



ThinkSystem SR850 Setup Guide



Machine Type: 7X18 and 7X19

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:

http://thinksystem.lenovofiles.com/help/topic/safety_documentation/pdf_files.html

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>

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

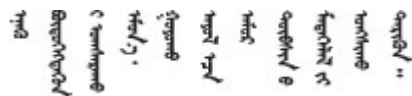
A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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 pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

ཐོན་ཐུང་འདི་བདེ་སྤྱད་མ་བྱས་གོང་། སྐྱོར་གྱི་ཡིད་གཟབ་
བྱ་འདྲ་མིན་ཡིད་པའི་འོད་མེར་བཟང་དགོས།

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

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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.

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.



Caution: This equipment must be installed by trained service personnel, as defined by the NEC and IEC 60950-1, Second Edition, the standard for Safety of Information Technology Equipment. Lenovo assumes you are qualified in the servicing of equipment and trained in recognizing hazards in products with hazardous energy levels.



Make sure all power cords are disconnected from the system when reading the following step in this manual: “Turn off the server and peripheral devices and disconnect the power cords and all external cables.”

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

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

- Make sure that the power cord is the correct type.
To view the power cords that are available for the server:
 - a. Go to:
<http://lesc.lenovo.com>
 - b. In the Customize a Model pane:
 - 1) Click **Select Options/Parts for a Model**.
 - 2) Enter the machine type and model for your server.
 - c. Click the Power tab 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 SR850 server is a 2U rack server designed for high-volume network transaction processing. This high-performance, multi-core server is ideally suited for networking environments that require superior processor performance, input/output (I/O) flexibility, and high manageability.

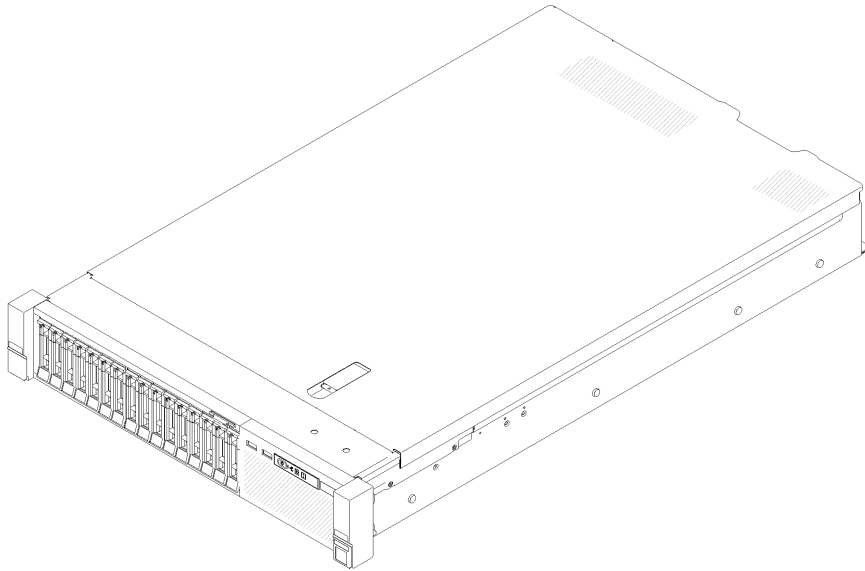


Figure 1. ThinkSystem SR850

The server comes with a limited warranty. For details about the warranty, see:
<https://datacentersupport.lenovo.com/us/en/documents/ht100742>

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

In addition, the system service label on the top cover of the server provides a QR code for mobile access to service information. You can scan the QR code with a mobile device for quick access to additional information including parts installation, replacement, and error codes.

Following illustration is the QR code: <https://support.lenovo.com/p/servers/sr850>



Figure 2. QR code

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:

Note: Some of the items listed are available on select models only.

- Server
- Rail installation kit (optional). Detailed instructions for installing the rail installation kit are provided in the package with the rail installation kit.
- Cable management arm or cable management bar.
- Material box, including items such as rack installation guide and accessory kit.

Features

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

Your server implements the following features and technologies:

- **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 Lenovo ThinkSystem server hardware. The Lenovo XClarity Controller consolidates multiple management functions in a single chip on the server system board.

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

http://sysmgt.lenovofiles.com/help/topic/com.lenovo.systems.management.xcc.doc/product_page.html

- **UEFI-compliant server firmware**

Lenovo Lenovo ThinkSystem firmware is Unified Extensible Firmware Interface (UEFI) 2.5 compliant. UEFI replaces BIOS and defines a standard interface between the operating system, platform firmware, and external devices.

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

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

- **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 “Specifications” on page 3.

- **Integrated network support**

The server comes with an integrated 4-port Gigabit Ethernet controller, which supports connection to a 10 Mbps, 100 Mbps, or 1000 Mbps network. In the initial server configuration, Ethernet 1 and Ethernet 2 are activated. To enable Ethernet 3 and Ethernet 4, a Features on Demand (FoD) key needs to be installed and activated. For more information, see Configuring the Gigabit Ethernet controller.

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

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

Note: For customers in the People's Republic of China, TPM is not supported. However, customers in the People's Republic of China can install a Trusted Cryptographic Module (TCM) adapter (sometimes called a daughter card).

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

The server models support the maximum of sixteen 2.5-inch hot-swap Serial Attached SCSI (SAS) or hot-swap Serial ATA (SATA) hard-disk drives, or maximum of eight 2.5-inch Non-volatile Memory express (NVMe) solid-state drives.

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

- **Light path diagnostics**

Light path diagnostics provides LEDs to help you diagnose problems. For more information about the light path diagnostics, see “Front operator panel with LCD display” on page 16 and “Light path diagnostics” in *ThinkSystem SR850 Maintenance Manual*.

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

The server provides a QR code on the system service label, which is on the top 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 and replacement videos, and error codes for server support.

- **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 and optional power capabilities**

The server supports a maximum of two 750-watt, 1100-watt or 1600-watt hot-swap power supplies and three dual-motor non hot-swap fans, which provide redundancy for a typical configuration. The redundant cooling by the fans in the server enables continued operation if one of the fans fails. The server comes with one 750-watt, 1100-watt or 1600-watt hot-swap power supply and three non hot-swap fans.

Note: You cannot mix 750-watt, 1100-watt or 1600-watt power supplies in the server.

- **RAID support**

The ThinkSystem RAID adapter provides hardware redundant array of independent disks (RAID) support to create configurations. The standard RAID adapter provides RAID levels 0 and 1. An optional RAID adapter is available for purchase.

Specifications

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

Table 1. Specifications, Type 7X18 and 7X19

Specification	Description
Dimension	<p>2U server</p> <ul style="list-style-type: none"> • Height: 86.5 mm (3.4 inches) • Width: <ul style="list-style-type: none"> – With rack handles: 482 mm (19.0 inches) – Without rack handles: 444.6 mm (17.5 inches) • Depth: 763.7 mm (30.1 inches) <p>Note: The depth is measured with rack handles installed, but without the security bezel installed.</p>
Weight (depending on the configuration)	27.0 kg (59.6 lb) in maximum.
Processor (depending on model)	<p>Supports multi-core Intel Xeon processors, with integrated memory controller and Intel Ultra Path Interconnect (UPI) architecture.</p> <ul style="list-style-type: none"> • Two processor sockets (expandable up to four) with minimal requirement of two installed. • Designed for LGA 3647 sockets • Scalable up to 28 cores • Supports Intel Extended Memory 32/64 Technology (EM32/64T)
Memory	<ul style="list-style-type: none"> • Minimum: 16 GB • Maximum: <ul style="list-style-type: none"> – RDIMM: 1.5 TB – LRDIMM: 3 TB – 3DS-RDIMM: 6 TB • DIMM types: <ul style="list-style-type: none"> – PC4-21300 (single-rank, dual-rank), 2666 MT/s, error correcting code (ECC), double-data-rate 4 (DDR4) registered DIMM (RDIMM) – PC4-21300 (quad-rank), 2666 MT/s, error correcting code (ECC), double-data-rate 4 (DDR4) load reduced DIMM (LRDIMM) – PC4-21300 (octa-rank), 2666 MT/s, error correcting code (ECC), double-data-rate 4 (DDR4) three-dimensional stacking registered DIMM (3DS-RDIMM) • Slots: 24/48 DIMM slots, two-way interleaved
Drive expansion	<p>Sixteen 2.5-inch drive bays:</p> <ul style="list-style-type: none"> • Eight 2.5-inch hot-swap SATA/SAS drive bays (bay 0-3, 8-11) • Eight 2.5-inch hot-swap SATA/SAS/NVMe drive bays (bay 4-7, 12-15)

Table 1. Specifications, Type 7X18 and 7X19 (continued)

Expansion slots	<p>Eleven expansion slots:</p> <ul style="list-style-type: none"> Slot 1: PCI Express 3.0 x16 (supports PCIe switch card) Slot 2: PCI Express 3.0 x8 (supports RAID adapters for SATA/SAS drives) Slot 3 - 5: PCI Express 3.0 for PCIe riser-card with the following slots available depending on the riser-card installed: <ul style="list-style-type: none"> x8/x8/x8 PCIe full-height riser assembly provides: <ul style="list-style-type: none"> Slot 3: PCI Express 3.0 x8 Slot 4: PCI Express 3.0 x8 Slot 5: PCI Express 3.0 x8 x8/x8/x8ML2 PCIe full-height riser assembly provides: <ul style="list-style-type: none"> Slot 3: PCI Express 3.0 x8 Slot 4: PCI Express 3.0 x8 Slot 5: Customized slot for x16 ML2 adapter x8/x16ML PCIe full-height riser assembly provides: <ul style="list-style-type: none"> Slot 3: PCI Express 3.0 x8 Slot 4: Not available Slot 5: Customized slot for ML2 adapter Slot 6: Customized slot for dual M.2 backplane that supports M.2 drives in three different physical sizes: <ul style="list-style-type: none"> 42 mm (2242) 60 mm (2242) 80 mm (2242) Slot 7: Customized slot for LOM adapter Slot 8: PCI Express 3.0 x8 Slot 9: PCI Express 3.0 x8 Slot 10: PCI Express 3.0 x8 (supports RAID adapters for SATA/SAS drives) Slot 11: PCI Express 3.0 x16 (supports PCIe switch card)
Integrated functions	<ul style="list-style-type: none"> Lenovo XClarity Controller (XCC), which provides service processor control and monitoring functions, video controller, and remote keyboard, video, mouse, and remote drive capabilities. One system-management RJ-45 connector on the rear to connect to a systems-management network. This connector is dedicated to the Lenovo XClarity Controller functions and runs at 1 GB speed. Light-path diagnostics Four universal serial bus (USB) ports: <ul style="list-style-type: none"> Two on the front of the server <ul style="list-style-type: none"> One USB 2.0 with Lenovo XClarity Controller management One USB 2.0 or 3.0 (depending on the model) Two USB 3.0 on the rear of the server One serial port
Network	<p>This server supports 1GbE and 10 GbE LOM adapters with the following requirements:</p> <ul style="list-style-type: none"> 1GbE LOM adapter: maximal bandwidth of network environment is 1GB. 10GbE LOM adapter: minimal bandwidth of network environment is 1GB.
RAID adapter (depending on model)	<p>The following options with support for RAID levels 0, 1, and 10 are available for this server:</p> <ul style="list-style-type: none"> ThinkSystem RAID 530-8i PCIe 12 GB Adapter ThinkSystem RAID 730-8i 1 GB Cache PCIe 12 GB Adapter ThinkSystem RAID 930-8i 2 GB Flash PCIe 12 GB Adapter ThinkSystem RAID 930-16i 4 GB Flash PCIe 12 GB Adapter ThinkSystem RAID 930-8e 4 GB Flash PCIe 12 GB Adapter
Fans	Six (60 mm x 38 mm) internal system fans (N+1 redundancy)

Table 1. Specifications, Type 7X18 and 7X19 (continued)

Electrical input	<p>This server comes with three types of power supply units:</p> <ul style="list-style-type: none"> • 750-watt platinum power supply <ul style="list-style-type: none"> – Input power 115V or 230V ac • 1100-watt platinum power supply <ul style="list-style-type: none"> – Input power 115V or 230V ac • 1600-watt platinum power supply <ul style="list-style-type: none"> – Input power 230V ac <p>Two power supplies provide N+1 redundancy support.</p>
Acoustical noise emissions	<ul style="list-style-type: none"> • Sound power, idling <ul style="list-style-type: none"> – 5.2 bels, minimum – 5.8 bels, typical – 6.4 bels, maximum • Sound power, operating <ul style="list-style-type: none"> – 5.8 bels, minimum – 6.8 bels, typical – 7.0 bels, maximum
Heat output	<p>Approximate heat output:</p> <ul style="list-style-type: none"> • Minimum configuration: 454 BTU , 133 W (in BTU per hour and watts) • Maximum configuration: 5118 BTU, 1500 W (in BTU per hour and watts)
Environment	<p>ThinkSystem SR850 complies with ASHRAE Class A2 specifications. Depending on the hardware configuration, some models comply with ASHRAE Class A3 and Class A4 specifications. System performance may be impacted when operating temperature is outside AHSARE A2 specification.</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – Operating <ul style="list-style-type: none"> – 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). – ASHARE Class A3: 5°C to 40°C (41°F to 104°F); the maximum ambient temperature decreases by 1°C for every 175 m (574 ft) increase in altitude above 900 m (2,953 ft). – ASHARE Class A4: 5°C to 45°C (41°F to 113°F); the maximum ambient temperature decreases by 1°C for every 125 m (410 ft) increase in altitude above 900 m (2,953 ft). – Server off: 5°C to 45°C (41°F to 113°F) – Shipment/storage: -40°C to 60°C (-40°F to 140°F) • Maximum altitude: 3,050 m (10,000 ft) • Relative Humidity (non-condensing): <ul style="list-style-type: none"> – Operating <ul style="list-style-type: none"> – ASHRAE Class A2: 8% to 80%; maximum dew point: 21°C (70°F) – ASHRAE Class A3: 8% to 85%; maximum dew point: 24°C (75°F) – ASHRAE Class A4: 8% to 90%; maximum dew point: 24°C (75°F) – Shipment/storage: 8% to 90% • Particulate contamination <p>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” in <i>ThinkSystem SR850 Maintenance Manual</i>.</p>

Note: To maintain component reliability, system performance might vary at ambient temperature higher than 35°C while all the fans are functioning. With one fan failing, system performance might vary at ambient temperature higher than 27°C.

Management options

Several management interfaces are available for managing your server. The management options described in this section are provided to support the direct management of Lenovo servers.

Function	Lenovo XClarity Administrator	Lenovo XClarity Integrator	Lenovo XClarity Energy Manager	Lenovo XClarity Provisioning Manager	Lenovo XClarity Essentials ¹	Lenovo XClarity Controller	Lenovo Capacity Planner	Lenovo Business Vantage
Multiple systems management	✓	✓	✓		✓			
Operating system deployment	✓			✓				
Firmware updates ²	✓	✓		✓ ³	✓	✓		
System configuration	✓	✓		✓	✓	✓		
Events / alerts	✓	✓	✓			✓		
Inventory / Log	✓	✓		✓ ⁴	✓	✓		
Power management		✓ ⁵	✓					
Data center planning							✓	
Security management								✓ ⁶

Notes:

1. Lenovo XClarity Essentials includes Lenovo XClarity Essentials OneCLI, Lenovo XClarity Essentials Bootable Media Creator, and Lenovo XClarity Essentials UpdateXpress.
2. Most options can be updated through the Lenovo tools. Some options, such as GPU firmware or Omni-Path firmware require the use of vendor tools.
3. Firmware updates are limited to Lenovo XClarity Provisioning Manager, Lenovo XClarity Controller firmware, and UEFI updates only. Firmware updates for optional devices, such as adapters, are not supported.
4. Limited inventory.
5. Power management function is supported by Lenovo XClarity Integrator for VMware vCenter.
6. Available only in the People's Republic of China.

Lenovo XClarity Administrator

Lenovo XClarity Administrator is a centralized, resource-management solution that simplifies infrastructure management, speeds responses, and enhances the availability of Lenovo server systems and solutions. It runs as a virtual appliance that automates discovery, inventory, tracking, monitoring, and provisioning for server, network, and storage hardware in a secure environment.

Lenovo XClarity Administrator provides a central interface to perform the following functions for all managed endpoints:

- **Manage and monitor hardware.** Lenovo XClarity Administrator provides agent-free hardware management. It can automatically discover manageable endpoints, including server, network, and storage hardware. Inventory data is collected for managed endpoints for an at-a-glance view of the managed hardware inventory and status.
- **Configuration management.** You can quickly provision and pre-provision all of your servers using a consistent configuration. Configuration settings (such as local storage, I/O adapters, boot settings,

firmware, ports, and Lenovo XClarity Controller and UEFI settings) are saved as a server pattern that can be applied to one or more managed servers. When the server patterns are updated, the changes are automatically deployed to the applied servers.

- **Firmware compliance and updates.** 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.

When an endpoint is out of compliance, you can use Lenovo XClarity Administrator to apply and activate firmware updates for all devices in that endpoint from a repository of firmware updates that you manage.

- **Operating System deployment.** You can use Lenovo XClarity Administrator to manage a repository of operating-system images and to deploy operating-system images to up to 28 managed servers concurrently.
- **Service and support.** Lenovo XClarity Administrator can be set up to collect and send diagnostic files automatically to your preferred service provider when certain serviceable events occur in Lenovo XClarity Administrator and the managed endpoints. You can choose to send diagnostic files to Lenovo Support using Call Home or to another service provider using SFTP. You can also manually collect diagnostic files, open a problem record, and send diagnostic files to the Lenovo Support Center.

Lenovo XClarity Administrator can be integrated into external, higher-level management and automation platforms through open REST application programming interfaces (APIs). Using the REST APIs, Lenovo XClarity Administrator can easily integrate with your existing management infrastructure. In addition, you can automate tasks using the PowerShell toolkit or the Python toolkit.

To obtain the latest version of the Lenovo XClarity Administrator, see:

<https://datacentersupport.lenovo.com/us/en/documents/LNVO-LXCAUPD>

Documentation for Lenovo XClarity Administrator is available at:

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

Lenovo XClarity Integrator

Lenovo also provides the following integrators that you can use to manage Lenovo servers from higher-level management tools:

- Lenovo XClarity Integrator for VMware vCenter
- Lenovo XClarity Integrator Microsoft System Center

For more information about Lenovo XClarity Integrator, see:

<http://www3.lenovo.com/us/en/data-center/software/systems-management/xclarity-integrators>

Lenovo XClarity Energy Manager

Lenovo XClarity Energy Manager is a web-based power and temperature management solution designed for data center administrators. It monitors and manages the power consumption and temperature of servers, such as Converged, NeXtScale, System x, ThinkServer, and ThinkSystem servers. Lenovo XClarity Energy Manager models data center physical hierarchy and monitors power and temperature at the server/group level. By analyzing monitored power and temperature data, Lenovo XClarity Energy Manager greatly improves business continuity and energy efficiency.

With Lenovo XClarity Energy Manager, administrators can take control of power usage through improved data analysis and lower the TCO (total cost of ownership). The tool optimizes data center efficiency by allowing administrators to:

- Monitor energy consumption, estimate power need, and re-allocate power to servers as needed via IPMI or Redfish.
- Track platform power consumption, inlet temperature, CPU and memory power consumption.
- Visually check the layout of room, row and rack via 2D thermal map.
- Send notifications when certain events occur or thresholds are reached.
- Limit the consumed amount of energy of an endpoint by setting up policies.
- Optimize energy efficiency by monitoring real-time inlet temperatures, identifying low-usage servers based on out-of-band power data, measuring power rangers for different server models, and evaluating how servers accommodate new workloads based on the availability of resources.
- Reduce the power consumption to the minimum level to prolong service time during emergency power event (such as a data-center power failure).

For more information about downloading, installation, and usage, see:

<http://www3.lenovo.com/us/en/data-center/software/systems-management/xclarity-energy-manager/>

Lenovo XClarity Provisioning Manager

Lenovo XClarity Provisioning Manager provides a graphic user interface for configuring the system. When you start a server and press F1, the Lenovo XClarity Provisioning Manager interface is displayed by default.

Note: The text-based interface to system configuration (the Setup Utility) is also available. From Lenovo XClarity Provisioning Manager, you can choose to restart the server and access the text-based interface. In addition, you can choose to make the text-based interface the default interface that is displayed when you press F1.

Lenovo XClarity Provisioning Manager provides a system summary of all installed devices and includes the following functions:

- **UEFI setup.** Use this function to configure UEFI system settings, such as processor configuration, start options, and user security. You can also view POST events and the System Event Log (SEL).
- **Platform update.** Use this function to update the firmware for Lenovo XClarity Controller, Lenovo XClarity Provisioning Manager, and operating system device drivers.
- **RAID setup.** Use this function to configure RAID for the server. It provides an easy-to-use graphical wizard that supports a unified process for performing RAID setup for a variety of RAID adapters. You can also perform advanced RAID configuration from the UEFI Setup.
- **OS installation.** Use this function to install an operating system for the server. You can install Microsoft Windows, Linux, and VMware ESXi.
- **Diagnostics.** Use this function to view the overall health of devices installed in the server and to perform diagnostics for hard disk drives and memory. You can also collect service data that can be saved to a USB device and sent to Lenovo Support.

Note: The service data collected by Lenovo XClarity Provisioning Manager does not include the operating system logs. To collect the operating system logs and the hardware service data, use Lenovo XClarity Essentials OneCLI.

Documentation for Lenovo XClarity Provisioning Manager is available at:

http://sysmgt.lenovofiles.com/help/topic/LXPM/LXPM_introduction.html

Lenovo XClarity Essentials

Lenovo XClarity Essentials (LXCE) is a collection of server management utilities that provides a less complicated method to enable customers to manage Lenovo ThinkSystem, System x, and Thinkserver servers more efficiently and cost-effectively.

Lenovo XClarity Essentials includes the following utilities:

- Lenovo XClarity Essentials OneCLI is a collection of several command line applications, which can be used to:
 - Configure the server.
 - Collect service data for the server. If you run Lenovo XClarity Essentials OneCLI from the server operating system (in-band), you can collect operating system logs as well. You can also choose to view the service data that has been collected or to send the service data to Lenovo Support.
 - Update firmware and device drivers for the server. Lenovo XClarity Essentials OneCLI can help to download UpdateXpress System Packs (UXSPs) for your server and update all the firmware and device drivers payloads within the UXSP.
 - Perform miscellaneous functions, such as rebooting the server or rebooting the BMC.

To learn more about Lenovo XClarity Essentials OneCLI, see:

<https://datacentersupport.lenovo.com/us/en/documents/LNVO-CENTER>

Documentation for Lenovo XClarity Essentials OneCLI is available at:

<http://sysmgt.lenovofiles.com/help/index.jsp>

- Lenovo XClarity Essentials Bootable Media Creator (BoMC) is a software application that applies UpdateXpress System Packs and individual updates to your system.

Using Lenovo XClarity Essentials Bootable Media Creator, you can:

- Update the server using an ISO image or CD.
- Update the server using a USB key.
- Update the server using the Preboot Execution Environment (PXE) interface.
- Update the server in unattendance mode.
- Update the server in Serial Over LAN (SOL) mode.

To learn more about Lenovo XClarity Essentials Bootable Media Creator, see:

<https://datacentersupport.lenovo.com/us/en/solutions/lnvo-bomc>

- Lenovo XClarity Essentials UpdateXpress is a software application that applies UpdateXpress System Packs and individual updates to your system.

Using Lenovo XClarity Essentials UpdateXpress, you can:

- Update the local server.
- Update a remote server.
- Create a repository of updates.

To learn more about Lenovo XClarity Essentials UpdateXpress, see:

<https://datacentersupport.lenovo.com/us/en/solutions/ht503692>

Lenovo XClarity Controller

Lenovo XClarity Controller is the management processor for the server. It is the third generation of the Integrated Management Module (IMM) service processor that consolidates the service processor functionality, super I/O, video controller, and remote presence capabilities into a single chip on the server system board.

There are two ways to access the management processor:

- **Web-based interface.** To access the web-based interface, point your browser to the IP address for the management processor.
- **Command-line interface.** To access the CLI interface, use SSH or Telnet to log in to the management processor.

