Lenovo

ThinkSystem SR630 V4
System Configuration Guide

Machine Types: 7DG8, 7DG9, 7DGA, 7DGB

Note

Before using this information and the product it supports, be sure to read and understand the safety information and the safety instructions, which are available at:
https://pubs.lenovo.com/safety_documentation/

In addition, be sure that you are familiar with the terms and conditions of the Lenovo warranty for your server, which can be found at:
http://datacentersupport.lenovo.com/warrantylookup

First Edition (November 2024)

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

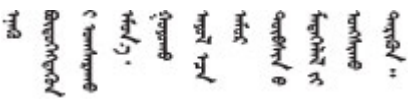
A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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



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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

ཐོན་རྫས་འདི་བདེ་སྒྲིག་མ་བྱས་གོང་། ་སྲོར་ཀྱི་ཡིད་གཟབ་
བྱ་འདུ་ཞེན་ཡོད་པའི་འོད་སྟེར་བལྟ་དགོས།

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

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

Safety inspection checklist

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

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

Note: The set-up of the server is made in the server room only.

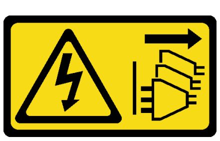
CAUTION:
This equipment must be installed or serviced by trained personnel, as defined by the IEC 62368-1, the standard for Safety of Electronic Equipment within the Field of Audio/Video, Information Technology and Communication Technology. Lenovo assumes that you are qualified in the servicing of equipment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

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

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

1. If your working condition necessitates the server being powered off or you intend to power off, make sure that the power cord is disconnected.

   S002

   CAUTION:

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

Note: Under certain circumstances, powering off the server is not a prerequisite. Refer to the precautions before conducting any tasks.

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

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

     a. Go to:

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

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

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

     d. Click **Power → Power Cables** to see all line cords.
   - Make sure that the insulation is not frayed or worn.
3. Check for any obvious non-Lenovo alterations. Use good judgment as to the safety of any non-Lenovo alterations.
4. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
5. Check for worn, frayed, or pinched cables.
6. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Chapter 1. Introduction

The ThinkSystem SR630 V4 server (7DG8, 7DG9, 7DGA, 7DGB) is a high-performance, multi-core 1U rack server designed to support many kinds of Information Technology (IT) workloads with high agility. It carries the most advanced processing and memory units and can scale up to the state-of-the-art liquid cooling solutions. This server is ideally suited for IT environments that require superior processor performance, flexible manageability, and thermal efficiency.

Figure 1. ThinkSystem SR630 V4

Features

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

Your server implements the following features and technologies:

- **Features on Demand**

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

  https://fod.lenovo.com/lkms

- **Lenovo XClarity Controller (XCC)**

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

  The server supports Lenovo XClarity Controller 3 (XCC3). For additional information about Lenovo XClarity Controller 3 (XCC3), refer to https://pubs.lenovo.com/lxcc-overview/.

- **UEFI-compliant server firmware**

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

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

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

- **Active Memory**

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

- **Large system-memory capacity**

  The server supports synchronous dynamic random-access memory (SDRAM) registered dual inline memory modules (DIMMs) with error correcting code (ECC). For more information about the specific types and maximum amount of memory, see "Technical specifications" on page 3.

- **Integrated network support**

  The server comes with an integrated 1-port Gigabit Ethernet controller with an RJ-45 connector, which supports connection to a 1000 Mbps network.

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

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

  Storage capacity is different depending on server models. See "Technical specifications" on page 3 for more information.

- **Lightpath Diagnostics**

  Lightpath Diagnostics provides LEDs to help you diagnose problems. For more information about the Lightpath Diagnostics, see "System LEDs and diagnostics display" on page 36.

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

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

- **Active Energy Manager**

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

- **Redundant networking connection**

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

- **Redundant cooling**

  The redundant cooling by the fans in the server enables continued operation if one of the fan rotors fails. See "Thermal rules" in *User Guide* or *Hardware Maintenance Guide* for more information.

- **Onboard RAID support**

  Onboard NVMe ports with software RAID support (Intel VROC NVMe RAID) and JBOD to create configurations. The standard VROC provides RAID levels 0, 1, and 10. VROC Premium provides RAID levels 0, 1, 5 and 10. VROC Boot provides RAID level 1 only.

Tech Tips

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

To find the Tech Tips available for your server:

1. Go to http://datacentersupport.lenovo.com, and input the model name or machine type of your server in the search bar to navigate to the support page.
2. Click on **How To's** from the navigation pane.
3. Click **Article Type → Solution** from the drop-down menu.

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

Security advisories

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

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

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

Specifications

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

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

Specification category	Technical specifications	Mechanical specifications	Environmental specifications
Content	• Processor • Memory • Internal drives • Expansion slots • Integrated functions and I/O connectors • Network • RAID support • System fan-pack • Electrical input and power policy • Minimal configuration for debugging • Operating systems	• Dimension • Weight	• Acoustical noise emissions • Ambient temperature management • Environmental

Technical specifications

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

Processor

Processor
Supports multi-core Intel® Xeon® processors, with integrated memory controller and Intel Mesh UPI (Ultra Path Interconnect) topology. • Up to two Intel® Xeon® 6 E-Cores series (Sierra Forest, SRF) scalable processors with the new LGA 4710-2 socket • Up to 144 cores per socket • Up to four UPI links at up to 24 GT/s • Thermal Design Power (TDP): up to 350 watts For a list of supported processors, see: https://serverproven.lenovo.com.

Memory

Memory
See “Memory module installation order” in *User Guide* or *Hardware Maintenance Guide* for detailed information about memory configuration and setup. • Slots: 32 dual inline memory module (DIMM) connectors that support up to: – 32 DDR5 DIMMs • Memory module type: – TruDDR5 6400MHz RDIMM: 32 GB (2Rx8) – TruDDR5 6400MHz 10x4 RDIMM: 32 GB (1Rx4), 64 GB (2Rx4) • Speed: Operating speed depends on processor model and UEFI settings. – 6400 MT/s for 1 DIMM per channel – 5200 MT/s for 2 DIMMs per channel (for 64 GB 10x4 RDIMMs) • Minimum memory: 32 GB • Maximum memory: 2 TB: 32 x 64 GB 10x4 RDIMMs For a list of supported memory options, see https://serverproven.lenovo.com. For technical rules for memory modules, see “Memory module installation order” in *User Guide* or *Hardware Maintenance Guide*.

Internal drives

Internal drives
Front: • Up to four 2.5-inch hot-swap NVMe drives • Up to eight 2.5-inch hot-swap NVMe drives • Up to ten 2.5-inch hot-swap NVMe drives Inside: • Up to two internal NVMe M.2 drives Rear: • Up to two 2.5-inch hot-swap NVMe drives • Up to two M.2 hot-swap NVMe drives

Expansion slots

Expansion slots
Depending on the model, your server supports up to three PCIe slots in the rear and up to two PCIe slots in the front. • PCIe x16, low-profile • PCIe x16/x16, low-profile + low-profile • PCIe x16/x16, low-profile + full-height • PCIe x16/x16, full-height + full-height • PCIe x16, full-height

Integrated functions and I/O connectors

Integrated functions and I/O connectors

• Lenovo XClarity Controller (XCC), which provides service processor control and monitoring functions, video controller, and remote keyboard, video, mouse, and remote drive capabilities.
  – The server supports Lenovo XClarity Controller 3 (XCC3). For additional information about Lenovo XClarity Controller 3 (XCC3), refer to https://pubs.lenovo.com/lxcc-overview/.
• One XCC system management port on the rear to connect to a systems-management network. This RJ-45 connector is dedicated to the Lenovo XClarity Controller functions and runs at 10/100/1000 Mbps speed.
• A group of two or four Ethernet connectors on OCP module
• Up to four USB 3.2 Gen1 (5 Gbps) ports:
  – Two on the rear of the server
  – (Optional) Two on the front of the server
• One internal USB 3.2 Gen1 (5 Gbps) port
• External LCD diagnostics handset connector on the front of the server
• (Optional) One Mini DisplayPort on the front of the server[1]
• One VGA connectors on the rear of the server
• (Optional) One serial port connector on the rear of the server[2]
Notes:
1. The maximum video resolution is 1920 x 1200 at 60 Hz.
2. Available when the serial port cable is installed in the server.

Network

Network
• OCP module **Notes:** • The server features three OCP slots: OCP 1 and OCP 2 are located on the rear side, and OCP 3 is positioned at the front when the customer configures the front adapter assembly. • OCP module 1 and front OCP module 3 are alternatives. When front OCP module 3 is configured, OCP module 1 will be disabled. • OCP module 1 and front OCP module 3 take priority over OCP module 2.

RAID support

RAID support
Onboard NVMe ports with software RAID support (Intel VROC NVMe RAID) and JBOD • Intel® VROC standard: requires an activation key and supports RAID levels 0, 1, and 10 • Intel® VROC Premium: requires an activation key and supports RAID levels 0, 1, 5, and 10 • Intel® VROC Boot: requires an activation key and supports RAID level 1 only

System fan-pack

System fan
• Supported fan-pack types: – Standard fan-pack 4056 (28000 RPM, single rotor) – Performance fan-pack 4056 (28000 RPM, dual rotors) • Fan redundancy: N+1 redundancy, one redundant fan rotor – One processor: three hot-swap dual-rotor system fan-packs (one redundant fan rotor) – Two processors: four hot-swap dual-rotor system fan-packs (one redundant fan rotor) **Notes:** • The redundant cooling by the fans in the server enables continued operation if one rotor fails. • When the system is powered off but still plugged in to AC power, and XCC has detected that OCP modules are installed, fan-pack 2 and 3 may continue to spin at a much lower speed. This is the system design to provide proper cooling.

Electrical input and power policy

Electrical input

Common Redundant Power Supply (CRPS) and CRPS Premium are supported as listed below:

Table 1. Electrical input for power supply units

Power supply	100–127 V ac	200–240 V ac	240 V dc	-48 V dc	CRPS	CRPS Premium
800-watt 80 PLUS Platinum	√	√	√		√	√
1300-watt 80 PLUS Platinum	√	√	√		√	√
800-watt 80 PLUS Titanium	√	√	√			√
1300-watt 80 PLUS Titanium	√	√	√			√
2000-watt 80 PLUS Titanium		√	√			√

One or two hot-swap power supply units for redundancy or over-subscription (OVS) support:

Table 2. Power policy for power supply units

Type	Watts	Redundancy		OVS
CRPS Premium	800-watt 80 PLUS Titanium	1+0	x	x
		1+1	√	√
	1300-watt 80 PLUS Titanium	1+0	x	x
		1+1	√	√
	2000-watt 80 PLUS Titanium	1+1	√	√
CRPS	800-watt 80 PLUS Platinum	1+1	√	x
	1300-watt 80 PLUS Platinum	1+1	√	x

Notes:

- CRPS PSUs do not support OVS, zero-output mode or vendor mixing. Zero Output Mode and Non-redundant will not be displayed on Lenovo XClarity Controller web interface when installed with CRPS PSUs.
- 1+0 indicates that the server has only one power supply unit installed and the system does not support power redundancy, while 1+1 indicates that two power supply units are installed and redundancy is supported.

CAUTION:

- **240 V dc input 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.**

Minimal configuration for debugging

Minimal configuration for debugging
• One processor in processor socket 1 • One memory module in slot 7 • One power supply unit • One HDD/SSD drive, one M.2 drive (if OS is needed for debugging) • Three system fan-packs

Operating systems

Operating systems
Supported and certified operating systems: • Microsoft Windows Server • Red Hat Enterprise Linux • SUSE Linux Enterprise Server • Canonical Ubuntu References: • Complete list of available operating systems: https://lenovopress.lenovo.com/osig. • OS deployment instructions: Follow the adopted combination to install memory modules (see “Install the operating system” in *User Guide*).

Mechanical specifications

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

Dimension
1U server • Height: 43.00 mm (1.69 inches) • Width: – With rack latches: 481.70 mm (18.96 inches) – Without rack latches: 434.40 mm (17.10 inches) • Depth: 751.90 mm (29.60 inches) **Note:** The depth is measured with rack latches and the handle of the power supply unit included.

Weight
• Net weight: up to 18.27 kg (40.28 lb) • Gross weight: up to 28.12 kg (62.00 lb) **Note:** The gross weight includes the weights of the server, power cable, packaging, rail kit and cable management arm.

Environmental specifications

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

Acoustical noise emissions

Acoustical noise emissions

The server has the following acoustic noise emissions declaration:

Table 3. Acoustic noise emissions declaration

Scenario	Sound power level (L_{WAd})		Sound pressure level (L_{pAm}):	
	Idling[11 on page 10]	Operating	Idling[11 on page 10]	Operating
Typical	5.5 Bel	6.0 Bel (50% CPU TDP)	43.7 dBA	48.5 dBA (50% CPU TDP)
		7.2 Bel (100% CPU TDP)		60.5 dBA (100% CPU TDP)
Storage-rich	6.2 Bel	7.8 Bel (100% CPU TDP)	51.1 dBA	65.5 dBA (100% CPU TDP)

Acoustical noise emissions

Table 3. Acoustic noise emissions declaration (continued)

Scenario	Sound power level (L_{WAd})		Sound pressure level (L_{pAm}):	
	Idling[11 on page 10]	Operating	Idling[11 on page 10]	Operating
		8.1 Bel[22 on page 10]		68.8 dBA[22 on page 10]

Notes:

1. Idle mode: The steady-state condition in which the server is powered-on but not operating any intended function.
2. The maximum of sound power and pressure output when the system is at 100% of input/output operations per second (IOPS) workload.

Table 4. Tested configuration

Scenario	System configuration
Typical	• 10 x 2.5'' chassis • 4 x standard fan-packs • 2 x 205-watt processors • 2 x standard heat sinks • 16 x 64 GB RDIMMs • 10 x 2.5'' NVMe drives • ThinkSystem Broadcom 57416 10GBASE-T 2-port OCP adapter on slot 6 • 2 x 800-watt PSUs
Storage-rich	• 10 x 2.5'' chassis • 4 x high-performance fan-packs • 2 x 330-watt processors • 2 x performance heat sinks • 16 x 64 GB RDIMMs • 10 x 2.5'' NVMe drives • ThinkSystem Broadcom 57416 10GBASE-T 2-port OCP adapter on slot 6 • 2 x 1300-watt PSUs

Notes:

- These sound power levels are measured in controlled acoustical environments according to procedures specified by ISO 7779 and are reported in accordance with ISO 9296.
- The declared sound levels may change depending on configuration/conditions.
- Government regulations (such as those prescribed by OSHA or European Community Directives) may govern noise level exposure in the workplace and may apply to you and your server installation. The actual sound pressure levels in your installation depend upon a variety of factors, including the number of racks in the installation; the size, materials, and configuration of the room; the noise levels from other equipment; the room ambient temperature, and employee's location in relation to the equipment. Further, compliance with such government regulations depends on a variety of additional factors, including the duration of employees' exposure and whether employees wear hearing protection. Lenovo recommends that you consult with qualified experts in this field to determine whether you are in compliance with the applicable regulations.

