Lenovo

ThinkSystem SR780a V3
User Guide

Machine Type: 7DJ5

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

First Edition (September 2024)

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

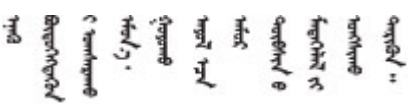
A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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



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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje 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་རྫས་འདི་བདེ་སྒྲིག་མ་བྱས་གོང་། ་སྲོར་ཀྱི་ཡིད་གཟབ་
བྱ་འདྲ་མིན་ཡོད་པའི་འོད་སྟེར་བལྟ་དགོས།

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

مەزكۇر مەھسۇلاتنى ئورنىتىشتىن بۇرۇن بىخەتەرلىك ئۇچۇرلىرىنى ئوقۇپ چىقىڭ.

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

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 serviced by trained personnel, as defined by the IEC 62368-1, 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. Equipment must be installed in a restricted access location and access to the equipment 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.
7. The design of the electrical distribution system must take into consideration the total grounding leakage current from all power supplies in the server.

   CAUTION:

   High touch current. Connect to earth before connecting to supply.
8. Use the PDUs (power distribution units) with pluggable equipment type B to distribute electrical power to servers.

Chapter 1. Introduction

The ThinkSystem SR780a V3 server (Type 7DJ5) is a powerful liquid-cooled 5U server that features two 5th Gen Intel Xeon Scalable processors and eight high-performance GPUs. Through liquid cooling, this system achieves the extensive computational prowess crucial for handling demanding AI and HPC workloads.

Figure 1. ThinkSystem SR780a 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

  Intel® On Demand is a feature that allows user to customize processor capabilities according to workload and tasks at hand. For more information, see “Enable Intel® On Demand” on page 410.

- **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).

- **Large system-memory capacity**

  The server supports registered DIMMs (RDIMMs) with error correcting code (ECC) and 3DS RDIMM. 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.

- **Lightpath Diagnostics**

  Lightpath Diagnostics provides LEDs to help you diagnose problems. For more information about the Lightpath Diagnostics, see "Troubleshooting by system LEDs and diagnostics display" on page 423.

- **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.

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	• Processor • Memory • M.2 Drive • Storage expansion • Expansion slots • Graphics processing unit (GPU) • Integrated functions and I/O connectors • Network • RAID • System fan • Electrical input • Minimal configuration for debugging • Operating systems	• Dimension • Weight	• 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 two 5th Gen Intel® Xeon® Scalable processors up to 350W TDP, with integrated memory controller and Intel Mesh UPI (Ultra Path Interconnect) topology.

- Up to two Platinum level processors with LGA 4677 sockets
- Scalable up to 56 cores per socket
- Supports UPI v2.0 links at higher width (x96) and speed: up to 12.8, 14.4, 16, 20 GT/s
- Thermal Design Power (TDP): up to 350 watts

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

Memory

See "Memory module installation rules and order" on page 47 for detailed information about memory configuration and setup.

- Memory module type:
  - TruDDR5 5600MHz RDIMM: 64 GB (2Rx4) and 96 GB (2Rx4)
- Capacity
  - Minimum: 2TB
  - Maximum: 3TB
- Slots: 16 DIMM slots per processor, 32 DIMM slots in total

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

M.2 Drive

The server supports the following M.2 drive capacity:

- 960 GB
- 1.92 TB

The following form factors are supported:

- 110 mm (22110)

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

Storage expansion

- Up to twelve 2.5-inch hot-swap NVMe drives
- Up to two M.2 drives (Onboard VROC RAID support)

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

Expansion slots

- Eight front PCIe slots
- Two rear PCIe slots

For more information, see "Front view" on page 13 and "Rear view with two PCIe risers" on page 15.

Graphics processing unit (GPU)

The server supports the following GPU configurations:

- Eight NVIDIA H100 700W SXM5 GPUs with 80GB HBM3 memory
- Eight NVIDIA H200 700W SXM5 GPUs with 141GB HBM3 memory

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:
  - One USB 3.1 Gen 1 (5 Gbps) connector
  - One USB 2.0 connector for XCC system management function
  - One Mini DisplayPort connector
  - Integrated diagnostics panel
    - Power button and power LED (green)
    - Network Activity LED (green)
    - System ID button/LED (blue)
    - System Error LED (yellow)
- Rear connectors:
  - One XCC system management port (10/100/1000 Mbps RJ-45) on the rear to connect to a systems-management network. This RJ-45connector is dedicated to the Lenovo XClarity Controller functions.
  - Two USB 3.1 Gen 1 (5 Gbps) connectors
  - One VGA connector

Note: The maximum video resolution is 1920 x 1200 at 60 Hz.

Network

Rear FHHL PCIe Ethernet Adapter

RAID

Onboard software RAID support for M.2 drives (Intel VROC NVMe RAID):

- Intel VROC standard: requires an activation key and supports RAID level 0 and 1

System fan

- Six front fans
- Five 80 mm x 80 mm x 56 mm dual-rotor rear fans

Electrical input

Eight power supplies provide N+N redundancy support.

- 2600-watt Titanium, input power 200-240 Vac

Important: Power supplies and redundant power supplies in the server must be with the same power rating, wattage or level.

Minimal configuration for debugging

- Two processors
- Two memory modules
- One power supply
- One M.2 drive (If OS is needed by debugging)
- Six front fans
- Five rear fans
- One rear PCIe Ethernet Adapter (If network is required)
- CPU water loop connected to water (If connected to DC power)

Operating systems
Supported and certified operating system: • Canonical Ubuntu References: • Complete list of available operating systems: https://lenovopress.lenovo.com/osig. • OS deployment instructions, see “Deploy the operating system” on page 409.

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
• Height: 218.5 mm (8.6 inches) • Width: – With EIA flange: 482.4 mm (19 inches) – Without EIA flange: 447 mm (17.6 inches) • Depth: – With EIA flange and PSU: 958.4 mm (37.7 inches) – Chassis: 909.2 mm (35.8 inches)

Weight
• Approximately 90 kg (198.4 lbs) with H100/H200 GPU complex, depending on the configuration

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.

Ambient temperature management

Ambient temperature management
Adjust ambient temperature when specific components are installed. Keep the ambient temperature to 30°C or lower when ThinkSystem NVIDIA BlueField-3 B3220 VPI QSFP112 2P 200G PCIe Gen5 x16 Adapter is installed in PCIe riser 1 (PCIe slot 9).

Environment

Environment
ThinkSystem SR780a V3 complies with ASHRAE Class A2 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). – Server off: 5°C to 45°C (41°F to 113°F) – Shipment/storage: -20°C to 60°C (-4°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) – 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 7. **Note:** The server is designed for standard data center environment and recommended to be placed in industrial data center.

Water requirements

Water requirements
• Water temperature: – ASHRAE class W45: up to 45°C (113°F) inlet temperature to the rack • Maximum pressure: 4.4 bars • Minimum water flow rate: 10.0 liters per minute per Chassis **Note:** The water required to initially fill the system side cooling loop must be reasonably clean, bacteria-free water (<100 CFU/ml) such as de-mineralized water, reverse osmosis water, de-ionized water, or distilled water. The water must be filtered with an in-line 50 micron filter (approximately 288 mesh). The water must be treated with anti-biological and anti-corrosion measures.

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	Severity level G1 as per ANSI/ISA 71.04-1985[1]: • The copper reactivity level shall be less than 200 Angstroms per month (Å/month ≈ 0.0035 µg/cm^2-hour weight gain).[2] • The silver reactivity level shall be less than 200 Angstroms per month (Å/month ≈ 0.0035 µg/cm^2-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	Data centers must meet the cleanliness level of ISO 14644-1 class 8. For data centers without airside economizer, the ISO 14644-1 class 8 cleanliness might be met by choosing one of the following filtration methods: • 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. 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. • The deliquescent relative humidity of the particulate contamination should be more than 60% RH.[4] • Data centers must be free of zinc whiskers.[5]

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

[2] The derivation of the equivalence between the rate of copper corrosion growth in the thickness of the corrosion product in Å/month and the rate of weight gain assumes that Cu_2S and Cu_2O grow in equal proportions.

[3] The derivation of the equivalence between the rate of silver corrosion growth in the thickness of the corrosion product in Å/month and the rate of weight gain assumes that Ag_2S is the only corrosion product.

[4] The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.

[5] Surface debris is randomly collected from 10 areas of the data center on a 1.5 cm diameter disk of sticky electrically conductive tape on a metal stub. If examination of the sticky tape in a scanning electron microscope reveals no zinc whiskers, the data center is considered free of zinc whiskers.

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	Baseboard management controller (BMC) 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). **Interface** • CLI application • Web GUI interface • Mobile application • Redfish API **Usage and downloads** https://pubs.lenovo.com/lxcc-overview/
Lenovo XCC Logger Utility	Application that reports the XCC events to local OS system log. **Interface** • CLI application **Usage and downloads** • https://pubs.lenovo.com/lxcc-logger-linux/ • https://pubs.lenovo.com/lxcc-logger-windows/
Lenovo XClarity Administrator	Centralized interface for multi-server management. **Interface** • Web GUI interface • Mobile application • REST API **Usage and downloads** https://pubs.lenovo.com/lxca/
Lenovo XClarity Essentials toolset	Portable and light toolset for server configuration, data collection, and firmware updates. Suitable both for single-server or multi-server management contexts. **Interface** • **OneCLI**: CLI application • **Bootable Media Creator**: CLI application, GUI application • **UpdateXpress**: GUI application **Usage and downloads** https://pubs.lenovo.com/lxce-overview/

Options	Description
Lenovo XClarity Provisioning Manager	UEFI-based embedded GUI tool on a single server that can simplify management tasks. **Interface** • Web interface (BMC remote access) • GUI application **Usage and downloads** https://pubs.lenovo.com/lxpm-overview/ **Important:** Lenovo XClarity Provisioning Manager (LXPM) supported version varies by product. All versions of Lenovo XClarity Provisioning Manager are referred to as Lenovo XClarity Provisioning Manager and LXPM in this document, unless specified otherwise. To see the LXPM version supported by your server, go to https://pubs.lenovo.com/lxpm-overview/.
Lenovo XClarity Integrator	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. **Interface** • GUI application **Usage and downloads** https://pubs.lenovo.com/lxci-overview/
Lenovo XClarity Energy Manager	Application that can manage and monitor server power and temperature. **Interface** • Web GUI Interface **Usage and downloads** https://datacentersupport.lenovo.com/solutions/lnvo-lxem
Lenovo Capacity Planner	Application that supports power consumption planning for a server or rack. **Interface** • Web GUI Interface **Usage and downloads** https://datacentersupport.lenovo.com/solutions/lnvo-lcp

Functions

Options		Functions							
		Multi-system mgmt	**OS deploy-ment**	**System configu-ration**	**Firm-ware up-dates[1]**	**Event-s/alert moni-toring**	**Inven-tory/ logs**	**Pow-er mgmt**	**Power planning**
Lenovo XClarity Controller				√	√[2]	√	√[4]		
Lenovo XCC Logger Utility						√			
Lenovo XClarity Administrator		√	√	√	√[2]	√	√[4]		
Lenovo XClarity Essen-tials 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 on the front view.

Note: The illustration in this section show the location of certain parts. Some parts may not be supported at the same time within certain configuration(s).

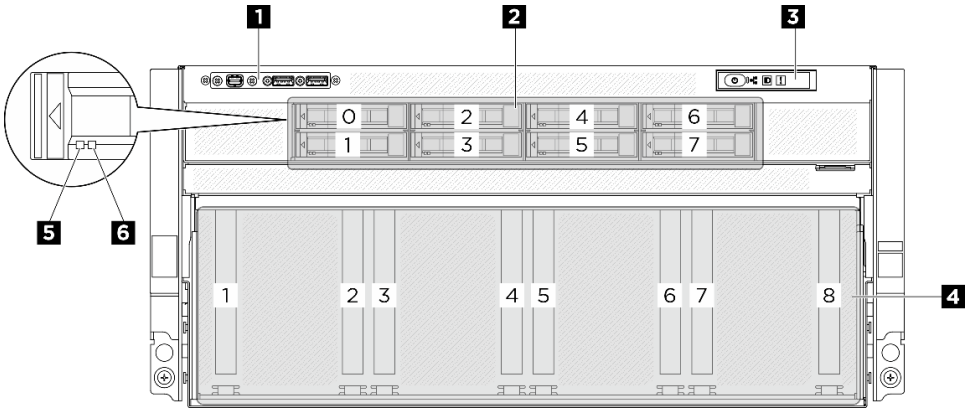


Figure 2. Front view

Table 2. Components on the front view

1 Front I/O module	2 2.5-inch drive bays (bay 0 to 7)
3 Integrated diagnostics panel	4 PCIe switch shuttle (PCIe slot 1-8)
5 Drive status LED (green)	6 Drive activity LED (yellow)

1 Front I/O module

For more information about the front I/O module, see “Front I/O module” on page 26.

2 2.5-inch drive bays (bay 0 to 7)

Install 2.5-inch NVMe drives to these bays. See “Install a 2.5-inch hot-swap drive” on page 75 for more information.

3 Integrated diagnostics panel

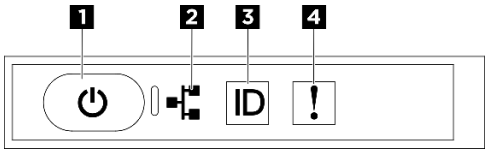


Figure 3. Integrated diagnostics panel LEDs

Table 3. Integrated diagnostics panel LEDs

1 Power button with power status LED (green)	2 Network activity LED (green)
3 System ID button with system ID LED (blue)	4 System Error LED (yellow)

1 Power button with power status LED (green)

You can press the power button to power on the server when you finish setting up the server. You also can hold the power button for several seconds to power off the server if you cannot shut down the server from the operating system. The states of the power LED are as follows:

Status	Color	Description
Off	None	No power supply is properly installed, or the LED itself has failed.
Flashing rapidly (four times per second)	Green	The server is turned off and is not ready to be turned on. The power button is disabled. This will last approximately 5 to 10 seconds.
Flashing slowly (once per second)	Green	The server is turned off and is ready to be turned on. You can press the power button to turn on the server.
Lit	Green	The server is turned on.

2 Network activity LED (green)

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

Note: SR780a V3 does not have the OCP module installed. The network activity LED will blink at a constant 1 Hz rate.

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

3 System ID button with system ID LED (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	An error has been detected on the server. Causes might include one or more of the following errors: • 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 the LCD display or the event log to determine the exact cause of the error.
Off	None	The server is off or the server is on and is working correctly.	None.

For more information about the integrated diagnostics panel, see “Integrated diagnostics panel” on page 429.

4 PCIe switch shuttle (PCIe slot 1-8)

Install PCIe adapters to the PCIe switch shuttle. These PCIe slots support the following configuration:

- PCIe Gen5 x16, FH/HL

5 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.

6 Drive status LED (yellow)

The drive status LED indicates the following status:

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

Rear view with two PCIe risers

The illustrations in this section provide information about the rear view of the server.

The ThinkSystem SR780a V3 rear view varies by model. Refer to the rear view specific to each model to identify the components.

- “Rear view with two PCIe risers” on page 15
- “Rear view with rear drive cage” on page 17

Rear view with two PCIe risers

This section contains information on the rear view with two PCIe risers.

Note: The illustration in this section show the location of certain parts. Some parts may not be supported at the same time within certain configuration(s).

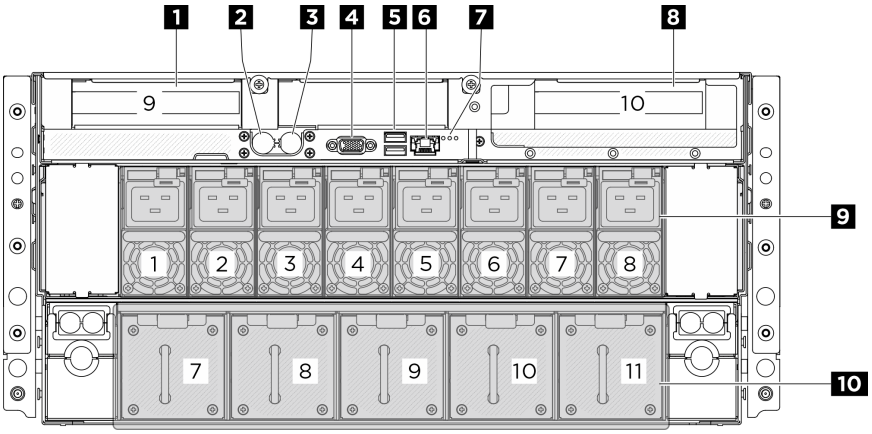


Figure 4. Rear view with two PCIe risers

Table 4. Components on the rear view with two PCIe risers

1 PCIe riser 1 (PCIe slot 9)	2 Inlet hose
3 Outlet hose	4 VGA connector
5 USB 3.1 Gen 1 (5 Gbps) connectors (total of two connectors)	6 XCC system management port (10/100/1000 Mbps RJ-45) (1 GB RJ-45)
7 Location LED/System error LED/RoT error LED	8 PCIe riser 2 (PCIe slot 10)
9 Power supply units	10 Rear fans

1 / 8 PCIe riser 1/2

Install PCIe adapters into these risers. See the following table for PCIe slots corresponding to the risers.

Table 5. PCIe riser and corresponding slots

PCIe riser	PCIe slot
1 PCIe riser 1	Slot 9: PCIe Gen5 x16, FH/HL
6 PCIe riser 2	Slot 10: PCIe Gen5 x16, FH/HL

2 / 3 Inlet and outlet hoses

The Direct Water cold plate module (DWCM) spreads two hoses out to connect to the manifolds. The inlet hose conveys warm water from the facility to the cold plates to cool down the processors, and the outlet hose conducts hot water out of the DWCM to realize system cooling.

4 VGA connector

Connect a monitor to this connector.

5 USB 3.1 Gen 1 (5 Gbps) connectors

There are two USB 3.1 Gen 1 (5 Gbps) connectors on the rear of the server. Connect a USB device, such as a mouse, keyboard, or other devices, to either of these connectors.

6 XCC system management port (10/100/1000 Mbps RJ-45)

The server has a 10/100/1000 Mbps 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 401
- “XCC system management port LEDs” on page 429

7 Identification LED/System error LED/RoT error LED

For more information on the rear LEDs, see “Rear system LEDs” on page 426.

9 Power supply units

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

- 2600-watt Titanium, input power 200-240 Vac

For more information on the power supply LEDs, see “Power supply LEDs” on page 425.

10 Rear fans

Install rear fans in this space. See “Install a rear hot-swap fan” on page 109 for more information.

Rear view with rear drive cage

This section contains information on the rear view with rear drive cage.

Note: The illustration in this section show the location of certain parts. Some parts may not be supported at the same time within certain configuration(s).

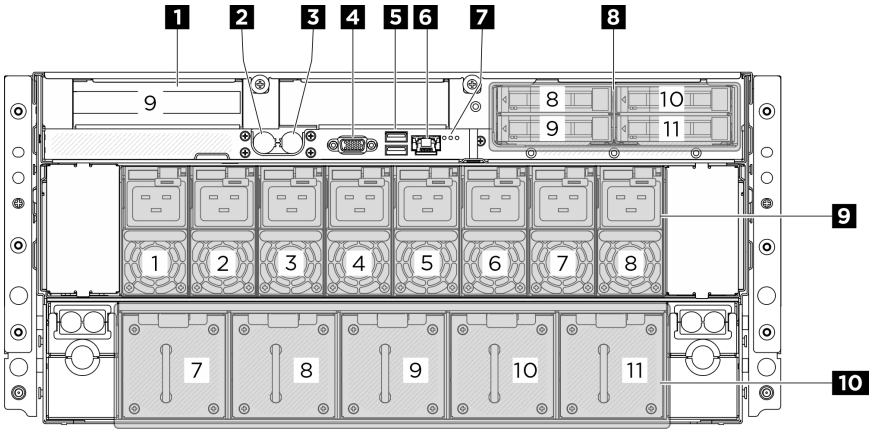


Figure 5. Rear view with rear drive cage

Table 6. Components on the rear view with rear drive cage

1 PCIe riser 1 (PCIe slot 9)	2 Inlet hose
3 Outlet hose	4 VGA connector
5 USB 3.1 Gen 1 (5 Gbps) connectors (total of two connectors)	6 XCC system management port (10/100/1000 Mbps RJ-45) (1 GB RJ-45)

Table 6. Components on the rear view with rear drive cage (continued)

7 Location LED/System error LED/RoT error LED	8 2.5-inch drive bays (bay 8 to 11)
9 Power supply units	10 Rear fans

1 PCIe riser 1

Install PCIe adapters into these risers. See the following table for PCIe slots corresponding to the risers.

Table 7. PCIe riser and corresponding slots

PCIe riser	PCIe slot
1 PCIe riser 1	Slot 9: PCIe Gen5 x16, FH/HL

2 / 3 Inlet and outlet hoses

The Direct Water cold plate module (DWCM) spreads two hoses out to connect to the manifolds. The inlet hose conveys warm water from the facility to the cold plates to cool down the processors, and the outlet hose conducts hot water out of the DWCM to realize system cooling.

4 VGA connector

Connect a monitor to this connector.

5 USB 3.1 Gen 1 (5 Gbps) connectors

There are two USB 3.1 Gen 1 (5 Gbps) connectors on the rear of the server. Connect a USB device, such as a mouse, keyboard, or other devices, to either of these connectors.

6 XCC system management port (10/100/1000 Mbps RJ-45)

The server has a 10/100/1000 Mbps 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 401
- “XCC system management port LEDs” on page 429

7 Identification LED/System error LED/RoT error LED

For more information on the rear LEDs, see “Rear system LEDs” on page 426.

8 2.5-inch drive bays (bay 8 to 11)

Install 2.5-inch NVMe drives to these bays. See “Install a 2.5-inch hot-swap drive” on page 75 for more information.

9 Power supply units

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

- 2600-watt Titanium, input power 200-240 Vac

For more information on the power supply LEDs, see “Power supply LEDs” on page 425.

10 Rear fans

Install rear fans in this space. See “Install a front fan” on page 106 for more information.

Top view

The illustrations in this section provide information about the top view of the server.

The ThinkSystem SR780a V3 top view varies by model. Refer to the top view specific to each model to identify the components.

- “Top view with two PCIe risers” on page 19
- “Top view with rear drive cage” on page 22

Top view with two PCIe risers

This section contains information on the top view with two PCIe risers.

Note: The illustrations in this section show the location of certain parts. Some parts may not be supported at the same time within certain configuration(s).

- “CPU complex top view” on page 19
- “CPU complex water loop top view” on page 20
- “Chassis top view” on page 21
- “GPU complex top view for H100/H200 GPU Model” on page 22

CPU complex top view

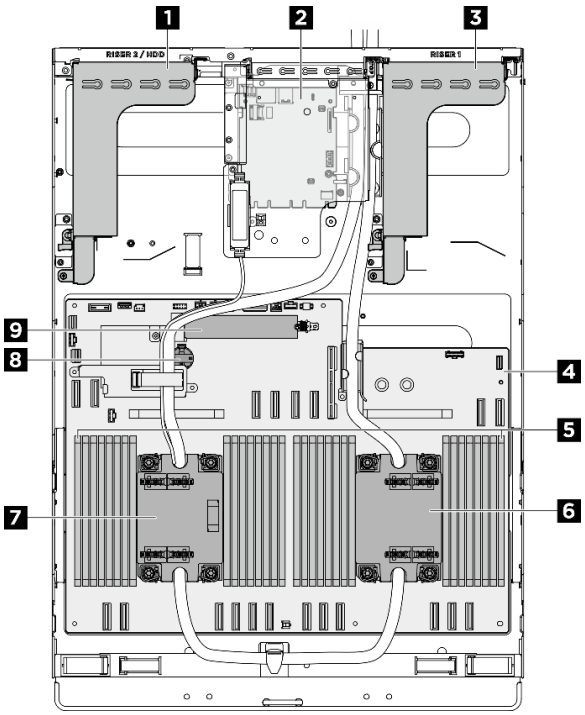


Figure 6. CPU complex top view

Table 8. Components on the CPU complex top view

1 PCIe riser 2	2 System I/O board
3 PCIe riser 1	4 System board
5 Memory modules	6 Processor 1
7 Processor 0	8 CMOS battery
9 M.2 drives	

CPU complex water loop top view

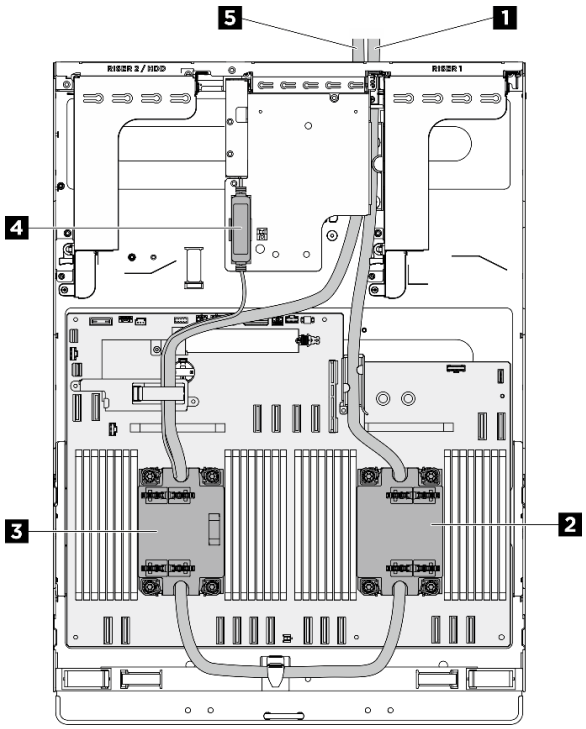


Figure 7. CPU complex water loop top view

Table 9. Components on the CPU complex water loop top view

1 Inlet hose	2 Processor 1
3 Processor 0	4 Leakage sensor module
5 Outlet hose	

Chassis top view

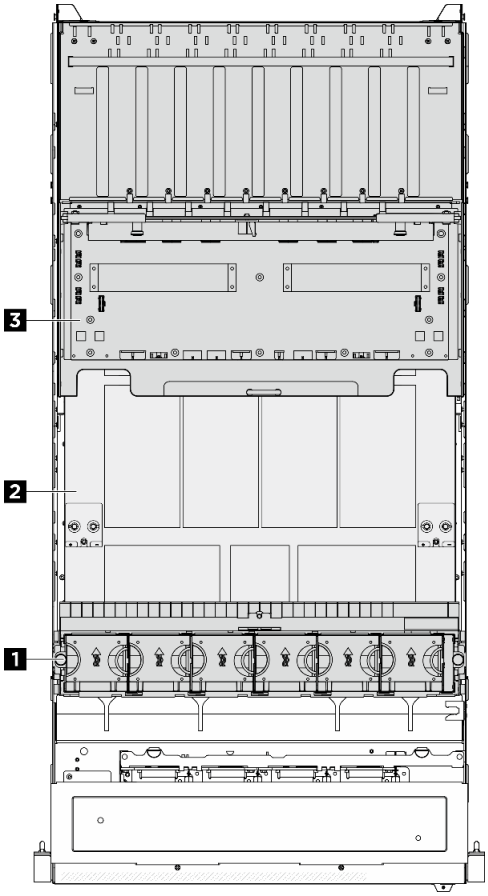


Figure 8. Chassis top view

Table 10. Components on the chassis top view

1 Front fans	2 GPU complex
3 Power distribution board	

GPU complex top view for H100/H200 GPU Model

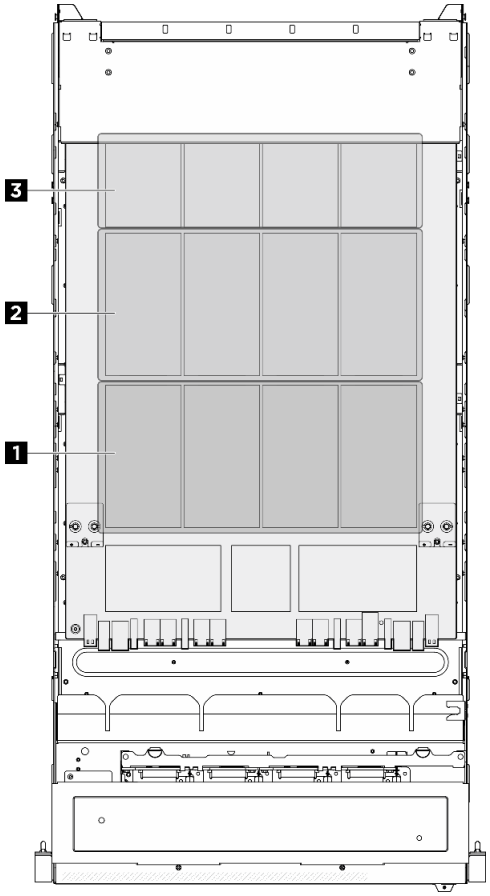


Figure 9. GPU complex top view for H100/H200 GPU Model

Table 11. Components on the GPU complex top view for H100/H200 GPU Model

1 Front H100/H200 GPUs	2 Rear H100/H200 GPUs
3 NVSwitches	

Top view with rear drive cage

This section contains information on the top view with rear drive cage.

Note: The illustrations in this section show the location of certain parts. Some parts may not be supported at the same time within certain configuration(s).

- “CPU complex top view” on page 23
- “CPU complex water loop top view” on page 24
- “Chassis top view” on page 25
- “GPU complex top view for H100/H200 GPU Model” on page 26

CPU complex top view

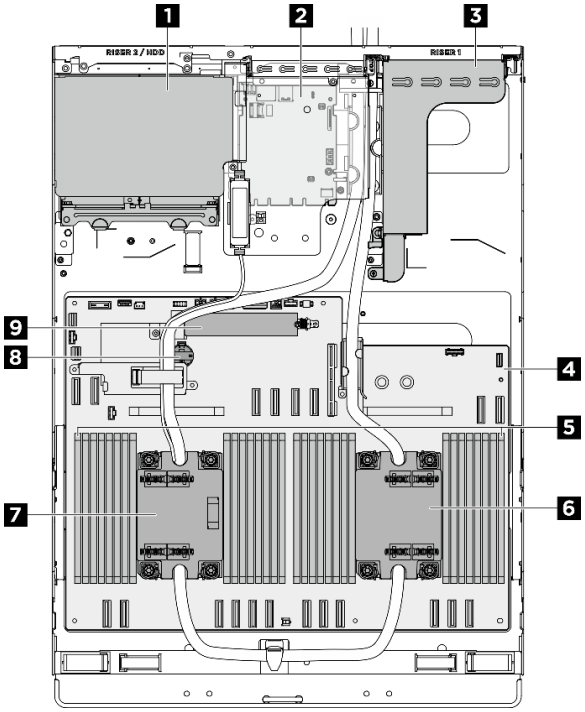


Figure 10. CPU complex top view

Table 12. Components on the CPU complex top view

1 Rear drive cage	2 System I/O board
3 PCIe riser 1	4 System board
5 Memory modules	6 Processor 1
7 Processor 0	8 CMOS battery
9 M.2 drives	

CPU complex water loop top view

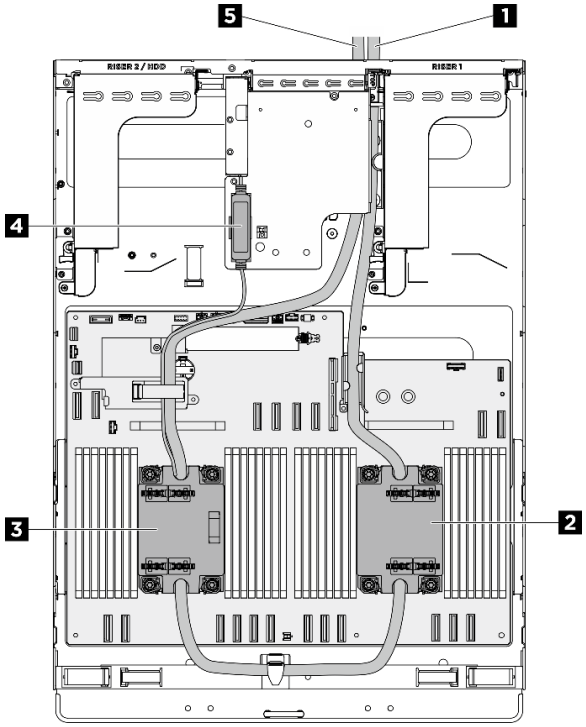


Figure 11. CPU complex water loop top view

Table 13. Components on the CPU complex water loop top view

1 Inlet hose	2 Processor 1
3 Processor 0	4 Leakage sensor module
5 Outlet hose	

Chassis top view

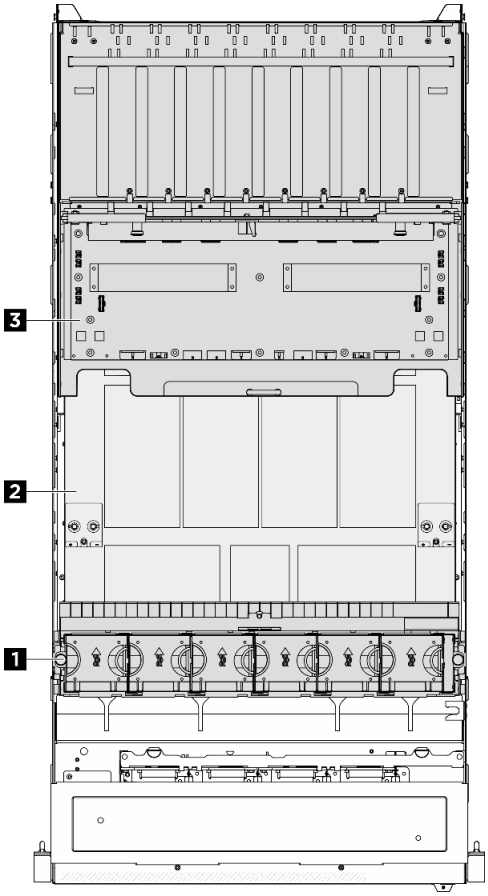


Figure 12. Chassis top view

Table 14. Components on the chassis top view

1 Front fans	2 GPU complex
3 Power distribution board	

GPU complex top view for H100/H200 GPU Model

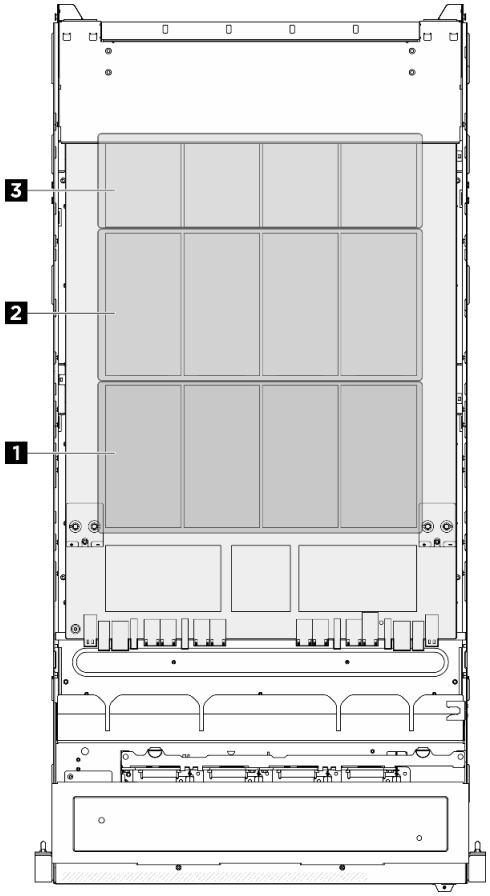


Figure 13. GPU complex top view for H100/H200 GPU Model

Table 15. Components on the GPU complex top view for H100/H200 GPU Model

1 Front H100/H200 GPUs	2 Rear H100/H200 GPUs
3 NVSwitches	

Front I/O module

This section contains information on the front I/O module

The following illustrations show the front I/O module. To locate the front I/O module, see “Front view” on page 13.

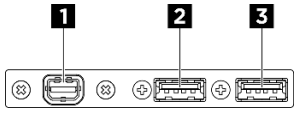


Figure 14. Front I/O module

Table 16. Components on the front I/O module

1 Mini DisplayPort connector	2 USB 2.0 connector with Lenovo XClarity Controller Management
3 USB 3.1 Gen 1 (5 Gbps) connector	

1 Mini DisplayPort connector

Connect a monitor to this connector.

Note: The maximum video resolution is 1920 x 1200 at 60 Hz.

2 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.

Note: This is the only USB port that supports USB automation update of the firmware and RoT security module.

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.

3 USB 3.1 Gen 1 (5 Gbps) connector

The USB 3.1 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.

System board connectors

The following illustration shows the internal connectors on the system board.

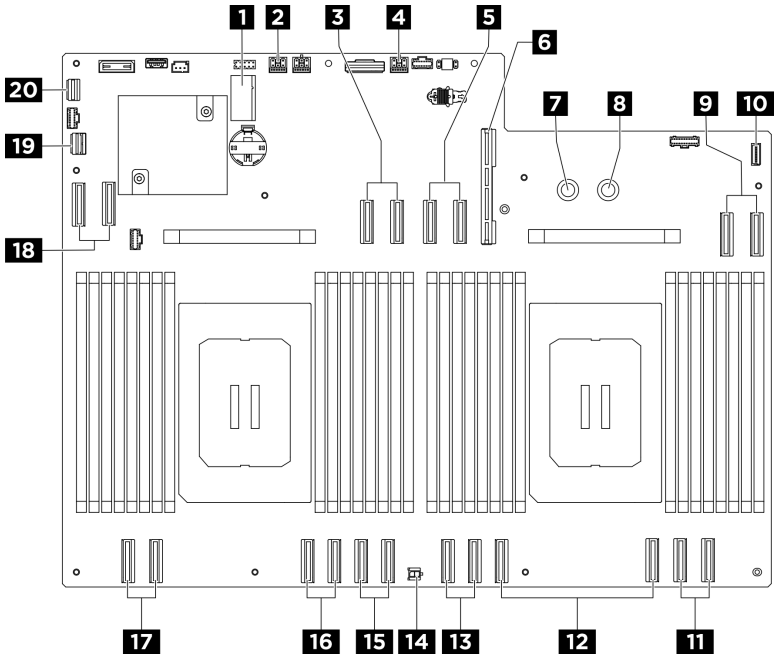


Figure 15. System board connectors

Table 17. System board connectors

1 M.2 slot 1 / M.2 slot 2	2 PCIe Riser 2 power and sideband connector
3 MCIO connector 4 / PCIe Riser 2 signal connector / Rear drive backplane signal connector	4 PCIe Riser 1 power and sideband connector
5 MCIO connector 8 / PCIe Riser 1 signal connectors	6 System I/O board connector (DC-SCM)
7 PDB_0V connector (PSU_GND)	8 PDB_P12V connector (PSU_P12V)
9 MCIO connector 7	10 Integrated diagnostics panel connector
11 MCIO connector 6	12 MCIO connector 5
13 MCIO connector 10	14 CPU leakage detection sensor connector
15 MCIO connector 3	16 MCIO connector 2
17 MCIO connector 1	18 MCIO connector 9
19 PCIe switch sideband connector	20 Front USB / Mini DisplayPort connector

System board switches

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

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.

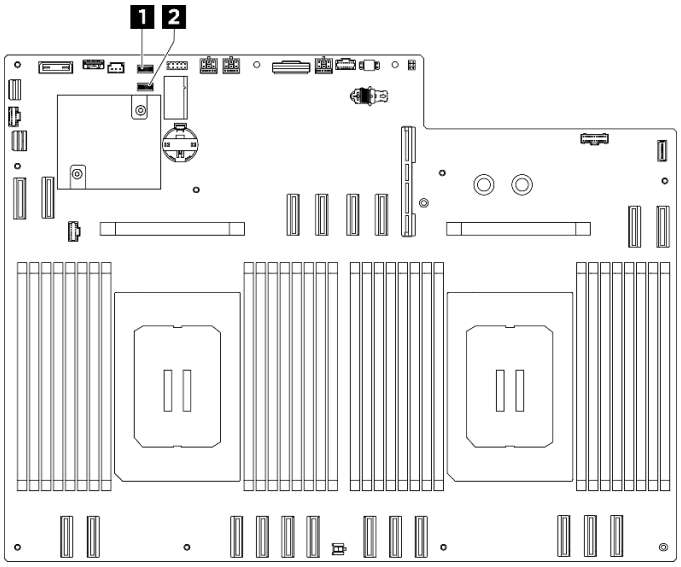


Figure 16. System board switches

Table 18. System board switches

1 Switch block 5 (SW5)	2 Switch block 4 (SW4)

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 43
   - “Handling static-sensitive devices” on page 46
   - “Power off the server” on page 51
2. Any system-board-assembly switch or jumper block that is not shown in the illustrations in this document are reserved.

Switch block 5 (SW5)

The following table describes the functions of the switch block 5 (SW5) on the system board assembly.

Table 19. Switch block 5 (SW5) description

Switch number	Switch name	Usage description	
		On	Off
1	XCC Trusted Platform Module (TPM) physical presence	Assert TPM physical presence	Normal (Default)
2	Flash security override	Enable flash security override	Disable flash security override (Default)
3	ME recovery	Enable ME boots to recovery	Normal (Default)
4	Reserved		

Table 19. Switch block 5 (SW5) description (continued)

Switch number	Switch name	Usage description	
		On	Off
5	Reserved		
6	Reserved		
7	Reserved		
8	Reserved		

Switch block 4 (SW4)

The following table describes the functions of the switch block 4 (SW4) on the system board assembly.

Table 20. Switch block 4 (SW4) description

Switch number	Switch name	Usage description	
		On	Off
1	BIOS recovery mode	Boot BIOS into recovery mode	Normal (Default)
2	Clear CMOS	Clear the real-time clock (RTC) registry	Normal (Default)
3	Password clear	Password clear	Normal (Default)
4	BIOS image swap	Enable BIOS image swap	Normal (Default)
5	PCH_TOP_SWAP_OVERRIDE	Swap	No swap (Default)
6	Reserved		
7	Reserved		
8	Reserved		

System I/O board connectors

The following illustration shows the internal connectors on the system I/O board.

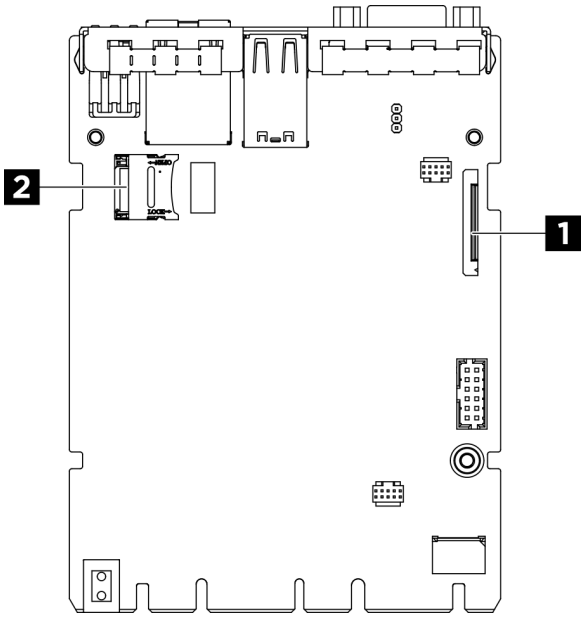


Figure 17. System I/O board connectors

Table 21. System-board-assembly connectors

1 Second Lenovo XClarity Controller management connector (PHY2_CONN)	2 MicroSD socket

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 423.

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.

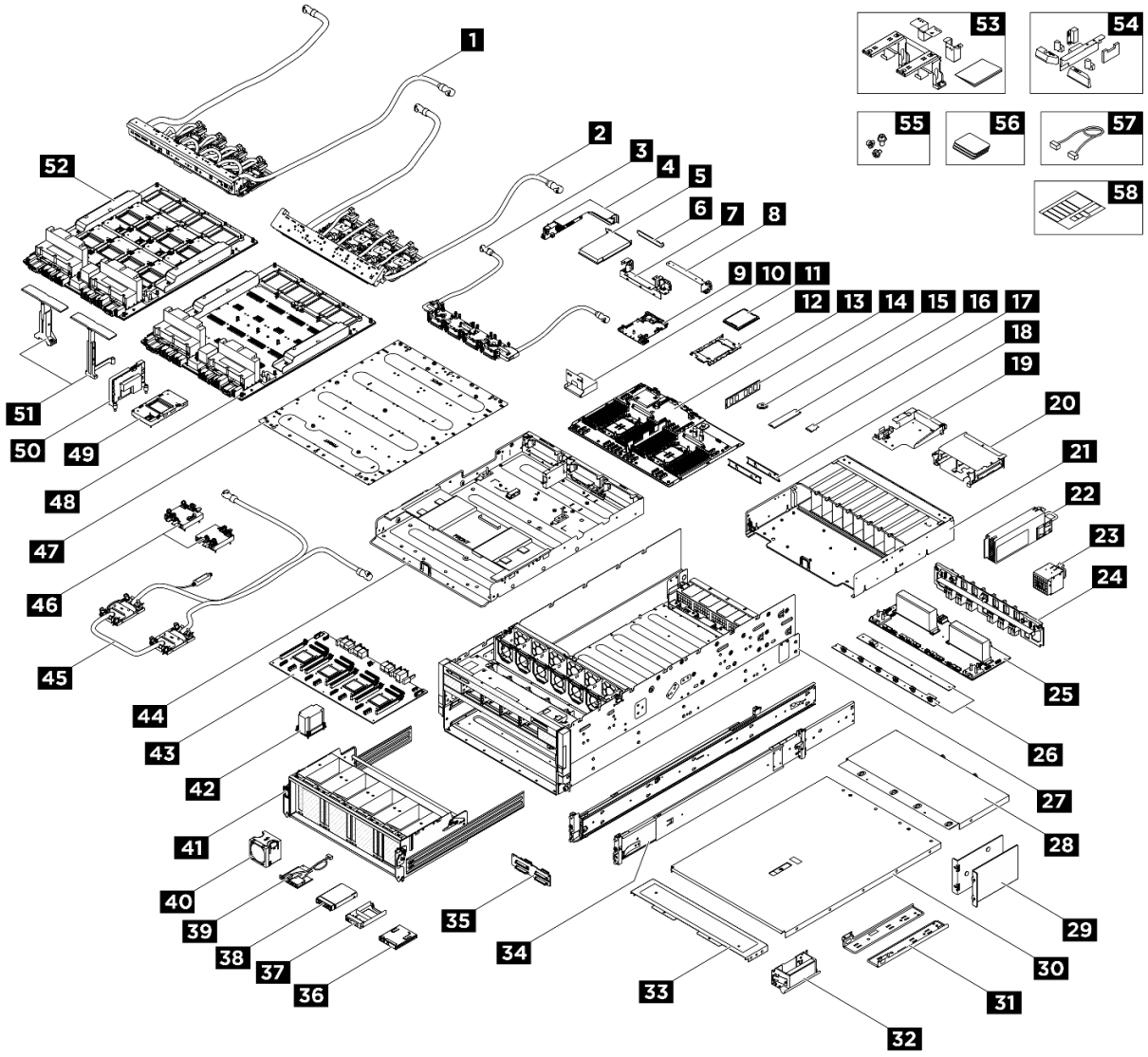


Figure 18. Server components

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 22. Parts list

Index	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 H100/H200 GPU cold plate module	F
2	Rear H100/H200 GPU cold plate module	F
3	NVSwitch cold plate module	F
4	PCIe riser	F
5	PCIe adapter	F
6	PCIe filler (single-slot)	F
7	Rear drive cage support bracket	F
8	PCIe riser support bracket	F
9	System I/O board	F
10	GPU cable holder	F
11	Processor	F
12	Processor carrier	F
13	System board	F
14	Memory module	T1
15	CMOS battery	C
16	M.2 drive	F
17	MicroSD card	F
18	Venting block	F
19	Leakage sensor module bracket	F
20	Rear drive cage	F
21	PSU cage	F
22	Power supply unit	T1
23	Rear fan	T1
24	PSU interposer	F
25	Power distribution board	F
26	Fan control board	F
27	Chassis	F
28	Rear top cover	T1
29	Shipping bracket	T1
30	Front top cover	T1
31	Hose guide	F

Table 22. Parts list (continued)

Index	Description	Type
32	Chassis lift handle	F
33	I/O cover	F
34	Slide rail kit	F
35	2.5-inch drive backplane	F
36	Integrated diagnostics panel	F
37	2.5-inch drive filler (1-bay)	T1
38	2.5-inch hot-swap drive	T1
39	Front I/O module	F
40	Front fan	T1
41	PCIe switch shuttle	F
42	PCIe switch board heat sink	F
43	PCIe switch board	F
44	CPU complex tray	F
45	Lenovo Neptune Processor Direct Water Cooling Module	F
46	Cold plate cover	F
47	GPU baseboard adapter	F
48	GPU baseboard	F
49	GPU	F
50	HMC card	F
51	GPU baseboard handle	F
52	GPU complex	F
53	GPU water loop Service Kit	F
54	DPU air baffle	F
55	Screw	F
56	PCM / putty pad kit	F
57	External cable	T1
	Internal cable	F
58	Label sheet	F

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 41 when setting up the server.

Attention: Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform the replacement procedure of certain parts. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

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.
- Material box, including items such as 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.

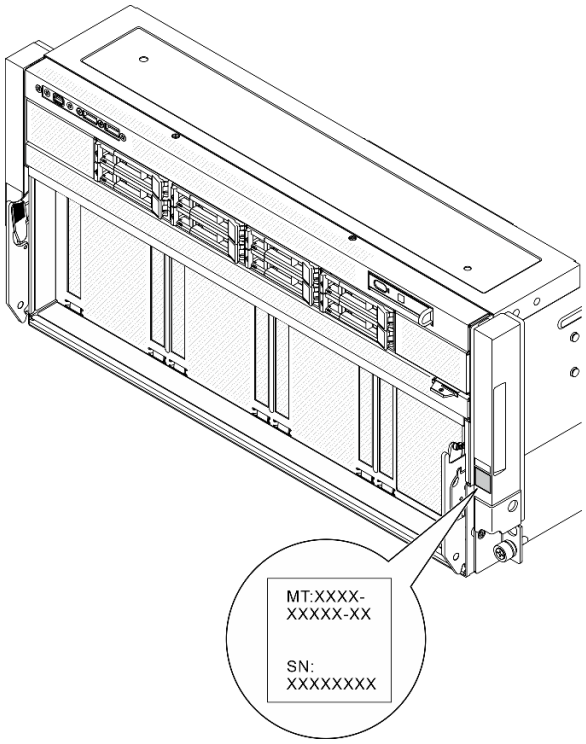


Figure 19. Location of the ID label

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 integrated diagnostics panel in the front of the chassis, with MAC address accessible with a pull.

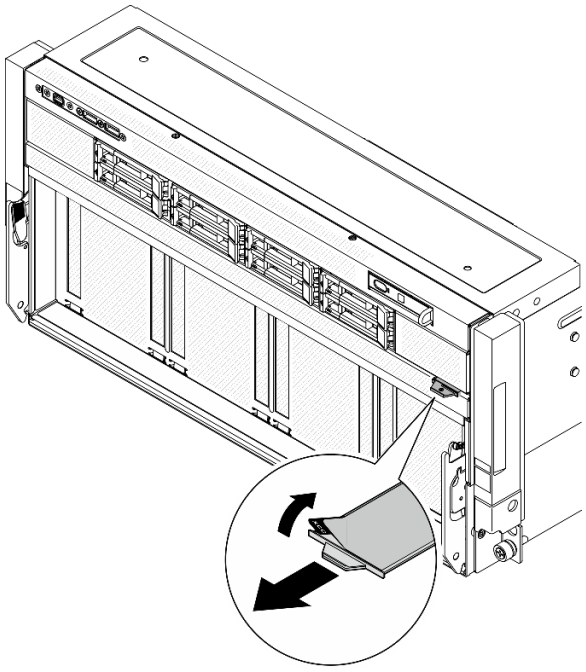


Figure 20. Lenovo XClarity Controller network access label on the pull-out information tab

Service Label and QR code

In addition, the system Service Label is located on the surface of the processor air baffle, provides a quick reference (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 solution support.

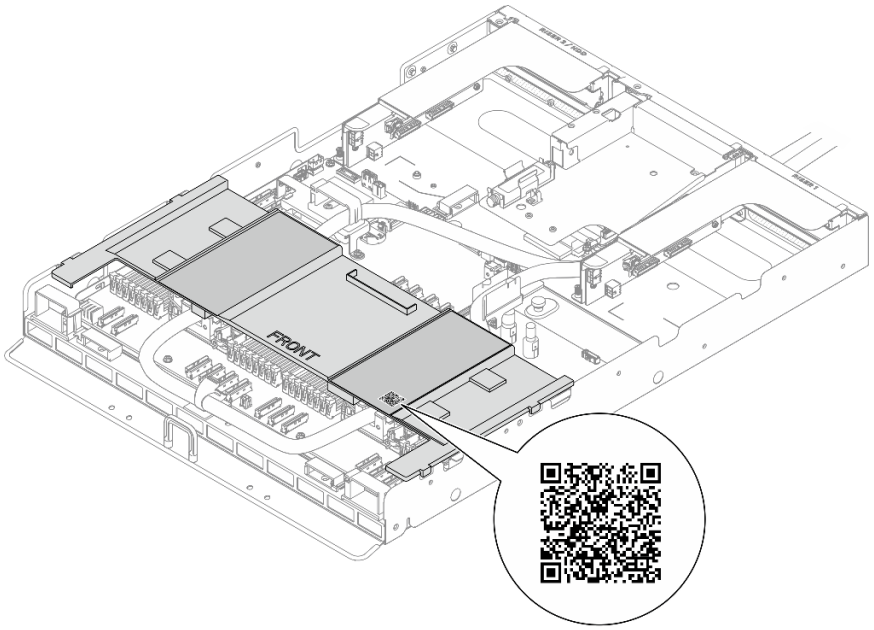


Figure 21. Service Label and QR code

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.

Attention: Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform the replacement procedure of certain parts. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

1. Unpack the server package. See “Server package contents” on page 39.
2. Install any required hardware or server options. See the related topics in Chapter 5 “Hardware replacement procedures” on page 43.

3. If necessary, install the rail to a standard rack cabinet. Follow the instruction in *Rail Installation Guide* that comes with the rail installation kit.
4. If necessary, install the chassis into a standard rack cabinet. See “Install the server to rack” on page 58.
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 423

   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 “System LEDs and diagnostics display” on page 31 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 401.

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.

Attention: Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform the replacement procedure of certain parts. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

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 guideline is available as well: “Handling static-sensitive devices” on page 46.
- 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/tw/en/products/servers/thinksystem/sr780av3/7dj5/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 403.
- 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 Phillips #1 screwdriver, a Phillips #2 screwdriver, a torque screwdriver, a Torx T10 screwdriver, a Torx T15 screwdriver, a flat heat screwdriver, and a 5 mm hex socket screw bit 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.
- Except PSU, orange on a component or a 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.
- PSU with a release tab is a hot-swap PSU.
- 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 serviced by trained personnel, as defined by the IEC 62368-1, 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. Equipment must be installed in a restricted

access location and access to the equipment 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.
7. The design of the electrical distribution system must take into consideration the total grounding leakage current from all power supplies in the server.

   CAUTION:

   High touch current. Connect to earth before connecting to supply.
8. Use the PDUs (power distribution units) with pluggable equipment type B to distribute electrical power to servers.

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.

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

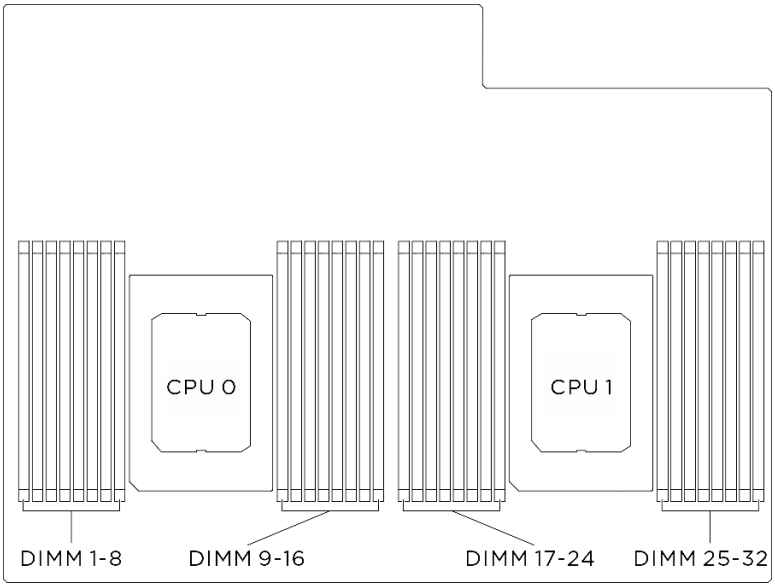


Figure 22. Memory modules and processors layout

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

Table 23. Memory slot and channel identification

Processor	**Processor 0**															
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.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Processor	**Processor 1**															
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.	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

Memory module installation guideline

The ThinkSystem SR780a V3 supports “Memory module installation rules and order” on page 47.

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:

- 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.
- x8 memory modules and x4 memory modules cannot be mixed in a system.
- Mixing 16Gbit (16 GB, 32 GB, 64 GB, 128 GB, 256 GB) and 24Gbit (96 GB) memory module is not allowed in a system.
- All memory modules to be installed must be of the same type. Value RDIMM cannot be mixed with non-value RDIMMs in a system.
- All memory modules in a system must have the same number of ranks.

The following table shows the sequence of populating memory modules for independent mode.

Table 24. Independent mode

Total DIMMs	**Processor 0**															
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
32 DIMMs†‡	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Total DIMMs	**Processor 1**															
	17	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**
32 DIMMs†‡	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

Note: † Sub NUMA Clustering (SNC2) feature can only be enabled when DIMMs are populated in this specified sequence. The SNC2 feature can be enabled via UEFI.

‡ DIMM configurations that support Software Guard Extensions (SGX), see “Enable Software Guard Extensions (SGX)” on page 408 to enable this feature.

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).
- Partial Memory Mirroring is a sub-function of memory mirroring. It requires following the memory installation order of memory mirroring mode.

The following table shows the DIMM population sequence for memory mirroring mode.

The following table shows the sequence of populating memory modules for independent mode.

Table 25. Mirroring mode mode

Total DIMMs	**Processor 0**															
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
32 DIMMs†‡	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Total DIMMs	**Processor 1**															
	17	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**
32 DIMMs†‡	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

Note: † Sub NUMA Clustering (SNC2) feature can only be enabled when DIMMs are populated in this specified sequence. The SNC2 feature can be enabled via UEFI.

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

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).

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 423

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 51.

Power off the server

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

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 423

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 50.

Server replacement

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

Remove the server from rack

Follow instructions in this section to remove the server from the rack.

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.

S036

CAUTION:
Use safe practices when lifting.

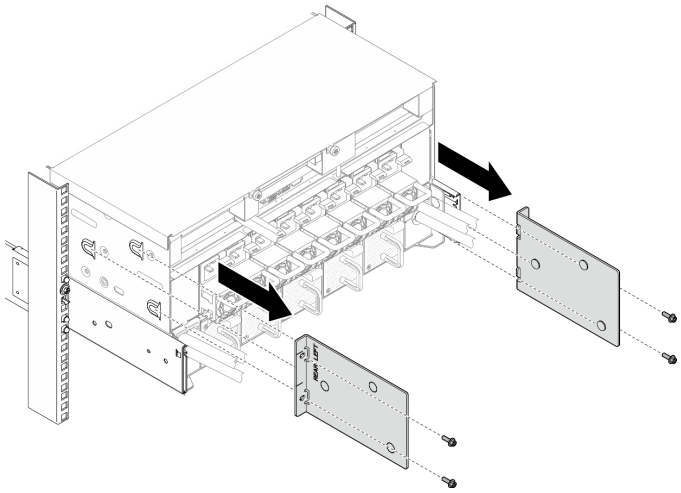
R006

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.

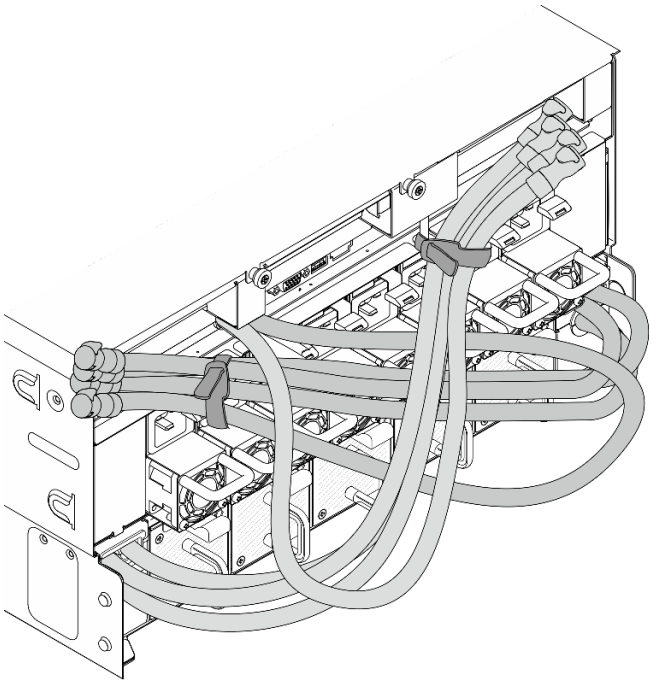
About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- Unfasten the four screws and remove the support bracket if necessary.



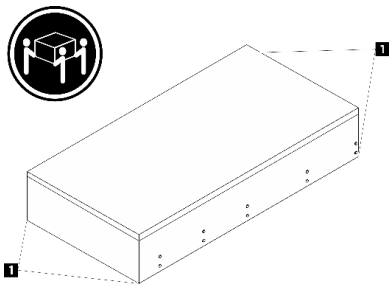
- Secure the hoses with the hose ties before removing the server from the rail.



Step 1. Make sure a lifting device is available on site to lift the server.

S037

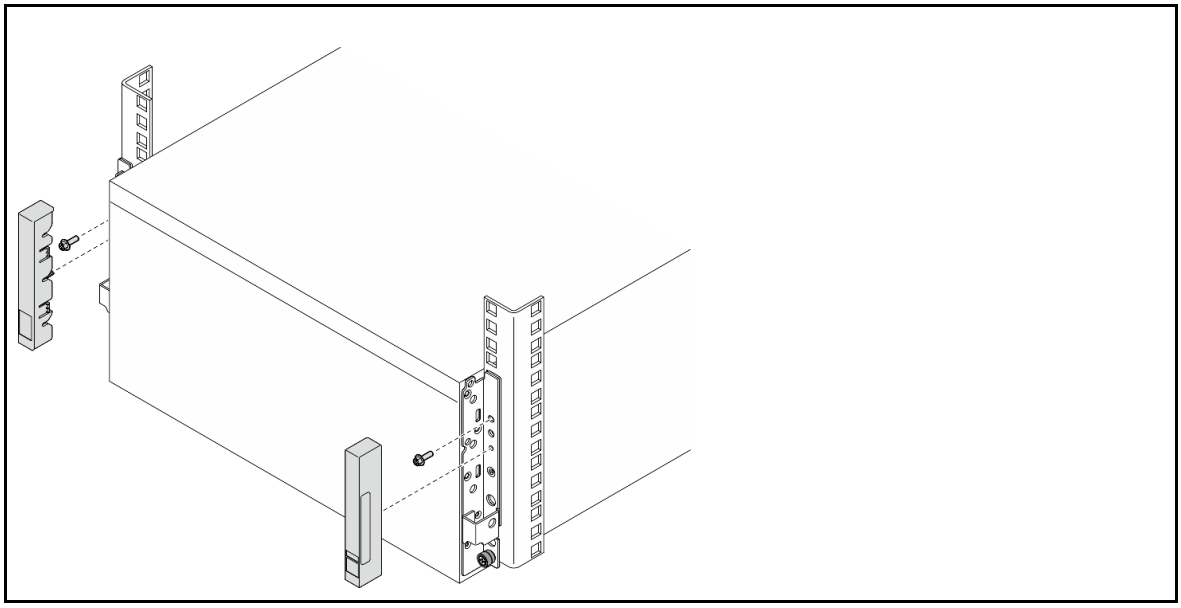
CAUTION:
The weight of this part or unit is more than 55 kg (121.2 lb). It takes specially trained persons, a lifting device, or both to safely lift this part or unit.



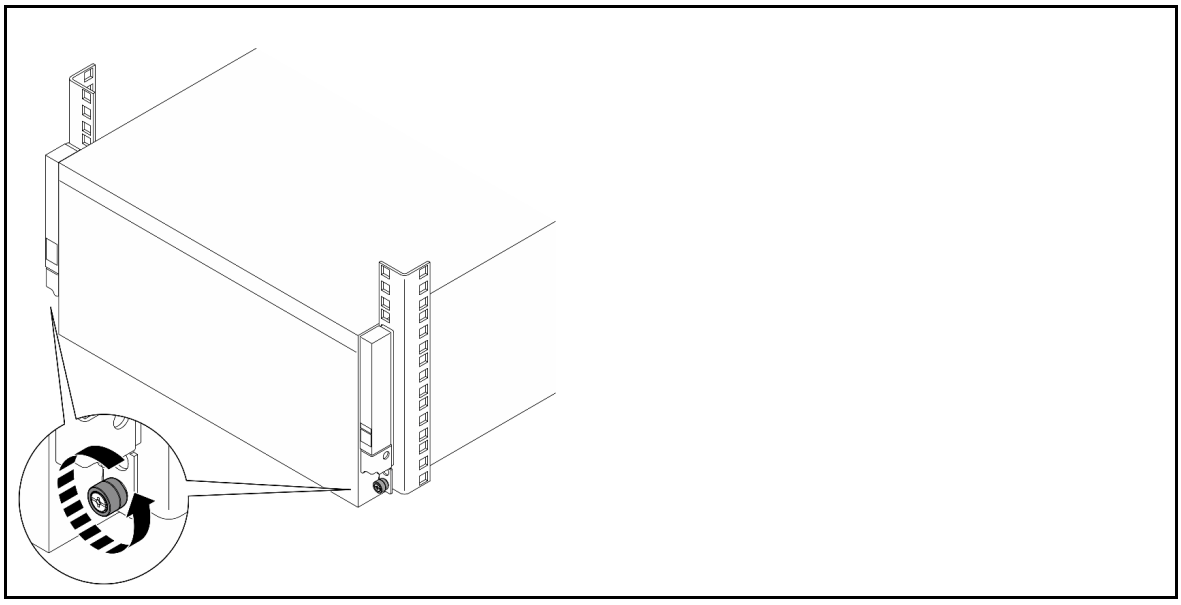
CAUTION:
Make sure to lift the server by holding the lift points.

1 Lift point

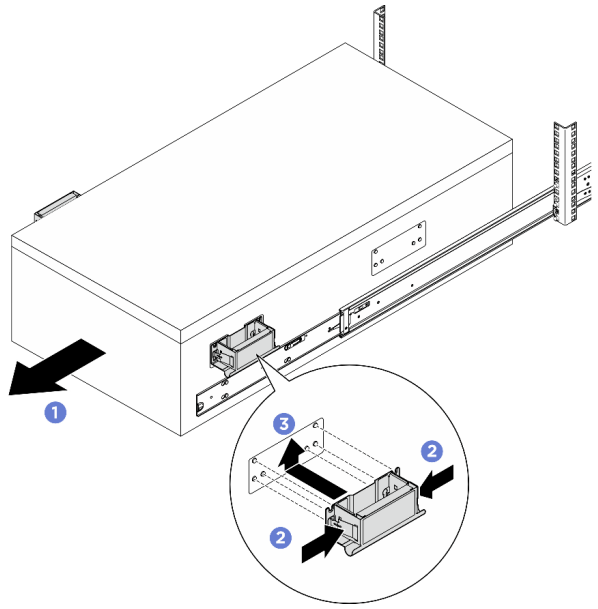
Step 2. If the chassis was shipped in the rack cabinet, remove the EIA covers and remove the two M5 screws; then, install the EIA covers back in place.



Step 3. Loosen the thumbscrews.



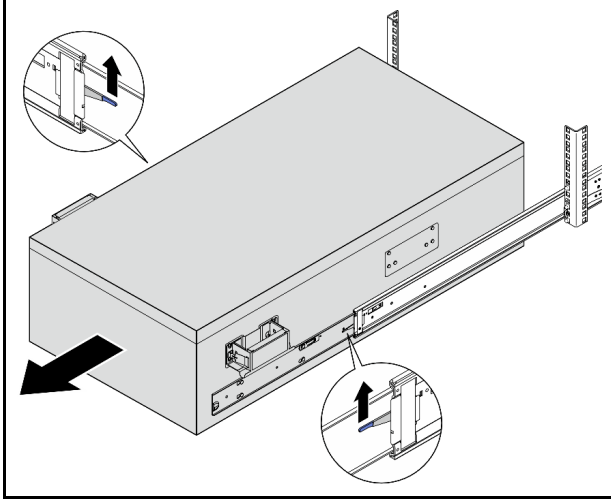
Step 4. Install the front lift handle.



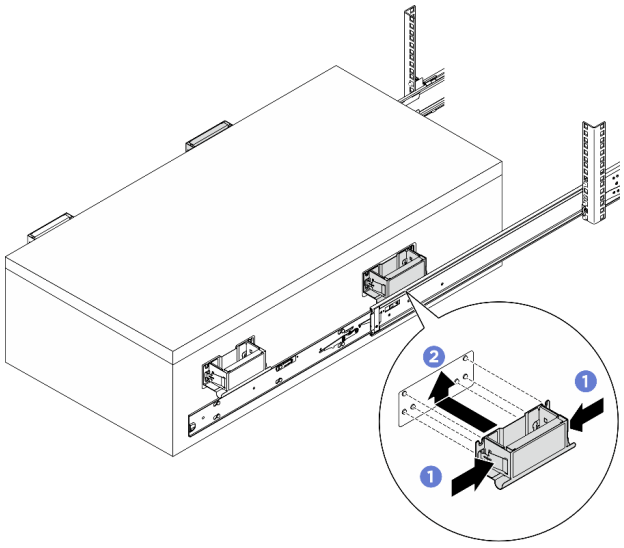
1. Slide the server out until it stops.
2. Pinch both flaps on the side of the handles.
3. Align the handles with the 6 posts on the sides of the server; then slide the handles up to secure them to the server.

CAUTION:
Make sure to install both front lift handles first before proceeding sliding out.

Step 5. Lift the first lock latches up to proceed sliding out.



Step 6. Attach the rear handles.

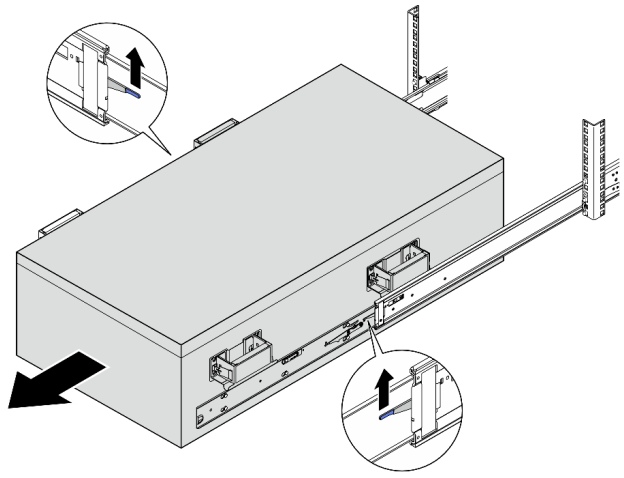


1 Pinch both flaps on the side of the handles.

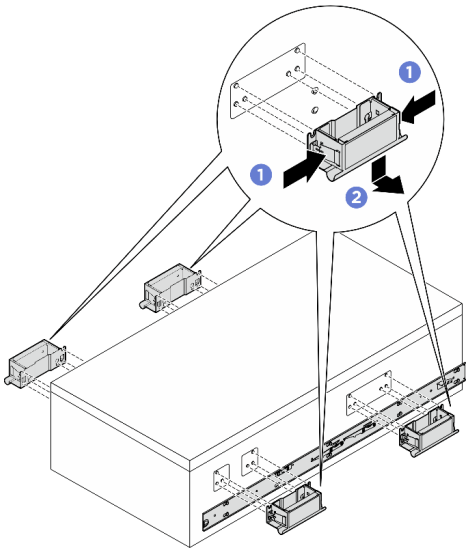
2 Align the handles with the 6 posts on the sides of the server; then slide the handles up to secure them to the server.

CAUTION:
Make sure to install both rear lift handles first before proceeding sliding out.

Step 7. Lift the second lock latches up and remove the server completely from the rack; then place it on a flat and stable surface.



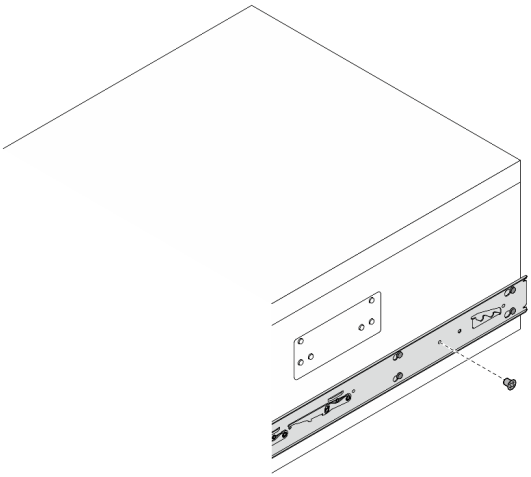
Step 8. Remove the lift handles.



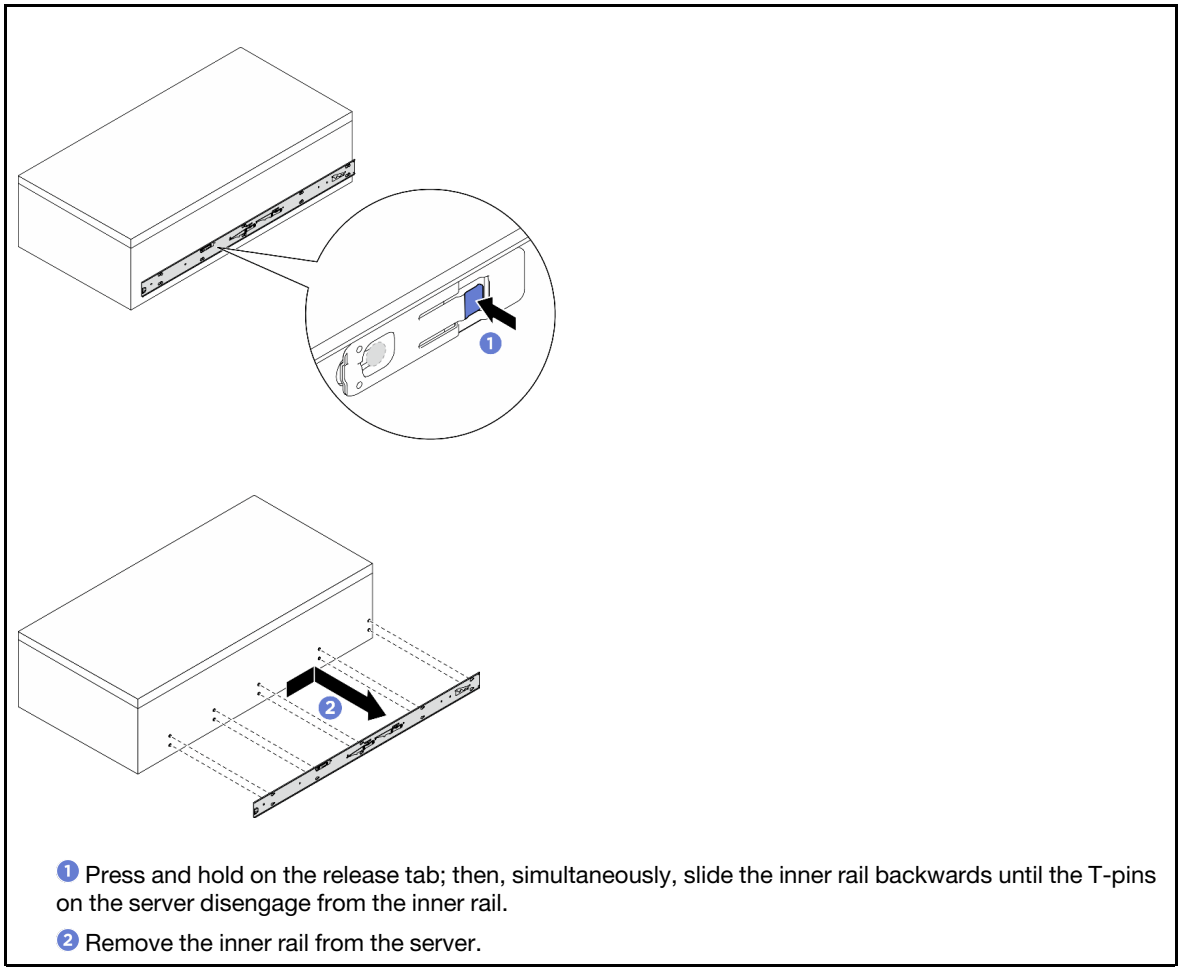
1 Pinch both flaps on the side of the handles.
2 Slide the handles down to remove them.

Note: Make sure to remove all 4 lift handles.

Step 9. Loosen and remove an M4 screw in the corresponding hole on both inner rails as shown.



Step 10. Remove the inner rail from the server.



1 Press and hold on the release tab; then, simultaneously, slide the inner rail backwards until the T-pins on the server disengage from the inner rail.

2 Remove the inner rail from the server.

Step 11. Repeat the previous step on the other rail.

After you finish

Carefully lay the chassis on a flat, static-protective surface.

1. To remove the rails from a rack, follow the instructions that are provided in the *Rail installation Guide*.

Install the server to rack

Follow instructions in this section to install the server to the rack.

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.

S036

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.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- **Firmware and driver download**: You might need to update the firmware or driver after replacing a component.
  - Go to https://datacentersupport.lenovo.com/tw/en/products/servers/thinksystem/sr780av3/7dj5/downloads/driver-list/ to see the latest firmware and driver updates for your server.
  - Go to “Update the firmware” on page 403 for more information on firmware updating tools.
- To install the rails into a rack, follow the instructions that are provided in the *Rail installation Guide*.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- The recommended maximum lift height for installation is 142 cm (56 inches). The recommended maximum units to be installed on the rack is up to 6 units from the bottom to the top of the rack as illustrated.

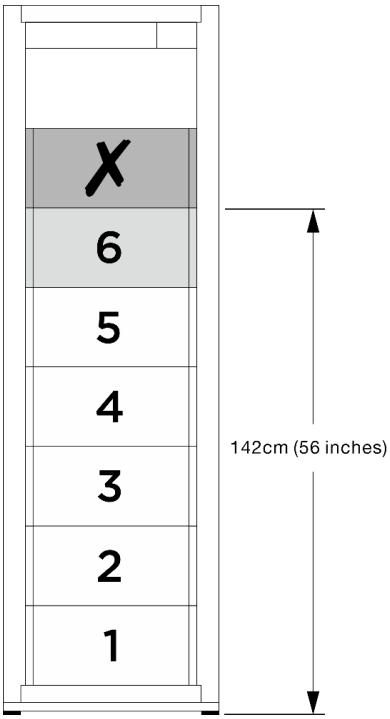


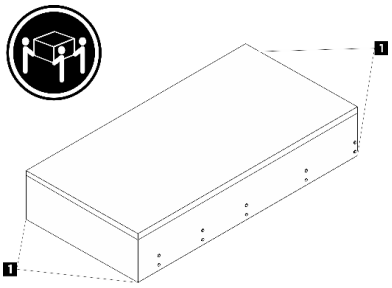
Figure 23. Recommended maximum installation height

After rails are installed successfully, complete the following steps to install the chassis in a rack.

Step 1. Make sure a lifting device is available on site to lift the server and place it on a flat and stable surface.

S037

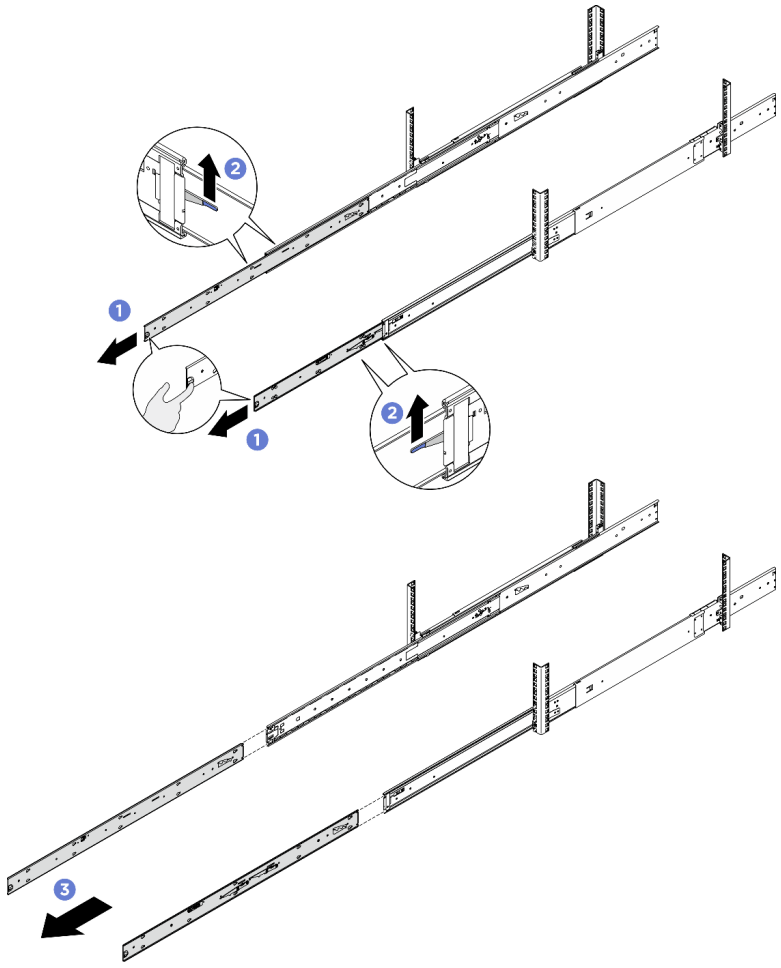
CAUTION:
The weight of this part or unit is more than 55 kg (121.2 lb). It takes specially trained persons, a lifting device, or both to safely lift this part or unit.



CAUTION:
Make sure to lift the server by holding the lift points.

1 Lift point

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



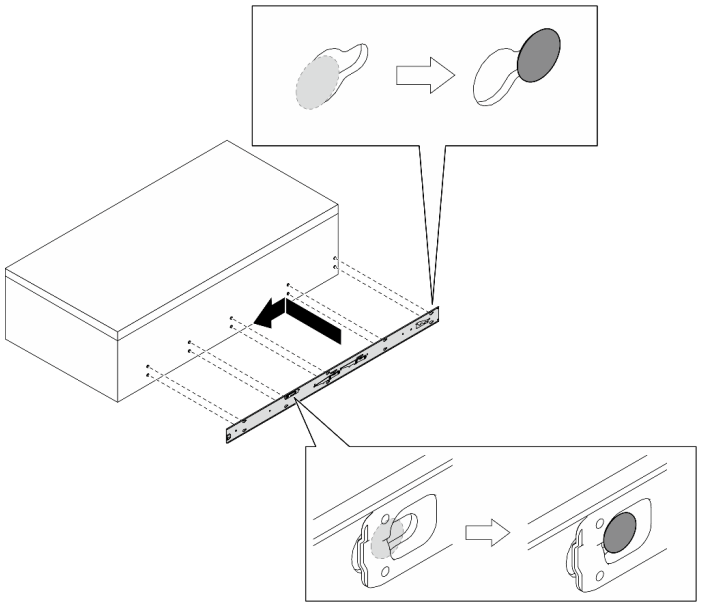
1 Pull the inner rails all the way out until they stop.

2 Lift the lock latches, and pull the inner rails to disengage them from the intermediate rails.

Attention: There are two pairs of lock latches on the rails. Lift the second pair of latches to proceed to slide the inner rails out.

3 Remove the inner rails.

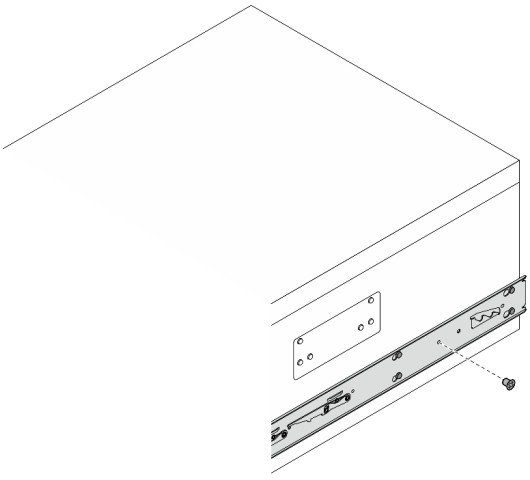
Step 3. Align the slots on the inner rail with the corresponding T-pins on the side of the server; then, install and slide the inner rail towards the front of the server until the T-pins lock into place.



Attention:

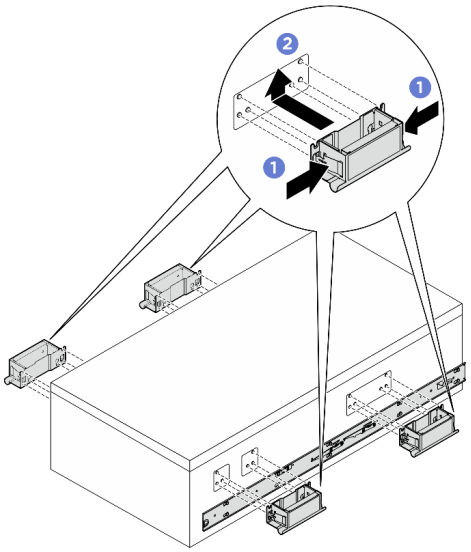
- Make sure all 10 T-pins are engaged with the inner rail.
- Once the inner rail locks into place, you will hear a soft “click” sound.

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 handles.



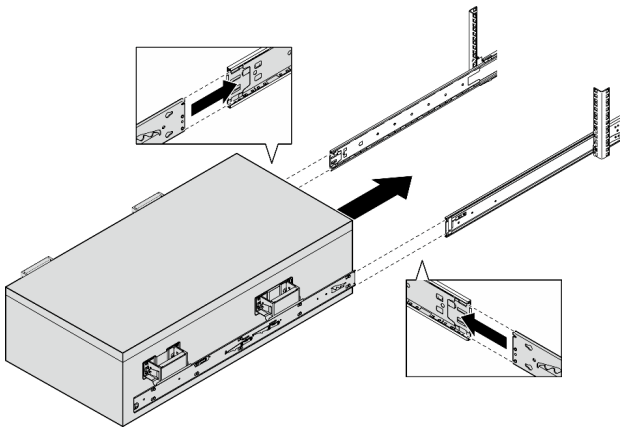
1 Pinch both flaps on the side of the handles.

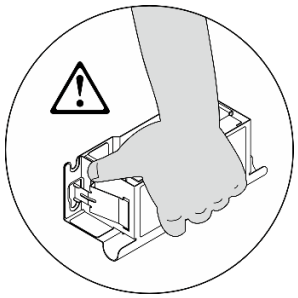
2 Align the handles with the 6 posts on the sides of the server; then slide the handles up to secure them to the server.

Notes:

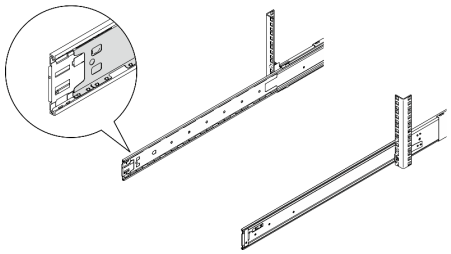
- Make sure all 6 posts are secured.
- There are 4 lift handles in total. Make sure to install them all properly before lifting the server.

Step 7. 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.



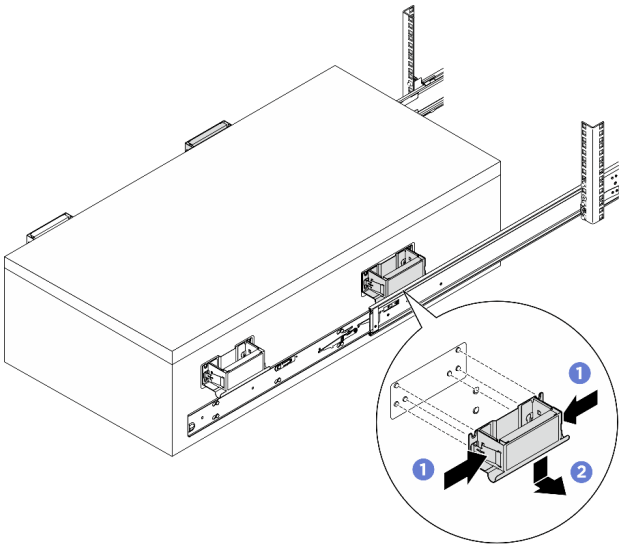


Attention: When moving the server, hold the server by its lift points or the lift handles at all time.



Attention: Before inner rail is inserted into intermediate rail, ensure that the ball retainer is at the foremost of the intermediate rail.

Step 8. Remove the lift handles.

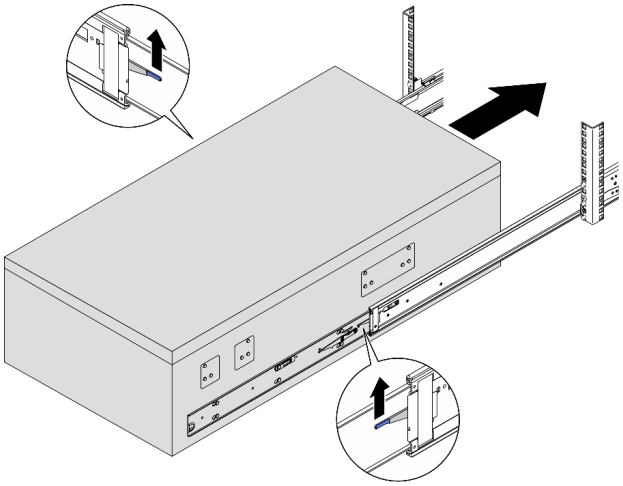


1 Pinch both flaps on the side of the handles.

2 Slide the handles down to remove them.

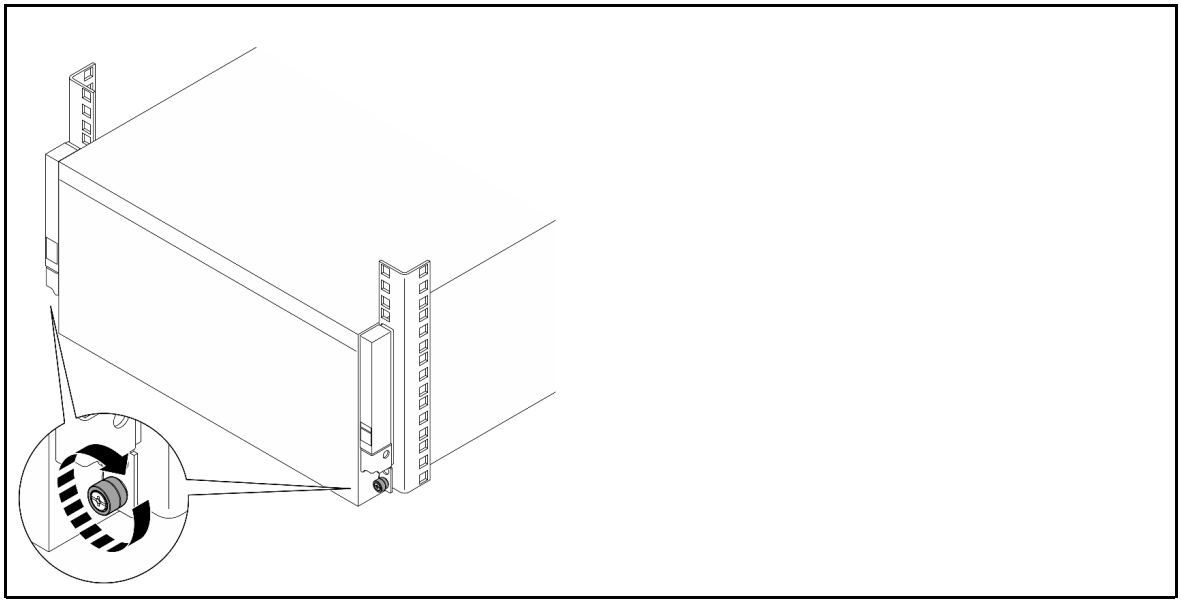
Note: Make sure to remove all the lift handles before proceeding sliding in.

Step 9. Lift the first pair of lock latches to proceed to slide the server in.



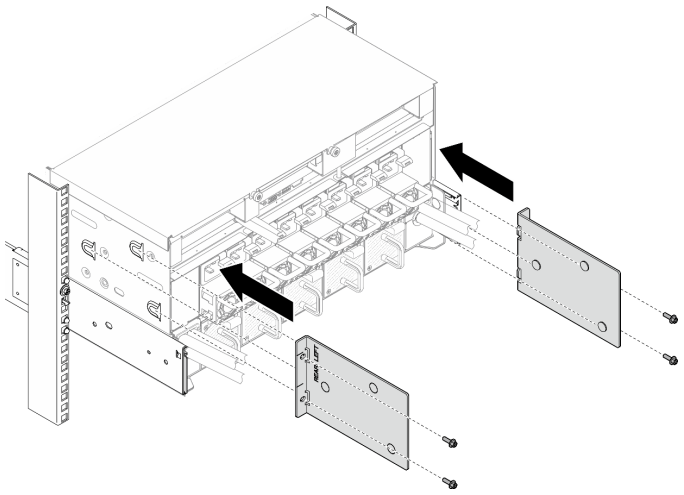
Attention: Slide the server all the way out and all the way back in to make sure the rails are working smoothly.

Step 10. Tighten the thumbscrews to secure the server to the rack.



After you finish

Install the support brackets if necessary. Align and insert the support brackets; then, fasten the four screws to secure the support brackets to the rack.



1. Reinstall all the components that were removed previously.
2. Reconnect the power cords and any cables that you removed.
3. Power on the server and any peripheral devices. See “Power on the server” on page 50.
4. Update the server configuration. See “Complete the parts replacement” on page 363.

Top cover replacement

Follow instructions in this section to remove and install the front top cover and the rear 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

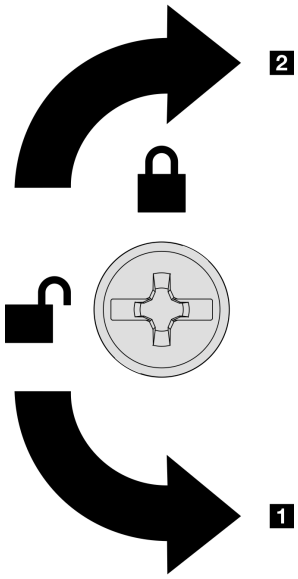
CAUTION:
Hazardous energy present. Voltages with hazardous energy might cause heating when shorted with metal, which might result in spattered metal, burns, or both.

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- 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 front top cover is locked, unlock it with a screwdriver (direction 1).



1 Unlocking direction
2 Locking direction

Figure 24. Front top cover locking/unlocking direction

Step 2. Remove the front top cover from the server.

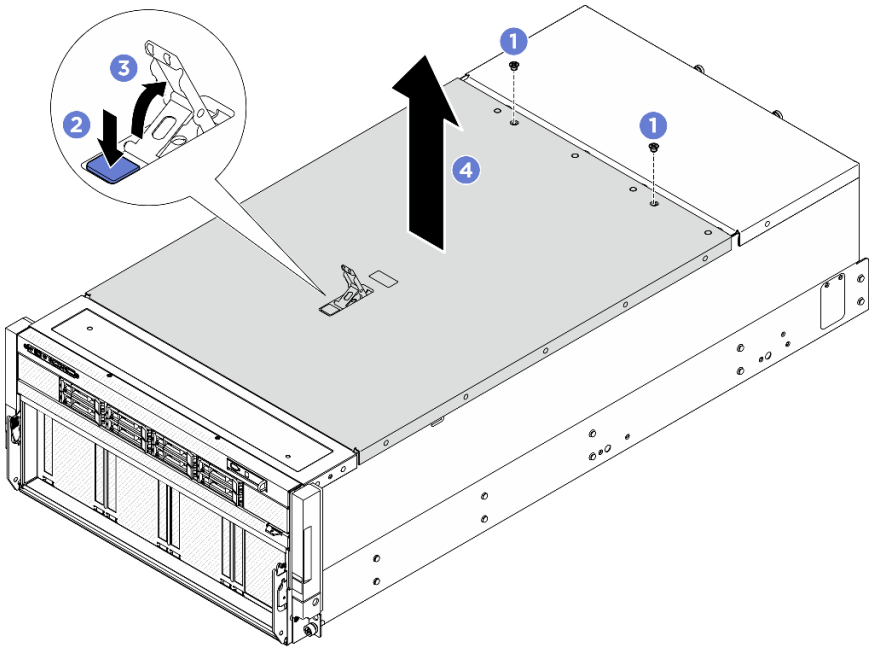


Figure 25. Removing front top cover

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 Unfasten the two M3 screws.

b. Press the blue button on the front top cover release latch.
c. Rotate the end of the latch up until it is in vertical position.
d. Lift the front top cover to remove it.

After you finish

1. Install a replacement unit. See “Install the front top cover” on page 69.
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 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 43 and “Safety inspection checklist” on page 44 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 365.

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.

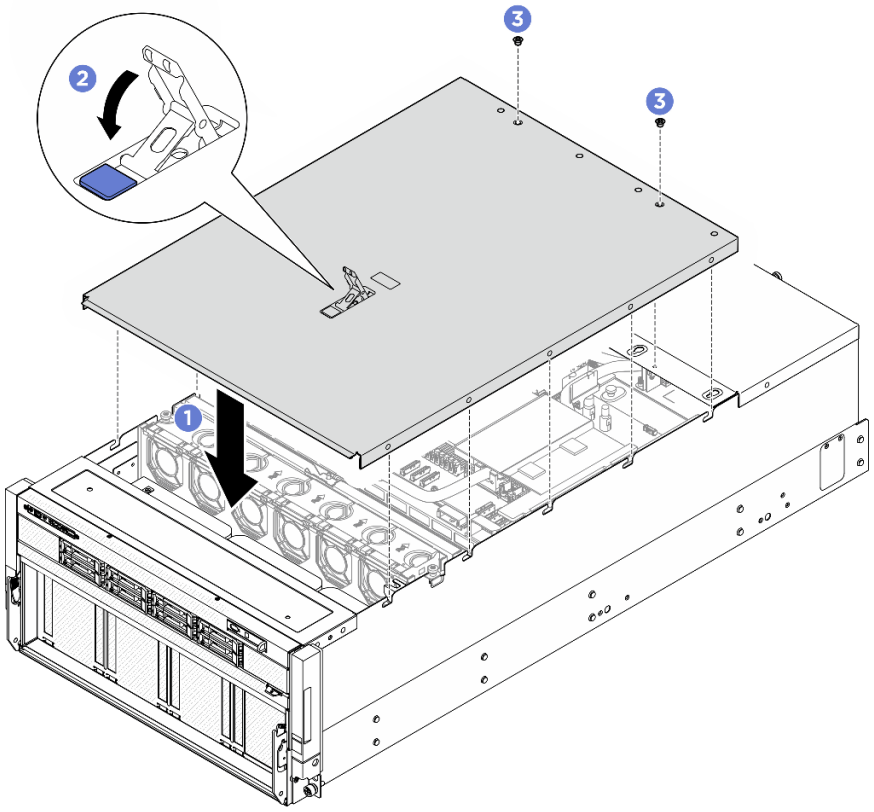


Figure 26. Installing front top cover

a. 1 Align the front top cover guide pins with the guide holes on chassis; then place the front top cover on top of the server with both sides aligned.

b. 2 Rotate the latch down until it stops.

c. 3 Fasten the two M3 screws (PH1, 2 x M3, 0.5 newton-meters, 4.3 inch-pounds).

After you finish

Complete the parts replacement. See “Complete the parts replacement” on page 363.

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 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See "Power off the server" on page 51.

Procedure

Step 1. Remove the front top cover. See "Remove the front top cover" on page 67.

Step 2. Remove the rear top cover from the server.

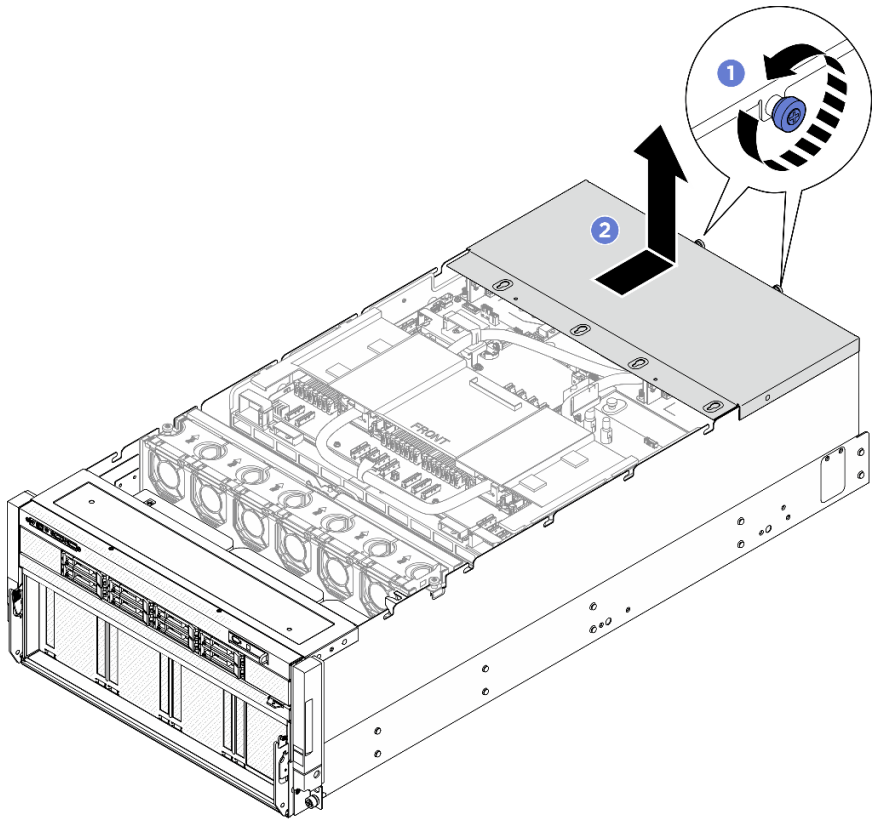


Figure 27. Removing rear top cover

a. ① Loosen the two thumbscrews on the rear of the server.

b. ② Slide the rear top cover towards the rear of the server and lift to remove it.

After you finish

1. Install a replacement unit. See “Install the rear top cover” on page 72.
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 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 43 and “Safety inspection checklist” on page 44 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 365.

Procedure

Step 1. Install the rear top cover.

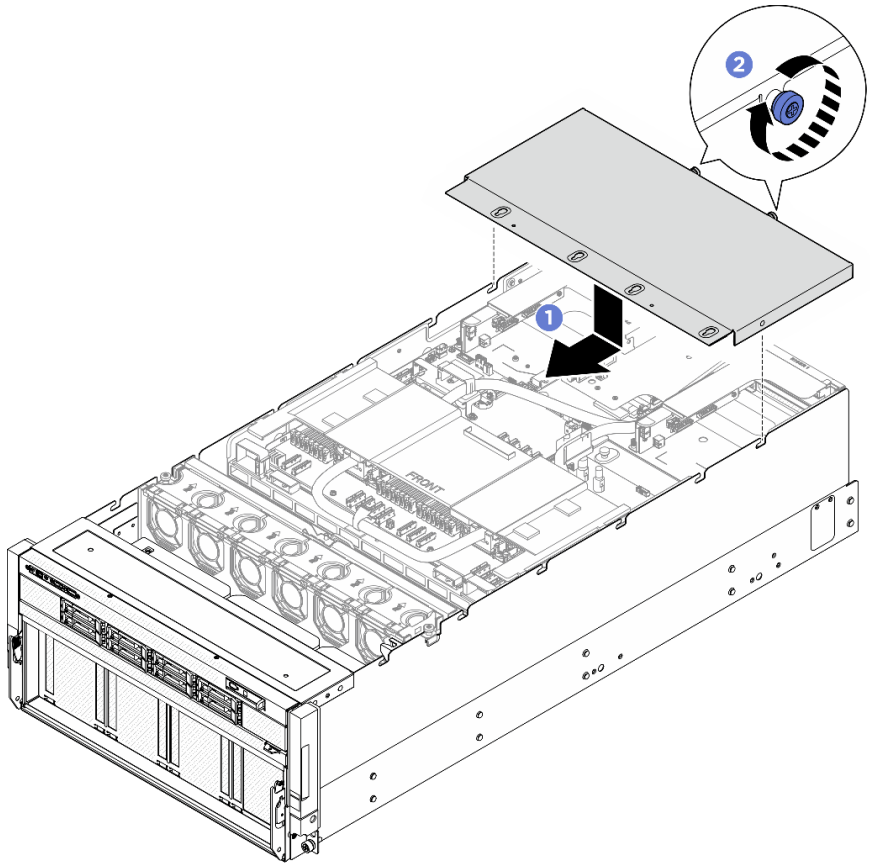


Figure 28. Installing rear top cover

a. 1 Align the rear top cover guide pins with the guide holes on chassis; then place the rear top cover on top of the server and slide it towards the front of the server until it engages with the chassis.

b. 2 Secure the two thumbscrews on the rear of the server.

After you finish

1. Reinstall the front top cover. See "Install the front top cover" on page 69.
2. Complete the parts replacement. See "Complete the parts replacement" on page 363.

2.5-inch hot-swap drive replacement

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

Remove a 2.5-inch hot-swap drive

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

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- 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 system board assembly), drive backplanes or drive cables, back up all important data that is stored on drives.
- The server supports up to eight front and four rear 2.5-inch hot-swap NVMe drives with the following corresponding drive bay numbers.

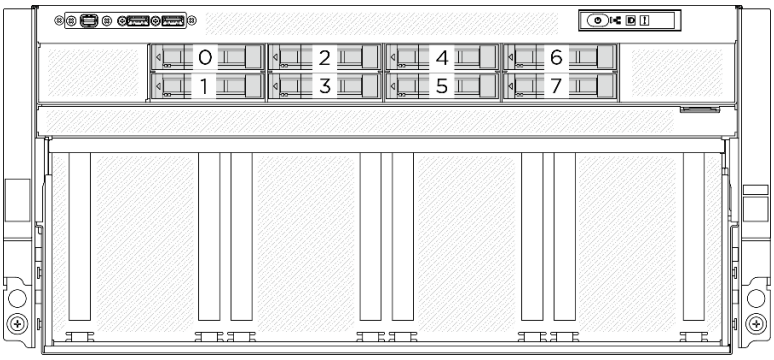


Figure 29. Front 2.5-inch drive bay numbering

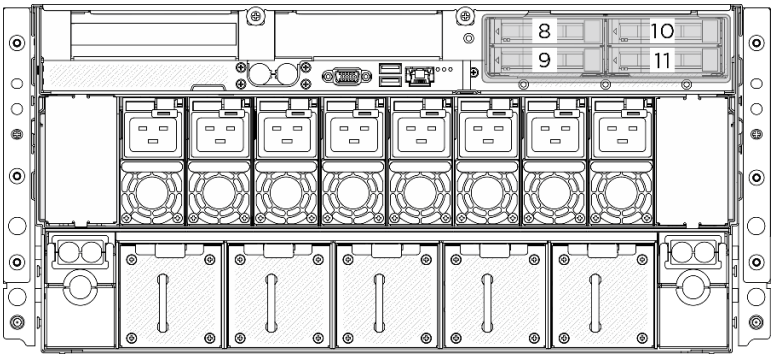


Figure 30. Rear 2.5-inch drive bay numbering

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

Procedure

Step 1. ❶ Slide the release latch to unlock the drive handle.

Step 2. ❷ Rotate the drive handle to the open position.

Step 3. ❸ Grasp the handle and slide the drive out of the drive bay.

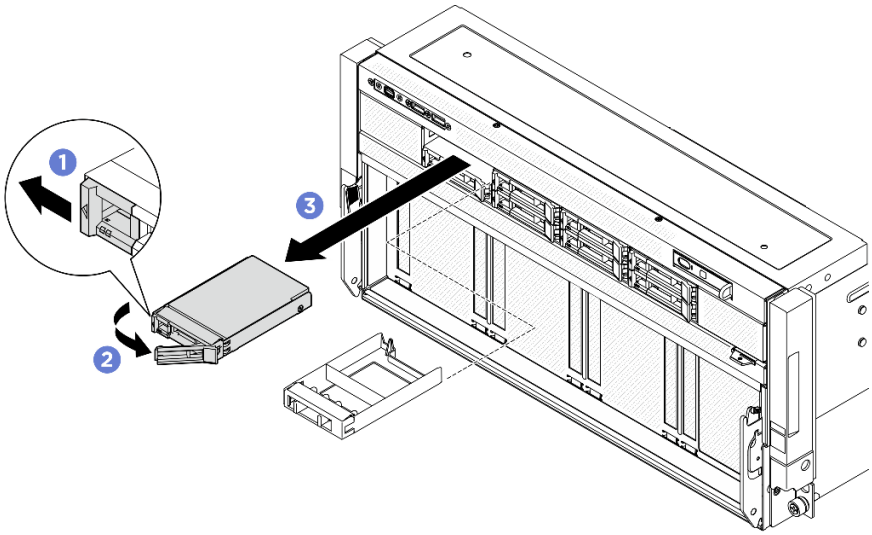


Figure 31. Front 2.5-inch hot-swap drive removal

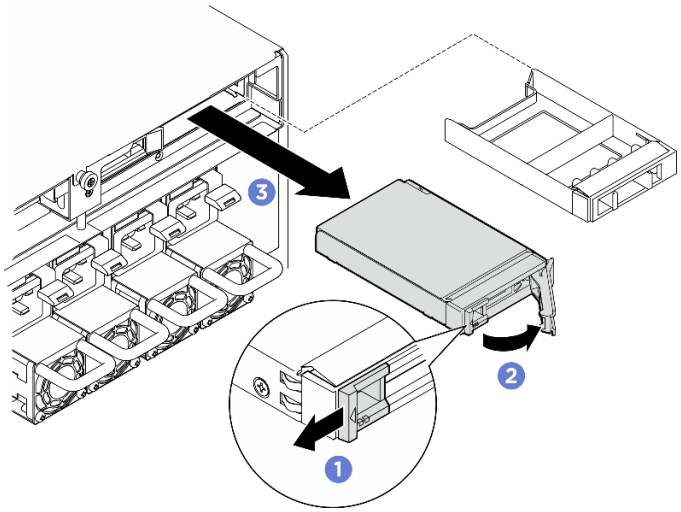


Figure 32. Rear 2.5-inch hot-swap drive removal

After you finish

Note: Install a drive bay filler or replacement drive as soon as possible. See "Install a 2.5-inch hot-swap drive" on page 75.

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 a 2.5-inch hot-swap drive

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

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- Make sure you save the data on your drive, especially if it is part of a RAID array, before you remove it from the server.
- 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 make changes to drives, drive controllers (including controllers that are integrated on the system board assembly), drive backplanes, or drive cables, back up all important data that is stored on drives.
- The server supports up to eight front and four rear 2.5-inch hot-swap NVMe drives with the following corresponding drive bay numbers.

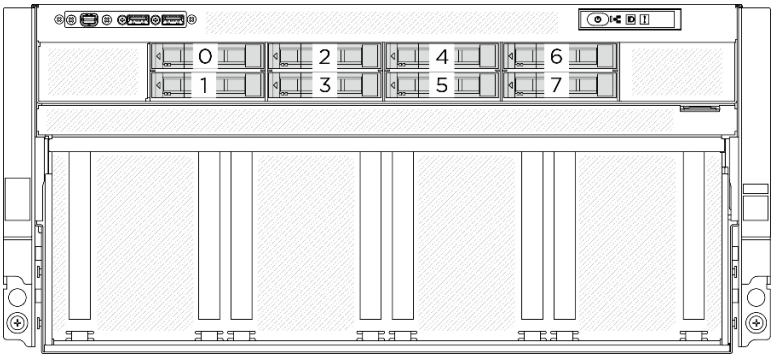


Figure 33. Front 2.5-inch drive bay numbering

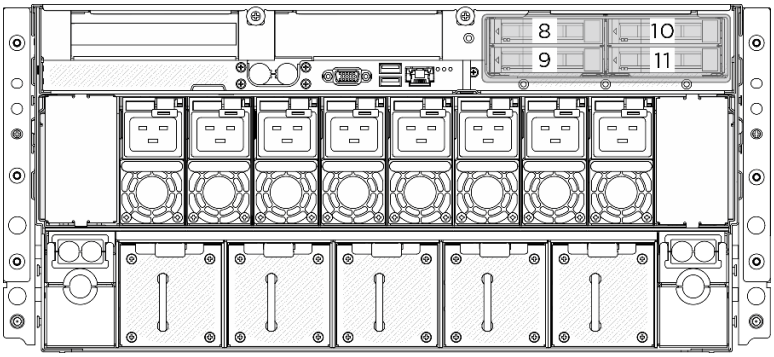


Figure 34. Rear 2.5-inch drive bay numbering

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

- Go to https://datacentersupport.lenovo.com/tw/en/products/servers/thinksystem/sr780av3/7dj5/downloads/driver-list/ to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” on page 403 for more information on firmware updating tools.

Procedure

Step 1. If the drive bay contains a filler, pull the release lever on the filler and slide it out of the bay.

Step 2. Install the 2.5-inch hot-swap drive.

a. ❶ Make sure that the drive handle is in the open position. Then, align the drive with the guide rails in the bay, and gently slide the drive into the bay until it stops.

b. ❷ Rotate the drive handle to the fully closed position until the handle latch clicks.

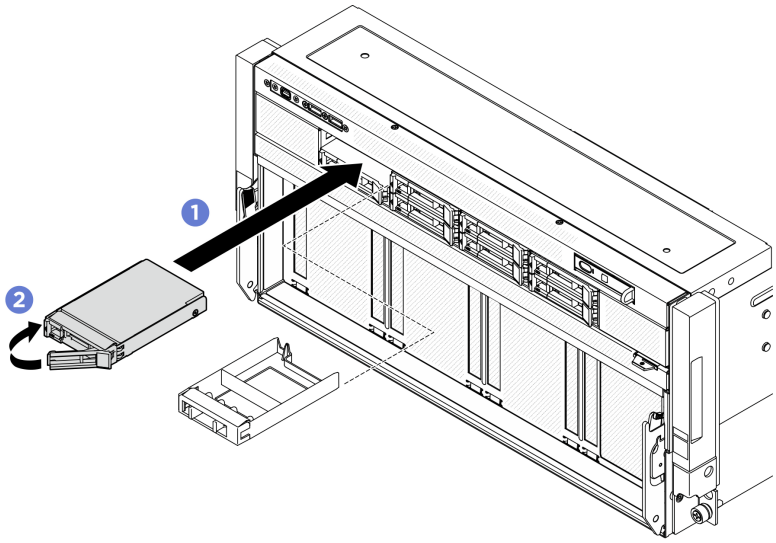


Figure 35. Front 2.5-inch hot-swap drive installation

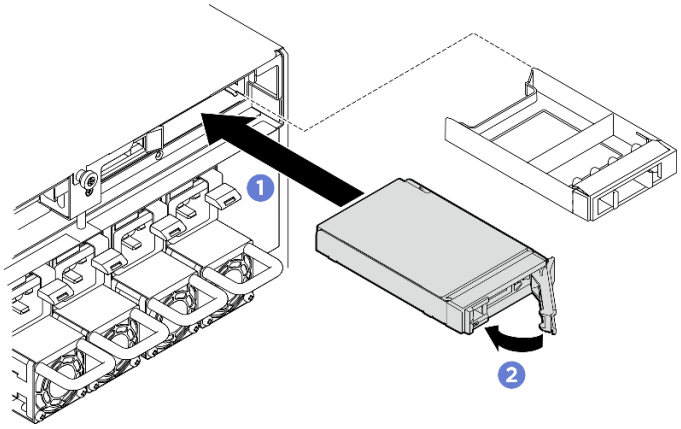


Figure 36. Rear 2.5-inch hot-swap drive installation

After you finish

1. Check the drive status LED to verify that the drive is operating correctly.
   - If the yellow drive status LED of a drive is lit continuously, that drive is faulty and must be replaced.
   - If the green drive activity LED is flashing, the drive is being accessed.
2. If you have installed 2.5-inch drive backplane with U.3 NVMe drives for Trimode. Enable U.3 x1 mode for the selected drive slots on the backplane through the XCC web GUI. See “U.3 NVMe drive can be detected in NVMe connection, but cannot be detected in Tri-mode” on page 453.

2.5-inch drive backplane replacement (trained technician only)

Follow instructions in this section to remove and install a 2.5-inch drive backplane.

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 a front 2.5-inch drive backplane

Follow instructions in this section to remove a front 2.5-inch drive backplane. The procedure must be executed by a trained technician.

About this task

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See "Power off the server" on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See "Remove the server from rack" on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- The server supports up to two front 2.5-inch drive backplanes with the following corresponding drive backplane numbering.

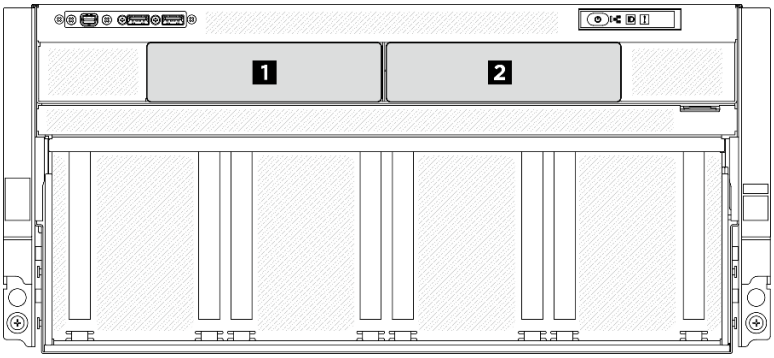


Figure 37. Front 2.5-inch drive backplane numbering

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See "Remove the front top cover" on page 67.

b. Remove all the 2.5-inch hot-swap drives and the drive bay fillers (if any) from the drive bays. See "Remove a 2.5-inch hot-swap drive" on page 73.

Step 2. Record the cable connections first; then, disconnect the power and signal cables from all the backplanes. See “2.5-inch drive backplane cable routing” on page 369 for more information on the internal cable routing.

Step 3. Remove the 2.5-inch drive backplane.

a. ❶ Grasp the backplane bracket to lift it out of the drive cage.

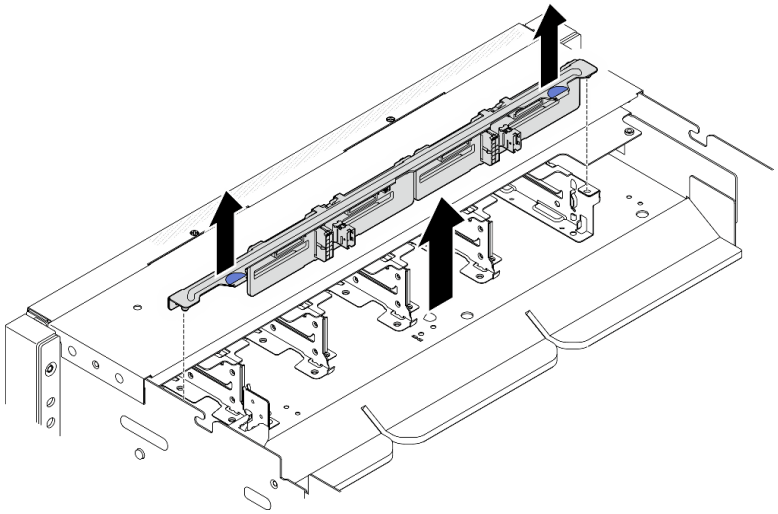


Figure 38. Front 2.5-inch drive backplane bracket removal

b. ❷ Unfasten the two M3 screws that secure the backplane to the bracket; then, remove the backplane from the bracket.

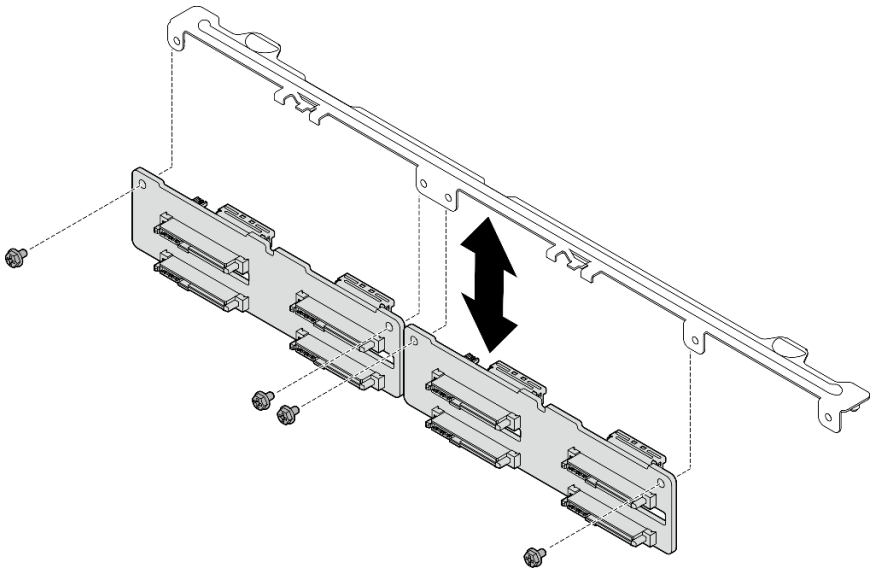


Figure 39. Front 2.5-inch drive backplane removal

After you finish

1. Install a replacement unit. See “Install a front 2.5-inch drive backplane” on page 80.
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 a front 2.5-inch drive backplane

Follow instructions in this section to install a front 2.5-inch drive backplane. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- The server supports up to two front 2.5-inch drive backplanes with the following corresponding drive backplane numbering.

