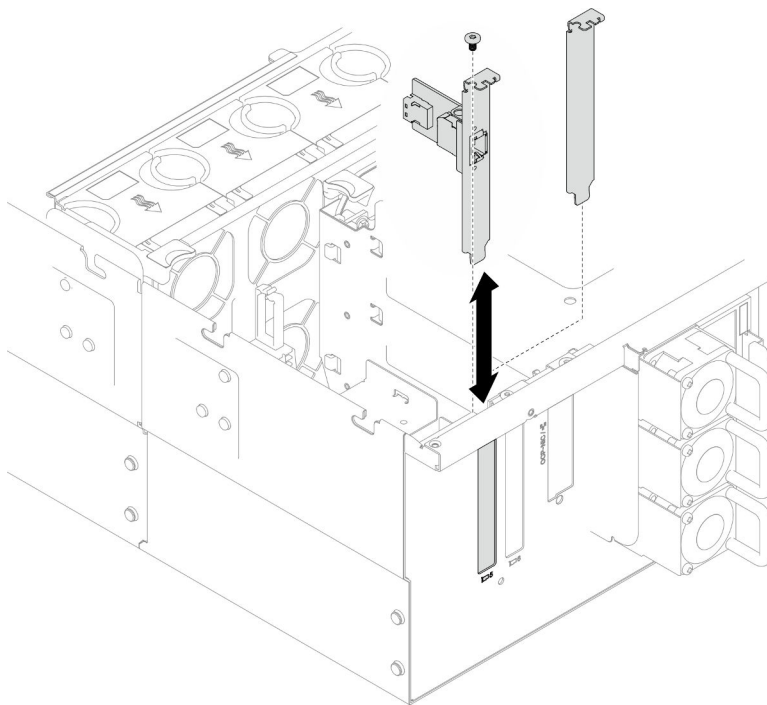


Figure 60. Installing Ethernet port assembly

After you finish

1. If you replaced the Ethernet port assembly cable, reinstall the upper processor board (CPU BD) and upper processor board (CPU BD) air baffle. See [“Install the upper processor board \(CPU BD\)” on page 252](#) and [“Install the upper processor board \(CPU BD\) air baffle” on page 73](#).
2. Reinstall the rear top cover. See [“Install the rear top cover” on page 236](#).

3. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
4. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

Fan and fan cage replacement

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

Remove a fan module

Follow the instructions in this section to remove a fan module.

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:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).

- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

Step 1. Remove the front top cover. See [“Remove the front top cover” on page 233](#).

Step 2. Remove the fan module.

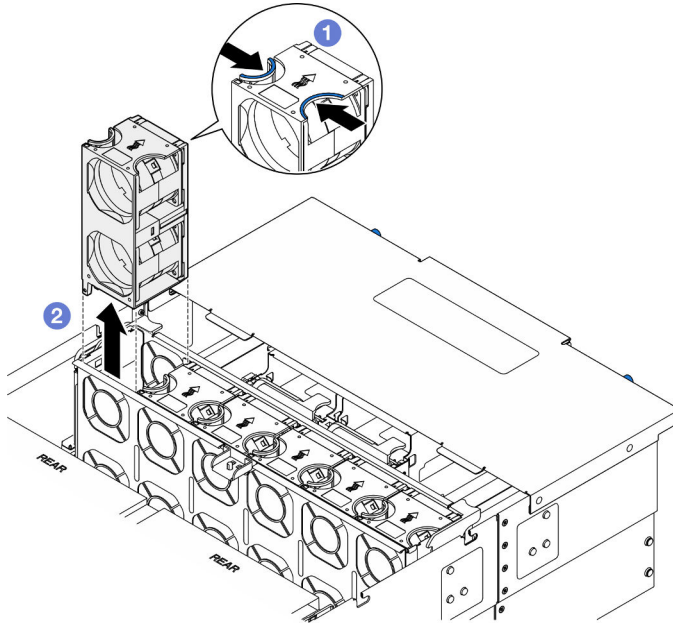


Figure 61. Removing a fan module

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

After you finish

1. Install a replacement unit. See [“Install a fan module” on page 108](#). Make sure the replacement unit is of the exact same type as the removed one.
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 the fan cage

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

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:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 233](#).
- b. Remove all fan modules. See [“Remove a fan module” on page 103](#).

Step 2. Remove the fan cage.

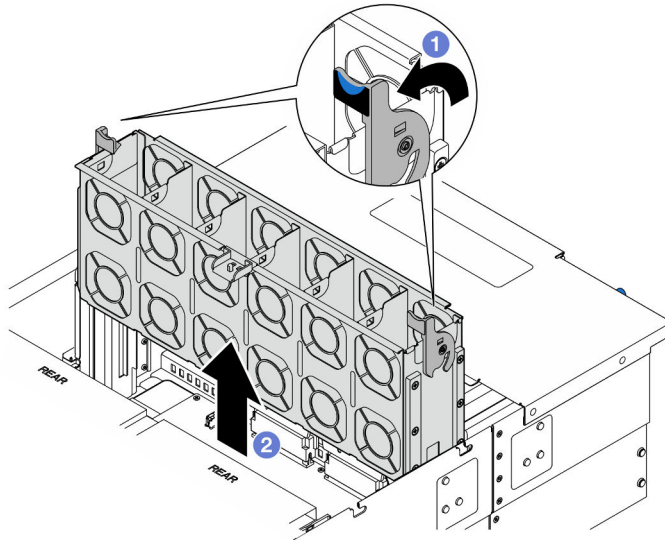


Figure 62. Removing the fan cage

- a. ① Lift and rotate the fan cage release latches to disengage the fan cage from the chassis.
- b. ② Lift the fan cage to remove it.

After you finish

1. Install a replacement unit. See “Install the fan cage” on page 106.
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 fan cage

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

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:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Step 1. Install the fan cage.

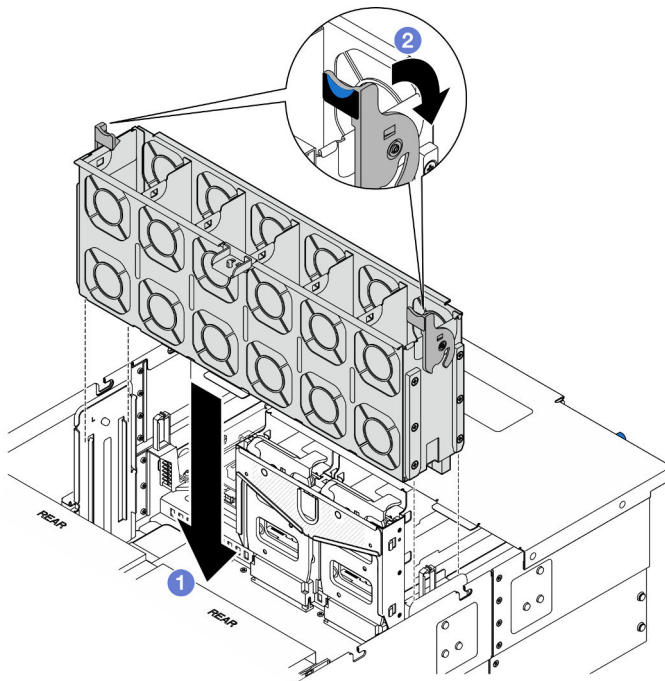


Figure 63. Installing the fan cage

- a. **1** Align the fan cage to the guides on both sides of the chassis; then, lower it into the chassis.
- b. **2** Rotate the fan cage release latches down until they stop.

After you finish

1. Reinstall all fan modules. See [“Install a fan module” on page 108](#).
2. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).

3. Complete the parts replacement. See [“Complete the parts replacement”](#) on page 256.

Demo video

[Watch the procedure on YouTube](#)

Install a fan module

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

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:

- Read [“Installation Guidelines”](#) on page 41 and [“Safety inspection checklist”](#) on page 42 to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server”](#) on page 50.
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails”](#) on page 50.

Procedure

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

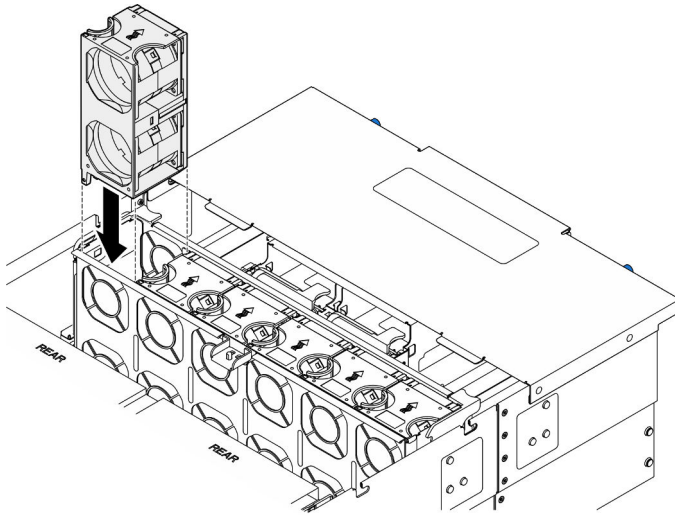


Figure 64. Installing a fan module

After you finish

1. Reinstall the front top cover. See “[Install the front top cover](#)” on page 239.
2. Complete the parts replacement. See “[Complete the parts replacement](#)” on page 256.

Demo video

[Watch the procedure on YouTube](#)

Flash power module replacement

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

Remove a flash power module

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

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 41 and “[Safety inspection checklist](#)” on page 42 to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See “[Power off the server](#)” on page 50.
- 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 installed in a rack, remove the server from the rack. See “[Remove the server from rails](#)” on page 50.

Procedure

- Step 1. Remove the front top cover. See “[Remove the front top cover](#)” on page 233.
- Step 2. Locate the flash power module on the upper processor board (CPU BD) air baffle.

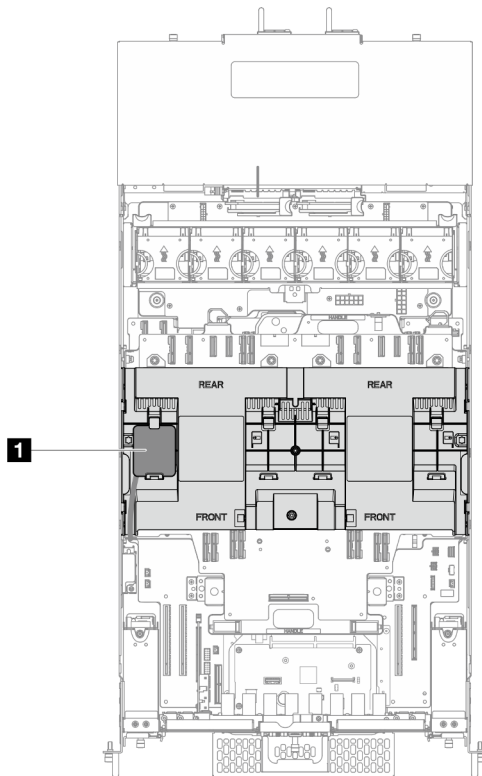


Figure 65. Flash power module location

1 Flash power module location

- Step 3. Disconnect the cable of the RAID flash power module from the extension cable.

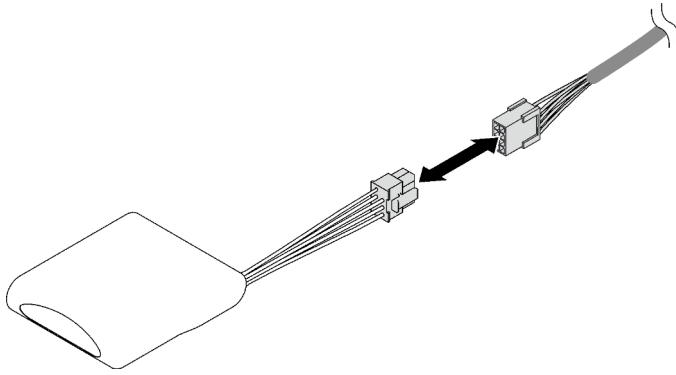


Figure 66. Disconnecting cable from flash power module

Step 4. Remove the flash power module.

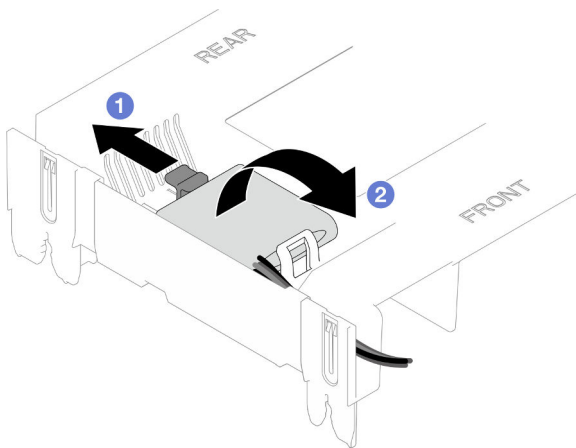


Figure 67. Flash power module removal

- a. ① Gently pivot the retaining clip as shown.
- b. ② Lift the flash power module up and remove it from the holder.

After you finish

1. Install a replacement unit. See [“Install a flash power module” on page 111](#).
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

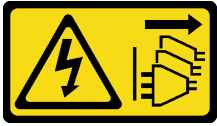
[Watch the procedure on YouTube](#)

Install a flash power module

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

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 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

- Step 1. Touch the static-protective package that contains the new part to any unpainted surface on the outside of the server; then, take the new part out of the package and place it on a static-protective surface.
- Step 2. Install the flash power module.

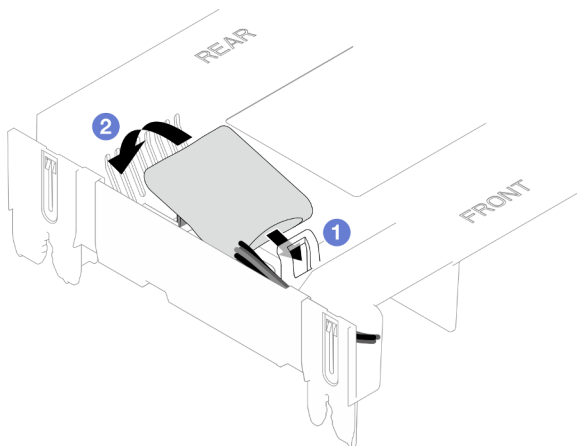


Figure 68. Flash power module installation

- 1 Note the orientation of the flash power module; then, gently insert the flash power module into the retaining clip at one side as shown.
 - 2 Press the flash power module down on the other side until it snaps into place.
- Step 3. Connect the cable of the RAID flash power module to the extension cable.

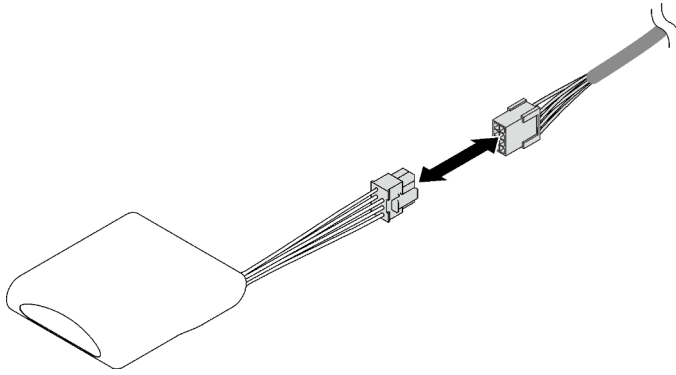


Figure 69. Connecting cable to flash power module

Step 4. Connect the flash power module to a RAID adapter with the extension cable.

After you finish

1. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

Front operator panel replacement

Follow the instructions in this section to install or remove the front operator panel.

Remove the front operator panel

Follow the instructions in this section to remove the front operator panel.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 233](#).
- b. Remove the upper processor board (CPU BD) air baffle. See [“Remove the upper processor board \(CPU BD\) air baffle” on page 71](#).

- c. Remove the upper processor board (CPU BD). See [“Remove the upper processor board \(CPU BD\)” on page 247.](#)
- d. For primary chassis only, remove the support bracket. See [“Remove the support bracket” on page 211.](#)
- e. For primary chassis only, remove the system I/O board and interposer assembly. See [“Remove the system I/O board and interposer board” on page 218.](#)

Step 2. Remove the front operator panel.

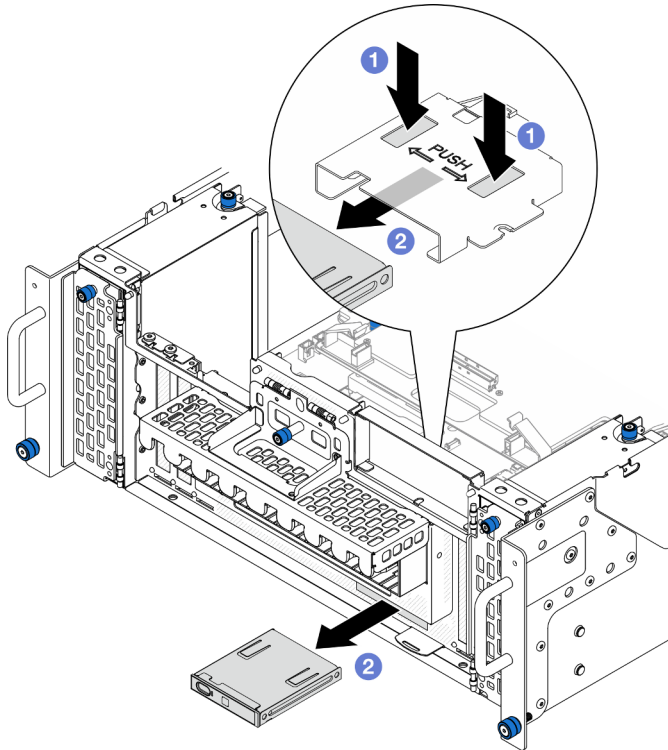


Figure 70. Removing front operator panel

- a. ① Press and hold on the two release tabs on the top of the front operator panel cage.
- b. ② Push the front operator panel assembly outwards from the inside of the chassis to remove it.

Step 3. If necessary, remove two screws and remove the front operator panel cage.

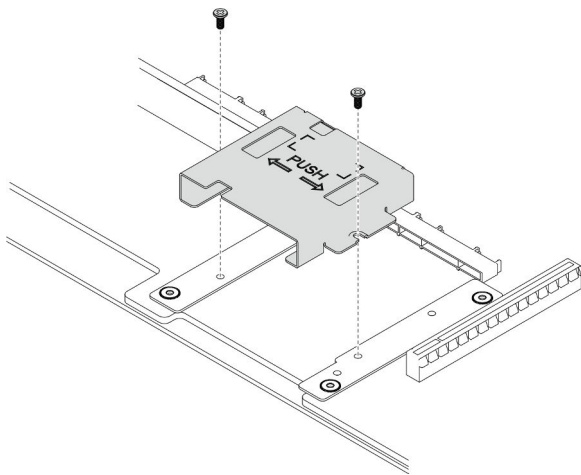


Figure 71. Removing front operator panel cage

Step 4. If necessary, remove two screws and remove the front operator panel bracket.

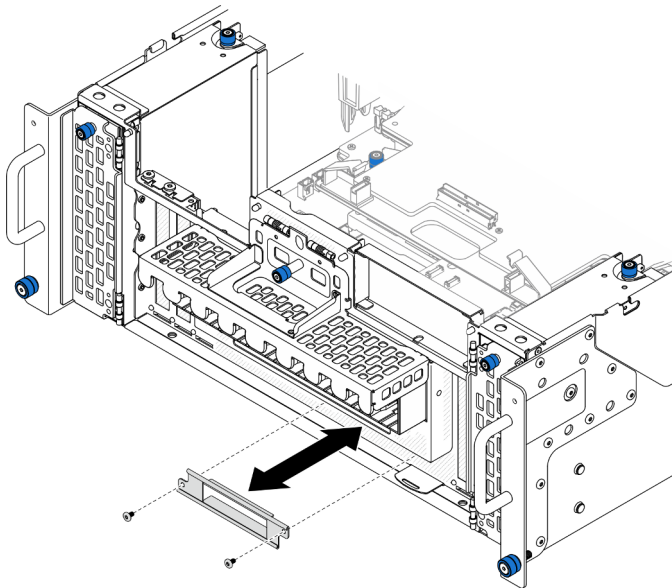


Figure 72. Removing front operator panel bracket

After you finish

1. Install a replacement unit. See [“Install the front operator panel” 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](#)

Install the front operator panel

Follow instruction in this section to install the front operator panel.

About this task

Attention:

- Read “[Installation Guidelines](#)” on page 41 and “[Safety inspection checklist](#)” on page 42 to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See “[Power off the server](#)” on page 50.
- 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 installed in a rack, remove the server from the rack. See “[Remove the server from rails](#)” on page 50.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “[Update the firmware](#)” on page 275 for more information on firmware updating tools.

Procedure

Step 1. If necessary, install the front operator panel bracket onto the chassis and secure it with two screws.

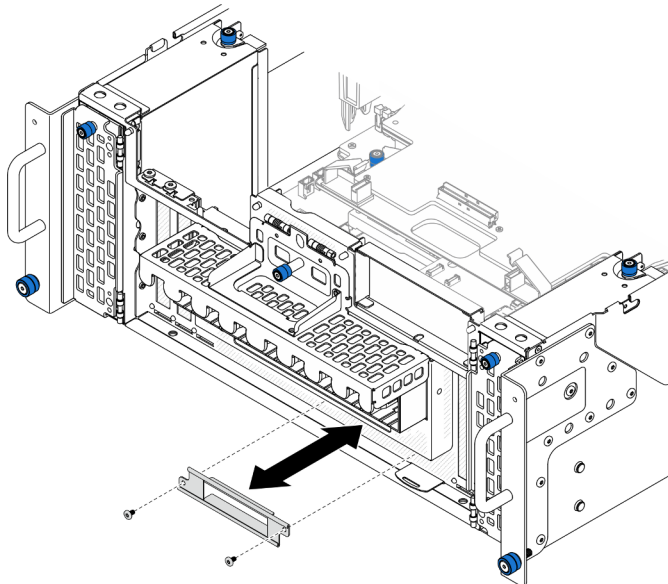


Figure 73. Installing front operator panel bracket

Step 2. If necessary, install the front operator panel cage onto the lower processor board (MB) and secure it with two screws.

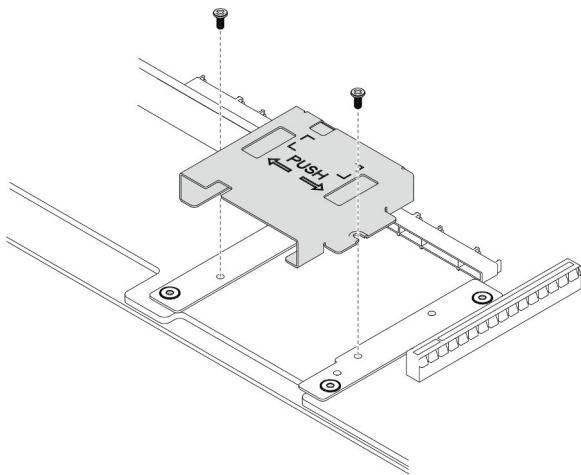


Figure 74. Installing front operator panel cage

Step 3. Align and install the front operator panel into the slot on the front of the chassis.

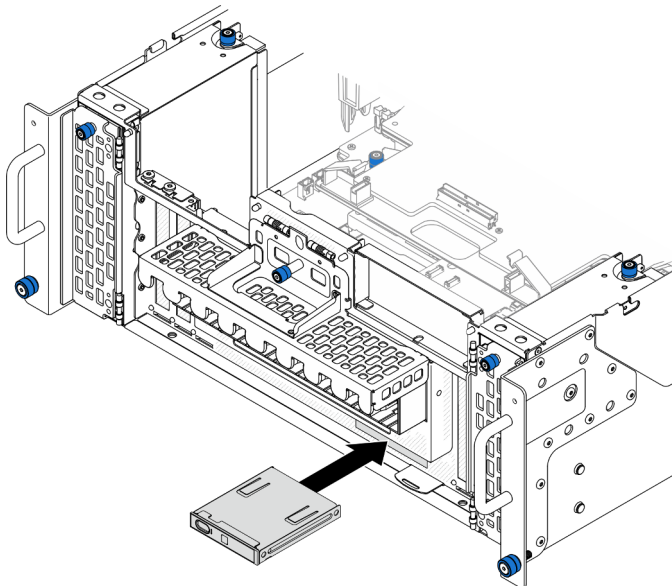


Figure 75. Installing front operator panel

After you finish

1. For primary chassis only, reinstall the system I/O board and interposer assembly. See [“Install the system I/O board and interposer board” on page 223](#).
2. For primary chassis only, reinstall the support bracket. See [“Install the support bracket” on page 213](#).
3. Reinstall the upper processor board (CPU BD). See [“Install the upper processor board \(CPU BD\)” on page 252](#).
4. Reinstall the upper processor board (CPU BD) air baffle. See [“Install the upper processor board \(CPU BD\) air baffle” on page 73](#).
5. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).

Demo video

[Watch the procedure on YouTube](#)

Intrusion switch replacement

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

Remove the top cover intrusion switch

Follow the instructions in this section to remove the top cover intrusion switch.

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 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

Step 1. Remove the front top cover. See [“Remove the front top cover” on page 233](#).

Step 2. Disconnect the intrusion switch cable from the lower processor board (MB).

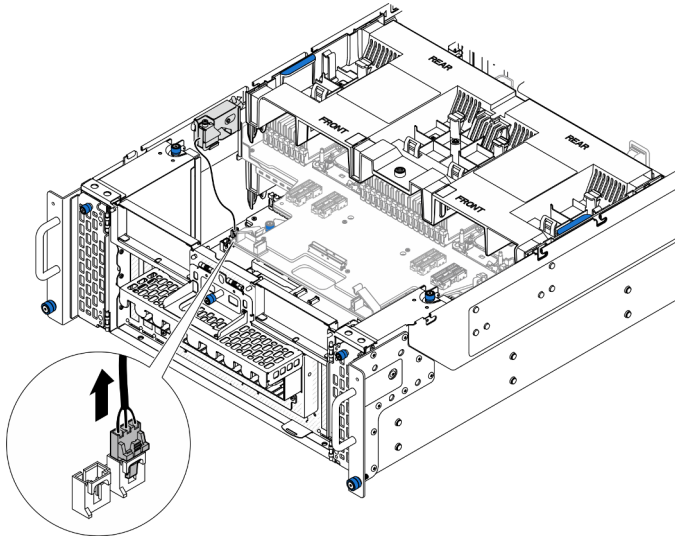


Figure 76. Disconnecting intrusion switch

Step 3. Remove the top cover intrusion switch.

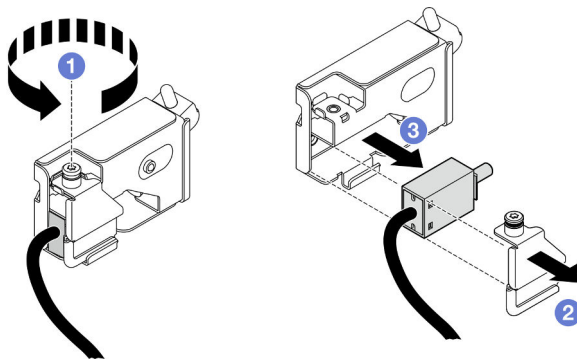


Figure 77. Removing top cover intrusion switch

- a. ① Loosen the captive screw.
- b. ② Remove the intrusion switch cover.
- c. ③ Remove the intrusion switch from the chassis.

After you finish

1. Install a replacement unit. See “[Install the top cover intrusion switch](#)” on page 119.
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 top cover intrusion switch

Follow the instructions in this section to install the top cover intrusion switch.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

Step 1. Install the top cover intrusion switch.

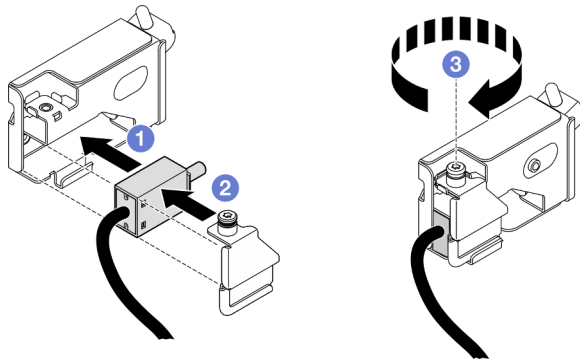


Figure 78. Installing top cover intrusion switch

- a. ① Align the intrusion switch with the slot in the chassis and push it in.
- b. ② Align and install the intrusion switch cover.
- c. ③ Tighten the captive screw to secure the intrusion switch cover.

Step 2. Connect the intrusion switch cable to the lower processor board (MB).

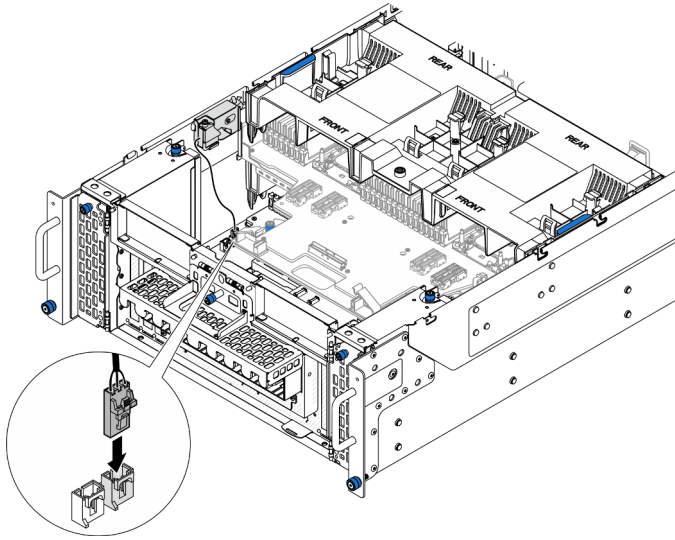


Figure 79. Connecting intrusion switch

After you finish

1. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

Remove the front intrusion switch

Follow the instructions in this section to remove the front intrusion switch.

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 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).

- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50.](#)

Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 233.](#)
- b. Remove the sideband card. See [“Remove the sideband card” on page 207.](#)

Step 2. Disconnect the intrusion switch.

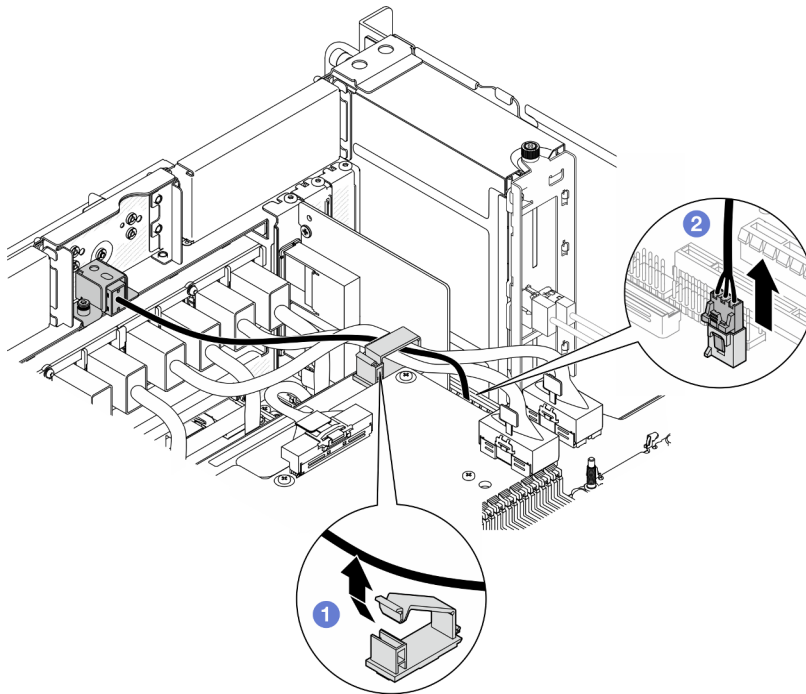


Figure 80. Disconnecting intrusion switch

- a. ① Open the cable clip and unhook the intrusion switch cable.
- b. ② Disconnect the intrusion switch cable from the lower processor board (MB).

Step 3. Remove the front intrusion switch assembly.

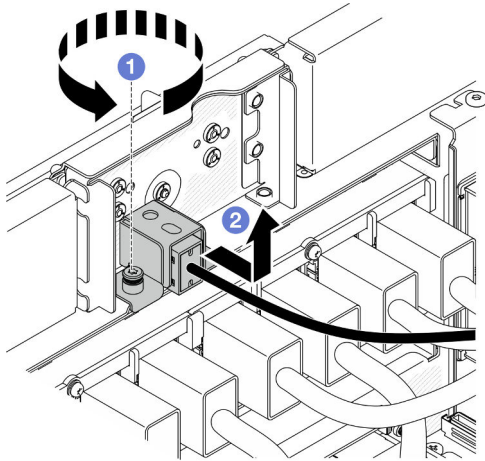


Figure 81. Removing front intrusion switch assembly

- a. ① Loosen the captive screw.
- b. ② Slide the intrusion switch assembly away from the front of the chassis and remove it.

Step 4. Grasp the switch, and remove it from the bracket.

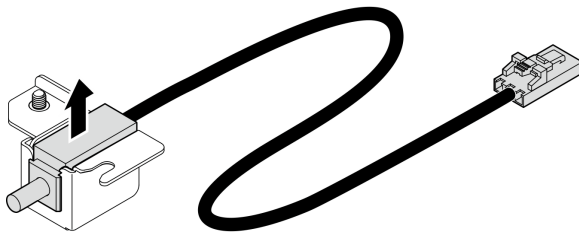


Figure 82. Removing intrusion switch

After you finish

1. Install a replacement unit. See [“Install the front intrusion switch” on page 123](#).
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 front intrusion switch

Follow the instructions in this section to install the front intrusion switch.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).

- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails”](#) on page 50.

Procedure

Step 1. Align the intrusion switch with the bracket and push it in.

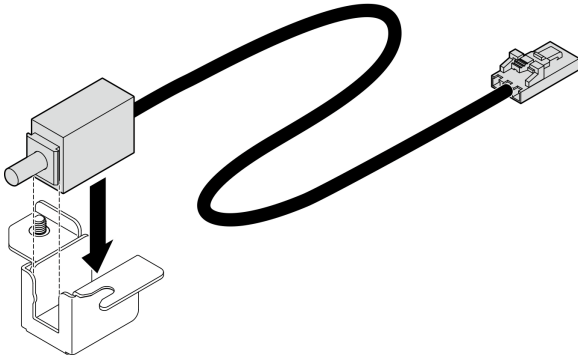


Figure 83. Installing intrusion switch

Step 2. Install the front intrusion switch assembly.

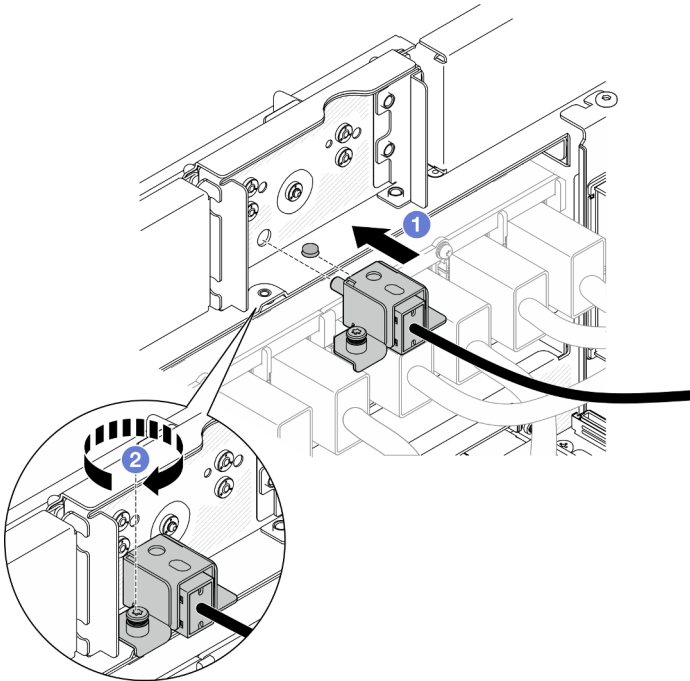


Figure 84. Installing front intrusion switch assembly

- 1 Align and install the intrusion switch assembly into the chassis.
- 2 Tighten the captive screw to secure the intrusion switch assembly.

Step 3. Connect the intrusion switch.

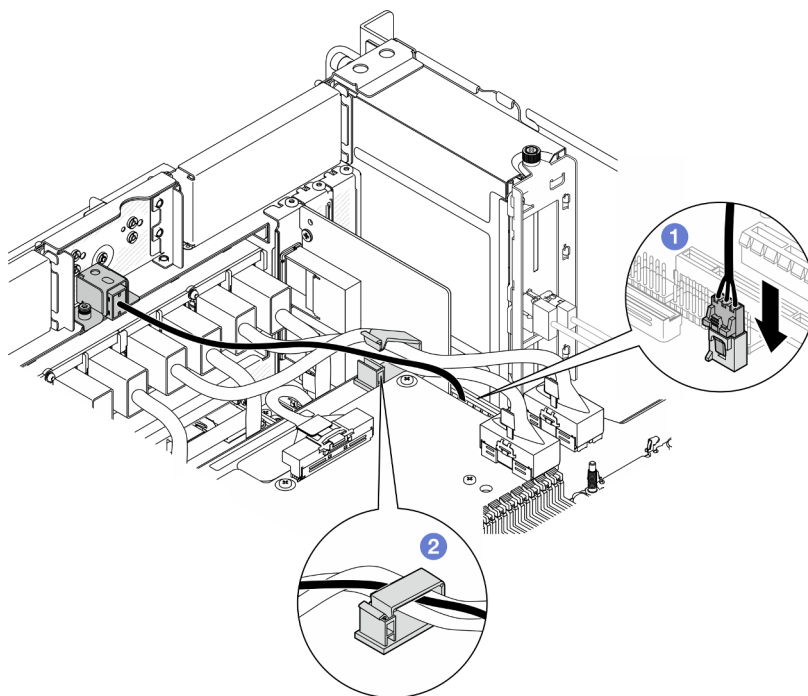


Figure 85. Connecting intrusion switch

- a. 1 Connect the intrusion switch cable to the lower processor board (MB).
- b. 2 Route the cable through the cable clip and close it.

After you finish

1. Reinstall the sideband card. See [“Install the sideband card” on page 209](#).
2. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

Lower processor board (MB) replacement (trained technician only)

Follow the instructions in this section to remove and install the lower processor board (MB).

Important: This task must be operated by trained technicians that are certified by Lenovo Service. Do not attempt to remove or install the part without proper training and qualification.

Remove the lower processor board (MB)

Follow instructions in this section to remove the lower processor board (MB).

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.

Important:

- This task must be operated by trained technicians that are certified by Lenovo Service. Do not attempt to remove or install the part without proper training and qualification.
- When removing the memory modules, label the slot number on each memory module, remove all the memory modules from the lower processor board (MB), and set them aside on a static-protective surface for reinstallation.
- **When disconnecting cables, make a list of each cable and record the connectors the cable is connected to, and use the record as a cabling checklist after installing the new lower processor board (MB).**

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

Step 1. Make preparation for the task.

- a. Gently pull and disengage every installed power supply unit. See [“Remove a hot-swap power supply unit” on page 184](#).
- b. Remove the front top cover. See [“Remove the front top cover” on page 233](#).
- c. Remove the fan cage. See [“Remove the fan cage” on page 104](#).
- d. Remove both power interposer boards. See [“Remove the power interposer board” on page 181](#).
- e. Remove the power distribution board. See [“Remove the power distribution board” on page 175](#).
- f. Remove the upper processor board (CPU BD) air baffle. See [“Remove the upper processor board \(CPU BD\) air baffle” on page 71](#).
- g. Remove the upper processor board (CPU BD). See [“Remove the upper processor board \(CPU BD\)” on page 247](#).
- h. Remove the support bracket. See [“Remove the support bracket” on page 211](#).
- i. For primary chassis only, remove the system I/O board and interposer assembly. See [“Remove the system I/O board and interposer board” on page 218](#).

- j. Remove the lower processor board (MB) air baffle. See [“Remove the lower processor board \(MB\) air baffle” on page 75.](#)
- k. For primary chassis only, remove the front operator panel and front operator panel cage. See [“Remove the front operator panel” on page 113.](#)
- l. Remove the PHMs. See [“Remove a processor and heat sink” on page 188.](#)
- m. Remove the memory modules. See [“Remove a memory module” on page 146.](#)
- n. Remove the sideband card. See [“Remove the sideband card” on page 207.](#)
- o. Remove the MicroSD card. See [“Remove the MicroSD card” on page 151.](#)
- p. Remove all the M.2 drive from the lower processor board (MB). See [“Remove an M.2 drive” on page 134.](#)
- q. Remove all PCIe adapters on the lower processor board (MB). See [“Remove a PCIe adapter” on page 161.](#)

Step 2. Disconnect UPI module cables.

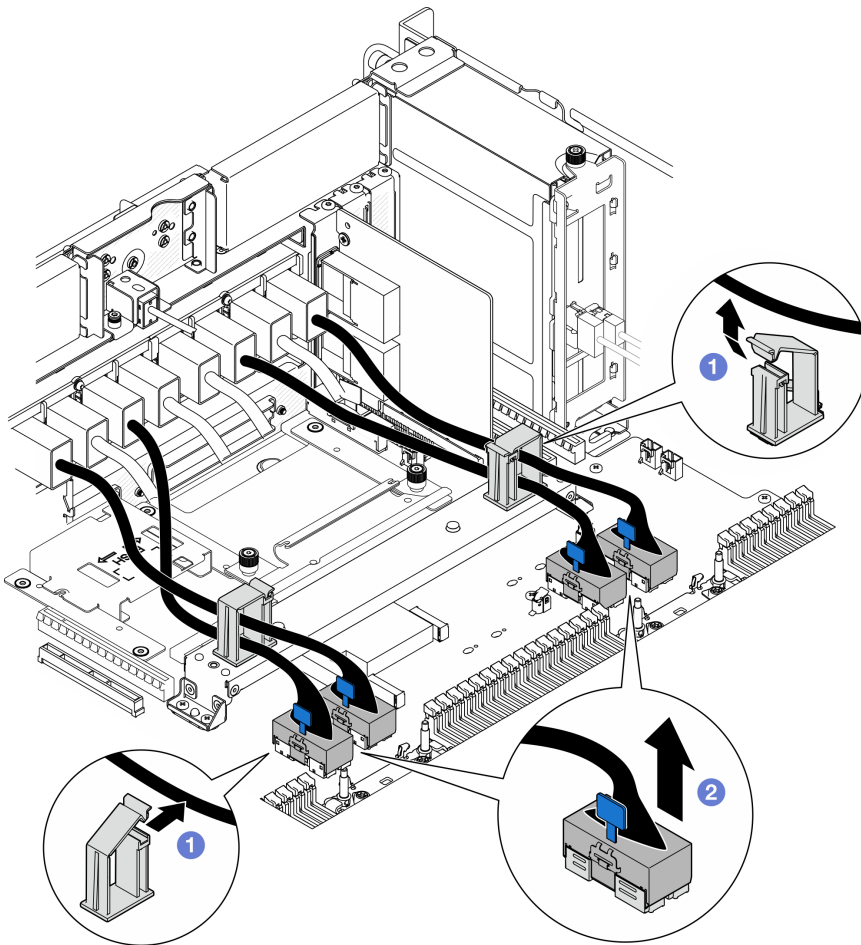


Figure 86. Disconnecting UPI module cables

- a. ① Open the cable clips and unhook the UPI module cables.
- b. ② Disconnect the UPI module cables from the lower processor board (MB).

Step 3. Disconnect the internal UPI cables from the lower processor board (MB).

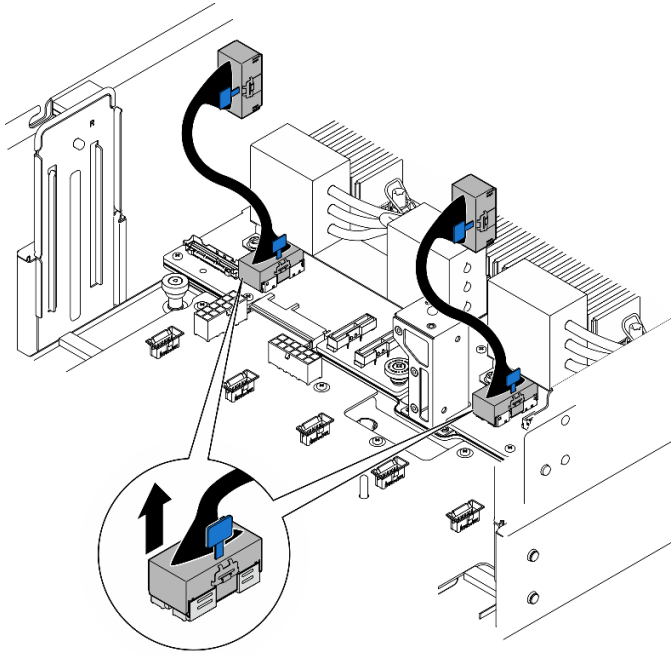


Figure 87. Disconnecting internal UPI cables

Step 4. For primary chassis only, disconnect the SCM cable.

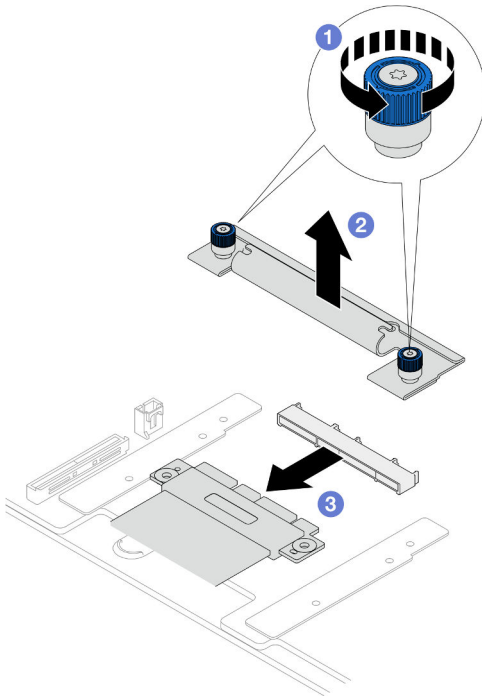


Figure 88. Disconnecting SCM cable

- a. ① Loosen the two thumbscrews on the SCM bracket. Use a screwdriver if needed.
- b. ② Remove the SCM bracket.
- c. ② Disconnect the SCM cable from the lower processor board (MB).

- Step 5. Make a list of all the cables connected to the lower processor board (MB); then, disconnect all the cables. See [Chapter 6 “Internal cable routing” on page 259](#).
- Step 6. Remove the lower processor board (MB).

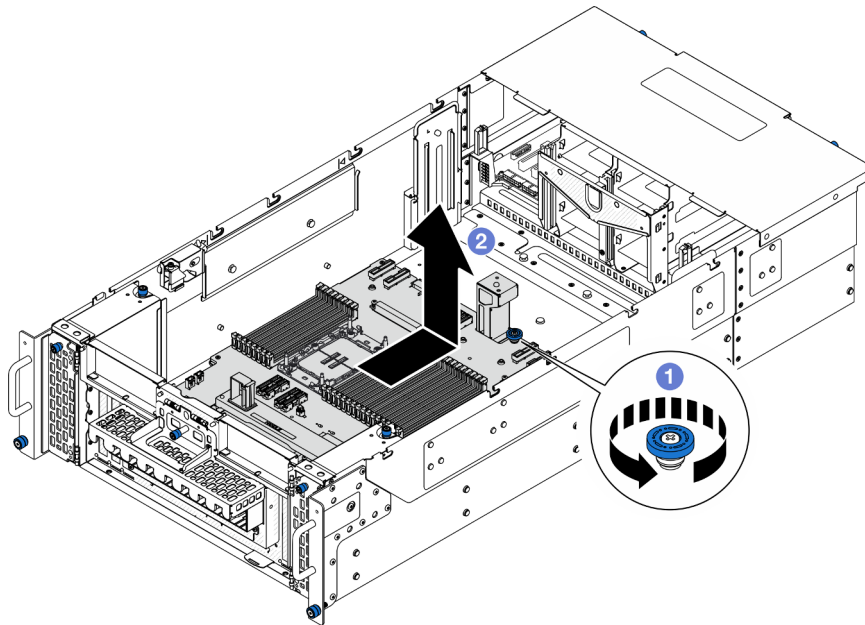


Figure 89. Lower processor board (MB) removal

Note: This lower processor board (MB) handle only serves the purpose of removing the lower processor board (MB). Do not attempt to lift the whole chassis with it.

- a. ① Loosen the thumbscrew that secures the lower processor board (MB). Use a screwdriver if needed.
- b. ② Grasp the thumbscrew and lower processor board (MB) handle; then, slide the lower processor board (MB) slightly towards the rear of the chassis to disengage and remove it.

After you finish

1. Install a replacement unit. See [“Install the lower processor board \(MB\)” on page 130](#).
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.

Important: Before you return the lower processor board (MB), make sure that you install the processor socket covers from the new lower processor board (MB). To replace a processor socket cover:

- a. Take a socket cover from the processor socket assembly on the new lower processor board (MB) and orient it correctly above the processor socket assembly on the removed lower processor board (MB).
 - b. Gently press down the socket 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 socket cover when it is securely attached.
 - c. **Make sure** that the socket cover is securely attached to the processor socket assembly.
3. If you plan to recycle the component, see [“Disassemble the lower processor board \(MB\) for recycle” on page 320](#).

Demo video

[Watch the procedure on YouTube](#)

Install the lower processor board (MB)

Follow instructions in this section to install the lower processor board (MB).

About this task

Important: This task must be operated by trained technicians that are certified by Lenovo Service. Do not attempt to remove or install the part without proper training and qualification.

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to [“Update the firmware” on page 275](#) for more information on firmware updating tools.

Procedure

- Step 1. Touch the static-protective package that contains the new part to any unpainted surface on the outside of the server; then, take the new part out of the package and place it on a static-protective surface.
- Step 2. Install the lower processor board (MB).

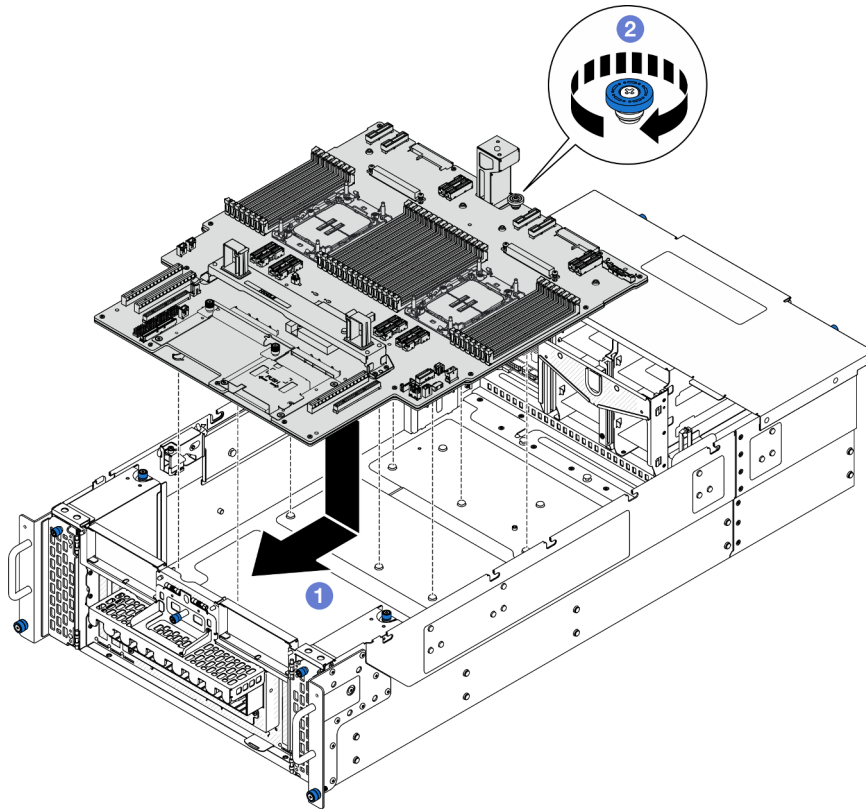


Figure 90. Lower processor board (MB) installation

- a. ① Grasp the thumbscrew and lower processor board (MB) handle; then, lower the lower processor board (MB) into the chassis and slide it towards the front of the chassis.
- b. ② Tighten the thumbscrew to secure the lower processor board (MB). Use a screwdriver if needed.

Step 3. For primary chassis only; if necessary, remove the **1** rubber band from the SCM cable.

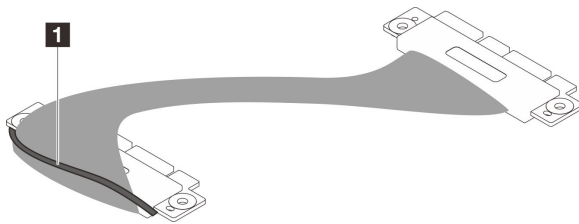


Figure 91. Removing SCM cable packaging

Step 4. For primary chassis only, connect the SCM cable.

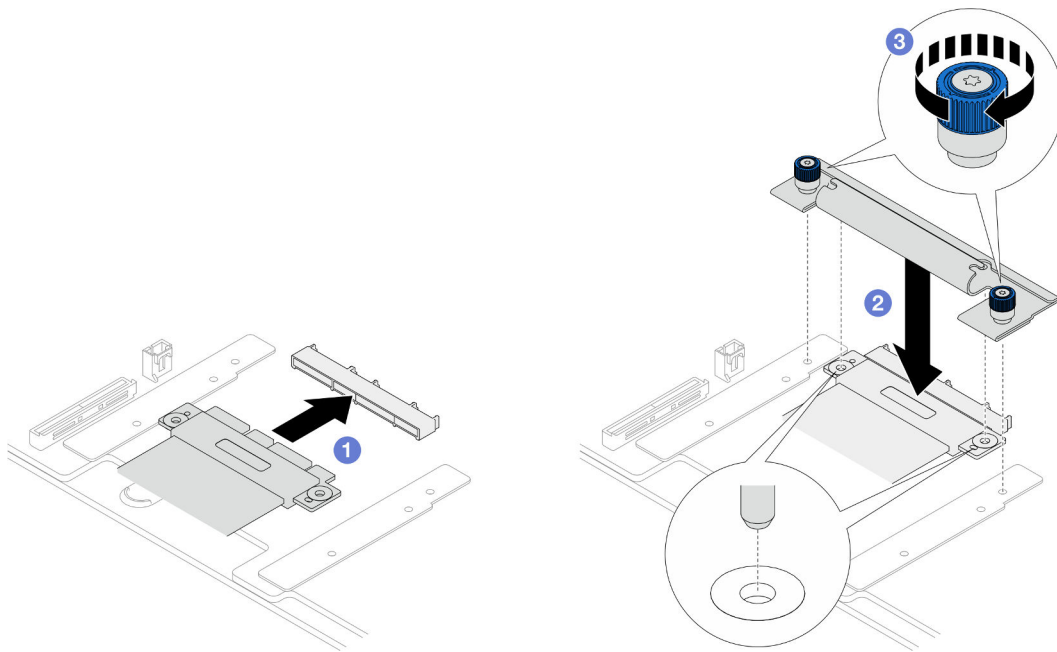


Figure 92. Connecting SCM cable

- a. ① Connect the SCM cable to the lower processor board (MB).
- b. ② Align the pins on the SCM bracket with the openings on the SCM cable; then, lower the SCM bracket onto the SCM cable.
- c. ② Tighten the two thumbscrews to secure the SCM cable. Use a screwdriver if needed.