Ambient temperature management

Ambient temperature management
The server is supported in the following environment: • Air temperature: – Operating: – ASHRAE class H1: 5–25°C (41–77°F); when the altitude exceeds 900 m (2953 ft), the maximum ambient temperature value decreases by 1°C (1.8°F) with every 500 m (1640 ft) of altitude increase. – 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. – ASHRAE class A3: 5–40°C (41–104°F); when the altitude exceeds 900 m (2953 ft), the maximum ambient temperature value decreases by 1°C (1.8°F) with every 175 m (574 ft) of altitude increase. – ASHRAE class A4: 5–45°C (41–113°F); when the altitude exceeds 900 m (2953 ft), the maximum ambient temperature value decreases by 1°C (1.8°F) with every 125 m (410 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 H1: 8%–80%, maximum dew point: 17°C (62.6°F) – ASHRAE Class A2: 8%–80%, maximum dew point: 21°C (70°F) – ASHRAE Class A3: 8%–85%, maximum dew point: 24°C (75°F) – ASHRAE Class A4: 8%–90%, maximum dew point: 24°C (75°F) – Shipment 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. For information about the limits for particulates and gases, see “Particulate contamination” on page 13.

Environment

Environment
ThinkSystem SR630 V4 complies with ASHRAE Class A2 specifications. System performance may be affected when operating temperature is outside of AHSARE A2 specification. • Air temperature: – Operating – ASHARE Class A2: 10°C to 35°C (50°F to 95°F); the maximum ambient temperature decreases by 1°C for every 300 m (984 ft) increase in altitude above 900 m (2,953 ft). – Server off: 5°C to 45°C (41°F to 113°F) – Shipment/storage: -40°C to 60°C (-40°F to 140°F) • Maximum altitude: 3,050 m (10,000 ft) • Relative Humidity (non-condensing): – Operating – ASHRAE Class A2: 8% to 80%; maximum dew point: 21°C (70°F) – Shipment/storage: 8% to 90% • Particulate contamination **Attention:** Airborne particulates and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server. For information about the limits for particulates and gases, see “Particulate contamination” on page 13. **Note:** The server is designed for standard data center environment and recommended to be placed in industrial data centers. When the ambient temperature is greater than the supported max temperature (ASHARE A4 45°C), the server will shut down. The server will not power on again until the ambient temperature falls within the supported temperature range. Depending on hardware configurations, the server complies with ASHRAE Class H1, A2, A3, or A4 specifications with certain thermal restrictions. System performance may be impacted when operating temperature is out of permitted conditions. The restrictions to ASHRAE support are as follows (cooling by air or Processor Neptune™ Air Module (NeptAir)) : • The ambient temperature must be no more than 30°C if your server meets the following conditions: – 300 W < TDP ≤ 350 W – NeptAir module – High-performance fan-packs – Any M.2 NVMe drive – Memory modules with capacity equal to or smaller than 64 GB • The ambient temperature must be no more than 35°C if your server meets any of the following conditions: – 205 W < TDP ≤ 300 W – High-performance fan-packs – ≥ 100 GbE AOC transceiver with high-performance fan-packs – 30°C when 225 < TDP ≤ 300 – 35°C when 185 ≤ TDP ≤ 225 – Any M.2 NVMe drive – Memory modules with capacity equal to or smaller than 64 GB • The ambient temperature must be no more than 35°C if your server meets any of the following conditions: – 185 W < TDP ≤ 205 W – Standard fan-packs – PCIe network interface cards (NICs) and OCP modules – ≥ 100 GbE AOC transceiver with high-performance fan-packs – Any M.2 NVMe drive – Memory modules with capacity equal to or smaller than 64 GB The restrictions to ASHRAE support are as follows (cooling by Processor Neptune™ Core Module (NeptCore)) : • The ambient temperature must be no more than 35°C if your server meets the following conditions: – TDP ≤ 350 – NeptCore module – Standard fan-packs

Environment

– ≥ 100 GbE AOC transceiver
  – 30°C when installed with standard fan-packs
  – 35°C when installed with high-performance fan-packs
– Any M.2 NVMe drive
– Memory modules with capacity equal to or smaller than 64 GB

Water requirements

Water requirements
ThinkSystem SR630 V4 is supported in the following environment: • Maximum pressure: 3 bars • Water inlet temperature and flow rates:

Water inlet temperature	Water flow rate
50°C (122°F)	**1.5** liters per minute (lpm) per server
45°C (113°F)	**1** liter per minute (lpm) per server
40°C (104°F) or lower	**0.5** liters per minute (lpm) per server

Note: The water required to initially fill the system side cooling loop must be reasonably clean, bacteria-free water (<100 CFU/ml) such as de-mineralized water, reverse osmosis water, de-ionized water, or distilled water. The water must be filtered with an in-line 50 micron filter (approximately 288 mesh). The water must be treated with anti-biological and anti-corrosion measures.

Particulate contamination

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

Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous factors, such as temperature or moisture in the air, can influence the effect 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 5. Limits for particulates and gases

Contaminant	Limits
Reactive gases	Severity level G1 as per ANSI/ISA 71.04-1985[1]: • The copper reactivity level shall be less than 200 Angstroms per month (Å/month ≈ 0.0035 µg/cm^2-hour weight gain).[2] • The silver reactivity level shall be less than 200 Angstroms per month (Å/month ≈ 0.0035 µg/cm^2-hour weight gain).[3] • The reactive monitoring of gaseous corrosivity must be conducted approximately 5 cm (2 in.) in front of the rack on the air inlet side at one-quarter and three-quarter frame height off the floor or where the air velocity is much higher.
Airborne particulates	Data centers must meet the cleanliness level of ISO 14644-1 class 8. For data centers without airside economizer, the ISO 14644-1 class 8 cleanliness might be met by choosing one of the following filtration methods: • The room air might be continuously filtered with MERV 8 filters. • Air entering a data center might be filtered with MERV 11 or preferably MERV 13 filters. For data centers with airside economizers, the choice of filters to achieve ISO class 8 cleanliness depends on the specific conditions present at that data center. • The deliquescent relative humidity of the particulate contamination should be more than 60% RH.[4] • Data centers must be free of zinc whiskers.[5]

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

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

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

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

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

Management options

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

Overview

Options	Description
Lenovo XClarity Controller	Baseboard management controller (BMC) Consolidates the service processor functionality, Super I/O, video controller, and remote presence capabilities into a single chip on the server system board (system board assembly). **Interface** • CLI application • Web GUI interface • Mobile application • Redfish API **Usage and downloads** https://pubs.lenovo.com/lxcc-overview/
Lenovo XCC Logger Utility	Application that reports the XCC events to local OS system log. **Interface** • CLI application **Usage and downloads** • https://pubs.lenovo.com/lxcc-logger-linux/ • https://pubs.lenovo.com/lxcc-logger-windows/
Lenovo XClarity Administrator	Centralized interface for multi-server management. **Interface** • Web GUI interface • Mobile application • REST API **Usage and downloads** https://pubs.lenovo.com/lxca/
Lenovo XClarity Essentials toolset	Portable and light toolset for server configuration, data collection, and firmware updates. Suitable both for single-server or multi-server management contexts. **Interface** • **OneCLI**: CLI application • **Bootable Media Creator**: CLI application, GUI application • **UpdateXpress**: GUI application **Usage and downloads** https://pubs.lenovo.com/lxce-overview/

Options	Description
Lenovo XClarity Provisioning Manager	UEFI-based embedded GUI tool on a single server that can simplify management tasks. **Interface** • Web interface (BMC remote access) • GUI application **Usage and downloads** https://pubs.lenovo.com/lxpm-overview/ **Important:** Lenovo XClarity Provisioning Manager (LXPM) supported version varies by product. All versions of Lenovo XClarity Provisioning Manager are referred to as Lenovo XClarity Provisioning Manager and LXPM in this document, unless specified otherwise. To see the LXPM version supported by your server, go to https://pubs.lenovo.com/lxpm-overview/.
Lenovo XClarity Integrator	Series of applications that integrate the management and monitoring functionalities of the Lenovo physical servers with the software used in a certain deployment infrastructure, such as VMware vCenter, Microsoft Admin Center, or Microsoft System Center while delivering additional workload resiliency. **Interface** • GUI application **Usage and downloads** https://pubs.lenovo.com/lxci-overview/
Lenovo XClarity Energy Manager	Application that can manage and monitor server power and temperature. **Interface** • Web GUI Interface **Usage and downloads** https://datacentersupport.lenovo.com/solutions/lnvo-lxem
Lenovo Capacity Planner	Application that supports power consumption planning for a server or rack. **Interface** • Web GUI Interface **Usage and downloads** https://datacentersupport.lenovo.com/solutions/lnvo-lcp

Functions

Options		Functions							
		Multi-system mgmt	**OS deploy-ment**	**System configu-ration**	**Firm-ware up-dates**[1]	**Event-s/alert moni-toring**	**Inven-tory/ logs**	**Pow-er mgmt**	**Power planning**
Lenovo XClarity Controller				√	√[2]	√	√[4]		
Lenovo XCC Logger Utility						√			
Lenovo XClarity Administrator		√			√[2]	√	√[4]		
Lenovo XClarity Essen-tials toolset	OneCLI	√		√	√[2]	√	√		
	Bootable Media Creator			√	√[2]		√[4]		
	UpdateXpress			√	√[2]				
Lenovo XClarity Provisioning Manager			√	√	√[3]		√[5]		
Lenovo XClarity Integrator		√		√	√	√	√	√[6]	
Lenovo XClarity Energy Manager		√				√		√	
Lenovo Capacity Planner									√[7]

Notes:

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

Chapter 2. Server components

This section includes information about the front view, rear view, and top view of the server. Front I/O modules, the system board assembly and LEDs are also illustrated in detail.

Front view

Front views vary by models. Depending on the model, the server might look slightly different from the illustrations in this topic.

Refer to the following front views for different server models:

- “Server model with four 2.5-inch drive bays” on page 19
- “Server model with four 2.5-inch drive bays and a front adapter assembly” on page 20
- “Server model with eight 2.5-inch drive bays” on page 20
- “Server model with ten 2.5-inch drive bays” on page 21
- “Server model with no backplane” on page 22

Server model with four 2.5-inch drive bays

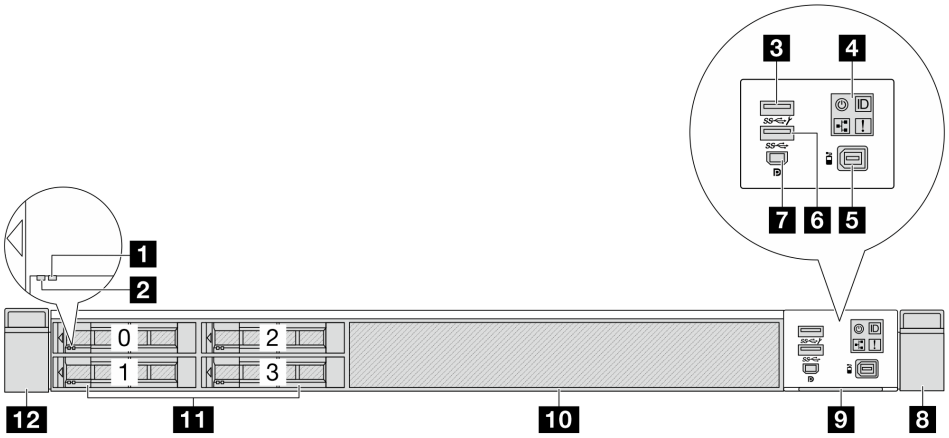


Table 6. Components on the front of the server

Callout	Callout
1 Drive status LED	2 Drive activity LED
3 USB 3.2 Gen 1 (5Gbps) connector	4 Diagnostics panel
5 External LCD connector	6 USB 3.2 Gen 1 (5Gbps) connector
7 Mini DisplayPort connector	8 Rack latch (right)
9 Pull-out information tab	10 Drive bay filler (1)
11 Drive bays (4)	12 Rack latch (left)

Note: For more information about each component, see “Front components overview” on page 22.

Server model with four 2.5-inch drive bays and a front adapter assembly

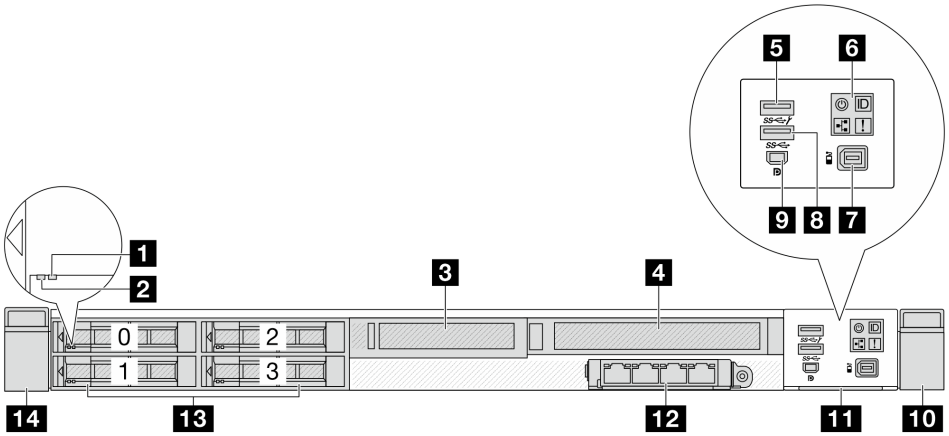


Table 7. Components on the front of the server

Callout	Callout
1 Drive status LED	2 Drive activity LED
3 Front low-profile adapter assembly	4 Front full-height adapter assembly
5 USB 3.2 Gen 1 (5Gbps) connector	6 Diagnostics panel
7 External LCD connector	8 USB 3.2 Gen 1 (5Gbps) connector
9 Mini DisplayPort connector	10 Rack latch (right)
11 Pull-out information tab	12 Front OCP module
13 Drive bays (4)	14 Rack latch (left)

Note: For more information about each component, see “Front components overview” on page 22.

Server model with eight 2.5-inch drive bays

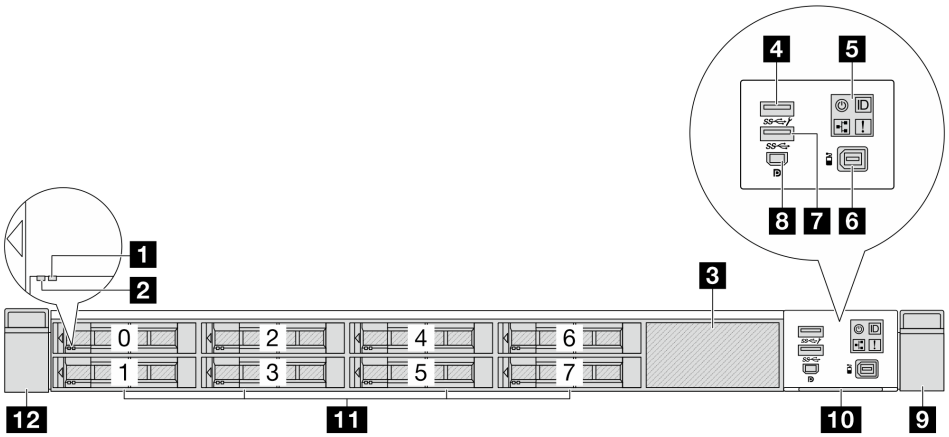


Table 8. Components on the front of the server

Callout	Callout
1 Drive status LED	2 Drive activity LED
3 Drive filler (1)	4 USB 3.2 Gen 1 (5Gbps) connector
5 Diagnostics panel	6 External LCD connector
7 USB 3.2 Gen 1 (5Gbps) connector	8 Mini DisplayPort connector
9 Rack latch (right)	10 Pull-out information tab
11 Drive bays (8)	12 Rack latch (left)

Note: For more information about each component, see "Front components overview" on page 22.