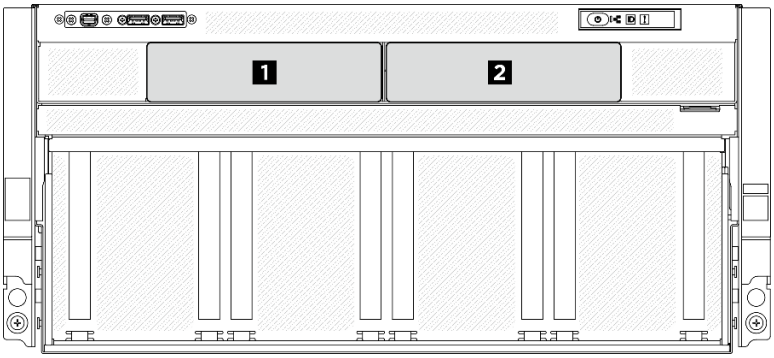


Figure 40. Front 2.5-inch drive backplane numbering

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

- Go to https://datacentersupport.lenovo.com/tw/en/products/servers/thinksystem/sr780av3/7dj5/downloads/driver-list/ to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” on page 403 for more information on firmware updating tools.

Procedure

Step 1. 1 Align the 2.5-inch drive backplane with the two screw holes on the bracket; then, fasten the two M3 screws (PH2, 2 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the drive backplane to the bracket.

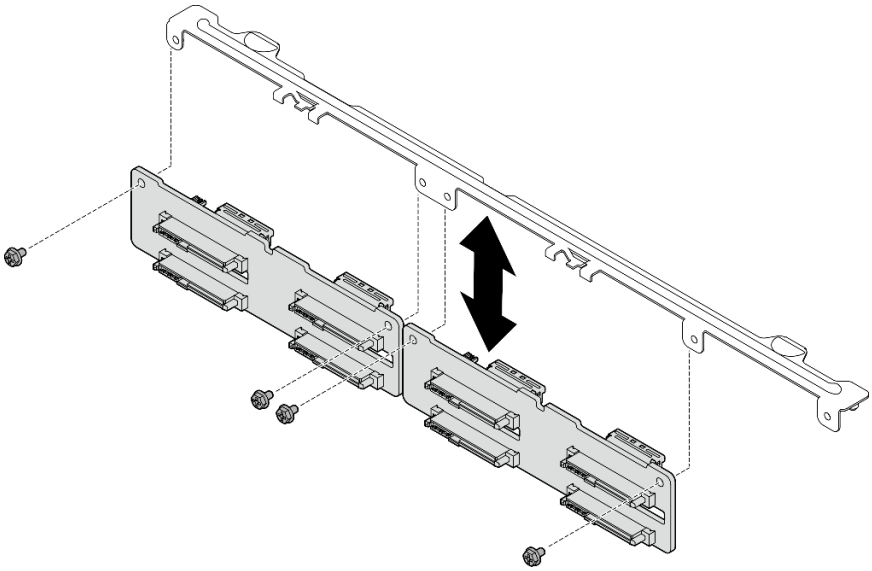


Figure 41. Front 2.5-inch drive backplane installation

Step 2. ❷ Align the pins on the backplane bracket with the slot on the drive cage; then, lower the backplane into the drive cage. Press the pins on the bracket to make them pass through the holes on the drive cage, and ensure the backplanes sit securely on the tabs.

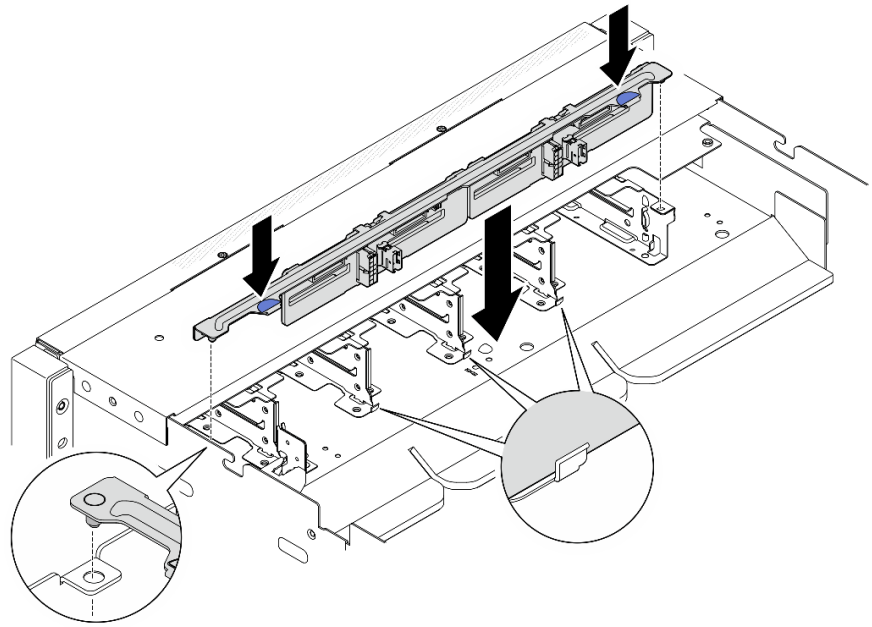


Figure 42. Front 2.5-inch drive backplane bracket installation

Step 3. Connect all the cables to the front 2.5-inch drive backplane. See “2.5-inch drive backplane cable routing” on page 369 for more information.

Step 4. If necessary, attach the labels to both ends of the cable.

a. ❶ Attach the white space portion of the label to one end of the cable.

b. ❷ Wrap the label around the cable and attach it to the white space portion.

c. Repeat to attach the other label to the opposite end of the cable.

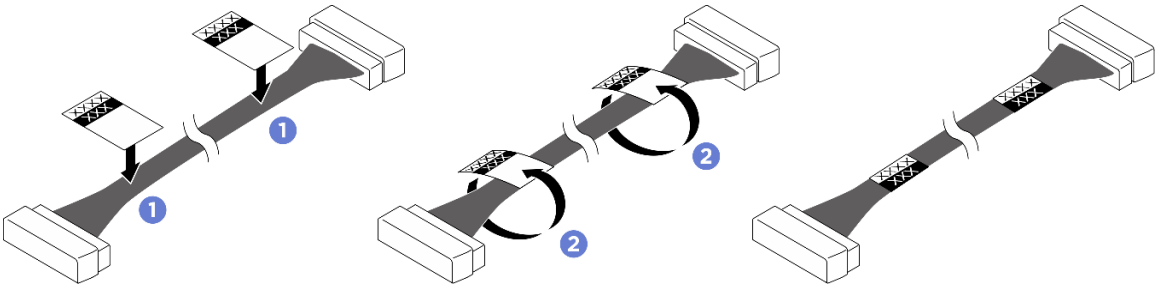


Figure 43. Label application

Note: See the table below to identify the corresponding labels for the cable.

From	To	Label
Backplane 1: NVMe connector 0-1	**PCIe switch board: NVMe connector 1 (NVME1)**	NVME 0-1 NVME 1
Backplane 1: Power connector	**Power distribution board: Backplane 1 power connector (BP1 PWR)**	BP1 PWR BP1 PWR
Backplane 1: NVMe connector 2-3	**PCIe switch board: NVMe connector 3 (NVME3)**	NVME 2-3 NVME 3
Backplane 2: NVMe connector 0-1	**PCIe switch board: NVMe connector 5 (NVME5)**	NVME 0-1 NVME 5
Backplane 2: Power connector	**Power distribution board: Backplane 2 power connector (BP2 PWR)**	BP2 PWR BP2 PWR
Backplane 2: NVMe connector 2-3	**PCIe switch board: NVMe connector 7 (NVME7)**	NVME 2-3 NVME 7

After you finish

1. Reinstall all the 2.5-inch hot-swap drives or drive bay fillers (if any) into the drive bays. See “Install a 2.5-inch hot-swap drive” on page 75.
2. Reinstall the front top cover. See “Install the front top cover” on page 69.
3. Complete the parts replacement. See “Complete the parts replacement” on page 363.

CPU complex replacement (trained technician only)

Follow instructions in this section to remove and install the CPU complex.

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 CPU complex

Follow instructions in this section to remove the CPU complex. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the rear top cover. See “Remove the rear top cover” on page 70.

c. Disconnect all the cables and remove them from the CPU complex. Before disconnecting the cables, make a list of each cable and record the connectors the cable is connected to. Refer to Chapter 6 “Internal cable routing” on page 365.

Step 2. ❶ Unfasten the twelve M3 screws that secure the CPU complex to the chassis (C1-C6).

Step 3. ❷ Hold the handle and the edge of the CPU complex to carefully lift it out of the chassis.

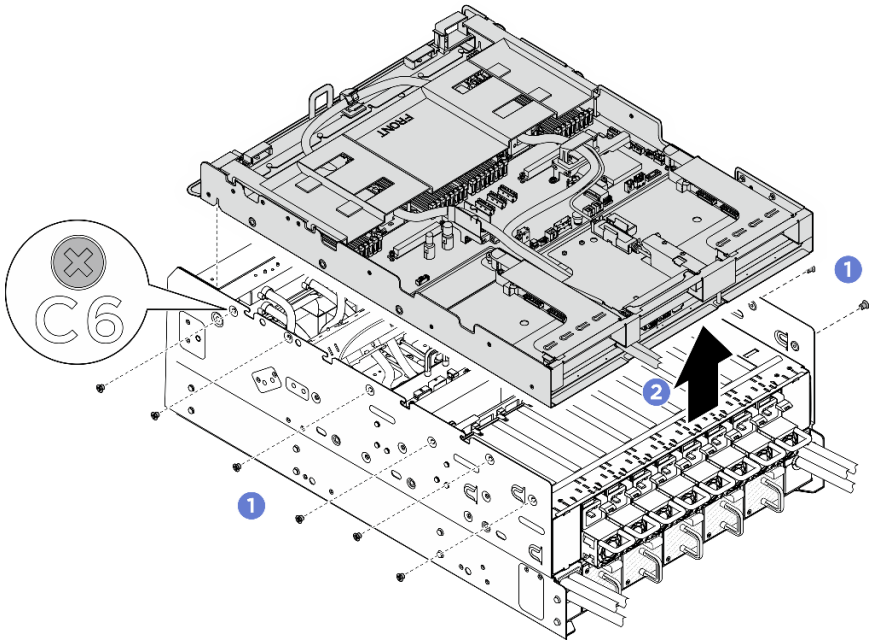


Figure 44. CPU complex removal

After you finish

1. Install a replacement unit. See “Install the CPU complex” on page 84.
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 CPU complex

Follow instructions in this section to install the CPU complex. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- 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 365.

Procedure

Step 1. ❶ Align the guide pins with the guide slots; then, carefully lower the CPU complex into the chassis.

Step 2. ❷ Fasten the twelve M3 screws (C1-C6) (PH2, 12 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the CPU complex to the chassis.

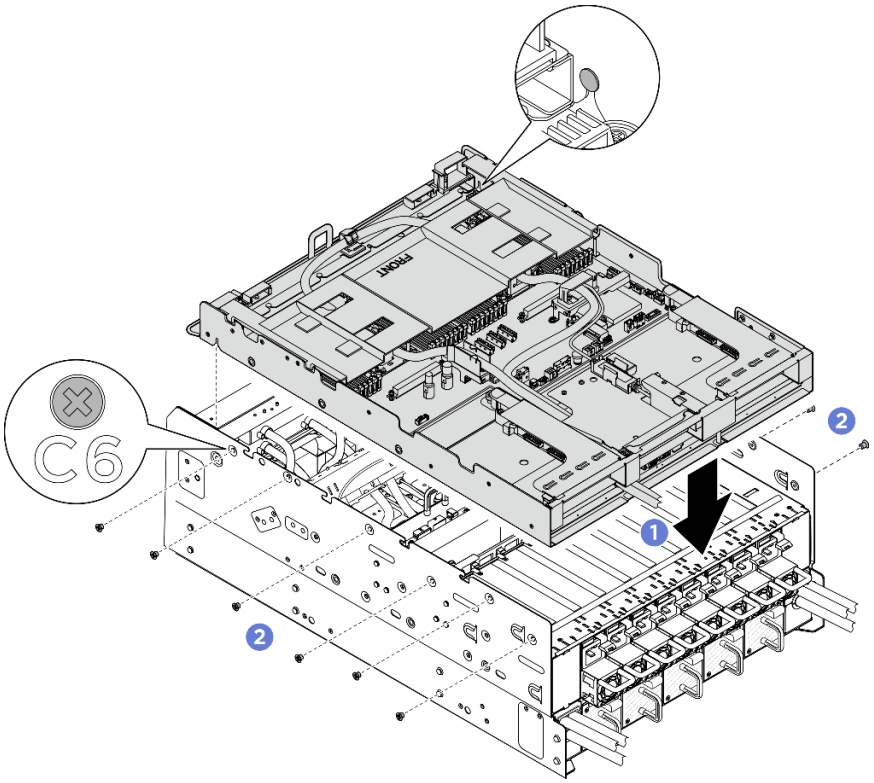


Figure 45. CPU complex installation

After you finish

1. Reconnect all the cables that were disconnected. See Chapter 6 “Internal cable routing” on page 365.
2. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
3. Reinstall the front top cover. See “Install the front top cover” on page 69.
4. Complete the parts replacement. See “Complete the parts replacement” on page 363.

CMOS battery (CR2032) replacement

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

Remove the CMOS battery (CR2032)

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

About this task

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 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See "Power off the server" on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See "Remove the server from rack" on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- The following notes describe information that you must consider when replacing the battery.
  - Lenovo has designed this product with your safety in mind. The lithium battery must be handled correctly to avoid possible danger. If you replace the battery, you must adhere to the following instructions.
  - If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.
  - After you replace the battery, you must reconfigure the server and reset the system date and time.

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See "Remove the front top cover" on page 67.

b. Remove the rear top cover. See "Remove the rear top cover" on page 70.

c. Remove the processor air baffle. See "Remove the processor air baffle" on page 323.

d. If necessary, disconnect the cables and remove them from the CPU complex. Before disconnecting the cables, make a list of each cable and record the connectors the cable is connected to. Refer to Chapter 6 “Internal cable routing” on page 365.

Step 2. Locate the battery socket on the system board assembly.

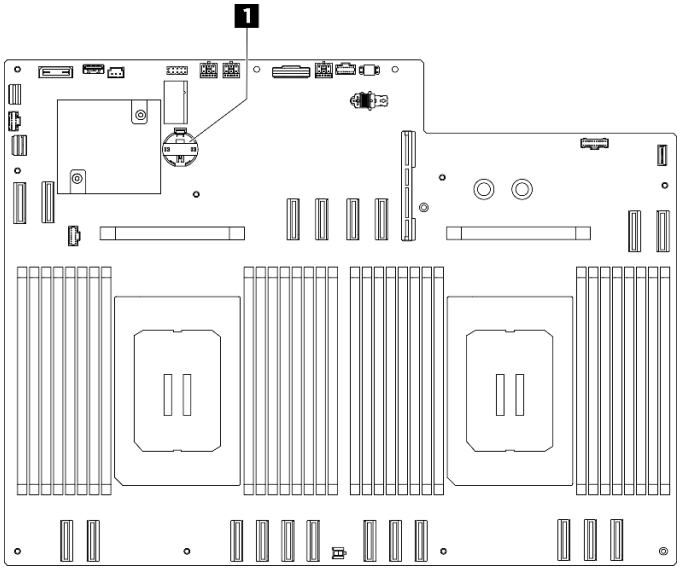


Figure 46. CMOS battery location

1 CMOS battery location

Step 3. ❶ Gently press on the nub on the side of the CMOS battery as illustrated.

Step 4. ❷ Pivot the CMOS battery away from the seat, and lift the CMOS battery out of the battery socket.

Figure 47. CMOS battery removal

After you finish

1. Install a replacement unit. See “Install the CMOS battery (CR2032)” on page 87.
2. Dispose the component with compliance to local regulations.

Install the CMOS battery (CR2032)

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

About this task

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 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See "Power off the server" on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See "Remove the server from rack" on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- The following notes describe information that you must consider when you are replacing the CMOS battery in the server:
  - You must replace the CMOS battery with a lithium 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.

Procedure

Step 1. Follow any special handling and installation instructions that come with the CMOS battery.

Step 2. Make preparation for this task.

a. Remove the CPU complex. See “Remove the CPU complex” on page 83.

Step 3. Locate the battery socket on the system board assembly.

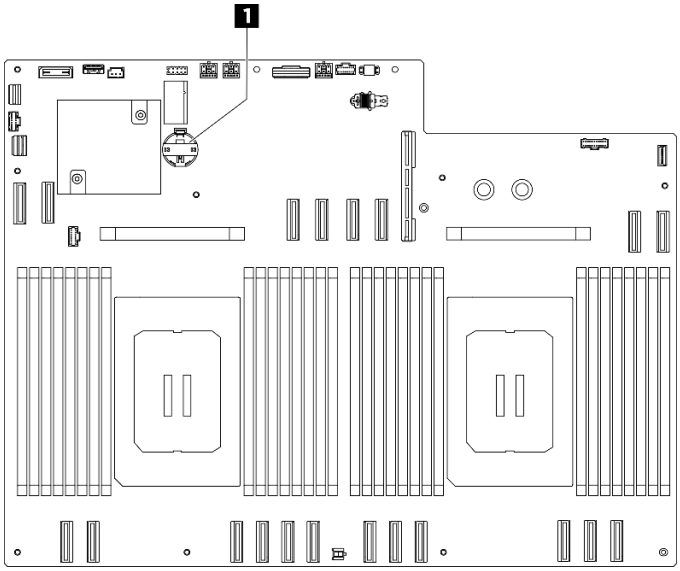


Figure 48. CMOS battery location

1 CMOS battery location

Step 4. 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 5. 1 Place the CMOS battery on top of the socket with the positive (+) symbol facing up, and press the battery into the seat until it clicks in place.

Step 6. 2 Tilt the CMOS battery at an angle and insert it into the battery socket.

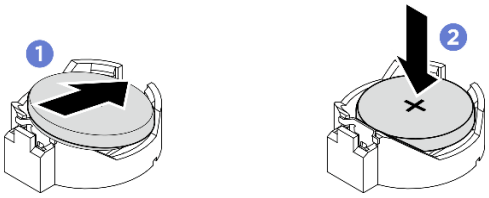


Figure 49. CMOS battery installation

After you finish

1. Reconnect all the cables that were disconnected. See Chapter 6 “Internal cable routing” on page 365.
2. Reinstall the processor air baffle. See “Install the processor air baffle” on page 324.
3. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
4. Reinstall the front top cover. See “Install the front top cover” on page 69.
5. Complete the parts replacement. See “Complete the parts replacement” on page 363.
6. Reconfigure the server and reset the system date and time.

DPU air baffle replacement (trained technician only)

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

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 DPU air baffle

Follow instructions in this section to remove the DPU air baffle. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- Remove the DPU air baffle before installing rear drive cage in riser 2 slot.

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the rear top cover. See “Remove the rear top cover” on page 70.

c. Remove the processor air baffle. See “Remove the processor air baffle” on page 323.

d. If applicable, remove the PCIe riser assembly(ies). See “Remove a PCIe riser assembly” on page 294.

e. If necessary, disconnect and removed the cables. Before disconnecting the cables, make a list of each cable and record the connectors the cable is connected to. Refer to Chapter 6 “Internal cable routing” on page 365.

Step 2. DPU air baffle location in riser 1 slot.

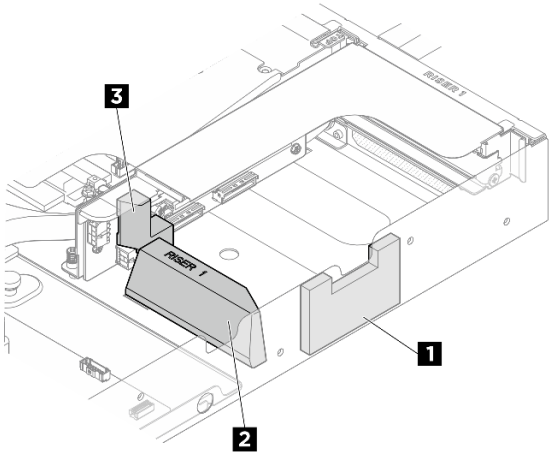


Figure 50. DPU air baffle location in riser 1 slot

Step 3. Remove the DPU air baffles in riser 1 slot.

Note: Clean the adhesive off from the chassis and components with alcohol cleaning pads.

a. ❶ Peel off the 1 DPU air baffle from the chassis.

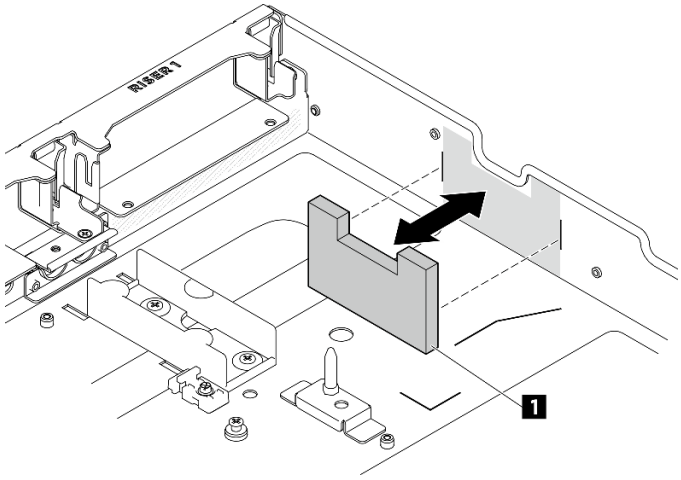


Figure 51. Removing DPU air baffle from the chassis

b. ❷ Peel off the 2 DPU air baffle from the chassis.

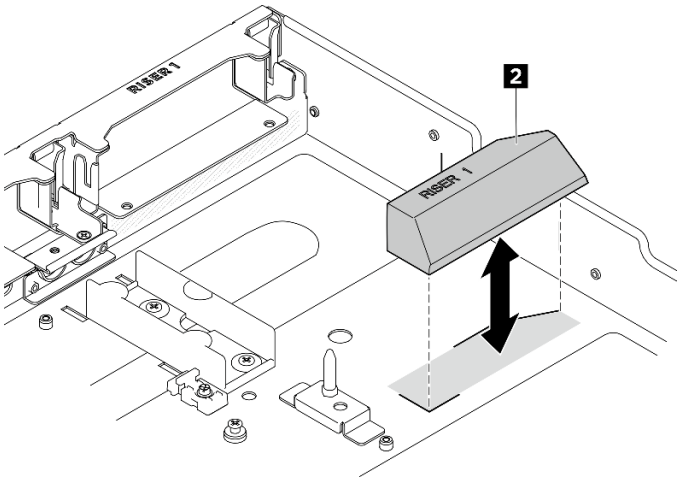


Figure 52. Removing DPU air baffle from the chassis

c. ② Peel off the 3 DPU air baffle from the PCIe riser card if necessary.

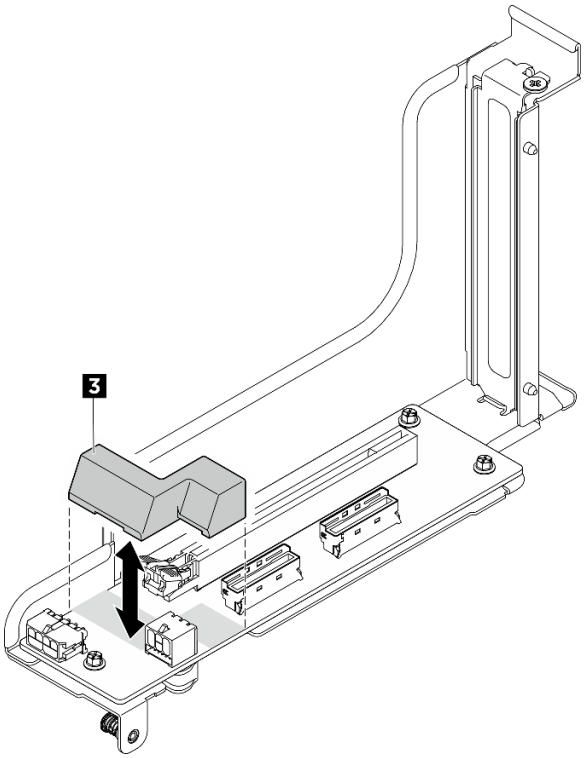


Figure 53. Removing DPU air baffle from the PCIe riser card

Step 4. DPU air baffle location in riser 2 slot.

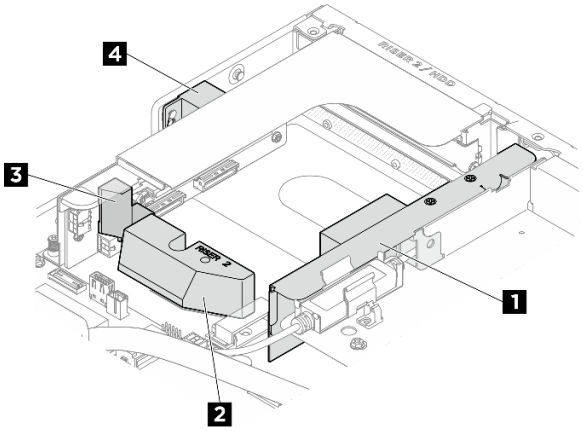


Figure 54. DPU air baffle location in riser 2 slot

Step 5. Remove the DPU air baffles in riser 2 slot.

Note: Clean the adhesive off from the chassis and components with alcohol cleaning pads.

a. ❶ Unfasten the two M3 screws that secure the 1 air baffle and bracket assembly to the chassis; then, lift the air baffle assembly to remove it from the slot.

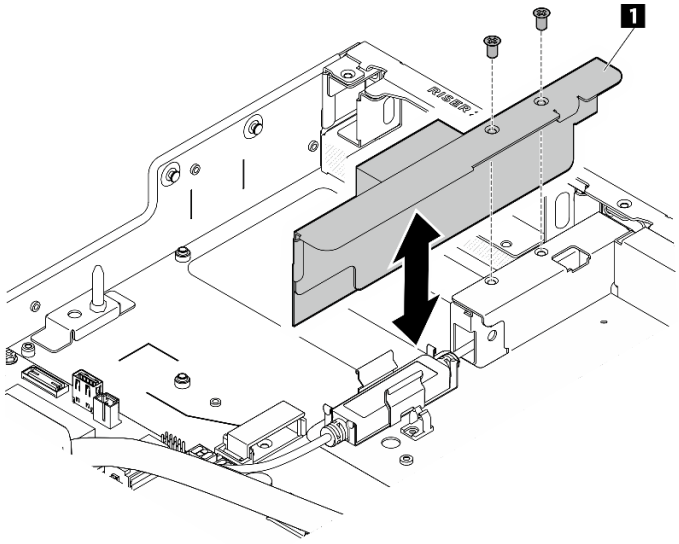


Figure 55. Removing DPU air baffle and bracket assembly

b. ❷ Unfasten the M3 screw that secure the 2 DPU air baffle to the chassis; then, peel it off from the chassis.

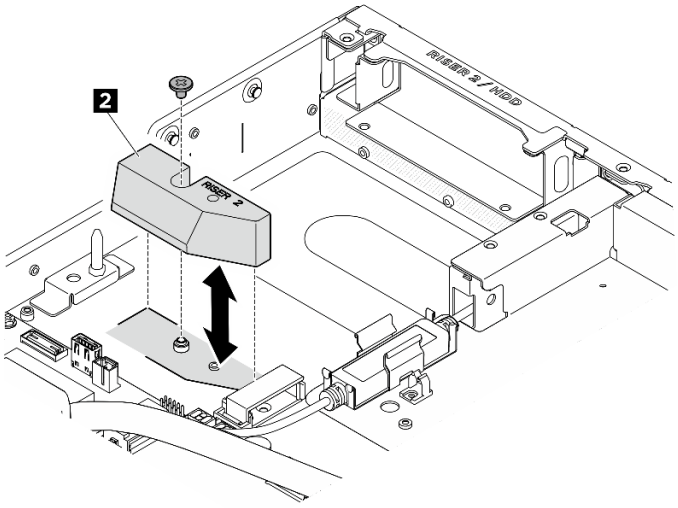


Figure 56. Removing DPU air baffle from the chassis

c. ❸ Peel off the 3 DPU air baffle from the PCIe riser card if necessary.

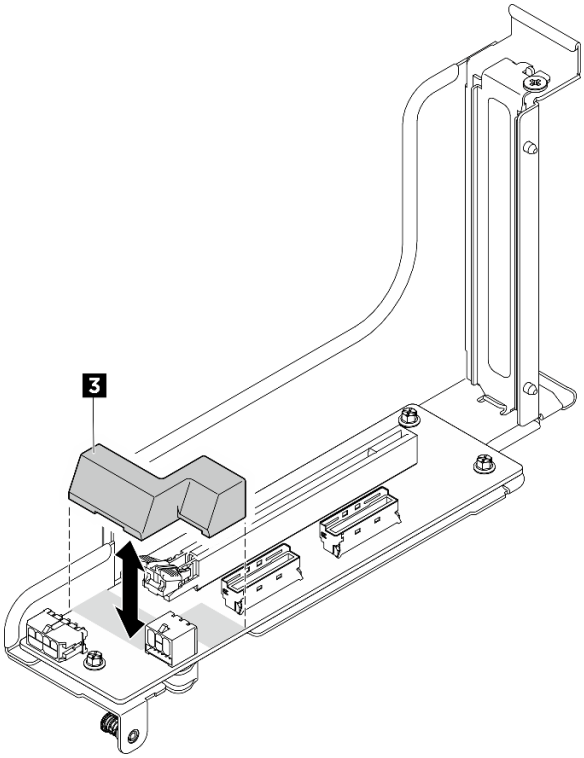


Figure 57. Removing DPU air baffle from the PCIe riser card

d. ❹ Unfasten the screw that secure the 4 DPU air baffle to the chassis; then lift the air baffle to disengage it from the pin on the chassis.

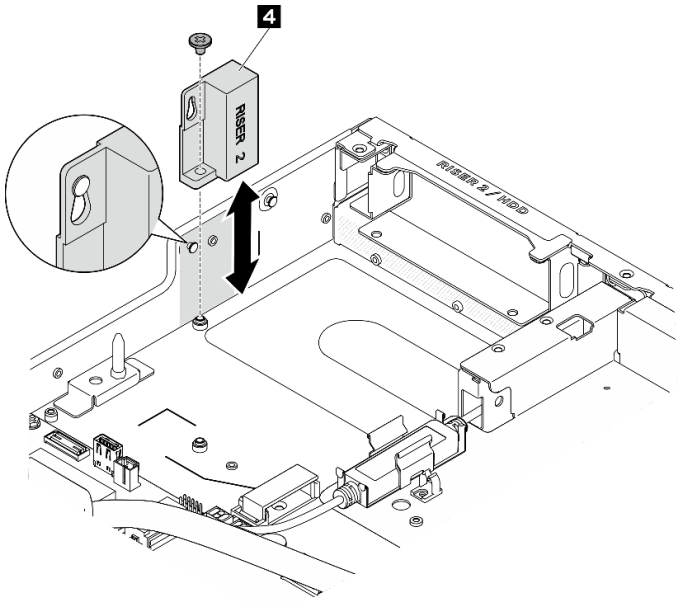


Figure 58. Removing DPU air baffle from the chassis

After you finish

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 DPU air baffle

Follow instructions in this section to install the DPU air baffle. The procedure must be executed by a trained technician.

About this task

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See "Power off the server" on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See "Remove the server from rack" on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- Install the DPU air baffle when NVIDIA BlueField-3 is installed in the riser slot.

Procedure

Step 1. DPU air baffle location in riser 1 slot.

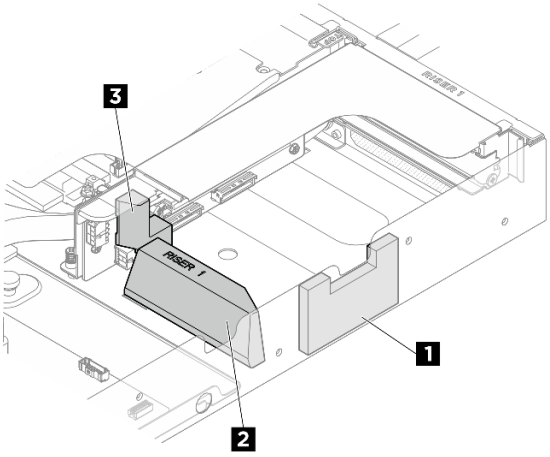


Figure 59. DPU air baffle location in riser 1 slot

Step 2. Install the DPU air baffles in riser 1 slot.

Note: Remove the liner from the adhesive on the back of the DPU air baffles before installation.

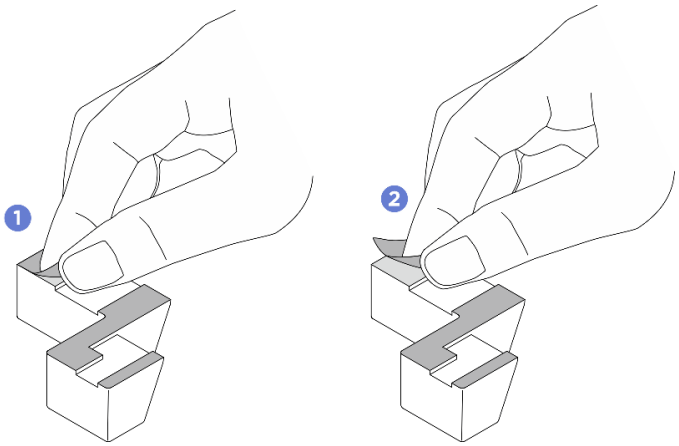


Figure 60. Remove the liner

a. 1 Remove the liner from the adhesive on the back of the 1 DPU air baffle, align the air baffle to the marking on the chassis; then, stick the air baffle to the chassis.

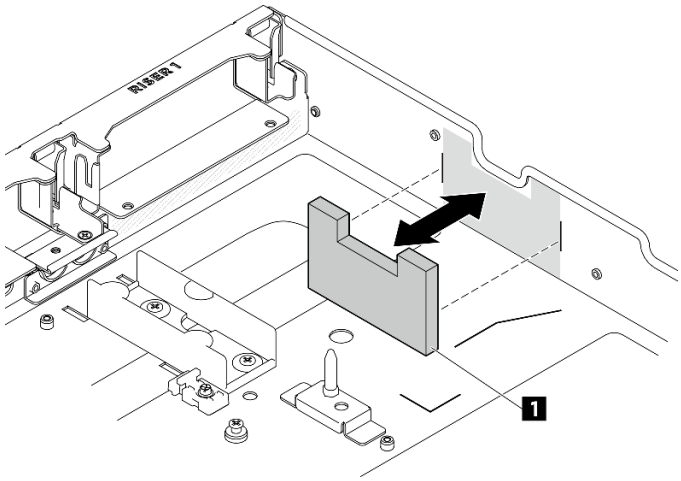


Figure 61. Installing riser slot 1 DPU air baffle to the chassis

b. 2 Remove the liner from the adhesive on the back of the 2 DPU air baffle, align the air baffle to the marking on the chassis; then, stick the air baffle to the chassis.

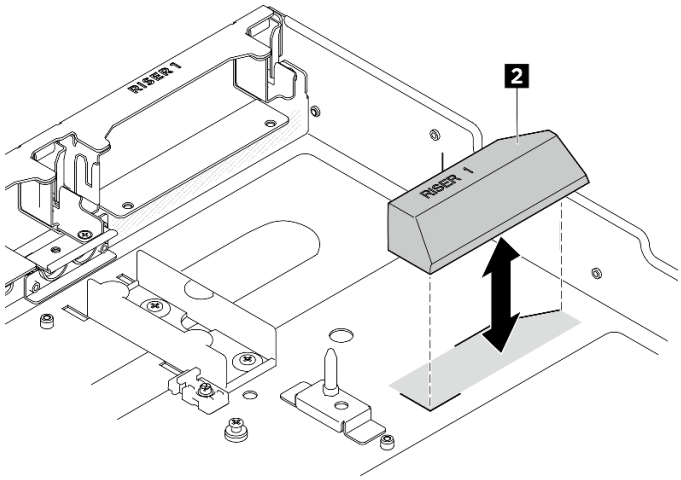


Figure 62. Installing DPU air baffle to the chassis

c. 3 Remove the liner from the adhesive on the back of the 3 DPU air baffle, align the air baffle to avoid the connectors on the PCIe riser card; then, stick the air baffle to the PCIe riser card as illustrated.

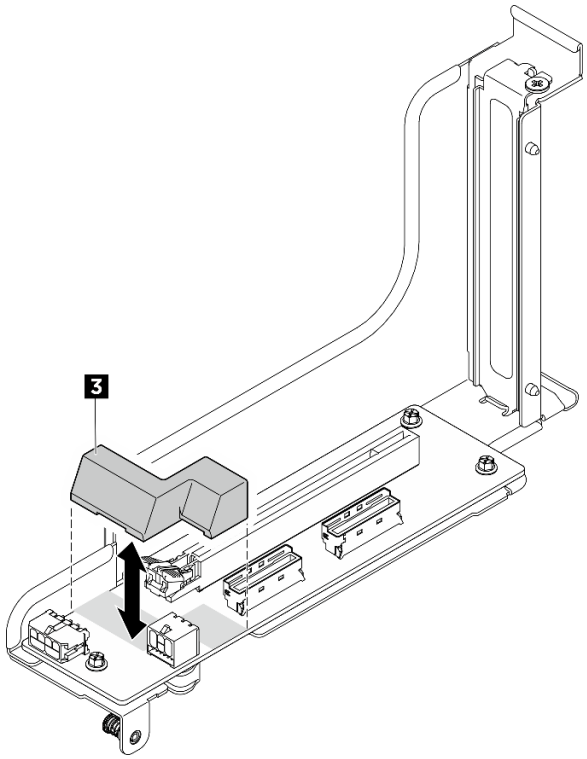


Figure 63. Installing DPU air baffle to the PCIe riser card

Step 3. DPU air baffle location in riser 2 slot.

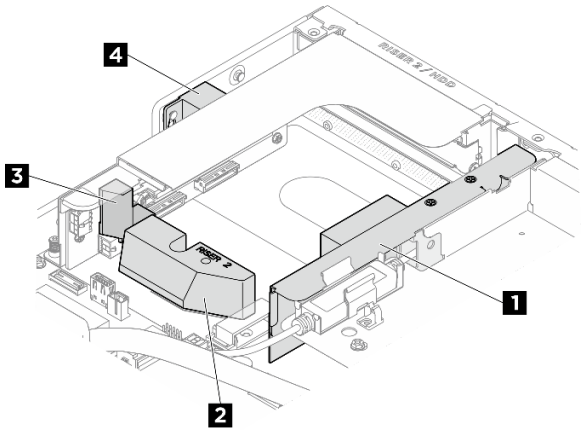


Figure 64. DPU air baffle location in riser 2 slot

Step 4. Install the DPU air baffles in riser 2 slot.

Note: Remove the liner from the adhesive on the back of the DPU air baffles before installation.

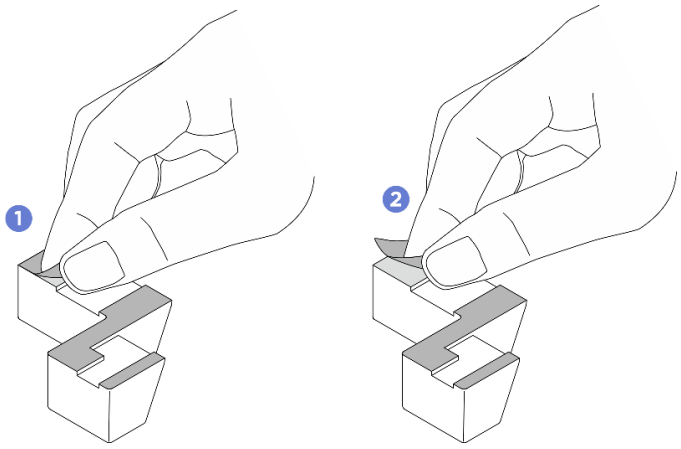


Figure 65. Remove the liner

a. 1 Align the 1 DPU air baffle and bracket assembly to the leakage sensor module bracket; then, insert the air baffle assembly into the slot. Fasten the two M3 screws (PH1, 2 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the air baffle assembly in place.

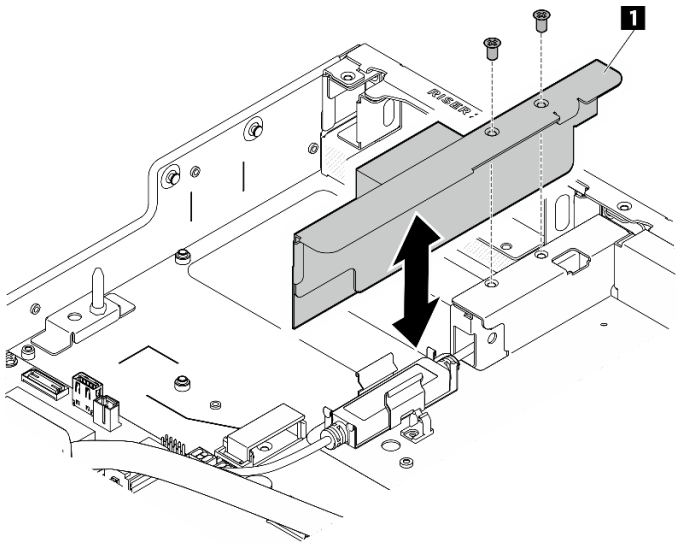


Figure 66. Installing DPU air baffle and bracket assembly

b. 2 Remove the liner from the adhesive on the 2 DPU air baffle, align the air baffle to the marking on the chassis; then, stick the air baffle to the chassis. Fasten the M3 screw (PH2, 1 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the DPU air baffle.

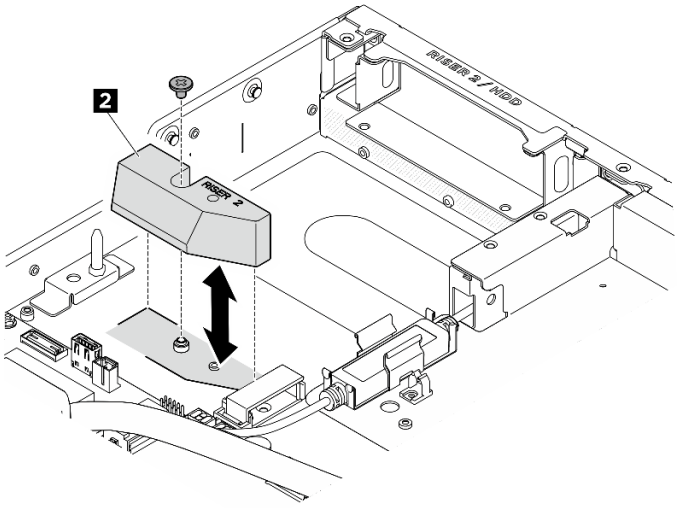


Figure 67. Installing DPU air baffle to the chassis

c. 3 Remove the liner from the adhesive on the back of the 3 DPU air baffle, align the air baffle to avoid the connectors on the PCIe riser card; then, stick the air baffle to the PCIe riser card as illustrated.

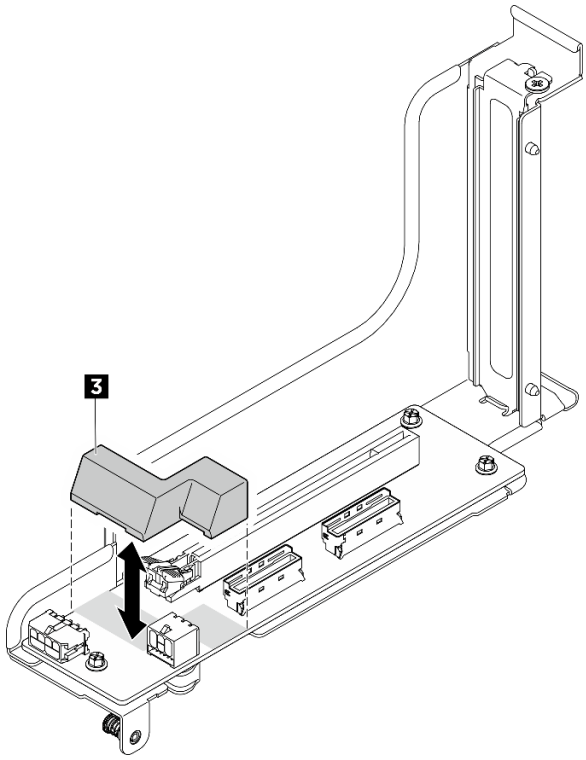


Figure 68. Installing DPU air baffle to the PCIe riser card

d. 4 Remove the liner from the adhesive on the back of the 4 DPU air baffle, align the keyhole on the air baffle to the pin on the chassis; then, engage the air baffle with the chassis. Fasten the M3 screw (PH2, 1 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the air baffle to the chassis.

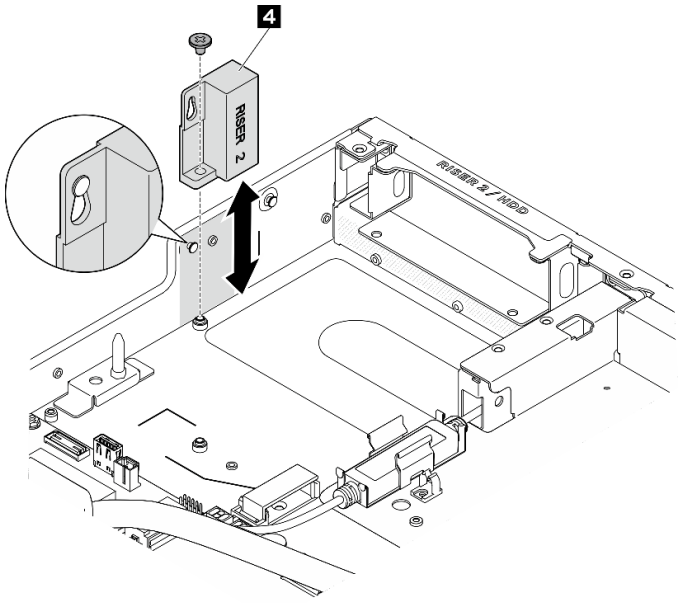


Figure 69. Installing DPU air baffle to the chassis

After you finish

1. Reconnect all the cables that were disconnected. See Chapter 6 “Internal cable routing” on page 365.
2. If applicable, reinstall the PCIe riser assembly(ies). See “Install a PCIe riser assembly” on page 297.
3. Reinstall the processor air baffle. See “Install the processor air baffle” on page 324.
4. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
5. Reinstall the front top cover. See “Install the front top cover” on page 69.
6. Complete the parts replacement. See “Complete the parts replacement” on page 363.

Fan and fan cage replacement

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

Remove a front fan

Follow instructions in this section to remove a front fan.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- The following illustrations show the front fan numbering:

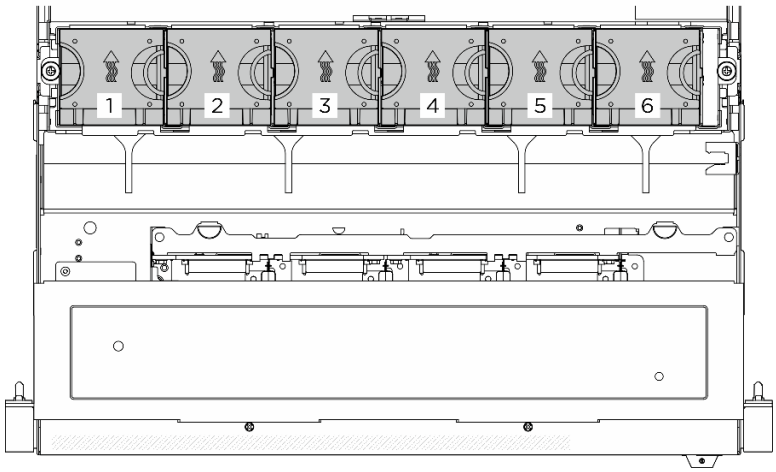


Figure 70. Front fan numbering

Procedure

Step 1. ❶ Press and hold the blue latch to release the fan.

Step 2. ❷ Grasp the fan and carefully lift it out of the fan cage.

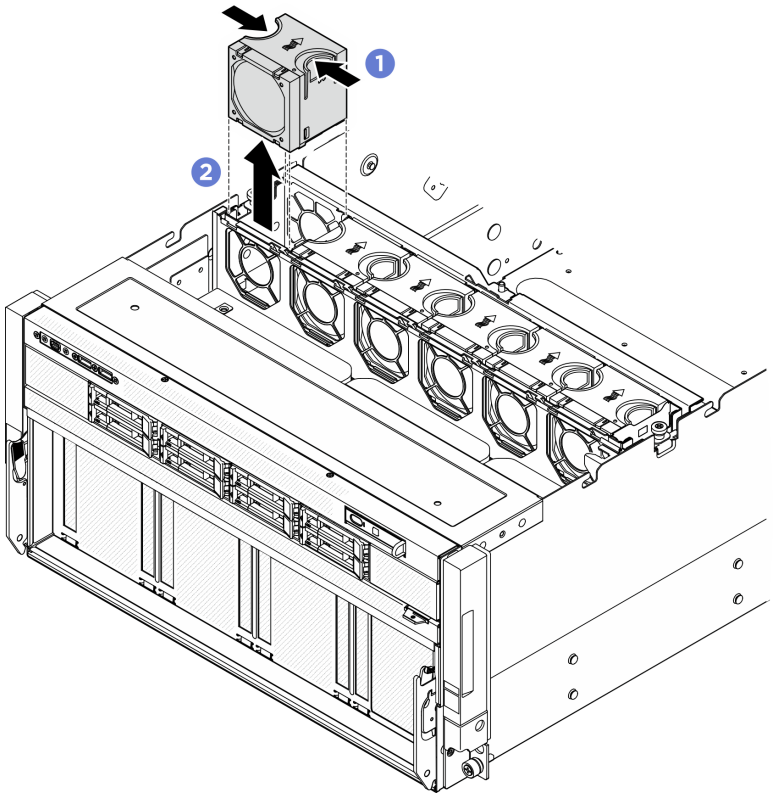


Figure 71. Front fan removal

After you finish

1. To install a replacement. See “Install a front fan” on page 106.

2. Complete the parts replacement. See “Complete the parts replacement” on page 363.

Remove the fan cage (trained technician only)

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

S017

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

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove all the front fans. See “Remove a front fan” on page 101.

Step 2. Remove the fan cage.

a. (1) Unfasten the six M3 screws that secure the fan cage to the server.

b. 2 Lift the fan cage out of the server.

Note: Ensure not to pull the fan cable while lifting the fan cage.

c. 3 Unfasten the two screws to remove the connector bracket.

d. 4 Disconnect the power cable from the front fan control board.

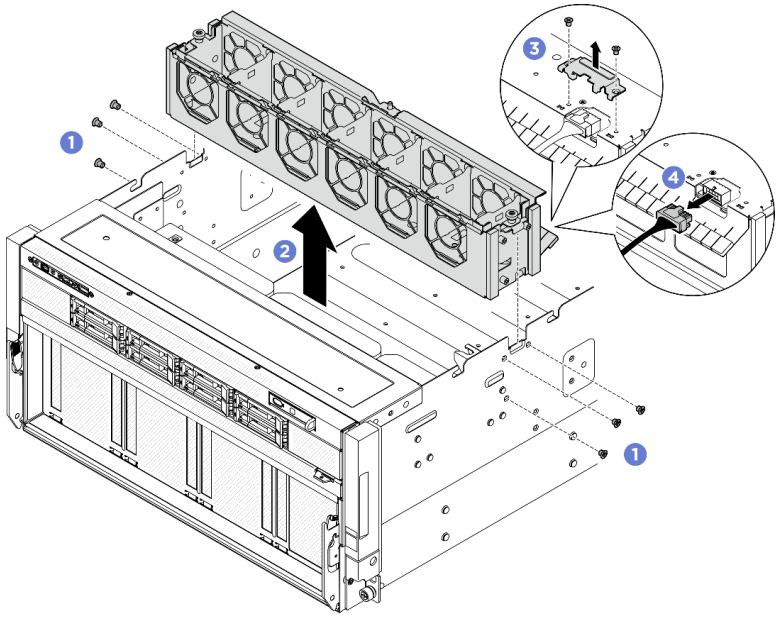


Figure 72. Removing the fan cage

After you finish

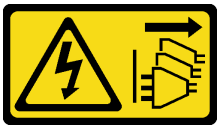
1. Install a replacement unit. See "Install the fan cage (trained technician only)" on page 104.
2. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Install the fan cage (trained technician only)

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

S017

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

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.

Step 1. Install the fan cage.

a. ❶ Connect the power cable to the front fan control board.

b. ❷ Fasten the two screws to secure the connector bracket to the fan cage.

c. ❸ Align the fan cage with the slots on both sides of the chassis; then, lower it into the chassis.

d. ❹ Fasten the six M3 screws (PH2, 6 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the fan cage to the chassis.

Note: Ensure the fan numbering label faces the front of the server.

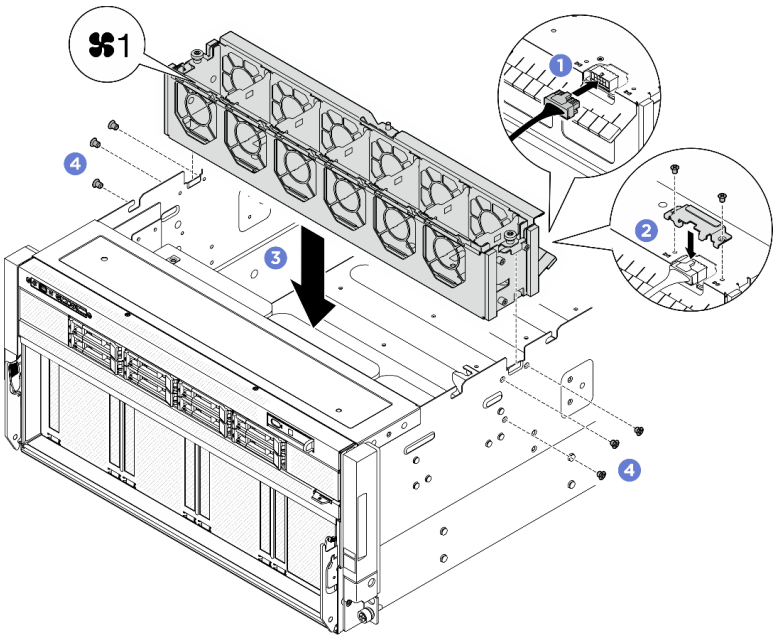


Figure 73. Installing fan cage

Step 2. If necessary, attach the labels to both ends of the power cable.

a. ❶ Attach the white space portion of the label to one end of the cable.

b. ❷ Wrap the label around the cable and attach it to the white space portion.

c. Repeat to attach the other label to the opposite end of the cable.

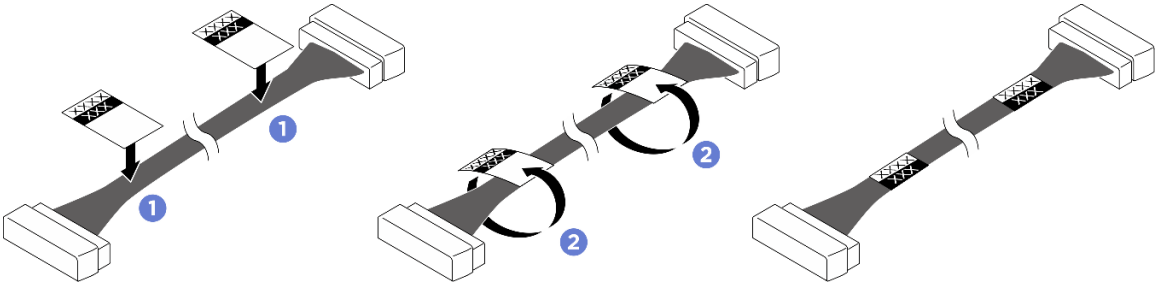


Figure 74. Label application

Note: See the table below to identify the corresponding labels for the cable.

From	To	Label
Front fan control board: Power connector	**Power distribution board: Front fan control board power connector (FRONT FAN PWR)**	**F-Fan PWR** **F-Fan PWR**

After you finish

1. Reinstall all the front fans. See “Install a front fan” on page 106.
2. Reinstall the front top cover. See “Install the front top cover” on page 69.
3. Complete the parts replacement. See “Complete the parts replacement” on page 363.

Install a front fan

Follow instructions in this section to install a front fan.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Make sure to replace a defective fan with another unit of the exact same type.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- The following illustrations show the front fan numbering:

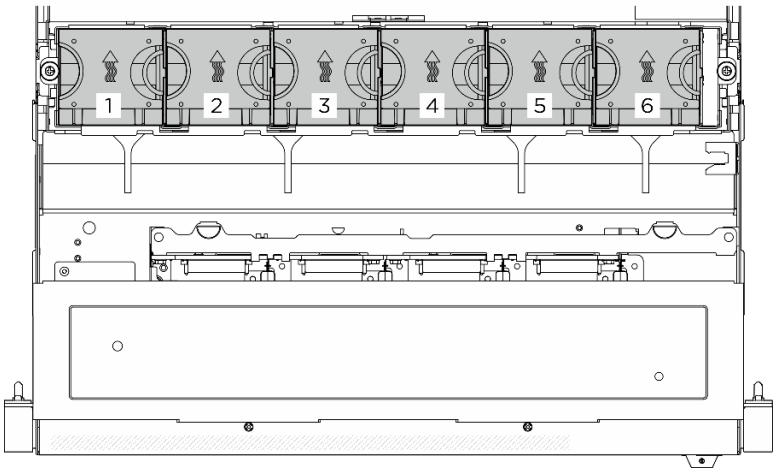


Figure 75. Front fan numbering

Procedure

Step 1. Make sure the airflow direction label on the fan is pointing towards the rear side of the server; then, align the fan with the fan socket.

Step 2. Press and hold the blue latch; then, slide the fan into the socket until it clicks into place.

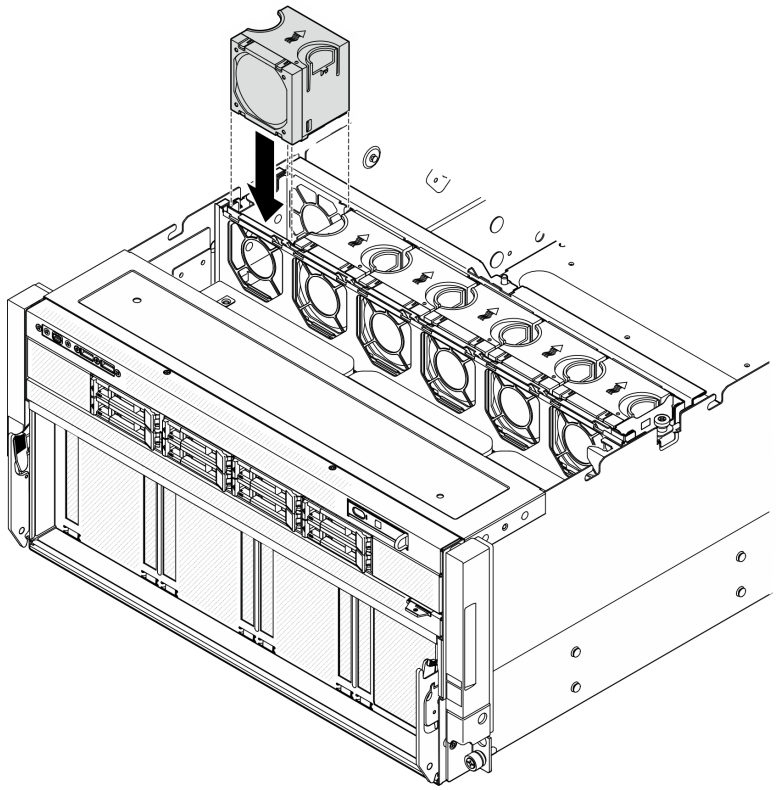


Figure 76. Front fan installation

After you finish

Complete the parts replacement. See “Complete the parts replacement” on page 363.

Remove a rear hot-swap fan

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

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- The following illustrations show the rear fan numbering:

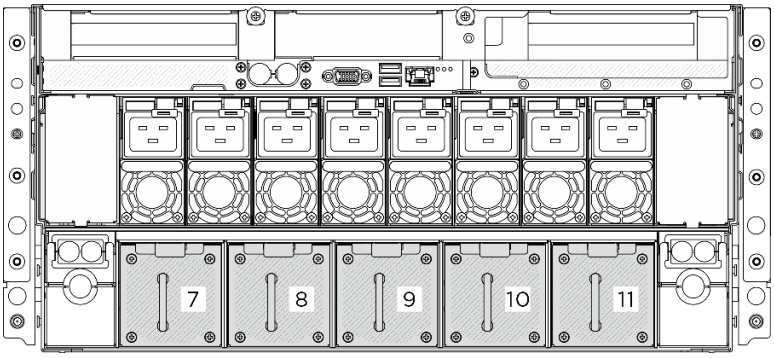


Figure 77. Rear fan numbering

Procedure

Step 1. ❶ Press and hold the orange latch to release the fan.

Step 2. ❷ Grasp the fan and carefully pull it out of the server.

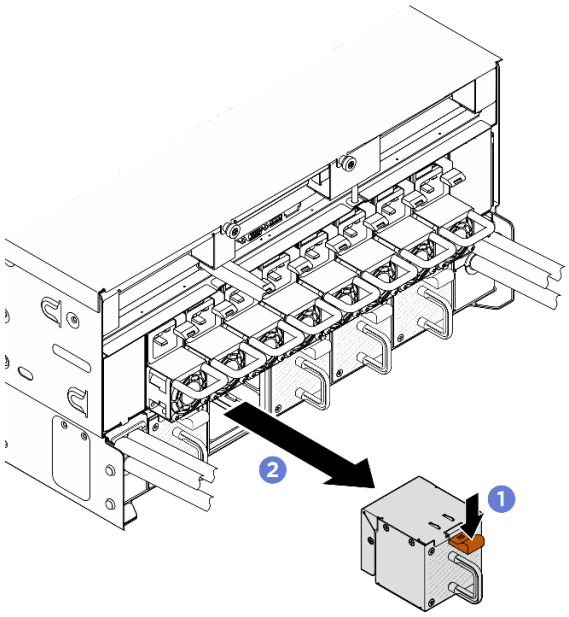


Figure 78. Rear fan removal

After you finish

1. To install a replacement. See “Install a rear hot-swap fan” on page 109.
2. Complete the parts replacement. See “Complete the parts replacement” on page 363.

Install a rear hot-swap fan

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

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Make sure to replace a defective fan with another unit of the exact same type.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- The following illustrations show the rear fan numbering:

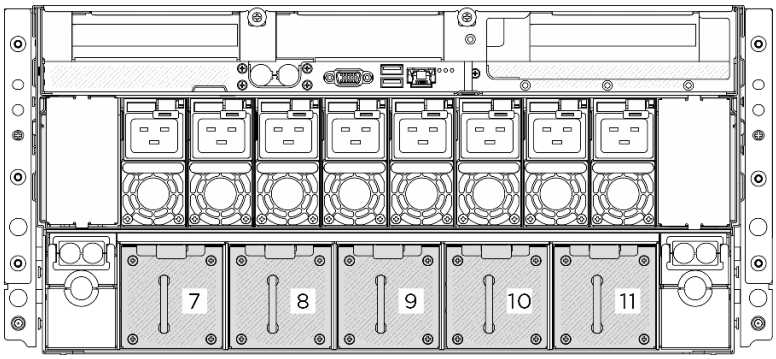


Figure 79. Rear fan numbering

Procedure

Step 1. Make sure the airflow direction label on the fan is facing up; then, align the fan with the fan socket.

Step 2. Press and hold the orange latch; then, slide the fan into the socket until it clicks into place.

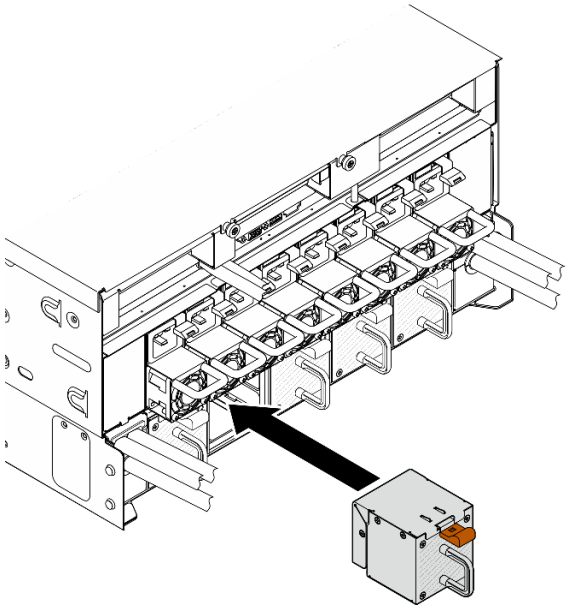


Figure 80. Rear fan installation

After you finish

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.

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fan control board assembly replacement (trained technician only)

Follow instructions in this section to remove or install a fan control board assembly.

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 front fan control board

Follow instructions in this section to remove the front fan control board. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove all the front fans. See “Remove a front fan” on page 101.

c. Remove the fan cage. See “Remove the fan cage (trained technician only)” on page 103.

Step 2. Remove the inner fan cage.

a. ❶ Unfasten the five screws that secure the inner fan cage to the outer fan cage.

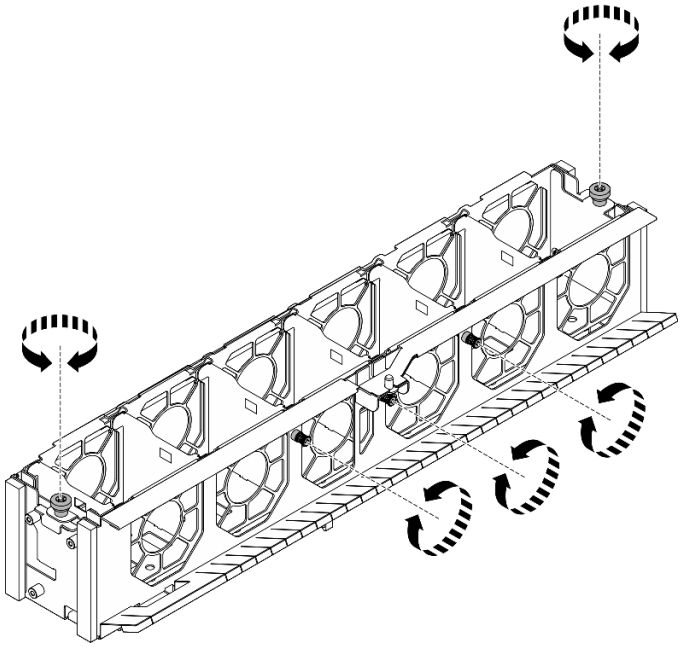


Figure 81. Separating inner fan cage

b. ❷ Grasp the inner fan cage and separate it from the outer fan cage.

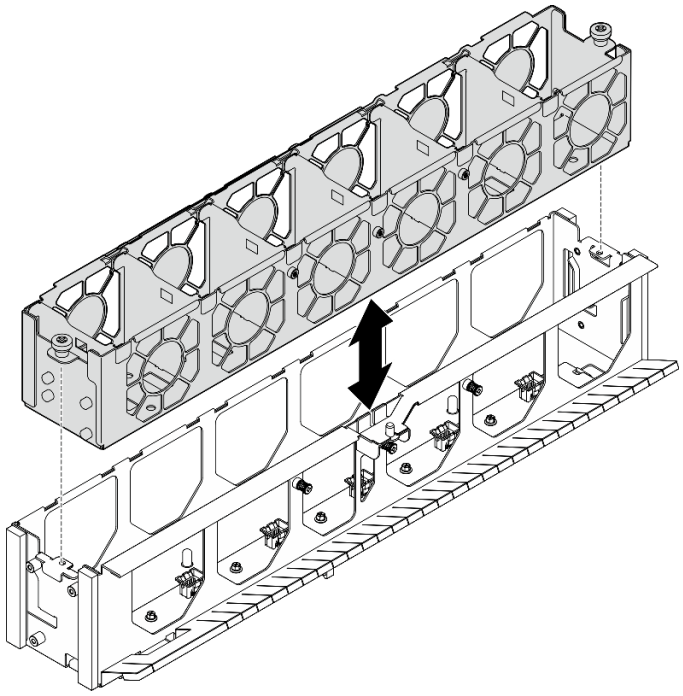


Figure 82. Inner fan cage removal

Step 3. Unfasten the five screws to remove the front fan control board from the outer fan cage.

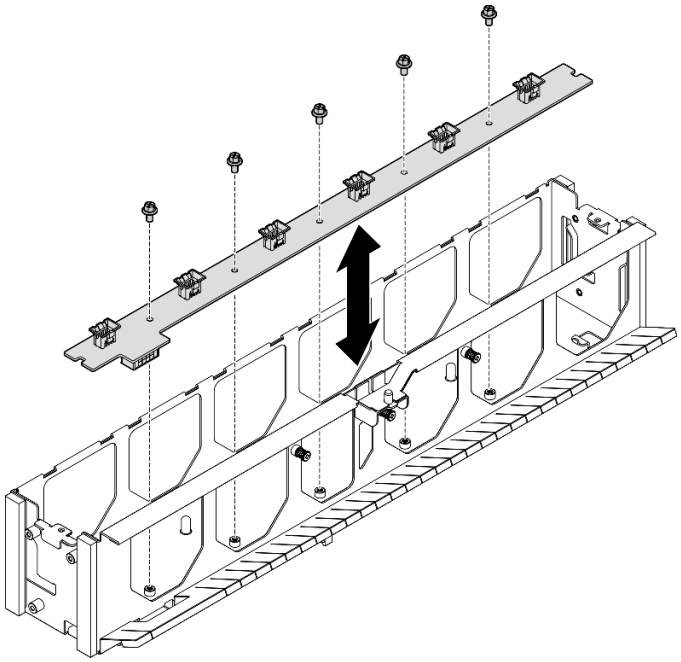


Figure 83. Front fan control board removal

1. Install a replacement unit. See “Install the front fan control board” on page 113.
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 front fan control board

Follow instructions in this section to install the front fan control board. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. Align and lower the front fan control board into the outer fan cage; then, fasten the five M3 screws (PH1, 5 x M3, 0.9 newton-meters, 8 inch-pounds) to secure the front fan control board.

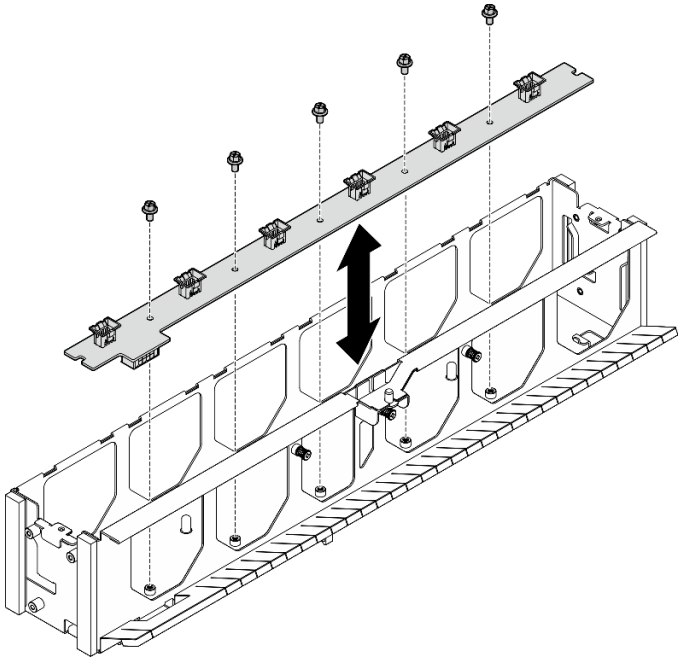


Figure 84. Front fan control board installation

Step 2. Install the inner fan cage.

a. ❶ Lower the inner fan cage into the outer fan cage. Ensure the three screw holes on the inner fan cage are aligned with the corresponding screw holes on the outer fan cage.

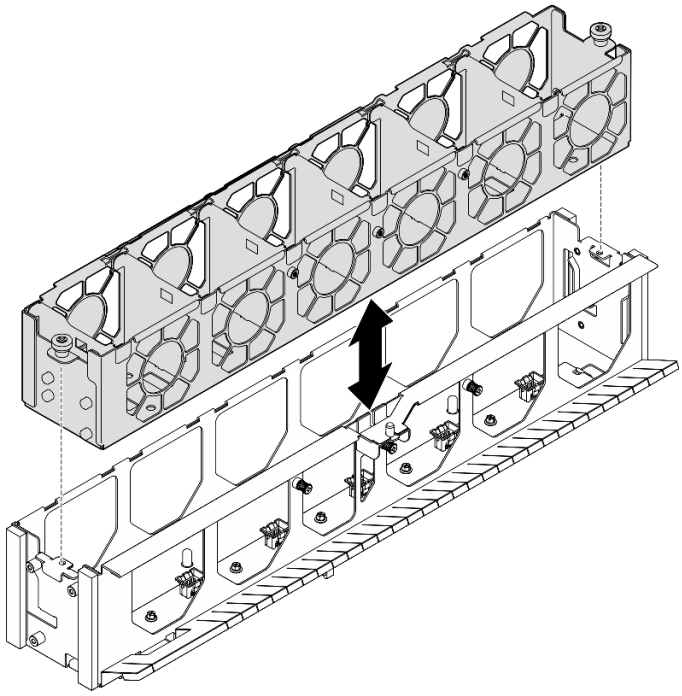


Figure 85. Inner fan cage installation

b. ❷ Fasten the five screws to secure the inner fan cage.

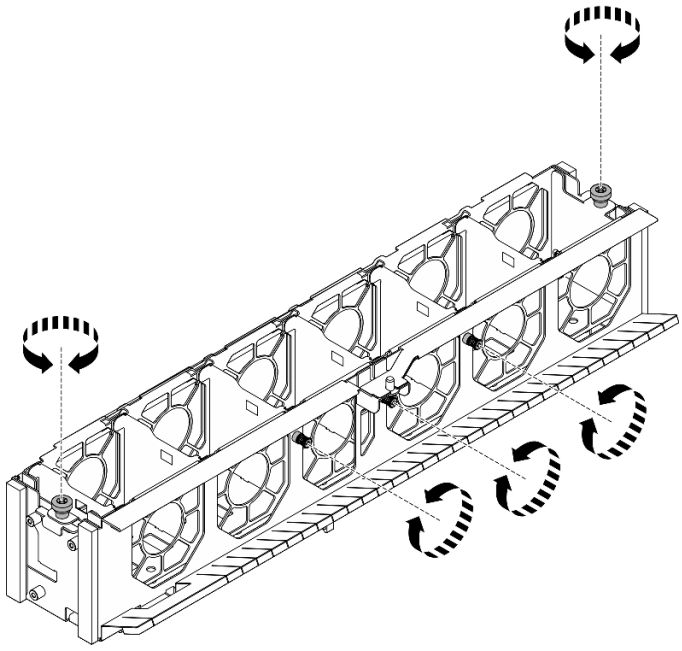


Figure 86. Securing the inner fan cage

After you finish

1. Reinstall the fan cage. See “Install the fan cage (trained technician only)” on page 104.
2. Reinstall all the front fans. See “Install a front fan” on page 106.

3. Reinstall the front top cover. See “Install the front top cover” on page 69.
4. Complete the parts replacement. See “Complete the parts replacement” on page 363.

Remove a rear fan control board

Follow instructions in this section to remove a rear fan control board module. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this task.

a. Remove all the rear fans. See “Remove a rear hot-swap fan” on page 108.
b. Remove the rear top cover. See “Remove the rear top cover” on page 70.
c. Remove the front top cover. See “Remove the front top cover” on page 67.
d. Remove the CPU complex. See “Remove the CPU complex” on page 83.
e. Remove the power complex. See “Remove the power complex” on page 312.

Step 2. Remove the rear fan cage support bracket.

a. ❶ Unfasten the eight M3 screws that secure the rear fan cage support bracket to the the chassis.
b. ❷ Unfasten the four M3 screws that secure the rear fan cage support bracket to the fan cage.
c. ❸ Grasp the rear fan cage support bracket to lift it from the fan cage.

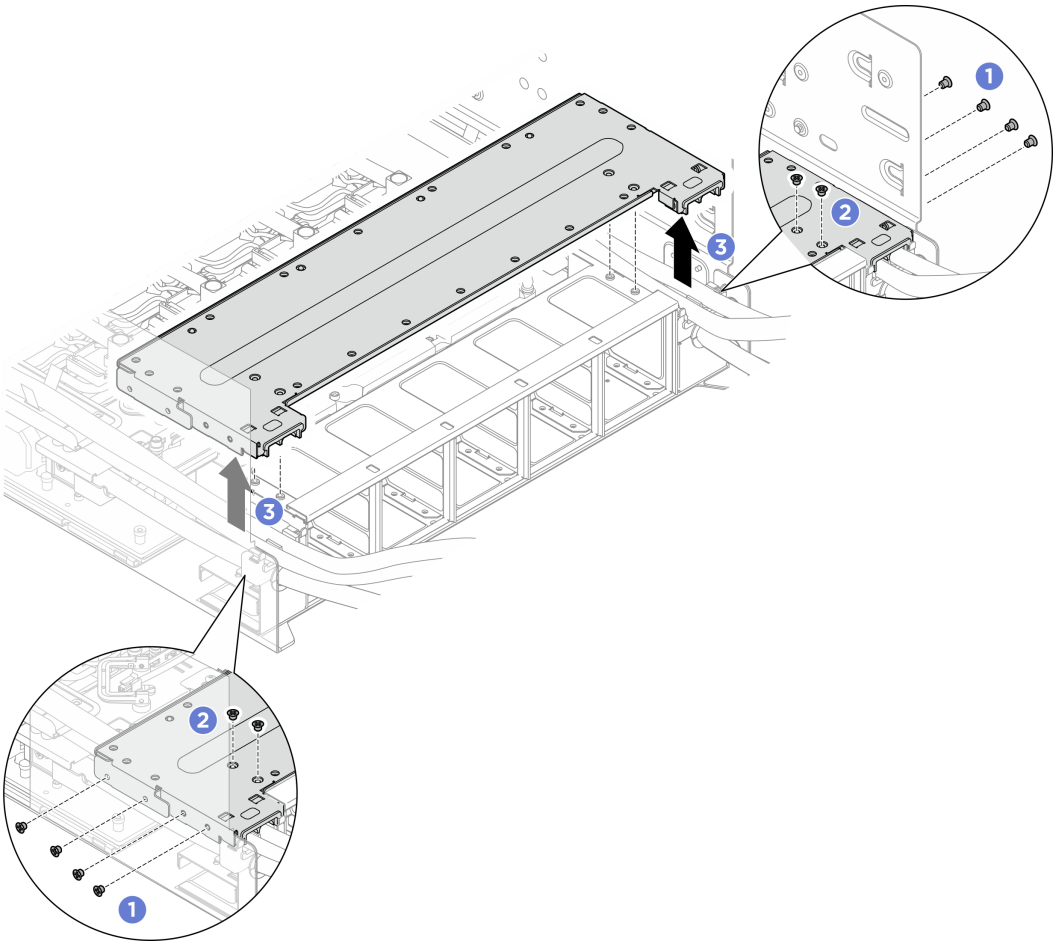


Figure 87. Removing the rear fan cage support bracket

Step 3. Disconnect the cable from the rear fan control board.

Step 4. Remove the rear fan control board.

a. ❶ Unfasten the five M3 screws that secure the rear fan control board to the bracket.

b. ❷ Grasp the rear fan control board and lift it out of the chassis.

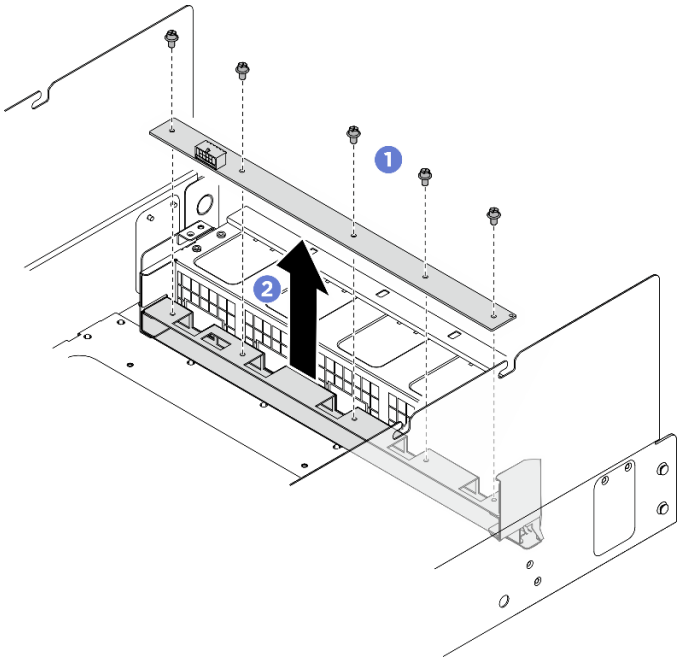


Figure 88. Rear fan control board removal

After you finish

1. Install a replacement unit. See "Install a rear fan control board" on page 117.
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 a rear fan control board

Follow instructions in this section to install a rear fan control board module. The procedure must be executed by a trained technician.

About this task

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. Install the rear fan control board.

a. (1) Align the rear fan control board with the screw holes; then, lower the rear fan control board onto the bracket.

b. (2) Fasten the five M3 screws (PH1, 5 x M3, 0.9 newton-meters, 8 inch-pounds) to secure the rear fan control board.

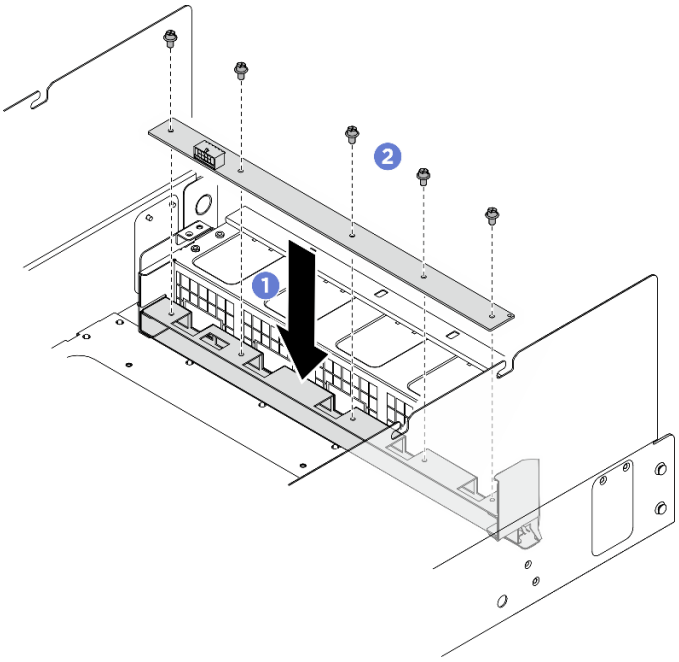


Figure 89. Rear fan control board installation

Step 2. Connect the cable to the rear fan control board. See "Fan control board cable routing" on page 374.

Step 3. If necessary, attach the labels to both ends of the power cable.

a. ❶ Attach the white space portion of the label to one end of the cable.

b. ❷ Wrap the label around the cable and attach it to the white space portion.

c. Repeat to attach the other label to the opposite end of the cable.

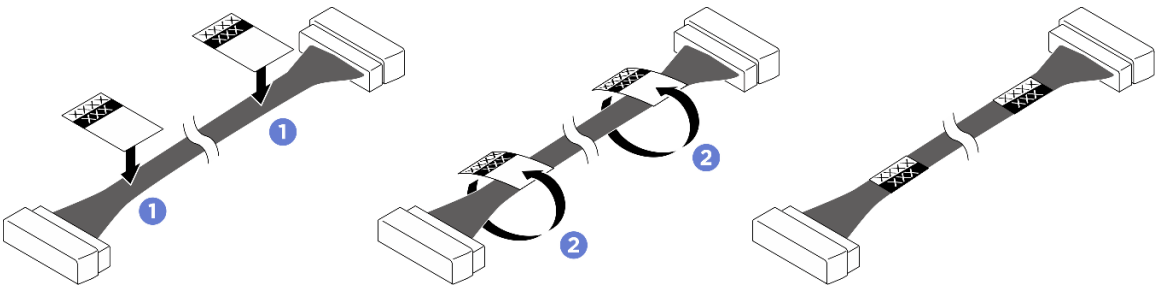


Figure 90. Label application

Note: See the table below to identify the corresponding labels for the cable.

From	To	Label
Rear fan control board: Power connector	**Power distribution board: Front fan control board power connector (REAR FAN PWR2)**	**R-Fan PWR** **R-Fan PWR2**

Step 4. Install the rear fan cage support bracket.

a. 1 Align the rear fan cage support bracket with the corresponding screw holes; then, install the rear fan cage support bracket on top of hose holder B/C as illustrated.

b. 2 Fasten the four M3 screws (PH2, 4 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the rear fan cage support bracket to the fan cage.

c. 3 Fasten the eight M3 screws (PH2, 8 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the rear fan cage support bracket to the chassis.

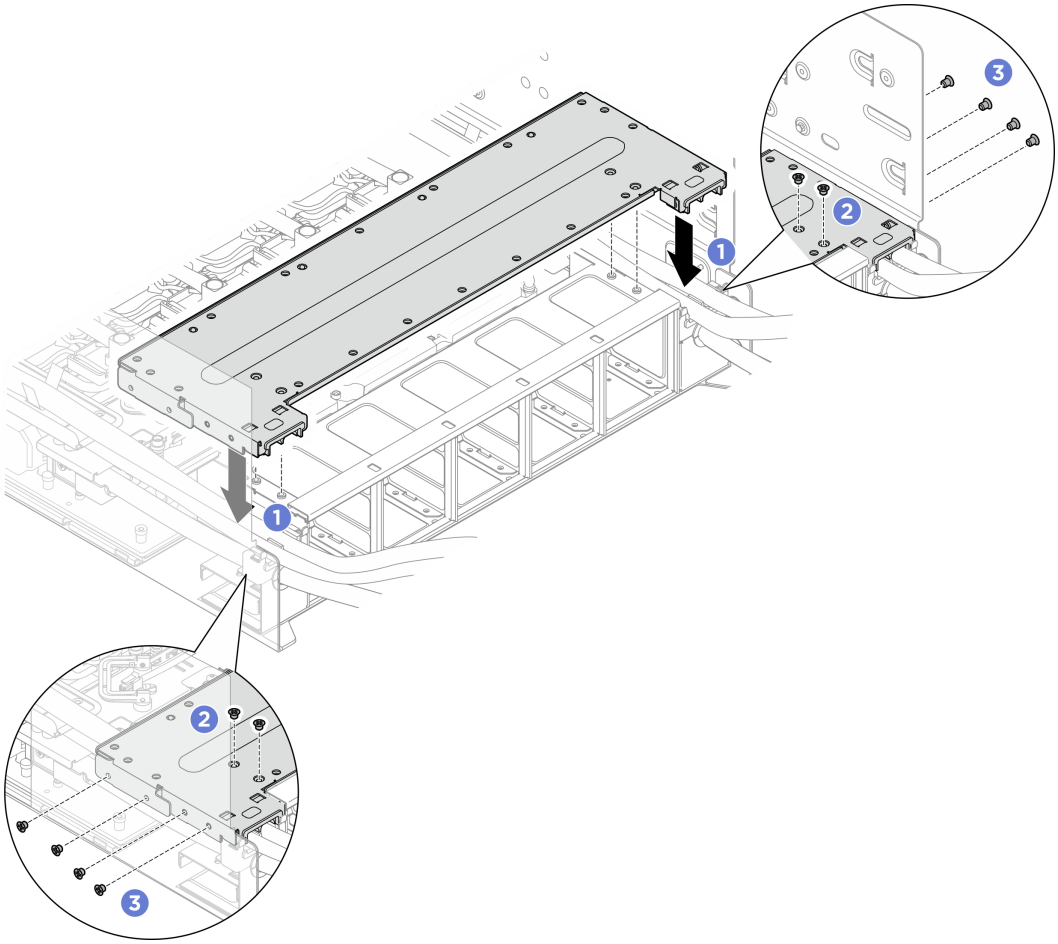


Figure 91. Installing the rear fan cage support bracket

After you finish

1. Reinstall the power complex. See "Install the power complex" on page 313.
2. Reinstall the CPU complex. See "Install the CPU complex" on page 84.
3. Reinstall the rear top cover. See "Install the rear top cover" on page 72.
4. Reinstall the front top cover. See "Install the front top cover" on page 69.
5. Reinstall all the rear fans. See "Install a rear hot-swap fan" on page 109.
6. Complete the parts replacement. See "Complete the parts replacement" on page 363.

Front I/O module replacement (trained technician only)

Follow instructions in this section to remove and install the front I/O module.

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 front I/O module

Follow instructions in this section to remove the front I/O module. The procedure must be executed by a trained technician.

About this task

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See "Power off the server" on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See "Remove the server from rack" on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Note: Make sure you have a 5 mm hex socket screwdriver available to properly replace the component:

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See "Remove the front top cover" on page 67.

b. Remove the fan cage. See "Remove the fan cage (trained technician only)" on page 103.

Step 2. Remove the front I/O module.

a. ❶ Unfasten the two outer screws on the front I/O module.

b. ❷ Unfasten the inner screw on the front I/O module.

c. ❸ Slide the front I/O module rearward.

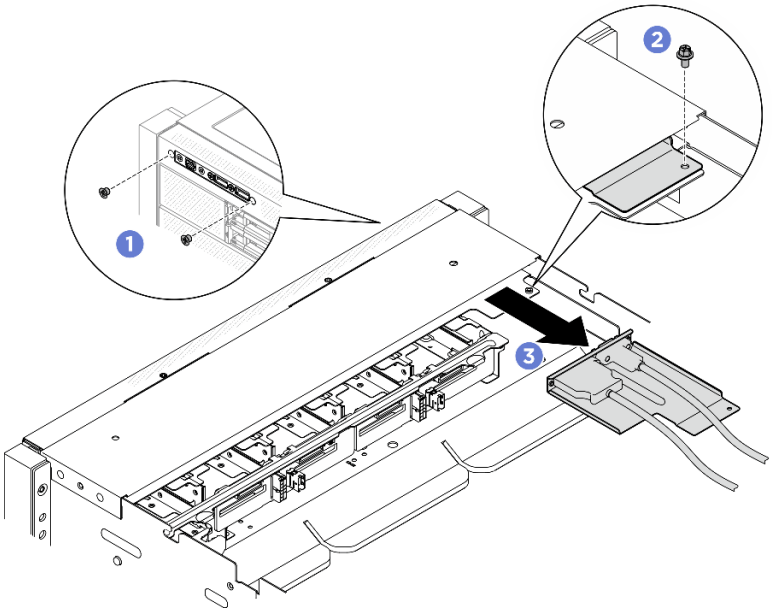


Figure 92. Front I/O module removal

Step 3. Remove the following front I/O module cables.

- Unfasten the two hex nuts (1) to remove the Mini DisplayPort cable from the front I/O bracket.
- Unfasten the two screws (2) to remove the USB cable from the front I/O bracket.

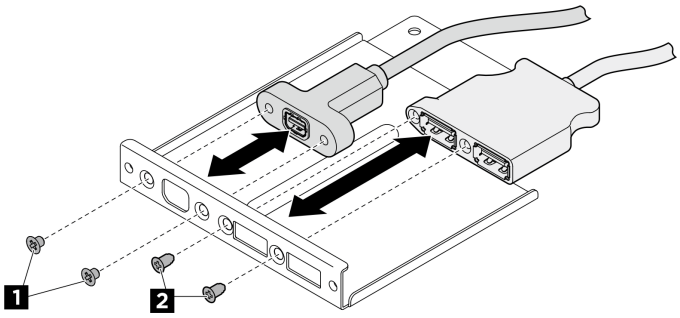


Figure 93. Front I/O module cables removal

After you finish

1. Install a replacement unit. See "Install the front I/O module" on page 121.
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 front I/O module

Follow instructions in this section to install the front I/O module. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Note: Make sure you have a 5 mm hex socket screwdriver available to properly replace the component:

Procedure

Step 1. Install the following front I/O module cables.

- Fasten the two hex nuts (1) to install the Mini DisplayPort cable to the front I/O bracket.
- Fasten the two screws (2) to install the USB cable to the front I/O bracket.

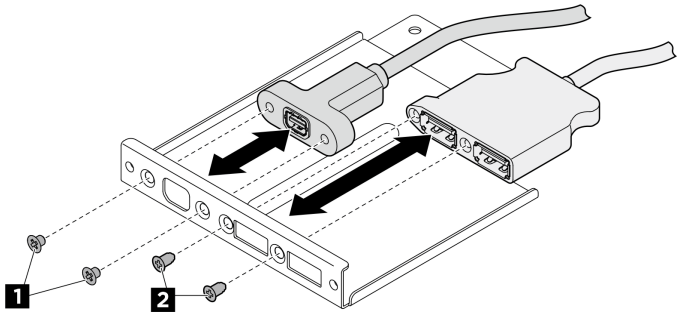


Figure 94. Front I/O module cables installation

Step 2. Install the front I/O module.

a. (1) Insert the front I/O module into the front I/O module slot.
b. (2) Fasten the inner screw to secure the front I/O module.
c. (3) Fasten the two outer screws to secure the front I/O module.

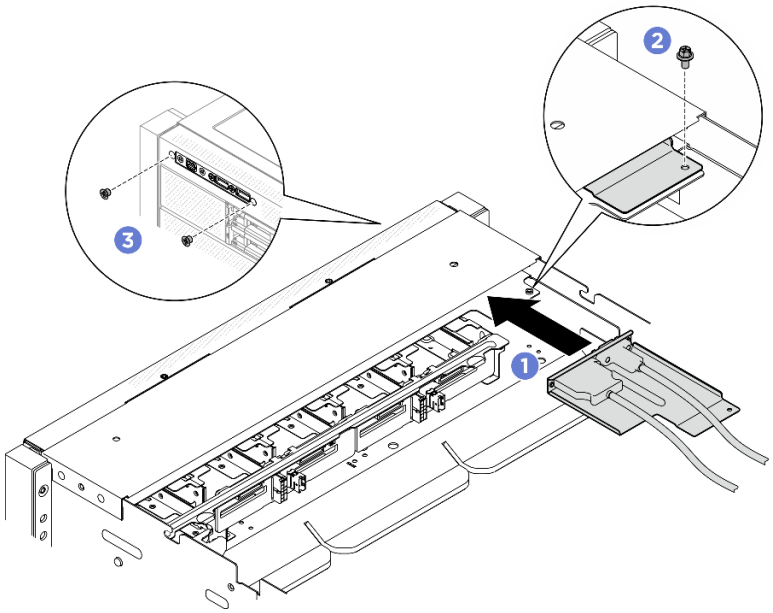


Figure 95. Front I/O module installation

Step 3. If necessary, attach the labels to both ends of the cables.

a. ❶ Attach the white space portion of the label to one end of the cable.

b. ❷ Wrap the label around the cable and attach it to the white space portion.

c. Repeat to attach the other label to the opposite end of the cable.

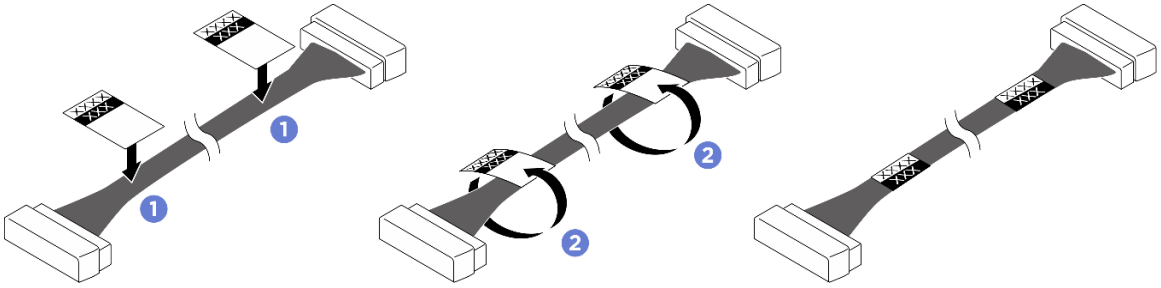


Figure 96. Label application

Note: See the table below to identify the corresponding labels for the cable.

From	To	Label
Front I/O module: USB / Mini DisplayPort cable	**System board assembly: Front USB / Mini DisplayPort connector (FRONT IO1)**	**DP/USB** **FRONT IO1**

After you finish

1. Reinstall the fan cage. See “Install the fan cage (trained technician only)” on page 104.
2. Reinstall the front top cover. See “Install the front top cover” on page 69.
3. Complete the parts replacement. See “Complete the parts replacement” on page 363.

GPU baseboard replacement (trained technician only)

Follow instructions in this section to remove or install the GPU baseboard.

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 H100/H200 GPU baseboard

Follow instructions in this section to remove the H100/H200 GPU baseboard. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, remove the server from the rack. See “Remove the server from rack” on page 51.

- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torx T10 head screwdriver
- Torx T15 head screwdriver
- Phillips #1 head screwdriver
- Phillips #2 head screwdriver
- Flat head screwdriver
- Alcohol cleaning pad
- 2 x H100/H200 PCM Kit
- 2 x SR780a V3 water loop putty pad kit
- SR780a V3 water loop service kit
- NVSwitch PCM Kit
- NVSwitch putty pad Kit
- GPU baseboard handles

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torque screwdriver which can be set to 0.6 newton-meters, 5.3 inch-pounds

The following illustration shows the GPU numbering and corresponding slot numbering in XCC.

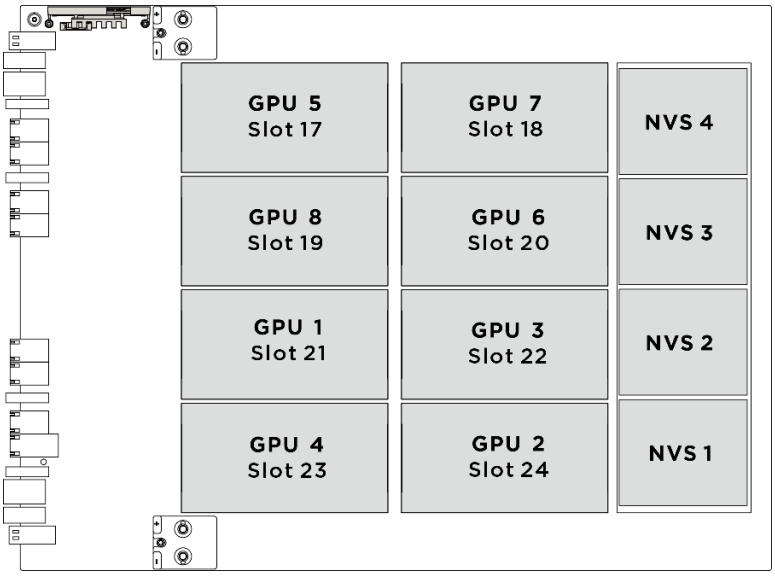


Figure 97. GPU numbering

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the rear top cover. See “Remove the rear top cover” on page 70.

c. Remove the fan cage. See “Remove the fan cage (trained technician only)” on page 103.

d. Remove the CPU complex. See “Remove the CPU complex” on page 83.

e. Remove the power complex. See “Remove the power complex” on page 312.

f. Disconnect the cables from the GPU baseboard.

g. Disconnect and remove the cables routed through the GPU complex, if necessary. Before disconnecting the cables, make a list of each cable and record the connectors the cable is connected to. Refer to Chapter 6 “Internal cable routing” on page 365.

h. Remove the rear H100/H200 GPU cold plate module. See “Remove the rear H100/H200 GPU cold plate module” on page 193.

i. Remove the front H100/H200 GPU cold plate module. See “Remove the front H100/H200 GPU cold plate module” on page 169.

j. Remove the NVswitch cold plate module. See “Remove the NVSwitch cold plate module” on page 153.

Step 2. Disengage the PCIe switch shuttle from the chassis.

a. ❶ Press the two blue release latches.

b. ❷ Rotate the two release levers until they are perpendicular to the PCIe switch shuttle.

c. ❸ Pull the PCIe switch shuttle forward until it stops.

Note: Push the two release levers back until they lock into place after pulling out the PCIe switch shuttle to avoid damage.

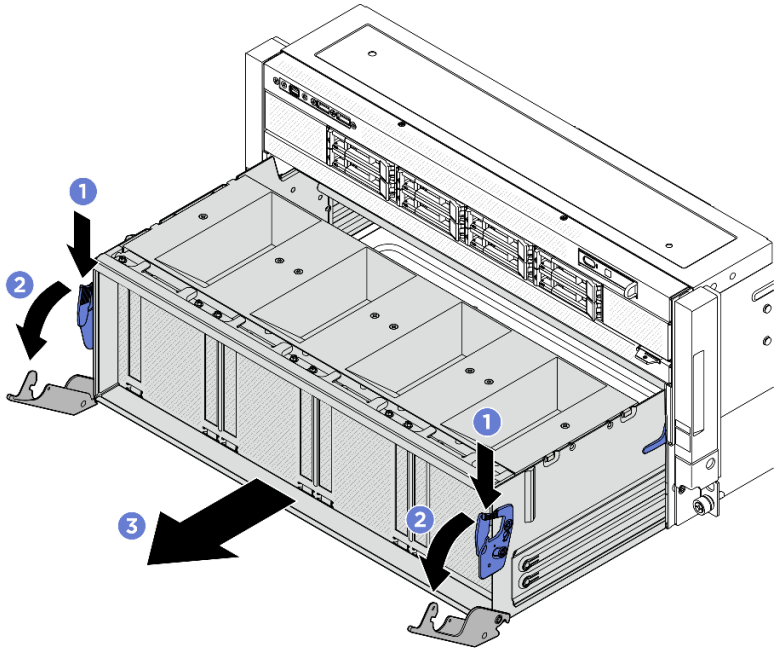


Figure 98. PCIe switch shuttle removal to stop position

Step 3. Unfasten the two M3 screws to remove the GPU connector protective bracket.

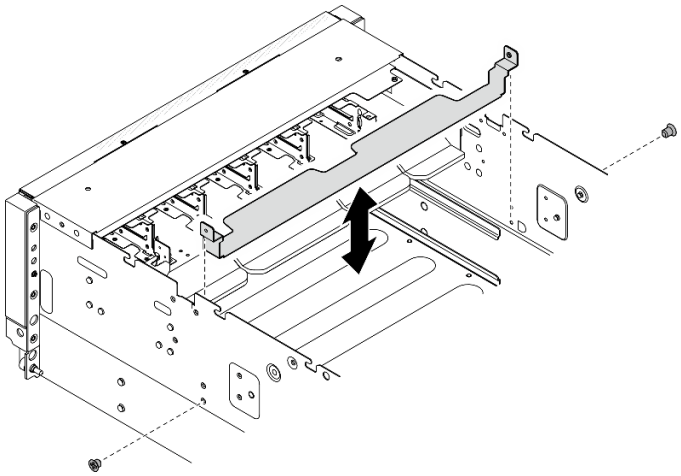


Figure 99. Removing the GPU connector protective bracket

Step 4. Unfasten the seventeen Torx T15 captive screws on the GPU baseboard.

Note: Loosen or tighten the screws with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to be fully loosen or tighten is 0.6 newton-meters, 5.3 inch-pounds.

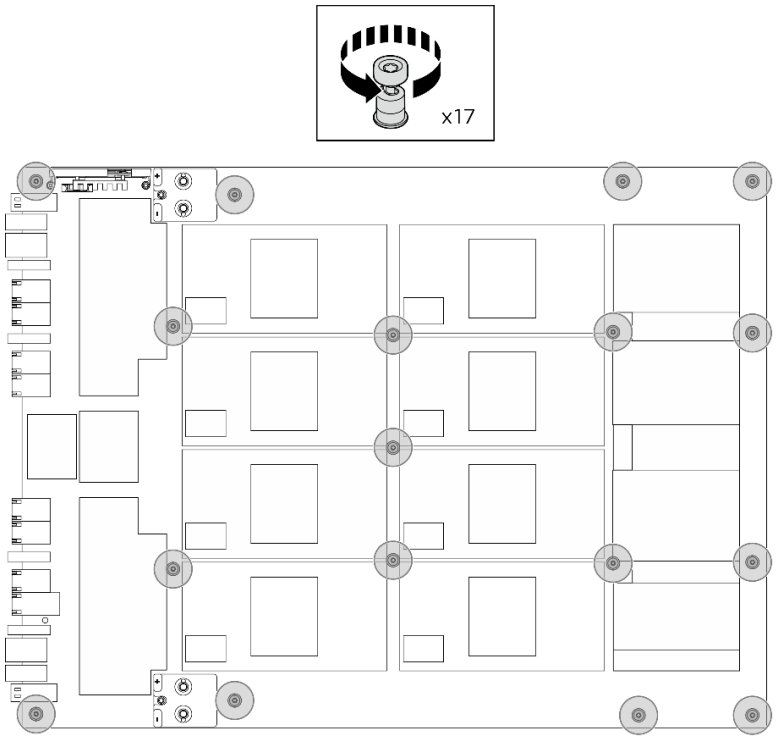


Figure 100. Screw removal

Step 5. Remove the GPU complex.

a. ❶ Press the button on the side of the handle.

b. ❷ Adjust the handle to create space for screwdriver.

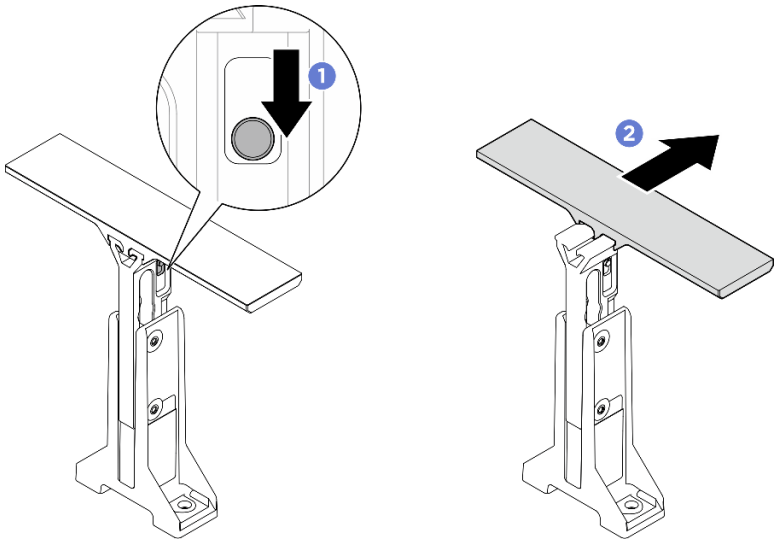


Figure 101. Adjusting the handle

c. 3 Align the handles with the screw holes and lower them onto the GPU baseboard; then, fasten the five M3 screws (5 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the handles to the GPU baseboard.

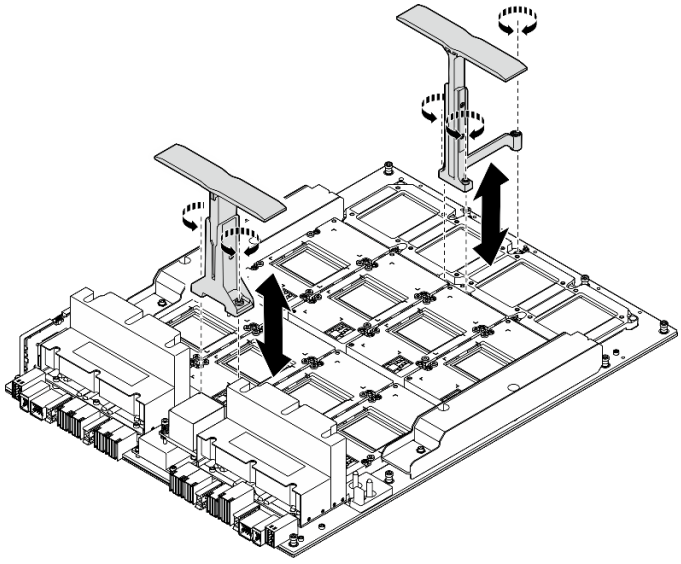


Figure 102. Installing the handles

d. 4 Hold the two handles (1), and lift the GPU complex out of the chassis.

Attention: Make sure two people stand on either side of the GPU complex, and lift it by holding the two handles (1).

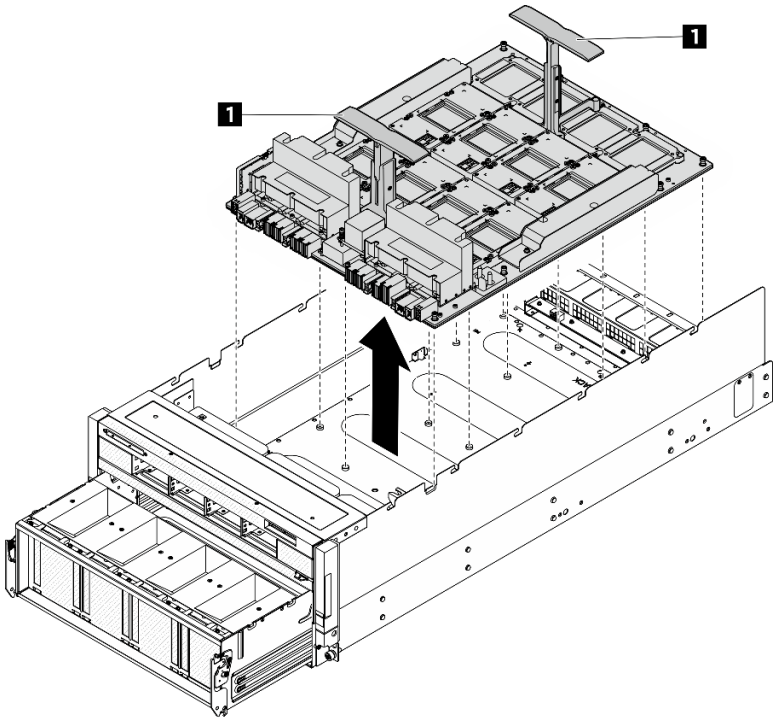


Figure 103. Removing the GPU complex

Step 6. Carefully lay the GPU complex on a flat, static protective surface; then, unfasten the five M3 screws that secure the handles to the baseboard. Lift the handles to remove them from the baseboard.

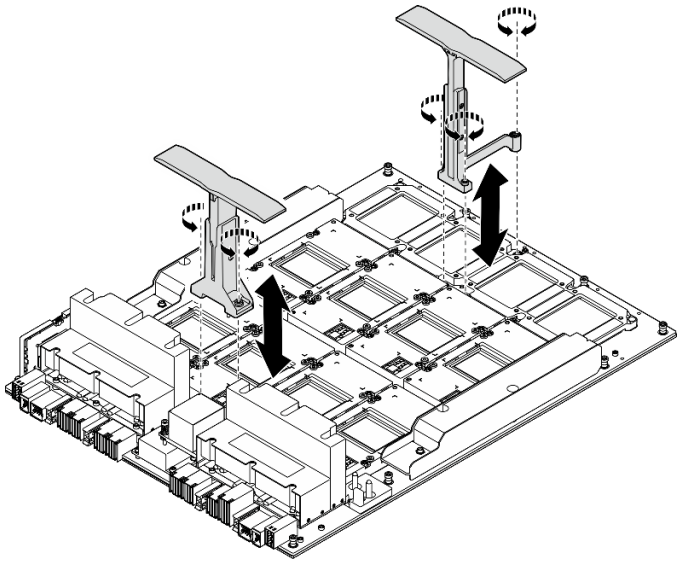


Figure 104. Removing handles

Step 7. Remove the GPUs from the GPU baseboard.

a. Carefully lay the GPU complex on a flat, static protective surface.

b. ❶❷❸❹ Unfasten the four Torx T15 screws in the sequence shown in the illustration below.

Note: Loosen the screws with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to be fully loosen is 0.6 newton-meters, 5.3 inch-pounds.

c. 5 Carefully remove the GPU from the GPU baseboard.

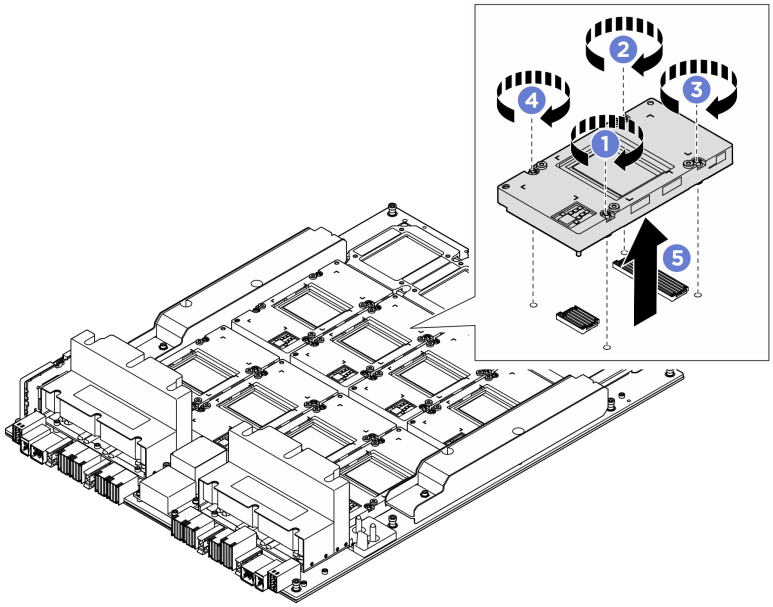


Figure 105. Removing the GPU

d. Repeat to remove all the GPUs.

After you finish

1. Install a replacement unit. See "Install the H100/H200 GPU baseboard" on page 129.
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 H100/H200 GPU baseboard

Follow instructions in this section to install the H100/H200 GPU baseboard. The procedure must be executed by a trained technician.

About this task

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- Make sure to inspect the connectors and sockets on the GPU and the GPU baseboard. Do not use the GPU or the GPU baseboard if its connectors are damaged or missing, or if there are debris in the sockets. Replace the GPU or the GPU baseboard with a new one before continuing the installation procedure.

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torx T10 head screwdriver
- Torx T15 head screwdriver

- Phillips #1 head screwdriver
- Phillips #2 head screwdriver
- Flat head screwdriver
- Alcohol cleaning pad
- 2 x H100/H200 PCM Kit
- 2 x SR780a V3 water loop putty pad kit
- SR780a V3 water loop service kit
- NVSwitch PCM Kit
- NVSwitch putty pad Kit
- GPU baseboard handles

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torque screwdriver which can be set to 0.6 newton-meters, 5.3 inch-pounds

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

- Go to https://datacentersupport.lenovo.com/tw/en/products/servers/thinksystem/sr780av3/7dj5/downloads/driver-list/ to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” on page 403 for more information on firmware updating tools.

The following illustration shows the GPU numbering and corresponding slot numbering in XCC.

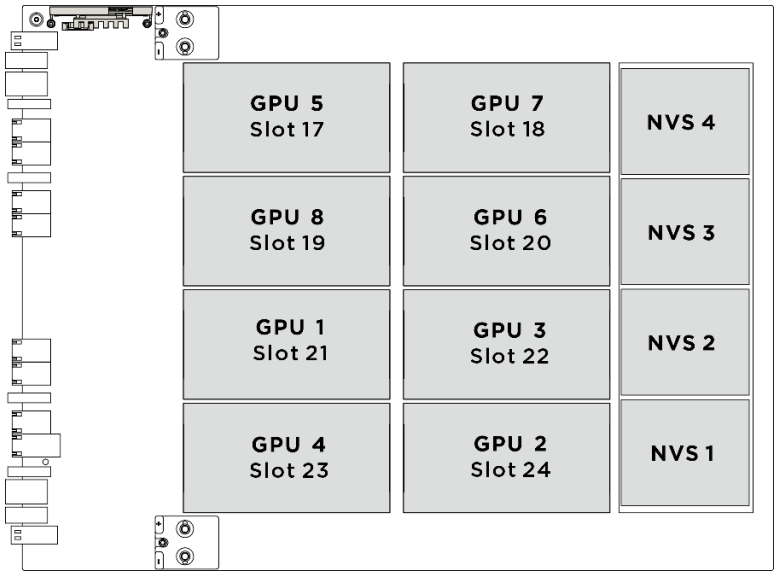


Figure 106. GPU numbering

Procedure

Step 1. (Optional) Remove the new GPU baseboard from the package box.

a. ① Extend the two handles on both sides of the GPU baseboard.

b. ② Hold the two handles, and remove the GPU baseboard out from the package box.

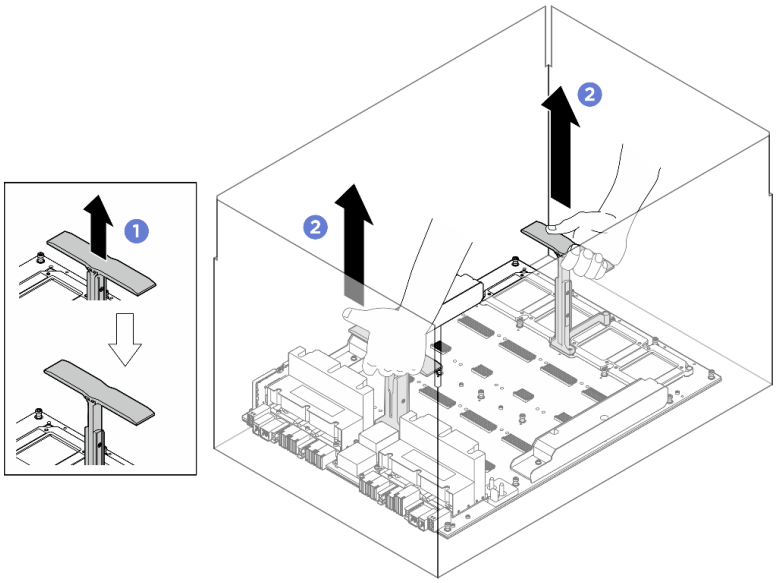


Figure 107. Removing the GPU baseboard from the package box

Step 2. Install the GPUs onto the GPU baseboard.

a. Carefully lay the GPU baseboard on a flat, static protective surface.

b. ❶ Gently place the GPU down onto the GPU baseboard.

c. ❷❸❹❺ Follow the sequence shown in the illustration below to fasten the four Torx T15 screws to secure the GPU to the GPU baseboard.

Note: First set the torque screwdriver to 0.1-0.12 newton-meters, 0.9-1.1 inch-pounds to fasten the screws for a few rounds. Then set the torque screwdriver to 0.58-0.62 newton-meters, 5-5.5 inch-pounds to fully fasten the screws.

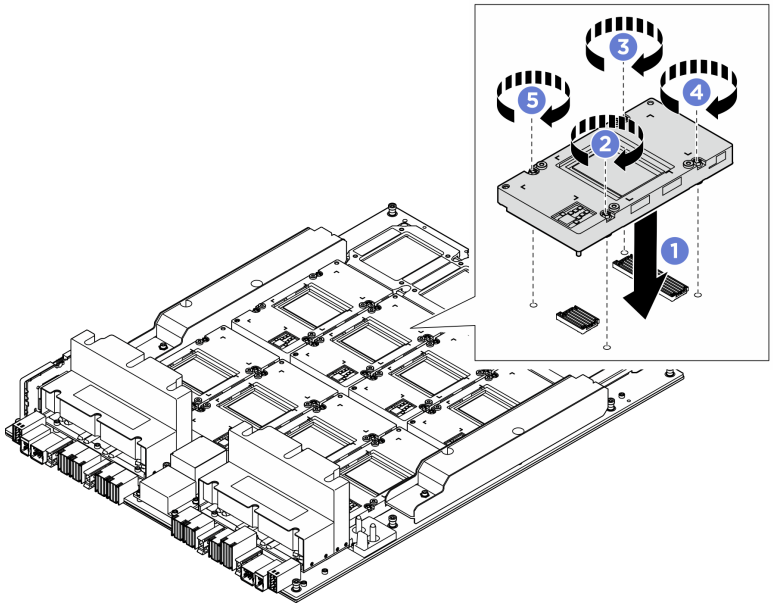


Figure 108. Installing the GPU

d. Repeat to install all the GPUs.

Step 3. Install the GPU complex.

a. ❶ Hold the handles (1) on both sides of the GPU baseboard in the correct orientation as illustrated; then, align the GPU complex with the seventeen standoffs on the GPU complex adapter plate, and carefully place it onto the adapter plate.

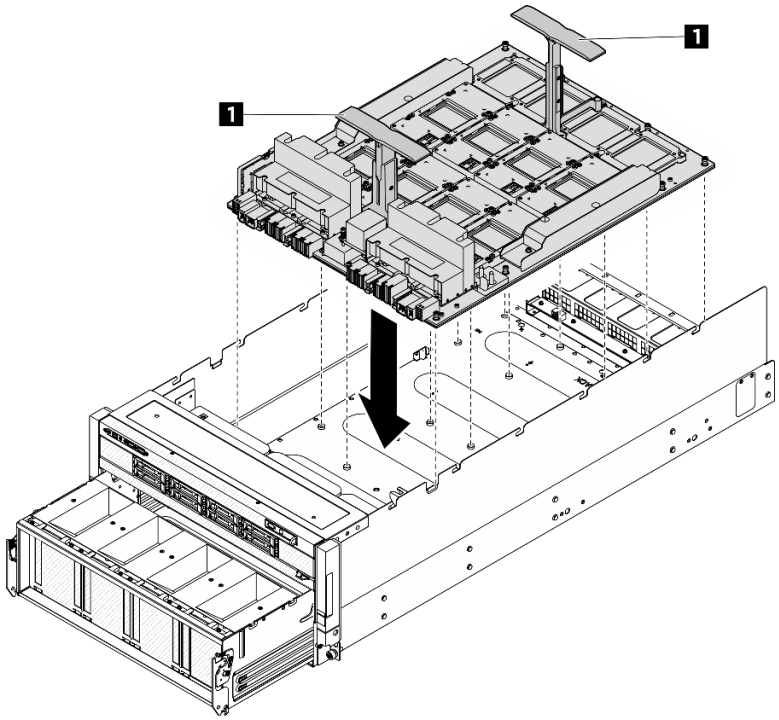


Figure 109. GPU complex installation

b. ❷ Press the button on the side of the handle.

c. ❸ Adjust the handle to create space for screwdriver.

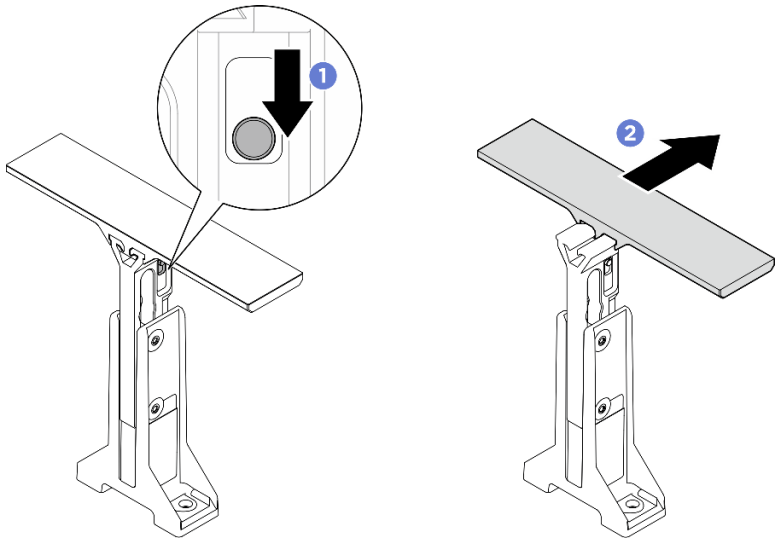


Figure 110. Adjusting the handle

d. ❹ Unfasten the five M3 screws that secure the handles to the GPU complex; then, remove the handles from the GPU complex.

