Lenovo

ThinkSystem SR670
Setup Guide

Machine Types: 7Y36, 7Y37, and 7Y38

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

Nineth Edition (November 2021)

Contents

Chapter 1. Introduction

The ThinkSystem™ SR670 server is a 2U rack server that enables the support of up to four PCIe 3.0 x16 Graphics Processing Unit (GPU) adapters directly attached to the server processors.

Special notices

Service should only be performed by trained and authorized service personnel.

This equipment is not suitable for use in locations where children are likely to be present.

The product is only to be powered on within a rack.

The product is intended to be installed in a server room only. The product is not suitable for use in the direct field of view at a visual display workplace according to §2 of the Workplace Regulations.

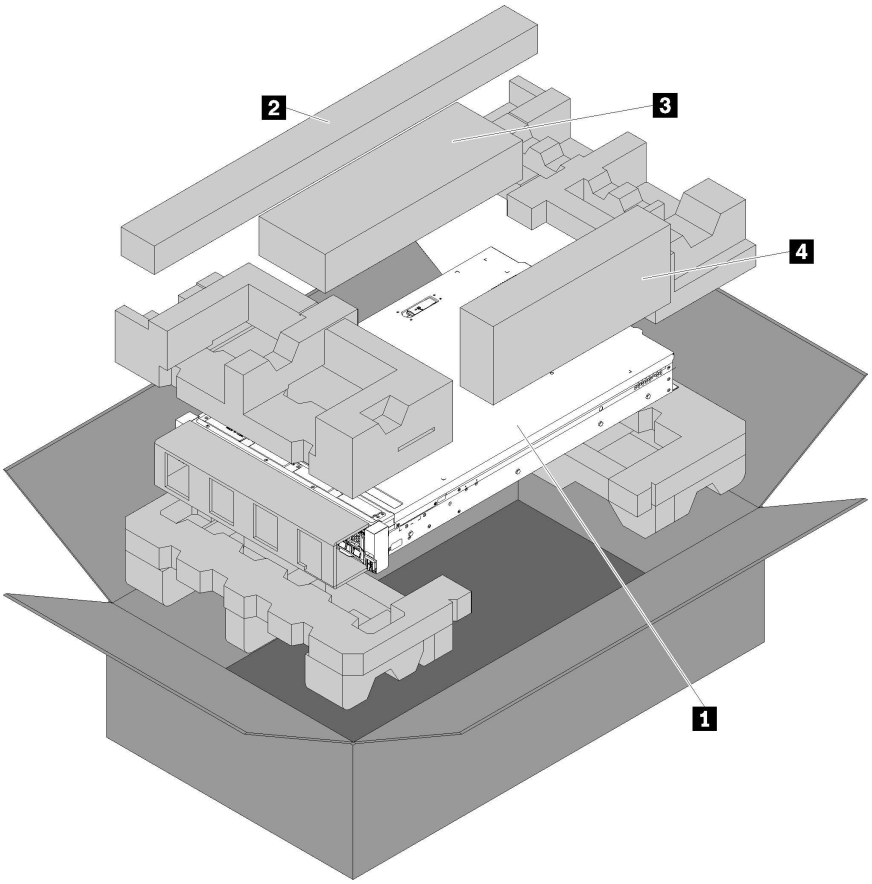
Helpful links

You might find the following links helpful:

Warranty lookup	Lenovo ServerProven	Software and operating systems
Lenovo product guides (Lenovo Press)	Lenovo forums	Drivers and Software downloads
Lenovo Support	Lenovo open source projects	Drivers and Firmware Updates Best Practices
Lenovo security advisories		

Server package contents

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



The server package includes the following items:

1 Server.

2 Slides kit. Detailed instructions for installing the slides in a rack are provided in the package with the slides kit.

3 Shipping bracket kit.

4 Material box, including items such as accessory kit, power cords, and documentation.

Identifying your server

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

The machine type and serial number are on the ID label on the right rack latch in the front of the server.

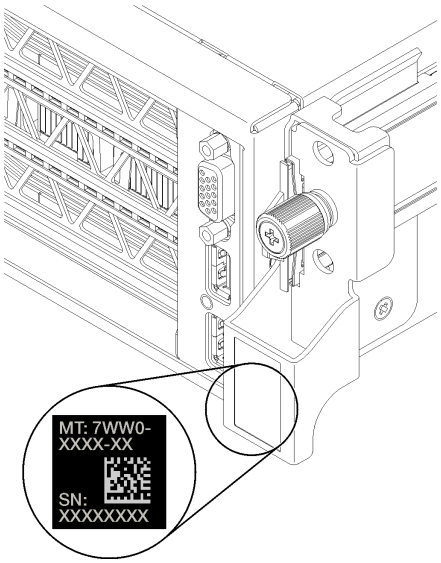


Figure 1. Location of the ID label

XClarity Controller network (XCC) access label

The XCC network access label is attached on the right side of the right pullout tab 1 (as you are looking at the server from the front). After you receive the server, peel the XCC network access label away and store it in a safe place.

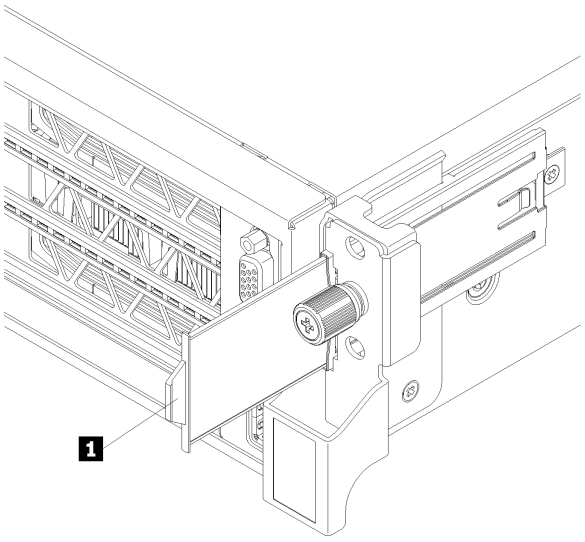


Figure 2. Location of the XClarity Controller network access label

Quick response code

The system service label, which is on the underside of the top cover, provides a quick response (QR) code for mobile access to service information. Scan the QR code with a mobile device to get quick access to the Lenovo Service web site for this server. The Lenovo Service Information Web site provides additional information for parts installation and replacement videos, and error codes for server support.

The following illustration shows the QR code:

https://support.lenovo.com/p/servers/sr670

Figure 3. QR code

Features

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

Your server implements the following features and technologies:

- **Lenovo XClarity Controller (XCC)**

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

  Some of the features that are unique to the Lenovo XClarity Controller are enhanced performance, higher-resolution remote video, and expanded security options. For additional information about the Lenovo XClarity Controller, refer to 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/.

- **UEFI-compliant server firmware**

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

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

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

- **Large system-memory capacity**

  The server supports registered DIMMs (RDIMMs). For more information about the specific types and maximum amount of memory, see “Specifications” on page 6.

- **Integrated Trusted Platform Module (TPM)**

  This integrated security chip performs cryptographic functions and stores private and public secure keys. It provides the hardware support for the Trusted Computing Group (TCG) specification. You can download the software to support the TCG specification, when the software is available.

  Note: For customers in the People’s Republic of China, the on-board TPM is not supported. However, customers in the People’s Republic of China can install a Lenovo-qualified TPM card (sometimes called a daughter card).

- **Large data-storage capacity**

  The server supports a maximum of eight 2.5-inch SATA hot-swap storage drives using the onboard RAID controller.

  Alternatively, the server supports a maximum of eight 2.5-inch SAS hot-swap storage drives if any supported RAID adapter is installed.

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

  The server provides a QR code on the system service label, which is located on the underside of the server, that you can scan with a mobile device to get quick access to the Lenovo Service Information

website. The Lenovo Service Information website provides additional information for parts installation and replacement videos, and error codes for server support.

- **Redundant cooling and optional power capabilities**

  The server supports a maximum of two hot-swap power supplies and six fans (each with redundant rotors), which provide redundancy for a typical configuration. The redundant cooling by the fans in the server enables continued operation if one of the fans fails.

Specifications

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

Table 1. Server specifications

Specification	Description
Dimension	• 2U • Height: 86.5 mm (3.4 in.) • Width: – Top cover: 438.7 mm (17.3 in.) – EIA flange: 488.0 mm (19.3 in.) • Depth: – EIA flange to rear: 869.5 mm (34.3 in.) – Overall: 932.8 mm (36.8 in.)
Weight	Approximately 37.3 kg (71.9 lbs.), depending on your configuration
Processor	The server requires two Intel ® XEON® processors. For a list of supported processors, see: https://serverproven.lenovo.com/ **Notes:** • Processors are factory-installed only; no field upgrade. • Due to lower operational processor temperature requirements, full performance cannot be guaranteed and processor throttling may occur when the ambient temperature is above 27°C or when a fan failure event occurs for the following processor SKUs: – 6242R – 6246R – 6248R – 6258R

Table 1. Server specifications (continued)

Specification	Description
DIMM	The server contains 24 DIMM slots, which can be populated with 16 GB or 32 GB registered DIMMs (RDIMMs) in quantities of 8, 12, 16, or 24. **Note:** All DIMMs installed in the server must be the same type and capacity. • Minimum configuration: 128 GB using 8 RDIMMs • Maximum configuration: 768 GB using 24 RDIMMs See "Memory configuration" on page 68 for supported DIMM types and population rules. For a list of supported DIMMs, see: https://serverproven.lenovo.com/ **Note:** List of supported memory module is different for 1st generation (Skylake) and 2nd generation (Cascade Lake) Intel Xeon processors. Make sure to install compatible memory modules to avoid system error.
Internal drives	The supported drives vary by models. • Up to eight 2.5-inch hot-swap SATA drives using the onboard RAID controller. • Up to eight 2.5-inch hot-swap SAS drives using a supported RAID adatper or HBA. • Up to two M.2 drives mounted on a vertical M.2 backplane.
Expansion slots	• Two PCIe 3.0 x16 slots and one PCIe 3.0 x4 slot in the I/O expansion cage • Two PCIe 3.0 x16 slots in PCIe expansion cage 1 • Two PCIe 3.0 x16 slots in PCIe expansion cage 2 For detailed information, see "Front view" on page 15.
Input/Output (I/O) features	• Front panel: – One VGA connector – One USB 2.0 connector and one USB 3.0 connector • Rear panel: – One serial port

Table 1. Server specifications (continued)

Specification	Description
Graphics processing unit (GPU)	The server supports the following double-width, full-height, full-length (FHFL) GPUs, which can be installed in the 3-slot PCIe expansion cage only: • NVIDIA P40 • NVIDIA V100 16 GB • NVIDIA V100 32 GB • AMD Radeon Instinct MI25 For a list of supported GPU adapters, see: https://lenovopress.com/lp1051-lenovo-thinksystem-sr670-server-xeon-sp-gen-2#gpu-adapters. **Note:** With GPUs greater than 250W (such as the AMD MI-25) and CPUs greater than 165W and 165W low TCase SKUs (8180, 8168, 6154, 6146, and 6144), full performance cannot be guaranteed and CPU throttling might occur for ambient temperatures above 30°C. The server also supports the following single-width, full-height, half-length (FHHL) GPU, which can be installed in the 4-slot PCIe expansion cage or in the 3-socket PCIe expansion cage: • NVIDIA T4 70W Low Profile 16 GB **Note:** If you choose to install a single-width, full-height, half-length GPU in the 3-socket PCIe expansion cage, you must install in either the top slot of the bottom slot. The middle slot does not have PCIe connectivity.
RAID adapters	• ThinkSystem RAID 530-8i PCIe adapter • ThinkSystem RAID 730-8i 2GB PCIe adapter • ThinkSystem RAID 930-8i adapter The adapter supports data retention by using NAND flash memory down on the adapter, backed up by the ThinkSystem RAID 930 supercapacitor (called a supercap).
Host bus adapter	• ThinkSystem 430-8i SAS/SATA 12 GB Dense HBA • ThinkSystem 430-8e adapter
System fans	Six dual-rotor fans
Power supplies	Two hot-swap power supplies for redundancy support • 2000-watt, 220V ac **Note:** In order for the ThinkSystem products to operate error free in both a DC or AC electrical environment, a TN-S earthing system which complies to 60364-1 IEC 2005 standard has to be present or installed.
Electrical input	• Sine-wave input (50 Hz to 60 Hz) required • Input voltage high range: – Minimum: 200 V ac – Maximum: 240 V ac **CAUTION:** **240 V dc input (input range: 180-300 V dc) is supported in Chinese Mainland ONLY. Power supply with 240 V dc input cannot support hot plugging power cord function. Before removing the power supply with dc input, please turn off server or disconnect dc power sources at the breaker panel or by turning off the power source. Then, remove the power cord.**

Table 1. Server specifications (continued)

Specification	Description
Acoustical noise emissions (base configuration)	• Sound power, idling: 6.7 bels • Sound power, operating (typical workload): 7.3 bels • Sound power, operating (maximum workload): 8.3 bels **Notes:** • The options supported in this server vary in function, power consumption, and required cooling. Any increase in cooling required by these options will increase the fan speed and generated sound level. The actual sound pressure levels measured in your installation depend upon a variety of factors, including: the number of racks in the installation; the size, materials, and configuration of the room; the noise levels of other equipment; the room ambient temperature and barometric pressure; and the location of employees in relation to the equipment. • The declared acoustic noise level are based on specified configurations and they may change depending on configuration/condition changes. • The declared acoustic noise levels may increase greatly, if high-power components are installed such as high-power NICs, high-power processors and GPUs.
Heat output	Approximate heat output: • Minimum configuration: 2543.86 BTU, 746W (in BTU per hour and watts) – Minimum configuration of two processors, 8 memory modules, zero M.2 adapters, zero PCIe adapters, zero HDDs, zero GPUs, two 2000W power supplies • Maximum configuration: 6963.22 BTU, 2042W (in BTU per hour and watts) – Maximum configuration of two processors, 24 memory modules, two M.2 adapters, three PCIe network adapters, eight HDDs, four GPUs, two 2000W power supplies

Table 1. Server specifications (continued)

Specification	Description
Environment	The server is supported in the following environment: • Air temperature: – Operating: – ASHRAE class A2: 10–35°C (50–95°F); when the altitude exceeds 900 m (2953 ft), the maximum ambient temperature value decreases by 1°C (1.8°F) with every 300 m (984 ft) of altitude increase. – Server off: 5–45°C (41–113°F) – Shipping or storage: -40–60°C (-40–140°F) • Maximum altitude: 3050 m (10 000 ft) • Relative humidity (non-condensing): – Operating: – ASHRAE class A2: 8%–80%; maximum dew point: 21°C (70°F) – Shipping or storage: 8%–90% • Particulate contamination **Attention:** Airborne particulates and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server. **Notes:** • Your server complies with ASHRAE class A2 specifications. The server performance might be impacted when the operating temperature is outside the ASHRAE A2 specifications. • The server is designed for standard data center environment and recommended to be placed in industrial data center.
Operating systems	Supported and certified operating systems: • Microsoft Windows Server • VMware ESXi • Red Hat Enterprise Linux • SUSE Linux Enterprise Server References: • Complete list of available operating systems: https://lenovopress.lenovo.com/osig. • OS deployment instructions: “Deploy the operating system” on page 69.

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.

Management options

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

Overview

Options	Description
Lenovo XClarity Controller	Baseboard management controller. (BMC) Consolidates the service processor functionality, Super I/O, video controller, and remote presence capabilities into a single chip on the server system board. **Interface** • CLI application • Web GUI interface • Mobile application • REST API **Usage and downloads**
Lenovo XClarity Essentials toolset	Portable and light toolset for server configuration, data collection, and firmware updates. Suitable both for single-server or multi-server management contexts. **Interface** • **OneCLI**: CLI application • **Bootable Media Creator**: CLI application, GUI application • **UpdateXpress**: GUI application **Usage and downloads** https://pubs.lenovo.com/lxce-overview/
Lenovo XClarity Provisioning Manager	UEFI-based embedded GUI tool on a single server that can simplify management tasks. **Interface** • Web interface (BMC remote access) • GUI application **Usage and downloads** https://pubs.lenovo.com/lxpm-overview/ **Important:** Lenovo XClarity Provisioning Manager (LXPM) supported version varies by product. All versions of Lenovo XClarity Provisioning Manager are referred to as Lenovo XClarity Provisioning Manager and LXPM in this document, unless specified otherwise. To see the LXPM version supported by your server, go to https://pubs.lenovo.com/lxpm-overview/.