Whenever power is applied to a server, the management processor is available. From the management processor interface, you can perform the following functions:

- Monitor all hardware devices installed in the server.
- Power the server on and off.
- View the system event log and system audit log for the server.
- Use the Remote management function to log in to the server itself.

Documentation for Lenovo XClarity Controller is available at:

http://sysmgt.lenovofiles.com/help/topic/com.lenovo.systems.management.xcc.doc/product_page.html

Lenovo Capacity Planner

Lenovo Capacity Planner is a power consumption evaluation tool that enhances data center planning by enabling IT administrators and pre-sales to understand important parameters of different type of racks, servers, and other devices. Lenovo Capacity Planner can dynamically calculate the power consumption, current, British Thermal Unit (BTU), and volt-ampere (VA) rating at the rack level, and therefore improves the efficiency of large scale deployments.

Lenovo Capacity Planner provides the following functions:

- Power/thermal evaluation in different deployments, device copying, configuration saving, and reporting.
- Customizable server configuration, selectable workload, CPU turbo model, and worst case of fans for different evaluations in different user scenarios.
- Flex/Density servers, chassis and node level customizable configuration.
- Easy to download and run with popular web browsers, like Internet Explorer 11, Firefox, Chrome, and Edge.

Note: Users can also access the Lenovo website to run the tool online.

More information about Lenovo Capacity Planner is available at:

<http://datacentersupport.lenovo.com/us/en/products/solutions-and-software/software/lenovo-capacity-planner>

Lenovo Business Vantage

Lenovo Business Vantage is a security software tool suite designed to work with the Trusted Cryptographic Module (TCM) adapter for enhanced security, to keep user data safe, and to erase confidential data completely from a hard disk drive.

Lenovo Business Vantage provides the following functions:

- **Data Safe.** Encrypt files to ensure data safety by using TCM chip , even when the disk is in “rest” status.
- **Sure Erase.** Erase confidential data from a hard disk. This tool follows the industry standard method to do the erasing and allows the user to select different erasing levels.
- **Smart USB Protection.** Prohibit unauthorized access to the USB port of devices.

- **USB Data Safe.** Encrypt data in USB Flash on a certain device and prohibit access of data on other devices.

Note: This tool is available in the People's Republic of China only.

More information about Lenovo Business Vantage is available at:

<http://www.lenovo.com>

Chapter 2. Server components

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

Identifying your server

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

Figure 3 “Location of the machine type, model, and serial number” on page 13 shows the location of the label containing the machine type, model, and serial number.

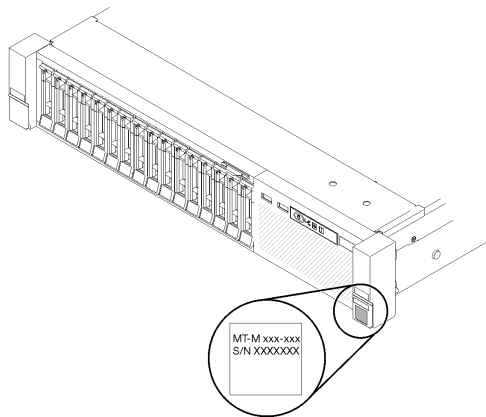


Figure 3. Location of the machine type, model, and serial number

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

XClarity Controller network access label

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

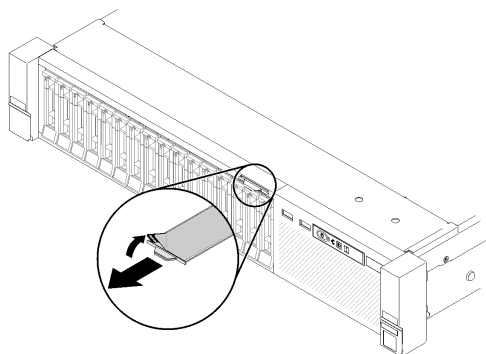


Figure 4. XClarity Controller network access label on the pull-out information tab

Front view

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

The following illustration shows the controls, LEDs, and connectors on the front of the server.

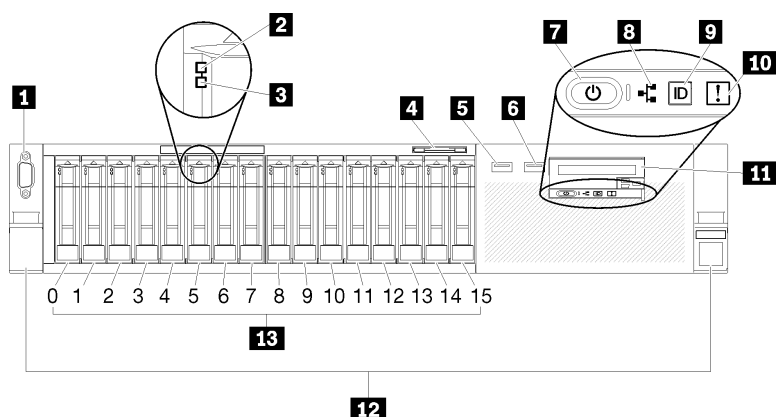


Figure 5. Front view

Table 2. Components on the server front view

1 VGA connector (optional)	8 Network activity LED (green)
2 Drive activity LED (green)	9 Identification button/LED (blue)
3 Drive status LED (yellow)	10 System error LED (yellow)
4 Pull-out information tab	11 Front operator panel with optional pull-out LCD display
5 USB 1 (USB 2.0 with Lenovo XClarity Controller management)	12 Rack release latches
6 USB 2	13 2.5-inch drive bays
7 Power button/LED (green)	

1 VGA connector (optional):

Connect a monitor to this connector.

Notes:

- When the optional front VGA connector is in use, the rear one will be disabled.
- The maximum video resolution is 1920 x 1200 at 60 Hz.

2 Drive activity LED (green):

Each hot-swap drive comes with an activity LED, and when this LED is flashing, it indicates that the drive is in use.

3 Drive status LED (yellow):

These LEDs are on SAS or SATA hard disk drives and solid-state drives. When one of these LEDs is lit, it indicates that the drive has failed. When this LED is flashing slowly (one flash per second), it indicates that the drive is being rebuilt. When the LED is flashing rapidly (three flashes per second), it indicates that the controller is identifying the drive.

4 Pull-out information tab:

This tag contains network information such as MAC address, which is available with a pull on the tab.

5 6 USB connectors:

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

- **5** USB 1: USB 2.0 with Lenovo XClarity Controller management.

Connection to XClarity Controller is primarily intended for users with a mobile device running the XClarity Controller mobile application. When a mobile device is connected to this USB port, an Ethernet over USB connection is established between the mobile application running on the device and the XClarity Controller.

Select **Network** in **BMC Configuration** to view or modify USB 2.0 with Lenovo XClarity Controller management settings.

Four types of settings are available:

- **Host only mode**

In this mode, the USB port is always solely connected to the server.

- **BMC only mode**

In this mode, the USB port is always solely connected to XClarity Controller.

- **Shared mode: owned by BMC**

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

- **Shared mode: owned by host**

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

- **6** USB 2: USB 2.0 or 3.0 (depending on the model).

7 Power button/LED (green):

Press the power button to turn the server on and off manually. This LED indicates power status of the server. See “Front operator panel” on page 16 for more details.

8 Network activity LED (green):

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

9 Identification button/LED (blue):

Press this button to visually locate the server among other servers. Use this LED to visually locate the server among other servers. XCC can also be used to turn this LED on and off.

10 System error LED (yellow):

When this yellow LED is lit, it indicates that a system error has occurred. This LED can be controlled by the XCC. Information provided from the LCD display of the front operator panel could also help isolate an error.

11 Front operator panel with optional pull-out LCD display:

This panel contains controls and LEDs that provide information about the status of the server. For information about the controls and LEDs on the front operator panel, see “Front operator panel” on page 16.

12 Rack release latches:

Press the latch on both sides in the front of the server to slide the server out of the rack.

13 2.5-inch drive bays:

Install 2.5-inch drives to these bays. See “Install a 2.5-inch hot-swap drive” on page 69 for more details.

Front operator panel

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

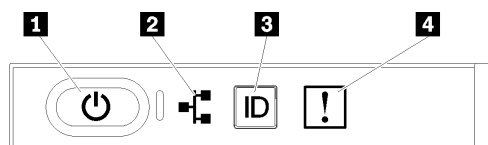


Figure 6. Front operator panel

Table 3. Buttons and LEDs on the front operator panel

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

1 Power button/LED (green)

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

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

Flashing rapidly (4 times per second): The server is turned off and is not ready to be turned on. The power-control button is disabled. This will last approximately 5 to 10 seconds.

Flashing slowly (once per second): The server is turned off and is ready to be turned on. You can press the power-control button to turn on the server.

Lit: The server is turned on.

2 Network activity LED (green)

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

3 Identification button/LED (blue)

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

4 System error LED (yellow)

When this yellow LED is lit, it indicates that a system error has occurred. This LED can be controlled by the XCC. Information provided from the LCD display of the front operator panel could also help isolate an error.

Front operator panel with LCD display

The following section includes an overview of the LCD system information display panel of front operator panel, which displays various types of information about the server.

Your front operator panel may come with a LCD display, which is accessible with a pull on the latch on the right of the front operator panel.

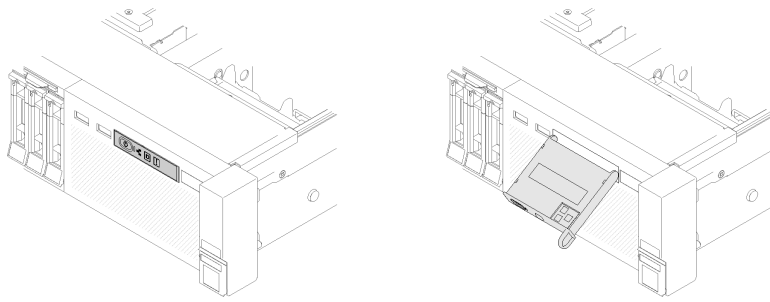


Figure 7. Front operator panel and LCD display

The LCD system information display panel attached to the front of the server allows quick access to system status, firmware, network, and health information.

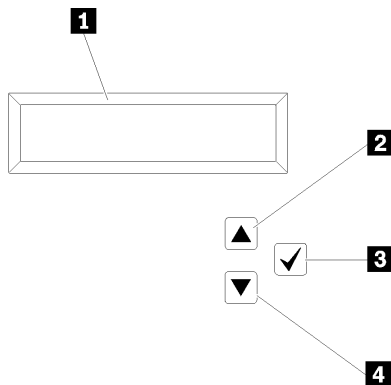


Figure 8. System information and control of the front operator panel

Table 4. System information and control of the front operator panel

1 System information: System information, including system name, system status, temperature, power consumption and UEFI/POST code, is displayed here.	3 Select button: Press this button to make your selection from the menu options.
2 Scroll up button: Press this button to scroll up or scroll to the left in the main menu to locate and select the system information that you want displayed.	4 Scroll down button: Press this button to scroll down or scroll to the right in the main menu to location and select the system information that you want displayed.

Following is an example of the information on the display panel.

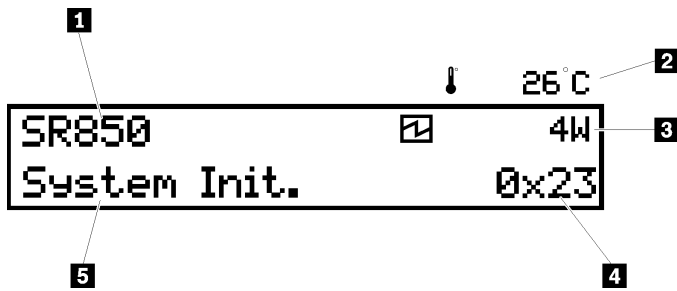


Figure 9. System information on LCD display panel

Table 5. System information display panel of front operator panel

1 System name (SR850)	4 Checkpoint code
2 Temperature (blinking in turns with 3)	5 System status
3 Power consumption (blinking in turns with 2)	

The option menu UI flow on the LCD display is illustrated as following.

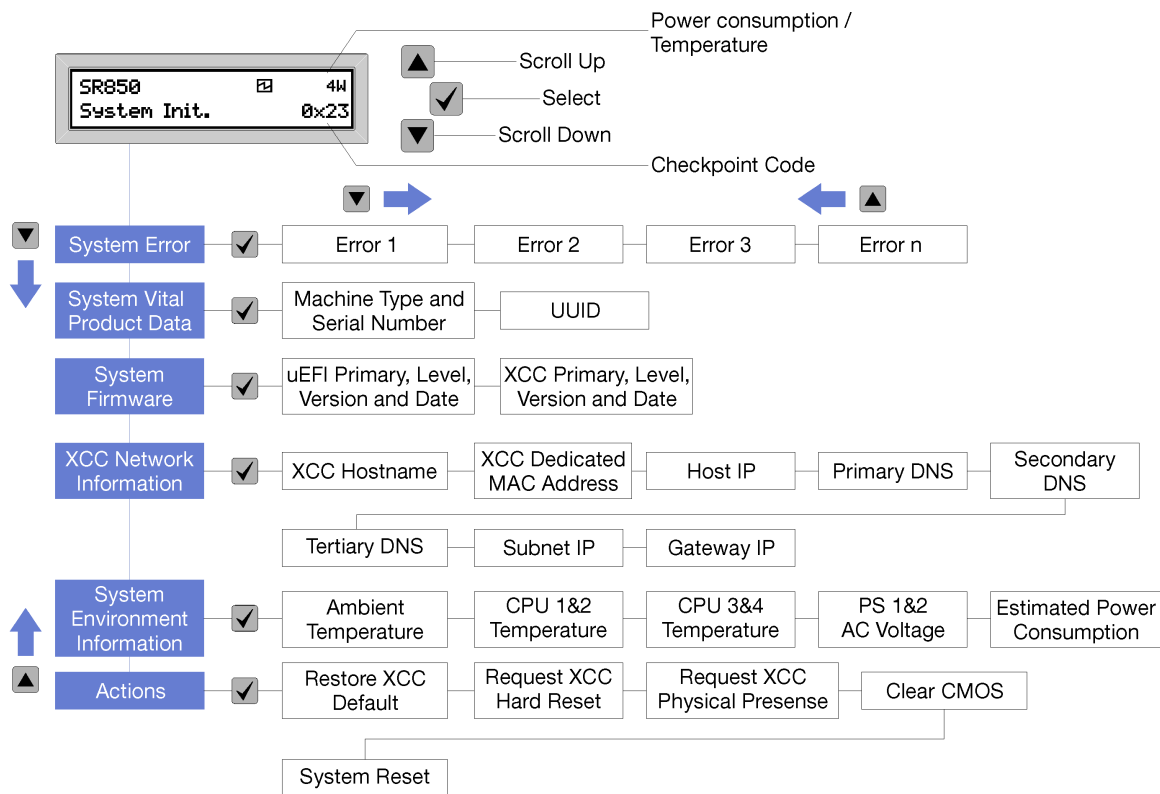


Figure 10. Front operator panel option menu UI flow

Following is the list of options available on the front operator panel. Switch between an option and the subordinate information entries with **Select** (✓) button, and switch among options or information entries with **Scroll up** (▼) and **Scroll down** (▲) buttons.

Table 6. Options available on the front operator panel (continued)

XCC network information	<p>XCC Network information provides the following XCC related network information:</p> <ul style="list-style-type: none"> • XCC hostname is displayed as following: XCC Hostname: XCC-NNNN • XCC shared or extension MAC address is displayed as following: XCC Dedicated MAC: XX:XX:XX:XX:XX:XX • IP Address is displayed as following: IP Host IP: Y.Y.Y.Y • Primary DNS is displayed as following: IP Primary DNS: Y.Y.Y.Y • Secondary DNS is displayed as following: IP Secondary DNS: Y.Y.Y.Y • Tertiary DNS is displayed as following: IP Tertiary DNS: Y.Y.Y.Y • Subnet IP is displayed as following: IP Subnet IP: Y.Y.Y.Y • Gateway IP is displayed as following: IP Gateway IP: Y.Y.Y.Y <p>Whereas</p> <ul style="list-style-type: none"> • NNNN is the machine type. • XX.XX:XX:XX:XX:XX is a MAC address. • Y.Y.Y.Y is an IPv4 or IPv6 address.
System environmental information	<p>System environmental information provides the following information:</p> <ul style="list-style-type: none"> • Ambient temperature is displayed as following: Ambient Temperature: XX C • Processor temperature is displayed as following: CPU1 Temperature: XX C CPU2 Temperature: XX C CPU3 Temperature: XX C CPU4 Temperature: XX C Switch between CPU1/2 and CPU3/4 with scroll up and down buttons. • AC input voltage is displayed as following: PS1 AC Voltage: YYY V PS2 AC Voltage: YYY V • Estimated power consumption is displayed as following: Sytem Power: ZZ W <p>Whereas</p>

Table 6. Options available on the front operator panel (continued)

	<ul style="list-style-type: none"> • XX is the temperature. • YYY is the AC voltage. • ZZ is the wattage.
Actions	<p>Actions provides the following available actions, which come in effect by pressing and holding on the select button for three seconds:</p> <ul style="list-style-type: none"> • Restore XCC default settings is displayed as following: RESTORE XCC DEFAULTS? HOLD v FOR 3s • Restart XCC is displayed as following: REQUEST XCC HARD RESET? HOLD v FOR 3s • Request XCC physical presence is displayed as following: REQUEST XCC PHY. PRES.? HOLD v FOR 3s • Clear CMOS is displayed as following: CLEAR CMOS? HOLD v FOR 3s <p>Note: This action is only available when the system power is off.</p> <ul style="list-style-type: none"> • System reboot is displayed as following: SYSTEM RESET BUTTOM? HOLD v FOR 3s

Rear view

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

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

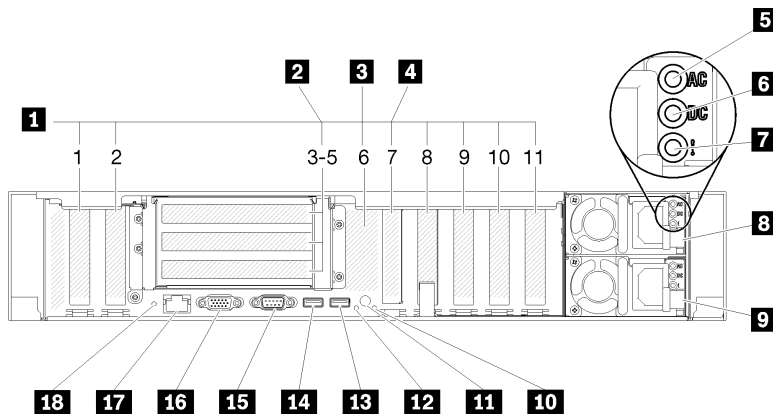


Figure 11. Rear view

Table 7. Components on the server rear view

1 PCIe slots (slot 1-2, 8-11)	10 System error LED (yellow)
2 PCIe riser-card (slot 3-5)	11 Identification button

Table 7. Components on the server rear view (continued)

3 M.2 backplane (slot 6, internal)	12 Identification LED (blue)
4 LOM adapter (slot 7)	13 USB 4 (USB 3.0)
5 AC power LED (green)	14 USB 3 (USB 3.0)
6 DC power LED (green)	15 Serial connector
7 Power supply error LED (yellow)	16 VGA connector
8 Power supply unit 2	17 XClarity Controller network connector
9 Power supply unit 1	18 NMI button

1 PCIe slots (slot 1-2, 8-11):

Install PCIe adapters into these slots. Following are detailed descriptions of each slot:

- Slot 1: PCI Express 3.0 x16 (supports PCIe switch card)
- Slot 2: PCI Express 3.0 x8 (supports RAID adapters for SATA/SAS drives)
- Slot 8: PCI Express 3.0 x8
- Slot 9: PCI Express 3.0 x8
- Slot 10: PCI Express 3.0 x8 (supports RAID adapters for SATA/SAS drives)
- Slot 11: PCI Express 3.0 x16 (supports PCIe switch card)

For more information, see “System-board connectors” in *ThinkSystem SR850 Maintenance Manual* for the location of the slots, and “PCIe riser-card and adapter replacement” in *ThinkSystem SR850 Maintenance Manual* for information about installation and removal.

2 PCIe riser-card (slot 3-5):

Install a full-height PCIe riser-card into this slot. Following are the PCIe riser-cards supported by this server.

- x8/x8/x8 PCIe full-height riser assembly provides:
 - Slot 3: PCI Express 3.0 x8
 - Slot 4: PCI Express 3.0 x8
 - Slot 5: PCI Express 3.0 x8
- x8/x8/x8ML2 PCIe full-height riser assembly provides:
 - Slot 3: PCI Express 3.0 x8
 - Slot 4: PCI Express 3.0 x8
 - Slot 5: Customized slot for x16 ML2 adapter
- x8/x16ML PCIe full-height riser assembly provides:
 - Slot 3: PCI Express 3.0 x8
 - Slot 4: Not available
 - Slot 5: Customized slot for ML2 adapter

3 M.2 backplane (slot 6):

Install M.2 backplane to this slot. See “Install the M.2 backplane” on page 82 and “Install an M.2 drive in the M.2 backplane” on page 81 for more details.

4 LOM adapter (slot 7):

Insert LOM adapter into this slot. (see “System-board connectors” in *ThinkSystem SR850 Maintenance Manual* for the location of the LOM adapter slot on the system board and “LOM adapter replacement” in *ThinkSystem SR850 Maintenance Manual* for information about the installation of the LOM adapter.

5 AC power LED:

Each hot-swap power supply comes with an ac power LED and a dc power LED. When the ac power LED is lit, it indicates that sufficient power is being supplied to the power supply through the power cord. During normal operation, both the ac and dc power LEDs are lit. For more information, see “Lightpath Diagnostics” in *ThinkSystem SR850 Maintenance Manual*.

6 DC power LED:

Each hot-swap power supply comes with a dc power LED and an ac power LED. When the dc power LED is lit, it indicates that the power supply is supplying adequate dc power to the system. During normal operation, both the ac and dc power LEDs are lit. For more information, see “Lightpath Diagnostics” in *ThinkSystem SR850 Maintenance Manual*.

7 Power-supply error LED:

When the power-supply error LED is lit, it indicates that the power supply has failed.

8 9 Power supply units:

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

- 750-watt platinum power supply
 - Input power 115V or 230V ac
- 1100-watt platinum power supply
 - Input power 115V or 230V ac
- 1600-watt platinum power supply
 - Input power 230V ac

10 System error LED (yellow):

When this yellow LED is lit, it indicates that a system error has occurred. This LED can be controlled by the XCC. Information provided from the LCD display of the front operator panel could also help isolate an error.

11 Identification button:

Press this button to visually locate the server among other servers. This button is functionally equivalent to the identification button on the front of the server.

12 Identification LED (blue):

Use this LED to visually locate the server among other servers. XCC can also be used to turn this LED on and off. This LED is functionally equivalent to the identification LED on the front of the server.

13 14 USB connectors (USB 3.0):

Connect a USB device, such as a USB mouse, keyboard, or other device, to any of these connectors.

15 Serial connector:

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

16 VGA connector:

Connect a monitor to this connector.

Notes:

- When the optional front VGA connector is in use, the rear one will be disabled.
- The maximum video resolution is 1920 x 1200 at 60 Hz.

17 XClarity Controller network connector:

Use this connector to manage the server, by using a dedicated management network. If you use this connector, the Lenovo XClarity Controller cannot be accessed directly from the production network. A dedicated management network provides additional security by physically separating the management network traffic from the production network. You can use the Setup utility to configure the server to use a dedicated systems-management network or a shared network.

18 NMI button:

Press this button to force a nonmaskable interrupt to the processor. You might have to use a pen or the end of a straightened paper clip to press the button. You can also use it to force a blue-screen memory dump. Use this button only when you are directed to do so by Lenovo Support.

Optional processor and memory expansion tray

Use this information to locate the connectors and LEDs on the optional processor and memory expansion tray.

The following illustrations show the connectors and LEDs on the processor and memory expansion tray.