Step 5. Connect the internal UPI cables to the lower processor board (MB).

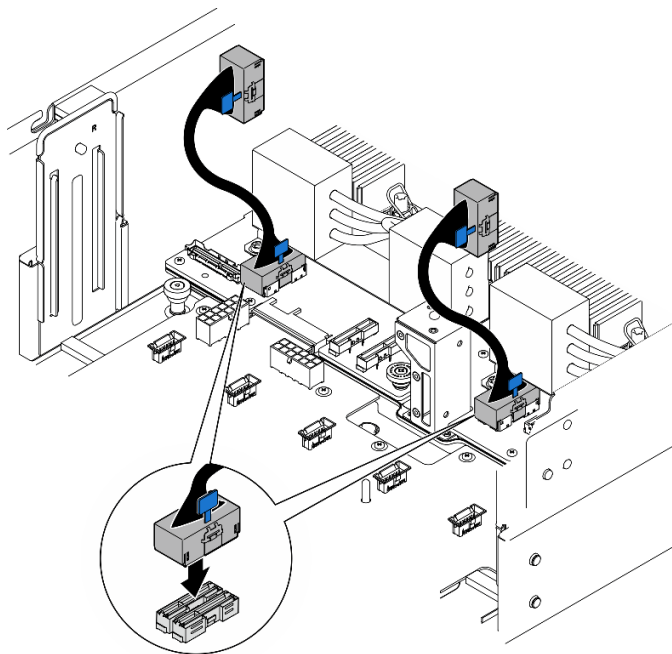


Figure 93. Connecting internal UPI cables

Step 6. Connect the UPI module cables.

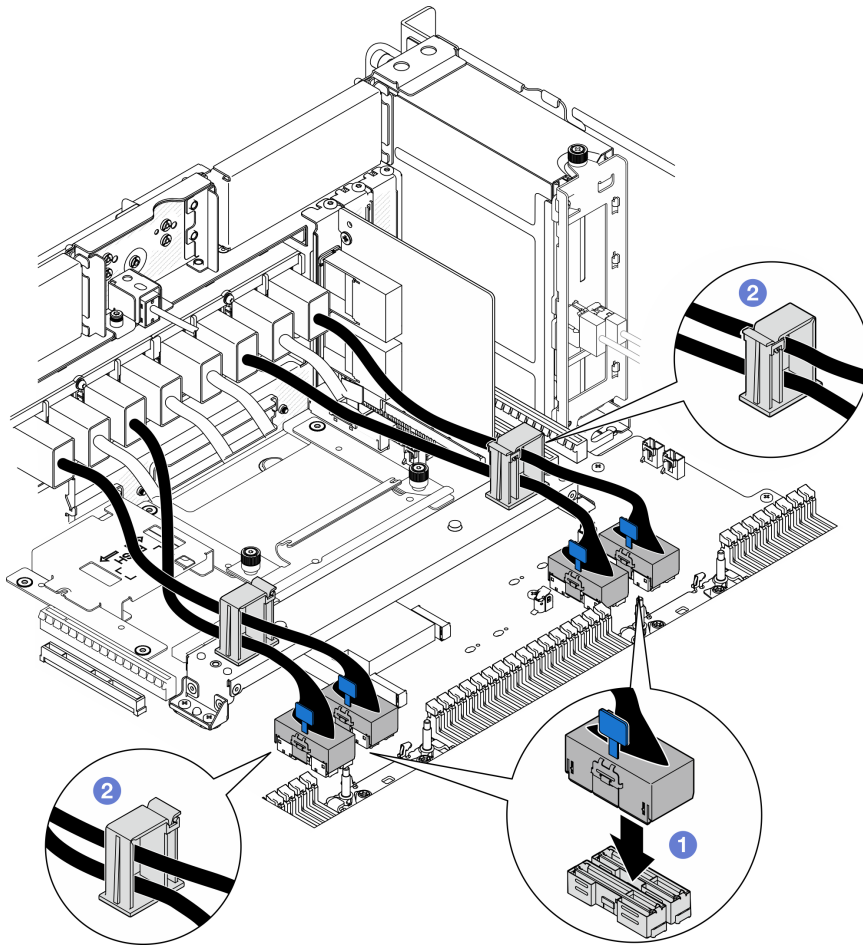


Figure 94. Connecting UPI module cables

- a. ① Connect the UPI module cables to the lower processor board (MB).
- b. ② Route the UPI module cables through the cable clips and close them.

Step 7. Reconnect all the cables to the lower processor board (MB). See [Chapter 6 “Internal cable routing” on page 259](#).

After you finish

1. Reinstall all PCIe adapters to the lower processor board (MB). See [“Install a PCIe adapter” on page 164](#).
2. Reinstall all the M.2 drive to the lower processor board (MB). See [“Install an M.2 drive” on page 143](#).
3. Install the MicroSD card. See [“Install the MicroSD card” on page 152](#).
4. Install the sideband card. See [“Install the sideband card” on page 209](#).
5. Reinstall the memory modules. See [“Install a memory module” on page 148](#).
6. Reinstall the PHMs. See [“Install a processor and heat sink” on page 194](#).
7. For primary chassis only, reinstall the system I/O board and interposer assembly. See [“Install the system I/O board and interposer board” on page 223](#).
8. Reinstall the support bracket. See [“Install the support bracket” on page 213](#).

9. For primary chassis only, reinstall the front operator panel and front operator panel cage. See [“Install the front operator panel” on page 115](#).
10. Reinstall the lower processor board (MB) air baffle. See [“Install the lower processor board \(MB\) air baffle” on page 76](#).
11. Reinstall the upper processor board (CPU BD). See [“Install the upper processor board \(CPU BD\)” on page 252](#).
12. Reinstall the upper processor board (CPU BD) air baffle. See [“Install the upper processor board \(CPU BD\) air baffle” on page 73](#).
13. Reinstall the power distribution board. See [“Install the power distribution board” on page 178](#).
14. Reinstall both power interposer boards. See [“Install the power interposer board” on page 183](#).
15. Reinstall the fan cage. See [“Install the fan cage” on page 106](#).
16. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
17. Reinstall all the power supply units. See [“Install a hot-swap power supply unit” on page 186](#).
18. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside the server.
19. Reconnect the power cords to the **secondary chassis**, then reconnect the power cords to the **primary chassis**.

Note: It is recommended to connect PSU P1-P3/S1-S3 to a PDU different from PSU P4-P6/S4-S6 in case of PDU failure.

20. Power on the server and any peripheral devices. See [“Power on the server” on page 49](#).
21. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

M.2 drive and M.2 boot adapter replacement

Follow the instructions in this section to remove or install an M.2 drive and the M.2 boot adapter.

Remove an M.2 drive

Follow the instructions in this section to remove an M.2 drive.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Depending on your configuration, follow the corresponding procedures below for proper removal procedure.

- [“Remove M.2 drive from M.2 boot adapter” on page 135](#)
- [“Remove M.2 drive from lower processor board \(MB\)” on page 135](#)

Remove M.2 drive from M.2 boot adapter

Procedure

- Step 1. Remove the front top cover. See [“Remove the front top cover” on page 233](#).
- Step 2. Remove the M.2 drive.

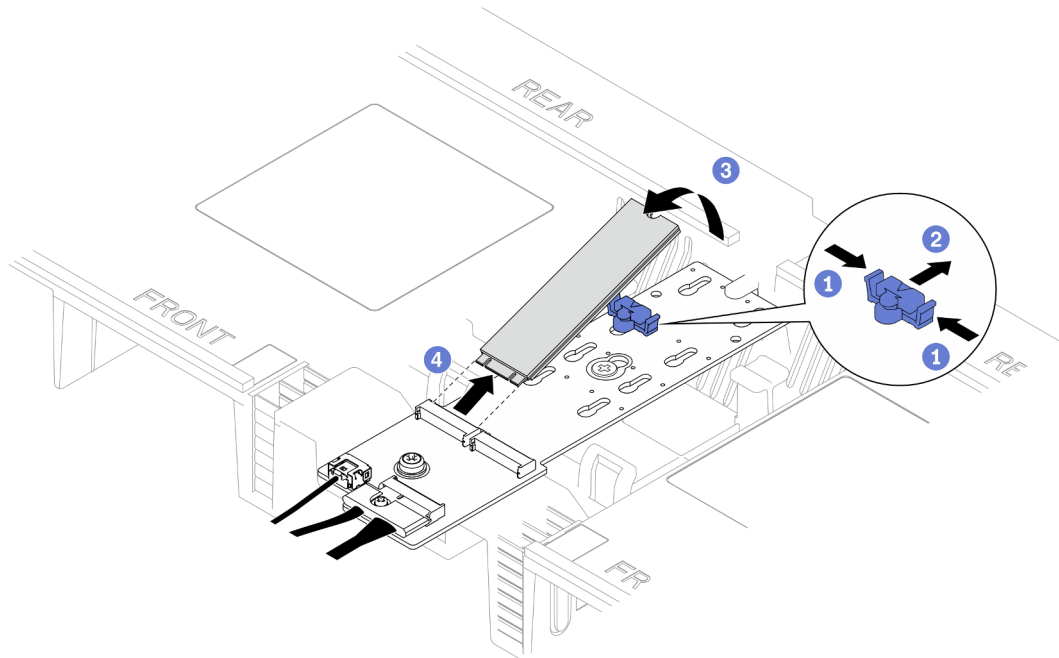


Figure 95. Removing M.2 drive

- ① Pinch and hold on the retainer clip.
- ② Slide the retainer backward to loosen the M.2 drive from the M.2 boot adapter.
- ③ Pivot the rear side of the M.2 drive away from the M.2 boot adapter.
- ④ Pull the M.2 drive away from the slot at an angle of approximately 30 degrees.

Remove M.2 drive from lower processor board (MB)

Procedure

- Step 1. Make preparation for the task.
- Remove the front top cover. See [“Remove the front top cover” on page 233](#).
 - Remove the upper processor board (CPU BD) air baffle. See [“Remove the upper processor board \(CPU BD\) air baffle” on page 71](#).
 - Remove the upper processor board (CPU BD). See [“Remove the upper processor board \(CPU BD\)” on page 247](#).
 - For primary chassis only, remove the support bracket. See [“Remove the support bracket” on page 211](#).
 - For primary chassis only, remove the system I/O board and interposer assembly. See [“Remove the system I/O board and interposer board” on page 218](#).

Step 2. Remove the M.2 drive.

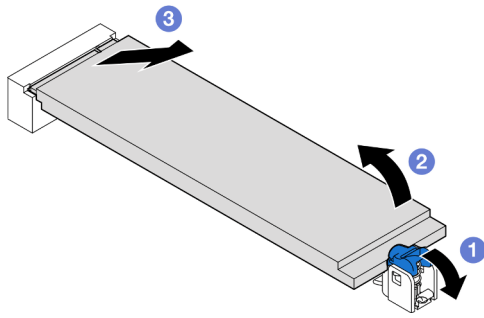


Figure 96. Removing M.2 drive

- a. ① Press the blue M.2 retaining clip.
- b. ② The M.2 drive will slightly lift away from the lower processor board (MB).
- c. ③ Hold the edge of the M.2 drive to pull it out of the M.2 drive slot at an angle of approximately 15 degrees.

After you finish

1. Adjust the retainer on the M.2 boot adapter to accommodate the particular size of the M.2 drive you wish to install. See [“Adjust the M.2 retainer” on page 140](#).
2. Install a replacement unit. See [“Install an M.2 drive” on page 143](#).
3. 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 M.2 boot adapter

Follow the instructions in this section to remove the M.2 boot adapter.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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.

Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 233](#).

- b. Remove all the M.2 drives from the M.2 boot adapter. See [“Remove an M.2 drive”](#) on page 134.

Step 2. Disconnect the cables from the M.2 boot adapter.

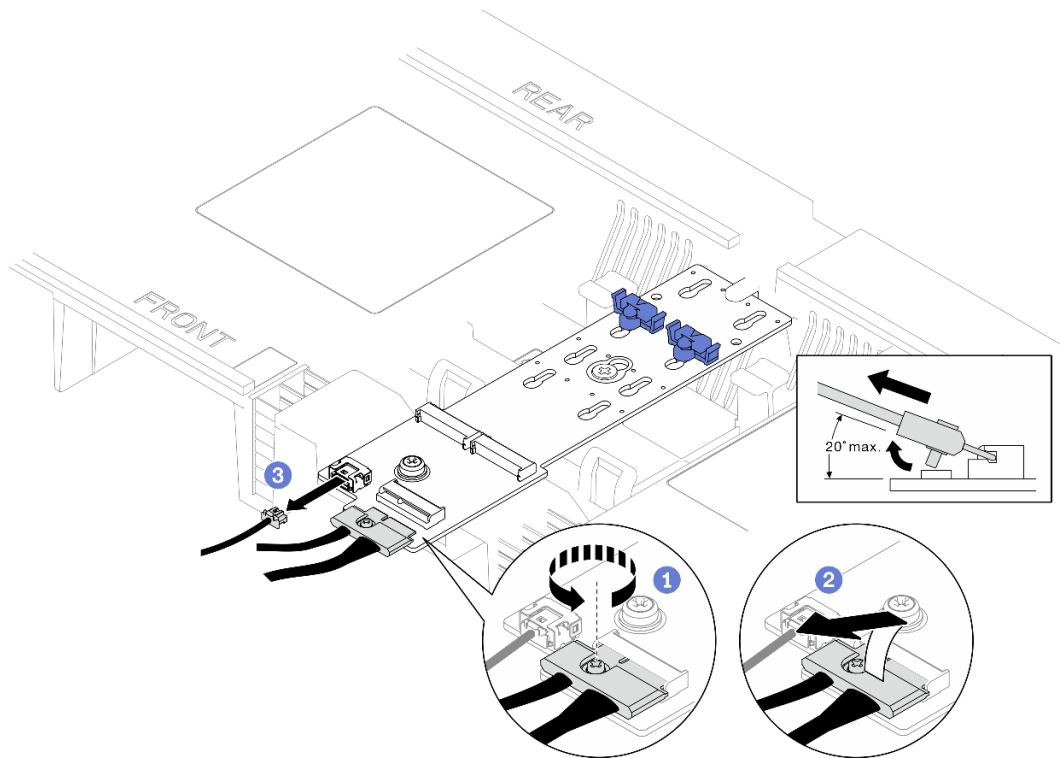


Figure 97. Disconnecting cable from M.2 boot adapter

- a. ① Loosen the screw on the signal cable.
- b. ② Tilt the connector and remove it.
- c. ③ Remove the power cable.

Step 3. Remove the M.2 boot adapter.

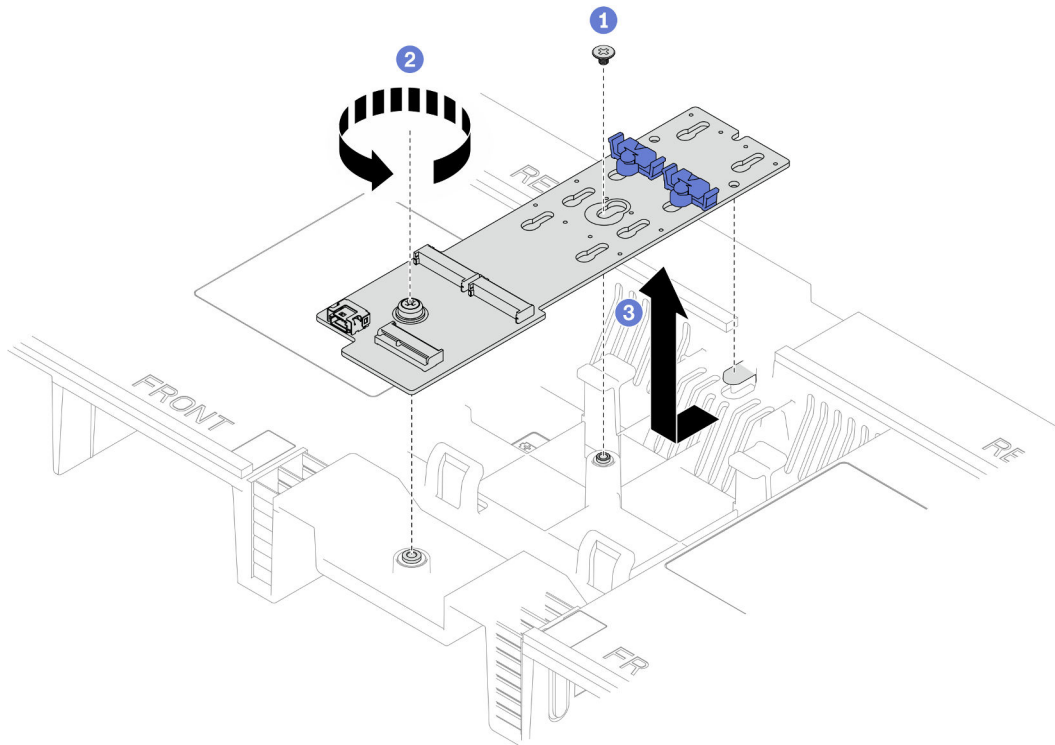


Figure 98. Removing M.2 boot adapter

- a. ① Unfasten the screw that secures the middle of the M.2 boot adapter to the upper processor board (CPU BD) air baffle.
- b. ② Unfasten the screw that secures the end of the M.2 boot adapter to the upper processor board (CPU BD) air baffle.
- c. ③ Slide the M.2 boot adapter towards the front of the chassis and lift it out of the upper processor board (CPU BD) air baffle.

Step 4. If necessary, disconnect the M.2 boot adapter cables from the lower processor board (MB).

After you finish

1. Install a replacement unit. See [“Install the M.2 boot adapter” on page 138](#).
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 M.2 boot adapter

Follow the instructions in this section to install the M.2 boot adapter.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.

- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See “Power off the server” on page 50.
- 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.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” on page 275 for more information on firmware updating tools.

Procedure

- Step 1. If necessary, connect the M.2 boot adapter cables to the lower processor board (MB).
- Step 2. Install M.2 boot adapter.

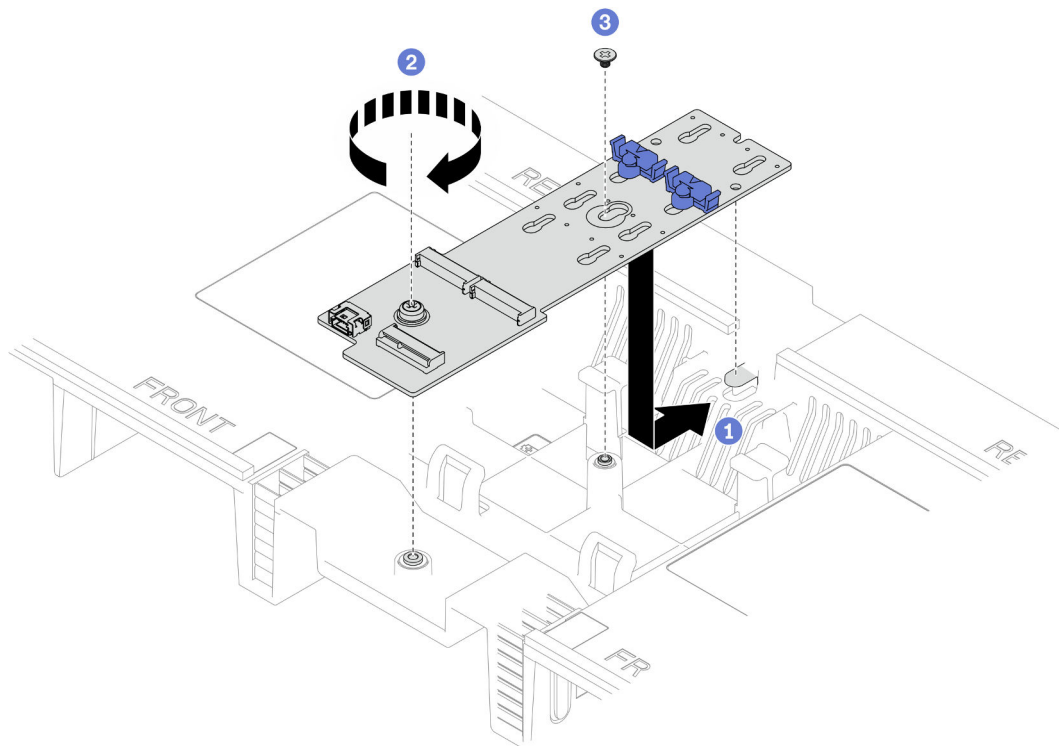


Figure 99. Installing M.2 boot adapter

- 1 Lower the M.2 boot adapter into the upper processor board (CPU BD) air baffle; then, slide the M.2 boot adapter towards the rear of the chassis until it is seated in place.
 - 2 Fasten the screw that secures the end of the M.2 boot adapter to the upper processor board (CPU BD) air baffle.
 - 3 Fasten the screw that secures the middle of the M.2 boot adapter to the upper processor board (CPU BD) air baffle.
- Step 3. Connect the cables to the M.2 boot adapter.

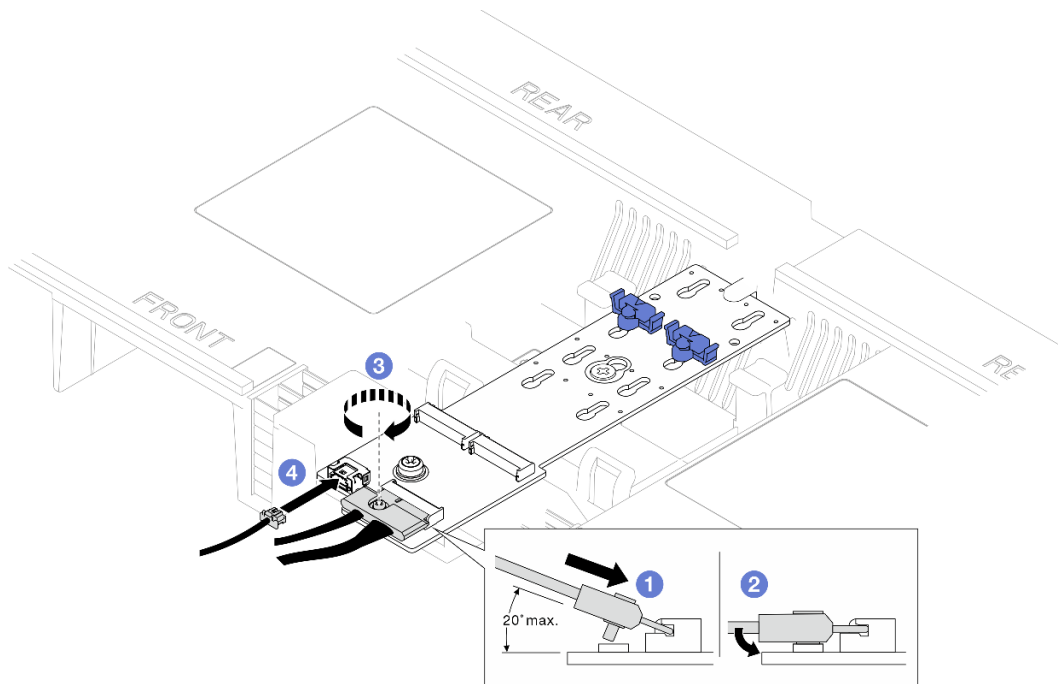


Figure 100. Connecting cable to M.2 boot adapter

1. ① Tilt the connector at an angle of 20 degrees or lower, and insert it until its bottom surface reaches the ramp.
2. ② Press the connector down flat.
3. ③ Tighten the screw on the signal cable.
4. ④ Connect the power cable.

After you finish

1. Reinstall the M.2 drives to the M.2 boot adapter. See [“Install an M.2 drive” on page 143](#).
2. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

Adjust the M.2 retainer

Use this information to adjust the M.2 retainer position.

About this task

Sometimes you need to adjust the M.2 drive retainer to a correct keyhole that can accommodate the particular size of the M.2 drive you wish to install.

Depending on your configuration, follow the corresponding procedures below for proper removal procedure.

- [“Adjust M.2 retainer on M.2 boot adapter” on page 141](#)
- [“Adjust M.2 retainer on lower processor board \(MB\)” on page 141](#)

Adjust M.2 retainer on M.2 boot adapter

Procedure

Step 1. Adjust the M.2 retainer.

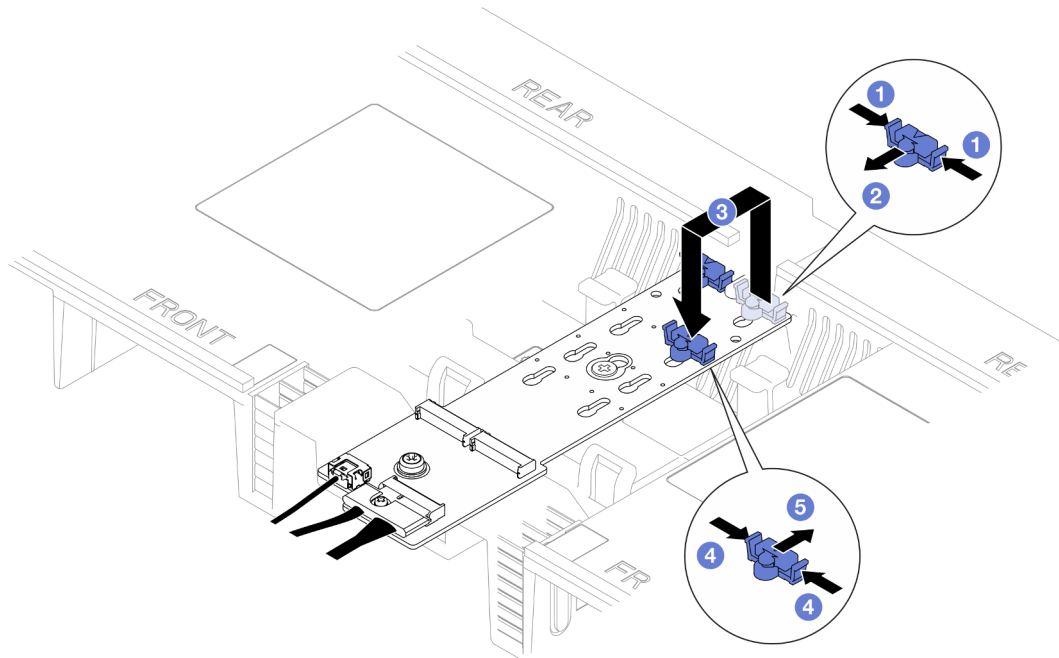


Figure 101. M.2 retainer adjustment

- 1 Press both sides of the retainer.
- 2 Move the retainer forward until it is in the large opening of the keyhole.
- 3 Take the retainer out of the keyhole; then, insert the retainer into the correct keyhole.
- 4 Press both sides of the retainer.
- 5 Slide the retainer backwards (toward the small opening of the keyhole) until it is seated in place.

Adjust M.2 retainer on lower processor board (MB)

Procedure

Step 1. Remove the M.2 retainer.

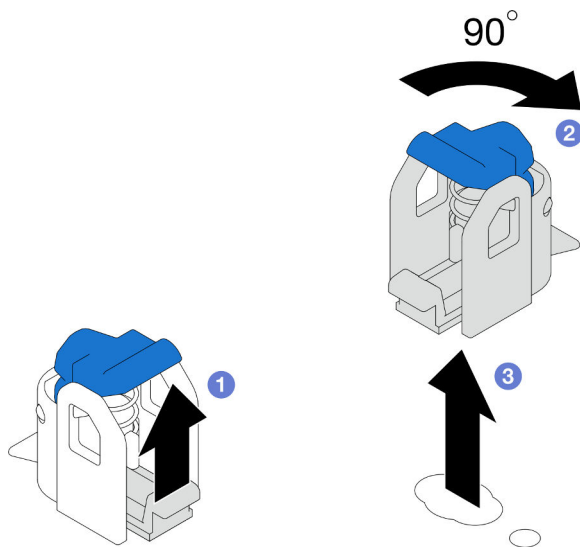


Figure 102. M.2 retainer removal

- a. ① Lift and hold the release latch on the retainer.
- b. ② Rotate the retainer by 90 degrees to the unlocked position.
- c. ③ Lift the retainer from the lower processor board (MB).

Step 2. Install the M.2 retainer.

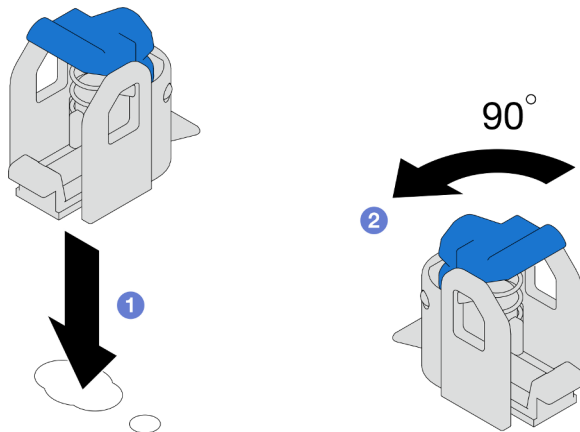


Figure 103. M.2 retainer installation

- a. ① Locate the correct keyhole into which the retainer should be installed; then, insert the retainer into the keyhole, orienting at the unlocked position.
- b. ② Rotate the retainer by 90 degrees to the locked position.

After you finish

1. Install an M.2 drive. See [“Install an M.2 drive” on page 143](#).
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 M.2 drive

Follow the instructions in this section to install an M.2 drive.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to [“Update the firmware” on page 275](#) for more information on firmware updating tools.

Depending on your configuration, follow the corresponding procedures below for proper removal procedure.

- [“Install M.2 drive to M.2 boot adapter” on page 143](#)
- [“Install M.2 drive to lower processor board \(MB\)” on page 145](#)

Install M.2 drive to M.2 boot adapter

Procedure

- Step 1. Touch the static-protective package that contains the new part to any unpainted surface on the outside of the server; then, take the new part out of the package and place it on a static-protective surface.
- Step 2. (Optional) Adjust the retainer on the M.2 boot adapter to accommodate the particular size of the M.2 drive you wish to install. See [“Adjust the M.2 retainer” on page 140](#).
- Step 3. Locate the connector on the M.2 boot adapter.

Notes:

- Your M.2 boot adapter might look different from the following illustrations, but the installation method is the same.
- Some M.2 boot adapters support two identical M.2 drives. Install the M.2 drive in slot 0 first.

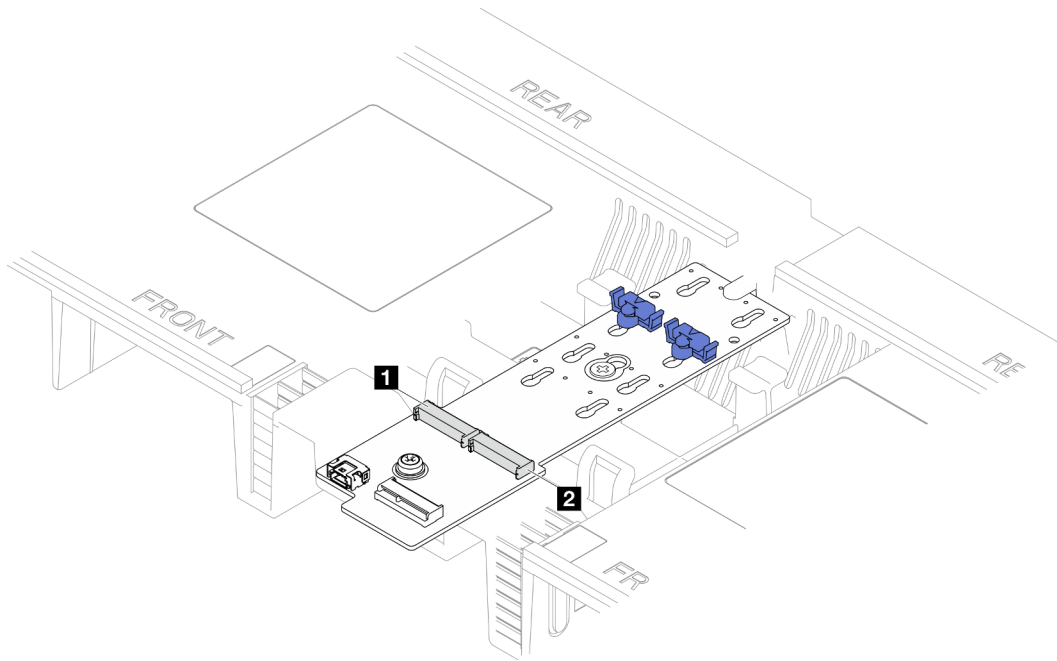


Figure 104. M.2 drive slots

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

Step 4. Install M.2 drive into M.2 boot adapter.

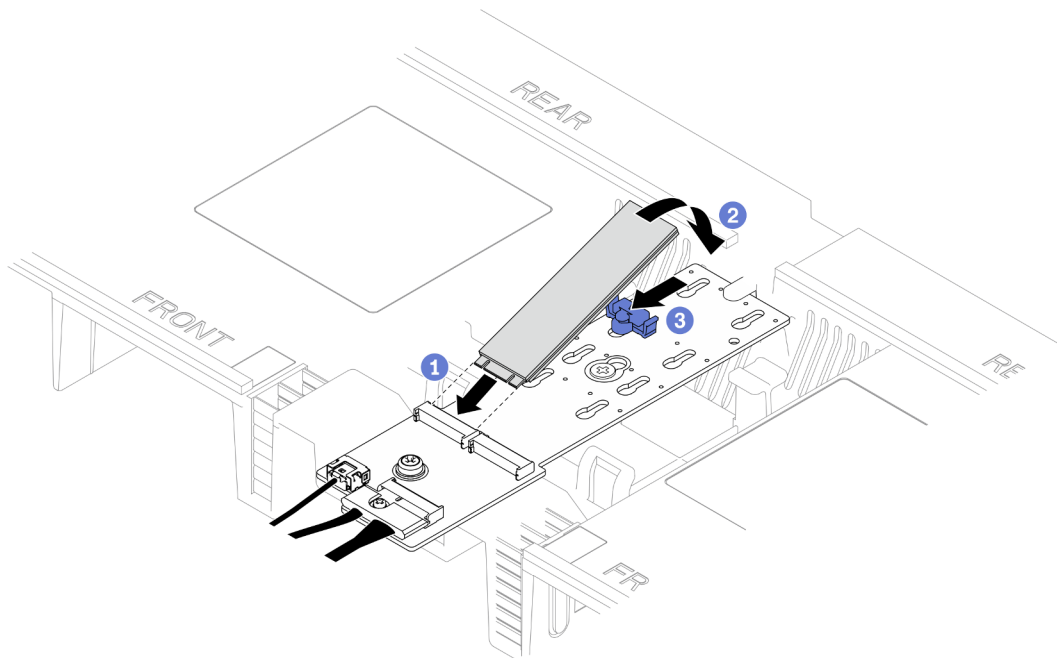


Figure 105. Installing M.2 drive

- a. 1 Insert the M.2 drive into the slot at an angle of approximately 30 degrees.
- b. 2 Pivot the M.2 drive down until the notch at the end of the M.2 drive catches on the lip of the retainer.

- c. 3 Slide the retaining clip forward to secure the M.2 drive to the M.2 boot adapter.

Install M.2 drive to lower processor board (MB)

Procedure

- Step 1. Touch the static-protective package that contains the new part to any unpainted surface on the outside of the server; then, take the new part out of the package and place it on a static-protective surface.
- Step 2. Locate the M.2 drive slots on the lower processor board (MB).

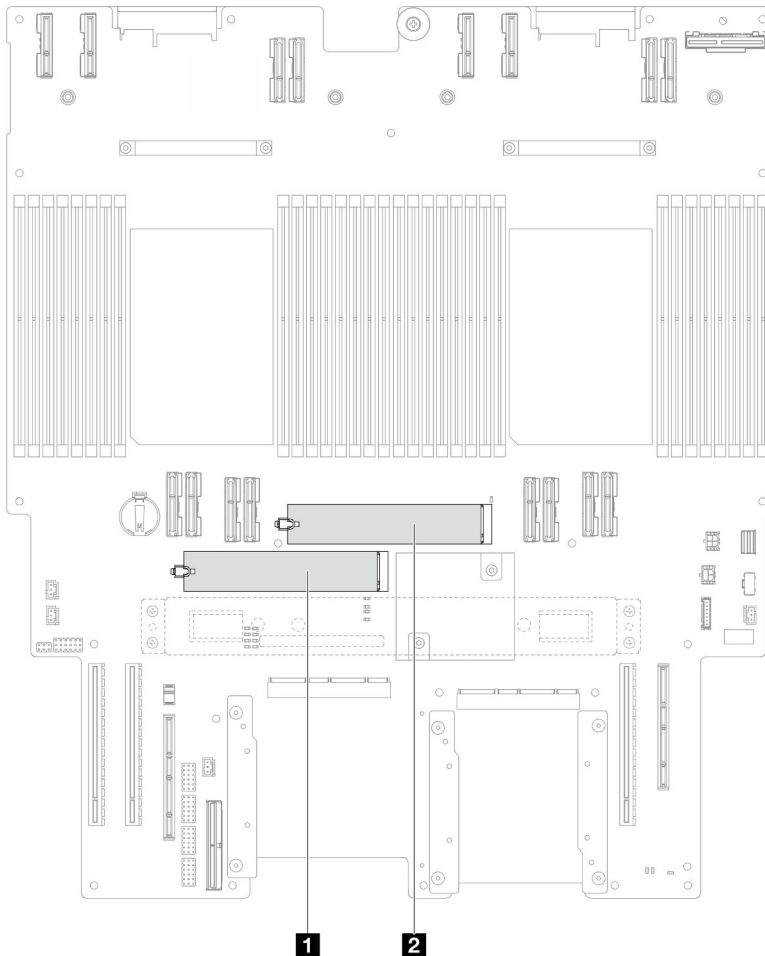


Figure 106. M.2 drive slots

1 Slot 1	2 Slot 2
-----------------	-----------------

- Step 3. (Optional) Adjust the retainer on the M.2 boot adapter to accommodate the particular size of the M.2 drive you wish to install. See [“Adjust the M.2 retainer” on page 140](#).
- Step 4. Install the M.2 drive.

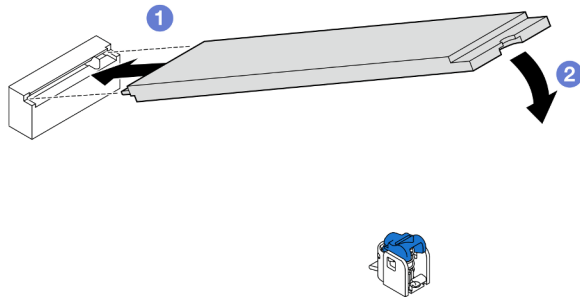


Figure 107. Installing M.2 drive

- a. ① Insert the M.2 drive into the M.2 drive slot at an angle of approximately 15 degrees.
- b. ② Pivot the other end of the M.2 drive down until the retaining clip engages.

After you finish

1. If you replaced an M.2 drive on the M.2 boot adapter, reinstall the front top cover. See [“Install the front top cover” on page 239](#).
2. If you replaced an M.2 drive on the lower processor board (MB), reinstall the following:
 - a. For primary chassis only, reinstall the system I/O board and interposer assembly. See [“Install the system I/O board and interposer board” on page 223](#).
 - b. For primary chassis only, reinstall the support bracket. See [“Install the support bracket” on page 213](#).
 - c. Reinstall the upper processor board (CPU BD). See [“Install the upper processor board \(CPU BD\)” on page 252](#).
 - d. Reinstall the upper processor board (CPU BD) air baffle. See [“Install the upper processor board \(CPU BD\) air baffle” on page 73](#).
 - e. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

Memory module replacement

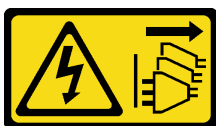
Use the following procedures to remove and install a memory module.

Remove a memory module

Use this information to remove a memory module.

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 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- Make sure to remove or install memory module 20 seconds after disconnecting power cords from the system. It allows the system to be completely discharged of electricity and safe for handling memory module.
- If the server is installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).
- If you are not installing a replacement memory module to the same slot, make sure you have memory module filler available.
- Memory modules are sensitive to static discharge and require special handling. Refer to the standard guidelines for [“Handling static-sensitive devices” on page 44](#).
 - Always wear an electrostatic-discharge strap when removing or installing memory modules. Electrostatic-discharge gloves can also be used.
 - Never hold two or more memory modules together so that they do not touch each other. Do not stack memory modules directly on top of each other during storage.
 - Never touch the gold memory module connector contacts or allow these contacts to touch the outside of the memory module connector housing.
 - Handle memory modules with care: never bend, twist, or drop a memory module.
 - Do not use any metal tools (such as jigs or clamps) to handle the memory modules, because the rigid metals may damage the memory modules.
 - Do not insert memory modules while holding packages or passive components, which can cause package cracks or detachment of passive components by the high insertion force.
- In the case of upper processor board (CPU BD) or lower processor board (MB) 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 upper processor board (CPU BD) or lower processor board (MB) replacement.

Important: Remove or install memory modules for one processor at a time.

Procedure

Attention: Make sure to remove or install memory module 20 seconds after disconnecting power cords from the system. It allows the system to be completely discharged of electricity and safe for handling memory module.

Step 1. Make preparation for the task.

- a. To replace a memory module on the upper processor board (CPU BD), remove the following:
 1. Remove the front top cover. See [“Remove the front top cover” on page 233](#).
 2. Remove the upper processor board (CPU BD) air baffle. See [“Remove the upper processor board \(CPU BD\) air baffle” on page 71](#).
- b. To replace a memory module on the lower processor board (MB), remove the following:
 1. Remove the front top cover. See [“Remove the front top cover” on page 233](#).

2. Remove the upper processor board (CPU BD) air baffle. See [“Remove the upper processor board \(CPU BD\) air baffle” on page 71.](#)
3. Remove the upper processor board (CPU BD). See [“Remove the upper processor board \(CPU BD\)” on page 247.](#)
4. Remove the lower processor board (MB) air baffle. See [“Remove the lower processor board \(MB\) air baffle” on page 75.](#)

Step 2. Remove the memory module from the slot.

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

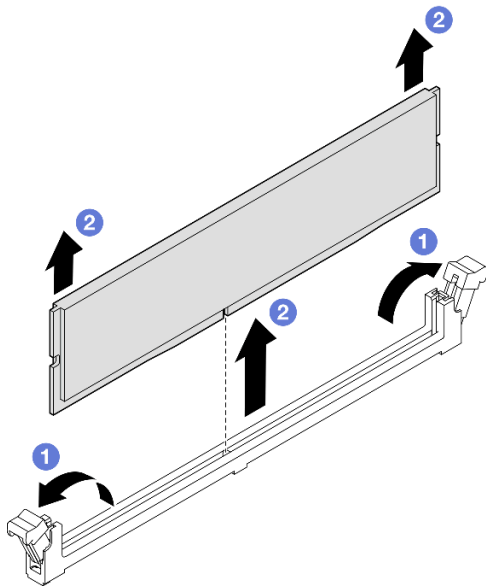


Figure 108. Memory module removal

- 1 Gently open the retaining clip on each end of the memory module slot.
- 2 Grasp the memory module at both ends and carefully lift it out of the slot.

After you finish

1. Install a memory module or a memory module filler. See [“Install a memory module” on page 148.](#)

Note: A memory module slot must be installed with a memory module or a memory module filler.

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

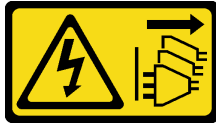
[Watch the procedure on YouTube](#)

Install a memory module

Follow the instructions in this section to install a memory module.

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.

See [“Memory module installation rules and order” on page 44](#) for detailed information about memory configuration and setup.

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- Make sure to remove or install memory module 20 seconds after disconnecting power cords from the system. It allows the system to be completely discharged of electricity and safe for handling memory module.
- If the server is installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).
- Make sure to adopt one of the supported configurations listed in [“Memory module installation rules and order” on page 44](#).
- Memory modules are sensitive to static discharge and require special handling. Refer to the standard guidelines at [“Handling static-sensitive devices” on page 44](#):
 - Always wear an electrostatic-discharge strap when removing or installing memory modules. Electrostatic-discharge gloves can also be used.
 - Never hold two or more memory modules together so that they do not touch each other. Do not stack memory modules directly on top of each other during storage.
 - Never touch the gold memory module connector contacts or allow these contacts to touch the outside of the memory module connector housing.
 - Handle memory modules with care: never bend, twist, or drop a memory module.
 - Do not use any metal tools (such as jigs or clamps) to handle the memory modules, because the rigid metals may damage the memory modules.
 - Do not insert memory modules while holding packages or passive components, which can cause package cracks or detachment of passive components by the high insertion force.

Important:

- Remove or install memory modules for one processor at a time.
- Before installing 24 Gb DRAM RDIMMs, make sure to update the UEFI firmware to the latest version first, then remove all existing 16 Gb DRAM RDIMMs.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” on page 275 for more information on firmware updating tools.

Procedure

Attention: Make sure to remove or install memory module 20 seconds after disconnecting power cords from the system. It allows the system to be completely discharged of electricity and safe for handling memory module.

Step 1. Locate the required memory module slot on the upper processor board (CPU BD) or lower processor board (MB).

Notes:

- Remove or install memory modules for one processor at a time.
- Ensure that you observe the installation rules and sequence order in “Memory module installation rules and order” on page 44.

Step 2. Touch the static-protective package that contains the memory module to any unpainted surface on the outside of the server. Then, take the memory module out of the package and place it on a static-protective surface.

Step 3. Install the memory module into the slot.

Attention:

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

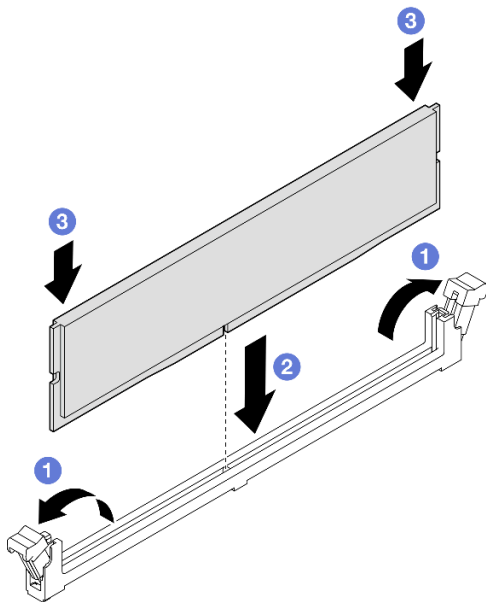


Figure 109. Memory module installation

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

- b. ② Align the memory module with the slot, and gently place the memory module on the slot with both hands.
- c. ③ Firmly press both ends of the memory module straight down into the slot until the retaining clips snap into the locked position.

After you finish

1. If you replaced a memory module on the upper processor board (CPU BD), reinstall the following:
 - a. Reinstall the upper processor board (CPU BD) air baffle. See [“Install the upper processor board \(CPU BD\) air baffle” on page 73](#).
 - b. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
2. If you replaced a memory module on the lower processor board (MB), reinstall the following:
 - a. Reinstall the lower processor board (MB) air baffle. See [“Install the lower processor board \(MB\) air baffle” on page 76](#).
 - b. Reinstall the upper processor board (CPU BD). See [“Install the upper processor board \(CPU BD\)” on page 252](#).
 - c. Reinstall the upper processor board (CPU BD) air baffle. See [“Install the upper processor board \(CPU BD\) air baffle” on page 73](#).
 - d. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

MicroSD card replacement

Follow the instructions in this section to remove and install the MicroSD card.

Remove the MicroSD card

Follow the instructions in this section to remove the MicroSD card.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

- Step 1. Make preparation for the task.
 - a. Remove the front top cover. See [“Remove the front top cover” on page 233](#).

- b. Remove the upper processor board (CPU BD) air baffle. See [“Remove the upper processor board \(CPU BD\) air baffle” on page 71.](#)
- c. Remove the upper processor board (CPU BD). See [“Remove the upper processor board \(CPU BD\)” on page 247.](#)
- d. Remove the support bracket. See [“Remove the support bracket” on page 211.](#)
- e. For primary chassis only, remove the system I/O board and interposer assembly. See [“Remove the system I/O board and interposer board” on page 218.](#)

Step 2. Remove the MicroSD card.

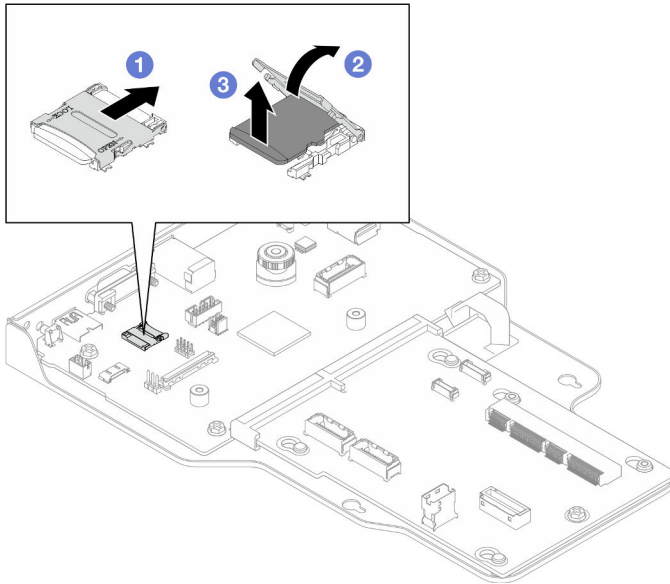


Figure 110. Removing MicroSD card

- a. ① Slide the socket lid to the open position.
- b. ② Lift open the socket lid.
- c. ③ Remove the MicroSD card from the socket.

After you finish

1. Install a replacement unit. See [“Install the MicroSD card” on page 152.](#)
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 MicroSD card

Follow the instructions in this section to install the MicroSD card.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

Step 1. Install the MicroSD card.

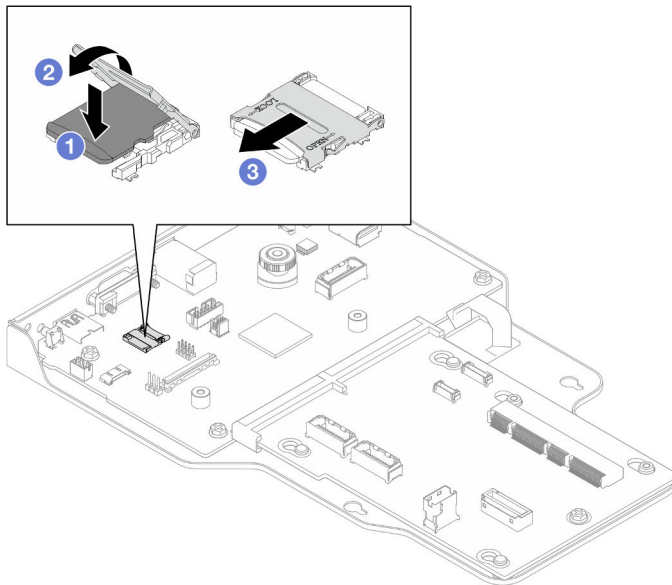


Figure 111. Installing MicroSD card

- 1 Place the MicroSD card into the socket.
- 2 Close the socket lid.
- 3 Slide the socket lid to the lock position.

After you finish

1. For primary chassis only, reinstall the system I/O board and interposer assembly. See [“Install the system I/O board and interposer board” on page 223](#).
2. Reinstall the support bracket. See [“Install the support bracket” on page 213](#).
3. Reinstall the upper processor board (CPU BD). See [“Install the upper processor board \(CPU BD\)” on page 252](#).
4. Reinstall the upper processor board (CPU BD) air baffle. See [“Install the upper processor board \(CPU BD\) air baffle” on page 73](#).
5. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
6. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

OCP module and cage replacement

Follow the instructions in this section to install or remove the OCP module and cage.

Remove the OCP module

Follow the instructions in this section to remove the OCP module.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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.

Procedure

Step 1. Remove the OCP module.

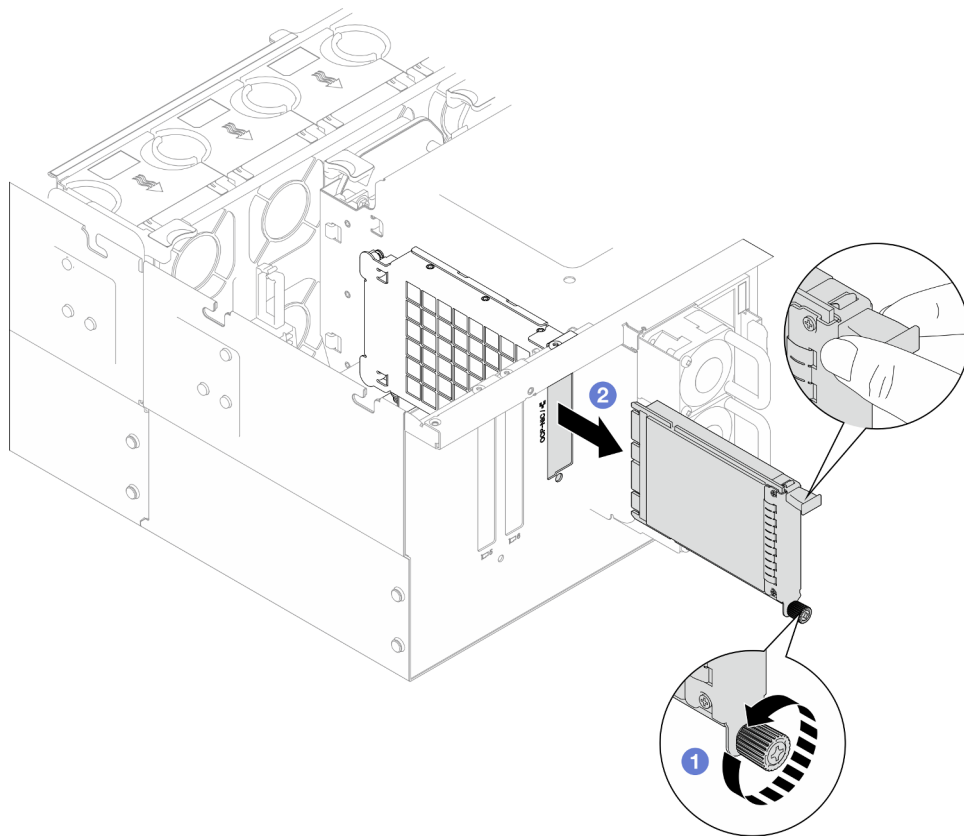


Figure 112. Removing OCP module

- a. ① Loosen the thumbscrew that secures the OCP module. Use a screwdriver if necessary. Use a screwdriver if needed.
- b. ② Grasp the handle, and slide the OCP module out.