Server model with ten 2.5-inch drive bays

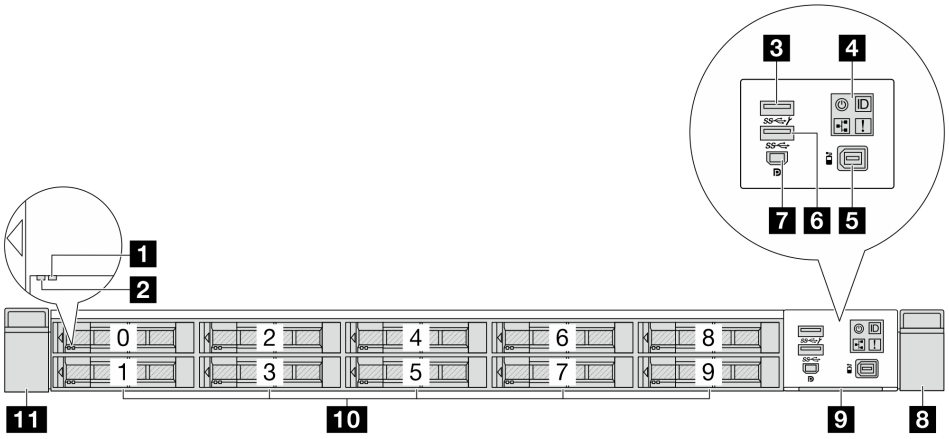


Table 9. Components on the front of the server

Callout	Callout
1 Drive status LED	2 Drive activity LED
3 USB 3.2 Gen 1 (5Gbps) connector	4 Diagnostics panel
5 External LCD connector	6 USB 3.2 Gen 1 (5Gbps) connector
7 Mini DisplayPort connector	8 Rack latch (right)
9 Pull-out information tab	10 Drive bays (10)
11 Rack latch (left)	

Note: For more information about each component, see "Front components overview" on page 22.

Server model with no backplane

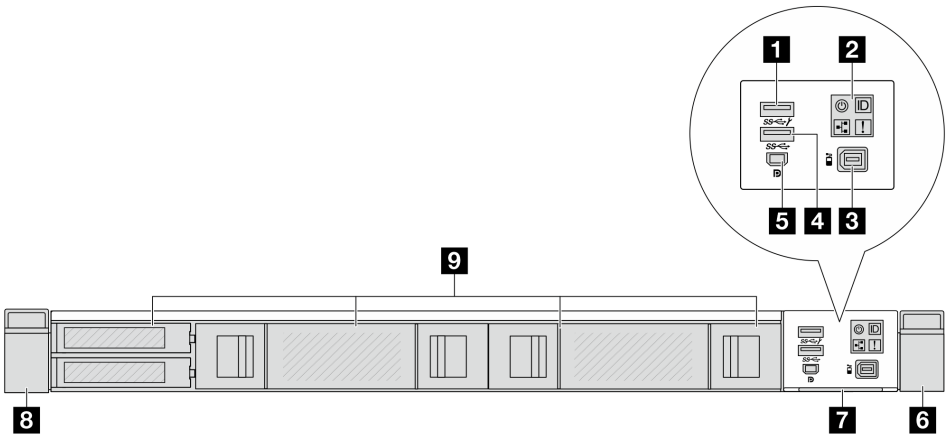


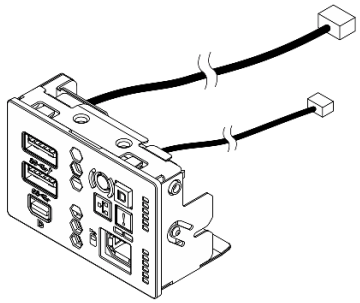
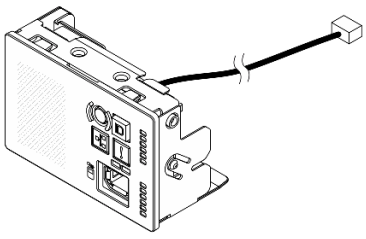
Table 10. Components on the front of the server

Callout	Callout
1 USB 3.2 Gen 1 (5Gbps) connector	2 Diagnostics panel
3 External LCD connector	4 USB 3.2 Gen 1 (5Gbps) connector
5 Mini DisplayPort connector	6 Rack latch (right)
7 Pull-out information tab	8 Rack latch (left)
9 Drive fillers	

Front components overview

Front I/O module

The front I/O module of the server provides controls, connectors, and LEDs. The front I/O module varies by model. Depending on server models, the server supports the following front I/O modules.

 *Figure 2. FIO module with USB/MiniDP*	 *Figure 3. Standard FIO module*
The module supports two USB connectors, one MiniDP connector and a front operator panel.	The module supports a front operator panel.

Front operator panel

The assembly comes with an integrated LCD diagnostics panel that can be used to quickly obtain system status, firmware levels, network information, and health information about the system. For more about the panel functions, see “Front operator panel” in *User Guide* or *Hardware Maintenance Guide*.

Hot-swap drives and drive bays

The drive bays on the front and rear of your server are designed for hot-swap drives. The number of the installed drives in your server varies by model. When you install drives, follow the order of the drive bay numbers.

The EMI integrity and cooling of the server are protected by having all drive bays occupied. Vacant drive bays must be occupied by drive fillers.

Pull-out information tab

The Lenovo XClarity Controller network access label is attached on the pull-out information tab. The default Lenovo XClarity Controller hostname and the IPv6 Link Local Address (LLA) are provided on the tab.

Rack latches

If your server is installed in a rack, you can use the rack latches to help you slide the server out of the rack. You also can use the rack latches and screws to secure the server in the rack so that the server cannot slide out, especially in vibration-prone areas. For more information, refer to the *Rack Installation Guide* that comes with your rail kit.

USB 3.2 Gen 1 (5Gbps) connectors

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

Mini DisplayPort connector

The Mini DisplayPort, short for Mini DP, connector can be used to attach a high-performance monitor and a direct-drive monitor with a video converter, or the devices that use a Mini DP connector. The maximum video resolution is 1920 x 1200 at 60 Hz.

Rear view

The rear view of the server varies by model. Depending on the model, your server might look slightly different from the illustrations in this topic.

Refer to the following rear view for different server models:

- “Server model with three PCIe slots” on page 23
- “Server model with two PCIe slots” on page 24
- “Server model with two 2.5-inch hot-swap rear drive bays and one PCIe slot” on page 25
- “Server model with two PCIe slots and a Processor Neptune™ Core Module (NeptCore)” on page 26
- “Server model with a NeptCore module and rear M.2 drives” on page 26

Server model with three PCIe slots

The following illustration shows the rear view of server model with three PCIe slots. Depending on the model, your server might look slightly different from the illustration below.

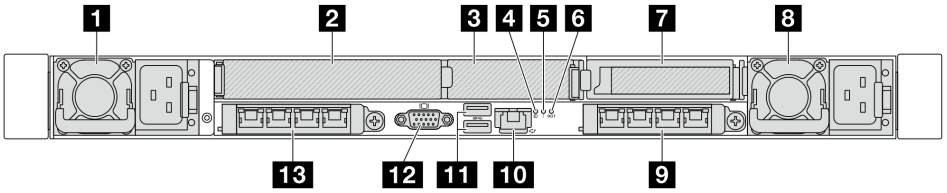


Figure 4. Rear view with two low profile and one full height PCIe adapters

Table 11. Components on the rear of the server

Callout	Callout
1 Power supply unit 1	2 PCIe slot 1 on riser 1 assembly
3 PCIe slot 2 on riser 1 assembly	4 System ID LED
5 System error LED	6 RoT fault LED
7 PCIe slot 3 on riser 2 assembly	8 Power supply unit 2
9 Ethernet connectors on rear OCP module 2 (optional)	10 XCC system management port (10/100/1000 Mbps RJ-45)
11 USB 3.2 Gen 1 (5Gbps) connectors (3 DCIs)	12 VGA connector
13 Ethernet connectors on rear OCP module 1 (optional)	

Note: For more information about each component, see "Rear components overview" on page 27.

Server model with two PCIe slots

The following illustration shows the rear views of the server model with two PCIe slots. Depending on the model, your server might look slightly different from the illustration below.

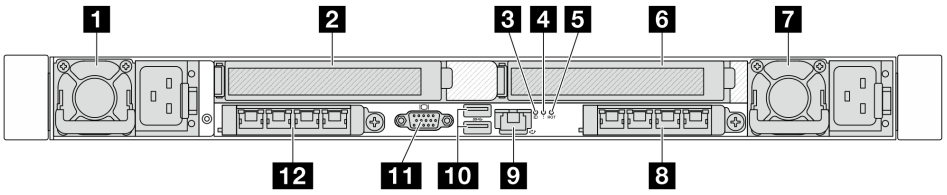


Figure 5. Rear view with two full height PCIe adapters

Table 12. Components on the rear of the server

Callout	Callout
1 Power supply unit 1	2 PCIe slot 1 on riser 1 assembly
3 System ID LED	4 System error LED
5 RoT fault LED	6 PCIe slot 3 on riser 2 assembly
7 Power supply unit 2	8 Ethernet connectors on rear OCP module 2 (optional)
9 XCC system management port (10/100/1000 Mbps RJ-45)	10 USB 3.2 Gen 1 (5Gbps) connectors (3 DCIs)
11 VGA connector	12 Ethernet connectors on rear OCP module 1 (optional)

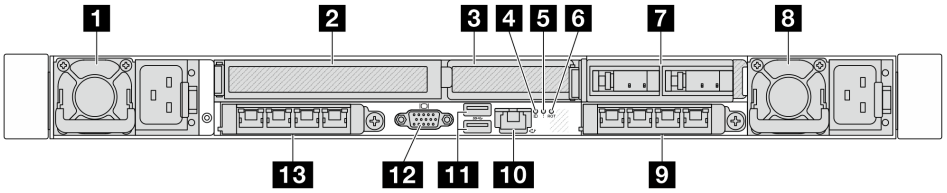


Figure 6. Rear view with one low profile and one full height PCIe adapter

Table 13. Components on the rear of the server

Callout	Callout
1 Power supply unit 1	2 PCIe slot 1 on riser 1 assembly
3 PCIe slot 2 on riser 1 assembly	4 System ID LED
5 System error LED	6 RoT fault LED
7 Rear M.2 assembly	8 Power supply unit 2
9 Ethernet connectors on rear OCP module 2 (optional)	10 XCC system management port (10/100/1000 Mbps RJ-45)
11 USB 3.2 Gen 1 (5Gbps) connectors (3 DCIs)	12 VGA connector
13 Ethernet connectors on rear OCP module 1 (optional)	

Note: For more information about each component, see "Rear components overview" on page 27.

Server model with two 2.5-inch hot-swap rear drive bays and one PCIe slot

The following illustration shows the rear view of the server model with two hot-swap drive bays and one PCIe slot. Depending on the model, your server might look slightly different from the illustration below.

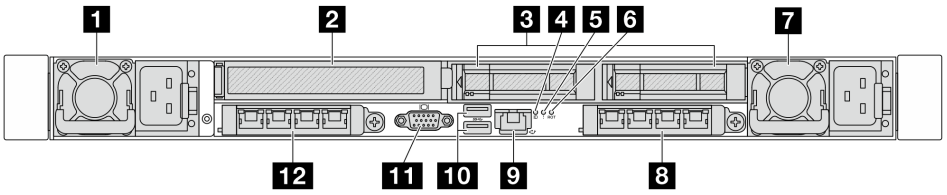


Figure 7. Rear view with one full height PCIe adapter

Table 14. Components on the rear of the server

1 Power supply unit 1	2 PCIe slot 1 on riser 1 assembly
3 Rear 2.5-inch drive bays (2)	4 System ID LED
5 System error LED	6 RoT fault LED
7 Power supply unit 2	8 Ethernet connectors on rear OCP module 2 (optional)
9 XCC system management port (10/100/1000 Mbps RJ-45)	10 USB 3.2 Gen 1 (5Gbps) connectors (3 DCIs)
11 VGA connector	12 Ethernet connectors on rear OCP module 1 (optional)

Note: For more information about each component, see "Rear components overview" on page 27.

Server model with two PCIe slots and a Processor Neptune™ Core Module (NeptCore)

The following illustration shows the rear view of the server model with two PCIe slots and a Processor Neptune™ Core Module (NeptCore). Depending on the model, your server might look slightly different from the illustration below.

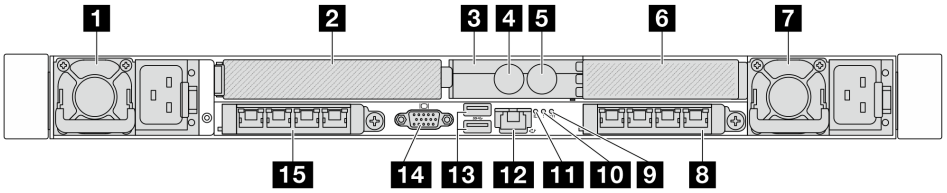


Table 15. Components on the rear of the server

1 Power supply unit 1	2 PCIe slot 1 on riser 1 assembly
3 Hose holder	4 Inlet hose
5 Outlet hose	6 PCIe slot 3 on riser 2 assembly
7 Power supply unit 1	8 Ethernet connectors on rear OCP module 2 (optional)
9 RoT fault LED	10 System error LED
11 System ID LED	12 XCC system management port (10/100/1000 Mbps RJ-45)
13 USB 3.2 Gen 1 (5Gbps) connectors (3 DCIs)	14 VGA connector
15 Ethernet connectors on rear OCP module 1 (optional)	

Note: For more information about each component, see "Rear components overview" on page 27.

Server model with a NeptCore module and rear M.2 drives

The following illustration shows the rear view of the server model with a NeptCore module and rear M.2 drives. Depending on the model, your server might look slightly different from the illustration below.

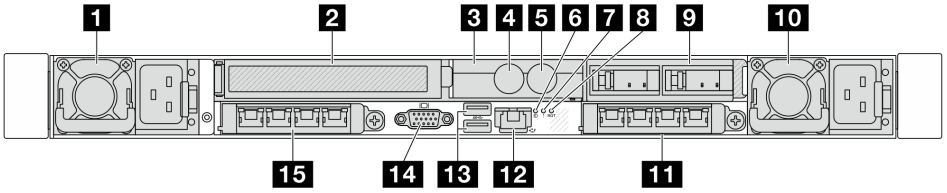


Table 16. Components on the rear of the server

1 Power supply unit 1	2 PCIe slot 1 on riser 1 assembly
3 Hose holder	4 Inlet hose
5 Outlet hose	6 System ID LED
7 System error LED	8 RoT fault LED
9 Rear M.2 drive assembly	10 Power supply unit 2
11 Ethernet connectors on rear OCP module 2 (optional)	12 XCC system management port (10/100/1000 Mbps RJ-45)

Table 16. Components on the rear of the server (continued)

13 USB 3.2 Gen 1 (5Gbps) connectors (3 DCIs)	14 VGA connector
15 Ethernet connectors on rear OCP module 1 (optional)	

Rear components overview

Ethernet connectors

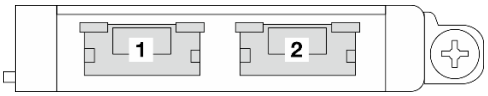


Figure 8. OCP module (two connectors)

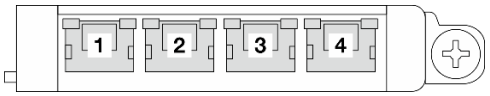


Figure 9. OCP module (four connectors)

- The OCP module provides two or four extra Ethernet connectors for network connections.
- By default, any Ethernet connector on the OCP module can also function as a management connector using the shared management capacity.