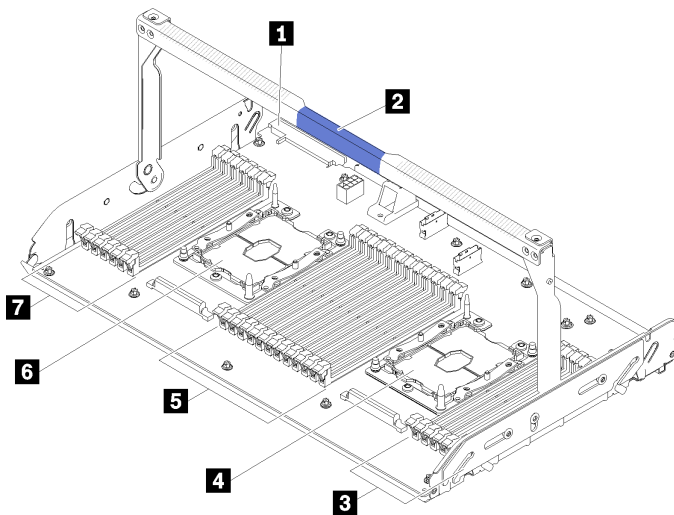


Figure 12. Optional processor and memory expansion tray

Table 8. Components on the optional processor and memory expansion tray

1 Power supply 2 connector	5 DIMM slot 31-42
2 Tray handle	6 Processor 3
3 DIMM slot 43-48	7 DIMM slot 25-30
4 Processor 4	

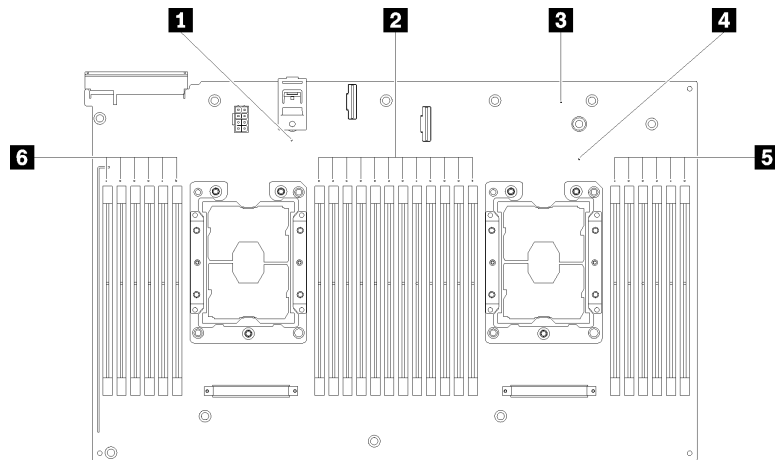


Figure 13. LEDs on the optional processor and memory expansion tray

Table 9. LEDs on the optional processor and memory expansion tray

1 Processor 3 error LED	4 Processor 4 error LED
2 DIMM slot 31-42 error LEDs	5 DIMM slot 43-48 error LEDs
3 Expansion board error LED	6 DIMM slot 25-30 error LEDs

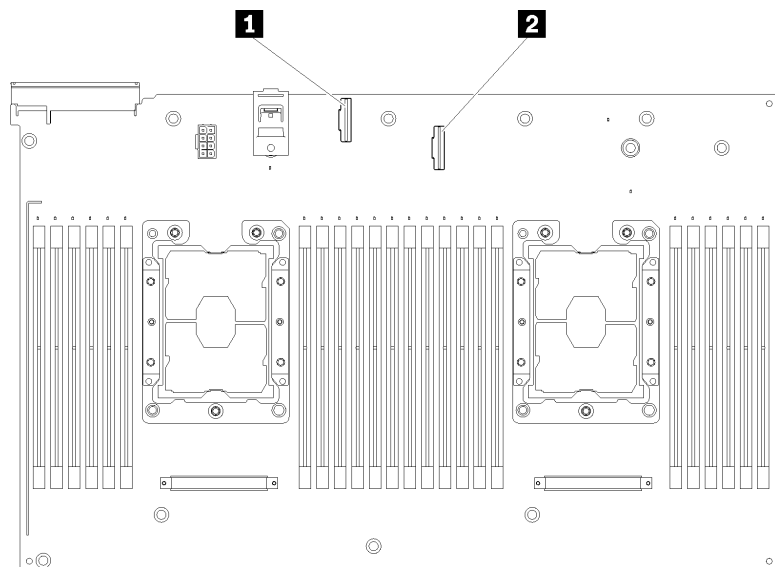


Figure 14. Connectors on the optional processor and memory expansion tray

Table 10. Connectors on the optional processor and memory expansion tray

1 NVMe signal cable connector 0-1	2 NVMe signal cable connector 2-3
--	--

PCIe riser-cards

Use this information to locate the connectors on the optional PCIe riser-cards.

x8/x8/x8 PCIe FH Riser Assembly

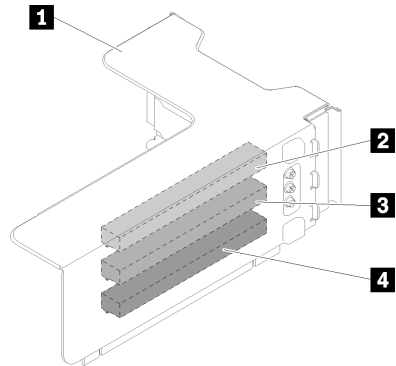


Figure 15. x8/x8/x8 PCIe FH Riser Assembly

Table 11. Components of x8/x8/x8 PCIe FH Riser Assembly

1 PCIe full-height riser cage	3 PCI Express 3.0 x8 (slot 4)
2 PCI Express 3.0 x8 (slot 3)	4 PCI Express 3.0 x8 (slot 5)

x8/x8/x8ML2 PCIe FH Riser Assembly

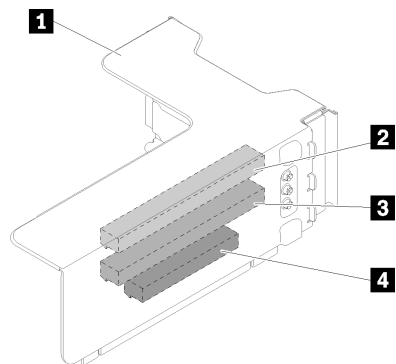


Figure 16. x8/x8/x8ML2 PCIe FH Riser Assembly

Table 12. Components of x8/x8/x8ML2 PCIe FH Riser Assembly

1 PCIe full-height riser cage	3 PCI Express 3.0 x8 (slot 4)
2 PCI Express 3.0 x8 (slot 3)	4 Customized slot for ML2 adapter (slot 5)

x8/x16ML2 PCIe FH Riser Assembly

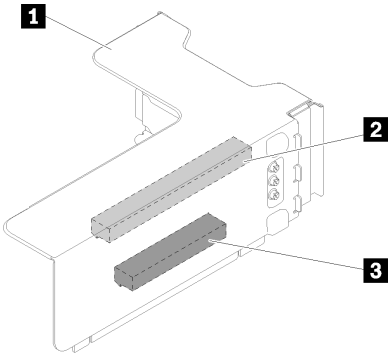


Figure 17. x8/x16ML2 PCIe FH Riser Assembly

Table 13. Components of x8/x16ML2 PCIe FH Riser Assembly

1 PCIe full-height riser cage	3 Customized slot for ML2 adapter (slot 5)
2 PCI Express 3.0 x8 (slot 3)	

2.5-inch drive backplanes

Use this information to locate the connectors on the optional 2.5-inch drive backplanes.

2.5-inch SATA/SAS 8-bay backplane

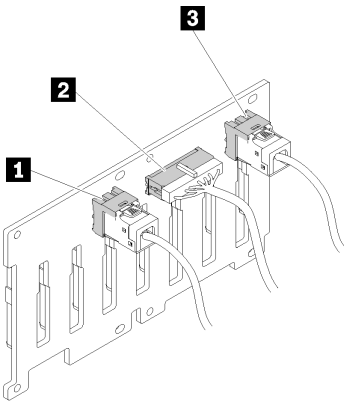


Figure 18. 2.5-inch SATA/SAS 8-bay backplane

Table 14. Connectors on 2.5-inch SATA/SAS 8-bay backplane

1 SATA/SAS connector 1	3 SATA/SAS connector 0
2 Power/configuration cable connector	

2.5-inch SATA/SAS 8-bay backplane comes with:

- Eight SATA/SAS drive connectors with bay numbers of 0-7 or 8-15, depending on the location installed.
- One power/configuration connector
- Two SATA/SAS connectors (0, 1)

2.5-inch AnyBay (SATA/SAS/NVMe) 8-bay backplane

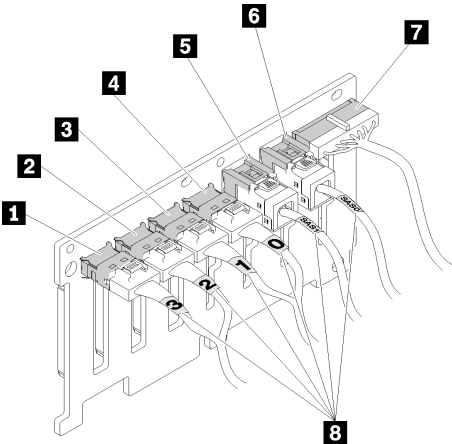


Figure 19. 2.5-inch AnyBay (SATA/SAS/NVMe) 8-bay backplane

Table 15. Connectors on 2.5-inch AnyBay (SATA/SAS/NVMe) 8-bay backplane

1 NVMe connector 3	5 SATA/SAS connector 1
2 NVMe connector 2	6 SATA/SAS connector 0
3 NVMe connector 1	7 Power/configuration cable connector
4 NVMe connector 0	8 Cable numbering labels

2.5-inch AnyBay (SATA/SAS/NVMe) 8-bay backplane comes with:

- Four SATA/SAS drive connectors with bay numbers of 0-3 or 8-11, depending on the location installed.
- Four NVMe drive connectors with bay numbers of 4-7 or 12-15, depending on the location installed.
- One power/configuration cable connector
- Two SATA/SAS connectors (0, 1)
- Four NVMe connectors (0, 1, 2, 3)

RAID adapters

Use this information to locate the connectors on the optional RAID adapters.

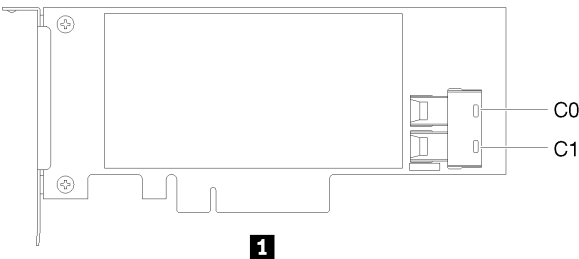


Figure 20. Connectors on SATA/SAS RAID adapter (8i)

Table 16. SATA/SAS RAID adapter (8i)

1 SATA/SAS RAID adapter (8i) with two SATA/SAS connectors (C0, C1)

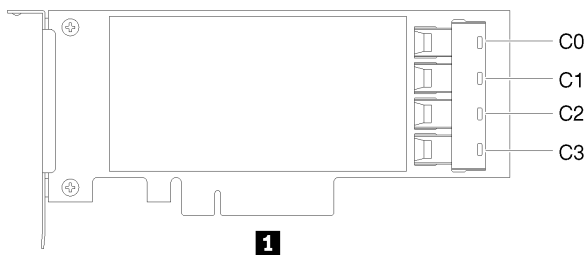


Figure 21. Connectors on SATA/SAS RAID adapter (16i)

Table 17. SATA/SAS RAID adapter (16i)

1 SATA/SAS RAID adapter (16i) with four SATA/SAS connectors (C0, C1, C2, C3)

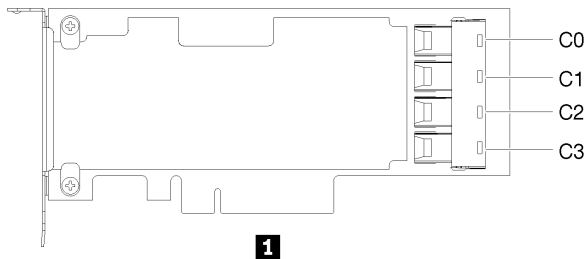


Figure 22. Connectors on PCIe switch card

Table 18. PCIe switch card

1 PCIe switch card with four SATA/SAS connectors (C0, C1, C2, C3)
--

Internal cable routing

Use this information to do cable routing to complete installation of certain components.

Note: Disengage all latches, release tabs, or locks on cable connectors when you disconnect cables from the system board. Failing to release them before removing the cables will damage the cable sockets on the system board, which are fragile. Any damage to the cable sockets might require replacing the system board.

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

Cable routing for 2.5-inch drives

Use this section to understand how to route cables for 2.5-inch drives.

Following is the list of combinations of cable routing for 2.5-inch drives.

- “Connecting signal cables to one backplane” on page 32
 - “One 8-bay backplane” on page 33
 - “One AnyBay backplane” on page 34
 - Two processors installed
 - Four processors installed
- “Connecting signal cables to two backplanes” on page 36

- “8-bay backplane + 8-bay backplane” on page 36
- “8-bay backplane + AnyBay backplane” on page 38
 - Two processors installed
 - Four processors installed
- “AnyBay backplane + AnyBay backplane” on page 42
 - Two processors installed
 - Four processors installed

Important:

1. Make sure all the signal cables go through the cable guides.

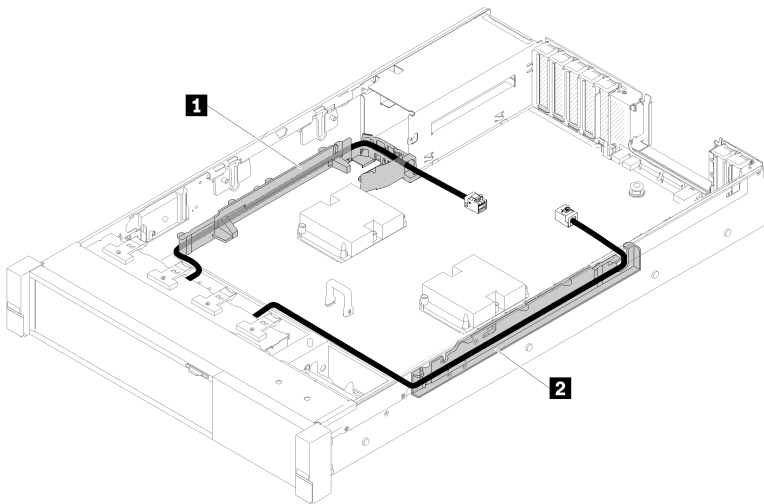


Figure 23. Cable guide locations

2. Connect the direct NVMe signal cables to the NVMe connectors on the processor and memory expansion tray.

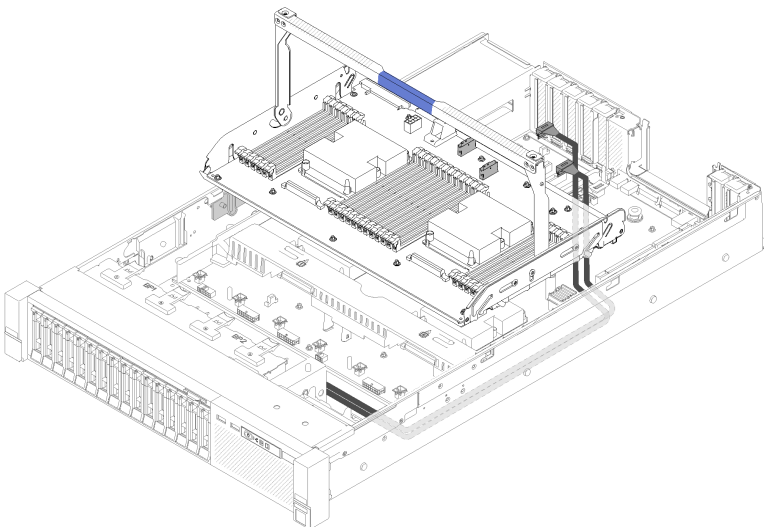


Figure 24. Connecting NVMe cables to the processor and memory expansion tray

Before starting cable routing for 2.5-inch drives:

1. Remove the fan cage assembly (see “Remove the fan cage assembly” on page 60).
2. Remove the system board air baffle (see “Remove the system board air baffle and the power interposer” on page 57) or the processor and memory expansion tray and the expansion tray air baffle (see “Remove the processor and memory expansion tray” on page 58).

Connecting power cable

Connect power cables for drive backplane(s) as in the following illustration.

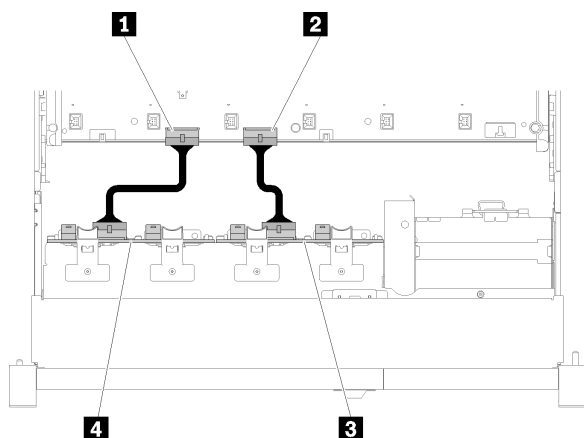


Figure 25. Location of power cable connectors on the system board

Table 19. Power cable connectors on the system board and the drive backplanes

1 Power cable connector on the system board	3 Power cable connector on the drive backplane
2 Power cable connector on the system board	4 Power cable connector on the drive backplane

Two types of drive backplanes are supported by this system:

- 2.5-inch SATA/SAS 8-bay backplane (referred to as “8-bay backplane”)
- 2.5-inch AnyBay 8-bay backplane (referred to as “AnyBay backplane”)

Connecting signal cables to one backplane

When there is one backplane installed, see the following illustrations for cable routing.

One 8-bay backplane

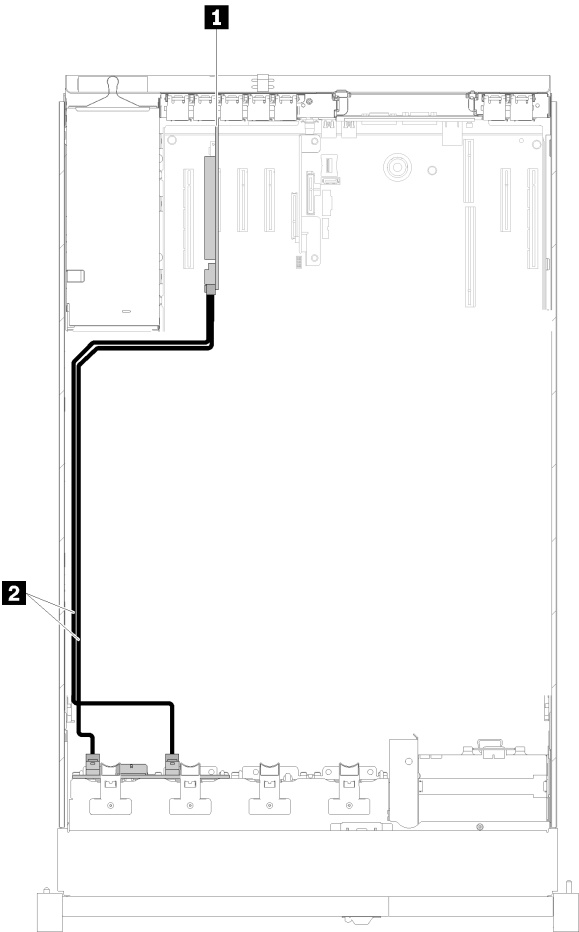


Figure 26. Cable routing, 8-bay backplane

Table 20. Cables and adapters for routing

1 SATA/SAS RAID adapter (8i)	2 SATA/SAS signal cables (720 mm)
-------------------------------------	--

One AnyBay backplane
Two processors installed

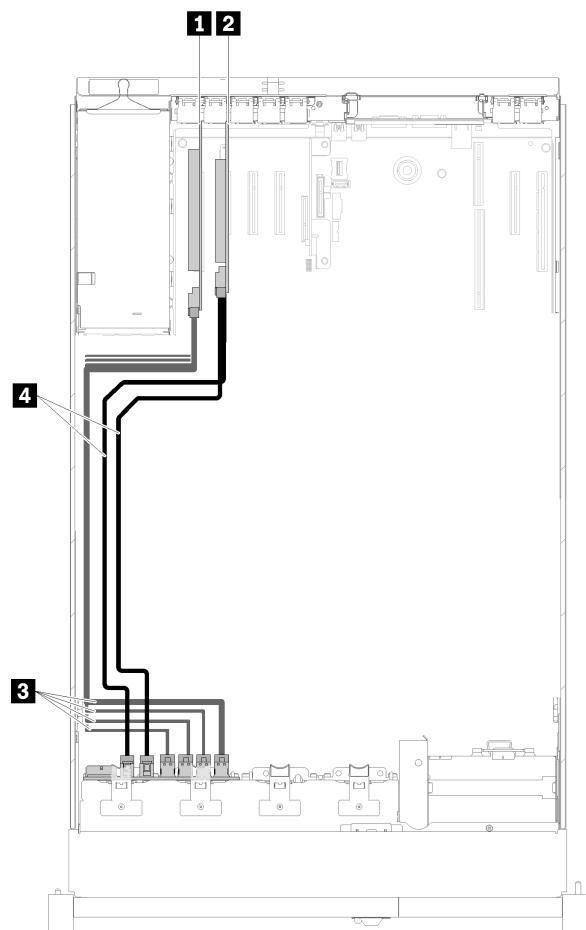


Figure 27. Cable routing, AnyBay backplane with two processors installed

Table 21. Cables and adapters for routing

1 PCIe switch card	3 NVMe signal cables for PCIe switch card
2 SATA/SAS RAID adapter (8i)	4 SATA/SAS signal cables (720 mm)

Four processors installed

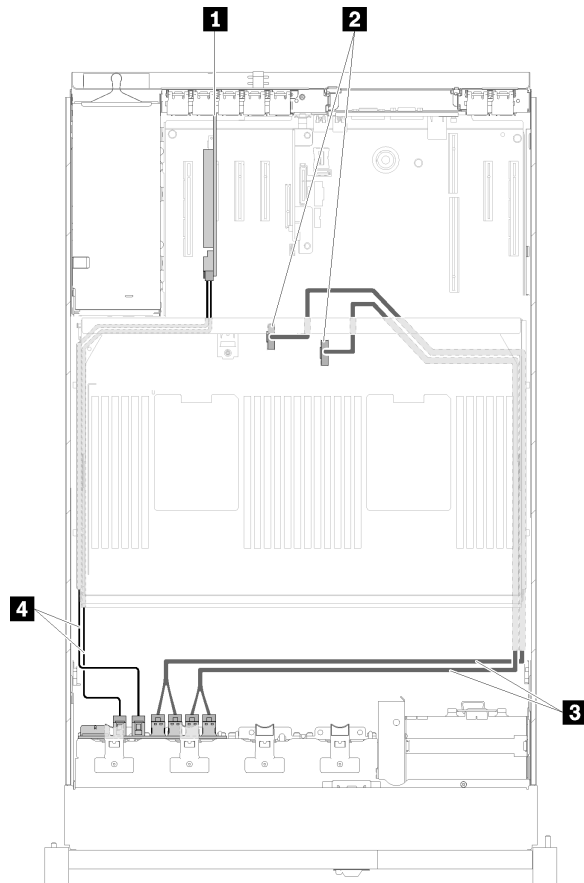


Figure 28. Cable routing, AnyBay backplane

Note: Install the processor and memory expansion tray before connecting the signal cables to NVMe connector on the expansion tray.

Table 22. Cables and adapters for routing

1 SATA/SAS RAID adapter (8i)	3 Direct NVMe signal cables for processor and memory expansion tray
2 NVMe connectors on the processor and memory expansion tray	4 SATA/SAS signal cables (720 mm)

Connecting signal cables to two backplanes

When there are two backplanes installed, see the following illustrations for cable routing.

8-bay backplane + 8-bay backplane

Two options are available for this combination:

Attention: When installing a 8-bay backplane and a AnyBay backplane, always install the 8-bay backplane to drive bay 0-7, and the AnyBay backplane to drive bay 8-15.