After you finish

1. Install a replacement unit or a filler. See [“Install the OCP module” 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](#)

Remove the OCP cage

Follow the instructions in this section to remove the OCP cage.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.

- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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.

Procedure

Step 1. Make preparation for the task.

- Remove the OCP module. See [“Remove the OCP module” on page 154](#).
- Remove the front top cover. See [“Remove the front top cover” on page 233](#).
- Remove the rear top cover. See [“Remove the rear top cover” on page 235](#).
- If you are replacing the OCP cable, remove the upper processor board (CPU BD) air baffle and upper processor board (CPU BD). See [“Remove the upper processor board \(CPU BD\) air baffle” on page 71](#) and [“Remove the upper processor board \(CPU BD\)” on page 247](#).

Step 2. Remove the OCP module cage.

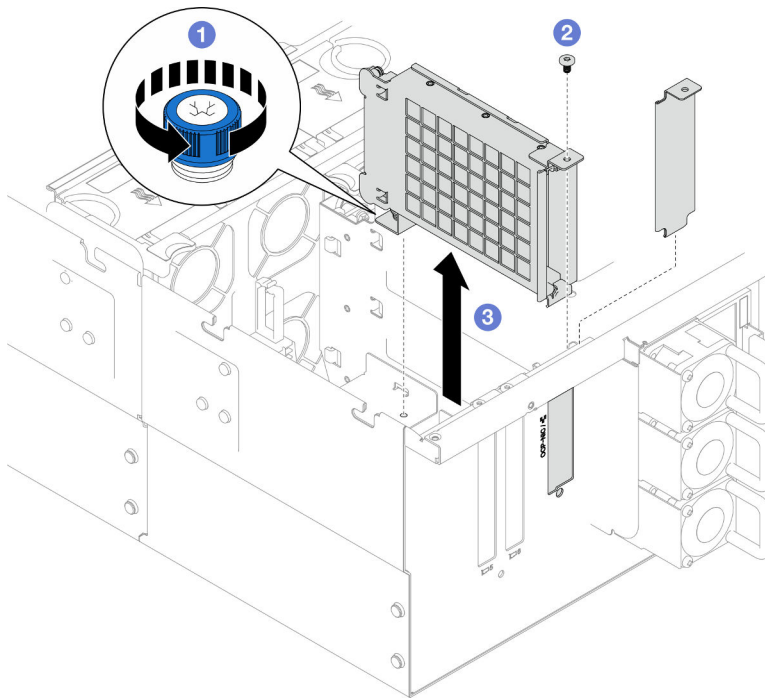


Figure 113. Removing OCP module cage

- ① Loosen the thumbscrew on the OCP module cage. Use a screwdriver if needed.
- ② Remove the screw that secures the OCP module cage.
- ③ Grasp the OCP module cage and carefully pull it out of the chassis.

Step 3. If necessary, remove two screws to remove the OCP cable.

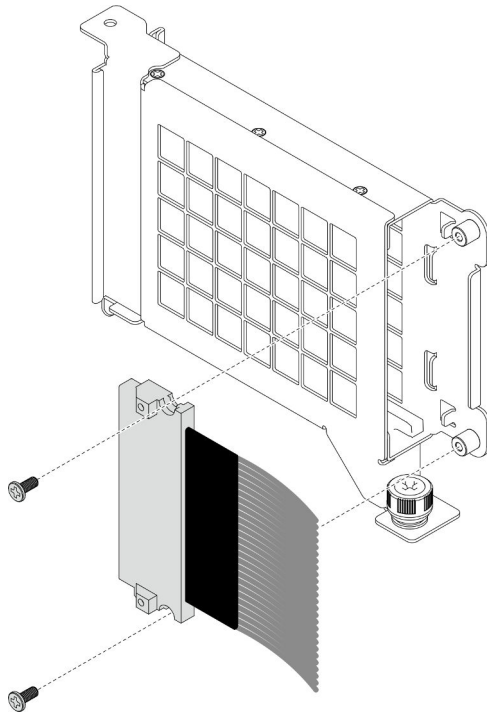


Figure 114. Removing OCP cable

Step 4. If necessary, disconnect the OCP cables from the lower processor board (MB) and interposer board. See [“OCP cable routing” on page 268](#).

After you finish

1. Install a replacement unit. See [“Install the OCP cage” on page 157](#).
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 cage

Follow the instructions in this section to install the OCP cage.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” on page 275 for more information on firmware updating tools.

Procedure

Step 1. If necessary, connect the OCP cables to the lower processor board (MB) and interposer board. See “OCP cable routing” on page 268.

Step 2. If necessary, install the OCP cable and secure it to the OCP module cage with two screws.

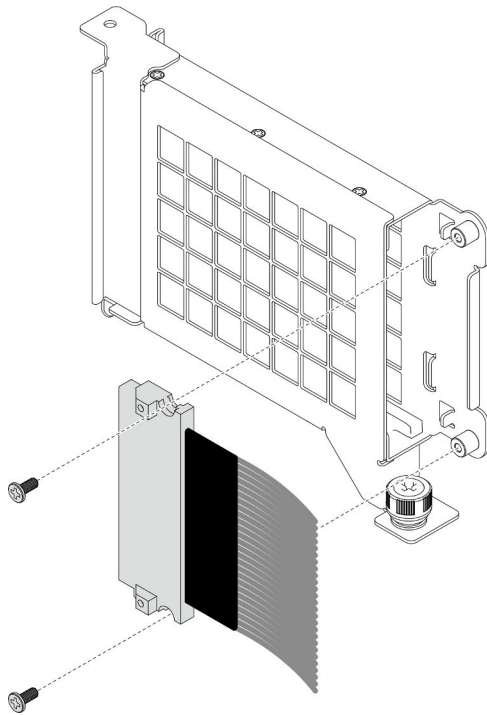


Figure 115. Installing OCP cable

Step 3. Install the OCP module cage.

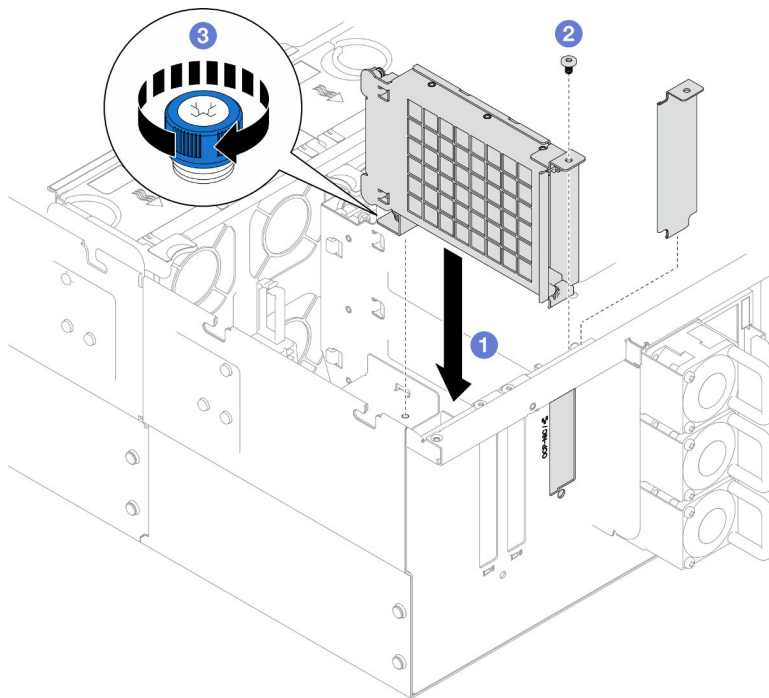


Figure 116. Installing OCP module cage

- a. 1 Align and install the OCP module cage into the chassis.
- b. 2 Install the screw to secure the OCP module cage.
- c. 2 Tighten the thumbscrew on the OCP module cage. Use a screwdriver if needed.

After you finish

1. If you replaced the OCP cable, reinstall the upper processor board (CPU BD) and upper processor board (CPU BD) air baffle. See [“Install the upper processor board \(CPU BD\)”](#) on page 252 and [“Install the upper processor board \(CPU BD\) air baffle”](#) on page 73.
2. Reinstall the rear top cover. See [“Install the rear top cover”](#) on page 236.
3. Reinstall the front top cover. See [“Install the front top cover”](#) on page 239.
4. Reinstall the OCP module. See [“Install the OCP module”](#) on page 159.
5. Complete the parts replacement. See [“Complete the parts replacement”](#) on page 256.

Demo video

[Watch the procedure on YouTube](#)

Install the OCP module

Follow the instructions in this section to install the OCP module.

About this task

Attention:

- Read [“Installation Guidelines”](#) on page 41 and [“Safety inspection checklist”](#) on page 42 to ensure that you work safely.

- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See “Power off the server” on page 50.
- 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.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” on page 275 for more information on firmware updating tools.

Procedure

- Step 1. If a filler is installed, remove it.
- Step 2. Install the OCP module.

Note: Ensure that the module is fully seated and the thumbscrew is securely tightened. Otherwise, the OCP module will not get full connection and may not function.

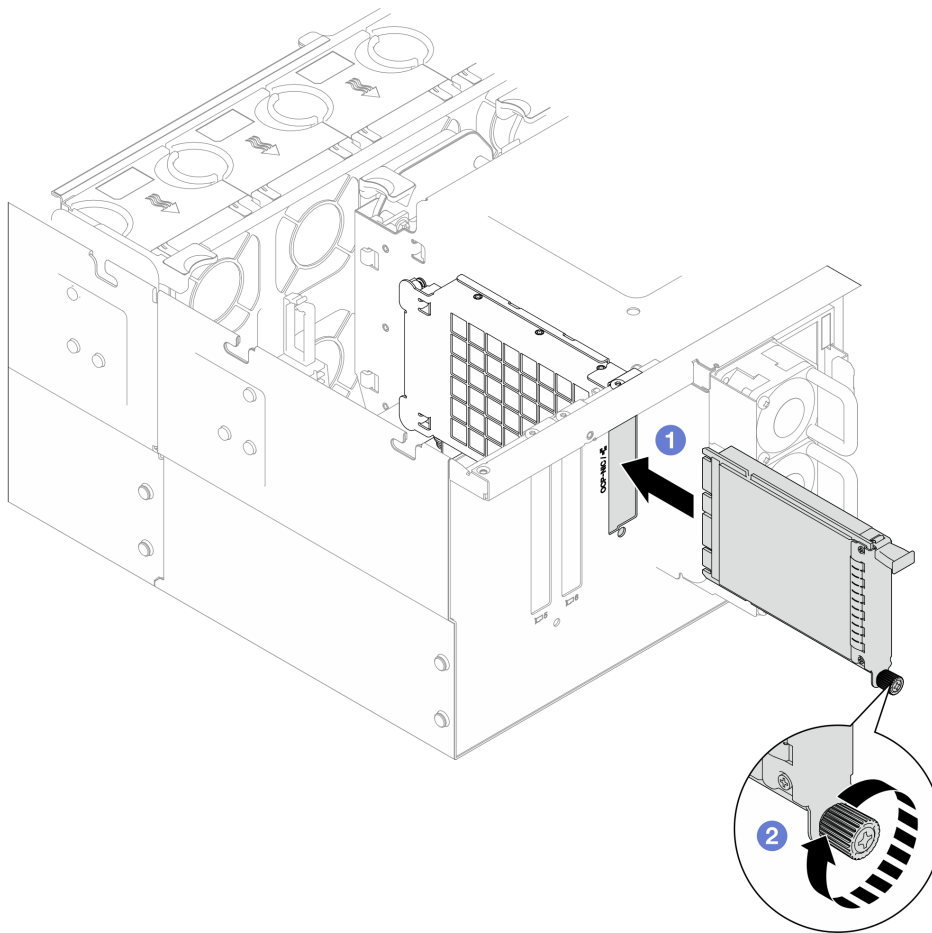


Figure 117. Installing OCP module

- a. 1 Slide the OCP module into the slot until it is fully seated.

- b. ② Tighten the thumbscrew to secure the OCP module. Use a screwdriver if necessary.

After you finish

Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

PCIe adapter replacement

Follow the instructions in this section to remove and install a PCIe adapter.

Remove a PCIe adapter

Follow the instructions in this section to remove a PCIe adapter.

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 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Notes:

- For a list of the supported PCIe adapters, see <https://serverproven.lenovo.com>.
- Ensure that you populate the PCIe adapters in the sequence below:
 1. RAID adapters: P1, S1
 2. Network adapters: P7, P8, P5, P6, S7, S8, S5, S6, P1, P2, P3, S1, S2, S3

Depending on your configuration, follow the corresponding procedures below for proper removal procedure.

- “Remove PCIe adapter from lower processor board (MB)” on page 162
- “Remove PCIe adapter from rear riser card” on page 163

Remove PCIe adapter from lower processor board (MB)

Note: PCIe slot P2 is shown below as an example, the replacement procedure for the other PCIe slots are similar.

Procedure

- Step 1. Remove the front top cover. See “Remove the front top cover” on page 233.
- Step 2. Remove the left PCIe filler from the chassis.

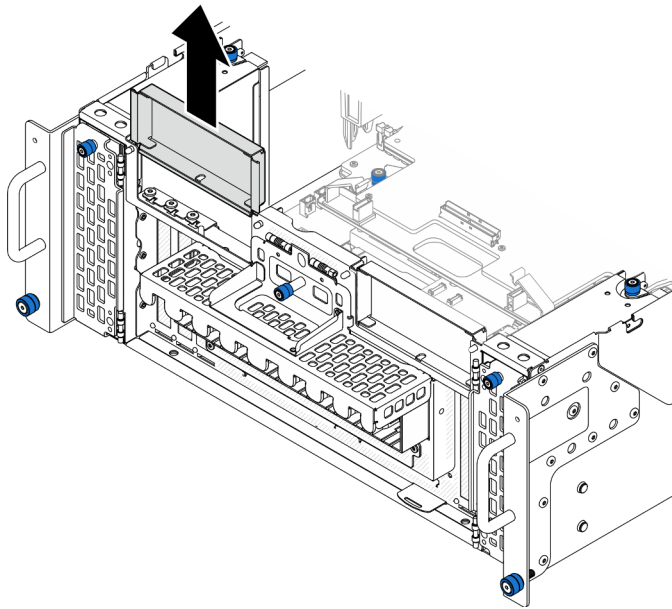


Figure 118. Removing left PCIe filler

- Step 3. Record the cable connections first; then, disconnect all cables from the PCIe adapter.
- Step 4. Remove the PCIe adapter.

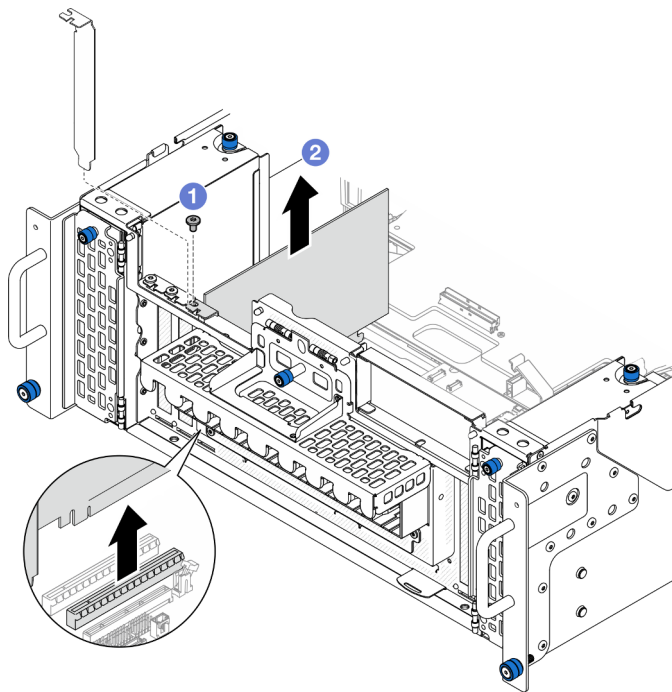


Figure 119. Removing PCIe adapter

- a. ① Remove the screw that secures the PCIe adapter.
- b. ② Grasp the PCIe adapter by its edges and carefully pull it out of the PCIe slot.

Step 5. If necessary, install the left PCIe filler.

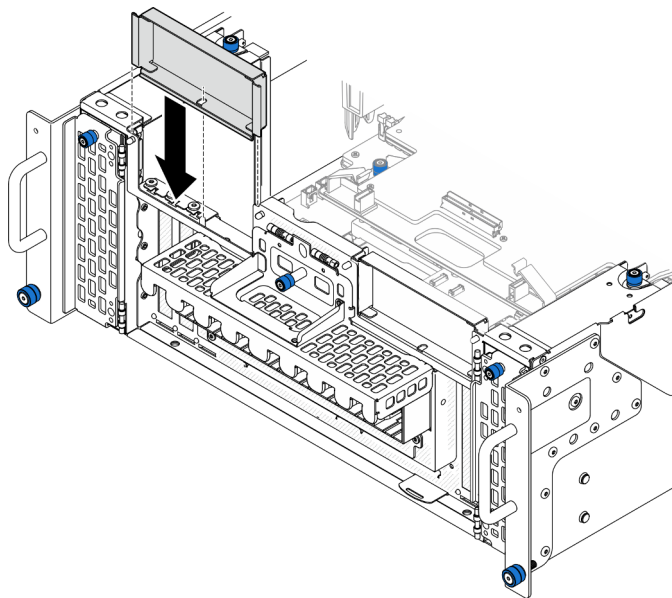


Figure 120. Installing left PCIe filler

Remove PCIe adapter from rear riser card

Note: PCIe slot P8 is shown below as an example, the replacement procedure for the other PCIe slots are similar.

Procedure

- Step 1. Make preparation for the task.
 - a. Remove the front top cover. See [“Remove the front top cover”](#) on page 233.
 - b. Remove the rear top cover. See [“Remove the rear top cover”](#) on page 235.
- Step 2. Record the cable connections first; then, disconnect all cables from the PCIe adapter.
- Step 3. Remove the PCIe adapter.

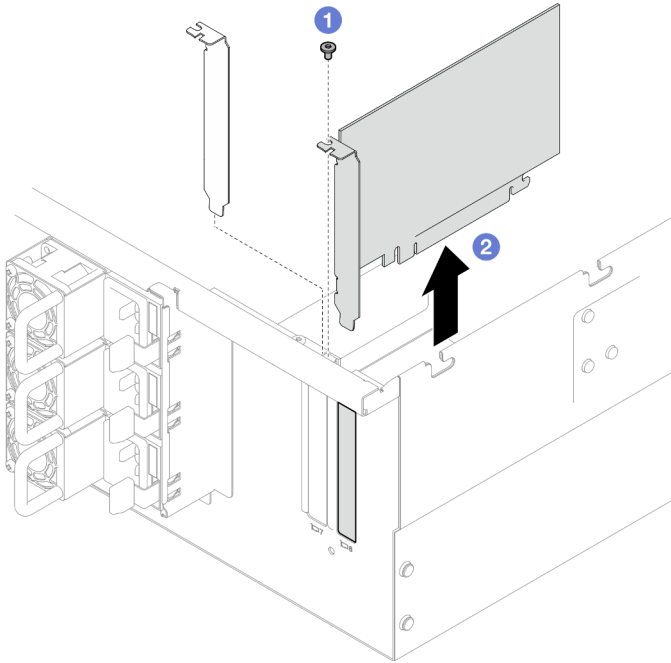


Figure 121. Removing PCIe adapter

- a. ① Remove the screw that secures the PCIe adapter.
- b. ② Grasp the PCIe adapter by its edges and carefully pull it out of the PCIe slot.

After you finish

1. Install a replacement unit or filler. See [“Install a PCIe adapter”](#) on page 164.
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 PCIe adapter

Follow the instructions in this section to install a PCIe adapter.

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 41 and “Safety inspection checklist” on page 42 to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See “Power off the server” on page 50.
- 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.

Notes:

- For a list of the supported PCIe adapters, see <https://serverproven.lenovo.com>.
- Ensure that you populate the PCIe adapters in the sequence below:
 1. RAID adapters: P1, S1
 2. Network adapters: P7, P8, P5, P6, S7, S8, S5, S6, P1, P2, P3, S1, S2, S3

Depending on your configuration, follow the corresponding procedures below for proper installation procedure.

- “Install PCIe adapter to lower processor board (MB)” on page 165
- “Install PCIe adapter to rear riser card” on page 167

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” on page 275 for more information on firmware updating tools.

Install PCIe adapter to lower processor board (MB)

Note: PCIe slot P2 is shown below as an example, the replacement procedure for the other PCIe slots are similar.

Procedure

Step 1. If the left PCIe filler is installed, remove it.

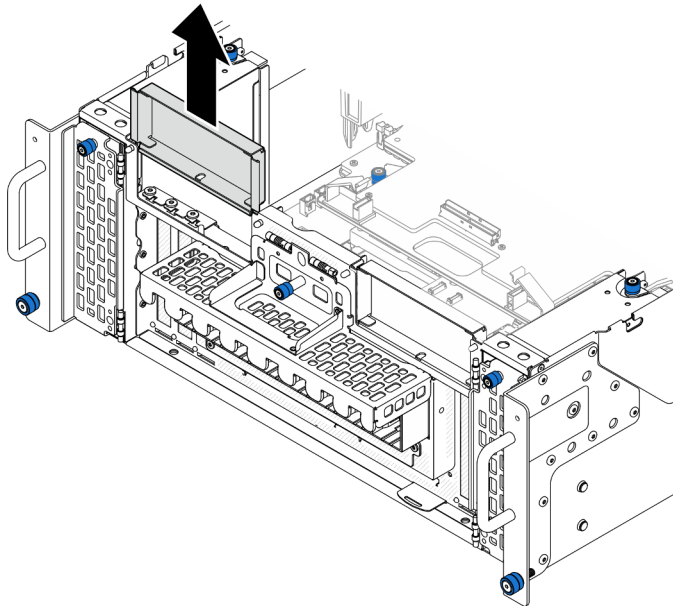


Figure 122. Removing left PCIe filler

Step 2. Install the PCIe adapter.

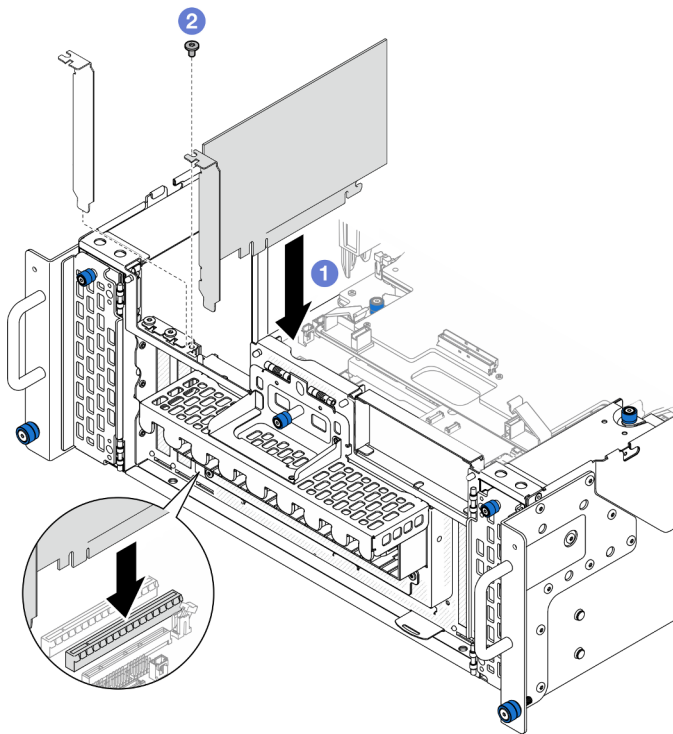


Figure 123. Installing PCIe adapter

- a. ① Align the PCIe adapter with the connector on the PCIe slot; then, carefully press the PCIe adapter straight into the slot until it is securely seated and its bracket also is secured.
- b. ② Secure the PCIe adapter with a screw.

Step 3. Connect all cables to the PCIe adapter.

Step 4. Install the left PCIe filler.

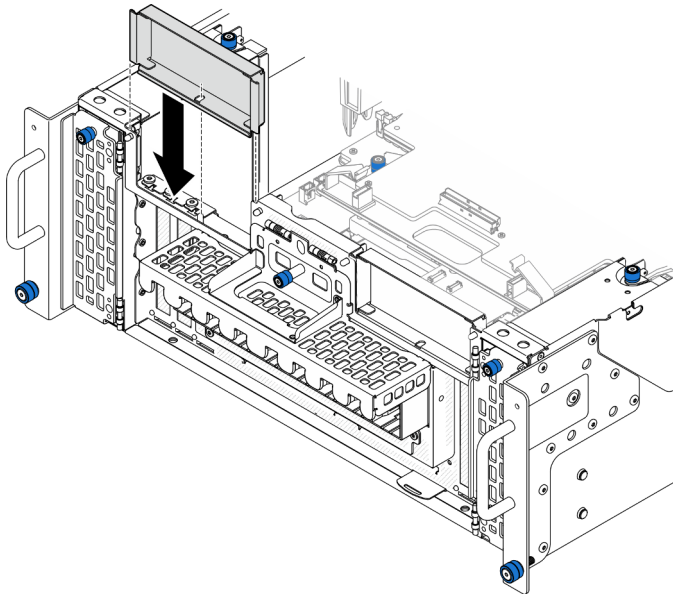


Figure 124. Installing left PCIe filler

After you finish

1. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

Install PCIe adapter to rear riser card

Note: PCIe slot P8 is shown below as an example, the replacement procedure for the other PCIe slots are similar.

Procedure

Step 1. Install the PCIe adapter.

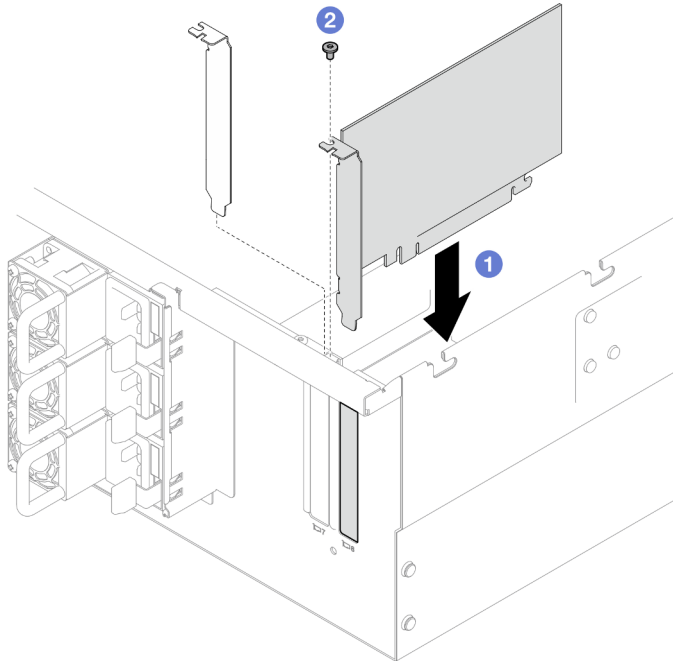


Figure 125. Installing PCIe adapter

- a. ① Align the PCIe adapter with the connector on the PCIe slot; then, carefully press the PCIe adapter straight into the slot until it is securely seated and its bracket also is secured.
- b. ② Secure the PCIe adapter with a screw.

Step 2. Connect all cables to the PCIe adapter.

After you finish

1. Reinstall the rear top cover. See [“Install the rear top cover” on page 236](#).
2. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

PCIe riser card replacement

Follow the instructions in this section to remove and install a PCIe riser card.

Remove the PCIe riser card

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

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.

- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Notes:

- The left PCIe riser card is shown below as an example, the replacement procedure for the right PCIe riser card is similar.
- Ensure that you populate the PCIe riser card in the sequence below:
 1. Primary chassis left riser card
 2. Primary chassis right riser card
 3. Secondary chassis left riser card
 4. Secondary chassis right riser card

Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 233](#).
- b. Remove the rear top cover. See [“Remove the rear top cover” on page 235](#).
- c. Remove all the PCIe adapters. See [“Remove a PCIe adapter” on page 161](#).
- d. If you are replacing the PCIe riser cables, remove the upper processor board (CPU BD) air baffle and upper processor board (CPU BD). See [“Remove the upper processor board \(CPU BD\) air baffle” on page 71](#) and [“Remove the upper processor board \(CPU BD\)” on page 247](#).

Step 2. Disconnect the power cables from the PCIe riser card.

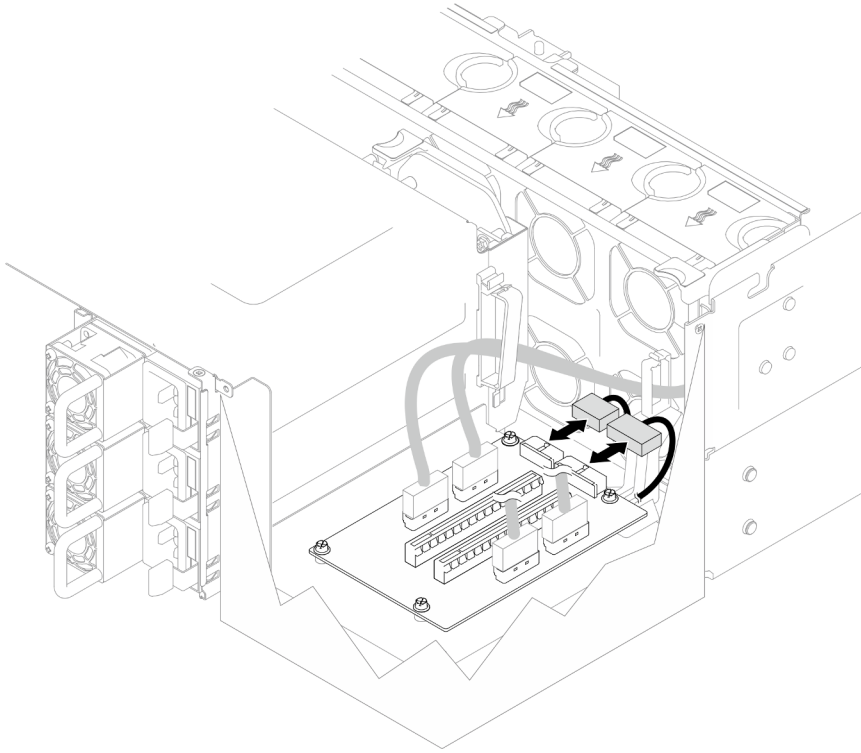


Figure 126. Disconnecting power cables

Step 3. Disconnect the PCIe riser cables from the PCIe riser card.

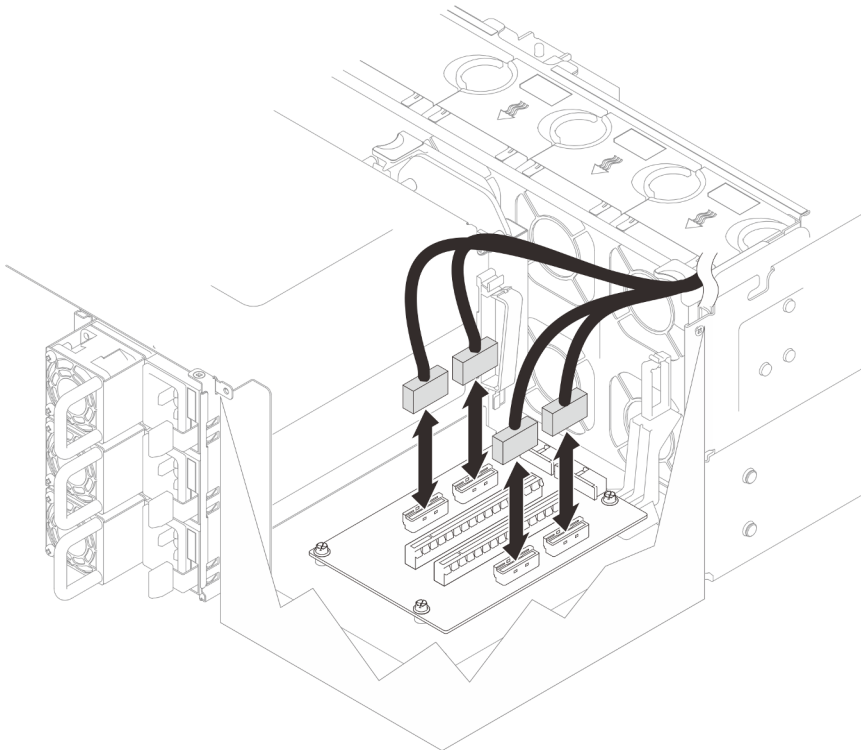


Figure 127. Disconnecting PCIe riser cables

- Step 4. Remove the four screws that secure the PCIe riser card; then, remove the PCIe riser card from the chassis

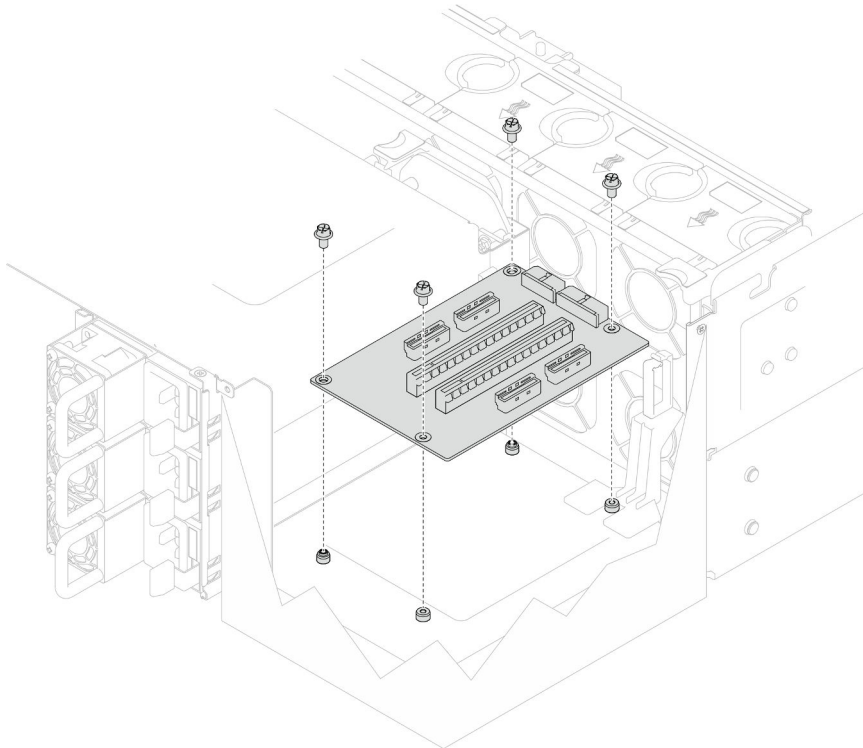


Figure 128. Removing PCIe riser card

- Step 5. If necessary, disconnect the PCIe riser cables from the lower processor board (MB) and the power cables from the PDB. See [“Riser card cable routing” on page 269](#).

After you finish

1. Install a replacement unit. See [“Install the PCIe riser card” on page 171](#).
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 PCIe riser card

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

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).

- 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.

Notes:

- The left PCIe riser card is shown below as an example, the replacement procedure for the right PCIe riser card is similar.
- Ensure that you populate the PCIe riser card in the sequence below:
 1. Primary chassis left riser card
 2. Primary chassis right riser card
 3. Secondary chassis left riser card
 4. Secondary chassis right riser card

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” on page 275 for more information on firmware updating tools.

Procedure

- Step 1. If you are installing the PCIe riser card in the left riser card position, align and install the cable guide to the chassis.

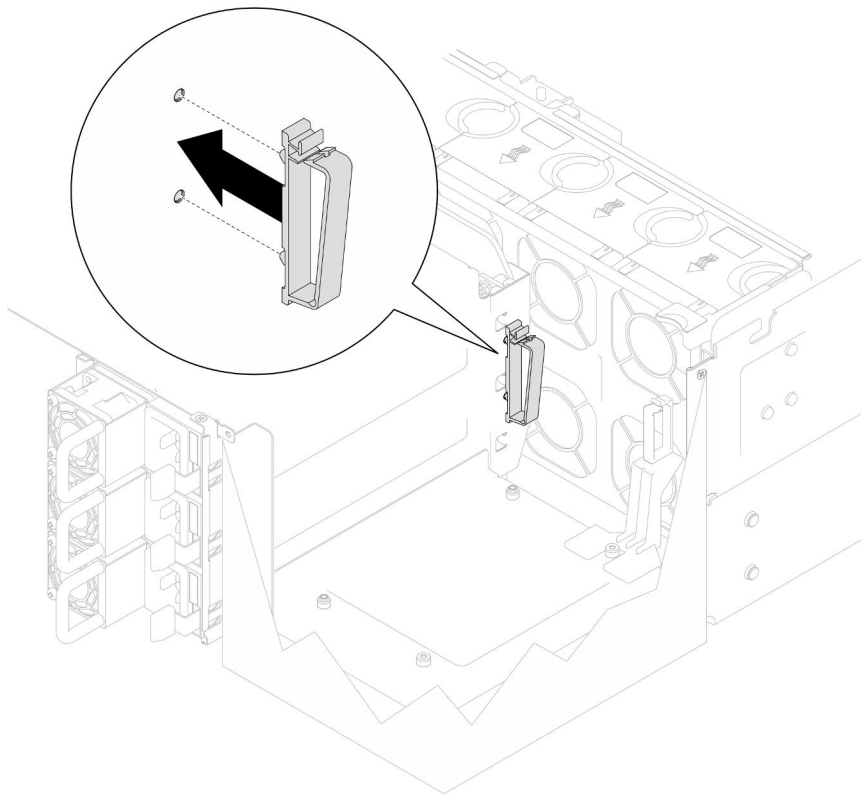


Figure 129. Installing cable guide

- Step 2. If necessary, connect the PCIe riser cables to the lower processor board (MB) and power cables to the PDB. See [“Riser card cable routing” on page 269](#).
- Step 3. Align the screw holes in the PCIe riser card with the screw holes in the chassis; then, install four screws to secure the PCIe riser card.

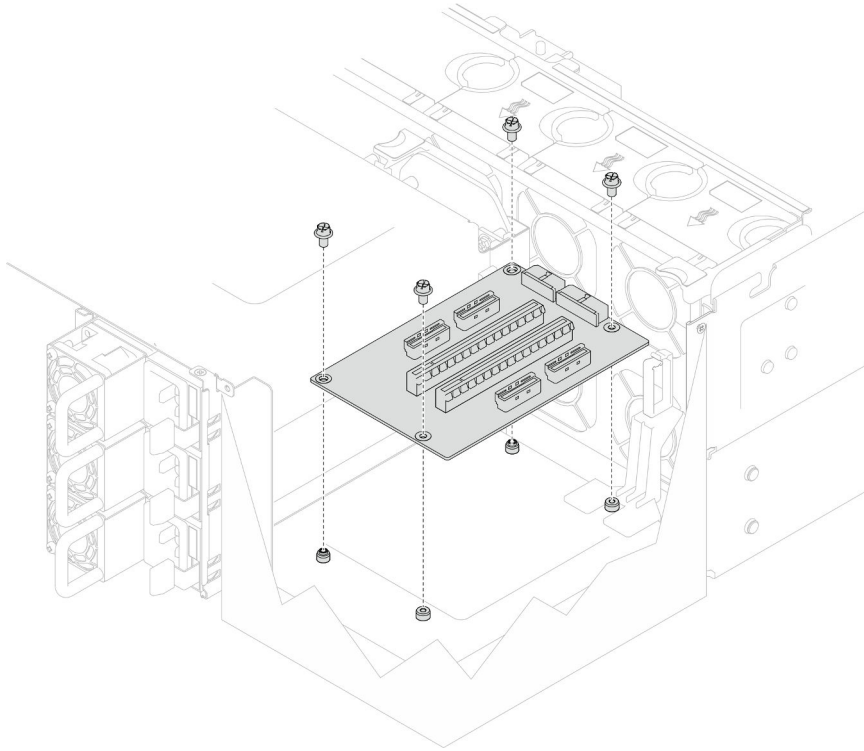


Figure 130. Installing PCIe riser card

- Step 4. Connect the PCIe riser cables to the corresponding connectors on the PCIe riser card.

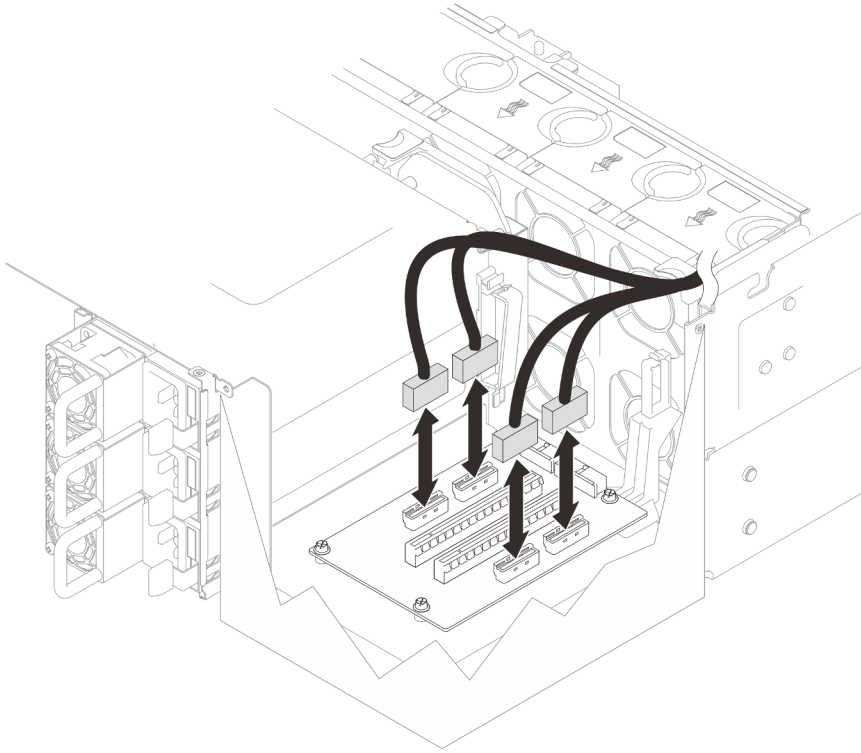


Figure 131. Connecting PCIe riser cables

Step 5. Connect the power cables to the corresponding connectors on the PCIe riser card.

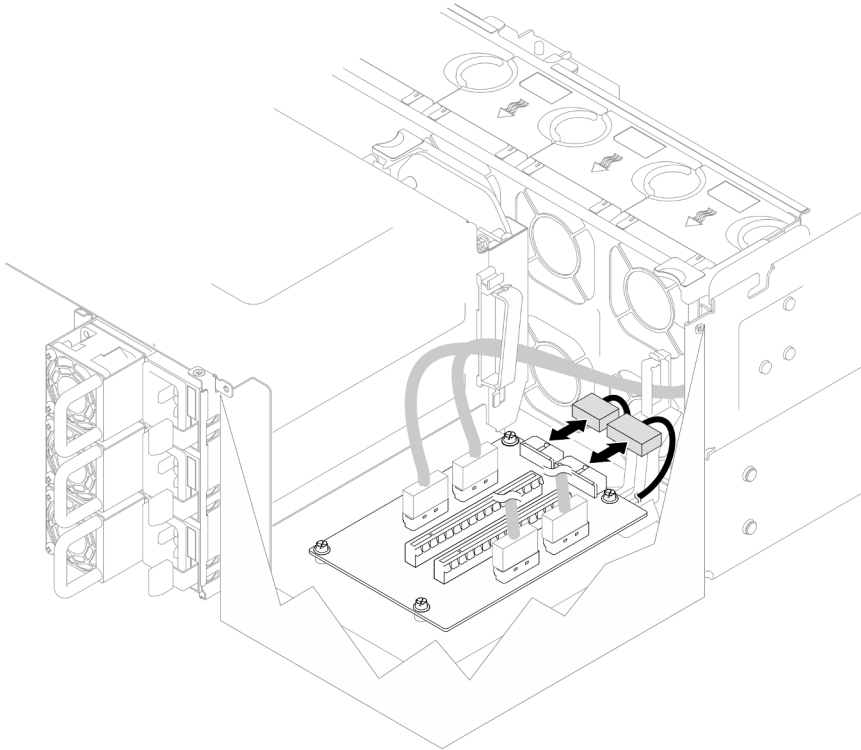


Figure 132. Connecting power cables

Note: Make sure the cables are properly routed through the cable clips and do not make contact with the fans or metal parts of the chassis.

After you finish

1. If you replaced the PCIe riser cables, reinstall the upper processor board (CPU BD) and upper processor board (CPU BD) air baffle. See [“Install the upper processor board \(CPU BD\)” on page 252](#) and [“Install the upper processor board \(CPU BD\) air baffle” on page 73](#).
2. Reinstall all the PCIe adapters. See [“Install a PCIe adapter” on page 164](#).
3. Reinstall the rear top cover. See [“Install the rear top cover” on page 236](#).
4. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
5. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

Power distribution board replacement

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

Remove the power distribution board

Follow the instructions in this section to remove the power distribution board.

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.

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:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

Step 1. Make preparation for the task.

- Gently pull and disengage every installed power supply unit. See [“Remove a hot-swap power supply unit” on page 184](#).
- Remove the front top cover. See [“Remove the front top cover” on page 233](#).
- Remove both power interposer boards. See [“Remove the power interposer board” on page 181](#).
- Remove the fan cage. See [“Remove the fan cage” on page 104](#).

Step 2. Disconnect the power cables from the power distribution board.

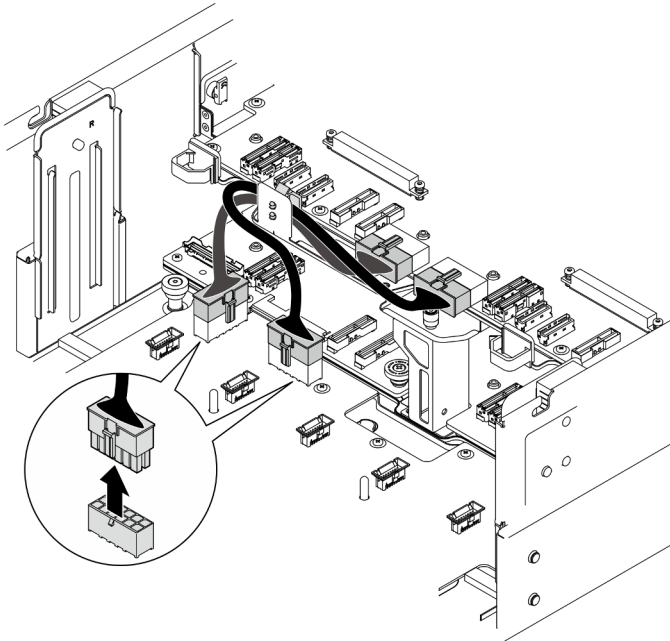


Figure 133. Disconnecting power distribution board cables

Step 3. Disengage the power distribution board.

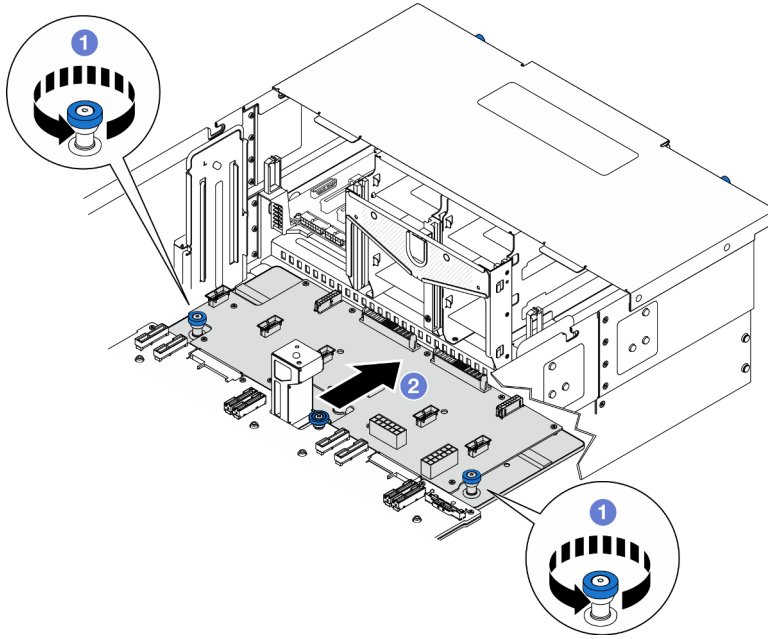


Figure 134. Disengaging power distribution board

- a. ① Loosen the two thumbscrews. Use a screwdriver if needed.
- b. ② Grasp the thumbscrews and slide the power distribution board towards the rear of the chassis to disengage it from the lower processor board (MB).

Step 4. Remove the power distribution board.

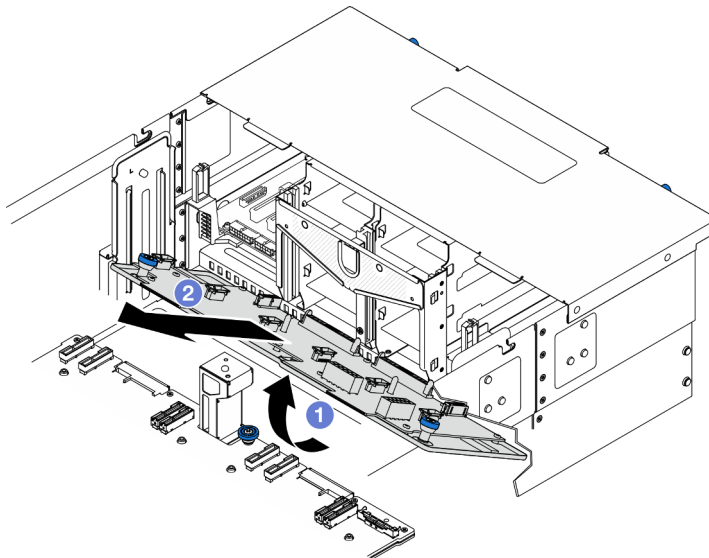


Figure 135. Removing power distribution board

- a. ① Lift the connector end of the power distribution board.
- b. ② Remove the power distribution board from the chassis.

After you finish

1. Install a replacement unit. See [“Install the power distribution board” 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.
3. If you plan to recycle the component.
 - a. Remove eleven screws, and separate the power distribution board from the bracket.

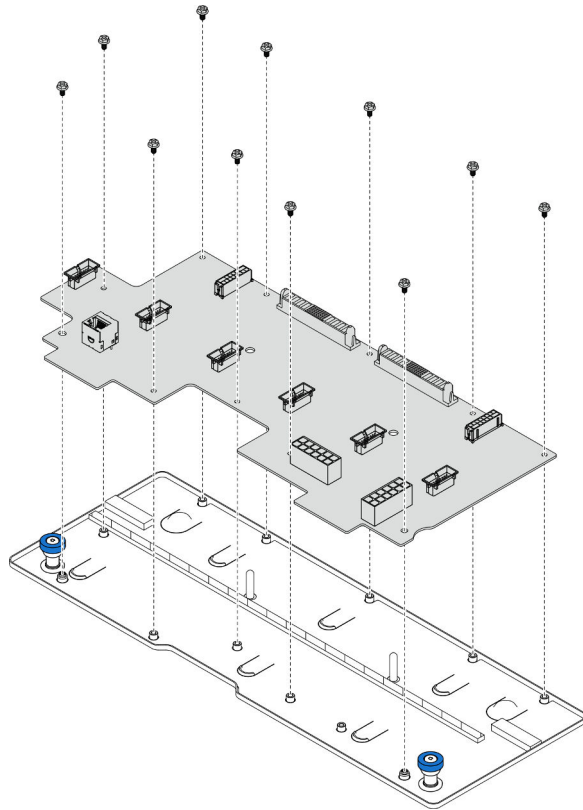


Figure 136. Disassembling the power distribution board

- b. Recycle the component in compliance with local regulations.

Demo video

[Watch the procedure on YouTube](#)

Install the power distribution board

Follow the instructions in this section to install the power distribution board.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).

- 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 installed in a rack, remove the server from the rack. See “[Remove the server from rails](#)” on [page 50](#).

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “[Update the firmware](#)” on [page 275](#) for more information on firmware updating tools.

Procedure

Step 1. Install the power distribution board.

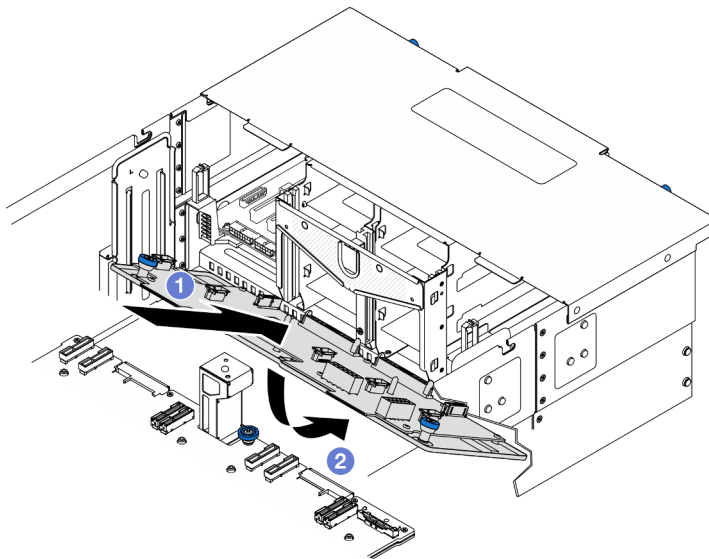


Figure 137. Installing power distribution board

- a. ① Install the power distribution board into the chassis at an angle as shown.
- b. ② Lower the connector end of the power distribution board onto the chassis.