Notes:

- The server features three OCP slots: OCP 1 and OCP 2 are located on the rear side, and OCP 3 is positioned at the front when the customer configures the front adapter assembly.
- OCP module 1 and front OCP module 3 are alternatives. When front OCP module 3 is configured, OCP module 1 will be disabled.
- OCP module 1 and front OCP module 3 take priority over OCP module 2.

Hot-swap drives and drive bays

The drive bays on the front and rear of your server are designed for hot-swap drives. The number of the installed drives in your server varies by model. When you install drives, follow the order of the drive bay numbers.

The EMI integrity and cooling of the server are protected by having all drive bays occupied. Vacant drive bays must be occupied by drive fillers.

PCIe slots

The PCIe slots are on the rear of the server and your server supports up to three PCIe slots on riser 1 and 2 assemblies.

Power supply units

The hot-swap redundant power supply helps you avoid significant interruption to the operation of the system when a power supply fails. You can purchase a power supply option from Lenovo and install the power supply to provide power redundancy without turning off the server.

On each power supply, there are three status LEDs near the power cord connector. For information about the LEDs, see “System LEDs and diagnostics display” on page 36.

USB 3.2 Gen 1 (5Gbps) connectors

The USB 3.2 Gen 1 (5Gbps) connectors are direct connect interfaces (DCIs) for debugging, which can be used to attach a USB-compatible device, such as a USB keyboard, USB mouse, or USB storage device.

VGA connector

The VGA connectors on the front and rear of the server can be used to attach a high-performance monitor, a direct-drive monitor, or other devices that use a VGA connector.

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

The XClarity Controller network connector can be used to attach an Ethernet cable to manage the baseboard management controller (BMC).

Rear LEDs

- For more information about the LEDs on the XCC system management port, see “LEDs on the XCC system management port” in *User Guide*.
- For more information about the system error LED, RoT fault LED and system ID LED, see “System-I/O-board LEDs” in *User Guide*.
- For more information about the LEDs on the power supply unit, see “Power-supply-unit LEDs” in *User Guide*.

Inlet and outlet hoses

The Processor Neptune™ Core Module (NeptCore) spreads two hoses out to connect to the manifolds. The inlet hose conveys warm water from the facility to the cold plates to cool down the processors, and the outlet hose conducts hot water out of the NeptCore module to realize system cooling.

Top view

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

The following illustrations show the top views of the server without any air baffle or rear drive cage installed.

- “Top view with standard heat sinks” on page 28
- “Top view with NeptAir module” on page 30
- “Top view with NeptCore module” on page 31

Top view with standard heat sinks

This topic offers the top view of server models with standard heat sinks.

Top view with standard heat sinks

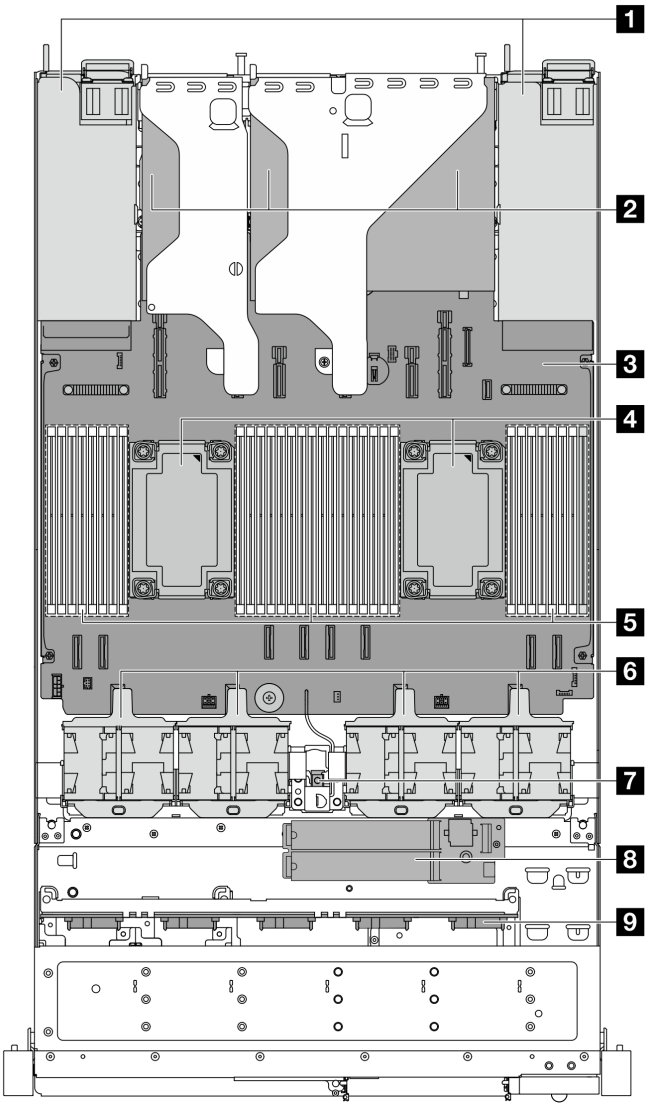


Figure 10. Top view with standard heat sinks

Table 17. Components on the top view with standard heat sinks

1 Power supply units	2 Riser assemblies
3 System board assembly	4 Processor and heat sink module
5 Memory modules	6 System fan-packs
7 Intrusion switch	8 Internal M.2 drive module
9 Front backplane	

Notes:

1. The illustration shows the server rear configuration with two riser assemblies. The server rear configurations vary by server model. For details, see "Rear view" on page 23.

2. The illustration shows the location of certain parts. Some parts may not be supported at the same time within certain configuration(s).

Top view with NeptAir module

This topic offers the top view of server models with the Processor Neptune™ Air Module (NeptAir).

Top view with the NeptAir module

The illustration below singles out the NeptAir module from other components in the chassis. The parts contained depend on the configuration of the server.

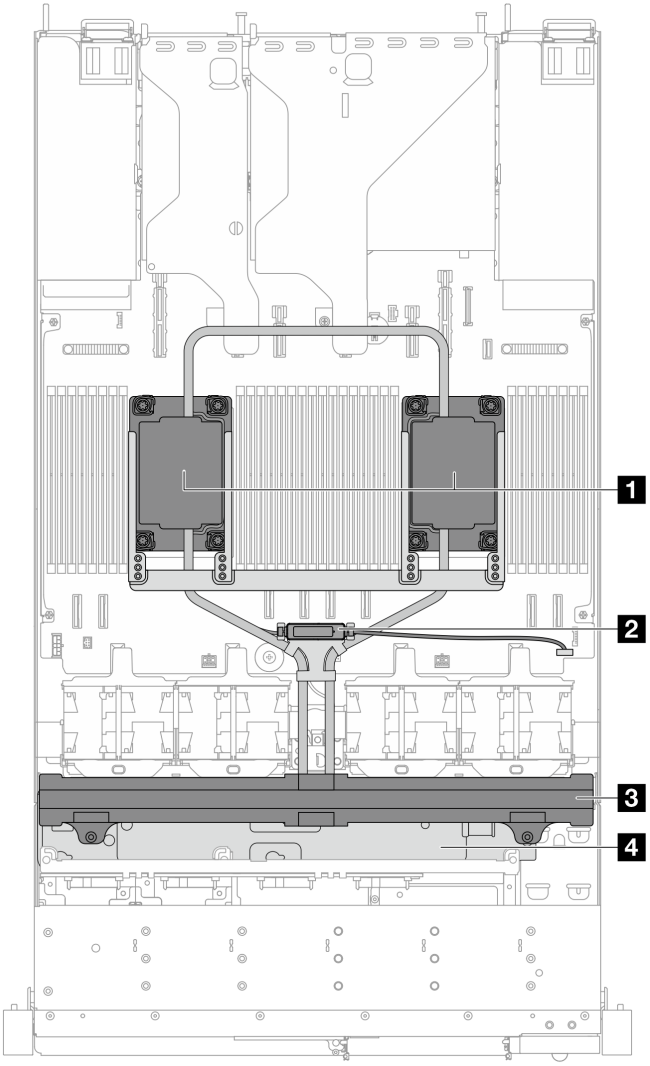


Figure 11. Top view of the NeptAir module

Table 18. Components on the top view of the NeptAir module

1 Cold plate assembly	2 Leakage detection sensor module
3 Radiator	4 Radiator holder

Top view with NeptCore module

This topic offers the top view of server models with the Processor Neptune™ Core Module (NeptCore).

Top view with the NeptCore module

The illustration below singles out the NeptCore module from other components in the chassis. The parts contained depend on the configuration of the server.

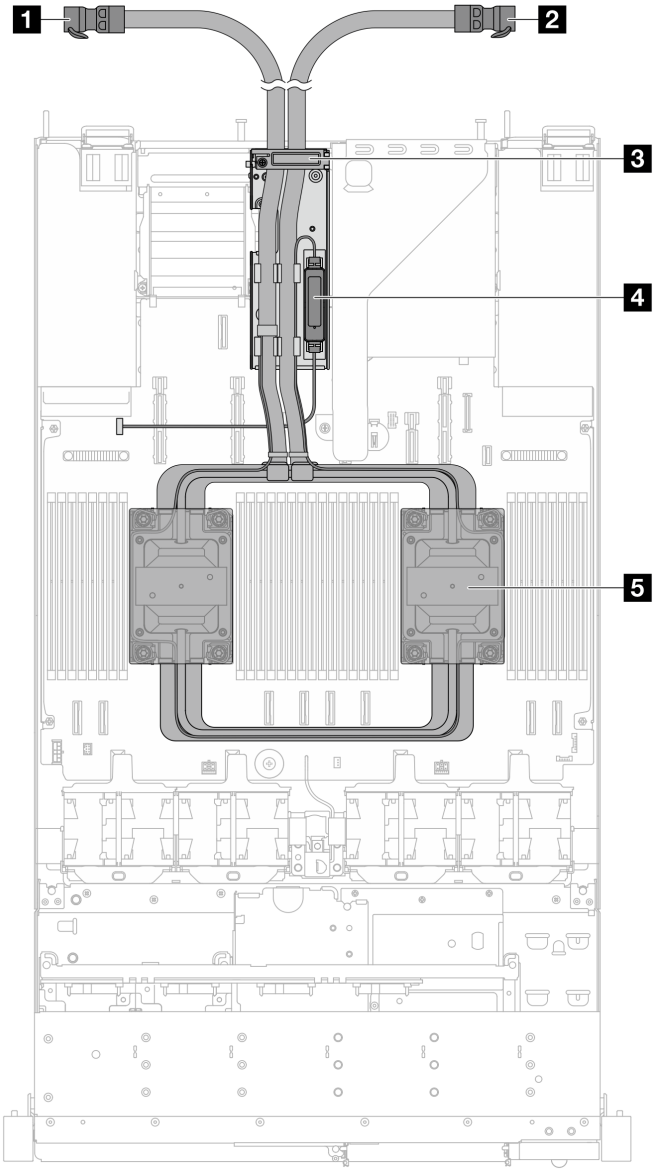


Figure 12. Top view of the NeptCore module

Table 19. Components on the top view of the NeptCore module

1 Outlet hose	2 Inlet hose
3 Hose holder	4 Leakage detection sensor module
5 Cold plate assembly	

System-board-assembly layout

The illustrations in this section provide information about the layout, connectors and switches that are available on the system board assembly.

The following illustration shows the layout of the system board assembly which consists of the system I/O board and processor board.

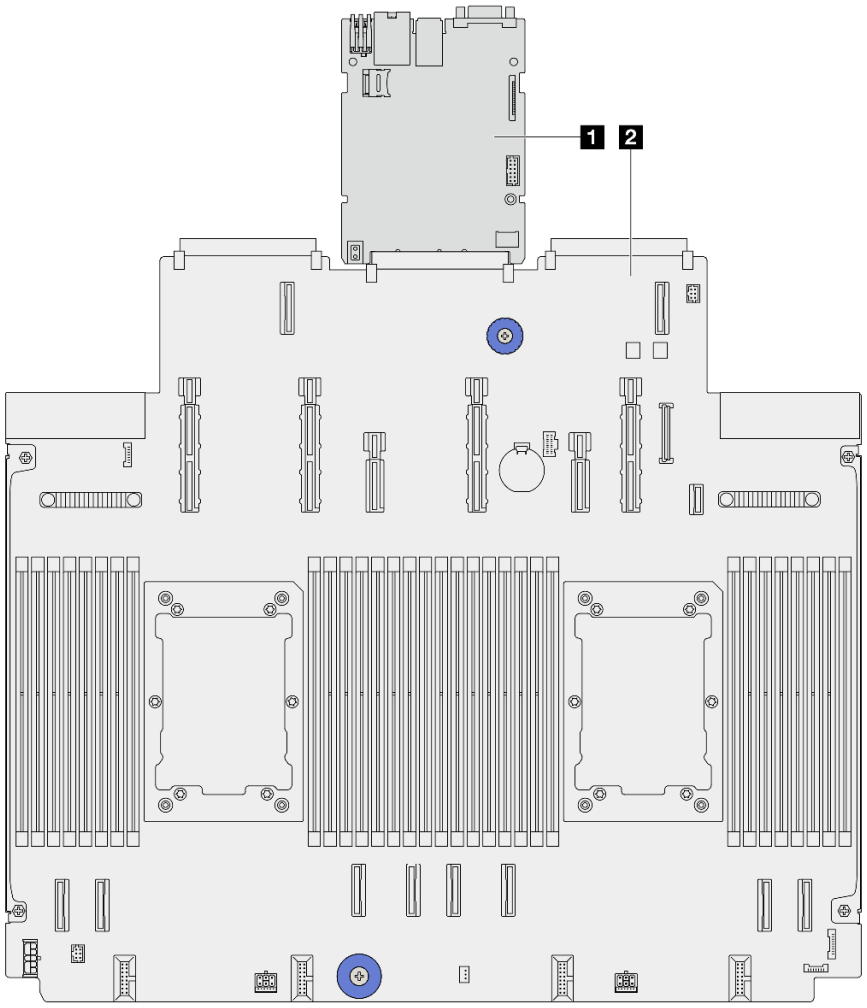


Figure 13. System-board-assembly layout

1 System I/O board	2 Processor board

For more information about the LEDs that are available on the system board assembly, see “System-board-assembly LEDs” in *User Guide* or *Hardware Maintenance Guide*.

System-board-assembly connectors

The following illustrations show the internal connectors on the system board assembly.