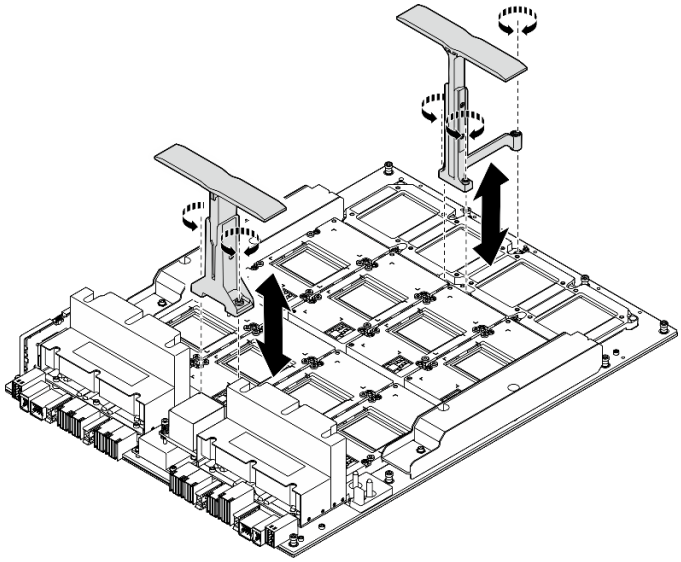


Figure 111. Removing handles

Step 4. Follow the sequence shown in the illustration below to fasten the seventeen Torx T15 captive screws to secure the GPU complex.

Important: Do not overtighten the screws to avoid damage.

Note: Loosen or tighten the screws with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to be fully loosen or tighten is 0.6 newton-meters, 5.3 inch-pounds.

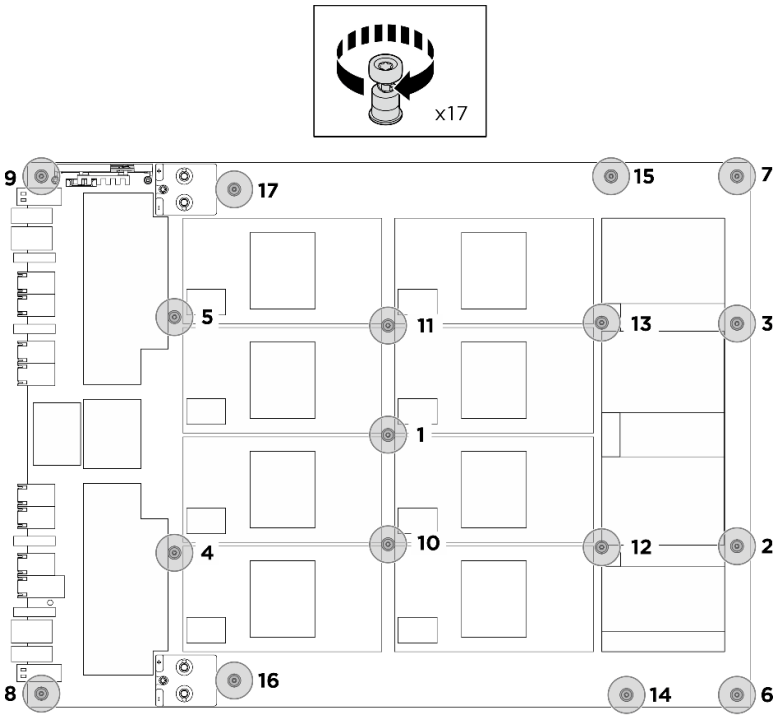


Figure 112. Screw installation

Step 5. Align the GPU connector protective bracket with the corresponding screw holes; then, fasten the two M3 screws (PH2, 2 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the GPU connector protective bracket to the chassis.

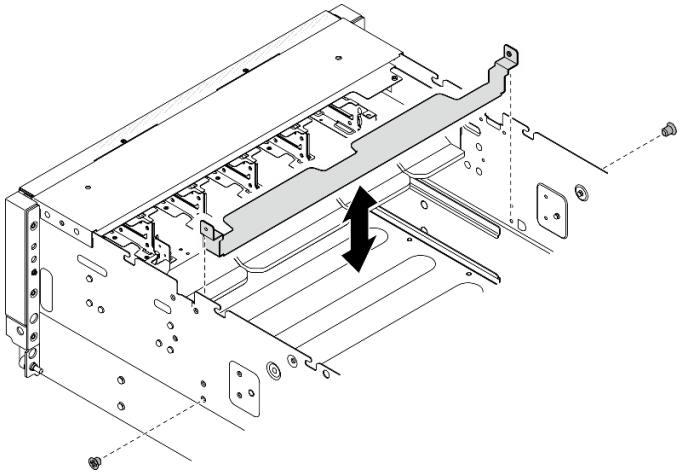


Figure 113. Installing GPU connector protective bracket

Step 6. Install the PCIe switch shuttle.

a. ❶ Press the two lock latches on both sides of the PCIe switch shuttle.

b. ❷ Push the PCIe switch shuttle into the chassis until it stops.

c. ❸ Rotate the two release levers until they lock into place.

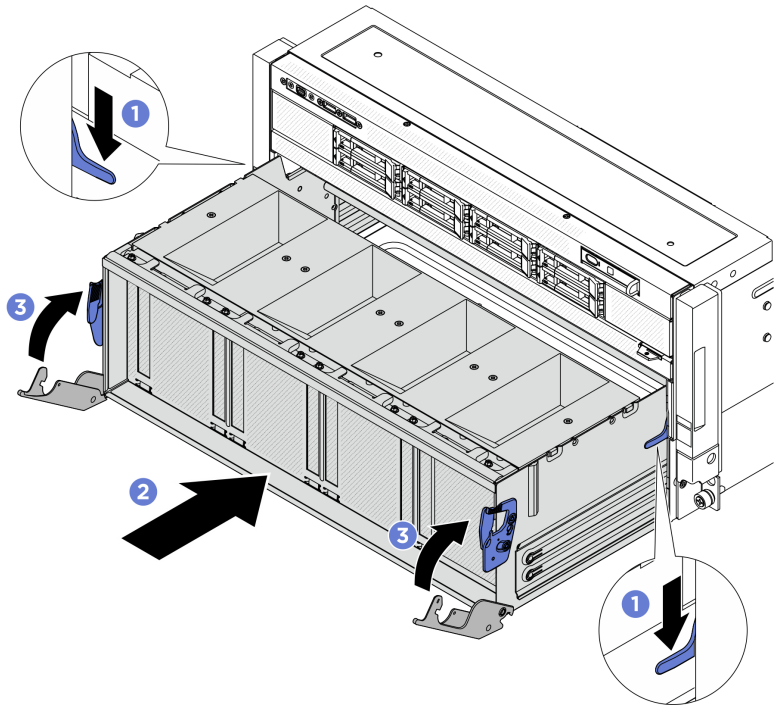


Figure 114. PCIe switch shuttle installation

After you finish

1. Reinstall the NVswitch cold plate module. See “Install the NVSwitch cold plate module” on page 160.
2. Reinstall the front H100/H200 GPU cold plate module. See “Install the front H100/H200 GPU cold plate module” on page 180.
3. Reinstall the rear H100/H200 GPU cold plate module. See “Install the rear H100/H200 GPU cold plate module” on page 203.
4. Reconnect the cables to the GPU baseboard. See “GPU baseboard cable routing” on page 376 for more information.
5. Reconnect all the cables that were disconnected. See Chapter 6 “Internal cable routing” on page 365.
6. Reinstall the power complex. See “Install the power complex” on page 313.
7. Reinstall the CPU complex. See “Install the CPU complex” on page 84.
8. Reinstall the fan cage. See “Install the fan cage (trained technician only)” on page 104.
9. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
10. Reinstall the front top cover. See “Install the front top cover” on page 69.
11. Complete the parts replacement. See “Complete the parts replacement” on page 363.

GPU complex replacement (trained technician only)

Follow instructions in this section to remove or install the GPU complex.

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 H100/H200 GPU complex

Follow instructions in this section to remove the H100/H200 GPU complex. The procedure must be executed by a trained technician.

About this task

S036

18 - 32 kg (39 - 70 lb)

32 - 55 kg (70 - 121 lb)

CAUTION:
Use safe practices when lifting.

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torx T10 head screwdriver
- Torx T15 head screwdriver
- Phillips #1 head screwdriver
- Phillips #2 head screwdriver
- Flat head screwdriver
- Alcohol cleaning pad
- 2 x H100/H200 PCM Kit
- 2 x SR780a V3 water loop putty pad kit
- SR780a V3 water loop service kit
- NVSwitch PCM Kit
- NVSwitch putty pad Kit
- GPU baseboard handles

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torque screwdriver which can be set to 0.6 newton-meters, 5.3 inch-pounds

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the rear top cover. See “Remove the rear top cover” on page 70.

c. Remove the fan cage. See “Remove the fan cage (trained technician only)” on page 103.

d. Remove the CPU complex. See “Remove the CPU complex” on page 83.

e. Remove the power complex. See “Remove the power complex” on page 312.

f. Disconnect the cables from the GPU baseboard.

g. Disconnect and remove the cables routed through the GPU complex, if necessary. Before disconnecting the cables, make a list of each cable and record the connectors the cable is connected to. Refer to Chapter 6 “Internal cable routing” on page 365.

h. Remove the rear H100/H200 GPU cold plate module. See “Remove the rear H100/H200 GPU cold plate module” on page 193.

i. Remove the front H100/H200 GPU cold plate module. See “Remove the front H100/H200 GPU cold plate module” on page 169.

j. Remove the NVswitch cold plate module. See “Remove the NVSwitch cold plate module” on page 153.

Step 2. Disengage the PCIe switch shuttle from the chassis.

a. ❶ Press the two blue release latches.

b. ❷ Rotate the two release levers until they are perpendicular to the PCIe switch shuttle.

c. ❸ Pull the PCIe switch shuttle forward until it stops.

Note: Push the two release levers back until they lock into place after pulling out the PCIe switch shuttle to avoid damage.

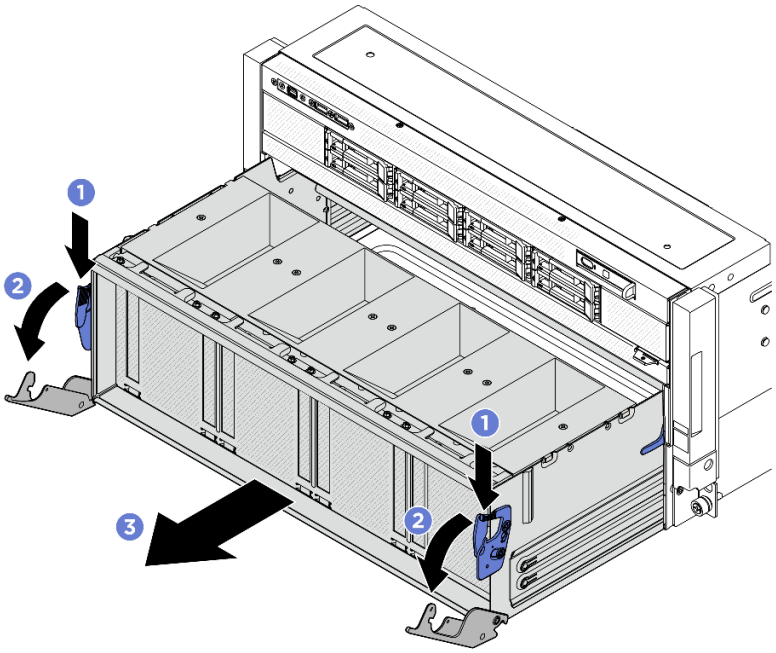


Figure 115. PCIe switch shuttle removal to stop position

Step 3. Unfasten the two M3 screws to remove the GPU connector protective bracket.

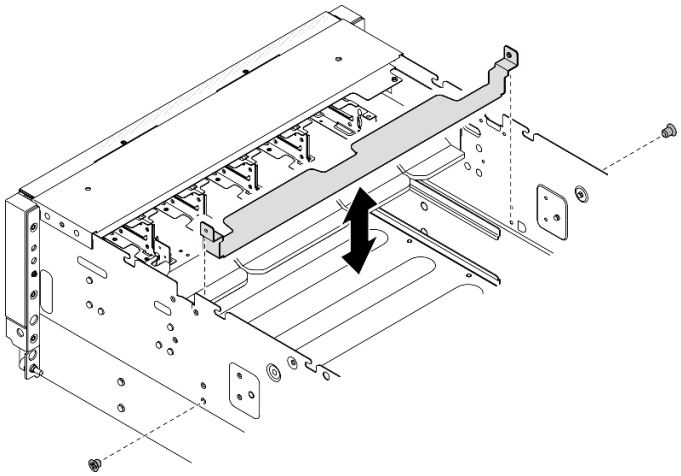


Figure 116. Removing the GPU connector protective bracket

Step 4. Unfasten the seventeen Torx T15 captive screws on the GPU baseboard.

Note: Loosen or tighten the screws with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to be fully loosen or tighten is 0.6 newton-meters, 5.3 inch-pounds.

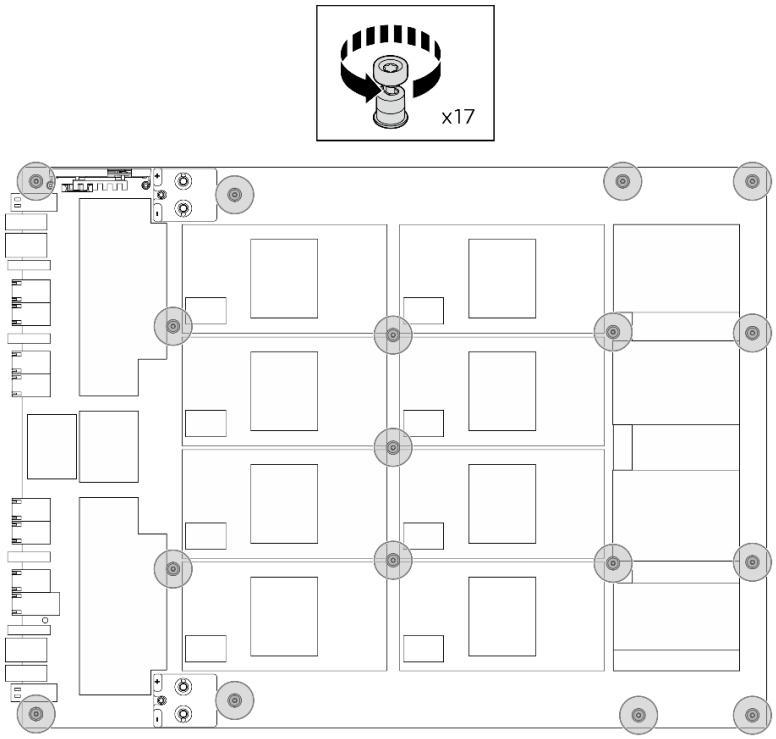


Figure 117. Screw removal

Step 5. Remove the GPU complex.

a. ❶ Press the button on the side of the handle.

b. ❷ Adjust the handle to create space for screwdriver.

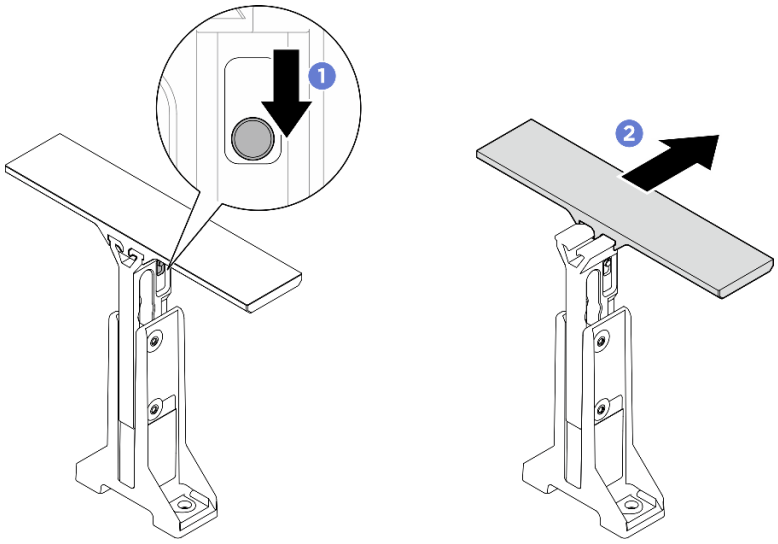


Figure 118. Adjusting the handle

c. 3 Align the handles with the screw holes and lower them onto the GPU baseboard; then, fasten the five M3 screws (5 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the handles to the GPU baseboard.

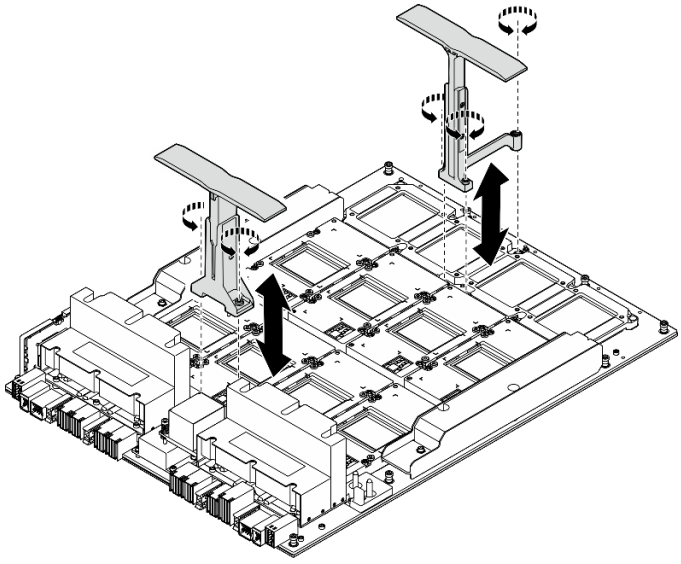


Figure 119. Installing the handles

d. 4 Hold the two handles (1), and lift the GPU complex out of the chassis.

Attention: Make sure two people stand on either side of the GPU complex, and lift it by holding the two handles (1).

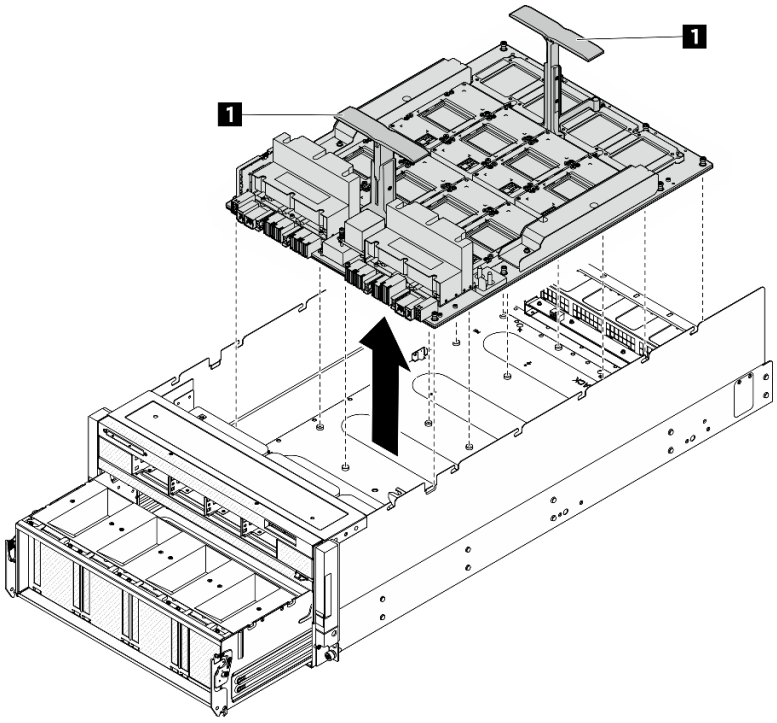


Figure 120. Removing the GPU complex

After you finish

1. Install a replacement unit. See “Install the H100/H200 GPU complex” on page 140.
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 H100/H200 GPU complex

Follow instructions in this section to install the H100/H200 GPU complex. The procedure must be executed by a trained technician.

About this task

S036

18 - 32 kg (39 - 70 lb)

32 - 55 kg (70 - 121 lb)

CAUTION:
Use safe practices when lifting.

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.

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

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torx T10 head screwdriver
- Torx T15 head screwdriver
- Phillips #1 head screwdriver
- Phillips #2 head screwdriver
- Flat head screwdriver
- Alcohol cleaning pad
- 2 x H100/H200 PCM Kit
- 2 x SR780a V3 water loop putty pad kit
- SR780a V3 water loop service kit
- NVSwitch PCM Kit
- NVSwitch putty pad Kit
- GPU baseboard handles

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torque screwdriver which can be set to 0.6 newton-meters, 5.3 inch-pounds

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

- Go to https://datacentersupport.lenovo.com/tw/en/products/servers/thinksystem/sr780av3/7dj5/downloads/driver-list/ to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” on page 403 for more information on firmware updating tools.

Procedure

Step 1. (Optional) Remove the new GPU complex from the package box.

a. ❶ Extend the two handles on both sides of the GPU baseboard.

b. ❷ Hold the two handles, and remove the GPU complex out from the package box.

Attention: Make sure two people stand on either side of the GPU complex, and lift it by holding the two handles.

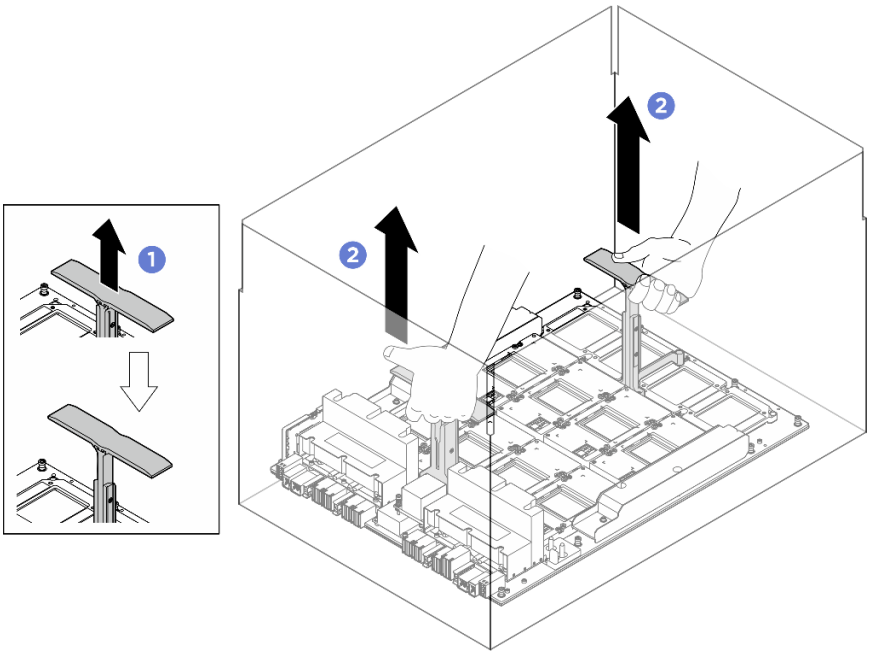


Figure 121. Removing the GPU complex from the package box

Step 2. Install the GPU complex.

a. 1 Hold the handles (1) on both sides of the GPU baseboard in the correct orientation as illustrated; then, align the GPU complex with the seventeen standoffs on the GPU complex adapter plate, and carefully place it onto the adapter plate.

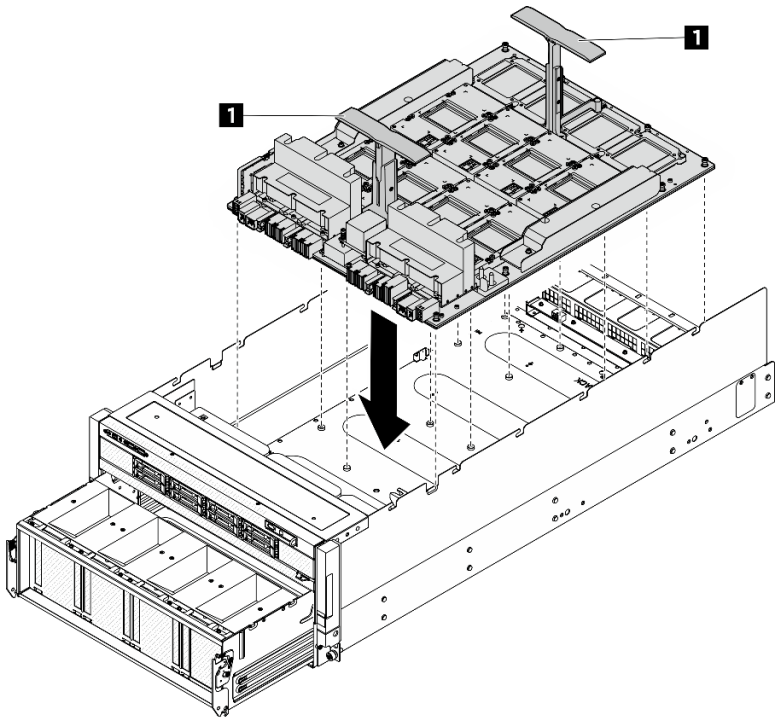


Figure 122. GPU complex installation

b. ❷ Press the button on the side of the handle.

c. ❸ Adjust the handle to create space for screwdriver.

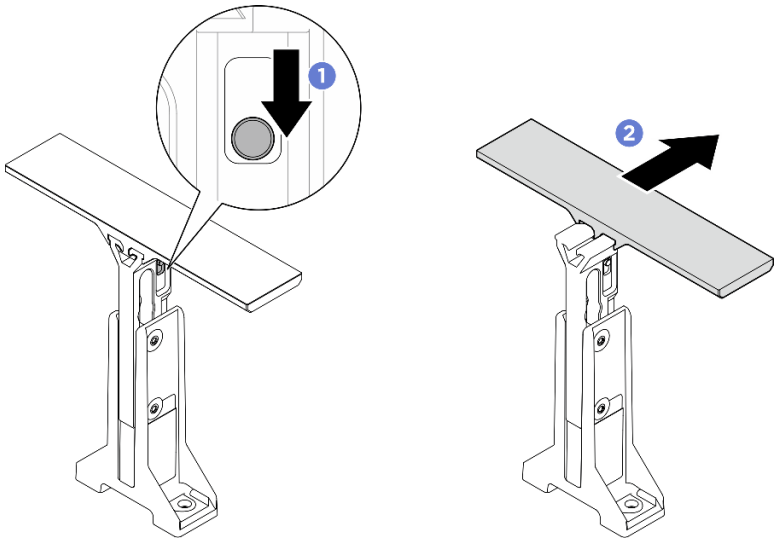


Figure 123. Adjusting the handle

d. ❹ Unfasten the five M3 screws that secure the handles to the GPU complex; then, remove the handles from the GPU complex.

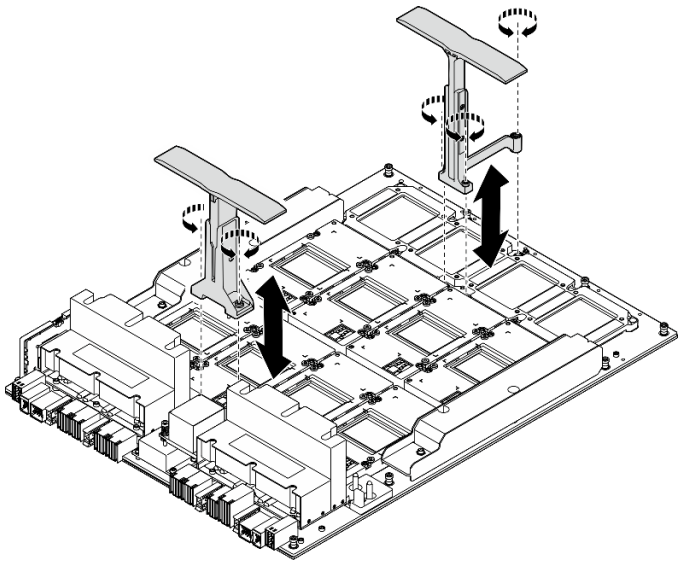


Figure 124. Removing handles

Step 3. Follow the sequence shown in the illustration below to fasten the seventeen Torx T15 captive screws to secure the GPU complex.

Important: Do not overtighten the screws to avoid damage.

Note: Loosen or tighten the screws with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to be fully loosen or tighten is 0.6 newton-meters, 5.3 inch-pounds.

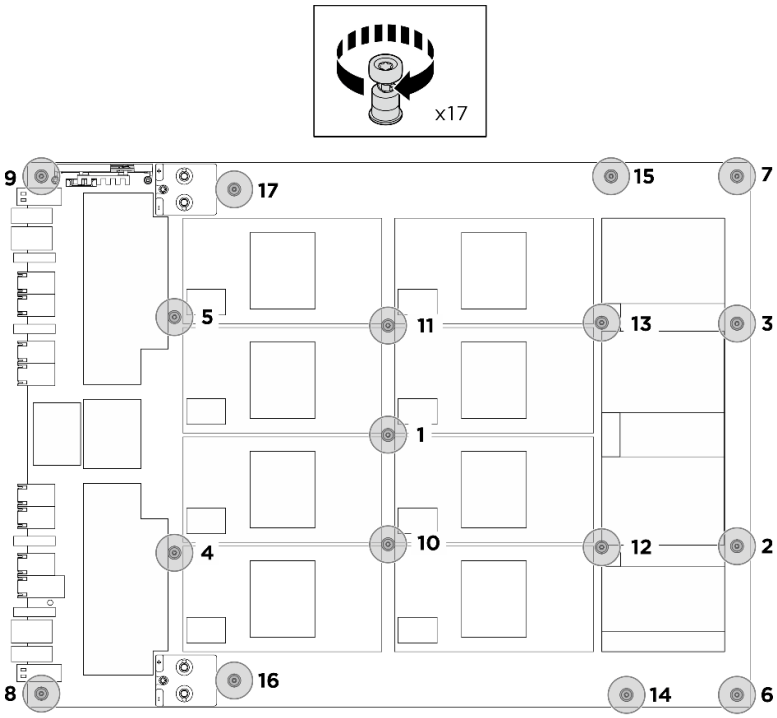


Figure 125. Screw installation

Step 4. Align the GPU connector protective bracket with the corresponding screw holes; then, fasten the two M3 screws (PH2, 2 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the GPU connector protective bracket to the chassis.

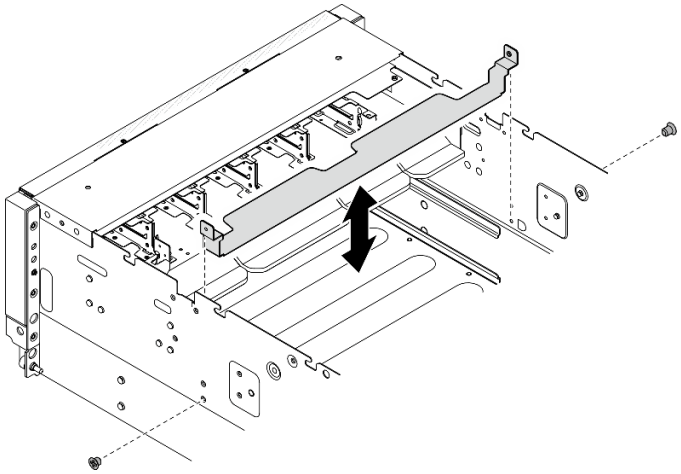


Figure 126. Installing GPU connector protective bracket

Step 5. Install the PCIe switch shuttle.

a. ❶ Press the two lock latches on both sides of the PCIe switch shuttle.

b. ❷ Push the PCIe switch shuttle into the chassis until it stops.

c. ❸ Rotate the two release levers until they lock into place.

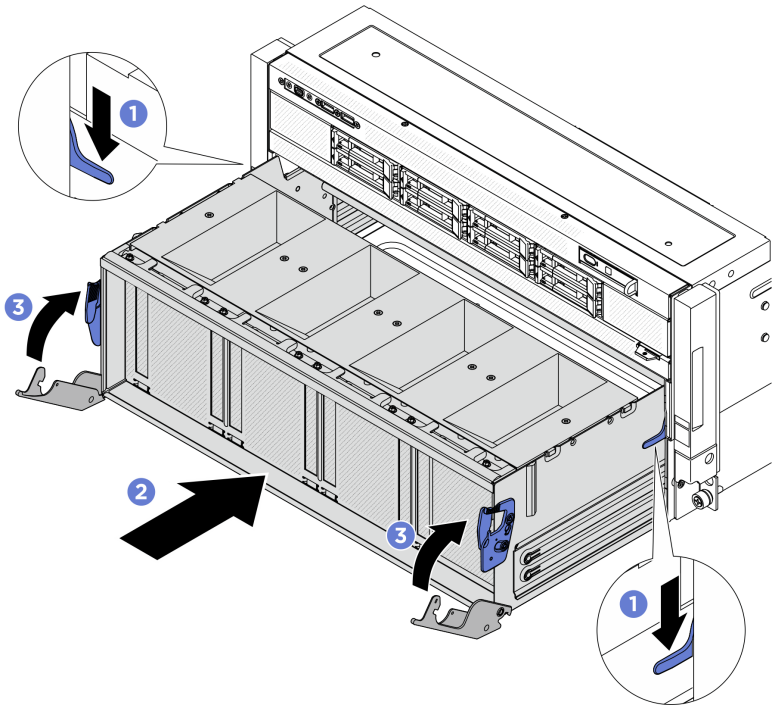


Figure 127. PCIe switch shuttle installation

After you finish

1. Reinstall the NVswitch cold plate module. See “Install the NVSwitch cold plate module” on page 160.
2. Reinstall the front H100/H200 GPU cold plate module. See “Install the front H100/H200 GPU cold plate module” on page 180.
3. Reinstall the rear H100/H200 GPU cold plate module. See “Install the rear H100/H200 GPU cold plate module” on page 203.
4. Reconnect the cables to the GPU baseboard. See “GPU baseboard cable routing” on page 376 for more information.
5. Reconnect all the cables that were disconnected. See Chapter 6 “Internal cable routing” on page 365.
6. Reinstall the power complex. See “Install the power complex” on page 313.
7. Reinstall the CPU complex. See “Install the CPU complex” on page 84.
8. Reinstall the fan cage. See “Install the fan cage (trained technician only)” on page 104.
9. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
10. Reinstall the front top cover. See “Install the front top cover” on page 69.
11. Complete the parts replacement. See “Complete the parts replacement” on page 363.

GPU complex adapter plate replacement (trained technician only)

Follow instructions in this section to remove or install the GPU complex adapter plate.

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 GPU complex adapter plate

Follow instructions in this section to remove the GPU complex adapter plate. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, remove the server from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torque screwdriver which can be set to 0.6 newton-meters, 5.3 inch-pounds (for H100/H200 GPU complex).

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the rear top cover. See “Remove the rear top cover” on page 70.

c. Remove the fan cage. See “Remove the fan cage (trained technician only)” on page 103.

d. Remove the CPU complex. See “Remove the CPU complex” on page 83.

e. Remove the power complex. See “Remove the power complex” on page 312.

f. Disconnect the cables from the GPU baseboard.

g. Disconnect and remove the cables routed through the GPU complex, if necessary. Before disconnecting the cables, make a list of each cable and record the connectors the cable is connected to. Refer to Chapter 6 “Internal cable routing” on page 365.

h. Remove the rear H100/H200 GPU cold plate module. See “Remove the rear H100/H200 GPU cold plate module” on page 193.

i. Remove the front H100/H200 GPU cold plate module. See “Remove the front H100/H200 GPU cold plate module” on page 169.

j. Remove the NVswitch cold plate module. See “Remove the NVSwitch cold plate module” on page 153.

Step 2. Disengage the PCIe switch shuttle from the chassis.

a. ❶ Press the two blue release latches.

b. ❷ Rotate the two release levers until they are perpendicular to the PCIe switch shuttle.

c. ❸ Pull the PCIe switch shuttle forward until it stops.

Note: Push the two release levers back until they lock into place after pulling out the PCIe switch shuttle to avoid damage.

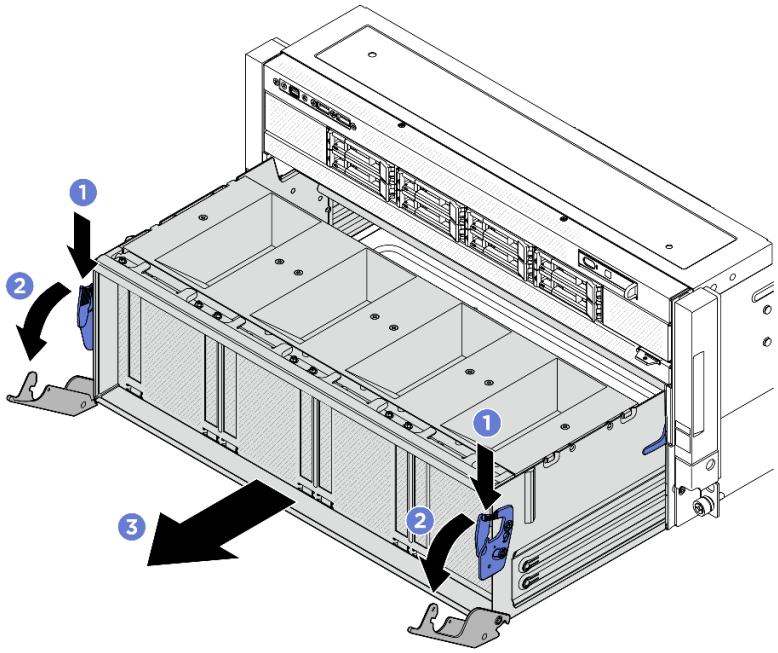


Figure 128. PCIe switch shuttle removal to stop position

Step 3. Remove the GPU complex. See “Remove the H100/H200 GPU complex” on page 136.

Step 4. Unfasten the fourteen screws marked with an arrow on the GPU complex adapter plate; then, lift the GPU complex adapter plate out of the chassis.

Notes:

- The GPU complex adapter plate might look different from the illustration.

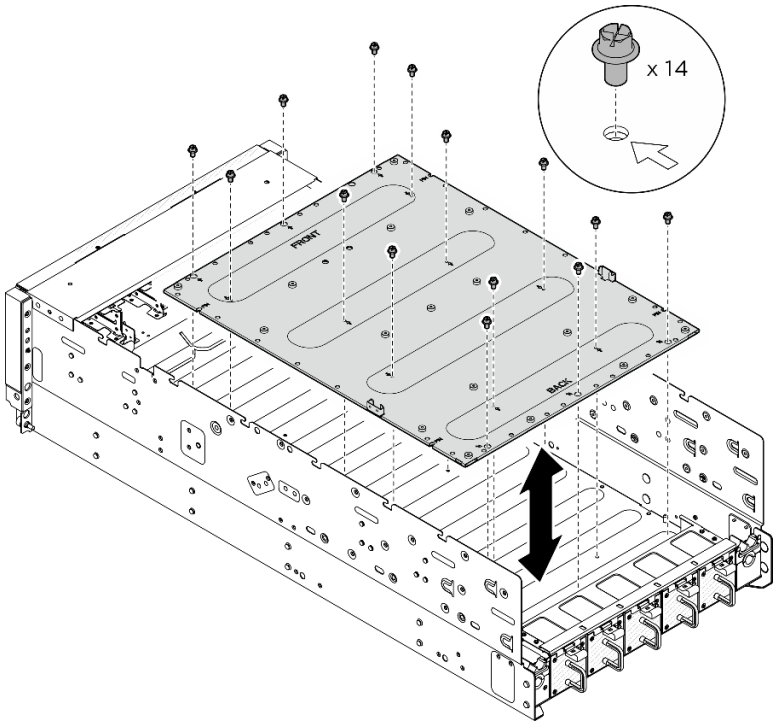


Figure 129. GPU complex adapter plate removal

After you finish

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 GPU complex adapter plate

Follow instructions in this section to install the GPU complex adapter plate. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torque screwdriver which can be set to 0.6 newton-meters, 5.3 inch-pounds (for H100/H200 GPU complex).

Procedure

Step 1. Align the GPU complex adapter plate with the four guide pins in the bottom of the chassis; then, lower the GPU complex adapter plate into the chassis.

Step 2. Locate the fourteen screw holes marked with an arrow; then, follow the sequence shown in the illustration below to fasten the fourteen M3 screws (PH1, 14 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the GPU complex adapter plate.

Notes:

- The GPU complex adapter plate might look different from the illustration.

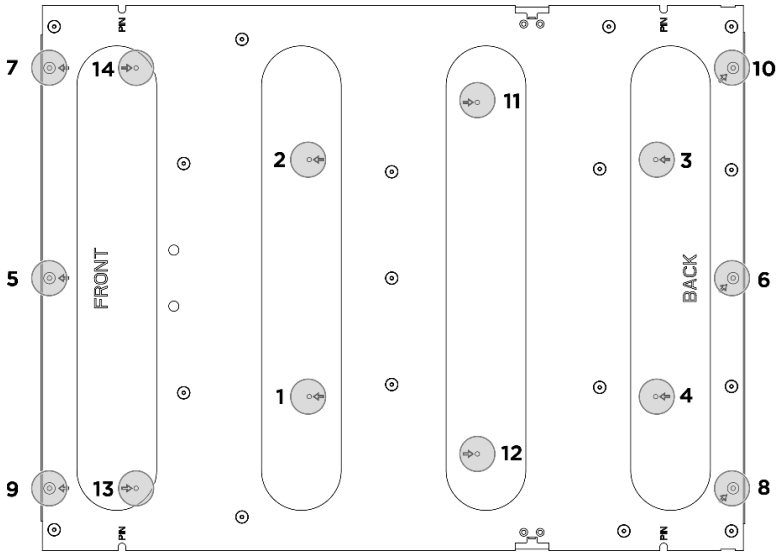


Figure 130. GPU complex adapter plate screw sequence

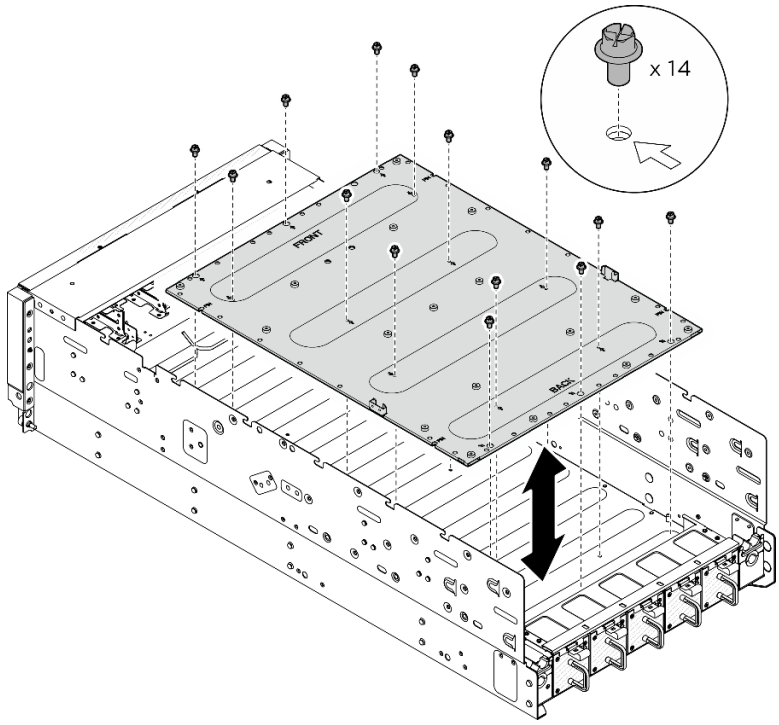


Figure 131. GPU complex adapter plate installation

Step 3. Install the GPU complex. See "Install the H100/H200 GPU complex" on page 140.

Step 4. Install the PCIe switch shuttle.

a. ❶ Press the two lock latches on both sides of the PCIe switch shuttle.

b. ❷ Push the PCIe switch shuttle into the chassis until it stops.

c. ❸ Rotate the two release levers until they lock into place.

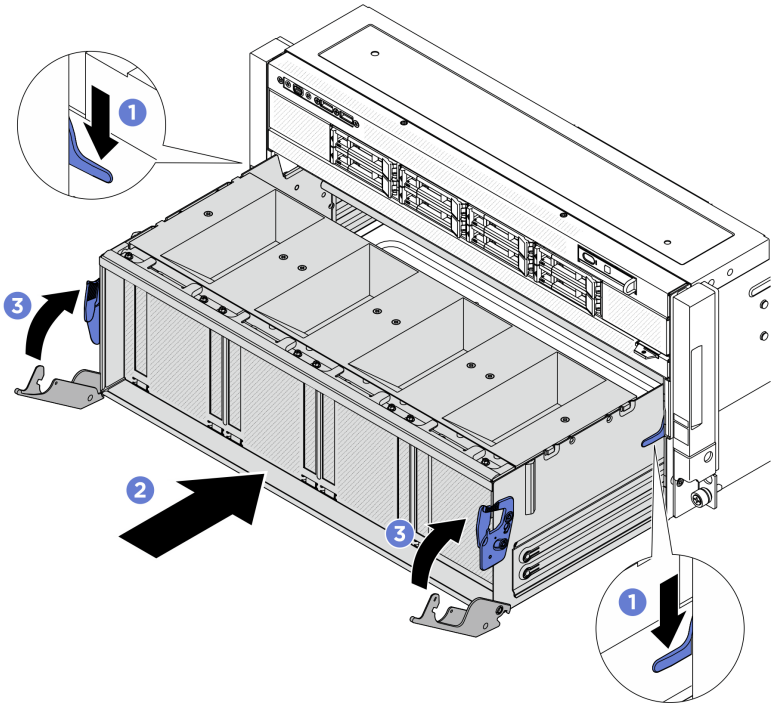


Figure 132. PCIe switch shuttle installation

After you finish

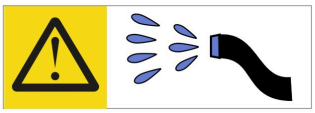
1. Reinstall the NVswitch cold plate module. See “Install the NVSwitch cold plate module” on page 160.
2. Reinstall the front H100/H200 GPU cold plate module. See “Install the front H100/H200 GPU cold plate module” on page 180.
3. Reinstall the rear H100/H200 GPU cold plate module. See “Install the rear H100/H200 GPU cold plate module” on page 203.
4. Reconnect the cables to the GPU baseboard. See “GPU baseboard cable routing” on page 376 for more information.
5. Reconnect all the cables that were disconnected. See Chapter 6 “Internal cable routing” on page 365.
6. Reinstall the power complex. See “Install the power complex” on page 313.
7. Reinstall the CPU complex. See “Install the CPU complex” on page 84.
8. Reinstall the fan cage. See “Install the fan cage (trained technician only)” on page 104.
9. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
10. Reinstall the front top cover. See “Install the front top cover” on page 69.
11. Complete the parts replacement. See “Complete the parts replacement” on page 363.

GPU water loop replacement (trained technician only)

Follow instructions in this section to remove and install the GPU water loop.

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.

L016



خطر: قد يتم التعرض لخطر الصدمة الكهربائية بسبب الماء أو المحلول المائي الذي يوجد بهذا المنتج.
تجنب العمل في أو بالقرب من أي جهاز فعال بأيدي مبتلة أو عند وجود تسرب للماء. (L016)

AVISO: Risco de choque elétrico devido à presença de água ou solução aquosa no produto. Evite trabalhar no equipamento ligado ou próximo a ele com as mãos molhadas ou quando houver a presença de água derramada. (L016)

ОПАСНО: Риск от токов удар поради вода или воден разтвор, присъстващи в продукта.
Избягвайте работа по или около оборудване под напрежение,
докато сте с мокри ръце или когато наоколо има разляна вода.
(L016)

DANGER : Risque de choc électrique lié à la présence d'eau ou d'une solution aqueuse dans ce produit. Évitez de travailler avec ou à proximité d'un équipement sous tension avec des mains mouillées ou lorsque de l'eau est renversée. (L016)

危险：由于本产品中存在水或者水溶液，因此存在电击风险。请避免使用潮湿的手在带电设备或者有水溅出的环境附近工作。 (L016)

危險：本產品中有水或水溶液，會造成電擊的危險。手濕或有潑濺的水花時，請避免使用或靠近帶電的設備。(L016)

OPASNOST: Rizik od električnog udara zbog vode ili tekućine koja postoji u ovom proizvodu.
Izbjegavajte rad u
blizini opreme pod naponom s mokrim rukama ili kad je u blizini prolivena
tekućina.
(L016)

NEBEZPEČÍ: Riziko úrazu elektrickým proudem v důsledku vody nebo vodního roztoku přítomného v tomto produktu. Dejte pozor, abyste při práci s aktivovaným vybavením nebo v jeho blízkosti neměli mokré ruce a vyvarujte se potřísnění nebo polití produktu vodou. (L016)

Fare! Risiko for stød på grund af vand eller en vandig opløsning i produktet. Undgå at arbejde med eller i nærheden af strømførende udstyr med våde hænder, eller hvis der er spildt vand. (L016)

GEVAAR: Risico op elektrische schok door water of waterachtige oplossing die aanwezig is in dit product. Vermijd werken aan of naast apparatuur die onder spanning staat als u natte handen hebt of als gemorst water aanwezig is. (L016)

DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

VAARA: Tässä tuotteessa oleva vesi tai vettä sisältävä liuos voi aiheuttaa sähköiskuvaaran. Vältä työskentelyä jännitteellisen laitteen ääressä tai sen läheisyydessä märin käsin tai jos laitteessa tai sen läheisyydessä on vesiroiskeita. (L016)

Gefahr: Aufgrund von Wasser oder wässriger Lösung in diesem Produkt besteht die Gefahr eines elektrischen Schlags. Nicht mit nassen Händen oder in der Nähe von Wasserlachen an oder in unmittelbarer Nähe von Bauteilen arbeiten, die unter Strom stehen. (L016)

ΚΙΝΔΥΝΟΣ: Κίνδυνος ηλεκτροπληξίας εξαιτίας της παρουσίας νερού ή υγρού διαλύματος στο εσωτερικό του προϊόντος. Αποφύγετε την εργασία με ενεργό εξοπλισμό ή κοντά σε ενεργό εξοπλισμό με βρεγμένα χέρια ή όταν υπάρχει διαρροή νερού. (L016)

VESZÉLY: A víz vagy a termékben lévő vizes alapú hűtőfolyadék miatt fennáll az elektromos áramütés veszélye. Ne dolgozzon áram alatt lévő berendezésen és közelében nedves kézzel, illetve amikor folyadék kerül a berendezésre. (L016)

PERICOLO: rischio di scossa elettrica a causa di presenza nel prodotto di acqua o soluzione acquosa. Evitare di lavorare su o vicino l'apparecchiatura accesa con le mani bagnate o in presenza di acqua. (L016)

危険: この製品内に存在する水または水溶液によって、電気ショックの危険があります。手が濡れている場合やこぼれた水が周囲にある場合は、電圧が印加された装置またはその周辺での作業は行わないでください。(L016)

위험: 이 제품에는 물 또는 수용액으로 인한 전기 쇼크 위험이 있습니다. 젖은 손으로 또는 엎질러진 물이 있는 상태에서 전력이 공급되는 장비나 그 주변에서 작업하지 마십시오. (L016)

ОПАСНОСТ: Опасност од струен удар поради присаство на вода или на воден раствор во овој производ. Избегнувајте работење на опрема вклучена во струја или во близина на опрема вклучена во струја со влажни раце или кога има истурено вода. (L016)

[illegible] (L016)

FARE: Fare for elektrisk støt på grunn av vann eller en vandig oppløsning som finnes i dette produktet. Unngå å arbeide med eller i nærheten av strømførende utstyr med våte hender eller ved eventuelt vannsøl. (L016)

NIEBEZPIECZEŃSTWO: Ryzyko porażenia prądem elektrycznym z powodu występowania w produkcie wody lub roztworu wodnego. Nie należy pracować przy podłączonym do źródła zasilania urządzeniu lub w jego pobliżu z mokrymi dłońmi lub kiedy rozlano wodę. (L016)

PERIGO: Risco de choque eléctrico devido à presença de água ou líquidos no produto. Evite trabalhar com equipamento com energia, ou na sua proximidade, com mãos molhadas ou caso exista água derramada. (L016)

ОПАСНО: Риск поражения электрическим током вследствие присутствия в этом продукте воды или водного раствора. Избегайте выполнения работ на оборудовании, находящемся под напряжением, или рядом с таким оборудованием влажными руками или при наличии пролитой воды. (L016)

NEBEZPEČENSTVO: Riziko úrazu elektrickým prúdom v dôsledku prítomnosti vody alebo vodného roztoku v tomto produkte. Vyhnite sa práci na zapnutom zariadení alebo v jeho blízkosti s vlhkými rukami, alebo keď je prítomná rozliata voda.
(L016)

NEVARNOST: Nevarnost električnega udara zaradi vode ali vodne raztopine, prisotne v izdelku. Ne delajte na opremi ali poleg opreme pod energijo z mokrimi rokami ali ko je prisotna razlita voda.
(L016)

PELIGRO: Existe riesgo de choque eléctrico por agua o por una solución de agua que haya en este producto. Evite trabajar en equipos bajo tensión o cerca de los mismos con las manos húmedas o si hay agua derramada. (L016)

Fara: Risk för elektriska stötar på grund av vatten eller vattenbaserat medel i denna produkt. Arbeta inte med eller i närheten av elektriskt laddad utrustning om du har våta händer eller vid vattenspill. (L016)

ཉེན་བརྡ། : ཐོན་རྫས་འདིའི་ནང་དུ་ཆུའམ་ཆུའི་གཞིར་གཟུགས་འདུས་ཡོད་པས། དེ་ལས་སྒོག་རྒྱག་པའི་ཉེན་ཁ་ཡོད། ལག་པའི་ཐོག་ཆུ་ཡོད་པའམ་ཆུ་ཐིག་མར་བཞུར་བའི་གནས་ཚུལ་འོག་སྒོག་ཡོད་པའི་སྐྱེས་ཆས་ལ་བཀོལ་སྤྱོད་བྱེད་མི་ཉན། (L016)

خەتەرلىك: بۇ مەھسۇلاتتا سۇ ياكى ئېرىتمە بولغاچقا، شۇڭا توك سوقۇۋېتىش خەۋپى مەۋجۇتدۇر. قول هۆل هالەتتە ۋە ياكى سۇ سرغىپ چىققان هالەتتە، توكلۇق ئۈسكۈنىگە قارىتا ۋە ياكى توكلۇق ئۈسكۈنىنىڭ ئەتراپىدا مەشغۇلات ئېلىپ بارغىلى بولمايدۇ. (L016)

Yungyiemj: Youzyiz aen canjbinj miz raemx roxnaeuz raemx yungzyiz, sojyij miz yungyiemj bungqden. Mboujndaej fwngz miz raemx seiz youq ndaw sezbi roxnaeuz youq henzgyawj guhhong.
(L016)

NVSwitch cold plate module replacement (trained technician only)

Follow instructions in this section to remove and install the NVSwitch cold plate module.

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 NVSwitch cold plate module

Follow instructions in this section to remove the NVSwitch cold plate module. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/

#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

- A torque screwdriver is available for request if you do not have one at hand.

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torx T15 head screwdriver
- Phillips #1 head screwdriver
- Phillips #2 head screwdriver
- Flat head screwdriver
- Alcohol cleaning pad
- NVSwitch PCM Kit
- NVSwitch putty pad Kit

Important: Putty pad/phase change material (PCM) replacement guidelines

- Before replacing the putty pad/PCM, gently clean the hardware surface with an alcohol cleaning pad.
- Hold the putty pad/PCM carefully to avoid deformation. Make sure no screw hole or opening is blocked by the putty pad/PCM.
- Do not use expired putty pad/PCM. Check the expiry date on putty pad/PCM package. If the putty pads/PCM are expired, acquire new ones to properly replace them.

The following illustration shows the GPU numbering and corresponding slot numbering in XCC.

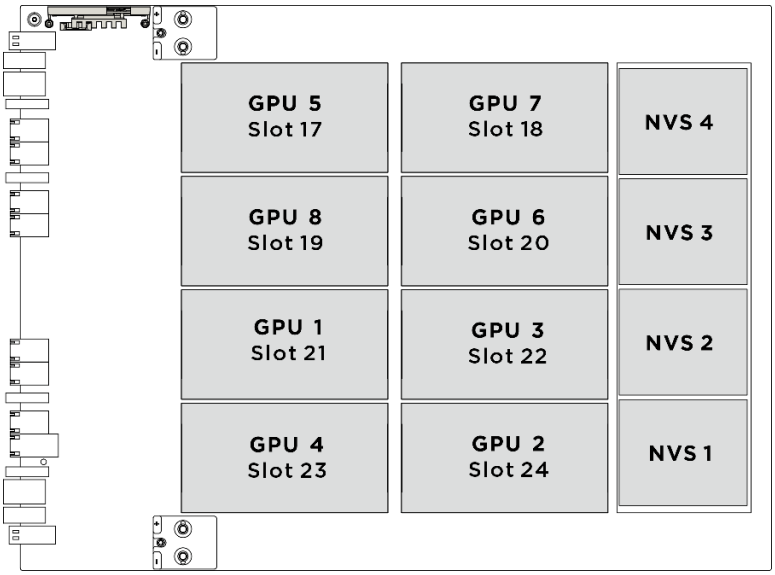


Figure 133. GPU numbering

The following illustration shows the components for NVSwitch cold plate module.

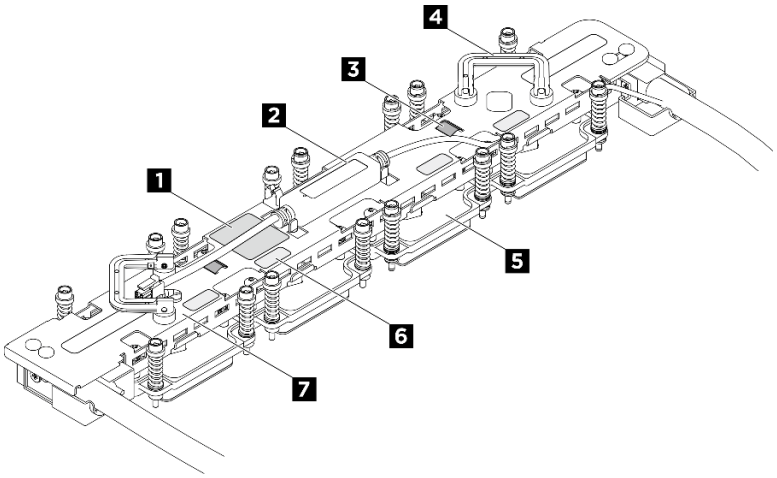


Figure 134. NVSwitch cold plate module components identification

Table 26. NVSwitch cold plate module components

1 NVSwitch cold plate torque label	2 leakage sensor module
3 Hose tie	4 Handle
5 NVSwitch cold plate	6 NVSwitch slot number label
7 Manifold	

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the rear top cover. See “Remove the rear top cover” on page 70.

c. Remove the fan cage. See “Remove the fan cage (trained technician only)” on page 103.

d. Remove the CPU complex. See “Remove the CPU complex” on page 83.

e. Remove the power complex. See “Remove the power complex” on page 312.

f. Disconnect the cables and remove them from the GPU complex if necessary. Before disconnecting the cables, make a list of each cable and record the connectors the cable is connected to. Refer to Chapter 6 “Internal cable routing” on page 365.

Step 2. The following illustration shows the hose holder location.

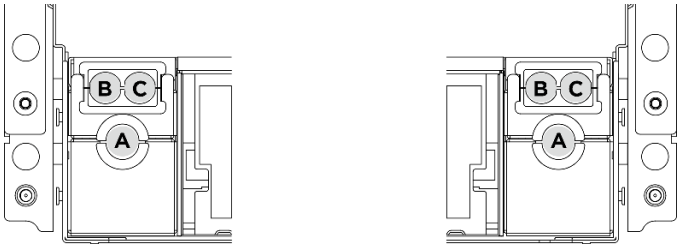


Figure 135. Hose holder location

Step 3. Remove the rear fan cage support bracket.

a. 1 Unfasten the eight M3 screws that secure the rear fan cage support bracket to the the chassis.

b. 2 Unfasten the four M3 screws that secure the rear fan cage support bracket to the fan cage.

c. 3 Grasp the rear fan cage support bracket to lift it from the fan cage.

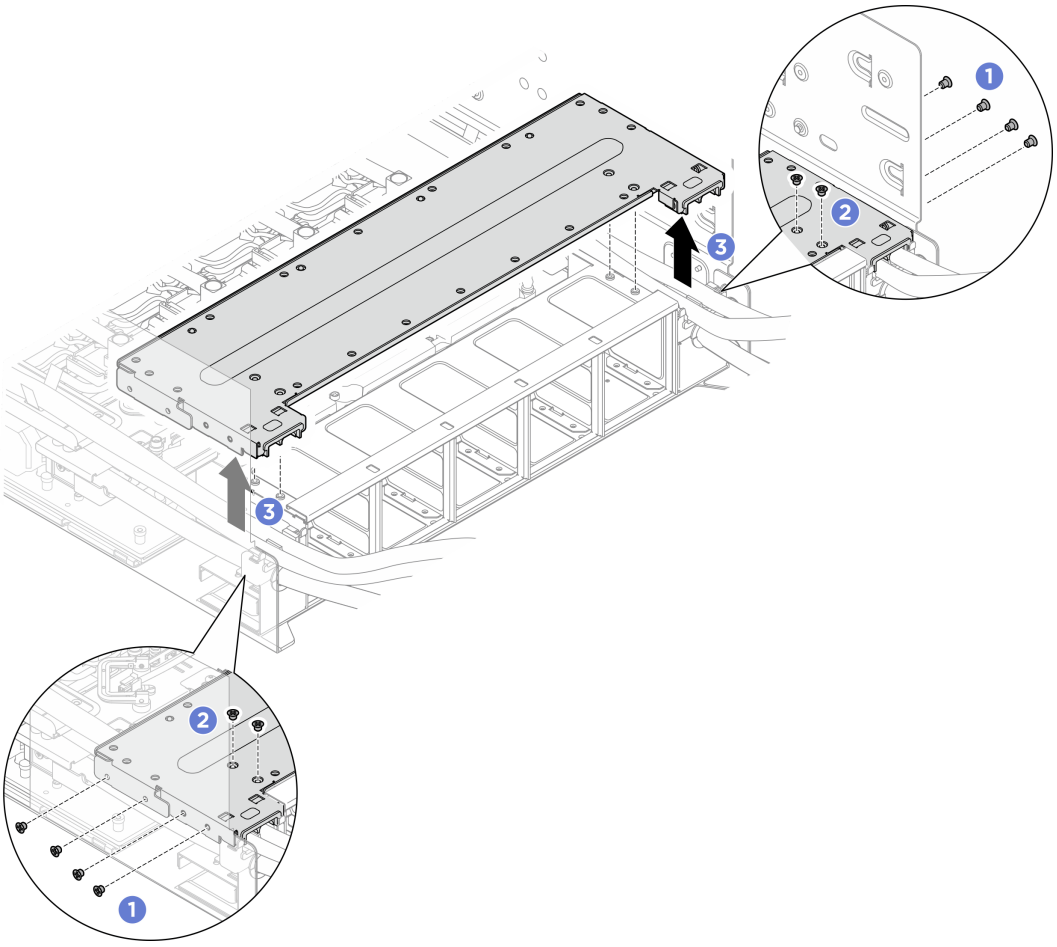


Figure 136. Removing the rear fan cage support bracket

Step 4. Unfasten the two captive screws that secure the hose holder in place; then, remove hose holder B/C. Repeat to remove hose holder B/C on the other side.

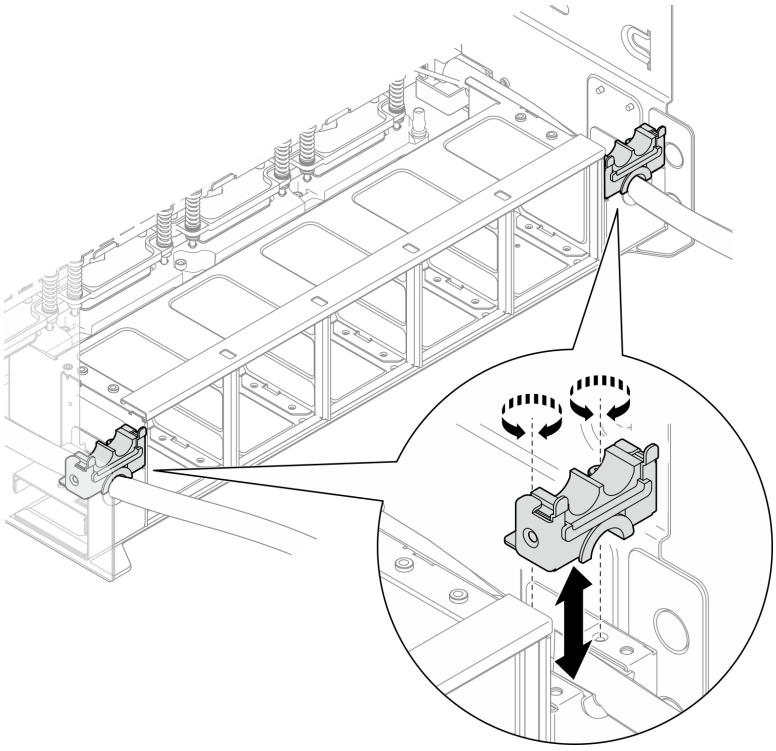
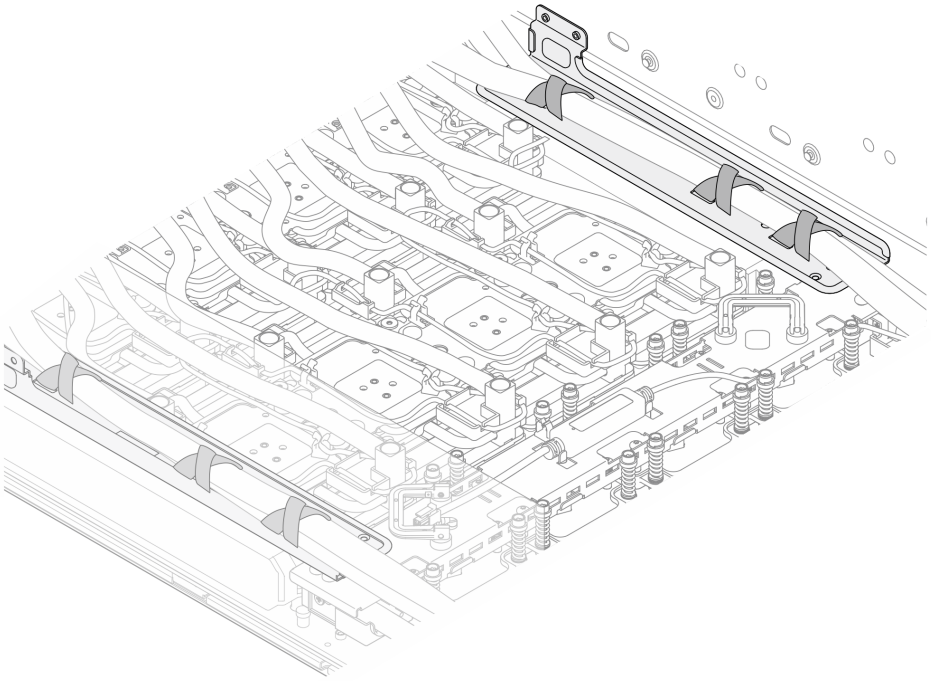


Figure 137. Removing hose holder B/C

Step 5. Release the hoses and cables from the hose ties that secure them to the hose guides.

Figure 138. Release the hoses and cables from hose ties



Step 6. Unfasten the three M3 screws that secure the hose guide to the chassis and the manifold; then, remove the hose guide. Repeat to remove the hose guide on the other side.

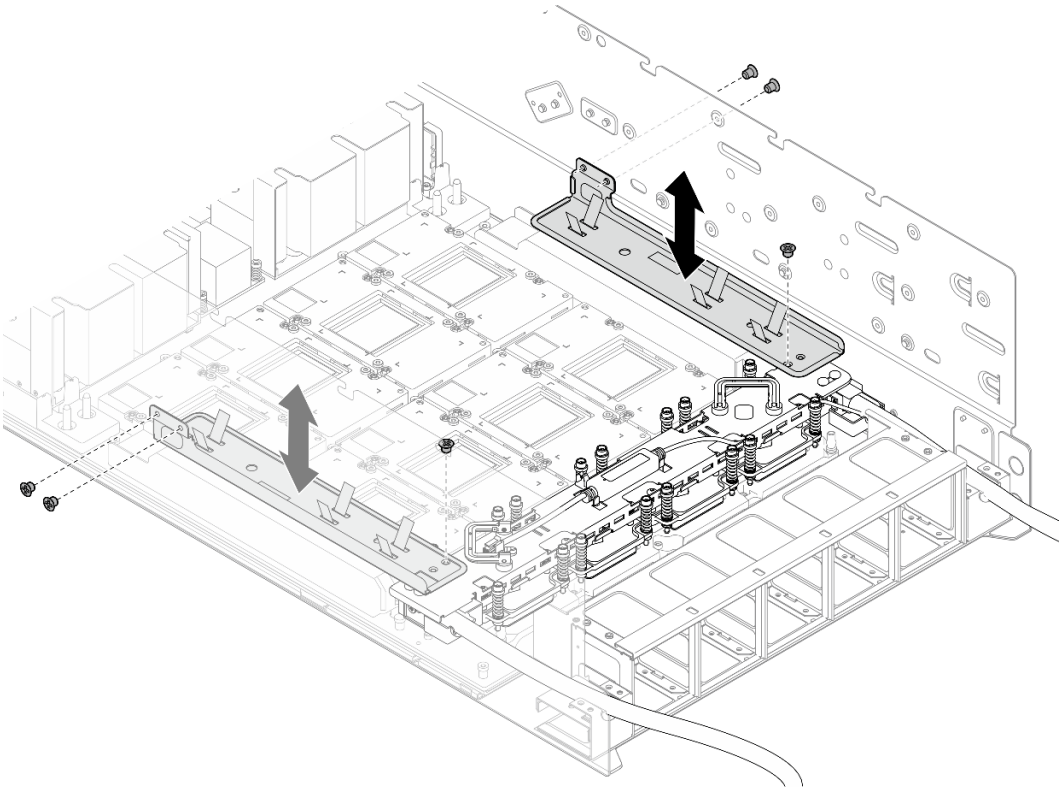


Figure 139. Removing the hose guides

Step 7. Follow the screw sequence specified on the cold plate label, and repeat to fully loosen the sixteen Torx T15 screws with a torque screwdriver set to the proper torque.

a. Set the torque screwdriver to 0.57-0.61 newton-meter, 5-5.4 pound-inch.

b. Loosen the screws 720 degrees following the screw sequence: ❶ → ❷ → ❸ → ❹

Note: Make sure to follow screw sequence to prevent cold plate tilting.

c. Repeat until all screws on the four cold plates are fully loosened.

Figure 140. Repeat to fully loosen all the screws

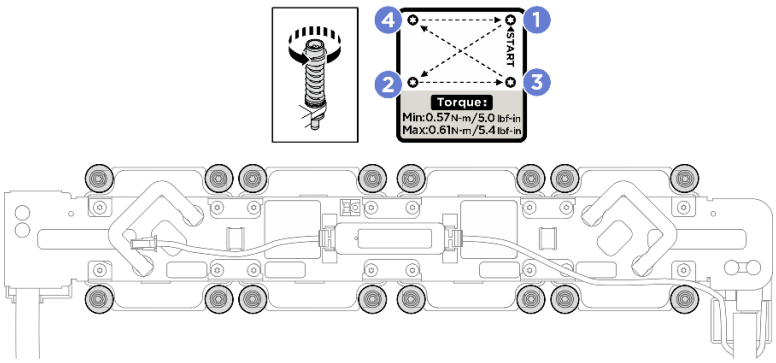


Figure 141. Removing the NVSwitch cold plates

Notes:

- If necessary, use a flat screwdriver to gently separate the cold plate and the NVSwitch from the corner of the cold plate. Ensure not the damage the NVSwitch or the cold plate.
- Ensure the captive screws are completely loosen before removing the cold plate module.

Step 8. Secure the hoses to the manifold with the hose ties. Hold the handles to lift the NVSwitch cold plate module out of the chassis.

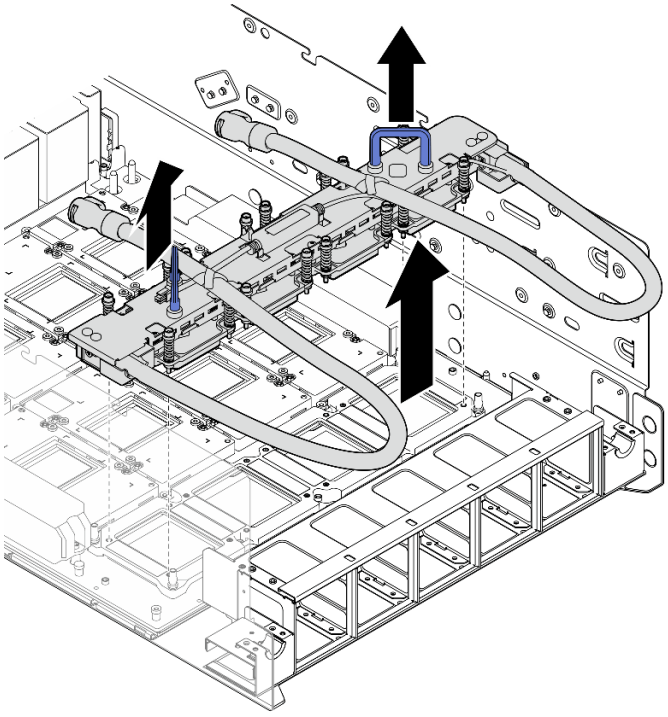


Figure 142. Removing the NVSwitch cold plate module

Step 9. **Immediately** clean the PCM and putty pads off from the NVSwitches with alcohol cleaning pads. **Gently** clean the PCM and putty pads to avoid NVSwitch damages.

Attention:

- It is recommended to clean the PCM while it is in liquid state.

- The electrical components around the die on the GPUs are extremely delicate. When removing the PCM and cleaning the GPU die, avoid touching the electrical components to prevent damage.

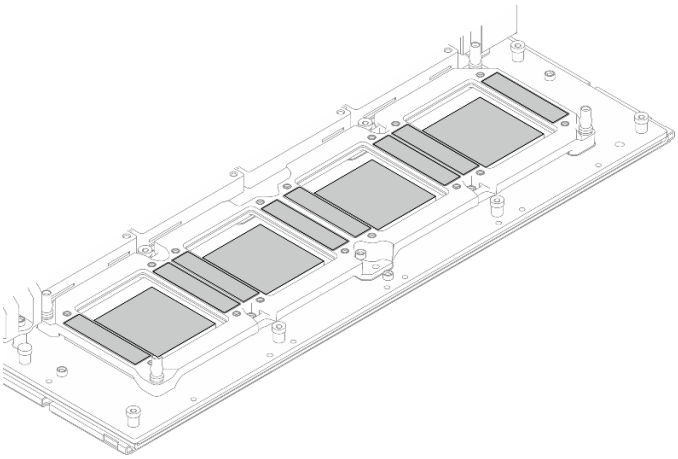


Figure 143. Cleaning PCM and putty pads off from the NVSwitches

Step 10. With alcohol cleaning pads, wipe off any remaining putty pad and PCMs from the NVSwitch cold plate module.

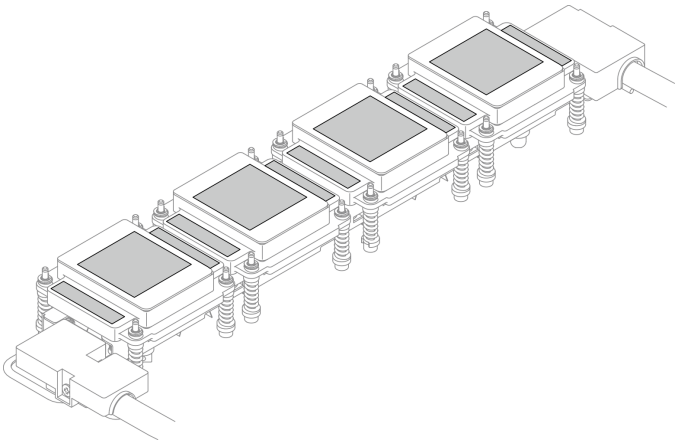


Figure 144. Wiping PCM and putty pads off from the cold plates

After you finish

1. Install a replacement unit. See "Install the NVSwitch cold plate module" on page 160.
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 NVSwitch cold plate module

Follow instructions in this section to install the NVSwitch cold plate module. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- A torque screwdriver is available for request if you do not have one at hand.

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torx T15 head screwdriver
- Phillips #1 head screwdriver
- Phillips #2 head screwdriver
- Flat head screwdriver
- Alcohol cleaning pad
- NVSwitch PCM Kit
- NVSwitch putty pad Kit

Important: Putty pad/phase change material (PCM) replacement guidelines

- Before replacing the putty pad/PCM, gently clean the hardware surface with an alcohol cleaning pad.
- Hold the putty pad/PCM carefully to avoid deformation. Make sure no screw hole or opening is blocked by the putty pad/PCM.
- Do not use expired putty pad/PCM. Check the expiry date on putty pad/PCM package. If the putty pads/PCM are expired, acquire new ones to properly replace them.

The following illustration shows the GPU numbering and corresponding slot numbering in XCC.

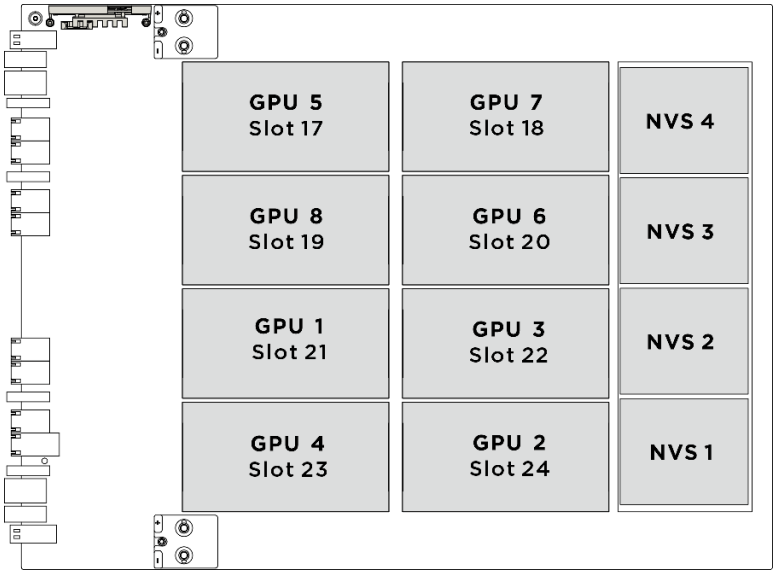


Figure 145. GPU numbering

The following illustration shows the components for NVSwitch cold plate module.

Table 27. NVSwitch cold plate module components

1 NVSwitch cold plate torque label	2 leakage sensor module
3 Hose tie	4 Handle
5 NVSwitch cold plate	6 NVSwitch slot number label
7 Manifold	

Procedure

Step 1. Make sure the GPU complex is installed in the chassis.

Step 2. Replace the Phase Change Material (PCM) and putty pads on the cold plates.

a. 1 Remove the liner from one side of the pad. Align the PCM with the marking (1) on the bottom of the cold plate, and place it onto the cold plate; then, apply finger pressure across the entire surface area of the PCM to remove any trapped air and allow 1-2 minutes dwell time until it is firmly attached. Carefully remove the remaining top liner.

b. 2 Remove the liner from one side of the pad. Align the putty pad with the marking (2) on the bottom of the cold plate, and attach it to the cold plate and apply light finger pressure across the entire surface area of the pad to ensure adhesion. Carefully remove the remaining top liner.

c. Repeat to replace the PCM and putty pads on the four cold plates.

Note: PCM and putty pads cannot be reused. PCM and putty pads must be replaced with new ones every time the water loop is removed.

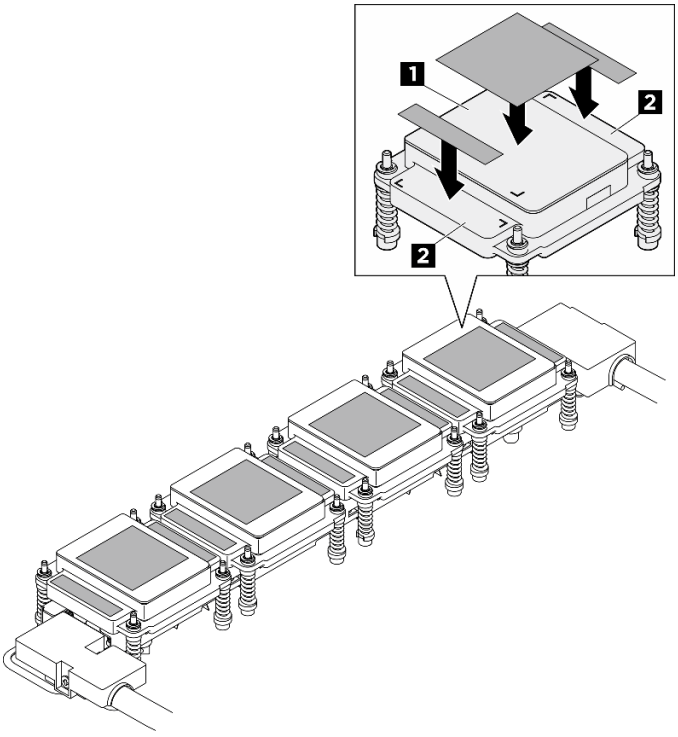


Figure 146. PCM and putty pads application

Step 3. Install the NVSwitch cold plate module.

a. ❶ Lift the NVSwitch cold plate module by the handles; then, align the cold plates with the NVSwitches on the GPU baseboard, and gently place it onto the NVSwitches.

b. ❷ Adjust the cold plates until they are securely seated in the NVSwitch sockets.

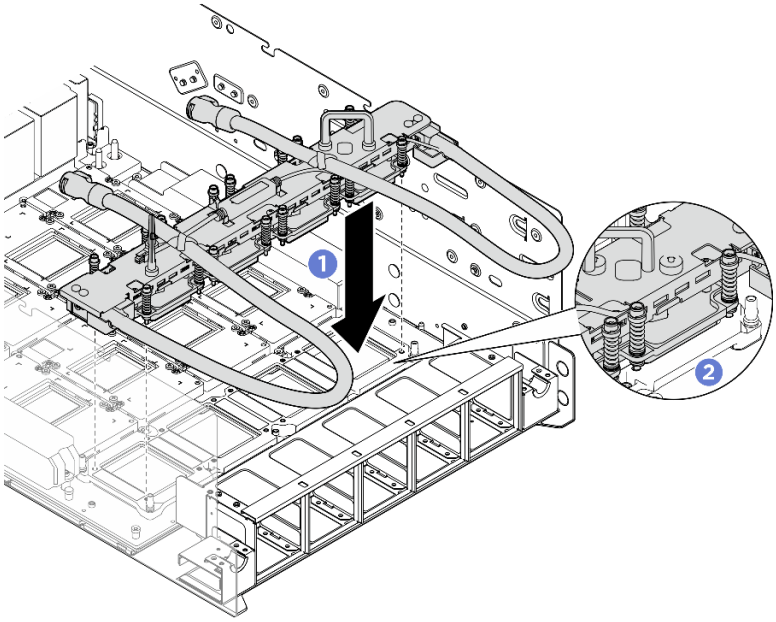


Figure 147. Installing the NVSwitch cold plate module

Step 4. Follow the screw sequence specified on the cold plate label, and repeat to fully tighten the sixteen Torx T15 screws with a torque screwdriver set to the proper torque.

a. Set the torque screwdriver to 0.57-0.61 newton-meter, 5-5.4 pound-inch.

b. Fasten the screws 720 degrees following the screw installation sequence: ❶ → ❷ → ❸ → ❹

Note: Make sure to follow screw installation sequence to prevent cold plate tilting.

c. Repeat until all screws on the four cold plates are fully tightened.

Figure 148. Repeat to fully tighten all the screws

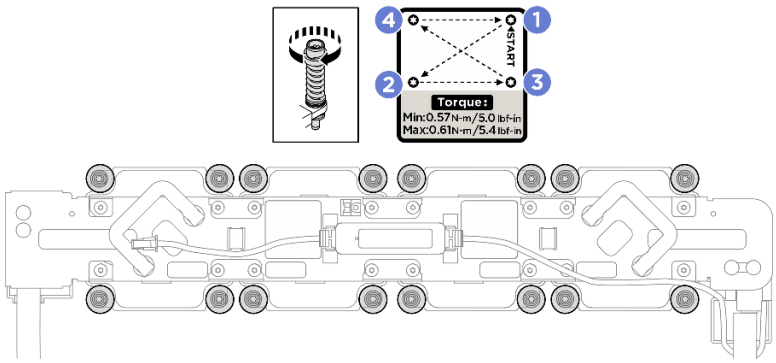


Figure 149. Installing the NVSwitch cold plates

Step 5. The following illustration shows the hose holder location.

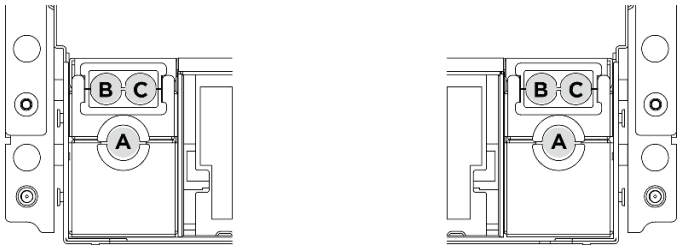


Figure 150. Hose holder location

Step 6. Place the NVSwitch cold plate module hoses on (1) hose holder A.

Important:

- Check the guiding labels on the hoses and hose holders before installation.

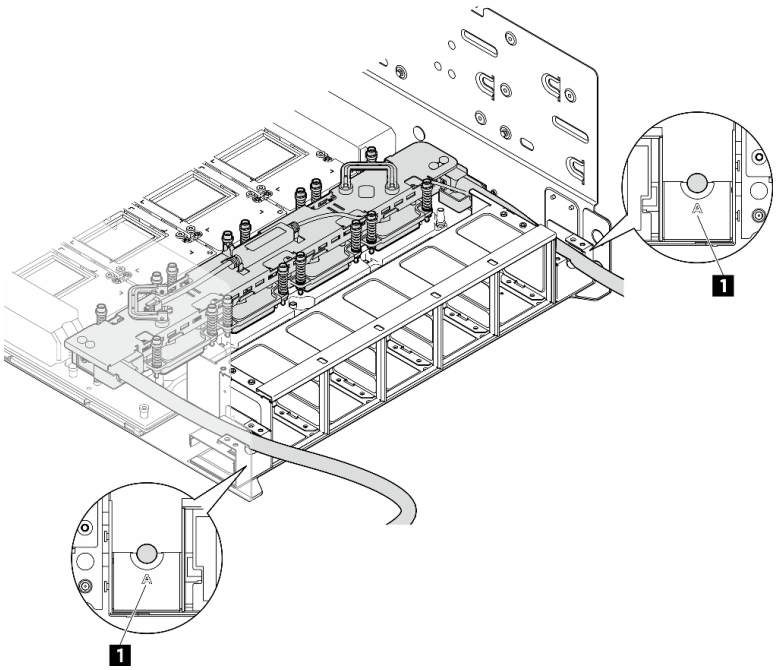


Figure 151. Placing the hoses

1 Hose holder A

Step 7. Align the hose holder B/C with the two screw holes on hose holder A; then, fasten the two captive screws (PH1, 2 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure hose holder B/C on top of hose holder A. Repeat to install hose holder B/C on the other side.

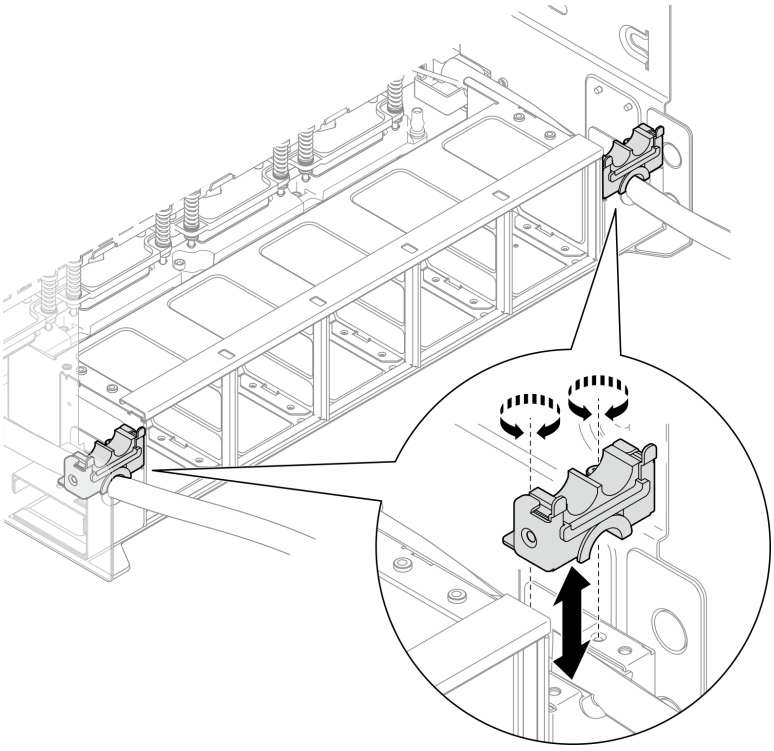


Figure 152. Installing hose holder B/C

Step 8. Align the hose guide with the screw hole on the NVSwitch manifold and the two screw holes on the chassis; then, fasten the three M3 screws (PH2, 3 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the hose guide. Repeat to install the hose guide on the other side.

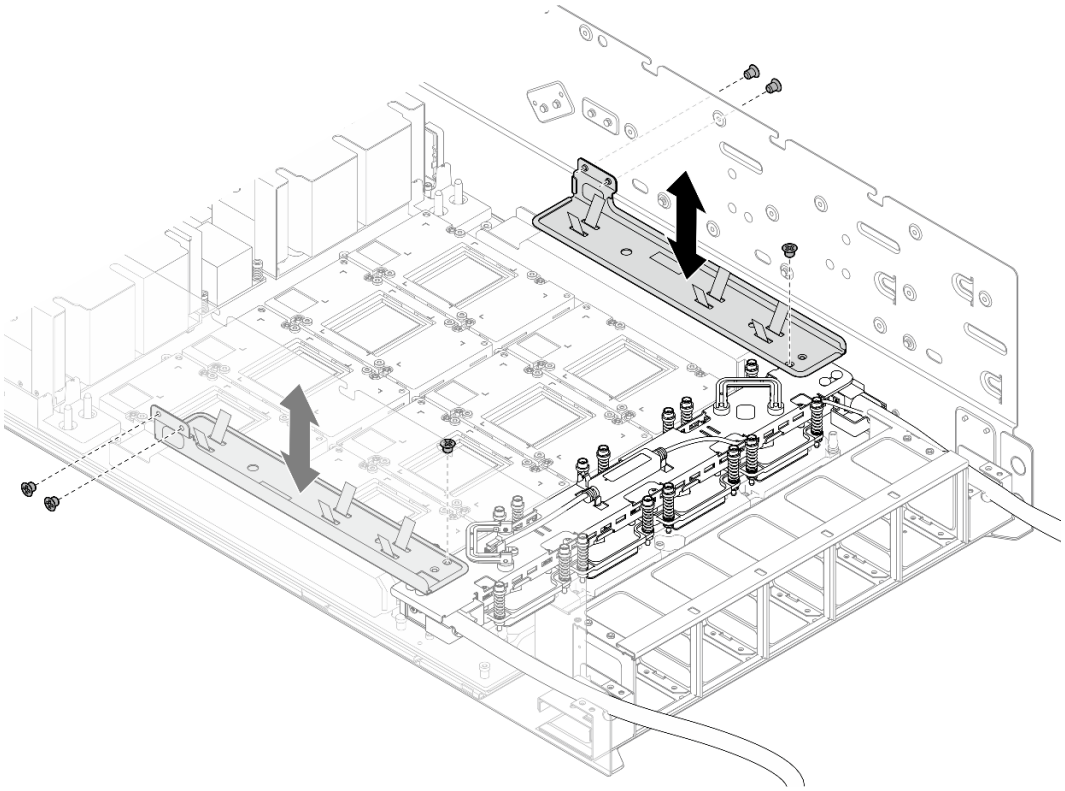


Figure 153. Installing the hose guides

Step 9. If you are installing the NVSwitch cold plate module after installing a new GPU complex, skip the following two steps and proceed to install the front H100/H200 GPU cold plate module. See “Install the front H100/H200 GPU cold plate module” on page 180.

Step 10. If front and rear GPU cold plate modules are installed, place the hoses and cables on the hose guides, and secure them with the hose ties. See “Fan control board cable routing” on page 374 and “Leakage sensor module cable routing” on page 397.

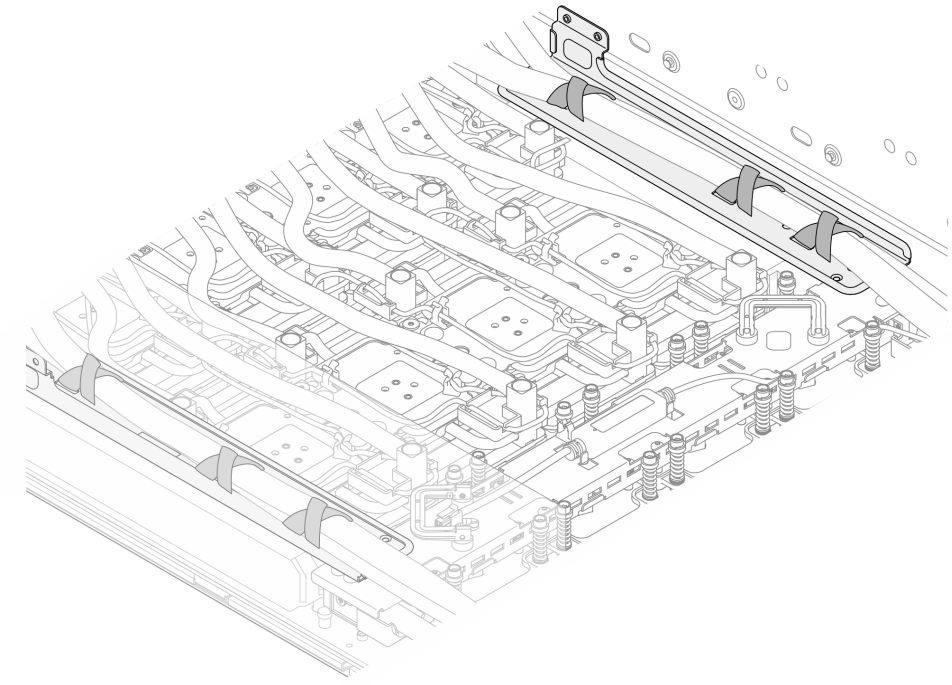


Figure 154. Placing the hoses and cables on the hose guides

Step 11. If front and rear GPU cold plate modules are installed, reinstall the hoses to their corresponding places on hose holder B/C; then, reinstall the rear fan cage support bracket. Ensure the labels on the hoses match with the markings on the hose holders.

Step 12. Install the rear fan cage support bracket.

a. ❶ Align the rear fan cage support bracket with the corresponding screw holes; then, install the rear fan cage support bracket on top of hose holder B/C as illustrated.

b. ❷ Fasten the four M3 screws (PH2, 4 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the rear fan cage support bracket to the fan cage.

c. ❸ Fasten the eight M3 screws (PH2, 8 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the rear fan cage support bracket to the chassis.

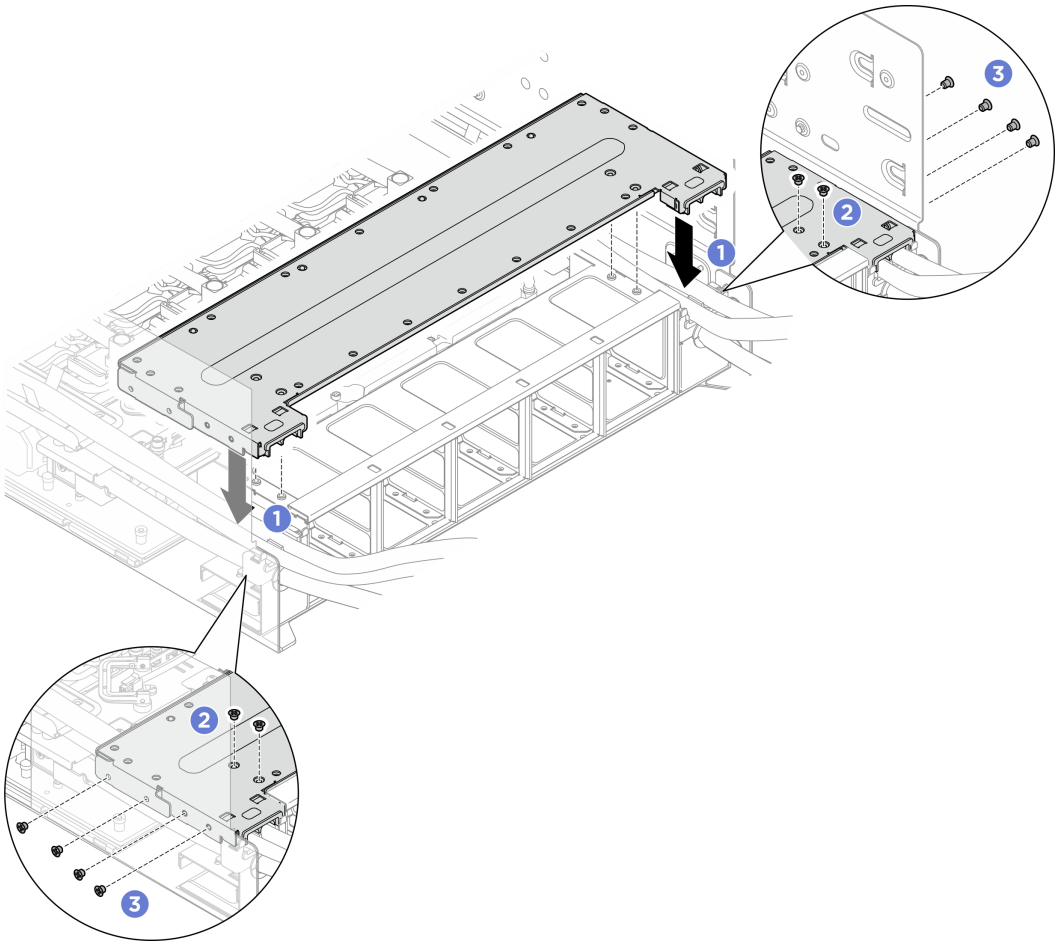


Figure 155. Installing the rear fan cage support bracket

After you finish

1. Reconnect all the cables that were disconnected. See Chapter 6 “Internal cable routing” on page 365.
2. Reinstall the power complex. See “Install the power complex” on page 313.
3. Reinstall the CPU complex. See “Install the CPU complex” on page 84.
4. Reinstall the fan cage. See “Install the fan cage (trained technician only)” on page 104.
5. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
6. Reinstall the front top cover. See “Install the front top cover” on page 69.
7. Complete the parts replacement. See “Complete the parts replacement” on page 363.

Front GPU cold plate module replacement (trained technician only)

Follow instructions in this section to remove and install the front GPU cold plate module.

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 front H100/H200 GPU cold plate module

Follow instructions in this section to remove the front H100/H200 GPU cold plate module. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- A torque screwdriver is available for request if you do not have one at hand.

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torx T10 head screwdriver
- Torx T15 head screwdriver
- Phillips #1 head screwdriver
- Phillips #2 head screwdriver
- Flat head screwdriver
- Alcohol cleaning pad
- H100/H200 PCM Kit
- SR780a V3 water loop putty pad kit
- SR780a V3 water loop service kit

Important: Putty pad/phase change material (PCM) replacement guidelines

- Before replacing the putty pad/PCM, gently clean the hardware surface with an alcohol cleaning pad.
- Hold the putty pad/PCM carefully to avoid deformation. Make sure no screw hole or opening is blocked by the putty pad/PCM.
- Do not use expired putty pad/PCM. Check the expiry date on putty pad/PCM package. If the putty pads/PCM are expired, acquire new ones to properly replace them.

The following illustration shows the GPU numbering and corresponding slot numbering in XCC.

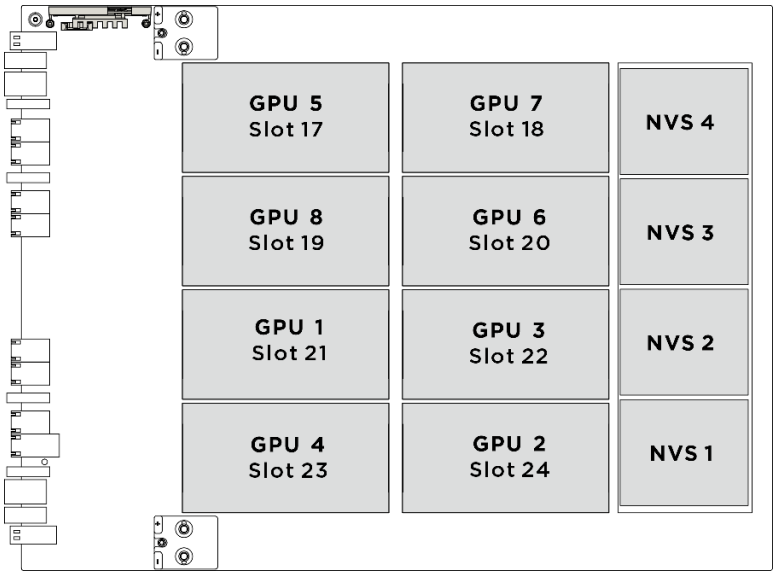


Figure 156. GPU numbering

The following illustration shows the components for front H100/H200 GPU cold plate module.

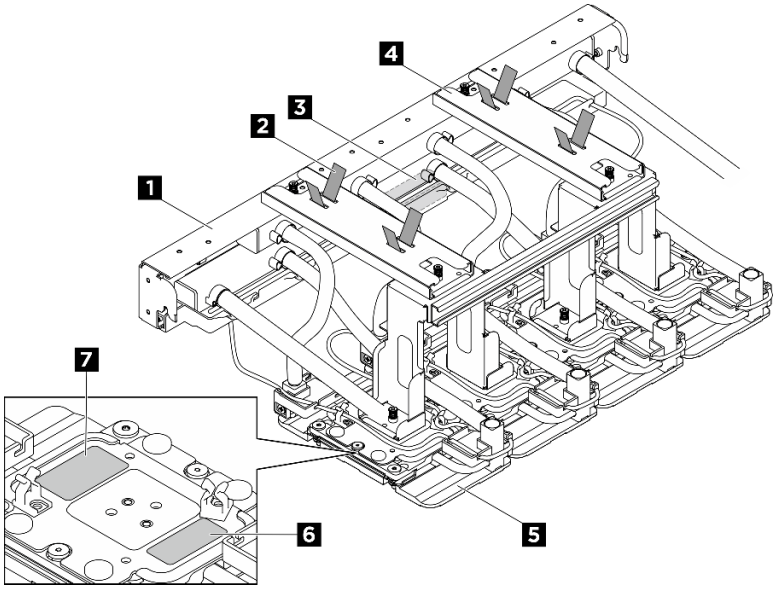


Figure 157. front H100/H200 GPU cold plate module components identification

Table 28. front H100/H200 GPU cold plate module components

1 Manifold	2 Hose tie
3 leakage sensor module	4 Shipping bracket
5 GPU cold plate	6 GPU slot number label
7 GPU cold plate screw torque label	

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.
b. Remove the rear top cover. See “Remove the rear top cover” on page 70.
c. Remove the fan cage. See “Remove the fan cage (trained technician only)” on page 103.
d. Remove the CPU complex. See “Remove the CPU complex” on page 83.
e. Remove the power complex. See “Remove the power complex” on page 312.
f. Disconnect the cables and remove them from the GPU complex if necessary. Before disconnecting the cables, make a list of each cable and record the connectors the cable is connected to. Refer to Chapter 6 “Internal cable routing” on page 365.

Step 2. The following illustration shows the hose holder location.

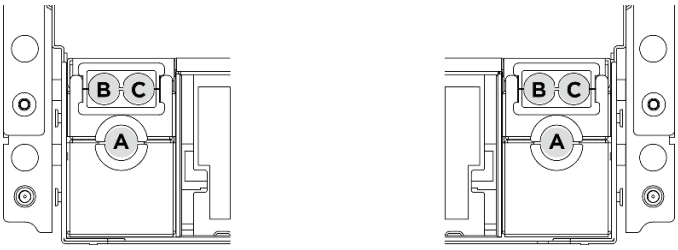


Figure 158. Hose holder location

Step 3. Remove the rear fan cage support bracket.
a. ❶ Unfasten the eight M3 screws that secure the rear fan cage support bracket to the the chassis.
b. ❷ Unfasten the four M3 screws that secure the rear fan cage support bracket to the fan cage.
c. ❸ Grasp the rear fan cage support bracket to lift it from the fan cage.

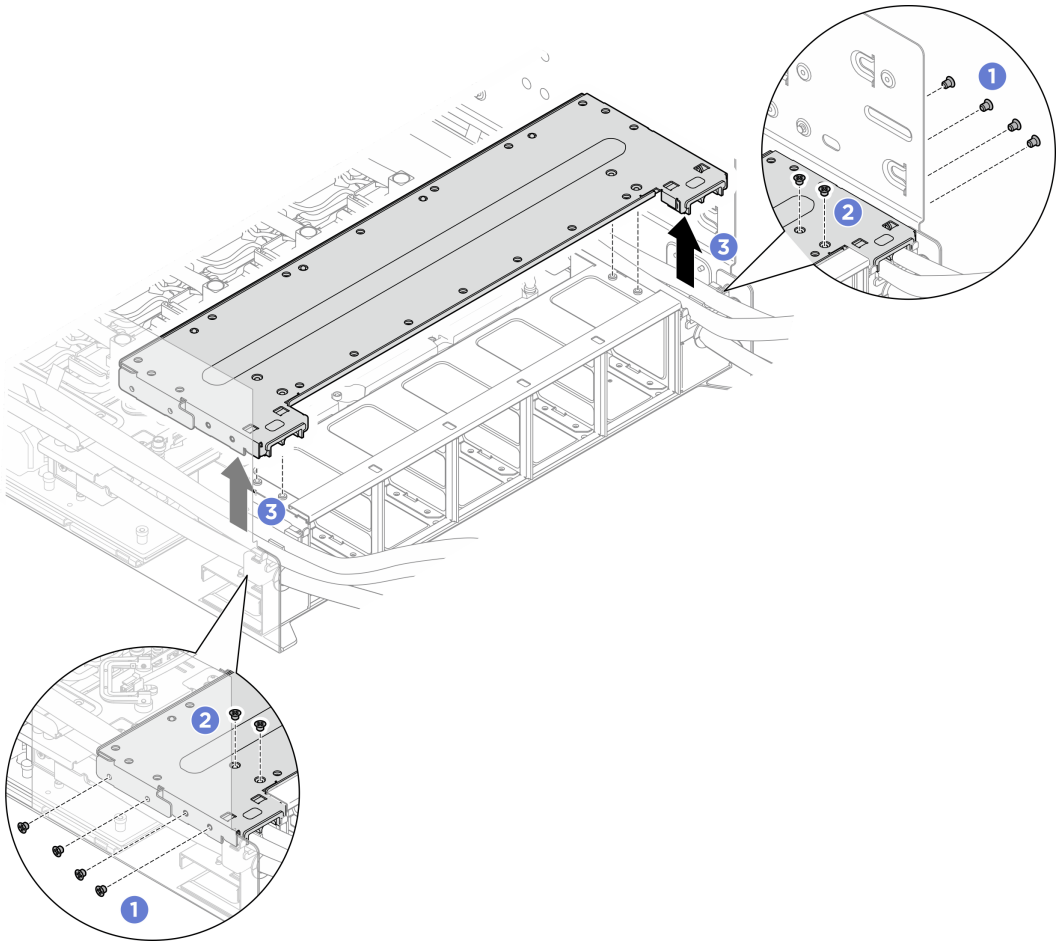


Figure 159. Removing the rear fan cage support bracket

Step 4. Reposition the rear H100/H200 GPU cold plate module to create space for front H100/H200 GPU cold plate module.

Step 5. Unfasten the four M3 screws (W7-W8) that secure the rear H100/H200 GPU cold plate module manifold to the chassis.

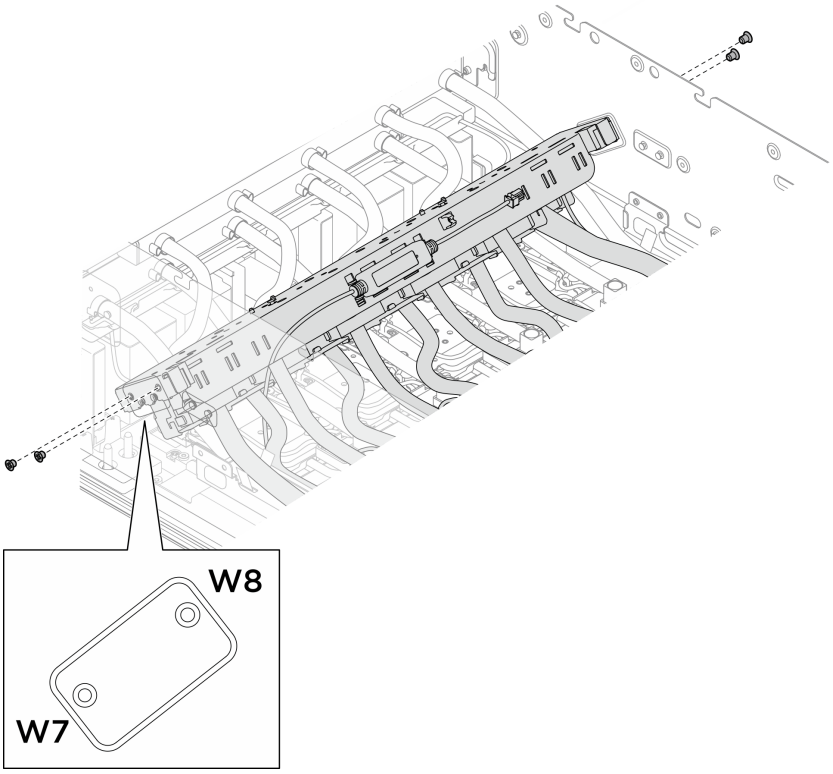


Figure 160. Removing the rear H100/H200 GPU cold plate module manifold

Step 6. Reposition the rear H100/H200 GPU cold plate module manifold as illustrated.

a. ❶ Disengage the manifold from the guide pins marked with B; then, move the manifold to the guide pins marked with A.

b. ❷ Ensure the guide slots on the manifold are securely engaged with the guide pins marked with A.

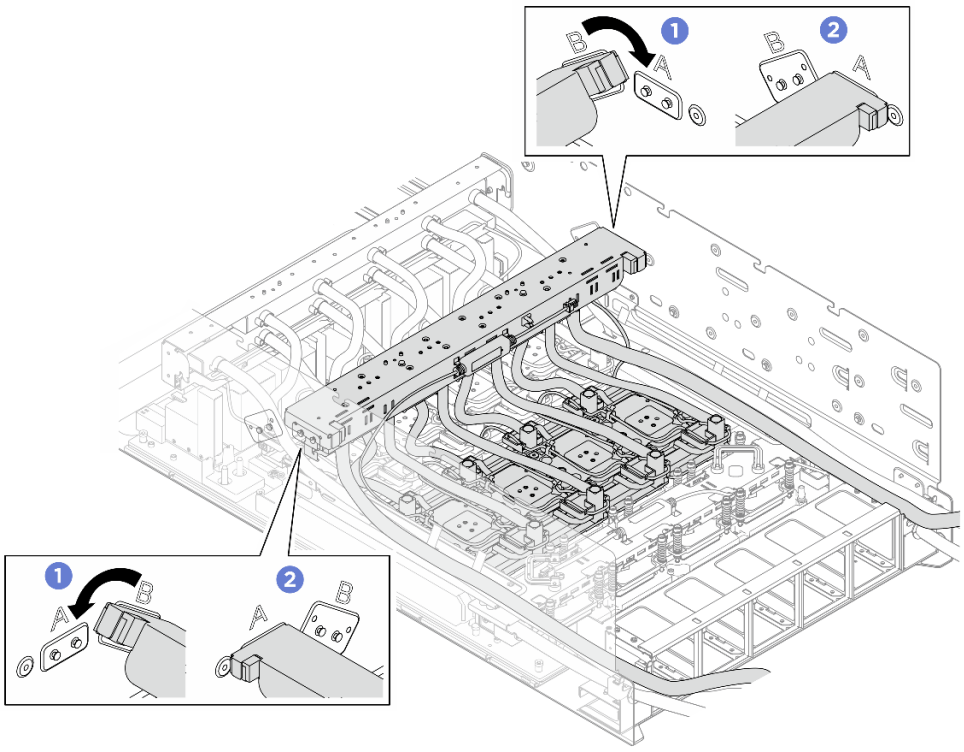


Figure 161. Repositioning the rear H100/H200 GPU cold plate module manifold

Step 7. Follow the screw sequence ❶❷❸❹ specified on the cold plate label, and fully loosen the sixteen Torx T10 screws with a torque screwdriver set to the proper torque.

Notes:

- Loosen or tighten the screws with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to be fully loosen or tighten is 0.4±0.05 newton-meter, 3.5 ±0.5 pound-inch.
- Ensure the captive screws are completely loosen before removing the cold plate module.

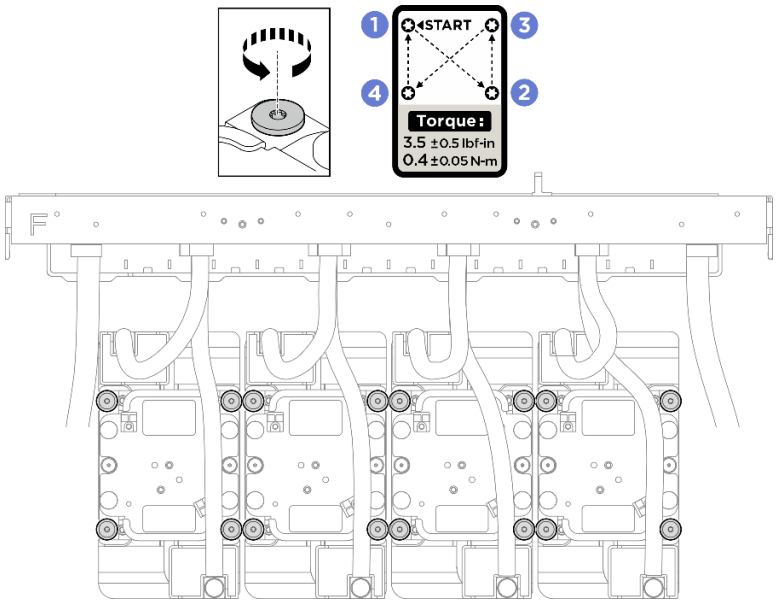


Figure 162. Removing the GPU cold plates

Note: If necessary, use a flat screwdriver to gently separate the cold plate and the GPU from the corner of the cold plate. Ensure not the damage the GPU or the cold plate.

Step 8. Align the guide pins on the shipping brackets with the guide holes on the manifold and the cold plates; then, lower the shipping brackets onto the front H100/H200 GPU cold plate module. Tighten the six captive screws (PH1, 6 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the shipping brackets to the front H100/H200 GPU cold plate module.

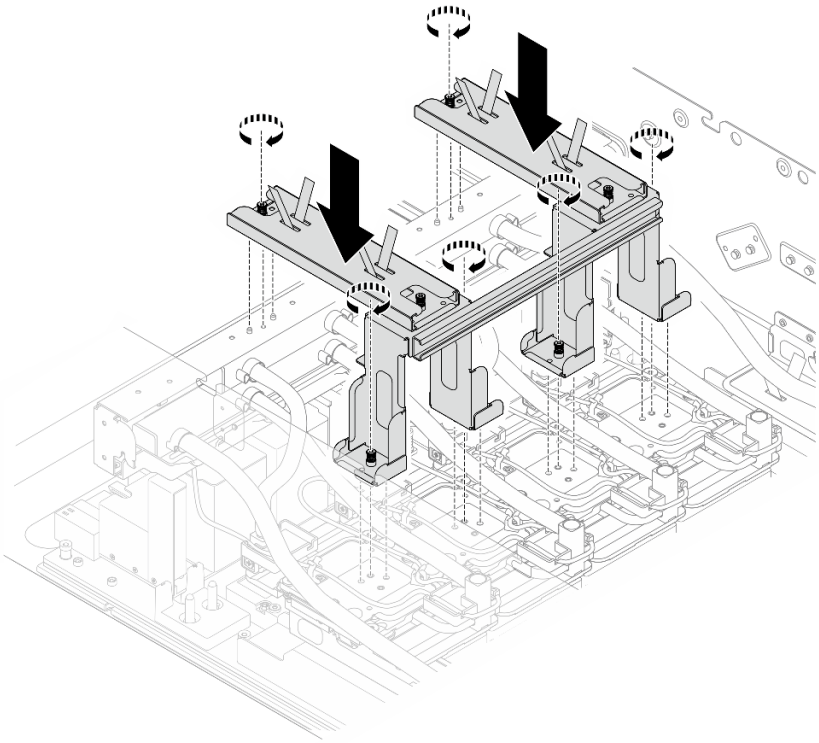


Figure 163. Installing the shipping brackets

Step 9. Unfasten the four M3 screws (W5-W6) that secure the front H100/H200 GPU cold plate module manifold to the chassis.

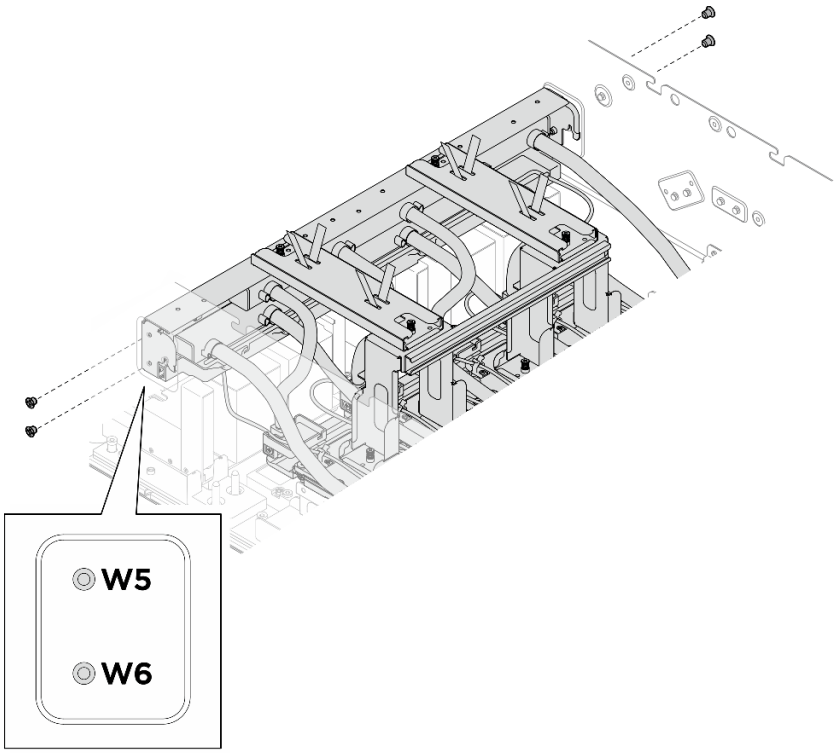


Figure 164. Removing the front H100/H200 GPU cold plate module manifold

Step 10. Remove the front H100/H200 GPU cold plate module.

a. ❶ Release the hoses from the hose ties that secure them to the hose guides.

b. ❷ Secure the hoses to the shipping brackets with the hose ties on the shipping brackets.

c. ❸ Hold the shipping brackets and lift the front H100/H200 GPU cold plate module out of the chassis.

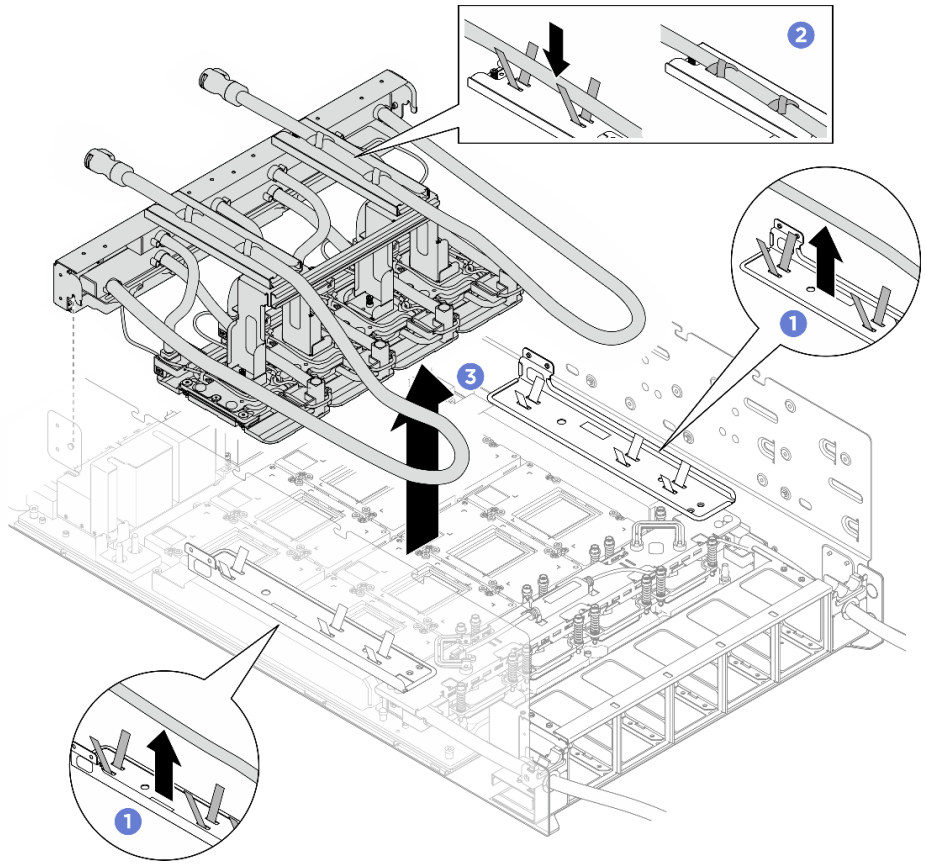


Figure 165. Removing the front H100/H200 GPU cold plate module

Step 11. **Immediately** clean the PCM and putty pads off from the GPUs with alcohol cleaning pads. **Gently** clean the PCM and putty pads to avoid GPU damage.