Functions

Options		Functions							
		Multi-system mgmt	**OS deploy-ment**	**System configu-ration**	**Firm-ware up-dates[1]**	**Event-s/alert moni-toring**	**Inven-tory/ logs**	**Pow-er mgmt**	**Power planning**
Lenovo XClarity Controller				√	√[2]	√	√[4]		
Lenovo XClarity Essen-tials toolset	OneCLI	√		√	√[2]	√	√[4]		
	Bootable Media Creator			√	√[2]		√[4]		
	UpdateXpress			√	√[2]				
Lenovo XClarity Provisioning Manager			√	√	√[3]		√[5]		

Notes:

1. Most options can be updated through the Lenovo tools. Some options, such as GPU firmware or Omni-Path firmware require the use of supplier tools.
2. The server UEFI settings for option ROM must be set to **Auto** or **UEFI** to update firmware using Lenovo XClarity Administrator, Lenovo XClarity Essentials, or Lenovo XClarity Controller.
3. Firmware updates are limited to Lenovo XClarity Provisioning Manager, Lenovo XClarity Controller, and UEFI updates only. Firmware updates for optional devices, such as adapters, are not supported.
4. The server UEFI settings for option ROM must be set to **Auto** or **UEFI** for detailed adapter card information, such as model name and firmware levels, to be displayed in Lenovo XClarity Administrator, Lenovo XClarity Controller, or Lenovo XClarity Essentials.
5. Limited inventory.

Chapter 2. Server components

This section provides information to help you locate your server components.

Front view

On the front of the server, the following components are available: PCIe adapters, PCIe expansion cages, and the KVM connectors (Monitor and 2 USB ports).

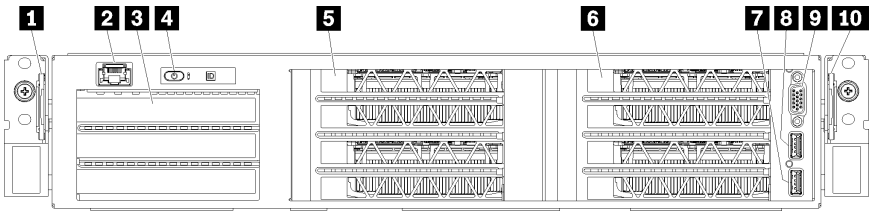


Figure 4. Front view of the server

Table 3. Components on the front of the server

Callout	Callout
1 Left pullout tab	2 Management port
3 I/O expansion cage	4 Operator panel
5 PCIe expansion cage 2	6 PCIe expansion cage 1
7 USB 2.0 port	8 USB 3.0 port
9 Video port	10 Right pullout tab

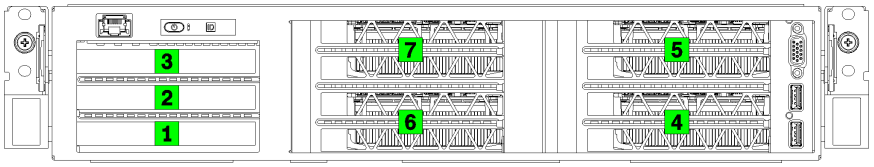


Figure 5. Numbering of the PCIe slots on the server (3-socket PCIe expansion cage)

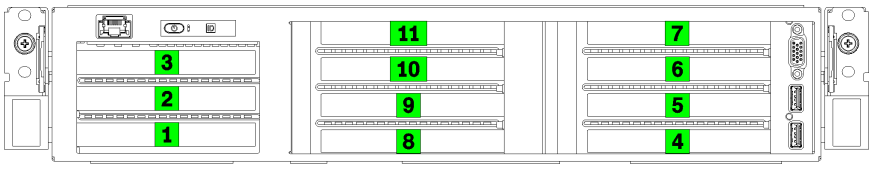


Figure 6. Numbering of the PCIe slots on the server (4-socket PCIe expansion cage)

1 Left pullout tab

You can use the left pullout tab to affix information specific to your server.

2 Management port

Through the management port, you can access the XCC directly by connecting your laptop to the management port using an Ethernet cable. Make sure that you modify the IP settings on the laptop so that it is on the same network as the server default settings.

Important: Access to the XCC on the Product_name, either locally or remotely, is supported **only** through the management port.

3 I/O expansion cage

The I/O expansion cage contains:

- Two PCIe 3.0 x16 full-height, half-length slots
- One PCIe 3.0 x4 full-height, half-length slot

4 Operator panel

For information about the operator panel, see "Operator panel" on page 17.

5 PCIe expansion cage 2

Two types of PCIe expansion cage are available:

- 3-socket PCIe expansion cage, which contains:
  - Three PCIe 3.0 x16 full-height, full-length slots

    Note: Only the top and bottom slots are available for use. The middle slot has no PCIe connectivity.
- 4-socket PCIe expansion cage, which contains:
  - Four PCIe 3.0 x16 full-height, half-length slots.

    Note: Only single-width, full-height, half-length GPUs are support in the 4-socket PCIe expansion cage.

Important: The same type of PCIe expansion cage must be used for PCIe expansion cage 2 and PCIe expansion cage 1.

See Figure 5 "Numbering of the PCIe slots on the server (3-socket PCIe expansion cage)" on page 15 and Figure 6 "Numbering of the PCIe slots on the server (4-socket PCIe expansion cage)" on page 15 for the ordering of the PCIe slots in PCIe expansion cage 2.

6 PCIe expansion cage 1

Two types of PCIe expansion cage are available:

- 3-socket PCIe expansion cage, which contains:
  - Three PCIe 3.0 x16 full-height, full-length slots

    Note: Only the top and bottom slots are available for use. The middle slot has no PCIe connectivity.
  - **7** USB 3.0 port
  - **8** USB 2.0 port
  - **9** Video port
- 4-socket PCIe expansion cage, which contains:
  - Four PCIe 3.0 x16 full-height, half-length slots.

Note: Only single-width, full-height, half-length GPUs are supported in the 4-socket PCIe expansion cage.

- 7 USB 3.0 port
- 8 USB 2.0 port
- 9 Video port

Important: The same type of PCIe expansion cage must be used for PCIe expansion cage 2 and PCIe expansion cage 1.

See Figure 5 “Numbering of the PCIe slots on the server (3-socket PCIe expansion cage)” on page 15 and Figure 6 “Numbering of the PCIe slots on the server (4-socket PCIe expansion cage)” on page 15 for the ordering of the PCIe slots in PCIe expansion cage 2.

10 Right pullout tab

The XCC network label is affixed to the right side of the right pullout tab.

Operator panel

The operator panel of the server provides controls and LEDs.

The following illustration shows the operator panel of the server.

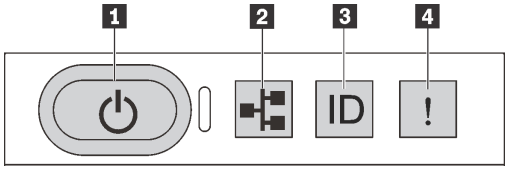


Figure 7. Operator panel

Table 4. Components on the operator panel

Callout	Callout
1 Power button with power status LED	2 System activity LED
3 System ID button with system ID LED	4 System error LED

1 Power button with power status LED

You can press the power button to power on the server when you finish setting up the server. You also can hold the power button for several seconds to power off the server if you cannot shut down the server from the operating system. The power status LED helps you to determine the current power status.

Status	Color	Description
Solid on	Green	The server is on and running.
Slow blinking (about one flash per second)	Green	The server is off and is ready to be powered on (standby state).
Fast blinking (about four flashes per second)	Green	The server is off, but the XClarity Controller is initializing, and the server is not ready to be powered on.
Off	None	There is no ac power applied to the server.

2 System activity LED

The system activity LED on the operator panel is not currently used.

3 System ID button with system ID LED

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

4 System error LED

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

Status	Color	Description	Action
On	Yellow	An error has been detected on the server. Causes might include but not limited to the following errors: • The temperature of the server reached the non-critical temperature threshold. • The voltage of the server reached the non-critical voltage threshold. • A fan has been detected to be running at low speed. • The power supply has a critical error. • The power supply is not connected to the power.	Check the event log to determine the exact cause of the error.
Off	None	The server is off or the server is on and is working correctly.	None.

Rear view

The rear of the server provides access to several connectors and components.

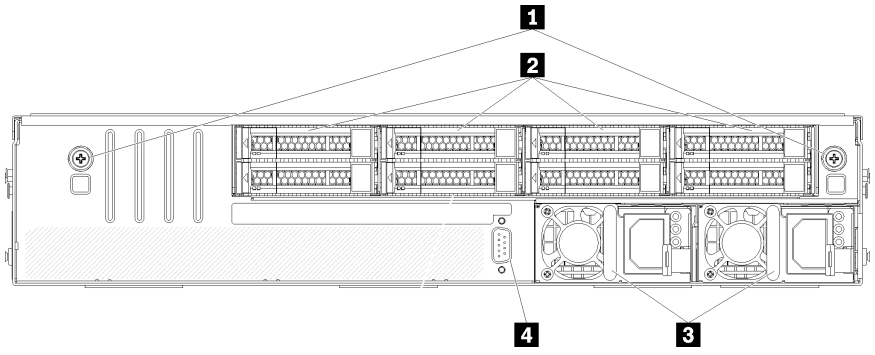


Figure 8. Rear view of server

Table 5. Components on the rear of the server

Callout	Callout
1 Drive cage thumbscrews	2 Hot-swap hard drives
3 Hot-swap power supplies	4 Serial port

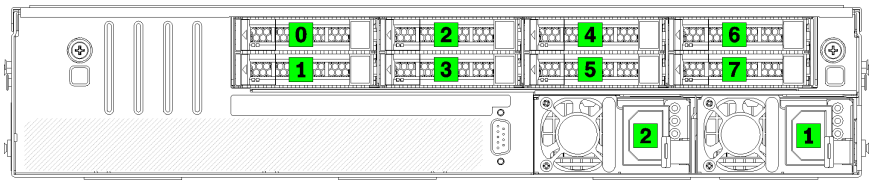


Figure 9. Numbering of hard drives and power supplies

1 Drive cage thumbscrews

Use these thumbscrews to secure the drive cage to the server chassis.

2 Hot-swap hard drives

You can install up to eight hot-swap hard drives. The hard drive bays are numbered from 0 to 7 (and labeled). See Figure 9 “Numbering of hard drives and power supplies” on page 19.

3 Hot-swap power supplies

You must install two hot-swap power supplies. Power supplies are numbered 1 and 2. See Figure 9 “Numbering of hard drives and power supplies” on page 19.

4 Serial port

Use the serial port to connect to the host system serial interface.front

Power Supply LEDs

The illustration in this section shows the power supply LEDs.

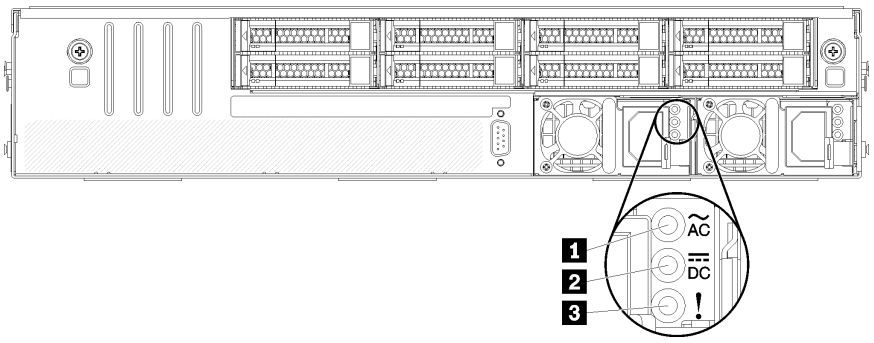


Figure 10. Rear view LEDs of the server

Table 6. Power supply LEDs

Callout	Callout
1 Power input LED	2 Power output LED
3 Power supply error LED	

1 Power input LED
2 Power output LED
3 Power supply error LED

Each hot-swap power supply has three status LEDs.

LED	Description
1 Power input LED	• Green: The power supply is connected to the ac power source. • Off: The power supply is disconnected from the ac power source or a power problem occurs.
2 Power output LED	• Green: The server is on and the power supply is working normally. • Off: The server 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: The power supply has failed. To resolve the issue, replace the power supply. • Off: The power supply is working normally.

System board components

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

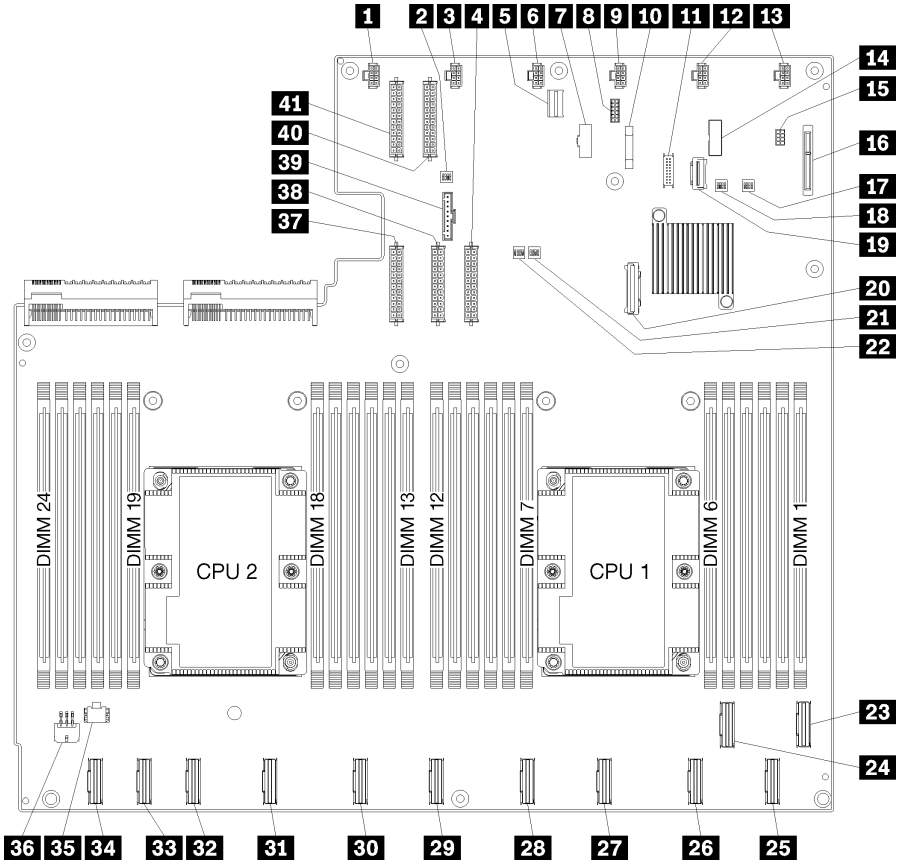


Figure 11. System board components

Table 7. System board components

Callout	Callout
1 System fan 6 connector	2 Switch block 1
3 System fan 5 connector	4 Power connector 1
5 XClarity Controller management connector	6 System fan 4 connector
7 Front panel VGA connector	8 Serial connector
9 System fan 3 connector	10 3V battery (CR2032)
11 Front panel USB connector	12 System fan 2 connector
13 System fan 1 connector	14 TPM header
15 Storage management connector	16 M.2 backplane connector
17 PCH/ME switch block	18 Switch block 3
19 PCIe connector 13 (PCIe x4)	20 SATA connector
21 FPGA switch block	22 Switch block 2

Table 7. System board components (continued)

Callout	Callout
23 PCIe connector 1 (CPU1)	24 PCIe connector 2 (CPU1)
25 PCIe connector 3 (CPU1)	26 PCIe connector 4 (CPU1)
27 PCIe connector 5 (CPU1)	28 PCIe connector 6 (CPU1)
29 PCIe connector 7 (CPU2)	30 PCIe connector 8 (CPU2)
31 PCIe connector 9 (CPU2)	32 PCIe connector 10 (CPU2)
33 PCIe connector 11 (CPU2)	34 PCIe connector 12 (CPU2)
35 I/O cage power connector 2	36 I/O cage power connector 1
37 Power connector 5	38 Power connector 2
39 Operator panel connector	40 Power connector 3
41 Power connector 4	

The system board is secured by two air baffle posts, two M.2 adapter guideposts, and 10 screws. See the following image for the locations.