Step 2. Secure the power distribution board.

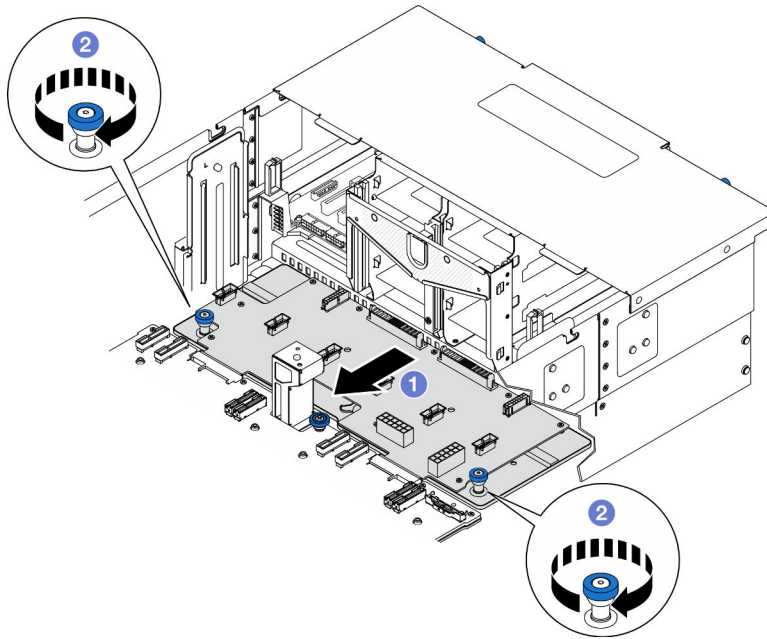


Figure 138. Securing power distribution board.

- a. ① Grasp the thumbscrews and slide the power distribution board towards the front of the chassis to engage it with the lower processor board (MB).
- b. ② Tighten the two thumbscrews. Use a screwdriver if needed.

Step 3. Connect the power cables to the power distribution board.

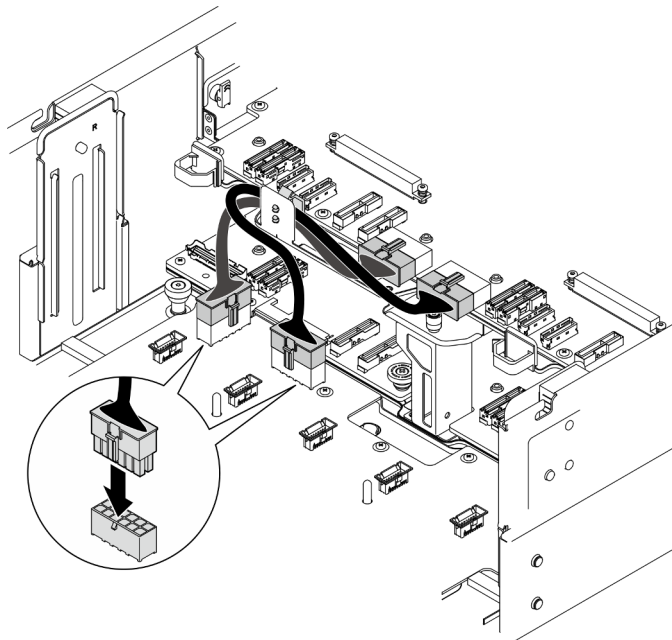


Figure 139. Connecting power distribution board cables

After you finish

1. Reinstall the fan cage. See [“Install the fan cage” on page 106](#).

2. Reinstall both power interposer boards. See [“Install the power interposer board”](#) on page 183.
3. Reinstall the front top cover. See [“Install the front top cover”](#) on page 239.
4. Reinstall all the power supply units. See [“Install a hot-swap power supply unit”](#) on page 186.
5. Complete the parts replacement. See [“Complete the parts replacement”](#) on page 256.

Demo video

[Watch the procedure on YouTube](#)

Power interposer board replacement

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

Remove the power interposer board

Follow the instructions in this section to remove the power interposer board.

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.

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:

- Read [“Installation Guidelines”](#) on page 41 and [“Safety inspection checklist”](#) on page 42 to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server”](#) on page 50.
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails”](#) on page 50.

Procedure

Step 1. Make preparation for the task.

- Gently pull and disengage every installed power supply unit. See [“Remove a hot-swap power supply unit”](#) on page 184.
- Remove the front top cover. See [“Remove the front top cover”](#) on page 233.

Step 2. Remove the power interposer board.

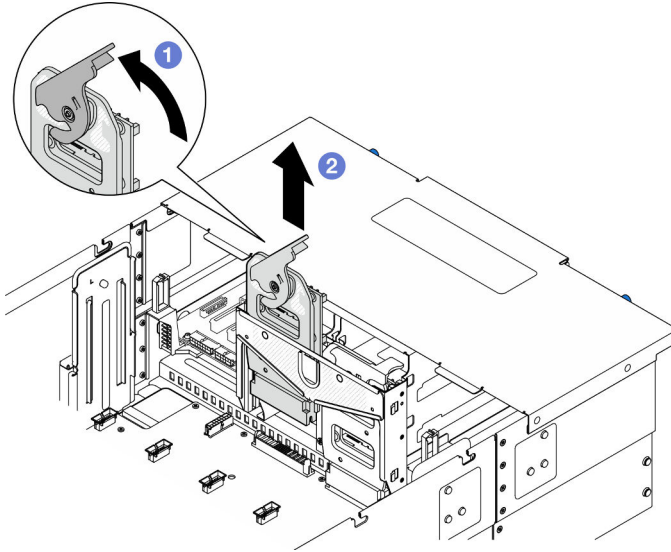


Figure 140. Removing power interposer board

- ① Lift and rotate the power interposer board release latch to disengage the power interposer board from the chassis.
- ② Lift the power interposer board to remove it.

After you finish

1. Install a replacement unit. See [“Install the power interposer board”](#) on page 183.
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.
3. If you plan to recycle the component.
 - a. Remove six screws, and separate the power interposer board from the bracket.

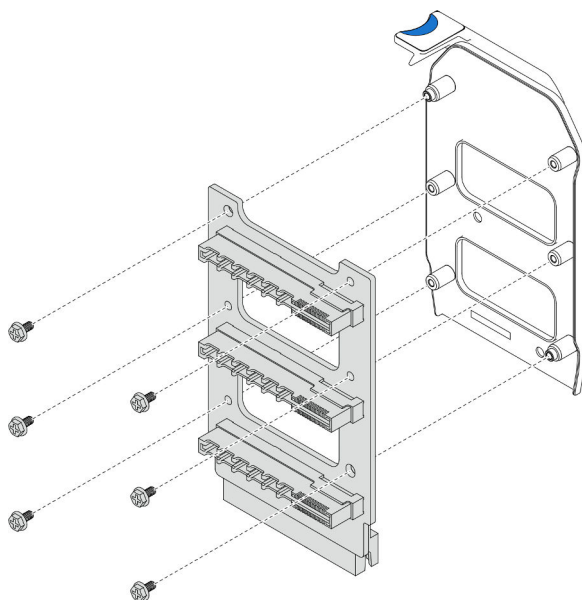


Figure 141. Disassembling the power interposer board

- b. Recycle the component in compliance with local regulations.

Demo video

[Watch the procedure on YouTube](#)

Install the power interposer board

Follow the instructions in this section to install the power interposer board.

About this task

Attention:

- Read “[Installation Guidelines](#)” on page 41 and “[Safety inspection checklist](#)” on page 42 to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See “[Power off the server](#)” on page 50.
- 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 installed in a rack, remove the server from the rack. See “[Remove the server from rails](#)” on page 50.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “[Update the firmware](#)” on page 275 for more information on firmware updating tools.

Procedure

Step 1. Install the power interposer board.

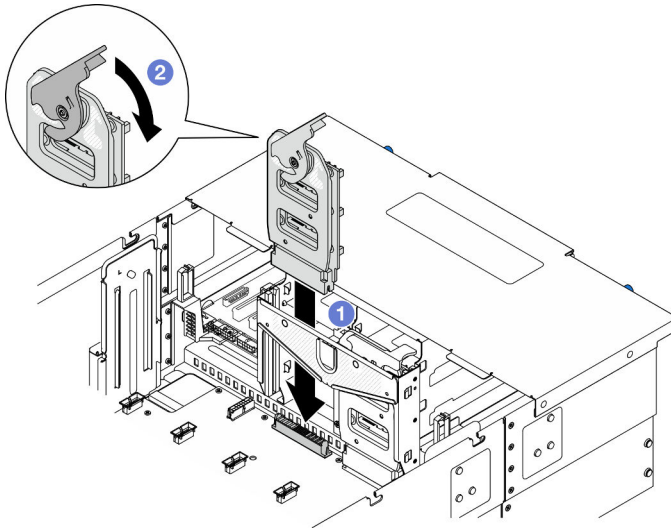


Figure 142. Installing power interposer board

- a. ① Align and lower the power interposer board into the chassis.
- b. ② Rotate the power interposer board release latch down until they stop.

After you finish

1. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
2. Reinstall all the power supply units. See [“Install a hot-swap power supply unit” on page 186](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

Power supply unit replacement

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

Remove a hot-swap power supply unit

Follow the 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.

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: Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.

Procedure

Step 1. Disconnect both ends of the power cord and keep it in an ESD-safe place.

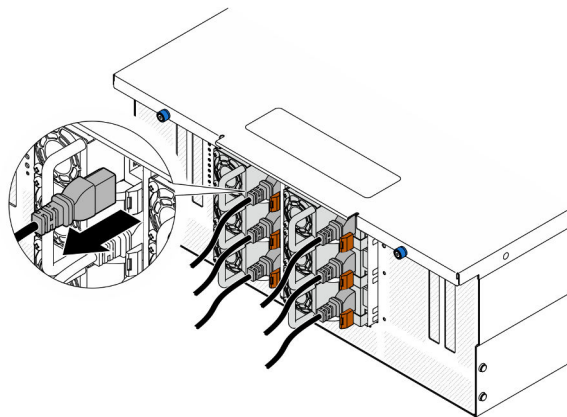


Figure 143. Disconnecting the power cord

Step 2. Remove the power supply.

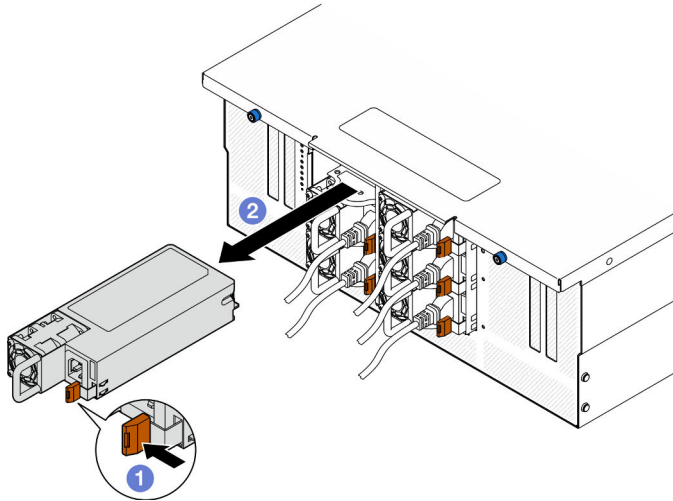


Figure 144. Removing the power supply

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

After you finish

1. Install a replacement unit or filler. See [“Install a hot-swap power supply unit” on page 186](#).
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 the instructions in this section to install a hot-swap power supply unit.

About this task

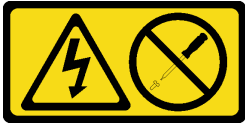
S002



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.

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: Read “[Installation Guidelines](#)” on page 41 and “[Safety inspection checklist](#)” on page 42 to ensure that you work safely.

Procedure

Step 1. Make preparation for the task.

- a. Make sure the power supply unit to be installed is of the same wattage as the installed ones.
- b. If installing a power supply into an empty bay, remove the power supply filler panel from the power supply bay.
- c. If more than one units are to be installed, install the power supplies in the sequence shown below.
 - 1. For configurations with eight power supplies, populate PSU bays P1, P2, P4, P5, S1, S2, S4, and S5.
 - 2. For configurations with twelve power supplies, populate all PSU bays.

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.

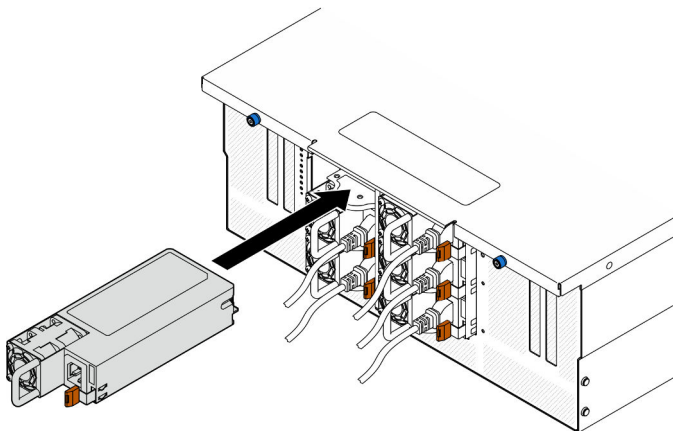


Figure 145. Installing power supply unit

Step 3. Connect the power cord to the power supply unit, and make sure it's properly connected to the power.

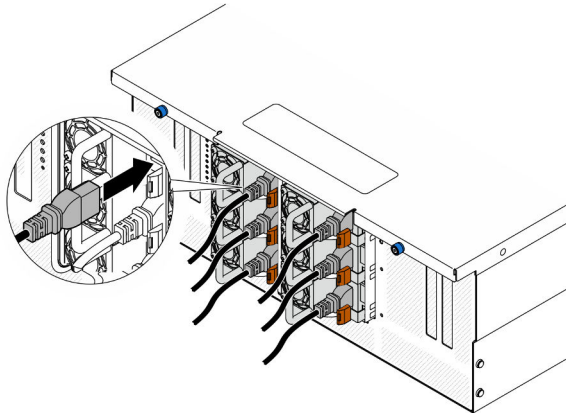


Figure 146. Connecting power cord

After you finish

1. Pull the handle to see if the power supply unit is properly installed. If it slides out, reinstall it.
2. If the server is turned off, turn on the server. Ensure that both the power input LED and the power output LED on the power supply are lit, indicating that the power supply is operating properly.

Demo video

[Watch the procedure on YouTube](#)

Processor and heat sink replacement (trained technician only)

Follow the instruction in this section to replace an assembled processor and heat sink, known as a processor-heat-sink module (PHM), a processor, or a heat sink.

Attention: Before reusing a processor or heat sink, make sure you use Lenovo proven 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 41 and “[Safety inspection checklist](#)” on page 42 to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See “[Power off the server](#)” on page 50.
- 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 supports multiple processors, install the PHMs starting with the first processor socket.

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.

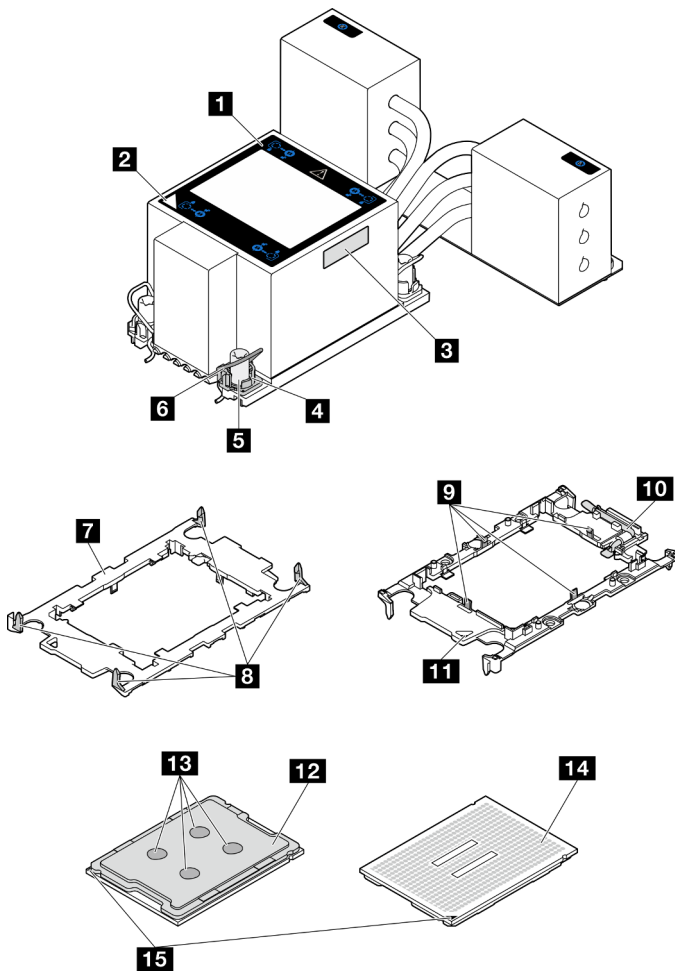


Figure 147. PHM components

1 Heat sink	9 Clips to secure processor in carrier
2 Heat sink triangular mark	10 Processor ejector handle
3 Processor identification label	11 Carrier triangular mark
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 preparation for the task.

- a. To replace a PHM on the upper processor board (CPU BD), remove the following:
 1. Remove the front top cover. See [“Remove the front top cover”](#) on page 233.
 2. Remove the upper processor board (CPU BD) air baffle. See [“Remove the upper processor board \(CPU BD\) air baffle”](#) on page 71.

- b. To replace a PHM on the lower processor board (MB), remove the following:
 1. Remove the front top cover. See [“Remove the front top cover”](#) on page 233.
 2. Remove the upper processor board (CPU BD) air baffle. See [“Remove the upper processor board \(CPU BD\) air baffle”](#) on page 71.
 3. Remove the upper processor board (CPU BD). See [“Remove the upper processor board \(CPU BD\)”](#) on page 247.
 4. Remove the lower processor board (MB) air baffle. See [“Remove the lower processor board \(MB\) air baffle”](#) on page 75.

Step 2. Remove the PHM from the upper processor board (CPU BD) or lower processor board (MB).

Notes:

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

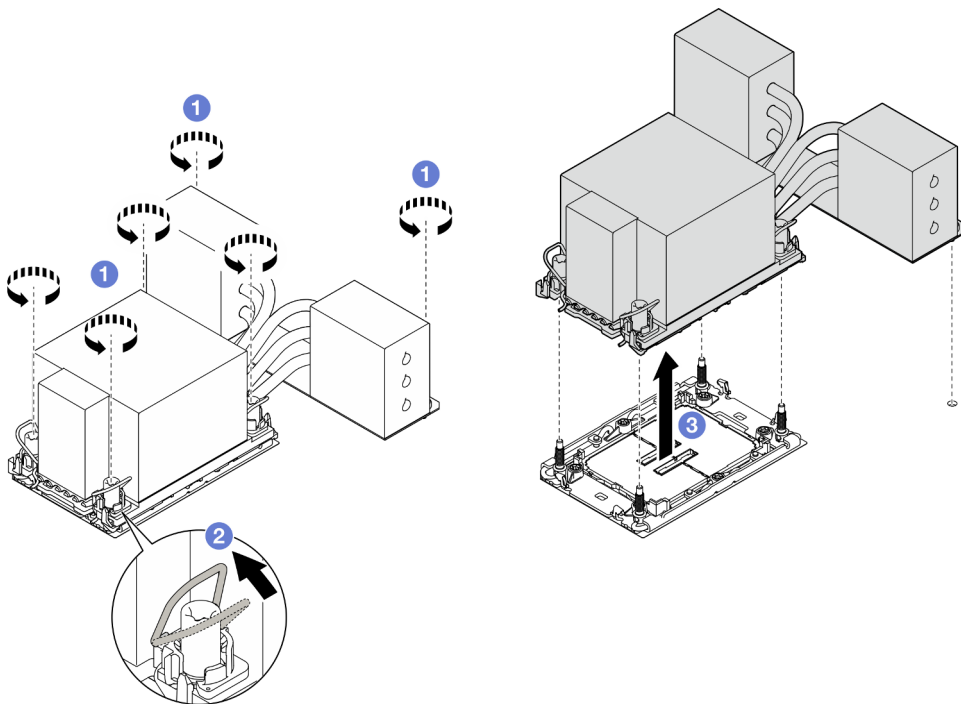


Figure 148. Removing a 3U PHM

- a. ① Fully loosen the Torx T30 nuts on the PHM **in the removal sequence shown** on the heat-sink label.
- b. ② Rotate the anti-tilt wire bails inward.
- c. 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.

After you finish

1. Each processor socket must always contain a cover or a PHM. Protect empty processor sockets with a cover or install a new PHM.
2. If you are removing the PHM as part of an upper processor board (CPU BD) or lower processor board (MB) replacement, set the PHM aside.

3. 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 192](#).
4. 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](#)

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:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 from those shown in the illustrations.

Procedure

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

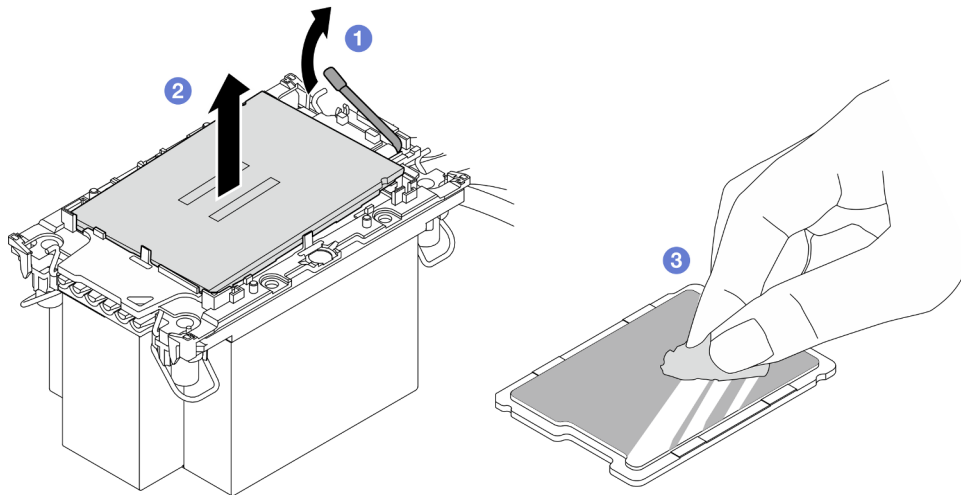


Figure 149. Separating a processor from the heat sink and carrier

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.

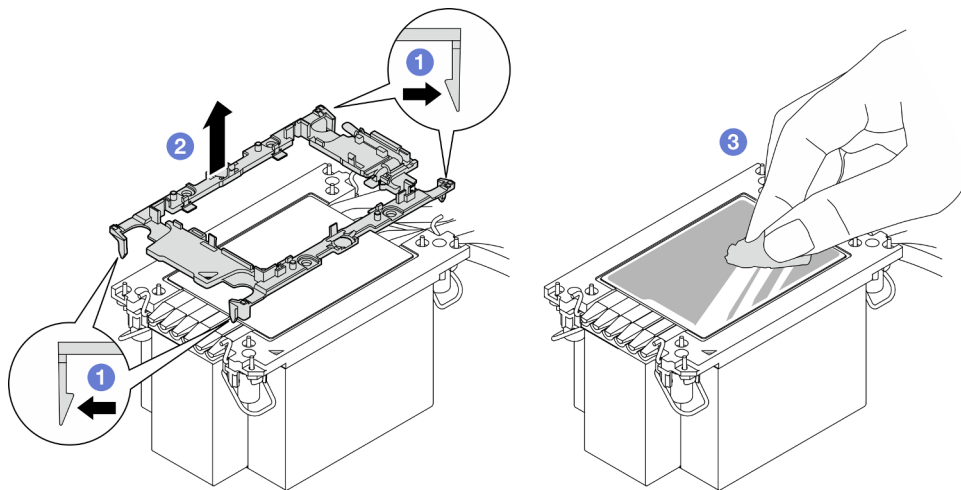


Figure 150. Separating a processor carrier from the heat sink

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.

After you finish

1. Install the PHM. See [“Install a processor and heat sink” on page 194](#).
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 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:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 supports multiple processors, install the PHMs starting with the first processor socket.

Notes:

- The heat sink, processor, and processor carrier for your 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 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” on page 275](#).

The following illustration shows the components of the PHM.

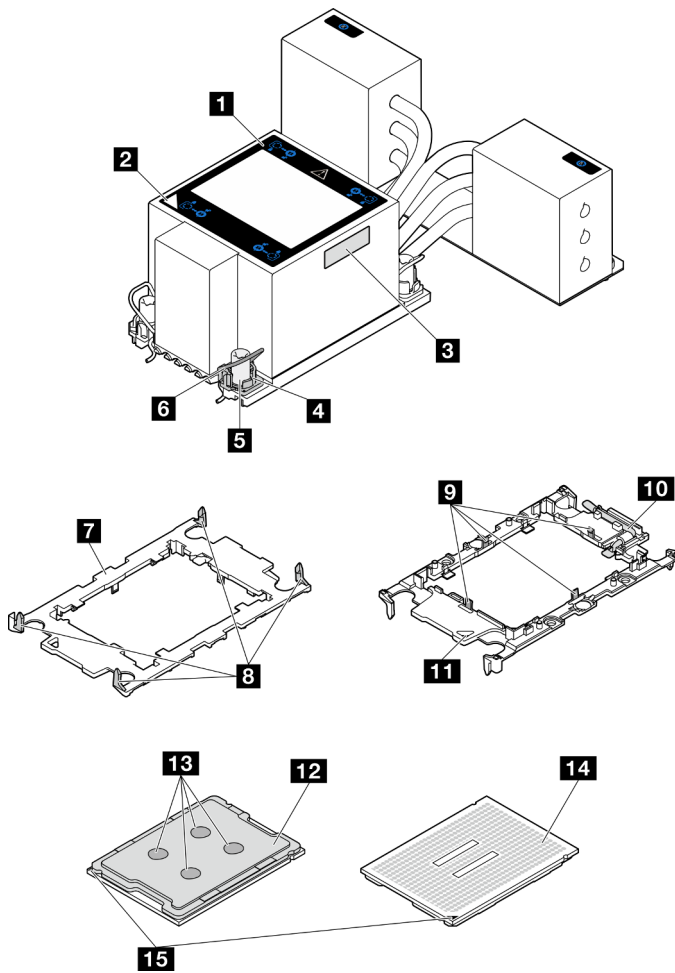


Figure 151. PHM components

1 Heat sink	9 Clips to secure processor in carrier
2 Heat sink triangular mark	10 Processor ejector handle
3 Processor identification label	11 Carrier triangular mark
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	

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” on page 275 for more information on firmware updating tools.

Procedure

Step 1. Record the processor identification label.

- If you are replacing a processor and reusing the heat sink, remove the processor identification label from the heat sink and replace it with the new label that comes with the replacement processor.
- If you are replacing a heat sink and reusing the processor, remove the processor identification label from the old heat sink and place it on the new heat sink in the same location.

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.

Step 2. Install the processor in the new carrier.

Notes:

- If you are replacing the processor and reusing the heat sink, use the new carrier that comes with the new processor.
- If you are replacing the heat sink and reusing the processor, and if the new heat sink comes with two processor carriers, make sure to use the same type of carrier as the one you discarded.

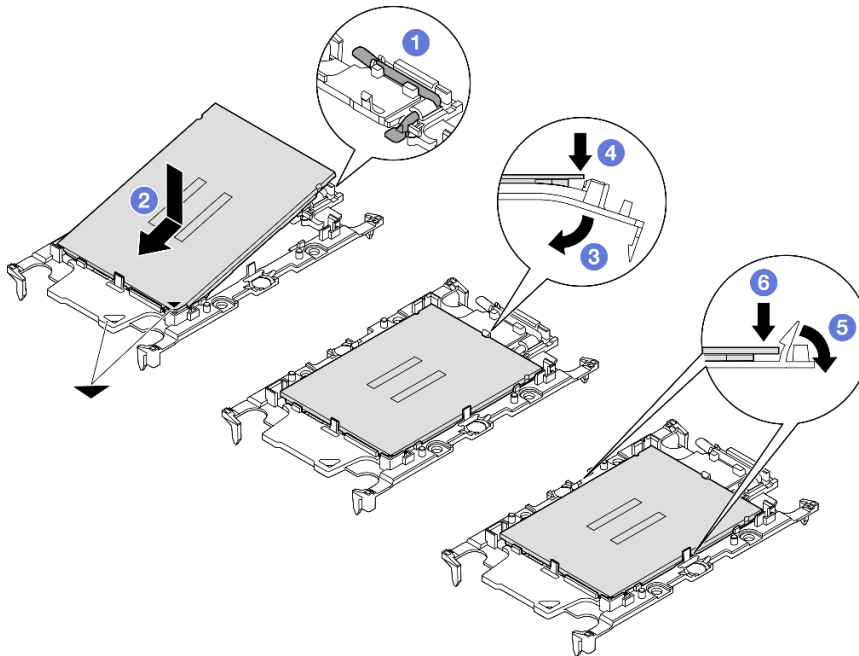


Figure 152. Installing a processor carrier

1. 1 Make sure the handle on the carrier is in the closed position.
2. 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. 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. 4 Press the processor and secure the unmarked end under the clip on the carrier.
5. 5 Carefully pivot the sides of the carrier down and away from the processor.
6. 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 thermal grease.

- If you are replacing the heat sink and reusing the processor, a new heat sink comes with thermal grease and you do not need to apply new thermal grease.

Note: To ensure the best performance, check the manufacturing date on the new heat sink and make sure it does not exceed two years. Otherwise, wipe off the existing thermal grease and apply new thermal grease.

- If you are replacing the processor and reusing the heat sink, do the following steps to apply thermal grease:
 1. If there is any old thermal grease on the heat sink, wipe off the thermal grease with an alcohol cleaning pad.
 2. 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 oriented in the shipping tray as shown below.
 3. 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.

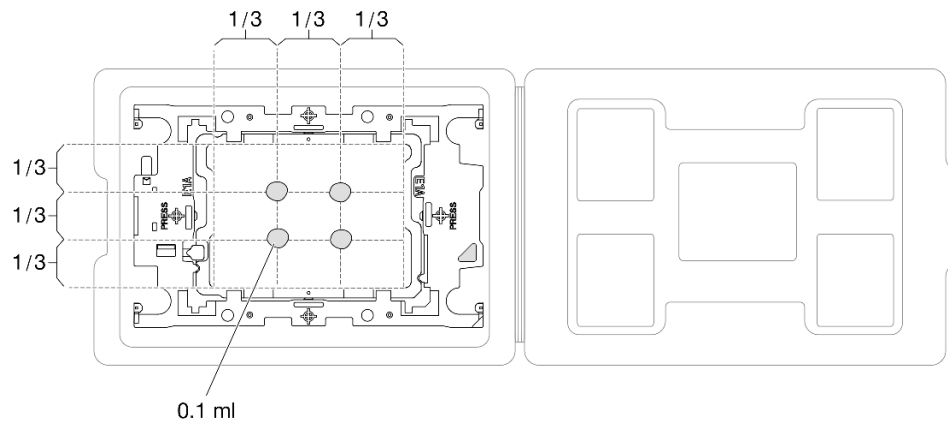


Figure 153. Thermal grease application with processor in shipping tray

Step 4. Assemble the processor and heat sink.

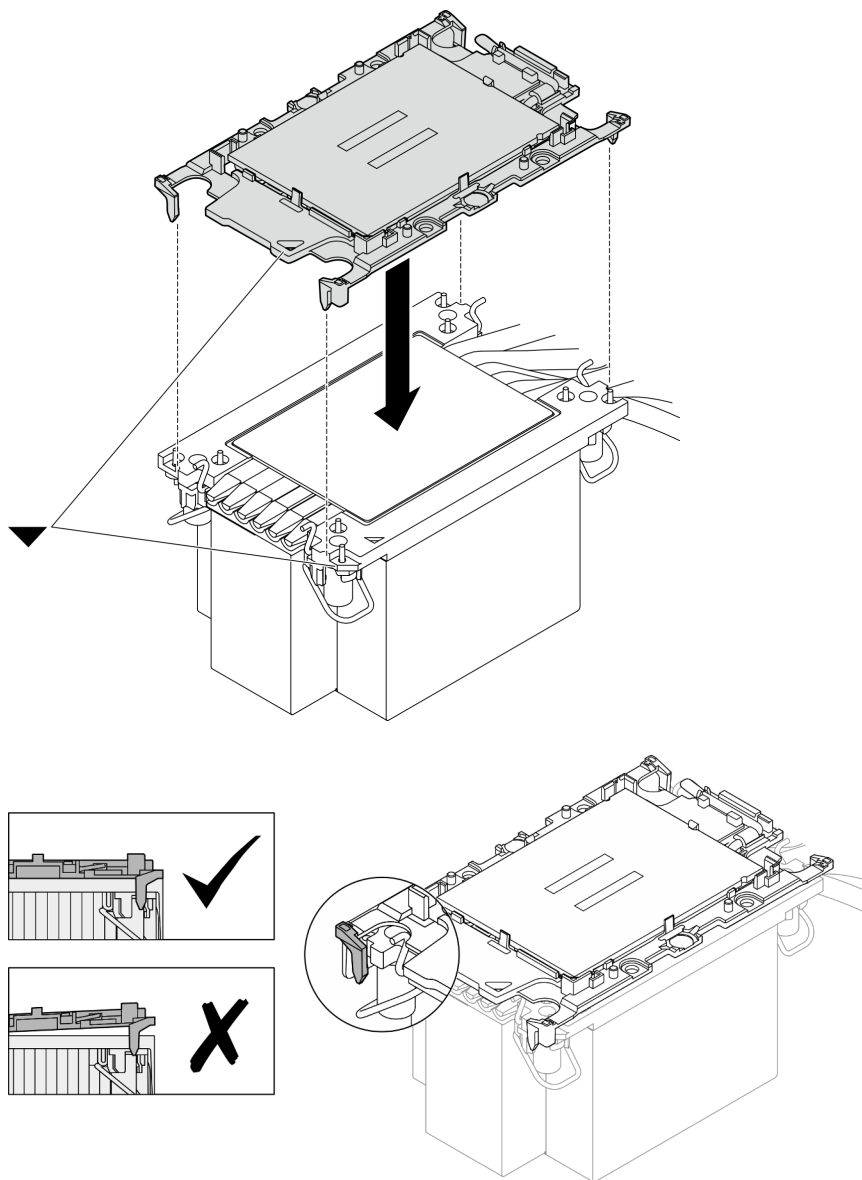


Figure 154. Assembling the PHM with processor in shipping tray

- 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. Visually inspect to make sure that there is no gap between the processor carrier and the heat sink.

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

Notes:

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

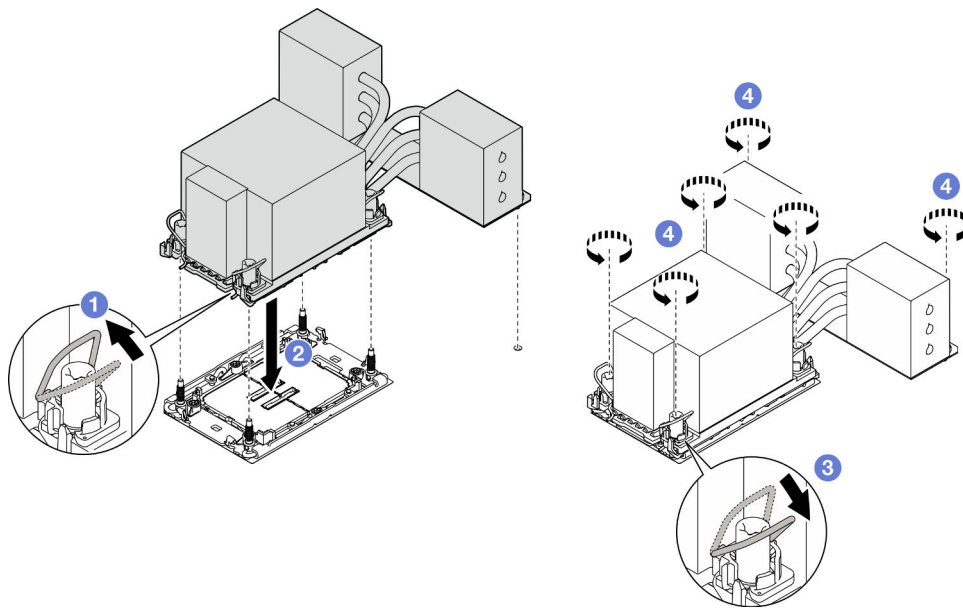


Figure 155. Installing a 3U PHM

- a. ① Rotate the anti-tilt wire bails inward.
- b. 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.
- c. ③ Rotate the anti-tilt wire bails outward until they engage with the hooks in the socket.
- d. 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 0.9 newton-meters, 8 inch-pounds).

After you finish

1. If you replaced a PHM on the upper processor board (CPU BD), reinstall the following:
 - a. Reinstall the upper processor board (CPU BD) air baffle. See [“Install the upper processor board \(CPU BD\) air baffle” on page 73](#).
 - b. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
2. If you replaced a PHM on the lower processor board (MB), reinstall the following:
 - a. Reinstall the lower processor board (MB) air baffle. See [“Install the lower processor board \(MB\) air baffle” on page 76](#).
 - b. Reinstall the upper processor board (CPU BD). See [“Install the upper processor board \(CPU BD\)” on page 252](#).
 - c. Reinstall the upper processor board (CPU BD) air baffle. See [“Install the upper processor board \(CPU BD\) air baffle” on page 73](#).
 - d. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

Security bezel replacement

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

Remove the security bezel

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

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- 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.

Procedure

Step 1. If the security bezel is locked, unlock it with the key.

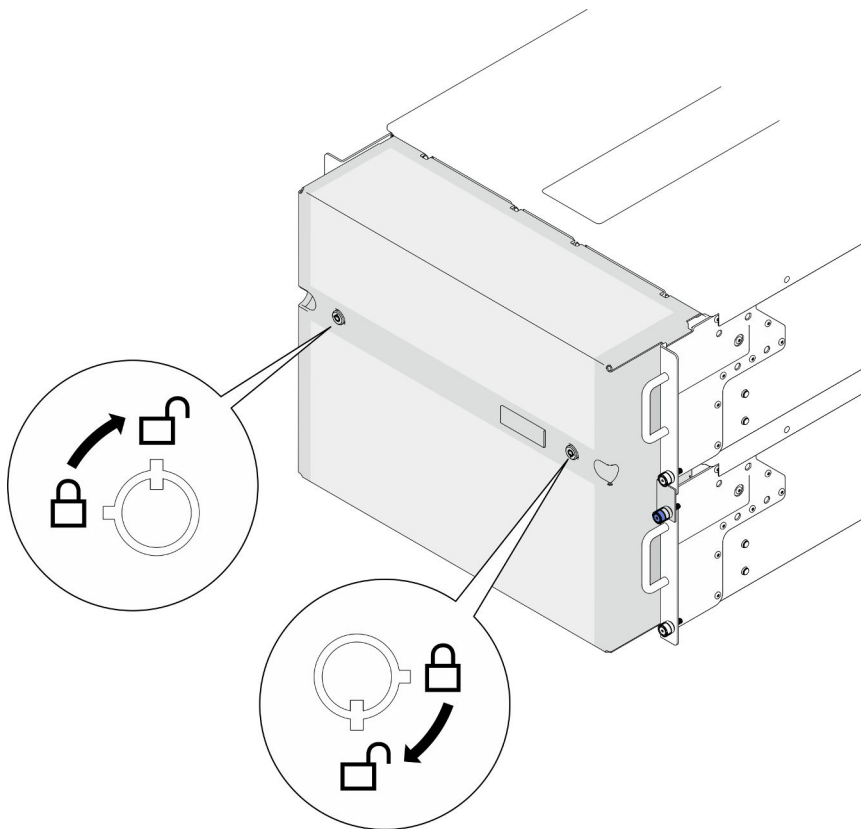


Figure 156. Unlocking security bezel

Step 2. Remove the security bezel.

- 1 Loosen the thumbscrews. Use a screwdriver if needed.
- 2 Lift the security bezel from the rack flanges to remove it.

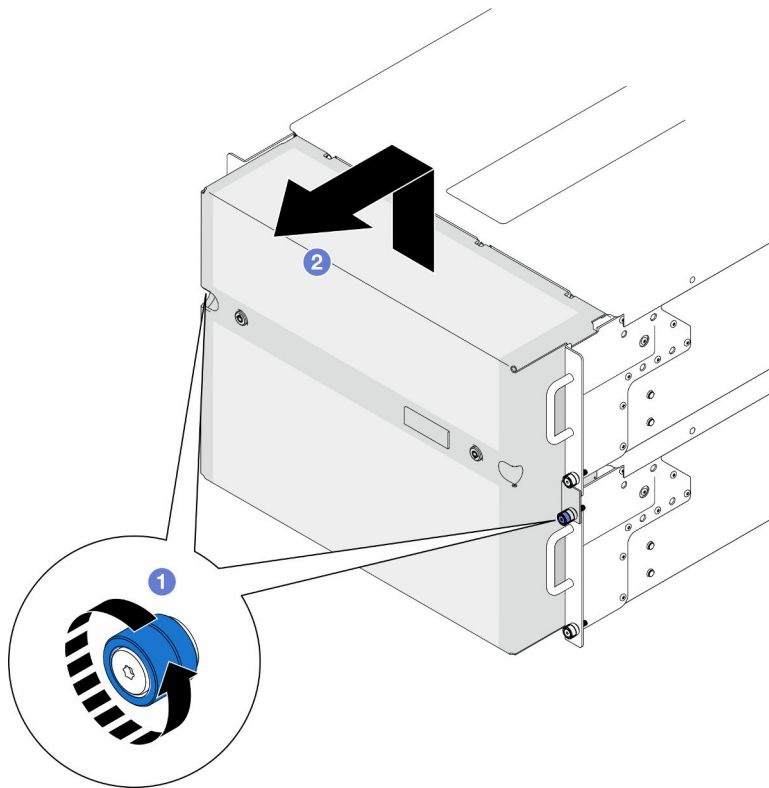


Figure 157. Removing security bezel

After you finish

1. Install a replacement unit. See [“Install the security bezel” on page 201](#).
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 security bezel

Follow instruction in this section to install the security bezel.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- 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.

Procedure

Step 1. If the key is held inside the security bezel, remove it out of the security bezel.

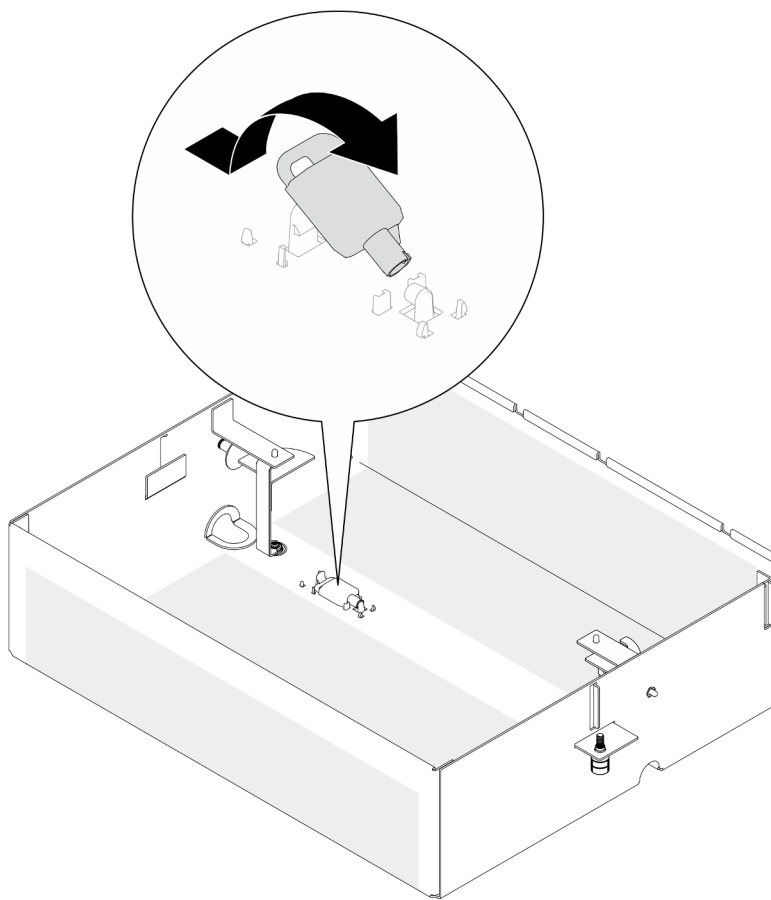


Figure 158. Key removal

Step 2. Install the security bezel.

- a. ① Align and install the security bezel onto the rack flanges.
- b. ② Tighten the thumbscrews on the security bezel. Use a screwdriver if needed.

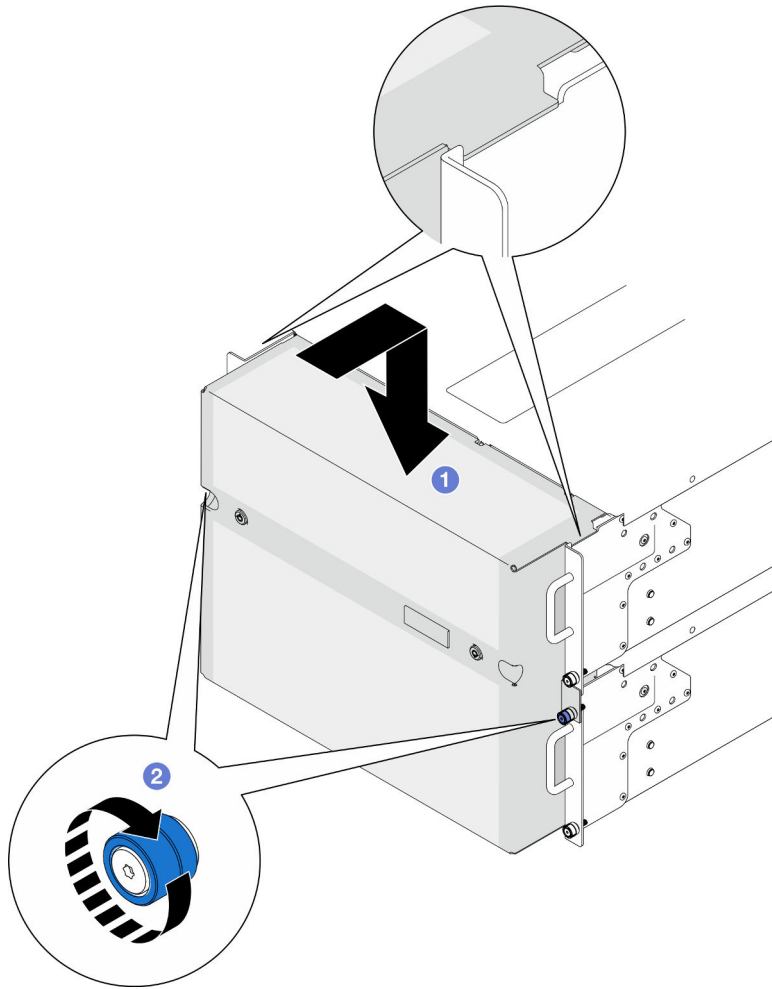


Figure 159. Installing security bezel

Step 3. (Optional) Lock the security bezel with the key.

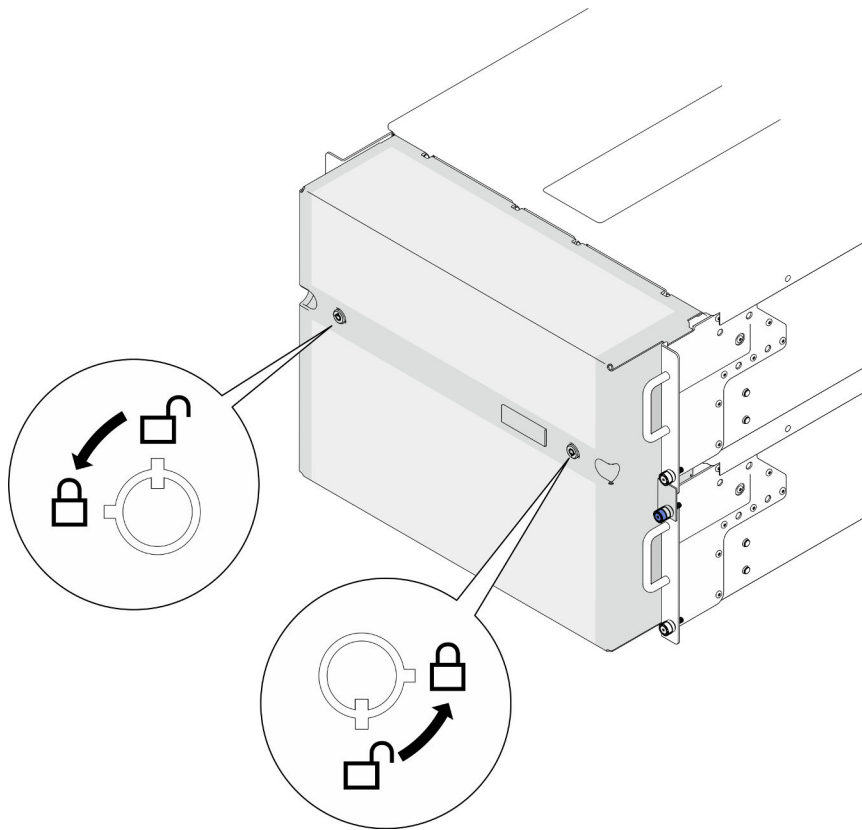


Figure 160. Locking security bezel

After you finish

Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

Serial port assembly replacement

Follow the instructions in this section to install or remove the serial port assembly.

Remove the serial port assembly

Follow the instructions in this section to remove the serial port assembly.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).

- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

Step 1. Make preparation for the task.

- Remove the front top cover. See [“Remove the front top cover” on page 233](#).
- Remove the upper processor board (CPU BD) air baffle. See [“Remove the upper processor board \(CPU BD\) air baffle” on page 71](#).
- Remove the upper processor board (CPU BD). See [“Remove the upper processor board \(CPU BD\)” on page 247](#).
- For primary chassis only, remove the support bracket. See [“Remove the support bracket” on page 211](#).
- For primary chassis only, remove the system I/O board and interposer assembly. See [“Remove the system I/O board and interposer board” on page 218](#).

Step 2. Remove the two screws that secure the serial port assembly and remove it from the chassis.

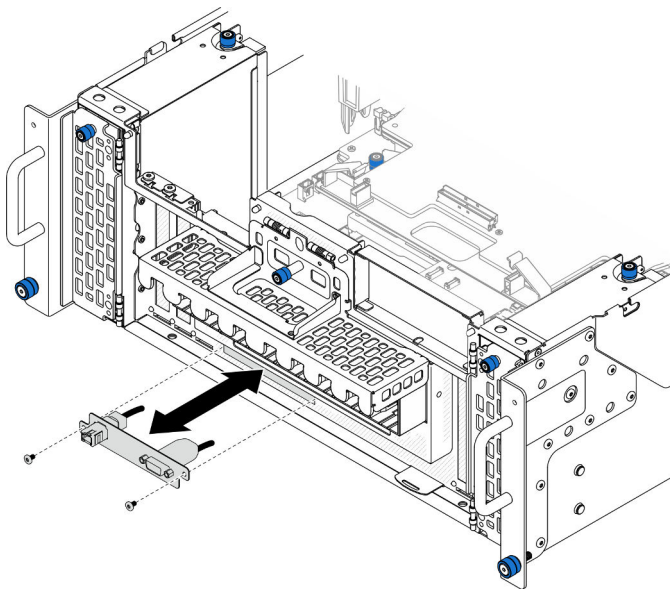


Figure 161. Removing serial port assembly

After you finish

1. Install a replacement unit. See [“Install the serial port assembly” on page 205](#).
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.

Install the serial port assembly

Follow instruction in this section to install the serial port assembly.

About this task

Attention:

- Read “[Installation Guidelines](#)” on page 41 and “[Safety inspection checklist](#)” on page 42 to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See “[Power off the server](#)” on page 50.
- 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 installed in a rack, remove the server from the rack. See “[Remove the server from rails](#)” on page 50.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “[Update the firmware](#)” on page 275 for more information on firmware updating tools.

Procedure

Step 1. Align and install the serial port assembly into the slot on the front of the chassis and secure it with two screws.

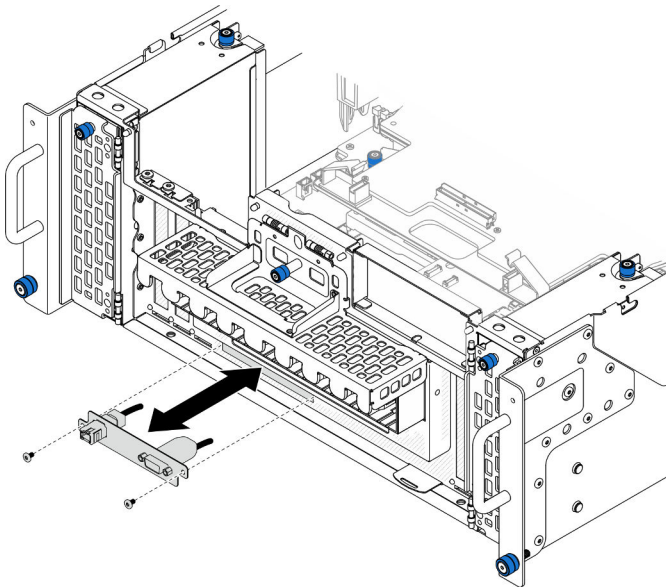


Figure 162. Installing serial port assembly

After you finish

1. For primary chassis only, reinstall the system I/O board and interposer assembly. See “[Install the system I/O board and interposer board](#)” on page 223.
2. For primary chassis only, reinstall the support bracket. See “[Install the support bracket](#)” on page 213.
3. Reinstall the upper processor board (CPU BD). See “[Install the upper processor board \(CPU BD\)](#)” on page 252.

4. Reinstall the upper processor board (CPU BD) air baffle. See [“Install the upper processor board \(CPU BD\) air baffle” on page 73](#).
5. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
6. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).
7. To enable the serial port module on Linux or Microsoft Windows, do one of the followings according to the installed operating system:

Note: If the Serial over LAN (SOL) or Emergency Management Services (EMS) feature is enabled, the serial port will be hidden on Linux and Microsoft Windows. Therefore, it is required to disable SOL and EMS to use the serial port on operating systems for serial devices.

