ThinkSystem SR150
Maintenance Manual

Machine Type: 7Y54

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

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.

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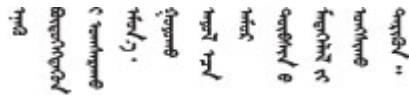
Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si 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་སྐྱོད་མ་བྱས་གོང་། སྐྱར་གྱི་ཡིད་གཟབ་
བྱ་འདྲ་མིན་ཡོད་པའི་འོད་སྟེར་བསྐྲ་དགོས།

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

مەزكۇر مەھسۇلاتنى ئورنتىشتىن بۇرۇن بىخەتەرلىك ئۇچۇرلىرىنى ئوقۇپ چىقڭ.

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

Safety inspection checklist

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

Notes:

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

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

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

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

1. Make sure that the power is off and the power cord is disconnected.
2. Check the power cord.

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

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

     a. Go to:

    b. Click **Preconfigured Model** or **Configure to order**.

    c. Enter the machine type and model for your server to display the configurator page.

    d. Click **Power ➙ Power Cables** to see all line cords.

- Make sure that the insulation is not frayed or worn.

3. Check for any obvious non-Lenovo alterations. Use good judgment as to the safety of any non-Lenovo alterations.

4. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.

5. Check for worn, frayed, or pinched cables.

6. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

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Chapter 1. Introduction

The ThinkSystem SR150 server is a 1U rack server designed for high-volume network transaction processing. This high-performance server is ideally suited for networking environments that require superior processor performance, input/output (I/O) flexibility, and high manageability.

Note: ThinkSystem SR150 is the model for the global market, while SR158 is the model only sold in Chinese Mainland.
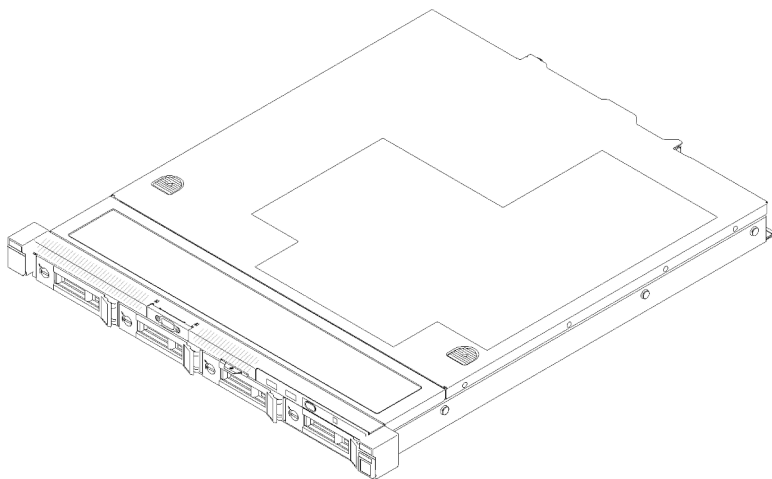
Figure 1. ThinkSystem SR150

The server comes with a limited warranty. For details about the warranty, see:
https://support.lenovo.com/us/en/solutions/ht503310

For details about your specific warranty, see:
http://datacentersupport.lenovo.com/warrantylookup

Specifications

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

Table 1. Server Specifications

Specification	Description

Size	1U server
	
	 • Height: 43.0 mm (1.7 inches)
	 • Width:
	   – With rack latches: 481.7 mm (18.9 inches)
	   – Without rack latches: 434.4 mm (17.1 inches)
	 • Depth: 497.8 mm (19.6 inches)
	
	 Note: The depth is measured from the front mounting flange of the rack to the rear of the server.

Weight	Approximately 6.1 kg (13.4 lb) to 12.3 kg (27.1 lb) depending on model

Table 1. Server Specifications (continued)

Specification	Description

Processor (depending on the model)	• Support up to one Intel® multi-core processor from Core™, Pentium® , Celeron® and Xeon® E processor family
	  – Designed for LGA 1151 sockets
	  – Scalable up to 6 cores
	  – Support up to 80W
	
	For a list of supported processors, see: https://serverproven.lenovo.com/.

Memory	See "Memory module installation order" in *Setup Guide* for detailed information about memory configuration and setup.
	
	• Slots: 4 dual inline memory module (DIMM) connectors
	• Type: Error correcting code (ECC) DDR4 unbuffered DIMM (UDIMM)
	• Capacity:
	  – Minimum capacity: 8 GB (1 x 8 GB)
	  – Max capacity: 128 GB (4 x 32 GB)
	
	Note: 32GB DIMM is supported by Intel® Xeon® E processor family with UEFI ISE114H Ver. 2.00 or later.

Drive	Depending on the configuration, server supports up to four or two drives
	
	• Four-drive backplate:
	
	  – Four 3.5-inch simple-swap SAS/SATA drives
	
	  – Four 2.5-inch simple-swap SAS/SATA drives (with 3.5-inch drive tray)
	
	• Two-drive backplate:
	
	  – Two 3.5-inch simple-swap SATA drives
	
	  – Two 2.5-inch simple-swap SATA drives (with 3.5-inch drive tray)
	
	Note: When the fourth SATA drive is installed, the M.2 drive is not supported.

M.2 drive	Supports two different physical sizes of M.2 drives • 42 mm • 80 mm **Note:** When the fourth SATA drive is installed, the M.2 drive is not supported.
PCI expansion slots	• Slot 1: PCI Express 3.0 x8 • Slot 2: PCI Express 3.0 x8 (x16 mechanical connector with x8 signal) **Notes:** • ThinkSystem SR150 does not support ARI/SR-IOV • QLogic QL41262 PCIe 25Gb 2-Port SFP28 Ethernet Adapter does not support shared storage V3700v2 and V5030 configurations.

Table 1. Server Specifications (continued)

Specification	Description
RAID	RAID adapter is supported when PCIe riser assembly is installed • Software RAID level: 0, 1, 5, and 10 • Hardware RAID level: 0, 1, 5, 6, and 10 **Notes:** • When all four storage drives have been installed, and the system has been set to software RAID mode in the UEFI settings, regardless if the disks are configured as an array or as separate disks, drives 2 and 3 cannot be used to install the Windows operating system. • If the M.2 drive has been installed, and the system has been set to software RAID mode in the UEFI settings, regardless if the disks are configured as an array or as separate disks, the M.2 drive cannot be used to install the Windows operating system.
Fans	Three internal system non-hot-swap fans (40mm x 28mm)

Power supplies	• Fixed power supply
	  – 300-watt gold power supply
	  – Input voltage 100-127V or 200-240V ac

Operating System	Supported and certified operating systems: • Microsoft Windows Server • VMware ESXi • Red Hat Enterprise Linux • SUSE Linux Enterprise Server • CentOS • NeoKylin • Ubuntu References: • Complete list of available operating systems: https://lenovopress.lenovo.com/osig. • OS deployment instructions: "Deploy the operating system" in *Setup Guide*.
Minimum configuration for debugging	• One processor with heat sink • One memory DIMM in slot 3 • One power supply • Three system fans (fan 1 to fan 3) • One M.2 or one HDD with backplate (if OS is needed for debugging)

Table 1. Server Specifications (continued)

Specification	Description

Acoustical noise emissions	Approximate sound level:
	
	• Sound power levels, idle
	  – 4.7 bels, minimum
	  – 4.7 bels, typical
	  – 4.9 bels, maximum
	• Sound power levels, operating
	  – 5.2 bels, minimum
	  – 5.2 bels, typical
	  – 5.5 bels, maximum
	
	Notes:
	
	• These sound power levels are measured in controlled acoustical environments according to procedures specified by ISO 7779 and are reported in accordance with ISO 9296.
	• The declared acoustic noise levels are based on specified configurations, which may change slightly depending on configurations/conditions.

Heat output	Approximate heat output: • Minimum configuration: 180 BTU, 53 W (in BTU per hour and watts) • Maximum configuration: 771 BTU, 226 W (in BTU per hour and watts)

Environment	The ThinkSystem SR150 server complies with ASHRAE Class A2 specifications. System performance may be impacted when operating temperature is outside ASHRAE A2 specification or fan failed condition. The ThinkSystem SR150 server is supported in the following environment:
	
	• Air temperature:
	  – Operating:
	    – ASHRAE Class A2: 10°C to 35°C (50°F to 95°F); decrease the maximum ambient temperature 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: -40°C to 60°C (-40°F to 140°F)
	• Maximum altitude: 3,050 m (10,000 ft)
	• Relative Humidity (non-condensing):
	  – Operating:
	    – ASHRAE Class A2: 8% to 80%, maximum dew point: 21°C (70°F)
	  – Shipment/Storage: 8% to 90%
	• Particulate contamination
	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 5.

Particulate contamination

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

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

Table 2. Limits for particulates and gases

Contaminant	Limits
Reactive gases	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.

Firmware updates

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

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

- Best practices related to updating firmware is available at the following site:
  - http://lenovopress.com/LP0656
- The latest firmware can be found at the following site:
  - https://datacentersupport.lenovo.com/products/servers/thinksystem/sr150/7y54/downloads/driver-list/
- You can subscribe to product notification to stay up to date on firmware updates:
  - https://datacentersupport.lenovo.com/tw/en/solutions/ht509500

UpdateXpress System Packs (UXSPs)

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

Update method terminology

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

Firmware updating tools

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

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

- **Lenovo XClarity Provisioning Manager**

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

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

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

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

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

- **Lenovo XClarity Controller**

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

  Notes:

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

    For additional information about configuring Ethernet over USB, see:

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

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

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

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

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

- **Lenovo XClarity Essentials OneCLI**

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

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

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

- **Lenovo XClarity Essentials UpdateXpress**

  Lenovo XClarity Essentials UpdateXpress provides most of OneCLI update functions through a graphical user interface (GUI). It can be used to acquire and deploy UpdateXpress System Pack (UXSP) update

packages and individual updates. UpdateXpress System Packs contain firmware and device driver updates for Microsoft Windows and for Linux.

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

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

- **Lenovo XClarity Essentials Bootable Media Creator**

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

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

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

- **Lenovo XClarity Administrator**

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

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

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

- **Lenovo XClarity Integrator offerings**

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

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

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

Tech Tips

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

To find the Tech Tips available for your server:

1. Go to http://datacentersupport.lenovo.com and navigate to the support page for your server.
2. Click 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:

Power on the server

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

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

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

For information about powering off the server, see "Power off the server" on page 10.

Power off the server

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

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

Note: The Lenovo XClarity Controller can place the server in a standby state as an automatic response to a critical system failure.

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

When in a standby state, the server can respond to remote power-on requests sent to the Lenovo XClarity Controller. For information about powering on the server, see "Power on the server" on page 10.

Chapter 2. Server components

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

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.

Figure 2 "Location of the machine type, model, and serial number" on page 11 shows the location of the label containing the machine type, model, and serial number.
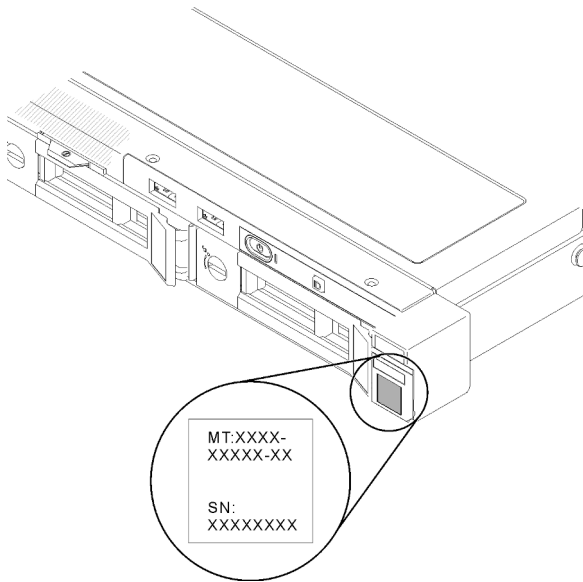
Figure 2. Location of the machine type, model, and serial number

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

XClarity Controller network access label

In addition, the XClarity Controller network access label is attached to the pull-out information tab located near the center of the front view, with MAC address accessible with a pull.
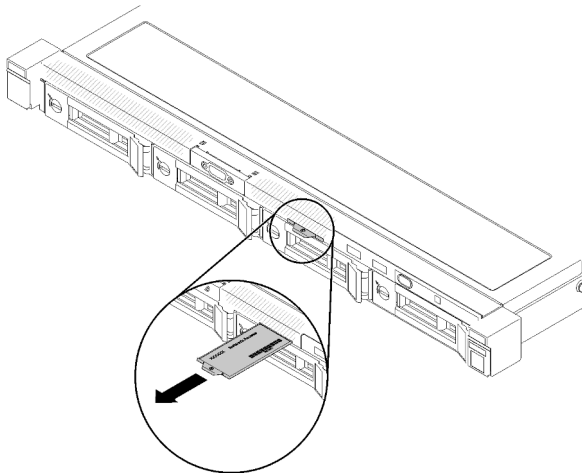
Figure 3. XClarity Controller network access label on the pull-out information tab

QR code

In addition, the system Service Card that is located on the top cover of the server, 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 server support.
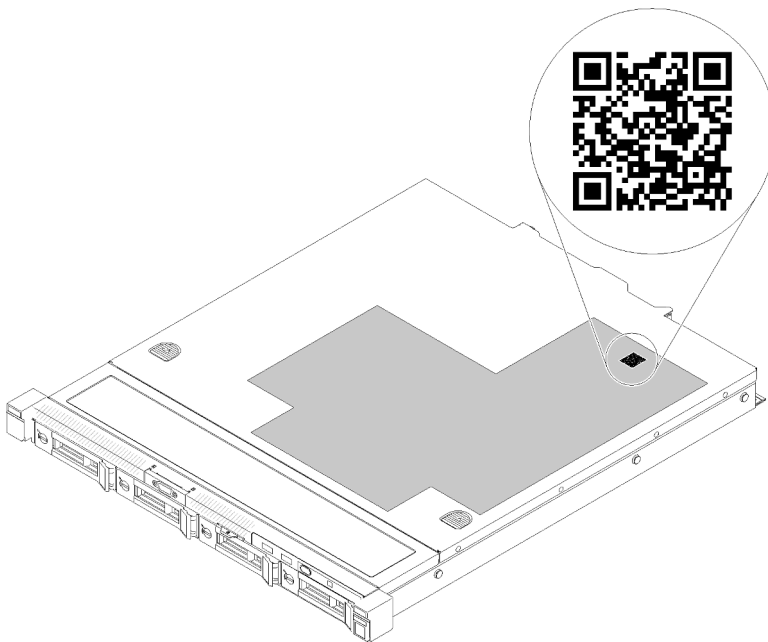
Figure 4. SR150 QR code

Front view

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

The following illustration shows the controls, LEDs, and connectors on the front of the server.
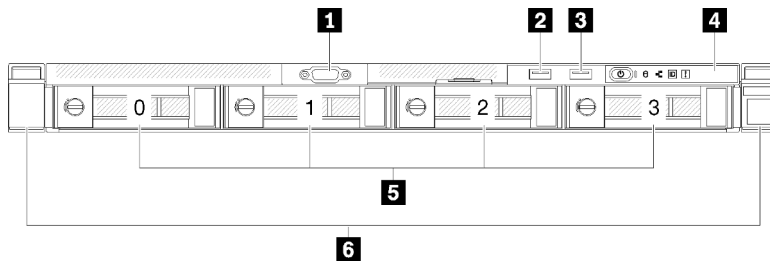
Figure 5. Front view

Table 3. Components on the server front view

1 VGA connector	**4** Front operator panel
2 USB 2.0 connector (with Lenovo XClarity Controller)	**5** Simple-swap drive bays (numbering 0-3, matching SATA port 4-7 on system board, see "System-board connectors" on page 16)
3 USB 3.1 Gen1 connector	**6** Rack latches

1 VGA connector:

Connect a monitor to this connector.

Notes:

- When the front VGA connector is in use, the rear VGA connector will be disabled.
- The maximum video resolution is 1600x1200 at 75 Hz.

2 3 USB connectors:

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

- USB 1: USB 2.0 with Lenovo XClarity Controller management
- USB 2: USB 3.1 Gen1

4 Front operator panel

Front operator panel contains several LED and buttons, see "Front operator panel" on page 14 for more information.

5 Simple-swap drives:

Install drives into these bays. See "Install a simple-swap disk drive" on page 44 for more details.

Notes:

- When SATA drives are installed and connected to SATA connectors 4-7 on system board (without a RAID adapter installed), the drive number will be reported by RAID utility as drives 4, 5, 6, and 7 (different from drive bay number)
- When SAS or SATA drives are installed and connected to RAID adapter, the drive number will be 0, 1, 2, and 3 (same as drive bay number)
- Drive bay 2 and 3 are not available when the two-drive backplate is installed.

6 Rack latches:

Pull the latch on both sides in the front of the server to remove the server out of the rack.

Front operator panel

The following illustration shows the controls and LEDs on the front operator panel.
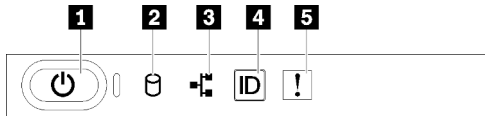
Figure 6. Front operator panel

Table 4. Buttons and LEDs on the front operator panel

1 Power button/LED (green)	**4** Identification button/LED (blue)
2 Drive activity LED (green)	**5** System error LED (yellow)
3 Network activity LED (green)	

1 Power button/LED (green)

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

Off: No power supply is properly installed, or the LED itself has failed.

Flashing rapidly (4 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.

Solid on: The server is turned on.

2 Drive activity LED (green)

When this LED is flashing, it indicates that the drives are in use.

3 Network activity LED (green)

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

4 Identification button/LED (blue)

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

5 System error LED (yellow)

When this yellow LED is lit, it indicates that a system error has occurred. This LED can be controlled by the Lenovo XClarity Controller.

Rear view

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

The following illustrations show the connectors and LEDs on the rear of the server.

Connectors and LEDs on the rear server
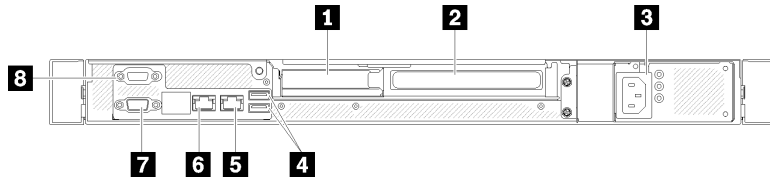
Figure 7. Rear view

Table 5. Components on the server rear view

1 PCIe slot 1	**5** Ethernet connector 2
2 PCIe slot 2	**6** Ethernet connector 1 (shared with XCC network port)
3 Server power connector	**7** VGA connector
4 USB 3.1 Gen1 connectors	**8** Serial connector

1 2 PCIe slot 1 and 2

Install the PCIe riser assembly:

- PCIe slot 1: PCI Express 3.0 x8
- PCIe slot 2: PCI Express 3.0 x8 (x16 mechanical connector with x8 signal)

For information about the PCIe slots, see "PCIe riser assembly" on page 20.

3 Server power connector:

Connect the power cord to this connector.

4 USB 3.1 Gen1 connector:

Connect USB devices, such as USB mouse, keyboard, or other devices to these two USB 3.1 Gen1 connectors.

5 6 Ethernet connector 1 and 2:

Each Ethernet connector has two status LEDs to help you identify the Ethernet connectivity and activity.

- Ethernet connector 2: connect server to the internet
- Ethernet connector 1: connect server to the internet, or set server to access Lenovo XClarity Controller

If the LOM adapter is not installed, Ethernet connector 1 can be set as XClarity Controller Network connector. To set Ethernet connector 1 as XClarity Controller Network connector, start Setup Utility and select **BMC Settings ➙ Network Settings ➙ Chapter 2.Server components15 Network Settings Network Interface Port : Shared.** Then, click **Shared NIC on** and select **Onboard Port 1.**

7 VGA connector:

Connect a monitor to this connector.

Notes:

- When the front VGA connector is in use, the rear VGA connector will be disabled.
- The maximum video resolution is 1600x1200 at 75 Hz.

8 **Serial connector:**

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

System-board layout

Use this information to locate the connectors, LEDs, and switches on the system board.

System-board LEDs

The following illustrations show the light-emitting diodes (LEDs) on the system board.
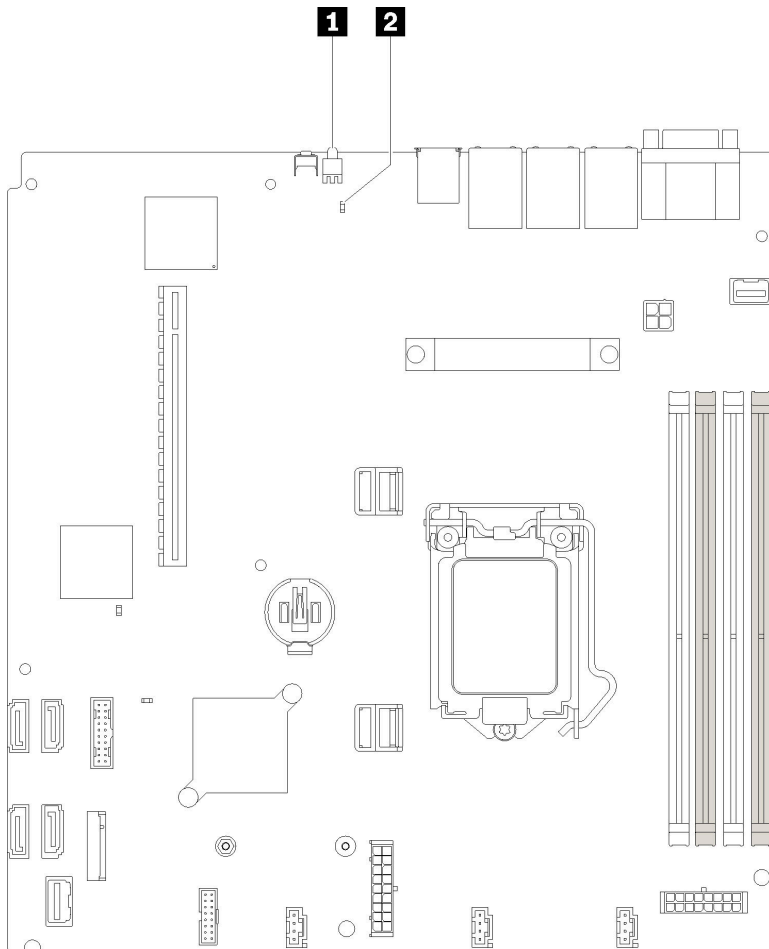
Figure 8. System-board LEDs

Table 6. System-board LEDs

1 Rear identification LED (blue)	**2** System error LED (yellow)

System-board connectors

Use this information to locate system-board components and connectors for optional devices.

The following illustration shows the system-board components, including connectors for user-installable optional devices, in the server.
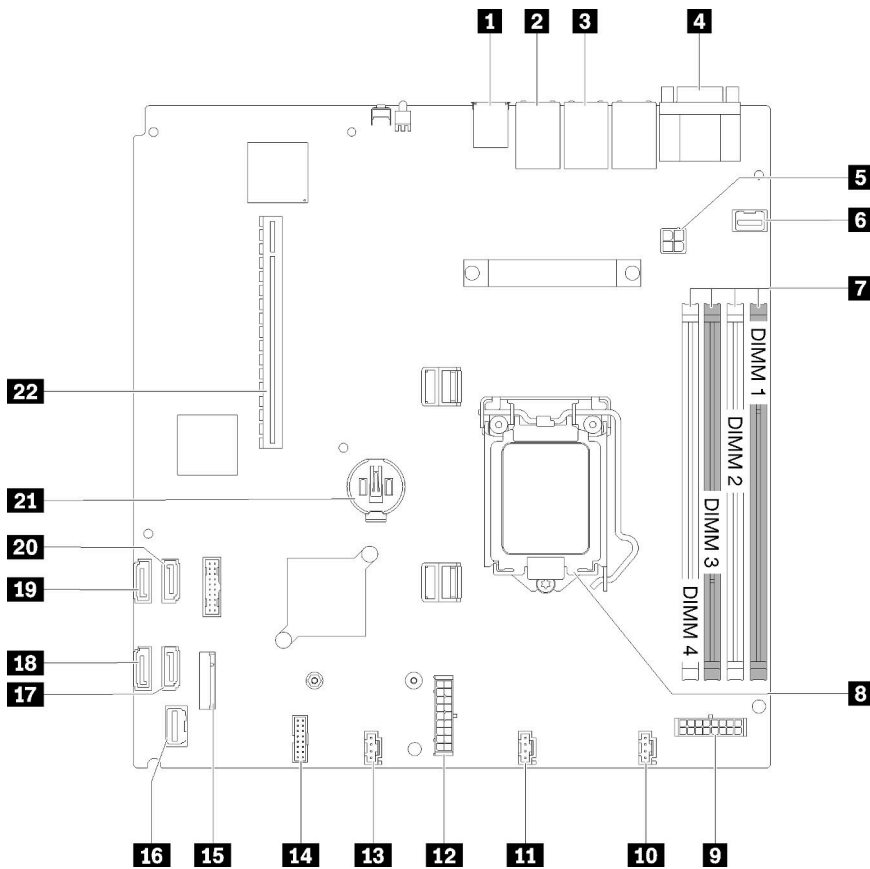
Figure 9. System-board connectors

Table 7. System board connectors

1 USB connector	**12** System power connector
2 LAN 2 connector	**13** Fan 3 connector
3 LAN 1 connector (shared with Lenovo XClarity Controller)	**14** TPM card connector
4 Serial port connector (upper) and VGA connector (bottom)	**15** M.2 connector
5 Processor power connector	**16** Front operator panel connector
6 Front VGA connector	**17** SATA 6 connector
7 DIMM connectors	**18** SATA 7 connector
8 Processor socket	**19** SATA 4 connector
9 Backplate power connector	**20** SATA 5 connector
10 Fan 1 connector	**21** CMOS battery connector
11 Fan 2 connector	**22** PCIe slot

System-board jumpers and buttons

The following illustrations show the location of the jumpers and buttons on the server.