1. With SATA/SAS RAID adapter (16i)

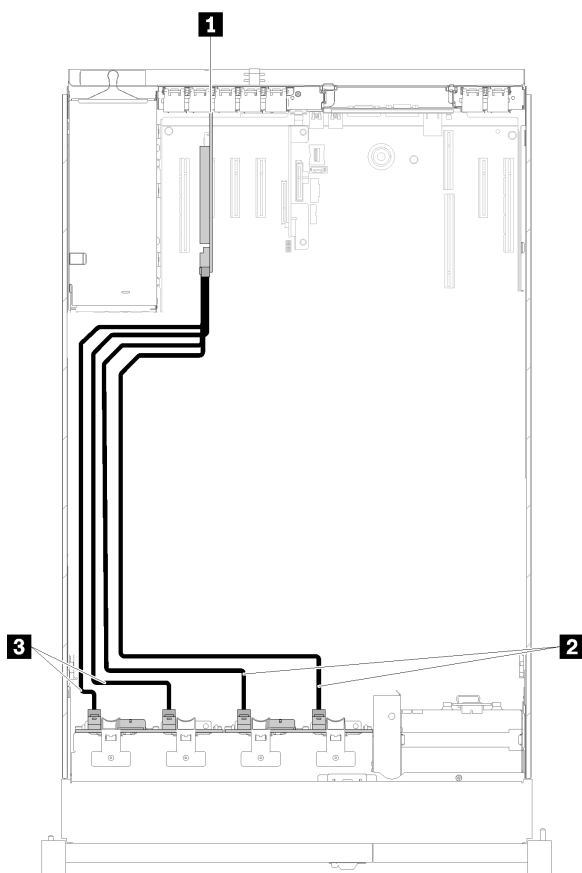


Figure 29. Cable routing, 8-bay backplane + 8-bay backplane

Table 23. Cables and adapters for routing

1 SATA/SAS RAID adapter (16i)	3 SATA/SAS signal cables (720 mm)
2 SATA/SAS signal cables (900 mm)	

2. With SATA/SAS RAID adapter (8i)

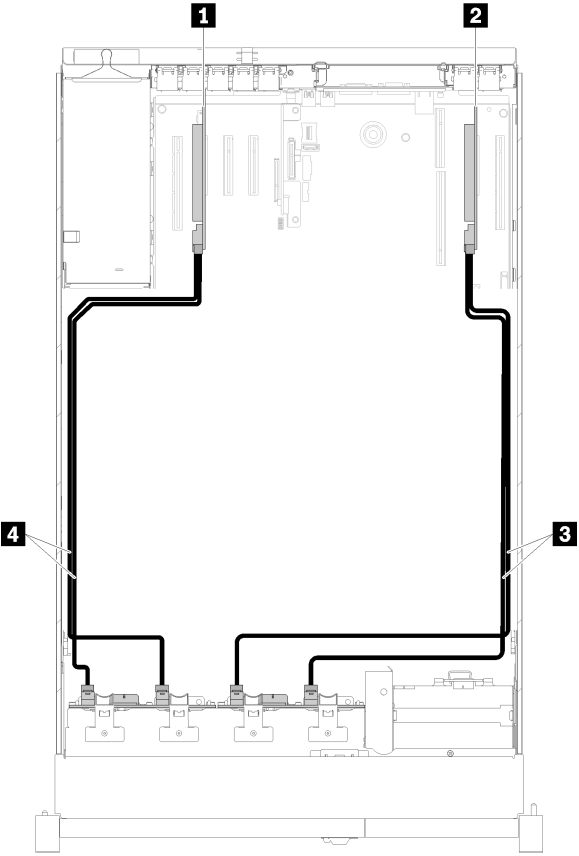


Figure 30. Cable routing, 8-bay backplane + 8-bay backplane

Table 24. Cables and adapters for routing

1 SATA/SAS RAID adapter (8i)	3 SATA/SAS signal cables (720 mm)
2 SATA/SAS RAID adapter (8i)	4 SATA/SAS signal cables (720 mm)

8-bay backplane + AnyBay backplane

Two processors installed

Two options are available for this combination:

1. With SATA/SAS RAID adapter (16i)

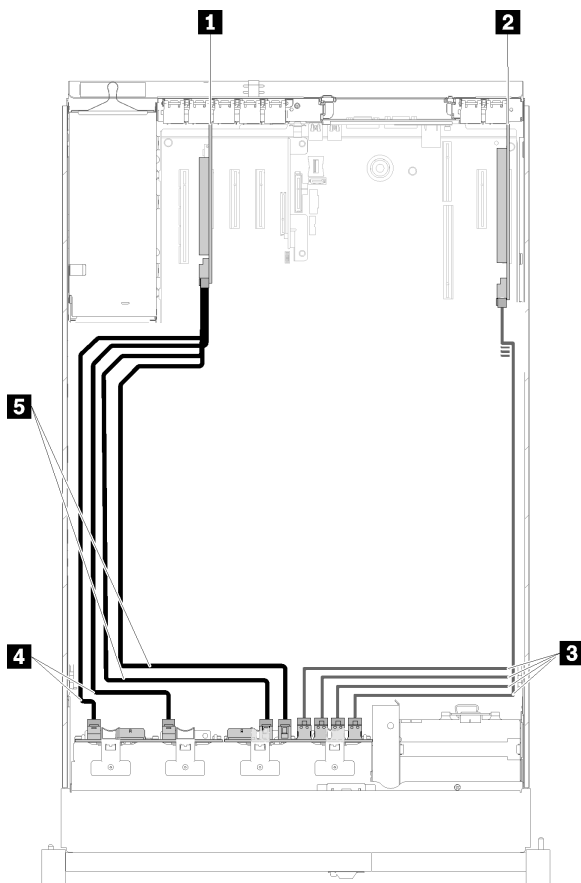


Figure 31. Cable routing, 8-bay backplane + AnyBay backplane

Table 25. Cables and adapters for routing

1 SATA/SAS RAID adapter (16i)	4 SATA/SAS signal cables (720 mm)
2 PCIe switch card	5 SATA/SAS signal cables (900 mm)
3 NVMe signal cables for PCIe switch card	

2. With SATA/SAS RAID adapter (8i)

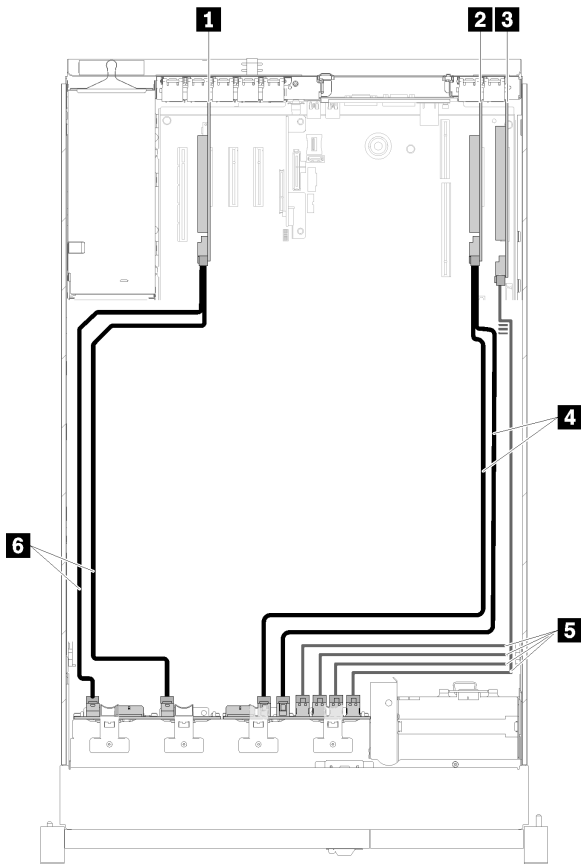


Figure 32. Cable routing, 8-bay backplane + AnyBay backplane

Table 26. Cables and adapters for routing

1 SATA/SAS RAID adapter (8i)	4 SATA/SAS signal cables (720 mm)
2 SATA/SAS RAID adapter (8i)	5 NVMe signal cables for PCIe switch card
3 PCIe switch card	6 SATA/SAS signal cables (720 mm)

Four processors installed

Two options are available for this combination:

Notes:

- When installing a 8-bay backplane and a AnyBay backplane, always install the 8-bay backplane to drive bay 0-7, and the AnyBay backplane to drive bay 8-15.
- Install the processor and memory expansion tray before connecting the signal cables to NVMe connector on the expansion tray.

1. With SATA/SAS RAID adapter (16i)

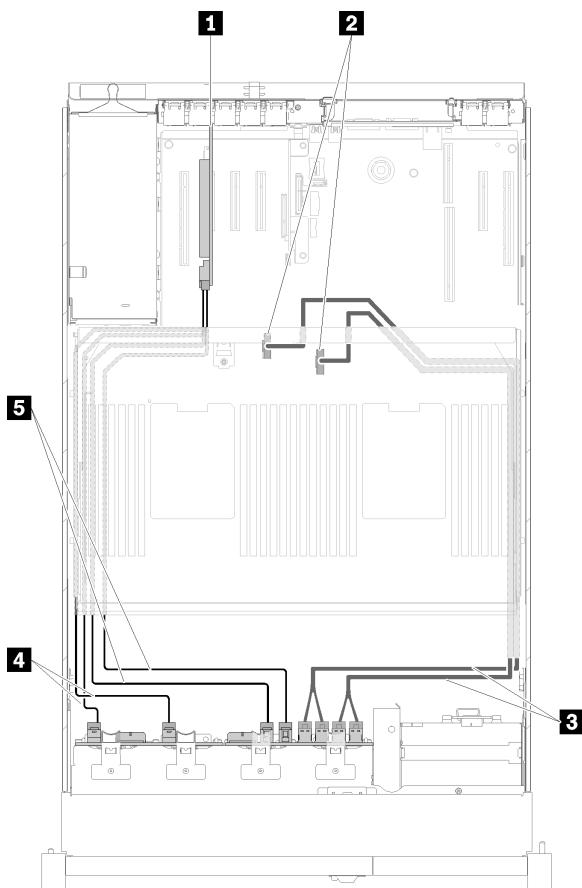


Figure 33. Cable routing, 8-bay backplane + AnyBay backplane

Table 27. Cables and adapters for routing

1 SATA/SAS RAID adapter (16i)	4 SATA/SAS signal cables (720 mm)
2 NVMe connectors on the processor and memory expansion tray	5 SATA/SAS signal cables (900 mm)
3 Direct NVMe signal cables for processor and memory expansion tray	

2. With SATA/SAS RAID adapter (8i)

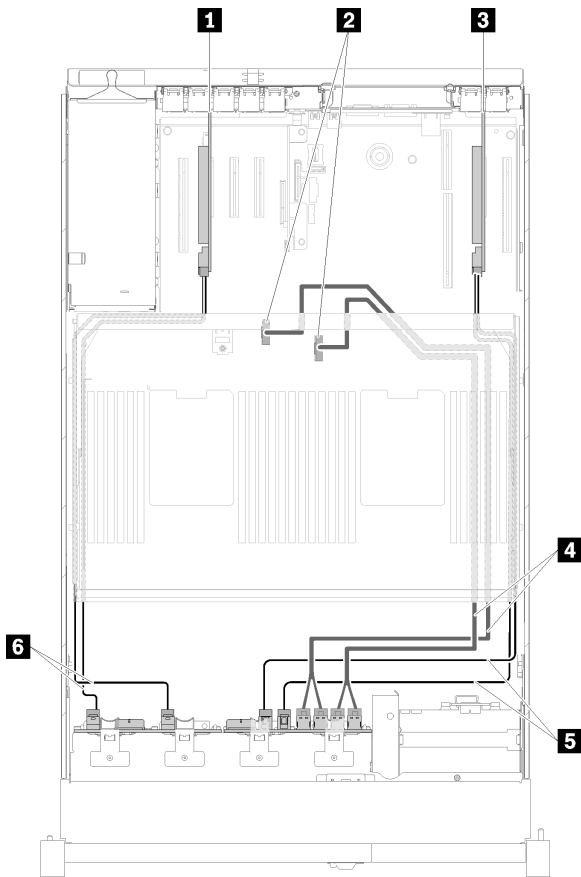


Figure 34. Cable routing, 8-bay backplane + AnyBay backplane

Table 28. Cables and adapters for routing

1 SATA/SAS RAID adapter (8i)	4 Direct NVMe signal cables for processor and memory expansion tray
2 NVMe connectors on the processor and memory expansion tray	5 SATA/SAS signal cables (720 mm)
3 SATA/SAS RAID adapter (8i)	6 SATA/SAS signal cables (720 mm)

AnyBay backplane + AnyBay backplane

Two processors installed

Two options are available for this combination:

1. With SATA/SAS RAID adapter (16i)

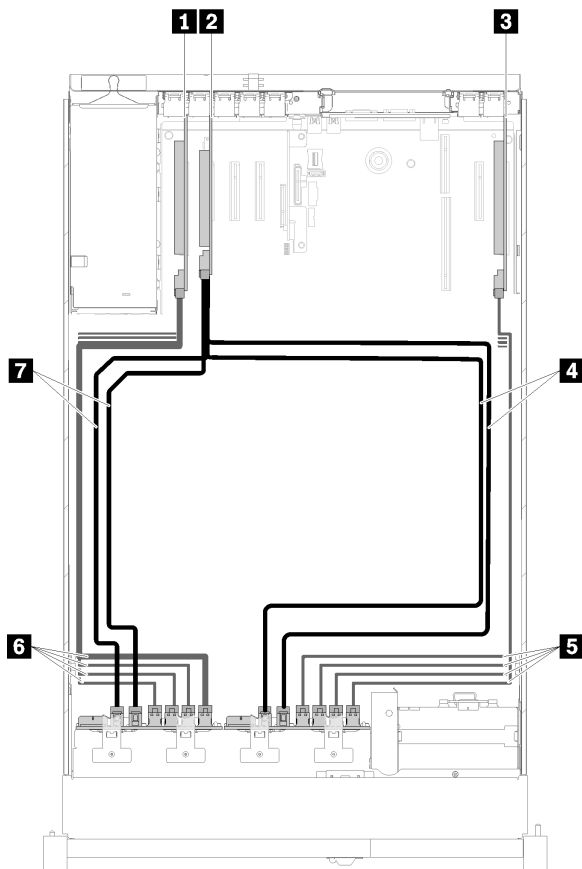


Figure 35. Cable routing, AnyBay backplane + AnyBay backplane

Table 29. Cables and adapters for routing

1 PCIe switch card	5 NVMe signal cables for PCIe switch card
2 SATA/SAS RAID adapter (16i)	6 NVMe signal cables for PCIe switch card
3 PCIe switch card	7 SATA/SAS signal cables (720 mm)
4 SATA/SAS signal cables (900 mm)	

2. With SATA/SAS RAID adapter (8i)

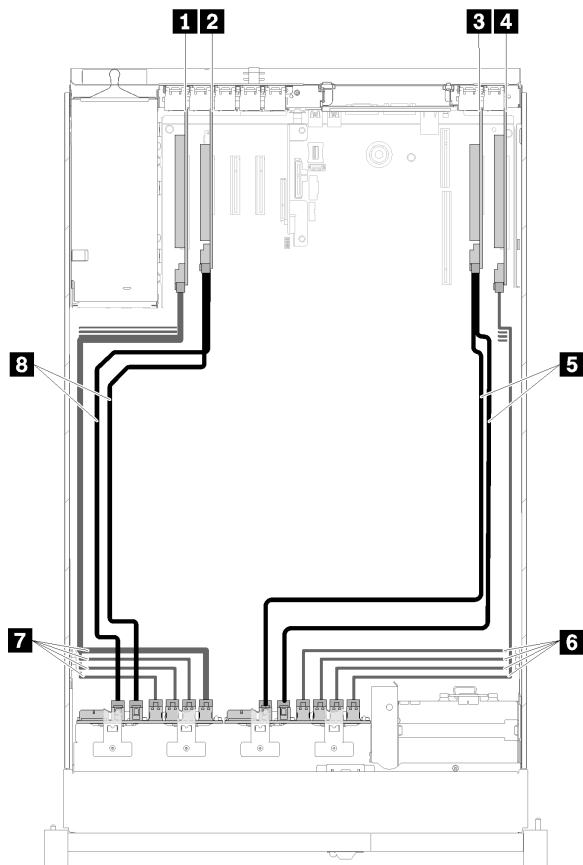


Figure 36. Cable routing, AnyBay backplane + AnyBay backplane

Table 30. Cables and adapters for routing

1 PCIe switch card	5 SATA/SAS signal cables (720 mm)
2 SATA/SAS RAID adapter (8i)	6 NVMe signal cables for PCIe switch card
3 SATA/SAS RAID adapter (8i)	7 NVMe signal cables for PCIe switch card
4 PCIe switch card	8 SATA/SAS signal cables (720 mm)

Four processors installed

Two options are available for this combination:

Note: Install the processor and memory expansion tray before connecting the signal cables to NVMe connector on the expansion tray.

1. With SATA/SAS RAID adapter (16i)

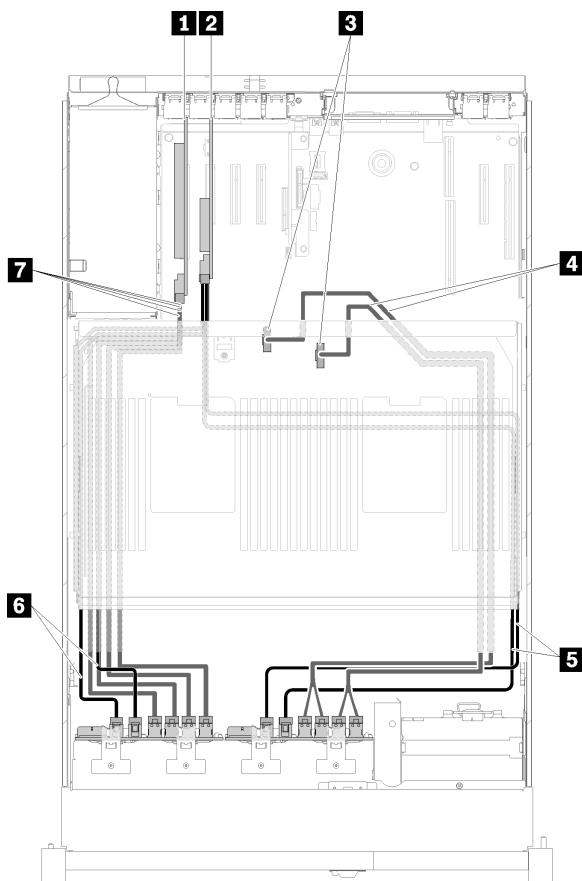


Figure 37. Cable routing, AnyBay backplane + AnyBay backplane

Table 31. Cables and adapters for routing

1 PCIe switch card	5 SATA/SAS signal cables (900 mm)
2 SATA/SAS RAID adapter (16i)	6 SATA/SAS signal cables (720 mm)
3 NVMe connectors on the processor and memory expansion tray	7 NVMe signal cables for PCIe switch card
4 Direct NVMe signal cables for processor and memory expansion tray	

2. With SATA/SAS RAID adapter (8i)

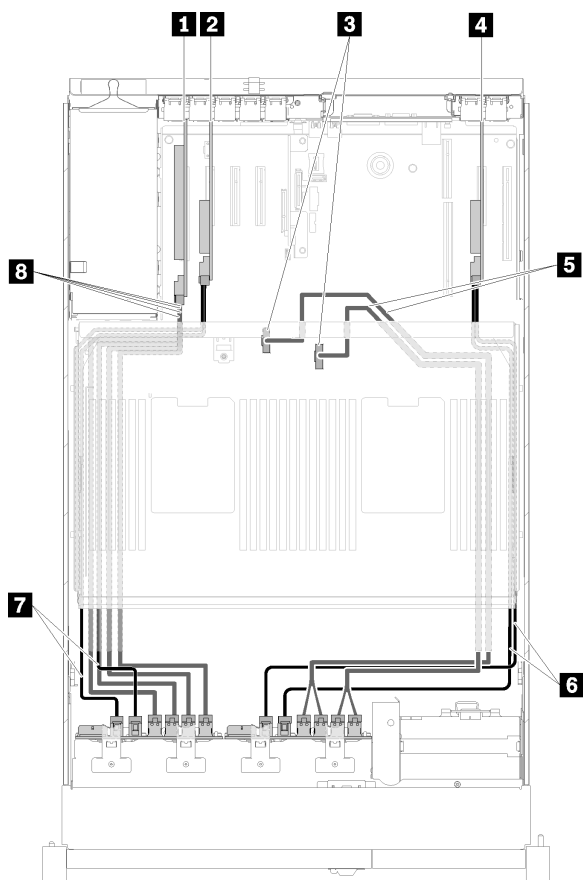


Figure 38. Cable routing, AnyBay backplane + AnyBay backplane

Table 32. Cables and adapters for routing

1 PCIe switch card	5 Direct NVMe signal cables for processor and memory expansion tray
2 SATA/SAS RAID adapter (8i)	6 SATA/SAS signal cables (720 mm)
3 NVMe connectors on the processor and memory expansion tray	7 SATA/SAS signal cables (720 mm)
4 SATA/SAS RAID adapter (8i)	8 NVMe signal cables for PCIe switch card

Parts list

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

For more information about ordering the parts shown in Figure 39 “Server components” on page 46:

1. Go to <http://datacentersupport.lenovo.com> and navigate to the support page for your server.
2. Click **Parts & Accessories** → **Parts Lookup**.
3. Enter either the serial number or the machine type model for your server to see the parts for your server.

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

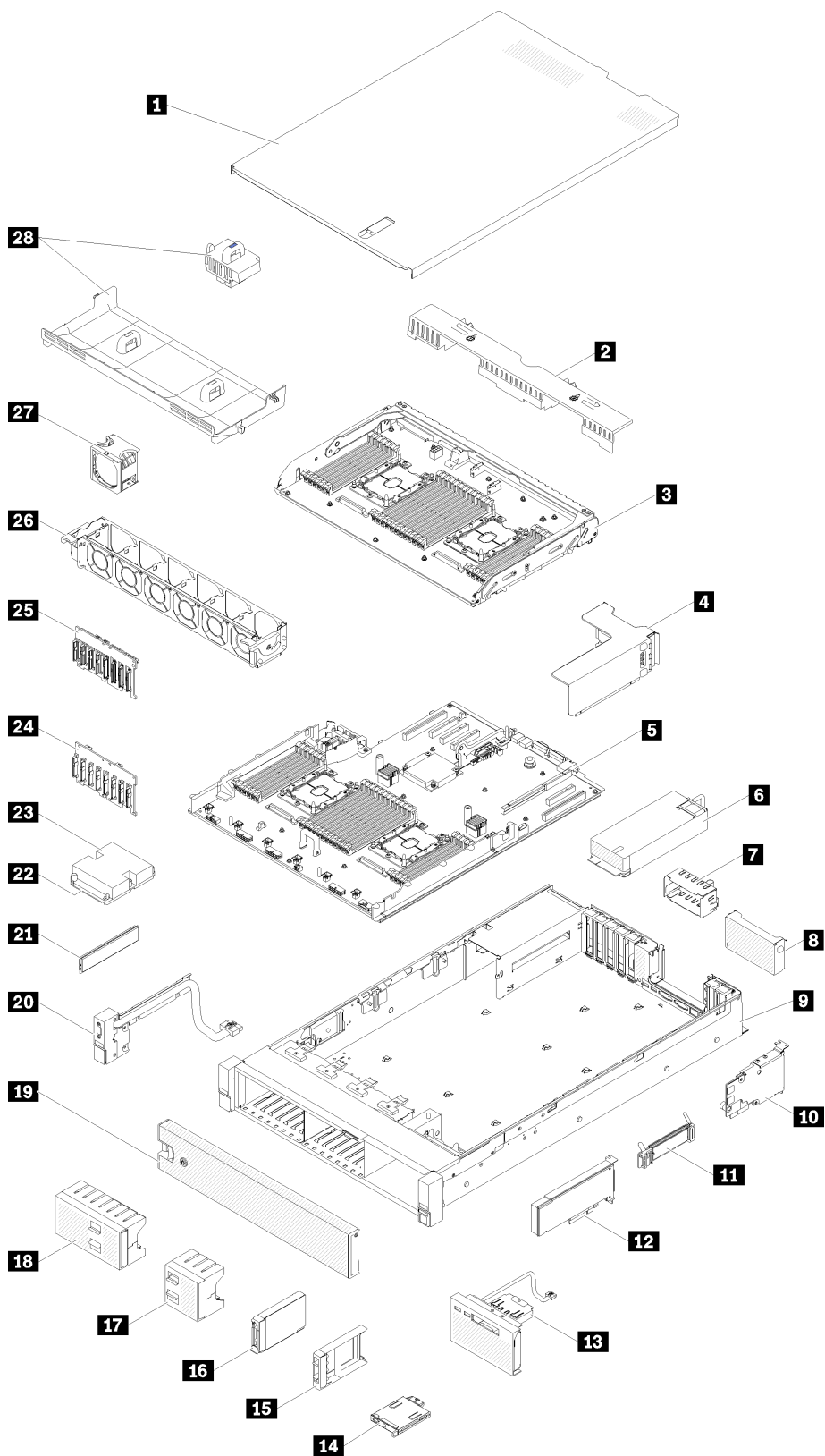


Figure 39. Server components

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

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

Table 33. Parts listing

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
For more information about ordering parts: <ol style="list-style-type: none"> 1. Go to http://datacentersupport.lenovo.com and click Parts & Accessories. 2. Click Parts Lookup. 3. Enter either the serial number or the machine type model for your server to see the parts for your server. 					
1	Top cover	✓			
2	Expansion tray air baffle	✓			
3	Processor and memory expansion tray			✓	
4	PCIe riser-card assembly	✓			
5	System board			✓	
6	Power supply unit	✓			
7	Power supply filler	✓			
8	PCIe riser-card filler				✓
9	Chassis			✓	
10	LOM adapter	✓			
11	M.2 backplane	✓			
12	PCIe adapter	✓			
13	Operator panel tray assembly		✓		
14	Front operator panel		✓		
15	2.5-inch drive filler	✓			
16	2.5-inch drive	✓			
17	2.5-inch drive 4-bay filler	✓			
18	2.5-inch drive 8-bay filler	✓			
19	Security bezel	✓			
20	Front VGA assembly	✓			
21	Memory module	✓			

Table 33. Parts listing (continued)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
<p>For more information about ordering parts:</p> <ol style="list-style-type: none"> 1. Go to http://datacentersupport.lenovo.com and click Parts & Accessories. 2. Click Parts Lookup. 3. Enter either the serial number or the machine type model for your server to see the parts for your server. 					
22	Processor			√	
23	Heatsink			√	
24	2.5-inch SATA/SAS 8-bay backplane	√			
25	2.5-inch AnyBay (SATA/SAS/NVMe) 8-bay backplane	√			
26	Fan cage	√			
27	Hot-swap fan	√			
28	System board air baffle and power interposer	√			

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://lesc.lenovo.com>
2. In the Customize a Model pane:
 - a. Click **Select Options/Parts for a Model**.
 - b. Enter the machine type and model for your server.
3. Click the Power tab 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 3. Server hardware setup

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

Server setup checklist

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

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:

1. Unpack the server package. See “Server package contents” on page 1.
2. Set up the server hardware.
 - a. Install any required hardware or server options. See the related topics in “Install server hardware options” on page 54.
 - b. If necessary, install the server into a standard rack cabinet by using the rail kit shipped with the server. See the *Rack Installation Instructions* that comes with optional rail kit.
 - c. Connect the Ethernet cables and power cords to the server. See “Rear view” on page 21 to locate the connectors. See “Cable the server” on page 87 for cabling best practices.
 - d. Power on the server. See “Power on the server” on page 87.