- For Linux:

Open the ipmitool and enter the following command to disable the Serial over LAN (SOL) feature:

```
-I lanplus -H IP -U USERID -P PASSWORD sol deactivate
```

- For Microsoft Windows:

- a. Open the ipmitool and enter the following command to disable the SOL feature:

```
-I lanplus -H IP -U USERID -P PASSWORD sol deactivate
```

- b. Open Windows PowerShell and enter the following command to disable the Emergency Management Services (EMS) feature:

```
Bcdedit /ems off
```

- c. Restart the server to ensure that the EMS setting takes effect.

Sideband card replacement

Follow the instructions in this section to remove and install the sideband card.

Remove the sideband card

Follow the instructions in this section to remove the sideband card.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

- Step 1. Remove the front top cover. See [“Remove the front top cover” on page 233](#).
- Step 2. Remove the left PCIe filler from the chassis.

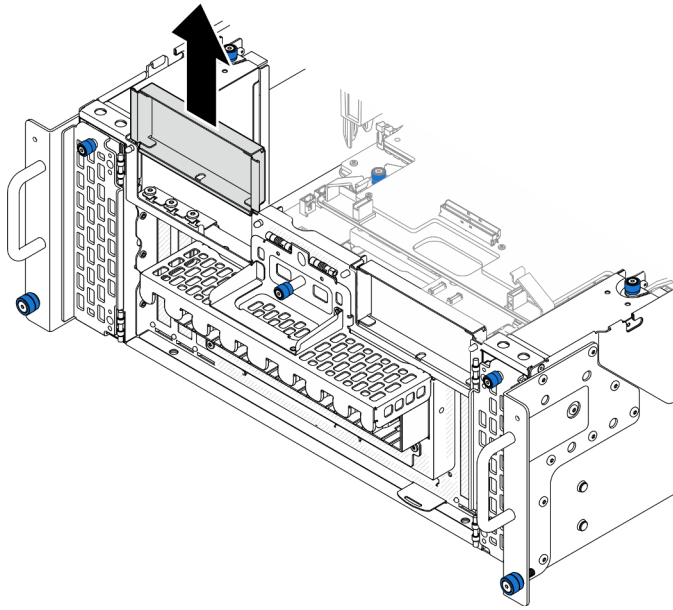


Figure 163. Removing left PCIe filler

Step 3. Remove the sideband card.

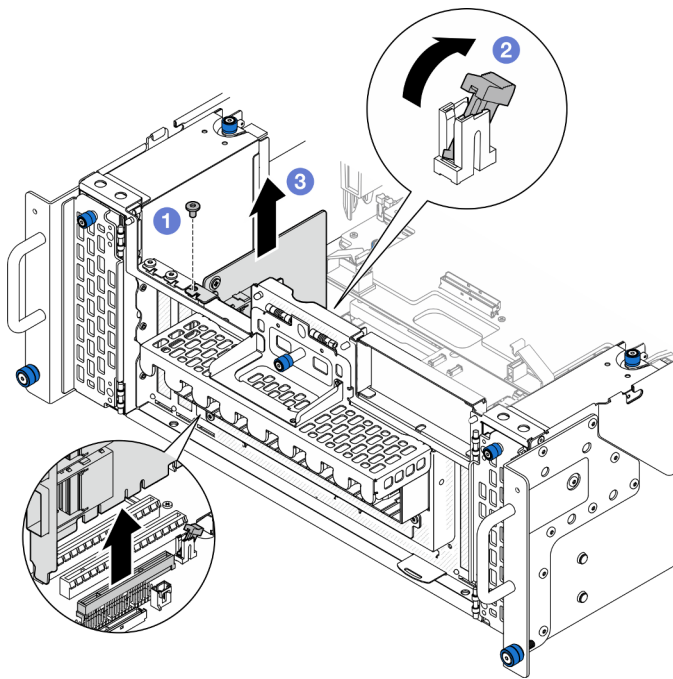


Figure 164. Removing sideband card

- a. ① Remove the screw that secures the sideband card.
- b. ② Press on the latch to disengage the sideband card from the PCIe slot.
- c. ③ Grasp the sideband card by its edges and carefully pull it out of the PCIe slot.

Step 4. If necessary, install the left PCIe filler.

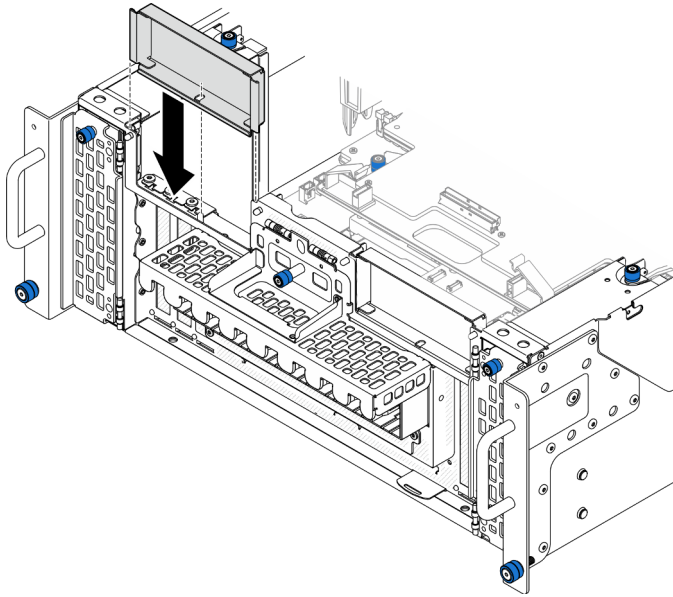


Figure 165. Installing left PCIe filler

After you finish

1. Install a replacement unit. See [“Install the sideband card” on page 209](#).
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 sideband card

Follow the instructions in this section to install the sideband card.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.

- Go to [“Update the firmware” on page 275](#) for more information on firmware updating tools.

Procedure

Step 1. If the left PCIe filler is installed, remove it.

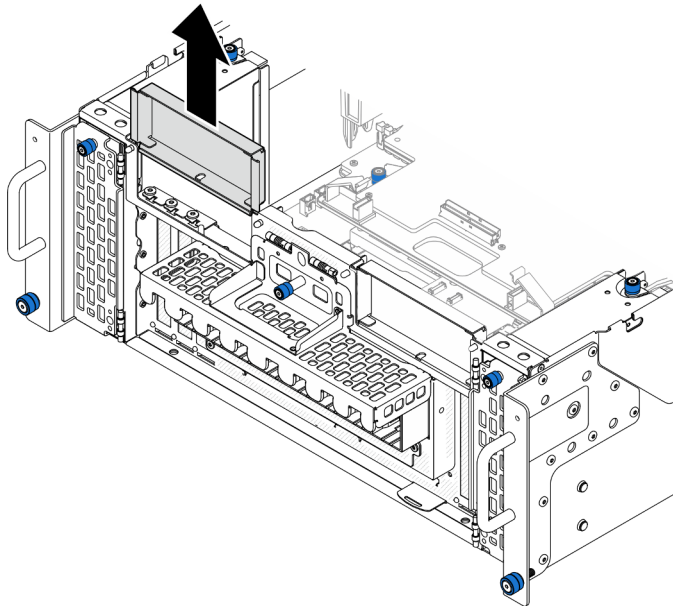


Figure 166. Removing left PCIe filler

Step 2. Install the sideband card.

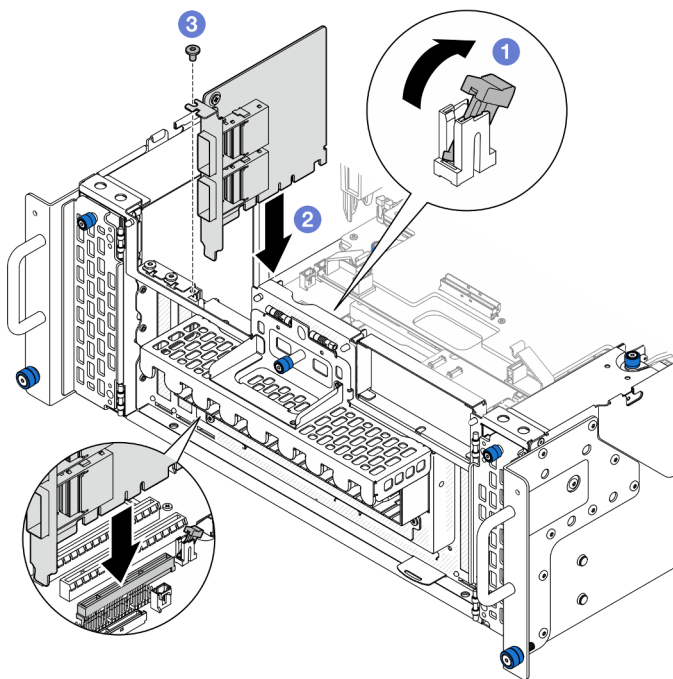


Figure 167. Installing sideband card

- 1 Make sure the latch on the PCIe slot is in the unlocked position.

- b. 2 Align the sideband card with the connector on the PCIe slot; then, carefully press the sideband card straight into the slot until it is securely seated and its bracket also is secured.
- c. 3 Secure the sideband card with a screw.

Step 3. Install the left PCIe filler.

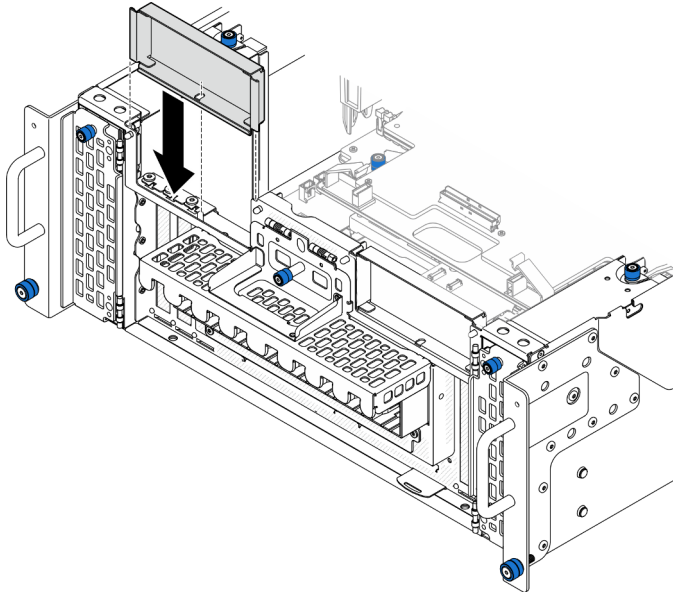


Figure 168. Installing left PCIe filler

After you finish

1. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

Support bracket replacement

Follow the instructions in this section to remove and install the support bracket.

Remove the support bracket

Follow the instructions in this section to remove the support bracket.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).

- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

Step 1. Make preparation for the task.

- Remove the front top cover. See [“Remove the front top cover” on page 233](#).
- Remove the upper processor board (CPU BD) air baffle. See [“Remove the upper processor board \(CPU BD\) air baffle” on page 71](#).
- Remove the upper processor board (CPU BD). See [“Remove the upper processor board \(CPU BD\)” on page 247](#).

Step 2. Remove the support bracket.

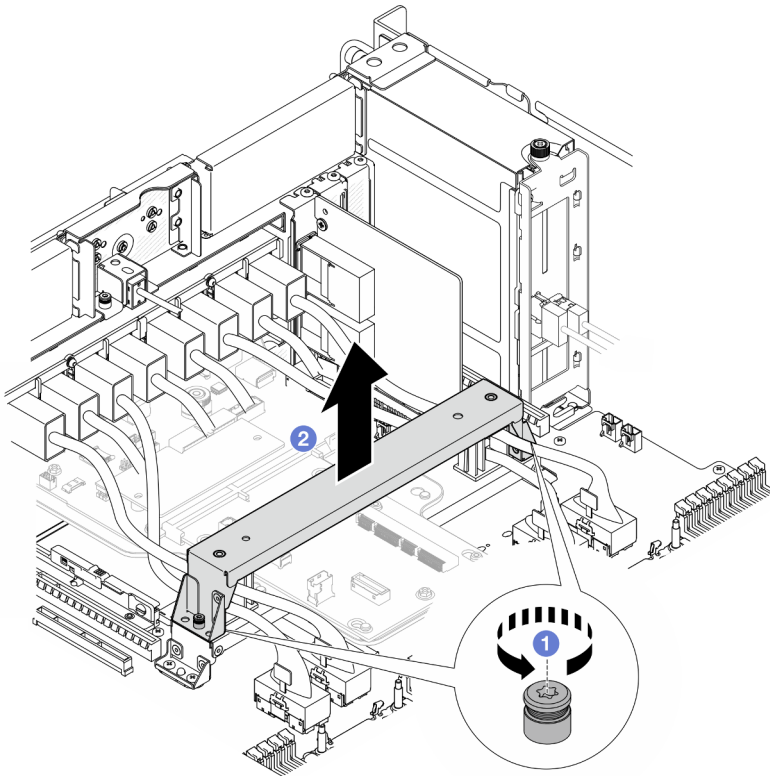


Figure 169. Removing support bracket

- Loosen the two screws that secure the support bracket.
- Grasp the support bracket and remove it from the lower processor board (MB) handle.

After you finish

- Install a replacement unit. See [“Install the support bracket” on page 213](#).
- 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 support bracket

Follow the instructions in this section to install the support bracket.

About this task

Attention:

- Read “[Installation Guidelines](#)” on page 41 and “[Safety inspection checklist](#)” on page 42 to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See “[Power off the server](#)” on page 50.
- 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 installed in a rack, remove the server from the rack. See “[Remove the server from rails](#)” on page 50.

Procedure

Step 1. Install the support bracket.

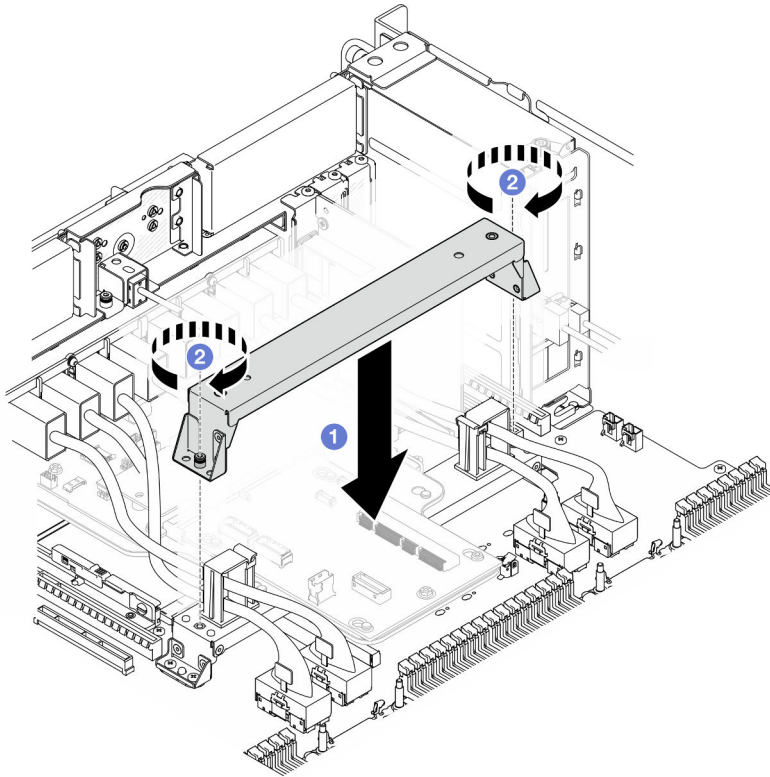



Figure 170. Installing support bracket

- a. 1 Lower the support bracket onto the lower processor board (MB) handle.

- b.  Tighten the two screws to secure the support bracket.

After you finish

1. Reinstall the upper processor board (CPU BD). See [“Install the upper processor board \(CPU BD\)” on page 252](#).
2. Reinstall the upper processor board (CPU BD) air baffle. See [“Install the upper processor board \(CPU BD\) air baffle” on page 73](#).
3. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
4. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

System I/O board and interposer board replacement (trained technician only)

Follow the instructions in this section to remove and install the system I/O board and interposer board.

Important: This task must be operated by trained technicians that are certified by Lenovo Service. Do not attempt to remove or install the part without proper training and qualification.

Remove the Firmware and RoT Security Module

Follow instructions in this section to remove the ThinkSystem V3 Firmware and Root of Trust Security Module (Firmware and RoT Security Module).

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.

Important: This task must be operated by trained technicians that are certified by Lenovo Service. Do not attempt to remove or install the part without proper training and qualification.

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).

- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

Step 1. Make preparation for the task.

- Perform OneCLI commands to back up the UEFI settings. See https://pubs.lenovo.com/lxce-onecli/onecli_r_save_command.
- Perform both OneCLI commands and XCC actions to back up the XCC settings. See https://pubs.lenovo.com/lxce-onecli/onecli_r_save_command and https://pubs.lenovo.com/xcc2/NN1ia_c_backupthexcc.html.
- Remove the front top cover. See [“Remove the front top cover” on page 233](#).
- Remove the upper processor board (CPU BD) air baffle. See [“Remove the upper processor board \(CPU BD\) air baffle” on page 71](#).
- Remove the upper processor board (CPU BD). See [“Remove the upper processor board \(CPU BD\)” on page 247](#).
- Remove the support bracket. See [“Remove the support bracket” on page 211](#).
- For primary chassis only, remove the system I/O board and interposer assembly. See [“Remove the system I/O board and interposer board” on page 218](#).

Step 2. Remove the Firmware and RoT Security Module.

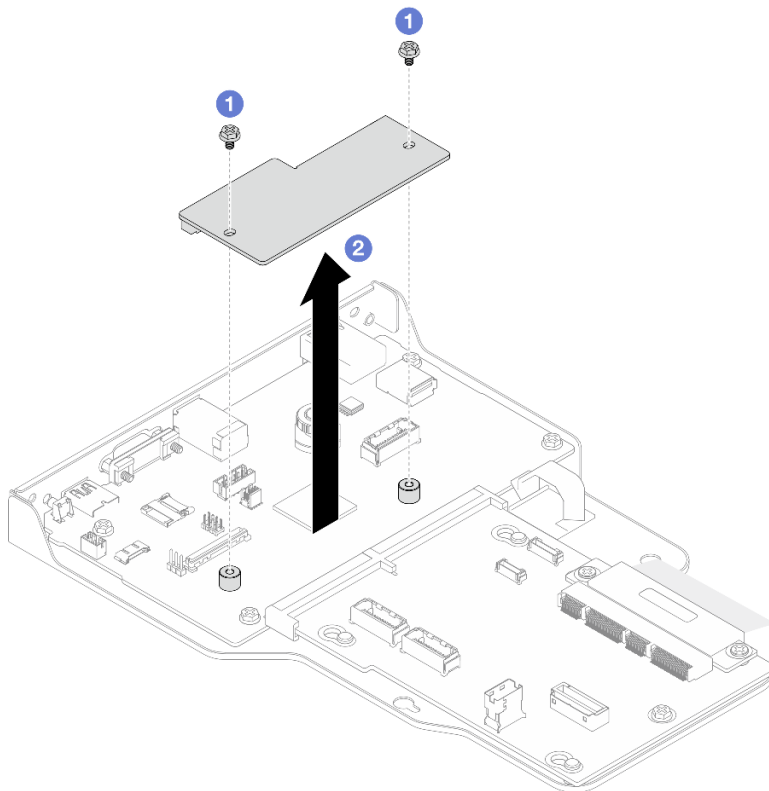


Figure 171. Firmware and RoT Security Module removal

- a. ① Loosen the two screws on the Firmware and RoT Security Module.
- b. ② Lift the Firmware and RoT Security Module out of the chassis.

After you finish

1. Install a replacement unit. See [“Install the Firmware and RoT Security Module” on page 216](#).
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 Firmware and RoT Security Module

Follow instructions in this section to install the ThinkSystem V3 Firmware and Root of Trust Security Module (Firmware and RoT Security Module).

About this task

Important: This task must be operated by trained technicians that are certified by Lenovo Service. Do not attempt to remove or install the part without proper training and qualification.

(Lenovo trained technician only) After replacing the Firmware and RoT Security Module, update the UEFI, XCC, and LXPM firmware to the specific version supported by the server. For detailed information on how to update the firmware, see <https://glosse4lenovo.lenovo.com/wiki/glosse4lenovo/view/How%20To/System%20related/How%20to%20do%20RoT%20Module%20FW%20update%20on%20ThinkSystem%20V3%20machines/>.

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to [“Update the firmware” on page 275](#) for more information on firmware updating tools.

Procedure

- Step 1. Touch the static-protective package that contains the new part to any unpainted surface on the outside of the server; then, take the new part out of the package and place it on a static-protective surface.
- Step 2. Install the Firmware and RoT Security Module.

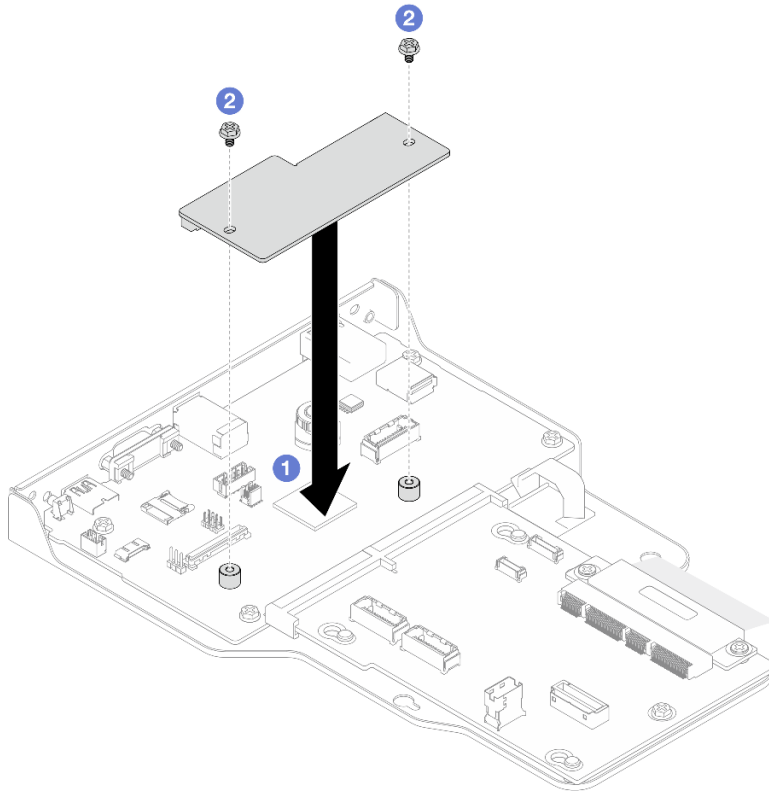


Figure 172. Firmware and RoT Security Module installation

- a. ❶ Lower the Firmware and RoT Security Module onto the system I/O board and ensure that the connector on the module is correctly inserted into the slot on the system I/O board.
- b. ❷ Tighten the two screws to secure the Firmware and RoT Security Module in place.

After you finish

1. For primary chassis only, reinstall the system I/O board and interposer assembly. See “Install the system I/O board and interposer board” on page 223.
2. Reinstall the support bracket. See “Install the support bracket” on page 213.
3. Reinstall the upper processor board (CPU BD). See “Install the upper processor board (CPU BD)” on page 252.
4. Reinstall the upper processor board (CPU BD) air baffle. See “Install the upper processor board (CPU BD) air baffle” on page 73.
5. Reinstall the front top cover. See “Install the front top cover” on page 239.
6. Complete the parts replacement. See “Complete the parts replacement” on page 256.
7. Update the UEFI, XCC, and LXPM firmware to the specific version supported by the server. See <https://glosse4lenovo.lenovo.com/wiki/glosse4lenovo/view/How%20To/System%20related/How%20to%20do%20RoT%20Module%20FW%20update%20on%20ThinkSystem%20V3%20machines/>.
8. Perform OneCLI commands to restore the UEFI settings. See https://pubs.lenovo.com/lxce-onecli/onecli_r_restore_command.
9. Perform both OneCLI commands and XCC actions to restore the XCC settings. See https://pubs.lenovo.com/lxce-onecli/onecli_r_restore_command and https://pubs.lenovo.com/xcc2/NN1ia_c_restorethexcc.html.

10. If there is a software (SW) key, for example, XCC FoD key, installed in the system, inject the key again to ensure that the key functions properly. See <https://lenovopress.lenovo.com/redp4895.pdf>.

Note: If you need to replace the lower processor board (MB) or upper processor board (CPU BD) together with the Firmware and RoT Security Module, update the VPD before injecting the key. See [Update the Vital Product Data \(VPD\)](#).

11. Optionally, do the following if needed:
 - Hide TPM. See [“Hide/observe TPM” on page 230](#).
 - Update the TPM firmware. See [“Update the TPM firmware” on page 231](#).
 - Enable UEFI Secure Boot. See [“Enable UEFI Secure Boot” on page 232](#).

Demo video

[Watch the procedure on YouTube](#)

Remove the system I/O board and interposer board

Follow instructions in this section to remove the system I/O board and interposer board.

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.

Important:

- This task must be operated by trained technicians that are certified by Lenovo Service. Do not attempt to remove or install the part without proper training and qualification.
- **When disconnecting cables, make a list of each cable and record the connectors the cable is connected to, and use the record as a cabling checklist after installing the new system I/O board and interposer board.**

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Important: When disconnecting cables, make a list of each cable and record the connectors the cable is connected to, and use the record as a cabling checklist after installing the new system I/O board and interposer board.

Procedure

Step 1. Make preparation for the task.

- a. Record all system configuration information, such as Lenovo XClarity Controller 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 front top cover. See [“Remove the front top cover” on page 233](#).
- e. Remove the upper processor board (CPU BD) air baffle. See [“Remove the upper processor board \(CPU BD\) air baffle” on page 71](#).
- f. Remove the upper processor board (CPU BD). See [“Remove the upper processor board \(CPU BD\)” on page 247](#).
- g. For primary chassis only, remove the support bracket. See [“Remove the support bracket” on page 211](#).

Step 2. Disconnect the SCM cable.

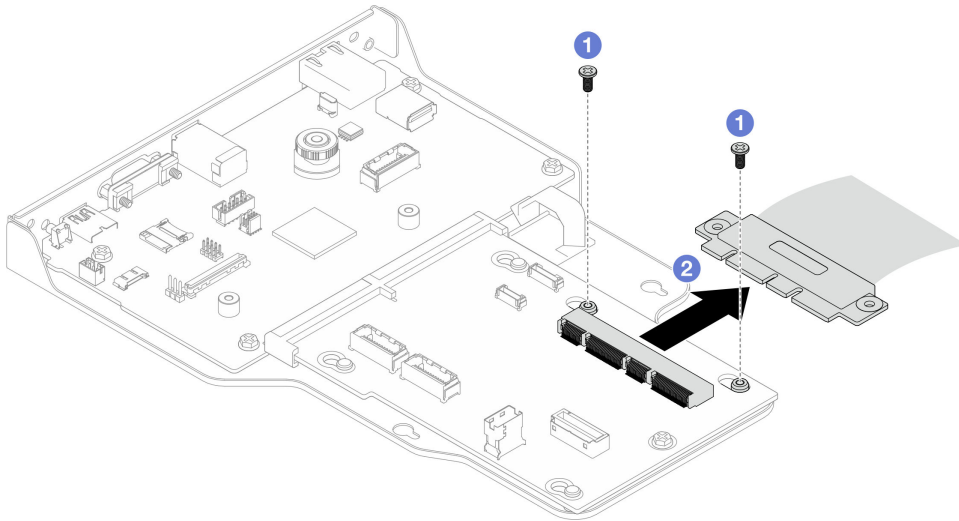


Figure 173. Disconnecting SCM cable

- a. ① Remove the two screws that secure the SCM cable.
- b. ② Disconnect the SCM cable from the interposer board.

Step 3. If necessary, make a list of each remaining cable and record the connectors the cable is connected to; then, disconnect and remove all the remaining cables on the interposer board and system I/O board.

Step 4. Remove the two screws on the front of the chassis.

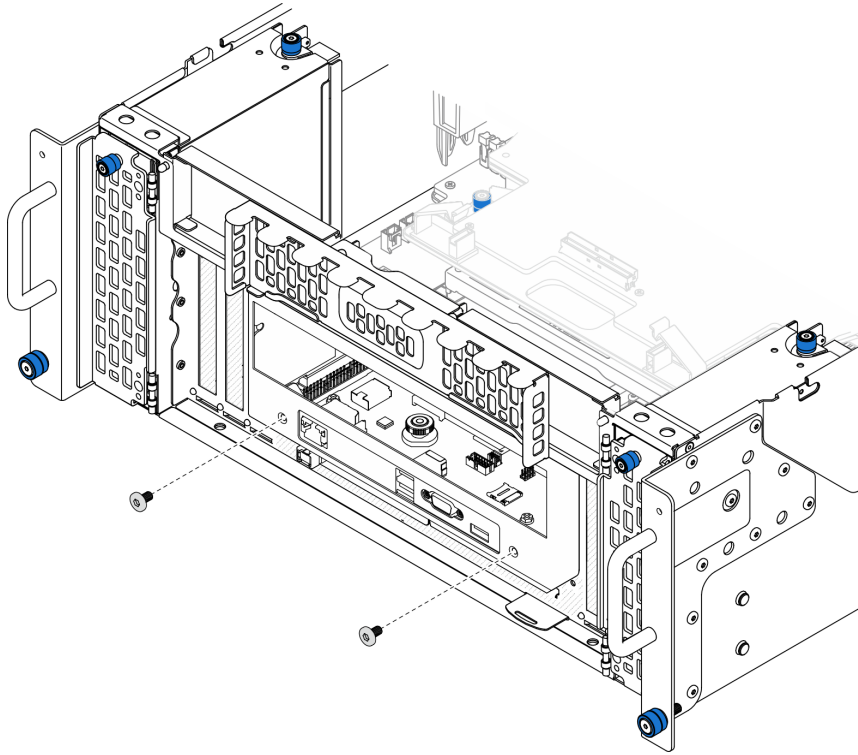


Figure 174. Loosening system I/O board and interposer assembly

Step 5. Slide the system I/O board and interposer assembly towards the rear of the chassis to remove it.

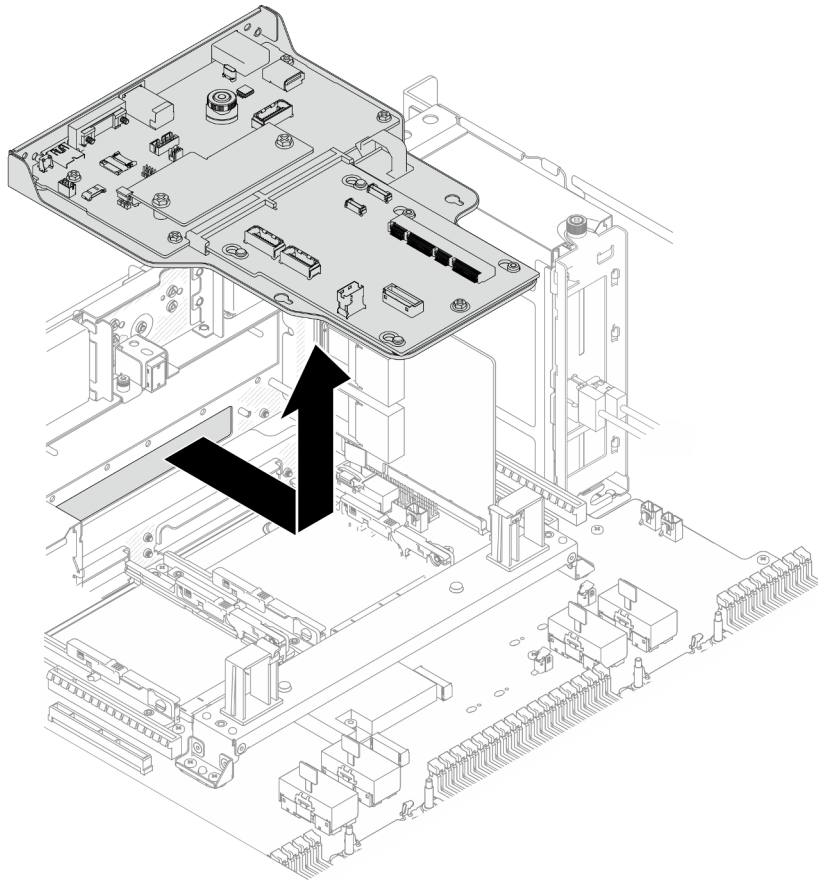


Figure 175. Removing system I/O board and interposer assembly

- Step 6. (Optional) If you are going to replace the system I/O board, remove the Firmware and RoT Security Module from the system I/O board. See [“Remove the Firmware and RoT Security Module”](#) on page 214. If you are going to replace the lower processor board (MB), go to next step directly.
- Step 7. Remove the interposer board.

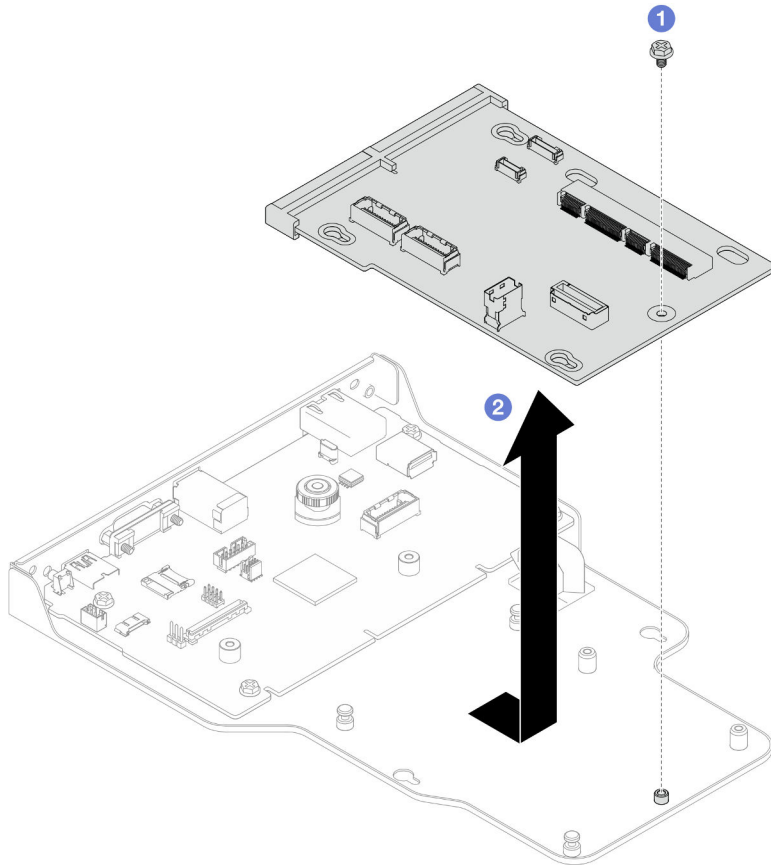


Figure 176. Removing interposer board

- a. ① Remove the screw that secure the interposer board.
- b. ② Hold the interposer board by its edges and slide it away from the system I/O board to remove it.

Step 8. Remove the system I/O board from the bracket.

Note: To prevent the contact of the system I/O board from damage, pinch and lift the plunger on the system I/O board upward a little and pull out the system I/O board outward. During the entire pulling action, ensure that the system I/O board remains as horizontal as possible.

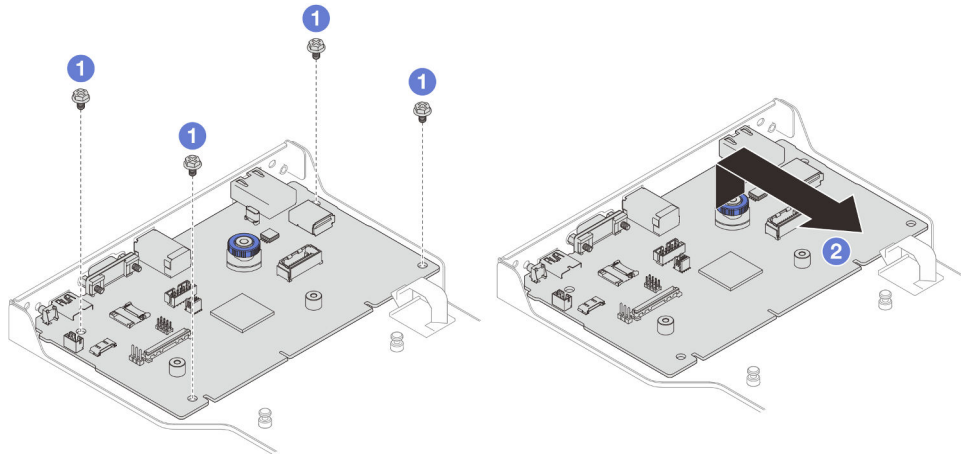


Figure 177. Removing system I/O board from bracket

- a. ① Remove the four screws that secure the system I/O board.
- b. ② Lift and hold the plunger; then, slide the system I/O board away from the bracket to remove it.

After you finish

1. Install a replacement unit. See “[Install the system I/O board and interposer board](#)” on page 223.
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 system I/O board and interposer board

Follow instructions in this section to install the system I/O board and interposer board.

About this task

Important: This task must be operated by trained technicians that are certified by Lenovo Service. Do not attempt to remove or install the part without proper training and qualification.

Attention:

- Read “[Installation Guidelines](#)” on page 41 and “[Safety inspection checklist](#)” on page 42 to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See “[Power off the server](#)” on page 50.
- 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.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” on page 275 for more information on firmware updating tools.

Procedure

Step 1. Touch the static-protective package that contains the new part to any unpainted surface on the outside of the server; then, take the new part out of the package and place it on a static-protective surface.

Step 2. Install the system I/O board to the bracket.

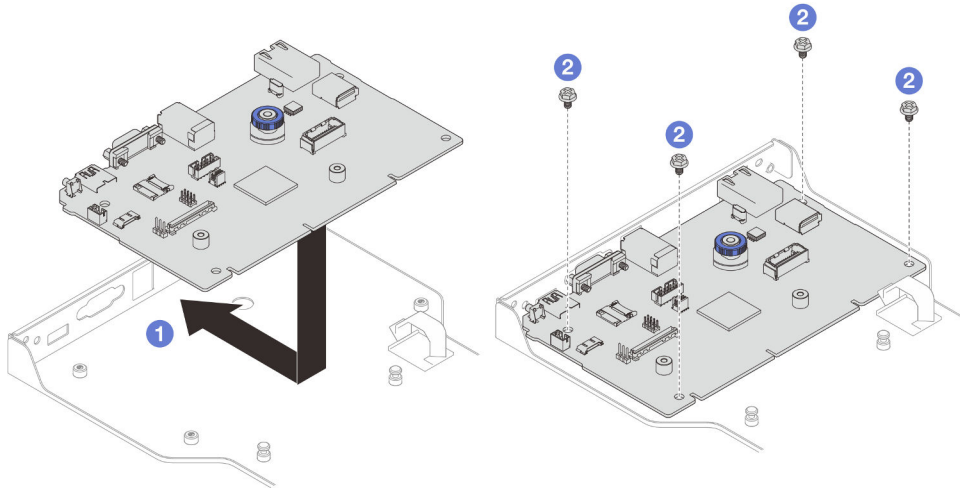


Figure 178. Installing system I/O board to bracket

- 1 Lower the system I/O board onto the bracket and slide it towards the openings on the bracket. Make sure the plunger engages with the bracket.
- 2 Install four screws to fix the system I/O board into place.

Step 3. Install the interposer board.

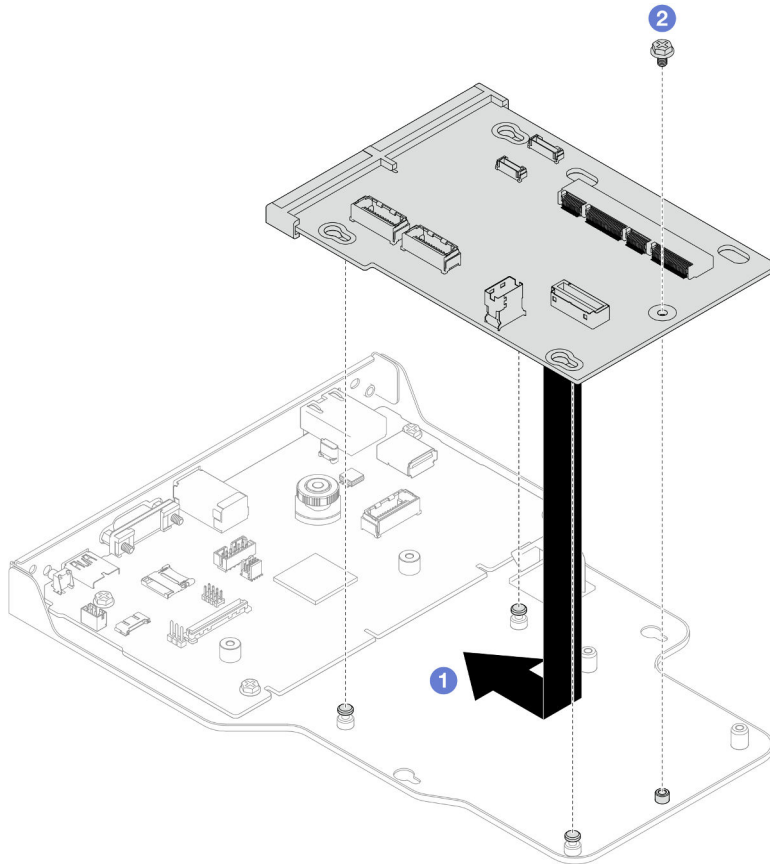
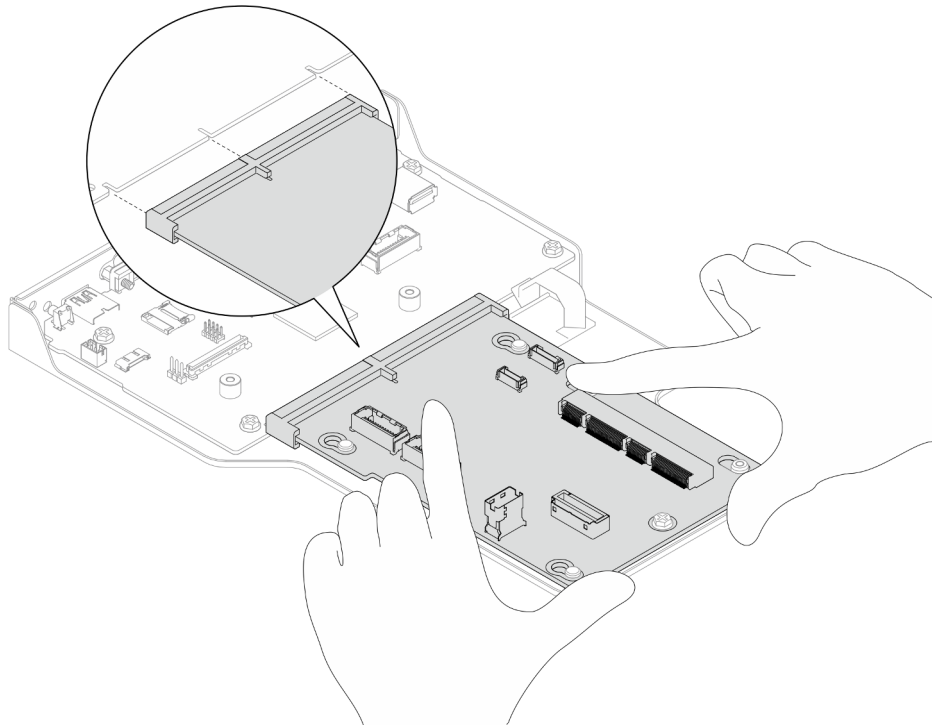



Figure 179. Installing interposer board

- a. ① Align the holes in the interposer board with the pins on the bracket; then, lower the interposer board onto the bracket and use both hands to push the interposer board by its edges into the contacts on the system I/O board.

Note: To prevent the contacts of the system I/O board from damage, ensure that the interposer board is aligned correctly with the contacts on the system I/O board, and remains as horizontal as possible during the insertion.



b.  Install a screw to secure the interposer board in place.

Step 4. (Optional) If you are replacing the system I/O board, install the Firmware and RoT Security Module that is removed from the old system I/O board onto the new system I/O board. See [“Install the Firmware and RoT Security Module” on page 216](#).

Step 5. Align the system I/O board and interposer board assembly with the pins on the support bracket; then slide it towards the front of the chassis to install it.

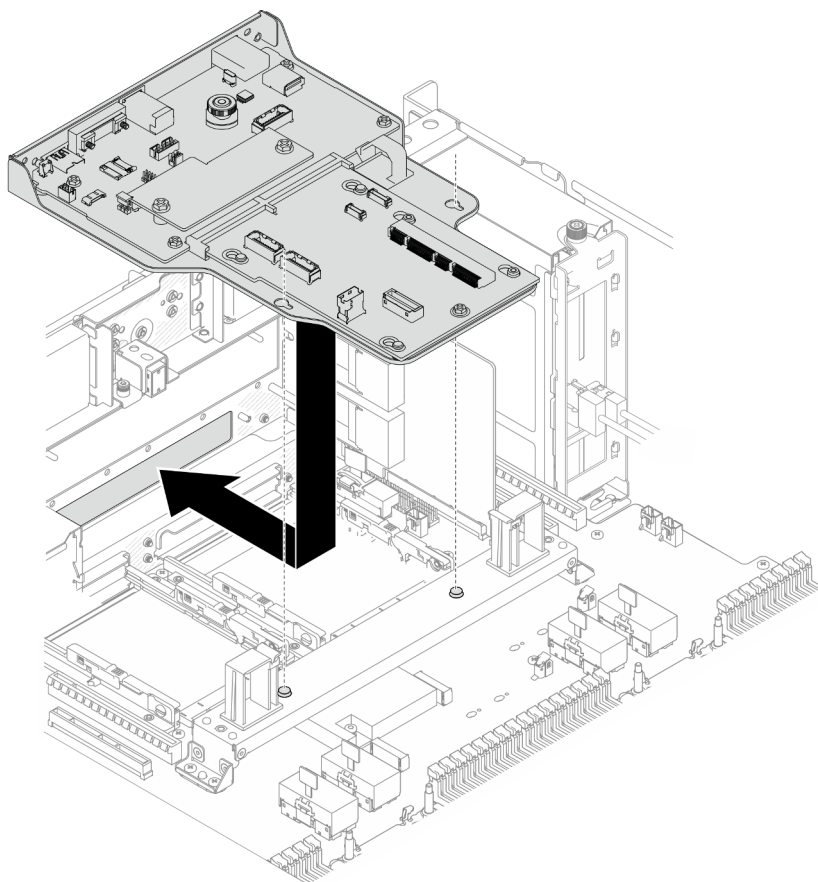


Figure 180. Installing system I/O board and interposer assembly

- Step 6. Install two screws on the front of the chassis to secure the system I/O board and interposer assembly.

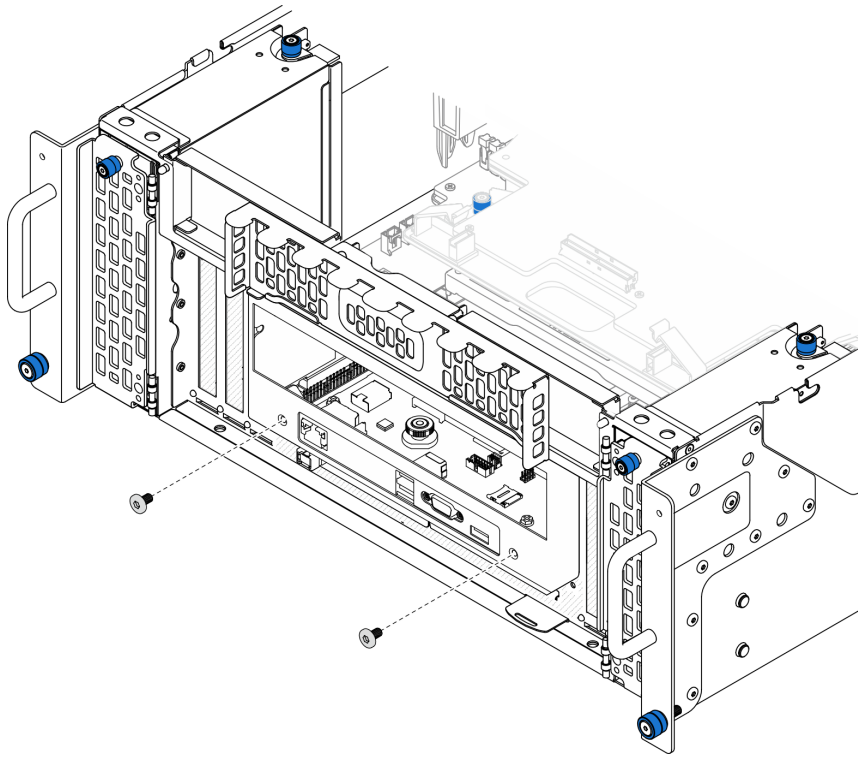


Figure 181. Securing system I/O board and interposer assembly

Step 7. Connect the SCM cable.

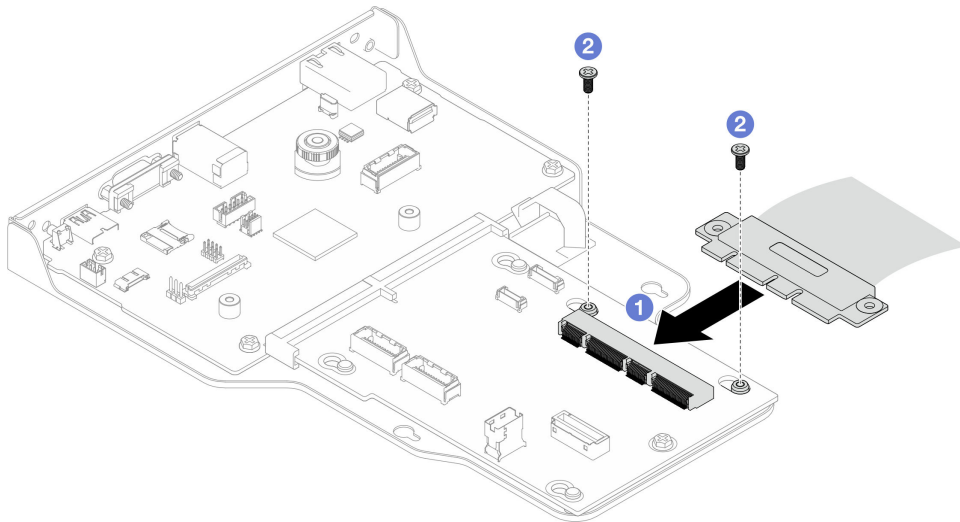


Figure 182. Connecting SCM cable

- a. ① Connect the SCM cable to the interposer board.
- b. ② Install two screws to secure the SCM cable.

Step 8. If necessary, reconnect all the cables that were removed previously.

After you finish

1. For primary chassis only, reinstall the support bracket. See [“Install the support bracket” on page 213](#).
2. Reinstall the upper processor board (CPU BD). See [“Install the upper processor board \(CPU BD\)” on page 252](#).
3. Reinstall the upper processor board (CPU BD) air baffle. See [“Install the upper processor board \(CPU BD\) air baffle” on page 73](#).
4. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
5. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).
6. Update the vital product data (VPD). See [“Update the Vital Product Data \(VPD\)” on page 229](#).

Machine type number and serial number can be found on the ID label, see [“Identify the server and access the Lenovo XClarity Controller” on page 35](#).

7. Optionally, enable UEFI Secure Boot. See [“Enable UEFI Secure Boot” on page 232](#).

Demo video

[Watch the procedure on YouTube](#)

Update the Vital Product Data (VPD)

Use this topic to update the Vital Product Data (VPD).


- **(Required)** Machine type
- **(Required)** Serial number
- **(Required)** System model
- (Optional) Asset tag
- (Optional) UUID

Recommended tools:

- Lenovo XClarity Provisioning Manager
- Lenovo XClarity Essentials OneCLI commands

Using Lenovo XClarity Provisioning Manager

Steps:

1. Start the server and press the key according to the on-screen instructions. The Lenovo XClarity Provisioning Manager interface is displayed by default.
2. Click  on the top right corner of the Lenovo XClarity Provisioning Manager main interface.
3. Click **Update VPD**; then, follow on-screen instructions to update the VPD.

Using Lenovo XClarity Essentials OneCLI commands

- Updating **machine type**
`onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> [access_method]`
- Updating **serial number**
`onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> [access_method]`
- Updating **system model**
`onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> [access_method]`
`onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx <system model> --override [access_method]`
- Updating **asset tag**
`onecli config set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> [access_method]`

- Updating **UUID**

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

Variable	Description
<m/t_model>	The server machine type and model number. Type xxxxyyy, where xxxx is the machine type and yyy is the server model number.
<s/n>	The serial number on the server. Type zzzzzzz, where zzzzzzz is the serial number.
<system model>	The system model on the server. Type system yyyyyyyy, where yyyyyyyy is the product identifier.
<asset_tag>	The server asset tag number. Type aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa, where aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa is the asset tag number.
[access_method]	<p>The access method that you select to access the target server.</p> <ul style="list-style-type: none"> • Online KCS (unauthenticated and user restricted): You can directly delete [access_method] from the command. • Online authenticated LAN: In this case, specify below LAN account information at the end of the OneCLI command: --bmc-username <user_id> --bmc-password <password> • Remote WAN/LAN: In this case, specify below XCC account information and IP address at the end of the OneCLI command: --bmc <bmc_user_id>:<bmc_password>@<bmc_external_IP> <p>Notes:</p> <ul style="list-style-type: none"> – <bmc_user_id> The BMC account name (1 of 12 accounts). The default value is USERID. – <bmc_password> The BMC account password (1 of 12 accounts).

Hide/observe TPM

TPM is enabled by default to encrypt data transfer for system operation. Optionally, you can disable TPM using Lenovo XClarity Essentials OneCLI.

To disable TPM, do the following:

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:

```
OneCli.exe config set TrustedComputingGroup.HideTPMfromOS "Yes" --imm <userid>:<password>@<ip_address> --override
```

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.