Note: If there is a clear protective sticker on the top of the switch blocks, you must remove and discard it to access the switches.
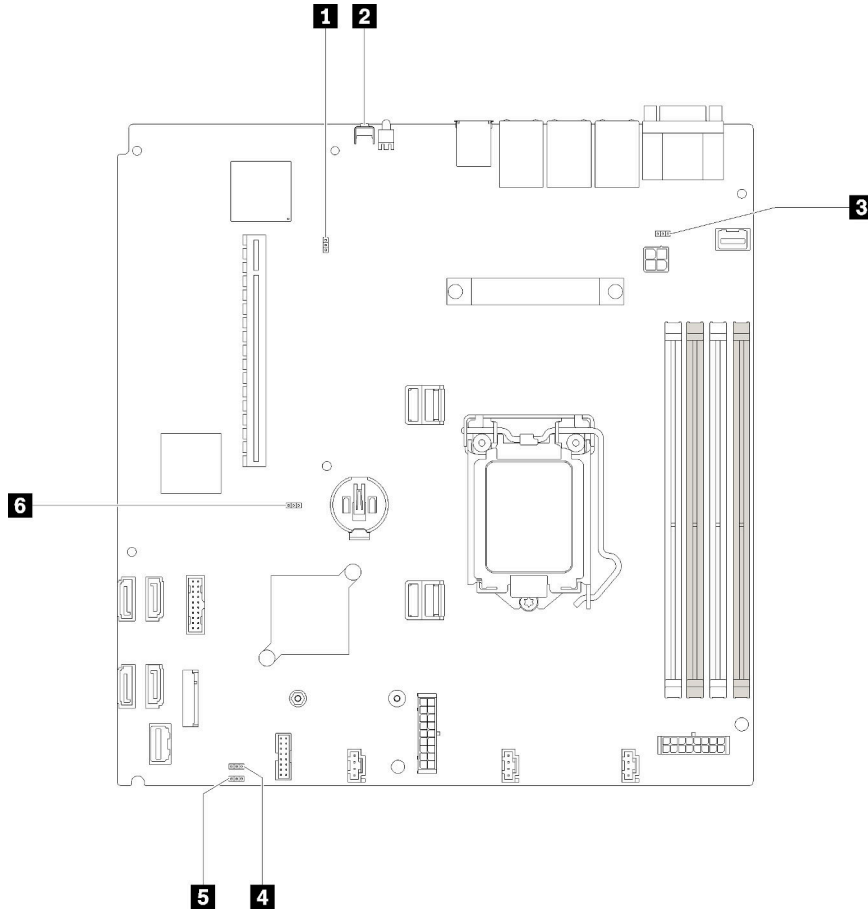
Figure 10. System-board jumpers and buttons

Table 8. System-board jumpers and buttons

Jumper and button name	Jumper setting / button function
1 Force XCC update jumper	• Pins 1 and 2: Default • Pins 2 and 3: Force the Lenovo XClarity Controller to update to the latest version
2 NMI button	Press this button to force a nonmaskable interrupt (NMI) to the processor. By this way, you can set the server into blue screen mode and take a memory dump.
3 NCSI function	• Pins 1 and 2: Default • Pins 2 and 3: Disable
4 Power permission override jumper	• Pins 1 and 2: Default • Pins 2 and 3: Override the power-on permission

Table 8. System-board jumpers and buttons (continued)

5 Clear CMOS jumper	• Pins 1 and 2: Default • Pins 2 and 3: Clear the real-time clock (RTC) registry
6 TPM card physical presence jumper	• Pins 1 and 2: Default • Pins 2 and 3: TPM card physical presence is asserted

Important:

1. Before you change any switch settings or move any jumpers, turn off the server; then, disconnect all power cords and external cables. Review the information in https://pubs.lenovo.com/safety_ documentation/, "Installation Guidelines" on page 31, "Handling static-sensitive devices" on page 33, and "Power off the server" on page 10.

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

PCIe riser assembly

Use this information to locate the connectors on the optional PCIe riser assembly.
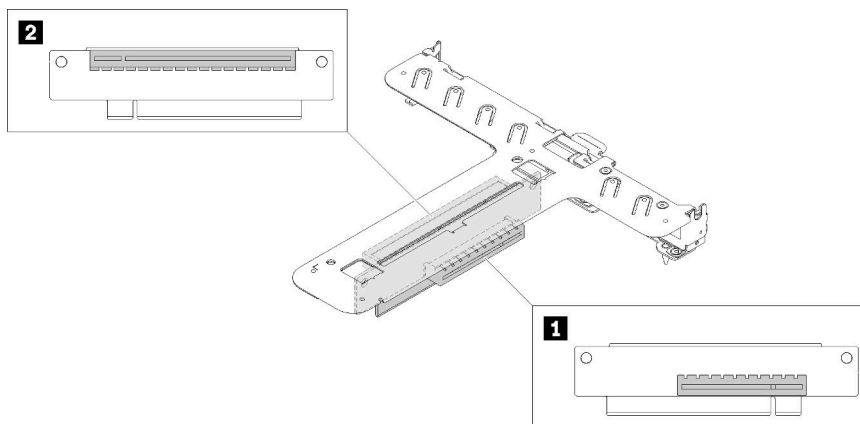
Figure 11. PCIe riser assembly

Table 9. PCIe riser assembly

1 PCI Express 3.0 x8	**2** PCI Express 3.0 x8 (x16 mechanical connector with x8 signal)

Backplate

Use this information to identify the drive backplate you use.

Two 3.5-inch drive backplate
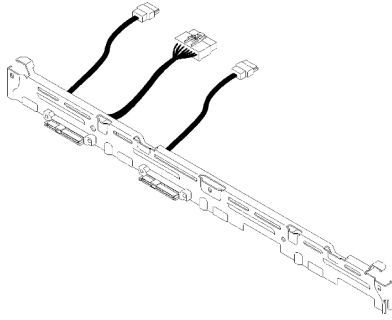
Figure 12. Two 3.5-inch drive backplate

Four 3.5-inch drive backplate (connects to onboard SATA connectors)
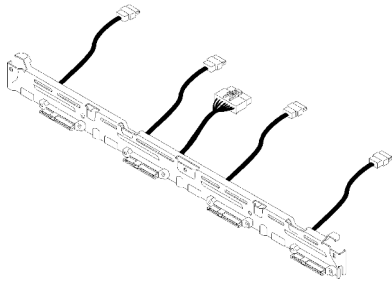
Figure 13. Four 3.5-inch drive backplate (connects to onboard SATA connectors)

Four 3.5-inch drive backplate (connects to RAID x30 adapter)

Figure 14. Four 3.5-inch drive backplate (connects to RAID x30 adapter)

Four 3.5-inch simple-swap drives (connects to RAID x40 adapter)
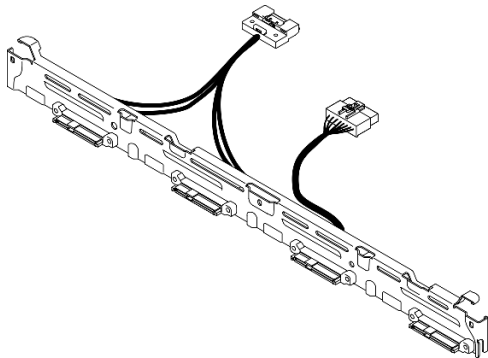
Figure 15. Four 3.5-inch simple-swap drives (connects to RAID x40 adapter)

Internal cable routing

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

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.

Some options, such as RAID controllers, might require additional internal cabling. See the documentation that is provided for the option to determine any additional cabling requirements and instructions.

Fan cables

Connect the fan cables to the corresponding connectors.

Fan cables

Connect the fan cables to the corresponding connectors. Make sure all cables are connected for proper fan operation.
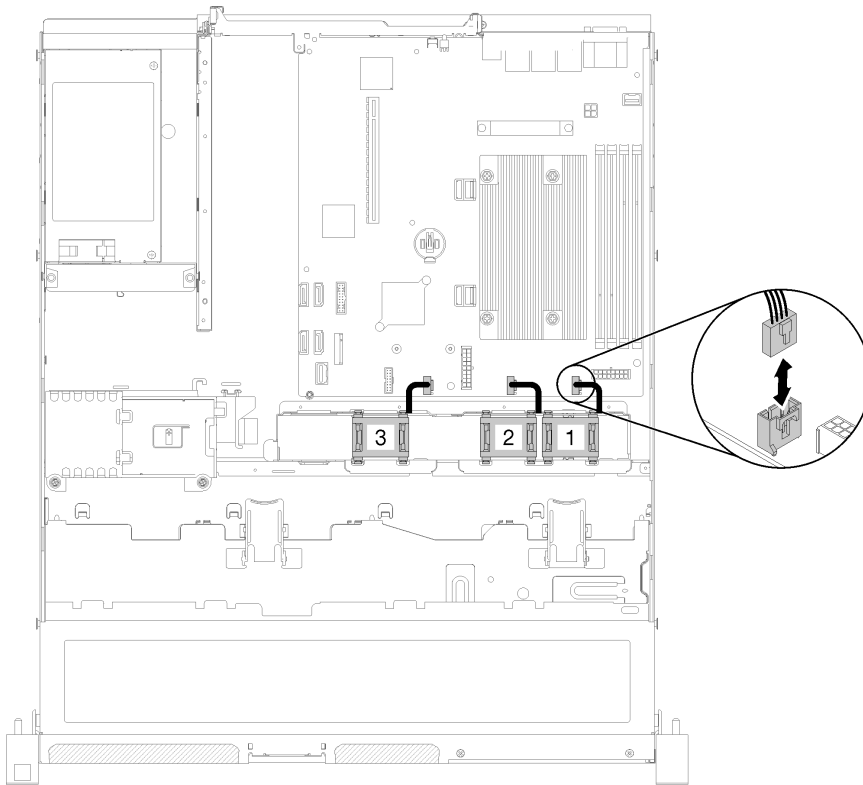
Figure 16. Fan cables

VGA cable

Connect the VGA cable to the VGA connector.

VGA cable

Connect the VGA cable to the connector and route the cable as shown.
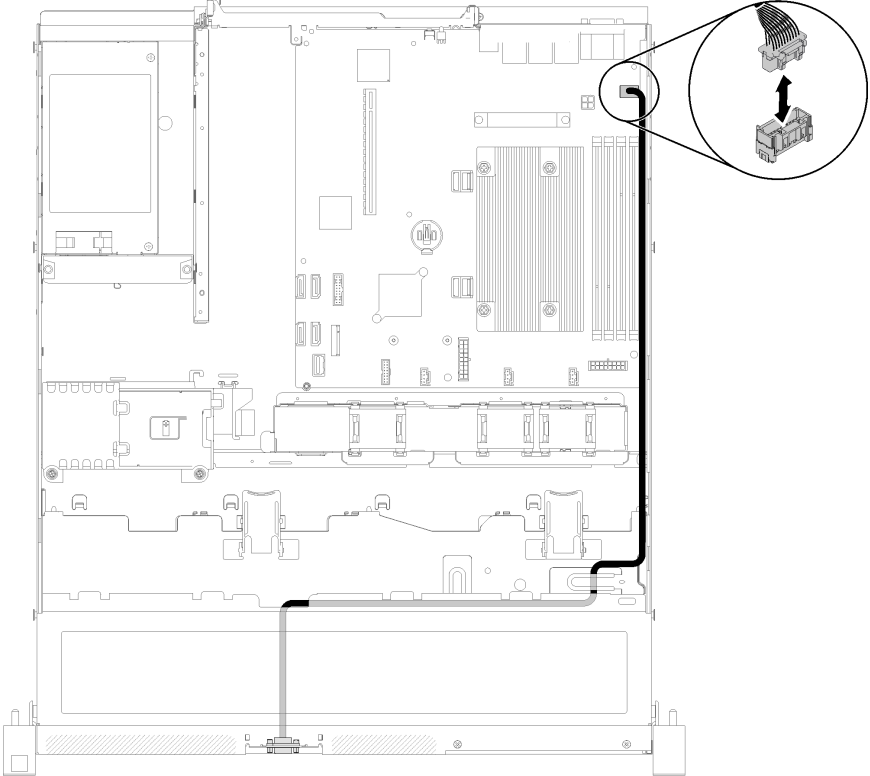
Figure 17. VGA cable

Fixed power supply cables

Connect the fixed power supply cables to the corresponding connectors.

Fixed power supply unit cables

Connect the cables to the corresponding connectors and route the cables as shown.
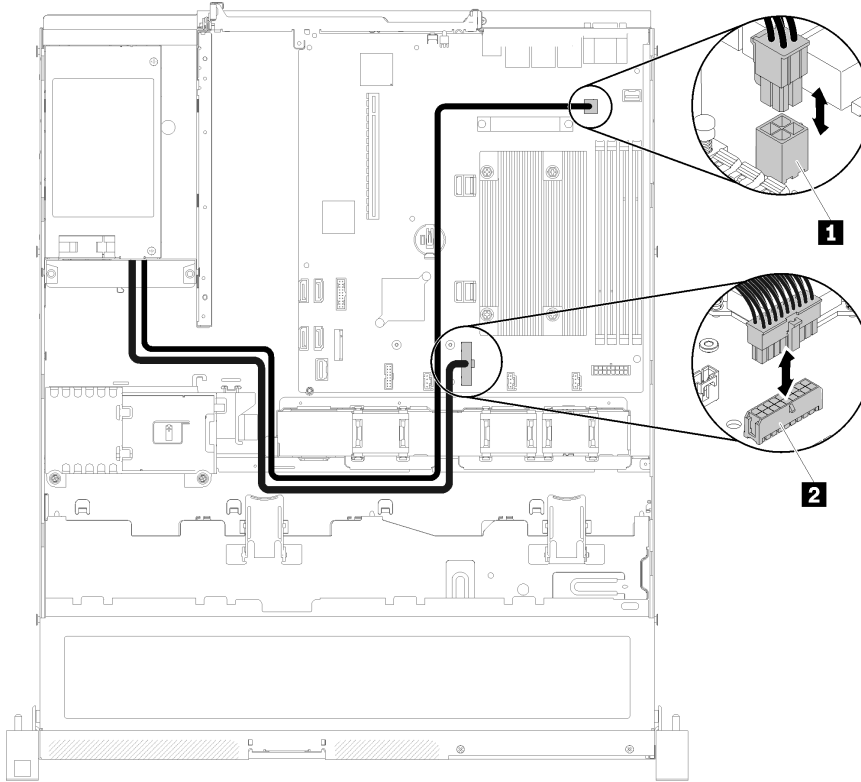
Figure 18. Fixed power supply unit cables

Table 10. Processor and system power connector

1 Processor power connector	**2** System-board power connector

Backplate cables

Connect drive backplate cables to the corresponding connectors.

Check "System-board connectors" on page 16 for the detailed connectors location.

Two 3.5-inch drive backplate
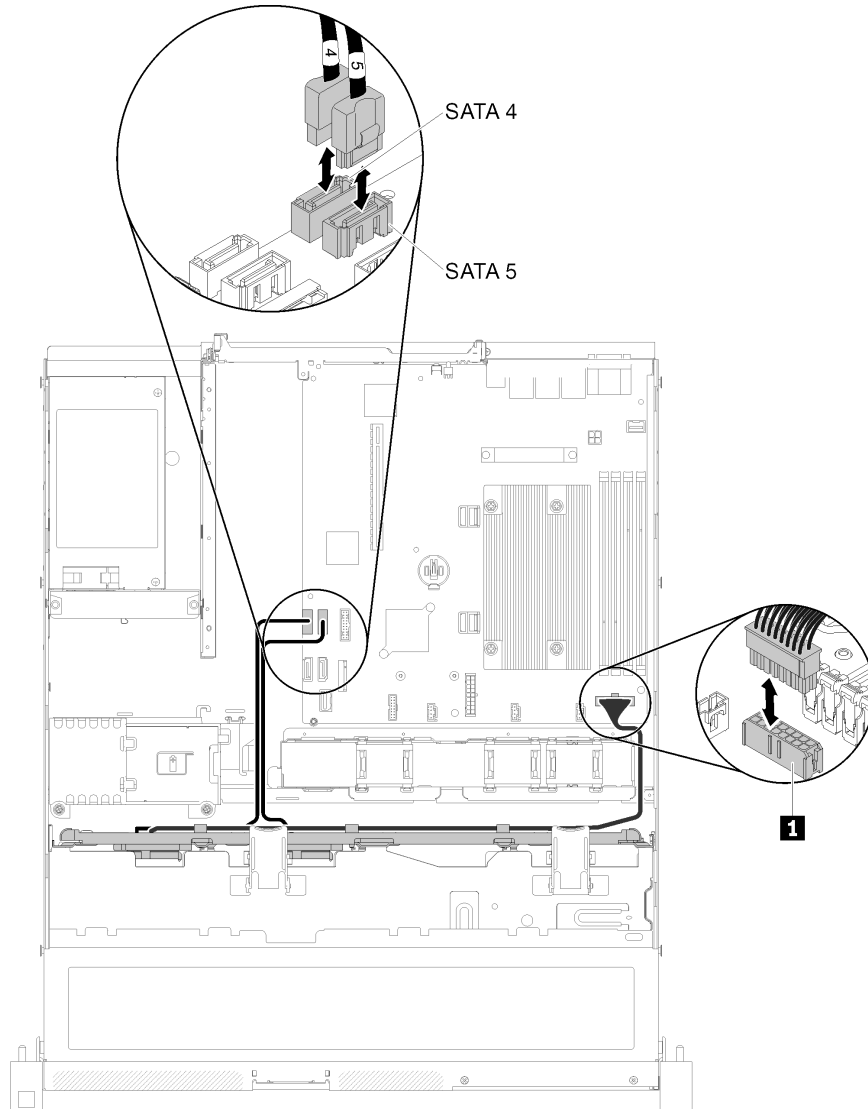
Figure 19. Two 3.5-inch drive backplate

Table 11. Two 3.5-inch drive backplate

1 Backplate power connector

Four 3.5-inch drive backplate (connects to onboard connectors)
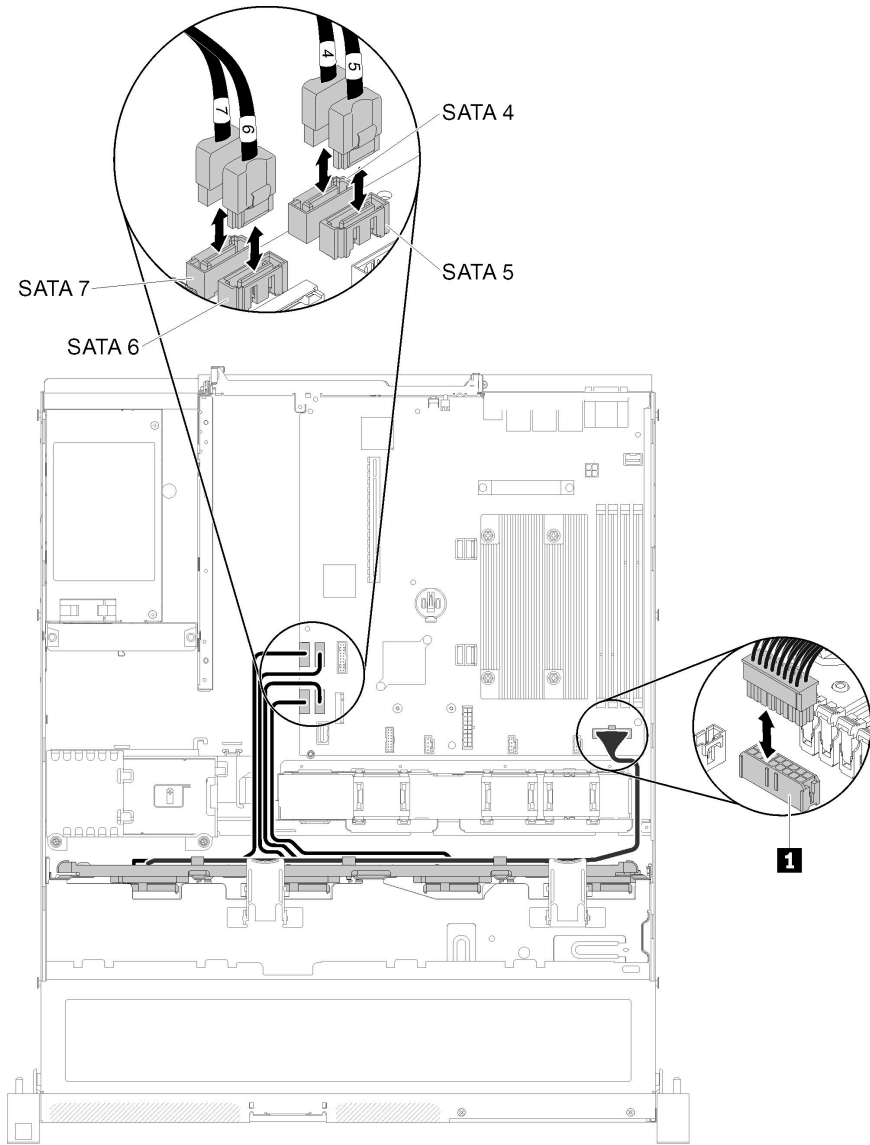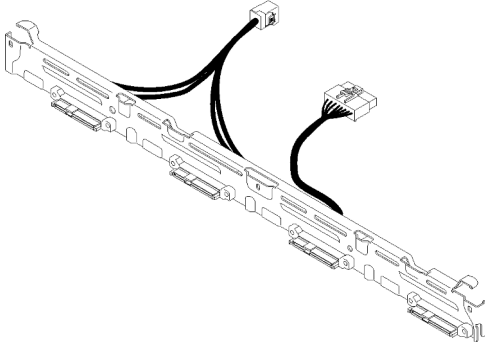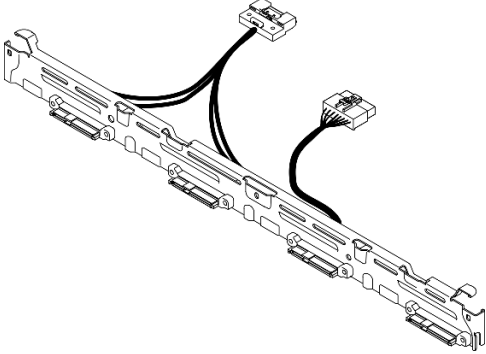
Figure 20. Four 3.5-inch drive backplate (connects to onboard connectors)
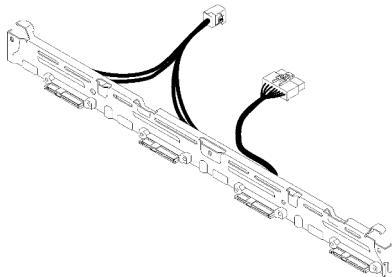
Table 12. Four 3.5-inch drive backplate (connects to onboard connectors)

1 Backplate power connector

Four 3.5-inch drive backplate (connects to RAID adapter)

Table 13. *Backplates for RAID x30 / x40 adapter*

For RAID x30 adapter:	For RAID x40 adapter:
4 x 3.5'' simple-swap backplate, miniSAS HD to SAS	4 x 3.5'' simple-swap backplate, slimSAS HD to SAS
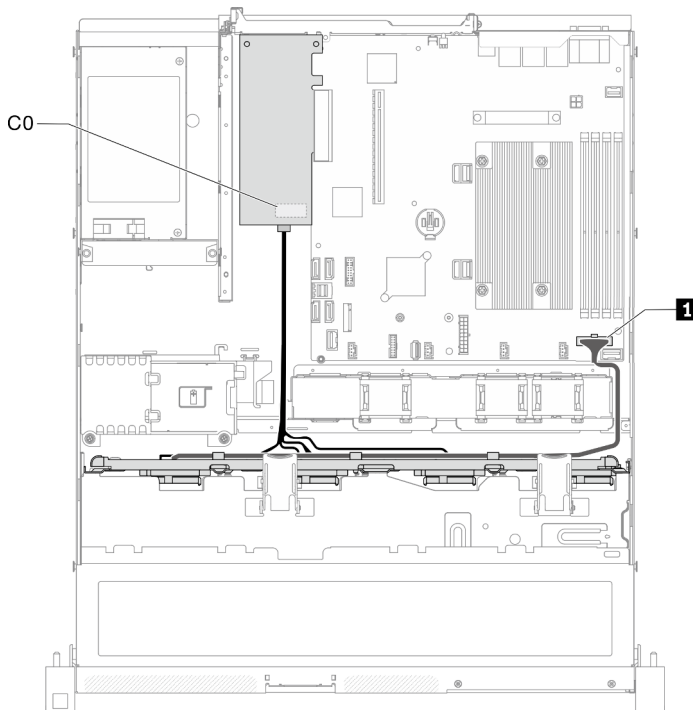
Figure 21. *3.5-inch simple-swap drive model with hardware RAID*

Table 14. *3.5-inch simple-swap drive model with hardware RAID*

1 Backplane power connector

Parts list

Use the parts list to identify each of the components that are available for your server.