Attention:

- It is recommended to clean the PCM while it is in liquid state.
- The electrical components around the die on the GPUs are extremely delicate. When removing the PCM and cleaning the GPU die, avoid touching the electrical components to prevent damage.

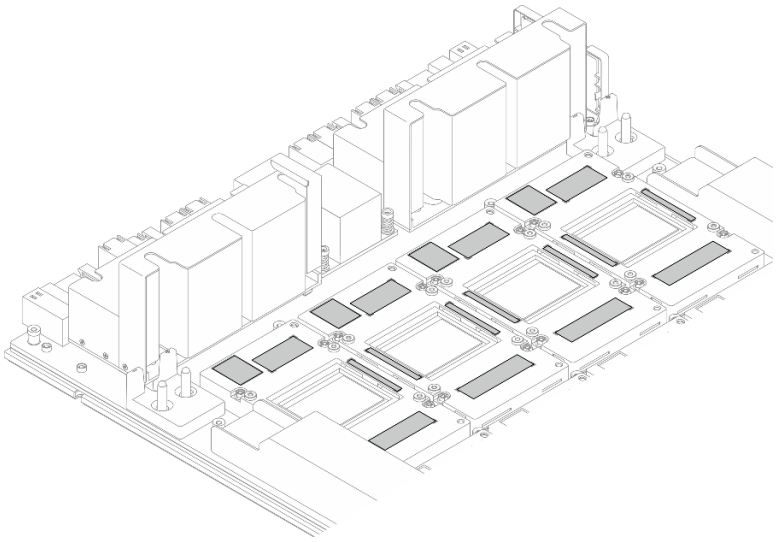


Figure 166. Cleaning PCM and putty pads off from the GPUs

Step 12. With alcohol cleaning pads, wipe off any remaining putty pad and PCMs from the GPU cold plate module.

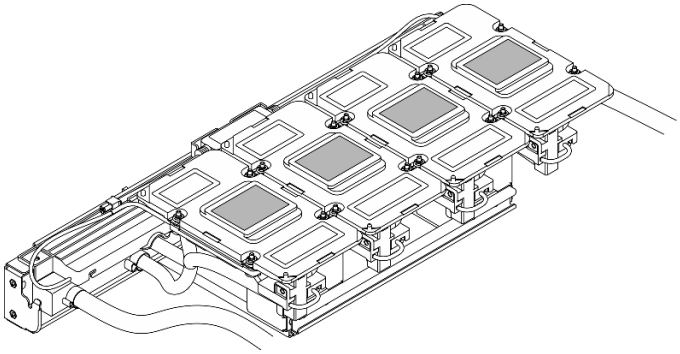


Figure 167. Wiping PCM and putty pads off from the cold plates

Step 13. If necessary, unfasten the two M3 screws to remove the GPU cable holder from the front H100/H200 GPU cold plate module manifold.

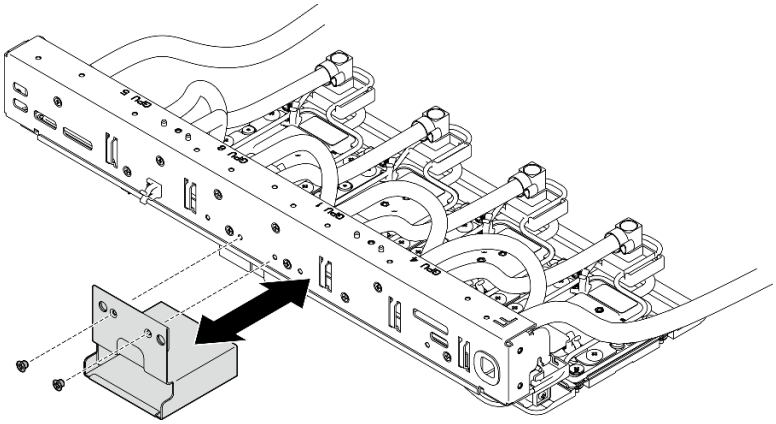


Figure 168. Removing GPU cable holder

After you finish

1. Install a replacement unit. See “Install the front H100/H200 GPU cold plate module” on page 180.
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 front H100/H200 GPU cold plate module

Follow instructions in this section to install the front H100/H200 GPU cold plate module. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- A torque screwdriver is available for request if you do not have one at hand.

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torx T10 head screwdriver
- Torx T15 head screwdriver
- Phillips #1 head screwdriver
- Phillips #2 head screwdriver
- Flat head screwdriver
- Alcohol cleaning pad
- H100/H200 PCM Kit
- SR780a V3 water loop putty pad kit
- SR780a V3 water loop service kit

Important: Putty pad/phase change material (PCM) replacement guidelines

- Before replacing the putty pad/PCM, gently clean the hardware surface with an alcohol cleaning pad.
- Hold the putty pad/PCM carefully to avoid deformation. Make sure no screw hole or opening is blocked by the putty pad/PCM.
- Do not use expired putty pad/PCM. Check the expiry date on putty pad/PCM package. If the putty pads/PCM are expired, acquire new ones to properly replace them.

The following illustration shows the GPU numbering and corresponding slot numbering in XCC.

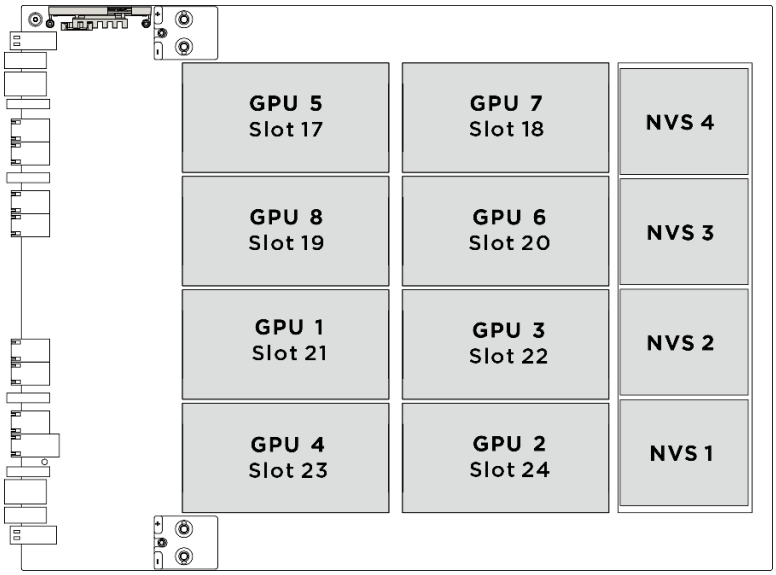


Figure 169. GPU numbering

The following illustration shows the components for front H100/H200 GPU cold plate module.

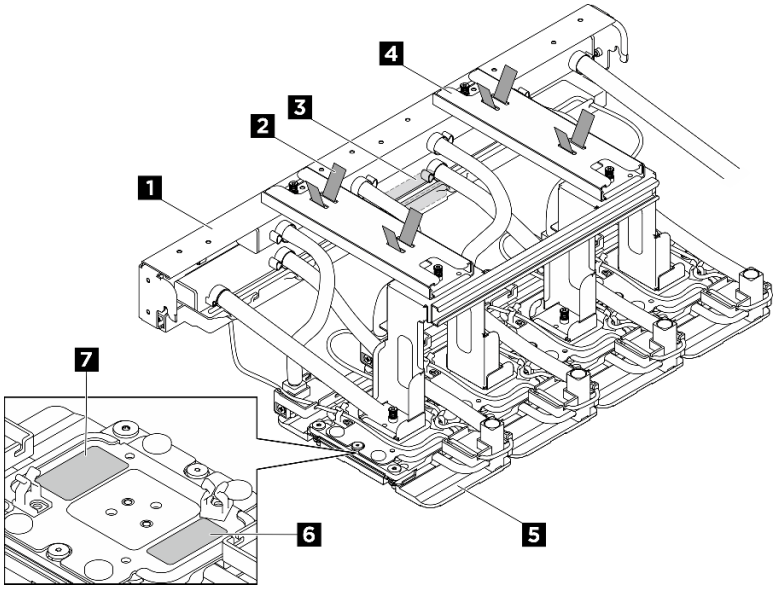


Figure 170. front H100/H200 GPU cold plate module components identification

Table 29. front H100/H200 GPU cold plate module components

1 Manifold	2 Hose tie
3 leakage sensor module	4 Shipping bracket
5 GPU cold plate	6 GPU slot number label
7 GPU cold plate screw torque label	

Procedure

Step 1. Make sure the GPU complex is installed in the chassis.

Step 2. (Optional) Install the GPU cable holder to the front H100/H200 GPU cold plate module if it is not installed.

a. Align the GPU cable holder to the corresponding screw holes on the front H100/H200 GPU cold plate module; then, fasten the two M3 screws (PH2, 2 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the GPU cable holder to the front H100/H200 GPU cold plate module.

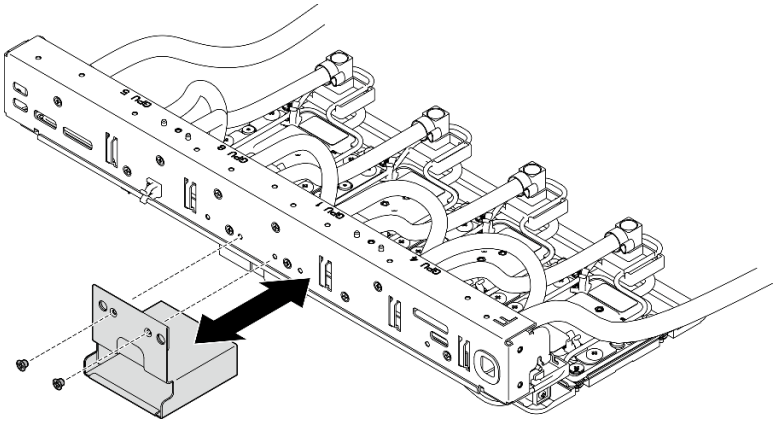


Figure 171. Installing the GPU cable holder

Step 3. Replace the Phase Change Material (PCM) on the front GPU cold plate module.

a. ❶ Remove the liner from one side of the pad.

b. ❷ Align the PCM with the marking on the bottom of the cold plate, and place it onto the cold plate; then, apply finger pressure across the entire surface area of the PCM to remove any trapped air and allow 1-2 minutes dwell time until it is firmly attached. Carefully remove the remaining top liner.

c. ❸ Repeat to replace the PCM on the four cold plates.

Attention:

- PCM cannot be reused. PCM must be replaced with new ones every time the water loop is removed.
- After PCM is replaced, there is an expected short duration of throttling before the GPU returns to normal operation. This is due to the PCM requiring a break-in period after being replaced.

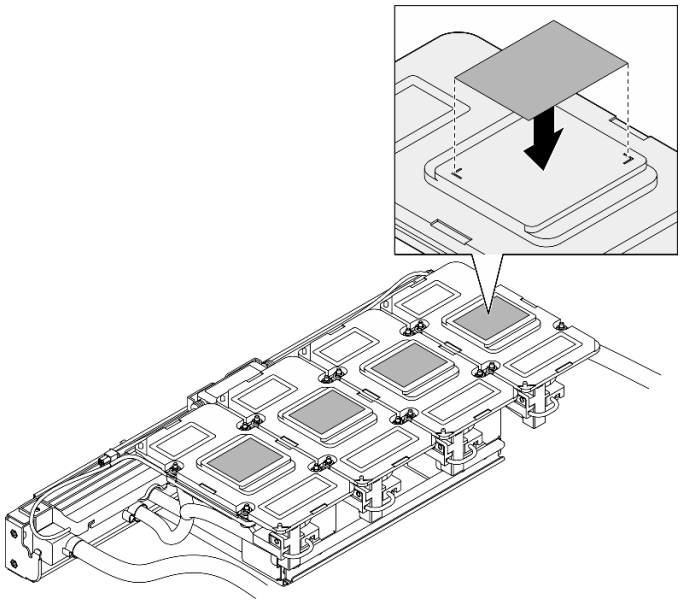


Figure 172. PCM application

Step 4. Replace the putty pads (x5) on the GPU.

a. ❶ Remove the liner from one side of the pad.

b. ❷ Make sure to align the putty pads to the GPU VR (1) and the markings on GPU; then, place the pads onto the GPU and apply light finger pressure across the entire surface area of the pads to ensure adhesion. Carefully remove the remaining top liner.

c. ❸ Repeat to replace all putty pads on the four GPUs.

Attention: Putty pad cannot be reused. Putty pad must be replaced with new ones every time the water loop is removed.

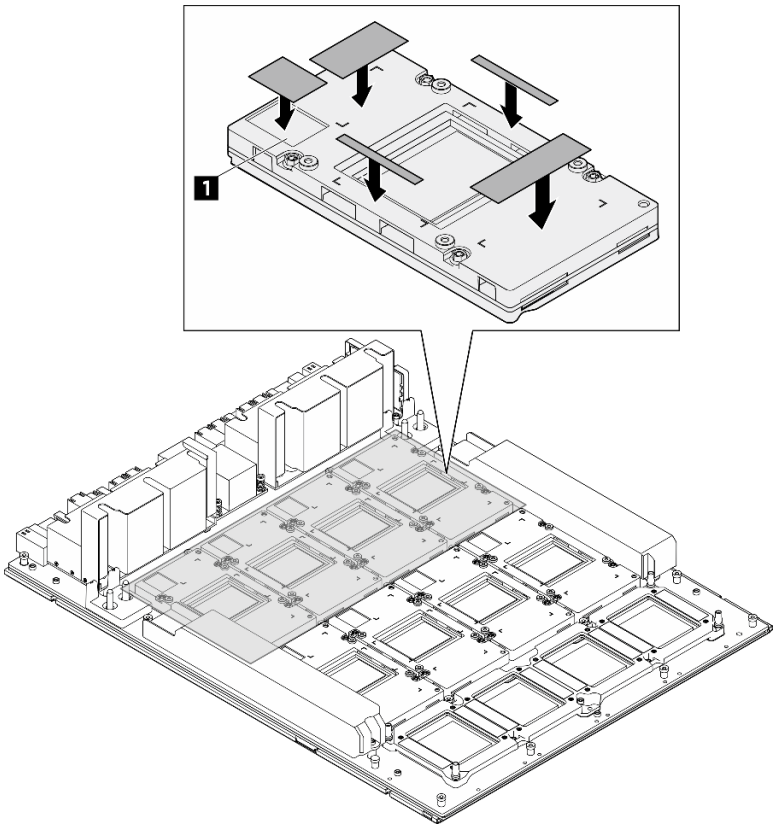


Figure 173. GPU putty pads replacement

1 GPU VR (Cover the GPU VR with putty pad)

Step 5. Install the front H100/H200 GPU cold plate module.

a. 1 Hold the front H100/H200 GPU cold plate module by the shipping brackets; then, align the guide slots on the manifold with the guide pins and gently place the cold plate module onto the four front GPUs.

b. 2 Ensure the guide slots on the manifold are securely engaged with the guide pins on the chassis.

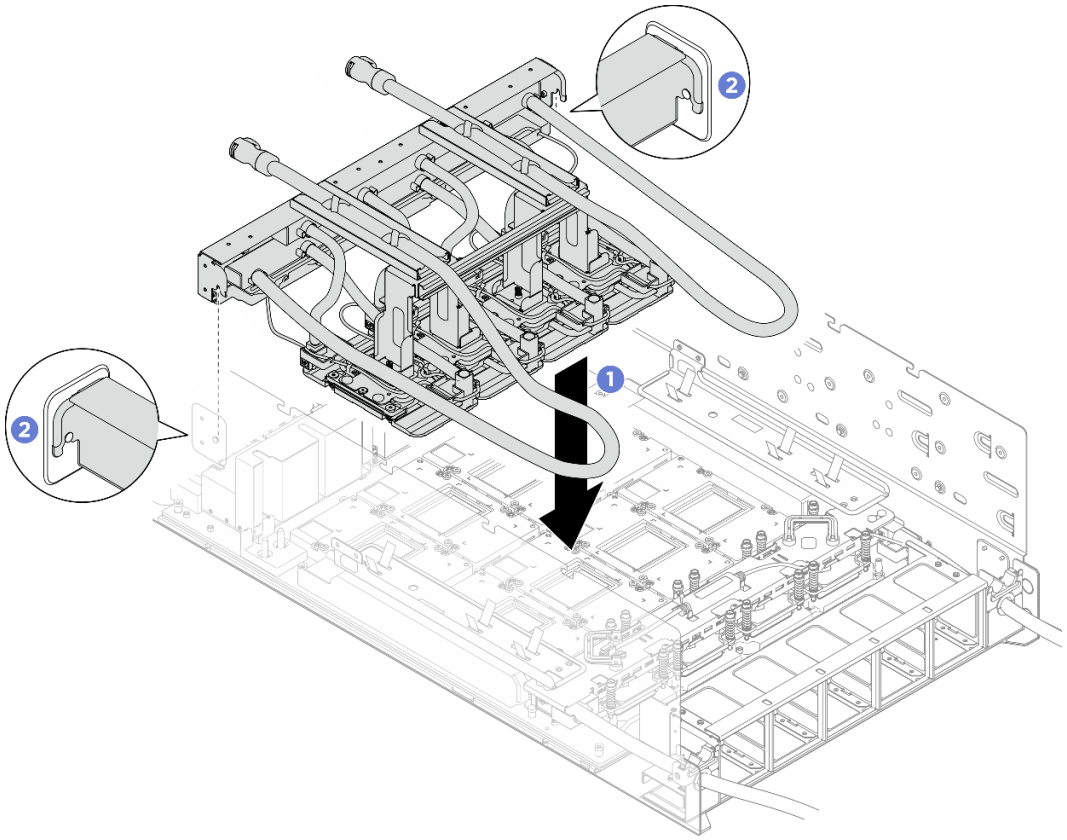


Figure 174. Installing the front H100/H200 GPU cold plate module

Step 6. Fasten the four M3 screws (W5-W6) (PH2, 4 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the front H100/H200 GPU cold plate module manifold to the chassis.

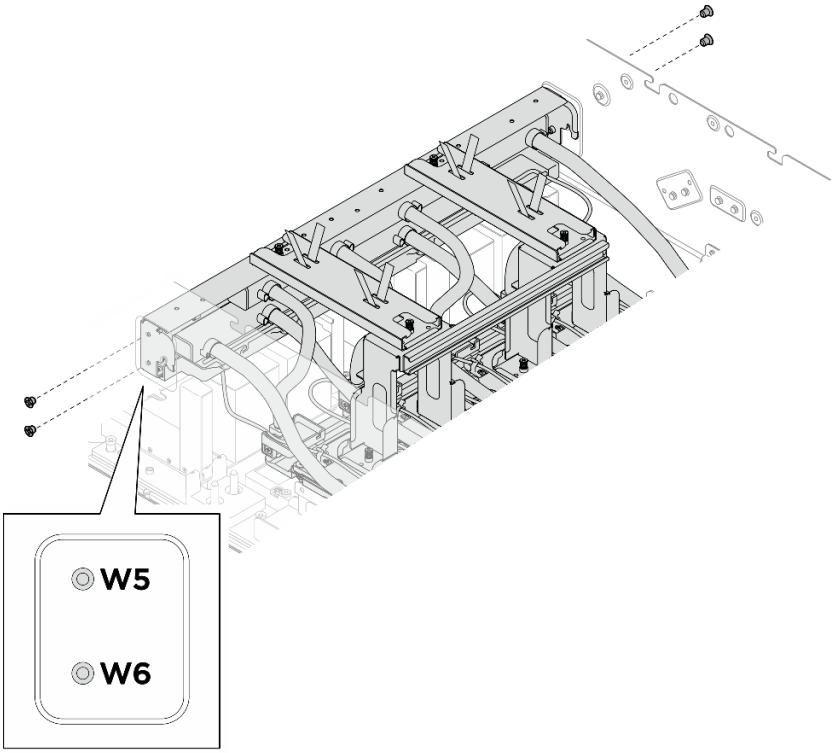


Figure 175. Installing the front H100/H200 GPU cold plate module manifold

Step 7. Loosen the six captive screws that secure the shipping brackets to the front H100/H200 GPU cold plate module; then, remove the shipping brackets from the front H100/H200 GPU cold plate module.

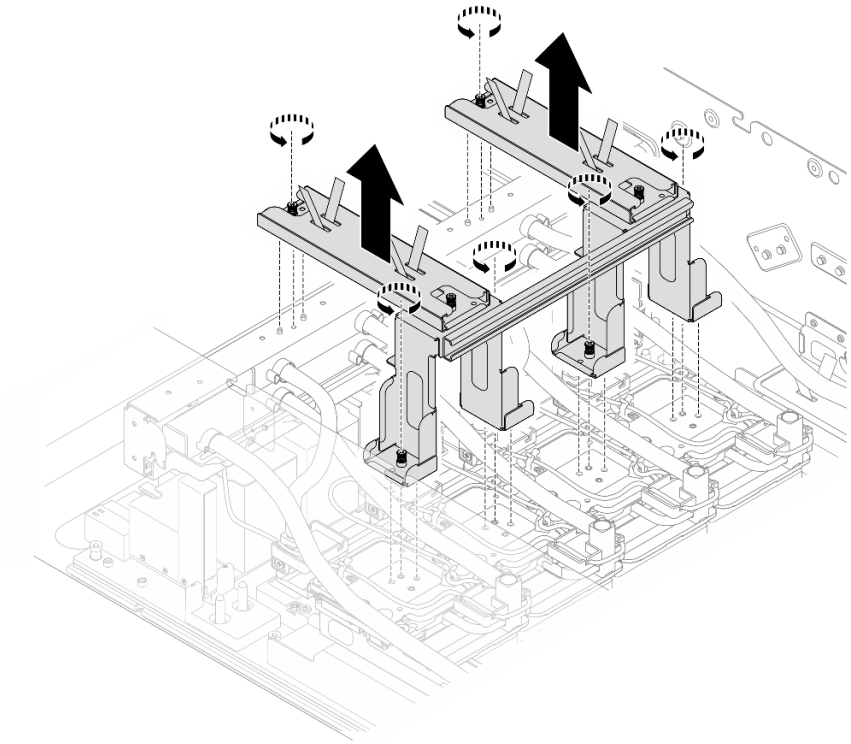


Figure 176. Removing the shipping brackets

Step 8. Adjust the cold plate until the two guide pins are seated in the guide holes on the GPU. Repeat to adjust the four cold plates.

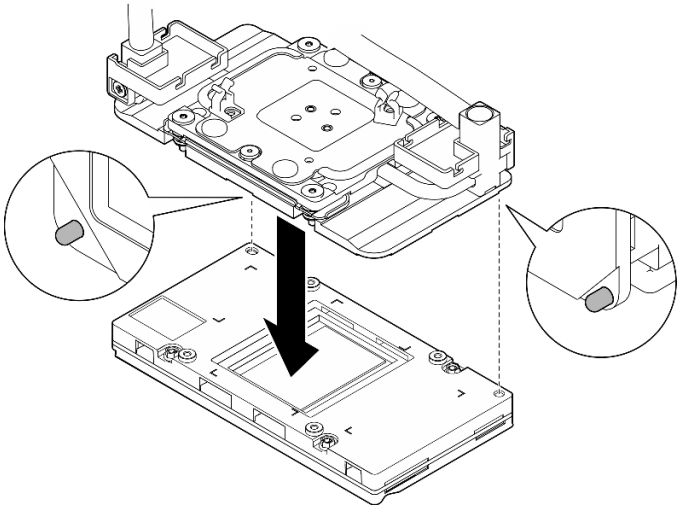


Figure 177. Adjusting the GPU cold plates

Step 9. Follow the screw sequence specified on the cold plate label, and repeat to fully tighten the sixteen Torx T10 screws with a torque screwdriver set to the proper torque.

a. Set the torque screwdriver to 0.4±0.05 newton-meter, 3.5±0.5 pound-inch.

b. Fasten the screws 720 degrees following the screw installation sequence: ❶ → ❷ → ❸ → ❹

Note: Make sure to follow screw installation sequence to prevent GPU cold plate tilting.

c. Repeat until all screws on the four GPU cold plates are fully tightened.

Figure 178. Repeat to fully tighten all the screws

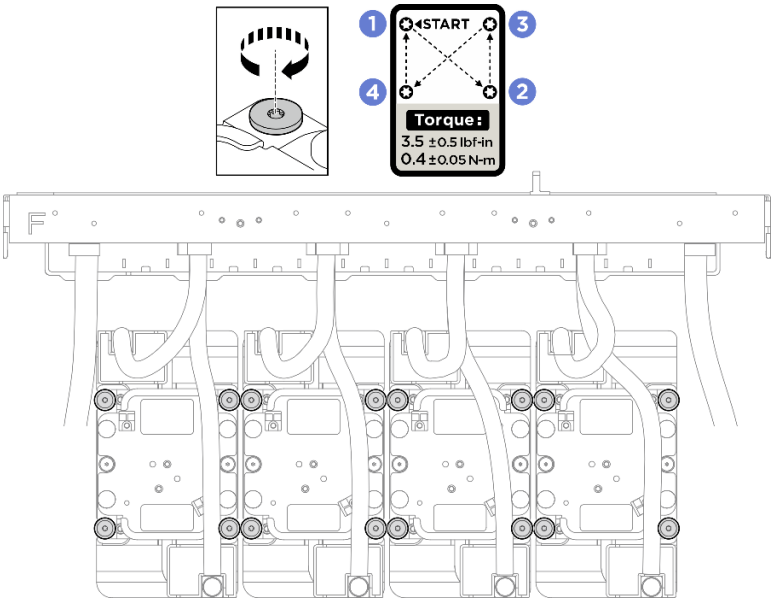


Figure 179. Installing the GPU cold plates

Step 10. The following illustration shows the hose holder location.

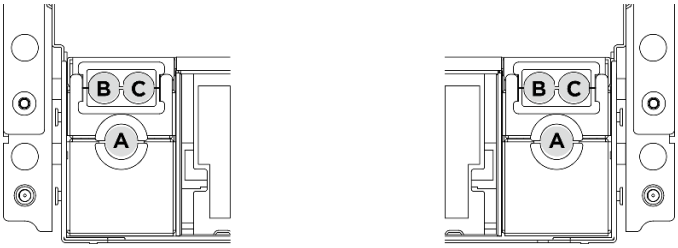


Figure 180. Hose holder location

Step 11. Place the hoses on the hose guides and the hose holders.

a. ❶ Place the front H100/H200 GPU cold plate module hoses and cables on the hose guides, and secure them with hose ties. See “Fan control board cable routing” on page 374 and “Leakage sensor module cable routing” on page 397.

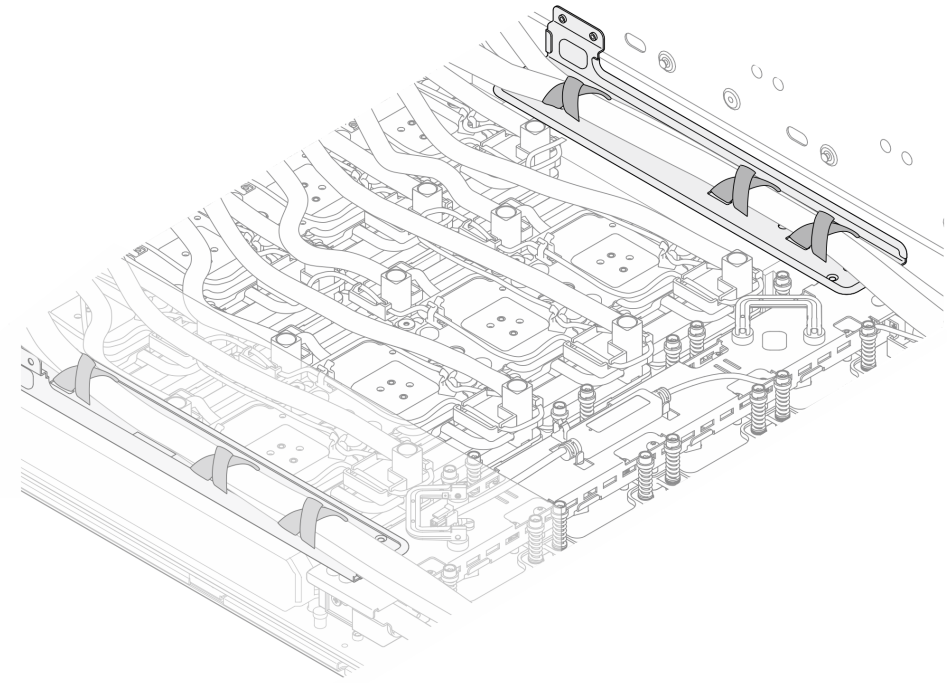


Figure 181. Securing the hoses and cables with hose ties

b. ❷ Place the left side front H100/H200 GPU cold plate module hose on (1) hose holder B, and the right side front H100/H200 GPU cold plate module hose on (2) hose holder C. Ensure the guiding labels on the hoses match with the markings on the hose holders.

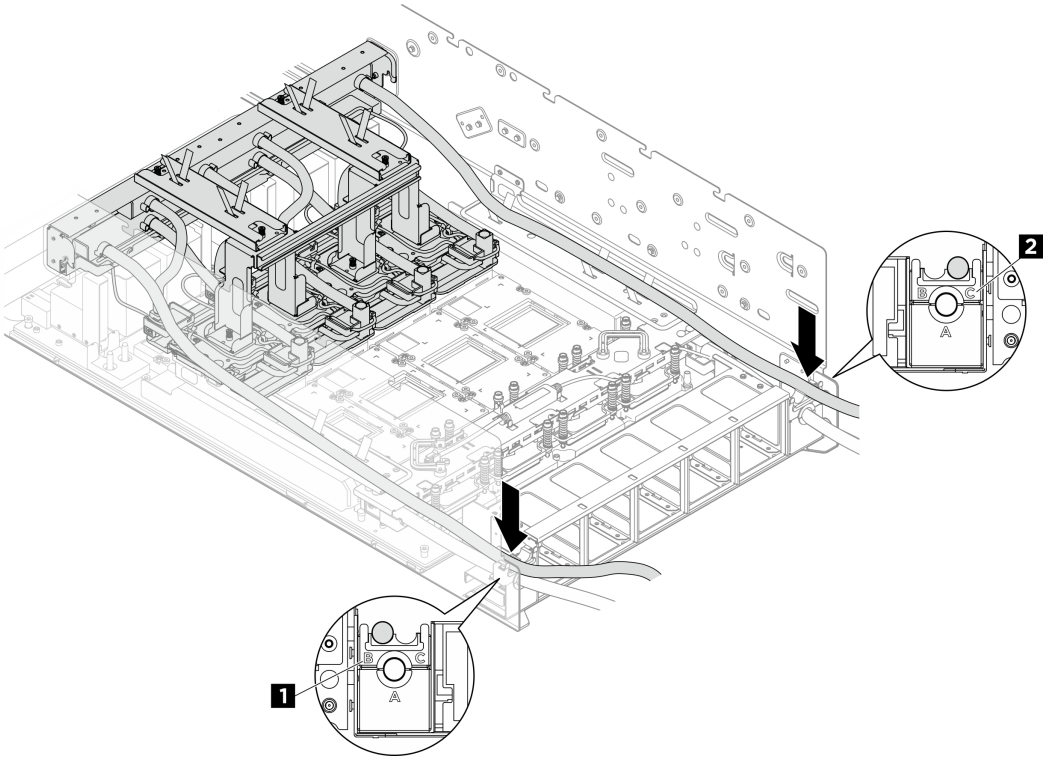


Figure 182. Placing the hoses on hose holders

1 Hose holder B (left side)	2 Hose holder C (right side)

Important:

- Check the guiding labels on the hoses and hose holders before installation.

Step 12. If you are installing the front H100/H200 GPU cold plate module after installing a new GPU complex, skip the following steps and proceed to install the rear H100/H200 GPU cold plate module. See "Install the rear H100/H200 GPU cold plate module" on page 203.

Step 13. If you are only replacing the front H100/H200 GPU cold plate module, reinstall the rear H100/H200 GPU cold plate module manifold since it was reposition in the replacement process.

a. (1) Disengage the rear H100/H200 GPU cold plate module manifold from the guide pins marked with A; then, move the manifold to the guide pins marked with B as illustrated.

b. (2) Ensure the guide slots on the manifold are securely engaged with the guide pins marked with B.

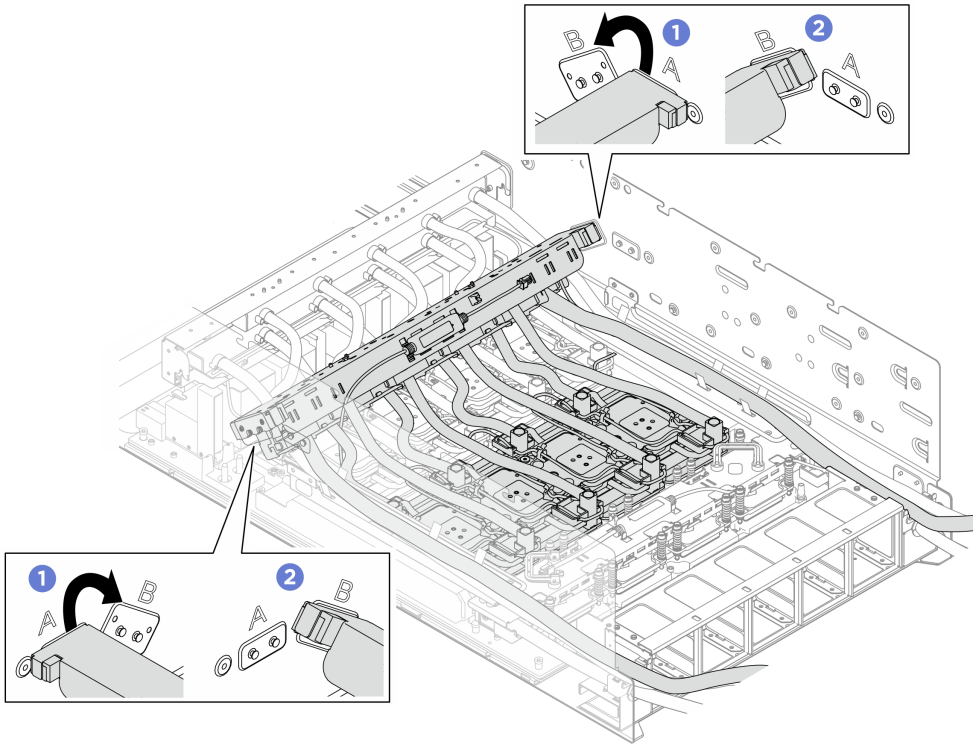


Figure 183. Reinstalling the rear H100/H200 GPU cold plate module manifold

Step 14. Fasten the four M3 screws (W7-W8) (PH2, 4 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the rear H100/H200 GPU cold plate module manifold to the chassis.

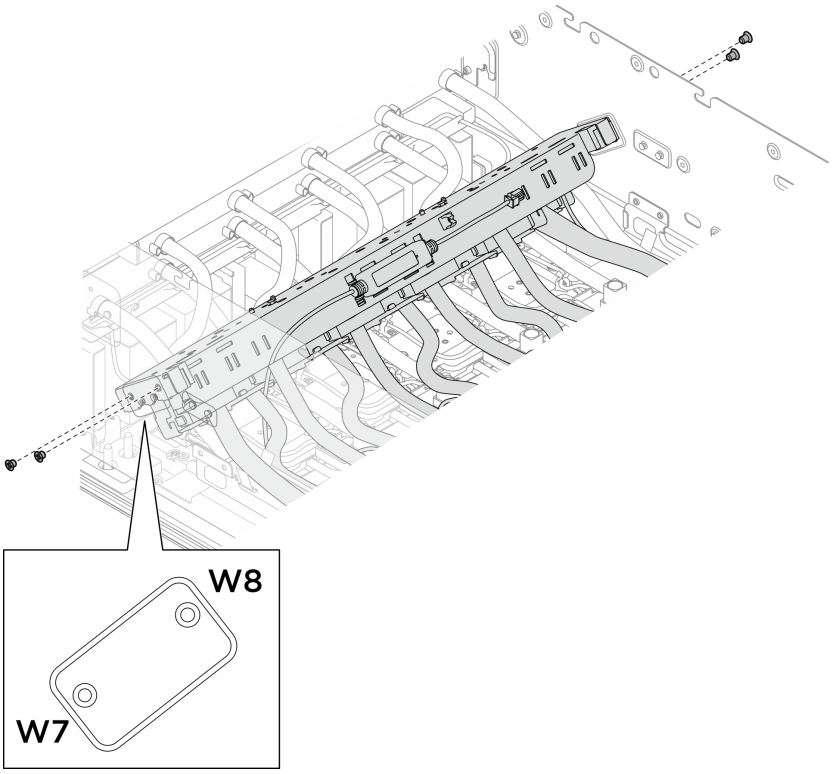


Figure 184. Installing the rear H100/H200 GPU cold plate module manifold

Step 15. Install the rear fan cage support bracket.

a. ❶ Align the rear fan cage support bracket with the corresponding screw holes; then, install the rear fan cage support bracket on top of hose holder B/C as illustrated.

b. ❷ Fasten the four M3 screws (PH2, 4 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the rear fan cage support bracket to the fan cage.

c. ❸ Fasten the eight M3 screws (PH2, 8 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the rear fan cage support bracket to the chassis.

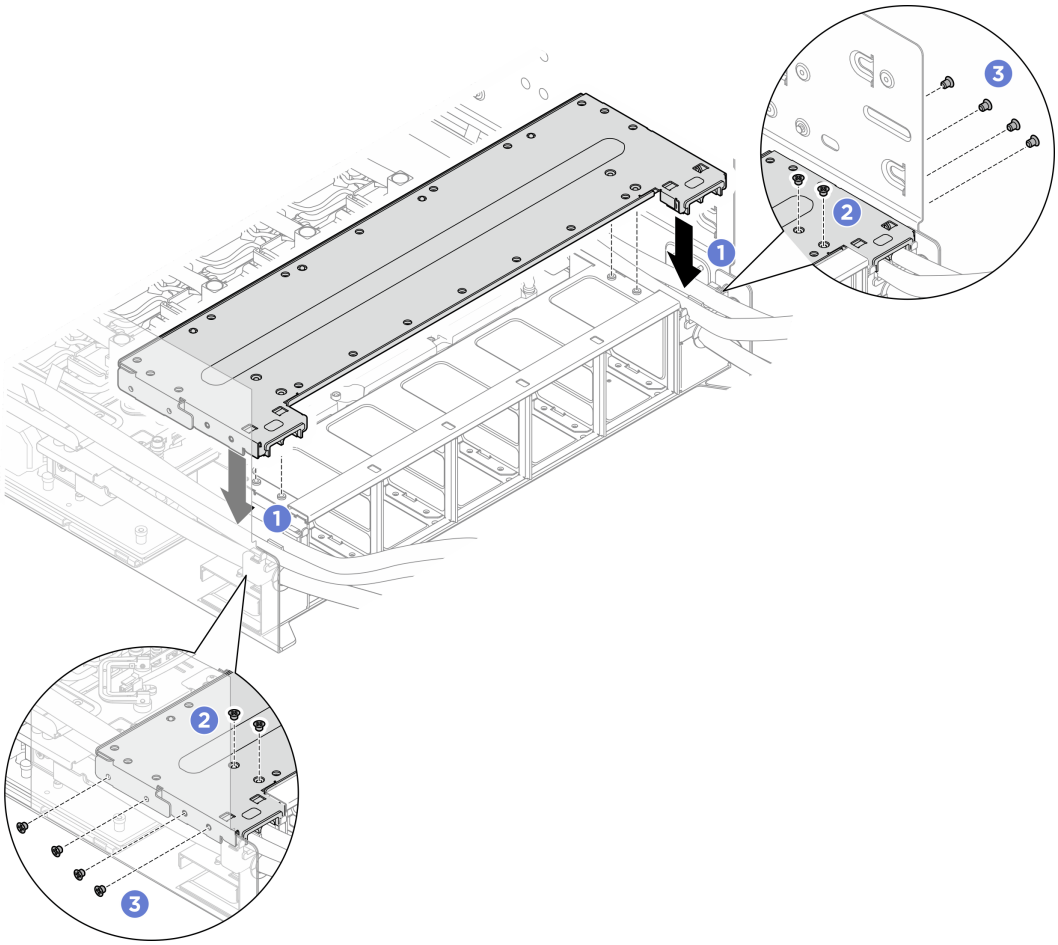


Figure 185. Installing the rear fan cage support bracket

After you finish

1. Reconnect all the cables that were disconnected. See Chapter 6 “Internal cable routing” on page 365.
2. Reinstall the power complex. See “Install the power complex” on page 313.
3. Reinstall the CPU complex. See “Install the CPU complex” on page 84.
4. Reinstall the fan cage. See “Install the fan cage (trained technician only)” on page 104.
5. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
6. Reinstall the front top cover. See “Install the front top cover” on page 69.
7. Complete the parts replacement. See “Complete the parts replacement” on page 363.

Rear GPU cold plate module replacement (trained technician only)

Follow instructions in this section to remove or install the rear GPU cold plate module.

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 rear H100/H200 GPU cold plate module

Follow instructions in this section to remove the rear H100/H200 GPU cold plate module. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- A torque screwdriver is available for request if you do not have one at hand.

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torx T10 head screwdriver
- Torx T15 head screwdriver
- Phillips #1 head screwdriver
- Phillips #2 head screwdriver
- Flat head screwdriver
- Alcohol cleaning pad
- H100/H200 PCM Kit
- SR780a V3 water loop putty pad kit
- SR780a V3 water loop service kit

Important: Putty pad/phase change material (PCM) replacement guidelines

- Before replacing the putty pad/PCM, gently clean the hardware surface with an alcohol cleaning pad.
- Hold the putty pad/PCM carefully to avoid deformation. Make sure no screw hole or opening is blocked by the putty pad/PCM.
- Do not use expired putty pad/PCM. Check the expiry date on putty pad/PCM package. If the putty pads/PCM are expired, acquire new ones to properly replace them.

The following illustration shows the GPU numbering and corresponding slot numbering in XCC.

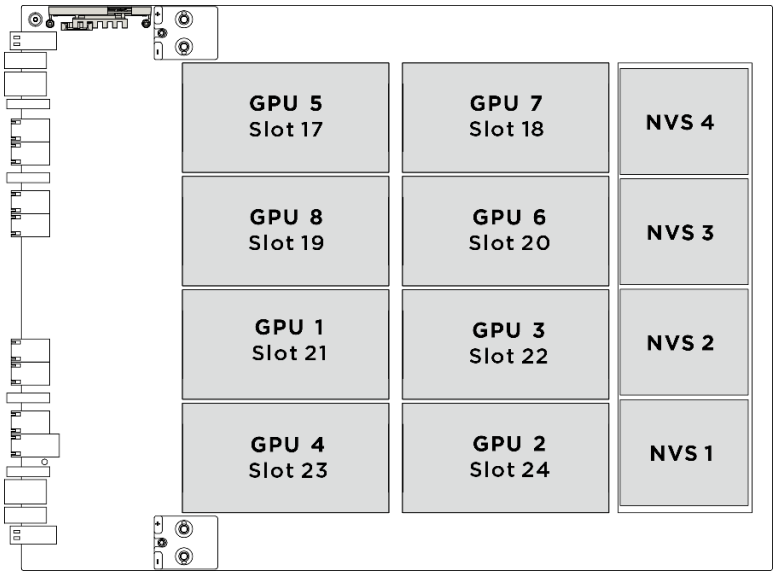


Figure 186. GPU numbering

The following illustration shows the components for rear H100/H200 GPU cold plate module.

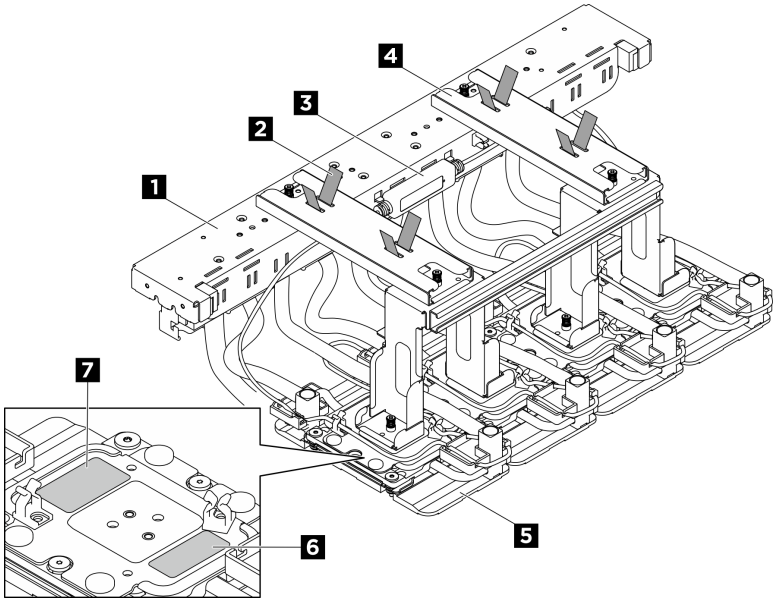


Figure 187. rear H100/H200 GPU cold plate module components identification

Table 30. rear H100/H200 GPU cold plate module components

1 Manifold	2 Hose tie
3 leakage sensor module	4 Shipping bracket
5 GPU cold plate	6 GPU slot number label
7 GPU cold plate screw torque label	

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the rear top cover. See “Remove the rear top cover” on page 70.

c. Remove the fan cage. See “Remove the fan cage (trained technician only)” on page 103.

d. Remove the CPU complex. See “Remove the CPU complex” on page 83.

e. Remove the power complex. See “Remove the power complex” on page 312.

f. Disconnect the cables and remove them from the GPU complex if necessary. Before disconnecting the cables, make a list of each cable and record the connectors the cable is connected to. Refer to Chapter 6 “Internal cable routing” on page 365.

Step 2. The following illustration shows the hose holder location.

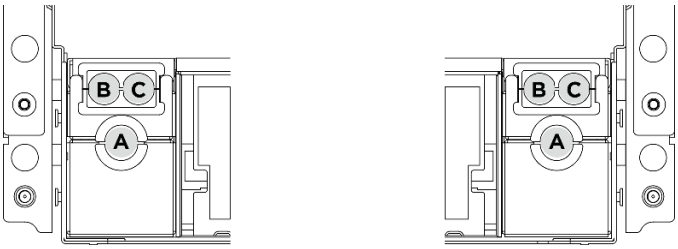


Figure 188. Hose holder location

Step 3. Remove the rear fan cage support bracket.

a. ❶ Unfasten the eight M3 screws that secure the rear fan cage support bracket to the the chassis.

b. ❷ Unfasten the four M3 screws that secure the rear fan cage support bracket to the fan cage.

c. ❸ Grasp the rear fan cage support bracket to lift it from the fan cage.

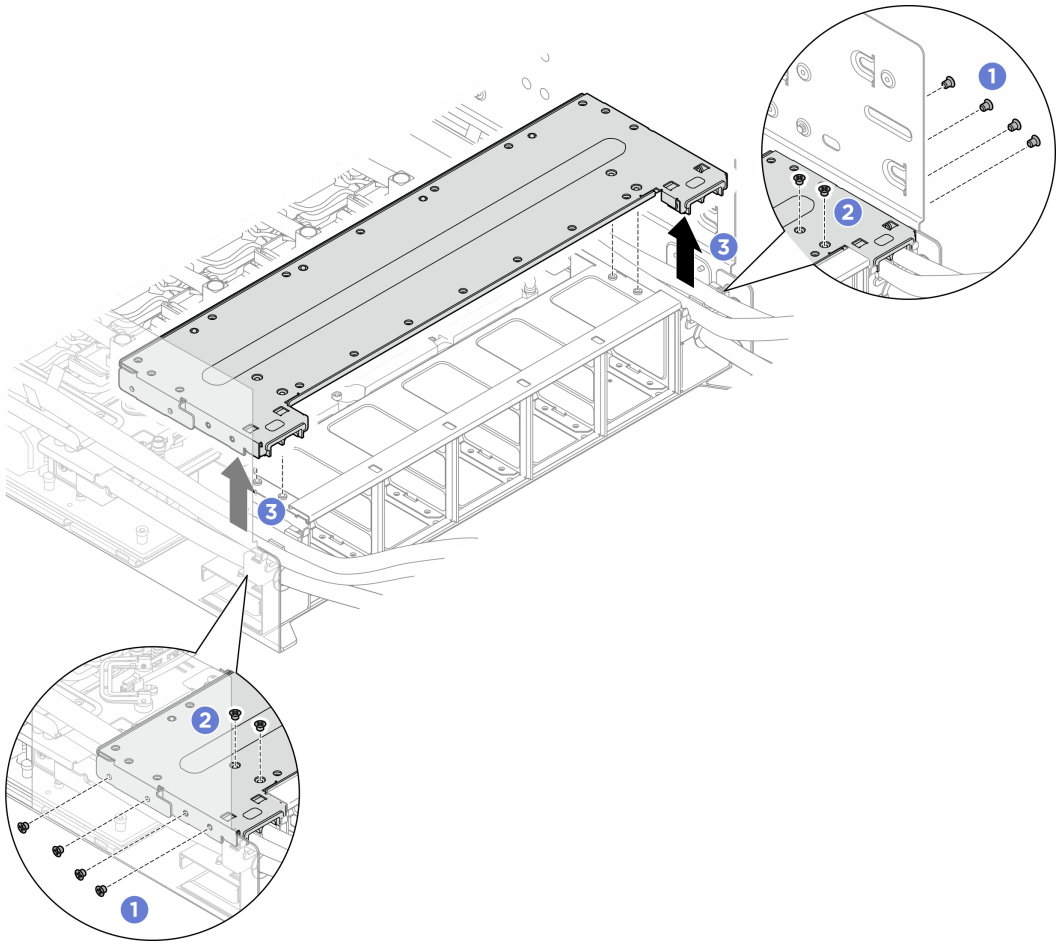


Figure 189. Removing the rear fan cage support bracket

Step 4. Follow the screw sequence ❶❷❸❹ specified on the cold plate label, and fully loosen the sixteen Torx T10 screws with a torque screwdriver set to the proper torque.

Notes:

- Loosen or tighten the screws with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to be fully loosen or tighten is 0.4±0.05 newton-meter, 3.5 ±0.5 pound-inch.
- Ensure the captive screws are completely loosen before removing the cold plate module.

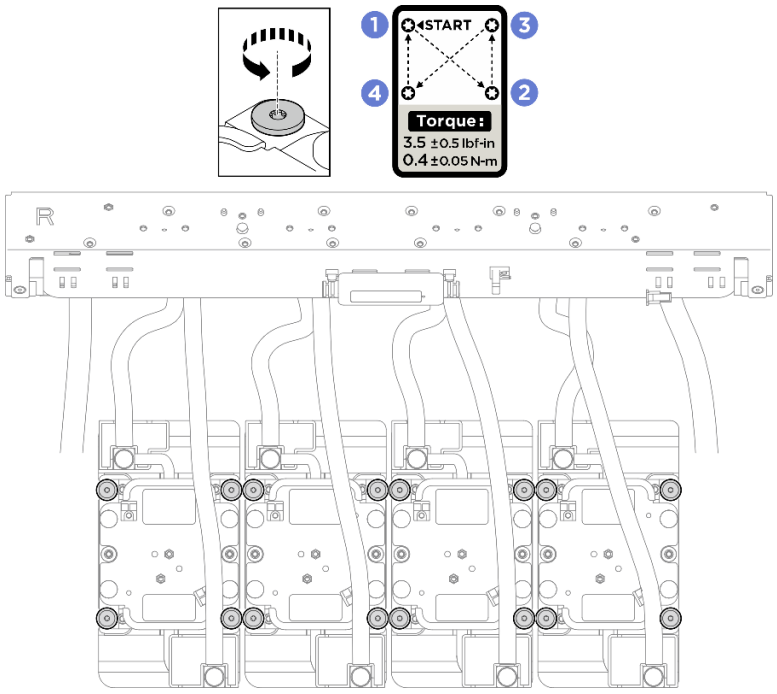


Figure 190. Removing the GPU cold plates

Note: If necessary, use a flat screwdriver to gently separate the cold plate and the GPU from the corner of the cold plate. Ensure not the damage the GPU or the cold plate.

Step 5. Unfasten the four M3 screws (W7-W8) that secure the rear H100/H200 GPU cold plate module manifold to the chassis.

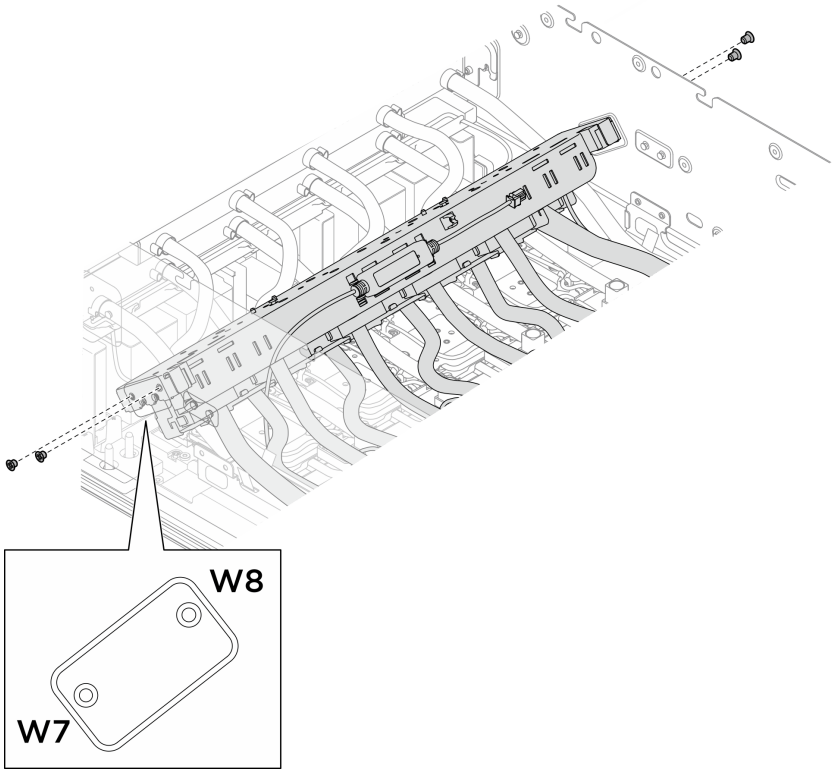


Figure 191. Removing the rear H100/H200 GPU cold plate module manifold

Step 6. Reposition the rear H100/H200 GPU cold plate module manifold as illustrated.

a. ❶ Disengage the manifold from the guide pins marked with B; then, move the manifold to the guide pins marked with A.

b. ❷ Ensure the guide slots on the manifold are securely engaged with the guide pins marked with A.

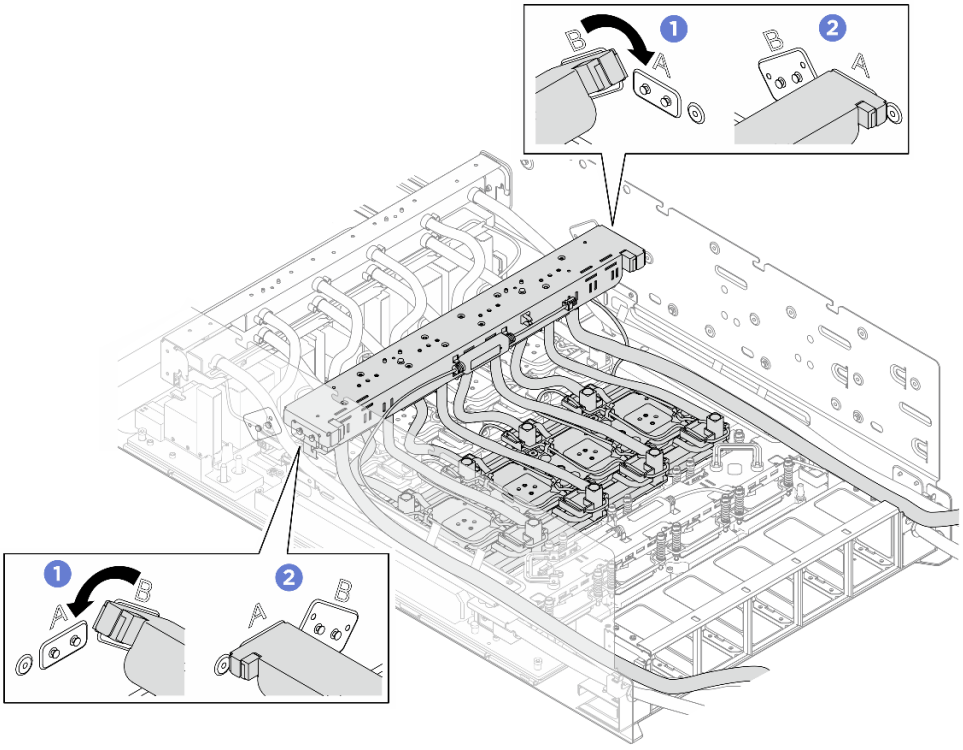


Figure 192. Repositioning the rear H100/H200 GPU cold plate module manifold

Step 7. Align the guide pins on the shipping brackets with the guide holes on the manifold and the cold plates; then, lower the shipping brackets onto the rear H100/H200 GPU cold plate module. Tighten the six captive screws (PH1, 6 x M3, 0.5 newton-meters, 4.3 inch-pound) to secure the shipping brackets to the rear H100/H200 GPU cold plate module.

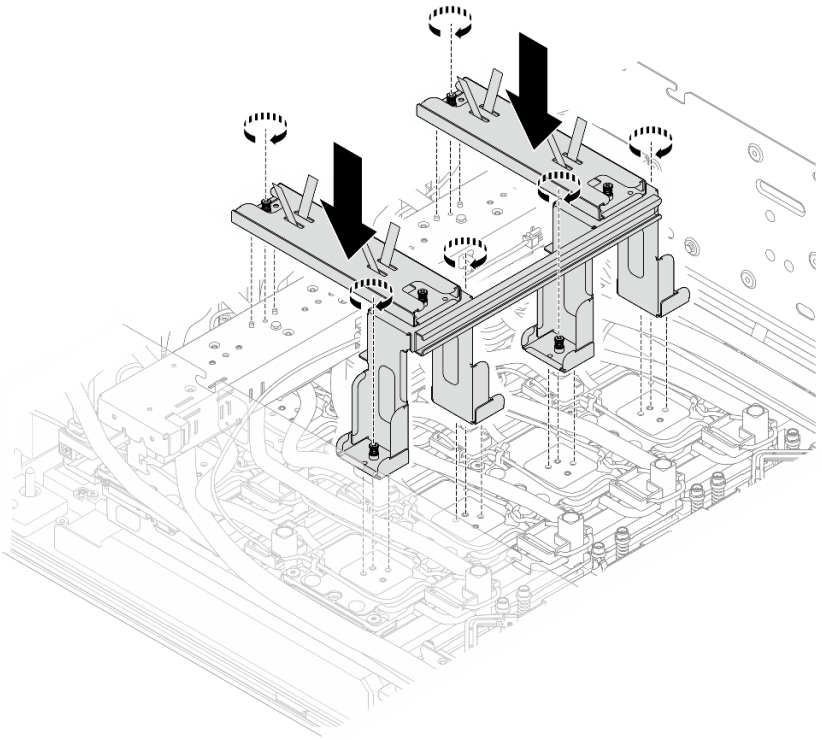


Figure 193. Installing the shipping brackets

Step 8. Hold the shipping brackets to remove the front GPU cold plate module from the chassis.

a. ❶ Release the hoses from the hose ties that secure them to the hose guides.

b. ❷ Secure the hoses to the shipping brackets with the hose ties on the shipping brackets.

c. ❷ Hold the shipping brackets and lift the rear H100/H200 GPU cold plate module out of the chassis.

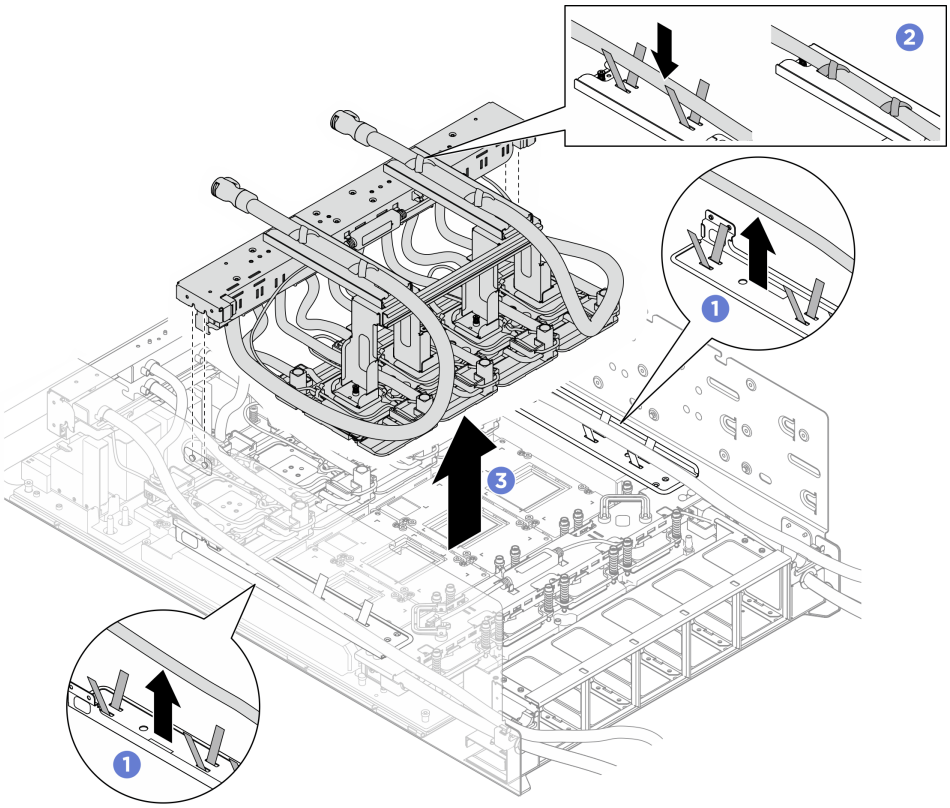


Figure 194. Removing the rear H100/H200 GPU cold plate module

Step 9. **Immediately** clean the PCM and putty pads off from the GPUs with alcohol cleaning pads. **Gently** clean the PCM and putty pads to avoid GPU damages.

Attention:

- It is recommended to clean the PCM while it is in liquid state.
- The electrical components around the die on the GPUs are extremely delicate. When removing the PCM and cleaning the GPU die, avoid touching the electrical components to prevent damage.

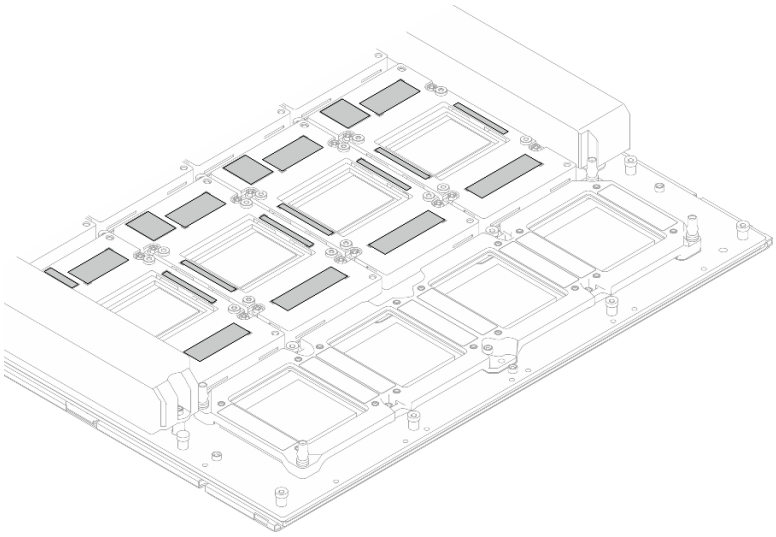


Figure 195. Cleaning PCM and putty pads off from the GPUs

Step 10. With alcohol cleaning pads, wipe off any remaining putty pad and PCMs from the GPU cold plate module.

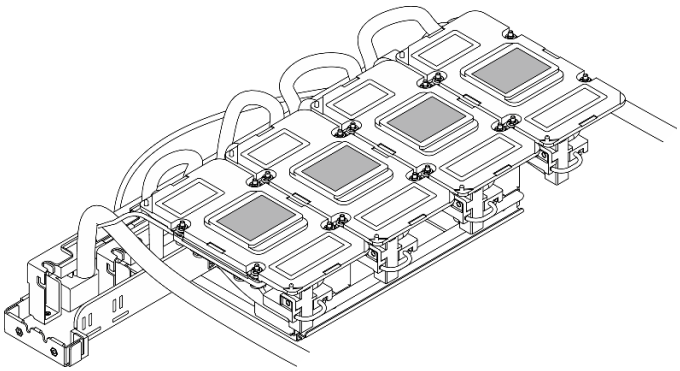


Figure 196. Wiping PCM and putty pads off from the cold plates

After you finish

1. Install a replacement unit. See “Install the rear H100/H200 GPU cold plate module” on page 203.
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 rear H100/H200 GPU cold plate module

Follow instructions in this section to install the rear H100/H200 GPU cold plate module. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

- A torque screwdriver is available for request if you do not have one at hand.

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torx T10 head screwdriver
- Torx T15 head screwdriver
- Phillips #1 head screwdriver
- Phillips #2 head screwdriver
- Flat head screwdriver
- Alcohol cleaning pad
- H100/H200 PCM Kit
- SR780a V3 water loop putty pad kit
- SR780a V3 water loop service kit

Important: Putty pad/phase change material (PCM) replacement guidelines

- Before replacing the putty pad/PCM, gently clean the hardware surface with an alcohol cleaning pad.
- Hold the putty pad/PCM carefully to avoid deformation. Make sure no screw hole or opening is blocked by the putty pad/PCM.
- Do not use expired putty pad/PCM. Check the expiry date on putty pad/PCM package. If the putty pads/PCM are expired, acquire new ones to properly replace them.

The following illustration shows the GPU numbering and corresponding slot numbering in XCC.

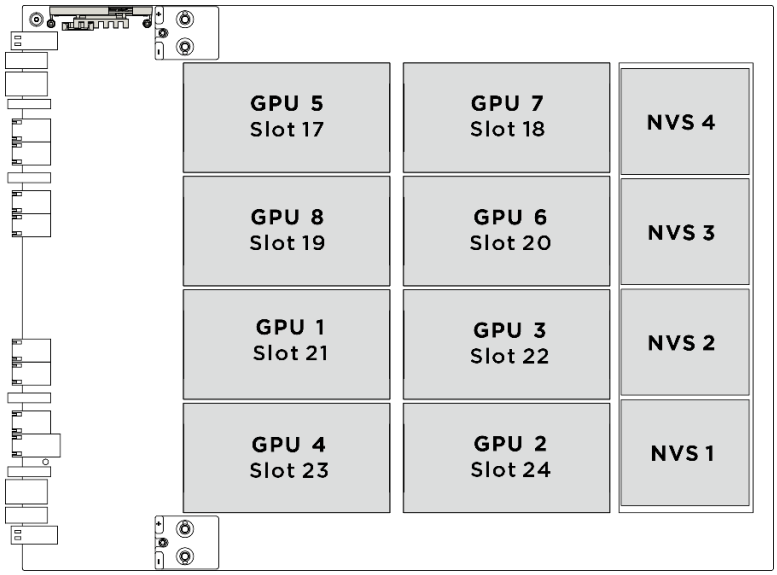


Figure 197. GPU numbering

The following illustration shows the components for rear H100/H200 GPU cold plate module.

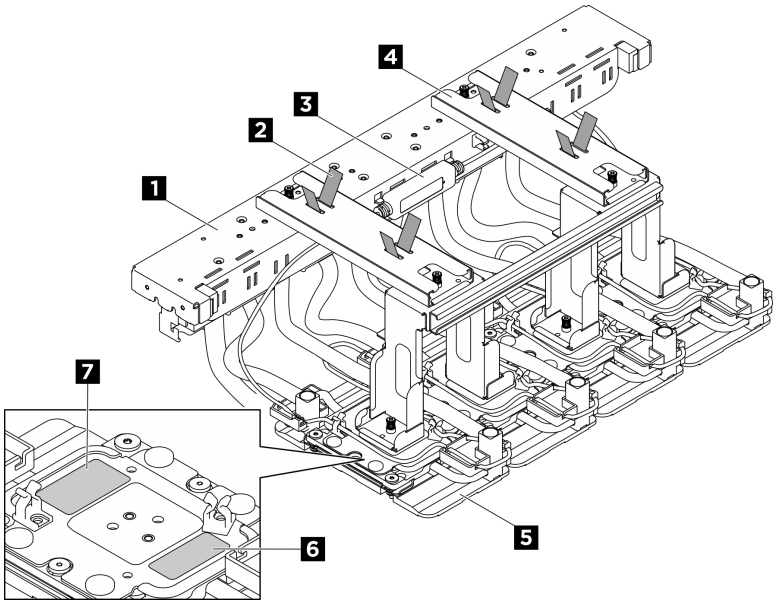


Figure 198. rear H100/H200 GPU cold plate module components identification

Table 31. rear H100/H200 GPU cold plate module components

1 Manifold	2 Hose tie
3 leakage sensor module	4 Shipping bracket
5 GPU cold plate	6 GPU slot number label
7 GPU cold plate screw torque label	

Procedure

Step 1. Make sure the GPU complex is installed in the chassis.

Step 2. Replace the Phase Change Material on the rear H100/H200 GPU cold plate module.

a. ❶ Remove the liner from one side of the pad.

b. ❷ Align the PCM with the marking on the bottom of the cold plate, and place it onto the cold plate; then, apply finger pressure across the entire surface area of the PCM to remove any trapped air and allow 1-2 minutes dwell time until it is firmly attached. Carefully remove the remaining top liner.

c. ❷ Repeat to replace the PCM on the four cold plates.

Attention:

- PCM cannot be reused. PCM must be replaced with new ones every time the water loop is removed.
- After PCM is replaced, there is an expected short duration of throttling before the GPU returns to normal operation. This is due to the PCM requiring a break-in period after being replaced.

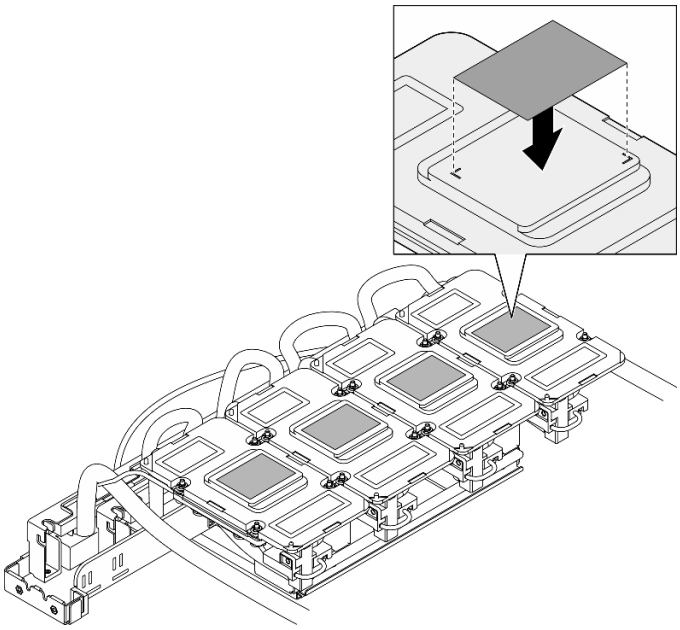


Figure 199. PCM application

Step 3. Replace the putty pads (x5) on the GPU.

a. ❶ Remove the liner from one side of the pad.

b. ❷ Make sure to align the putty pads to the GPU VR (1) and the markings on GPU; then, place the pads onto the GPU and apply light finger pressure across the entire surface area of the pads to ensure adhesion. Carefully remove the remaining top liner.

c. ❸ Repeat to replace all putty pads on the four GPUs.

Attention: Putty pad cannot be reused. Putty pad must be replaced with new ones every time the water loop is removed.

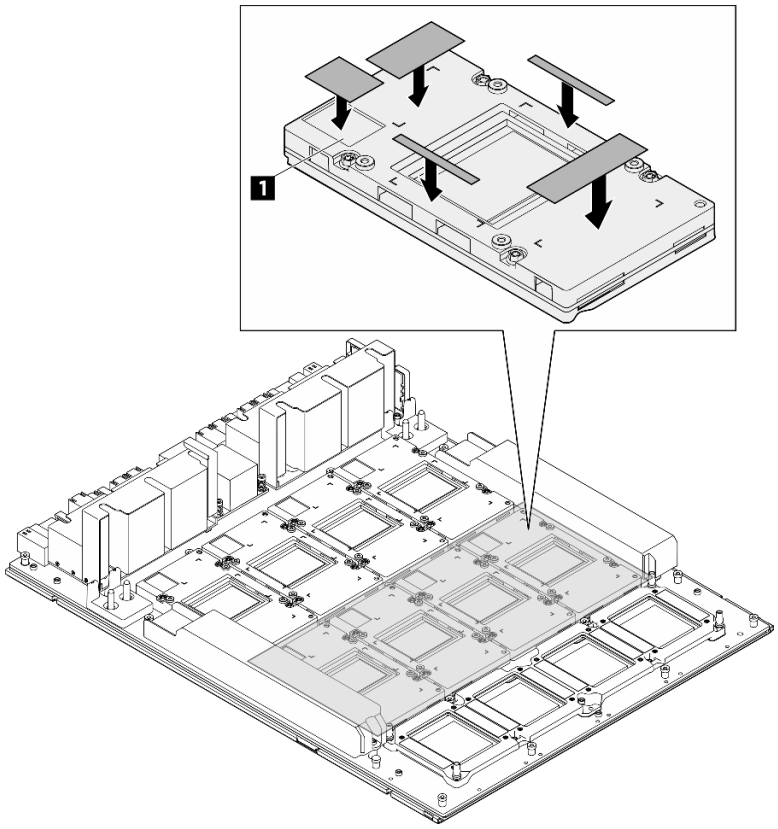


Figure 200. GPU putty pads replacement

1 GPU VR (Cover the GPU VR with putty pad)

Step 4. Install the rear H100/H200 GPU cold plate module.

a. ❶ Hold the rear H100/H200 GPU cold plate module by the shipping brackets; then, align the guide slots on the manifold with the guide pins marked with A and gently place the cold plate module onto the four rear GPUs.

b. ❷ Ensure the guide slots on the manifold are securely engaged with the guide pins marked with A on the chassis.

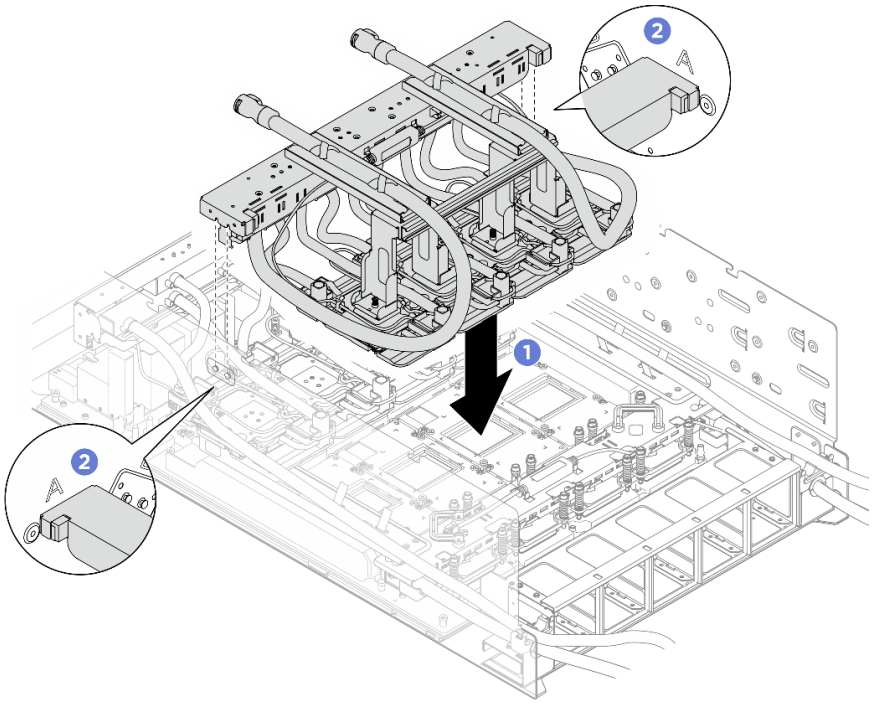


Figure 201. Installing the rear H100/H200 GPU cold plate module

Step 5. Loosen the six captive screws that secure the shipping brackets to the rear H100/H200 GPU cold plate module; then, remove the shipping brackets from the rear H100/H200 GPU cold plate module.

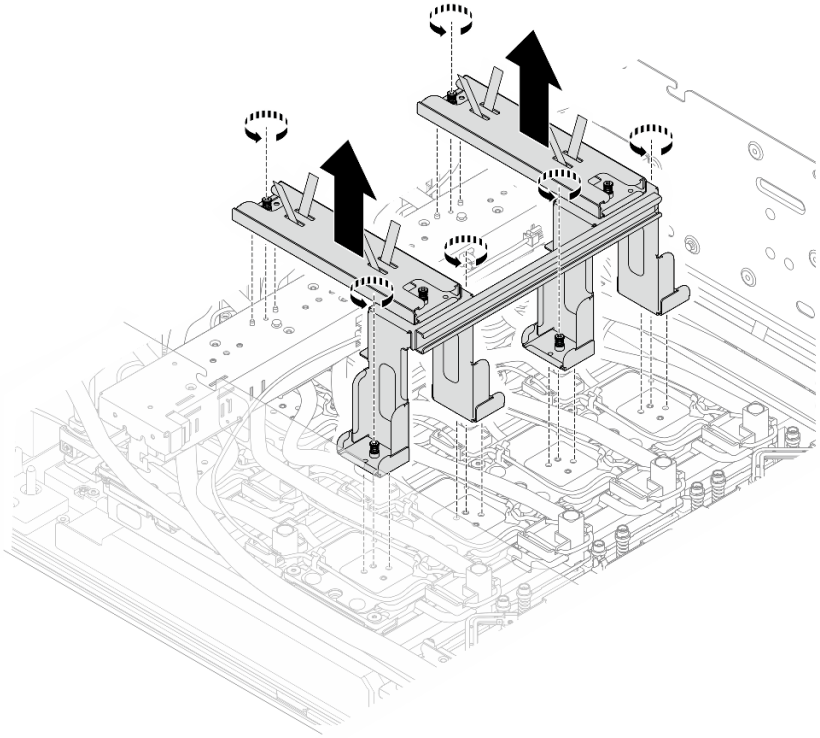


Figure 202. Removing the shipping brackets

Step 6. Adjust the cold plate until the two guide pins are seated in the guide holes on the GPU. Repeat to adjust the four cold plates.

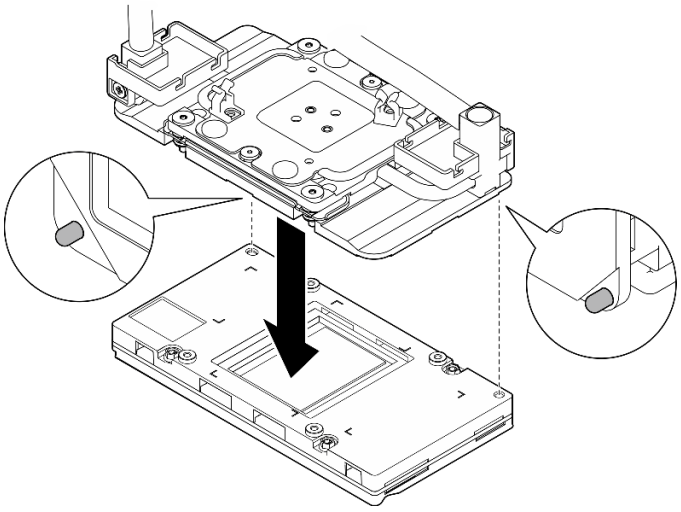


Figure 203. Adjusting the GPU cold plates

Step 7. Follow the screw sequence specified on the cold plate label, and repeat to fully tighten the sixteen Torx T10 screws with a torque screwdriver set to the proper torque.

a. Set the torque screwdriver to 0.4±0.05 newton-meter, 3.5±0.5 pound-inch.

b. Fasten the screws 720s degree following the screw installation sequence: ❶ → ❷ → ❸ → ❹

Note: Make sure to follow screw installation sequence to prevent GPU cold plate tilting.

c. Repeat until all screws on the four GPU cold plates are fully tightened.

Figure 204. Repeat to fully tighten all the screws

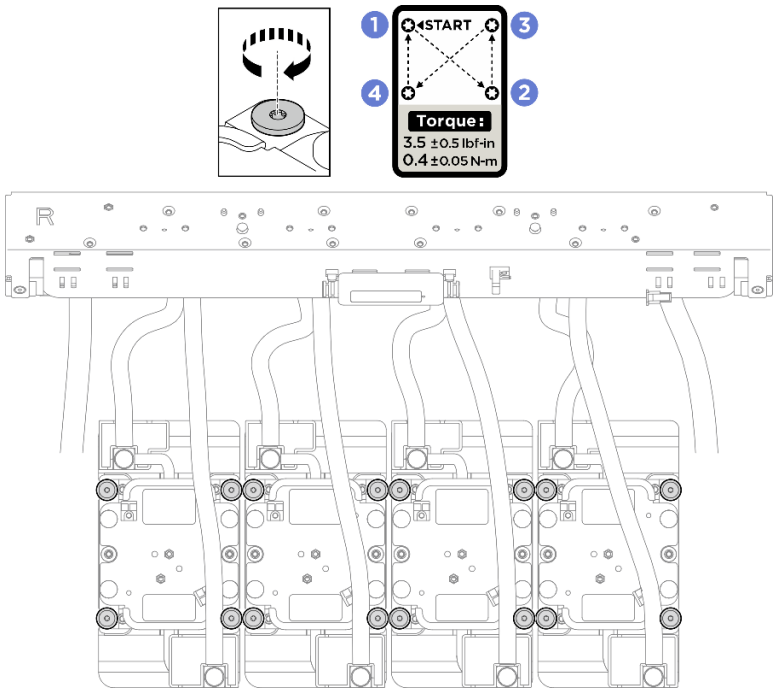


Figure 205. Installing the GPU cold plates

Step 8. The following illustration shows the hose holder location.

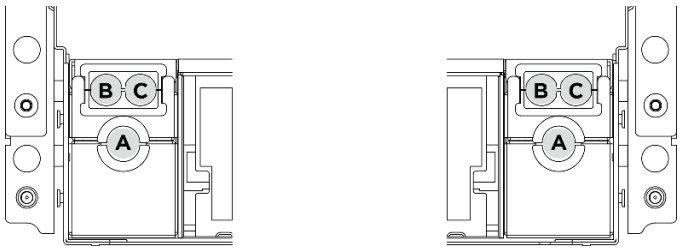


Figure 206. Hose holder location

Step 9. Place the hoses on the hose guides and the hose holders.

a. 1 Place the rear H100/H200 GPU cold plate module hoses and cables on the hose guides, and secure them with hose ties. See “Fan control board cable routing” on page 374 and “Leakage sensor module cable routing” on page 397.

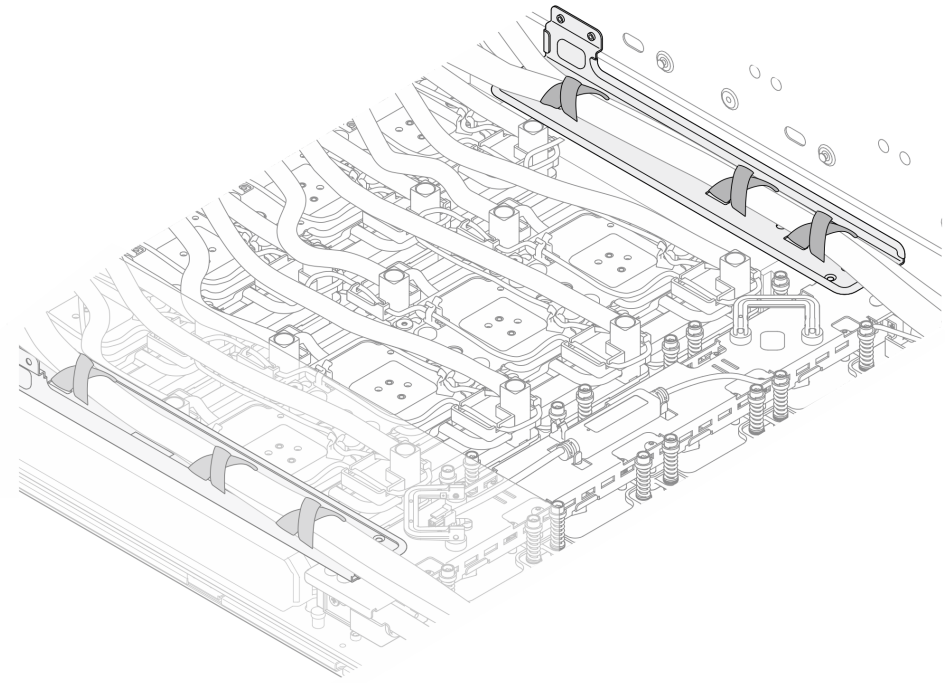


Figure 207. Securing the hoses and cables with hose ties

b. ❷ Place the left side rear H100/H200 GPU cold plate module hose on (1) hose holder C, and the right side rear H100/H200 GPU cold plate module hose on (2) hose holder B. Ensure the guiding labels on the hoses match with the markings on the hose holders.

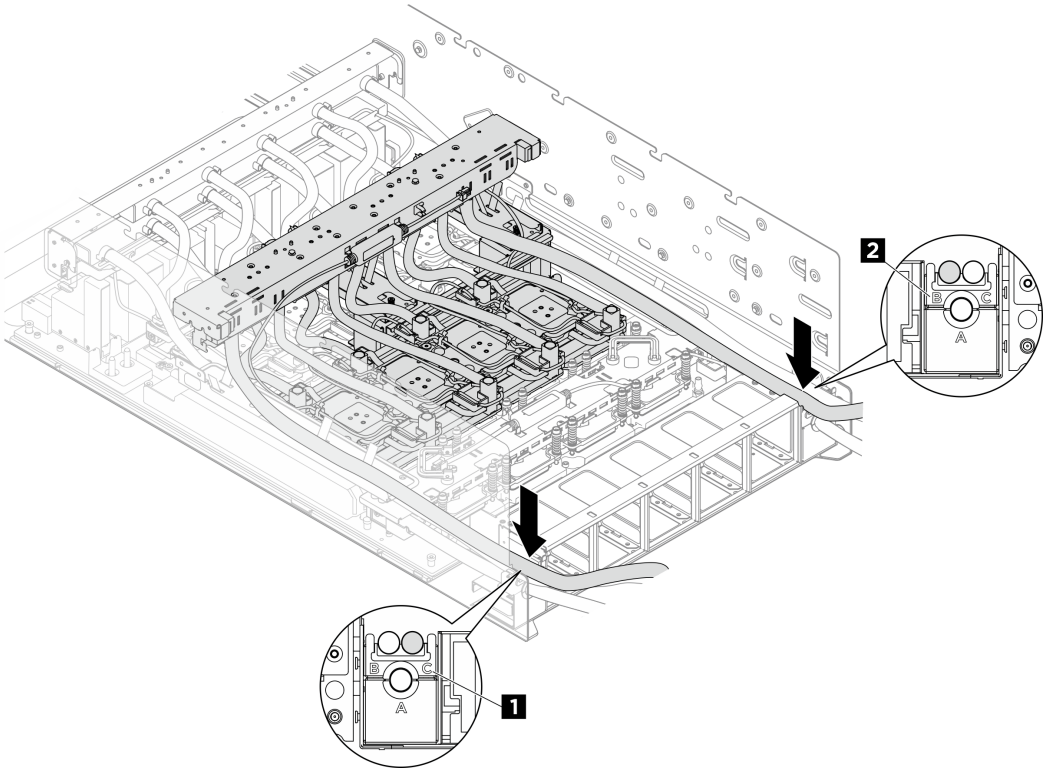


Figure 208. Placing the hoses on hose holders

1 Hose holder C (left side)	2 Hose holder B (right side)

Important:

- Check the guiding labels on the hoses and hose holders before installation.

Step 10. Reposition the rear H100/H200 GPU cold plate module manifold as illustrated.

a. 1 Disengage the manifold from the guide pins marked with A; then, move the manifold to the guide pins marked with B.

b. 2 Ensure the guide slots on the manifold bracket are securely engaged with the guide pins marked with B.

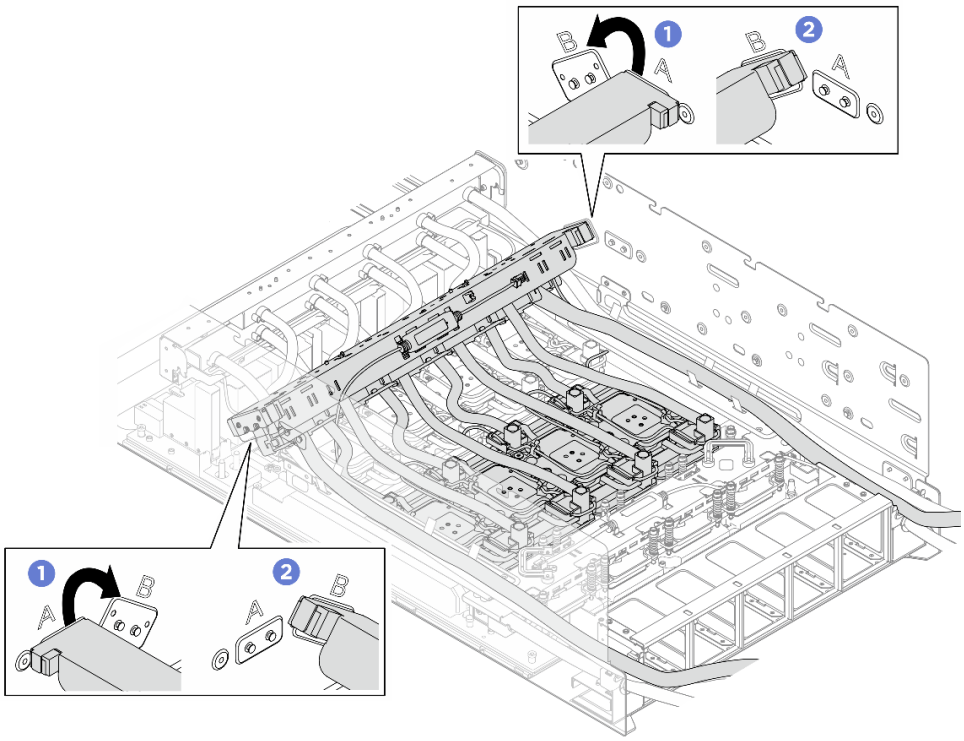


Figure 209. Repositioning the rear H100/H200 GPU cold plate module manifold

Step 11. Fasten the four M3 screws (W7-W8) (PH2, 4 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the rear H100/H200 GPU cold plate module manifold to the chassis.

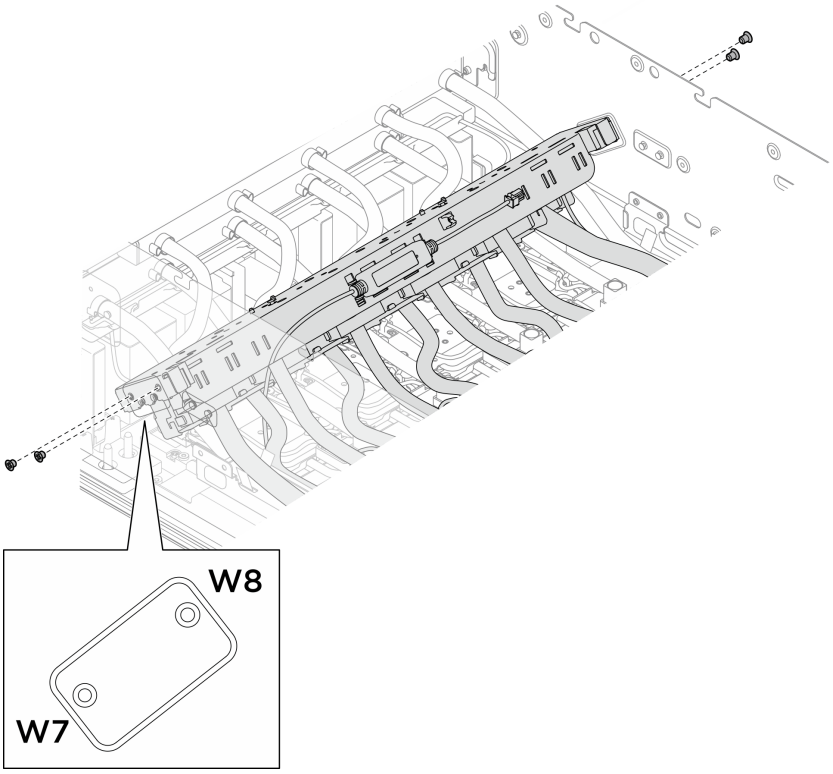


Figure 210. Installing the rear H100/H200 GPU cold plate module manifold

Step 12. If you are installing the rear H100/H200 GPU cold plate module after installing a new GPU complex, ensure that the NVSwitch cold plate module and the front H100/H200 GPU cold plate module are installed before installing the rear fan cage support bracket.

Step 13. Install the rear fan cage support bracket.

a. ❶ Align the rear fan cage support bracket with the corresponding screw holes; then, install the rear fan cage support bracket on top of hose holder B/C as illustrated.

b. ❷ Fasten the four M3 screws (PH2, 4 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the rear fan cage support bracket to the fan cage.

c. ❸ Fasten the eight M3 screws (PH2, 8 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the rear fan cage support bracket to the chassis.

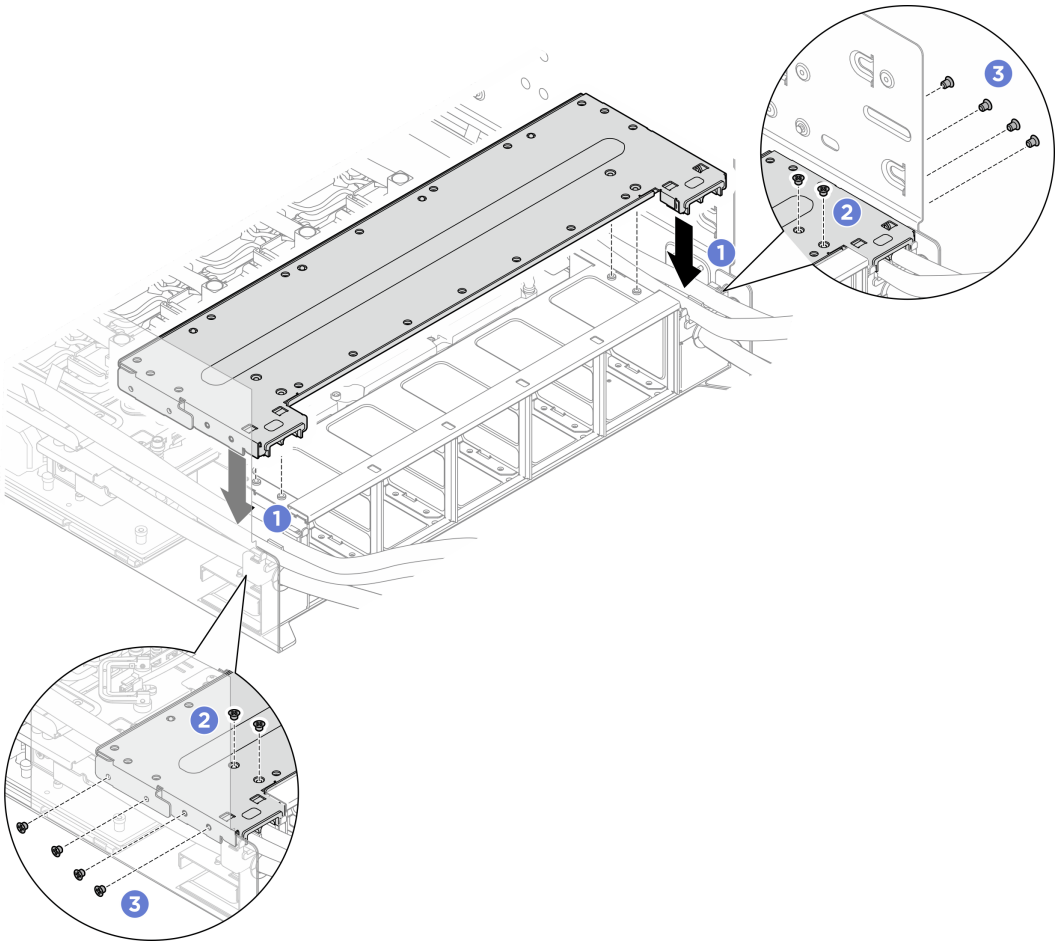


Figure 211. Installing the rear fan cage support bracket

After you finish

1. Reconnect all the cables that were disconnected. See Chapter 6 “Internal cable routing” on page 365.
2. Reinstall the power complex. See “Install the power complex” on page 313.
3. Reinstall the CPU complex. See “Install the CPU complex” on page 84.
4. Reinstall the fan cage. See “Install the fan cage (trained technician only)” on page 104.
5. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
6. Reinstall the front top cover. See “Install the front top cover” on page 69.
7. Complete the parts replacement. See “Complete the parts replacement” on page 363.

Front GPU replacement (trained technician only)

Follow instructions in this section to remove or install a front GPU.

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 a front H100/H200 GPU

Follow instructions in this section to remove a front H100/H200 GPU. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- A torque screwdriver is available for request if you do not have one at hand.

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torx T10 head screwdriver
- Torx T15 head screwdriver
- Phillips #1 head screwdriver
- Phillips #2 head screwdriver
- Flat head screwdriver
- Alcohol cleaning pad
- H100/H200 PCM Kit
- SR780a V3 water loop putty pad kit
- SR780a V3 water loop service kit

Important: Putty pad/phase change material (PCM) replacement guidelines

- Before replacing the putty pad/PCM, gently clean the hardware surface with an alcohol cleaning pad.
- Hold the putty pad/PCM carefully to avoid deformation. Make sure no screw hole or opening is blocked by the putty pad/PCM.
- Do not use expired putty pad/PCM. Check the expiry date on putty pad/PCM package. If the putty pads/PCM are expired, acquire new ones to properly replace them.

The following illustration shows the GPU numbering and corresponding slot numbering in XCC.

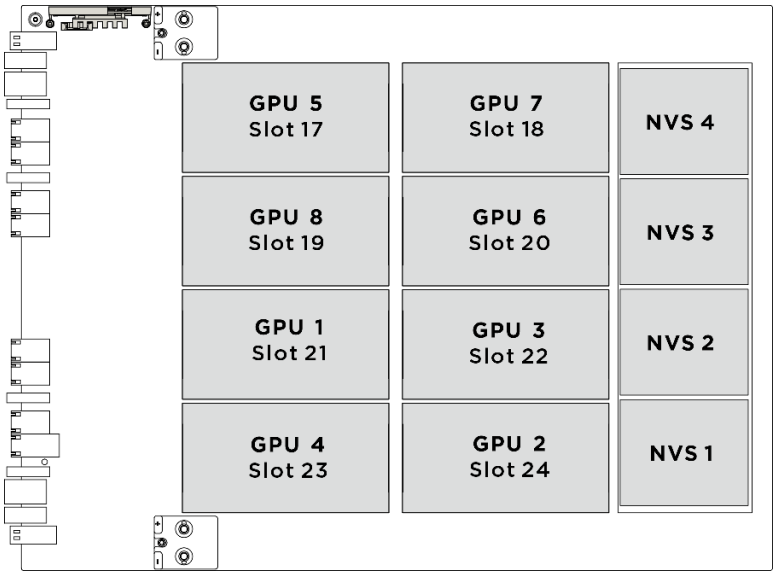


Figure 212. GPU numbering

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the rear top cover. See “Remove the rear top cover” on page 70.

c. Remove the fan cage. See “Remove the fan cage (trained technician only)” on page 103.

d. Remove the CPU complex. See “Remove the CPU complex” on page 83.

e. Remove the power complex. See “Remove the power complex” on page 312.

f. Disconnect the cables and remove them from the GPU complex if necessary. Before disconnecting the cables, make a list of each cable and record the connectors the cable is connected to. Refer to Chapter 6 “Internal cable routing” on page 365.

Step 2. Reposition the rear H100/H200 GPU cold plate module to create space for front H100/H200 GPU cold plate module.

Step 3. Install the shipping brackets onto the rear GPU cold plates.

a. (1) Align the guide pins on the shipping brackets with the guide holes on the GPU cold plates and lower it onto the cold plates; then, tighten the four captive screws (PH1, 4 x M3, 0.5 newton-meters, 4.3 inch-pound) to install the shipping brackets onto the rear GPU cold plates.

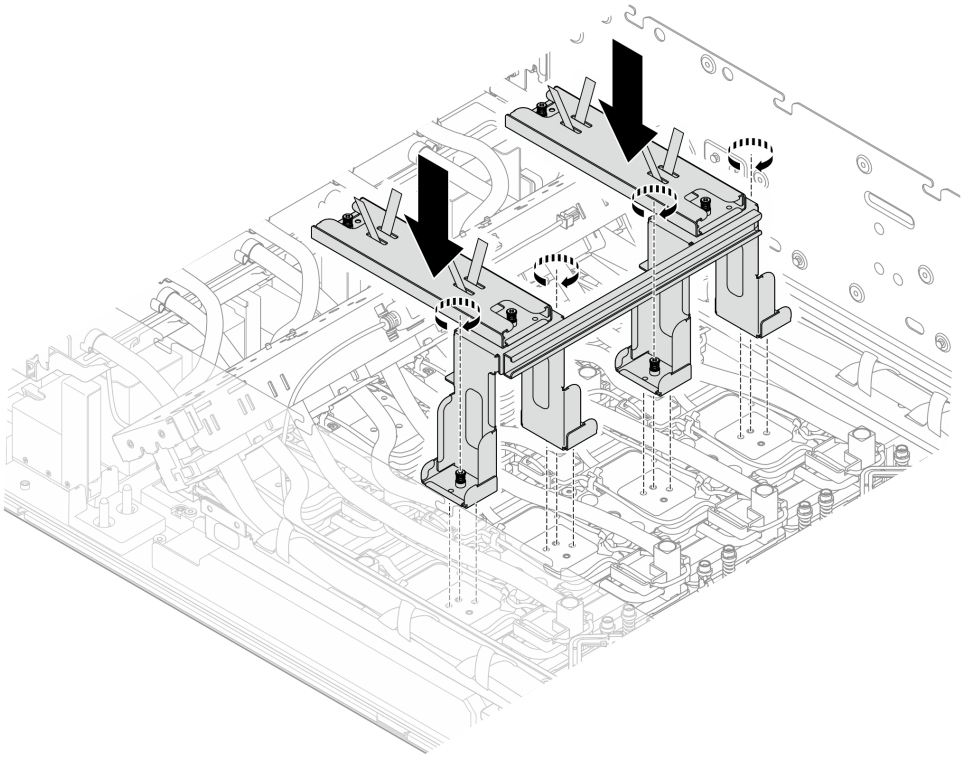


Figure 213. Installing the shipping brackets to the rear GPU cold plates

b. 2 Loosen the two captive screws; then, remove the handles from the shipping brackets.

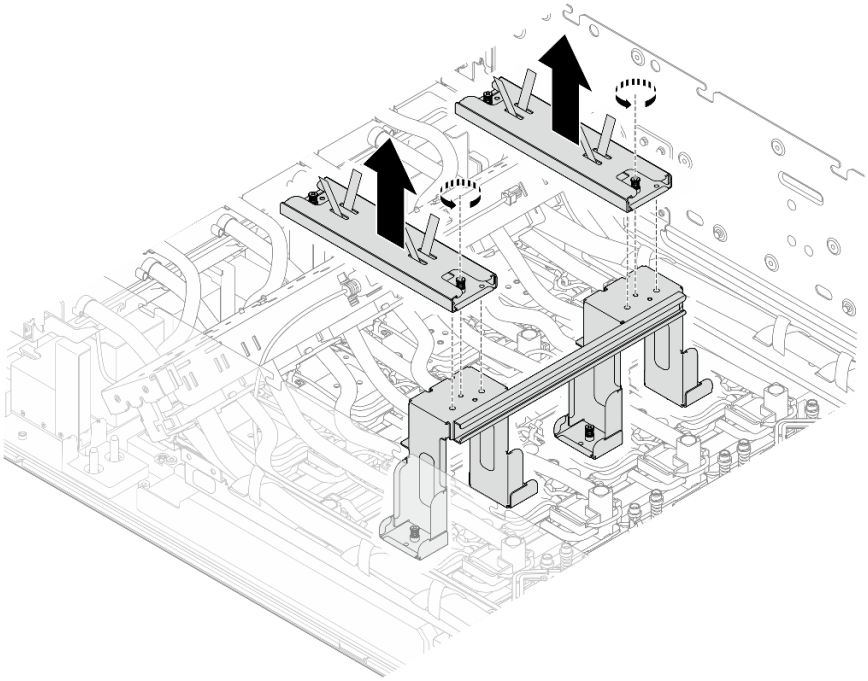


Figure 214. Removing the handles from shipping brackets

Step 4. Unfasten the four M3 screws (W7-W8) that secure the rear H100/H200 GPU cold plate module manifold to the chassis.

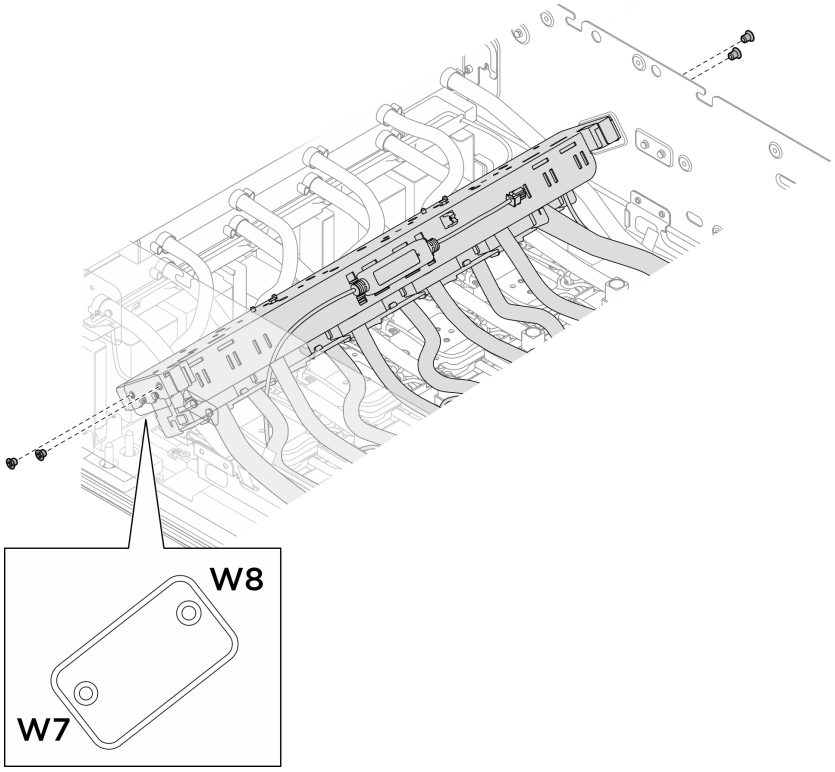


Figure 215. Removing the rear H100/H200 GPU cold plate module manifold

Step 5. Reposition the rear H100/H200 GPU cold plate module manifold.

a. ❶ Flip over the rear H100/H200 GPU cold plate module manifold as illustrated. Align the guide pins on the manifold with the guide slots on the shipping brackets; then, install the manifold onto the shipping brackets as illustrated.

b. ❷ Ensure the guide pins on the manifold are securely engaged with the guide slots on the shipping brackets.

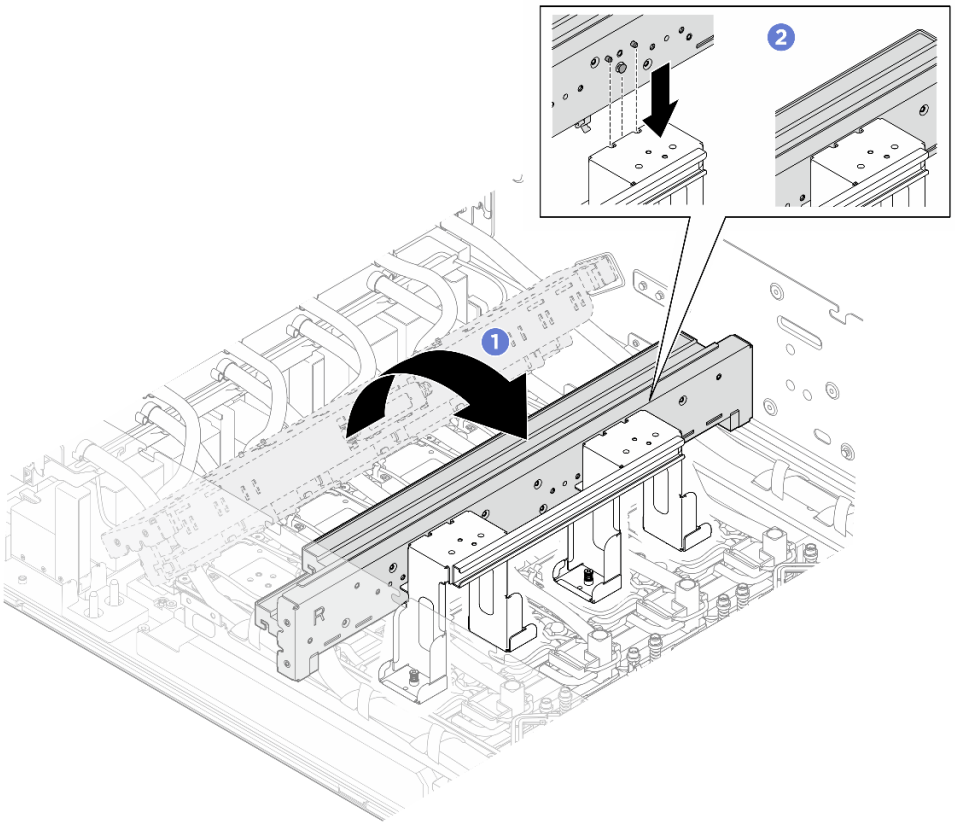


Figure 216. Repositioning the rear GPU cold plate module manifold

Step 6. Locate the front GPU.

Step 7. Remove the leakage sensor module cable from the cable clips, route it away from the cold plate, and reinstall it in the cable clips adjacent to the cold plate.

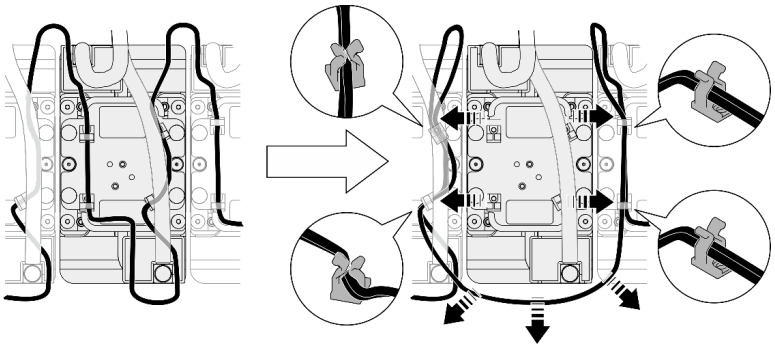


Figure 217. Removing the leakage sensor module cables

Step 8. Follow the screw sequence 1234 specified on the cold plate label, and fully loosen the four Torx T10 screws with a torque screwdriver set to the proper torque.

Notes:

- Loosen or tighten the screws with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to be fully loosen or tighten is 0.4±0.05 newton-meter, 3.5 ±0.5 pound-inch.

- Ensure the captive screws are completely loosen before removing the cold plate module.

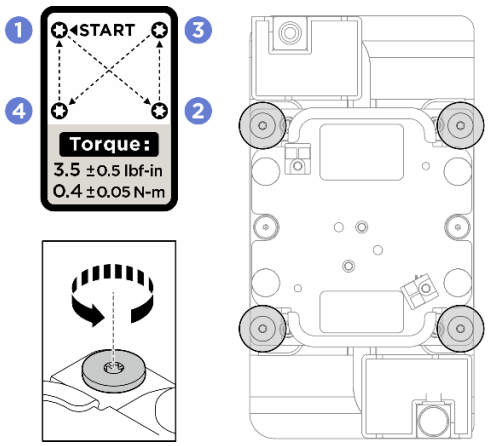


Figure 218. Removing the GPU cold plate

Note: If necessary, use a flat screwdriver to gently separate the cold plate and the GPU from the corner of the cold plate. Ensure not the damage the GPU or the cold plate.

Step 9. Install the service bracket onto the GPU cold plate.

a. 1 Align the two captive screws and guide pins at the bottom of the service bracket with the screw holes and guide holes on the GPU cold plate; then, lower it onto the cold plate.

b. 2 Fasten the two captive screws (PH1, 2 x M3, 0.5 newton-meters, 4.3 inch-pound) to secure the service bracket to the GPU cold plate.

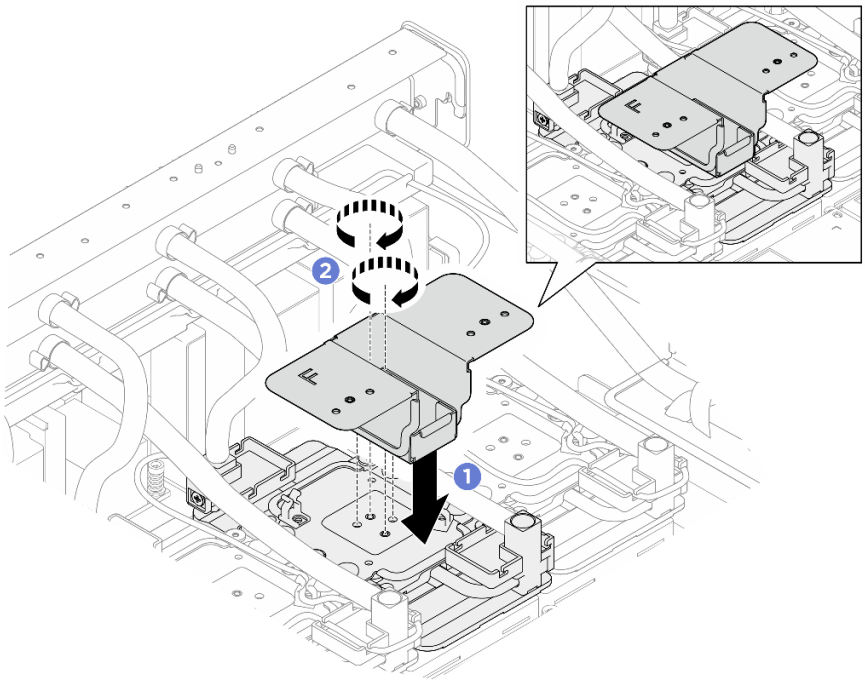


Figure 219. Installing the service bracket onto the GPU cold plate

Step 10. Install the service bracket and the GPU cold plate assembly onto the front H100/H200 GPU cold plate module manifold.

a. 1 Flip over the service bracket and the GPU cold plate assembly; then, align the two captive screws and two guide pins with the screw holes and guide holes on the manifold.

b. 2 Fasten the two captive screws (PH1, 2 x M3, 0.5 newton-meters, 4.3 inch-pound) to secure the service bracket and the GPU cold plate assembly to the manifold.

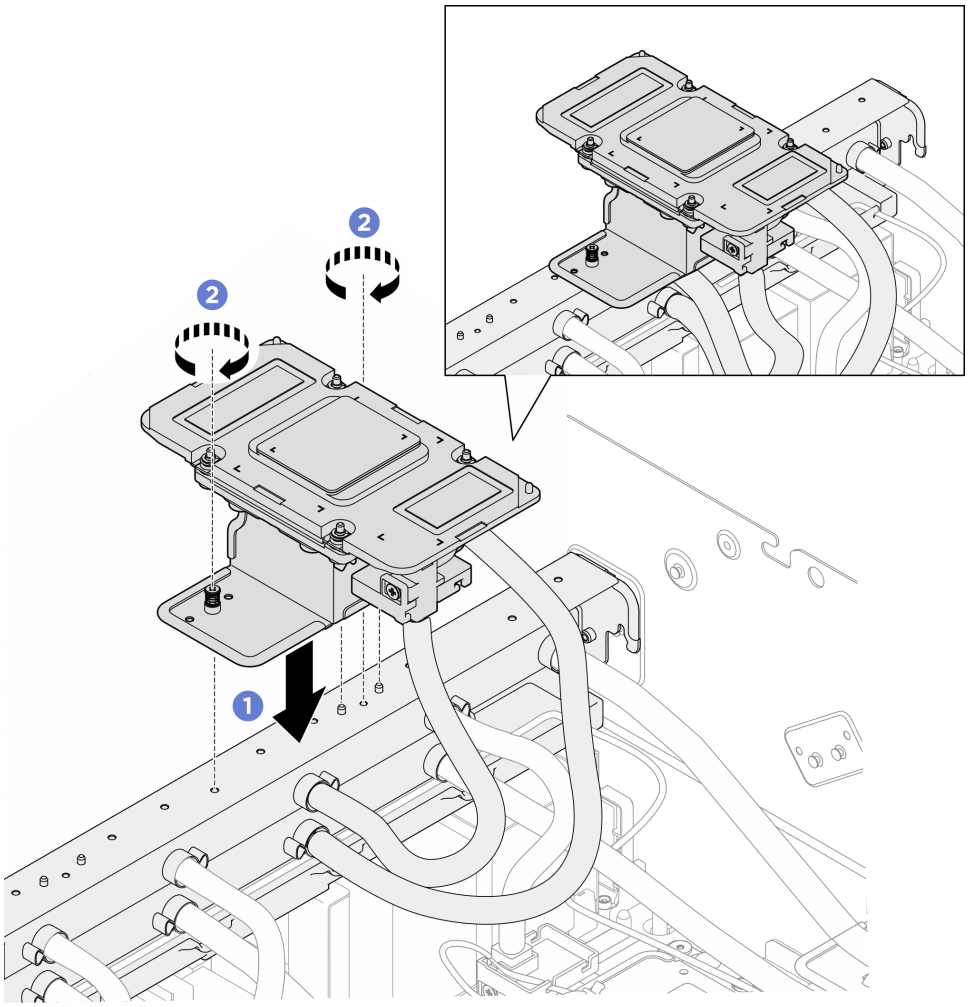


Figure 220. Installing the service bracket and the GPU cold plate assembly

Note: Ensure to install the service bracket and GPU cold plate assembly in the screw holes and guide holes corresponding to the specific GPU slot number.

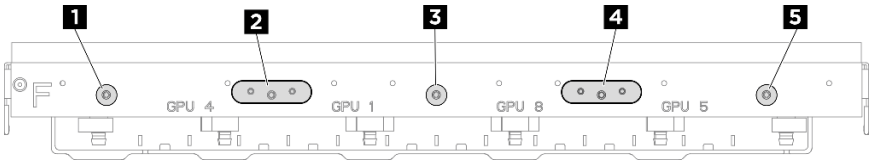


Figure 221. Service bracket and GPU cold plate assembly installation location

Table 32. GPU cold plate and service bracket assembly installation location

Installation location	GPU slot number
1 and 2	GPU 4
2 and 3	GPU 1
3 and 4	GPU 8
4 and 5	GPU 5

Step 11. **Immediately** clean the PCM and putty pads off from the GPU with alcohol cleaning pads. **Gently** clean the PCM and putty pads to avoid GPU damages.

Attention:

- It is recommended to clean the PCM while it is in liquid state.
- The electrical components around the die on the GPUs are extremely delicate. When removing the PCM and cleaning the GPU die, avoid touching the electrical components to prevent damage.

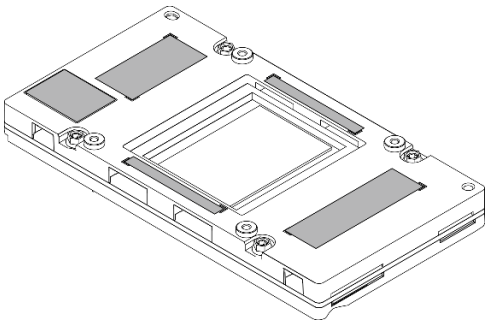


Figure 222. Cleaning PCM and putty pads off from the GPU

Step 12. With alcohol cleaning pads, wipe off any remaining putty pad and PCMs from the GPU cold plate.

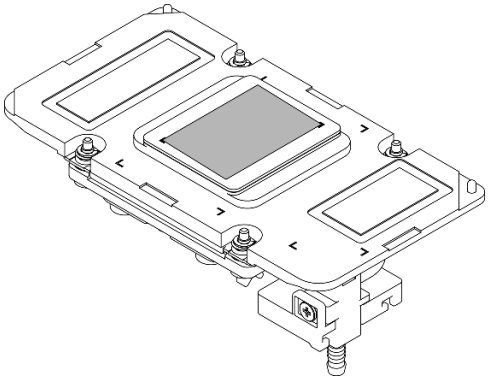


Figure 223. Wiping PCM and putty pads off from the cold plate

Step 13. Remove the GPU.

a. 1234 Unfasten the four Torx T15 screws in the sequence shown in the illustration below.

Note: Loosen the screws with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to be fully loosen is 0.6 newton-meters, 5.3 inch-pounds.

b. 5 Remove the GPU from the GPU baseboard.

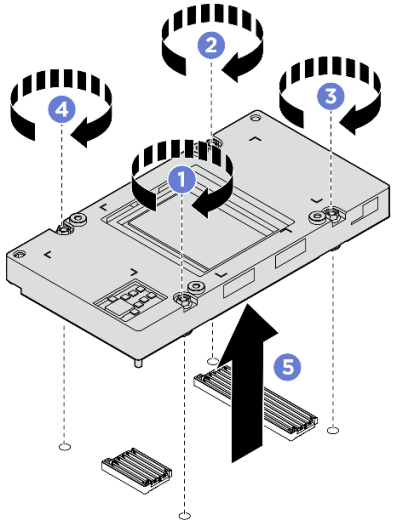


Figure 224. Removing the GPU

After you finish

1. Install a replacement unit. See "Install a front H100/H200 GPU" on page 224.
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 a front H100/H200 GPU

Follow instructions in this section to install a front H100/H200 GPU. The procedure must be executed by a trained technician.