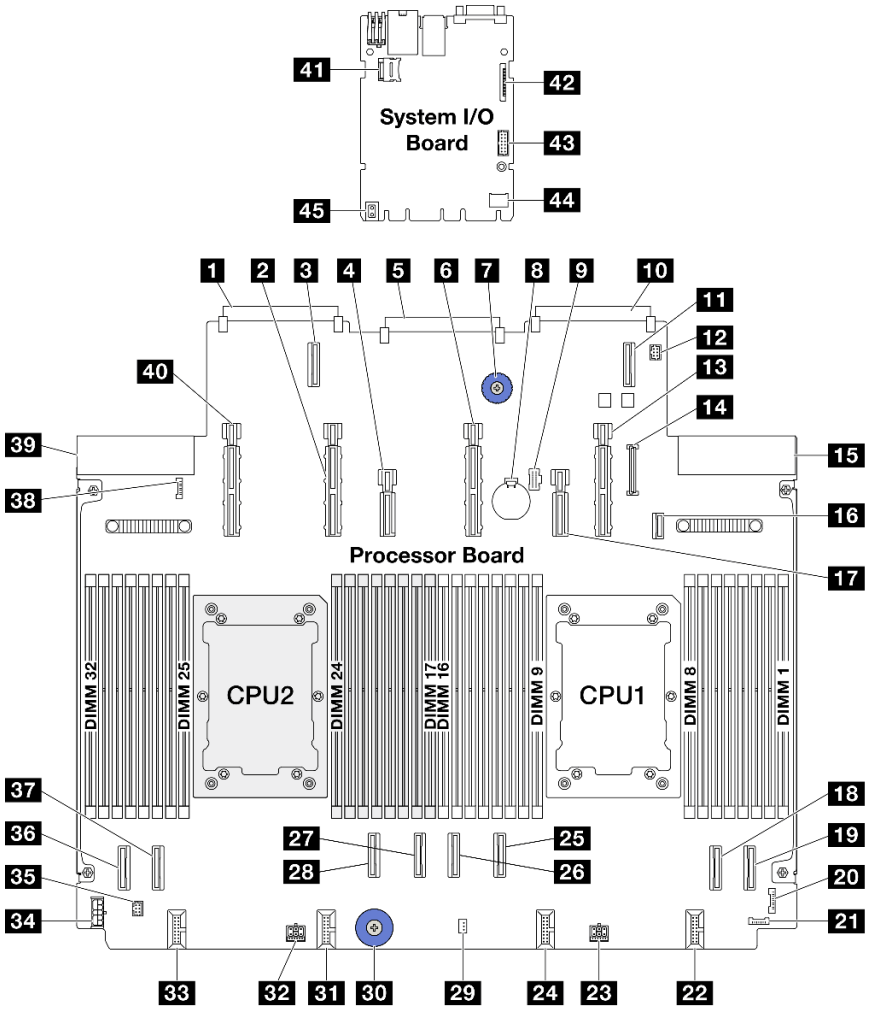


Figure 14. System-board-assembly connectors

Table 20. System-board-assembly connectors

1 OCP 3.0 network card connector 2	2 Power & PCIe connector 13
3 OCP expansion connector 2	4 Power & PCIe connector 12
5 Rear IO board connector	6 Power & PCIe connector 11
7 Lift Handle	8 3V Battery (CR2032)
9 M.2 power connector	10 OCP 3.0 network card connector 1
11 OCP expansion connector 1	12 Pump 1 Connector
13 Power & PCIe connector 9	14 Front panel USB connector
15 Power supply 1 connector	16 M.2 BP signal connector
17 Power & PCIe connector 10	18 PCIe connector 2
19 PCIe connector 1	20 FIO connector
21 Rear leak detection connector	22 Fan 1-2 connector
23 Power connector 3_A	24 Fan 3-4 connector

Table 20. System-board-assembly connectors (continued)

25 PCIe connector 3	26 PCIe connector 4
27 PCIe connector 5	28 PCIe connector 6
29 Intrusion switch connector	30 Lift Handle
31 Fan 5-6 connector	32 Power connector 2_A
33 Fan 7-8 connector	34 Internal RAID power connector
35 Pump 2 connector	36 PCIe connector 8
37 PCIe connector 7	38 Front leak detection connector
39 Power supply 2 connector	40 Power & PCIe connector 15
41 MicroSD connector	42 Second MGMT ethernet connector
43 Serial port connector	44 TCM connector
45 Lift Handle	

System-board-assembly switches

The following illustrations show the location of the switches on the server.

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

Important:

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

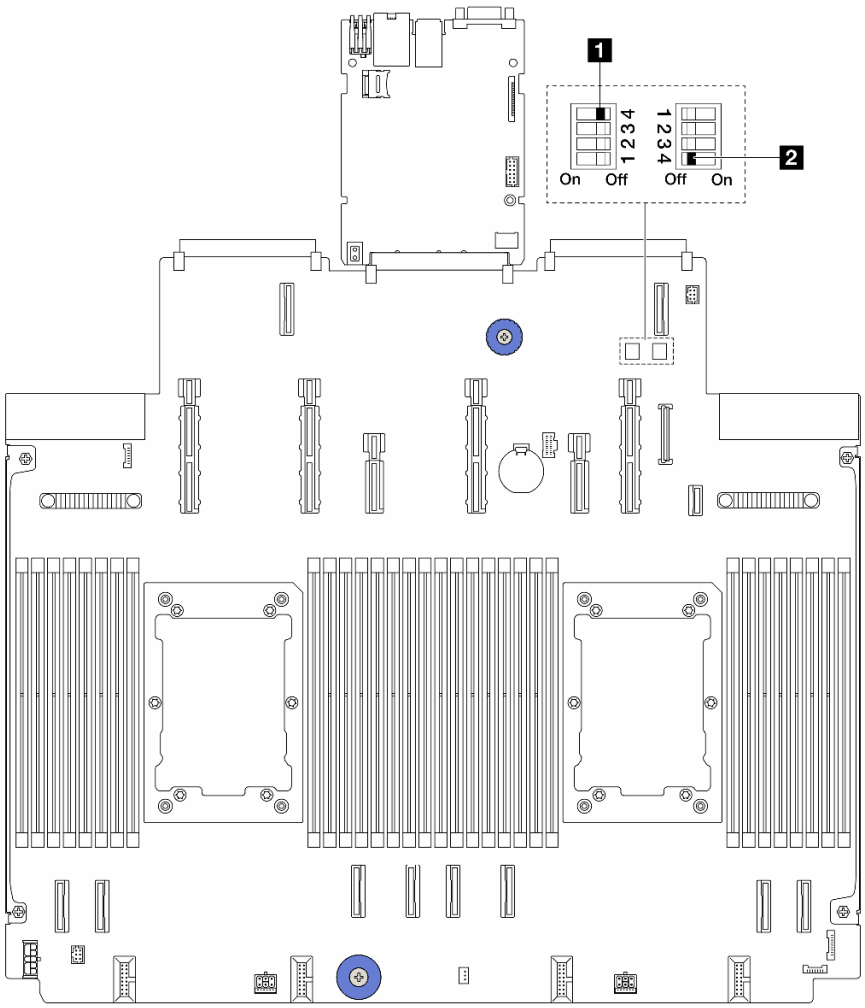


Figure 15. System-board-assembly switches

1 "Switch 1 (SW1)" on page 35	2 "Switch 2 (SW2)" on page 35

SW1 switch block

The following table describes the functions of the SW1 switch block on the system board assembly.

Table 21. SW1 switch block description

Switch-bit number	Switch name	Default position	Description
1 SW1–1	Reserved	OFF	Reserved
2 SW1–2	Reserved	OFF	Reserved
3 SW1–3	Reserved	OFF	Reserved
4 SW1–4	Clear CMOS	OFF	Clears the real-time clock (RTC) registry when switched to ON.

SW2 switch block

The following table describes the functions of the SW2 switch block on the system board assembly.

Table 22. SW2 switch block description

Switch-bit number	Switch name	Default position	Description
1 SW2–1	Reserved	OFF	Reserved
2 SW2–2	Reserved	OFF	Reserved
3 SW2–3	Reserved	OFF	Reserved
4 SW2–4	Password override	OFF	Overrides the power-on password when switched to ON.

System LEDs and diagnostics display

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

For more information, refer to "Troubleshooting by system LEDs and diagnostics display" on page 36.

Troubleshooting by system LEDs and diagnostics display

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

Drive LEDs

This topic provides information on drive LEDs.

Each drive comes with an activity LED and a status LED. Different colors and speeds indicate different activities or status of the drive. The following illustrations and tables describe the problems that are indicated by the activity LED and the status LED.

LEDs on hard disk drives or solid-state drives

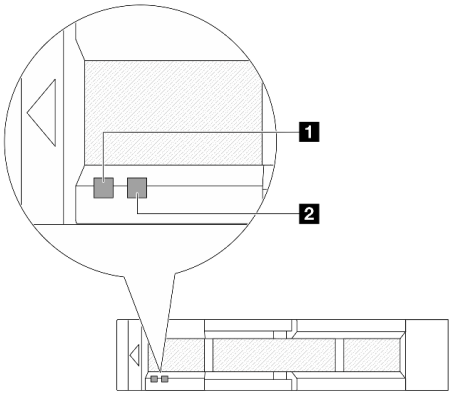


Figure 16. LEDs on hard disk drives or solid-state drives

Drive LED	Status	Description
1 Drive activity LED	Solid green	The drive is powered but not active.
	Blinking green	The drive is active.
2 Drive status LED	Solid yellow	The drive has an error.
	Blinking yellow (blinking slowly, about one flash per second)	The drive is being rebuilt.

Drive LED	Status	Description
	Blinking yellow (blinking rapidly, about four flashes per second)	The RAID adapter is locating the drive.

Front-operator-panel LEDs and buttons

The front operator panel of the server provides controls, connectors, and LEDs.

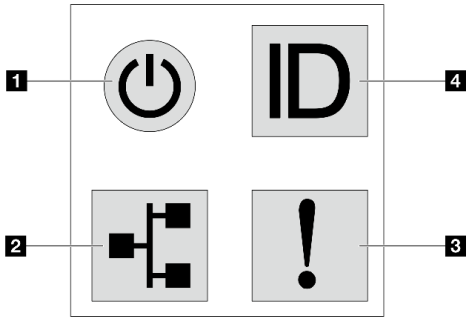


Figure 17. Diagnostics panel

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 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. • System-board-assembly power has failed.
Off	None	There is no ac power applied to the server.

2 Network activity LED

Compatibility of the NIC adapter and the network activity LED

NIC adapter	Network activity LED
OCP module	Support
PCIe NIC adapter	Not support

When an OCP module is installed, the network activity LED on the front I/O assembly helps you identify the network connectivity and activity. If no OCP module is installed, this LED is off.

Status	Color	Description
On	Green	The server is connected to a network.
Blinking	Green	The network is connected and active.
Off	None	The server is disconnected from the network. **Note:** If the network activity LED is off when an OCP module is installed, check the network ports in the rear of your server to determine which port is disconnected.

3 System error LED

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

Status	Color	Description	Action
On	Amber	An error has been detected on the server. Causes might include but are 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. • A hot-swap fan has been removed. • The power supply has a critical error. • The power supply is not connected to the power. • A processor error. • A system I/O board or processor board error. • Abnormal status is detected on the Processor Neptune™ Air Module (NeptAir) or Processor Neptune™ Core Module (NeptCore).	• Check the Lenovo XClarity Controller event log and the system event log to determine the exact cause of the error. • Check if additional LEDs in the server are lit. It will direct you to the error source. See "Troubleshooting by system LEDs and diagnostics display" on page 36. • Save the log if necessary. **Note:** For server models with NeptAir module or NeptCore module installed, it is required to open the top cover to check the LED status of the leakage detection sensor module. For more instructions, see "LED on the leakage detection sensor module" on page 39.
Off	None	The server is off or the server is on and is working correctly.	None.

4 System ID button with system ID LED

Use this system ID button and the blue system ID LED to visually locate the server. A system ID LED is also located on the rear of 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.

If the XClarity Controller USB connector is set to have both the USB 2.0 function and XClarity Controller management function, you can press the system ID button for three seconds to switch between the two functions.

LEDs on the XCC system management port

This topic provides information on LEDs of XCC system management port.

The following table describes the problems that are indicated by LEDs on XCC system management port.

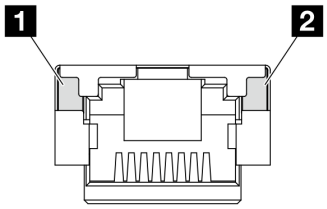


Figure 18. LEDs on the XCC system management port

LED	Description
1 XCC system management port (1 GB RJ-45) Ethernet port link LED	Use this green LED to distinguish the network connectivity status: • Off: The network link is disconnected. • Green: The network link is established.
2 XCC system management port (1 GB RJ-45) Ethernet port activity LED	Use this green LED to distinguish the network activity status: • Off: The server is disconnected from a LAN. • Green: The network is connected and active.

LED on the leakage detection sensor module

This topic provides information about the LED on the leakage detection sensor module.

The leakage detection sensor module on the Processor Neptune™ Air Module (NeptAir) or Processor Neptune™ Core Module (NeptCore) comes with one LED. The following illustration shows the LED on the module.

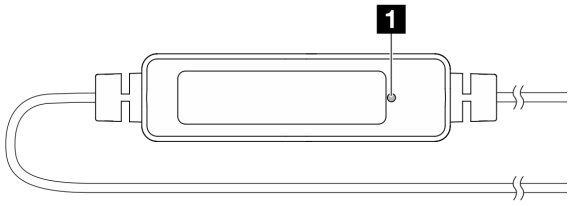


Figure 19. Leak detection LED

The following table describes the status that are indicated by the leakage detection sensor module LED.

1 Leakage detection sensor LED (green)	
Description	• On: No liquid leakage or cable break alert. • Slow blinking (about two flashes per second): Cable break alert. • Fast blinking (about five flashes per second): Liquid leak alert.
Action	• If the cable breaks, replace the NeptAir module or NeptCore module (trained technicians only). • If liquid leakage happens: – For NeptAir module problem determination and troubleshooting, see “Liquid cooling module problems (NeptAir module)” in *User Guide* and *Hardware Maintenance Guide*. – For NeptCore module problem determination and troubleshooting, see “Liquid cooling module problems (NeptCore module)” in *User Guide* and *Hardware Maintenance Guide*.

Power-supply-unit LEDs

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

The following minimal configuration is required for the server to start:
- One processor in processor socket 1
- One memory module in slot 7
- One power supply unit
- One HDD/SSD drive, one M.2 drive (if OS is needed for debugging)
- Three system fan-packs

The following table describes the problems that are indicated by various combinations of the power-supply unit LEDs and the power-on LED and suggested actions to correct the detected problems.

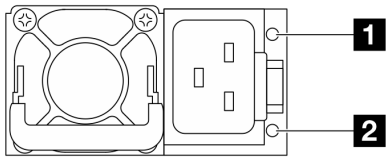


Figure 20. LEDs on a CRPS Premium *power supply unit*

LED	Description
1 Output and fault status (bi-color, green and yellow)	The output and fault status LED can be in one of the following states: • Off: The server is powered off, or the power supply unit is not working properly. If the server is powered on but the LED is off, replace the power supply unit. • Slow blinking green (about one flash per second): The power supply is in zero-output mode (standby). When the server power load is low, one of the installed power supplies enters into the standby state while the other one delivers entire load. When the power load increases, the standby power supply will switch to active state to provide sufficient power to the server. • Fast blinking green (about five flashes per second): The power supply unit is in firmware update mode. • Green: The server is on and the power supply unit is working normally. • Yellow: The power supply unit may have failed. Dump the FFDC log from the system and contact Lenovo back-end support team for PSU data log reviewing. Zero-output mode can be disabled via Setup Utility or Lenovo XClarity Controller web interface. If you disable zero-output mode, both power supplies will be in the active state. • Start the Setup utility, go to **System Settings → Power → Zero Output** and select **Disable**. If you disable zero-output mode, both power supplies will be in the active state. • Log in to the Lenovo XClarity Controller web interface, choose **Server Configuration → Power Policy**, disable **Zero Output Mode**, and then click **Apply**.
2 Input status (single color, green)	The input status LED can be in one of the following states: • Off: The power supply unit is disconnected from the input power source. • Green: The power supply unit is connected to the input power source. • Blinking (1Hz): The input power is unhealthy.