For more information about ordering the parts shown in :

Note: Depending on the model, your server might look slightly different from the illustration.
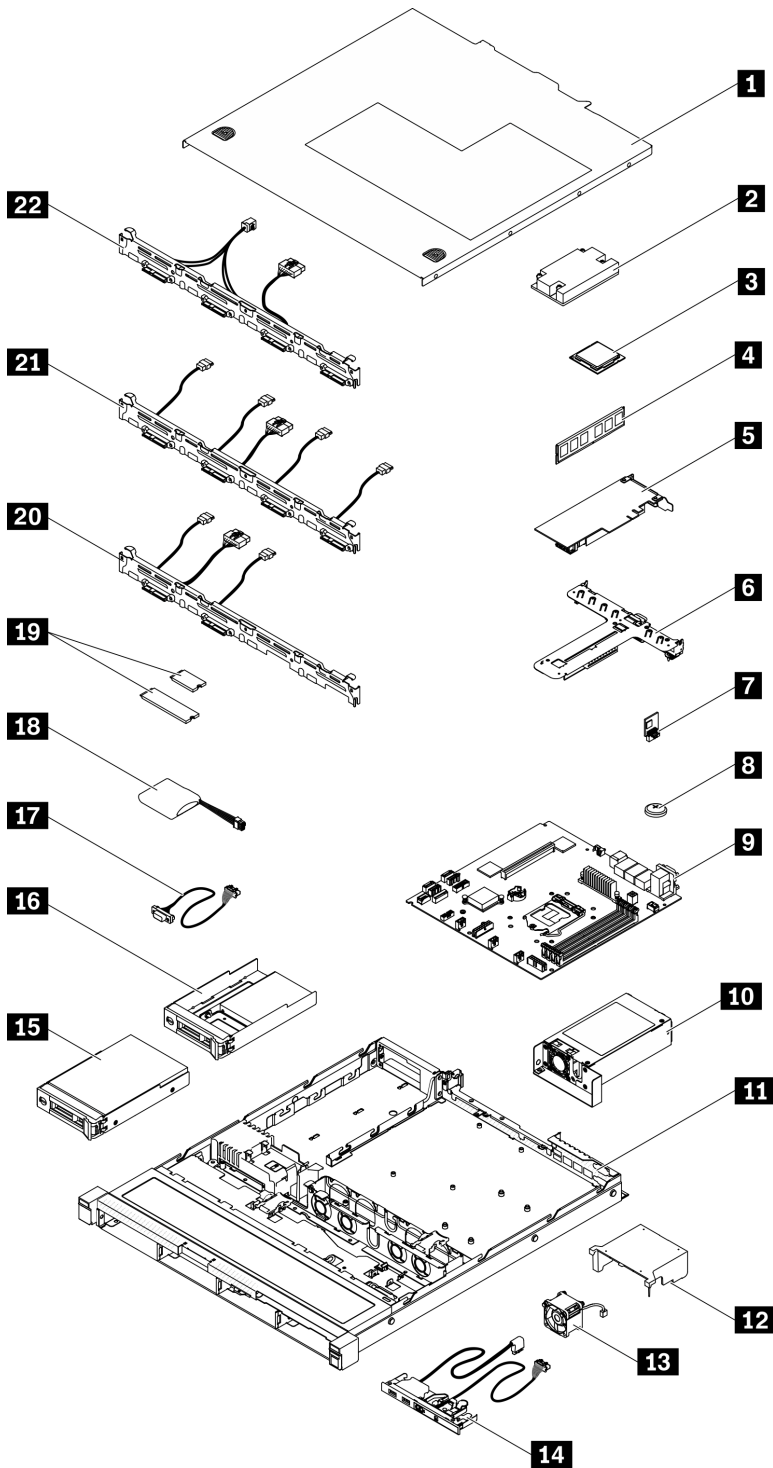
Figure 22. Server components

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

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request with no service agreement, you will be charged for the installation.

- **Tier 2 customer replaceable unit (CRU):** You may install a Tier 2 CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service that is designated for your server.

- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

- **Consumable and Structural parts:** Purchase and replacement of consumable and structural parts (components, such as a cover or bezel) is your responsibility. If Lenovo acquires or installs a structural component at your request, you will be charged for the service.

Table 15. Parts list

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.					
1	Top cover				√
2	Heat sink			√	
3	Processor			√	
4	DIMM	√			
5	PCIe adapter	√			
6	PCIe riser assembly	√			
7	TPM card	√			
8	CMOS battery (CR2032)				√
9	System board			√	
10	Power supply unit				√
11	Chassis				√
12	Air baffle				√
13	Fan	√			
14	Front operator panel	√			
15	3.5-inch simple-swap drive	√			
16	2.5-inch simple-swap drive with 3.5-inch drive tray	√			
17	VGA cable	√			
18	Flash power module	√			
19	M.2 drive (42 mm and 80 mm)	√			
20	Two 3.5-inch drive backplate	√			
21	Four 3.5-inch drive backplate (connects to onboard connectors)	√			
22	Four 3.5-inch drive backplate (connects to RAID adapter)	√			

Chapter 3. Hardware replacement procedures

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

For more information about ordering parts:

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

Note: If you replace a part, such as an adapter, that contains firmware, you might also need to update the firmware for that part. For more information about updating firmware, see "Firmware updates" on page 6.

Installation Guidelines

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

Before installing optional devices, read the following notices carefully:

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

- Read the safety information and guidelines to ensure your safety at work:
  - A complete list of safety information for all products is available at:

    https://pubs.lenovo.com/safety_documentation/
  - The following guidelines are available as well: "Handling static-sensitive devices" on page 33
- Make sure the components you are installing are supported by the server. For a list of supported optional components for the server, see https://serverproven.lenovo.com/.
- When you install a new server, download and apply the latest firmware. This will help ensure that any known issues are addressed, and that your server is ready to work with optimal performance. Go to ThinkSystem SR150 Drivers and Software to download firmware updates for your server.

  Important: Some cluster solutions require specific code levels or coordinated code updates. If the component is part of a cluster solution, verify the latest Best Recipe code level menu for cluster supported firmware and driver before you update the code.
- It is good practice to make sure that the server is working correctly before you install an optional component.
- Keep the working area clean, and place removed components on a flat and smooth surface that does not shake or tilt.
- Do not attempt to lift an object that might be too heavy for you. If you have to lift a heavy object, read the following precautions carefully:
  - Make sure that you can stand steadily without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.

- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.

- Back up all important data before you make changes related to the disk drives.

- Have a small flat-blade screwdriver, a small Phillips screwdriver, and a T8 torx screwdriver available.

- To view the error LEDs on the system board and internal components, leave the power on.

- You must turn off the server before you perform any steps that involve removing or installing adapter cables, and you must disconnect the power source from the server before you perform any steps that involve removing or installing a riser card.

- Blue on a component indicates touch points, where you can grip to remove a component from or install it in the server, open or close a latch, and so on.

- Terra-cotta on a component or a terra-cotta label on or near a component indicates that the component can be hot-swapped if the server and operating system support hot-swap capability, which means that you can remove or install the component while the server is still running. (Terra-cotta can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.

- The Red strip on the drives, adjacent to the release latch, indicates that the drive can be hot-swapped if the server and operating system support hot-swap capability. This means that you can remove or install the drive while the server is still running.

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

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

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 two minutes with the server cover removed, for it might damage server components.

- Cabling instructions that come with optional components must be followed.

- A failed fan must be replaced within 48 hours since malfunction.

- Every air baffle that comes with the server must be installed when the server starts (some servers might come with more than one air baffle). Operating the server with a missing air baffle might damage the processor.

- All processor sockets must contain either a socket cover or a processor with heat sink.

- When more than one processor is installed, fan population rules for each server must be strictly followed.

Working inside the server with the power on

You might need to keep the power on with the top cover removed to look at system information on the display panel. Review these guidelines before doing so.

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

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

Handling static-sensitive devices

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.

Adapter replacement

Use the following information to remove and install an adapter.

Remove an adapter

Use this information to remove an adapter.

Before you remove an adapter, complete the following steps:

Attention: Replacing the adapter might impact your RAID configurations. Back up your data before the replacement to avoid any data loss due to a RAID configuration change.

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.
2. Turn off the server. Disconnect the power cords and all external cables (see "Power off the server" on page 10).

3. If server is installed in a rack, remove the server from the rack.

4. Remove the top cover (see "Remove the top cover" on page 86).

5. Remove the PCIe riser assembly (see "Remove the PCIe riser assembly" on page 62).

6. Record the cable connections on the adapter; then, disconnect all cables from the adapter.

To remove an adapter, complete the following steps:
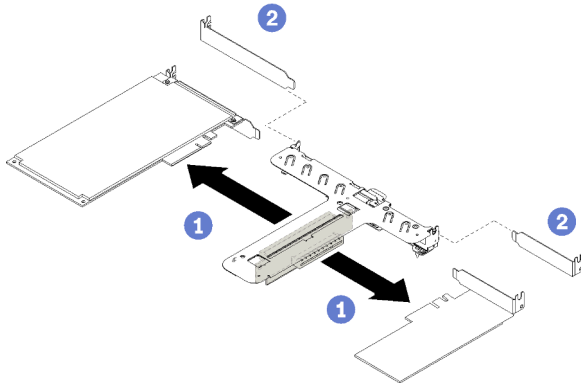
Figure 23. Adapter removal

Step 1. Disengage the adapter by pulling it straight out of the riser cage.

> **Note:** Remove one adapter at a time, do not pull out two adapters at the same time.

Step 2. Install the fillers (if you had them) by sliding them into the slot toward the center of the PCIe riser assembly.

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 adapter

Use this information to install an adapter.

Before you install an adapter, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

2. 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:
- ThinkSystem SR150 does not support ARI/SR-IOV
- QLogic QL41262 PCIe 25Gb 2-Port SFP28 Ethernet Adapter does not support shared storage V3700v2 and V5030 configurations.

To install an adapter, complete the following steps:
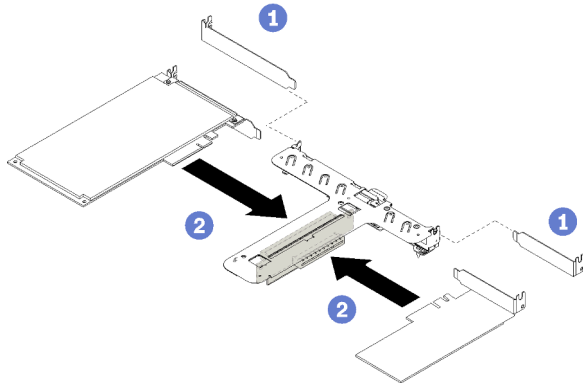
Figure 24. Adapter installation

Step 1.   Remove the fillers on the rear side of the riser cage.

Step 2.   Align and insert an adapter into the slot on the riser card. Make sure you install the adapter into the right slot.

> **Notes:**
>
> - For the detail connectors on the PCIe riser card, see "PCIe riser assembly" on page 20.
> - Install one adapter at a time, do not insert two adapters to the riser card at the same time.

After you install an adapter, complete the following steps:

1. Reconnect the cables.

2. Reinstall the PCIe riser assembly (see "Install the PCIe riser assembly" on page 63).

3. Install the top cover onto the server (see "Install the top cover" on page 87).

4. Install the server into the rack if necessary.

5. Reconnect power cords and all external cables.

6. If necessary, configure the RAID array using the Setup utility configuration.

Air baffle replacement

Use the following information to remove and install the air baffle.

Remove the air baffle

Use this information to remove the air baffle.

Before you remove the air baffle, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

2. Turn off the server. Disconnect the power cords and all external cables (see "Power off the server" on page 10).

3. If server is installed in a rack, remove the server from the rack.

4. Remove the top cover (see "Remove the top cover" on page 86).

To remove the air baffle, complete the following steps:
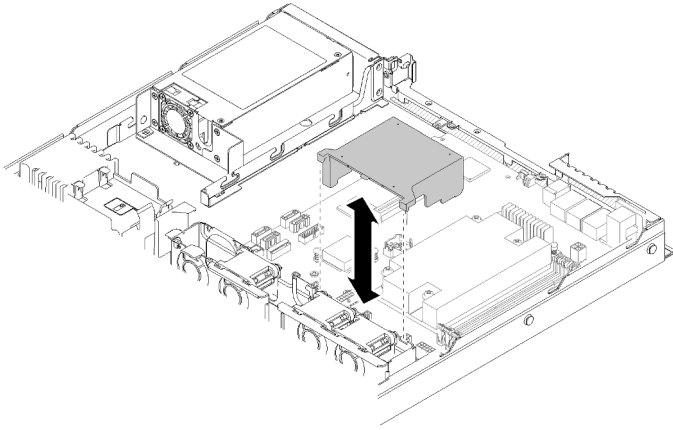
Figure 25. Air baffle removal

Step 1. Lift the air baffle up and set it aside.

> **Attention:** For proper cooling and airflow, reinstall the air baffle before you turn on the server. Operating the server with the air baffle removed might damage server components.

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 air baffle

Use this information to install the air baffle.

Before you install the air baffle, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

To install the air baffle, complete the following steps:
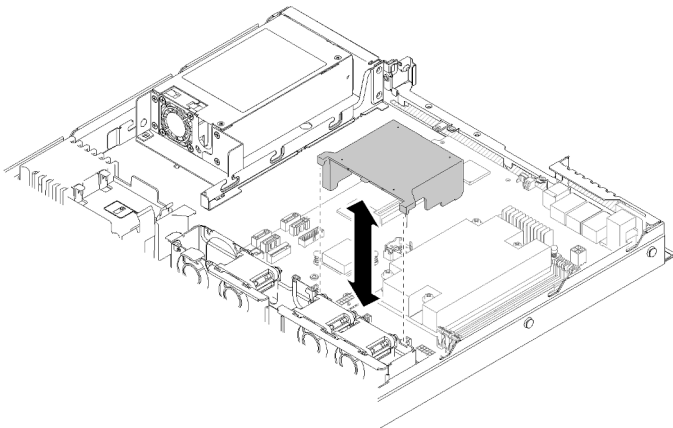
Figure 26. Air baffle installation

Step 1. Align the air baffle hooks with the slots on the top of the fan cage; then, hook the air baffle onto the slots.

After you install the air baffle, complete the following steps:

1. Install the top cover onto the server (see "Install the top cover" on page 87 for instructions).

2. Install the server into the rack if necessary.

3. Reconnect power cords and all external cables.

CMOS battery replacement

Use the following information to remove and install the CMOS battery.

Remove the CMOS battery

Use this information to remove the CMOS battery.

To avoid possible danger, read and follow the following safety information.

<u>S002</u>

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.

<u>S004</u>

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

Do not:

• **Throw or immerse into water**

• **Heat to more than 100°C (212°F)**

• **Repair or disassemble**

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

Before you remove the CMOS battery, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

2. If server is installed in a rack, remove the server from the rack.

3. Remove the top cover (see "Remove the top cover" on page 86).

4. Locate the CMOS battery on the system board (see "System-board connectors" on page 16).

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 solution and reset the system date and time.

To remove the CMOS battery, complete the following steps:
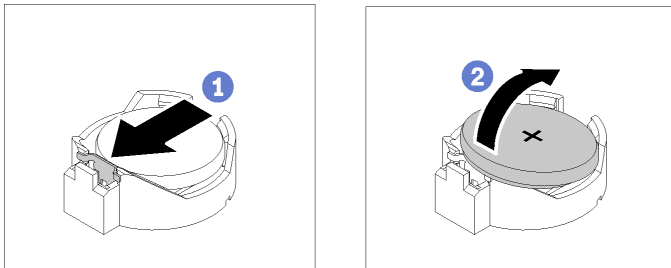
Figure 27. CMOS battery removal

Step 1.   Press the battery clip in the direction as shown.

Step 2.   Carefully tilt and lift CMOS battery out of the socket.

Attention: Do not use excessive force to tilt or push the battery, it might damage the socket.

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 CMOS battery (CR2032)

Use this information to install the CMOS battery (CR2032).

To avoid possible danger, read and follow the following safety information.

S002

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

S004

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

Do not:

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

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

Before you install the CMOS battery, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.
2. Locate the CMOS battery on the system board (see "System-board connectors" on page 16).
3. 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 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 (CR2032).
- After you replace the CMOS battery, you must reconfigure the server and reset the system date and time.
- Dispose of the battery as required by local ordinances or regulations.

Attention:

- Do not make CMOS battery in contact with a metal surface when replacing it. The contact with metal surface, such as server side, can cause damage to the battery.
- Make sure that all server power cords are disconnected from their power sources before performing this procedure.

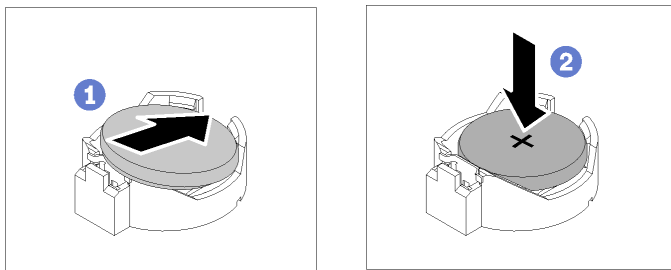To install the CMOS battery, complete the following steps:

Figure 28. CMOS battery installation

Step 1. Pivot the CMOS battery to insert it into the socket, with positive (+) side faces up.

Step 2.   Press the battery straight down until it clicks in place.

After you install the CMOS battery, complete the following steps:

1. Install the top cover onto the server (see "Install the top cover" on page 87).

2. Install the server into the rack if necessary.

3. Reconnect power cords and all external cables.

DIMM replacement

Use the following information to remove and install a DIMM.

Remove a DIMM

Use this information to remove a DIMM.

Attention: Memory modules are sensitive to static discharge and require special handling. In addition to the standard guidelines for "Handling static-sensitive devices" on page 33:

- Always wear an electrostatic-discharge strap when removing or installing memory modules. Electrostatic-discharge gloves can also be used.
- Never hold two or more memory modules together so that they touch. Do not stack memory modules directly on top of each other during storage.
- Never touch the gold memory module connector contacts or allow these contacts to touch the outside of the memory-module connector housing.
- Handle memory modules with care: never bend, twist, or drop a memory module.

Before you remove a DIMM, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

2. Turn off the server. Disconnect the power cords and all external cables (see "Power off the server" on page 10).

3. If server is installed in a rack, remove the server from the rack.

4. Remove the top cover (see "Remove the top cover" on page 86).

5. Locate the DIMM connectors. Determine which DIMM to be removed from the server.
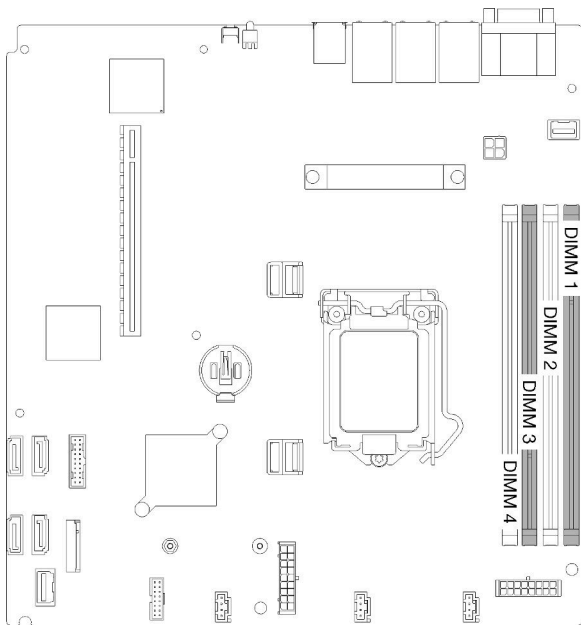
Figure 29. DIMM connectors

6. When removing DIMM 4, remove the air baffle first for more space for the DIMM removal (see "Remove the air baffle" on page 35).

To remove a DIMM, complete the following steps:
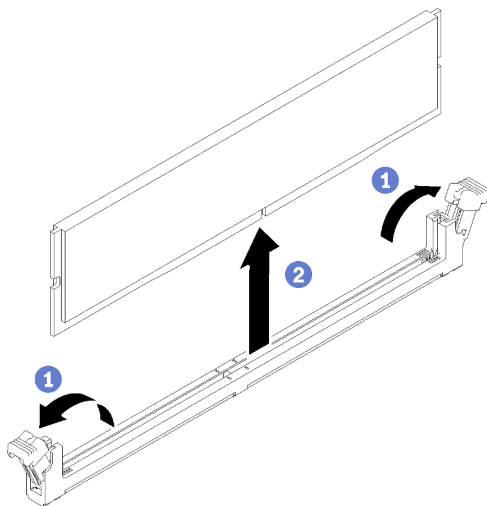
Figure 30. DIMM removal

Note: To avoid breaking the retaining clips or damaging the DIMM connectors, handle the clips gently.

Step 1.   Carefully open the retaining clips on each end of the DIMM connector.

Step 2.   Make sure that both retaining clips are in the fully-open position; then, pull the DIMM out of the connector.

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 DIMM

Use this information to install a DIMM.

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

Before you install a DIMM, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.
2. Remove the air baffle if necessary (see "Remove the air baffle" on page 35).
3. 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 system-board components, including DIMM connectors.
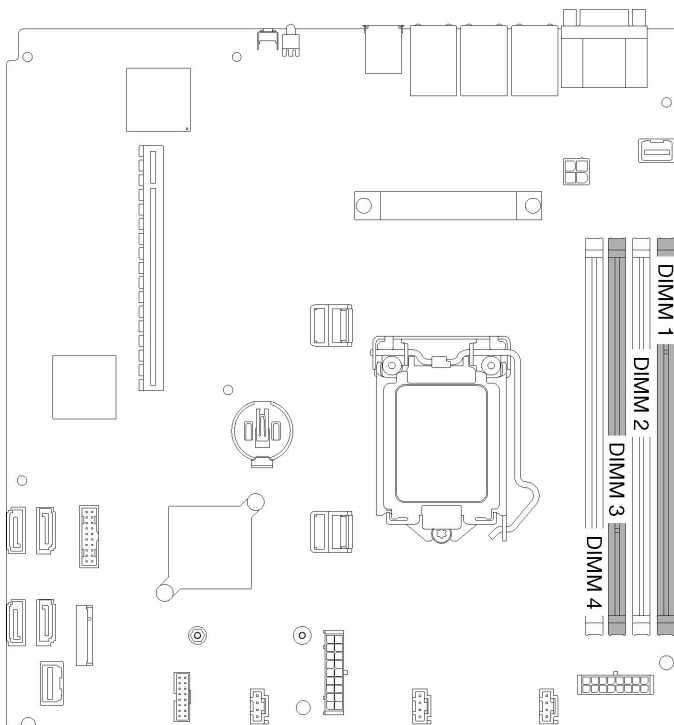
Figure 31. DIMM connectors

To install a DIMM, complete the following steps:

Attention: Memory modules are sensitive to static discharge and require special handling. In addition to the standard guidelines for "Handling static-sensitive devices" on page 33:

- Always wear an electrostatic-discharge strap when removing or installing memory modules. Electrostatic-discharge gloves can also be used.
- Never hold two or more memory modules together so that they touch. Do not stack memory modules directly on top of each other during storage.
- Never touch the gold memory module connector contacts or allow these contacts to touch the outside of the memory-module connector housing.
- Handle memory modules with care: never bend, twist, or drop a memory module.

Figure 32. DIMM installation

Step 1. Make sure the retaining clips are in the fully-open position; then, align the keys on the DIMM with the connector.

Step 2. Firmly press both ends of the DIMM straight down into the connector until the retaining clips snap into the locked position.

Step 3. If you are installing additional DIMMs, do so now.
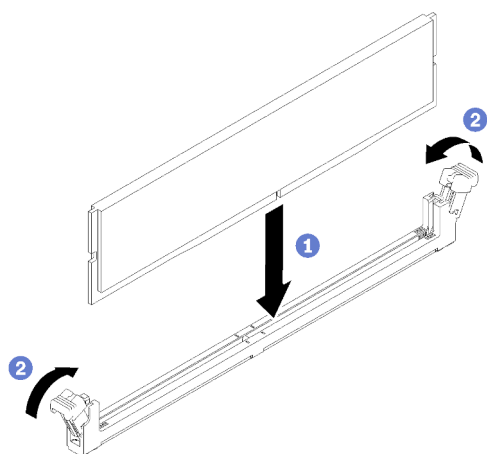
After you install the DIMM, complete the following steps:

1. Reinstall the air baffle if it is removed (see "Install the air baffle" on page 36).

2. Install the top cover onto the server (see "Install the top cover" on page 87).

3. Install the server into the rack if necessary.

4. Reconnect power cords and all external cables.

Drive replacement

Use the following information to remove and install a simple-swap drive.