About this task

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- A torque screwdriver is available for request if you do not have one at hand.

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torx T10 head screwdriver
- Torx T15 head screwdriver
- Phillips #1 head screwdriver
- Phillips #2 head screwdriver
- Flat head screwdriver
- Alcohol cleaning pad
- H100/H200 PCM Kit
- SR780a V3 water loop putty pad kit
- SR780a V3 water loop service kit

Important: Putty pad/phase change material (PCM) replacement guidelines

- Before replacing the putty pad/PCM, gently clean the hardware surface with an alcohol cleaning pad.
- Hold the putty pad/PCM carefully to avoid deformation. Make sure no screw hole or opening is blocked by the putty pad/PCM.
- Do not use expired putty pad/PCM. Check the expiry date on putty pad/PCM package. If the putty pads/PCM are expired, acquire new ones to properly replace them.

The following illustration shows the GPU numbering and corresponding slot numbering in XCC.

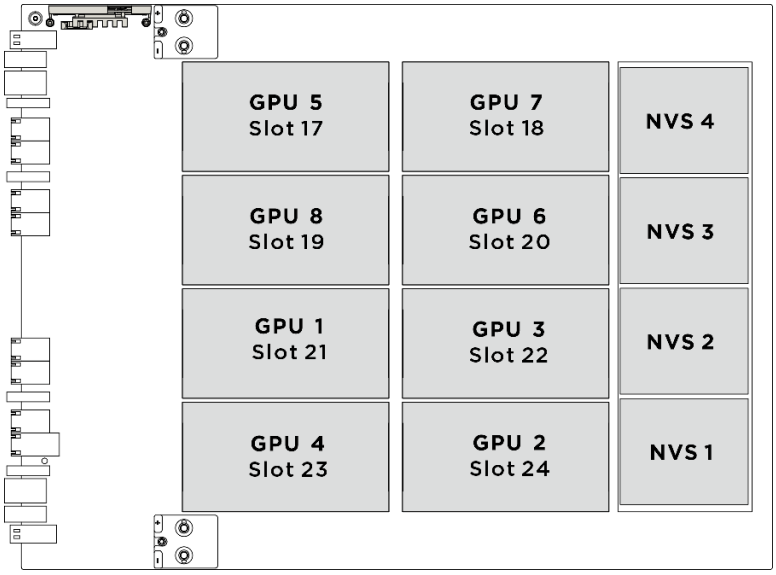


Figure 225. GPU numbering

Procedure

Step 1. (Optional) For new GPU, remove the connector covers at the bottom.

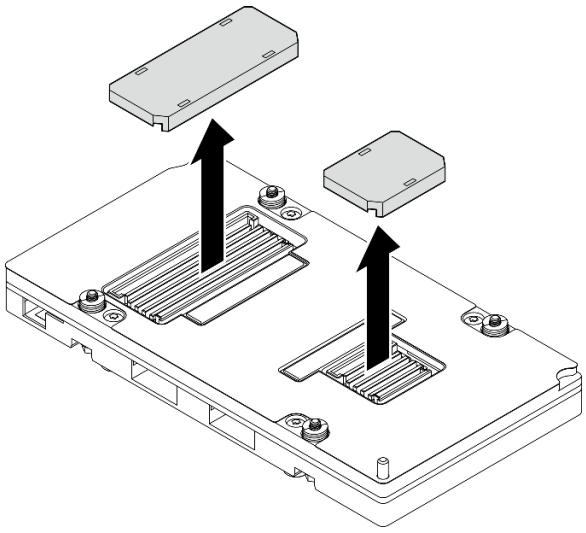


Figure 226. Removing connector covers

Step 2. ❶ Gently place the GPU down on the GPU baseboard.

Step 3. ❷❸❹❺ Follow the sequence shown in the illustration below to fasten the four Torx T15 screws to secure the GPU to the GPU baseboard.

Note: First set the torque screwdriver to 0.1-0.12 newton-meters, 0.9-1.1 inch-pounds to fasten the screws for a few rounds. Then set the torque screwdriver to 0.58-0.62 newton-meters, 5-5.5 inch-pounds to fully fasten the screws.

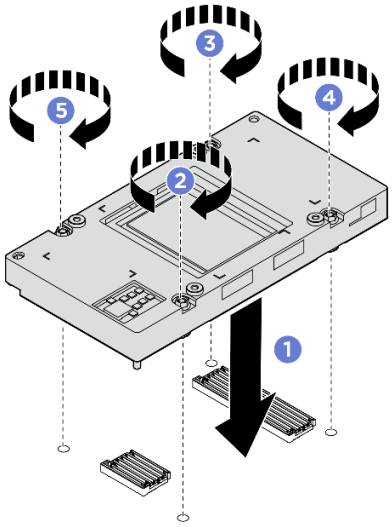


Figure 227. Installing the GPU

Step 4. Replace the Phase Change Material (PCM) on the front GPU cold plate.

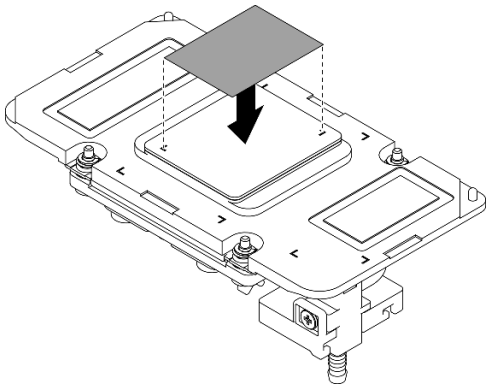
a. ❶ Remove the liner from one side of the pad.

b. ❷ Align the PCM with the marking on the bottom of the cold plate, and place it onto the cold plate; then, apply finger pressure across the entire surface area of the PCM to remove any trapped air and allow 1-2 minutes dwell time until it is firmly attached. Carefully remove the remaining top liner.

Attention:

- PCM cannot be reused. PCM must be replaced with new ones every time the water loop is removed.
- After PCM is replaced, there is an expected short duration of throttling before the GPU returns to normal operation. This is due to the PCM requiring a break-in period after being replaced.

Figure 228. PCM application



Step 5. Replace the putty pads (x5) on the GPU.

a. ❶ Remove the liner from one side of the pad.

b. ❷ Make sure to align the putty pads to the GPU VR (1) and the markings on GPU; then, place the pads onto the GPU and apply light finger pressure across the entire surface area of the pads to ensure adhesion. Carefully remove the remaining top liner.

Attention: Putty pad cannot be reused. Putty pad must be replaced with new ones every time the water loop is removed.

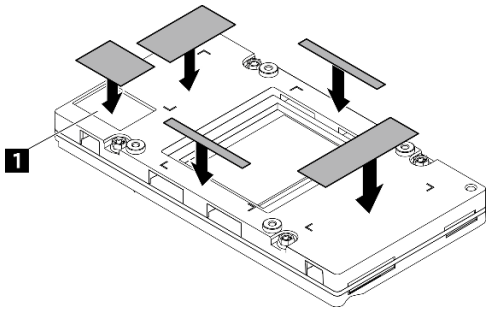


Figure 229. GPU putty pads replacement

1 GPU VR (Cover the GPU VR with putty pad)

Step 6. Remove the service bracket and GPU cold plate assembly.

a. ❶ Loosen the two captive screws that secure the service bracket to the manifold.

b. ❷ Lift the service bracket and GPU cold plate assembly away from the manifold to remove it.

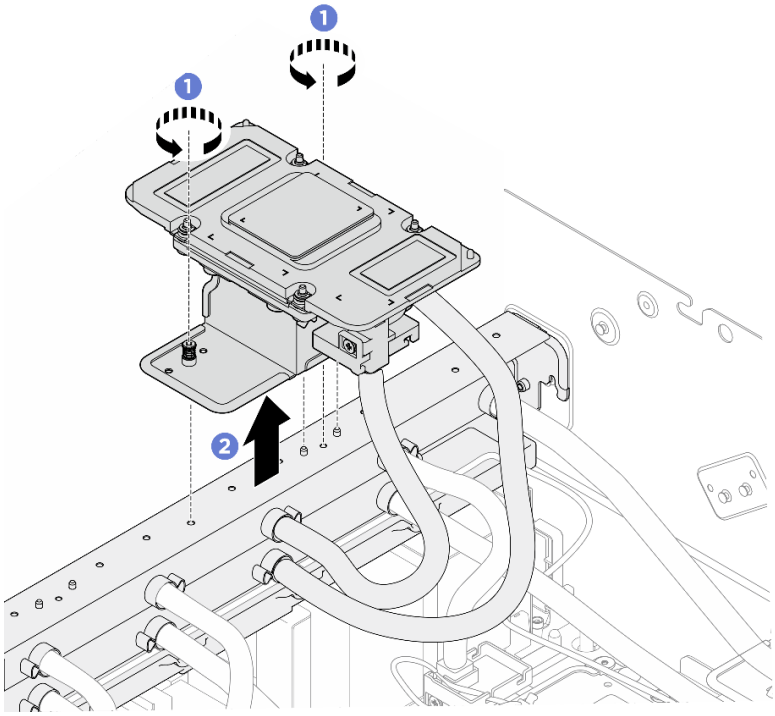


Figure 230. Removing the service bracket and GPU cold plate assembly

Step 7. Place the GPU cold plate onto the GPU.

a. 1 Flip over the service bracket and GPU cold plate assembly, slightly tilt the cold plate as illustrated to avoid interfering with the rear H100/H200 GPU cold plate module hoses; then, gently place the cold plate onto the H100/H200 GPU.

Note: Gently tilt the cold plate to prevent damage to the junction of the hose and the cold plate.

b. 2 Adjust the GPU cold plate until the two guide pins are seated in the guide holes on the GPU.

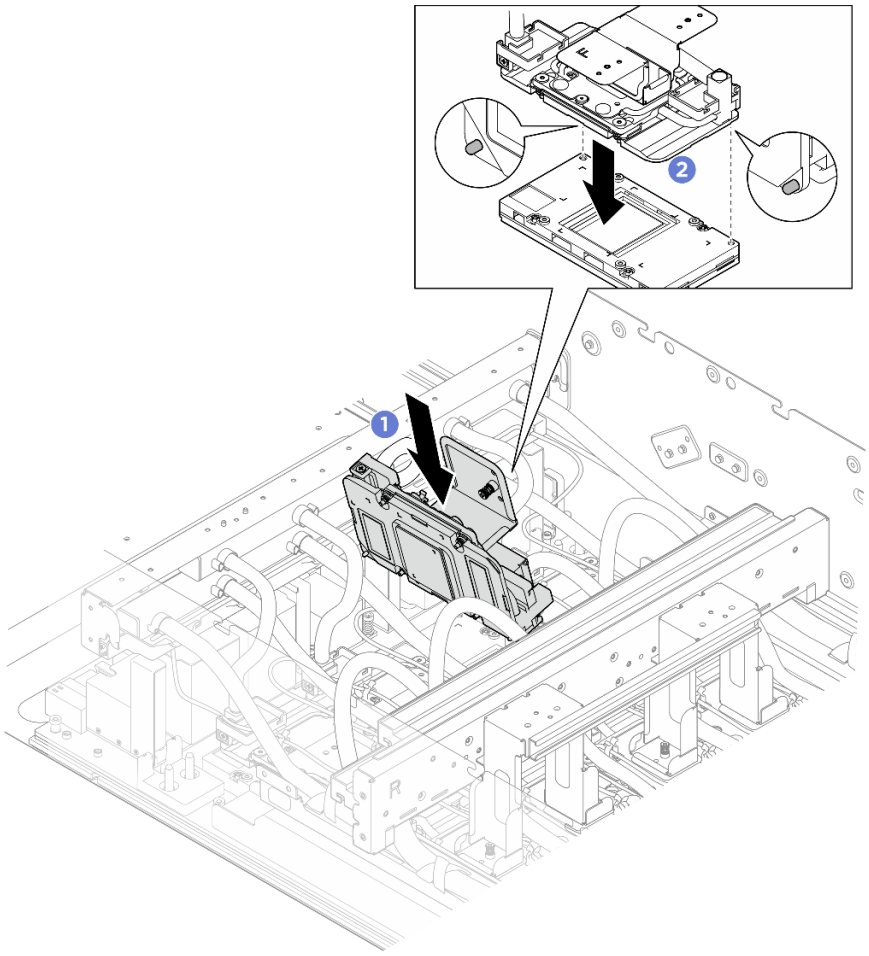


Figure 231. Placing the GPU cold plate

Step 8. Remove the service bracket from the GPU cold plate.

a. 1 Loosen the two captive screws that secure the service bracket to the GPU cold plate.

b. 2 Lift the service bracket away from the GPU cold plate to remove it.

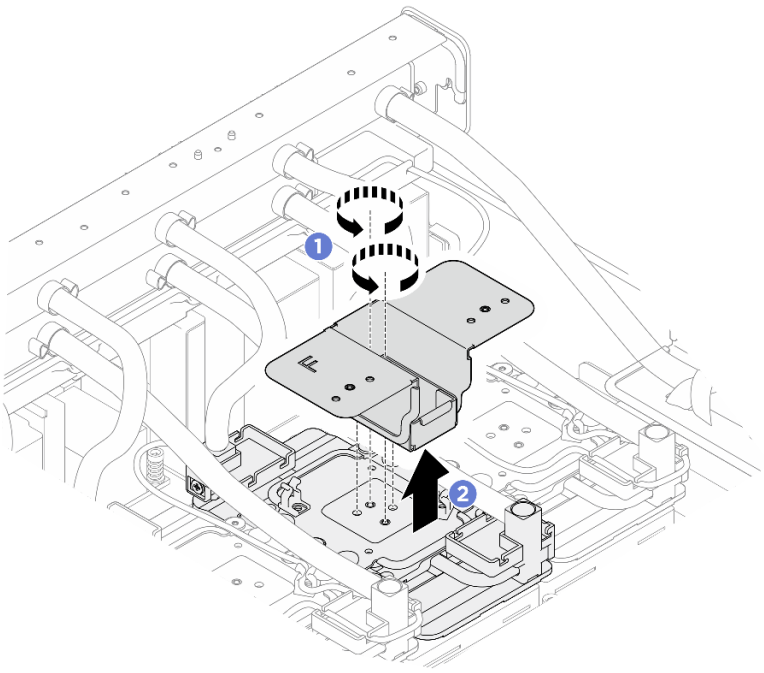


Figure 232. Removing the service bracket

Step 9. Follow the screw sequence specified on the cold plate label, and fully tighten the four Torx T10 screws with a torque screwdriver set to the proper torque.

a. Set the torque screwdriver to 0.4±0.05 newton-meter, 3.5±0.5 pound-inch.

b. Fasten the screws 720 degrees following the screw installation sequence:❶ → ❷ → ❸ → ❹

Note: Make sure to follow screw installation sequence to prevent GPU cold plate tilting.

c. Repeat until all screws on the four GPU cold plates are fully tightened.

Figure 233. Repeat to fully tighten all the screws

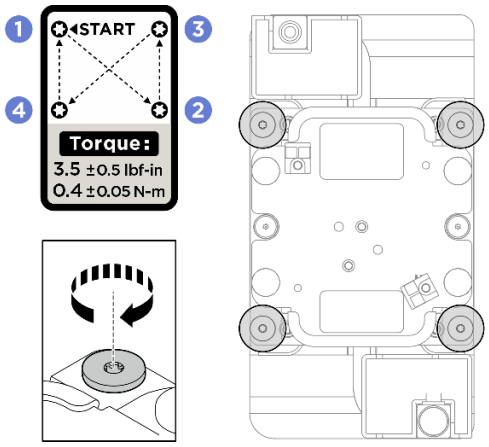


Figure 234. Installing the GPU cold plate

Step 10. Reinstall the leakage sensor module cable to the GPU cold plate.

a. ❶ Remove the leakage sensor module cable from the adjacent cable clips.

b. ❷ Route the leakage sensor module cable back onto the GPU cold plate, and install it in the cable clips on the cold plate.

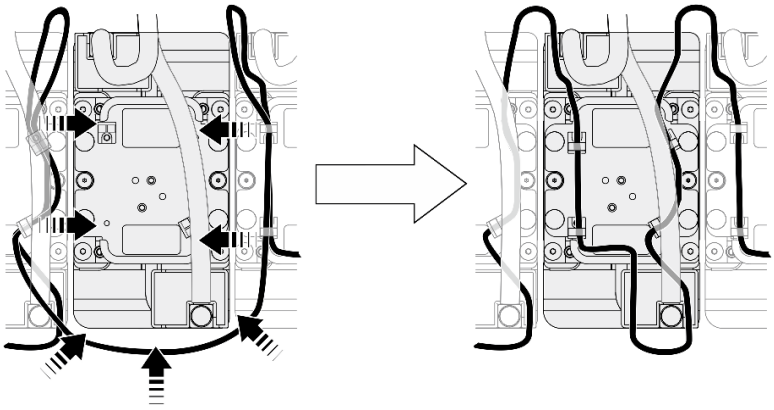


Figure 235. Installing the leakage sensor module cable

Step 11. Reposition the rear H100/H200 GPU cold plate module manifold.

a. ❶ Disengage the rear H100/H200 GPU cold plate module manifold from the shipping brackets. Move the manifold back to the guide pins marked with B as illustrated.

b. ❷ Ensure the guide slots on the manifold are securely engaged with the guide pins marked with B.

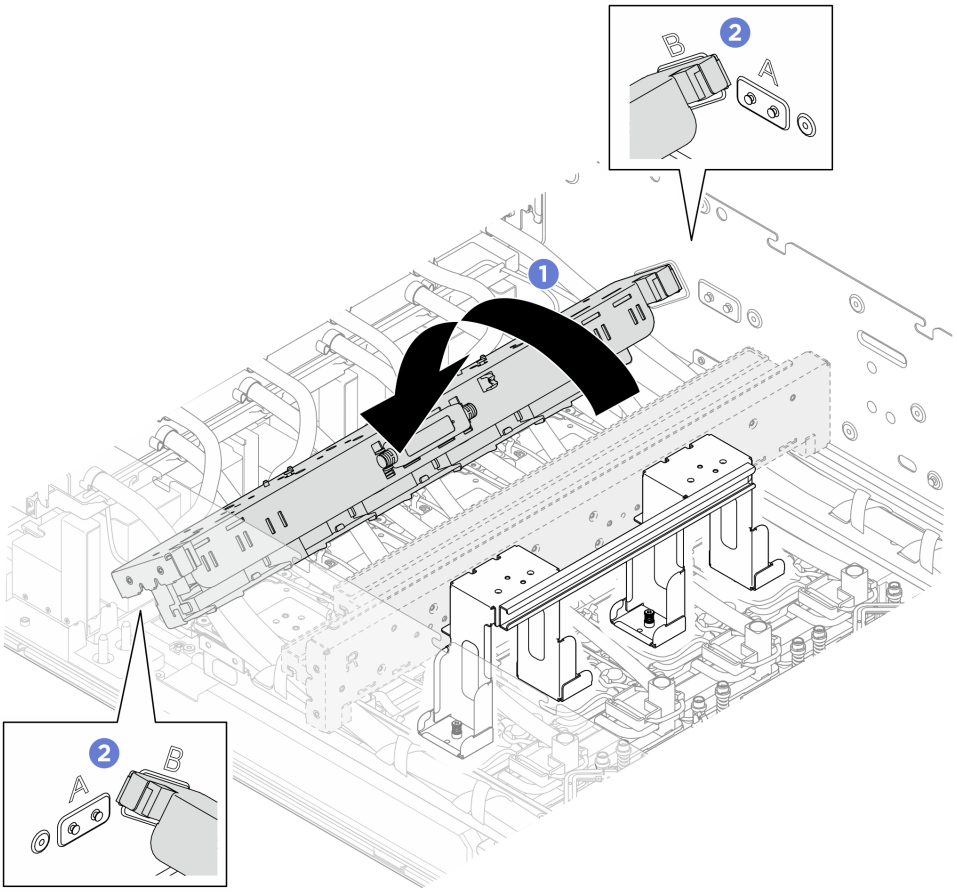


Figure 236. Repositioning the rear H100/H200 GPU cold plate module manifold

Step 12. Fasten the four M3 screws (W7-W8) (PH2, 2 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the rear H100/H200 GPU cold plate module manifold to the chassis.

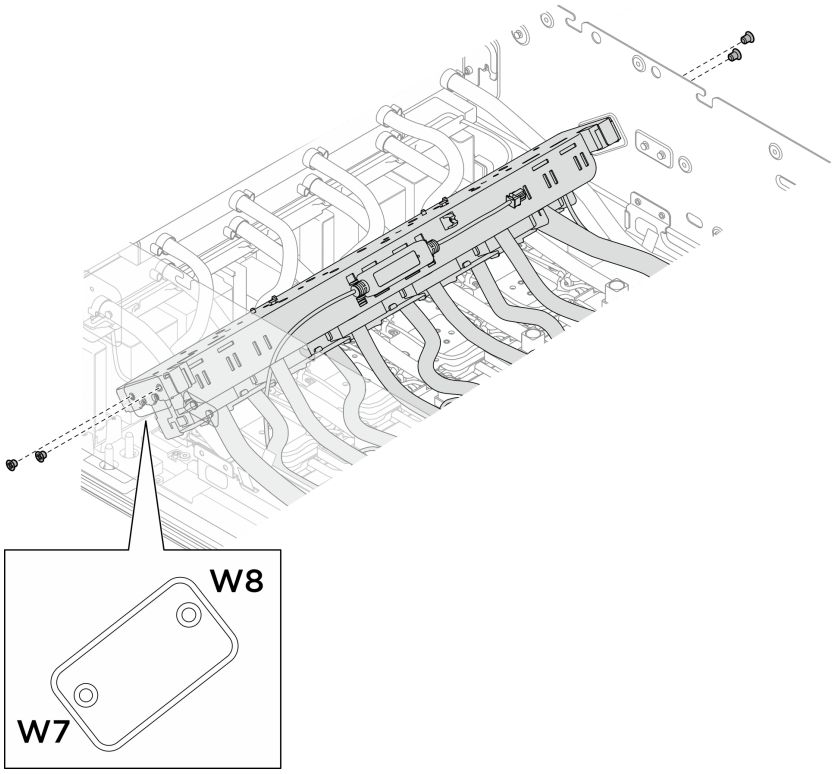


Figure 237. Installing the rear H100/H200 GPU cold plate module manifold

Step 13. Remove the shipping brackets from the rear H100/H200 GPU cold plate module.

a. ❶ Reinstall the handles to the shipping brackets. Align the guide pins on the handles with the guide holes on the shipping brackets; then, fasten the two captive screws to install the two handles to the shipping brackets.

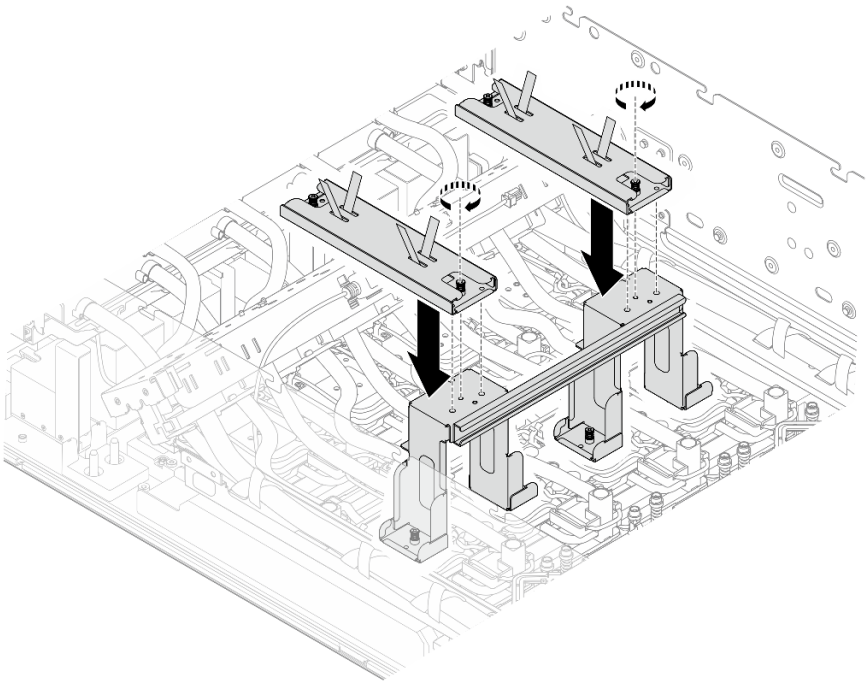


Figure 238. Installing the handles

b. ❷ Fully loosen the four captive screws that secure the shipping bracket to the GPU cold plates; then, lift the shipping brackets away from the GPU cold plates to remove it.

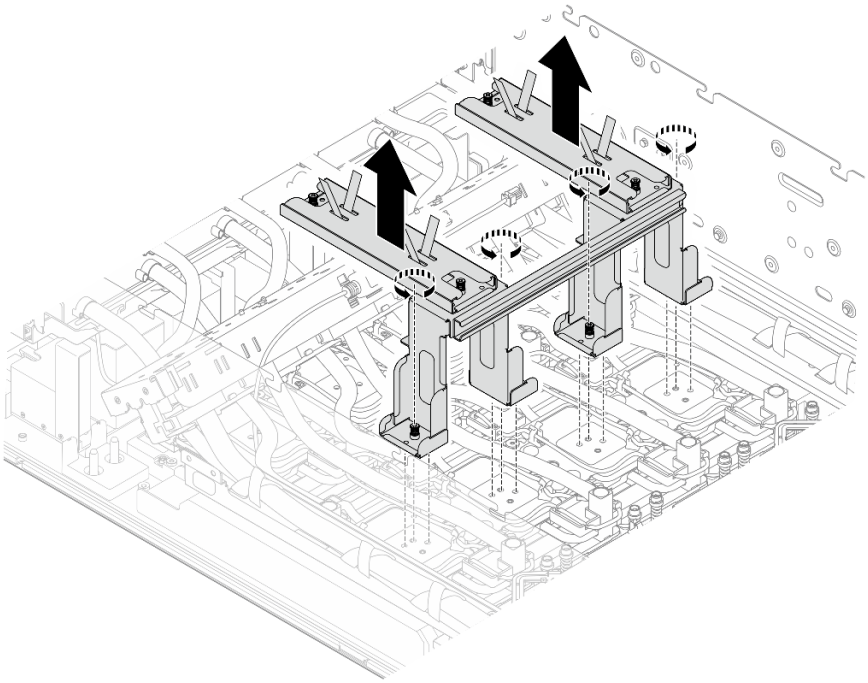


Figure 239. Removing the shipping brackets

After you finish

1. Reconnect all the cables that were disconnected. See Chapter 6 “Internal cable routing” on page 365.
2. Reinstall the power complex. See “Install the power complex” on page 313.
3. Reinstall the CPU complex. See “Install the CPU complex” on page 84.
4. Reinstall the fan cage. See “Install the fan cage (trained technician only)” on page 104.
5. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
6. Reinstall the front top cover. See “Install the front top cover” on page 69.
7. Complete the parts replacement. See “Complete the parts replacement” on page 363.

Rear GPU replacement (trained technician only)

Follow instructions in this section to remove or install a rear GPU.

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 a rear H100/H200 GPU

Follow instructions in this section to remove a rear H100/H200 GPU. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- A torque screwdriver is available for request if you do not have one at hand.

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torx T10 head screwdriver
- Torx T15 head screwdriver
- Phillips #1 head screwdriver
- Phillips #2 head screwdriver
- Flat head screwdriver
- Alcohol cleaning pad
- H100/H200 PCM Kit
- SR780a V3 water loop putty pad kit
- SR780a V3 water loop service kit

Important: Putty pad/phase change material (PCM) replacement guidelines

- Before replacing the putty pad/PCM, gently clean the hardware surface with an alcohol cleaning pad.
- Hold the putty pad/PCM carefully to avoid deformation. Make sure no screw hole or opening is blocked by the putty pad/PCM.
- Do not use expired putty pad/PCM. Check the expiry date on putty pad/PCM package. If the putty pads/PCM are expired, acquire new ones to properly replace them.

The following illustration shows the GPU numbering and corresponding slot numbering in XCC.

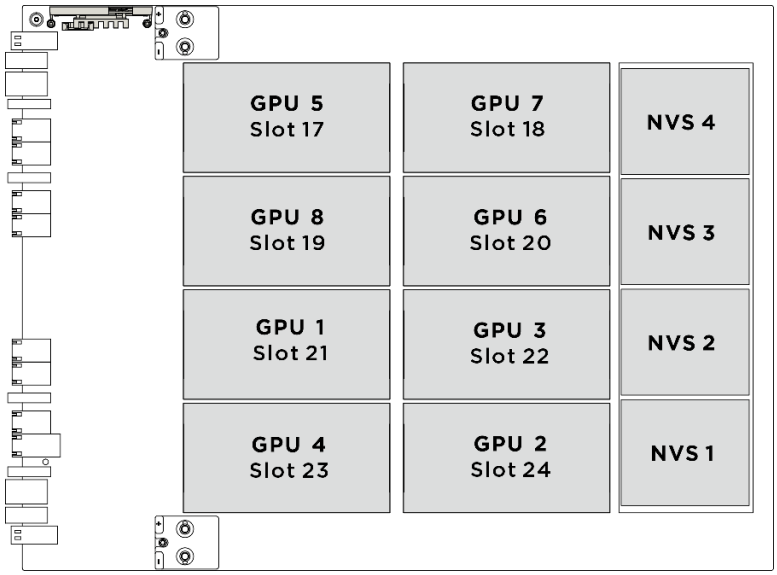


Figure 240. GPU numbering

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See "Remove the front top cover" on page 67.

b. Remove the rear top cover. See "Remove the rear top cover" on page 70.

c. Remove the fan cage. See "Remove the fan cage (trained technician only)" on page 103.

d. Remove the CPU complex. See "Remove the CPU complex" on page 83.

e. Remove the power complex. See "Remove the power complex" on page 312.

f. Disconnect the cables and remove them from the GPU complex if necessary. Before disconnecting the cables, make a list of each cable and record the connectors the cable is connected to. Refer to Chapter 6 "Internal cable routing" on page 365.

Step 2. Locate the rear GPU.

Step 3. Remove the leakage sensor module cable from the cable clips, route it away from the cold plate, and reinstall it in the cable clips adjacent to the cold plate.

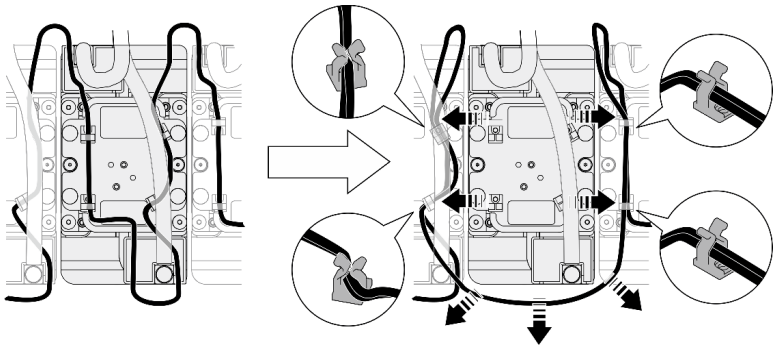


Figure 241. Removing the leakage sensor module cables

Step 4. Follow the screw sequence ❶❷❸❹ specified on the cold plate label, and fully loosen the four Torx T10 screws with a torque screwdriver set to the proper torque.

Note: Loosen or tighten the screws with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to be fully loosen or tighten is 0.4±0.05 newton-meter, 3.5±0.5 pound-inch.

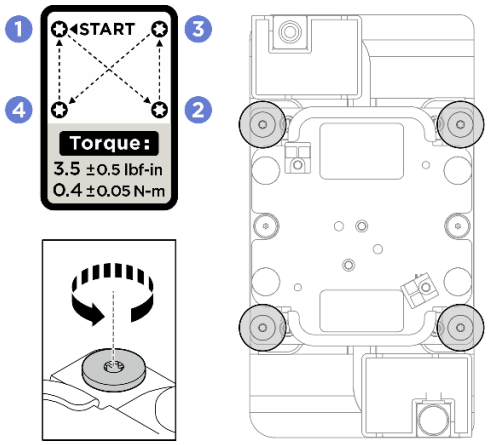


Figure 242. Removing the GPU cold plate

Note: If necessary, use a flat screwdriver to gently separate the cold plate and the GPU from the corner of the cold plate. Ensure not the damage the GPU or the cold plate.

Step 5. Install the service bracket onto the GPU cold plate.

a. ❶ Align the two guide pins at the bottom of the service bracket with the guide holes on the GPU cold plate; then, lower it onto the cold plate.

b. ❷ Fasten the captive screw (PH1, 1 x M3, 0.5 newton-meters, 4.3 inch-pound) to secure the service bracket to the cold plate.

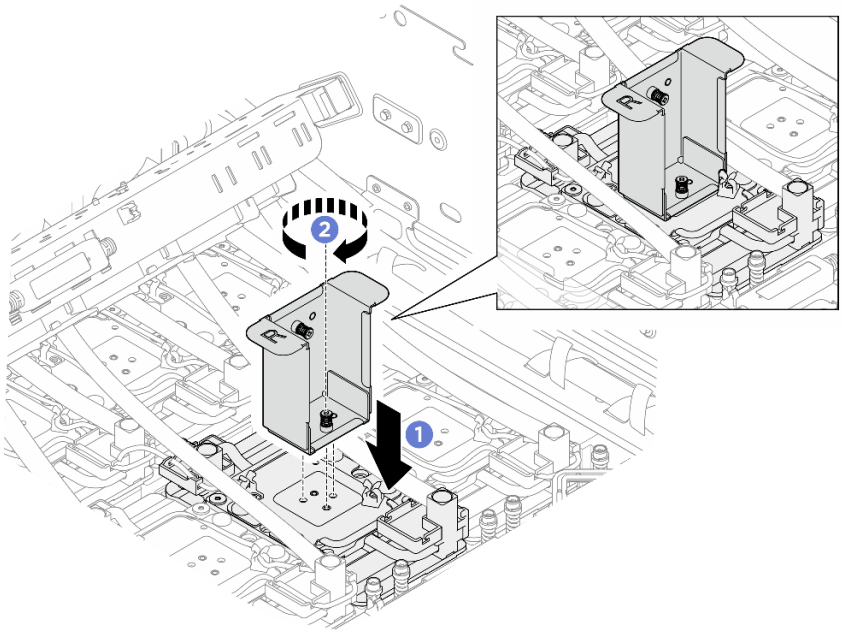


Figure 243. Installing the service bracket onto the GPU cold plate

Step 6. Install the service bracket and the GPU cold plate assembly onto the rear H100/H200 GPU cold plate module manifold.

a. 1 Flip over the service bracket and the GPU cold plate assembly; then, align the captive screw and two guide pins with the screw hole and guide holes on the manifold.

b. 2 Fasten the captive screw (PH1, 1 x M3, 0.5 newton-meters, 4.3 inch-pound) to secure the service bracket and GPU cold plate assembly onto the manifold.

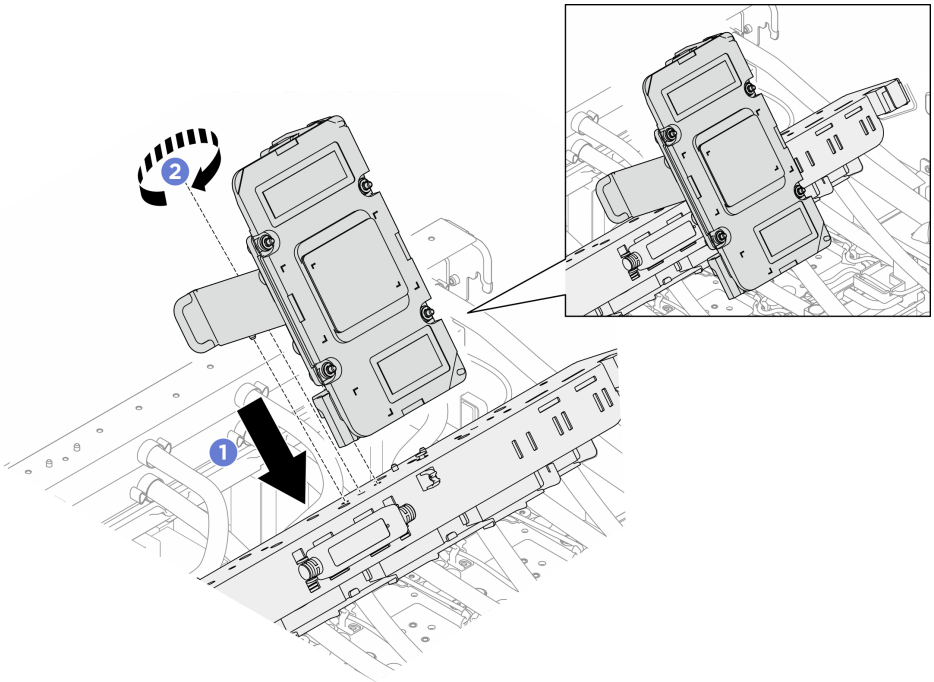


Figure 244. Installing the service bracket and the GPU cold plate assembly

Note: Ensure to install the service bracket and GPU cold plate assembly in the screw holes and guide holes corresponding to the specific GPU slot number.

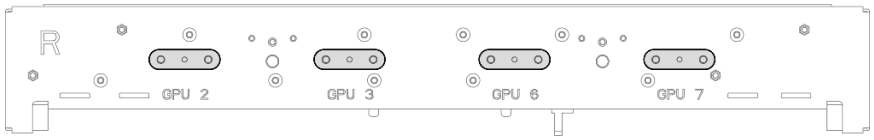


Figure 245. Service bracket and GPU cold plate assembly installation location

Step 7. **Immediately** clean the PCM and putty pads off from the GPU with alcohol cleaning pads. **Gently** clean the PCM and putty pads to avoid GPU damages.

Attention:

- It is recommended to clean the PCM while it is in liquid state.
- The electrical components around the die on the GPUs are extremely delicate. When removing the PCM and cleaning the GPU die, avoid touching the electrical components to prevent damage.

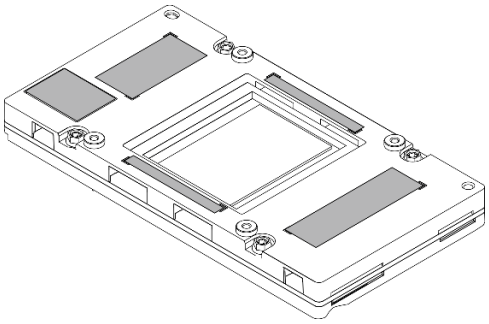


Figure 246. Cleaning PCM and putty pads off from the GPU

Step 8. With alcohol cleaning pads, wipe off any remaining putty pad and PCMs from the GPU cold plate.

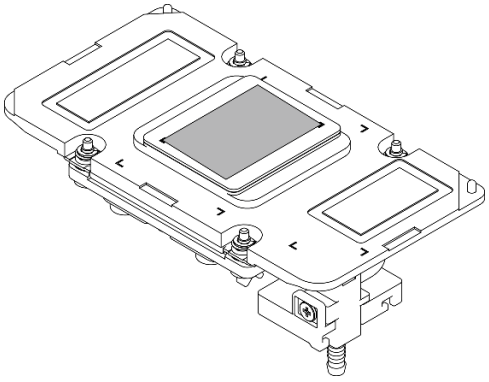


Figure 247. Wiping PCM and putty pads off from the cold plate

Step 9. Remove the GPU.

a. ❶❷❸❹ Unfasten the four Torx T15 screws in the sequence shown in the illustration below.

Note: Loosen the screws with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to be fully loosen is 0.6 newton-meters, 5.3 inch-pounds.

b. 5 Remove the GPU from the GPU baseboard.

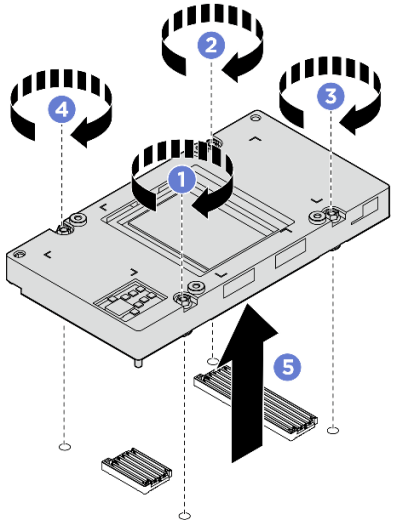


Figure 248. Removing the GPU

After you finish

1. Install a replacement unit. See “Install a rear H100/H200 GPU” on page 240.
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 a rear H100/H200 GPU

Follow instructions in this section to install a rear H100/H200 GPU. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- A torque screwdriver is available for request if you do not have one at hand.

Notes: Make sure you have the required tools listed below available to properly replace the component:

- Torx T10 head screwdriver
- Torx T15 head screwdriver
- Phillips #1 head screwdriver
- Phillips #2 head screwdriver
- Flat head screwdriver
- Alcohol cleaning pad
- H100/H200 PCM Kit
- SR780a V3 water loop putty pad kit
- SR780a V3 water loop service kit

Important: Putty pad/phase change material (PCM) replacement guidelines

- Before replacing the putty pad/PCM, gently clean the hardware surface with an alcohol cleaning pad.
- Hold the putty pad/PCM carefully to avoid deformation. Make sure no screw hole or opening is blocked by the putty pad/PCM.
- Do not use expired putty pad/PCM. Check the expiry date on putty pad/PCM package. If the putty pads/PCM are expired, acquire new ones to properly replace them.

The following illustration shows the GPU numbering and corresponding slot numbering in XCC.

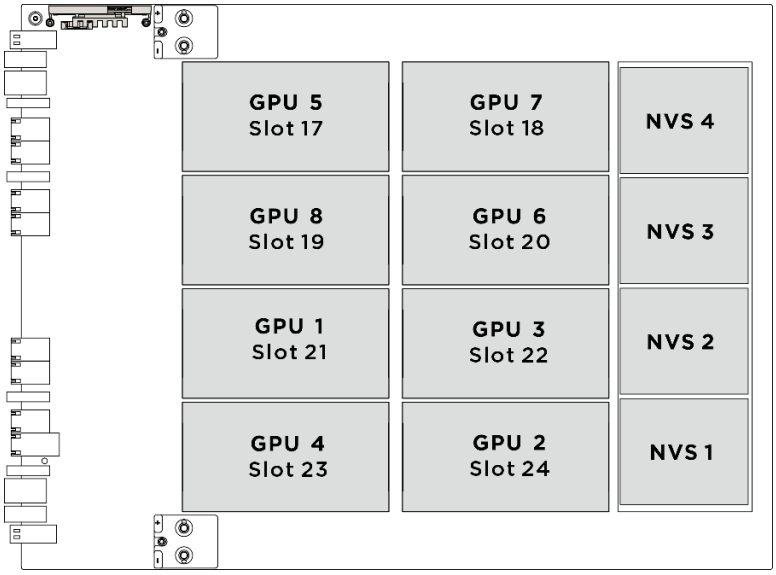


Figure 249. GPU numbering

Procedure

Step 1. (Optional) For new GPU, remove the connector covers at the bottom.

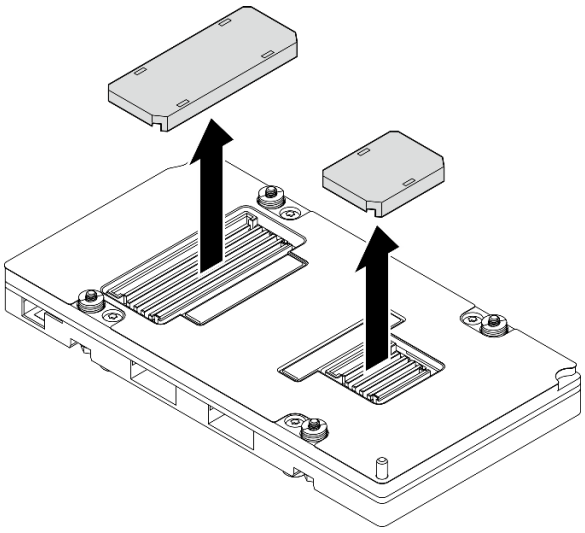


Figure 250. Removing connector covers

Step 2. ❶ Gently place the GPU down on the GPU baseboard.

Step 3. ❷❸❹❺ Follow the sequence shown in the illustration below to fasten the four Torx T15 screws to secure the GPU to the GPU baseboard.

Note: First set the torque screwdriver to 0.1-0.12 newton-meters, 0.9-1.1 inch-pounds to fasten the screws for a few rounds. Then set the torque screwdriver to 0.58-0.62 newton-meters, 5-5.5 inch-pounds to fully fasten the screws.

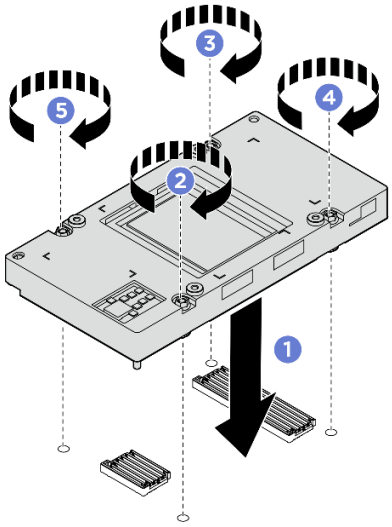


Figure 251. Installing the GPU

Step 4. Replace the Phase Change Material (PCM) on the rear GPU cold plate.

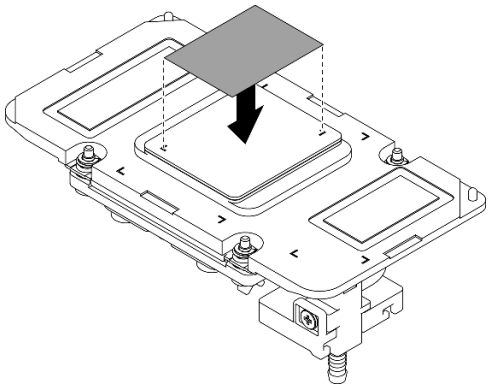
a. ❶ Remove the liner from one side of the pad.

b. ❷ Align the PCM with the marking on the bottom of the cold plate, and place it onto the cold plate; then, apply finger pressure across the entire surface area of the PCM to remove any trapped air and allow 1-2 minutes dwell time until it is firmly attached. Carefully remove the remaining top liner.

Attention:

- PCM cannot be reused. PCM must be replaced with new ones every time the water loop is removed.
- After PCM is replaced, there is an expected short duration of throttling before the GPU returns to normal operation. This is due to the PCM requiring a break-in period after being replaced.

Figure 252. PCM application



Step 5. Replace the putty pads (x5) on the GPU.

a. ❶ Remove the liner from one side of the pad.

b. ❷ Make sure to align the putty pads to the GPU VR (1) and the markings on GPU; then, place the pads onto the GPU and apply light finger pressure across the entire surface area of the pads to ensure adhesion. Carefully remove the remaining top liner.

Attention: Putty pad cannot be reused. Putty pad must be replaced with new ones every time the water loop is removed.

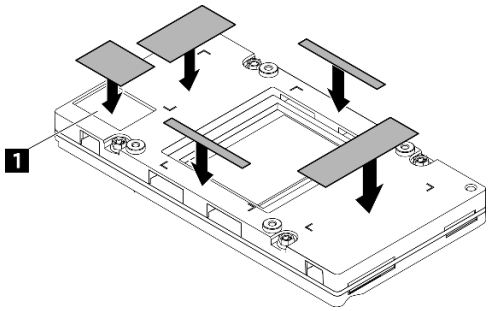


Figure 253. GPU putty pads replacement

1 GPU VR (Cover the GPU VR with putty pad)

Step 6. Remove the service bracket and GPU cold plate assembly from the manifold.

a. ❶ Loosen the captive screw that secure the service bracket to the manifold.

b. ❷ Lift the service bracket and GPU cold plate assembly away from the manifold to remove it.

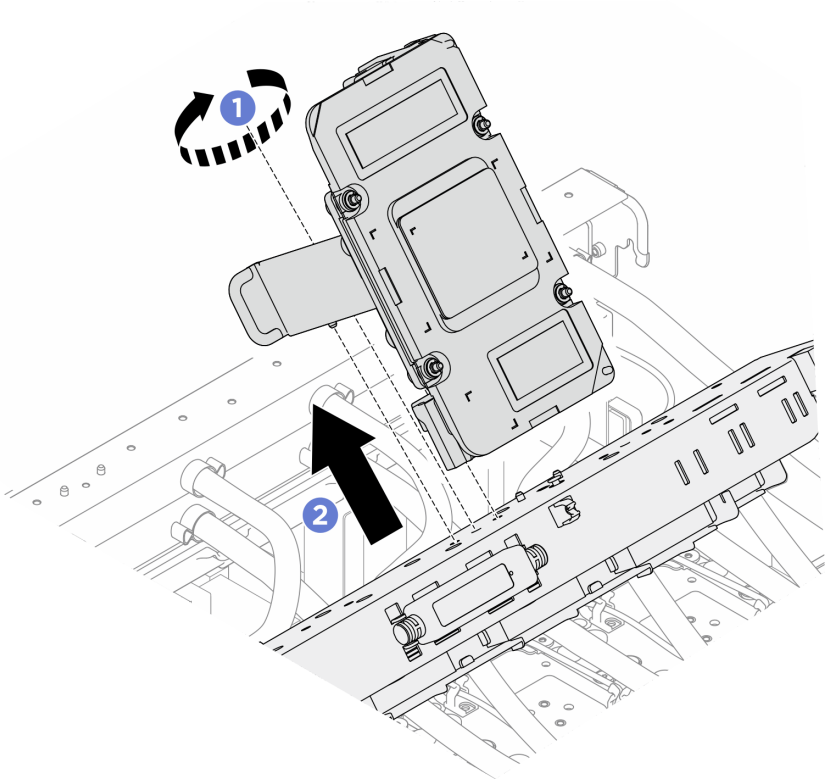


Figure 254. Removing the service bracket and the GPU cold plate assembly

Step 7. Place the cold place onto the GPU.

a. 1 Flip over the service bracket and GPU cold plate assembly; then, gently place the GPU cold plate onto the GPU.

b. 2 Adjust the cold plate until the two guide pins are seated in the guide holes on the GPU.

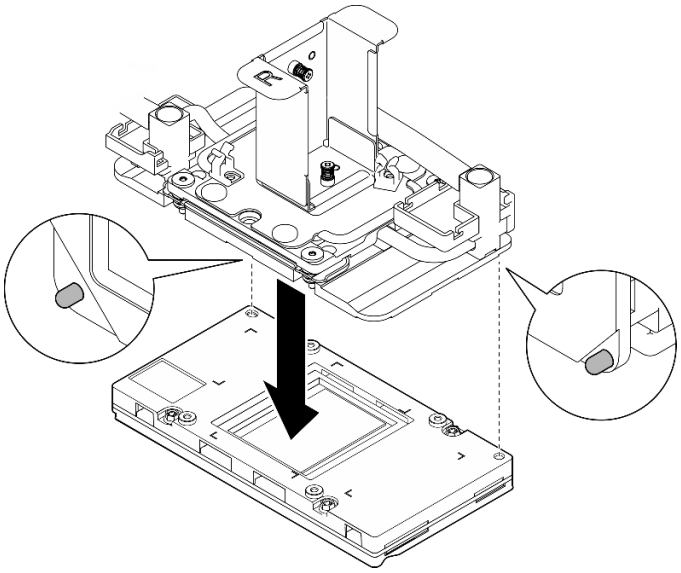


Figure 255. Adjusting the cold plate

Step 8. Loosen the captive screw to remove the service bracket from the cold plate.

a. ❶ Loosen the captive screw that secure the service bracket to the GPU cold plate.

b. ❷ Lift the service bracket away from the GPU cold plate to remove it.

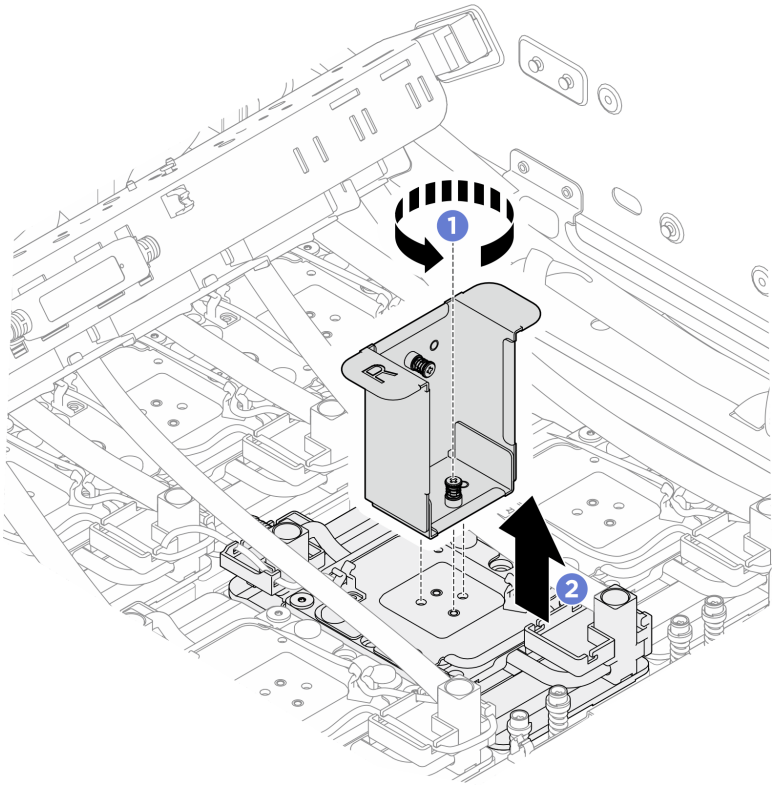


Figure 256. Removing the service bracket

Step 9. Follow the screw sequence specified on the cold plate label, and fully tighten the four Torx T10 screws with a torque screwdriver set to the proper torque.

a. Set the torque screwdriver to 0.4±0.05 newton-meter, 3.5±0.5 pound-inch.

b. Fasten the screws 720 degrees following the screw installation sequence:❶ → ❷ → ❸ → ❹

Note: Make sure to follow screw installation sequence to prevent GPU cold plate tilting.

c. Repeat until all screws on the four GPU cold plates are fully tightened.

Figure 257. Repeat to fully tighten all the screws

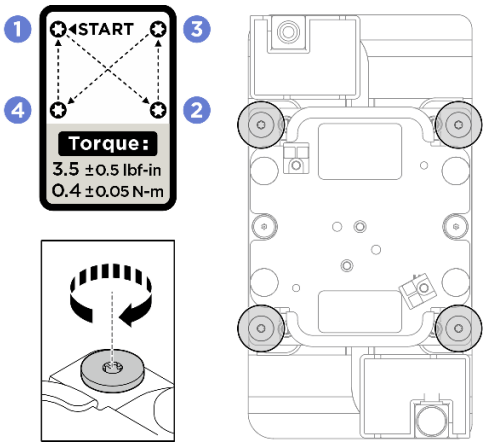


Figure 258. Installing the GPU cold plate

Step 10. Reinstall the leakage sensor module cable to the GPU cold plate.

a. ❶ Remove the leakage sensor module cable from the adjacent cable clips.

b. ❷ Route the leakage sensor module cable back onto the GPU cold plate; then, reinstall it in the cable clips on the cold plate.

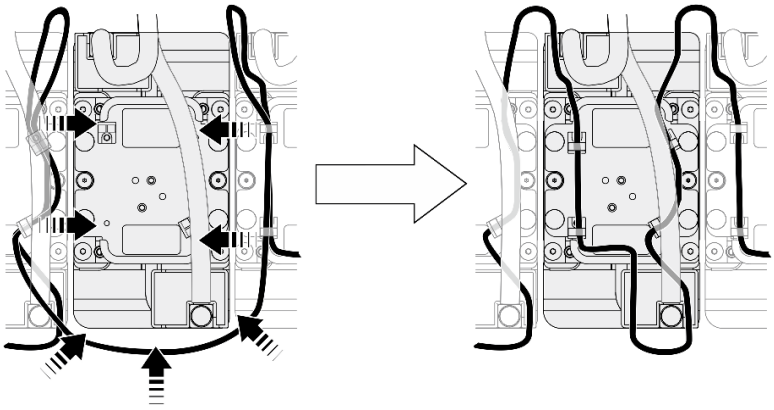


Figure 259. Installing the leakage sensor module cable

After you finish

1. Reconnect all the cables that were disconnected. See Chapter 6 “Internal cable routing” on page 365.
2. Reinstall the power complex. See “Install the power complex” on page 313.
3. Reinstall the CPU complex. See “Install the CPU complex” on page 84.
4. Reinstall the fan cage. See “Install the fan cage (trained technician only)” on page 104.
5. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
6. Reinstall the front top cover. See “Install the front top cover” on page 69.
7. Complete the parts replacement. See “Complete the parts replacement” on page 363.

HMC card replacement (trained technician only)

Follow instructions in this section to remove or install the HMC card.

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 HMC card

Follow instructions in this section to remove the HMC card. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- A torque screwdriver is available for request if you do not have one at hand.

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the rear top cover. See “Remove the rear top cover” on page 70.

c. Remove the CPU complex. See “Remove the CPU complex” on page 83.

d. Remove the power complex. See “Remove the power complex” on page 312.

e. Disconnect the cables and remove them from the GPU complex if necessary. Before disconnecting the cables, make a list of each cable and record the connectors the cable is connected to. Refer to Chapter 6 “Internal cable routing” on page 365.

Step 2. Unfasten the two screws to remove the HMC card from the GPU baseboard.

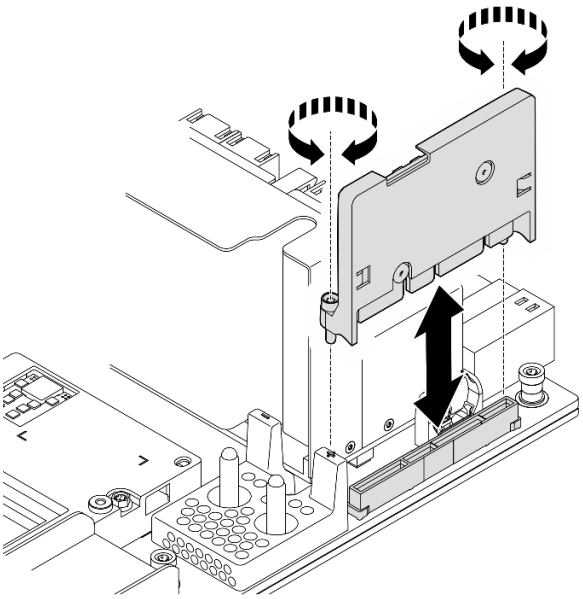


Figure 260. HMC card removal

After you finish

1. Install a replacement unit. See “Install the HMC card” on page 248.
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 HMC card

Follow instructions in this section to install the HMC card. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

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

- Go to https://datacentersupport.lenovo.com/tw/en/products/servers/thinksystem/sr780av3/7dj5/downloads/driver-list/ to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” on page 403 for more information on firmware updating tools.

Procedure

Step 1. Align the HMC card with its connector on the GPU baseboard; then, press the HMC card into the connector until it is fully seated.

Step 2. Fasten the two screws to secure the HMC card.

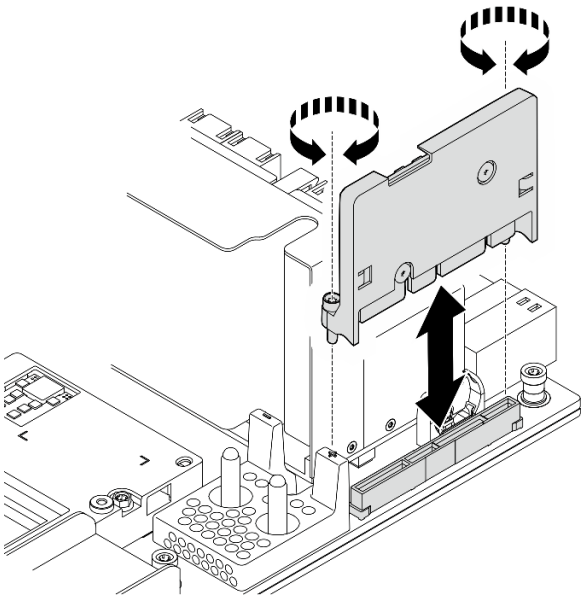


Figure 261. HMC card installation

After you finish

1. Reconnect all the cables that were disconnected. See Chapter 6 “Internal cable routing” on page 365.
2. Reinstall the power complex. See “Install the power complex” on page 313.
3. Reinstall the CPU complex. See “Install the CPU complex” on page 84.
4. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
5. Reinstall the front top cover. See “Install the front top cover” on page 69.
6. Complete the parts replacement. See “Complete the parts replacement” on page 363.

Integrated diagnostics panel replacement (trained technician only)

Follow instructions in this section to remove or install the integrated diagnostics panel.

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 integrated diagnostics panel

Follow instructions in this section to remove the integrated diagnostics panel. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.

- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the I/O cover. See “Remove the I/O cover” on page 252.

Step 2. Remove the integrated diagnostics panel.

a. ❶ Disconnect the cable from the integrated diagnostics panel.

b. ❷ Press and hold on the two release tabs.

c. ❸ Disengage the integrated diagnostics panel from the chassis to remove it.

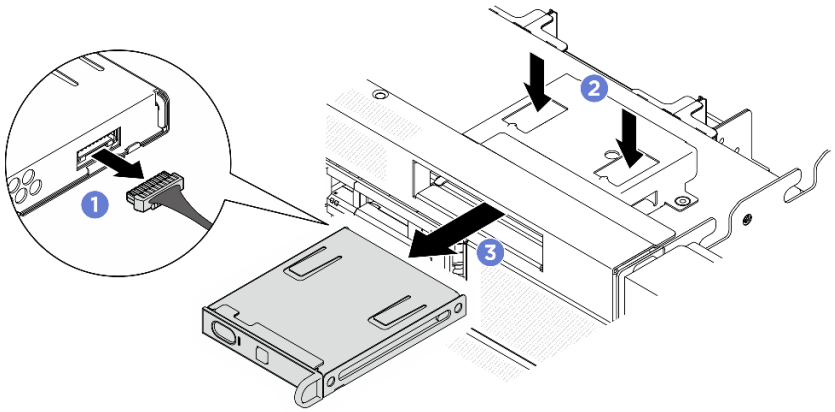


Figure 262. Integrated diagnostics panel removal

After you finish

1. Install a replacement unit. See “Install the integrated diagnostics panel” on page 250.
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 integrated diagnostics panel

Follow instructions in this section to install the integrated diagnostics panel. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. 1 Align the integrated diagnostics panel with the slot in the front of the chassis, and slide it in.

Step 2. 2 Connect the cable to the integrated diagnostics panel.

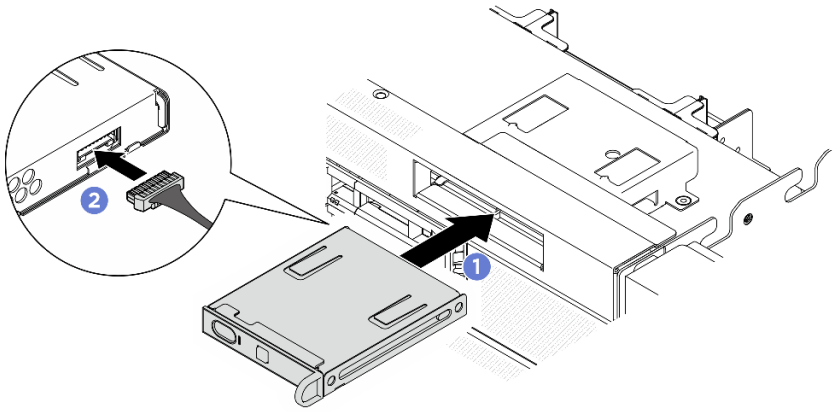


Figure 263. Integrated diagnostics panel installation

Step 3. If necessary, attach the labels to both ends of the cable.

a. 1 Attach the white space portion of the label to one end of the cable.

b. 2 Wrap the label around the cable and attach it to the white space portion.

c. Repeat to attach the other label to the opposite end of the cable.

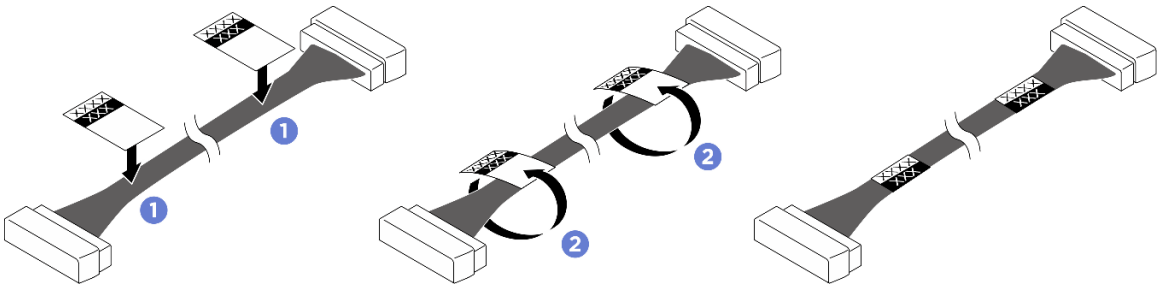


Figure 264. Label application

Note: See the table below to identify the corresponding labels for the cable.

From	To	Label
Integrated diagnostics panel: Integrated diagnostics panel cable	**System board assembly: Integrated diagnostics panel connector (FRONT IO2)**	**Pong** **FRONT IO2**

After you finish

1. Reinstall the I/O cover. See “Install the I/O cover” on page 253.
2. Reinstall the front top cover. See “Install the front top cover” on page 69.
3. Complete the parts replacement. See “Complete the parts replacement” on page 363.

I/O cover replacement (trained technician only)

Follow instructions in this section to remove and install the I/O cover.

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 I/O cover

Follow instructions in this section to remove the I/O cover. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

Step 2. Remove the I/O cover.

a. ❶ Unfasten the four M3 screws that secure the I/O cover to the chassis.

b. ❷ Slide the I/O cover backwards to disengage it from the chassis; then, lift if out of the chassis to remove it.

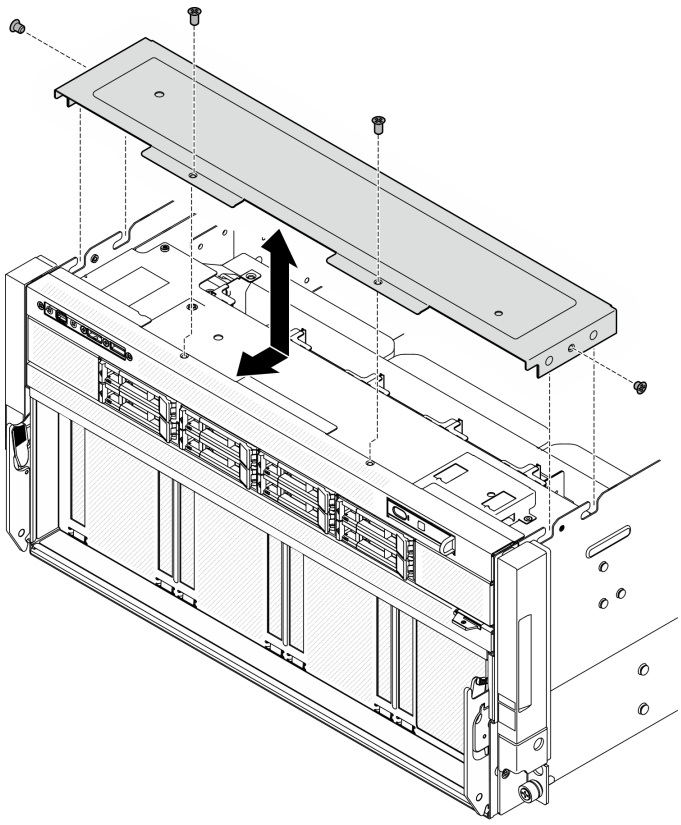


Figure 265. Removing the I/O cover

After you finish

1. Install a replacement unit. See "Install the I/O cover" on page 253.
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 I/O cover

Follow instructions in this section to install the I/O cover. The procedure must be executed by a trained technician.

About this task

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. Install the I/O cover.

a. ❶ Align the I/O cover guide pins with the guide holes on the chassis; then, lower the I/O cover onto the chassis and slide it towards the front of the server until it engages with the chassis.

b. 2 Fasten the four M3 screws (PH1, 4 x M3, 0.5 newton-meters, 4.3 inch-pounds) to install the I/O cover.

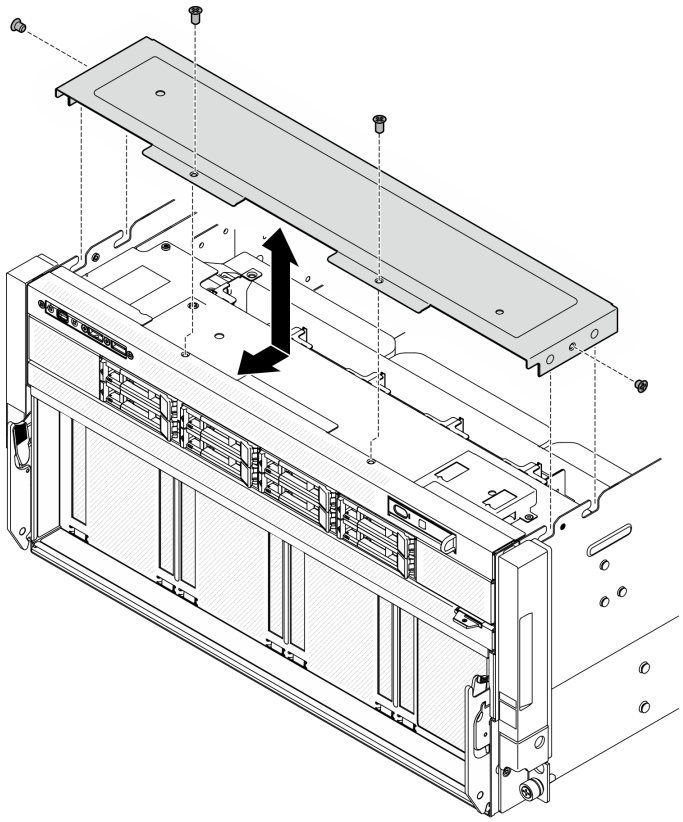


Figure 266. Installing the I/O cover

After you finish

1. Reinstall the front top cover. See "Install the front top cover" on page 69.
2. Complete the parts replacement. See "Complete the parts replacement" on page 363.

Leakage sensor module bracket replacement (trained technician only)

Follow the instructions in this section to remove or install the leakage sensor module bracket.

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 leakage sensor module bracket

Follow the instructions in this section to remove the leakage sensor module bracket. The procedure must be executed by a trained technician.

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.

- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the rear top cover. See “Remove the rear top cover” on page 70.

c. If applicable, remove the rear drive cage. See “Remove the rear drive cage” on page 334.

Step 2. Unfasten the four M3 screws (two M3 screws when rear drive cage was installed) that secure the leakage sensor module bracket to the chassis; then, grasp the leakage sensor module bracket to remove it from the chassis.

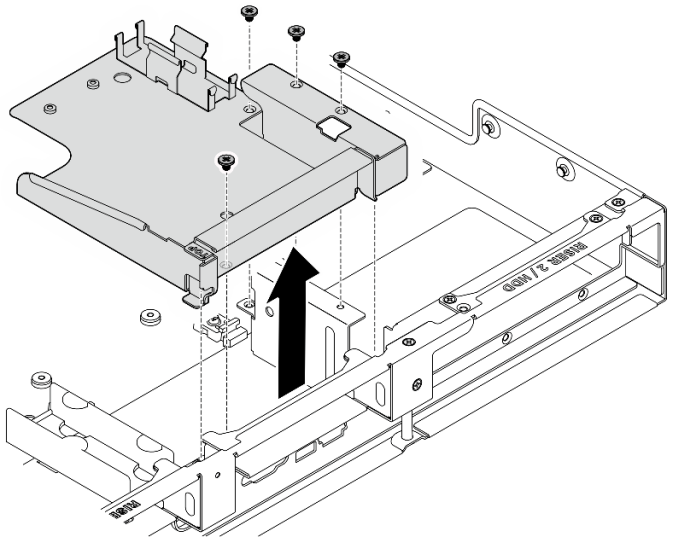


Figure 267. Removing the leakage sensor module bracket

Step 3. Unfasten only two M3 screws if rear drive cage was installed.

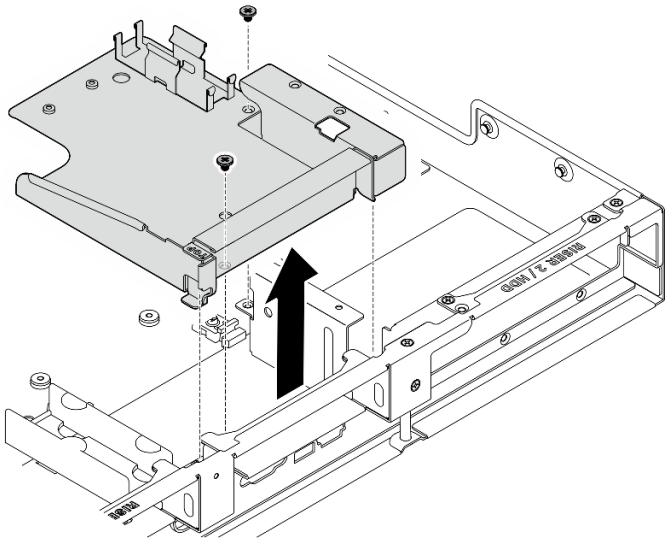


Figure 268. Removing the leakage sensor module bracket

After you finish

1. Reinstall the replacement. See “Install the leakage sensor module bracket” on page 256.
2. Complete the parts replacement. See “Complete the parts replacement” on page 363.

Install the leakage sensor module bracket

Follow the instructions in this section to install the leakage sensor module bracket. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. Align and insert the leakage sensor module bracket into the slot until it is securely seated. Fasten the four M3 screws (PH2, 4 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure it in place.

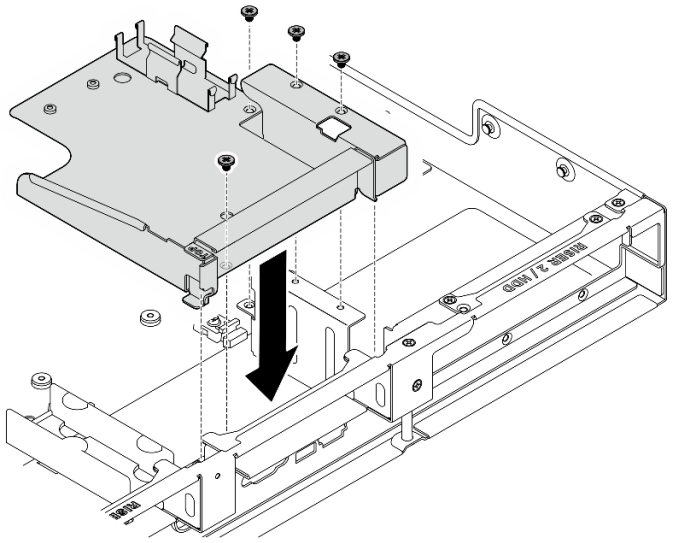


Figure 269. Installing the leakage sensor module bracket

Step 2. Fasten only two M3 screws (PH2, 2 x M3, 0.5 newton-meters, 4.3 inch-pounds) if rear drive cage is to be installed.

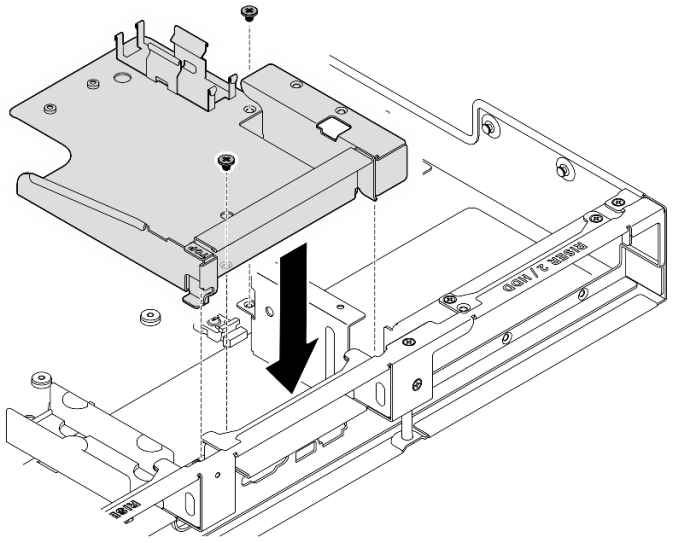


Figure 270. Installing the leakage sensor module bracket

After you finish

1. If applicable, reinstall the rear drive cage. See “Install the rear drive cage” on page 342.
2. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
3. Reinstall the front top cover. See “Install the front top cover” on page 69.
4. Complete the parts replacement. See “Complete the parts replacement” on page 363.

Lenovo Neptune(TM) Processor Direct Water Cooling Module replacement (trained technicians only)

Follow the instructions in this section to remove and install the Direct Water Cooling Module (DWCM).

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 Lenovo Neptune(TM) Processor Direct Water Cooling Module

Follow the instructions in this section to remove the Direct Water Cooling Module (DWCM). The procedure must be executed by a trained technician.

About this task

Safety information for liquid detection sensor module cable

S011

CAUTION:
Sharp edges, corners, or joints nearby.

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 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.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Prepare the following screwdrivers to ensure you can install and remove the corresponding screws properly.

Torque screwdriver type list	Screw Type
Torx T30 head screwdriver	Torx T30 screw

Procedure

Step 1. Make preparations for this task.

a. Remove the server from the rack. See “Remove the server from rack” on page 51.
b. Remove the front top cover. See “Remove the front top cover” on page 67.
c. Remove the rear top cover. See “Remove the rear top cover” on page 70.
d. Remove the processor air baffle. See “Remove the processor air baffle” on page 323.
e. Disconnect the PCIe cables and front I/O cables from the system board. See “PCIe switch board cable routing” on page 380 and “Front I/O module and integrated diagnostics panel cable routing” on page 376. Release the cables from the cable clips and keep them away from the DWCM.
f. Disconnect the leakage sensor module cable of the DWCM from the connector on the system board. See “Leakage sensor module cable routing” on page 397.

Step 2. Disengage the leakage sensor module.
a. Push the holder latches to both sides to unlock the module.
b. Disengage the leakage sensor module from the holder.

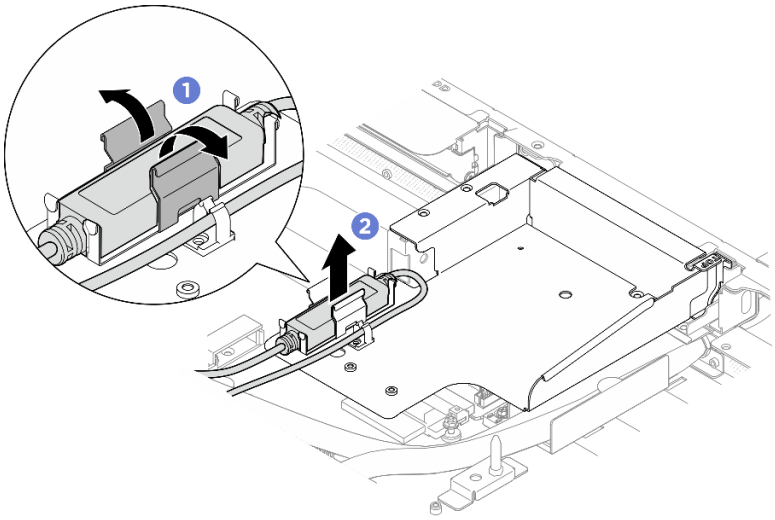


Figure 271. Disengage the leakage sensor module

Step 3. Remove the leakage sensor module holder bracket.
a. Unfasten the four M3 screws that secure the leakage detection sensor module holder bracket to the chassis.
b. Grasp the bracket and lift it from the chassis.

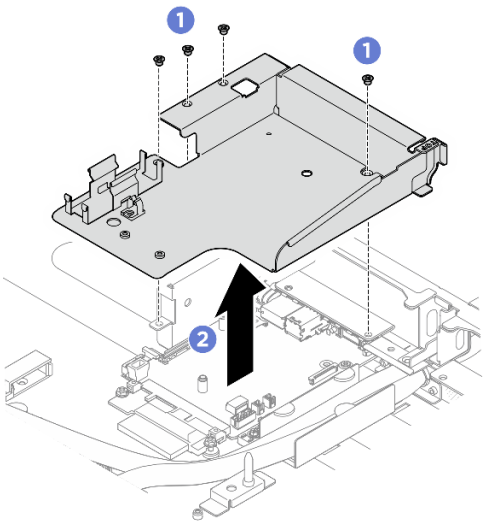


Figure 272. Removing the leakage sensor module holder bracket

Step 4. Remove the hose cover.

a. 1 Unfasten the three M3 screws that secure the hose cover to the chassis.

b. 2 Disengage the hose cover from the hose opening on the chassis by sliding it away from the opening; then, remove it from the chassis.

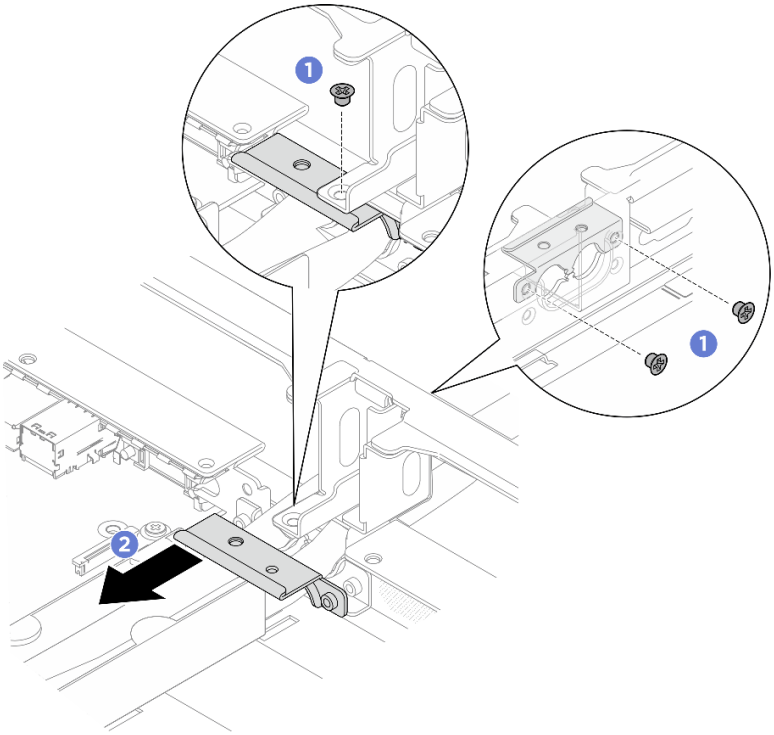


Figure 273. Removing hose cover

Step 5. Remove the hoses.

a. Disengage the hoses from the hose clips and holders.

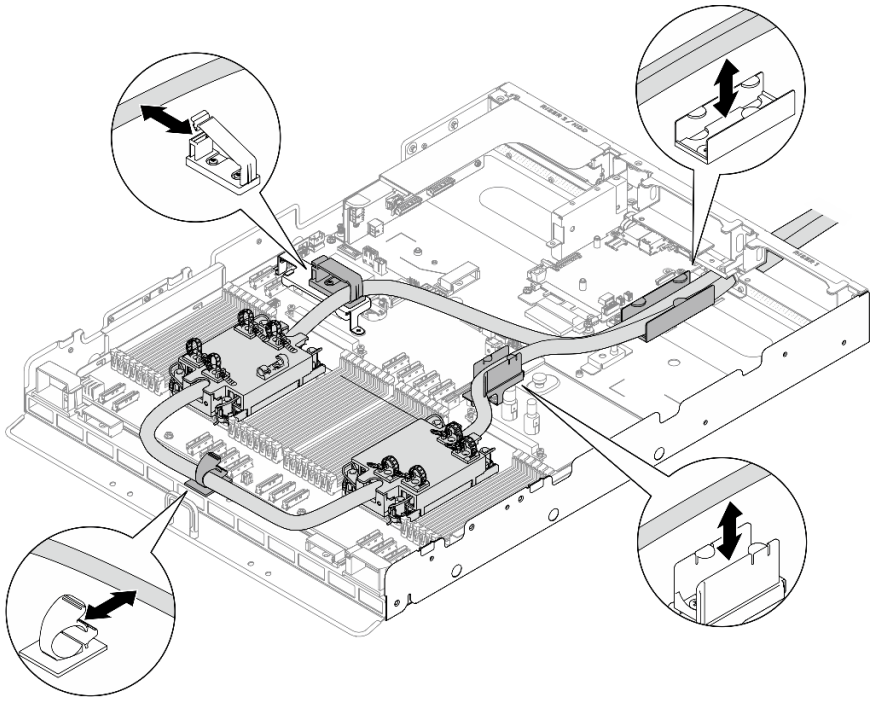


Figure 274. Disengaging the hoses

a. Unfasten the two M3 screws that secure the hose holder to the chassis.

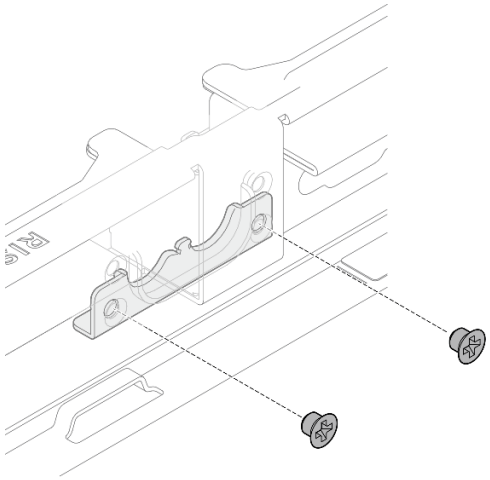


Figure 275. Removing the hose holder

b. ❶ Disengage the first hose from the hose holder as illustrated; then, remove the hose holder from the hose opening on the chassis by sliding it towards the front of the chassis.

c. ❷ Remove the hose holder from the hose opening on the chassis by sliding it away from the opening.

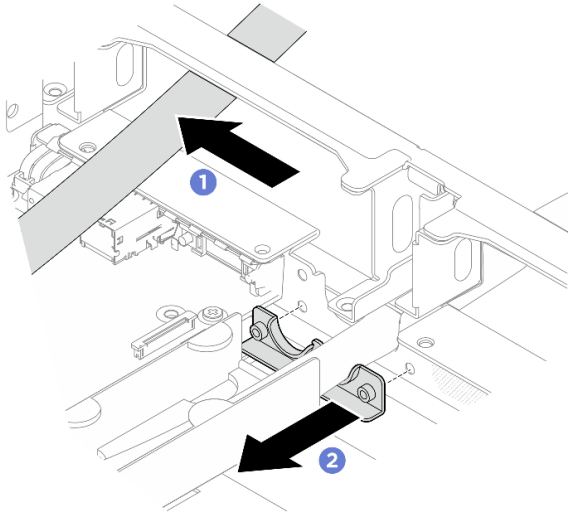
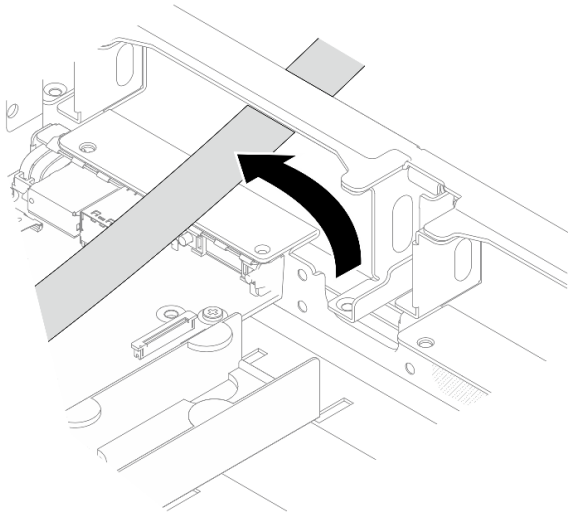


Figure 276. Disengaging the hose

d. Remove the second hose through the opening.

Figure 277. Removing the hose



Step 6. Remove the cold plate top covers.

Note: Remove the four memory modules adjacent to the heat sinks to avoid damage. Record each memory module before removing it.

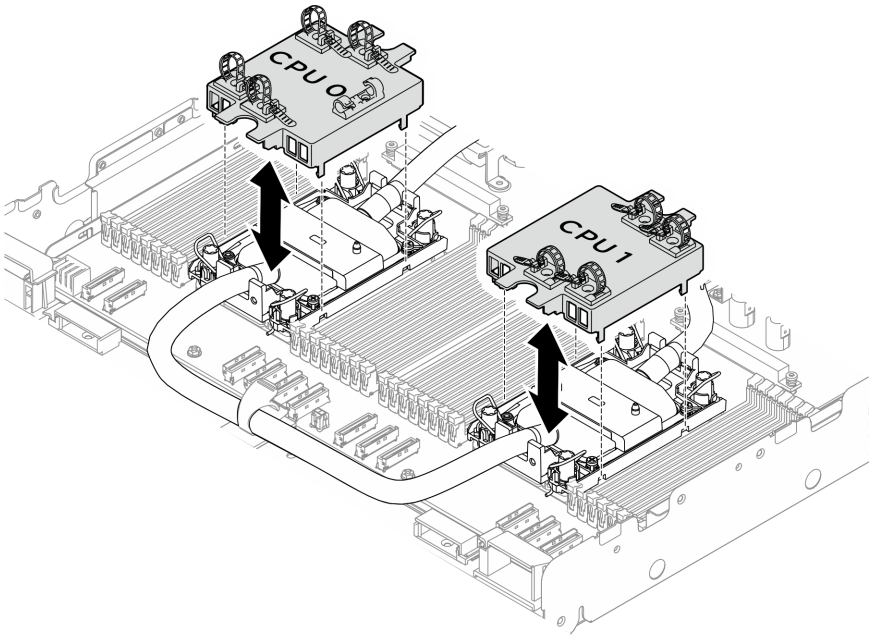


Figure 278. Removing the cold plate top covers

Step 7. Remove the DWCM from the processor board.

a. ❶ Fully loosen the Torx T30 nuts on the cold plate assembly. (For reference, the torque required for the fasteners to fully loosen is 1.1±0.2 newton-meters, 10±2.0 inch-pounds).

b. ❷ Rotate the anti-tilt wire bails inward.

c. ❸ Carefully lift the DWCM from the processor sockets. If the DWCM cannot be fully lifted out of the socket, further loosen the Torx T30 nuts and try lifting the DWCM again.

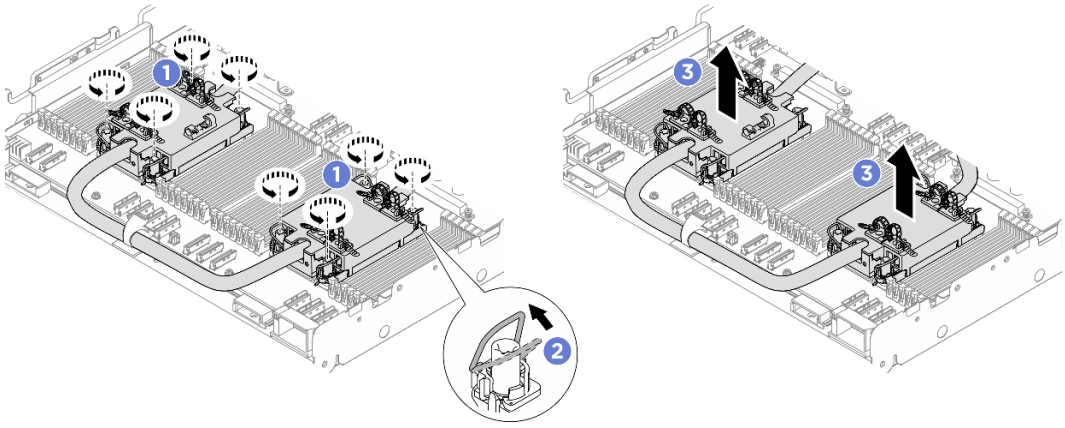


Figure 279. Removing the DWCM

Step 8. Remove the processor from the retainer.

a. ❶ Lift the handle to release the processor from the carrier.

b. ❷ Hold the processor by its edges; then, lift the processor from the cold plate and carrier.

c. ❸ 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.

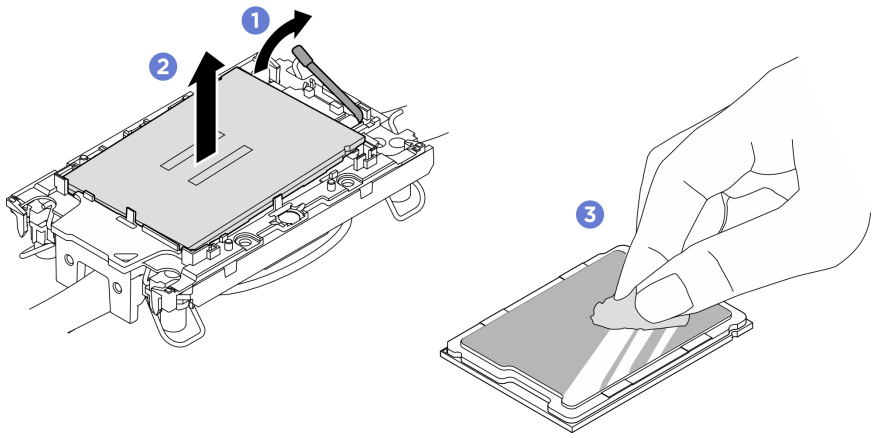


Figure 280. Removing the processor

Note: Do not touch the contacts on the processor.

d. Repeat to remove the other processor.

Step 9. Separate the processor carrier from the cold plate.

a. ❶ Release the retaining clips from the cold plate.

b. ❷ Lift the carrier from the cold plate.

c. ❸ Wipe the thermal grease from the bottom of the cold plate with an alcohol cleaning pad.

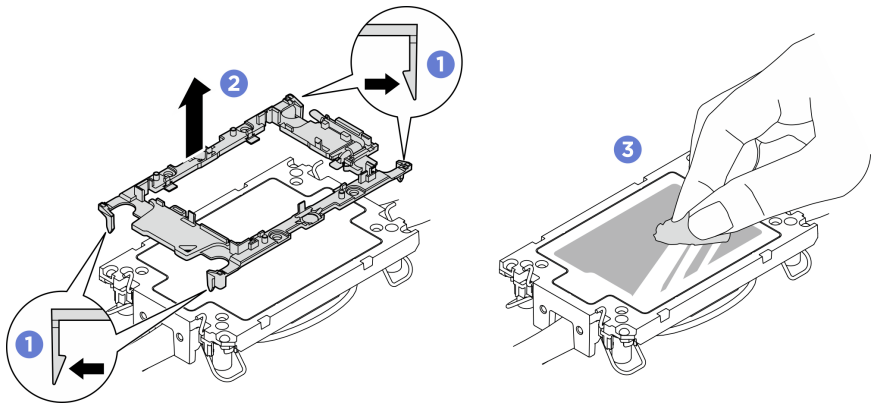


Figure 281. Separating a processor carrier from the cold plate

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

d. Repeat the separate the other processor from the cold plate.

After you finish

1. Each processor socket must always contain a cover or a processor and cold plate assembly. Protect empty processor sockets with a cover or install a new a processor and cold plate assembly.
2. If you are removing the processor and cold plate assembly as part of a system board assembly replacement, set the processor and cold plate assembly aside.
3. Install a replacement unit (see “Install the Lenovo Neptune(TM) Processor Direct Water Cooling Module” on page 265).
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

Install the Lenovo Neptune(TM) Processor Direct Water Cooling Module

Follow the instructions in this section to install the Direct Water Cooling Module (DWCM). The procedure must be executed by a trained technician.

About this task

S011

CAUTION:
Sharp edges, corners, or joints nearby.

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See "Power off the server" on page 51.
- 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.

CAUTION:
When removing a new DWCM from the shipping box, lift out the cold plate assembly with the shipping tray attached to prevent thermal grease on the cold plate assembly from damage.

Prepare the following screwdrivers to ensure you can install and remove the corresponding screws properly.

Torque screwdriver type list	Screw Type
Torx T30 head screwdriver	Torx T30 screw

Procedure

Step 1. If you are replacing a processor and reusing the cold plate.

a. Remove the processor identification label from the cold plate and replace it with the new label that comes with the replacement processor.

b. If there is any old thermal grease on the cold plate, wipe the thermal grease from the bottom of the cold plate with an alcohol cleaning pad.

Step 2. If you are replacing the cold plate and reusing the processor.

a. Remove the processor identification label from the old cold plate and place it on the new cold plate in the same location.

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

b. Install processor in new carrier.

1. ❶ Make sure the handle on the carrier is in the closed position.
2. ❷ 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. ❸ Hold the inserted end of the processor in place; then, pivot the unmarked end of the carrier down and away from the processor.
4. ❹ Press the processor and secure the unmarked end under the clip on the carrier.
5. ❺ Carefully pivot the sides of the carrier down and away from the processor.
6. ❻ 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.

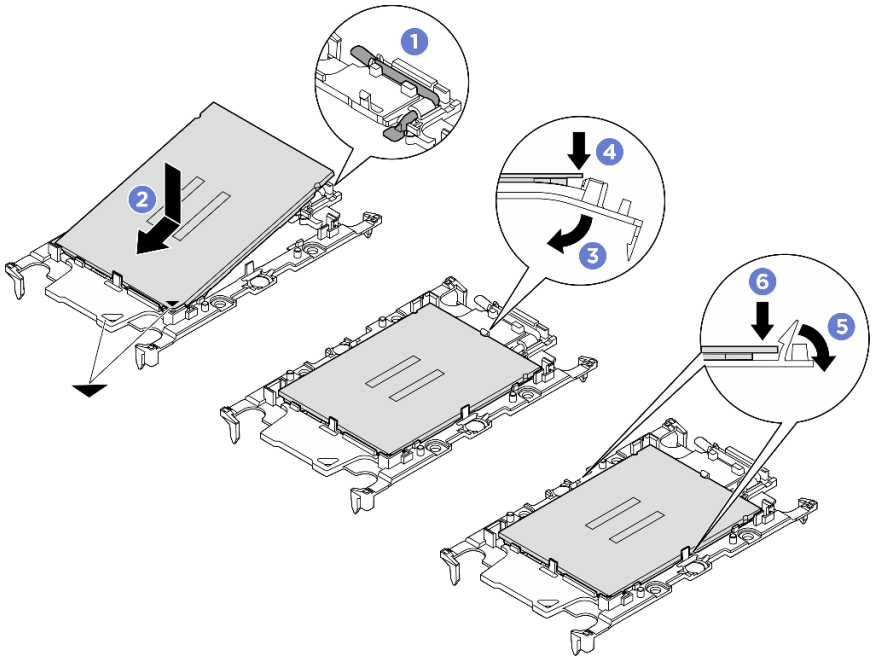


Figure 282. Processor carrier installation

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.

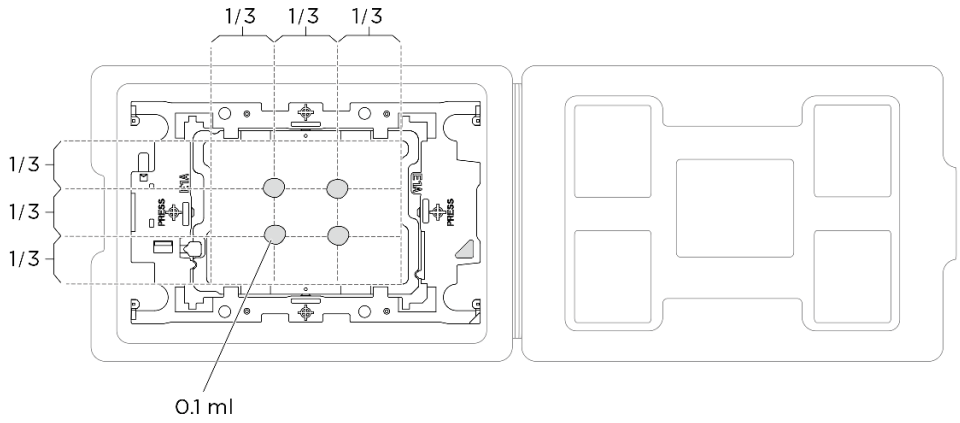


Figure 283. Thermal grease application with processor in shipping tray

Step 4. Align the triangular marks on the processor retainers with the triangular slots on the underside of the cold plate; then, attach the processors to the underside of the cold plate by inserting the processor retainer posts and clips features into the openings at the four corners of the cold plate.

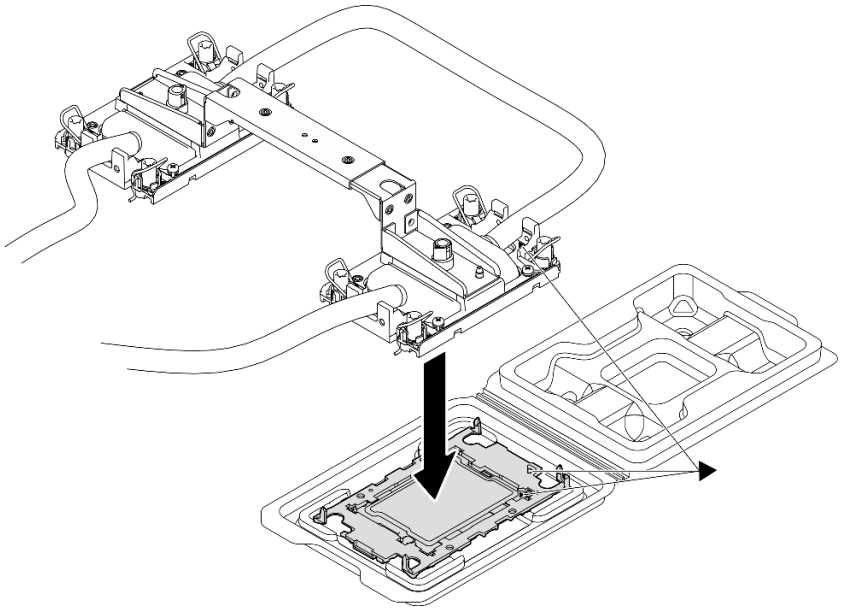


Figure 284. Assembling the processor with cold plate

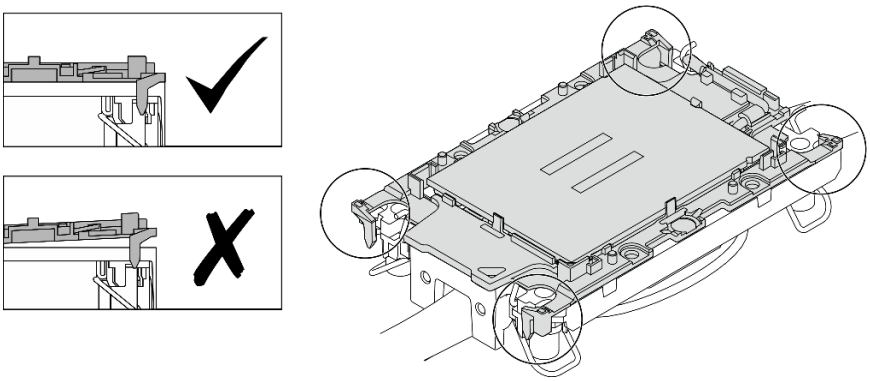


Figure 285. Inspecting the processor with cold plate

Step 5. Install the processor-DWCM to the system board assembly.

a. ❶ Rotate the anti-tilt wire bails inward.

b. ❷ Align the triangular mark and four Torx T30 nuts on the cold plate assembly with the triangular mark and threaded posts of the processor socket; then, insert the cold plate assembly into the processor socket.

c. ❸ Rotate the anti-tilt wire bails outward until they engage with the hooks in the socket.

d. ❹ Fully tighten the Torx T30 nuts *in the installation sequence shown* on the cold plate assembly. Tighten the screws until they stop; then, visually inspect to make sure that there is no gap between the screw shoulder beneath the cold plate assembly and the processor socket. (For reference, the torque required for the fasteners to fully tighten is 1.1±0.2 newton-meters, 10±2.0 inch-pounds.)

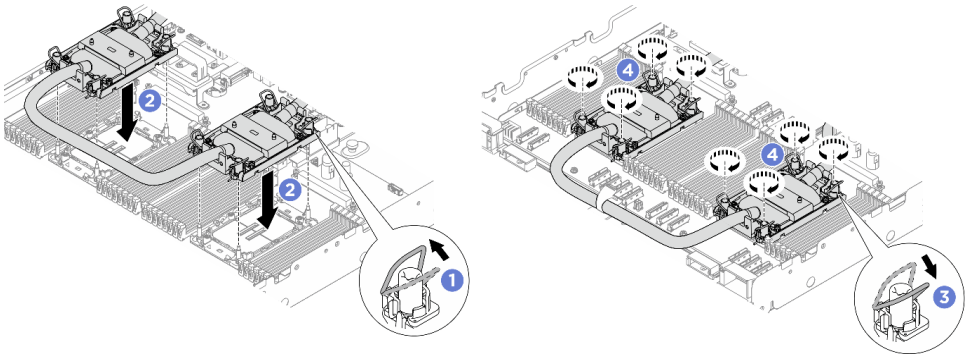


Figure 286. Installing the processor-DWCM

Step 6. If applicable, remove the module handle from the DWCM.

a. ❶ Rotate the screws as illustrated above to unlock the handle.

b. ❷ Separate the handle from the DWCM.

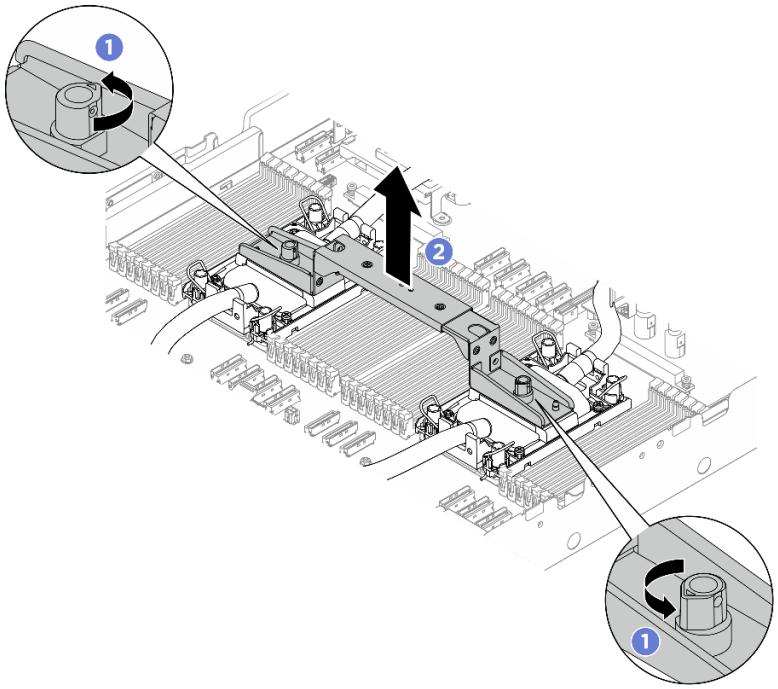


Figure 287. Removing the module handle

Notes: A new DWCM comes with a handle.

1. To replace an old DWCM with a new one, remove the handle of the new one as illustrated above.
2. To replace processors without changing the DWCM, a handle is not needed. Skip this step and proceed with further installation.

Step 7. Install the cold plate covers. Press the cover down as illustrated.

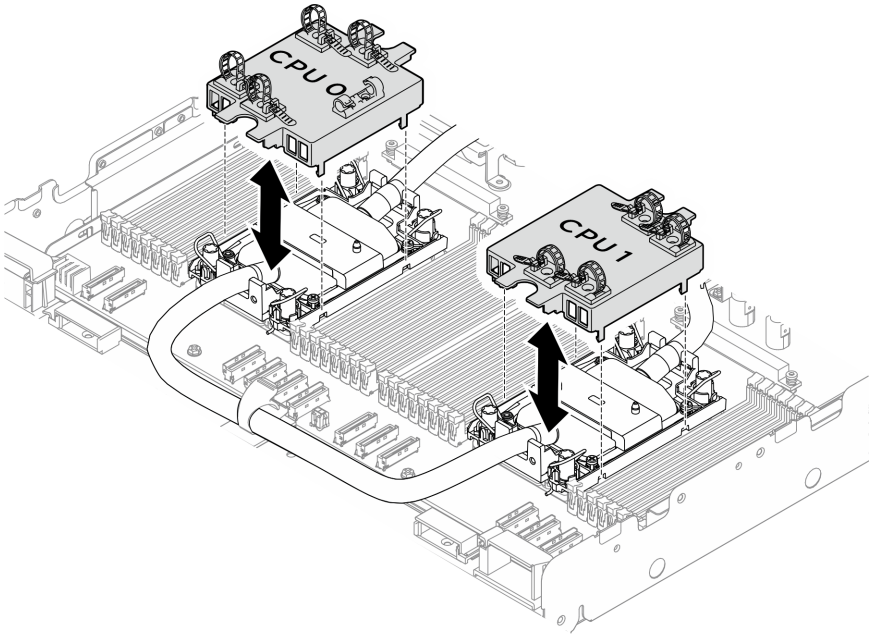


Figure 288. Installing cold plate covers

Notes:

- Ensure the cold plate cover matches the corresponding CPU number.
- Install the memory modules that were removed to their original slots.

Step 8. Install the hoses.

a. 1 Install the hoses to the hose clips and holders.

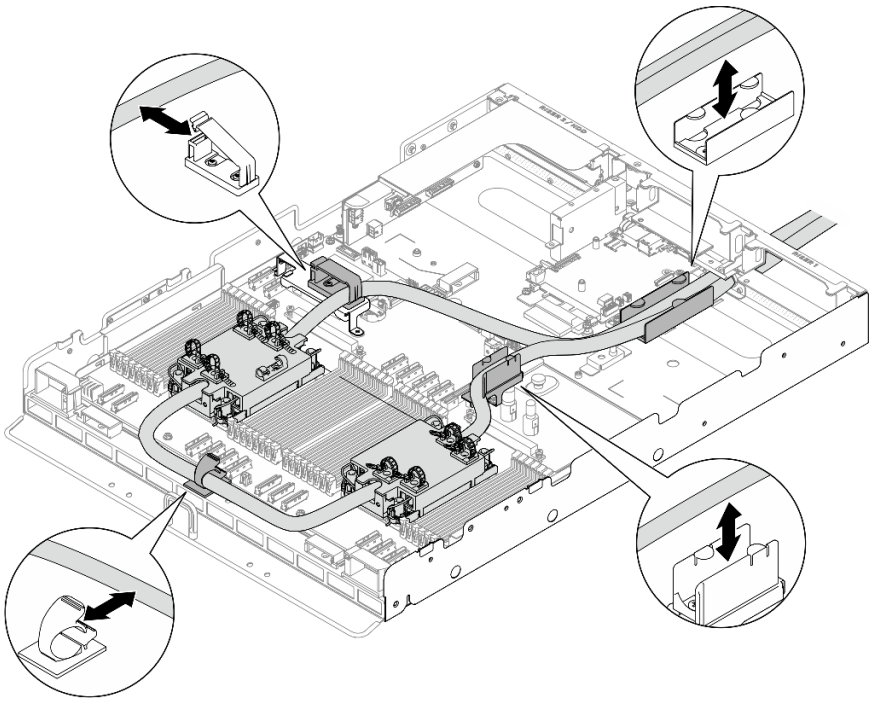


Figure 289. Installing the hoses and module

Note: For leakage sensor module working status, see “leakage sensor module LED” on page 435.

b. 2 Install the first hose through the hose opening on the chassis as illustrated.

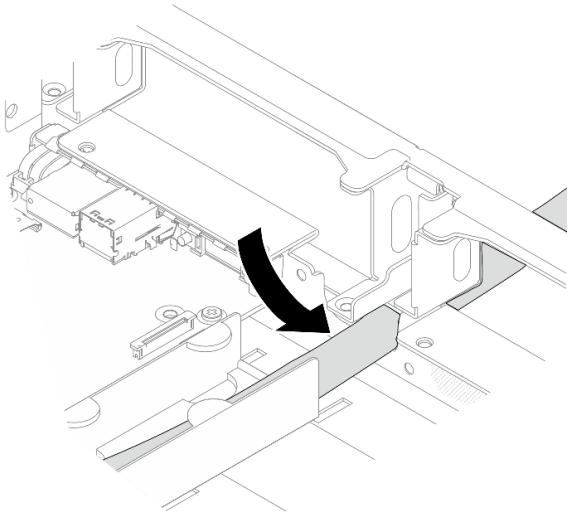


Figure 290. Installing the hose

c. Place the hose holder under the first hose; then, install the hose holder into position by sliding it towards the hose opening on the chassis.

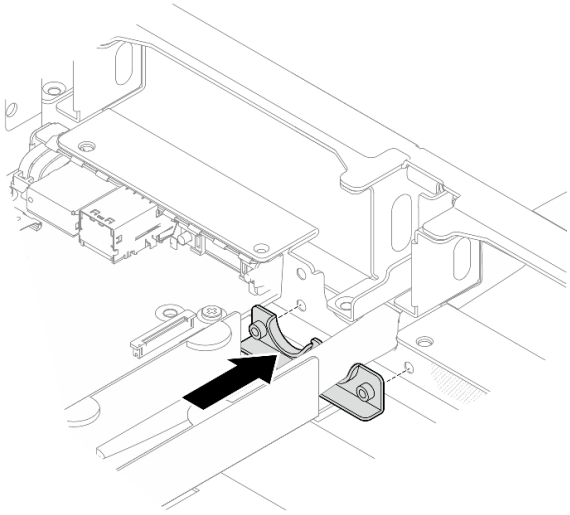


Figure 291. Installing the hose holder

d. ❹ Install the second hose through the hose opening on the chassis as illustrated.

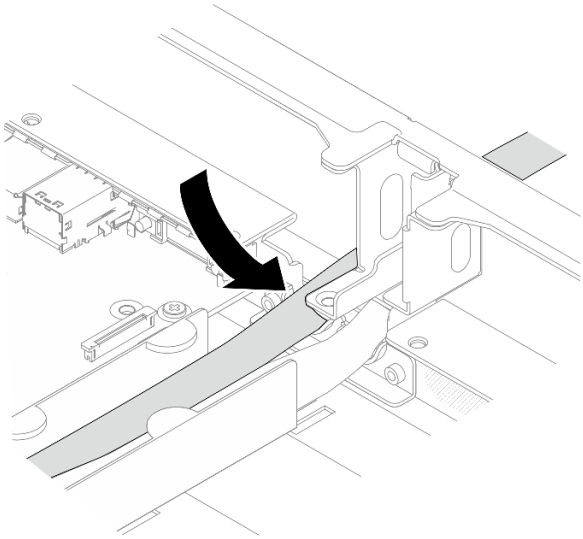


Figure 292. Installing the hose

e. ❺ Fasten the two M3 screws (PH2, 2 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the hose holder in place.

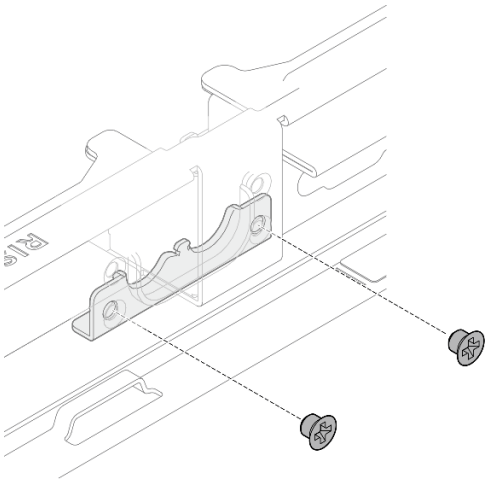


Figure 293. Securing the hose holder

Step 9. Install the hose cover.

a. ❶ Install the hose cover by placing it on top of the hoses; then, slide it towards the hose opening until it is in place.

b. ❷ Fasten the three M3 screws (PH2, 3 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the hose cover to the chassis.

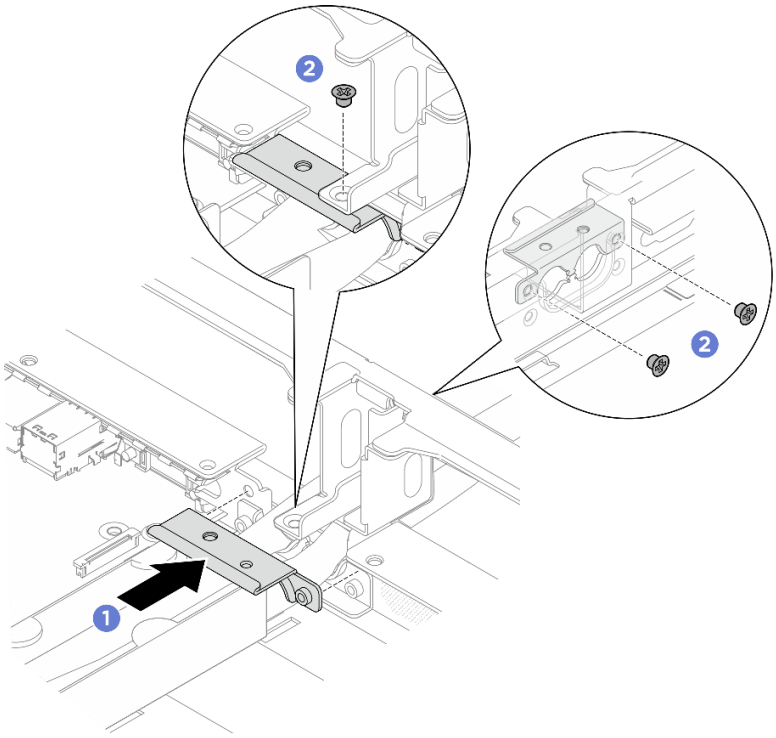


Figure 294. Installing the hose cover

Step 10. Install the leakage sensor module holder bracket.

a. ❶ Align the leakage sensor module holder bracket to the slot on the chassis; then, insert the bracket into the slot.

b. ❷ Fasten the four M3 screws (PH2, 4 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the leakage sensor module holder bracket to the chassis.

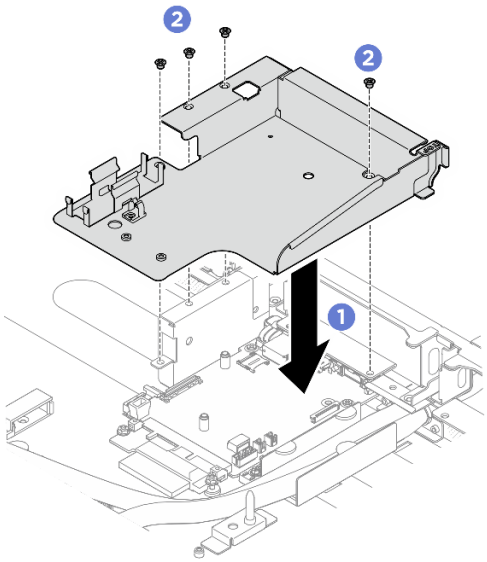


Figure 295. Installing the leakage sensor module holder bracket

Step 11. Install the leakage sensor module to the sensor module holder.

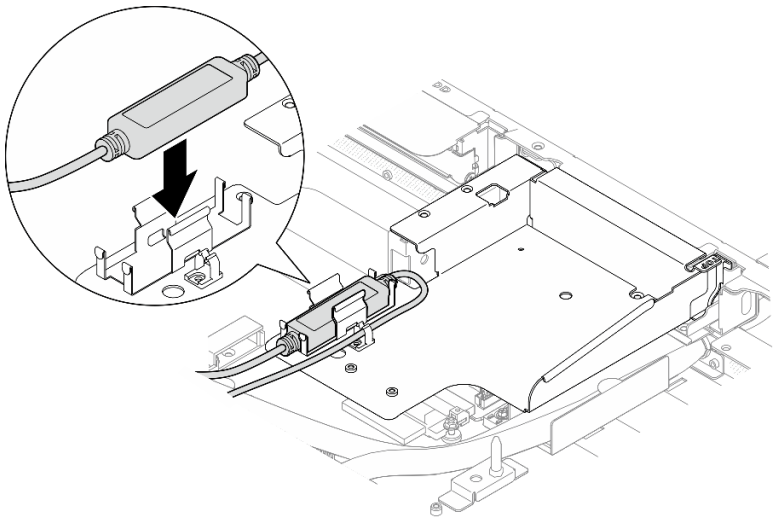


Figure 296. Installing the leakage sensor module

After you finish

1. Connect the cable of the leakage sensor module to the connector on the system board. See “Leakage sensor module cable routing” on page 397.
2. Connect the PCIe switch board signal cables. See “PCIe switch board cable routing” on page 380.
3. Connect the front I/O cables. See “Front I/O module and integrated diagnostics panel cable routing” on page 376.
4. Reinstall the processor air baffle. See “Install the processor air baffle” on page 324.
5. Reinstall the front top cover. See “Install the front top cover” on page 69.
6. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
7. Reinstall the server to the rack. See “Install the server to rack” on page 58.
8. Complete the parts replacement. See “Complete the parts replacement” on page 363.

Demo video

M.2 drive replacement (trained technician only)

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

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 an M.2 drive

Follow instructions in this section to remove an M.2 drive. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- 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 system board assembly), drive backplanes or drive cables, back up all important data that is stored on drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the rear top cover. See “Remove the rear top cover” on page 70.

c. Remove the processor air baffle. See “Remove the processor air baffle” on page 323.

Step 2. Locate the M.2 drive slots on the system board.