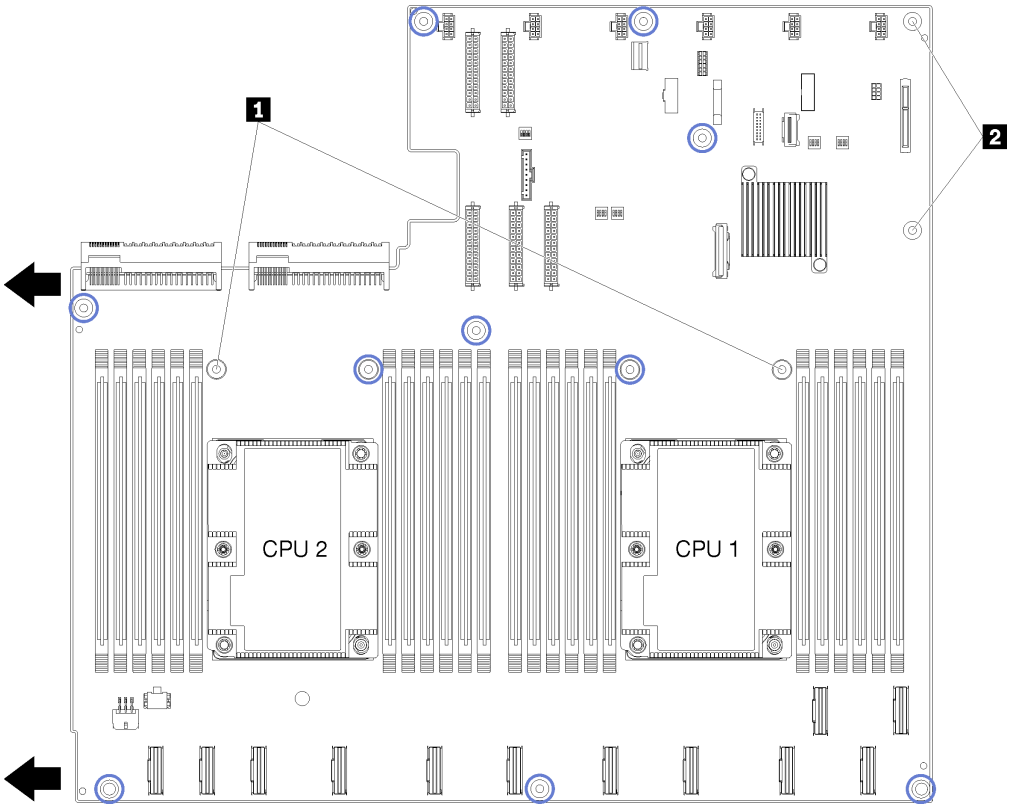


Figure 12. System board screw locations

Table 8. System board components

1 Air baffle posts
2 M.2 adapter guideposts

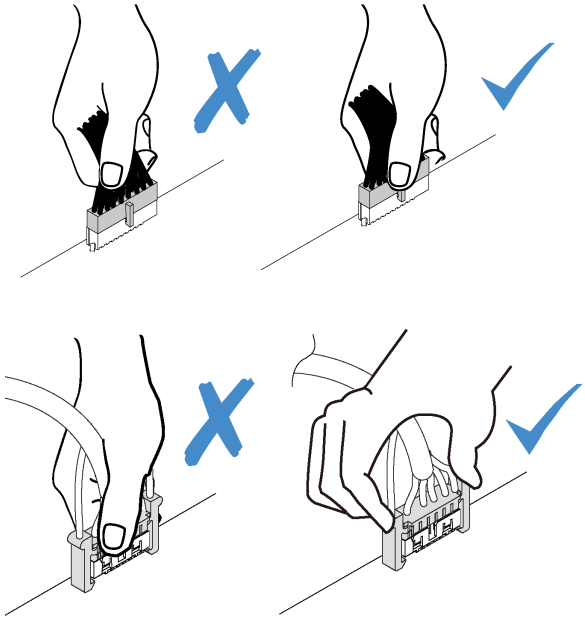
Internal cable routing

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

To connect cables, observe the following guidelines:

- Turn off the server before you connect or disconnect any internal cables.
- See the documentation that comes with any external devices for additional cabling instructions. It might be easier for you to route cables before you connect the devices to the server.
- Cable identifiers of some cables are printed on the cables that come with the server and optional devices. Use these identifiers to connect the cables to the correct connectors.
- Ensure that the cable is not pinched and does not cover any connectors or obstruct any components on the system board.
- Ensure that the relevant cables pass through the cable guides, troughs, and pathways.

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.



Internal cable routing guides

Wthin the server chassis, several cable routing guides are available to ensure that all cables are routed appropriately.

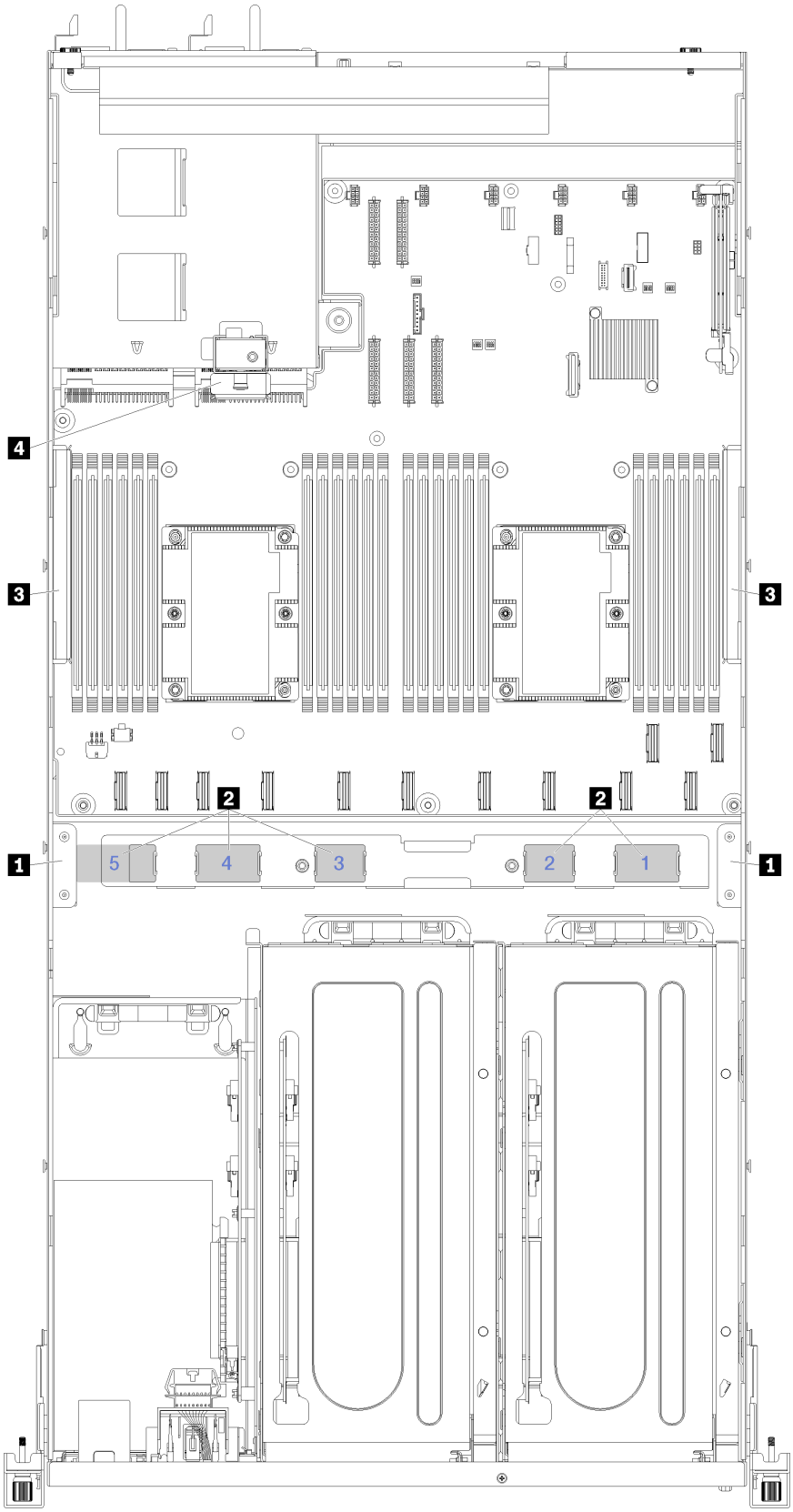


Figure 13. Cable routing guides

Note: Blue numbers represent cable routing pathways under the fan cage.

Cable Guide	Description
1 Front cable routing guides	Two cable routing guides are provided on the left and right of the cable pathways (when looking at the server from the front). • **Left front cable routing guide**. The order of cable placement in the left front cable routing guide is as follows: 1. Management port cable 2. Operator panel cable 3. PCIe expansion cage 2 power cable assembly. See "3-slot PCIe expansion cage 2 cable routing" on page 40 for PCIe expansion cage 2 cable routing. 4. RAID adapter SAS signal cables (if installed) • **Right front cable routing guide**. The order of cable placement in the right front cable routing guide is as follows: 1. USB cable 2. VGA cable 3. PCIe expansion cage 1 power cable assembly.
2 Cable routing pathways	The cable routing pathways ensure that sufficient clearance is available to protect the cables when the fan cage is installed. The following cable pathways are used: • Cable pathway 1 is unused. • Cable pathway 2. Routing for the PCIe cables from PCIe expansion cage 1. See "3-slot PCIe expansion cage 1 cable routing" on page 31 for PCIe expansion cage 1 cable routing. • Cable pathway 3. Routing for the PCIe cables from PCIe expansion cage 2. See "3-slot PCIe expansion cage 2 cable routing" on page 40 for PCIe expansion cage 2 cable routing. • Cable pathway 4. Routing for the PCIe cables from the I/O expansion cage. See "I/O expansion cage cable routing" on page 27 for I/O expansion cage cable routing. • Cable pathway 5. Routing for the I/O expansion cage card power cable.

Cable Guide	Description
3 Cable routing troughs	Two removable cable routing troughs are provided on the left and right of the server and behind the cable pathways (when looking at the server from the front). • **Left cable routing trough** The order of cable placement for the cables in the left cable routing trough is as follows: 1. Management port cable 2. Operator panel cable 3. PCIe expansion cage 2 power cable assembly. See "3-slot PCIe expansion cage 2 cable routing" on page 40 for PCIe expansion cage 2 cable routing. 4. RAID adapter SAS signal cables (if installed) • **Right cable routing trough** The order of cable placement for cables in the right cable routing trough is as follows: 1. PCIe 13 cable 2. USB cable 3. VGA cable 4. PCIe expansion cage 1 power cable assembly. See "3-slot PCIe expansion cage 1 cable routing" on page 31 for PCIe expansion cage 1 cable routing. 5. Fan cage power cable.
4 Rear cable routing guide	The rear cable routing guide is located in front of the drive cage. The order of cable placement for the cables in the rear cable routing guide is as follows: The order of cable placement for the cables in the rear cable routing guide is as follows: 1. Management port cable 2. Operator panel cable 3. PCIe expansion cage 2 power cable assembly. See "3-slot PCIe expansion cage 2 cable routing" on page 40 for PCIe expansion cage 2 cable routing.

I/O expansion cage cable routing

Use the section to understand the cable routing for the I/O expansion cage.

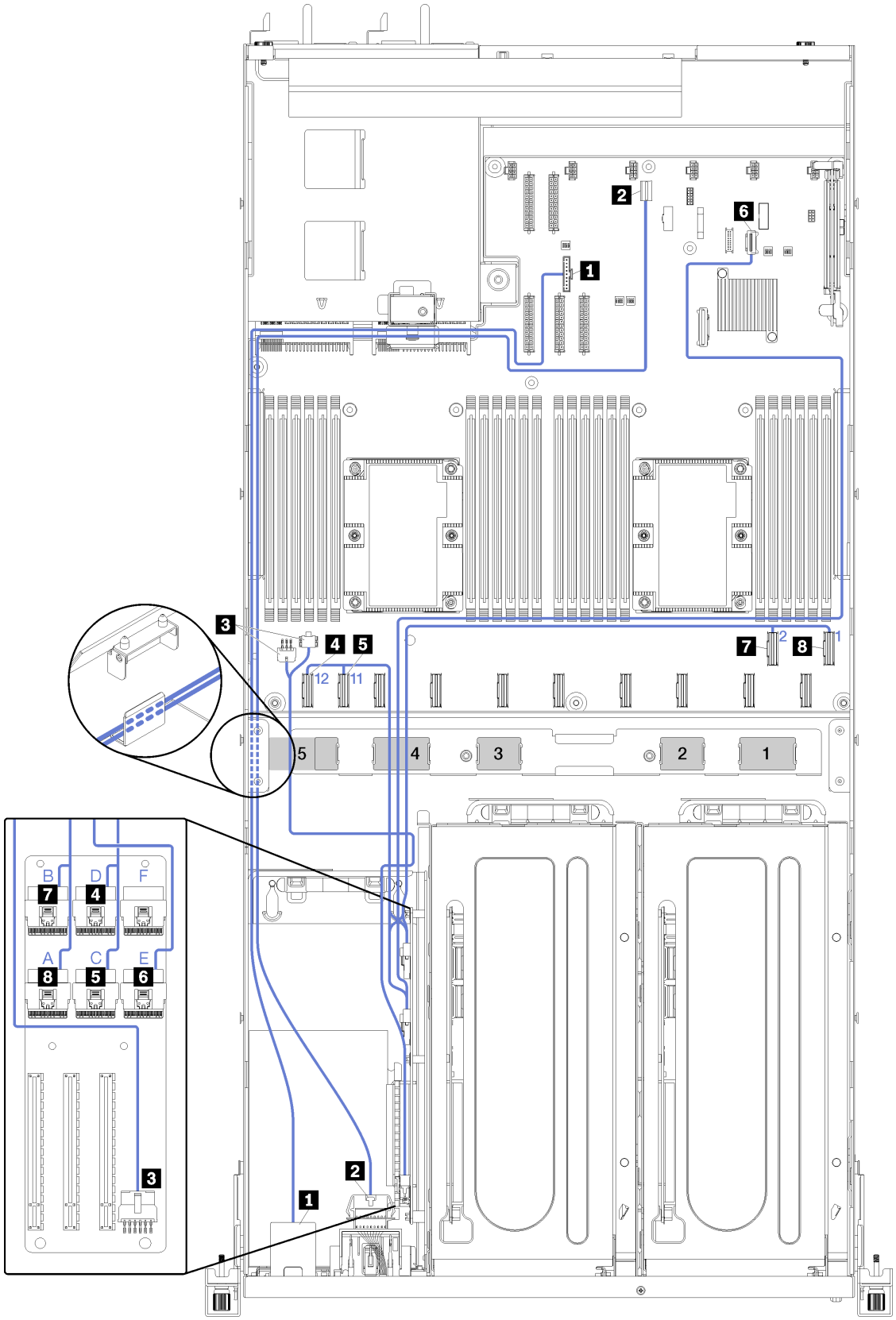


Figure 14. Cable routing for the I/O expansion cage

Note: Blue numbers/alphabets represent cable routing pathways under the fan cage.