Remove a simple-swap disk drive

Use this information to remove a simple-swap disk drive.

Before you remove a simple-swap disk drive, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

2. Turn off the server. Disconnect the power cords and all external cables (see "Power off the server" on page 10).

Attention:

- For proper system cooling, do not operate the server for more than 2 minutes without either a disk drive or a filler panel installed in each bay.

- Before you make changes to disk drives and drive related components, back up all important data that is stored on drives.

- Before you remove any component of a RAID array, back up all RAID configuration information.

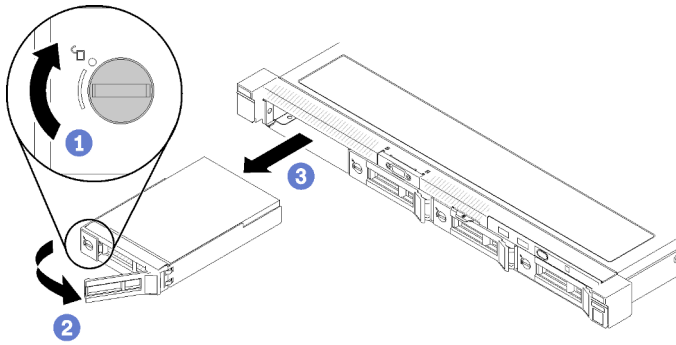To remove a simple-swap disk drive, complete the following steps:

Figure 33. Simple-swap disk drive removal

Step 1.   Use a flat-blade screwdriver to rotate the drive lock clockwise.

Step 2.   Make sure the drive handle is released after unlocking.

Step 3.   Grab the handle to pull the drive out of the drive bay.

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 simple-swap disk drive

Use this information to install a simple-swap disk drive.

Before you install a simple-swap disk drive:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.
2. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
3. Identify the drive bay in which you plan to install the simple-swap drive.

Notes:
- When SATA drives are installed and connected to SATA connectors 4-7 on system board (without a RAID adapter installed), the drive number will be reported by RAID utility as drives 4, 5, 6, and 7 (different from drive bay number)
- When SAS or SATA drives are installed and connected to RAID adapter, the drive number will be 0, 1, 2, and 3 (same as drive bay number)
- Drive bay 2 and 3 are not available when the two-drive backplate is installed.

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

Note: When the fourth SATA drive is installed, the M.2 drive is not supported.
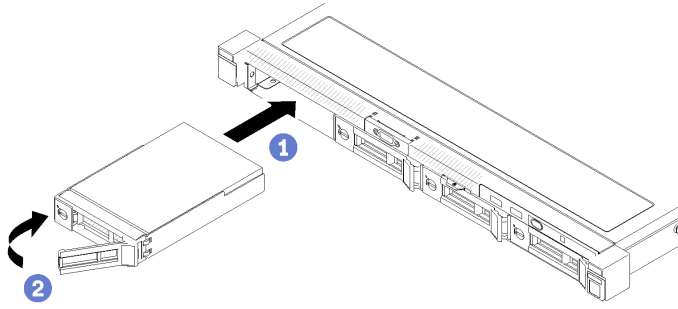
Figure 34. Simple-swap disk drive installation

Step 1.   Slide the drive into the drive bay. Make sure the drive handle is in the open position.

Step 2.   Lock the drive into place by rotating the drive handle inward until it clicks.

After you install all simple-swap disk drives, complete the following steps:

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. Reconnect power cords and all external cables.

Drive backplate replacement

Use the following information to remove and install the simple-swap drive backplate.

Remove the simple-swap drive backplate

Use this information to remove the simple-swap drive backplate.

Before you remove the simple-swap drive backplane, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

2. Turn off the server. Disconnect the power cords and all external cables (see "Power off the server" on page 10).

3. If server is installed in a rack, remove the server from the rack.

4. Remove the top cover (see "Remove the top cover" on page 86).

5. Disconnect the cables from the system board and the RAID card (if installed).

6. Pull all the drives and fillers slightly out to disengage them from the backplate.

To remove the simple-swap drive backplate, complete the following steps:

Notes: There are three types of backplate supported by the server, all are removed and installed in a similar method.

- Two 3.5-inch drive backplate
- Four 3.5-inch drive backplate (connects to onboard connectors)
- Four 3.5-inch drive backplate (connects to RAID adapter)
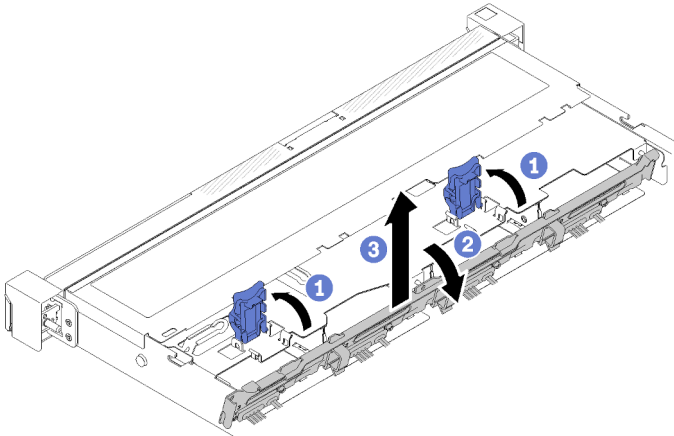
Figure 35. Simple-swap drive backplate removal

Step 1.   Open the retaining clips by rotating them up.

Step 2.   Rotate the backplate down toward the center of the server.

Step 3.   Lift the backplate out of the server.

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 simple-swap drive backplate

Use this information to install the drive backplate.

Before you install a simple-swap drive backplate, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

To install the simple-swap drive backplate, complete the following steps:

Notes: There are three types of backplate supported by the server, all are removed and installed in a similar method.

- Two 3.5-inch drive backplate
- Four 3.5-inch drive backplate (connects to onboard connectors)
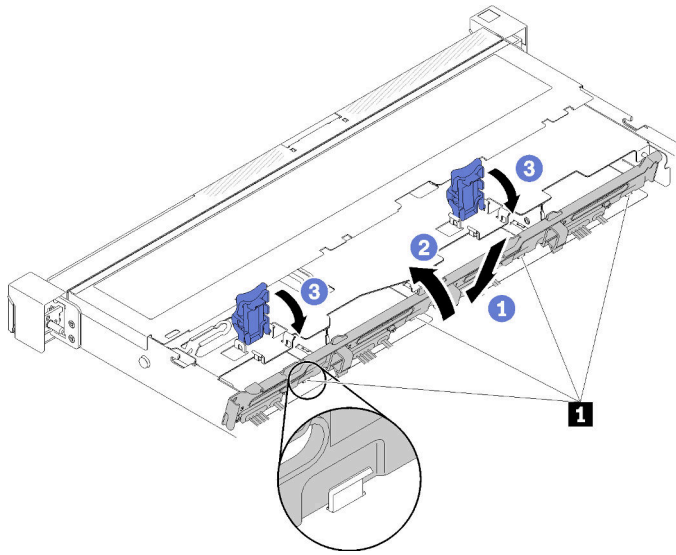- Four 3.5-inch drive backplate (connects to RAID adapter)

Figure 36. Simple-swap drive backplate installation

Table 16. Pin in the chassis

1 Pin

Step 1.   Insert the backplate into the chassis with an angle as shown. Make sure the pins are against the backplate on the backside.

Step 2.   Rotate the backplate up toward the front of the server.

Step 3.   Close the retaining clips to secure the backplate.

Step 4.   Connect the backplate cables to the system board and the RAID adapter (if installed). See "Backplate cables" on page 25.

After you install the simple-swap drive backplate, complete the following steps:

1. Install the top cover onto the server (see "Install the top cover" on page 87).

2. Install the server into the rack if necessary.

3. Reconnect power cords and all external cables.

Fan replacement

Use the following information to remove and install the fan.

Remove a fan

Use this information to remove a fan.

To avoid possible danger, read and follow the following safety information.

S002

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

S009

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

Before you remove a fan, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.
2. Turn off the server. Disconnect the power cords and all external cables (see "Power off the server" on page 10).
3. If server is installed in a rack, remove the server from the rack.
4. Remove the top cover (see "Remove the top cover" on page 86).
5. Remove the air baffle when removing fan 1 and fan 2 (see "Remove the air baffle" on page 35).
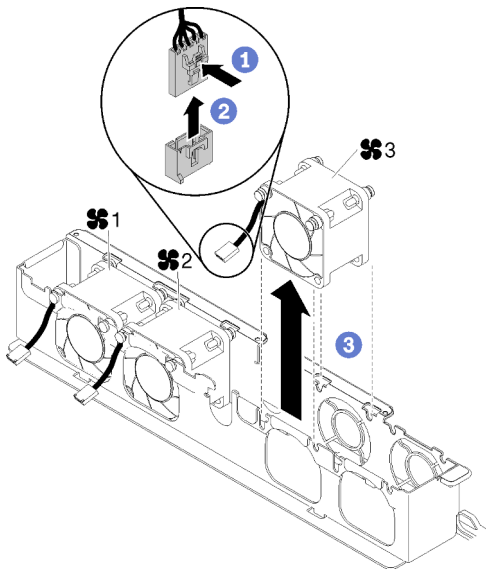
To remove a fan, complete the following steps:

Figure 37. Fan removal

Step 1.   Press and hold the fan cable latch.
Step 2.   Disconnect the cable from the connector.
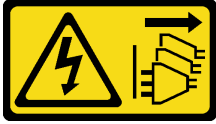Step 3.   Lift the fan out of the fan cage.

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 fan

Use this information to install a fan.

To avoid possible danger, read and follow the following safety information.

S002

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

S009

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

Before you install a fan, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.
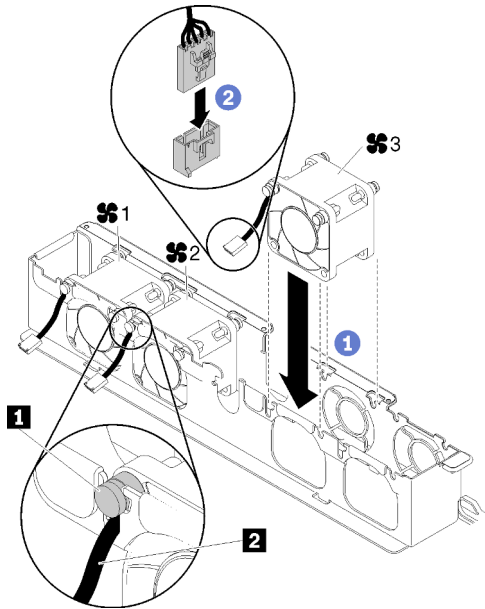
To install a fan, complete the following steps:

Figure 38. Fan installation

Table 17. Fan installation

1 Rubber mounting pin	**2** Fan cable

Step 1. Align the fan with the slot in the fan cage; then, place the fan into the slot. Make sure the fan cable goes in the cable slot, under the rubber mounting pin as shown.

Step 2. Connect the fan cable to the connector by pressing it down until it clicks.

> **Note:** Each fan has a corresponding cable connector on system board. Make sure you connect the cable to the right connector (see "System-board connectors" on page 16).

After you install the fan, complete the following steps:

1. Reinstall the air baffle if it was removed (see "Install the air baffle" on page 36).
2. Install the top cover onto the server (see "Install the top cover" on page 87).
3. Install the server into the rack if necessary.
4. Reconnect power cords and all external cables.

Flash power module replacement

Use the following information to remove and install the flash power module

Remove the flash power module

Use this information to remove the flash power module.

To avoid possible danger, read and follow the following safety information.

S002

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

S004

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

Do not:

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

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

Before you remove the flash power module, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.
2. Turn off the server. Disconnect the power cords and all external cables (see "Power off the server" on page 10).
3. If server is installed in a rack, remove the server from the rack.
4. Remove the top cover (see "Remove the top cover" on page 86).
5. Remove the RAID adapter (see "Remove an adapter" on page 33).
6. Make sure the flash power module cable is disconnected.

To remove the flash power module, complete the following steps:
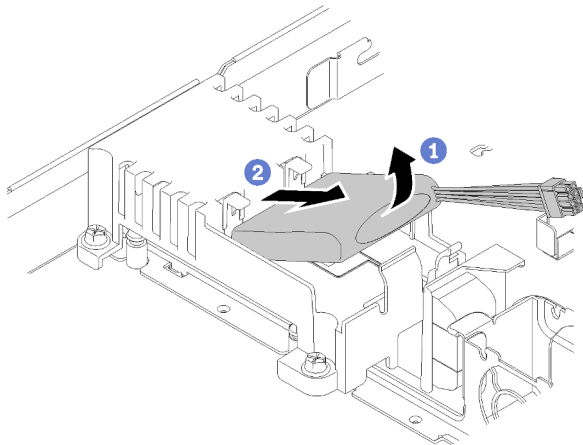
Figure 39. Flash power module removal

Step 1.   Lift the flash power module slightly.

Step 2.   Slide the flash power module out of the server.

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 flash power module

Use this information to install the flash power module.

To avoid possible danger, read and follow the following safety information.

S002

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

S004

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

Do not:

• **Throw or immerse into water**

• **Heat to more than 100°C (212°F)**

• **Repair or disassemble**

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

Before you install the flash power module, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

To install the flash power module, complete the following steps:
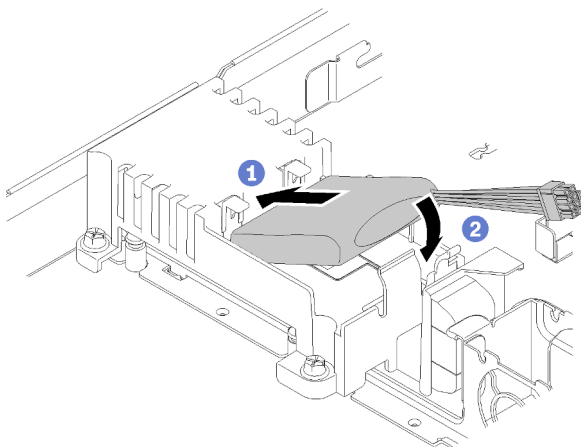

Figure 40. Flash power module installation

Step 1.   Insert the end of the flash power module into its carrier.

Step 2.   Rotate the flash power module down into the carrier until the tab clicks in place to secure it.

Step 3.   Connect the flash power module cable to the RAID adapter.

After you install the flash power module, complete the following steps:

1. Install the top cover onto the server (see).
2. Install the server into the rack if necessary.
3. Reconnect power cords and all external cables.

Front operator panel replacement

Use this procedure to remove or install the front operator panel.

Remove the front operator panel

Use this information to remove the front operator panel.

Before you remove the front operator panel, complete the following steps:

1. Read and to ensure that you work safely.
2. Turn off the server. Disconnect the power cords and all external cables (see).
3. If server is installed in a rack, remove the server from the rack.
4. Remove the top cover (see).

To remove the front operator panel, complete the following steps:

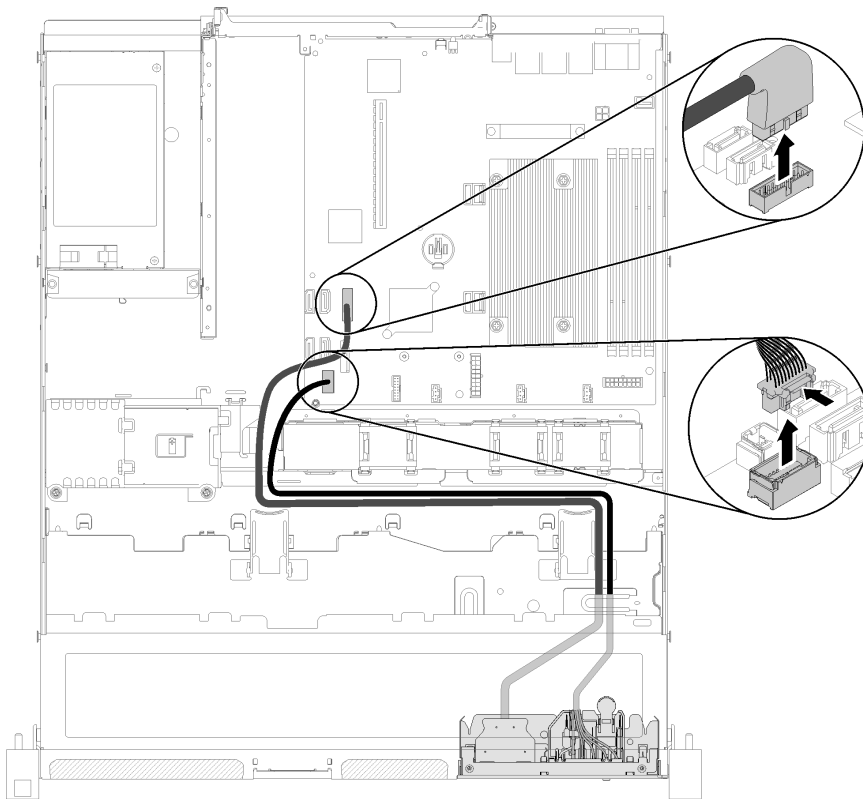Step 1. Disconnect the front operator and USB cables from the system board.

Figure 41. Front operator panel removal

Step 2. Remove the screws that secure the front operator panel.
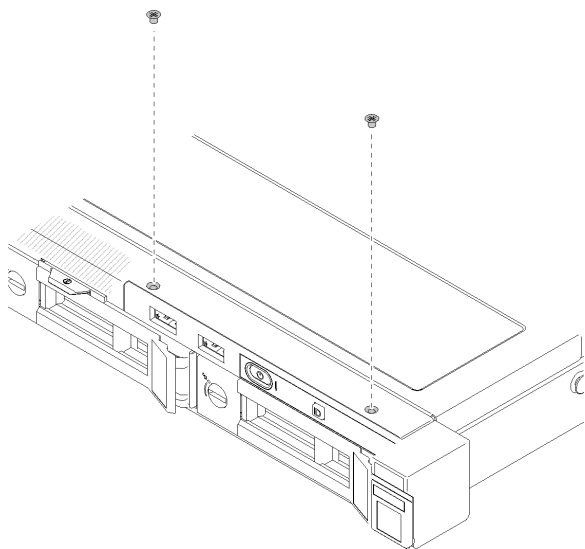
Figure 42. Front operator panel removal

Step 3. Pull out the front operator panel from the server.
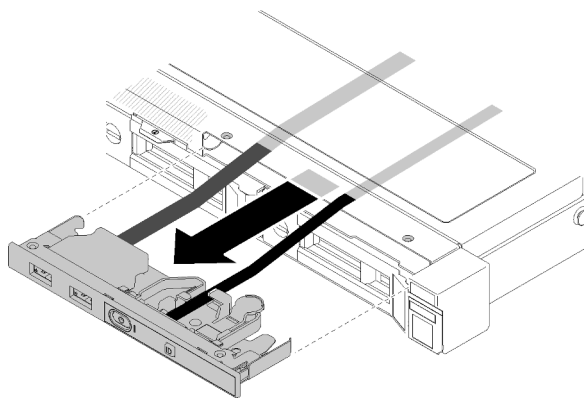
Figure 43. Front operator panel removal

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 operator panel

Use this information to install the front operator panel.

Before you install a fan, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

To install the front operator panel, complete the following steps:

Step 1. Slide the front operator panel and cables into the slot on the front server.

Figure 44. Front operator panel installation

Step 2.   Install the screws that secure the front operator panel.
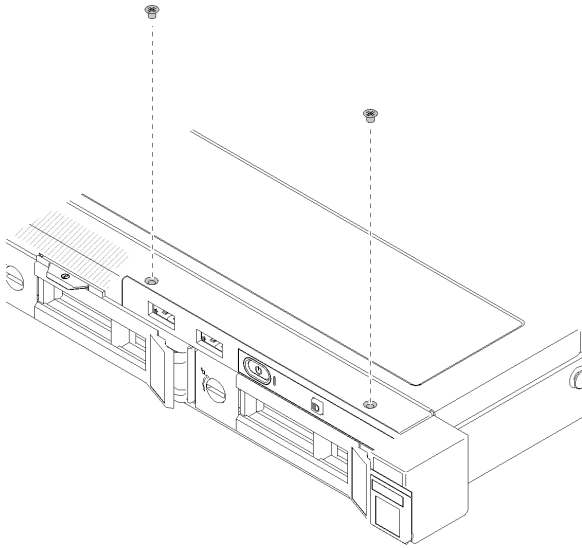
Figure 45. Front operator panel installation

Step 3.   Connect the front operator and USB cables to the system board.
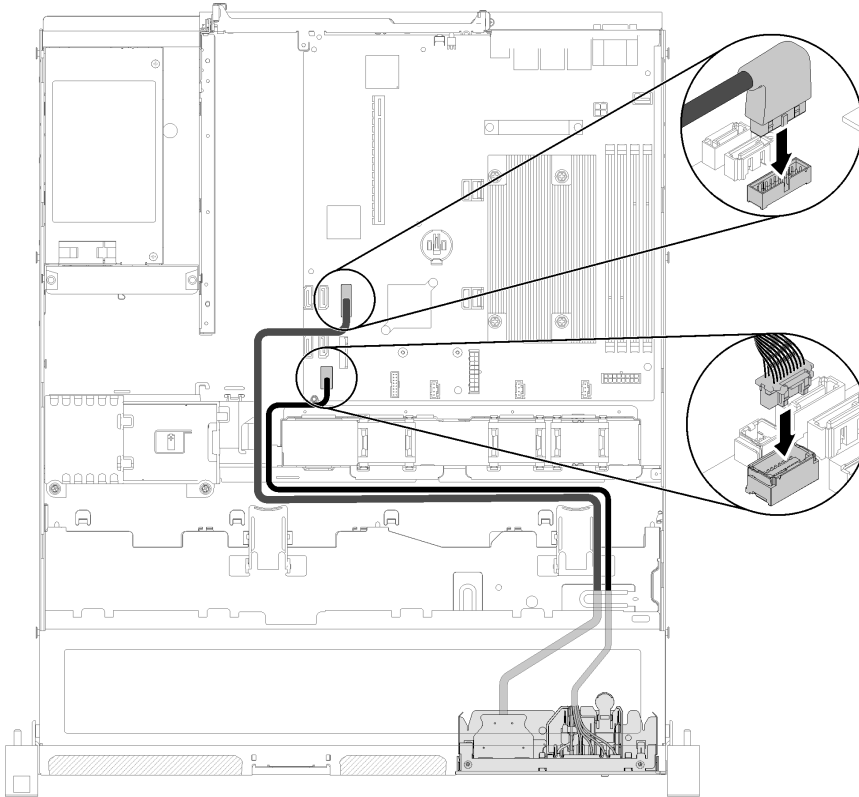
Figure 46. Front operator panel installation

After you install the front operator panel, complete the following steps:
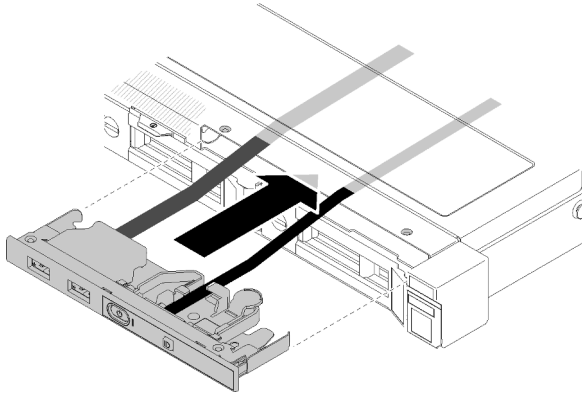
1. Install the top cover onto the server (see "Install the top cover" on page 87).
2. Install the server into the rack if necessary.
3. Reconnect power cords and all external cables.

Heat sink replacement

Use the following information to remove and install the heat sink.

Remove the heat sink

Use this information to remove the heat sink. This procedure must be executed by a trained technician.

Before you remove the heat sink, complete the following steps:
1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.
2. Turn off the server. Disconnect the power cords and all external cables (see "Power off the server" on page 10).
3. If server is installed in a rack, remove the server from the rack.
4. Remove the top cover (see "Remove the top cover" on page 86).

To remove the heat sink, complete the following steps:

Step 1.   Loosen screw 1 and 2:

a. Partially loosen screw 1.

b. Fully loosen screw 2.

c. Fully loosen screw 1.

Notes:

1. Gently remove the four screws to avoid any possible damage to the system board.

2. Always keep the four screws attached to the heat sink.

3. Do not touch the thermal grease while handling the heat sink.

Step 2. Loosen screw 3 and 4:

a. Partially loosen screw 3.

b. Fully loosen screw 4.

c. Fully loosen screw 3.
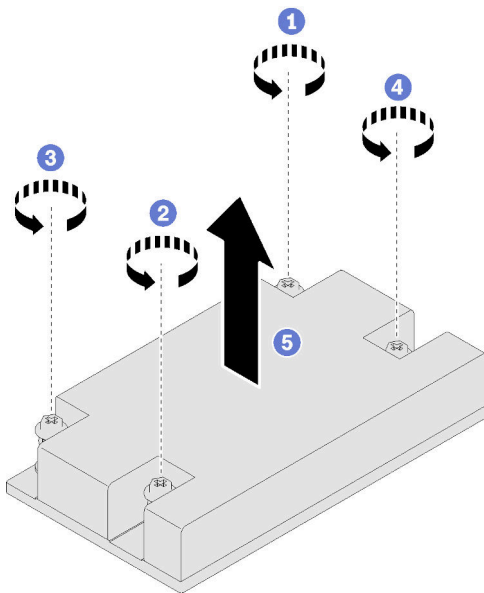
Figure 47. Heat sink removal

Step 3. Lift evenly and remove the heat sink from the server.