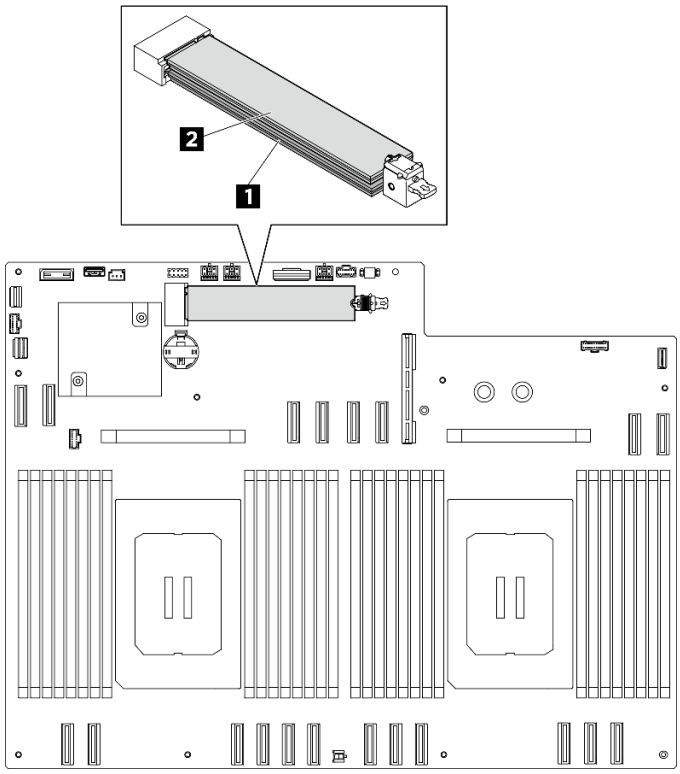


Figure 297. M.2 drive slots

1 Slot 1	2 Slot 2

Step 3. Remove the M.2 card holder if necessary.

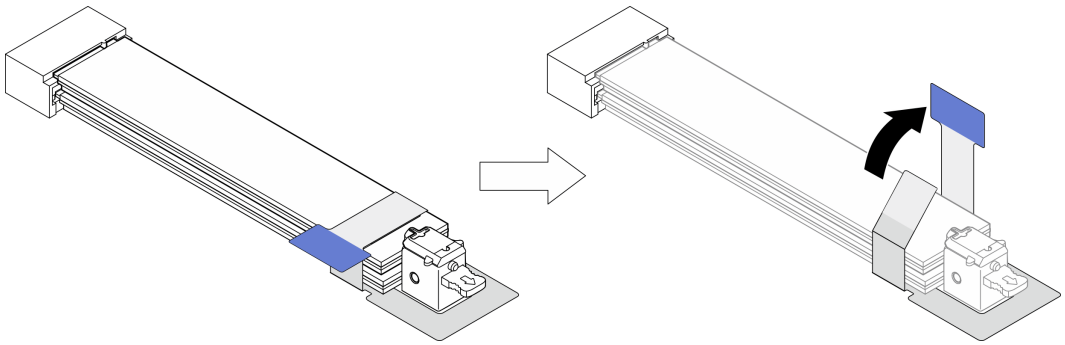


Figure 298. Removing M.2 card holder

Step 4. Remove the upper M.2 drive.

a. 1 Slide the upper retainer backward as illustrated to disengage the M.2 drive.

b. 2 The M.2 drive will slightly lift away from the system board.

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.

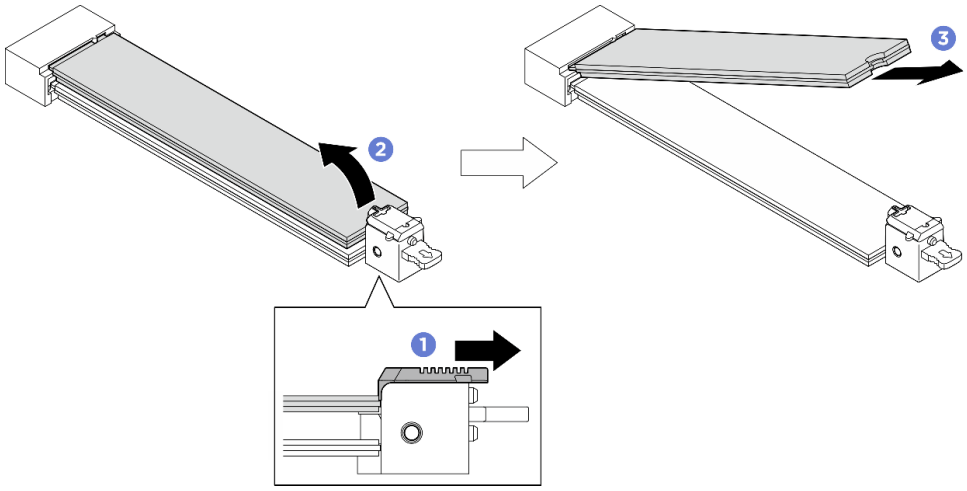


Figure 299. Removing upper M.2 drive

Step 5. Remove the lower M.2 drive.

a. ❶ Pull the lower retainer as illustrated to disengage the M.2 drive.

b. ❷ The M.2 drive will slightly lift away from the system board.

c. ❸ 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.

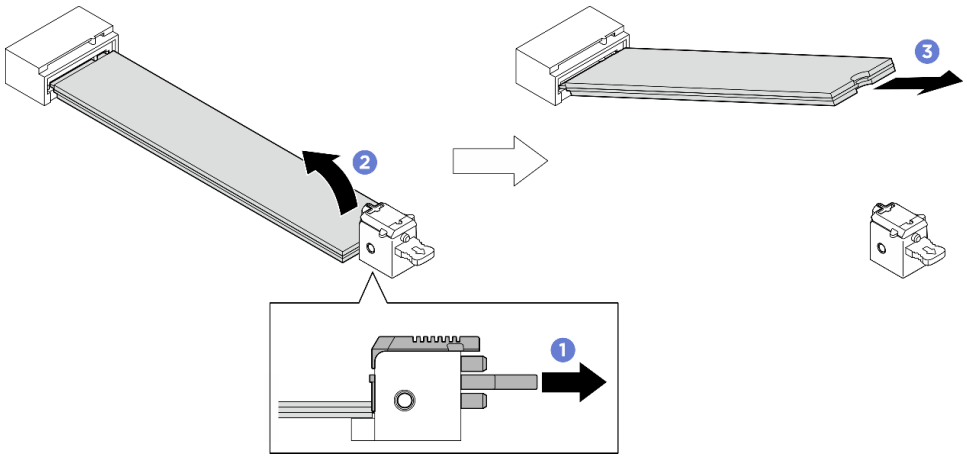


Figure 300. Removing lower M.2 drive

After you finish

- Install a replacement unit. See "Install an M.2 drive" on page 277.
- 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 M.2 drive

Follow instructions in this section to install an M.2 drive. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

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

- Go to https://datacentersupport.lenovo.com/tw/en/products/servers/thinksystem/sr780av3/7dj5/downloads/driver-list/ to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” on page 403 for more information on firmware updating tools.

Procedure

Step 1. Locate the M.2 drive slots on the system board.

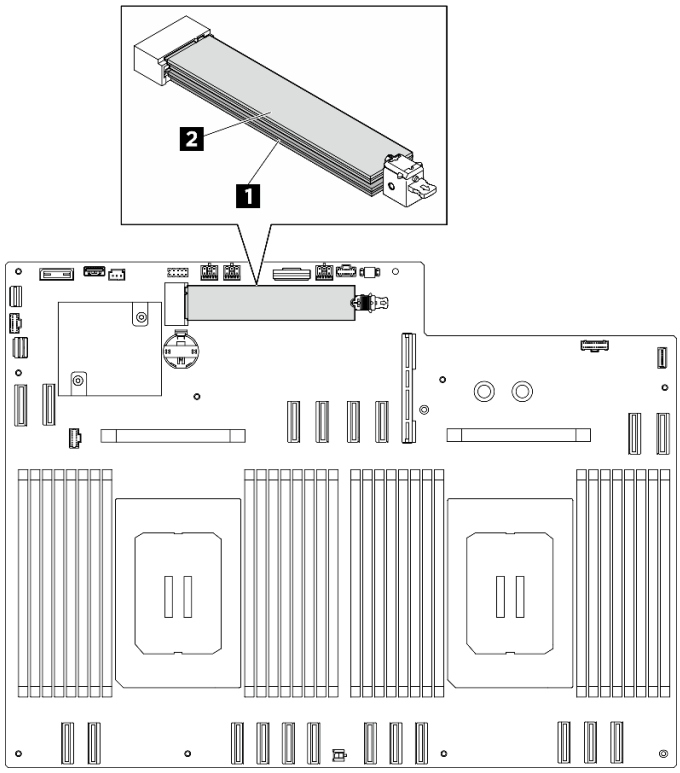


Figure 301. M.2 drive slots

1 Slot 1	2 Slot 2

Step 2. Install the lower M.2 drive.

a. (1) Pull and hold the lower retainer as illustrated.

b. (2) Insert the M.2 drive into the lower M.2 slot at an angle of approximately 15 degrees.

c. (3) Pivot the other end of the M.2 drive down and slide the retainer toward the M.2 drive to secure it in place.

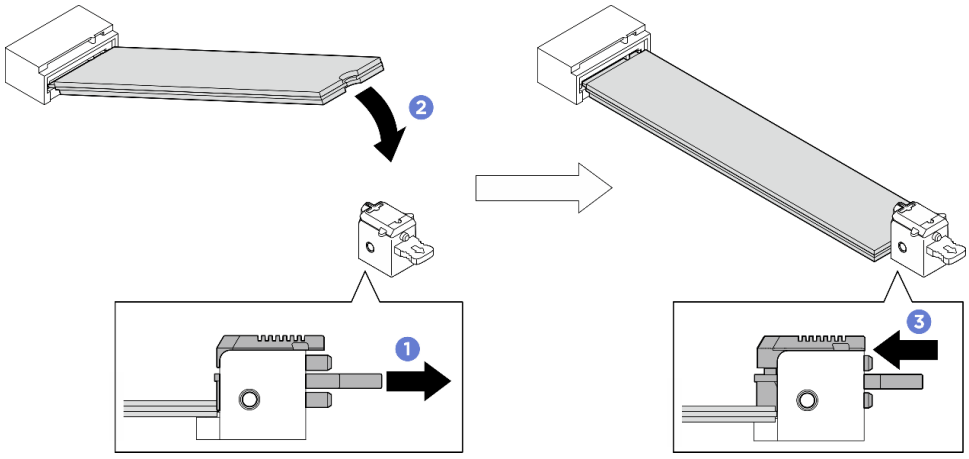


Figure 302. Installing lower M.2 drive

Step 3. Install upper M.2 drive.

a. ❶ Insert the M.2 drive into the upper M.2 slot at an angle of approximately 15 degrees.

b. ❷ Pivot the other end of the M.2 drive downward until it securely locks into place with the retainer.

c. ❸ The upper retainer will automatically lock into position, securing the M.2 drive in place.

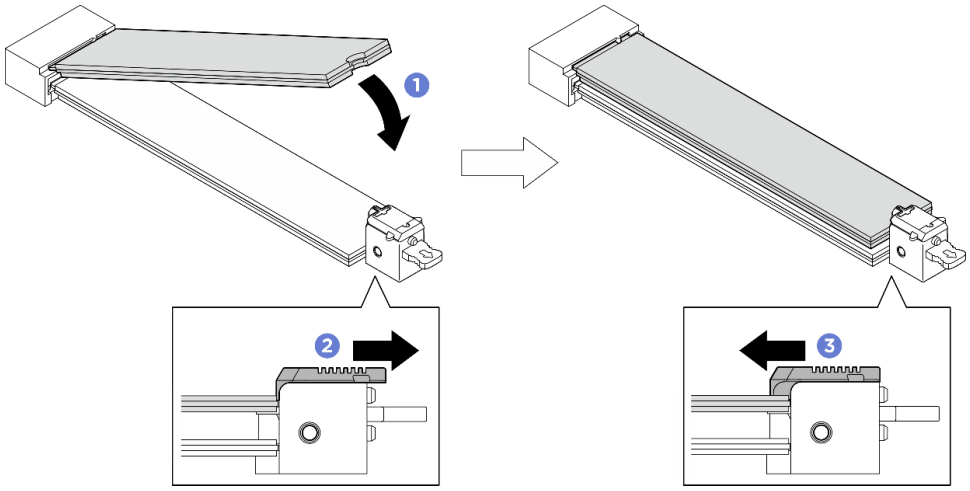


Figure 303. Installing upper M.2 drive

After you finish

1. Reinstall the processor air baffle. See “Install the processor air baffle” on page 324.
2. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
3. Reinstall the front top cover. See “Install the front top cover” on page 69.
4. Complete the parts replacement. See “Complete the parts replacement” on page 363.

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

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- Make sure to remove or install memory module at least 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 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 46.
  - 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.

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 this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the processor air baffle. See “Remove the processor air baffle” on page 323.

c. Locate the memory module slots and determine which memory module to be removed.

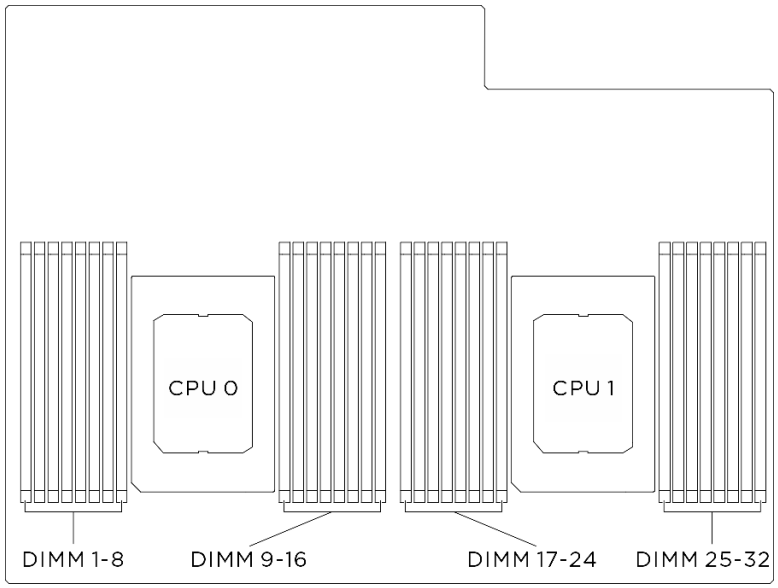


Figure 304. Memory modules and processors layout

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.

a. ❶ Gently open the retaining clip on each end of the memory module slot.

b. ❷ Grasp the memory module at both ends and carefully lift it out of the slot.

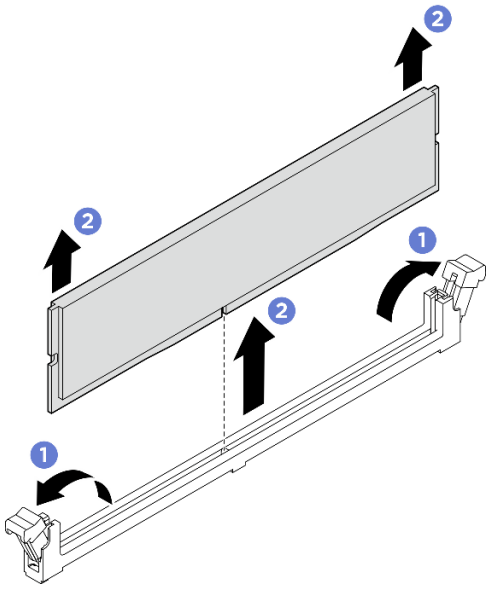


Figure 305. Memory module removal

After you finish

1. A memory module slot must be installed with a memory module or a memory module filler. See “Install a memory module” on page 282.

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 a memory module

Follow instructions in this section to install a memory module.

About this task

See “Memory module installation rules and order” on page 47 for detailed information about memory configuration and setup.

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- Make sure to remove or install memory module at least 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.
- Make sure to adopt one of the supported configurations listed in “Memory module installation rules and order” on page 47.
- Memory modules are sensitive to static discharge and require special handling. Refer to the standard guidelines at “Handling static-sensitive devices” on page 46:
  - 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.

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

- Go to https://datacentersupport.lenovo.com/tw/en/products/servers/thinksystem/sr780av3/7dj5/downloads/driver-list/ to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” on page 403 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 system board assembly.

Note: Ensure that you observe the installation rules and sequence order in “Memory module installation rules and order” on page 47.

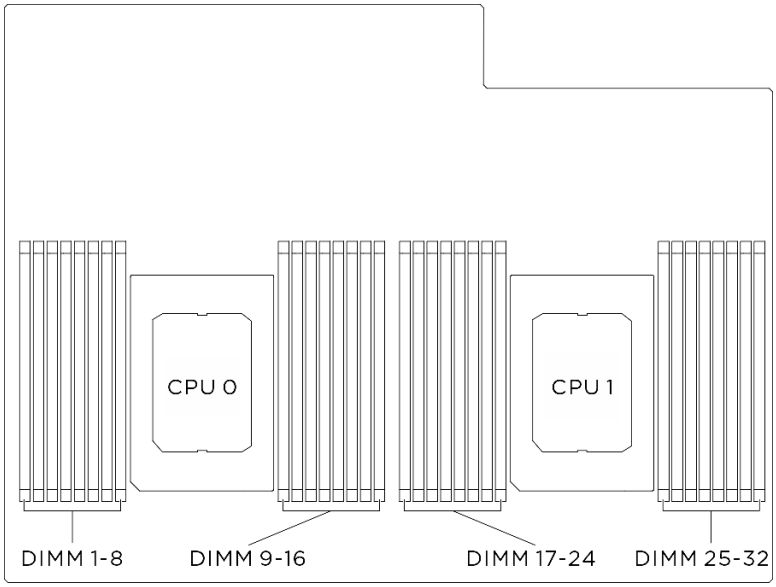


Figure 306. Memory modules and processors layout

Step 2. Install the memory module into the slot.

a. 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.

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.

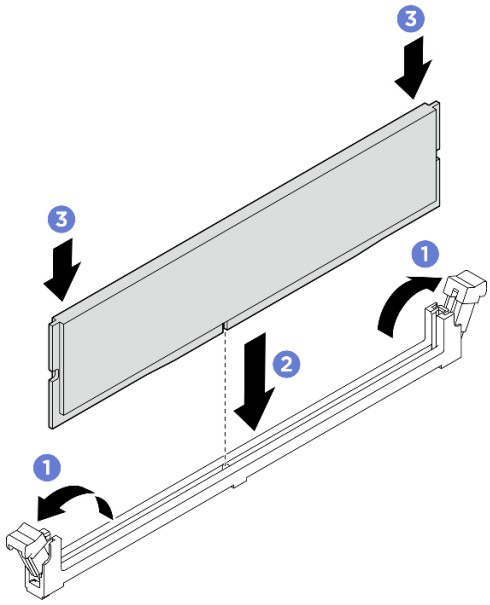


Figure 307. Memory module installation

After you finish

1. Reinstall the processor air baffle. See "Install the processor air baffle" on page 324.
2. Reinstall the CPU complex. See "Install the CPU complex" on page 84.
3. Complete the parts replacement. See "Complete the parts replacement" on page 363.

MicroSD card replacement (trained technician only)

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

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 MicroSD card

Follow instructions in this section to remove the MicroSD card.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the rear top cover. See “Remove the rear top cover” on page 70.

c. Remove the processor air baffle. See “Remove the processor air baffle” on page 323.

d. If applicable, remove the leakage detection sensor module bracket. See “Remove the leakage sensor module bracket” on page 254..

Step 2. Locate the MicroSD card on the system I/O board.

Step 3. Remove the MicroSD card.

a. ❶ Slide the socket lid to the open position.

b. ❷ Lift open the socket lid.

c. ❸ Remove the MicroSD card from the socket.

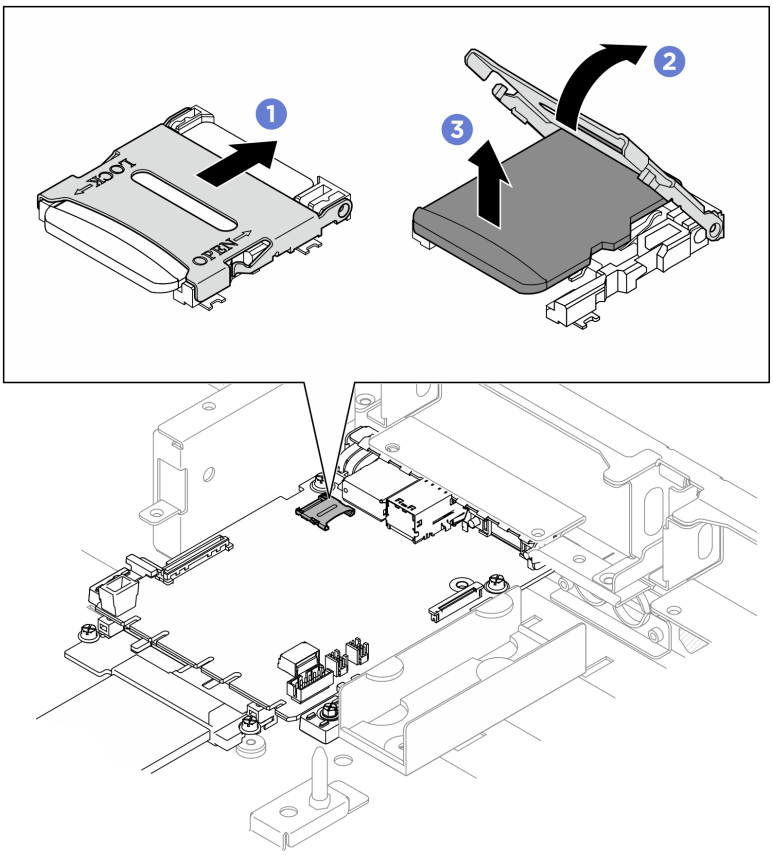


Figure 308. Removing MicroSD card

After you finish

1. Install a replacement unit (see “Install the MicroSD card” on page 286).
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 MicroSD card

Follow instructions in this section to install the MicroSD card.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. 1 Place the MicroSD card into the socket.

Step 2. 2 Close the socket lid.

Step 3. 3 Slide the socket lid to the lock position.

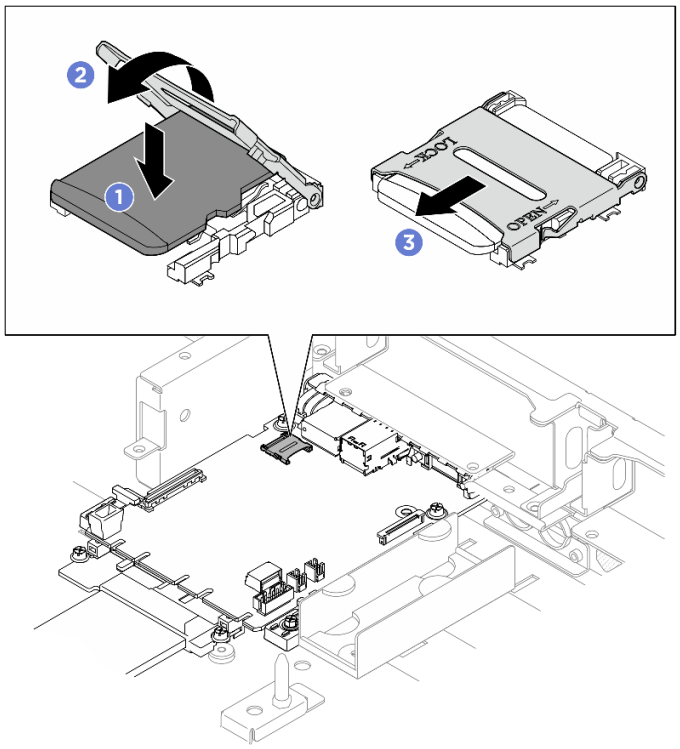


Figure 309. Installing MicroSD card

After you finish

1. If applicable, reinstall the leakage sensor module bracket. See "Install the leakage sensor module bracket" on page 256.
2. Reinstall the processor air baffle. See "Install the processor air baffle" on page 324.
3. Reinstall the rear top cover. See "Install the rear top cover" on page 72.
4. Reinstall the front top cover. See "Install the front top cover" on page 69.
5. Complete the parts replacement. See "Complete the parts replacement" on page 363.

PCIe adapter replacement (trained technician only)

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

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 a front PCIe adapter

Follow instructions in this section to remove a front PCIe adapter. The procedure must be executed by a trained technician.

About this task

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.

- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Disengage the PCIe switch shuttle from the chassis.

a. ❶ Press the two blue release latches.

b. ❷ Rotate the two release levers until they are perpendicular to the PCIe switch shuttle.

c. ❸ Pull the PCIe switch shuttle forward until it stops.

Note: Push the two release levers back until they lock into place after pulling out the PCIe switch shuttle to avoid damage.

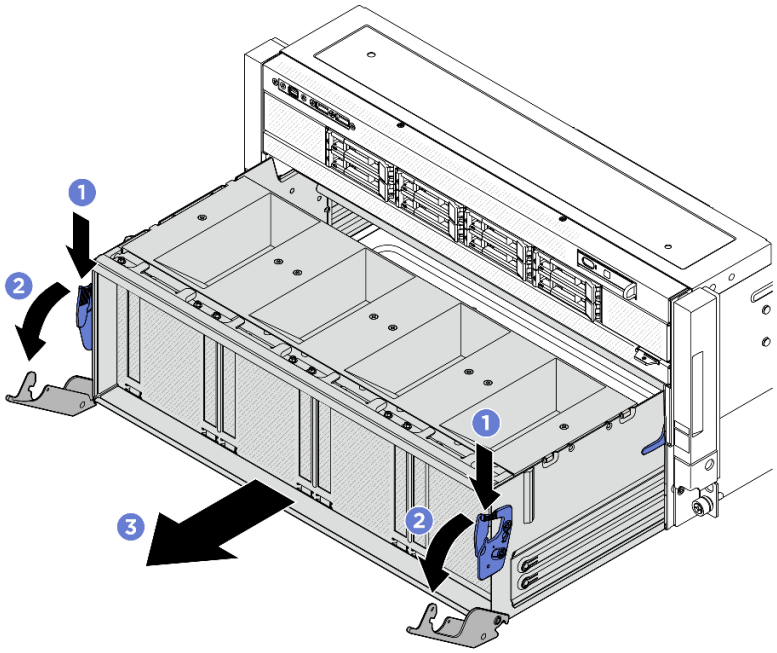


Figure 310. PCIe switch shuttle removal to stop position

Step 2. Remove the PCIe switch shuttle air baffle.

a. ❶ Unfasten the four screws that secure the air baffle.

b. ❷ Lift the air baffle out of the PCIe switch shuttle.

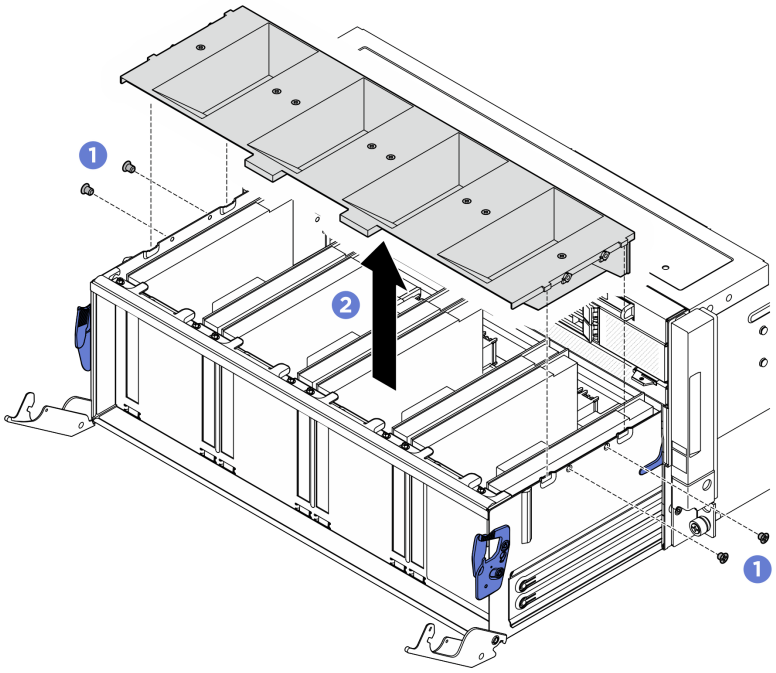


Figure 311. Removing air baffle

Step 3. Unfasten the screw that secures the front PCIe adapter to the PCIe switch shuttle; then, lift the front PCIe adapter out of the PCIe slot.

Note: The PCIe adapter might look different from the illustration.

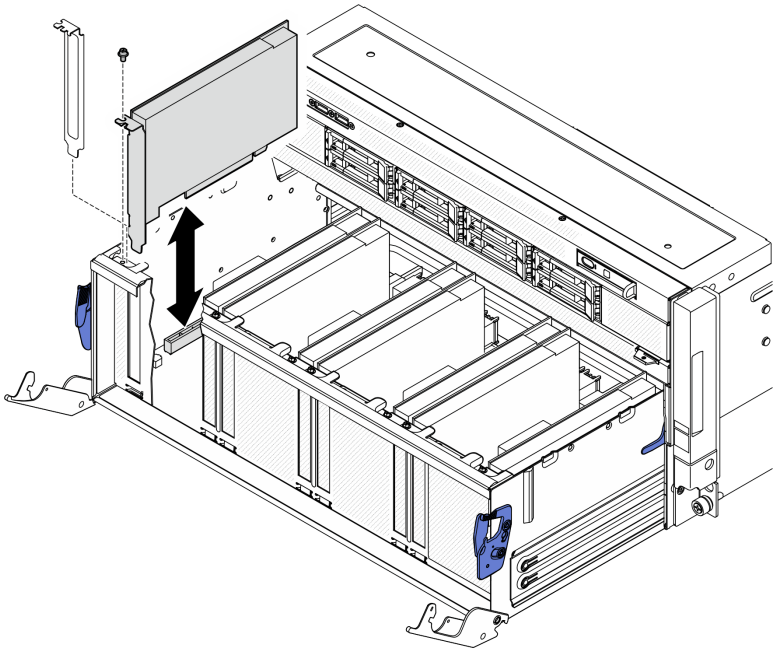


Figure 312. Front PCIe adapter removal

After you finish

1. Install a replacement unit. See "Install a front PCIe adapter" on page 290.

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 a front PCIe adapter

Follow instructions in this section to install a front PCIe adapter. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. Align the front PCIe adapter with the PCIe slot on the PCIe switch board; then, press the front PCIe adapter into the slot until it is fully seated.

Step 2. Fasten the screw to secure the front PCIe adapter.

Note: The PCIe adapter might look different from the illustration.

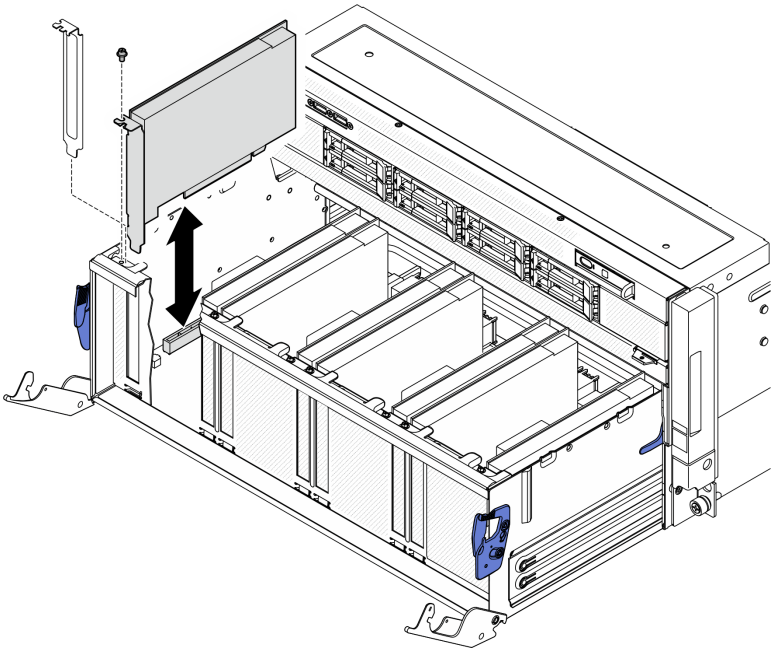


Figure 313. Front PCIe adapter installation

Step 3. Install the PCIe switch shuttle air baffle.

a. ❶ Align the air baffle with the slots on the PCIe switch shuttle; then, lower it into the shuttle.

b. ❷ Fasten the four screws to secure the air baffle in place.

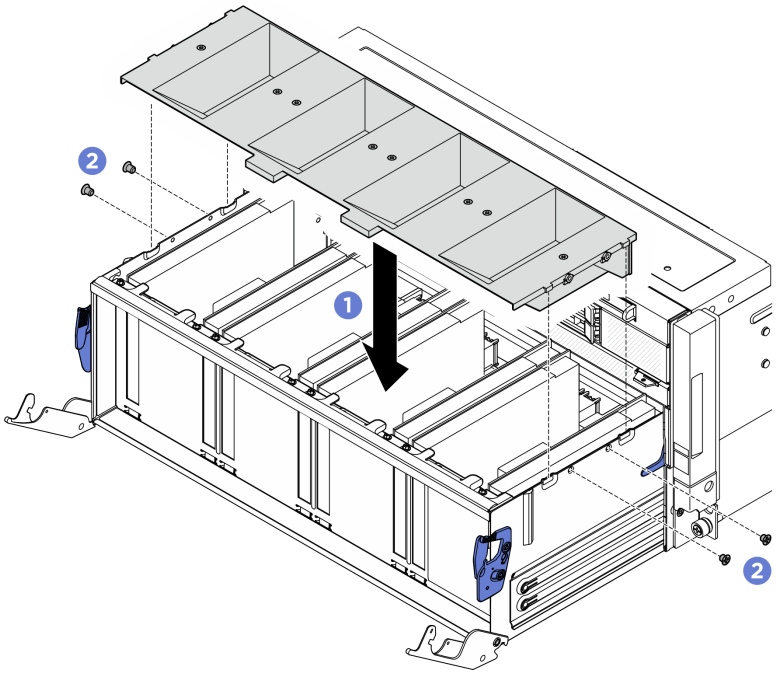


Figure 314. Installing air baffle

Step 4. Install the PCIe switch shuttle.

a. ❶ Press the two lock latches on both sides of the PCIe switch shuttle.

b. ❷ Push the PCIe switch shuttle into the chassis until it stops.

c. ❸ Rotate the two release levers until they lock into place.

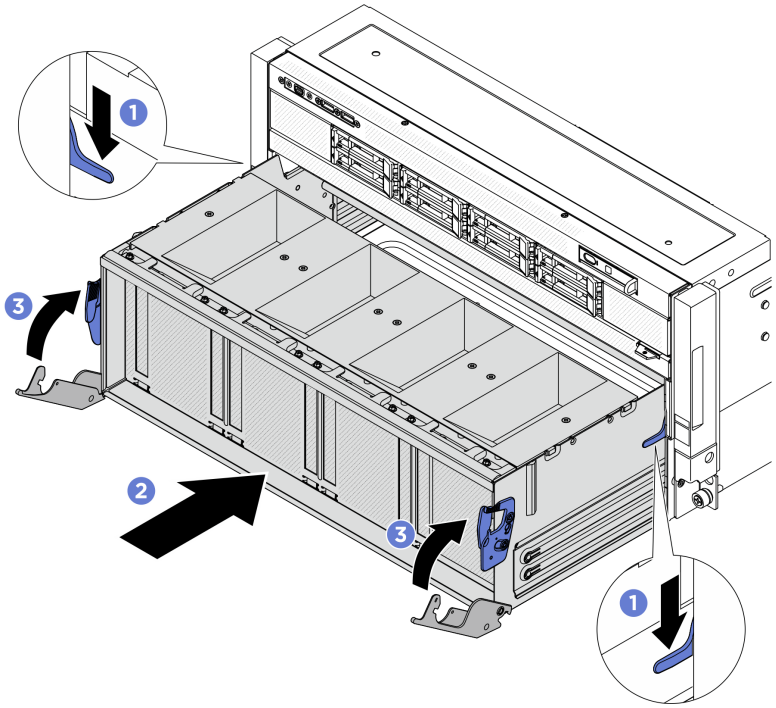


Figure 315. PCIe switch shuttle installation

After you finish

Complete the parts replacement. See “Complete the parts replacement” on page 363.

Remove a rear PCIe adapter

Follow instructions in this section to remove a rear PCIe adapter. The procedure must be executed by a trained technician.

About this task

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the rear top cover. See “Remove the rear top cover” on page 70.

c. Remove the processor air baffle. See “Remove the processor air baffle” on page 323.

d. If applicable, remove the PCIe riser assembly(ies). See “Remove a PCIe riser assembly” on page 294.

Step 2. Disconnect the cable from the rear PCIe adapter.

Step 3. Remove the rear PCIe adapter.

a. ❶ Unfasten the screw that secures the rear PCIe adapter to the PCIe riser.

b. ❷ Grasp the rear PCIe adapter by its edges and carefully pull it out of the PCIe slot.

Note: The PCIe adapter might look different from the illustration.

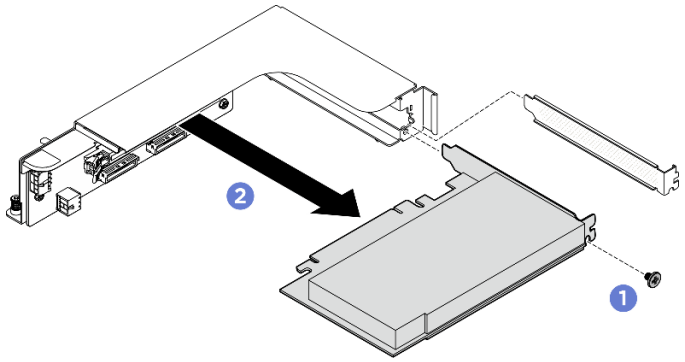


Figure 316. Rear PCIe adapter removal

After you finish

- Install a replacement unit. See “Install a rear PCIe adapter” on page 293.
- 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 a rear PCIe adapter

Follow instructions in this section to install a rear PCIe adapter. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. ❶ Insert the rear PCIe adapter into the PCIe riser.

Step 2. ❷ Fasten the screw to secure the rear PCIe adapter.

Note: The PCIe adapter might look different from the illustration.

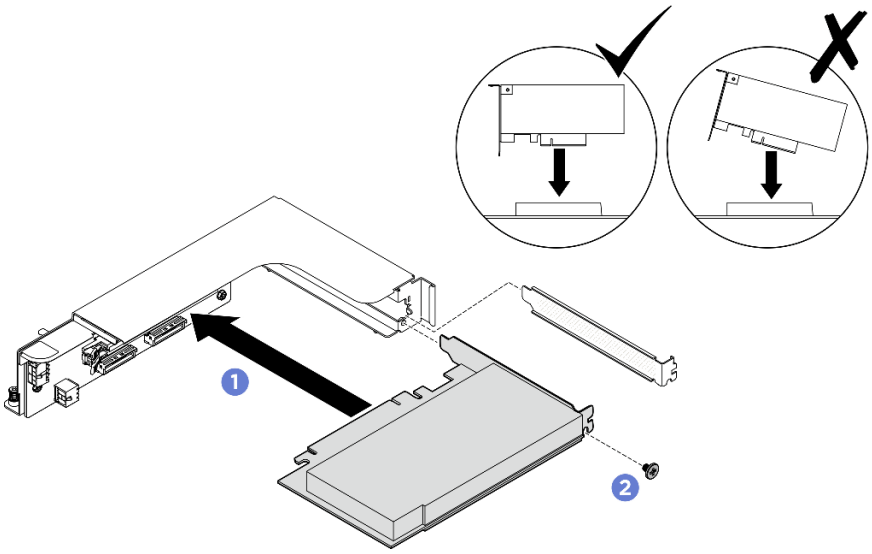


Figure 317. Rear PCIe adapter installation

Step 3. Connect the cable to the rear PCIe adapter.

After you finish

1. If applicable, reinstall the PCIe riser assembly(ies). See “Install a PCIe riser assembly” on page 297.
2. Reinstall the processor air baffle. See “Install the processor air baffle” on page 324.
3. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
4. Reinstall the front top cover. See “Install the front top cover” on page 69.

5. Complete the parts replacement. See “Complete the parts replacement” on page 363.

PCIe riser assembly replacement (trained technician only)

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

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 a PCIe riser assembly

Follow instructions in this section to remove a PCIe riser assembly. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- The server support up to two PCIe risers, see the following illustration for corresponding locations.

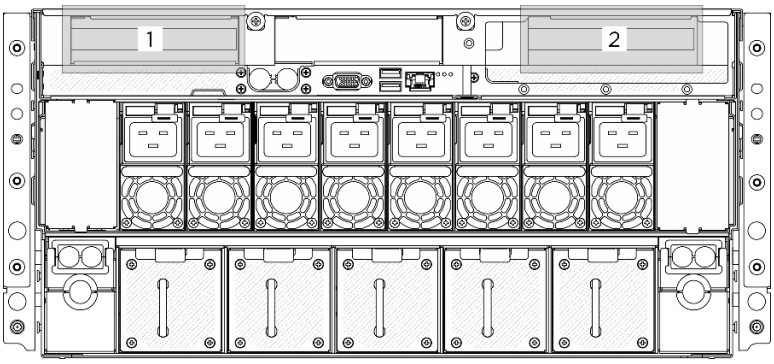


Figure 318. PCIe riser locations

Note: To maintain proper system cooling, do not operate the server without a PCIe riser or a riser filler installed in the CPU complex.

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the rear top cover. See “Remove the rear top cover” on page 70.

c. Remove the processor air baffle. See “Remove the processor air baffle” on page 323.

Step 2. Remove the PCIe riser assembly in riser slot 1.

a. ❶ Unfasten the thumbscrew on the PCIe riser.

b. ❷ Lift the PCIe riser assembly out of the CPU complex.

c. Disconnect the PCIe riser assembly cables. See “PCIe riser cable routing” on page 394 for more information on the internal cable routing.

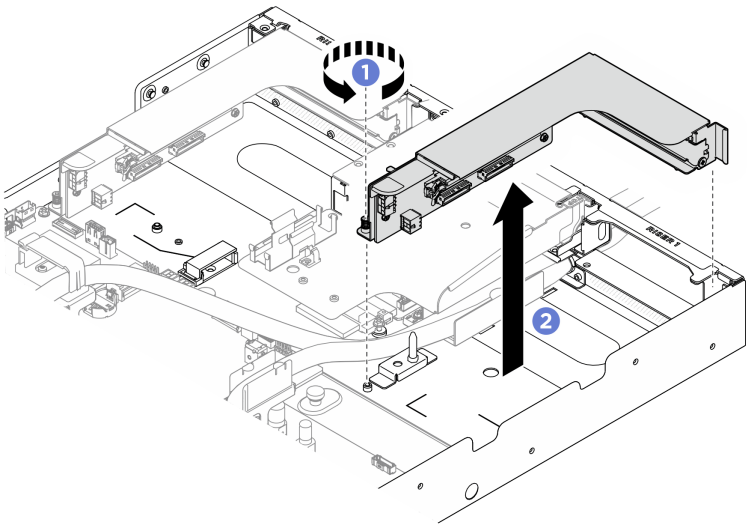


Figure 319. PCIe riser assembly removal in slot 1

Step 3. Remove the PCIe riser assembly in riser slot 2.

a. ❶ Unfasten the thumbscrew on the PCIe riser.

b. ❷ Lift the PCIe riser assembly out of the CPU complex.

c. Disconnect the PCIe riser assembly cables. See “PCIe riser cable routing” on page 394 for more information on the internal cable routing.

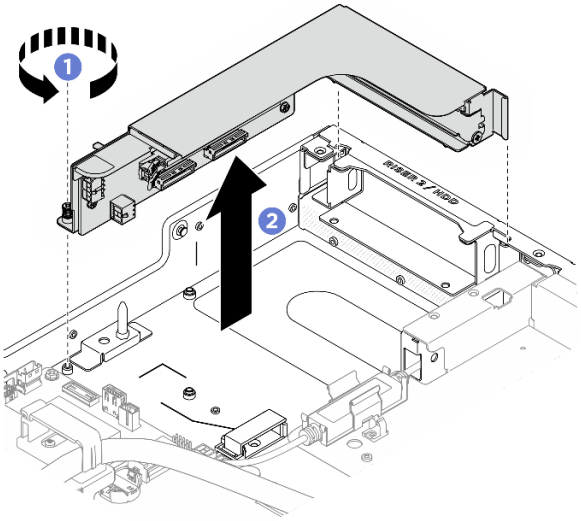


Figure 320. PCIe riser assembly removal in slot 2

Step 4. If necessary, remove the rear riser support bracket in riser slot 2.

a. ❶ Unfasten the ten screw that secure the rear riser support bracket to the CPU complex.

b. ❷ Lift the rear riser support bracket out of the riser slot.

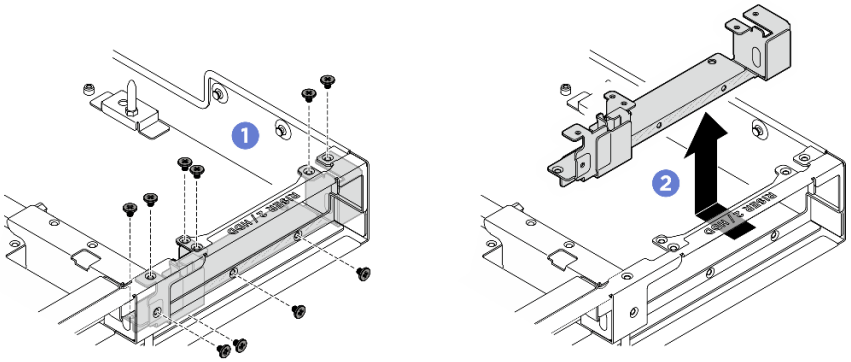


Figure 321. Removing rear riser support bracket

After you finish

1. 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.
2. If you plan to recycle the component:
   a. Remove the rear PCIe adapter from the PCIe riser.
      1) ❶ Unfasten the screw that secures the rear PCIe adapter to the PCIe riser.
      2) ❷ Grasp the rear PCIe adapter by its edges and carefully pull it out of the PCIe slot.

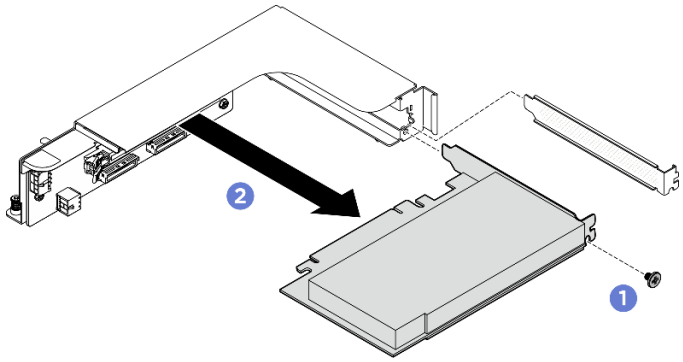


Figure 322. Rear PCIe adapter removal

b. Unfasten the three screws to remove the PCIe riser card from the PCIe riser cage.

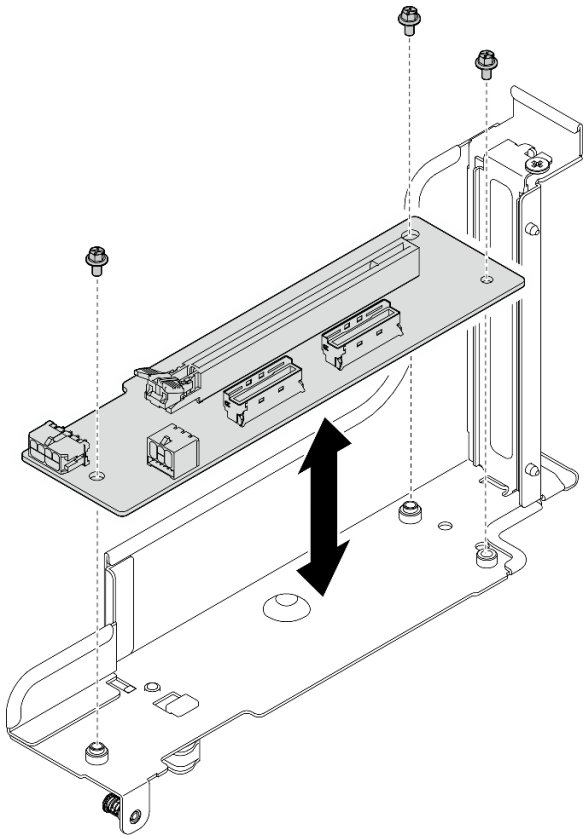


Figure 323. PCIe riser card removal

c. Recycle the component in compliance with local regulations.

Install a PCIe riser assembly

Follow instructions in this section to install a PCIe riser assembly. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- The server support up to two PCIe risers, see the following illustration for corresponding locations.

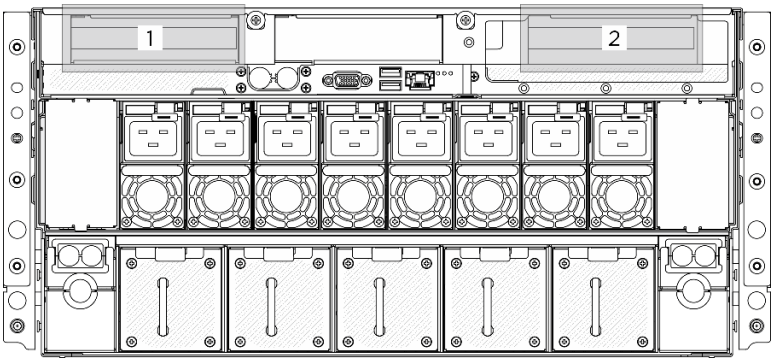


Figure 324. PCIe riser locations

Procedure

Step 1. Install the PCIe riser assembly in riser slot 1.

a. Connect the PCIe riser assembly cables. See “PCIe riser cable routing” on page 394 for more information on the internal cable routing.

b. 1 Align the guide hole on the PCIe riser with the guide post on the system board assembly; then, insert the PCIe riser assembly into the PCIe slot on the system board assembly.

c. 2 Fasten the thumbscrew to secure the PCIe riser assembly.

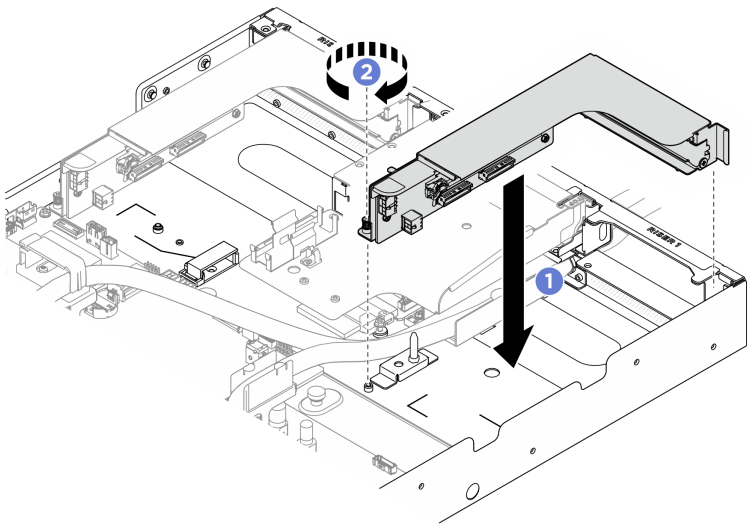


Figure 325. PCIe riser assembly installation in slot 1

Step 2. Install the rear riser support bracket before installing PCIe riser assembly in riser slot 2.

a. 1 Insert the rear riser support bracket into the riser slot until it is in place.

b. 2 Fasten the ten M3 screws (PH2, 10 x M3, 0.9 newton-meters, 8 inch-pounds) to secure the rear riser support bracket to the chassis.

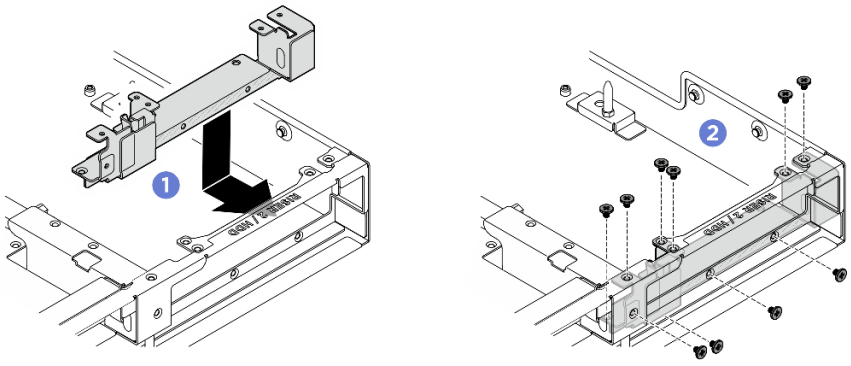


Figure 326. Installing rear riser support bracket

Step 3. Install the PCIe riser assembly in riser slot 2.

a. Connect the PCIe riser assembly cables. See "PCIe riser cable routing" on page 394 for more information on the internal cable routing.

b. 1 Align the guide hole on the PCIe riser with the guide post on the system board assembly; then, insert the PCIe riser assembly into the PCIe slot on the system board assembly.

c. 2 Fasten the thumbscrew to secure the PCIe riser assembly.

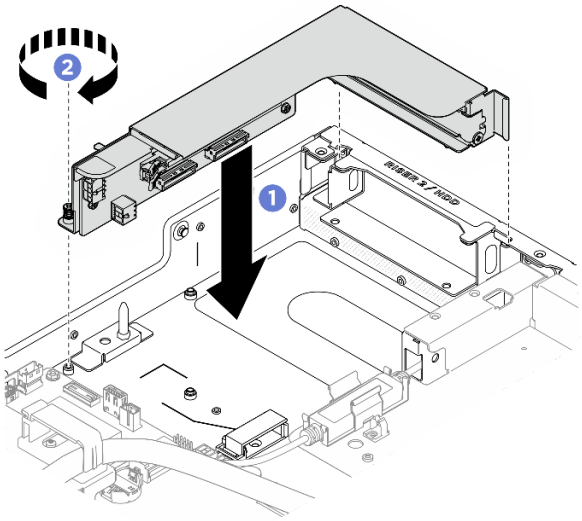


Figure 327. PCIe riser assembly installation in slot 2

Step 4. If necessary, attach the labels to both ends of the cable.

a. 1 Attach the white space portion of the label to one end of the cable.

b. 2 Wrap the label around the cable and attach it to the white space portion.

c. Repeat to attach the other label to the opposite end of the cable.

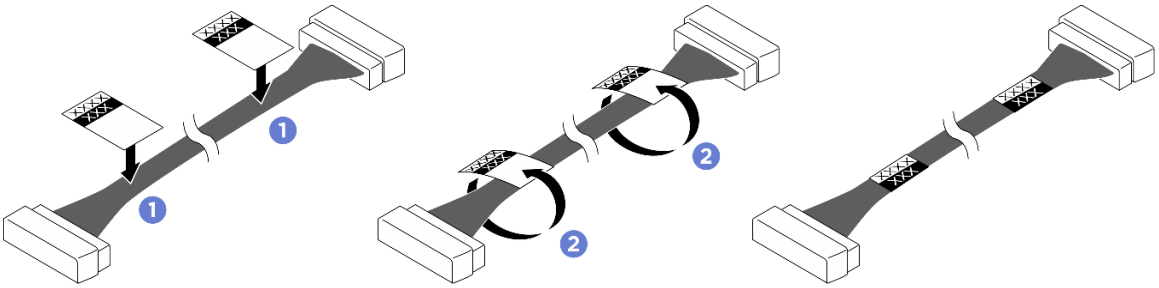


Figure 328. Label application

Note: See the table below to identify the corresponding labels for the cable.

From	To	Label
PCIe riser 2 signal connector (MCIO 1)	**System board assembly: PCIe Riser 2 signal connectors (MCIO4B)**	R2-MCIO 1 MCIO 4B
PCIe riser 2 signal connector (MCIO 2)	**System board assembly: PCIe Riser 2 signal connectors (MCIO4A)**	R2-MCIO 2 MCIO 4A
PCIe Riser 2 power connector (RISER PWR)	**System board assembly: PCIe Riser 2 power and sideband connector (BP PWR/SIG 1)**	R2-Riser PWR PWR/SIG 2
PCIe riser 1 signal connector (MCIO 1)	**System board assembly: PCIe Riser 1 signal connectors (MCIO8A)**	R1-MCIO 1 MCIO 8A
PCIe riser 1 signal connector (MCIO 2)	**System board assembly: PCIe Riser 1 signal connectors (MCIO8B)**	R1-MCIO 2 MCIO 8B
PCIe Riser 1 power connector (RISER PWR)	**System board assembly: PCIe Riser 1 power and sideband connector (BP PWR/SIG 3)**	R1-Riser PWR PWR/SIG 3

After you finish

1. Reinstall the processor air baffle. See “Install the processor air baffle” on page 324.
2. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
3. Reinstall the front top cover. See “Install the front top cover” on page 69.
4. Complete the parts replacement. See “Complete the parts replacement” on page 363.

PCIe switch board and heat sink replacement (trained technician only)

Follow instructions in this section to remove and install the PCIe switch board and a PCIe switch board heat sink.

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 a PCIe switch board heat sink

Follow instructions in this section to remove a PCIe switch board heat sink. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this task.

a. Remove the PCIe switch shuttle. See “Remove the PCIe switch shuttle” on page 306.

b. Remove all the front PCIe adapters. See “Remove a front PCIe adapter” on page 287.

Step 2. Remove the PCIe switch board heat sink.

a. 1 Fully loosen all the screws on the heat sink in the diagonal pattern.

b. 2 Carefully lift the heat sink from the PCIe switch board.

Note: Loosen or tighten the screws with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to be fully loosen or tighten is 0.9 newton-meters, 8 inch-pounds.

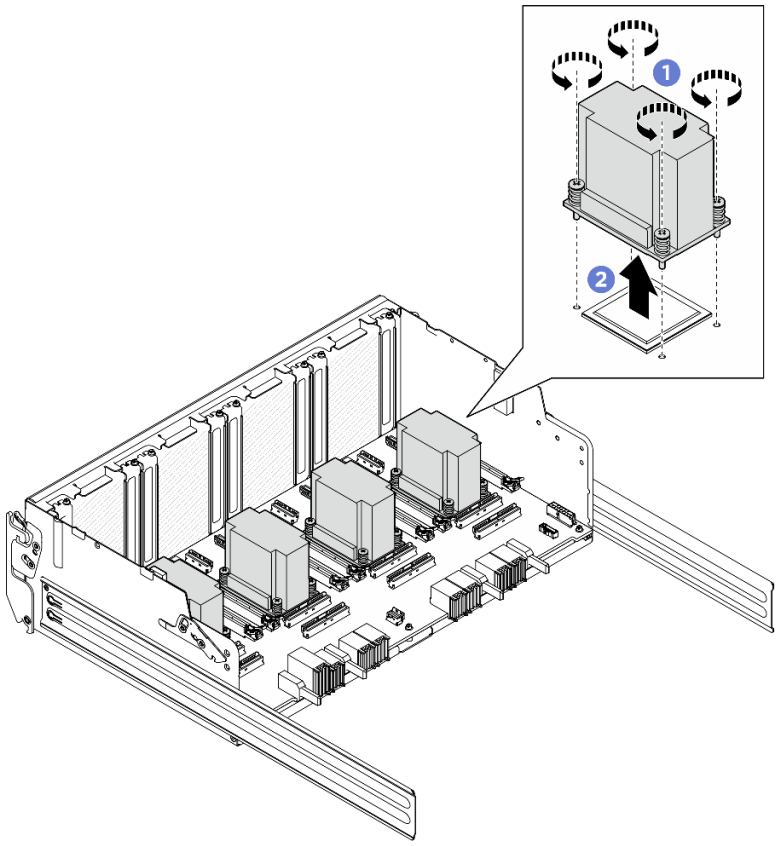


Figure 329. PCIe switch board heat sink removal

Step 3. With an alcohol cleaning pad, wipe off any thermal grease from the following components:

- Heat spreader on the PCIe switch board
- Bottom of the PCIe switch board heat sink

After you finish

1. If you are replacing a PCIe switch board heat sink, install a new one. See "Install a PCIe switch board heat sink" on page 305.
2. If you are replacing the PCIe switch board, remove it. See "Remove the PCIe switch board" on page 302.
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.

Remove the PCIe switch board

Follow instructions in this section to remove the PCIe switch shuttle. The procedure must be executed by a trained technician.

About this task

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.

- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this task.

a. Remove the PCIe switch shuttle. See “Remove the PCIe switch shuttle” on page 306.

b. Remove all the front PCIe adapters. See “Remove a front PCIe adapter” on page 287.

c. Remove all the PCIe switch board heat sinks. See “Remove a PCIe switch board heat sink” on page 301.

Step 2. Unfasten the six M3 screws on the PCIe switch board; then, lift the PCIe switch board out of the PCIe switch shuttle.

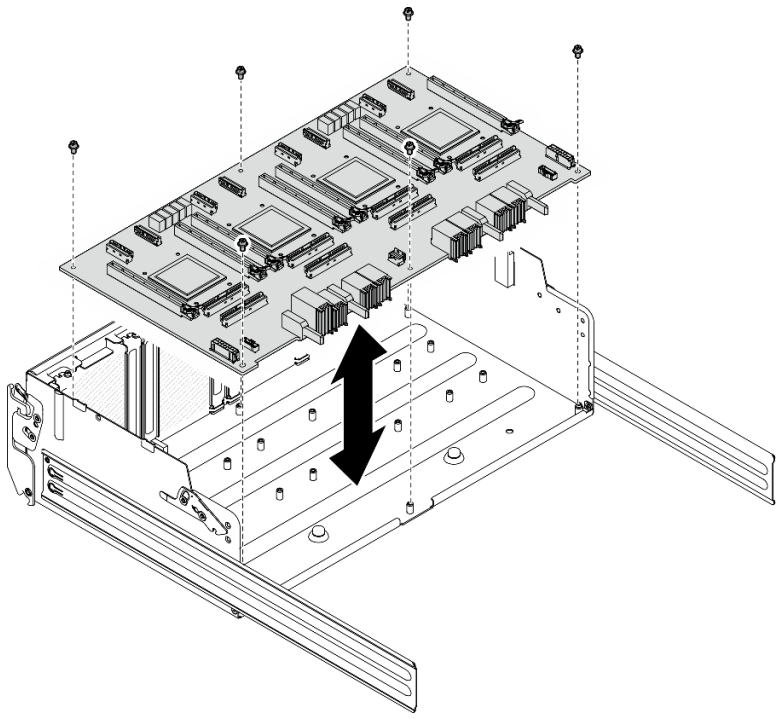


Figure 330. PCIe switch board removal

After you finish

1. Install a replacement unit. See “Install the PCIe switch board” on page 304.
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 PCIe switch board

Follow instructions in this section to install the PCIe switch board. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. Hold the PCIe switch board in the correct orientation as illustrated; then, align the PCIe switch board with the six standoffs on the PCIe switch shuttle, and gently place it onto the PCIe switch shuttle.

Step 2. Fasten the six M3 screws (PH1, 6 x M3, 0.9 newton-meters, 8 inch-pounds) to secure the PCIe switch board.

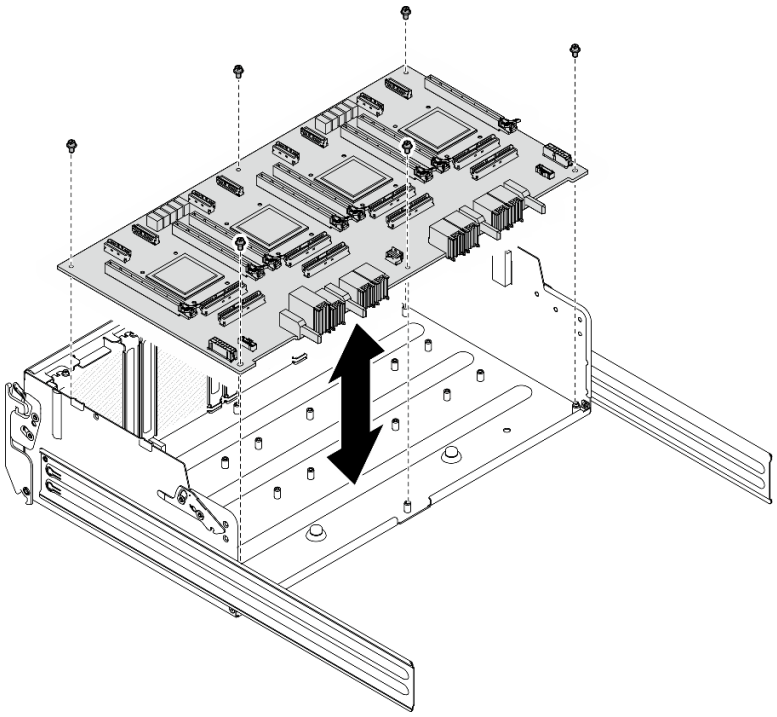


Figure 331. PCIe switch board installation

After you finish

1. Reinstall all the PCIe switch board heat sinks. See “Install a PCIe switch board heat sink” on page 305.
2. Reinstall all the front PCIe adapters. See “Install a front PCIe adapter” on page 290.
3. Reinstall the PCIe switch shuttle. See “Install the PCIe switch shuttle” on page 309.
4. Complete the parts replacement. See “Complete the parts replacement” on page 363.

Install a PCIe switch board heat sink

Follow instructions in this section to install a PCIe switch board heat sink. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. Apply a blob of new thermal grease (0.3 ml) onto the center of the heat spreader.

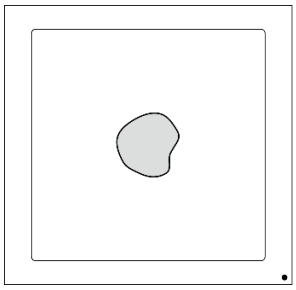


Figure 332. Thermal grease application

Step 2. Install the PCIe switch board heat sink.

a. ❶ Align the PCIe switch board heat sink with the four screw holes on the PCIe switch board; then, gently place the PCIe switch board heat sink onto the PCIe switch board.

b. ❷ Follow the screw sequence specified on the heat-sink label, and turn the four screws clockwise a few turns until the screw threads engage in the PCIe switch board.

c. ❷ Follow the screw sequence specified on the heat-sink label, and fully tighten the four screws to secure the PCIe switch board heat sink.

Note: Loosen or tighten the screws with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to be fully loosen or tighten is 0.9 newton-meters, 8 inch-pounds.

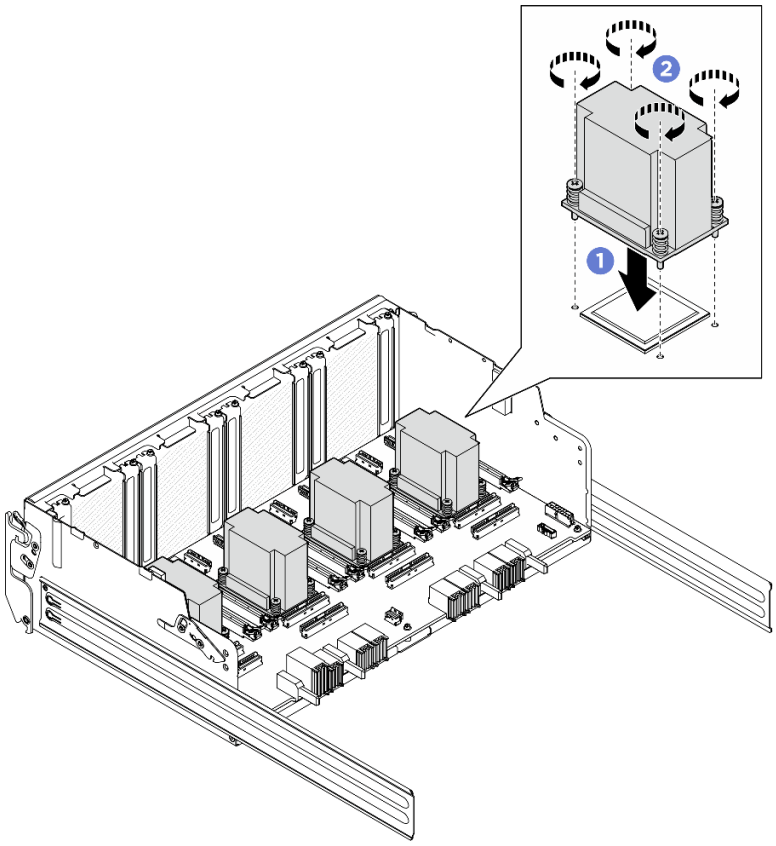


Figure 333. PCIe switch board heat sink installation

After you finish

1. Reinstall all the front PCIe adapters. See “Install a front PCIe adapter” on page 290.
2. Reinstall the PCIe switch shuttle. See “Install the PCIe switch shuttle” on page 309.
3. Complete the parts replacement. See “Complete the parts replacement” on page 363.

PCIe switch shuttle replacement (trained technician only)

Follow instructions in this section to remove and install the PCIe switch shuttle.

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 PCIe switch shuttle

Follow instructions in this section to remove the PCIe switch shuttle. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.

- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- Anti-static gloves are recommended as a precaution while disconnecting cables from the PCIe switch board.

Procedure

Step 1. Disengage the PCIe switch shuttle from the chassis.

a. ❶ Press the two blue release latches.

b. ❷ Rotate the two release levers until they are perpendicular to the PCIe switch shuttle.

c. ❸ Pull the PCIe switch shuttle forward until it stops.

Note: Push the two release levers back until they lock into place after pulling out the PCIe switch shuttle to avoid damage.

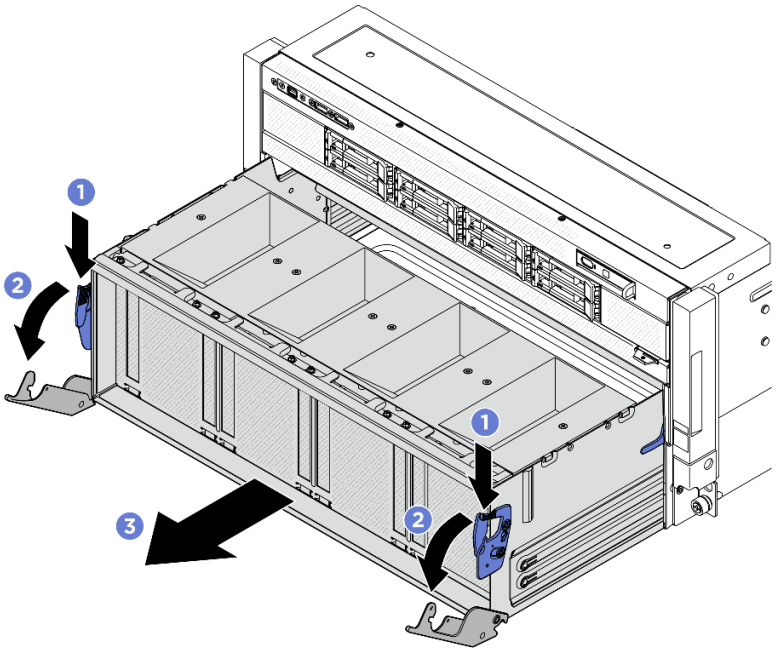


Figure 334. PCIe switch shuttle removal to stop position

Step 2. Remove the PCIe switch shuttle air baffle.

a. ❶ Unfasten the four screws that secure the air baffle.

b. ❷ Lift the air baffle out of the PCIe switch shuttle.

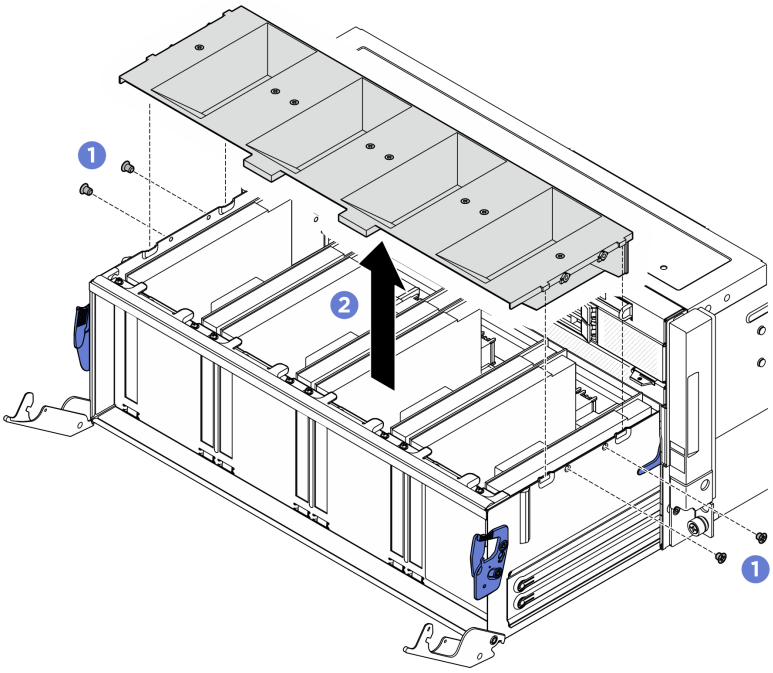


Figure 335. Removing air baffle

Step 3. Release the cables from the cable ties and disconnect them from the PCIe switch board. See "2.5-inch drive backplane cable routing" on page 369 and "PCIe switch board cable routing" on page 380.

Step 4. Remove the PCIe switch shuttle.

a. ❶ Press the two lock latches on both sides of the PCIe switch shuttle.

b. ❷ Slide the PCIe switch shuttle fully forward and remove it from the chassis.

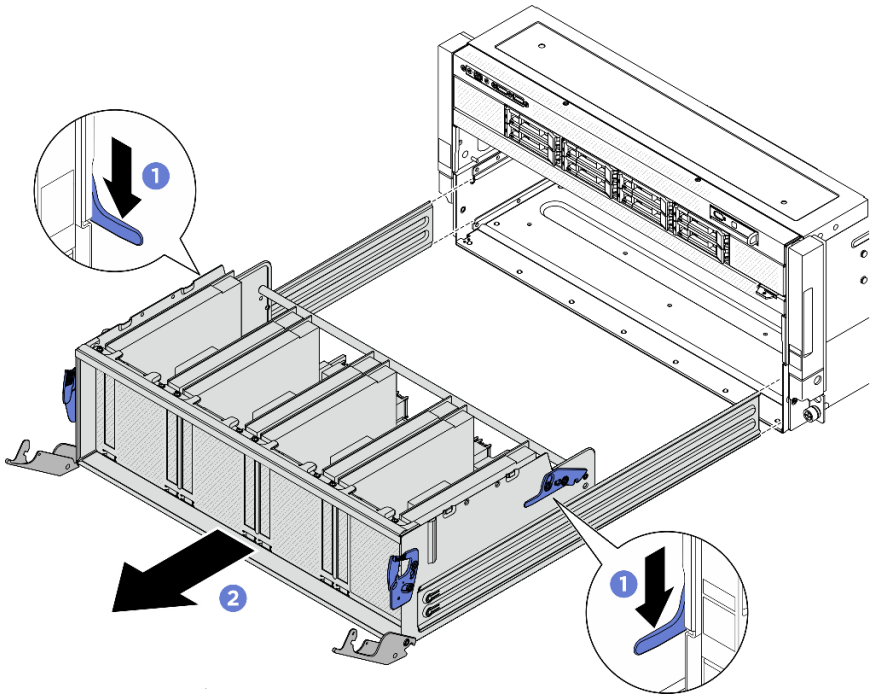


Figure 336. PCIe switch shuttle removal

After you finish

1. Install a replacement unit. See "Install the PCIe switch shuttle" on page 309.
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 PCIe switch shuttle

Follow instructions in this section to install the PCIe switch shuttle. The procedure must be executed by a trained technician.

About this task

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- Anti-static gloves are recommended as a precaution while connecting cables to the PCIe switch board.

Procedure

Step 1. Fully open the two release levers; then, align the PCIe switch shuttle with the opening in the front of the chassis, and slide it into the chassis until it snaps into place.

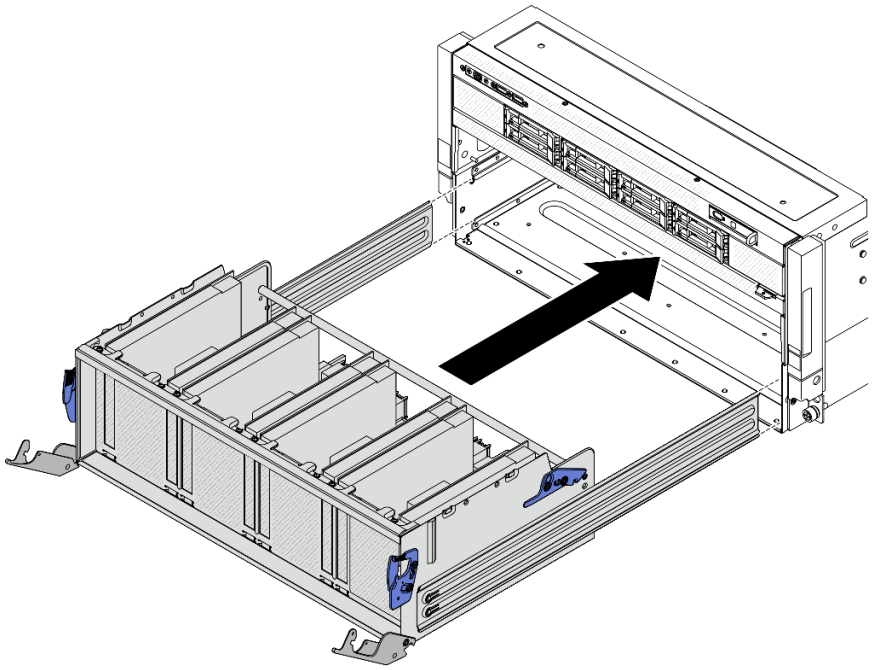


Figure 337. PCIe switch shuttle installation to stop position

Step 2. Reconnect all the cables to the PCIe switch shuttle, and tie them back to the crossbar. See "2.5-inch drive backplane cable routing" on page 369 and "PCIe switch board cable routing" on page 380 for more information.

Step 3. If necessary, attach the labels to both ends of the cable.

a. ❶ Attach the white space portion of the label to one end of the cable.

b. ❷ Wrap the label around the cable and attach it to the white space portion.

c. Repeat to attach the other label to the opposite end of the cable.

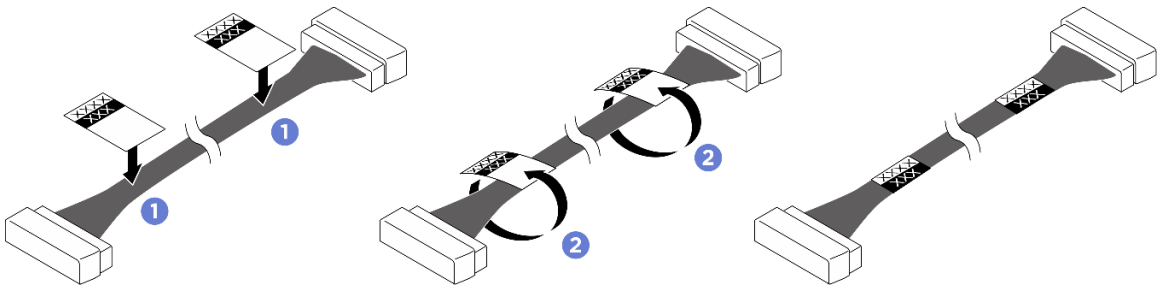


Figure 338. Label application

Note: See the cable routing to identify the corresponding labels for the cable.

Step 4. Install the PCIe switch shuttle air baffle.

a. ❶ Align the air baffle with the slots on the PCIe switch shuttle; then, lower it into the shuttle.

b. ❷ Fasten the four screws to secure the air baffle in place.

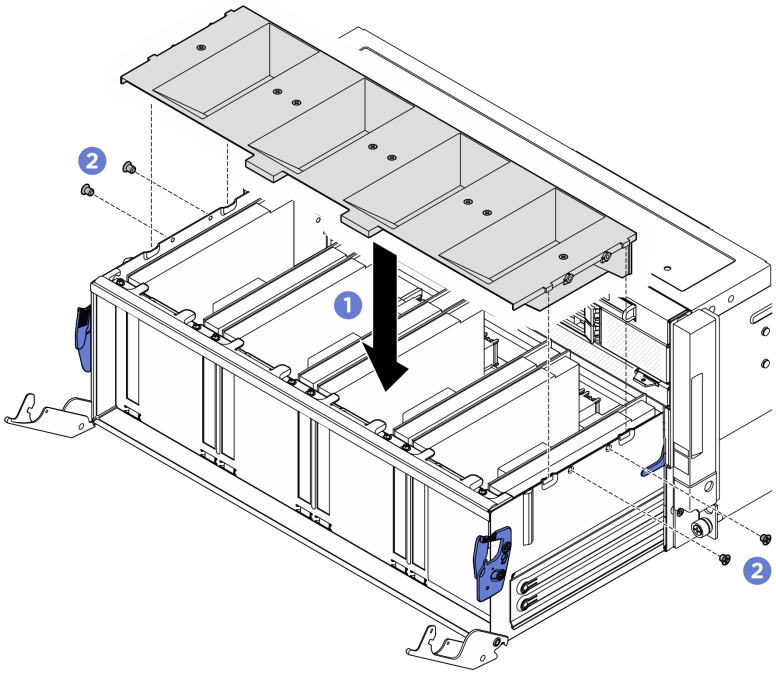


Figure 339. Installing air baffle

Step 5. Install the PCIe switch shuttle.

a. ❶ Press the two lock latches on both sides of the PCIe switch shuttle.

b. ❷ Push the PCIe switch shuttle into the chassis until it stops.

c. ❸ Rotate the two release levers until they lock into place.

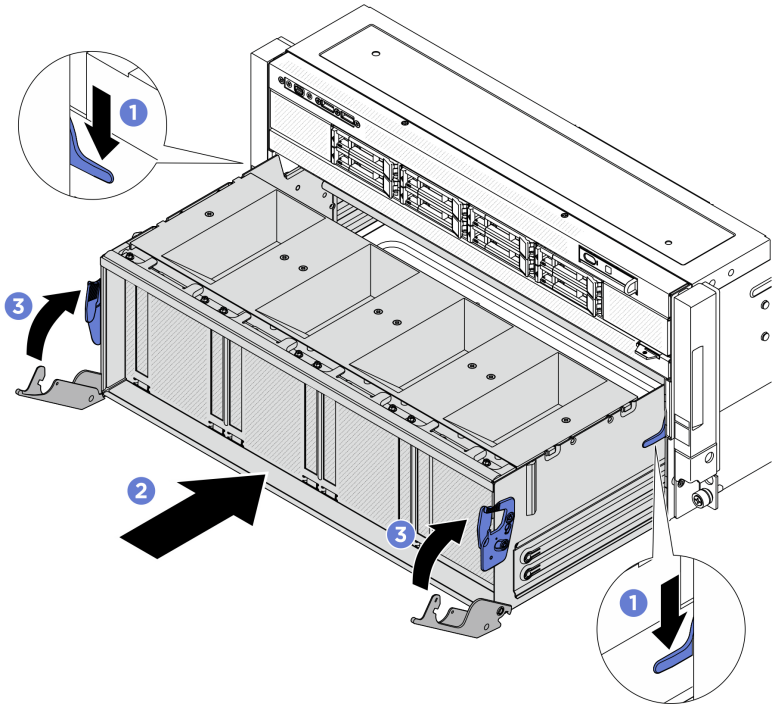


Figure 340. PCIe switch shuttle installation

After you finish

Complete the parts replacement. See “Complete the parts replacement” on page 363.

Power complex replacement (trained technician only)

Follow instructions in this section to remove and install the power complex.

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 power complex

Follow instructions in this section to remove the power complex. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this task.

a. Remove all the power supply units. See “Remove a hot-swap power supply unit” on page 320.

b. Remove the rear top cover. See “Remove the rear top cover” on page 70.

c. Remove the front top cover. See “Remove the front top cover” on page 67.

d. Remove the CPU complex. See “Remove the CPU complex” on page 83.

Step 2. Disconnect all the cables from the PSU interposer and the power distribution board.

Step 3. Remove the power complex.

a. ❶ Unfasten the ten M3 screws marked with **P** (P1-P5) on both sides of the chassis.

b. ❷ Lift the power complex out of the chassis.

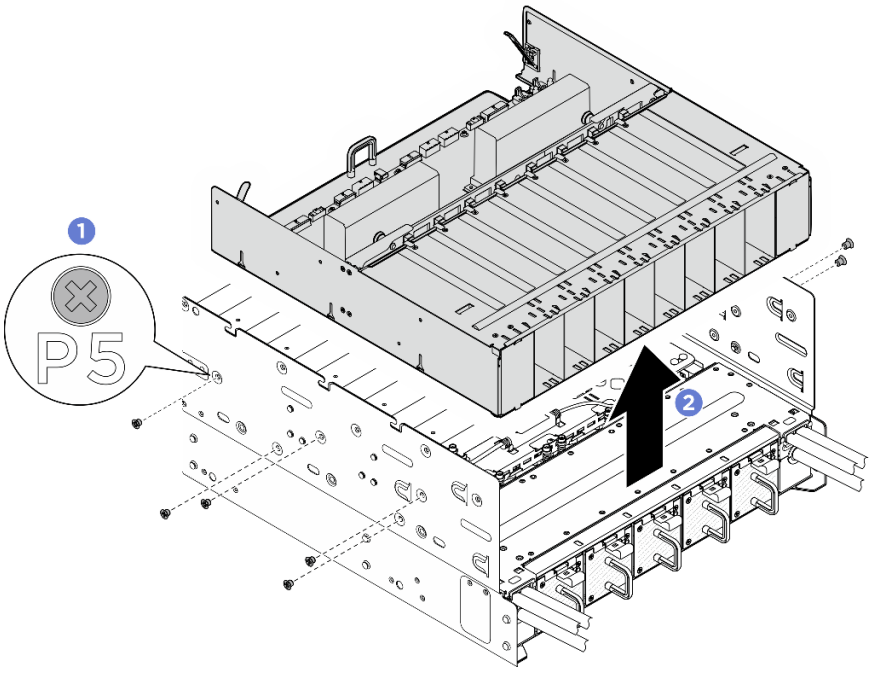


Figure 341. Power complex removal

After you finish

1. Reinstall the replacement. See "Install the power complex" on page 313.
2. Complete the parts replacement. See "Complete the parts replacement" on page 363.

Install the power complex

Follow instructions in this section to install the power complex. The procedure must be executed by a trained technician.

About this task

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. 1 Align the power complex with the six guide pins on the chassis; then, lower the power complex into the chassis until it is securely engaged.

Step 2. 2 Locate the ten screw holes marked with **P** on both sides of the chassis; then, fasten the ten M3 screws (P1-P5) (PH2, 10 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the power complex.

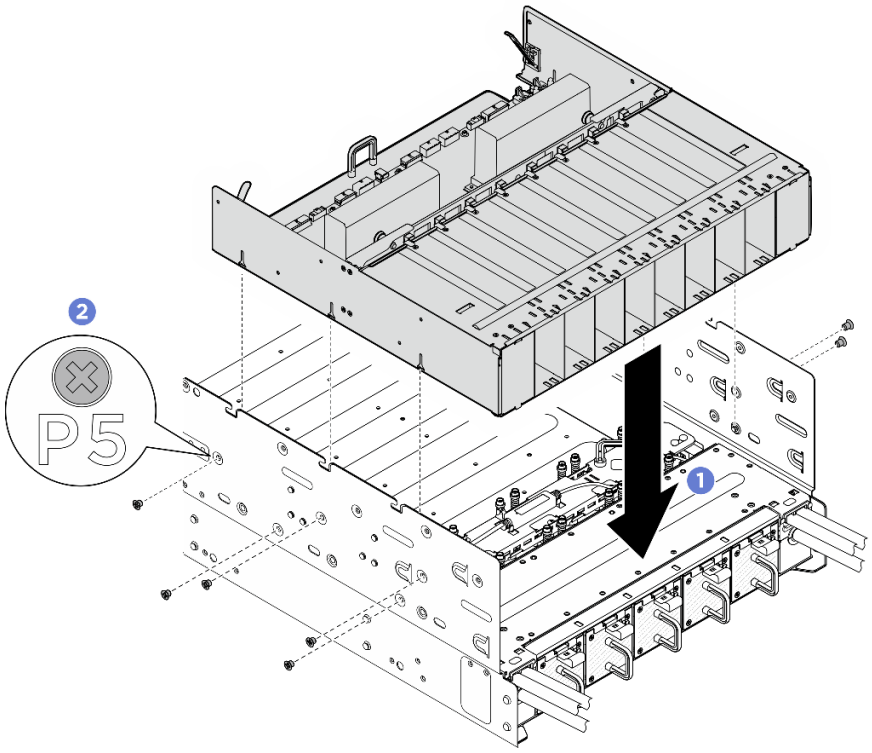


Figure 342. Power complex installation

Step 3. Connect the cables to the PSU interposer and the power distribution board. See “2.5-inch drive backplane cable routing” on page 369, “Fan control board cable routing” on page 374, “GPU baseboard cable routing” on page 376, “PCIe switch board cable routing” on page 380, “Leakage sensor module cable routing” on page 397 and “PSU interposer cable routing” on page 391 for more information.

Step 4. If necessary, attach the labels to both ends of the power cable.

a. ❶ Attach the white space portion of the label to one end of the cable.

b. ❷ Wrap the label around the cable and attach it to the white space portion.

c. Repeat to attach the other label to the opposite end of the cable.

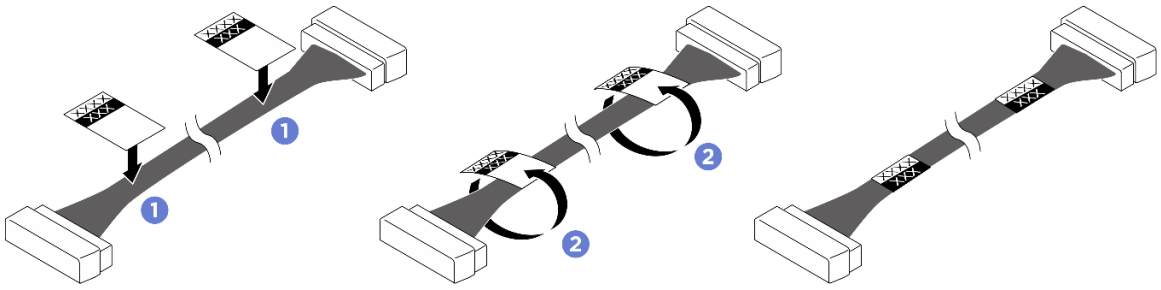


Figure 343. Label application

Note: See the cable routing to identify the corresponding labels for the cable.

After you finish

1. Reinstall the CPU complex. See “Install the CPU complex” on page 84.
2. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
3. Reinstall the front top cover. See “Install the front top cover” on page 69.
4. Reinstall all the power supply units. See “Install a hot-swap power supply unit” on page 321.
5. Complete the parts replacement. See “Complete the parts replacement” on page 363.

Power distribution board replacement (trained technician only)

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

Follow instructions in this section to remove the power distribution board. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this task.

a. Remove all the power supply units. See “Remove a hot-swap power supply unit” on page 320.

b. Remove the front top cover. See “Remove the front top cover” on page 67.

c. Remove the rear top cover. See “Remove the rear top cover” on page 70.

d. Remove the CPU complex. See “Remove the CPU complex” on page 83.

Step 2. Disconnect all the cables from the PSU interposer.

Step 3. Remove the PSU interposer.

a. ❶ Pull out the two plungers.

b. ❷ Rotate the two release latches to disengage the PSU interposer from the power distribution board.

c. ❸ Grasp the PSU interposer by its edges and carefully pull it out of the power complex.

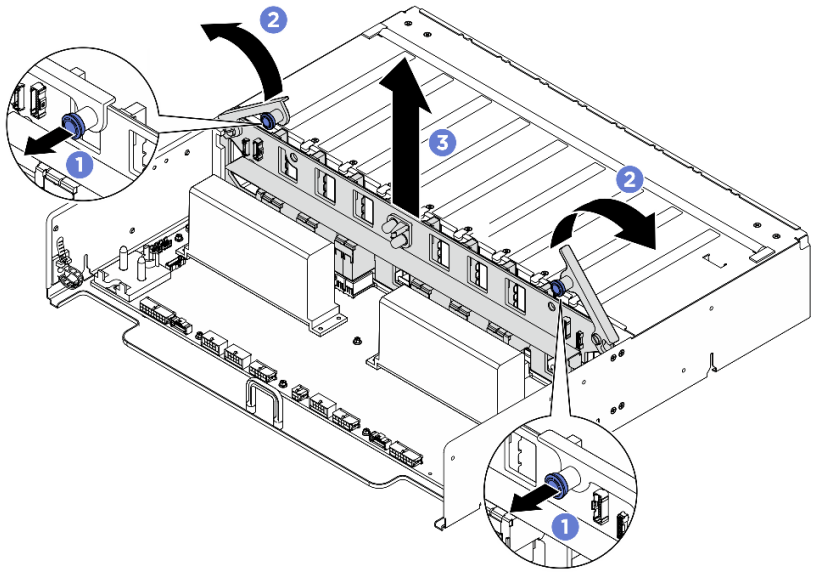


Figure 344. PSU interposer removal

Step 4. Disconnect all the cables from the power distribution board.

Step 5. Remove the two cable retainers from the power distribution board.

a. Unfasten the two screws to lift the cable retainer out of the power distribution board.

b. Repeat to remove the other cable retainer.

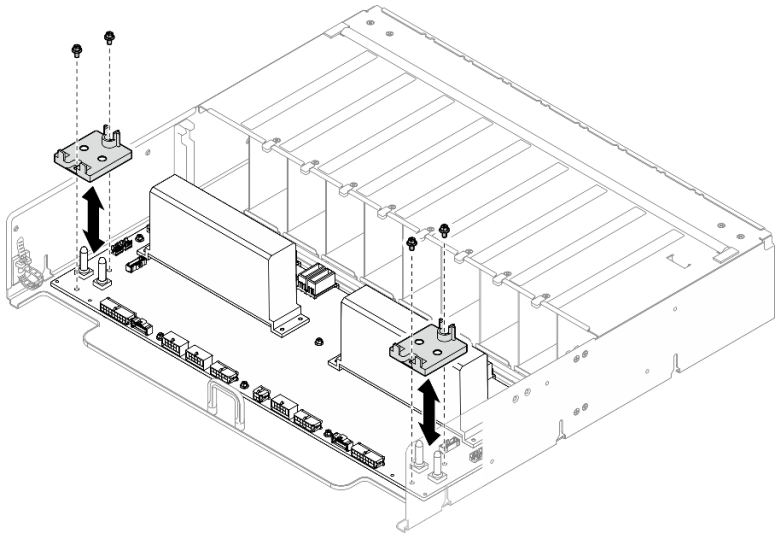


Figure 345. Cable retainer removal

Step 6. Unfasten the ten M3 screws to remove the power distribution board from the PSU cage.

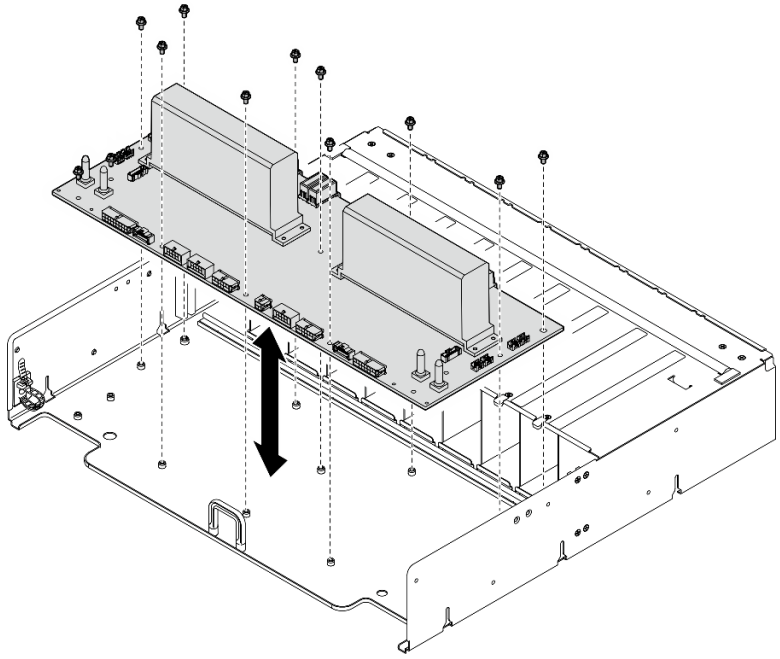


Figure 346. Power distribution board removal

After you finish

1. Install a replacement unit. See “Install the power distribution board” on page 317.
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 power distribution board

Follow instructions in this section to install the power distribution board. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

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

- Go to https://datacentersupport.lenovo.com/tw/en/products/servers/thinksystem/sr780av3/7dj5/downloads/driver-list/ to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” on page 403 for more information on firmware updating tools.

Procedure

Step 1. Align the power distribution board with the ten standoffs on the PSU cage; then, lower the power distribution board into the PSU cage.

Step 2. Fasten the ten screws (PH1, 10 x M3, 0.9 newton-meters, 8 inch-pounds) to secure the power distribution board.

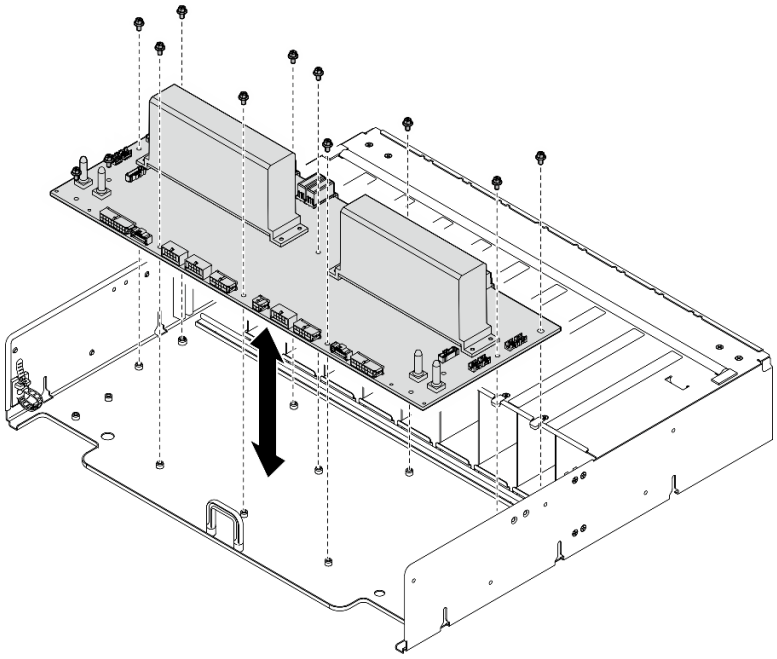


Figure 347. Power distribution board installation

Step 3. Install the two cable retainers to the power distribution board.

a. Align the cable retainer with the screw holes on the power distribution board; then, place the cable retainer onto the power distribution board.

b. Fasten the two screws (PH1, 2 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the cable retainer.

c. Repeat to install the other cable retainer.

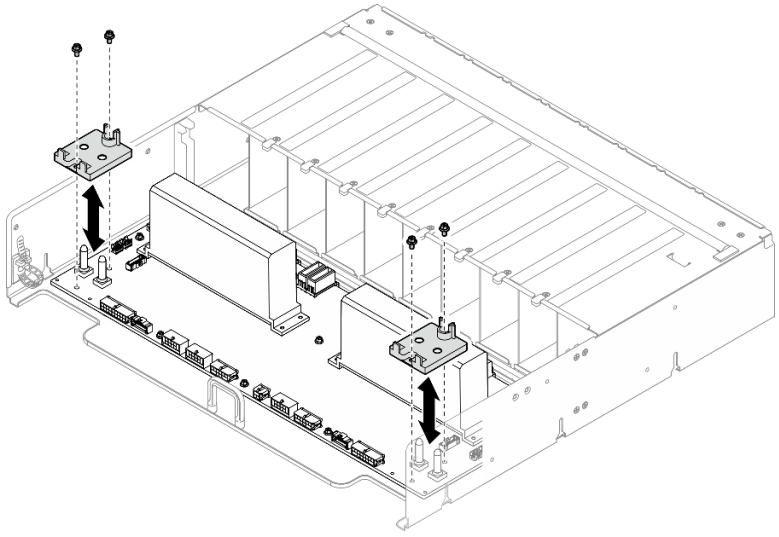


Figure 348. Cable retainer installation

Step 4. Install the PSU interposer.

a. 1 Align the PSU interposer with its connectors on the power distribution board; then, press the PSU interposer into the connectors until it is fully seated.

b. 2 Pull out the two plungers.

c. 3 Rotate the two release latches down until they stop.

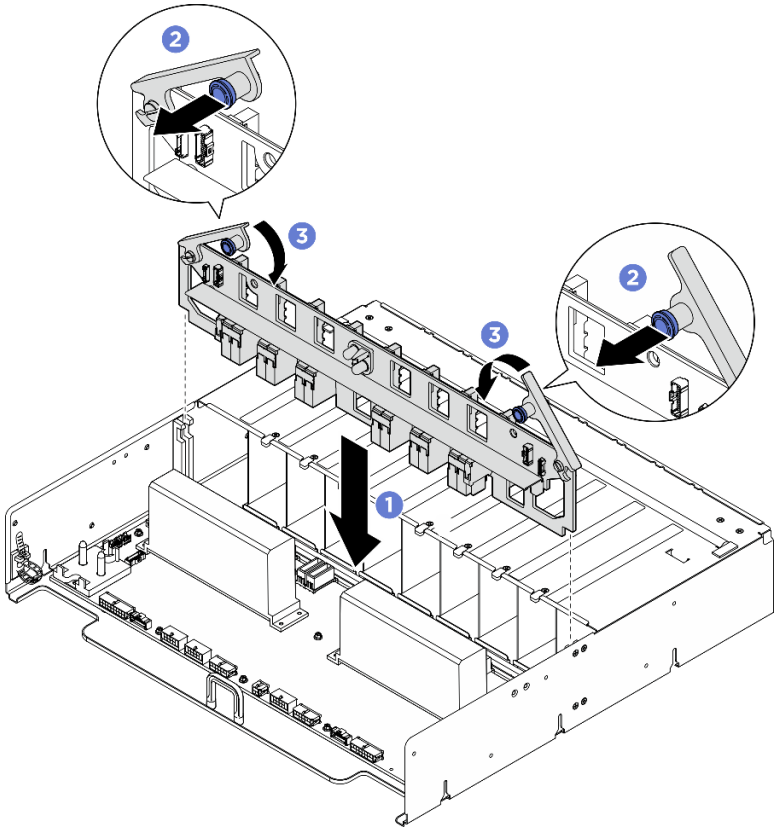


Figure 349. PSU interposer installation

Step 5. Connect the cables to the PSU interposer and power distribution board. See "2.5-inch drive backplane cable routing" on page 369, "Fan control board cable routing" on page 374, "GPU baseboard cable routing" on page 376, "PCIe switch board cable routing" on page 380, "Leakage sensor module cable routing" on page 397 and "PSU interposer cable routing" on page 391 for more information.

Step 6. If necessary, attach the labels to both ends of the power cable.

a. 1 Attach the white space portion of the label to one end of the cable.

b. 2 Wrap the label around the cable and attach it to the white space portion.

c. Repeat to attach the other label to the opposite end of the cable.

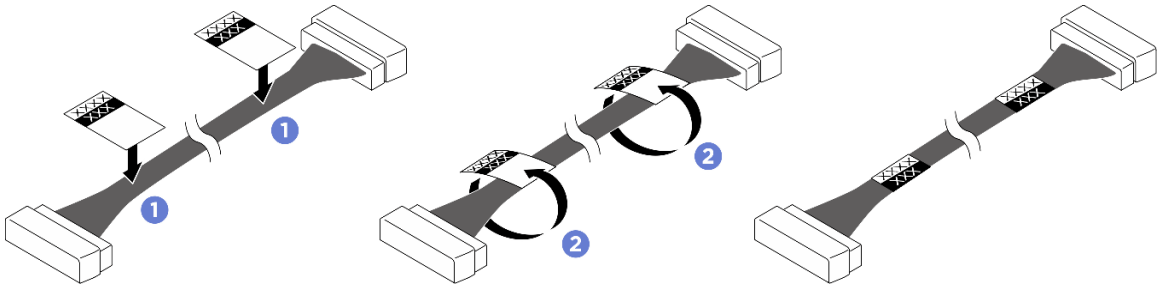


Figure 350. Label application

Note: See the cable routing to identify the corresponding labels for the cable.

After you finish

1. Reinstall the CPU complex. See “Install the CPU complex” on page 84.
2. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
3. Reinstall the front top cover. See “Install the front top cover” on page 69.
4. Reinstall all the power supply units. See “Install a hot-swap power supply unit” on page 321.
5. Complete the parts replacement. See “Complete the parts replacement” on page 363.

Power supply unit replacement

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

Remove a hot-swap power supply unit

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

About this task

CAUTION:

High touch current. Connect to earth before connecting to supply.

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Make sure you have a power supply unit filler available if some power supply bays will be left empty after the removal.
- The following illustration shows the power supply bay numbering:

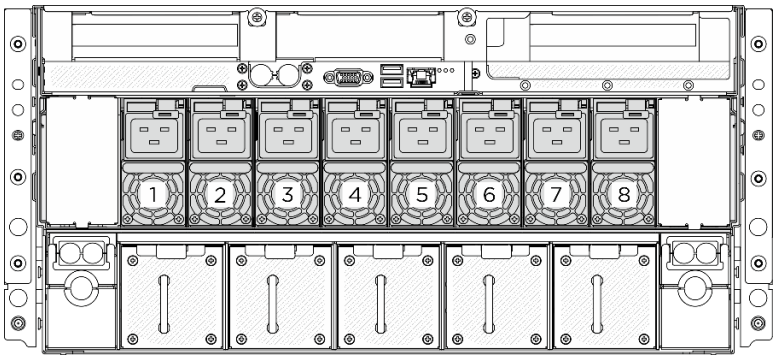


Figure 351. Power supply bay numbering

Procedure

Step 1. ❶ Press and hold the orange release tab.

Step 2. ❷ Grasp the handle, and pull the power supply unit out of the server.

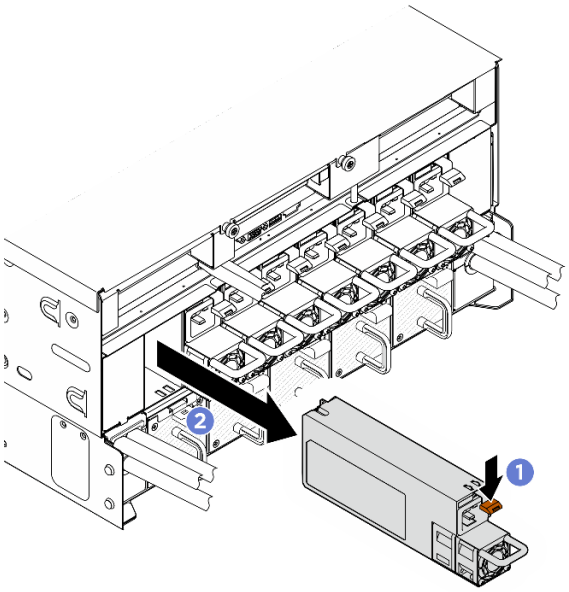


Figure 352. Power supply unit removal

After you finish

1. Install a power supply or power supply filler as soon as possible. See "Install a hot-swap power supply unit" on page 321.

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

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 a hot-swap power supply unit

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

About this task

CAUTION:

High touch current. Connect to earth before connecting to supply.

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- The following illustration shows the power supply bay numbering:

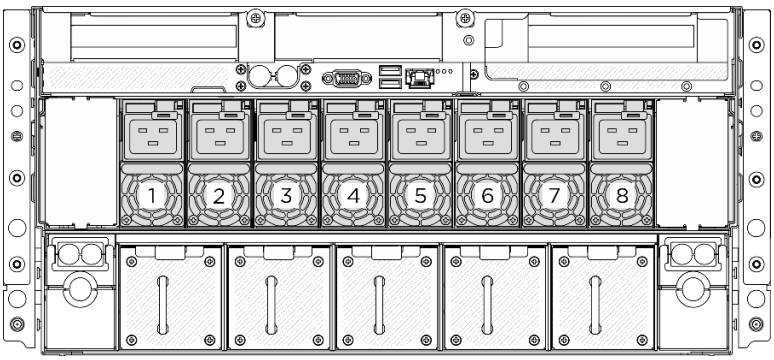


Figure 353. Power supply bay numbering

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

- Go to https://datacentersupport.lenovo.com/tw/en/products/servers/thinksystem/sr780av3/7dj5/downloads/driver-list/ to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” on page 403 for more information on firmware updating tools.

Procedure

Step 1. If a power supply filler is installed in the bay, pull the filler out of the bay.

Step 2. Grasp the handle and slide the power supply unit into the power supply bay until it clicks into place.

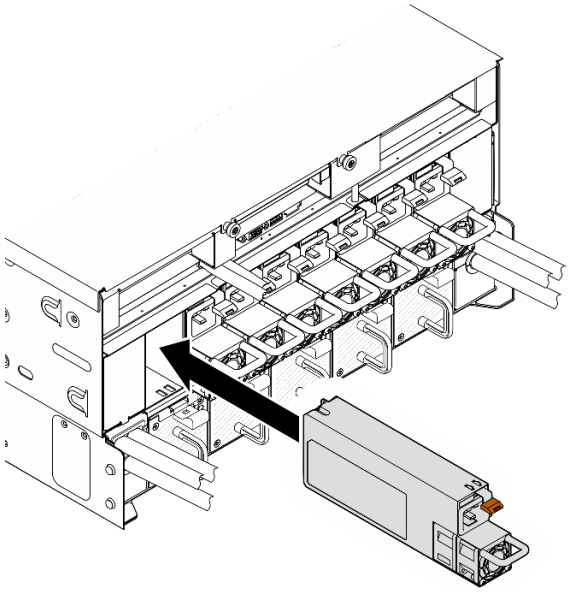


Figure 354. Power supply unit installation

After you finish

1. Pull the handle to see if the power supply unit is properly installed. If it slides out, reinstall it.
2. Connect the power cord to the power supply unit, and make sure it's properly connected to the power.
3. Complete the parts replacement. See “Complete the parts replacement” on page 363.
4. 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.

Processor air baffle replacement (trained technician only)

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

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 processor air baffle

Follow instructions in this section to remove the processor air baffle. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.

- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- If you intend to install memory modules in the CPU complex, you must first remove the processor air baffle from the server.

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the rear top cover. See “Remove the rear top cover” on page 70.

Step 2. Grasp the processor air baffle and carefully lift it out of the CPU complex.

Attention:

- For proper cooling and airflow, reinstall the processor air baffle before you turn on the server. Operating the server with the processor air baffle removed might damage server components.
- Service label is located on the processor air baffle.

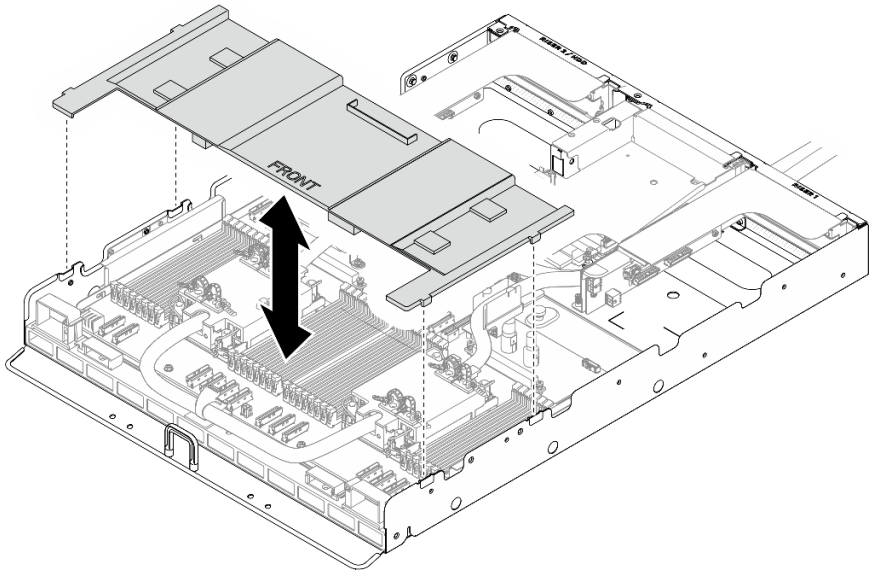


Figure 355. Processor air baffle removal

After you finish

1. Install a replacement unit. See “Install the processor air baffle” on page 324.
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 processor air baffle

Follow instructions in this section to install the processor air baffle. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Notes:

- If you are installing a new processor air baffle, attach the service label to the surface of the new processor air baffle if necessary.
- Close the retaining clip on each end of the memory module connector before installing the processor air baffle for proper cooling.

Procedure

Step 1. Align the processor air baffle tabs with the slots on both sides of the CPU complex; then, lower the processor air baffle into the CPU complex until it is securely seated.

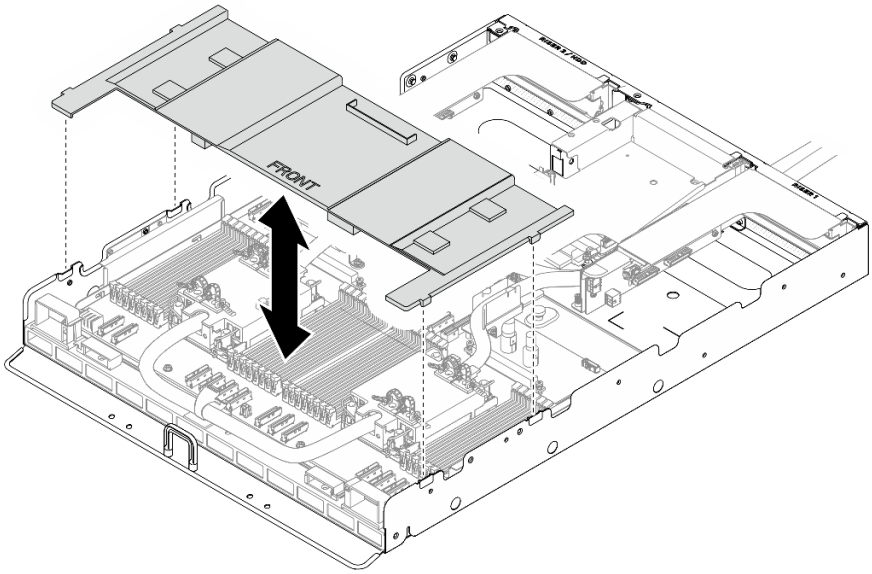


Figure 356. Processor air baffle installation

Step 2. Slightly press the processor air baffle down until it is securely seated.

After you finish

1. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
2. Reinstall the front top cover. See “Install the front top cover” on page 69.
3. Complete the parts replacement. See “Complete the parts replacement” on page 363.

PSU cage replacement (trained technician only)

Follow instructions in this section to remove and install the PSU cage.

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 PSU cage

Follow instructions in this section to remove the PSU cage. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this task.

a. Remove all the power supply units. See “Remove a hot-swap power supply unit” on page 320.

b. Remove the front top cover. See “Remove the front top cover” on page 67.

c. Remove the rear top cover. See “Remove the rear top cover” on page 70.

d. Remove the CPU complex. See “Remove the CPU complex” on page 83.

Step 2. Disconnect all the cables from the PSU interposer and the power distribution board.

Step 3. Remove the power complex.

a. ① Unfasten the ten M3 screws marked with **P** (P1-P5) on both sides of the chassis.

b. ② Lift the power complex out of the chassis.

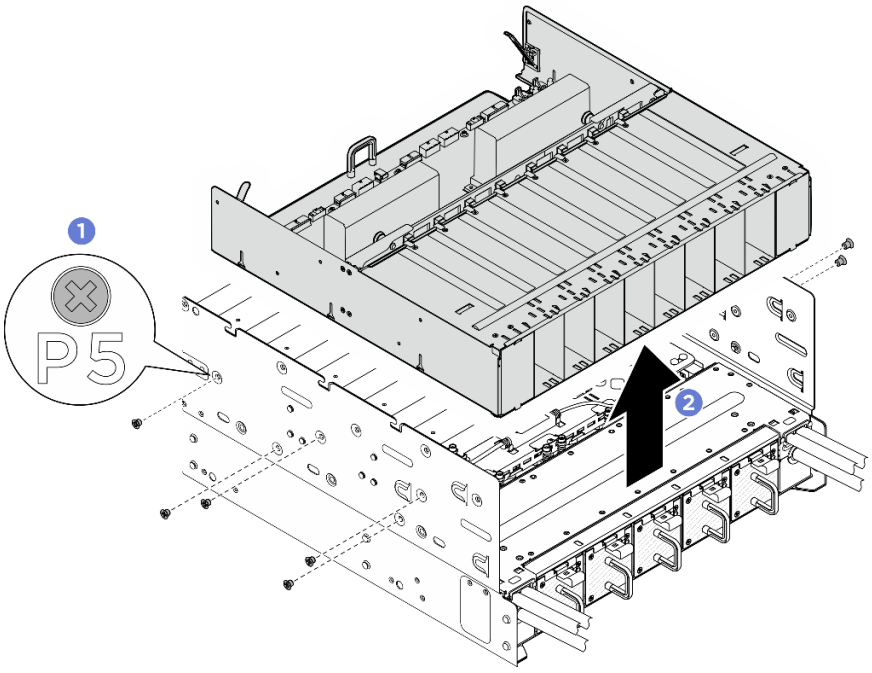


Figure 357. Power complex removal

Step 4. Remove the PSU interposer.

a. ❶ Pull out the two plungers.

b. ❷ Rotate the two release latches to disengage the PSU interposer from the power distribution board.

c. ❸ Grasp the PSU interposer by its edges and carefully pull it out of the power complex.

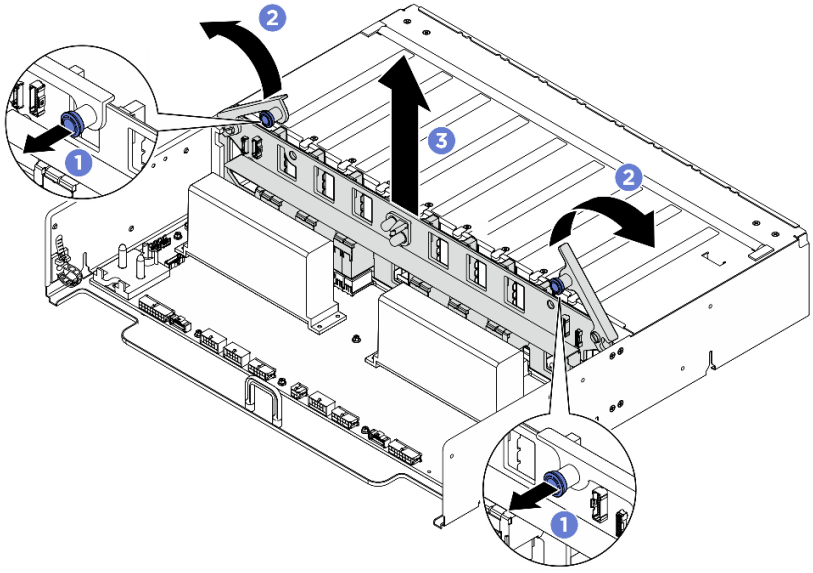


Figure 358. PSU interposer removal

Step 5. Disconnect all the cables from the power distribution board.

Step 6. Remove the two cable retainers from the power distribution board.

a. Unfasten the two screws to lift the cable retainer out of the power distribution board.
b. Repeat to remove the other cable retainer.

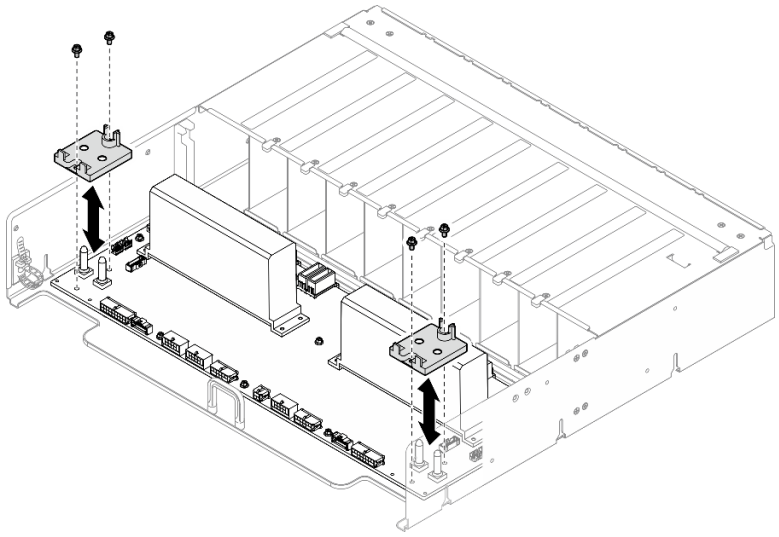


Figure 359. Cable retainer removal

Step 7. Unfasten the ten M3 screws to remove the power distribution board from the PSU cage.

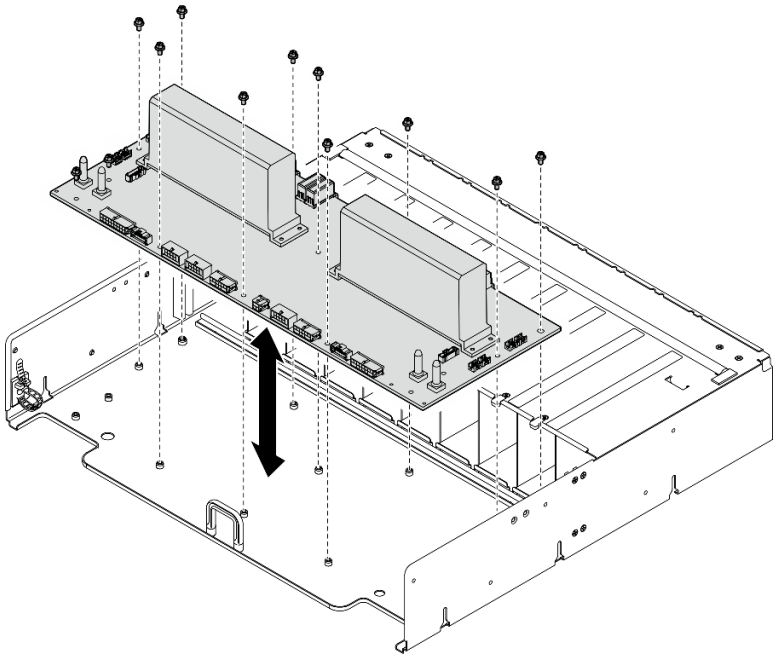


Figure 360. Power distribution board removal

After you finish

1. Install a replacement unit. See “Install the PSU cage” on page 329.
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 PSU cage

Follow instructions in this section to install the PSU cage. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. Install the power distribution board.

a. Align the power distribution board with the ten standoffs on the PSU cage; then, lower the power distribution board into the PSU cage.

b. Fasten the ten screws (PH1, 10 x M3, 0.9 newton-meters, 8 inch-pounds) to secure the power distribution board.