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:

http://sysmgt.lenovofiles.com/help/topic/com.lenovo.systems.management.xcc.doc/dw1lm_c_chapter2_openingandusing.html

- e. Validate that the server hardware was set up successfully. See Validate server setup.
3. Configure the system.
 - a. Connect the Lenovo XClarity Controller to the management network. See Set the network connection for the Lenovo XClarity Controller.
 - b. Update the firmware for the server, if necessary. See “Update the firmware” on page 90.
 - c. Configure the firmware for the server. See “Configure the firmware” on page 92.

The following information is available for RAID configuration:

 - <https://lenovopress.com/lp0578-lenovo-raid-introduction>
 - <https://lenovopress.com/lp0579-lenovo-raid-management-tools-and-resources>
 - d. Install the operating system. See “Install the operating system” on page 94.
 - e. Back up the server configuration. See “Back up the server configuration” on page 94.
 - f. Install the applications and programs for which the server is intended to be used.

Installation Guidelines

Use the installation guidelines to install components in your server.

Before installing optional devices, read the following notices carefully:

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

- Read the safety information and guidelines to ensure that you work safely.
 - A complete list of safety information for all products is available at:
http://thinksystem.lenovofiles.com/help/topic/safety_documentation/pdf_files.html
 - The following guidelines are available as well: “Handling static-sensitive devices” on page 54 and “Working inside the server with the power on” on page 53.
- Make sure the components you are installing are supported by the server. For a list of supported optional components for the server, see <http://www.lenovo.com/serverproven/>.
- When you install a new server, download and apply the latest firmware. This will help ensure that any known issues are addressed, and that your server is ready to work with optimal performance. Go to SR850 Drivers and Software to download firmware updates for your server.

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

- It is good practice to make sure that the server is working correctly before you install an optional component.
- Keep the working area clean, and place removed components on a flat and smooth surface that does not shake or tilt.
- Do not attempt to lift an object that might be too heavy for you. If you have to lift a heavy object, read the following precautions carefully:
 - Make sure that you can stand steadily without slipping.
 - Distribute the weight of the object equally between your feet.
 - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
 - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes related to the disk drives.
- Have a small flat-blade screwdriver, a small Phillips screwdriver, and a T8 torx screwdriver available.
- To view the error LEDs on the system board and internal components, leave the power on.
- You do not have to turn off the server to remove or install hot-swap power supplies, hot-swap fans, or hot-plug USB devices. However, you must turn off the server before you perform any steps that involve removing or installing adapter cables, and you must disconnect the power source from the server before you perform any steps that involve removing or installing a riser card.
- Blue on a component indicates touch points, where you can grip to remove a component from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped if the server and operating system support hot-swap capability, which means that you can remove or install the component while the server is still running. (Orange can also indicate touch points on

hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.

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

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

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

System reliability guidelines

Review the system reliability guidelines to ensure proper system cooling and reliability.

Make sure the following requirements are met:

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

Working inside the server with the power on

Guidelines to work inside the server with the power on.

S033



CAUTION:

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

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

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

Handling static-sensitive devices

Use this information to handle static-sensitive devices.

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

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

Install server hardware options

This section includes instructions for performing initial installation of optional hardware. Each component installation procedure references any tasks that need to be performed to gain access to the component being replaced.

Installation procedures are presented in the optimum sequence to minimize work.

Attention: To ensure the components you install work correctly without problems, read the following precautions carefully.

- Make sure the components you are installing are supported by the server. For a list of supported optional components for the server, see <http://www.lenovo.com/serverproven/>.
- Always download and apply the latest firmware. This will help ensure that any known issues are addressed, and that your server is ready to work with optimal performance. Go to SR850 Drivers and Software to download firmware updates for your server.

- It is good practice to make sure that the server is working correctly before you install an optional component.
- Follow the installation procedures in this section and use appropriate tools. Incorrectly installed components can cause system failure from damaged pins, damaged connectors, loose cabling, or loose components.

Remove the security bezel

Remove the security bezel by unlocking the security bezel and pressing the release latch.

Before removing the security bezel:

1. Read the safety information and installation guidelines (see “Safety” on page iii and “Installation Guidelines” on page 52).
2. If the server is installed in a rack, extend or remove the server from the rack.
3. **Watch the procedure.** A video of this procedure is available from the following links:
 - https://www.youtube.com/playlist?list=PLYV5R7hVcs-B2y7oAb54mfyuLrlusa_qE
 - http://list.youku.com/albumlist/show/id_50483449

To remove the security bezel, complete the following steps:

Watch the procedure. A video of the removal process is available:

- Youtube: Removing the security bezel
- Youku: Removing the security bezel

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

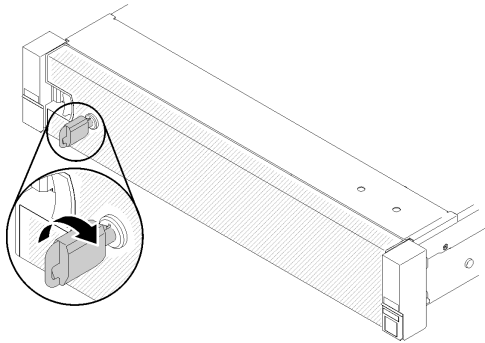


Figure 40. Unlocking the security bezel

Step 2. Press the release latch and pivot the security bezel outward to remove it from the chassis.

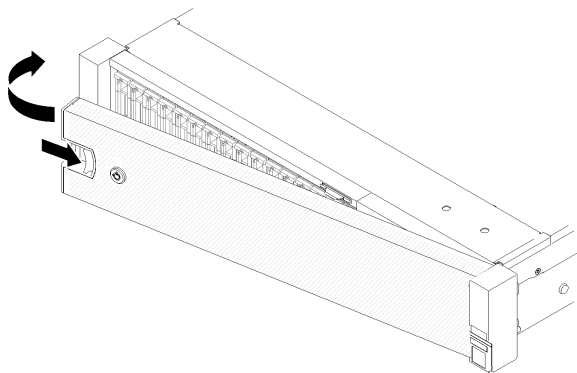


Figure 41. Security bezel removal

Remove the top cover

Use this procedure to remove the top cover.

S014



CAUTION:

Hazardous voltage, current, and energy levels might be present. Only a qualified service technician is authorized to remove the covers where the following label is attached.

S033



CAUTION:

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

Before removing the top cover:

1. Read the safety information and installation guidelines (see “Safety” on page iii and “Installation Guidelines” on page 52).
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables (see “Power off the server” on page 87).
3. If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.
4. **Watch the procedure.** A video of this procedure is available from the following links:
 - https://www.youtube.com/playlist?list=PLYV5R7hVcs-B2y7oAb54mfyuLrlusa_qE
 - http://list.youku.com/albumlist/show/id_50483449
5. Remove the top cover (see “Remove the top cover” on page 56).

To remove the top cover, complete the following steps:

Step 1. Unlock the cover release latch with a flat-end screwdriver.

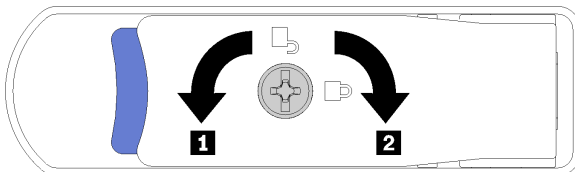


Figure 42. Lock on the top cover latch

Table 34. Lock/unlock directions on the top cover latch

1 Unlock	2 Lock
-----------------	---------------

- Step 2. Press and hold on the blue tab of cover release latch; then, rotate the tip of the latch up.
- Step 3. Push the latch forward to slide the top cover away from the server.

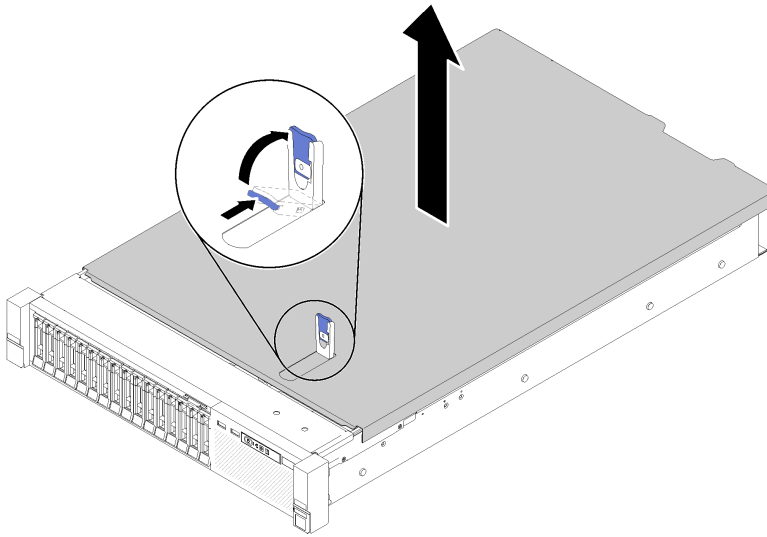


Figure 43. Top cover removal

- Step 4. Lift the cover, remove it from the server, and set it aside.

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Remove the system board air baffle and the power interposer

Use this procedure to remove the system board air baffle and the power interposer.

Note: If the server comes with a processor and memory expansion tray, it doesn't come with this component

Before removing the system board air baffle, complete the following steps:

1. Read the safety information and installation guidelines (see “Safety” on page iii and “Installation Guidelines” on page 52).
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables (see “Power off the server” on page 87).
3. If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.
4. **Watch the procedure.** A video of this procedure is available from the following links:
 - https://www.youtube.com/playlist?list=PLYV5R7hVcs-B2y7oAb54mfyuLrIusa_qE
 - http://list.youku.com/albumlist/show/id_50483449
5. Remove the top cover (see “Remove the top cover” on page 56).

To remove the system board air baffle, complete the following steps:

- Step 1. Slightly slide power supply 2 out from the power supply bay (see “Remove a hot-swap power supply unit” in *ThinkSystem SR850 Maintenance Manual*).
- Step 2. Lift the power interposer from the server, and set it aside.

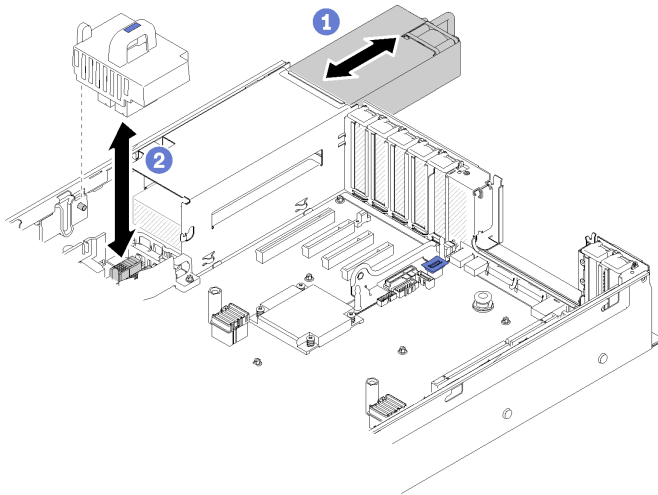


Figure 44. Power interposer removal

Step 3. Lift the system board air baffle from the server, and set it aside.

Attention: Air baffle is required for airflow that creates proper cooling. Make sure proper air baffle (s) for system configuration is installed before the power is turned on.

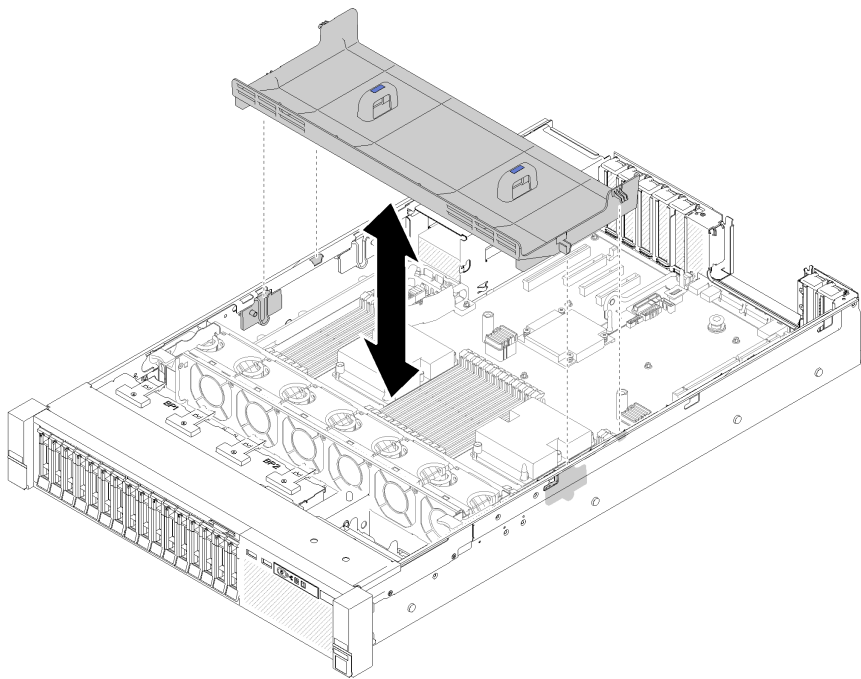


Figure 45. System board air baffle removal

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Remove the processor and memory expansion tray

Use this procedure to remove the processor and memory expansion tray.

Before removing the processor and memory expansion tray:

1. Read the safety information and installation guidelines (see “Safety” on page iii and “Installation Guidelines” on page 52).
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables (see “Power off the server” on page 87).
3. If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.
4. **Watch the procedure.** A video of this procedure is available from the following links:
 - https://www.youtube.com/playlist?list=PLYV5R7hVcs-B2y7oAb54mfyuLrlusa_qE
 - http://list.youku.com/albumlist/show/id_50483449
5. Remove the top cover (see “Remove the top cover” on page 56).
6. If you are replacing the processor and memory expansion tray, remove the expansion tray air baffle, DIMMs (see Remove a DIMM), and PHMs (see “Remove a processor and the heatsink” in *ThinkSystem SR850 Maintenance Manual*) on the expansion tray.

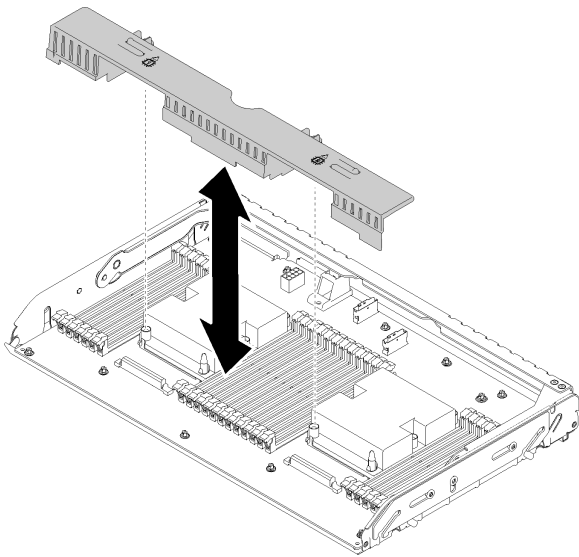


Figure 46. Expansion tray air baffle removal

Attention:

- Do not remove or install DIMMs and processors on the processor and memory expansion tray when the expansion tray is removed, for the instability might cause damages to components.

To remove the processor and memory expansion tray, complete the following steps:

Step 1. Slightly pull out power supply 2.

Attention: Do not remove the processor and memory expansion tray without physically disconnecting power supply 2.

Step 2. Grasp the handle of the processor and memory expansion tray; then, pull and rotate it all the way up until it is in the vertical position. This disengages the expansion tray from the system board.

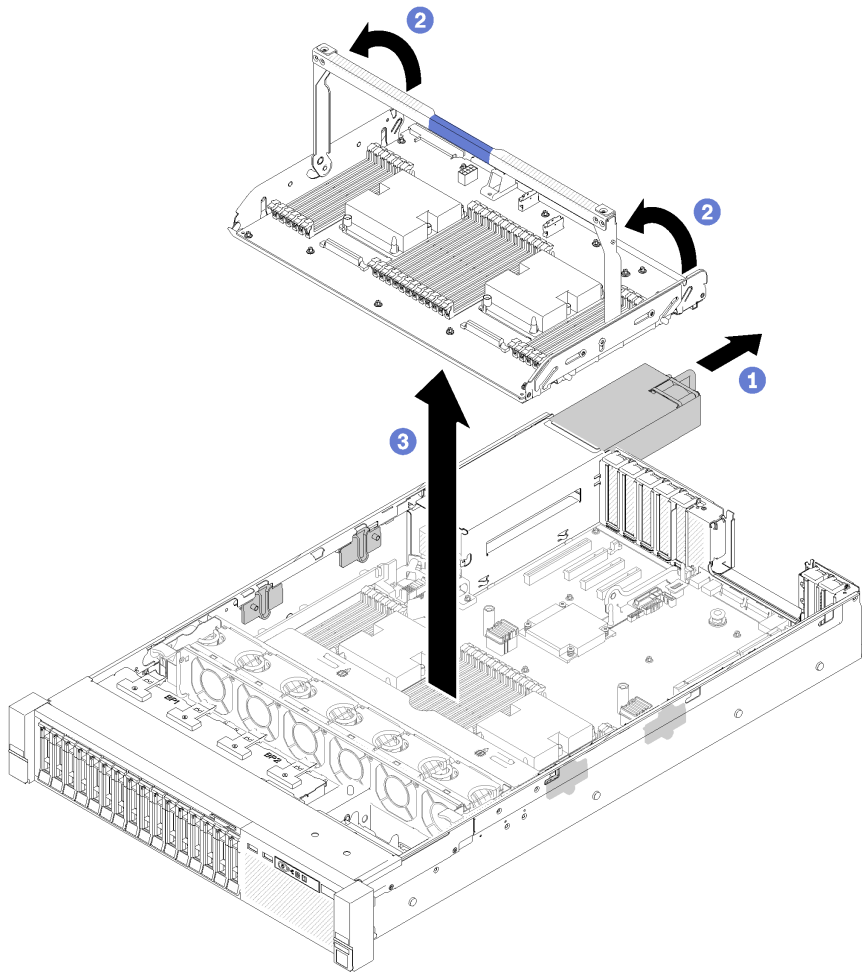


Figure 47. Processor and memory expansion tray removal

Step 3. Grasp the handle and slowly lift the expansion tray from the server; then, set it on a flat surface.

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Remove the fan cage assembly

Use this procedure to remove the fan cage assembly.

S002



CAUTION:

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

S017



CAUTION: Hazardous moving fan blades nearby.

Before removing the fan cage assembly:

1. Read the safety information and installation guidelines (see “Safety” on page iii and “Installation Guidelines” on page 52).
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables (see “Power off the server” on page 87).
3. If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.
4. **Watch the procedure.** A video of this procedure is available from the following links:
 - https://www.youtube.com/playlist?list=PLYV5R7hVcs-B2y7oAb54mfyuLrlusa_qE
 - http://list.youku.com/albumlist/show/id_50483449
5. Remove the top cover (see “Remove the top cover” on page 56).

To remove the fan cage assembly, complete the following steps:

Step 1. Lift and rotate the fan cage release latches to disengage the fan cage assembly from the server.

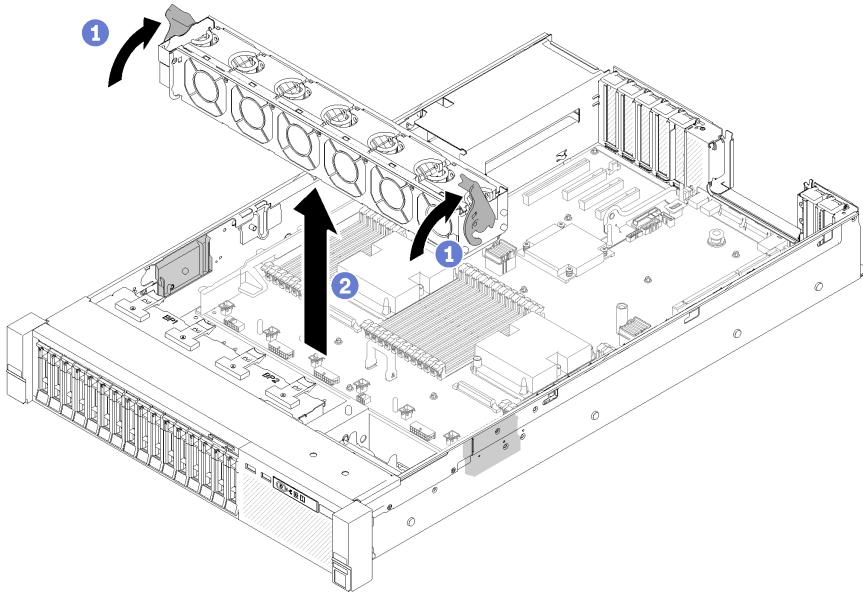


Figure 48. Fan cage assembly removal

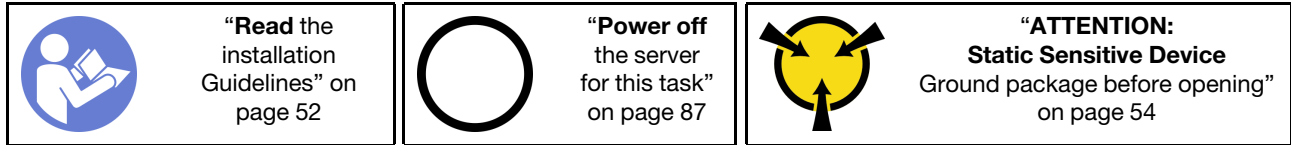
Step 2. Lift the fan cage assembly from the server.