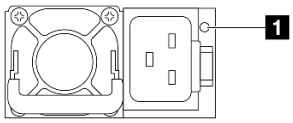


Figure 21. LED on a CRPS PSU (1)

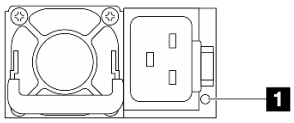


Figure 22. LED on a CRPS PSU (2)

1 Power-supply-unit LED (bi-color, green and yellow)	
Status	**Description**
On (green)	The server is on and the power supply unit is working normally.
Blinking (green, about two flashes per second)	The power supply unit is in firmware updating mode.
On (yellow)	When the power supply unit is lit yellow: • Scenario 1: one of the two power supply units has powered off or is unplugged from the power cord, and at the same time, the other one has power on. • Scenario 2: the power supply unit has failed due to one of the issues listed below: – Over-temperature protection (OTP) – Over-current protection (OCP) – Over-voltage protection (OVP) – Short circuit protection (SCP) – Fan failure

1 Power-supply-unit LED (bi-color, green and yellow)	
Status	**Description**
Blinking (yellow, about one flash per second)	The power supply unit is showing warnings, indicating over-temperature warning (OTW), over-current warning (OCW), or a slow fan speed.
Off	The server is powered off, or the power supply unit is not working properly. If the server is powered on but the LED is off, replace the power supply unit.

System-I/O-board LEDs

The following illustrations show the light-emitting diodes (LEDs) on the system I/O board.

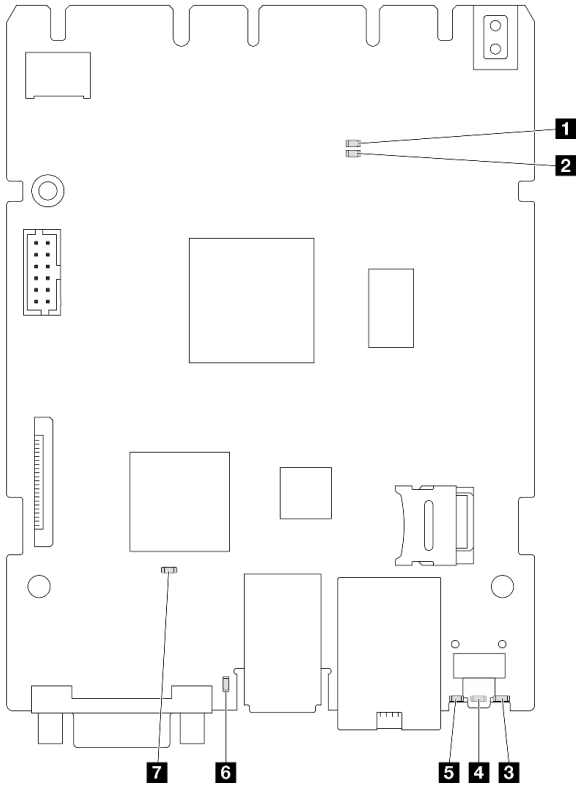


Figure 23. LEDs on the system I/O board

1 AP0 LED (green)

2 AP1 LED (green)

3 RoT fault LED (yellow)

4 System error LED (yellow)

5 System ID LED (blue)

6 XCC heartbeat LED (green)

7 SCM FPGA heartbeat LED (green)

Table 23. LEDs description

Scenario	1 AP0 LED	2 AP1 LED	3 RoT fault LED	7 SCM FPGA heart-beat LED	6 XCC heart-beat LED	Actions
RoT security module fatal firmware failure	Off	Off	On	N/A	N/A	Replace the system I/O board.
	Blink	N/A	On	N/A	N/A	Replace the system I/O board.
	Blink	N/A	On	On	N/A	Replace the system I/O board.

Table 23. LEDs description (continued)

Scenario	1 AP0 LED	2 AP1 LED	3 RoT fault LED	7 SCM FPGA heart-beat LED	6 XCC heart-beat LED	Actions
No system power (FPGA heartbeat LED off)	Off	Off	Off	Off	Off	If the AC power is on, but the system board assembly does not have power, then: 1. Check the power supply unit (PSU) or power interposer board (PIB) if any. If the PSU or PIB has any error, replace it. 2. If the PSU or PIB is good, do the following: a. Replace the system I/O board. b. Replace the processor board.
XCC firmware recoverable error	Blink	N/A	Off	N/A	N/A	Information only. No action is required.
XCC firmware is recovered from error	Blink	N/A	Off	N/A	N/A	Information only. No action is required.
UEFI firmware authentication failure	N/A	Blink	Off	N/A	N/A	Information only. No action is required.
UEFI firmware is recovered from authentication failure	N/A	On	Off	N/A	N/A	Information only. No action is required.
System is OK (FPGA heartbeat LED is On)	On	On	Off	On	On	Information only. No action is required.

4 System error LED (yellow)	
Description	When this yellow LED is lit, another one or more LEDs in the server might also be lit to direct you to the error source.
Action	Check system logs or internal error LEDs to identify the failed part. For more information, see "Front-operator-panel LEDs and buttons" on page 37.

5 System ID LED (blue)	
Description	The front system ID LED helps you locate the server.
Action	Each time you press the system ID button, the state of both system ID LEDs changes, and the state can be on, blinking, or off.

6 XCC heartbeat LED (green)	
Description	The XCC heartbeat LED helps you identify the XCC status. • Blinking (about one flash per second) : XCC is working normally. • Blinking at other speeds or always on: XCC is at the initial phase or is working abnormally. • Off: XCC is not working.
Action	• If the XCC heartbeat LED is always off or always on, do the following: – If XCC cannot be accessed: 1. Re-plug the power cord. 2. Check and ensure that the system I/O board is installed correctly. (Trained technicians only) Reinstall it if needed. 3. (Trained technicians only) Replace the system I/O board. – If XCC can be accessed, replace the system I/O board. • If the XCC heartbeat LED is always blinking fast over 5 minutes, do the following: 1. Re-plug the power cord. 2. Check and ensure that the system I/O board is installed correctly. (Trained technicians only) Reinstall it if needed. 3. (Trained technicians only) Replace the system I/O board. • If the XCC heartbeat LED is always blinking slow over 5 minutes, do the following: 1. Re-plug the power cord. 2. Check and ensure that the system I/O board is installed correctly. (Trained technicians only) Reinstall it if needed. 3. If the problem remains, contact Lenovo Support.

Processor-board LEDs

The following illustrations show the light-emitting diodes (LEDs) on the processor board.

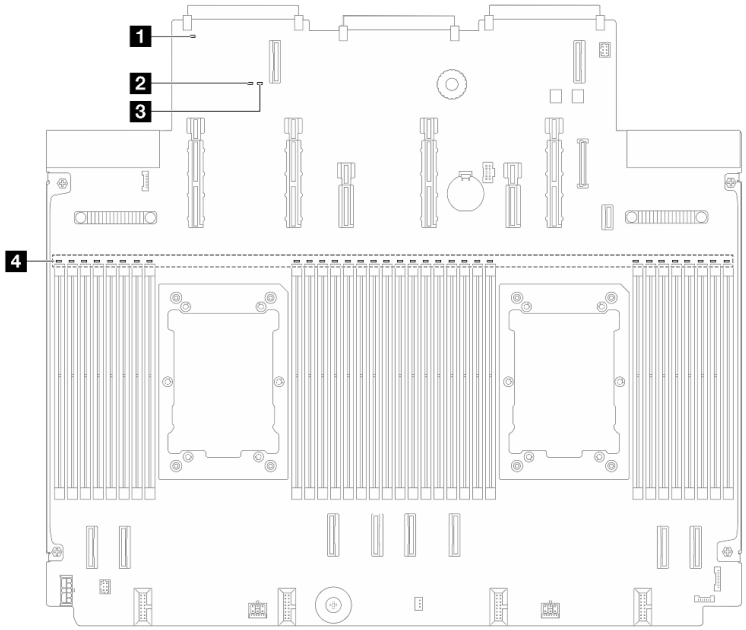


Figure 24. LEDs on the processor board

1 System error LED (yellow)

2 System status LED (green)

3 FPGA heartbeat LED (green)

4 DIMM error LEDs (amber)

Descriptions of LEDs on the processor board

1 System error LED (yellow)	
Description	When this yellow LED is lit, another one or more LEDs in the server might also be lit to direct you to the error source.
Action	Check system logs or internal error LEDs to identify the failed part. For more information, see "Front-operator-panel LEDs and buttons" on page 37.

2 System status LED (green)	
Description	The system status LED indicates the working status of the system. • Fast blinking (about four flashes per second): Power fault or is waiting for XCC power permission ready. • Slow blinking (about one flash per second): Power off and is ready to be powered on (standby state). • On: Power on.
Action	• If the system status LED is blinking fast over 5 minutes and cannot power on, check the XCC heartbeat LED and follow the actions for the XCC heartbeat LED. • If the system status LED remains off or is blinking fast (about four flashes per second) and the system error LED on the front panel is on (yellow), the system is in a power fault status. Do the following: 1. Re-plug the power cord. 2. Remove installed adapters/devices, one at a time, until you reach the minimal configuration for debugging. 3. (Trained technicians only) If the problem remains, capture FFDC log, and replace the processor board. 4. If the problem still remains, contact Lenovo Support.

3 FPGA heartbeat LED (green)	
Description	The FPGA heartbeat LED helps you identify the FPGA status. • Blinking (about one flash per second): FPGA is working normally. • On or off: FPGA is not working.
Action	If FPGA heartbeat LED is always off or always on, do the following: 1. Replace the processor board. 2. If the problem remains, contact Lenovo Support.

4 DIMM error LEDs (amber)	
Description	When a memory module error LED is lit, it indicates that the corresponding memory module has failed.
Action	For more information, see “Memory problems” in the *User Guide*.

Rear M.2 LEDs

This topic provides troubleshooting information for the rear M.2 drive assembly.

- “LEDs on the rear M.2 interposer” on page 46
- “LEDs on the rear M.2 backplane” on page 47

LEDs on the rear M.2 interposer

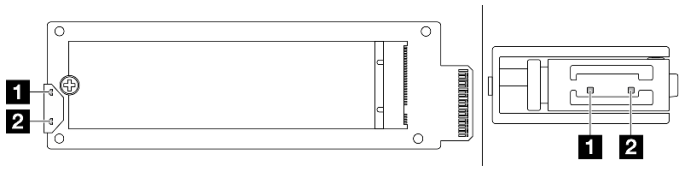


Figure 25. Rear M.2 interposer LEDs

The normal status of the LEDs on the interposer is that activity LED blinks and status LED remains off.

LED	Status and description
1 Activity LED (green)	On: The M.2 drive is idle.
	“Off: The M.2 drive appears de-asserted.” on page 46
	Blinking (about four flashes per second): The I/O activity of the M.2 drive is in progress.
2 Status LED (yellow)	On: A drive fault occurs.
	Off: The M.2 drive is working normally.
	Fast blinking (about four flashes per second): The M.2 drive is being located.
	Slow blinking (about one flash per second): The M.2 drive is being rebuilt.

Rear M.2 drive de-asserted problem

1. Hot-swap the two side-by-side M.2 drive assemblies with each other to see if the problem persists.
2. If the problem persists:
   - Scenario 1: activity LED remains off, replace the interposer. If replacing interposers does not work, it can be a power or PSoC fault, collect FFDC file and contact Lenovo Support.

- Scenario 2: both LEDs are on, access the drive information on XCC:
  - If the information is accessible but the drive remains de-asserted, replace the drive or check RAID chip log in FFDC file to see if any helpful information is available.
  - If the information is not accessible, check RAID chip log in FFDC file, replace the interposer or drive.

3. If the problem persists after replacing the interposer and drive, contact Lenovo Support.

LEDs on the rear M.2 backplane

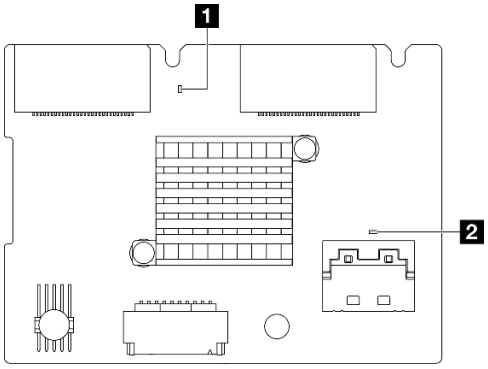


Figure 26. Rear M.2 backplane LEDs

The normal status of the LEDs on the backplane is that both system heartbeat LED and PSoC heartbeat LED blink.

LED	Status and description
1 System heartbeat LED (green)	Blinking: The M.2 backplane has power on.
2 PSoC heartbeat LED (green)	On: The PSoC firmware is not initialized or in a hung state.
	Off: Power off or in a hung state.
	Fast blinking (about one flash per second): Updating code (bootloader mode).
	Slow blinking (about one flash every two seconds): Exiting initialization (application mode).

Rear M.2 drive backplane troubleshooting procedure

- Visually inspect the LEDs on the backplane, with system power on and top cover removed.
  - If the PSoC heartbeat LED is always on or off, replace the backplane. If the problem persists after replacing, collect FFDC file and contact Lenovo Support.
  - If the system heartbeat LED is not blinking, it indicates that RAID chip problems occur. Replace the backplane. If the problem persists after replacing, collect FFDC file and contact Lenovo Support.
- If XCC event log shows PCIe errors concerning the rear M.2 drive and removing the top cover is not feasible.
  - Replace the backplane. If the problem persists after replacing, collect FFDC file and contact Lenovo Support.
  - Check PSoC register in the PSoC folder to further identify if PSoC is working normally:
    - If not, try to replace the backplane or update PSoC firmware. If they do not work, contact Lenovo Support.

– If yes, check if RAID chip information is accessible on FFDC file device list. If yes, replace the backplane or collect FFDC file and contact Lenovo Support; if not, replace the backplane.

Rear system LEDs

This topic provides an overview of the LEDs on the rear of the server.

Rear system LEDs of the server

The following illustration shows the LEDs on the rear view of server model with three PCIe slots. The LEDs on the rear view of other server models are the same.

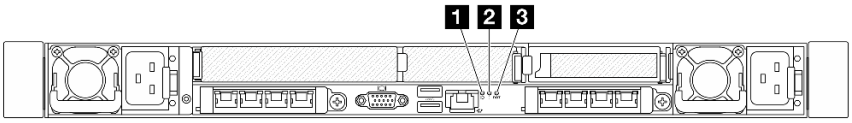


Figure 27. Rear LEDs overview

Callout	LED
1 2 3	"System-I/O-board LEDs" on page 42

Chapter 3. Parts list

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

For more information about ordering parts:

1. Go to **http://datacentersupport.lenovo.com**, and enter the model name or machine type of your server in the search bar to navigate to the support page.
2. Click **Parts**.
3. Enter the serial number to view a listing of parts for your server.