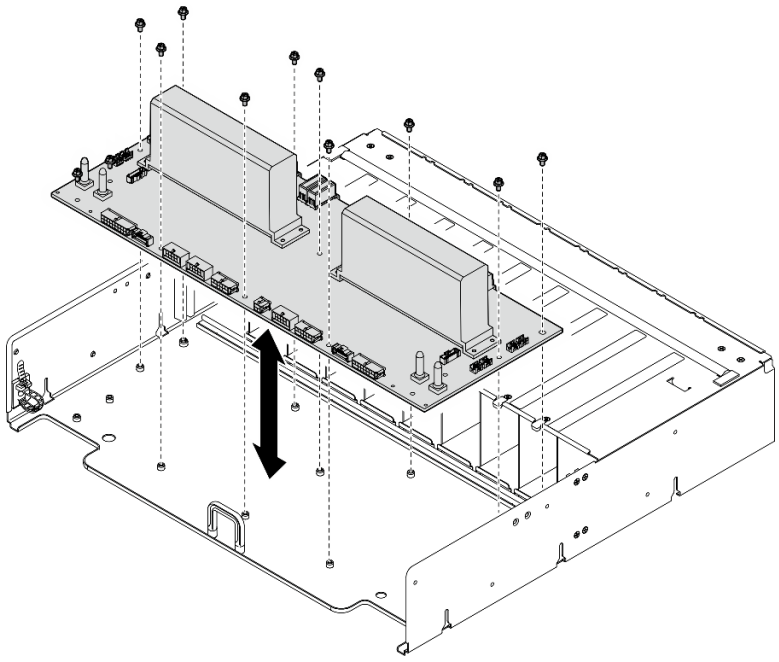


Figure 361. Power distribution board installation

Step 2. Install the two cable retainers to the power distribution board.

a. Align the cable retainer with the screw holes on the power distribution board; then, place the cable retainer onto the power distribution board.

b. Fasten the two screws (PH1, 2 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the cable retainer.

c. Repeat to install the other cable retainer.

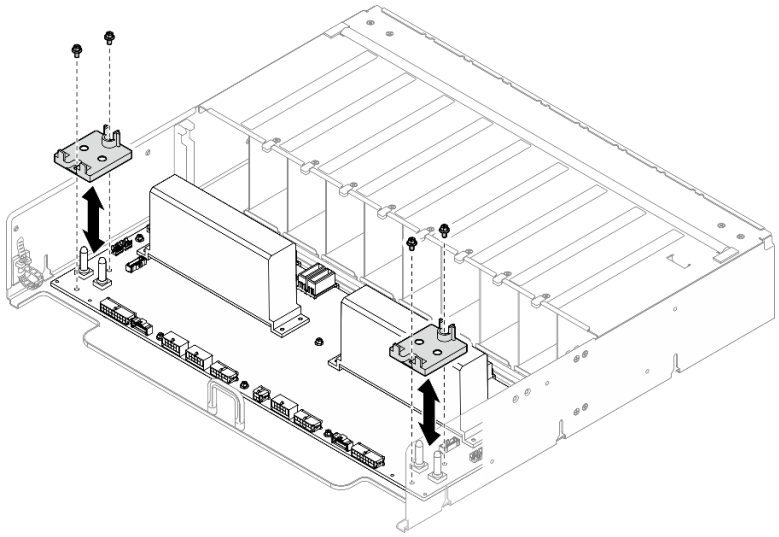


Figure 362. Cable retainer installation

Step 3. Install the PSU interposer.

a. ❶ Align the PSU interposer with its connectors on the power distribution board; then, press the PSU interposer into the connectors until it is fully seated.

b. ❷ Pull out the two plungers.

c. ❸ Rotate the two release latches down until they stop.

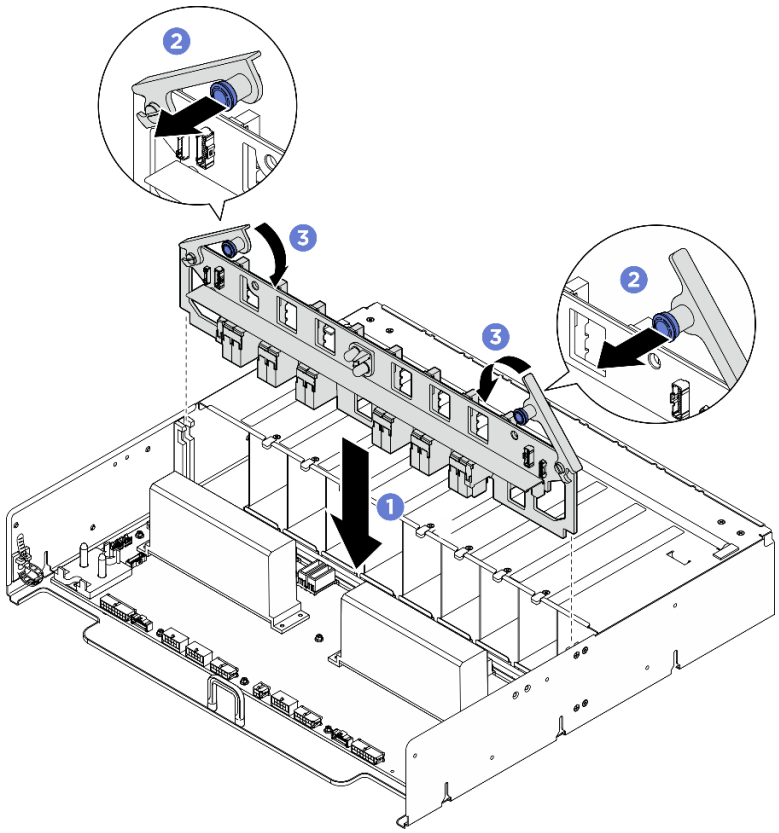


Figure 363. PSU interposer installation

Step 4. ❶ Align the power complex with the six guide pins on the chassis; then, lower the power complex into the chassis until it is securely engaged.

Step 5. ❷ Locate the ten screw holes marked with **P** on both sides of the chassis; then, fasten the ten M3 screws (P1-P5) (PH2, 10 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the power complex.

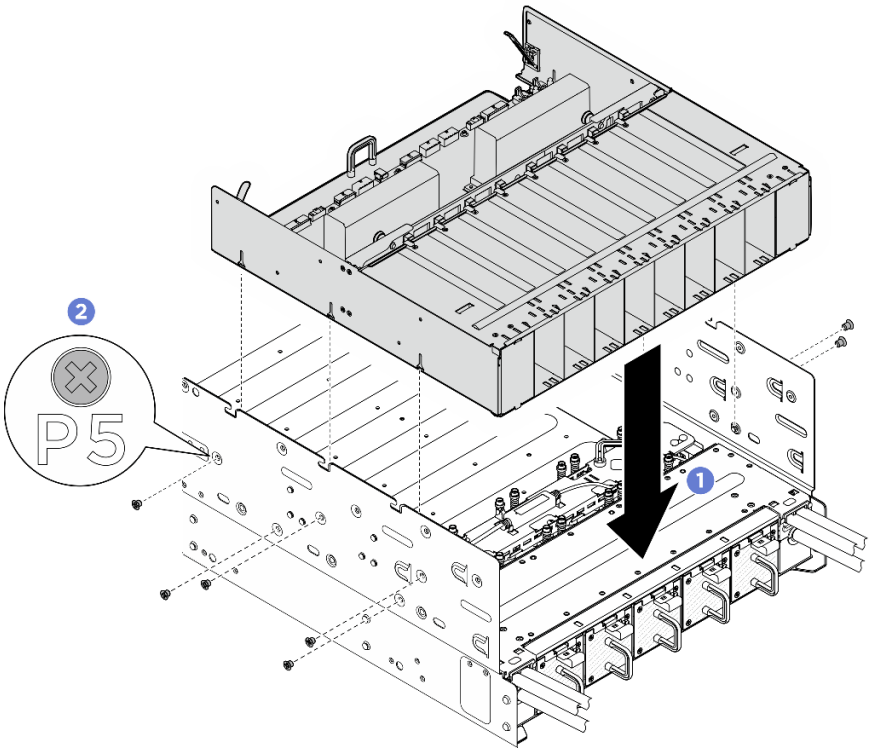


Figure 364. Power complex installation

Step 6. Connect the cables to the PSU interposer and power distribution board. See “2.5-inch drive backplane cable routing” on page 369, “Fan control board cable routing” on page 374, “GPU baseboard cable routing” on page 376, “PCIe switch board cable routing” on page 380, “Leakage sensor module cable routing” on page 397 and “PSU interposer cable routing” on page 391 for more information.

After you finish

1. Reinstall the CPU complex. See “Install the CPU complex” on page 84.
2. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
3. Reinstall the front top cover. See “Install the front top cover” on page 69.
4. Reinstall all the power supply units. See “Install a hot-swap power supply unit” on page 321.
5. Complete the parts replacement. See “Complete the parts replacement” on page 363.

PSU interposer replacement (trained technician only)

Follow instructions in this section to remove and install the PSU interposer.

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 PSU interposer

Follow instructions in this section to remove the PSU interposer. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this task.

a. Remove all the power supply units. See “Remove a hot-swap power supply unit” on page 320.

b. Remove the front top cover. See “Remove the front top cover” on page 67.

c. Remove the rear top cover. See “Remove the rear top cover” on page 70.

d. Remove the CPU complex. See “Remove the CPU complex” on page 83.

Step 2. Disconnect all the cables from the PSU interposer.

Step 3. Remove the PSU interposer.

a. ❶ Pull out the two plungers.

b. ❷ Rotate the two release latches to disengage the PSU interposer from the power distribution board.

c. ❸ Grasp the PSU interposer by its edges and carefully pull it out of the power complex.

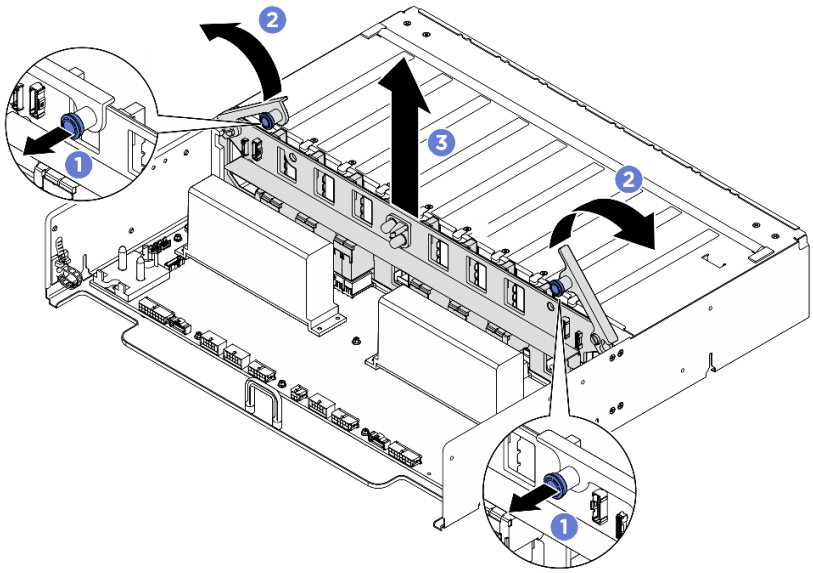


Figure 365. PSU interposer removal

After you finish

1. Install a replacement unit. See “Install the PSU interposer” on page 333.
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 PSU interposer

Follow instructions in this section to install the PSU interposer. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

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

- Go to https://datacentersupport.lenovo.com/tw/en/products/servers/thinksystem/sr780av3/7dj5/downloads/driver-list/ to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” on page 403 for more information on firmware updating tools.

Procedure

Step 1. (1) Align the PSU interposer with its connectors on the power distribution board; then, press the PSU interposer into the connectors until it is fully seated.

Step 2. (2) Pull out the two plungers.

Step 3. (3) Rotate the two release latches down until they stop.

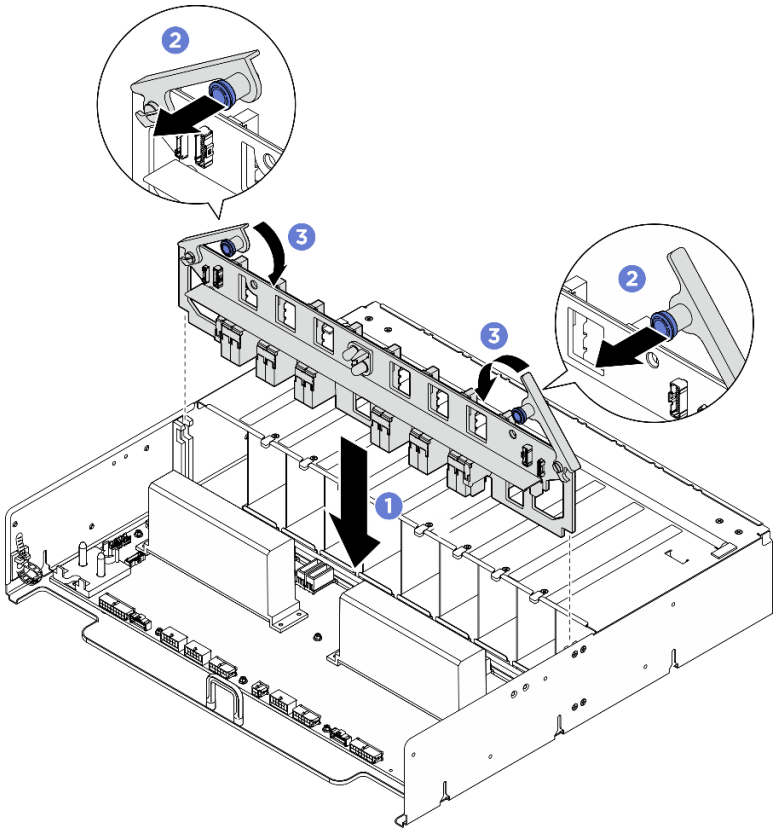


Figure 366. PSU interposer installation

Step 4. Connect the cables to the PSU interposer. See "PSU interposer cable routing" on page 391 for more information.

After you finish

1. Reinstall the CPU complex. See "Install the CPU complex" on page 84.
2. Reinstall the rear top cover. See "Install the rear top cover" on page 72.
3. Reinstall the front top cover. See "Install the front top cover" on page 69.
4. Reinstall all the power supply units. See "Install a hot-swap power supply unit" on page 321.
5. Complete the parts replacement. See "Complete the parts replacement" on page 363.

Rear 2.5-inch drive backplane and drive cage replacement (trained technician only)

Follow the instructions in this section to remove or install the rear 2.5-inch drive backplane and drive cage.

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 rear drive cage

Follow the instructions in this section to remove the rear drive cage. (trained technician only)

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the rear top cover. See “Remove the rear top cover” on page 70.

c. Remove all the 2.5-inch hot-swap drives and the drive bay fillers (if any) from the rear drive bay. See “Remove a 2.5-inch hot-swap drive” on page 73.

d. Remove the processor air baffle. See “Remove the processor air baffle” on page 323.

e. Remove the rear 2.5-inch drive backplane. See “Remove a rear 2.5-inch drive backplane” on page 337.

Step 2. Remove the rear drive cage.

a. ❶ Unfasten the five M3 screws; then, slide the drive cage towards the front of the chassis to disengage it from the pins on the chassis. Grasp the drive cage and remove it from the chassis.

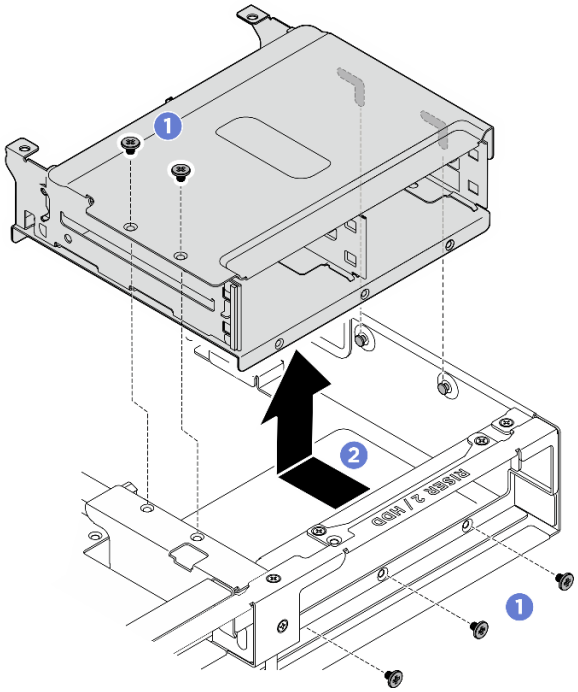


Figure 367. Removing the rear drive cage

Step 3. Remove the rear drive cage support bracket if necessary.

a. 2 Unfasten the two M3 screws that secure the leakage sensor module bracket to the chassis; then, remove it from the chassis.

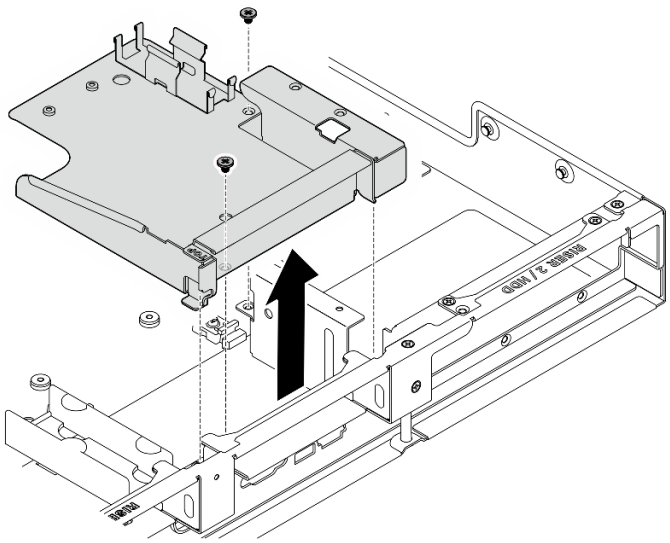


Figure 368. Removing the leakage sensor module bracket

b. 1 Unfasten the six M3 screw that secure the rear drive cage support bracket to the chassis.

c. 2 Grasp the rear drive cage support bracket to remove it from the chassis.

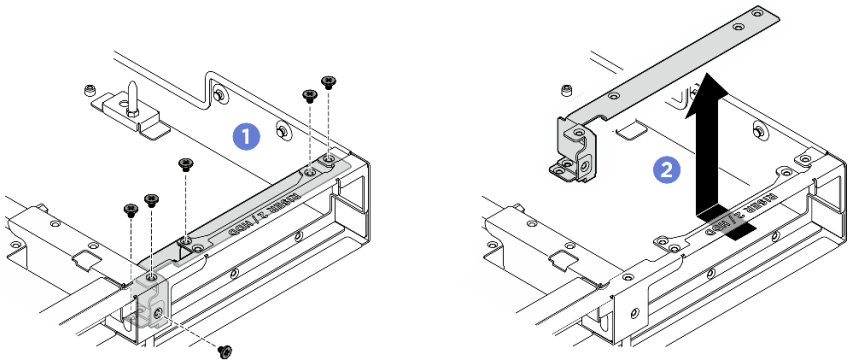


Figure 369. Removing the rear drive cage support bracket

After you finish

1. Install a replacement. See "Install the rear drive cage" on page 342.
2. Complete the parts replacement. See "Complete the parts replacement" on page 363.

Remove a rear 2.5-inch drive backplane

Follow instructions in this section to remove a rear 2.5-inch drive backplane. The procedure must be executed by a trained technician.

About this task

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See "Power off the server" on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See "Remove the server from rack" on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- The server supports one rear 2.5-inch drive backplane with the following corresponding drive backplane numbering.

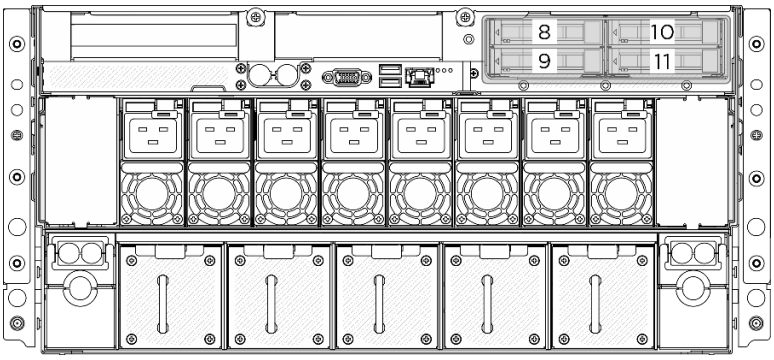


Figure 370. Rear 2.5-inch drive backplane numbering

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the rear top cover. See “Remove the rear top cover” on page 70.

c. Remove all the 2.5-inch hot-swap drives and the drive bay fillers (if any) from the drive bay. See “Remove a 2.5-inch hot-swap drive” on page 73.

d. Remove the processor air baffle. See “Remove the processor air baffle” on page 323.

e. Record the cable connections first; then, disconnect the power and signal cables from the rear backplane. See “2.5-inch drive backplane cable routing” on page 369 for more information on the internal cable routing.

Step 2. Remove the 2.5-inch drive backplane.

a. 1 Grasp the backplane bracket to lift it out of the drive cage.

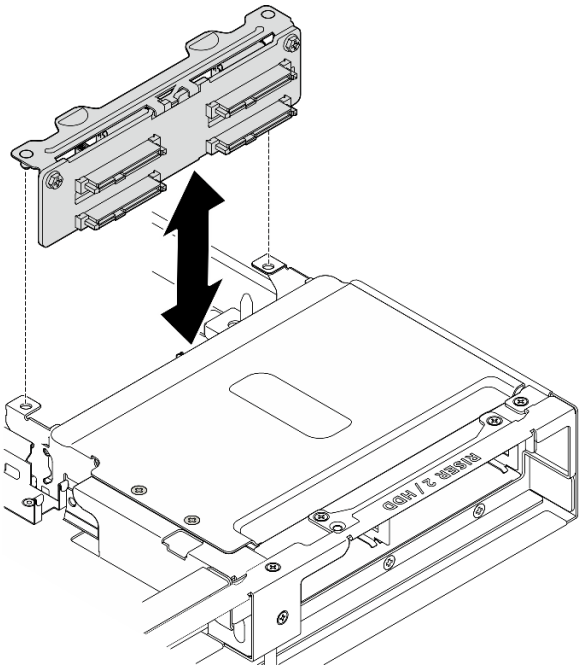


Figure 371. Rear 2.5-inch drive backplane bracket removal

b. ❷ Unfasten the two M3 screws that secure the backplane to the bracket; then, remove the backplane from the bracket.

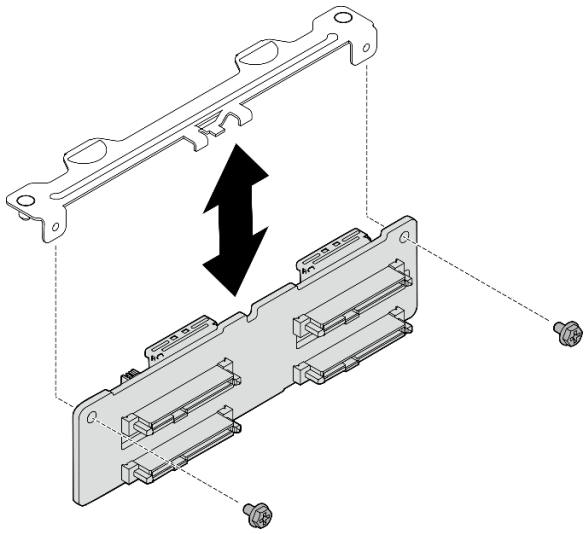


Figure 372. Rear 2.5-inch drive backplane removal

After you finish

1. Install a replacement unit. See "Install a rear 2.5-inch drive backplane" on page 339.
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 a rear 2.5-inch drive backplane

Follow instructions in this section to install a 2.5-inch drive backplane. The procedure must be executed by a trained technician.

About this task

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See "Power off the server" on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See "Remove the server from rack" on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- The server supports one rear 2.5-inch drive backplane with the following corresponding drive backplane numbering.

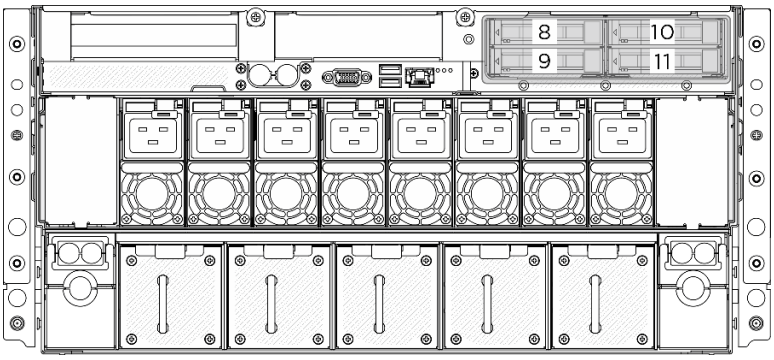


Figure 373. Rear 2.5-inch drive backplane numbering

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

- Go to https://datacentersupport.lenovo.com/tw/en/products/servers/thinksystem/sr780av3/7dj5/downloads/driver-list/ to see the latest firmware and driver updates for your server.
- Go to "Update the firmware" on page 403 for more information on firmware updating tools.

Procedure

Step 1. ❶ Align the 2.5-inch drive backplane with the screw holes on the bracket; then, fasten the two M3 screws (PH2, 2 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the drive backplane to the bracket.

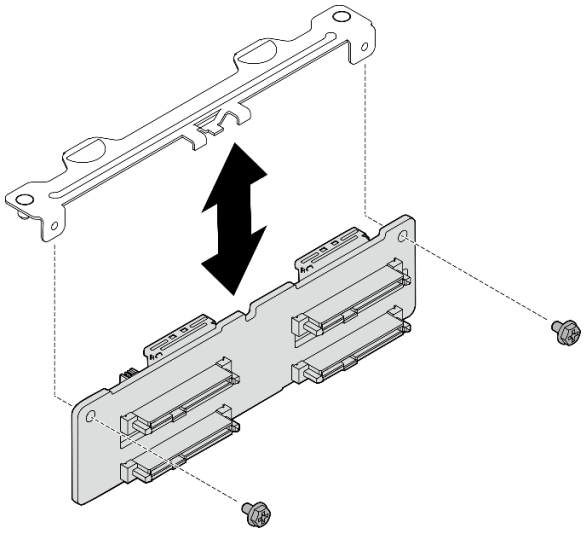


Figure 374. Rear 2.5-inch drive backplane installation

Step 2. ❷ Align the pins on the backplane bracket with the slot on the rear drive cage; then, lower the backplane into the drive cage so that the pins of the backplane pass through the holes on the drive cage, and press the backplane into position.

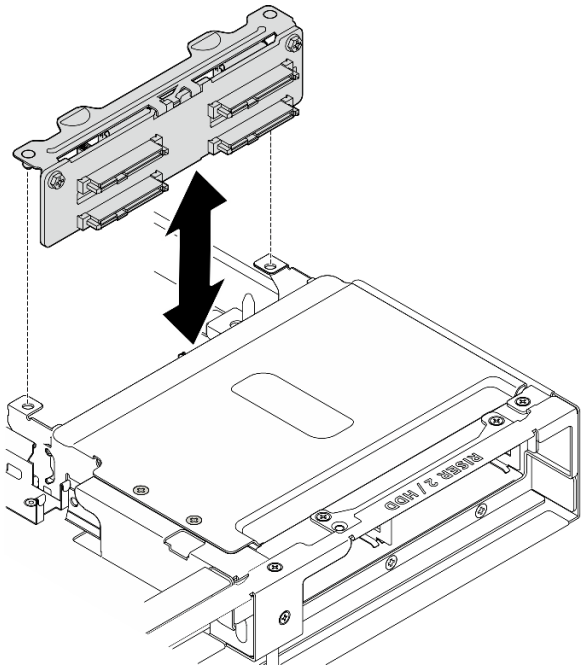


Figure 375. Rear 2.5-inch drive backplane bracket installation

Step 3. Connect all the cables to the rear 2.5-inch drive backplane. See "2.5-inch drive backplane cable routing" on page 369 for more information.

Step 4. If necessary, attach the labels to both ends of the cable.

a. ❶ Attach the white space portion of the label to one end of the cable.

b. ❷ Wrap the label around the cable and attach it to the white space portion.

c. Repeat to attach the other label to the opposite end of the cable.

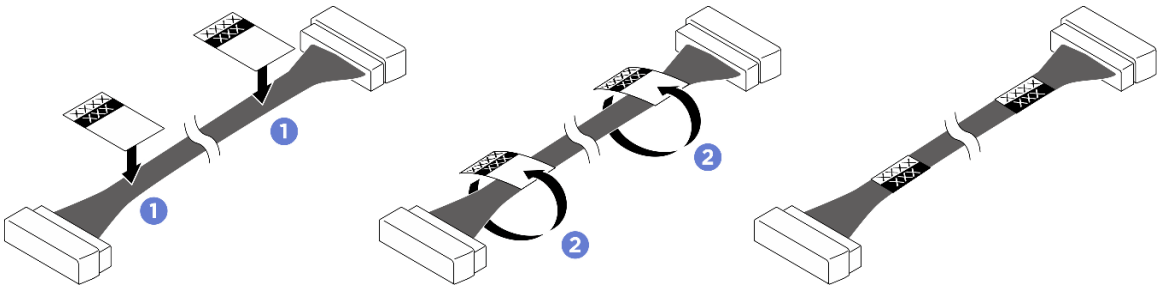


Figure 376. Label application

Note: See the table below to identify the corresponding labels for the cable.

Cable	From	To	Label
1	Backplane 1: NVMe connector 2-3	System board: MCIO connector 4B (MCIO4B)	R-NVME 2-3 MCIO 4B
2	Backplane 2: Power connector	System board: Backplane power connector (BP PWR/SIG 2)	R-BP PWR SIG 2
3	Backplane 2: NVMe connector 0-1	System board: MCIO connector 4A (MCIO4A)	R-NVME 0-1 MCIO 4A

After you finish

1. Reinstall all the 2.5-inch hot-swap drives or drive bay fillers (if any) into the drive bay. See “Install a 2.5-inch hot-swap drive” on page 75.
2. Reinstall the processor air baffle. See “Install the processor air baffle” on page 324.
3. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
4. Reinstall the front top cover. See “Install the front top cover” on page 69.
5. Complete the parts replacement. See “Complete the parts replacement” on page 363.

Install the rear drive cage

Follow the instructions in this section to install the rear drive cage.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this task.

a. If a PCIe riser assembly is installed in riser 2 slot, remove the PCIe riser assembly. See “Remove a PCIe riser assembly” on page 294.

b. If the DPU air baffles are installed in riser 2 slot, remove the DPU air baffles. See “Remove the DPU air baffle” on page 90.

Step 2. Install the rear drive cage support bracket.

a. ❶ Align the rear drive cage support bracket with the rear drive cage slot on the chassis; then, insert the bracket until it is in place.

b. ❷ Fasten the six M3 screws (PH2, 6 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the rear drive cage support bracket in place.

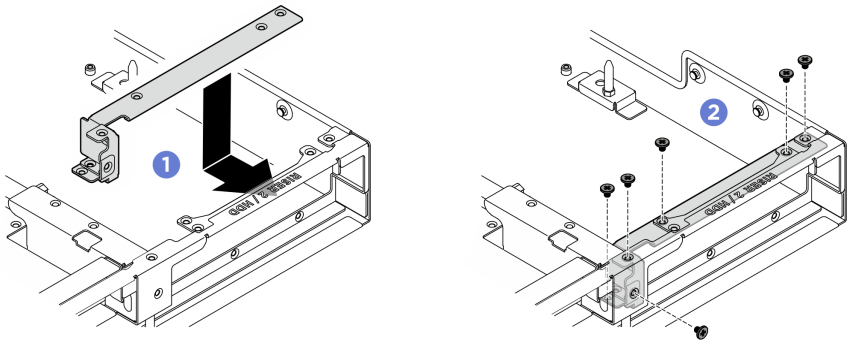


Figure 377. Installing the rear drive cage bracket

Step 3. Align the leakage sensor module bracket to the slot; then, insert the bracket into the slot until it is securely seated. Fasten the two M3 screws (PH2, 2 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure it in place.

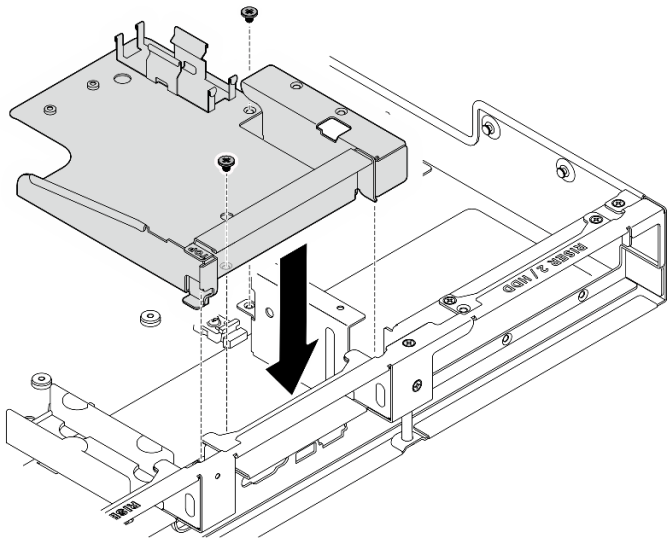


Figure 378. Installing the leakage sensor module bracket

Step 4. Align the keyholes on the rear drive cage with the two pins on the chassis; then, lower and insert the rear drive cage into the drive cage slot. Fasten the five M3 screws (PH2, 5 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure it in place.

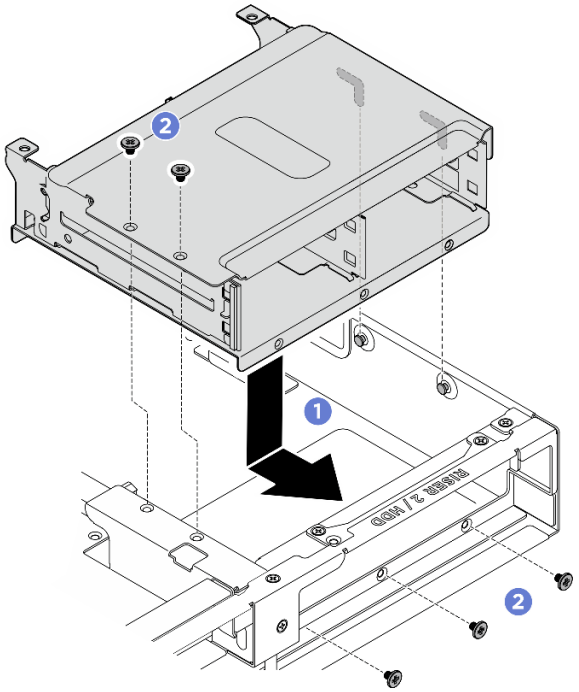


Figure 379. Installing the rear drive cage

After you finish

1. Reinstall the rear 2.5-inch drive backplane. See “Install a rear 2.5-inch drive backplane” on page 339.
2. Reinstall all the 2.5-inch hot-swap drives or drive bay fillers (if any) into the rear drive bay. See “Install a 2.5-inch hot-swap drive” on page 75.
3. Reinstall the processor air baffle. See “Install the processor air baffle” on page 324.
4. Reinstall the rear top cover. See “Install the rear top cover” on page 72.
5. Reinstall the front top cover. See “Install the front top cover” on page 69.
6. Complete the parts replacement. See “Complete the parts replacement” on page 363.

System I/O board replacement (trained technician only)

Follow the instructions in this section to install or remove the system I/O 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 system I/O board

Follow instructions in this section to remove the system I/O board. The procedure must be executed by a trained technician.

About this task

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.

- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See “Remove the server from rack” on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.
- 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.
- After replacing the system I/O board, update the firmware to the specific version supported by the server. Make sure that you have the required firmware or a copy of the pre-existing firmware before you proceed.

Procedure

Step 1. Make preparations for this task.

a. Perform OneCLI commands to back up the UEFI settings. See https://pubs.lenovo.com/lxce-onecli/onecli_r_save_command.

b. 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.

c. Remove the front top cover. See “Remove the front top cover” on page 67.

d. Remove the rear top cover. See “Remove the rear top cover” on page 70.

e. Remove the processor air baffle. See “Remove the processor air baffle” on page 323.

f. If applicable, remove the rear drive cage. See “Remove the rear drive cage” on page 334.

g. If applicable, remove the leakage detection sensor module bracket. See “Remove the leakage sensor module bracket” on page 254.

Step 2. Remove the system I/O board.

a. ❶ Loosen the four screws securing both the system I/O board and the cable.

b. ❷ Slide the system I/O board towards the system board until the notches are aligned to the retainer as illustrated. Lift the system I/O board out of the chassis.

c. ❸ Disconnect the cable from the system I/O board.

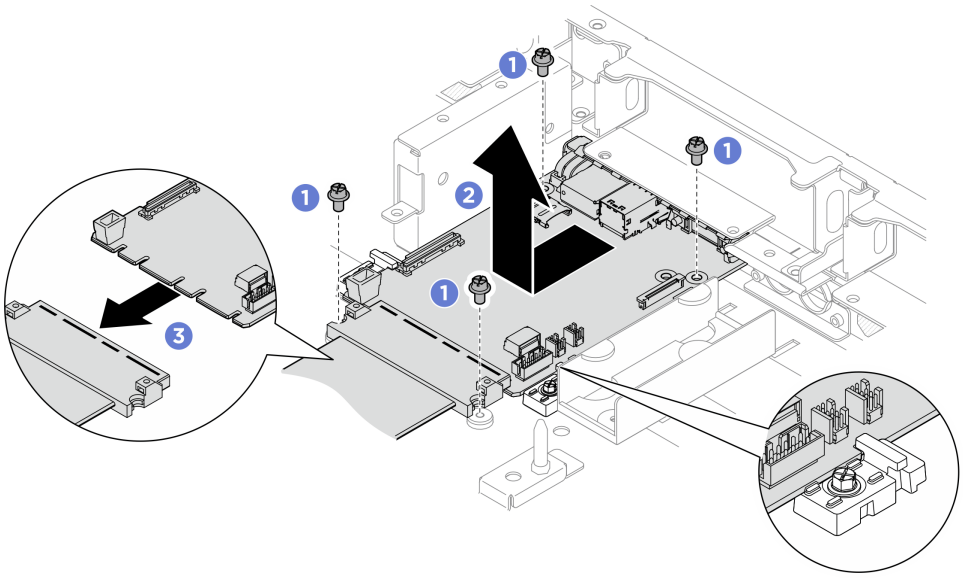


Figure 380. Removing the system I/O board

After you finish

1. Install a replacement unit. See “Install the system I/O board” on page 346
2. Complete the parts replacement. See “Complete the parts replacement” on page 363.

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 system I/O board

Follow instructions in this section to install the system I/O board. The procedure must be executed by a trained technician.

About this task

Important:

- (Lenovo trained technicians 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/ (Lenovo trained technicians only).

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- 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/tw/en/products/servers/thinksystem/sr780av3/7dj5/downloads/driver-list/ to see the latest firmware and driver updates for your server.
- Go to "Update the firmware" on page 403 for more information on firmware updating tools.

Procedure

Step 1. Install the system I/O board.

a. 1 Connect the cable to the system I/O board.

b. 2 Align the notches on the system I/O board with the retainers as illustrated. Align the connectors on the system I/O board with the slots on the CPU complex; then, gently slide and insert the system I/O board into place.

c. 3 Tighten the four M3 screws (PH1, 4 x M3, 0.9 newton-meters, 8 inch-pounds) to secure the system I/O board and the cable.

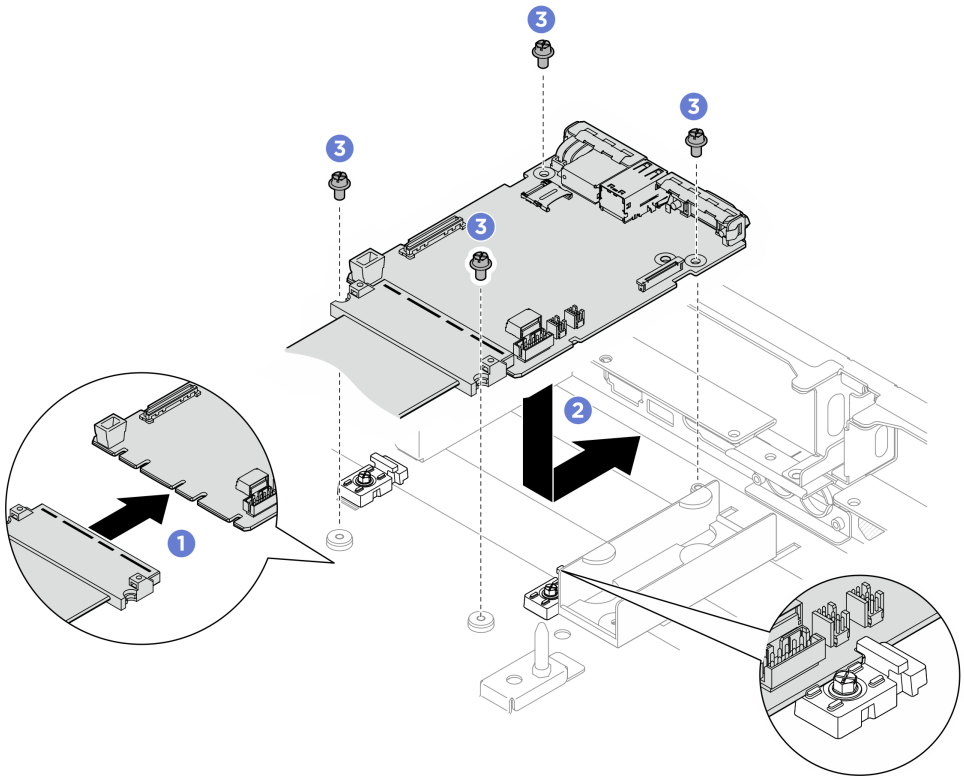


Figure 381. Installing the system I/O board

After you finish

1. 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/ (Lenovo trained technicians only).
2. Perform OneCLI commands to restore the UEFI settings. See https://pubs.lenovo.com/lxce-onecli/onecli_r_restore_command.

3. 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.
4. If applicable, reinstall the leakage sensor module bracket. See "Install the leakage sensor module bracket" on page 256.
5. If applicable, reinstall the rear drive cage. See "Install the rear drive cage" on page 342.
6. Reinstall the processor air baffle. See "Install the processor air baffle" on page 324.
7. Reinstall the rear top cover. See "Install the rear top cover" on page 72.
8. Reinstall the front top cover. See "Install the front top cover" on page 69.
9. Complete the parts replacement. See "Complete the parts replacement" on page 363.

System board replacement (trained technician only)

Follow instructions in this section to remove and install the system 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 system board

Follow instructions in this section to remove the system board. The procedure must be executed by a trained technician.

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.
- When removing the memory modules, label the slot number on each memory module, remove all the memory modules from the system board, and set them aside on a static-protective surface for reinstallation.
- **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 board.**

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See "Power off the server" on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See "Remove the server from rack" on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this 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.

Step 2. Remove the following components.

a. Remove the front top cover. See “Remove the front top cover” on page 67.

b. Remove the rear top cover. See “Remove the rear top cover” on page 70.

c. Remove the processor air baffle. See “Remove the processor air baffle” on page 323.

d. If applicable, remove the rear drive cage. See “Remove the rear drive cage” on page 334.

e. If applicable, remove the PCIe riser assembly(ies). See “Remove a PCIe riser assembly” on page 294.

f. If applicable, remove the leakage detection sensor module bracket. See “Remove the leakage sensor module bracket” on page 254.

g. Remove the processor and DWCM assembly. See “Remove the Lenovo Neptune(TM) Processor Direct Water Cooling Module” on page 258.

h. If applicable, remove the system I/O board. See “Remove the system I/O board” on page 344.

i. Make sure to label the slot number on each memory module, remove all the memory modules from the system board, and set them aside on a static-protective surface for reinstallation. See “Remove a memory module” on page 280.

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

Step 3. Disconnect all the cables from the system board. As you disconnect the cables, make a list of each cable and record the connectors the cables are connected to, and use the record as a cabling checklist after installing the new system board.

Step 4. Remove the two cable guides.

a. Unfasten the two screws that secure the cable guide to the chassis; then, lift the cable guide out of the slot.

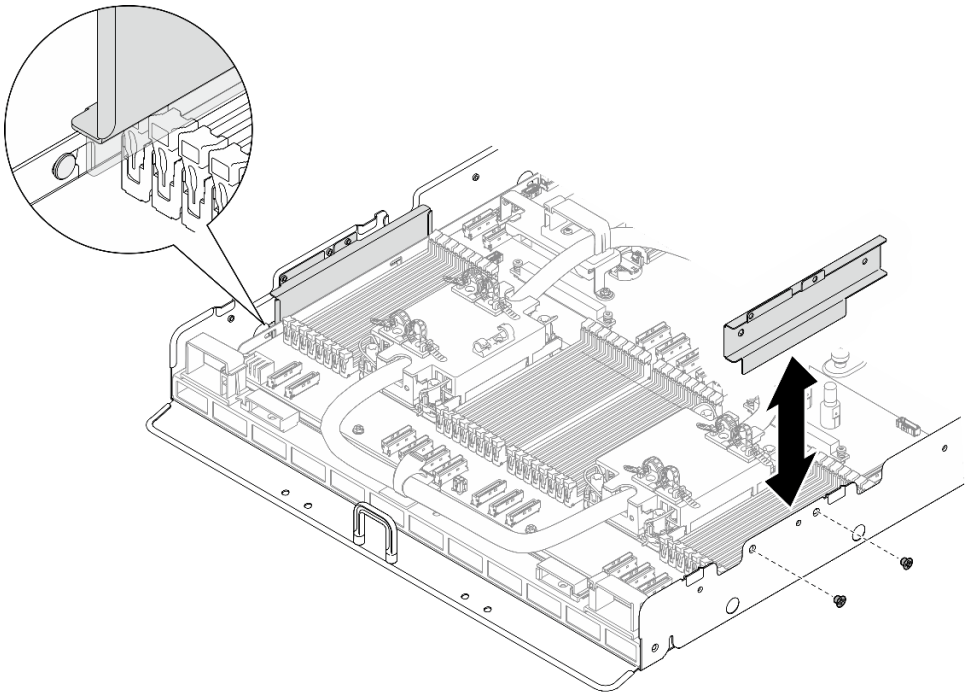


Figure 382. Cable guide removal

b. Repeat to remove the other cable guide.

Step 5. Disengage the system board.

a. ❶ Loosen the (1) thumbscrew to release the system board.

b. ❷ Slide the system board towards the front of the CPU complex as illustrated to disengage it from the chassis.

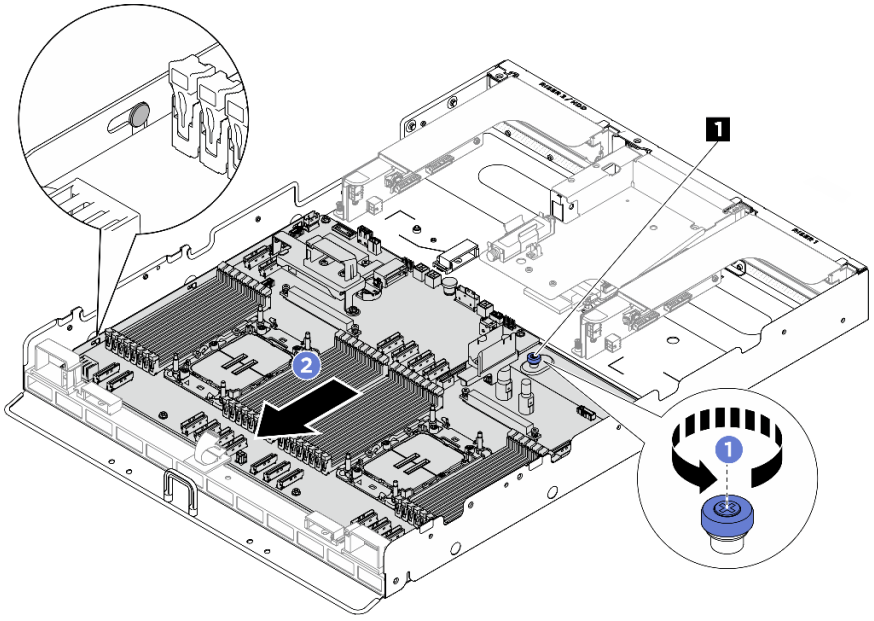


Figure 383. System board disengagement

1	Thumbscrew

Step 6. Remove the system board from the chassis.

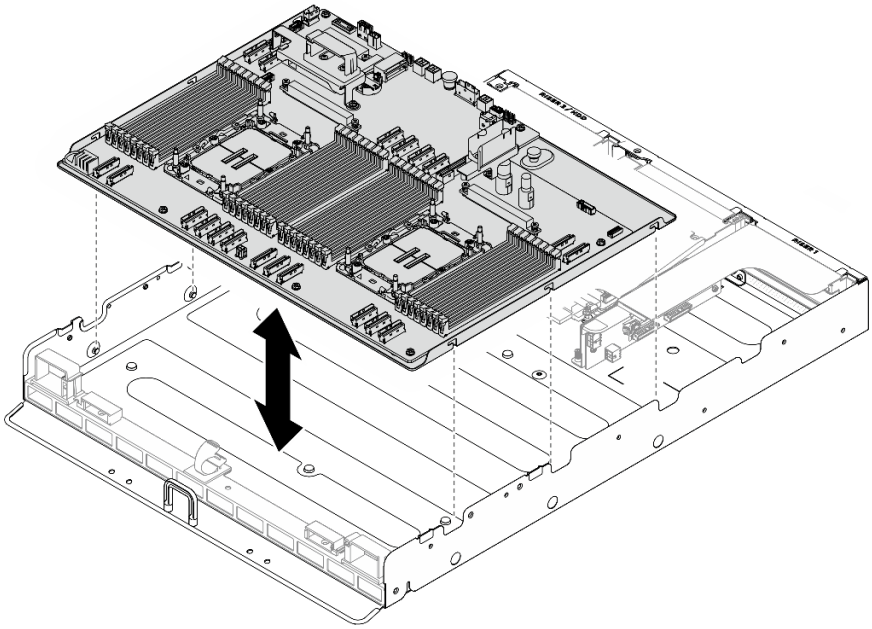


Figure 384. System board removal

After you finish

1. Install a replacement unit. See "Install the system board" on page 351.
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 processor board, make sure that you install the processor socket covers from the new processor board. To replace a processor socket cover:

   a. Take a socket cover from the processor socket assembly on the new processor board and orient it correctly above the processor socket assembly on the removed processor board.

   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 system board for recycle" on page 455.

Install the system board

Follow instructions in this section to install the system board. The procedure must be executed by a trained technician.

About this task

Important: Removing and installing this component requires trained technicians. **Do not** attempt to remove or install it without proper training.

Attention:

- Read “Installation Guidelines” on page 43 and “Safety inspection checklist” on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

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

- Go to https://datacentersupport.lenovo.com/tw/en/products/servers/thinksystem/sr780av3/7dj5/downloads/driver-list/ to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” on page 403 for more information on firmware updating tools.

Procedure

Step 1. Align the system board with the guide pins and lower the system board into the chassis.

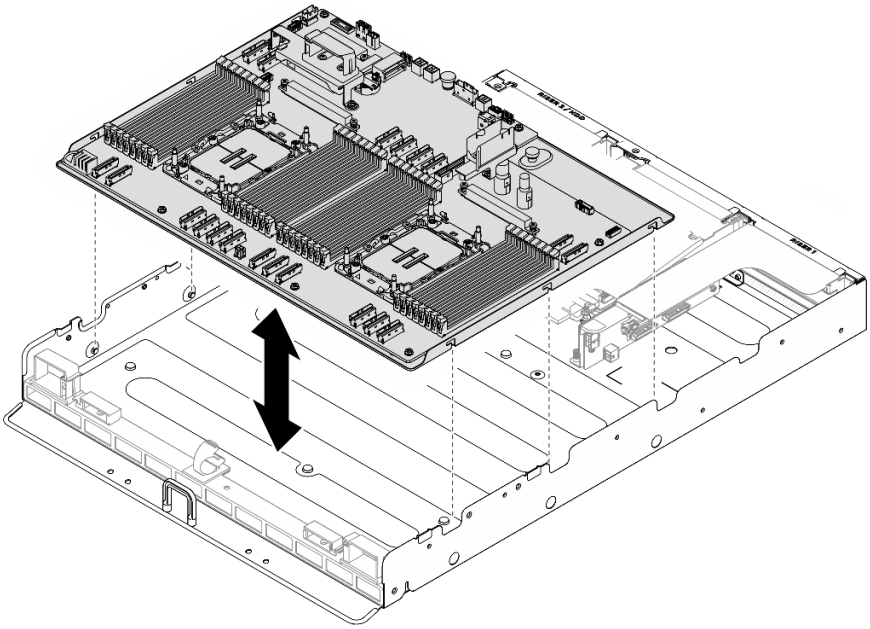


Figure 385. System board installation

Step 2. Secure the system board to the chassis.

a. ❶ Slide the system board towards the rear of the server until it is engaged with the pins as illustrated.

b. ❷ Tighten the (1) thumbscrew to secure the system board in place.

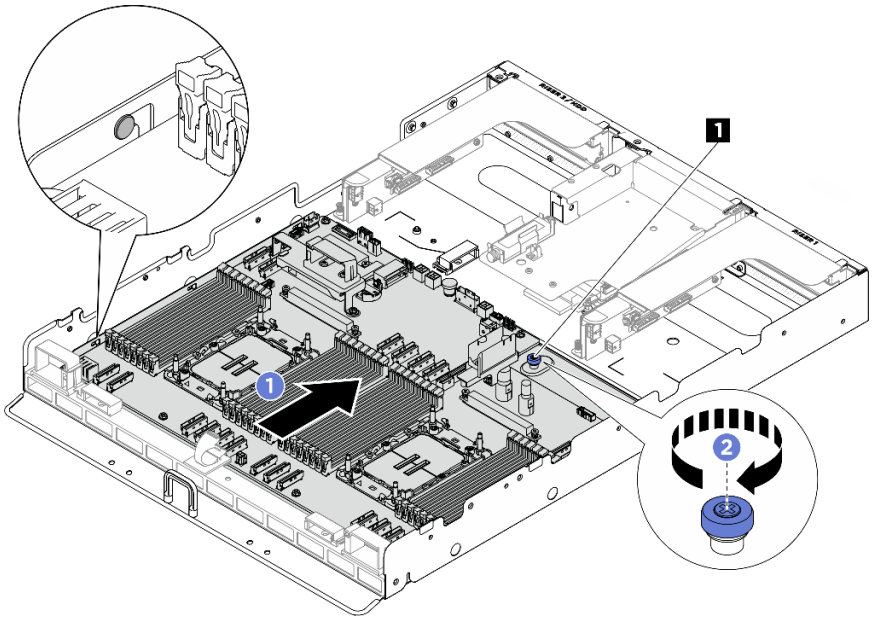


Figure 386. Securing the system board

1	Thumbscrew

Step 3. Install the cable guides.

a. Align the cable guide with the slot on the chassis; then, insert the cable guide into the slot until it is securely seated.

b. Fasten the two M3 screws (PH2, 2 x M3, 0.5 newton-meters, 4.3 inch-pounds) to secure the cable guide to the chassis.

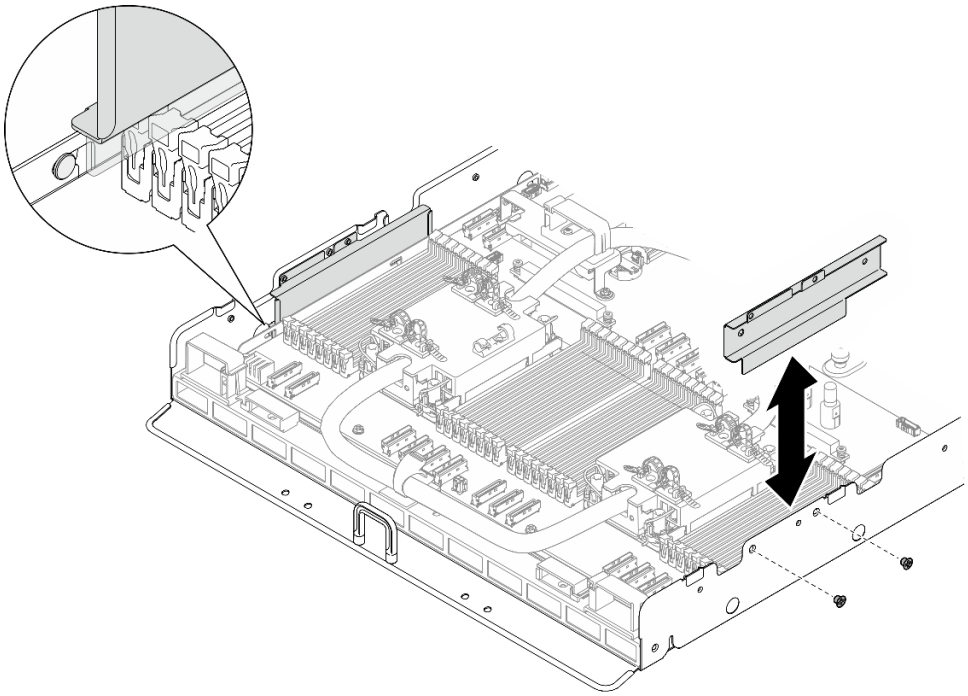


Figure 387. Cable guide installation

c. Repeat to install the other cable guide.

After you finish

1. Reinstall the following components.
   a. Reinstall each memory module to the same slot on the new system board assembly as on the defective system board assembly until all the memory modules are installed. See “Install a memory module” on page 282.
   b. If applicable, reinstall the system I/O board. See “Install the system I/O board” on page 346.
   c. Reinstall the processer and DWCM assembly. See “Install the Lenovo Neptune(TM) Processor Direct Water Cooling Module” on page 265
   d. If applicable, reinstall the leakage sensor module bracket. See “Install the leakage sensor module bracket” on page 256.
   e. If applicable, reinstall the PCIe riser assembly(ies). See “Install a PCIe riser assembly” on page 297.
   f. If applicable, reinstall the rear drive cage. See “Install the rear drive cage” on page 342.
2. Reconnect all the required cables to the same connectors on the system board as the defective system board.
3. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside the server.
4. Reinstall the processor air baffle. See “Install the processor air baffle” on page 324.
5. Power on the server and any peripheral devices. See “Power on the server” on page 50.
6. Update the vital product data (VPD). See “Update the Vital Product Data (VPD)” on page 355. 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 39.
7. Optionally, enable UEFI Secure Boot. See “Enable UEFI Secure Boot” on page 358.

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 `aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa`, where `aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa` is the asset tag number.
[access_method]	The access method that you select to access the target server. • 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>* **Notes:** – *<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 Unified Extensible Firmware Interface (UEFI) or Lenovo XClarity Essentials OneCLI.

Using UEFI

For details, see “Hide TPM from OS” in *UEFI User Guide* at https://pubs.lenovo.com/uefi-overview/.

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 PASSW0RD (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=11@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"

[1s]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 PASSW0RD (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 PASSW0RD (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>`

Venting block replacement (trained technician only)

Follow instructions in this section to remove and install a venting block.

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 venting block (CPU complex)

Follow instructions in this section to remove the venting block.

About this task

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See "Power off the server" on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See "Remove the server from rack" on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this task.

a. Remove the front top cover. See "Remove the front top cover" on page 67.

b. Remove the rear top cover. See "Remove the rear top cover" on page 70.

c. Remove the processor air baffle. See "Remove the processor air baffle" on page 323.

d. If applicable, remove the PCIe riser assembly(ies). See "Remove a PCIe riser assembly" on page 294.

Step 2. Unfasten the two M2 screws to remove the venting block from the CPU complex.

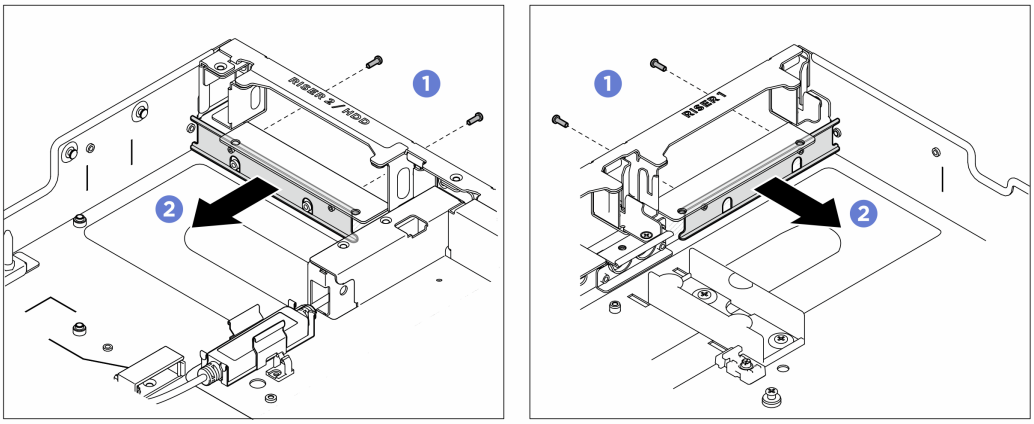


Figure 388. Venting block removal

After you finish

1. Install a replacement unit (see "Install the venting block (CPU complex)" on page 360).
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 venting block (CPU complex)

Follow instructions in this section to install the venting block. The procedure must be executed by a trained technician.

About this task

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. Install the venting block to riser 1 or riser 2 slot depending on the configuration.

Step 2. Align the venting block with the screw holes on the CPU complex; then, fasten the two M2 screws (PH1, 2 x M2, 0.2 newton-meters, 1.7 inch-pounds) to secure the venting block.

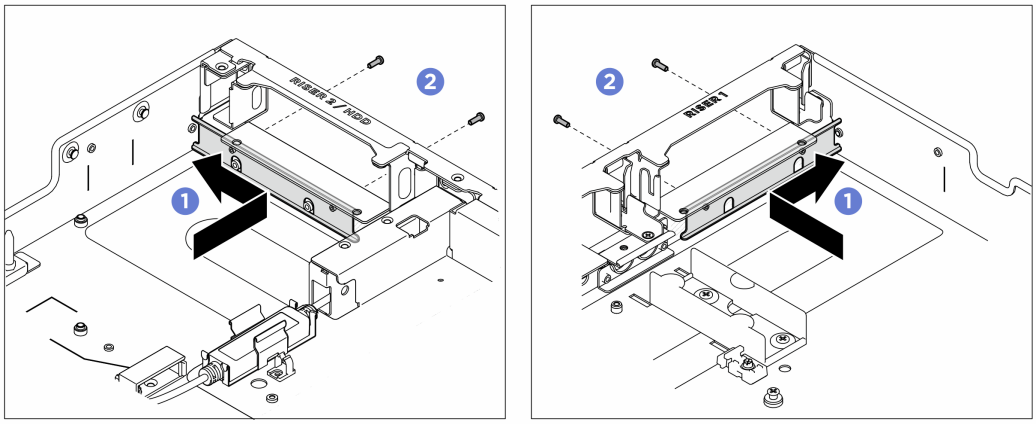


Figure 389. Venting block installation

After you finish

1. If applicable, reinstall the PCIe riser assembly(ies). See "Install a PCIe riser assembly" on page 297.
2. Reinstall the processor air baffle. See "Install the processor air baffle" on page 324.
3. Reinstall the rear top cover. See "Install the rear top cover" on page 72.
4. Reinstall the front top cover. See "Install the front top cover" on page 69.
5. Complete the parts replacement. See "Complete the parts replacement" on page 363.

Remove the venting block (PCIe switch shuttle)

Follow instructions in this section to remove the venting block.

About this task

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See "Power off the server" on page 51.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the chassis from the rack. See "Remove the server from rack" on page 51.
- Two people and one lifting device on site that can support up to 400 lb (181 kg) are required to perform this procedure. If you do not already have a lifting device available, Lenovo offers the Genie Lift GL-8 material lift that can be purchased at Data Center Solution Configurator: https://dcsc.lenovo.com/#/configuration/cto/7D5YCTO1WW?hardwareType=lifttool. Make sure to include the Foot-release brake and the Load Platform when ordering the Genie Lift GL-8 material lift.

Procedure

Step 1. Make preparation for this task.

a. Remove the PCIe switch shuttle. See "Remove the PCIe switch shuttle" on page 306.

Step 2. Remove the venting block from the PCIe switch shuttle.

a. ① Unfasten the M2 screw.

b. ② Lift the venting block to disengage it from the shuttle.

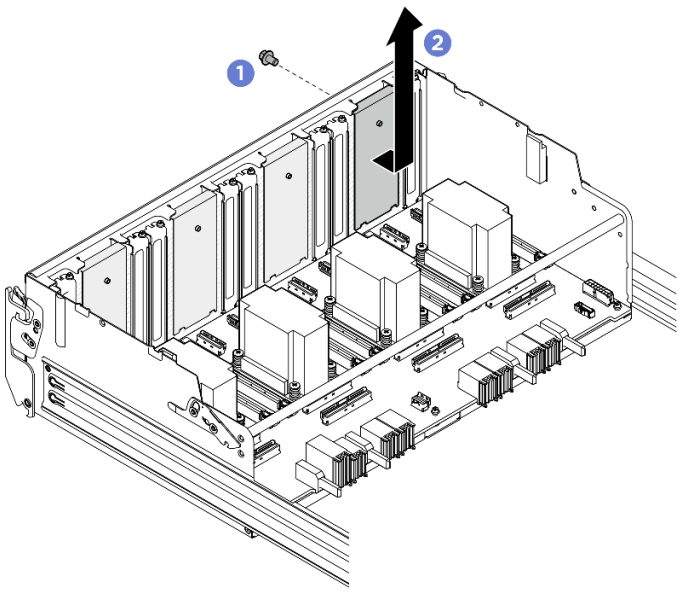


Figure 390. Venting block removal

After you finish

1. Install a replacement unit (see "Install the venting block (PCIe switch shuttle)" on page 362).
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 venting block (PCIe switch shuttle)

Follow instructions in this section to install the venting block. The procedure must be executed by a trained technician.

About this task

Attention:

- Read "Installation Guidelines" on page 43 and "Safety inspection checklist" on page 44 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

Procedure

Step 1. Install the venting block to the PCIe switch shuttle.

a. 1 Align and insert the venting block into the slot on the PCIe switch shuttle.

b. 2 Fasten the M3 screw (PH1, 1 x M3, 0.9 newton-meters, 8 inch-pounds) to secure the venting block to the shuttle.

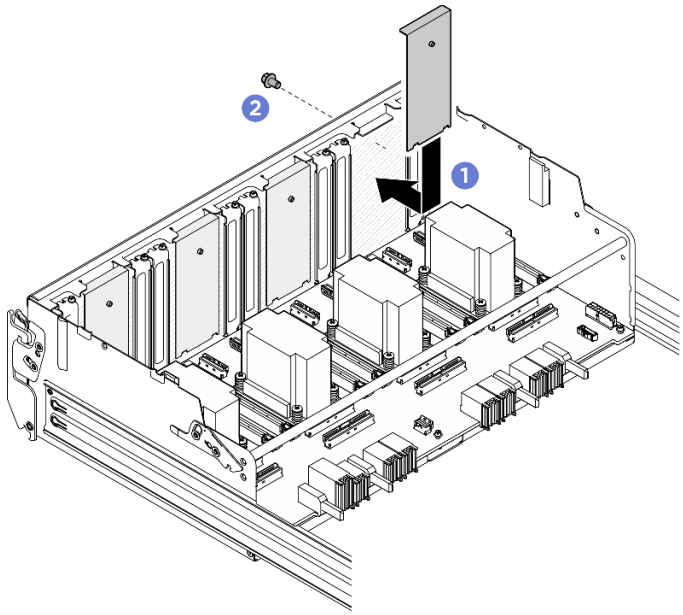


Figure 391. Venting block installation

After you finish

1. Reinstall the PCIe switch shuttle. See “Install the PCIe switch shuttle” on page 309.
2. Complete the parts replacement. See “Complete the parts replacement” on page 363.

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. Reconnect the power cords and any cables that you removed.
4. Power on the server and any peripheral devices. See “Power on the server” on page 50.
5. 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 403.
   - 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. 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 system board. Failing to release them before removing the cables will damage the cable sockets on the system board, which are fragile. Any damage to the cable sockets might require replacing the system board.

Identifying connectors

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

Drive backplane connectors

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

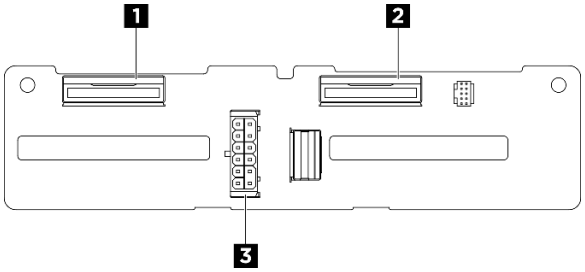


Figure 392. 2.5-inch drive backplane connectors

1 NVMe connector 2-3	2 NVMe connector 0-1
3 Power connector	

Fan control board connectors

See this section to locate the connectors on the fan control board.

- “Front fan control board” on page 365
- “Rear fan control board” on page 366

Front fan control board

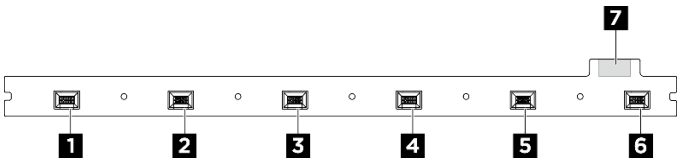


Figure 393. Front fan control board connector

1 Fan 1 connector	2 Fan 2 connector
3 Fan 3 connector	4 Fan 4 connector

5 Fan 5 connector	6 Fan 6 connector
7 Power connector	

Rear fan control board

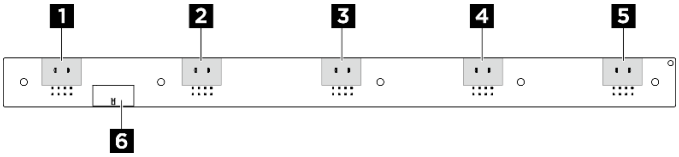


Figure 394. Rear fan control board connector

1 Fan 11 connector	2 Fan 10 connector
3 Fan 9 connector	4 Fan 8 connector
5 Fan 7 connector	6 Power connector

PCIe riser card connectors

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

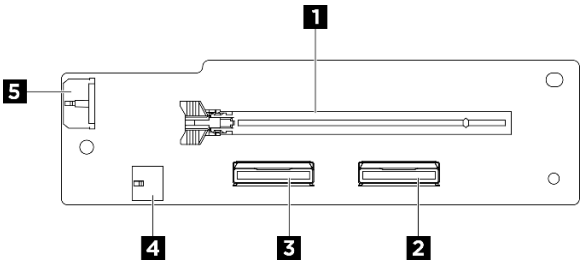


Figure 395. PCIe riser card connector

1 PCIe x16 (Gen5) slot	2 PCIe riser signal connector (MCIO 2)
3 PCIe riser signal connector (MCIO 1)	4 PCIe riser power connector (RISER PWR)
5 DPU power connector (AUX_PWR)	

PCIe switch board connectors

See this section to locate the connectors on the PCIe switch board.

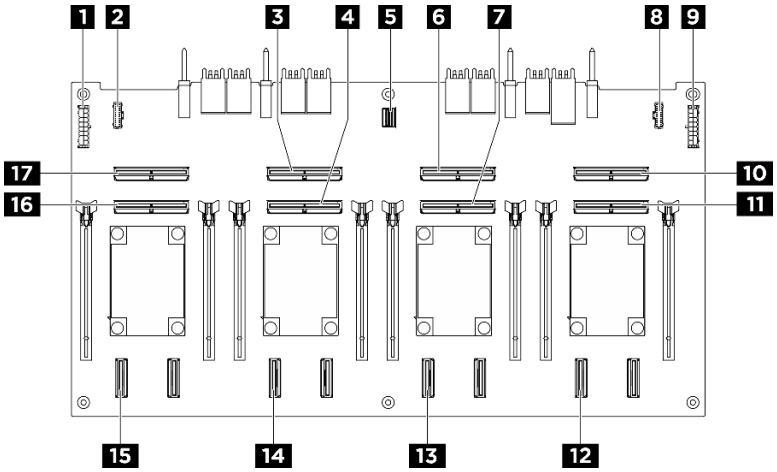


Figure 396. PCIe switch board connectors

1 Power distribution board power connector 1 (PDB PWR1)	2 Power distribution board sideband connector 1 (PDB SB1)
3 MCIO connector 3 (MCIO3)	4 MCIO connector 4 (MCIO4)
5 GPU management connector (MGMT)	6 MCIO connector 5 (MCIO5)
7 MCIO connector 6 (MCIO6)	8 Power distribution board sideband connector 2 (PDB SB2)
9 Power distribution board power connector 2 (PDB PWR2)	10 MCIO connector 7 (MCIO7)
11 MCIO connector 8 (MCIO8)	12 NVMe connector 7 (NVME7)
13 NVMe connector 5 (NVME5)	14 NVMe connector 3 (NVME3)
15 NVMe connector 1 (NVME1)	16 MCIO connector 2 (MCIO2)
17 MCIO connector 1 (MCIO1)	

Power distribution board connectors

See this section to locate the connectors on the power distribution board.

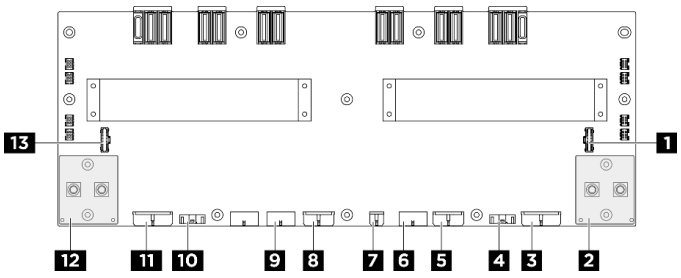


Figure 397. Power distribution board connectors

1 PSU interposer sideband connector 2 (PIB SB2)	2 Right GPU baseboard power connector (GPU PWR)
3 PCIe switch board power connector 2 (FRONT RISER PWR2)	4 PCIe switch board sideband connector 2 (SWSB2)

5 Backplane 2 power connector (BP2 PWR)	6 Front fan control board power connector (FRONT FAN PWR)
7 NVSwitch cold plate module leakage detection sensor connector (LEAK CONN)	8 Backplane 1 power connector (BP1 PWR)
9 Rear fan control board power connector (REAR FAN PWR2)	10 PCIe switch board sideband connector 1 (SWSB1)
11 PCIe switch board power connector 1 (FRONT RISER PWR1)	12 Left GPU baseboard power connector (GPU PWR)
13 PSU interposer sideband connector 1 (PIB SB1)	

PSU interposer connectors

See this section to locate the connectors on the PSU interposer.

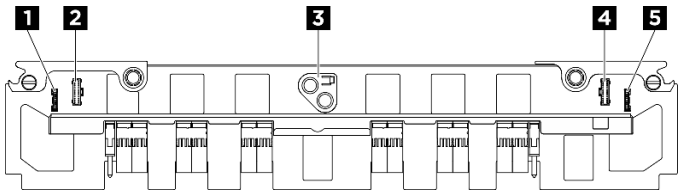


Figure 398. PSU interposer connectors

1 Front GPU leakage detection sensor connector (FAN2 LEAK2)	2 Power distribution board sideband connector 1 (PDB SB1)
3 System board power connector (MB PWR)	4 Power distribution board sideband connector 2 (PDB SB2)
5 Rear GPU leakage detection sensor connector (FAN1 LEAK1)	

System board connectors for cable routing

The following illustrations show the internal connectors on the system board that are used for internal cable routing.

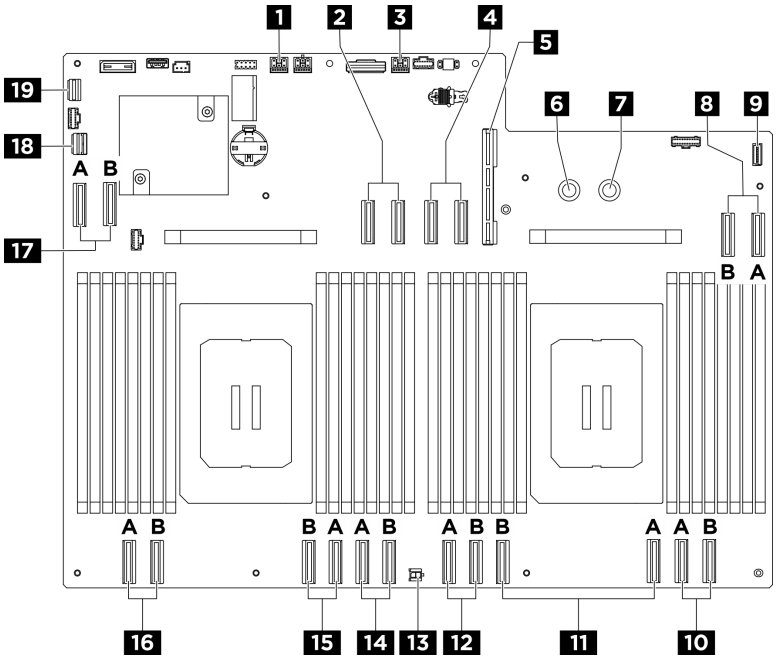


Figure 399. System board connectors for cable routing

Table 33. System board connectors for cable routing

1 PCIe Riser 2 power and sideband connector (BP PWR/ SIG 2)	2 PCIe Riser 2 signal connector (MCIO4A/MCIO4B)
3 PCIe Riser 1 power and sideband connector (BP PWR/ SIG 3)	4 PCIe Riser 1 signal connector (MCIO8A/MCIO8B)
5 System I/O board connector (DC-SCM)	6 PDB_0V connector (PSU_GND)
7 PDB_P12V connector (PSU_P12V)	8 MCIO connector 7 (MCIO7A/MCIO7B)
9 Integrated diagnostics panel connector (FRONT IO2)	10 MCIO connector 6 (MCIO6A/MCIO6B)
11 MCIO connector 5 (MCIO5A/MCIO5B)	12 MCIO connector 10 (MCIO10A/MCIO10B)
13 CPU leakage detection sensor connector (OUTLET TEMP SENSOR)	14 MCIO connector 3 (MCIO3A/MCIO3B)
15 MCIO connector 2 (MCIO2A/MCIO2B)	16 MCIO connector 1 (MCIO1A/MCIO1B)
17 MCIO connector 9 (MCIO9A/MCIO9B)	18 PCIe switch sideband connector (PCIE SW SIDEBAND)
19 Front USB / Mini DisplayPort connector (FRONT IO1)	

2.5-inch drive backplane cable routing

Use the section to understand the cable routing for the 2.5-inch drive backplane.

Based on the location of the drive backplane, select the corresponding routing plan:

- “Front 2.5-inch drive backplane cable routing” on page 370
- “Rear 2.5-inch drive backplane cable routing” on page 372

After you finish cable routing, bundle the cables with cable ties corresponding to their location:

- “Bundle cables connected to the PCIe switch board” on page 373
- “Bundle cables on the front drive backplane side” on page 372

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.

Front 2.5-inch drive backplane cable routing

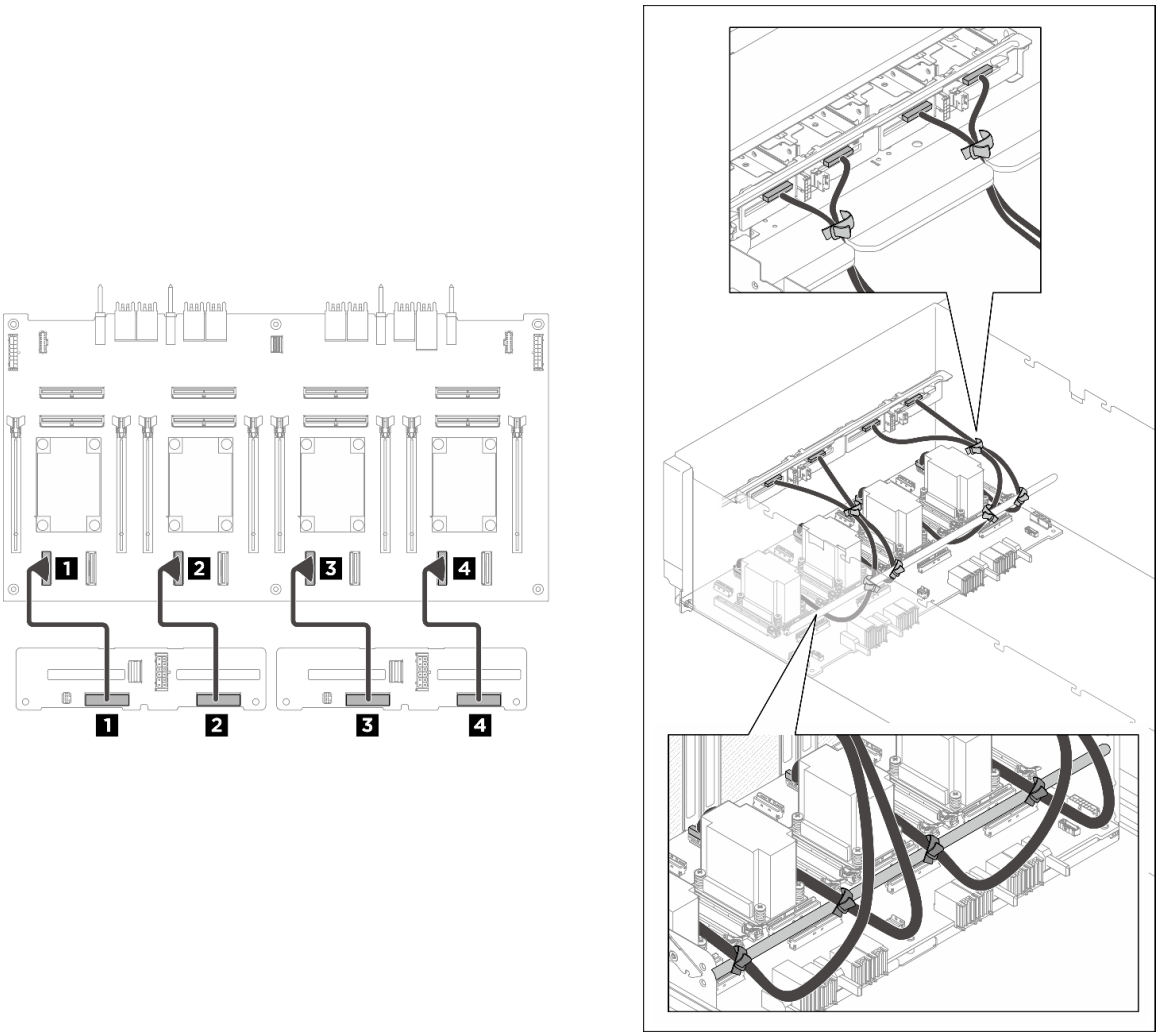
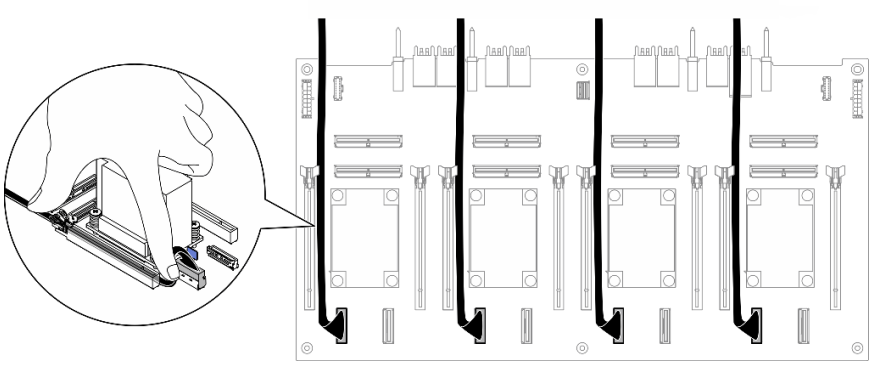


Figure 400. Front 2.5-inch drive backplane signal cable routing

Cable	From	To	Label
1	Backplane 1: NVMe connector 0-1	PCIe switch board: NVMe connector 1 (NVME1)	NVME 0-1 NVME 1
2	Backplane 1: NVMe connector 2-3	PCIe switch board: NVMe connector 3 (NVME3)	NVME 2-3 NVME 3

Cable	From	To	Label
3	Backplane 2: NVMe connector 0-1	PCIe switch board: NVMe connector 5 (NVME5)	NVME 0-1 NVME 5
4	Backplane 2: NVMe connector 2-3	PCIe switch board: NVMe connector 7 (NVME7)	NVME 2-3 NVME 7

Note:



Press the 2.5-inch drive backplane signal cables down onto the board to keep them away from the heat sinks.

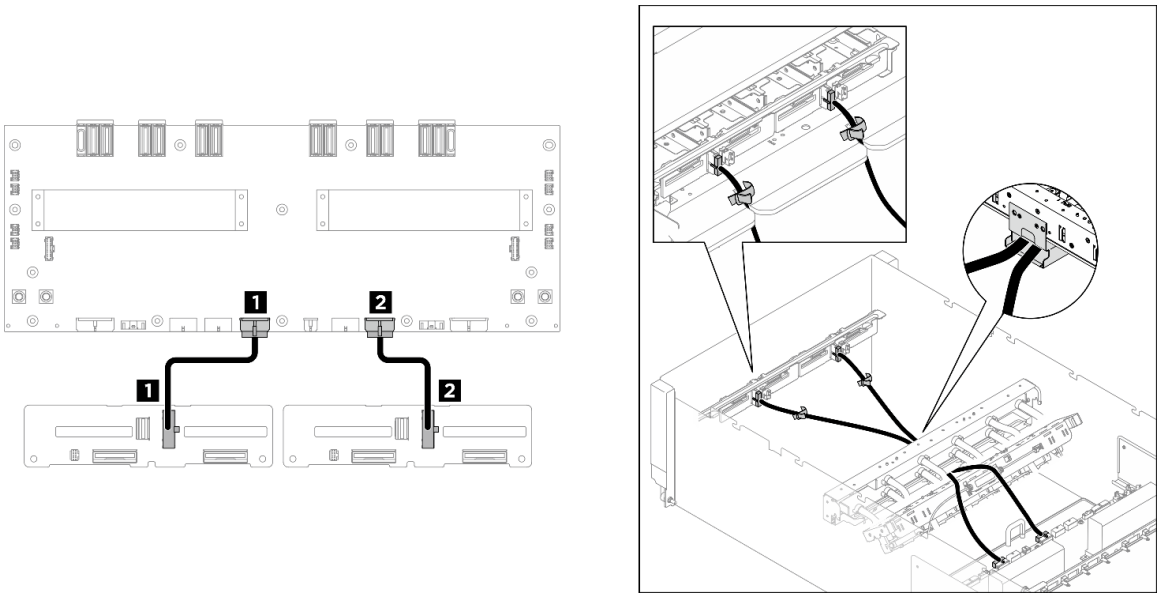


Figure 401. Front 2.5-inch drive backplane power cable routing

Cable	From	To	Label
1	Backplane 1: Power connector	Power distribution board: Backplane 1 power connector (BP1 PWR)	BP1 PWR BP1 PWR
2	Backplane 2: Power connector	Power distribution board: Backplane 2 power connector (BP2 PWR)	BP2 PWR BP2 PWR

Note: Route the 2.5-inch drive backplane power cables through the GPU cable holder as illustrated.

Rear 2.5-inch drive backplane cable routing

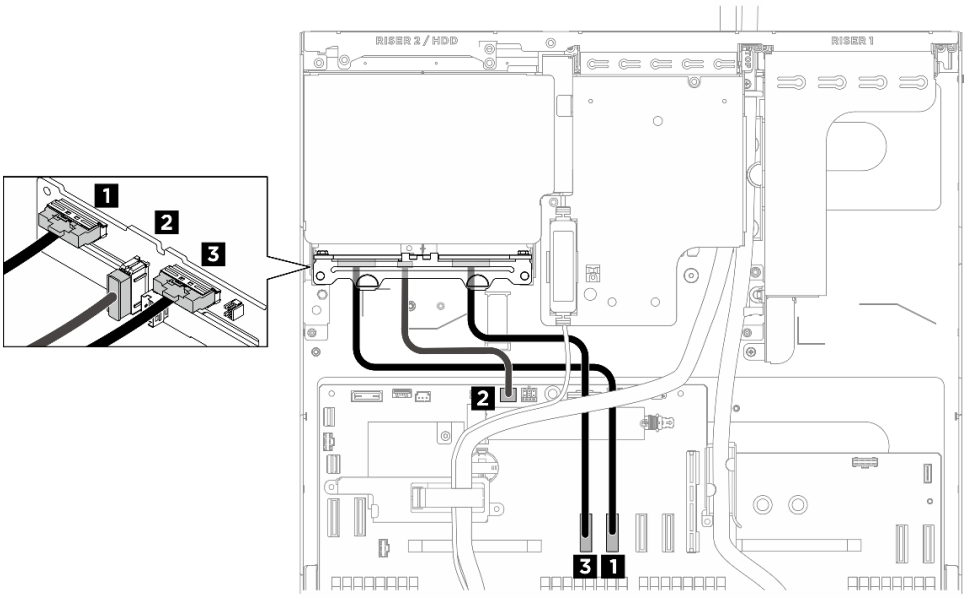


Figure 402. Rear 2.5-inch drive backplane cable routing

Cable	From	To	Label
1	Backplane 1: NVMe connector 2-3	System board: MCIO connector 4A (MCIO4A)	R-NVME 2-3 MCIO 4A
2	Backplane 2: Power connector	System board: Backplane power connector (BP PWR/SIG 2)	R-BP PWR SIG 2
3	Backplane 2: NVMe connector 0-1	System board: MCIO connector 4B (MCIO4B)	R-NVME 0-1 MCIO 4B

After you finish

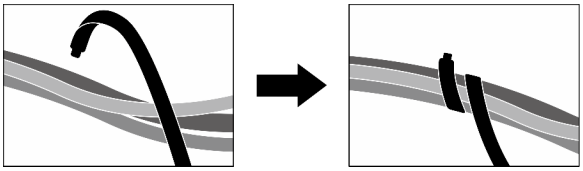
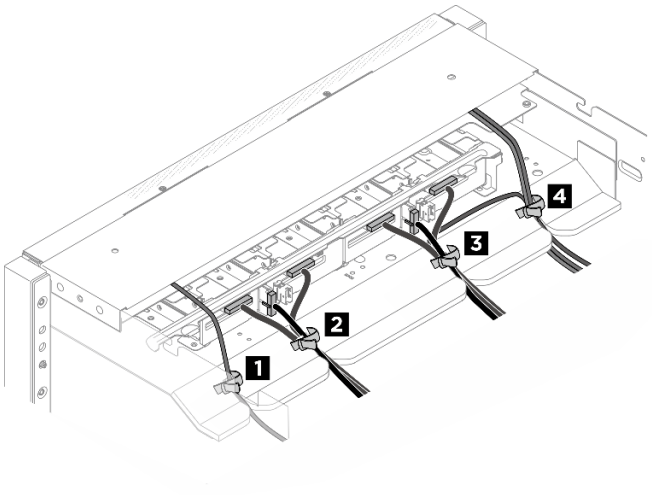


Figure 403. Securing cables with cable ties

Bundle cables on the front drive backplane side

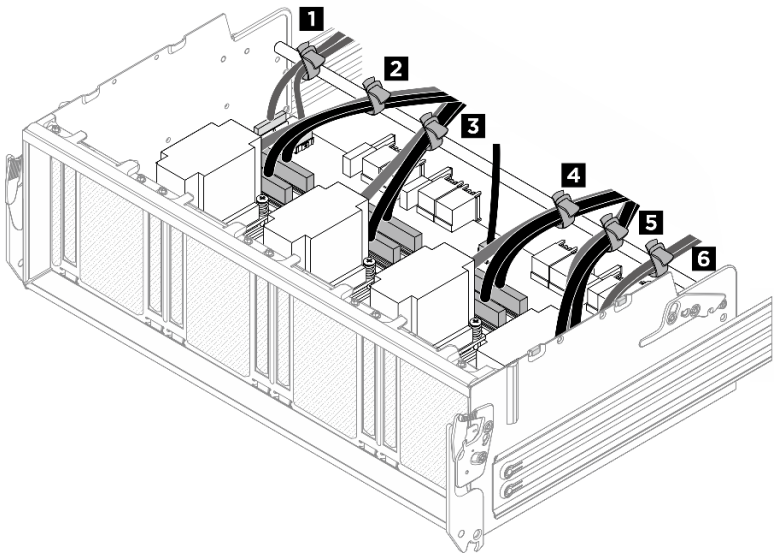
Divide the drive backplane signal and power cables, GPU management cable, front I/O module cables, and integrated diagnostics panel cable into four bundles, and secure them with cable ties as illustrated.



Bundle	Cable	Connector
1	• One integrated diagnostics panel cable	• Integrated diagnostics panel
2	• Two backplane 1 signal cables • One backplane 1 power cable	• Backplane 1: NVMe connector 0-1 • Backplane 1: Power connector • Backplane 1: NVMe connector 2-3
3	• Two backplane 2 signal cables • One backplane 2 power cable • One GPU management cable	• Backplane 2: NVMe connector 0-1 • Backplane 2: NVMe connector 2-3 • Backplane 2: Power connector • From PCIe switch board: GPU management connector (MGMT)
4	• One GPU management cable • Two front I/O module cables	• To system board: PCIe switch sideband connector (PCIE SW SIDEBAND) • Front I/O module

Bundle cables connected to the PCIe switch board

Divide the cables connected to the PCIe switch board into six bundles, and secure them to the crossbar with cable ties.



Bundle	Cable	Connector (on PCIe switch board)
1	• One PCIe switch board power cable • One PCIe switch board sideband cable	• PDB PWR1 • PDB SB1
2	• One backplane 1 signal cable • Two PCIe switch board signal cables	• NVME1 • MCIO1 • MCIO2
3	• One backplane 1 signal cable • Two PCIe switch board signal cables	• NVME3 • MCIO3 • MCIO4
4	• One backplane 2 signal cable • Two PCIe switch board signal cables	• NVME5 • MCIO5 • MCIO6
5	• One backplane 2 signal cable • Two PCIe switch board signal cables	• NVME7 • MCIO7 • MCIO8
6	• One PCIe switch board power cable • One PCIe switch board sideband cable	• PDB PWR2 • PDB SB2

Fan control board cable routing

Use the section to understand the cable routing for the front or rear fan control board.

Based on the location of the fan control board, select the corresponding routing plan:

- “Front fan control board” on page 375
- “Rear fan control board” on page 375

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.

Front fan control board

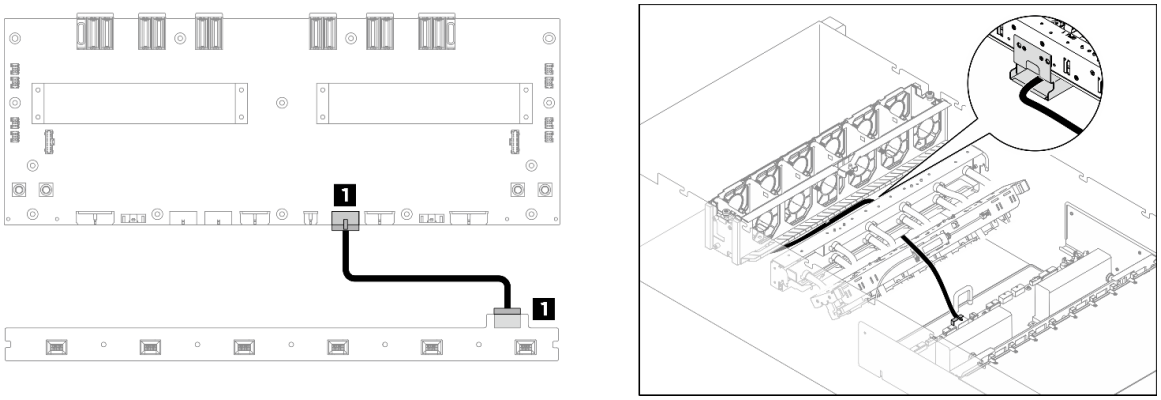


Figure 404. Front fan control board cable routing

Cable	From	To	Label
1	Front fan control board: Power connector	Power distribution board: Front fan control board power connector (FRONT FAN PWR)	F-Fan PWR F-Fan PWR

Note: Route the front fan control board cable through the GPU cable holder.

Rear fan control board

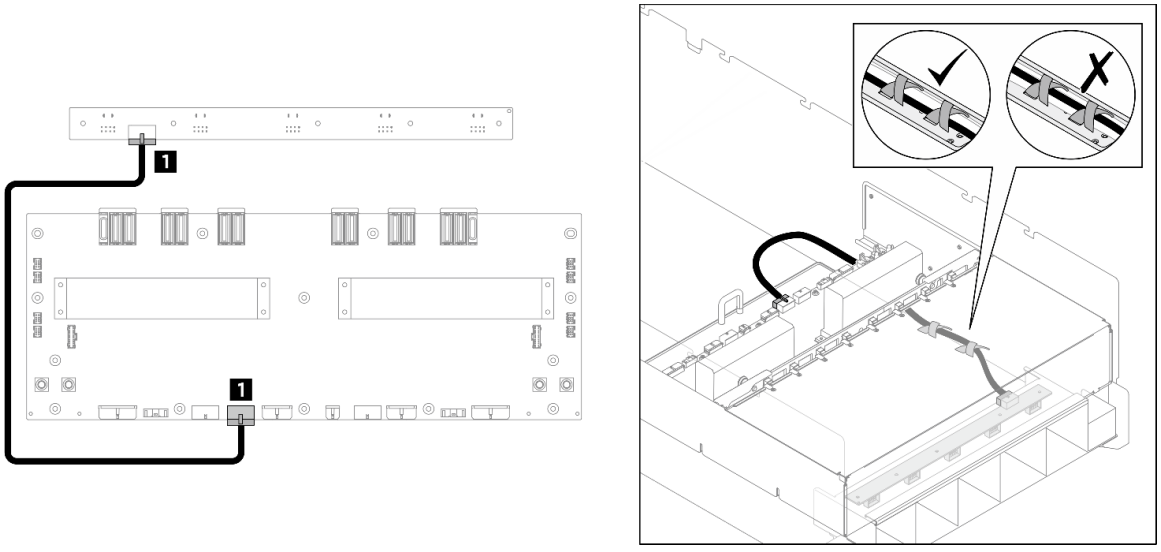


Figure 405. Rear fan control board cable routing

Cable	From	To	Label
1	Rear fan control board: Power connector	Power distribution board: Rear fan control board power connector (REAR FAN PWR2)	R-Fan PWR2 R-Fan PWR

Note: When securing sensor cable on the hose holder, ensure not to route the cable on top of the hoses.

GPU baseboard cable routing

Use the section to understand the cable routing for the GPU baseboard.

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.

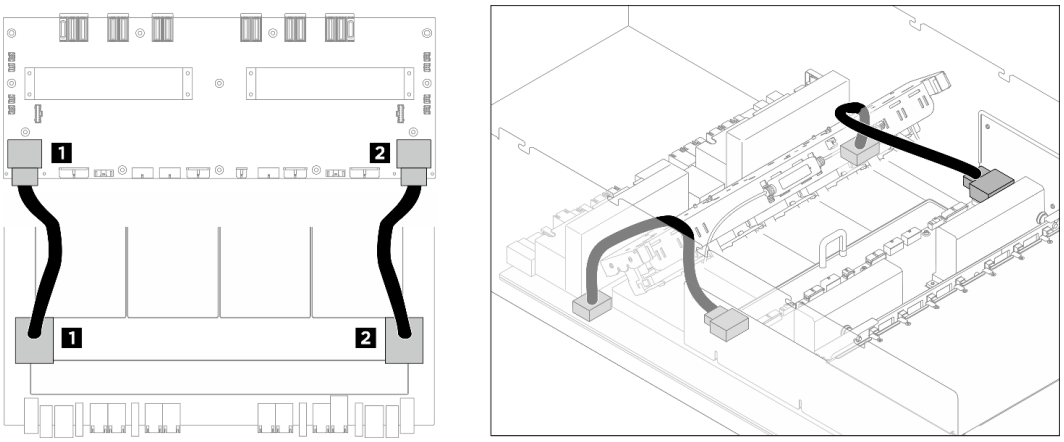


Figure 406. GPU baseboard cable routing

Cable	From	To
1	GPU baseboard: Left power connector	Power distribution board: Left GPU baseboard power connector (GPU PWR)
2	GPU baseboard: Right power connector	Power distribution board: Right GPU baseboard power connector (GPU PWR)

Front I/O module and integrated diagnostics panel cable routing

Use the section to understand the cable routing for the front I/O module and the integrated diagnostics panel.

Based on the location, select the corresponding routing plan:

- “Front I/O module cable routing” on page 377
- “Integrated diagnostics panel cable routing” on page 378

After you finish cable routing, bundle the cables with cable ties corresponding to their location:

- “Bundle cables on the front drive backplane side” on page 379

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.

Front I/O module cable routing

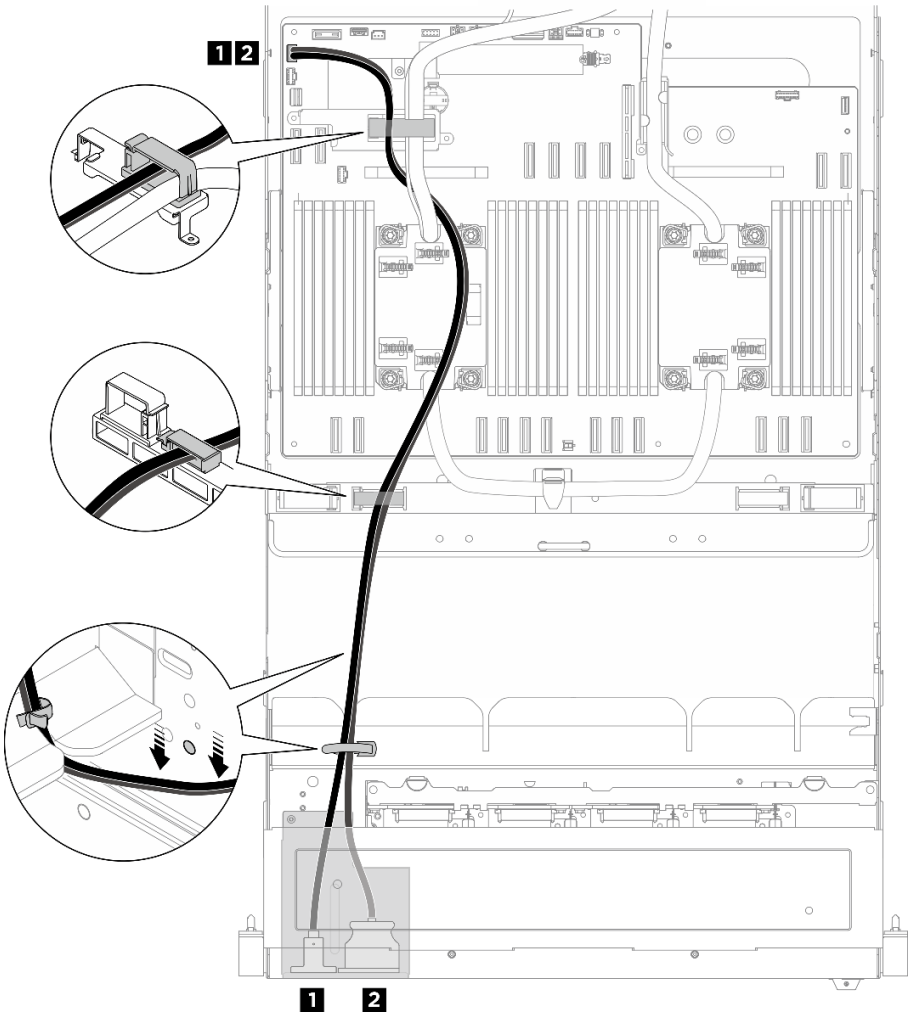


Figure 407. Front I/O module cable routing

Cable	From	To	Label
1	Front I/O module: Mini DisplayPort cable	System board assembly: Front USB / Mini DisplayPort connector (FRONT IO1)	DP/USB FRONT IO1
2	Front I/O module: USB cable		

Integrated diagnostics panel cable routing

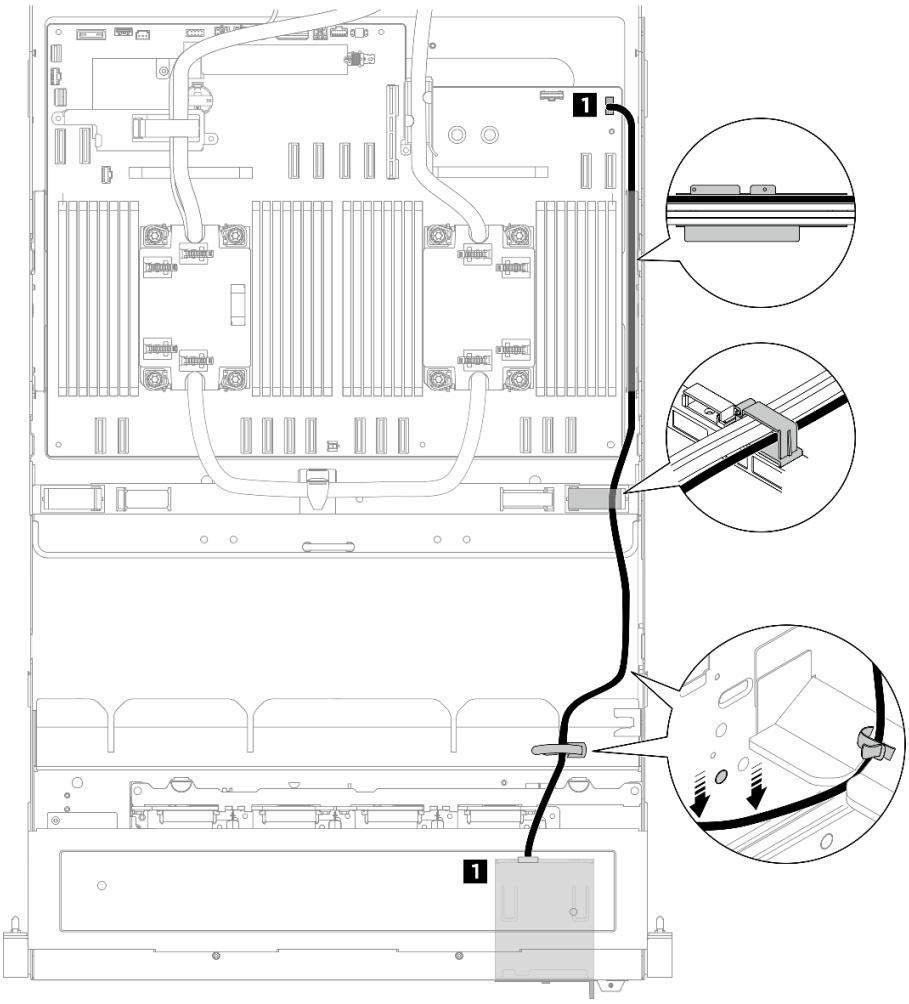


Figure 408. Integrated diagnostics panel cable routing

Cable	From	To	Label
1	Integrated diagnostics panel: Integrated diagnostics panel cable	System board assembly: Integrated diagnostics panel connector (FRONT IO2)	Pong FRONT IO2

Notes:

- Ensure to keep the integrated diagnostics panel cable and the front I/O module cable lower than the circle mark on the chassis as illustrated.
- When routing through the cable guides on the CPU complex chassis, keep the integrated diagnostics panel cable on top of the power cables, and keep them parallel to each other.

After you finish

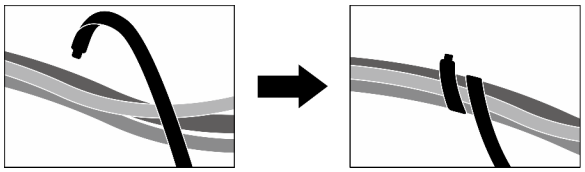
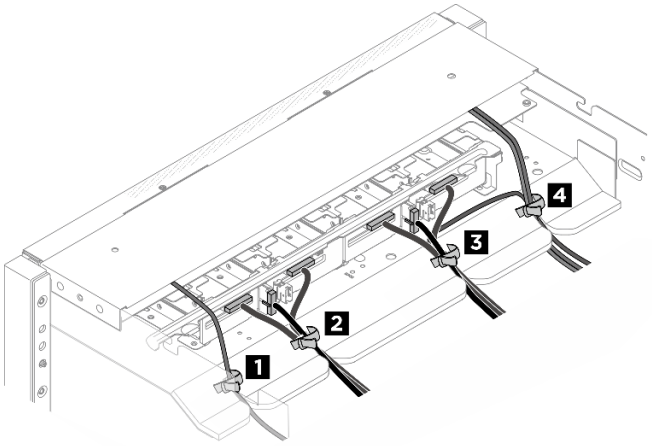


Figure 409. Securing cables with cable ties

Bundle cables on the front drive backplane side

Divide the drive backplane signal and power cables, GPU management cable, front I/O module cables, and integrated diagnostics panel cable into four bundles, and secure them with cable ties as illustrated.



Bundle	Cable	Connector
1	• One integrated diagnostics panel cable	• Integrated diagnostics panel
2	• Two backplane 1 signal cables • One backplane 1 power cable	• Backplane 1: NVMe connector 0-1 • Backplane 1: Power connector • Backplane 1: NVMe connector 2-3
3	• Two backplane 2 signal cables • One backplane 2 power cable • One GPU management cable	• Backplane 2: NVMe connector 0-1 • Backplane 2: NVMe connector 2-3 • Backplane 2: Power connector • From PCIe switch board: GPU management connector (MGMT)
4	• One GPU management cable • Two front I/O module cables	• To system board: PCIe switch sideband connector (PCIE SW SIDEBAND) • Front I/O module

System I/O board cable routing

Use the section to understand the cable routing for the system I/O board.

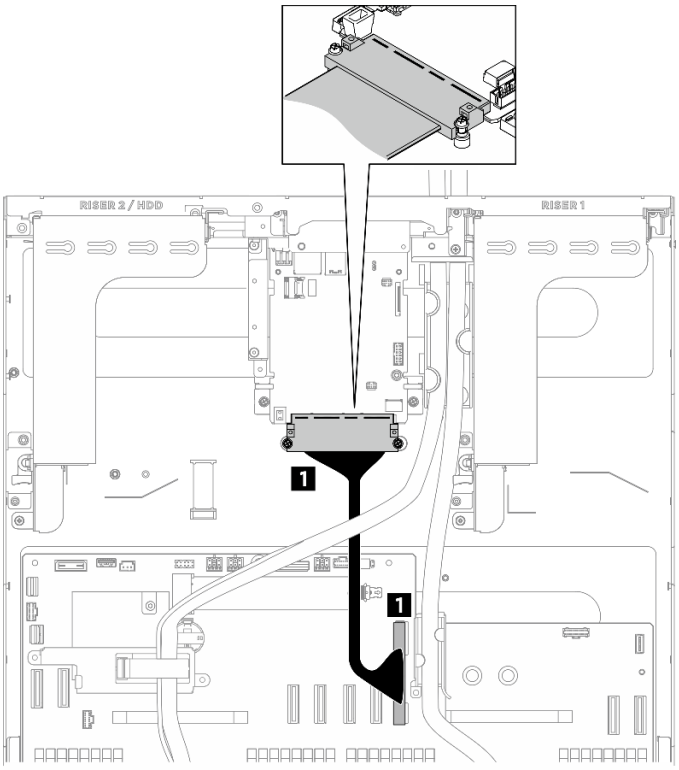


Figure 410. System I/O board cable routing

Cable	From	To
1	System I/O board: Processor board connector	System board assembly: System I/O board connector (DC-SCM)

PCIe switch board cable routing

Use the section to understand the cable routing for the PCIe switch board.

Based on the location, select the corresponding routing plan:

- “PCIe switch board signal cable routing” on page 381
- “GPU management cable routing” on page 386
- “PCIe switch board power and sideband cable routing” on page 388

If you are replacing an old PCIe switch board signal cable with a new one, prebend the cable before connect it to the PCIe switch board:

- “Prebend cable for PCIe switch board signal cables” on page 385

After you finish cable routing, bundle the cables with cable ties corresponding to their location:

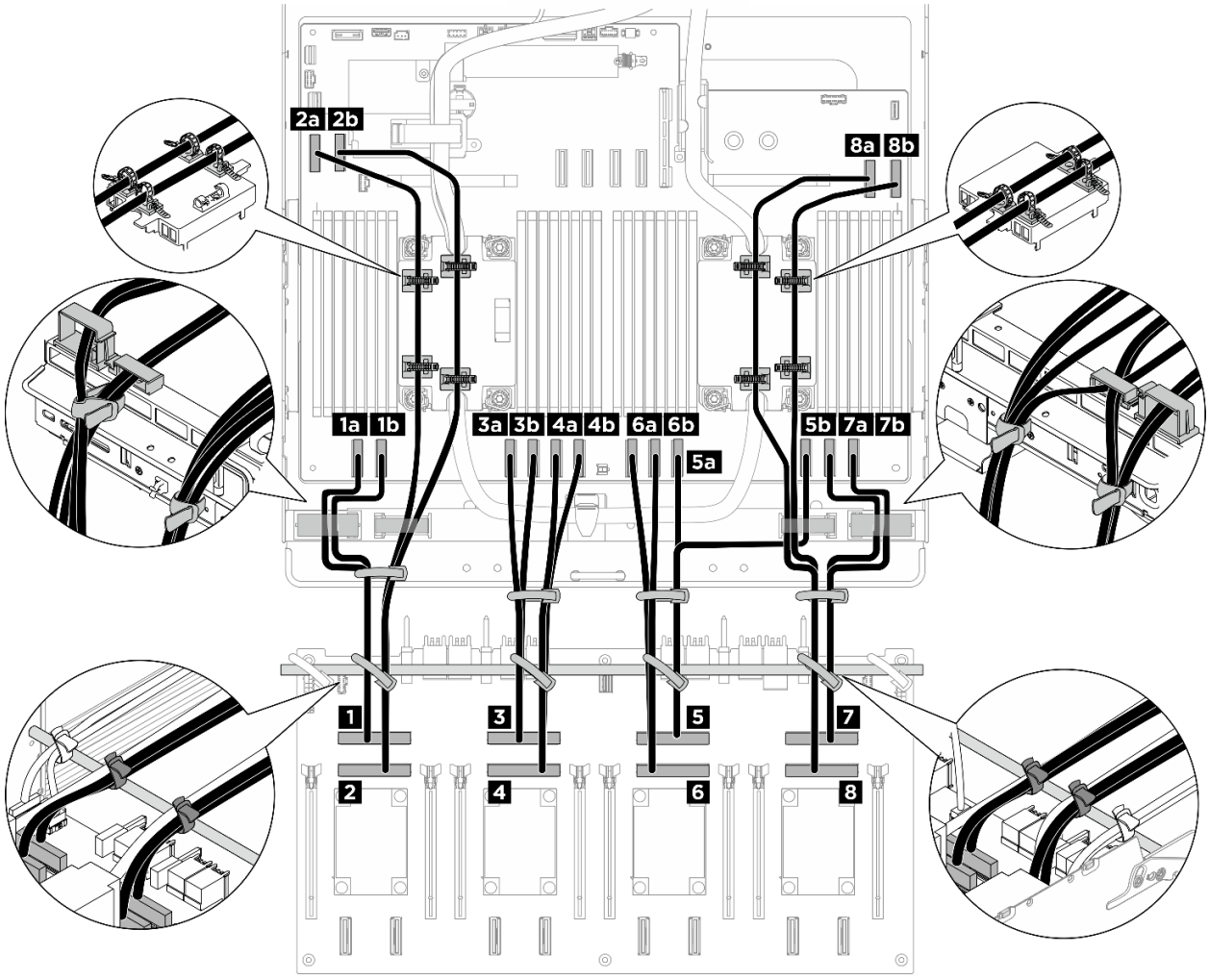
- “Bundle cables connected to the PCIe switch board” on page 389
- “Bundle cables connected to the system board” on page 390
- “Bundle cables on the front drive backplane side” on page 391

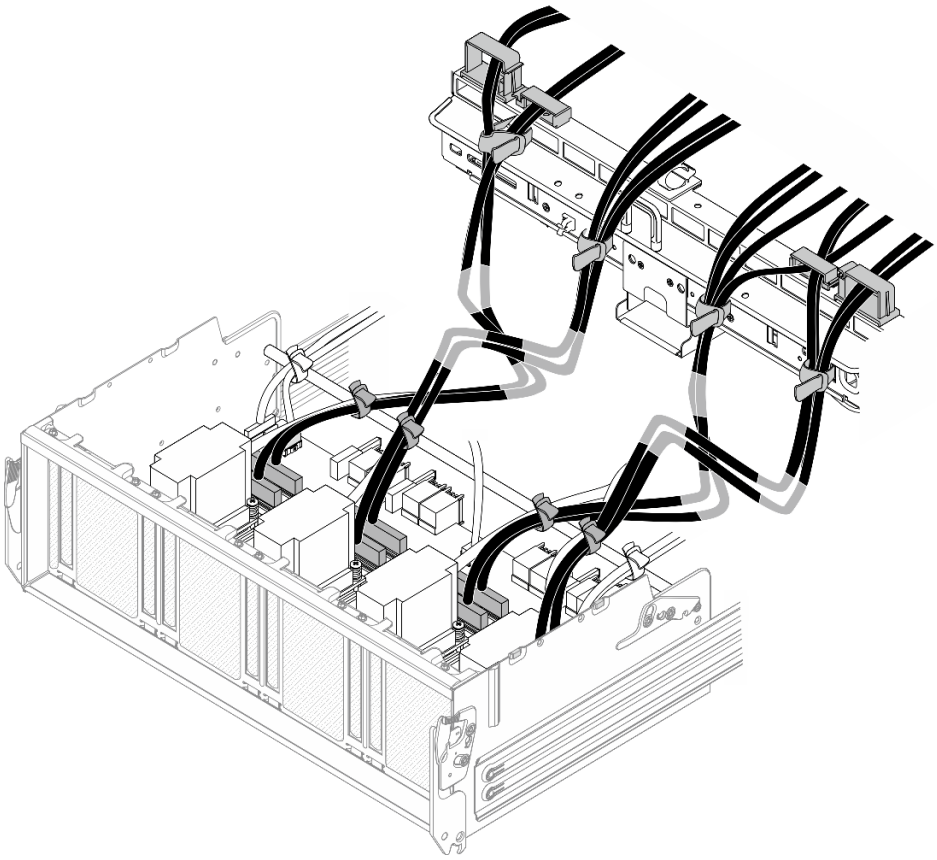
Notes:

- 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.

PCIe switch board signal cable routing

Signal cables

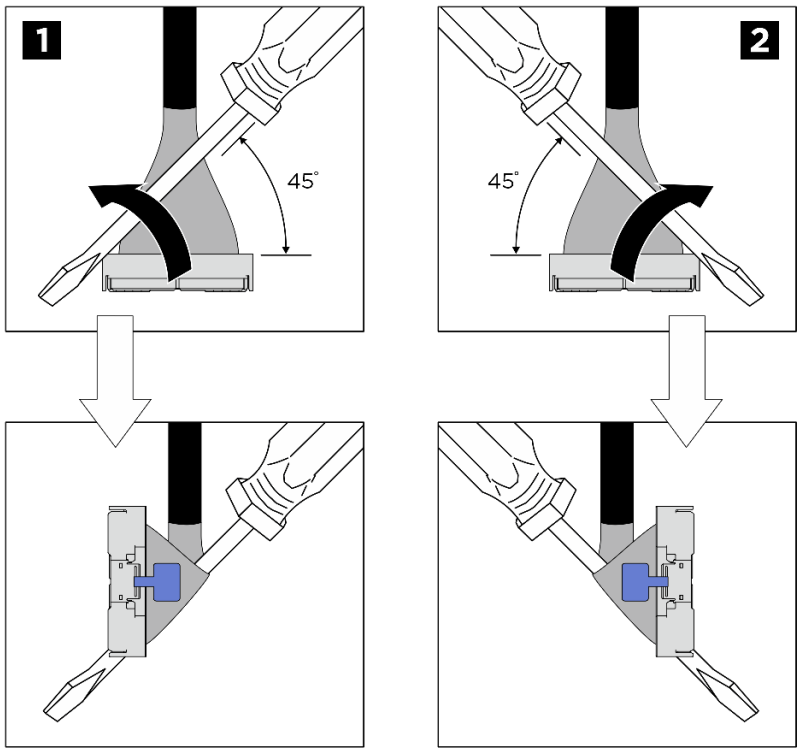

2a 2b
8a 8b
1a 1b
3a 3b 4a 4b 6a 6b
5a
5b 7a 7b
1
3
5
7
2
4
6
8



Cable	From	To	Label	Prebend
1	PCIe switch board: MCIO connector 1 (MCIO1)	1a System board: MCIO connector 1 (MCIO1A)	A-1A MCIO 1	Prebend direction B
		1b System board: MCIO connector 1 (MCIO1B)	B-1B MCIO 1	
2	PCIe switch board: MCIO connector 2 (MCIO2)	2a System board: MCIO connector 9 (MCIO9A)	A-9A MCIO 2	Prebend direction B
		2b System board: MCIO connector 9 (MCIO9B)	B-9B MCIO 2	
3	PCIe switch board: MCIO connector 3 (MCIO3) **Notes:** • Cable end A plugs into connector B. • Cable end B plugs into connector A.	3a System board: MCIO connector 2 (MCIO2B)	A-2B MCIO 3	Prebend direction A
		3b System board: MCIO connector 2 (MCIO2A)	B-2A MCIO 3	
4	PCIe switch board: MCIO connector 4 (MCIO4)	4a System board: MCIO connector 3 (MCIO3A)	A-3A MCIO 4	Prebend direction A

Cable	From	To	Label	Prebend
		4b System board: MCIO connector 3 (MCIO3B)	B-3B MCIO 4	
5	PCIe switch board: MCIO connector 5 (MCIO5) **Notes:** • Cable end A plugs into connector B. • Cable end B plugs into connector A.	5a System board: MCIO connector 5 (MCIO5B)	A-5B MCIO 5	Prebend direction B
		5b System board: MCIO connector 5 (MCIO5A)	B-5A MCIO 5	
6	PCIe switch board: MCIO connector 6 (MCIO6)	6a System board: MCIO connector 10 (MCIO10A)	A-10A MCIO 10	Prebend direction B
		6b System board: MCIO connector 10 (MCIO10B)	B-10B MCIO 10	
7	PCIe switch board: MCIO connector 7 (MCIO7)	7a System board: MCIO connector 6 (MCIO6A)	A-6A MCIO 6	Prebend direction A
		7b System board: MCIO connector 6 (MCIO6B)	B-6B MCIO 6	
8	PCIe switch board: MCIO connector 8 (MCIO8) **Notes:** • Cable end A plugs into connector B. • Cable end B plugs into connector A.	8a System board: MCIO connector 7 (MCIO7B)	A-7B MCIO 7	Prebend direction A
		8b System board: MCIO connector 7 (MCIO7A)	B-7A MCIO 7	

Prebend cable for PCIe switch board signal cables

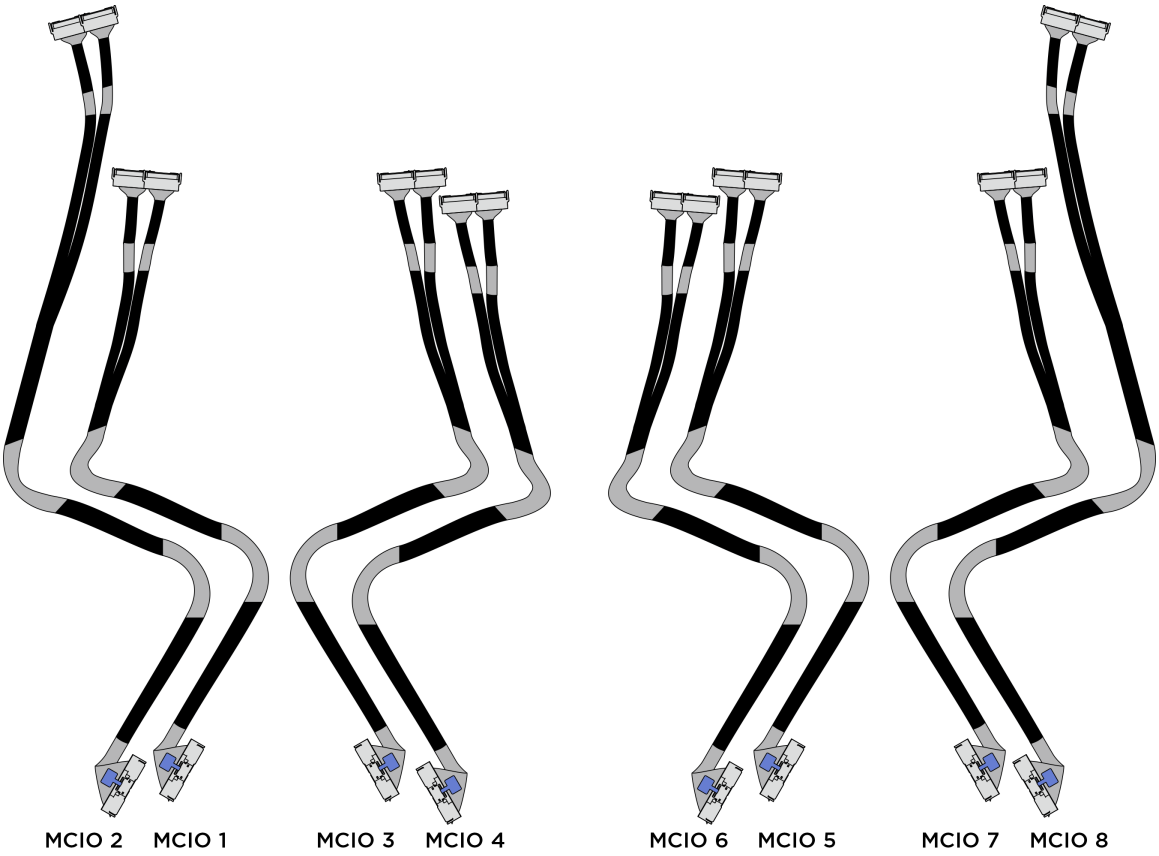


1	Prebend direction A
2	Prebend direction B

Use a Phillips screwdriver or a flat screwdriver as tool.