The management port cable and operator panel cable are routed through the left cable routing trough (as you are looking from the front of the server) and through the rear cable routing guide. The order of cable placement for cables in the left cable routing trough is as follows:

1. Management port cable
2. Operator panel cable
3. PCIe expansion cage 2 power cable assembly. See "3-slot PCIe expansion cage 2 cable routing" on page 40 for PCIe expansion cage 2 cable routing.
4. RAID adapter SAS signal cables (if installed)

The order of cable placement in the rear cable routing guide is as follows:

1. Management port cable
2. Operator panel cable
3. PCIe expansion cage 2 power cable assembly. See "3-slot PCIe expansion cage 2 cable routing" on page 40 for PCIe expansion cage 2 cable routing.

Cable	From	To
1 Management port cable	The XClarity Controller management connector on the system board.	To the management port adapter in the I/O cage through the rear cable routing guide and through the left cable routing trough (as you are looking from the front of the server).
2 Operator panel power cable	The operator panel connector on the system board.	To the operator panel in the I/O cage through the rear cable routing guide and through the left cable routing trough (as you are looking from the front of the server).
3 I/O cage expansion card power cable	I/O cage power connector 1 and I/O cage power connector 2 on the system board.	To the power connector on the I/O cage expansion card through cable routing pathway 5.
4 PCIe 12 cable	PCIe connector 12 on the system board.	To PCIe connector D on the I/O cage expansion card through cable routing pathway 4.
5 PCIe 11 cable	PCIe connector 11 on the system board.	To PCIe connector C on the I/O cage expansion card through cable routing pathway 4.
6 PCIe 13 cable	PCIe connector 13 on the system board (labeled PCIe x4).	To PCIe connector E on the I/O cage expansion card through the right cable routing trough (as you are looking from the front of the server) and through cable routing pathway 4.
7 PCIe 2 cable	PCIe connector 2 on the system board.	To PCIe connector B on the I/O cage expansion card through cable routing pathway 4.
8 PCIe 1 cable	PCIe connector 1 on the system board.	To PCIe connector A on the I/O cage expansion card through cable routing pathway 4.

3-slot PCIe expansion cage 1 cable routing

Use the section to understand the cable routing for 3-slot PCIe expansion cage 1.

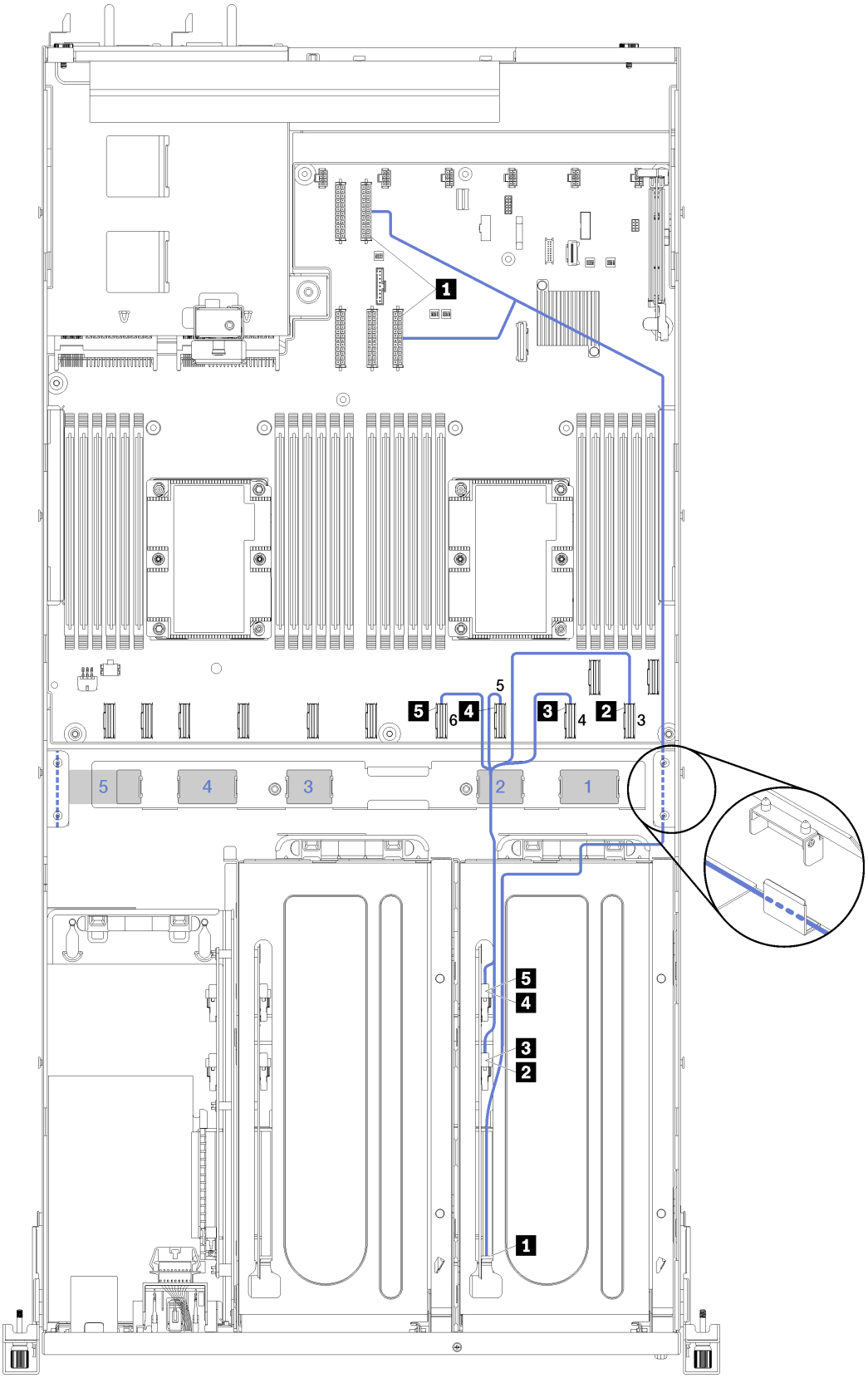


Figure 15. Cable routing for the 3-slot PCIe expansion cage 1

Note: Blue numbers represent cable routing pathways under the fan cage.

The PCIe expansion cage power cable is routed through the right cable routing trough (as you are looking from the front of the server). The order of cable placement for cables in the right cable routing trough is as follows:

1. PCIe 13 cable
2. USB cable
3. VGA cable
4. PCIe expansion cage 1 power cable assembly
5. Fan cage power cable. See "Fan cage cable routing" on page 53 for system fan cage routing information.

Cable	From	To
1 PCIe expansion cage 1 power cable (includes cabling for the PCIe expansion cage 1 and both GPU adapters)	Power connector 1 and power connector 3 on the system board.	**Note:** The GPU adapter power cable is routed through the right cable routing trough (as you are looking from the front of the server). • Power connector on the PCIe expansion cage 1 card. • GPU adapter in slot 4 • GPU adapter in slot 5
2 PCIe 3 cable	PCIe connector 3 on the system board.	To PCIe connector F on the PCIe expansion cage 1 expansion card through cable pathway 2.
3 PCIe 4 cable	PCIe connector 4 on the system board.	To PCIe connector E on the PCIe expansion cage 1 expansion card through cable pathway 2.
4 PCIe 5 cable	PCIe connector 5 on the system board.	To PCIe connector A on the PCIe expansion cage 1 expansion card through cable pathway 2.
5 PCIe 6 cable	PCIe connector 6 on the system board.	To PCIe connector B on the PCIe expansion cage 1 expansion card through cable pathway 2.

4-slot PCIe expansion cage 1 cable routing

Use the section to understand the cable routing for the 4-slot PCIe expansion cage 1.

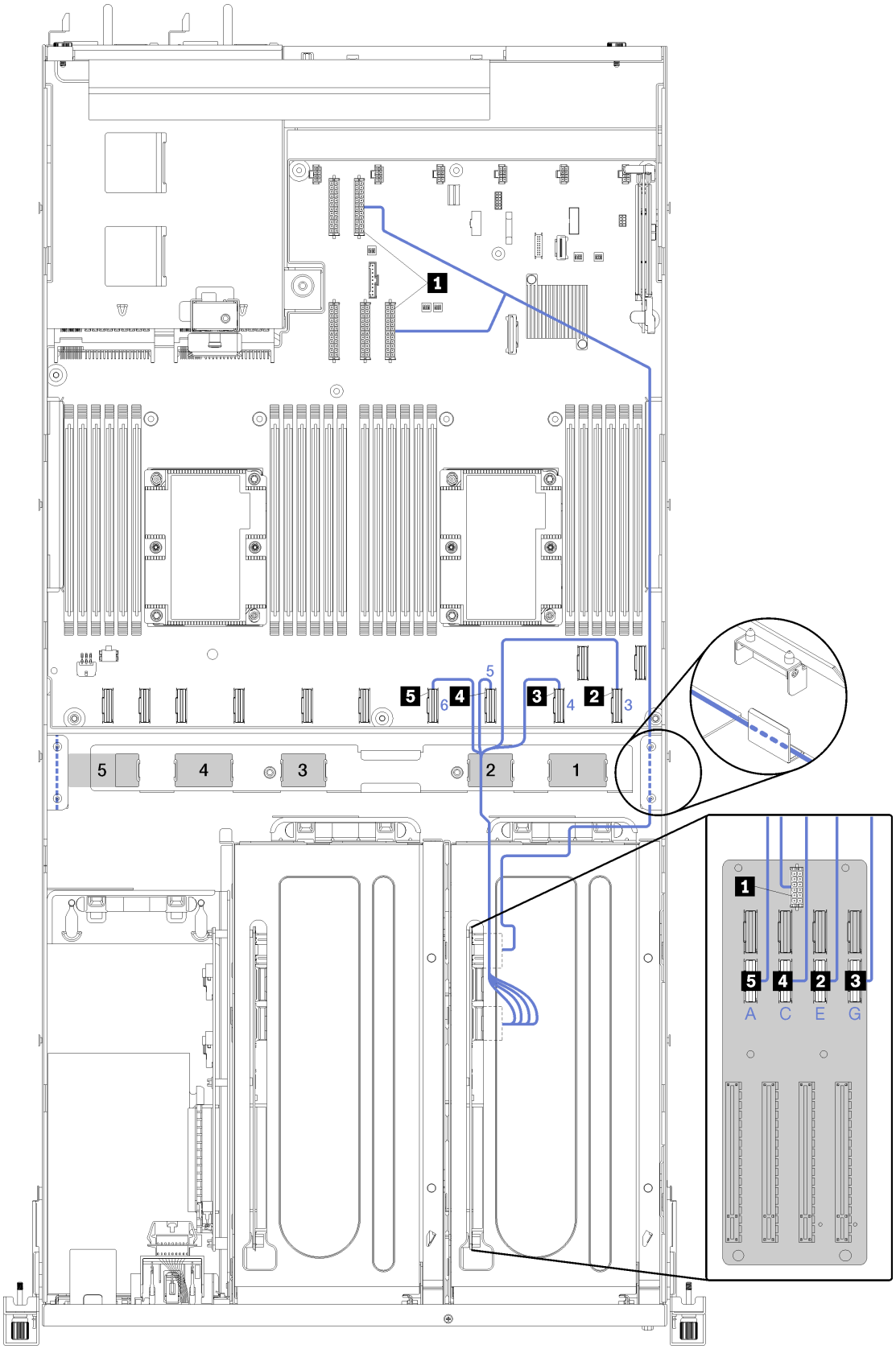


Figure 16. Cable routing for the 4-slot PCIe expansion cage 1

Note: Blue numbers/alphabets represent cable routing pathways under the fan cage.

The PCIe expansion cage power cable is routed through the right cable routing trough (as you are looking from the front of the server). The order of cable placement for cables in the right cable routing trough is as follows:

1. PCIe 13 cable
2. USB cable
3. VGA cable
4. PCIe expansion cage 1 power cable assembly
5. Fan cage power cable. See "Fan cage cable routing" on page 53 for system fan cage routing information.

Cable	From	To
1 PCIe expansion cage 1 power cable (includes cabling for the PCIe expansion cage 1 and the GPU adapters)	Power connector 1 and power connector 3 on the system board.	**Note:** The GPU adapter power cable is routed through the right cable routing trough (as you are looking from the front of the server). Power connector on the PCIe expansion cage 1 card.
2 PCIe adapter slot 4 cable	PCIe connector 4 on the system board.	To PCIe connector G on the PCIe expansion cage 1 expansion card through cable pathway 2.
3 PCIe adapter slot 5 cable	PCIe connector 3 on the system board.	To PCIe connector E on the PCIe expansion cage 1 expansion card through cable pathway 2.
4 PCIe adapter slot 6 cable	PCIe connector 5 on the system board.	To PCIe connector C on the PCIe expansion cage 1 expansion card through cable pathway 2.
5 PCIe adapter slot 7 cable	PCIe connector 6 on the system board.	To PCIe connector A on the PCIe expansion cage 1 expansion card through cable pathway 2.

Video and USB cable routing

Use the section to understand the cable routing for video and USB ports.

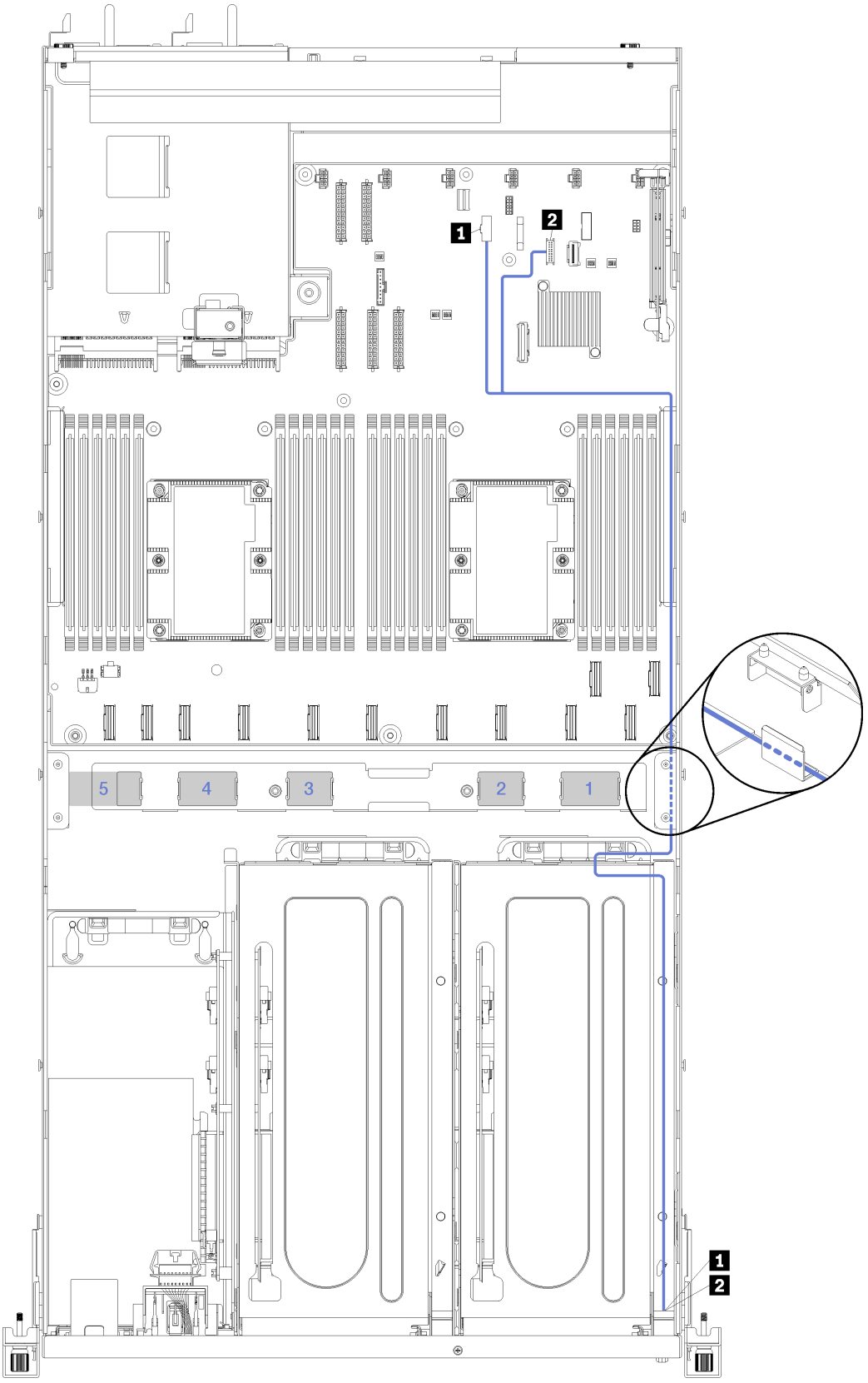


Figure 17. Cable routing for Video and USB cabling

Note: Blue numbers represent cable routing pathways under the fan cage.