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Install a processor-heat-sink module

Processors are in the compute system boards that are accessed from the front of the server. The processor and heat sink are removed together as part of a processor-heat-sink-module (PHM) assembly. PHM installation requires a Torx T30 driver.

Note: If you are installing multiple options relating to the compute system board, the PHM installation should be performed first.



Attention:

- Each processor socket must always contain a cover or a PHM. When removing or installing a PHM, protect empty processor sockets with a cover.
- Do not touch the processor socket or processor contacts. Processor-socket contacts are very fragile and easily damaged. Contaminants on the processor contacts, such as oil from your skin, can cause connection failures.
- Remove and install only one PHM at a time. If the system board supports multiple processors, install the PHMs starting with the first processor socket.
- Do not allow the thermal grease on the processor or heat sink to come in contact with anything. Contact with any surface can compromise the thermal grease, rendering it ineffective. Thermal grease can damage components, such as electrical connectors in the processor socket. Do not remove the grease cover from a heat sink until you are instructed to do so.

Notes:

- PHMs are keyed for the socket where they can be installed and for their orientation in the socket.
- See <http://www.lenovo.com/serverproven/> for a list of processors supported for your server. All processors on the system board must have the same speed, number of cores, and frequency.
- Before you install a new PHM or replacement processor, update your system firmware to the latest level. See "Update the firmware" on page 90.
- Installing an additional PHM can change the memory requirements for your system. See *ThinkSystem SR850 Memory Population Reference* for a list of processor-to-memory relationships.
- Optional devices available for your system might have specific processor requirements. See the documentation that comes with the optional device for information.

Before installing a PHM:

Note: The PHM for your system might be different than the PHM shown in the illustrations.

1. If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack.
2. Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
3. Remove the top cover (see "Remove the top cover" on page 56).
4. Remove the system board air baffle (see "Remove the system board air baffle and the power interposer" on page 57) or the processor and memory expansion tray and the expansion tray air baffle (see "Remove the processor and memory expansion tray" on page 58).
5. **Watch the procedure.** A video of this procedure is available from the following links:

- https://www.youtube.com/playlist?list=PLYV5R7hVcs-B2y7oAb54mfyuLrlusa_qE
- http://list.youku.com/albumlist/show/id_50483449

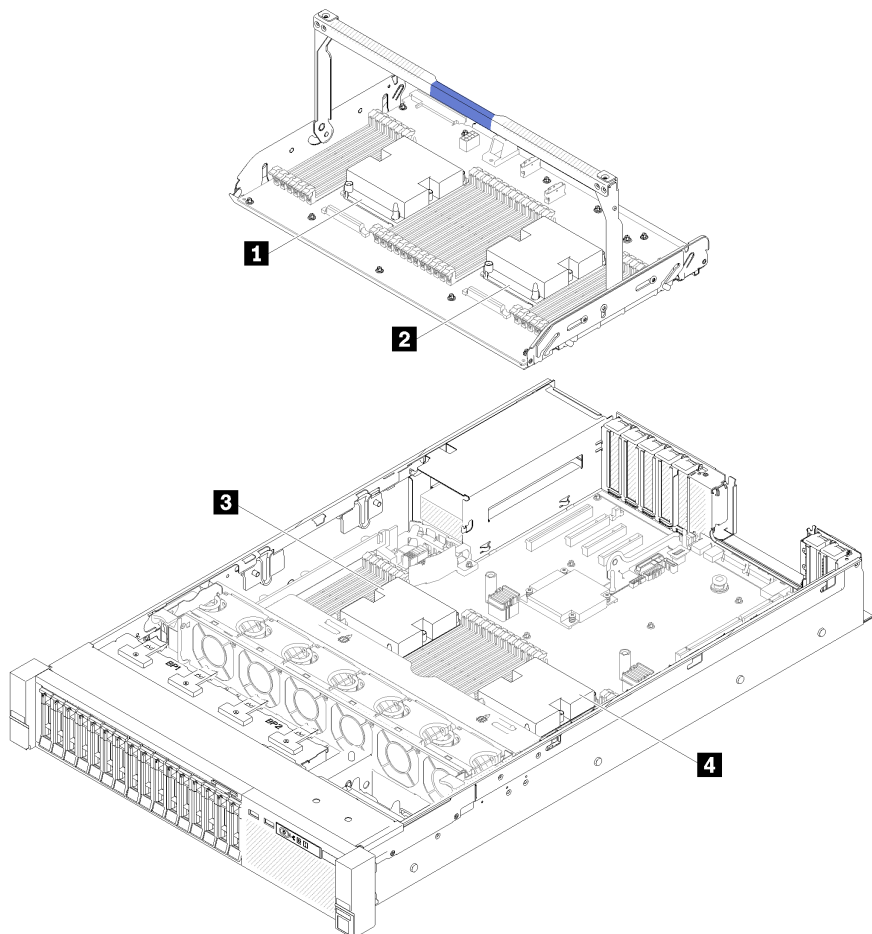


Figure 49. Processor locations

Table 35. Processor locations

1 Processor 3	2 Processor 4
3 Processor 1	4 Processor 2

Step 1. Remove the processor socket cover, if one is installed on the processor socket, by placing your fingers in the half-circles at each end of the cover and lifting it from the system board.

Step 2. Install the processor-heat-sink module on the system board.

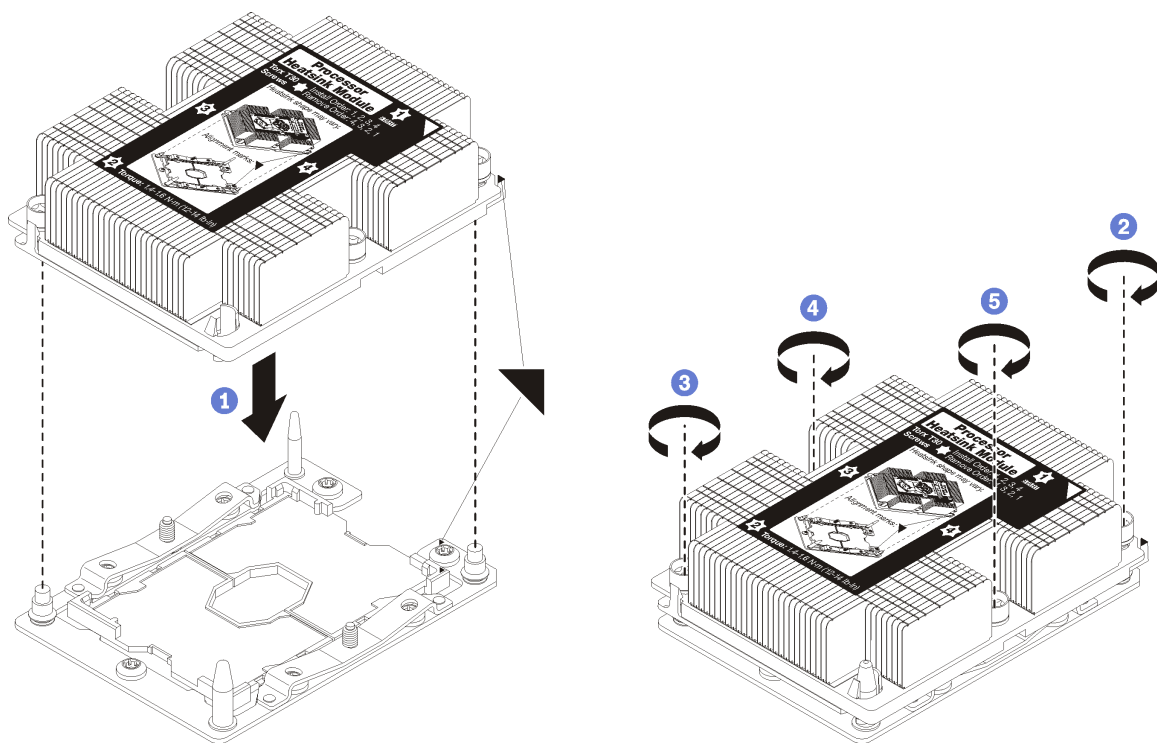


Figure 50. Installing a PHM

- a. Align the triangular marks and guide pins on the processor socket with the PHM; then, insert the PHM into the processor socket.

Attention: To prevent damage to components, make sure that you follow the indicated tightening sequence.

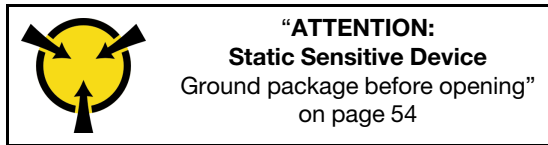
- b. Fully tighten the Torx T30 captive fasteners *in the installation sequence shown* on the heat-sink label. Tighten the screws until they stop; then, visually inspect to make sure that there is no gap between the screw shoulder beneath the heat sink and the processor socket. (For reference, the torque required for the nuts to fully tighten is 1.4 — 1.6 newton-meters, 12 — 14 inch-pounds).

After installing the PHM option:

1. If there are memory modules to install, install them. See “Install a memory module” on page 66.
2. Reinstall the system board air baffle (see “Install the system board air baffle and the power interposer” on page 71) or processor and memory expansion tray and expansion tray air baffle (see “Install the processor and memory expansion tray ” on page 73).
3. Reinstall the top cover (see “Install the top cover” on page 84).
4. Reconnect the power cords and any cables that you removed.
5. Power on the server and any peripheral devices.

Install a memory module

Memory modules are installed in the compute system boards that are accessed from the front of the server.



Attention: Memory modules are sensitive to static discharge and require special handling. In addition to the standard guidelines for “Handling static-sensitive devices” on page 54:

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

Before installing a memory module, make sure that you understand the required installation order, depending on whether you are implementing memory mirroring, memory rank sparing, or independent memory mode. See *ThinkSystem SR850 Memory Population Reference* for the required installation order.

If you are installing an optional processor, install it before installing memory modules. See “Install a processor-heat-sink module” on page 63

Before installing a memory module:

1. Read the safety information and installation guidelines (see “Safety” on page iii and “Installation Guidelines” on page 52).
2. Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
3. **Watch the procedure.** A video of this procedure is available from the following links:
 - https://www.youtube.com/playlist?list=PLYV5R7hVcs-B2y7oAb54mfyuLrlusa_qE
 - http://list.youku.com/albumlist/show/id_50483449

Complete the following steps to install a memory module:

Watch the procedure. A video of the installation process is available:

- Youtube: Installing a memory module
- Youku: Installing a memory module

- Step 1. Open the memory module connector retaining clips. If a memory module is already installed in the connector, remove it.
- Step 2. Align the keys on the memory module that you are installing with the connector; then, insert the memory module.
- Step 3. Firmly press both ends of the memory module straight down into the connector until the retaining clips snap into the locked position.

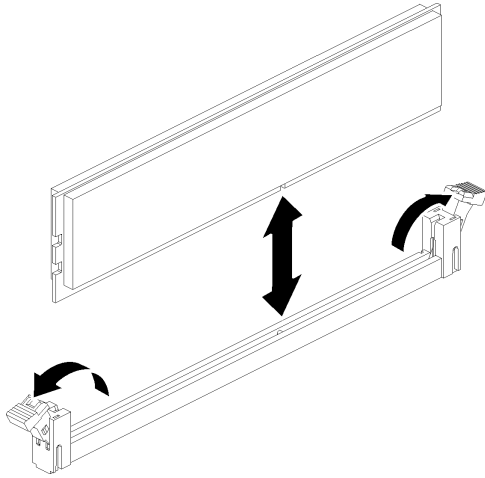


Figure 51. Memory module installation

Step 4. If you are installing additional memory modules, do so now.

After installing a memory module option:

1. Reinstall the system board air baffle (see “Install the system board air baffle and the power interposer” on page 71) or processor and memory expansion tray and expansion tray air baffle (see “Install the processor and memory expansion tray ” on page 73).
2. Reinstall the top cover (see “Install the top cover” on page 84).
3. Reconnect the power cords and any cables that you removed.
4. Install the server in the rack.
5. Power on the server and any peripheral devices.

Install a drive backplane

Use this procedure to install a drive backplane.

Before installing a drive backplane:

1. Read the safety information and installation guidelines (see “Safety” on page iii and “Installation Guidelines” on page 52).
2. Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
3. **Watch the procedure.** A video of this procedure is available from the following links:
 - https://www.youtube.com/playlist?list=PLYV5R7hVcs-B2y7oAb54mfyuLrlusa_qE
 - http://list.youku.com/albumlist/show/id_50483449

To install a drive backplane, complete the following steps:

- Step 1. Determine the location of the backplane to be installed accordingly to the following combinations. For more details about drive bay numbering, see “Front view” on page 13.
- One drive backplane:
Always install the drive backplane to the drive bay 0-7 when there is only one backplane.
 - Two drive backplanes:
Two types of drive backplanes are supported by this system:
 - 2.5-inch SATA/SAS 8-bay backplane (referred to as “8-bay backplane”)

- 2.5-inch AnyBay 8-bay backplane (referred to as “AnyBay backplane”)

When installing a 8-bay backplane and a AnyBay backplane, always install the 8-bay backplane to drive bay 0-7, and the AnyBay backplane to drive bay 8-15.

- Step 2. Align the tabs on the bottom of the drive backplane with the slots on the system board, and insert them into the slots.
- Step 3. Push the top of the drive backplane toward the front of the server until it clicks in place.

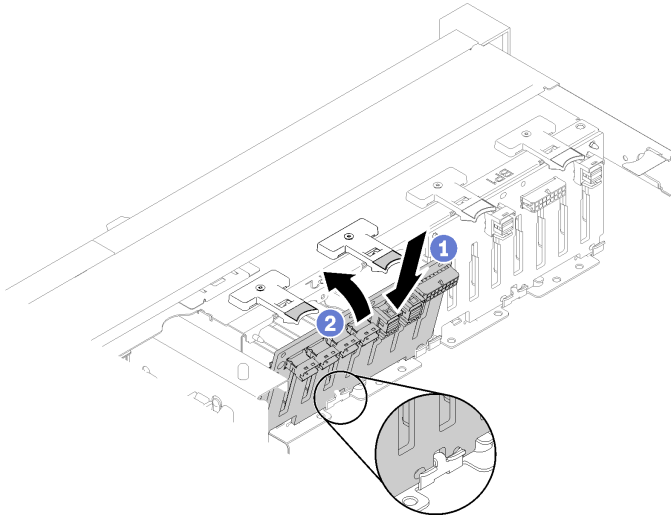


Figure 52. Drive backplane installation

- Step 4. Apply drive bay labels based on the type of backplane installed. Several drive bay labels come with each type of the supported drive backplane:

- 8-bay backplane
 - **12-15 (NVMe)**
Apply this label to drive bay 12-15 if an AnyBay backplane is installed to drive bay 8-15.
 - **12-15**
Apply this label to drive bay 12-15 if an 8-bay backplane is installed to drive bay 8-15
 - **4-7**
Apply this label to drive bay 4-7 if an 8-bay backplane is installed to drive bay 0-7.
- AnyBay backplane
 - **4-7 (NVMe)**
Apply this label to drive bay 4-7 if an AnyBay backplane is installed to drive bay 0-7.
 - **12-15 (NVMe)**
Apply this label to drive bay 12-15 if an AnyBay backplane is installed to drive bay 8-15.

Note: Only drive bay 4-7 and 12-15 may support NVMe solid-state drives when AnyBay backplane is installed. Drive bay 0-3 and 8-11 always support SATA/SAS drives only.

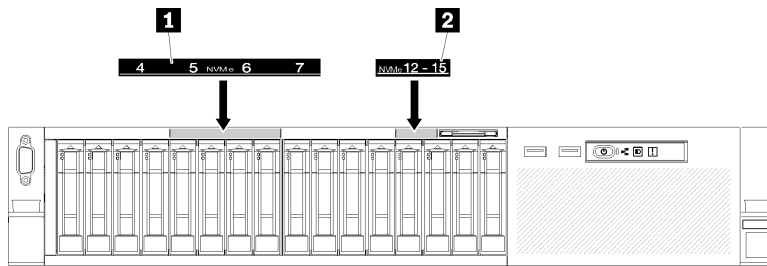


Figure 53. Drive bay labels of NVMe solid-state drives

Table 36. Drive bay labels of NVMe solid-state drives

1 Drive bay 4-7 label of NVMe solid-state drives	2 Drive bay 12-15 label of NVMe solid-state drives
---	---

After installing the drive backplane, complete the following steps:

1. Connect the cables to the drive backplane. If the type of drive backplane is changed, it is necessary to reroute the signal cables (see “Cable routing for 2.5-inch drives” on page 30 for detailed instructions).
2. Install the drives (see “Install a 2.5-inch hot-swap drive” on page 69).
3. If the system board air baffle or the processor and memory expansion tray and expansion tray air baffle have been removed, install them (see “Install the system board air baffle and the power interposer” on page 71 or “Install the processor and memory expansion tray” on page 73).
4. Reinstall the top cover (see “Install the top cover” on page 84).
5. Reconnect the power cords and any cables that you removed.
6. Install the server in the rack.
7. Power on the server and any peripheral devices.

Install a 2.5-inch hot-swap drive

Use this procedure to install a 2.5-inch drive.

Following are the types of drives supported by this server:

- NVMe solid-state drive
- SATA/SAS solid-state drive
- SATA/SAS hard-disk drive

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

Before installing a 2.5-inch hot-swap drive:

1. Read the safety information and installation guidelines (see “Safety” on page iii and “Installation Guidelines” on page 52).
2. Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
3. **Watch the procedure.** A video of this procedure is available from the following links:
 - https://www.youtube.com/playlist?list=PLYV5R7hVcs-B2y7oAb54mfyuLrlusa_qE
 - http://list.youku.com/albumlist/show/id_50483449

To install a 2.5-inch drive, complete the following steps:

Step 1. Determine the available drive bays based on the drive bay labels applied. The following labels indicate that the drive bays support both NVMe and SATA/SAS drives. Otherwise, only SATA/SAS drives are supported.

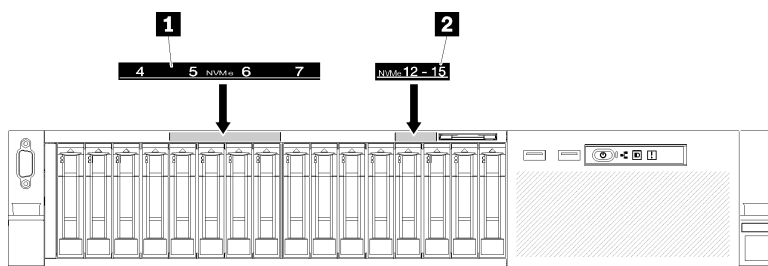


Figure 54. Drive bay labels of NVMe solid-state drives

Table 37. Drive bay labels of NVMe solid-state drives

1 Drive bay 4-7 label of NVMe solid-state drives	2 Drive bay 12-15 label of NVMe solid-state drives
---	---

Notes:

1. Make sure to install the correct type of drive(s) into supported by corresponding drive bays. Drive type information is available on the drive.

Step 2. Remove the drive bay filler if it has been installed in the drive bay.

Step 3. Gently rotate the release latch away to unlock the drive handle.

Step 4. Slide the drive into the drive bay, and push it until it stops.

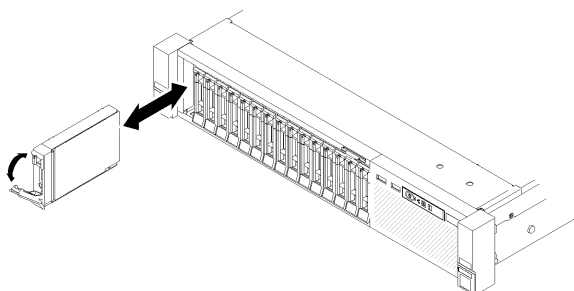


Figure 55. Drive installation

Step 5. Rotate the drive-tray handle back to the locked position.

After installing the 2.5-inch hot-swap drive, check the drive status LED to verify if the drive is operating correctly:

- If the yellow LED is lit continuously, it is malfunctioning and must be replaced.
- If the green LED is flashing, the drive is functioning.

Note: If the server is configured for RAID operation through a ThinkSystem RAID adapter, you might have to reconfigure your disk arrays after you install drives. See the ThinkSystem RAID adapter documentation for additional information about RAID operation and complete instructions for using ThinkSystem RAID adapters.

Install the fan cage assembly

Use this procedure to install the fan cage assembly.

Before installing the fan cage assembly:

1. Read the safety information and installation guidelines (see “Safety” on page iii and “Installation Guidelines” on page 52).
2. Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
3. **Watch the procedure.** A video of this procedure is available from the following links:
 - https://www.youtube.com/playlist?list=PLYV5R7hVcs-B2y7oAb54mfyuLrlusa_qE
 - http://list.youku.com/albumlist/show/id_50483449

To install the fan cage assembly, complete the following steps:

Step 1. Align the fan cage assembly to the slots on both sides of the server, and lower it into the server.

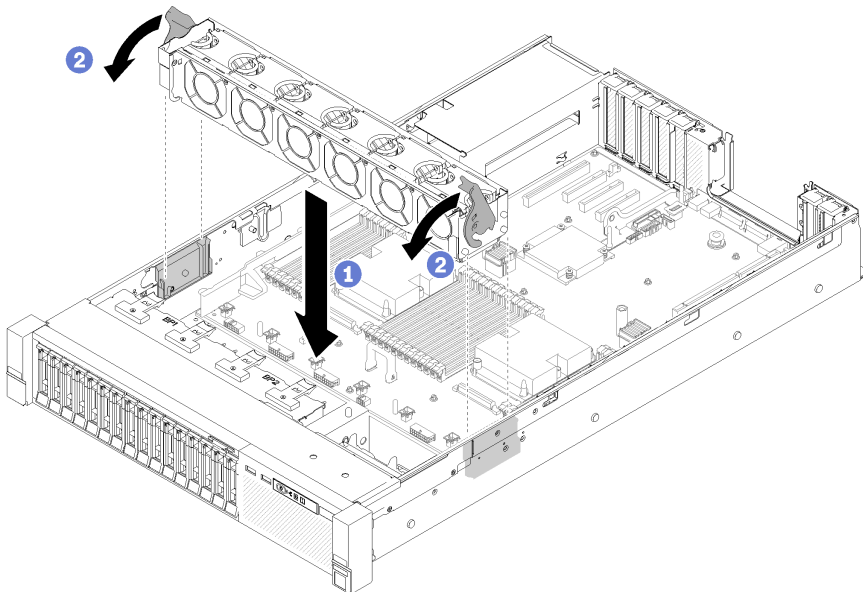


Figure 56. Fan cage assembly installation

Step 2. Rotate the fan cage release latches down until they stop.

After installing the fan cage assembly, complete the following steps:

1. Reinstall the top cover (see “Install the top cover” on page 84).
2. Reconnect the power cords and any cables that you removed.
3. Install the server in the rack.
4. Power on the server and any peripheral devices.

Install the system board air baffle and the power interposer

Use this procedure to install the system board air baffle and the power interposer.

Before installing the system board air baffle:

1. Read the safety information and installation guidelines (see “Safety” on page iii and “Installation Guidelines” on page 52).
2. Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
3. **Watch the procedure.** A video of this procedure is available from the following links:
 - https://www.youtube.com/playlist?list=PLYV5R7hVcs-B2y7oAb54mfyuLrlusa_qE
 - http://list.youku.com/albumlist/show/id_50483449

To install the system board air baffle, complete the following steps:

- Step 1. Slightly slide power supply 2 out from the power supply bay (see “Remove a hot-swap power supply unit” in *ThinkSystem SR850 Maintenance Manual*).
- Step 2. Align the power interposer to the server, and lower it until it sits firmly in place.

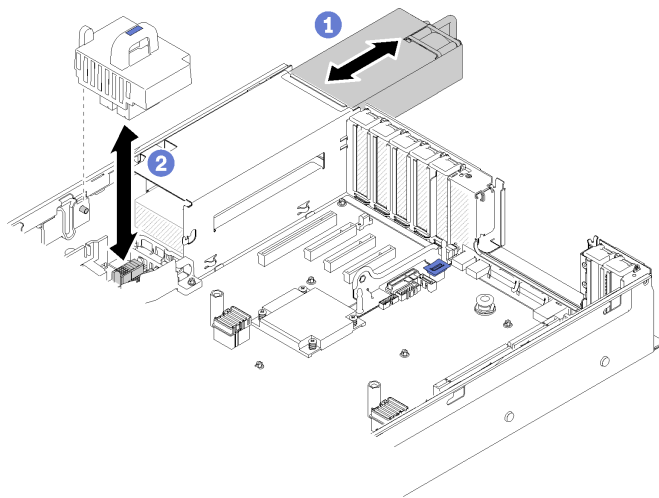


Figure 57. Power interposer installation

- Step 3. Align the two pairs of nailheads of the system board air baffle to slots, and lower it into the server.