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 heat sink

Use this information to install the heat sink. This procedure must be executed by a trained technician.

Before you install the heat sink, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

To install the heat sink, complete the following steps:

Step 1. Align the four screws on the heat sink with the corresponding screw holes on the system board.

Step 2. Tighten screw 1 and 2:

    a.   Partially tighten screw 1.

    b.   Fully tighten screw 2.

    c.   Fully tighten screw 1.
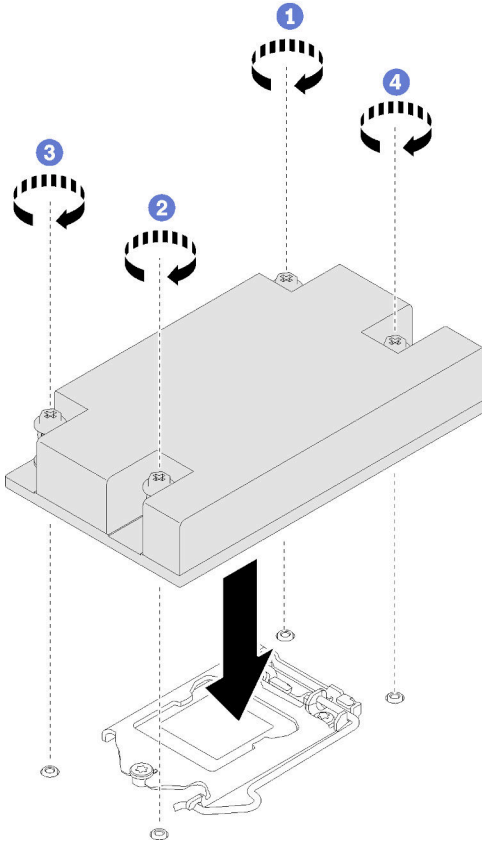
Figure 48. Heat sink installation

Step 3. Tighten screw 3 and 4:

    a.   Partially tighten screw 3.

    b.   Fully tighten screw 4.

    c.   Fully tighten screw 3.

After you install the heat sink, complete the following steps:

1. Install the top cover onto the server (see "Install the top cover" on page 87).

2. Install the server into the rack if necessary.

3. Reconnect power cords and all external cables.

M.2 drive replacement

Use the following information to remove and install the M.2 drive.

Remove the M.2 drive

Use this information to remove the M.2 drive.

Before you remove the M.2 drive, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.
2. Turn off the server. Disconnect the power cords and all external cables (see "Power off the server" on page 10).
3. If server is installed in a rack, remove the server from the rack.
4. Remove the top cover (see "Remove the top cover" on page 86).
5. Require a #1 Phillips and Hex 4.5 mm screwdriver.

Note: There are two dimensions of M.2 drive supported by the server, each with different length. Both are removed and installed in a similar method.

Figure 49. M.2 drive location

Table 18. M.2 drive location

1 Screw for 80 mm M.2 drive (requires a #1 Phillips and Hex 4.5 mm screwdriver)	**3** M.2 connector
2 Screw for 42 mm M.2 drive (requires a #1 Phillips and Hex 4.5 mm screwdriver)	

To remove the M.2 drive, complete the following steps:
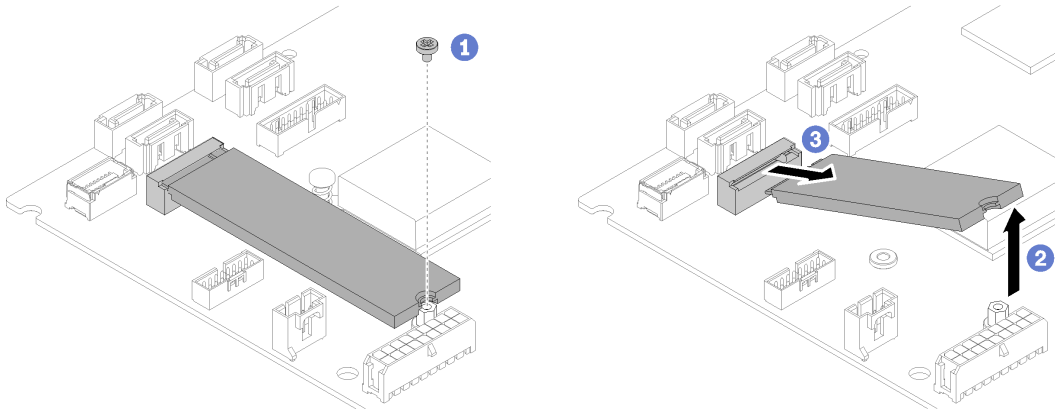
Figure 50. M.2 drive removal

Step 1.   Remove the screw that secures the M.2 drive.

Step 2.   Lift the other side of the M.2 drive as shown.

Step 3.   Remove the M.2 drive from the server.

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 M.2 drive

Use this information to install the M.2 drive.

Before you install the M.2 drive, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

2. Require a #1 Phillips and Hex 4.5 mm screwdriver.

Note: There are two dimensions of M.2 drive supported by the server, each with different length. Both are removed and installed in a similar method.
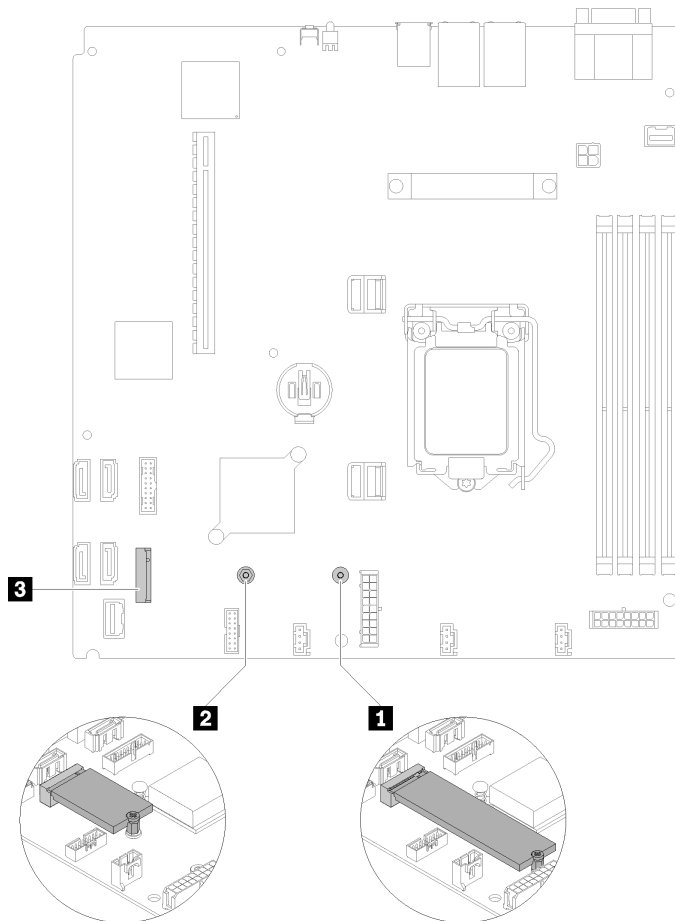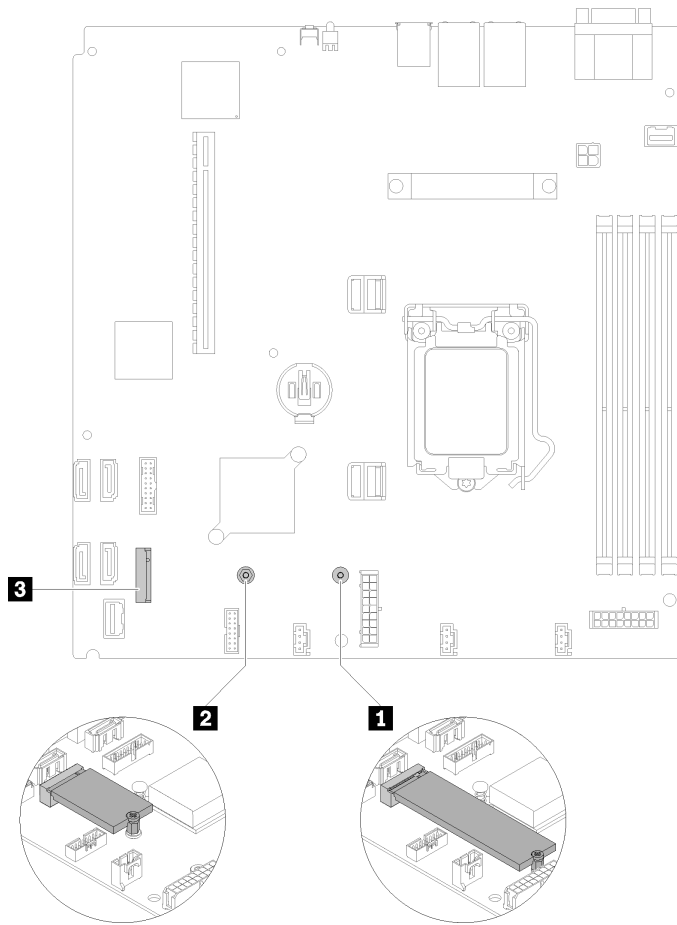
Figure 51. M.2 drive location

Table 19. M.2 drive location

1 Screw for 80 mm M.2 drive (requires a #1 Phillips and Hex 4.5 mm screwdriver)	**3** M.2 connector
2 Screw for 42 mm M.2 drive (requires a #1 Phillips and Hex 4.5 mm screwdriver)	

Note: When you install the 80 mm or the 42 mm M.2 drive, you need to change the hex screw location accordingly as the following illustration.
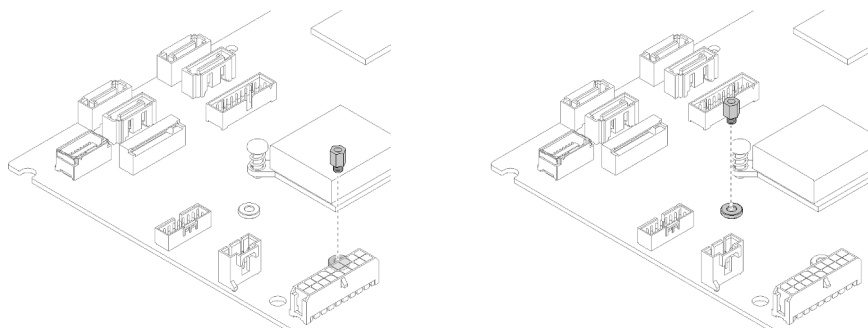
Figure 52. Hex screw location for 80 mm/42 mm M.2 drive

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

Note: When the fourth SATA drive is installed, the M.2 drive is not supported.
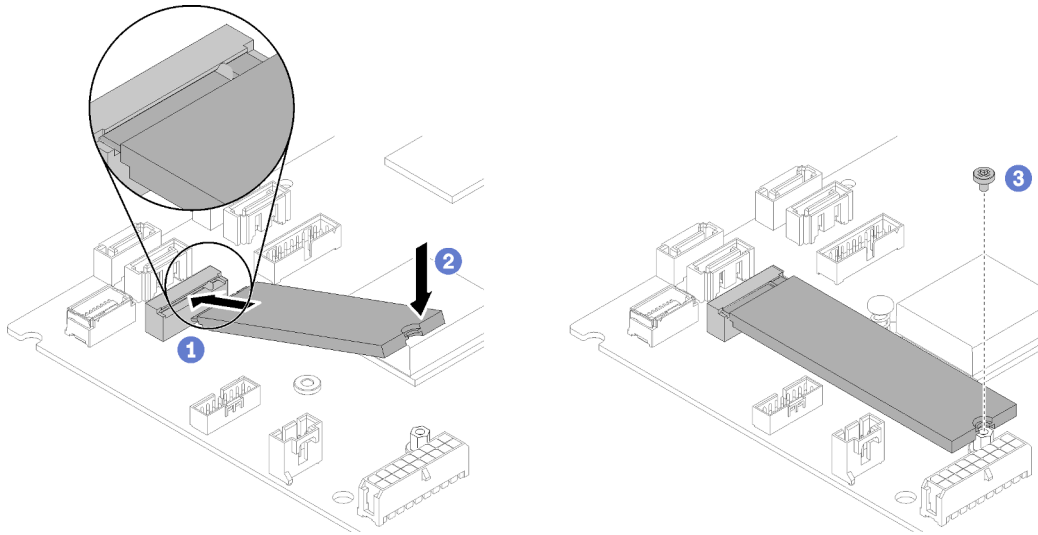
Figure 53. M.2 drive installation

Step 1. Insert the M.2 drive at an angle to the connector as shown.

Step 2. Lower down the other side of the M.2 drive to system board.

Step 3. Fasten the screw to secure the M.2 drive.

After you install the M.2 drive, complete the following steps:

1. Install the top cover onto the server (see "Install the top cover" on page 87).

2. Install the server into the rack if necessary.

3. Reconnect power cords and all external cables.

PCIe riser assembly replacement

Use this procedure to remove or install the PCIe riser assembly.

Remove the PCIe riser assembly

Use this information to remove the PCIe riser assembly.

Before you remove the PCIe riser assembly, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

2. Turn off the server. Disconnect the power cords and all external cables (see "Power off the server" on page 10).

3. If server is installed in a rack, remove the server from the rack.

4. Remove the top cover (see "Remove the top cover" on page 86).

To remove the PCIe riser assembly, complete the following steps:

Step 1. Grasp the PCIe riser assembly by its edges and carefully lift it out of the server.

Note: Carefully lift the PCIe riser assembly straight up. Avoid tilting the PCIe riser assembly at a large angle, tilting might cause damage to the connector.
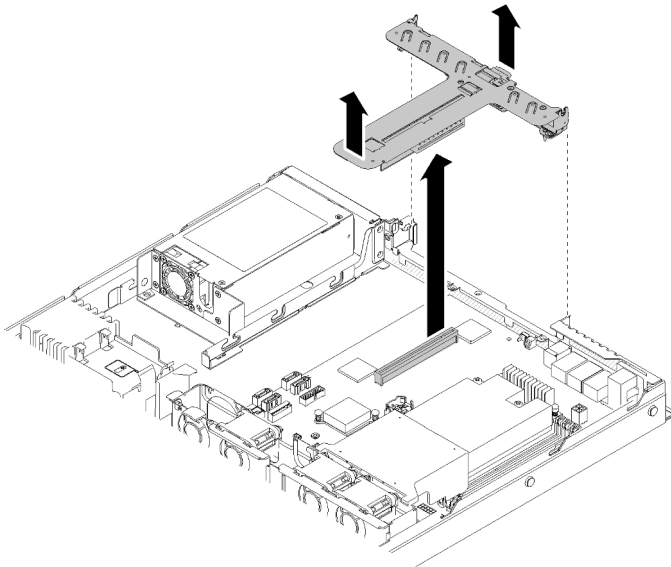
Figure 54. PCIe riser assembly removal

Step 2. Remove the two screws and carefully pull the PCIe riser card out of the riser cage.
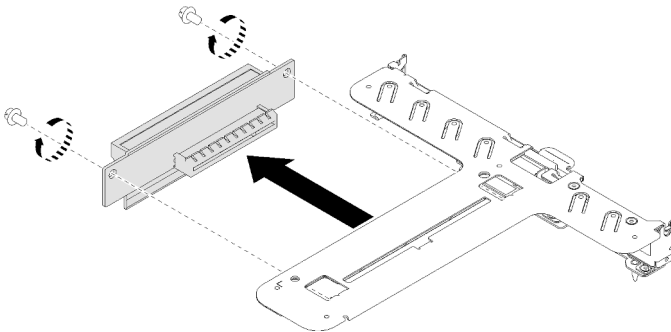
Figure 55. PCIe riser assembly removal

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 riser assembly

Use this information to install the PCIe riser assembly.

Before you install the PCIe riser assembly, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.
2. Install adapters (see "Install an adapter" on page 34).

To install the PCIe riser assembly, complete the following steps:

Step 1. Align the two screw slots on the PCIe riser card with the riser cage. Make sure two screw slot are aligned at the same time; then, fasten the screws to secure the riser card to the riser cage.
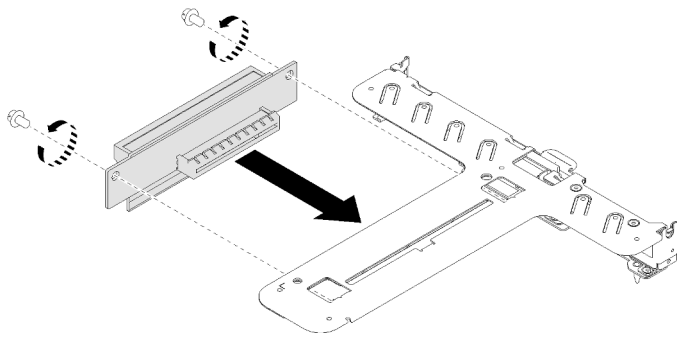
Figure 56. PCIe riser assembly installation

Step 2. Attach the label to the front side of the PCIe riser assembly.
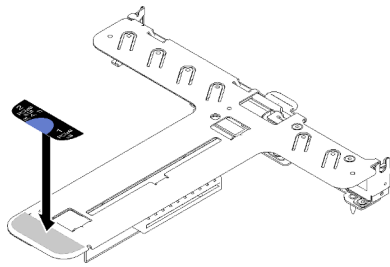
Figure 57. PCIe riser assembly installation

Step 3. Align the two tabs on PCIe riser assembly with the slots on the rear chassis; then, insert the PCIe riser assembly into the connector on the system board. Carefully press the riser card straight down into the slot until it is fully seated.
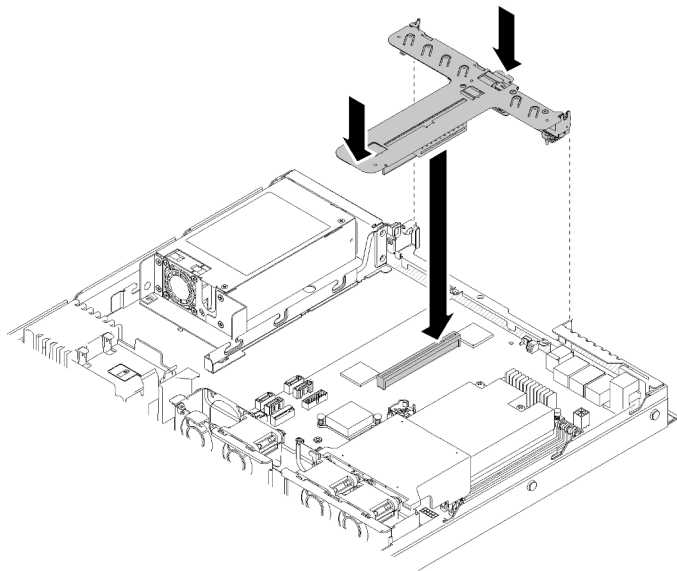
Figure 58. PCIe riser assembly installation

After you install the PCIe riser assembly, complete the following steps:

1. Install the top cover onto the server (see "Install the top cover" on page 87).

2. Install the server into the rack if necessary.

3. Reconnect power cords and all external cables.

Power supply unit replacement

Use this procedure to install or remove the fixed power supply unit.

Remove the fixed power supply unit

Use this information to remove the fixed power supply unit.

To avoid possible danger, read and follow the following safety information.

S001

DANGER

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

- **Connect all power cords to a properly wired and grounded electrical outlet/source.**

- **Connect any equipment that will be attached to this product to properly wired outlets/sources.**

- **When possible, use one hand only to connect or disconnect signal cables.**

- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**

- **The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**

S002

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

S035

CAUTION:

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

Before you remove the fixed power supply unit, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.
2. Turn off the server. Disconnect the power cords and all external cables (see "Power off the server" on page 10).
3. If server is installed in a rack, remove the server from the rack.
4. Remove the top cover (see "Remove the top cover" on page 86).
5. Disconnect internal power cable of power supply unit from system board.

To remove the fixed power supply unit, complete the following steps:
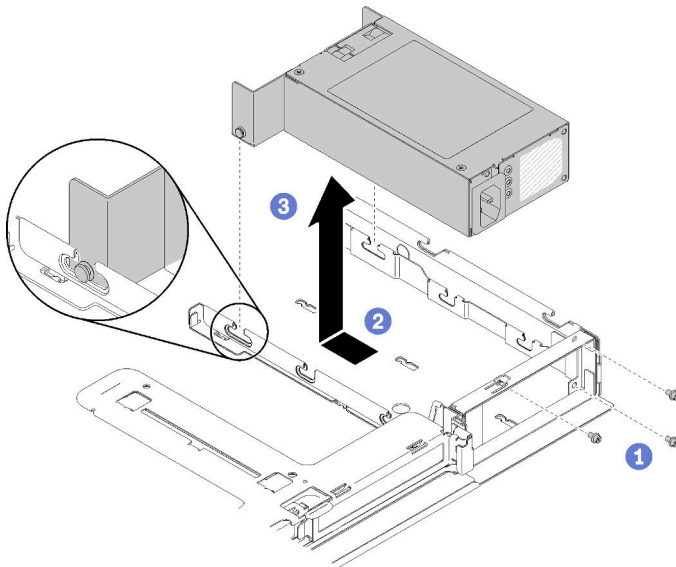
Figure 59. Power supply unit removal

Step 1. Remove the screws on the rear side of the server.

Step 2. Slide the power supply unit forward until the pins align with the opening of the slots.

Step 3. Lift the power supply unit out of the server.

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 fixed power supply unit

Use this information to install the fixed power supply unit.

To avoid possible danger, read and follow the following safety information.

S001

$\triangle$ **DANGER**

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

- **Connect all power cords to a properly wired and grounded electrical outlet/source.**

- **Connect any equipment that will be attached to this product to properly wired outlets/sources.**

- **When possible, use one hand only to connect or disconnect signal cables.**

- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**

- **The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**

S035

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

Before you install the fixed power supply unit, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

Note: If the server is installed with Delta fixed 300W PSU: when the AC power is dropout without the proper server power off process, wait for at least 10 seconds to re-plug the AC power to the server.

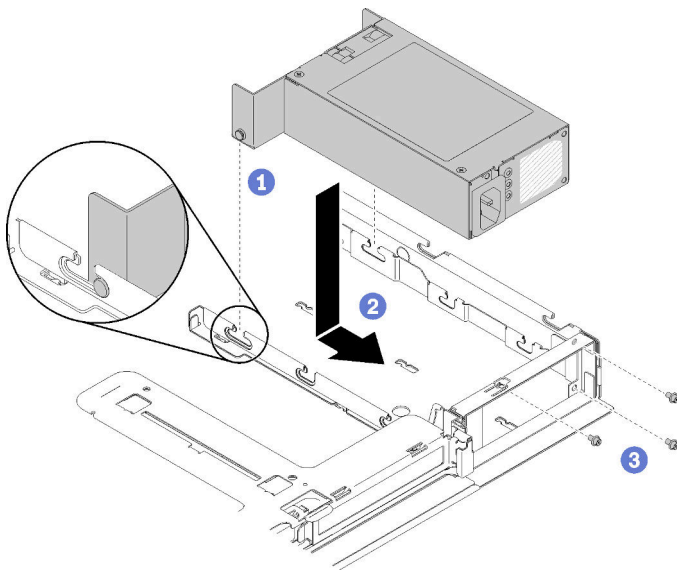To install the fixed power supply, complete the following steps:

Figure 60. Power supply unit installation

Step 1.   Align the pins with the slots on the chassis; then, lower the power supply unit into the server.

Step 2.   Slide the power supply unit backward to lock the pins into the slots.

Step 3.   Install the screws that secure the power supply unit.

Step 4.   Connect the internal power cable to system board, see "Fixed power supply cables" on page 24.

After you install the fixed power supply unit, complete the following steps:

1. Install the top cover onto the server (see "Install the top cover" on page 87).
2. Install the server into the rack if necessary.
3. Reconnect power cords and all external cables.

Processor replacement

Use the following information to remove and install the processor.

Attention: Before reusing a processor or heat sink, make sure you use Lenovo proven alcohol cleaning pad and thermal grease.

Important: The processor in your server can throttle in response to thermal conditions, temporarily lowering its speed to reduce heat output. In instances where a few processor cores are throttled for an extremely short time period (100 ms or less), the only indication might be an entry in the operating system event log with no corresponding entry in the system XCC event log. If this situation occurs, the event can be ignored and processor replacement is not required.

Remove the processor

Use this information to remove the processor. This procedure must be executed by a trained technician.

Before you remove the processor, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.
2. Turn off the server. Disconnect the power cords and all external cables (see "Power off the server" on page 10).

3. If server is installed in a rack, remove the server from the rack.

4. Remove the top cover (see "Remove the top cover" on page 86).

5. Remove the heat sink if necessary (see "Remove the heat sink" on page 56).

To remove the processor, complete the following steps:

Step 1.   Gently pull the handle away from the processor retainer.