The video cable (VGA) and USB cable are routed through the right cable routing trough (as you are looking from the front of the server). The order of cable placement for cables in the right cable routing trough is as follows:

1. PCIe 13 cable
2. USB cable
3. VGA cable
4. PCIe expansion cage 1 power cable assembly. See "3-slot PCIe expansion cage 1 cable routing" on page 31 for PCIe expansion cage 1 cable routing.
5. Fan cage power cable. See "Fan cage cable routing" on page 53 for system fan cage routing information.

Cable	From	To
1 Video cable	Front panel video connector on the system board. **Note:** Route the cable through the right cable routing trough and around the PCH heat sink before connecting the cable to the front panel VGA connector on the system board.	Front video port.
2 USB 3.0 + USB 2.0 cable	Front panel USB connector on the system board.	Front USB 3.0 Port and USB 2.0 port.

3-slot PCIe expansion cage 2 cable routing

Use the section to understand the cable routing for the 3-slot PCIe expansion cage 2.

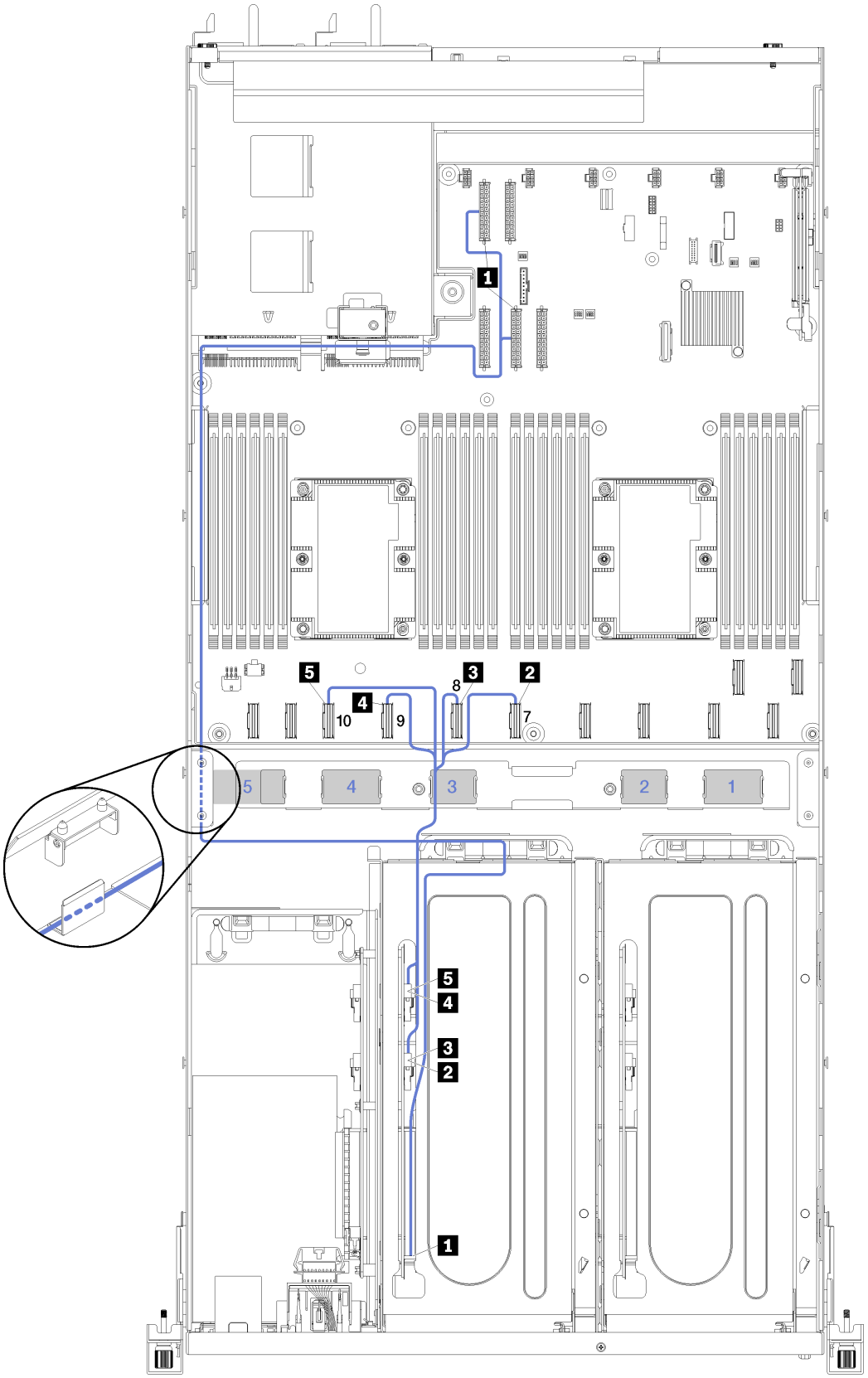


Figure 18. Cable routing for the 3-slot PCIe expansion cage 2

Note: Blue numbers represent cable routing pathways under the fan cage.

The PCIe expansion cage 2 power cable assembly is routed through the left cable routing trough (as you are looking from the front of the server) and through the rear cable routing guide. The order of cable placement for cables in the left cable routing trough is as follows:

1. Management port cable
2. Operator panel cable
3. PCIe expansion cage 2 power cable assembly.
4. RAID adapter SAS signal cables (if installed)

The order of cable placement in the rear cable routing guide is as follows:

1. Management port cable
2. Operator panel cable
3. PCIe expansion cage 2 power cable assembly.

Cable	From	To
1 PCIe expansion cage 2 power cable (includes cabling for the PCIe expansion cage and both GPU adapters)	Power connector 2 and power connector 4 on the system board.	**Note:** The GPU adapter power cable is routed through the left cable routing trough (as you are looking from the front of the server) through the rear cable routing guide. • Power connector on the PCIe expansion cage 2 card. • GPU adapter in slot 5. • GPU adapter in slot 6.
2 PCIe 7 cable	PCIe connector 7 on the system board.	To PCIe connector A on the PCIe expansion cage 2 expansion card through cable pathway 3.
3 PCIe 8 cable	PCIe connector 8 on the system board.	To PCIe connector B on the PCIe expansion cage 2 expansion card through cable pathway 3.
4 PCIe 9 cable	PCIe connector 9 on the system board.	To PCIe connector E on the PCIe expansion cage 2 expansion card through cable pathway 3.
5 PCIe 10 cable	PCIe connector 10 on the system board.	To PCIe connector F on the PCIe expansion cage 2 expansion card through cable pathway 3

4-slot PCIe expansion cage 2 cable routing

Use the section to understand the cable routing for the 4-slot PCIe expansion cage 2.

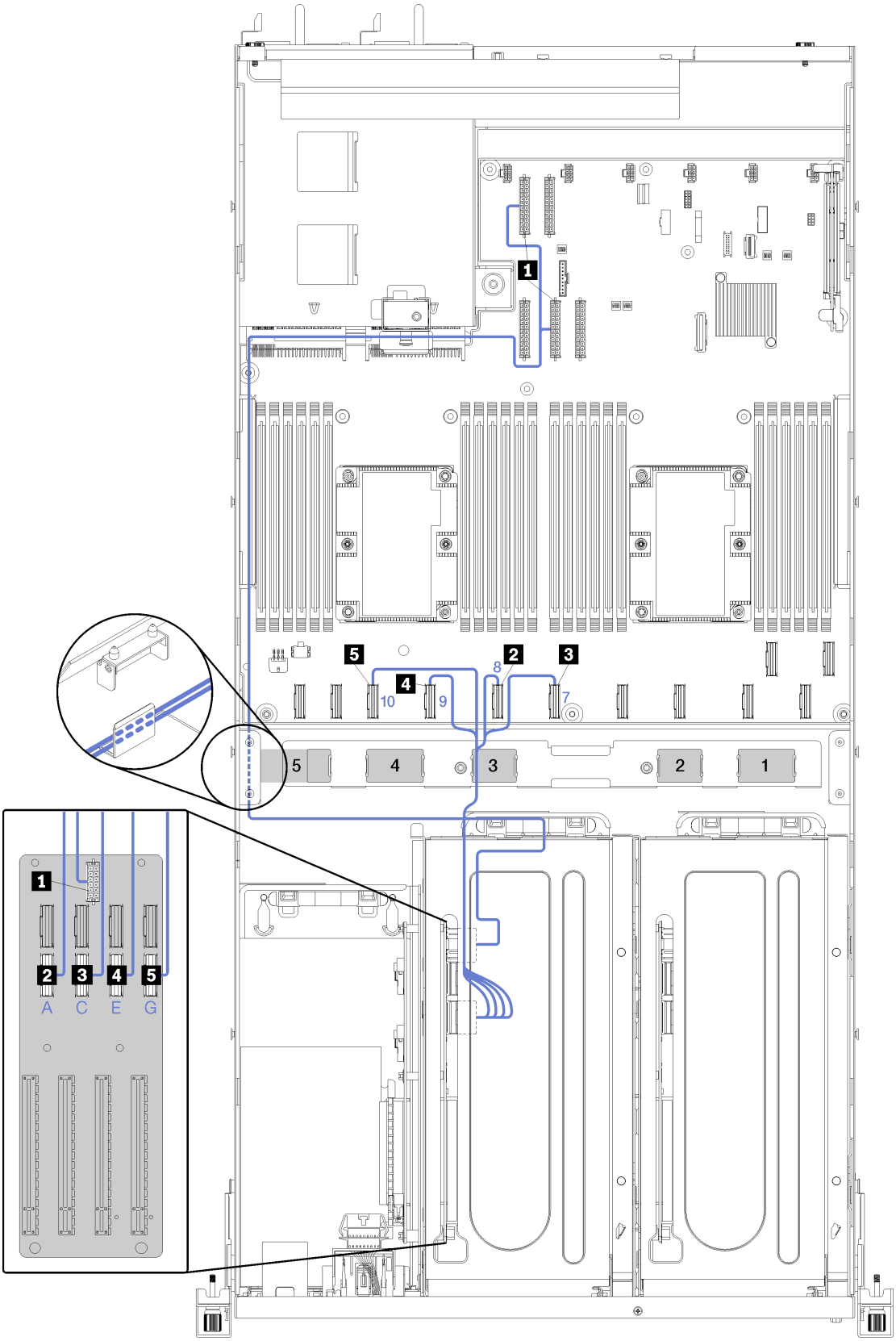


Figure 19. Cable routing for the 4-slot PCIe expansion cage 2

Note: Blue numbers/alphabets represent cable routing pathways under the fan cage.

The PCIe expansion cage 2 power cable assembly is routed through the left cable routing trough (as you are looking from the front of the server) and through the rear cable routing guide. The order of cable placement for cables in the left cable routing trough is as follows:

1. Management port cable
2. Operator panel cable
3. PCIe expansion cage 2 power cable assembly.
4. RAID adapter SAS signal cables (if installed)

The order of cable placement in the rear cable routing guide is as follows:

1. Management port cable
2. Operator panel cable
3. PCIe expansion cage 2 power cable assembly.

Cable	From	To
1 PCIe expansion cage 2 power cable (includes cabling for the PCIe expansion cage and the GPU adapters)	Power connector 2 and power connector 4 on the system board.	**Note:** The GPU adapter power cable is routed through the left cable routing trough (as you are looking from the front of the server) through the rear cable routing guide. Power connector on the PCIe expansion cage 2 card.
2 PCIe adapter slot 8 cable	PCIe connector 10 on the system board.	To PCIe connector G on the PCIe expansion cage 2 expansion card through cable pathway 3.
3 PCIe adapter slot 9 cable	PCIe connector 9 on the system board.	To PCIe connector E on the PCIe expansion cage 2 expansion card through cable pathway 3.
4 PCIe adapter slot 10 cable	PCIe connector 7 on the system board.	To PCIe connector C on the PCIe expansion cage 2 expansion card through cable pathway 3.
5 PCIe adapter slot 11 cable	PCIe connector 8 on the system board.	To PCIe connector A on the PCIe expansion cage 2 expansion card through cable pathway 3

Drive cage cable routing (onboard RAID controller)

Use this section to understand the drive cage cable routing if you are using the onboard RAID controller to manage the drives.

Note: If you order a SATA signal cable option, use these instructions to understand how to install the cable.

If a RAID adapter is installed, see "RAID adapter cable routing" on page 49 for the correct cable routing to the drive cage backplane.

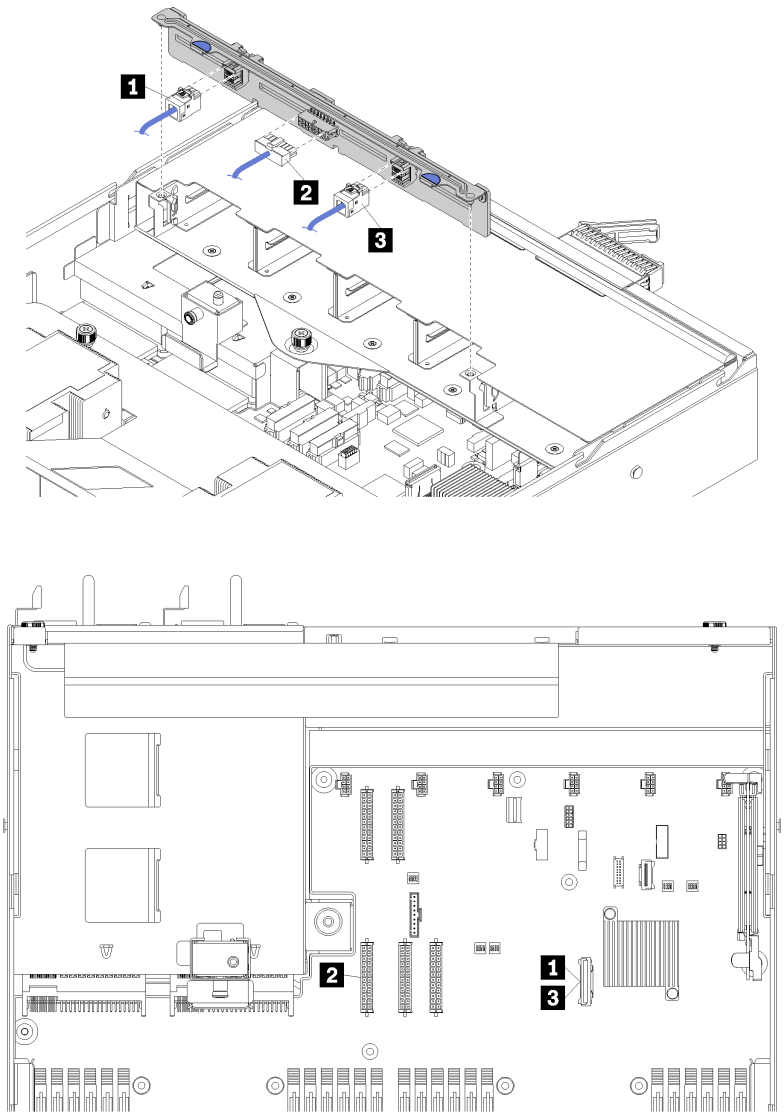


Figure 20. Drive cage cable routing

Cable	From	To
1, 3 SATA signal cable	SATA connector on the system board.	SAS 0 and SAS 1 connectors on the backplane.
2 Power cable	Backplane power connector 5 on the system board.	Power connector on the backplane.

RAID adapter cable routing

Use this section to understand the hard drive cable routing if a RAID adapter is installed.