Attention: Air baffle is required for airflow that creates proper cooling. Make sure proper air baffle (s) for system configuration is installed before the power is turned on.

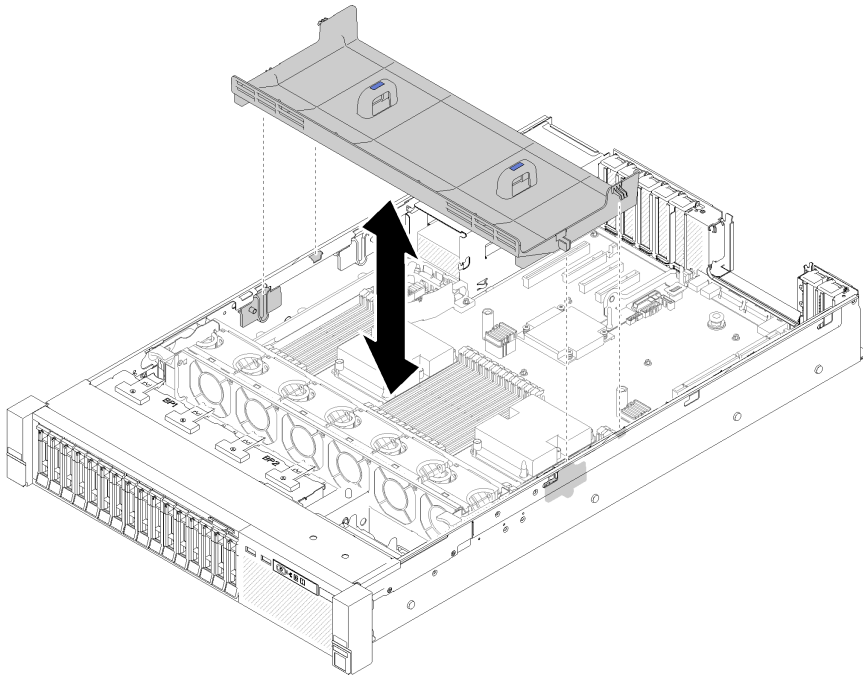


Figure 58. System board air baffle installation

After installing the system board air baffle, complete the following steps:

1. Reinstall the top cover (see “Install the top cover” on page 84).
2. Reconnect the power cords and any cables that you removed.
3. Install the server in the rack.
4. Power on the server and any peripheral devices.

Install the processor and memory expansion tray

Use this procedure to install the processor and memory expansion tray.

Before installing the processor and memory expansion tray:

1. Read the safety information and installation guidelines (see “Safety” on page iii and “Installation Guidelines” on page 52).
2. Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
3. **Watch the procedure.** A video of this procedure is available from the following links:
 - https://www.youtube.com/playlist?list=PLYV5R7hVcs-B2y7oAb54mfyuLrlusa_qE
 - http://list.youku.com/albumlist/show/id_50483449

To install processor and memory expansion tray, complete the following steps:

- Step 1. If a power interposer and a system board air baffle are installed, remove them (see “Remove the system board air baffle and the power interposer” on page 57).
- Step 2. Install an expansion tray air baffle on the system board. Make sure it is properly installed before installing the processor and memory expansion tray.

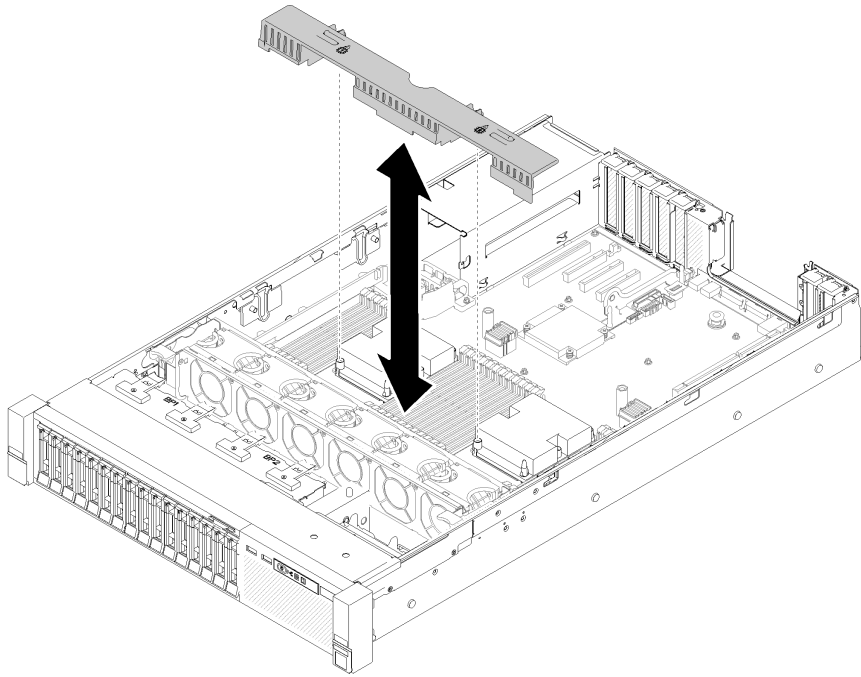


Figure 59. Expansion tray air baffle installation

Attention: Air baffle is required for airflow that creates proper cooling. Make sure proper air baffle (s) for system configuration is installed before the power is turned on.

- Step 3. Slightly slide power supply 2 out from the power supply bay (see “Remove a hot-swap power supply unit” in *ThinkSystem SR850 Maintenance Manual*).
- Step 4. Grip on the blue touch point on the handle of the expansion tray, and lift it up; then, lower the tray vertically into the server with nailheads aligned to the slots on both sides.
- Step 5. Rotate the handle all the way down. This connects and fix the expansion tray to the system board.

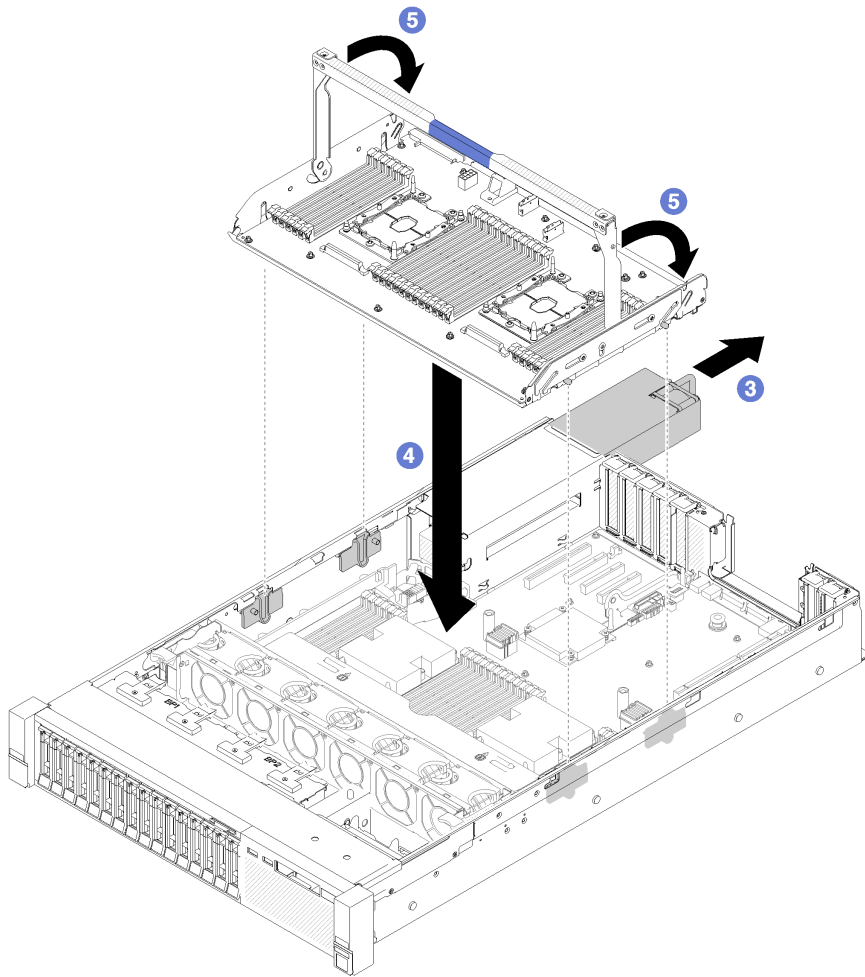


Figure 60. Processor and memory expansion tray installation

Step 6. Install DIMMs (see “Install a memory module” on page 66), PHMs (see “Install a processor-heat-sink module” on page 63), and another expansion tray air baffle on the expansion tray.

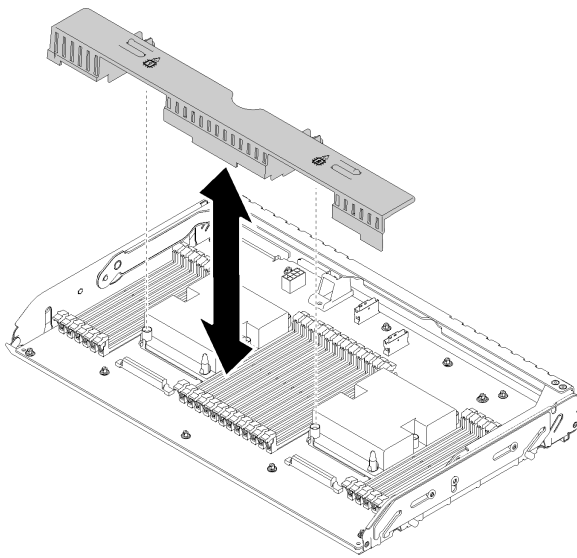


Figure 61. Expansion tray air baffle installation

Attention:

1. For the optimal performance, make sure both PHMs and corresponding DIMMs are installed to the processor and memory expansion tray.
2. Air baffle is required for airflow that creates proper cooling. Make sure proper air baffle(s) for system configuration is installed before the power is turned on.

After installing the processor and memory expansion tray, complete the following steps:

1. Reinstall power supply 2 (see “Install hot-swap power supply” in *ThinkSystem SR850 Maintenance Manual*).
2. Reinstall the top cover (see “Install the top cover” on page 84).
3. Reconnect the power cords and any cables that you removed.
4. Power on the server and any peripheral devices.

Install the PCIe riser-card assembly

Use this procedure to install the PCIe riser-card assembly.

Before installing the PCIe riser-card assembly:

1. Read the safety information and installation guidelines (see “Safety” on page iii and “Installation Guidelines” on page 52).
2. Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
3. **Watch the procedure.** A video of this procedure is available from the following links:
 - https://www.youtube.com/playlist?list=PLYV5R7hVcs-B2y7oAb54mfyuLrlusa_qE
 - http://list.youku.com/albumlist/show/id_50483449
4. Disconnect the USB 3.0 cable of operator panel tray assembly, and remove it vertically from the system board.

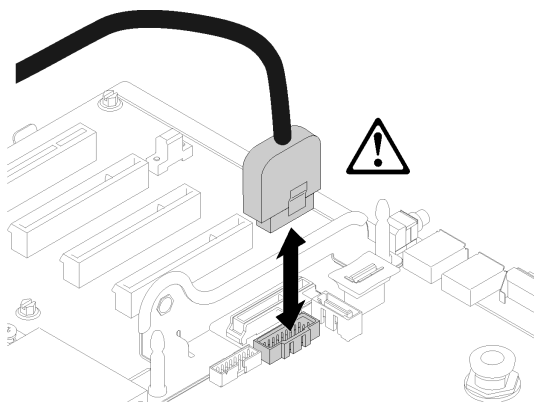


Figure 62. Removing USB 3.0 connector vertically

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

Step 1. Assemble the PCIe riser-card assembly:

- a. Align the bottom of the PCIe riser-card to the slot, and rotate the top to fit it into the slot on the riser-cage; then, move the PCIe riser-card slightly to fit the holes into the pins.

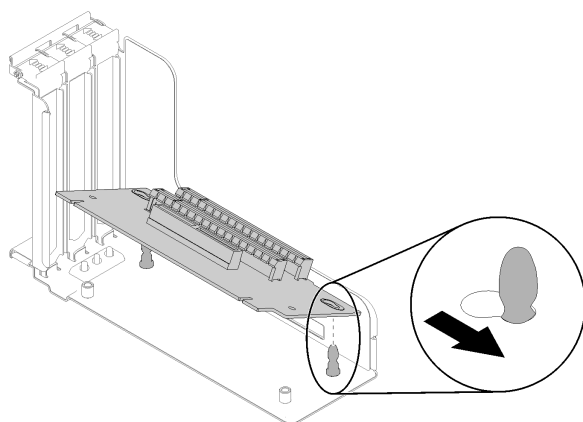


Figure 63. PCIe riser-card assembly

- b. Install the PCIe riser-card to the riser-cage with screws.

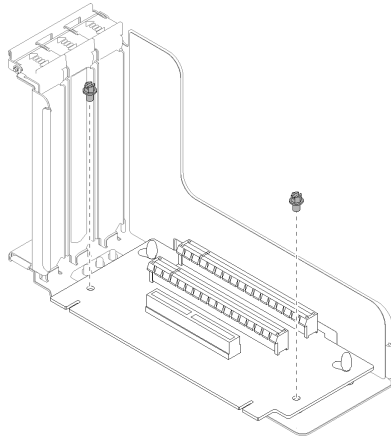


Figure 64. PCIe riser-card assembly

Step 2. Align the PCIe riser-card assembly with the connector on the system board; then, push it in until it clicks in place.

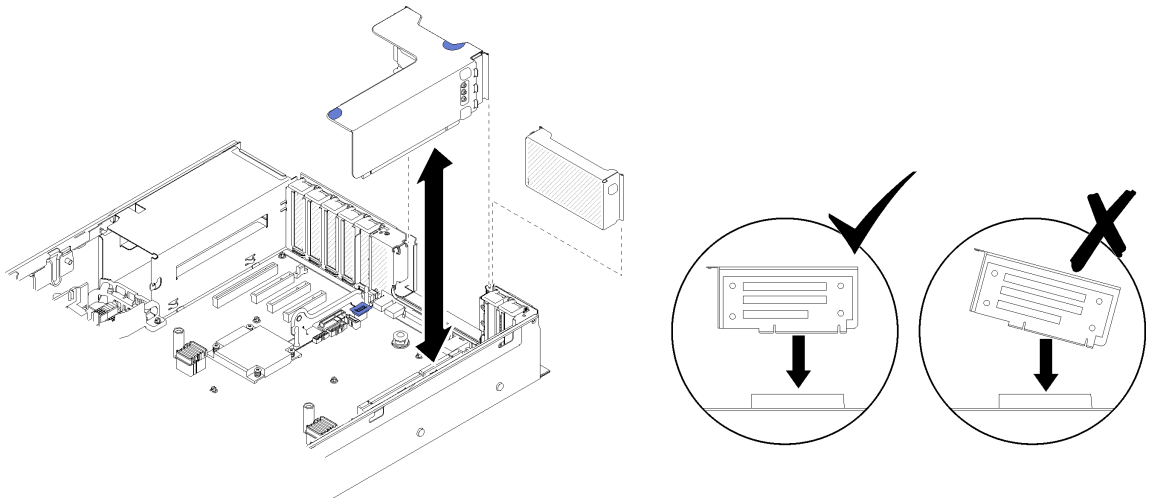


Figure 65. PCIe riser-card assembly installation

Step 3. Reconnect all the cables disconnected previously.

After installing the PCIe riser-card assembly, complete the following steps:

1. Reinstall the top cover (see “Install the top cover” on page 84).
2. Reconnect the power cords and any cables that you removed.
3. Install the server in the rack.
4. Power on the server and any peripheral devices.

Install the LOM adapter

Use this procedure to install the LOM adapter.

Note: When both LOM adapter and ML2 adapter are installed to the server, the system can support up to two additional network adapters.

Before installing the LOM adapter:

1. Read the safety information and installation guidelines (see “Safety” on page iii and “Installation Guidelines” on page 52).
2. Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
3. **Watch the procedure.** A video of this procedure is available from the following links:
 - https://www.youtube.com/playlist?list=PLYV5R7hVcs-B2y7oAb54mfyuLrlusa_qE
 - http://list.youku.com/albumlist/show/id_50483449
4. Make sure the LOM adapter to be installed supports the bandwidth of the network environment. Following are the requirements:
 - 1GbE LOM adapter: maximal bandwidth of network environment is 1GB.
 - 10GbE LOM adapter: minimal bandwidth of network environment is 1GB.
5. Attach the mounting bracket with the two screws as illustrated.

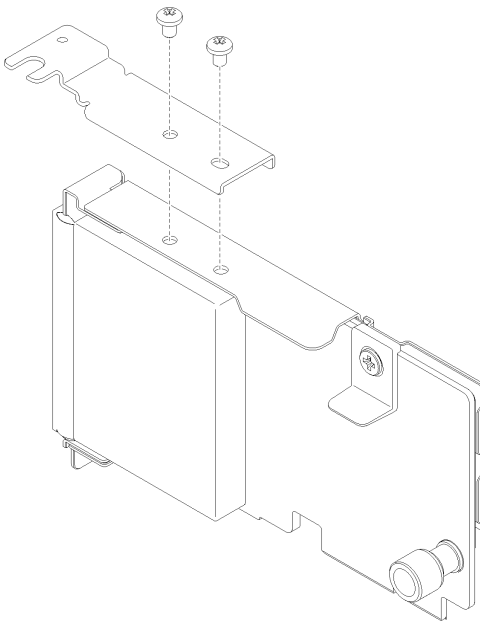


Figure 66. LOM adapter assembly

To install the LOM adapter, complete the following steps:

- Step 1. Open the retention latch.
- Step 2. Align the LOM adapter to the connector, and push it in.
- Step 3. Tighten the captive thumbscrew to lock it to the system board.

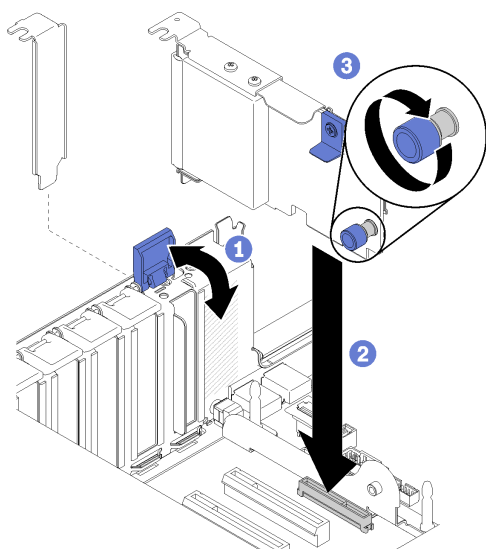


Figure 67. LOM adapter installation

Step 4. Close the retention latch.

After installing the LOM adapter, complete the following steps:

1. Reinstall the top cover (see “Install the top cover” on page 84).
2. Reconnect the power cords and any cables that you removed.
3. Power on the server and any peripheral devices.

How to adjust the position of the retainer on the M.2 backplane

Use this information to adjust the position of the retainer on the M.2 backplane.

Before you adjust the position of the retainer on the M.2 backplane, complete the following steps:

1. Read the safety information and installation guidelines (see “Safety” on page iii and “Installation Guidelines” on page 52).
2. Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

To adjust the position of the retainer on the M.2 backplane, complete the following steps:

- Step 1. Locate the correct keyhole that the retainer should be installed into to accommodate the particular size of the M.2 drive you wish to install.
- Step 2. Press both sides of the retainer and move it forward until it is in the large opening of the keyhole; then, remove it from the backplane.
- Step 3. Insert the retainer into the correct keyhole and slide it backwards until the nubs are in the holes.

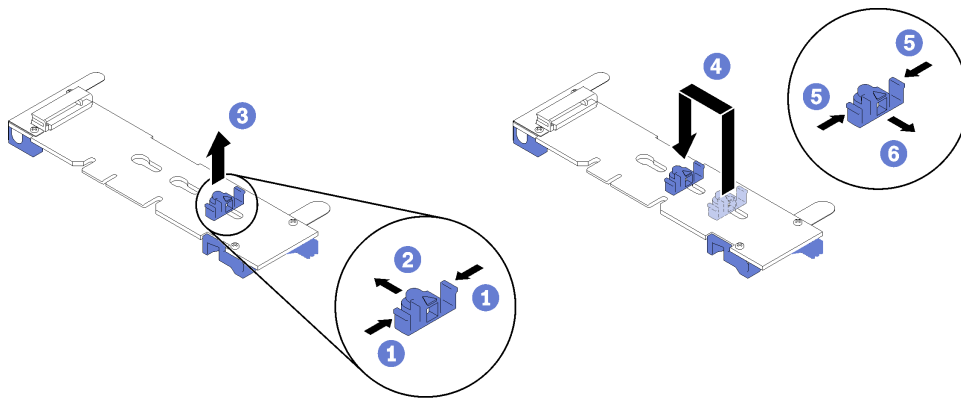


Figure 68. M.2 retainer adjustment

Install an M.2 drive in the M.2 backplane

Use this procedure to install an an M.2 drive in the M.2 backplane.

Before installing an M.2 drive in the M.2 backplane:

1. Read the safety information and installation guidelines (see “Safety” on page iii and “Installation Guidelines” on page 52).
2. Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

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

Step 1. Locate the connector on each side of the M.2 backplane.

Notes:

- Some M.2 backplanes support two M.2 drives. When two drives are installed, align and support both drives when sliding the retainer forward to secure the drives.
- Install the M.2 drive in slot 0 first.

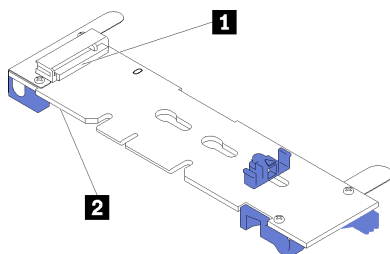


Figure 69. M.2 drive slots

Table 38. M.2 drive slots

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

Step 2. Insert the M.2 drive at an angle (approximately 30 degrees) into the connector and rotate it until the notch catches on the lip of the retainer; then, slide the retainer forward (toward the connector) to secure the M.2 drive in the M.2 backplane.

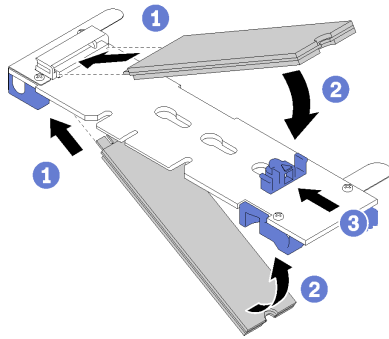


Figure 70. M.2 drive installation

Attention: When sliding the retainer forward, make sure the two nubs on the retainer enter the small holes on the M.2 backplane. Once they enter the holes, you will hear a soft “click” sound.

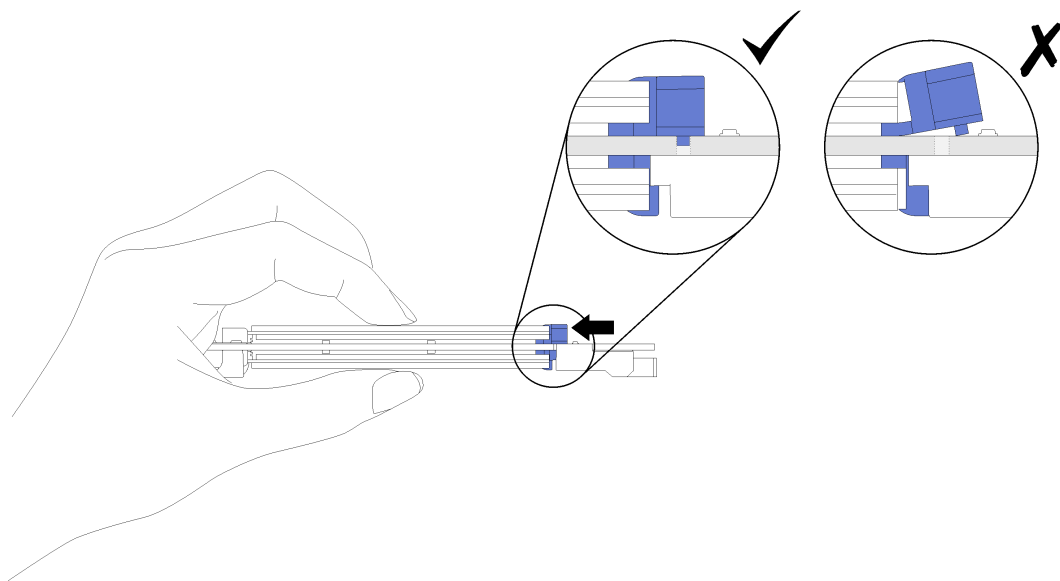


Figure 71. M.2 drive installation with the retainers in place

After installing an M.2 drive in the M.2 backplane, see “Install the M.2 backplane” on page 82 to complete installation.