Example:

```
D:\onecli>OneCli.exe config set TrustedComputingGroup.HideTPMfromOS "Yes" --imm USERID:PASSWORD=1@10.245.39.79 --override

Lenovo XClarity Essentials OneCLI 1xce_onecli01p-2.3.0
Licensed Materials - Property of Lenovo
(C) Copyright Lenovo Corp. 2013-2018 All Rights Reserved
If the parameters you input includes password, please Note that:
* The password must consist of a sequence of characters from `0-9a-zA-Z_+.$%!*^&*()=` set
* Use "" to quote when password parameters include special characters
* Do not use reserved characters in path name when parameter contains path
Invoking SET command ...
Connected to BMC at IP address 10.245.39.79 by IPMI
TrustedComputingGroup.HideTPMfromOS=Yes
Success.
```

3. Reboot the system.

If you want to enable TPM again, run the following command and reboot the system:

```
OneCli.exe config set TrustedComputingGroup.HideTPMfromOS "No" --imm <userid>:<password>@<ip_address> --override
```

Example:

```
D:\onecli3>OneCli.exe config set TrustedComputingGroup.HideTPMfromOS "No" --imm USERID:PASSWORD=1@10.245.39.79 --override

Lenovo XClarity Essentials OneCLI 1xce_onecli01h-3.0.1
(C) Lenovo 2013-2020 All Rights Reserved

OneCLI License Agreement and OneCLI Legal Information can be found at the following location:
"D:\onecli3\Lic"

[Is]Certificate check finished [100%][=====]
Invoking SET command ...
Connected to BMC at IP address 10.245.39.79 by IPMI
TrustedComputingGroup.HideTPMfromOS=No
Configure successfully, please reboot system.
Succeed.
```

Update the TPM firmware

Optionally, you can update the TPM firmware using Lenovo XClarity Essentials OneCLI.

Note: TPM firmware update is irreversible. After update, the TPM firmware cannot be downgraded to earlier versions.

TPM firmware version

Follow the procedure below to see the TPM firmware version:

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** → **Trusted Platform Module** → **TPM 2.0** → **TPM Firmware Version**.

Update the TPM firmware

To update the TPM firmware, do the following:

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:

```
OneCli.exe config set TrustedComputingGroup.DeviceOperation "Update to TPM 2.0 firmware version <x.x.x.x>" --bmc <userid>:<password>@<ip_address>
```

where:

- <x.x.x.x> is the target TPM version.
e.g. TPM 2.0 (7.2.1.0) -> TPM 2.0 (7.2.2.0):

```
OneCli.exe config set TrustedComputingGroup.DeviceOperation "Update to TPM 2.0 firmware version 7.2.2.0" --bmc <userid>:<password>@<ip_address>
```

- <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.

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.

Note: If disabling UEFI secure boot is needed, select Disable in step 4.

- 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 the instructions in this section to remove and install the top cover.

Remove the front top cover

Follow the instructions in this section to remove the front 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:

- Read “[Installation Guidelines](#)” on page 41 and “[Safety inspection checklist](#)” on page 42 to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See “[Power off the server](#)” on page 50.
- 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 installed in a rack, remove the server from the rack. See “[Remove the server from rails](#)” on page 50.

Procedure

Step 1. If the front top cover is locked, unlock it with a screwdriver (direction .

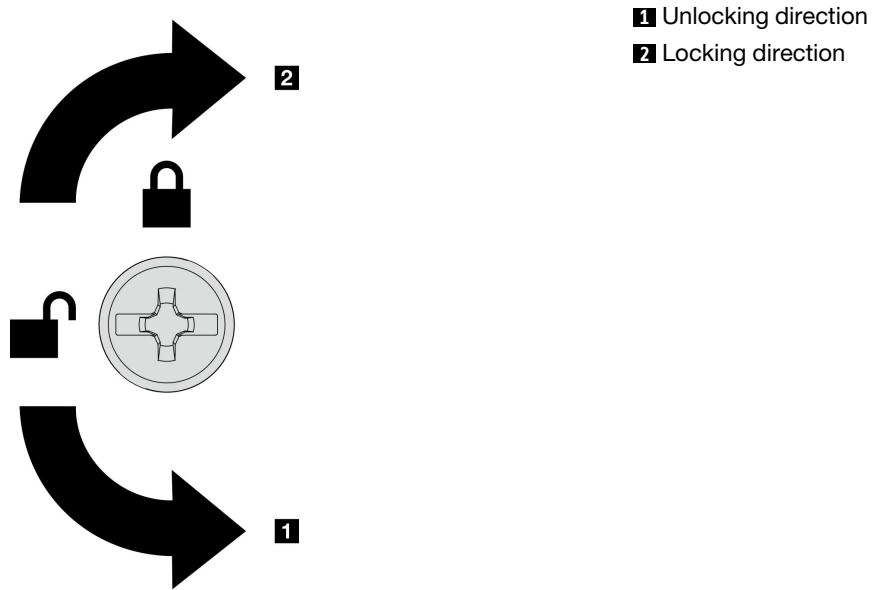


Figure 183. Front top cover locking/unlocking direction

Step 2. Remove the front top cover from the chassis.

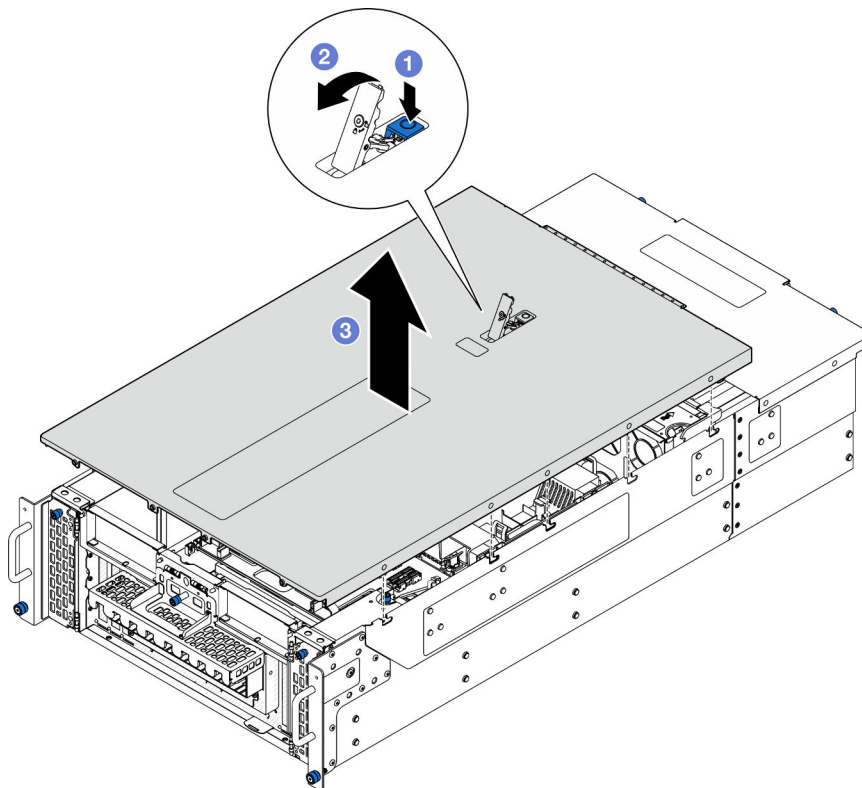


Figure 184. Removing front top cover

Attention:

- Service label is located on the inside of the front top cover.

- For proper cooling and air flow, install the front and rear top covers before you power on the server. Operating the server with the top covers removed might damage server components.
 - a. ① Press the blue button on the front top cover release latch.
 - b. ② Rotate the end of the latch up until it is in vertical position.
 - c. ③ Lift the front top cover to remove it.

After you finish

1. Install a replacement unit. See [“Install the front top cover” on page 239](#).
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 the rear top cover

Follow the instructions in this section to remove the rear 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:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- If the server is installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

- Step 1. Remove the front top cover. See [“Remove the front top cover”](#) on page 233.
- Step 2. Remove the rear top cover from the chassis.

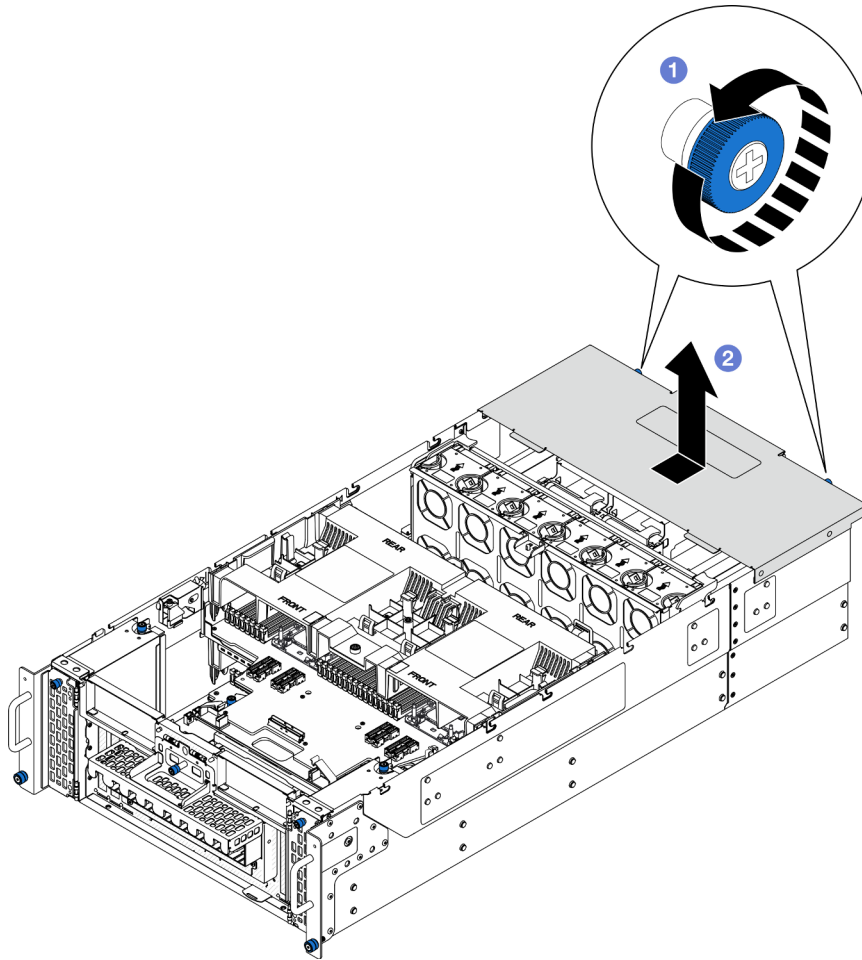


Figure 185. Removing rear top cover

- a. ① Loosen the two thumbscrews on the rear of the chassis. Use a screwdriver if needed.
- b. ② Slide the rear top cover towards the rear of the chassis and lift to remove it.

After you finish

1. Install a replacement unit. See [“Install the rear top cover”](#) on page 236.
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 rear top cover

Follow the instructions in this section to install the rear 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:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- 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.
- Make sure that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server.
- Make sure that all internal cables are correctly routed. See [Chapter 6 “Internal cable routing” on page 259](#).

Procedure

Step 1. Install the rear top cover.

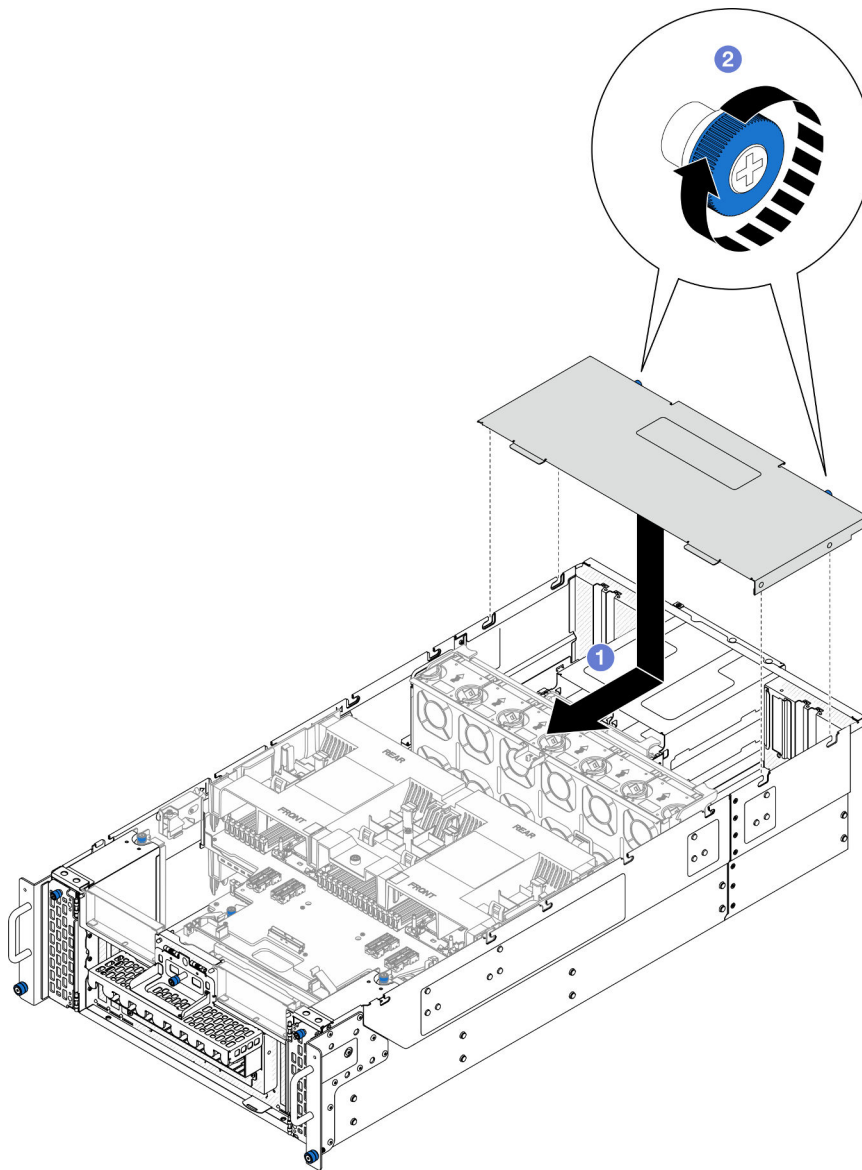


Figure 186. Installing rear top cover

- a. ① Align the rear top cover guide pins with the guide holes on the chassis; then place the rear top cover on top of the chassis and slide it towards the front of the chassis until it engages.
- b. ② Secure the two thumbscrews on the rear of the chassis. Use a screwdriver if needed.

After you finish

1. Reinstall the front top cover. See [“Install the front top cover”](#) on page 239.
2. Complete the parts replacement. See [“Complete the parts replacement”](#) on page 256.

Demo video

[Watch the procedure on YouTube](#)

Install the front top cover

Follow the instructions in this section to install the front 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:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- 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.
- Make sure that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server.
- Make sure that all internal cables are correctly routed. See [Chapter 6 “Internal cable routing” on page 259](#).

Note: If you are installing a new top cover, attach the service label to the inside of the new top cover if necessary.

Procedure

Step 1. Install the front top cover.

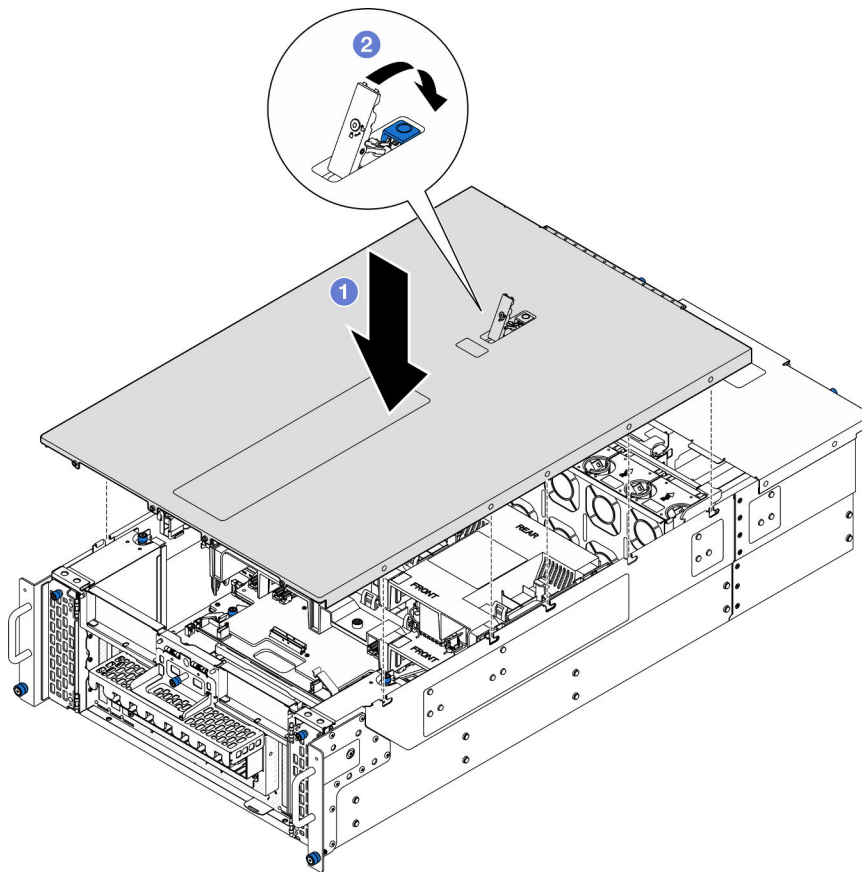



Figure 187. Installing front top cover

- a. ① Align the front top cover guide pins with the guide holes on the chassis; then place the front top cover on top of the chassis with both sides aligned.
- b. ② Rotate the latch down until it stops.

Step 2. (Optional) Lock the front top cover with a screw driver (direction )

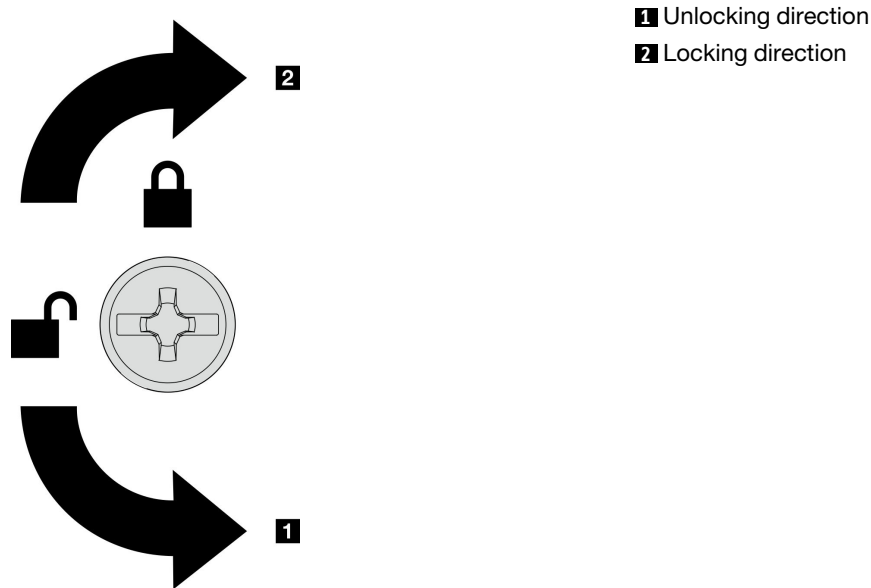


Figure 188. Front top cover locking/unlocking direction

After you finish

Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

UPI module replacement

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

Remove the UPI module

Follow instructions in this section to remove the UPI module.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- If the server is installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

- Step 1. Make preparation for the task.
 - a. Remove the front top cover. See [“Remove the front top cover” on page 233](#).

- b. Remove the upper processor board (CPU BD) air baffle. See [“Remove the upper processor board \(CPU BD\) air baffle” on page 71.](#)
- c. Remove the upper processor board (CPU BD). See [“Remove the upper processor board \(CPU BD\)” on page 247.](#)
- d. Remove the support bracket. See [“Remove the support bracket” on page 211.](#)
- e. For primary chassis only, remove the system I/O board and interposer assembly. See [“Remove the system I/O board and interposer board” on page 218.](#)

Step 2. Disconnect UPI module cables.

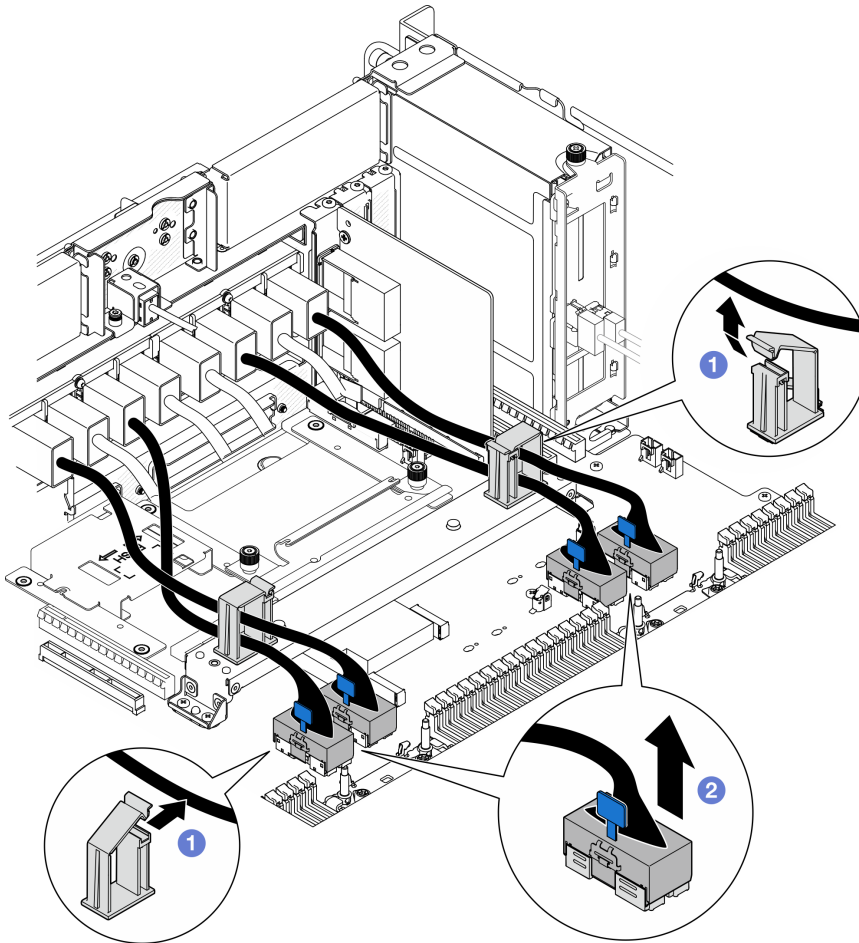


Figure 189. Disconnecting UPI module cables

- a. ① Open the cable clips and unhook the UPI module cables.
- b. ② Disconnect the UPI module cables from the lower processor board (MB).

Step 3. Remove the eight screws that secure the UPI module.

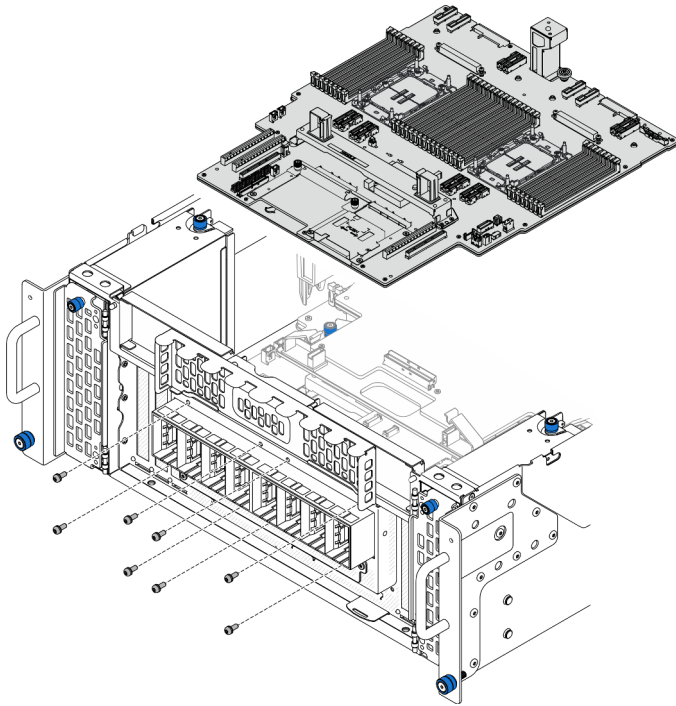


Figure 190. Removing UPI module screws

Step 4. Push the UPI module out of the UPI module hole and carefully lift it out of the chassis.

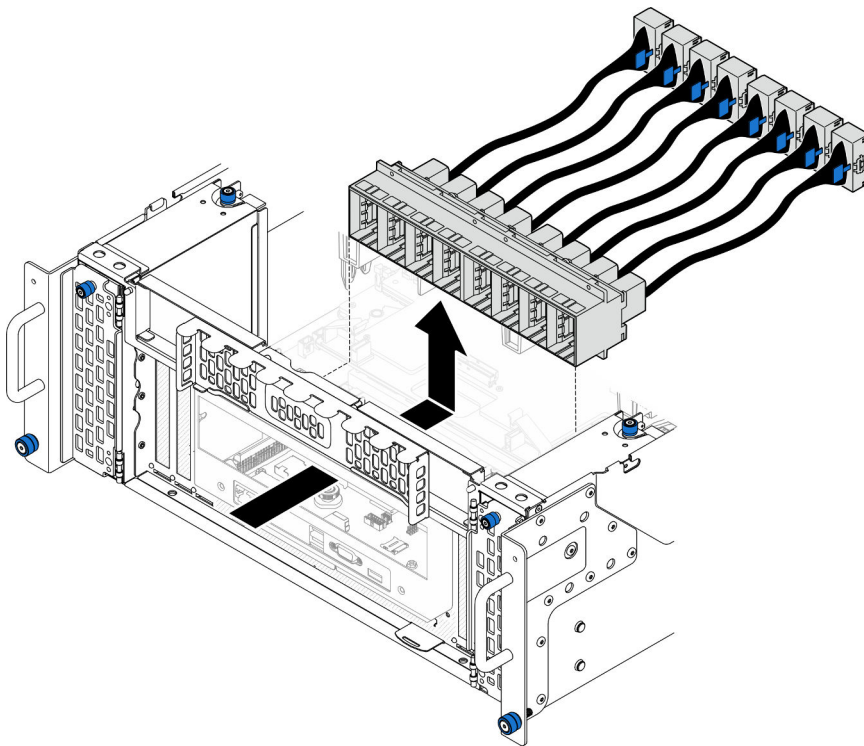


Figure 191. Removing UPI module

After you finish

1. Install a replacement unit. See [“Install the UPI module” on page 244](#).
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 UPI module

Follow instructions in this section to install the UPI module.

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- If the server is installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

Step 1. Align and install the UPI module into the UPI module hole from inside of the chassis.

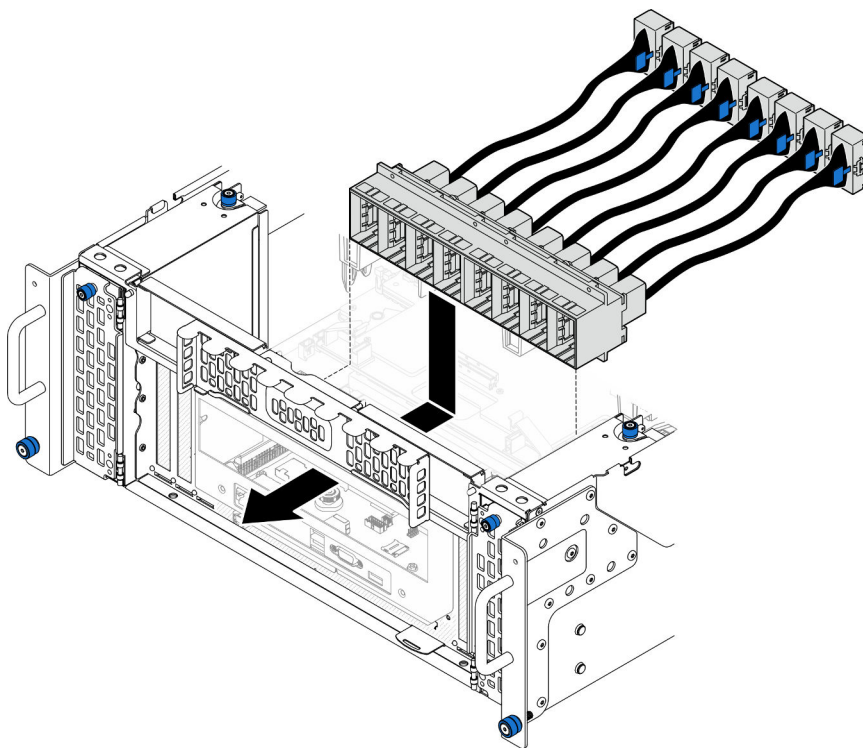


Figure 192. Installing UPI module

Step 2. Secure the UPI module with eight screws.

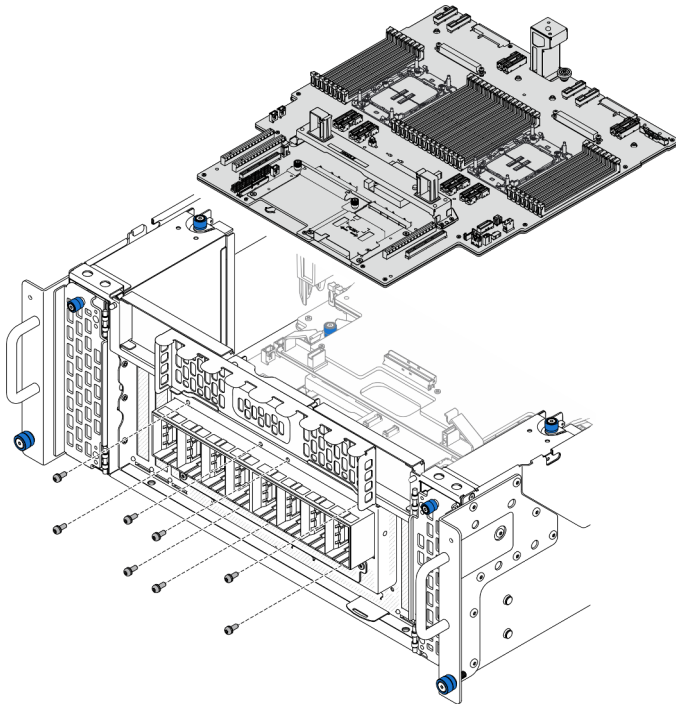


Figure 193. Installing UPI module screws

Step 3. Connect the UPI module cables.

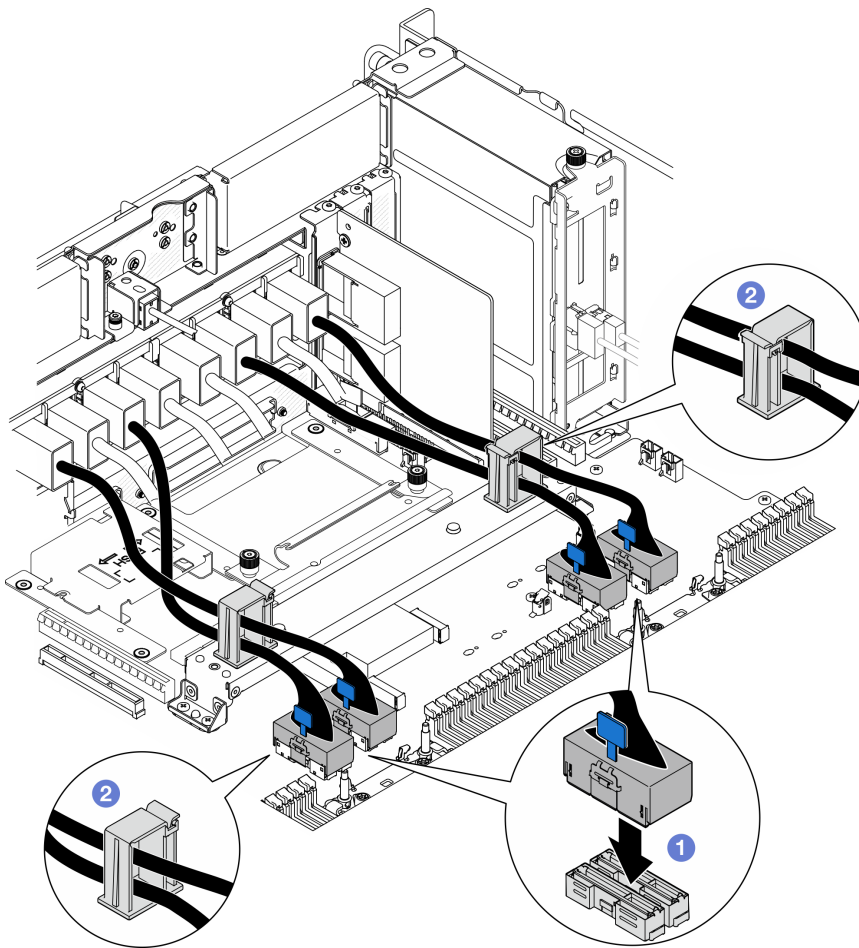


Figure 194. Connecting UPI module cables

- a. 1 Connect the UPI module cables to the lower processor board (MB).
- b. 2 Route the UPI module cables through the cable clips and close them.

After you finish

1. For primary chassis only, reinstall the system I/O board and interposer assembly. See [“Install the system I/O board and interposer board” on page 223](#).
2. Reinstall the support bracket. See [“Install the support bracket” on page 213](#).
3. Reinstall the upper processor board (CPU BD). See [“Install the upper processor board \(CPU BD\)” on page 252](#).
4. Reinstall the upper processor board (CPU BD) air baffle. See [“Install the upper processor board \(CPU BD\) air baffle” on page 73](#).
5. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
6. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

Upper processor board (CPU BD) replacement

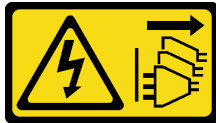
Follow the instructions in this section to remove and install an upper processor board (CPU BD).

Remove the upper processor board (CPU BD)

Follow the instructions in this section to remove the upper processor board (CPU BD).

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.

Important:

- When removing the memory modules, label the slot number on each memory module, remove all the memory modules from the upper processor board (CPU BD), and set them aside on a static-protective surface for reinstallation.
- **When disconnecting cables, make a list of each cable and record the connectors the cable is connected to, and use the record as a cabling checklist after installing the new upper processor board (CPU BD).**

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 233](#).
- b. Remove the upper processor board (CPU BD) air baffle. See [“Remove the upper processor board \(CPU BD\) air baffle” on page 71](#).
- c. If you are replacing the upper processor board (CPU BD), remove all the memory modules and PHMs from the upper processor board (CPU BD). See [“Remove a memory module” on page 146](#) and [“Remove a processor and heat sink” on page 188](#).

Important: To avoid component damage, **DO NOT** remove or install memory modules or PHMs when the upper processor board (CPU BD) is removed from the chassis.

Step 2. Disconnect the UPI module cables from the upper processor board (CPU BD).

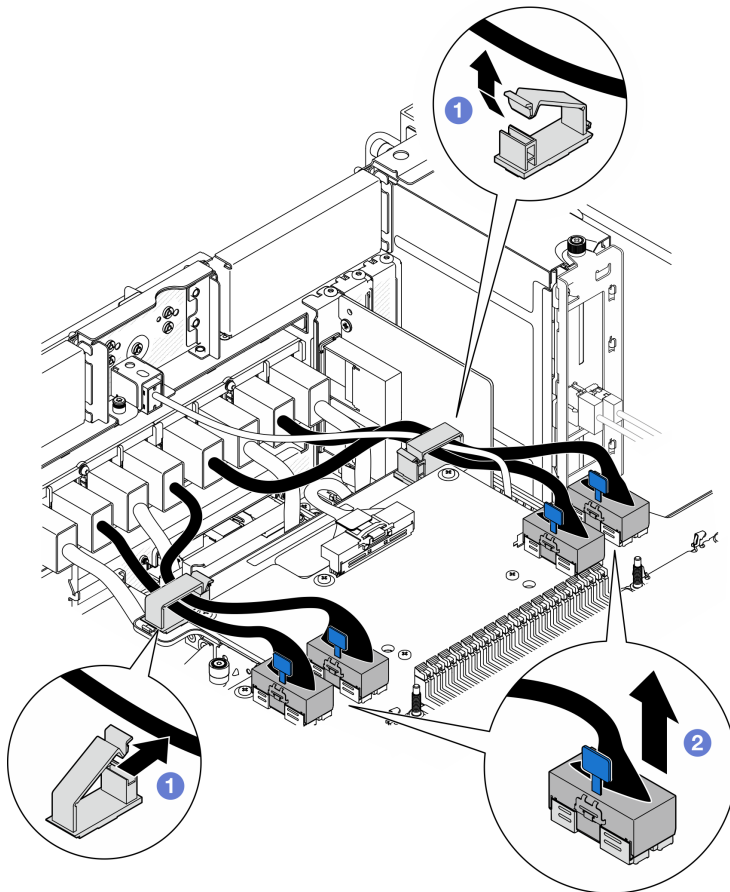


Figure 195. Disconnecting UPI module cables

- a. ① Open the cable clips and unhook the UPI module cables.
- b. ② Disconnect the UPI module cables from the upper processor board (CPU BD).

Step 3. Disconnect the internal sideband cable from the upper processor board (CPU BD) and lower processor board (MB).

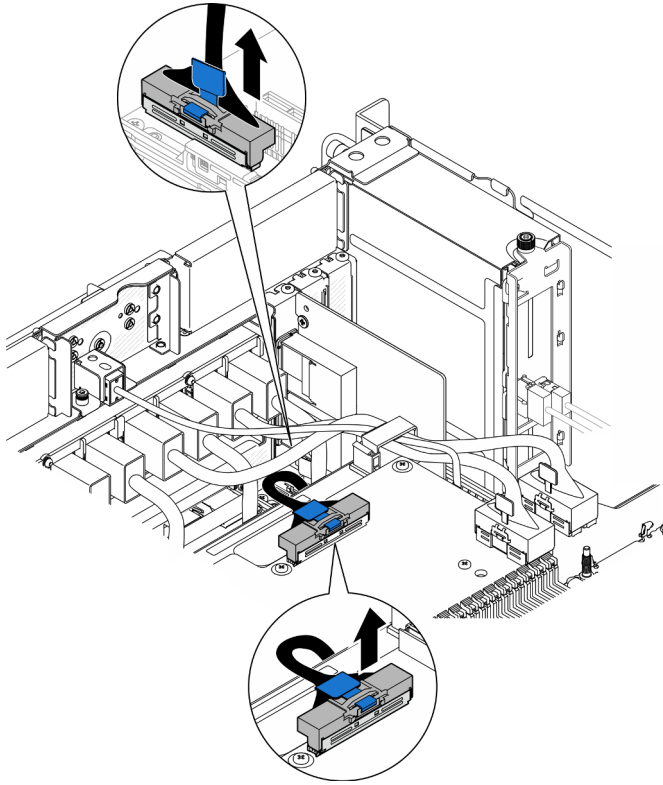


Figure 196. Disconnecting internal sideband cable

Step 4. Disconnect the internal UPI cables.

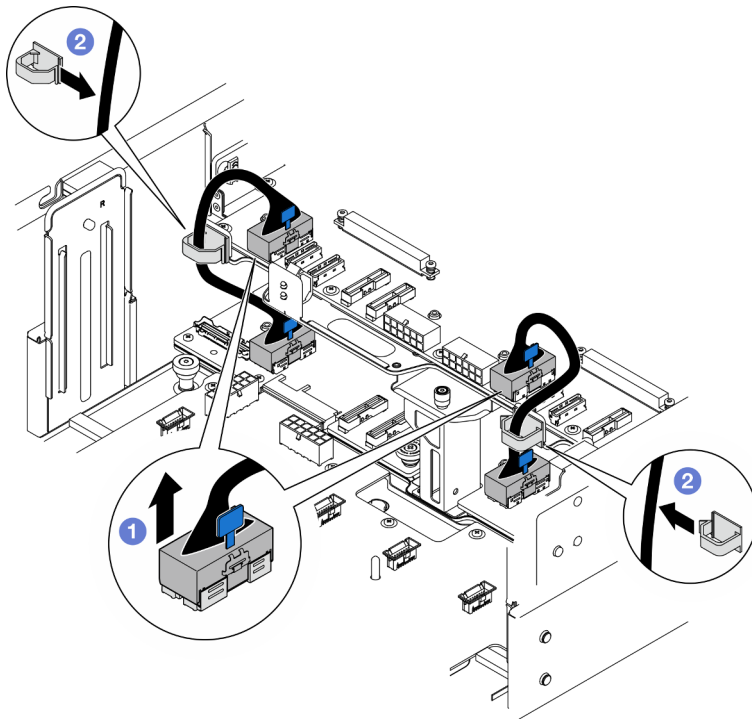


Figure 197. Disconnecting internal UPI cables

- a. ① Disconnect the internal UPI cables from the upper processor board (CPU BD).
- b. ② Lift the internal UPI cables from the cable clips.

Step 5. Disconnect the power cables from the upper processor board (CPU BD).

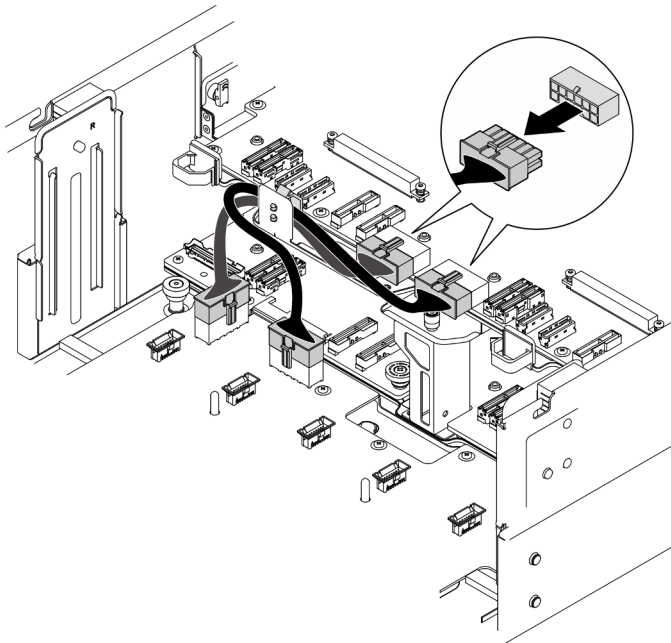


Figure 198. Disconnecting upper processor board (CPU BD) power cables

- Step 6. Make a list of each remaining cable and record the connectors the cable is connected to; then, disconnect and remove all the remaining cables on the upper processor board (CPU BD).
- Step 7. Disengage the upper processor board (CPU BD).

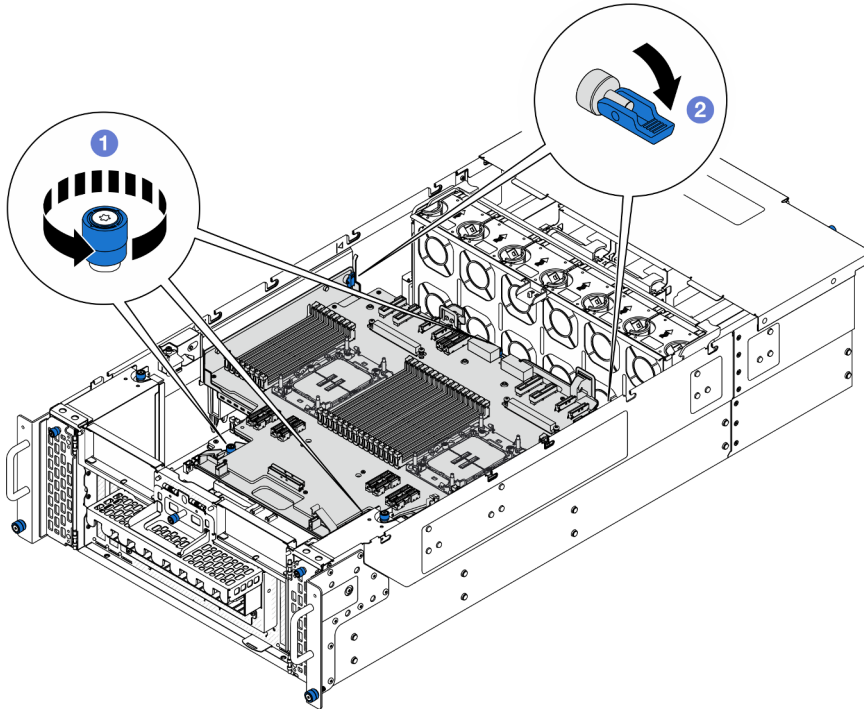


Figure 199. Disengaging upper processor board (CPU BD)

- a. ① Loosen the three thumbscrews. Use a screwdriver if needed.
- b. ② Open the plunger to the unlocked position.

Step 8. Grasp the blue handles and remove the upper processor board (CPU BD).

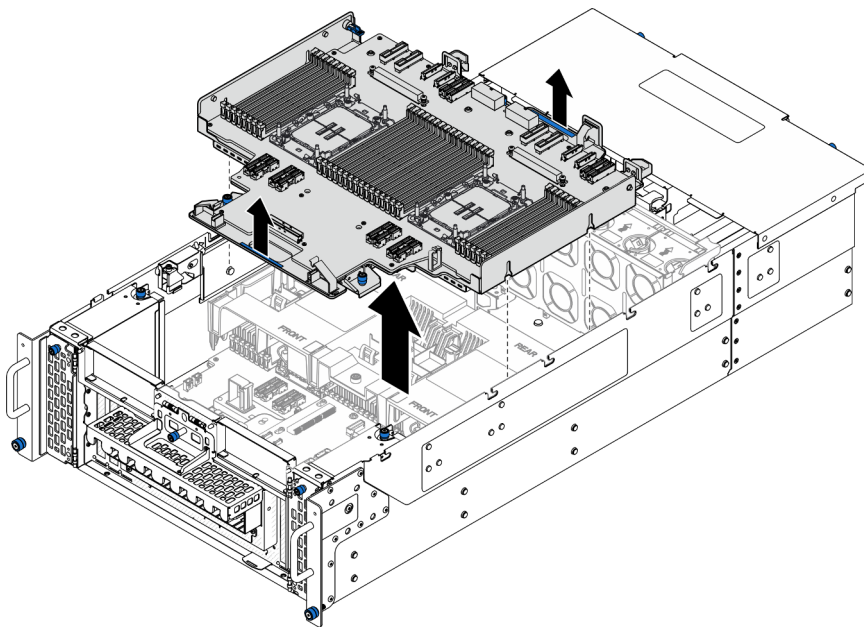


Figure 200. Removing upper processor board (CPU BD)

After you finish

1. Install a replacement unit. See [“Install the upper processor board \(CPU BD\)” on page 252](#).
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.

Important: Before you return the upper processor board (CPU BD), make sure that you install the processor socket covers from the new upper processor board (CPU BD). To replace a processor socket cover:

- a. Take a socket cover from the processor socket assembly on the new upper processor board (CPU BD) and orient it correctly above the processor socket assembly on the removed upper processor board (CPU BD).
 - b. Gently press down the socket 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 socket cover when it is securely attached.
 - c. **Make sure** that the socket cover is securely attached to the processor socket assembly.
3. If you plan to recycle the component, see [“Disassemble the upper processor board \(CPU BD\) for recycle” on page 319](#).

Demo video

[Watch the procedure on YouTube](#)

Install the upper processor board (CPU BD)

Follow the instructions in this section to install the upper processor board (CPU BD).

About this task

Attention:

- Read [“Installation Guidelines” on page 41](#) and [“Safety inspection checklist” on page 42](#) to ensure that you work safely.
- Power off the server and peripheral devices, disconnect the power cords from the **primary chassis**, then disconnect the power cords from the **secondary chassis**. See [“Power off the server” on page 50](#).
- 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 installed in a rack, remove the server from the rack. See [“Remove the server from rails” on page 50](#).

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to [“Update the firmware” on page 275](#) for more information on firmware updating tools.

Procedure

- Step 1. Grasp the blue handles and lower the upper processor board (CPU BD) into the chassis until the T-pins on the inside of the chassis engages with the upper processor board (CPU BD).

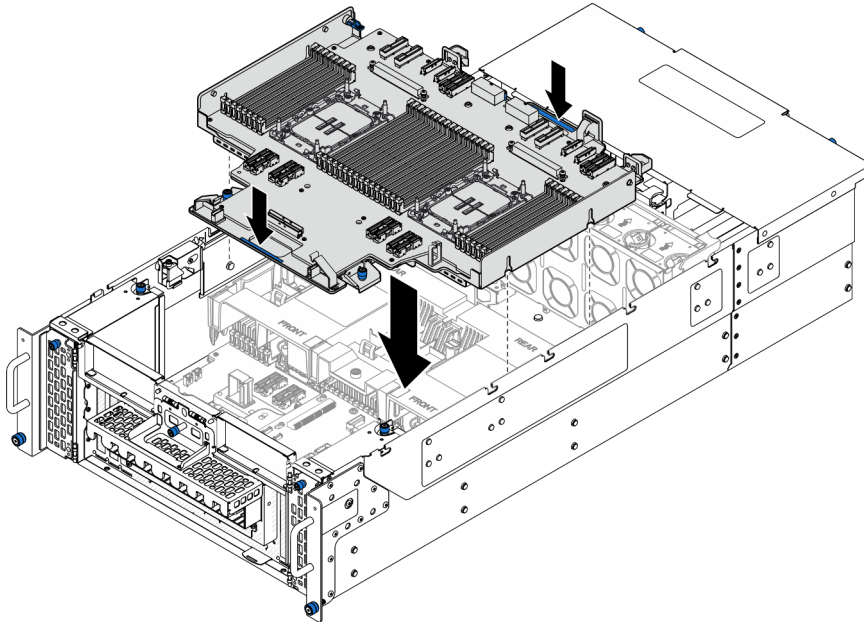


Figure 201. Installing upper processor board (CPU BD)

Step 2. Secure the upper processor board (CPU BD).

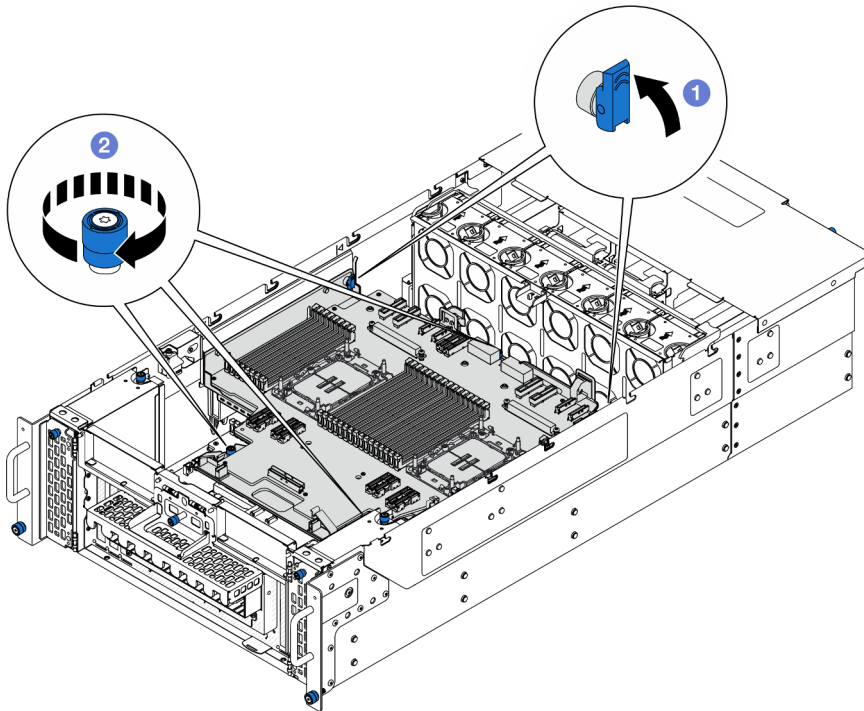


Figure 202. Securing upper processor board (CPU BD)

- a. 1 Close the plunger to the locked position.
- b. 2 Tighten the three thumbscrews. Use a screwdriver if needed.

Step 3. Connect the power cables to the upper processor board (CPU BD).

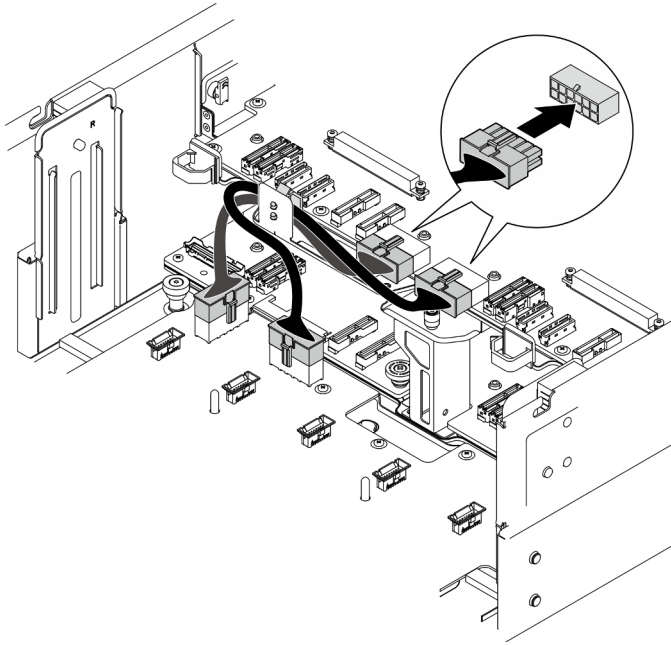


Figure 203. Connecting upper processor board (CPU BD) power cables

Step 4. Connect the internal UPI cables.

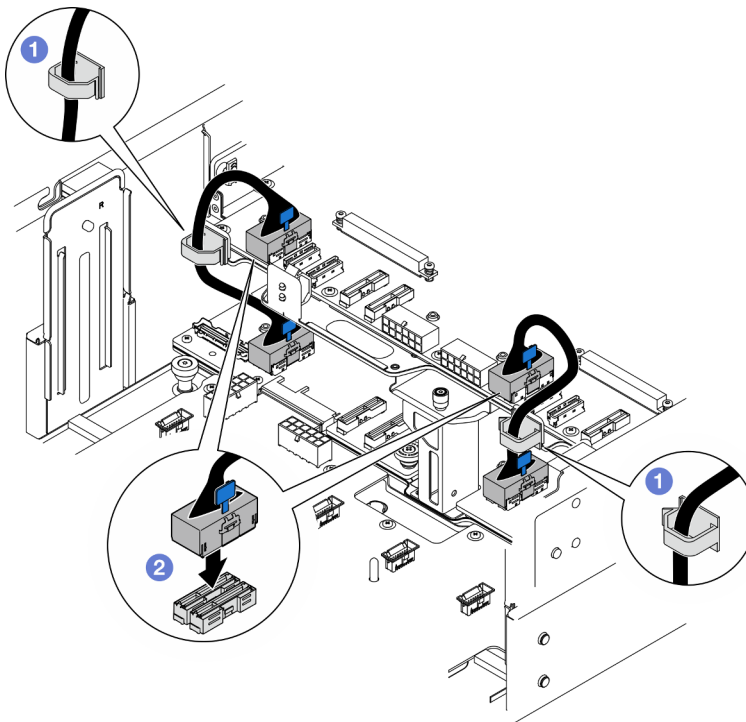


Figure 204. Connecting internal UPI cables

- a. ① Route the internal UPI cables through the cable clips.
- b. ② Connect the internal UPI cables to the upper processor board (CPU BD).