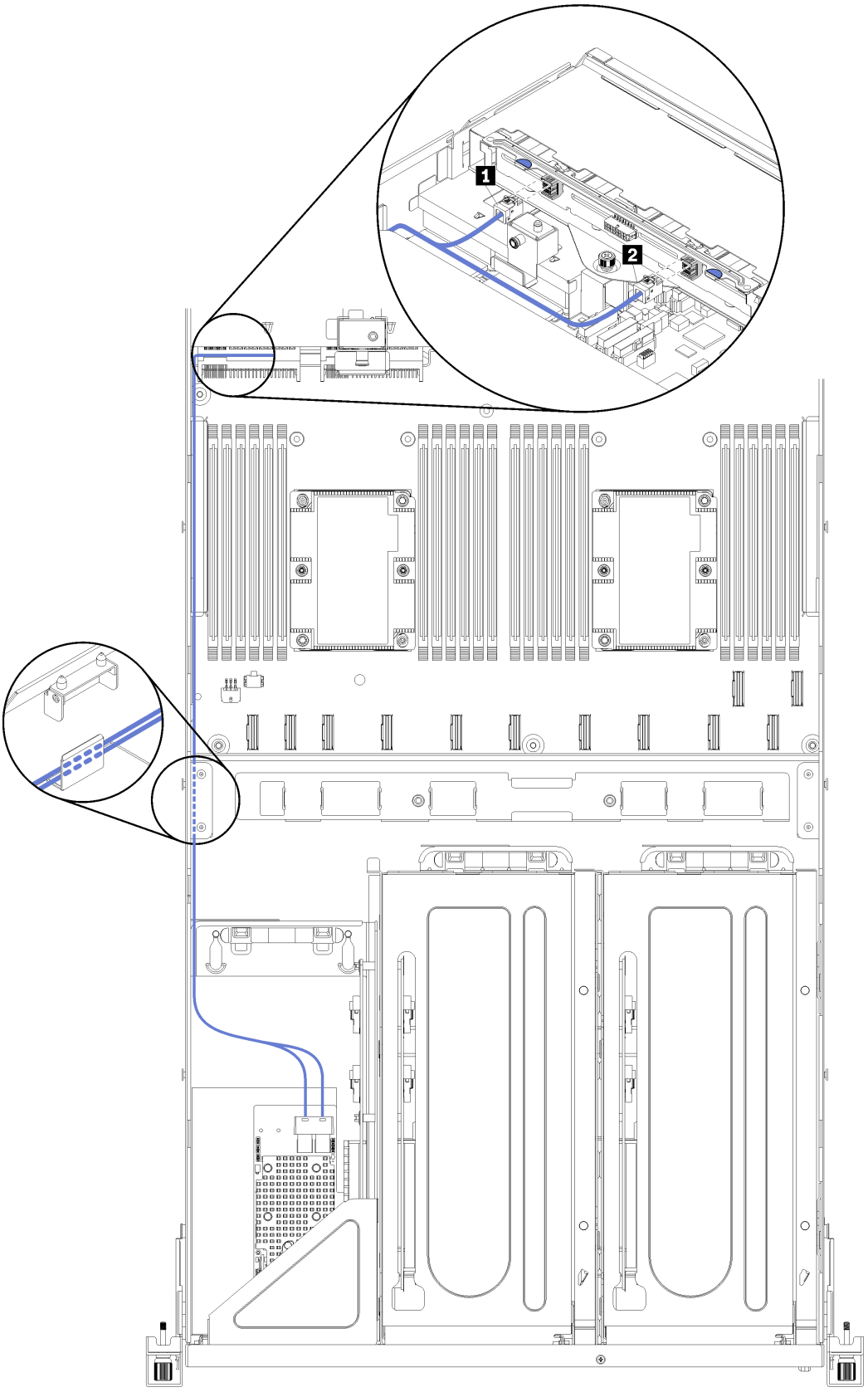


Figure 21. Drive cage cable routing

The RAID adapter SAS signal cables are routed through the left cable routing trough (as you are looking from the front of the server). The order of cable placement for cables in the left cable routing trough is as follows:

1. Management port cable
2. Operator panel cable
3. PCIe expansion cage 2 power cable assembly. See “3-slot PCIe expansion cage 2 cable routing” on page 40 for PCIe expansion cage 2 cable routing.
4. RAID adapter SAS signal cables

Cable	From	To
1, 2 SAS signal cable	SAS connectors on the RAID adapter.	SAS 0 and SAS 1 connectors on the backplane.

Fan cage cable routing

Use this section to understand the fan cage cable routing

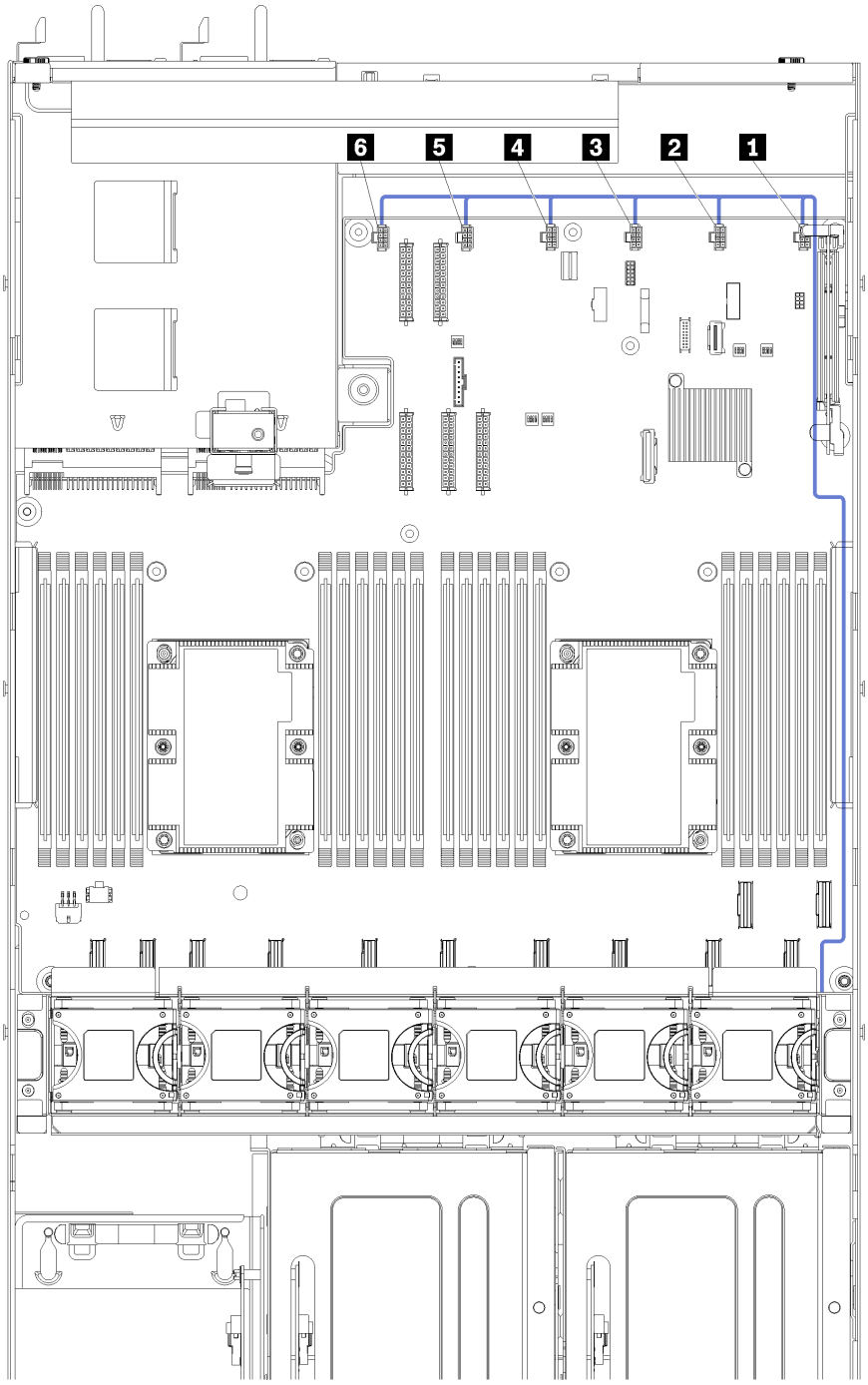


Figure 22. Fan cage cable routing

The fan cage power cable is routed through the right cable routing trough (as you are looking from the front of the server). The order of cable placement for cables in the right cable routing trough is as follows:

1. PCIe 13 cable
2. USB cable

3. VGA cable
4. PCIe expansion cage 1 power cable assembly. See “3-slot PCIe expansion cage 1 cable routing” on page 31 for PCIe expansion cage 1 cable routing.
5. Fan cage power cable. See “Fan cage cable routing” on page 53 for system fan cage cable routing.

Cable	From	To
1 Power cable	The six fan connectors on the system board. Make sure that you match the number on the cable with the connector on the system board.	The fan cage through the right cable routing trough (as you are looking from the front of the server). **Note:** The power cable should be the topmost cable routed through the cable routing trough.

Parts list

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

For more information about ordering the parts shown in Figure 23 “Server components” on page 55:

http://datacentersupport.lenovo.com/us/en/products/servers/thinksystem/sr670/7Y37/parts

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

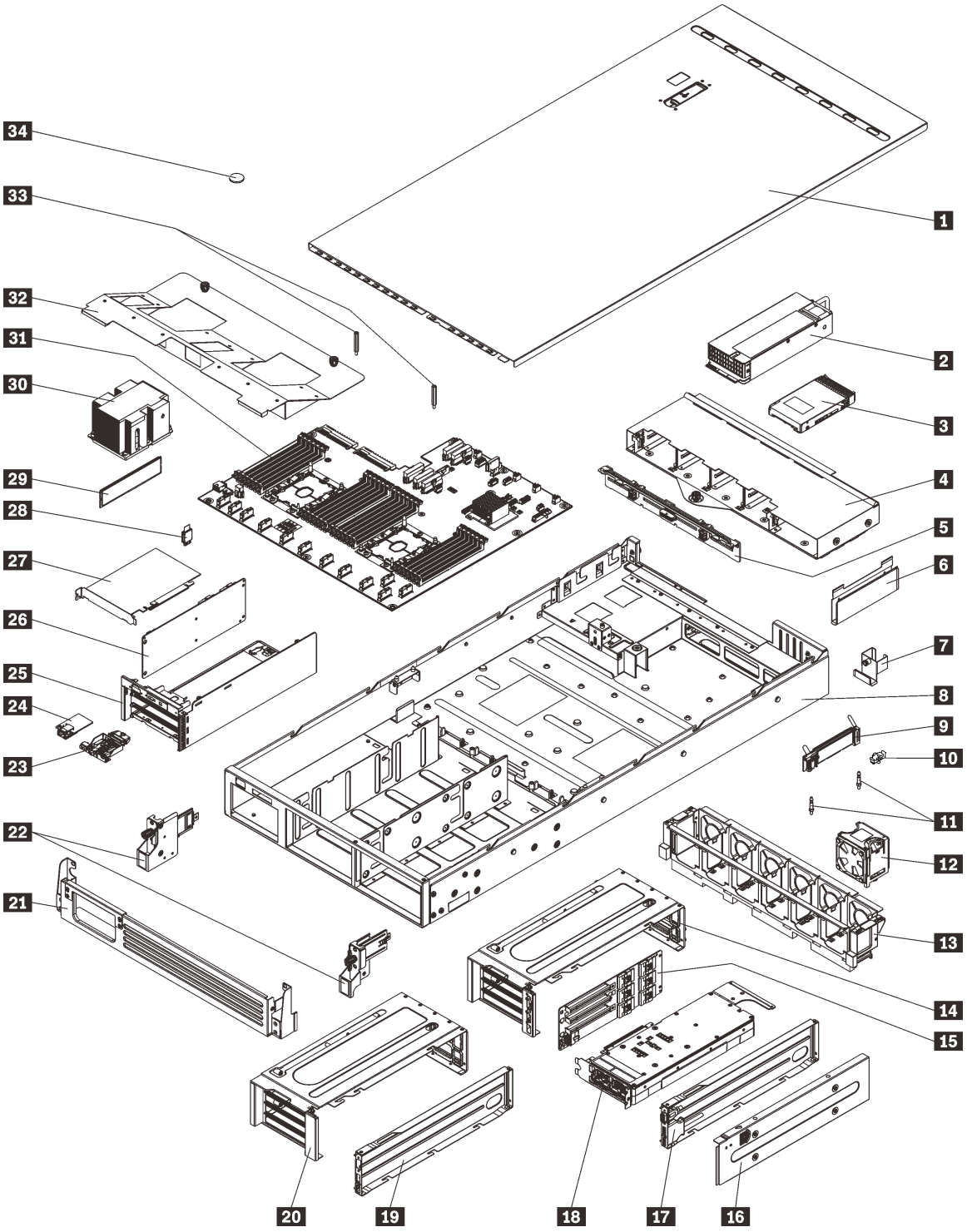


Figure 23. Server components

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

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request with no service agreement, you will be charged for the installation.
- **Tier 2 customer replaceable unit (CRU):** You may install a Tier 2 CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service that is designated for your server.

- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.
- **Consumable and Structural parts:** Purchase and replacement of consumable and structural parts is your responsibility. If Lenovo acquires or installs a structural component at your request, you will be charged for the service.

Table 9. Parts list

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural parts
For more information about ordering the parts shown in Figure 23 “Server components” on page 55: http://datacentersupport.lenovo.com/us/en/products/servers/thinksystem/sr670/7Y37/parts					
1	Top cover	√			
2	Power supply (up to two power supplies)	√			
3	2.5-inch hard drive (up to eight hard drives)	√			
4	Drive cage		√		
5	Hard drive backplane		√		
6	Cable routing trough (there are two of them)	√			
7	Rear cable guide	√			
8	Server chassis			√	
9	M.2 backplane		√		
10	M.2 retainer clip	√			
11	M.2 guideposts			√	
12	System fan (up to six fans)	√			
13	System fan cage	√			
14, 20	PCIe expansion cage (there are two of them).			√	
15, 26	Expansion cage card (the same card can be installed in the PCIe expansion cages and the I/O expansion cage			√	
16	PCIe expansion cage cover	√			
17, 19	PCIe expansion cage cable tray (a video port and USB port assembly can be installed in PCIe expansion cage 1)	√			
18	Graphics Processing Unit (GPU adapter)			√	
21	Shipping bracket				√
22	Rack latches (left and right)	√			
23	Operator panel		√		

Table 9. Parts list (continued)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural parts
24	Management port	√			
25	I/O expansion cage			√	
27	PCIe adapter		√		
28	TPM card (for Chinese Mainland only)			√	
29	DIMM (up to 24 can be installed)	√			
30	Processor / Heat sink			√	
31	System board			√	
32	Air baffle	√			
33	Air baffle posts	√			
34	CMOS battery				√

Power cords

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

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

1. Go to:

   http://dcsc.lenovo.com/#/

2. Click **Preconfigured Model** or **Configure to order**.
3. Enter the machine type and model for your server to display the configurator page.
4. Click **Power → Power Cables** to see all line cords.

Notes:

- For your safety, a power cord with a grounded attachment plug is provided to use with this product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.
- Power cords for this product that are used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).
- For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 16 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.
- For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 16 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.
- For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.
- Power cords for a specific country or region are usually available only in that country or region.

Chapter 3. Server hardware setup

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

Server setup checklist

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

To set up the server, perform the following steps:

1. Unpack the server package. See “Server package contents” on page 1.
2. Set up the server hardware.
   a. Install the server into a standard rack cabinet by using the rail kit shipped with the server. See the *Rack Installation Guide* that comes with optional rail kit.

      Note: The Product_name server is designed to be serviced while it is installed in a rack. You do not need to remove the server from the rack to perform service. However, you should make sure that the server is installed low enough in the rack to support this feature. For example, if you install the server in the very top of the rack (41U and 42U), the clearance will not be sufficient to remove the top cover.
   b. Connect the Ethernet cables and power cords to the server. See “Rear view” on page 18 to locate the connectors. See “Cable the server” on page 62 for cabling best practices.
   c. Power on the server. See “Power on the server” on page 62.