Install the M.2 backplane

Use this procedure to install the M.2 backplane.

Before installing the M.2 backplane:

1. Read the safety information and installation guidelines (see “Safety” on page iii and “Installation Guidelines” on page 52).
2. Install an M.2 drive to every available connector on the M.2 backplane (see “Install an M.2 drive in the M.2 backplane” on page 81).
3. Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
4. Disconnect the USB 3.0 cable of operator panel tray assembly, and remove it vertically from the system board.

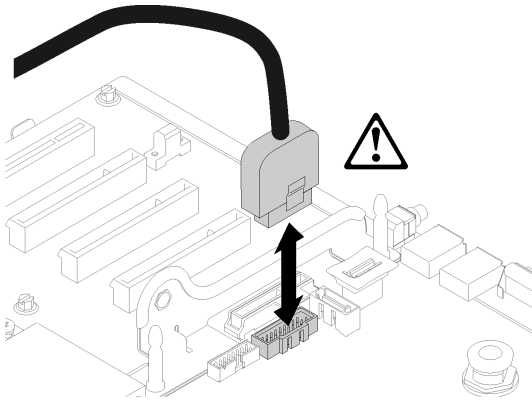


Figure 72. Removing USB 3.0 connector vertically

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

Note: Before installing the M.2 backplane, make sure an M.2 drive is installed to every available connector on the M.2 backplane.

Step 1. Align the openings located at the bottom of the blue plastic supports at each end of the M.2 backplane with the guide pin on the system board and T-head pins on the hard drive cage; then, insert the backplane in the system board connector. Press down on the M.2 backplane to fully seat it.

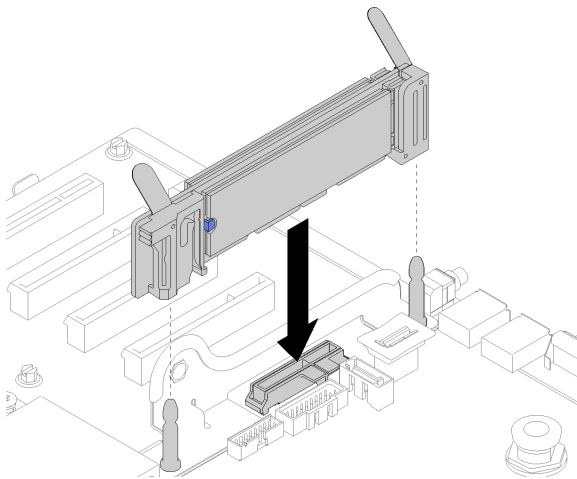


Figure 73. M.2 backplane installation

After installing the M.2 backplane, complete the following steps:

1. Reinstall the PCIe riser-card if necessary (see “Install the PCIe riser-card assembly” on page 76).
2. Reinstall the LOM adapter if necessary (see “Install the LOM adapter” on page 78).
3. Reinstall the top cover (see “Install the top cover” on page 84).
4. Reconnect the power cords and any cables that you removed.
5. Install the server in the rack.
6. Power on the server and any peripheral devices.

Install the top cover

Use this procedure to install the server top cover.

S014



CAUTION:

Hazardous voltage, current, and energy levels might be present. Only a qualified service technician is authorized to remove the covers where the following label is attached.

S033



CAUTION:

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

Before installing the top cover:

1. Read the safety information and installation guidelines (see “Safety” on page iii and “Installation Guidelines” on page 52).
2. **Watch the procedure.** A video of this procedure is available from the following links:
 - https://www.youtube.com/playlist?list=PLYV5R7hVcs-B2y7oAb54mfyuLrlusa_qE
 - http://list.youku.com/albumlist/show/id_50483449
3. Make sure all the removed components are installed, and all the disconnected cables are reconnected.

To install the top cover, complete the following steps:

- Step 1. Press and hold on the blue tab of cover release latch; then, rotate the tip of the latch up.
- Step 2. Place the top cover on top of the server with both sides aligned.
- Step 3. Push the latch down until it clicks in place.

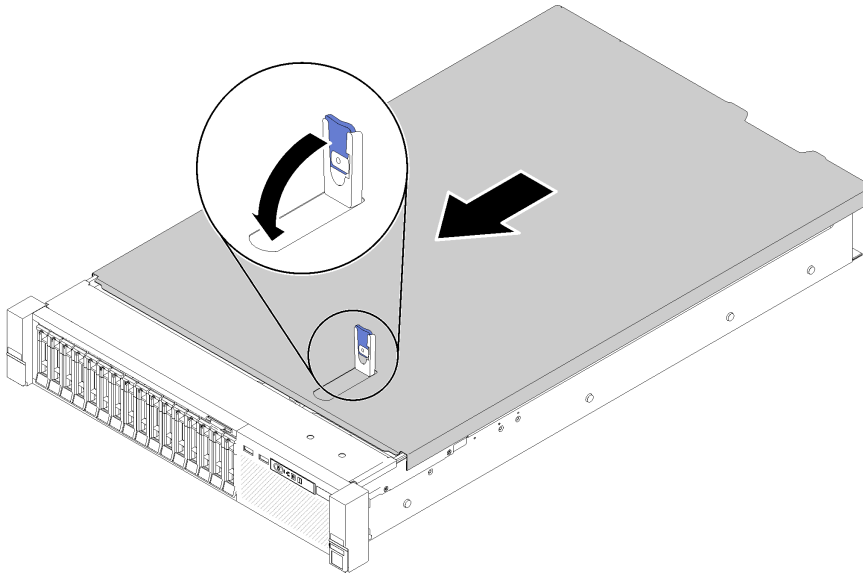


Figure 74. Top cover installation

After installing the top cover, complete the following steps:

1. Reconnect the power cords and any cables that you removed.
2. Install the server in the rack.
3. Power on the server and any peripheral devices.

Install the security bezel

Install the security bezel by pivoting the security bezel inward until the other side clicks into place, and then locking the security bezel.

Before installing the security bezel:

1. Read the safety information and installation guidelines (see “Safety” on page iii and “Installation Guidelines” on page 52).
2. **Watch the procedure.** A video of this procedure is available from the following links:
 - https://www.youtube.com/playlist?list=PLYV5R7hVcs-B2y7oAb54mfyuLrlusa_qE
 - http://list.youku.com/albumlist/show/id_50483449
3. If you have removed the rack handles, reinstall it (see *ThinkSystem SR850 Rack Installation Guide*).

To install the security bezel, complete the following steps:

Watch the procedure. A video of the installation process is available:

- Youtube: Installing the security bezel
- Youku: Installing the security bezel

- Step 1. Carefully insert the tabs on the security bezel into the slots on the right rack handle. Then, press and hold the release latch, and pivot the security bezel inward until the other side clicks into place.

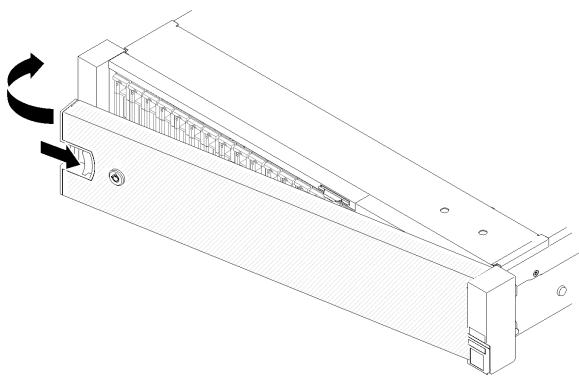


Figure 75. Security bezel installation

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

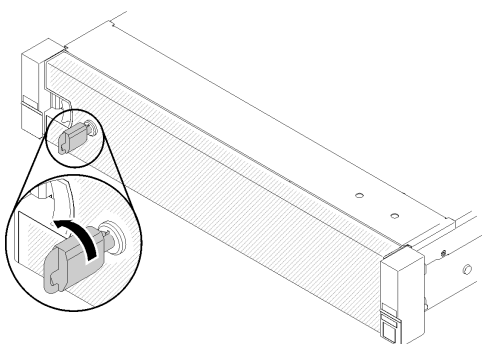


Figure 76. Locking the security bezel

After installing the security bezel, push or install the server into the rack if necessary. See ThinkSystem SR850 Rack Installation Guide that comes with the rail kit.

Install the server in a rack

To install the server in a rack, follow the instructions that are provided below.

- Rack servers
 - To install the server in a rack, follow the instructions that are provided in the Rail Installation Kit for the rails on which the server will be installed.
- Blade servers
 - To install the server in a chassis, follow the instructions that are provided in the documentation for the chassis in which you are installing the server.
 - For instructions related to the Flex System Enterprise chassis, see http://flexsystem.lenovofiles.com/help/topic/com.lenovo.acc.8721.doc/installing_components.html.
 - For instructions related to the Flex System Carrier-Grade chassis, see http://flexsystem.lenovofiles.com/help/topic/com.lenovo.acc.7385.doc/installing_components.html.

Cable the server

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

Connect to power

Connect the server to power.

Connect to the network

Connect the server to the network.

Connect to storage

Connect the server to any storage devices.

Power on the server

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

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

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

For information about powering off the server, see “Power off the server” on page 87.

Validate server setup

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

Power off the server

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

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

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

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

When in a standby state, the server can respond to remote power-on requests sent to the Lenovo XClarity Controller. For information about powering on the server, see “Power on the server” on page 87.

Chapter 4. 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 procedure for setting the network connection will depend on whether or not you have a video connection to the server.

- If a monitor is attached to the server, you can use Lenovo XClarity Controller to set the network connection.
- If no monitor attached to the server, you can set the network connection through the Lenovo XClarity Controller interface. Connect an Ethernet cable from your laptop to Lenovo XClarity Controller connector on the server.

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.

Important: The Lenovo XClarity Controller is set initially with a user name of USERID and password of PASSWORD (with a zero, not the letter O). This default user setting has Supervisor access. Change this user name and password during your initial configuration for enhanced security.

You can use the Lenovo XClarity Administrator Mobile app to connect to the Lenovo XClarity Controller interface and configure the network address. For additional information about the Mobile app, see the following site:

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

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

Step 1. Start the server.

Step 2. When you see <F1> Setup, press F1.

Step 3. 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.

Step 4. Click **OK** to continue starting the server.

Set front USB port for Lenovo XClarity Controller connection

Before you can access the Lenovo XClarity Controller through the front USB port, you need to configure the USB port for Lenovo XClarity Controller connection.

Your server has a front panel USB port that you can use as an Lenovo XClarity Controller management connection. See “Front view” on page 13 for the location of this connector.

You can switch the front panel USB port between normal and Lenovo XClarity Controller management operation by performing one of the following steps.

- Hold the blue ID button on the front panel for at least 3 seconds until its LED flashes slowly (once every couple of seconds). See “Front view” on page 13 for the location of the ID button.
- From the Lenovo XClarity Controller management controller CLI, run the `usbfp` command. For information about using the Lenovo XClarity Controller CLI, see http://managementsoftware.lenovofiles.com/help/topic/com.lenovo.thinksystem.xcc.doc/dw1lm_c_ch7_commandlineinterface.html.
- From the Lenovo XClarity Controller management controller web interface, click **BMC Configuration > Network > Front Panel USB Port Management**. For information about Lenovo XClarity Controller web interface functions, see http://managementsoftware.lenovofiles.com/help/topic/com.lenovo.thinksystem.xcc.doc/dw1lm_r_immactiondescriptions.html.

You can also check the current setting of the front panel USB port using the Lenovo XClarity Controller management controller CLI (`usbfp` command) or the Lenovo XClarity Controller management controller web interface (**BMC Configuration > Network > Front Panel USB Port Management**). See http://managementsoftware.lenovofiles.com/help/topic/com.lenovo.thinksystem.xcc.doc/dw1lm_c_ch7_commandlineinterface.html or http://managementsoftware.lenovofiles.com/help/topic/com.lenovo.thinksystem.xcc.doc/dw1lm_r_immactiondescriptions.html.

Update the firmware

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

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

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

Important terminology

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

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

Tool	In-band update	Out-of-band update	On-target update	Off-target update	Graphical user interface	Command-line interface	Supports UXSPs
Lenovo XClarity Provisioning Manager Limited to core system firmware only.	✓			✓	✓		✓
Lenovo XClarity Controller Supports core system firmware and most advanced I/O option firmware updates		✓		✓	✓	✓	
Lenovo XClarity Essentials OneCLI Supports all core system firmware, I/O firmware, and installed operating system driver updates	✓	✓				✓	✓
Lenovo XClarity Essentials UpdateXpress Supports all core system firmware, I/O firmware, and installed operating system driver updates	✓	✓			✓		✓
Lenovo XClarity Administrator Supports core system firmware and I/O firmware updates	✓	✓		✓	✓		

The latest firmware can be found at the following site:

<http://datacentersupport.lenovo.com/products/servers/thinksystem/sr850/7X18/downloads>

- **Lenovo XClarity Provisioning Manager**

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

Note: By default, the Lenovo XClarity Provisioning Manager Graphical User Interface is displayed when you press F1. If you have changed that default to be the text-based system setup, you can bring up the Graphical User Interface from the text-based system setup interface.

Additional information about using Lenovo XClarity Provisioning Manager to update firmware is available at:

http://sysmgt.lenovofiles.com/help/topic/LXPM/platform_update.html

- **Lenovo XClarity Controller**

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

Notes:

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

Additional information about configuring Ethernet over USB is available at:

http://sysmgt.lenovofiles.com/help/topic/com.lenovo.systems.management.xcc.doc/NN1ia_c_configuringUSB.html

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

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

http://sysmgt.lenovofiles.com/help/topic/com.lenovo.systems.management.xcc.doc/NN1ia_c_manageserverfirmware.html

- **Lenovo XClarity Essentials OneCLI**

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

Specific details about updating firmware using Lenovo XClarity Essentials OneCLI is available at:

http://sysmgt.lenovofiles.com/help/topic/toolsctr_cli_lenovo/onecli_c_update.html

- **Lenovo XClarity Essentials UpdateXpress**

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

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

<https://datacentersupport.lenovo.com/us/en/solutions/ht503692>

- **Lenovo XClarity Administrator**

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

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

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

Configure the firmware

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

- **Lenovo XClarity Provisioning Manager**

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

Note: The Lenovo XClarity Provisioning Manager provides a Graphical User Interface to configure a server. The text-based interface to system configuration (the Setup Utility) is also available. From Lenovo XClarity Provisioning Manager, you can choose to restart the server and access the text-based interface.

In addition, you can choose to make the text-based interface the default interface that is displayed when you press F1.

- **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:

http://sysmgt.lenovofiles.com/help/topic/toolsctr_cli_lenovo/onecli_c_settings_info_commands.html

- **Lenovo XClarity Administrator**

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

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

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

- **Lenovo XClarity Controller**

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

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

http://sysmgt.lenovofiles.com/help/topic/com.lenovo.systems.management.xcc.doc/NN1ia_c_manageserverfirmware.html

Memory configuration

Memory performance depends on several variables, such as memory mode, memory speed, memory ranks, memory population and processor.

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

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

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

http://lsec.lenovo.com/ss/#/memory_configuration

For specific information about the required installation order of memory modules in your server based on the system configuration and memory mode that you are implementing, see the *SR850 Memory Population Reference*.

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.com/lp0578-lenovo-raid-introduction>

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

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

Install the operating system

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

- **Lenovo XClarity Administrator**

If you are managing your server using Lenovo XClarity Administrator, you can use it to deploy operating-system images to up to 28 managed servers concurrently. For more information about using Lenovo XClarity Administrator to deploy operating system images, see:

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

- **Lenovo XClarity Provisioning Manager**

Lenovo XClarity Provisioning Manager is used to install operating system of single server. You can complete operating system installation by following the instructions in Lenovo XClarity Provisioning Manager OS Installation function.

- **Install the operating system manually**

If you cannot install the operating system through Lenovo XClarity Administrator or Lenovo XClarity Provisioning Manager, you can install the operating system manually. For more information about installing a specific operating system:

1. Go to <http://datacentersupport.lenovo.com> and navigate to the support page for your server.
2. Click **How-tos & Solutions**.
3. Select an operating system and the installation instructions will be displayed.

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:

http://sysmgt.lenovofiles.com/help/topic/com.lenovo.systems.management.xcc.doc/NN1ia_c_backupthexcc.html

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:

http://sysmgt.lenovofiles.com/help/topic/toolsctr_cli_lenovo/onecli_r_save_command.html

- **Operating system**

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

If you are managing the server from Lenovo XClarity Administrator, you can back up the server configuration from the Lenovo XClarity Administrator interface. For more information, see:

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

Chapter 5. Resolving installation issues

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

- “Server does not power on” on page 97
- “The server immediately displays the POST Event Viewer when it is turned on” on page 98
- “Embedded hypervisor is not in the boot list” on page 98
- “Server cannot recognize a drive” on page 98
- “Displayed system memory less than installed physical memory” on page 99
- “A Lenovo optional device that was just installed does not work.” on page 100
- “Voltage planar fault is displayed in the event log” on page 100

Server does not power on

Complete the following steps until the problem is resolved:

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

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

- b. Power supplies
6. Replace the following components, restarting the server each time:
 - a. Operator information panel connector
 - b. Power supplies
7. If you just installed an optional device, remove it, and restart the server. If the server now starts, you might have installed more devices than the power supply supports.
8. See “Power supply LEDs” in *ThinkSystem SR850 Maintenance Manual*.

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

Complete the following steps until the problem is solved.

1. Correct any errors that are indicated by the light path diagnostics LEDs.
2. Make sure that the server supports all the processors and that the processors match in speed and cache size.

You can view processor details from system setup.

To determine if the processor is supported for the server, see <http://www.lenovo.com/serverproven/>.
3. (Trained technician only) Make sure that processor 1 is seated correctly
4. (Trained technician only) Remove processor 2 and restart the server.
5. Replace the following components one at a time, in the order shown, restarting the server each time:
 - a. (Trained technician only) Processor
 - b. (Trained technician only) System board

Embedded hypervisor is not in the boot list

Complete the following steps until the problem is resolved:

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

Server cannot recognize a drive

Complete the following steps until the problem is solved.

1. Observe the associated yellow drive status LED. If the LED is lit, it indicates a drive fault.
2. If the LED is lit, remove the drive from the bay, wait 45 seconds, and reinsert the drive, making sure that the drive assembly connects to the drive backplane.
3. Observe the associated green drive activity LED and the yellow status LED:
 - If the green activity LED is flashing and the yellow status LED is not lit, the drive is recognized by the controller and is working correctly. Run the diagnostics tests for the hard disk drives. When you start a server and press F1, the Lenovo XClarity Provisioning Manager interface is displayed by default. You can perform hard drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → HDD test**.
 - If the green activity LED is flashing and the yellow status LED is flashing slowly, the drive is recognized by the controller and is rebuilding.
 - If neither LED is lit or flashing, check the drive backplane (go to step drive problems).

- If the green activity LED is flashing and the yellow status LED is lit, replace the drive. If the activity of the LEDs remains the same, go to step drive problems. If the activity of the LEDs changes, return to step 1.
4. Make sure that the drive backplane is correctly seated. When it is correctly seated, the drive assemblies correctly connect to the backplane without bowing or causing movement of the backplane.
 5. Reseat the backplane power cable and repeat steps 1 through 3.
 6. Reseat the backplane signal cable and repeat steps 1 through 3.
 7. Suspect the backplane signal cable or the backplane:
 - Replace the affected backplane signal cable.
 - Replace the affected backplane.
 8. Run the diagnostics tests for the SATA/SAS adapter and drives. When you start a server and press F1, the Lenovo XClarity Provisioning Manager interface is displayed by default. You can perform drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → HDD test**.

Based on those tests:

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

Displayed system memory less than installed physical memory

Complete the following steps until the problem is resolved:

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

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

5. Reverse the DIMMs between the channels (of the same processor), and then restart the server. If the problem is related to a DIMM, replace the failing DIMM.
6. Re-enable all DIMMs using the Setup utility, and then restart the server.
7. (Trained technician only) Install the failing DIMM into a DIMM connector for processor 2 (if installed) to verify that the problem is not the processor or the DIMM connector.
8. (Trained technician only) Replace the system board.

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

1. Check the XCC event log for any events associated with the device.
2. Make sure that the following conditions are met:
 - The device is installed in the correct port.
 - The device is designed for the server (see <http://www.lenovo.com/serverproven/>).
 - You followed the installation instructions that came with the device, and the device is installed correctly.
 - You have not loosened any other installed devices or cables.
 - You updated the configuration information in the Setup utility. Whenever memory or any other device is changed, you must update the configuration.
3. Reseat the device that you just installed.
4. Replace the device that you just installed.

Voltage planar fault is displayed in the event log

Complete the following steps until the problem is solved.

1. Revert the system to the minimum configuration. See “Specifications” on page 3 for the minimally required number of processors and DIMMs.
2. Restart the system.
 - If the system restarts, add each of the items that you removed one at a time, restarting the system each time, until the error occurs. Replace the item for which the error occurs.
 - If the system does not restart, suspect the system board.

Appendix A. Getting help and technical assistance

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

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

<http://datacentersupport.lenovo.com>

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

Before you call

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

Attempt to resolve the problem yourself

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

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

<http://thinksystem.lenovofiles.com/help/index.jsp>

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

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Check for updated software, firmware, and operating-system device drivers for your Lenovo product. The Lenovo Warranty terms and conditions state that you, the owner of the Lenovo product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.
- If you have installed new hardware or software in your environment, check <http://www.lenovo.com/serverproven/> to make sure that the hardware and software is supported by your product.
- Go to <http://datacentersupport.lenovo.com> and check for information to help you solve the problem.
 - Check the Lenovo forums at https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv_eg to see if someone else has encountered a similar problem.

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

messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

Gathering information needed to call Support

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

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

- Hardware and Software Maintenance agreement contract numbers, if applicable
- Machine type number (Lenovo 4-digit machine identifier)
- Model number
- Serial number
- Current system UEFI and firmware levels
- Other pertinent information such as error messages and logs

As an alternative to calling Lenovo Support, you can go to <https://www-947.ibm.com/support/servicerequest/Home.action> 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 http://sysmgt.lenovofiles.com/help/topic/com.lenovo.systems.management.xcc.doc/NN1ia_c_servicesandsupport.html.
- For more information about using the CLI to collect service data, see http://sysmgt.lenovofiles.com/help/topic/com.lenovo.systems.management.xcc.doc/nn1ia_r_ffdcommand.html.

- **Lenovo XClarity Administrator**

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

You can find more information about setting up automatic problem notification within the Lenovo XClarity Administrator at http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/admin_setupcallhome.html.

- **Lenovo XClarity Essentials OneCLI**

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

To obtain service data, you can run the **getinfor** command. For more information about running the **getinfor**, see http://sysmgt.lenovofiles.com/help/topic/toolstr_cli_lenovo/onecli_r_getinfor_command.html.

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/us/en/serviceprovider> and use filter searching for different countries. For Lenovo support telephone numbers, see <https://datacentersupport.lenovo.com/us/en/supportphonelist>. In the U.S. and Canada, call 1-800-426-7378.

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

China product support

To contact product support in China, go to:
<http://support.lenovo.com.cn/lenovo/wsi/es/ThinkSystem.html>

You can also call 400-106-8888 for product support. The call support is available Monday through Friday, from 9 a.m. to 6 p.m.

Taiwan product support

To contact product support for Taiwan, call 0800-016-888. The call support is available 24 hours a day, 7 days a week.

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