Step 5. Connect the internal sideband cable to the upper processor board (CPU BD) and lower processor board (MB).

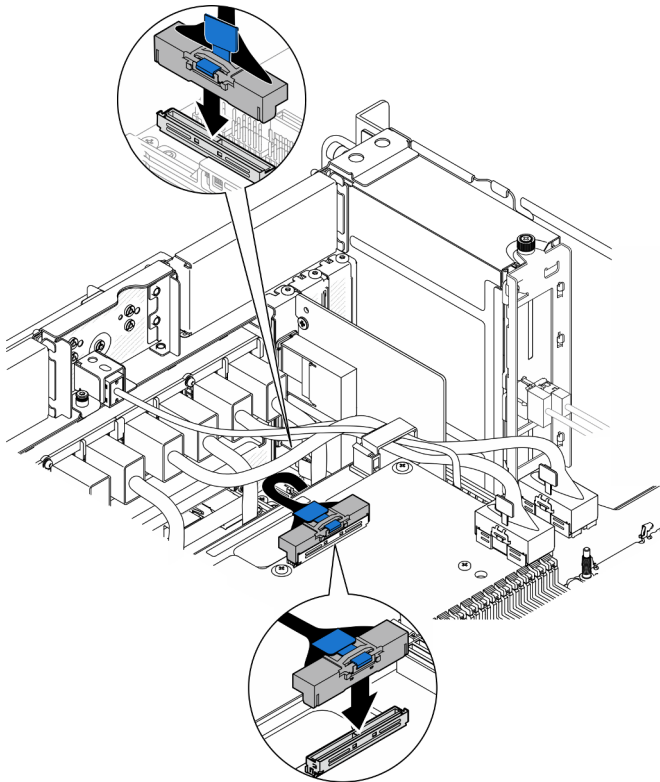


Figure 205. Connecting internal sideband cable

Step 6. Connect the UPI module cables.

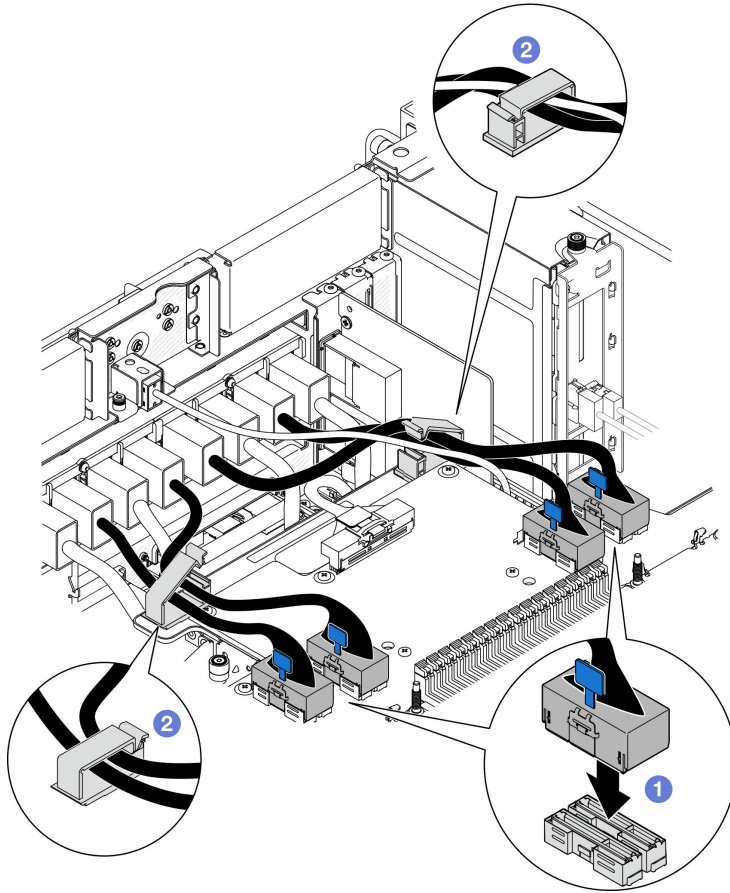


Figure 206. Connecting UPI module cables

- a. ① Connect the UPI module cables to the upper processor board (CPU BD).
- b. ② Route the UPI module cables through the cable clips and close them.

Step 7. Reconnect all the cables that were removed previously.

After you finish

1. If you replaced the upper processor board (CPU BD), reinstall all the memory modules and PHMs. See [“Install a memory module” on page 148](#) and [“Install a processor and heat sink” on page 194](#).
2. Reinstall the upper processor board (CPU BD) air baffle. See [“Install the upper processor board \(CPU BD\) air baffle” on page 73](#).
3. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
4. Complete the parts replacement. See [“Complete the parts replacement” on page 256](#).

Demo video

[Watch the procedure on YouTube](#)

Complete the parts replacement

Go through the checklist to complete parts replacement

To complete the parts replacement, do the following:

1. Ensure that all components have been reassembled correctly 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. Reinstall the air baffles. See “[Install the upper processor board \(CPU BD\) air baffle](#)” on page 73 and “[Install the lower processor board \(MB\) air baffle](#)” on page 76.

Attention: For proper cooling and airflow, reinstall the upper processor board (CPU BD) and lower processor board (MB) air baffles before you turn on the server. Operating the server with the air baffle removed might damage server components.

4. Reinstall the top cover. See “[Install the front top cover](#)” on page 239 and “[Install the rear top cover](#)” on page 236.
5. If the server was installed in a rack, reinstall the server into the rack. See “[Install the server to rails](#)” on page 59.
6. Reconnect the power cords to the **secondary chassis**, then reconnect the power cords to the **primary chassis**.

Note: It is recommended to connect PSU P1-P3/S1-S3 to a PDU different from PSU P4-P6/S4-S6 in case of PDU failure.

7. Reconnect all external cables that you removed.
8. Power on the server and any peripheral devices. See “[Power on the server](#)” on page 49.
9. Update the server configuration.
 - Download and install the latest device drivers: <http://datacentersupport.lenovo.com>.
 - Update the system firmware. See “[Update the firmware](#)” on page 275.
 - Update the UEFI configuration. See <https://pubs.lenovo.com/uefi-overview/>.
 - Reconfigure the disk arrays if you have installed or removed a hot-swap drive or a RAID adapter. See <https://pubs.lenovo.com/lxpm-overview/> for the LXPM documentation compatible with your server.

Chapter 6. Internal cable routing

See this section to do cable routing for specific components.

Note: Disengage all latches, release tabs, or locks on cable connectors when you disconnect cables from the upper processor board (CPU BD) or lower processor board (MB). Failing to release them before removing the cables will damage the cable sockets on the upper processor board (CPU BD) or lower processor board (MB), which are fragile. Any damage to the cable sockets might require replacing the upper processor board (CPU BD) or lower processor board (MB).

Identifying connectors

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

2.5-inch drive backplane connectors

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

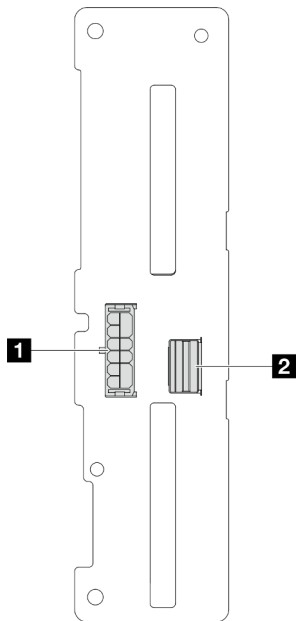


Figure 207. 2.5-inch drive backplane connectors

Table 20. 2.5-inch drive backplane connectors

1 Power connector	2 SAS / SATA connector
--------------------------	-------------------------------

Upper processor board (CPU BD) connectors for cable routing

The following illustrations show the internal connectors on the upper processor board (CPU BD) that are used for internal cable routing.

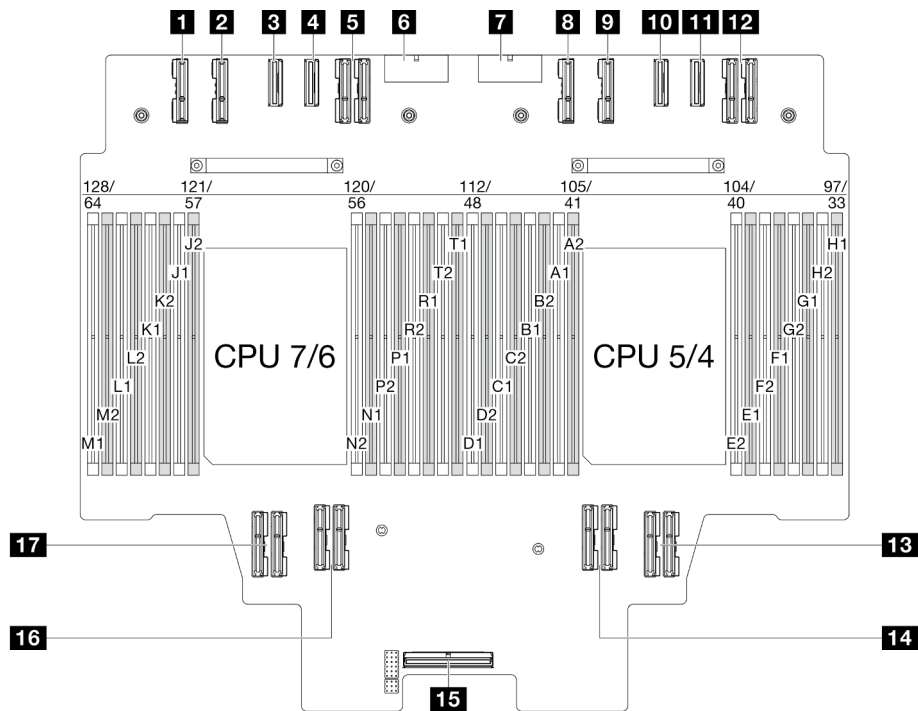


Figure 208. Upper processor board (CPU BD) connectors

Table 21. Upper processor board (CPU BD) connectors

1 PE4AB_L connector	10 PE3CD_R connector
2 PE4CD_L connector	11 PE3AB_R connector
3 PE3CD_L connector	12 UPI3_R connector
4 PE3AB_L connector	13 UPI1_R connector
5 UPI3_L connector	14 UPI0_R connector
6 PWR1 connector	15 Internal sideband connector
7 PWR2 connector	16 UPI1_L connector
8 PE4AB_R connector	17 UPI0_L connector
9 PE4CD_R connector	

System I/O board and interposer assembly connectors for cable routing

The following illustrations show the internal connectors on the System I/O board and interposer assembly that are used for internal cable routing.

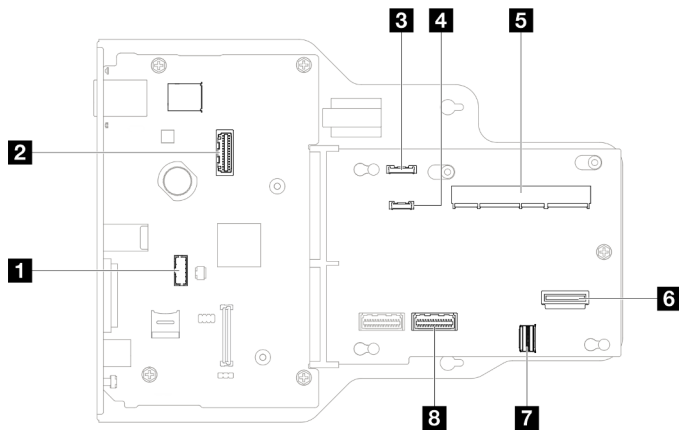


Figure 209. System I/O board and interposer assembly connectors

Table 22. System I/O board and interposer assembly connectors

1 Serial port module connector	5 SCM connector
2 Second management Ethernet connector	6 Rear OCP connector
3 Front operator panel connector	7 Rear Ethernet card connector
4 External diagnostics handset connector	8 PHY 2 connector

Lower processor board (MB) connectors for cable routing

The following illustrations show the internal connectors on the lower processor board (MB) that are used for internal cable routing.

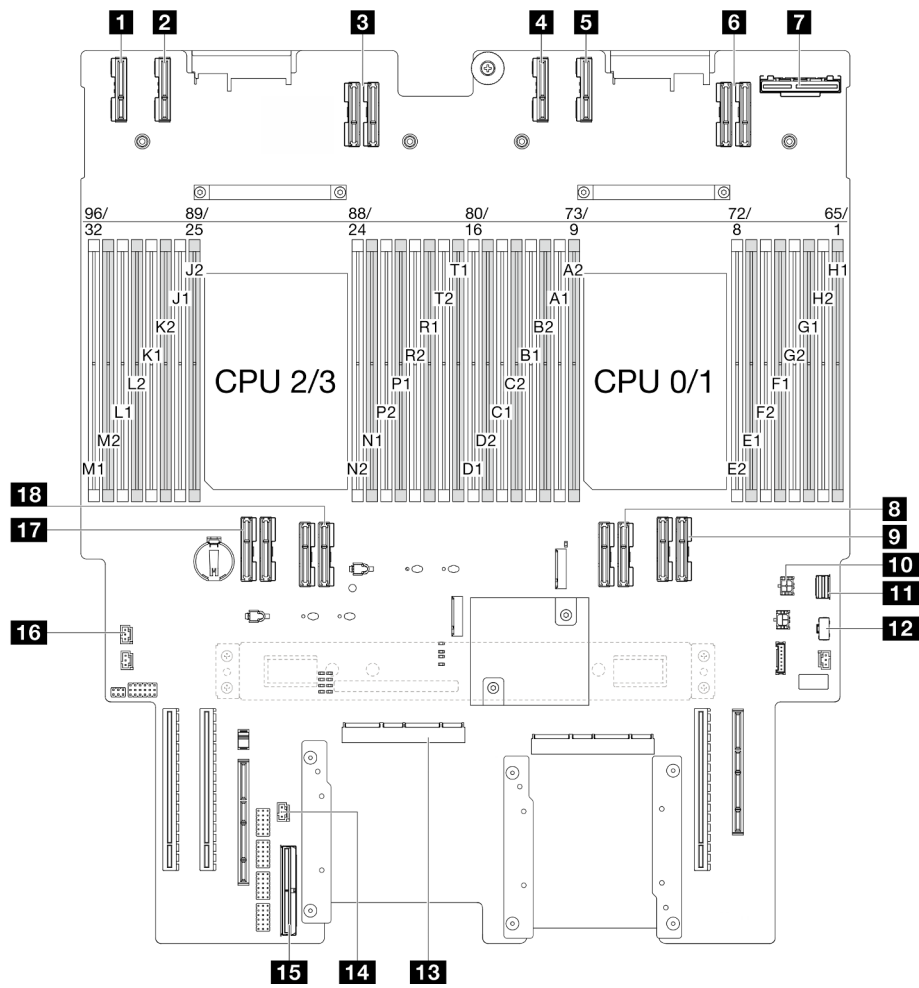


Figure 210. Lower processor board (MB) connectors

Table 23. Lower processor board (MB) connectors

1 PE4AB_L connector	10 Rear OCP power connector
2 PE4CD_L connector	11 M.2 signal connector
3 UPI3_L connector	12 M.2 power connector
4 PE4AB_R connector	13 SCM connector
5 PE4CD_R connector	14 UPI Intrusion connector
6 UPI3_R connector	15 Internal sideband connector
7 Rear OCP connector	16 Top cover intrusion connector
8 UPI0_R connector	17 UPI0_L connector
9 UPI1_R connector	18 UPI1_L connector

Power distribution board connectors

See this section to locate the connectors in the power distribution board.

Power distribution board connectors

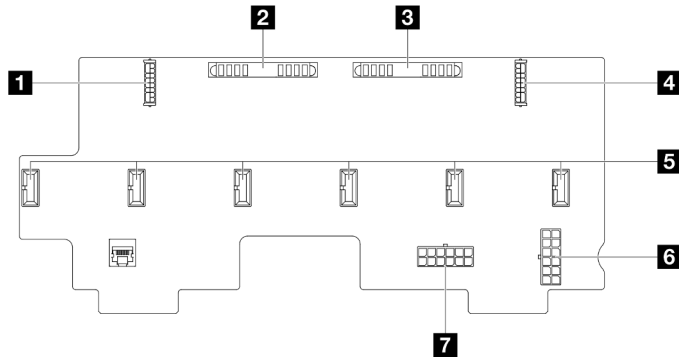


Figure 211. Power distribution board connectors

Table 24. Power distribution board connectors

1 Rear PCIe power 1 connector	5 Fan carrier connector 1-6
2 PIB1 connector	6 PWR2 connector
3 PIB2 connector	7 PWR1 connector
4 Rear PCIe power 2 connector	

PCIe riser connectors

See this section to locate the connectors in the PCIe riser.

PCIe riser connectors

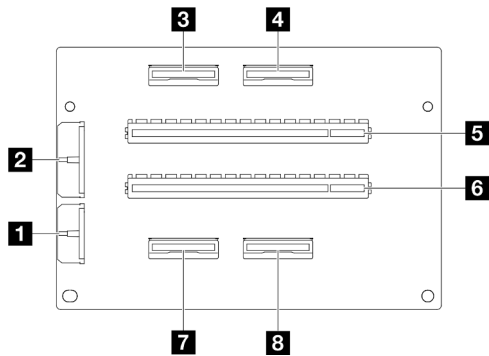


Table 25. PCIe riser connectors

1 Backplane power connector	5 PCIe x16 (Gen4 x8) slot 5/7
2 Riser power connector	6 PCIe x16 (Gen4 x8) slot 6/8
3 MCIO 4 connector	7 MCIO 2 connector
4 MCIO 3 connector	8 MCIO 1 connector

2.5-inch drive backplane cable routing

Use the section to understand the cable routing for the 2.5-inch drive backplane.

Notes:

- Connections between connectors; **1**↔**1**, **2**↔**2**, **3**↔**3**, ... **n**↔**n**
- When routing the cables, ensure that all cables are routed appropriately through the cable guides.

2.5-inch drive backplane power cable routing

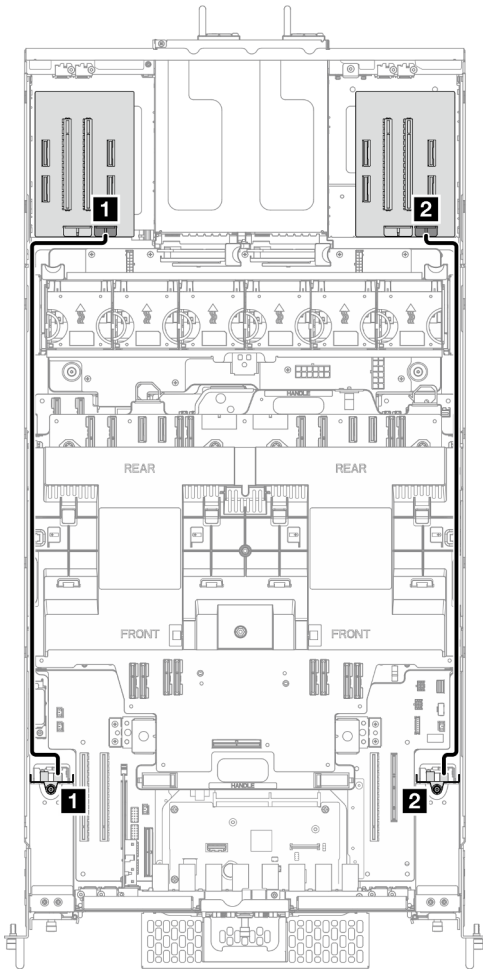


Figure 212. 2.5-inch drive backplane power cable routing

From	To	Cable
1 Drive backplane 1: Power connector	1 Left riser card: Backplane power connector	Power 2x6 pin to power 2x6 pin (720 mm)
2 Drive backplane 2: Power connector	2 Right riser card: Backplane power connector	Power 2x6 pin to power 2x6 pin (720 mm)

One 2.5-inch drive backplane cable routing

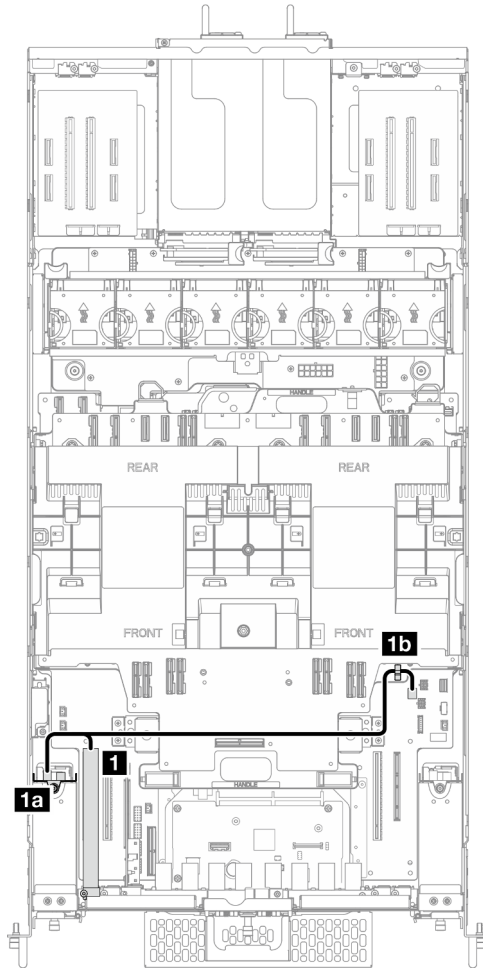


Figure 213. One 2.5-inch drive backplane cable routing

From	To	Cable
1 RAID/HBA adapter	1a Left drive backplane: Signal connector	SlimSAS x8 to 2 x SlimSAS x4 (270/590 mm)
	1b Cable clip on upper processor board (CPU BD) Note: This end of the cable is left unconnected.	

Two 2.5-inch drive backplane cable routing

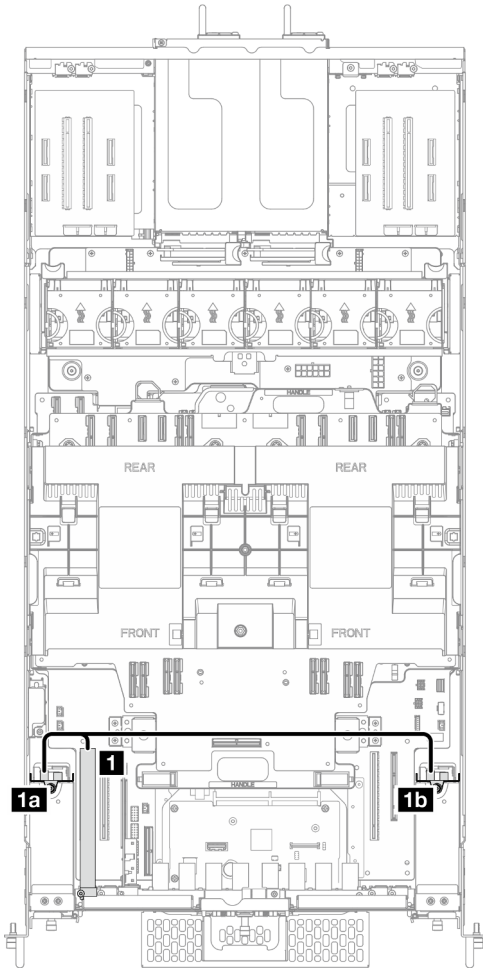


Figure 214. Two 2.5-inch drive backplane cable routing

From	To	Cable
1 RAID/HBA adapter	1a Left drive backplane: Signal connector	SlimSAS x8 to 2 x SlimSAS x4 (270/590 mm)
	1b Right drive backplane: Signal connector	

E3.S cable assembly cable routing

Use the section to understand the cable routing for the E3.S cable assembly.

Notes:

- Connections between connectors; **1**↔**1**, **2**↔**2**, **3**↔**3**, ... **n**↔**n**
- When routing the cables, ensure that all cables are routed appropriately through the cable guides.

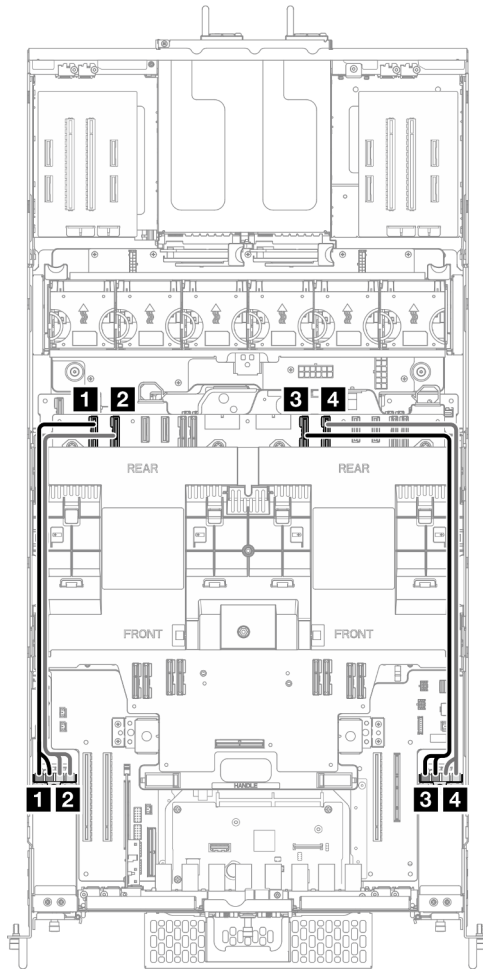


Figure 215. E3.S cable assembly cable routing

From	To
1 Left E3.S cable assembly: Drive 0/1 or 8/9	1 Upper processor board (CPU BD): PE4AB_L connector
2 Left E3.S cable assembly: Drive 2/3 or 10/11	2 Upper processor board (CPU BD): PE4CD_L connector
3 Right E3.S cable assembly: Drive 4/5 or 12/13	3 Upper processor board (CPU BD): PE4AB_R connector
4 Right E3.S cable assembly: Drive 6/7 or 14/15	4 Upper processor board (CPU BD): PE4CD_R connector

Ethernet port assembly cable routing

Use the section to understand the cable routing for the Ethernet port assembly.

Notes:

- Connections between connectors; **1** ↔ **1**, **2** ↔ **2**, **3** ↔ **3**, ... **n** ↔ **n**
- When routing the cables, ensure that all cables are routed appropriately through the cable guides.

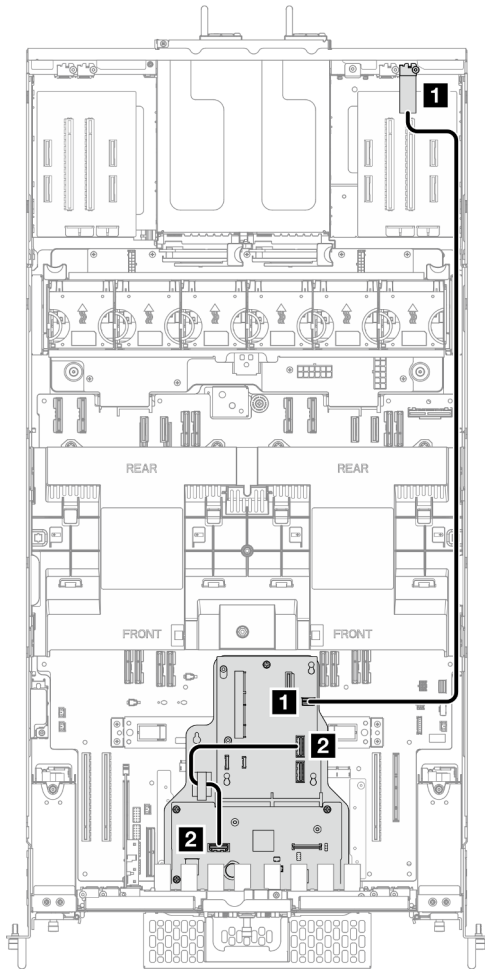


Figure 216. Ethernet port assembly cable routing

From	To	Cable
1 Ethernet port assembly	1 Interposer board: Rear Ethernet card connector	SlimSAS x4 to SlimSAS x4 (1000 mm)
2 System I/O board: System I/O board	2 Interposer board: PHY 2 connector	Internal interposer board (360 mm)

OCP cable routing

Use the section to understand the cable routing for the OCP module.

Notes:

- Connections between connectors; **1**↔**1**, **2**↔**2**, **3**↔**3**, ... **n**↔**n**
- When routing the cables, ensure that all cables are routed appropriately through the cable guides.

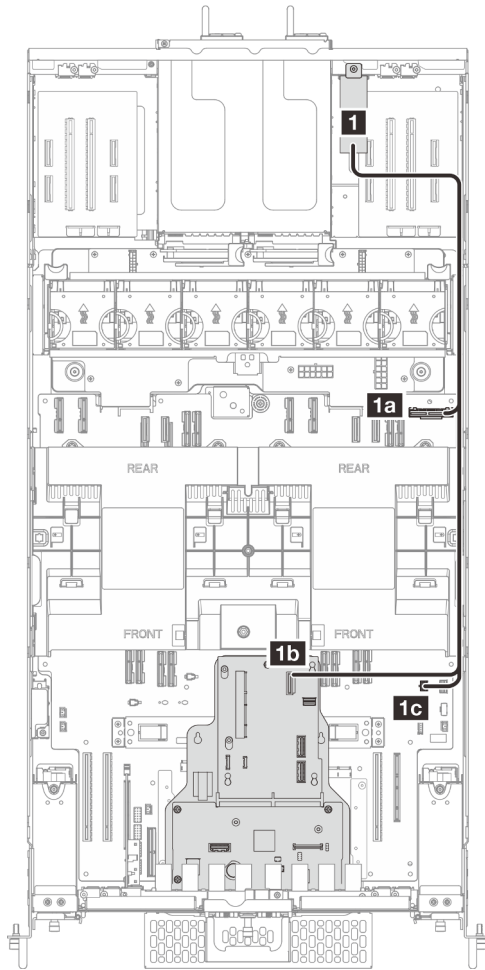


Figure 217. OCP cable routing

From	To	Cable
1 OCP cage	1a Lower processor board (MB): Rear OCP connector	Internal OCP (330/750/650 mm)
	1b Interposer board : Rear OCP connector	
	1c Lower processor board (MB): Rear OCP power connector	

Riser card cable routing

Use the section to understand the cable routing for the riser card.

Notes:

- Connections between connectors: **1**↔**1**, **2**↔**2**, **3**↔**3**, ... **n**↔**n**
- When routing the cables, ensure that all cables are routed appropriately through the cable guides.

Riser card power cable routing

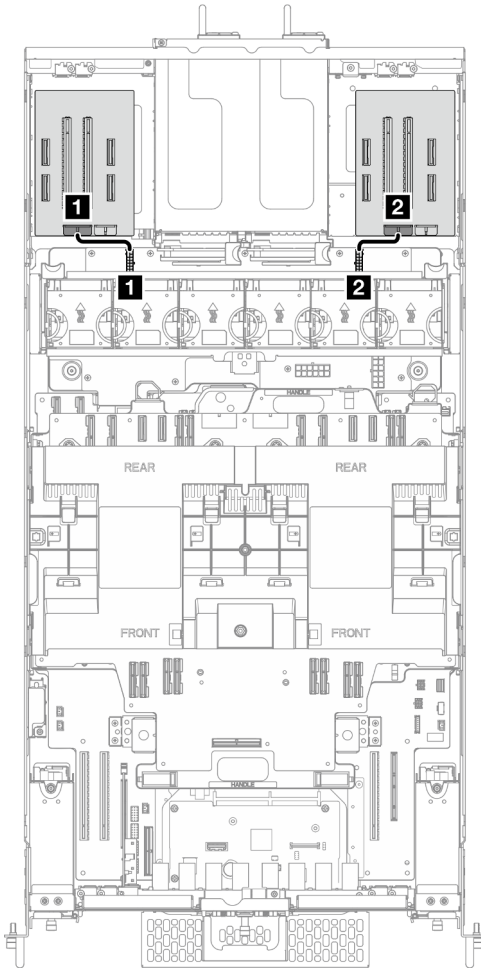
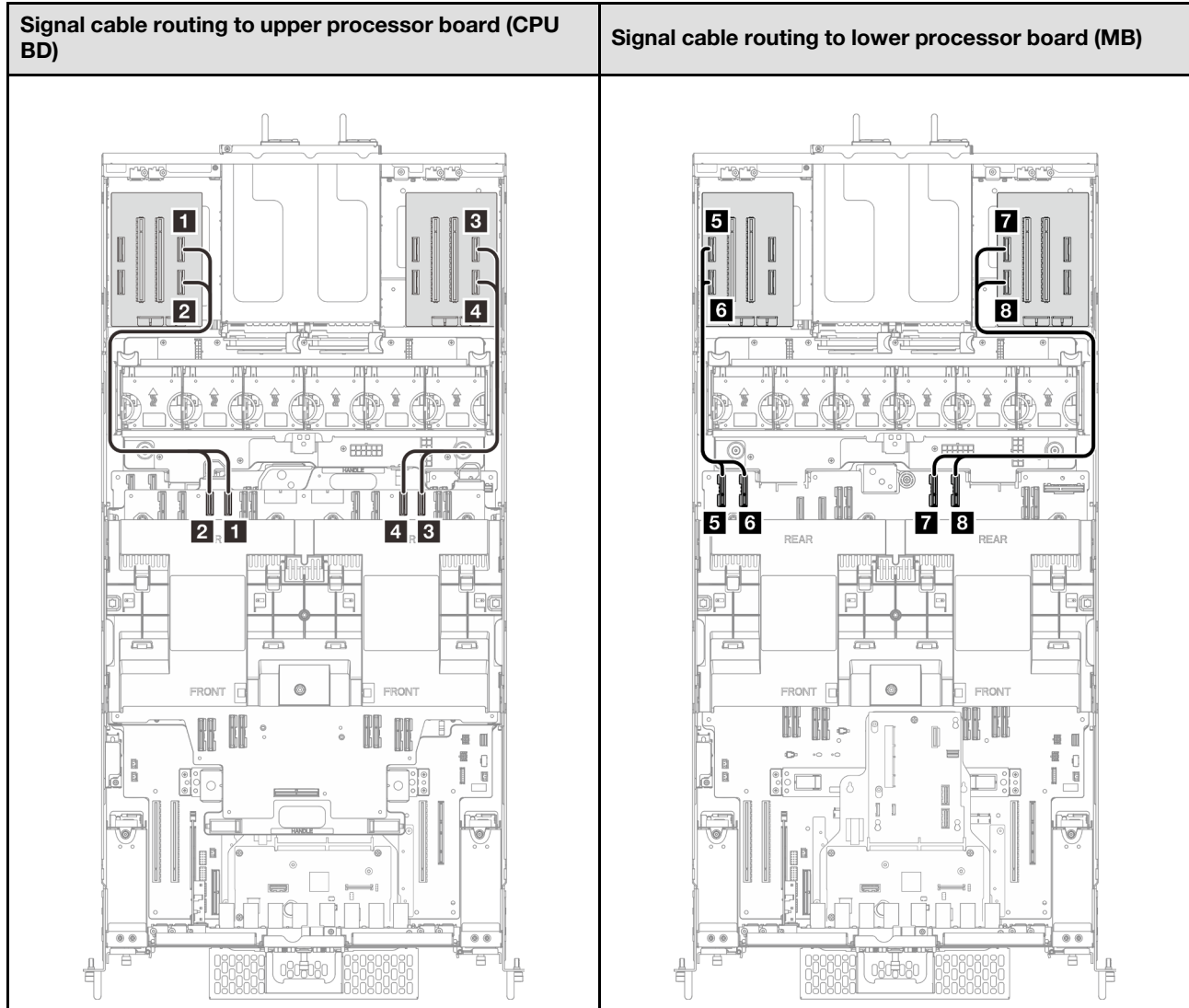


Figure 218. Riser card power cable routing

From	To	Cable
1 Left riser card: Riser power connector	PDB: Rear PCIe power 1 connector	Power 2x8 pin to power 2x8 pin (90 mm)
2 Right riser card: Riser power connector	PDB: Rear PCIe power 2 connector	Power 2x8 pin to power 2x8 pin (70 mm)

Riser card signal cable routing



From	To	Cable
1 Left riser card: MCIO 1 connector	Upper processor board (CPU BD): PE3AB_L connector	MCIO x8 to MCIO x8 (500 mm)
2 Left riser card: MCIO 2 connector	Upper processor board (CPU BD): PE3CD_L connector	MCIO x8 to MCIO x8 (500 mm)
3 Right riser card: MCIO 1 connector	Upper processor board (CPU BD): PE3AB_R connector	MCIO x8 to MCIO x8 (500 mm)
4 Right riser card: MCIO 2 connector	Upper processor board (CPU BD): PE3CD_R connector	MCIO x8 to MCIO x8 (500 mm)
5 Left riser card: MCIO 3 connector	Lower processor board (MB): PE4AB_L connector	Gen-Z 84 pin to MCIO x8 (500 mm)
6 Left riser card: MCIO 4 connector	Lower processor board (MB): PE4CD_L connector	Gen-Z 84 pin to MCIO x8 (500 mm)

From	To	Cable
7 Right riser card: MCIO 3 connector	Lower processor board (MB): PE4AB_R connector	Gen-Z 84 pin to MCIO x8 (500 mm)
8 Right riser card: MCIO 4 connector	Lower processor board (MB): PE4CD_R connector	Gen-Z 84 pin to MCIO x8 (500 mm)

Chapter 7. System configuration

Complete these procedures to configure your system.

Set the network connection for the Lenovo XClarity Controller

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

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

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

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

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

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

- If no monitor is attached to the server, you can set the network connection through the Lenovo XClarity Controller interface. Connect an Ethernet cable from your laptop to XCC system management port on your server. For the location of the XCC system management port, see [Chapter 2 “Server components” on page 13](#).

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

The default IPv4 address and the IPv6 Link Local Address (LLA) is provided on the Lenovo XClarity Controller Network Access label that is affixed to the Pull Out Information Tab. See [“Identify the server and access the Lenovo XClarity Controller” on page 35](#).

- If you are using the Lenovo XClarity Administrator Mobile app from a mobile device, you can connect to the Lenovo XClarity Controller through the Lenovo XClarity Controller USB connector on the server. For the location of the Lenovo XClarity Controller USB connector, see [Chapter 2 “Server components” on page 13](#).

Note: The Lenovo XClarity Controller USB connector mode must be set to manage the Lenovo XClarity Controller (instead of normal USB mode). To switch from normal mode to Lenovo XClarity Controller management mode, hold the ID button on the server for at least 3 seconds until its LED flashes slowly (once every couple of seconds). See [Chapter 2 “Server components” on page 13](#) for the location of the ID button.

To connect using the Lenovo XClarity Administrator Mobile app:

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

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

https://pubs.lenovo.com/lxca/lxca_usemobileapp

Set USB port for Lenovo XClarity Controller connection

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

Server support

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

- Refer to [Chapter 2 “Server components” on page 13](#).



- If there is a wrench icon on the USB port of your server, you can set the management USB port to connect to Lenovo XClarity Controller. It is also the only USB port that supports USB automation update of the firmware and RoT security module.

Setting the USB port for Lenovo XClarity Controller connection

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

- Hold the ID button for at least 3 second until its LED flashes slowly (once every couple of seconds). See [Chapter 2 “Server components” on page 13](#) for ID button location.
- From the Lenovo XClarity Controller management controller CLI, run the `usbfp` command. For information about using the Lenovo XClarity Controller CLI, see the “Command-line interface” section in the XCC documentation compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>.
- From the Lenovo XClarity Controller management controller web interface, click **BMC Configuration → Network → USB Management Port Assignment**. For information about Lenovo XClarity Controller web interface functions, see the “Description of XClarity Controller functions on web interface” section in the XCC documentation compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>.

Checking USB port current setting

You can also check the current setting of the USB port using the Lenovo XClarity Controller management controller CLI (`usbfp` command) or the Lenovo XClarity Controller management controller web interface (**BMC Configuration → Network → USB Management Port Assignment**). See the “Command-line

interface” and “Description of XClarity Controller functions on web interface” sections in the XCC documentation compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>.

Update the firmware

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

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

- Best practices related to updating firmware is available at the following site:
 - <https://lenovopress.lenovo.com/lp0656-lenovo-thinksystem-firmware-and-driver-update-best-practices>
- The latest firmware can be found at the following site:
 - <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/>
- You can subscribe to product notification to stay up to date on firmware updates:
 - <https://datacentersupport.lenovo.com/solutions/ht509500>

Update Bundles (Service Packs)

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

Update method terminology

- **In-band update.** The installation or update is performed using a tool or application within an operating system that is executing on the server’s core CPU.
- **Out-of-band update.** The installation or update is performed by the Lenovo XClarity Controller collecting the update and then directing the update to the target subsystem or device. Out-of-band updates have no dependency on an operating system executing on the core CPU. However, most out-of-band operations do require the server to be in the S0 (Working) power state.
- **On-Target update.** The installation or update is initiated from an installed operating system executing on the target server itself.
- **Off-Target update.** The installation or update is initiated from a computing device interacting directly with the server’s Lenovo XClarity Controller.
- **Update Bundles (Service Packs).** Update Bundles (Service Packs) are bundled updates designed and tested to provide the interdependent level of functionality, performance, and compatibility. Update Bundles (Service Packs) 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 Update Bundles (Service Packs) 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	Drive Firmware Updates	Graphical user interface	Command line interface	Supports Update Bundles (Service Packs)
Lenovo XClarity Provisioning Manager (LXPM)	In-band ² On-Target	√			√		
Lenovo XClarity Controller (XCC)	In-band ⁴ Out-of-band Off-Target	√	Selected I/O devices	√ ³	√		√
Lenovo XClarity Essentials OneCLI (OneCLI)	In-band Out-of-band On-Target Off-Target	√	All I/O devices	√ ³		√	√
Lenovo XClarity Essentials UpdateXpress (LXCE)	In-band Out-of-band On-Target Off-Target	√	All I/O devices		√		√
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		√		√

Tool	Update Methods Supported	Core System Firmware Updates	I/O Devices Firmware Updates	Drive Firmware Updates	Graphical user interface	Command line interface	Supports Update Bundles (Service Packs)
Lenovo XClarity Integrator (LXCI) for Microsoft System Center Configuration Manager	In-band On-Target	√	All I/O devices		√		√
Notes: <ol style="list-style-type: none"> For I/O firmware updates. For BMC and UEFI firmware updates. Drive firmware update is only supported by the tools and methods below: <ul style="list-style-type: none"> XCC Bare Metal Update (BMU): In-band, and requires system reboot. Lenovo XClarity Essentials OneCLI: <ul style="list-style-type: none"> For drives supported by ThinkSystem V2 and V3 products (legacy drives): In-band, and does not require system reboot. For drives supported only by ThinkSystem V3 products (new drives): Staging to XCC and complete the update with XCC BMU (In-band, and requires system reboot.). Bare Metal Update (BMU) only. 							

- **Lenovo XClarity Provisioning Manager**

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

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

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

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

- **Lenovo XClarity Controller**

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

Notes:

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

For additional information about configuring Ethernet over USB, see:

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

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

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

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

- **Lenovo XClarity Essentials OneCLI**

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

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

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

- **Lenovo XClarity Essentials UpdateXpress**

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

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

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

- **Lenovo XClarity Essentials Bootable Media Creator**

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

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

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

- **Lenovo XClarity Administrator**

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

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

https://pubs.lenovo.com/lxca/update_fw

- **Lenovo XClarity Integrator offerings**

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

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

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

Configure the firmware

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

Important: Lenovo does not recommend setting option ROMs to **Legacy**, but you can conduct this setting if necessary. Note that this setting prevents UEFI drivers for the slot devices from loading, which may cause negative side effects to Lenovo software, such as LXCA, OneCLI, and XCC. These side effects include but

are not limited to the inability to determine adapter card details, such as model name and firmware levels. For example, "ThinkSystem RAID 930-16i 4GB Flash" may be displayed as "Adapter 06:00:00". In some cases, the functionality on a specific PCIe adapter may not be enabled properly.

- **Lenovo XClarity Provisioning Manager (LXPM)**

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

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

See the following documentations for more information:

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

- **Lenovo XClarity Essentials OneCLI**

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

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

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

- **Lenovo XClarity Administrator**

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

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

https://pubs.lenovo.com/lxca/server_configuring

- **Lenovo XClarity Controller**

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

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

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

Memory module configuration

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

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

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

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

https://dcsc.lenovo.com/#/memory_configuration

Enable Software Guard Extensions (SGX)

Intel® Software Guard Extensions (Intel® SGX) operates under the assumption that the security perimeter includes only the internals of the CPU package, and leaves the DRAM untrusted.

Complete the following steps to enable SGX.

- Step 1. **Make sure** to refer to “[Memory module installation rules and order](#)” on page 44, which specifies whether your server supports SGX and lists the memory module population sequence for SGX configuration. (DIMM configuration must be at least 8 DIMMs per socket to support SGX.)
- Step 2. Restart the system. Before the operating system starts up, press the key specified in the on-screen instructions to enter 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/>.)
- Step 3. Go to **System settings** → **Processors** → **UMA-Based Clustering** and disable the option.
- Step 4. Go to **System settings** → **Processors** → **Total Memory Encryption (TME)** and enable the option.
- Step 5. Save the changes, then go to **System settings** → **Processors** → **SW Guard Extension (SGX)** and enable the option.

RAID configuration

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

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

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

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

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

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

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

Intel VROC

Enabling Intel VROC

Before setting up RAID for NVMe drives, follow the below steps to enable VROC:

1. Restart the system. Before the operating system starts up, press the key specified in the on-screen instructions to enter 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/>.)
2. Go to **System settings → Devices and I/O Ports → Intel® VMD technology → Enable/Disable Intel® VMD** and enable the option.
3. Save the changes and reboot the system.

Intel VROC configurations

Intel offers various VROC configurations with different RAID level and SSD support. See the following for more details.

Notes:

- Supported RAID levels varies by model. For the RAID level supported by SR950 V3, see [Technical specifications](#).
- For more information about acquiring and installing the activation key, see <https://fod.lenovo.com/lkms>.

Intel VROC configurations for PCIe NVMe SSDs	Requirements
Intel VROC Standard	<ul style="list-style-type: none"> • Supports RAID levels 0, 1, and 10 • Requires an activation key
Intel VROC Premium	<ul style="list-style-type: none"> • Supports RAID levels 0, 1, 5, and 10 • Requires an activation key
Bootable RAID	<ul style="list-style-type: none"> • RAID 1 only • 5th Gen Intel® Xeon® Scalable processors (formerly codenamed as Emerald Rapids, EMR)
Intel VROC configurations for SATA SSDs	Requirements
Intel VROC SATA RAID	<ul style="list-style-type: none"> • Supports RAID levels 0, 1, 5, and 10.

Deploy the operating system

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

Available operating systems

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

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

Tool-based deployment

• Multi-server

Available tools:

- Lenovo XClarity Administrator
https://pubs.lenovo.com/lxca/compute_node_image_deployment
- Lenovo XClarity Essentials OneCLI

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

- Lenovo XClarity Integrator deployment pack for SCCM (for Windows operating system only)
https://pubs.lenovo.com/lxci-deploypack-sccm/dpsccm_c_endtoend_deploy_scenario

- **Single-server**

Available tools:

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

Manual deployment

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

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

Back up the server configuration

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

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

- **Management processor**

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

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

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

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

- **Operating system**

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

Chapter 8. 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.

Web resources

- **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 on **How To's** from the navigation pane.
3. Click **Article Type** → **Solution** from the drop-down menu.

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

- **Lenovo Data Center Forum**

- Check https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv_eg to see if someone else has encountered a similar problem.

Event logs

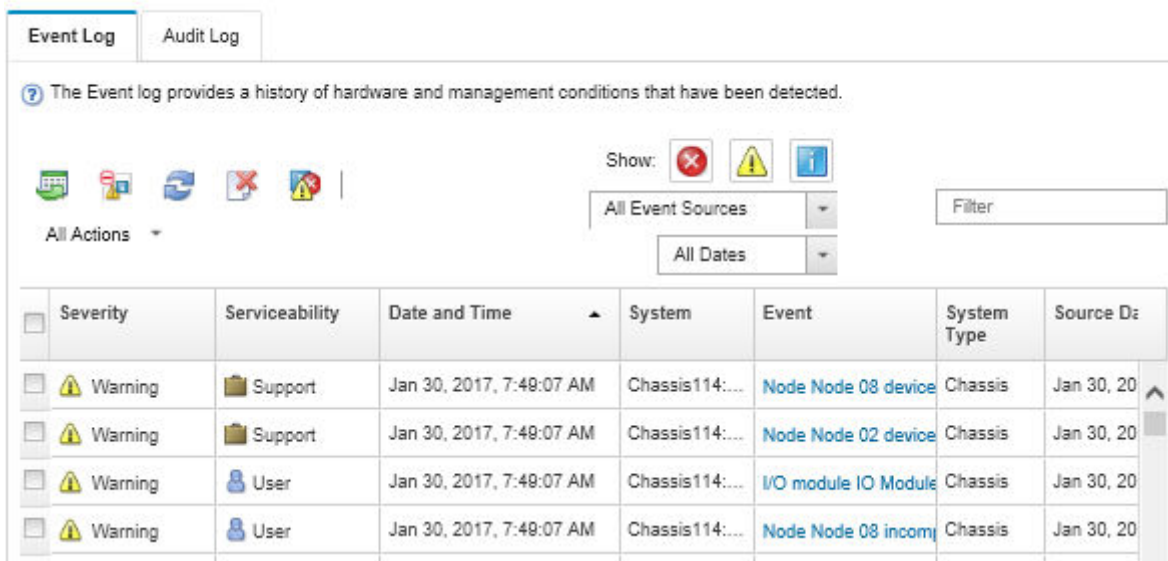
An *alert* is a message or other indication that signals an event or an impending event. Alerts are generated by the Lenovo XClarity Controller or by UEFI in the servers. These alerts are stored in the Lenovo XClarity Controller Event Log. If the server is managed by the Chassis Management Module 2 or 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/sr860v3/pdf_files.html.




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 219. Lenovo XClarity Administrator event log

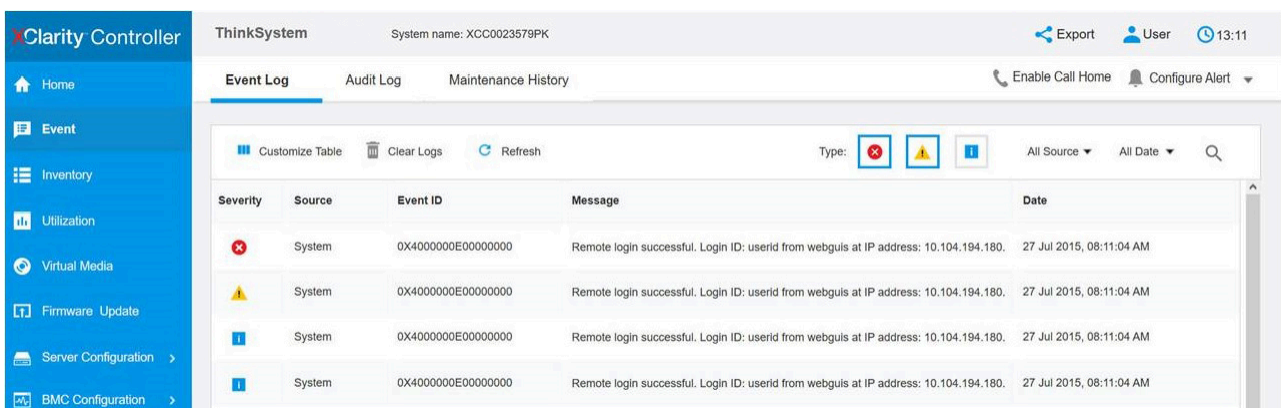
For more information about working with events from XClarity Administrator, see:

https://pubs.lenovo.com/lxca/events_vieweventlog

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 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 220. 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/>

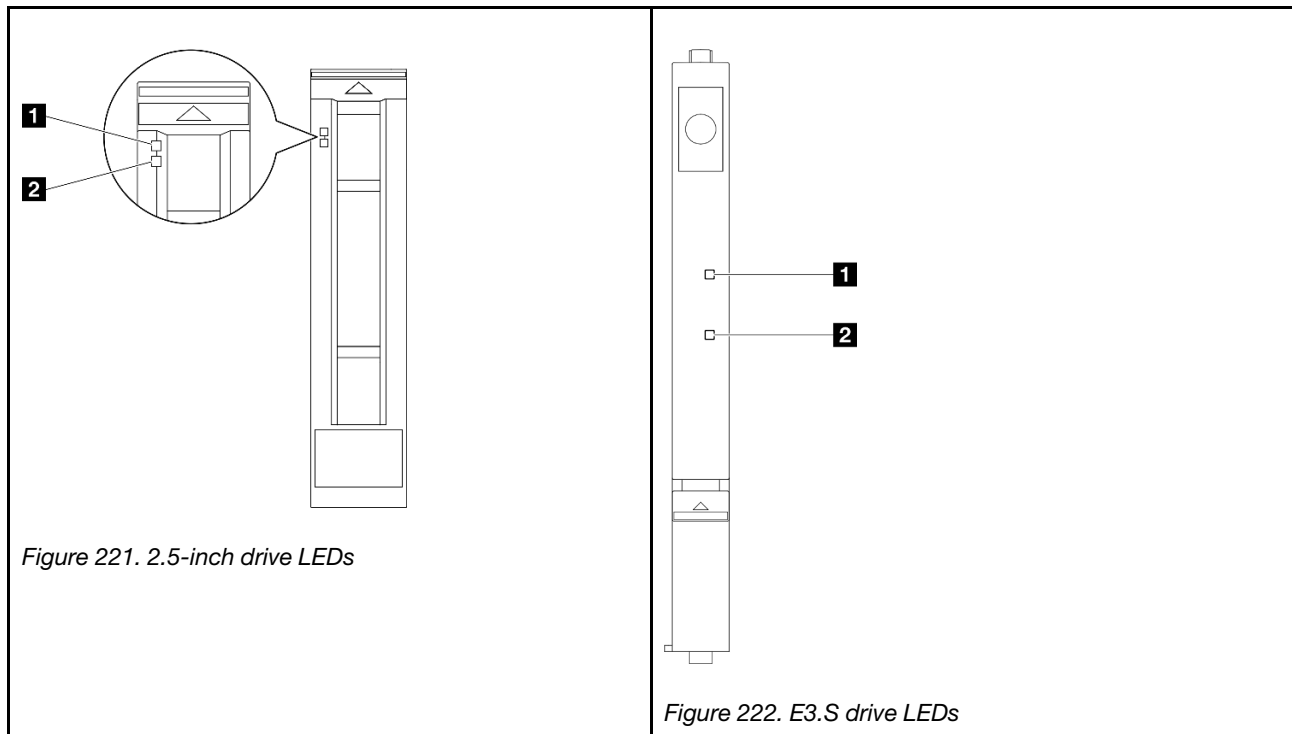
Troubleshooting by system LEDs and diagnostics display

See the following section for information on available system LEDs and diagnostics display.