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

      “Opening and Using the XClarity Controller Web Interface” section in the XCC documentation version compatible with your server at https://pubs.lenovo.com/lxcc-overview/.
   d. Validate that the server hardware was set up successfully. See “Validate server setup” on page 62.
3. Configure the system.
   a. Connect the Lenovo XClarity Controller to the management network. See “Set the network connection for the Lenovo XClarity Controller” on page 63.
   b. Update the firmware for the server, if necessary. See “Update the firmware” on page 64.
   c. Configure the firmware for the server. See “Configure the firmware” on page 67.
   d. Install the operating system. See “Deploy the operating system” on page 69.
   e. Back up the server configuration. See “Back up the server configuration” on page 70.
   f. Install the applications and programs for which the server is intended to be used.

Installation Guidelines

Use the installation guidelines to install components in your server.

Before installing optional devices, read the following notices carefully:

- Read the safety information and guidelines to ensure that you work safely.
  - 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 61 .
- 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 Product_name Drivers and Software to download firmware updates for your server.

  Important: Some cluster solutions require specific code levels or coordinated code updates. If the component is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
- It is good practice to make sure that the server is working correctly before you install an optional component.
- Keep the working area clean, and place removed components on a flat and smooth surface that does not shake or tilt.
- Do not attempt to lift an object that might be too heavy for you. If you have to lift a heavy object, read the following precautions carefully:
  - Make sure that you can stand steadily without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- 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 the following tools available:
  - Phillips #1 and #2 screwdrivers
  - Torx8 and Torx30 screwdrivers.
  - 6mm nut drive tool (hex socket)
- You do not have to turn off the server to remove or install hot-swap power supplies or hot-plug USB devices. However, you must turn off the server before you perform any steps that involve removing or installing adapter cables, and you must disconnect the power source from the server before you perform any steps that involve removing or installing a riser card.
- Blue on a component indicates touch points, where you can grip to remove a component from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange 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. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- The Red strip on the drives, adjacent to the release latch, indicates that the drive can be hot-swapped if the server and operating system support hot-swap capability. This means that you can remove or install the drive while the server is still running.

  Note: See the system specific instructions for removing or installing a hot-swap drive for any additional procedures that you might need to perform before you remove or install the drive.
- After finishing working on the server, make sure you reinstall all air baffles, safety shields, guards, labels, and ground wires.

System reliability guidelines

The system reliability guidelines to ensure proper system cooling.

Make sure the following requirements are met:

- When the server comes with redundant power, a power supply must be installed in each power-supply bay.
- Adequate space around the server must be spared to allow server cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the server. Do not place any object in front of the fans.
- For proper cooling and airflow, refit the server cover before you turn the power on. Do not operate the server for more than 30 minutes with the server cover removed, for it might damage server components.
- Cabling instructions that come with optional components must be followed.
- A failed fan must be replaced within 48 hours since malfunction.
- A removed hot-swap drive must be replaced within two minutes after removal.
- A removed hot-swap power supply must be replaced within two minutes after removal.
- The air baffle that comes with the server must be installed when the server starts. Operating the server with a missing air baffle might damage the processors.
- All processor sockets must contain either a socket cover or a processor with heat sink.
- When more than one processor is installed, fan population rules for each server must be strictly followed.

Handling static-sensitive devices

Use this information to handle static-sensitive devices.

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

- Limit your movement to prevent building up static electricity around you.
- Take additional care when handling devices during cold weather, for heating would reduce indoor humidity and increase static electricity.
- Always use an electrostatic-discharge wrist strap or other grounding system, particularly when working inside the server with the power on.
- While the device is still in its static-protective package, touch it to an unpainted metal surface on the outside of the server for at least two seconds. This drains static electricity from the package and from your body.
- Remove the device from the package and install it directly into the server without putting it down. If it is necessary to put the device down, put it back into the static-protective package. Never place the device on the server or on any metal surface.
- When handling a device, carefully hold it by the edges or the frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Keep the device from others' reach to prevent possible damages.

Install the server in a rack

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

A copy of the Rack Installation Guide is also available here:

SR670 PDF files

Cable the server

Attach all external cables to the server. Typically, you will need to connect the server to a power source, to the data network, and to storage. In addition, you will need to connect the server to the management network.

Connect to power

Connect the server to power.

Connect to the network

Connect the server to the network.

Connect to storage

Connect the server to any storage devices.

Power on the server

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

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

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

For information about powering off the server, see “Power off the server” on page 62.

Validate server setup

After powering up the server, make sure that the LEDs are lit and that they are green.

Power off the server

The server remains in a standby state when it is connected to a power source, allowing the 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 62.

Chapter 4. System configuration

Complete these procedures to configure your system.

Notes: The minimum supported configuration for this server is as follows:

- 2 processors
- 8 DIMMs
- 2 power supplies
- 6 fans

Set the network connection for the Lenovo XClarity Controller

Before you can access the Lenovo XClarity Controller over your network, you need to specify how Lenovo XClarity Controller will connect to the network. Depending on how the network connection is implemented, you might need to specify a static IP address as well.

The following methods are available to set the network connection for the Lenovo XClarity Controller if you are not using DHCP:

- If a monitor is attached to the server, you can use Lenovo XClarity Provisioning Manager to set the network connection.

  Complete the following steps to connect the Lenovo XClarity Controller to the network using the Lenovo XClarity Provisioning Manager.

  1. Start the server.
  2. When you see <F1> Setup, press F1 to open up the Lenovo XClarity Provisioning Manager.
  3. Go to **LXPM → UEFI Setup → BMC Settings** to specify how the Lenovo XClarity Controller will connect to the network.
     - If you choose a static IP connection, make sure that you specify an IPv4 or IPv6 address that is available on the network.
     - If you choose a DHCP connection, make sure that the MAC address for the server has been configured in the DHCP server.
  4. Click **OK** to apply the setting and wait for two to three minutes.
  5. Use an IPv4 or IPv6 address to connect Lenovo XClarity Controller.

     Important: The Lenovo XClarity Controller is set initially with a user name of USERID and password of PASSW0RD (with a zero, not the letter O). This default user setting has Supervisor access. It is required to change this user name and password during your initial configuration for enhanced security.
- If no monitor attached to the server, you can set the network connection through the Lenovo XClarity Controller interface. Connect an Ethernet cable from your laptop to Lenovo XClarity Controller connector, which is located at the rear of the server. For the location of the Lenovo XClarity Controller connector, see "Rear view" on page 18.

  Note: Make sure that you modify the IP settings on the laptop so that it is on the same network as the server default settings.

  The default IPv4 address and the IPv6 Link Local Address (LLA) is provided on the Lenovo XClarity Controller Network Access label that is affixed to the Pull Out Information Tab.

- If you are using the Lenovo XClarity Administrator Mobile app from a mobile device, you can connect to the Lenovo XClarity Controller through the Lenovo XClarity Controller USB connector on the front of the server. For the location of the Lenovo XClarity Controller USB connector, see "Front view" on page 15.

  Note: The Lenovo XClarity Controller USB connector mode must be set to manage the Lenovo XClarity Controller (instead of normal USB mode). To switch from normal mode to Lenovo XClarity Controller management mode, hold the blue ID button on the front panel for at least 3 seconds until its LED flashes slowly (once every couple of seconds).

  To connect using the Lenovo XClarity Administrator Mobile app:

  1. Connect the USB cable of your mobile device to the Lenovo XClarity Administrator USB connector on the front panel.
  2. On your mobile device, enable USB tethering.
  3. On your mobile device, launch the Lenovo XClarity Administrator mobile app.
  4. If automatic discovery is disabled, click **Discovery** on the USB Discovery page to connect to the Lenovo XClarity Controller.

  For more information about using the Lenovo XClarity Administrator Mobile app, see:

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

Update the firmware

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

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

- Best practices related to updating firmware is available at the following site:
  - http://lenovopress.com/LP0656
- The latest firmware can be found at the following site:
  - http://datacentersupport.lenovo.com/products/servers/thinksystem/sr670/7Y37/downloads
- You can subscribe to product notification to stay up to date on firmware updates:
  - https://datacentersupport.lenovo.com/tw/en/solutions/ht509500

UpdateXpress System Packs (UXSPs)

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

Update method terminology

- **In-band update**. The installation or update is performed using a tool or application within an operating system that is executing on the server's core CPU.
- **Out-of-band update**. The installation or update is performed by the Lenovo XClarity Controller collecting the update and then directing the update to the target subsystem or device. Out-of-band updates have no dependency on an operating system executing on the core CPU. However, most out-of-band operations do require the server to be in the S0 (Working) power state.
- **On-Target update.** The installation or update is initiated from an Operating System executing on the server's operating system.

- **Off-Target update.** The installation or update is initiated from a computing device interacting directly with the server's Lenovo XClarity Controller.
- **UpdateXpress System Packs (UXSPs)**. UXSPs are bundled updates designed and tested to provide the interdependent level of functionality, performance, and compatibility. UXSPs are server machine-type specific and are built (with firmware and device driver updates) to support specific Windows Server, Red Hat Enterprise Linux (RHEL) and SUSE Linux Enterprise Server (SLES) operating system distributions. Machine-type-specific firmware-only UXSPs are also available.

Firmware updating tools

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

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

Tool	Update Methods Supported	Core System Firmware Updates	I/O Devices Firmware Updates	Graphical user interface	Command line interface	Supports UXSPs
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 press F1. 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.

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

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

- **Lenovo XClarity Controller**

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

  Notes:

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

    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.

  Specific details about updating firmware using Lenovo XClarity Controller, see:

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

- **Lenovo XClarity Essentials OneCLI**

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

Specific details about updating firmware using Lenovo XClarity Essentials OneCLI, 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.

  Specific details about updating firmware using Lenovo XClarity Administrator are available at:

  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.

  Specific details about updating firmware using Lenovo XClarity Integrator offerings, see:

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

Configure the firmware

Several options are available to install and set up the firmware for the server.

Important: Do not configure option ROMs to be set to **Legacy** unless directed to do so by Lenovo Support. This setting prevents UEFI drivers for the slot devices from loading, which can cause negative side effects for Lenovo software, such as Lenovo XClarity Administrator and Lenovo XClarity Essentials OneCLI, and to the Lenovo XClarity Controller. The side effects include the inability to determine adapter card details, such as model name and firmware levels. When adapter card information is not available, generic information for the model name, such as "Adapter 06:00:00" instead of the actually model name, such as "ThinkSystem RAID 930-16i 4GB Flash." In some cases, the UEFI boot process might also hang.

- **Lenovo XClarity Provisioning Manager**

  From Lenovo XClarity Provisioning Manager, you can configure the UEFI settings for your server.

  Notes: The Lenovo XClarity Provisioning Manager provides a Graphical User Interface to configure a server. The text-based interface to system configuration (the Setup Utility) is also available. From Lenovo XClarity Provisioning Manager, you can choose to restart the server and access the text-based interface. In addition, you can choose to make the text-based interface the default interface that is displayed when you press **F1**. To do this, go to **Lenovo XClarity Provisioning Manager → UEFI Setup → System Settings → <F1>Start Control → Text Setup**. To start the server with Graphic User Interface, select **Auto** or **Tool Suite**.

  See the following documentations for more information:

  - *Lenovo XClarity Provisioning Manager User Guide*
    - Search for the LXPM documentation version compatible with your server at https://pubs.lenovo.com/lxpm-overview/
  - *UEFI User Guide*
    - https://pubs.lenovo.com/uefi-overview/

- **Lenovo XClarity Essentials OneCLI**

  You can use the config application and commands to view the current system configuration settings and make changes to Lenovo XClarity Controller and UEFI. The saved configuration information can be used to replicate or restore other systems.

  For information about configuring the server using Lenovo XClarity Essentials OneCLI, see:

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

- **Lenovo XClarity Administrator**

  You can quickly provision and pre-provision all of your servers using a consistent configuration. Configuration settings (such as local storage, I/O adapters, boot settings, firmware, ports, and Lenovo XClarity Controller and UEFI settings) are saved as a server pattern that can be applied to one or more managed servers. When the server patterns are updated, the changes are automatically deployed to the applied servers.

  Specific details about updating firmware using Lenovo XClarity Administrator are available at:

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

- **Lenovo XClarity Controller**

  You can configure the management processor for the server through the Lenovo XClarity Controller Web interface or through the command-line interface.

  For information about configuring the server using Lenovo XClarity Controller, see:

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

Memory configuration

The server supports memory configurations in capacities of 8, 12, 16, and 24. All DIMMs to be installed must be the same type and capacity.

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

Your server has 24 memory module slots. It supports up to 12 memory modules when one processor is installed, and up to 24 memory modules when two processors are installed. Supporting memory module type is as follows:

For Intel Xeon Skylake processors:
- Type: TruDDR4 2666, dual-rank, 16 GB/32 GB RDIMM
- Minimum: 64GB
- Maximum: 768GB

For Intel Xeon Cascade Lake processors:
- Type:
  - TruDDR4 2933, dual-rank, 16 GB/32 GB RDIMM
  - TruDDR4 Performance+ 2933, dual-rank, 16 GB/32 GB RDIMM

    Note: Performance+ RDIMM configuration can be only purchased at your initial order. You cannot upgrade RDIMM to Performance+ level per your following orders.
- Minimum: 128GB
- Maximum: 768GB

The following illustration shows the location of the DIMM connectors on the system board.

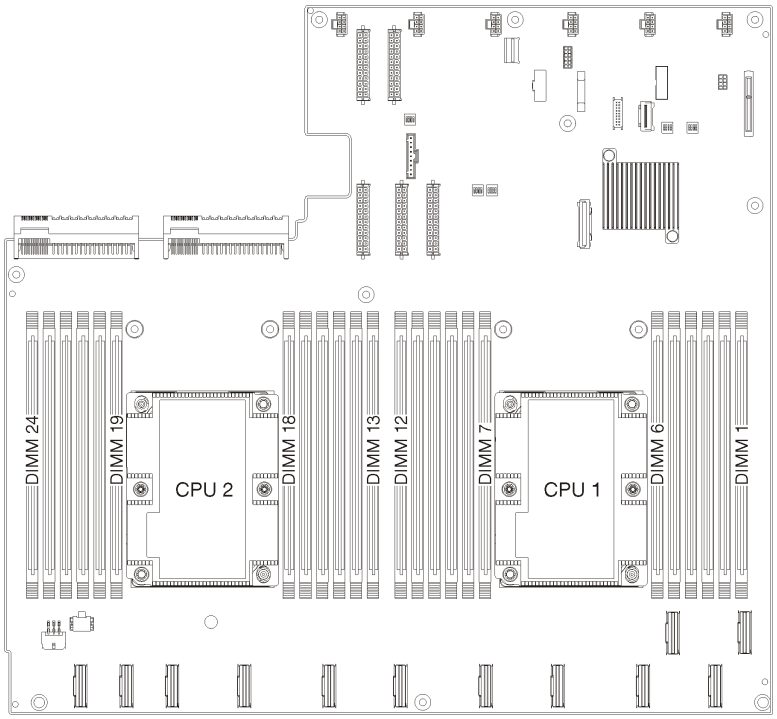


Figure 24. The location of the DIMM connectors on the system board

Deploy the operating system

Several options are available to deploy an operating system on the server.

Available operating systems

- Microsoft Windows Server
- VMware ESXi

- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server

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

Tool-based deployment

- **Multi-server**

  Available tools:

  – Lenovo XClarity Administrator

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

  – Lenovo XClarity Essentials OneCLI

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

  – Lenovo XClarity Integrator deployment pack for SCCM (for Windows operating system only)

  https://pubs.lenovo.com/lxci-deploypack-sccm/dpsccm_c_endtoend_deploy_scenario

- **Single-server**

  Available tools:

  – Lenovo XClarity Provisioning Manager

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

  – Lenovo XClarity Essentials OneCLI

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

  – Lenovo XClarity Integrator deployment pack for SCCM (for Windows operating system only)

  https://pubs.lenovo.com/lxci-deploypack-sccm/dpsccm_c_endtoend_deploy_scenario

Manual deployment

If you cannot access the above tools, follow the instructions below, download the corresponding *OS Installation Guide*, and deploy the operating system manually by referring to the guide.