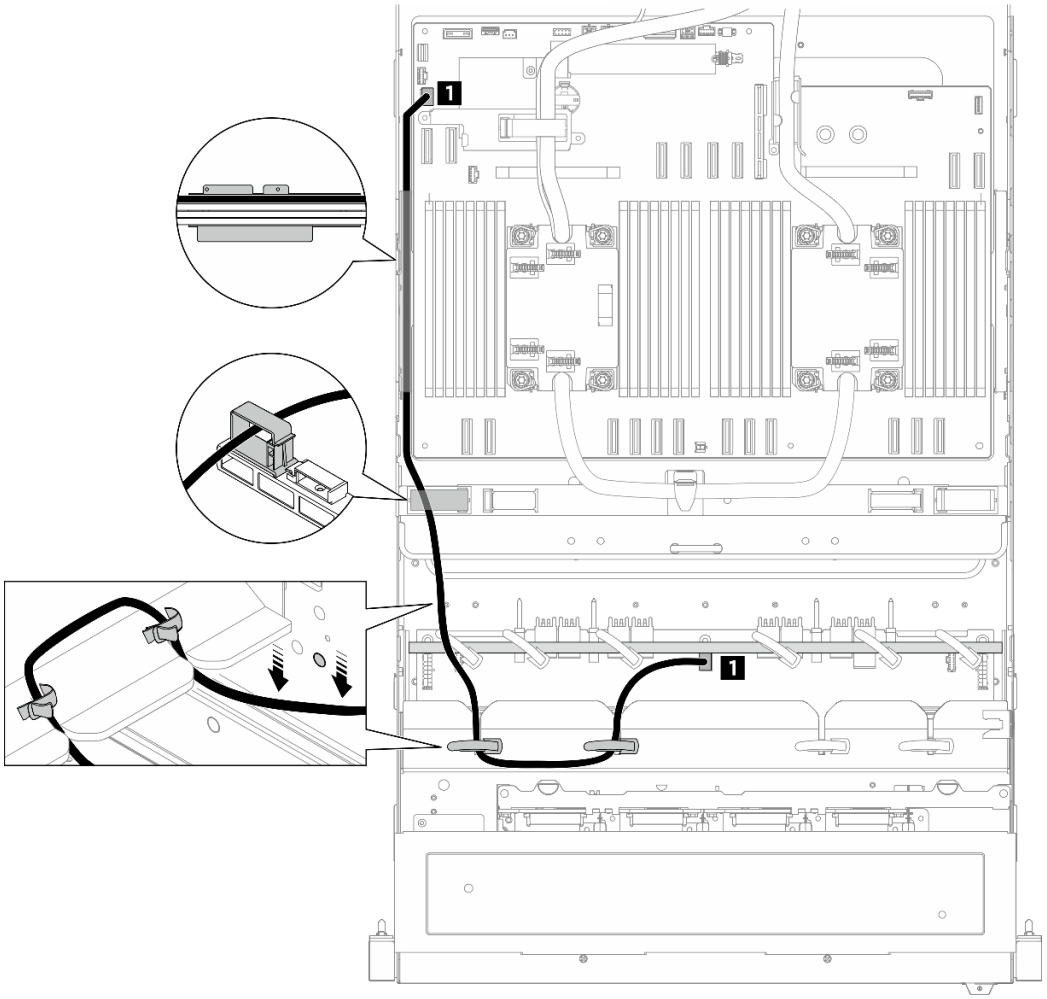
Place the screwdriver at a 45-degree angle to the connector. Carefully bend the cable as illustrated.

See the following illustration for prebend direction:



GPU management cable routing

GPU management cable

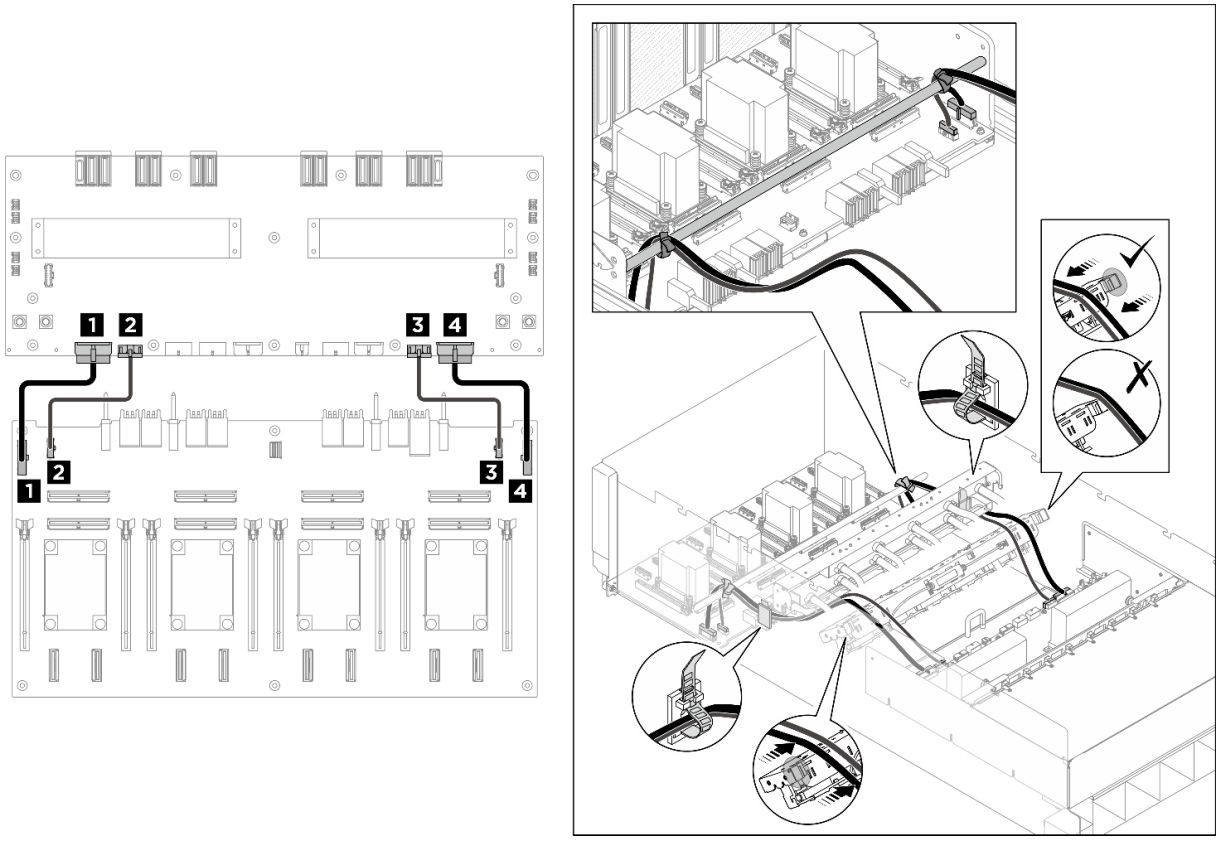


Cable	From	To
1	PCIe switch board: GPU management connector (MGMT)	System board: PCIe switch sideband connector (PCIE SW SIDEBAND)

Note: Ensure to keep the GPU management cable lower than the circle mark on the chassis as illustrated.

Figure 411. PCIe switch board cable routing (GPU management cable)

PCIe switch board power and sideband cable routing



Cable	From	To
1	PCIe switch board: Power distribution board power connector 1 (PDB PWR1)	Power distribution board: PCIe switch board power connector 1 (FRONT RISER PWR1)
2	PCIe switch board: Power distribution board sideband connector 1 (PDB SB1)	Power distribution board: PCIe switch board sideband connector 1 (SWSB1)
3	PCIe switch board: Power distribution board power connector 2 (PDB PWR2)	Power distribution board: PCIe switch board power connector 2 (FRONT RISER PWR2)
4	PCIe switch board: Power distribution board sideband connector 2 (PDB SB2)	Power distribution board: PCIe switch board sideband connector 2 (SWSB2)

Figure 412. PCIe switch board cable routing (power and sideband cables)

Note: Ensure not to place the sensor cables on the right and left ends of the manifold.

After you finish

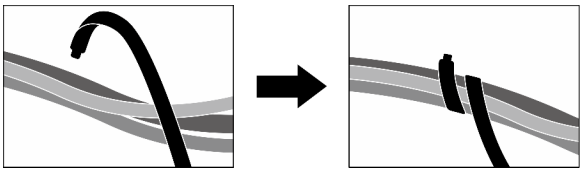
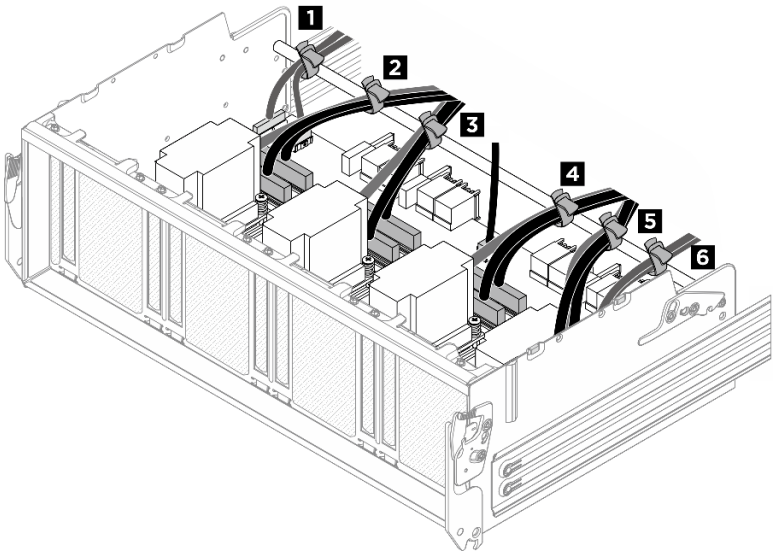


Figure 413. Securing cables with cable ties

Bundle cables connected to the PCIe switch board

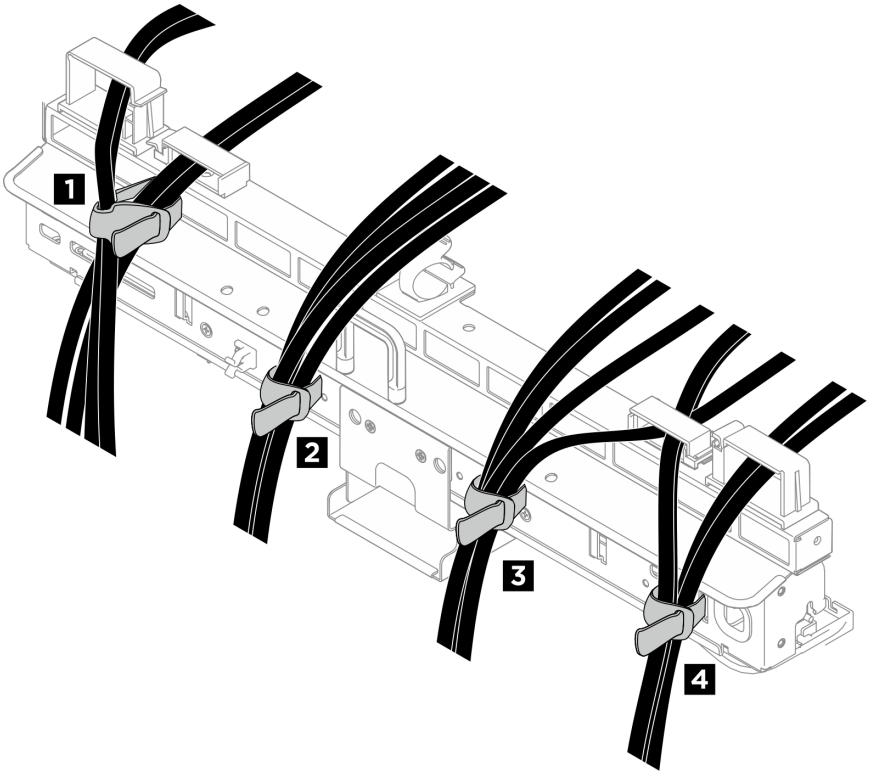
Divide the cables connected to the PCIe switch board into six bundles, and secure them to the crossbar with cable ties.



Bundle	Cable	Connector (on PCIe switch board)
1	• One PCIe switch board power cable • One PCIe switch board sideband cable	• PDB PWR1 • PDB SB1
2	• One backplane 1 signal cable • Two PCIe switch board signal cables	• NVME1 • MCIO1 • MCIO2
3	• One backplane 1 signal cable • Two PCIe switch board signal cables	• NVME3 • MCIO3 • MCIO4
4	• One backplane 2 signal cable • Two PCIe switch board signal cables	• NVME5 • MCIO5 • MCIO6
5	• One backplane 2 signal cable • Two PCIe switch board signal cables	• NVME7 • MCIO7 • MCIO8
6	• One PCIe switch board power cable • One PCIe switch board sideband cable	• PDB PWR2 • PDB SB2

Bundle cables connected to the system board

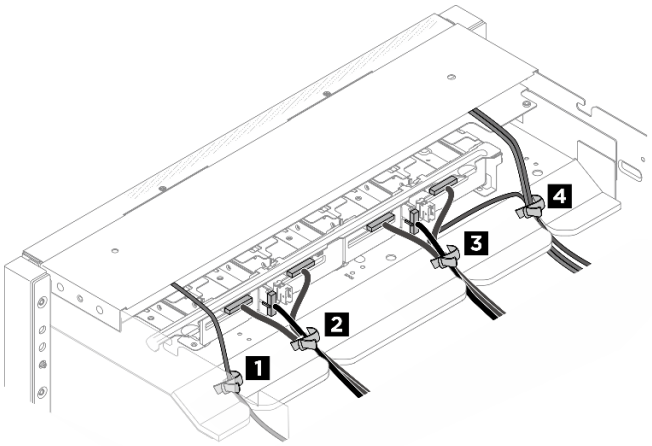
Divide the PCIe switch board signal cables into four bundles, and secure them with cable ties as illustrated.



Bundle	Cable	Connector (on system board)
1	• Four PCIe switch board signal cables	• MCIO1A • MCIO1B • MCIO9A • MCIO9B
2	• Four PCIe switch board signal cables	• MCIO2A • MCIO2B • MCIO3A • MCIO3B
3	• Four PCIe switch board signal cables	• MCIO5A • MCIO5B • MCIO10A • MCIO10B
4	• Four PCIe switch board signal cables	• MCIO6A • MCIO6B • MCIO7A • MCIO7B

Bundle cables on the front drive backplane side

Divide the drive backplane signal and power cables, GPU management cable, front I/O module cables, and integrated diagnostics panel cable into four bundles, and secure them with cable ties as illustrated.



Bundle	Cable	Connector
1	• One integrated diagnostics panel cable	• Integrated diagnostics panel
2	• Two backplane 1 signal cables • One backplane 1 power cable	• Backplane 1: NVMe connector 0-1 • Backplane 1: Power connector • Backplane 1: NVMe connector 2-3
3	• Two backplane 2 signal cables • One backplane 2 power cable • One GPU management cable	• Backplane 2: NVMe connector 0-1 • Backplane 2: NVMe connector 2-3 • Backplane 2: Power connector • From PCIe switch board: GPU management connector (MGMT)
4	• One GPU management cable • Two front I/O module cables	• To system board: PCIe switch sideband connector (PCIE SW SIDEBAND) • Front I/O module

PSU interposer cable routing

Use the section to understand the cable routing for the PSU interposer.

Based on the location, select the corresponding routing plan:

- “PSU interposer to power distribution board cable routing” on page 392
- “PSU interposer to system board cable routing” on page 393

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.

PSU interposer to power distribution board cable routing

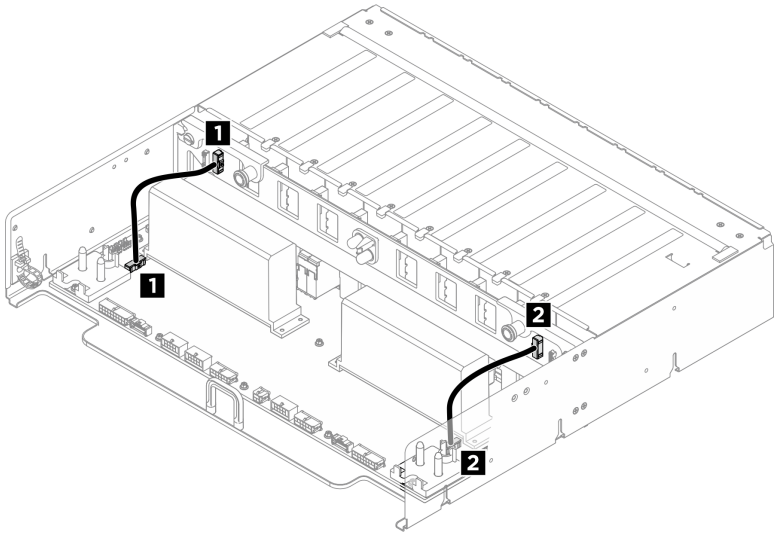


Figure 414. PSU interposer to power distribution board cable routing

Cable	From	To
1	PSU interposer: Power distribution board sideband connector 1 (PDB SB1)	Power distribution board: PSU interposer sideband connector 1 (PIB SB1)
2	PSU interposer: Power distribution board sideband connector 2 (PDB SB2)	Power distribution board: PSU interposer sideband connector 2 (PIB SB2)

PSU interposer to system board cable routing

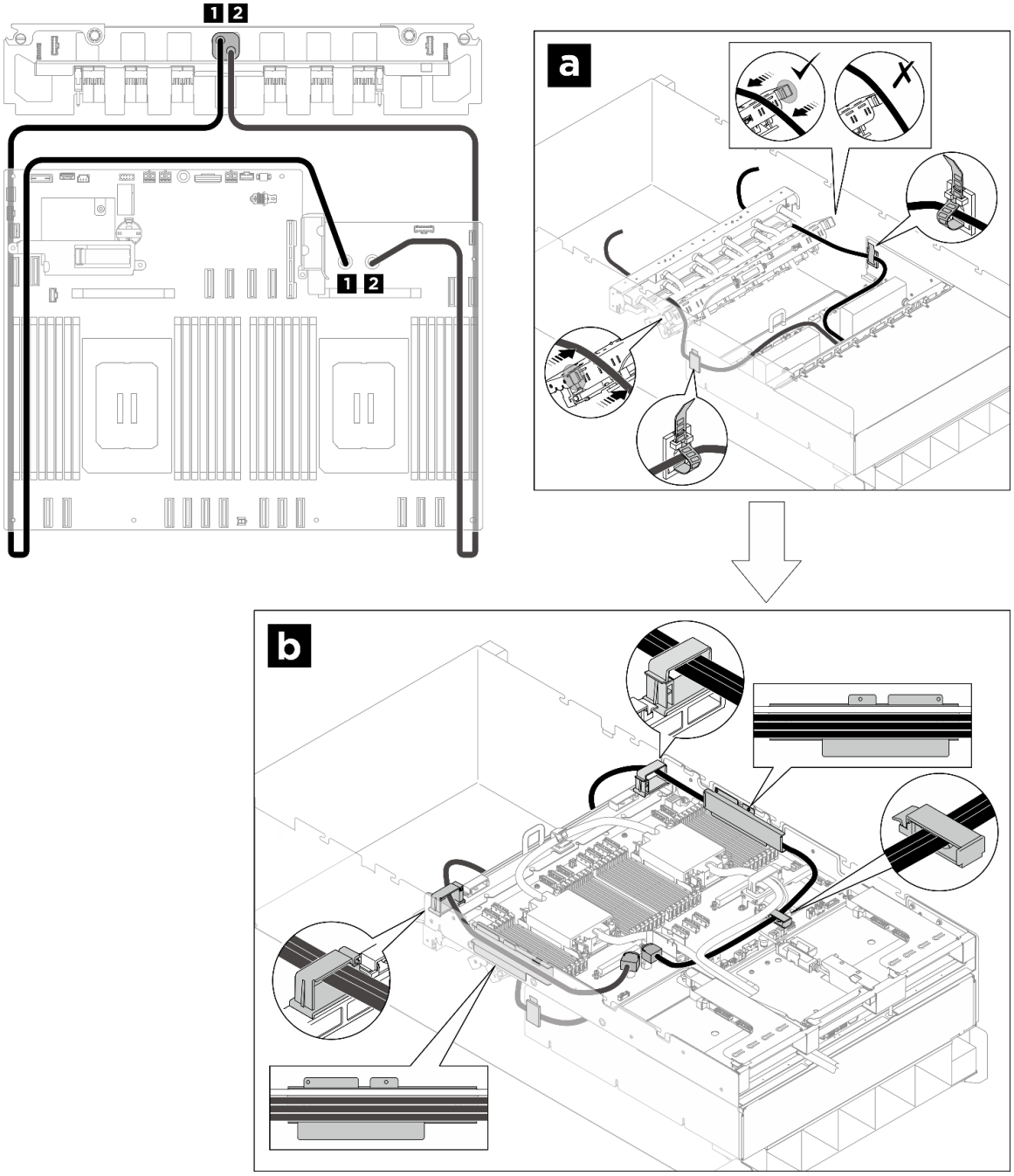


Figure 415. PSU interposer to system board cable routing

Cable	From	To
1	PSU interposer: System board power connector (MB PWR)	1 System board: PDB_0V connector (PSU_GND) (black cable)
2		2 System board: PDB_P12V connector (PSU_P12V) (red cable)

a	View from PDB and GPU complex
b	View from CPU complex

Notes:

- When routing through the cable guides on the CPU complex chassis, keep the integrated diagnostics panel cable and the GPU management cable on top of the power cables, and keep them parallel to each other. As illustrated in b.
- Ensure not to place the power cables on the right and left ends of the manifold. As illustrated in a.

PCIe riser cable routing

Use the section to understand the cable routing for the PCIe risers.

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.
- A label on each cable indicates the connection source and destination. This information is in the format **RY-X** and **P Z**. Where ***Y*** indicates the PCIe riser number, ***X*** indicates the connector on the riser card, and ***Z*** indicates the connector on the system board assembly.

PCIe riser cable routing

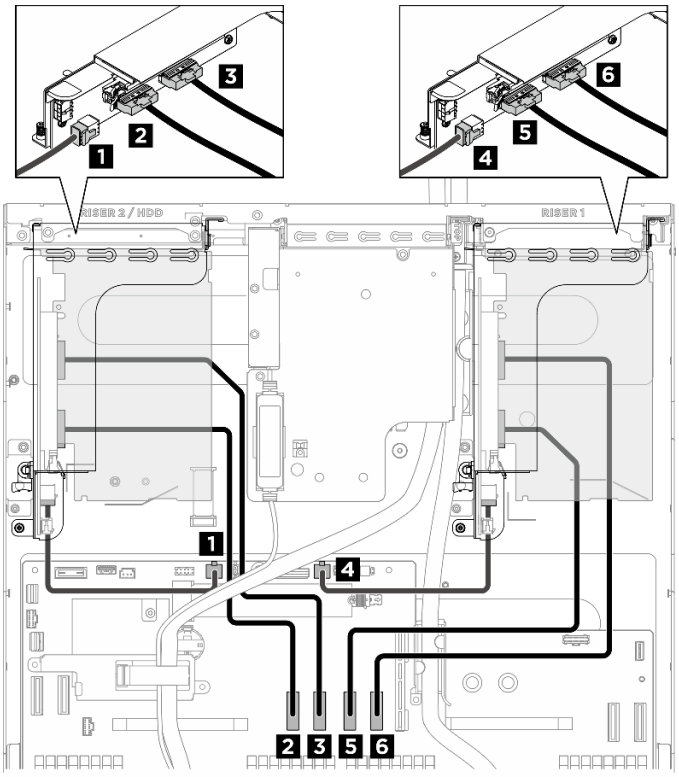


Figure 416. PCIe riser cable routing

From	To	Label
1 PCIe Riser 2 power connector (RISER PWR)	System board assembly: PCIe Riser 2 power and sideband connector (BP PWR/SIG 1)	R2-Riser PWR PWR/SIG 2
2 PCIe riser 2 signal connector (MCIO 1)	System board assembly: PCIe Riser 2 signal connectors (MCIO4B)	R2-MCIO 2 MCIO 4B
3 PCIe riser 2 signal connector (MCIO 2)	System board assembly: PCIe Riser 2 signal connectors (MCIO4A)	R2-MCIO 1 MCIO 4A
4 PCIe Riser 1 power connector (RISER PWR)	System board assembly: PCIe Riser 1 power and sideband connector (BP PWR/SIG 3)	R1-Riser PWR PWR/SIG 3
5 PCIe riser 1 signal connector (MCIO 1)	System board assembly: PCIe Riser 1 signal connectors (MCIO8A)	R1-MCIO 1 MCIO 8A
6 PCIe riser 1 signal connector (MCIO 2)	System board assembly: PCIe Riser 1 signal connectors (MCIO8B)	R1-MCIO 2 MCIO 8B

DPU power cable routing

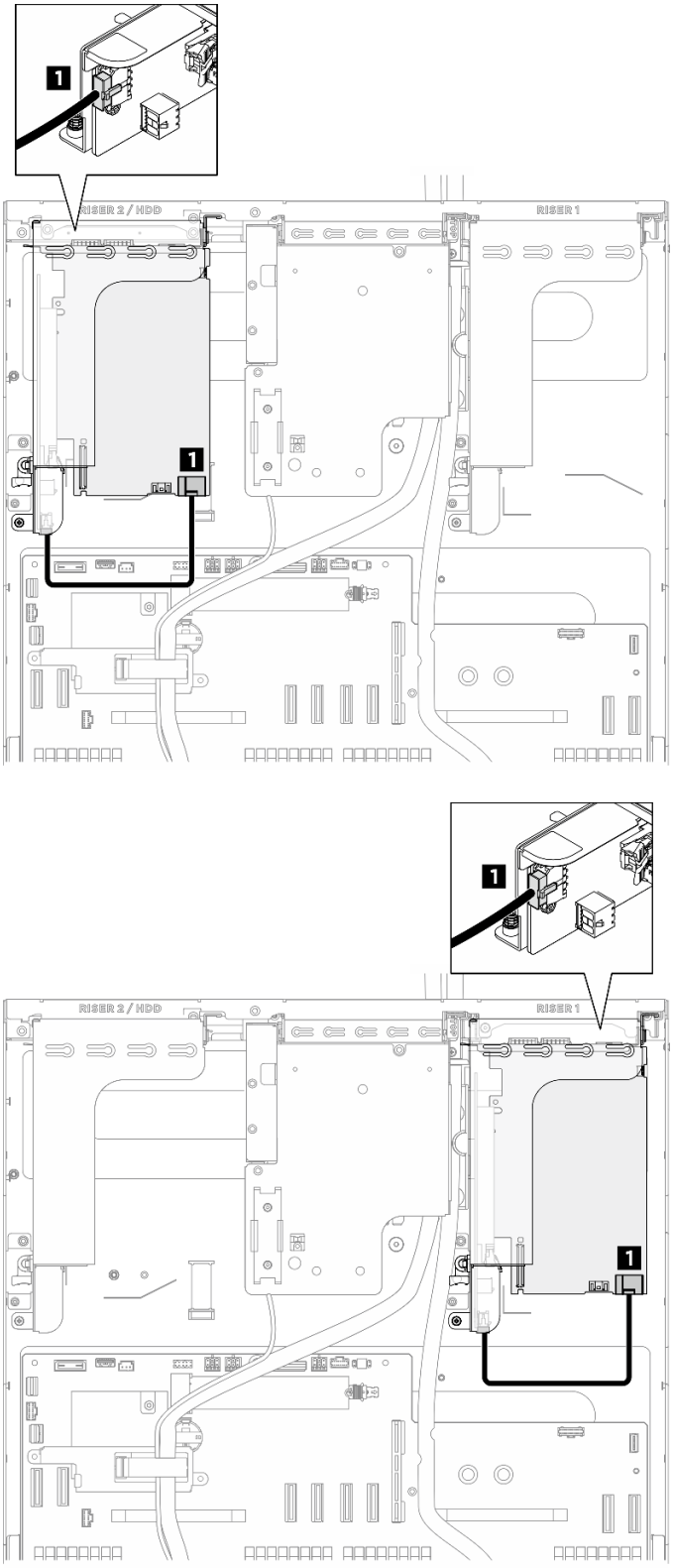


Figure 417. DPU power cable routing

Cable	From	To
1	DPU adapter: Power connector	PCIe riser 1 or 2: Power connector (AUX PWR)

Leakage sensor module cable routing

Use this section to understand the cable routing of the leakage sensor module.

Based on the location of the leakage detection sensor, select the corresponding routing plan:

- “NVSwitch leakage detection sensor module cable routing” on page 397
- “Front GPU leakage detection sensor module cable routing” on page 398
- “Rear GPU leakage detection sensor module cable routing” on page 398
- “DWCM leakage sensor module cable routing” on page 398

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.

NVSwitch leakage detection sensor module cable routing

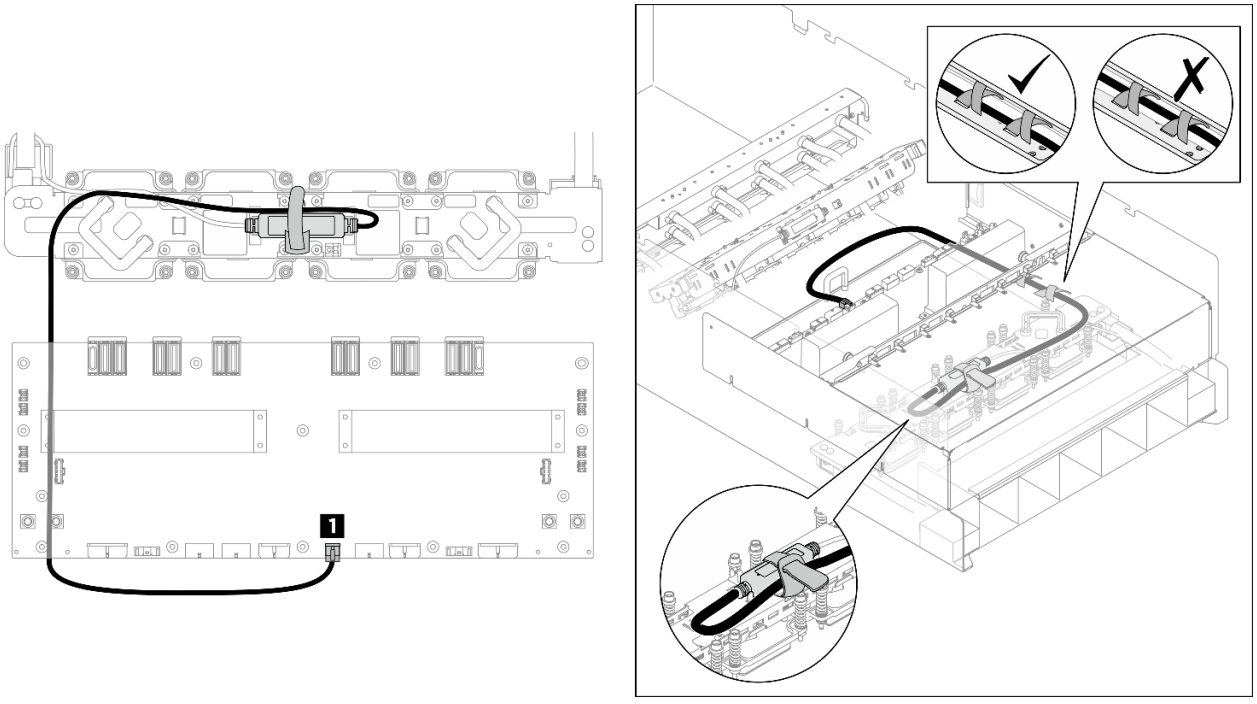


Figure 418. NVSwitch leakage sensor module cable routing

Cable	From	To
1 NVSwitch leakage sensor module cable	NVSwitch leakage sensor module	Power distribution board: NVSwitch leakage detection sensor connector (LEAK CONN)

Note: When securing sensor cable on the hose holder, ensure not to route the cable on top of the hoses.

Front GPU leakage detection sensor module cable routing

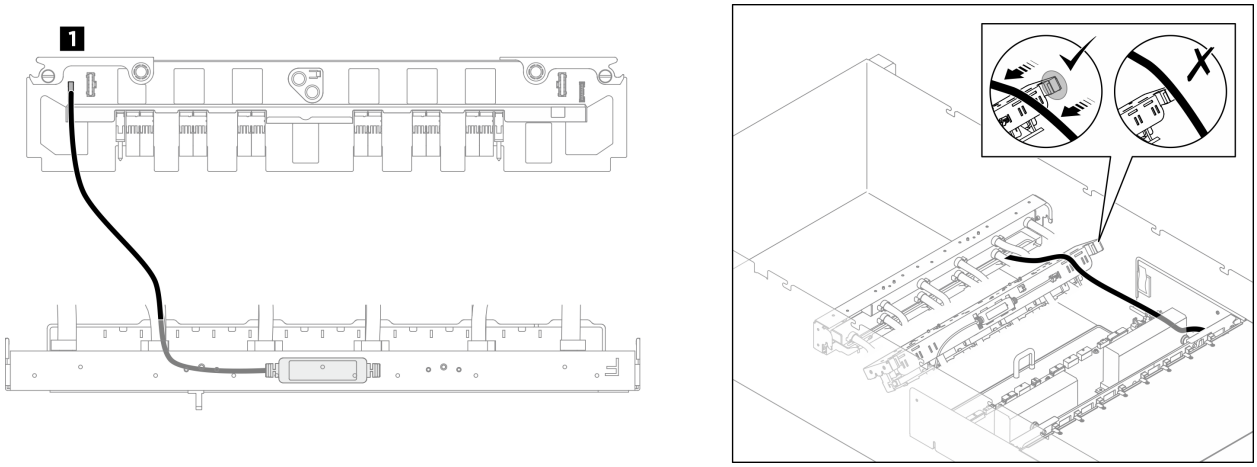


Figure 419. Front GPU leakage sensor module cable routing

Cable	From	To
1 Front GPU leakage sensor module cable	Front GPU leakage sensor module	PSU interposer: Front GPU leakage detection sensor connector (FAN2 LEAK2)

Note: Ensure not to place the sensor cables on the right and left ends of the manifold.

Rear GPU leakage detection sensor module cable routing

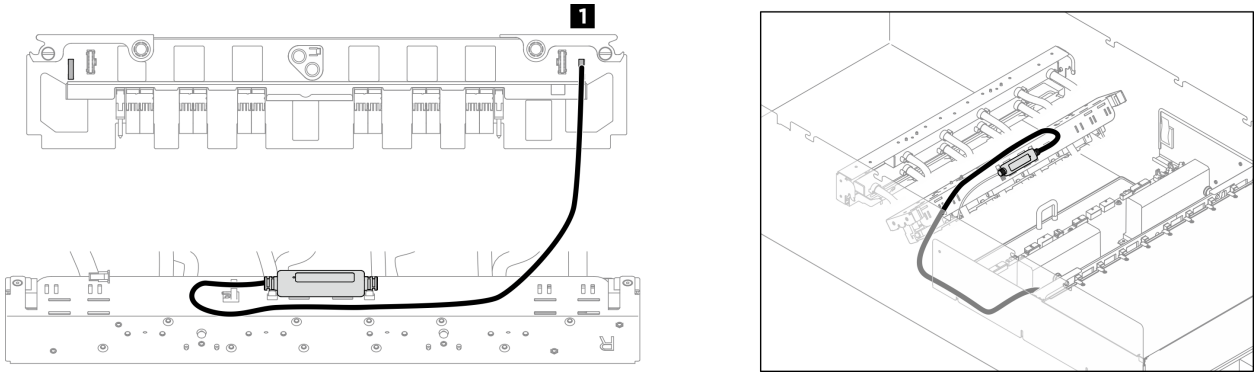


Figure 420. Rear GPU leakage sensor module cable routing

Cable	From	To
1 Rear GPU leakage sensor module cable	Rear GPU leakage sensor module	PSU interposer: Rear GPU leakage detection sensor connector (FAN1 LEAK1)

DWCM leakage sensor module cable routing

Note: For better cable arrangement, it is required to install the hoses and leakage sensor module to a designated holder, and make sure that the module is secured in holder clips. Use the illustration below or "Install the Lenovo Neptune(TM) Processor Direct Water Cooling Module" on page 265 for details.

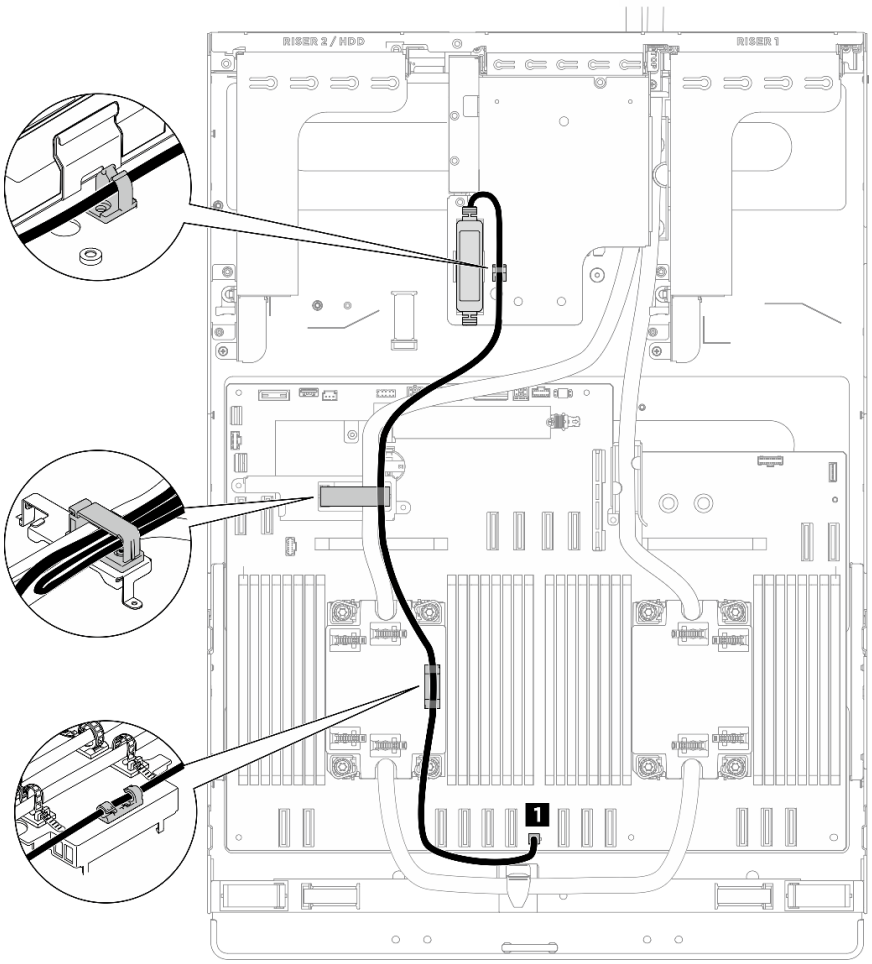


Figure 421. DWCM leakage sensor module cable routing

Cable	From	To
1 DWCM leakage sensor module cable	DWCM leakage sensor module	System board: DWCM leakage detection sensor connector (OUTLET TEMP SENSOR)

Note: Manage redundant sensor cable in the cable clip as illustrated.

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 (10/100/1000 Mbps RJ-45) on your server. For the location of the XCC system management port (10/100/1000 Mbps RJ-45), 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 39.
- 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 system I/O board (or 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 seconds 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/tw/en/products/servers/thinksystem/sr780av3/7dj5/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:

1. For I/O firmware updates.
2. For BMC and UEFI firmware updates.
3. Drive firmware update is only supported by the tools and methods below:
   - XCC Bare Metal Update (BMU): In-band, and requires system reboot.
   - Lenovo XClarity Essentials OneCLI:
     - For OneCLI version earlier than 5.0.0:
       - 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.).
     - For OneCLI 5.0.0 and later versions: In-band, and does not require system reboot.
4. 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/lnvo-xpress

- **Lenovo XClarity Essentials Bootable Media Creator**

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

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

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

- **Lenovo XClarity Administrator**

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

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

  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 47, which specifies whether your sever 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 SR780a 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	• Supports RAID levels 0, 1, and 10 • Requires an activation key
Intel VROC Premium	• Supports RAID levels 0, 1, 5, and 10 • Requires an activation key
Bootable RAID	• RAID 1 only • Supported by 5th Gen Intel® Xeon® Scalable processors (formerly codenamed as Emerald Rapids, EMR) • Requires an activation key
Intel VROC configurations for SATA SSDs	**Requirements**
Intel VROC SATA RAID	• 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

- Canonical Ubuntu

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.

Enable Intel® On Demand

A processor is equipped with various computing capabilities. Basic capabilities are available at the initial processor installation, while others remain inactivated. As development environment and tasks evolve, computing demands may accelerate and require leverage of the previously inactivated processor capabilities. In such cases, user can select desired processor capabilities and activate them through Intel On Demand feature—a feature that allows user to customize processor capabilities according to environment

and tasks at hand. The following section specifies system hardware and software requirement, Intel On Demand enabling and transferring procedures, and list of processor capabilities.

This documentation includes the following sections:
- “Supported processor” on page 411
- “Installation tool” on page 411
- Procedures for “Enabling Intel On Demand Features” on page 412
- Procedures for “Transferring Intel On Demand Features” on page 413
- XCC and LXCE OneCLI instructions for:
  - “Reading PPIN” on page 413
  - “Installing Intel On Demand to processor” on page 415
  - “Acquiring and uploading Intel On Demand State Report” on page 416
  - “Checking the Intel On Demand features installed in a processor” on page 418

Note: Depending on the model, the XCC Web GUI layout may be slightly different from the illustrations in this document.

Supported processor

Intel On Demand is only supported by Intel On Demand capable processors. For more information on Intel On Demand capable processors supported by SR780a V3, see https://lenovopress.lenovo.com/.

Note: All processors in a system must be installed with identical Intel On Demand feature.

Installation tool

Intel On Demand can be installed via Lenovo XClarity Controller (XCC) and Lenovo XClarity Essentials OneCLI (LXCE OneCLI). After confirming that your processor supports Intel On Demand, you also need to make sure the XCC and LXCE OneCLI installed in your system supports installing Intel On Demand.

1. Check if Lenovo XClarity Controller (XCC) supports installing Intel On Demand (two methods provided):
   - **Via XCC WebGUI**

     Go to **BMC Configuration → License**, if there is a section named **On Demand Capabilities for Intel CPU** in the page, it indicates that current XCC supports installing Intel On Demand, otherwise you need to update XCC firmware to the latest version to ensure it supports installing Intel On Demand.

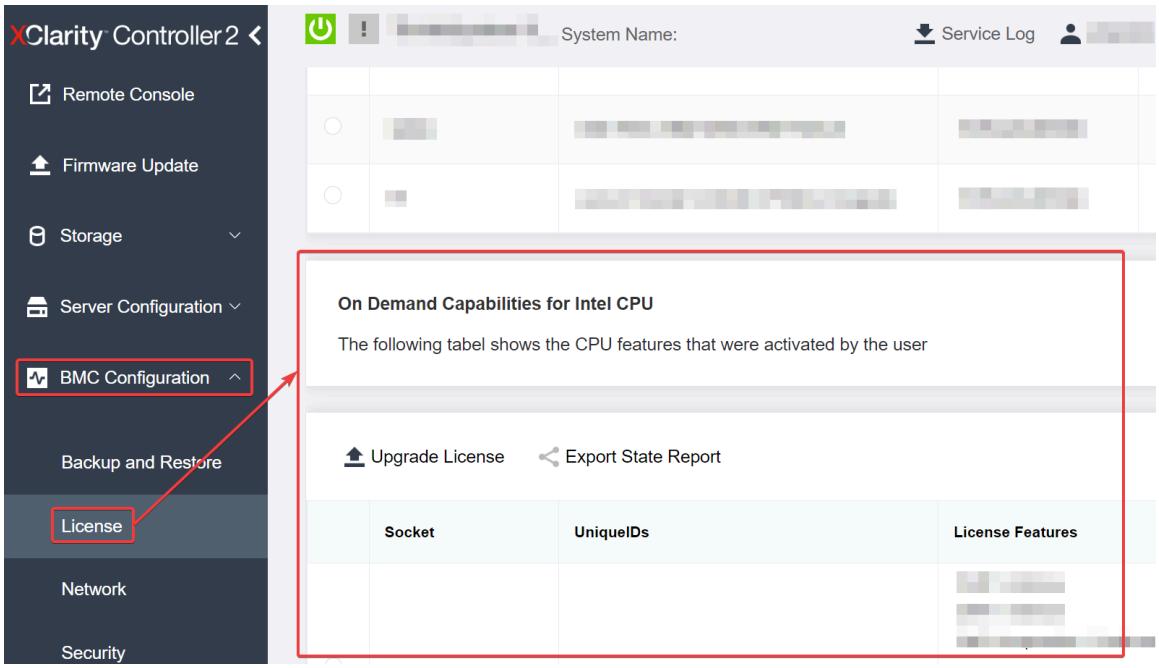


Figure 422. On Demand Capabilities for Intel CPU in XCC Web GUI

- **Via XCC REST API**
  a. Use the **GET** method with the following Request URL:
  `GET https://bmc_ip/redfish/v1/LicenseService/Licenses/`
  b. In the response JSON object, the `Members` field includes the API such as `/redfish/v1/LicenseService/Licenses/CPUX_OnDemandCapability`, where `X` is the CPU numbering, it indicates that current XCC supports installing Intel On Demand, otherwise you need to update XCC firmware to the latest version to ensure it supports installing Intel On Demand.

  For example:

```
"Members": [
        {
            "@odata.id": "/redfish/v1/LicenseService/Licenses/CPU1_OnDemandCapability"
        },
        {
            "@odata.id": "/redfish/v1/LicenseService/Licenses/CPU2_OnDemandCapability"
        },
    ]
```

2. Check if LXCE OneCLI supports installing Intel On Demand
   - LXCE OneCLI version must be at 4.2.0 or above.

Enabling Intel On Demand Features

1. Select the Intel On Demand features that meets your workload needs, see “Intel On Demand Features” on page 419.
2. After completing ordering the features, you will receive Authorization Code via e-mail.
3. PPIN is a mandatory information for enabling the features. Read the PPIN of the processor that is to be installed with the features. See “Reading PPIN” on page 413.
4. Go to https://fod.lenovo.com/lkms and input the Authorization Code to acquire the Activation Key.
5. In the website, input Machine Type, Machine serial number, and PPIN.
6. The website will generate the Activation Key. Download the Activation Key.

7. Install the features to the processor with the Activation Key via XCC or LXCE OneCLI. See “Installing Intel On Demand to processor” on page 415.

   Note: If more than one Activation Keys are acquired, it is mandatory to install them in the sequential order they were acquired. For example, start with installing the first acquired key, and proceed with the second acquired key, and so on.
8. AC cycle the server.
9. (Optional) Upload Intel On Demand State Report. See “Acquiring and uploading Intel On Demand State Report” on page 416.

   The State Report represents the current configuration state of the Intel On Demand capable processors. Lenovo accepts State Reports from customers to calibrate the current state of the Intel On Demand capable processors.
10. To see the features installed in a processor, see “Checking the Intel On Demand features installed in a processor” on page 418.

For reference, see https://pubs.lenovo.com/lenovo_fod.

Transferring Intel On Demand Features

After replacing a processor, you may need to transfer the features from the defective processor to the new processor. Complete the following steps to transfer features to new processor.

1. Before removing the defective processor from the system, read the PPIN of the defective processor. See “Reading PPIN” on page 413.
2. After installing the new processor, read the PPIN of the new processor. See “Reading PPIN” on page 413.
3. Go to https://fod.lenovo.com/lkms and input the PPIN of the defective processor. (Input PPIN in the UID section.)
4. Select the features to be transferred.
5. Input the PPIN of the new processor.
6. The website will generate the new Activation Key. Download the new Activation Key. See “Installing Intel On Demand to processor” on page 415.
7. Install the features to the new processor with the new Activation Key via XCC or LXCE OneCLI.
8. AC cycle the server.
9. (Optional) Upload Intel On Demand State Report. See “Acquiring and uploading Intel On Demand State Report” on page 416.

   The State Report represents the current configuration state of the Intel On Demand capable processors. Lenovo accepts State Reports from customers to calibrate the current state of the Intel On Demand capable processors.
10. To see the features installed in a processor, see “Checking the Intel On Demand features installed in a processor” on page 418.

For reference, see https://pubs.lenovo.com/lenovo_fod.

Reading PPIN

Protected Processor Inventory Number, or PPIN, is a mandatory information for enabling Intel On Demand. PPIN can be read via XCC Web GUI, XCC REST API, and LXCE OneCLI. See the following for more information.

Reading PPIN via XCC Web GUI

Open XCC Web GUI, go to **Inventory page → CPU tab → Expand → PPIN**

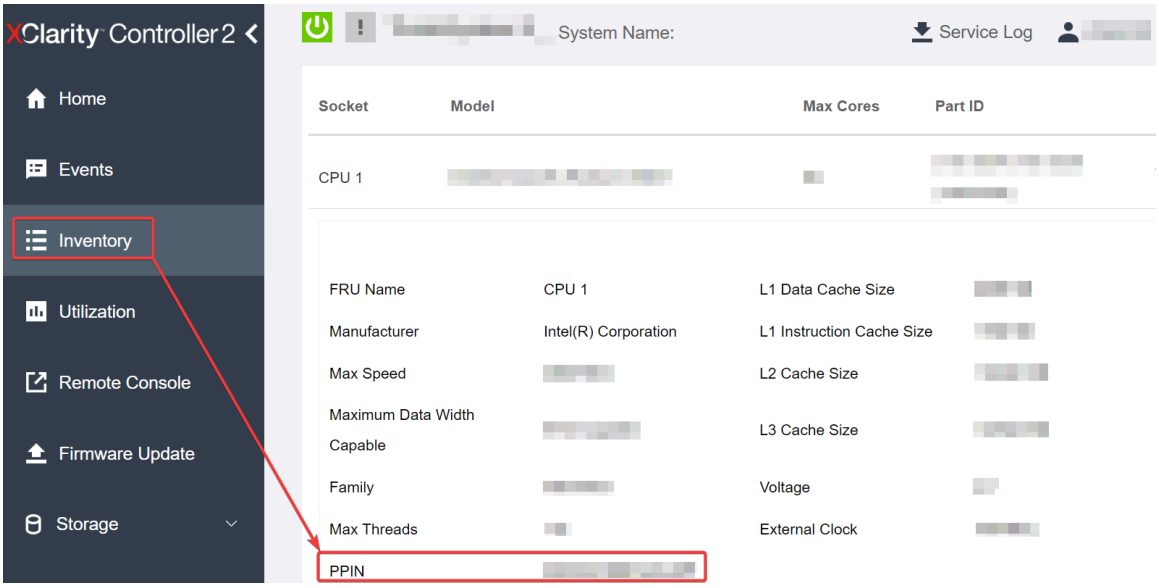


Figure 423. Reading PPIN via XCC Web GUI

Reading PPIN via XCC REST API

1. Use the **GET** method with the following Request URL:
   `GET https://bmc_ip/redfish/v1/Systems/1/Processors`
   For example:
   `GET https://bmc_ip/redfish/v1/Systems/1/Processors`
2. In the response JSON object, the `Members` field shows reference link to an element of processor resource.

   For example:
   ```
   "Members":[
   {
   @odata.id: "/redfish/v1/Systems/1/Processors/1"
   },
   {
   @odata.id: "/redfish/v1/Systems/1/Processors/2"
   }
   ],
   ```
3. Select the processor you need to read the PPIN from. Use the **GET** method with the following Request URL, where `x` is the CPU numbering:
   `GET https://bmc_ip/redfish/v1/Systems/1/Processors/x`
   For example, to read Processor 1 PPIN, see the following:
   `GET https://bmc_ip/redfish/v1/Systems/1/Processors/1`
4. In the response JSON object, the `ProcessorId` field shows the `ProtectedIdentificationNumber` field, which is the PPIN info of the requested CPU.

   For example:
   ```
   "ProcessorId":{
     "ProtectedIdentificationNumber":"1234567890xxxyyy"
   },
   ```

Reading PPIN via LXCE OneCLI

Input the following command:

```
OneCli.exe fod showppin -b XCC_USER:XCC_PASSWORD@XCC_HOST
```

The output shows PPIN information. For example:

```
Machine Type: 7D75
Serail Number: 7D75012345
FoD PPIN result:
=====================================
|   Socket ID   |        PPIN        |
|  Processor 1  |  1234567890xxxyyy  |
|  Processor 2  |  9876543210zzzyyy  |
=====================================
```

Installing Intel On Demand to processor

Install Intel On Demand features to the processor with the Activation Key downloaded from the https://fod.lenovo.com/lkms via XCC Web GUI, XCC REST API or LXCE OneCLI.

Use XCC Web GUI to install Intel On Demand

1. Open XCC Web GUI, go to **BMC Configuration → License → On Demand Capabilities for Intel CPU → Upgrade License → Browse → Import** to upload the Activation Key

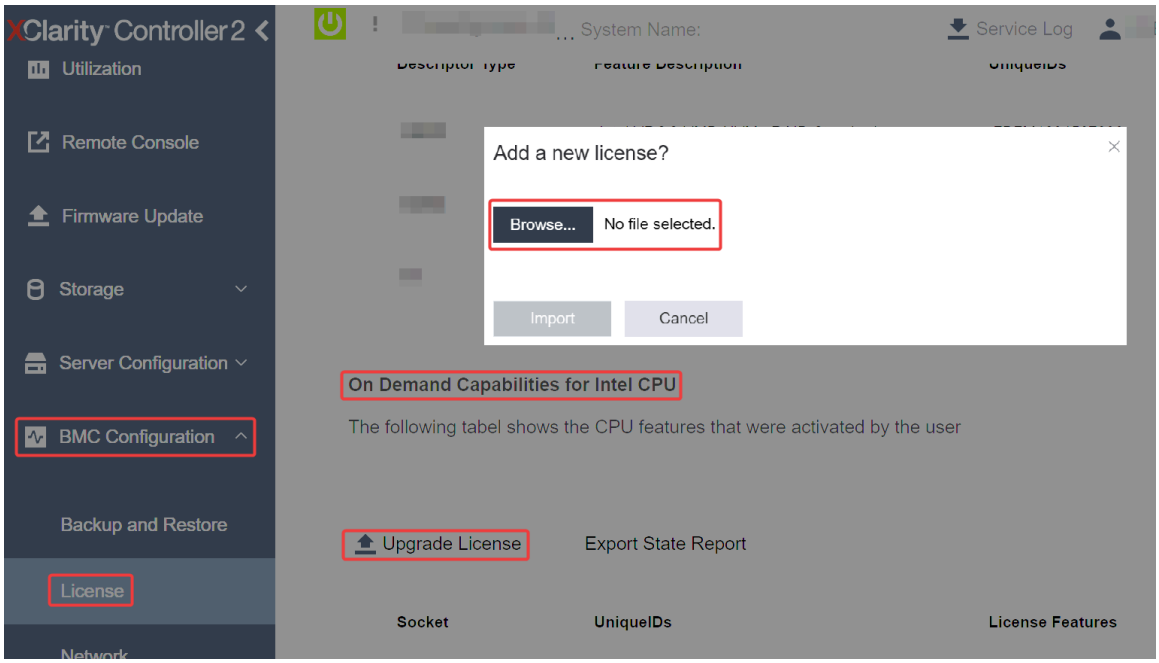


Figure 424. Uploading Activation Key via XCC Web GUI

2. If the installation is successful, the Web GUI will show a pop-up window with the message "`License key upgraded successfully. The features will be activated on the processor after system power cycle`".

   Otherwise, see "Enable Intel® On Demand Troubleshooting" on page 420.

Use XCC REST API to install Intel On Demand

1. Use the **POST** method with the following Request URL:
   ```
   POST https://bmc_ip/redfish/v1/LicenseService/Licenses
   ```
2. Transfer Activation Key to base64 string at first and fill it into the LicenseString field as POST data.
   ```
   {
       "LicenseString": ""
   }
   ```

3. If the installation is successful, XCC REST API show the message “`License key upgraded successfully. The features will be activated on the processor after system power cycle`”.

   Otherwise, see “Enable Intel® On Demand Troubleshooting” on page 420.

Use LXCE OneCLI to install Intel On Demand

Input the following command, where `<key_file>` specifies the Activation Key:
```
OneCli.exe fod install --keyfile <key_file>
```

If successfully installed, the response will show:
```
Successfully install key
```

Call Lenovo support if the response shows the following:
```
Failed to install key
```

Acquiring and uploading Intel On Demand State Report

After completing enabling or transferring Intel On Demand, acquire and upload the State Report via XCC Web GUI, XCC REST API, and LXCE OneCLI. See the following for more information.

Use XCC Web GUI to upload State Report

1. Open XCC Web GUI, go to **BMC Configuration → License → On Demand Capabilities for Intel CPU → Choose CPU → Export State Report**

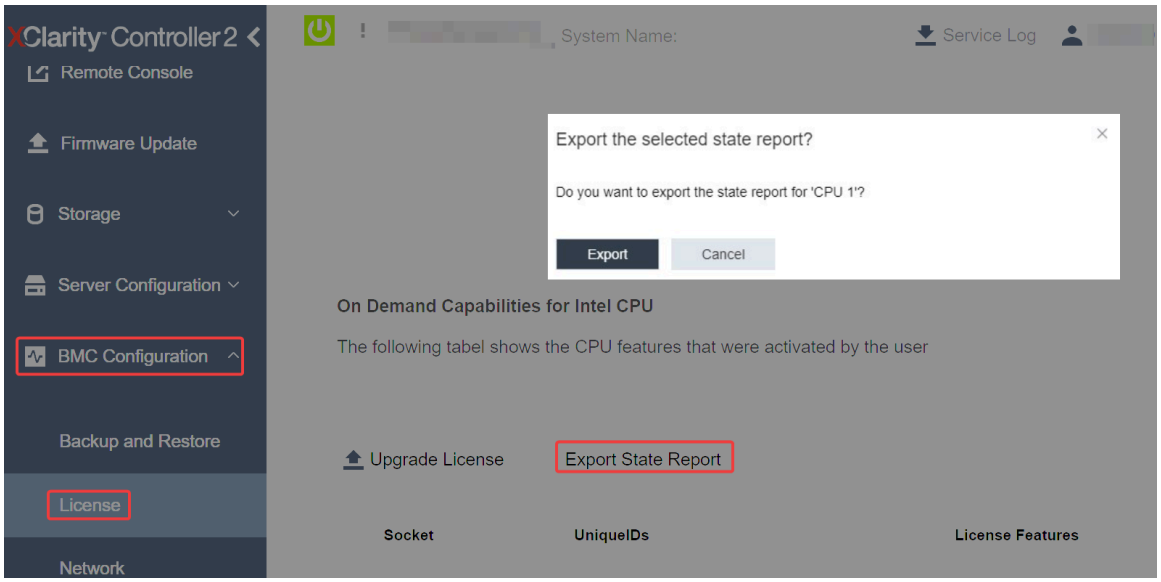


Figure 425. Export State Report via XCC Web GUI

2. Upload State Report via “On Demand Feedback” section in https://fod.lenovo.com/lkms.

Use XCC REST API to upload State Report

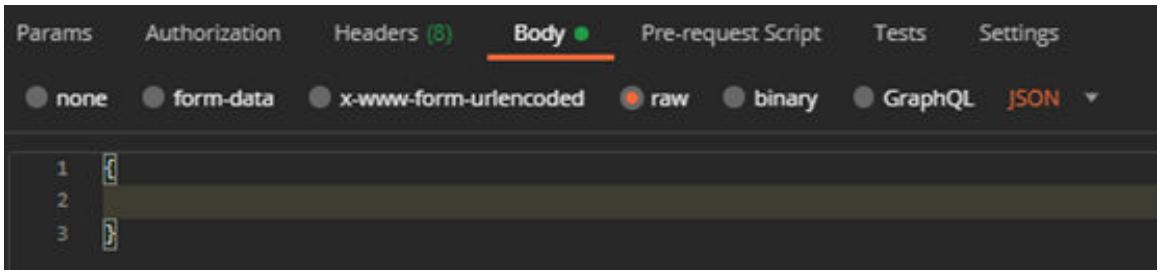
1. Use the **GET** method with the following Request URL to retrieve CPU State Report API, where `X` is the CPU numbering:
   `GET https://bmc_ip/redfish/v1/LicenseService/Licenses/CPUX_OnDemandCapability`
   For example, to retrieve CPU 1 State Report API, see the following:
   `GET https://bmc_ip/redfish/v1/LicenseService/Licenses/CPU1_OnDemandCapability`
2. In the response JSON object, the response of the `target` field of the `LenovoLicense.ExportStateReport` field is the CPU State Report API, where `X` is the CPU numbering:

```
"Actions": {
    "Oem": {
        "#LenovoLicense.ExportStateReport": {
            "title": "ExportStateReport",
            "target": "/redfish/v1/LicenseService/Licenses/CPUX_OnDemandCapability/Actions/Oem/LenovoLicense.ExportStateReport"
        }
    }
},
```

In the following example, the response of the `target` field is the CPU 1 State Report API. Copy the CPU 1 State Report API.

```
"Actions": {
    "Oem": {
        "#LenovoLicense.ExportStateReport": {
            "title": "ExportStateReport",
            "target": "/redfish/v1/LicenseService/Licenses/CPU1_OnDemandCapability/Actions/Oem/LenovoLicense.ExportStateReport"
        }
    }
},
```

3. Retrieve the State Report.
   a. Use the **POST** method with the following Request URL with CPU State Report API to retrieve the State Report, where `X` is the CPU numbering:
   `POST https://bmc_ip/redfish/v1/LicenseService/Licenses/CPUX_OnDemandCapability/Actions/Oem/LenovoLicense.ExportStateReport`
   For example, to retrieve CPU 1 State Report, see the following:
   `POST https://bmc_ip/redfish/v1/LicenseService/Licenses/CPU1_OnDemandCapability/Actions/Oem/LenovoLicense.ExportStateReport`
   b. Use an empty JSON object as POST data. When using API tool such as Postman, fill an empty JSON object in **Body → Raw → JSON**, fill a NULL object '{}' in a JSON file.



4. In the response, retrieve the State Report in the `stateReports` field.

```
{
    "stateReports": [
        {
            "syntaxVersion": "1.0",
            "timestamp": "",
            "objectId": "",
            "hardwareComponentData": [
                {
                    "hardwareId": {
                        "type": "PPIN",
                        "value": ""
                    },
                    "stateCertificate": {
                        "pendingCapabilityActivationPayloadCount": ,
                        "value": ""
                    },
                    "hardwareType": "CPU"
                }
            ]
```

```
        }
    ]
}
```

5. Upload State Report via “On Demand Feedback” section in https://fod.lenovo.com/lkms.

Use LXCE OneCLI to upload State Report

1. Acquire State Report with the following command:
   `OneCli.exe fod exportreport -b XCC_USER:XCC_PASSWORD@XCC_HOST`
2. Upload State Report with the following command:
   `OneCli.exe fod uploadreport --file CPU1_xxxxxx_StateReport.json --kmsid KMS_USER:KMS_PASSWORD`
   Where:

   `CPU1_xxxxxx_StateReport.json` is the file name downloaded from the **fod exportreport** command in Step 1.

   `KMS_USER` and `KMS_PASSWORD` are your ID and password on the https://fod.lenovo.com/lkms.

Checking the Intel On Demand features installed in a processor

You can check the Intel On Demand features installed in a processor via XCC Web GUI, XCC REST API, and LXCE OneCLI. See the following for more information.

Note: If the processor has not been installed with any license, it would not appear in the **On Demand Capabilities for Intel CPU** section in XCC Web GUI.

Use XCC Web GUI to check the Intel On Demand features installed in a processor

Go to **BMC Configuration → License → On Demand Capabilities for Intel CPU → Choose CPU → License Features**, where the installed features are listed.

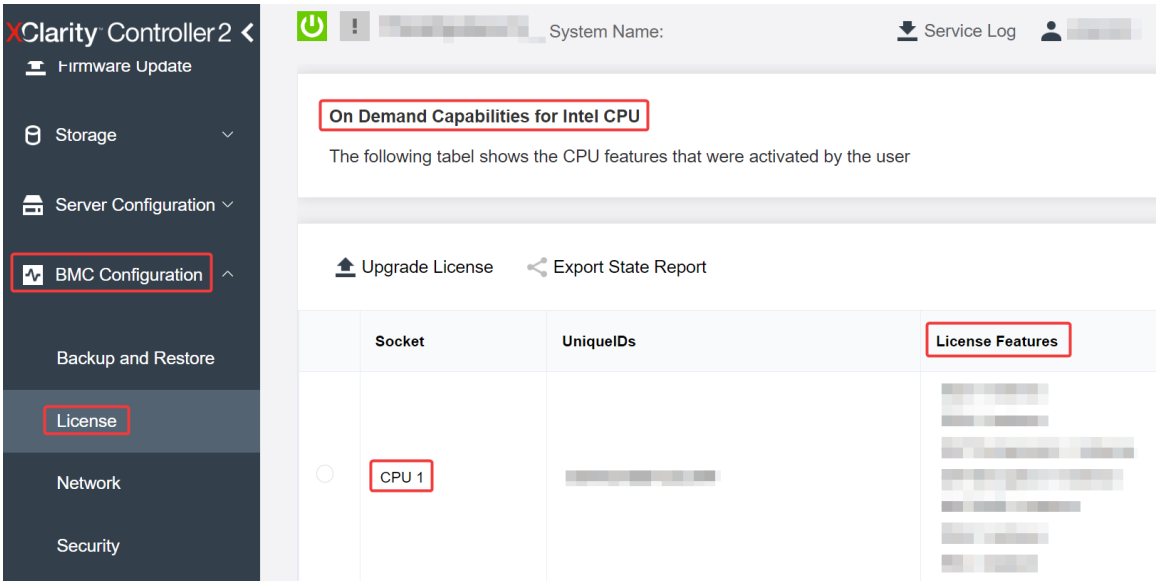


Figure 426. Checking the Intel On Demand features installed in a processor in XCC Web GUI

Use XCC REST API to check the Intel On Demand features installed in a processor

1. Use the **GET** method with the following Request URL to retrieve Intel On Demand features installed on CPU X, where `X` is the CPU numbering:
   `GET https://bmc_ip/redfish/v1/LicenseService/Licenses/CPUX_OnDemandCapability`
   For example, to retrieve Intel On Demand features installed on CPU 1, see the following:

```
GET https://bmc_ip/redfish/v1/LicenseService/Licenses/CPU1_OnDemandCapability
```

2. In the response JSON object, the `FeatureList` field contains the Intel On Demand features installed in this processor.

```
"Oem": {
 "Lenovo":{
    "FeatureList":[]
    "@odata.type":""
  }
},
```

Use LXCE OneCLI to check the Intel On Demand features installed in a processor

1. Check installed features with the following command:
`OneCli.exe fod report -b XCC_USER:XCC_PASSWORD@XCC_HOST`
2. The output shows all license, including Intel On Demand features. For example:

```
                                  FoD Reports result:
===========================================================================================
| Feature | Key                     | Status        | Description                 | User      | Expired |
| Type    | ID                      |               | Feature List                | Reminding | Date    |
|------------------------------------------------------------------------------------------
| N/A     | CPU1_OnDemandCapability | StandbyOffline | DSA 4 instances,           | N/A       | N/A     |
|         |                         |               | IAA 4 instances             |           |         |
-------------------------------------------------------------------------------------------
| N/A     | CPU2_OnDemandCapability | Enabled       | DSA 4 instances,            | N/A       | N/A     |
|         |                         |               | IAA 4 instances             |           |         |
-------------------------------------------------------------------------------------------
| 004a    | XCC2_Platinum           | Enabled       | Lenovo XClarity Controller 2 | N/A      | N/A     |
|         |                         |               | Platinum Upgrade            |           |         |
===========================================================================================
Succeed.
```

Intel On Demand Features

Intel On Demand features are listed below. Supported features vary by product, for more information, see https://lenovopress.lenovo.com/.

Features

- **Intel Quick Assist Technology (Intel QAT)**[1]

  Intel® QAT which helps free up processor cores by offloading encryption, decryption, and compression so systems can serve a larger number of clients or use less power. With Intel QAT, 4th gen Intel Xeon Scalable processors are the highest performance CPUs that can compress and encrypt in a single data flow.

- **Intel Dynamic Load Balancer (Intel DLB)**[2]

  Intel DLB is a hardware managed system of queues and arbiters connecting producers and consumers. It is a PCI device envisaged to live in the server CPU uncore and can interact with software running on cores, and potentially with other devices.

- **Intel Data Streaming Accelerator (Intel DSA)**[1]

  Intel DSA drives high performance for storage, networking, and data-intensive workloads by improving streaming data movement and transformation operations. Designed to offload the most common data movement tasks that cause overhead in data center-scale deployments, Intel DSA helps speed up data movement across the CPU, memory, caches, all attached memory, storage, and network devices.

- **Intel In Memory Accelerator (Intel IAA)**[1]

Intel IAA helps run database and analytics workloads faster, with potentially greater power efficiency. This built-in accelerator increases query throughput and decreases the memory footprint for in-memory database and big data analytics workloads. Intel IAA is ideal for in-memory databases, and source databases.

- **Intel Software Guard Extensions (Intel SGX) 512 GB**[3]

  Intel® SGX offers hardware-based memory encryption that isolates specific application code and data in memory. Intel SGX allows user-level code to allocate private regions of memory, called enclaves, which are designed to be protected from processes running at higher privilege levels.

References
- [1]*Achieve Performance Advantage with Intel oneAPI, AI Tools, and 4th Gen Intel® Xeon® Scalable Processors Featuring Built-in Accelerator Engines*, (n.d.). Intel. https://www.intel.com/content/www/us/en/developer/articles/technical/performance-advantage-with-xeon-and-oneapi-tools.html
- [2]*Intel® Dynamic Load Balancer*, (2023, May 23) Intel. https://www.intel.com/content/www/us/en/download/686372/intel-dynamic-load-balancer.html
- [3]*Intel® Software Guard Extensions (Intel® SGX)*, (n.d.) Intel. https://www.intel.com/content/www/us/en/architecture-and-technology/software-guard-extensions.html

Enable Intel® On Demand Troubleshooting

Refer to the table below for Intel On Demand installation error messages and user actions.

Table 34. Intel On Demand installation messages and user actions

Message	User Action
License key upgraded successfully. The features will be activated on the processor after system power cycle.	You can activate Intel On Demand after performing one system power cycle.
The activation key format is invalid	Check if you have uploaded the correct Activation Key file. If the error persists, contact Lenovo support.
Invalid processor PPIN in Activation key	Contact Lenovo support.
The license was installed in the processor already	You have already installed this activation key. Check if the activation key you uploaded is correct.
Not enough NMRAM space in the processor	Contact Lenovo support.
Internal error	Contact Lenovo support.
Cold reset needed before next provisioning	If you want to continue installing an activation key, perform a system power cycle at first.
Unable to provision LAC due to FEH error	Contact Lenovo support.
Unable to import license in shutdown state, please try again after power on.	Power on the system before installing Intel On Demand.
Unable to import license due to On Demand Capabilities information is in progress. Please try again later.	If you want to continue installing an activation key, try again later.

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/sr780a-v3/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.

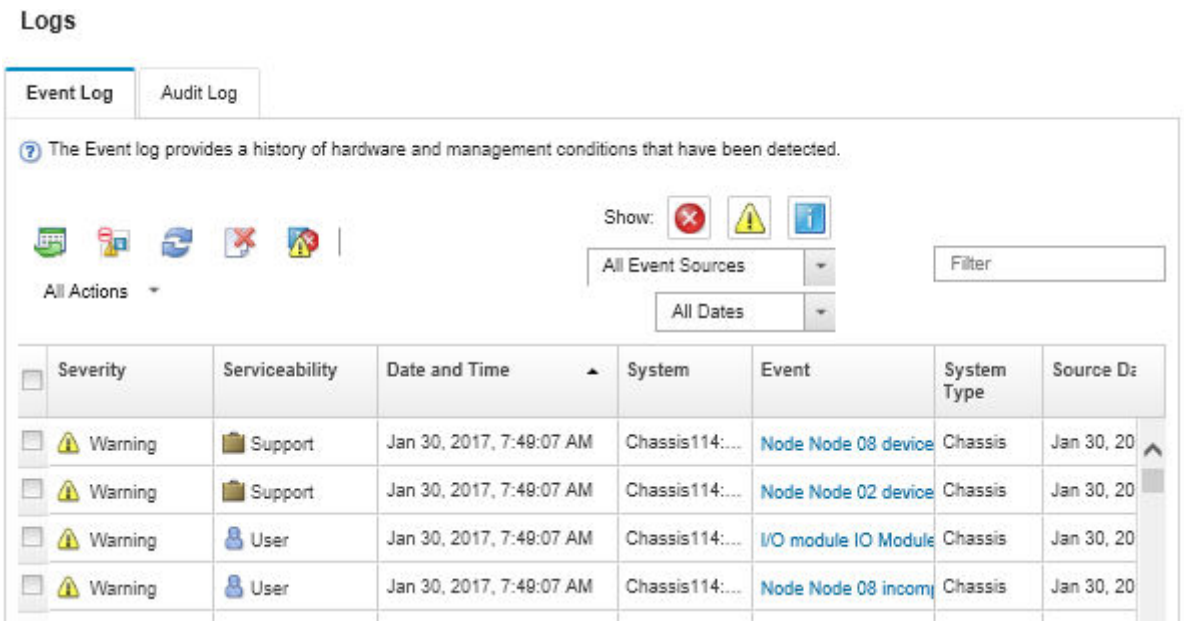


Figure 427. Lenovo XClarity Administrator event log

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.

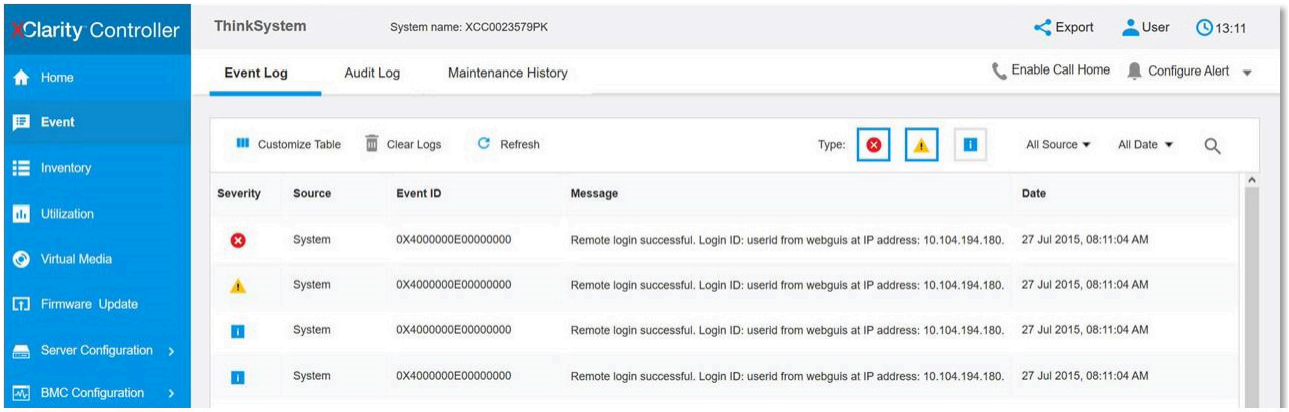


Figure 428. Lenovo XClarity Controller event log

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.

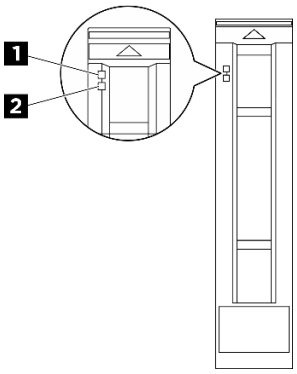


Figure 429. Drive LEDs

Table 35. Drive LEDs

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: • 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.

System I/O board LEDs

This topic provides information on LEDs of the system I/O board.

The following table describes the problems that are indicated by LEDs on the system I/O board.

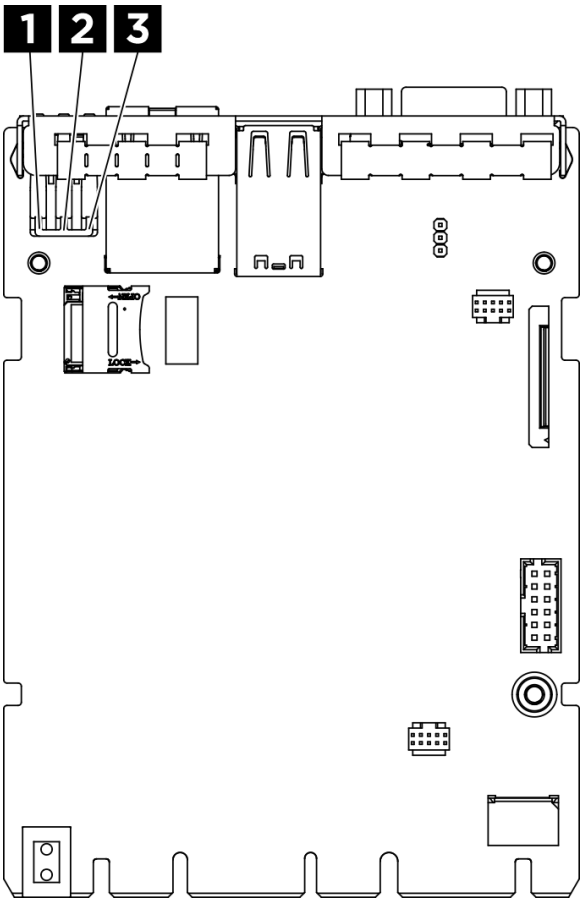


Figure 430. LEDs on the system I/O board

1 RoT error LED (Amber)	2 System error LED (yellow)	3 Location LED (blue)

Table 36. System LEDs on system I/O board

LED	Description and actions
1 RoT error LED (Amber)	The RoT error LED indicates that there is a Root of Trust failure on either the XCC or UEFI image.
2 System error LED (yellow)	LED on: an error has occurred. Complete the following steps: 1. Check the identification LED and check log LED and follow the instructions. 2. Check the Lenovo XClarity Controller event log and the system error log for information about the error. 3. Save the log if necessary, and clear the log afterwards.
3 Location LED (blue)	This LED is used as a presence detection LED. You can use Lenovo XClarity Controller to light this LED remotely. Use this LED to locate the server among other servers visually.

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
- Two memory modules
- One power supply
- One M.2 drive (If OS is needed by debugging)
- Six front fans
- Five rear fans
- One rear PCIe Ethernet Adapter (If network is required)
- CPU water loop connected to water (If connected to DC power)

The following table describes the problems that are indicated by various combinations of the power supply LEDs and the power-on LED and suggested actions to correct the detected problems.

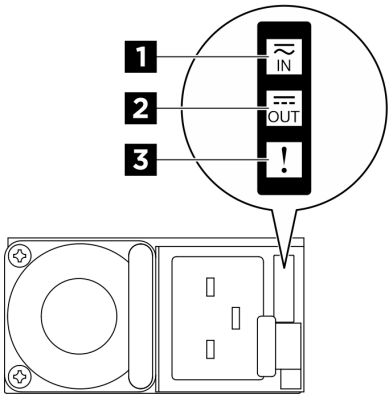


Figure 431. CFFv4 power supply LEDs

Table 37. CFFv4 power supply LEDs

LED	Description
1 Input status	The input status LED can be in one of the following states: • 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	The output status LED can be in one of the following states: • 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	• 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.

Rear system LEDs

This topic provides information on system LEDs on the rear of the server.

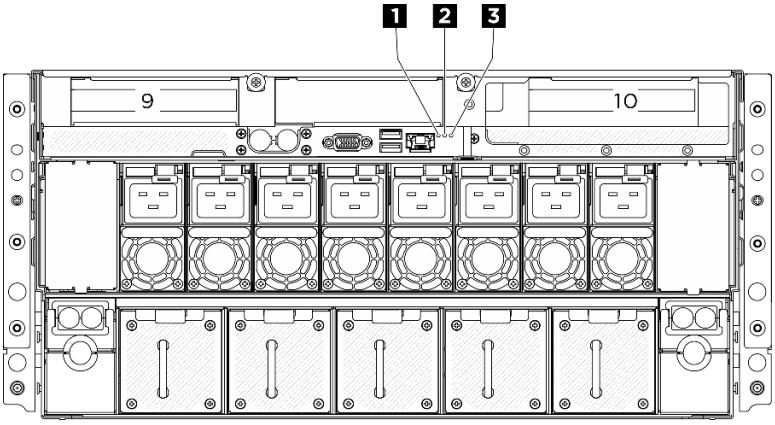


Figure 432. System LEDs on the rear view

1 Location LED (blue)	2 System error LED (yellow)	3 RoT error LED (Amber)

Table 38. System LEDs on the rear view

LED	Description and actions
1 Location LED (blue)	This LED is used as a presence detection LED. You can use Lenovo XClarity Controller to light this LED remotely. Use this LED to locate the server among other servers visually.
2 System error LED (yellow)	LED on: an error has occurred. Complete the following steps: 1. Check the identification LED and check log LED and follow the instructions. 2. Check the Lenovo XClarity Controller event log and the system error log for information about the error. 3. Save the log if necessary, and clear the log afterwards.
3 RoT error LED (Amber)	The RoT error LED indicates that there is a Root of Trust failure on either the XCC or UEFI image.

System board LEDs

The following illustrations show the light-emitting diodes (LEDs) on the system board.

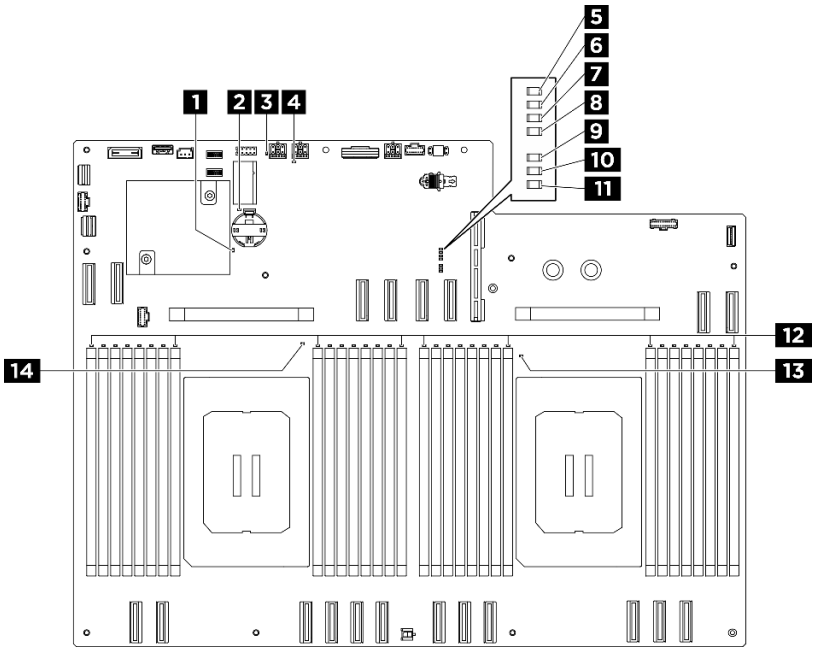


Figure 433. System board LEDs

Table 39. System board LEDs

LED	Description and actions
1 ME heartbeat LED (green)	• Blinking (about one flash per second): System normal. • off: System fault occurred.
2 CMOS battery error LED (yellow)	The system CMOS battery is not installed or is not working.

Table 39. System board LEDs (continued)

LED	Description and actions
3 M.2 slot 1 activity LED (green)	• On: M.2 Slot 1 active. • Off: M.2 Slot 1 not active.
4 M.2 slot 2 activity LED (green)	• On: M.2 Slot 2 active. • Off: M.2 Slot 2 not active.
5 P5V_AUX PGOOD LED (green)	• On: P5V_AUX power is present. • Off: P5V_AUX is not ready.
6 FPGA heartbeat LED (green)	• Blinking (about one flash per second): FPGA is working normally. • If FPGA heartbeat LED is always off or always on, do the following: 1. Replace the processor board. 2. If the problem remains, contact Lenovo Support.
7 P12V PGOOD LED (green)	Indicates the system is DC on.
8 System power LED (green)	The states of the power LED are as follows: • Off: No power supply is properly installed, or the LED itself has failed. • Flashing rapidly (four times per second): The server is turned off and is not ready to be turned on. The power-control button is disabled. This will last approximately 5 to 10 seconds. • Flashing slowly (once per second): The server is turned off and is ready to be turned on. You can press the power-control button to turn on the server. • Lit: The server is turned on.
9 NMI error LED (amber)	Indicates that the system had an NMI (Non Maskable Interrupt).
10 Processor mismatch LED (amber)	Indicates that processors are not matched.
11 System-board-assembly error LED (yellow)	LED on: an error has occurred to the system board assembly. Complete the following steps: 1. Check the Lenovo XClarity Controller event log and the system error log for information about the error. 2. Save the log if necessary, and clear the log afterward.
12 DIMM error LEDs (1-32) (amber)	• LED on: an error has occurred to the DIMM the LED represents. • For more information, see “Memory problems” on page 440.
13 Processor 1 error LED (amber)	LED on: an error has occurred to the processor the LED represents. Replace the processor.
14 Processor 0 error LED (amber)	LED on: an error has occurred to the processor the LED represents. Replace the processor.

XCC system management port LEDs

This topic provides information on LEDs of XCC system management port (10/100/1000 Mbps RJ-45).

The following table describes the problems that are indicated by LEDs on XCC system management port (10/100/1000 Mbps RJ-45).

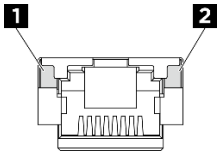


Figure 434. XCC system management port (10/100/1000 Mbps RJ-45) LEDs

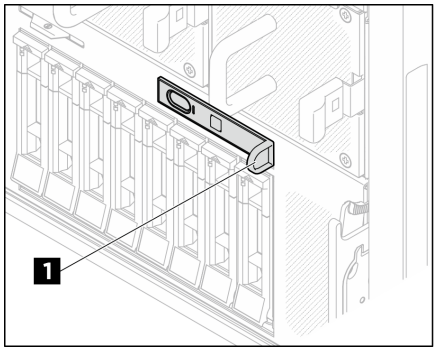
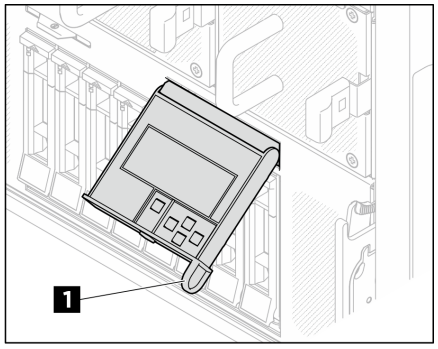
Table 40. XCC system management port (10/100/1000 Mbps RJ-45) LEDs

LED	Description
1 XCC system management port (10/100/1000 Mbps RJ-45) link LED	Use this green LED to distinguish the network connectivity status: • Off: The network link is disconnected. • Green: The network link is established.
2 XCC system management port (10/100/1000 Mbps RJ-45) activity LED	Use this green LED to distinguish the network activity status: • Off: The server is disconnected from a LAN. • Green: The network is connected and active.

Integrated diagnostics panel

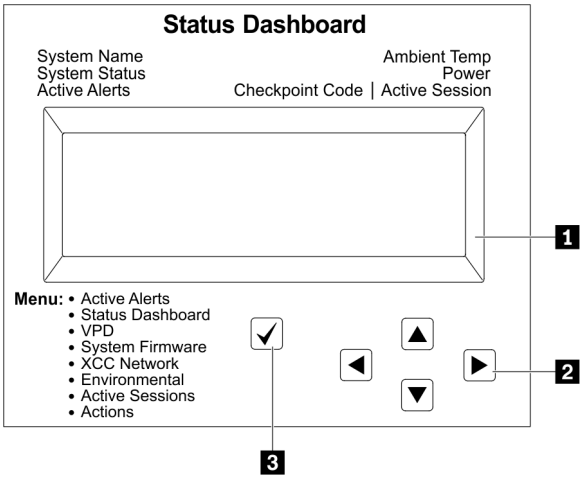
The Integrated diagnostics panel is attached to the front of the server, while it allows quick access to system information such as errors, system status, firmware, network, and health information. The Integrated Diagnostics Panel may also provide front operator panel function.

Location of the integrated diagnostics panel

Location	The integrated diagnostics panel is attached to the front of the 8U GPU shuttle.  
Callout	1 The handle with which the panel can be pulled out from the server. **Notes:** • The panel can be pushed in or pulled out regardless of the system power status. • When pulling it out, do it gently to avoid damage.

Display panel overview

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

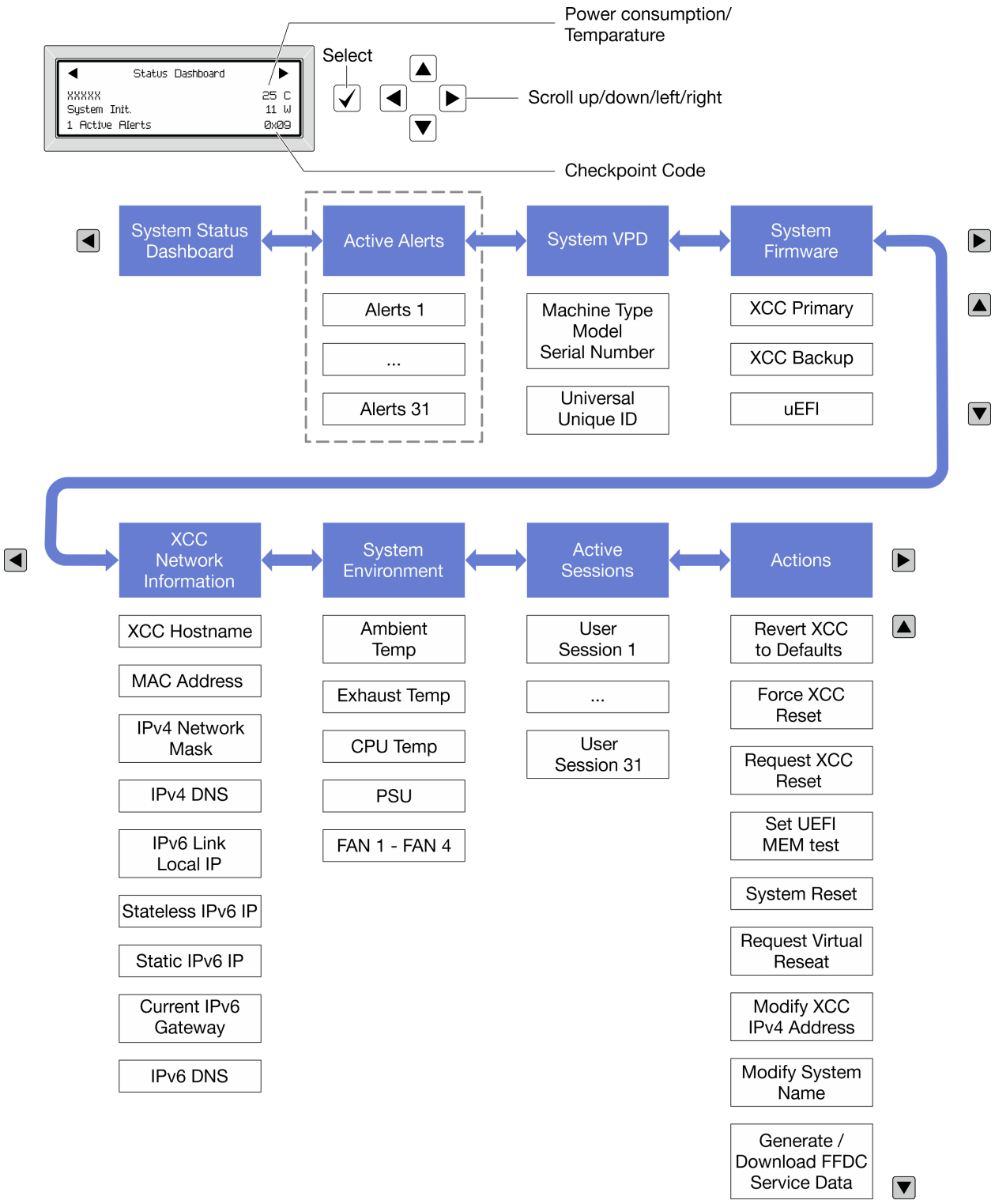


1 LCD display
2 Scroll buttons (up/down/left/right) Press the scroll buttons to locate and select system information.
3 Select button Press the select button to select from the options in the menu.

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
1 System name 2 System status 3 Active alert quantity 4 Temperature 5 Power consumption 6 Checkpoint code	

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: • 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
• Machine type and serial number • Universal Unique ID (UUID)	Machine Type: xxxx Serial Num: xxxxxx Universal Unique ID: xxxxxxxxxxxxxxxxxxxxxxxxxxxx

System Firmware

Sub Menu	Example
XCC Primary • Firmware level (status) • Build ID • Version number • Release date	XCC Primary (Active) Build: DVI399T Version: 4.07 Date: 2020-04-07
XCC Backup • Firmware level (status) • Build ID • Version number • Release date	XCC Backup (Active) Build: D8BT05I Version: 1.00 Date: 2019-12-30
UEFI • 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
• XCC hostname • MAC address • IPv4 Network Mask • IPv4 DNS • IPv6 Link Local IP • Stateless IPv6 IP • Static IPv6 IP • Current IPv6 Gateway • IPv6 DNS **Note:** Only the MAC address that is currently in use is displayed (extension or shared).	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
• 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: • 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

leakage sensor module LED

This topic provides information about the LED on the leakage detection sensor module.

The leakage sensor module on the GPU cold plate module and Direct Water Cooling Module (DWCM) comes with one LED. The following illustration shows the LED on the module.

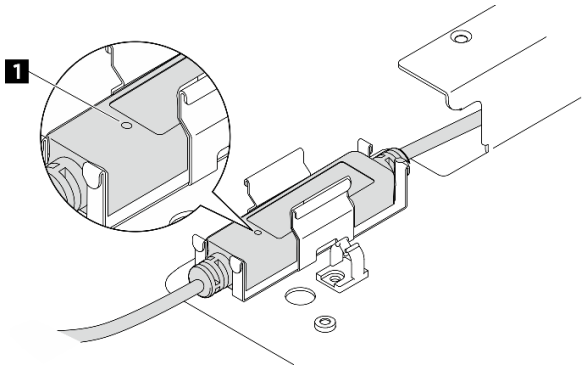


Figure 435. Leak detection LED

The following table describes the status that are indicated by the leakage sensor module LED.

1 leakage sensor module LED	
Description	• Solid green: No coolant leakage detected. • Blinking green: Abnormal status detected.
Action	See water leakage problem determination and troubleshooting.

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 421.

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, reseat 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 423.

- 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 423.

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 421).
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 463).

Intermittent problems

Use this information to solve intermittent problems.

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 421 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

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 440
- “Displayed system memory is less than installed physical memory” on page 441
- “Invalid memory population detected” on page 441

Multiple memory modules in a channel identified as failing

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

Complete the following procedure to solve the problem.

1. Reseat the memory modules; then, restart the server.
2. Remove the highest-numbered memory module of those that are identified and replace it with an identical known good memory module; then, restart the server. Repeat as necessary. If the failures continue after all identified memory modules are replaced, go to step 4.
3. Return the removed memory modules, one at a time, to their original connectors, restarting the server after each memory module, until a memory module fails. Replace each failing memory module with an identical known good memory module, restarting the server after each memory module replacement. Repeat step 3 until you have tested all removed memory modules.
4. Replace the highest-numbered memory module of those identified; then, restart the server. Repeat as necessary.
5. Reverse the memory modules between the channels (of the same processor), and then restart the server. If the problem is related to a memory module, replace the failing memory module.
6. (Trained technician only) Install the failing memory module into a memory module connector for processor 2 (if installed) to verify that the problem is not the processor or the memory module connector.
7. (Trained technician only) Replace the system board (system board assembly).

Displayed system memory is less than installed physical memory

Complete the following procedure to solve the problem.

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

1. Make sure that:
   - No error LEDs are lit. See “Troubleshooting by system LEDs and diagnostics display” on page 423.
   - No memory module error LEDs are lit on the system board (system board assembly).
   - 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 47 for requirements).
   - After changing or replacing a memory module, memory configuration is updated accordingly in the Setup Utility.
   - All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled.
   - There is no memory mismatch when the server is at the minimum memory configuration.
2. Reseat the memory modules, and then restart the server.
3. Check the POST error log:
   - If a memory module was disabled by a systems-management interrupt (SMI), replace the memory module.
   - If a memory module was disabled by the user or by POST, reseat the memory module; then, run the Setup Utility and enable the memory module.
4. Re-enable all memory modules using the Setup Utility, and then restart the server.
5. (Trained technician only) Install the failing memory module into a memory module connector for processor 2 (if installed) to verify that the problem is not the processor or the memory module connector.
6. (Trained technician only) Replace the system board (system board assembly).

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 47 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

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 403.

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 403.
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) System board (system board assembly)

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 403.

Network problems

Use this information to resolve issues related to networking.

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 421), 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

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) System board (system board assembly)

Server is unresponsive (POST is complete and operating system is running)

Complete the following steps until the problem is solved.

- If you are in the same location as the compute node, complete the following steps:
  1. If you are using a KVM connection, make sure that the connection is operating correctly. Otherwise, make sure that the keyboard and mouse are operating correctly.
  2. If possible, log in to the compute node and verify that all applications are running (no applications are hung).
  3. Restart the compute node.
  4. If the problem remains, make sure that any new software has been installed and configured correctly.
  5. Contact your place of purchase of the software or your software provider.
- If you are accessing the compute node from a remote location, complete the following steps:
  1. Make sure that all applications are running (no applications are hung).
  2. Attempt to log out of the system and log back in.
  3. Validate the network access by pinging or running a trace route to the compute node from a command line.
     a. If you are unable to get a response during a ping test, attempt to ping another compute node in the enclosure to determine whether it is a connection problem or compute node problem.
     b. Run a trace route to determine where the connection breaks down. Attempt to resolve a connection issue with either the VPN or the point at which the connection breaks down.
  4. Restart the compute node remotely through the management interface.
  5. If the problem remains, verify that any new software has been installed and configured correctly.
  6. Contact your place of purchase of the software or your software provider.

Server is unresponsive (POST failed and cannot start System Setup)

Configuration changes, such as added devices or adapter firmware updates, and firmware or application code problems can cause the server to fail POST (the power-on self-test).

If this occurs, the server responds in either of the following ways:

- The server restarts automatically and attempts POST again.
- The server hangs, and you must manually restart the server for the server to attempt POST again.

After a specified number of consecutive attempts (automatic or manual), the server reverts to the default UEFI configuration and starts System Setup so that you can make the necessary corrections to the configuration and restart the server. If the server is unable to successfully complete POST with the default configuration, there might be a problem with the system board (system board assembly).

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 system board (system board assembly).

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 43 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.

- “A Lenovo optional device that was just installed does not work.” on page 448
- “A Lenovo optional device that worked previously does not work now” on page 448

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 damage, 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 448
- "Operating system performance" on page 448

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 449
- "Server does not power on" on page 449

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 integrated diagnostics panel cable, and then repeat steps 1a and 2b.
      - If the server starts, reseat the integrated diagnostics panel.
      - If the problem remains, replace the integrated diagnostics 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 system board (system board assembly).
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 system board (system board assembly) 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 450
- “Serial device does not work” on page 450

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 “System board connectors” on page 27).
2. Reseat the following components:
   a. Failing serial device.
   b. Serial cable.

3. Replace the following components:
   a. Failing serial device.
   b. Serial cable.
4. (Trained technician only) Replace the system board (system board assembly).

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 451
- “Multiple drives fail” on page 452
- “Multiple drives are offline” on page 452
- “A replacement drive does not rebuild” on page 452
- “Green drive activity LED does not represent actual state of associated drive” on page 453
- “Yellow drive status LED does not represent actual state of associated drive” on page 453
- “U.3 NVMe drive can be detected in NVMe connection, but cannot be detected in Tri-mode” on page 453

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.

U.3 NVMe drive can be detected in NVMe connection, but cannot be detected in Tri-mode

In Tri-mode, NVMe drives are connected via a PCIe x1 link to the controller. To support Tri-mode with U.3 NVMe drives, **U.3 x1 mode** must be enabled for the selected drive slots on the backplane through the XCC Web GUI. By default, the backplane setting is **U.2 x4 mode**.

Complete the following steps to enable **U.3 x1 mode**:

1. Log into the XCC Web GUI, and choose **Storage → Detail** from the navigation tree on the left.
2. In the window that is displayed, click the icon ⚙ next to **Backplane**.
3. In the dialog box that is displayed, select the target drive slots and click **Apply**.
4. Do a DC power cycle to make the setting take effect.

Appendix A. Hardware disassembling for recycle

Follow the instructions in this section to recycle components with compliance with local laws or regulations.

Disassemble the CPU complex

Follow the instructions in this section to disassemble the CPU complex before recycling.

About this task

Refer to local environmental, waste or disposal regulations to ensure compliance.

Procedure

Step 1. Remove the CPU complex. See “Remove the CPU complex” on page 83.

Step 2. Remove the processor air baffle. See “Remove the processor air baffle” on page 323.

Step 3. If applicable, remove the PCIe riser assembly(ies). See “Remove a PCIe riser assembly” on page 294.

Step 4. If applicable, remove the venting block. See “Remove the venting block (CPU complex)” on page 359.

Step 5. If applicable, remove the DPU air baffle. See “Remove the DPU air baffle” on page 90.

Step 6. If applicable, remove the rear drive cage. See “Remove the rear drive cage” on page 334.

Step 7. If applicable, remove the leakage detection sensor module bracket. See “Remove the leakage sensor module bracket” on page 254.

Step 8. If applicable, remove the system I/O board. See “Remove the system I/O board” on page 344.

Step 9. Remove the processor and DWCM assembly. See “Remove the Lenovo Neptune(TM) Processor Direct Water Cooling Module” on page 258.

Step 10. Remove all the memory modules. See “Remove a memory module” on page 280.

Step 11. Remove the CMOS battery (CR2032). See “Remove the CMOS battery (CR2032)” on page 85.

Step 12. Remove the system board. See “Remove the system board” on page 348.

After you finish

After disassembling the CPU complex, recycle the unit in compliance with local regulations.

Disassemble the system board for recycle

Follow the instructions in this section to disassemble the system board before recycling.

About this task

Before disassembling the system board:

1. Remove the processor air baffle. See “Remove the processor air baffle” on page 323.
2. If applicable, remove the PCIe riser assembly(ies). See “Remove a PCIe riser assembly” on page 294.
3. If applicable, remove the rear drive cage. See “Remove the rear drive cage” on page 334.
4. If applicable, remove the DPU air baffle. See “Remove the DPU air baffle” on page 90.

5. If applicable, remove the leakage detection sensor module bracket. See “Remove the leakage sensor module bracket” on page 254.
6. If applicable, remove the system I/O board. See “Remove the system I/O board” on page 344.
7. Remove the processor and DWCM assembly. See “Remove the Lenovo Neptune(TM) Processor Direct Water Cooling Module” on page 258.
8. Remove all the memory modules. See “Remove a memory module” on page 280.
9. Remove the CMOS battery (CR2032). See “Remove the CMOS battery (CR2032)” on page 85.
10. Refer to local environmental, waste or disposal regulations to ensure compliance.

Procedure

Step 1. Remove the two cable guides.

a. Unfasten the two screws that secure the cable guide to the chassis; then, lift the cable guide out of the slot.

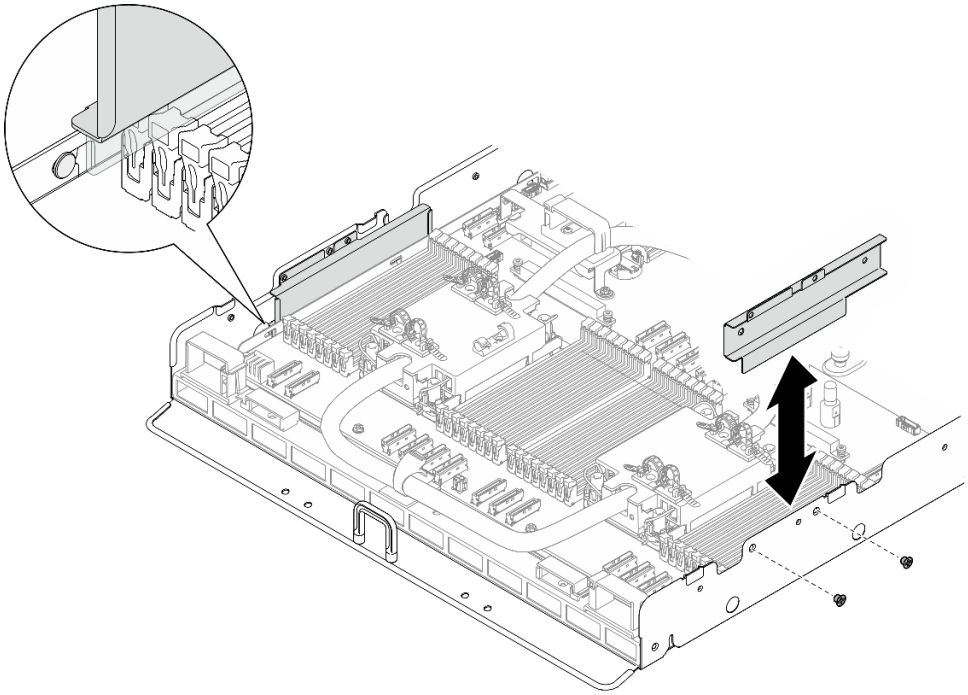


Figure 436. Cable guide removal

b. Repeat to remove the other cable guide.

Step 2. Disengage the system board.

a. ❶ Loosen the (1) thumbscrew to release the system board.

b. ❷ Slide the system board towards the front of the CPU complex as illustrated to disengage it from the chassis.

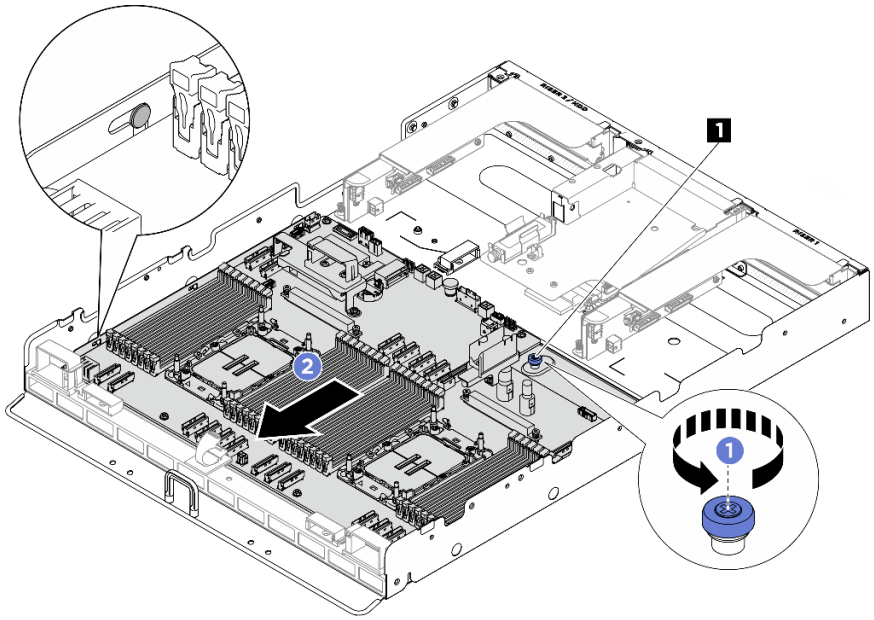


Figure 437. System board disengagement

1 Thumbscrew

Step 3. Remove the system board from the chassis.

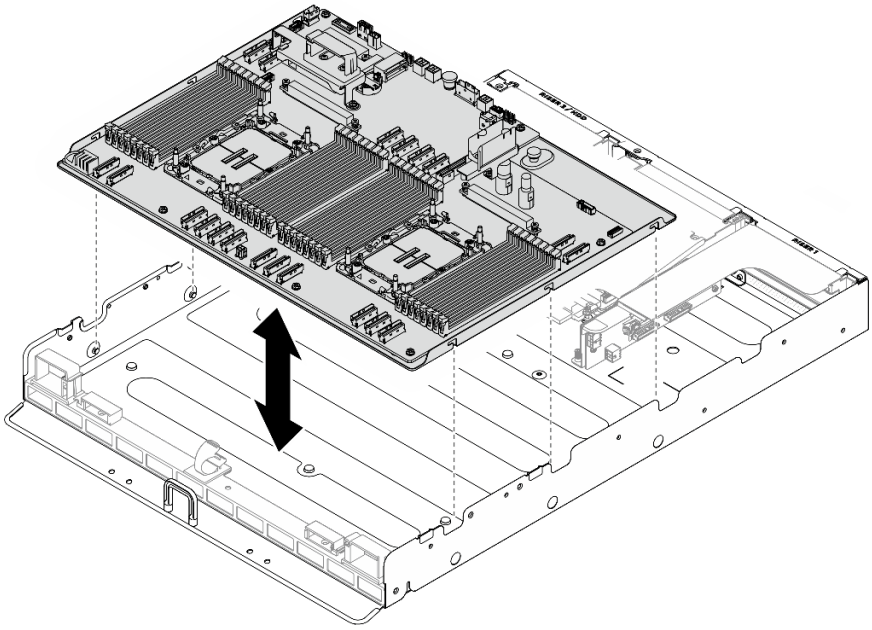


Figure 438. System board removal

Step 4. Separate the system board from the supporting sheet metal.

1. Carefully turn the system board assembly upside down.

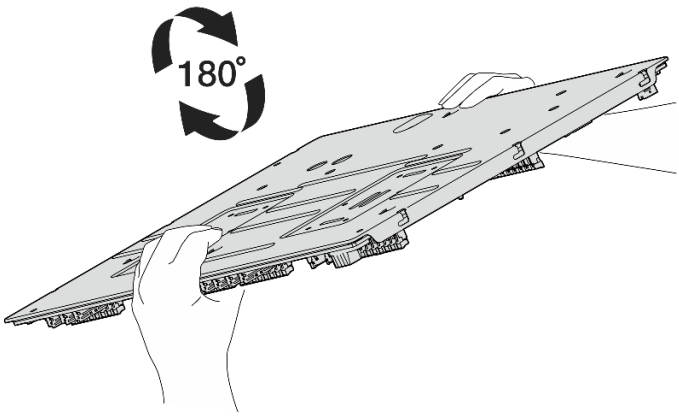


Figure 439. Turning the system board assembly upside down

2. Unfasten the two screws from the bottom of the supporting sheet metal to remove the power connectors.

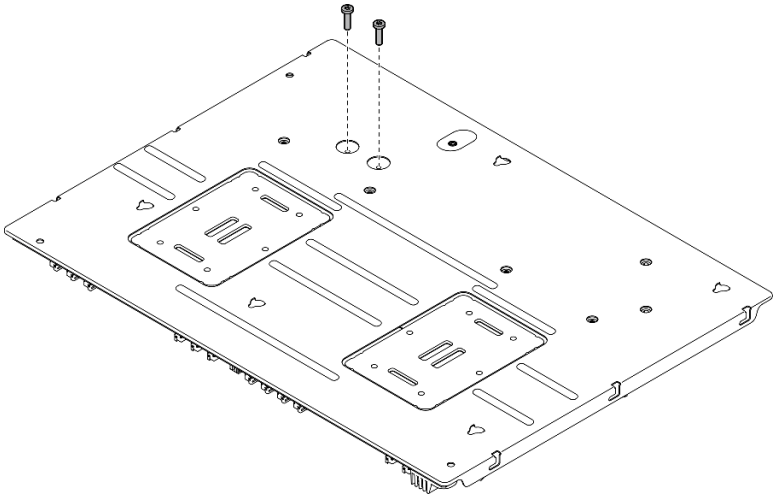


Figure 440. Screw removal

3. Carefully turn the system board assembly right-side up.

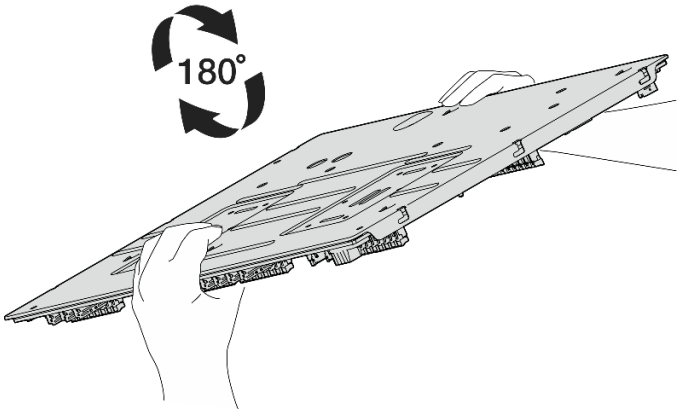


Figure 441. Turning the system board assembly right-side up

4. Remove the thumbscrew and ten screws from the system board assembly as illustrated:

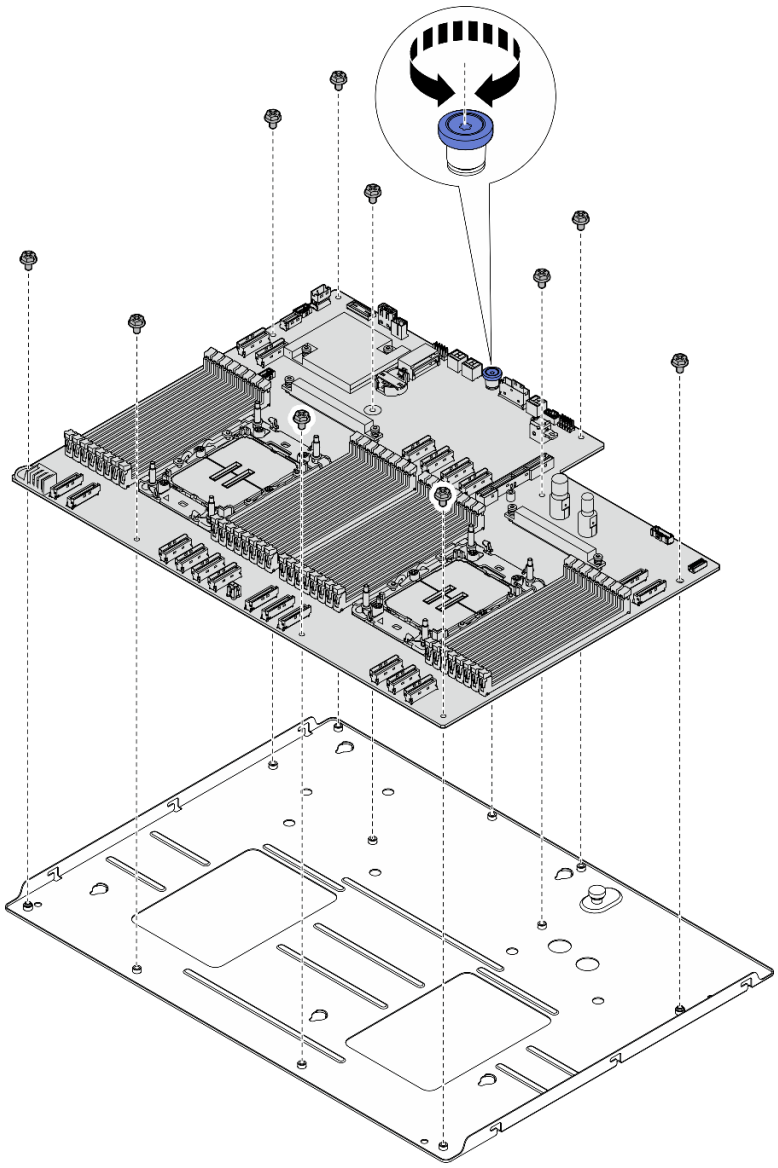


Figure 442. Component removal

5. Separate the system board assembly from the supporting sheet metal.

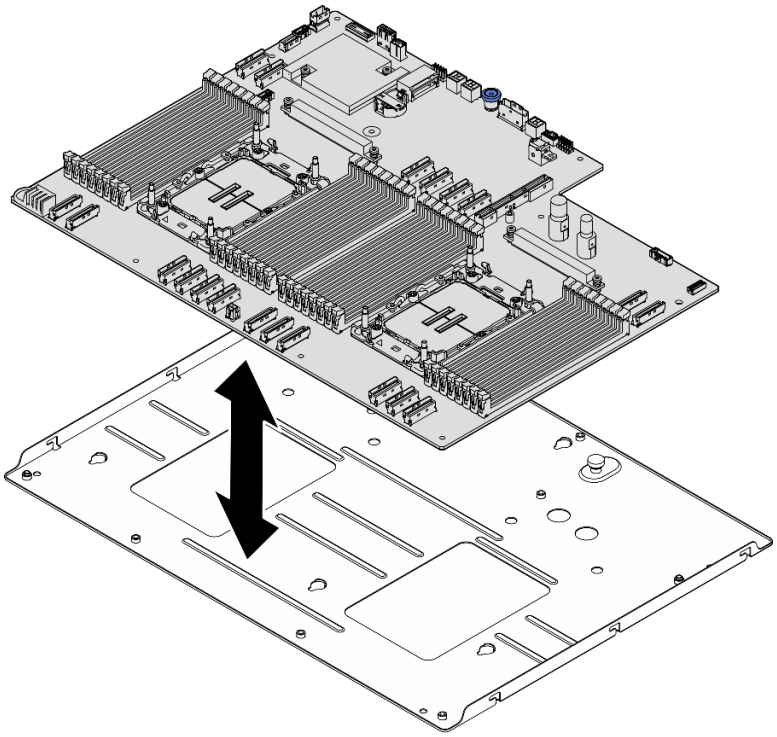


Figure 443. System board assembly disassembly

After you finish

After disassembling the system board assembly, 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/tw/en/products/servers/thinksystem/sr780av3/7dj5/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 421 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 39.
- 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/lxcc-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/supportphonelist 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/sr780a-v3/pdf_files.html

- ***Rail Installation Guides***
  - Rail installation in a rack
- ***GPU Water Loop Service Guide***
  - GPU water loop maintenance and service
- ***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 SR780a V3
  - https://datacentersupport.lenovo.com/tw/en/products/servers/thinksystem/sr780av3/7dj5/downloads/driver-list/
- Lenovo Data Center Forum
  - https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv_eg
- Lenovo Data Center Support for ThinkSystem SR780a V3
  - https://datacentersupport.lenovo.com/products/servers/thinksystem/sr780av3/7dj5
- Lenovo License Information Documents
  - https://datacentersupport.lenovo.com/documents/lnvo-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.

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Morrisville, NC 27560
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Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

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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	○	○	○	○	○	○
機械組合件	–	○	○	○	○	○
空氣傳動設備	–	○	○	○	○	○
冷卻組合件	–	○	○	○	○	○
內存模組	–	○	○	○	○	○
處理器模組	–	○	○	○	○	○
圖形處理器模組	–	○	○	○	○	○
電纜組合件	–	○	○	○	○	○
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.

0724

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