Drive LEDs

This topic provides information on drive LEDs.

The following table describes the problems that are indicated by drive activity LED and drive status LED.



LED	Description
1 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.
2 Drive status LED (yellow)	The drive status LED indicates the following status: <ul style="list-style-type: none"> 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.

Front operator panel LEDs

This topic provides information on the front operator panel LEDs.

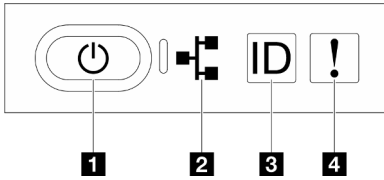


Figure 223. Front operator panel LEDs

Table 26. Front operator panel LEDs

1 Power button/LED (green)	3 System ID button/LED (blue)
2 Network Activity LED (green)	4 System error LED (yellow)

1 Power button/LED (green)

Press this button to turn the server on and off manually. The states of the power LED are as follows:

Status	Color	Description
Off	None	Power is not present, or the power supply has failed.
Fast blinking (about four flashes per second)	Green	<ul style="list-style-type: none"> The server is off, but the XClarity Controller is initializing, and the server is not ready to be powered on. System-board-assembly power has failed.
Slow blinking (about one flash per second)	Green	The server is off and is ready to be powered on (standby state).
Solid on	Green	The server is on and running.

2 Network Activity LED (green)

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

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

3 System ID button/LED (blue)

Use this system ID button and the blue system ID LED to visually locate the server. Each time you press the system ID button, the state of the system ID LED changes. The LED can be changed to on, blinking, or off. You can also use the Lenovo XClarity Controller or a remote management program to change the state of the system ID LED to assist in visually locating the server among other servers.

4 System error LED (yellow)

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

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

Power supply LEDs

This topic provides information about various power supply LED status and corresponding action suggestions.

The following minimal configuration is required for the server to start:

- Two processors on primary chassis lower processor board (MB)
- One DRAM DIMM in slot A1 on primary chassis lower processor board (MB)
- One power supply
- One M.2 drive in M.2#1 Slot (if OS is needed for debugging)

Note: Depending on the power supply type, your power supply might look slightly different from the following illustration.

CFFv4 power supply LEDs

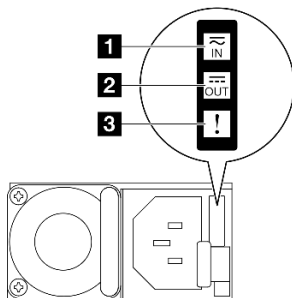


Figure 224. Power supply LEDs

LED	Description
1 Input status	<p>The input status LED can be in one of the following states:</p> <ul style="list-style-type: none"> • Off: The power supply is disconnected from the AC power source. • Green: The power supply is connected to the AC power source.
2 Output status	<p>The output status LED can be in one of the following states:</p> <ul style="list-style-type: none"> • Off: The server is powered off, or the power supply is not working properly. If the server is powered on but the output status LED is off, replace the power supply. • Slow blinking green (about one flash every two seconds): The power supply is in cold redundancy active mode. • Fast blinking green (about 2 flashes each second): The power supply is in cold redundancy sleep mode. • Green: The server is on and the power supply is working normally.
3 Fault LED	<ul style="list-style-type: none"> • Off: The power supply is working normally • Amber: The power supply may have failed. Dump the FFDC log from the system and contact Lenovo back end support team for PSU data log reviewing.

Upper processor board (CPU BD) LEDs

The following illustrations show the light-emitting diodes (LEDs) on the upper processor board (CPU BD).

Press the power button to light the LEDs on the upper processor board (CPU BD) when the power source has been removed from the server.

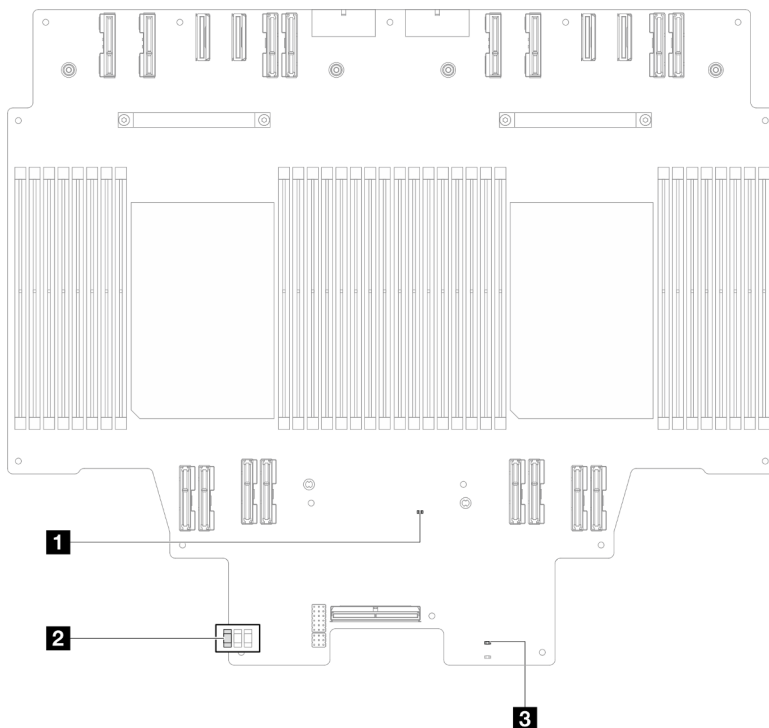


Figure 225. Upper processor board (CPU BD) LEDs

Table 27. Upper processor board (CPU BD) LEDs

LED	Description and actions
1 FPGA heartbeat LED (Green)	<ul style="list-style-type: none"> Blinking (about one flash per second): FPGA is working normally. On or off: FPGA is not working. <ol style="list-style-type: none"> Replace the lower processor board (MB). If the problem remains, contact Lenovo Support.
2 P5V_AUX status LED (Green)	<ul style="list-style-type: none"> On: P5V_AUX power is present. Off: P5V_AUX is not ready.
3 Power fault LED (Amber)	<ul style="list-style-type: none"> Off: System normal. Blinking (about one flash per second): System fault occurred. <ol style="list-style-type: none"> Check the power supply unit (PSU), power interposer board, and power distribution board. If the PSU, power interposer board, or power distribution board has any error, replace it. If the PSU, power interposer board, and power distribution board is error free, replace the upper processor board (CPU BD).

System I/O board LEDs

The following illustrations show the light-emitting diodes (LEDs) on the system I/O board.

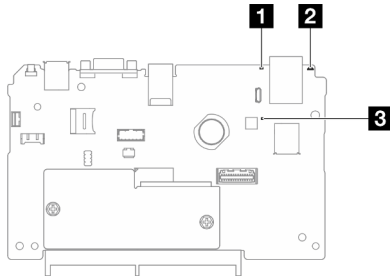


Figure 226. System I/O board LEDs

Table 28. System I/O board LEDs

LED	Description	Action
1 System error LED (yellow)	LED on: an error has been detected on the server. Causes might include one or more of the following errors: <ul style="list-style-type: none"> • The temperature of the server reached the non-critical temperature threshold. • The voltage of the server reached the non-critical voltage threshold. • A fan has been detected to be running at low speed. • The power supply has a critical error. • The power supply is not connected to the power. 	Check system logs or internal error LEDs to identify the failed part.
2 System ID LED (blue)	This LED helps you to visually locate the server.	A system ID button with LED is also located on the front of the server. You can press the system ID button to turn on/off or blink the front and rear ID LEDs.
3 XCC heartbeat LED (green)	The XCC heartbeat LED helps you identify the XCC status. <ul style="list-style-type: none"> • Blinking (about one flash per second) : XCC is working normally. • Blinking at other speeds or always on: XCC is at the initial phase or is working abnormally. • Off: XCC is not working. 	If the XCC heartbeat LED is always off or always on, do the following: <ul style="list-style-type: none"> • If XCC cannot be accessed: <ol style="list-style-type: none"> 1. Re-plug the power cord. 2. Check and ensure that the system I/O board and the firmware and RoT security module are installed correctly. (Trained technician only) Reinstall them if needed. 3. (Trained technician only) Replace the firmware and RoT security module. 4. (Trained technician only) Replace the system I/O board. • If XCC can be accessed, replace the system I/O board. If the XCC heartbeat LED is always blinking fast over 5 minutes, do the following: <ol style="list-style-type: none"> 1. Re-plug the power cord. 2. Check and ensure that the system I/O board and the firmware and RoT security module are installed correctly. (Trained technician only) Reinstall them if needed. 3. (Trained technician only) Replace the firmware and RoT security module. 4. (Trained technician only) Replace the system I/O board.

Table 28. System I/O board LEDs (continued)

LED	Description	Action
		<p>If the XCC heartbeat LED is always blinking slow for over 5 minutes, do the following:</p> <ol style="list-style-type: none"> 1. Re-plug the power cord. 2. Check and ensure that the system I/O board and the firmware and RoT security module are installed correctly. (Trained technician only) Reinstall them if needed. 3. If the problem remains, contact Lenovo Support.

Lower processor board (MB) LEDs

The following illustrations show the light-emitting diodes (LEDs) on the lower processor board (MB).

Press the power button to light the LEDs on the lower processor board (MB) when the power source has been removed from the server.

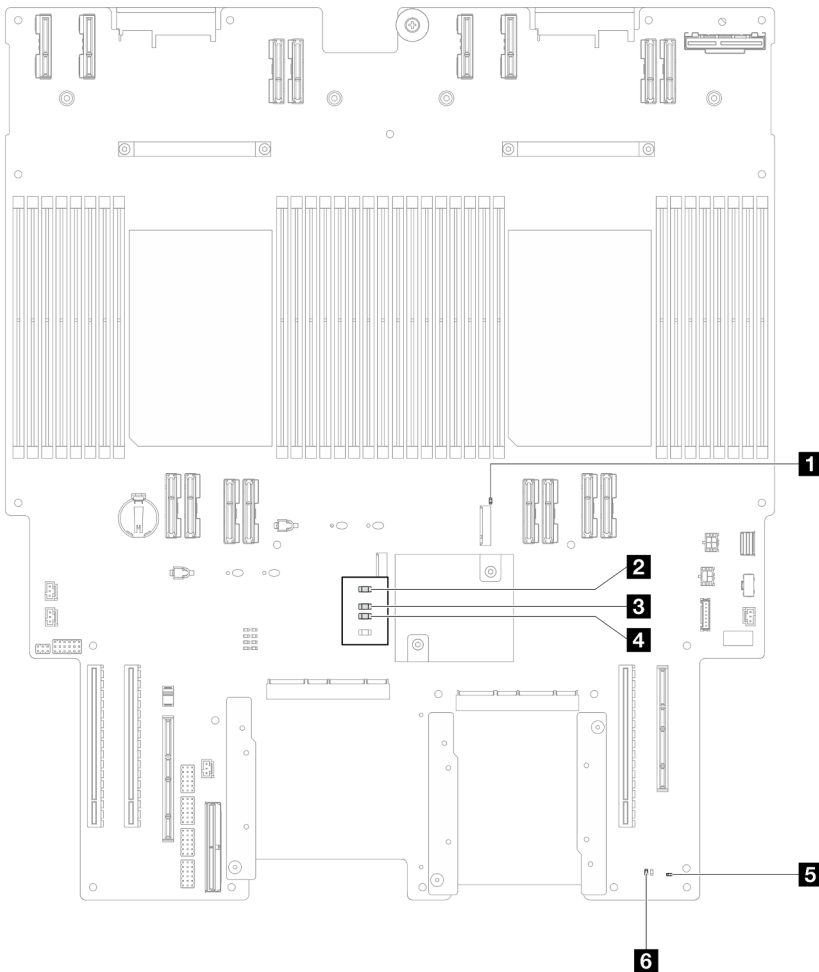


Figure 227. Lower processor board (MB) LEDs

Table 29. Lower processor board (MB) LEDs

LED	Description and actions
1 M.2 Slot 2 activity LED (Green)	<ul style="list-style-type: none"> On: M.2 Slot 2 active. Off: M.2 Slot 2 not active.
2 M.2 Slot 1 activity LED (Green)	<ul style="list-style-type: none"> On: M.2 Slot 1 active. Off: M.2 Slot 1 not active.
3 FPGA heartbeat LED (Green)	<ul style="list-style-type: none"> Blinking (about one flash per second): FPGA is working normally. On or off: FPGA is not working. <ol style="list-style-type: none"> Replace the lower processor board (MB). If the problem remains, contact Lenovo Support.
4 Power fault LED (Amber)	<ul style="list-style-type: none"> Off: System normal. Blinking (about one flash per second): System fault occurred. <ol style="list-style-type: none"> Check the power supply unit (PSU), power interposer board, and power distribution board. If the PSU, power interposer board, or power distribution board has any error, replace it. If the PSU, power interposer board, and power distribution board is error free, replace the lower processor board (MB).
5 ME heartbeat LED (Green)	<ul style="list-style-type: none"> Blinking (about one flash per second): System normal. OFF: System fault occurred.
6 P5V_AUX status LED (Green)	<ul style="list-style-type: none"> On: P5V_AUX power is present. Off: P5V_AUX is not ready.

Firmware and RoT Security Module LEDs

The following illustrations show the light-emitting diodes (LEDs) on the ThinkSystem V3 Firmware and Root of Trust Security Module (Firmware and RoT Security Module).

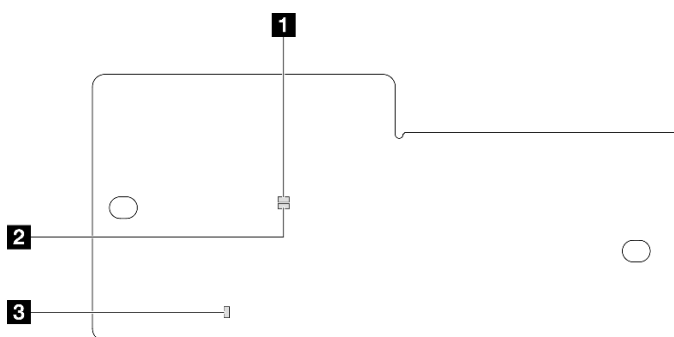


Figure 228. LEDs on the Firmware and RoT Security Module

1 AP0 LED (Green)	2 AP1 LED (Green)	3 Fatal Error LED (Amber)
--------------------------	--------------------------	----------------------------------

Table 30. LEDs description

Scenario	AP0 LED	AP1 LED	Fatal Error LED	FPGA heart-beat LED ^{note}	XCC heart-beat LED ^{note}	Actions
RoT security module fatal firmware failure	Off	Off	On	N/A	N/A	Replace the Firmware and RoT Security Module.
	Blink	N/A	On	N/A	N/A	Replace the Firmware and RoT Security Module.
	Blink	N/A	On	On	N/A	Replace the Firmware and RoT Security Module.
No system power (FPGA heartbeat LED off)	Off	Off	Off	Off	Off	<p>If the AC power is on, but the system board assembly does not have power, then:</p> <ol style="list-style-type: none"> 1. Check the power supply unit (PSU), power interposer board (PIB), or power distribution board (PDB). If the PSU, PIB, or PDB has any error, replace it. 2. If the PSU, PIB, or PDB is good, do the following: <ol style="list-style-type: none"> a. Replace the system I/O board. b. Replace the lower processor board (MB). c. Replace the upper processor board (CPU BD).
XCC firmware recoverable error	Blink	N/A	Off	N/A	N/A	Information only. No action is required.
XCC firmware is recovered from error	On	N/A	Off	N/A	N/A	Information only. No action is required.
UEFI firmware authentication failure	N/A	Blink	Off	N/A	N/A	Information only. No action is required.
UEFI firmware is recovered from authentication failure	N/A	On	Off	N/A	N/A	Information only. No action is required.
System is OK (FPGA heartbeat LED is On)	On	On	Off	On	On	Information only. No action is required.

Note: For locations of the FPGA LED and XCC heartbeat LED, see [“Lower processor board \(MB\) LEDs” on page 291](#) and [“System I/O board LEDs” on page 289](#).

XCC system management port LEDs

This topic provides information on LEDs of XCC system management port.

The following table describes the problems that are indicated by LEDs on XCC system management port.

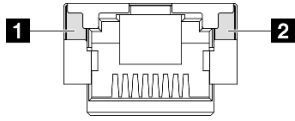


Figure 229. XCC system management port LEDs

LED	Description
1 XCC system management port (1GB RJ-45) Ethernet port link LED	Use this green LED to distinguish the network connectivity status: <ul style="list-style-type: none"> • Off: The network link is disconnected. • Green: The network link is established.
2 XCC system management port (1 GB RJ-45) Ethernet port activity LED	Use this green LED to distinguish the network activity status: <ul style="list-style-type: none"> • Off: The server is disconnected from a LAN. • Green: The network is connected and active.

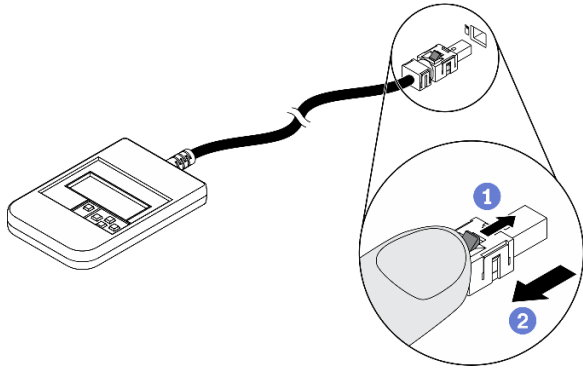
External Diagnostics Handset

The External 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 Diagnostics Handset

Location	Callouts
<p>The External Diagnostics Handset is connected to the server with an external cable.</p>	1 External Diagnostics Handset
	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.
	3 External diagnostics connector This connector is located on the front of the server, and is used to connect an External Diagnostics Handset.

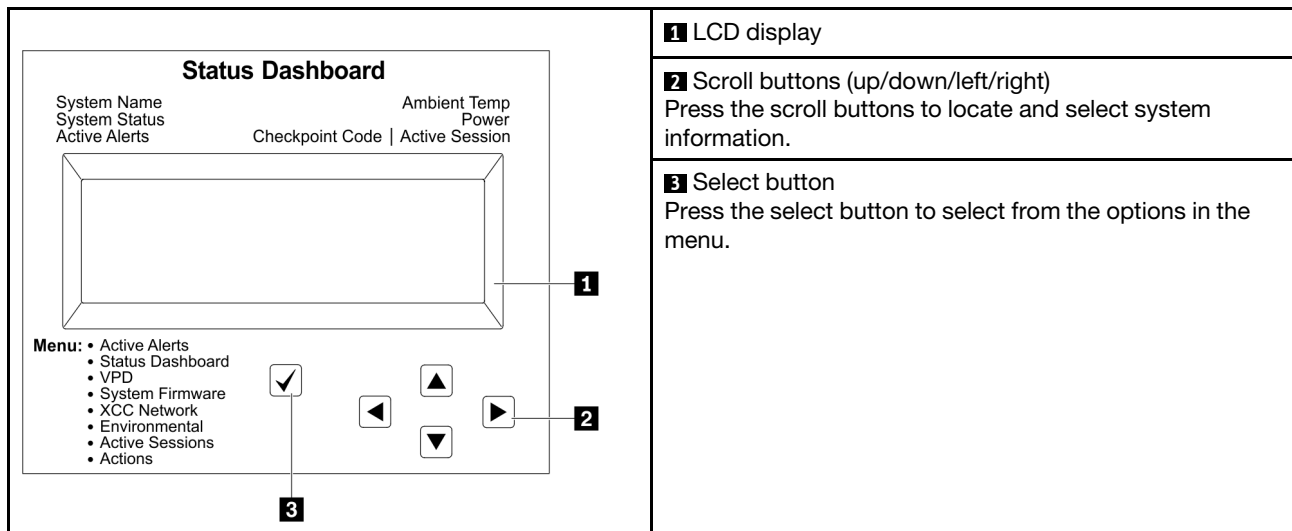
Note: When unplugging the External Diagnostics Handset, see the following instructions:



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

Display panel overview

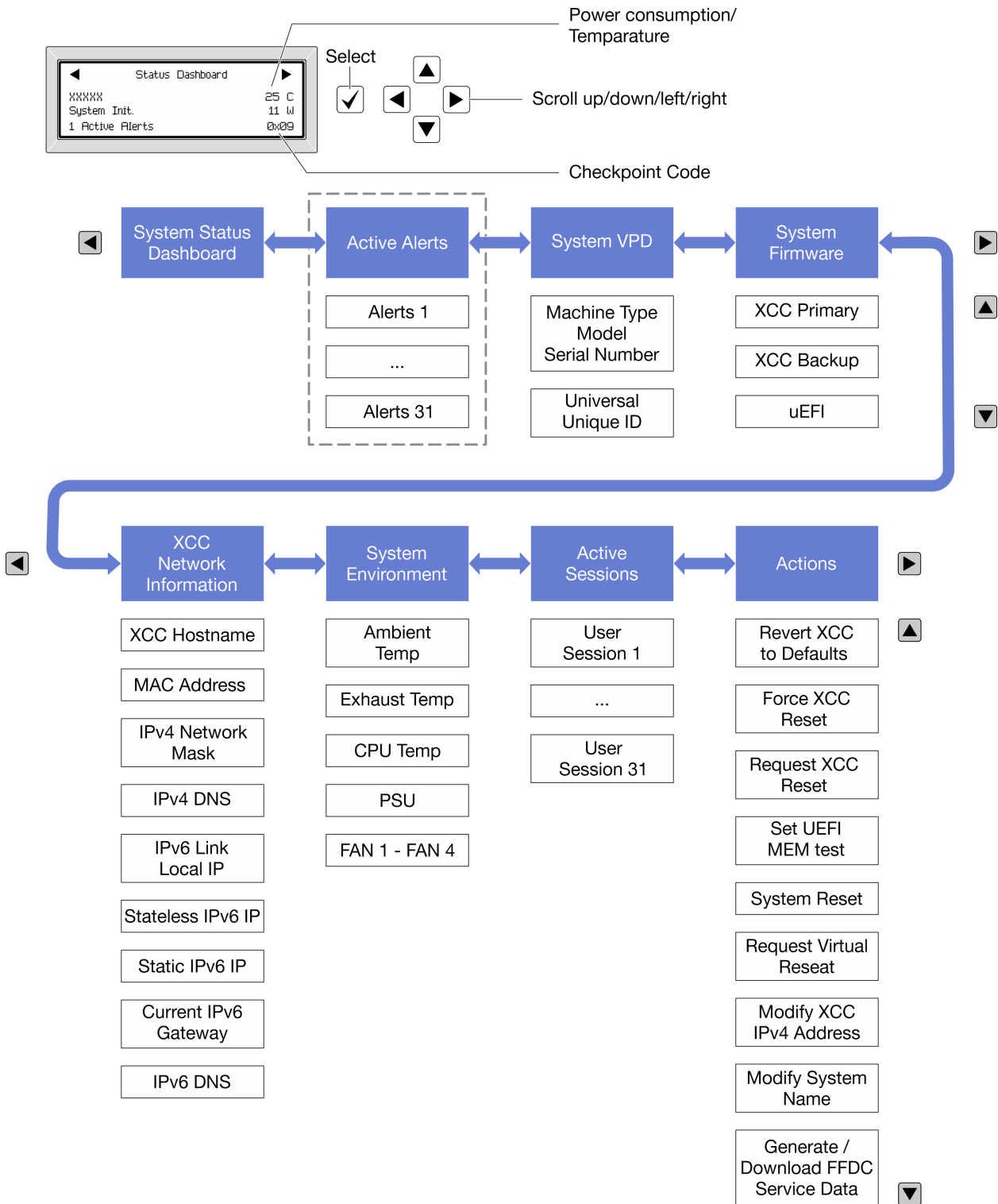
The diagnostics device consists of an LCD display and 5 navigation buttons.



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' with the following information: <ul style="list-style-type: none"> 1: System name (xxxxxx) 2: System status (System Init.) 3: Active alert quantity (1 Active Alerts) 4: Temperature (25 C) 5: Power consumption (11 W) 6: 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
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
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 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 • CPU temperature • PSU status • Spinning speed of fans by RPM 	Ambient Temp: 24 C Exhaust Temp: 30 C CPU1 Temp: 50 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"> • Revert XCC to Defaults • Force XCC Reset • Request XCC Reset • Set UEFI Memory Test • 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 √ for 3 seconds

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 minimal configuration for debugging that is supported for the server.

To determine the minimal configuration for your server, see “Minimal configuration for debugging” in [“Technical specifications” on page 3](#).

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 283](#).

Step 2. Check for short circuits, for example, if a loose screw is causing a short circuit on a circuit board.

Step 3. Remove the adapters and disconnect the cables and power cords to all internal and external devices until the server is at the minimal configuration for debugging that is required for the server to start. To determine the minimal configuration for your server, see “Minimal configuration for debugging” in [“Technical specifications” on page 3](#).

Step 4. Reconnect all AC power cords and turn on the server. If the server starts successfully, reseal the adapters and devices one at a time until the problem is isolated.

If the server does not start from the minimal configuration, replace the components in the minimal 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.

- If you set the Ethernet controller to operate at 100 Mbps or 1000 Mbps, you must use Category 5 cabling.

Step 3. Determine whether the hub supports auto-negotiation. If it does not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.

Step 4. Check the Ethernet controller LEDs on the server. These LEDs indicate whether there is a problem with the connector, cable, or hub.

Ethernet controller LED locations are specified in [“Troubleshooting by system LEDs and diagnostics display” on page 285](#).

- The Ethernet link status LED is lit when the Ethernet controller receives a link pulse from the hub. If the LED is off, there might be a defective connector or cable or a problem with the hub.
- 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 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.

Network activity LED location is specified in [“Troubleshooting by system LEDs and diagnostics display” on page 285](#).

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

Use this information 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 using some other management application, begin with the Lenovo XClarity Controller event log.

For more information about event logs (see [“Event logs” on page 283](#)).

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 327](#)).

Intermittent problems

Use this information to solve intermittent problems.

- [“Intermittent external device problems” on page 302](#)
- [“Intermittent KVM problems” on page 302](#)

- [“Intermittent unexpected reboots” on page 302](#)

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 283](#) 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 303](#)
- [“Mouse does not work” on page 303](#)
- [“KVM switch problems” on page 303](#)
- [“USB-device does not work” on page 303](#)

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.

Common memory problems

- [“Multiple memory modules in a channel identified as failing” on page 304](#)
- [“Displayed system memory is less than installed physical memory” on page 304](#)
- [“Invalid memory population detected” on page 305](#)

Multiple memory modules in a channel identified as failing

Note: Before you install or remove a memory module, you must first remove the AC power for at least 10 seconds.

Complete the following procedure to solve the problem.

1. Reseat the memory modules; then, restart the server.

Note: If the same memory module is installed in the same slot, that slot must be re-enabled in the Setup Utility before UEFI will attempt to train that memory module again.

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 on a different processor (if installed) to verify that the problem is not the processor or the memory module connector.
7. (Trained technician only) Replace the upper processor board (CPU BD) or lower processor board (MB).

Displayed system memory is less than installed physical memory

Complete the following procedure to solve the problem.

Note: Before you install or remove a memory module, you must first remove the AC power for at least 10 seconds.

1. Make sure that:
 - No error LEDs are lit. See [“Troubleshooting by system LEDs and diagnostics display” on page 285](#).
 - Memory mirrored channel does not account for the discrepancy.

- The memory modules are seated correctly.
 - You have installed the correct type of memory module (see “[Memory module installation rules and order](#)” on page 44 for requirements).
 - After changing or replacing a memory module, memory configuration is updated accordingly in the Setup Utility.
 - All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled.
 - There is no memory mismatch when the server is at the minimum memory configuration.
2. Reseat the memory modules, and then restart the server.
 3. Check the POST error log:
 - If a memory module was disabled by a systems-management interrupt (SMI), replace the memory module.
 - If a memory module was disabled by the user or by POST, reseat the memory module; then, run the Setup Utility and enable the memory module.
 4. Run memory diagnostics. When you start a server and press the key according to the on-screen instructions, the LXPM interface 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 memory diagnostics with this interface. From the Diagnostic page, go to **Run Diagnostic → Memory test → Advanced Memory Test**.
 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.
 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 upper processor board (CPU BD) or lower processor board (MB).

Invalid memory population detected

If this warning message appears, complete the following steps:

Invalid memory population (unsupported DIMM population) detected. Please verify memory configuration is valid.

1. See “[Memory module installation rules and order](#)” on page 44 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.

Monitor and video problems

Use this information to solve problems related to a monitor or video.

- “[Incorrect characters are displayed](#)” on page 306
- “[Screen is blank](#)” on page 306
- “[Screen goes blank when you start some application programs](#)” on page 306
- “[The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted](#)” on page 306
- “[The wrong characters appear on the screen](#)” on page 307

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 [“Update the firmware” on page 275](#).

Screen is blank

Note: Make sure that the expected boot mode has not been changed from the UEFI to Legacy or vice versa.

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. The management controller remote presence function is disabled if you install an optional video adapter. To use the management controller remote presence function, remove the optional video adapter.
3. If the server is installed with the graphical adapters while turning on the server, the Lenovo logo is displayed on the screen after approximately 3 minutes. This is normal operation while the system loads.
4. 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.
5. Make sure that the correct server is controlling the monitor, if applicable.
6. Make sure that the video output is not affected by corrupted server firmware; See [“Update the firmware” on page 275](#).
7. 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) Upper processor board (CPU BD) or lower processor board (MB)

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 [“Update the firmware” on page 275](#).

Network problems

Use this information to resolve issues related to networking.

- [“Cannot wake server using Wake on LAN” on page 307](#)
- [“Could not log in using LDAP account with SSL enabled” on page 307](#)

Cannot wake server using Wake on LAN

Complete the following steps until the problem is resolved:

1. If you are using the dual-port network adapter and the server is connected to the network using Ethernet 5 connector, check the system-error log or IMM2 system event log (see [“Event logs” on page 283](#)), make sure:
 - a. Fan 3 is running in standby mode, if Emulex dual port 10GBase-T embedded adapter is installed.
 - b. The room temperature is not too high (see [“Specifications” on page 3](#)).
 - c. The air vents are not blocked.
 - d. The air baffle is installed securely.
2. Reseat the dual-port network adapter.
3. Turn off the server and disconnect it from the power source; then, wait 10 seconds before restarting the server.
4. If the problem still remains, replace the dual-port network adapter.

Could not log in using LDAP account with SSL enabled

Complete the following steps until the problem is resolved:

1. Make sure that the license key is valid.
2. Generate a new license key and log in again.

Observable problems

Use this information to solve observable problems.

- [“Server hangs during the UEFI boot process” on page 308](#)
- [“The server immediately displays the POST Event Viewer when it is turned on” on page 308](#)
- [“Server is unresponsive \(POST is complete and operating system is running\)” on page 308](#)
- [“Server is unresponsive \(POST failed and cannot start System Setup\)” on page 309](#)
- [“Voltage planar fault is displayed in the event log” on page 309](#)
- [“Unusual smell” on page 309](#)
- [“Server seems to be running hot” on page 309](#)
- [“Cannot enter legacy mode after installing a new adapter” on page 310](#)

- [“Cracked parts or cracked chassis” on page 310](#)

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/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 system LEDs and diagnostics display.
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) Upper processor board (CPU BD) or lower processor board (MB)

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 upper processor board (CPU BD) or lower processor board (MB).

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 3 for the minimally required number of processors and DIMMs.
2. Restart the system.
 - If the system restarts, add each of the removed items one at a time and restart the system each time until the error occurs. Replace the item for which the error occurs.
 - If the system does not restart, suspect the upper processor board (CPU BD) or lower processor board (MB).

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 3).

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 [Chapter 5 “Hardware replacement procedures” on page 41](#) 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 310](#)
- [“PCIe adapter is not recognized or is not functioning” on page 310](#)
- [“Insufficient PCIe resources are detected.” on page 311](#)
- [“A Lenovo optional device that was just installed does not work.” on page 311](#)
- [“A Lenovo optional device that worked previously does not work now” on page 312](#)

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.

Performance problems

Use this information to solve performance problems.

- [“Network performance” on page 312](#)
- [“Operating system performance” on page 312](#)

Network performance

Complete the following steps until the problem is solved:

1. Isolate which network is operating slowly (such as storage, data, and management). You might find it helpful to use ping tools or operating-system tools such as task manager or resource manager.
2. Check for traffic congestion on the network.
3. Update the NIC device driver, or the storage device controller device driver.
4. Use the traffic-diagnostic tools that are provided by the IO-module manufacturer.

Operating system performance

Complete the following steps until the problem is solved:

1. If you have recently made changes to the compute node (for example updated device drivers or installed software applications) remove the changes.
2. Check for any networking issues.
3. Check the operating system logs for performance related errors.
4. Check for events related to high temperatures and power issues as the compute node might be throttled to help with cooling. If it is throttled, reduce the workload on the compute node to help improve performance.
5. Check for events related to disabled DIMMs. If you do not have enough memory for the application workload, your operating system will have poor performance.
6. Ensure that the workload is not too high for the configuration.

Power on and power off problems

Use this information to resolve issues when powering on or powering off the server.

- [“The power button does not work \(server does not start\)” on page 312](#)
- [“Server does not power on” on page 313](#)

The power button does not work (server does not start)

Note: The power button will not function until approximately 1 to 3 minutes after the server has been connected to ac power to allow time for BMC to initialize.

Complete the following steps until the problem is resolved:

1. Make sure that the power button on the server is working correctly:
 - a. Disconnect the server power cords.
 - b. Reconnect the server power cords.
 - c. Reseat the front operator panel cable, and then repeat steps 1a and 2b.
 - If the server starts, reseat the front operator panel.
 - If the problem remains, replace the front operator panel.
2. Make sure that:
 - The power cords are correctly connected to the server and to a working electrical outlet.
 - The LEDs on the power supply do not indicate a problem.
 - The Power button LED is lit on and is flashing slowly.
 - The push force is enough and with button force response.
3. If the power button LED is not lit on or is not flashing correctly, reseat all the power supplies and make sure AC LED on PSU rear side are lit on.
4. If you have just installed an optional device, remove it, and restart the server.
5. If the issue is still observed or without power button LED lit on, implement the minimum configuration to check whether any specific components lock the power permission. Replace the each power supply and check the power button function after installing the each one.
6. If everything is still done and the issue cannot be resolved, collect the failure information with system logs captured to Lenovo support.

Server does not power on

Complete the following steps until the problem is resolved:

1. Check the event log for any events related to the server not powering on.
2. Check for any LEDs that are flashing amber.
3. Check the power LED on the upper processor board (CPU BD) or lower processor board (MB).
4. Check if AC power LED is lit on or the amber LED is lit on at the PSU rear side.
5. AC cycle the system.
6. Remove the CMOS battery for at least ten seconds, then, reinstall the CMOS battery.
7. Try to power on the system by IPMI command through XCC or by the power button.
8. Implement the minimum configuration (see [“Technical specifications” on page 3](#)).
9. Reseat all power supplies and make sure that AC LEDs on the PSU rear side are lit.
10. Replace the each power supply and check the power button function after installing the each one.
11. If the issue cannot be resolved by above actions, call service to review the issue symptom and see whether the upper processor board (CPU BD) or lower processor board (MB) replacement is necessary.

Power problems

Use this information to resolve issues related to power.

System error LED is on and event log "Power supply has lost input" is displayed

To resolve the problem, ensure that:

1. The power supply is properly connected to a power cord.
2. The power cord is connected to a properly grounded electrical outlet for the server.

3. Make sure that the power supply AC source is stable within the supported range.
4. Swap the power supply to see if the issue follows the power supply, if it follows the power supply, then replace the failing one.
5. Review the event log and see how the problem it is to follow the event log actions to resolved the problems.

Serial-device problems

Use this information to solve problems with serial ports or devices.

- [“Number of displayed serial ports is less than the number of installed serial ports” on page 314](#)
- [“Serial device does not work” on page 314](#)

Number of displayed serial ports is less than the number of installed serial ports

Complete the following steps until the problem is solved.

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

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 (see [“Lower processor board \(MB\) connectors” on page 24](#)).
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 upper processor board (CPU BD) or lower processor board (MB).

Software problems

Use this information 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 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. Contact your place of purchase of the software.

Storage drive problems

Use this information to resolve issues related to the storage drives.

- [“Server cannot recognize a drive” on page 315](#)
- [“Multiple drives fail” on page 316](#)
- [“Multiple drives are offline” on page 316](#)
- [“A replacement drive does not rebuild” on page 316](#)
- [“Green drive activity LED does not represent actual state of associated drive” on page 316](#)
- [“Yellow drive status LED does not represent actual state of associated drive” on page 316](#)

Server cannot recognize a drive

Complete the following steps until the problem is solved.

1. Observe the associated yellow 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 drive backplane.
3. Observe the associated green 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 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 drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → 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 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.
4. Make sure that the 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 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 drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → 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 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 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 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 drive does not rebuild

Complete the following steps until the problem is solved:

1. Make sure that the drive is recognized by the adapter (the green drive activity LED is flashing).
2. Review the SAS/SATA RAID adapter documentation to determine the correct configuration parameters and settings.

Green drive activity LED does not represent actual state of associated drive

Complete the following steps until the problem is solved:

1. If the green drive activity LED does not flash when the drive is in use, run the diagnostics tests for the 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 drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → Disk Drive Test**
2. If the drive passes the test, replace the backplane.
3. If the drive fails the test, replace the drive.

Yellow 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 drive.

5. Power on the server and observe the activity of the drive LEDs.

Appendix A. Hardware disassembling for recycle

Follow the instructions in this section to recycle components with compliance with local laws or regulations.

Disassemble the upper processor board (CPU BD) for recycle

Follow the instructions in this section to disassemble the upper processor board (CPU BD) before recycling.

About this task

Before disassembling the upper processor board (CPU BD), refer to local environmental, waste or disposal regulations to ensure compliance.

Procedure

- Step 1. Remove sixteen screws and separate the upper processor board (CPU BD) from the supporting sheet metal.

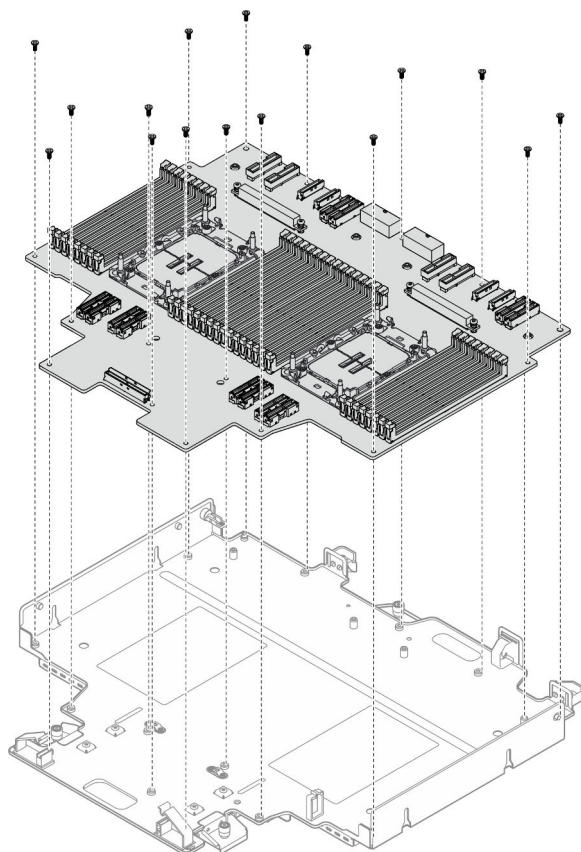


Figure 230. Screw removal

After you finish

After disassembling the upper processor board (CPU BD), recycle the unit in compliance with local regulations.

Disassemble the lower processor board (MB) for recycle

Follow the instructions in this section to disassemble the lower processor board (MB) before recycling.

About this task

Before disassembling the lower processor board (MB), refer to local environmental, waste or disposal regulations to ensure compliance.

Procedure

- Step 1. Remove six screws from the bottom of the lower processor board (MB) and remove the three lower processor board (MB) brackets.

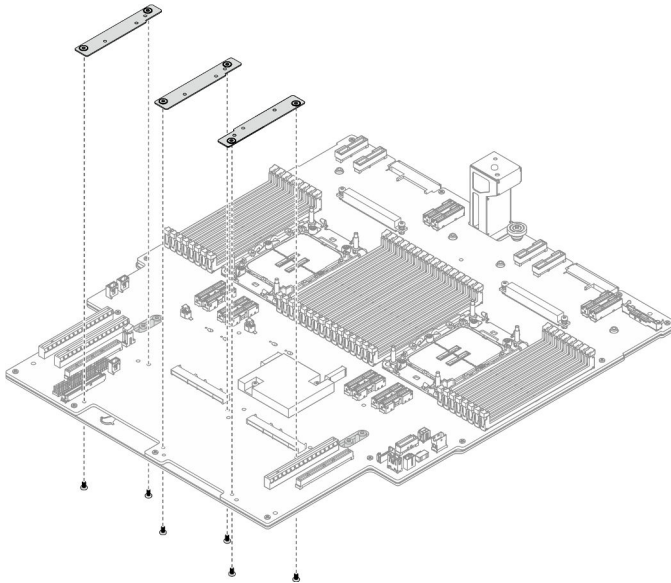


Figure 231. Lower processor board (MB) bracket removal

- Step 2. Remove the four screws that secure the lower processor board (MB) handle; then, remove the lower processor board (MB) handle.

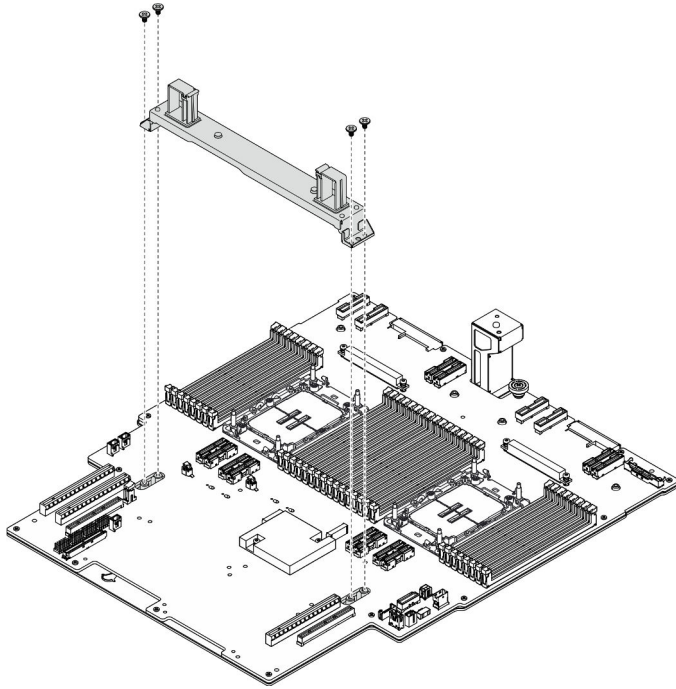


Figure 232. Handle removal

Step 3. Remove twenty-one screws and separate the lower processor board (MB) from the supporting sheet metal.

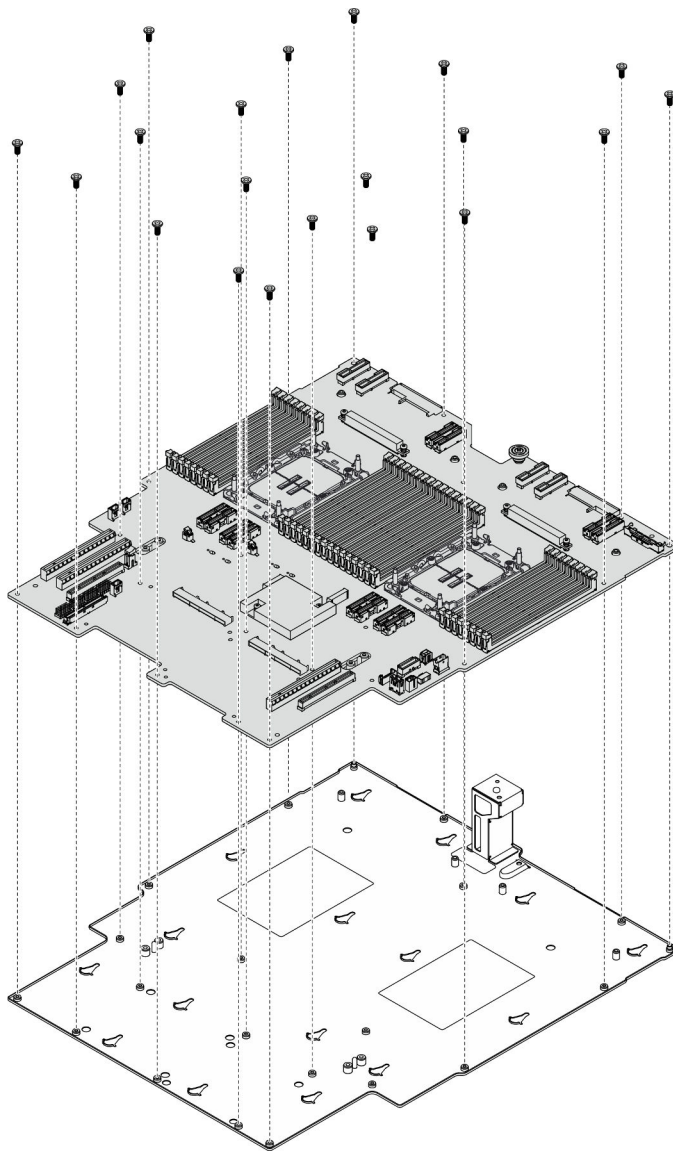


Figure 233. Screw removal

After you finish

After disassembling the lower processor board (MB), recycle the unit in compliance with local regulations.

Disassemble the chassis for recycle

Follow the instructions in this section to disassemble the chassis before recycling.

About this task

Refer to local environmental, waste or disposal regulations to ensure compliance.

Procedure

Step 1. Make preparation for the task.

- a. Gently pull and disengage every installed power supply unit. See [“Remove a hot-swap power supply unit” on page 184.](#)
- b. Remove the front top cover. See [“Remove the front top cover” on page 233.](#)
- c. Remove the rear top cover. See [“Remove the rear top cover” on page 235.](#)
- d. Remove the fan cage. See [“Remove the fan cage” on page 104.](#)
- e. Remove both power interposer boards. See [“Remove the power interposer board” on page 181.](#)
- f. Remove the power distribution board. See [“Remove the power distribution board” on page 175.](#)
- g. Remove the upper processor board (CPU BD) air baffle. See [“Remove the upper processor board \(CPU BD\) air baffle” on page 71.](#)
- h. Remove the upper processor board (CPU BD). See [“Remove the upper processor board \(CPU BD\)” on page 247.](#)
- i. Remove the support bracket. See [“Remove the support bracket” on page 211.](#)
- j. For primary chassis only, remove the system I/O board and interposer assembly. See [“Remove the system I/O board and interposer board” on page 218.](#)
- k. Remove the lower processor board (MB) air baffle. See [“Remove the lower processor board \(MB\) air baffle” on page 75.](#)
- l. For primary chassis only, remove the front operator panel and front operator panel cage. See [“Remove the front operator panel” on page 113.](#)
- m. Remove the PHMs. See [“Remove a processor and heat sink” on page 188.](#)
- n. Remove the memory modules. See [“Remove a memory module” on page 146.](#)
- o. Remove the sideband card. See [“Remove the sideband card” on page 207.](#)
- p. Remove the Ethernet port assembly. See [“Remove the Ethernet port assembly” on page 99.](#)
- q. Remove the OCP module. See [“Remove the OCP module” on page 154.](#)
- r. Remove the OCP cage. See [“Remove the OCP cage” on page 155.](#)
- s. Remove all the PCIe adapters. See [“Remove a PCIe adapter” on page 161.](#)
- t. Remove the PCIe riser card. See [“Remove the PCIe riser card” on page 168.](#)
- u. Remove the UPI module. See [“Remove the UPI module” on page 241.](#)
- v. Remove the all the intrusion switch. See [“Remove the top cover intrusion switch” on page 118](#) and [“Remove the front intrusion switch” on page 121.](#)
- w. Remove the serial port assembly. See [“Remove the serial port assembly” on page 204.](#)
- x. Remove all the hot-swap drives and drive fillers. See [“Remove a hot-swap drive” on page 83.](#)
- y. Remove all the E3.S cable assemblies. See [“Remove an E3.S cable assembly” on page 95.](#)
- z. Remove all the drive backplanes. See [“Remove a drive backplane” on page 88.](#)
- aa. Remove all the drive cages. See [“Remove a drive cage” on page 91.](#)
- ab. Remove the lower processor board (MB). See [“Remove the lower processor board \(MB\)” on page 125.](#)

After you finish

After disassembling the chassis, 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: 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 online help 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:

<https://pubs.lenovo.com/>

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

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Check for updated software, firmware, and operating-system device drivers for your Lenovo product. (See the following links) 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.
 - Drivers and software downloads
 - <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/>
 - Operating system support center
 - <https://datacentersupport.lenovo.com/solutions/server-os>
 - Operating system installing instructions
 - <https://pubs.lenovo.com/thinksystem#os-installation>
- If you have installed new hardware or software in your environment, check <https://serverproven.lenovo.com> to make sure that the hardware and software are supported by your product.
- Refer to [Chapter 8 “Problem determination” on page 283](#) for instructions on isolating and solving issues.

- Go to <http://datacentersupport.lenovo.com> and check for information to help you solve the problem.

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 on **How To's** from the navigation pane.
3. Click **Article Type** → **Solution** from the drop-down menu.

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

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

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

- Hardware and Software Maintenance agreement contract numbers, if applicable
- Machine type number (Lenovo 4-digit machine identifier). Machine type number can be found on the ID label, see “[Identify the server and access the Lenovo XClarity Controller](#)” on page 35.
- 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 “Backing up the BMC configuration” section in the XCC documentation compatible with your server at <https://pubs.lenovo.com/lxccc-overview/>.

- For more information about using the CLI to collect service data, see the “XCC `ffdc` command” section in the XCC documentation 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.

You can find more information about setting up automatic problem notification within the Lenovo XClarity Administrator at https://pubs.lenovo.com/lxca/admin_setupcallhome.

- **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/supportphonenumber> for your region support details.

Appendix C. Documents and supports

This section provides handy documents, driver and firmware downloads, and support resources.

Documents download

This section provides introduction and download link for handy documents.

Documents

Download the following product documentations at:

https://pubs.lenovo.com/sr860v3/pdf_files.html

- **Rail Installation Guides**
 - Rail installation in a rack
- **CMA Installation Guide**
 - CMA installation in a rack
- **User Guide**
 - Complete overview, system configuration, hardware components replacing, and troubleshooting.
Selected chapters from *User Guide*:
 - **System Configuration Guide** : Server overview, components identification, system LEDs and diagnostics display, product unboxing, setting up and configuring the server.
 - **Hardware Maintenance Guide** : Installing hardware components, cable routing, and troubleshooting.
- **Messages and Codes Reference**
 - XClarity Controller, LXPM, and uEFI events
- **UEFI Manual**
 - UEFI setting introduction

Support websites

This section provides driver and firmware downloads and support resources.

Support and downloads

- Drivers and Software download website for ThinkSystem SR950 V3
 - <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4/downloads/driver-list/>
- Lenovo Data Center Forum
 - https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv_eg
- Lenovo Data Center Support for ThinkSystem SR950 V3
 - <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr950v3/7dc4>
- Lenovo License Information Documents
 - <https://datacentersupport.lenovo.com/documents/Invo-eula>
- Lenovo Press website (Product Guides/Datasheets/White papers)

- <https://lenovopress.lenovo.com/>
- Lenovo Privacy Statement
 - <https://www.lenovo.com/privacy>
- Lenovo Product Security Advisories
 - https://datacentersupport.lenovo.com/product_security/home
- Lenovo Product Warranty Plans
 - <http://datacentersupport.lenovo.com/warrantylookup>
- Lenovo Server Operating Systems Support Center website
 - <https://datacentersupport.lenovo.com/solutions/server-os>
- Lenovo ServerProven website (Options compatibility lookup)
 - <https://serverproven.lenovo.com>
- Operating System Installation Instructions
 - <https://pubs.lenovo.com/thinksystem#os-installation>
- Submit an eTicket (service request)
 - <https://support.lenovo.com/servicerequest>
- Subscribe to Lenovo Data Center Group product notifications (Stay up to date on firmware updates)
 - <https://datacentersupport.lenovo.com/solutions/ht509500>

Appendix D. Notices

Lenovo may not offer the products, services, or features discussed in this document in all countries. Consult your local Lenovo representative for information on the products and services currently available in your area.

Any reference to a Lenovo product, program, or service is not intended to state or imply that only that Lenovo product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any Lenovo intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any other product, program, or service.

Lenovo may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document is not an offer and does not provide a license under any patents or patent applications. You can send inquiries in writing to the following:

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

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

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

The products described in this document are not intended for use in implantation or other life support applications where malfunction may result in injury or death to persons. The information contained in this document does not affect or change Lenovo product specifications or warranties. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Lenovo or third parties. All information contained in this document was obtained in specific environments and is presented as an illustration. The result obtained in other operating environments may vary.

Lenovo may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Any references in this publication to non-Lenovo Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this Lenovo product, and use of those Web sites is at your own risk.

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

Trademarks

LENOVO and THINKSYSTEM are trademarks of Lenovo.

All other trademarks are the property of their respective owners.

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

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

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

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

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

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

Electronic emission notices

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

Additional electronic emissions notices are available at:

https://pubs.lenovo.com/important_notices/

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

Lenovo