Step 2.   Lift the handle along with the retainer to the fully open position.
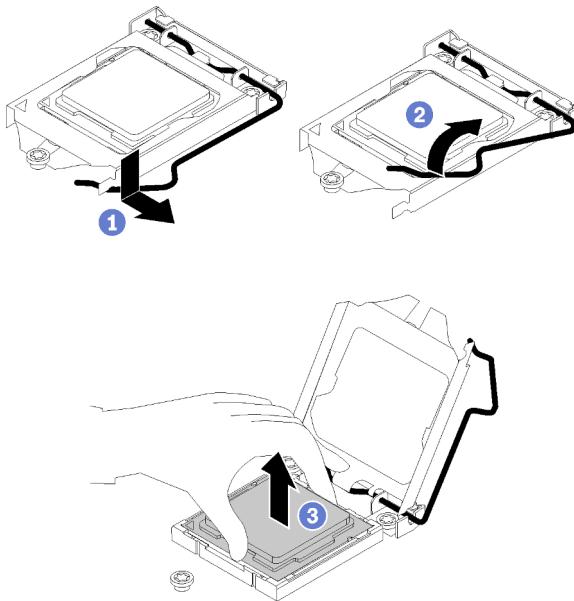
Figure 61. Opening the processor retainer

Step 3.   Hold the processor by both sides and gently lift it away from the processor socket.

> **Notes:**
>
> 1. Do not touch the gold contacts on the bottom of the processor.
>
> 2. Keep the processor socket clean from any object to prevent possible damages.

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

Use this information to install the processor. This procedure must be executed by a trained technician.

Before you install the processor, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

2. If there is any old thermal grease on the processor, gently clean the top of the processor using an alcohol cleaning pad. Dispose of the cleaning pad after all of the thermal grease is removed.

   Note: If you are applying new thermal grease on the top of the processor, make sure to do it after the alcohol has fully evaporated.

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.
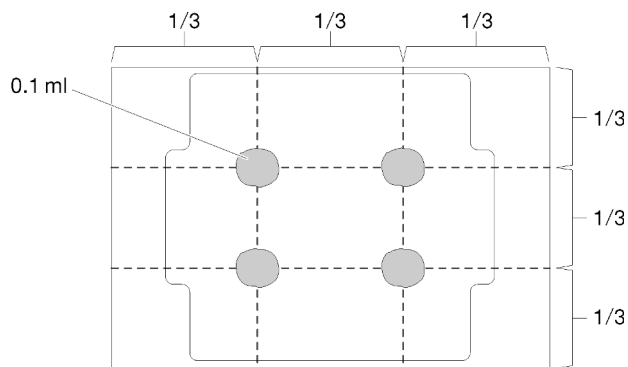
Figure 62. Proper shape of the thermal grease

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

To install the processor, complete the following steps:

Step 1. Hold the processor by both sides, and align the following:

1. Align **1** the small notches on the processor to **2** the tabs on the socket.
2. Align **3** the small triangle of the processor to **4** the beveled corner on the socket.

Then, gently lower the processor evenly into the socket.
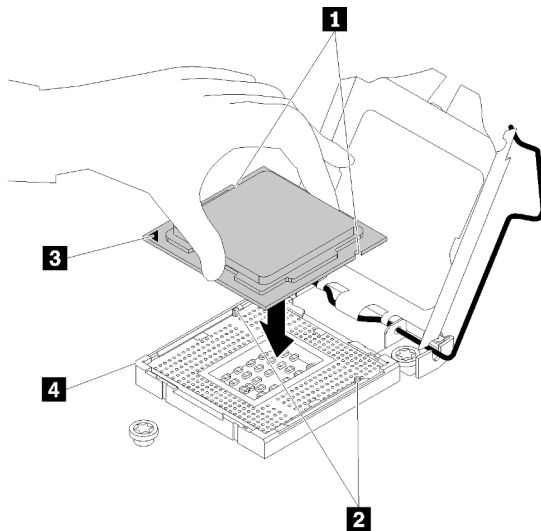
Figure 63. Installing the processor

Step 2. Close the processor retainer, and push the handle to the locked position.
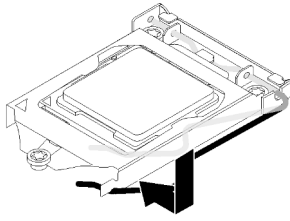
Figure 64. Closing the processor retainer

After you install the processor, complete the following steps:

1. Reinstall the heat sink (see "Install the heat sink" on page 57).
2. Install the top cover onto the server (see "Install the top cover" on page 87).
3. Install the server into the rack if necessary.
4. Reconnect power cords and all external cables.

Rack latches replacement

Use the following information to remove and install the rack latches.

Remove the rack latches

Use this information to remove the rack latches.

Before you remove the rack latches, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.
2. Turn off the server. Disconnect the power cords and all external cables (see "Power off the server" on page 10).
3. If server is installed in a rack, remove the server from the rack.
4. If security bezel is installed, remove it first (see "Remove the security bezel" on page 74).

To remove the rack latches, complete the following steps:

Note: Both rack latches are removed and installed in a similar method.

Step 1. Use a flat-blade screwdriver to slide down the ID label plate on the right rack latch and place it in a safe place.
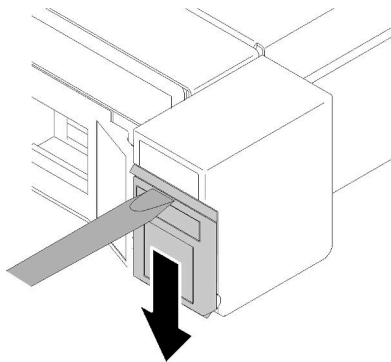
Figure 65. ID label removal

Step 2.   Remove the screws that secure the rack latch.
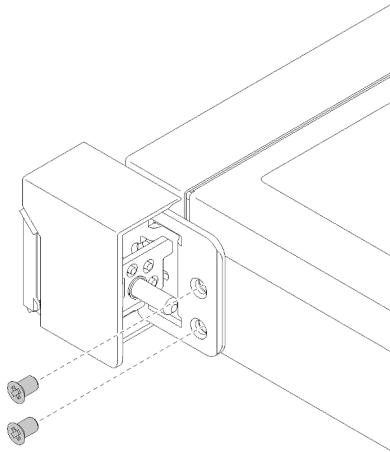
Figure 66. Rack latches removal

Step 3.   Slide the latch backward and remove it from the server.
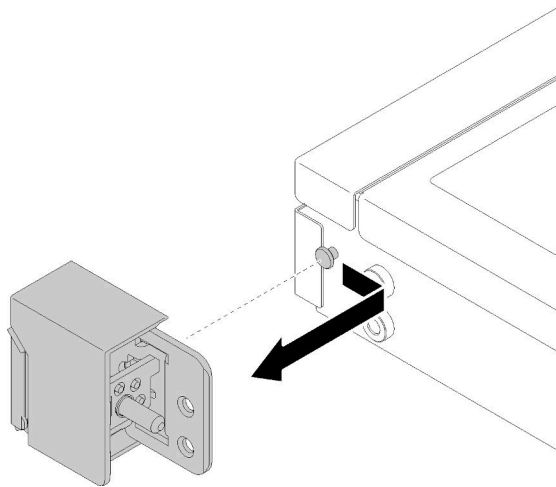
Figure 67. Rack latches removal

Step 4.   If you are removing the other rack latch, do so now.

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 rack latches

Use this information to install the rack latches.

Before you install the rack latches, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

To install the rack latches, complete the following steps:

Note: Both rack latches are removed and installed in a similar method.

Step 1. Align the pin hole with the pin on the chassis; then, press the rack latch onto the chassis and slightly slide it forward.
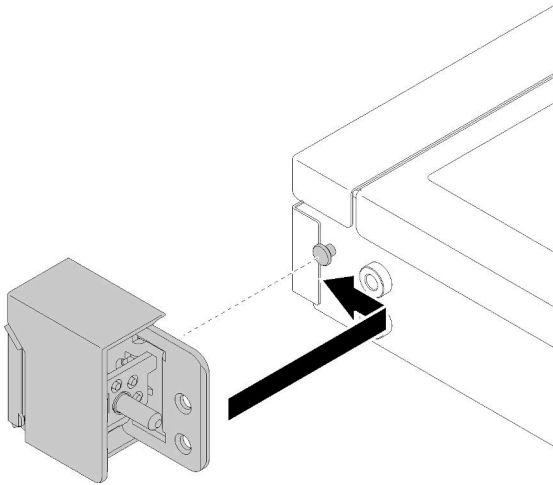
Figure 68. Rack latches installation

Step 2. Install the screws to secure the rack latch on the side of the server.
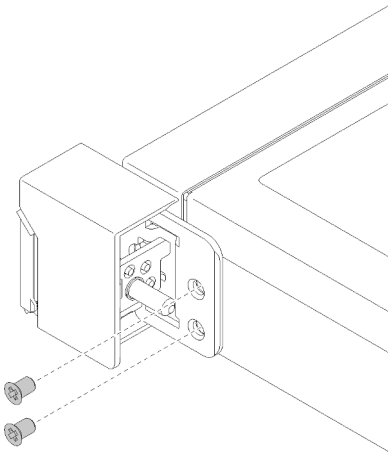
Figure 69. Rack latches installation

Step 3. If you are installing the other rack latch, do so now.

After you install the rack latches, complete the following steps:

1. Install the ID label to the right rack latch by inserting the label onto the right rack latch.
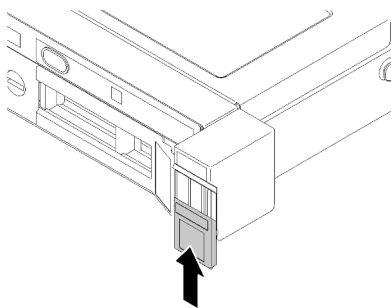
Figure 70. ID label installation

2. Reinstall the security bezel if it is removed (see "Install the security bezel" on page 75).
3. Install the server into the rack if necessary.
4. Reconnect power cords and all external cables.

Security bezel replacement

Use this procedure to remove or install the security bezel.

Remove the security bezel

Use this information to remove the security bezel.

Before removing the security bezel:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.
2. If the server is installed in a rack, extend or remove the server from the rack.

To remove the security bezel, complete the following steps:

Step 1. Use the key to unlock the security bezel to the open position.
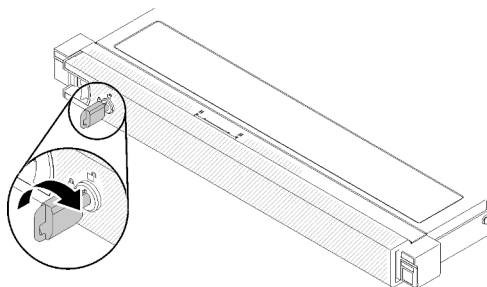
Figure 71. Unlocking the security bezel

Step 2. Press the release latch and rotate the security bezel outward to remove it from the chassis.
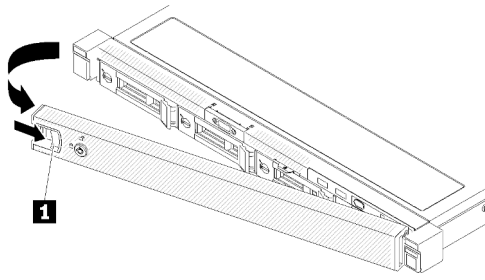
Figure 72. Security bezel removal

Table 20. Security bezel removal

1 Release latch

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 security bezel

Use this information to install the security bezel.

Before you install the security bezel, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

To install the security bezel, complete the following steps:

Step 1. Carefully insert the tabs on the security bezel into the slots on the right rack handle. Press and hold the release latch; then, pivot the security bezel inward until it clicks in place.
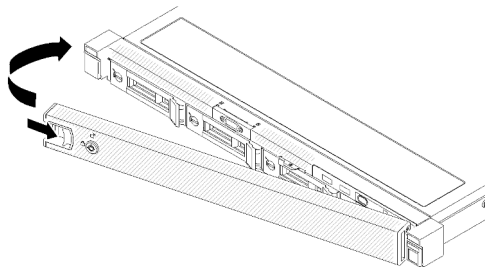
Figure 73. Security bezel installation

Step 2. Use the key to lock the security bezel to the closed position.
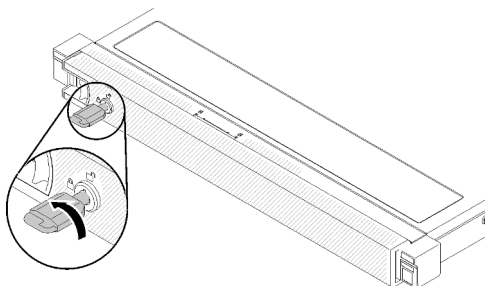
Figure 74. Locking the security bezel

After you install the security bezel, push or install the server into the rack if necessary. See *Rack Installation Guide* that comes with the rail kit.

System board replacement

Use this procedure to remove or install the system board.

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

1. Take a socket cover from the CPU socket assembly on the new system board and orient it correctly above the CPU socket assembly on the removed system board.
2. Gently press down the socket cover legs to the CPU socket assembly, pressing on the edges to avoid damage to the socket pins. You might hear a click on the socket cover is securely attached.
3. **Make sure** that the socket cover is securely attached to the CPU socket assembly.

Remove the system board

Use this information to remove the system board.

Attention: Removing and installing this component requires trained technicians. Do no attempt to remove or install it without proper training.

Before removing the system board:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.
2. 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.
3. Use the Lenovo XClarity Essentials OneCLI to save the system configuration to external media.
4. Save the system-event log to external media.

   Note: When replacing the system board, always update the server with the latest firmware or restore the pre-existing firmware. Make sure that you have the latest firmware or a copy of the pre-existing firmware before you proceed.
5. Turn off the server. Disconnect the power cords and all external cables (see "Power off the server" on page 10).
6. If server is installed in a rack, remove the server from the rack.
7. Remove the top cover (see "Remove the top cover" on page 86).

To remove the system board, complete the following steps:

Step 1. Remove the following components that are installed on the system board and put them in a safe, static-protective place.

- Disconnect the fan cables (see "Remove a fan" on page 47).
- Disconnect the backplate cable (see "Remove the simple-swap drive backplate" on page 45).
- Disconnect the front operator and front USB cables (see "Remove the front operator panel" on page 53).
- Remove the air baffle (see "Remove the air baffle" on page 35).
- Remove the M.2 drive (see "Remove the M.2 drive" on page 58).
- Remove the PCIe riser card (see "Remove the PCIe riser assembly" on page 62).

- Remove the TPM card (see "Remove the TPM card (for Chinese Mainland only)" on page 88).
- Remove the DIMMs (see "Remove a DIMM" on page 40).
- Remove the heat sink (see "Remove the heat sink" on page 56).
- Remove the processor (see "Remove the processor" on page 68).

Step 2. Remove all eight screws that secure the system board to the chassis.
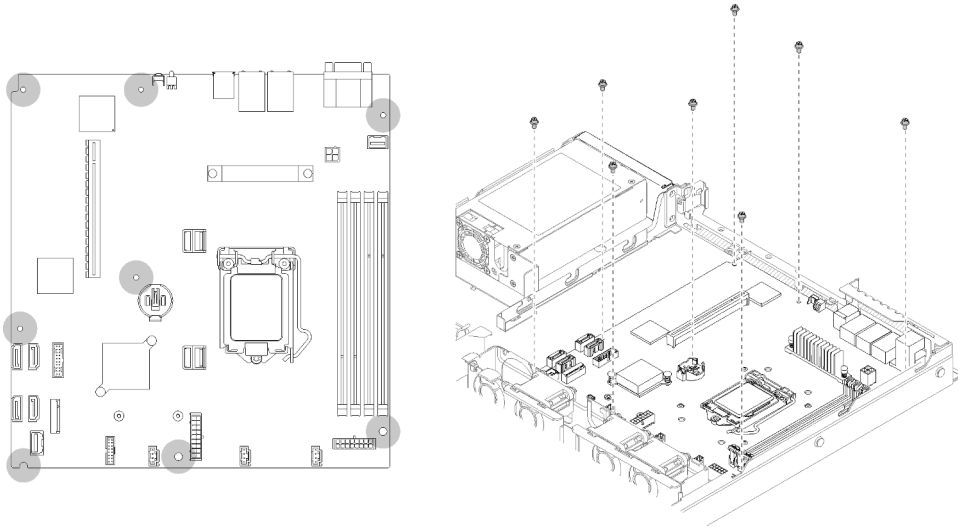
Figure 75. System-board screws location

Step 3. Slightly lift up the front side of the system board; then, slide the system board toward the front of the server and lift it out of the server.
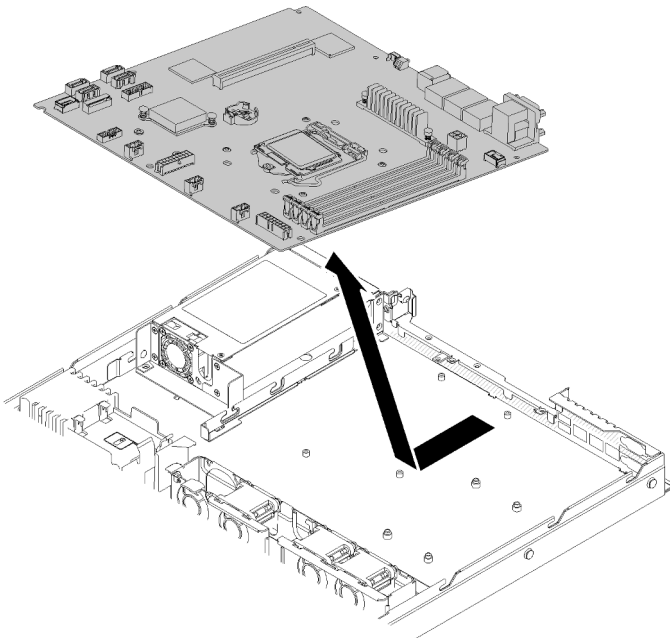
Figure 76. System board removal

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

1. Insert the new system board into the chassis with an angle and install all the screws, see "Install the system board" on page 78.

2. Take a socket cover from the CPU socket assembly on the new system board and orient it correctly above the CPU socket assembly on the removed system board.

3. Gently press down the socket cover legs to the CPU socket assembly, pressing on the edges to avoid damage to the socket pins. You might hear a click on the socket cover is securely attached.

4. **Make sure** that the socket cover is securely attached to the CPU socket assembly.

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 board

Use this information to install the system board.

Attention: Removing and installing this component requires trained technicians. Do no attempt to remove or install it without proper training.

Before you install a system board, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

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

To install the system board, complete the following steps:

Step 1. Insert the system board into the chassis with an angle as shown, so serial and VGA port can be inserted in the slots on the rear chassis.

    a. Place the system board flat into the chassis, screw slots on the system board will match the screw slots on the chassis.
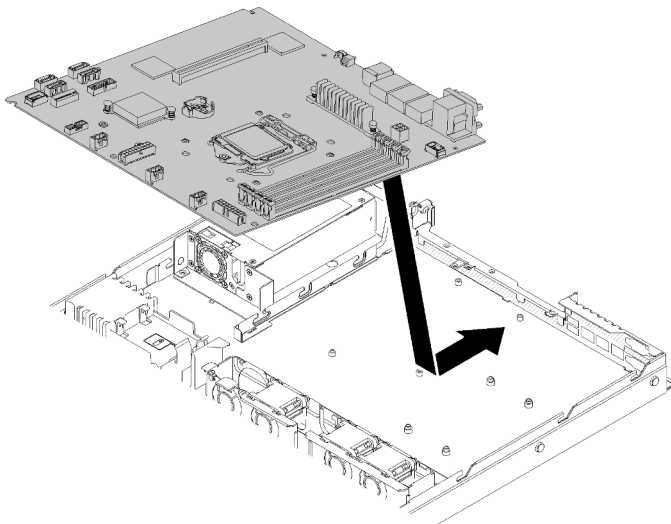
Figure 77. System board installation

Step 2. Install all eight screws to secure the system board to the chassis.
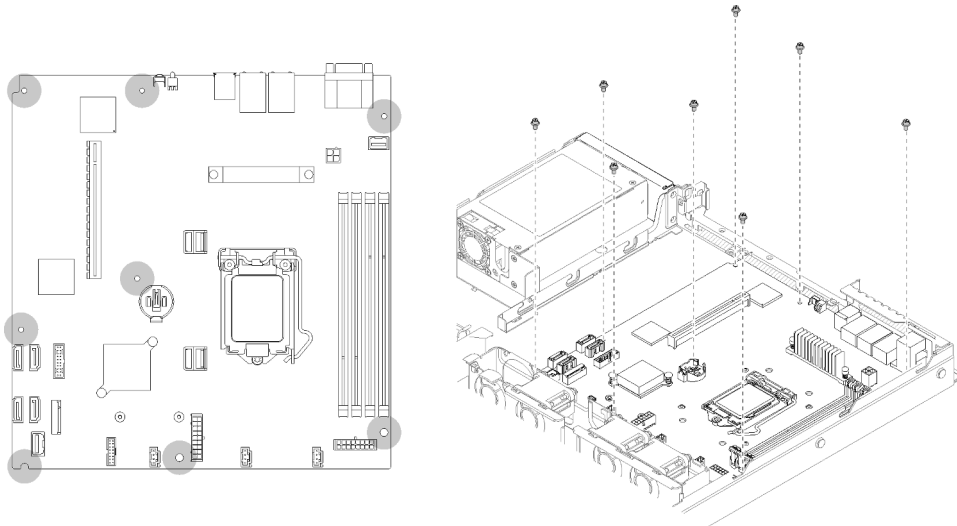
Figure 78. System-board screws location

Step 3. Install the following components:

- Install CPU socket cover to the defected board, right after the new system board is installed into the chassis.
- Install the processor (see "Install the processor " on page 69).
- Install the heat sink (see "Install the heat sink" on page 57).
- Install the DIMMs (see "Install a DIMM" on page 42).
- Install the TPM card (see "Install the TPM card (for Chinese Mainland only)" on page 89).
- Install the M.2 drive if necessary (see "Install the M.2 drive" on page 60).
- Install an adapter if necessary (see "Install an adapter" on page 34).
- Install the PCIe riser assembly if necessary (see "Install the PCIe riser assembly" on page 63).
- Connect the fan cables (see "Install a fan" on page 49).
- Connect the backplate cables (see "Install the simple-swap drive backplate" on page 46).
- Connect the front operator and front USB cables (see "Install the front operator panel" on page 54).
- Install the air baffle (see "Install the air baffle" on page 36).

After you install the system board, complete the following steps:

1. Install the top cover onto the server (see "Install the top cover" on page 87).
2. Install the server into the rack if necessary.
3. Reconnect power cords and all external cables.
4. Update the machine type and serial number with new vital product data (VPD). Use the Lenovo XClarity Provisioning Manager to update the machine type and serial number. See "Update the machine type and serial number" on page 80.
5. Enable TPM. See "Enable TPM" on page 82.
6. Optionally, enable UEFI Secure Boot. See "Enable UEFI Secure Boot" on page 85.

Update the machine type and serial number

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

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

- From Lenovo XClarity Provisioning Manager

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

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

- From Lenovo XClarity Essentials OneCLI

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

  – Operate from the target system, such as LAN or keyboard console style (KCS) access

  – Remote access to the target system (TCP/IP based)

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

  1. Download and install Lenovo XClarity Essentials OneCLI.

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

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

  2. Copy and unpack the OneCLI package, which also includes other required files, to the server. Make sure that you unpack the OneCLI and the required files to the same directory.

  3. After you have Lenovo XClarity Essentials OneCLI in place, type the following commands to set the machine type and serial number:
     ```
     onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> [access_method]
     onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> [access_method]
     onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> [access_method]
     onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx <system model> --override [access_method]
     ```

     Where:

     <m/t_model>
     > The server machine type and model number. Type `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. Type `system yyyyyyyy`, where *yyyyyyyy* is the product identifier.

     [access_method]
     > The access method that you select to use from the following methods:

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

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

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

Example commands are as follows:
```
onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> --bmc-username <xcc_user_id>
--bmc-password <xcc_password>
onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> --bmc-username <xcc_user_id> --bmc-
password <xcc_password>
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> --bmc-username xcc_user_
id --bmc-password xcc_password
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx <system model> --override --bmc-
username xcc_user_id --bmc-password xcc_password
```

– Online KCS access (unauthenticated and user restricted):

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

Example commands are as follows:
```
onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model>
onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n>
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model>
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx <system model> --override
```

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

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

Where:

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

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

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

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

Example commands are as follows:
```
onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> --bmc <xcc_user_id>:<xcc_
password>@<xcc_external_ip>
onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> --bmc <xcc_user_id>:<xcc_
password>@<xcc_external_ip>
```
```
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> --bmc xcc_user_id:xcc_
password@xcc_external_ip
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx <system model> --override --bmc xcc_
user_id:xcc_password@xcc_external_ip
```

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

Enable TPM

The server supports Trusted Platform Module (TPM), Version 1.2 or Version 2.0

Note: For customers in the People's Republic of China, integrated on-board TPM is not supported. However, customers in the People's Republic of China can install a TPM card.

When a system board is replaced, you must make sure that the TPM policy is set correctly.