1. Go to https://datacentersupport.lenovo.com/solutions/server-os.
2. Select an operating system from the navigation pane and click **Resources**.
3. Locate the "OS Install Guides" area and click the installation instructions. Then, follow the instructions to complete the operation system deployment task.

Back up the server configuration

After setting up the server or making changes to the configuration, it is a good practice to make a complete backup of the server configuration.

Make sure that you create backups for the following server components:

- **Management processor**

  You can back up the management processor configuration through the Lenovo XClarity Controller interface. For details about backing up the management processor configuration, see:

  "Backing up the BMC configuration" section in the XCC documentation compatible with your server at https://pubs.lenovo.com/lxcc-overview/.

Alternatively, you can use the `save` command from Lenovo XClarity Essentials OneCLI to create a backup of all configuration settings. For more information about the `save` command, see:

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

- **Operating system**

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

Update the Vital Product Data (VPD)

After initial setup of the system, you can update some Vital Product Data (VPD), such as asset tag and Universal Unique Identifier (UUID).

Update the Universal Unique Identifier (UUID)

Optionally, you can update the Universal Unique Identifier (UUID).

There are two methods available to update the UUID:

- From Lenovo XClarity Provisioning Manager

  To update the UUID from Lenovo XClarity Provisioning Manager:

  1. Start the server and press F1 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 UUID.

- From Lenovo XClarity Essentials OneCLI

  Lenovo XClarity Essentials OneCLI sets the UUID in the Lenovo XClarity Controller. Select one of the following methods to access the Lenovo XClarity Controller and set the UUID:

  – 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 UUID 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 command to set the UUID:

     ```
     onecli config set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value> [access_method]
     ```

     Where:

     <uuid_value>
     Up to 16-byte hexadecimal value assigned by you.

     [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 command is as follows:
```
onecli config set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value> --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 command is as follows:
```
onecli config set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value>
```

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 external IP address. There is no default value. This parameter is required.

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).

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

Example command is as follows:
```
onecli config set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value>
--bmc xcc_user_id:xcc_password@xcc_external_ip
```

4. Restart the Lenovo XClarity Controller.
5. Restart the server.

Update the asset tag

Optionally, you can update the asset tag.

There are two methods available to update the asset tag:

- From Lenovo XClarity Provisioning Manager

  To update the asset tag from Lenovo XClarity Provisioning Manager:

  1. Start the server and press F1 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 asset tag information.

- From Lenovo XClarity Essentials OneCLI

  Lenovo XClarity Essentials OneCLI sets the asset tag in the Lenovo XClarity Controller. Select one of the following methods to access the Lenovo XClarity Controller and set the asset tag:

  – 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 asset tag 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 command to set the DMI:

     `onecli config set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> [access_method]`

     Where:

     <asset_tag>
     The server asset tag number. Type `asset aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa`, where *aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa* is the asset tag number.

     [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 command is as follows:
       `onecli config set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> --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 command is as follows:
       `onecli config set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag>`

       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 command is as follows:

```
onecli config set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag>
--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/.

Chapter 5. Resolving installation issues

Use this information to resolve issues that you might have when setting up your system.

Use the information in this section to diagnose and resolve problems that you might encounter during the initial installation and setup of your server.

Server does not power on

Complete the following steps until the problem is resolved:

Note: The power-control button will not function until approximately 5 to 10 seconds after the server has been connected to power.

1. Make sure that the power-control button is working correctly:
   a. Disconnect the server power cords.
   b. Reconnect the power cords.
   c. (Trained technician only) Reseat the operator information panel cable, and then repeat steps 1a and 1b.
      - (Trained technician only) If the server starts, reseat the operator information panel. If the problem remains, replace the operator information panel.
      - If the server does not start, bypass the power-control button by using the force power-on jumper. If the server starts, reseat the operator information panel. If the problem remains, replace the operator information panel.
2. Make sure that the reset button is working correctly:
   a. Disconnect the server power cords.
   b. Reconnect the power cords.
   c. (Trained technician only) Reseat the operator information panel cable, and then repeat steps 2a and 2b.
      - (Trained technician only) If the server starts, replace the operator information panel.
      - If the server does not start, go to step 3.
3. Make sure that both power supplies installed in the server are of the same type. Mixing different power supplies in the server will cause a system error (the system-error LED on the front panel turns on).
4. Make sure that:
   - The power cords are correctly connected to the server and to a working electrical outlet.
   - The type of memory that is installed is correct.
   - The DIMMs are fully seated.
   - The LEDs on the power supply do not indicate a problem.
   - The processors are installed in the correct sequence.

5. Reseat the following components:
   a. Operator information panel connector
   b. Power supplies
6. Replace the following components. restarting the server each time:
   a. Operator information panel connector
   b. Power supplies
7. If you just installed an optional device, remove it, and restart the server. If the server now starts, you might have installed more devices than the power supply supports.
8. See “Power supply LEDs” in *Maintenance Manual*.

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

Complete the following steps until the problem is solved.

1. 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/.
2. (Trained technician only) Make sure that processor 1 is seated correctly.
3. (Trained technician only) Remove processor 2 and restart the server.
4. 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

Embedded hypervisor is not in the boot list

Complete the following steps until the problem is resolved:

1. Make sure that the optional embedded hypervisor flash device is selected on the boot manager `<F12> Select Boot Device` at startup.
2. Make sure that the embedded hypervisor flash device is seated in the connector correctly.
3. See the documentation that comes with the optional embedded hypervisor flash device to validate that the device is configured correctly.
4. Make sure that other software works on the server.

Server 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 F1, the Lenovo XClarity Provisioning Manager interface is displayed by default. You can perform hard drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → HDD test**.
   - If the green activity LED is flashing and the yellow status LED is flashing slowly, the drive is recognized by the controller and is rebuilding.

- If neither LED is lit or flashing, check the hard disk drive backplane.
- If the green activity LED is flashing and the yellow status LED is lit, replace the drive. If the activity of the LEDs remains the same, go to step Hard disk drive problems. If the activity of the LEDs changes, return to step 1.

4. Make sure that the hard disk drive backplane is correctly seated. When it is correctly seated, the drive assemblies correctly connect to the backplane without bowing or causing movement of the backplane.
5. Reseat the backplane power cable and repeat steps 1 through 3.
6. Reseat the backplane signal cable and repeat steps 1 through 3.
7. Suspect the backplane signal cable or the backplane:
   - Replace the affected backplane signal cable.
   - Replace the affected backplane.
8. Run the diagnostics tests for the hard disk drives. When you start a server and press F1, the Lenovo XClarity Provisioning Manager interface is displayed by default. You can perform hard drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → HDD test**.

   Based on those tests:
   - If the adapter passes the test but the drives are not recognized, replace the backplane signal cable and run the tests again.
   - Replace the backplane.
   - If the adapter fails the test, disconnect the backplane signal cable from the adapter and run the tests again.
   - If the adapter fails the test, replace the adapter.

Displayed system memory 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 panel.
   - Memory mirrored channel does not account for the discrepancy.
   - The memory modules are seated correctly.
   - You have installed the correct type of memory.
   - If you changed the memory, you updated the memory configuration in the Setup utility.
   - All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled.
   - There is no memory mismatch when the server is at the minimum memory configuration.
2. Reseat the DIMMs, and then restart the server.
3. Run memory diagnostics. When you start a server and press F1, the Lenovo XClarity Provisioning Manager interface is displayed by default. You can perform memory diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → Memory test**.
4. Check the POST error log:
   - If a DIMM was disabled by a systems-management interrupt (SMI), replace the DIMM.
   - If a DIMM was disabled by the user or by POST, reseat the DIMM; then, run the Setup utility and enable the DIMM.

5. Reseat the DIMM.
6. Restart the server.

A Lenovo optional device that was just installed does not work

1. Make sure that:
   - The device is supported for the server (see https://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 F1 to display the system setup interface. Whenever memory or any other device is changed, you must update the configuration.
2. Reseat the device that you just installed.
3. Replace the device that you just installed.

Voltage 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 6 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.

Appendix A. GPU adapter population rules and processor mapping

Use the information in this topic to understand adapter-to-processor mapping and the GPU adapter population order, depending on whether the server has 3-slot expansion cages or 4-slot expansion cages installed.

GPU processor mapping and adapter population rules (3-slot PCIe expansion cage)

Use the information in this topic to understand adapter-to-processor mapping and the GPU adapter population order for adapters in the 3-slot PCIe expansion cage.

Note: PCIe expansion cage 1 and PCIe expansion cage 2 must be the same type, either 4-slot PCIe expansion cages or 3-slot PCIe expansion cages

The following figure illustrates the numbering for the PCIe slots in the server (when 3-slot PCIe expansion cages are installed).

Note: Only double-width full-height, full-length (FHFL) GPUs are supported in the 3-slot PCIe expansion cage.

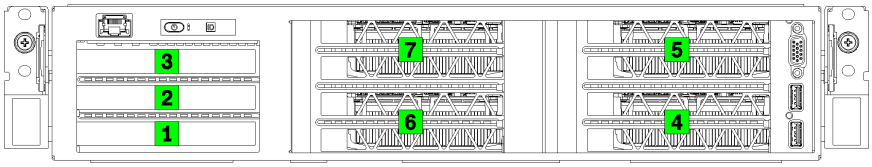


Figure 25. Numbering of the PCIe slots on the server

The following table shows how the PCIe adapter slots are mapped to the system processors.

Table 10. PCIe adapter-to-processor mapping

Adapter slot	Description	Processor mapping
I/O expansion cage		
Slot 1	PCIe 3.0 x16 (full-height, half-length). Typically, a network adapter is installed in this slot.	1
Slot 2	PCIe 3.0 x16 (full-height, half-length). Typically, a RAID adapter or a network adapter is installed in this slot.	2
Slot 3	PCIe 3.0 x4 (full-height, half-length). Typically, a 1GbE network adapter is installed in this slot.	Onboard chipset, also known as the Platform Controller Hub (PCH)
3-slot PCIe expansion cage 1		
Slot 4	PCIe 3.0 x16 for a GPU (full-height, full-length, double-width)	1
Slot 5	PCIe 3.0 x16 for a GPU (full-height, full-length, double-width)	1

Table 10. PCIe adapter-to-processor mapping (continued)

Adapter slot	Description	Processor mapping
3-slot PCIe expansion cage 2		
Slot 6	PCIe 3.0 x16 for a GPU (full-height, full-length, double-width)	2
Slot 7	PCIe 3.0 x16 for a GPU (full-height, full-length, double-width)	2
System board		
Slot 8 (internal)	M.2	Onboard chipset, also known as the Platform Controller Hub (PCH)

The following table defines the population order for the GPU adapters in the PCIe expansion cages 1 and 2.

Table 11. GPU adapter population order

The GPU adapter population order varies depending on adapter-to-processor utilization goals:

- **Concentrated utilization**. Adapters are connected to the PCIe busses from CPU1 until all PCIe busses on CPU1 is consumed before populating adapters against the CPU2 PCI Express busses.
- **Distributed utilization**. Adapters are populated as equally as possible between the CPU1 and CPU2 PCIe Express busses

Number of PCIe adapters	Concentrated	Distributed
1 GPU adapter	Slot 4	Slot 4
2 GPU adapters	Slot 4, slot 5	Slot 4, slot 6
3 GPU adapters	Slot 4, slot 5, slot 6	Slot 4, slot 5, slot 6
4 GPU adapters	Slot 4, slot 5, slot 6, slot 7	Slot 4, slot 5, slot 6, slot 7

GPU processor mapping and adapter population rules (4-slot PCIe expansion cage)

Use the information in this topic to understand adapter-to-processor mapping and the GPU adapter population order for adapters in the 4-slot PCIe expansion cage.

Note: PCIe expansion cage 1 and PCIe expansion cage 2 must be the same type, either 4-slot PCIe expansion cages or 3-slot PCIe expansion cages

The following figure illustrates the numbering for the PCIe slots in the server (when 4-slot PCIe expansion cages are installed).

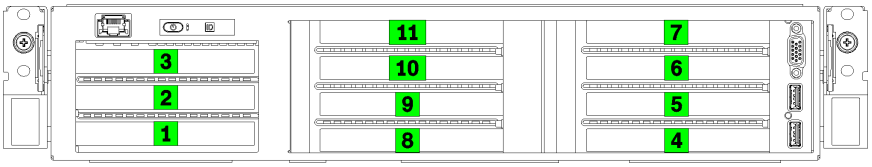


Figure 26. Numbering of the PCIe slots on the server (4-slot PCIe expansion cage)

The following table shows how the PCIe adapter slots are mapped to the system processors.

Table 12. PCIe adapter-to-processor mapping

Adapter slot	Description	Processor mapping
I/O expansion cage		
Slot 1	PCIe 3.0 x16 (full-height, half-length). Typically, a network adapter is installed in this slot.	1
Slot 2	PCIe 3.0 x16 (full-height, half-length). Typically, a RAID adapter or a network adapter is installed in this slot.	2
Slot 3	PCIe 3.0 x4 (full-height, half-length). Typically, a 1GbE network adapter is installed in this slot.	Onboard chipset, also known as the Platform Controller Hub (PCH)
4-slot PCIe expansion cage 1		
Slot 4 *	PCIe 3.0 x16 for a GPU (full-height, half-length, single-width)	1
Slot 5 *	PCIe 3.0 x16 for a GPU (full-height, half-length, single-width)	1
Slot 6 *	PCIe 3.0 x16 for a GPU (full-height, half-length, single-width)	1
Slot 7 *	PCIe 3.0 x16 for a GPU (full-height, half-length, single-width)	1
4-slot PCIe expansion cage 2		
Slot 8 *	PCIe 3.0 x16 for a GPU (full-height, half-length, single-width)	2
Slot 9 *	PCIe 3.0 x16 for a GPU (full-height, half-length, single-width)	2
Slot 10 *	PCIe 3.0 x16 for a GPU (full-height, half-length, single-width)	2
Slot 11 *	PCIe 3.0 x16 for a GPU (full-height, half-length, single-width)	2
System board		
Slot 12 (internal)	M.2	Onboard chipset, also known as the Platform Controller Hub (PCH)

Note: * Slots 4 through 11 operate in x8 mode. If an x16 adapter is installed in one of these slots, the adatper will function as a x8 adapter in these slots.

The following table defines the population order for the GPU adapters in the PCIe expansion cages 1 and 2.

Table 13. GPU adapter population order

The GPU adapter population order varies depending on adapter-to-processor utilization goals:

- **Concentrated utilization**. Adapters are connected to the PCIe busses from CPU1 until all PCIe busses on CPU1 is consumed before populating adapters against the CPU2 PCI Express busses.
- **Distributed utilization**. Adapters are populated as equally as possible between the CPU1 and CPU2 PCIe Express busses

Table 13. GPU adapter population order (continued)

Number of PCIe adapters	Concentrated	Distributed
1 GPU adapter	Slot 4	Slot 4
2 GPU adapters	Slot 4, slot 5	Slot 4, slot 8
3 GPU adapters	Slot 4, slot 5, slot 6	Slot 4, slot 5, slot 8
4 GPU adapters	Slot 4, slot 5, slot 6, slot 7	Slot 4, slot 5, slot 8, slot 9
5 GPU adapters	Slot 4, slot 5, slot 6, slot 7, slot 8	Slot 4, slot 5, slot 6, slot 8, slot 9
6 GPU adapters	Slot 4, slot 5, slot 6, slot 7, slot 8, slot 9	Slot 4, slot 5, slot 6, slot 8, slot 9, slot 10
7 GPU adapters	Slot 4, slot 5, slot 6, slot 7, slot 8, slot 9, slot 10	Slot 4, slot 5, slot 6, slot 7, slot 8, slot 9, slot 10
8 GPU adapters	Slot 4, slot 5, slot 6, slot 7, slot 8, slot 9, slot 10, slot 11	Slot 4, slot 5, slot 6, slot 7, slot 8, slot 9, slot 10, slot 11

Appendix B. Getting help and technical assistance

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

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

http://datacentersupport.lenovo.com

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

Before you call

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

Attempt to resolve the problem yourself

You can solve many problems without outside assistance by following the troubleshooting procedures that Lenovo provides in the online help or in the Lenovo product documentation. The 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.

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