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

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

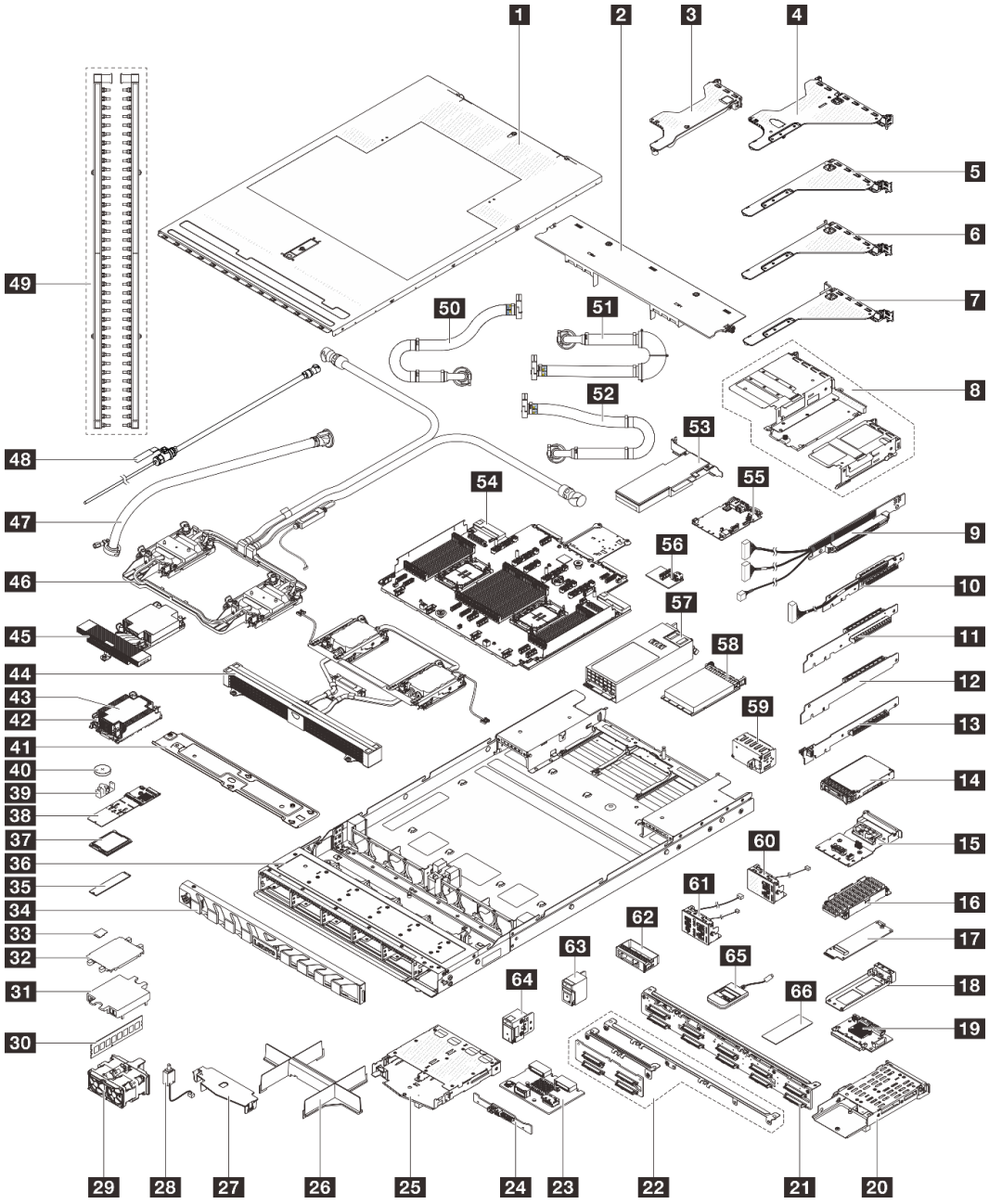


Figure 28. Server components

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

- **T1**: Tier 1 customer replaceable unit (CRU). Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request with no service agreement, you will be charged for the installation.
- **T2**: Tier 2 customer replaceable unit (CRU). You may install a Tier 2 CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **FRU**: Field replaceable unit (FRU). FRUs must be installed only by trained service technicians.
- **C**: Consumable and Structural parts. Purchase and replacement of consumable and structural parts is your responsibility. If Lenovo acquires or installs a structural component at your request, you will be charged for the service.

Description	Type	Description	Type
1 Top cover	T1	2 Air baffle	T1
3 Riser bracket (low profile, LP)	T1	4 Riser bracket (low profile-full height, LP-FH)	T1
5 Riser bracket (full height, FH)	T1	6 Riser bracket (full height, FH)	T1
7 Rear riser bracket (full height, FH)	T1	8 Front riser cages	T1
9 Riser 5–4 card	T2	10 Riser 2–1 card	T2
11 Riser 2–2 card	T1	12 Riser 3 card	T1
13 Riser 1 card	T1	14 2.5-inch drive	T1
15 Rear OCP interposer card	T1	16 Rear M.2 drive assembly	T2
17 Rear M.2 adapter	T1	18 Rear M.2 adapter tray	T1
19 Front OCP interposer card	T2	20 Rear M.2 cage	T1
21 10 x 2.5-inch front drive backplane	T2	22 4 x 2.5-inch front drive backplane	T2
23 Rear M.2 backplane	T2	24 2 x 2.5-inch rear drive backplane	T2
25 2 x 2.5-inch rear drive cage	T1	26 Processor and heat sink module filler	C
27 2 x 2.5-inch rear drive cage air baffle	T1	28 Intrusion switch	T1
29 System fan-pack	T1	30 Memory module	T1
31 Cold plate cover	C	32 Processor socket cover	C
33 MicroSD card	T1	34 Security bezel	C
35 M.2 drive	T1	36 Chassis	FRU
37 Processor	FRU	38 Internal M.2 backplane	T2
39 M.2 retainer clip	T1	40 CMOS battery	C
41 Radiator holder	T1	42 Heat sink PEEK nut	T2
43 Standard heat sink	FRU	44 Processor Neptune™ Air Module (NeptAir)	FRU
45 Performance heat sink	FRU	46 Processor Neptune™ Core Module (NeptCore)	FRU
47 42U in-row hose kit	FRU	48 Bleeder kit	FRU
49 Manifolds	FRU	50 42U/48U in-rack connection hose (return side)	FRU
51 42U in-rack connection hose (supply side)	FRU	52 48U in-rack connection hose (supply side)	FRU
53 PCIe adapter	T1	54 Processor board	FRU
55 System I/O board	FRU	56 USB I/O board	T1
57 Power supply unit	T1	58 OCP module	T1
59 Power-supply-unit filler	C	60 Front I/O module (1)	T2
61 Front I/O module (2)	T1	62 2.5-inch drive bay filler	C
63 Rack latch (right)	T1	64 Rack latch (left)	T1
65 External diagnostics handset	T1	66 Rear M.2 heat sink thermal pad	FRU

Power cords

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

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

1. Go to:

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

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

Notes:

- For your safety, a power cord with a grounded attachment plug is provided to use with this product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.
- Power cords for this product that are used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).
- For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.
- For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.
- For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.
- Power cords for a specific country or region are usually available only in that country or region.

Chapter 4. Unboxing and setup

Information in this section assists you on unboxing and setting up the server. When unboxing the server, check if the items in the package are correct, and learn where to find information of server serial number and Lenovo XClarity Controller access. Make sure to follow the instructions in “Server setup checklist” on page 55 when setting up the server.

Server package contents

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

The server package includes the following items:

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

Notes:

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

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

Identify the server and access the Lenovo XClarity Controller

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

Identifying your server

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

The illustration below shows the location of the ID label which contains the model number, machine type, and serial number of the server.

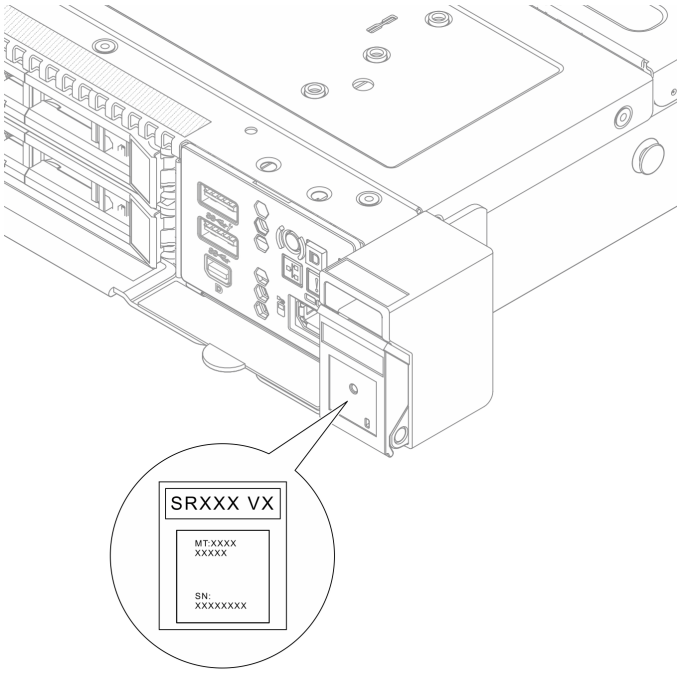


Figure 29. Location of the ID label

Lenovo XClarity Controller network access label

In addition, the Lenovo XClarity Controller network access label is attached to the pull-out information tab in the front of the chassis, with MAC address accessible with a pull.

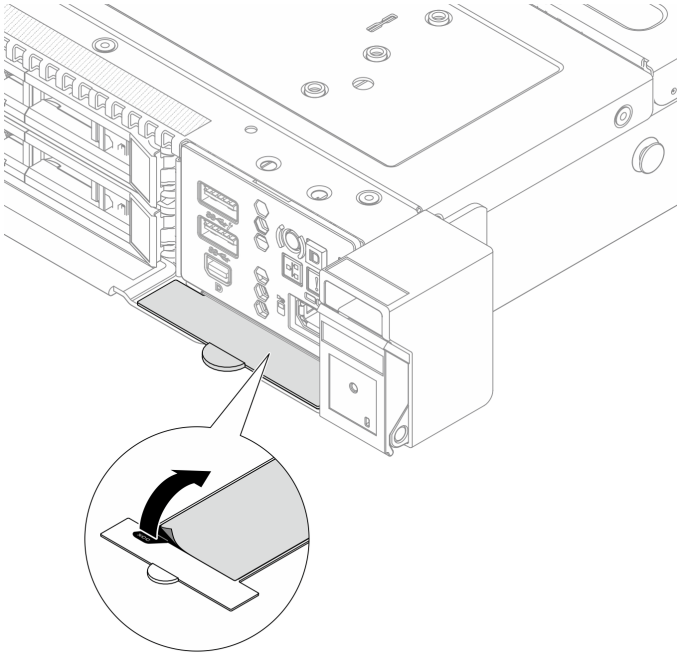


Figure 30. Lenovo XClarity Controller network access label on the pull-out information tab

Service Label and QR code

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

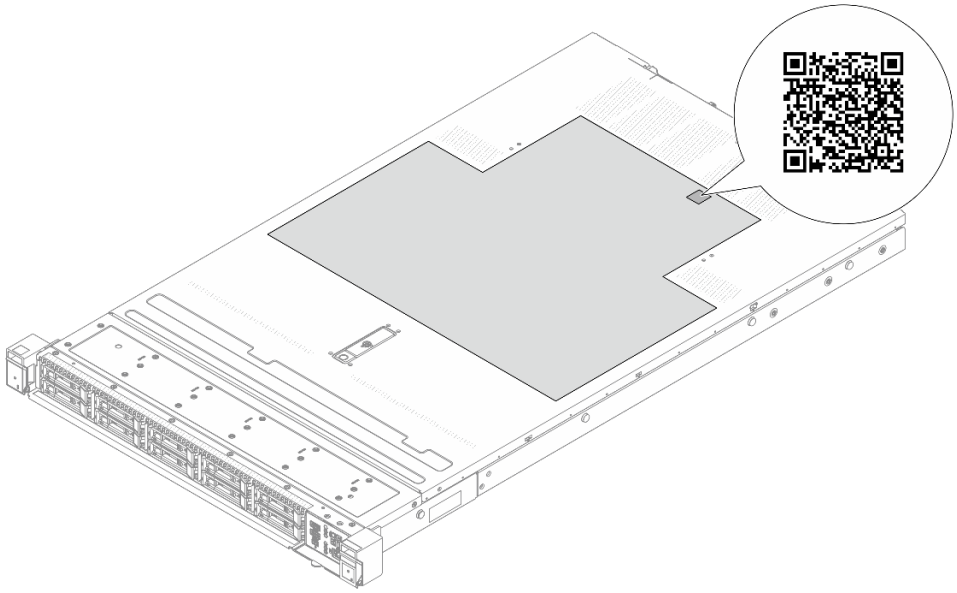


Figure 31. Service Label and QR code

Server setup checklist

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

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

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

Setup the server hardware

Complete the following procedures to setup the server hardware.

1. Unpack the server package. See “Server package contents” on page 53.
2. Install any required hardware or server options. See the related topics in “Hardware replacement procedures” in *User Guide* or *Hardware Maintenance Guide*.
3. If necessary, install the rail and CMA to a standard rack cabinet. Follow the instruction in *Rail Installation Guide* and *CMA Installation Guide* that comes with the rail installation kit.
4. If necessary, install the server into a standard rack cabinet. See “Install the server to the rack (friction rails)” or “Install the server to the rack (slide rails)” in *User Guide* or *Hardware Maintenance Guide*.
5. Connect all external cables to the server. See Chapter 2 “Server components” on page 19 for connectors locations.

Typically, you will need to connect the following cables:

- Connect server to the power source
- Connect server to the data network
- Connect the server to the storage device
- Connect the server to the management network

6. Power on the server.

   Power button location and power LED are specified in:

   - Chapter 2 “Server components” on page 19
   - “Troubleshooting by system LEDs and diagnostics display” in *User Guide*

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

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

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

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

   See “System LEDs and diagnostics display” on page 36 for more information on the LED indications.

Configure the system

Complete the following procedures to configure the system. For detailed instructions, refer to Chapter 5 “System configuration” on page 57.

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

   The following information is available for RAID configuration:

   - https://lenovopress.lenovo.com/lp0578-lenovo-raid-introduction
   - https://lenovopress.lenovo.com/lp0579-lenovo-raid-management-tools-and-resources

4. Install the operating system.
5. Back up the server configuration.
6. Install the applications and programs that the server intends to use.

Chapter 5. System configuration

Complete these procedures to configure your system.

Set the network connection for the Lenovo XClarity Controller

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

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

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

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

  1. Start the server.
  2. Press the key specified in the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/.)
  3. Go to **LXPM → UEFI Setup → BMC Settings** to specify how the Lenovo XClarity Controller will connect to the network.
     - If you choose a static IP connection, make sure that you specify an IPv4 or IPv6 address that is available on the network.
     - If you choose a DHCP connection, make sure that the MAC address for the server has been configured in the DHCP server.
  4. Click **OK** to apply the setting and wait for two to three minutes.
  5. Use an IPv4 or IPv6 address to connect Lenovo XClarity Controller.