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

Set the TPM policy

By default, a replacement system board is shipped with the TPM policy set to **undefined**. You must modify this setting to match the setting that was in place for the system board that is being replaced.

There are two methods available to set the TPM policy:

- From Lenovo XClarity Provisioning Manager

  To set the TPM policy from Lenovo XClarity Provisioning Manager:

  1. Start the server and press the key according to the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface.
  2. If the power-on Administrator password is required, enter the password.
  3. From the System Summary page, click **Update VPD**.
  4. Set the policy to one of the following settings.

     – **NationZ TPM 2.0 enabled - China only**. Customers in the Chinese Mainland should choose this setting if a NationZ TPM 2.0 adapter is installed.
     – **TPM enabled - ROW**. Customers outside of the Chinese Mainland should choose this setting.
     – **Permanently disabled**. Customers in the Chinese Mainland should use this setting if no TPM adapter is installed.

     Note: Although the setting **undefined** is available as a policy setting, it should not be used.

- From Lenovo XClarity Essentials OneCLI

  Note: Please note that a Local IPMI user and password must be setup in Lenovo XClarity Controller for remote accessing to the target system.

  To set the TPM policy from Lenovo XClarity Essentials OneCLI:

  1. Read TpmTcmPolicyLock to check whether the TPM_TCM_POLICY has been locked:
     ```
     OneCli.exe config show imm.TpmTcmPolicyLock --override --imm <userid>:<password>@<ip_address>
     ```

     Note: The imm.TpmTcmPolicyLock value must be 'Disabled', which means TPM_TCM_POLICY is NOT locked and changes to the TPM_TCM_POLICY are permitted. If the return code is 'Enabled' then no changes to the policy are permitted. The planar may still be used if the desired setting is correct for the system being replaced.

  2. Configure the TPM_TCM_POLICY into XCC:

     – For customers in Chinese Mainland with no TPM, or customers that require to disable TPM:
       ```
       OneCli.exe config set imm.TpmTcmPolicy "NeitherTpmNorTcm" --override --imm <userid>:<password>@<ip_address>
       ```
     – For customers in Chinese Mainland that require to enable TPM:

```
OneCli.exe config set imm.TpmTcmPolicy "NationZTPM20Only" --override --imm <userid>:<password>@<ip_
address>
```
  – For customers outside Chinese Mainland that require to enable TPM:
```
OneCli.exe config set imm.TpmTcmPolicy "TpmOnly" --override --imm <userid>:<password>@<ip_address>
```

3. Issue reset command to reset system:
```
OneCli.exe misc ospower reboot --imm <userid>:<password>@<ip_address>
```

4. Read back the value to check whether the change has been accepted:
```
OneCli.exe config show imm.TpmTcmPolicy --override --imm <userid>:<password>@<ip_address>
```

   Notes:

   – If the read back value is matched it means the TPM_TCM_POLICY has been set correctly.

     imm.TpmTcmPolicy is defined as below:

     – Value 0 use string "Undefined" , which means UNDEFINED policy.
     – Value 1 use string "NeitherTpmNorTcm", which means TPM_PERM_DISABLED.
     – Value 2 use string "TpmOnly", which means TPM_ALLOWED.
     – Value 4 use string "NationZTPM20Only", which means NationZ_TPM20_ALLOWED.

   – Below 4 steps must also be used to 'lock' the TPM_TCM_POLICY when using OneCli/ASU commands:

5. Read TpmTcmPolicyLock to check whether the TPM_TCM_POLICY has been locked , command as below:
```
OneCli.exe config show imm.TpmTcmPolicyLock --override --imm <userid>:<password>@<ip_address>
```

   The value must be 'Disabled', it means TPM_TCM_POLICY is NOT locked and must be set.

6. Lock the TPM_TCM_POLICY:
```
OneCli.exe config set imm.TpmTcmPolicyLock "Enabled"--override --imm <userid>:<password>@<ip_address>
```

7. Issue reset command to reset system, command as below:
```
OneCli.exe misc ospower reboot --imm <userid>:<password>@<ip_address>
```

   During the reset, UEFI will read the value from imm.TpmTcmPolicyLock, if the value is 'Enabled' and the imm.TpmTcmPolicy value is valid, UEFI will lock the TPM_TCM_POLICY setting.

   Note: The valid values for imm.TpmTcmPolicy include 'NeitherTpmNorTcm', 'TpmOnly', and 'NationZTPM20Only'.

   If the imm.TpmTcmPolicyLock is set as 'Enabled' but imm.TpmTcmPolicy value is invalid, UEFI will reject the 'lock' request and change imm.TpmTcmPolicyLock back to 'Disabled'.

8. Read back the value to check whether the 'Lock' is accepted or rejected. Command as below:
```
OneCli.exe config show imm.TpmTcmPolicy --override --imm <userid>:<password>@<ip_address>
```

   Note: If the read back value is changed from 'Disabled' to 'Enabled' that means the TPM_TCM_POLICY has been locked successfully. There is no method to unlock a policy once it has been set other than replacing system board.

   imm.TpmTcmPolicyLock is defined as below:

   Value 1 uses string "Enabled" , which means lock the policy. Other values are not accepted.

Assert Physical Presence

Before you can assert Physical Presence, the Physical Presence Policy must be enabled. By default, the Physical Presence Policy is enabled with a timeout of 30 minutes.

There are two ways to assert the Physical Presence:

1. If the Physical Presence Policy is enabled, you can assert Physical Presence through the Lenovo XClarity Provisioning Manager or through the Lenovo XClarity Controller.

2. Switch the hardware jumpers on the system board.

Notes: If the Physical Presence Policy has been disabled:

1. Set the hardware Physical Presence jumper on the system board to assert Physical Presence.

2. Enable the Physical Presence Policy using either F1 (UEFI Settings) or Lenovo XClarity Essentials OneCLI.

Assert Physical Presence through the Lenovo XClarity Controller

Complete the following steps to assert Physical Presence through the Lenovo XClarity Controller:

1. Log in to the Lenovo XClarity Controller interface.

   For information about logging in to the Lenovo XClarity Controller, see the "Opening and Using the XClarity Controller Web Interface" section in the XCC documentation version compatible with your server at https://pubs.lenovo.com/lxcc-overview/.

2. Click **BMC Configuration ➙ Security** and verify that Physical Presence is set to **assert**.

Assert Physical Presence through the hardware

You can also assert hardware Physical Presence through the use of a jumper on the system board. For more information about asserting hardware Physical Presence through the use of a jumper, see:

"System board jumpers and switches" on page 19

Set the TPM version

To set the TPM version, Physical Presence must be asserted.

For information about accessing the Lenovo XClarity Controller interface, see:

https://pubs.lenovo.com/lxcc-overview/

To set the TPM version:

1. Download and install Lenovo XClarity Essentials OneCLI.

   a. Go to http://datacentersupport.lenovo.com and navigate to the support page for your server.

   b. Click **Drivers & Software**.

   c. Navigate to the version of Lenovo XClarity Essentials OneCLI for your operating system and download the package.

2. Run the following command to set the TPM version:

   Note: You can change the TPM version from 1.2 to 2.0 and back again. However, you can toggle between versions a maximum of 128 times.

   To set the TPM version to version 2.0:

   ```
   OneCli.exe config set TrustedComputingGroup.DeviceOperation "Update to TPM2.0 compliant"
   --bmc userid:password@ip_address
   ```

   To set the TPM version to version 1.2:

   ```
   OneCli.exe config set TrustedComputingGroup.DeviceOperation "Update to TPM1.2 compliant"
   --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

3. Alternatively, you can use the following Advanced Settings Utility (ASU) commands:

   To set the TPM version to version 2.0:

   ```
   asu64 set TPMVersion.TPMVersion "Update to TPM2.0 compliant" --host <ip_address>
   --user <userid> --password <password> --override
   ```

   To set the TPM version to version 1.2:

   ```
   asu64 set TPMVersion.TPMVersion "Update to TPM1.2 compliant" --host <ip_address>
   --user <userid> --password <password> --override
   ```

   where:

   - *<userid>* and *<password>* are the credentials used to 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.

- 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>*

Top cover replacement

Use the following information to remove and install the top cover.

Remove the top cover

Use this information to remove the top cover.

To avoid possible danger, read and follow the following safety information.

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.

Before you remove the top cover, complete the following steps:
1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.
2. Turn off the server. Disconnect the power cords and all external cables (see "Power off the server" on page 10).
3. If server is installed in a rack, remove the server from the rack.
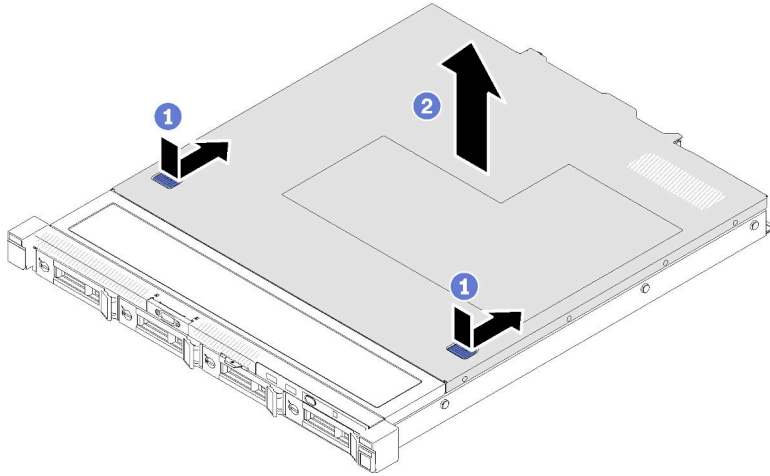
To remove the top cover, complete the following steps:

Figure 79. Top cover removal

Step 1. Press on the release button and the push point at the same time; then, slide the cover toward the rear of the server.

Step 2. Lift the top cover away from the server.

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 top cover

Use this information to install the top cover.

To avoid possible danger, read and follow the following safety information.

<u>S014</u>

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.

<u>S033</u>

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

Before you install the top cover, complete the following steps:
1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

2. Make sure all the removed components are installed, and all the disconnected cables inside the server are reconnected.

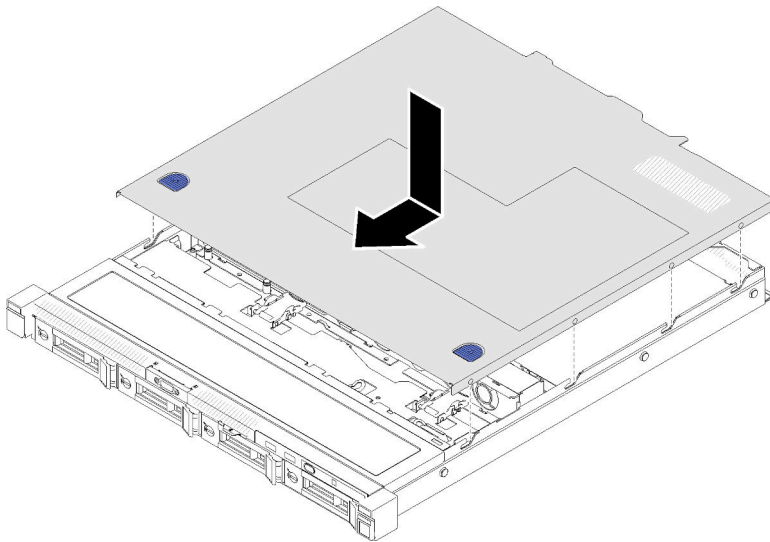To install the top cover, complete the following steps:

Figure 80. Top cover installation

Step 1.   Align the posts inside the top cover with the slots on the chassis.

Step 2.   Hold the front of the server and slide the top cover toward the front server until it clicks into place.

After you install the top cover, complete the following steps:

1. Install the server into rack if necessary.

2. Reconnect power cords and all external cables.

3. Turn on the server (see "Power on the server" on page 10).

TPM card replacement (for Chinese Mainland only)

Use this information to remove and install the TPM card.

Remove the TPM card (for Chinese Mainland only)

Use this information to remove the TPM card.

Before you remove the TPM card, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

2. Turn off the server. Disconnect the power cords and all external cables (see "Power off the server" on page 10).

3. If server is installed in a rack, remove the server from the rack.

4. Remove the top cover (see "Remove the top cover" on page 86).

5. Locate the TPM card connector on the system board (see "System-board connectors" on page 16).
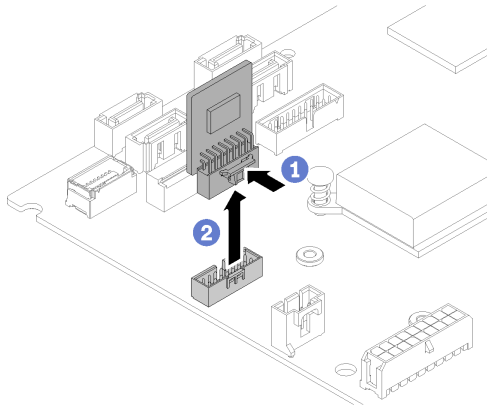
To remove the TPM card, complete the following steps:

Figure 81. TPM card removal

Step 1. Press and hold the release latch.

Step 2. Lift the TPM card out of the server.

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 TPM card (for Chinese Mainland only)

Use this information to install the TPM card.

Before you install the TPM card, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

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

3. Locate the TPM card connector on the system board (see "System-board connectors" on page 16).
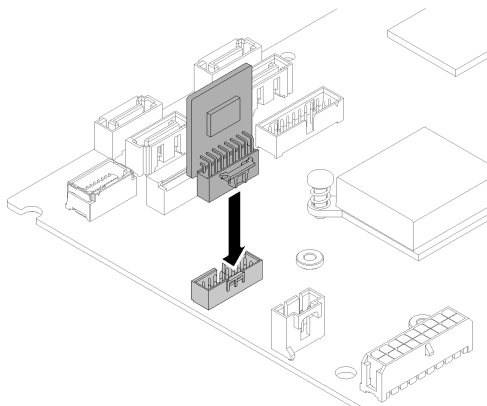
To install the TPM card, complete the following steps:

Figure 82. TPM card installation

Step 1. Insert the TPM card into the TPM connector on the system board.

Notes:

- Carefully handle the TPM card by its edges.
- Your TPM card might look slightly different from the illustration.

After you install the TPM card, complete the parts replacement. See "Complete the parts replacement" on page 93.

VGA cable replacement

Use the following information to remove and install the VGA cable.

Remove the VGA cable

Use this information to remove the VGA cable.

Before you remove the VGA cable, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.
2. Turn off the server. Disconnect the power cords and all external cables (see "Power off the server" on page 10).
3. If server is installed in a rack, remove the server from the rack.
4. Remove the top cover (see "Remove the top cover" on page 86).

To remove the VGA cable, complete the following steps:

Step 1.   Press the VGA cable latch and disconnect the cable from the system board.
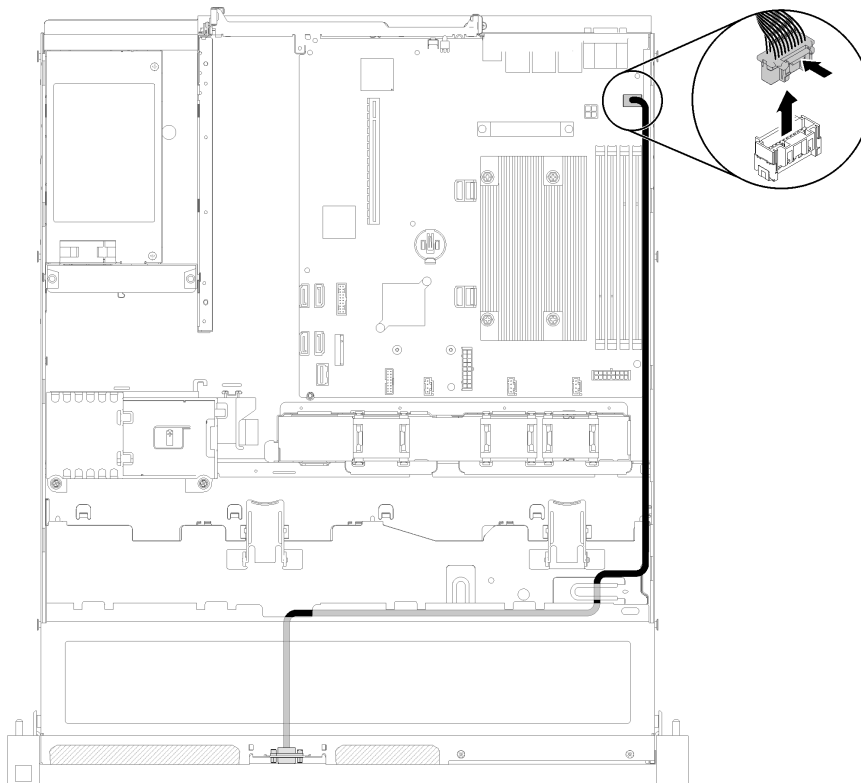

Figure 83. VGA cable removal

Step 2. Use a tool to press both clips; then, pull the VGA cable cover out.
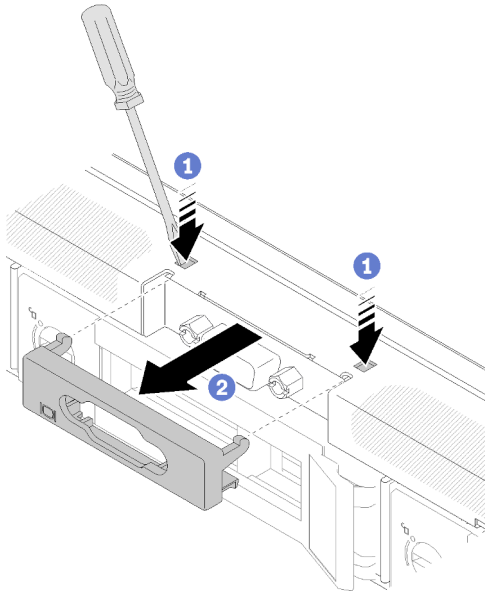

Figure 84. VGA cable removal

Step 3. Remove the screws that secure the VGA cable; then, pull the VGA cable out of the server.
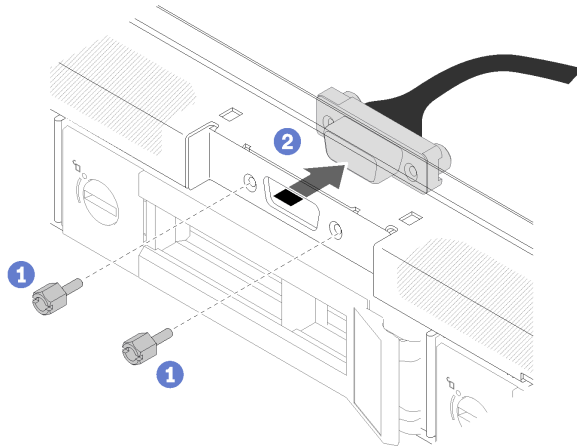

Figure 85. VGA cable removal

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 VGA cable

Use this information to install the VGA cable.

Before you install the VGA cable, complete the following steps:

1. Read "Safety" on page iii and "Installation Guidelines" on page 31 to ensure that you work safely.

To install the VGA cable, complete the following steps:

Step 1.   Insert the VGA cable into the slot on the front chassis; then, install the screws to secure the VGA cable.
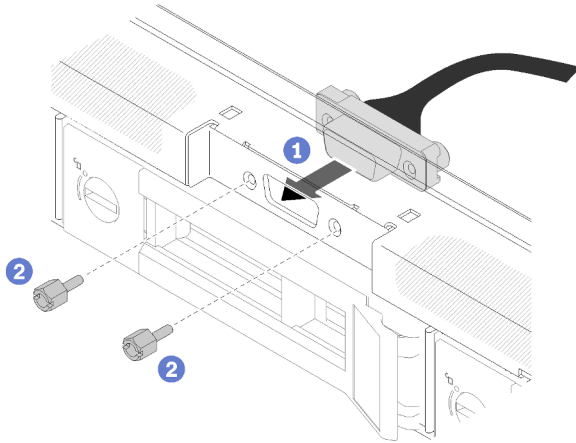

Figure 86. VGA cable installation

Step 2.   Connect the VGA cable to the connector on the system board.

Note: Make sure the VGA cable routes same as shown.
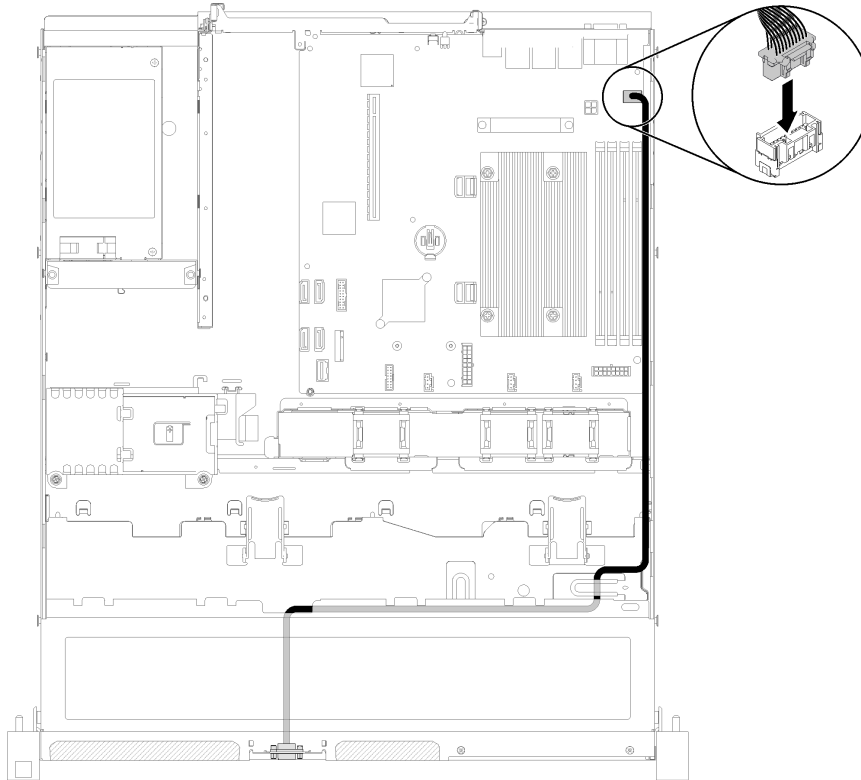

Figure 87. VGA cable installation

Step 3.   Push the VGA cable cover into the slot until the clips are locked.
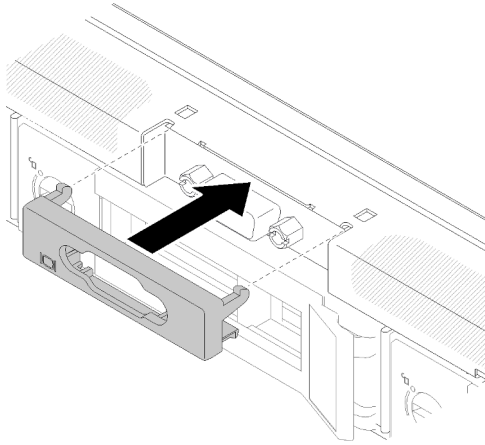
Figure 88. VGA cable installation

After you install the VGA cable, complete the following steps:

1. Install the top cover onto the server (see "Install the top cover" on page 87).

2. Install the server into the rack if necessary.

3. Reconnect power cords and all external cables.

Complete the parts replacement

Use this information to complete the 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. If you have removed the server cover, reinstall it. See "Install the top cover" on page 87.

4. Reconnect external cables and power cords to the server.

   Attention: To avoid component damage, connect the power cords last.

5. Update the server configuration.

   - Download and install the latest device drivers: http://datacentersupport.lenovo.com

   - Update the system firmware. See "Firmware updates" on page 6.

   - Update the UEFI configuration.

   - Reconfigure the disk arrays if you have installed or removed a drive or a RAID adapter. See the Lenovo XClarity Provisioning Manager User Guide, which is available for download at: http://datacentersupport.lenovo.com

Chapter 4. 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.

Notes:

- For your server, the Lenovo XClarity Controller web page or command-line interface does not support the display of system utilization information for the following:
  - Processor
  - DIMM
  - I/O

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:http://ralfss28.labs.lenovo.com:8787/help/topic/royce/pdf_files.html

Lenovo XClarity Administrator event log

If you are using Lenovo XClarity Administrator to manage server, network, and storage hardware, you can view the events from all managed devices through the XClarity Administrator.

Logs

Figure 89. Lenovo XClarity Administrator event log

For more information about working with events from XClarity Administrator, see:

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

Lenovo XClarity Controller event log

The Lenovo XClarity Controller monitors the physical state of the server and its components using sensors that measure internal physical variables such as temperature, power-supply voltages, fan speeds, and component status. The Lenovo XClarity Controller provides various interfaces to systems management software and to system administrators and users to enable remote management and control of a server.

The Lenovo XClarity Controller monitors all components of the server and posts events in the Lenovo XClarity Controller event log.

Figure 90. 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/

Operator Panel and Error LEDs

Operator Panel and Error LEDs is a system of LEDs on various external and internal components of the server that leads you to the failed component. When an error occurs, LEDs are lit on the front operator panel on the front of the server, then on the failed component. By viewing the LEDs in a particular order, you can often identify the source of the error.
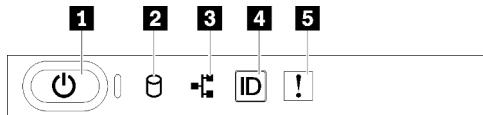

Figure 91. Front operator panel

Table 21. Buttons and LEDs on the front operator panel

1 Power button/LED (green)	**4** Identification button/LED (blue)
2 Drive activity LED (green)	**5** System error LED (yellow)
3 Network activity LED (green)	

1 Power button/LED (green)

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

> **Off:** No power supply is properly installed, or the LED itself has failed.

> **Flashing rapidly (4 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.

> **Solid on:** The server is turned on.

2 Drive activity LED (green)

When this LED is flashing, it indicates that the drives are in use.

3 Network activity LED (green)

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

4 Identification button/LED (blue)

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

5 System error LED (yellow)

When this yellow LED is lit, it indicates that a system error has occurred. This LED can be controlled by the Lenovo XClarity Controller.

Power supply LEDs

This topic provides information about various power supply LED status and corresponding action suggestions.
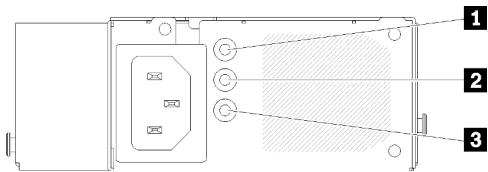

Figure 92. Power supply LEDs

Table 22. Power supply LEDs

LED	Description
1 Power input LED (green)	• Off: The power supply is disconnected from the ac power source or a power problem occurs. • Green: The power supply is connected to the ac power source.
2 Power output LED (green)	• Green: The server is on and the power supply is working normally. • Off: The sever is powered off, or the power supply is not working properly. If the server is powered on but the power output LED is off, replace the power supply.
3 Power supply error LED (yellow)	• Off: The power supply is working normally. • Yellow: The power supply has failed. To resolve the issue, replace the power supply.

System-board LEDs

The following illustrations show the light-emitting diodes (LEDs) on the system board.
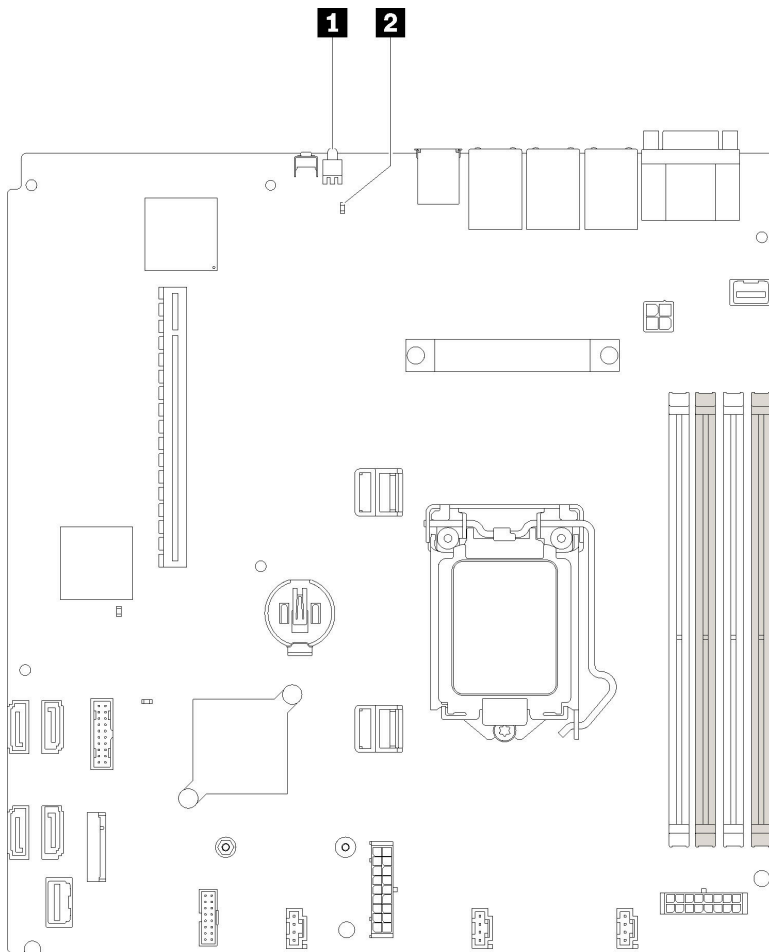
Figure 93. System-board LEDs

Table 23. System-board LEDs

1 Rear identification LED (blue)	**2** System error LED (yellow)

General problem determination procedures

Use the information in this section to resolve problems if the event log does not contain specific errors or the server is inoperative.

If you are not sure about the cause of a problem and the power supplies are working correctly, complete the following steps to attempt to resolve the problem:

1. Power off the server.

2. Make sure that the server is cabled correctly.

3. Remove or disconnect the following devices if applicable, one at a time, until you find the failure. Power on and configure the server each time you remove or disconnect a device.
   - Any external devices.
   - Surge-suppressor device (on the server).
   - Printer, mouse, and non-Lenovo devices.
   - Each adapter.
   - Hard disk drives.
   - Memory modules until you reach the minimum configuration that is supported for the server.

See "Specifications" on page 1 to determine the minimum configuration for your server.

4. Power on the server.

If the problem is solved when you remove an adapter from the server, but the problem recurs when you install the same adapter again, suspect the adapter. If the problem recurs when you replace the adapter with a different one, try a different PCIe slot.

If the problem appears to be a networking problem and the server passes all system tests, suspect a network cabling problem that is external to the server.

Resolving suspected power problems

Power problems can be difficult to solve. For example, a short circuit can exist anywhere on any of the power distribution buses. Usually, a short circuit will cause the power subsystem to shut down because of an overcurrent condition.

Complete the following steps to diagnose and resolve a suspected power problem.

Step 1. Check the event log and resolve any errors related to the power.

Note: Start with the event log of the application that is managing the server. For more information about event logs, see "Event logs" on page 95

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 minimum configuration that is required for the server to start. See "Specifications" on page 1 to determine the minimum configuration for your server.

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 minimum configuration, see "Power supply LEDs" on page 98 to replace the components in the minimum configuration one at a time until the problem is isolated.

Resolving suspected Ethernet controller problems

The method that you use to test the Ethernet controller depends on which operating system you are using. See the operating-system documentation for information about Ethernet controllers, and see the Ethernet controller device-driver readme file.

Complete the following steps to attempt to resolve suspected problems with the Ethernet controller.

Step 1. Make sure that the correct device drivers, which come with the server are installed and that they are at the latest level.

Step 2. Make sure that the Ethernet cable is installed correctly.

- The cable must be securely attached at all connections. If the cable is attached but the problem remains, try a different cable.

- 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 rear panel of the server. These LEDs indicate whether there is a problem with the connector, cable, or hub.

- 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 rear of the server. The Network activity LED is lit when data is active on the Ethernet network. If the Network activity LED is off, make sure that the hub and network are operating and that the correct device drivers are installed.

Step 6. Check for operating-system-specific causes of the problem, and also make sure that the operating system drivers are installed correctly.

Step 7. Make sure that the device drivers on the client and server are using the same protocol.

If the Ethernet controller still cannot connect to the network but the hardware appears to be working, the network administrator must investigate other possible causes of the error.

Troubleshooting by symptom

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 95)

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 119).

Power on and power off problems

Use this information to resolve issues when powering on or powering off the server.

- "Embedded hypervisor is not in the boot list" on page 101
- "The power button does not work (server does not start)" on page 102
- "Server does not power on" on page 102

Embedded hypervisor is not in the boot list

Complete the following steps until the problem is solved.

1. If the server has been installed, moved, or serviced recently, or if this is the first time the embedded hypervisor is being used, make sure that the device is connected properly and that there is no physical damage to the connectors.

2. See the documentation that comes with the optional embedded hypervisor flash device for setup and configuration information.

3. Check https://serverproven.lenovo.com/ to validate that the embedded hypervisor device is supported for the server.

4. Make sure that the embedded hypervisor device is listed in the list of available boot options. From the management controller user interface, click **Server Configuration ➙ Boot Options**.

For information about accessing the management controller user interface, see "Opening and Using the XClarity Controller Web Interface" section in the XCC documentation compatible with your server at:

https://pubs.lenovo.com/lxcc-overview/

5. Check http://datacentersupport.lenovo.com for any tech tips (service bulletins) related to the embedded hypervisor and the server.

6. Make sure that other software works on the server to ensure that it is working properly.

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 operator information panel cable, and then repeat steps 1a and 1b.

      • If the server starts, reseat the operator information panel.

      • If the problem remains, replace the operator information 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 flash slowly.

   • The push force is enough and with button force response.

3. If the power button LED didn't lit on or flash 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.

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 (one processor, one DIMM and one PSU without any adapter and any drive installed).

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 replacement is necessary.

Memory problems

Use this information to resolve issues related to memory.

- "Multiple memory modules in a channel identified as failing" on page 103
- "Displayed system memory less than installed physical memory" on page 103
- "Invalid memory population detected" on page 104

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.

Displayed system memory less than installed physical memory

Complete the following steps until the problem is resolved:

Note: Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server.

1. Make sure that:
   - No error LEDs are lit on the operator information panel.
   - No memory module error LEDs are lit on the system board.
   - Memory mirrored channel does not account for the discrepancy.
   - The memory modules are seated correctly.
   - You have installed the correct type of memory module (see "Specifications" on page 1 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 DIMMs, and then restart the server.

3. Check the POST error log:

   - If a memory module was disabled by a systems-management interrupt (SMI), replace the memory module.

   - If a memory module was disabled by the user or by POST, reseat the memory module; then, run the Setup Utility and enable the memory module.

4. Run memory diagnostics. When you start a solution and press the key according to the on-screen instructions, the LXPM interface is displayed by default. (For more information, see the "Startup" section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/.) You can perform memory diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic ➔ Memory test**.

5. Re-enable all memory modules using the Setup Utility, and then restart the server.

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.

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 order" in *Setup Guide* to make sure the present memory module population sequence is supported.

2. If the present sequence is indeed supported, see if any of the modules is displayed as "disabled" in Setup Utility.

3. Reseat the module that is displayed as "disabled," and reboot the system.

4. If the problem persists, replace the memory module.

Hard disk drive problems

Use this information to resolve issues related to the hard disk drives.

Server cannot recognize a hard drive

Complete the following steps until the problem is solved.

1. Observe the associated yellow hard disk drive status LED. If the LED is lit, it indicates a drive fault.

2. If the LED is lit, remove the drive from the bay, wait 45 seconds, and reinsert the drive, making sure that the drive assembly connects to the hard disk drive backplane.

3. Observe the associated green hard disk drive activity LED and the yellow status LED:

- If the green activity LED is flashing and the yellow status LED is not lit, the drive is recognized by the controller and is working correctly. Run the diagnostics tests for the hard disk drives. When you start a server and press the key according to the on-screen instructions, the LXPM is displayed by default. (For more information, see the "Startup" section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/.)You can perform hard drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic ➙ HDD test/Disk Drive Test**.*

- If the green activity LED is flashing and the yellow status LED is flashing slowly, the drive is recognized by the controller and is rebuilding.

- If neither LED is lit or flashing, check the hard disk drive backplane (go to step Hard disk drive problems).

- If the green activity LED is flashing and the yellow status LED is lit, replace the drive. If the activity of the LEDs remains the same, go to step Hard disk drive problems. If the activity of the LEDs changes, return to step 1.

4. Make sure that the hard disk drive backplane is correctly seated. When it is correctly seated, the drive assemblies correctly connect to the backplane without bowing or causing movement of the backplane.

5. Reseat the backplane power cable and repeat steps 1 through 3.

6. Reseat the backplane signal cable and repeat steps 1 through 3.

7. Suspect the backplane signal cable or the backplane:

   - Replace the affected backplane signal cable.

   - Replace the affected backplane.

8. Run the diagnostics tests for the hard disk drives. When you start a server and press the key according to the on-screen instructions, the LXPM is displayed by default. (For more information, see the "Startup" section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/.) You can perform hard drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic ➙ HDD test/Disk Drive Test**.*

   Based on those tests:

   - If the adapter passes the test but the drives are not recognized, replace the backplane signal cable and run the tests again.

   - Replace the backplane.

   - If the adapter fails the test, disconnect the backplane signal cable from the adapter and run the tests again.

   - If the adapter fails the test, replace the adapter.

Multiple hard drives fail

Complete the following steps until the problem is solved:

- View the Lenovo XClarity Controller event log for events related to power supplies or vibration issues and resolve those events.

- Make sure that the device drivers and firmware for the hard disk drive and server are at the latest level

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

Multiple hard drives are offline

Complete the following steps until the problem is solved:

- View the Lenovo XClarity Controller event log for events related to power supplies or vibration issues and resolve those events.

- View the storage subsystem log for events related to the storage subsystem and resolve those events.

A replacement hard disk drive does not rebuild

Complete the following steps until the problem is solved:

1. Make sure that the hard disk drive is recognized by the adapter (the green hard disk drive activity LED is flashing).

2. Review the SAS/SATA RAID adapter documentation to determine the correct configuration parameters and settings.

Green hard disk drive activity LED does not represent actual state of associated drive

Complete the following steps until the problem is solved:

1. If the green hard disk drive activity LED does not flash when the drive is in use, run the diagnostics tests for the hard disk drives. When you start a server and press the key according to the on-screen instructions, the LXPM is displayed by default. (For more information, see the "Startup" section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/.) You can perform hard drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic ➙ HDD test/Disk Drive Test**.[*]

2. If the drive passes the test, replace the backplane.

3. If the drive fails the test, replace the drive.

Yellow hard disk drive status LED does not represent actual state of associated drive

Complete the following steps until the problem is solved:

1. Turn off the server.

2. Reseat the SAS/SATA adapter.

3. Reseat the backplane signal cable and backplane power cable.

4. Reseat the hard disk drive.

5. Power on the server and observe the activity of the hard disk drive LEDs.

Note: [*]Depending on the LXPM version, you may see **HDD test** or **Disk Drive Test**.

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 "Firmware updates" on page 6.

Screen is blank

1. If the server is attached to a KVM switch, bypass the KVM switch to eliminate it as a possible cause of the problem: connect the monitor cable directly to the correct connector on the rear of the server.

2. If the server installed with the graphical adapters while turning on the server, the Lenovo logo displays on the screen after approximately 3 minutes. This is normal operation while the system loads.

3. Make sure that:
   - The server is turned on and there is power supplied to the server.
   - The monitor cables are connected correctly.
   - The monitor is turned on and the brightness and contrast controls are adjusted correctly.

4. Make sure that the correct server is controlling the monitor, if applicable.

5. Make sure that the video output is not affected by corrupted server firmware; see "Firmware updates" on page 6.

6. If the problem remains, contact Lenovo Support.

Screen goes blank when you start some application programs

1. Make sure that:

   - The application program is not setting a display mode that is higher than the capability of the monitor.

   - You installed the necessary device drivers for the application.

The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.

1. If the monitor self-tests show that the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescents, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor.

   Attention: Moving a color monitor while it is turned on might cause screen discoloration.

   Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor.

   Notes:
   a. To prevent diskette drive read/write errors, make sure that the distance between the monitor and any external diskette drive is at least 76 mm (3 in.).
   b. Non-Lenovo monitor cables might cause unpredictable problems.

2. Reseat the monitor cable.

3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time:
   a. Monitor cable
   b. Video adapter (if one is installed)
   c. Monitor
   d. (Trained technician only) System board.

The wrong characters appear on the screen

Complete the following steps until the problem is solved:

1. Verify that the language and locality settings are correct for the keyboard and operating system.

2. If the wrong language is displayed, update the server firmware to the latest level. See "Firmware updates" on page 6.

Keyboard, mouse, or USB-device problems

Use this information to solve problems related to a keyboard, mouse, or USB device.

- "All or some keys on the keyboard do not work." on page 108
- "Mouse does not work." on page 108
- "KVM switch problems" on page 108
- "USB-device does not work." on page 108

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.

Optional-device problems

Use this information to solve problems related to optional devices.

- "External USB device is not recognized" on page 109
- "PCIe adapter is not recognized or is not functioning" on page 109
- "Insufficient PCIe resources are detected." on page 109
- "A Lenovo optional device that was just installed does not work." on page 110
- "A Lenovo optional device that worked previously does not work now" on page 110

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. Contact Lenovo technical support.

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

1. Make sure that:
   - The device is supported for the server (see https://serverproven.lenovo.com/).
   - You followed the installation instructions that came with the device and the device is installed correctly.
   - You have not loosened any other installed devices or cables.
   - You updated the configuration information in system setup. When you start a server and press the key according to the on-screen instructions to display the Setup Utility. (For more information, see the "Startup" section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/.) Whenever memory or any other device is changed, you must update the configuration.

2. Reseat the device that you have just installed.

3. Replace the device that you have just installed.

4. Reseat the cable connection and check there is no physical damage to the cable.

5. If there is any cable damages, then replace the cable.

A Lenovo optional device that worked previously does not work now

1. Make sure that all of the cable connections for the device are secure.

2. If the device comes with test instructions, use those instructions to test the device.

3. Reseat the cable connection and check if any physical parts have been damaged, .

4. Replace the cable.

5. Reseat the failing device.

6. Replace the failing device.

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 110
- "Serial device does not work" on page 111

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.

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.

Intermittent problems

Use this information to solve intermittent problems.

- "Intermittent external device problems" on page 111
- "Intermittent KVM problems" on page 111
- "Intermittent unexpected reboots" on page 112

Intermittent external device problems

Complete the following steps until the problem is solved.

1. Make sure that the correct device drivers are installed. See the manufacturer's website for documentation.

2. 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 95 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.

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.

Network problems

Use this information to resolve issues related to networking.

• "Cannot wake server using Wake on LAN" on page 112

• "Could not log in using LDAP account with SSL enabled" on page 113

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 95), 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).

    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.

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Server hangs during the UEFI boot process

If the system hangs during the UEFI boot process with the message `UEFI: DXE INIT` on the display, make sure that Option ROMs were not configured with a setting of **Legacy**. You can remotely view the current settings for Option ROMs by running the following command using the Lenovo XClarity Essentials OneCLI:

`onecli config show EnableDisableAdapterOptionROMSupport --bmc` *xcc_userid*`:`*xcc_password*`@`*xcc_ipaddress*

To recover a system that hangs during the boot process with Legacy Option ROM settings, see the following Tech Tip:

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

If legacy Option ROMs must be used, do not set slot Option ROMs to **Legacy** on the Devices and I/O Ports menu. Instead, set slot Option ROMs to **Auto** (the default setting), and set the System Boot Mode to **Legacy Mode**. Legacy option ROMs will be invoked shortly before the system boots.

The server immediately displays the POST Event Viewer when it is turned on

Complete the following steps until the problem is solved.

1. Correct any errors that are indicated by the light path diagnostics LEDs.

2. Make sure that the server supports all the processors and that the processors match in speed and cache size.

    You can view processor details from system setup.

    To determine if the processor is supported for the server, see https://serverproven.lenovo.com/.

3. (Trained technician only) Make sure that processor 1 is seated correctly

4. (Trained technician only) Remove processor 2 and restart the server.

5. Replace the following components one at a time, in the order shown, restarting the server each time:

    a. (Trained technician only) Processor

    b. (Trained technician only) System board

Server is unresponsive (POST is complete and operating system is running)

Complete the following steps until the problem is solved.

- If you are in the same location as the server, 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 server and verify that all applications are running (no applications are hung).

    3. Restart the server.

    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 server 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 server from a command line.

        a. If you are unable to get a response during a ping test, attempt to ping another server in the enclosure to determine whether it is a connection problem or server 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 server 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 to reverts to the default UEFI configuration and starts System Setup so that you can make the necessary corrections to the configuration and restart the server. If the server is unable to successfully complete POST with the default configuration, there might be a problem with the system board.

You can specify the number of consecutive restart attempts in System Setup. Restart the server and press the key according to the on-screen instructions to display the LXPM system setup interface. (For more information, see the "Startup" section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/.) Then, click **System Settings ➙ Recovery and RAS ➙ POST Attempts ➙ POST Attempts Limit**. Available options are 3, 6, 9, and disable.

Voltage planar fault is displayed in the event log

Complete the following steps until the problem is solved.

1. Revert the system to the minimum configuration. See "Specifications" on page 1 for the minimally required number of processors and DIMMs.
2. Restart the system.
   - If the system restarts, add each of the items that you removed one at a time, restarting the system each time, until the error occurs. Replace the item for which the error occurs.
   - If the system does not restart, suspect the system board.

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 servers or chassis:

1. Make sure that the room temperature is within the specified range (see "Specifications" on page 1).
2. Check the management processor event log for rising temperature events. If there are no events, the server 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.

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.

Appendix A. Getting help and technical assistance

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

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

http://datacentersupport.lenovo.com

Note: This section includes references to IBM web sites and information about obtaining service. IBM is Lenovo's preferred service provider for ThinkSystem.

Before you call

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

Attempt to resolve the problem yourself

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

You can find the product documentation for your ThinkSystem products at 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. The Lenovo Warranty terms and conditions state that you, the owner of the Lenovo product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.
- If you have installed new hardware or software in your environment, check https://serverproven.lenovo.com/ to make sure that the hardware and software are supported by your product.
- Go to http://datacentersupport.lenovo.com and check for information to help you solve the problem.
  - Check the Lenovo forums at https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv_eg to see if someone else has encountered a similar problem.

Gathering information needed to call Support

If you 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)
- Model number
- Serial number
- Current system UEFI and firmware levels
- Other pertinent information such as error messages and logs

As an alternative to calling Lenovo Support, you can go to https://support.lenovo.com/servicerequest to submit an Electronic Service Request. Submitting an Electronic Service Request will start the process of determining a solution to your problem by making the pertinent information available to the service technicians. The Lenovo service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

Collecting service data

To clearly identify the root cause of a server issue or at the request of Lenovo Support, you might need collect service data that can be used for further analysis. Service data includes information such as event logs and hardware inventory.

Service data can be collected through the following tools:

- **Lenovo XClarity Provisioning Manager**

  Use the Collect Service Data function of Lenovo XClarity Provisioning Manager to collect system service data. You can collect existing system log data or run a new diagnostic to collect new data.

- **Lenovo XClarity Controller**

  You can use the Lenovo XClarity Controller web interface or the CLI to collect service data for the server. The file can be saved and sent to Lenovo Support.

  – For more information about using the web interface to collect service data, see the "Downloading service data" section in the XCC documentation version compatible with your server at https://pubs.lenovo.com/lxcc-overview/.

  – For more information about using the CLI to collect service data, see the "ffdc command" section in the XCC documentation version compatible with your server at https://pubs.lenovo.com/lxcc-overview/.

- **Lenovo XClarity Administrator**

  Lenovo XClarity Administrator can be set up to collect and send diagnostic files automatically to Lenovo Support when certain serviceable events occur in Lenovo XClarity Administrator and the managed endpoints. You can choose to send diagnostic files to Lenovo Support using Call Home or to another service provider using SFTP. You can also manually collect diagnostic files, open a problem record, and send diagnostic files to the Lenovo Support Center.

  You can find more information about setting up automatic problem notification within the Lenovo XClarity Administrator at http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/admin_setupcallhome.html.

- **Lenovo XClarity Essentials OneCLI**

  Lenovo XClarity Essentials OneCLI has inventory application to collect service data. It can run both in-band and out-of-band. When running in-band within the host operating system on the server, OneCLI can collect information about the operating system, such as the operating system event log, in addition to the hardware service data.

To obtain service data, you can run the `getinfor` command. For more information about running the `getinfor`, see https://pubs.lenovo.com/lxce-onecli/onecli_r_getinfor_command.

Contacting Support

You can contact Support to obtain help for your issue.

You can receive hardware service through a Lenovo Authorized Service Provider. To locate a service provider authorized by Lenovo to provide warranty service, go to https://datacentersupport.lenovo.com/serviceprovider and use filter searching for different countries. For Lenovo support telephone numbers, see https://datacentersupport.lenovo.com/supportphonelist for your region support details.

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

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Important notes

Processor speed indicates the internal clock speed of the 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.

Telecommunication regulatory statement

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

Electronic emission notices

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

Additional electronic emissions notices are available at:

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	–	○	○	○	○	○
電纜組合件	–	○	○	○	○	○
電源供應器	–	○	○	○	○	○
儲備設備	–	○	○	○	○	○
電路卡	–	○	○	○	○	○
光碟機	–	○	○	○	○	○

備考1.〝超出0.1 wt％〞及〝超出0.01 wt％〞係指限用物質之百分比含量超出百分比含量基準值。

Note1 : "exceeding 0.1wt%" and "exceeding 0.01 wt%" indicate that the percentage content
   of the restricted substance exceeds the reference percentage value of presence condition.

備考2.〝○〞係指該項限用物質之百分比含量未超出百分比含量基準值。

Note2 : "○"indicates that the percentage content of the restricted substance does not exceed the
   percentage of reference value of presence.

備考3.〝–〞係指該項限用物質為排除項目。

Note3 : The "-" indicates that the restricted substance corresponds to the exemption.

Taiwan Region import and export contact information

Contacts are available for Taiwan Region import and export information.

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