     Important: The Lenovo XClarity Controller is set initially with a user name of USERID and password of PASSW0RD (with a zero, not the letter O). This default user setting has Supervisor access. It is required to change this user name and password during your initial configuration for enhanced security.
- If no monitor is attached to the server, you can set the network connection through the Lenovo XClarity Controller interface. Connect an Ethernet cable from your laptop to XCC system management port on your server. For the location of the XCC system management port, see Chapter 2 “Server components” on page 19.

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

  The default IPv4 address and the IPv6 Link Local Address (LLA) is provided on the Lenovo XClarity Controller Network Access label that is affixed to the Pull Out Information Tab. See “Identify the server and access the Lenovo XClarity Controller” on page 53.

Update the firmware

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

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

- Best practices related to updating firmware is available at the following site:
  - https://lenovopress.lenovo.com/lp0656-lenovo-thinksystem-firmware-and-driver-update-best-practices
- The latest firmware can be found at the following site:
  - https://datacentersupport.lenovo.com/products/servers/thinksystem/sr630v4/7dg8/downloads/driver-list/
- You can subscribe to product notification to stay up to date on firmware updates:
  - https://datacentersupport.lenovo.com/solutions/ht509500

Update Bundles (Service Packs)

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

Update method terminology

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

Firmware updating tools

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

Tool	Update Methods Supported	Core System Firmware Updates	I/O Devices Firmware Updates	Drive Firmware Updates	Graphical user interface	Command line interface	Supports Update Bundles (Service Packs)
Lenovo XClarity Provisioning Manager (LXPM)	In-band[2] On-Target	√			√		
Lenovo XClarity Controller (XCC)	In-band[4] Out-of-band Off-Target	√	Selected I/O devices	√[3]	√		√
Lenovo XClarity Essentials OneCLI (OneCLI)	In-band Out-of-band On-Target Off-Target	√	All I/O devices	√[3]		√	√
Lenovo XClarity Essentials UpdateXpress (LXCE)	In-band Out-of-band On-Target Off-Target	√	All I/O devices		√		√
Lenovo XClarity Essentials Bootable Media Creator (BoMC)	In-band Out-of-band Off-Target	√	All I/O devices		√ (BoMC application)	√ (BoMC application)	√
Lenovo XClarity Administrator (LXCA)	In-band[1] Out-of-band[2] Off-Target	√	All I/O devices	√	√		√
Lenovo XClarity Integrator (LXCI) for VMware vCenter	Out-of-band Off-Target	√	Selected I/O devices		√		

Tool	Update Methods Supported	Core System Firmware Updates	I/O Devices Firmware Updates	Drive Firmware Updates	Graphical user interface	Command line interface	Supports Update Bundles (Service Packs)
Lenovo XClarity Integrator (LXCI) for Microsoft Windows Admin Center	In-band Out-of-band On-Target Off-Target	√	All I/O devices		√		√

Notes:

1. For I/O firmware updates.
2. For BMC and UEFI firmware updates.
3. Drive firmware update is only supported by the tools and methods below:
   - XCC Bare Metal Update (BMU): In-band, and requires system reboot.
   - Lenovo XClarity Essentials OneCLI: In-band, and does not require system reboot.
4. Bare Metal Update (BMU) only.

- **Lenovo XClarity Provisioning Manager**

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

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

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

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

- **Lenovo XClarity Controller**

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

  Notes:

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

    For additional information about configuring Ethernet over USB, see:

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

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

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

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

- **Lenovo XClarity Essentials OneCLI**

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

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

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

- **Lenovo XClarity Essentials UpdateXpress**

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

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

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

- **Lenovo XClarity Essentials Bootable Media Creator**

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

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

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

- **Lenovo XClarity Administrator**

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

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

  https://pubs.lenovo.com/lxca/update_fw

- **Lenovo XClarity Integrator offerings**

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

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

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

Configure the firmware

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

Note: UEFI **Legacy Mode** is not supported by ThinkSystem V4 products.

- **Lenovo XClarity Provisioning Manager (LXPM)**

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

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

See the following documentations for more information:

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

- **Lenovo XClarity Essentials OneCLI**

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

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

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

- **Lenovo XClarity Controller**

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

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

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

Enable Software Guard Extensions (SGX)

Intel® Software Guard Extensions (Intel® SGX) operates under the assumption that the security perimeter includes only the internals of the CPU package, and leaves the DRAM untrusted.

Complete the following steps to enable SGX.

Step 1. **Make sure** to refer to "Memory module installation rules and order" section in the *User Guide* or *Hardware Maintenance Guide*, which specifies whether your sever supports SGX and lists the memory module population sequence for SGX configuration. (DIMM configuration must be at least 8 DIMMs per socket to support SGX.)

Step 2. Restart the system. Before the operating system starts up, press the key specified in the on-screen instructions to enter the Setup Utility. (For more information, see the "Startup" section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/.)

Step 3. Go to **System settings → Processors → Total Memory Encryption** and enable the option.

Step 4. Save the changes, then go to **System settings → Processors → SW Guard Extension** and enable the option.

RAID configuration

Using a Redundant Array of Independent Disks (RAID) to store data remains one of the most common and cost-efficient methods to increase server's storage performance, availability, and capacity.

RAID increases performance by allowing multiple drives to process I/O requests simultaneously. RAID can also prevent data loss in case of a drive failure by reconstructing (or rebuilding) the missing data from the failed drive using the data from the remaining drives.

RAID array (also known as RAID drive group) is a group of multiple physical drives that uses a certain common method to distribute data across the drives. A virtual drive (also known as virtual disk or logical drive) is a partition in the drive group that is made up of contiguous data segments on the drives. Virtual drive is presented up to the host operating system as a physical disk that can be partitioned to create OS logical drives or volumes.

An introduction to RAID is available at the following Lenovo Press website:

https://lenovopress.lenovo.com/lp0578-lenovo-raid-introduction

Detailed information about RAID management tools and resources is available at the following Lenovo Press website:

https://lenovopress.lenovo.com/lp0579-lenovo-raid-management-tools-and-resources

Intel VROC

Enabling Intel VROC

Before setting up RAID for NVMe drives, follow the below steps to enable VROC:

1. Restart the system. Before the operating system starts up, press the key specified in the on-screen instructions to enter the Setup Utility. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/.)
2. Go to **System settings → Devices and I/O Ports → Intel® VMD technology → Enable/Disable Intel® VMD** and enable the option.
3. Save the changes and reboot the system.

Intel VROC configurations

Intel offers various VROC configurations with different RAID level and SSD support. See the following for more details.

Notes:
- Supported RAID levels varies by model. For the RAID level supported by SR630 V4, see Technical specifications.
- For more information about acquiring and installing the activation key, see https://fod.lenovo.com/lkms.

Intel VROC configurations for PCIe NVMe SSDs	Requirements
Intel VROC Standard	• Supports RAID levels 0, 1, and 10 • Requires an activation key
Intel VROC Premium	• Supports RAID levels 0, 1, 5, and 10 • Requires an activation key
Bootable RAID	• RAID 1 only • Supported by Intel® Xeon® 6 Scalable processors (formerly codenamed as Sierra Forest, SRF) • Requires an activation key

Deploy the operating system

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

Available operating systems

- Microsoft Windows Server
- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server
- Canonical Ubuntu

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

Tool-based deployment

- **Multi-server**

  Available tools:

  – Lenovo XClarity Administrator

  https://pubs.lenovo.com/lxca/compute_node_image_deployment

  – Lenovo XClarity Essentials OneCLI

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

- **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

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.

Appendix A. Getting help and technical assistance

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

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

http://datacentersupport.lenovo.com

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

Before you call

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

Attempt to resolve the problem yourself

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

You can find the product documentation for your ThinkSystem products at the following location:

https://pubs.lenovo.com/

You can take these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Check for updated software, firmware, and operating-system device drivers for your Lenovo product. (See the following links) The Lenovo Warranty terms and conditions state that you, the owner of the Lenovo product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.
  - Drivers and software downloads
    - https://datacentersupport.lenovo.com/products/servers/thinksystem/sr630v4/7dg8/downloads/driver-list/
  - Operating system support center
    - https://datacentersupport.lenovo.com/solutions/server-os
  - Operating system installing instructions
    - https://pubs.lenovo.com/#os-installation
- If you have installed new hardware or software in your environment, check https://serverproven.lenovo.com to make sure that the hardware and software are supported by your product.
- Refer to “Problem Determination” in *User Guide* or *Hardware Maintenance Guide* for instructions on isolating and solving issues.

- Go to http://datacentersupport.lenovo.com and check for information to help you solve the problem.

  To find the Tech Tips available for your server:

  1. Go to http://datacentersupport.lenovo.com, and input the model name or machine type of your server in the search bar to navigate to the support page.
  2. Click on **How To's** from the navigation pane.
  3. Click **Article Type → Solution** from the drop-down menu.

     Follow the on-screen instructions to choose the category for the problem that you are having.
- Check Lenovo Data Center Forum at https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv_eg to see if someone else has encountered a similar problem.

Gathering information needed to call Support

If you require warranty service for your Lenovo product, the service technicians will be able to assist you more efficiently if you prepare the appropriate information before you call. You can also go to http://datacentersupport.lenovo.com/warrantylookup for more information about your product warranty.

Gather the following information to provide to the service technician. This data will help the service technician quickly provide a solution to your problem and ensure that you receive the level of service for which you might have contracted.

- Hardware and Software Maintenance agreement contract numbers, if applicable
- Machine type number (Lenovo 4-digit machine identifier). Machine type number can be found on the ID label, see "Identify the server and access the Lenovo XClarity Controller" on page 53.
- Model number
- Serial number
- Current system UEFI and firmware levels
- Other pertinent information such as error messages and logs

As an alternative to calling Lenovo Support, you can go to https://support.lenovo.com/servicerequest to submit an Electronic Service Request. Submitting an Electronic Service Request will start the process of determining a solution to your problem by making the pertinent information available to the service technicians. The Lenovo service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

Collecting service data

To clearly identify the root cause of a server issue or at the request of Lenovo Support, you might need collect service data that can be used for further analysis. Service data includes information such as event logs and hardware inventory.

Service data can be collected through the following tools:

- **Lenovo XClarity Provisioning Manager**

  Use the Collect Service Data function of Lenovo XClarity Provisioning Manager to collect system service data. You can collect existing system log data or run a new diagnostic to collect new data.
- **Lenovo XClarity Controller**

  You can use the Lenovo XClarity Controller web interface or the CLI to collect service data for the server. The file can be saved and sent to Lenovo Support.

  - For more information about using the web interface to collect service data, see the “Backing up the BMC configuration” section in the XCC documentation compatible with your server at https://pubs.lenovo.com/lxcc-overview/.
  - For more information about using the CLI to collect service data, see the “XCC `ffdc` command” section in the XCC documentation compatible with your server at https://pubs.lenovo.com/lxcc-overview/.
- **Lenovo XClarity Administrator**

  Lenovo XClarity Administrator can be set up to collect and send diagnostic files automatically to Lenovo Support when certain serviceable events occur in Lenovo XClarity Administrator and the managed endpoints. You can choose to send diagnostic files to Lenovo Support using Call Home or to another service provider using SFTP. You can also manually collect diagnostic files, open a problem record, and send diagnostic files to the Lenovo Support.

  You can find more information about setting up automatic problem notification within the Lenovo XClarity Administrator at https://pubs.lenovo.com/lxca/admin_setupcallhome.
- **Lenovo XClarity Essentials OneCLI**

  Lenovo XClarity Essentials OneCLI has inventory application to collect service data. It can run both in-band and out-of-band. When running in-band within the host operating system on the server, OneCLI can collect information about the operating system, such as the operating system event log, in addition to the hardware service data.

  To obtain service data, you can run the `getinfor` command. For more information about running the `getinfor`, see https://pubs.lenovo.com/lxce-onecli/onecli_r_getinfor_command.

Contacting Support

You can contact Support to obtain help for your issue.

You can receive hardware service through a Lenovo Authorized Service Provider. To locate a service provider authorized by Lenovo to provide warranty service, go to https://datacentersupport.lenovo.com/serviceprovider and use filter searching for different countries. For Lenovo support telephone numbers, see https://datacentersupport.lenovo.com/supportphonelist for your region support details.

Appendix B. Documents and supports

This section provides handy documents, driver and firmware downloads, and support resources.

Documents download

This section provides introduction and download link for handy documents.

Documents

- ***Rail Installation Guides***
  - Rail installation in a rack
- ***CMA Installation Guide***
  - Cable management arm (CMA) installation in a rack
- ***User Guide***
  - Complete overview, system configuration, hardware components replacing, and troubleshooting.

    Selected chapters from *User Guide*:
    - ***System Configuration Guide* :** Server overview, components identification, system LEDs and diagnostics display, product unboxing, setting up and configuring the server.
    - ***Hardware Maintenance Guide* :** Installing hardware components and troubleshooting.
- ***Cable Routing Guide***
  - Cable routing information.
- ***Messages and Codes Reference***
  - XClarity Controller, LXPM, and uEFI events
- ***UEFI Manual***
  - UEFI setting introduction

Support websites

This section provides driver and firmware downloads and support resources.

Appendix C. Notices

Lenovo may not offer the products, services, or features discussed in this document in all countries. Consult your local Lenovo representative for information on the products and services currently available in your area.

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Morrisville, NC 27560
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Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

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All other trademarks are the property of their respective owners.

Important notes

Processor speed indicates the internal clock speed of the processor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1 024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard-disk-drive bays with the largest currently supported drives that are available from Lenovo.

Maximum memory might require replacement of the standard memory with an optional memory module.

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as `total bytes written` (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. Lenovo is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.

Lenovo makes no representations or warranties with respect to non-Lenovo products. Support (if any) for the non-Lenovo products is provided by the third party, not Lenovo.

Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

Electronic emission notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

Additional electronic emissions notices are available at:

https://pubs.lenovo.com/important_notices/

Taiwan Region BSMI RoHS declaration

單元 Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	鉛Lead (PB)	汞Mercury (Hg)	鎘Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr^{+6})	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
機架	○	○	○	○	○	○
外部蓋板	○	○	○	○	○	○
機械組合件	–	○	○	○	○	○
空氣傳動設備	–	○	○	○	○	○
冷卻組合件	–	○	○	○	○	○
內存模組	–	○	○	○	○	○
處理器模組	–	○	○	○	○	○
電纜組合件	–	○	○	○	○	○
電源供應器	–	○	○	○	○	○
儲備設備	–	○	○	○	○	○
印刷電路板	–	○	○	○	○	○

備考1. 〝超出0.1 wt %〞及〝超出0.01 wt %〞係指限用物質之百分比含量超出百分比含量基準值。

Note1 : "exceeding 0.1wt%" and "exceeding 0.01 wt%" indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.

備考2. 〝○〞係指該項限用物質之百分比含量未超出百分比含量基準值。

Note2 : " ○ "indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.

備考3. 〝 - 〞係指該項限用物質為排除項目。

Note3 : The "-" indicates that the restricted substance corresponds to the exemption.

Taiwan Region import and export contact information

Contacts are available for Taiwan Region import and export information.

委製商/進口商名稱: 台灣聯想環球科技股份有限公司
進口商地址: 台北市南港區三重路 66 號 8 樓
進口商電話: 0800-000-702

TCO Certified

Selected models/configurations meet the requirements of TCO Certified and bear the TCO Certified label.

Note: TCO Certified is an international third-party sustainability certification for IT products. For details, go to https://www.lenovo.com/us/en/compliance/tco/.